

HOW TO USE THIS MANUAL

0103I-11

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual is made in accordance with SAE J2008.
- (b) Generally, repair operations can be separated in the following 3 main processes:
 1. Diagnosis
 2. Removing/Installing, Replacing, Disassembling/Reassembling, Checking and Adjusting
 3. Final Inspection
- (c) This manual explains the 1st process of "Diagnosis" (found in the "Diagnostics" section), the 2nd process of "Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting", but the 3rd process of "Final Inspection" is omitted.
- (d) The following essential operations are not written in this manual. However, these operations must be performed in actual situations.
 - (1) Operations with a jack or lift
 - (2) Cleaning of a removed part when necessary
 - (3) Visual check

2. INDEX

- (a) An alphabetical INDEX section is provided at the end of the book to guide you to the item to be repaired.

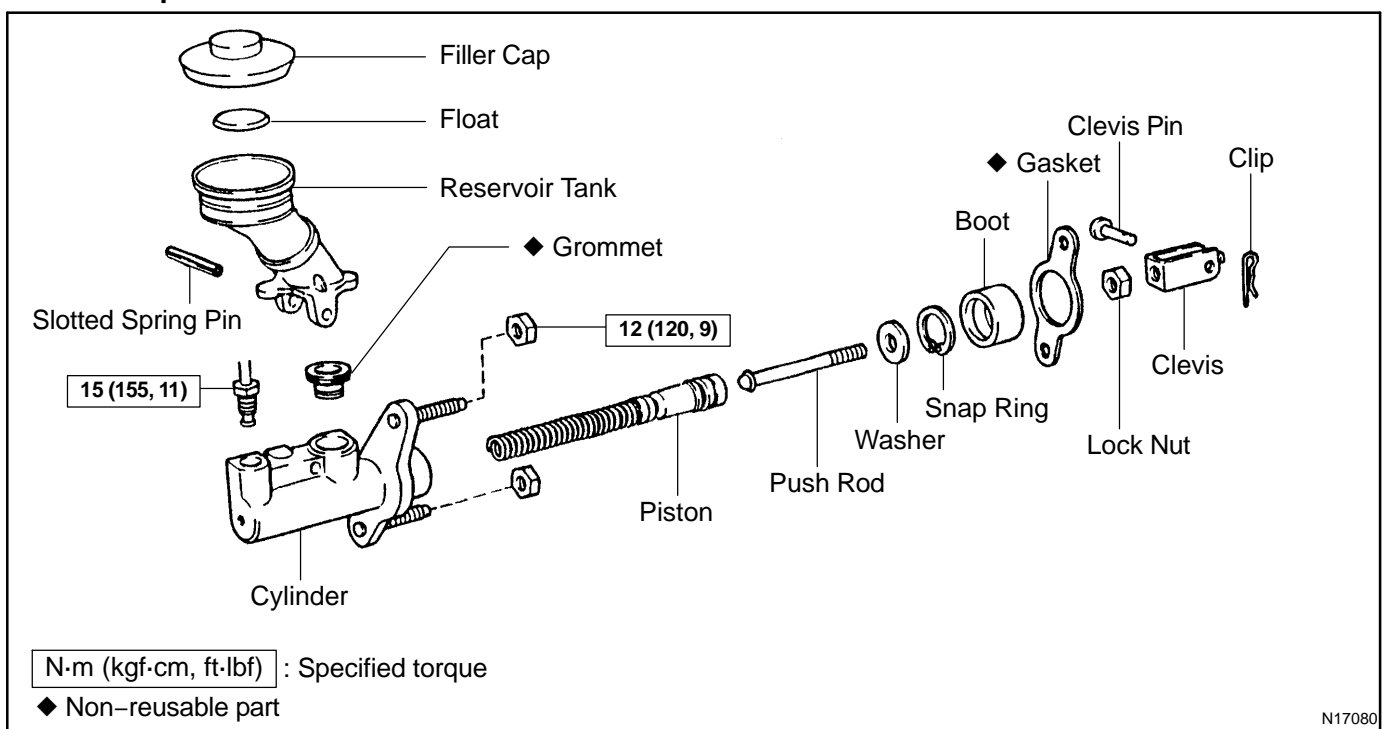
3. PREPARATION

- (a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repair situation. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section of this manual.

4. REPAIR PROCEDURES

- (a) Component drawing is placed under the title where necessary.
- (b) Non-reusable parts, grease application area, precoated parts and tightening torque are specified in the components drawing.

Example:

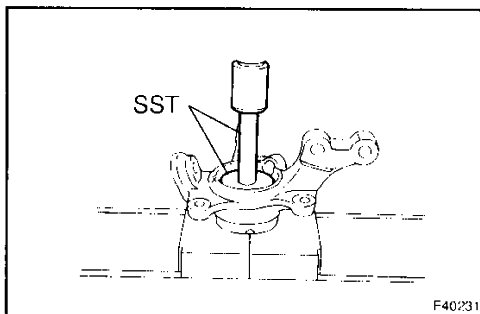


- (c) Tightening torque, grease application area, and non-reusable parts are described as important points in the procedures.

NOTICE:

There are cases where such information can only be indicated by an illustration. In those cases, all the information such as torque, oil, etc. are described in the illustration.

- (d) Installing procedures are performed in the reverse order of the removal, and only the important points are described.
- (e) Only items with points are described in the procedure, and the operational portion and content are placed using an illustration. In the explanations, details of the operational method, standard value and notice are placed.
- (f) There may be a case where the illustrations of similar models are used. In that case, specific details may be different from the actual vehicle.
- (g) The procedures are presented in a step-by-step format:
- (1) The illustration shows what to do and where to do it.
 - (2) The task heading tells what to do.
 - (3) The explanation text tells how to perform the task and gives other information such as specifications and warnings.

Example:*Illustration:**what to do and where*

- Task heading: what to do*
- 14. INSTALL FRONT AXLE HUB LH BEARING**
- (a) Using SST and a press, install a new bearing to the steering knuckle. *Explanation text: how to perform task*
- SST **09950-60020 (09951-00720), 09950-70010 (09951-07100)**
- Set part No.* *Component part No.*

D26745

HINT:

This format provides an experienced technician with a FAST TRACK to the necessary information. The task heading can be read at a glance when necessary, and the text below provides detailed information. Important specifications and warnings always stand out in bold type.

5. SERVICE SPECIFICATIONS

- (a) Specifications are presented in bold type throughout the manual. You never have to leave the procedure to look up your specifications. The specifications are also found in the Service Specifications section for a quick reference.

6. TERMS DEFINITION

CAUTION	Indicates the possibility of injury to you or other people.
NOTICE	Indicates the possibility of damage to the components being repaired.
HINT	Provides additional information to help you to perform the repair efficiently.

7. SI UNIT

- (a) The units given in this manual are primarily expressed according to the SI UNIT (International System of Units), and alternately expressed in the metric system and in the English System.

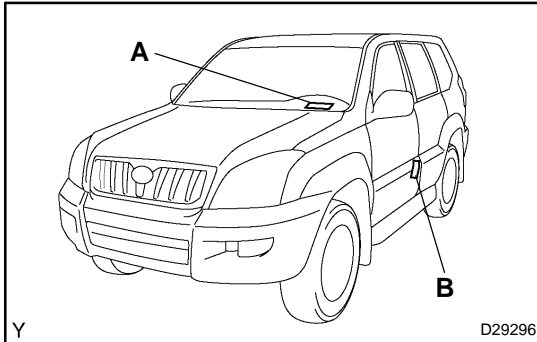
Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION AND SERIAL NUMBERS

010JJ-03

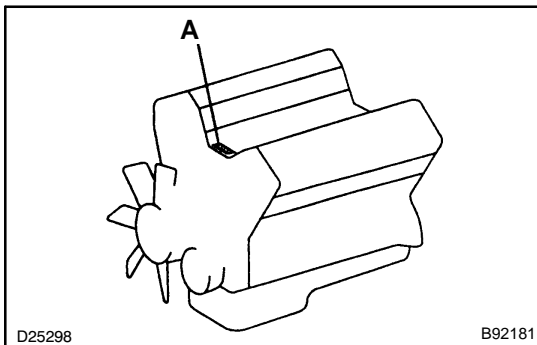


1. VEHICLE IDENTIFICATION NUMBER

- (a) The vehicle identification number is stamped on the vehicle identification number plate and the certification label, as shown in the illustration.

A: Vehicle Identification Number Plate

B: Certification Label

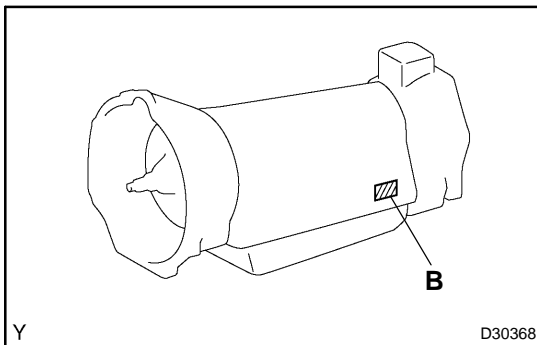


2. ENGINE SERIAL NUMBER AND TRANSMISSION SERIAL NUMBER

- (a) The engine serial number is stamped on the cylinder block of the engine, and the transmission serial number is stamped on the housing, as shown in the illustration.

A: Engine Serial Number

B: Transmission Serial Number



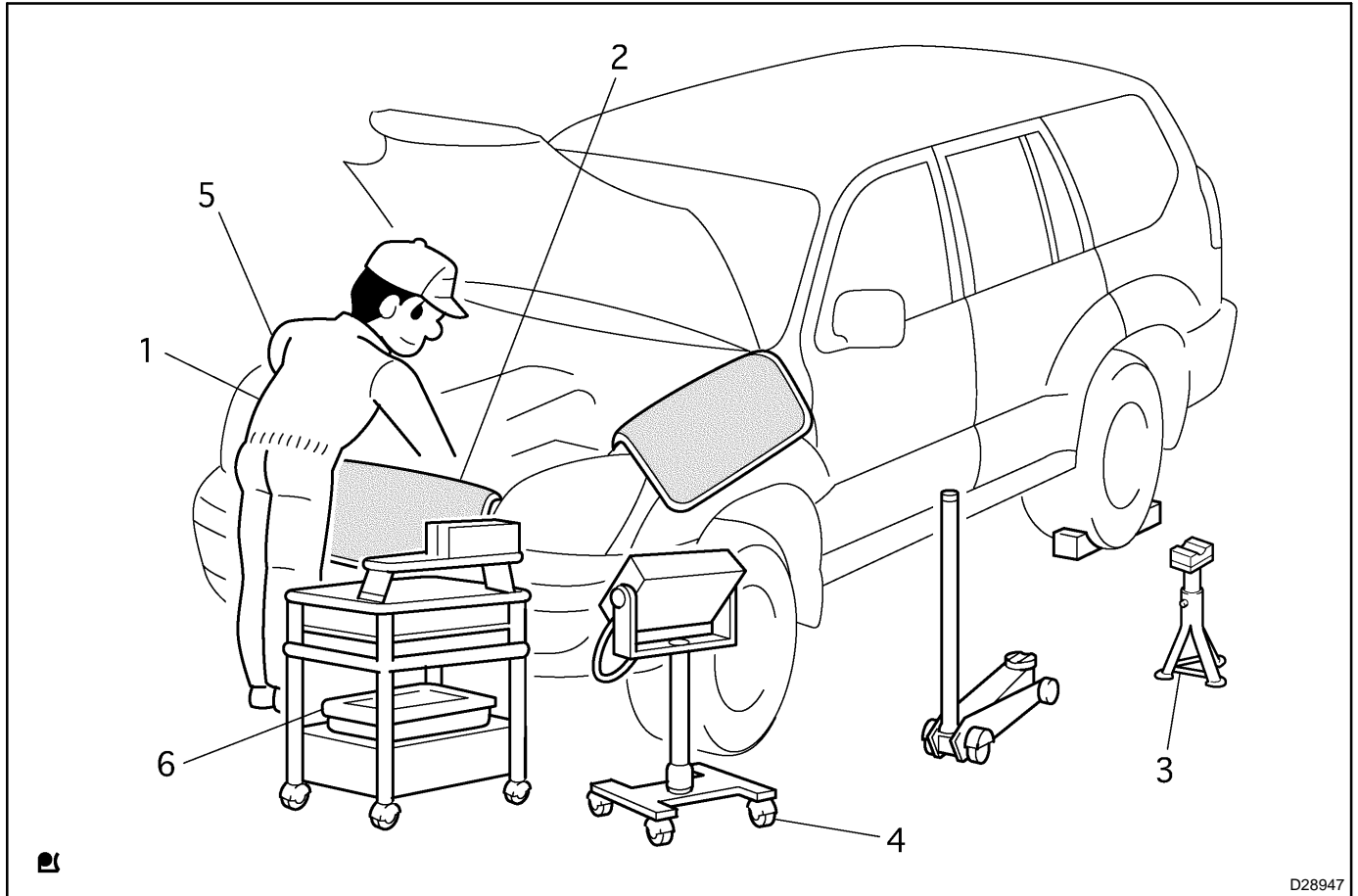
REPAIR INSTRUCTION

010JH-03

PRECAUTION

1. BASIC REPAIR HINT

(a) HINTS ON OPERATIONS

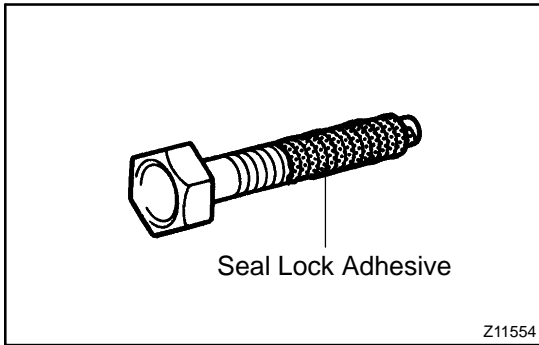


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1	Looks	<ul style="list-style-type: none"> • Always wear a clean uniform. • Hat and safety shoes must be worn.
2	Vehicle protection	<ul style="list-style-type: none"> • Set a grill cover, fender cover, seat cover and floor mat before starting operation.
3	Safe operation	<ul style="list-style-type: none"> • When working with 2 or more persons, be sure to check the safety of one another. • When working with the engine running, pay attention to the ventilation in the workshop. • When working on high-temperature, rotating, moving and vibrating parts, be careful not to burn or injure yourself. • When jacking up the vehicle, be sure to support the specified location with a safety stand. • When lifting up the vehicle, use safety equipment.
4	Preparation of tools and measuring gauge	<ul style="list-style-type: none"> • Before starting repairs, prepare the tool stand, SST, gauge, oil, shop rag and parts for replacement.
5	Removal and installation, disassembly and assembly operations	<ul style="list-style-type: none"> • Diagnose with a thorough understanding of the trouble condition and perform effective operation. • Before removing the parts, check the general condition of the assembly, and for deformation and damage. • When the structure is complicated, take a note or make matchmarks as not to make mistakes that affect the function of the parts. • Clean and wash the removed parts if necessary, and assemble them after a thorough check.
6	Removed parts	<ul style="list-style-type: none"> • Place the removed parts in the correct order to avoid mixing them up or making them dirty. • As for non-reusable parts such as gaskets, O-rings, and self-locking nuts, replace them with new ones following the instructions in this manual. • Organize the parts that were replaced in a box and show them to the customer.

(b) JACKING UP AND SUPPORTING VEHICLE

- (1) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page 01-23).



(c) PRECOATED PARTS

- (1) Precoated parts such as bolts, nuts, etc., are coated with a seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
- (3) When reusing precoated parts, clean off the old adhesive and dry the part with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

NOTICE:

Check the torque with the lower limit value of the torque tolerance.

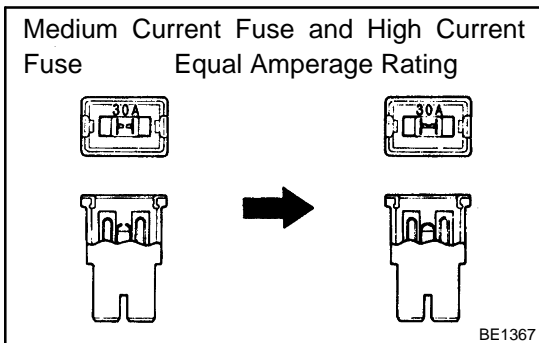
- (4) Depending on the seal lock agent to be applied, there may be cases where it is necessary to leave it for a specified time until it hardens.

(d) GASKETS

- (1) When necessary, use a sealer on gaskets to prevent leaks.

(e) BOLTS, NUTS AND SCREWS

- (1) Carefully observe all the specifications for tightening torques. Always use a torque wrench.



(f) FUSES

- (1) When replacing fuses, be sure that a new fuse has the correct amperage rating. DO NOT exceed the rating, or use one with a lower rating.

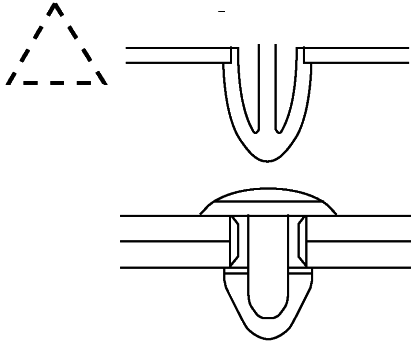
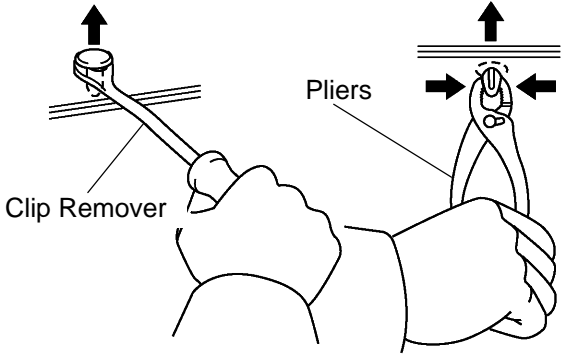
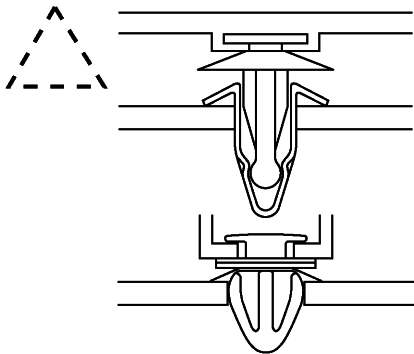
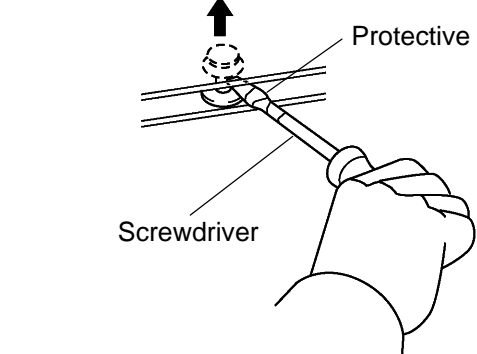
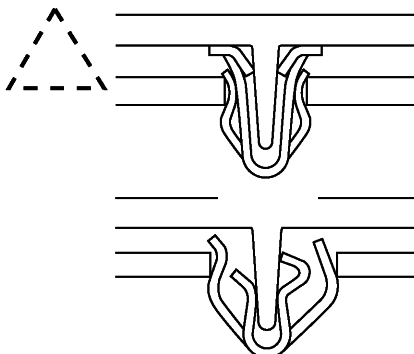
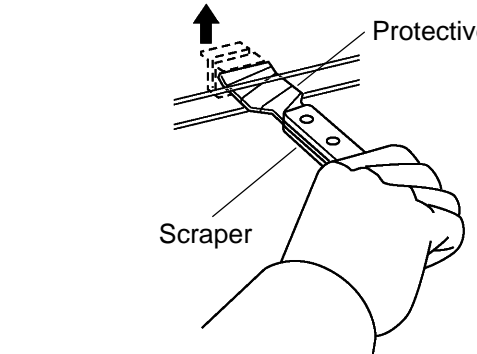
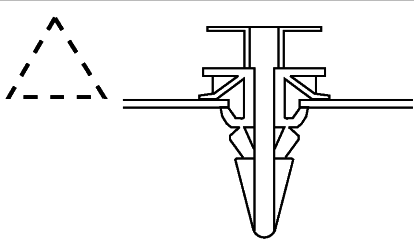
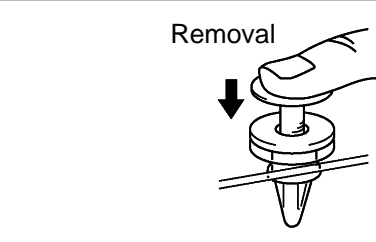
Illustration	Symbol	Part Name	Abbreviation
<p style="text-align: right;">BE5594</p>	<p style="text-align: right;">IN0365</p>	FUSE	FUSE
<p style="text-align: right;">BE5595</p>	<p style="text-align: right;">IN0366</p>	MEDIUM CURRENT FUSE	M-FUSE
<p style="text-align: right;">D27353</p>	<p style="text-align: right;">IN0367</p>	HIGH CURRENT FUSE	H-FUSE

(g) CLIPS

(1) The removal and installation methods of typical clips used in body parts are shown in the table below.

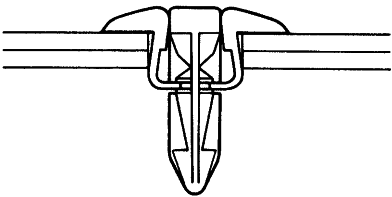
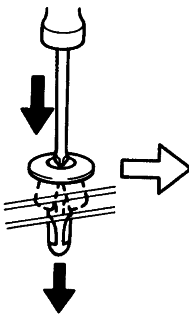
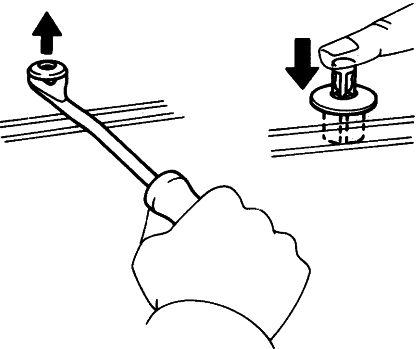
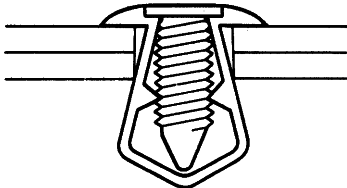
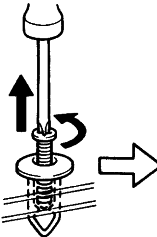
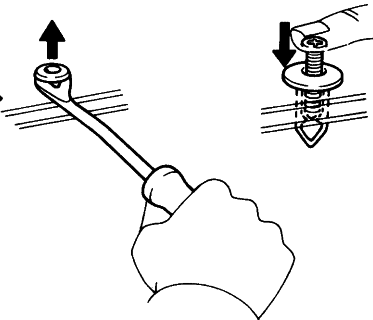
HINT:

If the clip is damaged during a procedure, always replace it with a new clip.

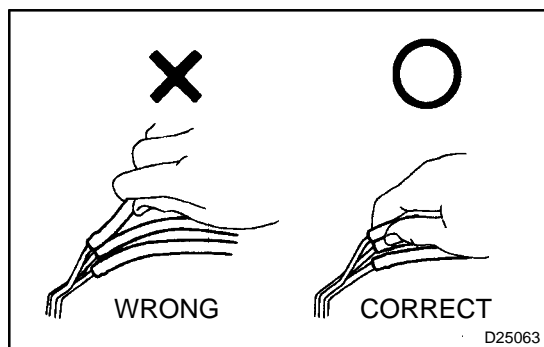
Shape (Example)	Removal/Installation
	 <p>Clip Remover</p> <p>Pliers</p>
	 <p>Protective Tape</p> <p>Screwdriver</p>
	 <p>Protective Tape</p> <p>Scraper</p>
	 <p>Removal</p>

Y

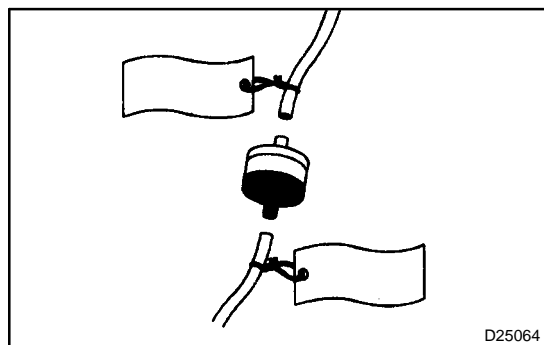
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Shape (Example)	Removal/Installation	
	<p>Removal</p> 	<p>Installation</p> 
	<p>Removal</p> 	<p>Installation</p> 

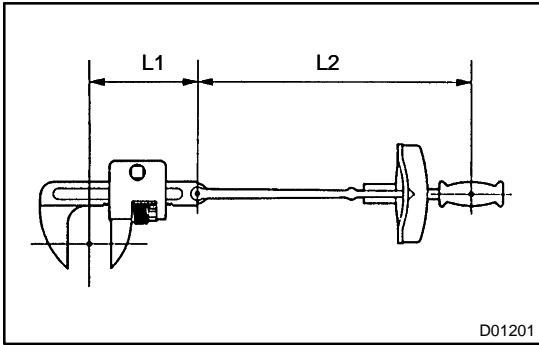
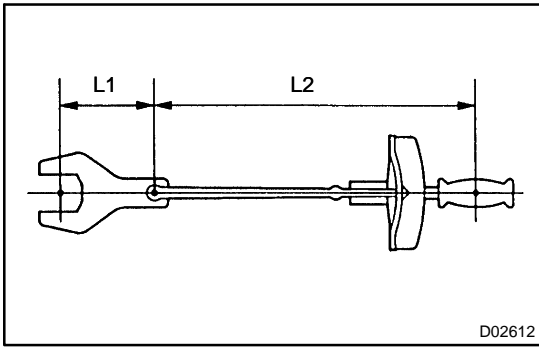
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- (h) REMOVAL AND INSTALLATION OF VACUUM HOSES
- (1) To disconnect vacuum hoses, pull them by holding the end, not the middle of the hose.



- (2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.
- (3) After completing the job, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.
- (4) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter for adjustment. Once the hose has been stretched, it may leak air.



(i) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL

- (1) When the torque wrench is combined with SST or an extension tool to extend the length, and you tighten until the torque wrench reads the specified torque value, the actual torque becomes excessive.
- (2) In this manual, only the specified torque is described. In case of using SST or extension tool, calculate the reading of the torque wrench by the following formula.

(3) Formula $T' = T \times L2 / (L1 + L2)$

T'	Reading of torque wrench {N·m (kgf·cm, ft·lbf)}
T	Torque {N·m (kgf·cm, ft·lbf)}
L1	Length of SST or extension tool (cm)
L2	Length of torque wrench (cm)

2. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

HINT:

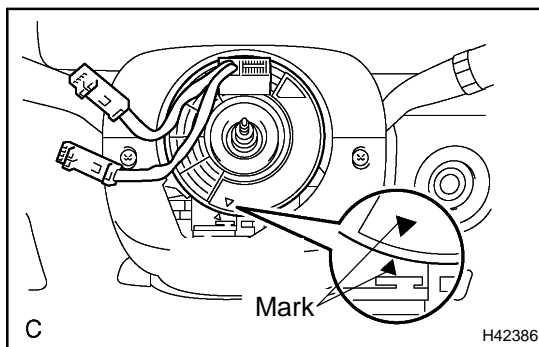
The LEXUS GX470 is equipped with an SRS (Supplemental Restraint System), which includes the driver airbag, front passenger airbag, side airbag, curtain shield airbag and seat belt pretensioner. Failure to carry out the service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy while servicing. This can cause a serious accident.

Furthermore, if a mistake is made when servicing the supplemental restraint system, it is possible that the SRS will fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully. Then follow the correct procedures described in this manual.

(a) GENERAL NOTICE

- (1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always check the diagnostic trouble codes before disconnecting the battery (See page 05-1222).
- (2) Work must be started after 90 seconds from the time that the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery. (The supplemental restraint system is equipped with a back-up power source. So, if work is started within 90 seconds after disconnecting the negative (-) terminal cable from the battery, the SRS may deploy).
When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems is cancelled. So, before starting work, make a record of the contents recorded in each memory system. Then, when work is finished, reset the clock and audio systems as before.

- (3) Even in the case of a minor collision where the SRS does not deploy, the horn button assembly, instrument panel passenger airbag assembly, front seat airbag assembly, curtain shield airbag assembly and seat belt pretensioner should be inspected (See pages [60-21](#), [60-33](#), [60-42](#), [60-48](#) and [61-15](#)).
- (4) Never use the SRS related parts from another vehicle. When replacing the parts, replace them with new parts.
- (5) Before repairs, remove the airbag sensor if it may be shocked during repairs.
- (6) Never disassemble and repair the center airbag sensor assembly, side airbag sensor assembly, horn button assembly, instrument panel passenger airbag assembly, front seat airbag assembly, curtain shield airbag assembly or seat belt pretensioner.
- (7) If the center airbag sensor assembly, the side airbag sensor assembly, the horn button assembly, the instrument panel passenger airbag assembly, the front seat airbag assembly or the curtain shield airbag assembly have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- (8) Do not directly expose the airbag sensor assembly, the side airbag sensor assembly, the horn button assembly, the instrument panel passenger airbag assembly, the front seat airbag assembly, the curtain shield airbag assembly or the seat belt pretensioner to hot air or flames.
- (9) Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting an electrical circuit.
- (10) Information labels are attached to the SRS components. Follow the instructions on the notices.
- (11) After work on the supplemental restraint system is completed, check the SRS warning light (See page [05-1222](#)).



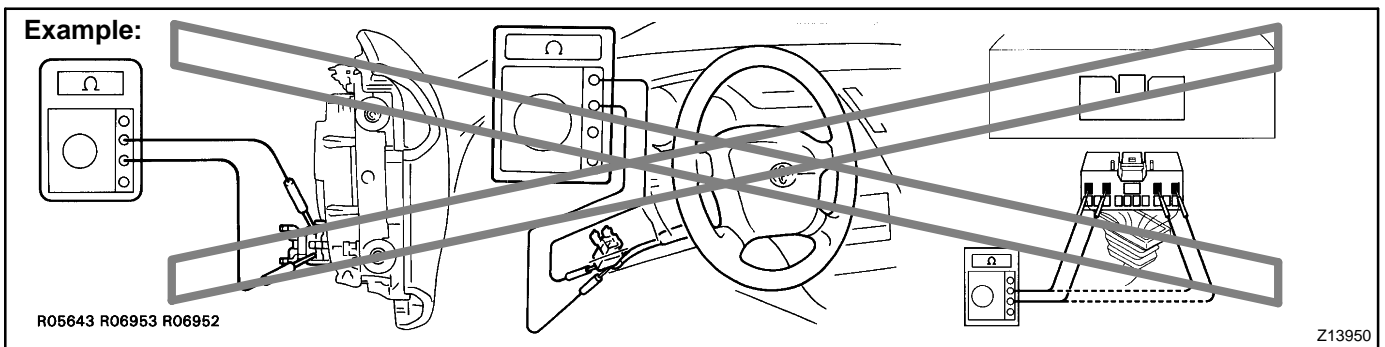
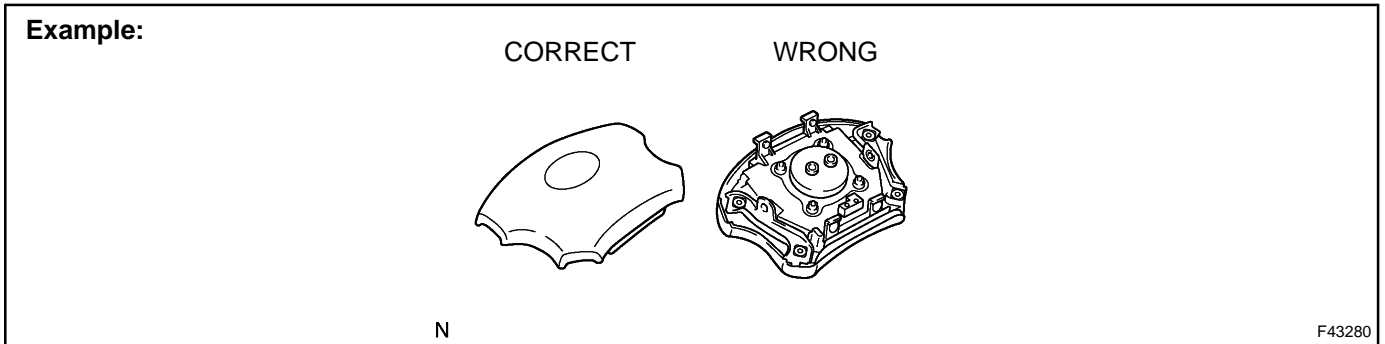
(b) SPIRAL CABLE (in Combination Switch)

- (1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may occur. Refer to page [60-28](#) of this manual concerning the correct installation of the steering wheel.

(c) HORN BUTTON ASSEMBLY (with Airbag)

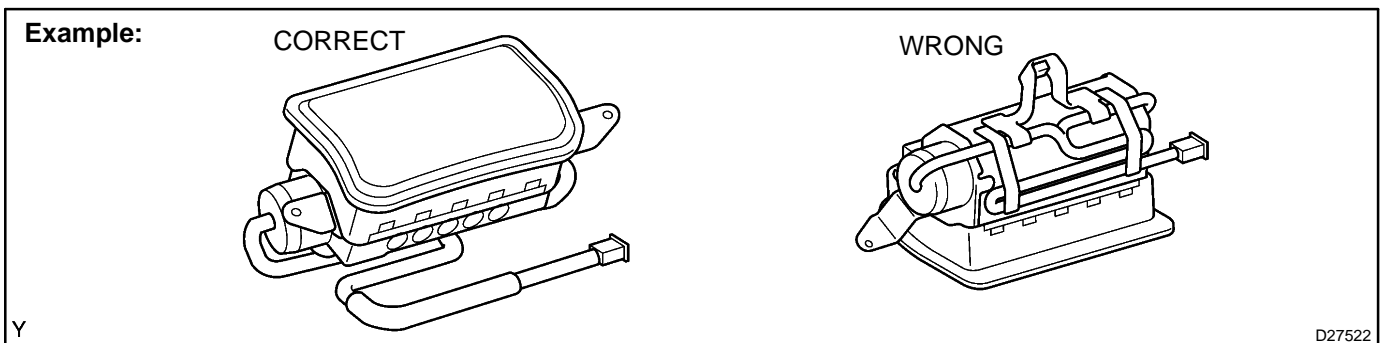
- (1) When removing the horn button assembly or handling a new horn button, it should be placed with the top of the pad surface facing upward. Placing it with the pad surface facing downward may lead to a serious accident if the airbag deploys for some reasons. Also, do not place anything on top of the horn button.
- (2) Never measure the resistance of the airbag squib (This may cause the airbag to inflate, which is very dangerous).
- (3) Grease should not be applied to the horn button assembly, and the pad should not be cleaned with detergents of any kinds.
- (4) Store the horn button assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, disconnect the airbag connector (2 yellow pins) under the steering column near the combination switch connector before starting work.

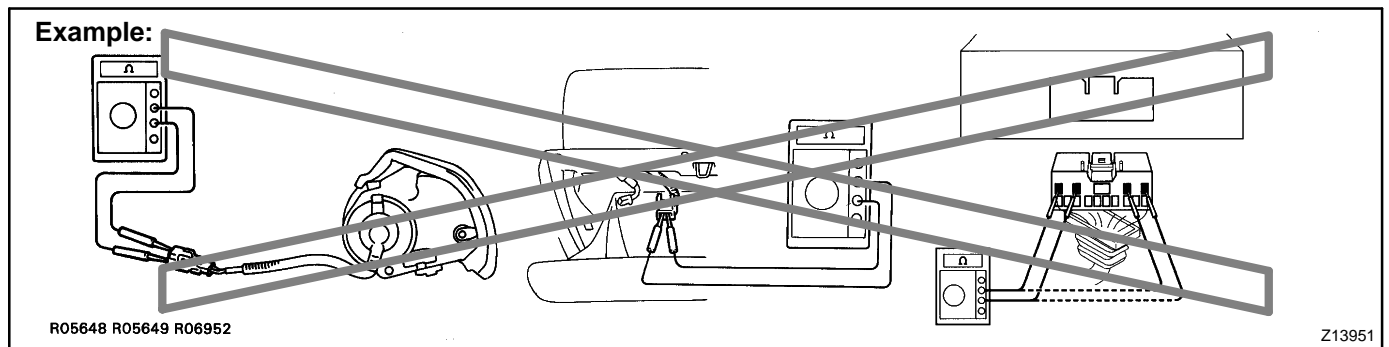
- (6) When disposing of the vehicle or the horn button assembly unit, the airbag should be deployed using SST before disposal (See page 60-21). Activate in a safe place away from electrical noise.



(d) INSTRUMENT PANEL PASSENGER AIRBAG ASSEMBLY

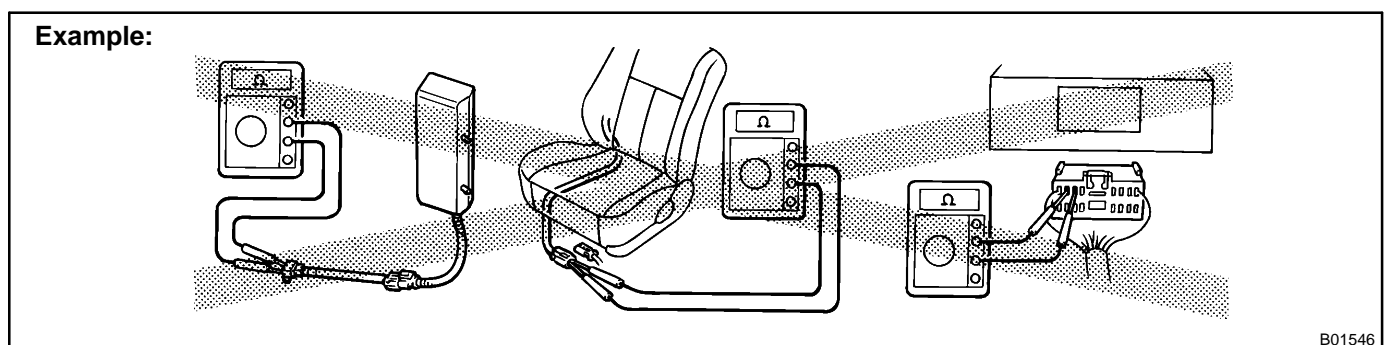
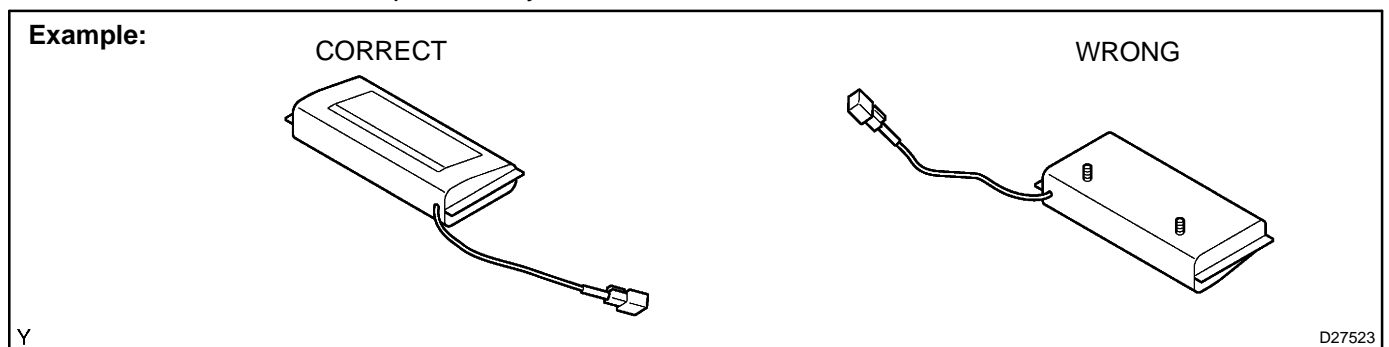
- (1) Always place a removed or new instrument panel passenger airbag assembly with the airbag inflation direction facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag deploys.
- (2) Never measure the resistance of the airbag squib (This may cause the airbag to inflate, which is very dangerous).
- (3) Grease should not be applied to the instrument panel passenger airbag assembly, and the airbag door should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, disconnect the airbag connector (4 yellow pins) installed on the assembly before starting work.
- (6) When disposing of a vehicle or the airbag assembly unit, the airbag should be deployed using SST before disposal (See page 60-33). Activate in a safe place away from electrical noise.





(e) FRONT SEAT AIRBAG ASSEMBLY

- (1) Always place a removed or new front seat airbag assembly with the airbag inflation direction facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag deploys.
- (2) Never measure the resistance of the airbag squib (This may cause the airbag to inflate, which is very dangerous).
- (3) Grease should not be applied to the front seat airbag assembly, and the airbag door should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, disconnect the airbag connector (2 yellow pins) installed on the assembly before starting work.
- (6) When disposing of a vehicle or the airbag assembly unit, the airbag should be deployed using SST before disposal (See page 60-48). Activate in a safe place away from electrical noise.



(f) CURTAIN SHIELD AIRBAG ASSEMBLY

- (1) Always place the removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

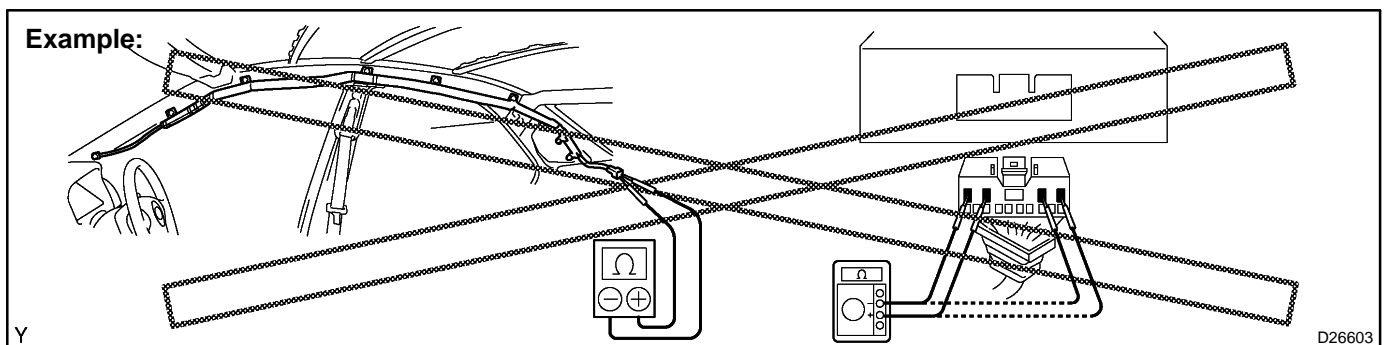
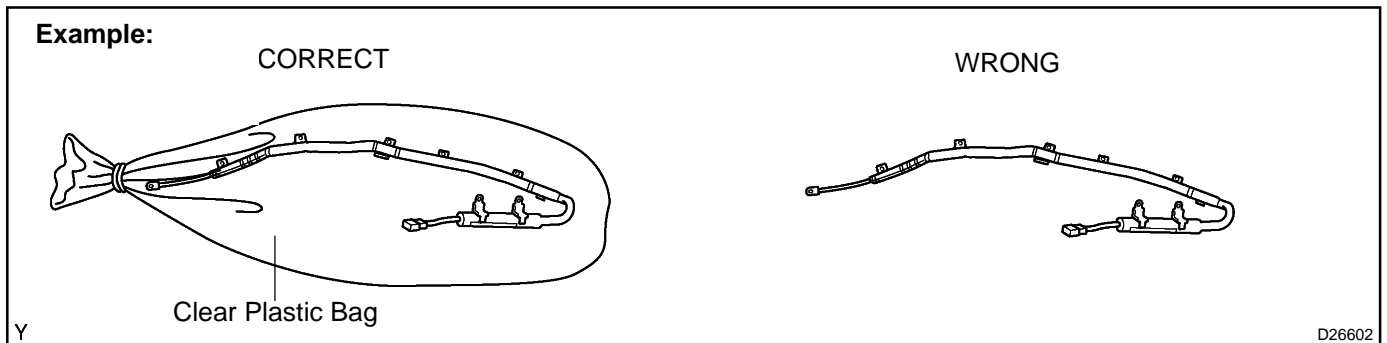
NOTICE:

Protective bag is not re-useable.

CAUTION:

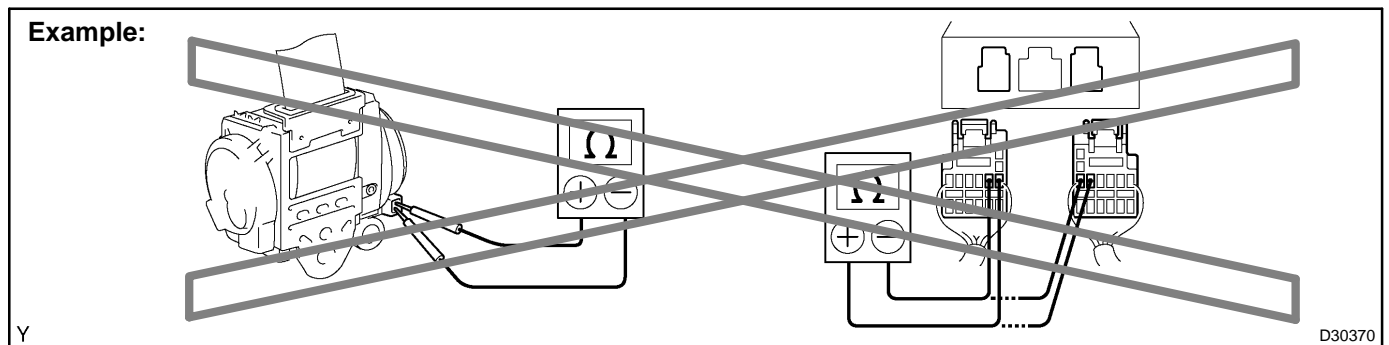
Never disassemble the curtain shield airbag assembly.

- (2) Never measure the resistance of the airbag squib (This may cause the airbag to inflate, which is very dangerous).
- (3) Grease should not be attached to the curtain shield airbag assembly, and the surface should not be cleared with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, disconnect the airbag connector (2 yellow pins) from the instrument panel before starting work.
- (6) When disposing of a vehicle or the curtain shield airbag assembly unit, the airbag should be deployed using SST before disposal (See page 60-42). Activate in a safe place away from electrical noise.



(g) SEAT BELT PRETENSIONER

- (1) Never measure the resistance of the seat belt pretensioner (This may cause the seat belt pretensioner to activate, which is very dangerous).
- (2) Never disassemble the seat belt pretensioner.
- (3) Never install the seat belt pretensioner on another vehicle.
- (4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) without high humidity and away from electrical noise.
- (5) When using electric welding, disconnect the connector (2 yellow pins) before starting work.
- (6) When disposing of a vehicle or the seat belt pretensioner unit, the seat belt pretensioner should be activated before disposal (See page 61-15). Perform operation in a safe place away from electrical noise.
- (7) The seat belt pretensioner is hot after activated, so let it cool down sufficiently before disposal. Never apply water to cool down the seat belt pretensioner.
- (8) Oil or water should not be put on the front seat outer belt, and the front seat outer belt should not be cleaned with detergents of any kind.

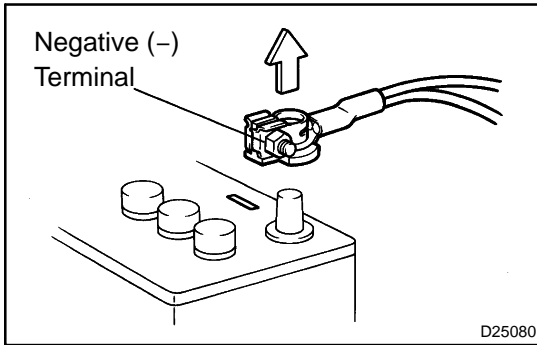


(h) AIRBAG SENSOR ASSEMBLY

- (1) Never reuse an airbag sensor assembly involved in a collision where the SRS has deployed.
- (2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause the supplemental restraint system to deploy potentially resulting in injury.
- (3) Work must be started after 90 seconds from the time that the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

(i) WIRE HARNESS AND CONNECTOR

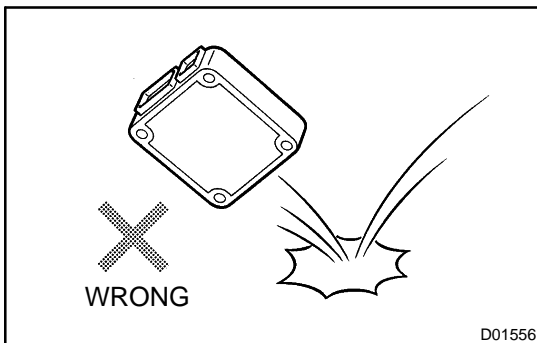
- (1) The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it.



3. ELECTRONIC CONTROL

(a) REMOVAL AND INSTALLATION OF BATTERY TERMINAL

- (1) Before performing electronic work, disconnect the battery negative (-) terminal cable beforehand in order to prevent it from shorting and burning out.
- (2) When disconnecting and installing the terminal cable, turn the ignition switch and lighting switch OFF, and loosen the terminal nut completely. Perform these operations without twisting or prying the terminal.
- (3) When the battery terminal cable is removed, the memories of the clock, radio, DTCs, etc. are erased. So before removing it, check them and make a note of their settings.
- (4) When the battery terminal is disconnected, the sliding roof position memory is erased. Make sure to reset the sliding roof to the zero point (See page 74-6).



(b) HANDLING OF ELECTRONIC PARTS

- (1) Do not open the cover or case of the ECU unless absolutely necessary (If the IC terminals are touched, the IC may be rendered inoperative by static electricity).
- (2) To disconnect electronic connectors, pull the connector itself, not the wires.
- (3) Be careful not to drop electronic components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not be reused.
- (4) When cleaning the engine with steam, protect the electronic components, air filter and emission-related components from water.
- (5) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (6) When checking the continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.

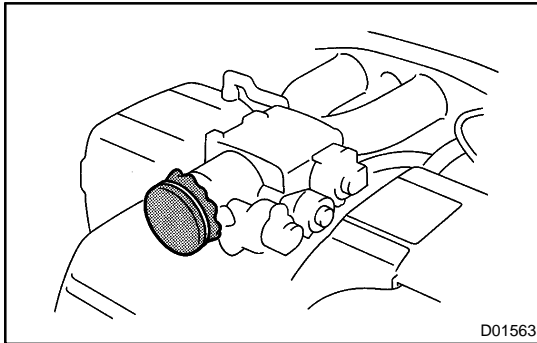
4. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

(a) PLACE FOR REMOVING AND INSTALLING OF FUEL SYSTEM PARTS

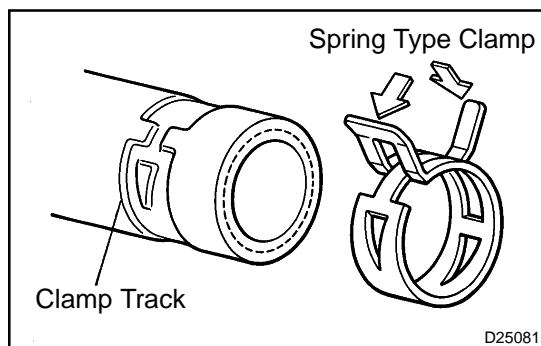
- (1) Work in a place with good air ventilation and without anything that could cause combustion such as a welder, grinder, drill, electric motor or stove in the surroundings.
- (2) Never work in a place such as a pit or nearby a pit, as there is a possibility that vaporized fuel will collect in those places.

(b) REMOVING AND INSTALLING OF FUEL SYSTEM PARTS

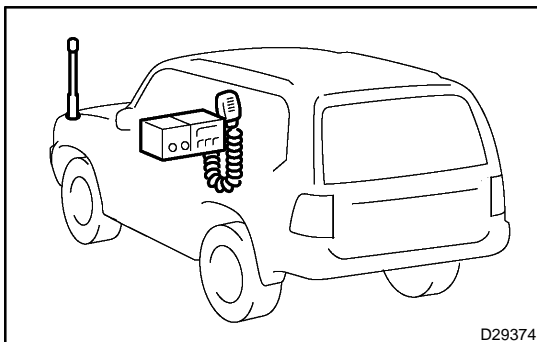
- (1) Prepare a fire extinguisher before starting operations.
- (2) To prevent static electricity, install a ground on the fuel changer, vehicle and fuel tank, and do not spray much water so as to prevent slipping.
- (3) Never use any electric equipment like an electric motor or a working light, as they may create sparks or a high temperature.
- (4) Never use an iron hammer, as it may cause sparks.
- (5) Dispose separately of shop rags containing fuel deposits.

**5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS**

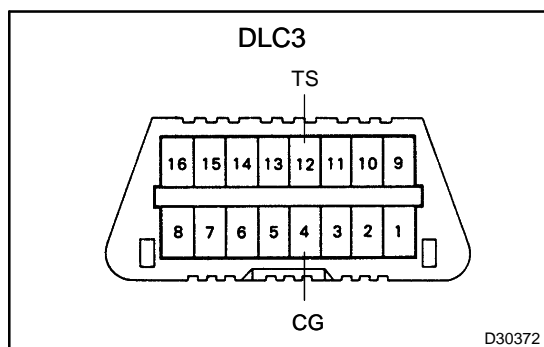
- (a) If any metal particle enters the inlet pass, it may have a bad effect on the engine and turbocharger.
- (b) When removing and installing the inlet system parts, close the opening of the removed inlet system parts and the engine with a clean shop rag or gummed tape.
- (c) When installing the inlet system parts, check that no metal particles have entered.

**6. HANDLING OF HOSE CLAMPS**

- (a) Before removing the hose, check the clamp position to ensure that it can be restored securely.
- (b) Replace a deformed or dented clamp with a new one.
- (c) When reusing the hose, install the clamp on the hose where it has a clamp track.
- (d) For a spring type clamp, make an adjustment after installation by pushing in the direction of the arrow mark.

**7. FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEM**

- (a) Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.
- (b) Install an antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle electronic systems. For details of the ECU and sensors locations, refer to the section on the applicable component.
- (c) Prevent the antenna feeder from getting entangled with the other wiring, and keep the antenna feeder separate from other wiring as much as possible.
- (d) Check that the antenna and feeder are correctly adjusted.
- (e) Do not install any high-powered mobile communication system.



8. FOR VEHICLES EQUIPPED WITH VEHICLE STABILITY CONTROL (VSC) SYSTEM

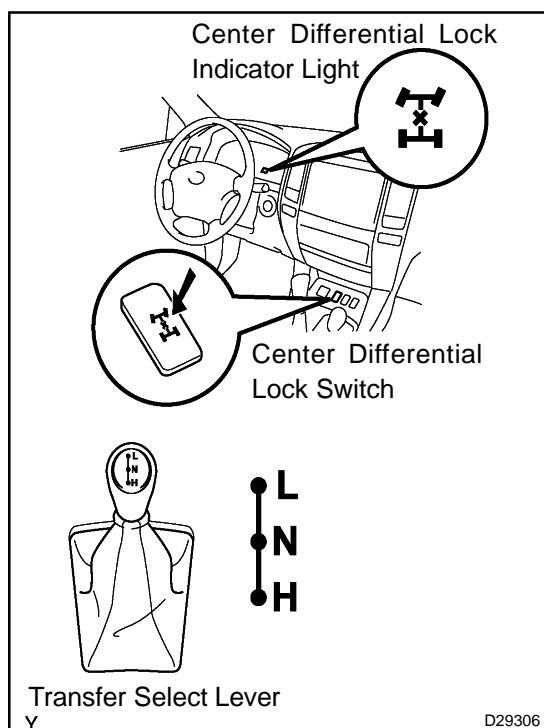
(a) NOTE WHEN USING DRUM TESTER

- (1) When using a drum tester, be sure to start the engine with the ignition switch OFF, and connect SST to the terminals TS and CG of the DLC3 before the measurement in order to cancel the VSC operation.

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NOTICE:

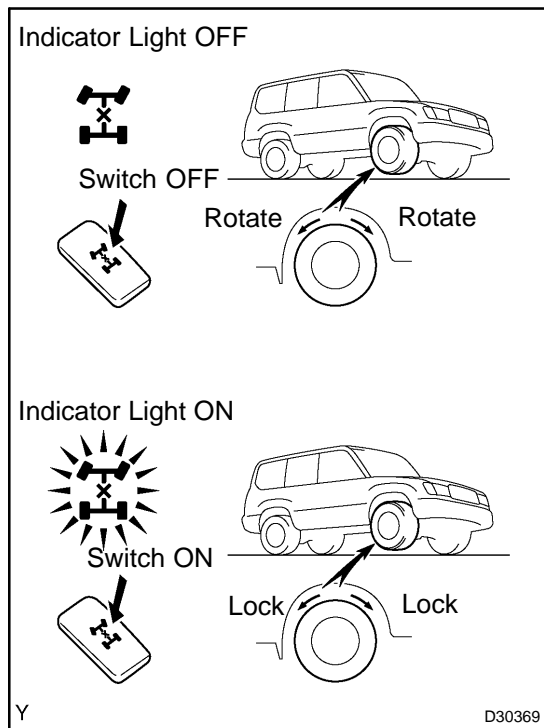
- Confirm that the VSC/TRAC warning light blinks.
 - The VSC system is reset when the engine is restarted.
 - Fasten the vehicle with lock chains.
- (b) OPERATIONS RELATED TO VSC
- (1) Do not carry out unnecessary installation and removal, because it may interfere with the setting of the parts related to the VSC.
 - (2) Be sure to carry out the preparation for operation and the confirmation of operation completion, in accordance with the instructions of the text, when the operations related to the VSC are performed.



9. WHEN SERVICING FULL-TIME 4WD VEHICLES

The Full-time 4WD LEXUS GX470 is equipped with the mechanical lock type center differential system.

During tests that require the use of a brake tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the front or rear wheels are to be rotated, it is necessary to set the position of the center differential to FREE or LOCK depending on the type of the test being performed.



Center differential FREE condition:

	Condition	Wheel
Center differential switch	OFF	A lifted wheel can be rotated if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	OFF	
Transfer select lever (H/L)	Either	

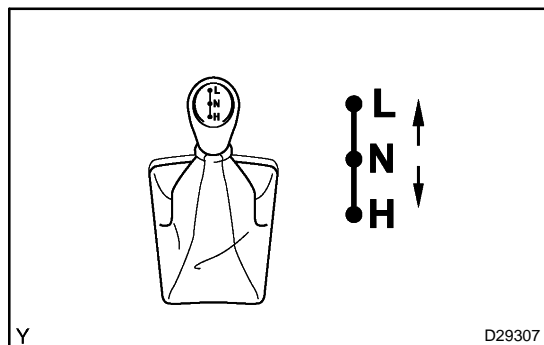
Center differential LOCK condition:

	Condition	Wheel
Center differential switch	ON	A lifted wheel cannot be rotated even if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	ON	
Transfer select lever (H/L)	Either	

NOTICE:

Center differential LOCK ↔ FREE selecting procedures:

- Operate the switch only when all 4 wheels are stopped or driving in a straight line.
- Never operate the switch when any wheel is slipping.
- Never operate the switch when any wheel is spinning freely.
- Never operate the switch when swerving or cornering.



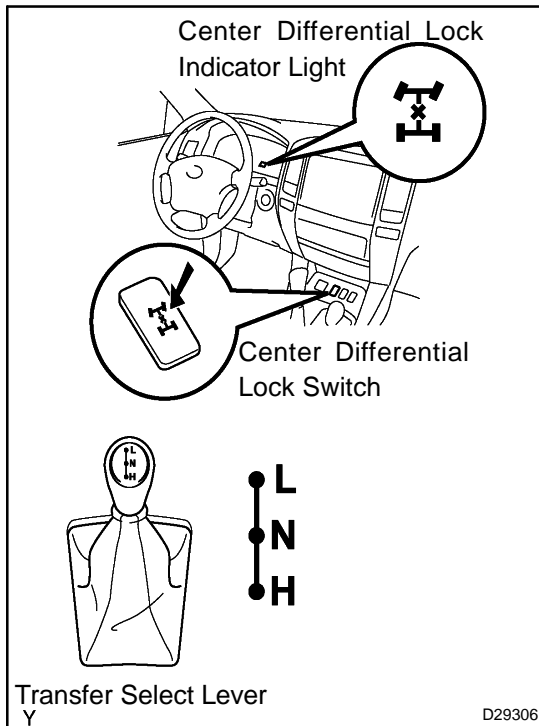
Transfer gear H ↔ L gear shifting procedures:

When shifting, always put the shift lever of the transmission in N position. In other positions, the transfer gear cannot be changed.

HINT:

Center differential LOCK ↔ FREE selecting procedures:

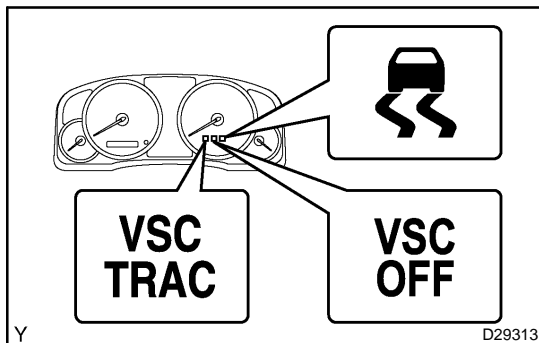
Move the vehicle forward or backward slightly if the indicator light does not operate correctly when the center differential lock switch is turned ON or OFF.



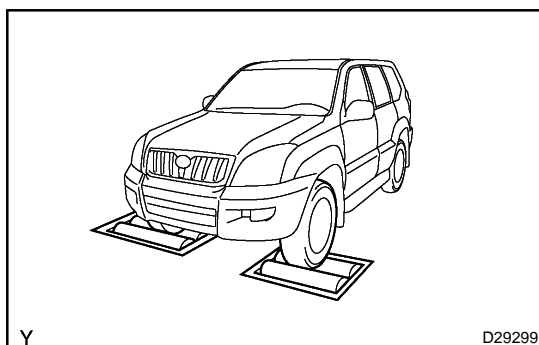
10. WHEN TESTING BRAKES, SPEEDOMETER, ETC.

(a) When carrying out any kind of servicing or testing on a Full-time 4WD with Active Traction Control System & Vehicle Stability Control (VSC) System in which the front or rear wheels are to be rotated (braking test, speedometer test), be sure to observe the precautions listed below. Incorrect preparations or test procedures may cause damage as well as unsuccessful test results. Before starting any such servicing or test, be sure to check the following items:

- Center differential mode position (FREE or LOCK)



- w/ Vehicle Stability Control (VSC) system:
Center differential switch and VSC OFF indicator light
- Whether wheels should be touching the ground or jacked up
- Transmission gear position (N position)
- Transfer gear position (H or L position)
- Maximum testing vehicle speed
- Maximum testing time



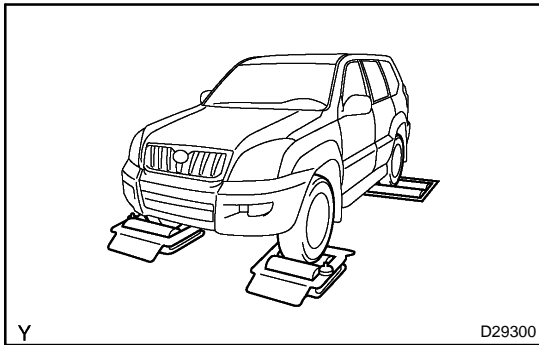
(b) Using Braking Tester:

Measure by low-speed type (Vehicle Speed: Below 0.5 km/h (0.3 mph)) brake tester and observe the following instructions before performing the test.

- (1) Position the wheels to be tested (front or rear) on the tester.
- (2) Put the center differential in FREE position.
- (3) Deactivate the Active Traction Control System & Vehicle Stability Control (VSC) System.
- (4) Shift the transmission shift lever to N position.

HINT:

After completing the test with speedometer tester, do not forget to reactivate the Active Traction Control System & Vehicle Stability Control (VSC) System. Check that the VSC/TRAC warning light goes off when restarting the engine.



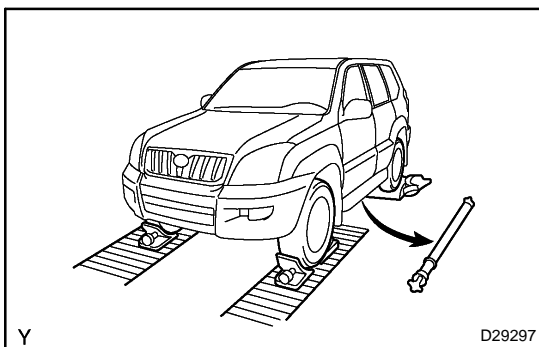
- (c) Using Speedometer Tester:
Observe the following instructions and then test with the rear wheels.
- (1) Position the rear wheels on the tester roller.
 - (2) Position the front wheels on the free roller or jack them up.
 - (3) Put the center differential in FREE position.
 - (4) Deactivate the Active Traction Control System & Vehicle Stability Control (VSC) System.
 - (5) Ensure that the vehicle does not move using chains.

NOTICE:

The maximum speed should be less than 60 km/h (37 mph) and maximum driving time should be 1 minute.

HINT:

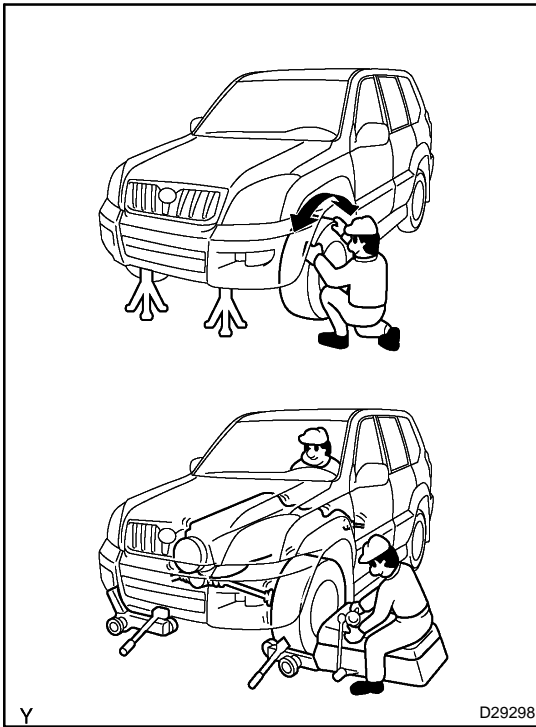
- Do not suddenly shift gears, brake, accelerate or decelerate.
- After completing on-vehicle wheel balancing, do not forget to reactivate the Active Traction Control System & Vehicle Stability Control (VSC) System. Check that VSC/TRAC warning indicator light goes off when restarting the engine.



- (d) Using Chassis Dynamometer:
Observe the following instructions, and then test with the rear wheels.
- (1) Remove the front propeller shaft.
 - (2) Put the center differential in LOCK position.
 - (3) Deactivate the Active Traction Control System & Vehicle Stability Control (VSC) System.
 - (4) Make sure that the vehicle is secured in place.

HINT:

- Do not suddenly shift gears, brake, accelerate or decelerate.
- Do not forget to reactivate the Active Traction Control System & Vehicle Stability Control (VSC) System. Check that the VSC/TRAC warning indicator light goes off when restarting the engine.



- (e) On-Vehicle Wheel Balancing:
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent each wheel from being rotated at different speed in different directions (which could damage the center differential), always be sure to observe the following precautions.
- (1) All 4 wheels should be jacked up, so they do not touch the ground at all.
 - (2) Put the center differential in LOCK position.
 - (3) Deactivate the Active Traction Control System & Vehicle Stability Control (VSC) System.
 - (4) Fully release the parking brake lever.
 - (5) None of the brakes should be applied.
 - (6) Drive the wheels driven on the wheel balancer with the engine running.
 - (7) Carry out the wheel balancing with the transmission range in D position.

HINT:

- When balancing, pay attention to the other wheels rotating at the same time.
- Do not suddenly shift gears, brake, accelerate or decelerate.
- Do not forget to reactivate the Active Traction Control System & Vehicle Stability Control (VSC) System. Check that the VSC/TRAC warning indicator light goes off when restarting the engine.

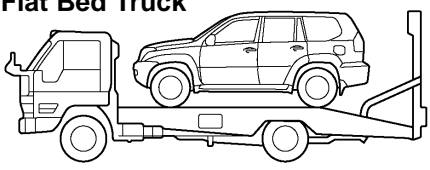
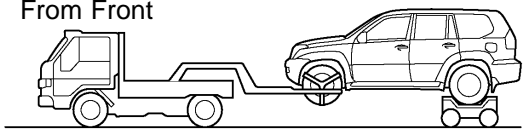
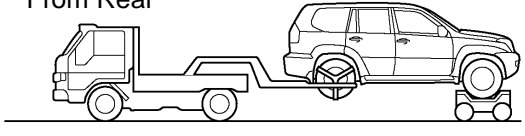
11. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER**CAUTION:**

If a large amount of unburned gasoline flows into the converter, it may cause overheating and is a fire hazard. To prevent this, observe the following precautions.

- (a) Use only unleaded gasoline.
- (b) Avoid prolonged idling.
Avoid idling the engine for more than 20 minutes.
- (c) Avoid a spark jump test.
 - (1) Perform a spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
 - (2) While testing, never race the engine.
- (d) Avoid a prolonged engine compression measurement.
Engine compression measurements must be performed as rapidly as possible.
- (e) Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

12. WHEN TOWING FULL-TIME 4WD VEHICLES

- Use one of the methods shown below to tow the vehicle.
- If the vehicle has trouble with the chassis or drive train, use method 1 (flat bed truck).

Towing Method	Conditions	Parking Brake	Transmission Shift Lever Position
<p>1. Flat Bed Truck</p> 		Applied	Any Position
<p>2. Wheel Lift Type Truck</p> <p>From Front</p>  <p>From Rear</p> 		Applied	Any Position

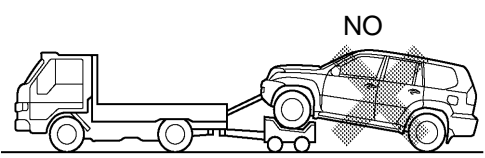
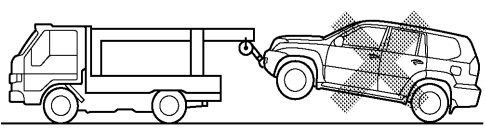
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NOTICE:

Do not use any towing method other than those shown above.

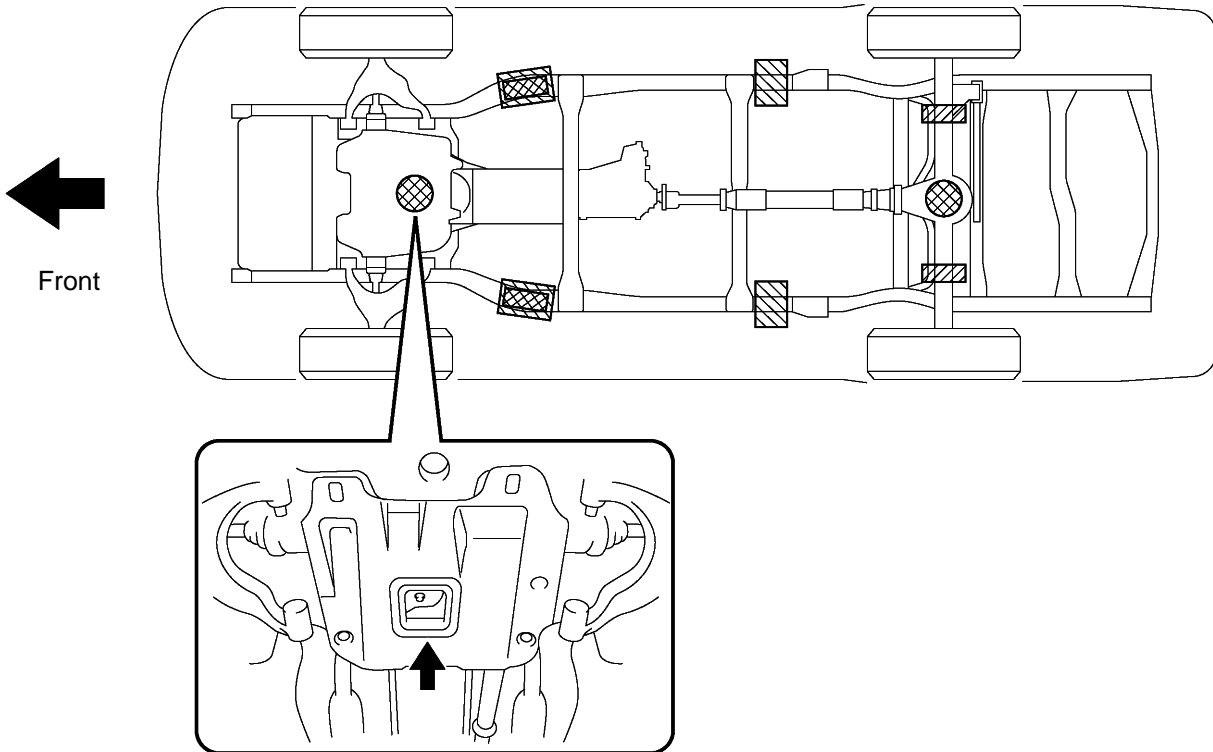
- The towing methods shown below are dangerous and can damage the vehicle, so do not use them.

	<ul style="list-style-type: none"> • Never tow the vehicle using a method in which the wheels that are lifted up cannot rotate. • Do not use the sling type towing method either from the front or rear. • If these towing methods are used either from the front or rear: <ol style="list-style-type: none"> (a) The drive train may heat up and be damaged and the wheels may fly off the dolly. (b) In addition, if the vehicle is equipped with the VSC & TRAC system, the system will apply an internal brake to the rotating wheels when the engine is not shut off.
	

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VEHICLE LIFT AND SUPPORT LOCATIONS




JACK POSITION 


Front Center of crossmember

Rear Center of rear axle housing

CAUTION: When jacking up the front and rear, make sure the vehicle is not carrying any extra weight.

SUPPORT POSITION

Safety stand 

Swing arm type lift 

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HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

GENERAL INFORMATION

010JK-04

There are many ECU controlled systems used in LEXUS GX470. In general, ECU controlled system are considered to be very intricate and require a high level of technical knowledge and expert skill to troubleshoot. The fact is, however, that if you proceed by inspecting the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and basic knowledge of electricity, the problem can be accurately diagnosed and fixed. This manual is designed based on the above principle to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:

The troubleshooting procedures are described on the following pages.

System	Page
1. SFI System (2UZ-FE)	05-1
2. Electronic Modulated Suspension & Rear Air Suspension System	05-465
3. Kinetic Dynamic Suspension System	05-556
4. Tire Pressure Warning System	05-635
5. ABS with EBD & BA & TRAC & VSC System	05-716
6. Electronic Controlled Automatic Transmission [ECT]	05-904
7. Power Tilt and Power Telescopic Steering Column	05-1064
8. Air Conditioning System	05-1098
9. Supplemental Restraint System	05-1200
10. Lighting System	05-1527
11. Wiper and Washer System	05-1601
12. Audio System	05-1647
13. LEXUS Navigation System	05-1711
14. Rear Seat Audio System	05-1901
15. Rear Seat Entertainment System	05-1931
16. Back Monitor System	05-2003
17. Combination Meter	05-2033
18. Power Window Control System	05-2075
19. Power Mirror Control System (w/ memory)	05-2119
20. Front Power Seat Control System (w/ memory)	05-2133
21. Power Door Lock Control System	05-2143
22. Wireless Door Lock Control System	05-2168
23. Key Reminder Warning System	05-2192
24. Engine Immobiliser System	05-2206
25. Theft Deterrent System	05-2233
26. Multiplex Communication System	05-2254
27. Can Communication System	05-2315
28. Cruise Control System	05-2373

FOR USING OBDII SCAN TOOL OR HAND-HELD TESTER

- Before using the scan tool or tester, the scan tool's instruction book or tester's operator manual should be read thoroughly.
- If the scan tool or tester cannot communicate with the ECU controlled systems when you have connected the cable of the tester to the DLC3 with the ignition switch and tester turned ON, there is a problem on the vehicle side or tester side.

- (1) If the communication is normal when the tester is connected to another vehicle, inspect the diagnosis data link line (Bus \oplus line) or ECU power circuit of the vehicle.
- (2) If the communication is still impossible when the tester is connected to another vehicle, the problem is probably in the tester itself, so perform the Self Test procedures outlined in the Tester Operator's Manual.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

Carry out troubleshooting in accordance with the procedures on the following page. Here, only the basic procedures are shown. Details are provided in the Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning the troubleshooting of that circuit.

1 Vehicle brought to workshop



2 Customer problem analysis

- (a) Ask the customer about the conditions and environment when the problem occurred.



3 Symptom confirmation and DTC (and freeze frame data) check

- (a) Check the battery positive voltage.
Voltage: 10 – 14 V (Engine stopped)
- (b) Visually check the wire harness, connectors and fuses for open and short, etc.
- (c) Warm up the engine to the normal operating temperature.
- (d) Confirm the problem symptoms and conditions, and check for DTCs according to the applicable chart.

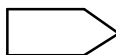
OK

Go to step 5

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4 DTC chart

- (a) Check the results obtained in step 3, then confirm the inspection procedures for the system or the part which should be checked using the DTC chart.



Go to step 6

5 Problem symptoms chart

- (a) Check the results obtained in step 3, then confirm the inspection procedures for the system or the part which should be checked using the problem symptoms table.



6 Circuit inspection or parts inspection

- (a) Confirm the circuit for the system or the part which should be checked using the problem symptoms table or the results obtained in step 4.



7	Repair
----------	---------------

- (a) Repair the affected system or part in accordance with the instructions in step 6.



8	Confirmation test
----------	--------------------------

- (a) After completing repairs, confirm that the problem has been solved (If the problem does not recur, perform a confirmation test under the same conditions and in the same environment as when it occurred for the first time).



END

CUSTOMER PROBLEM ANALYSIS

HINT:

- In troubleshooting, the problem symptoms must be confirmed accurately, meaning that all preconceptions must be set aside in order to make an accurate judgement. To ascertain what the problem symptoms are, it is extremely important to ask the customer about the problem and conditions when it occurred.
- The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases. So, as much information as possible should be gathered and their relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided for your use in the Diagnostics section for each system.

Important Points with Customer Problem Analysis

- What ----- Vehicle model, system name
- When ----- Date, time, occurrence frequency
- Where ----- Road conditions
- Under what conditions? ----- Running conditions, driving conditions, weather conditions
- How did it happen? ----- Problem symptoms

(Sample) Supplemental restraint system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK			
Supplemental Restraint System Check Sheet		Inspector's Name	
Customer's Name	Registration No.		
	Registration Year		/ /
	Frame No.		
Date Vehicle Brought In	/ /	Odometer Reading	km miles
Date Problem First Occurred	/ /		
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Other		
Temperature	Approx.		
Vehicle Operation	<input type="checkbox"/> Starting <input type="checkbox"/> Idling <input type="checkbox"/> Driving [<input type="checkbox"/> Constant speed <input type="checkbox"/> Acceleration <input type="checkbox"/> Deceleration] <input type="checkbox"/> Other		

SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

- The diagnostic system in LEXUS GX470 has various functions. The first function is the Diagnostic Trouble Code (DTC) Check, in which a malfunction in the signal circuits to the ECU is stored in code form in the ECU memory. Another function is the Input Signal Check, which checks if the signals from various switches are sent to the ECU correctly. By using these check functions, it is possible to quickly narrow down potential problem areas and troubleshooting can be performed effectively. The diagnostic functions are incorporated in the following systems in LEXUS GX470.

System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
SFI System	○ (with Check Mode)	○	○
Electronic Modulated Suspension & Rear Air Suspension System	○	○	○
Kinetic Dynamic Suspension System	○	○	○
ABS with EBD & BA & TRAC & VSC System	○	○	○
Electronically Controlled Automatic Transmission [ECT]	○ (with Check Mode)	○	
Power Tilt and Power Telescopic Steering Column	○	○	○
Air Conditioning System	○	○	
Supplemental Restraint System	○		
Engine Immobiliser System	○		○
Multiplex Communication System	○		
Cruise Control System	○	○	

- In the DTC check, it is very important to determine whether the problem indicated by the DTC is still occurring or has occurred in the past but returned to normal at present. In addition during the problem symptom check it must be checked whether the malfunction indicated by the DTC is directly related to the problem symptom or not. For this reason, the DTC should be checked before and after symptom confirmation to determine the current conditions. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, making it more difficult to detect the problem area, or in trying to repair irrelevant areas. Therefore, always follow the procedures in the correct order and perform the DTC check.
- A flow chart showing how to proceed with troubleshooting using the diagnostic trouble code (DTC) check is shown on this page. This flow chart shows how to utilize the DTC check effectively. Then, by carefully checking the results, this chart indicates how to proceed either to the DTC troubleshooting or to the troubleshooting of the problem symptoms table.

1	DTC check
----------	------------------



2	Make a note of DTCs displayed and then clear the memory
----------	--



3 Symptom confirmation

a	Symptoms exist
b	No symptoms exist

a → **Go to step 5**

b

4 Simulation test using the symptom simulation methods

b

5 DTC check

a	DTC displayed
b	Normal code displayed

a → **Troubleshooting of problem indicated by DTC**

b

6 Symptom confirmation

a	No symptoms exist
b	Symptoms exist

If a DTC is displayed in the initial DTC check, it indicates that a trouble may have occurred in a wire harness or connector in that circuit in the past. Therefore, check the wire harness and connectors (See page 01-36).

a → **System normal**

b

Troubleshooting of each problem symptom

The problem is still occurring in a place other than the diagnostic circuit (The DTC displayed first is either for a past problem or a secondary problem).

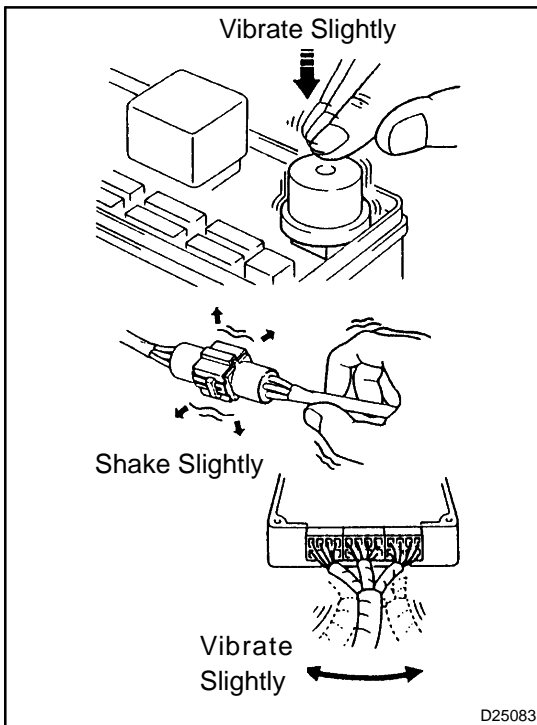
SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no symptoms occurs. In such cases, a thorough customer problem analysis must be carried out. Then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he may be, if he proceeds to troubleshoot without confirming the problem symptoms, he will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined when the engine is hot or when the vehicles is at a standstill. Since vibration, heat or water penetration (mois-ture) is a likely cause for the problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in a point that the external causes are applied to the vehicle in a stationary condi-tion.

Important points in the symptom simulation test:

In the symptom simulation test, the problem symptoms should be confirmed, and the problem area or parts must also be found out. To do so, reduce the possible problem circuits according to the symptoms before starting this test and have the hand-held tester connected beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the prob-lem symptoms at the same time. Refer to the problem symptoms table of each system to narrow down the possible causes of the symptom.



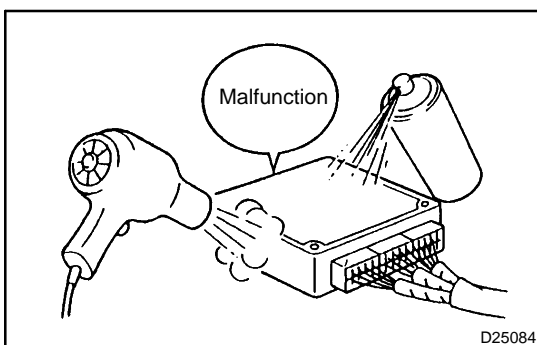
1. VIBRATION METHOD: When vibration seems to be the major cause.

- (a) PART AND SENSOR
 - (1) Apply slight vibration with your finger to the part of the sensor considered to be the problem cause and check that the malfunction occurs.

HINT:

Applying strong vibration to relays may result in open relays.

- (b) CONNECTORS
 - (1) Slightly shake the connector vertically and hori-zontally.
- (c) WIRE HARNESS
 - (1) Slightly shake the wire harness vertically and hori-zontally.
The connector joint and fulcrum of the vibration are the major areas to be checked thoroughly.



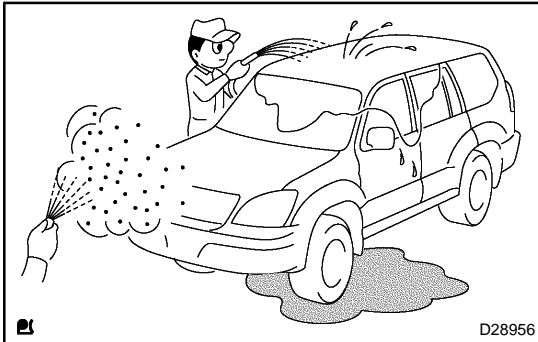
2. HEAT METHOD: If the problem seems to occur when the area in question is heated.

- (a) Heat the component that is the possible cause of the mal-func-tion with a hair dryer or similar object. Check if the malfunction occurs.

NOTICE:

- Do not heat the components to more than 60°C (140°F) (Temperature is limited to keep the compo-nents from being damaged).

- Do not apply heat directly to the parts in the ECU.



3. WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in high-humidity.

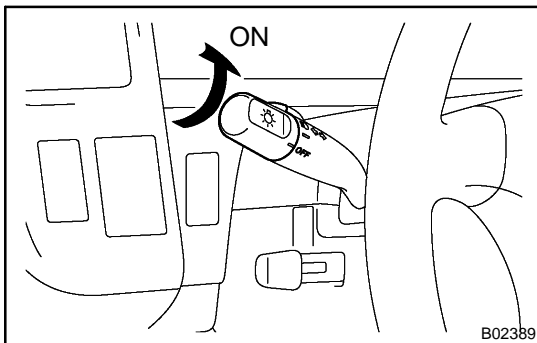
- (a) Sprinkle water onto the vehicle and check if the malfunction occurs.

NOTICE:

- Never sprinkle water directly onto the engine compartment, but indirectly change the temperature and humidity by spraying a mist of water onto the radiator front surface.
- Never apply water directly onto the electronic components.

HINT:

If a vehicle is subject to water leakage, the leaking water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.



4. OTHERS: If the malfunction seems to occur when electrical load is excessive.

- (a) Turn on all the electrical equipment including the heater blower, headlights, rear window defogger, etc., and check if the malfunction occurs.

DIAGNOSTIC TROUBLE CODE CHART

The inspection procedures are shown in the table below. This table allows efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code chart. Proceed with troubleshooting in accordance with the inspection procedures listed in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The diagnostic trouble code chart for the Supplemental Restraint System is shown below as an example.

- DTC No.
Indicates the diagnostic trouble code.
- Page or Instructions
Indicates the page where the inspection procedures for each circuit is to be found, or gives instructions for checking and repairs.

- Trouble Area
Indicates the suspect areas of the problem.

- Detection Item
Indicates the system or details of the problem.

DIAGNOSTIC TROUBLE CODE CHART
If a malfunction code is displayed during the DTC check, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

DTC No. (See page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (05-119)	● Short in D squib circuit	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0101/14 (05-124)	● Open in D squib circuit	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0102/11 (05-128)	● Short in D squib circuit (to ground)	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0103/12 (05-132)	● Short in D squib circuit (to B+)	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0105/53 (05-136)	● Short in P squib circuit	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	ON
B0106/54	● Open in P squib circuit	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	
	● Short in P squib circuit (to Ground)	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	

PROBLEM SYMPTOMS TABLE

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a Normal code is displayed in the diagnostic trouble code chart but the problem is still occurring. Numbers in the table indicate the order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it may be that the problem is occurring outside the detection range of the diagnostic system.

● Page
Indicates the page where the flow chart for each circuit is located.

● Circuit Inspection, Inspection Order
Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

● Problem Symptom

● Circuit or Part Name
Indicates the circuit or part which needs to be checked.

PROBLEM SYMPTOMS TABLE
Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspected Area	See page
1. With the ignition switch in ACC or ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed. 2. SRS warning light is always lit up even when ignition switch is in the LOCK position	1. SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	05-180
1. With the ignition switch in the ACC or ON position, the SRS warning light does not light up.	1. SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	05-183
1. DTC is not displayed. 2. SRS warning light is always lit up at the time of DTC check procedure. 3. DTC is displayed without Tc and CG terminal connection.	1. Tc terminal circuit	05-187

CIRCUIT INSPECTION

How to read and use each page is shown below.

● **Circuit Description**
The major role, operation, etc. of the circuit and its component parts are explained.

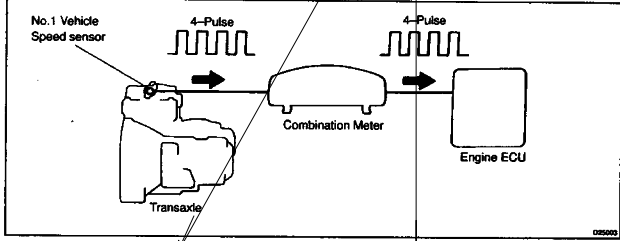
● **Diagnostic Trouble Code No. and Detection Item**

● Indicates the diagnostic trouble codes, diagnostic trouble code settings and suspect areas of the problem.

● **Inspection Procedures**
Use the inspection procedures to determine if the circuit is normal or abnormal. If it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

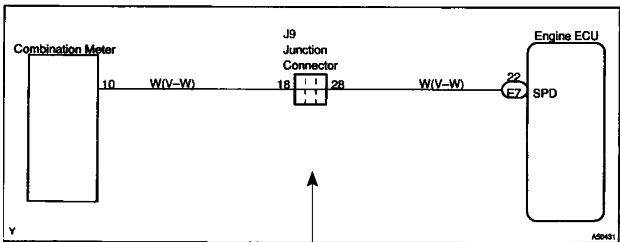
05-178 DIAGNOSTICS - SEI SYSTEM (1ZZ-FE) **DTC P0500/42 VEHICLE SPEED SENSOR MALFUNCTION**

CIRCUIT DESCRIPTION
The vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the Engine ECU. The Engine ECU determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	During vehicle is being driven, no vehicle speed sensor signal to engine ECU (2 trip detection logic)	<ul style="list-style-type: none"> Combination meter Open or short in No. 1 vehicle speed sensor circuit No. 1 vehicle speed sensor Engine ECU

WIRING DIAGRAM



● **Wiring Diagram**
This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
Wire colors are indicated by an alphabetical code. B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow, SB = Sky Blue
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

DIAGNOSTICS - SEI SYSTEM (1ZZ-FE) 05-179

INSPECTION PROCEDURE

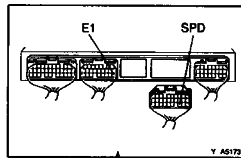
1 READ VALUE OF VEHICLE SPEED VALUE(SPEEDOMETER OPERATION)

- (a) Select data monitor on the hand-held tester.
 - (b) Perform a test drive of the vehicle.
 - (c) Read the vehicle speed on the hand-held tester.
- RESULT:** The same as the speed displayed on the speed meter.

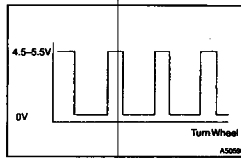
NG → **REPLACE COMBINATION METER ASSY**

OK

2 INSPECT ECU



- (a) Check the output waveform.
- HINT:**
Using the oscilloscope function of hand-held tester, it is possible to check the function between the engine ECU and the knock control sensor. The waveform shown in the illustration is an example without noise and chattering.
- (1) Connect the hand-held tester between the terminals SPD of the engine ECU E7 connector and E1 of the engine ECU E8 connector.
 - (2) Select the oscilloscope function on the hand-held tester. (Refer to the hand-held tester's instruction book for operating instructions.)



RESULT: Voltage is intermittently generated

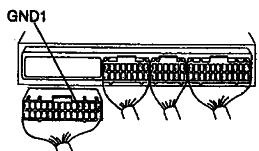
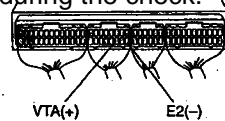
ITEM	CONTENTS
TERMINAL	SPD→E1
EQUIPMENT SET	5V/DIV, 20ms/DIV
CONDITION	Running at 20 km/h

- HINT:**
- The multitude gets shorter as the engine speed becomes faster.

OK → **CHECK AND REPLACE ECU**

NG

● Indicates the condition of the connector of the ECU during the check.



Connector being checked is connected. Connections of tester are indicated by (+), (-) after terminals name.

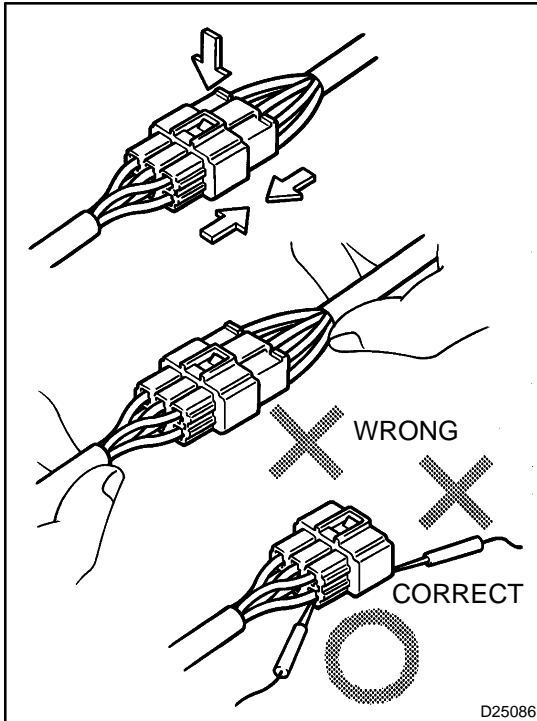
Connector being checked is disconnected. For inspection of connector with body ground, there is nothing about the body ground written down.

ELECTRONIC CIRCUIT INSPECTION PROCEDURE

1. BASIC INSPECTION

(a) RESISTANCE MEASURING CONDITION OF ELECTRONIC PARTS

- (1) Unless stated, all resistance is measured at an ambient temperature of 68°F (20°C). Resistances measured may be outside the specifications if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled down.



(b) HANDLING CONNECTORS

- (1) When disconnecting a connector, first squeeze the mating halves tightly together to release the lock, then press the lock claw and separate the connector.
- (2) When disconnecting a connector, do not pull on the harnesses. Grasp the connector directly and separate it.
- (3) Before connecting the connector, check that there are no deformed, damaged, loose or missing terminals.
- (4) When connecting a connector, press firmly until you hear the lock close with a "click" sound.
- (5) If checking the connector with a TOYOTA electrical tester, check it from the backside (harness side) of the connector using a mini test lead.

NOTICE:

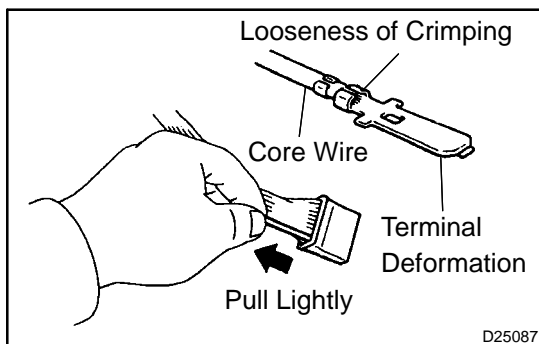
- As a waterproof connector cannot be checked from the backside, check by connecting a sub-harness.
- Do not damage the terminals by moving the inserted tester needle.

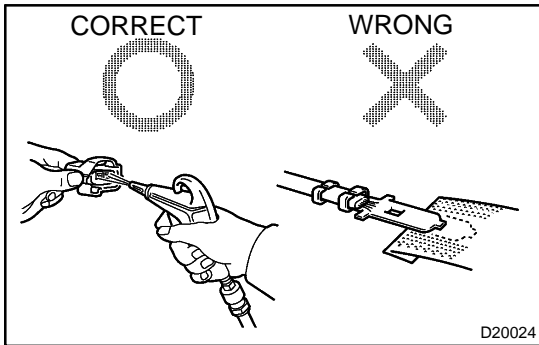
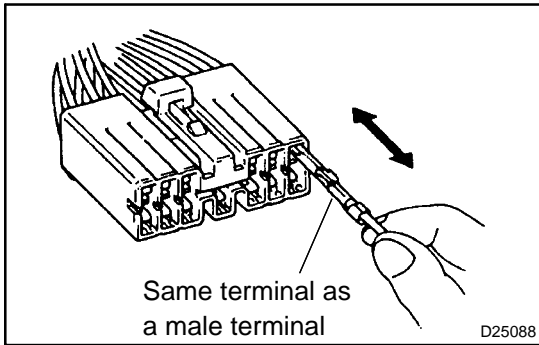
(c) CHECKING CONNECTORS

- (1) Checking when the connector is connected: Squeeze the connector together to confirm that it is fully inserted and locked.
- (2) Checking when the connector is disconnected: Check by pulling the wire harness lightly from the backside of the connector. Look for unlatched terminals, missing terminals, loose crimps or broken conductor wires. Check visually for corrosion, metallic or foreign objects and water; and bent, rusted, overheated, contaminated, and deformed terminals.

NOTICE:

When testing a gold-plated female terminal, always use a gold-plated male terminal.

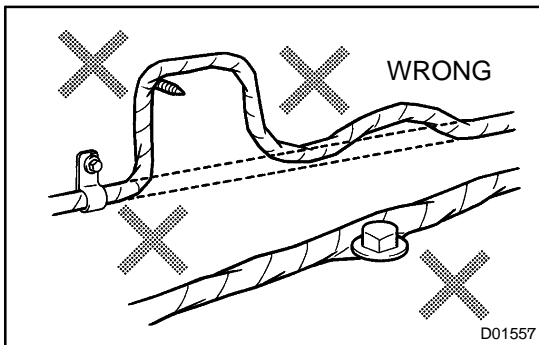




- (3) Checking the contact pressure of the terminal: Prepare a spare male terminal. Insert it into a female terminal, and check for good tension when inserting and after full engagement.

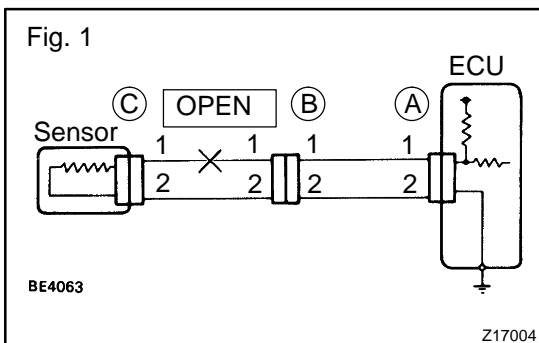
(d) REPAIR METHOD OF CONNECTOR TERMINAL

- (1) If there is any dirt on the terminal, clean the contact point using an air gun or shop rag. Never polish the contact point using a sandpaper as the platings may come off.
- (2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold-plated (gold color), use a gold-plated female terminal; if it is silver-plated (silver color), use a silver-plated female terminal.
- (3) Damaged, deformed, or corroded terminals should be replaced. If the terminal will not lock into the housing, the housing may have to be replaced.



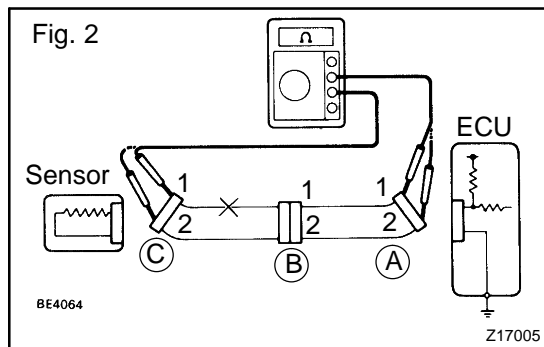
(e) HANDLING OF WIRE HARNESS

- (1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.
- (2) Never twist, pull or slacken the wire harness more than necessary.
- (3) Never make the wire harness come into contact with a high temperature part, rotating, moving, vibrating or sharp-edged parts. Avoid panel edges, screw tips and similar sharp items.
- (4) When installing parts, never pinch the wire harness.
- (5) Never cut or break the cover of the wire harness. If it is cut or broken, replace it or securely repair it with vinyl tape.



2. CHECK OPEN CIRCUIT

- (a) For an open circuit in the wire harness in Fig. 1, perform a resistance check (step b) or a voltage check (step c).



- (b) Check the resistance.
 (1) Disconnect connectors A and C and measure the resistance between them.

Resistance: Below 1 Ω

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.

Fig. 2:

Between terminal 1 of connector A and terminal 1 of connector C → 10 kΩ or higher

Between terminal 2 of connector A and terminal 2 of connector C → Below 1 Ω

If your results match the examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

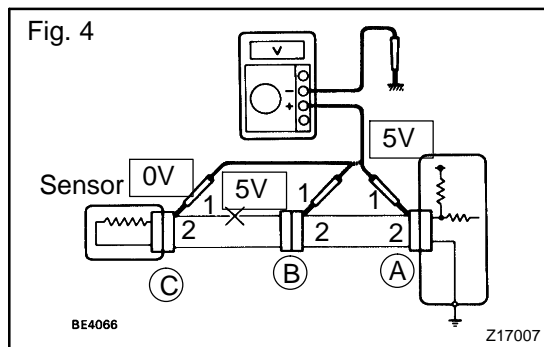
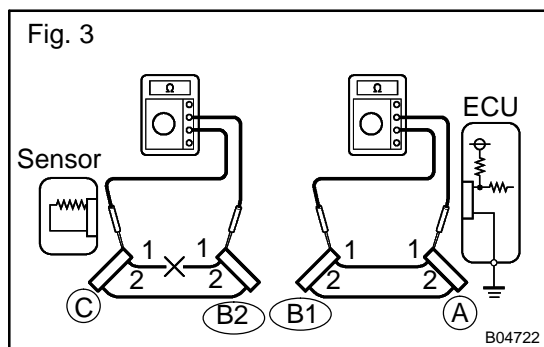
- (2) Disconnect connector B and measure the resistance between the connectors.

Fig. 3:

Between terminal 1 of connector A and terminal 1 of connector B1 → Below 1 Ω

Between terminal 1 of connector B2 and terminal 1 of connector C → 10 kΩ or higher

If your results match the examples above, an open circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

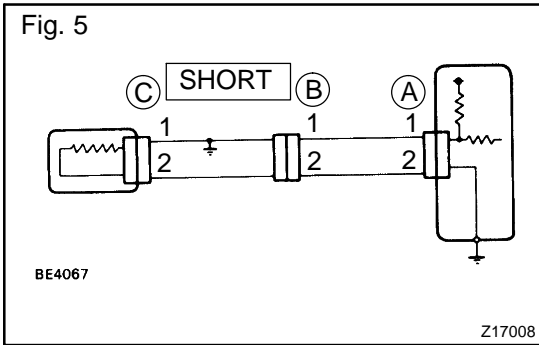


- (c) Check the voltage.
 (1) In a circuit in which voltage is applied to the ECU connector terminal, an open circuit can be checked by conducting a voltage check.

Fig. 4:

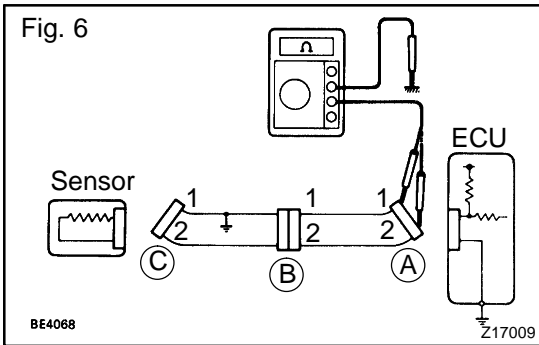
With each connector still connected, measure the voltage between the body ground and terminal 1 of connector A at the ECU 5 V output terminal, terminal 1 of connector B and terminal 1 of connector C, in that order.

- (2) Example results:
 5 V: Between terminal 1 of connector A and body ground
 5 V: Between terminal 1 of connector B and body ground
 0 V: Between terminal 1 of connector C and body ground
 If your results match the examples above, an open circuit exists in the wire harness between terminal 1 of B and terminal 1 of C.



3. CHECK SHORT CIRCUIT

(a) If the wire harness is ground shorted (Fig. 5), locate the section by conducting a resistance check with the body ground (below).



(b) Check the resistance with the body ground.
 (1) Disconnect connectors A and C and measure the resistance between terminals 1 and 2 of connector A and the body ground.

Resistance: 10 kΩ or higher

HINT:

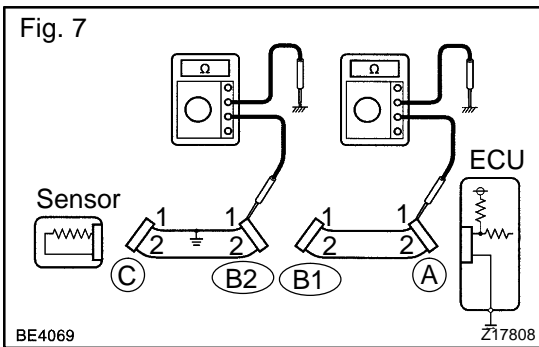
Measure the resistance while lightly shaking the wire harness vertically and horizontally.

Fig. 6:

Between terminal 1 of connector A and body ground → Below 1 Ω

Between terminal 2 of connector A and body ground → 10 kΩ or higher

If your results match the examples above, a short circuit exists between terminal 1 of connector A and terminal 1 of connector C.



(2) Disconnect connector B and measure the resistance between terminal 1 of connector A and the body ground, and terminal 1 of connector B2 and the body ground.

Fig. 7:

Between terminal 1 of connector A and body ground → 10 kΩ or higher

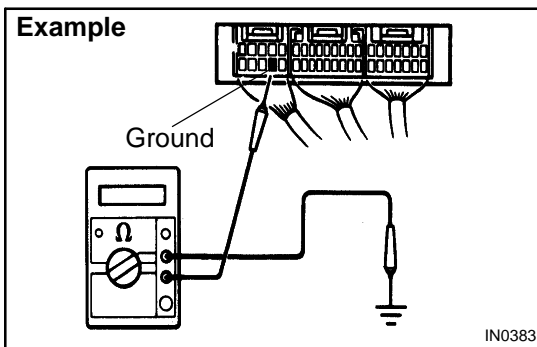
Between terminal 1 of connector B2 and body ground → Below 1 Ω

If your results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

4. CHECK AND REPLACE ECU

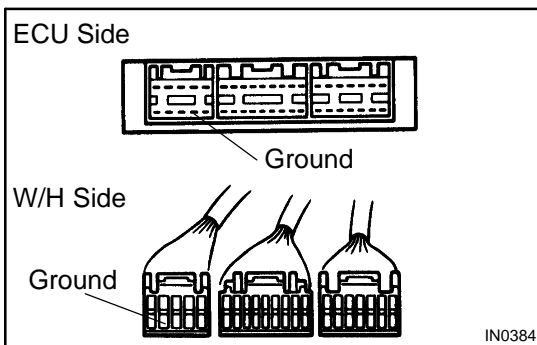
NOTICE:

- Start an inspection of the connector from the back-side of the connector at the wire harness side with the connector connected to the ECU.
 - When no measuring condition is specified, perform the inspection with the engine stopped and the ignition switch ON.
 - Check that the connectors are fully seated. Check for loose, corroded or broken wires.
- (a) First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty. Replace the ECU with a normal functioning one and check if the symptoms occur. If the trouble symptoms stop, replace the ECU.



- (1) Measure the resistance between the ECU ground terminal and body ground.

Resistance: Below 1 Ω



- (2) Disconnect the ECU connector. Check the ground terminals (on the ECU side and wire harness side) for evidence of bending, corrosion or foreign material. Lastly check the contact pressure of the female terminals.

TERMS

ABBREVIATIONS USED IN MANUAL

01037-10

Abbreviations	Meaning
ABS	Anti-Lock Brake System
A/C	Air Conditioner
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
A/F	Air-Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
ASSY	Assembly
A/T, ATM	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
B+	Battery Voltage
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
Calif.	California
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
CKD	Complete Knock Down
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve
CW	Curb Weight
DC	Direct Current

Abbreviations	Meaning
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLC	Data Link Connector
DLI	Distributorless Ignition
DOHC	Double Overhead Camshaft
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
DTC	Diagnostic Trouble Code
DVD	Digital Versatile Disc
EBD	Electric Brake Force Distribution
ECAM	Engine Control And Measurement System
ECD	Electronically Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Control Transmission
ECU	Electronic Control Unit
ED	Electro-Deposited Coating
EDU	Electronic Driving Unit
EDIC	Electric Diesel Injection Control
EFI	Electronic Fuel Injection
E/G	Engine
EGR	Exhaust Gas Recirculation
EGR-VM	EGR-Vacuum Modulator
ELR	Emergency Locking Retractor
EMPS	Electric Motor Power Steering
ENG	Engine
ESA	Electronic Spark Advance
ETCS-i	Electronic Throttle Control System-intelligent
EVAP	Evaporative Emission Control
EVP	Evaporator
E-VRV	Electric Vacuum Regulating Valve
EX	Exhaust
FE	Fuel Economy
FF	Front-Engine Front-Wheel-Drive
F/G	Fuel Gauge
FIPG	Formed In Place Gasket
FL	Fusible Link
F/P	Fuel Pump
FPU	Fuel Pressure Up
Fr	Front
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
HAC	High Altitude Compensator
H/B	Hatchback

INTRODUCTION - TERMS

Abbreviations	Meaning
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
HSG	Housing
HT	Hard Top
HWS	Heated Windshield System
IC	Integrated Circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
ISC	Idle Speed Control
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
L/H/W	Length, Height, Width
LLC	Long-Life Coolant
LNG	Liquified Natural Gas
LO	Low
LPG	Liquified Petroleum Gas
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning And Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAP	Manifold Absolute Pressure
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MG1	Motor Generator No.1
MG2	Motor Generator No.2
MP	Multipurpose
MPI	Multipoint Electronic Injection
MPX	Multiplex Communication System
M/T, MTM	Manual Transmission (Transaxle)
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
No.	Number
O2S	Oxygen Sensor
OC	Oxidation Catalyst

Abbreviations	Meaning
O/D	Overdrive
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
ORVR	On-board Refilling Vapor Recovery
O/S	Oversize
P & BV	Proportioning And Bypass Valve
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PROM	Programmable Read Only Memory
PS	Power Steering
PTO	Power Take-Off
P/W	Power Window
R & P	Rack And Pinion
RAM	Random Access Memory
R/B	Relay Block
RBS	Recirculating Ball Type Steering
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory
Rr	Rear
RRS	Rigid Rear Suspension
RWD	Rear-Wheel Drive
SC	Supercharger
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCV	Timing Control Valve
TDC	Top Dead Center

INTRODUCTION - TERMS

Abbreviations	Meaning
TEMP.	Temperature
TEMS	TOYOTA Electronically Modulated Suspension
TFT	Toyota Free-Tronic
TIS	Total Information System For Vehicle Development
T/M	Transmission
TMC	TOYOTA Motor Corporation
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TRAC	Traction Control System
TURBO	Turbocharge
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VGRS	Variable Gear Ratio Steering
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
w/	With
WGN	Wagon
W/H	Wire Harness
w/o	Without
WU-TWC	Warm Up Three-way Catalytic Converter
WU-OC	Warm Up Oxidation Catalytic Converter
1st	First
2nd	Second
2WD	Two Wheel Drive Vehicle (4 x 2)
3rd	Third
4th	Fourth
4WD	Four Wheel Drive Vehicle (4 x 4)
4WS	Four Wheel Steering System
5th	Fifth

GLOSSARY OF SAE AND LEXUS TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their LEXUS equivalents.

SAE ABBREVIATIONS	SAE TERMS	LEXUS TERMS ()--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner (A/CL)
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	Battery Voltage (+B)
BARO	Barometric Pressure	High Altitude Compensator (HAC)
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Position	LL ON, Idle ON
DFI	Direct Fuel Injection (Diesel)	Direct Injection (D/INJ)
DI	Distributor Ignition	-
DLC3	Data Link Connector 3	OBDD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Trouble Code
DTM	Diagnostic Test Mode	-
ECL	Engine Control Level	-
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DLI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO ₂ S)

INTRODUCTION - TERMS

IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection (IDL)
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Lamp
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O ₂ S)
OBD	On-Board Diagnostic	On-Board Diagnostic System (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Convert (OC) Catalytic Converter for Oxidation (CCo)
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	Electronic Air Bypass Valve (E-ABV)
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter


TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CC _{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC _R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	-
3GR	Third Gear	-
4GR	Fourth Gear	-

DIAGNOSTICS



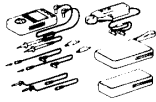
PREPARATION


SST

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	<p>09843-18040 Diagnosis Check Wire No. 2</p>	<p>ELECTRONIC MODULATED SUSPENSION & REAR AIR SUSPENSION SYSTEM SUPPLEMENTAL RESTRAINT SYSTEM AIR CONDITIONING SYSTEM</p>
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Recommended Tools

	<p>09082-00040 TOYOTA Electrical Tester</p>	<p>WIPER AND WASHER SYSTEM LIGHTING SYSTEM COMBINATION METER SFI SYSTEM(2UZ-FE) ELECTRONIC CONTROLLED AUTOMATIC TRANSMISSION [ECT]</p>
	<p>(09083-00150) Test Lead Set</p>	<p>WIPER AND WASHER SYSTEM LIGHTING SYSTEM ELECTRONIC MODULATED SUSPENSION & REAR AIR SUSPENSION SYSTEM MULTIPLEX COMMUNICATION SYSTEM ENGINE IMMOBILIZER SYSTEM WIRELESS DOOR LOCK CONTROL SYSTEM CRUISE CONTROL SYSTEM COMBINATION METER POWER DOOR LOCK CONTROL SYSTEM KEY REMINDER WARNING SYSTEM SFI SYSTEM(2UZ-FE) ELECTRONIC CONTROLLED AUTOMATIC TRANSMISSION [ECT] AIR CONDITIONING SYSTEM</p>
	<p>09082-00050 TOYOTA Electrical Tester Set</p>	<p>POWER DOOR LOCK CONTROL SYSTEM</p>


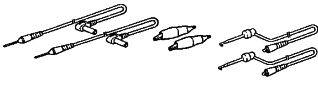
	<p>(09083-00150) Test Lead Set</p>	<p>WIPER AND WASHER SYSTEM LIGHTING SYSTEM ELECTRONIC MODULATED SUSPENSION & REAR AIR SUSPENSION SYSTEM MULTIPLEX COMMUNICATION SYSTEM ENGINE IMMOBILIZER SYSTEM WIRELESS DOOR LOCK CONTROL SYSTEM CRUISE CONTROL SYSTEM COMBINATION METER POWER DOOR LOCK CONTROL SYSTEM KEY REMINDER WARNING SYSTEM SFI SYSTEM(2UZ-FE) ELECTRONIC CONTROLLED AUTOMATIC TRANSMISSION [ECT] AIR CONDITIONING SYSTEM</p>
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ENGINE CONTROL SYSTEM

PREPARATION

0227S-03

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	SFI SYSTEM (2UZ-FE)
	(09083-00150) Test Lead Set	SFI SYSTEM (2UZ-FE)

Equipment

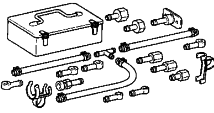
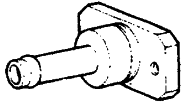
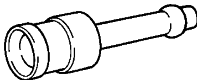


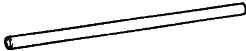


Service Wire Harness	
Torque wrench	
Ohmmeter	

FUEL

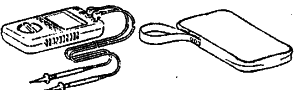

PREPARATION

SST

0227T-03

	09268-41047	Injection Measuring Tool Set	FUEL SYSTEM(2UZ-FE)
	(09268-41091)	NO.7 Union	FUEL SYSTEM(2UZ-FE)
	(09268-41110)	Adaptor	FUEL SYSTEM(2UZ-FE)
	(09268-41300)	Clamp	FUEL SYSTEM(2UZ-FE)
	(95333-06030)	Hose	FUEL SYSTEM(2UZ-FE)
	(95336-08070)	Hose	FUEL SYSTEM(2UZ-FE)
	(96150-02000)	C-Ring	FUEL SYSTEM(2UZ-FE)
	09842-30070	Wire "F" EFI Inspection	FUEL SYSTEM(2UZ-FE)

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	FUEL SYSTEM(2UZ-FE)
	(09083-00150)	Test Lead Set	FUEL SYSTEM(2UZ-FE)

Equipment

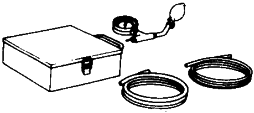
Service Wire Harness	
Stopwatch	
Measuring Flask	
Ohmmeter	
Clip	
Torque wrench	

EMISSION CONTROL



PREPARATION

0227U-03

SST

	09992-00242 Turbocharger Pressure Gauge	EMISSION CONTROL SYSTEM (2UZ-FE)
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Recommended Tools

	09082-00040 TOYOTA Electrical Tester	EMISSION CONTROL SYSTEM (2UZ-FE)
	(09083-00150) Test Lead Set	EMISSION CONTROL SYSTEM (2UZ-FE)


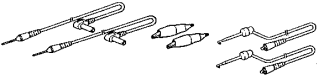
Equipment

Service Wire Harness	
Ohmmeter	
Torque wrench	
Vacuum gauge	
Hand-held vacuum pump	

INTAKE PREPARATION

024HR-01

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	INTAKE AIR CONTROL SYSTEM(2UZ-FE)
	(09083-00150) Test Lead Set	INTAKE AIR CONTROL SYSTEM(2UZ-FE)



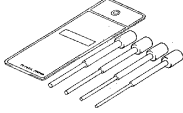
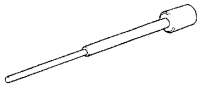

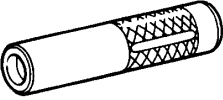
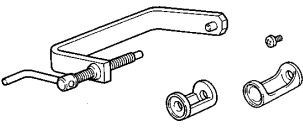
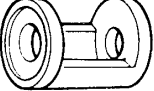
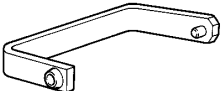
Equipment


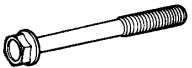
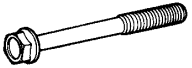

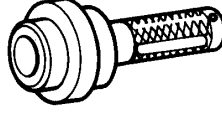
Hand-held vacuum pump	
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ENGINE MECHANICAL**PREPARATION**

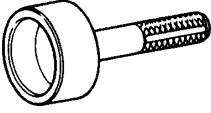
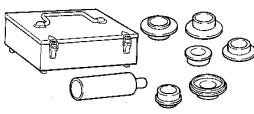
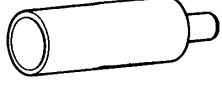
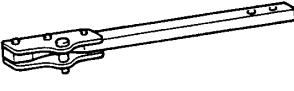
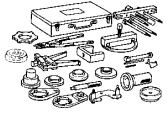
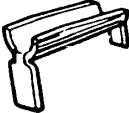

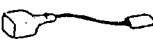

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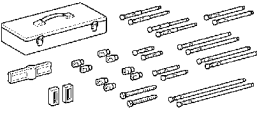
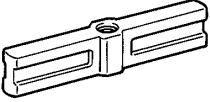
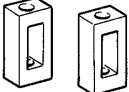
SST

	09023-12701	Union Nut Wrench 17 mm	ENGINE REAR OIL SEAL(2UZ-FE)
	09032-00100	Oil Pan Seal Cutter	PARTIAL ENGINE ASSY(2UZ-FE)
	09201-10000	Valve Guide Bushing Remover & Replacer Set	CYLINDER HEAD ASSY(2UZ-FE)
	(09201-01060)	Valve Guide Bushing Remover & Replacer 6	CYLINDER HEAD ASSY(2UZ-FE)
	(09951-07100)	Handle 100	PARTIAL ENGINE ASSY(2UZ-FE) CYLINDER HEAD ASSY(2UZ-FE) CYLINDER BLOCK ASSY(2UZ-FE)
	09201-41020	Valve Stem Oil Seal Replacer	CYLINDER HEAD ASSY(2UZ-FE)
	09202-70020	Valve Spring Compressor	CYLINDER HEAD ASSY(2UZ-FE)
	(09202-00010)	Attachment	CYLINDER HEAD ASSY(2UZ-FE)
	(09202-01010)	Arm	CYLINDER HEAD ASSY(2UZ-FE)


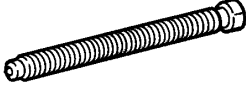
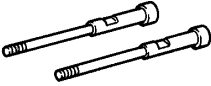

	09213-70011 Crankshaft Pulley Holding Tool	OIL PUMP SEAL(2UZ-FE) ENGINE REAR OIL SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(09213-70020) Bolt	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(90105-08076) Bolt	PARTIAL ENGINE ASSY(2UZ-FE)
	09222-30010 Connecting Rod Bushing Remover & Replacer	CYLINDER BLOCK ASSY(2UZ-FE)
	09223-46011 Crankshaft Front Oil Seal Replacer	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)

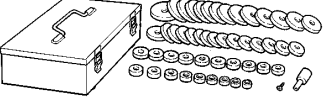




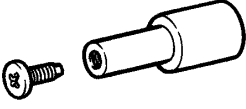
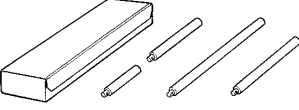

PREPARATION - ENGINE MECHANICAL

	09223-56010	Crankshaft Rear Oil Seal Replacer	ENGINE REAR OIL SEAL(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE)
	09316-60011	Transmission & Transfer Bearing Replacer	OIL PUMP SEAL(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE)
	(09316-00011)	Replacer Pipe	OIL PUMP SEAL(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE)
	09330-00021	Companion Flange Holding Tool	OIL PUMP SEAL(2UZ-FE) ENGINE REAR OIL SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	09350-32014	TOYOTA Automatic Transmission Tool Set	ENGINE REAR OIL SEAL(2UZ-FE)
	(09351-32020)	Stator Stopper	ENGINE REAR OIL SEAL(2UZ-FE)
	09816-30010	Oil Pressure Switch Socket	PARTIAL ENGINE ASSY(2UZ-FE)
	09843-18030	Tacho-pulse Pickup Wire No. 2	ENGINE(2UZ-FE)
	09843-18040	Diagnosis Check Wire No. 2	ENGINE(2UZ-FE)

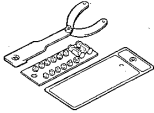
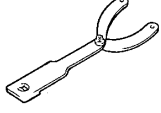


	09950-50013 Puller C Set	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(09951-05010) Hanger 150	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(09952-05010) Slide Arm	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)

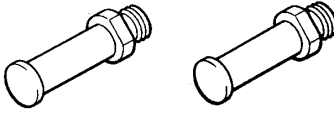
PREPARATION - ENGINE MECHANICAL

	(09953-05010) Center Bolt 100	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(09953-05020) Center Bolt 150	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)
	(09954-05010) Claw No. 1	OIL PUMP SEAL(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE)
	(09954-05021) Claw No. 2	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE)

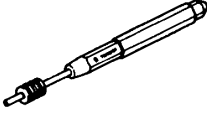
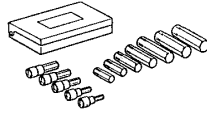
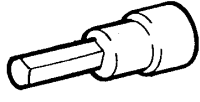
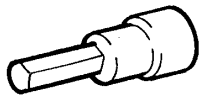
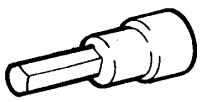
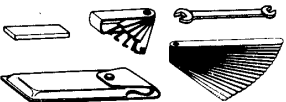
	<p>09950-60010 Replacer Set</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE) CYLINDER HEAD ASSY(2UZ-FE) CYLINDER BLOCK ASSY(2UZ-FE)</p>
	<p>(09951-00240) Replacer 24</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE)</p>
	<p>(09951-00300) Replacer 30</p>	<p>CYLINDER HEAD ASSY(2UZ-FE)</p>
	<p>(09951-00350) Replacer 35</p>	<p>CYLINDER BLOCK ASSY(2UZ-FE)</p>
	<p>(09951-00440) Replacer 44</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE)</p>
	<p>(09952-06010) Adapter</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE)</p>
	<p>09950-70010 Handle Set</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE) CYLINDER HEAD ASSY(2UZ-FE) CYLINDER BLOCK ASSY(2UZ-FE)</p>
	<p>(09951-07100) Handle 100</p>	<p>PARTIAL ENGINE ASSY(2UZ-FE) CYLINDER HEAD ASSY(2UZ-FE) CYLINDER BLOCK ASSY(2UZ-FE)</p>

PREPARATION - ENGINE MECHANICAL


	09960-10010 Variable Pin Wrench Set	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE) CYLINDER HEAD GASKET NO.2(2UZ-FE)
	(09962-01000) Variable Pin Wrench Arm Assy	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE) CYLINDER HEAD GASKET NO.2(2UZ-FE)
	(09963-00350) Pin 3.5	PARTIAL ENGINE ASSY(2UZ-FE) TIMING BELT(2UZ-FE)
	(09963-00500) Pin 5	PARTIAL ENGINE ASSY(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE) CYLINDER HEAD GASKET NO.2(2UZ-FE)

	(09963-01000) Pin 10	OIL PUMP SEAL(2UZ-FE) VALVE CLEARANCE(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE) CYLINDER HEAD GASKET NO.2(2UZ-FE)
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Recommended Tools

	09031-00040 Pin Punch	CYLINDER HEAD ASSY(2UZ-FE)
	09040-00011 Hexagon Wrench Set	PARTIAL ENGINE ASSY(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE)
	(09043-20050) Socket Hexagon Wrench 5	PARTIAL ENGINE ASSY(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE)
	(09043-20060) Socket Hexagon Wrench 6	PARTIAL ENGINE ASSY(2UZ-FE)
	(09043-20100) Socket Hexagon Wrench 10	PARTIAL ENGINE ASSY(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE)
	09200-00010 Engine Adjust Kit	PARTIAL ENGINE ASSY(2UZ-FE)

PREPARATION - ENGINE MECHANICAL

	09904-00010 Expander Set	PARTIAL ENGINE ASSY(2UZ-FE)
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SSM

	08826-00080 Seal Packing Black or equivalent (FIPG)	PARTIAL ENGINE ASSY(2UZ-FE) CAMSHAFT (RH BANK)(2UZ-FE) CAMSHAFT (LH BANK)(2UZ-FE) CYLINDER HEAD GASKET(2UZ-FE) CYLINDER HEAD GASKET NO.2(2UZ-FE)
	08826-00100 "Seal Packing 1282B" THREE BOND 1282B or equivalent (FIPG)	PARTIAL ENGINE ASSY(2UZ-FE)
	08833-00070 "Adhesive 1324" THREE BOND 1324 or equivalent	ENGINE REAR OIL SEAL(2UZ-FE) PARTIAL ENGINE ASSY(2UZ-FE) CYLINDER BLOCK ASSY(2UZ-FE)

Equipment

Reamer	
V-block	
Piston ring compressor	
Piston ring expander	
Valve seat cutter	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Feeler gauge	
Micrometer	
Precision straight edge	
Radiator cap tester	
Steel square	
Tachometer	
Torque wrench	
Vernier calipers	
Dial indicator with magnetic base	
Spring tension gauge	
OBD II scan tool	
Engine Sling Device	
Chain Block	

Spring tester	
Plastigage	
Heater	
Universal engine lifter	
Plastic Hammer	
Press	
Timing light	
Engine tune-up tester	

EXHAUST PREPARATION

0227X-02

Equipment



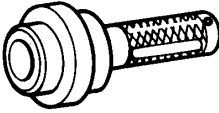
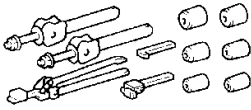
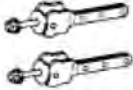

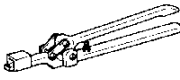




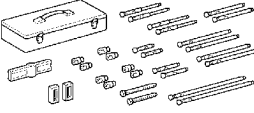
Torque wrench	
Vernier calipers	

COOLING

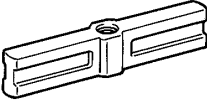
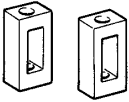



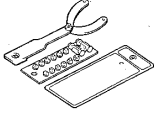
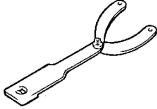
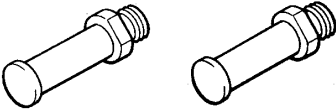
PREPARATION

SST

0227Y-03

	09213-70011 Crankshaft Pulley Holding Tool	WATER PUMP ASSY(2UZ-FE)
	(09213-70020) Bolt	WATER PUMP ASSY(2UZ-FE)
	09223-46011 Crankshaft Front Oil Seal Replacer	WATER PUMP ASSY(2UZ-FE)
	09230-01010 Radiator Service Tool Set	RADIATOR ASSY (2UZ-FE)
	(09231-00030) Plug Handle	RADIATOR ASSY (2UZ-FE)
	(09231-00060) No.3 Plug	RADIATOR ASSY (2UZ-FE)
	(09231-01010) Overhaul Handle	RADIATOR ASSY (2UZ-FE)
	09231-01020 Punch Assembly	RADIATOR ASSY (2UZ-FE)
	(09231-01030) Claw	RADIATOR ASSY (2UZ-FE)
	(09231-14010) Punch	RADIATOR ASSY (2UZ-FE)
	09330-00021 Companion Flange Holding Tool	WATER PUMP ASSY(2UZ-FE)
	09950-50013 Puller C Set	WATER PUMP ASSY(2UZ-FE)

PREPARATION - COOLING

	(09951-05010) Hanger 150	WATER PUMP ASSY(2UZ-FE)
	(09952-05010) Slide Arm	WATER PUMP ASSY(2UZ-FE)
	(09953-05010) Center Bolt 100	WATER PUMP ASSY(2UZ-FE)
	(09953-05020) Center Bolt 150	WATER PUMP ASSY(2UZ-FE)
	(09954-05021) Claw No.2	WATER PUMP ASSY(2UZ-FE)
	09960-10010 Variable Pin Wrench Set	WATER PUMP ASSY(2UZ-FE)
	(09962-01000) Variable Pin Wrench Arm Assy	WATER PUMP ASSY(2UZ-FE)
	(09963-01000) Pin 10	WATER PUMP ASSY(2UZ-FE)

Equipment

CO/HC meter	
Radiator cap tester	
Thermometer	
Torque wrench	
Vernier calipers	
Heater	

Coolant



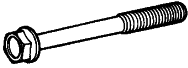


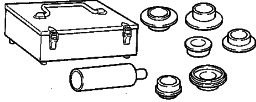


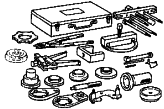
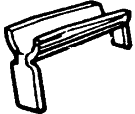
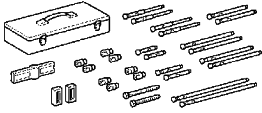
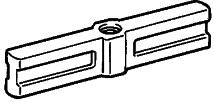
Item	Capacity	Classification
Engine coolant	12.9 liters (13.6 US qts, 11.4 Imp. qts)	"TOYOTA SUPER LONG LIFE Antifreeze Coolant" or equivalent

LUBRICATION

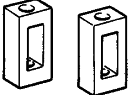

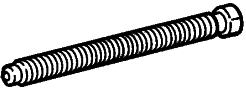

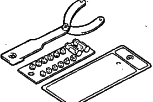
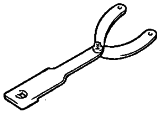

PREPARATION

SST

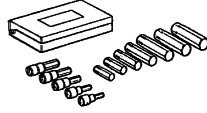
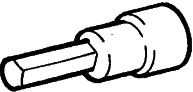
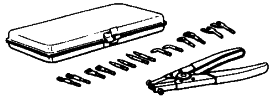
024HS-01

	09032-00100	Oil Pan Seal Cutter	OIL PUMP ASSY(2UZ-FE)
	09213-70011	Crankshaft Pulley Holding Tool	OIL PUMP ASSY(2UZ-FE)
	(90105-08076)	Bolt	OIL PUMP ASSY(2UZ-FE)
	09223-46011	Crankshaft Front Oil Seal Replacer	OIL PUMP ASSY(2UZ-FE)
	09228-07501	Oil Filter Wrench	OIL FILTER ASSY(2UZ-FE) OIL COOLER ASSY(2UZ-FE)
	09316-60011	Transmission & Transfer Bearing Replacer	OIL PUMP ASSY(2UZ-FE)
	(09316-00011)	Replacer Pipe	OIL PUMP ASSY(2UZ-FE)
	09330-00021	Companion Flange Holding Tool	OIL PUMP ASSY(2UZ-FE)
	09350-32014	TOYOTA Automatic Transmission Tool Set	OIL PUMP ASSY(2UZ-FE)
	(09351-32020)	Stator Stopper	OIL PUMP ASSY(2UZ-FE)
	09950-50013	Puller C Set	OIL PUMP ASSY(2UZ-FE)
	(09951-05010)	Hanger 150	OIL PUMP ASSY(2UZ-FE)

PREPARATION - LUBRICATION

	(09952-05010) Slide Arm	OIL PUMP ASSY(2UZ-FE)
	(09953-05010) Center Bolt 100	OIL PUMP ASSY(2UZ-FE)
	(09953-05020) Center Bolt 150	OIL PUMP ASSY(2UZ-FE)
	(09954-05021) Claw No.2	OIL PUMP ASSY(2UZ-FE)
	09960-10010 Variable Pin Wrench Set	OIL PUMP ASSY(2UZ-FE)
	(09962-01000) Variable Pin Wrench Arm Assy	OIL PUMP ASSY(2UZ-FE)
	(09963-00350) Pin 3.5	OIL PUMP ASSY(2UZ-FE)

Recommended Tools

	09040-00011 Hexagon Wrench Set	OIL PUMP ASSY(2UZ-FE)
	(09043-20060) Socket Hexagon Wrench 6	OIL PUMP ASSY(2UZ-FE)
	09904-00010 Expander Set	OIL PUMP ASSY(2UZ-FE)

SSM

	08826-00080 Seal Packing Black or equivalent (FIPG)	OIL PUMP ASSY(2UZ-FE)
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Equipment

Feeler gauge	
CO/HC meter	
Straight edge	
Torque wrench	


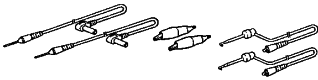
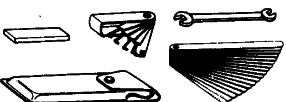

Lubricant

Item	Capacity	Classification
Engine oil		API grade SL, Energy-Conserving or ILSAC multigrade engine oil. SAE 5W-30 is the best choice for good fuel economy, and good starting in cold weather
Dry fill	7.1 liters (7.5 US qts, 6.2 Imp. qts)	
Drain and refill	6.2 liters (6.5 US qts, 5.5 Imp. qts)	
	w/ oil filter change	
	w/o oil filter change	5.7 liters (6.0 US qts, 5.0 Imp. qts)

IGNITION PREPARATION

02280-03

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	IGNITION SYSTEM(2UZ-FE)
	(09083-00150) Test Lead Set	IGNITION SYSTEM(2UZ-FE)
	09200-00010 Engine Adjust Kit	IGNITION SYSTEM(2UZ-FE)
	(09857-00031) Spark Plug Gap Gauge	IGNITION SYSTEM(2UZ-FE)


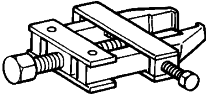

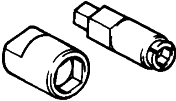

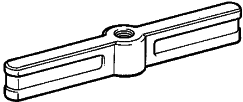
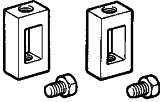
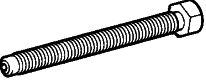
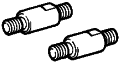
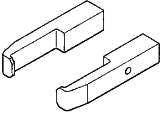

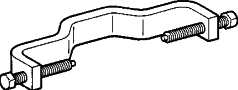
Equipment

Spark plug cleaner	
Torque wrench	

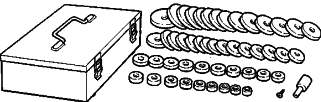


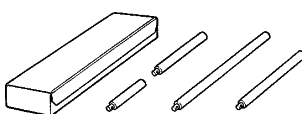

STARTING & CHARGING**PREPARATION**

02281-03


SST

	09285-76010	Injection Pump Camshaft Bearing Cone Replacer	GENERATOR ASSY(2UZ-FE)
	09820-00021	Alternator Rear Bearing Puller	GENERATOR ASSY(2UZ-FE)
	09820-00031	Alternator Rotor Rear Bearing Replacer	GENERATOR ASSY(2UZ-FE)
	09820-63011	Alternator Pulley Set Nut Wrench Set	GENERATOR ASSY(2UZ-FE)
	09950-40011	Puller B Set	GENERATOR ASSY(2UZ-FE)
	(09951-04020)	Hanger 200	GENERATOR ASSY(2UZ-FE)
	(09952-04010)	Slide Arm	GENERATOR ASSY(2UZ-FE)
	(09953-04020)	Center Bolt 150	GENERATOR ASSY(2UZ-FE)
	(09954-04010)	Arm 25	GENERATOR ASSY(2UZ-FE)
	(09955-04071)	Claw No.7	GENERATOR ASSY(2UZ-FE)
	(09957-04010)	Attachment	GENERATOR ASSY(2UZ-FE)
	(09958-04011)	Holder	GENERATOR ASSY(2UZ-FE)

PREPARATION - STARTING & CHARGING

	09950-60010 Replacer Set	GENERATOR ASSY(2UZ-FE)
	(09951-00250) Replacer 25	GENERATOR ASSY(2UZ-FE)
	(09951-00470) Replacer 47	GENERATOR ASSY(2UZ-FE)
	09950-70010 Handle Set	GENERATOR ASSY(2UZ-FE)
	(09951-07100) Handle 100	GENERATOR ASSY(2UZ-FE)

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	STARTER ASSY(2UZ-FE)
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Equipment

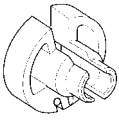

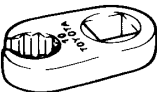
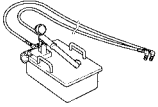
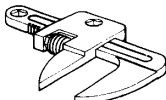
Dial indicator	
Ammeter (A)	
Ohmmeter	
Torque wrench	
V-block	
Vernier calipers	
Dial indicator with magnetic base	
Press	
Service Wire Harness	
Pull scale	

SUSPENSION CONTROL SYSTEM

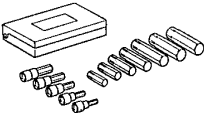
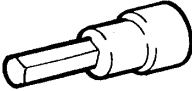
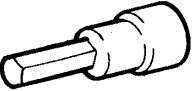
PREPARATION

023SA-02

SST

	09730-00010	Tube Remover	HEIGHT CONTROL RESERVOIR ASSY
	09023-00101	Union Nut Wrench 10 mm	STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS)
	09023-12701	Union Nut Wrench 17 mm	FRONT STABILIZER(KDSS) STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS)
	09760-60010	High Pressure Oil Pump	FRONT STABILIZER(KDSS) REAR STABILIZER(KDSS) STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS) SUSPENSION FLUID(KDSS)
	09922-10010	Variable Open Wrench	STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS)

Recommended Tools

	09040-00011	Hexagon Wrench Set	FRONT STABILIZER(KDSS) REAR STABILIZER(KDSS) STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS) SUSPENSION FLUID(KDSS)
	(09043-20080)	Socket Hexagon Wrench 8	FRONT STABILIZER(KDSS) REAR STABILIZER(KDSS) STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS) SUSPENSION FLUID(KDSS)
	(09043-20100)	Socket Hexagon Wrench 10	FRONT STABILIZER(KDSS) REAR STABILIZER(KDSS) STABILIZER CONTROL W/BRACKET VALVE ASSY(KDSS) SUSPENSION FLUID(KDSS)

Equipment

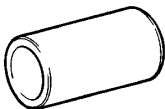
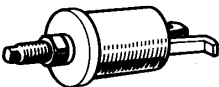
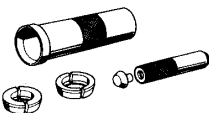
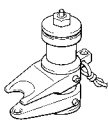

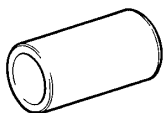
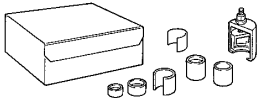



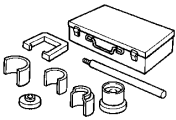

Torque wrench	
Drill (Safety equipment: protective goggles, etc.)	Stabilizer control w/ accumulator housing disposal


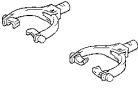
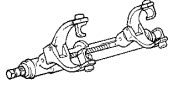
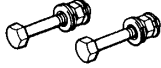
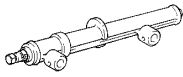
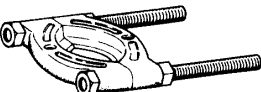
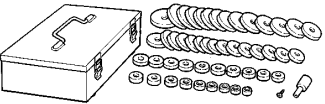

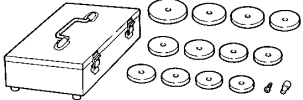

FRONT SUSPENSION

PREPARATION

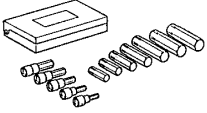
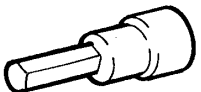
02270-01

SST

	09223-00010	Cover & Seal Replacer	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09612-30012	Steering Worm Bearing Puller	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09613-26010	Steering Worm Bearing Cone Remover	FRONT SUSPENSION UPPER ARM ASSY LH
	09628-00011	Ball Joint Puller	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09628-62011	Ball Joint Puller	FRONT SUSPENSION UPPER ARM ASSY LH
	09632-36010	Steering Vane Pump Bearing Replacer	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09710-22021	Front Suspension Bushing Tool Set	FRONT SHOCK ABSORBER WITH COIL SPRING FRONT SUSPENSION UPPER ARM ASSY LH
	(09710-01031)	Upper Arm Bushing Replacer	FRONT SUSPENSION UPPER ARM ASSY LH
	(09710-01071)	Lower Arm Bushing Remover	FRONT SHOCK ABSORBER WITH COIL SPRING
	(09710-01081)	Lower Arm Bushing Replacer	FRONT SHOCK ABSORBER WITH COIL SPRING
	09710-26010	Rear Suspension Bushing Tool Set	FRONT SUSPENSION UPPER ARM ASSY LH FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	(09710-05061)	Replacer	FRONT SUSPENSION UPPER ARM ASSY LH

	(09710-05081) Rear Base	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09727-00060 "Arm Set "C""	FRONT SHOCK ABSORBER WITH COIL SPRING
	09727-30021 Coil Spring Compressor	FRONT SHOCK ABSORBER WITH COIL SPRING
	(09727-00010) Bolt Set	FRONT SHOCK ABSORBER WITH COIL SPRING
	(09727-00031) Compressor	FRONT SHOCK ABSORBER WITH COIL SPRING
	09950-00020 Bearing Remover	FRONT SUSPENSION UPPER ARM ASSY LH FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09950-60010 Replacer Set	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	(09951-00400) Replacer 40	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	09950-60020 Replacer Set No.2	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH
	(09951-00890) Replacer 89	FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

Recommended Tools

	09040-00011 Hexagon Wrench Set	FRONT SHOCK ABSORBER WITH COIL SPRING STABILIZER BAR FRONT
	(09043-20060) Socket Hexagon Wrench 6	FRONT SHOCK ABSORBER WITH COIL SPRING STABILIZER BAR FRONT

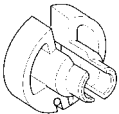
Equipment

Torque wrench	
Dial indicator with magnetic base	
Tire pressure gauge	
Alignment tester	
Toe-in gauge	
Angle gauge	

REAR SUSPENSION**PREPARATION**

0227F-01

SST

	09730-00010 Tube Remover	PNEUMATIC CYLINDER ASSY REAR LH
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Equipment

Torque wrench	
Wooden block	

TIRE & WHEEL PREPARATION

0227P-01

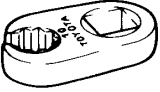
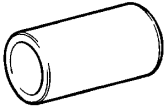



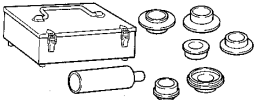


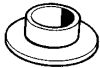
Equipment

Torque wrench	
Dial indicator with magnetic base	
Wheel balancer	




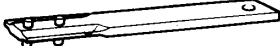


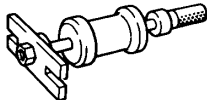
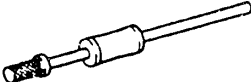

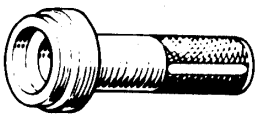
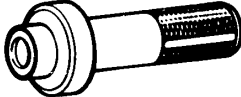
DIFFERENTIAL PREPARATION

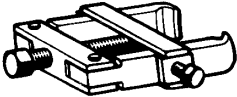
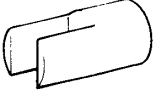
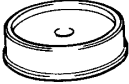
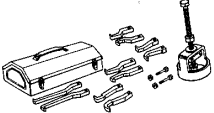
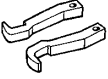
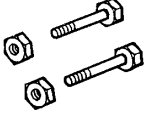
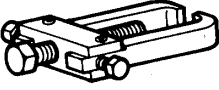
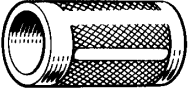
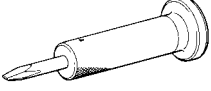

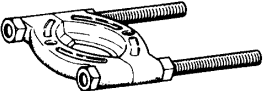
SST

0227M-03

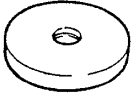
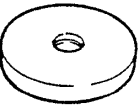
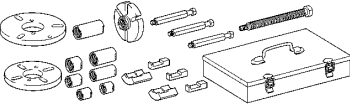


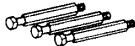


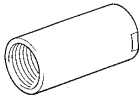
	09023-00101	Union Nut Wrench 10 mm	DIFFERENTIAL CARRIER ASSY REAR
	09223-00010	Cover & Seal Replacer	DIFFERENTIAL CARRIER ASSY FRONT
	09223-15020	Oil Seal & Bearing Replacer	DIFFERENTIAL CARRIER ASSY FRONT
	09308-00010	Oil Seal Puller	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	09308-10010	Oil Seal Puller	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	09316-60011	Transmission & Transfer Bearing Replacer	DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09316-00011)	Replacer Pipe	DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09316-00021)	Replacer "A"	DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09316-00041)	Replacer "C"	DIFFERENTIAL CARRIER ASSY REAR

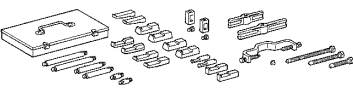
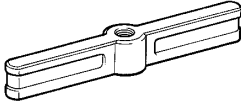
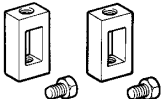
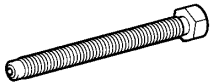
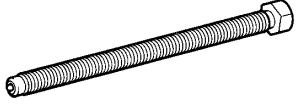
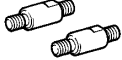
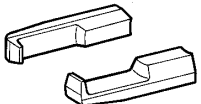

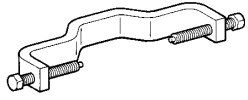
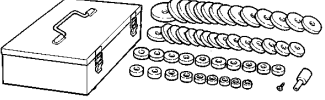



PREPARATION - DIFFERENTIAL

	09330-00021 Companion Flange Holding Tool	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09330-00030) Pin	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	09502-12010 Differential Bearing Replacer	DIFFERENTIAL CARRIER ASSY FRONT
	09504-00011 Differential Side Bearing Adjusting Nut Wrench	DIFFERENTIAL CARRIER ASSY REAR
	09506-30012 Differential Drive Pinion Rear Bearing Cone Replacer	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR
	09520-01010 Drive Shaft Remover Attachment	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT
	09520-24010 Differential Side Gear Shaft Puller	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT
	(09520-32040) Shocker Set	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT
	09550-00032 Replacer	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL
	09554-22010 Differential Oil Seal Replacer	DIFFERENTIAL CARRIER ASSY FRONT FRONT DIFFERENTIAL CARRIER OIL SEAL
	09554-30011 Differential Oil Seal Replacer	DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL







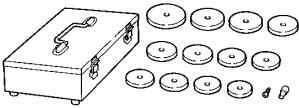
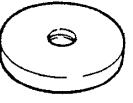
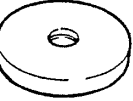
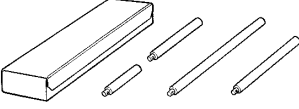


	09556-22010	Drive Pinion Front Bearing Remover	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	09564-32011	Differential Preload Adaptor	DIFFERENTIAL CARRIER ASSY FRONT
	09608-32010	Steering Knuckle Oil Seal Replacer	DIFFERENTIAL CARRIER ASSY FRONT
	09612-65014	Steering Worm Bearing Puller	DIFFERENTIAL CARRIER ASSY FRONT
	(09612-01020)	Claw "B"	DIFFERENTIAL CARRIER ASSY FRONT
	(09612-01050)	Hanger Pin with Nut	DIFFERENTIAL CARRIER ASSY FRONT
	09628-62011	Boll Joint Puller	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT
	09636-20010	Upper Ball Joint Dust Cover Replacer	DIFFERENTIAL CARRIER ASSY REAR
	09930-00010	Drive Shaft Nut Chisel	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09330-00030)	Pin	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	09950-00020	Bearing Remover	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR

PREPARATION - DIFFERENTIAL

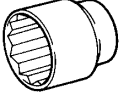

	(09951-00680) Replacer 68	DIFFERENTIAL CARRIER ASSY FRONT
	(09951-00890) Replacer 89	DIFFERENTIAL CARRIER ASSY FRONT
	09950-30012 Puller A Set	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09951-03010) Upper Plate	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09953-03010) Center Bolt	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09954-03010) Arm	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09955-03030) Lower Plate 130	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09956-03020) Adapter 18	DIFFERENTIAL CARRIER ASSY FRONT FRONT DIFFERENTIAL CARRIER OIL SEAL
	(09956-03030) Adaptor 20	DIFFERENTIAL CARRIER ASSY REAR REAR DIFFERENTIAL CARRIER OIL SEAL

	09950-40011 Puller B Set	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09951-04020) Hanger 200	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09952-04010) Slide Arm	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09953-04020) Center Bolt 150	DIFFERENTIAL FRONT	CARRIER	ASSY
	(09953-04030) Center Bolt 200	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09954-04010) Arm 25	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09955-04061) Claw No.6	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09957-04010) Attachment	DIFFERENTIAL REAR	CARRIER	ASSY
	(09958-04011) Holder	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	09950-60010 Replacer Set	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	(09951-00360) Replacer 36	DIFFERENTIAL REAR	CARRIER	ASSY
	(09951-00380) Replacer 38	DIFFERENTIAL REAR	CARRIER	ASSY
	(09951-00430) Replacer 43	DIFFERENTIAL REAR	CARRIER	ASSY

PREPARATION - DIFFERENTIAL

	(09951-00470) Replacer 47	DIFFERENTIAL CARRIER ASSY REAR
	(09951-00480) Replacer 48	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR
	(09951-00510) Replacer 51	DIFFERENTIAL CARRIER ASSY FRONT
	(09951-00520) Replacer 52	DIFFERENTIAL CARRIER ASSY FRONT
	(09951-00550) Replacer 55	DIFFERENTIAL CARRIER ASSY REAR
	(09951-00610) Replacer 61	DIFFERENTIAL CARRIER ASSY FRONT
	09950-60020 Replacer Set No.2	DIFFERENTIAL CARRIER ASSY FRONT
	(09951-00680) Replacer 68	DIFFERENTIAL CARRIER ASSY FRONT
	(09951-00810) Replacer 81	DIFFERENTIAL CARRIER ASSY FRONT
	09950-70010 Handle Set	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR
	(09951-07100) Handle 100	DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL
	(09951-07150) Handle 150	DIFFERENTIAL CARRIER ASSY FRONT DIFFERENTIAL CARRIER ASSY REAR

Recommended Tools

	09011-12301	Socket Wrench 30 mm	DIFFERENTIAL FRONT DIFFERENTIAL REAR	CARRIER	ASSY
	09031-00030	Pin Punch	DIFFERENTIAL FRONT	CARRIER	ASSY
	09044-00010	Torx Socket E14	DIFFERENTIAL FRONT	CARRIER	ASSY
	09905-00012	Snap Ring No.1 Expander	DIFFERENTIAL FRONT	CARRIER	ASSY
	09905-00013	Snap Ring Pliers	DIFFERENTIAL FRONT	CARRIER	ASSY

Torx is a registered trademark of Textron Inc.

Equipment

Dial indicator	
Micrometer	
Torque wrench	
Vernier calipers	
Press	

Lubricant

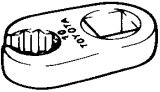
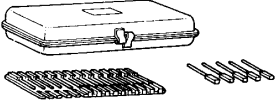

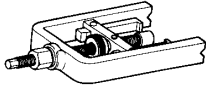

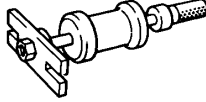
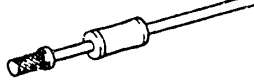
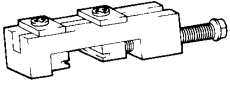

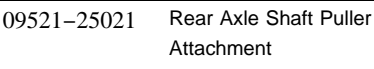
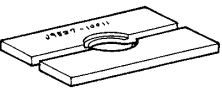

Item	Capacity	Classification
Front differential oil	1.40 ± 0.05 liters (1.48 ± 0.05 US qts, 1.23 ± 0.04 Imp.qts)	Hypoid gear oil APL GL-5 Above - 18°C (0°F): SAE 90 Below - 18°C (0°F): SAE 80W or 80W - 90
Rear differential oil	3.05 ± 0.05 liters (3.22 ± 0.05 US qts, 2.68 ± 0.04 Imp.qts)	Hypoid gear oil APL GL-5 Above - 18°C (0°F): SAE 90 Below - 18°C (0°F): SAE 80W or 80W - 90

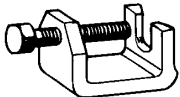
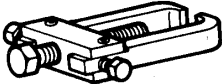
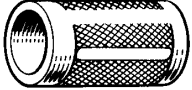
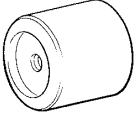
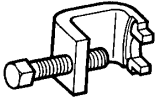
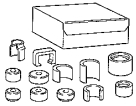

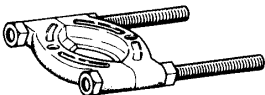

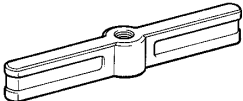
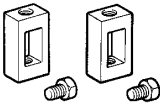
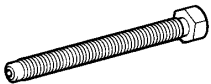
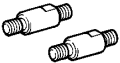
DRIVE SHAFT / PROPELLER SHAFT

PREPARATION

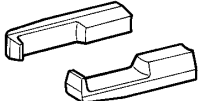

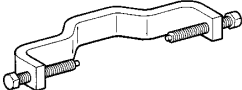
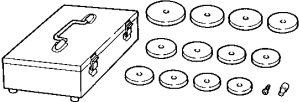

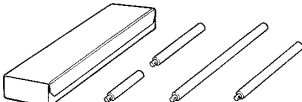



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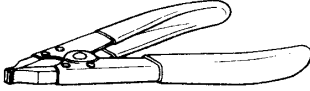
	09023-00101	Union Nut Wrench 10 mm	FRONT AXLE HUB SUB-ASSY LH FRONT AXLE LH HUB BOLT REAR AXLE SHAFT LH
	09240-00020	Wire Gauge Set	FRONT DRIVE SHAFT ASSY LH
	09308-00010	Oil Seal Puller	FRONT AXLE HUB SUB-ASSY LH REAR AXLE SHAFT LH
	09332-25010	Propeller Shaft Center Bearing Replacer	PROPELLER SHAFT ASSY FRONT PROPELLER SHAFT ASSY
	09520-01010	Drive Shaft Remover Attachment	FRONT DRIVE SHAFT ASSY LH
	09520-24010	Differential Side Gear Shaft Puller	FRONT DRIVE SHAFT ASSY LH
	(09520-32040)	Shocker Set	FRONT DRIVE SHAFT ASSY LH
	09521-24010	Rear Axle Shaft Puller	FRONT DRIVE SHAFT ASSY LH
	09521-25011	Rear Axle Shaft Puller	REAR AXLE SHAFT LH
	09521-25021	Rear Axle Shaft Puller Attachment	REAR AXLE SHAFT LH
	09527-10011	Rear Axle Shaft Bearing Remover	FRONT DRIVE SHAFT ASSY LH
	09527-17011	Rear Axle Shaft Bearing Remover	FRONT AXLE HUB SUB-ASSY LH

	09611-12010 Tie Rod End Puller	FRONT AXLE LH HUB BOLT
	09628-62011 Ball Joint Puller	FRONT DRIVE SHAFT ASSY LH FRONT AXLE HUB SUB-ASSY LH
	09636-20010 Upper Ball Joint Dust Cover Replacer	PROPELLER SHAFT ASSY FRONT PROPELLER SHAFT ASSY
	09649-17010 Steering Knuckle Tool	FRONT AXLE HUB SUB-ASSY LH
	09650-17011 Hub Bolt Remover	REAR AXLE SHAFT LH REAR AXLE LH HUB BOLT
	09710-30021 Suspension Bushing Tool Set	FRONT AXLE HUB SUB-ASSY LH
	(09710-03051) Bushing Replacer	FRONT AXLE HUB SUB-ASSY LH
	09950-00020 Bearing Remover	FRONT DRIVE SHAFT ASSY LH
	09950-40011 Puller B Set	FRONT AXLE HUB SUB-ASSY LH
	(09951-04020) Hanger 200	FRONT AXLE HUB SUB-ASSY LH
	(09952-04010) Slide Arm	FRONT AXLE HUB SUB-ASSY LH
	(09953-04020) Center Bolt 150	FRONT AXLE HUB SUB-ASSY LH
	(09954-04010) Arm 25	FRONT AXLE HUB SUB-ASSY LH

PREPARATION - DRIVE SHAFT / PROPELLER SHAFT

	(09955-04061) Claw No.6	FRONT AXLE HUB SUB-ASSY LH
	(09957-04010) Attachment	FRONT AXLE HUB SUB-ASSY LH
	(09958-04011) Holder	FRONT AXLE HUB SUB-ASSY LH
	09950-60020 Replacer Set No.2	REAR AXLE SHAFT LH
	(09951-00770) Replacer 77	REAR AXLE SHAFT LH
	09950-70010 Handle Set	FRONT AXLE HUB SUB-ASSY LH REAR AXLE SHAFT LH
	(09951-07100) Handle 100	FRONT AXLE HUB SUB-ASSY LH
	(09951-07150) Handle 150	REAR AXLE SHAFT LH
	09951-01000 Replacer 100	FRONT AXLE HUB SUB-ASSY LH

Recommended Tools

	09905-00012 Snap Ring No.1 Expander	FRONT DRIVE SHAFT ASSY LH REAR AXLE SHAFT LH
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
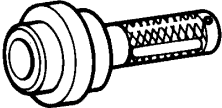
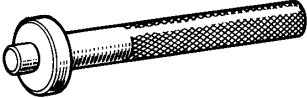

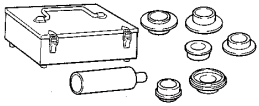
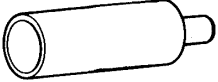



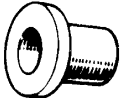
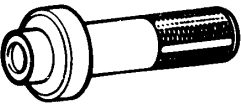

Equipment

Torque wrench	
Dial indicator with magnetic base	
Spring tension gauge	

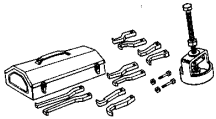
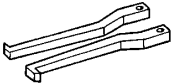
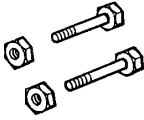
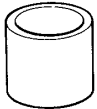
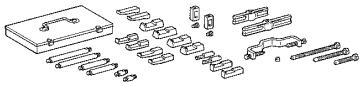
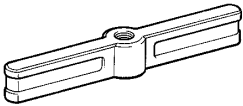
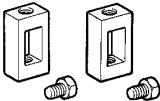
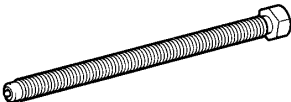
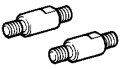
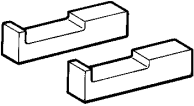

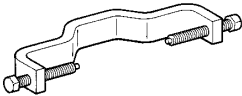
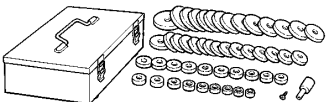
TRANSFER PREPARATION




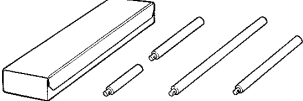

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	09223-15020	Oil Seal & Bearing Replacer	TRANSFER ASSY
	09223-46011	Crankshaft Front Oil Seal Replacer	TRANSFER EXTENSION HOUSING TYPE T OIL SEAL TRANSFER ASSY
	09304-12012	Input Shaft Front Bearing Replacer	TRANSFER ASSY
	09308-00010	Oil Seal Puller	TRANSFER CASE OIL SEAL TRANSFER EXTENSION HOUSING TYPE T OIL SEAL
	09316-60011	Transmission & Transfer Bearing Replacer	TRANSFER CASE OIL SEAL TRANSFER ASSY
	(09316-00011)	Replacer Pipe	TRANSFER CASE OIL SEAL TRANSFER ASSY
	(09316-00031)	Replacer "B"	TRANSFER ASSY
	(09316-00071)	Replacer "F"	TRANSFER ASSY
	09330-00021	Companion Flange Holding Tool	TRANSFER ASSY
	09515-30010	Rear Wheel Bearing Replacer	TRANSFER ASSY
	09554-30011	Differential Oil Seal Replacer	TRANSFER ASSY
	09555-55010	Differential Drive Pinion Bearing Replacer	TRANSFER ASSY

PREPARATION - TRANSFER

	09612-65014 Steering Worm Bearing Puller	TRANSFER ASSY
	(09612-01030) Claw "C"	TRANSFER ASSY
	(09612-01050) Hanger Pin with Nut	TRANSFER ASSY
	09631-32020 Seal Ring Tool	TRANSFER EXTENSION HOUSING TYPE T OIL SEAL TRANSFER ASSY
	09950-40011 Puller B Set	TRANSFER ASSY
	(09951-04020) Hanger 200	TRANSFER ASSY
	(09952-04010) Slide Arm	TRANSFER ASSY
	(09953-04030) Center Bolt 200	TRANSFER ASSY
	(09954-04010) Arm 25	TRANSFER ASSY
	(09955-04051) Claw No.5	TRANSFER ASSY
	(09957-04010) Attachment	TRANSFER ASSY
	(09958-04011) Holder	TRANSFER ASSY
	09950-60010 Replacer Set	TRANSFER ASSY

	(09951-00320) Replacer 32	TRANSFER ASSY
	(09951-00570) Replacer 57	TRANSFER ASSY
	(09951-00590) Replacer 59	TRANSFER ASSY
	09950-70010 Handle Set	TRANSFER ASSY
	(09951-07100) Handle 100	TRANSFER ASSY

Equipment

Dial indicator	
Dial indicator with magnetic base	
Micrometer	
Torque wrench	
Plastic hammer	
Vernier calipers	

Lubricant

Transfer oil	1.4 liters (1.5 US qts, 1.2 Imp. qts)	API GL-5 SAE 75W-90
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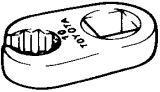
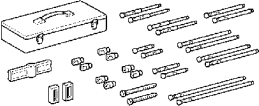
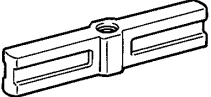
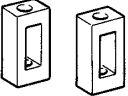
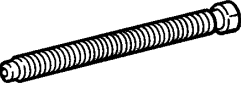

SSM (Special Service Materials)

08826-00090	"Seal Packing 1281," THREE BOND 1281 or equivalent (FIPG)	TRANSFER ASSY
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	TRANSFER ASSY


BRAKE PREPARATION

024HP-01

SST

	09023-00101	Union Nut Wrench 10 mm	FRONT BRAKE W/MASTER CYLINDER BRAKE BOOSTER ASSY
	09950-50013	Puller C Set	STEERING SENSOR
	(09951-05010)	Hanger 150	STEERING SENSOR
	(09952-05010)	Slide Arm	STEERING SENSOR
	(09953-05020)	Center Bolt 150	STEERING SENSOR
	(09954-05021)	Claw No. 2	STEERING SENSOR

Recommended Tools

	09042-00010	Torx Socket T30	STEERING SENSOR
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Equipment

Micrometer	
Dial indicator w/ magnetic base	
Dial indicator or dial indicator w/ magnetic base	
Brake drum gauge	
Slide calipers	
Torque wrench	

Lubricant

Item	Capacity	Classification
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3

PARKING BRAKE

PREPARATION

0227G-01

Equipment

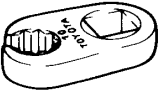

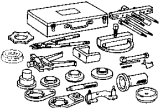
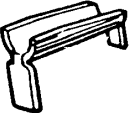

Torque wrench	
Slide calipers	

AUTOMATIC TRANSMISSION / TRANS

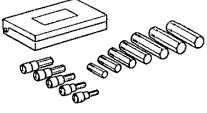
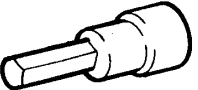
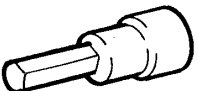
PREPARATION

023B2-02

SST

	09023-12701	Union Nut Wrench 17 mm	AUTOMATIC TRANSMISSION ASSY
	09032-00100	Oil Pan Seal Cutter	TRANSMISSION WIRE
	09350-32014	TOYOTA Automatic Transmission Tool Set	TORQUE CONVERTER CLUTCH AND DRIVE PLATE AUTOMATIC TRANSMISSION ASSY
	(09351-32020)	Stator Stopper	TORQUE CONVERTER CLUTCH AND DRIVE PLATE AUTOMATIC TRANSMISSION ASSY
	09843-18020	Diagnosis Check Wire	AUTOMATIC TRANSMISSION FLUID

Recommended Tools

	09040-00011	Hexagon Wrench Set	TRANSMISSION WIRE TRANSMISSION VALVE BODY ASSY
	(09043-20100)	Socket Hexagon Wrench 10	TRANSMISSION WIRE TRANSMISSION VALVE BODY ASSY
	(09043-20060)	Socket Hexagon Wrench 6	AUTOMATIC TRANSMISSION FLUID

Equipment

Straight edge	Torque converter
Vernier calipers	Torque converter
Dial indicator or dial indicator with magnetic base	Drive plate
Punch	
Torque wrench	

Lubricant

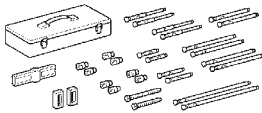
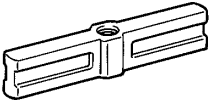
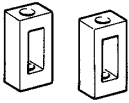
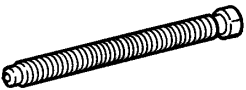

Automatic transmission fluid		
Dry fill	10.4 liters (11.0 US qts, 9.2 Imp.qts)	Toyota Genuine ATF WS
Drain and refill	3.0 liters (3.2 US qts, 2.6 Imp.qts)	

STEERING COLUMN

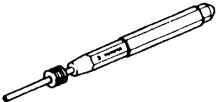
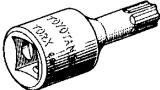
PREPARATION

02274-02

SST

	09950-50013 Puller C Set	STEERING COLUMN ASSY
	(09951-05010) Hanger 150	STEERING COLUMN ASSY
	(09952-05010) Slide Arm	STEERING COLUMN ASSY
	(09953-05020) Center Bolt 150	STEERING COLUMN ASSY
	(09954-05021) Claw No.2	STEERING COLUMN ASSY

Recommended Tools

	09031-00030 Pin Punch	STEERING COLUMN ASSY
	09042-00010 Torx Socket T30	STEERING COLUMN ASSY

Torx is a registered trademark of Textron Inc.

EQUIPMENT

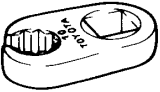
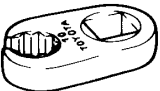
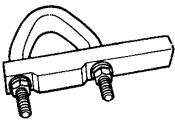
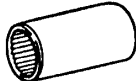

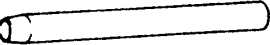
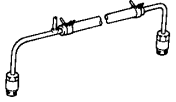

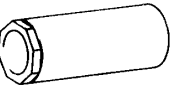
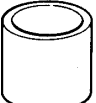
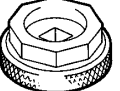
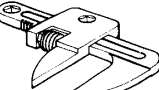
Torque wrench	
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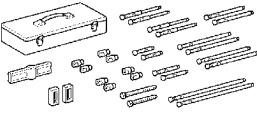
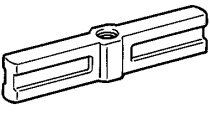
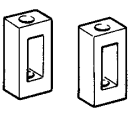
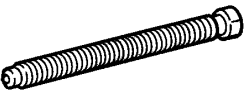
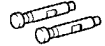
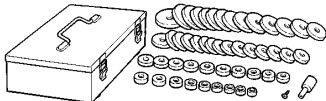



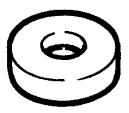


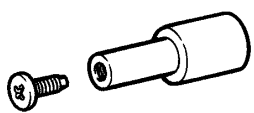
POWER STEERING

PREPARATION

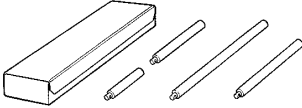



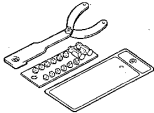
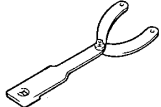
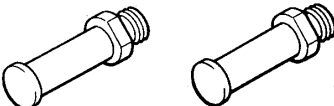
0227E-02

SST

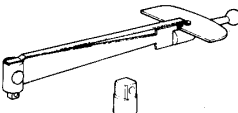
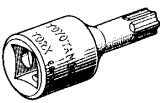
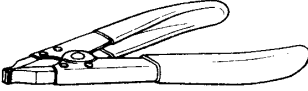
	09023-12701	Union Nut Wrench 17 mm	POWER STEERING LINK ASSY
	09023-38201	Union Nut Wrench 12mm	POWER STEERING LINK ASSY
	09612-00012	Rack & Pinion Steering Rack Housing Stand	POWER STEERING LINK ASSY
	09616-00011	Steering Worm Bearing Adjusting Socket	POWER STEERING LINK ASSY
	09628-62011	Boll Joint Puller	POWER STEERING LINK ASSY
	09631-00350	Steering Rack Cover 35	POWER STEERING LINK ASSY
	09631-12071	Steering Rack Oil Seal Test Tool	POWER STEERING LINK ASSY
	(09633-00010)	Packing	POWER STEERING LINK ASSY
	09631-20060	Bearing Guide Nut Wrench	POWER STEERING LINK ASSY
	09631-20081	Seal Ring Tool	POWER STEERING LINK ASSY
	09631-20120	Cylinder End Stopper Nut Wrench	POWER STEERING LINK ASSY
	09922-10010	Variable Open Wrench	POWER STEERING LINK ASSY

	09950-50013 Puller C Set	POWER STEERING LINK ASSY
	(09951-05010) Hanger 150	POWER STEERING LINK ASSY
	(09952-05010) Slide Arm	POWER STEERING LINK ASSY
	(09953-05020) Center Bolt 150	POWER STEERING LINK ASSY
	(09954-05021) Claw No.2	POWER STEERING LINK ASSY
	09950-60010 Replacer Set	VANE PUMP ASSY POWER STEERING LINK ASSY
	(09951-00180) Replacer 18	POWER STEERING LINK ASSY
	(09951-00250) Replacer 25	POWER STEERING LINK ASSY
	(09951-00300) Replacer 30	POWER STEERING LINK ASSY
	(09951-00320) Replacer 32	VANE PUMP ASSY POWER STEERING LINK ASSY
	(09951-00340) Replacer 34	POWER STEERING LINK ASSY
	(09951-00390) Replacer 39	POWER STEERING LINK ASSY
	(09952-06010) Adapter	POWER STEERING LINK ASSY

PREPARATION - POWER STEERING

	09950-70010 Handle Set	VANE PUMP ASSY POWER STEERING LINK ASSY
	(09951-07100) Handle 100	VANE PUMP ASSY POWER STEERING LINK ASSY
	(09951-07150) Handle 150	POWER STEERING LINK ASSY
	(09951-07200) Handle 200	POWER STEERING LINK ASSY
	09960-10010 Variable Pin Wrench Set	VANE PUMP ASSY
	(09962-01000) Variable Pin Wrench Arm Assy	VANE PUMP ASSY
	(09963-01000) Pin 10	VANE PUMP ASSY

Recommended Tools

	09025-00010 Torque Wrench (30 kgf-cm)	VANE PUMP ASSY
	09042-00010 Torx Socket T30	POWER STEERING LINK ASSY
	09905-00012 Snap Ring No.1 Expander	VANE PUMP ASSY

Torx is a registered trademark of Textron Inc.

Equipment

Caliper gauge	
Vernier caliper	
Dial indicator	
Feeler gauge	
Micrometer	
Torque wrench	

Lubricant

Item	Capacity	Classification
Power steering fluid (Total)	1.0 liters (1.0 US qts, 0.9 Imp.qts)	ATF DEXRON® II or III

SSM


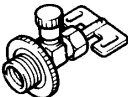
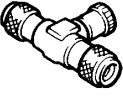




08833-00080 Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	POWER STEERING LINK ASSY
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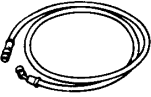

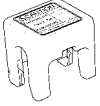

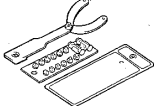
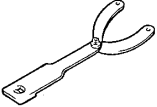

HEATER & AIR CONDITIONER

PREPARATION

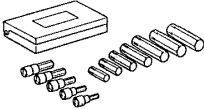
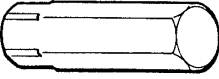
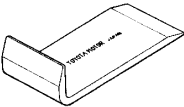
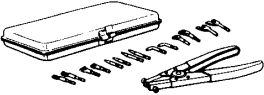

02271-02

SST

	07110-58060 Air Conditioner Service Tool Set	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-58060) Refrigerant Drain Service Valve	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-58070) T-Joint	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-58080) Quick Disconnect Adapter	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-58090) Quick Disconnect Adapter	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-78050) Refrigerant Charging Gauge	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-88060) Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)

	(07117-88070) Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	(07117-88080) Refrigerant Charging Hose	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
	09870-00015 A/C Quick Joint Puller No.1	AIR CONDITIONING RADIATOR ASSY
	09870-00025 A/C Quick Joint Puller No.2	AIR CONDITIONING RADIATOR ASSY
	09960-10010 Variable Pin Wrench Set	COOLER COMPRESSOR ASSY(2UZ-FE)
	(09962-01000) Variable Pin Wrench Arm Assy	COOLER COMPRESSOR ASSY(2UZ-FE)
	(09963-00500) Pin 5	COOLER COMPRESSOR ASSY(2UZ-FE)

Recommended Tools

	09040-00011 Hexagon Wrench Set	COOLER CONDENSER CORE
	(09043-30140) Straight Hexagon Wrench 14	COOLER CONDENSER CORE
	09070-20010 Moulding Remover	AIR CONDITIONING CONTROL ASSY AIR CONDITIONING RADIATOR ASSY
	09904-00010 Expander Set	COOLER COMPRESSOR ASSY(2UZ-FE)
	(09904-00050) No. 4 Claw	COOLER COMPRESSOR ASSY(2UZ-FE)

PREPARATION - HEATER & AIR CONDITIONER

	95416-00140 Gas Leak Detector (Halogen Leak Detector) (DENSO Part No.)	REFRIGERANT AIR CONDITIONING RADIATOR ASSY COOLER CONDENSER CORE COOLING (REAR) UNIT ASSY COOLER COMPRESSOR ASSY(2UZ-FE)
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Equipment

Voltmeter	
Ammeter	
Ohmmeter	
Vinyl tape	
Hexagon wrench 4 mm (0.15 in.)	
Hexagon wrench 14 mm (0.55 in.)	
Gas leak detector	
Dial indicator with magnetic base	
Radiator cap tester	
Torque wrench	

Lubricant

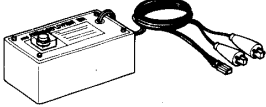
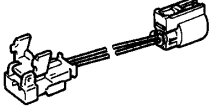

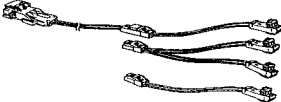
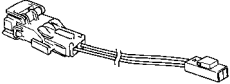


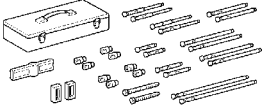
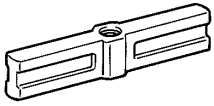
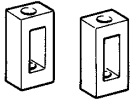
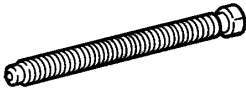

Item	Capacity	Classification
Compressor oil	-	ND-OIL 8 or equivalent

SUPPLEMENTAL RESTRAINT SYSTEM

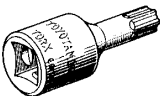
PREPARATION

0228E-02

SST

	09082-00700	SRS Airbag Deployment Tool	HORN BUTTON ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY CURTAIN SHIELD AIR BAG ASSY RH FRONT SEAT AIRBAG ASSY RH
	09082-00750	Airbag Deployment Wire Sub-harness No.3	FRONT SEAT AIRBAG ASSY RH
	09082-00780	Airbag Deployment Wire Sub-harness No.6	HORN BUTTON ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
	09082-00802	Airbag Deployment Wire Sub-Harness No. 8	HORN BUTTON ASSY CURTAIN SHIELD AIR BAG ASSY RH
	(09082-10801)	Wire A	HORN BUTTON ASSY CURTAIN SHIELD AIR BAG ASSY RH
	(09082-20801)	Wire B	CURTAIN SHIELD AIR BAG ASSY RH
	(09082-30801)	Wire C	HORN BUTTON ASSY
	09950-50013	Puller C Set	SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
	(09951-05010)	Hanger 150	SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
	(09952-05010)	Slide Arm	SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
	(09953-05020)	Center Bolt 150	SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
	(09954-05021)	Claw No.2	SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY

Recommended Tools

	09042-00010 Torx Socket T30	HORN BUTTON ASSY SPIRAL CABLE SUB-ASSY INSTR PNL PASS L/DOOR AIR BAG ASSY
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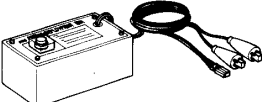
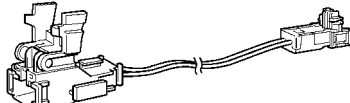
Equipment

Torque wrench	
Bolt Length: 35.0 mm (1.378 in.) Pitch: 1.0 mm (0.039 in.) Diameter: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Plastic bag	Airbag disposal


SEAT BELT PREPARATION

0228D-01

SST

	09082-00700 SRS Airbag Deployment Tool	FRONT SEAT BELT
	09082-00770 Airbag Deployment Wire Sub-harness No.5	FRONT SEAT BELT

Recommended Tools

	09082-00040 TOYOTA Electrical Tester	SEAT BELT WARNING SYSTEM
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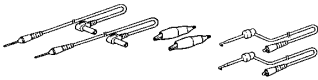
Equipment

Torque wrench	
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LIGHTING PREPARATION

02279-01


Recommended Tools

	09082-00040 TOYOTA Electrical Tester	LIGHTING SYSTEM
	(09083-00150) Test Lead Set	LIGHTING SYSTEM

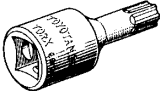

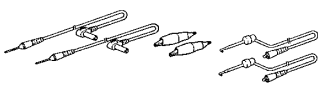
WIPER & WASHER PREPARATION

0227A-02

SST

	09843-18040 Diagnosis Check Wire No.2	WIPER AND WASHER SYSTEM
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Recommended Tools

	09042-00010 Torx Socket T30	WINDSHIELD WIPER MOTOR ASSY
	09082-00040 TOYOTA Electrical Tester	WIPER AND WASHER SYSTEM
	(09083-00150) Test Lead Set	WIPER AND WASHER SYSTEM

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SSM

	08850-00065 Butyl Tape Set	REAR WIPER MOTOR ASSY
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Equipment

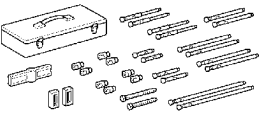
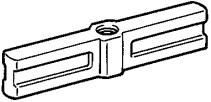
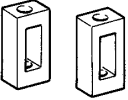
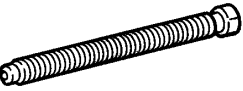

Torque wrench	
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AUDIO & VISUAL SYSTEM

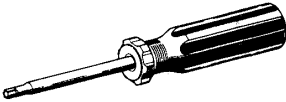
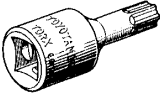

PREPARATION

02278-01

SST

	09950-50013	Puller C Set	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT
	(09951-05010)	Hanger 150	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT
	(09952-05010)	Slide Arm	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT
	(09953-05020)	Center Bolt 150	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT
	(09954-05021)	Claw No.2	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT

Recommended Tools

	09041-00030	Torx Driver T30	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT
	09042-00010	Torx Socket T30	ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY STEREO COMPONENT SPEAKER ASSY FRONT STEERING PAD SWITCH LH STEERING PAD SWITCH RH
	09070-20010	Moulding Remover	CIGARETTE LIGHTER ASSY RADIO RECEIVER ASSY MULTI-DISPLAY (CRT DISPLAY) DISPLAY ANTENNA CORD SUB-ASSY NAVIGATION ANTENNA ASSY AMPLIFIER ANTENNA ASSY DISC PLAYER CONTROLLER POWER POINT SOCKET ASSY STEREO COMPONENT SPEAKER ASSY FRONT

Equipment

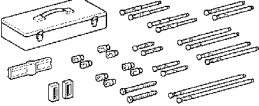
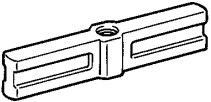
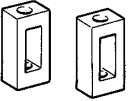
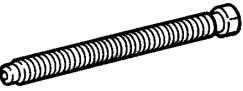

Torque wrench	
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COMMUNICATION SYSTEM

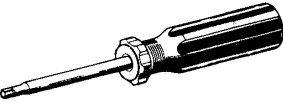
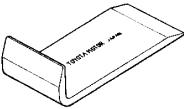
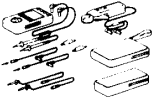
PREPARATION

02290-02

SST

	09950-50013 Puller C Set	GPS ANTENNA
	(09951-05010) Hanger 150	GPS ANTENNA
	(09952-05010) Slide Arm	GPS ANTENNA
	(09953-05020) Center Bolt 150	GPS ANTENNA
	(09954-05021) Claw No.2	GPS ANTENNA

Recommended Tools


	09041-00030 Torx Driver T30	GPS ANTENNA
	09070-20010 Moulding Remover	GPS ANTENNA
	09082-00050 TOYOTA Electrical Tester Set	HORN SYSTEM

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WINDSHIELD/WINDOWGLASS/MIRROR

0228K-01

PREPARATION**Recommended Tools**

	09082-00040 TOYOTA Electrical Tester	WINDOW DEFOGGER SYSTEM POWER MIRROR CONTROL SYSTEM INNER REAR VIEW MIRROR ASSY
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Equipment

Adhesive	
Knife	
Piano wire	Windshield
Plastic sheet	To avoid surface damage.
Sealer gun	
Torque wrench	
Tape	To avoid surface damage.
Wooden block or similar object	For tying both piano wire ends

SSM

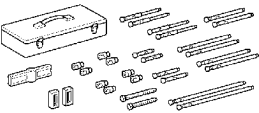
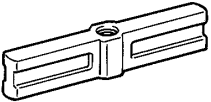
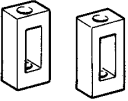
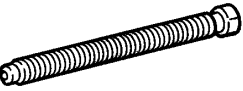

08850-00801 Windshield Glass Adhesive Set or equivalent	WINDSHIELD GLASS
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INSTRUMENT PANEL/METER

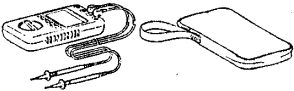
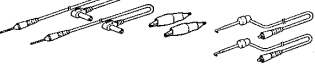
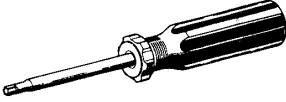
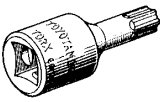

PREPARATION

0229N-02

SST

	09950-50013	Puller C Set	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	(09951-05010)	Hanger 150	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	(09952-05010)	Slide Arm	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	(09953-05020)	Center Bolt 150	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	(09954-05021)	Claw No.2	INSTRUMENT PANEL SAFETY PAD SUB-ASSY

Recommended Tools

	09082-00040	TOYOTA Electrical Tester	COMBINATION METER
	(09083-00150)	Test Lead Set	COMBINATION METER
	09041-00030	Torx Driver T30	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	09042-00010	Torx Socket T30	INSTRUMENT PANEL SAFETY PAD SUB-ASSY
	09070-20010	Moulding Remover	INSTRUMENT PANEL SAFETY PAD SUB-ASSY ACCESSORY METER ASSY(MULTI INFORMATION)

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Equipment

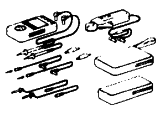
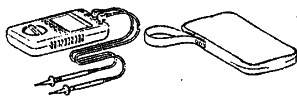
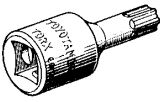
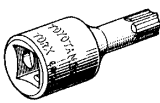
Torque wrench	
Tape	To avoid surface damage

SEAT

PREPARATION

024GH-01

Recommended Tools

	09082-00050	TOYOTA Electrical Tester Set	FRONT POWER SEAT CONTROL SYSTEM SEAT HEATER SYSTEM
	09082-00040	TOYOTA Electrical Tester	FRONT POWER SEAT CONTROL SYSTEM SEAT HEATER SYSTEM
	09042-00010	Torx Socket T30	FRONT LH SEAT ASSY
	09042-00020	Torx Socket T40	FRONT LH SEAT ASSY

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Equipment

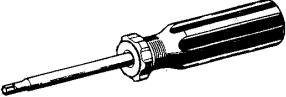

Hog ring	
Hog ring pliers	
Tape	To avoid surface damage
Torque wrench	

SLIDING ROOF/CONVERTIBLE

PREPARATION

0228I-02

Recommended Tools



	09041-00020 Torx Driver T25	SLIDING ROOF HOUSING SUB-ASSY
	09082-00040 TOYOTA Electrical Tester	SLIDING ROOF SYSTEM

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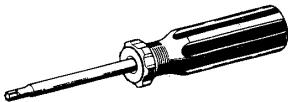
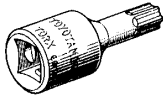
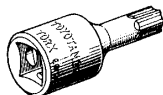
ENGINE HOOD/DOOR**PREPARATION**

0227H-02

SST

	09812-00010	Door Hinge Set Bolt Wrench	FRONT DOOR
	09812-00020	Door Hinge Set Bolt Wrench	FRONT DOOR

Recommended Tools

	09041-00020	Torx Driver T25	FRONT DOOR REAR DOOR
	09042-00010	Torx Socket T30	FRONT DOOR REAR DOOR BACK DOOR
	09042-00020	Torx Socket T40	FRONT DOOR REAR DOOR BACK DOOR

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	08833-00070	"Adhesive 1324," THREE BOND 1324 or equivalent	FRONT DOOR REAR DOOR BACK DOOR
	08850-00065	Butyl Tape Set	FRONT DOOR REAR DOOR BACK DOOR

Equipment


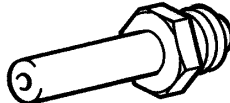
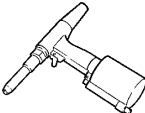

Clip remover	
Tape	To avoid surface damage
Torque wrench	

EXTERIOR/INTERIOR TRIM

PREPARATION

0228J-01

Recommended Tools

	09050-00032 Air Drill	OUTSIDE MOULDING
	09050-02050 Nose Piece No.4	OUTSIDE MOULDING
	09050-20010 Air Riveter	OUTSIDE MOULDING
	09070-20010 Moulding Remover	OUTSIDE MOULDING ROOF HEADLINING ASSY REAR DOOR BELT MOULDING LH

Equipment

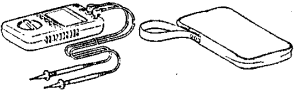
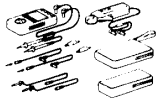
Adhesive tape	To avoid surface damage.
Clip remover	
Knife	
Protective tape	To avoid surface damage.
Torque wrench	

VEHICLE CONTROL SYSTEM

PREPARATION

02291-02


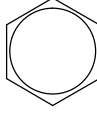
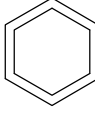
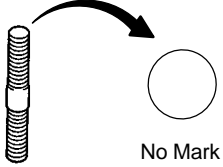
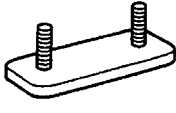

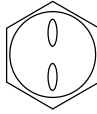
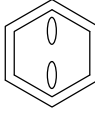

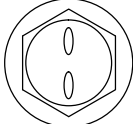
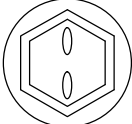










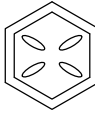

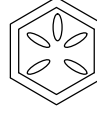
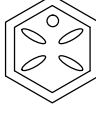


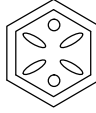
Recommended Tools

	09082-00040 TOYOTA Electrical Tester	IGNITION OR STARTER SWITCH ASSY
	09082-00050 TOYOTA Electrical Tester Set	IGNITION OR STARTER SWITCH ASSY

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

0305S-02

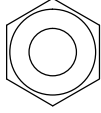
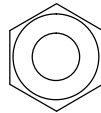
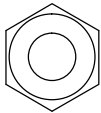


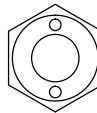
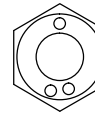
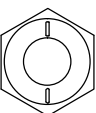
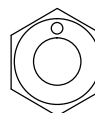
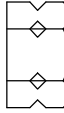
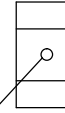
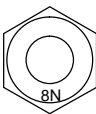
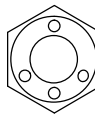
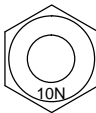
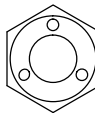
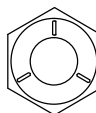
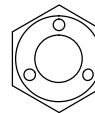
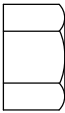
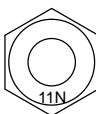
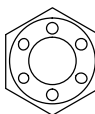

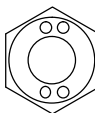
Bolt Type			Class	
Hexagon Head Bolt		Stud Bolt		Weld Bolt
Normal Recess Bolt	Deep Recess Bolt			
  No Mark	 No Mark	 No Mark		4T
 				5T
  w/ Washer	 w/ Washer			6T
 	 			7T
		 		8T
				9T
	 			10T
	 			11T

B06431

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N-m	kgf-cm	ft-lbf	N-m	kgf-cm	ft-lbf
4T	6	1	5	55	48 in.-lbf	6	60	52 in.-lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	-	-	-
5T	6	1	6.5	65	56 in.-lbf	7.5	75	65 in.-lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	-	-	-
6T	6	1	8	80	69 in.-lbf	9	90	78 in.-lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	-	-	-
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

HOW TO DETERMINE NUT STRENGTH

Nut Type		Class	
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut		Cutting Processed Nut
 No Mark		4N	
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
  			6N
	 	  *	7N (5T)
 			8N
 	 	 No Mark	10N (7T)
 			11N
 			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

2005 LEXUS GX470 REPAIR MANUAL (RM1164U)

ENGINE CONTROL SYSTEM

SERVICE DATA

0317N-03

Throttle body	Standard throttle valve opening percentage	60 % or more
Accelerator pedal position sensor		
Voltage (ACCEL POS)	Accelerator pedal released	0.5 to 1.1 V
	Accelerator pedal depress	2.6 to 4.5 V
Voltage (ACCEL POS#2)	Accelerator pedal released	1.2 to 2.0 V
	Accelerator pedal depress	3.4 to 5.3 V
Mass air flow meter		
Resistance	at -20°C(-4°F)	12.5 to 16.9 kΩ
	at 20°C(68°F)	2.19 to 2.67 kΩ
	at 60°C(140°F)	0.50 to 0.68 kΩ
Camshaft timing oil control valve assy		
Resistance	at 20°C (68°F)	6.9 to 7.9 Ω
Throttle w/ motor body		
Resistance	at 20 °C (68 °F)	0.3 to 100 Ω
Knock control sensor	at 20°C (68°F)	120 to 280 kΩ
Engine coolant temperature sensor		
Resistance	Approx. 20°C (68°F)	2.32 to 2.59 kΩ
	Approx. 80°C (176°F)	0.310 to 0.326 kΩ
Circuit opening relay		
Specified condition	3 - 5	10 kΩ or higher
	3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)
EFI relay		
Specified condition	3 - 5	10 kΩ or higher
	3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle body assy x Intake manifold	14	143	10
V-bank cover x Intake manifold	7.5	80	66 in.·lbf
Knock sensor x Cylinder block assy	20	204	15
Intake manifold x Cylinder head	18	185	13
V-bank cover bracket x Intake manifold	7.5	76	66 in.·lbf
Wire bracket x Intake manifold	7.5	76	66 in.·lbf
ECM x Body	13	133	10
Accelerator pedal rod assy x Body	5.0	51	44 in.·lbf

FUEL

SERVICE DATA

0317R-03

Fuel pressure		265 to 304 kPa (2.7 to 3.1 kgf/cm ² , 38 to 44 psi)
Fuel pressure		147 kPa (1.5 kgf/cm ² , 21 psi) or more
Fuel injector Resistance	at 20°C (68°F)	13.4 to 14.2Ω
Injection volume		56 to 69 cm ³ (3.4 to 4.2 cu in.) per 15 seconds
Difference between each cylinder		13 cm ³ (0.8 cu in.) or less
Fuel leakage		1 drop or less per 12 minutes
Fuel pump resister Resistance	at 20°C (68°F)	0.70 to 0.76 Ω
Fuel pump Resistance	at 20°C (68°F)	0.2 to 3.0 Ω
Fuel pump relay assy Specified condition	1 - 2 3 - 4 3 - 5	Continuity Continuity No continuity

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Delivery pipe x Intake manifold	21	214	16
Delivery pipe No.2 x Intake manifold	21	214	16
Fuel hose x Delivery pipe	39	400	29
Vacuum switching valve assy No.1 x Intake manifold	18	185	13
Fuel pipe sub-assy No.3 x Intake manifold	7.5	80	66 in.·lbf
Fuel pipe sub-assy No.1 x Delivery pipe	39	400	29
Throttle body cover sub-assy x Intake manifold	7.5	80	66 in.·lbf
Fuel tank x Body	40	408	30
Fuel tank protector sub-assy No.1 x Body	20	204	15

EMISSION CONTROL

SERVICE DATA

0317T-03

VSV for charcoal canister Resistance	at 20 °C (68 °F) at 100 °C (212 °F)	25 to 30 Ω 32 to 42 Ω
Vacuum switchig valve assy Resistance	at 20 °C (68 °F)	26 to 30 Ω
Heated oxygen sensor (Bank 1, 2) Resistance	1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
Resistance	1 (HT) - 4 (E1)	No continuity
Heated oxygen sensor No. 2 (Bank 1, 2) Resistance	1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
Resistance	1 (HT) - 4 (E1)	No continuity
Pressure sennsor Voltage	AIP-E2	1.0 to 2.2 V
Vacuum switchig valve assy Resistance	1-2 1-Body ground 2-Body ground	33 to 39 Ω at 20°C (68°F) 10 MΩ or higher 10 MΩ or higher

TORQUE SPECIFICATION

Part Tightened	N-m	kgf.cm	ft.lbf
Charcoal canister x Body	20	204	15
Charcoal canister filter No. 2 x Body	20	204	15
Air pump assy x Air pump bracket	10	102	7
Air pump assy w/bracket x Cylinder block assy	16	163	12
Air switching valve assy x Air pump bracket	16	163	12
Pressure sensor x Air pump bracket	5.0	51	44 in. lbf
Air switching valve assy No.2 x water by-pass joint rear	10	102	7
Air tube No.3 x Air switching valve assy No.2	10	102	7
Air tube No.3 x Exhaust manifold	10	102	7
Air tube No.2 x Air switching valve assy No.2	10	102	7
Air tube No.2 x Exhaust manifold	10	102	7

INTAKE

SERVICE DATA

032KZ-01

Vacuum switchig valve assy for IAC valve Resistance	Between each terminal	33 to 39 Ω at 20 °C (68 °F)
	Between each terminal–Body ground	10 M Ω or higher

ENGINE MECHANICAL

SERVICE DATA

0317V-04

Ignition timing	Terminals TC and CG of DLC3 connected	5 to 15° BTDC at idle (Transmission in neutral)
Idle speed		650 to 750 r/min
Compression	Compression pressure Minimum pressure Difference between each cylinder	1,373 kPa (14.0 kgf/cm ² , 199 psi) or more 1,030 kPa (10.5 kgf/cm ² , 149 psi) 98 kPa (1.0 kgf/cm ² , 14 psi)
Valve clearance		
Intake	(cold)	0.15 to 0.25 mm (0.006 to 0.010 in.)
Exhaust	(cold)	0.25 to 0.35 mm (0.010 to 0.014 in.)
Cylinder head		
Warpage	Maximum	0.10 mm (0.039 in.)
Valve seat		
Refacing angle		30°, 45°, 60°
Contacting angle		45°
Contacting width		1.0 to 1.4 mm (0.039 to 0.055 in.)
Valve guide bushing bore diameter	STD O/S 0.05	10.285 to 10.306 mm (0.4049 to 0.4057 in.) 10.335 to 10.356 mm (0.4069 to 0.4077 in.)
Cylinder head seat bolt thread inside diameter	STD	9.810 to 9.960 mm (0.3862 to 0.3921 in.)
Protrusion height	Minimum Intake Exhaust	9.70 mm (0.3819 in.) 9.2 to 9.8 mm (0.362 to 0.386 in.) 8.2 to 8.8 mm (0.323 to 0.346 in.)
Valve guide bushing		
Inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Outside diameter (for repair part)	STD O/S 0.05	10.285 to 10.306 mm (0.4049 to 0.4057 in.) 10.335 to 10.356 mm (0.4069 to 0.4077 in.)
Valve		
Valve overall length	STD Intake Exhaust Minimum Intake Exhaust	95.05 mm (3.7421 in.) 95.10 mm (3.7441 in.) 94.55 mm (3.7224 in.) 94.60 mm (3.7244 in.)
Valve face angle		44.5°
Stem diameter	Intake Exhaust	5.470 to 5.485 mm (0.2154 to 0.2159 in.) 5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Stem oil clearance	STD Intake Exhaust Maximum Intake Exhaust	0.025 to 0.060 mm (0.0010 to 0.0024 in.) 0.030 to 0.065 mm (0.0012 to 0.0026 in.) 0.08 mm (0.0031 in.) 0.10 mm (0.0039 in.)
Margin thickness	STD IN EX Minimum	1.25 mm (0.049 in.) 1.4 mm (0.055 in.) 0.5 mm (0.020 in.)
Valve spring		
Deviation	Maximum	2.0 mm (0.079 in.)
Free length		54.1 mm (2.130 in.)
Installed tension at 35.0 mm (1.378 in.)		210 to 226 N (21.4 to 23.0 kgf-cm, 47.2 to 50.7 lbf)
Valve lifter		
Lifter diameter		30.968 to 30.976 mm (1.2192 to 1.2195 in.)
Lifter bore diameter		31.000 to 31.016 mm (1.2205 to 1.2211 in.)
Oil clearance	STD Maximum	0.024 to 0.050 mm (0.0009 to 0.0020 in.) 0.07 mm (0.0028 in.)

Camshaft Thrust clearance	STD Intake Exhaust Minimum Intake Exhaust	0 to 0.040 mm (0 to 0.0016 in.) 0.030 to 0.070 mm (0.0012 to 0.0028 in.) 0.12 mm (0.0047 in.) 0.10 mm (0.0039 in.)
Journal oil diameter	STD Maximum	0.030 to 0.071 mm (0.012 to 0.0028 in.) 0.10 mm (0.0039 in.)
Journal diameter	Maximum	26.954 to 26.970 mm (1.0612 to 1.0618 in.)
Circuit runout	Maximum	0.08 mm (0.0031 in.)
Cam lobe height	STD Intake Exhaust Minimum Intake Exhaust	41.94 to 42.04 mm (1.6512 to 1.6551 in.) 41.96 to 42.06 mm (1.6520 to 1.6559 in.) 41.79 mm (1.6453 in.) 41.81 mm (1.6461 in.)
Camshaft gear backlash	STD Maximum	0.020 to 0.200 mm (0.0008 to 0.0079 in.) 0.30 mm (0.0118 in.)
Camshaft gear bolt washer end free distance		18.2 to 18.8 mm (0.717 to 0.740 in.)
Cylinder block Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
Cylinder bore diameter	STD Mark 1 Mark 2 Mark 3 Maximum STD O/S 0.5	94.002 to 94.010 mm (3.7009 to 3.7012 in.) 94.010 to 94.023 mm (3.7012 to 3.7017 in.) 94.023 to 94.031 mm (3.7017 to 3.7020 in.) 94.231 mm (3.7099 in.) 94.731 mm (3.7296 in.)
Main bearing cap bolt tension portion diameter	STD Minimum	10.760 to 10.970 mm (0.4236 to 0.4319 in.) 10.40 mm (0.4094 in.)
Piston and piston ring Piston diameter	STD Mark 1 Mark 2 Mark 3 O/S 0.5	93.902 to 93.912 mm (3.6969 to 3.6973 in.) 93.912 to 93.920 mm (3.6973 to 3.6976 in.) 93.920 to 93.930 mm (3.6976 to 3.6980 in.) 94.402 to 94.430 mm (3.7168 to 3.7177 in.)
Piston oil clearance	STD Maximum	0.090 to 0.111 mm (0.0035 to 0.0044 in.) 0.13 mm (0.0051 in.)
Piston ring groove clearance	No.1 No.2	0.030 to 0.080 mm (0.0012 to 0.0032 in.) 0.020 to 0.060 mm (0.0008 to 0.0024 in.)
Piston ring end gap	No.1 No.2 Oil Maximum No.1 No.2 Oil	0.300 to 0.400 mm (0.0118 to 0.0158 in.) 0.400 to 0.550 mm (0.0158 to 0.0217 in.) 0.130 to 0.380 mm (0.0051 to 0.0150 in.) 1.10 mm (0.0433 in.) 1.30 mm (0.0512 in.) 0.90 mm (0.0354 in.)
Camshaft timing tube assy Journal oil diameter	STD Maximum	0.036 to 0.057 mm (0.0014 to 0.0022 in.) 0.075 mm (0.0030 in.)

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Connecting rod Thrust clearance	STD Maximum	0.160 to 0.290 mm (0.0063 to 0.0114 in.) 0.35 mm (0.0138 in.)
Connecting rod thickness		22.880 to 22.920 mm (0.9008 to 0.9024 in.)
Connecting rod oil clearance	STD Maximum	0.021 to 0.047 mm (0.0008 to 0.0019 in.) 0.065 mm (0.0026 in.)
Connecting rod bearing center wall thickness	Mark 2 Mark 3 Mark 4 Mark 5 Mark 6 Mark 7	1.487 to 1.490 mm (0.0585 to 0.0587 in.) 1.490 to 1.493 mm (0.0587 to 0.0588 in.) 1.493 to 1.496 mm (0.0588 to 0.0589 in.) 1.496 to 1.499 mm (0.0589 to 0.0590 in.) 1.499 to 1.502 mm (0.0590 to 0.0591 in.) 1.502 to 1.505 mm (0.0591 to 0.0593 in.)
Rod bend	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
Bushing inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Piston pin diameter		21.997 to 22.006 mm (0.8660 to 0.8664 in.)
Bushing oil clearance	STD Maximum	0.005 to 0.011 mm (0.0002 to 0.0004 in.) 0.05 mm (0.0020 in.)
Connecting rod bolt tension portion diameter	STD Maximum	7.200 to 7.300 mm (0.2835 to 0.2874 in.) 7.00 mm (0.2756 in.)
Crankshaft Thrust clearance	STD Maximum	0.020 to 0.220 mm (0.0008 to 0.0087 in.) 0.30 mm (0.0118 in.)
Thrust washer thickness	STD U/S 0.125	2.440 to 2.490 mm (0.0961 to 0.0980 in.) 2.503 to 2.553 mm (0.0985 to 0.1005 in.)
Main journal bore diameter on cylinder block		72.000 to 72.016 mm (2.8347 to 2.8353 in.)
Main journal oil clearance	No.1 and No.5 STD Others STD No.1 and No.5 Maximum Others Maximum	0.028 to 0.046 mm (0.0011 to 0.0018 in.) 0.040 to 0.058 mm (0.0016 to 0.0023 in.) 0.065 mm (0.0026 in.) 0.065 mm (0.0026 in.)
Main journal diameter		66.988 to 67.000 mm (2.6373 to 2.6378 in.)
Main bearing center wall thickness	No.1 and No.5 Mark 3 Mark 4 Mark 5 Mark 6 Mark 7 Other Mark 1 Mark 2 Mark 3 Mark 4 Mark 5	2.487 to 2.490 mm (0.0979 to 0.0980 in.) 2.490 to 2.493 mm (0.0980 to 0.0982 in.) 2.493 to 2.496 mm (0.0982 to 0.0983 in.) 2.496 to 2.499 mm (0.0983 to 0.0984 in.) 2.499 to 2.502 mm (0.0984 to 0.0985 in.) 2.481 to 2.484 mm (0.0977 to 0.0978 in.) 2.484 to 2.487 mm (0.0978 to 0.0979 in.) 2.487 to 2.490 mm (0.0979 to 0.0980 in.) 2.490 to 2.493 mm (0.0980 to 0.0982 in.) 2.493 to 2.496 mm (0.0981 to 0.0983 in.)
Crank pin diameter		51.982 to 52.000 mm (2.0465 to 2.0472 in.)
Circle runout	Maximum	0.04 mm (0.0016 in.)
Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Oil pan sub-assy No.2 x Drain plug		39	398	29
Cylinder head cover sub-assy LH x Ventilation valve sub-assy		27	275	20
Oil pump assy x Oil cooler assy	Bolt	18	183	13
	Nut	18	183	13
Water by-pass joint FR x Cylinder head		18	185	13
Water by-pass pipe x Cylinder block		18	185	13
Starter assy x Cylinder block		39	400	29
Starter assy x Engine wire No. 2		9.8	100	7.2
Water by-pass joint RR x Cylinder head		18	185	13
Knock sensor x Cylinder block		45	450	33
Crankshaft position sensor x Oil pump assy		6.5	65	58 in.·lbf
Camshaft position sensor x Cylinder head		7.5	80	66 in.·lbf
Ignition coil assy x Cylinder head cover		7.5	80	66 in.·lbf
Fan bracket sub-assy x Cylinder block	12 mm head	16	160	12
	14 mm head	32	326	24
V-ribbed belt tensioner assy x Cylinder block	Bolt	16	160	12
	Nut	16	160	12
Timing belt cover sub-assy No.2 x Cylinder block		16	160	12
Timing chain or belt cover No.2 x Cylinder block	Bolt	7.5	80	66 in.·lbf
	Nut	7.5	80	66 in.·lbf
Timing belt cover sub-assy No.3 LH x Cylinder block		7.5	80	66 in.·lbf
Pump bracket x Cylinder block		43	438	32
Oil cooler pipe x Cylinder block	Bolt	7.5	80	66 in.·lbf
	Nut	7.5	80	66 in.·lbf
Harness bracket x Cylinder block		8.0	80	71 in.·lbf
Engine mounting bracket x Cylinder block		36	367	27
Wire harness heat insulator No.2 x Cylinder block		17	175	13
Intake manifold assy x Cylinder head		18	185	13
Engine mounting bracket x Frame brackets		38	387	28
Exhaust manifold x Cylinder head		44	450	33
Exhaust manifold heat insulator x Exhaust manifold		7.5	80	69 in.·lbf
Oil level gauge guide x Cylinder head		15	155	11
Transmission oil filler tube x Cylinder head		12	122	9
Fan w/ fluid coupling x Fan bracket sub-assy		29	296	21
Compressor x Cylinder block	Bolt	47	475	34
	Nut	25	255	18
Vane pump assy x Cylinder block	Bolt	43	438	32
	Nut	43	438	32
Fan shroud x Radiator assy		5.0	51	44 in.·lbf
Air cleaner assy x Body		12	122	9
V-bank cover sub-assy x Intake manifold assy		7.5	80	66 in.·lbf
Hood x Body		13	133	10
Engine rear oil seal retainer x Cylinder block		8.0	82	71 in.·lbf
Oil pump assy x Cylinder block	Bolt A, B, C and E	16	158	11
	Bolt D	31	311	23
Oil strainer sub-assy x Cylinder block		7.5	76	66 in.·lbf
Oil pan sub-assy x Cylinder block	Bolt A and D	7.5	76	66 in.·lbf
	Bolt B, C and nut	28	286	21
Oil pan baffle plate x Oil pan sub-assy		7.5	76	66 in.·lbf
Oil pan sub-assy No.2 x Oil pan sub-assy		7.5	76	66 in.·lbf

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Part Tightened		N·m	kgf·cm	ft·lbf
Water pump assy x Cylinder block	Bolt	21	214	15
	Stud bolt and nut	18	184	13
Cylinder head x Cylinder block	1st	40	408	30
	2nd	Turn 90	Turn 90	Turn 90
	3rd	Turn 90	Turn 90	Turn 90
Bearing cap x Cylinder head	Bolt C	7.5	76	66 in.·lbf
	Other	16	163	12
Timing belt plate RR x Cylinder head		7.5	76	66 in.·lbf
Timing belt idler sub-assy No.2 x Cylinder block		35	352	25
Timing belt idler sub-assy No.1 x Cylinder block		35	352	25
Camshaft timing pulley x Camshaft		108	1101	80
Chain tensioner assy x Oil pump assy		26	270	19
Timing belt No.1 over x Cylinder block		7.5	76	66 in.·lbf
Crankshaft damper x Crankshaft		245	2498	181
Idler pulley sub-assy No.2		39	398	29
Oil filler cap housing x Cylinder head cover		7.5	76	66 in.·lbf
Spark plug x Cylinder head		17.5	178	13
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90	Turn 90	Turn 90
Main bearing cap x Cylinder block	1st	27	275	20
	2nd	Turn 90	Turn 90	Turn 90
Cylinder head cover x Cylinder head		6.0	60	53 in.·lbf
Drive plate & ring gear x Crankshaft	1st	49	500	36
	2nd	Turn 90	Turn 90	Turn 90
Camshaft drive gear x Camshaft timing tube assy		7.5	76	66 in.·lbf
Camshaft timing tube assy x Camshaft		78	795	58
Screw plug x Camshaft timing tube assy		15	152	11
Timing belt plate RR x Cylinder head		7.5	76	66 in.·lbf

EXHAUST

TORQUE SPECIFICATION

0317X-02

Part Tightened		N-m	kgf-cm	ft-lbf
Front exhaust pipe x Exhaust manifold		54	554	40
Front exhaust pipe x Center exhaust pipe	Bolt	48	490	35
	Nut	54	554	40
Center exhaust pipe x Tail pipe		48	490	35
Heated oxygen sensor x Front exhaust pipe		44	450	33

COOLING

SERVICE DATA

0317Y-02

Thermostat	Valve opening temperature		80 – 84 °C (176 – 183 °F)
	Valve lift	at 95 °C (203 °F)	10 mm (0.39 in.) or more
Radiator cap	Relief valve opening pressure	Standard	93 – 123 kPa (0.95 – 1.25 kgf/cm ² , 13.5 – 17.8 psi)
		Minimum	78 kPa (0.8 kgf/cm ² , 11.4 psi)

TORQUE SPECIFICATION

Part Tightened	N-m	kgf·cm	ft·lbf
Drain plug x Union on cylinder block	13	130	9
Water pump x Cylinder block	Bolt	21	215
	Stud bolt and nut	18	185
Water inlet housing x Water pump	18	185	13
Water inlet x Water inlet housing	19	195	14
Radiator x Radiator support	18	184	13
Fan shroud x Radiator	5.0	51	44 in.·lbf
Radiator reserve tank x Fan shroud	5.0	51	44 in.·lbf

LUBRICATION

SERVICE DATA

03180-03

Oil pressure		at idle speed at 3,000 rpm	29 kPa (0.3 kgf/cm ² , 4.2 psi) or more 294 to 588 kPa (3.0 to 6.0 kgf/cm ² , 43 to 85 psi)
Oil pump	Tip clearance	Standard	0.060 to 0.180 mm (0.0024 to 0.0071 in.)
		Maximum	0.18 mm (0.0071 in.)
	Side clearance	Standard	0.030 to 0.090 mm (0.0012 to 0.0035 in.)
		Maximum	0.09 mm (0.0035 in.)
	Body clearance	Standard	0.250 to 0.325 mm (0.0098 to 0.0128 in.)
		Maximum	0.325 mm (0.0128 in.)

TORQUE SPECIFICATION

Part Tightened	N-m	kgf.cm	ft.lbf
No. 2 oil pan x Drain plug	39	398	29
Oil pump x Cylinder block	14 mm head	31	23
	Others	16	11
Oil pump body cover x Oil pump body	10	105	7
Oil pump relief valve x Oil pump body	49	500	36
Oil cooler x Oil filter bracket	69	700	51

IGNITION

SERVICE DATA

03182-03

Spark plug	Recommended spark plug	DENSO made	SK20R11
		NGK made	1FR6A11
	Electrode gap		1.0 to 1.1 mm (0.039 – 0.043 in.)
	Maximum electrode gap		1.3 mm (0.051 in.)
	Correct insulation resistance		10 M Ω or more
VVT sensor	Resistance	Cold	835 to 1,400 Ω
		Hot	1,060 to 1,645 Ω
Crankshaft position sensor	Resistance	Cold	1,630 to 2,740 Ω
		Hot	2,065 to 3,225 Ω

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	20	204	15
Ignition coil (with igniter) x Cylinder head cover	7.5	76	66 in·lbf
Camshaft position sensor x LH cylinder head	7.5	80	66 in·lbf
Crankshaft position sensor x Oil pump	6.5	65	58 in·lbf

STARTING & CHARGING

SERVICE DATA

03184-03

Starter	Rated voltage and output power		12 V 2.0 kW
	No-load characteristics	Current	100 A or less at 11.5 V
	Brush length	Standard	15.0 mm (0.591 in.)
		Minimum	9.0 mm (0.354 in.)
	Spring installed load	Standard	21.5 to 27.5 N (2.2 to 2.8 kgf, 4.8 to 6.2 lbf)
		Minimum	12.7 N (1.3 kgf, 2.9 lbf)
	Commutator Diameter	Standard	35.0 mm (1.378 in.)
		Minimum	34.0 mm (1.339 in.)
	Undercut depth	Standard	0.7 mm (0.028 in.)
		Minimum	0.2 mm (0.008 in.)
Circle runout	Maximum	0.05 mm (0.0020 in.)	
Field frame			
Shunt coil resistance	at 20°C (68°F)	1.5 to 1.9 Ω	
Battery	Maintenance-free Voltage	at 20°C (68°F)	12.5 to 12.9 V
Generator	Rated output		12V 130A
	Rotor coil resistance	at 20°C (68°F)	2.3 to 2.7 Ω
	Slip ring diameter	Standard	14.2 to 14.4 mm (0.559 to 0.567 in.)
		Minimum	14.0 mm (0.551 in.)
Brush exposed length	Standard	10.5 mm (0.413 in.)	
	Minimum	4.5 mm (0.177 in.)	
Voltage regulator	Regulating voltage		13.2 to 14.8 V

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
End cover x Brush holder		3.8	39	34 in.·lbf
Starter hosing x Magnetic switch		9.3	95	82 in.·lbf
End cover with field frame x Magnetic switch		9.3	95	82 in.·lbf
Lead wire of field coil x Terminal C		5.9	60	52 in.·lbf
Wire clamp, Starter wire x Starter		9.8	100	86 in.·lbf
Starter x Cylinder block		39	400	29
Water by-pass joint RR x Cylinder head		18	185	13
Water by-pass pipe x Water pump		18	185	13
Intake manifold x Cylinder head	Bolt	18	185	13
	Nut	18	185	13
Bearing retainer x Drive end frame		2.6	2.7	23 in.·lbf
Rectifier end frame x Drive end frame		5.8	59	51 in.·lbf
Generator pulley x Rotor		111	1,125	81
Brush holder x Rectifier holder, Voltage regulator		1.8	18	16 in.·lbf
Rear end cover x Rectifier holder		4.6	47	41 in.·lbf
Generator x Cylinder block	Bolt	39	400	29
	Nut (M10)	39	400	29
	Nut (M8)	16	158	11
Generator wire x Generator		9.8	100	86
Fan shroud x Radiator		5.0	51	44 in.·lbf
Fluid coupling x Engine		29	296	21

SUSPENSION CONTROL SYSTEM

SERVICE DATA

0313H-06

Air suspension	Amount of change in vehicle height	HIGH position: 40 mm (1.57 in.) LOW position: -20 mm (-0.79 in.)
	Difference between the right side and the left side measured vehicle height value:	10 mm (0.39 in.) or less
	using the hand-held tester value:	5 mm (0.20 in.) or less
	not using the hand-held tester value:	0.06 V or less
	Difference between the tester value and vehicle height (D-C measurement):	5 mm (0.20 in.) or less
	Height control sensor link standard length:	6.5 to 15.0 mm (0.26 to 0.59 in.)
Kinetic dynamic suspension system	Height difference of left and right sides	20 mm (0.79 in.) or less
	Specified charging pressure	at 20°C (68°F) 2.60 to 3.00 MPa at 35°C (95°F) 2.90 to 3.40 MPa

TORQUE SPECIFICATION

Part Tightened	N-m	kgf-cm	ft-lbf
Air suspension			
Height control sensor link x Upper control arm assy	5.4	55	48 in.-lbf
Height control sensor link lock nut	5.4	55	48 in.-lbf
Height control compressor assy x Height control dryer assy	6.4	65	57 in.-lbf
Height control bracket x Frame	29	300	21
Height control compressor assy x Height control bracket	5.9	60	52 in.-lbf
Height control filter x Height control bracket	6.4	65	57 in.-lbf
Rear disc wheel hub nut	112	1,140	83
Height control reservoir assy x Body	29	300	21
Suspension control ECU x Body	7.8	80	69 in.-lbf
Height control sensor sub-assy x Body	13	133	10
Kinetic dynamic suspension system			
Front stabilizer w/ tube cylinder assy x Frame	135	1,377	100
Front stabilizer w/ tube cylinder assy x Bleeder plug	9.5	97	84 in.-lbf
Front stabilizer w/ tube cylinder assy x Front stabilizer control tube No.1	44	450	32
Front stabilizer w/ tube cylinder assy set bolt	29	296	21
Return tube sub-assy set bolt	28	286	21
Tube clamp bracket No.3 set bolt	29	296	21
Front stabilizer link assy x Frame	130	1,326	96
Front stabilizer w/ tube cylinder assy x Front stabilizer lower bracket LH	59	602	44
Front stabilizer link assy x Front stabilizer lower bracket RH	59	602	44
Front stabilizer bracket No.1 LH x Front suspension arm sub-assy lower No.1 LH	75	765	55
Front stabilizer end bracket RH x Front suspension arm sub-assy lower No.1 RH	75	765	55
Rear stabilizer control cylinder x Frame	130	1,326	96
Rear stabilizer control cylinder x Bleeder plug	9.5	97	84 in.-lbf
Rear stabilizer control cylinder x Rear stabilizer control tube No.2	69	704	51
Rear stabilizer link assy x Frame	130	1,326	96
Stabilizer bar rear x Rear axle housing	110	1,122	81
Rear stabilizer control cylinder x Rear stabilizer bracket lower	50	510	37
Rear stabilizer link assy x Rear stabilizer bracket lower	50	510	37
Front stabilizer tube protector set bolt	29	296	21
Stabilizer control valve protector set bolt	29	296	21
Front stabilizer control tube flare nut	44	450	33
Front stabilizer control tube set bolt	29	296	21
Rear stabilizer control tube flare nut	44	450	33
Rear stabilizer control tube set bolt	29	296	21
Stabilizer control w/ bracket valve assy set bolt	29	296	21
Stabilizer control w/ accumulator housing assy x Accumulator pressure sensor	75	762	55
Stabilizer control w/ accumulator housing assy x Bleeder plug	9.5	97	84 in.-lbf
Stabilizer control adapter sub-assy x Oil nozzle valve sub-assy	12	122	9
Stabilizer control adapter sub-assy x Stabilizer control adapter shutter valve	14	140	10
Stabilizer control valve x Stabilizer bracket sub-assy	39	398	29
Stabilizer control w/ accumulator housing assy x Stabilizer bracket sub-assy	39	398	29
Stabilizer control adapter sub-assy x Stabilizer bracket sub-assy	39	398	29
Stabilizer control accumulator valve tube sub-assy flare nut	16	158	11
Stabilizer control valve to adapter tube flare nut	44	450	32
Stabilizer control valve to adapter tube set bolt	13	127	9

SERVICE SPECIFICATIONS - SUSPENSION CONTROL SYSTEM

Part Tightened	N·m	kgf·cm	ft·lbf
Hub nut	112	1,140	83
Acceleration sensor assy set bolt	8.0	82	71 in.·lbf
Stabilizer control ECU set bolt	7.8	80	69 in.·lbf

FRONT SUSPENSION

SERVICE DATA

0313J-03

Front wheel alignment	• Vehicle height	
	Front A-B:	91.9 mm (3.62 in.)
	Rear C-D:	77.1 mm (3.04 in.)
	• Toe-in (total)	
	Rack end length difference	0°05' ± 0°10' (0.08° ± 0.16°) 1 ± 2 mm (0.04 ± 0.08 in.) 1.0 mm (0.04 in.) or less
	• Wheel angle	
	Inside wheel	36°36' (34°36' - 37°36')
	Outside wheel: Reference	36.60° (34.60° - 37.60°) 32°58' 32.97°
	• Camber	
	Right-left error	0°01' ± 45' (0.02° ± 0.75°) 45' (0.75°) or less
	• Caster	
	Right-left error	3°17' ± 45' (3.28° ± 0.75°) 45' (0.75°) or less
	• Steering axis inclination	
Right-left error	12°29' ± 45' (12.48° ± 0.75°) 45' (0.75°) or less	
Front suspension	Upper arm ball joint turning torque	4.5 N·m (46 kgf·cm, 40 in.-lbf) or less
	Lower arm ball joint turning torque	3.0 N·m (31 kgf·cm, 27 in.-lbf) or less
	Stabilizer link ball joint turning torque	2.0 N·m (20 kgf·cm, 18 in.-lbf) or less

A: Ground clearance of front wheel center

B: Ground clearance of lower suspension arm No.2 set bolt center

C: Ground clearance of rear wheel center

D: Ground clearance of strut rod set bolt center

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Tie rod end lock nut	88	897	65

REAR SUSPENSION

SERVICE DATA

0317E-02

Stabilizer link ball joint turning torque	2.0 N·m (20 kgf·cm, 17.7 in.-lbf) or less
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TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Shock absorber x Body	25	255	18
Hub nut	112	1,137	82
Shock absorber x Rear axle housing	98	1,000	72
Upper control arm x Rear axle housing	80	816	59
Upper control arm x Frame	80	816	59
Upper control arm x Height control sensor link	5.4	55	48 in.·lbf
Lower control arm x Rear axle housing	130	1,326	96
Lower control arm x Frame	130	1,326	96
Lower control arm x Parking brake cable	13	127	9
Lateral control rod x Rear axle housing	130	1,326	96
Lateral control rod x Frame	130	1,326	96
Stabilizer bar x Stabilizer link	70	714	52
Stabilizer bar x Rear axle housing	30	306	22
Stabilizer link x Frame	15	153	11

TIRE & WHEEL

SERVICE DATA

0313L-02

Cold tire inflation pressure:	Tire size: P265/65R17 110S Front, Rear	220 kPa (2.2 kgf-cm ² , 32 psi)
Tire runout		3.0 mm (0.118 in.) or less
Imbalance after adjustment		7 g (0.015 lb) or less

DIFFERENTIAL

SERVICE DATA

03132-02

Front differential	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)	
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)	
	Drive pinion preload (at starting)	New bearing		0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.-lbf)
		Reused bearing		0.49 – 0.78 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)
	Total preload (at starting)		Drive pinion preload plus 0.20 – 0.63 N·m (2 – 6 kgf·cm, 1.8 – 5.6 in.-lbf)	
	Drive pinion to ring gear backlash		0.11 – 0.18 mm (0.0043 – 0.0071 in.)	
	Side gear backlash		0 – 0.15 mm (0 – 0.0059 in.)	
	Carrier oil seal drive in depth		4.35 ± 0.45 mm (0.171 ± 0.018 in.)	
	Side oil seal drive in depth		0 ± 0.45 mm (0 ± 0.018 in.)	
	Side tube oil seal drive in depth		5.3 ± 0.5 mm (0.209 ± 0.020 in.)	
	Side gear thrust washer thickness			1.48 – 1.52 mm (0.0583 – 0.0598 in.)
				1.53 – 1.57 mm (0.0602 – 0.0618 in.)
				1.58 – 1.62 mm (0.0622 – 0.0638 in.)
				1.63 – 1.67 mm (0.0642 – 0.0657 in.)
				1.68 – 1.72 mm (0.0661 – 0.0677 in.)
				1.73 – 1.77 mm (0.0681 – 0.0697 in.)
				1.78 – 1.82 mm (0.0701 – 0.0717 in.)
			1.83 – 1.87 mm (0.0720 – 0.0736 in.)	
Side bearing adjusting washer thickness			1.88 – 1.92 mm (0.0740 – 0.0756 in.)	
			1.59 – 1.61 mm (0.0626 – 0.0634 in.)	
			1.62 – 1.64 mm (0.0638 – 0.0646 in.)	
			1.65 – 1.67 mm (0.0650 – 0.0657 in.)	
			1.68 – 1.70 mm (0.0661 – 0.0669 in.)	
			1.71 – 1.73 mm (0.0673 – 0.0681 in.)	
			1.74 – 1.76 mm (0.0685 – 0.0693 in.)	
			1.77 – 1.79 mm (0.0697 – 0.0705 in.)	
			1.80 – 1.82 mm (0.0709 – 0.0717 in.)	
			1.83 – 1.85 mm (0.0720 – 0.0728 in.)	
			1.86 – 1.88 mm (0.0732 – 0.0740 in.)	
			1.89 – 1.91 mm (0.0744 – 0.0752 in.)	
			1.92 – 1.94 mm (0.0756 – 0.0764 in.)	
			1.95 – 1.97 mm (0.0768 – 0.0776 in.)	
			1.98 – 2.00 mm (0.0780 – 0.0787 in.)	
			2.01 – 2.03 mm (0.0791 – 0.0800 in.)	
			2.04 – 2.06 mm (0.0803 – 0.0811 in.)	
			2.07 – 2.09 mm (0.0815 – 0.0823 in.)	
			2.10 – 2.12 mm (0.0827 – 0.0835 in.)	
		2.13 – 2.15 mm (0.0839 – 0.0846 in.)		
		2.16 – 2.18 mm (0.0850 – 0.0858 in.)		
		2.19 – 2.21 mm (0.0862 – 0.0870 in.)		
		2.22 – 2.24 mm (0.0874 – 0.0882 in.)		
		2.25 – 2.27 mm (0.0886 – 0.0894 in.)		
		2.28 – 2.30 mm (0.0898 – 0.0906 in.)		
		2.31 – 2.33 mm (0.0909 – 0.0917 in.)		
		2.34 – 2.36 mm (0.0921 – 0.0929 in.)		
		2.37 – 2.39 mm (0.0933 – 0.0941 in.)		
		2.40 – 2.42 mm (0.0945 – 0.0953 in.)		
		2.43 – 2.45 mm (0.0957 – 0.0965 in.)		
		2.46 – 2.48 mm (0.0969 – 0.0976 in.)		

Front differential (cont'd)	Drive pinion bearing adjusting washer thickness	1.69 – 1.71 mm (0.0665 – 0.0673 in.) 1.72 – 1.74 mm (0.0677 – 0.0685 in.) 1.75 – 1.77 mm (0.0689 – 0.0697 in.) 1.78 – 1.80 mm (0.0701 – 0.0709 in.) 1.81 – 1.83 mm (0.0713 – 0.0720 in.) 1.84 – 1.86 mm (0.0724 – 0.0732 in.) 1.87 – 1.89 mm (0.0736 – 0.0744 in.) 1.90 – 1.92 mm (0.0748 – 0.0756 in.) 1.93 – 1.95 mm (0.0760 – 0.0768 in.) 1.96 – 1.98 mm (0.0772 – 0.0780 in.) 1.99 – 2.01 mm (0.0783 – 0.0791 in.) 2.02 – 2.04 mm (0.0795 – 0.0803 in.) 2.05 – 2.07 mm (0.0807 – 0.0815 in.) 2.08 – 2.10 mm (0.0819 – 0.0827 in.) 2.11 – 2.13 mm (0.0831 – 0.0839 in.) 2.14 – 2.16 mm (0.0843 – 0.0850 in.) 2.17 – 2.19 mm (0.0854 – 0.0862 in.) 2.20 – 2.22 mm (0.0866 – 0.0874 in.) 2.23 – 2.25 mm (0.0878 – 0.0886 in.) 2.26 – 2.28 mm (0.0890 – 0.0898 in.) 2.29 – 2.31 mm (0.0902 – 0.0909 in.) 2.32 – 2.34 mm (0.0913 – 0.0921 in.)
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SERVICE SPECIFICATIONS - DIFFERENTIAL

Rear differential	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)	
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)	
	Drive pinion preload (at starting)	New bearing		1.05 – 1.64 N·m (10.7 – 16.7 kgf·cm, 9.3 – 14.5 in.·lbf)
		Reused bearing		0.56 – 0.85 N·m (5.7 – 8.7 kgf·cm, 5.0 – 7.5 in.·lbf)
	Total preload (at starting)		Drive pinion preload plus 0.39 – 0.59 N·m (4.0 – 6.0 kgf·cm, 3.5 – 5.2 in.·lbf)	
	Ring gear runout	Max.	0.07 mm (0.0028 in.)	
	Ring gear backlash		0.13 – 0.18 mm (0.0051 – 0.0071 in.)	
	Side gear backlash		0.05 – 0.20 mm (0.002 – 0.0079 in.)	
	Differential case runout	Max.	0.07 mm (0.0028 in.)	
	Rear differential front oil seal drive in depth		1.0 ± 0.45 mm (0.039 ± 0.018 in.)	
	Side gear thrust washer thickness			0.9 mm (0.035 in.)
				1.0 mm (0.039 in.)
				1.1 mm (0.043 in.)
				1.2 mm (0.047 in.)
				1.3 mm (0.051 in.)
Tooth contact pattern adjusting washer thickness			1.70 mm (0.0669 in.)	
			1.73 mm (0.0681 in.)	
			1.76 mm (0.0693 in.)	
			1.79 mm (0.0705 in.)	
			1.82 mm (0.0717 in.)	
			1.85 mm (0.0728 in.)	
			1.88 mm (0.0740 in.)	
			1.91 mm (0.0752 in.)	
			1.94 mm (0.0764 in.)	
			1.97 mm (0.0776 in.)	
			2.00 mm (0.0787 in.)	
			2.03 mm (0.0799 in.)	
			2.06 mm (0.0811 in.)	
			2.09 mm (0.0823 in.)	
			2.12 mm (0.0835 in.)	
		2.15 mm (0.0846 in.)		
		2.18 mm (0.0858 in.)		
		2.21 mm (0.0870 in.)		
		2.24 mm (0.0882 in.)		
		2.27 mm (0.0894 in.)		
		2.30 mm (0.0906 in.)		
		2.33 mm (0.0917 in.)		

TORQUE SPECIFICATION

Part tightened	N-m	kgf-cm	ft-lbf
Front Differential			
Companion flange x Drive pinion	See Page 29-13		
Differential support No.2 x Differential tube	160	1,630	118
Differential support No.1 x Differential carrier	186	1,900	137
Differential support No.3 x Differential carrier	108	1,100	80
Differential support No.3 x Front Crossmember	87	889	64
Breather hose bracket x Differential carrier	13	133	10
Filler plug	39	400	29
Drain plug	65	660	48
Differential tube x Differential carrier	110	1,120	81
Side Bearing Retainer x Differential carrier	50	510	37
Differential case x Ring gear	97	985	71
Rear Differential			
Companion flange x Drive pinion	See Page 29-37		
Differential carrier x Axle housing	25	255	18
Filler plug	49	500	36
Drain plug	49	500	36
Differential case x Ring gear	97	985	71
Bearing cap x Differential carrier	85	867	63
Adjusting nut lock x Bearing cap	13	130	9
RH differential case x LH differential case	47	480	35

DRIVE SHAFT, PROPELLER SHAFT, AXLE

03134-02

SERVICE DATA

PROPELLER SHAFT ASSY FRONT		
Propeller shaft runout	Maximum:	0.3 mm (0.012 in.)
Universal joint spider bearing axial play	Maximum:	0 mm (0 in.)
PROPELLER SHAFT ASSY		
Propeller shaft runout	Maximum:	0.3 mm (0.012 in.)
Universal joint spider bearing axial play	Maximum:	0 mm (0 in.)
FRONT AXLE HUB SUB-ASSY		
Front axle hub backlash	Maximum:	0.05 mm (0.0020 in.)
Front axle hub deviation	Maximum:	0.05 mm (0.0020 in.)
REAR AXLE SHAFT LH		
Rear axle shaft backlash	Maximum:	0.05 mm (0.0020 in.)
Rear axle shaft deviation	Maximum:	0.05 mm (0.0020 in.)
Rear axle shaft runout	Maximum:	1.5 mm (0.0591 in.)
Rear axle shaft flange runout	Maximum:	0.05 mm (0.0020 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
PROPELLER SHAFT ASSY FRONT			
Propeller shaft flange yoke x Companion flange	88	898	65
PROPELLER SHAFT ASSY			
Propeller shaft x Companion flange	88	898	65
FRONT AXLE HUB SUB-ASSY LH			
Front axle hub assy x Lock nut	235	2,396	173
Steering knuckle x Tie rod end	91	928	67
Steering knuckle x Stabilizer link	70	714	52
Disc brake caliper x Steering knuckle	123	1,254	91
Disc brake caliper x Brake tube	15	155	11
Front brake tube bracket set bolt	29	296	21
ABS speed sensor wire harness bracket set bolt	13	133	10
ABS speed sensor set bolt	8.3	85	73 in.·lbf
Steering knuckle x Upper ball joint	110	1,122	81
Steering knuckle x Lower ball joint	225	2,294	166
Steering knuckle x Front axle w/ABS rotor bearing assy	80	816	59
Front wheel adjusting nut x Front axle w/ABS rotor bearing assy	275	2,804	203
Front wheel	112	1,142	83
REAR AXLE SHAFT			
Axle housing x Rear axle shaft	120	1,224	89
Rear disc brake caliper x Rear axle shaft	105	1,071	77
Parking brake cable assy set bolt	8.0	82	71 in.·lbf
Rear axle shaft w/backing plate x Disc brake caliper	47	480	35
ABS speed sensor set nut	8.3	85	73 in.·lbf
Rear brake tube x Master cylinder	15	155	11
Rear wheel	112	1,142	83

TRANSFER

SERVICE DATA

0317L-01

Output shaft rear		
Drive sprocket thrust clearance	STD	0.15 – 0.24 mm (0.0059 – 0.0094 in.)
	Max.	0.24 mm (0.0094 in.)
Drive sprocket radial clearance	STD	0.01 – 0.06 mm (0.0004 – 0.0024 in.)
	Max.	0.06 mm (0.0024 in.)
Gear shift fork No.2 claw thickness		10 mm (0.3937 in.)
High and low clutch sleeve groove distance		10.5 mm (0.4134 in.)
Gear shift fork No.2 to high and low clutch sleeve clearance	STD	0.26 – 0.84 mm (0.0102 – 0.0331 in.)
	Max.	0.84 mm (0.0331 in.)
CTR differential lock fork claw thickness		10 mm (0.3937 in.)
Front drive clutch sleeve groove distance		10.5 mm (0.4134 in.)
CTR differential lock fork to front drive clutch sleeve clearance	STD	0.26 – 0.84 mm (0.0102 – 0.0331 in.)
	Max.	0.84 mm (0.0331 in.)
Output shaft rear journal outer diameter		
Part A	STD	27.98 – 27.99 mm (1.1016 – 1.1020 in.)
	Min.	27.98 mm (1.1016 in.)
Part B	STD	31.98 – 32.00 mm (1.2591 – 1.2598 in.)
	Min.	31.98 mm (1.2591 in.)
Part C	STD	34.98 – 35.00 mm (1.3772 – 1.3780 in.)
	Min.	34.98 mm (1.3772 in.)
Part D	STD	36.98 – 37.00 mm (1.4559 – 1.4567 in.)
	Min.	36.98 mm (1.4559 in.)
Input shaft		
Input shaft journal outer diameter	Min.	47.59 mm (1.8736 in.)
Input shaft bushing inside diameter	Max.	48.14 mm (1.8953 in.)
Input gear stopper snap ring thickness	Mark	
	A	2.10 – 2.15 mm (0.0827 – 0.0846 in.)
	B	2.15 – 2.20 mm (0.0846 – 0.0866 in.)
	C	2.20 – 2.25 mm (0.0866 – 0.0886 in.)
	D	2.25 – 2.30 mm (0.0886 – 0.0906 in.)
	E	2.30 – 2.35 mm (0.0906 – 0.0925 in.)
	F	2.35 – 2.40 mm (0.0925 – 0.0945 in.)
	G	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	H	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	J	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	K	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	L	2.60 – 2.65 mm (0.1024 – 0.1043 in.)
	M	2.65 – 2.70 mm (0.1043 – 0.1063 in.)
	N	2.70 – 2.75 mm (0.1063 – 0.1083 in.)
	P	2.75 – 2.80 mm (0.1083 – 0.1102 in.)
	Q	2.80 – 2.85 mm (0.1102 – 0.1122 in.)
	R	2.85 – 2.90 mm (0.1122 – 0.1142 in.)
	S	2.90 – 2.95 mm (0.1142 – 0.1161 in.)
	T	2.95 – 3.00 mm (0.1161 – 0.1181 in.)
	U	3.00 – 3.05 mm (0.1181 – 0.1201 in.)
Planetary gear		
Pinion gear thrust clearance	STD	0.11 – 0.84 mm (0.0043 – 0.0331 in.)
	Max.	0.84 mm (0.0331 in.)
Pinion gear radial clearance	STD	0.009 – 0.038 mm (0.0004 – 0.0015 in.)
	Max.	0.038 mm (0.0015 in.)
Input bearing shaft snap ring thickness	Mark	
	1	1.45 – 1.50 mm (0.0571 – 0.0591 in.)
	2	1.50 – 1.55 mm (0.0591 – 0.0610 in.)
	3	1.55 – 1.60 mm (0.0610 – 0.0630 in.)
	4	1.60 – 1.65 mm (0.0630 – 0.0650 in.)
	5	1.65 – 1.70 mm (0.0650 – 0.0669 in.)
Low planetary gear bearing press in depth		7.7 – 8.3 mm (0.303 – 0.327 in.)
Oil seal No.2 drive in depth		-0.5 – 0.5 mm (-0.020 – 0.020 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Transfer case lower protector x Transfer	18	184	13
Transfer assy x Transfer adaptor	24	245	18
Front bearing retainer sub-assy x Front case	12	117	8
Transfer case cover sub-assy x Front case	18	184	13
Output shaft companion flange sub-assy lock nut	118	1,200	87
Extension housing sub-assy x Case rear	12	122	9
Front case x Case rear	28	285	21
Plug No.1 x Case rear	19	190	14
CTR differential lock fork sub-assy x Transfer shift actuator assy	24	245	18
Transfer shift actuator assy x Case rear	20	204	15
Case No.1 plug (Filler plug) x Case rear	37	377	27
Case No.1 plug (Drain plug) x Case rear	37	377	27
Oil separator sub-assy x Case rear	7.5	76	66 in.·lbf
Oil pump body sub-assy x Case rear	7.5	76	66 in.·lbf
Transfer case plug x Front case	19	190	14
Indicator switch x Front case	37	377	27

BRAKE

SERVICE DATA

03176-02

Brake pedal height (from dash panel)	181.6 – 191.6 mm (7.150 – 7.543 in.)
Rod operating adapter length	220.2 – 221.2 mm (8.669 – 8.709 in.)
Brake pedal free play	1 – 6 mm (0.04 – 0.24 in.)
Stop light switch clearance	0.5 – 2.5 mm (0.020 – 0.098 in.)
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf)	More than 55 mm (2.17 in.)
Front pad lining thickness	Standard thickness: 11.5 mm (0.453 in.) Minimum thickness: 1.0 mm (0.039 in.)
Front disc thickness	Standard thickness: 28.0 mm (1.102 in.) Minimum thickness: 26.0 mm (1.024 in.)
Front disc runout	Maximum disc runout: 0.05 mm (0.0020 in.)
Rear pad lining thickness	Standard thickness: 10.0 mm (0.394 in.) Minimum thickness: 1.0 mm (0.039 in.)
Rear disc thickness	Standard thickness: 18.0 mm (0.709 in.) Minimum thickness: 16.0 mm (0.630 in.)
Rear disc runout	Maximum disc runout: 0.20 mm (0.0079 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Bleeder plug	11	112	8
Brake booster clevis lock nut	26	260	19
Brake pedal sub-assy x Brake pedal support sub-assy	34.3	350	25
Brake pedal support sub-assy x Brake master cylinder sub-assy	14	145	10
Brake pedal support reinforcement x Reinforcement	34.3	350	25
Brake pedal support sub-assy x Brake pedal support reinforcement	34.3	350	25
Front disc brake cylinder x Steering knuckle	123	1,254	91
Flexible hose x Disc brake cylinder assy rear	31	316	23
Rear disc brake cylinder mounting x Axle hub	105	1,071	77
Rear disc brake cylinder mounting x Disc brake cylinder assy rear	88	897	65
Flexible hose x Disc brake cylinder assy rear	31	316	23
Brake booster pump x Brake booster accumulator	57	585	42
Brake booster pump x Pin	7.8	80	69 in.·lbf
Brake master cylinder x Brake booster pump bracket No. 1	7.8	80	69 in.·lbf
Brake master cylinder x Master cylinder solenoid	32	326	24
Master cylinder solenoid x Wire harness	2.9	30	26 in.·lbf
Brake tube union nut	14 (16)	145 (158)	10 (11)
Brake actuator tube union nut	14 (15)	143 (155)	10 (11)
Brake master cylinder x Master cylinder reservoir	1.7	17	15 in.·lbf
Front speed sensor x Steering knuckle	8.3	85	73 in.·lbf
Rear speed sensor x Axle hub	8.3	85	73 in.·lbf
Yawrate sensor x Body	13	136	10

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PARKING BRAKE

SERVICE DATA

0317G-01

Parking brake lever travel at 196 N (20 kgf, 44.1 lbf):		5 - 7 clicks
Rear brake disc inside diameter	Standard	210 mm (8.27 in.)
	Maximum	211 mm (8.30 in.)
Parking brake shoe lining thickness	Standard	4.0 mm (0.158 in.)
	Maximum	1.0 mm (0.039 in.)

TORQUE SPECIFICATION

Part Tightened	N-m	kgf.cm	ft.lbf
Wheel nut	112	1,137	82
Parking brake lock nut	13	127	9
Parking brake lever x Body	13	127	9
Floor heat insulator x Body	13	127	9
Parking brake cable assy No.3 x Fram	13	127	9
Parking brake cable assy No.3 x Backing plate	8.0	82	71 in.lbf
Disk brake caliper x Backing plate	105	1,071	77

AUTOMATIC TRANSMISSION / TRANSAXLE

SERVICE DATA

0319E-05

A750F			
Line pressure (Wheel locked)	Engine idling		
	D position	362 to 423 kPa (3.7 to 4.3 kgf·cm ² , 53 to 61 psi)	
	R position	495 to 576 kPa (5.0 to 5.9 kgf·cm ² , 71 to 84 psi)	
	AT stall (Throttle valve fully open)		
	D position	1,235 to 1,332 kPa (12.6 to 13.6 kgf·cm ² , 179 to 193 psi)	
	R position	1,229 to 1,350 kPa (12.5 to 13.8 kgf·cm ² , 178 to 196 psi)	
Engine stall revolution	D positions	2,200 ± 150 rpm	
Time lag	N → D position	Less than 1.2 seconds	
	N → R position	Less than 1.5 seconds	
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm	
Drive plate runout	Max.	0.20 mm (0.0079 in.)	
Torque converter runout	Max.	0.30 mm (0.0118 in.)	
Torque converter clutch installation distance		More than 17.1 mm (0.673 in.)	
Shift schedule			
D position (Throttle valve fully open)	1 → 2	50 to 61 km/h (31 to 38 mph)	
	2 → 3	94 to 103 km/h (58 to 64 mph)	
	3 → 4	134 to 147 km/h (83 to 91 mph)	
	4 → 5	181 to 191 km/h (112 to 119 mph)	
	5 → 4	176 to 186 km/h (109 to 116 mph)	
	4 → 3	123 to 133 km/h (76 to 83 mph)	
	3 → 2	83 to 89 km/h (52 to 55 mph)	
	2 → 1	39 to 44 km/h (24 to 27 mph)	
	(Throttle valve fully closed)	4 → 5	49 to 54 km/h (30 to 34 mph)
		5 → 4	25 to 30 km/h (16 to 19 mph)
4 position (Throttle valve fully open)	1 → 2	50 to 61 km/h (31 to 38 mph)	
	2 → 3	94 to 103 km/h (58 to 64 mph)	
	3 → 4	134 to 147 km/h (83 to 91 mph)	
	5 → 4	193 to 203 km/h (120 to 126 mph)	
	4 → 3	123 to 133 km/h (76 to 83 mph)	
	3 → 2	83 to 89 km/h (52 to 55 mph)	
	2 → 1	39 to 44 km/h (24 to 27 mph)	
3 position (Throttle valve fully open)	1 → 2	50 to 61 km/h (31 to 38 mph)	
	2 → 3	94 to 103 km/h (58 to 64 mph)	
	4 → 3	135 to 145 km/h (84 to 90 mph)	
	3 → 2	83 to 89 km/h (52 to 55 mph)	
	2 → 1	39 to 44 km/h (24 to 27 mph)	
2 position (Throttle valve fully open)	1 → 2	50 to 61 km/h (31 to 38 mph)	
	3 → 2	89 to 99 km/h (55 to 62 mph)	
	2 → 1	39 to 44 km/h (24 to 27 mph)	
L position (Throttle valve fully open)	2 → 1	39 to 44 km/h (24 to 27 mph)	

A750F		
Lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Lock-up ON	70 to 76 km/h (43 to 47 mph)
	Lock-up OFF	63 to 68 km/h (39 to 42 mph)
4 position		
4th gear	Lock-up ON	114 to 120 km/h (71 to 75 mph)
	Lock-up OFF	107 to 112 km/h (66 to 70 mph)
Fleks lock-up point	Throttle valve opening 3 %	
D position		
5th gear	Lock-up ON	49 to 54 km/h (30 to 34 mph)
	Lock-up OFF	48 to 53 km/h (30 to 33 mph)
4 position		
4th gear	Lock-up ON	36 to 41 km/h (22 to 25 mph)
	Lock-up OFF	34 to 39 km/h (21 to 24 mph)

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Park/neutral position switch	Bolt	13	130	9
	Nut	6.9	70	61 in.·lbf
Transmission control cable x Automatic transmission		12	122	9
Engine mounting insulator rear No.1 x Automatic transmission		65	663	48
Automatic transmission x Engine	17 mm head	71	720	53
	14 mm head	37	380	27
Torque converter clutch x Drive plate		48	490	35
Flywheel housing under cover x Automatic transmission		18	184	13
Engine rear mounting member x Body	Nut	72	735	53
	Bolt	18	184	13
Transmission control cable bracket No.1 x Automatic transmission		25	255	19
Oil cooler tube clamp		5	51	43 in.·lbf
Oil cooler outlet tube No.1 x Automatic transmission		34	346	25
Oil cooler inlet tube No.1 x Automatic transmission		34	346	25
Exhaust pipe x Exhaust manifold		54	554	40
Exhaust pipe x Exhaust pipe		43	440	32
Front suspension member bracket LH x Body		33	336	24
Front suspension member bracket x Body		33	336	24
Speed sensor x Automatic transmission		5.4	55	48 in.·lbf
Drain plug x Oil pan		28	285	21
Transmission wire set bolt x Automatic transmission		8.0	83	71 in.·lbf
Transmission wire clamp x Valve body	A	10	100	7
	B	11	110	8
Oil strainer x Valve body		10	100	7
Oil pan x Transmission case		4.4	45	39 in.·lbf
Shift solenoid valve S1 x Valve body		6.4	65	56 in.·lbf
Shift solenoid valve S2 x Valve body		10	100	7
Shift solenoid valve SR x Valve body		6.4	65	56 in.·lbf
Shift solenoid valve SLU, SL2 x Valve body		6.4	65	56 in.·lbf
Shift solenoid valve SLT, SL1 x Valve body		6.4	65	56 in.·lbf
Valve body x Transmission case		11	110	8
Floor shift assy x Body		12	122	9
Overflow plug x Automatic transmission		20	204	15
Refill plug x Automatic transmission		39	400	29

STEERING COLUMN

SERVICE DATA

03178-01

Steering wheel freeplay	Maximum	30 mm (1.18 in.)
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TORQUE SPECIFICATION

Part Tightened	N-m	kgf.cm	ft.lbf
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx [®] screw)	8.8	90	78 in.lbf
Steering column assy set nut	26	270	20
Steering sliding yoke x Intermediate shaft No.2	36	370	26
Power steering gear box x Intermediate shaft No.2	36	370	26
Steering sliding yoke x Intermediate shaft	36	370	26
Steering intermediate shaft cover	5	50	44 in.lbf

POWER STEERING

SERVICE DATA

030QA-11

POWER STEERING FLUID		
Fluid level rise	Maximum:	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed		8,336 kPa (85 kgf/cm ² , 1,209 psi)
STEERING WHEEL		
Steering effort at idle speed	(Reference)	6 N·m (60 kgf·cm, 53 in.-lbf)
VANE PUMP ASSY		
Vane pump rotating torque		0.27 N·m (2.8 kgf·cm, 2.4 in.-lbf) or less
Vane pump shaft and vane pump housing oil clearance	STD:	0.027 – 0.054 mm (0.0011 – 0.0021 in.)
	Maximum:	0.07 mm (0.0028 in.)
Vane plate height	Minimum:	8.6 mm (0.33858 in.)
Vane plate thickness	Minimum:	1.397 mm (0.05500 in.)
Vane plate length	Minimum:	14.991 mm (0.59020 in.)
Clearance between the rotor groove and plate	Maximum:	0.033 mm (0.00130 in.)
Spring free length	Minimum:	32.1 mm (1.264 in.)
POWER STEERING LINK ASSY		
Total preload (Tie rod rotating torque)	(Turning)	0.29 – 1.96 N·m (2.9 – 20.0 kgf·cm, 2.57 – 17.35 in.-lbf)
Total preload in center position (Control valve rotating torque)	(Turning)	1.35 – 1.55 N·m (13.77 – 15.81 kgf·cm, 11.94 – 13.71 in.-lbf)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
VANE PUMP ASSY			
Vane pump housing rear x Vane pump housing front	24	240	17
Pressure port union	83	850	61
Suction port union set bolt	13	130	9
Vane pump assy x Engine	43	438	32
Vane pump assy x Stud bolt	22	224	16
Vane pump pulley set nut	44	449	32
Pressure feed tube assy x Vane pump assy	51	520	38
POWER STEERING LINK ASSY			
Control valve housing set bolt	18	184	13
Bearing guide nut	25	250	18
Cylinder end stopper	145	1,479	107
Rack guide spring cap	25	250	18
Rack guide spring cap lock nut	69 (65)	700 (660)	51 (48)
Power steering rack x Rack end	103 (98)	1,050 (1,000)	76 (72)
Tie rod assy lock nut	88	897	65
Turn pressure tube union nut	25 (23)	250 (230)	18 (17)
Power steering link assy set bolt and nut	100	1,020	74
Pressure feed and return tubes x Control valve housing	44 (42)	449 (428)	32 (31)
Pressure feed tube clamp set bolt	28	286	21
Outlet return tube	44 (42)	449 (428)	32 (31)
Outlet return tube clamp set bolt	28	286	21
Tie rod end x steering knuckle	91	928	67
Stabilizer bar front bracket set bolt	40	408	30
Stabilizer link x Steering knuckle	70	714	52

(): For use without SST

HEATER AND AIR CONDITIONING

SERVICE DATA

0317J-01

Refrigerant charge volume	Standard:	
	Single A/C:	600 ± 30 g (21.16 ± 1.06 oz.)
	Dual:	800 ± 30 g (28.21 ± 1.06 oz.)
Magnetic clutch clearance	2UZ-FE:	0.35 - 0.60 mm (0.013 - 0.023 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
AIR CONDITIONER RADIATOR ASSY			
Air conditioning tube assy x Cooler evaporator sub-assy No. 1	3.5	35	30 in.·lbf
Air conditioner unit assy x Body	5.4	55	48 in.·lbf
Air conditioner unit assy x Instrument panel reinforcement	9.8	100	87 in.·lbf
Wiring harness x Instrument panel reinforcement	8.3	85	73 in.·lbf
Steering column assy x Instrument panel reinforcement	26	265	19
BLOWER ASSY			
Blower assy x Body	5.4	55	48 in.·lbf
Blower assy x Instrument panel reinforcement	9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (2UZ-FE)			
Magnet clutch hub x Cooler compressor assy	18	183	13
Compressor and magnetic clutch x Engine (Bolt)	46	469	34
Compressor and magnetic clutch x Engine (Nut)	24	245	18
Discharge hose sub-assy x Compressor and magnetic clutch	9.8	100	87 in.·lbf
Suction hose sub-assy x Compressor and magnetic clutch	9.8	100	87 in.·lbf
COOLER CONDENSER CORE			
Cap x Cooler condenser core	2.9	29	25 in.·lbf
Cooler condenser cushion No.1 x Cooler condenser core	5.4	55	48 in.·lbf
Cooler condenser cushion No.2 x Cooler condenser core	5.4	55	48 in.·lbf
Cooler condenser bracket No.1 x Cooler condenser core	5.4	55	48 in.·lbf
Air conditioning tube assy x Cooler condenser core	5.4	55	48 in.·lbf
Discharge hose sub-assy x Cooler condenser core	5.4	55	48 in.·lbf
COOLING (REAR) UNIT ASSY			
Air conditioning tube assy x Evaporator sub-assy (rear)	5.4	55	47 in.·lbf
Pipe cooler refrigerant suction B x Cooling (rear) unit assy	9.8	100	87 in.·lbf
C pipe cooler refrigerant liquid x Cooling (rear) unit assy	9.8	100	87 in.·lbf

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

0318S-02

Part Tightened	N-m	kgf-cm	ft-lbf
Horn button assy x Steering wheel assy	8.8	90	78 in.-lbf
Steering wheel assy x Steering column assy	50	510	37
Instr pnl pass l/door airbag assy x Instrument panel reinforcement	20	200	14
Curtain shield airbag assy x Body	9.8	100	87 in.-lbf
Airbag sensor assy center x Body	17.5	178	13
Airbag sensor front x Body	7.5	76	66 in.-lbf
Side airbag sensor assy RH x Body	17.5	178	13
Airbag sensor rear RH x Body	17.5	178	13
Seat position airbag sensor x Front seat assy LH	8.0	82	71 in.-lbf
Front seat airbag assy x Front seat adjuster assy LH	5.5	56	49 in.-lbf

SEAT BELT

TORQUE SPECIFICATION

0318N-02

Part Tightened	N-m	kgf-cm	ft-lbf
FRONT SEAT BELT			
Front seat outer belt assy RH (Upper part of retractor) x Body	8.0	80	71 in. lbf
Front seat outer belt assy RH (Lower part of retractor) x Body	42	420	31
Front seat inner belt assy RH x Front seat	42	420	31
Front shoulder belt anchor adjuster assy x Body	42	420	31
Front seat outer belt floor anchor x Body	42	420	31
Front seat outer belt shoulder anchor x Body	42	420	31
REAR SEAT BELT			
Rear seat belt assy outer (Upper part of retractor) x Body	8.0	80	71 in. lbf
Rear seat belt assy outer (Lower part of retractor) x Body	42	420	31
Rear seat belt assy outer floor anchor x Body	42	420	31
Rear seat belt assy outer shoulder anchor x Body	42	420	31
Rear seat belt assy inner x Rear No. 1 seat assembly RH	42	430	31
Rear No. 1 seat belt assy inner LH x Rear No. 1 seat assy RH	42	430	31
No. 1 seat 3 point type belt assy LH x Rear No. 1 seat assembly RH	42	430	31
Rear No. 2 seat belt assy outer RH x Body	42	420	31
Rear No. 2 seat belt assy outer floor anchor x Body	42	420	31
Rear No. 2 seat belt assy outer shoulder anchor x Body	42	420	31
Rear No. 2 seat belt sub-assy inner x Rear No. 2 seat assy	42	420	31
Rear No. 2 seat belt sub-assy inner LH x Rear No. 2 seat assy	42	420	31
Rear seat belt sub-assy inner x Rear No. 2 seat assy	42	420	31
Rear seat outer belt sub-assy x Rear No. 2 seat assy	42	420	31
Rear No. 2 seat belt sub-assy inner x Rear No. 2 seat assy	42	420	31

WIPER & WASHER

TORQUE SPECIFICATION

0317D-01

Part Tightened	N-m	kgf-cm	ft-lbf
FF Wiper motor x Wiper link	7.5	76	66 in.-lbf
FF Wiper link x Body	7.0	71	62 in.-lbf
FR Wiper arm RH x Wiper link	25	254	18
FR Wiper arm LH x Wiper link	25	254	18
RR Wiper motor x Body	5.5	56	49 in.-lbf
RR Wiper arm x RR Wiper motor	5.5	56	49 in.-lbf

AUDIO & VISUAL SYSTEM

TORQUE SPECIFICATION

0317C-02

Part Tightened	N-m	kgf-cm	ft-lbf
Amplifier Antenna Assy x Body	8	82	71 in.-lbf

COMMUNICATION SYSTEM

TORQUE SPECIFICATION

0319B-01

Part Tightened	N-m	kgf-cm	ft-lbf
HIGH PITCHED HORN ASSY			
High pitched horn assy x Body	20	199	15
LOW PITCHED HORN ASSY			
Low pitched horn assy x Body	20	199	15
TELEPHONE ANTENNA BASE			
Telephone Antenna Base x Body	3 - 9	31 - 92	20 - 80 in.lbf

WINDSHIELD/WINDOWGLASS/MIRROR

TORQUE SPECIFICATION

0318Z-01

Part Tightened	N-m	kgf·cm	ft·lbf
OUTER REAR VIEW MIRROR ASSY LH			
Outer rear view mirror assy x Front door	8.0	82	71 in.·lbf

INSTRUMENT PANEL/METER

TORQUE SPECIFICATION

031AE-02

Part Tightened	N·m	kgf·cm	ft·lbf
Instrument Panel Reinforcement × Airbag	20	204	14

SEAT

TORQUE SPECIFICATION

0318X-02

Part Tightened		N-m	kgf-cm	ft-lbf
Seat position airbag sensor x Front seat adjuster assy (Driver Seat)		8.0	82	71 in.-lbf
Front seat track assy outer LH x Front seat adjuster assy (Driver Seat)		42	430	31
Power seat motor assy (Front vertical) x Front seat adjuster assy	Bolt	4.9	50	43 in.-lbf
	Nut	25	255	18
Power seat motor assy (lifter) x Front seat adjuster assy	Bolt	4.9	50	43 in.-lbf
	Nut	25	255	18
Power seat motor assy (Slide) x Front seat adjuster assy	Bolt	4.9	50	43 in.-lbf
	Nut	25	255	18
Power seat motor assy (Reclining) x Front seat adjuster assy		4.9	50	43 in.-lbf
Front seatback cover bracket x Front seat adjuster assy (w/ Side airbag)		5.5	56	49 in.-lbf
Seat armrest assy x Front seat adjuster assy		37	377	27
Front seat Inner belt assy LH x Front seat adjuster assy		42	428	31
Front LH seat assy x Body		37	377	27
Rear No. 1 seat LH and RH x Body		37	375	27
Rear seat belt inner x Rear seat cushion frame		42	430	31
Rear seat belt inner No. 2 x Rear seat cushion frame		42	430	31
Rear seat 3-joint type belt assy LH x Rear seat cushion frame		42	430	31
Rear seatback frame x Rear seat cushion frame		50	510	37
Seat No. 1 cushion frame x Rear seat frame		18	185	13
Rear seat belt inner x Rear seat frame		42	430	31

SLIDING ROOF

SERVICE DATA

0318Q-01

Sliding roof	Difference in level between sliding roof weatherstrip and roof panel	
	<p style="text-align: right;">Corner of rear side</p> Difference in level between sliding roof glass and roof panel front end and rear end	0 ± 1.5 mm (0 ± 0.059 in.)
	<p style="text-align: right;">Front end and rear end</p>	21.4 mm (0.843 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Sliding roof glass assembly × Drive cable	4.0	41	35 in.·lbf
Sliding roof housing sub-assy × Body	5.5	56	49 in.·lbf
Sliding roof housing sub-assy × Sliding roof drive gear	5.4	55	48 in.·lbf

ENGINE HOOD/DOOR

TORQUE SPECIFICATION

03171-02

Part Tightened	N-m	kgf-cm	ft-lbf
HOOD			
Auxiliary catch hook x Hood panel	8.0	81	72 in. lbf
Auxiliary catch release lever x Hood panel	8.0	82	71 in. lbf
Hood hinge x Body	13	130	10
Hood hinge x Hood panel	13	130	10
Hood lock x Hood panel	8.0	82	71 in. lbf
Hood support x Hood panel	17.5	180	13
Hood support x Body	17.5	180	13
Radiator grille x Hood panel	5.5	56	49 in. lbf
FRONT DOOR			
Door check x Body	30	306	22
Door check x Door panel	5.5	56	49 in. lbf
Door frame sub-assy rear lower x Door panel	5.0	51	44 in. lbf
Door glass x Door panel	8.0	82	71 in. lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock x Door panel	5.0	51	42 in. lbf
Door lock striker x Body	23	235	17
Door outside handle cover x Door panel	7.0	71	62 in. lbf
Door outside handle frame x Door panel	7.0	71	62 in. lbf
Door wire x Door panel	8.0	82	71 in. lbf
Outer view mirror x Door panel	8.0	82	71 in. lbf
Power window regulator motor x Window regulator	5.4	55	48 in. lbf
Window regulator x Door panel	8.0	82	71 in. lbf
REAR DOOR			
Division bar x Door panel	5.0	51	44 in. lbf
Door check x Body	30	306	22
Door check x Door panel	5.5	56	49 in. lbf
Door glass x Door panel	8.0	82	71 in. lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock x Door panel	5.5	56	49 in. lbf
Door lock striker x Body	23	235	17
Door outside handle cover x Door panel	7.0	71	62 in. lbf
Door outside handle frame x Door panel	4.0	41	35 in. lbf
Outer view mirror x Door panel	8.0	82	71 in. lbf
Power window regulator motor x Window regulator	5.4	55	48 in. lbf
Window regulator x Door panel	8.0	82	71 in. lbf
BACK DOOR			
Door hinge x Door panel	8.0	82	71 in. lbf
Door hinge x Body	8.0	82	71 in. lbf
Door lock x Door panel	8.0	82	71 in. lbf
Door lock striker x Body	27	275	20
Door link x Stay bracket	18	184	13
Door stay x Body	18	184	13
Door stay x Door panel	18	184	13
Wiper arm x Wiper motor	5.5	56	49 in. lbf

SERVICE SPECIFICATIONS - ENGINE HOOD/DOOR

Part Tightened	N·m	kgf·cm	ft·lbf
Wiper motor x Door panel	5.5	55	49 in.·lbf
Door outside handle x Door panel	5.0	51	42 in.·lbf

EXTERIOR/INTERIOR TRIM

TORQUE SPECIFICATION

0318Y-02

Part Tightened	N-m	kgf-cm	ft-lbf
FRONT BUMPER COVER			
Front bumper reinforcement x Body	65	663	48
Front bumper stay No. 2 x Body	8.0	82	71 in.-lbf
Front bumper side support x Body	3.0	31	27 in.-lbf
Front bumper cover x Body	8.0	82	71 in.-lbf
Front bumper cover lower x Body	8.0	82	71 in.-lbf
REAR BUMPER COVER			
Rear bumper cover x Body	8.0	82	70 in.-lbf
Rear bumper side support x Body	3.0	31	27 in.-lbf
Rear bumper reinforcement No. 1 x Body	25	255	18
ROOF HEADLINING			
Front seat outer belt x Body	42	430	31
ROOF DRIP SIDE FINISH MOULDING LH			
Roof rack bracket front x Body	10.0	102	7.4
SIDE STEP			
Side step bracket x Body	18	184	13
Side step bracket x Step sub-assy	5.0	51	44 in.-lbf

SFI SYSTEM (2UZ-FE)

05GHN-02

PRECAUTION

NOTICE:

Perform the **RESET MEMORY (AT initialization)** when replacing the automatic transaxle assembly, engine assembly or ECM (see page [05-923](#)).

HINT:

RESET MEMORY cannot be completed by only removing the battery.

DEFINITION OF TERMS

Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	A group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM sets the DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring, if multiple sensors and components are used to detect the malfunction. While another sensor is being monitored, the next sensor or component will not be monitored until the current sensor monitoring is finished.
Required sensor/components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects malfunction only one time during a single driving cycle. "Continuous" means that the ECM detects the malfunction every time an enabling condition is met.
Duration	The minimum time that the ECM must sense a continuous deviation in the monitored value(s) before setting a DTC. This timing begins after the "typical enabling conditions" are met.
Malfunction thresholds	Beyond this value, the ECM will conclude that there is a malfunction and set a DTC.
MIL operation	MIL illumination timing after a defect is detected. "Immediately" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycle" means that the ECM illuminates the MIL if the same malfunction is detected again in the 2nd driving cycle.

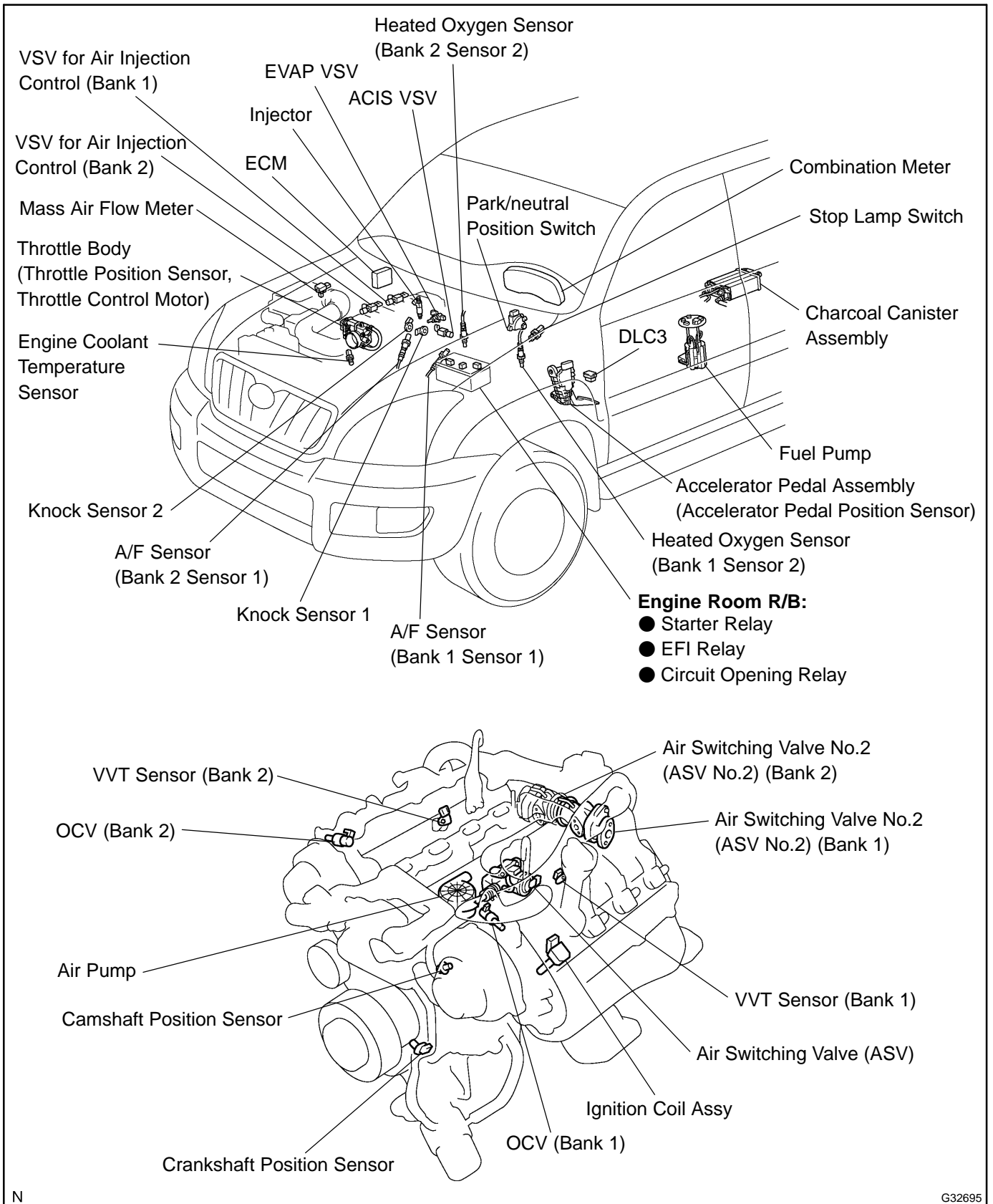
PART AND SYSTEM NAME LIST

This reference list indicates the part names used in this manual along with their definitions.

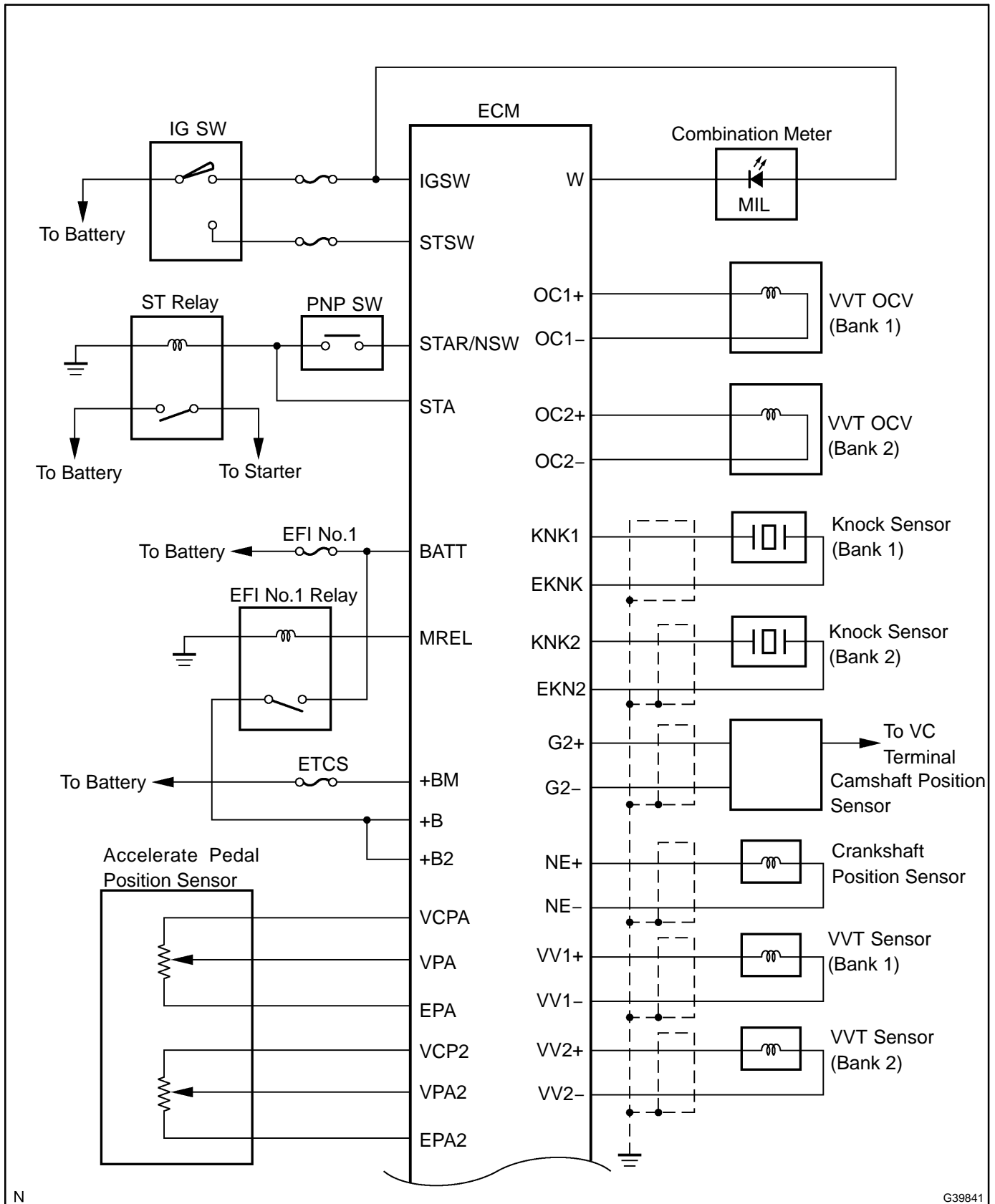
TOYOTA/LEXUS name	Definition
Toyota HCAC system, Hydro-carbon Adsorptive Catalyst (HCAC) system, HC adsorptive three-way catalyst	HC adsorptive three-way catalytic converter
Variable Valve Timing sensor, VVT sensor	Camshaft position sensor
Variable valve timing system, VVT system	Camshaft timing control system
Camshaft timing oil control valve, Oil control valve, OCV, VVT, VSV	Camshaft timing oil control valve
Variable timing and lift, VVTL	Camshaft timing and lift control
Crankshaft position sensor "A"	Crankshaft position sensor
Engine speed sensor	Crankshaft position sensor
THA	Intake air temperature
Knock control module	Engine knock control module
Knock sensor	Engine knock sensor
Mass or volume air flow circuit	Mass air flow sensor circuit
Vacuum sensor	Manifold air pressure sensor
Internal control module, Control module, Engine control ECU, PCM	Power train control module
FC idle	Deceleration fuel cut
Idle air control valve	Idle speed control
VSV for CCV, Canister close valve VSV for canister control	Evaporative emissions canister vent valve
VSV for EVAP, Vacuum switching valve assembly No. 1, EVAP VSV, Purge VSV	Evaporative emissions canister purge valve
VSV for pressure switching valve, Bypass VSV	Evaporative emission pressure switching valve
Vapor pressure sensor, EVAP pressure sensor, Evaporative emission control system pressure sensor	Fuel tank pressure sensor
Charcoal canister	Evaporative emissions canister
ORVR system	On-board refueling vapor recovery system
Intake manifold runner control	Intake manifold tuning system
Intake manifold runner valve, IMRV, IACV (runner valve)	Intake manifold tuning valve
Intake control VSV	Intake manifold tuning solenoid valve
AFS	Air fuel ratio sensor
O2 sensor	Heater oxygen sensor
Oxygen sensor pumping current circuit	Oxygen sensor output signal
Oxygen sensor reference ground circuit	Oxygen sensor signal ground
Accel position sensor	Accelerator pedal position sensor
Throttle actuator control motor, Actuator control motor, Electronic throttle motor, Throttle control motor	Electronic throttle actuator
Electronic throttle control system, Throttle actuator control system	Electronic throttle control system
Throttle/pedal position sensor, Throttle/pedal position switch, Throttle position sensor/switch	Throttle position sensor
Turbo press sensor	Turbocharger pressure sensor
Turbo VSV	Turbocharger pressure control solenoid valve
P/S pressure switch	Power-steering pressure switch
VSV for ACM	Active control engine mount
Speed sensor, Vehicle speed sensor "A", Speed sensor for skid control ECU	Vehicle speed sensor
ATF temperature sensor, Trans. fluid temp. sensor, ATF temperature sensor "A"	Transmission fluid temperature sensor
Electronic controlled automatic transmission, ECT	Electronically controlled automatic
Intermediate shaft speed sensor "A"	Counter gear speed sensor

TOYOTA/LEXUS name	Definition
Output speed sensor	Output shaft speed sensor
Input speed sensor, Input turbine speed sensor "A", Speed sensor (NT), Turbine speed sensor	Input turbine speed sensor
PNP switch, NSW	Park/neutral position switch
Pressure control solenoid	Transmission pressure control solenoid
Shift solenoid	Transmission shift solenoid valve
Transmission control switch, Shift lock control unit	Shift lock control module
Engine immobilizer system, Immobilizer system	Vehicle anti-theft system
Air switching valve (ASV)	Secondary air injection control valve
AI system	Secondary air injection system
Air pump	Secondary air injection pump
Air switching valve No.2 (ASV No.2)	Secondary air injection bypass valve (Bank 1, 2)
VSV for air injection control	Secondary air injection vacuum switching valve
Air injection driver	Secondary air injection driver

LOCATION

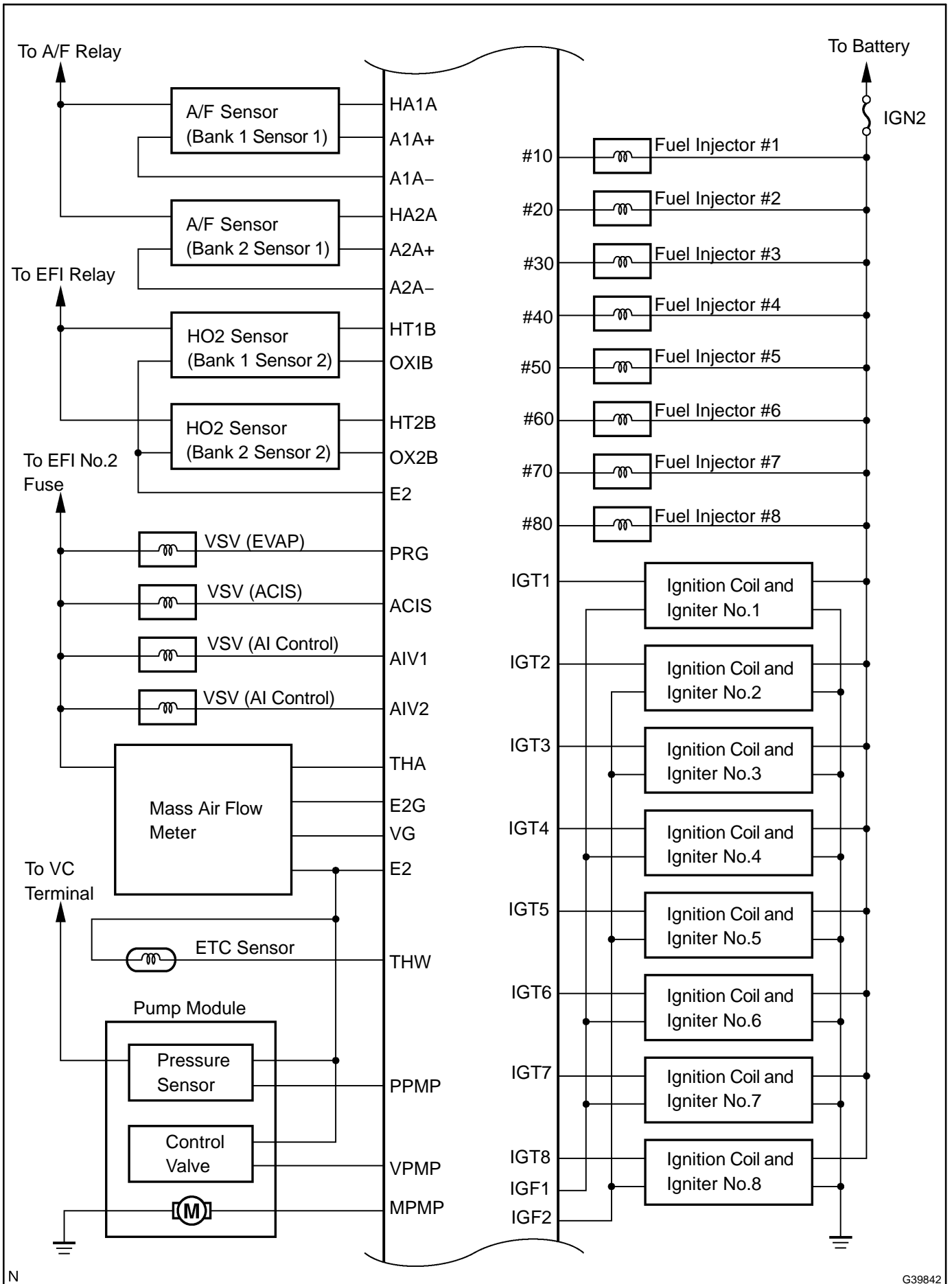


SYSTEM DIAGRAM



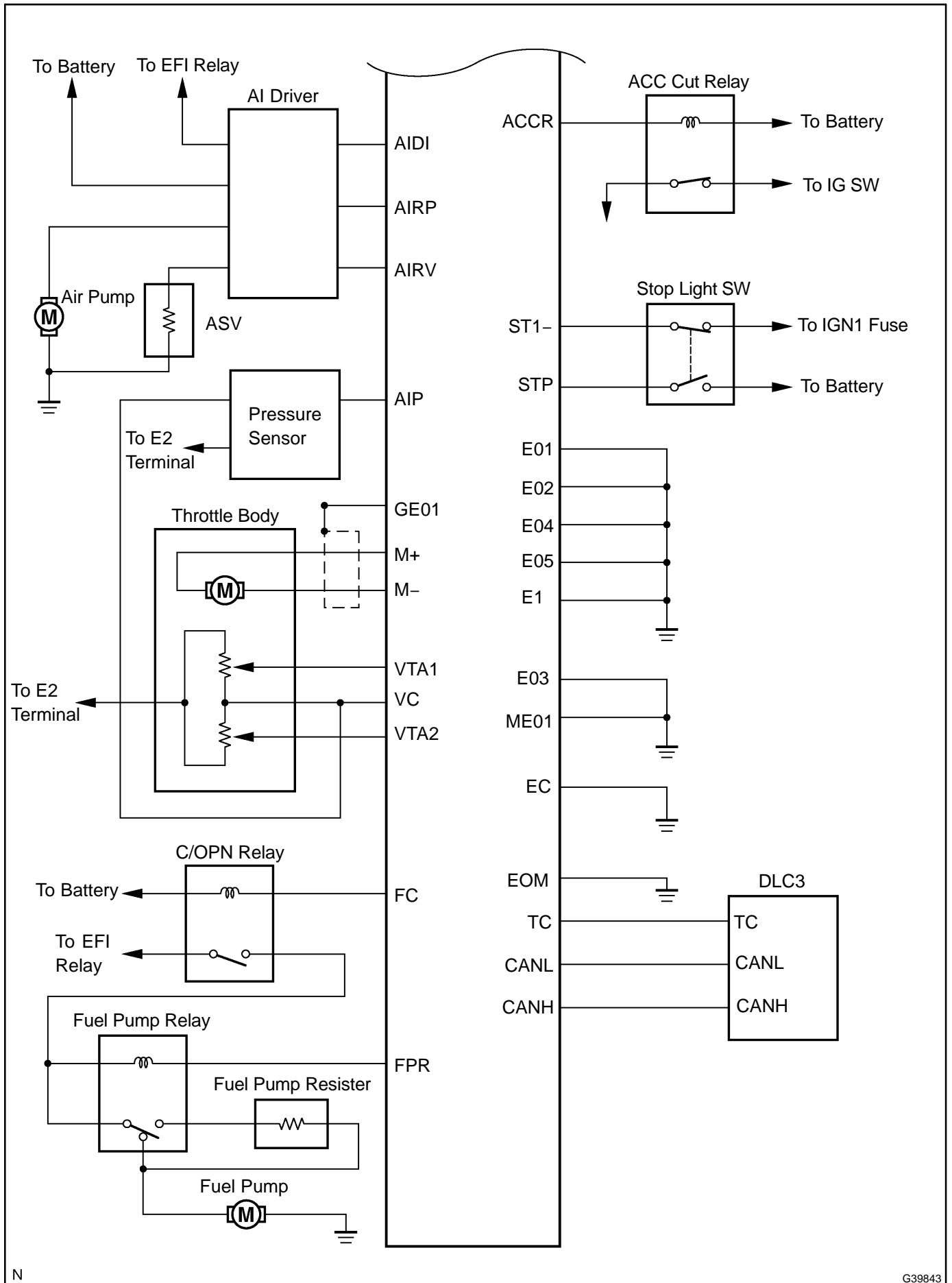
N

G39841



N

G39842



N

G39843

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

The hand-held tester can be used at step 3, 4, 5, 7, 10 and 15.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS (See page 05-12)



3 CONNECT HAND-HELD TESTER TO DLC3

HINT:

If the display indicates a communication fault in the tool, inspect the DLC3.



4 CHECK DTC AND FREEZE FRAME DATA (See page 05-44)

HINT:

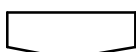
Record or print DTC and freeze frame data, if needed.



5 CLEAR DTC AND FREEZE FRAME DATA (See page 05-44)



6 VISUAL INSPECTION



7 SETTING CHECK (TEST) MODE DIAGNOSIS (See page 05-46)



8 PROBLEM SYMPTOM CONFIRMATION

HINT:

If the engine does not start, perform steps 10 and 12 first.

A	Malfunction does not occur
B	Malfunction occurs

B → GO TO STEP 10

A

9	SYMPTOM SIMULATION
----------	---------------------------



10	DTC CHECK (See page 05-44)
-----------	-----------------------------------

A	Malfunction code
B	No code

B	GO TO STEP 12
----------	----------------------

A

11	DTC CHART (See page 05-60)
-----------	-----------------------------------



GO TO STEP 14

12	BASIC INSPECTION (See page 05-14)
-----------	--

A	Wrong parts not confirmed
B	Wrong parts confirmed

B	GO TO STEP 17
----------	----------------------

A

13	PROBLEM SYMPTOMS TABLE (See page 05-34)
-----------	--

A	Wrong circuit confirmed
B	Wrong parts confirmed

B	GO TO STEP 17
----------	----------------------

A

14	CHECK ECM POWER SOURCE CIRCUIT (See page 05-442)
-----------	---



15	CIRCUIT INSPECTION
-----------	---------------------------

A	Malfunction not confirmed
B	Malfunction confirmed

B	GO TO STEP 18
----------	----------------------

A

16	CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)
-----------	---



GO TO STEP 18

17	PARTS INSPECTION
-----------	-------------------------



18	IDENTIFICATION OF PROBLEM
-----------	----------------------------------



19	ADJUSTMENT AND/OR REPAIR
-----------	---------------------------------



20	CONFIRMATION TEST
-----------	--------------------------



END

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Customer's Name		VIN	
Date Vehicle Brought in		Production Data	
License Plate No.		Odometer Reading	km miles

Problem Symptoms	<input type="checkbox"/> Engine does not Start	<input type="checkbox"/> Engine does not crank	<input type="checkbox"/> No initial combustion	<input type="checkbox"/> No complete combustion
	<input type="checkbox"/> Difficult to Start	<input type="checkbox"/> Engine cranks slowly <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Poor Idling	<input type="checkbox"/> Incorrect first idle <input type="checkbox"/> Idling rpm is abnormal <input type="checkbox"/> High (rpm) <input type="checkbox"/> Low (rpm) <input type="checkbox"/> Rough idling <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Poor Driveability	<input type="checkbox"/> Hesitation <input type="checkbox"/> Back fire <input type="checkbox"/> Muffler explosion (after-fire) <input type="checkbox"/> Surging <input type="checkbox"/> Knocking <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Engine Stall	<input type="checkbox"/> Soon after starting <input type="checkbox"/> After accelerator pedal depressed <input type="checkbox"/> After accelerator pedal released <input type="checkbox"/> During A/C operation <input type="checkbox"/> Shifting from N to D <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Others	_____		

Data Problem Occurred		_____		
Problem Frequency		<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (times per day/month) <input type="checkbox"/> Once only <input type="checkbox"/> Other _____		
Condition When Problem Occurs	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Other _____		
	Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (approx. ____ °C/ ____ °F)		
	Place	<input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner City <input type="checkbox"/> Uphill <input type="checkbox"/> Downhill <input type="checkbox"/> Rough road <input type="checkbox"/> Other _____		
	Engine Temp.	<input type="checkbox"/> Cold <input type="checkbox"/> Warming up <input type="checkbox"/> After Warming up <input type="checkbox"/> Any temp. <input type="checkbox"/> Other _____		
	Engine Operation	<input type="checkbox"/> Starting <input type="checkbox"/> Just after starting (min.) <input type="checkbox"/> Idling <input type="checkbox"/> Racing <input type="checkbox"/> Driving <input type="checkbox"/> Constant speed <input type="checkbox"/> Acceleration <input type="checkbox"/> Deceleration <input type="checkbox"/> A/C switch ON/OFF <input type="checkbox"/> Other _____		

Condition of malfunction indicator lamp (MIL)		<input type="checkbox"/> Remains on <input type="checkbox"/> Sometimes lights up <input type="checkbox"/> Does not light up		
DTC Inspection	Normal mode (Pre-check)	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code) <input type="checkbox"/> Freeze frame data ()	
	Check Mode	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code) <input type="checkbox"/> Freeze frame data ()	

CHECK FOR INTERMITTENT PROBLEMS

HINT:

Hand-held tester only:

Inspect the vehicle's ECM using check mode. Intermittent problems are easier to detect when the ECM is in check mode with a hand-held tester. In check mode, the ECM uses 1 trip detection logic, which has a higher sensitivity to malfunctions than normal mode (default) using 2 trip detection logic.

- (a) Clear the DTCs (see page [05-44](#)).
- (b) Switch the hand-held tester from normal mode to check mode (see page [05-46](#)).
- (c) Perform a simulation test (see page [01-26](#)).
- (d) Check the connector(s) and terminal(s) (see page [01-36](#)).
- (e) Wiggle the harness(s) and connector(s) (see page [01-36](#)).

BASIC INSPECTION

When the malfunction is not confirmed in the DTC check, troubleshooting should be carried out in all the possible circuits considered as causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location causing the problem can be found quickly and efficiently. Therefore, using this check is essential in the engine troubleshooting.

1 CHECK BATTERY POSITIVE VOLTAGE

NOTICE:

Carry out this check with the engine stopped and ignition switch OFF.

	OK	NG
Voltage	11 V or more	Less than 11 V

NG → CHARGE OR REPLACE BATTERY

OK

2 CHECK IF ENGINE IS CRANKED

NG → PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE [05-34](#)

OK

3 CHECK IF ENGINE STARTS

NG → GO TO STEP 7

OK

4 CHECK AIR FILTER

(a) Visually check that the air filter is not excessively dirty or oily.

NG → REPLACE AIR FILTER

OK

5 CHECK IDLE SPEED (See page [14-1](#))

NG → PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE [05-34](#)

OK

6 CHECK IGNITION TIMING (See page 14-1)

NG

PROCEED TO PAGE 14-1 AND CONTINUE TO TROUBLESHOOT

OK

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-34

7 CHECK FUEL PRESSURE (See page 11-8)

NG

PROCEED TO PAGE 11-8 AND CONTINUE TO TROUBLESHOOT

OK

8 CHECK FOR SPARK (See page 18-1)

NG

PROCEED TO PAGE 18-1 AND CONTINUE TO TROUBLESHOOT

OK

PROCEED TO PROBLEM SYMPTOMS TABLE ON PAGE 05-34

REGISTRATION

NOTICE:

The Vehicle Identification Number (VIN) must be input into the replacement ECM.

HINT:

The VIN is in the form of a 17-digit alphanumeric vehicle identification number. A hand-held tester is required to register the VIN.

1. DESCRIPTION

This registration section consists of three parts, Input Instructions, Read VIN and Write VIN.

- (a) Input Instructions: Explains the general VIN input instructions using a hand-held tester.
- (b) Read VIN: Explains the VIN reading process in a flowchart. This process allows the VIN stored in the ECM to be read, in order to confirm that the two VINs, provided with the vehicle and stored in the vehicle's ECM, are the same.
- (c) Write VIN: Explains the VIN writing process in a flowchart. This process allows the VIN to be input into the ECM. If the ECM is changed, or the VIN and VIN do not match, the VIN can be registered, or overwritten in the ECM by following this procedure.

2. INPUT INSTRUCTIONS

- (a) Hand-held tester
 - (1) The arrow buttons (UP, DOWN, RIGHT and LEFT) and numerical buttons (0 to 9) are used, in order to input the VIN.
- (b) Cursor Operation
 - (1) To move the cursor around the tester screen, press the RIGHT and LEFT buttons.
- (c) Alphabetical Character Input
 - (1) Press the UP and DOWN buttons to select the desired alphabetical character.
 - (2) After selection, the cursor should move.
- (d) Numeric Character Input
 - (1) Press the numerical button corresponding to the number that you want to input.
 - (2) After input, the cursor should move.

HINT:

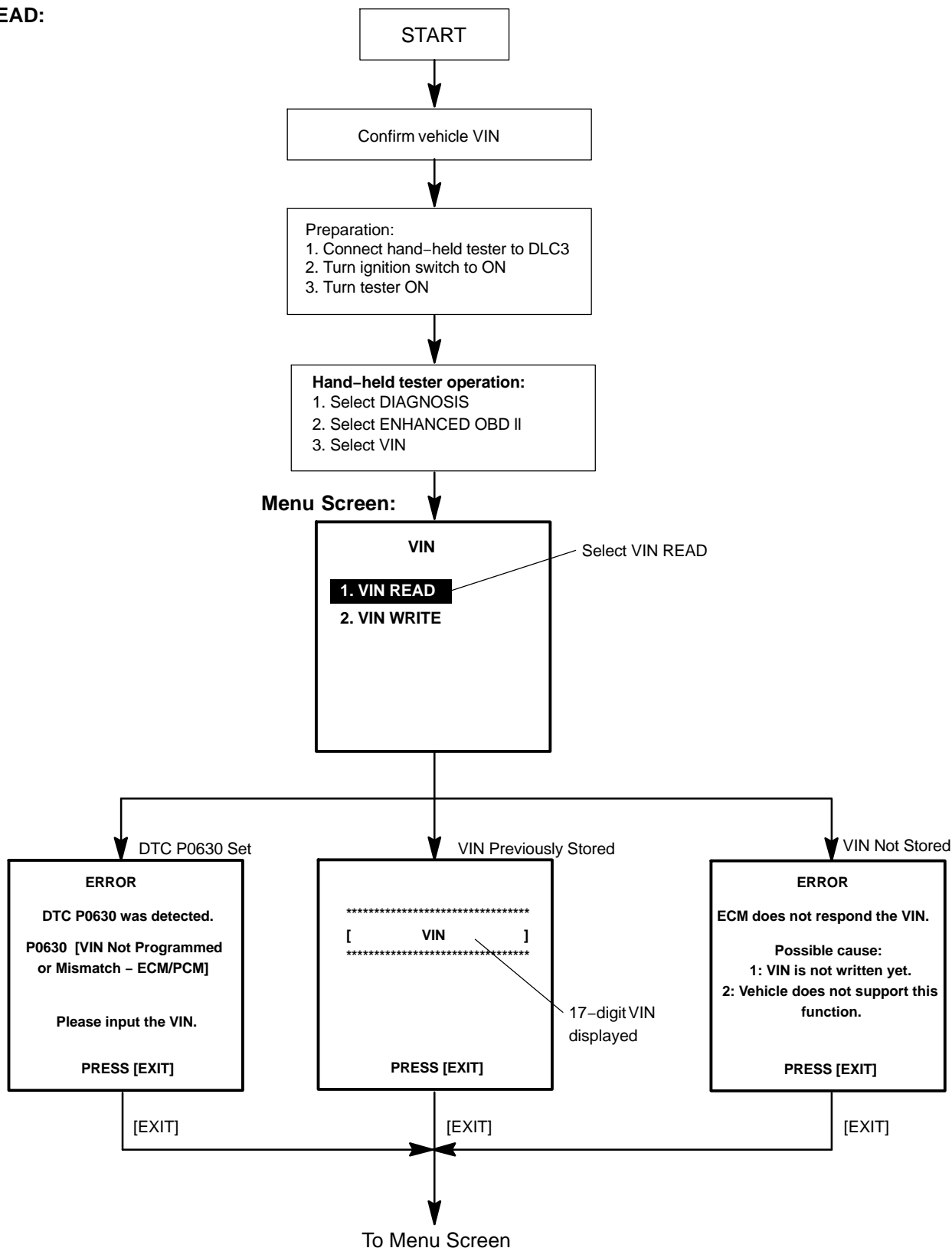
Numerical characters can be selected by using the UP and DOWN buttons.

- (e) Correction
 - (1) When correcting the input character(s), put the cursor onto the character using the RIGHT or LEFT buttons.
 - (2) Select or input the correct character using the UP/DOWN buttons, or the numerical buttons.
- (f) Finishing Input Operation
 - (1) Make sure that the input VIN matches the vehicle VIN after input.
 - (2) Press the ENTER button on the tester.

3. READ VIN (Vehicle Identification Number)

(a) Read VIN using a hand-held tester.

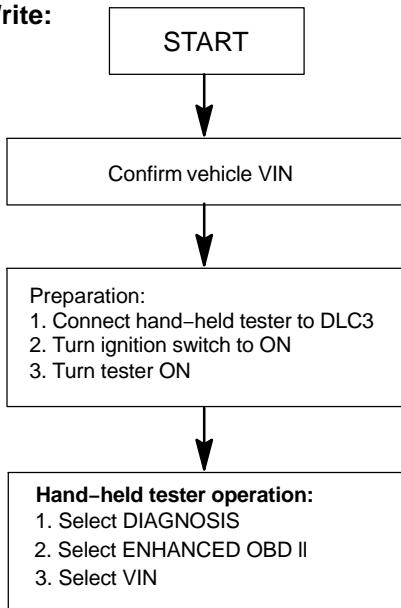
READ:



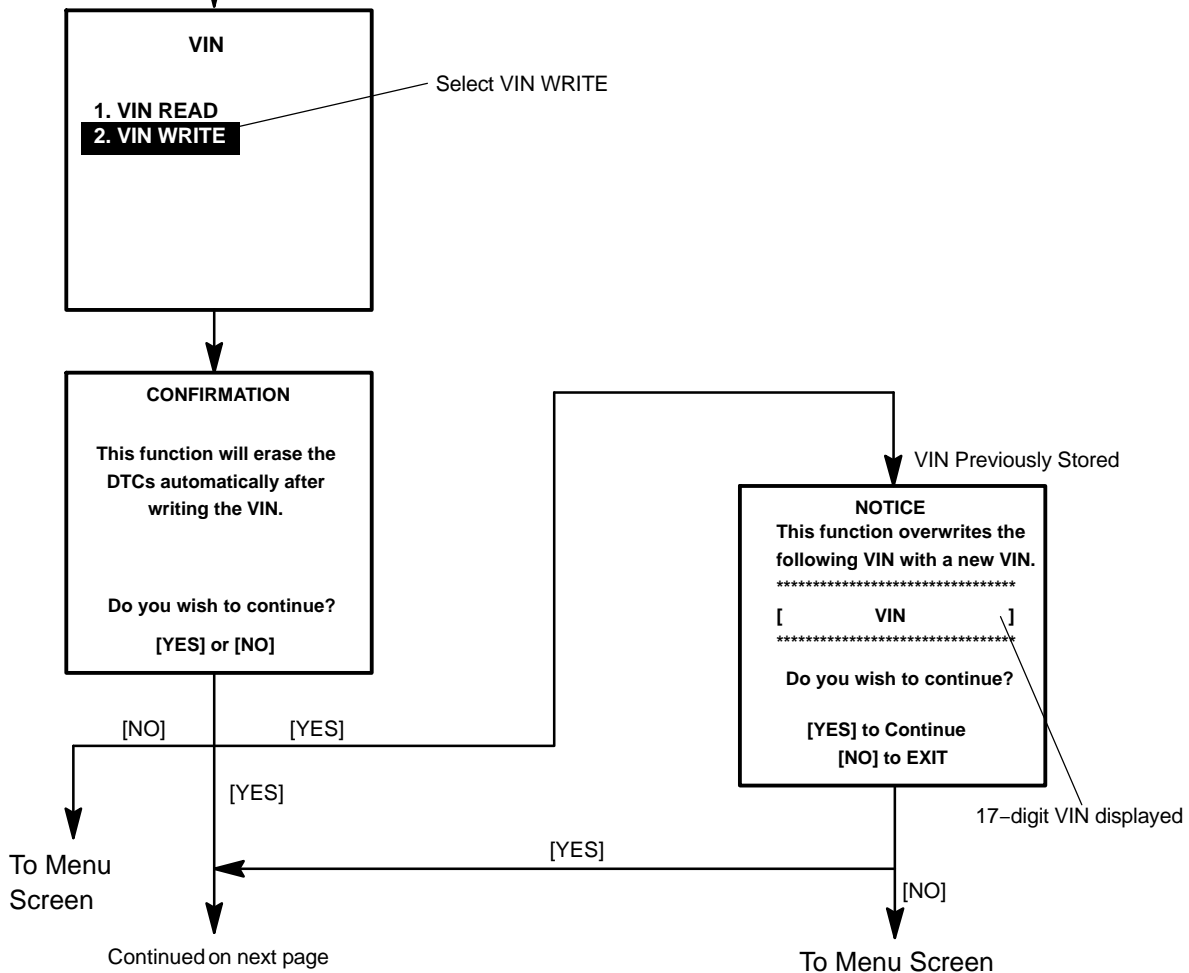
4. WRITE VIN

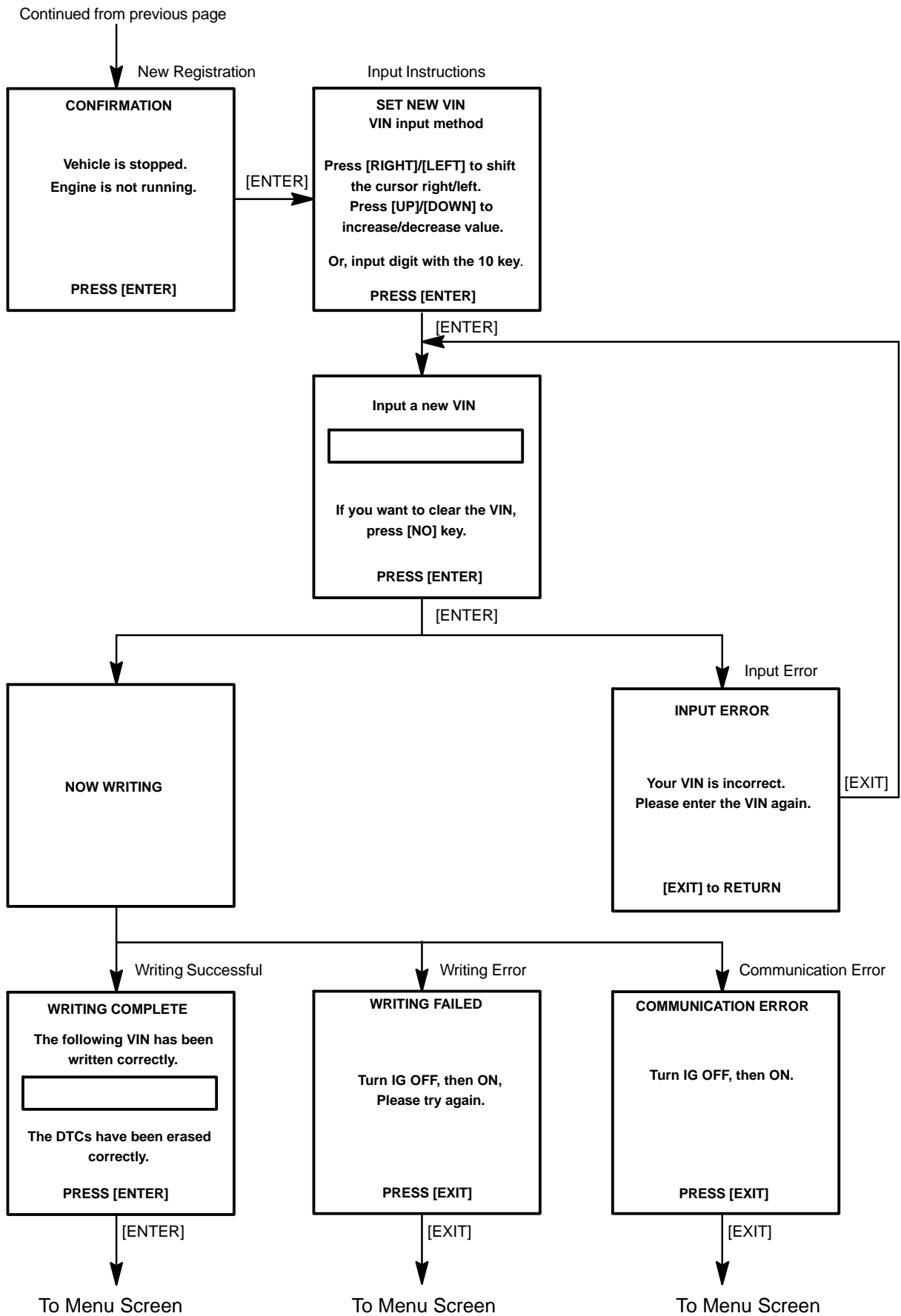
(a) Write VIN using the hand-held tester.

Write:



Menu Screen:





LIST OF DISABLE A MONITOR

HINT:

The table below shows the ECM monitoring status for the components listed in the top of the table when the DTCs on the left of the table are set.

As for the "x" mark, when the DTC on the left is stored, detection of the DTC in the upper column is not performed.

Monitor detected malfunction	Fault code		Component/ system	Monitor disablement (X - disabled)																													
	Fault code			P0010,P0020	P0011	P0012	P0016,P0018	P0021	P0022	P0030,50	P0031,32,51,52	P0033,56	P0043,44,63,64	P0100	P0101	P0105	P0106	P0110	P0115	P0116	P0120,P0121	P0125	P0128	P0130-P0153	P0134,P0154	P0136,P0156	P0142,P0162	P0171,P0172	P0300-P0308				
	Component/ system			VVT VSV1,2	VVT System1 - Advance	VVT System1 - Retard	VVT System - Misalignment	VVT System2 - Advance	VVT System2 - Retard	O2 Sensor Heater - Sensor1	A/F Sensor Heater - Sensor1	O2 Sensor Heater - Sensor2	O2 Sensor Heater - Sensor3	MAF sensor	MAF sensor	MAP sensor	MAP sensor	IAT sensor	ECT sensor	ECT sensor	TP sensor	Insufficient ECT for Closed Loop	Thermostat	O2 Sensor - Sensor1	O2 Sensor, A/F Sensor(No Activity) - Sensor1	O2 Sensor - Sensor2	O2 Sensor - Sensor3	Fuel system	Misfire				
P0010,P0020	P0010,P0020	VVT VSV1,2	X																														
P0011	P0011	VVT System1 - Advance		X									X	X																			
P0012	P0012	VVT System1 - Retard			X																												
P0016,P0018	P0016,P0018	VVT System - Misalignment				X																											
P0021	P0021	VVT System2 - Advance					X																										
P0022	P0022	VVT System2 - Retard						X																									
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1							X																								
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1								X																							
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2									X																						
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3										X																					
P0100,P0101	P0100-P0103	MAF sensor		X	X								X	X																			
P0105,P0106	P0105-P0108	MAP sensor		X	X										X	X																	
P0110	P0110-P0113	IAT sensor														X	X					X	X	X	X	X	X	X					
P0115,P0116	P0115-P0118	ECT sensor		X	X	X	X	X							X	X						X	X	X	X	X	X	X					
P0120,P0121	P0120-P0223,P2135	TP sensor														X	X					X	X	X	X	X	X	X					
P0125	P0125	Insufficient ECT for Closed Loop		X	X									X	X							X	X	X	X	X	X	X					
P0128	P0128	Thermostat																															
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1																				X	X	X	X	X	X	X					
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1									X											X	X	X	X	X	X	X					
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2																															
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3																															
P0171,P0172	P0171,P0172	Fuel system																															
P0300-P0308	P0300-P0308	Misfire										X										X	X	X	X	X	X	X					
P0325,P0330	P0325-P0333	Knock sensor																															
P0335	P0335	CKP sensor		X	X										X	X							X	X	X	X	X	X					
P0340, P0341	P0340, P0341	CMP sensor		X	X										X	X							X	X	X	X	X	X					
P0340-P0346	P0340-P0346	VVT sensor1,2																				X											
P0351-P0358	P0351-P0358	Ignitor		X	X																												
P0385	P0385	CKP sensor 2												X	X							X	X	X	X	X	X	X					
P0401	P0401	EGR system (closed)																				X											
P0402	P0402	EGR system (open)																					X	X	X	X	X	X					
P0405,P0409	P0405-P0409	Lift sensor																															
P0420,P0430	P0420,P0430	Catalyst																															
P0442-P0456	P0442-P0456	EVAP system																					X	X	X	X	X	X					
P0450,P0451	P0450-P0453	EVAP press sensor																															

Monitor detected malfunction	Fault code		Monitor disablement (X - disabled)	
	Fault code	Component/system	Fault code	Component/system
P0500	P0500	VSS	P0010,P0020	VVT VSV1,2
P0511	P0511	IAC valve	P0011	VVT System1 - Advance
P0510	P0510	Idle switch	P0012	VVT System1 - Retard
P0560	P0560	System Voltage	P0016,P0018	VVT System - Misalignment
P0617	P0617	Starter signal	P0021	VVT System2 - Advance
P0705	P0705	Shift lever position switch	P0022	VVT System2 - Retard
P0710	P0710-P0713	Trans fluid temp sensor	P0031,32,51,52	O2 Sensor Heater - Sensor1
P0720-P0793	P0720-P0793	Output speed sensor	P0031,32,51,52	A/F Sensor Heater - Sensor1
P0715-P0717	P0715-P0717	Input speed sensor	P0037,38,57,58	O2 Sensor Heater - Sensor2
P0724	P0724	Stop lamp switch	P0043,44,63,64	O2 Sensor Heater - Sensor3
P0741-P0796	P0741-P0796	Trans solenoid (function)	P0100-P0103	MAF sensor
P0748-P0798	P0748-P0799	Trans solenoid (range)	P0101	MAP sensor
P0850	P0850	PNP switch	P0105	MAP sensor
P1010,P1020	P1010,P1020	VVTL	P0106	MAP sensor
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1,(2)	P0110	IAT sensor
P1126	P1126	Electronic magnet clutch	P0115	ECT sensor
P1129	P1129	Electronic throttle system	P0116	ECT sensor
P1430	P1430	HC adsorber ACT press sensor	P0120-P0223,P2135	TP sensor
P2004,6	P2004,6	Intake Manifold Runner Control	P0125	Insufficient ECT for Closed Loop
P2009,10	P2009,10	Intake Manifold Runner Control Circuit	P0128	Thermostat
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor	P0130-P0153	O2 Sensor - Sensor1
P2102,P2103	P2102,P2103	Throttle motor	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1
P2120-P2138	P2120-P2138	Accel position sensor	P0136,P0156	O2 Sensor - Sensor2
P2196,P2198	P2196,P2198	A/F sensor (rationality)	P0142,P0162	O2 Sensor - Sensor3
P2226	P2226	BARO sensor	P0171,P0172	Fuel system
P2237,P2240	P2237,P2240	A/F sensor (open)	P0300-P0308	Misfire
P2423,24	P2423,24	HC Absorption Catalyst		
P2430,2,3	P2430,2,3	AIR Pressure Sensor(Low/High)		
P2431	P2431	AIR Pressure Sensor(Rationality)		
P2440	P2440	AIR control valve stuck open		
P2441	P2441	AIR control valve stuck close		
P2444	P2444	AIP stuck On		
P2445	P2445	AIP stuck Off		
P2714-P2759	P2714-P2759	Trans solenoid(SLU-SLD)		
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)		

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Monitor detected malfunction	Fault code		Monitor disablement (X - disabled)																									
	Fault code	Component/ system	P0325-P0330	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405	P0409	P0420-P0430	P0440-P0446	P0450-P0451	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796
			Knock sensor	CKP sensor	CMP sensor	VVT sensor1,2	Ignitor	CKP sensor 2	EGR system (closed)	EGR system (open)	EGR Lift sensor	EGR Lift sensor	Catalyst	EVAP system	EVAP press sensor	VSS(ECT2sensor)	VSS(ECT1sensor, non-ECT)	VSS(M/T)	IAC valve	Idle switch	System Voltage	Starter signal	Shift lever position switch	Trans fluid temp sensor	Output speed sensor	Input speed sensor	Stop lamp switch	Trans solenoid (function)*1
P0010,P0020	P0010,P0020	VVT VSV1,2																										X
P0011	P0011	VVT System1 - Advance						X	X			X	X					X										
P0012	P0012	VVT System1 - Retard						X	X			X	X					X										
P0016,P0018	P0016,P0018	VVT System - Misalignment																										
P0021	P0021	VVT System2 - Advance						X	X			X	X					X										
P0022	P0022	VVT System2 - Retard						X	X			X	X					X										
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1						X	X			X						X										X
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1						X	X			X						X										
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2										X																
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3										X																
P0100,P0101	P0100-P0103	MAF sensor						X	X			X	X					X	X									X
P0105,P0106	P0105-P0108	MAP sensor						X	X			X	X					X	X									X
P0110	P0110-P0113	IAT sensor						X	X			X																X
P0115,P0116	P0115-P0118	ECT sensor						X	X	X	X	X	X					X	X									X
P0120,P0121	P0120-P0223,P2135	TP sensor						X	X			X	X				X		X									X
P0125	P0125	Insufficient ECT for Closed Loop						X	X		X	X	X					X	X									X
P0128	P0128	Thermostat																										
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1						X	X			X	X					X										X
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1						X	X			X						X										X
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2										X																
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3										X																
P0171,P0172	P0171,P0172	Fuel system						X	X			X	X					X										X
P0300-P0308	P0300-P0308	Misfire										X	X					X										X
P0325,P0330	P0325-P0333	Knock sensor						X	X																			X
P0335	P0335	CKP sensor						X	X			X	X					X										X
P0340, P0341	P0340, P0341	CMP sensor						X	X			X	X					X										X
P0340-P0346	P0340-P0346	VVT sensor1,2																										
P0351-P0358	P0351-P0358	Ignitor						X	X			X	X					X										X
P0385	P0385	CKP sensor 2						X	X			X	X					X										
P0401	P0401	EGR system (closed)						X				X																X
P0402	P0402	EGR system (open)						X				X	X					X										X
P0405,P0409	P0405-P0409	Lift sensor																										
P0420,P0430	P0420,P0430	Catalyst																										
P0442-P0456	P0442-P0456	EVAP system																X										
P0450,P0451	P0450-P0453	EVAP press sensor																										

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Note*1: Without speed sensor input
 Note*2: With speed sensor input

Monitor detected malfunction	Fault code		Monitor disablement (X - disabled)																									
	Fault code	Component/system	P0325-P0330	P0335	P0340,P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405	P0409	P0420,P0430	P0440-P0446	P0450,P0451	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796
			P0325-P0333	P0335	P0340,P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405,P0406	P0409	P0420,P0430	P0440-P0446	P0450-P0453	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796
P0500	P0500	VSS						X	X			X	X						X						X	X		X
P0511	P0511	IAC valve																	X									
P0510	P0510	Idle switch							X			X	X						X									X
P0560	P0560	System Voltage																										
P0617	P0617	Starter signal																										
P0705	P0705	Shift lever position switch																										
P0710	P0710-P0713	Trans fluid temp sensor																										
P0720-P0793	P0720-P0793	Output speed sensor																										X
P0715-P0717	P0715-P0717	Input speed sensor																										
P0724	P0724	Stop lamp switch																										
P0741-P0796	P0741-P0796	Trans solenoid (function)																										
P0748-P0798	P0748-P0799	Trans solenoid (range)																							X	X		X
P0850	P0850	PNP switch																	X									X
P1010,P1020	P1010,P1020	VVTL																										
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1,(2)						X	X			X	X						X									
P1126	P1126	Electronic magnet clutch																										
P1129	P1129	Electronic throttle system																										
P1430	P1430	HC adsorber ACT press sensor												X	X													
P2004,6	P2004,6	Intake Manifold Runner Control																										
P2009,10	P2009,10	Intake Manifold Runner Control Circuit																										
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor																										
P2102,P2103	P2102,P2103	Throttle motor																										
P2120-P2138	P2120-P2138	Accel position sensor																										
P2196,P2198	P2196,P2198	A/F sensor (rationality)						X	X			X							X									X
P2226	P2226	BARO sensor																										X
P2237,P2240	P2237,P2240	A/F sensor (open)						X	X			X							X									X
P2423,24	P2423,24	HC Absorption Catalyst																										
P2430,2,3	P2430,2,3	AIR Pressure Sensor(Low/High)																										
P2431	P2431	AIR Pressure Sensor(Rationality)																										
P2440	P2440	AIR control valve stuck open						X	X			X																
P2441	P2441	AIR control valve stuck close						X	X			X																
P2444	P2444	AIP stuck On						X	X			X																
P2445	P2445	AIP stuck Off						X	X			X																
P2714-P2759	P2714-P2759	Trans solenoid(SLU-SLD)																										X
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)						X	X			X							X									X

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Note*1: Without speed sensor input

Note*2: With speed sensor input

Monitor detected malfunction	Fault code		Component/system		Monitor disablement (X - disabled)																							
	Fault code	Component/system	Trans solenoid (function)*2	Trans solenoid (range)	PNP switch	VVTL	VVTL system(,2)	Electronic magnet clutch	Electronic throttle system	HC adsorber ACT press sensor	Intake Manifold Runner Control	Intake Manifold Runner Control Circuit	Intake Manifold Runner Position Sensor	Throttle motor	Accel position sensor	A/F Sensor(Rationality) - Sensor1	BARO sensor	A/F Sensor(Open) - Sensor1	HC Absorption Catalyst	AIR Pressure Sensor(Low/High)	AIR Pressure Sensor(Rationality)	AIR control valve stuck open	AIR control valve stuck close	AIP stuck On	AIP stuck Off	Trans solenoid(SLU,SLD)	A/F Sensor (Slow response) - Sensor1	
			P0741-P0796	P0748-P0798	P0850	P1010,P1020	P1011,12,(21,22)	P1126	P1129	P1430	P2004,P2006	P2009,P2010	P2014,16,17	P2102,P2103	P2120-P2138	P2196,P2198	P2226	P2237,P2240	P2423,24	P2430,2,3	P2431	P2440	P2441	P2444	P2445	P2714-P2759	P2A00,P2A03	
P0010,P0020	P0010,P0020	VVT VSV1,2																										
P0011	P0011	VVT System1 - Advance																				X	X	X	X			
P0012	P0012	VVT System1 - Retard																				X	X	X	X			
P0016,P0018	P0016,P0018	VVT System - Misalignment																				X	X	X	X			
P0021	P0021	VVT System2 - Advance																				X	X	X	X			
P0022	P0022	VVT System2 - Retard																				X	X	X	X			
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1																				X	X	X	X			
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1														X		X	X			X	X	X	X			X
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2														X		X	X			X	X	X	X			
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3																				X	X	X	X			
P0100,P0101	P0100-P0103	MAF sensor				X	X								X		X	X				X	X	X	X			X
P0105,P0106	P0105-P0108	MAP sensor				X	X								X		X	X				X	X	X	X			X
P0110	P0110-P0113	IAT sensor								X								X	X			X	X	X	X			X
P0115,P0116	P0115-P0118	ECT sensor	X			X	X			X					X		X	X				X	X	X	X			X
P0120,P0121	P0120-P0223,P2135	TP sensor													X		X	X				X	X	X	X			X
P0125	P0125	Insufficient ECT for Closed Loop	X			X									X		X	X				X	X	X	X			X
P0128	P0128	Thermostat																										
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1																	X			X	X	X	X			
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1														X		X	X			X	X	X	X			X
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2														X		X				X	X	X	X			
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3																	X			X	X	X	X			
P0171,P0172	P0171,P0172	Fuel system													X		X	X				X	X	X	X			X
P0300-P0308	P0300-P0308	Misfire													X		X	X				X	X	X	X			X
P0325,P0330	P0325-P0333	Knock sensor																				X	X	X	X			
P0335	P0335	CKP sensor				X	X								X		X	X				X	X	X	X			X
P0340, P0341	P0340, P0341	CMP sensor				X	X								X		X	X				X	X	X	X			X
P0340-P0346	P0340-P0346	VVT sensor1,2																				X	X	X	X			
P0351-P0358	P0351-P0358	Ignitor																	X			X	X	X	X			
P0385	P0385	CKP sensor 2				X	X								X		X	X				X	X	X	X			X
P0401	P0401	EGR system (closed)																	X			X	X	X	X			
P0402	P0402	EGR system (open)													X		X	X				X	X	X	X			X
P0405,P0409	P0405-P0409	Lift sensor																				X	X	X	X			
P0420,P0430	P0420,P0430	Catalyst																				X	X	X	X			
P0442-P0456	P0442-P0456	EVAP system													X		X					X	X	X	X			X
P0450,P0451	P0450-P0453	EVAP press sensor																				X	X	X	X			

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Note*1: Without speed sensor input

Note*2: With speed sensor input

Monitor detected malfunction	Fault code		Component/system		Monitor disablement (X - disabled)	
	Code 1	Code 2	Code 1	Code 2	Code 1	Code 2
	P0500	P0500	VSS		X	
P0511	P0511	IAC valve				
P0510	P0510	Idle switch				
P0560	P0560	System Voltage				
P0617	P0617	Starter signal				
P0705	P0705	Shift lever position switch				
P0710	P0710-P0713	Trans fluid temp sensor				
P0720-P0793	P0720-P0793	Output speed sensor				
P0715-P0717	P0715-P0717	Input speed sensor				
P0724	P0724	Stop lamp switch				
P0741-P0796	P0741-P0796	Trans solenoid (function)				
P0748-P0798	P0748-P0798	Trans solenoid (range)				
P0850	P0850	PNP switch				
P1010,P1020	P1010,P1020	VVTL				
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1,(2)				
P1126	P1126	Electronic magnet clutch				
P1129	P1129	Electronic throttle system				
P1430	P1430	HC adsorber ACT press sensor				
P2004,6	P2004,6	Intake Manifold Runner Control				
P2009,10	P2009,10	Intake Manifold Runner Control Circuit				
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor				
P2102,P2103	P2102,P2103	Throttle motor				
P2120-P2138	P2120-P2138	Accel position sensor				
P2196,P2198	P2196,P2198	A/F sensor (rationality)				
P2226	P2226	BARO sensor				
P2237,P2240	P2237,P2240	A/F sensor (open)				
P2423,24	P2423,24	HC Absorption Catalyst				
P2430,2,3	P2430,2,3	AIR Pressure Sensor(Low/High)				
P2431	P2431	AIR Pressure Sensor(Rationality)				
P2440	P2440	AIR control valve stuck open				
P2441	P2441	AIR control valve stuck close				
P2444	P2444	AIP stuck On				
P2445	P2445	AIP stuck Off				
P2714-P2759	P2714-P2759	Trans solenoid(SLU-SLD)				
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)				

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Note*1: Without speed sensor input

Note*2: With speed sensor input

O2S TEST RESULT

1. INTRODUCTION

The O2S TEST RESULT refers to the results of the engine control module (ECM) when it monitors the heated oxygen sensor (O2S), and it can be read using the hand-held tester or the generic OBDII scan tool. Based on this, you can find the O2S's conditions.

The ECM monitors the O2S in the various items. You can read the monitor result (TEST DATA) of each monitor item using the O2S TEST RESULT. However, the output value of the TEST DATA is the latest "snapshot" value that is taken after monitoring and therefore it is not dynamic.

In this repair manual, the description of the O2S TEST RESULT (for O2S related DTCs) are written in a table.

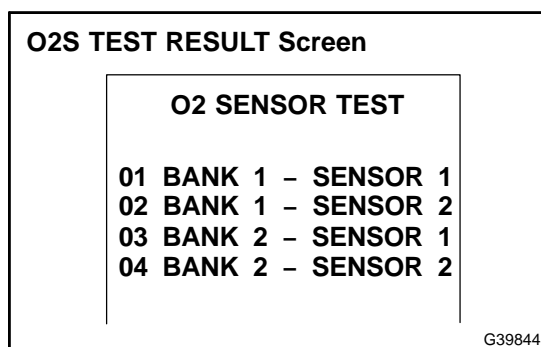
This table consists of 5 items:

- (1) TEST ID (a code applied to each TEST DATA)
- (2) Description of TEST DATA
- (3) Conversion Factor (When Conversion Factor has a value written in the table, multiply the TEST DATA value appearing on the scan tool by the Conversion Factor value. The result will be the required value.)
- (4) Unit
- (5) Standard Value

If the TEST DATA value appearing on the scan tool is out of the standard value, the O2S is malfunctioning. If it is within the standard value, the O2S is functioning normally. However, if the value is on the borderline of the standard value, the O2S may malfunction very soon.

2. HOW TO READ O2S TEST RESULT USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.



- (b) On the tester screen, select the following menus: DIAGNOSIS/CARB OBDII/O2S TEST RESULT. A list of the O2S equipped on the vehicle will be displayed.

TEST DATA Screen	
LOW SW V	0.400 V
HIGH SW V	0.550 V
MIN O2S V	0.035 V
MAX O2S V	0.835 V
Time \$81	17
Time \$84	84
Time \$85	79

G39845

- (c) Select the desired O2S and press ENTER. The following screen will appear.
- (d) Press HELP and * simultaneously. More information will appear.
- (e) Example:
 - (1) The hand-held tester displays "17" as a value of the "TIME \$81" (see the illustration on the left).
 - (2) Find the Conversion Factor value of "TIME \$81" in the O2S TEST RESULT chart below. 0.3906 is specified for \$81 in this chart.
 - (3) Multiply "17" in step (1) by 0.3906 (Conversion Factor) in the step (2).
17 x 0.3906 = 6.6 %
 - (4) If the answer is within the standard value, the "TIME \$81" can be confirmed to be normal.

O2S TEST RESULT Chart

TEST ID	Description of TEST DATA	Conversion Factor	Unit	Standard Value
\$81	Percentage of monitoring time when the HO2S voltage is less than 0.05V	Multiply 0.3906	%	Within 60 %

CHECKING MONITOR STATUS

1. OUTLINE

The monitor results and the test values can be checked with the OBD II scan tool.

The engine control module (ECM) monitors the emissions-related components as the thermostat, catalyst converter and evaporative emissions (EVAP), and determines whether they are functioning normally or not. When finished and monitoring, the ECM stores the monitor results and the test values.

The monitor result indicates whether the component is functioning normally or not. The test value is the value that was used to determine the monitor result. If the test value is outside the test limit (malfunction criterion), the ECM determines the component is malfunctioning. Some emissions-related components have multiple test values to determine monitor result. If one of these test values is outside test limit, the ECM determines the component is determine monitor result. If one of these test values is outside test limit, the ECM determines the components is malfunctioning.

2. DESCRIPTION

The test value and test limit information are described as shown in the following table. This information is included under "MONITOR RESULT" in the emissions-related DTC sections.

Thermostat:

MID	TID	Scaling	Test Result	Minimum Test Limit	Maximum Test Limit
\$E1	\$E8	Multiply by 0.1 [°C]	ECT sensor output when estimated ECT reached to malfunction criteria	Malfunction criteria	Maximum test limit

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

3. PROCEDURE (USING HAND-HELD TESTER)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch and hand-held tester ON.
- Clear DTCs.
- Allow the vehicle to drive, in accordance with the applicable drive pattern described in the READINESS MONITOR DRIVE PATTERN section (see page 05-29).
- Check the monitor result. Select the hand-held tester menus: DIAGNOSIS/ENHANCED OBDII/MONITOR INFO/MONITOR STATUS. The monitor result appears after the component name.
 - AVAIL indicates the component has not been monitored yet.
 - COMPL indicates the component is functioning normally.
 - INCMPL indicates the component is malfunctioning.
- Check the test value(s). Select the hand-held tester menus: DIAGNOSIS/ENHANCED OBDII/MONITOR INFO/TEST RESULT.
- Select the component and press ENTER. If the monitor result has been COMPL or INCMPL, the accuracy test value appears.
- Compare the test value with the test limits, MIN and MAX.
 - If the test value is outside of the test limit, the component is malfunctioning.
 - If the test value is on the borderline of the test limit, a malfunction is concealed in the component.

HINT:

The monitor result might on rare occasions be COMPL even if the malfunction indicator lamp (MIL) is illuminated. This indicates the system malfunctioned on a previous driving cycle. This might be caused by an intermittent problem.

READINESS MONITOR DRIVE PATTERN

1. PURPOSE OF THE READINESS TESTS

- The On-Board Diagnostic (OBD II) system is designed to monitor the performance of emission-related components and report any detected abnormalities in the form of Diagnostic Trouble Codes (DTCs). Since the various components need to be monitored during different driving conditions, the OBD II system is designed to run separate monitoring programs called Readiness Monitors. Many state Inspection and Maintenance (I/M) programs require that vehicles complete their Readiness Monitors prior to beginning an emission test.
- The current status of the Readiness Monitors can be seen by using the hand-held tester with version 9.0 software (or newer), or a generic OBD II scan tool.
- To view the Readiness Monitor status using the hand-held tester, select "Monitor Status" from the Enhanced OBD II menu.
- A status of "complete" indicates that the necessary conditions have been met to run the performance tests for the related Readiness Monitor.
- The Readiness Monitor will be reset to "incomplete" if:
 - ECM has lost power (battery or fuse).
 - DTCs have been cleared.
 - The conditions for running the Readiness Monitor have not been met.
- In the event that any Readiness Monitor shows "incomplete", follow the appropriate Readiness Monitor Drive Pattern to activate the monitor and change the readiness status to "complete".

CAUTION:

Strictly observe the posted speed limits traffic laws and road conditions when performing these drive patterns.

NOTICE:

These drive patterns represent the fastest method to satisfy all necessary conditions which allow the specific readiness monitor to complete.

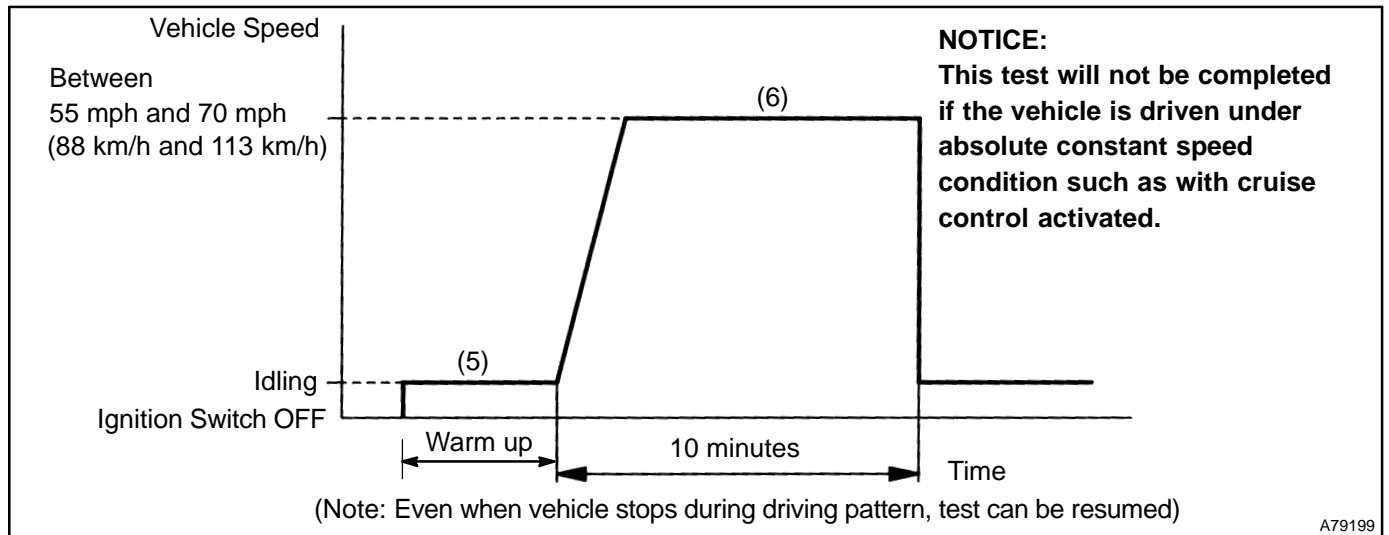
In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors) the drive pattern can be resumed, and in most cases, the READINESS MONITOR will still set to "complete".

To ensure rapid completion of readiness monitors, avoid sudden changes in vehicle load and speed (driving up and down hills and/or sudden acceleration).

Contents:

TITLE	STEP(s)
CATALYST MONITOR	2
EVAP MONITOR	3
AIR-FUEL RATIO (A/F) AND OXYGEN SENSOR (O ₂ S) MONITOR	4
OXYGEN SENSOR HEATER MONITOR	5

2. CATALYST MONITOR (ACTIVE AIR-FUEL RATIO CONTROL TYPE)



(a) Preconditions

The monitor will not run unless:

- The MIL is OFF

(b) Drive Pattern

- (1) Connect a hand-held tester or OBD II scan tool to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the tester or scan tool ON.
- (4) Clear DTCs (where set) (see page 05-44).
- (5) Start the engine and warm it up.
- (6) Drive the vehicle at between 55 mph and 70 mph (88 km/h and 113 km/h) for at least 10 minutes.

(c) Monitor Status

- (1) Check the Readiness Monitor status displayed on the tester or scan tool.
- (2) If the status does not switch to COMPL (complete), extend the driving time.

3. EVAP SYSTEM MONITOR (KEY-OFF TYPE)

(a) Preconditions

The monitor will not run unless:

- The fuel tank is less than 90 % full.
- The altitude is less than 8,000 ft (2,450 m).
- The vehicle is at stationary.
- The engine coolant temperature is between 4.4°C and 35°C (40°F to 95°F).
- The intake air temperature is between 4.4°C and 35°C (40°F to 95°F).
- Vehicle was driven in the city area (or on free-way) for 10 minutes or more.

(b) Monitor Conditions

- (1) Turn the ignition switch to OFF and wait for 6 hours.

HINT:

Do not start the engine until checking Readiness Monitor status. If the engine is started, the step described above must be repeated.

(c) Monitor Status

- (1) Connect a hand-held tester or OBD II scan tool to the DLC3.
- (2) Turn the ignition switch to ON.
- (3) Turn the tester or scan tool ON.
- (4) Check the Readiness Monitor status displayed on the tester or scan tool.

If the status does not switch to COMPL (complete), restart the engine, make sure that the preconditions have been met, and then perform the Monitor Conditions again.

4. AIR-FUEL RATIO (A/F) AND OXYGEN SENSOR (HO2) MONITOR (ACTIVE AIR-FUEL RATIO CONTROL TYPE)

(a) Preconditions

The monitor will not run unless:

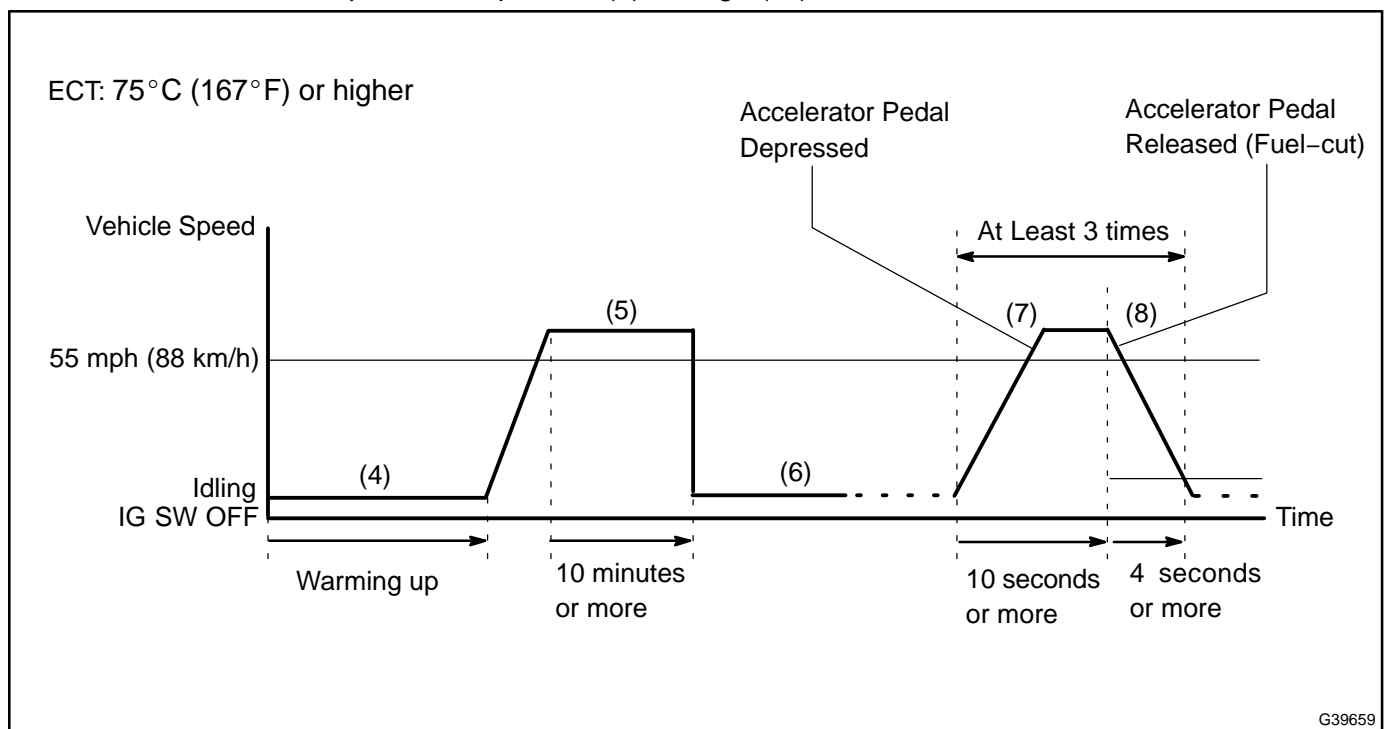
- 2 minutes or more have elapsed since the engine was started.
- The Engine Coolant Temperature (ECT) is 75°C (167°F) or higher.
- Air-fuel ratio feedback control is performed.
- Fuel-cut control is performed for 8 seconds or more.

(b) Drive Pattern

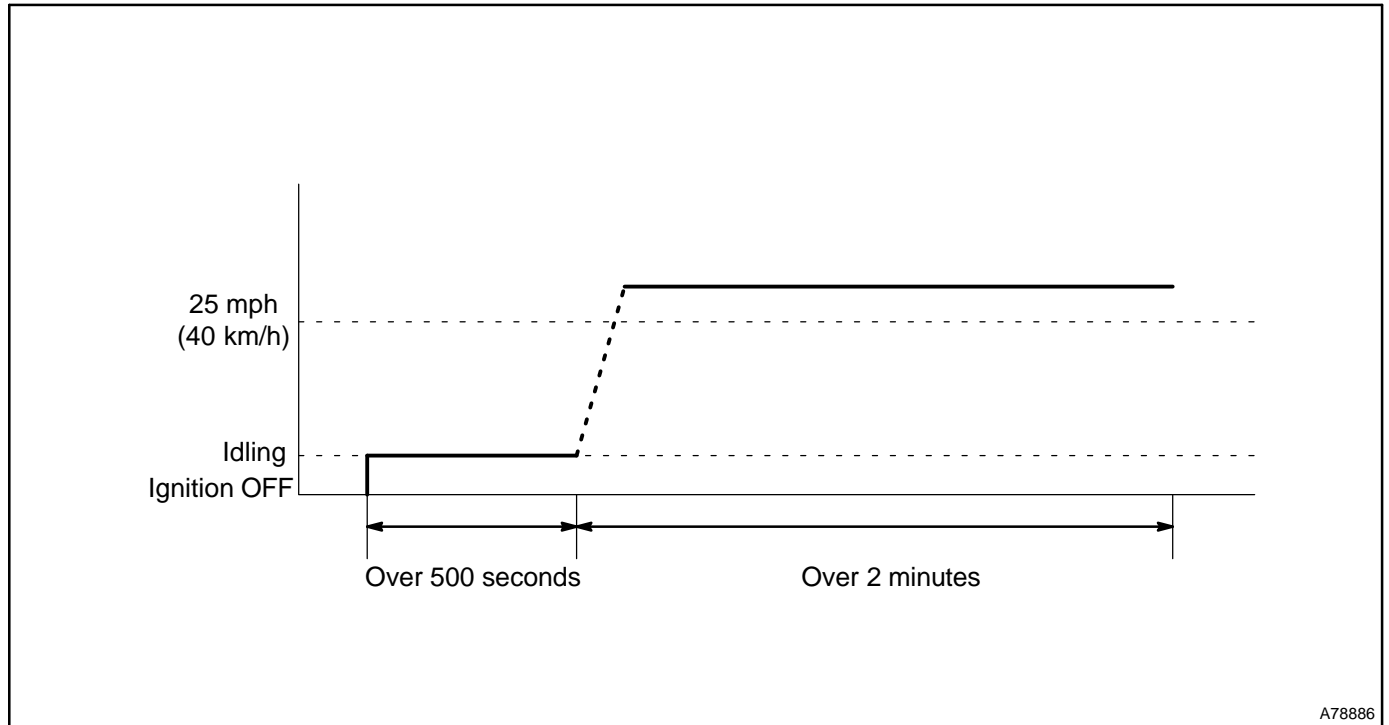
- (1) Connect the hand-held tester to DLC3.
- (2) Turn the ignition switch to ON.
- (3) Clear DTCs (see page 05-44).
- (4) Start the engine, and warm it up until the ECT reaches 75°C (167°F) or higher.
- (5) Drive the vehicle at 55 mph (88 km/h) or more for at least 10 minutes.
- (6) Change the transmission to 2nd gear.
- (7) Accelerate the vehicle to 55 mph (88 km/h) or more by depressing the accelerator pedal for at least 10 seconds.
- (8) Soon after performing step (7) above, release the accelerator pedal for at least 4 seconds without depressing the brake pedal, in order to execute fuel-cut control.
- (9) Stop the vehicle and allow the engine to idle for 10 seconds or more.
- (10) Allow the vehicle to decelerate until the vehicle speed declines to less than 6 mph (10 km/h).
- (11) Repeat steps from (7) through (10) above at least 3 times in one driving cycle.

(c) Monitor Status

- (1) Check the Readiness Monitor status displayed on the tester.
- (2) If the status does not switch to COMPL (complete), make sure that the preconditions have been met, and then perform steps from (5) through (11) in Drive Pattern above.



5. OXYGEN SENSOR HEATER MONITOR



(a) Preconditions

The monitor will not run unless:

- MIL is OFF

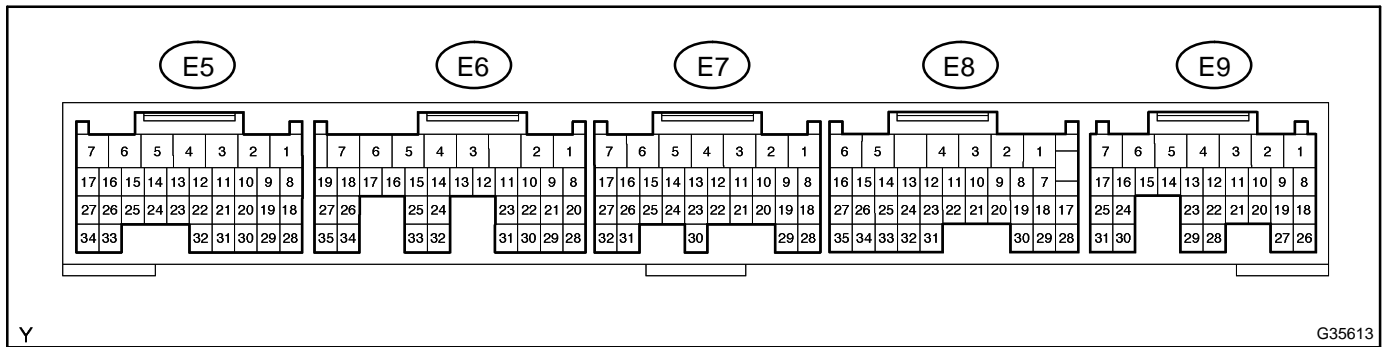
(b) Drive Pattern

- (1) Connect the OBD II scan tool to the DLC3 to check monitor status and preconditions (refer to (a)).
- (2) Start the engine and allow it to idle for 500 seconds or more.
- (3) Drive the vehicle at 25 mph (40 km/h) or more for at least 2 minutes.
- (4) Check the status of the readiness monitor on the scan tool display. If readiness status did not switch to complete, ensure the preconditions are met, turn the ignition off and then repeat steps (2) and (3).

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See page
Engine does not crank (Does not start)	1. Cranking holding function circuit 2. Starter 3. Starter relay	05-447 19-1 19-1
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	05-442 05-453 01-26
No complete combustion (Does not start)	1. Fuel pump control circuit	05-453
Difficult to start (Engine cranks normally)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	05-277 05-453 14-1
Difficult to start (With cold engine)	1. Starter signal circuit 2. Fuel pump control circuit	05-277 05-453
Difficult to start (With hot engine)	1. Starter signal circuit 2. Fuel pump control circuit	05-277 05-453
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	05-1178 05-442
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	05-1178 05-453
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	14-1 05-453
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	05-442 05-453
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	05-453 05-904
Surging (Poor driveability)	1. Fuel pump control circuit	05-453
Engine stalls soon after starting	1. Fuel pump control circuit	05-453
Engine stalls during A/C operation	1. A/C signal circuit (Compressor circuit) 2. ECM	05-1178 01-26
Unable to refuel/Difficult to refuel	1. ORVR system	12-7

TERMINALS OF ECM



HINT:

The standard normal voltage between each pair of ECM terminals is shown in the table below. The appropriate conditions for checking each pair of terminals is also indicated.

The result of checks should be compared with the standard normal voltage for that pair of terminals, displayed in the STD Voltage column.

The illustration above can be used as a reference to identify the ECM terminal locations.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
BATT (E9-3) - E1 (E7-1)	L - BR	Battery (for measuring the battery voltage and for the ECM memory)	Always	9 to 14 V
+BM (E9-7) - E1 (E7-1)	L-B - BR	Power source of throttle motor	Always	9 to 14 V
IGSW (E9-9) - E1 (E7-1)	B-O - BR	Ignition switch	Ignition switch ON	9 to 14 V
+B (E9-1) - E1 (E7-1)	B - BR	Power source of ECM	Ignition switch ON	9 to 14 V
+B2 (E9-2) - E1 (E7-1)	B - BR	Power source of ECM	Ignition switch ON	9 to 14 V
MREL (E9-8) - E1 (E7-1)	W-G - BR	EFI relay	Ignition switch ON	9 to 14 V
VC (E5-23) - E2 (E5-28)	LG-B - BR	Power source for sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
VG (E5-30) - E2 (E5-28)	W-R - BR	Mass air flow meter	Idling, shift lever position P or N, A/C switch OFF	0.5 to 3.0 V
THA (E5-22) - E2 (E5-28)	B-R - BR	Intake air temperature sensor	Idling, Intake air temperature 20°C (68°F)	0.5 to 3.4 V
THW (E5-21) - E2 (E5-28)	R-L - BR	Engine coolant temperature sensor	Idling, Engine coolant temperature 80°C (176°F)	0.2 to 1.0 V
VTA1 (E5-20) - E2 (E5-28)	Y - BR	Throttle position sensor (for engine control)	Ignition switch ON, throttle valve fully closed	0.5 to 1.2 V
VTA1 (E5-20) - E2 (E5-28)	Y - BR	Throttle position sensor (for engine control)	Ignition switch ON, throttle valve fully open	3.2 to 4.8 V
VTA2 (E5-19) - E2 (E5-28)	R-B - BR	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, throttle valve fully closed	2.1 to 3.1 V
VTA2 (E5-19) - E2 (E5-28)	R-B - BR	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, throttle valve fully open	4.5 to 5.5 V
VPA (E9-18) - EPA (E9-20)	W-L - BR-W	Accelerator pedal position sensor (for engine control)	Ignition switch ON, throttle valve fully closed	0.5 to 1.1 V
VPA (E9-18) - EPA (E9-20)	W-L - BR-W	Accelerator pedal position sensor (for engine control)	Ignition switch ON, throttle valve fully open	2.6 to 4.5 V
VPA2 (E9-19) - EPA2 (E9-21)	GR-G - BR-Y	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, throttle valve fully closed	1.2 to 2.0 V

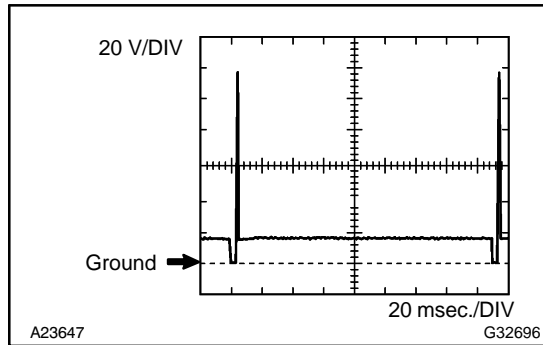
Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
OC1+ (E7-17) - OC1- (E7-16)	BR - GR	Camshaft timing oil control valve (OCV)	Idling	Pulse generation (See waveform 3)
OC2+ (E7-15) - OC2- (E7-14)	L-R - LG	Camshaft timing oil control valve (OCV)	Idling	Pulse generation (See waveform 3)
VV1+ (E7-25) - VV1- (E7-24)	P* - V*	Variable valve timing (VVT) sensor (Bank 1)	Idling	Pulse generation (See waveform 4)
VV2+ (E7-18) - VV2- (E7-28)	R* - G*	Variable valve timing (VVT) sensor (Bank 2)	Idling	Pulse generation (See waveform 4)
M+ (E5-5) - E1 (E7-1)	R* - BR	Throttle motor	Idling	Pulse generation (See waveform 7)
M- (E5-4) - E1 (E7-1)	G* - BR	Throttle motor	Idling	Pulse generation (See waveform 8)
A1A+ (E6-22) - E1 (E7-1)	Y* - BR	A/F sensor	Ignition switch ON	
A1A- (E6-30) - E1 (E7-1)	L* - BR	A/F sensor	Ignition switch ON	
A2A+ (E6-23) - E1 (E7-1)	P* - BR	A/F sensor	Ignition switch ON	
A2A- (E6-31) - E1 (E7-1)	V* - BR	A/F sensor	Ignition switch ON	
HA1A (E6-2) - E1 (E7-1)	B-W - BR	A/F sensor heater	Idling	
HA2A (E6-1) - E1 (E7-1)	R-L - BR	A/F sensor heater	Ignition switch ON	
VPA2 (E9-19) - EPA2 (E9-21)	GR-G - BR-Y	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, throttle valve fully open	3.4 to 5.3 V
VCPA (E9-26) - EPA (E9-20)	LG-R - BR-W	Power source of accelerator pedal position sensor (for VPA)	Ignition switch ON	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-21)	BR-R - BR-Y	Power source of accelerator pedal position sensor (for VPA2)	Ignition switch ON	4.5 to 5.5 V
OX1B (E5-18) - E1 (E7-1) OX2B (E6-33) - E1 (E7-1)	B* - BR W* - BR	Heated oxygen sensor	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See waveform 10)
HT1B (E5-1) - E1 (E7-1) HT2B (E6-5) - E1 (E7-1)	G-Y - BR P - BR	Heated oxygen sensor heater	Idling	Below 3.0 V
HT1B (E5-1) - E1 (E7-1) HT2B (E6-5) - E1 (E7-1)	G-Y - BR P - BR	Heated oxygen sensor heater	Ignition switch ON	9 to 14 V
#1 (E7-2) - E01 (E5-7) #2 (E7-3) - E01 (E5-7) #3 (E7-4) - E01 (E5-7) #4 (E7-5) - E01 (E5-7) #5 (E7-6) - E01 (E5-7) #6 (E7-7) - E01 (E5-7) #7 (E5-3) - E01 (E5-7) #8 (E5-2) - E01 (E5-7)	R-L - W-B L - W-B R - W-B Y - W-B G - W-B R - W-B W - W-B R-B - W-B	Injector	Ignition switch ON	9 to 14 V
#1 (E7-2) - E01 (E5-7) #2 (E7-3) - E01 (E5-7) #3 (E7-4) - E01 (E5-7) #4 (E7-5) - E01 (E5-7) #5 (E7-6) - E01 (E5-7) #6 (E7-7) - E01 (E5-7) #7 (E5-3) - E01 (E5-7) #8 (E5-2) - E01 (E5-7)	R-L - W-B L - W-B R - W-B Y - W-B G - W-B R - W-B W - W-B R-B - W-B	Injector	Idling	Pulse generation (See waveform 1)
KNK1 (E6-29) - EKNK (E6-28)	W* - B*	Knock sensor	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See waveform 2)
KNK2 (E6-21) - EKN2 (E6-20)	G* - R*	Knock sensor	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See waveform 2)
G2+ (E7-19) - G2- (E7-29)	R* - G*	Camshaft position sensor	Idling	Pulse generation (See waveform 5)

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
NE+ (E7-21) - NE- (E7-20)	B* - W*	Crankshaft position sensor	Idling	Pulse generation (See waveform 5)
PRG (E5-34) - E1 (E7-1)	Y-R - BR	VSV for EVAP	Ignition switch ON	9 to 14 V
SPD (E8-8) - E1 (E7-1)	V-R - BR	Speed signal from combination meter	Ignition switch ON, Rotate driving wheel slowly	Pulse generation (See waveform 6)
FPR (E7-30) - E1 (E7-1)	G-R - BR	Fuel pump relay	Ignition switch ON	0 to 3.0 V
FC (E9-10) - E1 (E7-1)	GR-B - BR	Fuel pump control	Ignition switch ON	9 to 14 V
IGT1 (E5-8) - E1 (E7-1) IGT2 (E5-15) - E1 (E7-1) IGT3 (E5-11) - E1 (E7-1) IGT4 (E5-10) - E1 (E7-1) IGT5 (E5-13) - E1 (E7-1) IGT6 (E5-12) - E1 (E7-1) IGT7 (E5-14) - E1 (E7-1) IGT8 (E5-9) - E1 (E7-1)	B-Y - BR L-Y - BR G-O - BR L-B - BR G-R - BR G - BR G-W - BR G-B - BR	Ignition coil with igniter (ignition signal)	Idling	Pulse generation (See waveform 9)
IGF1 (E5-24) - E1 (E7-1) IGF2 (E5-25) - E1 (E7-1)	R-Y - BR R-W - BR	Ignition coil with igniter (ignition confirmation signal)	Ignition switch ON	4.5 to 5.5 V
IGF1 (E5-24) - E1 (E7-1) IGF2 (E5-25) - E1 (E7-1)	R-Y - BR R-W - BR	Ignition coil with igniter (ignition confirmation signal)	Idling	Pulse generation (See waveform 9)
STP (E9-15) - E1 (E7-1)	G-Y - BR	Stop lamp switch	Brake pedal depressed	7.5 to 14 V
STP (E9-15) - E1 (E7-1)	G-Y - BR	Stop lamp switch	Brake pedal released	Below 1.5 V
ST1- (E9-16) - E1 (E7-1)	R-L - BR	Stop lamp switch (opposite to STP terminal)	Ignition switch ON, Brake pedal depressed	Below 1.5 V
ST1- (E9-16) - E1 (E7-1)	R-L - BR	Stop lamp switch (opposite to STP terminal)	Ignition switch ON, Brake pedal released	7.5 to 14 V
NSW (E6-8) - E1 (E7-1)	L-Y - BR	Park/Neutral position switch	Ignition switch ON, Shift lever position other than P and N	9 to 14 V
NSW/STAR (E6-8) - E1 (E7-1)	L-Y - BR	Park/Neutral position switch	Ignition switch ON, Shift lever position in P, N	Below 3.0 V
W (E8-30) - E1 (E7-1)	R-B - BR	MIL	Idling	9 to 14 V
W (E8-30) - E1 (E7-1)	R-B - BR	MIL	Ignition switch ON	Below 3.0 V
ELS (E8-13) - E1 (E7-1)	G - BR	Electric load	Taillamp switch ON, Defogger switch ON	7.5 to 14 V
ELS (E8-13) - E1 (E7-1)	G - BR	Electric load	Taillamp switch OFF, Defogger switch OFF	0 to 1.5 V
TACH (E8-1) - E1 (E7-1)	B-W - BR	Engine speed	Idling	Pulse generation (See waveform 11)
TC (E9-23) - E1 (E7-1)	P-L - BR	Terminal TC of DLC 3	Ignition switch ON	9 to 14 V
STA (E7-11) - E1 (E7-1)	B-Y - BR	Starter signal	Cranking	6 V or higher
STA (E7-11) - E1 (E7-1)	B-Y - BR	Park/neutral position switch	Shift lever position P or N, Ignition switch START	9 to 14 V
STSW (E7-12) - E1 (E7-1)	L-Y - BR	STA No.2 fuse	Shift lever position P or N, Ignition switch START	9 to 14 V
VPMP (E9-5) - E1 (E7-1)	L-W - BR	Canister closed valve	Ignition switch ON	9 V to 14 V
MPMP (E9-6) - E1 (E7-1)	G-Y - BR	Leak detection pump	Vacuum pump OFF	0 V to 3 V
MPMP (E9-6) - E1 (E7-1)	G-Y - BR	Leak detection pump	Vacuum pump ON	9 V to 14 V
PPMP (E9-22) - E1 (E7-1)	O - BR	Vapor pressure sensor	Ignition switch ON	3 V to 3.6 V
AIV1 (E5-27) - E1 (E7-1)	G - BR	VSV for air injection control (Bank 1)	Ignition switch ON	9 to 14 V
AIV2 (E5-26) - E1 (E7-1)	R - BR	VSV for air injection control (Bank 2)	Ignition switch ON	9 to 14 V

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage
AIRV (E9-4) - E1 (E7-1)	L - BR	AI driver (ASV control signal)	Ignition switch ON	9 to 14 V
AIRP (E9-25) - E1 (E7-1)	Y - BR	AI driver (Air pump control signal)	Ignition switch ON	9 to 14 V
AIP (E5-32) - E1 (E7-1)	W-L - BR	Air pressure sensor	Ignition switch ON	3 V to 3.6 V

*: Shielded



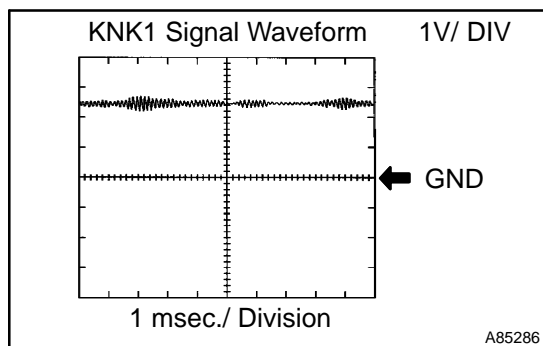
WAVEFORM 1

Fuel injector

ECM Terminal Names	Between #10 (to 40) and E01
Tester Ranges	20 V/DIV, 20 msec./DIV
Conditions	Idling

HINT:

The wavelength becomes shorter as the engine rpm increases.



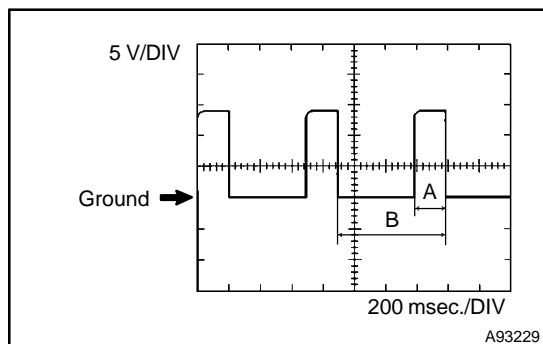
WAVEFORM 2

Knock sensor

ECM Terminal Name	Between KNK1 and EKNK Between KNK2 and EKN2
Tester Range	1 V/DIV, 1 msec./DIV
Condition	Maintain engine RPM at 2,000 rpm after engine warmed-up

HINT:

- The wavelength becomes shorter as the engine rpm increases.
- The waveforms and amplitudes displayed differ slightly depending on the vehicle.



WAVEFORM 3

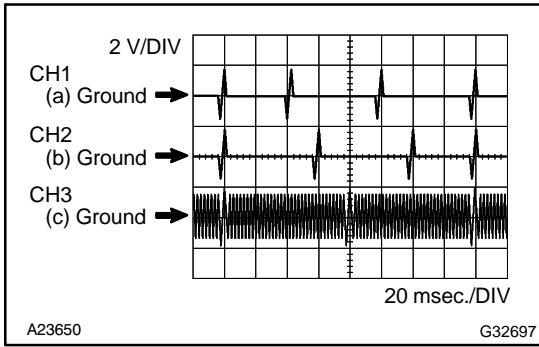
VVT OCV

ECM Terminal Name	Between OC1+ and OC1- Between OC2+ and OC2-
Tester Range	5 V/DIV, 200 msec./DIV
Condition	Accelerate slowly after engine warmed-up

HINT:

In the DATA LIST, the items VVT OCV DUTY B1 and B2 show the duty ratio of voltage flowing to the OCV (see illustration on left).

$$\text{VVT OCV DUTY B1, B2} = \frac{A}{B} \times 100 (\%)$$



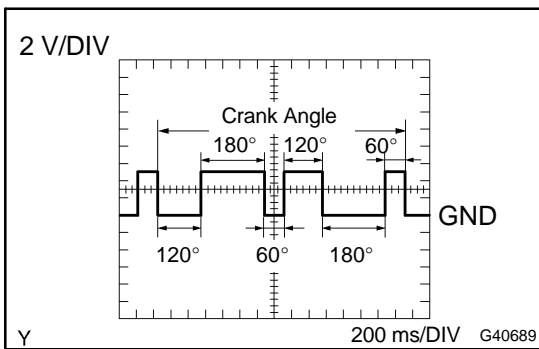
WAVEFORM 4

- (a) VVT sensor bank 1
- (b) VVT sensor bank 2
- (c) Crankshaft position sensor

ECM Terminal Name	(a) Between VV1+ and VV1- (b) Between VV2 + and VV2- (c) Between NE+ and NE-
Tester Range	2 V/DIV, 20 msec./DIV
Condition	Idle after engine warmed-up

HINT:

The wavelength becomes shorter as the engine rpm increases.



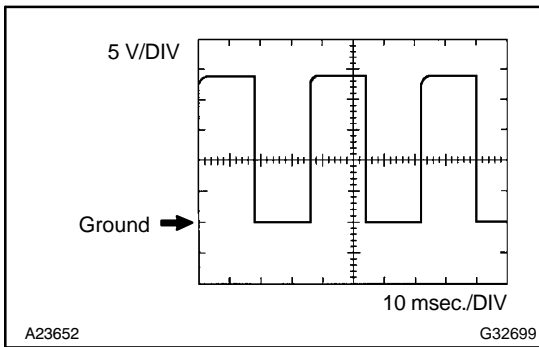
WAVEFORM 5

- (a) Camshaft position sensor
- (b) Crankshaft position sensor

ECM Terminal Name	Between G2+ and G2-
Tester Range	2 V/DIV, 200 msec./DIV
Condition	Idle after engine warmed-up

HINT:

The wavelength becomes shorter as the engine rpm increases.



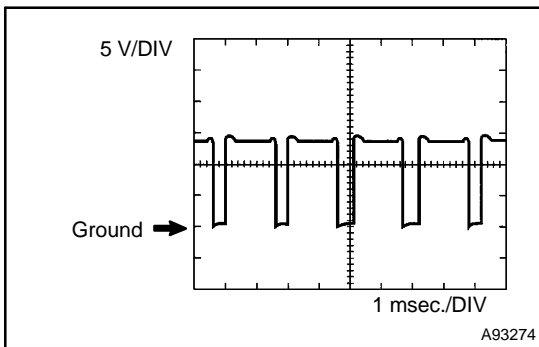
WAVEFORM 6

Vehicle speed signal

ECM Terminal Name	Between SP2+ and SP2-
Tester Range	5 V/DIV, 10 msec./DIV
Condition	Driving by 40 km/h (25 mph)

HINT:

The wavelength becomes shorter as vehicle speed increases.



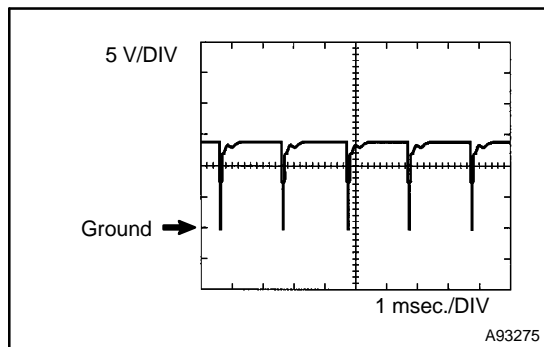
WAVEFORM 7

Throttle actuator positive terminal

ECM Terminal Name	Between M+ and ME01
Tester Range	5 V/DIV, 1 msec./DIV
Condition	Idle after engine warmed-up

HINT:

The duty ratio varies depending on the throttle opening operation.



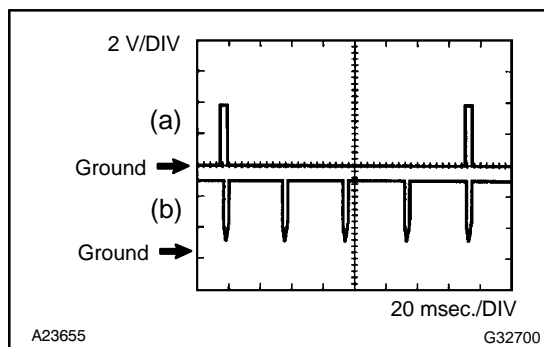
WAVEFORM 8

Throttle actuator negative terminal

ECM Terminal Name	Between M- and ME01
Tester Range	5 V/DIV, 1 msec./DIV
Condition	Idle after engine warmed-up

HINT:

The duty ratio varies depending on the throttle opening operation.



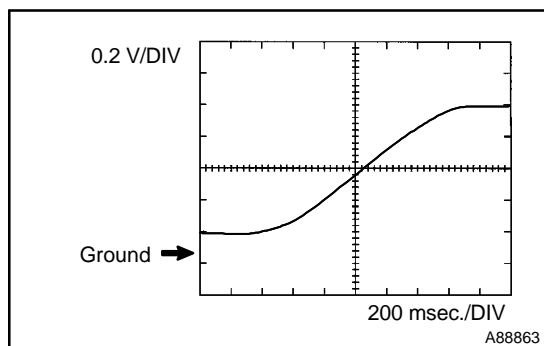
WAVEFORM 9

- (a) Igniter IGT signal (from ECM to igniter)
- (b) Igniter IGF signal (from igniter to ECM)

ECM Terminal Name	(a) Between IGT1 (to IGT8) and E1 (b) Between IGF1 (IGF2) and E1
Tester Range	2 V/DIV, 20 msec./DIV
Condition	Idling

HINT:

The wavelength becomes shorter as vehicle speed increases.



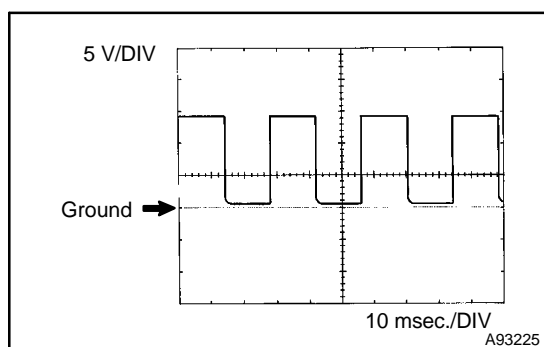
WAVEFORM 10

Heated oxygen sensor

ECM Terminal Names	Between OX1B and E2
Tester Ranges	0.2 V/DIV, 200 msec./DIV
Conditions	Engine speed maintained 2,500 rpm for 2 minutes after warming up sensor

HINT:

In the DATA LIST, item O2S B1S2 shows the ECM input values from the heated oxygen sensor.



WAVEFORM 11

Engine speed signal

ECM Terminal Names	Between TACH and E1
Tester Ranges	5 V/DIV, 10 msec./DIV
Conditions	Idling

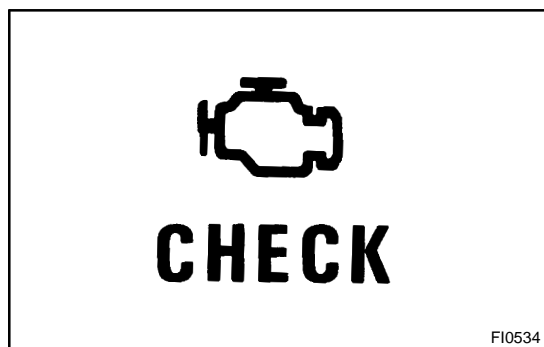
HINT:

The wavelength becomes shorter as vehicle speed increases.

DIAGNOSIS SYSTEM

1. DESCRIPTION

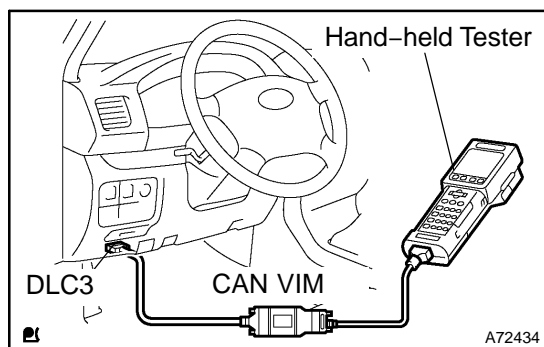
When troubleshooting OBD II (On-Board Diagnostics) vehicles, a hand-held tester must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle's ECM (Engine Control Module) can be then read.



OBD II regulations require that the vehicle's on-board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

- (a) The emission control systems and components
- (b) The power train control components (which affect vehicle emissions)
- (c) The computer itself

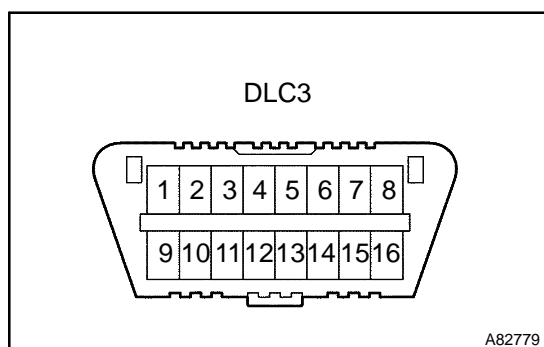
In addition, the applicable DTCs (Diagnostic Trouble Codes) prescribed by SAE J2012 are recorded on 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



To check DTCs, connect a hand-held tester to the DLC3. The tester displays DTCs, freeze frame data, and a variety of engine data. The DTCs and freeze frame data can be erased with the tester (see page 05-60).

In order to enhance OBD function on vehicles and develop the Off-Board diagnosis system, CAN communication is introduced in this system (CAN: Controller Area Network). It minimizes a gap between technician skills and vehicle technology. CAN is a network, which uses a pair of data transmission lines, spanning multiple computers and sensors. It allows a high speed communication between the systems and to simplify the wire harness connection.

Since the CAN communication is equipped in this system, CAN VIM (VIM: Vehicle Interface Module) connecting with hand-held tester is necessary to display any information from the ECM on the tester. (Also communication between the hand-held tester and the ECM uses CAN communication signal) When confirm the DTCs and any data of the ECM, connect the CAN VIM between the DLC3 and the hand-held tester.



2. NORMAL MODE AND CHECK MODE

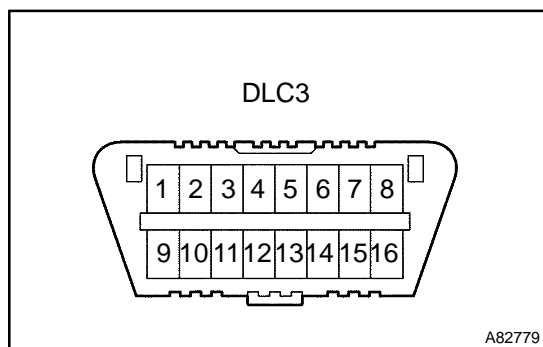
The diagnosis system operates in the normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (hand-held tester only) (see page 05-13).

3. 2 TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the next subsequent drive cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

Freeze frame data record the engine condition (fuel system, calculated engine load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.



5. DLC3 (Data Link Connector 3)

The vehicle's ECM uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

Symbols	Terminal No.	Names	Reference terminals	Results	Conditions
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always
CANH	6	CAN "High" line	CANL	54 to 69 Ω	Power switch OFF
CANH	6	CAN "High" line	Battery positive	1 M Ω or higher	Power switch OFF
CANH	6	CAN "High" line	CG	1 k Ω or higher	Power switch OFF
CANH	14	CAN "Low" line	Battery positive	1 M Ω or higher	Power switch OFF
CANH	14	CAN "Low" line	CG	1 k Ω or higher	Power switch OFF

HINT:

The DLC3 is the interface prepared for reading various data from the vehicle's ECM. After connecting the cable of a hand-held tester, turn the ignition switch to ON and turn the tester ON. If a communication failure message is displayed on the tester screen (on the tester: UNABLE TO CONNECT TO VEHICLE), a problem exists in either the vehicle or tester. In order to identify the location of the problem, connect the tester to another vehicle.

If communication is normal: Inspect the DLC3 on the original vehicle.

If communication is impossible: The problem is probably with the tester itself. Consult the Service Department listed in the instruction manual.

6. BATTERY VOLTAGE**Battery Voltage: 11 to 14 V**

If the voltage is below 11 V, recharge the battery before proceeding.

7. MIL (Malfunction Indicator Lamp)

- (a) The MIL is illuminated when the ignition switch is first turned to ON (the engine is not running).
- (b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL is not illuminated when the ignition switch is first turned to ON, check the MIL circuit (see page 05-463).

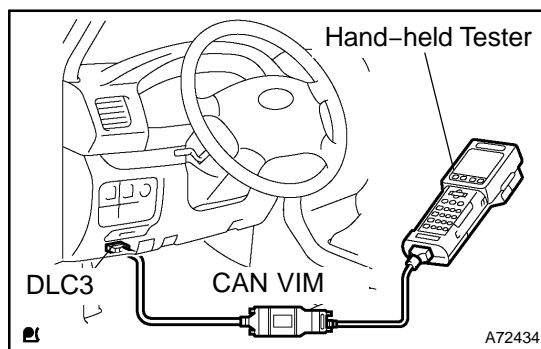
8. ALL READINESS

For this vehicle, using the hand-held tester allows readiness codes corresponding to all DTCs to be read. When diagnosis (normal or malfunctioning) has been complete, readiness codes are set. Enter the following menus: ENHANCED OBD II / MONITOR STATUS on the hand-held tester.

DTC CHECK/CLEAR

NOTICE:

- **If no DTC appears in normal mode:**
On the OBD II scan tool or the hand-held tester, check the pending fault code using the Continuous Test Results function (Mode 7 for SAE J1979).
- **When the diagnosis system is changed from normal mode to check mode or vice-versa, all DTCs and freeze frame data recorded in normal mode will be erased. Before changing modes, always check and make a note of DTCs and freeze frame data.**



1. CHECK DTC (Using the OBD II scan tool or hand-held tester)

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Use the OBD II scan tool or the hand-held tester to check the DTCs and freeze frame data and then write them down. For the hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES. For the OBD II scan tool, see its instruction manual.
- (d) See page 05-60 to confirm the details of the DTCs.

NOTICE:

- **When simulating a symptom with the OBD II scan tool (excluding hand-held tester) to check the DTCs, use the normal mode. For DTCs subject to "2 trip detection logic", perform either of the following actions.**
- **Turn the ignition switch to OFF after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated again, the MIL illuminates and the DTCs are recorded in the ECM.**
- **Check the pending fault code using the Continuous Test Results function (Mode 7 for SAE J1979) on the OBD II scan tool.**

2. FREEZE FRAME DATA (Using the OBD II scan tool or hand-held tester)

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Use the OBD II scan tool or hand-held tester to check the DTCs and freeze frame data and then write them down. For the hand-held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / FREEZE FRAME DATA. For the OBD II scan tool, see its instruction manual.

- 3. CLEAR DTC (Using the OBD II scan tool or hand-held tester)**
 - (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
 - (b) Turn the ignition switch to ON.
 - (c) Erase DTCs and freeze frame data with the OBD II scan tool (complying with SAE J1978) or the hand-held tester. For the hand-held tester: 1) enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES; and 2) press YES. For the OBD II scan tool, see its instruction manual.
- 4. CLEAR DTC (Not using the OBD II scan tool or hand-held tester)**
 - (a) Remove the EFI and ETCS fuse from the engine room R/B for more than 60 seconds, or disconnect the battery terminal for more than 60 seconds. When disconnecting the battery terminal, perform the "INITIALIZE" procedure.

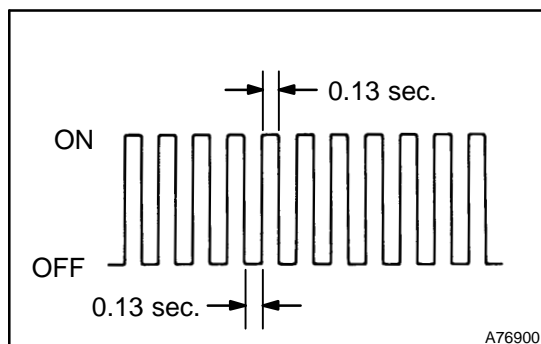
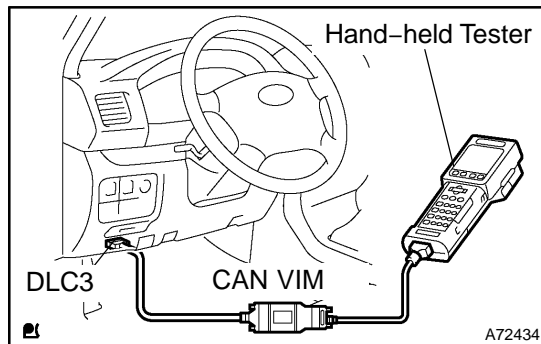
CHECK MODE PROCEDURE

HINT:

Hand-held tester only:

Check mode has a higher sensitivity to detect malfunctions and can detect malfunctions that normal mode cannot detect.

Check mode can also detect all the malfunctions that normal mode can detect.



1. CHECK MODE PROCEDURE (Using the hand-held tester)

- (a) Make sure that the items below are true.
 - (1) Battery positive voltage 11 V or more
 - (2) Throttle valve fully closed
 - (3) Transmission in the P or N position
 - (4) A/C switched OFF
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Change the ECM to check mode with hand-held tester. Make sure the MIL flashes as shown in the illustration.

NOTICE:

All DTCs and freeze frame data recorded will be erased if:
1) the hand-held tester is used to change the ECM from normal mode to check mode or vice versa; or 2) during check mode, the ignition switch is turned from ON to ACC or OFF.

- (f) Start the engine. The MIL should turn off after the engine starts.
- (g) Simulate the conditions of the malfunction described by the customer.
- (h) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTC, freeze frame data and other data.
- (i) After checking the DTC, inspect the applicable circuit.

2. CLEAR DTC (Using the OBD II scan tool or hand-held tester)

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Erase DTCs and freeze frame data with the OBD II scan tool (complying with SAE J1978) or the hand-held tester. For the hand-held tester: 1) enter the following menus: DIAGNOSIS ENHANCED OBD II / DTC INFO / CLEAR CODES; and 2) press YES. For the OBD II scan tool, see its instruction manual.

3. **CLEAR DTC (Not using the OBD II scan tool or hand-held tester)**
 - (a) Remove the EFI and ETCS fuse from the engine room R/B for more than 60 seconds, or disconnect the battery terminal for more than 60 seconds. When disconnecting the battery terminal, perform the "INITIALIZE" procedure.

FAIL-SAFE CHART

If any of the following codes are recorded, the ECM enters the fail-safe mode.

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0031 P0032 P0037 P0038 P0051 P0052 P0057 P0058	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0100 P0102 P0103	Ignition timing is calculated from engine RPM and TP (Throttle Position)	"Pass" condition detected
P0110 P0112 P0113	IAT (Intake Air Temperature) is fixed at 20°C (68°F)	"Pass" condition detected
P0115 P0117 P0118	ECT (Engine Coolant Temperature) is fixed at 80°C (176°F)	"Pass" condition detected
P0120 P0121 P0122 P0123 P0220 P0222 P0223 P2102 P2103 P2111 P2112 P2118 P2119 P2135	If the Electronic Throttle Control System (ETCS) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimal speed. If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly. If the accelerator pedal is depressed quickly, the vehicle may speed up and slow down erratically.	"Pass" condition detected and then the ignition switch turned OFF
P0325 P0327 P0328 P0330 P0332 P0333	Maximum ignition timing retardation	Ignition switch OFF
P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358	Fuel is cut	"Pass" condition detected
P2120 P2121 P2122 P2123 P2125 P2127 P2128 P2138	The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the functioning circuit is used to calculate the accelerator pedal opening angle to allow the vehicle to continue driving. If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.	"Pass" condition detected and then the ignition switch turned OFF

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P2440 and P1441 and/or P1444	Restrict the throttle opening angle: $G_a \leq 30$ g/s	"Pass" condition detected
P1441 and P1444	Restrict the throttle opening angle: $G_a \leq 50$ g/s	"Pass" condition detected
P1441 P1444	Restrict the throttle opening angle: $G_a \leq 100$ g/s	"Pass" condition detected
P2430 P2431 P2432 P2433	Restrict the throttle opening angle: $G_a \leq 50$ g/s	"Pass" condition detected

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the hand-held tester, DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading DATA LIST early in troubleshooting is one way to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the hand-held tester ON.
- (f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
- (g) According to the display on the tester, perform DATA LIST.

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
INJECTOR	Injection period of the No. 1 cylinder: Min.: 0 ms, Max.: 32.64 ms	2.3 to 3.8 ms: Idling	—
IGN ADVANCE	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	BTDC 4 to 17°: Idling	—
CALC LOAD	Calculated load by ECM: Min.: 0 %, Max.: 100 %	• 11 to 21 %: Idling • 12 to 22 %: Running without load (2,500 rpm)	—
VEHICLE LOAD	Vehicle load: Min.: 0 %, Max.: 25700 %	Actual vehicle load	—
MAF	Air flow rate from MAF meter: Min.: 0 g/s, Max.: 655 g/s	2.0 to 3.9 g/s: Idling	If the value approximately 0.0 g/s: • Mass air flow meter power source circuit open • VG circuit open or short If the value 160.0 g/s or more: • E2G circuit open
ENGINE SPD	Engine speed: Min.: 0 rpm, Max.: 16,383 rpm	600 ± 50 rpm: Idling	—
VEHICLE SPD	Vehicle speed: Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on speedometer
COOLANT TEMP	Engine coolant temperature: Min.: -40°C, Max.: 140°C	80 to 100°C (176 to 212°F): After warming up	• If the value -40°C (-40°F): sensor circuit open • If the value 140°C (284°F): sensor circuit shorted
INTAKE AIR	Intake air temperature: Min.: -40°C, Max.: 140°C	Equivalent to ambient air temperature	• If the value -40°C (-40°F): sensor circuit open • If the value 140°C (284°F): sensor circuit shorted
SECONDARY AIR	Second air system status: ON or OFF	ON: Secondary air system operation	—
AIR-FUEL RATIO	Air-fuel ratio: Min.: 0, Max.: 1.999	0.8 to 1.2: During idling	—

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
PURGE DENSITY	Learning value of purge density/ Min.: -50, Max.: 350	Idling: -40 to 0 %	Service data
EVAP PURGE FLOW	Purge flow: Min.: 0 %, Max.: 102.4 %	0 to 100 %: Idling	—
EVAP PURGE VSV	EVAP (Purge) VSV control duty: Min.: 0 %, Max.: 100 %	0 to 100 %: During idling	Order signal from ECM
VAPOR PRESS	Vapor pressure: Min.: -4.125 kPa, Max.: 2.125 kPa	0 kPa: Fuel tank cap removed	Pressure inside fuel tank monitored by the vapor pressure sensor
KNOCK CRRT VAL	Correction learning value of knocking: Min.: -64 CA, Max.: 1,984 CA	0 to 22 °CA: Driving, 44 mph (70 km/h)	Service data
KNOCK FB VAL	Feedback value of knocking: Min.: -64 CA, Max.: 1,984 CA	-22 to 0 °CA Driving, 44 mph (70 km/h)	Service data
ACCEL POS #1	Absolute Accelerator Pedal Position (APP) No. 1: Min.: 0 %, Max.: 100 %	10 to 22 %: accelerator pedal is released 54 to 86 %: accelerator pedal is fully depressed	—
ACCEL POS #2	Absolute APP No. 2: Min.: 0 %, Max.: 100 %	12 to 42 %: accelerator pedal is released 66 to 98 %: The accelerator pedal is fully depressed	—
ACCEL POS #1	APP sensor No. 1 voltage: Min.: 0 V, Max.: 4.98 V	—	ETCS freeze data
ACCEL POS #2	APP sensor No. 2 voltage: Min.: 0 V, Max.: 4.98 V	—	ETCS freeze data
ACCEL POS #1	APP sensor No. 1 voltage: Min.: 0 V, Max.: 5 V	0.5 to 1.1 V: accelerator pedal is released. 2.6 to 4.5 V: or pedal is fully depressed.	—
ACCEL POS #2	APP sensor No. 2 voltage: Min.: 0 V, Max.: 5 V	1.2 to 2.0 V: accelerator pedal is released. 3.4 to 5.3 V: accelerator pedal is fully depressed.	—
ACCEL IDL POS	Whether or not accelerator pedal position sensor detecting idle: ON or OFF	ON: Idling	—
THRTL LEARN VAL	Throttle valve fully closed (learned value):	0.4 to 0.8 V	—
ACCEL SSR #1 AD	Accelerator fully closed value No.1 (AD): Min.: 0, Max.: 4.98 V	—	ETCS service data
ACCEL LRN VAL#1	Accelerator fully closed learning value No.1: Min.: 0, Max.: 124.512	—	ETCS service data
ACCEL LRN VAL#2	Accelerator fully closed learning value No.2: Min.: 0, Max.: 124.512	—	ETCS service data
FAIL #1	Whether or not fail safe function executed: ON or OFF	ON: ETCS has failed	—

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
FAIL #2	Whether or not fail safe function executed: ON or OFF	ON: ETCS has failed	—
ST1	Starter signal: ON or OFF	ON: Cranking	—
SYSGUARD JUDGE	System guard: ON or OFF	—	ETCS service data
OPN MALFUNCTION	Open side malfunction: ON or OFF	—	ETCS service data
THROTTLE POS	Absolute throttle position sensor: Min.: 0 %, Max.: 100 %	• 10 to 24 %: Throttle fully closed • 64 to 96 %: Throttle fully open	Read the value with intrusive operation (active test)
THROTTL IDL POS	Whether or not throttle position sensor detecting idle: ON or OFF	ON: Idling	—
THRTL REQ POS	Throttle requirement position: Min.: 0 V, Max.: 5 V	0.5 to 1.0 V: Idling	—
THROTTLE POS	Throttle sensor positioning: Min.: 0 %, Max.: 100 %	10 to 18 %: Idling	Calculated value based on VTA1
THROTTLE POS #2	Throttle sensor positioning #2: Min.: 0 %, Max.: 100 %	—	Calculated value based on VTA2
THROTTLE POS #1	Throttle position sensor No. 1 output voltage: Min.: 0 V, Max.: 4.9 V	—	ETCS freeze data
THROTTLE POS #2	Throttle position sensor No.2 output voltage: Min.: 0 V, Max.: 4.9 V	—	ETCS freeze data
THROTTLE POS #1	Throttle position No. 1: Min.: 0 V, Max.: 5 V	• 0.5 to 1.2 V: Throttle fully closed • 3.2 to 4.8 V: Throttle fully opened	—
THROTTLE POS #2	Throttle position No. 2: Min.: 0 V, Max.: 5 V	• 2.0 to 2.9 V: Throttle fully closed • 4.6 to 5.5 V: Throttle fully open	Read the value with intrusive operation (active test)
THRTL COMND VAL	Throttle position command value: Min.: 0 V, Max.: 4.98 V	0.5 to 4.8 V	ETCS service data
THROTTLE SSR #1	Throttle sensor opener position No. 1: Min.: 0 V, Max.: 4.98 V	0.6 to 0.9 V	ETCS service data
THROTTLE SSR #2	Throttle sensor opener position No. 2: Min.: 0 V, Max.: 4.98 V	2.2 to 2.6 V	ETCS service data
THRTL SSR #1 AD	Throttle sensor opener position No.1 (AD): Min.: 0 V, Max.: 4.98 V	0.6 to 0.9 V	ETCS service data
THROTTLE MOT	Whether or not throttle motor control permitted: ON or OFF	ON: Idling	Read the value with the power switch ON (Do not start engine)
THROTTLE MOT	Throttle motor current: Min.: 0 A, Max.: 80 A	0 to 3.0 A: Idling	—
THROTTLE MOT	Throttle motor: Min.: 0 %, Max.: 100 %	0.5 to 40 %: Idling	—
THROTTLE MOT	Throttle motor current: Min.: 0 A, Max.: 19.92 A	0 to 3.0 A: Idling	—
THROTL OPN DUTY	Throttle motor opening duty ratio: Min.: 0 %, Max.: 100 %	0 to 40 %: During idling	When accelerator pedal depressed, duty ratio increased

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
THROTL CLS DUTY	Throttle motor closed duty ratio: Min.: 0 %, Max.: 100 %	0 to 40 %: During idling	When accelerator pedal released quickly, duty ratio increased
THRTL MOT (OPN)	Throttle motor duty ratio (open): Min.: 0 %, Max.: 100 %	—	ETCS service data
THRTL MOT (CLS)	Throttle motor duty ratio (close): Min.: 0 %, Max.: 100 %	—	ETCS service data
O2S B1 S2	Heated oxygen sensor output voltage for bank 1 sensor 2: Min.: 0 V, Max.: 1.275 V	0.1 to 0.9 V: Driving 44 mph (70 km/h)	Performing the INJ VOL or A/F CONTROL function of the ACTIVE TEST enables the technician to check voltage output of the sensor
O2S B2 S2	Heated oxygen sensor output voltage for bank 2 sensor 2: Min.: 0 V, Max.: 1.275 V	0.1 to 0.9 V: Driving 44 mph (70 km/h)	Performing the INJ VOL or A/F CONTROL function of the ACTIVE TEST enables the technician to check voltage output of the sensor
AFS B1 S1	A/F sensor output voltage for bank 1 sensor 1: Min.: 0 V, Max.: 7.999 V	2.8 to 3.8 V: Idling	Performing the INJ VOL or A/F CONTROL function of the ACTIVE TEST enables the technician to check voltage output of the sensor
AFS B2 S1	A/F sensor output voltage for bank 2 sensor 1: Min.: 0 V, Max.: 7.999 V	2.8 to 3.8 V: Idling	Performing the INJ VOL or A/F CONTROL function of the ACTIVE TEST enables the technician to check voltage output of the sensor
TOTAL FT #1	Total fuel trim of bank 1 Average value for fuel trim system of bank 1: Min.: -0.5, Max.: 1,496	-0.2 to 0.2: Idling	—
TOTAL FT #2	Total fuel trim of bank 2 Average value for fuel trim system of bank 2: Min.: -0.5, Max.: 1,496	-0.2 to 0.2: Idling	—
SHORT FT #1	Short-term fuel trim of bank 1: Min.: -100 %, Max.: 99.2%	0 ± 20 %	This item the short-term fuel compensation used to maintain the air-fuel ratio at stoichiometric air-fuel ratio
SHORT FT #2	Short-term fuel trim of bank 2: Min.: -100 %, Max.: 99.2%	0 ± 20 %	This item the short-term fuel compensation used to maintain the air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long-term fuel trim of bank 1: Min.: -100 %, Max.: 99.2 %	0 ± 20 %	This item the overall fuel compensation carried out in long-term to compensate a continual deviation of the short-term fuel trim from the central value
LONG FT #2	Long-term fuel trim of bank 2: Min.: -100 %, Max.: 99.2 %	0 ± 20 %	This item the overall fuel compensation carried out in long-term to compensate a continual deviation of the short-term fuel trim from the central value

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
FUEL SYS #1	Fuel system status (Bank1): OL or CL or OL DRIVE or OL FAULT or CL FAULT	CL: Idling after warming up	<ul style="list-style-type: none"> •OL (Open Loop): Has not yet satisfied conditions to go closed loop •CL (Closed Loop): Using heated oxygen sensor as feedback for fuel control. •OL DRIVE: Open loop due to driving conditions (fuel enrichment) •OL FAULT: Open loop due to detected system fault •CL FAULT: Closed loop but heated oxygen sensor, which used for fuel control malfunctioning
FUEL SYS #2	Fuel system status (Bank 2): OL or CL or OL DRIVE or OL FAULT or CL FAULT	CL: Idling after warming up	<ul style="list-style-type: none"> •OL (Open Loop): Has not yet satisfied conditions to go closed loop •CL (Closed Loop): Using heated oxygen sensor as feedback for fuel control •OL DRIVE: Open loop due to driving conditions (fuel enrichment) •OL FAULT: Open loop due to detected system fault •CL FAULT: Closed loop but heated oxygen sensor, which used for fuel control malfunctioning
O2FT B1 S2	Short-term fuel trim associated with the bank 1 sensor 2: Min.: -100 %, Max.: 99.2 %	0 ± 20 %	Same as SHORT FT #1
O2FT B2 S2	Short-term fuel trim associated with the bank 2 sensor 2: Min.: -100 %, Max.: 99.2 %	0 ± 20 %	Same as SHORT FT #1
AF FT B1 S1	Short-term fuel trim associated with the bank 1 sensor 1: Min.: 0, Max.: 1.999	<ul style="list-style-type: none"> • Less than 1 = Rich • 1=Stoichiometric air-fuel ratio • More than 1 = Lean 	—
AF FT B2 S1	Short-term fuel trim associated with the bank 2 sensor 1: Min.: 0, Max.: 1.999	<ul style="list-style-type: none"> • Less than 1 = Rich • 1=Stoichiometric air-fuel ratio • More than 1 = Lean 	—
CAT TEMP B1S1	Catalyst temperature (Bank 1, Sensor 1): Min.: -40, Max.: 6,513.5 °C	—	—
CAT TEMP B2S1	Catalyst temperature (Bank 2, Sensor 1): Min.: -40, Max.: 6,513.5 °C	—	—
CAT TEMP B1S2	Catalyst temperature (Bank 1, Sensor 2): Min.: -40, Max.: 6,513.5 °C	—	—

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
CAT TEMP B2S2	Catalyst temperature (Bank 2, Sensor 2): Min.: -40, Max.: 6,513.5 °C	—	—
INI COOL TEMP	Initial engine coolant temperature: Min.: -40°C, Max.: 140°C	Close to ambient air temperature	Service data
INI INTAKE TEMP	Initial intake air temperature: Min.: -40°C, Max.: 140°C	Close to ambient air temperature	Service data
INJ VOL	Injection volume (cylinder 1): Min.: 0 ml, Max.: 2.048 ml	0 to 0.5 ml	Quantity of fuel injection volume for 10 times
STARTER SIG	Starter signal: ON or OFF	ON: Cranking	—
PS SW	Power steering signal: ON or OFF	ON: Power steering operation	—
PS SIGNAL	Power steering signal: ON or OFF	ON: When steering wheel first turned after ignition switch turned to ON	This signal status usually ON until ignition switch turned to OFF
CTP SW	Closed throttle position switch: ON or OFF	• ON: Throttle fully closed • OFF: Throttle open	—
A/C SIG	A/C signal: ON or OFF	ON: A/C ON	—
ELECT LOAD SIG	Electrical load signal: ON or OFF	ON: Headlights or defogger is turned ON	—
STOP LIGHT SW	Stop lamp switch: ON or OFF	ON: brake pedal is depressed.	—
+BM	Whether or not electric throttle control system power inputted: ON or OFF	ON: Idling	—
+BM VOLTAGE	+BM voltage: Min.: 0, Max.: 19.92	10 to 15 V: Idling	ETCS service data
BATTERY VOLTAGE	Battery voltage: Min.: 0 V, Max.: 65.535 V	9 to 14 V: Idling	—
ACTUATOR POWER	Actuator power supply: ON or OFF	ON: Idling	ETCS service data
ATM PRESSURE	Atmospheric pressure: Min.: 0 kPa, Max.: 150 kPa	Equivalent to atmospheric pressure (absolute pressure)	—
SECOND AIR VSV	Secondary air injection system status	ON: Secondary air injection system operation	—
AIR PMP RPES (A)	Air pump pressure Min.: 0 kPa, Max.: 320 kPa	—	Air pump pressure (absolute)
ACT VSV	A/C cut status for Active Test: ON or OFF	—	Active Test support data
EVAP (Purge) VSV	VSV status for EVAP control: ON or OFF	—	Active Test support data
FUEL PUMP / SPD	Fuel pump/speed status: ON or OFF	—	Active Test support data
VVT CTRL B1	VVT control status (Bank 1): ON or OFF	—	Active Test support data
VVT CTRL B2	VVT control status (Bank 2): ON or OFF	—	Active Test support data
VACUUM PUMP	Key-off EVAP system pump status: ON or OFF	—	Active Test support data

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
EVAP VENT VAL	Key-off EVAP system vent valve status: ON or OFF	—	Active Test support data
TC/TE1	TC and TE1 terminal of DLC3: ON or OFF	—	—
VVTL AIM ANGL #1	VVT aim angle (Bank 1): Min.: 0 %, Max.: 100 %	0 %: Idling	VVT duty signal value during intrusive operation
VVTL AIM ANGL #2	VVT aim angle (Bank 2): Min.: 0 %, Max.: 100 %	0 %: Idling	VVT duty signal value during intrusive operation
VVT CHNG ANGL #1	VVT change angle (Bank 1): Min.: 0°FR, Max.: 60°FR	0 to 5 °FR: Idling	Displacement angle during intrusive operation
VVT CHNG ANGL #2	VVT change angle (Bank 2): Min.: 0°FR, Max.: 60°FR	0 to 5 °FR: Idling	Displacement angle during intrusive operation
VVT OCV DUTY B1	VVT OCV operation duty (Bank 1): Min.: 0 %, Max.: 100 %	0 %: Idling	Requested duty value for intrusive operation
VVT OCV DUTY B2	VVT OCV operation duty (Bank 2): Min.: 0 %, Max.: 100 %	0 %: Idling	Requested duty value for intrusive operation
FC IDL	Fuel cut idle: ON or OFF	ON: Fuel cut operation	FC IDL = "ON" when throttle valve fully closed and engine speed over 2,800 rpm
FC TAU	Fuel cut TAU: Fuel cut during very light load: ON or OFF	ON: Fuel cut operating	The fuel cut being performed under very light load to prevent the engine combustion from becoming incomplete
IGNITION	Ignition counter: Min.: 0, Max.: 800	0 to 800	—
CYL #1, #2, #3, #4, #5, #6, #7, #8	Misfire ratio of the cylinder 1 to 8: Min.: 0, Max.: 255	0 %	This item displayed in only idling
CYL ALL	All cylinders misfire rate: Min.: 0, Max.: 255	0 to 35	—
MISFIRE RPM	Engine RPM for first misfire range: Min.: 0 rpm, Max.: 6,375 rpm	0 rpm: Misfire 0	—
MISFIRE LOAD	Engine load for first misfire range: Min.: 0 g/rev, Max.: 3.98 g/rev	0 g/rev: Misfire 0	—
MISFIRE MARGIN	Misfire monitoring: Min.: -100 %, Max.: 99.22 %	-100 to 99.2 %	Misfire detecting margin
#CODES	#Codes: Min.: 0, Max.: 255	—	Number of detected DTCs
CHECK MODE	Check mode: 0: ON, 1: OFF	ON: Check mode ON	See page 05-46
SPD TEST	Check mode result for vehicle speed sensor: 0: COMPL, 1: INCOMPL	—	—
AS TEST	Check mode result for secondary air injection system: 0: COMPL, 1: INCOMPL	—	—
MISFIRE TEST	Check mode result for misfire monitor: 0: COMPL, 1: INCOMPL	—	—
OXS1 TEST	Check mode result for HO2 sensor (Bank 1): 0: COMPL, 1: INCOMPL	—	—

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
OXS2 TEST	Check mode result for HO2 sensor (Bank 2): 0: COMPL, 1: INCOMPL	—	—
A/F SSR TEST B1	Check mode result for air-fuel ratio sensor (Bank 1): 0: COMPL, 1: INCOMPL	—	—
A/F SSR TEST B2	Check mode result for air-fuel ratio sensor (Bank 2): 0: COMPL, 1: INCOMPL	—	—
MIL	MIL status: ON or OFF	ON: MIL ON	—
MIL ON RUN DIST	MIL ON Run Distance: Min.: 0 second, Max.: 65,535 seconds	Distance after DTC detected	—
MIL ON RUN TIME	Running time from MIL ON: Min.: 0 minute, Max.: 65,535 minutes	Equivalent to running time after MIL was ON	—
ENG RUN TIME	Engine run time: Min.: 0 second, Max.: 65,535 seconds	Time after engine start	Service data
TIME DTC CLEAR	Time after DTC cleared: Min.: 0 minute, Max.: 65,535 minutes	Equivalent to time after DTCs were erased	—
DIST DTC CLEAR	Distance after DTC cleared: Min.: 0 km/h, Max.: 65535 km/h	Equivalent to drive distance after DTCs were erased	—
WU CYC DTC CLEAR	Warm-up cycle after DTC cleared: Min.: 0, Max.: 255	—	Number of warm-up cycles after DTC cleared
MODEL CODE	Model code:	—	Identifying the model code: UCK30 (2WD), UCK40 (4WD)
ENGINE TYPE	Engine type:	—	Identifying the engine type: 2UZFE
CYLINDER NUMBER	Cylinder number: Min.: 0, Max.: 255	—	Identifying the cylinder number: 8
TRANSMISSION	Transmission type:	—	Identifying the transmission type: ECT(5AT)
DESTINATION	Destination	—	Identifying the destination: A (America)
MODEL YEAR	Model year: Min.: 0, Max.: 255	—	Identifying the model year: 200#
SYSTEM	System identification	—	Identifying the engine system: GASLIN (gasoline engine)
AI STATUS	AI operation prohibit: OK or NG	OK	—

*: If no conditions are specifically stated for "Idling", the shift lever is in the N or P position, the A/C switch is OFF and all accessory switches are OFF.

2. ACTIVE TEST

HINT:

Performing ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as first step of troubleshooting is one of the methods to shorten labor time.

It is possible to display DATA LIST during ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the hand-held tester ON.
- (f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
- (g) According to the display on the tester, perform the ACTIVE TEST.

Hand-held Tester Display	Test Details		Diagnostic Note
INJ VOL	Change injection volume	Between -12 % and 25 %	<ul style="list-style-type: none"> • All injectors tested at the same time • Perform test at less than 3,000 rpm • Injection volume can be changed in 1 % graduations within control range
A/F CONTROL	Change injection volume	Lower by 12.5 % or increase by 25 %	<ul style="list-style-type: none"> • Perform test at less than 3,000 rpm • A/F CONTROL enables checking and graphing of A/F (Air Fuel Ratio) sensor and Heated Oxygen (HO2) sensor voltage outputs • To conduct test, select following menu items: ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press YES and ENTER followed by F4
EVAP VSV (ALONE)	Activate EVAP VSV control	ON/OFF	-
VVT CTRL B1	Turn on and off OCV (Oil Control Valve)	ON/OFF	<ul style="list-style-type: none"> • Engine stalls or idles roughly when OCV turned ON • Normal engine running or idling when OCV off
VVT CTRL B2	Turn on and off OCV (Oil Control Valve)	ON/OFF	<ul style="list-style-type: none"> • Engine stalls or idles roughly when OCV turned ON • Normal engine running or idling when OCV off
A/C CUT SIG	Control A/C cut signal	ON/OFF	-
FUEL PUMP/SPD	Activate fuel pump (C/OPN Relay)	ON/OFF	-
TC/TE1	Turn on and off TC and TE1 connection	ON/OFF	<ul style="list-style-type: none"> • ON: TC and TE1 connected • OFF: TC and TE1 disconnected
FC IDL PROHBT	Prohibit idling fuel cut control	ON/OFF	-
ETCS OPEN SLOW	Throttle actuator	ON: throttle valve opens slowly	<p>This test is possible when the following conditions are met:</p> <ul style="list-style-type: none"> • Ignition switch ON • Engine does not start • Fully depressing accelerator pedal (APP: 58 degrees or more)
ETCS CLOSE SLOW	Throttle actuator	ON: throttle valve closes slowly	Same as above
ETCS OPEN FAST	Throttle actuator	ON: throttle valve opens fast	Same as above
ETCS CLOSE FAST	Throttle actuator	ON: throttle valve closes fast	Same as above

FUEL CUT #1	Cylinder #1 injector fuel cut	ON/OFF	This test is possible during vehicle stopping and engine idling.
FUEL CUT #2	Cylinder #2 injector fuel cut	ON/OFF	Same as above
FUEL CUT #3	Cylinder #3 injector fuel cut	ON/OFF	Same as above
FUEL CUT #4	Cylinder #4 injector fuel cut	ON/OFF	Same as above
FUEL CUT #5	Cylinder #5 injector fuel cut	ON/OFF	Same as above
FUEL CUT #6	Cylinder #6 injector fuel cut	ON/OFF	Same as above
FUEL CUT #7	Cylinder #7 injector fuel cut	ON/OFF	Same as above
FUEL CUT #8	Cylinder #8 injector fuel cut	ON/OFF	Same as above
VENT VALVE (ALONE)	Activate vent valve (built into pump module)	ON/OFF	-
VCUUM PUMP	Activate vacuum pump (built into pump module)	ON/OFF	-

3. SYSTEM CHECK

HINT:

Performing a SYSTEM CHECK enables the system, which consists of multiple actuators, to be operated without removing any parts. In addition, it can show whether or not any DTCs are set, and can detect potential malfunctions in the system. The SYSTEM CHECK can be performed with a hand-held tester.

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the tester ON.
- (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK.
- (e) Perform the SYSTEM CHECK by referring to the table below.

Hand-held Tester Displays	Test Details	Recommended Fuel Temperatures	Diagnostic Notes
EVAP SYS CHECK (AUTO OPERATION)	Perform 5 steps in order to operate EVAP key-off monitor automatically	35°C (95°F) or less	<ul style="list-style-type: none"> • If no DTCs in PENDING CODE after performing this test, system functioning normally • Refer to EVAP Inspection Procedure on page 05-408
EVAP SYS CHECK (MANUAL OPERATION)	Perform 5 steps in order to operate EVAP key-off monitor manually	35°C (95°F) or less	<ul style="list-style-type: none"> • Used to detect malfunctioning parts • Refer to EVAP Inspection Procedure on page 05-408
AI INJ CHECK (AUTO OPERATION)	Perform 6 steps in order to operate air injection system automatically	-	<ul style="list-style-type: none"> • If no DTCs in PENDING CODE after performing this test, system functioning normally
AI INJ CHECK (MANUAL OPERATION)	Perform 8 operations in order to operate air injection system monitor manually	-	<ul style="list-style-type: none"> • Used to detect malfunctioning parts

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may be different than your readings depending on the type of instrument used and other factors.

During the DTC check, refer to the table below if a malfunction code is displayed. For details about each code, refer to the page number in the DTC Chart in the left column.

DTC No. (See Page)	Detection Item	Trouble Area	MIL ^{*1}	Memory
P0010 (05-76)	Camshaft Position "A" Actuator Circuit (Bank 1)	<ul style="list-style-type: none"> • Open or short in OCV circuit • OCV • ECM 	○	○
P0011 (05-81)	Camshaft Position "A" -Timing Over- Advanced or System Performance (Bank 1)	<ul style="list-style-type: none"> • Valve timing • OCV • VVT controller assembly • ECM 	○	○
P0012 (05-81)	Camshaft Position "A" -Timing Over- Retarded (Bank 1)	<ul style="list-style-type: none"> • Valve timing • OCV • VVT controller assembly • ECM 	○	○
P0016 (05-86)	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)	<ul style="list-style-type: none"> • Open or short in VVT sensor circuit • VVT sensor • ECM 	○	○
P0018 (05-86)	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor A)	<ul style="list-style-type: none"> • Open or short in VVT sensor circuit • VVT sensor • ECM 	○	○
P0020 (05-76)	Camshaft Position "A" Actuator Circuit (Bank 2)	<ul style="list-style-type: none"> • Open or short in OCV circuit • OCV • ECM 	○	○
P0021 (05-81)	Camshaft Position "A" -Timing Over- Advanced or System Performance (Bank 2)	<ul style="list-style-type: none"> • Valve timing • OCV • VVT controller assembly • ECM 	○	○
P0022 (05-81)	Camshaft Position "A" -Timing Over- Retarded (Bank 2)	<ul style="list-style-type: none"> • Valve timing • OCV • VVT controller assembly • ECM 	○	○
P0031 (05-89)	Oxygen (A/F) Sensor Heater Control Circuit Low (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM 	○	○
P0032 (05-89)	Oxygen (A/F) Sensor Heater Control Circuit High (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Short in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM 	○	○
P0037 (05-132)	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)	<ul style="list-style-type: none"> • Open in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM 	○	○
P0038 (05-132)	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)	<ul style="list-style-type: none"> • Short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM 	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0051 (05-89)	Oxygen (A/F) Sensor Heater Control Circuit Low (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM 	○	○
P0052 (05-89)	Oxygen (A/F) Sensor Heater Control Circuit High (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Short in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM 	○	○
P0057 (05-94)	Oxygen Sensor Heater Control Circuit Low (Bank 2 Sensor 2)	<ul style="list-style-type: none"> • Open in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM 	○	○
P0058 (05-94)	Oxygen Sensor Heater Control Circuit High (Bank 2 Sensor 2)	<ul style="list-style-type: none"> • Short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM 	○	○
P0100 (05-101)	Mass or Volume Air Flow Circuit	<ul style="list-style-type: none"> • Open or short in mass air flow meter circuit • Mass air flow meter • ECM 	○	○
P0101 (05-108)	Mass or Volume Air Flow Circuit Range/Performance Problem	<ul style="list-style-type: none"> • Mass air flow meter 	○	○
P0102 (05-101)	Mass or Volume Air Flow Circuit Low Input	<ul style="list-style-type: none"> • Open in mass air flow meter circuit • Short in ground circuit • Mass air flow meter • ECM 	○	○
P0103 (05-101)	Mass or Volume Air Flow Circuit High Input	<ul style="list-style-type: none"> • Open in mass air flow meter circuit (E2G circuit) • Short in mass air flow meter circuit (+B circuit) • Mass air flow meter • ECM 	○	○
P0110 (05-110)	Intake Air Temperature Circuit	<ul style="list-style-type: none"> • Open or short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM 	○	○
P0112 (05-110)	Intake Air Temperature Circuit Low Input	<ul style="list-style-type: none"> • Short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM 	○	○
P0113 (05-110)	Intake Air Temperature Circuit High Input	<ul style="list-style-type: none"> • Open in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM 	○	○
P0115 (05-115)	Engine Coolant Temperature Circuit	<ul style="list-style-type: none"> • Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM 	○	○
P0116 (05-120)	Engine Coolant Temperature Circuit Range/Performance Problem	<ul style="list-style-type: none"> • Engine coolant temperature sensor 	○	○
P0117 (05-115)	Engine Coolant Temperature Circuit Low Input	<ul style="list-style-type: none"> • Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM 	○	○
P0118 (05-115)	Engine Coolant Temperature Circuit High Input	<ul style="list-style-type: none"> • Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM 	○	○
P0120 (05-122)	Throttle/Pedal Position Sensor/Switch "A" Circuit	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • ECM 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0121 (05-130)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Range/Performance Problem	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) 	○	○
P0122 (05-122)	Throttle/Pedal Position Sensor/ Switch "A" Circuit Low Input	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM 	○	○
P0123 (05-122)	Throttle/Pedal Position Sensor/ Switch "A" Circuit High Input	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Open in VTA1 circuit • Open in E2 circuit • VC and VTA1 circuit are short-circuited • ECM 	○	○
P0125 (05-132)	Insufficient Coolant Temperature for Closed Loop Fuel Control	<ul style="list-style-type: none"> • Cooling system • Engine coolant temperature sensor • Thermostat 	○	○
P0128 (05-135)	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	<ul style="list-style-type: none"> • Thermostat • Cooling system • Engine coolant temperature sensor • ECM 	○	○
P0136 (05-138)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	<ul style="list-style-type: none"> • Open or short in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • HO2 sensor heater (Sensor 2) • Air-Fuel Ratio (A/F) sensor (Sensor 1) • EFI relay • Gas leakage from exhaust system 	○	○
P0137 (05-138)	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2)	<ul style="list-style-type: none"> • Open in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • HO2 sensor heater (Sensor 2) • EFI relay • Gas leakage from exhaust system 	○	○
P0138 (05-138)	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)	<ul style="list-style-type: none"> • Short in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • ECM internal circuit malfunction 	○	○
P0156 (05-138)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)	<ul style="list-style-type: none"> • Open or short in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • HO2 sensor heater (Sensor 2) • Air-Fuel Ratio (A/F) sensor (Sensor 1) • EFI relay • Gas leakage from exhaust system 	○	○
P0157 (05-138)	Oxygen Sensor Circuit Low Voltage (Bank 2 Sensor 2)	<ul style="list-style-type: none"> • Open in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • HO2 sensor heater (Sensor 2) • EFI relay • Gas leakage from exhaust system 	○	○
P0158 (05-138)	Oxygen Sensor Circuit High Voltage (Bank 2 Sensor 2)	<ul style="list-style-type: none"> • Short in HO2 sensor (Sensor 2) circuit • HO2 sensor (Sensor 2) • ECM internal circuit malfunction 	○	○
P0171 (05-155)	System too Lean (Bank 1)	<ul style="list-style-type: none"> • Air induction system • Injector blockage • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage in exhaust system • Heated oxygen sensor (Bank 1 Sensor 1) • EFI relay • PCV piping • ECM 	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0172 (05-155)	System too Rich (Bank 1)	<ul style="list-style-type: none"> • Injector leak, blockage • Mass air flow meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage in exhaust system • Heated oxygen sensor (Bank 1 Sensor 1) • ECM 	○	○
P0174 (05-155)	System too Lean (Bank 2)	<ul style="list-style-type: none"> • Air induction system • Injector blockage • Mass air flow meter • Engine coolant temperature sensor • Fuel pressure • Gas leakage in exhaust system • Heated oxygen sensor (Bank 2 Sensor 1) • EFI relay • PCV piping • ECM 	○	○
P0175 (05-155)	System too Rich (Bank 2)	<ul style="list-style-type: none"> • Injector leak, blockage • Mass air flow meter • Engine coolant temperature sensor • Ignition system • Fuel pressure • Gas leakage in exhaust system • Heated oxygen sensor (Bank 2 Sensor 1) • ECM 	○	○
P0220 (05-122)	Throttle/Pedal Position Sensor/ Switch "B" Circuit	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • ECM 	○	○
P0222 (05-122)	Throttle/Pedal Position Sensor/ Switch "B" Circuit Low Input	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM 	○	○
P0223 (05-122)	Throttle/Pedal Position Sensor/ Switch "B" Circuit High Input	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Open in VTA2 circuit • Open in E2 circuit • VC and VTA2 circuits are short-circuited • ECM 	○	○
P0230 (05-168)	Fuel Pump Primary Circuit	<ul style="list-style-type: none"> • Open or short in fuel pump relay circuit • Fuel pump relay • Circuit opening relay • Fuel pump • ECM 	-	○
P0300 (05-173)	Random/Multiple Cylinder Misfire Detected	<ul style="list-style-type: none"> • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose • ECM 	○*2	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0301 (05-173)	Cylinder 1 Misfire Detected	<ul style="list-style-type: none"> • Ignition system • Injector • Compression pressure • Valve clearance 	○*2	○
P0302 (05-173)	Cylinder 2 Misfire Detected	• Same as P0301	○*2	○
P0303 (05-190)	Cylinder 3 Misfire Detected	• Same as P0301	○*2	○
P0304 (05-190)	Cylinder 4 Misfire Detected	• Same as P0301	○*2	○
P0305 (05-173)	Cylinder 5 Misfire Detected	• Same as P0301	○*2	○
P0306 (05-173)	Cylinder 6 Misfire Detected	• Same as P0301	○*2	○
P0307 (05-173)	Cylinder 7 Misfire Detected	• Same as P0301	○*2	○
P0308 (05-173)	Cylinder 8 Misfire Detected	• Same as P0301	○*2	○
P0325 (05-190)	Knock Sensor 1 Circuit (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> • Knock sensor 1 • Knock sensor 1 (looseness) • ECM 	○	○
P0327 (05-190)	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> • Short in knock sensor 1 circuit • Knock sensor 1 • ECM 	○	○
P0328 (05-190)	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> • Open in knock sensor 1 circuit • Knock sensor 1 • ECM 	○	○
P0330 (05-190)	Knock Sensor 2 Circuit (Bank 2)	<ul style="list-style-type: none"> • Knock sensor 2 • Knock sensor 2 (looseness) • ECM 	○	○
P0332 (05-190)	Knock Sensor 2 Circuit Low Input (Bank 2)	<ul style="list-style-type: none"> • Short in knock sensor 2 circuit • Knock sensor 2 • ECM 	○	○
P0333 (05-190)	Knock Sensor 2 Circuit High Input (Bank 2)	<ul style="list-style-type: none"> • Open in knock sensor 2 circuit • Knock sensor 2 • ECM 	○	○
P0335 (05-197)	Crankshaft Position Sensor "A" Circuit	<ul style="list-style-type: none"> • Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate (crankshaft position sensor plate No.1) • ECM 	○	○
P0339 (05-197)	Crankshaft Position Sensor "A" Circuit Intermittent	<ul style="list-style-type: none"> • Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate (crankshaft position sensor plate No.1) • ECM 	-	○
P0340 (05-202)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> • Open or short in camshaft position sensor circuit • Camshaft position sensor • Bank 1 camshaft timing pulley • Jumped tooth of timing belt • ECM 	○	○
P0341 (05-202)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> • Open or short in camshaft position sensor circuit • Camshaft position sensor • Bank 1 camshaft timing pulley • Jumped tooth of timing belt • ECM 	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0345 (05-202)	Camshaft Position Sensor "A" Circuit (Bank 2)	<ul style="list-style-type: none"> • Open or short in camshaft position sensor circuit • Camshaft position sensor • Bank 2 camshaft timing pulley • Jumped tooth of timing belt • ECM 	○	○
P0346 (05-202)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)	<ul style="list-style-type: none"> • Open or short in camshaft position sensor circuit • Camshaft position sensor • Bank 2 camshaft timing pulley • Jumped tooth of timing belt • ECM 	○	○
P0351 (05-207)	Ignition Coil "A" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 1 and IGT 1 circuit from No. 1 ignition coil with igniter to ECM • No. 1 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0352 (05-207)	Ignition Coil "B" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 2 and IGT 2 circuit from No. 2 ignition coil with igniter to ECM • No. 2 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0353 (05-207)	Ignition Coil "C" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 2 and IGT 3 circuit from No. 3 ignition coil with igniter to ECM • No. 3 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0354 (05-207)	Ignition Coil "D" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 1 and IGT 4 circuit from No. 4 ignition coil with igniter to ECM • No. 4 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0355 (05-207)	Ignition Coil "E" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 2 and IGT 5 circuit from No. 5 ignition coil with igniter to ECM • No. 5 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0356 (05-207)	Ignition Coil "F" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 1 and IGT 6 circuit from No. 6 ignition coil with igniter to ECM • No. 6 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0357 (05-207)	Ignition Coil "G" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 1 and IGT 7 circuit from No. 7 ignition coil with igniter to ECM • No. 7 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○
P0358 (05-207)	Ignition Coil "H" Primary/Secondary Circuit	<ul style="list-style-type: none"> • Open or short in IGF 2 and IGT 8 circuit from No. 8 ignition coil with igniter to ECM • No. 8 ignition coil with igniter (primary ignition) • Ignition system • ECM 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0412 (05-217)	Secondary Air Injection System Switching Valve "A" Circuit	<ul style="list-style-type: none"> • Open in air switching valve drive circuit • Short between air switching valve circuit and +B circuit • Short between air switching valve circuit and body ground • Air injection driver • Air switching valve • ECM 	○	○
P0418 (05-224)	Secondary Air Injection System Relay "A" Circuit	<ul style="list-style-type: none"> • Open in air pump drive circuit • Short between air pump circuit and +B circuit • Short between air pump circuit and body ground • Air injection driver • ECM 	○	○
P0420 (05-230)	Catalyst System Efficiency Below Threshold (Bank 1)	<ul style="list-style-type: none"> • Exhaust manifold sub-assy LH (front catalyst) and exhaust pipe assy front (rear catalyst) • Gas leakage on exhaust system • A/F sensor (Bank 1 Sensor 1) • Heated oxygen sensor (Bank 1 Sensor 2) 	○	○
P0430 (05-230)	Catalyst System Efficiency Below Threshold (Bank 2)	<ul style="list-style-type: none"> • Exhaust manifold sub-assy RH (front catalyst) and exhaust pipe assy front (rear catalyst) • Gas leakage on exhaust system • A/F sensor (Bank 2 Sensor 1) • Heated oxygen sensor (Bank 2 Sensor 2) 	○	○
P043E (05-237)	Evaporate Emission System Reference Orifice Clog Up	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • Leakage from EVAP system 	○	○
P043F (05-237)	Evaporate Emission System Reference Orifice High Flow	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Purge VSV - ECM) • Leakage from EVAP system 	○	○
P0441 (05-243)	Evaporative Emission Control System Incorrect Purge Flow	<ul style="list-style-type: none"> • Purge VSV • Connector/Wire harness (Purge VSV - ECM) • ECM • Pump module • Leakage from EVAP system 	○	○
P0450 (05-249)	Evaporative Emission Control System Pressure Sensor Malfunction	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P0451 (05-249)	Evaporative Emission Control System Pressure Sensor/Switch Range/Performance	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P0452 (05-249)	Evaporative Emission Control System Pressure Sensor/Switch Low Input	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P0453 (05-249)	Evaporative Emission Control System Pressure Sensor/Switch High Input	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P0455 (05-256)	Evaporative Emission Control System Leak Detected (Gross Leak)	<ul style="list-style-type: none"> • Fuel tank cap (loose) • Leakage from EVAP line (Canister - Fuel tank) • Leakage from EVAP line (Purge VSV - canister) • Pump module • Leakage from fuel tank • Leakage from canister 	○	○
P0456 (05-256)	Evaporative Emission Control System Leak Detected (Very Small Leak)	<ul style="list-style-type: none"> • Same as DTC No. P0455 	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0500 (05-261)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> • Combination meter • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Skid control ECU • ECM 	○	○
P0503 (05-261)	Vehicle Speed Sensor "A" Intermittent/Erratic/High	<ul style="list-style-type: none"> • Combination meter • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Skid control ECU • ECM 	-	○
P0504 (05-264)	Brake Switch "A"/"B" Correlation	<ul style="list-style-type: none"> • Short in stop lamp switch signal circuit • Stop lamp fuse • Stop lamp switch • ECM 	-	○
P0505 (05-264)	Idle Air Control System	<ul style="list-style-type: none"> • Air induction system • Electric throttle control system • PCV hose connection • ECM 	○	○
P0560 (05-271)	System Voltage	<ul style="list-style-type: none"> • Open in back-up power source circuit • EFI fuse • ECM 	○	○
P0604 (05-275)	Internal Control Module Random Access Memory (RAM) Error	<ul style="list-style-type: none"> • ECM 	○	○
P0606 (05-276)	ECM/PCM Processor	<ul style="list-style-type: none"> • ECM • Heated oxygen sensor • Exhaust gas leak 	○	○
P0607 (05-277)	Control Module Performance	<ul style="list-style-type: none"> • ECM 	○	○
P0617 (05-278)	Starter Relay Circuit High	<ul style="list-style-type: none"> • Short in Park/Neutral position switch circuit • Park/Neutral position switch • Ignition switch • ECM 	○	○
P0630 (05-281)	VIN not Programmed or Mismatch-ECM/PCM	<ul style="list-style-type: none"> • ECM 	○	○
P0657 (05-282)	Actuator Supply Voltage Circuit/ Open	<ul style="list-style-type: none"> • ECM 	○	○
P0705 (05-958)	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0710 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0711 (05-969)	Transmission Fluid Temperature Sensor "A" Performance	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0712 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit Low Input	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0713 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit High Input	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0717 (05-972)	Input Speed Sensor Circuit No Signal	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0722 (05-977)	Output Speed Sensor Circuit No Signal	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P0724 (05-981)	Brake Switch "B" Circuit High	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P0748 (05-984)	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	• Electronic controlled automatic transmission (ECT)	○	○
P0751 (05-987)	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	• Electronic controlled automatic transmission (ECT)	○	○
P0756 (05-992)	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	• Electronic controlled automatic transmission (ECT)	○	○
P0771 (05-997)	Shift Solenoid "E" Performance (Shift Solenoid Valve SR)	• Electronic controlled automatic transmission (ECT)	○	○
P0776 (05-1003)	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	• Electronic controlled automatic transmission (ECT)	○	○
P0778 (05-1009)	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	• Electronic controlled automatic transmission (ECT)	○	○
P0781 (05-1012)	1-2 Shift (1-2 Shift Valve)	• Electronic controlled automatic transmission (ECT)	○	○
P0818 (05-1017)	Driveline Disconnect Switch In- put Circuit	• Electronic controlled automatic transmission (ECT)	○	○
P0973 (05-1021)	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	• Electronic controlled automatic transmission (ECT)	○	○
P0974 (05-1021)	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)	• Electronic controlled automatic transmission (ECT)	○	○
P0976 (05-1024)	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	• Electronic controlled automatic transmission (ECT)	○	○
P0977 (05-1024)	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)	• Electronic controlled automatic transmission (ECT)	○	○
P0985 (05-1027)	Shift Solenoid "E" Control Circuit Low (Shift Solenoid Valve SR)	• Electronic controlled automatic transmission (ECT)	○	○
P0986 (05-1027)	Shift Solenoid "E" Control Circuit High (Shift Solenoid Valve SR)	• Electronic controlled automatic transmission (ECT)	○	○
P1340 (05-283)	Camshaft Position Sensor "A" Circuit (Bank 1 Sensor 2)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • LH camshaft timing pulley • ECM	○	○
P1341 (05-283)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 Sensor 2)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • LH camshaft timing pulley • ECM	○	○
P1440 (05-287)	Secondary Air Injection System Control Valve Circuit Bank 1	• Open or short in VSV for air injection control circuit (Bank 1) • VSV power source • VSV for air injection control (Bank 1) • ECM	○	○
P1441 (05-290)	Secondary Air Injection System Switching Valve No.2 Bank 1 Stuck Open	• VSV for air injection control circuit (Bank 1) • Air switching valve No.2 (Bank 1) • VSV for air injection system (Bank 1) • ECM	○	○
P1442 (05-303)	Secondary Air Injection System Switching Valve No.2 Bank 1 Stuck Close	• VSV for air injection control circuit (Bank 1) • Vacuum hose (VSV for air injection control - air switching valve No.2) • Air injector pipe (Air switching valve No.2 - exhaust manifold) • Air switching valve No.2 (Bank 1) • VSV for air injection control (Bank 1) • ECM	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P1443 (05-287)	Secondary Air Injection System Control Valve Circuit Bank 2	<ul style="list-style-type: none"> • Open or short in VSV for air injection control circuit (Bank 2) • VSV power source • VSV for air injection control (Bank 2) • ECM 	○	○
P1444 (05-290)	Secondary Air Injection System Switching Valve No.2 Bank 2 Stuck Open	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 2) • Air switching valve No.2 (Bank 2) • VSV for air injection system (Bank 2) • ECM 	○	○
P1445 (05-303)	Secondary Air Injection System Switching Valve No.2 Bank 2 Stuck Close	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 2) • Vacuum hose (VSV for air injection control – air switching valve No.2) • Air injector pipe (Air switching valve No.2 – exhaust manifold) • Air switching valve No.2 (Bank 2) • VSV for air injection control (Bank 2) • ECM 	○	○
P1613 (05-312)	Secondary Air Injection System Driver	<ul style="list-style-type: none"> • Air injection driver (AID) • Open in air injection driver ground circuit • Open or short in diagnostic information signal circuit (AID – ECM) • Open or short in air pump and air switching valve command signal circuit (AID – ECM) • Open or short in AID power source circuit • ECM 	○	○
P2102 (05-322)	Throttle Actuator Control Motor Circuit Low	<ul style="list-style-type: none"> • Open in throttle control motor circuit • Throttle control motor • ECM 	○	○
P2103 (05-322)	Throttle Actuator Control Motor Circuit High	<ul style="list-style-type: none"> • Short in throttle control motor circuit • Throttle control motor • Throttle valve • Throttle body assembly • ECM 	○	○
P2111 (05-326)	Throttle Actuator Control System – Stuck Open	<ul style="list-style-type: none"> • Throttle control motor circuit • Throttle control motor • Throttle valve • Throttle body 	○	○
P2112 (05-326)	Throttle Actuator Control System – Stuck Closed	<ul style="list-style-type: none"> • Throttle control motor circuit • Throttle control motor • Throttle valve • Throttle body 	○	○
P2118 (05-329)	Throttle Actuator Control Motor Current Range/Performance	<ul style="list-style-type: none"> • Open in ETCS power source circuit • ETCS fuse • ECM 	○	○
P2119 (05-333)	Throttle Actuator Control Throttle Body Range/Performance	<ul style="list-style-type: none"> • Electric throttle control system • ECM 	○	○
P2120 (05-336)	Throttle/Pedal Position Sensor/ Switch "D" Circuit	<ul style="list-style-type: none"> • Accelerator pedal position sensor • ECM 	○	○
P2121 (05-344)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Range/Perfor- mance	<ul style="list-style-type: none"> • Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM 	○	○
P2122 (05-336)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Low Input	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in VCP1 circuit • VPA circuit open or ground short • ECM 	○	○
P2123 (05-336)	Throttle/Pedal Position Sensor/ Switch "D" Circuit High Input	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in EPA circuit • ECM 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P2125 (05-336)	Throttle/Pedal Position Sensor/ Switch "E" Circuit	<ul style="list-style-type: none"> • Accelerator pedal position sensor • ECM 	○	○
P2127 (05-336)	Throttle/Pedal Position Sensor/ Switch "E" Circuit Low Input	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in VCP2 circuit • VPA2 circuit open or ground short • ECM 	○	○
P2128 (05-336)	Throttle/Pedal Position Sensor/ Switch "E" Circuit High Input	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in EPA2 circuit • ECM 	○	○
P2135 (05-122)	Throttle Pedal Position Sensor/ Switch "A" / "B" Voltage Correlation	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • VTA1 and VTA2 circuits are short-circuited • ECM 	○	○
P2138 (05-336)	Throttle Pedal Position Sensor/ Switch "D" / "E" Voltage Correlation	<ul style="list-style-type: none"> • VPA and VPA2 circuits are short-circuited • Accelerator pedal position sensor • ECM 	○	○
P2195 (05-347)	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor (Sensor 1) heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • Air induction system • Fuel pressure • Injector • ECM 	○	○
P2196 (05-347)	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor (Sensor 1) heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • Air induction system • Fuel pressure • Injector • ECM 	○	○
P2197 (05-347)	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater (Sensor 1) • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • Air induction system • Fuel pressure • Injector • ECM 	○	○
P2198 (05-347)	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater (Sensor 1) • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • Air induction system • Fuel pressure • Injector • ECM 	○	○
P2238 (05-364)	Oxygen Sensor Pumping Current Circuit Low (For A/F Sensor) (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P2239 (05-364)	Oxygen Sensor Pumping Current Circuit High (For A/F Sensor) (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2241 (05-364)	Oxygen Sensor Pumping Current Circuit Low (For A/F Sensor) (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2242 (05-364)	Oxygen Sensor Pumping Current Circuit High (For A/F Sensor) (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2252 (05-364)	Oxygen Sensor Reference Ground Current Circuit Low (For A/F Sensor) (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2253 (05-364)	Oxygen Sensor Reference Current Circuit High (For A/F Sensor) (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2255 (05-364)	Oxygen Sensor Reference Ground Current Circuit Low (For A/F Sensor) (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2256 (05-364)	Oxygen Sensor Reference Current Circuit High (For A/F Sensor) (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F sensor heater relay • A/F sensor heater and A/F sensor heater relay circuits • ECM 	○	○
P2401 (05-371)	Evaporative Emission System Leak Detection Pump Control Circuit Low	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P2402 (05-371)	Evaporative Emission System Leak Detection Pump Control Circuit High	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P2419 (05-377)	Evaporate Emission System Switching Valve Control Circuit Low	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P2420 (05-377)	Evaporate Emission System Switching Valve Control Circuit High	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	○	○
P2430 (05-383)	Secondary Air Injection System Air Flow/Pressure Sensor Circuit Bank 1	<ul style="list-style-type: none"> • Pressure sensor • Open or short in pressure sensor circuit • ECM 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P2431 (05-383)	Secondary Air Injection System Air Flow/Pressure Sensor Circuit Range/Performance Bank 1	<ul style="list-style-type: none"> • Pressure sensor • Open or short in pressure sensor circuit • ECM 	○	○
P2432 (05-383)	Secondary Air Injection System Air Flow/Pressure Sensor Circuit Low Bank 1	<ul style="list-style-type: none"> • Pressure sensor • Open or short in pressure sensor circuit • ECM 	○	○
P2433 (05-383)	Secondary Air Injection System Air Flow/Pressure Sensor Circuit High Bank 1	<ul style="list-style-type: none"> • Pressure sensor • Open or short in pressure sensor circuit • ECM 	○	○
P2440 (05-290)	Secondary Air Injection System Switching Valve Stuck Open Bank 1	<ul style="list-style-type: none"> • Electromagnetic air switching valve • Air switching valve No.2 (Bank 1 and/or 2) • VSV for air injection system (Bank 1 and/or 2) • Air injection driver • Air injection driver circuit • ECM 	○	○
P2441 (05-303)	Secondary Air Injection System Switching Valve Stuck Close Bank 1	<ul style="list-style-type: none"> • Vacuum hoses (Throttle body - VSVs for air injection control) • Air switching valve • Air injector pipe (Air switching valve No.2 - exhaust manifold) • Air injection hose • Air switching valve No.2 (Bank 1 and/or 2) • VSV for air injection control (Bank 1 and/or 2) • Air injection driver • Air injection driver circuit • ECM 	○	○
P2444 (05-386)	Secondary Air Injection System Pump Stuck On Bank 1	<ul style="list-style-type: none"> • Short in air pump circuit • Pressure sensor • Air injection driver • Open or short in pressure sensor circuit • ECM 	○	○
P2445 (05-386)	Secondary Air Injection System Pump Stuck Off Bank 1	<ul style="list-style-type: none"> • Air pump fuse • Vacuum hose • Air pump assembly • Air injection driver • Open in air pump circuit • Air injection system piping • Pressure sensor • Open or short in pressure sensor circuit • ECM 	○	○
P2610 (05-397)	ECM/PCM Internal Engine Off Timer Performance	<ul style="list-style-type: none"> • ECM 	○	○
P2714 (05-1031)	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2716 (05-1036)	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2740 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2742 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit Low Input	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2743 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit High Input	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2757 (05-1043)	Torque Converter Clutch Pres- sure Control Solenoid Perfor- mance (Shift Solenoid Valve SLU)	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○

DTC No. (See Page)	Detection Item	Trouble Area	MIL*1	Memory
P2759 (05-1049)	Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2772 (05-1053)	Transfer L4 SW Circuit	<ul style="list-style-type: none"> • Electronic controlled automatic transmission (ECT) 	○	○
P2A00 (05-399)	A/F Sensor Circuit Slow Response (Bank 1 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • ECM 	○	○
P2A03 (05-399)	A/F Sensor Circuit Slow Response (Bank 2 Sensor 1)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • ECM 	○	○

*1 -: MIL does not illuminate, ○: MIL illuminates.

*2 MIL illuminates up or blinks.

-MEMO-

-MEMO-

DTC	P0010	CAMSHAFT POSITION "A" ACTUATOR CIRCUIT (BANK 1)
DTC	P0020	CAMSHAFT POSITION "A" ACTUATOR CIRCUIT (BANK 2)

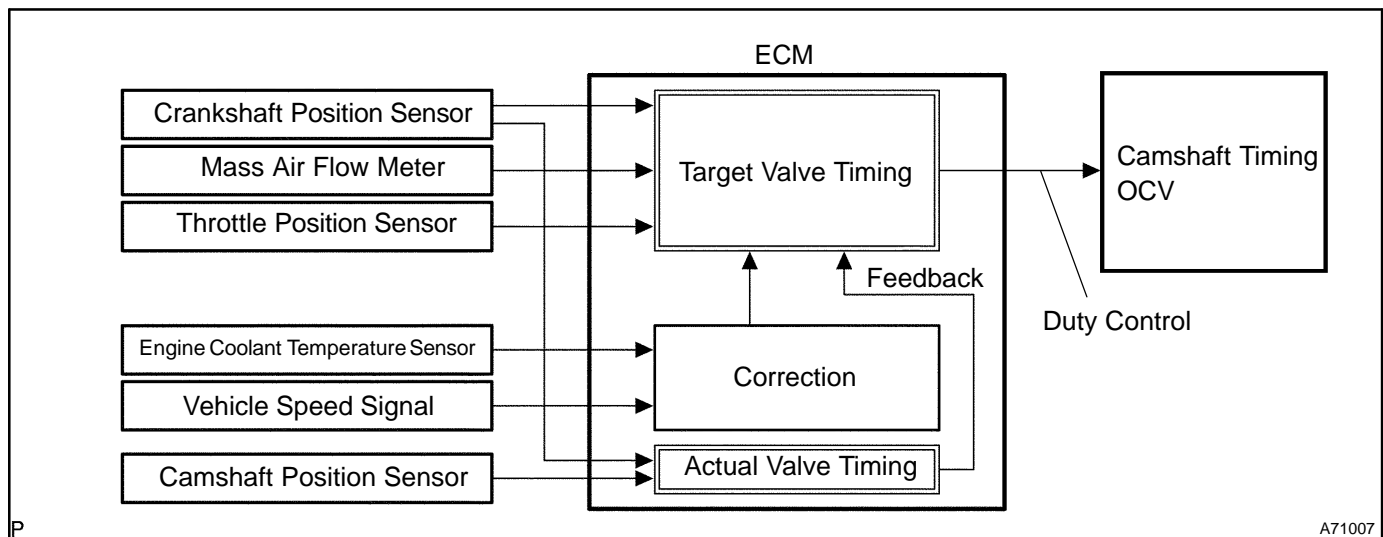
HINT:

These DTCs relates to the Oil Control Valve (OCV).

CIRCUIT DESCRIPTION

The Variable Valve Timing (VVT) system includes the ECM, OCV and VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed according to engine operating conditions such as the intake air volume, throttle valve position and engine coolant temperature.

The ECM controls the OCV, based on the signals transmitted by several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As a result, the relative positions of the camshaft and crankshaft are optimized, the engine torque and fuel economy improve, and the exhaust emissions decrease under overall driving conditions. The ECM detects the actual intake valve timing using signals from the camshaft and crankshaft position sensors, and performs feedback control. This is how the target intake valve timing is verified by the ECM.



DTC No.	DTC Detection Conditions	Trouble Areas
P0010	Open or short in OCV circuit (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in OCV circuit • OCV • ECM
P0020	Open or short in OCV circuit (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in OCV circuit • OCV • ECM

MONITOR DESCRIPTION

After the ECM sends the "target" duty-cycle signal to the OCV (Oil Control Valve), the ECM monitors the OCV current to establish an "actual" duty-cycle. When the actual duty-cycle ratio varies from the target duty-cycle, the ECM sets a DTC.

MONITOR STRATEGY

Related DTCs	P0010: VVT OCV (Bank 1) range check P0020: VVT OCV (Bank 2) range check
Required sensors/components (Main)	VVT OCV
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 to 13 V
Starter	OFF
OCV target duty ratio	70 % or less
OCV current cut status	Not cut

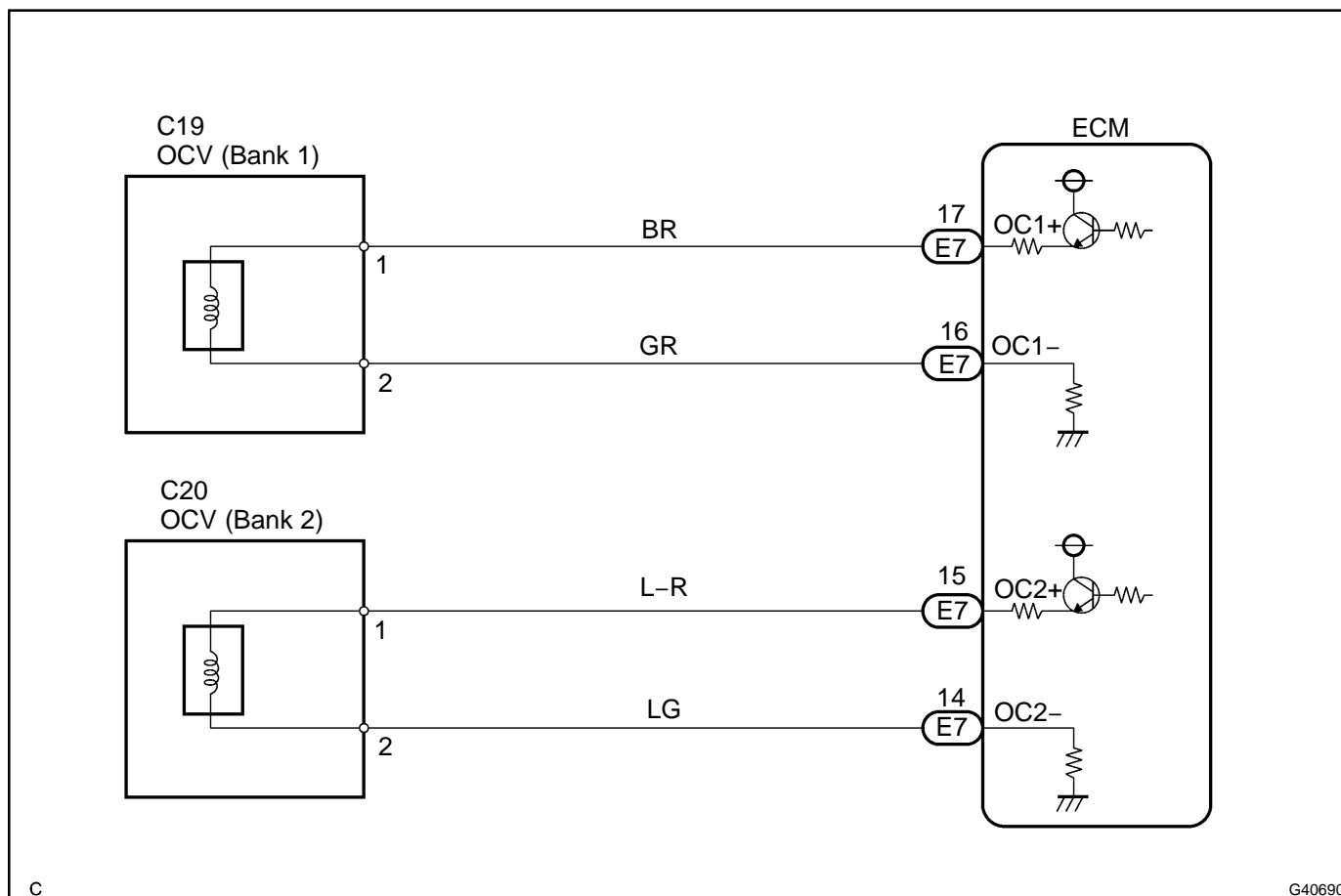
TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:	Condition 1 or 2
1. Output signal duty for OCV	Output duty ratio is 100% (always ON) but target duty ratio is less than 70%
2. Output signal duty for OCV	Output duty is 3% or less despite the ECM supplying current to the OCV

COMPONENT OPERATING RANGE

Output signal duty for OCV	"More than 3%" and "less than 100%"
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WIRING DIAGRAM



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G40690

INSPECTION PROCEDURE

HINT:

- If DTC P0010 is displayed, check the bank 1 VVT system circuit.
- Bank 1 refers to the bank that includes cylinder No.1.
- If DTC P0020 is displayed, check the bank 2 VVT system circuit.
- Bank 2 refers to the bank that does not include cylinder No.1.
- Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 PERFORM ACTIVE TEST USING HAND-HELD TESTER (OPERATE OCV)

- Connect the hand-held tester to the DLC3.
- Start the engine and turn the tester ON.
- Warm up the engine.
- On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT CTRL B1 or VVT CTRL B2.
- Check the engine speed while operating the Oil Control Valve (OCV) using the tester.

OK:

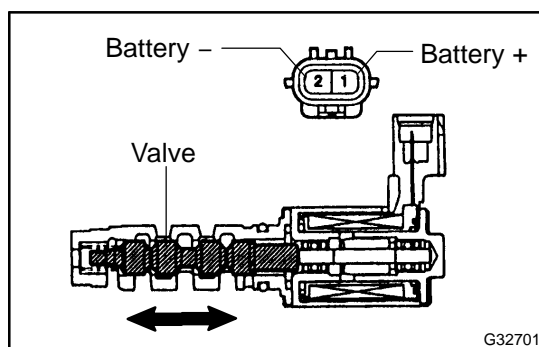
Tester Operations	Specified Conditions
OCV OFF	Normal engine speed
OCV ON	Engine idles roughly or stalls (soon after OCV switched from OFF to ON)

OK

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)

NG

2 INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY



- Start the engine and warmed it up.
- Disconnect the OCV connector.
- Apply battery positive voltage between the terminals of the OCV.
- Check the engine speed.

Standard:

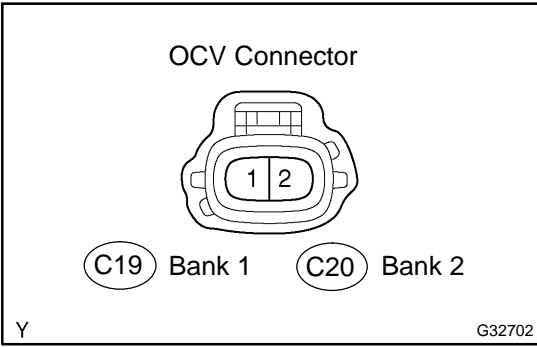
Rough idle or engine stalled.

NG

REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY

OK

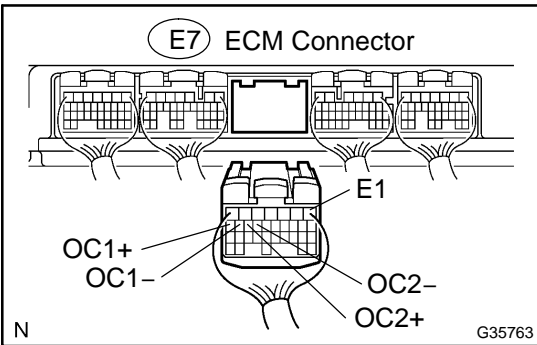
3 CHECK HARNESS AND CONNECTOR(OCV - ECM)



- (a) Disconnect the OCV connector.
- (b) Disconnect the E7 ECM connector.
- (c) Check for resistance between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
OCV (C19-1) - OC1+ (E7-17)	Below 1 Ω
OCV (C19-2) - OC1- (E7-16)	Below 1 Ω
OCV (C20-1) - OC2+ (E7-15)	Below 1 Ω
OCV (C20-2) - OC2- (E7-14)	Below 1 Ω



Standard (Check for short):

Symbols (Terminal No.)	Specified condition
OCV (C19-1) or OC1+ (E7-17) - E1 (E7-1)	10 kΩ or higher
OCV (C19-2) or OC1- (E7-16) - E1 (E7-1)	10 kΩ or higher
OCV (C20-1) or OC2+ (E7-15) - E1 (E7-1)	10 kΩ or higher
OCV (C20-2) or OC2- (E7-14) - E1 (E7-1)	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

-MEMO-

DTC	P0011	CAMSHAFT POSITION "A" - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1)
DTC	P0012	CAMSHAFT POSITION "A" - TIMING OVER-RETARDED (BANK 1)
DTC	P0021	CAMSHAFT POSITION "A" - TIMING OVER - ADVANCED OR SYSTEM PERFORMANCE (BANK 2)
DTC	P0022	CAMSHAFT POSITION "A" - TIMING OVER-RETARDED (BANK2)

CIRCUIT DESCRIPTION

Refer to DTCs P0010 on page [05-76](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0011 P0021	Advanced cam timing: After engine is warmed up and engine speed is at 400 to 4,000 rpm, condition (a) continues. (1 trip detection logic) (a) Valve timing does not change from current valve timing	<ul style="list-style-type: none"> • Valve timing • OCV • VVT controller assembly • ECM
P0012 P0022	Retarded cam timing: After engine is warmed up and engine speed is at 400 to 4,000 rpm, condition (a) continues. (2 trip detection logic) (a) Valve timing does not change from current valve timing	

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT (Variable Valve Timing) system to control the intake valve camshaft. The VVT system includes the ECM, the OCV (Oil Control Valve) and the VVT controller. The ECM sends a target "duty-cycle" control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake valve camshaft.

Example:

A DTC will set if: 1) the difference between the target and actual valve timing is more than 5 degrees of the crankshaft angle (CA) and the condition continues for more than 4.5 sec.; or 2) the OCV is forcibly activated 63 times or more.

Advanced cam DTCs are subject to "1 trip" detection logic.

Retarded cam DTCs are subject to "2 trip" detection logic.

MONITOR STRATEGY

Related DTCs	P0011: VVT system advance (Bank 1) P0012: VVT system retard (Bank 1) P0021: VVT system advance (Bank 2) P0022: VVT system retard (Bank 2)
Required sensors/ components (Main)	VVT OCV, VVT actuator
Required sensors/ components (Related)	ECT sensor, Camshaft position sensor, Crankshaft position sensor
Frequency of operation	Once per driving cycles
Duration	10 sec.
MIL operation	P0011, P0021: Immediate P0012, P0022: 2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 V or more
Throttle position learning	Completed
Engine RPM	400 to 4,000 rpm
ECT	75 to 100°C (167 to 212°F)

TYPICAL MALFUNCTION THRESHOLDS

Deviation of valve timing	More than 5°CA
OCV activation	63 times or more
Response of valve timing	1 second/°CA or more (valve timing does not change)

WIRING DIAGRAM

Refer to DTCs P0010 on page [05-76](#).

INSPECTION PROCEDURE

HINT:

- Bank 1 refers to bank that includes cylinder No. 1.
- Bank 2 refers to bank that does not include cylinder No. 1.
- If DTC P0011, P0012 is displayed, check the bank 1 VVT system.
- If DTC P0021, P0022 is displayed, check the bank 2 VVT system.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1 WHEN USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Start the engine and warm it up.
- (c) Turn the ignition switch to ON and turn the hand-held tester ON.
- (d) Select the item: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT CTRL B1 or VVT CTRL B2.
- (e) Using the hand-held tester, operate the OCV and check the engine speed.

Standard:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idle or engine stall

OK → **VVT SYSTEM OK**

HINT:

DTC P0011, P0012, P0021 or P0022 is also output when a foreign object is detected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign object, there is no problem on the VVT. There is also no problem on the VVT as the oil filter should catch the foreign object in the engine oil.

NG

2 CHECK VALVE TIMING (See page 14-115)

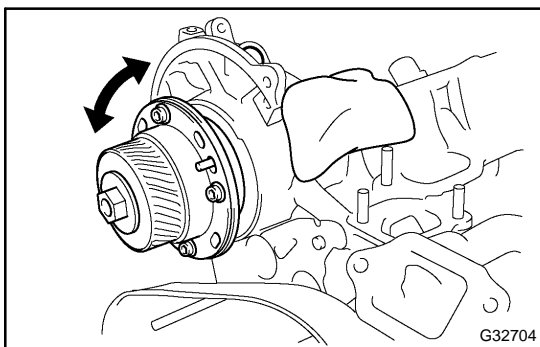
NG → **ADJUST VALVE TIMING**

OK

3 CHECK CAMSHAFT TIMING OIL CONTROL VALVE ASSY (OCV) (See page 10-3)

NG → **REPLACE OCV AND THEN GO TO STEP 5**

OK

4 CHECK CAMSHAFT TIMING GEAR ASSY

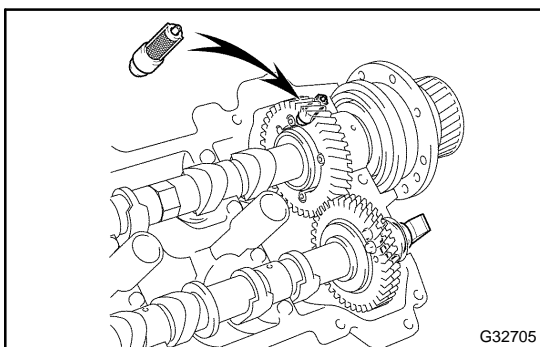
- (a) Remove the timing belt (See page 14-115).
- (b) Remove the cylinder head cover.
- (c) Remove the OCV (See page 14-35).
- (d) Drain the oil in the VVT controller assembly (See page 14-35).
- (e) Check whether the oil in VVT controller assembly is drained or not.

Standard:

The oil in VVT controller assembly is drained.

NG

REPLACE CAMSHAFT TIMING GEAR ASSY AND THEN GO TO NEXT STEP

OK**5 CHECK OIL CONTROL VALVE FILTER**

- (a) Remove the cylinder head cover.
- (b) Remove the camshaft bearing cap and OCV filter.
- (c) Check that the filter is not clogged.

OK:

The filter is not clogged.

NG

REPLACE OIL CONTROL VALVE FILTER

OK**6 CHECK WHETHER DTC OUTPUT RECURS**

- (a) Clear DTCs (See page 05-44).
- (b) Perform simulation test.
- (c) Check whether or not DTC P0011, P0012, P0021 or P0022 is stored (See page 05-60).

Standard:

DTC P0011, P0012, P0021 or P0022 is not stored.

OK

VVT SYSTEM OK

HINT:

DTC P0011, P0012, P0021 or P0022 is also output when a foreign object is detected in some parts of the system in the engine oil, and then the system returns to normal in a short time. As ECM is controlled to eject a foreign object, there is no problem on the VVT. There is also no problem on the VVT as the oil filter should catch the foreign object in the engine oil.

NG

REPLACE ECM (See page 10-16)

-MEMO-

DTC	P0016	CRANKSHAFT POSITION – CAMSHAFT POSITION CORRELATION (BANK 1 SENSOR A)
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DTC	P0018	CRANKSHAFT POSITION – CAMSHAFT POSITION CORRELATION (BANK 2 SENSOR A)
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CIRCUIT DESCRIPTION

VVT sensor (VVL or VVR signal) consist of a signal plate and pickup coil.

The VVL or VVR signal plate has 1 tooth on its outer circumference and is mounted on the intake camshafts. When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.

The actual camshaft angle is detected by the VVT sensor and it provides feedback to the ECM to control the intake valve timing in response to during condition.

DTC No.	DTC Detecting Condition	Trouble Area
P0016 P0018	No VVT sensor signal to ECM during cranking at 4 sec. or more	<ul style="list-style-type: none"> • Open or short in VVT sensor circuit • VVT sensor • ECM
	No VVT sensor signal to ECM with 5 sec. or more engine speed 600 rpm or more	
	While the crankshaft rotates twice, VVT sensor signal will be input to ECM 5 times	

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT (Variable Valve Timing) system to control the intake valve camshaft. The VVT system includes the ECM, the OCV (Oil Control Valve) and the VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake valve camshaft. The ECM calibrates the valve timing of the VVT system by setting the camshaft to the maximum retard angle when the engine is idle. The ECM closes the OCV to retard the cam. The ECM stores this value as VVT learning value (When the difference between the target valve timing and the actual valve timing is 5 degrees or less, the ECM stores this in its memory).

If the learning value meets both of the following conditions ((a) and (b)), the ECM interprets this as a defect in the VVT system and sets a DTC.

- (a) VVT learning value is less than 20°CA (Crankshaft Angle) or more than 39°CA.
- (b) Above condition continues for more than 18 sec.

MONITOR STRATEGY

Related DTCs	P0016: Deviation in crankshaft position sensor signal and camshaft position sensor signal (Bank 1) P0018: Deviation in crankshaft position sensor signal and camshaft position sensor signal (Bank 2)
Required sensors/ components (Main)	VVT actuator
Required sensors/ components (Related)	Camshaft position sensor, Crankshaft position sensor
Frequency of operation	Once per driving cycle
Duration	60 sec.
MIL operation	2 driving cycle
Sequence operation	None

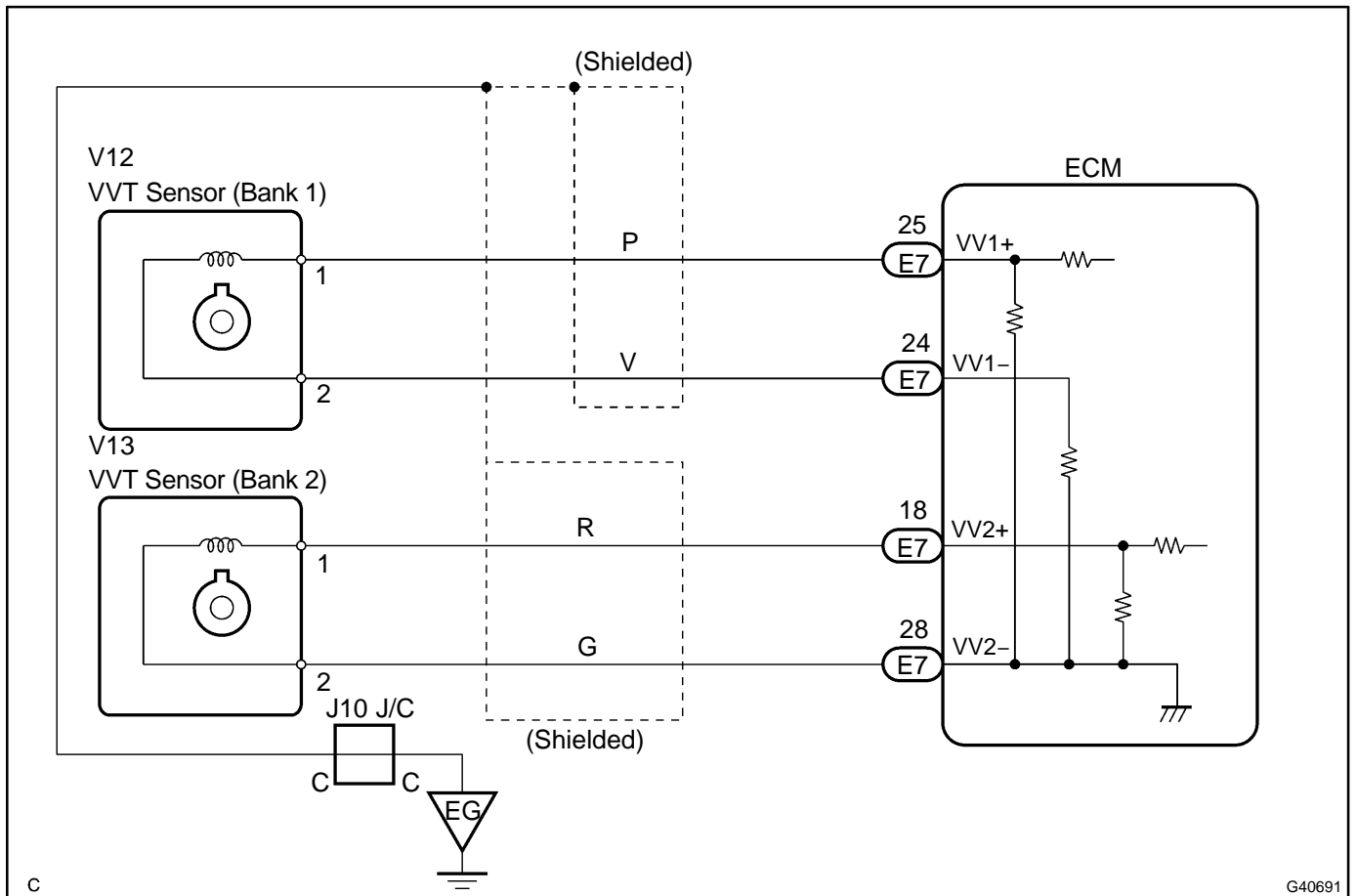
TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Engine RPM	400 to 1,400 rpm

TYPICAL MALFUNCTION THRESHOLDS

Duration that either of following condition 1 or 2 is set	18 sec. or more
1. VVT angle when camshaft is retarded maximum	Less than 20° CA
2. VVT angle when camshaft is retarded maximum	More than 39° CA

WIRING DIAGRAM



G40691

INSPECTION PROCEDURE

HINT:

- If DTC P0016 is displayed, check left bank VVT sensor.
- If DTC P0018 is displayed, check right bank VVT sensor.
- Read freeze frame data using hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	CHECK VALVE TIMING(CHECK FOR LOOSE AND JUMPING TEETH OF TIMING BELT) (See page 14-115)
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NG

ADJUST VALVE TIMING (See page 14-115)
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OK

REPLACE ECM (See page 10-16)

DTC	P0031	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1)
DTC	P0032	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1)
DTC	P0051	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT LOW (BANK 2 SENSOR 1)
DTC	P0052	OXYGEN (A/F) SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 2 SENSOR 1)

HINT:

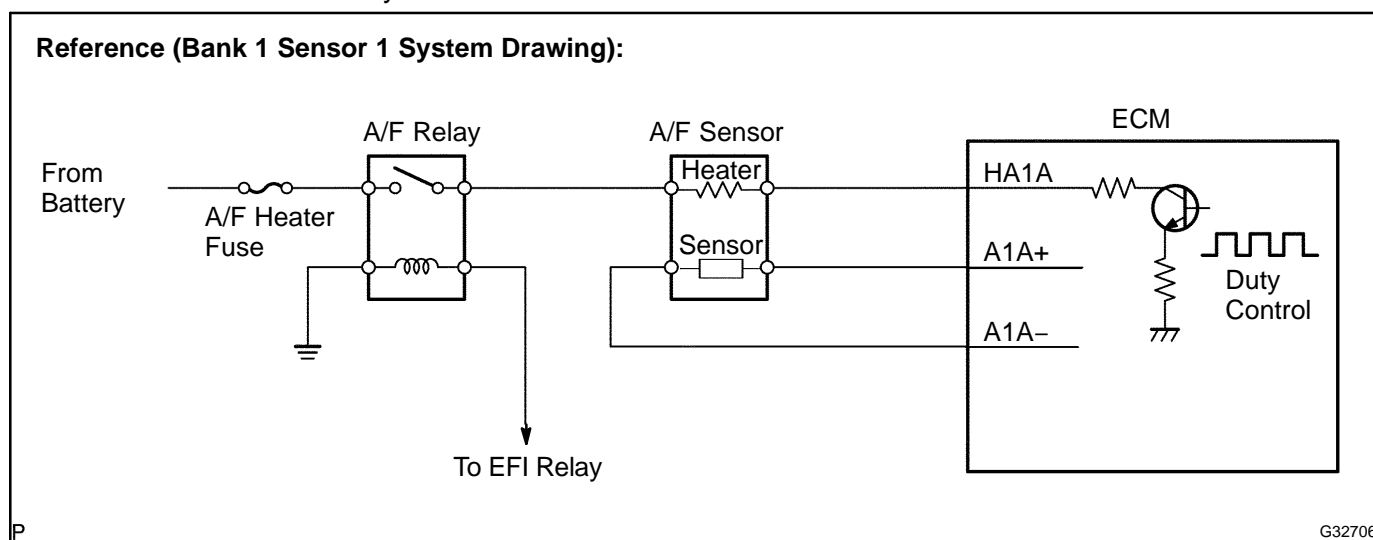
Although each DTC title (DTC description) says "oxygen sensor", these DTCs are related to the "A/F sensor".

CIRCUIT DESCRIPTION

Refer to DTC P2195 on page 05-347.

HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The A/F sensor heater circuit uses a relay on the B+ side of the circuit.



DTC No.	DTC Detection Condition	Trouble Area
P0031 P0051	Heated current is 0.8 A or less when heater operates (1 trip detection logic)	<ul style="list-style-type: none"> • Open in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM
P0032 P0052	When the heater operates, heated current exceeds 19.7 A (1 trip detection logic)	<ul style="list-style-type: none"> • Short in heater circuit of A/F sensor • A/F sensor heater • A/F sensor heater relay • ECM

HINT:

- Bank 1 refers to the bank that includes cylinder No.1.
- Bank 2 refers to the bank that does not include cylinder No.1.
- Sensor 1 refers to the closest sensor to the engine assembly.
- Sensor 2 refers to the farthest sensor from the engine assembly.

MONITOR DESCRIPTION

The ECM uses the Air-Fuel Ratio sensor (A/F sensor) information to regulate the air-fuel ratio close to the stoichiometric ratio. This maximizes the catalytic converter's ability to purify exhaust gases. The sensor detects oxygen levels in the exhaust gas and sends this signal to the ECM.

The inner surface of the sensor element is exposed to outside air. The outer surface of the sensor element is exposed to exhaust gas. The sensor element is made of platinum coated zirconia and includes an integrated heating element. The zirconia element generates a small voltage when there is a large difference in the oxygen concentrations of the exhaust and the outside air. The platinum coating amplifies the voltage generation. When heated, the sensor becomes very efficient. If the temperature of the exhaust is low, the sensor will not generate useful voltage signals without supplemental heating. The ECM regulates the supplemental heating using a duty-cycle approach to regulate the average current in the heater element. If the heater current is out of the normal range, the sensor's output signals will be inaccurate and the ECM can not regulate the air-fuel ratio properly.

When the heater current is out of the normal operating range, the ECM interprets this as a malfunction and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0031: A/F sensor heater (Bank 1) range check (Low current) P0032: A/F sensor heater (Bank 1) range check (High current) P0051: A/F sensor heater (Bank 2) range check (Low current) P0052: A/F sensor heater (Bank 2) range check (High current)
Required sensors/ components (Main)	A/F sensor heater
Required sensors/ components (Related)	-
Frequency of Operation	Continuous
Duration	10 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS**All:**

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

P0031, P0051 (Low current):

Battery voltage	10.5 V or more
A/F sensor heater duty ratio	50% or more
Time after engine start	10 sec. or more

P0032, P0052 (High current):

Time after engine start	10 sec. or more
-------------------------	-----------------

TYPICAL MALFUNCTION THRESHOLDS**P0031, P0051 (Low current):**

A/F sensor heater current	Less than 0.8 A
---------------------------	-----------------

P0032, P0052 (High current):

A/F sensor heater current	More than 10 A
---------------------------	----------------

COMPONENT OPERATING RANGE

A/F sensor heater current	1.8 to 3.4 A at 20°C (68°F)
---------------------------	-----------------------------

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (See page 05-29).

- TID (Test Identification Data) is assigned to each emissions-related component.
- TLT (Test Limit Type):
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- CID (Component Identification Data) is assigned to each test value.
- Unit Conversion is used to calculate the test value indicated on generic OBD II scan tools.

WIRING DIAGRAM

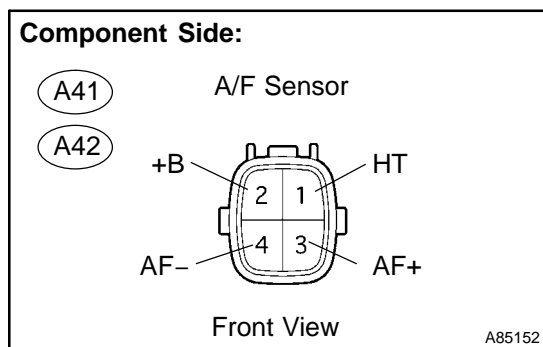
Refer to DTC P2195 on page 05-347.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 INSPECT A/F SENSOR(HEATER RESISTANCE)



- Disconnect the A41 or A42 air-fuel ratio (A/F) sensor connector.
- Measure resistance between the terminals of the A/F sensor connector.

Standard:

Tester Connection	Specified Condition
HT (1) - +B (2)	1.8 Ω to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 k Ω or higher

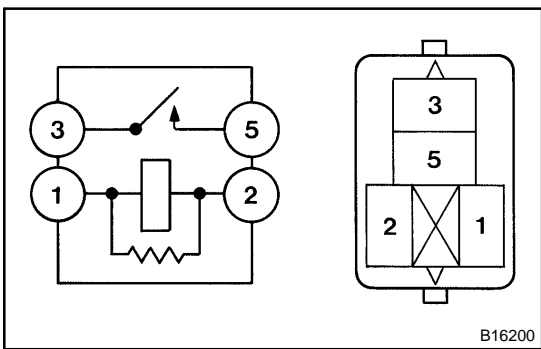
- Reconnect the A/F sensor connector.

NG

REPLACE A/F SENSOR

OK

2 INSPECT AIR FUEL RATIO SENSOR HEATER RELAY



- (a) Remove the A/F sensor heater relay from the engine room R/B.
- (b) Inspect the A/F sensor heater relay.

Standard:

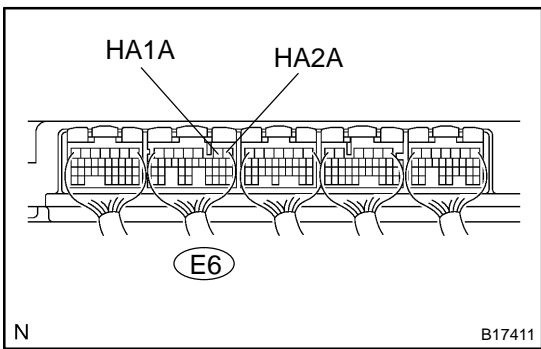
Terminal No.	Condition	Specified Condition
3 - 5	Always	10 KΩ or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

- (c) Reinstall the A/F sensor heater relay.

NG → **REPLACE AIR FUEL RATIO SENSOR HEATER RELAY**

OK

3 INSPECT ECM(HA1A OR HA2A VOLTAGE)



- (a) Turn the ignition switch ON.
- (b) Measure the voltage between terminals of the ECM connectors and body ground.

HINT:

- Connect terminal HA1A to the bank 1 sensor 1.
- Connect terminal HA2A to the bank 2 sensor 1.

Standard:

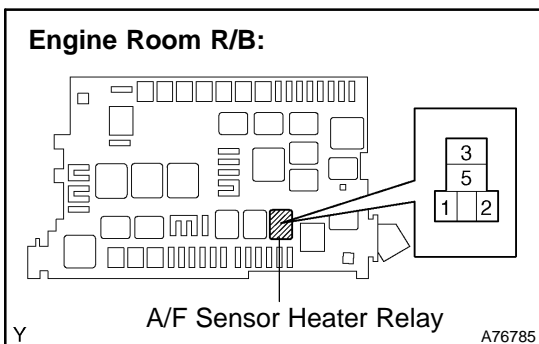
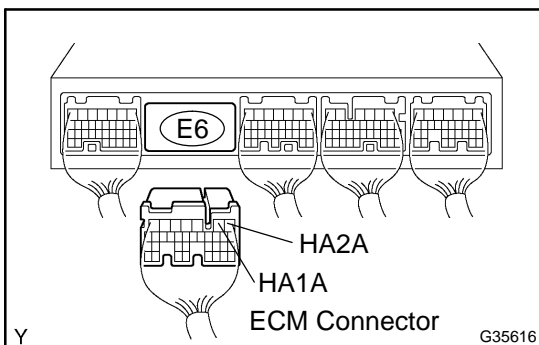
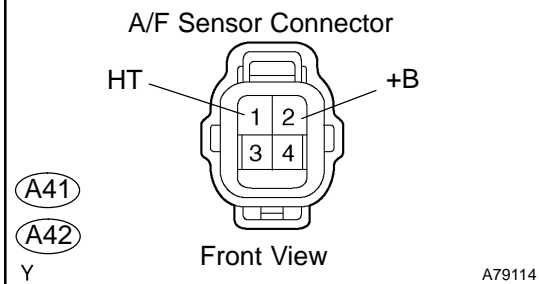
Tester Connection	Specified Condition
HA1A (E6-2) - Body ground	9 V to 14 V
HA2A (E6-1) - Body ground	9 V to 14 V

OK → **REPLACE ECM (See page 10-16)**

NG

4 CHECK HARNESS AND CONNECTOR(ECM - A/F SENSOR)

Wire Harness Side:



- (a) Check the harness and the connector between the ECM and the A/F sensor.
- (1) Turn the ignition switch to OFF.
 - (2) Disconnect the A41 or A42 A/F sensor connector.
 - (3) Disconnect the E6 ECM connector.

Check the resistance.

Standard (Check for open):

Tester Connections	Specified Conditions
HT (A41-1) - HA1A (E6-2) HT (A42-1) - HA2A (E6-1)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
HT (A41-1) or HA1A (E6-2) - Body ground HT (A42-1) or HA2A (E6-1) - Body ground	10 k Ω or higher

- (1) Reconnect the A/F sensor connector.
 - (2) Reconnect the ECM connector.
- (b) Check the harness and the connector between the A/F sensor and A/F sensor heater relay.
- (1) Turn the ignition switch to OFF.
 - (2) Disconnect the A41 or A42 A/F sensor connector.
 - (3) Remove A/F relay from engine room R/B.

Check the resistance.

Standard (Check for open):

Tester Connections	Specified Conditions
+B (A41-2) - A/F relay (3) +B (A42-2) - A/F relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
+B (A41-2) or A/F relay (3) - Body ground +B (A42-2) or A/F relay (3) - Body ground	10 k Ω or higher

- (1) Reconnect the A/F sensor connector.
- (2) Reinstall the A/F sensor heater relay.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

DTC	P0037	OXYGEN SENSOR HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2)
DTC	P0038	OXYGEN SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2)
DTC	P0057	OXYGEN SENSOR HEATER CONTROL CIRCUIT LOW (BANK 2 SENSOR 2)
DTC	P0058	OXYGEN SENSOR HEATER CONTROL CIRCUIT HIGH (BANK 2 SENSOR 2)

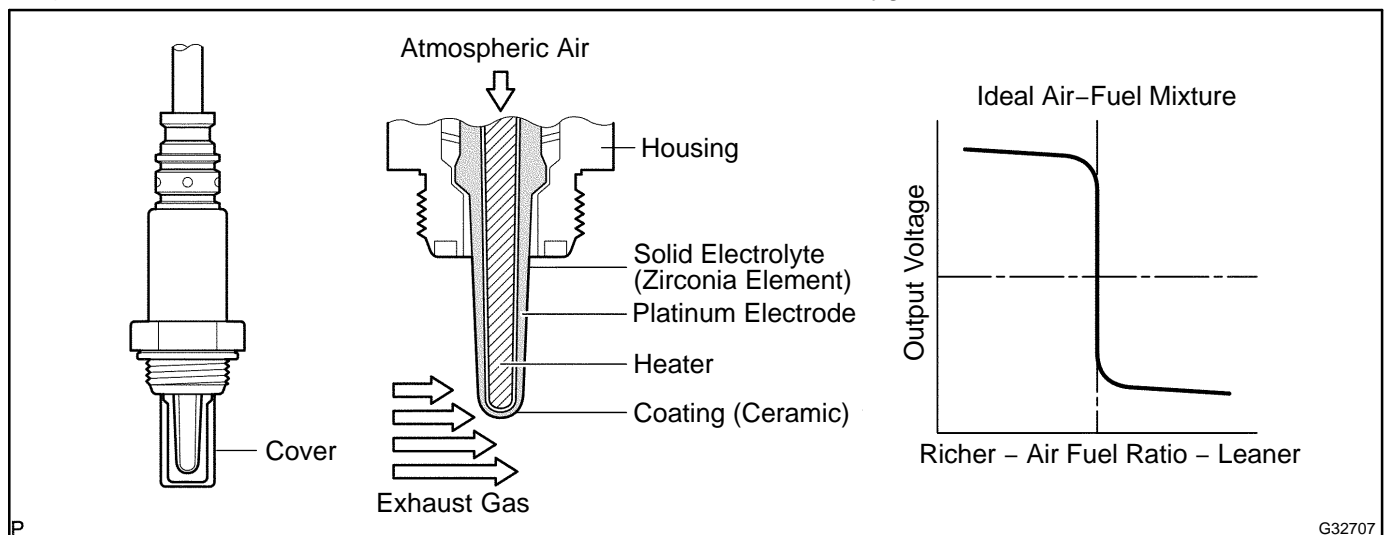
CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NO_x components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio.

The heated oxygen sensor has the characteristic which its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide the ECM with feedback to control the air-fuel ratio.

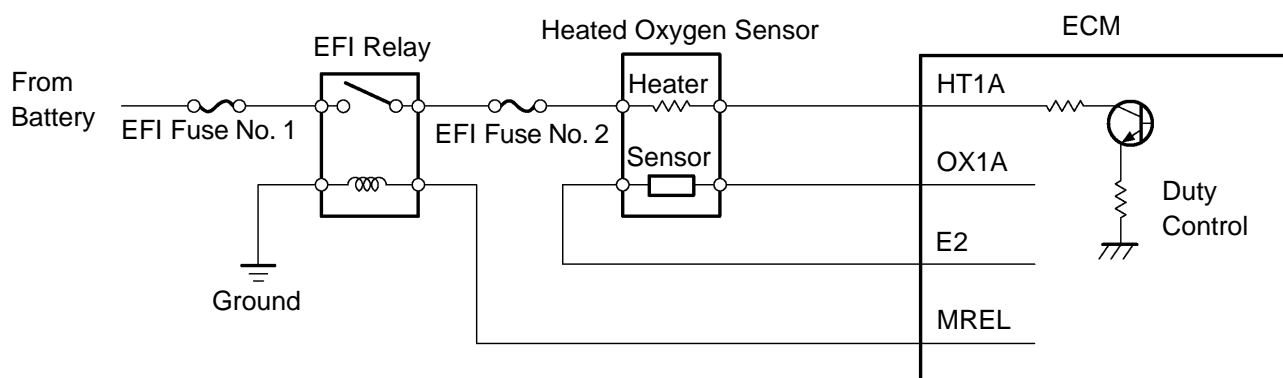
When the air-fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the heated oxygen sensor informs the ECM of the LEAN condition (low voltage, i.e. less than 0.45 V).

When the air-fuel ratio is RICHER than the stoichiometric air-fuel ratio, the oxygen concentration in the exhaust gas is reduced and the heated oxygen sensor informs the ECM of the RICH condition (high voltage, i.e. more than 0.45 V). The ECM judges by the voltage output from the heated oxygen sensor whether the air-fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the heated oxygen sensor causes output of abnormal voltage, this disables the ECM for performing an accurate air-fuel ratio control. The heated oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



HINT:

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the B+ side of the circuit.

Reference (Bank 1 Sensor 1 System Drawing) :

Y

G32708

DTC No.	DTC Detecting Condition	Trouble Area
P0037 P0057	Heater current is 0.25 A or less when the heater operates with more than 10.5 V positive battery voltage	<ul style="list-style-type: none"> • Open in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM
P0038 P0058	When heater operates, heater current exceeds 2.0 A	<ul style="list-style-type: none"> • Short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • EFI relay • ECM

HINT:

- Bank 1 refers to bank that includes cylinder No. 1.
- Bank 2 refers to bank that does not include cylinder No. 1.
- Sensor 1 refers to the sensor closer to the engine assembly.
- Sensor 2 refers to the sensor farther away from the engine assembly.

MONITOR DESCRIPTION

The sensing portion of the heated oxygen sensor has a zirconia element which is used to detect oxygen concentration in the exhaust. If the zirconia element is at the proper temperature and difference of the oxygen concentration between the inside and outside surface of sensor is large, the zirconia element will generate voltage signals. In order to increase the oxygen concentration detecting capacity in the zirconia element, the ECM supplements the heat from the exhaust with heat from a heating element inside the sensor. When current in the sensor is out of the standard operating range, the ECM interprets this as a fault in the heated oxygen sensor and sets a DTC.

Example:

The ECM will set a high current DTC if the current in the sensor is more than 2.0 A when the heater is OFF. Similarly, the ECM will set a low current DTC if the current is less than 0.3 A when the heater is ON.

MONITOR STRATEGY

Related DTCs	P0037: Rear HO2S heater (Bank 1) range check (Low Current) P0038: Rear HO2S heater (Bank 1) range check (High Current) P0057: Rear HO2S heater (Bank 2) range check (Low Current) P0058: Rear HO2S heater (Bank 2) range check (High Current)
Required sensors/ components (Main)	HO2S heater
Required sensors/ components (Related)	Vehicle speed sensor (VSS)
Frequency of Operation	Continuous
Duration	0.3 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

P0037, P0057 (Low current):

Battery voltage	10.5 V or more
All heater is turned OFF and intrusive heating is operated when the following conditions are met	Conditions (a) and (b)
(a) Heater	ON
(b) Heater current	Less than 0.3 A

P0038, P0058 (High current):

Case 1:

Battery voltage	10.5 V or more
Engine	Running
Starter	OFF
Intrusive heating	Not operating

Case 2:

Battery voltage	10.5 V or more
All heater is turned OFF and intrusive heating is operated when the following conditions are met	Conditions (a) and (b)
(a) Heater	ON
(b) Heater current	2 A or more

TYPICAL MALFUNCTION THRESHOLDS

P0037, P0057 (Low current):

HO2S heater current during intrusive heating	Less than 0.3 A (when battery voltage is 10.5 V or more)
--	--

P0038, P0058 (High current):

Case 1:

HO2S heater current	2 A or more
---------------------	-------------

Case 2:

HO2S heater current during intrusive heating	More than 2 A
--	---------------

COMPONENT OPERATING RANGE

HO2S heater current	0.4 to 1 A (at idle, warmed-up engine and +B: 11 to 14 V)
---------------------	---

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

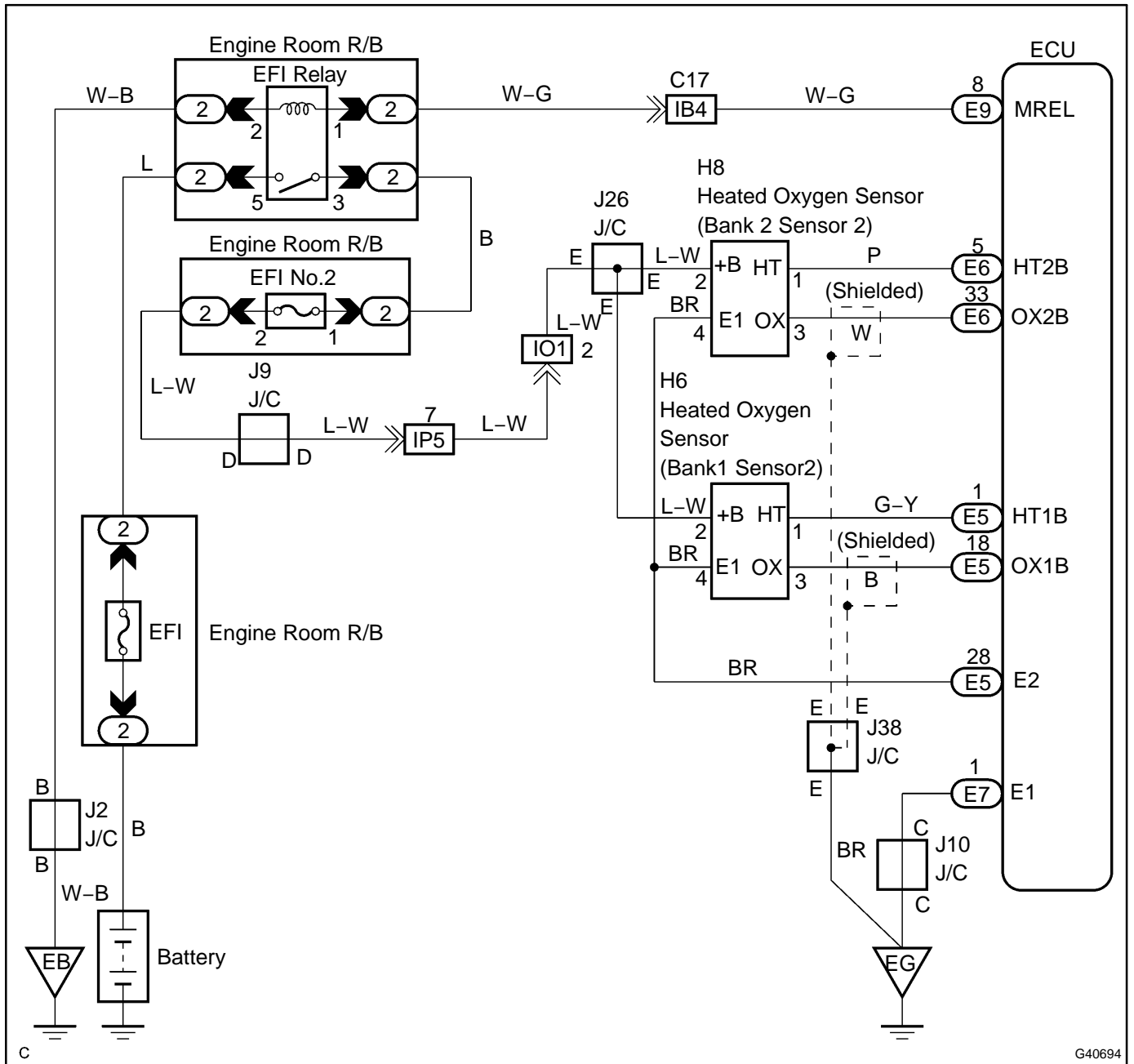
HO2S heater bank 1 sensor 2

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$42	\$90	Multiply by 0.001 (A)	Maximum sensor heater current	Minimum test limit	Maximum test limit

HO2S heater bank 2 sensor 2

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$46	\$90	Multiply by 0.001 (A)	Maximum sensor heater current	Minimum test limit	Maximum test limit

WIRING DIAGRAM

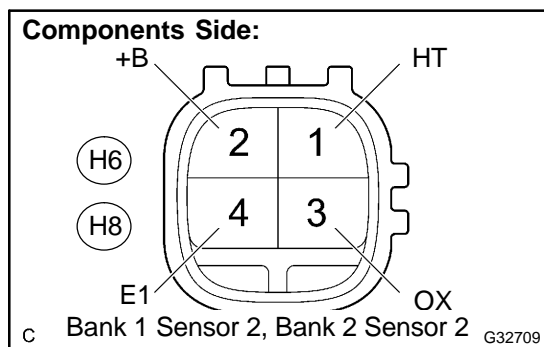


INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand-held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. when a malfunction occurred.

1 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



- Disconnect the H6 or H8 heated oxygen sensor connector.
- Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard (Bank 1, 2 sensor 2):

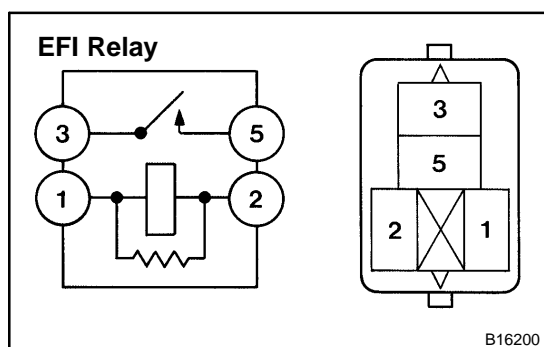
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20 °C (68 °F)
1 (HT) - 4 (E1)	10 k Ω or higher

- Reconnect the heated oxygen sensor connector.

NG → REPLACE HEATED OXYGEN SENSOR

OK

2 INSPECT EFI RELAY



- Remove the EFI relay from the engine room R/B.
- Inspect the EFI relay.

Standard:

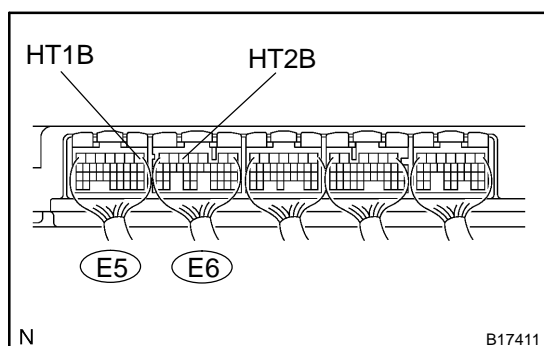
Terminal No.	Condition	Specified Condition
3 - 5	Always	10 K Ω or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

- Reinstall the EFI relay.

NG → REPLACE EFI RELAY

OK

3 INSPECT ECM(HT1B OR HT2B VOLTAGE)



- Turn the ignition switch ON.
- Measure the voltage between terminals of the ECM connectors and body ground.

HINT:

- Connect terminal HT1B to the bank 1 sensor 2.
- Connect terminal HT2B to the bank 2 sensor 2.

Standard:

Tester Connection	Specified Condition
HT1B (E5-1) - Body ground	9 to 14 V
HT2B (E6-5) - Body ground	9 to 14 V

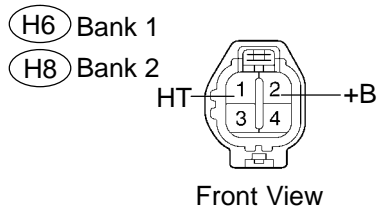
OK → REPLACE ECM (See page 10-16)

NG

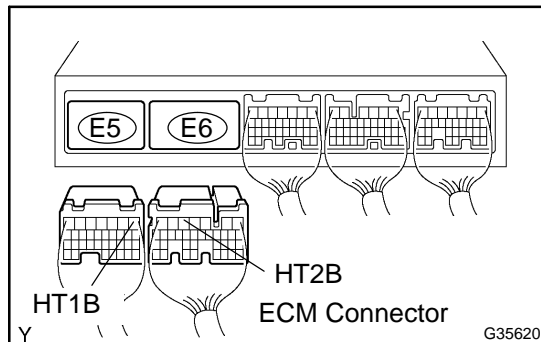
4 CHECK HARNESS AND CONNECTOR(HEATED OXYGEN SENSOR - ECM, HEATED OXYGEN SENSOR - EFI RELAY)

Wire Harness Side:

Heated Oxygen Sensor Connector

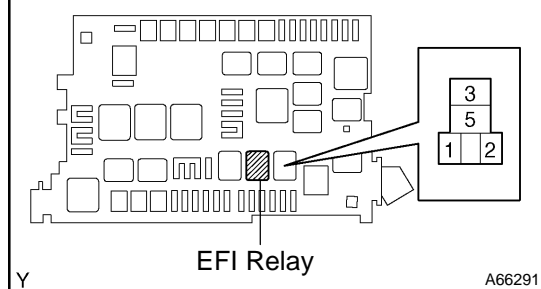


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Engine Room R/B:



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- (a) Check the harness and connector between the ECM and heated oxygen sensor.
- (1) Turn the ignition switch to OFF.
 - (2) Disconnect the H6 or H8 heated oxygen sensor connector.
 - (3) Disconnect the E5 and E6 ECM connector.
 - (4) Check the resistance.

Standard (Check for open):

Tester Connections	Specified Conditions
HT (H6-1) - HT1B (E5-1)	Below 1 Ω
HT (H8-1) - HT2B (E6-5)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
HT (H6-1) or HT1B (E5-1) - Body ground	10 k Ω or higher
HT (H8-1) or HT2B (E6-5) - Body ground	10 k Ω or higher

- (5) Reconnect the heated oxygen sensor connector.
 - (6) Reconnect the ECM connector.
- (b) Check the harness and connector between the heated oxygen sensor and EFI relay.
- (1) Turn the ignition switch to OFF.
 - (2) Disconnect the H6 or H8 heated oxygen sensor connector.
 - (3) Remove EFI relay from engine room R/B.
 - (4) Check the resistance.

Standard (Check for open):

Tester Connections	Specified Conditions
+B (H6-2) - EFI relay (3) +B (H8-2) - EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
+B (H6-2) or EFI relay (3) - Body ground +B (H8-2) or EFI relay (3) - Body ground	10 k Ω or higher

- (5) Reconnect the heated oxygen sensor connector.
- (6) Reinstall the EFI relay.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

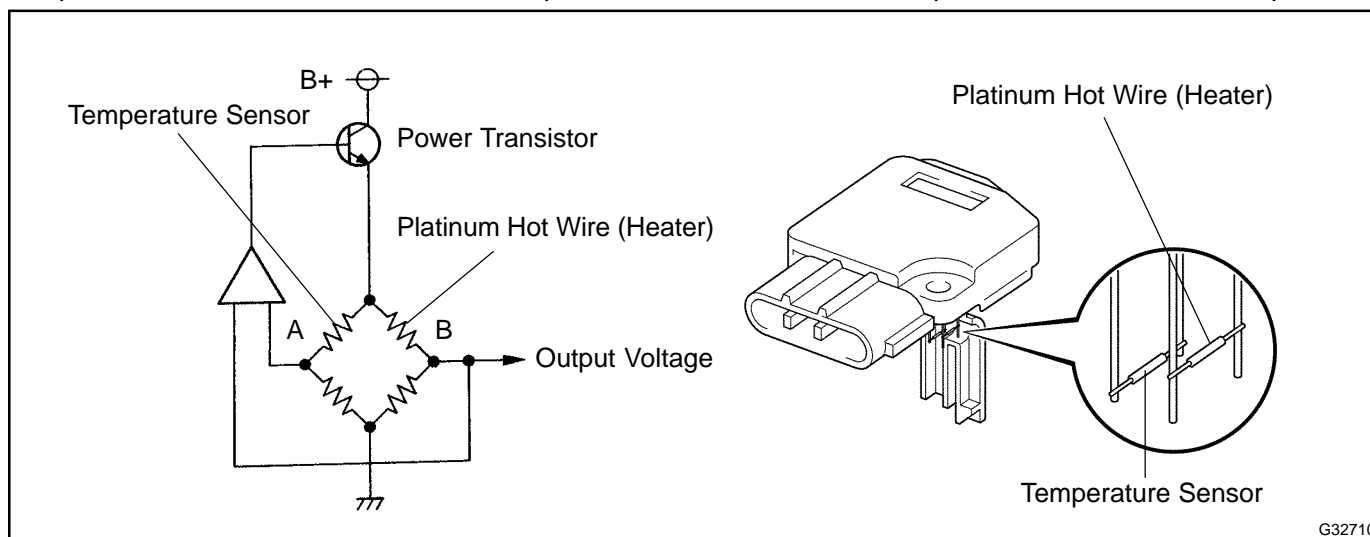
DTC	P0100	MASS OR VOLUME AIR FLOW CIRCUIT
DTC	P0102	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT
DTC	P0103	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The MAF (Mass Air Flow) meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provide a proper air-fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the flow of the air passing through the sensor. The ECM interprets this voltage as the intake air amount.

The circuit is constructed so that the platinum hot wire and temperature sensor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



G32710

DTC No.	DTC Detection Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with more than 3 seconds engine speed 4,000 rpm or less	<ul style="list-style-type: none"> • Open or short in mass air flow meter circuit • Mass air flow meter • ECM
P0102	Open or short in mass air flow meter circuit with more than 3 seconds engine speed 4,000 rpm or less	<ul style="list-style-type: none"> • Open in mass air flow meter circuit • Short in ground circuit • Mass air flow meter • ECM
P0103	Open in mass air flow meter circuit with more than 3 seconds (E2G circuit) engine speed 4,000 rpm or less Short in mass air flow meter circuit with more than 3 seconds (+B circuit) engine speed 4,000 rpm or less	<ul style="list-style-type: none"> • Open in mass air flow meter circuit (E2G circuit) • Short in mass air flow meter circuit (+B circuit) • Mass air flow meter • ECM

HINT:

After confirming DTC P0100, P0102 or P0103, use the hand-held tester or the OBD II scan tool to confirm the mass air flow ratio from the DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL.

Air Flow Value (gm/s)	Malfunction
Approximately 0.0	<ul style="list-style-type: none"> • Mass air flow meter power source circuit open • VG circuit open or short
271.0 or more	<ul style="list-style-type: none"> • E2G circuit open

MONITOR DESCRIPTION

If there is a defect in the MAF (Mass Air Flow) meter or an open or short circuit, the voltage level will deviate outside the normal operation range. The ECM interprets this deviation as a defect in the MAF meter and sets a DTC.

Example:

When the MAF meter voltage output is less than 0.2 V, or more than 4.9 V, and if either the condition continues for more than 3 sec.

MONITOR STRATEGY

Related DTCs	P0100: Mass air flow meter circuit range check (Fluttering) P0102: Mass air flow meter circuit range check (Low voltage) P0103: Mass air flow meter circuit range check (High voltage)
Required sensors/ components (Main)	Mass air flow meter
Required sensors/ components (Related)	Crankshaft position sensor
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	Immediate (When engine speed is at less than 4,000 rpm) 2 driving cycles (When engine speed is at 4,000 rpm or more)
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
The typical enabling condition is not available	-

TYPICAL MALFUNCTION THRESHOLDS**P0100:**

Mass air flow meter voltage	Less than 0.2 V, or more than 4.9 V
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P0102:

Mass air flow meter voltage	Less than 0.2 V
-----------------------------	-----------------

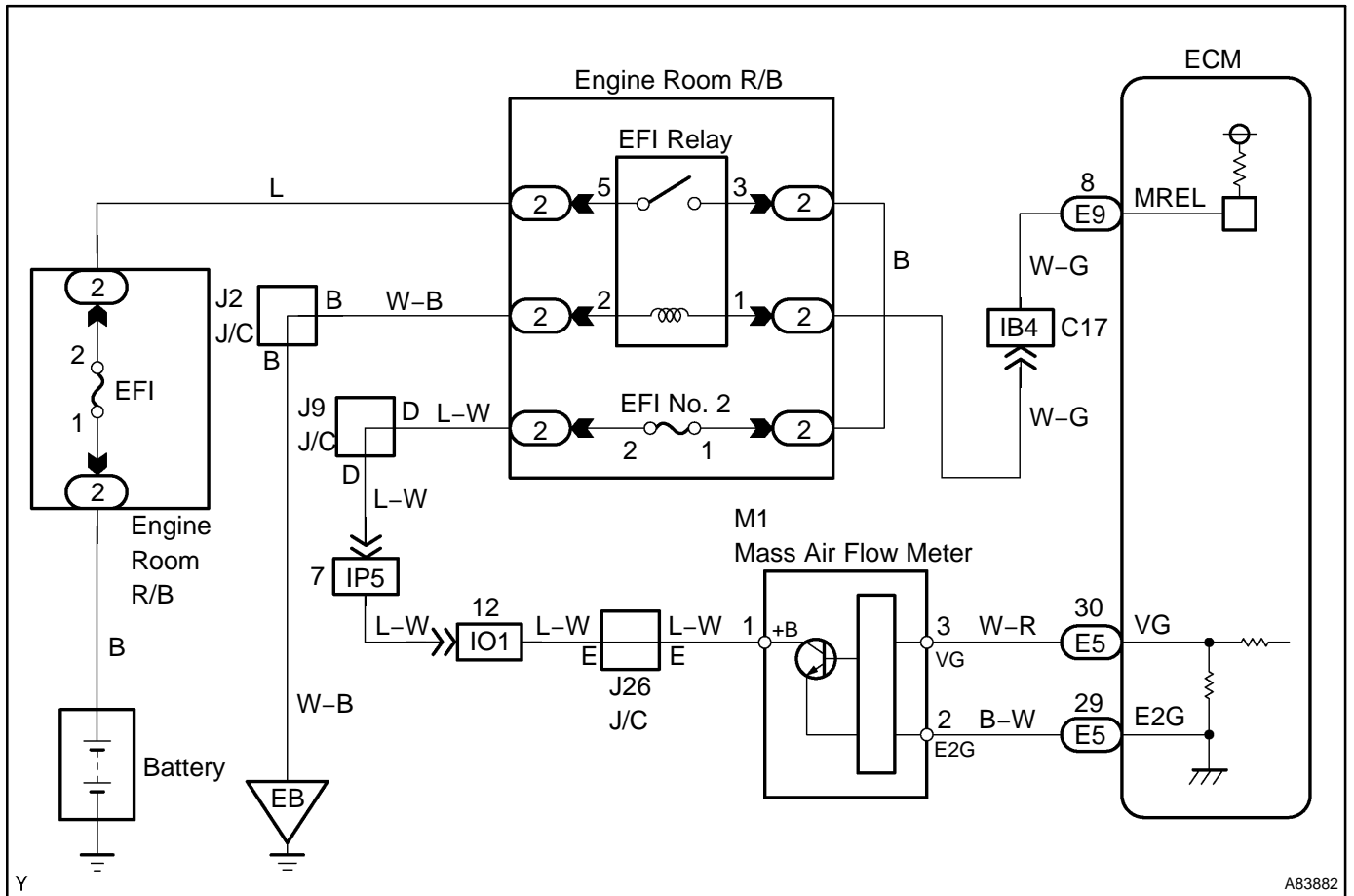
P0103:

Mass air flow meter voltage	More than 4.9 V
-----------------------------	-----------------

COMPONENT OPERATING RANGE

Mass air flow meter voltage	0.4 to 2.2 V
-----------------------------	--------------

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER(MASS AIR FLOW RATE)

- (a) Connect the hand-held tester to the DLC3.
- (b) Start the engine.
- (c) Turn the hand-held tester ON.
- (d) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.
- (e) Read the values.

Result:

Air Flow Rate (gm/s)	Proceed to
0.0	A
271.0 or more	B
Between 1.0 and 270.0 (*1)	C

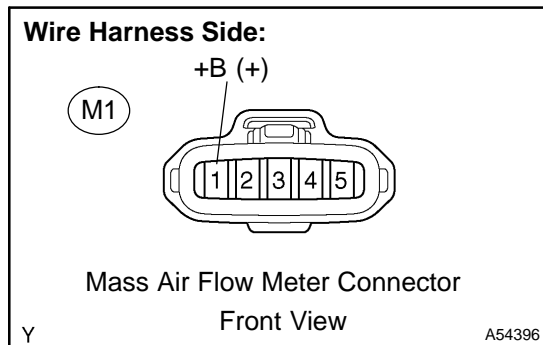
*1: The value must be changed when the throttle valve is opened or closed.

B Go to step 6

C CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)

A

2 INSPECT MASS AIR FLOW METER(POWER SOURCE)



- (a) Turn the ignition switch to the ON position.
- (b) Disconnect the mass air flow meter connector.
- (c) Measure the voltage between the terminal of the wire harness side connector and body ground.

Standard:

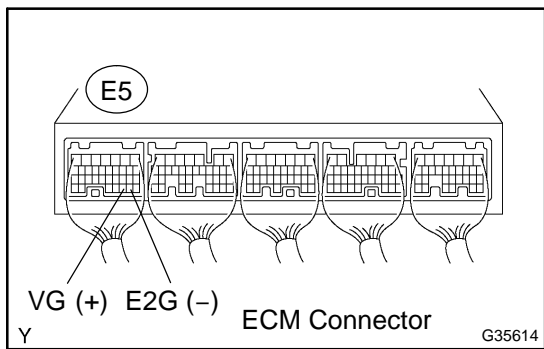
Tester Connection	Specified Condition
+B (M1-1) - Body ground	9 to 14 V

- (d) Reconnect the mass air flow meter connector.

NG Go to step 5

OK

3 INSPECT ECM(VG VOLTAGE)



- (a) Start the engine.
- (b) Measure the voltage between the specified terminals of the E5 ECM connector.

HINT:

The shift position should be P or N and the A/C switch should be turned OFF.

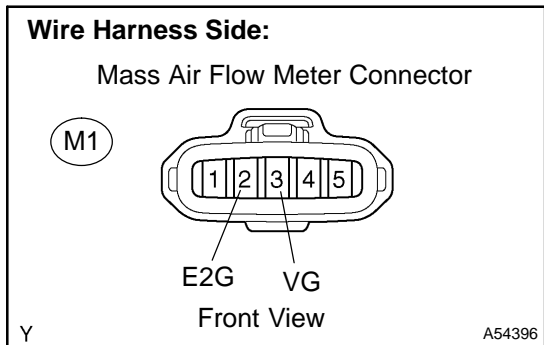
Standard:

Tester Connection	Condition	Specified Condition
VG (E5-30) - E2G (E5-29)	Engine is idling	0.5 to 3.0 V

OK → **REPLACE ECM (See page 10-16)**

NG

4 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



- (a) Disconnect the M1 mass air flow meter connector.
- (b) Disconnect the E5 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

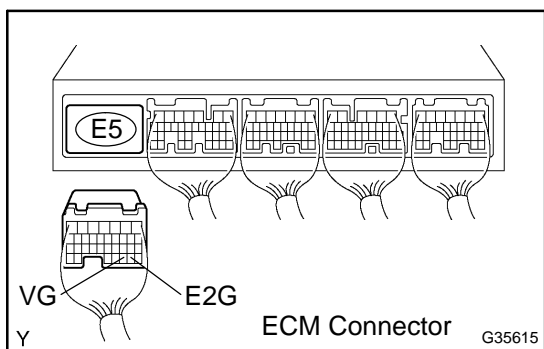
Standard (Check for open):

Tester Connection	Specified Condition
VG (M1-3) - VG (E5-30)	Below 1 Ω
E2G (M1-2) - E2G (E5-29)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (M1-3) or VG (E5-30) - Body ground	10 kΩ or higher

- (d) Reconnect the mass air flow meter connector.
- (e) Reconnect the ECM connector.

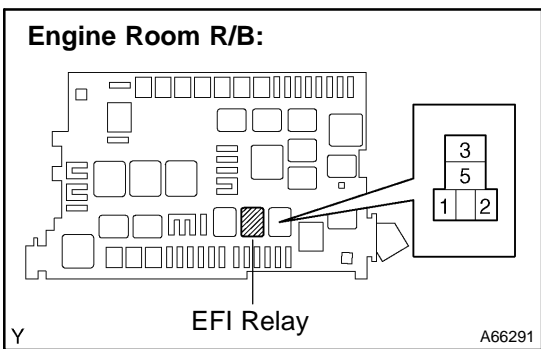
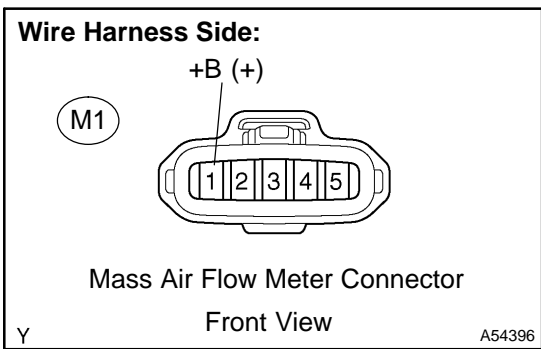


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

5 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - EFI RELAY)



- (a) Inspect the EFI No.2 fuse.
 - (1) Remove the EFI No.2 fuse from the engine room R/B.
 - (2) Check for continuity in the EFI No.2 fuse.
Standard: Continuity
 - (3) Reinstall the EFI No. 2 fuse.
- (b) Disconnect the M1 mass air flow meter connector.
- (c) Remove the EFI relay from the engine room R/B.
- (d) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
+B (M1-1) - Engine room R/B (EFI relay terminal 3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (M1-1) or Engine room R/B (EFI relay terminal 3) - Body ground	10 kΩ or higher

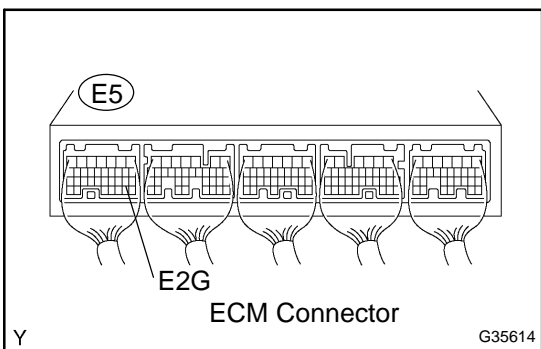
- (e) Reconnect the mass air flow meter connector.
- (f) Reinstall the EFI relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05-442)

6 INSPECT ECM(SENSOR GROUND)



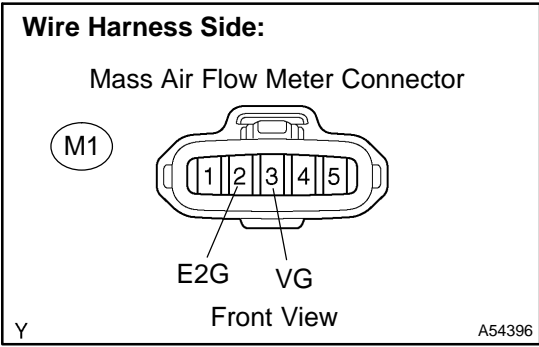
- (a) Check the resistance between the specified terminal of the E5 ECM connector and body ground.
Standard:

Tester Connection	Specified Condition
E2G (E5-29) - Body ground	Below 1 Ω

NG → **REPLACE ECM (See page 10-16)**

OK

7 | CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER - ECM)



- (a) Disconnect the M1 mass air flow meter connector.
- (b) Disconnect the E5 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

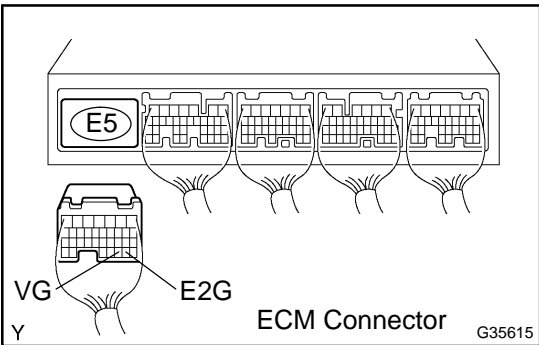
Standard (Check for open):

Tester Connection	Specified Condition
VG (M1-3) - VG (E5-30)	Below 1 Ω
E2G (M1-2) - E2G (E5-29)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (M1-3) or VG (E5-30) - Body ground	10 kΩ or higher

- (d) Reconnect the mass air flow meter connector.
- (e) Reconnect the ECM connector.



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

DTC	P0101	MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE PROBLEM
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CIRCUIT DESCRIPTION

Refer to DTCs P0100 on page [05-101](#).

DTC No.	DTC Detection Condition	Trouble Area
P0101	(1) After the engine is warmed up, conditions (a), (b), (c) and (d) continue for more than 10 seconds (2 trip detection logic): (a) Throttle valve is fully closed (b) Voltage output of the mass air flow meter is more than 2.2 V (c) Engine coolant temperature is more than 70°C (d) Engine speed is less than 900 rpm (2) Conditions (a), (b) and (c) continue for more than 6 seconds (2 trip detection logic): (a) Engine speed is more than 0 rpm (b) VTA is more than 0.1 V (c) Voltage output of the mass air flow meter is less than 0.25 V	<ul style="list-style-type: none"> • Mass air flow meter

MONITOR DESCRIPTION

The MAF (Mass Air Flow) meter helps the ECM calculate the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provide a proper air fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air. By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the air flow through the MAF meter. The ECM interprets this voltage as the intake air amount. If there is a defect in the MAF meter or an open or short circuit, the voltage level will deviate outside the normal operating range. The ECM interprets this deviation as a defect in the MAF meter and sets a DTC.

Example:

If the voltage is more than 2.2 V at idle or less than 1.0 V at idle OFF, the ECM interprets this as a defect in the MAF meter and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0101: Mass air flow meter rationality (Low voltage) P0101: Mass air flow meter rationality (High voltage)
Required sensors/ components (Main)	Mass air flow meter
Required sensors/ components (Related)	Engine speed sensor, Engine coolant temperature sensor, Throttle position sensor
Frequency of operation	Continuous
Duration	10 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
---	----------------

Mass Air Flow Meter Rationality (High voltage):

Engine RPM	Less than 2,000 rpm
MAF meter voltage	4.9 V or less
Engine coolant temperature	70°C (158°F) or more

Mass Air Flow Meter Rationality (Low voltage):

Engine RPM	More than 300 rpm
MAF meter voltage	0.2 V or more
Fuel cut	OFF

TYPICAL MALFUNCTION THRESHOLDS

Mass Air Flow Meter Rationality (High voltage):

Mass air flow meter voltage	More than 2.2 V (varies with throttle position sensor voltage)
-----------------------------	--

Mass Air Flow Meter Rationality (Low voltage):

Mass air flow meter voltage	Less than 1.0 V (varies with throttle position sensor voltage)
-----------------------------	--

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0101)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester main switch ON.
- (c) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTCs using the hand-held tester.

Result:

Display (DTC output)	Proceed to
P0101 and other DTCs	A
P0101	B

HINT:

If any other codes besides P0101 are output, perform troubleshooting for those DTCs first.

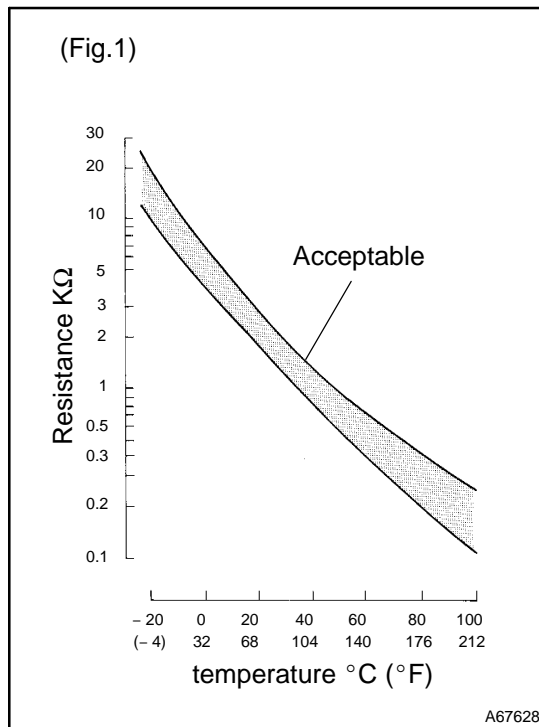
B → REPLACE MASS AIR FLOW METER

A

GO TO DTC CHART (See page 05-60)

DTC	P0110	INTAKE AIR TEMPERATURE CIRCUIT
DTC	P0112	INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT
DTC	P0113	INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION



The intake air temperature (IAT) sensor, mounted on the mass air flow (MAF) meter, monitors the intake air temperature. The IAT sensor has a thermistor that varies its resistance depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected as voltage changes to the ECM terminal (see Fig. 1).

The intake air temperature sensor is connected to the ECM (See below). The 5 V power source voltage in the ECM is applied to the intake air temperature sensor from terminal THA (THAR) via resistor R.

That is, the resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA (THAR) also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in intake air temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Open or short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM
P0112	Step 4	Short in intake air temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Short in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM
P0113	Step 2	Open in intake air temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Open in intake air temperature sensor circuit • Intake air temperature sensor (built in mass air flow meter) • ECM

HINT:

After confirming DTC P0110, P0112 or P0113, use the hand-held tester or the OBD II scan tool to confirm the intake air temperature from the "DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL".

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
140°C (284°F) or more	Short circuit

MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the intake air temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the IAT (Intake Air Temperature) sensor and sets a DTC.

Example:

When the sensor voltage output is equal to -40°C (-40°F), or more than 140°C (284°F).

MONITOR STRATEGY

Related DTCs	P0110: Intake air temperature sensor range check (Fluttering) P0112: Intake air temperature sensor range check (Low resistance) P0113: Intake air temperature sensor range check (High resistance)
Required sensors/components (Main)	Intake air temperature sensor
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
The typical enabling condition is not available	-

TYPICAL MALFUNCTION THRESHOLDS

P0110:

Intake air temperature sensor resistance (Intake air temperature)	Less than $98.5\ \Omega$, or more than $156\ \text{k}\Omega$ (More than 140°C (284°F), or less than -40°C (-40°F))
--	---

P0112:

Intake air temperature sensor resistance (Intake air temperature)	Less than $98.5\ \Omega$ (More than 140°C (284°F))
--	--

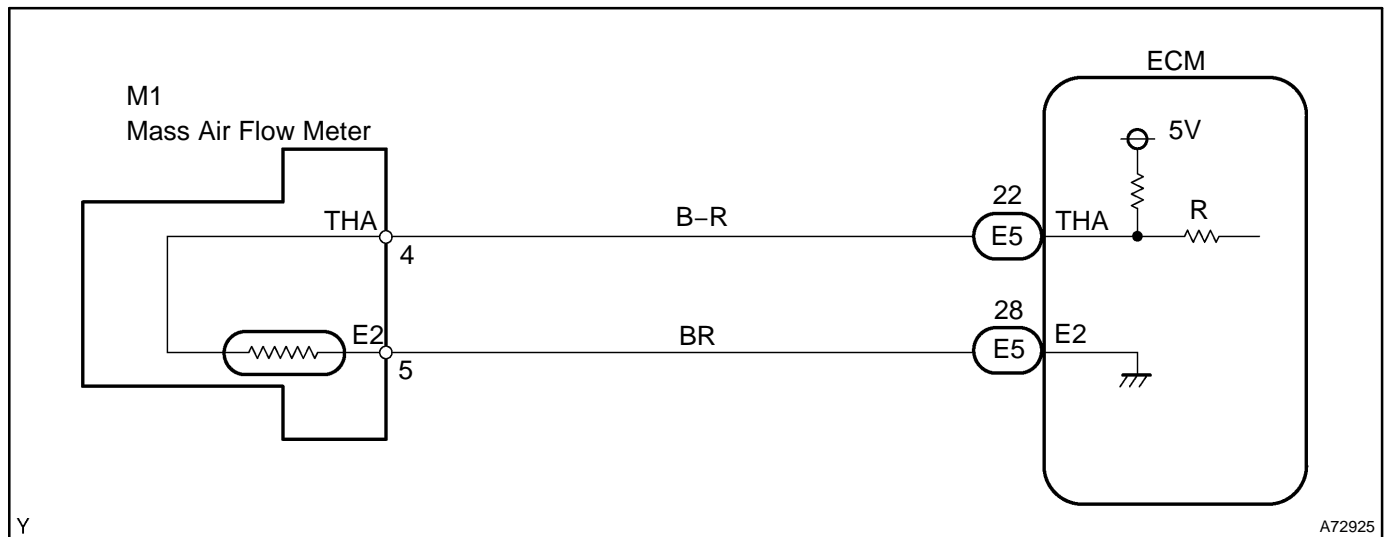
P0113:

Intake air temperature sensor resistance (Intake air temperature)	More than $156\ \text{k}\Omega$ (Less than -40°C (-40°F))
--	---

COMPONENT OPERATING RANGE

Intake air temperature sensor resistance	$98.5\ \Omega$ (140°C (284°F)) to $156\ \text{k}\Omega$ (-40°C (-40°F))
--	---

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER(INTAKE AIR TEMPERATURE)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
- Read the values.

Temperature: Same value as the actual intake air temperature.

Result:

Temperature Displayed	Proceed to
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as present temperature)	C

HINT:

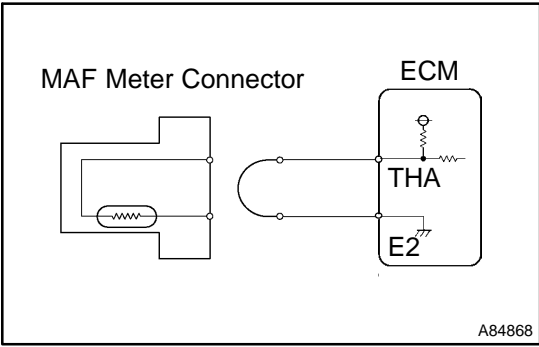
- If there is an open circuit, the hand-held tester indicates -40°C (-40°F).
- If there is a short circuit, the hand-held tester indicates 140°C (284°F) or more.

B Go to step 4

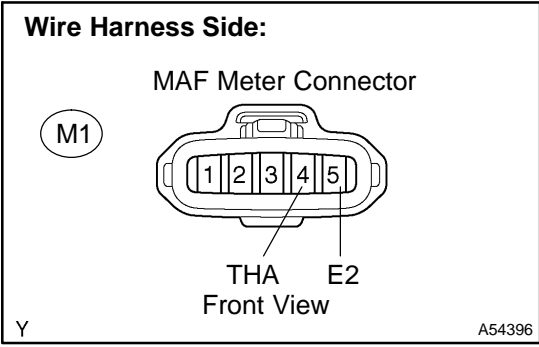
C CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

A

2 READ VALUE OF HAND-HELD TESTER(CHECK FOR OPEN IN WIRE HARNESS)



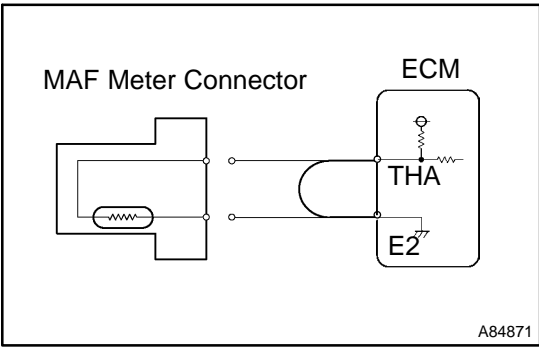
- (a) Disconnect the M1 mass air flow meter connector.
- (b) Connect terminals THA and E2 of the mass air flow meter wire harness side connector.
- (c) Turn the ignition switch to ON.
- (d) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
- (e) Read the values.
Temperature value: 140°C (284°F) or more
- (f) Reconnect the mass air flow meter connector.



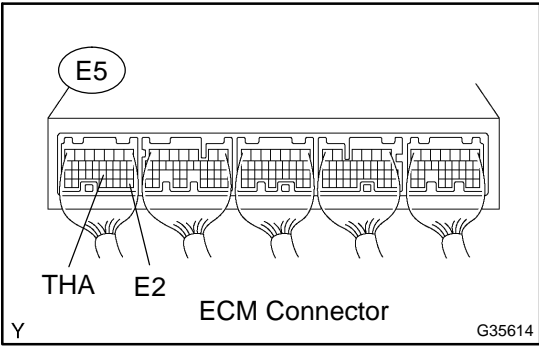
OK CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE MASS AIR FLOW METER

NG

3 READ VALUE OF HAND-HELD TESTER(CHECK FOR OPEN IN ECM)



- (a) Disconnect the M1 mass air flow meter connector.
 - (b) Connect terminals THA and E2 of the E5 ECM connector.
- HINT:
Before checking, do a visual and contact pressure check for the ECM connector.
- (c) Turn the ignition switch to ON.
 - (d) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
 - (e) Read the values.
Temperature value: 140°C (284°F) or more
 - (f) Reconnect the mass air flow meter connector.

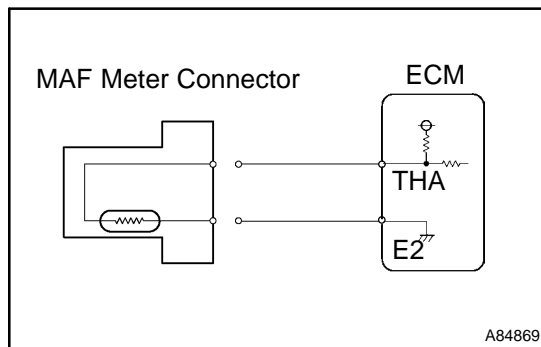


OK REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM (See page 10-16)

4 READ VALUE OF HAND-HELD TESTER(CHECK FOR SHORT IN WIRE HARNESS)

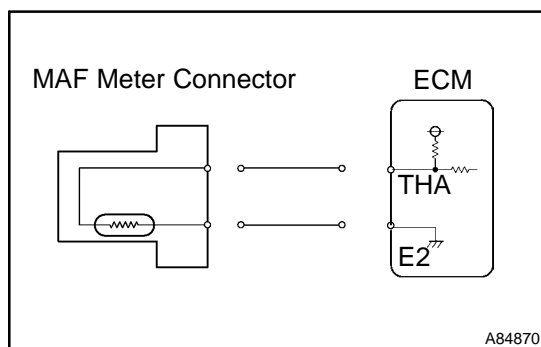


- Disconnect the M1 mass air flow meter connector.
- Turn the ignition switch to ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
- Read the values.
Temperature value: -40°C (-40°F)
- Reconnect the mass air flow meter connector.

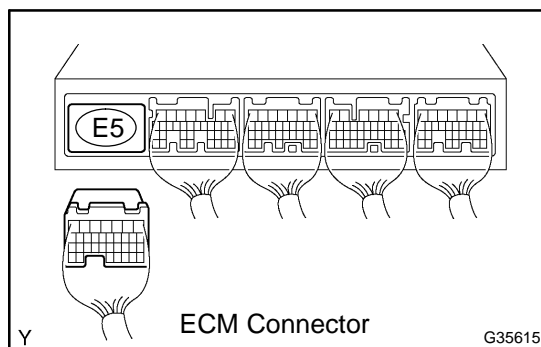
OK REPLACE MASS AIR FLOW METER

NG

5 READ VALUE OF HAND-HELD TESTER(CHECK FOR SHORT IN ECM)



- Disconnect the E5 ECM connector.
- Turn the ignition switch ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
- Read the values.
Temperature value: -40°C (-40°F)
- Reconnect the ECM connector.



OK REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10-16)

DTC	P0115	ENGINE COOLANT TEMPERATURE CIRCUIT
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DTC	P0117	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT
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DTC	P0118	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT
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CIRCUIT DESCRIPTION

A thermistor is built in the engine coolant temperature sensor changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as those of the intake air temperature sensor.

HINT:

If the ECM detects the DTC P0115, P0117 or P0118, the ECM enter fail-safe function in which the engine coolant temperature is assumed to be 80 °C (176 °F).

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0117	Step 4	Short in engine coolant temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0118	Step 2	Open in engine coolant temperature sensor circuit for 0.5 second	<ul style="list-style-type: none"> • Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM

HINT:

After confirming DTC P0115, P0117 or P0118, use the hand-held tester to confirm the engine coolant temperature from the DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
140°C (284°F) or more	Short circuit

MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the engine coolant temperature. The ECT sensor has a thermistor that varies its resistance depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The resistance varies as output voltage from the sensor changes.

The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Example:

When the ECM calculates that the ECT is less than -40°C (-40°F), or more than 140°C (284°F), and if either the condition continues for 0.5 sec. or more, the ECM will set a DTC.

MONITOR STRATEGY

Related DTCs	P0115: Engine coolant temperature sensor range check (Fluttering) P0117: Engine coolant temperature sensor range check (Low resistance) P0118: Engine coolant temperature sensor range check (High resistance)
Required sensors/components (Main)	Engine coolant temperature sensor
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
The typical enabling condition is not available	-

TYPICAL MALFUNCTION THRESHOLDS

P0115:

Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 Ω , or more than 156 k Ω (More than 140°C (284°F), or less than -40°C (-40°F))
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P0117:

Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 Ω (More than 140°C (284°F))
--	---

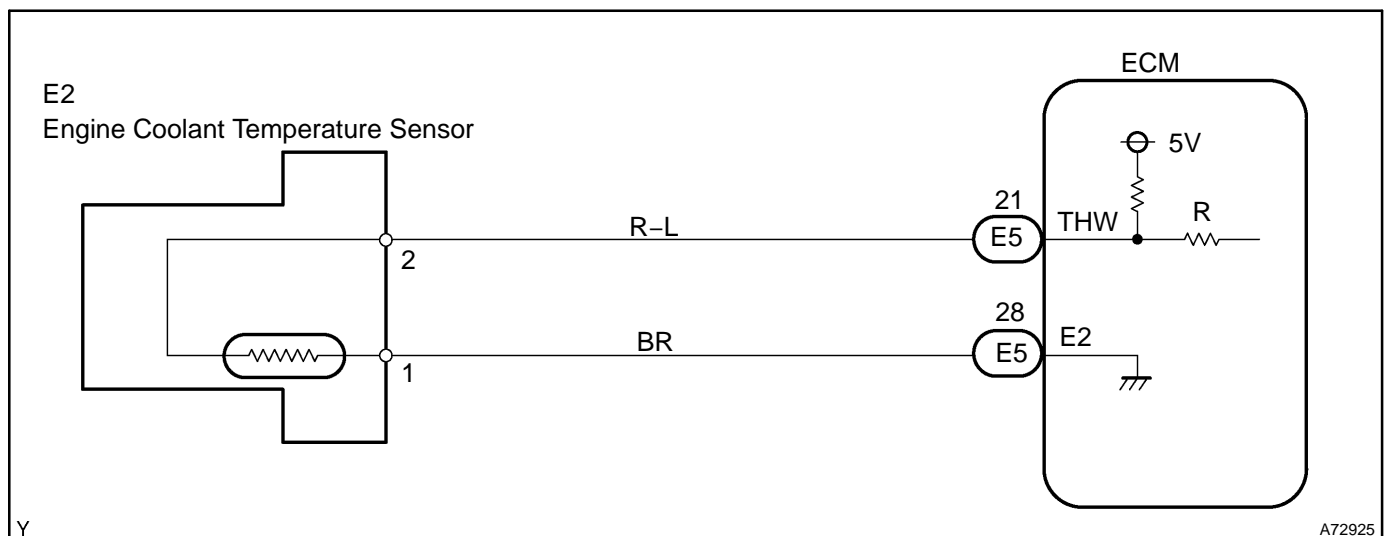
P0118:

Engine coolant temperature sensor resistance (Coolant temperature)	More than 156 k Ω (Less than -40°C (-40°F))
--	--

COMPONENT OPERATING RANGE

Engine coolant temperature sensor resistance	79 Ω (140°C (284°F)) to 156 k Ω (-40°C (-40°F))
--	---

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	READ VALUE OF HAND-HELD TESTER(ENGINE COOLANT TEMPERATURE)
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
- (d) Read the values.

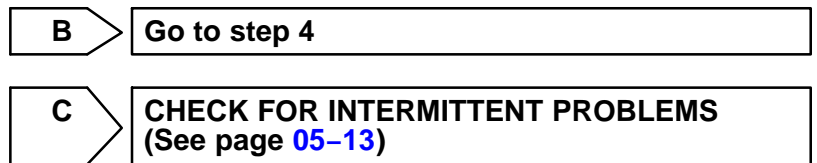
Temperature: Same value as the actual intake air temperature.

Result:

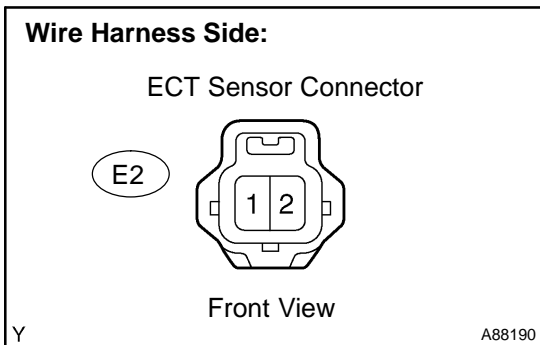
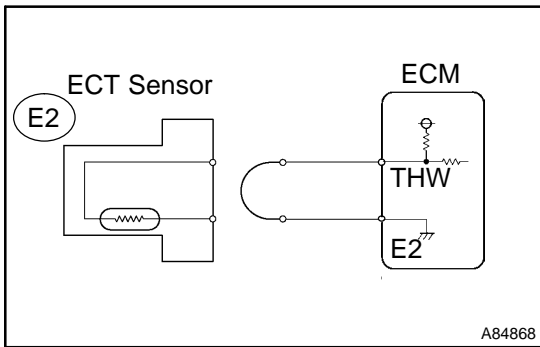
Temperature Displayed	Proceed to
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as present temperature)	C

HINT:

- If there is an open circuit, the hand-held tester indicates -40°C (-40°F).
- If there is a short circuit, the hand-held tester indicates 140°C (284°F) or more.



2 | READ VALUE OF HAND-HELD TESTER(CHECK FOR OPEN IN WIRE HARNESS)

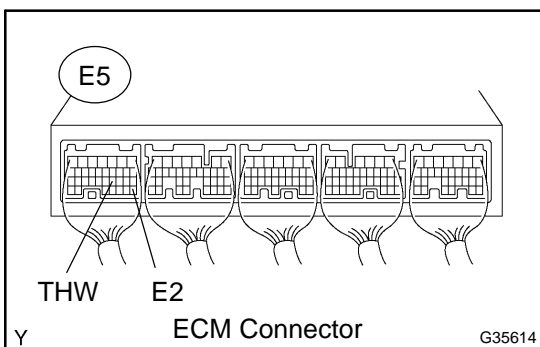
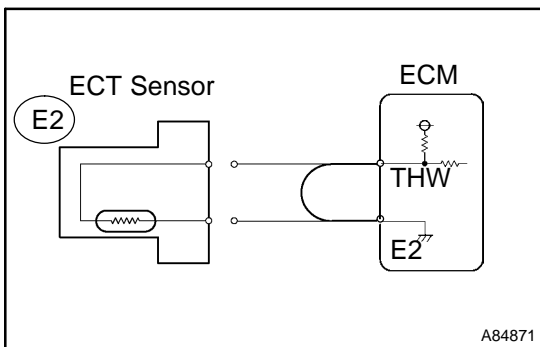


- (a) Disconnect the E2 engine coolant temperature sensor connector.
- (b) Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
- (c) Turn the ignition switch to ON.
- (d) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
- (e) Read the values.
Temperature value: 140°C (284°F) or more
- (f) Reconnect the engine coolant temperature sensor connector.

OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

NG

3 | READ VALUE OF HAND-HELD TESTER(CHECK FOR OPEN IN ECM)



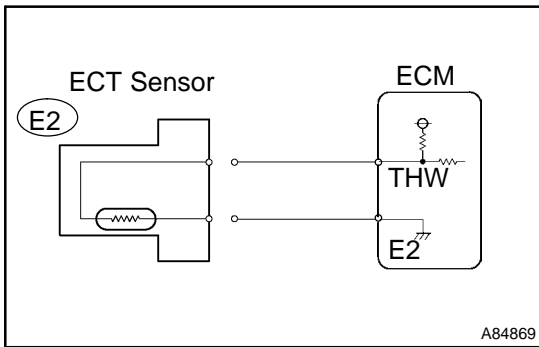
- (a) Disconnect the E2 engine coolant temperature sensor connector.
- (b) Connect terminals THW and E2 of the E5 ECM connector.
HINT:
Before checking, do a visual and contact pressure check for the ECM connector.
- (c) Turn the ignition switch to ON.
- (d) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
- (e) Read the values.
Temperature value: 140°C (284°F) or more
- (f) Reconnect the engine coolant temperature sensor connector.

OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, CHECK AND REPLACE ECM (See page 10-16)

4 READ VALUE OF HAND-HELD TESTER(CHECK FOR SHORT IN WIRE HARNESS)

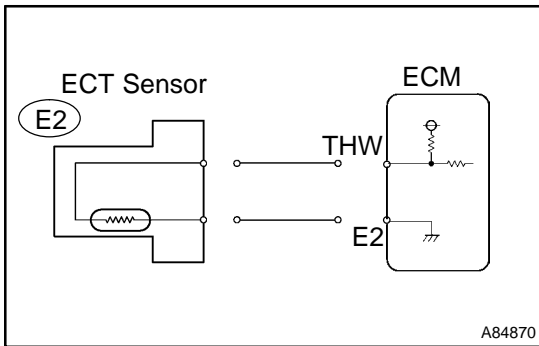


- (a) Disconnect the E2 engine coolant temperature sensor connector.
- (b) Turn the ignition switch to ON.
- (c) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
- (d) Read the values.
Temperature value: -40°C (-40°F)
- (e) Reconnect the engine coolant temperature sensor connector.

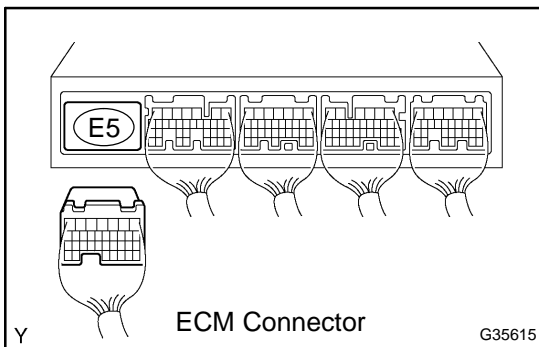
OK → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

NG

5 READ VALUE OF HAND-HELD TESTER(CHECK FOR SHORT IN ECM)



- (a) Disconnect the E5 ECM connector.
- (b) Turn the ignition switch to ON.
- (c) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
- (d) Read the values.
Temperature: -40°C (-40°F)
- (e) Reconnect the ECM connector.



OK → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG

REPLACE ECM (See page 10-16)

DTC	P0116	ENGINE COOLANT TEMPERATURE CIRCUIT RANGE/PERFORMANCE PROBLEM
------------	--------------	---

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [05-115](#).

DTC No.	DTC Detection Condition	Trouble Area
P0116	<p>(1) With the engine coolant temperature was 35°C (95°F) or more but less than 60°C (140°F) when the engine was started, and if conditions (a) and (b) are met:</p> <p>(a) Vehicle has accelerated and decelerated.</p> <p>(b) Engine coolant temperature remains within 3°C (5.4°F) of the initial engine coolant temperature (2 trip detection logic).</p> <p>(2) If the engine coolant temperature is more than 60°C (140°F) when the engine is started and the vehicle has accelerated and decelerated</p> <p>(3) If the engine coolant temperature sensor records a temperature variation below 1°C (1.8°F) successively 6 times (6 trip detection logic)</p>	<ul style="list-style-type: none"> Engine coolant temperature sensor

MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the engine coolant temperature. The ECT sensor has a thermistor that varies its resistance depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected in the voltage output from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Examples:

- Upon starting the engine, the ECT is between 35°C (95°F) and 60°C (140°F). If after driving for 250 sec., the ECT still remains within 3°C (5.4°F) of the starting temperature, a DTC will be set (2 trip detection logic).
- Upon starting the engine, the ECT is over 60°C (140°F). If after driving for 250 sec., the ECT still remains within 1°C (1.8°F) of the starting temperature, a DTC will be set (6 trip detection logic).

MONITOR STRATEGY

Related DTCs	P0116: ECT sensor stuck P0116: ECT sensor stuck at high ECT
Required sensors/ components (Main)	Engine coolant temperature sensor
Required sensors/ components (Related)	Intake air temperature sensor, Crankshaft position sensor, Mass air flow meter
Frequency of operation	Continuous
Duration	250 sec. or more
MIL operation	2 driving cycles: ECT sensor stuck 6 driving cycles: ECT sensor stuck at high ECT
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
---	--------------------------------

ECT sensor stuck:

Cumulative idle off period	250 sec. or more
Vehicle speed increase by 30 km/h (18.6 mph) or more	10 times or more
Engine coolant temperature	35 to 60°C (95 to 140°F)
Intake air temperature	-6.7°C (20°F) or more

ECT sensor stuck at high ECT:

Engine coolant temperature at engine start	60°C (140°F) or more
Intake air temperature	-6.7°C (20°F) or more
Stop and go*1	Once or more
Steady driving and stop*2	Once or more
Engine running time after engine start	0.3 sec. or more

HINT:

*1: Vehicle is stopped for 20 seconds or more and accelerated to more than 70 km/h (43.5 mph) within 40 sec.

*2: Vehicle is driven by 65 km/h (40.4 mph) or more for 30 sec. or more and the vehicle speed reaches 70 km/h (43.5 mph). The vehicle is decelerated from 65 km/h (40.4 mph) to 3 km/h (1.86 mph) or less within 35 sec. and stopped for 10 sec.

TYPICAL MALFUNCTION THRESHOLDS

ECT sensor stuck:

Change of engine coolant temperature value	Less than 3°C (5.4°F)
--	-----------------------

ECT sensor stuck at high ECT:

Change of engine coolant temperature value	1°C (1.8°F) or less
--	---------------------

COMPONENT OPERATING RANGE

Engine coolant temperature	Varies with actual ECT
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WIRING DIAGRAM

Refer to DTC P0115 on page [05-115](#).

INSPECTION PROCEDURE

HINT:

- If DTCs P0115, P0116, P0117, P0118 and P0125 are output simultaneously, engine coolant temperature sensor circuit may be open or short. Perform the troubleshooting of DTC P0115, P0117 or P0118 first.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	REPLACE ENGINE COOLANT TEMPERATURE SENSOR
----------	--

DTC	P0120	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT
DTC	P0122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW INPUT
DTC	P0123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH INPUT
DTC	P0220	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT
DTC	P0222	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW INPUT
DTC	P0223	THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH INPUT
DTC	P2135	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION

HINT:

This is the repair purpose for the throttle position sensor.

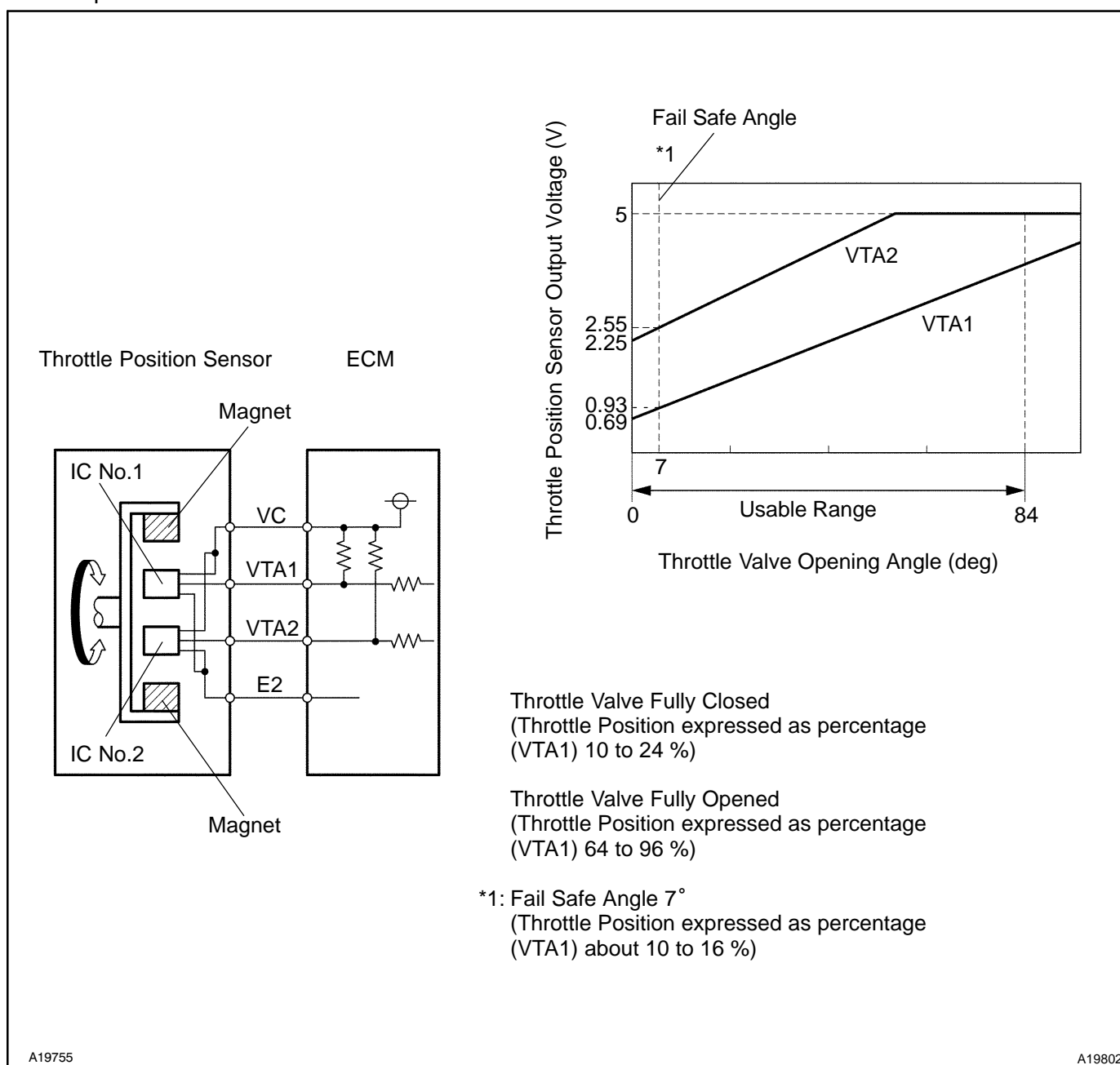
CIRCUIT DESCRIPTION

HINT:

- This Electrical Throttle Control System (ETCS) does not use a throttle cable.
- This throttle position sensor is a non-contact type.

The throttle position sensor is mounted on the throttle body and it detects the opening angle of the throttle valve. This sensor is electronically controlled and uses Hall-effect elements, so that accurate control and reliability can be obtained. The throttle position sensor has 2 sensor elements / signal outputs: VTA1 and VTA2. VTA1 used to detect the throttle opening angle and VTA2 is used to detect malfunctions in VTA1. Voltage applied to VTA1 and VTA2 change between 0V and 5V in proportion to the opening angle of the throttle valve. There are several checks that the ECM performs to confirm proper operation of the throttle position sensor and VTA1.

The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA1 and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driver inputs.



DTC No.	DTC Detection Condition	Trouble Area
Condition (a) of DTC P0120, P0122, P0123, P0220, P0222 or P0223 continues for 2 seconds (Open or short in the throttle position sensor circuit)		
P0120	Detection conditions for DTCs P0122 and P0123 are not satisfied but condition (a) is satisfied: (a) VTA1 is "0.2 V or less" or VTA1 is "4.8 V or more"	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • ECM
P0122	(a) VTA1 is 0.2 V or less	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM
P0123	(a) VTA1 is 4.8 V or more	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Open in VTA1 circuit • Open in E2 circuit • VC and VTA1 circuit are short-circuited • ECM
P0220	Detection conditions for DTCs P0222 and P0223 are not satisfied but condition (a) is satisfied (a) VTA2 is "0.5 V or less or VTA2 is 4.8 V or more, and VTA1 is between 0.2 V and 1.8 V	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • ECM
P0222	(a) VTA2 is 0.5 V or less	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM
P0223	(a) VTA2 is 4.8 V or more, and VTA1 is between 0.2 V and 1.8 V	<ul style="list-style-type: none"> • Throttle position sensor (built in throttle body) • Open in VTA2 circuit • Open in E2 circuit • VC and VTA2 circuits are short-circuited • ECM
P2135	Condition (a) continues for 0.5 second or more, or condition (b) continues for 0.4 second or more: (a) Difference between VTA1 and VTA2 is 0.02 V or less (b) VTA1 is 0.2 V or less and VTA2 is 0.5 V or less	<ul style="list-style-type: none"> • VTA1 and VTA2 circuits are short-circuited • Throttle position sensor (built in throttle body) • ECM

NOTICE:

When a malfunction is detected, the throttle valve is locked at a certain opening angle. Also, the whole electronically controlled throttle operation is cancelled until the system returns to normal and the ignition switch is turned OFF.

HINT:

- After confirming DTCs, use the hand-held tester or the OBD II scan tool to confirm the throttle valve opening percentage and closed throttle position switch condition.
- The THROTTLE POS means VTA1 signal as well as the THROTTLE POS #2 for the VTA2 signal.

Reference (Normal condition):

Tester display	Accelerator pedal fully released	Accelerator pedal fully depressed
THROTTLE POS	10 to 24 %	64 to 96 %
THROTTLE POS #2	2.1 to 3.1 V	4.5 to 5.5 V

MONITOR DESCRIPTION

The ECM uses throttle position sensor to monitor the throttle valve opening angle.

- (a) There is an expected specific voltage difference between VTA1 and VTA2 for each throttle opening angle.
- If the difference between VTA1 and VTA2 is incorrect the ECM interprets this as a fault and will set a DTC.
- (b) VTA1 and VTA2 each have a specific voltage operating range.
- If VTA1 or VTA2 is out of the normal operating range the ECM interprets this as a fault and will set a DTC.
- (c) VTA1 and VTA2 should never be close to the same voltage levels.
- If VTA1 is within the range of ± 0.02 V of VTA2 the ECM interprets this as a short circuit in the throttle position sensor system and will set a DTC.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P0120: Throttle position sensor 1 range check (Fluttering) P0122: Throttle position sensor 1 range check (low voltage) P0123: Throttle position sensor 1 range check (high voltage) P0220: Throttle position sensor 2 range check (Fluttering) P0222: Throttle position sensor 2 range check (low voltage) P0223: Throttle position sensor 2 range check (high voltage) P2135: Throttle position sensor range check (correlation)
Required sensors/components (Main)	Throttle position sensor
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	Accelerator pedal ON: 2 sec. Accelerator pedal OFF: 10 sec. P2135: 0.5 sec. or 0.4 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Throttle control motor power	ON

TYPICAL MALFUNCTION THRESHOLDS

P0120:

VTA1 voltage	0.2 V or less, or 4.8 V or more
--------------	---------------------------------

P0122:

VTA1 voltage	0.2 V or less
--------------	---------------

P0123:

VTA1 voltage	4.8 V or more
--------------	---------------

P0220:

VTA1 voltage	0.5 V or less, or 4.8 V or more
--------------	---------------------------------

P0222:

VTA2 voltage	0.5 V or less
--------------	---------------

P0223:

VTA2 voltage when the VTA1 is 0.2 to 1.8 V	4.8 V or more
--	---------------

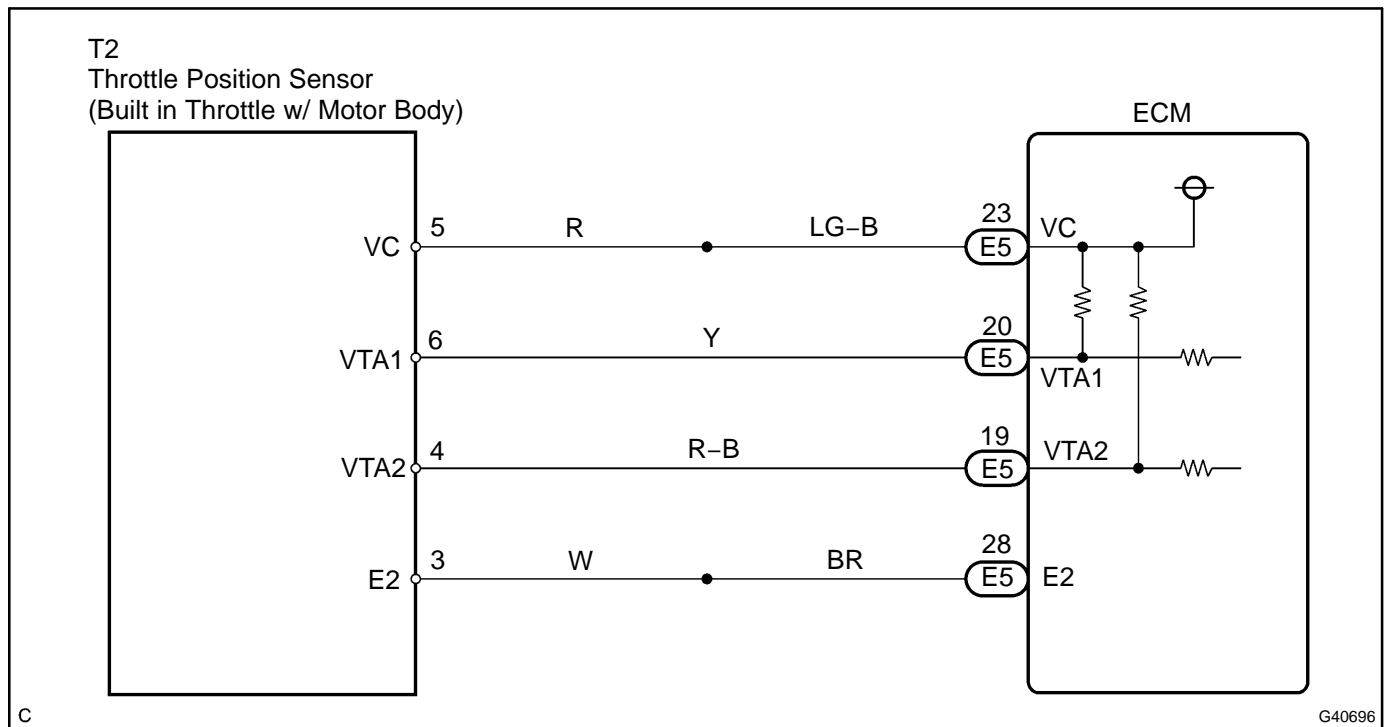
P2135:

Either of the following condition A or B is met:	-
Condition A	-
Difference between VTA1 and VTA2 voltage	0.02 V or less
Condition B	-
VTA1 voltage	0.2 V or less
VTA2 voltage	0.5 V or less

COMPONENT OPERATING RANGE

VTA1 voltage	0.6 to 3.96 V
VTA2 voltage	2.25 to 5.0 V

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER(THROTTLE POS AND THROTTLE POS #2)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- On the hand-held tester, select the items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS and THROTTLE POS #2.
- Read the values.

Result:

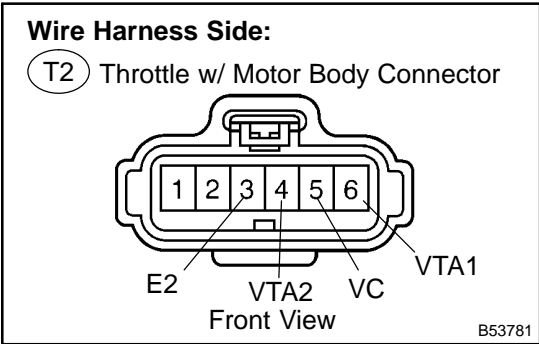
Throttle position expressed as percentage and voltage				Trouble Area	Proceed to
Accelerator pedal released		Accelerator pedal depressed			
THROTTLE POS (VTA1)	THROTTLE POS #2 (VTA2)	THROTTLE POS (VTA1)	THROTTLE POS #2 (VTA2)		
0 %	0 to 0.2 V	0 %	0 to 0.2 V	VC circuit open	A
100 %	4.5 to 5.5 V	100 %	4.5 to 5.5 V	E2 circuit open	
0 % or 100 %	2.1 to 3.1 V (Fail safe)	0 % or 100 %	2.1 to 3.1 V (Fail safe)	VTA1 circuit open or ground short	
10 to 24 % (Fail safe)	0 to 0.2 or 4.5 to 5.5 V	10 to 24 % (Fail safe)	0 to 0.2 or 4.5 to 5.5 V	VTA2 circuit open or ground short	
10 to 24 %	2.1 to 3.1 V	64 to 96 % (Does not fail safe)	4.5 to 5.5 V (Does not fail safe)	Throttle position sensor circuit is normal	B

B

Go to step 5

A

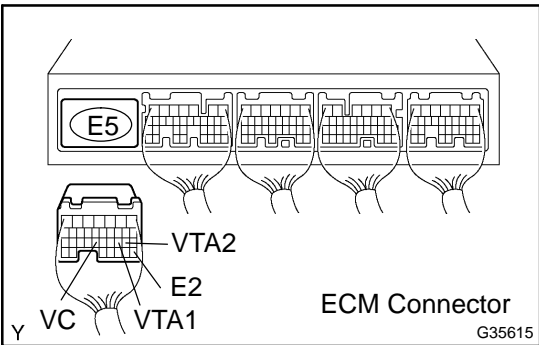
2 CHECK HARNESS AND CONNECTOR(THROTTLE POSITION SENSOR - ECM)



- (a) Disconnect the T2 throttle w/ motor body connector.
- (b) Disconnect the E5 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VC (T2-5) - VC (E5-23)	Below 1 Ω
VTA1 (T2-6) - VTA1 (E5-20)	Below 1 Ω
VTA2 (T2-4) - VTA2 (E5-19)	Below 1 Ω
E2 (T2-3) - E2 (E5-28)	Below 1 Ω



Standard (Check for short):

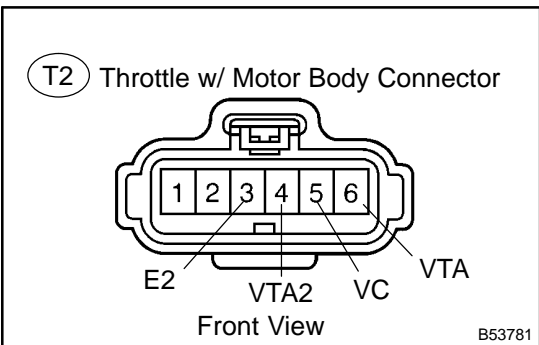
Tester Connection	Specified Condition
VC (T2-5) or VC (E5-23) - Body ground	10 kΩ or higher
VTA1 (T2-6) or VTA1 (E5-20) - Body ground	10 kΩ or higher
VTA2 (T2-4) or VTA2 (E5-19) - Body ground	10 kΩ or higher

- (d) Reconnect the throttle w/ motor body connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT ECM(VC VOLTAGE)

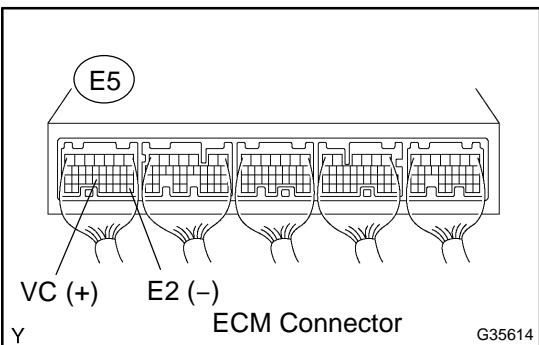


- (a) Disconnect the T2 throttle w/ motor body connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminals of the E5 ECM connector.

Standard:

Tester Connection	Specified Condition
VC (E5-23) - E2 (E5-28)	4.5 to 5.5 V

- (d) Reconnect the throttle w/ motor body connector.



NG REPLACE ECM (See page 10-16)

OK

4	REPLACE THROTTLE W/MOTOR BODY ASSY (See page 10-7)
----------	---

NEXT

5	READ OUTPUT DTC(THROTTLE POSITION SENSOR DTCS ARE OUTPUT AGAIN)
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- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Clear DTCs (See page 05-44).
- (d) Start the engine.
- (e) Allow the engine to idle for 15 seconds or more.
- (f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (g) Read DTCs.

Result:

Display (DTC output)	Proceed to
P0120, P0122, P0123, P0220, P0222, P0223 and/or P2135	A
No output	B

B

SYSTEM OK

A

REPLACE ECM (See page 10-16)

DTC	P0121	THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE PROBLEM
------------	--------------	--

HINT:

This is the procedure of the throttle position sensor.

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page [05-122](#).

DTC No.	DTC Detection Condition	Trouble Area
P0121	Difference between voltage output of VTA1 and VTA2 deviates from the threshold for 2.0 seconds.	• Throttle position sensor (built in throttle body)

MONITOR DESCRIPTION

The ECM uses throttle position sensor to monitor the throttle valve opening angle.

This sensor includes two signals, VTA1 and VTA2. VTA1 is used to detect the throttle opening angle and VTA2 is used to detect malfunctions in VTA1. There are several checks that the ECM performs confirm proper operation of the throttle position sensor and VTA1.

There is a specific voltage difference expected between VTA1 and VTA2 for each throttle opening angle. If the voltage output difference of the VTA1 and VTA2 deviates from the normal operating range, the ECM interprets this as a malfunction of the throttle position sensor. The ECM will turn on the MIL and a DTC is set.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P0121: Throttle position sensor rationality
Required sensors/components (Main)	Throttle position sensor
Required sensors/components (Related)	-
Frequency of operation	Continuous
Duration	2 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
VTA2 voltage	4.6 V

TYPICAL MALFUNCTION THRESHOLDS

Different between VTA1 and VTA2 VTA1 - (VTA2 × 0.8 to 1.2) * * Corrected by learning value	Less than 0.8 V and more than 1.6 V
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INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	REPLACE THROTTLE W/MOTOR BODY ASSY (See page 10-7)
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DTC	P0125	INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL
------------	--------------	--

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [05-115](#).

DTC No.	DTC Detection Condition	Trouble Area
P0125	<p>(1) If THW or THA is less than -6.6°C (20°F) at engine start and 20 minutes or more after starting engine, engine coolant temperature sensor value is 20°C (68°F) or less (2 trip detection logic)</p> <p>(2) If THW and THA is between -6.6°C (20°F) and 10°C (50°F) at engine start, 5 minutes or more after starting engine and engine coolant temperature sensor value is 20°C (68°F) or less (2 trip detection logic)</p> <p>(3) If THW and THA are greater than 10°C (50°F) at engine start and 2 minutes or more after starting engine, engine coolant temperature sensor value is 20°C (68°F) or less (2 trip detection logic)</p>	<ul style="list-style-type: none"> • Cooling system • Engine coolant temperature sensor • Thermostat

MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the temperature of the engine coolant. The resistance of the sensor varies with the actual coolant temperature. The ECM applies a voltage to the sensor and the varying resistance of the sensor cause the signal voltage to vary. The ECM monitors the ECT signal voltage after engine start-up. If the sensor still reports that the engine is not warmed up enough for closed-loop fuel control after sufficient time has passed, the ECM interprets this as a fault in the sensor or cooling system and sets a DTC.

Example:

The engine coolant temperature was 0°C (32°F) at engine start. After 5 min. running time, the ECT sensor still indicates that the engine is not warmed up enough to begin air fuel ratio feedback control of the air-fuel ratio. The ECM interprets this as a fault in the sensor or cooling system and will set a DTC.

MONITOR STRATEGY

Related DTCs	P0125: Insufficient coolant temperature for closed loop fuel control
Required sensors/components (Main)	Thermostat, Cooling system
Required sensors/components (Related)	Engine coolant temperature sensor, Mass air flow meter
Frequency of operation	Continuous
Duration	<p>2 min. (at engine start, engine coolant or intake air temperature of -8.34°C (17°F) or more)</p> <p>5 min. (at engine start, engine coolant or intake air temperature of -19.45 to -8.34°C (-3 to 17°F))</p> <p>20 min. (at engine start, engine coolant or intake air temperature of less than -19.45°C (-3°F))</p>
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Engine	Running
Fuel cut	OFF

TYPICAL MALFUNCTION THRESHOLDS

Time until "engine coolant temperature" detection temperature reaches feedback start temperature	-
When the temperature at the time of engine starting is -8.34°C (17°F) or more	Engine coolant temperature is less than "closed-loop enable temperature" when 2 min. or more after engine start
When the temperature at the time of engine starting is -19.45 to -8.34°C (-3 to 17°F)	Engine coolant temperature is less than "closed-loop enable temperature" when 5 min. or more after engine start
When the temperature at the time of engine starting is -19.45°C (-3°F) or less	Engine coolant temperature is less than "closed-loop enable temperature" when 20 min. or more after engine start

WIRING DIAGRAM

Refer to DTC P0115 on page 05-115.

INSPECTION PROCEDURE

HINT:

- If DTCs P0115, P0116, P0117, P0118 and P0125 are output simultaneously, the engine coolant temperature sensor circuit may be open or short. Perform the troubleshooting of DTC P0115, P0117 or P0118 first.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0125)

- Connect the hand-held tester or to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read the DTCs.

Result:

Display (DTC output)	Proceed to
P0125	A
P0125 and other DTCs	B

HINT:

If any other codes besides P0125 is output, perform the troubleshooting for those DTCs first.

B → GO TO DTC CHART (See page 05-60)

A

2 INSPECT THERMOSTAT (See page 16-3)

- Check the valve opening temperature of the thermostat.

OK:

Valve opening temperature is 80 to 84°C (176 to 183°F)

HINT:

Also check that the valve is completely closed under opening temperature as above.

NG → REPLACE THERMOSTAT (See page 16-8)

OK

3 CHECK COOLING SYSTEM

- (a) Check that there is a defect in the cooling system which causes overcool, such as abnormal radiator fan operation, modified cooling system and so on.

NG**REPAIR OR REPLACE COOLING SYSTEM****OK****REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

DTC	P0128	COOLANT THERMOSTAT (COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)
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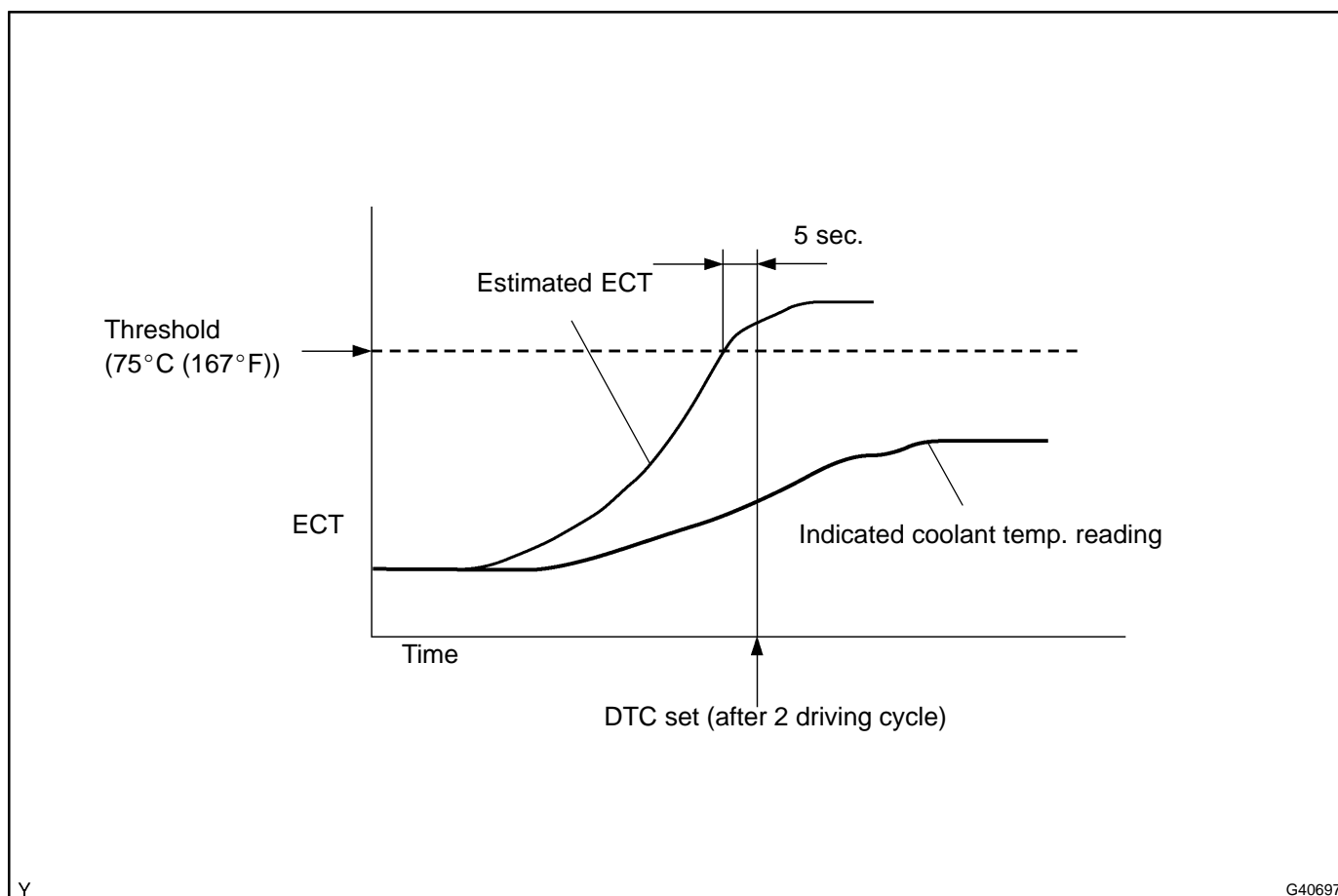
HINT:

This is the procedure of the "thermostat" malfunction detection.

CIRCUIT DESCRIPTION

If the engine coolant temperature does not reach 75°C (167°F) despite sufficient warm-up time has elapsed.

DTC No.	DTC Detection Condition	Trouble Area
P0128	Conditions (a), (b) and (c) are met: (a) Cold start (b) After sufficient warm-up time has elapsed (c) Engine coolant temperature less than 75°C (167°F)	<ul style="list-style-type: none"> • Thermostat • Cooling system • Engine coolant temperature sensor • ECM

MONITOR DESCRIPTION

The ECM estimates the coolant temperature based on starting temperature, engine loads and engine speeds. The ECM then compares the estimated temperature with the actual ECT (Engine Coolant Temperature). When the estimated coolant temperature reaches 75°C (167°F), the ECM checks the actual ECT. If the actual ECT is less than 75°C (167°F), the ECM will interpret this as a fault in the thermostat or engine cooling system and set a DTC.

MONITOR STRATEGY

Related DTCs	P0128: Thermostat
Required sensors/components (Main)	Thermostat, Engine cooling system
Required sensors/components (Related)	Engine coolant temperature sensor, Intake air temperature sensor, Vehicle speed sensor
Frequency of operation	Once per driving cycle
Duration	15 min.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 V or more
Throttle position learning	Completed
Either of the following conditions is met	Condition 1, 2 or 3
1. All of the following conditions are met	Conditions (a), (b) and (c)
(a) ECT at engine start - IAT at engine start	-15 to 7°C (-27 to 12.6°F)
(b) ECT at engine start	-10 to 56°C (14 to 133°F)
(c) IAT at engine start	-10 to 56°C (14 to 133°F)
2. All of the following conditions are met	Conditions (a), (b) and (c)
(a) ECT at engine start - IAT at engine start	More than 7°C (12.6°F)
(b) ECT at engine start	56°C (133°F) or less
(c) IAT at engine start	-10°C (14°F) or more
3. All of the following condition are met	Conditions (a), (b) and (c)
(a) ECT at engine start - IAT at engine start	-15 to 7°C (-27 to 12.6°F)
(b) ECT at engine start	-10 to 35°C (14 to 95°F)
(c) IAT at engine start	-10 to 35°C (14 to 95°F)
Accumulated time that vehicle speed is 80 mph (128 km/h) or more	Less than 20 sec.

TYPICAL MALFUNCTION THRESHOLDS

Duration that both of following conditions 1 and 2 are set	5 sec. or more
1. Estimated engine coolant temperature	75°C (167°F) or more
2. Engine coolant temperature sensor output	Below 75°C (167°F)

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

Thermostat

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$E1	\$E8	Multiply by 0.1 (°C)	ECT sensor output when estimated ECT reached to malfunction criteria	Malfunction criterion	Maximum test limit

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) On the hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTC.

Display (DTC Output)	Proceed to
P0128	A
P0128 and other DTCs	B

HINT:

If any other codes besides P0128 are output, perform the troubleshooting for those DTCs first.

B

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)

A

2 CHECK COOLING SYSTEM

- (a) Check for defects in the cooling system that might cause the system to be too cold, such as abnormal radiator fan operation or a modified cooling system.
- (b) Check the valve opening temperature of the thermostat.

OK:

Valve opening temperature is 80 to 84°C (176 to 183°F)

HINT:

Also check that the valve is completely closed under opening temperature as above.

NG

REPAIR OR REPLACE COOLING SYSTEM

OK

3 INSPECT THERMOSTAT (See page 16-3)

- (a) Check the valve lift.

OK:

Valve lift: 10 mm (0.39 in.) or more at 95°C (203°F)

NG

REPLACE THERMOSTAT (See page 16-8)

OK

REPLACE ECM (See page 10-16)

DTC	P0136	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 1 SENSOR 2)
DTC	P0137	OXYGEN SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2)
DTC	P0138	OXYGEN SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2)
DTC	P0156	OXYGEN SENSOR CIRCUIT MALFUNCTION (BANK 2 SENSOR 2)
DTC	P0157	OXYGEN SENSOR CIRCUIT LOW VOLTAGE (BANK 2 SENSOR 2)
DTC	P0158	OXYGEN SENSOR CIRCUIT HIGH VOLTAGE (BANK 2 SENSOR 2)

HINT:

Sensor 2 refers to the sensor mounted behind the Three-Way Catalytic Converter (TWC) and located far from the engine assembly.

CIRCUIT DESCRIPTION

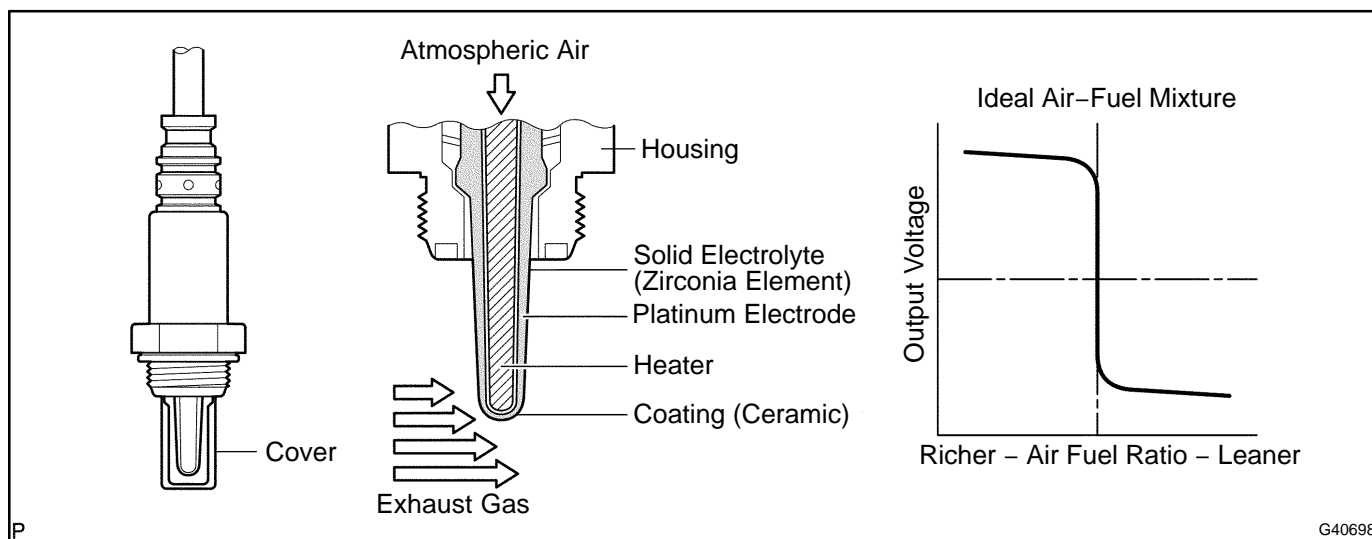
In order to obtain a high purification rate of the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a TWC is used. For the most efficient use of the TWC, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel level. For the purpose of helping the ECM to deliver accurate air-fuel ratio control, a Heated Oxygen (HO2) sensor is used.

The HO2 sensor is located behind the TWC, and detects the oxygen concentration in the exhaust gas. Since the sensor is integrated with the heater that heats the sensing portion, it is possible to detect the oxygen concentration even when the intake air volume is low (the exhaust gas temperature is low).

When the air-fuel ratio becomes lean, the oxygen concentration in the exhaust gas is rich. The HO2 sensor informs the ECM that the post-TWC air-fuel ratio is lean (low voltage, i.e. less than 0.45 V).

Conversely, when the air-fuel ratio is richer than the stoichiometric air-fuel level, the oxygen concentration in the exhaust gas becomes lean. The HO2 sensor informs the ECM that the post-TWC air-fuel ratio is rich (high voltage, i.e. more than 0.45 V). The HO2 sensor has the property of changing its output voltage drastically when the air-fuel ratio is close to the stoichiometric level.

The ECM uses the supplementary information from the HO2 sensor to determine whether the air-fuel ratio after the TWC is rich or lean, and adjusts the fuel injection time accordingly. Thus, if the HO2 sensor is working improperly due to internal malfunctions, the ECM is unable to compensate for deviations in the primary air-fuel ratio control.



P

G40698

DTC No.	DTC Detecting Condition	Trouble Area
P0136 P0156	During active air-fuel ratio control, following conditions (a) and (b) are met for certain period of time (2 trip detection logic): (a) Heated Oxygen (HO2) sensor voltage does not decrease to less than 0.2 V (b) HO2 sensor voltage does not increase to more than 0.6 V	<ul style="list-style-type: none"> • Open or short in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • HO2 sensor heater (sensor 2) • Air-Fuel Ratio (A/F) sensor (sensor 1)
P0136 P0156	Sensor impedance less than 5 Ω for more than 30 seconds when ECM presumes sensor to being warmed up and operating normally (1 trip detection logic)	<ul style="list-style-type: none"> • EFI relay • Gas leakage from exhaust system
P0137 P0157	During active air-fuel ratio control, following conditions (a) and (b) are met for certain period of time (2 trip detection logic): (a) HO2 sensor voltage output less than 0.21 V (b) Target air-fuel ratio rich	<ul style="list-style-type: none"> • Open in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • HO2 sensor heater (sensor 2)
P0137 P0157	High impedance: Sensor impedance 348.1 M Ω or more for more than 90 seconds when ECM presumes sensor to being warmed up and operating normally (1 trip detection logic)	<ul style="list-style-type: none"> • EFI relay • Gas leakage from exhaust system

P0138 P0158	During active air-fuel ratio control, following conditions (a) and (b) are met for certain period of time (2 trip detection logic): (a) HO2 sensor voltage output 0.59 V or more (b) Target air-fuel ratio lean	<ul style="list-style-type: none"> • Short in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • ECM internal circuit malfunction
P0138 P0158	HO2 sensor voltage output exceeds 1.2 V for more than 30 seconds (1 trip detection logic)	

MONITOR DESCRIPTION

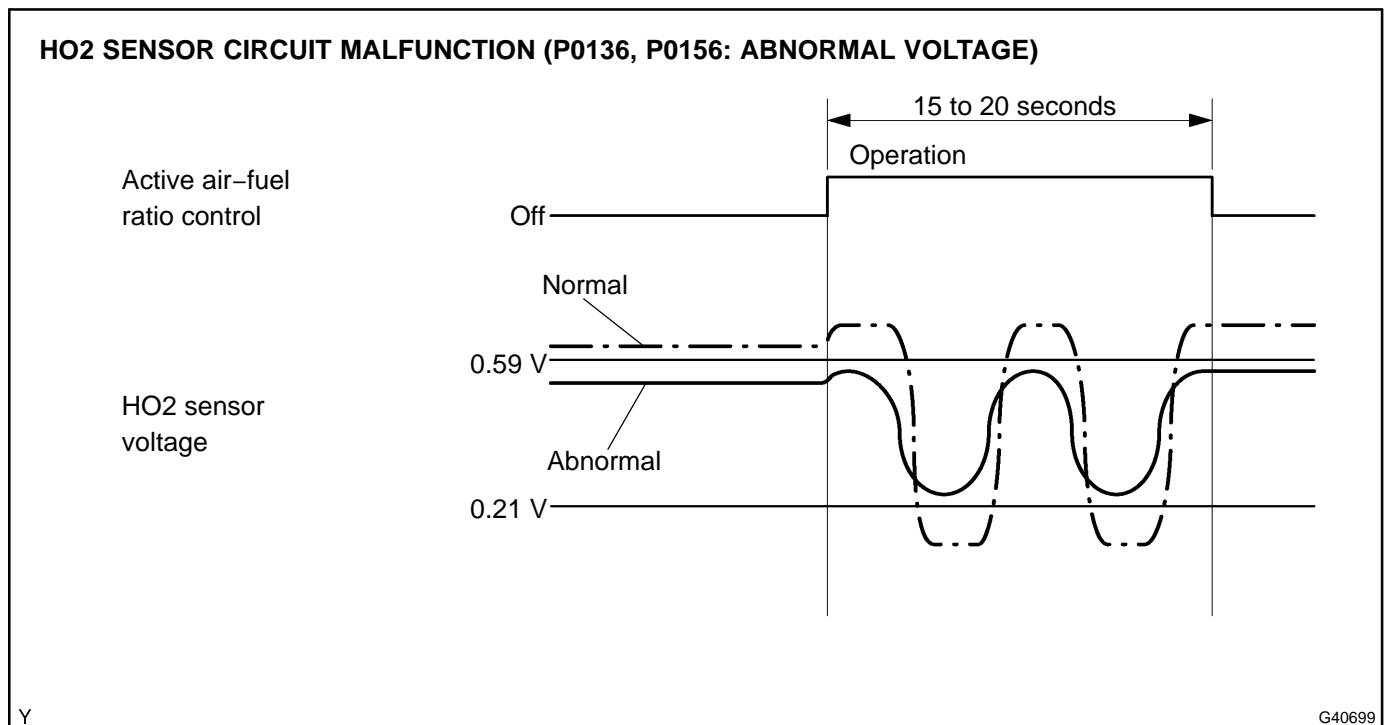
Active Air-Fuel Ratio Control

The ECM usually performs air-fuel ratio feedback control so that the Air-Fuel Ratio (A/F) sensor output indicates a near stoichiometric air-fuel level. This vehicle includes active air-fuel ratio control in addition to regular air-fuel ratio control. The ECM performs active air-fuel ratio control to detect any deterioration in the Three-Way Catalytic Converter (TWC) and Heated Oxygen (HO2) sensor malfunctions (refer to the diagram below).

Active air-fuel ratio control is performed for approximately 15 to 20 seconds while driving with a warm engine. During active air-fuel ratio control, the air-fuel ratio is forcibly regulated to become lean or rich by the ECM. If the ECM detects a malfunction, one of the following DTCs is set: DTC P0136, P0156 (abnormal voltage output), P0137, P0157 (open circuit) and P0138, P0158 (short circuit).

Abnormal Voltage Output of HO2 Sensor (DTC P0136, P0156)

While the ECM is performing active air-fuel ratio control, the air-fuel ratio is forcibly regulated to become rich or lean. If the sensor is not functioning properly, the voltage output variation is small. For example, when the HO2 sensor voltage does not decrease to less than 0.21 V and does not increase to more than 0.59 V during active air-fuel ratio control, the ECM determines that the sensor voltage output is abnormal and sets DTC P0136.



Open or Short in the Heated Oxygen (HO2) Sensor Circuit (DTC P0137, P0157, P0138 or P0158)

During active air-fuel ratio control, the ECM calculates the Oxygen Storage Capacity (OSC)* of the Three-Way Catalytic Converter (TWC) by forcibly regulating the air-fuel ratio to become rich or lean.

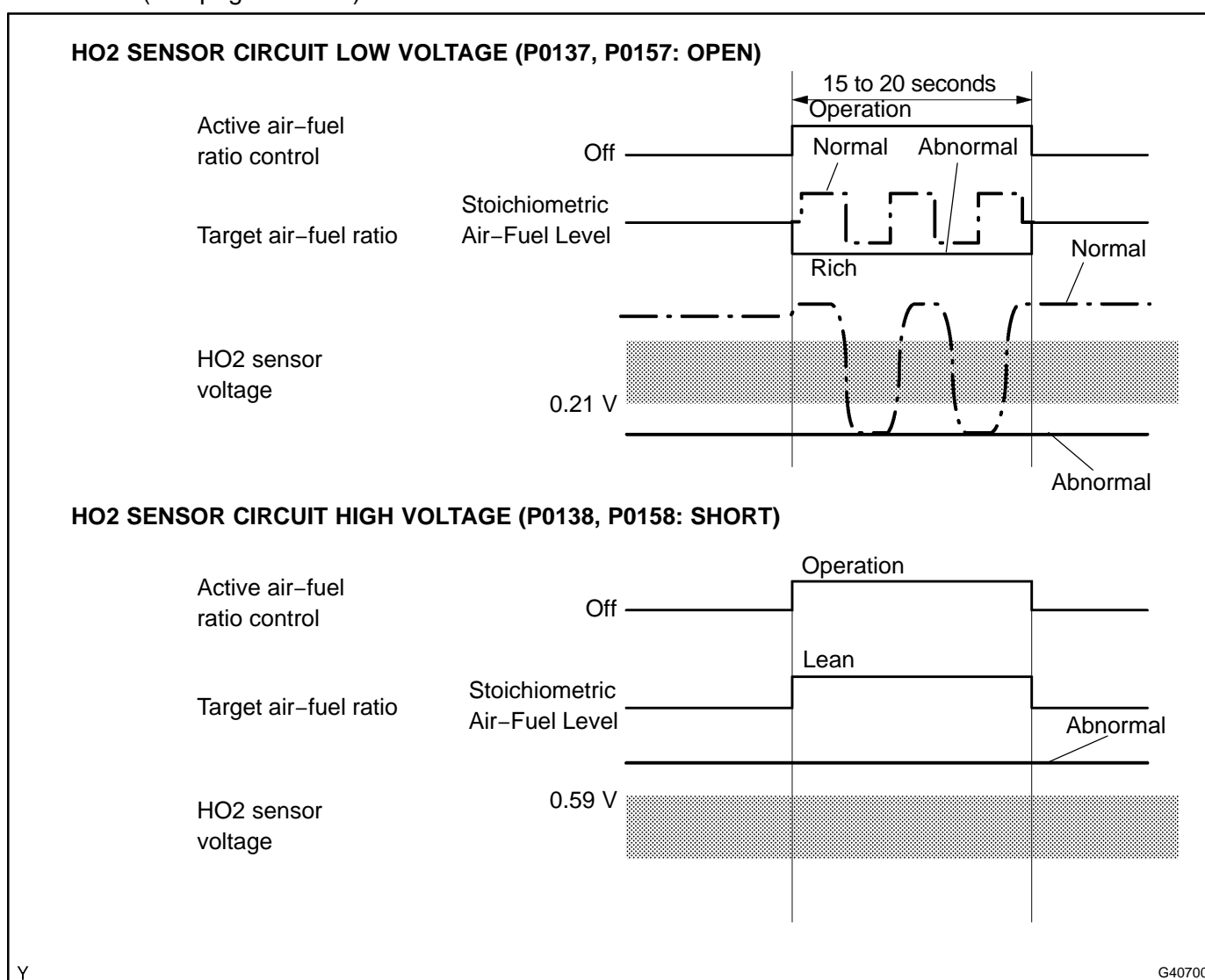
If the HO2 sensor has an open or short, or the voltage output of the sensor noticeably decreases, the OSC indicates an extraordinarily high value. Even if the ECM attempts to continue regulating the air-fuel ratio to become rich or lean, the HO2 sensor output does not change.

While performing active air-fuel ratio control, when the target air-fuel ratio is rich and the HO2 sensor voltage output is 0.21 V or less (lean), the ECM interprets this as an abnormally low sensor output voltage and sets DTC P0137 or P0157. When the target air-fuel ratio is lean and the voltage output is 0.59 V or more (rich) during active air-fuel ratio control, the ECM determines that the sensor voltage output is abnormally high, and sets DTC P0138 or P0158.

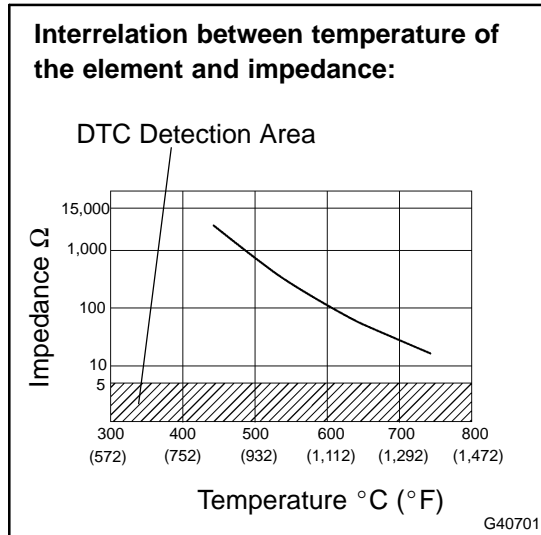
HINT:

DTC P0138 or P0158 is also set if the HO2 sensor voltage output is more than 1.2 V for 30 seconds or more.

*: The TWC has the capability to store oxygen. The OSC and the emission purification capacity of the TWC are mutually related. The ECM determines whether the catalyst has deteriorated, based on the calculated OSC value (see page 05-230).



High or Low Impedance of Heated Oxygen (HO2) Sensor (DTC P0136, P0156, P0137 or P0157)



During normal air-fuel ratio feedback control, there are small variations in the exhaust gas oxygen concentration. In order to continuously monitor the slight variation of the HO2 sensor signal while the engine is running, the impedance* of the sensor is measured by the ECM. The ECM determines that there is a malfunction in the sensor when the measured impedance deviates from the standard range.

*: The effective resistance in an alternating current electrical circuit.

HINT:

- The impedance cannot be measured using an ohmmeter.
- DTC P0136 or P0156 indicates the deterioration of the HO2 sensor. The ECM sets the DTC by calculating the impedance of the sensor when the typical enabling conditions are satisfied (1 driving cycle).
- DTC P0137 or P0157 indicates an open circuit in the HO2 sensor (1 driving cycle). The ECM sets this DTC when the impedance of the sensor exceeds the threshold 348.1 MΩ.

MONITOR STRATEGY

Related DTCs	P0136: Heated rear oxygen sensor (Bank 1) output voltage (Output voltage) P0136: Heated rear oxygen sensor (Bank 1) impedance (Low) P0137: Heated rear oxygen sensor (Bank 1) output voltage (Low voltage) P0137: Heated rear oxygen sensor (Bank 1) impedance (High) P0138: Heated rear oxygen sensor (Bank 1) output voltage (High voltage) P0138: Heated rear oxygen sensor (Bank 1) output voltage (Extremely high) P0156: Heated rear oxygen sensor (Bank 2) output voltage (Output voltage) P0156: Heated rear oxygen sensor (Bank 2) impedance (Low) P0157: Heated rear oxygen sensor (Bank 2) output voltage (Low voltage) P0157: Heated rear oxygen sensor (Bank 2) impedance (High) P0158: Heated rear oxygen sensor (Bank 2) output voltage (High voltage) P0158: Heated rear oxygen sensor (Bank 2) output voltage (Extremely high)
Required Sensors/Components (Main)	Heated rear oxygen sensor
Required Sensors/Components (Related)	Mass air flow meter
Frequency of operation	Once per driving cycle: Active air-fuel ratio control detection Continuous: Others
Duration	20 sec.: Heated oxygen sensor output (Output voltage, High voltage, Low voltage) 30 sec.: Heated oxygen sensor impedance (Low) 90 sec.: Heated oxygen sensor impedance (High) 10 sec.: Heated oxygen sensor impedance (Extremely high)
MIL operation	2 driving cycles Heated oxygen sensor output (Output voltage, High voltage, Low voltage) Immediate: Heated oxygen sensor impedance (Low, High, Extremely high)
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
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Heated oxygen sensor output voltage (Output voltage, High voltage, Low voltage)

Active air-fuel ratio control	Executing
Active air-fuel ratio control being when all of following conditions are met:	-
Battery voltage	11 V or more
Engine coolant temperature	75°C (167°F) or more
Idle	OFF
Engine RPM	Less than 3,200 rpm
A/F sensor status	Activated
Fuel-cut	OFF
Engine load	10 to 70%
Shift position	4th or more

Heated oxygen sensor impedance (Low):

Battery voltage	11 V or more
Estimated sensor temperature	Less than 700°C (1,292°F)
ECM monitor	Completed
P0606	Not set

Heated oxygen sensor impedance (High):

Battery voltage	11 V or more
Estimated sensor temperature	450°C (842°F) or more
ECM monitor	Completed
P0606	Not set

Heated oxygen sensor output voltage (Extremely high):

Battery voltage	11 V or more
Time after engine start	2 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

Heated oxygen sensor output voltage (Output voltage)

Either of the following conditions is met:	Condition 1 or 2
1. All of the following conditions are met:	Conditions (a), (b) and (c)
(a) Commanded air-fuel ratio	14.3 or less
(b) Rear HO2S voltage	0.21 to 0.59 V
(c) OSC (Oxygen Storage Capacity of catalyst)	3 g or more
2. All of the following conditions are met:	Conditions (a), (b) and (c)
(a) Commanded air-fuel ratio	14.9 or more
(b) Rear HO2S voltage	0.21 to 0.59 V
(c) OSC (Oxygen Storage Capacity of catalyst)	3 g or more

Heated oxygen sensor output voltage (Low voltage)

All of the following conditions are met:	Conditions 1, 2 and 3
1. Commanded air-fuel ratio	14.3 or less
2. Rear HO2S voltage	Less than 0.21 V
3. OSC (Oxygen Storage Capacity of catalyst)	3 g or more

Heated oxygen sensor output voltage (High voltage)

All of the following conditions are met:	Conditions 1, 2 and 3
1. Commanded air-fuel ratio	14.9 or more
2. Rear HO2S voltage	More than 0.59 V
3. OSC (Oxygen Storage Capacity of catalyst)	3 g or more

Heated oxygen sensor impedance (Low):

Duration of following condition	30 sec. or more
Heated oxygen sensor impedance	Less than 5 Ω

Heated oxygen sensor impedance (High):

Duration of following condition	90 sec. or more
Heated oxygen sensor impedance	348.1 MΩ or more

Heated oxygen sensor output voltage (Extremely high):

Duration of following condition	10 sec. or more
Heated oxygen sensor voltage	More than 1.2 V

COMPONENT OPERATING RANGE

Heated oxygen sensor voltage	Varies between 0.1 to 0.9 V
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MONITOR RESULT

Refer to page [05-28](#) for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

HO2S bank 1 sensor 2

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$02	\$07	Multiply by 0.001 (V)	Minimum sensor voltage	Minimum test limit	Maximum test limit
\$02	\$08	Multiply by 0.001 (V)	Maximum sensor voltage	Minimum test limit	Maximum test limit
\$02	\$8F	Multiply by 0.001 (g)	Maximum oxygen storage capacity	0	Maximum test limit

HO2S bank 2 sensor 2

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$06	\$07	Multiply by 0.001 (V)	Minimum sensor voltage	Minimum test limit	Maximum test limit
\$06	\$08	Multiply by 0.001 (V)	Maximum sensor voltage	Minimum test limit	Maximum test limit
\$06	\$8F	Multiply by 0.001 (g)	Maximum oxygen storage capacity	0	Maximum test limit

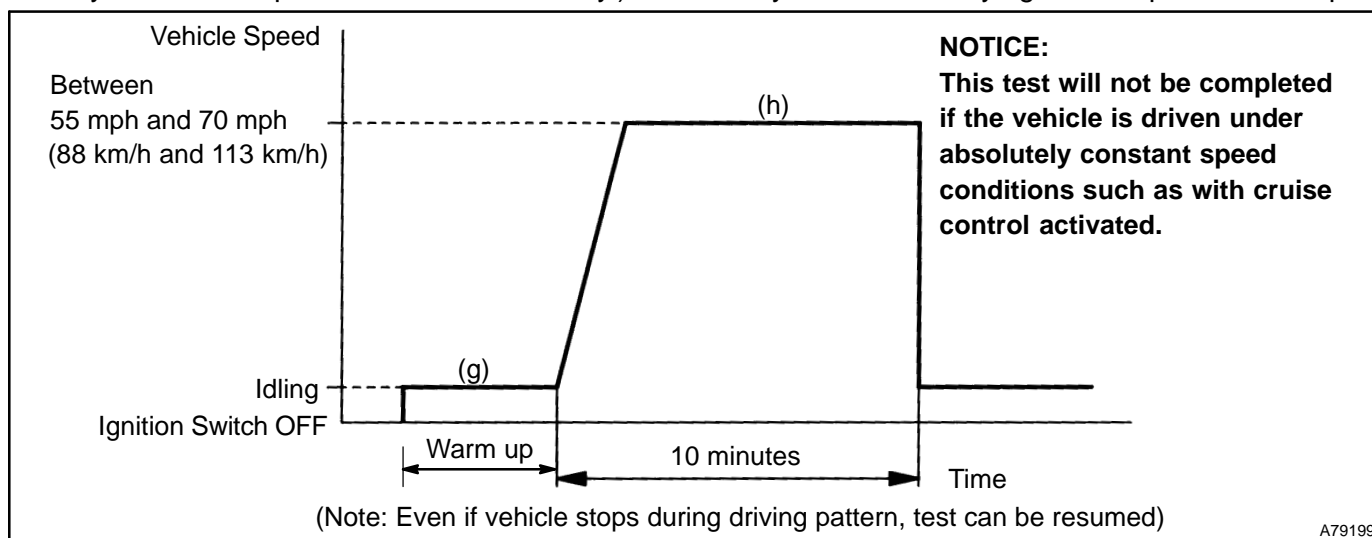
WIRING DIAGRAM

Refer to DTC P2195 on page [05-347](#).

CONFIRMATION DRIVING PATTERN

HINT:

- This confirmation driving pattern is used in steps 5, 8 and 11 of the following diagnostic troubleshooting procedure when using a hand-held tester.
- Performing this confirmation pattern will activate the Heated Oxygen (HO₂) sensor monitor. (The catalyst monitor is performed simultaneously.) This is very useful for verifying the completion of a repair.



READINESS TESTS	
MISFIRE MON	AVAIL
FUEL SYS MON	AVAIL
COMP MON	AVAIL
CAT EVAL	INCMPL
HTD CAT EVAL	N/A
EVAP EVAL	INCMPL
2nd AIR EVAL	N/A
A/C EVAL	N/A
O2S EVAL	INCMPL
O2S HTR EVAL	INCMPL
EGR EVAL	N/A

A76855 A98191

- Connect a hand-held tester to the DLC3.
- Turn the ignition switch to ON.
- Turn the tester or scan tool ON.
- Clear DTCs (where set) (see page 05-44).
- Select the following menu items: DIAGNOSIS / CARB OBD II / READINESS TESTS.
- Check that O2S EVAL is INCMPL (incomplete).
- Start the engine and warm it up.
- Drive the vehicle at between 40 mph and 70 mph (64 km/h and 113 km/h) for at least 10 minutes.
- Note the state of the Readiness Tests items. Those items will change to COMPL (complete) as O2S EVAL monitor operates.
- On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES and check if any DTCs (any pending DTCs) are set.

HINT:

If O2S EVAL does not change to COMPL, and any pending DTCs fail to set, extend the driving time.

INSPECTION PROCEDURE

HINT:

Hand-held tester only:

Narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the menu "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

Result:

A/F sensor reacts in accordance with increase and decrease of injection volume:

+25 % → rich output: Less than 3.0 V

-12.5 % → lean output: More than 3.35 V

Heated oxygen sensor reacts in accordance with increase and decrease of injection volume

+25 % → rich output: More than 0.5 V

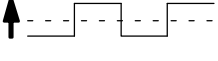

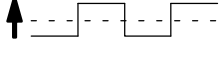
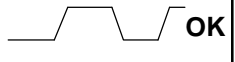
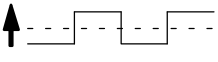

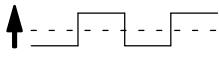
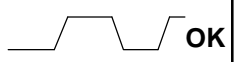
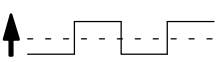

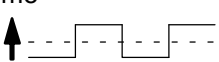

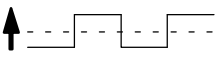
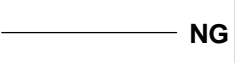
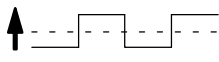
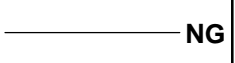
-12.5 % → lean output: Less than 0.4 V

NOTICE:

The A/F sensor output has a few seconds of delay and the heated oxygen sensor output has about 20 seconds of delay at maximum.

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors.

For displaying the graph indication, first enter "ACTIVE TEST / A/F CONTROL / USER DATA," then select "A/F B1,2S1 and O2S B1,2S2" by pressing "YES" button, and push "ENTER" button before pressing "F4" button.

	Output voltage of A/F sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspected trouble area
Case 1	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0 V	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  OK Less than 0.4 V	—
Case 2	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  OK Less than 0.4 V	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0 V	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Extremely rich or lean actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

HINT:

- If different DTCs that are related to different system are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. when a malfunction occurred.

1	CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P0136, P0137, P0138, P0156, P0157 AND/OR P0158)
----------	--

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTCs.

Result:

Display (DTC Output)	Proceed to
P0138, P0158	A
P0137, P0157	B
P0136, P0156	C

HINT:

If any other codes besides P0136 and/or P0156 are output, perform troubleshooting for those DTCs first.

B → Go to step 14

C → Go to step 7

A

2	READ VALUE OF HAND-HELD TESTER(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) After warming up the engine, run the engine at 2,500 rpm for 3 minutes.
- (c) On the hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1S2 or B2S2.
- (d) Allow the engine to idle.
- (e) Read the Heated Oxygen (HO2) sensor output voltage while idling.

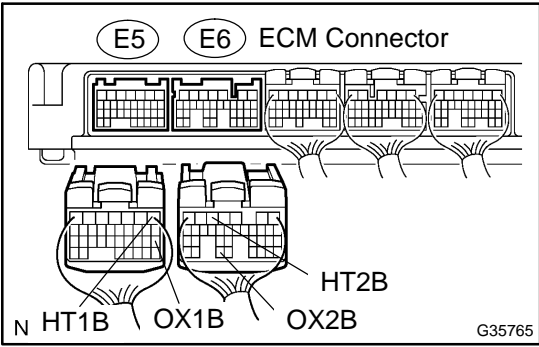
Result:

HO2 Sensor Output Voltages	Proceed To
More than 1.2 V	A
Less than 1.0 V	B

B → Go to step 5

A

3 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT)



- (a) Turn the ignition switch to OFF and wait for 5 minutes.
- (b) Disconnect the E5 and E6 ECM connectors.
- (c) Check the resistance.

Standard:

Tester Connections	Specified Conditions
HT1B (E5-1) - OX1B (E5-18)	10 kΩ or higher
HT2B (E6-5) - OX2B (E6-33)	10 kΩ or higher

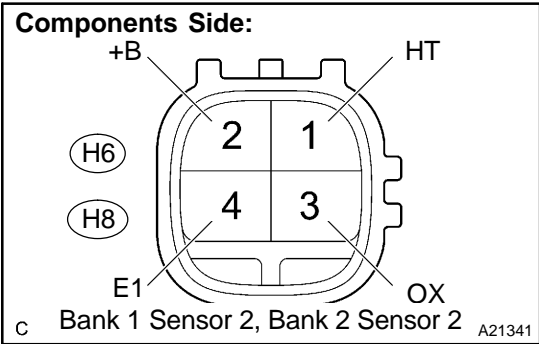
- (d) Reconnect the ECM connectors.

NG → Go to step 4

OK

REPLACE ECM (See page 10-16)

4 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



- (a) Disconnect the H6 or H8 heated oxygen sensor connector.
- (b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard (Bank 1, 2 sensor 2):

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20 °C (68 °F)
1 (HT) - 4 (E1)	10 kΩ or higher

- (c) Reconnect the heated oxygen sensor connector.

NG → REPLACE HEATED OXYGEN SENSOR

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

5 PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs prior to performing the confirmation driving pattern.

NEXT

6	READ OUTPUT DTC(DTC P0138, P0158)
----------	--

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC output)	Proceed to
No output	A
P0136 and/or P0156	B

NG

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

A

REPLACE HEATED OXYGEN SENSOR

7	READ VALUE OF HAND-HELD TESTER(OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Start the engine.
- (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1S2.
- (e) After warming up the engine, run the engine at an engine speed of 2,500 rpm for 3 minutes.
- (f) Read the output voltage of the HO2 sensor when the engine rpm is suddenly increased.

HINT:

Quickly accelerate the engine to 4,000 rpm 3 times using the accelerator pedal.

Standard: Fluctuates between 0.4 V or less and 0.5 V or more.

NG

Go to step 14

OK

8	PERFORM CONFIRMATION DRIVING PATTERN
----------	---

NEXT

9	READ OUTPUT DTC(DTC P0138, P0158)
----------	--

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0136 or P0156	A
No output	B

B

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

A

10 REPLACE HEATED OXYGEN SENSOR

NEXT

11 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

12 READ OUTPUT DTC(DTC P0138, P0158)

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0136 or P0156	A
No output	B

B **REPLACE COMPLETED**

A

13	PERFORM ACTIVE TEST BY HAND-HELD TESTER(INJECTION VOLUME)
-----------	--

- (a) Connect the hand-held tester to the DLC3.
- (b) Start the engine and turn the tester ON.
- (c) Warm up the engine.
- (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / INJ VOL.
- (e) Change the fuel injection volume using the tester, monitoring the voltage output of Air-Fuel Ratio (A/F) and HO2 sensors displayed on the tester.

HINT:

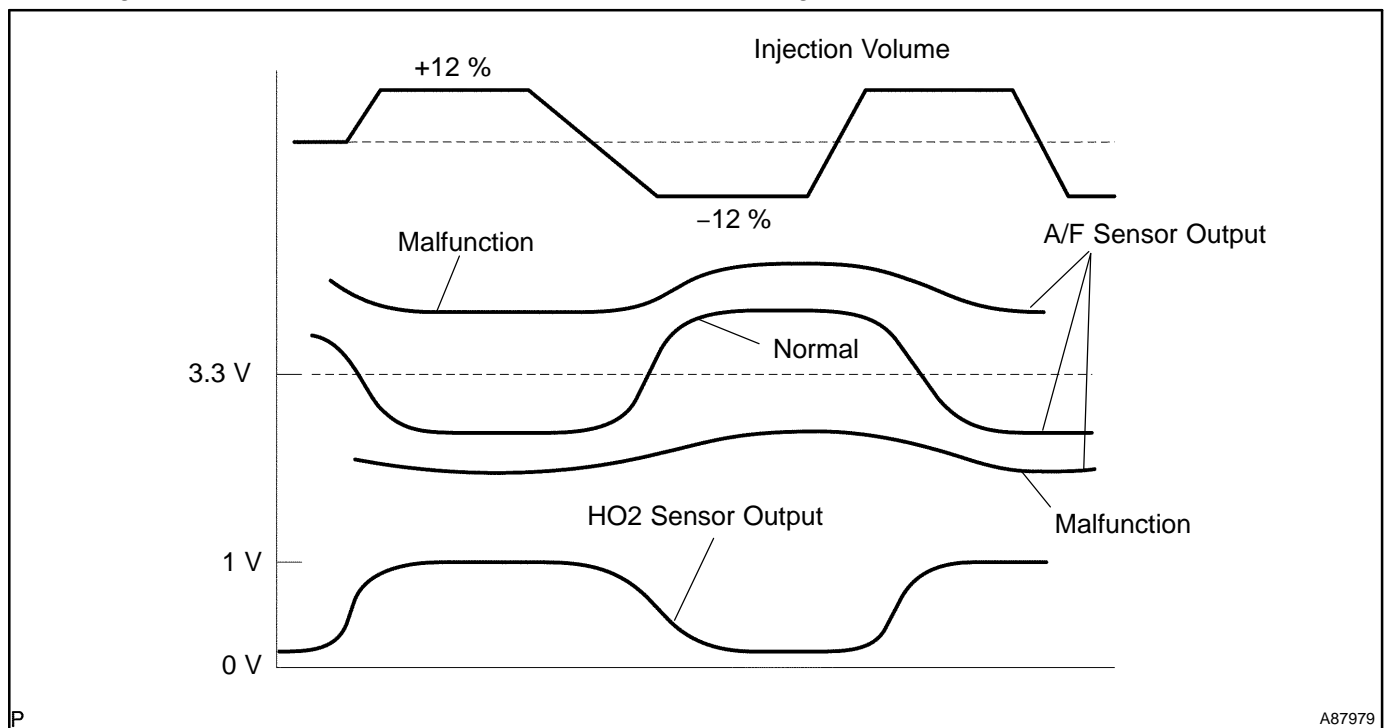
- Change the fuel injection volume within the range of -12 % and +12 %. The injection volume can be changed in 1 % graduations within the range.
- The A/F sensor is displayed as AFS B1S1 (AFS B2S1), and the HO2 sensor is displayed as O2S B1S2 (O2S B2S2), on hand-held testers.

Result:

Tester Display (Sensor)	Voltage Variations	Proceed To
AFS B1S1 (AFS B2S1) (A/F)	Alternates between more and less than 3.3 V	OK
AFS B1S1 (AFS B2S1) (A/F)	Remains at more than 3.3 V	NG
AFS B1S1 (AFS B2S1) (A/F)	Remains at less than 3.3 V	NG

HINT:

A normal HO2 sensor voltage (O2S B1S2) reacts in accordance with increases and decreases in fuel injection volumes. When the A/F sensor voltage remains at either less or more than 3.3 V despite the HO2 sensor indicating a normal reaction, the A/F sensor is malfunctioning.



NG

REPLACE A/F SENSOR

OK

CHECK AND REPLACE EXTREMELY RICH OR LEAN ACTUAL AIR FUEL RATIO

14 CHECK FOR EXHAUST GAS LEAKAGE

(a) Check for exhaust gas leakage from the exhaust manifold and pipe.

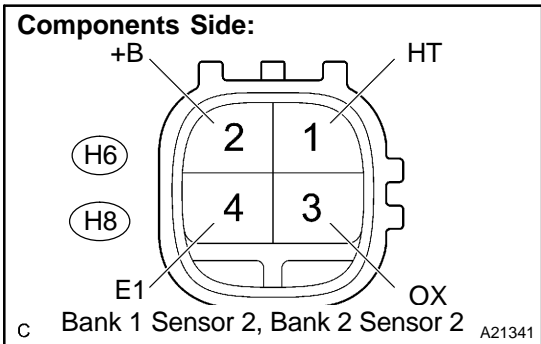
OK:

No exhaust gas leakage.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

15 INSPECT HEATED OXYGEN SENSOR(HEATER RESISTANCE)



- (a) Disconnect the H6 or H8 heated oxygen sensor connector.
- (b) Measure the resistance between the terminals of the heated oxygen sensor connector.

Standard (Bank 1, 2 sensor 2):

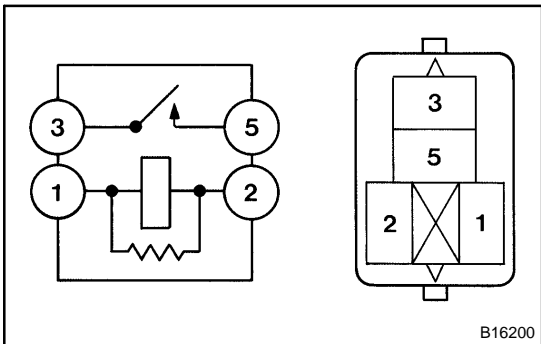
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20 °C (68 °F)
1 (HT) - 4 (E1)	10 kΩ or higher

- (c) Reconnect the HO2 sensor connector.

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

16 INSPECT EFI RELAY



- (a) Remove the EFI relay from the engine room R/B.
- (b) Check for continuity in the EFI relay.

Standard:

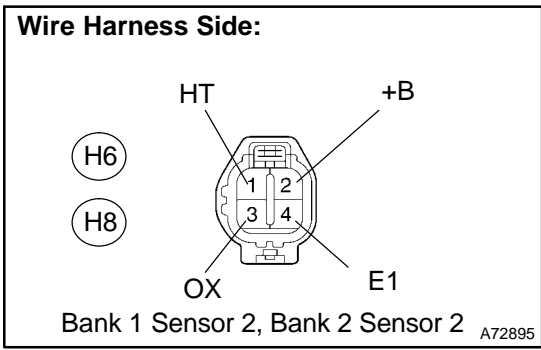
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the EFI relay.

NG → **REPLACE EFI RELAY**

OK

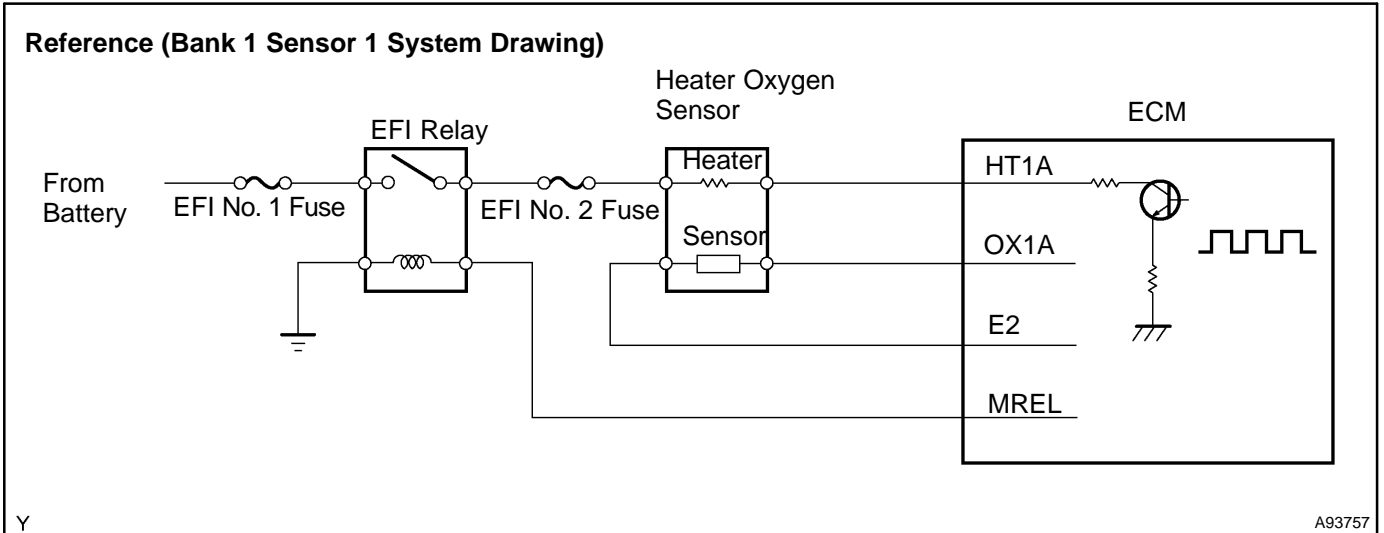
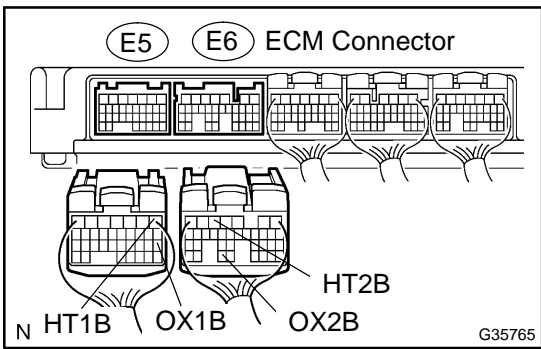
17 CHECK HARNESS AND CONNECTOR(ECM - HEATED OXYGEN SENSOR)



- (a) Disconnect the heated oxygen sensor connector.
- (b) Disconnect the E6 and E5 ECM connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
OX (H6-3) - OX1B (E5-18)	Below 1 Ω
HT (H6-1) - HT1B (E5-1)	Below 1 Ω
OX (H8-3) - OX2B (E6-33)	Below 1 Ω
HT (H8-1) - HT2B (E6-5)	Below 1 Ω
OX (H6-3) or OX1B (E5-18) - Body ground	10 k Ω or higher
HT (H6-1) or HT1B (E5-1) - Body ground	10 k Ω or higher
OX (H8-3) or OX2B (E6-33) - Body ground	10 k Ω or higher
HT (H8-1) or HT2B (E6-5) - Body ground	10 k Ω or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE HEATED OXYGEN SENSOR

DTC	P0171	SYSTEM TOO LEAN (BANK 1)
DTC	P0172	SYSTEM TOO RICH (BANK 1)
DTC	P0174	SYSTEM TOO LEAN (BANK 2)
DTC	P0175	SYSTEM TOO RICH (BANK 2)

CIRCUIT DESCRIPTION

These DTCs indicate that the fuel is not enough (P0171, P0174) or too much (P0172, P0175). A DTC is set when the smoothed fuel trim (short FT + long FT) reaches the malfunction limit. This limit is basically +35% (too lean, adding fuel) or -35% (too rich, subtracting fuel). The values may vary with the emission limit for each vehicle.

Fuel trim is related to the feedback compensation value, not to the basic injection time. Fuel trim includes short term fuel trim and long-term fuel trim.

Short term fuel trim (short FT) is the short term fuel compensation used to maintain the air-fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air-fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air-fuel ratio is RICH and an increase in fuel volume if it is LEAN.

Long term fuel trim (long FT) is overall fuel compensation carried out in long term to compensate for continual deviation of the short term fuel trim from the central value, which is due to individual engine differences, wear overtime and changes in the using environment.

DTC No.	DTC Detection Condition	Trouble Area
P0171 P0174	Sum of short FT and long FT is more than 35% when following conditions are met (2 trip detection logic): <ul style="list-style-type: none"> • Engine is warmed up • Closed loop 	<ul style="list-style-type: none"> • PCV valve and hose • Mass air flow meter • Injector blockage • Air induction system • Fuel pressure • Gas leakage in exhaust system • A/F sensor (bank 1) • A/F sensor (bank 2) • ECM
P0172 P0175	Sum of short FT and long FT is below -35% when following conditions are met (2 trip detection logic): <ul style="list-style-type: none"> • Engine is warmed up • Closed loop 	<ul style="list-style-type: none"> • Mass air flow meter • Injector leak, blockage • Ignition system • Fuel pressure • Gas leakage in exhaust system • A/F sensor (bank 1) • A/F sensor (bank 2) • ECM

MONITOR STRATEGY

Required components/sensors	Fuel system, PCV system
Related components/sensors	A/F sensor, MAF sensor
Frequency of operation	Continuous
Duration	10 seconds
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 V or more
Fuel system status	Closed loop
EVAP purge cut	ON

One of the following conditions is met:

Engine rpm	Less than 1100 rpm
MAF per revolution	0.26 g/rev or more

TYPICAL MALFUNCTION THRESHOLDS

Smoothed fuel trim learning value (too lean)	35 % or more
Smoothed fuel trim learning value (too rich)	-35 % or less

INSPECTION PROCEDURE

1 CONFIRM DTC

- (a) Save the freeze frame data.
- (b) Clear the DTCs.
- (c) Warm up the engine.
- (d) Drive the vehicle for about 10 minutes.
- (e) Make sure that the DTC is present.

NO → Go to step 10

OK

2 CHECK FOR EXHAUST GAS LEAKAGE

Check the leakage from the A/F sensor.

NG → REPAIR

OK

3 CHECK AIR FUEL RATIO SENSOR

- (a) Warm up the engine.
- (b) On the hand-held tester, select "A/F CONTROL" from the active test menu.
- (c) Switch the injection volume between +25% and -12.5%.

OK:

Injection Volume	AFS B1S1, AFS B2S1
+25%	< 3.0 V
-12.5%	> 3.35 V

NG → REPLACE AIR FUEL RATIO SENSOR

OK

4 CHECK PCV VALVE AND HOSE FOR LEAKAGE

NG REPAIR

OK

5 CHECK LEAKAGE BETWEEN AIR CLEANER AND INTAKE MANIFOLD

NG REPAIR

OK

6 CHECK MASS AIR FLOW METER

- (a) Remove the mass air flow meter.
 (b) Check if the foreign matter like lint sticks to the sensor element.

NG CLEAN SENSOR ELEMENT. REPLACE MASS AIR FLOW METER IF NECESSARY

OK

7 CHECK FOR SPARK AND IGNITION

NG REPAIR OR REPLACE

OK

8 CHECK FUEL PRESSURE (See Page 11-6)

NG CHECK FUEL PUMP, FUEL LINE AND FUEL PRESSURE REGULATOR

OK

9 CHECK FUEL INJECTOR (See page 11-8)

NG REPLACE INJECTOR

OK

REPLACE ECM (See Page 10-16)

10 CHECK IF VEHICLE HAS RUN OUT OF FUEL RECENTLY**NO** → **Go to step 11****YES****DTC WAS SET WHEN VEHICLE RAN OUT OF FUEL****11 PERFORM DRIVING PATTERN**

- (a) Turn the ignition switch OFF.
- (b) Start the engine and warm up the engine until the coolant temp reaches 75°C (167°F).
- (c) On the hand-held tester, select "CHECK MODE".
- (d) Drive the vehicle at 60 – 120 km/h (35 – 75 mph) for 5 minutes.
- (e) Check DTCs.

Result:**Is DTC P0171, P0172, P0174 or P0175 present?****NO** → **PERFORM TEST DRIVE ACCORDING TO CUSTOMER INTERVIEW AND FREEZE FRAME DATA UNTIL DTC IS SET****YES****Go to step 2**

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

-MEMO-

DTC	P0230	FUEL PUMP PRIMARY CIRCUIT
------------	--------------	----------------------------------

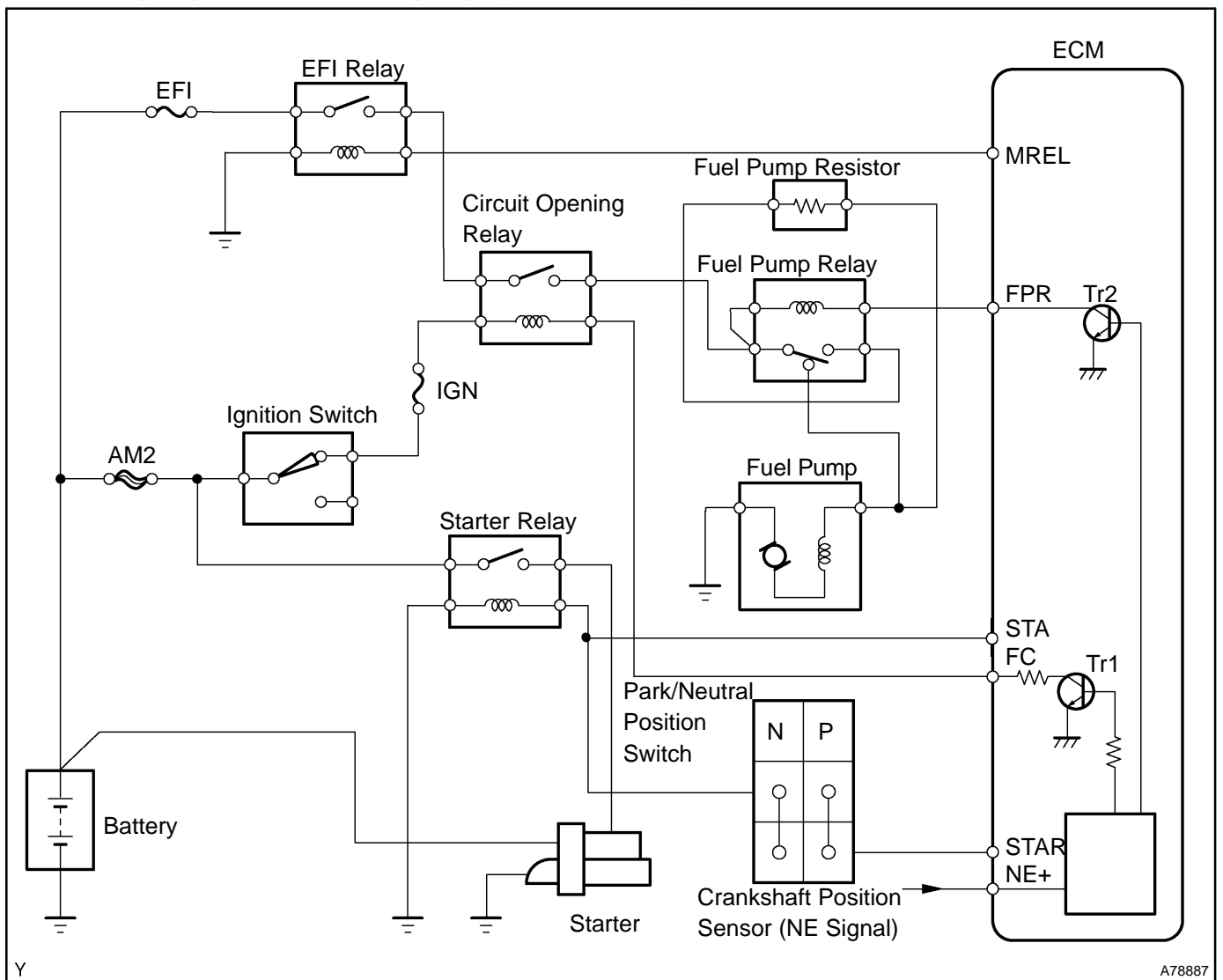
CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal STAR of the ECM to the starter relay coil and also current flows to terminal STA of the ECM (STA signal).

When the STA signal and NE signal are input to the ECM, the Tr1 is turned ON, current flows to the coil of the circuit opening relay, the relay switches on, power is supplied to the fuel pump, and the fuel pump operates.

While the NE signal is generated (engine running), the ECM keeps the Tr1 ON (circuit opening relay ON) and the fuel pump also keeps operating.

The fuel pump speed is controlled at two levels (high speed or low speed) by the engine condition (starting, light load, heavy load). When the engine starts (STA ON), the Tr2 in the ECM is OFF, so the fuel pump relay closes and battery positive voltage is applied directly to the fuel pump. The fuel pump operates at high speed. After the engine starts during idling or light loads, since the Tr2 goes ON, power is supplied to the fuel pump via the fuel pump resistor. The fuel pump operates at low speed.



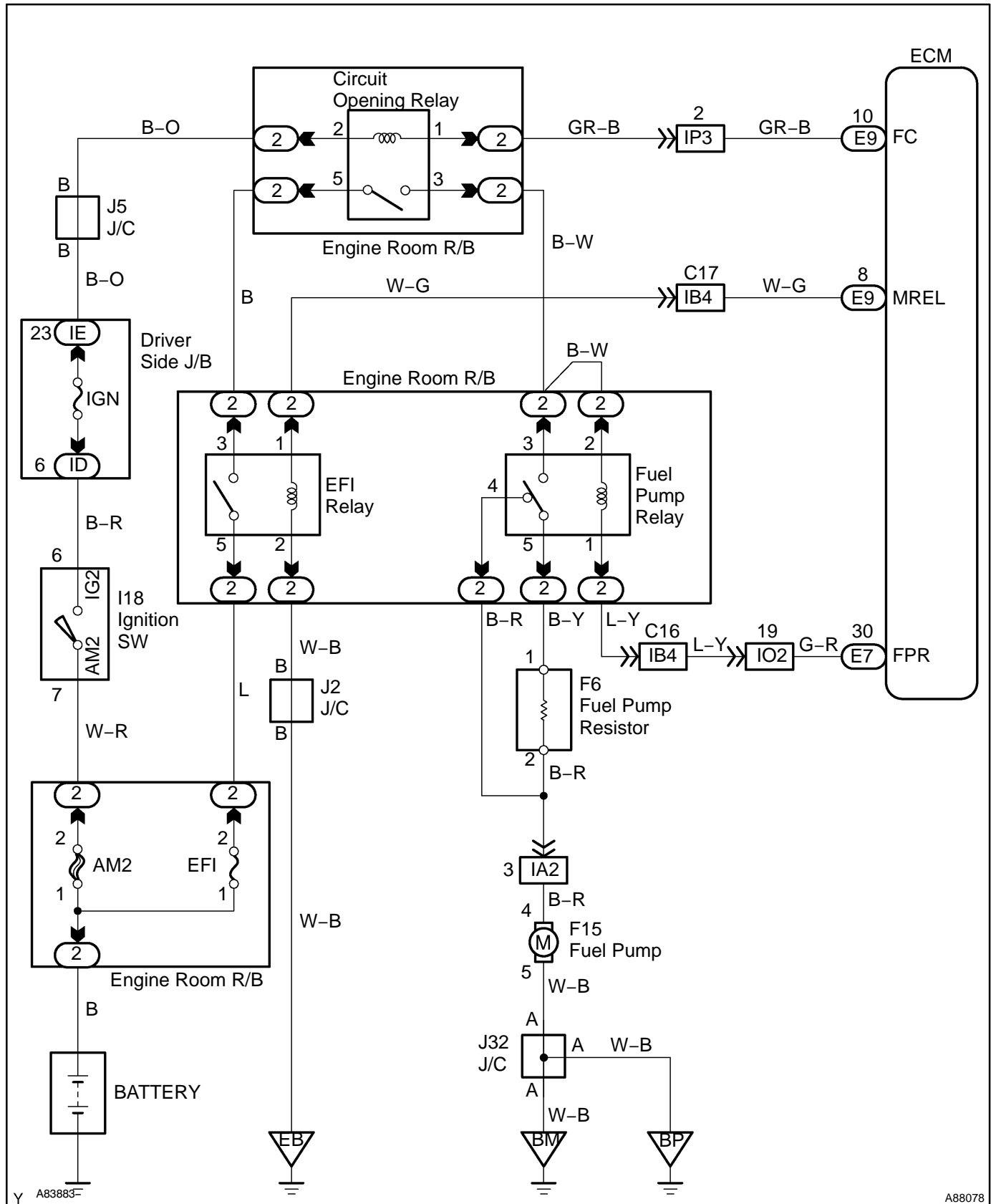
Y

A78887

DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

DTC No.	DTC Detection Condition	Trouble Area
P0230	Open or short in fuel pump relay circuit	<ul style="list-style-type: none">• Open or short in fuel pump relay circuit• Fuel pump relay• Circuit opening relay• Fuel pump• ECM

WIRING DIAGRAM



Y A83883

A88078

HINT:

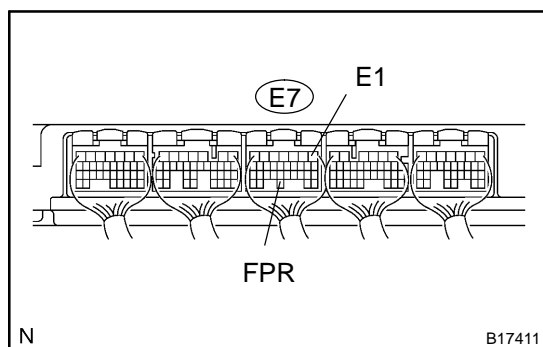
This DTC chart is on the premise that the engine is started. If the engine is not started, proceed to the problem symptoms table on 05-34.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT ECM(FPR VOLTAGE)



- (a) Measure the voltage between the terminals of the E7 ECM connectors.

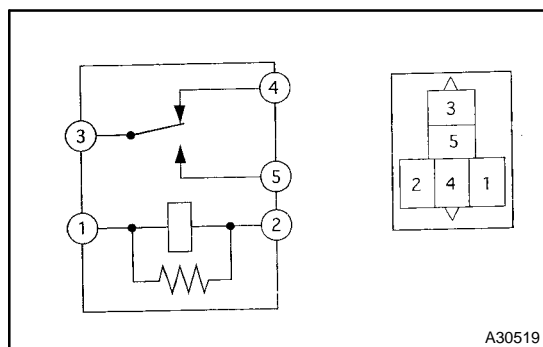
Standard:

Tester Connection	Condition	Specified Condition
FPR (E7-30) - E1 (E7-1)	STA signal ON	9 to 14 V
FPR (E7-30) - E1 (E7-1)	STA signal OFF	0 to 3 V

OK → REPLACE ECM (See page 10-16)

NG

2 INSPECT FUEL PUMP RELAY ASSY



- (a) Remove the fuel pump relay from the engine room R/B.
(b) Check for continuity in the fuel pump relay.

Standard:

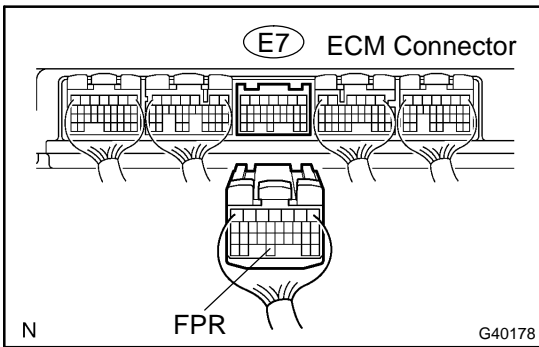
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 4	
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the fuel pump relay.

NG → REPLACE FUEL PUMP RELAY ASSY

OK

3 CHECK HARNESS AND CONNECTOR(FUEL PUMP RELAY - ECM)



- (a) Remove the fuel pump relay from the engine room R/B.
- (b) Disconnect the E7 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

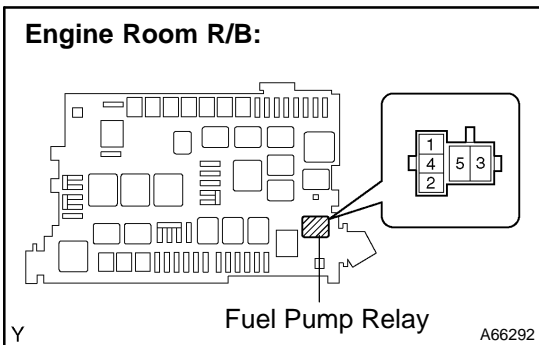
Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (Fuel pump relay terminal 1) - FPR (E7-30)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B (Fuel pump relay terminal 1) or FPR (E7-30) - Body ground	10 kΩ or higher

- (d) Reinstall the fuel pump relay.
- (e) Reconnect the ECM connector.



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

DTC	P0300	RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED
DTC	P0301	CYLINDER 1 MISFIRE DETECTED
DTC	P0302	CYLINDER 2 MISFIRE DETECTED
DTC	P0303	CYLINDER 3 MISFIRE DETECTED
DTC	P0304	CYLINDER 4 MISFIRE DETECTED
DTC	P0305	CYLINDER 5 MISFIRE DETECTED
DTC	P0306	CYLINDER 6 MISFIRE DETECTED
DTC	P0307	CYLINDER 7 MISFIRE DETECTED
DTC	P0308	CYLINDER 8 MISFIRE DETECTED

CIRCUIT DESCRIPTION

When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emissions levels. High concentrations of HC can also cause the temperature of the catalyst to increase, possibly damaging the catalyst. To prevent this increase in emissions and limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the catalyst reaches a point of thermal degradation, the ECM will blink the MIL. For monitoring misfire, the ECM uses both the camshaft position sensor and the crankshaft position sensor. The camshaft position sensor is used to identify misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. The misfire counter increments when crankshaft rotation speed variations exceed threshold values.

If the misfiring rate exceeds the threshold value and could cause emissions deterioration, the ECM illuminates the MIL.

DTC No.	DTC Detection Condition	Trouble Area
P0300	Misfiring of random cylinders is detected	<ul style="list-style-type: none"> • Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM
P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	Misfiring of each cylinder is detected	<ul style="list-style-type: none"> • Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temperature sensor • Compression pressure • Valve clearance • Valve timing • PCV hose connection • PCV hose • ECM

HINT:

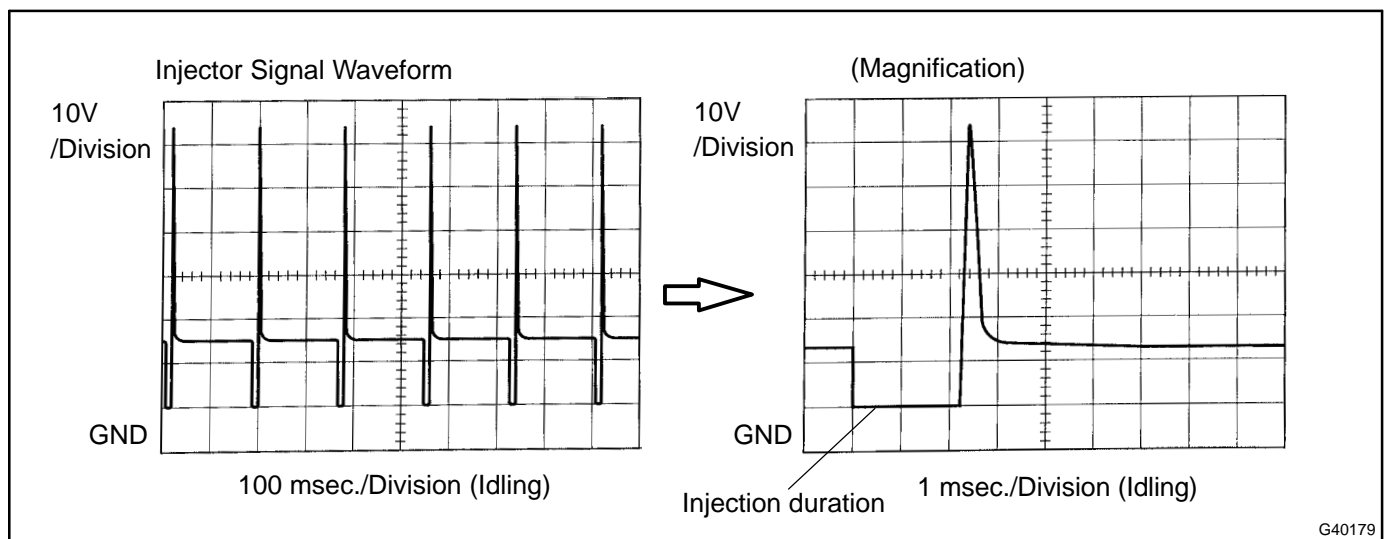
When several DTCs for a misfiring cylinder are recorded repeatedly but no random misfire code is recorded, it indicates that the misfires have been detected and recorded at different times.

Reference: Inspection using oscilloscope

With the engine idling, check the waveform between terminals #1 to #8 and E01 of the ECM connectors.

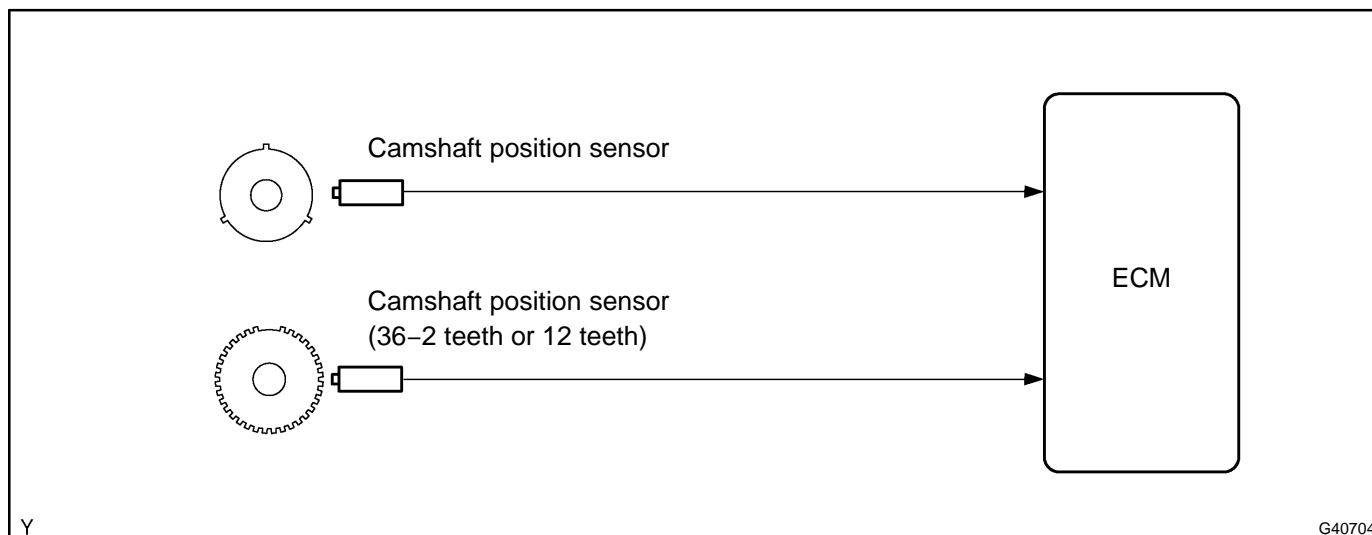
HINT:

The correct waveform is as shown.



G40179

MONITOR DESCRIPTION



The ECM illuminates the MIL (2 trip detection logic) if:

When the percentage of misfire exceeds the specified limit per 1,000 engine revolutions. One occurrence of excessive misfire during engine start will set the MIL. Four occurrences are required to set the MIL 1,000 revolutions after engine start.

The ECM blinks the MIL (the MIL blinks immediately) if:

- Within 200 engine revolutions at a high rpm, the threshold for "percentage of misfire causing catalyst damage" is reached 1 time.
- Within 200 engine revolutions at a normal rpm, the threshold for "percentage of misfire causing catalyst damage" is reached 3 time.

MONITOR STRATEGY

Related DTCs	P0300: Random/Multiple cylinder misfire detected P0301: Cylinder 1 misfire detected P0302: Cylinder 2 misfire detected P0303: Cylinder 3 misfire detected P0304: Cylinder 4 misfire detected P0305: Cylinder 5 misfire detected P0306: Cylinder 6 misfire detected P0307: Cylinder 7 misfire detected P0308: Cylinder 8 misfire detected
Required Sensors/Components (Main)	Camshaft position sensor, Crankshaft position sensor
Required Sensors/Components (Related)	Engine coolant temperature sensor, Intake air temperature sensor, Throttle position sensor
Frequency of Operation	Continuous
Duration	Every 1,000 revolutions (soon after engine is started: 1 time, other: 4 times) (emission related misfire) Every 200 revolutions (1 or 3 times) (catalyst deteriorating misfire)
MIL Operation	2 driving cycles MIL ON Immediate MIL blinking (Catalyst deteriorating misfire)
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	8 V or higher
Throttle position learning	Completed
VVT system	No operate by scan tool
Engine RPM	400 to 5,700rpm
All of following conditions are met:	Conditions 1 and 2
1. Engine coolant temperature	-10°C (14°F) or higher
2. Either of following conditions are met:	Condition (a) or (b)
(a) Engine coolant temperature at engine start	-7°C (19°F) or higher
(b) Engine coolant temperature	20°C (68°F) or higher
Fuel cut	OFF

Emission-related-misfire:

First 1,000 revolutions after engine start, or check mode	Crankshaft 1,000 revolutions
Except above	Crankshaft 1,000 revolutions x 4

Catalyst-damage-misfire (MIL blinks):

All of the following conditions 1, 2 and 3 are met:	Crankshaft 200 revolutions
1. Driving cycle	1st
2. Check mode	OFF
3. Engine RPM	Less than 2,800 rpm
Except above	Crankshaft 200 revolutions x 3

TYPICAL MALFUNCTION THRESHOLDS

Emission-related-misfire:

Misfire rate:	1.2 % or more
---------------	---------------

Catalyst-damage-misfire (MIL blinks):

Number of misfire per 200 revolutions	93 or more (varies with intake air amount and RPM)
Multiple cylinders misfire	Detected

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

Misfire monitor – All cylinders

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A1	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A1	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A2	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A2	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 2

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A3	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A3	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 3

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A4	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A4	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 4

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A5	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A5	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 5

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A6	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A6	\$0C	Multiply by 1 (time)	Misfire counts for last and current driving cycles – total	0	65535

Misfire monitor – Cylinder 6

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A7	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A7	\$0C	Multiply by 1 (time)	Misfire counts for last and current driv- ing cycles – total	0	65535

Misfire monitor – Cylinder 7

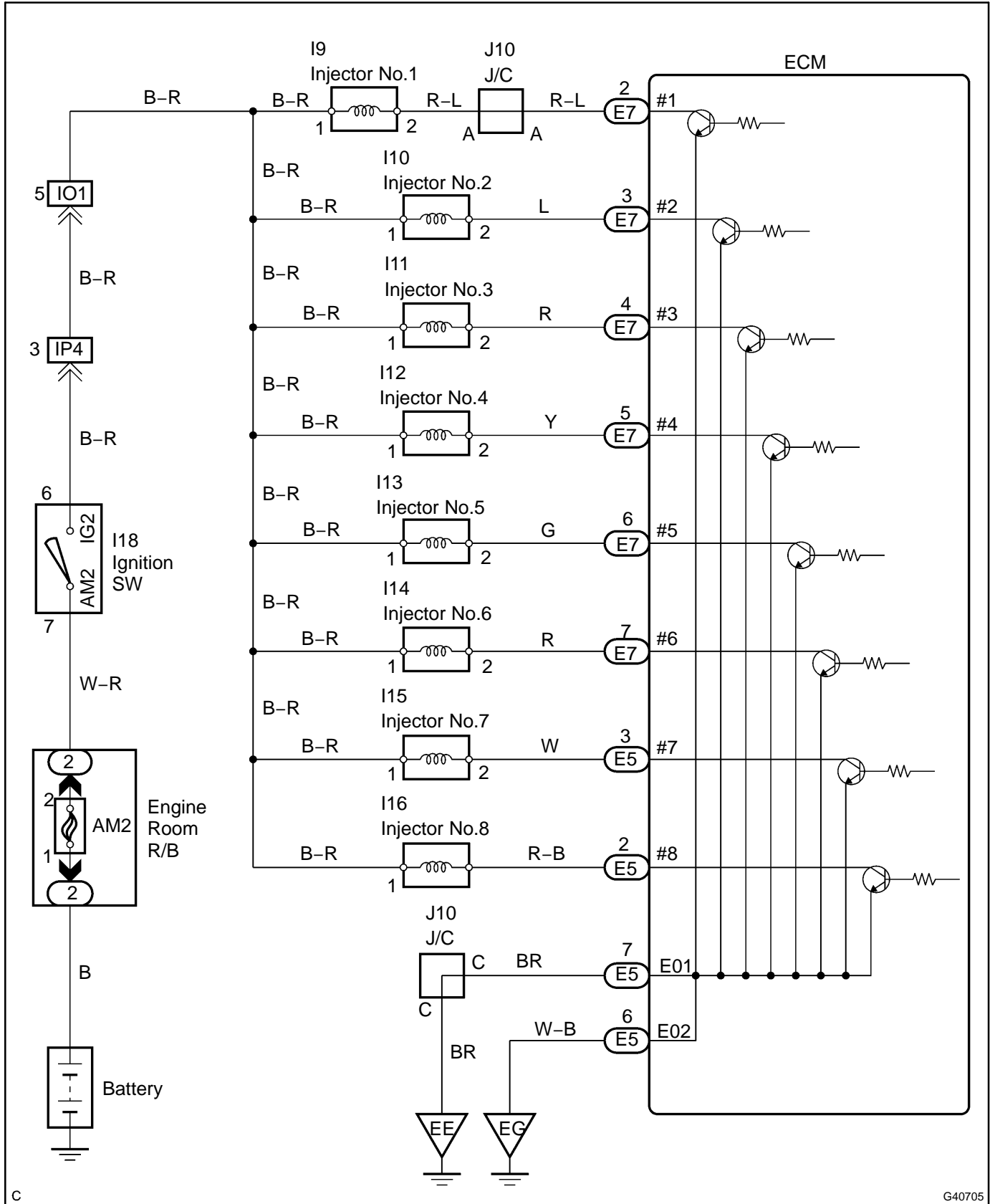
MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A8	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A8	\$0C	Multiply by 1 (time)	Misfire counts for last and current driv- ing cycles – total	0	65535

Misfire monitor – Cylinder 8

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$A9	\$0B	Multiply by 1 (time)	Exponential Weighted Moving Average misfire counts for last 10 driving cycles – total	0	65535
\$A9	\$0C	Multiply by 1 (time)	Misfire counts for last and current driv- ing cycles – total	0	65535

WIRING DIAGRAM

Refer to DTC P0351 on page 05-207 for the wiring diagram of the ignition system.



C

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CONFIRMATION DRIVING PATTERN

- (a) Connect the hand-held tester to the DLC3.
- (b) Record DTC and the freeze frame data.
- (c) Use the hand-held tester to set the check mode (See page 05-46).
- (d) Read the value on the misfire counter for each cylinder when idling. If the value is displayed on the misfire counter, skip the following procedure of confirmation driving.
- (e) Drive the vehicle several times with the engine speed, load and surrounding range shown as ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the DATA LIST.

If you have no hand-held tester, turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again.

HINT:

In order to memorize the DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the DATA LIST for the following period of time. Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode, and all DTCs, etc., are erased.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

- (f) Check if there is misfire, and the DTC and the freeze frame data. Record the DTC's, freeze frame data and misfire counter data.
- (g) Turn the ignition switch OFF and wait for at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If DTCs besides misfire DTCs are memorized simultaneously, troubleshoot the non-misfire DTCs first.
- If the misfire does not occur when the vehicle is brought to the workshop, the misfire can be confirmed by reproducing the condition of the freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See confirmation driving pattern).
- On 6 or 8 cylinder engines, misfiring cylinder identification is disabled at high engine speed and only a general misfire fault code P0300 is stored instead of a cylinder specific misfire fault code (P0301 to P0308).

If the misfire starts in a high engine speed area or the misfire occurs only in a high engine speed area, only code P0300 may be stored.

When only a general misfire fault code like P0300 is stored:

- Erase the general misfire fault code using the hand-held tester
- Start the engine and drive the confirmation pattern.
- Read the value of the misfire ratio for each cylinder. Or read the DTC.
- Repair the cylinder that has a high misfire ratio. Or repair the cylinder indicated by the DTC.
- After finishing repairs, drive the confirmation pattern again and confirm that no misfire occurs.
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is over the range of $\pm 20\%$, there is a possibility that the air-fuel ratio is becoming RICH (-20% or less) or LEAN ($+20\%$ or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during engine warm-up.
- If the misfire cannot be reproduced, the following reasons may apply: 1) the vehicle has low fuel, 2) improper fuel is being used, or 3) the ignition plug is contaminated.
- Be sure to check the value on the misfire counter after the repair.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO MISFIRE DTCS)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTCs.

Result:

Display (DTC output)	Proceed to
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308	A
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 or P0308 and other DTCs	B

HINT:

If any other codes besides P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308 are output, perform the troubleshooting for those DTCs first.

B → **GO TO DTC CHART (See page 05-60)**

A

2 CHECK WIRE HARNESS, CONNECTOR AND VACUUM HOSE IN ENGINE ROOM

- (a) Check the connection conditions of the wire harness and connector.
- (b) Check the vacuum hose piping for disconnection or breaks.

NG → **REPAIR OR REPLACE, THEN CONFIRM THAT THERE IS NO MISFIRE**

OK

3 CHECK CONNECTION OF PCV HOSE**OK:**

PCV hose is connected correctly and is not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

4 READ VALUE OF HAND-HELD TESTER(NUMBER OF MISFIRE)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- Start the engine.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL#1 to CYL#8.
- Read the number of misfire on the hand-held tester.

HINT:

When a misfire is not reproduced, be sure to branch below based on the stored DTC.

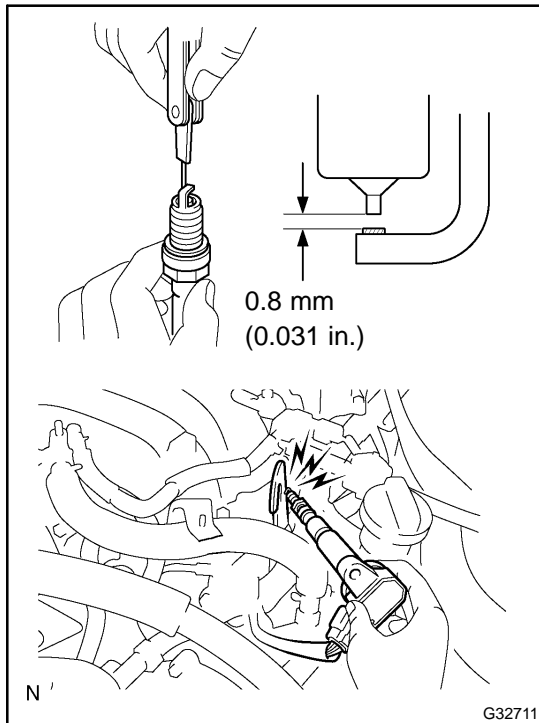
Result:

High Misfire Rate Cylinder	Proceed to
1 or 2 cylinders	A
More than 3 cylinders	B

B Go to step 15

A

5 CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER



- Remove the ignition coil assembly.
- Remove the spark plug.
- Check the spark plug type.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11

- Check the spark plug electrode gap.
Electrode gap: 1.0 to 1.1 mm (0.039 to 0.043 in.)
Maximum electrode gap: 1.3 mm (0.051 in.)

NOTICE:

If adjusting the gap of a new spark plug, bend only "the base/ground" electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.

- Check the electrode for carbon deposits.
- Perform a spark test.

CAUTION:

Absolutely disconnect each injector connector.

NOTICE:

Do not crank the engine for more than 2 seconds.

- Install the spark plug to the ignition coil, and connect the ignition coil connector.
- Disconnect the 8 injector connectors.
- Ground the spark plug.
- Check if spark occurs while the engine is being cranked.

Standard: Spark jumps across electrode gap.

- Reinstall the spark plug.
- Reinstall the ignition coil assy.
- Reinstall the 8 injector connectors.

OK

Go to step 8

NG

6 CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

- (a) Change to the normal spark plug.
 (b) Perform a spark test.

CAUTION:**Absolutely disconnect the each injector connector.****NOTICE:****Do not crank the engine for more than 5 to 10 seconds at a time.**

- (1) Install the spark plug to the ignition coil, and connect the ignition coil connector.
- (2) Disconnect the 8 injector connectors.
- (3) Ground the spark plug.
- (4) Check if spark occurs while the engine is being cranked.

Standard: Spark jumps across electrode gap.

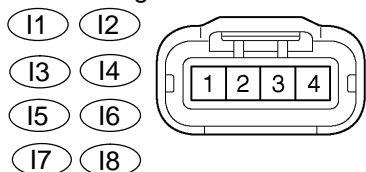
OK

REPLACE SPARK PLUG

NG

7 CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(IGNITION COIL - ECM)**Wire Harness Side:**

Ignition Coil Connector



Y

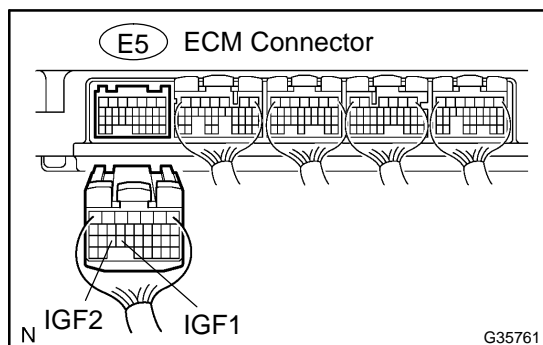
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- (a) Check the harness and connector between the ignition coil and ECM (IGF terminal).

- (1) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (2) Disconnect the E5 ECM connector.
- (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGF (I1-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I2-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I3-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I4-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I5-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I6-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I7-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I8-2) - IGF2 (E5-25)	Below 1 Ω



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Standard (Check for short):

Tester Connection	Specified Condition
IGF (11-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (12-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (13-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (14-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (15-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (16-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (17-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (18-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher

(4) Reconnect the ignition coil connector.

(5) Reconnect the ECM connector.

(b) Check the harness and connector between the ignition coil and ECM (IGT terminals).

(1) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.

(2) Disconnect the E5 ECM connector.

(3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGT (I1-3) - IGT1 (E5-8)	Below 1 Ω
IGT (I2-3) - IGT2 (E5-15)	Below 1 Ω
IGT (I3-3) - IGT3 (E5-11)	Below 1 Ω
IGT (I4-3) - IGT4 (E5-10)	Below 1 Ω
IGT (I5-3) - IGT5 (E5-13)	Below 1 Ω
IGT (I6-3) - IGT6 (E5-12)	Below 1 Ω
IGT (I7-3) - IGT7 (E5-14)	Below 1 Ω
IGT (I8-3) - IGT8 (E5-9)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
IGT (I1-3) or IGT1 (E5-8) - Body ground	10 kΩ or higher
IGT (I2-3) or IGT2 (E5-15) - Body ground	10 kΩ or higher
IGT (I3-3) or IGT3 (E5-11) - Body ground	10 kΩ or higher
IGT (I4-3) or IGT4 (E5-10) - Body ground	10 kΩ or higher
IGT (I5-3) or IGT5 (E5-13) - Body ground	10 kΩ or higher
IGT (I6-3) or IGT6 (E5-12) - Body ground	10 kΩ or higher
IGT (I7-3) or IGT7 (E5-14) - Body ground	10 kΩ or higher
IGT (I8-3) or IGT8 (E5-9) - Body ground	10 kΩ or higher

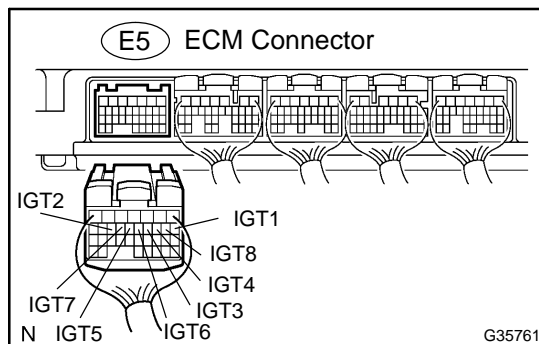
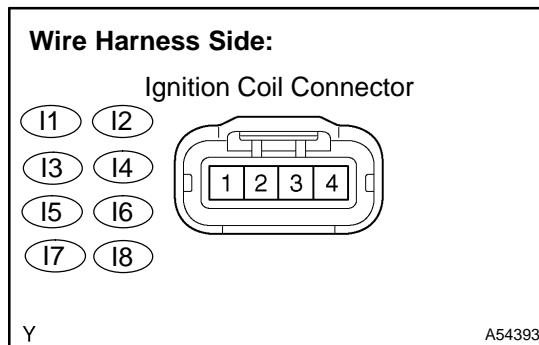
(4) Reconnect the ignition coil connector.

(5) Reconnect the ECM connector.

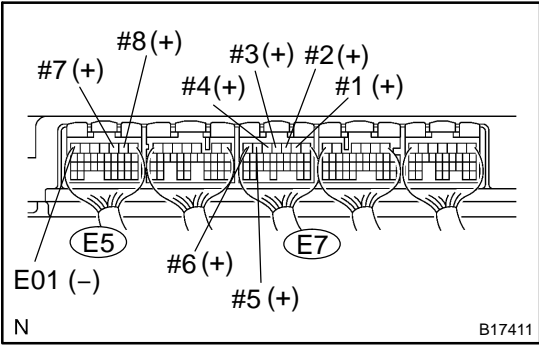
OK

REPLACE IGNITION COIL ASSY (THEN CONFIRM THAT THERE IS NO MISFIRE)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

8 INSPECT ECM TERMINAL OF MISFIRING CYLINDER(#1, #2, #3, #4, #5, #6, #7 OR #8 VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the applicable terminals of the E5 and E7 ECM connectors.

Standard:

Tester Connection	Specified Condition
#1 (E7-2) - E01 (E5-7)	9 to 14 V
#2 (E7-3) - E01 (E5-7)	9 to 14 V
#3 (E7-4) - E01 (E5-7)	9 to 14 V
#4 (E7-5) - E01 (E5-7)	9 to 14 V
#5 (E7-6) - E01 (E5-7)	9 to 14 V
#6 (E7-7) - E01 (E5-7)	9 to 14 V
#7 (E5-3) - E01 (E5-7)	9 to 14 V
#8 (E5-2) - E01 (E5-7)	9 to 14 V

OK → **Go to step 11**

NG

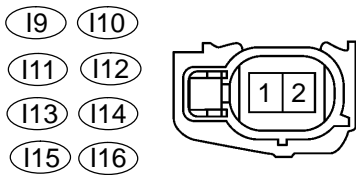
9 INSPECT FUEL INJECTOR RESISTANCE OF MISFIRING CYLINDER (See page 11-8)

NG → **REPLACE FUEL INJECTOR ASSY (See page 11-12)**

OK

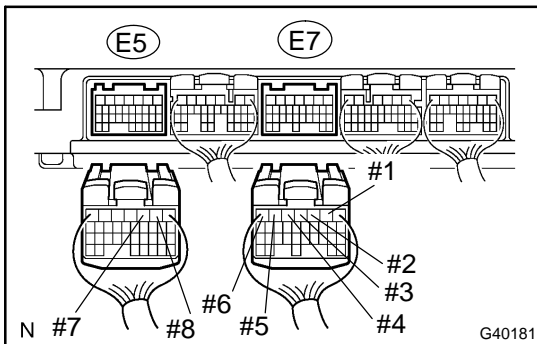
10 CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(INJECTOR - ECM, INJECTOR - IGNITION SWITCH)

Wire Harness Side: Injector Connector



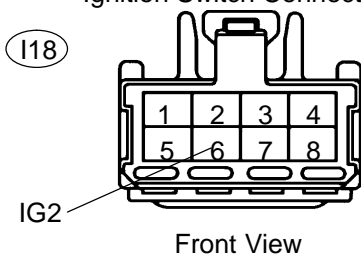
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Wire Harness Side: Ignition Switch Connector



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(a) Check the harness and connector between the injector and ECM.

- (1) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
- (2) Disconnect the E5 or E7 ECM connector.
- (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I9-2) - #1 (E7-2)	Below 1 Ω
Injector (I10-2) - #2 (E7-3)	Below 1 Ω
Injector (I11-2) - #3 (E7-4)	Below 1 Ω
Injector (I12-2) - #4 (E7-5)	Below 1 Ω
Injector (I13-2) - #5 (E7-6)	Below 1 Ω
Injector (I14-2) - #6 (E7-7)	Below 1 Ω
Injector (I15-2) - #7 (E5-3)	Below 1 Ω
Injector (I16-2) - #8 (E5-2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I9-2) or #1 (E7-2) - Body ground	10 k Ω or higher
Injector (I10-2) or #2 (E7-3) - Body ground	10 k Ω or higher
Injector (I11-2) or #3 (E7-4) - Body ground	10 k Ω or higher
Injector (I12-2) or #4 (E7-5) - Body ground	10 k Ω or higher
Injector (I13-2) or #5 (E7-6) - Body ground	10 k Ω or higher
Injector (I14-2) or #6 (E7-7) - Body ground	10 k Ω or higher
Injector (I15-2) or #7 (E5-3) - Body ground	10 k Ω or higher
Injector (I16-2) or #8 (E5-2) - Body ground	10 k Ω or higher

(4) Reconnect the injector connector.

(5) Reconnect the ECM connector.

(b) Check the harness and connector between the injector and ignition switch.

- (1) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
- (2) Disconnect the I18 ignition switch connector.
- (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Injector (I9-1) - IG2 (I18-6)	Below 1 Ω
Injector (I10-1) - IG2 (I18-6)	Below 1 Ω
Injector (I11-1) - IG2 (I18-6)	Below 1 Ω
Injector (I12-1) - IG2 (I18-6)	Below 1 Ω
Injector (I13-1) - IG2 (I18-6)	Below 1 Ω
Injector (I14-1) - IG2 (I18-6)	Below 1 Ω
Injector (I15-1) - IG2 (I18-6)	Below 1 Ω
Injector (I16-1) - IG2 (I18-6)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Injector (I9-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I10-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I11-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I12-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I13-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I14-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I15-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I16-1) or IG2 (I18-6) - Body ground	10 kΩ or higher

(4) Reconnect the injector connector.

(5) Reconnect the ECM connector.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

11	INSPECT FUEL INJECTOR INJECTION AND VOLUME OF MISFIRING CYLINDER (See page 11-8)
-----------	--

NG**REPLACE FUEL INJECTOR ASSY**
(See page 11-12)**OK**

12	CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER (See page 14-1)
-----------	---

NG**REPAIR OR REPLACE****OK**

13	CHECK VALVE CLEARANCE OF MISFIRING CYLINDER (See page 14-6)
-----------	--

NG**ADJUST VALVE CLEARANCE**
(See page 14-6)**OK**

14	SWITCH STEP BY NUMBER OF MISFIRE CYLINDER(REFER RESULT OF STEP 4)
-----------	--

HINT:

- If the result of step 4 is "1 or 2 cylinders", proceed to A.
- If the result of step 4 is "more than 3 cylinders", proceed to B.

B**CHECK FOR INTERMITTENT PROBLEMS**
(See page 05-13)**A**

15	CHECK VALVE TIMING(CHECK FOR LOOSE AND A JUMPED TOOTH OF TIMING BELT) (See page 14-115)
-----------	--

NG

**ADJUST VALVE TIMING
(REPAIR OR REPLACE TIMING BELT)**

OK

16	CHECK FUEL PRESSURE (See page 11-8)
-----------	--

NG

**CHECK AND REPLACE FUEL PUMP,
PRESSURE REGULATOR, FUEL PIPE LINE AND
FILTER**

OK

17	READ VALUE OF HAND-HELD TESTER(INTAKE AIR TEMPERATURE AND MASS AIR FLOW RATE)
-----------	--

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Check the intake air temperature.
- (1) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
- (2) Read the values.
- Temperature: Equivalent to ambient air temperature**
- (d) Check the air flow rate.
- (1) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.
- (2) Read the values.

Standard:

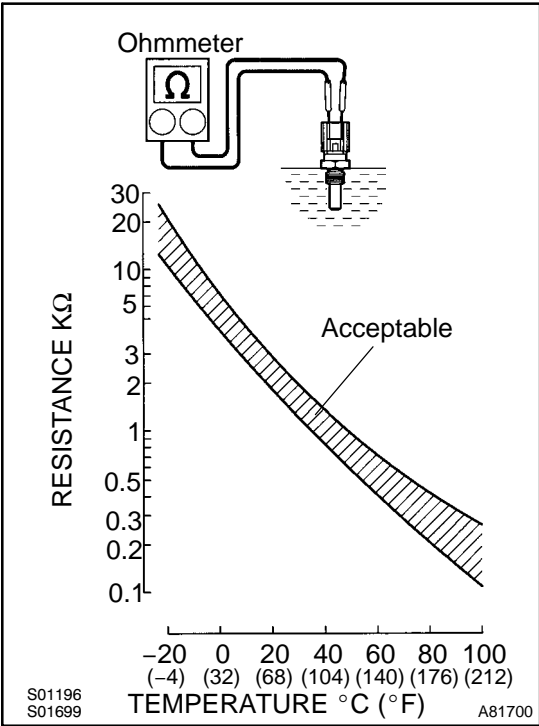
Condition	Air flow rate (gm/s)
Ignition switch ON (do not start engine)	0
Idling	4 to 6
Running without load (2,500 rpm)	13 to 20
Idling to quickly accelerating	Air flow rate fluctuates

NG

REPLACE MASS AIR FLOW METER

OK

18 INSPECT ENGINE COOLANT TEMPERATURE SENSOR(RESISTANCE)



- (a) Remove the engine coolant temperature sensor.
- (b) Measure the resistance between the terminals of the engine coolant temperature sensor.

Resistance:

Tester Connection	Temperature	Specified Condition
1 - 2	20°C (68°F)	2.32 to 2.59 kΩ
1 - 2	80°C (176°F)	0.310 to 0.326 kΩ

NOTICE:

When checking the engine coolant temperature sensor in water, be careful not to allow water to contact the terminals. After checking, dry the sensor.

HINT:

Alternate procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values to the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

- (c) Reinstall the engine coolant temperature sensor.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

19 SWITCH STEP BY NUMBER OF MISFIRE CYLINDER(REFER RESULT OF STEP 4)

HINT:

- If the result of step 4 is "1 or 2 cylinders", proceed to A.
- If the result of step 4 is "more than 3 cylinders", proceed to B.

B → **Go to step 5**

A

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

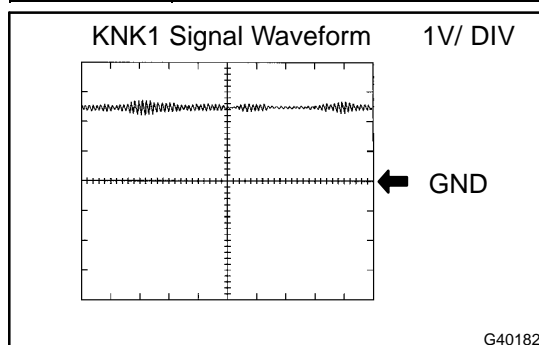
DTC	P0325	KNOCK SENSOR 1 CIRCUIT (BANK 1 OR SINGLE SENSOR)
DTC	P0327	KNOCK SENSOR 1 CIRCUIT LOW INPUT (BANK 1 OR SINGLE SENSOR)
DTC	P0328	KNOCK SENSOR 1 CIRCUIT HIGH INPUT (BANK 1 OR SINGLE SENSOR)
DTC	P0330	KNOCK SENSOR 2 CIRCUIT (BANK 2)
DTC	P0332	KNOCK SENSOR 2 CIRCUIT LOW INPUT (BANK 2)
DTC	P0333	KNOCK SENSOR 2 CIRCUIT HIGH INPUT (BANK 2)

CIRCUIT DESCRIPTION

A flat type knock sensor (non-resonant type) has the structure that can detect the vibration in a wider band of frequency from about 6 kHz to 15 kHz and has the following features.

Knock sensors are fitted on the right bank and left bank of the cylinder block to detect engine knocking. Each knock sensor contains a piezoelectric element which generates voltage when it becomes deformed. Generation of the voltage occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, the ignition timing is retarded in order to suppress the knocking.

DTC No.	DTC Detection Condition	Trouble Area
P0325 P0330	Knock sensor signal level remains at low (1 trip detection logic)	<ul style="list-style-type: none"> • Knock sensor 1 or 2 • Knock sensor 1 or 2 (looseness) • ECM
P0327 P0332	Output voltage of the knock sensor 1 or 2 is 0.5 V or less (1 trip detection logic)	<ul style="list-style-type: none"> • Short in knock sensor 1 or 2 circuit • Knock sensor 1 or 2 • ECM
P0328 P0333	Output voltage of the knock sensor 1 or 2 is 4.5 V or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open in knock sensor 1 or 2 circuit • Knock sensor 1 or 2 • ECM



Reference: Inspection using the oscilloscope.
The correct waveform is as shown.

Item	Details
Terminal	KNK1 - EKNK or KNK2 - EKN2
Equipment Settings	0.01 to 10 V/Division, 0.01 to 10 msec./Division
Condition	After warming up the engine, keep the engine speed at 2,000 rpm.

MONITOR DESCRIPTION

The knock sensor located on the cylinder block detects spark knock.

When spark knock occurs, the sensor pick-up vibrates in a specific frequency range. When the ECM detects the voltage in this frequency range, it retards the ignition timing to suppress the spark knock.

If there is a defect in the knock sensor or an open or short circuit, the voltage level will deviate outside the normal operating range. The ECM interprets this deviation as a defect in the knock sensor and sets a DTC.

Example:

When the knock sensor voltage output is less than 0.5 V, or more than 4.5 V, and if either the condition continues for more than 3 sec.

MONITOR STRATEGY

Related DTCs	P0325: Knock sensor (Bank 1) range check (Chattering) P0327: Knock sensor (Bank 1) range check (Low voltage) P0328: Knock sensor (Bank 1) range check (High voltage) P0330: Knock sensor (Bank 2) range check (Chattering) P0332: Knock sensor (Bank 2) range check (Low voltage) P0333: Knock sensor (Bank 2) range check (High voltage)
Required sensors/Components (Main)	Knock sensor
Required sensors / components (Related)	Crankshaft position sensor, Camshaft position sensor, Engine coolant temperature sensor, Mass air flow meter
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	10.5 V or more
Time after engine start	5 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

Knock sensor range check (Chattering) P0325, P0330:

Knock sensor voltage	Less than 0.5 V, or more than 4.5 V
----------------------	-------------------------------------

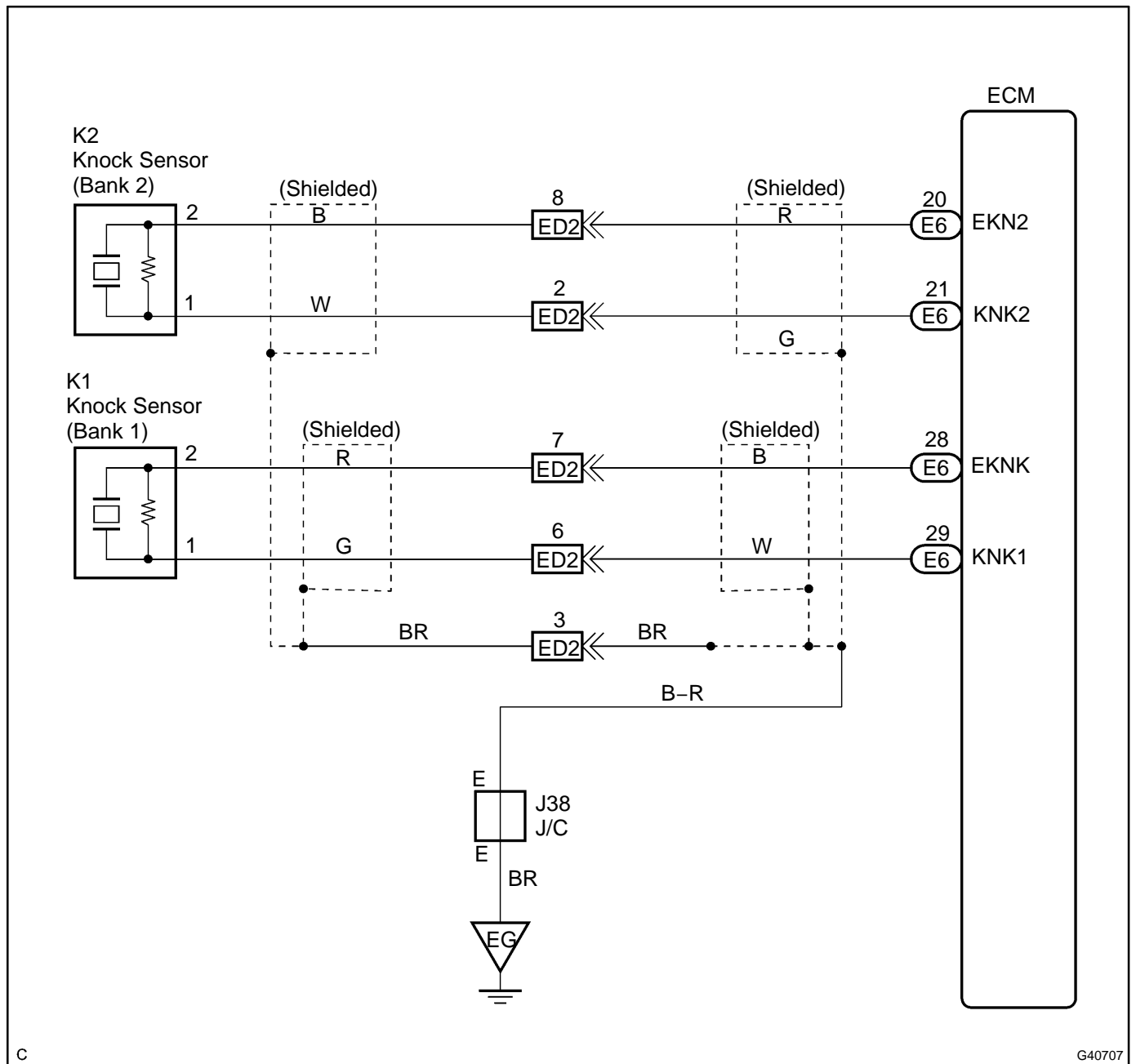
Knock sensor range check (Low voltage) P0327, P0332:

Knock sensor voltage	Less than 0.5 V
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Knock sensor range check (High voltage) P0328, P0333:

Knock sensor voltage	More than 4.5 V
----------------------	-----------------

WIRING DIAGRAM

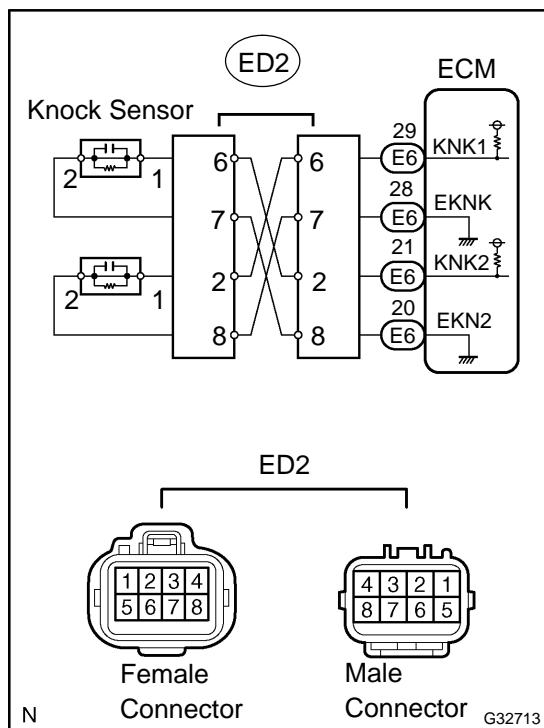


INSPECTION PROCEDURE

HINT:

- DTC P0325, P0327 and P0328 are for the bank 1 knock sensor circuit.
- DTC P0330, P0332 and P0333 are for the bank 2 knock sensor circuit.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ OUTPUT DTC(CHECK KNOCK SENSOR CIRCUIT)



- (a) Disconnect the ED2 connector.
- (b) Using lead wires, connect the ED2 connectors as follows.

Male connector - Female connector
Terminal 6 - Terminal 2
Terminal 2 - Terminal 6
Terminal 7 - Terminal 8
Terminal 8 - Terminal 7

- (c) Warm up the engine.
- (d) Perform a quick engine RPM acceleration at 3,000 rpm for 10 seconds or more.
- (e) Check the DTC.

Standard:

Display	Proceed to
DTC same as when vehicle brought in P0325, P0327, P0328 → P0325, P0327, P0328 or P0330, P0332, P0333 → P0330, P0332, P0333	A
DTC different from when vehicle brought in P0325 → P0330 or P0330 → P0325	B
DTCs different from when vehicle brought in P0327, P0328 → P0332, P0333 or P0332, P0333 → P0327, P0328	C

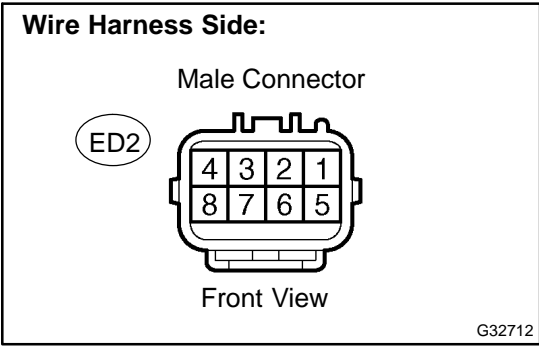
- (f) Reconnect the ED2 connector.

B → Go to step 4

C → Go to step 5

A

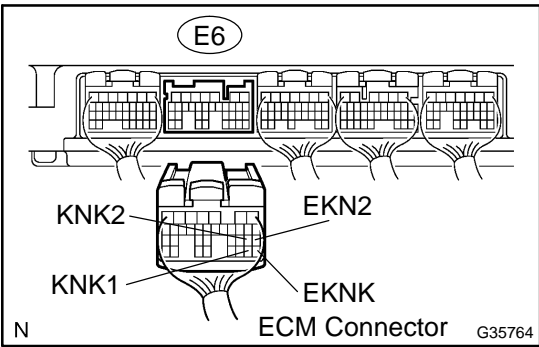
2 CHECK HARNESS AND CONNECTOR(ED2 CONNECTOR - ECM)



- (a) Disconnect the ED2 connector.
- (b) Disconnect the E6 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
ED2 male connector 6 - KNK1 (E6-29)	Below 1 Ω
ED2 male connector 7 - EKNK (E6-28)	Below 1 Ω
ED2 male connector 2 - KNK2 (E6-21)	Below 1 Ω
ED2 male connector 8 - EKN2 (E6-20)	Below 1 Ω



Standard (Check for short):

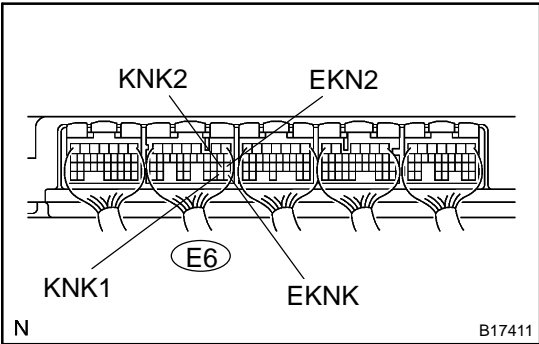
Tester Connection	Specified Condition
ED2 male connector 6 or KNK1 (E6-29) - Body ground	10 kΩ or higher
ED2 male connector 7 or EKNK (E6-28) - Body ground	10 kΩ or higher
ED2 male connector 2 or KNK2 (E6-21) - Body ground	10 kΩ or higher
ED2 male connector 8 or EKN2 (E6-20) - Body ground	10 kΩ or higher

- (d) Reconnect the ED2 connector.
- (e) Reconnect the ECM connector.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM



- (a) Disconnect the E6 ECM connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the specified ECM terminals.

Standard:

Tester Connection	Specified Condition
KNK1 (E6-29) - EKNK (E6-28)	4.5 to 5.5 V
KNK2 (E6-21) - EKN2 (E6-20)	4.5 to 5.5 V

- (d) Reconnect the ECM connector.

NG → **REPLACE ECM (See page 10-16)**

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

4 CHECK KNOCK SENSOR INSTALLATION

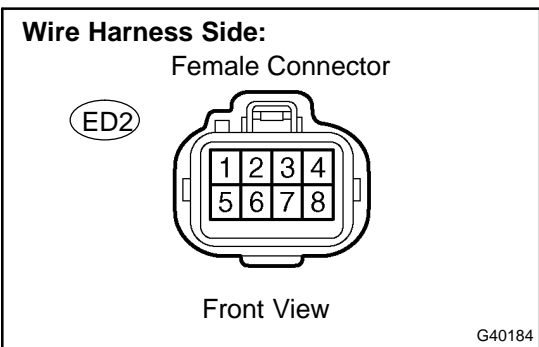
- (a) Check the knock sensor installation.

NG → **TIGHTEN SENSOR**

OK

REPLACE KNOCK SENSOR

5 INSPECT KNOCK SENSOR



- (a) Disconnect the ED2 connector.
- (b) Check the resistance between the terminals of the ED2 male connector.

Standard:

Tester Connection	Specified Condition
ED2 female connector 6 - 7	120 to 280 kΩ
ED2 female connector 2 - 8	120 to 280 kΩ

- (c) Reconnect the ED2 connector.

OK → **CHECK FOR INTERMITTENT PROBLEMS**

NG

6 CHECK HARNESS AND CONNECTOR(EC3 CONNECTOR - ECM)

HINT:

- If DTC P0327 or P0328 has changed to P0332 or P0333, check the knock sensor circuit on the right bank side.
- If DTC P0332 or P0333 has changed to P0327 or P0328, check the knock sensor circuit on the left bank side.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE KNOCK SENSOR**

DTC	P0335	CRANKSHAFT POSITION SENSOR "A" CIRCUIT
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DTC	P0339	CRANKSHAFT POSITION SENSOR "A" CIRCUIT INTERMITTENT
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CIRCUIT DESCRIPTION

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pick-up coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pick-up coil is made of an iron core and magnet. The sensor plate rotates and as each tooth passes through the pick-up coil, a pulse signal is created. The pick-up coil generates 34 signals for each engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine RPM. Using these calculations, the fuel injection time and ignition timing are controlled.

DTC No.	DTC Detection Condition	Trouble Area
P0335	(1) No crankshaft position sensor signal to ECM during cranking (1 trip detection logic) (2) No crankshaft position sensor signal to ECM at engine speed of 600 rpm or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate (crankshaft position sensor plate No. 1) • ECM
P0339	No crankshaft position sensor signal to ECM for 0.05 second or more, and conditions (a), (b) and (c) are met: (a) Engine speed is at 1,000 rpm or more (b) STA signal is OFF (c) 3 seconds or more have elapsed after STA signal is switched from ON to OFF	<ul style="list-style-type: none"> • Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate (crankshaft position sensor plate No. 1) • ECM

MONITOR DESCRIPTION

If there are no signals from the crankshaft sensor even though the engine is revolving, the ECM interprets this as a malfunction of the sensor.

MONITOR STRATEGY

Related DTCs	Crankshaft position sensor range check or rationality
Required Sensors/Components (Main)	Crankshaft position sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	Case 1: 3 times Case 2: 0.016 sec.
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

Case 1:

Time after starter ON to OFF	0.3 sec. or more
Number of camshaft position sensor signal pulse	3 or more
Battery voltage	7 V or more
Ignition switch	ON

Case 2:

Starter	OFF
Engine RPM	More than 450 rpm
Time after starter from ON to OFF	3 sec. or more

TYPICAL MALFUNCTION THRESHOLDS

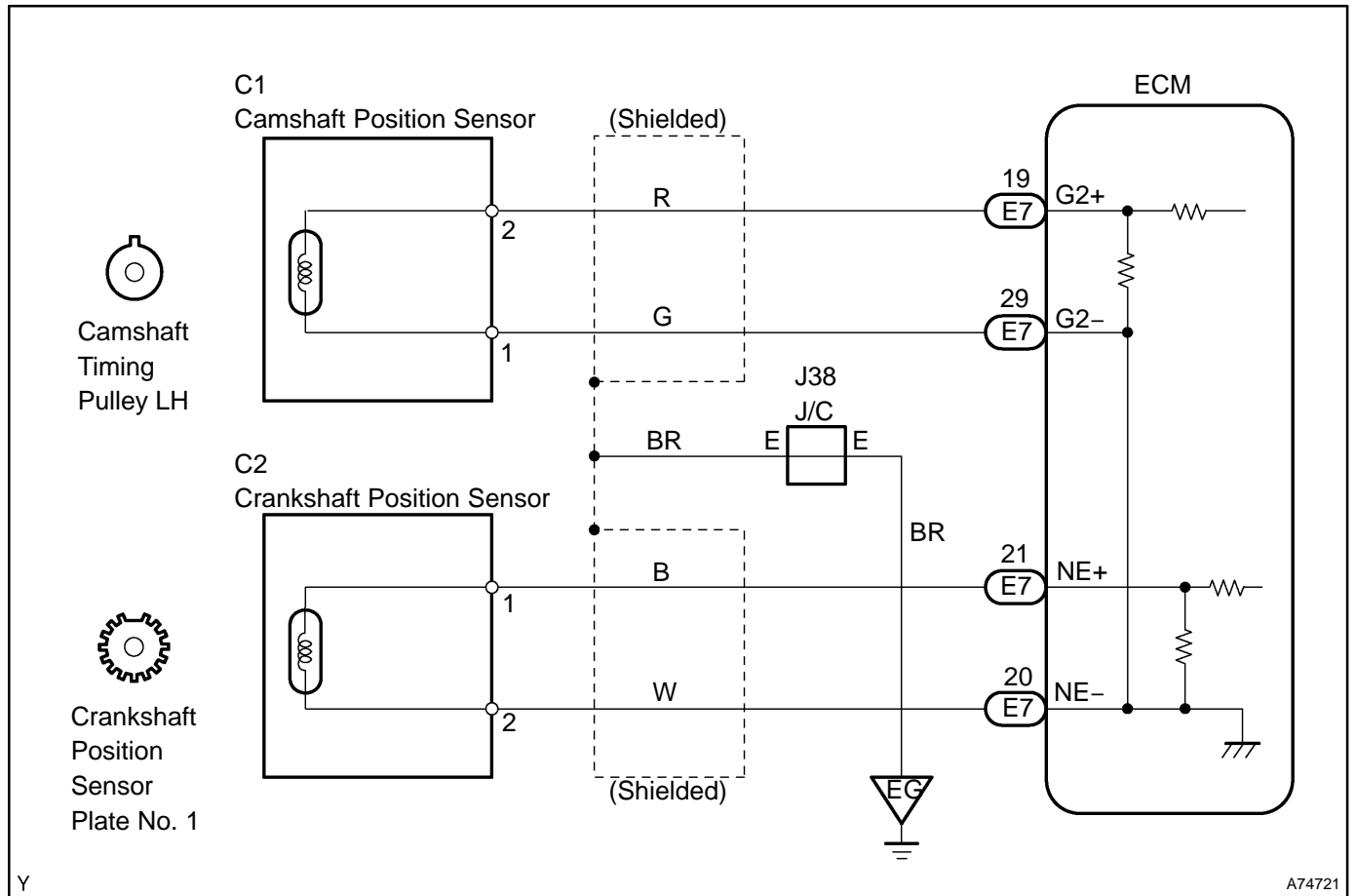
Case 1:

Number of crankshaft position sensor signal pulse	44 or less, or 58 or more
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Case 2:

Engine speed signal	No signal for 0.016 sec.
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WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335 first. If no trouble is found, troubleshoot the engine mechanical systems.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- Read value of hand-held tester
 - (a) Connect the hand-held tester to the DLC3.
 - (b) Start the engine and turn the hand-held tester ON.
 - (c) Select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ENGINE SPD.

The engine speed can be observed in DATA LIST using the hand-held tester. If there is no NE signals from the crankshaft position sensor despite the engine revolving, the engine speed will be indicated as zero. If voltage output from the crankshaft position sensor is insufficient, the engine speed will be indicated as lower PRM (than the actual RPM).

1	INSPECT CRANKSHAFT POSITION SENSOR(RESISTANCE)
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- (a) Disconnect the C2 crankshaft position sensor connector.
- (b) Measure the resistance between terminals of the crankshaft position sensor connector.

Standard:

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
1 - 2	2,065 to 3,225 Ω at hot

NOTICE:

The terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10°C to 50°C (14°F to 122°F). "Hot" means approximately 50°C to 100°C (122°F to 212°F).

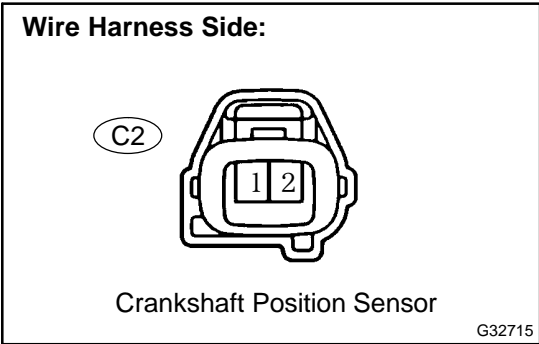
- (c) Reconnect the crankshaft position sensor connector.

NG

REPLACE CRANKSHAFT POSITION SENSOR
(See page 18-4)

OK

2 CHECK HARNESS AND CONNECTOR(CRANKSHAFT POSITION SENSOR - ECM)



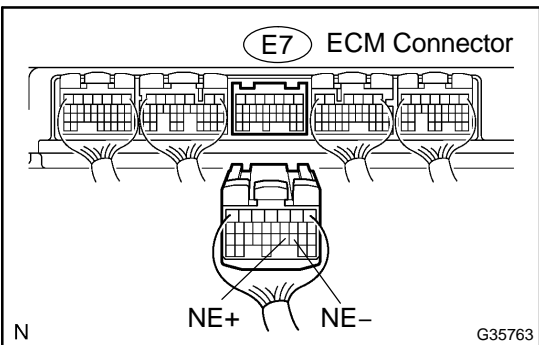
- (a) Disconnect the C2 crankshaft position sensor connector.
- (b) Disconnect the E7 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
NE+ (C2-1) - NE+ (E7-21)	Below 1 Ω
NE- (C2-2) - NE- (E7-20)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
NE+ (C2-1) or NE+ (E7-21) - Body ground	10 kΩ or higher
NE- (C2-2) or NE- (E7-20) - Body ground	10 kΩ or higher

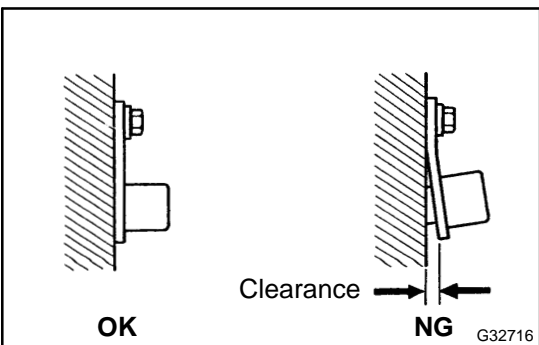


- (d) Reconnect the crankshaft position sensor connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK SENSOR INSTALLATION(CRANKSHAFT POSITION SENSOR)



- (a) Check the crankshaft position sensor installation.
- OK:**
The crankshaft position sensor is installed properly.

NG TIGHTEN SENSOR

OK

4 CHECK CRANKSHAFT POSITION SENSOR PLATE NO.1(TOOTH OF PLATE)

- (a) Remove the crankshaft position sensor plate No. 1.
- (b) Check the tooth of the signal plate.

NG REPLACE CRANKSHAFT POSITION SENSOR PLATE NO.1

OK

REPLACE ECM (See page 10-16)

DTC	P0340	CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR)
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DTC	P0341	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)
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DTC	P0345	CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2)
------------	--------------	--

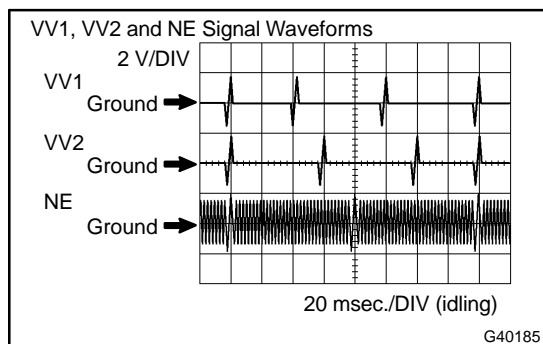
DTC	P0346	CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 2)
------------	--------------	--

CIRCUIT DESCRIPTION

The VVT sensor consists of a magnet, an iron core and a pick-up coil. This sensor monitors a timing rotor located on the camshaft and is used by the ECM to detect the camshaft angle. The camshaft rotation synchronizes with the crankshaft rotation, and this sensor communicates the rotation of the camshaft timing rotor as a pulse signal to the ECM.

If there is no signal from the VVT sensor even though the engine is turning or the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction in the sensor and sets a DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0340 P0345	<ul style="list-style-type: none"> No VVT sensor signal to ECM during cranking (2 trip detection logic) No VVT sensor signal to ECM at engine speed of 600 rpm or more (1 trip detection logic) 	<ul style="list-style-type: none"> Open or short in VVT sensor circuit VVT sensor Bank 1 or 2 camshaft timing pulley Jumped tooth of timing belt ECM
P0341 P0346	While crankshaft rotates twice, VVT sensor signal is input to ECM 12 times or more (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in VVT sensor circuit VVT sensor Bank1 or 2 camshaft timing pulley Jumped tooth of timing belt ECM



Reference: Inspection using the oscilloscope.

The correct waveform is as shown.

Tester Connection	Specified Condition
VV1+ (E7-25) - VV1- (E7-24)	Correct waveform is as shown
VV2+ (E7-18) - VV2- (E7-28)	
NE+ (E7-21) - NE- (E7-20)	

MONITOR DESCRIPTION

If there are no signals from the VVT sensor even though the engine is turning, or if the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor.

MONITOR STRATEGY

Related DTCs	P0340: VVT sensor (Bank 1) range check or rationality P0341: VVT sensor (Bank 1) range check or rationality P0345: VVT sensor (Bank 2) range check or rationality P0346: VVT sensor (Bank 2) range check or rationality
Required Sensors/Components (Main)	VVT sensor
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	5 sec.
MIL Operation	P0340, P0345 case 1: 2 driving cycles P0340, P0345 case 2, P0341, P0346: Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

P0340, P0345 Case 1:

Starter	ON
Minimal battery voltage while starter ON	Less than 11 V

P0340, P0345 Case 2:

Engine RPM	600 rpm or more
Starter	OFF
Battery voltage	8 V or more
Ignition switch	ON

P0341, P0346:

Starter	After OFF to ON timing
Engine revolution	720°CA

TYPICAL MALFUNCTION THRESHOLDS

P0340, P0345 Case 1:

VVT sensor signal	No signal
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P0340, P0345 Case 2:

VVT sensor signal	No signal
-------------------	-----------

P0341, P0346:

VVT sensor count	12 or more / 720°CA (= Engine 2 revolutions)
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COMPONENT OPERATING RANGE

VVT sensor signal input during every 720°CA	3
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WIRING DIAGRAM

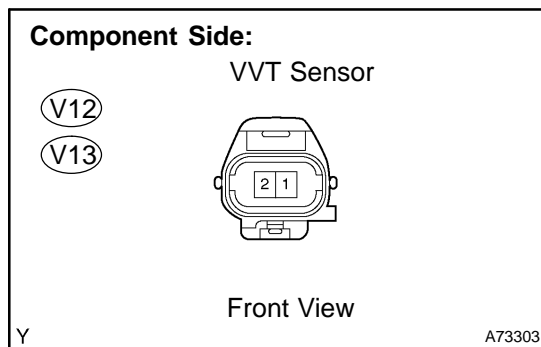
Refer to DTC P0016 on page 05-86.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT VVT SENSOR(RESISTANCE)



- (a) Disconnect the V12 or V13 VVT sensor connector.
- (b) Measure the resistance between the terminals of camshaft position sensor connector.

Standard:

Tester Connection	Specified Condition
1 - 2	835 to 1,400 Ω at cold
1 - 2	1,060 to 1,645 Ω at hot

NOTICE:

The terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10°C to 50°C (14°F to 122°F). "Hot" means approximately 50°C to 100°C (122°F to 212°F).

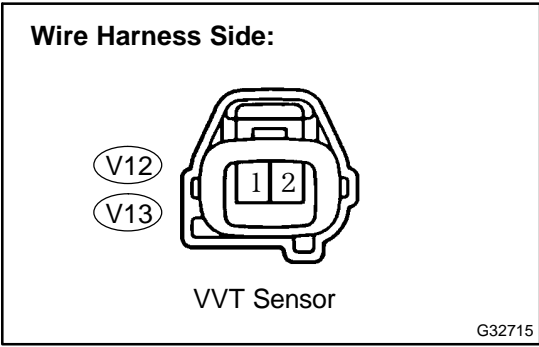
- (c) Reconnect the VVT sensor connector.

NG

REPLACE VVT SENSOR
(See page xx-xxx)

OK

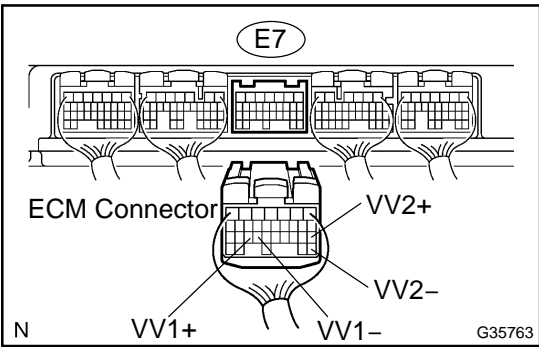
2 CHECK HARNESS AND CONNECTOR(VVT SENSOR - ECM)



- (a) Disconnect the V12 or V13 VVT sensor connector.
- (b) Disconnect the E7 ECM connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VVT sensor (V12-1) - VV1+ (E7-25)	Below 1 Ω
VVT sensor (V12-2) - VV1- (E7-24)	Below 1 Ω
VVT sensor (V13-1) - VV2+ (E7-18)	Below 1 Ω
VVT sensor (V13-2) - VV2- (E7-28)	Below 1 Ω
VVT sensor (V12 -1) or VV1+ (E7-25) - Body ground	10 kΩ or higher
VVT sensor (V12-2) or VV1- (E7-24) - Body ground	10 kΩ or higher
VVT sensor (V13 -1) or VV2+ (E7-18) - Body ground	10 kΩ or higher
VVT sensor (V13-2) or VV2- (E7-28) - Body ground	10 kΩ or higher

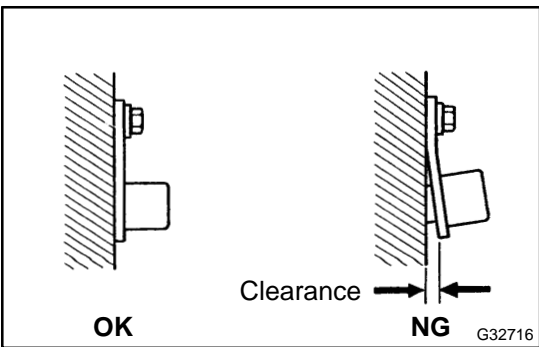


- (d) Reconnect the ECM connector.
- (e) Reconnect the VVT sensor connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 CHECK SENSOR INSTALLATION(VVT SENSOR)



- (a) Check the VVT sensor installation.
- OK:**
The VVT sensor is installed properly.

NG → **TIGHTEN SENSOR**

OK

4 CHECK CAMSHAFT (TOOTH)

- (a) Remove the cylinder head cover.
- (b) Check the tooth of the camshaft.

NG**REPLACE CAMSHAFT****OK****REPLACE VVT SENSOR**

DTC	P0351	IGNITION COIL "A" PRIMARY/SECONDARY CIRCUIT
DTC	P0352	IGNITION COIL "B" PRIMARY/SECONDARY CIRCUIT
DTC	P0353	IGNITION COIL "C" PRIMARY/SECONDARY CIRCUIT
DTC	P0354	IGNITION COIL "D" PRIMARY/SECONDARY CIRCUIT
DTC	P0355	IGNITION COIL "E" PRIMARY/SECONDARY CIRCUIT
DTC	P0356	IGNITION COIL "F" PRIMARY/SECONDARY CIRCUIT
DTC	P0357	IGNITION COIL "G" PRIMARY/SECONDARY CIRCUIT
DTC	P0358	IGNITION COIL "H" PRIMARY/SECONDARY CIRCUIT

CIRCUIT DESCRIPTION

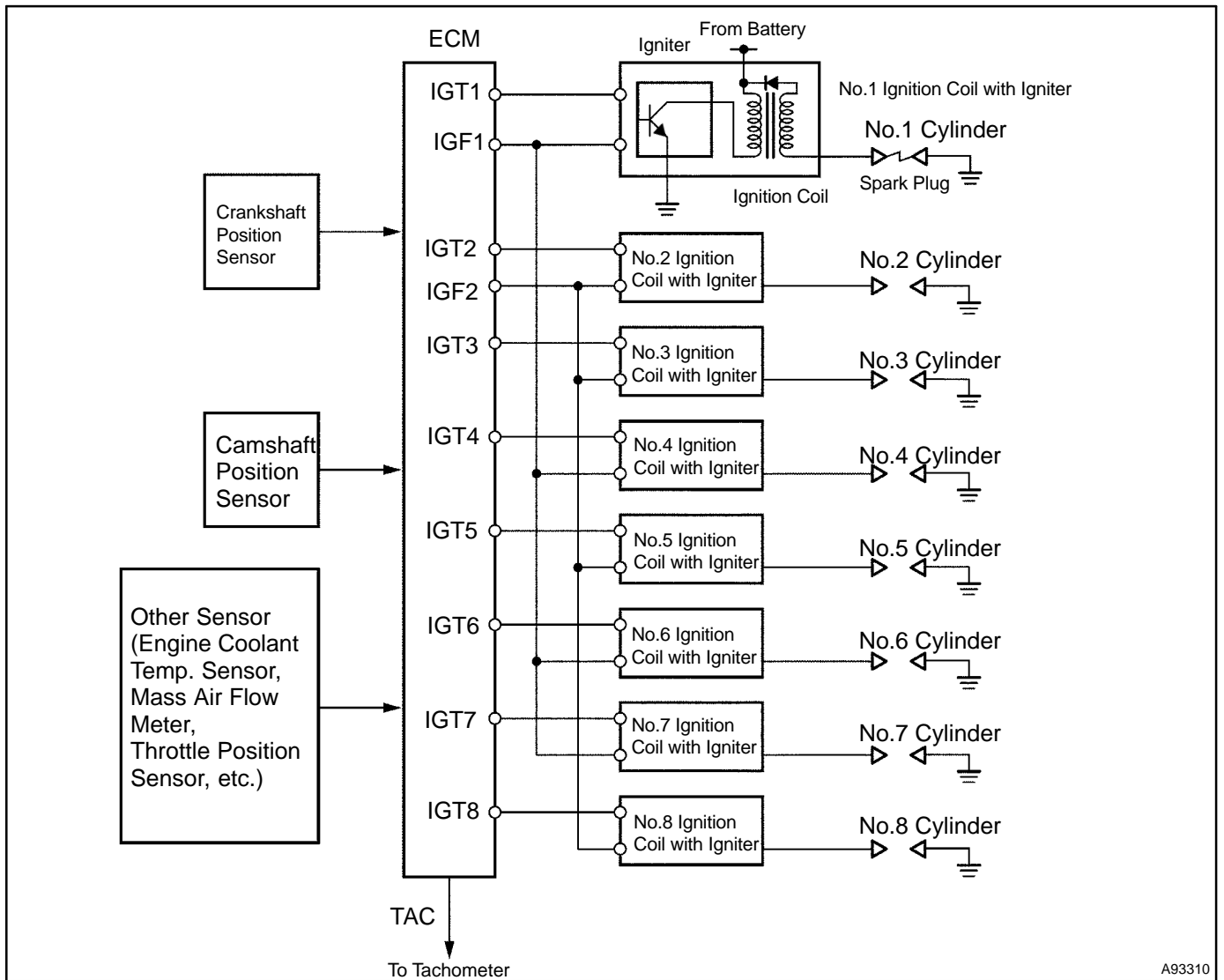
HINT:

- These DTCs indicate a malfunction related to the primary circuit.
- If DTC P0351 is displayed, check No.1 ignition coil with igniter circuit.
- If DTC P0352 is displayed, check No.2 ignition coil with igniter circuit.
- If DTC P0353 is displayed, check No.3 ignition coil with igniter circuit.
- If DTC P0354 is displayed, check No.4 ignition coil with igniter circuit.
- If DTC P0355 is displayed, check No.5 ignition coil with igniter circuit.
- If DTC P0356 is displayed, check No.6 ignition coil with igniter circuit.
- If DTC P0357 is displayed, check No.7 ignition coil with igniter circuit.
- If DTC P0358 is displayed, check No.8 ignition coil with igniter circuit.

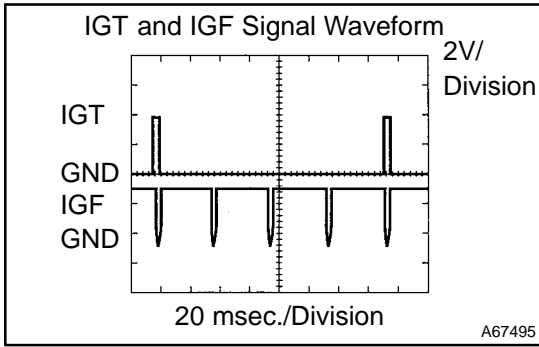
A Direct Ignition System (DIS) has been adopted.

The DIS is a 1-cylinder ignition system which ignites one cylinder with one ignition coil. In the 1-cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug passes from the center electrode to the ground electrode.

The ECM determines the ignition timing and outputs the ignition (IGT) signals for each cylinder. Using the IGT signal, the ECM turns on and off the power transistor inside the igniter and this switches on and off the current to the primary coil. When the current flow to the primary coil is cut off, high-voltage is generated in the secondary coil and this voltage is applied to the spark plugs to spark inside the cylinders. As the ECM cuts the current to the primary coil, the igniter sends back the ignition confirmation (IGF) signal for each cylinder ignition to the ECM.



DTC No.	DTC Detection Condition	Trouble Area
P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358	No IGF signal to ECM while engine is running	<ul style="list-style-type: none"> • Ignition system • Open or short in IGF or IGT1 to 8 circuit between ignition coil with igniter and ECM • No.1 to No.8 ignition coil with igniter (primary ignition) • ECM



Reference: Inspection using the oscilloscope.

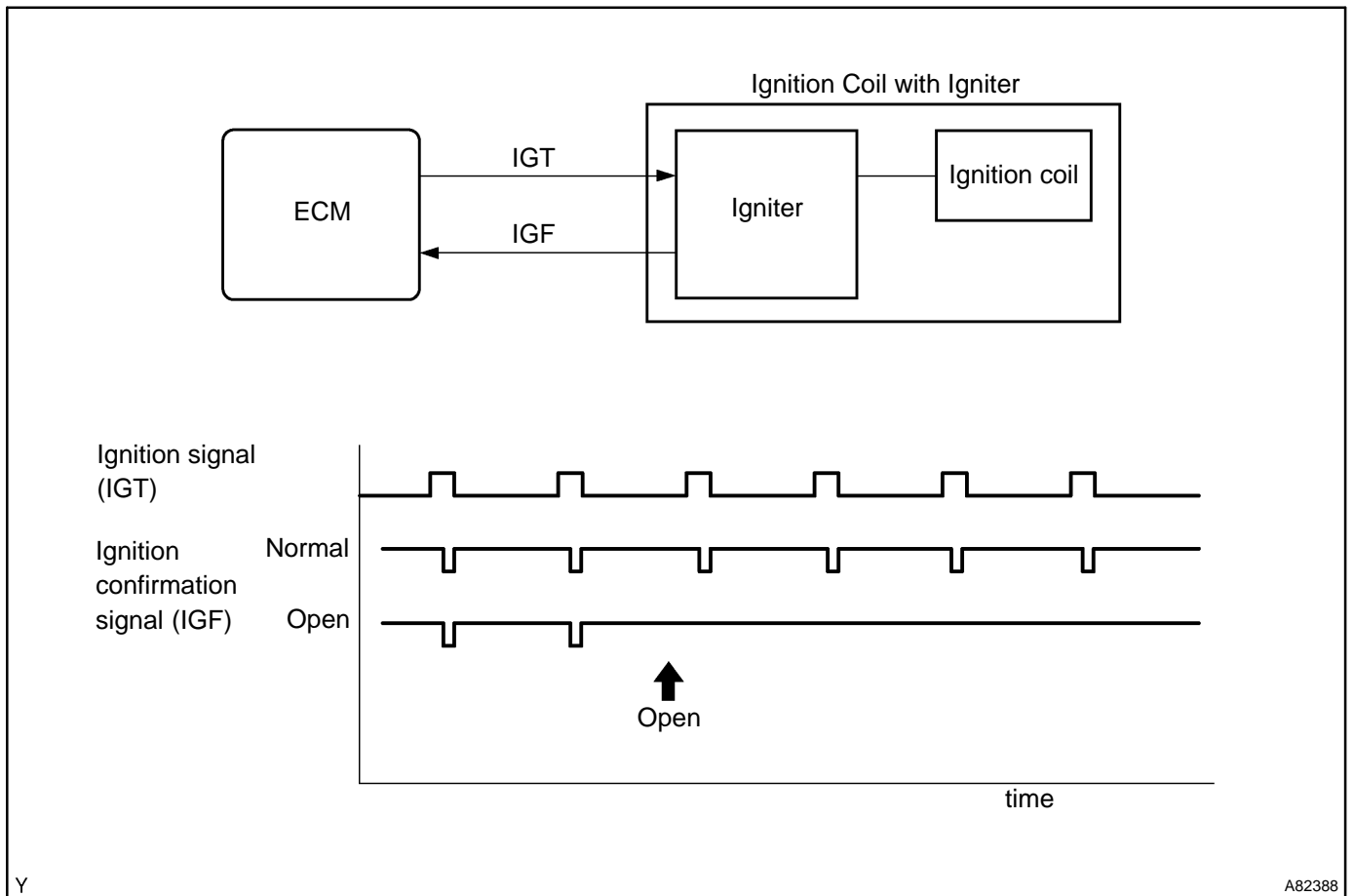
HINT:

The correct waveform is as shown on the left.

Item	Contents
Terminal	CH1: IGT1 to IGT8 - E1 CH2: IGF - E1
Equipment Setting	2V/Division, 20ms/Division
Condition	While the engine is cranking or idling

MONITOR DESCRIPTION

If the ECM does not receive the IGF after sending the IGT, it interprets this as a fault in the igniter and sets a DTC.



If the ECM does not receive the IGF after sending the IGT it interprets this as a fault in the igniter and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0351: Igniter (Cylinder 1) Malfunction P0352: Igniter (Cylinder 2) Malfunction P0353: Igniter (Cylinder 3) Malfunction P0354: Igniter (Cylinder 4) Malfunction P0355: Igniter (Cylinder 5) Malfunction P0356: Igniter (Cylinder 6) Malfunction P0357: Igniter (Cylinder 7) Malfunction P0358: Igniter (Cylinder 8) Malfunction
Required sensors/components (Main)	Igniter
Required sensors/components (Related)	Crankshaft position sensor
Frequency of operation	Continuous
Duration	0.256 sec. + 4 sparks
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Engine speed	1,500 rpm or less
Either of the following conditions is met:	Condition 1 or 2
1. Following conditions are met:	Conditions (a) and (b)
(a) Engine speed	500 rpm or less
(b) Battery voltage	6 V or more
2. Following conditions are met:	Conditions (a) and (b)
(a) Engine speed	More than 500 rpm
(b) Battery voltage	10 V or more

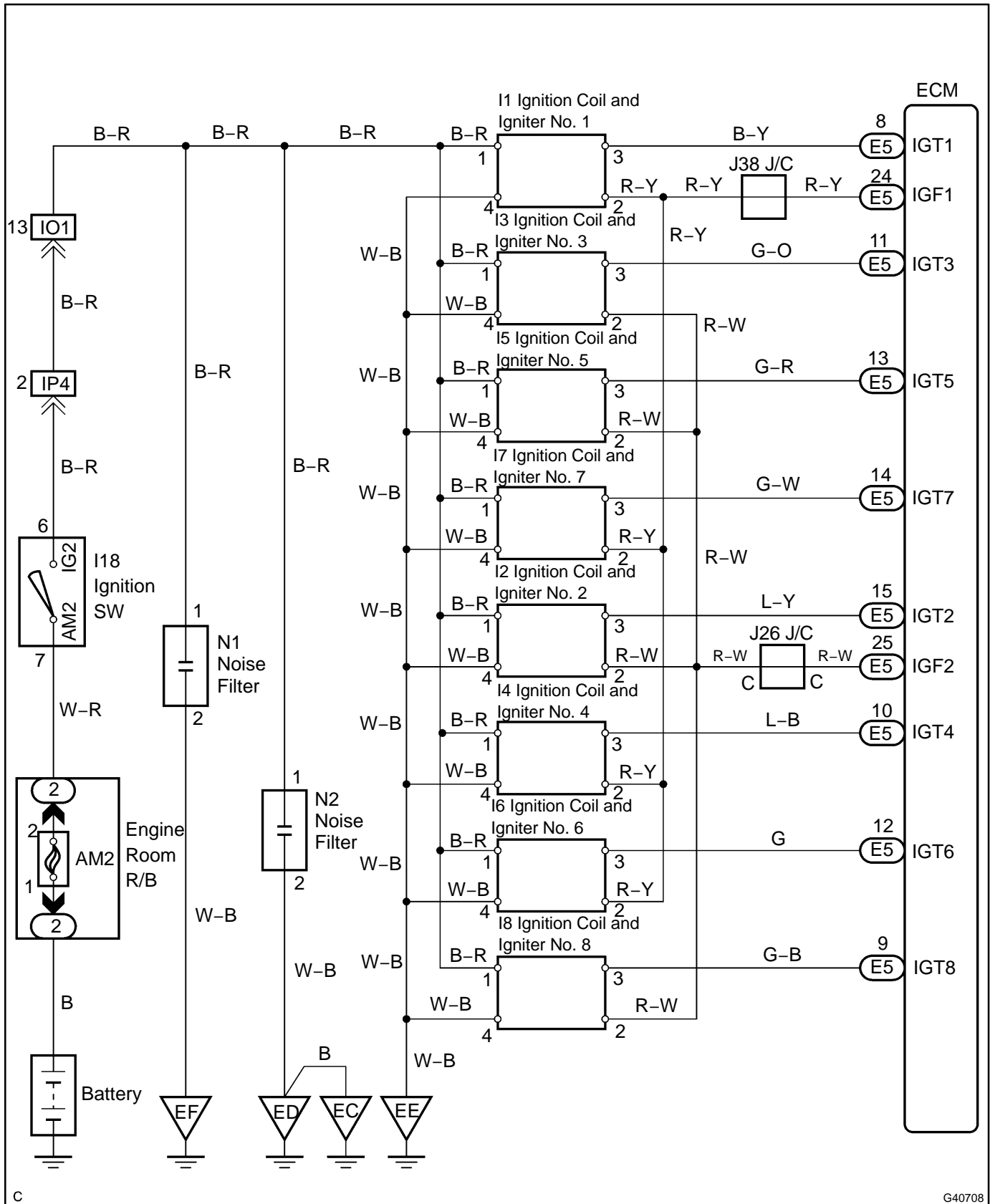
TYPICAL MALFUNCTION THRESHOLDS

"Ignition signal fail count"	More than 2
"Ignition signal fail count" is on the right:	When IGF does not return despite sending IGT.

COMPONENT OPERATING RANGE

IGF signal	Igniter outputs IGF signal when it receives IGT signal from ECM
------------	---

WIRING DIAGRAM



C

G40708

INSPECTION PROCEDURE

HINT:

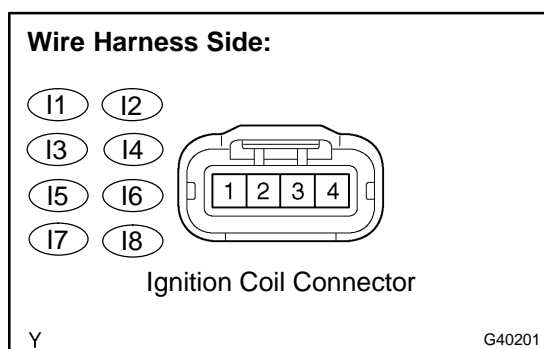
- If DTCs P0351, P0354, P0356 and P0357 are output simultaneously, IGF1 circuit may be open or short.
- If DTCs P0352, P0353, P0355 and P0358 are output simultaneously, IGF2 circuit may be open or short.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER (See page 18-1)

NG Go to step 4

OK

2 CHECK HARNESS AND CONNECTOR(IGNITION COIL - ECM (IGF SIGNAL TERMINAL))



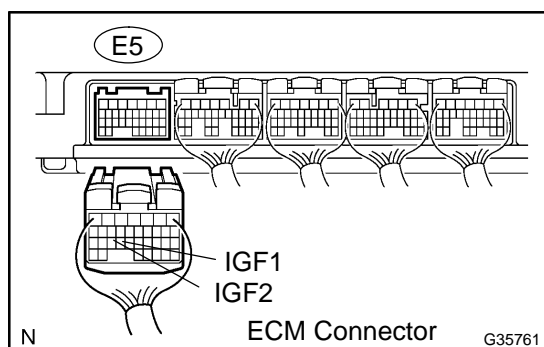
- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- Disconnect the E5 ECM connector.
- Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGF (I1-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I2-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I3-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I4-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I5-2) - IGF2 (E5-25)	Below 1 Ω
IGF (I6-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I7-2) - IGF1 (E5-24)	Below 1 Ω
IGF (I8-2) - IGF2 (E5-25)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
IGF (I1-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (I2-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (I3-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (I4-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (I5-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher
IGF (I6-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (I7-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
IGF (I8-2) or IGF2 (E5-25) - Body ground	10 kΩ or higher

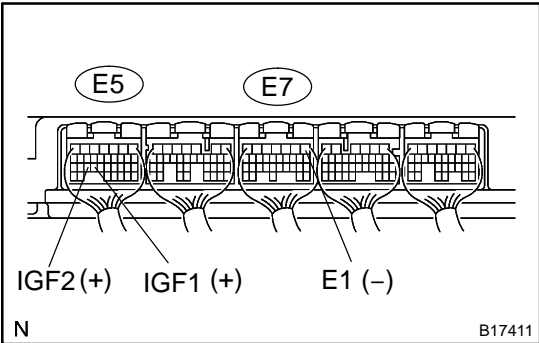


- Reconnect the ignition coil connector.
- Reconnect the ECM connector.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM(IGF1 AND IGF2 VOLTAGE)



- (a) Disconnect the ignition coil connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminals of the E5 and E7 ECM connector.

Standard:

Tester Connection	Specified Condition
IGF1 (E5-24) - E1 (E7-1)	4.5 to 5.5 V
IGF2 (E5-25) - E1 (E7-1)	4.5 to 5.5 V

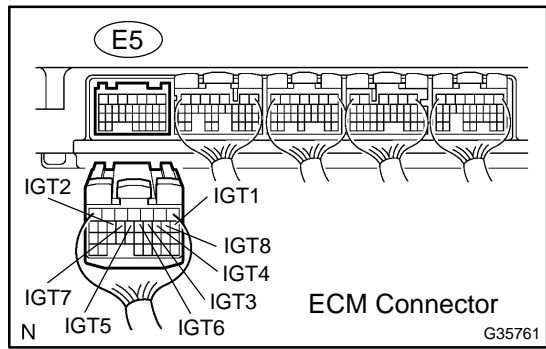
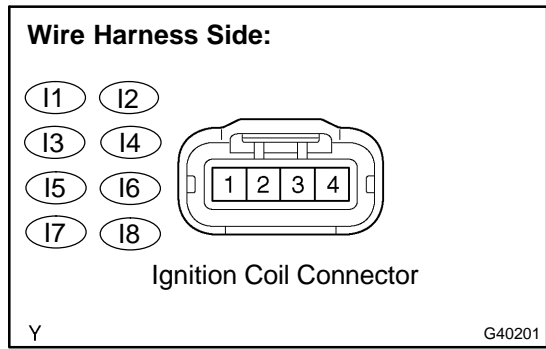
- (d) Reconnect the ignition coil connector.

NG **REPLACE ECM (See page 10-16)**

OK

REPLACE IGNITION COIL ASSY

4 CHECK HARNESS AND CONNECTOR(IGNITION COIL - ECM (IGT SIGNAL TERMINAL))



- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (b) Disconnect the E5 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
IGT (I1-3) - IGT1 (E5-8)	Below 1 Ω
IGT (I2-3) - IGT2 (E5-15)	Below 1 Ω
IGT (I3-3) - IGT3 (E5-11)	Below 1 Ω
IGT (I4-3) - IGT4 (E5-10)	Below 1 Ω
IGT (I5-3) - IGT5 (E5-13)	Below 1 Ω
IGT (I6-3) - IGT6 (E5-12)	Below 1 Ω
IGT (I7-3) - IGT7 (E5-14)	Below 1 Ω
IGT (I8-3) - IGT8 (E5-9)	Below 1 Ω

Standard (Check for short):

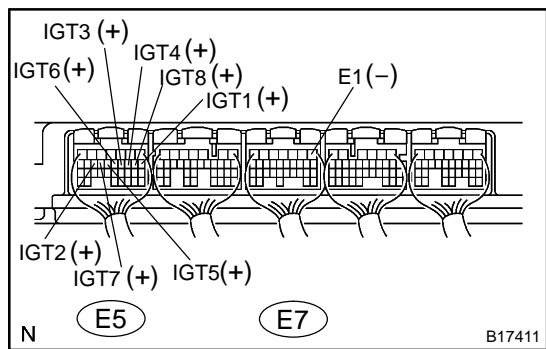
Tester Connection	Specified Condition
IGT (I1-3) or IGT1 (E5-8) - Body ground	10 kΩ or higher
IGT (I2-3) or IGT2 (E5-15) - Body ground	10 kΩ or higher
IGT (I3-3) or IGT3 (E5-11) - Body ground	10 kΩ or higher
IGT (I4-3) or IGT4 (E5-10) - Body ground	10 kΩ or higher
IGT (I5-3) or IGT5 (E5-13) - Body ground	10 kΩ or higher
IGT (I6-3) or IGT6 (E5-12) - Body ground	10 kΩ or higher
IGT (I7-3) or IGT7 (E5-14) - Body ground	10 kΩ or higher
IGT (I8-3) or IGT8 (E5-9) - Body ground	10 kΩ or higher

- (d) Reconnect the ignition coil connector.
- (e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 INSPECT ECM(IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7 OR IGT8 VOLTAGE)



- (a) Measure the voltage between the terminals of the E5 and E7 ECM connectors when the engine is cranked.

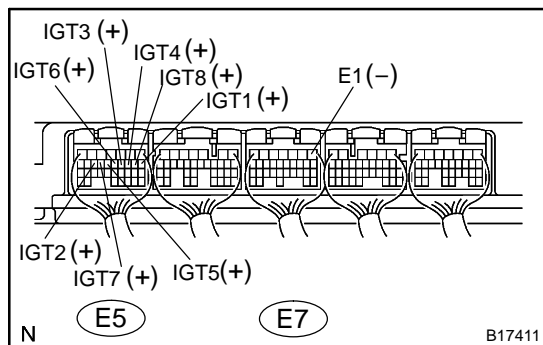
Standard:

Tester Connection	Specified Condition
IGT1 (E5-8) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT2 (E5-15) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT3 (E5-11) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT4 (E5-10) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT5 (E5-13) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT6 (E5-12) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT7 (E5-14) - E1 (E7-1)	Between 0.1 V and 4.5 V
IGT8 (E5-9) - E1 (E7-1)	Between 0.1 V and 4.5 V

NG

REPLACE ECM (See page 10-16)

OK

6 INSPECT ECM(IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7 OR IGT8 VOLTAGE)

- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- Measure the voltage between the terminals of the E5 and E7 ECM connectors when the engine is cranked.

Standard:

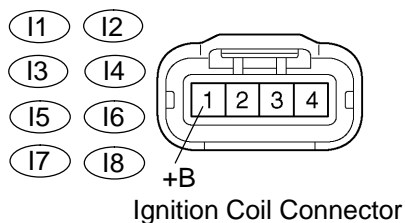
Tester Connection	Specified Condition
IGT1 (E5-8) - E1 (E7-1)	4.5 V or more
IGT2 (E5-15) - E1 (E7-1)	4.5 V or more
IGT3 (E5-11) - E1 (E7-1)	4.5 V or more
IGT4 (E5-10) - E1 (E7-1)	4.5 V or more
IGT5 (E5-13) - E1 (E7-1)	4.5 V or more
IGT6 (E5-12) - E1 (E7-1)	4.5 V or more
IGT7 (E5-14) - E1 (E7-1)	4.5 V or more
IGT8 (E5-9) - E1 (E7-1)	4.5 V or more

- Reconnect the ignition coil connector.

NG

REPLACE ECM (See page 10-16)

OK

7 INSPECT IGNITION COIL ASSY(POWER SOURCE)**Wire Harness Side:**

- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- Turn the ignition switch to ON or START.
- Measure the voltage between the terminal of the wire harness side connector and body ground.

Standard:

Tester Connection	Specified Condition
+B (I1-1) - Body ground	9 to 14 V
+B (I2-1) - Body ground	9 to 14 V
+B (I3-1) - Body ground	9 to 14 V
+B (I4-1) - Body ground	9 to 14 V
+B (I5-1) - Body ground	9 to 14 V
+B (I6-1) - Body ground	9 to 14 V
+B (I7-1) - Body ground	9 to 14 V
+B (I8-1) - Body ground	9 to 14 V

- Reconnect the ignition coil connector.

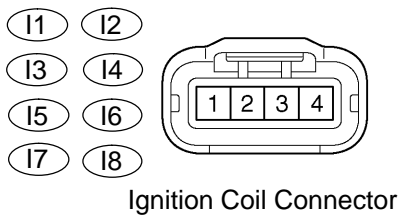
OK

REPLACE IGNITION COIL ASSY

NG

8 CHECK HARNESS AND CONNECTOR(IGNITION COIL - IGNITION SWITCH)

Wire Harness Side:



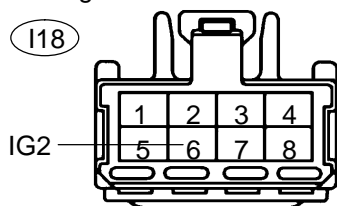
Ignition Coil Connector

Y

G40201

Wire Harness Side:

Ignition Switch Connector



Front View

A61075

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (b) Disconnect the I18 ignition switch connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
+B (I1-1) - IG2 (I18-6)	Below 1 Ω
+B (I2-1) - IG2 (I18-6)	Below 1 Ω
+B (I3-1) - IG2 (I18-6)	Below 1 Ω
+B (I4-1) - IG2 (I18-6)	Below 1 Ω
+B (I5-1) - IG2 (I18-6)	Below 1 Ω
+B (I6-1) - IG2 (I18-6)	Below 1 Ω
+B (I7-1) - IG2 (I18-6)	Below 1 Ω
+B (I8-1) - IG2 (I18-6)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (I1-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I2-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I3-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I4-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I5-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I6-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I7-1) or IG2 (I18-6) - Body ground	10 k Ω or higher
+B (I8-1) or IG2 (I18-6) - Body ground	10 k Ω or higher

- (d) Reconnect the ignition coil connector.
- (e) Reconnect the ignition switch connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE IGNITION COIL ASSY

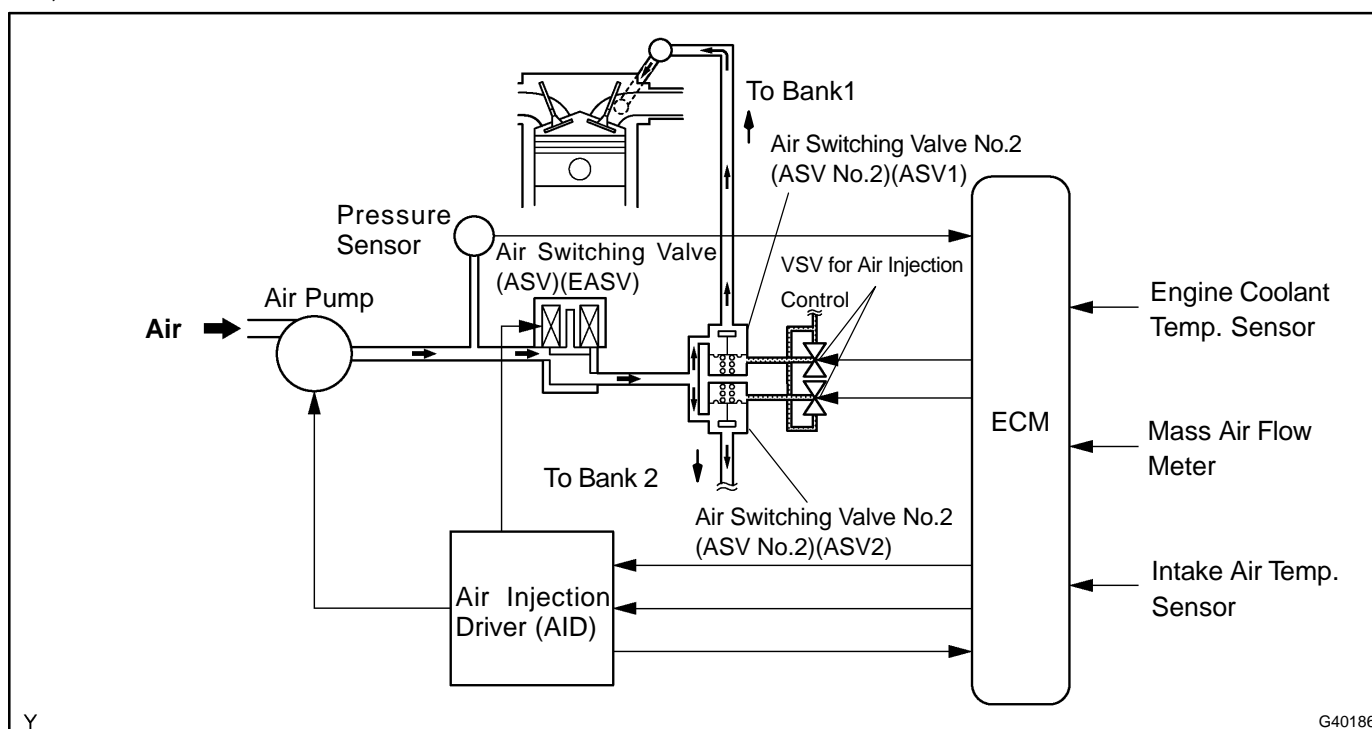
DTC	P0412	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "A" CIRCUIT
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CIRCUIT DESCRIPTION

The secondary air injection system pumps air to the exhaust port to accelerate the activation of the catalyst. The secondary air injection system consists of the ECM, air pump, Air Switching Valve (ASV) (EASV), Air Switching Valve No.2 (ASV No.2) (ASV1, 2), pressure sensor and air injection driver (AID). The Air Switching Valve (ASV)(EASV) is an electromagnetic type and Air Switching Valve No.2 (ASV No.2)(ASV1,2) is a vacuum type.

The secondary air injection system pumps pressurized air to the exhaust port by the air pump through the ASV and ASV No.2. The ASV assists the ASV No.2. The ASV No.2 also controls air supply.

The ECM sends signals to the AID, and then the AID operates the air pump and ASV. The pressure sensor detects pressure and exhaust pulsation in the system when the system operates and when it does not operate, and sends the data to the ECM.



DTC No.	DTC Detection Condition	Trouble Area
P0412	All of the following conditions are met when engine is idling just after cold start (1 trip detection logic): (a) Air injection system does not operate (Air pump OFF and all ASVs OFF) (b) Air injection driver diagnostic signal duty is 40%.	<ul style="list-style-type: none"> • Open in air switching valve drive circuit • Short between air switching valve circuit and +B circuit • Air injection driver • Air switching valve • ECM
P0412	All of the following conditions are met when engine is idling just after cold start (1 trip detection logic): (a) Air injection system operates (Air pump ON and all ASVs ON) (b) Air injection driver diagnostic signal duty is 40%.	<ul style="list-style-type: none"> • Short between air switching valve circuit and body ground • Air injection driver • Air switching valve • ECM

MONITOR DESCRIPTION

The air injection driver (AID) detects an open or short in the circuit according to the voltage of the air pump terminal (VP) and electromagnetic air switching valve terminal (VV), and sends a signal as diagnostic information to the ECM.

The AID outputs the air switching valve terminal malfunction signal to the ECM if: 1) VV terminal voltage is low despite the AID receiving the command signal from the ECM to drive the air switching valve terminal or 2) VV terminal voltage is high despite the AID not receiving the command signal from the ECM.

The ECM stores the DTC based on the diagnostic signal from the AID and illuminates the MIL.

MONITOR STRATEGY

Related DTCs	P0412: Air switching valve circuit malfunction (Secondary air injection system)
Required sensors/components	Air injection driver, Air switching valve
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITION

All:

The monitor will run whenever this DTC is not present	See page 05-20
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Case 1:

Air pump	Operating
Air switching valve	Operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 2:

Air pump	Not operating
Air switching valve	Not operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

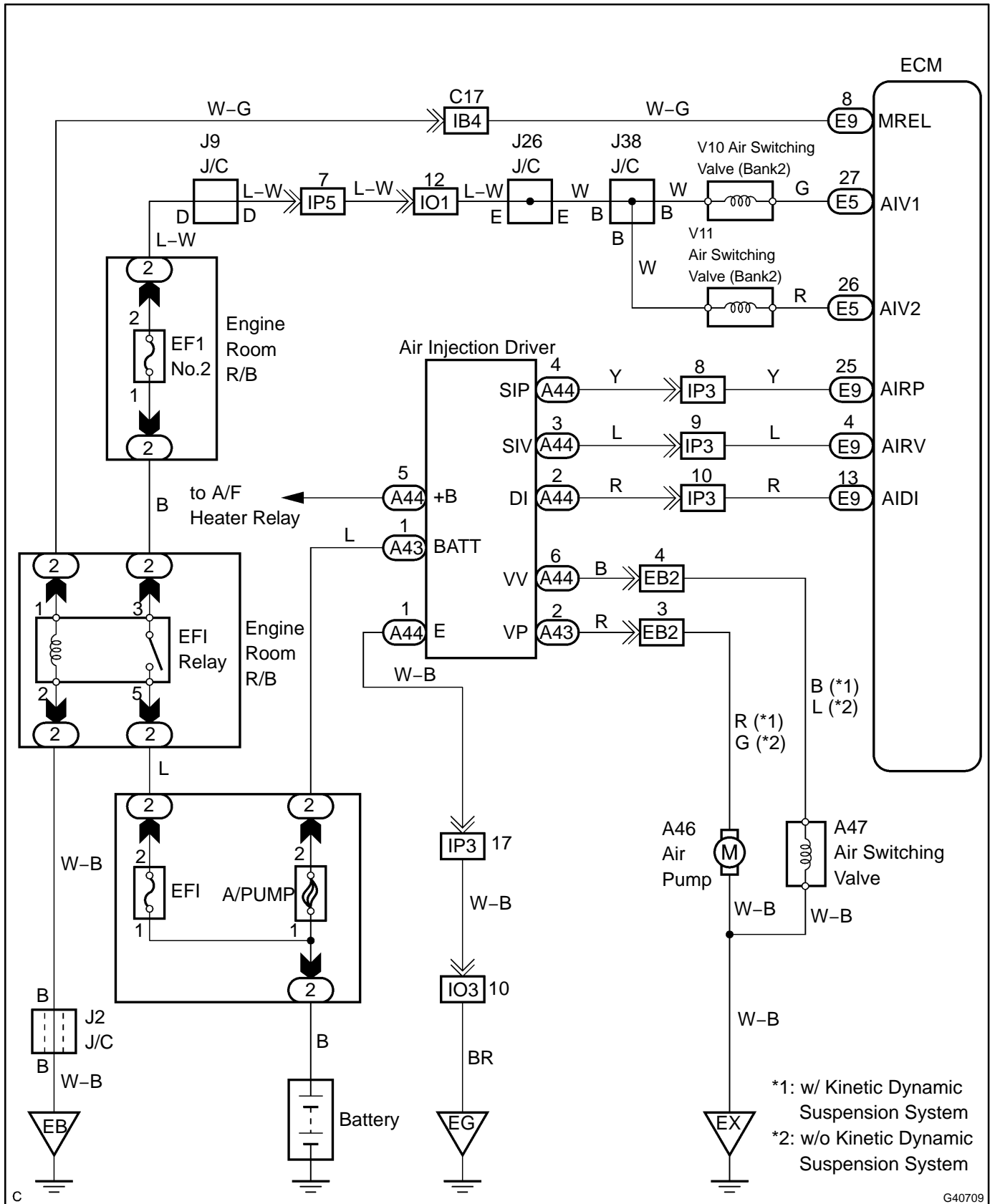
Case 1, 2:

Diagnostic signal duty ratio from air injection driver	31 to 48 %
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COMPONENT OPERATING RANGE

Diagnostic signal duty ratio from air injection driver	70 to 90% when secondary air injection system operating and 0% when secondary air injection system not operating
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WIRING DIAGRAM

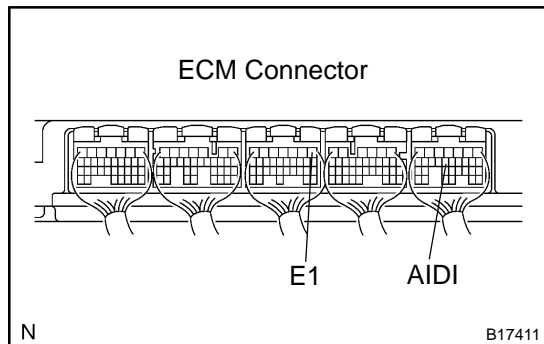


INSPECTION PROCEDURE

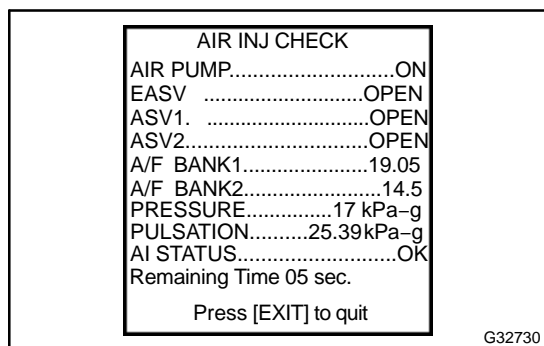
HINT:

The diagnostic information output from AID can be confirmed by connecting an oscilloscope to the diagnostic information terminal of the AID. It narrows a trouble area search to read the waveform on the oscilloscope when performing the AI system intrusive operation function provided in the SYSTEM CHECK.

- (1) Start the engine and warm it up.
- (2) Turn the ignition switch to OFF.
- (3) Connect a hand-held tester to the DLC3.



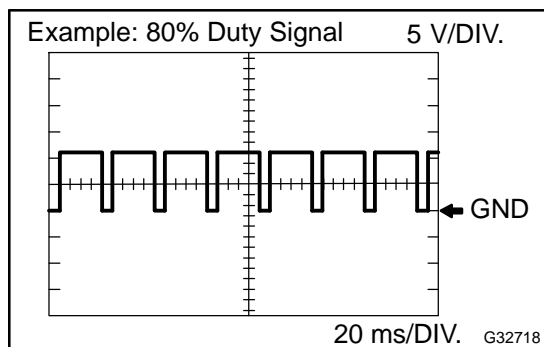
- (4) Connect an oscilloscope probe to the AIDI terminal of the ECM.
- (5) Start the engine and turn the tester ON.



- (6) On the tester, select the following menu items:
 DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / AIR INJ CHECK / MANUAL OPERATION / OPERATION 1 and 2.

HINT:

OPERATION 1: AP: OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:CLOSE
 OPERATION 2: AP: ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN



- (7) Monitor the voltage output of the AID (duty ratio signal).

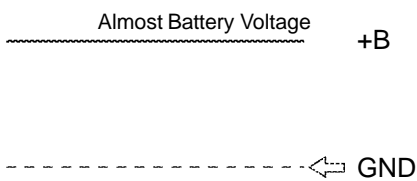
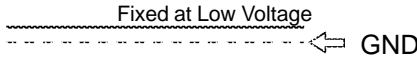
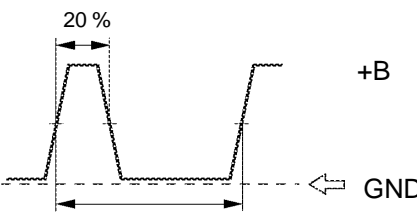
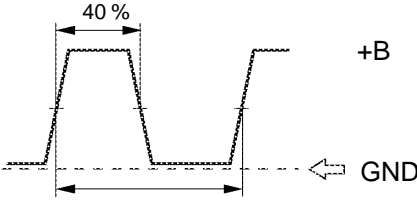
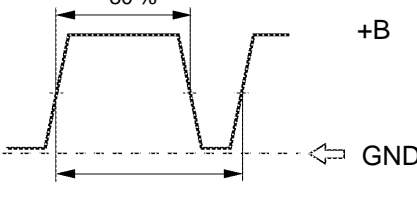
Oscilloscope range:

Items	Contents
Terminals	CH1: AIDI - E1
Equipment Settings	5 V/Division, 20 to 40 ms/Division
Conditions	Idling

NOTICE:

- This AIR INJECTION CHECK only allows technicians to operate the AI system for 5 seconds. Furthermore, the check can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between checks.
 While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.
- Performing the AIR INJ CHECK over and over again may cause the damage in the secondary air injection system. If necessary, put an interval of several minutes between tests to prevent overheating the system.

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

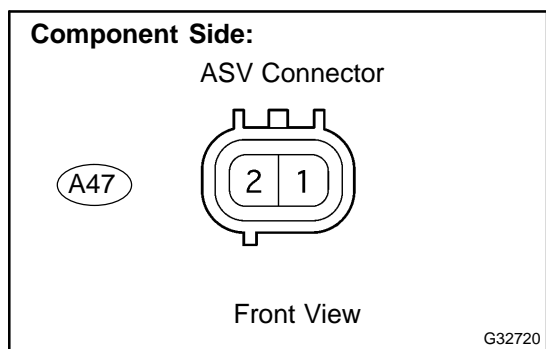
AID Diagnostic Signal Waveforms	ECM Commands	DTCs (ECM Output)	Suspected Trouble Areas
100 % Duty ratio 	Any Air Injection (AI) System operation	P1613	<ul style="list-style-type: none"> • Open in diagnostic signal circuit • Air Injection Control Driver (AID) • Open in AID+B circuit (AID power source) • Short between +B circuit and diagnostic signal circuit
0 % Duty ratio 	AI System: ON (Air pump ON, ASV ON)	P1613	<ul style="list-style-type: none"> • Open or short in air pump or Air Switching Valve (ASV) command signal circuit (ECM-AID) • Open in AID ground circuit • Short between diagnostic signal circuit and body ground • AID • ECM
	AI System: OFF (Air pump OFF, ASV OFF)	—	Normal
20 % Duty ratio 	Air Pump: ON	P0418	Short between air pump drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
	Air Pump: OFF	P0418	Open in air pump drive circuit (AID-Pump), or short between air pump drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
40 % Duty ratio 	ASV: ON	P0412	Short between ASV drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • ASV • AID • ECM
	ASV: OFF	P0412	Open in ASV drive circuit (AID-ASV), or short between ASV drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • AID • ASV • ECM
80 % Duty ratio 	AI System: OFF (Air pump OFF, ASV OFF)	P1613	<ul style="list-style-type: none"> • AID • ECM
	AI System: ON (Air pump ON, ASV ON)	—	Normal
Excluding above (excluding 0, 20, 40, 80, 100 % duty)	—	P1613	<ul style="list-style-type: none"> • AID • Open in AID ground circuit

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HINT:

- Using the AIR INJ CHECK operation of the SYSTEM CHECK provided in the hand-held tester function, conditions for air-fuel ratio and pressure in the secondary air injection system passage can be checked while the secondary air injection system operating. It helps technicians to troubleshoot the system when it malfunctioning.
- Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 INSPECT AIR SWITCHING VALVE ASSY



- (a) Remove the intake manifold.
- (b) Disconnect the A47 ASV connector.
- (c) Measure the resistance of the ASV.

Standard:

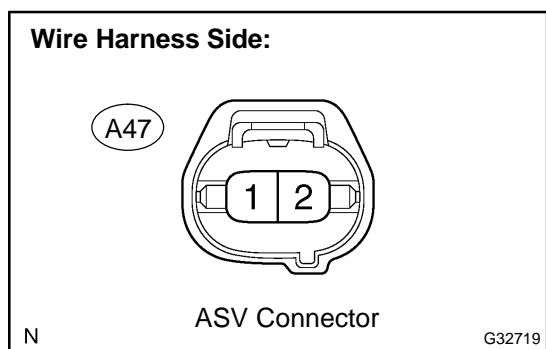
Tester Connections	Specified Conditions
ASV (A47-1) - ASV (A47-2)	4.5 to 5.5 Ω

- (d) Reconnect the ASV connector.

NG → **REPLACE AIR SWITCHING VALVE ASSY**

OK

2 CHECK HARNESS AND CONNECTOR(AIR SWITCHING VALVE - BODY GROUND)



- (a) Remove the intake manifold.
- (b) Disconnect the A47 ASV connector.
- (c) Check the resistance between the wire harness side connectors and body ground.

Standard:

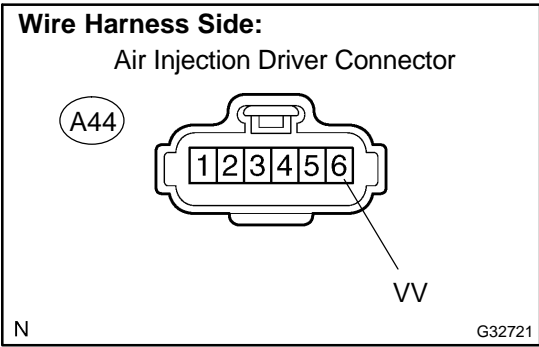
Tester Connection	Specified Condition
A47-2 - Body ground	Below 1 Ω

- (d) Reconnect the ASV connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

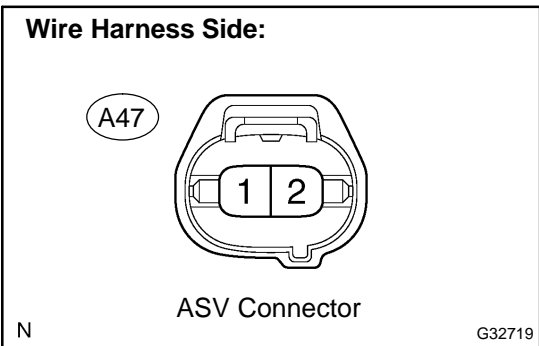
3 CHECK HARNESS AND CONNECTOR(AIR SWITCHING VALVE - AIR INJECTION DRIVER)



- (a) Remove the intake manifold.
- (b) Disconnect the A44 air injection driver connector.
- (c) Disconnect the A47 ASV connector.
- (d) Check the resistance between the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
VV (A44-6) - A47-1	Below 1 Ω
VV (A44-6) or A47-1 - Body ground	10 kΩ or higher



- (e) Reconnect the air injection driver connector.
- (f) Reconnect the ASV connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE AIR INJECTION DRIVER

DTC	P0418	SECONDARY AIR INJECTION SYSTEM RELAY "A" CIRCUIT
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CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P0418	All of the following conditions are met, when idling just after cold start (1 trip detection logic): (a) Air injection system not operate (b) Air injection driver outputs air pump malfunction signal (20% duty signal)	<ul style="list-style-type: none"> • Open in air pump drive circuit • Short between air pump circuit and +B circuit • Air injection driver • ECM
P0418	All of the following conditions are met, when idling just after cold start (1 trip detection logic): (a) Air injection system operates (b) Air injection driver outputs air pump malfunction signal (20% duty signal)	<ul style="list-style-type: none"> • Short between air pump circuit and body ground • Air injection driver • ECM

MONITOR DESCRIPTION

Air Injection Driver (AID) detects an open or short in the air pump and Air Switching Valve (ASV) circuit according to the terminal voltage and sends a signal as diagnostic information to the ECM.

When the air injection system operation is required while the engine is warming up, the ECM transmits command signals to the AID to drive the air pump and ASV.

The AID inputs the command signal from ECM if: 1) VP terminal voltage is low despite the AID inputting the command signal from the ECM to drive the ASV or 2) VP terminal voltage is high despite the AID not inputting the command signal from the ECM.

The ECM sets the DTC based on the diagnostic information from the AID.

MONITOR STRATEGY

Related DTCs	P0418: Air pump range check
Required sensors/components	Air injection driver, Air pump
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITION

All:

The monitor will run whenever this DTC is not present	See page 05-20
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Case 1:

Air pump	Operating
Air switching valve	Operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 2:

Air pump	Not operating
Air switching valve	Not operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Case 1, 2:

Diagnostic signal duty ratio from air injection driver	11 to 29 %
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COMPONENT OPERATING RANGE

Diagnostic signal duty ratio from air injection driver	70 to 90% when secondary air injection system operating and 0% when secondary air injection system not operating
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WIRING DIAGRAM

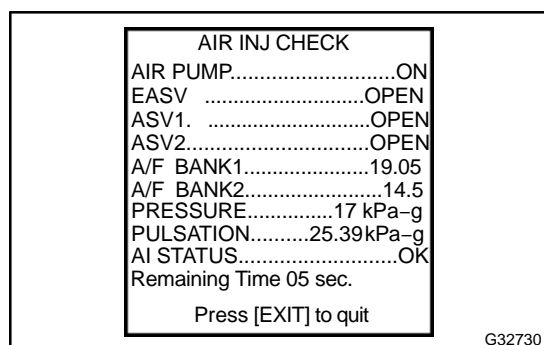
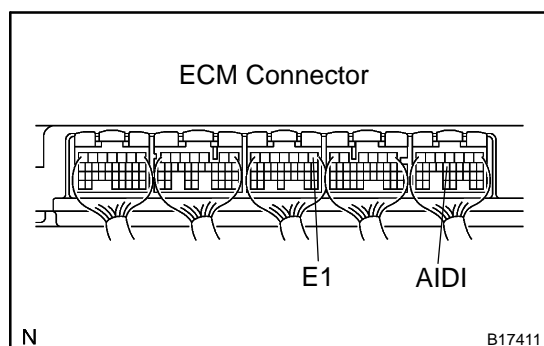
Refer to DTC P0412 on page 05-217.

INSPECTION PROCEDURE

HINT:

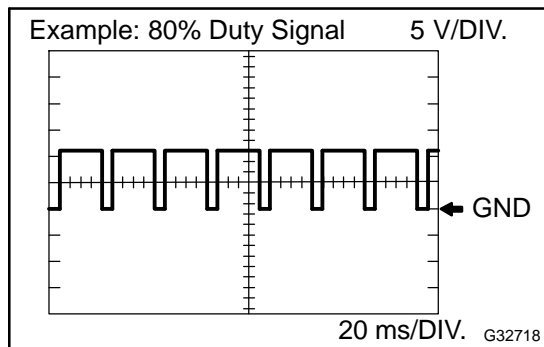
The diagnostic information output from the AID can be confirmed by connecting an oscilloscope to the diagnostic information terminal of the AID. It narrows the trouble area search to read the waveform on the oscilloscope when performing the AI system intrusive operation function provided in the SYSTEM CHECK.

- (1) Start the engine and warm it up.
- (2) Turn the ignition switch to OFF.
- (3) Connect a hand-held tester to the DLC3.
- (4) Connect an oscilloscope probe to the AIDI terminal of the ECM.
- (5) Start the engine and turn the tester ON.
- (6) On the tester, select the following menu items:
DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / AIR INJ SYSTEM.
- (7) On the tester, select the following menu items:
DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / AIR INJ CHECK / MANUAL OPERATION / OPERATION 1 and 2.



HINT:

OPERATION 1: AP: OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:CLOSE
OPERATION 2: AP: ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN



(8) Monitor the voltage output of the AID (duty ratio signal).

Oscilloscope range:

Items	Contents
Terminals	CH1: AIDI - E1
Equipment Settings	5 V/Division, 20 to 40 ms/Division
Conditions	Idling

NOTICE:

- This AIR INJECTION CHECK only allows technicians to operate the AI system for 5 seconds. Furthermore, the check can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between checks.
While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (AI STATUS NG) or ERROR. At this time stop the engine for 10 minutes and then try again.
- Performing the AIR INJ CHECK over and over again may cause the damage in the secondary air injection system. If necessary, put an interval of several minutes between tests to prevent overheating the system.
- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

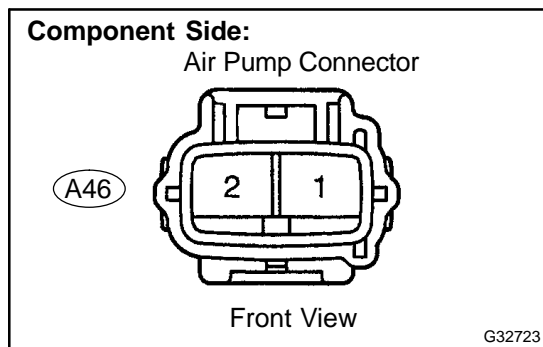
AID Diagnostic Signal Waveforms	ECM Commands	DTCs (ECM Output)	Suspected Trouble Areas
<p>100 % Duty ratio</p>	Any Air Injection (AI) System operation	P1613	<ul style="list-style-type: none"> • Open in diagnostic signal circuit • Air Injection Control Driver (AID) • Open in AID+B circuit (AID power source) • Short between +B circuit and diagnostic signal circuit
<p>0 % Duty ratio</p>	AI System: ON (Air pump ON, ASV ON)	P1613	<ul style="list-style-type: none"> • Open or short in air pump or Air Switching Valve (ASV) command signal circuit (ECM-AID) • Open in AID ground circuit • Short between diagnostic signal circuit and body ground • AID • ECM
	AI System: OFF (Air pump OFF, ASV OFF)	—	Normal
<p>20 % Duty ratio</p>	Air Pump: ON	P0418	Short between air pump drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
	Air Pump: OFF	P0418	Open in air pump drive circuit (AID-Pump), or short between air pump drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
<p>40 % Duty ratio</p>	ASV: ON	P0412	Short between ASV drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • ASV • AID • ECM
	ASV: OFF	P0412	Open in ASV drive circuit (AID-ASV), or short between ASV drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • AID • ASV • ECM
<p>80 % Duty ratio</p>	AI System: OFF (Air pump OFF, ASV OFF)	P1613	<ul style="list-style-type: none"> • AID • ECM
	AI System: ON (Air pump ON, ASV ON)	—	Normal
Excluding above (excluding 0, 20, 40, 80, 100 % duty)	—	P1613	<ul style="list-style-type: none"> • AID • Open in AID ground circuit

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HINT:

- Using the AIR INJ CHECK operation of the SYSTEM CHECK provided in the hand-held tester function, conditions for air-fuel ratio and pressure in the secondary air injection system passage can be checked while the secondary air injection system operating. It helps technicians to troubleshoot the system when it malfunctioning.
- Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 INSPECT AIR PUMP ASSY



- (a) Remove the intake manifold.
 - (b) Disconnect the A46 air pump connector.
- Measure the resistance of the air pump.

Standard:

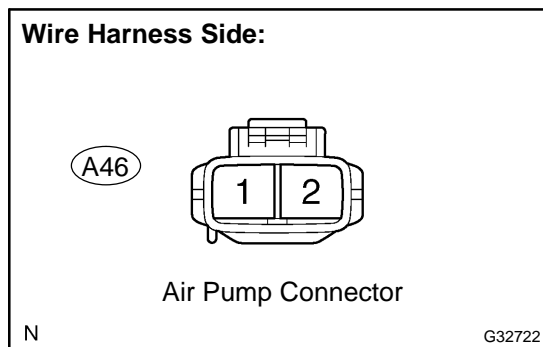
Tester Connections	Specified Conditions
ASV (A46-1) - ASV (A46-2)	0.4 to 1.0 Ω

- (c) Reconnect the air pump connector.

NG → **REPLACE AIR PUMP ASSY**

OK

2 CHECK HARNESS AND CONNECTOR(AIR PUMP - BODY GROUND)



- (a) Remove the intake manifold.
 - (b) Disconnect the A46 air pump connector.
- Check the resistance between the wire harness side connectors and body ground.

Standard:

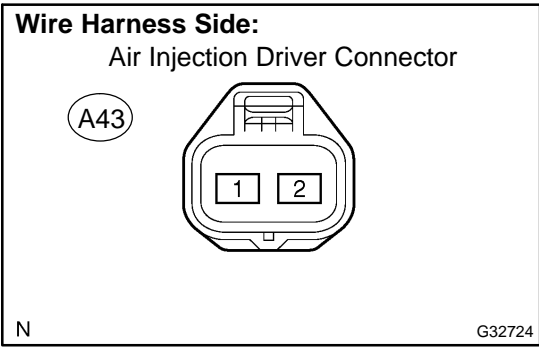
Tester Connection	Specified Condition
A46-1 - Body ground	Below 1 Ω

- (c) Reconnect the air pump connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

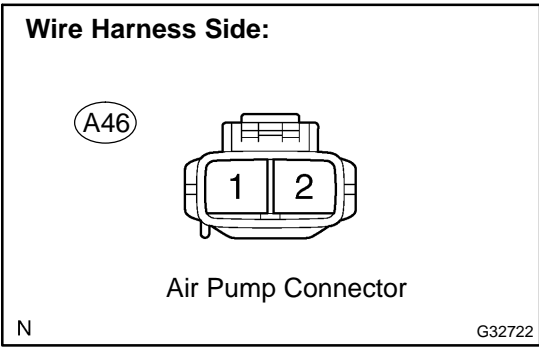
3 CHECK HARNESS AND CONNECTOR(AIR PUMP - AIR INJECTION CONTROL DRIVER)



- (a) Remove the intake manifold.
 - (b) Disconnect the A43 air injection driver connector.
 - (c) Disconnect the A46 air pump connector.
- Check the resistance between the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
VP (A43-2) - A46-2	Below 1 Ω
VP (A43-2) or A46-2 - Body ground	10 kΩ or higher



- (d) Reconnect the air injection driver connector.
- (e) Reconnect the air pump connector.

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE AIR INJECTION DRIVER

DTC	P0420	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)
DTC	P0430	CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 2)

MONITOR DESCRIPTION

The ECM uses sensors mounted in front of and behind the Three-Way Catalytic Converter (TWC) to monitor its efficiency. The first sensor, the Air-Fuel Ratio (A/F) sensor, sends pre-catalyst information to the ECM. The second sensor, the Heated Oxygen (HO2) sensor, sends post-catalyst information to the ECM.

In order to detect any deterioration in the TWC, the ECM calculates the Oxygen Storage Capacity (OSC) of the TWC. This calculation is based on the voltage output of the HO2 sensor while performing active air-fuel ratio control, rather than the conventional detecting method, which uses the locus ratio.

The OSC value is an indication of the oxygen storage capacity of the TWC. When the vehicle is being driven with a warm engine, active air-fuel ratio control is performed for approximately 15 to 20 seconds. When it is performed, the ECM deliberately sets the air-fuel ratio to lean or rich levels. If a rich-lean cycle of the HO2 sensor is long, the OSC becomes greater. There is a direct correlation between the OSCs of the HO2 sensor and the TWC.

The ECM uses the OSC value to determine the state of the TWC. If any deterioration has occurred, it illuminates the MIL and sets the DTC.

DTC	Detecting Condition	Trouble Area
P0420	Oxygen storage capacity of catalyst (OSC) bank 1 is less than malfunction threshold while active A/F control (2 trip detection logic).	<ul style="list-style-type: none"> • Exhaust manifold sub-assy LH (front catalyst bank 1) • Exhaust pipe assy front (rear catalyst) • Gas leakage on exhaust system • Heated oxygen sensor (Bank 1 Sensor 2) • A/F sensor (Bank 1 Sensor 1)
P0430	Oxygen storage capacity of catalyst (OSC) bank 2 is less than malfunction threshold while active A/F control (2 trip detection logic).	<ul style="list-style-type: none"> • Exhaust manifold sub-assy RH (front catalyst bank 2) • Exhaust pipe assy front (rear catalyst) • Gas leakage on exhaust system • Heated oxygen sensor (Bank 2 Sensor 2) • A/F sensor (Bank 2 Sensor 1)

MONITOR STRATEGY

Required sensors/components (Main)	Catalyst
Required sensors/components (Related)	Heated oxygen sensors, A/F sensors
Frequency of operation	Once per driving cycle
Duration	15 - 20 sec
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	11 V or more
Intake air temperature	-10°C (14°F) or more
Engine coolant temperature	75°C (167°F) or more
Atmospheric pressure coefficient	0.75 or more
Idle	OFF
Engine RPM	Less than 3000 rpm
A/F sensor	Activated
Fuel system status	Closed-loop
Engine load	10 to 70 %
MAF	6 to 75 g/sec
Front catalyst temperature (estimated)	715 to 830°C (1319 to 1526°F)
Rear catalyst temperature (estimated)	410 to 830°C (770 to 1526°F)
Rear HO2S monitor	Completed
Shift position	4th or more

TYPICAL MALFUNCTION THRESHOLDS

Oxygen storage capacity of catalyst (OSC)	Less than 0.08 g
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MONITOR RESULT (MODE 6)

Refer to page 05-28 for detailed information.

Catalyst monitor

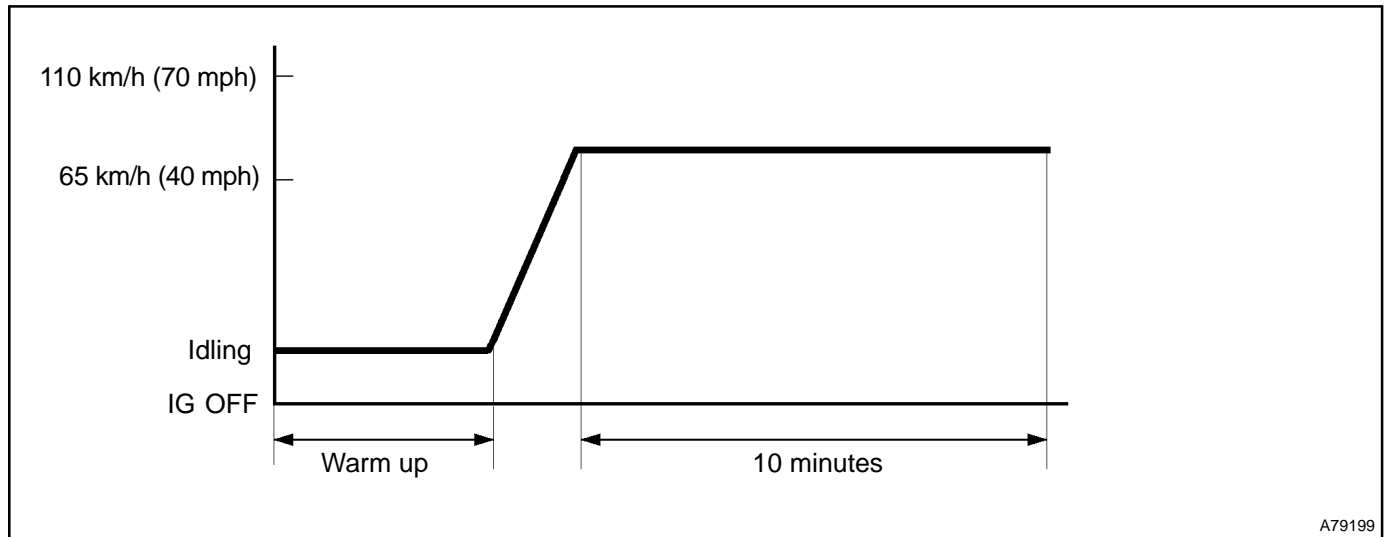
MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$21	\$A9	Multiply by 0.0003 (no dimension)	Oxygen storage capacity of catalyst (OSC) bank 1	Minimum test limit for catalyst	Maximum test limit for catalyst
\$22	\$A9	Multiply by 0.0003 (no dimension)	Oxygen storage capacity of catalyst (OSC) bank 2	Minimum test limit for catalyst	Maximum test limit for catalyst

CONFIRMATION DRIVING PATTERN

- (a) Connect a hand-held tester to the DLC3.
- (b) Clear DTCs.
- (c) Warm up the engine until the engine coolant temperature reaches 75°C (167°F).
- (d) Drive the vehicle at 40 to 70 mph (65 to 110 km/h) for 10 minutes.

NOTICE:

The catalyst monitor is not completed if the vehicle drives at an absolutely constant speed by the cruise control.



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INSPECTION PROCEDURE

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

1 CHECK DTC OTHER THAN P0420 AND P0430

If DTCs other than P0420 and P0430 are present, troubleshoot those DTCs first.

Result:

DTC	Proceed to
P0420 or P0430	A
P0420 or P0430 and others	B

B → GO TO DTC CHART (See page 05-60)

A

2 CHECK FOR EXHAUST GAS LEAKAGE

OK: No exhaust gas leakage.

NG → REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT

OK

3 | PERFORM A/F CONTROL ACTIVE TEST

This active test enables you to identify a malfunction in the A/F sensor or heated oxygen sensor.

- (a) Connect the hand-held tester to the DLC3.
- (b) Run the engine at 2500 rpm for 90 seconds to warm-up the A/F sensor and oxygen sensor.
- (c) Allow the engine to idle.
- (d) Select from the tester menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
- (e) Switch the injection volume between +25% and -12.5%, then read the A/F sensor and oxygen sensor voltages.

	A	B	C
Injection volume	+25 % -12.5%	+25 % -12.5%	+25 % -12.5%
A/F sensor	3.35 V 3.0 V	Almost no reaction	3.35 V 3.0 V
Oxygen sensor	0.6 V 0.4 V	0.6 V 0.4 V	Almost no reaction
Trouble area	A/F sensor and heated oxygen sensor are OK.	A/F sensor	Heated oxygen sensor

NOTICE:

The A/F sensor output has a few seconds of delay.

The heated oxygen sensor output has 20 seconds of delay at maximum.

B → **REPLACE AIR FUEL RATIO SENSOR**

C → **REPLACE HEATED OXYGEN SENSOR**

A

REPLACE FRONT AND REAR CATALYSTS (See page 14-14 and 15-1)

If DTC P0420 is present, replace both of the exhaust manifold sub-assy LH (front catalyst bank 1) and the exhaust pipe assy front (rear catalyst).

If DTC P0430 is present, replace both of the exhaust manifold sub-assy RH (front catalyst bank 2) and the exhaust pipe assy front (rear catalyst).

-MEMO-

-MEMO-

-MEMO-

DTC	P043E	EVAPORATIVE EMISSION SYSTEM REFERENCE ORIFICE CLOG UP
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DTC	P043F	EVAPORATIVE EMISSION SYSTEM REFERENCE ORIFICE HIGH FLOW
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DTC SUMMARY

DTCs	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P043E	0.02 inch orifice clogged	Vacuum pump creates negative pressure through 0.02 inch orifice, and EVAP system pressure is measured to determine leak pressure standard. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If system pressure lower than -4.85 kPa (-36.38 mmHg)*, ECM determines that 0.02 inch orifice has clogging malfunction.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM • Leakage from EVAP system 	While ignition switch is OFF	2 trip
P043F	0.02 inch orifice high-flow	Vacuum pump creates negative pressure through 0.02 inch orifice, and EVAP system pressure is measured to determine leak pressure standard. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If system pressure higher than -1.06 kPa (-7.95 mmHg)*, ECM determines that 0.02 inch orifice has high-flow malfunction.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM • Leakage from EVAP system 	While ignition switch is OFF	2 trip

*: The threshold values vary according to the atmospheric pressure measured at EVAP monitor beginning. The values described in the table above are based on an atmospheric pressure of 100 kPa (750.1 mmHg) (absolute pressure).

HINT:

The 0.02 inch orifice is located inside the pump module.

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page [05-408](#)).

MONITOR DESCRIPTION

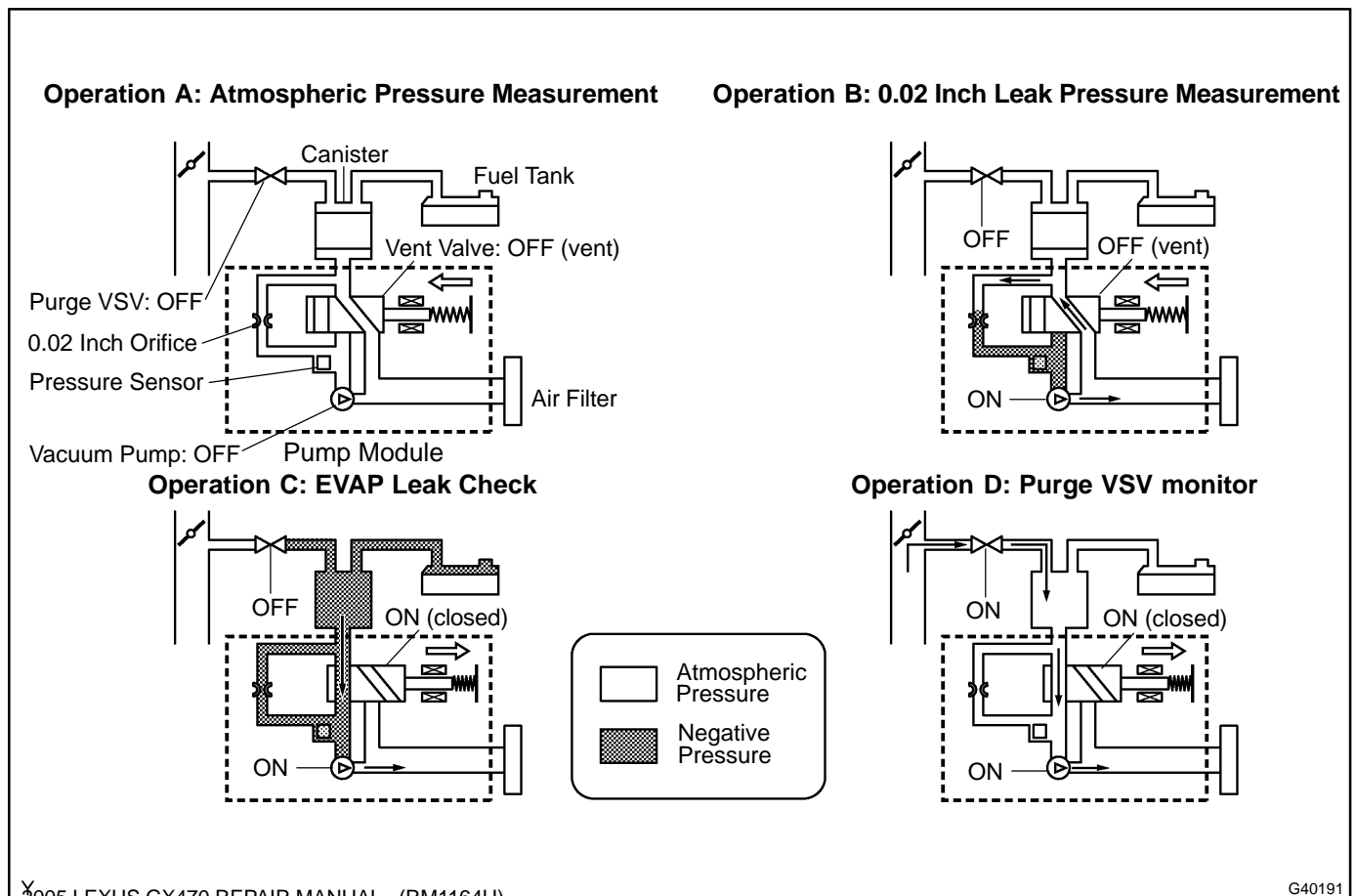
5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

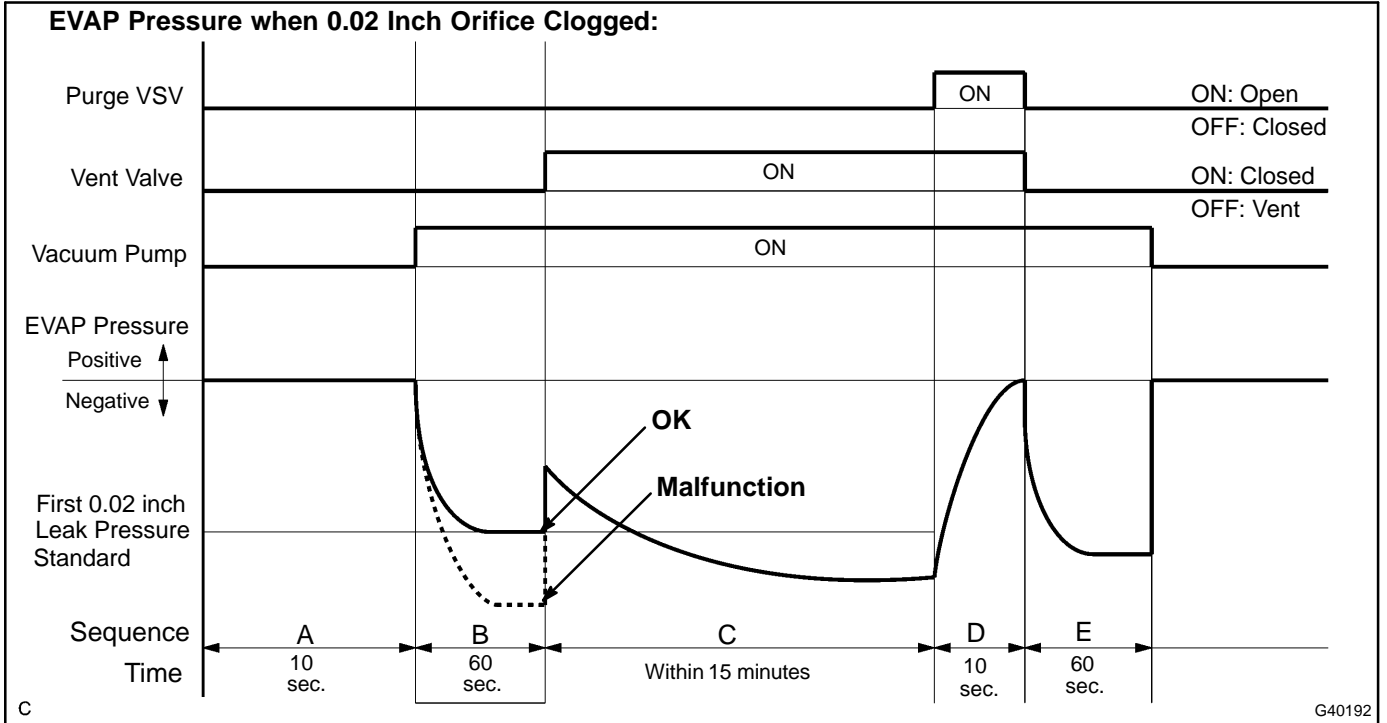
* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



(a) P043E: 0.02 inch orifice clogged

In operation B, the vacuum pump creates negative pressure (vacuum) through the 0.02 inch orifice. The EVAP system pressure is then measured by the ECM, using the pressure sensor, to determine the 0.02 inch leak pressure standard. If the pressure is lower than -4.85 kPa (-36.38 mmHg)*, the ECM interprets this as a clog malfunction in the 0.02 inch orifice, and stops the EVAP (Evaporative Emission) system monitor. The ECM then illuminates the MIL and sets the DTC (2 trip detection logic).

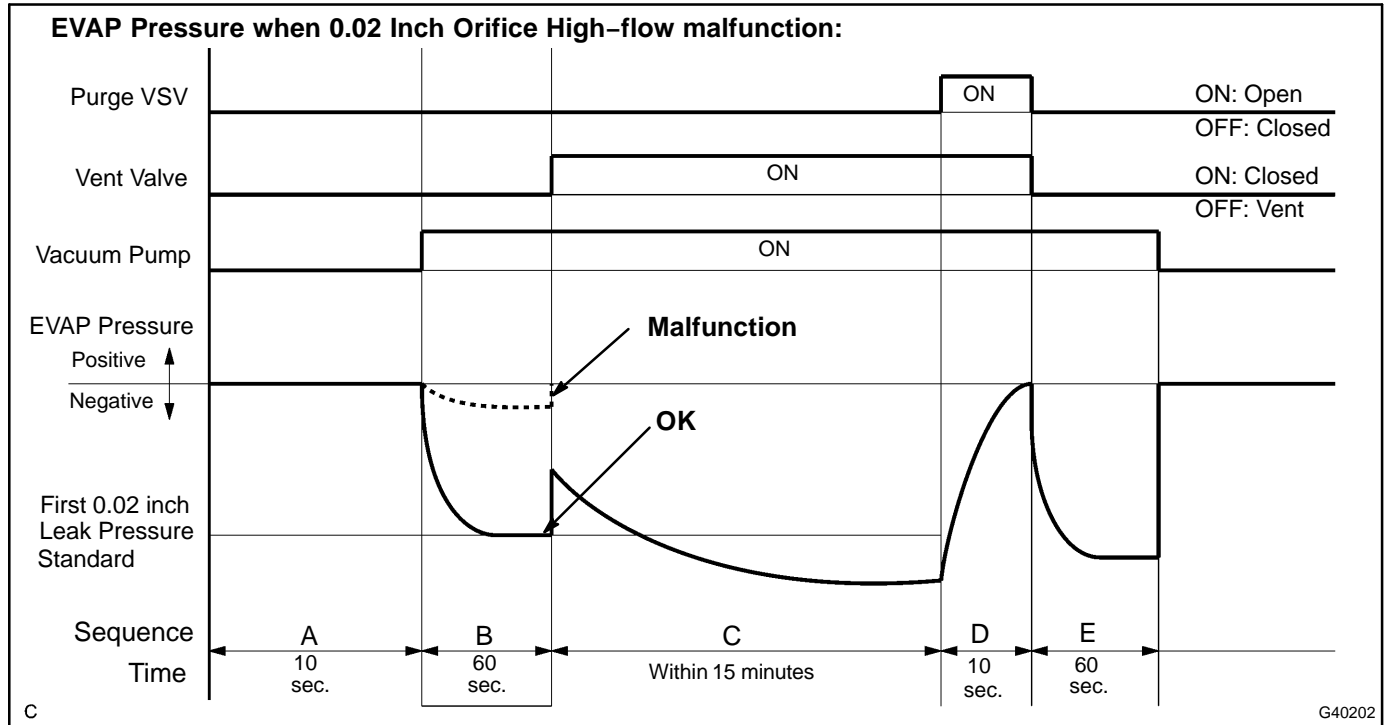
*: The threshold varies according to the atmospheric pressure measured in operation A. The value described above is based on an atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.



(b) P043F: 0.02 inch orifice high-flow

In operation B, the vacuum pump creates negative pressure (vacuum) through the 0.02 inch orifice. The EVAP system pressure is then measured by the ECM using the pressure sensor to determine the 0.02 inch leak pressure standard. If the pressure is higher than -1.06 kPa (-7.95 mmHg)*, the ECM interprets this as a high-flow malfunction in the 0.02 inch orifice, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC (2 trip detection logic).

*: The threshold varies according to the atmospheric pressure measured in operation A. The value described above is based on a atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.



MONITOR STRATEGY

Related DTCs	P043E: 0.02 inch orifice clog (built-in pump module) P043F: 0.02 inch orifice high-flow (built-in pump module)
Required sensors/Components	Pump module
Frequency of operation	Once per driving cycle
Duration	Within 2 min. (varies with amount of fuel in tank)
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
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Purge VSV stuck open and closed:

Following values are when atmospheric is 760 mmHg (100 kPa)	-
EVAP key-off monitor runs when all of the following conditions met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Less than 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Key-off monitor sequence (1 to 8)

1. Atmospheric pressure

Next sequence is run if following condition set	-
Atmospheric pressure change for 10 sec.	Less than 2.25 mmHg (0.3 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions set	Conditions 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition set	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.286 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions set	Conditions 1 and 2
1. Vacuum introduction time	15 min. or less
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition set	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.3 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions set	Conditions 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition set	-
FTP when vacuum introduction was complete	Second reference pressure

8. Atmospheric pressure

Monitor is complete if following	-
Atmospheric pressure difference between sequence 1 and 8	Less than 2.25 mmHg (0.3 kPa)

TYPICAL MALFUNCTION THRESHOLDS

Following values are when atmospheric pressure is 760 mmHg (100 kPa)	-
One of the following conditions is met	-
FTP when 4 sec. after reference pressure measurement began	More than -7.5 mmHg (-1 kPa)
Reference pressure	Less than -36.38 mmHg (-4.85 kPa)
Reference pressure	-7.93 mmHg (-1.057 kPa) or more
Reference pressure	Not saturated
Reference pressure difference between first and second	5.3 mmHg (0.7 kPa) or more

MONITOR RESULT (MODE 06 DATA)

Refer to page [05-28](#) for detailed information on Monitor Result.

INSPECTION PROCEDURE

Refer to the EVAP Inspection Procedure (see page [05-408](#)).

DTC	P0441	EVAPORATIVE EMISSION CONTROL SYSTEM INCORRECT PURGE FLOW
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DTC SUMMARY

DTCs	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0441	Purge VSV (Vacuum Switching Valve) stuck open	Vacuum pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If stabilized pressure higher than [second 0.02 inch leak pressure standard x 0.2], ECM determines that purge VSV stuck open	<ul style="list-style-type: none"> • Purge VSV • Connector/wire harness (Purge VSV - ECM) • ECM • Pump module • Leakage from EVAP system 	While ignition Switch OFF	2 trip
P0441	Purge VSV stuck closed	After EVAP leak check performed, purge VSV turned ON (open), and atmospheric air introduced into EVAP system. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If pressure does not return to near atmospheric pressure, ECM determines that purge valve stuck closed	<ul style="list-style-type: none"> • Purge VSV • Connector/wire harness (Purge VSV - ECM) • ECM • Pump module • Leakage from EVAP system 	While ignition Switch OFF	2 trip
P0441	Purge flow	While engine running, following conditions successively met: <ul style="list-style-type: none"> • Negative pressure is not created in EVAP system when purge VSV turned ON (open) • EVAP system pressure change less than 0.5 kPa (3.75 mmHg) when vent valve turned ON (closed) • Atmospheric pressure change before and after purge flow monitor less than 0.1 kPa (0.75 mmHg) 	<ul style="list-style-type: none"> • Purge VSV • Connector/wire harness (Purge VSV - ECM) • Leakage from EVAP line (Purge VSV - Intake manifold) • ECM 	While engine running	2 trip

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page 05-408).

MONITOR DESCRIPTION

The two monitors, Key-Off and Purge Flow, are used to detect malfunctions relating to DTC P0441. The Key-Off monitor is initiated by the ECM internal timer, known as the soak timer, 5 hours* after the ignition switch is turned to OFF. The purge flow monitor runs while the engine is running.

1. KEY-OFF MONITOR

5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

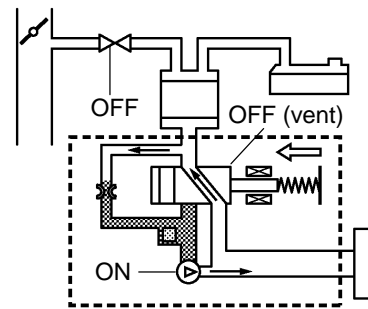
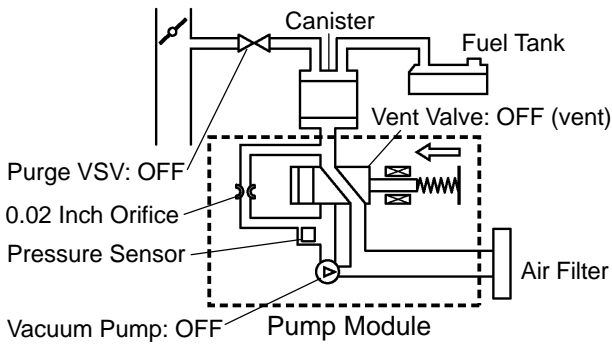
HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

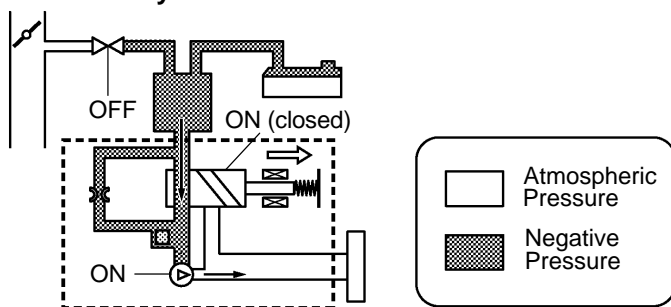
Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.

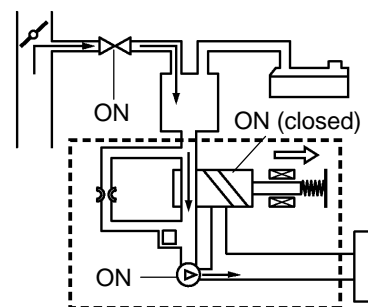
Operation A: Atmospheric Pressure Measurement Operation B, E: 0.02 Inch Leak Pressure Measurement



Operation C: EVAP System Pressure Measurement



Operation D: Purge VSV monitor



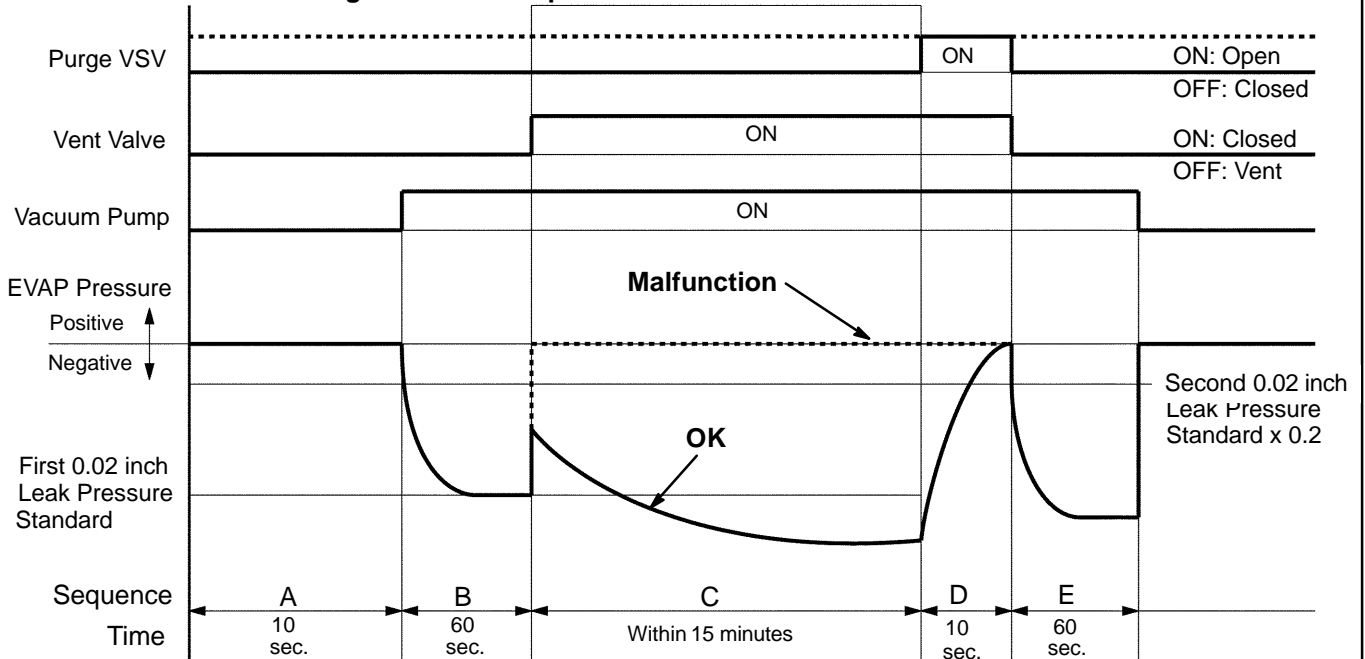
Y

G40191

(a) Purge VSV stuck open

In operation C, the vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The EVAP system pressure is then measured by the ECM using the pressure sensor. If the stabilized system pressure is higher than [second 0.02 inch leak pressure standard x 0.2], the ECM interprets this as the purge VSV (Vacuum Switching Valve) being stuck open. The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

EVAP Pressure when Purge VSV Stuck Open:

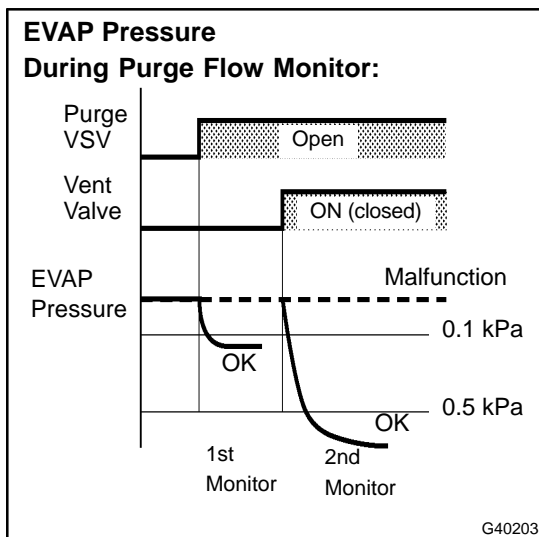
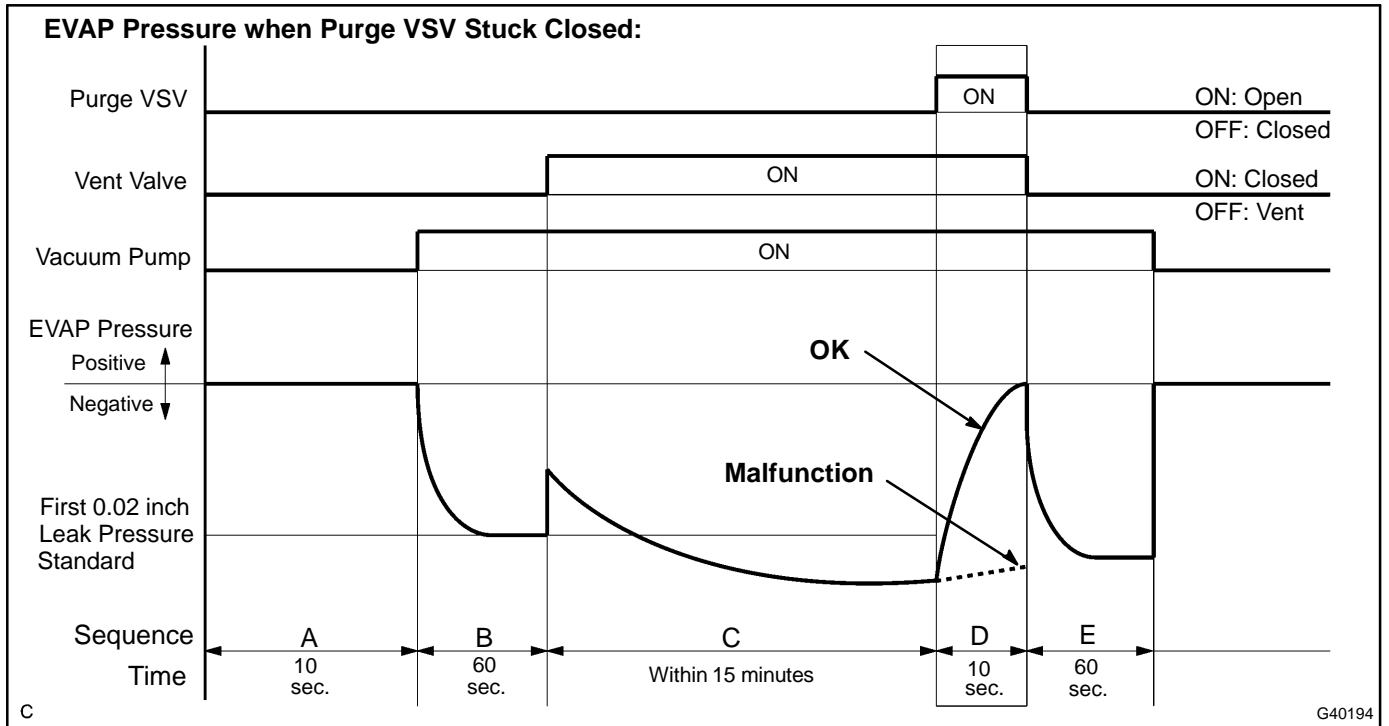


C

G40193

(b) Purge VSV stuck closed

In operation D, the pressure sensor measures the EVAP system pressure. The pressure measurement for purge VSV monitor is begun when the purge VSV is turned ON (open) after the EVAP leak check. When the measured pressure indicates an increase of 0.3 kPa (2.25 mmHg) or more, the purge VSV is functioning normally. If the pressure does not increase, the ECM interprets this as the purge VSV being stuck closed. The ECM illuminates the MIL and sets the DTC (2 trip detection logic).



2. PURGE FLOW MONITOR

The purge flow monitor consists of the two step monitors. The 1st monitor is conducted every time and the 2nd monitor is activated if necessary.

- The 1st monitor
While the engine is running and the purge VSV (Vacuum Switching Valve) is ON (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If negative pressure is not created, the ECM begins the 2nd monitor.
- The 2nd monitor
The vent valve is turned ON (closed) and the EVAP pressure is then measured. If the variation in the pressure is less than 0.5 kPa (3.75 mmHg), the ECM interprets this as the purge VSV being stuck closed, and illuminates the MIL and sets DTC P0441 (2 trip detection logic).

Atmospheric pressure check:

In order to ensure reliable malfunction detection, the variation between the atmospheric pressures, before and after conduction of the purge flow monitor, is measured by the ECM.

MONITOR STRATEGY

Related DTCs	P0441: Purge VSV stuck open P0441: Purge VSV stuck closed P0441: Purge flow
Required sensors/Components	Purge VSV, Pump module
Frequency of operation	Once per driving cycle
Duration	Purge VSV stuck open and closed: Within 2 min. (varies with amount of fuel in tank) Purge flow: Within 30 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
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Purge VSV stuck open and closed:

Following values are when atmospheric is 760 mmHg (100 kPa)	-
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Less than 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Key-off monitor sequence (1 to 8)

1. Atmospheric pressure

Next sequence is run if following condition is set	-
Atmospheric pressure change for 10 sec.	Less than 2.25 mmHg (0.3 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions are set	Conditions 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.286 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions are set	Conditions 1 and 2
1. Vacuum introduction time	15 min. or less
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.3 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions are set	Conditions 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition is set	-
FTP when vacuum introduction was completed	Second reference pressure

8. Atmospheric pressure

Monitor is complete if following condition is set	-
Atmospheric pressure difference between sequence 1 and 8	Less than 2.25 mmHg (0.3 kPa)

Purge flow

Engine condition	Running
ECT	4.4°C (40°F) or more
IAT	4.4°C (40°F) or more
FTP sensor malfunction	Not detected
Purge VSV	Not operated by scan tool
EVAP system check	Not operated by scan tool
Battery voltage	10 V or more
Purge duty cycle	8% or more

TYPICAL MALFUNCTION THRESHOLDS**Purge VSV stuck open**

FTP when vacuum introduction was compleat	Higher than reference pressure x 0.2
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Purge VSV stuck closed

FTP change for 10 sec. after purge VSV ON	Less than 2.25 mmHg (0.3 kPa)
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Purge flow

Both of the following conditions are met	Condition 1 or 2
1. FTP change when purge operation is started	Less than 0.75 mmHg (0.1 kPa)
2. FTP change during purge operation when vent valve is closed	Less than 3.75 mmHg (0.5 kPa)

MONITOR RESULT (MODE 06 DATA)

Refer to page [05-28](#) for detailed information on Monitor Result.

INSPECTION PROCEDURE

Refer to the EVAP Inspection Procedure (see page [05-408](#)).

DTC	P0450	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR MALFUNCTION
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DTC	P0451	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE
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DTC	P0452	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH LOW INPUT
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DTC	P0453	EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR/SWITCH HIGH INPUT
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DTC SUMMARY

DTC	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0450	Pressure sensor voltage abnormal fluctuation	Sensor output voltage rapidly fluctuates beyond upper and lower malfunction thresholds for 0.5 second.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	<ul style="list-style-type: none"> • EVAP monitoring (ignition OFF) • Ignition ON 	1 trip
P0451	Pressure sensor noising	Sensor output voltage fluctuates frequently in certain time period.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	<ul style="list-style-type: none"> • EVAP monitoring (ignition OFF) • Engine running 	2 trip
P0451	Pressure sensor stuck	Sensor output voltage does vary in certain time period.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	<ul style="list-style-type: none"> • EVAP monitoring (ignition OFF) 	2 trip
P0452	Pressure sensor voltage low	Sensor output voltage is less than 0.45 V for 0.5 second.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	<ul style="list-style-type: none"> • Ignition ON • EVAP monitoring (ignition OFF) 	1 trip
P0453	Pressure sensor voltage high	Sensor output voltage is more than 4.9 V for 0.5 second.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	<ul style="list-style-type: none"> • Ignition ON • EVAP monitoring (ignition OFF) 	1 trip

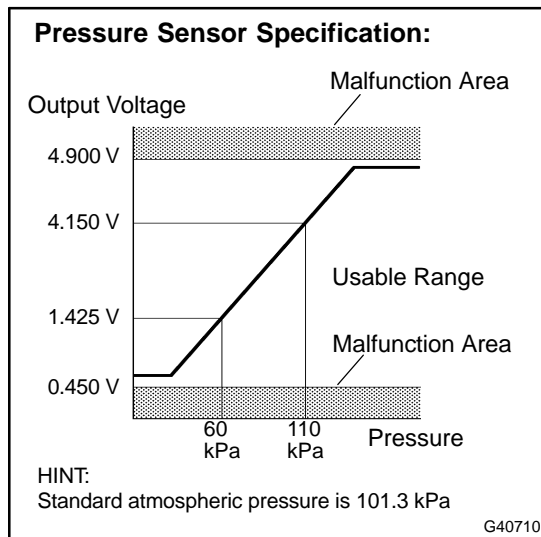
HINT:

The pressure sensor is built into the pump module.

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page 05-408).

MONITOR DESCRIPTION



- (a) DTC P0450: Pressure sensor voltage abnormal fluctuation.
If the pressure sensor voltage output rapidly fluctuates between less than 0.45 V and more than 4.9 V, the ECM interprets this as an open or short circuit malfunction in the pressure sensor or its circuit, and stops the EVAP (Evaporative Emission) system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).
- (b) DTC P0451: Pressure sensor noising or stuck
If the pressure sensor voltage output fluctuates rapidly for 10 seconds, the ECM stops the EVAP system monitor. The ECM interprets this as noise from the pressure sensor, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC.
Alternatively, if the sensor voltage output does not change for 10 seconds, the ECM interprets this as the sensor being stuck, and stops the monitor. The ECM then illuminates the MIL and sets the DTC
(Both the malfunctions are detected by 2 trip detection logic).
- (c) DTC P0452: Pressure sensor voltage low
If the pressure sensor voltage output is below 0.45 V, the ECM interprets this as an open or short circuit malfunction in the pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).
- (d) DTC P0453: Pressure sensor voltage high
If the pressure sensor voltage output is 4.9 V or more, the ECM interprets this as an open or short circuit malfunction in the pressure sensor or its circuit, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC (1 trip detection logic).

MONITOR STRATEGY

Related DTCs	P0450: Evaporative emission control system pressure sensor/switch chattering P0451: Evaporative emission control system pressure sensor noise P0451: Evaporative emission control system pressure sensor stuck P0452: Evaporative emission control system pressure sensor/switch low input P0453: Evaporative emission control system pressure sensor/switch high input
Required sensors/Components	Pump module
Frequency of operation	Once per driving cycle
Duration	0.5 sec.: P0450, P0452, P0453 10 sec.: P0451
MIL operation	Immediate: P0450, P0452, P0453 2 driving cycles: P0451
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
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Pressure sensor noise:

Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
IAT	4.4 to 35°C (40 to 95°F)
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Either of the following conditions is met	Condition 1 or 2
1. Time after engine stopped	5 hours
2. Engine condition	Running
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Pressure sensor stuck:

Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
IAT	4.4 to 35°C (40 to 95°F)
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Time after engine stopped	5 hours
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Pressure sensor chattering, low/high voltage:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Pressure sensor noise:

Frequency that FTP change is 0.3 kPa or more	10 times or more for 10 sec.
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Pressure sensor stuck:

FTP change for 10 sec. during EVAP monitor (0.02 inch reference pressure)	Less than 4.9 mmHg (0.65 kPa)
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Pressure sensor chattering:

Pressure sensor voltage	Less than 0.45 V, or more than 4.9 V
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Pressure sensor low voltage:

Pressure sensor voltage	Less than 0.45 V
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Pressure sensor high voltage:

Pressure sensor voltage	More than 4.9 V
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INSPECTION PROCEDURE

NOTICE:

- When a vehicle is brought into the workshop, leave it as it is. Do not change the vehicle condition. For example, do not tighten the fuel tank cap.
- Do not disassemble the pump module.
- A hand-held tester is required to conduct the following diagnostic troubleshooting procedure.

1 CONFIRM DTC AND EVAP PRESSURE

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON (do not start the engine).
- (c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read DTCs.
- (e) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / VAPOR PRESS.
- (f) Read the EVAP (Evaporative Emission) pressure displayed on the tester.

Result:

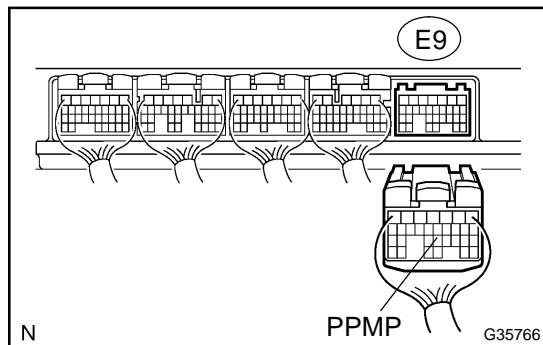
Display (DTC Output)	Test Results	Suspected Trouble Areas	Proceed To
P0451	—	• Pressure sensor	C
P0452	Less than 45 kpa (338 mmHg)	• Wire harness/connector (ECM - pressure sensor) • Pressure sensor • Short in ECM circuit	A
P0453	More than 120 kPa (900 mmHg)	• Wire harness/connector (ECM - pressure sensor) • Pressure sensor • Open in ECM circuit	B

B Go to step 4

C GO TO EVAP INSPECTION PROCEDURE (See page 05-408)

A

2 CHECK HARNESS AND CONNECTOR(PUMP MODULE - ECM)



- (a) Turn the ignition switch to OFF.
- (b) Disconnect the E9 ECM connector.
- (c) Measure the resistance between PPMP terminal of the ECM connector and the body ground.

Result:

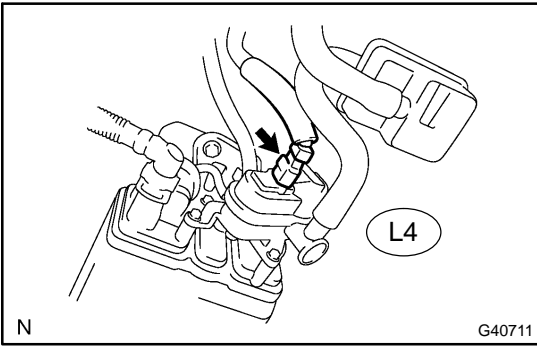
Test Results	Suspected Trouble Areas	Proceed To
10 Ω or less	• Wire harness/connector (ECM - pressure sensor) • Short in pressure sensor circuit	A
10 kΩ or more	• Wire harness/connector (ECM - pressure sensor) • Short in ECM circuit	B

- (d) Reconnect the ECM connector.

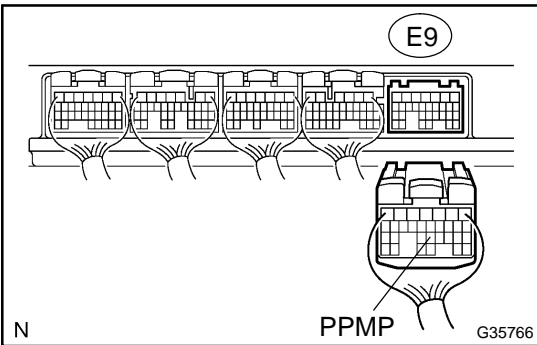
B Go to step 7

A

3 CHECK HARNESS AND CONNECTOR(PUMP MODULE - ECM)



- (a) Disconnect the L4 canister connector.
- (b) Disconnect the E9 ECM connector.
- (c) Check the resistance between PPMP terminal of the ECM connector and the body ground.



Result:

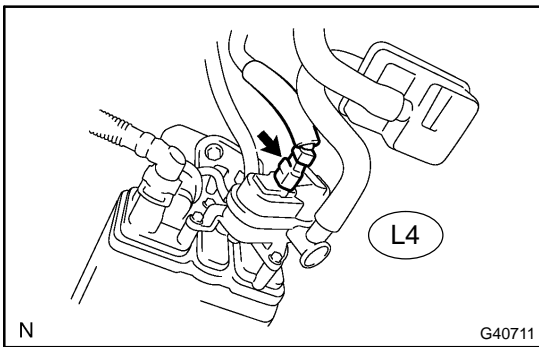
Test Results	Suspected Trouble Areas	Proceed To
10 kΩ or more	• Short in pressure sensor circuit	A
10 Ω or less	• Short in wire harness/connector (ECM - pressure sensor)	B

- (d) Reconnect the canister connector.
- (e) Reconnect the ECM connector.

A → Go to step 5

B → Go to step 6

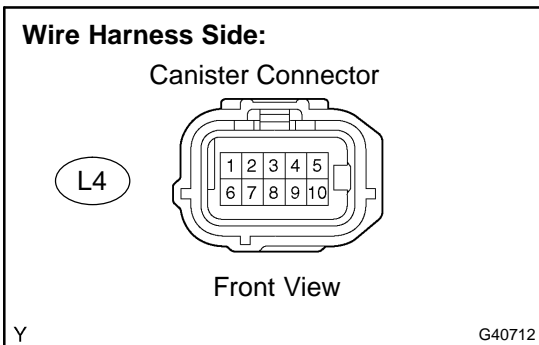
4 CHECK HARNESS AND CONNECTOR(PUMP MODULE - ECM)



- (a) Disconnect the L4 canister connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage and resistance of the L4 connector.

Standard:

Tester Connections	Specified Conditions
L4-4 - Body ground	Between 4.5 V and 5.5 V
L4-3 - Body ground	Between 4.5 V and 5.5 V
L4-2 - Body ground	100 Ω or less



Result:

Test Results	Suspected Trouble Areas	Proceed To
Voltage and resistance within standard ranges	• Open in pressure sensor circuit	A
Voltage and resistance outside standard ranges	• Open in wire harness/connector (ECM - pressure sensor)	B

- (d) Reconnect the canister connector.

B → Go to step 6

A

5 REPLACE CHARCOAL CANISTER ASSY

NEXT → Go to step 8

6 REPAIR OR REPLACE WIRE HARNESS AND CONNECTORS

HINT:

If the exhaust tail pipe has been removed, go to the next step before reinstalling it.

NEXT → Go to step 8

7 REPLACE ECM (See page 10-16)

NEXT

8 CHECK WHETHER DTC OUTPUT RECURS(AFTER REPAIR)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Wait for at least 60 seconds.
- (d) On the tester, select the following menu items: DIAGNOSIS/ENHANCED OBD II/DTC INFO/PENDING CODES.

HINT:

If no pending DTC is displayed on the tester, the repair has been successfully completed.

NEXT**COMPLETED**

DTC	P0455	EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (GROSS LEAK)
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DTC	P0456	EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)
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DTC SUMMARY

DTC	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P0455	EVAP gross leak	Vacuum pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If stabilized pressure higher than [second 0.02 inch leak pressure standard x 0.2], ECM determines that EVAP system has large leakage.	<ul style="list-style-type: none"> Fuel tank cap (loose) Leakage from EVAP line (Canister - Fuel tank) Leakage from EVAP line (Purge VSV - Canister) Pump module Leakage from fuel tank Leakage from canister 	While ignition switch OFF	2 trip
P0456	EVAP small leak	Vacuum pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If stabilized pressure larger than second 0.02 inch leak pressure, ECM determines that EVAP system has small leakage.	Same above	While ignition switch OFF	2 trip

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page 05-408).

MONITOR DESCRIPTION

5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

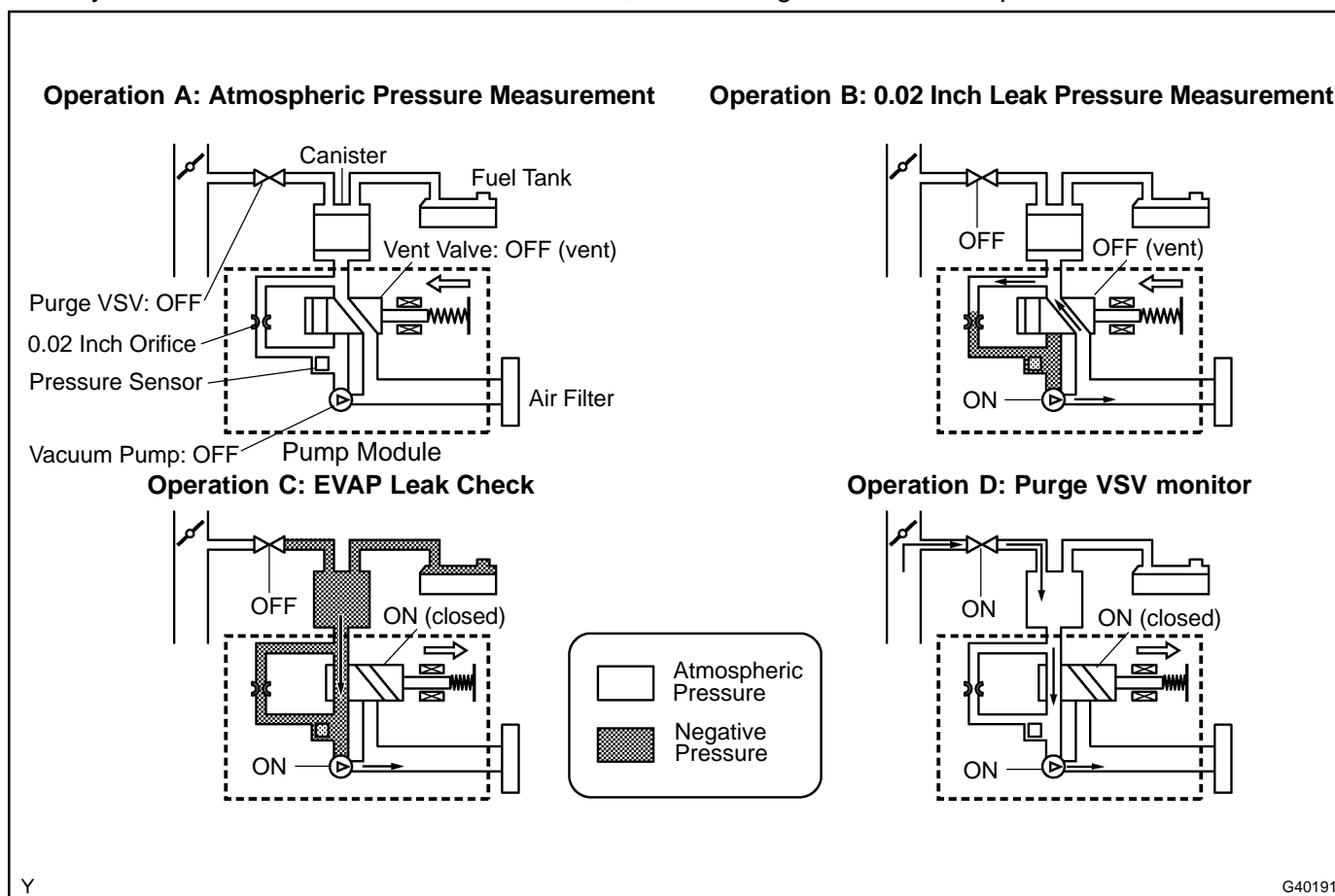
HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds

C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.

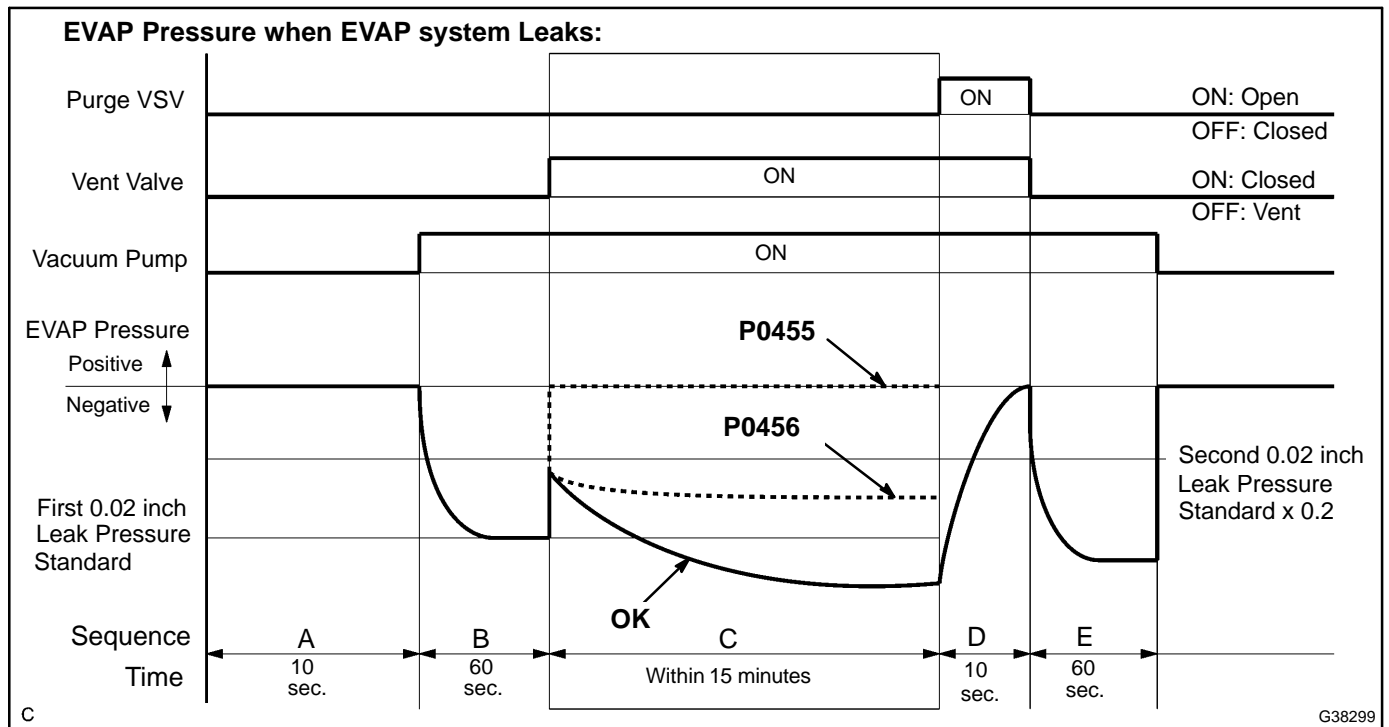


(a) P0455: EVAP (Evaporative Emission) gross leak

In operation C, the vacuum pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than [second 0.02 inch leak pressure standard x 0.2] (near atmospheric pressure), the ECM determines that the EVAP system has a large leakage, illuminates the MIL and sets the DTC (2 trip detection logic).

(b) P0456: EVAP very small leak

In operation C, the vacuum pump creates negative pressure (vacuum) in the EVAP system and the EVAP system pressure is measured. If the stabilized system pressure is higher than second 0.02 inch leak pressure standard, the ECM determines that the EVAP system has a small leakage, illuminates the MIL and sets the DTC (2 trip detection logic).



MONITOR STRATEGY

Related DTCs	P0455: Gross leak detected P0456: Very small leak (0.020 inch hole) detected
Required sensors/Components	Purge VSV, Pump module
Frequency of operation	Once per driving cycle
Duration	Within 15 min. (varies with amount of fuel in tank)
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
Following values are when atmospheric is 760 mmHg (100 kPa)	-
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Less than 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool

Both of the following conditions are met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Key-off monitor sequence (1 to 8)**1. Atmospheric pressure**

Next sequence is run if following condition is set	-
Atmospheric pressure change for 10 sec.	Less than 2.25 mmHg (0.286 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions are set	Conditions 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.3 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions are set	Conditions 1 and 2
1. Vacuum introduction time	15 min. or less
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.286 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions are set	Conditions 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition is set	-
FTP when vacuum introduction was complete	Second reference pressure

8. Atmospheric pressure

Monitor is complete if following condition is set	-
Atmospheric pressure difference between sequence 1 and 8	Less than 2.25 mmHg (0.286 kPa)

TYPICAL MALFUNCTION THRESHOLDS**Small leak (0.020 inch) malfunction detection:**

FTP when vacuum introduction was complete	Between 1 and 2
Condition 1.	Higher than second reference pressure
Condition 2.	Lower than reference pressure x 0.2

Gross leak detection:

FTP when vacuum introduction was compleat	Higher than reference pressure x 0.2
---	--------------------------------------

MONITOR RESULT (MODE 06 DATA)

Refer to page [05-28](#) for detailed information on Monitor Result.

INSPECTION PROCEDURE

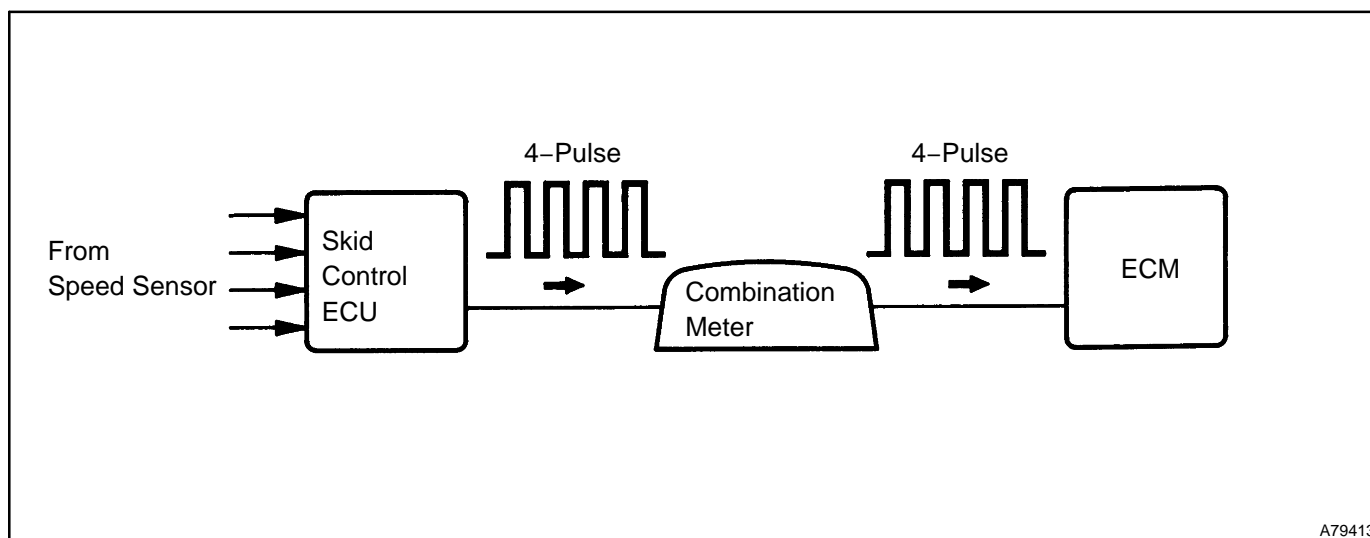
Refer to the EVAP Inspection Procedure (see page [05-408](#)).

DTC	P0500	VEHICLE SPEED SENSOR "A"
------------	--------------	---------------------------------

DTC	P0503	VEHICLE SPEED SENSOR "A" INTERMITTENT/ERRATIC/HIGH
------------	--------------	---

CIRCUIT DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a 4-pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detection Condition	Trouble Area
P0500 P0503	The ECM detects following conditions simultaneously for 1 second (1 trip detection logic): <ul style="list-style-type: none"> • No SPD (speed sensor) signal while ECM detects NC (transmission counter gear) signal • Park/Neutral position switch is OFF (When shift lever is in other than P and N positions) • Transfer lever is in other than N position (4WD) 	<ul style="list-style-type: none"> • Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Combination meter • ECM • Skid control ECU

MONITOR DESCRIPTION

The ECM assumes that the vehicle is driven when the park/neutral position switch is OFF and it has been over 4 sec. since the actual vehicle speed was 9 km/h (6 mph) or more.

If there is no signal from the vehicle speed sensor when these conditions are satisfied, the ECM concludes that there is a fault in the vehicle speed sensor. The ECM will turn on the MIL and a DTC is set.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor "A" pulse input error
Required Sensors/Components (Main)	Vehicle speed sensor
Required Sensors/Components (Related)	Park/Neutral position switch, Engine coolant temperature sensor, Combination meter
Frequency of Operation	Continuous
Duration	500 times
MIL Operation	Immediate
Sequence of Operation	None

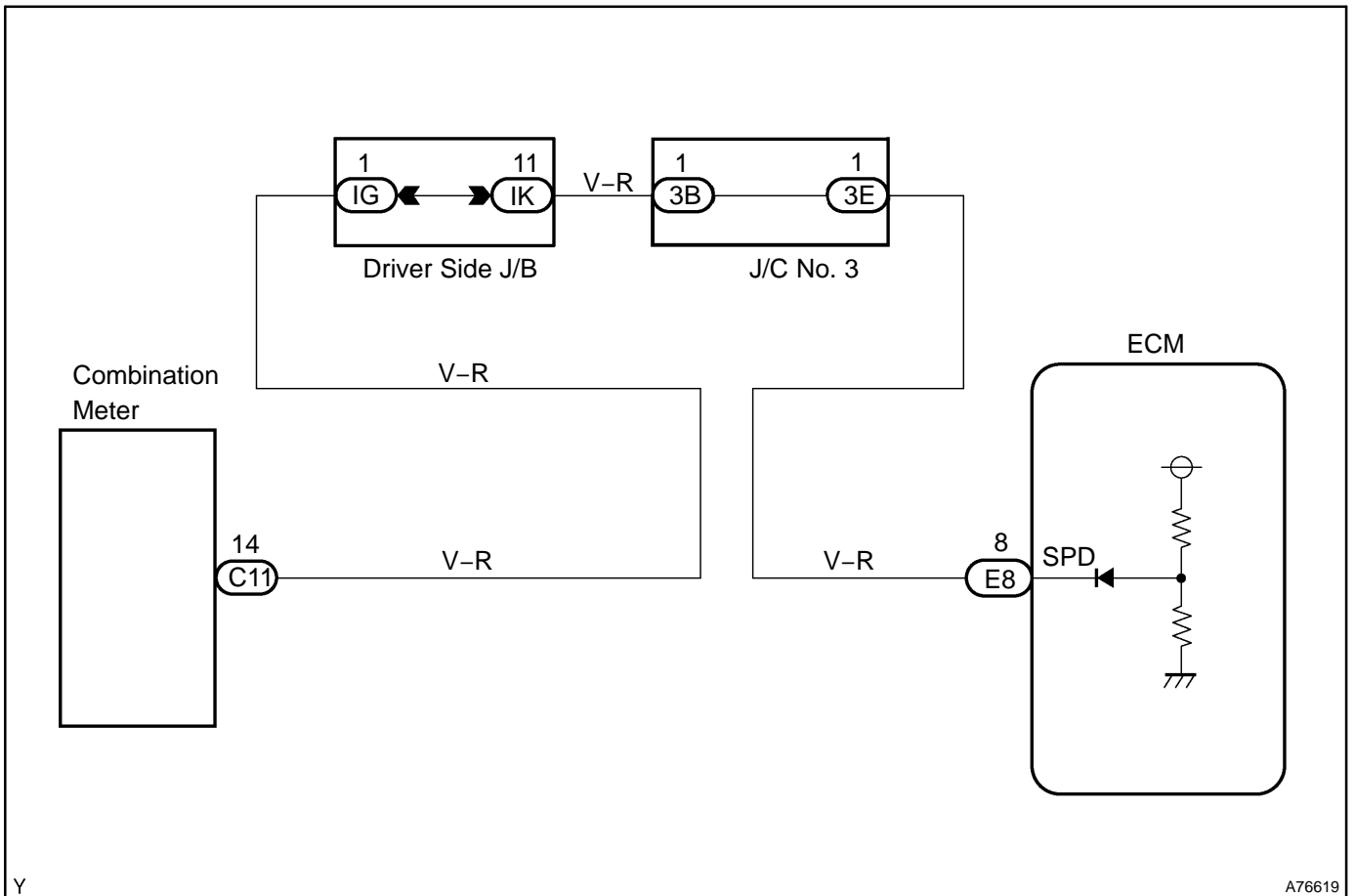
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Vehicle speed is 9 km/h (6 mph) or more	4 sec. or more
Park/neutral position switch	OFF

TYPICAL MALFUNCTION THRESHOLDS

Sensor signal	No pulse input
---------------	----------------

WIRING DIAGRAM



Y

A76619

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OPERATION OF SPEEDOMETER

(a) Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

HINT:

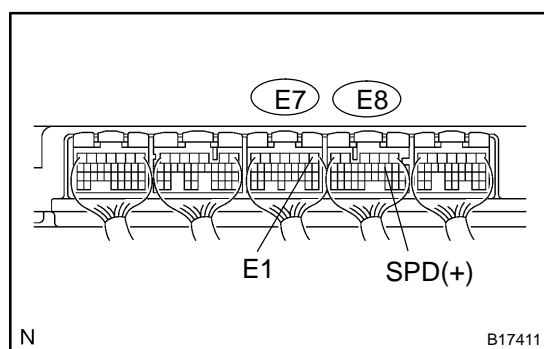
The vehicle speed sensor is operating normally if the speedometer display is normal.

NG

CHECK SPEEDOMETER CIRCUIT
(See page 05-2049)

OK

2 INSPECT ECM (SPD VOLTAGE)



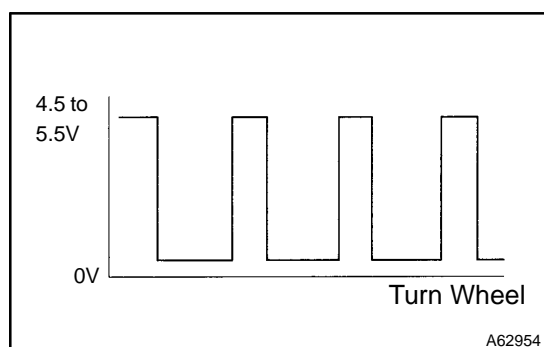
- Shift the lever to the neutral position.
- Jack up the vehicle.
- Turn the ignition switch to ON.
- Check the voltage between the specified terminals of the E7 and E8 ECM connectors as the wheel is turned slowly.

Standard:

Tester Connection	Specified Condition
SPD (E8-8) - E1 (E7-1)	Generated intermittently

HINT:

The output voltage should fluctuate up and down similarly to the diagram on the left when the wheel is turned slowly.



NG

CHECK AND REPAIR HARNESS OR CONNECTOR (COMBINATION METER - ECM)

OK

REPLACE ECM (See page 10-16)

DTC	P0504	BRAKE SWITCH "A"/"B" CORRELATION
------------	--------------	---

CIRCUIT DESCRIPTION

In addition to turning on the stop lamps, the stop lamp switch signals are used for a variety of engine, transmission, and suspension functions as well as being an input for diagnostic checks. It is important that the switch operates properly, therefore this switch is designed with two complementary signal output: STP and ST1-. The ECM analyzes these signal output to detect malfunctions in the stop lamp switch.

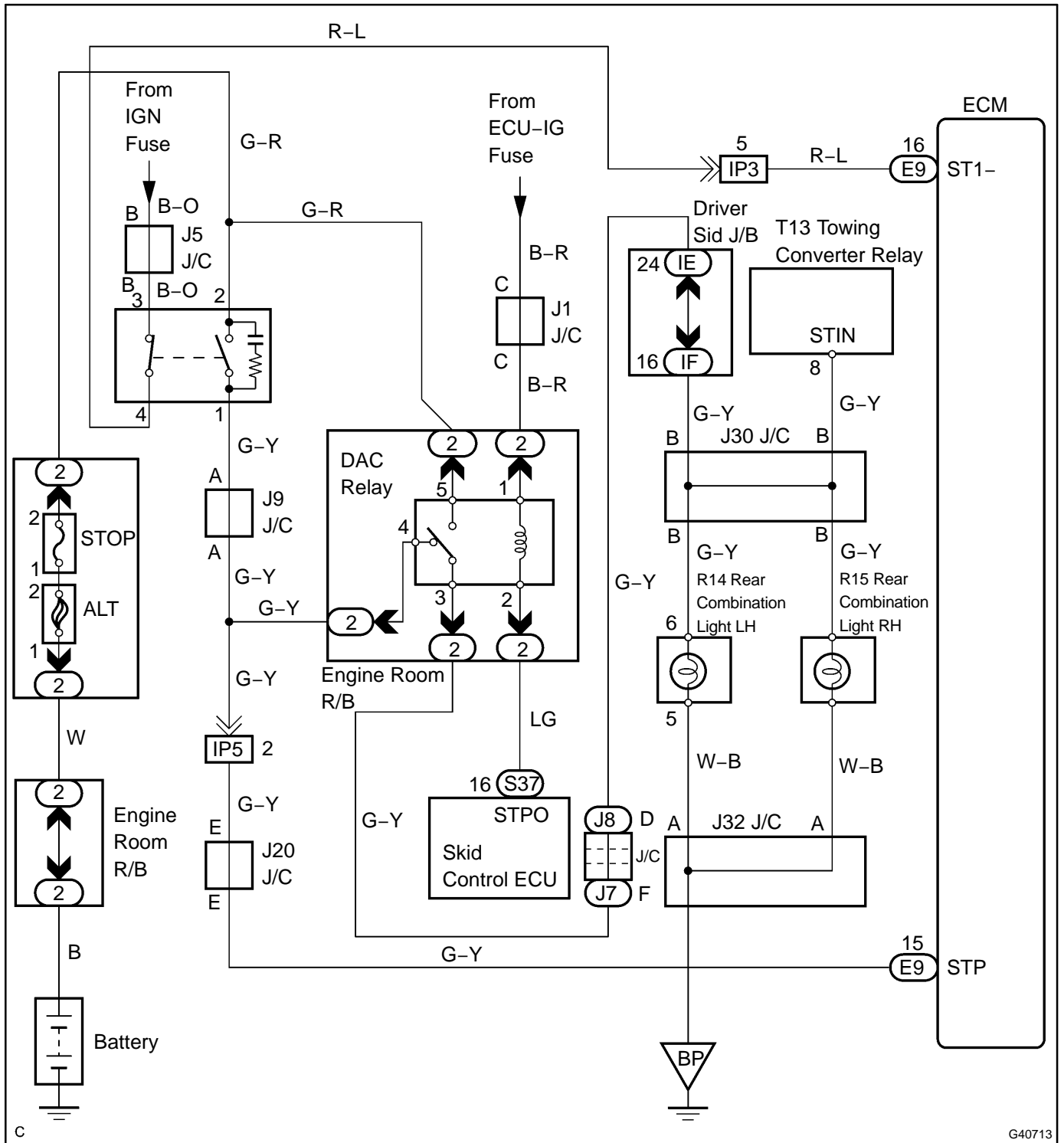
HINT:

The normal signal conditions are as shown in the table below.

Signal (ECM terminal)	Brake pedal released	In transition	Brake pedal depressed
STP	OFF	ON	ON
ST1-	ON	ON	OFF

DTC No.	DTC Detection Condition	Trouble Area
P0504	Conditions (a), (b) and (c) continue for 0.5 second or more (a) Ignition switch ON (b) Brake pedal released (c) STP signal is OFF when the ST1- signal is OFF	<ul style="list-style-type: none"> • Short in stop lamp switch signal circuit • Stop lamp fuse • Stop lamp switch • ECM

WIRING DIAGRAM



C

G40713

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OPERATION OF STOP LAMP

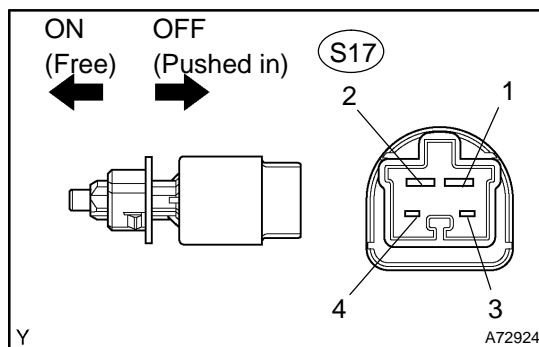
- (a) Check if the stop lamps go on and off normally when the brake pedal is depressed and released.

NG

REPAIR OR REPLACE STOP LAMP SWITCH CIRCUIT

OK

2 INSPECT STOP LAMP SWITCH ASSY



- (a) Check for continuity between each pair of the terminals when the switch is ON and OFF.

Standard:

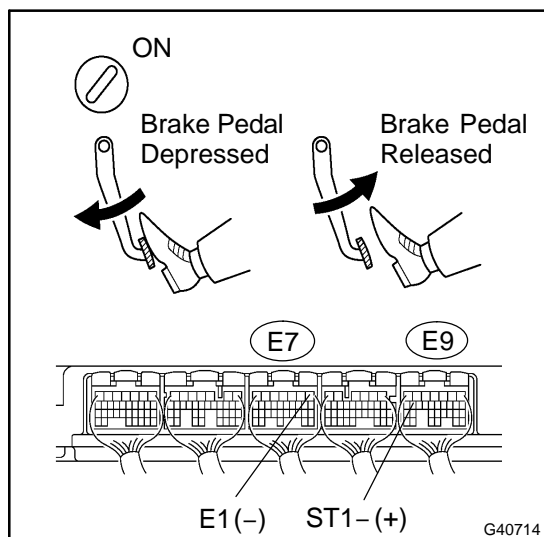
Switch Position	Tester Connection	Specified Condition
Switch pin free	1 - 2	Continuity
Switch pin free	3 - 4	No Continuity
Switch pin pushed in	1 - 2	No Continuity
Switch pin pushed in	3 - 4	Continuity

NG

REPLACE STOP LAMP SWITCH ASSY

OK

3 READ VALUE OF HAND-HELD TESTER(STP SIGNAL AND ST1- VOLTAGE)



- Turn the ignition switch to ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STOP LIGHT SW. Read the values.

Standard:

Brake Pedal	Specified Condition
Depressed	STP Signal ON
Released	STP Signal OFF

- Measure the voltage between the terminals of the E7 and E9 ECM connectors.

Standard:

Tester Connection	Brake Pedal	Specified Condition
ST1- (E9-16) - E1 (E7-1)	Depressed	Below 1.5 V
ST1- (E9-16) - E1 (E7-1)	Released	7.5 to 14 V

OK

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)

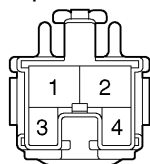
NG

4 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH - ECM)

Wire Harness Side:

Stop Lamp Switch Connector

S17



Front View

Y

A56986

- Disconnect the S17 stop lamp switch connector.
- Disconnect the E9 ECM connector.
- Check the resistance between the wire harness side connectors.

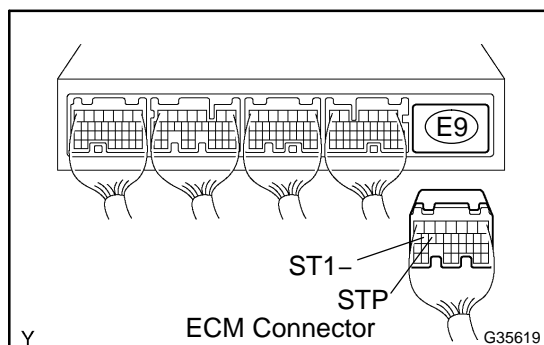
Standard (Check for open):

Tester Connection	Specified Condition
Stop lamp switch (S17-1) - STP (E9-15)	Below 1 Ω
Stop lamp switch (S17-4) - ST1- (E9-16)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Stop lamp switch (S17-1) or STP (E9-15) - Body ground	10 k Ω or higher
Stop lamp switch (S17-4) or ST1- (E9-16) - Body ground	10 k Ω or higher

- Reconnect the stop lamp switch connector.
- Reconnect the ECM connector.



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

DTC	P0505	IDLE AIR CONTROL SYSTEM
------------	--------------	--------------------------------

MONITOR DESCRIPTION

The idle speed is controlled by the Electronic Throttle Control System (ETCS).

ETCS is composed of the throttle motor which operates the throttle valve, and the throttle position sensor which detects the opening angle of the throttle valve.

The ECM controls the throttle motor to provide the proper throttle valve opening angle to obtain the target idle speed.

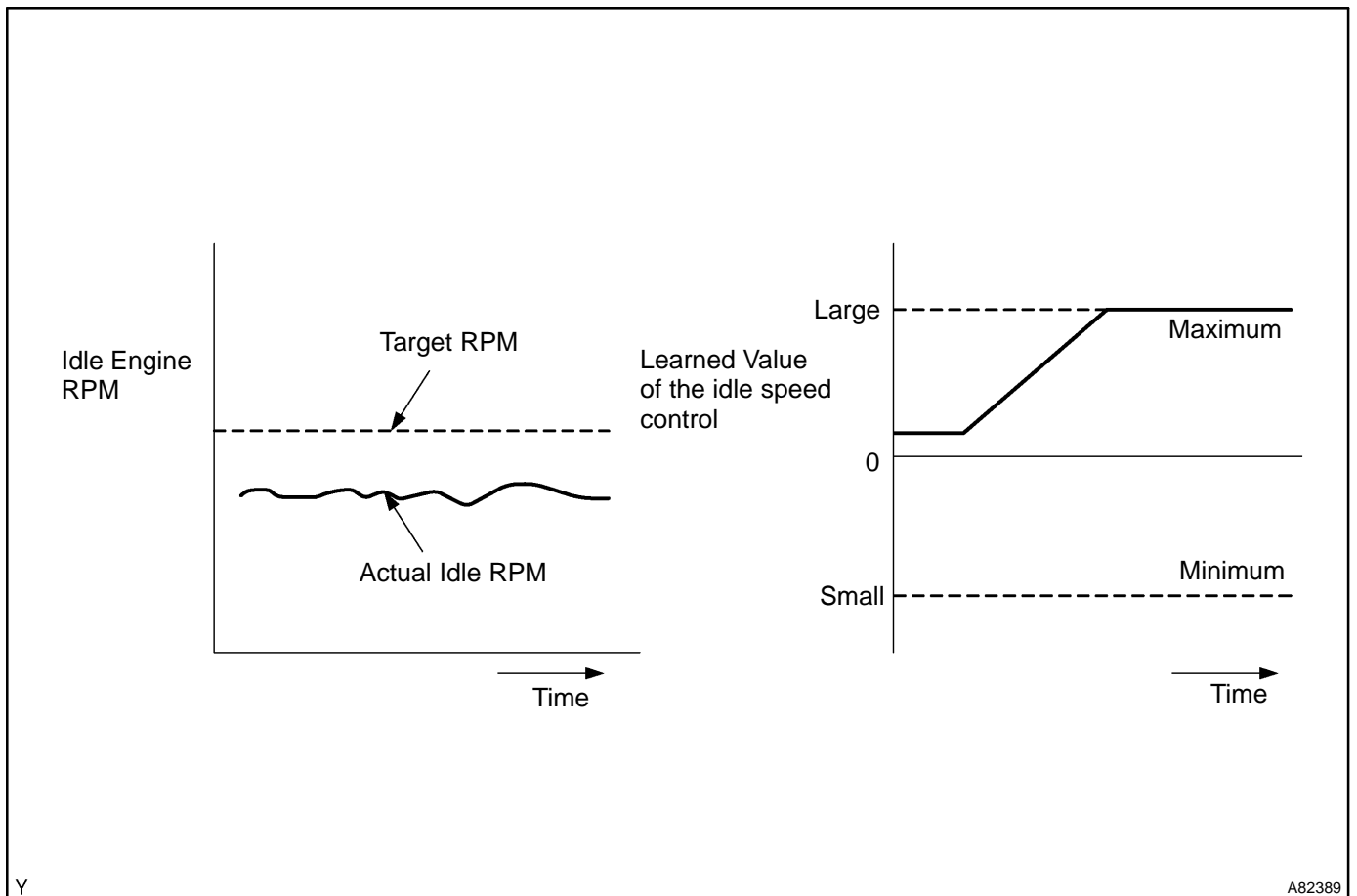
The ECM regulates the idle speed by opening and closing the throttle valve using the ETCS. The ECM concludes that the idle speed control ECM function is malfunctioning if: 1) the actual idle RPM varies more than the specified amount five times or more during a drive cycle, or 2) a learned value of the idle speed control remains at the maximum or minimum five times or more during a drive cycle. The ECM will turn on the MIL and set a DTC.

Example:

If the actual idle RPM varies from the target idle RPM by more than 200 (*1) rpm five times during a drive cycle, the ECM will turn on the MIL and a DTC is set.

HINT:

*1: RPM threshold varies with engine load.



DTC No.	DTC Detection Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed (1 trip detection logic)	<ul style="list-style-type: none"> • Electric throttle control system • Air induction system • ECM • PCV hose connection

MONITOR STRATEGY

Related DTCs	P0505: Idle air control malfunction
Required Sensors/Components (Main)	Crankshaft position sensor
Required Sensors/Components (Related)	Vehicle speed sensor, Engine coolant temperature sensor
Frequency of Operation	Once per driving cycle
Duration	10 min.
MIL Operation	2 drive cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:	Condition 1 or 2
1. Frequency that both of the following conditions (a) and (b) are met:	5 times or more
(a) Engine RPM - target engine RPM	Less than -100 rpm or more than 150 rpm
(b) Vehicle condition	Stop after vehicle was driven by 10 km/h (6.25 mph) or more
2. Frequency that both of the following conditions (a) and (b) are met:	Once
(a) Engine RPM - target engine RPM	Less than -100 rpm or more than 150 rpm
(b) Intake air control flow rate learning value	2.48 L/sec. or less, or 11 L/sec. or more

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0505)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTCs.

Result:

Display (DTC output)	Proceed to
P0505	A
P0505 and other DTCs	B

HINT:

If any other codes besides P0505 are output, perform troubleshooting for those DTCs first.

B → GO TO DTC CHART (See page 05-60)

A

2 CHECK CONNECTION OF PCV HOSE**NG** → **REPAIR OR REPLACE PCV HOSE****OK****3 CHECK AIR INDUCTION SYSTEM**

(a) Check for vacuum leaks in the air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM****OK****4 INSPECT THROTTLE W/MOTOR BODY ASSY**

(a) Check the throttle valve condition.

NG → **REPLACE THROTTLE W/MOTOR BODY ASSY****OK****REPLACE ECM (See page 10-16)**

DTC	P0560	SYSTEM VOLTAGE
------------	--------------	-----------------------

MONITOR DESCRIPTION

The battery supplies electricity to the ECM even when the ignition switch is OFF. This electricity allows the ECM to store data such as DTC history, freeze frame data, fuel trim values, and other data. If the battery voltage falls below a minimum level, the ECM will conclude that there is a fault in the power supply circuit. The next time the engine start, the ECM will turn on the MIL and a DTC will be set.

DTC No.	DTC Detection Condition	Trouble Area
P0560	Open in back-up power source circuit	<ul style="list-style-type: none"> • Open in back-up power source circuit • EFI fuse • ECM

HINT:

If DTC P0560 appears, the ECM does not store another DTC.

MONITOR STRATEGY

Related DTCs	P0560: System voltage malfunction
Required sensors/Components (Main)	ECM
Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	Immediate (*1)
Sequence operation	None

*1: The DTC is set immediate. The MIL will be illuminated after the engine starts in the next time.

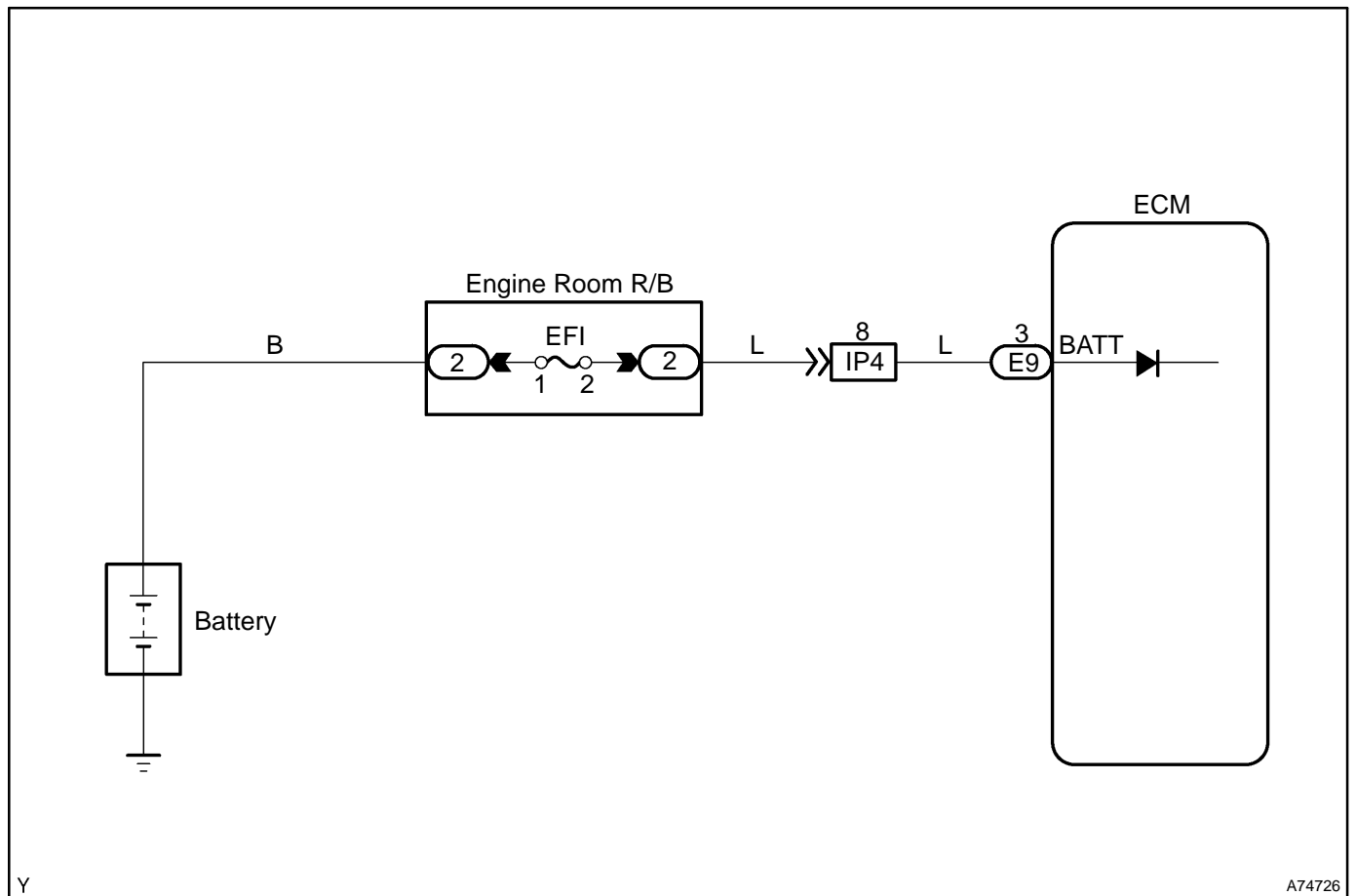
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Stand-by RAM	Initialized

TYPICAL MALFUNCTION THRESHOLDS

Battery voltage	Less than 3.5 V
-----------------	-----------------

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK BATTERY(VOLTAGE)
----------	-------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / BATTERY VOLTAGE.
- (d) Read the battery voltage on the hand-held tester

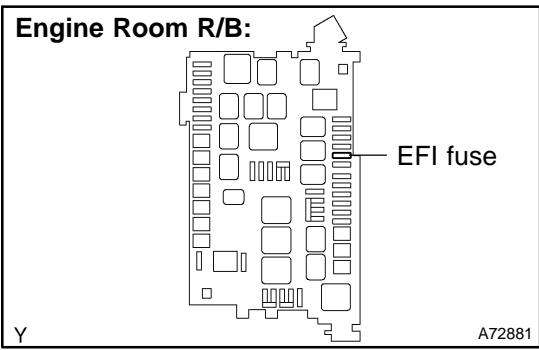
Result:

Battery voltage	Proceed to
0 V	A
Except 0 V	B

B
Go to step 5

A

2 CHECK FUSE(EFI FUSE)

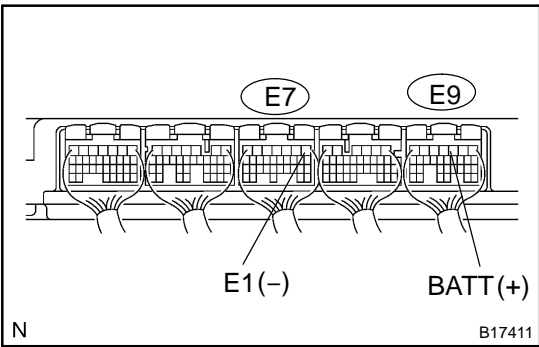


- (a) Remove the EFI fuse from the engine room R/B.
- (b) Check for continuity in the EFI fuse.
Standard: Continuity
- (c) Reinstall the EFI fuse.

NG CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED EFI FUSE, AND REPLACE EFI FUSE

OK

3 INSPECT ECM(BATT VOLTAGE)



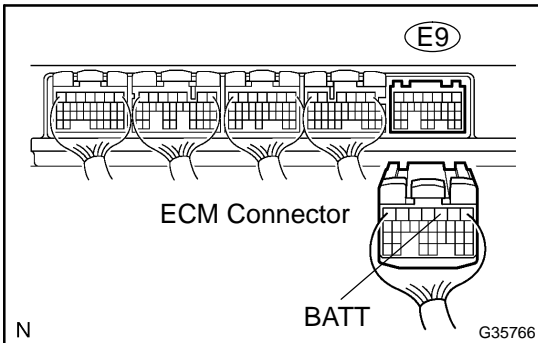
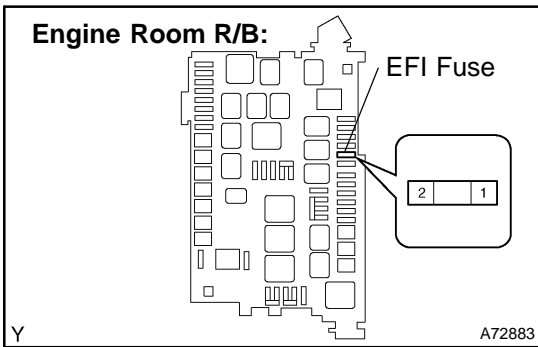
- (a) Measure the voltage between the terminals of the E7 and E9 ECM connectors.
Standard:

Tester Connection	Specified Condition
BATT (E9-3) - E1 (E7-1)	9 to 14 V

OK CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

NG

4 CHECK HARNESS AND CONNECTOR(ECM - EFI FUSE, EFI FUSE - BATTERY)



- (a) Check the harness and the connector between the EFI fuse and ECM.
 - (1) Remove the EFI fuse from the engine room R/B.
 - (2) Disconnect the E9 ECM connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (EFI fuse terminal 2) - BATT (E9-3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B (EFI fuse terminal 2) or BATT (E9-3) - Body ground	10 kΩ or higher

- (4) Reinstall the EFI fuse.
- (5) Reconnect the ECM connector.
- (b) Check the harness and the connector between the EFI fuse and battery.
 - (1) Remove the EFI fuse from the engine room R/B.
 - (2) Disconnect the negative positive battery cable.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Positive battery cable - Engine room R/B (EFI fuse terminal 1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Positive battery cable or Engine room R/B (EFI fuse terminal 1) - Body ground	10 kΩ or higher

- (4) Reinstall the EFI fuse.
- (5) Reconnect the negative positive battery cable.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK BATTERY (See page 19-13)

NG → **REPLACE BATTERY**

OK

REPLACE ENGINE ROOM RELAY BLOCK

DTC	P0604	INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY ERROR
------------	--------------	---

MONITOR DESCRIPTION

The ECM continuously monitors its internal memory status. This is diagnosed by internal "mirroring" of the main CPU and the sub CPU to detect random access memory (RAM) errors. If the outputs from these CPUs are different and deviate from the standards, the ECM set the DTC and illuminates the MIL.

DTC	DTC Detection Condition	Trouble Area
P0604	ECM RAM error	ECM

MONITOR STRATEGY

Required sensors/components	ECM
Frequency of operation	Continuous
Duration	16 sec
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

None

TYPICAL MALFUNCTION THRESHOLDS

Main CPU and sub CPU mirroring	Fail
--------------------------------	------

INSPECTION PROCEDURE

1	CHECK WHETHER DTC RECURS (IN ADDITION TO DTC P0604)
----------	--

- (a) Clear the DTC.
- (b) Turn the ignition switch off.
- (c) Disconnect the battery negative terminal for 1 minute.
- (d) Reconnect the the battery negative terminal.
- (e) Turn the ignition switch on.
- (f) Check DTCs.

Result

DTC	Go to
P0604	A
No DTC	B

B	CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)
----------	---

A

REPLACE ECM (See page 10-16)

DTC	P0606	ECM/PCM PROCESSOR
------------	--------------	--------------------------

MONITOR DESCRIPTION

The ECM continuously monitors its internal processor (CPU) and heated oxygen sensor transistors. If any malfunction is detected, the ECM set the DTC and illuminate the MIL.

DTC	DTC Detection Condition	Trouble Area
P0606	Malfunction in ECM CPU Malfunction in oxygen sensor transistors of ECM	ECM Heated oxygen sensor Exhaust gas leak

MONITOR STRATEGY

Required sensors/components (Main)	ECM
Required sensors/components (Related)	Cruise control, HO2S, APP sensor, TP sensor, stop light switch
Frequency of operation	Continuous
Duration	60 sec
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	None
Engine	Running
HO2S temperature	450 to 700°C (842 to 1292°F)

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:

Cruise control	Forbiddance (while cruise control operating)
APP sensor 1 voltages difference between main and sub CPUs	0.3 V or more
TP sensor 1 voltages difference between main and sub CPUs	0.3 V or more
Brake switch signal between CPU and monitor IC	Unmatched
Oxygen sensor transistor 1 (high side)	Malfunction
Oxygen sensor transistor 2 (low side)	Malfunction

INSPECTION PROCEDURE

NOTICE:

Check for an exhaust gas leak around the heated oxygen sensor (HO2S) first. An exhaust gas leak generates noise in the HO2S output. The ECM may interpret this as a HO2S transistor malfunction.

1	CHECK ANY OTHER DTCS
----------	-----------------------------

Result

DTC	Proceed to
P0136, P0137, P0138, P0156, P0157 or P0158 and P0606	A
P0606	B

B	Go to step 3
----------	---------------------

A

2	PERFORM INSPECTION PROCEDURE OF P0136, P0137, P0138, P0156, P0157 AND P0158 (See page 05-138)
----------	--

NEXT

Go to step 7

3	CHECK FOR EXHAUST GAS LEAK
----------	-----------------------------------

Check for exhaust gas leak around the heated oxygen sensor when the engine is idling and revving.

Result

Exhaust Gas Leak	Proceed to
Detected	A
Not detected	B

B	Go to step 5
----------	---------------------

A

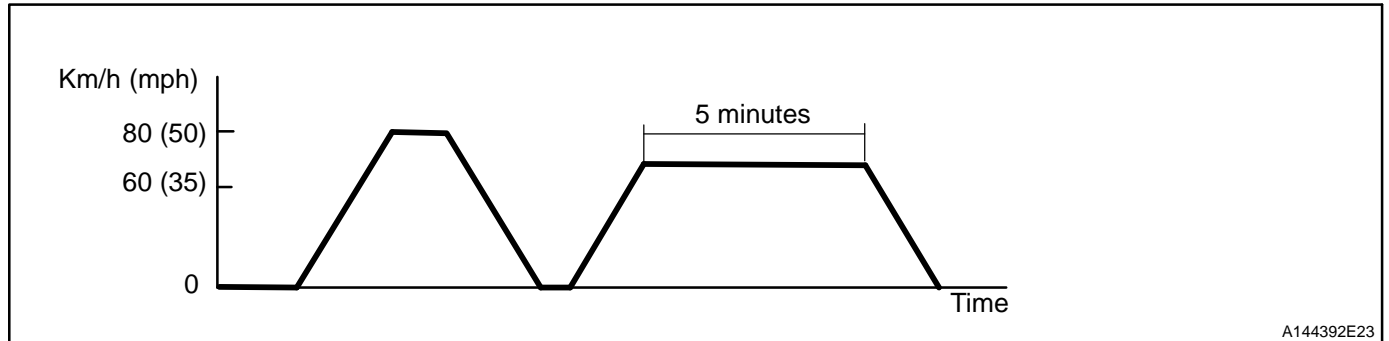
4	REPAIR EXHAUST GAS LEAK
----------	--------------------------------

NEXT

5 PERFORM CONFIRMATION DRIVING PATTERN

- Clear DTC.
- Warm up the engine until the engine coolant temperature becomes 75°C (167°F) or more.
- Drive the vehicle at 80 km/h (50 mph) and stop the vehicle.
- Drive the vehicle at 60 to 80 km/h (35 to 50 mph) for 5 minutes.
- Check DTC.

Driving Pattern



A144392E23

Result

DTC	Proceed to
P0136, P0137, P0138, P0156, P0157 or P0158 and P0606	A
P0606	B
No DTC	C

B

REPLACE ECM (See page 10-16)

C

Go to step 7

A

6 PERFORM INSPECTION PROCEDURE OF P0136, P0137, P0138, P0156, P0157 AND P0158 (See page 05-138)

NEXT

7 CHECK ECM

- Clear DTC.
- Turn the ignition switch off and wait for 30 minutes.
- Allow the engine to idle for 2 minutes.
- Check DTC.

Result

DTC	Proceed to
No DTC	A
P0606	B

B

REPLACE ECM (See page 10-16)

A

END

DTC	P0607	CONTROL MODULE PERFORMANCE
------------	--------------	-----------------------------------

MONITOR DESCRIPTION

The ECM continuously monitors its main and sub CPUs. If the outputs of the CPUs are different and deviate from the standard, the ECM set the DTC and illuminate the MIL.

The ECM also monitors the cruise control cancel circuit. If this circuit malfunctions, the ECM sets the DTC but the MIL is not illuminated.

DTC	DTC Detection Condition	Trouble Area
P0607	ECM main CPU error ECM sub CPU error Cruise control cancel circuit	ECM

MONITOR STRATEGY

Required sensors/components	ECM
Frequency of operation	Continuous
Duration	16 sec
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

None

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:	Condition 1 or 2
1. All of the following conditions are met:	Condition (a), (b) and (c)
(a) CPU reset	1 time or more
(b) Difference between TP and APP learned	0.4 V or more
(c) Electronic throttle actuator	OFF
2. CPU reset	2 times or more

INSPECTION PROCEDURE

1	CHECK WHETHER DTC RECURS (IN ADDITION TO DTC P0607)
----------	--

- (a) Clear the DTC.
- (b) Turn the ignition switch off.
- (c) Disconnect the battery negative terminal for 1 minute.
- (d) Reconnect the the battery negative terminal.
- (e) Turn the ignition switch on.
- (f) Check DTCs.

Result

DTC	Go to
P0607	A
No DTC	B

B

**CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)**

A

REPLACE ECM (See page 10-16)

DTC	P0617	STARTER RELAY CIRCUIT HIGH
------------	--------------	-----------------------------------

CIRCUIT DESCRIPTION

HINT:

Refer to cranking holding function circuit on page [05-447](#).

If the vehicle is being driven and the ECM detects the starter control signal (STA), the ECM concludes that the starter control circuit is malfunctioning. The ECM will turn on the MIL and a DTC is set.

DTC No.	DTC Detection Condition	Trouble Area
P0617	When conditions (a), (b) and (c) are met when the battery (+B) voltage 10.5 V or more is applied for 20 seconds: (a) Vehicle speed greater than 12 mph (20 km/h) (b) Engine speed greater than 1,000 rpm (c) STA signal ON	<ul style="list-style-type: none"> • Short in Park/Neutral position switch circuit • Park/Neutral position switch • Ignition switch • ECM

MONITOR STRATEGY

Related DTCs	P0617: Starter signal error
Required sensors/Components (Main)	Starter relay, PNP switch, Ignition switch
Required sensors/Components (Related)	Vehicle speed sensor, Crankshaft position sensor
Frequency of operation	Continuous
Duration	20 sec.
MIL operation	Immediate
Sequence operation	None

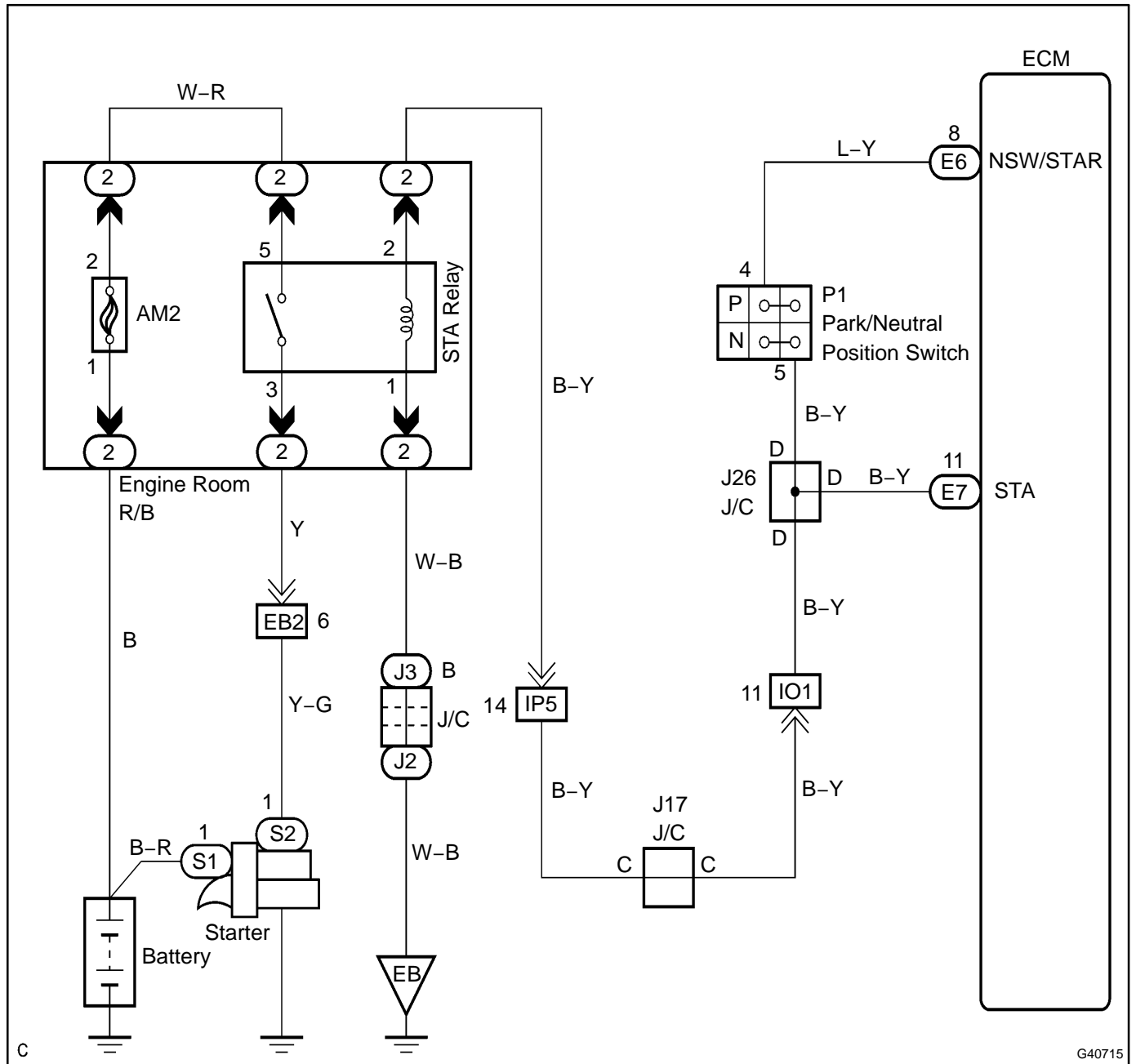
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Battery voltage	10.5 V or more
Vehicle speed	20 km/h (12.4 mph) or more
Engine RPM	1,000 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Starter signal	ON
----------------	----

WIRING DIAGRAM



C

G40715

INSPECTION PROCEDURE

HINT:

- This DTC chart is on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page 05-34.
- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER(STARTER SIGNAL)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
- Read the values.

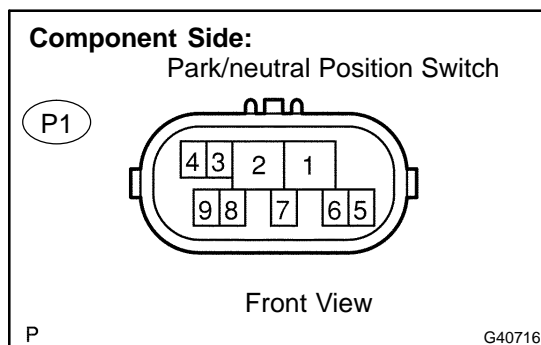
Result:

Ignition Switch Position	ON	START
STARTER SIG	OFF	ON

OK → Go to step 5

NG

2 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



- Disconnect the P1 park/neutral position switch connector.
- Check the resistance between each terminal shown below when the shift lever is moved to each position.

Standard:

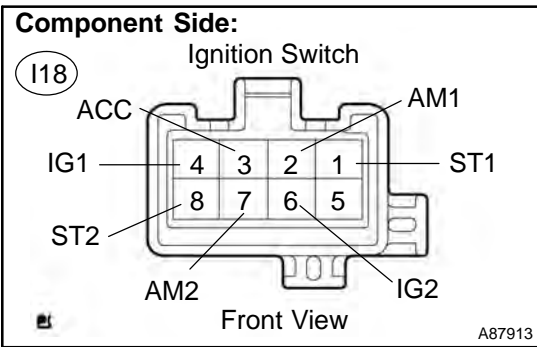
Shift Position	Tester Connection	Specified Condition
P	2 - 6, 4 - 5	Below 1 Ω
R	1 - 2	Below 1 Ω
N	2 - 9, 4 - 5	Below 1 Ω
D,4	2 - 7	Below 1 Ω
3	2 - 4	Below 1 Ω
2,L	2 - 8	Below 1 Ω

- Reconnect the park/neutral position switch connector.

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH ASSY (See page 40-10) (GO TO NEXT STEP 5 AFTER THE REPLACEMENT)**

OK

3 INSPECT IGNITION OR STARTER SWITCH ASSY



- (a) Disconnect the I18 ignition switch connector.
- (b) Measure the resistance between the connector terminals shown in the chart below.

Standard:

Switch Position	Tester Connection	Specified Condition
LOCK	All Terminals	10 kΩ or higher
ACC	2-3	Below 1 Ω
ON	2-3, 2-4, 6-7	Below 1 Ω
START	1-2, 2-4, 6-7, 6-8	Below 1 Ω

- (c) Reconnect the ignition switch connector.

NG → **REPLACE IGNITION OR STARTER SWITCH ASSY (GO TO STEP 5 AFTER THE REPLACEMENT)**

OK

4 READ VALUE OF HAND-HELD TESTER(STARTER SIGNAL)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
- (d) Read the values.

Result:

Ignition Switch Position	ON	START
STARTER SIG	OFF	ON

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 | CHECK IF DTC OUTPUT REOCCURS

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) To erase DTC, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODE; and press YES.
- (d) Drive the vehicle more than 25 mph (40 km/h) for 20 seconds or more.
- (e) Check DTC reoccur.

Result:

Display (DTC output)	Proceed to
P0617	A
No output	B

B  **CHECK FOR INTERMITTENT PROBLEMS**

A 

REPLACE ECM (See page 10-16)

DTC	P0630	VIN NOT PROGRAMMED OR MISMATCH - ECM/PCM
------------	--------------	---

CIRCUIT DESCRIPTION

DTC P0630 is set when the Vehicle Identification Number (VIN) is not stored in the Engine Control Module (ECM) or the input VIN is not accurate. Input the VIN with the hand-held tester.

DTC No.	DTC Detecting Condition	Trouble Area
P0630	<ul style="list-style-type: none"> • VIN is not stored in ECM. • Input VIN in ECM is not accurate. 	• ECM

MONITOR STRATEGY

Related DTCs	P0630: VIN not programmed
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	—
Frequency of Operation	Continuous
Duration	0.5 sec.
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

VIN code	Not programmed
----------	----------------

COMPONENT OPERATING RANGE

VIN code	Programmed
----------	------------

INSPECTION PROCEDURE

1	READ CURRENT DTC
----------	-------------------------

NOTICE:

If P0630 is present, the VIN must be input to the ECM using the hand-held tester. However, all DTCs are cleared automatically by the tester when inputting the VIN. If DTCs other than P0630 are present, check them first.

NEXT

2	INPUT VIN WITH HAND-HELD TESTER (See page 05-16)
----------	---

NEXT

END

DTC	P0657	ACTUATOR SUPPLY VOLTAGE CIRCUIT/OPEN
------------	--------------	---

DESCRIPTION

The ECM monitors the voltage of the throttle actuator power supply. When the ignition switch is turned from ON to OFF, the ECM shuts down this voltage. If this voltage maintains 7 V or higher, the ECM will set the DTC and illuminate the MIL when the ignition switch is turned ON.

DTC	DTC Detection Condition	Trouble Area
P0657	Throttle actuator power supply is 7 V or higher when ignition switch is turned from ON to OFF.	ECM

MONITOR STRATEGY

Required sensors/components (main)	ECM
Required sensors/components (sub)	Throttle actuator
Frequency of operation	Continuous
Duration	Within 1 sec
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

This monitor will not run whenever these DTCs are not set	None
Ignition switch	From ON to OFF

TYPICAL MALFUNCTION THRESHOLDS

Throttle actuator power supply	7 V or more
--------------------------------	-------------

INSPECTION PROCEDURE

1	CHECK WHETHER DTC RECURS (IN ADDITION TO DTC P0657)
----------	--

- (a) Clear the DTC.
- (b) Turn the ignition switch off.
- (c) Disconnect the battery negative terminal for 1 minute.
- (d) Reconnect the the battery negative terminal.
- (e) Turn the ignition switch on for 10 seconds.
- (f) Turn the ignition switch off.
- (g) Turn the ignition switch on.
- (h) Check DTCs.

Result

DTC	Go to
P0657	A
No DTC	B

B	CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)
----------	---

A

REPLACE ECM (See page 10-16)

DTC	P1340	CAMSHAFT POSITION SENSOR "A" (BANK 1 SENSOR 2)
------------	--------------	---

DTC	P1341	CAMSHAFT POSITION SENSOR "A" (BANK 1 SENSOR 2)
------------	--------------	---

CIRCUIT DESCRIPTION

Camshaft position sensor (G signal) consists of a magnet, iron core and pickup coil.

The camshaft drive gear (LH) has 3 teeth on its inner circumference. When the camshaft gear rotates, air gap changes between the protrusion on the gear and the pickup coil. The change affects the magnetic field and result in change in the resistance of the MRE element.

The crankshaft signal plate has 34 teeth and is mounted on the crankshaft. The crankshaft position sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detecting Condition	Trouble Area
P1340	No camshaft position sensor signal to ECM during cranking (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in camshaft position sensor circuit • Camshaft position sensor • LH camshaft timing pulley • ECM
P1341	No camshaft position sensor signal to ECM with engine speed 600 rpm or more	

MONITOR DESCRIPTION

The camshaft position sensor (G signal) consists of a magnet and MRE element.

The camshaft drive gear has 3 teeth on its inner circumference. When the camshaft gear rotates, air gap changes between the protrusion on the gear and the pickup coil. The change affects the magnetic field and result in change in the resistance of the MRE element. The crankshaft angle sensor plate has 34 teeth and output 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal and actual crankshaft angle and engine speed by NE signal.

MONITOR STRATEGY

Related DTCs	P1340: Camshaft position sensor range check P1340: Camshaft position/crankshaft position misalignment P1341: Camshaft position sensor malfunction
Required sensors/Components (Main)	Camshaft position sensor
Required sensors/Components (Related)	Crankshaft position sensor, Engine speed sensor
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	2 driving cycles: Camshaft position sensor range check Immediate: Camshaft position/crankshaft position misalignment and camshaft position sensor malfunction
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	----------------

Camshaft position sensor range check:

Starter	ON
Minimal battery voltage while starter ON	Less than 11 V

Camshaft position/crankshaft position misalignment:

Engine RPM	600 rpm or more
Starter	OFF

Camshaft position sensor malfunction:

Starter	After OFF to ON timing
---------	------------------------

TYPICAL MALFUNCTION THRESHOLDS

Camshaft position sensor range check:

Camshaft position signal	No signal
--------------------------	-----------

Camshaft position/crankshaft position misalignment:

Camshaft position and crankshaft position phase	Misaligned
---	------------

Camshaft position sensor malfunction:

Camshaft position and crankshaft position phase	Misaligned
Camshaft position signal per 2 revolutions crankshaft	12 signals or more

COMPONENT OPERATING RANGE

Camshaft position sensor signal	<ul style="list-style-type: none"> • Camshaft position sensor voltage fluctuates when the camshaft rotates • 3 signals per 2 revolution crankshaft
---------------------------------	--

WIRING DIAGRAM

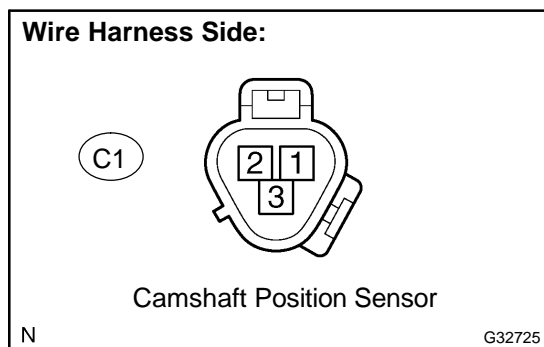
Refer to DTC P0335 on page 05-217.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand-held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	CHECK CAMSHAFT POSITION SENSOR ASSY(SENSOR POWER SOURCE)
----------	---

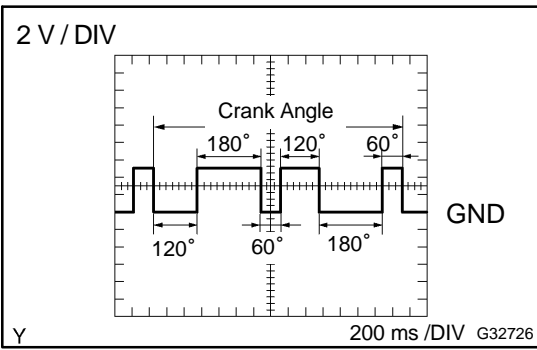


- (a) Disconnect the camshaft position sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between terminal 3 of the camshaft position sensor connector and body ground.
Standard: 4.5 to 5.5 V
- (d) Reconnect the camshaft position sensor connector.

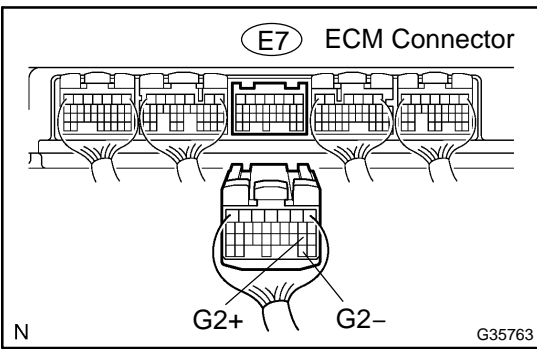
NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

2 CHECK ECM TERMINAL VOLTAGE



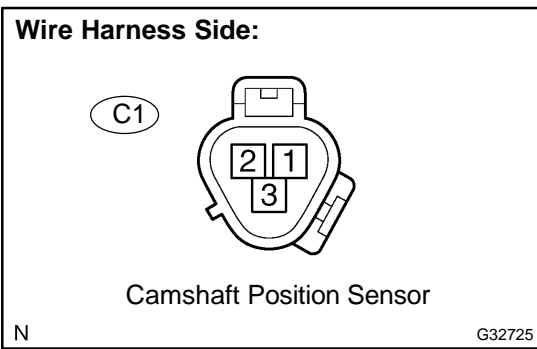
- (a) Start the engine.
- (b) Check the waveform between the G2+ (E7-19) and G2- (E7-29) of the ECM connector.
Standard: Correct waveform is as shown.



OK → REPLACE ECM (See page 10-16)

NG

3 CHECK HARNESS AND CONNECTOR (ECM - CAMSHAFT POSITION SENSOR)



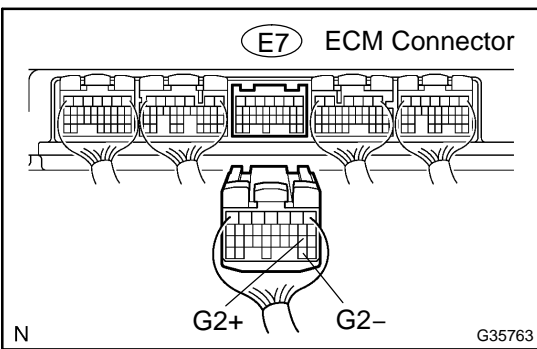
- (a) Disconnect the camshaft position sensor connector.
- (b) Disconnect the E7 ECM connector.
- (c) Measure the resistance between wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Camshaft position sensor (C1-2) - G2+ (E7-19)	Below 1 Ω
Camshaft position sensor (C1-1) - G2- (E7-29)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Camshaft position sensor (C1-2) or G2+ (E7-19) - Body ground	10 kΩ or higher
Camshaft position sensor (C1-1) or G2- (E7-29) - Body ground	10 kΩ or higher

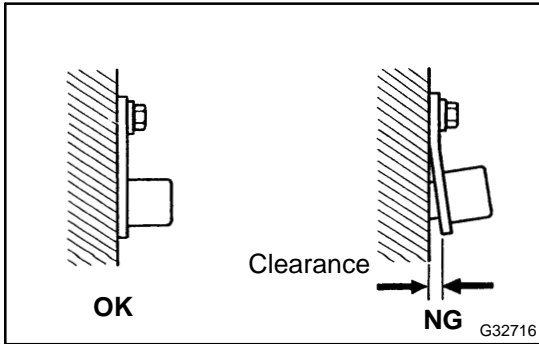


- (d) Reconnect the camshaft position sensor connector.
- (e) Reconnect the ECM connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT SENSOR INSTALLATION



(a) Check the camshaft position sensor installation.

OK:

The camshaft position sensor is installed properly.

NG

REPAIR OR REPLACE SENSOR

OK

5 INSPECT CAMSHAFT TIMING PULLEY (SIGNAL PLATE TOOTH)

NG

REPLACE CAMSHAFT TIMING PULLEY

OK

REPLACE CAMSHAFT POSITION SENSOR ASSY

DTC	P1440	SECONDARY AIR INJECTION SYSTEM CONTROL VALVE CIRCUIT BANK 1
------------	--------------	--

DTC	P1443	SECONDARY AIR INJECTION SYSTEM CONTROL VALVE CIRCUIT BANK 2
------------	--------------	--

CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P1440	AIV1 terminal voltage becomes less than half of the +B voltage while the VSV for air injection control is not operating. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in VSV for air injection control circuit (Bank 1) • VSV power source • VSV for air injection control (Bank 1) • ECM
P1443	AIV2 terminal voltage becomes less than half of the +B voltage while the VSV for air injection control is not operating. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in VSV for air injection control circuit (Bank 2) • VSV power source • VSV for air injection control (Bank 2) • ECM

MONITOR DESCRIPTION

The ECM detects an open or short in the circuit of the VSV for air injection control according to the AIV1 (AIV2) terminal voltage, stores the DTC, and then illuminates the MIL. When the AIV1 (AIV2) terminal voltage is less than half of the +B voltage while the VSV for air injection control is not operating, the ECM determines it as a malfunction.

MONITOR STRATEGY

Related DTCs	P1440: Secondary air injection system control valve circuit (Bank 1) range check P1443: Secondary air injection system control valve circuit (Bank 2) range check
Required sensors/components	VSV for air injection control
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITION

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

P1440:

Engine	Running
Air switching valve No. 2 (Bank 1)	Not operating

P1443:

Engine	Running
Air switching valve No. 2 (Bank 2)	Not operating

TYPICAL MALFUNCTION THRESHOLDS

P1440:

Air switching valve No. 2 (Bank 1) output terminal level	Low
--	-----

P1443:

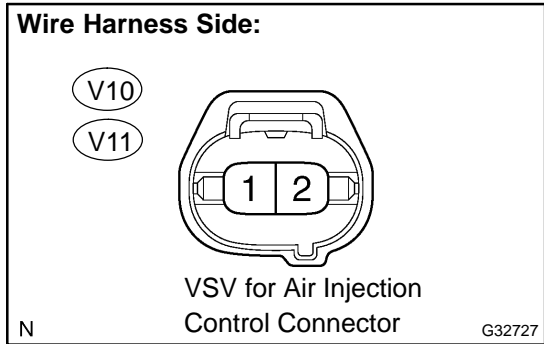
Air switching valve No. 2 (Bank 2) output terminal level	Low
--	-----

WIRING DIAGRAM

Refer to DTC P0412 on page 05-217.

INSPECTION PROCEDURE

1 CHECK VSV(AIR INJECTION CONTROL POWER SOURCE)

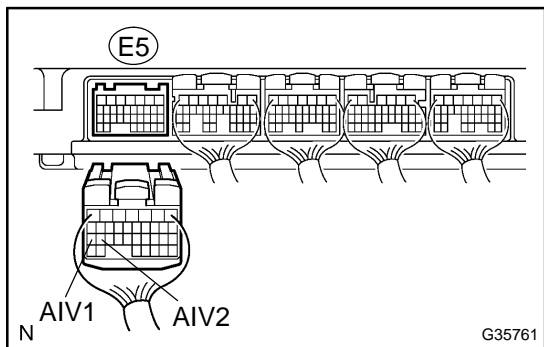


- (a) Disconnect the V10 or V11 VSV for air injection control connector.
- (b) Turn the ignition switch ON.
- (c) Measure the voltage between the terminal 1 of VSV connector and body ground.
Standard: 9 V or more
- (d) Reconnect the VSV for air injection control connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR(ECM - VSV FOR AIR INJECTION CONTROL)



- (a) Disconnect the E5 ECM connector.
- (b) Disconnect the V10 and V11 VSV for air injection control connectors.
- (c) Measure the resistance between the VSV connector and ECM.

Standard:

Tester connection	Specified condition
AIV1 (E5-27) - VSV (V10-2)	Below 1 Ω
AIV2 (E5-26) - VSV (V11-2)	Below 1 Ω

- (d) Measure the resistance between the VSV connector and body ground.

Standard:

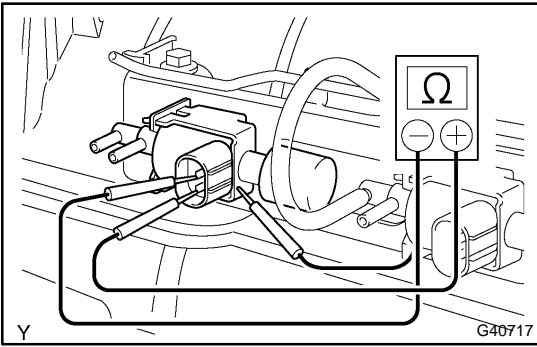
Tester connection	Specified condition
AIV1 (E5-27) or VSV (V10-2) - Body ground	10 KΩ or higher
AIV2 (E5-26) or VSV (V11-2) - Body ground	10 KΩ or higher

- (e) Reconnect the ECM connector.
- (f) Reconnect the VSV for air injection control connectors.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK VSV(RESISTANCE)



- (a) Disconnect the V10 or V11 VSV for air injection control connector.
- (b) Disconnect the 2 vacuum hoses from the VSV.
- (c) Measure the resistance between the VSV terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	33 to 39 Ω at 20°C (68°F)
1 - Body ground	10 kΩ or higher
2 - Body ground	10 kΩ or higher

- (d) Reconnect the VSV for air injection control connector.
- (e) Reconnect the vacuum hose.

NG → **REPLACE VSV**

OK

REPLACE ECM (See page 10-16)

DTC	P1441	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE NO.2 BANK 1 STUCK OPEN
------------	--------------	--

DTC	P1444	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE NO.2 BANK 2 STUCK OPEN
------------	--------------	--

DTC	P2440	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN BANK1
------------	--------------	--

CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P1441	Air switching valve No.2 (Bank 1) stuck open: The pressure sensor detects exhaust pulsation, when both of air switching valve No.2 OFF (and air switching valve ON). (2 trip detection logic)	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 1) • Air switching valve No.2 (Bank 1) • VSV for air injection system (Bank 1) • ECM
P1444	Air switching valve No.2 (Bank 2) stuck open: The pressure sensor detects exhaust pulsation, when both of air switching valve No.2 OFF (and air switching valve ON). (2 trip detection logic)	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 2) • Air switching valve No.2 (Bank 2) • VSV for air injection system (Bank 2) • ECM
P2440	Air switching valve stuck open: The pressure sensor detects exhaust pulsation when the system is not operate (both of air switching valve No.2 OFF, and air switching valve OFF and air pump OFF). This DTC means open stuck of air switching valve and "air switching valve No.2 bank 1 or bank 2". (1 trip detection logic)	<ul style="list-style-type: none"> • Electromagnetic air switching valve • Air switching valve No.2 (Bank 1 and/or 2) • VSV for air injection system (Bank 1 and/or 2) • Air injection driver • Air injection driver circuit • ECM

MONITOR DESCRIPTION

The ECM detects pressure change with the pressure sensor to determine malfunctioning parts in the system, and stores the DTCs. The ECM measures pressure and/or exhaust pulsation of the system at 6 points, A to F, when the air injection system is in operation or when not in operation. When the pressure is high, the ECM determines that the pump operates. When exhaust pulsation is detected, the ECM determines that the ASV is open. The ECM determines malfunction parts based on the measured value, and stores the DTCs.

Points A and B:

ECM detects pressure changes (decrease), and determines that the ASV No.2 is open.

Points C and F:

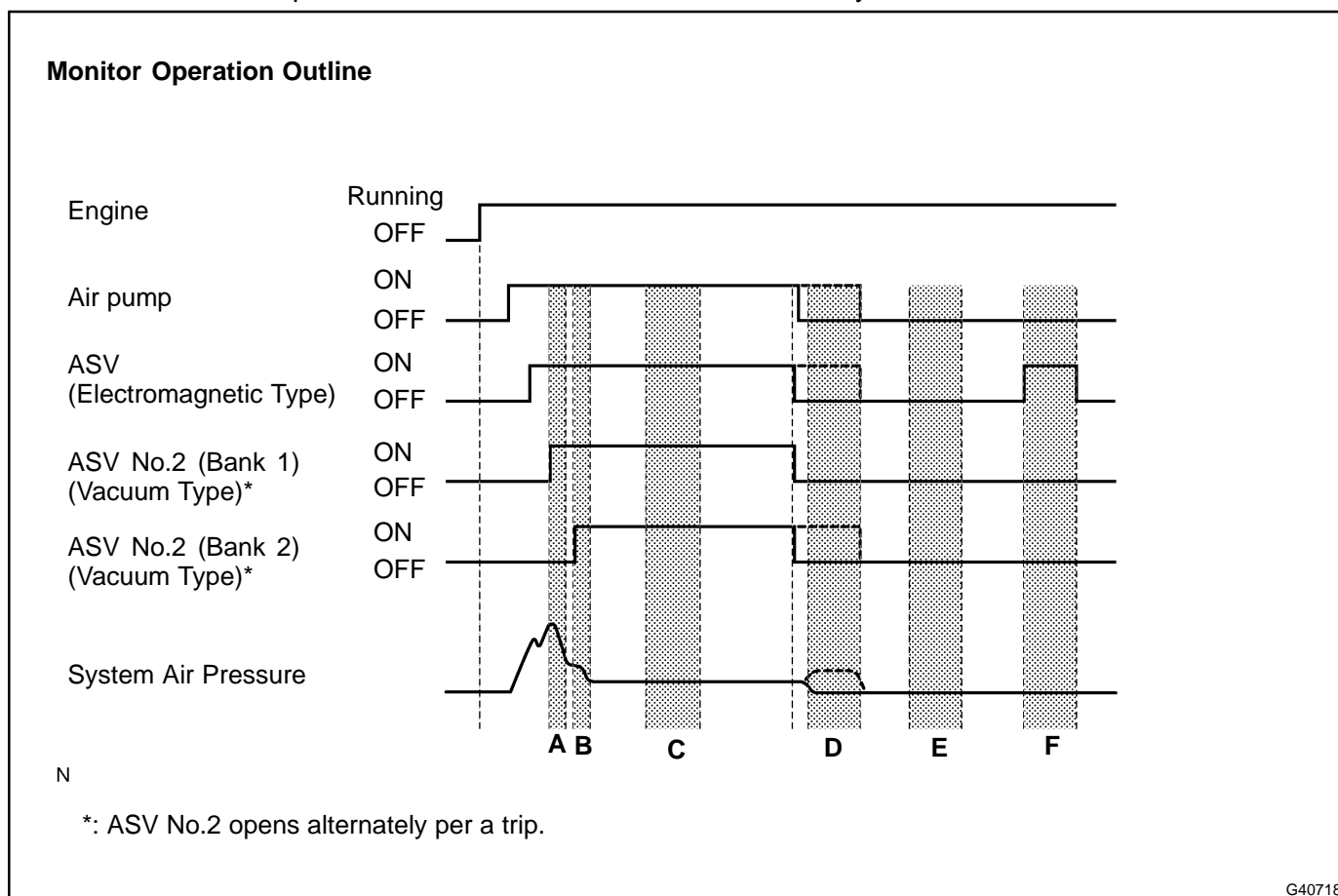
ECM detects pressure and exhaust pulsation, and determines the pressure pattern of the system.

Point D:

ECM operates the system, as indicated by the dashed lines, to determine which of the ASV No.2 is malfunctioning only when pressure changes cannot be detected at point A or B.

Point E:

ECM detects exhaust pulsation to determine the condition of the system.



Pressure condition in Secondary Air Injection System (Point C and F)

Pattern 1:

Air Pump	ON
Air Switching Valve and Air Switching Valve No.2	Open
Pressure	1 kPa or more
Pulsation detection	Exhaust gas pulsation detected

Pattern 2:

Air Pump	OFF
Air Switching Valve and Air Switching Valve No.2	Open
Pressure	Less than 5 kPa
Pulsation detection	Exhaust gas pulsation detected

Pattern 3:

Air Pump	ON
Air Switching Valve and Air Switching Valve No.2	Close
Pressure	1 kPa or more
Pulsation detection	Slight pulsation detected

Pattern 4:

Air Pump	OFF
Air Switching Valve and Air Switching Valve No.2	Close
Pressure	Less than 5 kPa
Pulsation detection	Not detected

Judgement and decision of failure mode:

Monitor						Judgement
C	F	A	B	D	E	DTCs where set
Pattern 1	Pattern 1	Pressure changed	Pressure changed	-	No pulsation detected	P2444, P1441 and P1444
Pattern 1	Pattern 1	No pressure changed	Pressure changed	-	No pulsation detected	P2444 and "P1441 or P1444"
Pattern 1	Pattern 1	Pressure changed	No pressure changed	Pulsation detected	No pulsation detected	P2444, P1441 and P1444
Pattern 1	Pattern 1	No pressure changed	No pressure changed	Pulsation detected	No pulsation detected	P2444, P1441 and P1444
Pattern 1	Pattern 2	Pressure changed	Pressure changed	-	No pulsation detected	P1441 and P1444
Pattern 1	Pattern 2	No pressure changed	Pressure changed	-	No pulsation detected	P1441 or P1444
Pattern 1	Pattern 2	Pressure changed	No pressure changed	Pulsation detected	No pulsation detected	P1441 and P1444
Pattern 1	Pattern 2	No pressure changed	No pressure changed	Pulsation detected	No pulsation detected	P1441 and P1444
Pattern 1	Pattern 3	Pressure changed	Pressure changed	-	No pulsation detected	P2444
Pattern 1	Pattern 3	No pressure changed	Pressure changed	-	No pulsation detected	P2444 and "P1442 or P1445"
Pattern 1	Pattern 3	Pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P2444 and "P1442 or P1445"
Pattern 1	Pattern 3	No pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P2444, P1442 and P1444
Pattern 1	Pattern 4	Pressure changed	Pressure changed	-	No pulsation detected	Normal
Pattern 1	Pattern 4	Pressure changed	No pressure changed	Pulsation detected	No pulsation detected	Normal
Pattern 1	Pattern 4	Pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P1442 or P1445
Pattern 1	Pattern 4	No pressure changed	Pressure changed	-	No pulsation detected	P1442 or P1445
Pattern 1	Pattern 4	No pressure changed	No pressure changed	Pulsation detected	No pulsation detected	P1442 or P1445
Pattern 1	Pattern 4	No pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P1442 and P1445
Pattern 2	-	No pressure changed	No pressure changed	-	-	P2445
Pattern 3	Pattern 3	No pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P2441, P2444, P1442 and P1445
Pattern 3	Pattern 4	No pressure changed	No pressure changed	No pulsation detected	No pulsation detected	P2441, P1442 and P1445
Pattern 4	-	No pressure changed	No pressure changed	-	-	P2445
-	-	-	-	-	Pulsation detected	P2440 and "P1441 or P1444"

MONITOR STRATEGY

Related DTCs	P1441: Air switching valve No. 2 (Bank 1) is stuck open P1444: Air switching valve No. 2 (Bank 2) is stuck open P2440: Air switching valve and air switching valve No. 2 are stuck open
Required sensors/components	Pressure sensor, Air switching valve No. 2 (Bank 1, 2), Electromagnetic air switching valve
Frequency of operation	Continuous
Duration	P1441 (Air switching valve No. 2 (Bank 1) is stuck open): 20 sec. P1444 (Air switching valve No. 2 (Bank 2) is stuck open): 20 sec. P2440 (Air switching valve and air switching valve No. 2 are stuck open): 18 sec.
MIL operation	P1441 (Air switching valve No. 2 (Bank 1) is stuck open): 2 driving cycles P1444 (Air switching valve No. 2 (Bank 2) is stuck open): 2 driving cycles P2440 (Air switching valve and air switching valve No. 2 are stuck open): 1 driving cycle
Sequence operation	None

TYPICAL ENABLING CONDITION

P1441, P1444: Air switching valve No. 2 (Bank 1 and/or Bank 2) are stuck open

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

Case 1:

Atmospheric pressure	76 kPa (570 mmHg) or more
Battery voltage	11.5 V or more
Time after secondary air injection out of operation	10 sec. or more
Air pump	OFF
Time after engine start	10 sec. or more
Air switching valve No. 2 (Bank 1)	OFF
Air switching valve No. 2 (Bank 2)	OFF
Air injection pressure sensor fail	Not detected
Air switching valve	ON
Engine RPM	Less than 3,750 rpm

Case 2:

Atmospheric pressure	76 kPa (570 mmHg) or more
Battery voltage	11.5 V or more
Air pump	OFF
Time after engine start	10 sec. or more
Air switching valve No. 2 (Bank 1)	OFF
Air switching valve No. 2 (Bank 2)	OFF
Air injection pressure sensor fail	Not detected
Engine load	0% or more
Intake air amount	40 g/sec or more
IAT at engine start	-15°C (5°F) or more
ECT at engine start	Less than 5°C (41°F)
Air switching valve	ON
Engine RPM	Less than 3,750 rpm

P2440: Electromagnetic air switching valve No. 2 is stuck open

The monitor will run whenever these DTCs are not present	See page 05-20
Atmospheric pressure	76 kPa (570 mmHg) or more
Battery voltage	11.5 V or more
Time after secondary air injection out of operation	10 sec. or more
Cumulative intake air amount	172 g or more
Air pump	OFF
Air switching valve	OFF

Air switching valve No. 2 (Bank 1)	OFF
Air switching valve No. 2 (Bank 2)	OFF
Engine RPM	Less than 3,750 rpm
Air injection pressure sensor fail	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P1441, P1444: Air switching valve No. 2 (Bank 1 and/or Bank 2) are stuck open

Case 1:

Both of the following conditions are met	Conditions 1 and 2
1. Cumulative pressure pulsation (When AI OFF)	20 kPa (150 mmHg) or more
2. Air pressure change (When ASV No.2 open) (P1441 (Bank 1), P1444 (Bank 2))	Less than 1 kPa (7.5 mmHg) or more

Case 2:

Detected times of identifying condition 1 is met	4 times or more
1. Cumulative pressure pulsation	100 kPa (750 mmHg) or more

P2440: Electromagnetic air switching valve No. 2 are stuck open

Detected times of identifying condition 1 is met	4 times or more
1. Cumulative pressure pulsation	100 kPa (750 mmHg) or more

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

Secondary air injection (AIR) system

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$71	\$E1	Multiply by 0.01 (g/s)	Test value of AIR amount insufficient	Minimum test limit	Maximum test limit
\$71	\$E2	Multiply by 0.01 (kPa)	Test value of AIR pump stuck ON	Minimum test limit	Maximum test limit
\$71	\$E3	Multiply by 0.01 (kPa)	Test value of AIR pump stuck OFF	Minimum test limit	Maximum test limit
\$71	\$E9	Multiply by 0.01 (kPa)	Test value of AIR control valve ON	Minimum test limit	Maximum test limit
\$71	\$E5	Multiply by 0.01 (kPa)	Test value of AIR control valve OFF	Minimum test limit	Maximum test limit
\$71	\$E6	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR valve	Minimum test limit	Maximum test limit
\$71	\$E7	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 1	Minimum test limit	Maximum test limit
\$71	\$E5	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 2	Minimum test limit	Maximum test limit
\$71	\$E9	Multiply by 0.01 (kPa)	Test value of AIR pressure pulsation for AIR VSV when AIR pressure is low	Minimum test limit	Maximum test limit

WIRING DIAGRAM

Refer to DTC P0412 on page 05-217.

INSPECTION PROCEDURE

1 CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO SECONDARY AIR INJECTION SYSTEM DTCS)

- Connect hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the tester ON.
- Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

Result:

Display (DTC Output)	Proceed To
"P1441 and/or P1444" and P2440	A
P1441 and/or P1444	B
"P1441 and/or P1444 and/or P2440" and other DTCs	C

HINT:

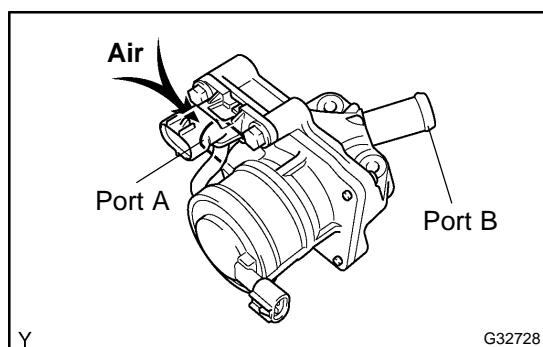
If any DTCs other than P1441, P1444 or P2440 are output, troubleshoot those DTCs first.

B Go to step 7

C GO TO DTC CHART (See page 05-60)

A

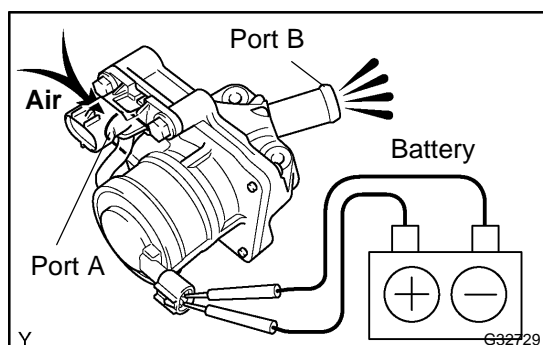
2 CHECK AIR SWITCHING VALVE(OPERATION)



- Remove the intake manifold.
- Remove the air switching valve.
- Blow air into port A and check that air is not discharged from port B.

OK:

Not discharged



- Apply battery positive across the terminals.
- Blow air into port A and check that air is discharged from port B.

OK:

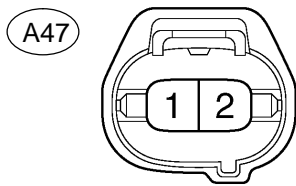
Discharged

NG REPLACE AIR SWITCHING VALVE

OK

3 CHECK AIR SWITCHING VALVE(VOLTAGE)

Wire Harness Side:



ASV Connector

N

G32727

- Remove the intake manifold.
- Disconnect the A47 ASV connector.
- Turn the ignition switch ON.
- Measure the voltage between terminal 1 of the air switching valve connector and body ground.

Standard:

Tester Connection	Specified Condition
A47-1 - Body ground	Below 1.0 V

- Reconnect the ASV connector.

NG

Go to step 4

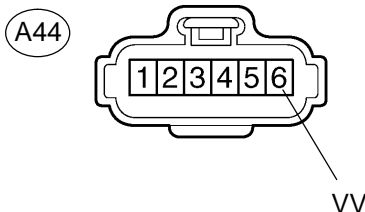
OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

4 CHECK HARNESS AND CONNECTOR(AIR INJECTION DRIVER - AIR SWITCHING VALVE)

Wire Harness Side:

Air Injection Driver Connector



N

G32721

- Remove the intake manifold.
- Disconnect the A44 air injection driver connector.
- Disconnect the A47 ASV connector.
- Disconnect the battery negative terminal cable.
- Measure the resistance between the wire harness side connectors.

Standard:

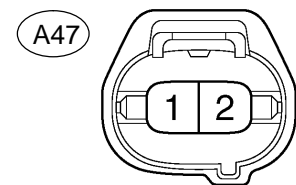
Tester Connection	Specified Condition
VV (A44-6) - A47-1	Below 1 Ω
VV (A44-6) or A47-1 - Battery positive terminal cable	10 kΩ or higher

- Reconnect the air injection driver connector.
- Reconnect the ASV connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

Wire Harness Side:



ASV Connector

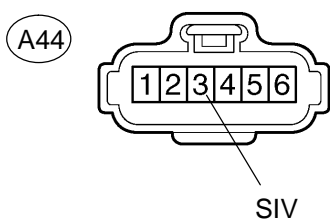
N

G32727

OK

5 CHECK AIR INJECTION DRIVER(VOLTAGE)**Wire Harness Side:**

Air Injection Driver Connector



N

G32721

- Disconnect the A44 air injection driver connector.
- Turn the ignition switch ON.
- Measure the voltage between terminal 3 (SIV) of the air injection driver connector and body ground.

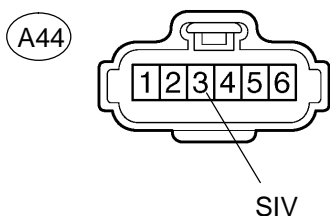
Standard:

Tester Connection	Specified Condition
SIV (A44-3) - Body ground	10 V or more

- Reconnect the air injection driver connector.

NG**Go to step 6****OK****REPLACE AIR INJECTION DRIVER****6 CHECK HARNESS AND CONNECTOR(AIR INJECTION DRIVER - ECM)****Wire Harness Side:**

Air Injection Driver Connector



N

G32721

- Disconnect the A44 air injection driver connector.
- Disconnect the E9 ECM connector.
- Measure the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
SIV (A44-3) - AIRV (E9-4)	Below 1 Ω

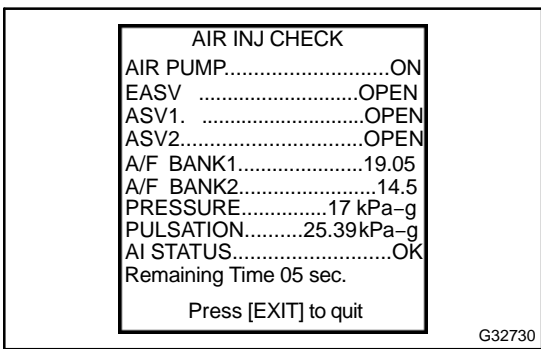
Standard (Check for short):

Tester Connection	Specified Condition
SIV (A44-3) or AIRV (E9-4) - Body ground	10 k Ω or higher

- Reconnect the air injection driver connector.
- Reconnect the ECM connector.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE ECM (See page 10-16)**

7 CHECK AIR SWITCHING VALVE NO.2(OPERATION)



- (a) Start the engine and warm it up.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Start the engine and push the hand-held tester main switch ON.
- (e) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/ AIR INJ CHECK/ MANUAL OPERATION/OPERATION 5 and 6

HINT:
 OPERATION 5: AP:ON, EASV:OPEN, ASV1:OPEN, ASV2:CLOSE
 OPERATION 6: AP:ON, EASV:OPEN, ASV1:CLOSE, ASV2:OPEN

- NOTICE:**
- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.
 While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again..
 - When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
 - Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.
- (f) Read values of the A/F BANK1 and BANK2 on the hand-held tester.

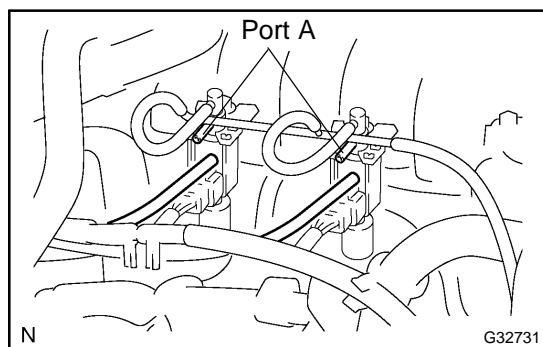
Result:

Air switching valve No.2 operation	Air-fuel ratio
Open	18 or more
Close	Approximately 14.5

- HINT:**
- When the ASV No.2 operates normally, the A/F value is 18 or more when the valve is open, and approximately 14.5 when the valve is closed.
 - Perform the following procedures only on the bank of which the valve is not closed.

NEXT

8	CHECK VSV(AIR INJECTION CONTROL)
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- (a) Turn the ignition switch OFF.
- (b) Disconnect the vacuum hose from the VSV for air injection control.
- (c) Connect the hand-held tester to the DLC3.
- (d) Start the engine and turn the tester ON.
- (e) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/ AIR INJ CHECK/MANUAL OPERATION/OPERATION 1
- (f) At this time, check that no negative pressure generates at port A of the VSV.

HINT:

OPERATION 1: AP: OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:CLOSE

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.

While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again..

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

OK:

No negative pressure is generated.

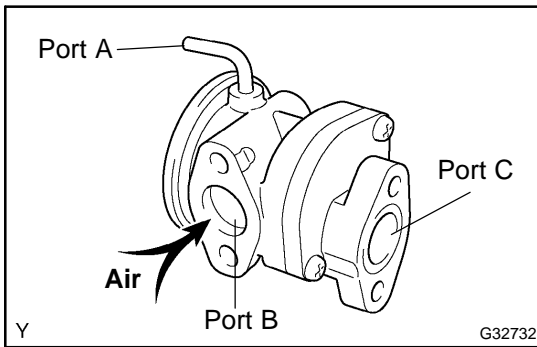
- (g) Reconnect the vacuum hose.

NG

Go to step 10

OK

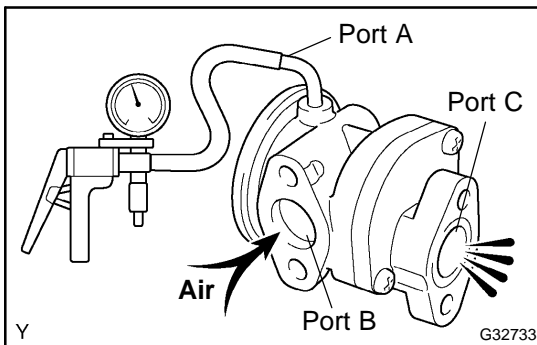
9 CHECK AIR SWITCHING VALVE NO.2(OPERATION)



- (a) Remove the air switching valve No.2.
 (b) Blow air into port B and check that air is not discharged from port C.

OK:

Not discharged from port C



- (c) Apply vacuum 30 kPa (225 mmHg) to port A, blow air into port B and check that air is discharged from port C.

OK:

Discharged from port C

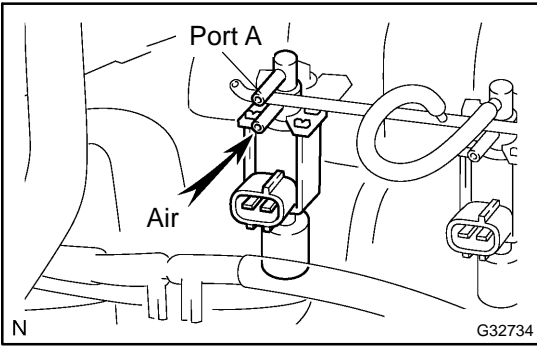
NG

REPLACE AIR SWITCHING VALVE NO.2

OK

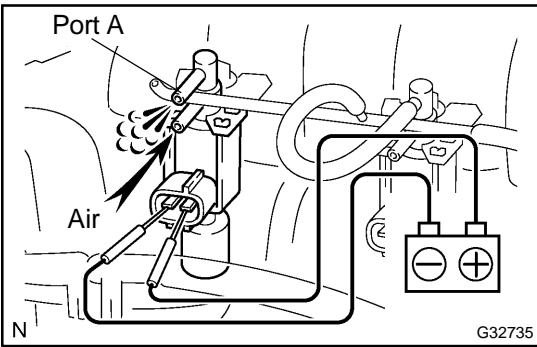
CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

10 CHECK VSV(AIR INJECTION CONTROL)



- (a) Disconnect the VSV for air injection control connector.
- (b) Check that air does not flow from the port as shown in the illustration.

OK:
Does not flow from port A



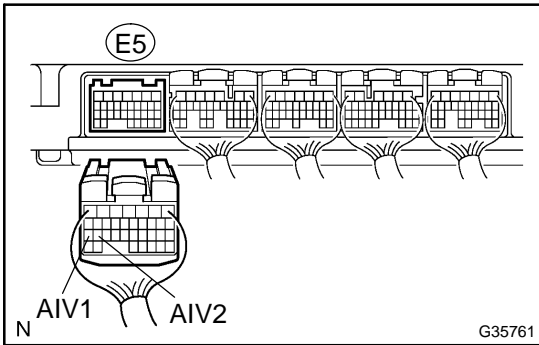
- (c) Apply battery positive across the terminals, check that air flows from the ports.

OK:
Flows from port A

OK

NG **REPLACE VSV**

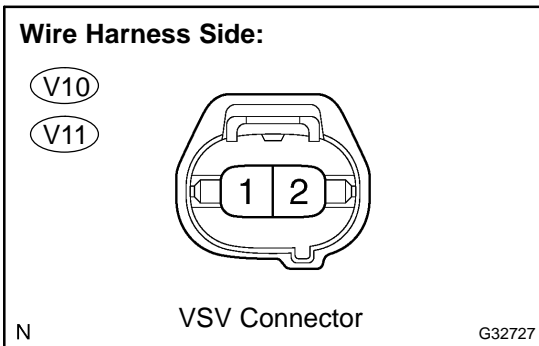
11 CHECK HARNESS AND CONNECTOR(ECM - VSV FOR AIR INJECTON CONTROL)



- (a) Remove the intake manifold.
- (b) Disconnect the E5 ECM connector.
- (c) Disconnect the V10 and V11 VSV for air injection control connectors.
- (d) Measure the resistance between the VSV connector and ECM.

Standard:

Tester connection	Specified condition
AIV1 (E5-27) - VSV (V10-2)	Below 1 Ω
AIV2 (E5-26) - VSV (V11-2)	Below 1 Ω



- (e) Measure the resistance between the VSV connectors and body ground.

Standard:

Tester connection	Specified condition
AIV1 (E5-27) or VSV (V10-2) - Body ground	10 KΩ or higher
AIV2 (E5-26) or VSV (V11-2) - Body ground	10 KΩ or higher

- (f) Reconnect the ECM connector.
- (g) Reconnect the VSV connectors.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

DTC	P1442	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE NO.2 BANK 1 STUCK CLOSE
DTC	P1445	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE NO.2 BANK 2 STUCK CLOSE
DTC	P2441	SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSE BANK1

CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P1442	Air switching valve No.2 (Bank 1) stuck close: No pressure change (decrease) after the ECM sends an open air switching valve No.2 (Bank 1) signal. (2 trip detection logic)	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 1) • Vacuum hose (VSV for air injection control – air switching valve No.2) • Air injector pipe (Air switching valve No.2 – exhaust manifold) • Air switching valve No.2 (Bank 1) • VSV for air injection control (Bank 1) • ECM
P1445	Air switching valve No.2 (Bank 2) stuck close: No pressure change (decrease) after the ECM sends an open air switching valve No.2 (Bank 2) signal. (2 trip detection logic)	<ul style="list-style-type: none"> • VSV for air injection control circuit (Bank 2) • Vacuum hose (VSV for air injection control – air switching valve No.2) • Air injector pipe (Air switching valve No.2 – exhaust manifold) • Air switching valve No.2 (Bank 2) • VSV for air injection control (Bank 2) • ECM
P2441	Air switching valve stuck close: The pressure sensor does not detect exhaust pulsation when system operates. (All of air switching valve ON) This DTC means either of following conditions. (a) Electromagnetic air switching valve stuck closed. (b) Both of "air switching valve No.2 (Bank 1)" and "air switching valve No.2 (Bank 2)" are stuck closed. (2 trip detection logic)	<ul style="list-style-type: none"> • Vacuum hoses (Throttle body – VSVs for air injection control) • Air switching valve • Air injector pipe (Air switching valve No.2 – exhaust manifold) • Air injection hose • Air switching valve No.2 (Bank 1 and/or 2) • VSV for air injection control (Bank 1 and/or 2) • Air injection driver • Air injection driver circuit • ECM

MONITOR DESCRIPTION

Refer to DTC P1441, P1444 and P2440 on page [05-290](#).

MONITOR STRATEGY

Related DTCs	P1442: Air switching valve No. 2 (Bank 1) is stuck closed P1445: Air switching valve No. 2 (Bank 2) is stuck closed P2441: Air switching valve and air switching valve No. 2 are stuck closed
Required sensors/components	Pressure sensor, Air switching valve No. 2 (Bank 1, 2), Electromagnetic air switching valve
Frequency of operation	Continuous
Duration	P1442 (Air switching valve No. 2 (Bank 1) is stuck open): 20 sec. P1445 (Air switching valve No. 2 (Bank 2) is stuck open): 20 sec. P2441 (Air switching valve is stuck open): 8 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITION

P1442, P1445: Air switching valve No. 2 (Bank 1 and/or Bank 2) are stuck closed

The monitor will run whenever these DTCs are not present	See page 05-20
Atmospheric pressure	76 kPa (570 mmHg) or more
Battery voltage	11.5 V or more
Idle	ON
Engine RPM	Less than 3,750 rpm
Time after secondary air injection out of operation	10 sec. or more
Air injection pressure sensor fail	Not detected

P2441: Electromagnetic air switching valve is stuck closed or air switching valve No. 2 (Bank 1 and Bank 2) are stuck closed

The monitor will run whenever these DTCs are not present	See page 05-20
Atmospheric pressure	76 kPa (570 mmHg) or more
Battery voltage	11.5 V or more
Time after secondary air injection out of operation	6 sec. or more
AIR pump	ON
Air switching valve	ON
Air switching valve No. 2 (Bank 1)	ON
Air switching valve No. 2 (Bank 2)	ON
Engine RPM	Less than 3,750 rpm
Delay time after engine started	6 sec. or more
Air injection pressure sensor fail	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P1442: Air switching valve No. 2 bank 1 is stuck closed

Both of the following conditions are met	Conditions 1 and 2
1. Cumulative pressure pulsation	15 kPa (113 mmHg) or more (when AI ON (Air pump ON, all of air switching valves are ON))
2. Air pressure change	Less than 1 kPa (7.5 mmHg) (when opening air switching valve No. 2 (Bank 1))

P1445: Air switching valve No. 2 bank 2 is stuck closed

Both of the following conditions are met	Conditions 1 and 2
1. Cumulative pressure pulsation	15 kPa (113 mmHg) or more (when AI ON (Air pump ON, all of air switching valves are ON))
2. Air pressure change	Less than 1 kPa (7.5 mmHg) (when opening air switching valve No. 2 (Bank 2))

P2441: Electromagnetic air switching valve is stuck closed or air switching valve No. 2 (Bank 1 and Bank 2) are stuck closed

Cumulative pressure pulsation	Less than 15 kPa (113 mmHg) (when AI ON (Air pump ON, all of air switching valves are ON))
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MONITOR RESULT

Refer to page [05-28](#) for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

Secondary air injection (AIR) system

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$71	\$E1	Multiply by 0.01 (g/s)	Test value of AIR amount insufficient	Minimum test limit	Maximum test limit
\$71	\$E2	Multiply by 0.01 (kPa)	Test value of AIR pump stuck ON	Minimum test limit	Maximum test limit
\$71	\$E9	Multiply by 0.01 (kPa)	Test value of AIR pump stuck OFF	Minimum test limit	Maximum test limit
\$71	\$E4	Multiply by 0.01 (kPa)	Test value of AIR control valve ON	Minimum test limit	Maximum test limit
\$71	\$E5	Multiply by 0.01 (kPa)	Test value of AIR control valve OFF	Minimum test limit	Maximum test limit
\$71	\$E6	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR valve	Minimum test limit	Maximum test limit
\$71	\$E7	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 1	Minimum test limit	Maximum test limit
\$71	\$E5	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 2	Minimum test limit	Maximum test limit
\$71	\$E9	Multiply by 0.01 (kPa)	Test value of AIR pressure pulsation for AIR VSV when AIR pressure is low	Minimum test limit	Maximum test limit

WIRING DIAGRAM

Refer to DTC P1441, P1444 and P2440 on page [05-290](#).

INSPECTION PROCEDURE

1 CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO SECONDARY AIR INJECTION SYSTEM DTCS)

- Connect a hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the tester ON.
- Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

Display (DTC Output)	Proceed To
"P1442 and/or P1445" and P2441	A
P1442 and/or P1445	B
"P1442 and/or P1445 and/or P2441" and other DTCs	C

HINT:

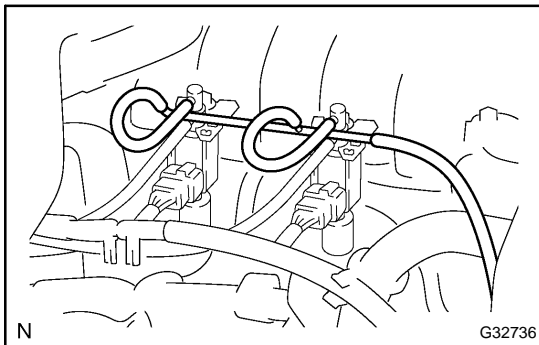
If any DTCs other than P1441 and/or P1444 and P2440 are output, troubleshoot those DTCs first.

B Go to step 5

C GO TO DTC CHART (See page 05-60)

A

2 CHECK VACUUM HOSES(THROTTLE BODY - VSV FOR AIR INJECTION CONTROL)



- Check that the vacuum hoses between the throttle body and VSV for air injection control are securely connected.

OK:

The vacuum hoses are securely connected.

- Inspect the vacuum hoses for blockages and damage.

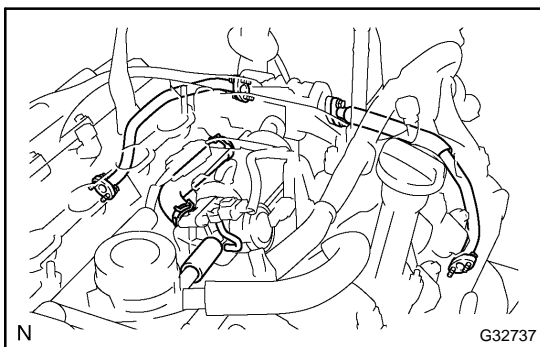
OK:

The vacuum hoses have no blockages and damages.

NG REPAIR OR REPLACE VACUUM HOSES

OK

3 CHECK PIPES AND HOSES(AIR INJECTION SYSTEM)

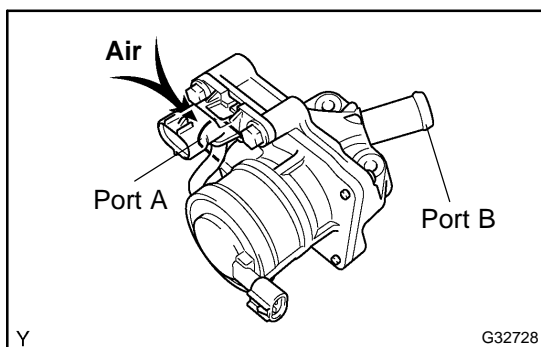


- (a) Remove the intake manifold.
- (b) Check all pipes and hoses of the air injection system.
OK:
All the air injection pipes and hoses are securely connected.
- (c) Check all pipes and hoses of the air injection system for blockage or damage.
OK:
The air injection system pipes and hoses have no blockage or damage.

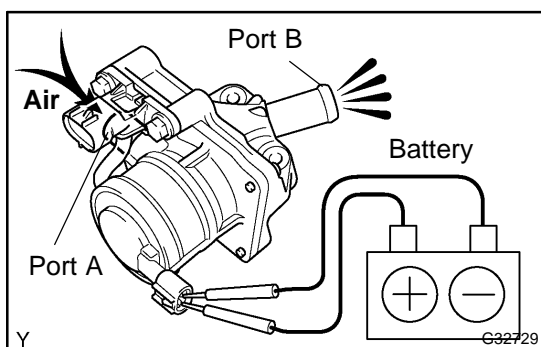
NG REPAIR OR REPLACE PIPE OR HOSE

OK

4 CHECK AIR SWITCHING VALVE(OPERATION)



- (a) Remove the intake manifold.
- (b) Remove the air switching valve.
- (c) Blow air into port A and check that air is not discharged from port B.
OK:
Not discharged

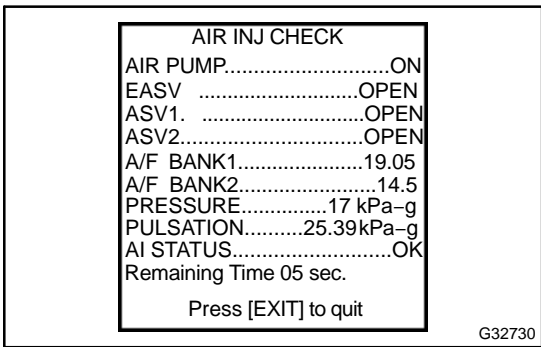


- (d) Apply battery positive across the terminals.
- (e) Blow air into port A and check that air is discharged from port B.
OK:
Discharged

NG REPLACE AIR SWITCHING VALVE AND GO TO STEP 6

OK

5 CHECK AIR SWITCHING VALVE NO.2(OPERATION)



- (a) Start the engine and warm it up.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (e) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/ AIR INJ CHECK/ MANUAL OPERATION/OPERATION 5 and 6

HINT:

OPERATION 5: AP:ON, EASV:OPEN, ASV1:OPEN, ASV2:CLOSE

OPERATION 6: AP:ON, EASV:OPEN, ASV1:CLOSE, ASV2:OPEN

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.
While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.
 - When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
 - Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.
- (f) Read value of the A/F BANK1 and BANK2 on the hand-held tester.

Result:

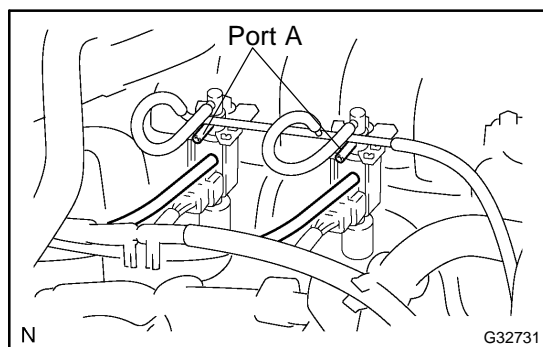
Air switching valve No.2 operation	Air-fuel ratio
Open	18 or more
Close	Approximately 14.5

HINT:

- When the ASV No.2 operates normally, the A/F value is 18 or more when the valve is open, and approximately 14.5 when the valve is closed.
- Perform the following procedures only on the bank of which the valve is not open.

NEXT

6	CHECK VSV(AIR INJECTION CONTROL)
----------	---



- (a) Turn the ignition switch OFF.
- (b) Disconnect the vacuum hoses from the VSV for air injection control.
- (c) Connect the hand-held tester to the DLC3.
- (d) Start the engine and turn the tester ON.
- (e) When the air switching valve is operated using the hand-held tester, check that negative pressure from the port A.
- (f) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/ AIR INJ CHECK/MANUAL OPERATION/OPERATION 2

HINT:

OPERATION 2: AP: ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.

While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

OK:

Negative pressure from port A

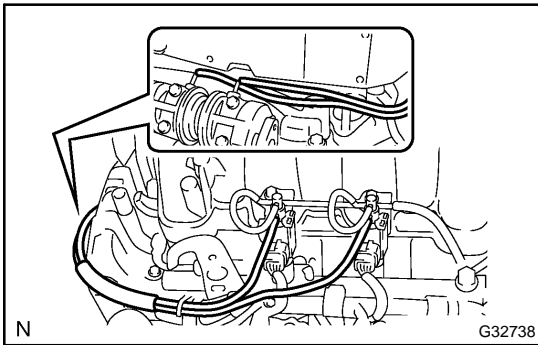
- (g) Reconnect the vacuum hose.

NG

Go to step 10

OK

7 CHECK VACUUM HOSES(AIR SWITCHING VALVE - VSV FOR AIR INJECTION CONTROL)



- (a) Check that the vacuum hoses between the air switching valve(s) No.2 and VSV for air injection control are securely connected.

OK:

The vacuum hose(s) are securely connected.

- (b) Check the vacuum hoses for blockages and damage.

OK:

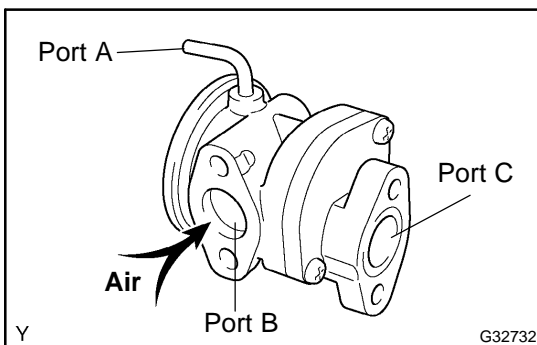
The vacuum hoses have no blockages and damages.

NG

REPAIR OR REPLACE VACUUM HOSES

OK

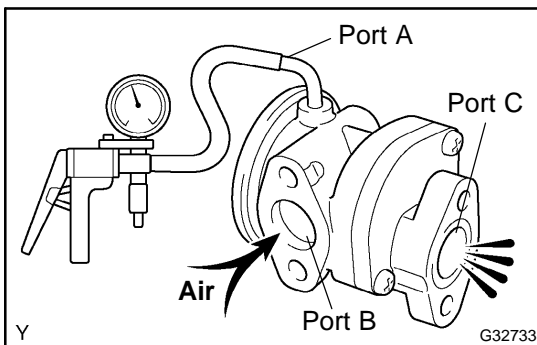
8 CHECK AIR SWITCHING VALVE NO.2(OPERATION)



- (a) Remove the air switching valve No.2.
 (b) Blow air into port B and check that air is not discharged from the port C.

OK:

Not discharged from port C



- (c) Apply vacuum 30 kPa (225 mmHg) to port A, blow air into port B and check that air is discharged from the port C.

OK:

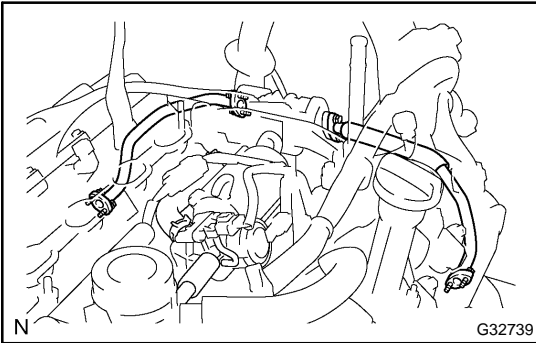
Discharged from port C

NG

REPLACE AIR SWITCHING VALVE NO.2

OK

9 CHECK AIR INJECTION PIPE(AIR SWITCHING VALVE NO.2 - EXHAUST MANIFOLD)



- (a) Check that the air injection pipe between the air switching valve(s) No.2 and exhaust manifold are securely connected.

OK:

The air injection pipe is securely connected.

- (b) Check the air injection pipe for blockages and damage.

OK:

The air injection pipe has no blockages and damages.

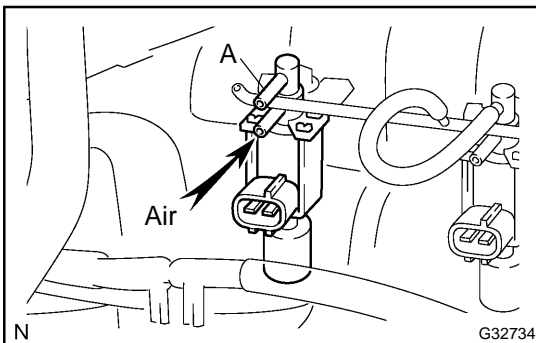
NG

REPAIR OR REPLACE AIR INJECTION PIPE

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

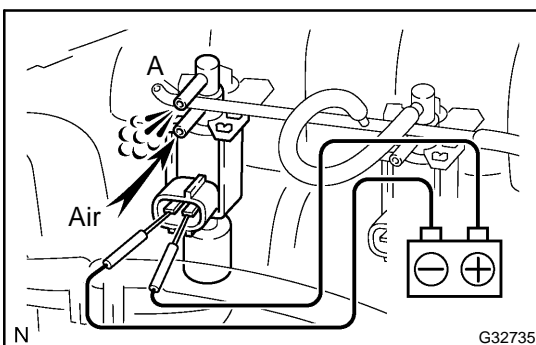
10 CHECK VSV(AIR INJECTION CONTROL)



- (a) Disconnect the 2 vacuum hoses.
 (b) Check that air does not flow from the port A as shown in the illustration.

OK:

Not flow from port A



- (c) Apply battery positive across the terminals, check that air flows from the port A.

OK:

Flow from port A

NG

REPLACE VSV

OK

REPLACE ECM (See page 10-16)

DTC	P1613	SECONDARY AIR INJECTION SYSTEM DRIVER
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CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P1613	Either of following condition (a) or (b) is met: (a) All of following conditions are met (1 trip detection logic): • While either of air pump or air switching valve does not operate. • Air injection driver outputs normal signal (80% duty signal) (b) All of following conditions are met (1 trip detection logic): • Air injection driver outputs abnormal duty signal (duty signal excluding 0, 20, 40, 60, 80, 100%)	<ul style="list-style-type: none"> • Air injection driver (AID) • Open in air injection driver ground circuit
P1613	All of following conditions are met (1 trip detection logic): (a) While air injection system operating (Air pump ON and all ASV ON) (b) Air injection driver outputs air pump malfunction signal (0% duty signal)	<ul style="list-style-type: none"> • Short in diagnostic information signal circuit (AID - ECM) • Open or short in air pump and air switching valve command signal circuit (AID - ECM) • Air injection driver (AID) • Open in air injection driver ground circuit • ECM
P1613	Air injection driver outputs abnormal duty signal (100% duty signal) (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in AID power source circuit • Open in diagnostic information signal circuit (AID - ECM) • Air injection driver (AID) • ECM

MONITOR DESCRIPTION

When the air injection system operation is required while the engine is warming up, the ECM transmits command signals to the Air Injection Driver (AID) to drive the air pump and air switching valve.

AID detects an open and short in the air pump and air switching valve circuit according to the terminal voltage and sends a signal as the diagnostic information to the ECM.

If the air injection system drive circuit or the AID itself has a malfunction, the AID sends a malfunction signal (duty signal) as a diagnostic information signal to the ECM (when the system is normal, a system normal signal is sent).

The ECM sets the DTC based on the diagnostic information from the AID.

Example:

- (1) The duty ratio of the diagnostic information signal output from AID is 0 or 100% (remains at 0 V or battery voltage).
- (2) The duty ratio output from AID is the ratio to output the impossible (excluding 0, 20, 40, 60, 80, 100%).
- (3) The AID outputs the normal signal (normal duty signal: 80%) while the system is not operating.

MONITOR STRATEGY

Related DTCs	P1613: Secondary air injection system control module range check
Required sensors/components	Air injection driver
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITION

All:

The monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

Case 1:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 2:

Either of following conditions is met	Condition 1 or 2
1. Air pump	Not operating
2. Air switching valve	Not operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 3:

Air pump	Operating
Air switching valve	Operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 4:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Case 1:

One of the following conditions is met	Condition 1, 2, 3 or 4
1. Diagnostic signal duty ratio from air injection driver	1 to 10%
2. Diagnostic signal duty ratio from air injection driver	30%
3. Diagnostic signal duty ratio from air injection driver	49%
4. Diagnostic signal duty ratio from air injection driver	91 to 99%

Case 2:

Diagnostic signal duty ratio from air injection driver	70 to 90%
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Case 3:

Diagnostic signal duty ratio from air injection driver	0%
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Case 4:

Diagnostic signal duty ratio from air injection driver	100%
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COMPONENT OPERATING RANGE

Diagnostic signal duty ratio from air injection driver	70 to 90% when secondary air injection system is operating and 0% when secondary air injection system is not operating
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WIRING DIAGRAM

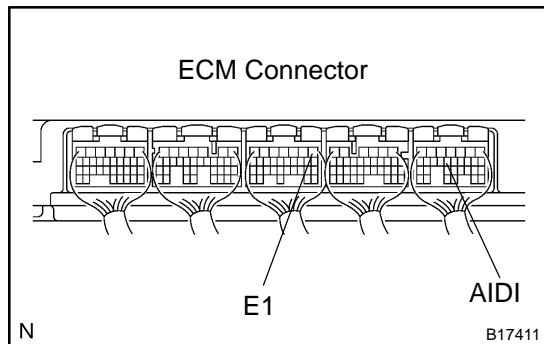
Refer to DTC P0412 on page [05-217](#).

INSPECTION PROCEDURE

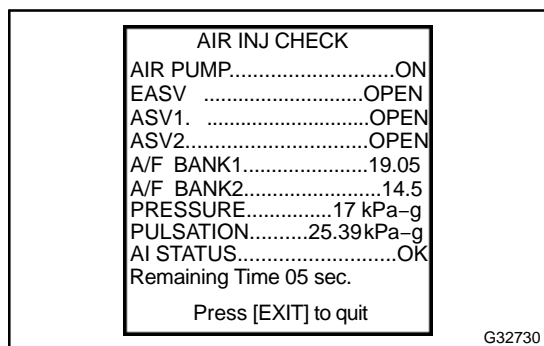
HINT:

The diagnostic information output from the AID can be confirmed by connecting an oscilloscope to the diagnostic information terminal of the AID. It narrows a trouble area search to read the waveform on the oscilloscope when performing the AI system intrusive operation function provided in the SYSTEM CHECK.

- (a) Start the engine and warm it up.
- (b) Turn the ignition switch to OFF.
- (c) Connect a hand-held tester to the DLC3.



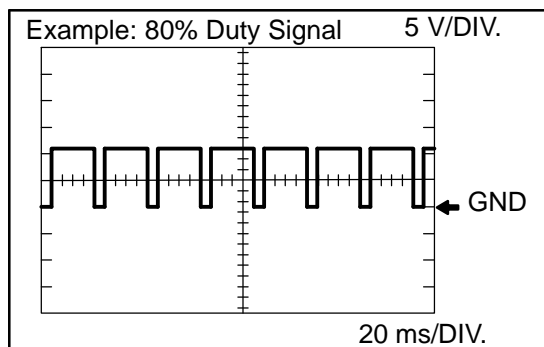
- (d) Connect an oscilloscope probe to the AIDI terminal of the ECM.
- (e) Start the engine and turn the tester ON.
- (f) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / AIR INJ SYSTEM.



- (g) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / AIR INJ CHECK / MANUAL OPERATION / OPERATION 1 and 2.

HINT:

OPERATION 1: AP: OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:OFF
 OPERATION 2: AP: ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN



- (1) Monitor the voltage output of the AID (duty ratio signal).

Oscilloscope range:

Items	Contents
Terminals	CH1: AIDI - E1
Equipment Settings	5 V/Division, 20 to 40 ms/Division
Conditions	Idling

NOTICE:

- This AIR INJECTION CHECK only allows technicians to operate the AI system for 5 seconds. Furthermore, the check can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between checks. While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.
- Performing the AIR INJ CHECK over and over again may cause the damage in the secondary air injection system. If necessary, put an interval of several minutes between tests to prevent overheating the system.

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

AID Diagnostic Signal Waveforms	ECM Commands	DTCs (ECM Output)	Suspected Trouble Areas
<p>100 % Duty ratio</p>	Any Air Injection (AI) System operation	P1613	<ul style="list-style-type: none"> • Open in diagnostic signal circuit • Air Injection Control Driver (AID) • Open in AID+B circuit (AID power source) • Short between +B circuit and diagnostic signal circuit
<p>0 % Duty ratio</p>	AI System: ON (Air pump ON, ASV ON)	P1613	<ul style="list-style-type: none"> • Open or short in air pump or Air Switching Valve (ASV) command signal circuit (ECM-AID) • Open in AID ground circuit • Short between diagnostic signal circuit and body ground • AID • ECM
	AI System: OFF (Air pump OFF, ASV OFF)	—	Normal
<p>20 % Duty ratio</p>	Air Pump: ON	P0418	Short between air pump drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
	Air Pump: OFF	P0418	Open in air pump drive circuit (AID-Pump), or short between air pump drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-Pump) • Air Pump • AID • ECM
<p>40 % Duty ratio</p>	ASV: ON	P0412	Short between ASV drive circuit and body ground <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • ASV • AID • ECM
	ASV: OFF	P0412	Open in ASV drive circuit (AID-ASV), or short between ASV drive circuit and +B <ul style="list-style-type: none"> • Harness & connector (AID-ASV) • AID • ASV • ECM
<p>80 % Duty ratio</p>	AI System: OFF (Air pump OFF, ASV OFF)	P1613	<ul style="list-style-type: none"> • AID • ECM
	AI System: ON (Air pump ON, ASV ON)	—	Normal
Excluding above (excluding 0, 20, 40, 80, 100 % duty)	—	P1613	<ul style="list-style-type: none"> • AID • Open in AID ground circuit

G40188

HINT:

- Using the AIR INJ CHECK operation of the SYSTEM CHECK provided in the hand-held tester function, conditions for air-fuel ratio and pressure in the secondary air injection system passage can be checked while the secondary air injection system is operating. It helps technicians to troubleshoot the system when it is malfunctioning.
- Read freeze frame data using a hand-held tester. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1	CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO DTC P1613)
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- Connect a hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the tester ON.
- Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

Result:

Display (DTC Output)	Proceed To
P1613	A
P1613 and other DTCS	B

HINT:

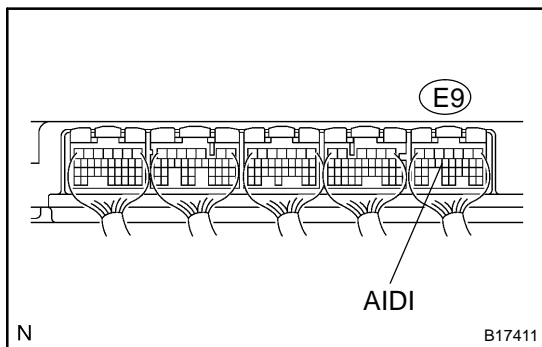
If any DTCs other than P1613 are output, troubleshoot those DTCs first.

B

GO TO DTC CHART (See page 05-60)

A

2 | PERFORM ACTIVE TEST USING HAND-HELD TESTER(AIDI VOLTAGE)



- (a) Start the engine and warm it up.
- (b) Turn the ignition switch to OFF.
- (c) Connect a hand-held tester to the DLC3.
- (d) Turn the ignition switch ON and turn the tester ON.
- (e) Start the engine.
- (f) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/AIR INJ CHECK/AUTOMATIC OPERATION

NOTICE:

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
 - Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.
- (g) Measure voltage between terminal E9-13 (AIDI) of the ECM connector and body ground when the air injection system is ON and OFF.

Result:

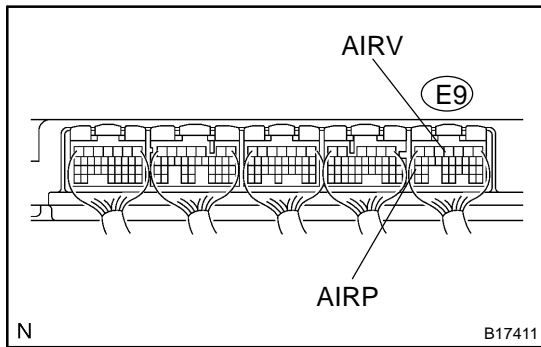
Results	Suspected Trouble Areas	Proceed To
Fixed at Low (1.6 V or less) even when AI system ON (Air pump ON, ASV ON)	<ul style="list-style-type: none"> • Short between air pump or air switching valve command signal circuit and body ground • Open in air pump command signal circuit (between ECM and AID) • Open in ASV command signal circuit (between ECM and AID) • Open in AID ground circuit (between AID and body ground) • Diagnostic signal circuit ground short • AID • ECM 	A
Fixed at High (12 V or more) even when AI system OFF (Air pump OFF, ASV OFF)	<ul style="list-style-type: none"> • Open in diagnostic signal circuit (ECM - AID) • Short between +B circuit and diagnostic signal circuit (ECM - AID) • Open in AID power source circuit • AID • ECM 	B
Other than above: • Fluctuating (duty signal excluding 20, 40, 80%)	<ul style="list-style-type: none"> • AID • Open in AID ground circuit (between AID and body ground) 	C

B Go to step 5

C Go to step 8

A

3 INSPECT ECM(AIRP AND AIRV VOLTAGE)



- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminal E9-25 (AIRP), E9-4 (AIRV) of the ECM connector and body ground.

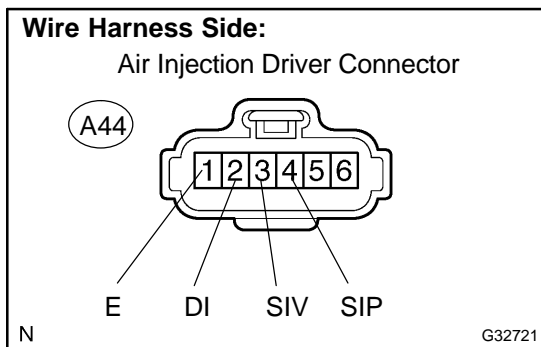
Standard:

Tester Connection	Specified Condition
AIRP (E9-25) - Body ground	10 V or more
AIRV (E9-4) - Body ground	10 V or more

NG → **REPLACE ECM (See page 10-16)**

OK

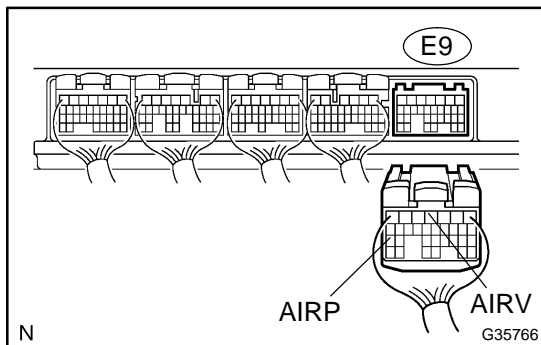
4 CHECK HARNESS AND CONNECTOR(ECM - AIR INJECTION DRIVER, AIR INJECTION DRIVER - BODY GROUND)



- (a) Disconnect the A44 air injection driver connector.
- (b) Disconnect the E9 ECM connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
SIP (A44-4) or AIRP (E9-25) - Body ground	10 kΩ or higher
SIV (A44-3) or AIRV (E9-4) - Body ground	10 kΩ or higher
E (A44-1) - Body ground	Below 1 Ω



- (d) Measure the voltage between DI (A44-2) and E (A44-1) of the air injection driver wire harness side connectors.

Standard:

Tester Connection	Specified Condition
DI (A44-2) - E (A44-1)	9 V or more

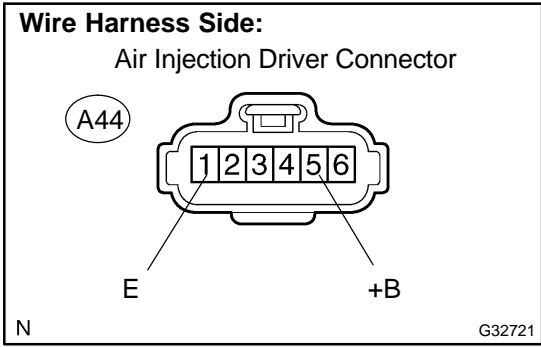
- (e) Reconnect the air injection driver connector.
- (f) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE AIR INJECTION DRIVER

5 CHECK POWER SOURCE OF AIR INJECTION DRIVER



- (a) Disconnect the A44 air injection driver connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminal +B (A44-5) and E (A44-1) of the air injection driver connector.

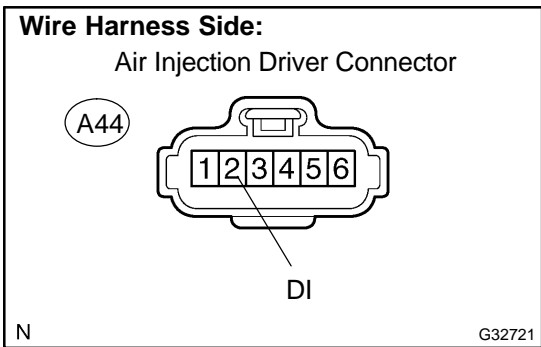
Standard:

Tester Connection	Specified Condition
+B (A44-5) - E (A44-1)	10 V or more

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 INSPECT AIR INJECTION DRIVER (DI TERMINAL VOLTAGE)



- (a) Disconnect the A44 air injection driver connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminal A44-2 (DI) of the air injection driver connector and body ground.

Standard:

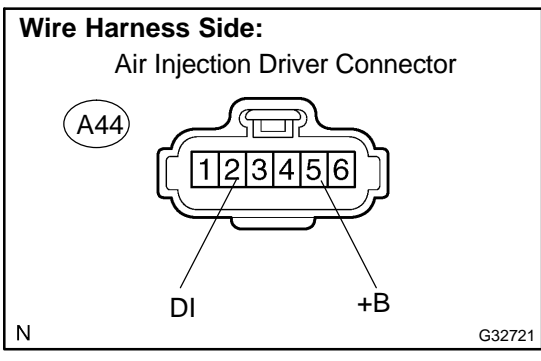
Tester Connection	Specified Condition
DI (A44-2) - Body ground	10 V or more

- (d) Reconnect the air injection driver.

NG Go to step 7

OK

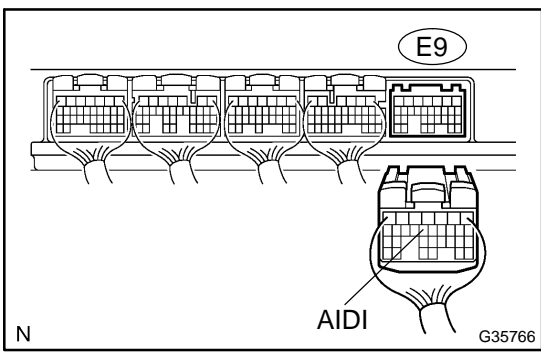
7 CHECK HARNESS AND CONNECTOR(ECM - AIR INJECTION DRIVER)



- (a) Disconnect the A44 air injection driver connector.
- (b) Disconnect the E9 ECM connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
DI (A44-2) - AIDI (E9-13)	Below 1 Ω
DI (A44-2) or AIDI (E9-13) - +B (A44-5)	10 kΩ or higher



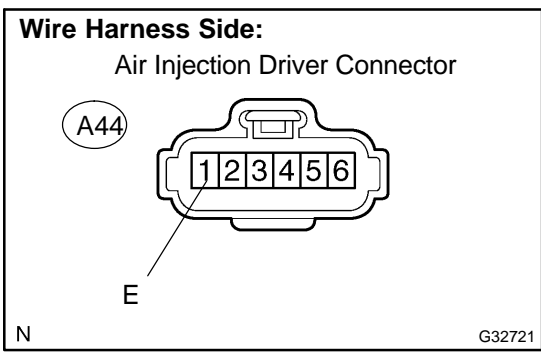
- (d) Reconnect the air injection driver connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

8 CHECK HARNESS OR CONNECTOR(AIR INJECTION DRIVER - BODY GROUND)



- (a) Disconnect the A44 air injection driver connector.
- (b) Measure the resistance between the terminal E (A44-1) of the air injection driver connector and body ground.

Standard:

Tester Connection	Specified Condition
E (A44-1) - Body ground	Below 1 Ω

- (c) Reconnect the air injection driver connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9 REPLACE AIR INJECTION DRIVER

NEXT

10 | CHECK WHETHER DTC OUTPUT RECURS(DTC P1613)

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Clear the DTCs (see page 05-44).
- (d) Start the engine.
- (e) Perform ACTIVE TEST to operate the air injection system.
Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/AIR INJ CHECK/AUTOMATIC OPERATION
- (f) After operating the secondary air injection system, confirm the pending codes of the secondary air injection system by selecting the following menu items: DIAGNOSIS/ENHANCED OBD II/DTC INFO/PENDING CODES.

NOTICE:

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

OK:

DTC P1613 for the secondary air injection system is not output.

NG**GO TO DTC CHART (See page 05-60)****OK****END**

DTC	P2102	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW
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DTC	P2103	THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH
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CIRCUIT DESCRIPTION

The throttle motor is operated by the ECM and it opens and closes the throttle valve.

The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body. The throttle position sensor provides feedback to the ECM. This feedback allows the ECM to control the throttle motor and monitor the throttle opening angle as the ECM responds to driver input.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds: (1 trip detection logic) (a) Throttle control motor output duty ratio 80 % or more (b) Throttle control motor current 0.5 A or less	<ul style="list-style-type: none"> • Open in throttle control motor circuit • Throttle control motor • ECM
P2103	Either of following conditions is met: (1 trip detection logic) <ul style="list-style-type: none"> • Throttle control motor current 10 A or more (0.1 second) • Throttle control motor current 7A or more (0.6second) 	<ul style="list-style-type: none"> • Short in throttle control motor circuit • Throttle control motor • Throttle valve • Throttle body assembly • ECM

MONITOR DESCRIPTION

The ECM monitors the current through the electronic throttle motor and detects malfunctions or open circuit in the throttle motor based on the voltage of the current. When the current deviates from the standard, the ECM concludes that there is a fault in the throttle motor.

Or, if the throttle valve is not functioning properly (for example, stuck ON), the ECM concludes that there is a fault, turns on the MIL and sets a DTC is set.

Example:

When the current is more than 10 A. Or the current is less than 0.5 A when the motor driving duty ratio is exceeding 80%. The ECM concludes that the current is out of range, turns on the MIL and a DTC is set.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2102: Throttle actuator control motor current (Low current) P2103: Throttle actuator control motor current (High current)
Required sensors/Components	Throttle actuator motor
Frequency of operation	Continuous
Duration	2 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor will run whenever these DTCs are not present	See page 05-20
--	--------------------------------

P2102:

Throttle motor	ON
Duty ratio to open throttle actuator	80% or more
Throttle actuator power supply	8 V or more
Motor current at 0.016 sec. before	Less than 0.2 A

P2103:

Throttle motor	ON
Either of the following conditions is met:	Condition 1 or 2
1. Throttle actuator power supply	8 V or more
2. Throttle actuator power	ON
Battery voltage	8 V or more
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

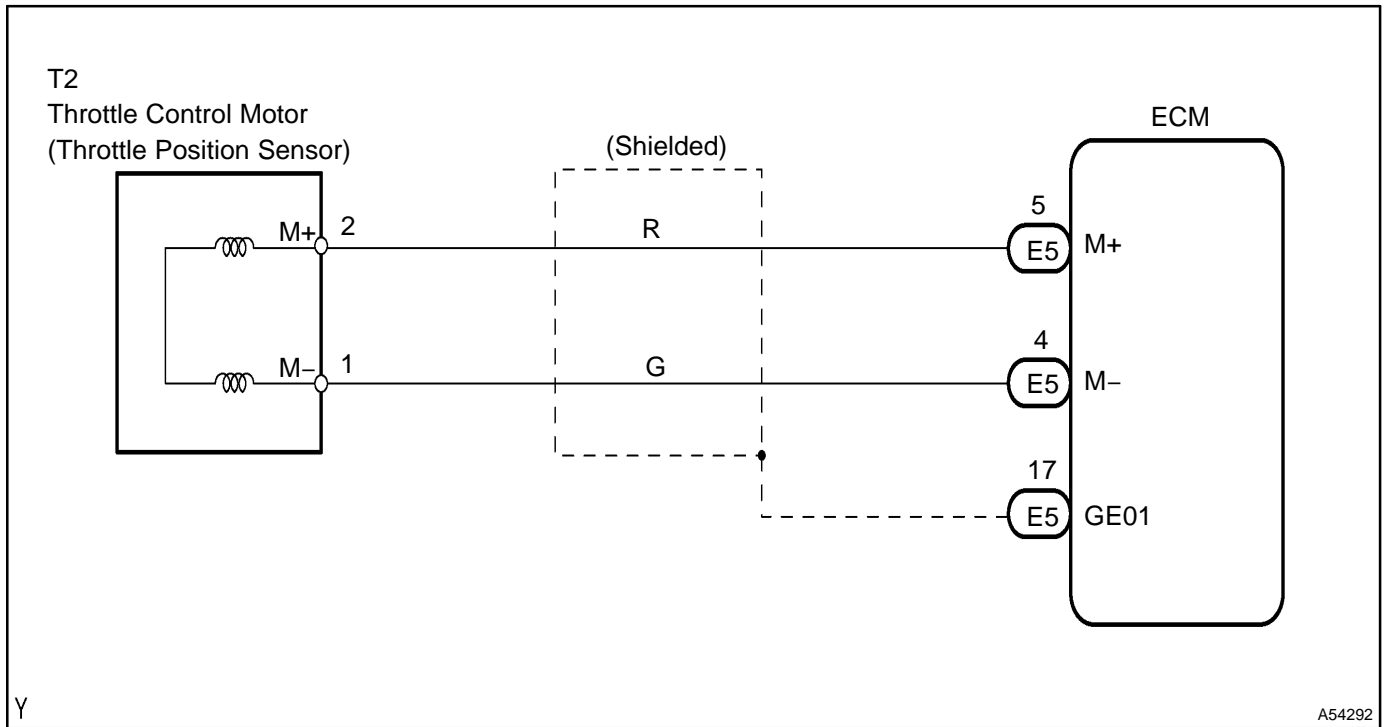
P2102:

Throttle actuator current	Less than 0.5 A (when motor drive duty 80% or more)
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P2103:

Throttle actuator current	More than 10 A (0.1 sec.) More than 7 A (0.6 sec.)
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WIRING DIAGRAM

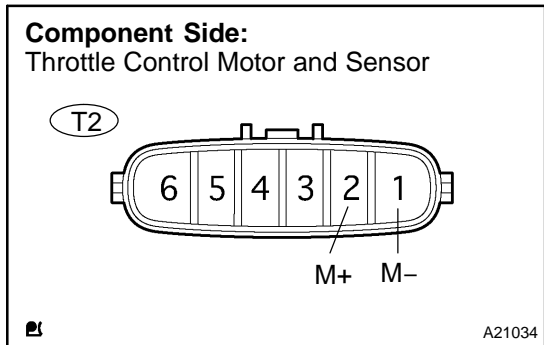


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 INSPECT THROTTLE W/MOTOR BODY ASSY(RESISTANCE OF THROTTLE CONTROL MOTOR)



- (a) Disconnect the T2 throttle w/ motor body connector.
- (b) Measure the motor resistance between terminals M+ and M-.

Standard:

Tester Connection	Specified Condition
M+ (T2-2) - M- (T2-1)	0.3 to 100 Ω (20°C (68°F))

- (c) Reconnect the throttle w/ motor body connector.

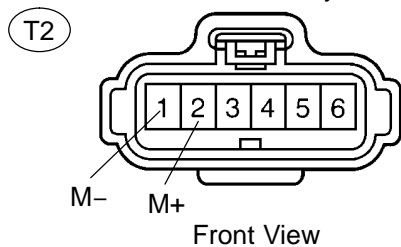
NG **REPLACE THROTTLE W/MOTOR BODY ASSY**

OK

2 CHECK HARNESS AND CONNECTOR(THROTTLE CONTROL MOTOR - ECM)

Wire Harness Side:

Throttle w/ Motor Body Connector



- Disconnect the T2 throttle w/ motor body connector.
- Disconnect the E5 ECM connector.
- Check the resistance between the wire harness side connectors.

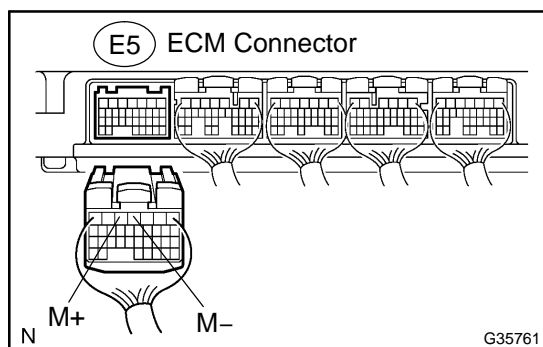
Standard (Check for open):

Tester Connection	Specified Condition
M+ (T2-2) - M+ (E5-5)	Below 1 Ω
M- (T2-1) - M- (E5-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
M+ (T2-2) or M+ (E5-5) - Body ground	10 k Ω or higher
M- (T2-1) or M- (E5-4) - Body ground	10 k Ω or higher

- Reconnect the throttle w/ motor body connector.
- Reconnect the ECM connector.



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT THROTTLE W/MOTOR BODY ASSY(VISUALLY CHECK THROTTLE VALVE)

- Check between the throttle valve and the housing for foreign object. Also, check if the valve can open and close smoothly.

OK:

The throttle valve is not contaminated by foreign object and can move smoothly.

NG

REMOVE FOREIGN OBJECT AND CLEAN THROTTLE BODY

OK

REPLACE ECM (See page 10-16)

DTC	P2111	THROTTLE ACTUATOR CONTROL SYSTEM - STUCK OPEN
------------	--------------	--

DTC	P2112	THROTTLE ACTUATOR CONTROL SYSTEM - STUCK CLOSED
------------	--------------	--

CIRCUIT DESCRIPTION

The throttle motor is operated by the ECM and it opens and closes the throttle valve using gears. The opening angle of the throttle valve is detected by the throttle position sensor, which is mounted on the throttle body. The throttle position sensor provides feedback to the ECM to control the throttle motor and set the throttle valve angle in response to driver input.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2111	Throttle valve opening angle is stuck during ECM orders to close (1 trip detection logic)	<ul style="list-style-type: none"> • Throttle control motor circuit • Throttle control motor • Throttle body • Throttle valve
P2112	Throttle valve opening angle is stuck during ECM orders to open (1 trip detection logic)	<ul style="list-style-type: none"> • Throttle control motor circuit • Throttle control motor • Throttle body • Throttle valve

MONITOR DESCRIPTION

The ECM concludes that there is a malfunction of the ETCS (Electronic Throttle Control System) when the throttle valve remains at a fixed angle despite high drive current from the ECM. The ECM will turn on the MIL and a DTC is set.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2111: Throttle motor actuator lock (Open) P2112: Throttle motor actuator lock (Closed)
Required sensors/Components (Main)	Throttle actuator motor
Required sensors/Components (Related)	Throttle position sensor
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor will run whenever these DTCs are not present	None
--	------

P2111:

Throttle motor current	2 A or more
Throttle motor duty to close side	80 % or more

P2112:

Throttle motor current	2 A or more
Throttle motor duty to open side	80 % or more

TYPICAL MALFUNCTION THRESHOLDS

[Current throttle position sensor voltage at this time - throttle position sensor voltage 0.016 sec. earlier]	Less than 0.1 V when throttle motor open (or close) duty 80% or more
---	--

WIRING DIAGRAM

Refer to DTC P2102 on page [05-322](#).

INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- If any other codes besides P2111 and P2112 are output, perform troubleshooting for those DTCs first.

1	CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P2111 OR P2112)
----------	---

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

Result:

Display (DTC output)	Proceed to
P2111 or P2112	A
P2111 or P2112 and other DTCs	B

HINT:

If any other codes besides P2111 or P2112 are output, perform troubleshooting for those DTCs first.

B	GO TO DTC CHART (See page 05-60)
----------	---

A

2	INSPECT THROTTLE W/MOTOR BODY ASSY(VISUALLY CHECK THROTTLE VALVE)
----------	--

- (a) Check if or not a foreign object has been caught between the throttle valve and housing. Also, check if the valve can open and close smoothly.

OK:

The throttle valve is not contaminated by foreign object and can move smoothly.

NG 

**REPLACE THROTTLE W/MOTOR BODY ASSY
(See page 10-7)**

OK 

3	CHECK WHETHER DTC OUTPUT RECURS(DTC P2111 OR P2112)
----------	--

- (a) Clear the DTC (See page 05-44).
 (b) Start the engine, and depress and release the accelerator pedal quickly (fully open and fully close).
 (c) Connect the hand-held tester to the DLC3.
 (d) Turn the ignition switch to ON and turn the hand-held tester ON.
 (e) Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
 (f) Read DTC.

Result:

Display (DTC output)	Proceed to
No DTC	A
P2111 and/or P2112	B

NG 

REPAIR ECM (See page 10-16)

OK 

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

DTC	P2118	THROTTLE ACTUATOR CONTROL MOTOR CURRENT RANGE/PERFORMANCE
------------	--------------	--

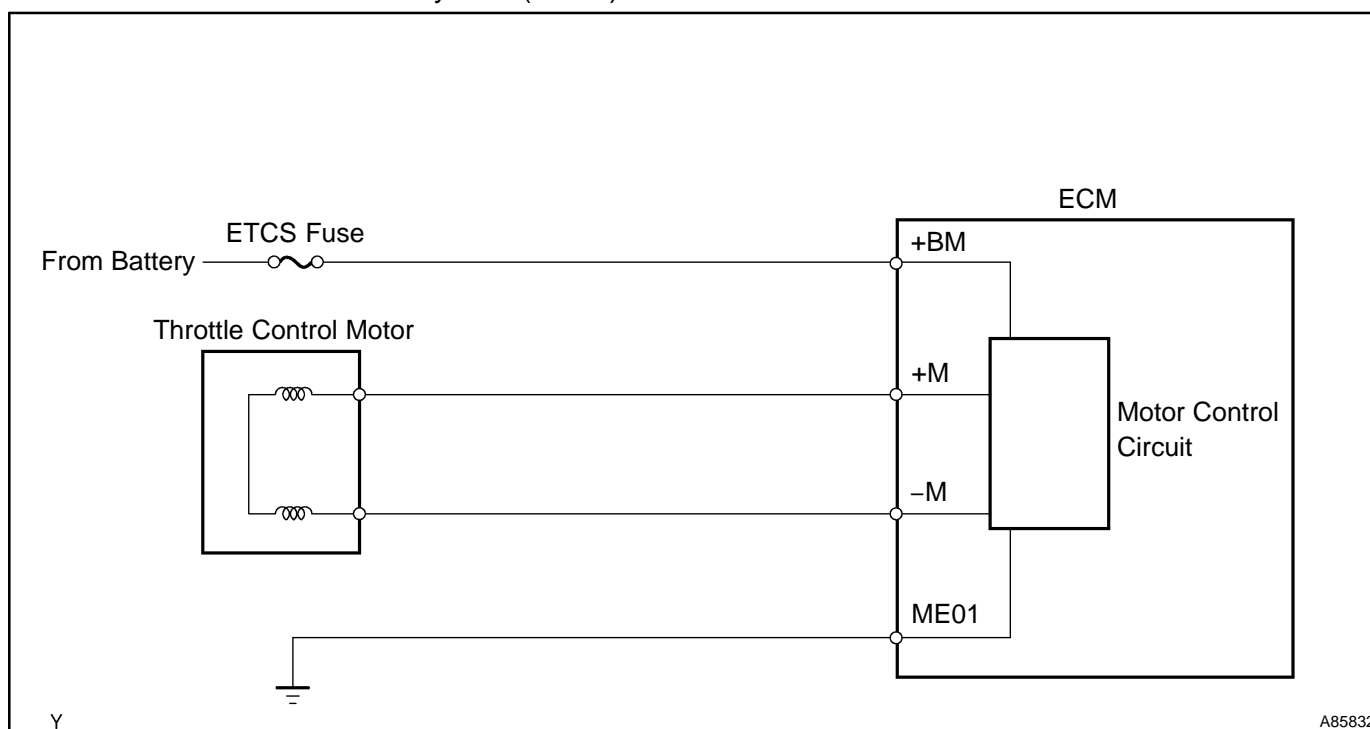
CIRCUIT DESCRIPTION

The Electronic Throttle Control System (ETCS) has a dedicated power supply circuit. The voltage (+BM) is monitored and when the voltage is low (less than 4V), the ECM concludes that the ETCS has a fault and current to the throttle control motor is cut.

When the voltage becomes unstable, the ETCS itself becomes unstable. For this reason, when the voltage is low, the current to the motor is cut. If repairs are made and the system has returned to normal, turn the ignition switch to OFF. The ECM then allows current to flow to the motor and the motor can be restarted.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.



DTC No.	DTC Detection Condition	Trouble Area
P2118	Open in ETCS power source circuit (+BM) (1 trip detection logic)	<ul style="list-style-type: none"> • Open in ETCS power source circuit • ETCS fuse • ECM

MONITOR DESCRIPTION

The ECM monitors the battery supply voltage applied to the electronic throttle motor +BM. When the power supply voltage drops below the threshold, the ECM concludes that the power supply has an open circuit. The MIL is turned on and a DTC is set.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2118: Throttle actuator motor power supply line range check (Low voltage)
Required sensors/Components	Throttle actuator motor
Frequency of operation	Continuous
Duration	0.8 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever these DTCs are not present	See page 05-20
Battery voltage	More than 8 V
Actuator power	ON

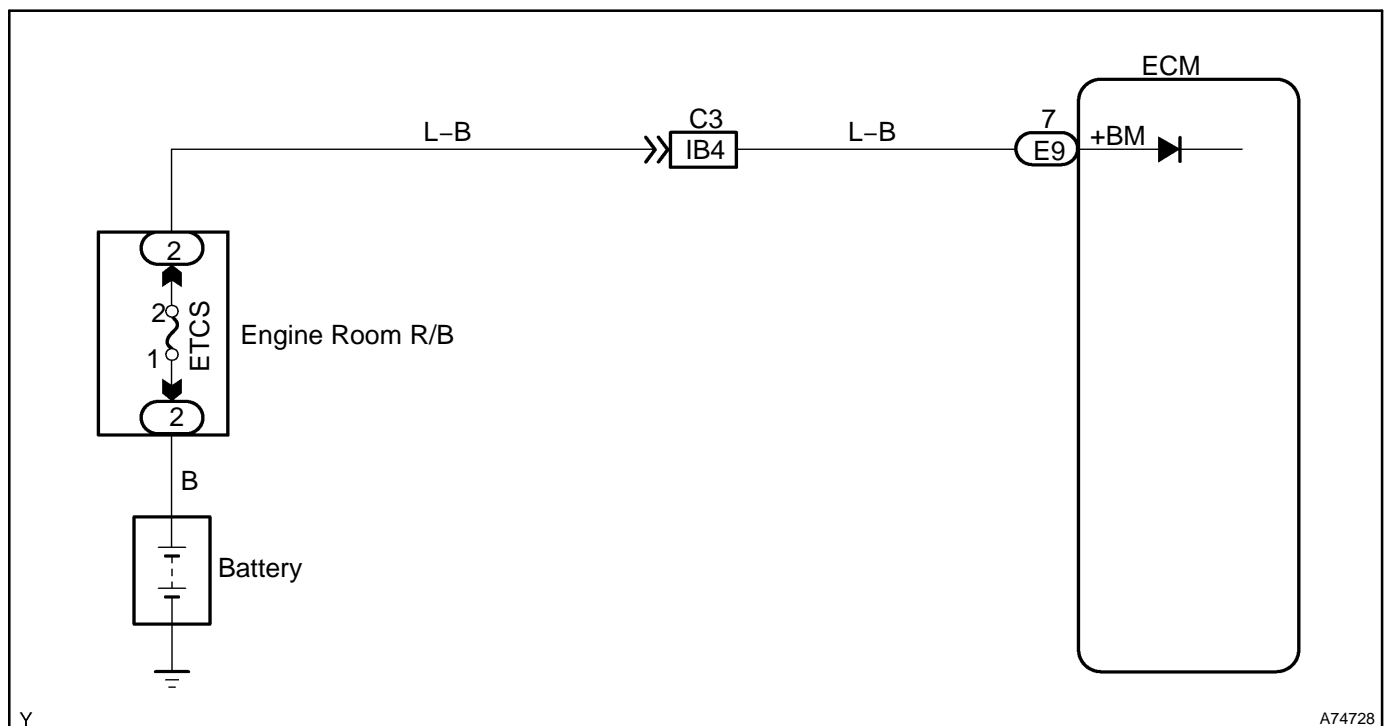
TYPICAL MALFUNCTION THRESHOLDS

Throttle actuator power supply voltage (+BM)	Less than 4 V
--	---------------

COMPONENT OPERATING RANGE

Throttle actuator power supply voltage	9 to 14 V
--	-----------

WIRING DIAGRAM



Y

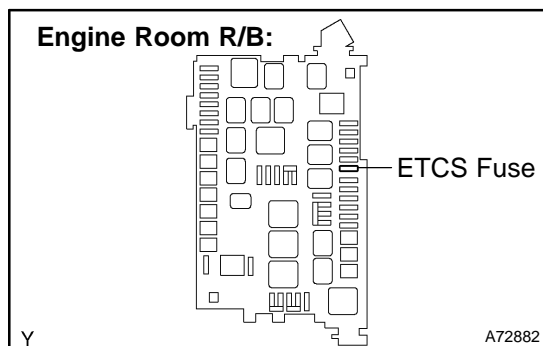
A74728

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK FUSE(ETCS FUSE)



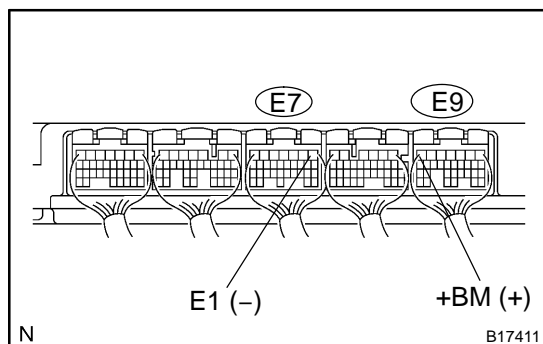
- (a) Remove the ETCS fuse from the engine room R/B.
- (b) Check for continuity in the ETCS fuse.
Standard: Continuity
- (c) Reinstall the ETCS fuse.

NG

REPLACE CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED ETCS FUSE, AND REPLACE ETCS FUSE

OK

2 INSPECT ECM(+BM VOLTAGE)



- (a) Check the voltage between the terminals of the E7 and E9 ECM connectors.

Standard:

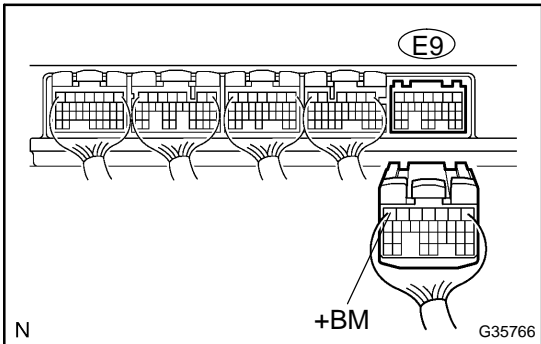
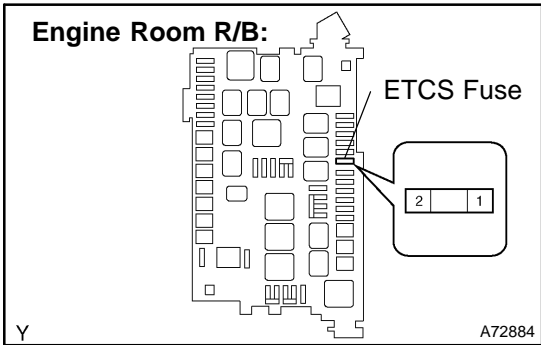
Tester Connection	Specified Condition
+BM (E9-7) - E1 (E7-1)	9 to 14 V

OK

REPLACE ECM (See page 10-16)

NG

3 CHECK HARNESS AND CONNECTOR(ECM - ETCS FUSE, ETCS FUSE - BATTERY)



- (a) Check the harness and connector between the ETCS fuse and ECM.
 - (1) Remove the ETCS fuse from the engine room R/B.
 - (2) Disconnect the E9 ECM connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (ETCS fuse terminal 2) - +BM (E9-7)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B (ETCS fuse terminal 2) or +BM (E9-7) - Body ground	10 kΩ or higher

- (4) Reinstall the ETCS fuse.
 - (5) Reconnect the ECM.
- (b) Check the harness and connector between the ETCS fuse and battery.
 - (1) Remove the ETCS fuse from the engine room R/B.
 - (2) Disconnect the negative battery cable.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Positive battery cable - Engine room R/B (ETCS fuse terminal 1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Positive battery cable or Engine room R/B (ETCS fuse terminal 1) - Body ground	10 kΩ or higher

- (4) Reinstall the ETCS fuse.
 - (5) Reconnect the negative battery cable.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (SEE PAGE 10-16)

DTC	P2119	THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE
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CIRCUIT DESCRIPTION

The Electric Throttle Control System (ETCS) is composed of a throttle motor that operates the throttle valve, a throttle position sensor that detects the opening angle of the throttle valve, an accelerator pedal position sensor that detects the accelerator pedal position, and the ECM that controls the ETCS system.

The ECM operates the throttle motor to position the throttle valve for proper response to driver input. The throttle position sensor, mounted on the throttle body, detects the opening angle of the throttle valve and provides this signal to the ECM so that the ECM can regulate the throttle motor.

DTC No.	DTC Detection Condition	Trouble Area
P2119	Throttle opening angle continues to vary greatly from target throttle opening angle (1 trip detection logic)	<ul style="list-style-type: none"> • Electric throttle control system • ECM

MONITOR DESCRIPTION

The ECM determines the "actual" throttle angle based on the throttle position sensor signal. The "actual" throttle position is compared to the "target" throttle position commanded by the ECM. If the difference of these two values exceeds a specified limit, the ECM interprets this as a fault in the ETCS (Electronic Throttle Control System). The ECM turns on the MIL and a DTC is set.

FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2119: Electronic throttle control system failure
Required sensors/Components (Main)	Throttle actuator motor
Required sensors/Components (Related)	Throttle position sensor
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever following DTCs are not present	See page 05-20
The typical enabling condition is not available	-

TYPICAL MALFUNCTION THRESHOLDS

Difference between "target throttle position" and "actual throttle position"	0.3 V or more
--	---------------

WIRING DIAGRAM

Refer to DTC P2102 on page 05-322.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 CHECK OTHER DTC OUTPUT(IN ADDITION TO DTC P2119)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to ON and turn the hand-held tester ON.
- Select the item: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read the DTCs.

Result:

Display (DTC output)	Proceed to
P2119	A
P2119 and other DTCs	B

HINT:

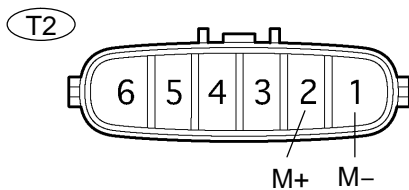
If any other codes besides P2119 are output, perform troubleshoot on those DTCs first.

B → GO TO DTC CHART (See page 05-60)

A

2 CHECK THROTTLE W/MOTOR BODY ASSY

Component Side: Throttle Control Motor and Sensor



- Disconnect the T2 throttle w/ motor body assy connector.
- Measure the resistance between terminals of the throttle control motor.

Standard:

Tester Connection	Specified Condition
M+ (T2-2) - M- (T2-1)	0.3 to 100 Ω (20°C (68°F))

- Reconnect the throttle w/ motor body assy connector.

NG → REPLACE THROTTLE W/MOTOR BODY ASSY (See page 10-7)

OK

3 REPLACE ECM (See page 10-16)

NEXT

4 CHECK DTC

- (a) Start and warm up the engine.
- (b) Run the engine at idle for 15 seconds or more.
- (c) Read the DTC using the hand-held tester (see page [05-44](#)).

Standard: No DTC output.

NG

REPLACE THROTTLE W/MOTOR BODY ASSY
(See page [10-7](#))

OK**NORMAL**

DTC	P2120	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT
DTC	P2122	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT
DTC	P2123	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH INPUT
DTC	P2125	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT
DTC	P2127	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT
DTC	P2128	THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT
DTC	P2138	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION

HINT:

This is the repair procedure for the accelerator pedal position sensor.

CIRCUIT DESCRIPTION

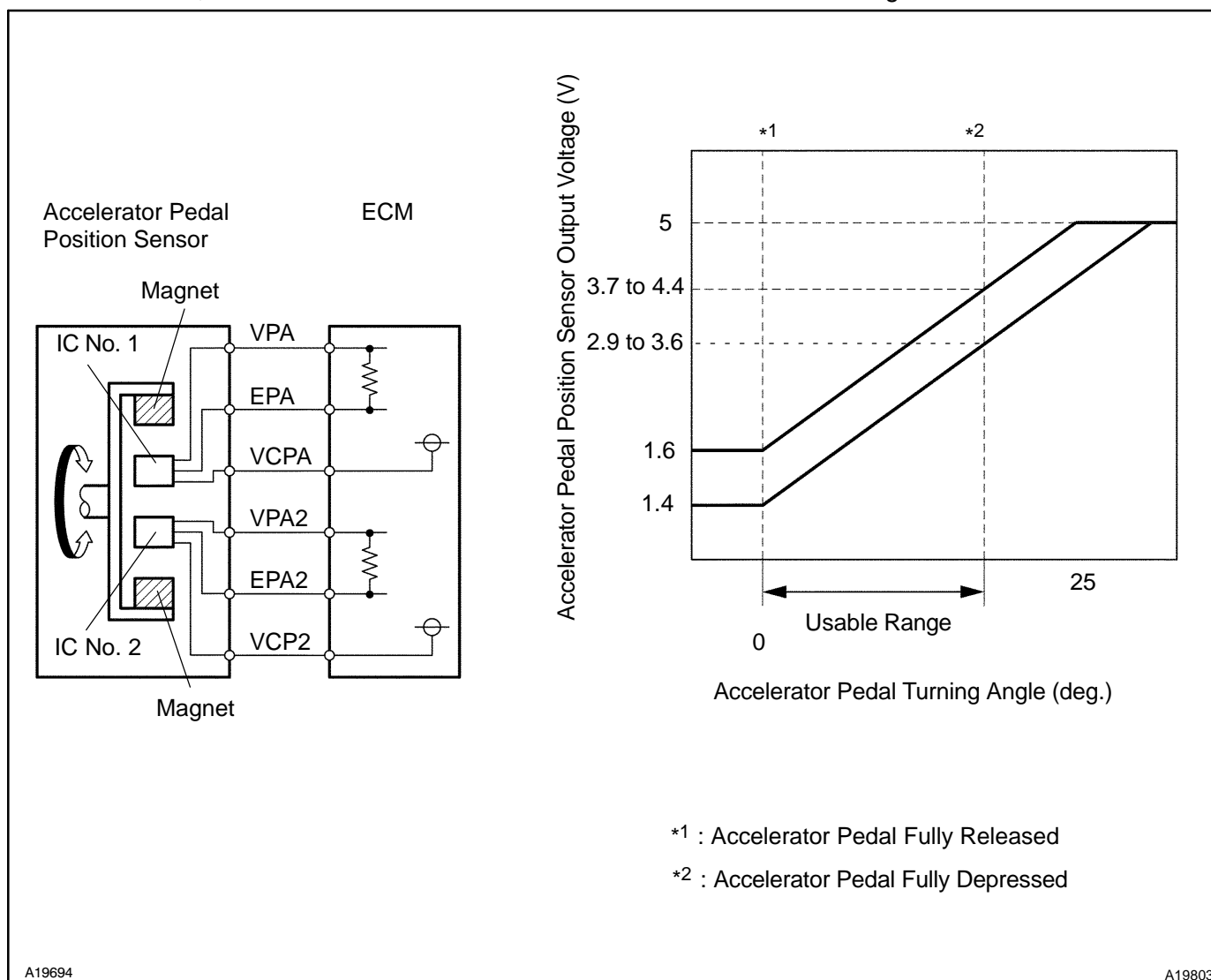
HINT:

- This electrical throttle system is no use a throttle cable.
- This accelerator pedal position sensor is non-contact type.

The accelerator pedal position sensor is mounted on the accelerator pedal to detect the opening angle of the accelerator pedal. Since this sensor is electronically controlled with hall elements, accurate control and reliability can be obtained. It have the 2 sensors to detect the accelerator position and a malfunction of the accelerator position sensor.

In the accelerator pedal position sensor, the voltage applied to pedal terminals VPA1 and VPA2 of the ECM changes between 0 V and 5 V, in proportion to the opening angle of the accelerator pedal. The VPA1 is a signal to indicate the actual accelerator pedal opening angle which is used for the engine control, and the VPA2 is a signal to indicate the information about the opening angle which is used for detecting a malfunction.

The ECM judges the current opening angle of the accelerator pedal from these signals input from terminals VPA1 and VPA2, and the ECM controls the throttle motor based on these signals.



DTC No.	DTC Detection Condition	Trouble Area
P2120	Condition (a) continues for 0.5 second or more: (a) VPA is 0.2 V or less when accelerator pedal is fully released, or VPA is 4.8 V or more	<ul style="list-style-type: none"> • Accelerator pedal position sensor • ECM
P2122	Condition (a) continues for 0.5 second or more when accelerator pedal is fully released: (a) VPA is 0.2 V or less	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in VCP1 circuit • VPA circuit open or ground short • ECM
P2123	Condition (a) continues for 2.0 seconds or more: (a) VPA is 4.8 V or more	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in EPA circuit • ECM
P2125	Condition (a) continues for 0.5 second or more: (a) (VPA2 is 0.5 V or less when accelerator pedal is fully released) or (VPA2 is 4.8 V or more and VPA is between 0.2 V and 3.45 V)	<ul style="list-style-type: none"> • Accelerator pedal position sensor • ECM
P2127	Condition (a) continues for 0.5 second or more when accelerator pedal is fully released: (a) VPA2 is 0.5 V or less	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in VCP2 circuit • VPA2 circuit open or ground short • ECM
P2128	Conditions (a) and (b) continue for 2.0 seconds or more: (a) VPA2 is 4.8 V or more (b) VPA is 0.2 V or more and VPA is 3.45 V or less	<ul style="list-style-type: none"> • Accelerator pedal position sensor • Open in EPA2 circuit • ECM
P2138	Condition (a) or (b) continues for 2.0 seconds or more: (a) Difference between VPA and VPA2 is 0.02 V or less (b) VPA is 0.2 V or less and VPA2 is 0.5 V or less	<ul style="list-style-type: none"> • VPA and VPA2 circuits are short-circuited • Accelerator pedal position sensor • ECM

HINT:

After confirming DTC P2120, P2122, P2123, P2125, P2127, P2128 and P2138, use the hand-held tester or the OBD II scan tool to confirm the throttle valve opening percentage.

Trouble area	Accelerator pedal position expressed as voltage			
	Accelerator pedal released		Accelerator pedal depressed	
	ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2
VC circuit open	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V
VPA circuit open or ground short	0 to 0.2 V	1.2 to 2.0 V	0 to 0.2 V	3.4 to 5.3 V
VPA2 circuit open or ground short	0.5 to 1.1 V	0 to 0.2 V	2.6 to 4.5 V	0 to 0.2 V
E2 circuit open	4.5 to 5.5 V	4.5 to 5.5 V	4.5 to 5.5 V	4.5 to 5.5 V

MONITOR DESCRIPTION

When VPA or VPA2 deviates from the standard, or the difference between the voltage outputs of the two sensors is less than threshold, the ECM concludes that there is a defect in the accelerator pedal position sensor. The ECM turns on the MIL and a DTC is set.

Example:

When the voltage output of the VPA is below 0.2 V or exceeds 4.8 V.

FAIL SAFE

The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving.

If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2120: Accelerator pedal position sensor 1 range check (fluttering) P2122: Accelerator pedal position sensor 1 range check (low voltage) P2123: Accelerator pedal position sensor 1 range check (high voltage) P2125: Accelerator pedal position sensor 2 range check (fluttering) P2127: Accelerator pedal position sensor 2 range check (low voltage) P2128: Accelerator pedal position sensor 2 range check (high voltage) P2138: Accelerator pedal position sensor range check
Required Sensors/Components (Main)	Accelerator pedal position sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2 sec.
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever these DTCs are not present	See page 05-20
Ignition switch	ON
Throttle control motor power	ON

TYPICAL MALFUNCTION THRESHOLDS

P2120:

Either of the following conditions is met:	Condition 1 or 2
1. VPA1 voltage when VPA2 is 0.97° or more	0.2 V or less
2. VPA1 voltage	4.8 V or more

P2122:

VPA1 voltage when VPA2 is 0.97° or more	0.2 V or less
---	---------------

P2123:

VPA1 voltage	4.8 V or more
--------------	---------------

P2125:

Either of the following conditions is met:	Condition 1 or 2
1. VPA2 voltage when VPA1 is 0.97° or more	0.5 V or less
2. VPA2 voltage when VPA1 is 0.2 to 3.45 V	4.8 V or more

P2127:

VPA2 voltage when VPA1 is 0.97° or more	0.5 V or less
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P2128:

VPA2 voltage when VPA1 is 0.2 to 3.45 V	4.8 V or more
---	---------------

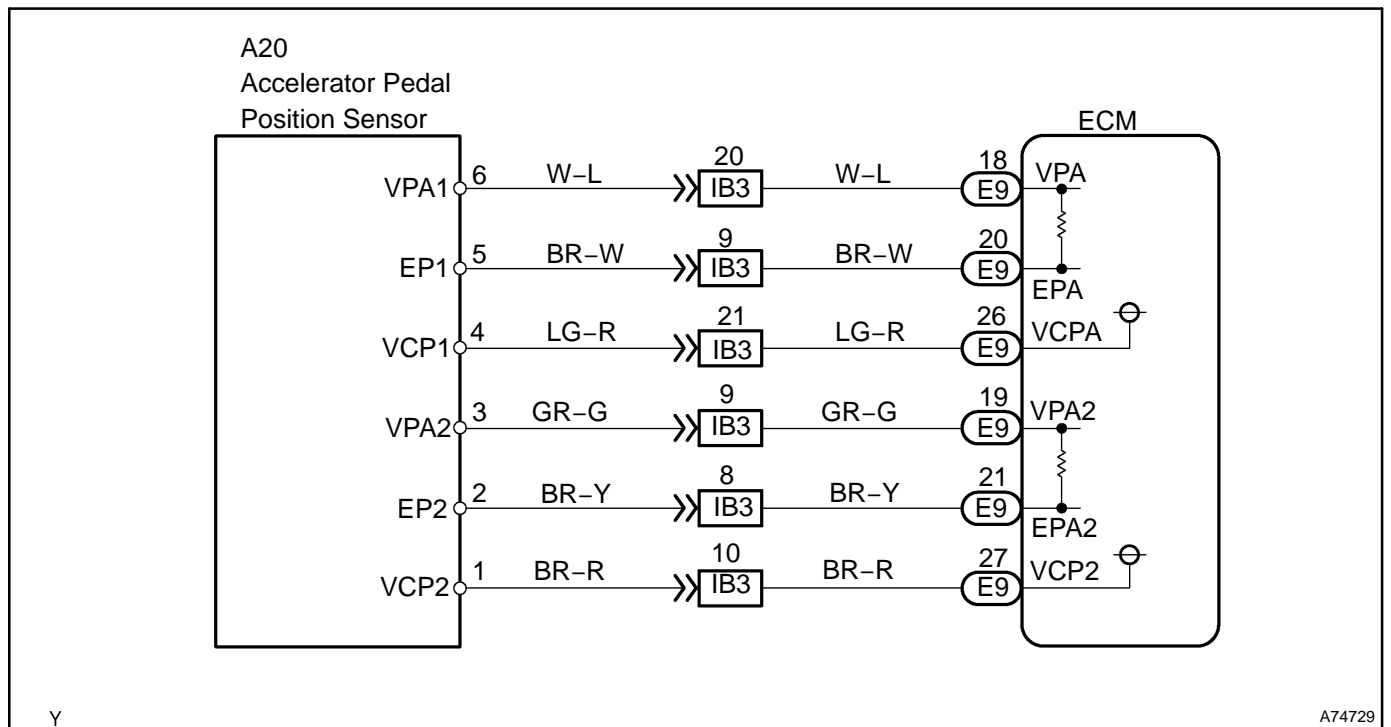
P2138:

Either of the following condition is met:	Condition 1 or 2
1. Difference between VPA1 and VPA2 voltage	0.02 V or less
2. Both of the following conditions are met:	Conditions (a) and (b)
(a) VPA1 voltage	0.2 V or less
(b) VPA2 voltage	0.5 V or less

COMPONENT OPERATING RANGE

VPA voltage	More than 0.2 V and less than 4.8 V
VPA2 voltage	More than 0.5 V and Less than 4.8 V
Difference between VPA and VPA2 voltages	More than 0.02 V

WIRING DIAGRAM

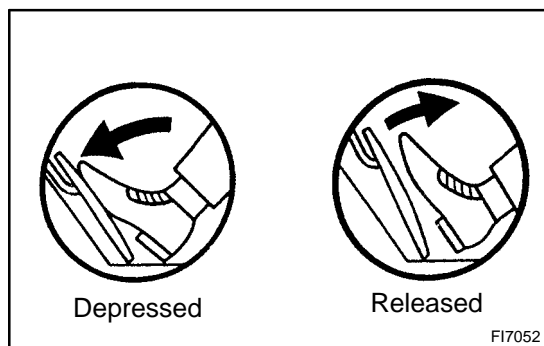


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER(ACCEL POS #1 AND ACCEL POS #2)



- Turn the ignition switch to ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2.
- Read the values.

Standard:

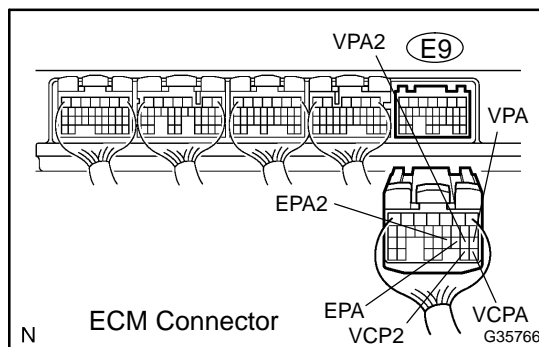
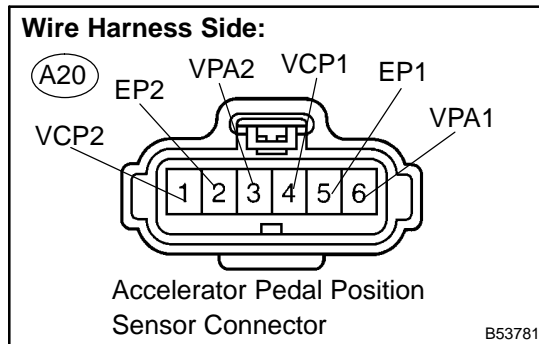
Accelerator Pedal	ACCEL POS #1	ACCEL POS #2
Released	0.5 to 1.1 V	1.5 to 2.9 V
Depressed	2.5 to 4.6 V	3.5 to 5.5 V

OK

Go to step 5

NG

2 CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)



- Disconnect the A20 accelerator pedal position sensor connector.
- Disconnect the E9 ECM connector.
- Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A20-6) - VPA (E9-18)	Below 1 Ω
EP1 (A20-5) - EPA (E9-20)	Below 1 Ω
VCP1 (A20-4) - VCPA (E9-26)	Below 1 Ω
VPA2 (A20-3) - VPA2 (E9-19)	Below 1 Ω
EP2 (A20-2) - EPA2 (E9-21)	Below 1 Ω
VCP2 (A20-1) - VCP2 (E9-27)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A20-6) or VPA (E9-18) - Body ground	10 k Ω or higher
EP1 (A20-5) or EPA (E9-20) - Body ground	10 k Ω or higher
VCP1 (A20-4) or VCPA (E9-26) - Body ground	10 k Ω or higher
VPA2 (A20-3) or VPA2 (E9-19) - Body ground	10 k Ω or higher
EP2 (A20-2) or EPA2 (E9-21) - Body ground	10 k Ω or higher
VCP2 (A20-1) or VCP2 (E9-27) - Body ground	10 k Ω or higher

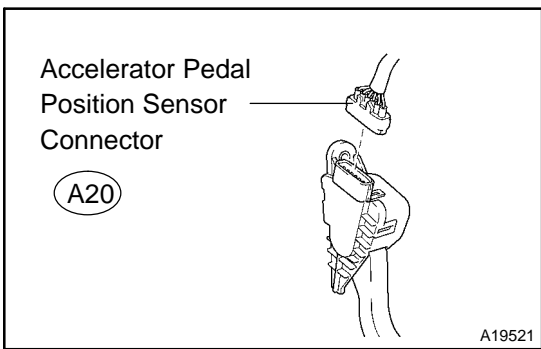
- Reconnect the accelerator pedal position sensor connector.
- Reconnect the ECM connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

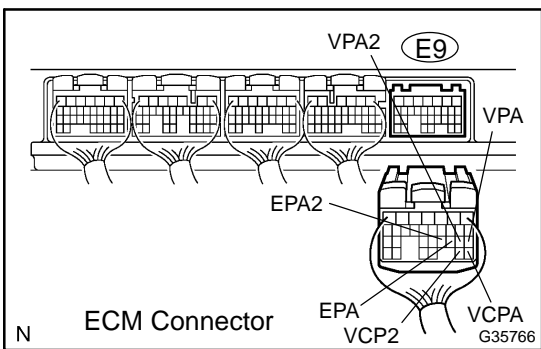
3 INSPECT ECM(VCPA AND VCP2 VOLTAGE)



- (a) Disconnect the A20 accelerator pedal position sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the terminals of the E9 ECM connector.

Standard:

Tester Connection	Specified Condition
VCPA (E9-26) - EPA (E9-20)	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-21)	4.5 to 5.5 V



- (d) Reconnect the accelerator pedal position sensor connector.

NG → **REPLACE ECM (See page 10-16)**

OK

4 REPLACE ACCELERATOR PEDAL ROD ASSY (See page 10-15)

NEXT

5 READ OUTPUT DTC(SEE IF ACCELERATOR PEDAL POSITION SENSOR DTCS ARE OUTPUT AGA)

- (a) Clear the DTC (see page 05-44).
- (b) Start the engine.
- (c) Run the engine at idle for 15 seconds or more.
- (d) Read DTCs (see page 05-44).

Result:

Display (DTC output)	Proceed to
P2120, P2122, P2123, P2125, P2127, P2128 and/or P2138	A
No output	B

B → **SYSTEM OK**

A

REPLACE ECM (See page 10-16)

DTC	P2121	THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT RANGE/PERFORMANCE
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HINT:

This is the repair procedure of accelerator pedal position sensor.

CIRCUIT DESCRIPTION

Refer to DTC P2120 on page [05-336](#).

DTC No.	DTC Detection Condition	Trouble Area
P2121	Conditions (a) and (b) continue for 0.5 second: (a) Difference between VPA1 and VPA2 deviates from the standard (b) IDL is OFF	<ul style="list-style-type: none"> • Accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM

MONITOR DESCRIPTION

The accelerator pedal position sensor is mounted on the accelerator pedal bracket. The accelerator pedal position sensor has 2 sensor elements/signal outputs: VPA1 and VPA2. VPA1 is used to detect the actual accelerator pedal angle (used for engine control) and VPA2 is used to detect malfunctions in VPA1. When the difference between the voltage outputs of VPA1 and VPA2 deviates from the standard, the ECM concludes the accelerator pedal position sensor has a malfunction. The ECM turns on the MIL and a DTC is set.

FAIL SAFE

The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving.

If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

MONITOR STRATEGY

Related DTCs	P2121: Accelerator pedal position sensor malfunction
Required sensors/Components (Main)	Accelerator pedal position sensor
Required sensors/Components (Related)	-
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Either of the following conditions is met:	Condition 1 or 2
1. Ignition switch	ON
2. Throttle control motor power	ON

TYPICAL MALFUNCTION THRESHOLDS

Difference between VPA1 voltage (learned value) and VPA2 voltage (learned value)	Less than 0.4 V, or more than 1.2 V
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WIRING DIAGRAM

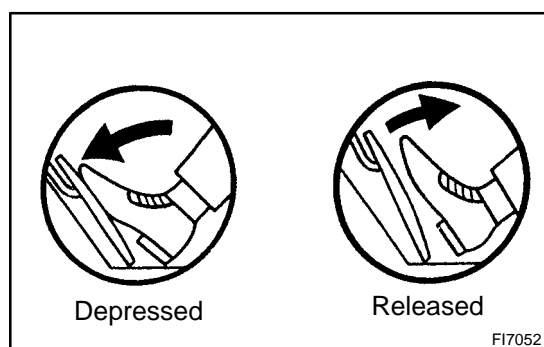
Refer to DTC P2120 on page [05-336](#).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF HAND-HELD TESTER (ACCEL POS #1 AND ACCEL POS #2)



- Turn the ignition switch to ON.
- On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2.
- Read the values.

Standard:

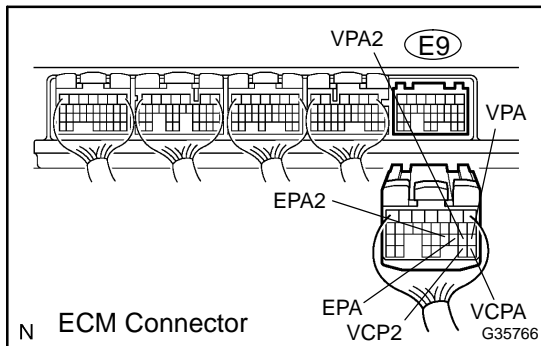
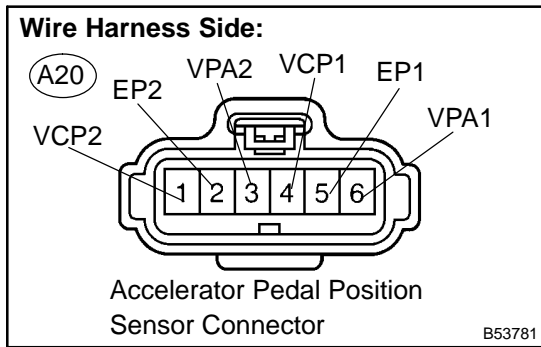
Accelerator Pedal	ACCEL POS #1	ACCEL POS #2
Released	0.5 to 1.1 V	1.5 to 2.9 V
Depressed	2.5 to 4.6 V	3.5 to 5.5 V

OK

REPLACE ECM (See page [10-16](#))

NG

2 CHECK HARNESS AND CONNECTOR(ACCELERATOR PEDAL POSITION SENSOR - ECM)



- (a) Disconnect the A20 accelerator pedal position sensor connector.
- (b) Disconnect the E9 ECM connector.
- (c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VPA1 (A20-6) - VPA (E9-18)	Below 1 Ω
EP1 (A20-5) - EPA (E9-20)	Below 1 Ω
VCP1 (A20-4) - VCPA (E9-26)	Below 1 Ω
VPA2 (A20-3) - VPA2 (E9-19)	Below 1 Ω
EP2 (A20-2) - EPA2 (E9-21)	Below 1 Ω
VCP2 (A20-1) - VCP2 (E9-27)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VPA1 (A20-6) or VPA (E9-18) - Body ground	10 kΩ or higher
EP1 (A20-5) or EPA (E9-20) - Body ground	10 kΩ or higher
VCP1 (A20-4) or VCPA (E9-26) - Body ground	10 kΩ or higher
VPA2 (A20-3) or VPA2 (E9-19) - Body ground	10 kΩ or higher
EP2 (A20-2) or EPA2 (E9-21) - Body ground	10 kΩ or higher
VCP2 (A20-1) or VCP2 (E9-27) - Body ground	10 kΩ or higher

- (d) Reconnect the accelerator pedal position sensor connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ACCELERATOR PEDAL ROD ASSY (See page 10-15)

DTC	P2195	OXYGEN (A/F) SENSOR SIGNAL STUCK LEAN (BANK 1 SENSOR 1)
DTC	P2196	OXYGEN (A/F) SENSOR SIGNAL STUCK RICH (BANK 1 SENSOR 1)
DTC	P2197	OXYGEN (A/F) SENSOR SIGNAL STUCK LEAN (BANK 2 SENSOR 1)
DTC	P2198	OXYGEN (A/F) SENSOR SIGNAL STUCK RICH (BANK 2 SENSOR 1)

HINT:

- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

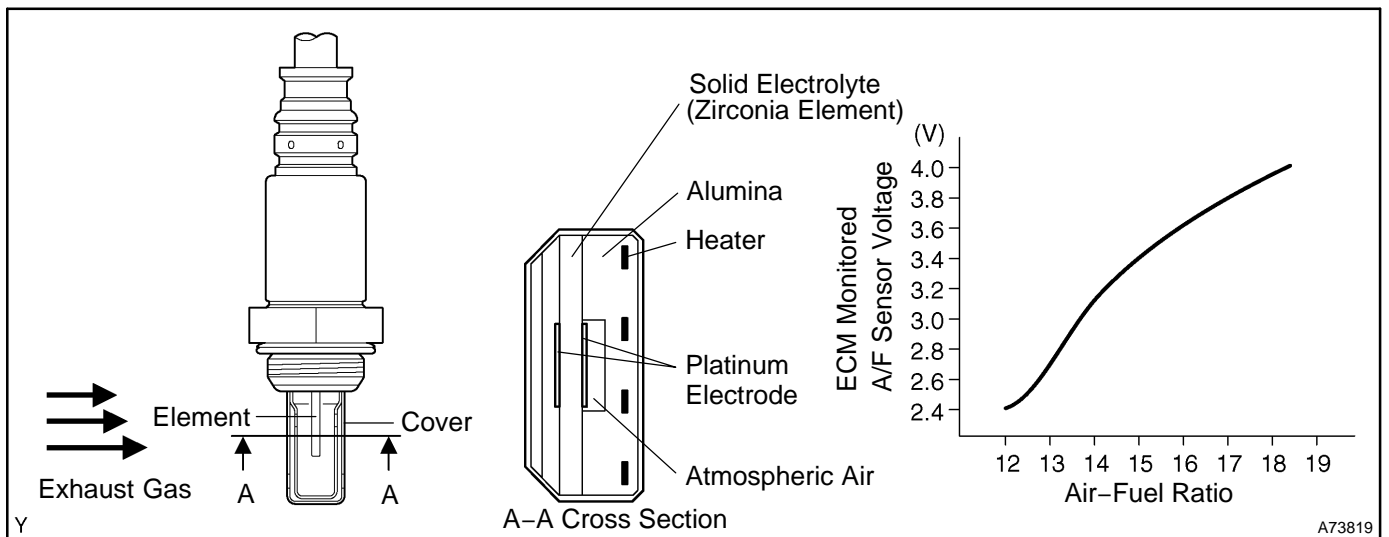
CIRCUIT DESCRIPTION

The A/F sensor generates a voltage* that corresponds to the actual air-fuel ratio. This sensor voltage is used to provide the ECM with feedback so that it can control the air-fuel ratio. The ECM determines the deviation from the stoichiometric air-fuel ratio level, and regulates the fuel injection time. If the A/F sensor malfunctions, the ECM is unable to control the air-fuel ratio accurately.

The A/F sensor is the planar type and is integrated with the heater, which heats the solid electrolyte (zirconia element). This heater is controlled by the ECM. When the intake air volume is low (the exhaust gas temperature is low), a current flows into the heater to heat the sensor, in order to facilitate accurate air-fuel ratio detection. In addition, the sensor and heater portions are narrower than the conventional type. The heat generated by the heater is conducted to the solid electrolyte through the alumina, therefore the sensor activation is accelerated.

In order to obtain a high purification rate of the carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxide (NOx) components in the exhaust gas, a TWC is used. For the most efficient use of the TWC, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric level.

*: Value changes inside the ECM. Since the A/F sensor is the current output element, a current is converted to a voltage inside the ECM. Any measurements taken at the A/F sensor or ECM connectors will show a constant voltage.



DTC No.	DTC Detection Conditions	Trouble Areas
P2195 P2197	While fuel-cut operation (during vehicle deceleration), air-fuel ratio sensor current is 3.6 mA or more for 1 seconds.	<ul style="list-style-type: none"> • A/F sensor (Sensor 1) • ECM
P2195	Conditions (a) and (b) continue for 2 seconds or more: (2 trip detection logic) (a) Air-Fuel Ratio (A/F) sensor voltage more than 3.8 V (b) Heated Oxygen (HO2) sensor voltage 0.15 V or more	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor (Sensor 1) heater • EFI relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM
P2196 P2198	While fuel-cut operation (during vehicle deceleration), air-fuel ratio sensor current is less than 1.4 mA for 1 seconds.	<ul style="list-style-type: none"> • A/F sensor (Sensor 1) • ECM
P2196	Conditions (a) and (b) continue for 2 seconds or more: (2 trip detection logic) (a) A/F sensor voltage less than 2.8 V (b) HO2 sensor voltage less than 0.6 V	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor (Sensor 1) heater • EFI relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM

HINT:

- When any of these DTCs are set, check the A/F sensor voltage output by selecting the following menu items on the hand-held tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / AFS B1S1.
- Short-term fuel trim values can also be read using a hand-held tester.
- The ECM regulates the voltage at the A1A+ and A1A- terminals of the ECM at a constant level. Therefore, the A/F sensor voltage output cannot be confirmed without using a hand-held tester.
- If the A/F sensor functional malfunction is detected, the ECM sets this DTC.

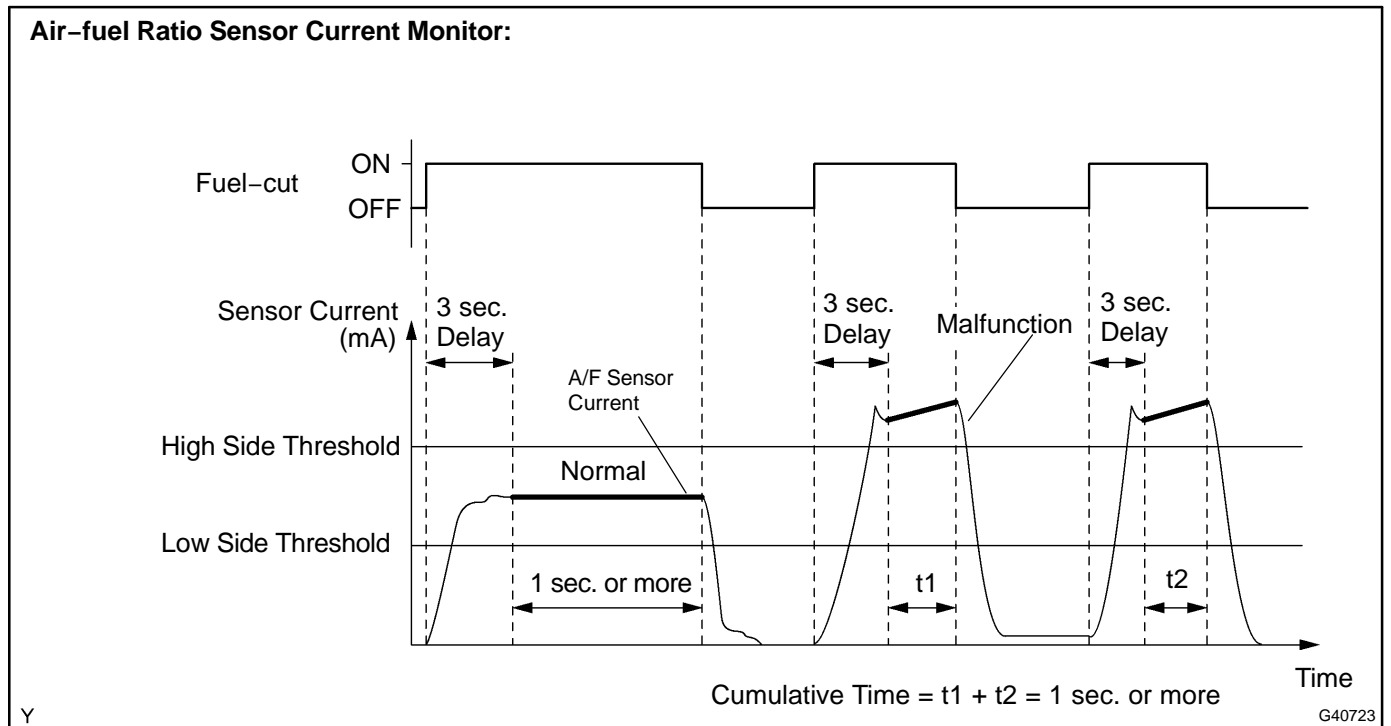
MONITOR DESCRIPTION

- Sensor voltage detection monitor:
Under the air-fuel ratio feedback control, if the A/F sensor voltage output indicates rich or lean for a certain period of time, the ECM determines that there is a malfunction in the A/F sensor. The ECM illuminates the MIL and sets a DTC.

Example:

If the A/F sensor voltage output is less than 2.8 V (very rich condition) for 15 seconds, despite the HO2 sensor voltage output being less than 0.6 V, the ECM sets DTC P2196. Alternatively, if the A/F sensor voltage output is more than 3.8 V (very lean condition) for 15 seconds, despite the HO2 sensor voltage output being 0.15 V or more, DTC P2195 or P2197 is set.

- Sensor current detection monitor:
 A rich air-fuel mixture causes a low air-fuel ratio sensor current, and a lean air fuel mixture causes a high air-fuel ratio sensor current. Therefore, the sensor output becomes high during acceleration, and the sensor becomes low during deceleration.
 The ECM monitors the air-fuel ratio sensor current during fuel-cut and detects unusual current value. If the cumulative time sensor output exceeds 1 seconds, the ECM interprets a malfunction in the air-fuel ratio sensor and sets a DTC.



MONITOR STRATEGY

Related DTCs	P2195: A/F sensor (Bank 1) signal stuck lean P2195: A/F sensor (Bank 1) current (high side) P2196: A/F sensor (Bank 1) signal stuck rich P2196: A/F sensor (Bank 1) current (low side) P2197: A/F sensor (Bank 2) signal stuck lean P2197: A/F sensor (Bank 2) current (high side) P2198: A/F sensor (Bank 2) signal stuck rich P2198: A/F sensor (Bank 2) current (low side)
Required sensors/Components	A/F sensor
Frequency of operation	Once per driving cycle
Duration	15 sec.: A/F sensor signal stuck lean/rich 1 sec.: A/F sensor current (high/low side)
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
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P2195, P2197 (A/F sensor signal stuck lean):

Duration while all of following conditions are met	2 sec. or more
Rear HO2S voltage	0.15 V or more
Time after engine start	30 sec. or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2196, P2198 (A/F sensor signal stuck rich):

Duration while all of following conditions are met	2 sec. or more
Rear HO2S voltage	Less than 0.6 V
Time after engine start	30 sec. or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2195, P2197 (A/F sensor current (High side)):

Battery voltage	11 V or more
ECT	75°C (167°F) or more
Atmospheric pressure/760 mmHg	0.75 or more
A/F sensor status	Activated
Continuous time of fuel-cut	3 to 10 sec.

P2196, P2198 (A/F sensor current (Low side)):

Battery voltage	11 V or more
ECT	75°C (167°F) or more
Atmospheric pressure/760 mmHg	0.75 or more
A/F sensor status	Activated
Continuous time of fuel-cut	3 to 10 sec.

TYPICAL MALFUNCTION THRESHOLDS

P2195, P2197 (A/F sensor signal stuck lean):

A/F sensor voltage	More than 3.8 V for 15 sec.
--------------------	-----------------------------

P2196, P2198 (A/F sensor signal stuck rich):

A/F sensor voltage	Less than 2.8 V for 15 sec.
--------------------	-----------------------------

P2195, P2197 (A/F sensor current (High side)):

Duration of the following condition	1 sec. or more
A/F sensor current	3.6 mA or more

P2196, P2198 (A/F sensor current (Low side)):

Duration of the following condition	1 sec. or more
A/F sensor current	Less than 1.4 mA

MONITOR RESULT

Refer to page 05-28 for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor driving pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

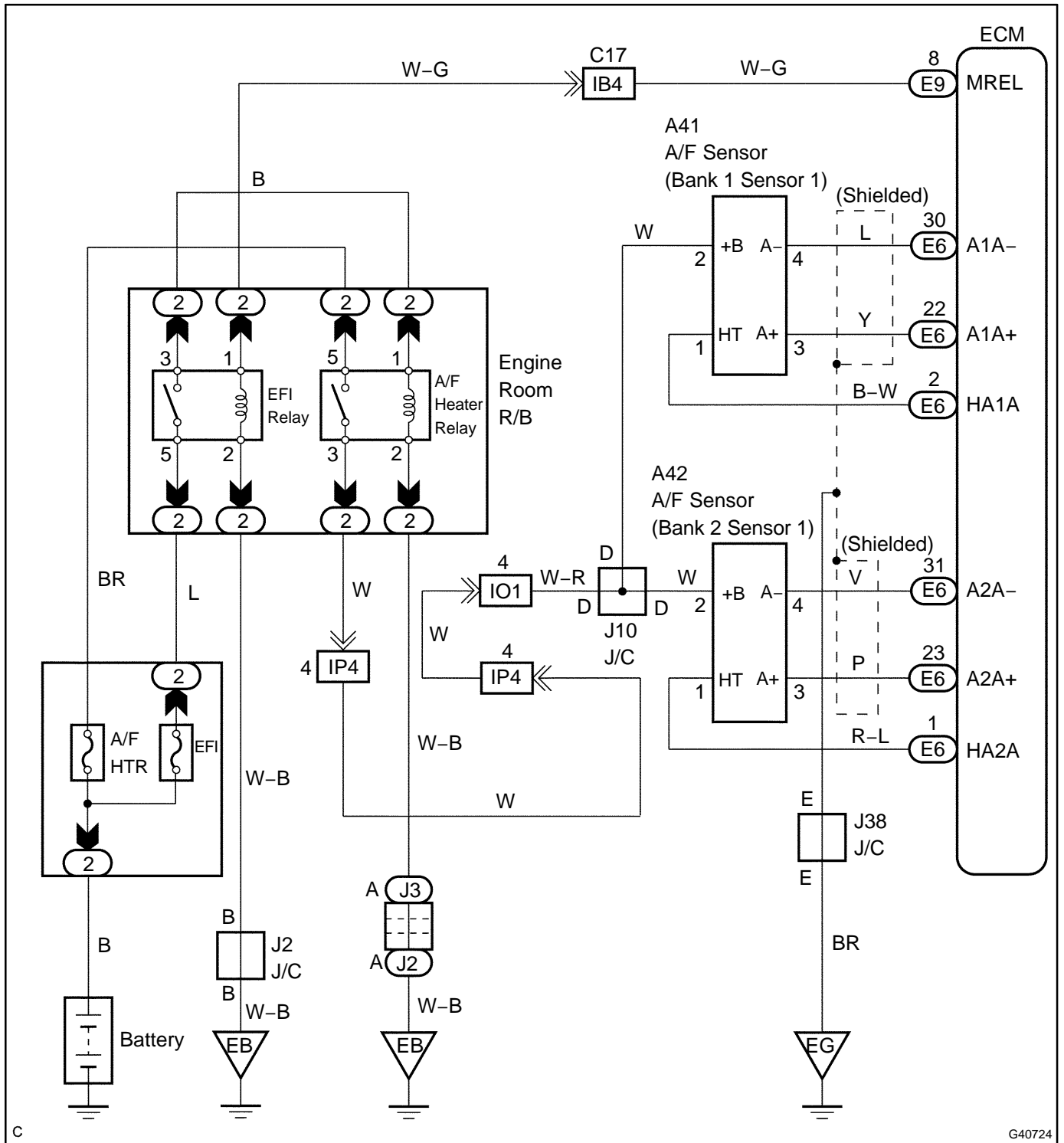
A/F sensor bank 1 sensor 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$01	\$91	Multiply by 0.003906 (mA)	A/F current	Minimum test limit	Maximum test limit

A/F sensor bank 2 sensor 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$05	\$91	Multiply by 0.003906 (mA)	A/F current	Minimum test limit	Maximum test limit

WIRING DIAGRAM



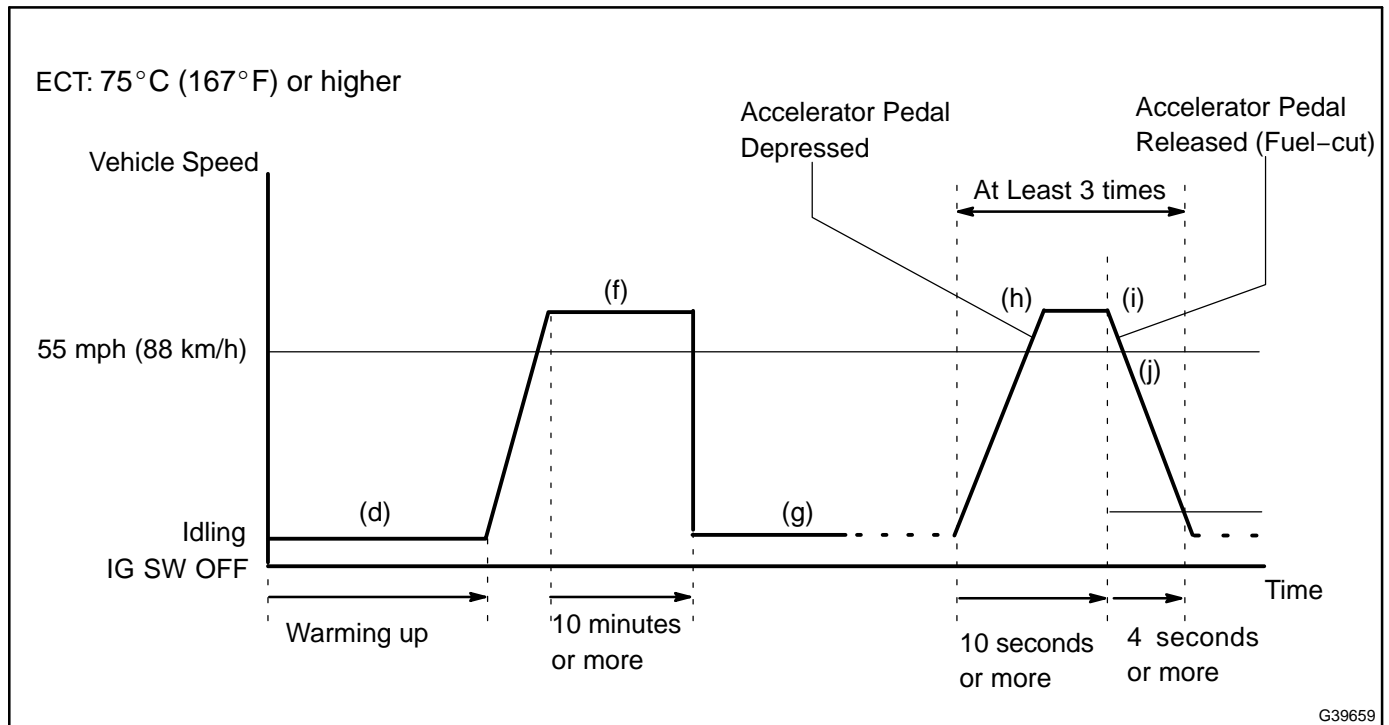
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CONFIRMATION DRIVING PATTERN

HINT:

This confirmation driving pattern is used in steps 4, 7, 17 and 21 of the following diagnostic troubleshooting procedure when using a hand-held tester.



- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Clear DTCs (see page 05-44).
- (d) Start the engine, and warm it up until the ECT reaches 75°C (167°F) or higher.
- (e) On the hand-held tester, select the following menu items: DIAGNOSIS/ENHANCED OBD II/DATA LIST/FC IDL.
- (f) Drive the vehicle at 55 mph (88 km/h) or more for at least 10 minutes.
- (g) Change the transmission to 2nd gear.
- (h) Drive the vehicle at an appropriate speed to perform fuel-cut operation.

HINT:

Fuel-cut is performed when the following conditions are met:

- Accelerator pedal is fully released.
 - Engine speed is 2,500 rpm or more (fuel injection returns at 1,000 rpm).
- (i) Accelerate the vehicle to 55 mph (88 km/h) or more by depressing the accelerator pedal for at least 10 seconds.
 - (j) Soon after performing step (i) above, release the accelerator pedal for at least 4 seconds without depressing the brake pedal, in order to execute fuel-cut control.
 - (k) Stop the vehicle and allow the engine to idle for 10 seconds or more.
 - (l) Allow the vehicle to decelerate until the vehicle speed declines to less than 6 mph (10 km/h).
 - (m) Repeat steps from (i) through (l) above at least 3 times in one driving cycle.

HINT:

Completing all A/F sensor monitors are required to change the value in TEST RESULT.

CAUTION:

Strictly observe the posted speed limits, traffic laws, and road conditions when performing these driving patterns.

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using a hand-held tester.

- (1) Connect a hand-held tester to the DLC3.
- (2) Start the engine and turn the tester ON.
- (3) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
- (4) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
- (5) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
- (6) Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 (AFS B2S1) and OS2 B1S2 (O2S B2S2)) displayed on the tester.

HINT:

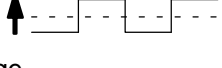
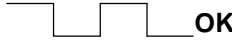
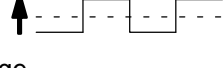
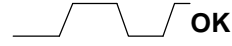
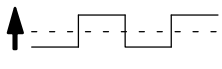
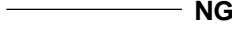
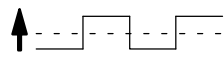
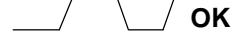
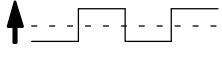

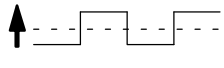

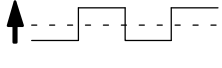

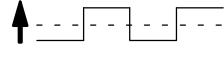

- The A/F CONTROL operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
AFS B1S1 (AFS B2S1) (A/F)	+25 %	Rich	Less than 3.0
AFS B1S1 (AFS B2S1) (A/F)	-12.5 %	Lean	More than 3.35
O2S B1S2 (O2S B2S2) (HO2)	+25 %	Rich	More than 0.55
O2S B1S2 (O2S B2S2) (HO2)	-12.5 %	Lean	Less than 0.4

NOTICE:

The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage	HO2 Sensor (Sensor 2) Output Voltage	Main Suspected Trouble Areas
1	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0 V	Injection volume +25 %  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	—
2	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	<ul style="list-style-type: none"> • A/F sensor • A/F sensor heater • A/F sensor circuit
3	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0V	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • HO2 sensor • HO2 sensor heater • HO2 sensor circuit
4	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- Read freeze frame data using a hand-held tester or OBD II scan tool. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.
- A low A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO P2195, P2196, P2197 OR P2198)
----------	---

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2195, P2196, P2197 or P2198	A
P2195, P2196, P2197 or P2198 and other DTCs	B

HINT:

If any DTCs other than P2195, P2196, P2197 or P2198 are output, troubleshoot those DTCs first.

B	GO TO DTC CHART (See page 05-60)
----------	---

A

2	READ VALUE USING HAND-HELD TESTER(TEST VALUE OF A/F SENSOR)
----------	--

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Clear DTCs (see page 05-44).
- (d) On the hand-held tester, select the following menu items: DIAGNOSIS/ENHANCED OBD II/MONITOR INFO/MONITOR STATUS.
- (e) Check that the status of O2S MON is COMPL.
- (f) On the hand-held tester, select the following menu items: DIAGNOSIS/ENHANCED OBD II/MONITOR INFO/TEST RESULT/RANGE B1S1 and B2S1.
- (g) Check the test value of the air-fuel ratio sensor output current during fuel-cut.

Result:

Test Value	Proceed to
Out of normal range (1.4 mA or more, and less than 3.6 mA)	A
Within normal range (Less than 1.4 mA, or 3.6 mA or more)	B

B	Go to step 20
----------	----------------------

A

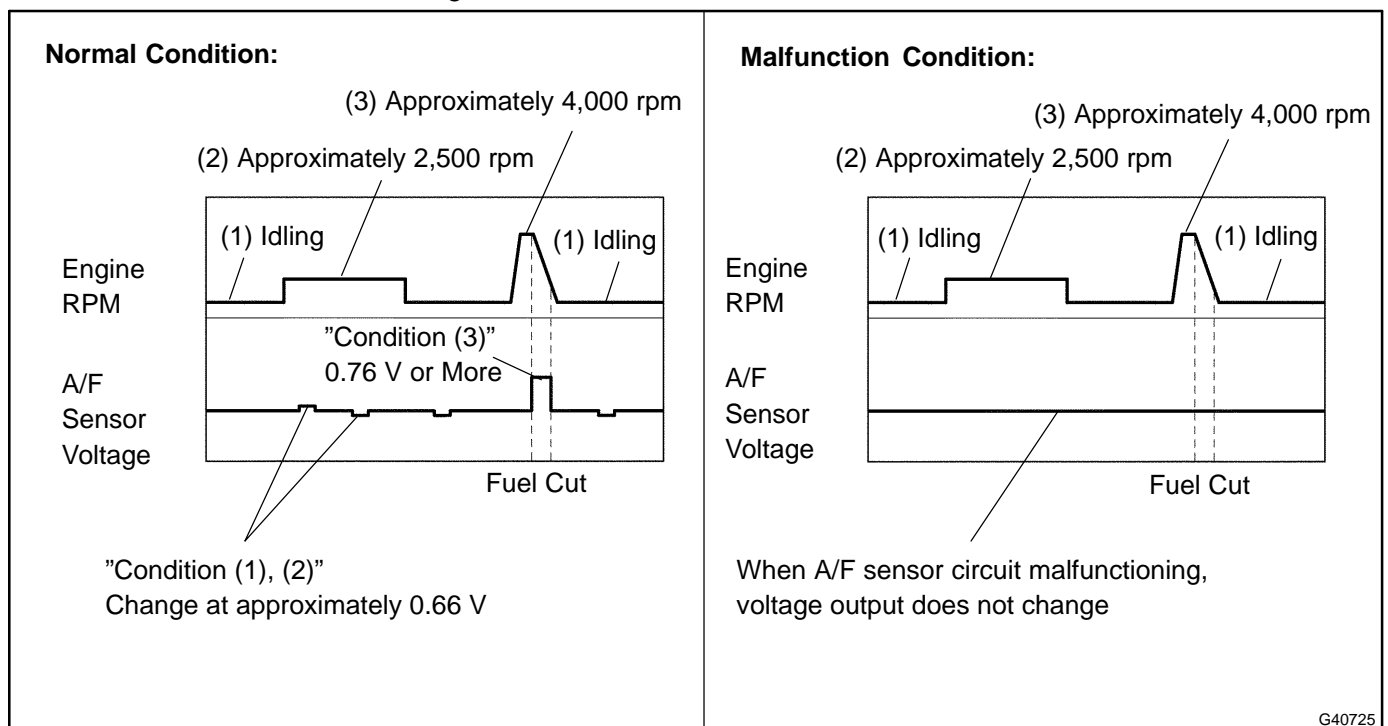
3 READ VALUE USING HAND-HELD TESTER(OUTPUT VOLTAGE OF A/F SENSOR)

- (a) Connect the hand-held tester to the DLC3.
- (b) Start the engine and turn the scan tool ON.
- (c) Warm up the Air-Fuel Ratio (A/F) sensor at an engine speed of 2,500 rpm for 90 seconds.
- (d) Using the tester, check the A/F sensor voltage 3 times, once when the engine is in each of the following conditions:
 - (1) While idling (check for at least 30 seconds)
 - (2) At an engine speed of approximately 2,500 rpm (without any sudden changes in engine speed)
 - (3) Raise the engine speed to 4,000 rpm and then quickly release the accelerator pedal so that the throttle valve is fully closed.

Standard:

Conditions	A/F Sensor Voltage Variations	Reference
(1) and (2)	Changes at approx 0.66 V	Between 0.62 V and 0.7 V
(3)	Increases to 0.76 V or more	This occurs during engine deceleration (when fuel-cut performed)

For more information, see the diagrams below.



HINT:

- If the output voltage of the A/F sensor remains at approximately 0.66 V (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have an open circuit. (This will also happen if the A/F sensor heater has an open circuit.)
- If the output voltage of the A/F sensor remains at either approximately 0.76 V or more, or 0.56 V or less (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have a short circuit.
- The ECM stops fuel injection (fuel cut) during engine deceleration. This causes a lean condition and results in a momentary increase in the A/F sensor output voltage.
- The ECM must establish a closed throttle valve position learning value to perform fuel cut. If the battery terminal has been reconnected, the vehicle must be driven over 10 mph (16 km/h) to allow the ECM to learn the closed throttle valve position.

- When the vehicle is driven:
The output voltage of the A/F sensor may be below 0.56 V during fuel enrichment. For the vehicle, this translates to a sudden increase in speed with the accelerator pedal fully depressed when trying to overtake another vehicle. The A/F sensor is functioning normally.
- The A/F sensor is a current output element; therefore, the current is converted into a voltage inside the ECM. Measuring the voltage at the connectors of the A/F sensor or ECM will show a constant voltage result.

NG Go to step 9

OK

4 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

5 CHECK WHETHER DTC OUTPUT RECURS(DTC P2195, P2196, P2197 OR P2198)

- On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2195, P2196, P2197 or P2198	A
No output	B

B Go to step 5

A

6 REPLACE AIR FUEL RATIO SENSOR

NEXT

7 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

8 CHECK WHETHER DTC OUTPUT RECURS(DTC P2195, P2196, P2197 OR P2198)

- On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2195, P2196, P2197 or P2198	A
No output	B

B Go to step 5

A

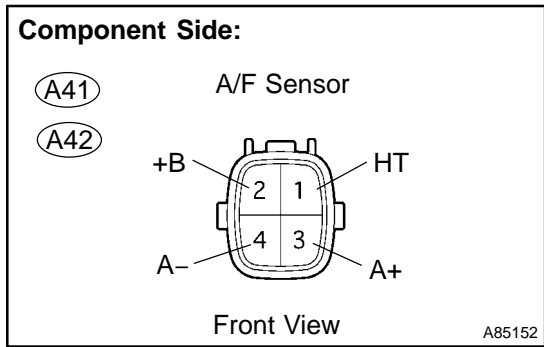
9 CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

NO CHECK FOR INTERMITTENT PROBLEMS

YES

DTC CAUSED BY RUNNING OUT OF FUEL

10 INSPECT AIR FUEL RATIO SENSOR(HEATER RESISTANCE)



- (a) Disconnect the A41 or A42 air-fuel ratio (A/F) sensor connector.
- (b) Measure resistance between the terminals of the A/F sensor connector.

Standard:

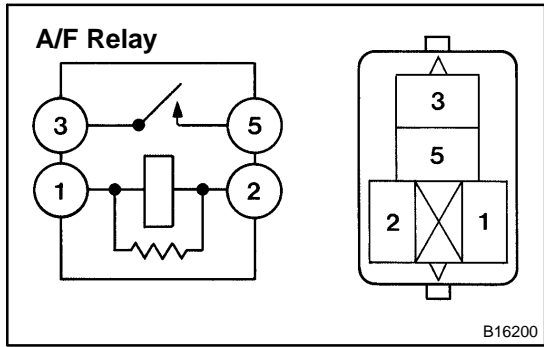
Tester Connection	Specified Condition
HT (1) - +B (2)	Between 1.8 Ω and 3.4 Ω at 20°C (68°F)
HT (1) - A- (4)	10 kΩ or higher

- (c) Reconnect the A/F sensor connector.

NG REPLACE AIR FUEL RATIO SENSOR

OK

11 INSPECT AIR FUEL RATIO SENSOR HEATER RELAY



- (a) Remove the A/F sensor heater relay from the engine room R/B.
- (b) Inspect the A/F sensor heater relay.

Standard:

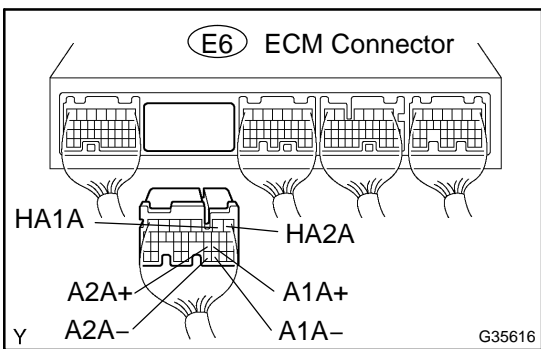
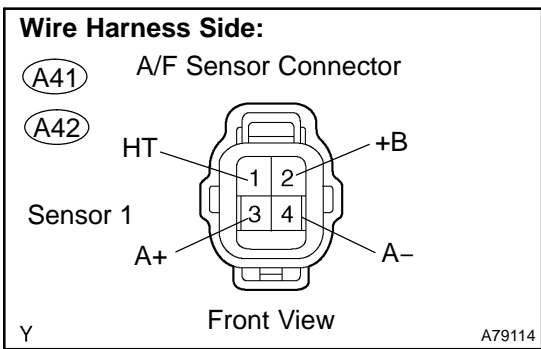
Terminal No.	Condition	Specified Condition
3 - 5	Always	10 KΩ or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

- (c) Reconnect the A/F sensor heater relay.

NG REPLACE AIR FUEL RATIO SENSOR HEATER RELAY

OK

12 CHECK HARNESS AND CONNECTOR(A/F SENSOR - ECM)



- (a) Disconnect the A41 or A42 A/F sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the +B terminal of the A/F sensor connector and body ground.

Standard:

Tester Connections	Specified Conditions
+B (2) - Body ground	Between 9 V and 14 V

- (d) Turn the ignition switch to OFF.
- (e) Disconnect the E6 ECM connector.
- (f) Check the resistance.

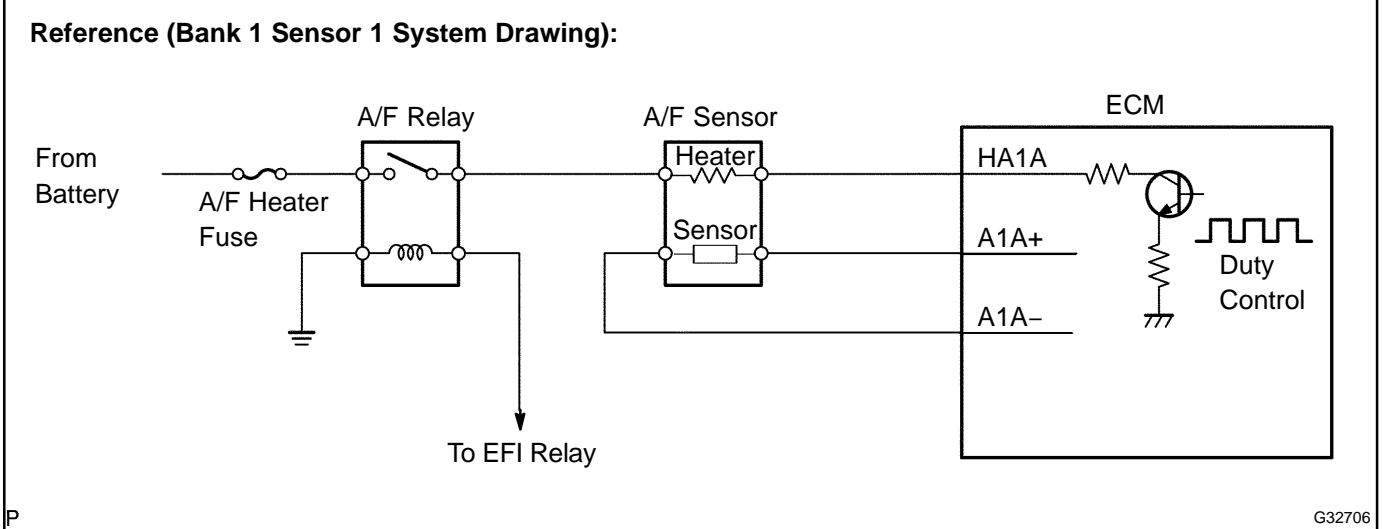
Standard (Check for open):

Tester Connections	Specified Conditions
HT (A41-1) - HA1A (E6-2) HT (A42-1) - HA2A (E6-1)	Below 1 Ω
A+ (A41-3) - A1A+ (E6-22) A+ (A42-3) - A2A+ (E6-23)	Below 1 Ω
A- (A41-4) - A1A- (E6-30) A- (A42-4) - A2A- (E6-31)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
HT (A41-1) or HA1A (E6-2) - Body ground HT (A42-1) or HA2A (E6-1) - Body ground	10 kΩ or higher
A+ (A41-3) or A1A+ (E6-22) - Body ground A+ (A42-3) or A2A+ (E6-23) - Body ground	10 kΩ or higher
A- (A41-4) or A1A- (E6-30) - Body ground A- (A42-4) or A2A- (E6-31) - Body ground	10 kΩ or higher

- (g) Reconnect the A/F sensor connector.
- (h) Reconnect the ECM connector.



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

13 CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leaks.

NG

REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

14 CHECK FUEL PRESSURE (See page 11-8)

(a) Check the fuel pressure (high or low pressure).

NG

REPAIR OR REPLACE FUEL SYSTEM

OK

15 INSPECT FUEL INJECTOR ASSY (See page 11-8)

NG

REPLACE FUEL INJECTOR ASSY

OK

16 REPLACE AIR FUEL RATIO SENSOR

NEXT

17 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

18 CHECK WHETHER DTC OUTPUT RECURS(DTC P2195, P2196, P2197 OR P2198)

(a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.

(b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2195, P2196, P2197 or P2198	A
No output	B

B

REPLACE ECM (See page 10-16) AND PERFORM CONFIRMATION DRIVING PATTERN

A

19 CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

NO

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

YES

DTC CAUSED BY RUNNING OUT OF FUEL**20 REPLACE AIR FUEL RATIO SENSOR****NEXT****21 PERFORM CONFIRMATION DRIVING PATTERN****NEXT****22 CHECK WHETHER DTC OUTPUT RECURS(DTC P2195, P2196, P2197 OR P2198)**

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2195, P2196, P2197 or P2198 (A/F sensor pending DTCs)	A
No output	B

B**REPLACE ECM (See page 10-16)****A****END**

DTC	P2238	OXYGEN SENSOR PUMPING CURRENT CIRCUIT LOW (FOR A/F SENSOR)(BANK 1 SENSOR 1)
DTC	P2239	OXYGEN SENSOR PUMPING CURRENT CIRCUIT HIGH (FOR A/F SENSOR)(BANK 1 SENSOR 1)
DTC	P2241	OXYGEN SENSOR PUMPING CURRENT CIRCUIT LOW (FOR A/F SENSOR)(BANK 2 SENSOR 1)
DTC	P2242	OXYGEN SENSOR PUMPING CURRENT CIRCUIT HIGH (FOR A/F SENSOR)(BANK 2 SENSOR 1)
DTC	P2252	OXYGEN SENSOR REFERENCE GROUND CIRCUIT LOW (FOR A/F SENSOR)(BANK 1 SENSOR 1)
DTC	P2253	OXYGEN SENSOR REFERENCE GROUND CIRCUIT HIGH (FOR A/F SENSOR)(BANK 1 SENSOR 1)
DTC	P2255	OXYGEN SENSOR REFERENCE GROUND CIRCUIT LOW (FOR A/F SENSOR)(BANK 2 SENSOR 1)
DTC	P2256	OXYGEN SENSOR REFERENCE GROUND CIRCUIT HIGH (FOR A/F SENSOR)(BANK 2 SENSOR 1)

HINT:

- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

CIRCUIT DESCRIPTION

Refer to DTC P2195 on page 05-347.

DTC No.	DTC Detection Conditions	Trouble Areas
P2238 P2241	<ul style="list-style-type: none"> • Case 1: Condition (a) or (b) continues for 5.0 seconds or more: (1 trip detection logic) (a) AF+ voltage 0.5 V or less (b) (AF+) - (AF-) = 0.1 V or less • Case 2: A/F sensor admittance: Less than 0.022 1/Ω (1 trip detection logic) 	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F relay • A/F sensor heater and relay circuits • ECM
P2239 P2242	AF+ voltage more than 4.5 V for 5.0 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F relay • A/F sensor heater and relay circuits • ECM
P2252 P2255	AF- voltage 0.5 V or less for 5.0 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F relay • A/F sensor heater and relay circuits • ECM
P2253 P2256	AF- voltage more than 4.5 V for 5.0 seconds or more (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • A/F sensor heater • A/F relay • A/F sensor heater and relay circuits • ECM

MONITOR DESCRIPTION

The Air-Fuel Ratio (A/F) sensor varies its output voltage in proportion to the air-fuel ratio. If the A/F sensor impedance (alternating current resistance) or voltage output deviates greatly from the standard range, the ECM determines that there is an open or short malfunction in the A/F sensor circuit.

MONITOR STRATEGY

Related DTCs	P2238: A/F sensor (Bank 1) open circuit between AF+ and AF- P2238: A/F sensor (Bank 1) short circuit between AF+ and AF- P2238: A/F sensor (Bank 1) short circuit between AF+ and GND P2239: A/F sensor (Bank 1) short circuit between AF+ and +B P2241: A/F sensor (Bank 2) open circuit between AF+ and AF- P2241: A/F sensor (Bank 2) short circuit between AF+ and AF- P2241: A/F sensor (Bank 2) short circuit between AF+ and GND P2242: A/F sensor (Bank 2) short circuit between AF+ and +B P2252: A/F sensor (Bank 1) short circuit between AF- and GND P2253: A/F sensor (Bank 1) short circuit between AF- and +B P2255: A/F sensor (Bank 2) short circuit between AF- and GND P2256: A/F sensor (Bank 2) short circuit between AF- and +B
Required sensors/Components	A/F sensor
Frequency of operation	Once per driving cycle
Duration	10 sec.: A/F sensor open circuit between AF+ and AF- 5 sec.: Others
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
---	--------------------------------

P2238, P2241 (A/F sensor open circuit between AF+ and AF-):

Duration while all of following conditions are met:	20 sec. or more
AF+ terminal voltage	0.5 to 4.5 V
AF- terminal voltage	0.5 to 4.5 V
Difference between AF+ terminal and AF- terminal voltage	0.1 to 0.8 V
ECT	20°C (68°F) or more
Engine	Running
Time after engine start	20 sec. or more
Fuel-cut	OFF
A/F sensor heater duty cycle	0% or more
Time after A/F sensor heating	20 sec. or more
Battery voltage	10.5 V or more
Ignition switch	ON

Others:

Battery voltage	10.5 V or more
Ignition switch	ON

TYPICAL MALFUNCTION THRESHOLDS

P2238, P2241 (A/F sensor open circuit between A+ and A-):

A/F sensor admittance	Bellow 0.022 1/ohm
-----------------------	--------------------

P2238, P2241 (A/F sensor short circuit between A+ and GND):

A/F+ terminal voltage	0.5 V or less
-----------------------	---------------

P2238, P2241 (A/F sensor short circuit between A+ and A-):

Difference between A/F+ terminal and AF- terminal voltage	0.1 V or less
---	---------------

P2239, P2242 (A/F sensor short circuit between A+ and +B):

A/F+ terminal voltage	More than 4.5 V
-----------------------	-----------------

P2252, P2255 (A/F sensor short circuit between A- and GND):

A/F- terminal voltage	0.5 V or less
-----------------------	---------------

P2253, P2256 (A/F sensor short circuit between A- and +B):

A/F- terminal voltage	More than 4.5 V
-----------------------	-----------------

WIRING DIAGRAM

Refer to DTC P2195 on page [05-347](#).

INSPECTION PROCEDURE

HINT:

Hand-held tester only:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using a hand-held tester.

- (1) Connect a hand-held tester to the DLC3.
- (2) Start the engine and turn the tester ON.
- (3) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
- (4) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
- (5) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
- (6) Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 (AFS B2S1) and OS2 B1S2 (O2S B2S2)) displayed on the tester.

HINT:

- The A/F CONTROL operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

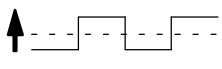
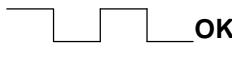
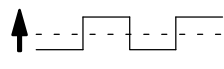

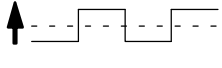

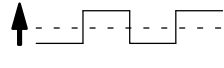
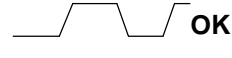
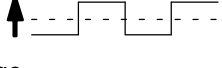

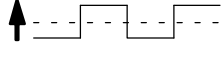
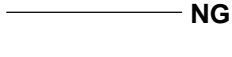
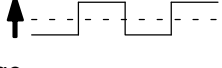

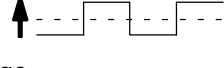

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
AFS B1S1 (AFS B2S1) (A/F)	+25 %	Rich	Less than 3.0
AFS B1S1 (AFS B2S1) (A/F)	-12.5 %	Lean	More than 3.35
O2S B1S2 (O2S B2S2) (HO2)	+25 %	Rich	More than 0.55
O2S B1S2 (O2S B2S2) (HO2)	-12.5 %	Lean	Less than 0.4

NOTICE:

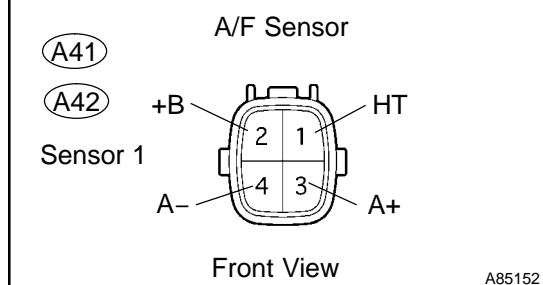
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

Case	A/F Sensor (Sensor 1) Output Voltage	HO2 Sensor (Sensor 2) Output Voltage	Main Suspected Trouble Areas
1	Injection volume +25 % ↑  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0 V	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	—
2	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	<ul style="list-style-type: none"> • A/F sensor • A/F sensor heater • A/F sensor circuit
3	Injection volume +25 % ↑  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0V	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • HO2 sensor • HO2 sensor heater • HO2 sensor circuit
4	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)

HINT:

Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 INSPECT AIR FUEL RATIO SENSOR(HEATER RESISTANCE)**Component Side:**

- (a) Disconnect the A41 or A42 air-fuel ratio (A/F) sensor connector.
- (b) Measure resistance between the terminals of the A/F sensor connector.

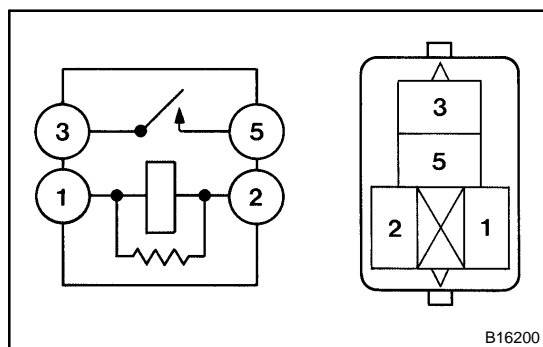
Standard:

Tester Connection	Specified Condition
HT (1) - +B (2)	Between 1.8 Ω and 3.4 Ω at 20°C (68°F)
HT (1) - A- (4)	10 k Ω or higher

- (c) Reconnect the A/F sensor connector.

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

2 INSPECT AIR FUEL RATIO SENSOR HEATER RELAY

- (a) Remove the A/F relay from the engine room J/B.
- (b) Inspect the A/F relay.

Standard:

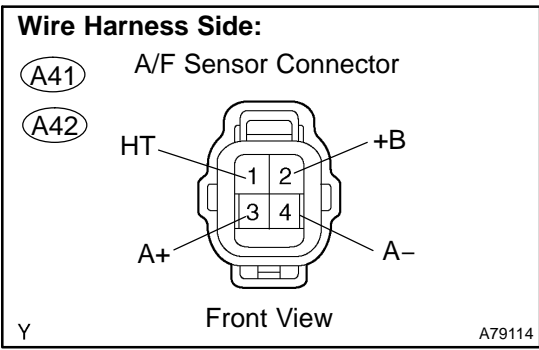
Terminal No.	Condition	Specified Condition
1 - 2	Constant	Continuity
3 - 5	Usually	No Continuity
	Apply B+ between terminals 1 and 2	Continuity

- (c) Reconnect the A/F sensor heater connector.

NG → **REPLACE AIR FUEL RATIO SENSOR HEATER RELAY**

OK

3 CHECK HARNESS AND CONNECTOR(A/F SENSOR - ECM)



- (a) Disconnect the A41 or A42 A/F sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the +B terminal of the A/F sensor connector and body ground.

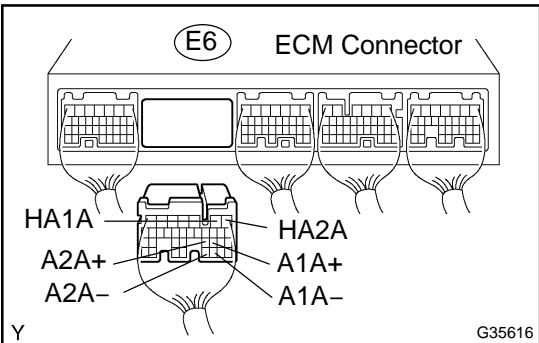
Standard:

Tester Connections	Specified Conditions
+B (2) - Body ground	Between 9 V and 14 V

- (d) Turn the ignition switch to OFF.
- (e) Disconnect the E6 ECM connector.
- (f) Check the resistance.

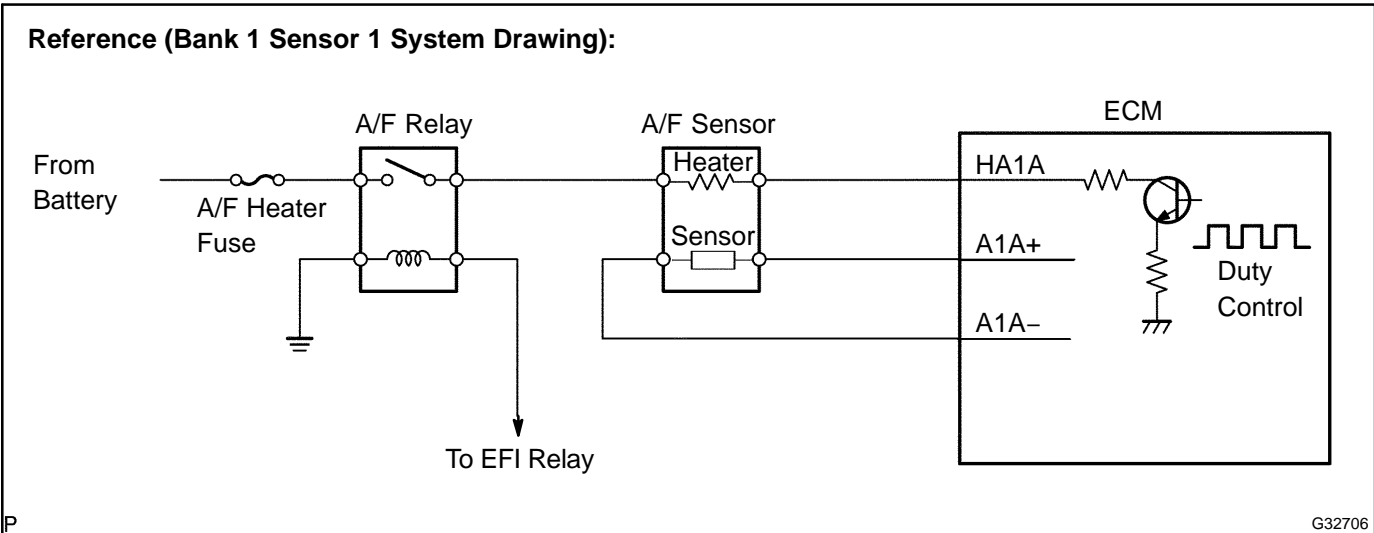
Standard (Check for open):

Tester Connections	Specified Conditions
HT (A41-1) - HA1A (E6-2) HT (A42-1) - HA2A (E6-1)	Below 1 Ω
A+ (A41-3) - A1A+ (E6-22) A+ (A42-3) - A2A+ (E6-23)	Below 1 Ω
A- (A41-4) - A1A- (E6-30) A- (A42-4) - A2A- (E6-31)	Below 1 Ω



Standard (Check for short):

Tester Connections	Specified Conditions
HT (A41-1) or HA1A (E6-2) - Body ground HT (A42-1) or HA2A (E6-1) - Body ground	10 kΩ or higher
A+ (A41-3) or A1A+ (E6-22) - Body ground A+ (A42-3) or A2A+ (E6-23) - Body ground	10 kΩ or higher
A- (A41-4) or A1A- (E6-30) - Body ground A- (A42-4) or A2A- (E6-31) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

DTC	P2401	EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW
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DTC	P2402	EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH
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DTC SUMMARY

DTCs	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P2401	Vacuum pump stuck OFF	Vacuum pump creates negative pressure through 0.02 inch orifice, and EVAP system pressure measured to determine leak pressure standard. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If system pressure higher than -1.06 kPa (-7.93 mmHg)*, or lower than -4.85 kPa (-36.38 mmHg)*, ECM determines that vacuum pump stuck OFF.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	While ignition switch OFF	2 trip
P2402	Vacuum pump stuck ON	Vacuum pump creates negative pressure through 0.02 inch orifice, and EVAP system pressure measured to determine leak pressure standard. If system pressure higher than -1.06 kPa (-7.93 mmHg)*, or lower than -4.85 kPa (-36.38 mmHg)*, ECM determines that vacuum pump stuck ON.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	While ignition switch OFF	2 trip

*: The threshold values vary according to the atmospheric pressure measured in operation A. The values described in the table above are based on an atmospheric pressure of 100 kPa (750.1 mmHg).

HINT:

The vacuum pump is built into the pump module.

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page [05-408](#)).

MONITOR DESCRIPTION

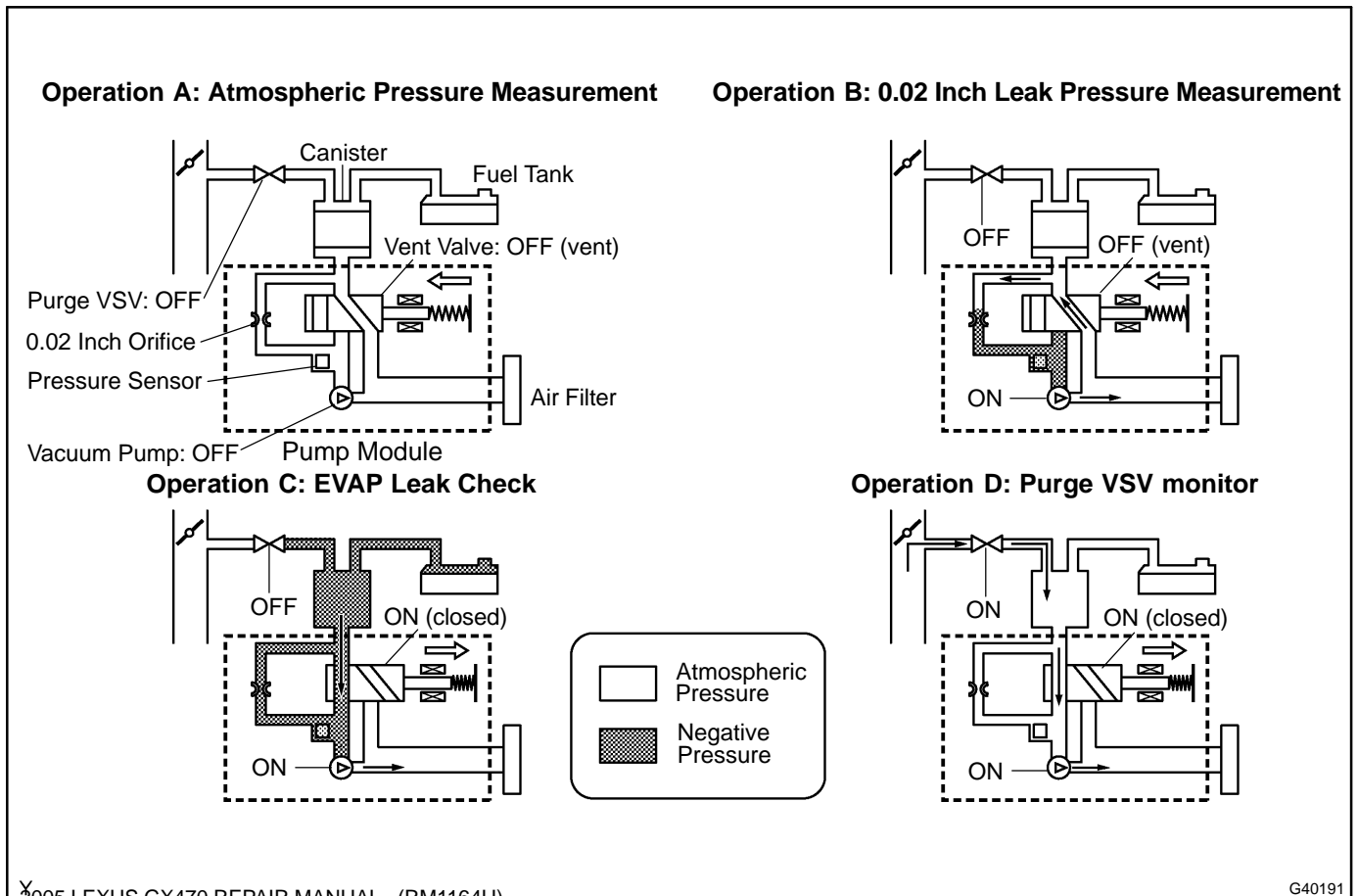
5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

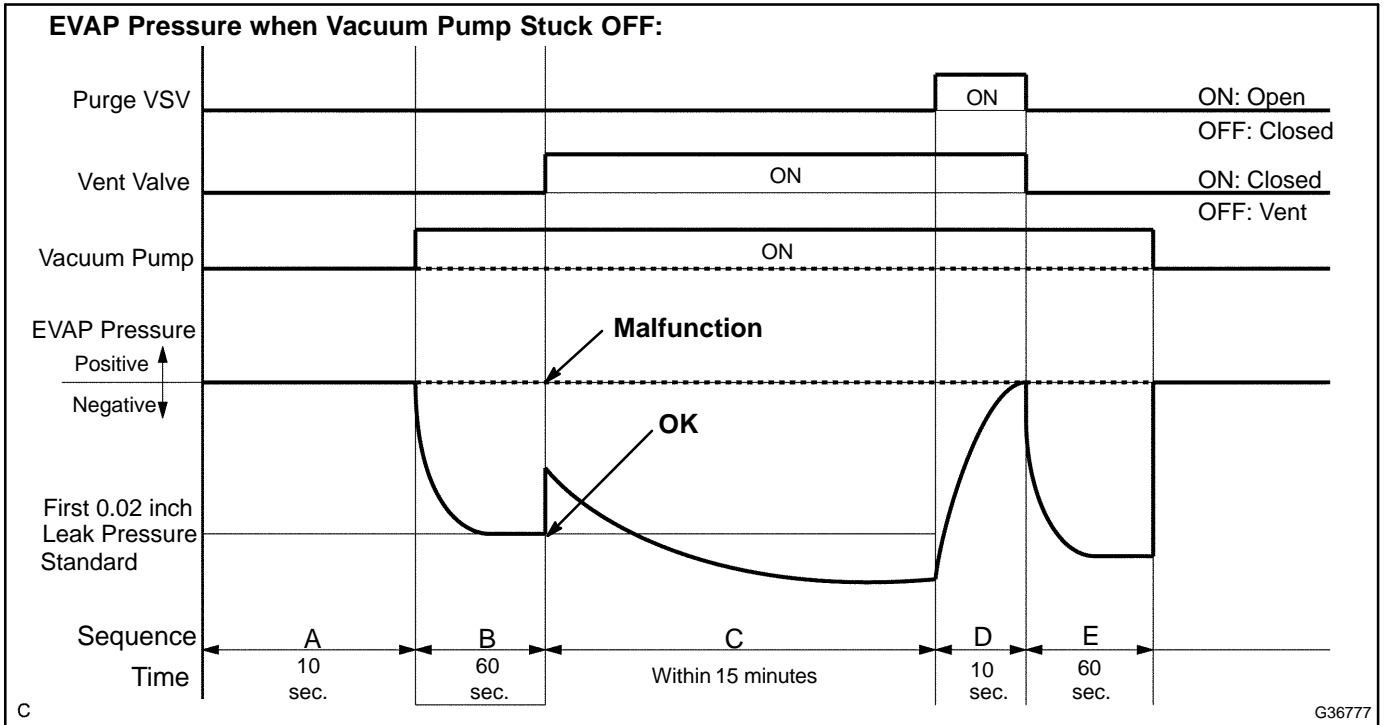
* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



(a) P2401: Vacuum pump stuck OFF

In operation B, the vacuum pump creates negative pressure (a vacuum) through the 0.02 inch orifice. The EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to determine the 0.02 inch leak pressure standard. If the pressure is higher than -1.06 kPa (-7.95 mmHg)*, or lower than -4.85 kPa (-36.38 mmHg)*, the ECM interprets this as the vacuum pump being stuck OFF (not operating). The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

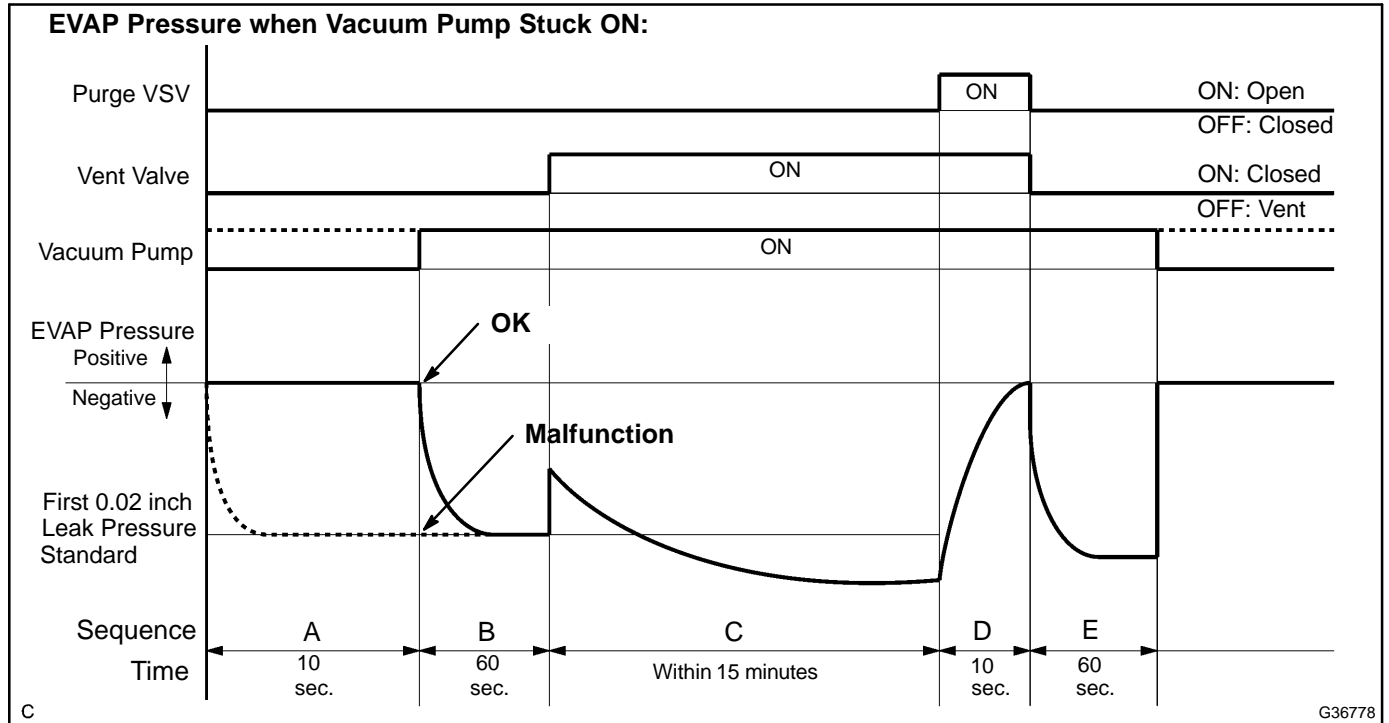
*: The thresholds vary according to the atmospheric pressure measured in operation A. The values described above are based on an atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.



(b) P2402: Vacuum pump stuck ON

In operation B, the vacuum pump creates negative pressure (a vacuum) through the 0.02 inch orifice. The EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to determine the 0.02 inch leak pressure standard. If the pressure is higher than -1.06 kPa (-7.95 mmHg)*, or lower than -4.85 kPa (-36.38 mmHg)*, the ECM interprets this as the vacuum pump being stuck ON (remaining ON all the time). The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

*: The thresholds vary according to the atmospheric pressure measured in operation A. The values described above are based on an atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.



HINT:

The detection logic of DTCs P2401 and P2402 is the same because in both cases the 0.02 inch leak pressure standard measured in operation B is compared to the atmospheric pressure registered in operation A. The ECM calculates the difference between these pressures by deducting [the 0.02 inch leak pressure standard] from [the stored atmospheric pressure], and uses this to monitor the EVAP system pressure change.

MONITOR STRATEGY

Related DTCs	P2401: Vacuum pump stuck OFF P2402: Vacuum pump stuck ON
Required sensors/Components	Pump module
Frequency of operation	Once per driving cycle
Duration	Within 2 min.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Following values are when atmospheric is 760 mmHg (100 kPa)	-
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Less than 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Key-off monitor sequence (1 to 8)

1. Atmospheric pressure

Next sequence is run if following condition is set	-
Atmospheric pressure change for 10 sec.	Less than 2.25 mmHg (0.286 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions are set	Conditions 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.286 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions are set	Conditions 1 and 2
1. Vacuum introduction time	15 min. or less
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.286 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions are set	Conditions 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition is set	-
FTP when vacuum introduction was complete	Second reference pressure

8. Atmospheric pressure

Monitor is complete if following condition is set	-
Atmospheric pressure difference between sequence 1 and 8	Less than 2.25 mmHg (0.286 kPa)

TYPICAL MALFUNCTION THRESHOLDS

Following values are when atmospheric pressure is 760 mmHg (100 kPa)	-
One of the following conditions set	Conditions 1, 2, 3, 4 or 5
1. FTP when 4 sec. after reference pressure measurement began	-7.5 mmHg (-1 kPa) or more
2. Reference pressure	-36.38 mmHg (-4.85 kPa) or less
3. Reference pressure	-7.93 mmHg (-1.057 kPa) or more
4. Reference pressure	Not saturated
5. Reference pressure difference between first and second	More than 5.25 mmHg (0.7 kPa)

MONITOR RESULT (MODE 06 DATA)

Refer to page [05-28](#) for detailed information on Monitor Result.

INSPECTION PROCEDURE

Refer to the EVAP Inspection Procedure (see page [05-408](#)).

DTC	P2419	EVAPORATE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW
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DTC	P2420	EVAPORATE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH
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DTC SUMMARY

DTCs	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P2419	Vent valve stuck closed	Vacuum pump creates negative pressure through 0.02 inch orifice and EVAP system pressure measured to determine leak pressure standard. If system pressure higher than -1.06 kPa (-7.95 mmHg)* 4 seconds after vacuum pump turned ON, ECM determines that vent valve stuck closed.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	While ignition switch OFF	2 trip
P2420	Vent valve stuck open (vent)	Vacuum pump creates negative pressure through 0.02 inch orifice and EVAP system pressure measured to determine leak pressure standard. 0.02 inch leak pressure standard is measured at the start and at the end of the leak check. If system pressure does not increase by more than 0.3 kPa (2.25 mmHg) within 10 seconds when vent valve turned ON, ECM determines that vent valve stuck closed.	<ul style="list-style-type: none"> • Pump module • Connector/Wire harness (Pump module - ECM) • ECM 	While ignition switch OFF	2 trip

*: The threshold value varies according to the atmospheric pressure measured in operation A. The value described above is based on an atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.

HINT:

The vent valve is built into the pump module.

CIRCUIT DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) Inspection Procedure (see page [05-408](#)).

MONITOR DESCRIPTION

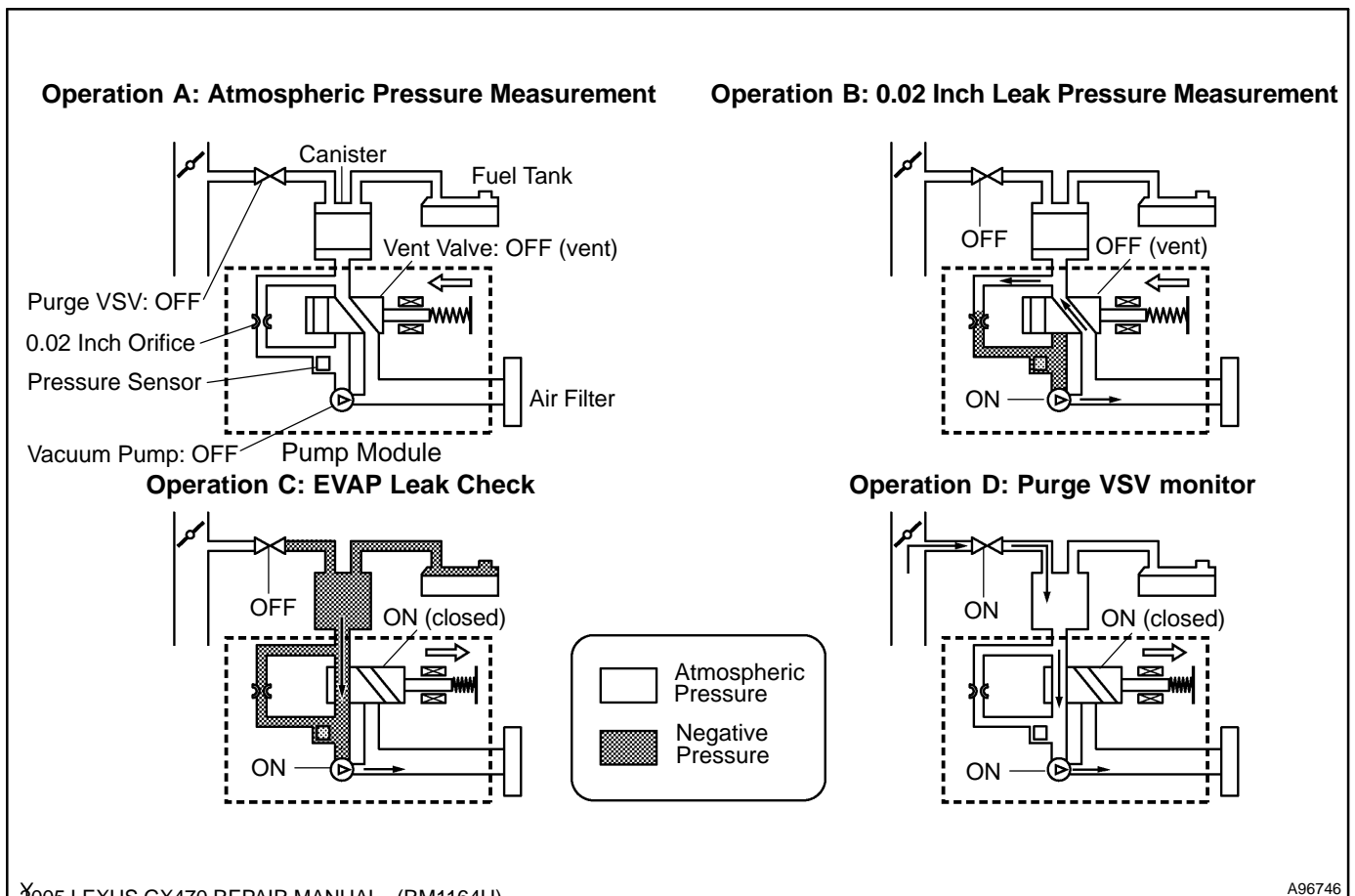
5 hours* after the ignition switch is turned OFF, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch turned to OFF.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If EVAP pressure is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down the measured value as it will be used in the leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	Leak check is performed after second 0.02 inch leak pressure standard is measured. If stabilized system pressure higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system leaking.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

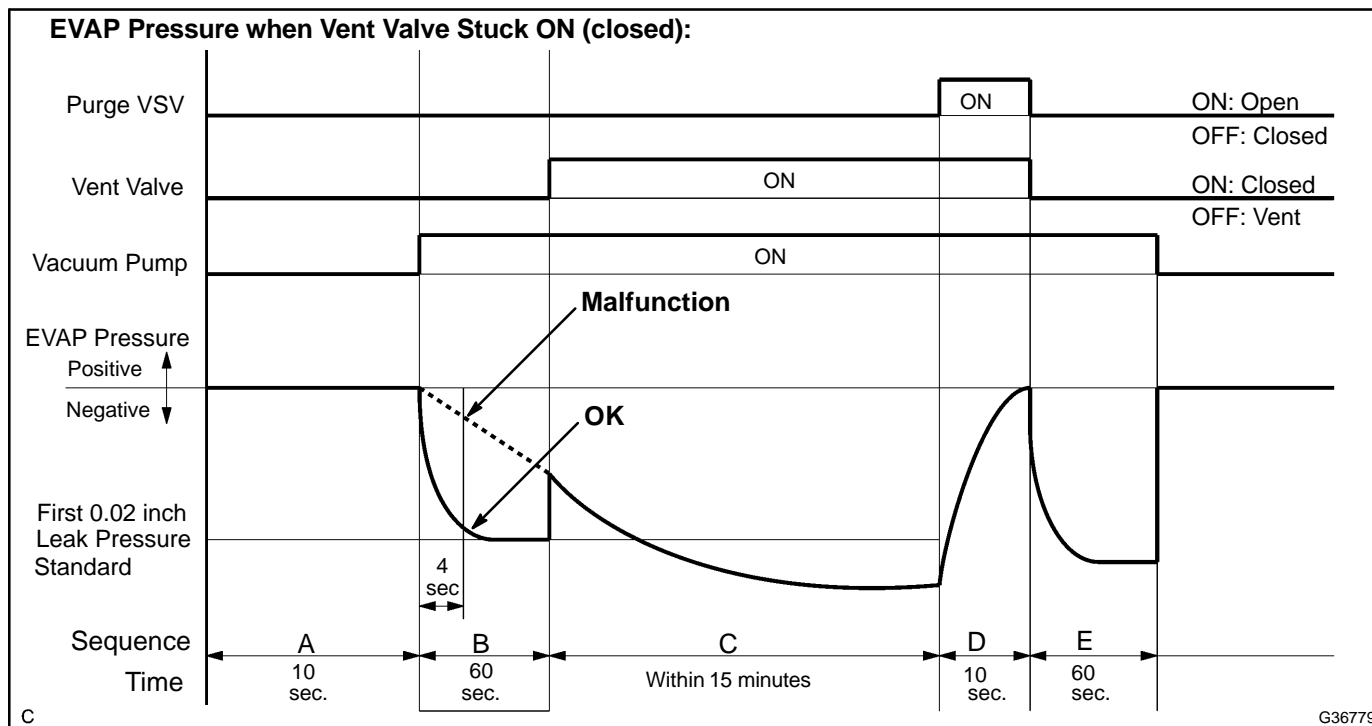
* If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



(a) P2419: Vent valve stuck closed

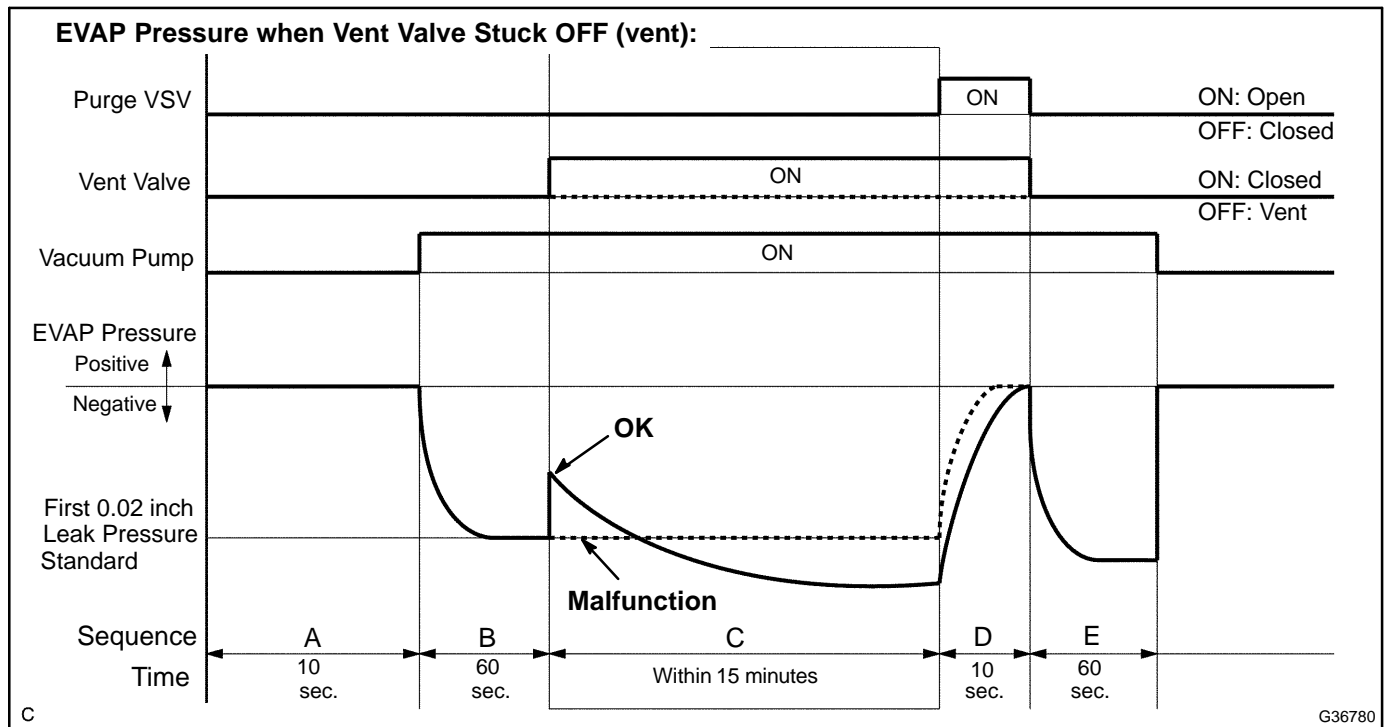
In operation B, the vacuum pump creates negative pressure (a vacuum) through the 0.02 inch orifice. The EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to determine the 0.02 inch leak pressure standard. If the pressure exceeds -1.06 kPa (-7.95 mmHg)* 4 seconds after the vacuum pump is turned ON, the ECM interprets this as the vent valve being stuck closed. The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

*: The threshold varies according to the atmospheric pressure measured in operation A. The value described above is based on an atmospheric pressure of 100 kPa (750.1 mmHg): absolute pressure.



(b) P2420: Vent valve stuck open (vent)

In operation C, the vent valve turns ON (closes) and the EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to conduct an EVAP leak check. If the pressure does not increase when the vent valve is open, the ECM interprets this as the vent valve being stuck open. The ECM illuminates the MIL and sets the DTC.



MONITOR STRATEGY

Related DTCs	P2419: Vent valve stuck open P2420: Vent valve stuck closed
Required sensors/Components	Vent valve
Frequency of operation	Once per driving cycle
Duration	P2419: 8 sec. P2420: 10 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-20
---	----------------

Purge VSV stuck open and closed:

Following values are when atmospheric is 760 mmHg (100 kPa)	-
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	525 to 825 mmHg (70 to 110 kPa)
Battery voltage	10.5 V or more
Vehicle speed	Less than 4 km/h (2.5 mph)
Ignition switch	OFF
Engine condition	Not running
Time after engine stopped	5 hours
FTP sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool

Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met before IG switch OFF	Conditions 1 and 2
1. Duration that vehicle is driven	5 min. or more
2. Purge flow	Executed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)
Example of re-start time	-
First time	7 hours
Second time	9 hours and 30 min.

Key-off monitor sequence (1 to 8)

1. Atmospheric pressure

Next sequence is run if following condition is set	-
Atmospheric pressure change for 10 sec.	Less than 2.25 mmHg (0.286 kPa) for 1 sec.

2. First reference pressure

Next sequence is run if all of following conditions are set	Conditions 1, 2 and 3
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated

3. Vent valve stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after vent valve ON (closed)	2.25 mmHg (0.286 kPa) or more

4. Vacuum introduction and leak

Next sequence is run if both of following conditions are set	Conditions 1 and 2
1. Vacuum introduction time	15 min. or less
2. FTP	FTP was saturated

5. Purge VSV stuck closed check

Next sequence is run if following condition is set	-
FTP change for 10 sec. after purge VSV ON (open)	2.25 mmHg (0.286 kPa) or more

6. Second reference pressure measurement

Next sequence is run if all of following conditions are set	Conditions 1, 2, 3 and 4
1. FTP when 4 sec. after reference pressure measurement	-7.5 mmHg (-1 kPa) or less
2. Reference pressure	-36.38 to -7.93 mmHg (-4.85 to -1.057 kPa)
3. Reference pressure	Saturated
4. Reference pressure difference between first and second	Less than 5.25 mmHg (0.7 kPa)

7. Leak check

Next sequence is run if following condition is set	-
FTP when vacuum introduction was complete	Second reference pressure

8. Atmospheric pressure

Monitor is complete if following condition is set	-
Atmospheric pressure difference between sequence 1 and 8	Less than 2.25 mmHg (0.286 kPa)

TYPICAL MALFUNCTION THRESHOLDS

Vent valve stuck open:

Following values are when atmospheric pressure is 760 mmHg (100 kPa)	-
One of the following conditions are set	Conditions 1, 2, 3, 4 or 5
1. FTP when 4 sec. after reference pressure measurement began	-7.5 mmHg (-1 kPa) or more
2. Reference pressure	-36.38 mmHg (-4.85 kPa) or less
3. Reference pressure	-7.93 mmHg (-1.057 kPa) or more
4. Reference pressure	Not saturated
5. Reference pressure difference between first and second	More than 5.25 mmHg (0.7 kPa)

Vent valve stuck closed:

FTP change for 10 sec. after vent valve opened	Less than 2.25 mmHg (0.286 kPa)
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MONITOR RESULT (MODE 06 DATA)

Refer to page [05-28](#) for detailed information on Monitor Result.

INSPECTION PROCEDURE

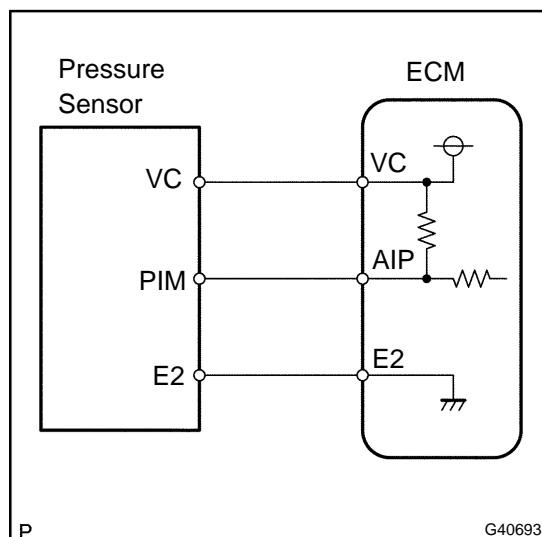
Refer to the EVAP Inspection Procedure (see page [05-408](#)).

DTC	P2430	SECONDARY AIR INJECTION SYSTEM AIR FLOW/PRESSURE SENSOR CIRCUIT BANK1
DTC	P2431	SECONDARY AIR INJECTION SYSTEM AIR FLOW/PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE BANK1
DTC	P2432	SECONDARY AIR INJECTION SYSTEM AIR FLOW/PRESSURE SENSOR CIRCUIT LOW BANK1
DTC	P2433	SECONDARY AIR INJECTION SYSTEM AIR FLOW/PRESSURE SENSOR CIRCUIT HIGH BANK1

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
P2430	While the engine is running, if voltage output of the pressure sensor indicates 0.1V or less, or indicates 4.8V or more. (1 trip detection logic)	<ul style="list-style-type: none"> • Pressure sensor • Open or short in pressure sensor circuit • ECM
P2431	The pressure sensor indicates less than 45 kPa (338 mHg), or more than 135 kPa (1013 mHg). (1 trip detection logic)	
P2432	While the engine is running, if voltage output of pressure sensor remains below 0.1 V. (1 trip detection logic)	
P2433	While the engine is running, if voltage output of the pressure sensor remains above 4.8 V. (1 trip detection logic)	

MONITOR DESCRIPTION



The ECM observes the pressure in the secondary air passage using the pressure sensor located on the air switching valve in the secondary air injection system.

If there is a defect in the sensor or the sensor circuit, the voltage level will deviate from the normal operating range, the ECM interprets this deviation as a defect in the pressure sensor circuit and sets a DTC.

MONITOR STRATEGY

Related DTCs	P2430: Air flow/pressure sensor circuit range check (Fluctuating) P2431: Air flow/pressure sensor circuit rationality P2432: Air flow/Pressure sensor circuit range check (Low voltage) P24313 Air flow/pressure sensor circuit range check (High voltage)
Required sensors/Components	Pressure sensor
Frequency of operation	Continuous
Duration	P2430, P2432, P2433: 0.5 sec. P2431: 5 sec.
MIL operation	P2430, P2432, P2433: Immediate P2431: 2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Starter	OFF
Time after starter turned from ON to OFF	2 sec. or more
Battery voltage	8 V or more
Ignition switch	ON

TYPICAL MALFUNCTION THRESHOLDS

P2430:

Air pressure sensor voltage	Less than 0.1 V, or more than 4.8 V
-----------------------------	-------------------------------------

P2431:

Air pressure	Less than 338 mmHg (45 kPa), or more than 1013 mmHg (135 kPa)
--------------	---

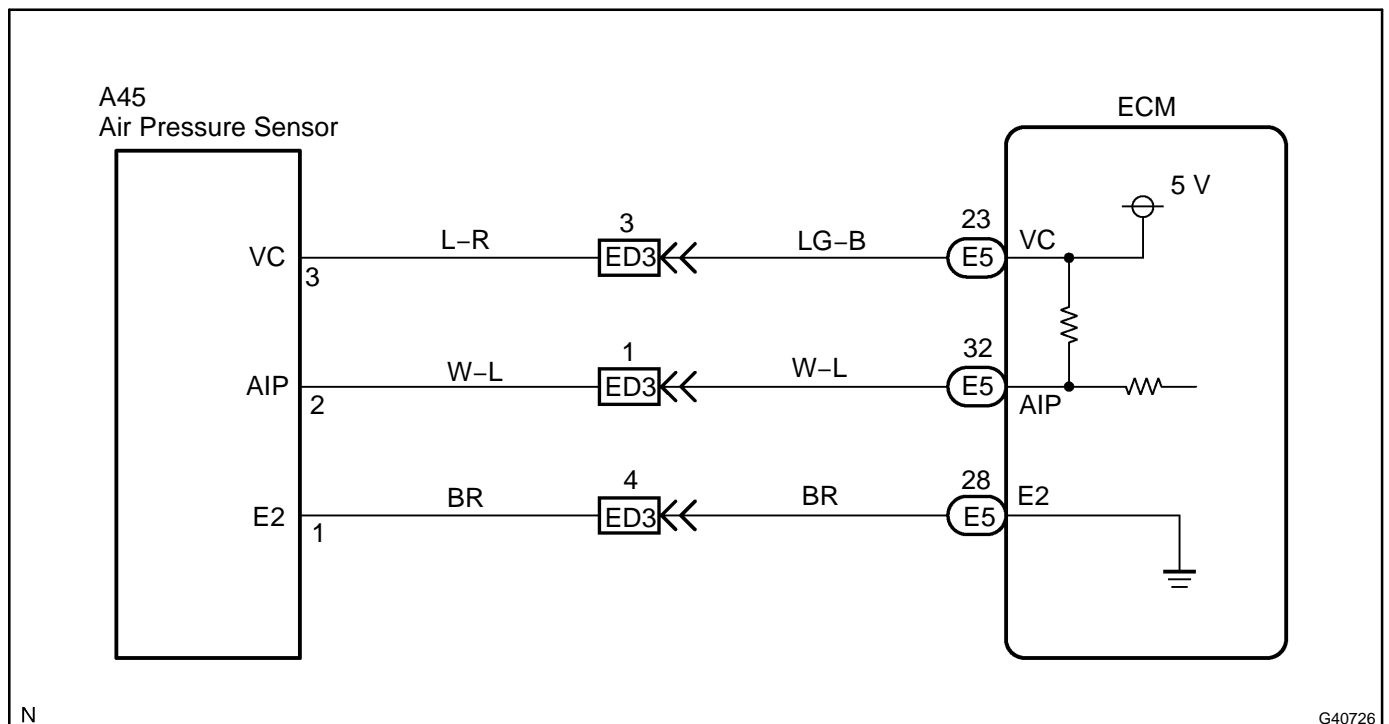
P2432:

Air pressure sensor voltage	Less than 0.1 V
-----------------------------	-----------------

P2433:

Air pressure sensor voltage	More than 4.8 V
-----------------------------	-----------------

WIRING DIAGRAM

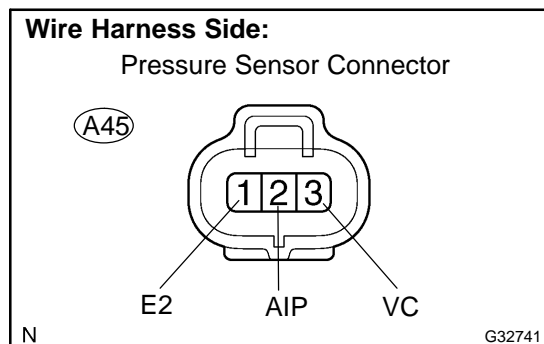


N

G40726

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(PRESSURE SENSOR - ECM)



- Remove the intake manifold.
- Disconnect the A45 pressure sensor connector.
- Disconnect the E5 ECM connector.
- Measure the resistance between the wire harness side connectors.

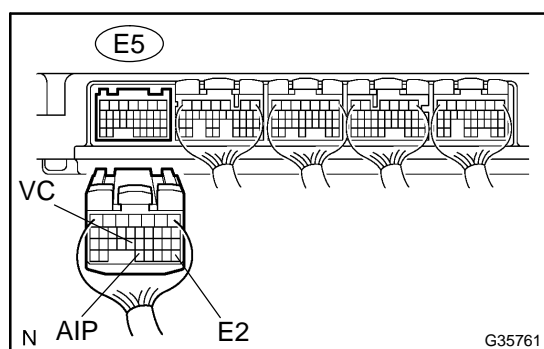
Standard:

Tester Connection	Specified Condition
VC (A45-3) - VC (E5-23) AIP (A45-2) - AIP (E5-32) E2 (A45-1) - E2 (E5-28)	Below 1 Ω
VC (A45-3) or VC (E5-23) - Body ground AIP (A45-2) or AIP (E5-32) - Body ground	10 k Ω or higher

- Reconnect the pressure sensor connector.
- Reconnect the ECM connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR



OK

2 INSPECT PRESSURE SENSOR

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON (Do not start engine).
- Select the following items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / 2ND AIR PRESS.
- Check that the pressure displayed on the hand-held tester.

Standard:

45 kPa to 135 kPa

NG

REPLACE PRESSURE SENSOR

OK

REPLACE ECM (See page 10-16)

DTC	P2444	SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON BANK1
------------	--------------	---

DTC	P2445	SECONDARY AIR INJECTION SYSTEM PUMP STUCK OFF BANK1
------------	--------------	--

CIRCUIT DESCRIPTION

Refer to DTC P0412 on page [05-217](#).

DTC No.	DTC Detection Condition	Trouble Area
P2444	<p>Air pump stuck ON.</p> <p>The secondary air pressure is more than 5 kPa (38 mmHg) despite the ECM ordering the air pump to turn off. (2 trip detection logic)</p>	<ul style="list-style-type: none"> • Short in air pump circuit • Air injection driver • Pressure sensor • Open or short in pressure sensor circuit • ECM
P2445	<p>Air pump stuck OFF or air injection volume is insufficient.</p> <p>The amount of air flow is below the criteria. (The secondary air pressure is less than specified value despite the ECM ordering the air pump turn ON.) (2 trip detection logic)</p>	<ul style="list-style-type: none"> • Air pump fuse • Vacuum hose • Air pump assembly • Air injection driver • Open in air pump circuit • Air injection system piping • Pressure sensor • Open or short in pressure sensor circuit • ECM

MONITOR DESCRIPTION

P2444:

The ECM observes the pressure in the secondary air passage using the pressure sensor located on the air switching valve in the secondary air injection system. The sensor measures the pressure in the secondary air passage and sends a signal to the ECM.

If the pressure level from the sensor exceed a certain level despite the ECM turning off the air pump, the ECM interprets this as a fault in the secondary air injection system and sets a DTC.

P2445:

The ECM calculates the amount of air flow within the secondary air system based on the output values of the pressure sensor and Mas air flow meter.

The ECM determines whether the amount of air flow is normal or not according to the calculated value. When the amount of air flow is below the criteria the ECM stores the DTC and illuminates the MIL.

MONITOR STRATEGY

Related DTCs	P2444: Air pump is stuck ON P2445: Air pump is stuck OFF P2445: Air flow volume is insufficient P2445: Air pressure sensor is stuck
Required sensors/Components	AIR pump, AIR pressure sensor
Frequency of operation	Continuous
Duration	P2444 (Air pump is stuck ON): 20 sec. P2445 (Air pump is stuck OFF): 8 sec. P2445 (Air flow volume is insufficient): 8 sec. P2445 (Air pressure sensor is stuck): 1.5 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

P2444: Air pump is stuck ON

The monitor will run whenever this DTC is not present	See page 05-20
Atmospheric pressure	570 mmHg (76 kPa)
Battery voltage	11.5 V or more
Time after secondary air injection out of operation	10 sec. or more
AIR pump	OFF
Air switching valve No. 2 (Bank 1)	OFF
Air switching valve No. 2 (Bank 2)	OFF
Engine RPM	Less than 3,750 rpm
Air injection pressure sensor fail	Not detected

P2445: Air pump is stuck OFF or air insufficient

The monitor will run whenever this DTC is not present	See page 05-20
Atmospheric pressure	570 mmHg (76 kPa)
Battery voltage	11.5 V or more
Time after secondary air injection out of operation	6 sec. or more
AIR pump	ON
Air switching valve	ON
Air switching valve No. 2 (Bank 1)	ON
Air switching valve No. 2 (Bank 2)	ON
Engine RPM	Less than 3,750 rpm
Delay time after engine started	6 sec. or more
Air injection pressure sensor fail	Not detected

P2445: Air pressure sensor is stuck

The monitor will run whenever this DTC is not present	See page 05-20
ECT at engine start	Less than 5°C (41°F)
IAT at engine start	-15°C (5°F) or more
Time that ECT is 80°C (176°F) or higher	10 to 60 min.
Cumulative intake air amount	172 g or more
One of the following conditions is met	Condition is 1, 2 or 3
1. Vehicle speed	80 km/h (49.7 mile) or more
2. Engine RPM	0 rpm or more
3. Throttle position	0 deg or more
Air switching valve	OFF
Air switching valve No. 2 (Bank 1)	OFF
Air switching valve No. 2 (Bank 2)	OFF
Air injection pressure sensor fail	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P2444: Air pump is stuck ON

Smoothed pressure	5 kPa (113 mmHg) or more (when AI OFF (Air pump OFF, all of air switching valves are OFF))
-------------------	---

P2445: Air pump is stuck OFF or air insufficient

Either of the following conditions is met	Condition 1 or 2
1. Air flow value	100 L/min. or less
2. Smoothed pressure	Less than 1 kPa (7.5 mmHg) (when AI ON (Air pump ON, all of air switching valves are ON))

P2445: Air pressure sensor is stuck

Detected times of identifying condition 1 is met	4 times or more
Air pressure change	5 kPa (113 mmHg) or more

MONITOR RESULT

Refer to page [05-28](#) for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

Secondary air injection (AIR) system

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$71	\$E1	Multiply by 0.01 (g/s)	Test value of AIR amount insufficient	Minimum test limit	Maximum test limit
\$71	\$E2	Multiply by 0.01 (kPa)	Test value of AIR pump stuck ON	Minimum test limit	Maximum test limit
\$71	\$E3	Multiply by 0.01 (kPa)	Test value of AIR pump stuck OFF	Minimum test limit	Maximum test limit
\$71	\$E4	Multiply by 0.01 (kPa)	Test value of AIR control valve ON	Minimum test limit	Maximum test limit
\$71	\$E5	Multiply by 0.01 (kPa)	Test value of AIR control valve OFF	Minimum test limit	Maximum test limit
\$71	\$E6	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR valve	Minimum test limit	Maximum test limit
\$71	\$E7	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 1	Minimum test limit	Maximum test limit
\$71	\$E8	Multiply by 0.01 (kPa)	Test value of AIR pressure change for AIR VSV bank 2	Minimum test limit	Maximum test limit
\$71	\$E9	Multiply by 0.01 (kPa)	Test value of AIR pressure pulsation for AIR VSV when AIR pressure is low	Minimum test limit	Maximum test limit

WIRING DIAGRAM

Refer to DTC P0412 on page [05-217](#).

INSPECTION PROCEDURE

HINT:

To check the pressure condition in the secondary air passage, the hand-held tester is available.

1 CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO DTC P2444 AND P2445)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Enter the following menu: DIAGNOSIS/ENHANCED OBD II/DTC INFO/CURRENT CODES.
- (d) Read the DTCs.

Result:

Display (DTC output)	Proceed to
P2445	A
P2444	B
P2444 and P2445	B
"P2444 and P2445" and other DTCs	C

HINT:

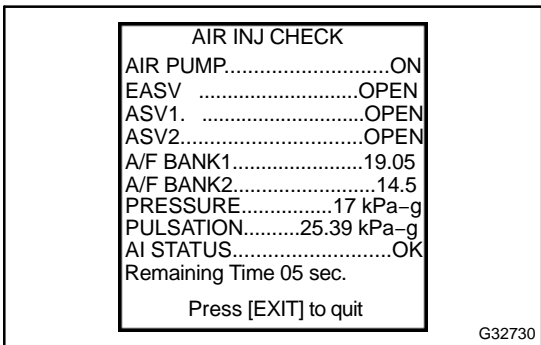
If any other codes besides P2444 or P2445 is output, perform the troubleshooting for those DTCs first.

B Go to step 7

C GO TO DTC CHART (See page [05-60](#))

A

2 CHECK AIR INJECTION SYSTEM PRESSURE



- (a) Start the engine and warm it up.
- (b) Turn the ignition switch to OFF.
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (e) Start the engine.
- (f) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/ AIR INJ CHECK/MANUAL OPERATION/OPERATION 1 and 2

HINT:

OPERATION 1: AP:OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:CLOSE

OPERATION 2: AP:ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN

- (g) Check that the PRESSURE on the hand-held tester.

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.

While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

Standard:

Tester operation	PRESSURE
Operation 1	Less than 2.5 kPa
Operation 2	5 kPa or more

NG Go to step 4

OK

3 CHECK WHETHER DTC OUTPUT RECURS

- (a) Start the engine and warm it up.
- (b) Turn the ignition switch OFF.
- (c) Connect a hand-held tester to the DLC3.
- (d) Turn the ignition switch to ON and turn the tester ON.
- (e) Clear the DTCs (see page 05-44).
- (f) Start the engine.
- (g) Perform ACTIVE TEST to operate the air injection system.
Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/AIR INJ CHECK/AUTOMATIC OPERATION

NOTICE:

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
 - Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.
- (h) After operating the secondary air injection system, confirm the pending codes for the secondary air injection system by selecting the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
 - (i) Read DTC and check DTC.

OK:

DTC P2444 or P2445 for the secondary air injection system is not output.

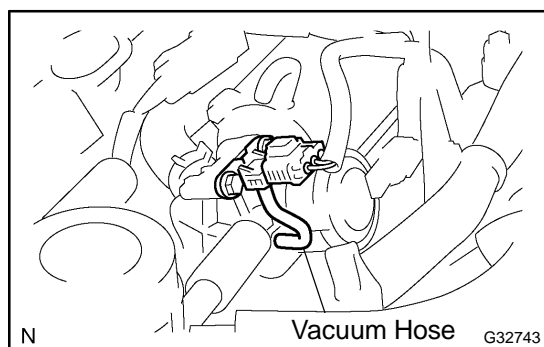
NG

Go to step 4

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)

4 CHECK VACUUM HOSE



- (a) Remove the intake manifold.
- (b) Check the vacuum hose connection between the pressure sensor and air switching valve.

OK:

The vacuum hose is securely connected.

- (c) Inspect the vacuum hose for blockage or damage.

OK:

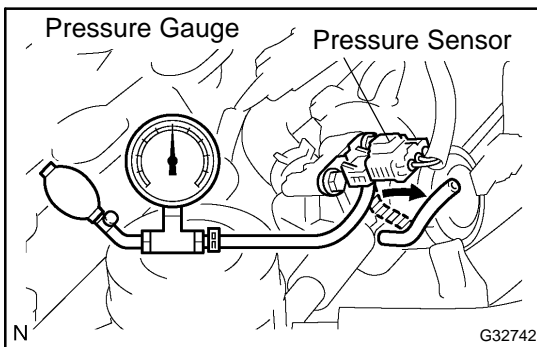
The vacuum hoses no blockages and damages.

NG

REPAIR OR REPLACE VACUUM HOSE

OK

5 READ VALUE OF HAND-HELD TESTER(AIR VOLTAGE)



- Remove the intake manifold.
- Connect the pressure gauge to the pressure sensor as shown in the illustration.
- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON (Do not start engine).
- Select the following items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / AIR PMP PRS (A).

HINT:

The value of AIR PMP PRS (A) in the DATA LIST shows absolute pressure.

- Check that the pressure displayed on the hand-held tester fluctuates when applying the pressure to the pressure sensor with the pressure gauge.

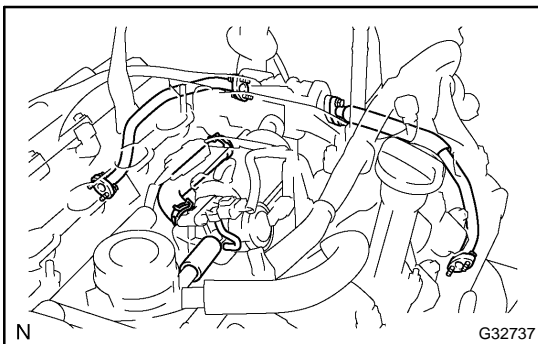
OK:

Pressure fluctuates in response to the pressure applied with pressure gauge.

NG → **REPLACE PRESSURE SENSOR**

OK

6 CHECK PIPING AND HOSES(CONNECTION OF ALL AIR INJECTION SYSTEM)



- Remove the intake manifold.
- Check that all the pipes and hoses between the air pump and air switching valve are securely connected.

OK:

The all air injection pipes and hoses are securely connected.

- Check the pipe and hoses for blockage or damage.

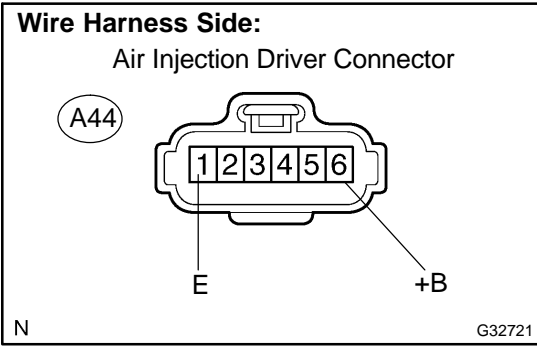
OK:

The air injection system pipes and hoses has no blockages and damages.

NG → **REPAIR OR REPLACE AIR INJECTION SYSTEM PIPING AND HOSES**

OK

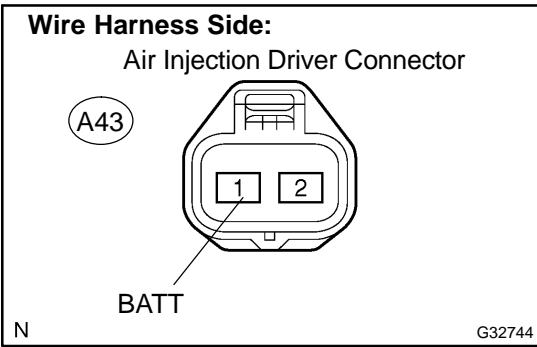
7 INSPECT AIR INJECTION DRIVER(POWER SOURCE CIRCUIT)



- (a) Disconnect the A43 and A44 air injection driver connectors.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between terminals A44-5 (+B) and A43-1 (BATT) of the air injection driver and body ground.

Standard:

Tester Connection	Specified Condition
+B (A44-5) - Body ground	10 V or more
BATT (A43-1) - Body ground	10 V or more



- (d) Measure the resistance between the terminal A44-1 (E) of the air injection driver and body ground.

Standard:

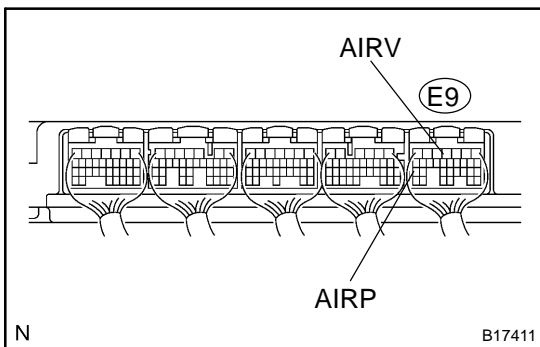
Tester Connection	Specified Condition
E (A44-1) - Body ground	Below 1 Ω

- (e) Reconnect the air injection driver connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8 INSPECT ECM(AIRP AND AIRV VOLTAGE)



- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and turn the tester ON.
- (c) When the air pump and air switching valve are operated using hand-held tester, measure voltage between terminal E9-25 (AIRP) and E9-4 (AIRV) of the air injection driver connector and body ground.
- (d) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/SYSTEM CHECK/AIR INJ CHECK/MANUAL OPERATION/OPERATION 1 and 2

HINT:

OPERATION 1: AP:OFF, EASV:CLOSE, ASV1:CLOSE, ASV2:CLOSE

OPERATION 2: AP:ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.
While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.
- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

Standard:

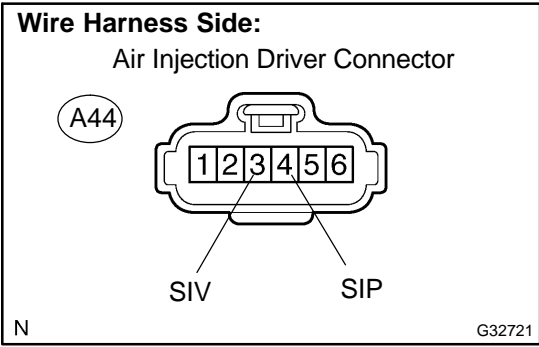
Air pump operation	Tester Connection	Specified Condition
ON	AIRP (E9-25) – Body ground	10 V or more
OFF	AIRP (E9-25) – Body ground	3.5 to 7.7 V*
ASV operation (EASV)	Tester Connection	Specified Condition
OPEN	AIRV (E9-4) – Body ground	10 V or more
CLOSE	AIRV (E9-4) – Body ground	3.5 to 7.7 V*

*: 35 to 55 % of the +B voltage.

NG → **REPLACE ECM (See page 10-16)**

OK

9 INSPECT ECM(SIV AND SIP VOLTAGE)



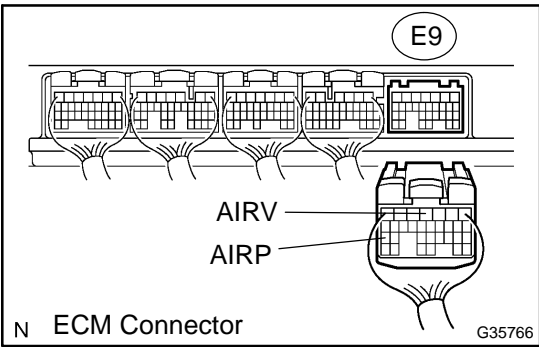
- (a) Disconnect the A44 air injection driver connector.
- (b) Disconnect the E9 ECM connector.
- (c) Measure the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connections	Specified Conditions
AIP (A44-4) - AIRP (E9-25)	Below 1 Ω
SIV (A44-3) - AIRV (E9-4)	Below 1 Ω

Standard (Check for short):

Tester Connections	Specified Conditions
AIP (A44-4) or AIRP (E9-25) - Body ground	10 kΩ or higher
SIV (A44-3) or AIRV (E9-4) - Body ground	10 kΩ or higher

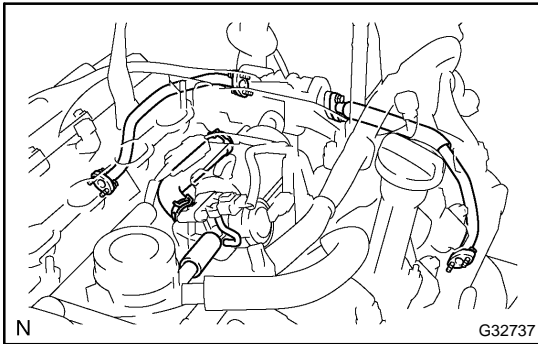


- (d) Reconnect the air injection driver connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

10	INSPECT AIR PUMP(OPERATION)
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- (a) Remove the hose between EASV and ASV.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and turn the tester ON.
- (d) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST/AIR INJ CHECK/MANUAL OPERATION/OPERATION 2
- (e) When the air pump is operated check that air comes out from the air pump.

HINT:

OPERATION 2: AP:ON, EASV:OPEN, ASV1:OPEN, ASV2:OPEN

NOTICE:

- This test only allows technicians to operate the AI system for 5 seconds. Furthermore, the test can be performed 4 times a trip. If the test is repeated, intervals of at least 30 seconds are required between tests.

While the AI system operation using the hand-held tester is prohibited, the tester displays the prohibition (WAIT or ERROR). If the ERROR (AI STATUS NG) is displayed on the tester, stop the engine for 10 minutes and then try again.

- When performing the AIR INJ CHECK operation after the battery cable has been reconnected, wait for 7 minutes with the ignition switch turned to ON or the engine running.
- Turn the ignition switch to OFF when the AIR INJ CHECK operation finishes.

OK:

Air comes out from the air pump

NG

REPLACE AIR PUMP

OK

CHECK WHETHER DTC OUTPUT NOT RECURS
--

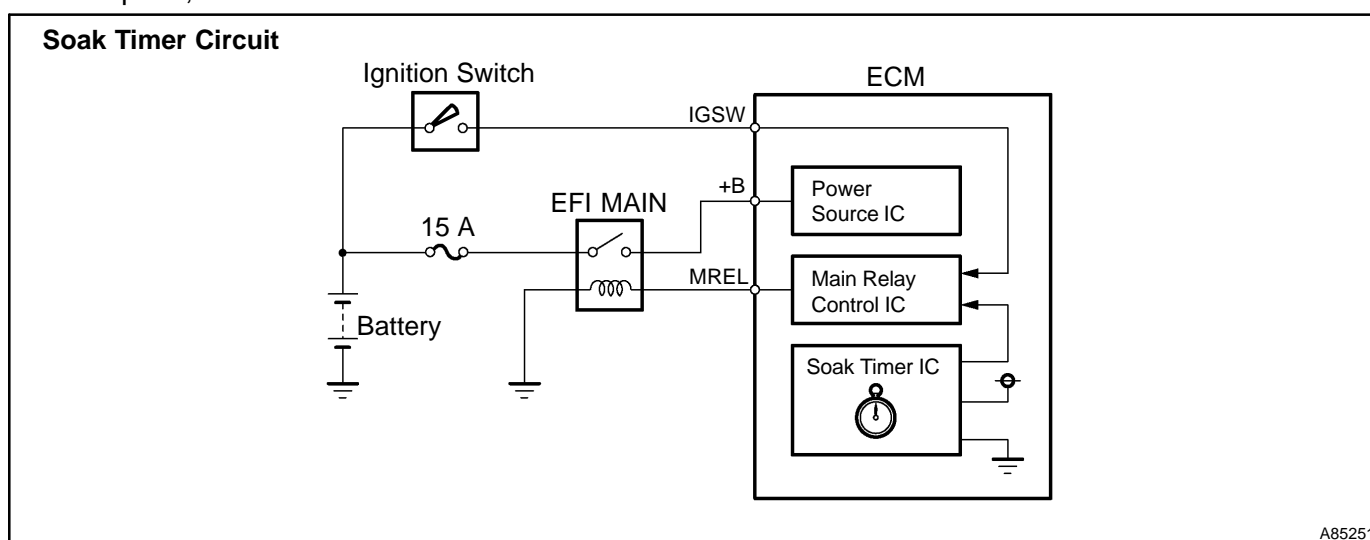
DTC	P2610	ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE
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DTC SUMMARY

DTC	Monitoring Items	Malfunction Detection Conditions	Trouble Areas	Detection Timings	Detection Logic
P2610	Soak timer (built into ECM)	ECM internal malfunction	ECM	Engine running	2 trip

CIRCUIT DESCRIPTION

To ensure the accuracy of the EVAP (Evaporative Emission) monitor values, the soak timer, which is built into the ECM, measures 5 hours (± 15 minutes) from when the ignition switch is turned OFF, before the monitor is run. This allows the fuel to cool down, which stabilizes the Fuel Tank Pressure (FTP). When 5 hours have elapsed, the ECM turns on.



MONITOR DESCRIPTION

5 hours after the ignition switch is turned OFF, the soak timer activates the ECM to begin the EVAP system monitor. While the engine is running, the ECM monitors the synchronization of the soak timer and the CPU clock. If these two are not synchronized, the ECM interprets this as a malfunction, illuminates the MIL and sets the DTC (2 trip detection logic).

MONITOR STRATEGY

Related DTCs	P2610: Soak timer (built into ECM)
Required sensors/Components	ECM
Frequency of operation	Once per driving cycle
Duration	10 min.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

Soak time measurement when ECM CPU clock counts 10 min.	Less than 7 min., or more than 13 min.
---	--

INSPECTION PROCEDURE

HINT:

- DTC P2610 is set if an internal ECM problem is detected. Diagnostic procedures are not required. ECM replacement is required.
- Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1	REPLACE ECM (See page 10-16)
----------	---

NEXT

CHECK WHETHER DTC OUTPUT RECURS

- Connect a hand-held tester to the DLC3.
- Turn the ignition switch to ON.
- Clear DTCs (see page [05-44](#)).
- Start the engine and wait for 10 minutes or more.
- On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- If no pending DTC is displayed, the repair has been successfully completed.

DTC	P2A00	A/F SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1)
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DTC	P2A03	A/F SENSOR CIRCUIT SLOW RESPONSE (BANK 2 SENSOR 1)
------------	--------------	---

CIRCUIT DESCRIPTION

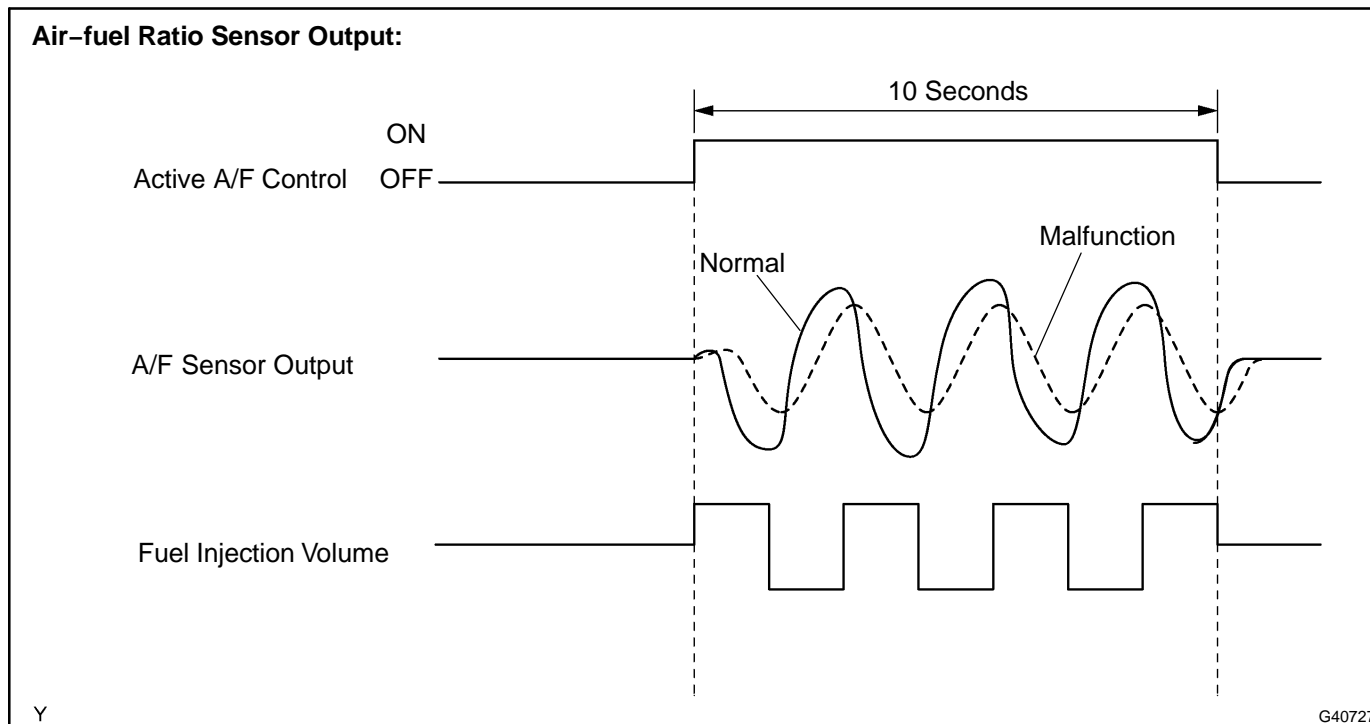
Refer to DTC P2195 on page 05-347.

DTC No.	DTC Detection Conditions	Trouble Areas
P2A00 P2A03	Calculated test value for A/F sensor response rate deterioration level is less than threshold.	<ul style="list-style-type: none"> • Open or short in A/F sensor (Sensor 1) circuit • A/F sensor (Sensor 1) • ECM

MONITOR DESCRIPTION

After engine is warmed up, the ECM performs air-fuel ratio feedback control to regulate the air-fuel ratio at stoichiometric ratio. In addition, this vehicle performs Active A/F Ratio Control for approximately 10 seconds after preconditions met in order to measure the A/F sensor response rate. During active air-fuel ratio control, the ECM forcibly increases and decreases the injection volume for certain amount based on learned stoichiometric air-fuel ratio during usual air-fuel feedback control, and measures the A/F sensor response rate. The ECM calculates the signal from the A/F sensor while value for A/F sensor response rate deterioration level.

If the test value for A/F sensor response rate deterioration level is less than threshold, ECM interprets this as a malfunction, and sets the DTC.



MONITOR STRATEGY

Related DTCs	P2A00: A/F sensor (Bank 1) slow response P2A03: A/F sensor (Bank 2) slow response
Required sensors/Components	A/F sensor
Frequency of operation	Once per driving cycle
Duration	10 to 15 sec.
MIL operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05-20
Battery voltage	11 V or more
ECT	75°C (167°F) or more
Idle	OFF
Engine RPM	Less than 4,000 rpm
A/F sensor status	Activated
Fuel cut	OFF
Engine load	10 to 70%
Estimated catalyst temperature	500 to 800°C (932 to 1,472°F)
Shift position	2nd or more
Catalyst monitor	Not executing
Intake air amount	2.5 to 12 g/sec

TYPICAL MALFUNCTION THRESHOLDS

Response rate deterioration level	Less than 0.2 V
Number of average	5 or more

MONITOR RESULT

Refer to page [05-28](#) for detailed information.

The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

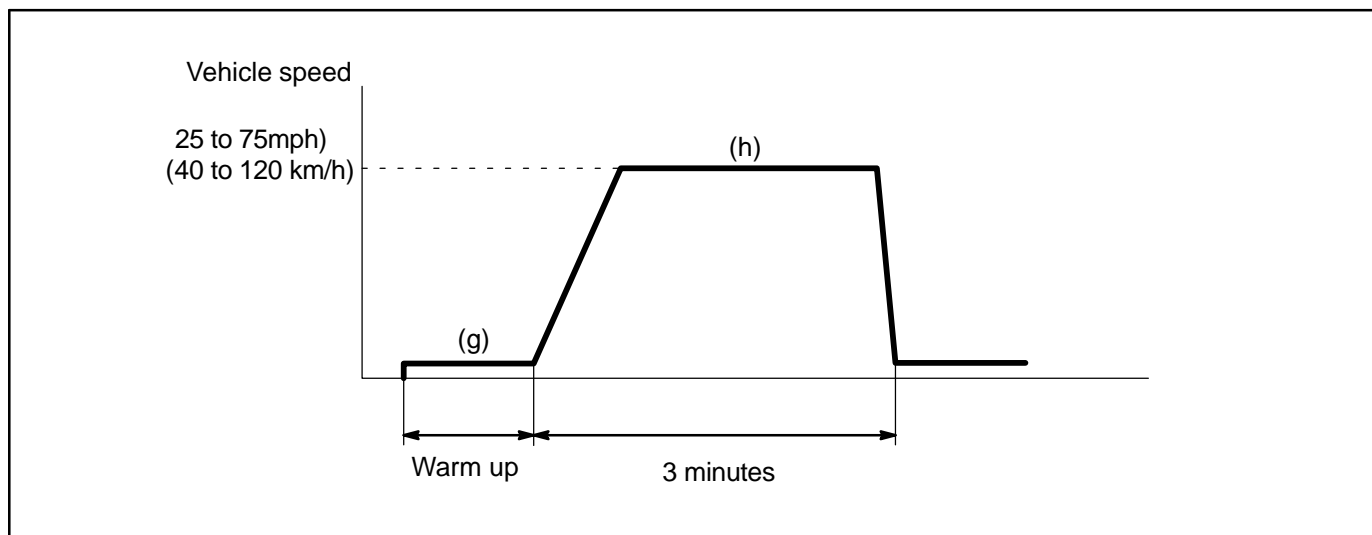
A/F sensor bank 1 sensor 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$01	\$8E	Multiply by 0.0003 (no dimension)	Response rate deterioration level for A/F sensor	Malfunction criterion	FF

A/F sensor bank 2 sensor 1

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$05	\$8E	Multiply by 0.0003 (no dimension)	Response rate deterioration level for A/F sensor	Malfunction criterion	FF

CONFIRMATION DRIVING PATTERN



- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the hand-held tester ON.
- (d) Clear DTCs.
- (e) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/MONITOR INFO/MONITOR RESULT.
- (f) Check that RES RATE B1 S1 is INCOMPL.
- (g) Start the engine and warm it up.
- (h) Drive the vehicle at between 25 mph and 75 mph (40 km/h and 120km/h) for 3 minutes. However, the vehicle should be driven at constant speed.
- (i) When detection is complete, response rate of MONITOR RESULT changes. If the value does not change, perform step (g) once more.
- (j) Note the value of the Monitor Result.
- (k) Select the following menu items: DIAGNOSIS/ENHANCED OBD II/DTC INFO/ PENDING CODES.
- (l) Check if any DTCs (any pending DTCs) are set.

WIRING DIAGRAM

Refer to DTC P2195 on page [05-347](#).

INSPECTION PROCEDURE

HINT:

Hand-held tester only:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using a hand-held tester.

- (1) Connect a hand-held tester to the DLC3.
- (2) Start the engine and turn the tester ON.
- (3) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
- (4) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
- (5) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).

- (6) Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 (AFS B2S1) and OS2 B1S2 (O2S B2S2)) displayed on the tester.

HINT:

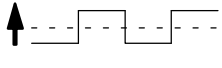
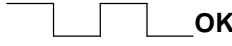
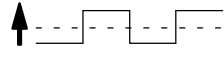
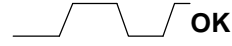
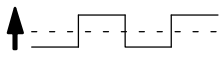
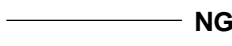
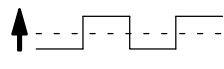
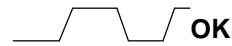
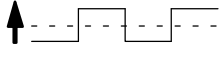

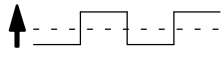

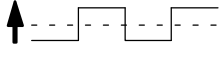
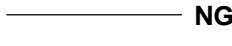
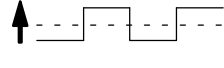
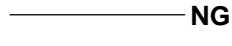
- The A/F CONTROL operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volumes	Status	Voltages
AFS B1S1 (AFS B2S1) (A/F)	+25 %	Rich	Less than 3.0
AFS B1S1 (AFS B2S1) (A/F)	-12.5 %	Lean	More than 3.35
O2S B1S2 (O2S B2S2) (HO2)	+25 %	Rich	More than 0.55
O2S B1S2 (O2S B2S2) (HO2)	-12.5 %	Lean	Less than 0.4

NOTICE:

The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage	HO2 Sensor (Sensor 2) Output Voltage	Main Suspected Trouble Areas
1	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0 V	Injection volume +25 %  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	—
2	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage More than 0.55 V  OK Less than 0.4V	<ul style="list-style-type: none"> • A/F sensor • A/F sensor heater • A/F sensor circuit
3	Injection volume +25 %  -12.5 % Output voltage More than 3.35 V  OK Less than 3.0V	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • HO2 sensor • HO2 sensor heater • HO2 sensor circuit
4	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  NG	<ul style="list-style-type: none"> • Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- DTC P2A00 may be also set, when the air-fuel ratio is stuck rich or lean.
- A low A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.
- Read freeze frame data using a hand-held tester or OBD II scan tool. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1 CHECK ANY OTHER DTCS OUTPUT(IN ADDITION TO DTC P2A00 AND/OR P2A03)

- (a) Connect a hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the tester ON.
- (c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2A00 and/or P2A03	A
P2A00 and/or P2A03 and other DTCs	B

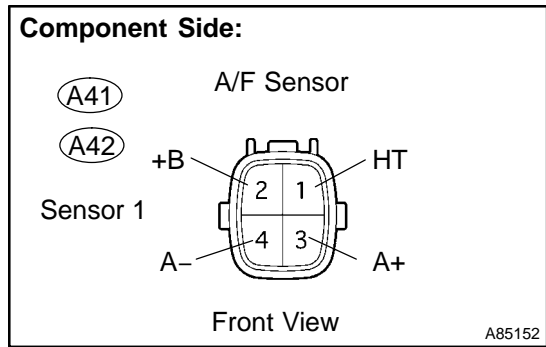
HINT:

If any DTCs other than P2A00 and/or P2A03 are output, troubleshoot those DTCs first.

B → **GO TO DTC CHART (See page 05-60)**

A

2 INSPECT AIR FUEL RATIO SENSOR(HEATER RESISTANCE)



- (a) Disconnect the A41 or A42 air-fuel ratio (A/F) sensor connector.
- (b) Measure resistance between the terminals of the A/F sensor connector.

Standard:

Tester Connection	Specified Condition
HT (1) - +B (2)	Between 1.8 Ω and 3.4 Ω at 20°C (68°F)
HT (1) - A- (4)	10 kΩ or higher

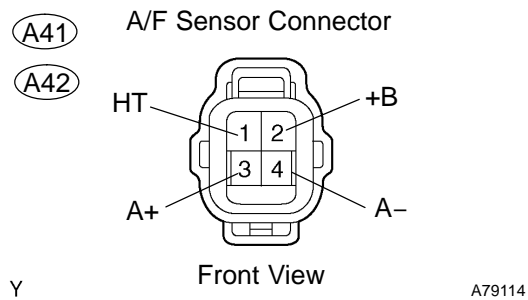
- (c) Reconnect the A/F sensor connector.

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

3 CHECK HARNESS AND CONNECTOR(A/F SENSOR - ECM)

Wire Harness Side:



- (a) Disconnect the A41 or A42 A/F sensor connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between the +B terminal of the A/F sensor connector and body ground.

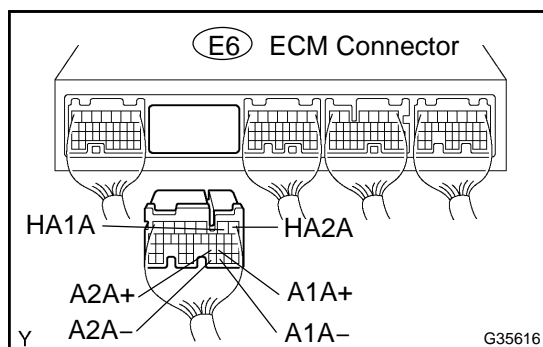
Standard:

Tester Connections	Specified Conditions
+B (2) - Body ground	Between 9 V and 14 V

- (d) Turn the ignition switch to OFF.
- (e) Disconnect the E6 ECM connector.
- (f) Check the resistance.

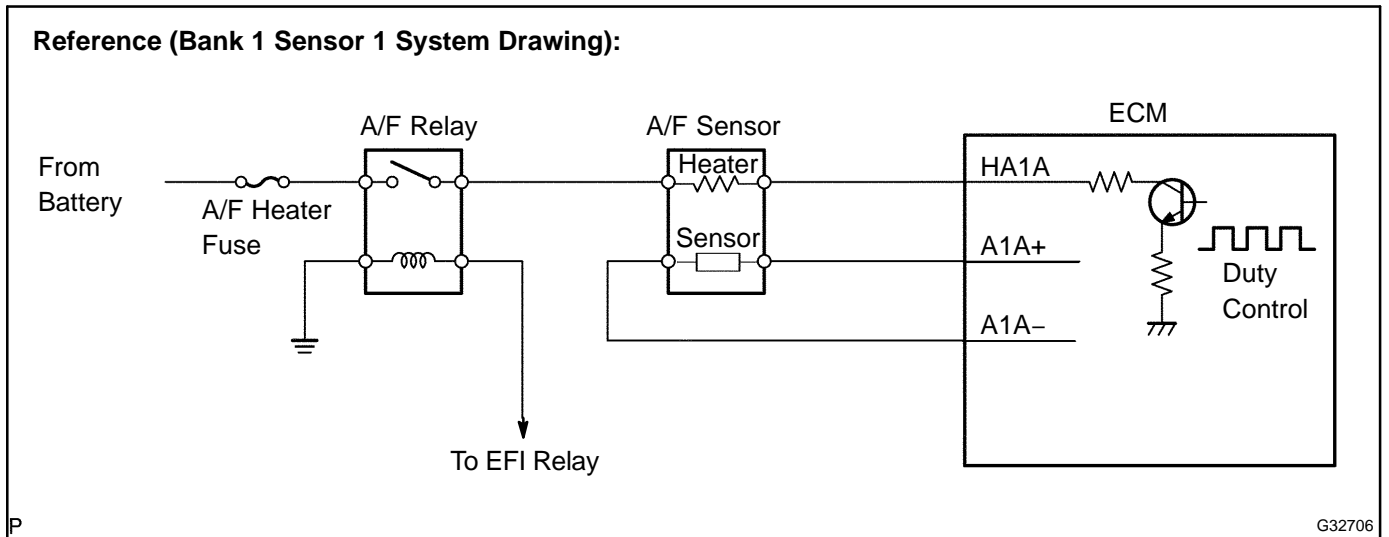
Standard (Check for open):

Tester Connections	Specified Conditions
HT (A41-1) - HA1A (E6-2) HT (A42-1) - HA2A (E6-1)	Below 1 Ω
A+ (A41-3) - A1A+ (E6-22) A+ (A42-3) - A2A+ (E6-23)	Below 1 Ω
A- (A41-4) - A1A- (E6-30) A- (A42-4) - A2A- (E6-31)	Below 1 Ω



Standard (Check for short):

Tester Connections	Specified Conditions
HT (A41-1) or HA1A (E6-2) - Body ground HT (A42-1) or HA2A (E6-1) - Body ground	10 k Ω or higher
A+ (A41-3) or A1A+ (E6-22) - Body ground A+ (A42-3) or A2A+ (E6-23) - Body ground	10 k Ω or higher
A- (A41-4) or A1A- (E6-30) - Body ground A- (A42-4) or A2A- (E6-31) - Body ground	10 k Ω or higher



(g) Reconnect the A/F sensor connector.

(h) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

5 CHECK WHETHER DTC OUTPUT RECURS(DTC P2A00 AND/OR P2A03)

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2A00 or P2A03	A
No output	B

B → **CHECK FOR INTERMITTENT PROBLEMS (See page 05-13)**

A

6 REPLACE AIR FUEL RATIO SENSOR

NEXT

7 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

8 | CHECK WHETHER DTC OUTPUT RECURS(DTC P2A00 AND/OR P2A03)

- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (b) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P2A00 or P2A03	A
No output	B

A → **CHECK EXTREMELY RICH OR LEAN ACTUAL AIR FUEL RATIO (See page 05-155)**

B

END

EVAP INSPECTION PROCEDURE

MONITOR RESULT

Refer to page 05-28 for detailed information.

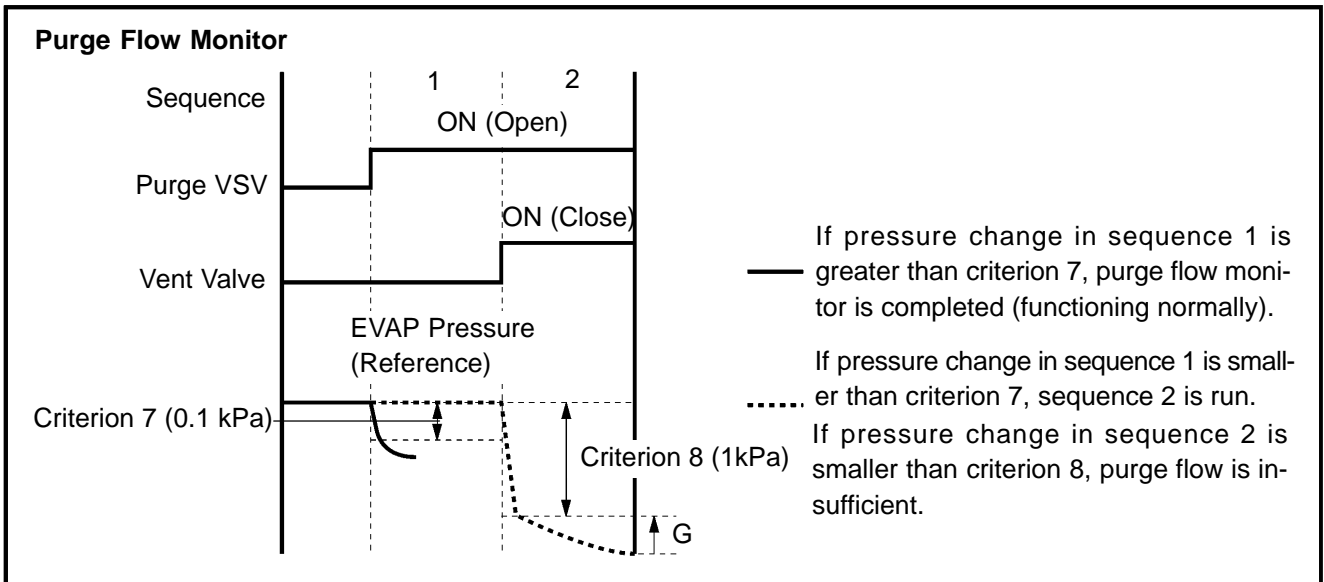
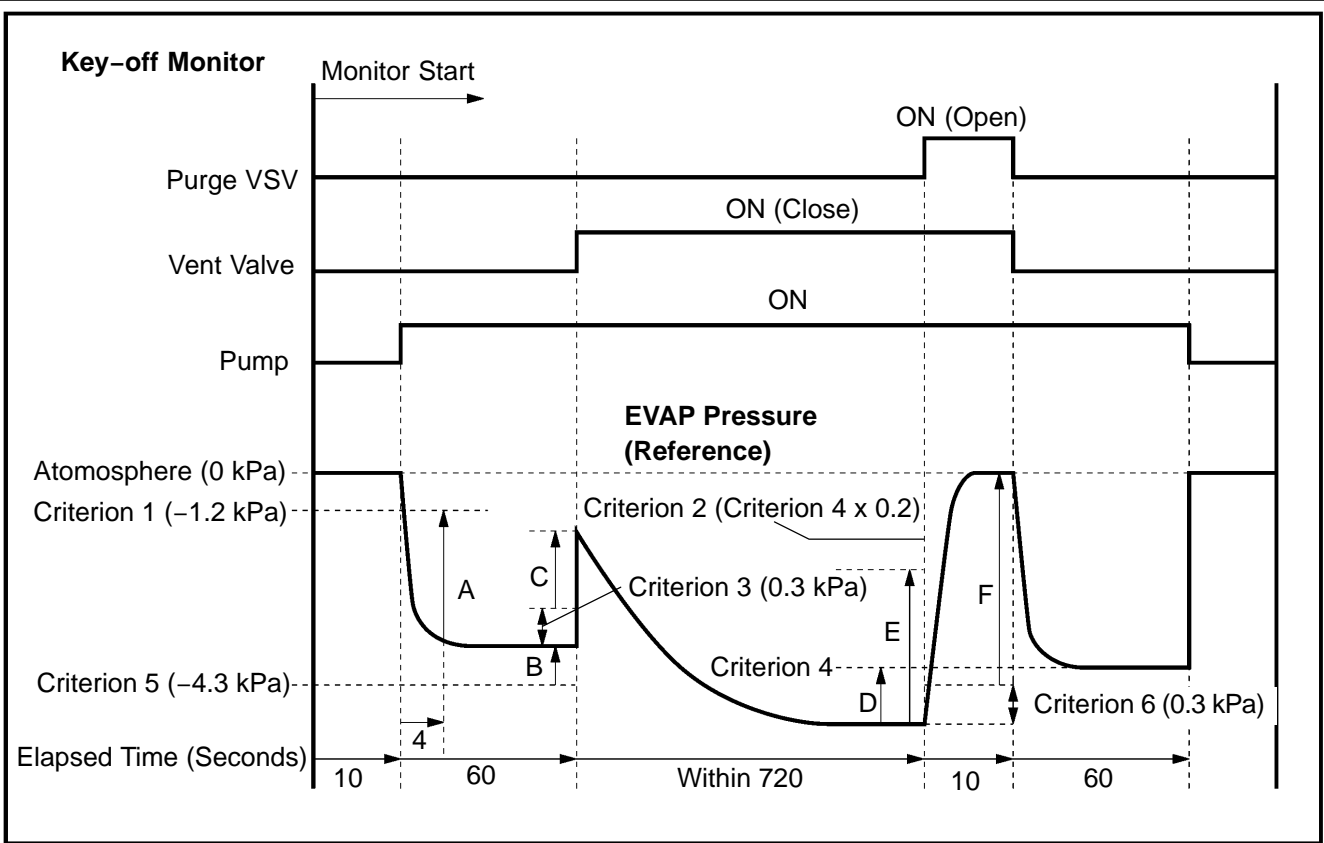
The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

EVAP-Key-off monitor

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$3D	\$C9	Multiply by 0.01 (kPa)	Test value for small leak (P0456): Refer to pressure D*.	Minimum test limit for small leak	Maximum test limit for small leak
\$3D	\$CA	Multiply by 0.01 (kPa)	Test value for gross leak (P0455): Refer to pressure E*.	Minimum test limit for gross leak	Maximum test limit for gross leak
\$3D	\$CB	Multiply by 0.01 (kPa)	Test value for vacuum pump stuck OFF (P2401): Refer to pressure A*.	Minimum test limit for vacuum pump stuck OFF	Maximum test limit for vacuum pump stuck OFF
\$3D	\$CD	Multiply by 0.01 (kPa)	Test value for vacuum pump stuck ON (P2402): Refer to pressure A*.	Minimum test limit for vacuum pump stuck ON	Maximum test limit for vacuum pump stuck ON
\$3D	\$CE	Multiply by 0.01 (kPa)	Test value for vent valve stuck OFF (vent) (P2420): Refer to pressure C*.	Minimum test limit for vent valve stuck ON	Maximum test limit for vent valve stuck ON
\$3D	\$CF	Multiply by 0.01 (kPa)	Test value for vent valve stuck ON (closed) (P2419): Refer to pressure A*.	Minimum test limit for vent valve stuck OFF	Maximum test limit for vent valve stuck OFF
\$3D	\$D0	Multiply by 0.01 (kPa)	Test value for 0.02 inch orifice low flow (P043E): Refer to pressure B*.	Minimum test limit for 0.02 inch orifice low flow	Maximum test limit for 0.02 inch orifice low flow
\$3D	\$D1	Multiply by 0.01 (kPa)	Test value for 0.02 inch orifice high flow (P043F): Refer to pressure A*.	Minimum test limit for 0.02 inch orifice high flow	Maximum test limit for 0.02 inch orifice high flow
\$3D	\$D4	Multiply by 0.01 (kPa)	Test value for purge VSV stuck close (P0441): Refer to pressure F*.	Minimum test limit for purge VSV stuck close	Maximum test limit for purge VSV stuck close
\$3D	\$D5	Multiply by 0.01 (kPa)	Test value for purge VSV stuck open (P0441): Refer to pressure E*.	Minimum test limit for purge VSV stuck open	Maximum test limit for purge VSV stuck open
\$3D	\$D7	Multiply by 0.01 (kPa)	Test value for purge flow (P0441): Refer to pressure G*.	Minimum test limit for purge flow	Maximum test limit for purge flow

* Pressures A to G are indicated as shown in the diagram on the next page.



C

G38136

DTCS RELATING TO EVAP SYSTEM

DTCS	Monitoring Items	See Page
P043E	0.02 inch orifice clogged (built into pump module)	05-237
P043F	0.02 inch orifice high-flow (built into pump module)	05-237
P0441	<ul style="list-style-type: none"> • Purge VSV (Vacuum Switching Valve) stuck closed • Purge VSV stuck open • Purge flow 	05-243
P0450	Pressure sensor (built into pump module) voltage abnormal fluctuation	05-249
P0451	<ul style="list-style-type: none"> • Pressure sensor (built into pump module) noising • Pressure sensor stuck (built into pump module) 	05-249
P0452	Pressure sensor (built into pump module) voltage low	05-249
P0453	Pressure sensor (built into pump module) voltage high	05-249
P0455	EVAP gross leak	05-256
P0456	EVAP small leak	05-256
P2401	Vacuum pump stuck OFF (built into pump module)	05-371
P2402	Vacuum pump stuck ON (built into pump module)	05-371
P2419	Vent valve stuck closed (built into pump module)	05-377
P2420	Vent valve stuck open (vent) (built into pump module)	05-377
P2610	Soak timer (built into ECM)	05-397

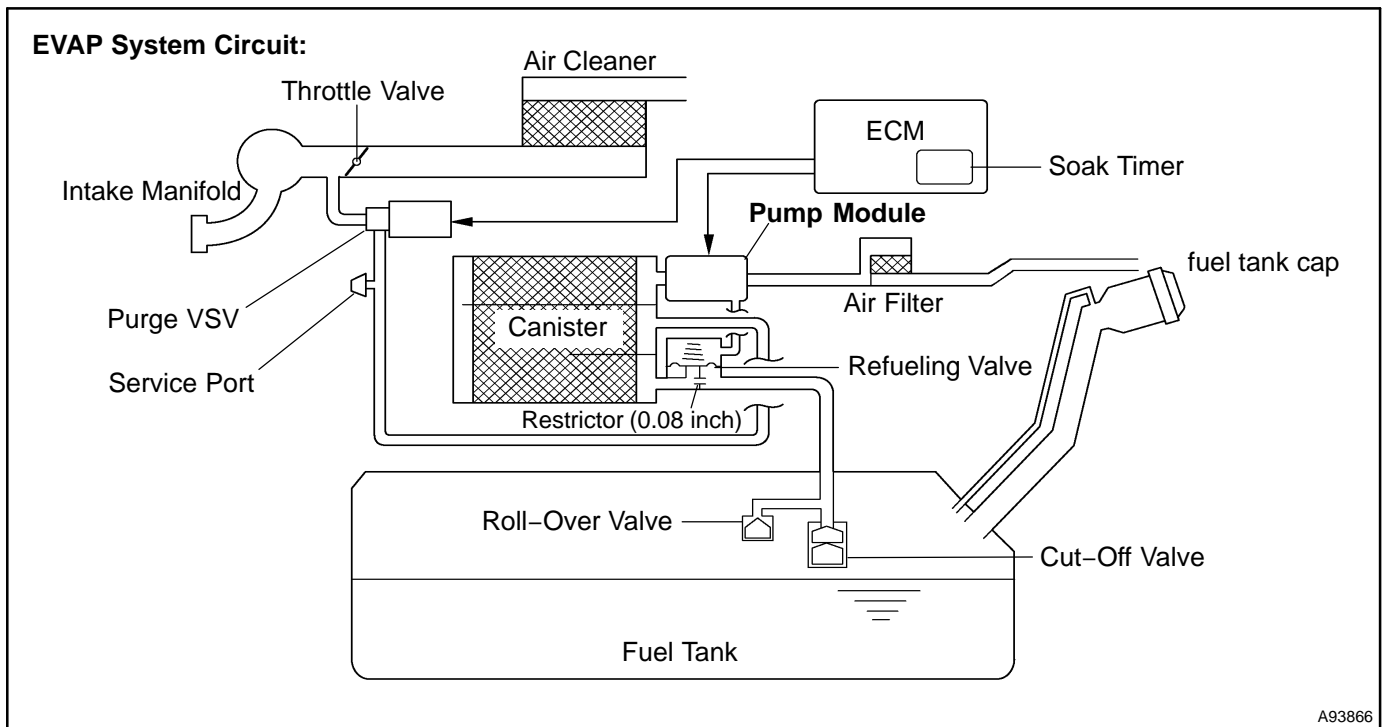
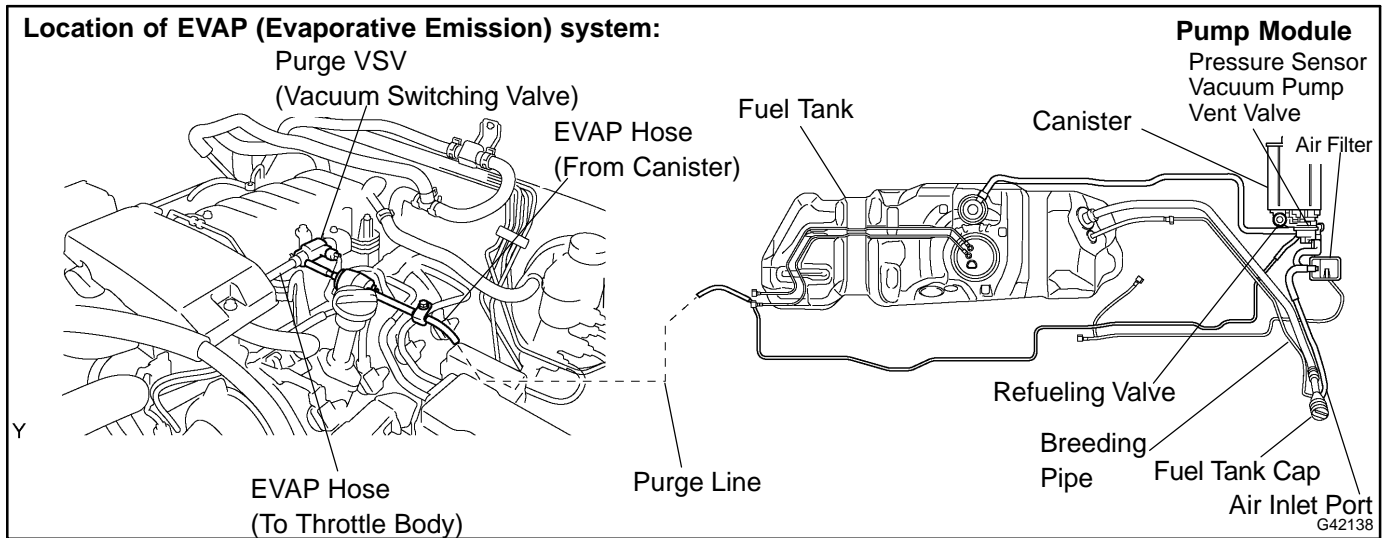
If any EVAP system DTCs are set, the malfunctioning area can be determined using the table below.

Malfunctioning Areas	DTCS											
	P043E P043F	P0441	P0450	P0451	P0452	P0453	P0455	P0456	P2401 P2402	P2419	P2420	
0.02 inch orifice clogged	●								●	●		
0.02 inch orifice high-flow	●								●	●		
Purge VSV stuck open		●					●					
Purge VSV stuck closed		●										
Pressure sensor stuck				●								
Pressure sensor noise				●								
Pressure sensor low output			●		●							
Pressure sensor high output			●			●						
Gross leak		●					●					
Small leak								●				
Vacuum pump stuck OFF	●								●	●		
Vacuum pump stuck ON	●								●	●		
Vent valve stuck closed	●								●	●		
Vent valve stuck open (vent)											●	

NOTICE:

If the 0.02 inch reference pressure difference between the first and second checks is greater than the specification, the DTCs corresponding to the reference pressure (P043E, P043F, P0441, P0455, P0456, P2401, P2420) will be all stored.

CIRCUIT DESCRIPTION



While the engine is running, if a predetermined condition (closed-loop, etc.) is met, the purge VSV is opened by the ECM and stored fuel vapors in the canister are purged to the intake manifold. The ECM changes the duty cycle ratio of the purge VSV to control purge flow volume.

The purge flow volume is also determined by the intake manifold pressure. Atmospheric pressure is allowed into the canister through the vent valve to ensure that the purge flow is maintained when the negative pressure (vacuum) is applied to the canister.

The following two monitors run to confirm appropriate EVAP system operation.

Key-off monitor

This monitor checks for EVAP (Evaporative Emission) system leaks and pump module malfunctions. The monitor starts 5 hours* after the ignition switch is turned OFF. More than 5 hours are required to allow enough time for the fuel to cool down to stabilize the Fuel Tank Pressure (FTP), thus making the EVAP system monitor more accurate.

The electric vacuum pump creates negative pressure (vacuum) in the EVAP system and the pressure is measured. Finally, the ECM monitors for leaks from the EVAP system, and malfunctions in both the pump module and purge VSV, based on the EVAP pressure.

HINT:

*:If the engine coolant temperature is not below 35°C 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

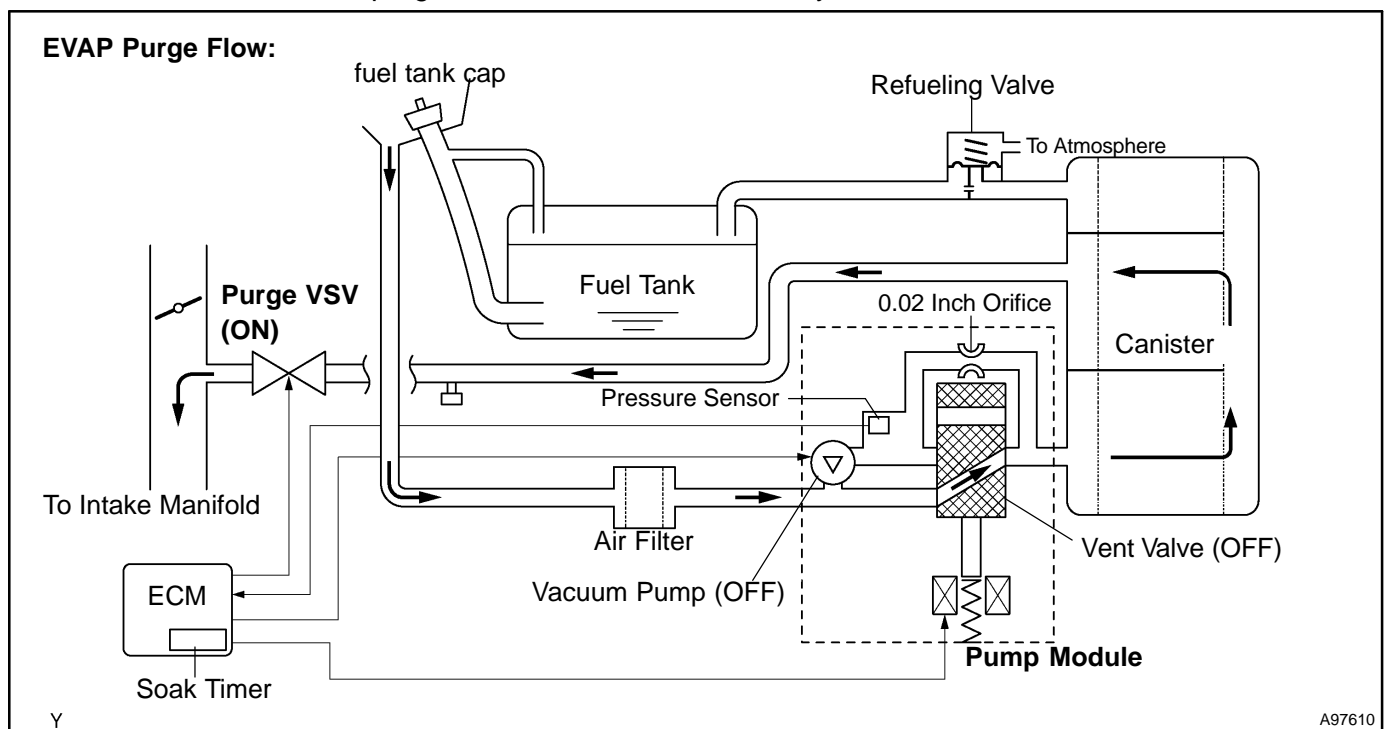
Purge flow monitor

The purge flow monitor consists of the two monitors. The 1st monitor is always conducted every time and the 2nd monitor is activated if necessary.

- The 1st monitor
While the engine is running and the purge VSV (Vacuum Switching Valve) is ON (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If negative pressure is not created, the ECM begins the 2nd monitor.
- The 2nd monitor
The vent valve is turned ON (closed) and the EVAP pressure is then measured. If the variation in the pressure is less than 0.5 kpa (3.75 mmHg), the ECM interprets this as the purge VSV being stuck closed, and illuminates the MIL and sets DTC P0441 (2 trip detection logic).

Atmospheric pressure check:

In order to ensure reliable malfunction detection, the variation between the atmospheric pressures, before and after conduction of the purge flow monitor, is measured by the ECM.

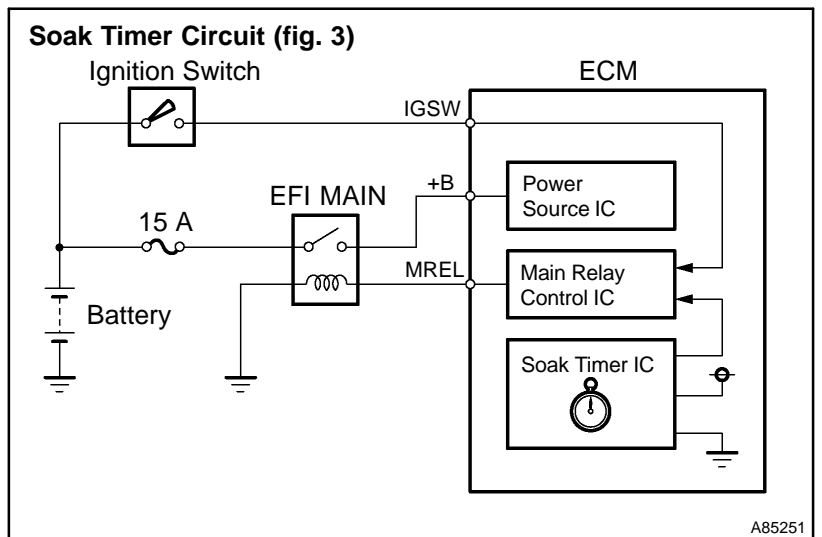
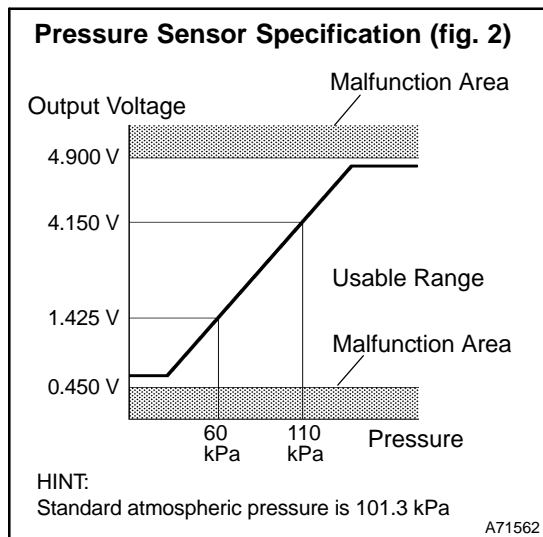
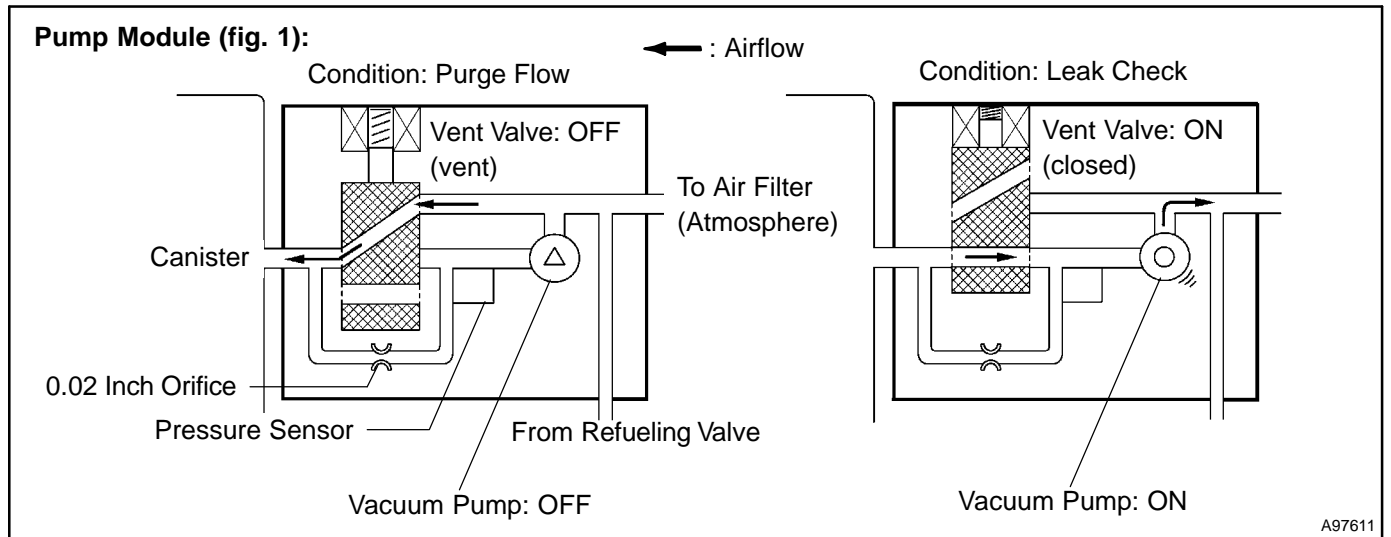


DIAGNOSTICS - SFI SYSTEM (2UZ-FE)

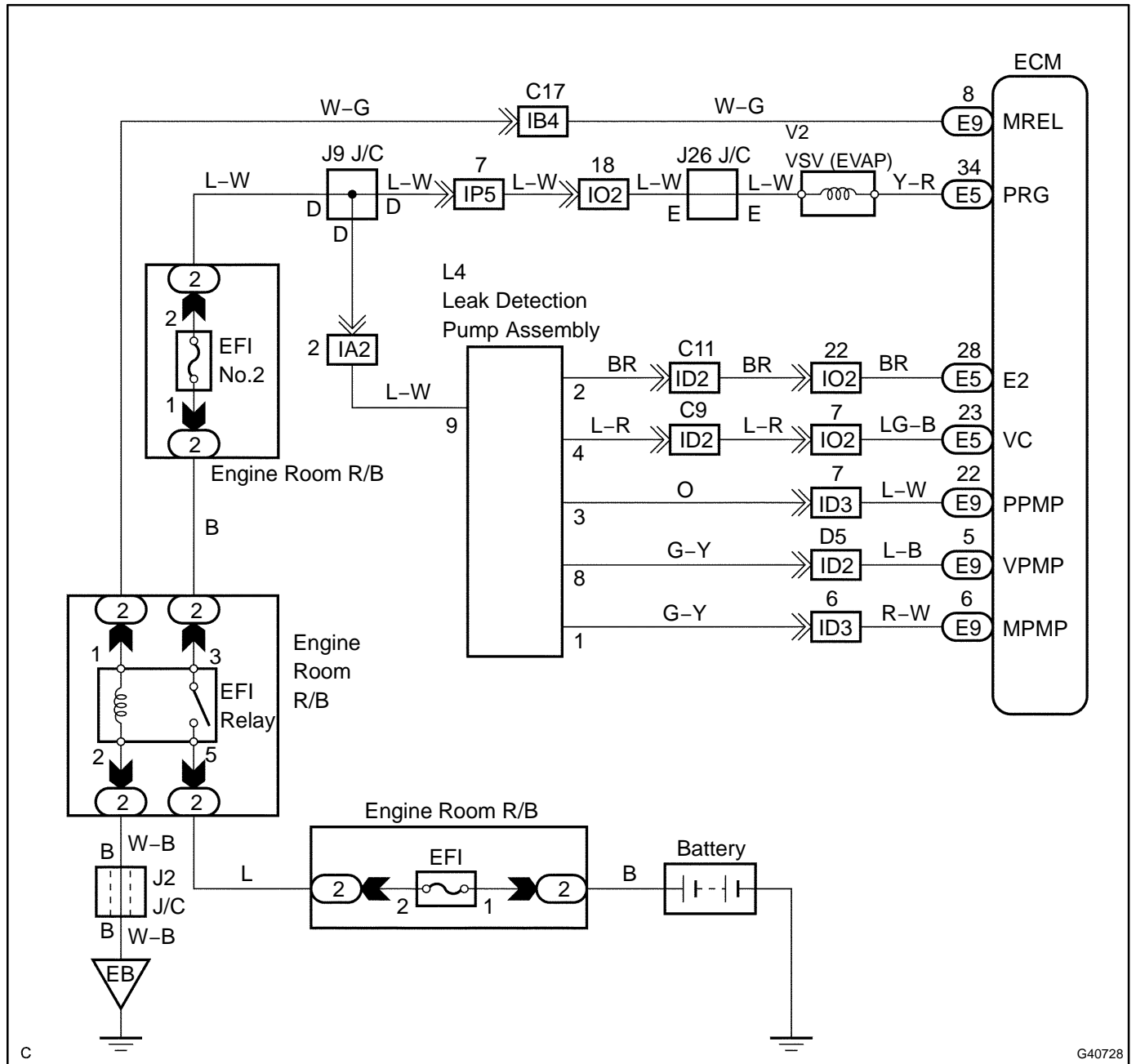
Components	Operations
Canister	Contains activated charcoal to absorb EVAP (Evaporative Emissions) generated in fuel tank.
Cut-off valve	Located in fuel tank. Valve floats and closes when fuel tank is 100 % full.
Purge VSV (Vacuum Switching Valve)	Opens or closes line between canister and intake manifold. ECM uses purge VSV to control EVAP purge flow. In order to discharge EVAP absorbed by canister to intake manifold, ECM opens purge VSV. EVAP discharge volume to intake manifold controlled by purge VSV duty cycle ratio (current-carrying time). (Open: ON, Close: OFF)
Refueling valve	Controls EVAP pressure from fuel tank to canister. Valve consists of diaphragm, spring and restrictor (diameter: 0.08 inch). When fuel vapor and pressure inside fuel tank increase, valve opens. While EVAP purged, valve closes and restrictor prevents large amount of vacuum from affecting pressure in fuel tank. Valve opened while refueling. When valve open, adding fuel into fuel tank possible.
Roll-over valve	Located in fuel tank. Valve closes by its own weight when vehicle overturns to prevent fuel from spilling out.
Service port	Used for connecting vacuum gauge for inspecting EVAP system.
Soak timer	Built into ECM. To ensure accurate EVAP monitor, measures 5 hours* after ignition switch turned to OFF. This allows fuel to cool down, stabilizing Fuel Tank Pressure (FTP). When approx. 5 hours* elapsed, ECM activates.
Pump module	Consists of (a) to (d) below. Pump module cannot be disassembled.
(a) Vent valve	Vents and closes EVAP system. When ECM turns valve ON, EVAP system closed. When, ECM turns valve OFF, EVAP system vented. Negative pressure (vacuum) created in EVAP system to check for EVAP leaks by closing purge VSV, turning on vent valve (closed) and operating vacuum pump (refer to fig. 1).
(b) Pressure sensor	Indicates pressure as voltages. ECM supplies regulated 5 V to pressure sensor, and uses feedback from sensor to monitor EVAP system pressure (refer to fig 2).
(c) Vacuum pump	Creates negative pressure (vacuum) in EVAP system for leak check.
(d) 0.02 inch orifice	Has opening with 0.02 inch diameter. Vacuum produced through orifice by closing purge VSV, turning off vent valve and operating vacuum pump, to monitor 0.02 inch leak pressure. 0.02 inch leak pressure indicates small leak of EVAP.

HINT:

*:If the engine coolant temperature is not below 35°C after 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.



WIRING DIAGRAM



c

G40728

INSPECTION PROCEDURE

NOTICE:

A hand-held tester is required to conduct the following diagnostic troubleshooting procedure.

HINT:

- Using hand-held tester monitor results enables the EVAP (Evaporative Emission) system to be confirmed.
- Read freeze frame data using a hand-held tester. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data, from the time the malfunction occurred.

1	CONFIRM DTC
----------	--------------------

- (a) Turn the ignition switch to OFF and wait for 10 seconds.
- (b) Turn the ignition switch to ON.
- (c) Turn the ignition switch to OFF and wait for 10 seconds.
- (d) Connect a hand-held tester to the DLC3.
- (e) Turn the ignition switch to ON and turn the tester ON.
- (f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (g) Confirm DTCs and freeze frame data.

If any EVAP system DTCs are set, the malfunctioning area can be determined using the table below.

Malfunctioning Areas \ DTCs	P043E P043F	P0441	P0450	P0451	P0452	P0453	P0455	P0456	P2401 P2402	P2419	P2420
0.02 inch orifice clogged	●								●	●	
0.02 inch orifice high-flow	●								●	●	
Purge VSV stuck open		●					●				
Purge VSV stuck closed		●									
Pressure sensor stuck				●							
Pressure sensor noising				●							
Pressure sensor voltage low			●		●						
Pressure sensor voltage high			●			●					
Gross leak		●					●				
Small leak								●			
Vacuum pump stuck OFF	●								●	●	
Vacuum pump stuck ON	●								●	●	
Vent valve stuck ON (closed)	●								●	●	
Vent valve stuck OFF (vent)											●

NOTICE:

If the 0.02 inch reference pressure difference between the first and second checks is greater than the specification, the DTCs corresponding to the reference pressure (P043E, P043F, P0441, P0455, P0456, P2401, P2420) will be all stored.

NEXT

2	PERFORM EVAP SYSTEM CHECK(AUTO OPERATION)
----------	--

NOTICE:

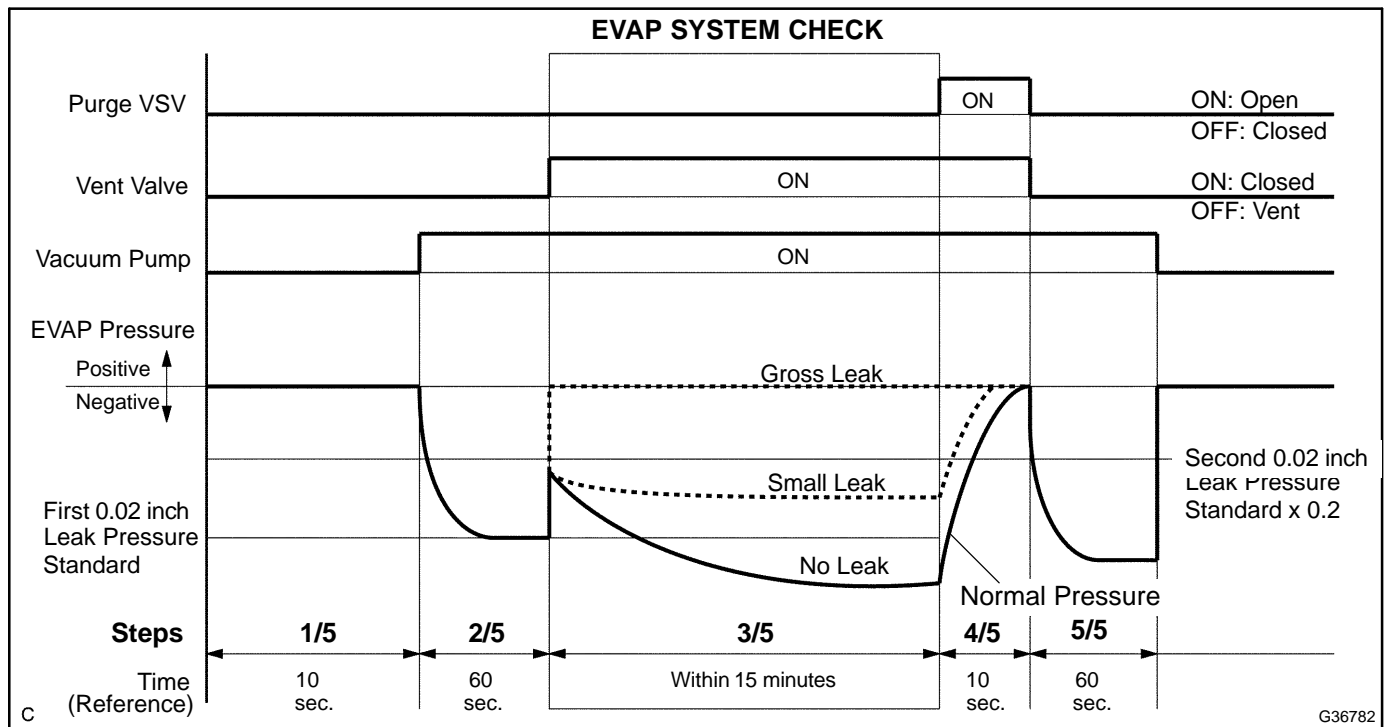
- In the EVAP SYSTEM CHECK (AUTO OPERATION), the series of 5 EVAP SYSTEM CHECK steps is performed automatically. It takes a maximum of approximately 18 minutes.
 - Do not perform the EVAP SYSTEM CHECK when the fuel tank is more than 90% full because the cut-off valve may be closed and making the leak check of the fuel tank unavailable.
 - Do not run the engine in this step.
 - When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).
- (a) Clear DTCs (see page 05-44).
- (b) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / AUTO OPERATION.
- (c) After the EVAP SYSTEM CHECK is completed, check for pending DTCs by selecting the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.

HINT:

If no pending DTC is displayed, perform the Monitor Confirmation after this repair is completed. After this confirmation, check for pending DTCs. If no DTC is displayed, the EVAP system is normal.

NEXT

3 PERFORM EVAP SYSTEM CHECK(MANUAL OPERATION)

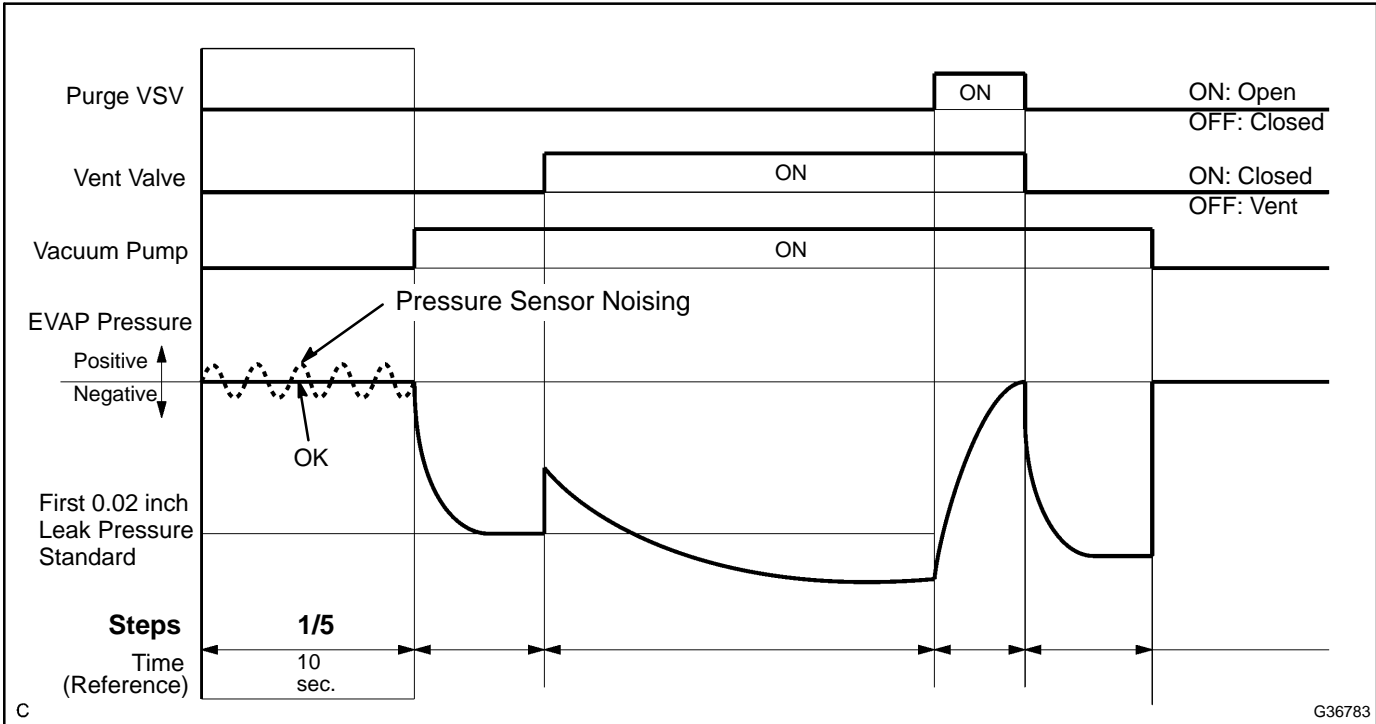


NOTICE:

- In the EVAP SYSTEM CHECK (MANUAL OPERATION), the series of 5 EVAP SYSTEM CHECK steps is performed manually.
 - Do not perform the EVAP SYSTEM CHECK when the fuel tank is more than 90% full because the cut-off valve may be closed and making the leak check of the fuel tank unavailable.
 - Do not run the engine in this step.
 - When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing the EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).
- (a) Clear DTCs (see page 05-44).
- (b) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / MANUAL OPERATION.

NEXT

4 | PERFORM EVAP SYSTEM CHECK(STEP 1/5)



(a) Check the EVAP pressure in step 1/5.

Result:

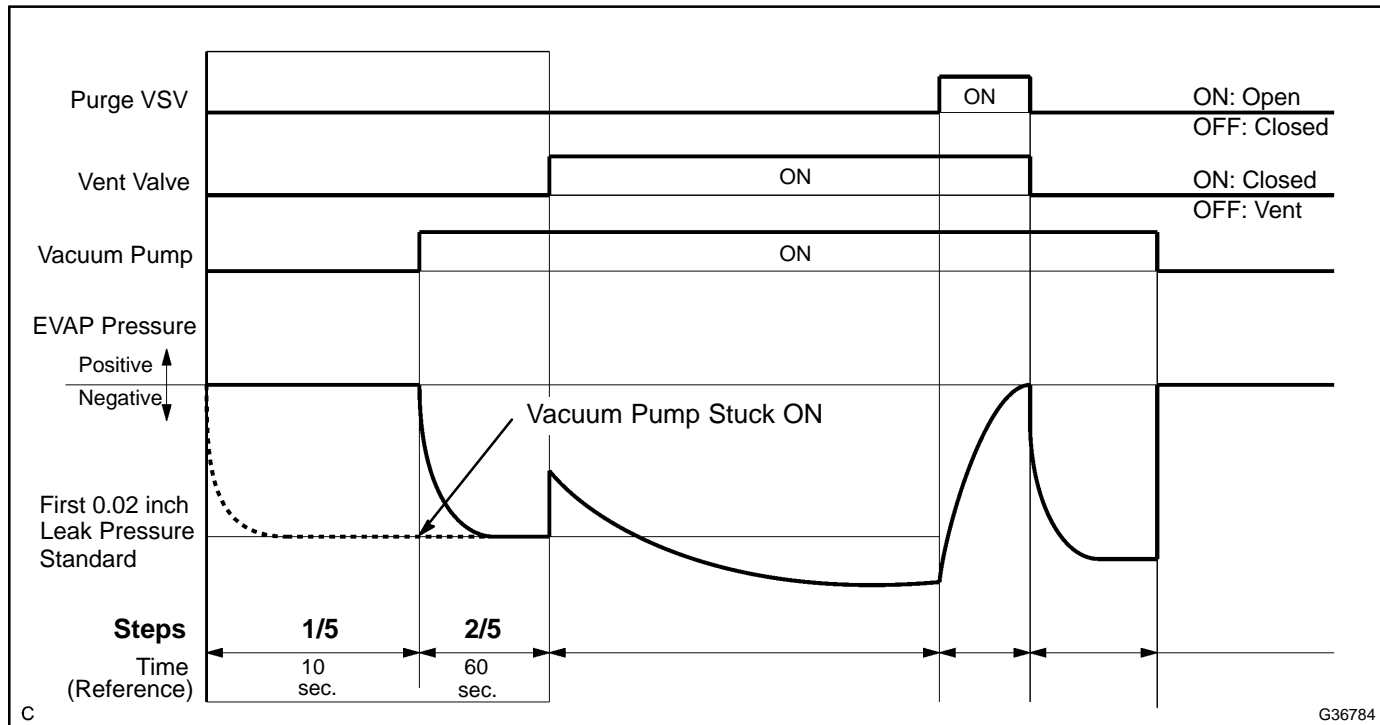
DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	Virtually no variation in EVAP pressure	Not yet determined	A
P0451	EVAP pressure fluctuates by ± 0.3 kPa (2.25 mmHg) or more	Pressure sensor noising	B

*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

B **Go to step 30**

A

5 PERFORM EVAP SYSTEM CHECK(STEP 1/5 TO 2/5)



(a) Check the EVAP pressure in step 1/5 and 2/5.

Result:

DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	Virtually no variation in EVAP pressure during step 1/5. Then decreases to 0.02 inch leak pressure standard*	Not yet determined	A
P2402	Small difference between EVAP pressures during steps 1/5 and 2/5	Vacuum pump stuck ON	B

*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

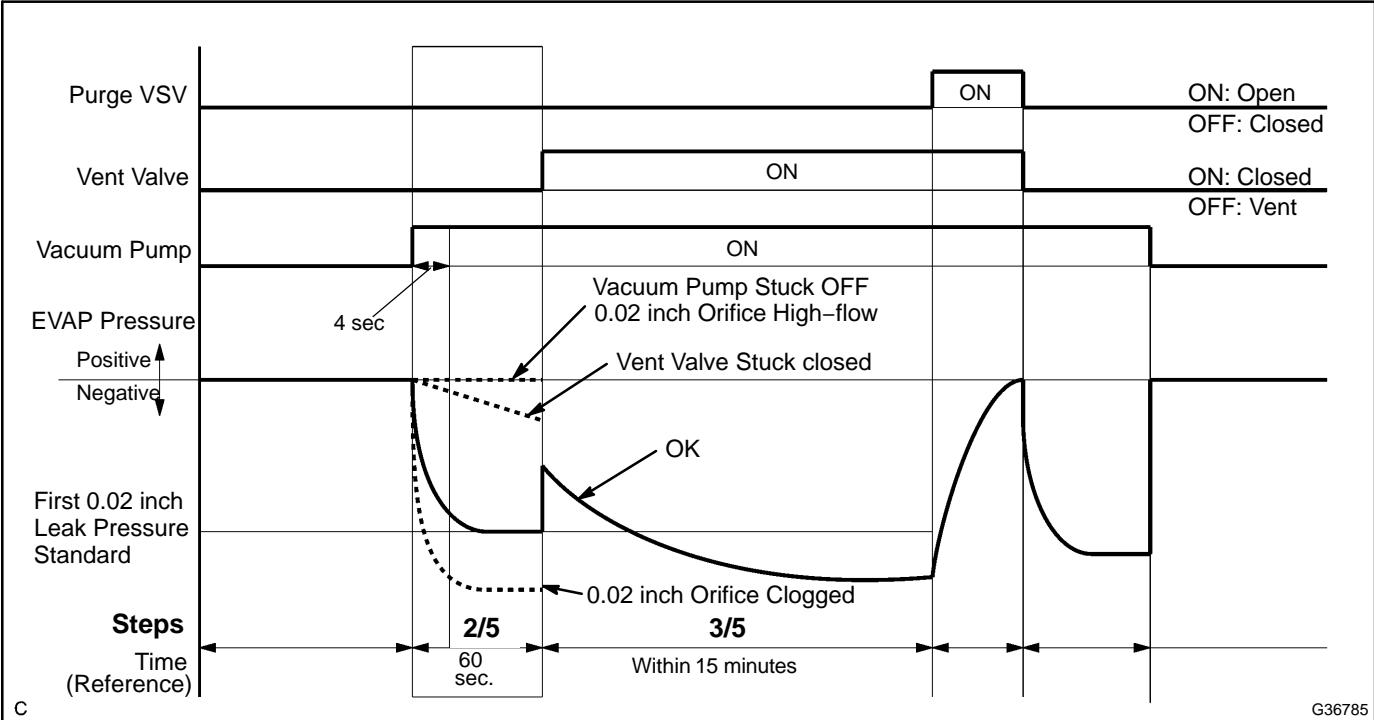
HINT:

The 0.02 inch leak pressure standard is the value determined in step 2/5.

B Go to step 23

A

6 | PERFORM EVAP SYSTEM CHECK(STEP 2/5)



HINT:

Make a note of the pressures checked in steps (a) and (b) below.

- (a) Check the EVAP pressure 4 seconds after the vacuum pump is activated*.
 (b) Check the EVAP pressure again when it has stabilized. This pressure is the 0.02 inch leak pressure standard.

*: The vacuum pump begins to operate as step 1/5 is proceeded to step 2/5.

Result:

DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	EVAP pressure in step (b) between -4.85 kPa and -1.06 kPa (-36.38 mmHg and -7.95 mmHg)	Not yet determined	A
P043F and P2401	EVAP pressure in step (b) -1.06 kPa (-7.95 mmHg) or more	<ul style="list-style-type: none"> • 0.02 inch orifice high-flow • Vacuum pump stuck OFF 	B
P043E	EVAP pressure in step (b) below -4.85 kPa (-36.38 mmHg)	0.02 inch orifice clogged	C
P2419	EVAP pressure in step (a) more than -1.06 kPa (-7.95 mmHg)	Vent valve stuck closed	D

*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

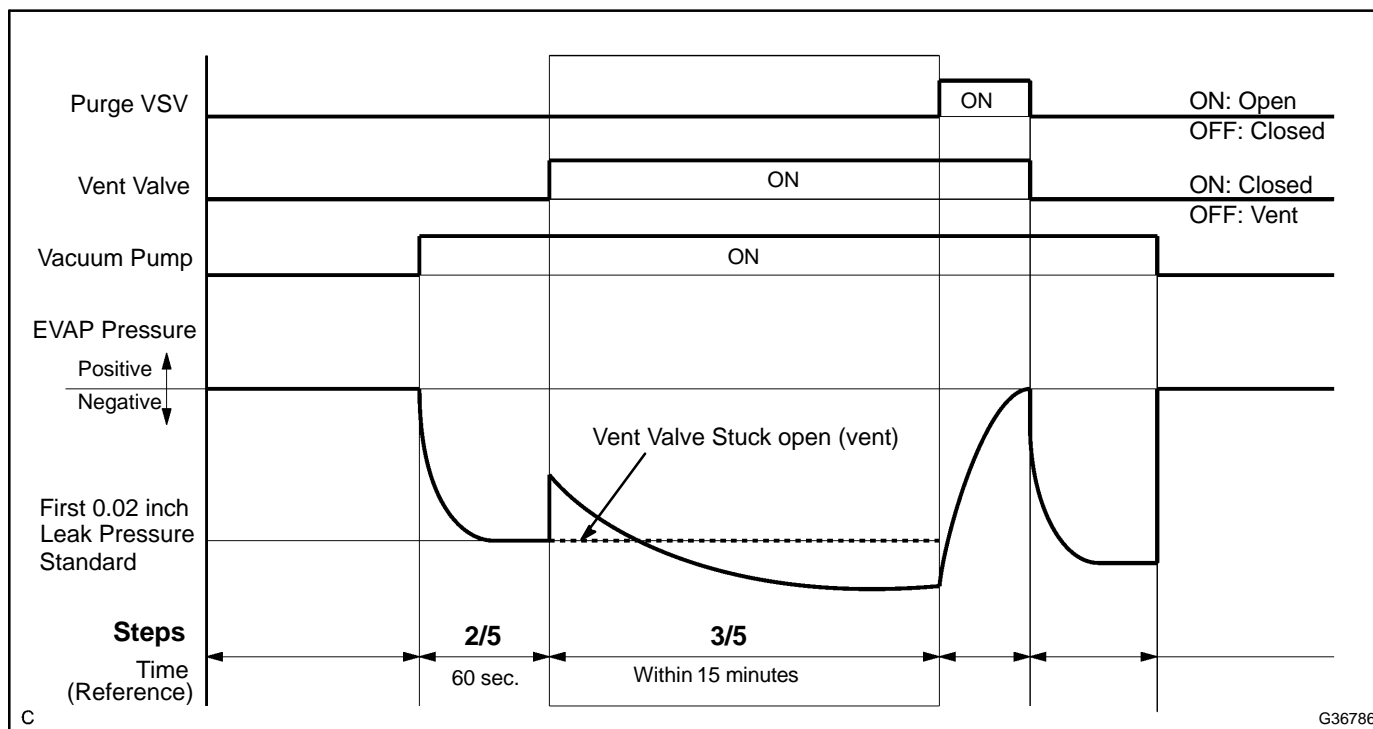
B → Go to step 11

C → Go to step 30

D → Go to step 19

A

7 | PERFORM EVAP SYSTEM CHECK(STEP 2/5 TO 3/5)



(a) Check the EVAP pressure increase in step 3/5.

Result:

DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	EVAP pressure increases by 0.3 kPa (2.25 mmHg) or more within 10 seconds of proceeding from step 2/5 to step 3/5	Not yet determined	A
P2420	No variation in EVAP pressure despite proceeding from step 2/5 to step 3/5	Vent valve stuck open (vent)	B
P0451	No variation in EVAP pressure during steps 1/5 through 3/5	Pressure sensor malfunction stuck	C

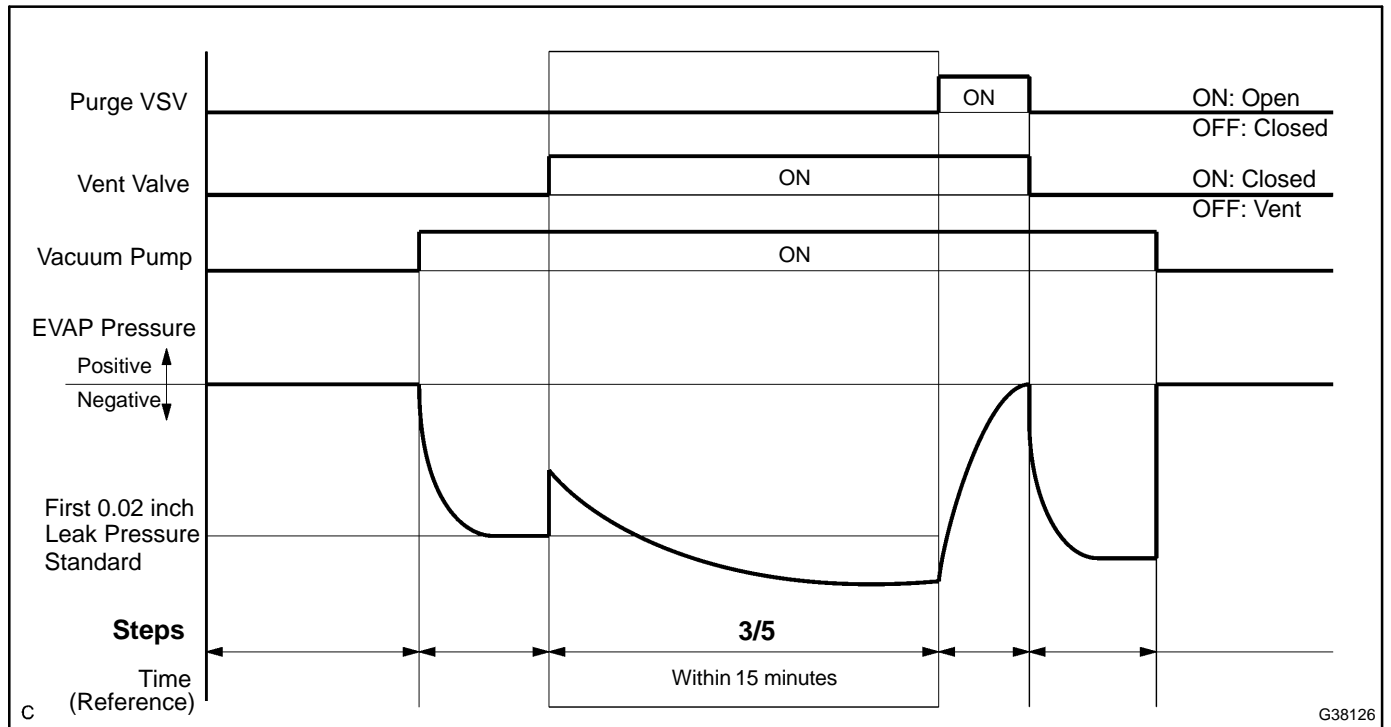
*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

B → Go to step 19

C → Go to step 30

A

8 | PERFORM EVAP SYSTEM CHECK(STEP 3/5)



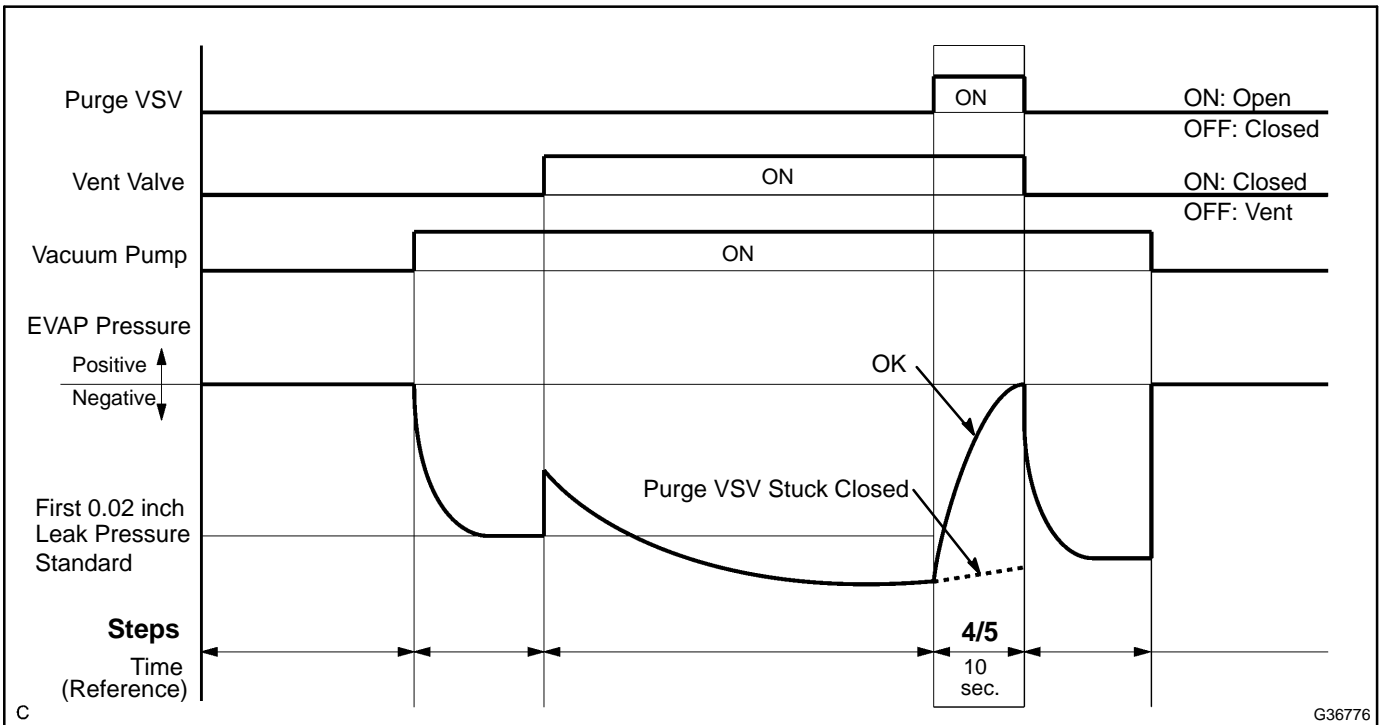
- (a) Wait until the EVAP pressure change is less than 0.1 kPa (0.75 mmHg) for 30 seconds.
- (b) Measure the EVAP pressure and record it.

HINT:

A few minutes are required for the EVAP pressure to become saturated. When there is little fuel in the fuel tank, it takes up to 12 minutes.

NEXT

9 PERFORM EVAP SYSTEM CHECK(STEP 4/5)



(a) Check the EVAP pressure in step 4/5.

DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	EVAP pressure increases by 0.3 kPa (2.25 mmHg) or more within 10 seconds of proceeding from step 3/5 to step 4/5	Not yet determined	A
P0441	EVAP pressure increases by 0.3 kPa (2.25 mmHg) or more within 10 seconds of proceeding from step 3/5 to step 4/5	Problems in EVAP hose between pure VSV and throttle body	B
P0441	Variation in EVAP pressure is less than 0.3 kPa (2.25 mmHg) for 10 seconds, after proceeding from step 3/5 to step 4/5	Purge VSV stuck closed	C

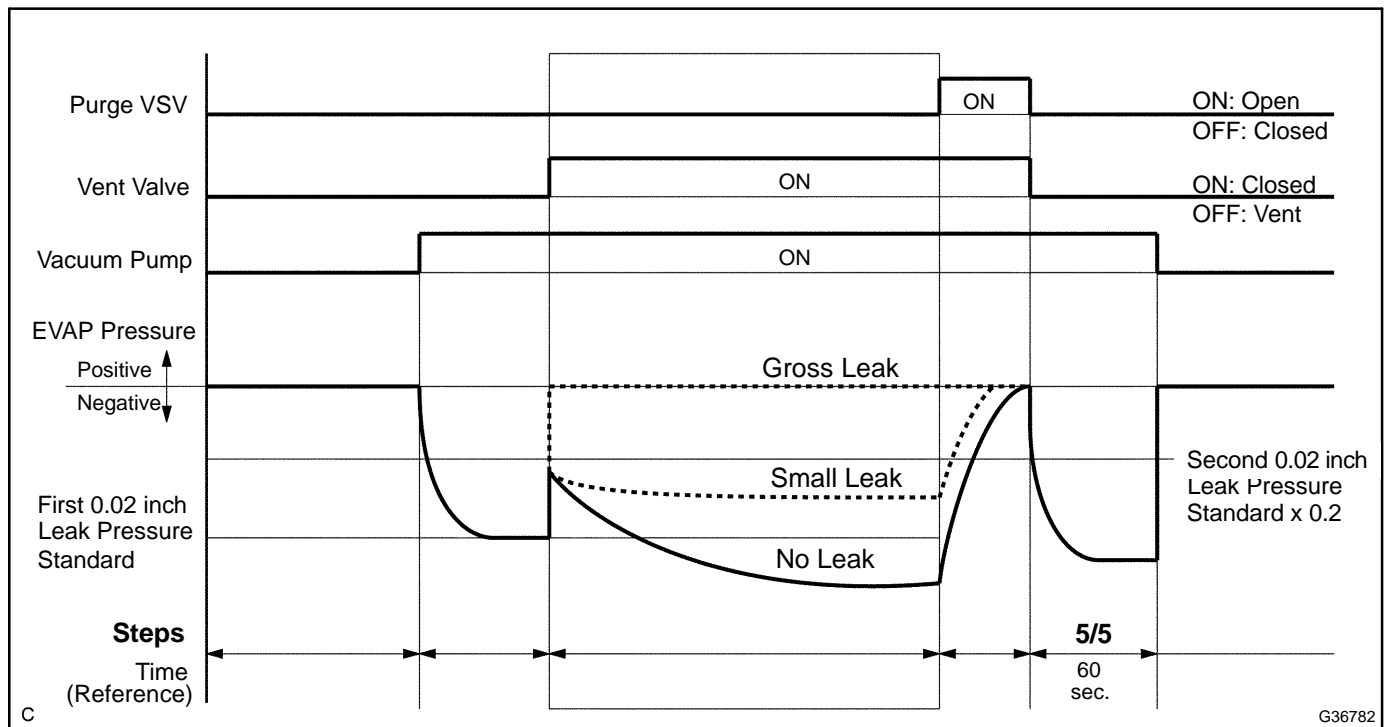
*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

B Go to step 15

C Go to step 12

A

10 | PERFORM EVAP SYSTEM CHECK(STEP 5/5)



- (a) Check the EVAP pressure in step 5/5.
- (b) Compare the EVAP pressure in step 3/5 and the second 0.02 inch leak pressure standard (step 5/5).

Result:

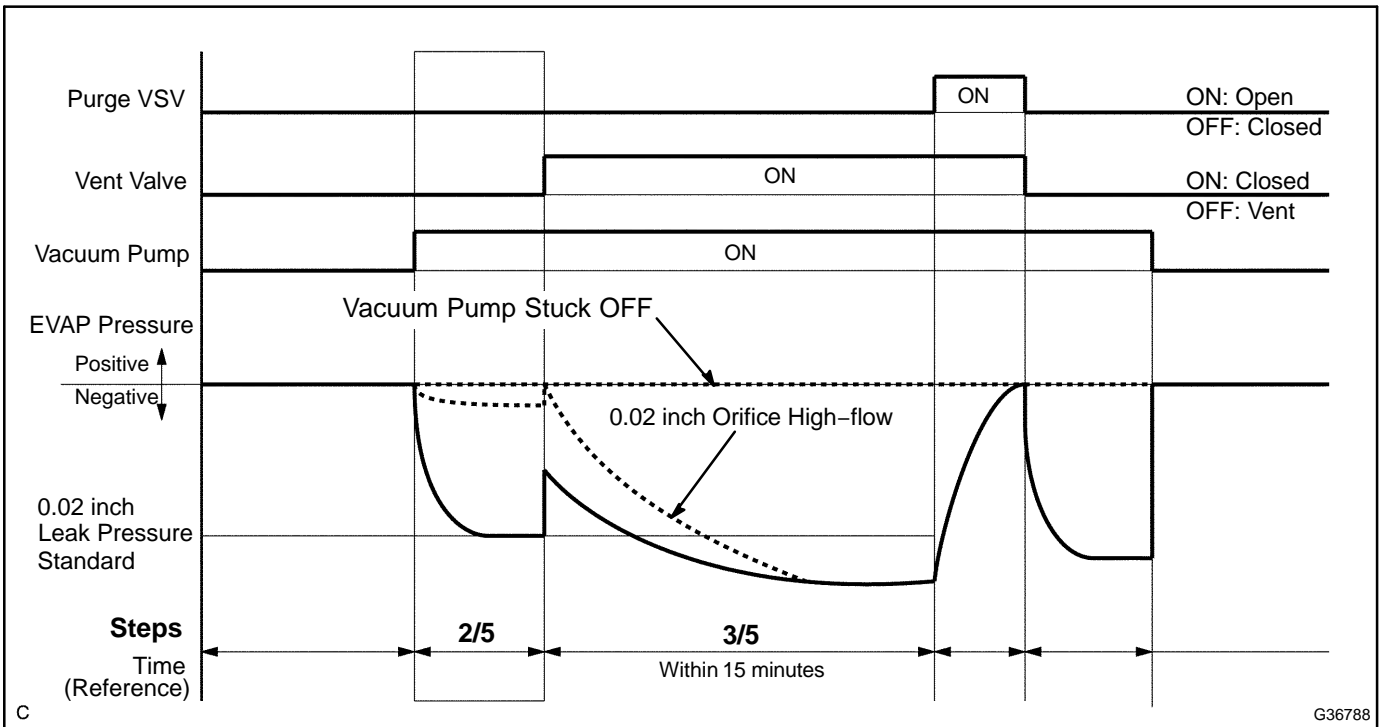
DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	EVAP pressure (step 3/5) lower than the second 0.02 inch leak pressure standard (step 5/5)	Not yet determined (no leakage from EVAP system)	A
P0441 and P0455	EVAP pressure (step 3/5) higher than [second 0.02 inch leak pressure standard (step 5/5) x 0.2]	<ul style="list-style-type: none"> • Purge VSV stuck open • EVAP gross leak 	B
P0456	EVAP pressure (step 3/5) higher than second 0.02 inch leak pressure standard (step 5/5)	EVAP small leak	B

*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

A → **Go to step 36**

B → **Go to step 12**

11 | PERFORM ACTIVE TEST USING HAND-HELD TESTER (STEP 3/5)



(a) Check the EVAP pressure in step 3/5.

Result:

DTCs*	Test Results	Suspected Trouble Areas	Proceed To
—	EVAP pressure less than [0.02 inch leak pressure standard x 0.2]	0.02 inch orifice high-flow	A
—	EVAP pressure more than [0.02 inch leak pressure standard x 0.2]	Vacuum pump stuck OFF	B

*: The DTCs relating to the EVAP system displayed on a hand-held tester when checking.

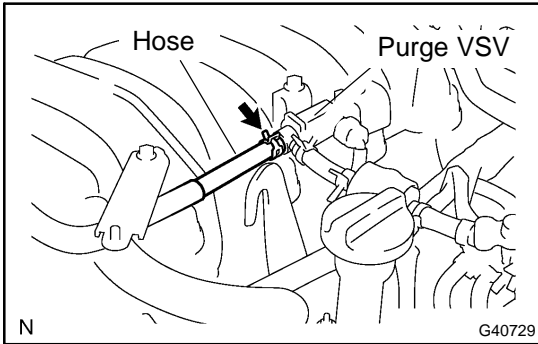
HINT:

The 0.02 inch leak pressure standard is the value determined in step 2/5.

A → Go to step 30

B → Go to step 23

12 | PERFORM ACTIVE TEST USING HAND-HELD TESTER(PURGE VSV)



- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II/ ACTIVE TEST / EVAP VSV.
- (b) Disconnect the hose (connected to the canister) from the purge VSV.
- (c) Start the engine.
- (d) On the tester, turn off the purge VSV (EVAP VSV: OFF).
- (e) Use your finger to confirm that the purge VSV has no suction.
- (f) Using the tester, turn on the purge VSV (EVAP VSV: ON).
- (g) Use your finger to confirm that the purge VSV has suction.

Result:

Test Results	Suspected Trouble Areas	Proceed To
No suction when purge VSV turned OFF, and suction applied when tuned ON	Purge VSV normal	A
Suction applied when purge VSV turned OFF	Purge VSV stuck open	B
No suction when purge VSV turned ON	<ul style="list-style-type: none"> • Purge VSV stuck closed • Problems with EVAP hose between purge VSV and throttle body 	C

B → **Go to step 14**

C → **Go to step 15**

A

13 CHECK FUEL TANK CAP ASSY

- (a) Check that the fuel tank cap is correctly installed.
 (b) Confirm that the fuel tank cap is tightened until a few click sounds are heard.

HINT:

If an EVAP tester is available, check the fuel tank cap using the tester.

- (1) Remove the fuel tank cap and install it onto a fuel tank cap adapter.
- (2) Connect an EVAP tester pump hose to the adapter, and pressurize to 3.2 to 3.7 kPa (24 to 28 mmHg) using an EVAP tester pump.
- (3) Seal the adapter and wait for 2 minutes.
- (4) Check the pressure. If the pressure is 2 kPa (15 mmHg) or more, the fuel tank cap is normal.
- (5) Reinstall the fuel tank cap.

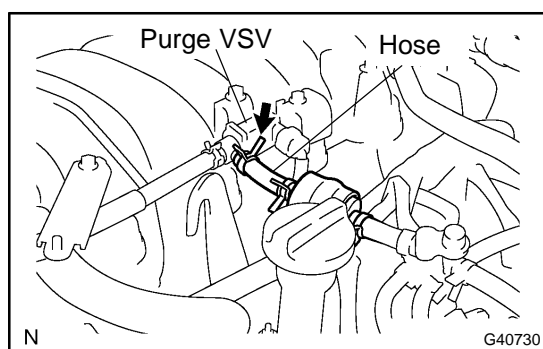
Result:

Test Results	Suspected Trouble Areas	Proceed To
Fuel tank cap correctly installed	—	A
Fuel tank cap loose	<ul style="list-style-type: none"> • Fuel tank cap improperly installed • Defective fuel tank cap • Fuel tank cap does not meet OEM specifications 	B
No fuel tank cap	—	C

A → Go to step 29

B → Go to step 27

C → Go to step 28

14 INSPECT VACUUM SWITCHING VALVE ASSY NO.1

- (a) Turn the ignition switch to OFF.
- (b) Disconnect the V2 purge VSV connector.
- (c) Disconnect the hose (connected to the canister) from the purge VSV.
- (d) Start the engine.
- (e) Use your finger to confirm that the purge VSV has no suction.

Result:

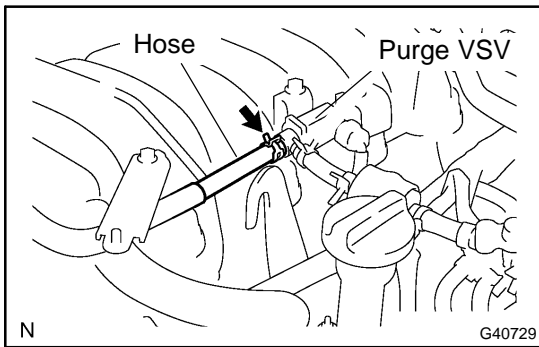
Test Results	Suspected Trouble Areas	Proceed To
No suction	ECM	A
Suction applied	Purge VSV	B

- (f) Reconnect the purge VSV connector.

A → Go to step 34

B → Go to step 30

15 CHECK EVAP HOSE(PURGE VSV - THROTTLE BODY)



- (a) Disconnect the hose (connected to the throttle body) from the purge VSV.
- (b) Start the engine.
- (c) Use your finger to confirm that the hose has suction.

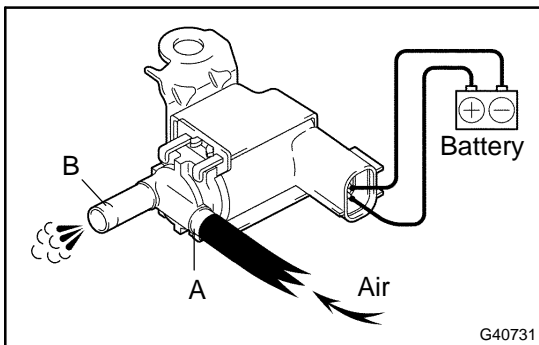
Result:

Test Results	Suspected Trouble Areas	Proceed To
Suction applied	EVAP hose between purge VSV and throttle body normal	A
No suction	<ul style="list-style-type: none"> • Throttle body • EVAP hose between purge VSV and throttle body 	B

B Go to step 26

A

16 INSPECT VACUUM SWITCHING VALVE ASSY NO.1(PURGE VSV)



- (a) Remove the purge VSV.
- (b) Apply battery voltage to the terminals of the purge VSV.
- (c) Blow air into port A and check that air is discharged from the port B.

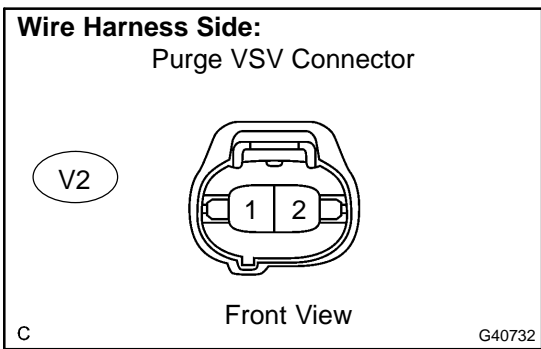
Result:

Test Results	Suspected Trouble Areas	Proceed To
Suction applied	EVAP hose between purge VSV and throttle body normal	A
No suction	<ul style="list-style-type: none"> • Throttle body • EVAP hose between purge VSV and throttle body 	B

B Go to step 31

A

17 CHECK WIRE HARNESS AND CONNECTOR(POWER SOURCE OF PURGE VSV)



- (a) Disconnect the V2 purge VSV connector.
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between terminal 1 of the purge VSV connector and the body ground.

Result:

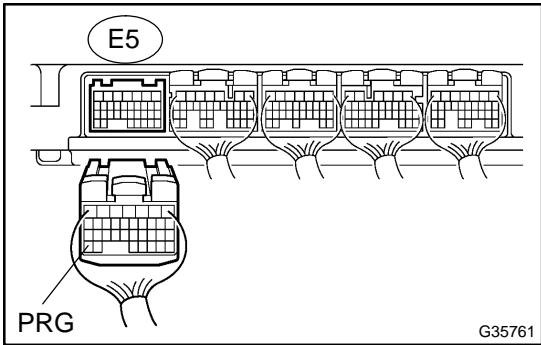
Test Results	Suspected Trouble Areas	Proceed To
Between 11 V and 14 V	Normal	A
Other than result above	Wire harness or connectors between purge VSV and ECM	B

- (d) Reconnect the purge VSV connector.

B Go to step 32

A

18 CHECK WIRE HARNESS AND CONNECTOR(PURGE VSV - ECM)

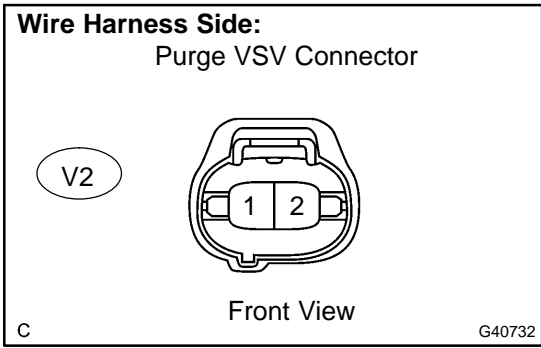


- (a) Disconnect the E5 ECM connector and the V2 purge VSV connector.
- (b) Check the resistance.

Standard:

Tester Connections	Specified Conditions
PRG (E5-34) - VSV (V2-1)	Below 1 Ω
PRG (E5-34) - Body ground	10 kΩ or higher
VSV (V2-1) - Body ground	10 kΩ or higher

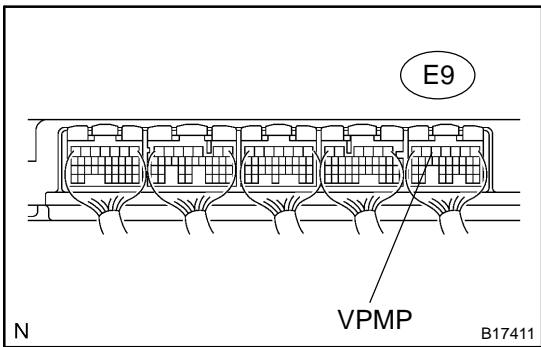
- (c) Reconnect the ECM connector.
- (d) Reconnect the purge VSV connector.



OK Go to step 35

NG Go to step 32

19 PERFORM ACTIVE TEST USING HAND-HELD TESTER(FOR VENT VALVE)



- (a) Turn the ignition switch to ON.
- (b) On the hand-held tester, select the following menu items: DIAGNOSIS/ ENHANCED OBD II/ ACTIVE TEST/ VENT VALVE (ALONE).
- (c) Measure the voltage between terminal VPMP of the ECM connector and the body ground when the vent valve is turned ON (close) and OFF (vent) using the tester.

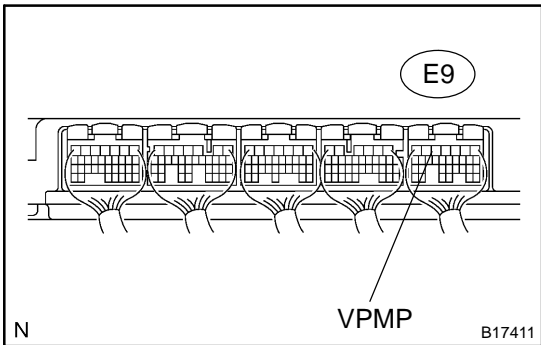
Result:

Test Results	Suspected Trouble Areas	Proceed To
Between 9 V and 14 V when OFF Below 3 V when ON	Vent valve	A
Below 3 V when OFF and ON	ECM	B

A Go to step 22

B Go to step 35

20 PERFORM ACTIVE TEST USING HAND-HELD TESTER(FOR VENT VALVE)



- (a) Turn the ignition switch to ON.
- (b) On the hand-held tester, select the following menu items: DIAGNOSIS/ ENHANCED OBD II/ ACTIVE TEST/ VENT VALVE (ALONE).
- (c) Measure the voltage between terminal VPMP of the ECM connector and the body ground when the vent valve is turned ON (close) and OFF (vent) using the tester.

Result:

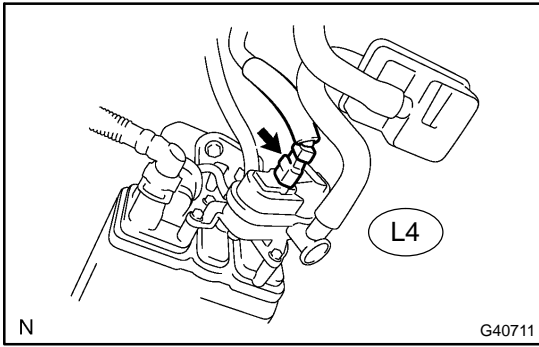
Test Results	Suspected Trouble Areas	Proceed To
Below 3 V when OFF and ON	Power source of vent valve	A
Between 9 V and 14 V when OFF Below 3 V when ON	Vent valve	B
Between 9 V and 14 V when OFF and ON	ECM	C

B Go to step 24

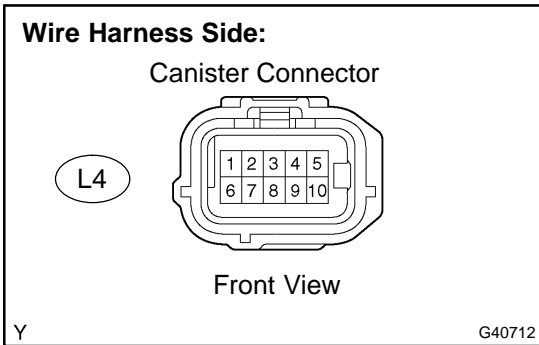
C Go to step 35

A

21 INSPECT PUMP MODULE(POWER SOURCE FOR VENT VALVE)



- (a) Turn the ignition switch to OFF.
- (b) Disconnect the L4 canister connector.
- (c) Turn the ignition switch to ON.
- (d) Measure the voltage between terminal 9 of the canister connector and the body ground.



Result:

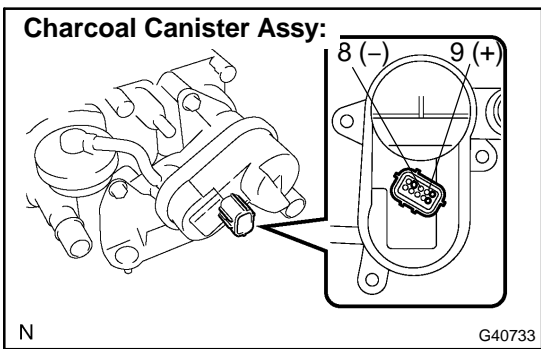
Test Results	Suspected Trouble Areas	Proceed To
Between 9 V and 14 V	Normal	A
Between 0 V and 3 V	Power source wire harness of vent valve	B

- (e) Reconnect the canister connector.

B → **Go to step 32**

A

22 INSPECT PUMP MODULE(VENT VALVE OPERATION)



- (a) Disconnect the L4 canister connector.
- (b) Turn the ignition switch to OFF.
- (c) Apply the battery voltage to terminals 9 and 8 of the pump module.
- (d) Touch the pump module to confirm the vent valve operation.

Result:

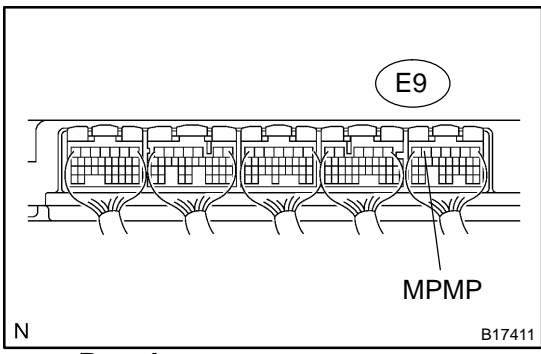
Test Results	Suspected Trouble Areas	Proceed To
Operating	Wire harness between vent valve and ECM	A
Not operating	Vent valve	B

- (e) Reconnect the casister connector.

A → Go to step 32

B → Go to step 30

23 PERFORM ACTIVE TEST USING HAND-HELD TESTER(FOR PUMP MODULE(VACUUM PUMP))



- (a) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VACUUM PUMP (ALONE).
- (b) Measure the voltage between terminal MPMP of the ECM connector and the body ground when the vacuum pump is turned ON and OFF using the tester.

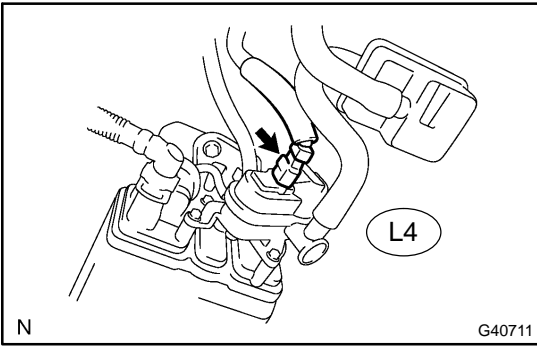
Result:

Tests Results	Suspected Trouble Areas	Proceed To
Between 0 V and 3 V when OFF Between 9 V and 14 V when ON	ECM normal	A
Between 9 V and 14 V when OFF Between 0 V and 3 V when ON	ECM	B

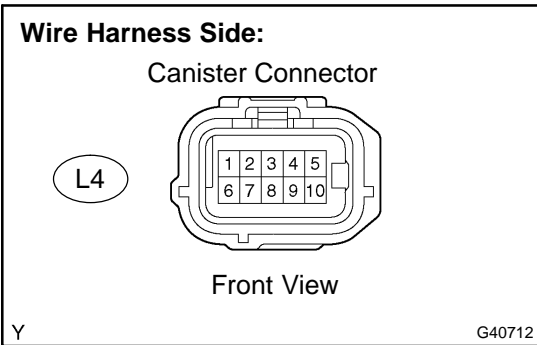
B → Go to step 35

A

24 | CHECK WIRE HARNESS AND CONNECTOR(PUMP MODULE - ECM)



- (a) Turn the ignition switch to OFF.
- (b) Disconnect the L4 canister connector.
- (c) Turn the ignition switch to ON.
- (d) On the hand-held tester, select the following menu items:DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VACUUM PUMP (ALONE).
- (e) Turn the vacuum pump ON.
- (f) Measure the voltage between terminal 1 of the canister connector and the body ground.



Result:

Test Results	Suspected Trouble Areas	Proceed To
Between 9 V and 14 V	Normal	A
Between 0 V and 3 V	Wire harness between ECM and vacuum pump	B

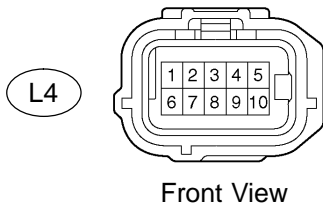
- (g) Reconnect the casister connector.

B → **Go to step 32**

A

25 CHECK WIRE HARNESS AND CONNECTOR(PUMP MODULE - GROUND)**Wire Harness Side:**

Canister Connector



Y

G40712

- (a) Disconnect the L4 canister connector.
- (b) Turn the ignition switch to OFF.
- (c) Check the resistance between terminal 6 of the canister connector and the body ground.

Result:

Test Results	Suspected Trouble Areas	Proceed To
Below 1 Ω	Vacuum pump	A
10 k Ω or more	Wire harness between vacuum pump and body ground	B

- (d) Reconnect the canister connector.

A**Go to step 30****B****Go to step 32****26 INSPECT THROTTLE W/MOTOR BODY ASSY**

- (a) Stop the engine.
- (b) Disconnect the EVAP hose from the throttle body.
- (c) Start the engine.
- (d) Use your finger to confirm that the port of the throttle body has suction.

Result:

Test Results	Suspected Trouble Areas	Proceed To
Suction applied	EVAP hose between throttle body and purge VSV	A
No suction	Throttle body	B

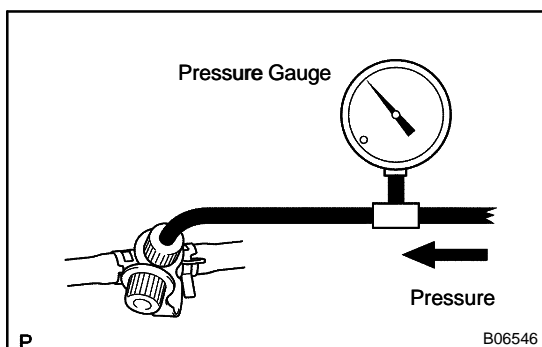
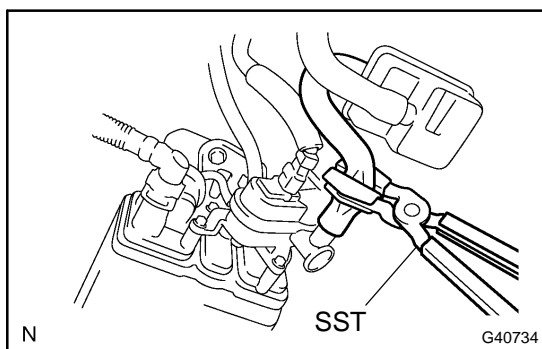
A**Go to step 33****B****Go to step 34****27 CORRECTLY REINSTALL OR REPLACE FUEL TANK CAP****HINT:**

- When reinstalling the fuel tank cap, tighten it until a few click sounds are heard.
- When replacing the fuel tank cap, use a fuel tank cap that meets OEM specifications, and install it until a few click sounds are heard.

NEXT**Go to step 37****28 REPLACE FUEL TANK CAP ASSY****HINT:**

When installing the fuel tank cap, tighten it until a few click sounds are heard.

NEXT**Go to step 37**

29 REPAIR EVAP LEAK PART

- (a) Prepare a rubber hose with a 15 to 18.5 mm inside diameter.
- (b) Reinstall the fuel tank cap.
- (c) Disconnect the atmospheric side hose of the pump module.
- (d) Connect the rubber tube to the pump module.
- (e) Using SST, pinch the rubber tube to close the canister passage to air.
SST 00002-6872A
- (f) Connect a pressure gauge (SST) to the service port (green cap near the air cleaner box).
- (g) Pressurize the EVAP system to 3.2 to 3.7 kPa (24 to 28 mmHg).
- (h) Apply soapy water to the piping and connecting parts of the EVAP system. Look for areas where bubbles appear. This indicates leaking points.
- (i) Repair or replace leaking point.

HINT:

- If the system has leaks, a whistling sound will be heard.
- Disconnect the hose between the canister and the fuel tank from the canister. Close the canister hose connected to the fuel tank, and conduct an inspection. In this way, the fuel tank can be excluded as an area suspected of causing fuel leaks.

NEXT > Go to step 36

30 REPLACE CHARCOAL CANISTER ASSY

NEXT > Go to step 37

31 REPLACE VACUUM SWITCHING VALVE ASSY NO.1(PURGE VSV)

- (a) Disconnect the connector and the hoses from the purge VSV.
- (b) Remove the purge VSV.
- (c) Install a new purge VSV.
- (d) Reconnect the connector and hoses.

NEXT > Go to step 37

32 REPAIR OR REPLACE WIRE HARNESS AND CONNECTOR

NEXT > Go to step 37

33 REPLACE EVAP HOSE(THROTTLE BODY - PURGE VSV)

NEXT > Go to step 37

34	INSPECT THROTTLE W/MOTOR BODY ASSY
-----------	---

- (a) Remove the throttle body (see page 10-7).
- (b) Check that the EVAP purge port of the throttle body is not clogged. If necessary, replace the throttle body.

NEXT	Go to step 37
-------------	----------------------

35	REPLACE ECM (See page 10-16)
-----------	-------------------------------------

NEXT	Go to step 37
-------------	----------------------

36	REPAIR OR REPLACE PARTS AND COMPONENTS INDICATED BY OUTPUT DTCS
-----------	--

- (a) Repair the malfunctioning areas indicated by the DTCs that had been confirmed when the vehicle was brought in.

NEXT

37	PERFORM EVAP SYSTEM CHECK(AUTO OPERATION)
-----------	--

NOTICE:

- In the EVAP SYSTEM CHECK (AUTO OPERATION), the series of 4 EVAP SYSTEM CHECK steps is performed automatically. It takes a maximum of approximately 15 minutes.
 - Do not perform the EVAP SYSTEM CHECK when the fuel tank is more than 90 % full because the cut-off valve may be closed and making the leak check of the fuel tank unavailable.
 - Do not run the engine in this step.
 - When the temperature of the fuel is 35°C (95°F) or more, a large amount of vapor forms and any check results become inaccurate. When performing an EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).
- (a) Clear DTCs (see page 05-44).
- (b) On the hand-held tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / AUTO OPERATION.
- (c) After the SYSTEM CHECK is completed, check for pending DTCs by selecting the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.

HINT:

If no pending DTC is found, the repair has been successfully completed.

NEXT

COMPLETED

Monitor Confirmation

HINT:

After a repair, check Monitor Status by performing the Key-Off Monitor Confirmation and Purge Flow Monitor Confirmation described below.

1. KEY-OFF MONITOR CONFIRMATION

(a) Preconditions

The monitor will not run unless:

- The vehicle has been driven for 10 minutes or more (in a city area or on a free way)
- The fuel tank is less than 90 % full
- The altitude is less than 8,000 ft (2,400 m)
- The Engine Coolant Temperature (ECT) is between 4.4°C and 35°C (40°F and 95°F)
- The Intake Air Temperature (IAT) is between 4.4°C and 35°C (40°F and 95°F)
- The vehicle remains stationary (the vehicle speed is 0 mph [0 km/h])

(b) Monitor Conditions

- (1) Allow the engine to idle for at least 5 minutes.
- (2) Turn the ignition switch to OFF and wait for 6 hours (8 or 10.5 hours).

HINT:

Do not start the engine until checking MONITOR STATUS. If the engine is started, the steps described above must be repeated.

(c) Monitor Status

- (1) Connect a hand-held tester to the DLC3.
- (2) Turn the ignition switch to ON and turn the tester ON.
- (3) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / MONITOR STATUS.
- (4) Check the Monitor Status displayed on the tester.

HINT:

If INCMP is displayed, the monitor is not completed. Make sure that the preconditions have been met, and perform the Monitor Conditions again.

2. PURGE FLOW MONITOR CONFIRMATION (P0441)

HINT:

Perform this monitor confirmation after the Key-Off Monitor Confirmation shows COMPL (complete).

(a) Preconditions

The monitor will not run unless:

- The vehicle has been driven for 10 minutes or more (in a city area or on a free way)
- The ECT is between 4.4°C and 35°C (40°F and 95°F)
- The IAT is between 4.4°C and 35°C (40°F and 95°F)

(b) Monitor Conditions

- (1) Release the pressure from the fuel tank by removing and reinstalling the fuel tank cap.
- (2) Warm the engine up until the ECT reaches more than 75°C (167°F).
- (3) Increase the engine speed to 3,000 rpm once.
- (4) Allow the engine to idle and turn A/C ON for 1 minute.

(c) Monitor Status

- (1) Turn the ignition switch to OFF (where ON or the engine is running).
- (2) Connect a hand-held tester to the DLC3.
- (3) Turn the ignition switch to ON and turn the tester ON.
- (4) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / MONITOR STATUS.
- (5) Check the Monitor Status displayed on the tester.

HINT:

If INCMP is displayed, the monitor is not completed. Make sure that the preconditions have been met, and perform the Monitor Conditions again.

MONITOR RESULT

Refer to page 05-28 for detailed information.

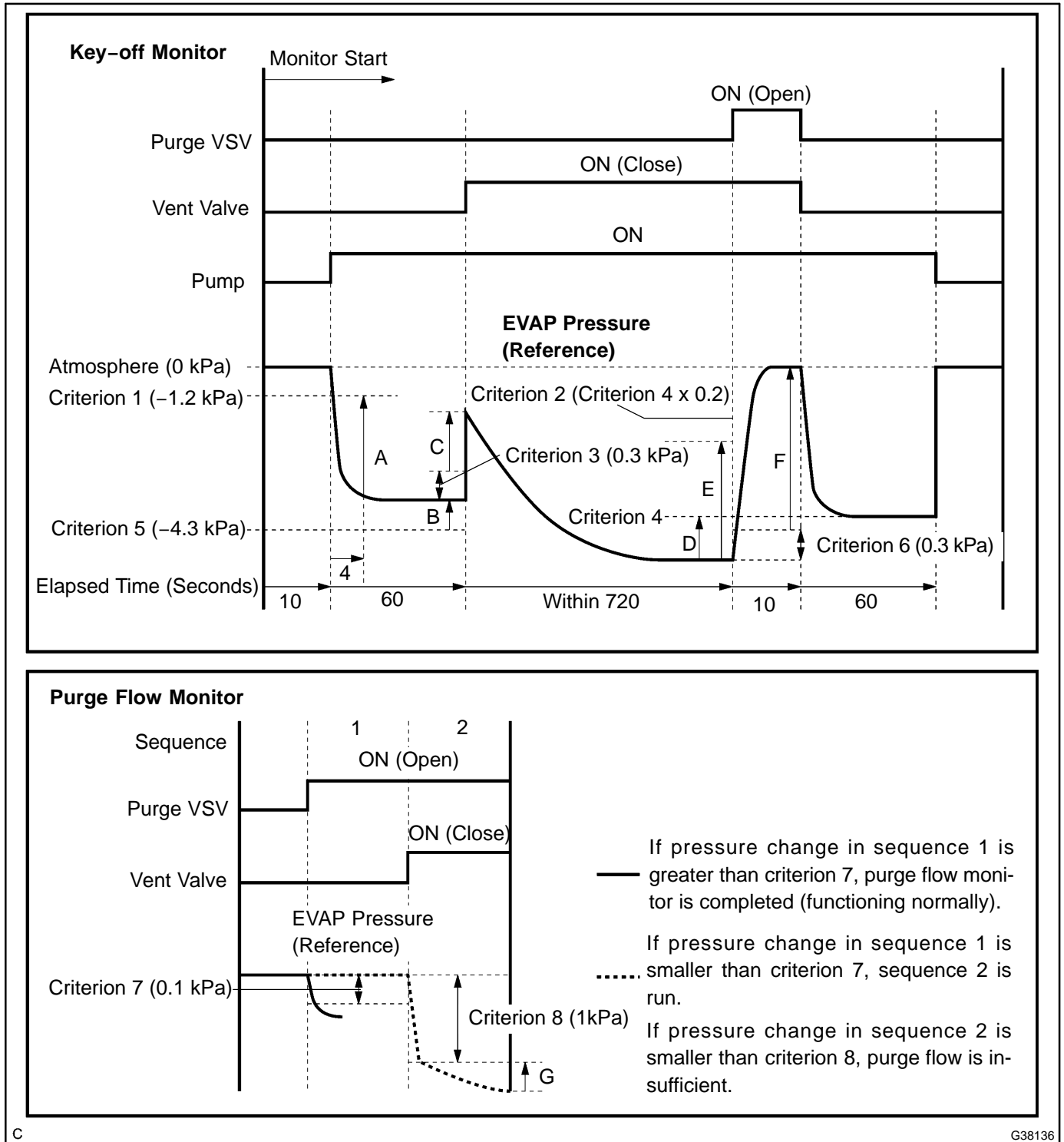
The test value and test limit information are described as shown in the following table. Check the monitor result and test values after performing the monitor drive pattern (refer to "Confirmation Monitor").

- MID (Monitor Identification Data) is assigned to each emissions-related component.
- TID (Test Identification Data) is assigned to each test value.
- Scaling is used to calculate the test value indicated on generic OBD II scan tools.

EVAP-Key-off monitor

MID	TID	Scaling	Description of Test Value	Minimum Test Limit	Maximum Test Limit
\$3D	\$C9	Multiply by 0.01 (kPa)	Test value for small leak (P0456): Refer to pressure D*.	Minimum test limit for small leak	Maximum test limit for small leak
\$3D	\$CA	Multiply by 0.01 (kPa)	Test value for gross leak (P0455): Refer to pressure E*.	Minimum test limit for gross leak	Maximum test limit for gross leak
\$3D	\$CB	Multiply by 0.01 (kPa)	Test value for vacuum pump stuck OFF (P2401): Refer to pressure A*.	Minimum test limit for vacuum pump stuck OFF	Maximum test limit for vacuum pump stuck OFF
\$3D	\$CD	Multiply by 0.01 (kPa)	Test value for vacuum pump stuck ON (P2402): Refer to pressure A*.	Minimum test limit for vacuum pump stuck ON	Maximum test limit for vacuum pump stuck ON
\$3D	\$CE	Multiply by 0.01 (kPa)	Test value for vent valve stuck OFF (vent) (P2420): Refer to pressure C*.	Minimum test limit for vent valve stuck ON	Maximum test limit for vent valve stuck ON
\$3D	\$CF	Multiply by 0.01 (kPa)	Test value for vent valve stuck ON (closed) (P2419): Refer to pressure A*.	Minimum test limit for vent valve stuck OFF	Maximum test limit for vent valve stuck OFF
\$3D	\$D0	Multiply by 0.01 (kPa)	Test value for 0.02 inch orifice low flow (P043E): Refer to pressure B*.	Minimum test limit for 0.02 inch orifice low flow	Maximum test limit for 0.02 inch orifice low flow
\$3D	\$D1	Multiply by 0.01 (kPa)	Test value for 0.02 inch orifice high flow (P043F): Refer to pressure A*.	Minimum test limit for 0.02 inch orifice high flow	Maximum test limit for 0.02 inch orifice high flow
\$3D	\$D4	Multiply by 0.01 (kPa)	Test value for purge VSV stuck close (P0441): Refer to pressure F*.	Minimum test limit for purge VSV stuck close	Maximum test limit for purge VSV stuck close
\$3D	\$D5	Multiply by 0.01 (kPa)	Test value for purge VSV stuck open (P0441): Refer to pressure E*.	Minimum test limit for purge VSV stuck open	Maximum test limit for purge VSV stuck open
\$3D	\$D7	Multiply by 0.01 (kPa)	Test value for purge flow (P0441): Refer to pressure G*.	Minimum test limit for purge flow	Maximum test limit for purge flow

* Pressure A to G are indicated as shown in the diagram below.



C

G38136

ECM POWER SOURCE CIRCUIT

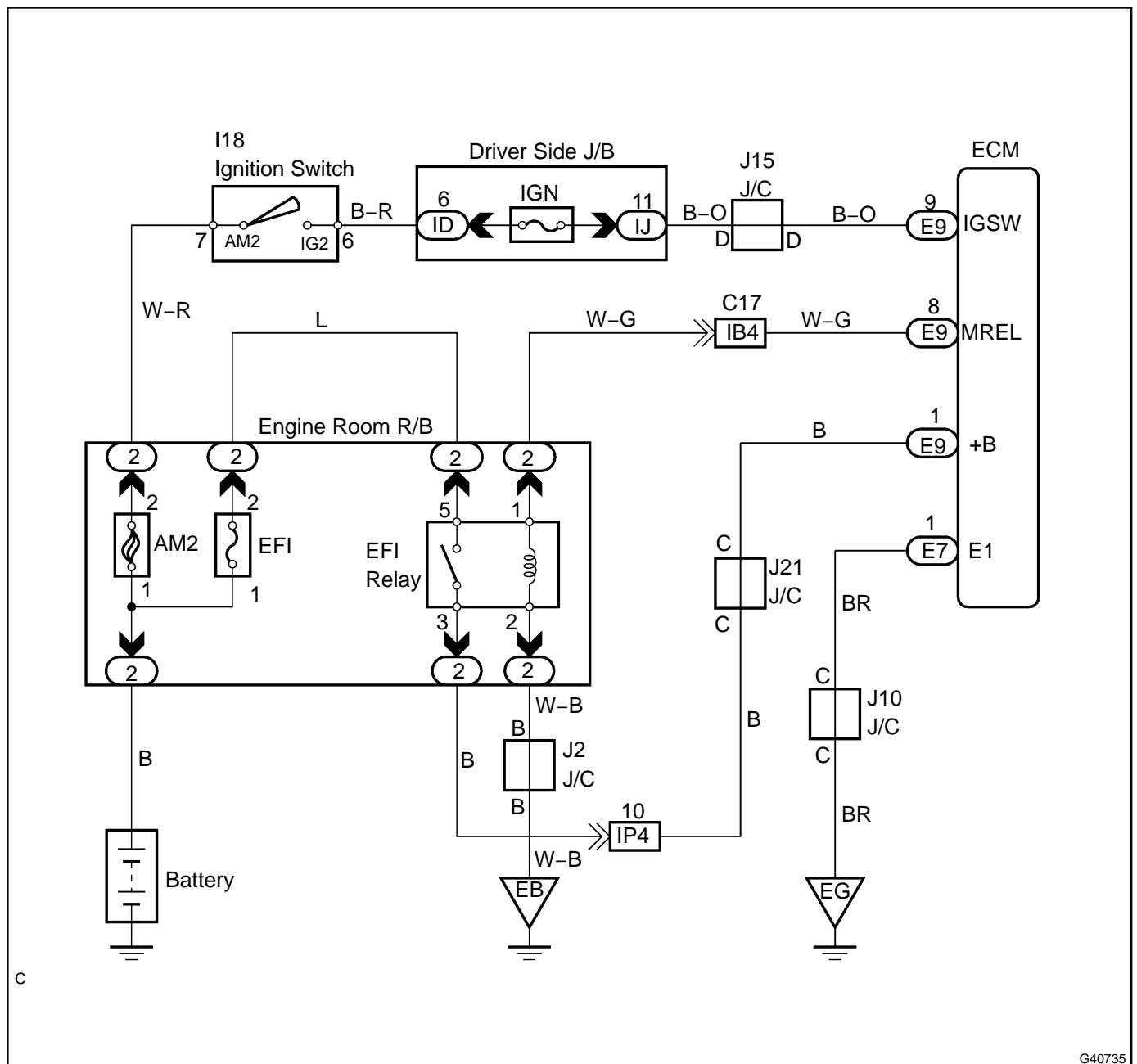
CIRCUIT DESCRIPTION

When the ignition switch is turned ON, the positive battery voltage is applied to terminal IGSW of the ECM and the EFI relay (Marked: EFI) control circuit in the ECM sends a signal to terminal MREL of the ECM switching on the EFI relay.

This signal causes current to flow to the coil, closing the contacts of the EFI relay and supplying power to terminal +B of the ECM.

If the ignition switch is turned OFF, the ECM holds the EFI relay for a maximum of 2 seconds to allow for the initial setting of the throttle valve.

WIRING DIAGRAM

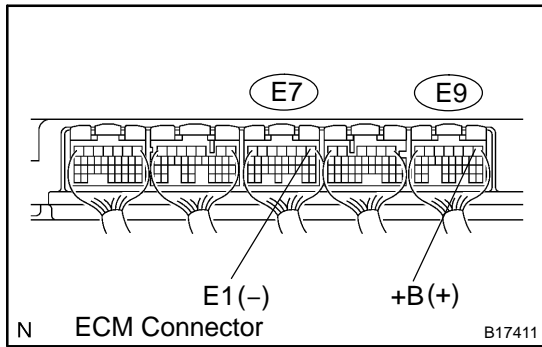


c

G40735

INSPECTION PROCEDURE

1 INSPECT ECM(+B VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the terminals of the E7 and E9 ECM connectors.

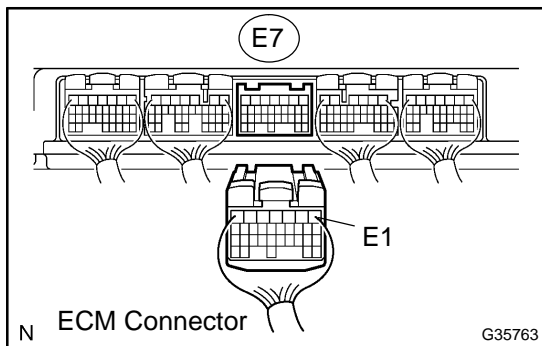
Standard:

Tester Connection	Specified Condition
+B (E9-1) - E1 (E7-1)	9 to 14 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-34)**

NG

2 CHECK HARNESS AND CONNECTOR(ECM - BODY GROUND)



- (a) Disconnect the E7 ECM connector.
- (b) Check the resistance between the wire harness side connector.

Standard (Check for open):

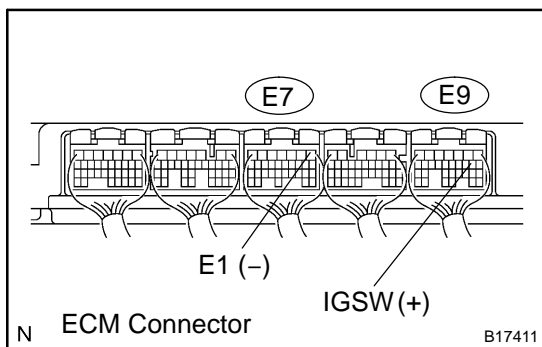
Tester Connection	Specified Condition
E1 (E7-1) - Body ground	Below 1 Ω

- (c) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT ECM(IGSW VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the terminals of the E7 and E9 ECM connectors.

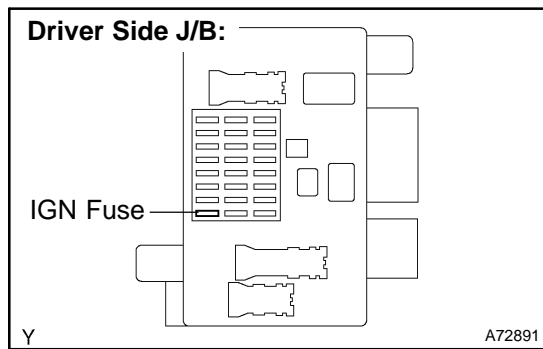
Standard:

Tester Connection	Specified Condition
IGSW (E9-9) - E1 (E7-1)	9 to 14 V

OK → **Go to step 6**

NG

4 CHECK FUSE(IGN FUSE)

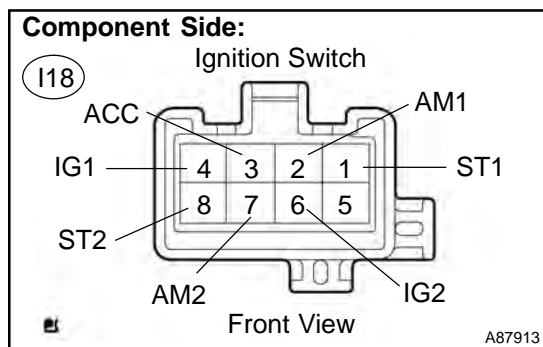


- (a) Remove the IGN fuse from the driver side J/B.
- (b) Check for continuity in the IGN fuse.
Standard: Continuity
- (c) Reinstall the IGN fuse.

NG CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED IGN FUSE, AND REPLACE IGN FUSE

OK

5 INSPECT IGNITION OR STARTER SWITCH ASSY



- (a) Disconnect the I18 ignition switch connector.
- (b) Measure the resistance between the connector terminals shown in the chart below.

Standard:

Switch Position	Tester Connection	Specified Condition
LOCK	All Terminals	10 kΩ or higher
ACC	2-3	Below 1 Ω
ON	2-3, 2-4, 6-7	Below 1 Ω
START	1-2, 2-4, 6-7, 6-8	Below 1 Ω

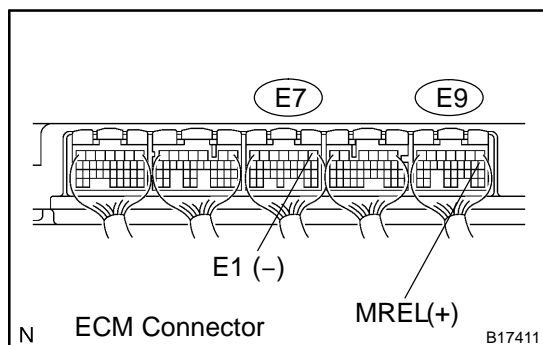
- (c) Reconnect the ignition switch connector.

NG REPLACE IGNITION OR STARTER SWITCH ASSY

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (BATTERY - IGNITION SWITCH, IGNITION SWITCH - ECM)

6 INSPECT ECM(MREL VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the terminals of the E7 and E9 ECM connectors.

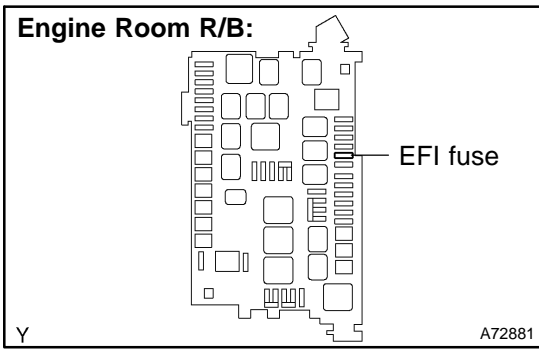
Standard:

Tester Connection	Specified Condition
MREL (E9-8) - E1 (E7-1)	9 to 14 V

NG REPLACE ECM (See page 10-16)

OK

7 CHECK FUSE(EFI FUSE)

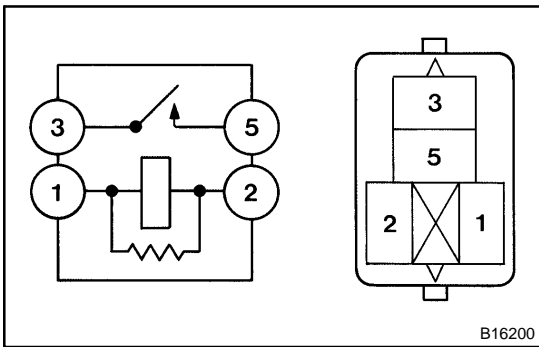


- (a) Remove the EFI fuse from the engine room R/B.
- (b) Check for continuity in the EFI fuse.
Standard: Continuity
- (c) Reinstall the EFI fuse.

NG CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED EFI FUSE, AND REPLACE EFI FUSE

OK

8 INSPECT EFI RELAY



- (a) Remove the EFI relay from the engine room R/B.
- (b) Check for continuity in the EFI relay.

Standard:

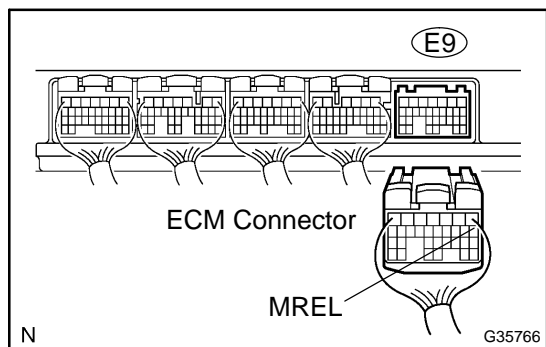
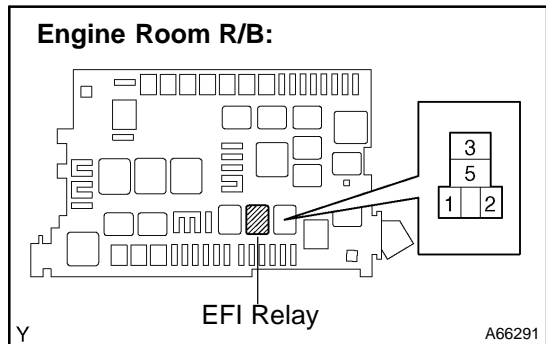
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the EFI relay.

NG REPLACE EFI RELAY

OK

9 CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM, EFI RELAY - BODY GROUND)



- (a) Check the harness and connector between the EFI relay and ECM.
 - (1) Remove the EFI relay from the engine room R/B.
 - (2) Disconnect the E9 ECM connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (EFI relay terminal 1) - MREL (E9-8)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B (EFI relay terminal 1) or MREL (E9-8) - Body ground	10 kΩ or higher

- (4) Reinstall the EFI relay.
- (5) Reconnect the ECM connector.
- (b) Check the harness and connector between the EFI relay and body ground.
 - (1) Remove the EFI relay from the engine room R/B.
 - (2) Check the resistance between the wire harness side connector and body ground.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (EFI relay terminal 2) - Body ground	Below 1 Ω

- (3) Reinstall the EFI relay.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

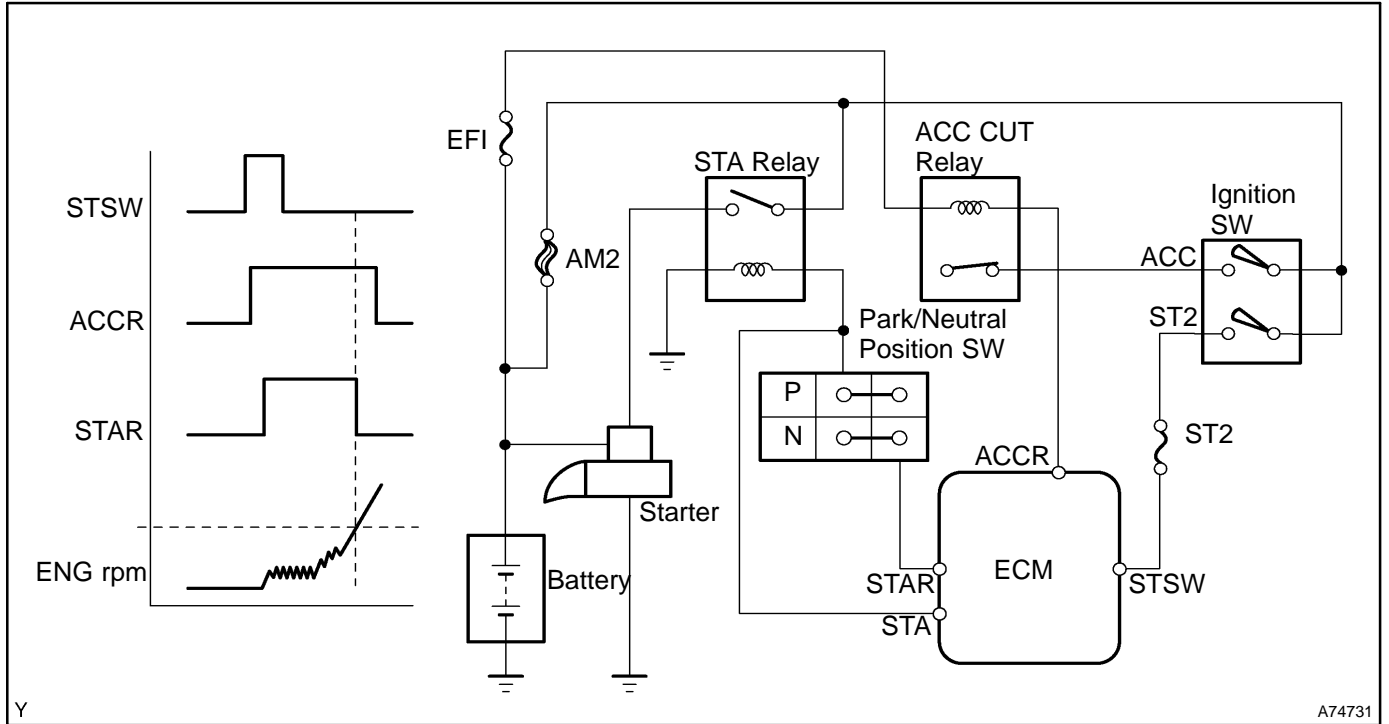
NG

CHECK AND REPAIR HARNESS AND CONNECTOR (TERMINAL +B OF ECM - BATTERY POSITIVE TERMINAL)

CRANKING HOLDING FUNCTION CIRCUIT

CIRCUIT DESCRIPTION

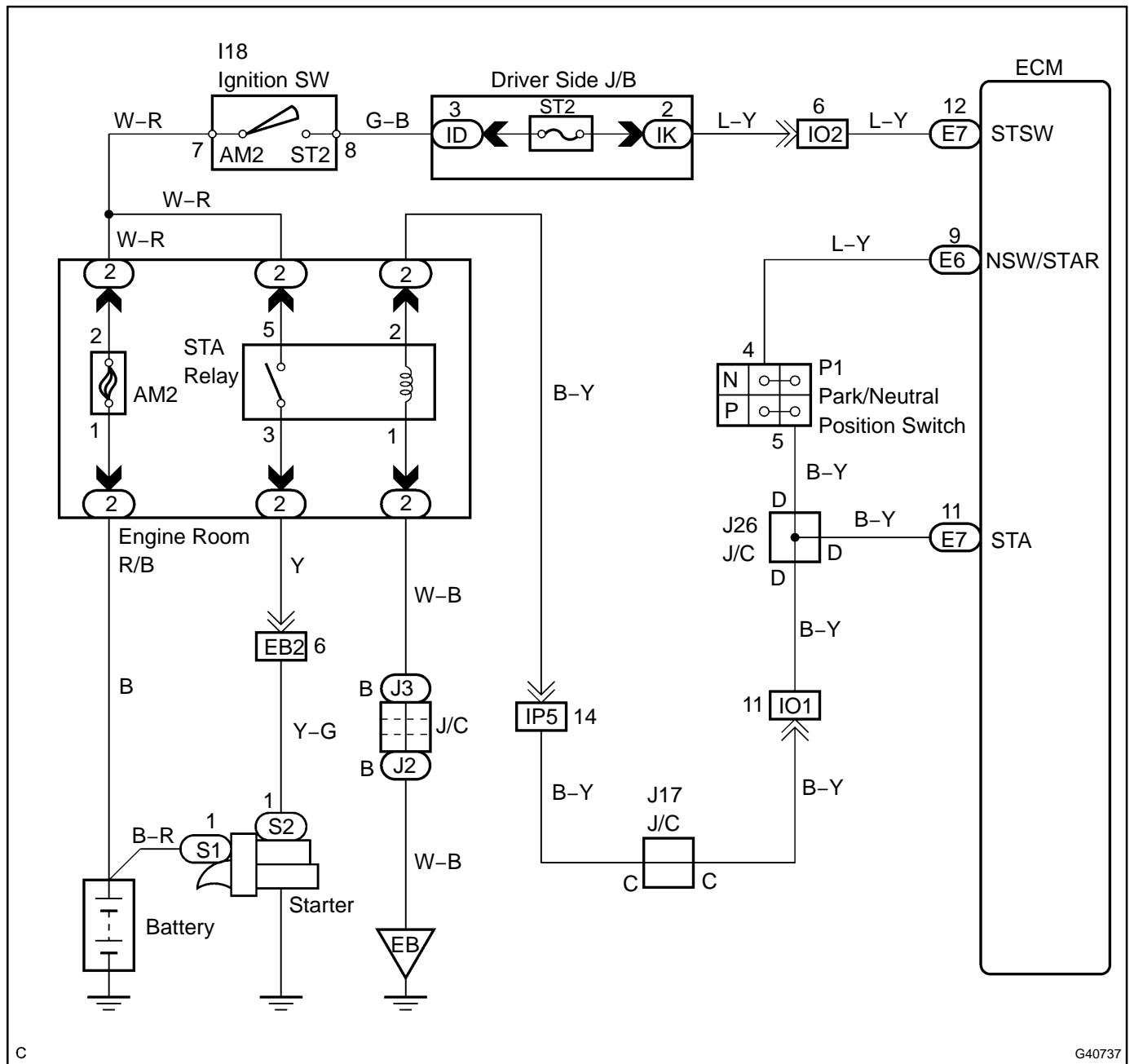
The starter is controlled by the ECM, when the ECM detects a start signal (STSW) from the ignition switch, this system monitors the engine speed (NE) and continues to operate the starter until it has determined that the engine has started (engine speed reaches approximately 500 rpm). If the engine is already running and the ignition switch is turned to START, the ECM will not operate the starter.



Y

A74731

WIRING DIAGRAM



C

G40737

INSPECTION PROCEDURE

1 CHECK OPERATION OF ENGINE CRANKING

- (a) When turning the ignition switch to the START position, check if the starter motor starts.

OK

CHECK FOR INTERMITTENT PROBLEMS
(See page 05-13)

NG

2 READ VALUE OF HAND-HELD TESTER(STA SIGNAL)

- (a) On the hand-held tester, select the item: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
(b) Read the values.

Standard:

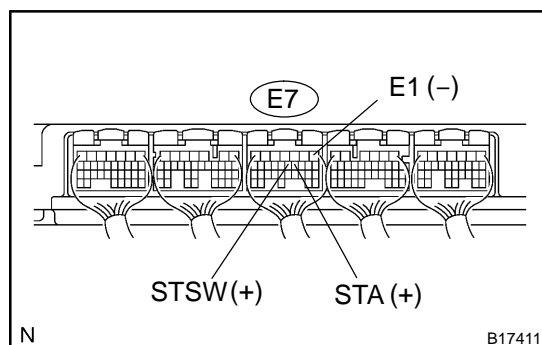
Ignition Switch Position	ON	START
STARTER SIG	OFF	ON

OK

Go to step 5

NG

3 INSPECT ECM(STA AND STSW VOLTAGE)



- (a) Measure the voltage between the terminals of the E7 ECM connectors, while cranking the engine (ignition switch is in the START position).

Standard:

Tester Connection	Specified Condition
STA (E7-11) - E1 (E7-1)	9 to 14 V
STSW (E7-12) - E1 (E7-1)	9 to 14 V

Result:

Terminal STA	Terminal STSW	Proceed to
9 to 14 V	9 to 14 V	A
0 V	9 to 14 V	B
0 V	0 V	C

B

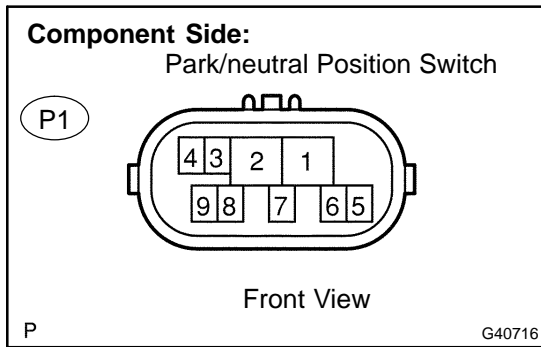
REPLACE ECM (See page 10-16)

C

Go to step 9

A

4 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



- (a) Disconnect the P1 park/neutral position switch connector.
- (b) Measure the resistance between each terminal shown below when the shift lever is moved to each position.

Standard:

Shift Position	Tester Connection	Specified Condition
P	2 - 6, 4 - 5	Below 1 Ω
R	1 - 2	Below 1 Ω
N	2 - 9, 4 - 5	Below 1 Ω
D.4	2 - 7	Below 1 Ω
3	2 - 3	Below 1 Ω
2-L	2 - 8	Below 1 Ω

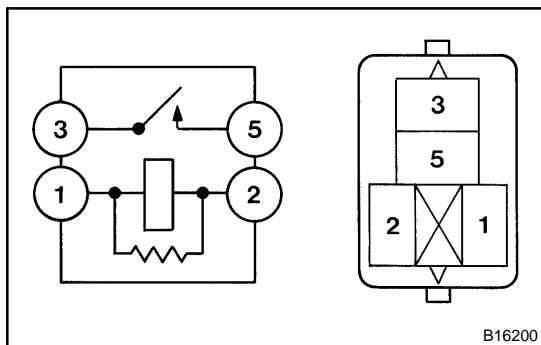
- (1) Reconnect the park/neutral position switch connector.

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH ASSY**

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)

5 INSPECT STARTER RELAY ASSY



- (a) Remove the starter relay from the engine room R/B.
- (b) Check for continuity in the starter relay.

Standard:

Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

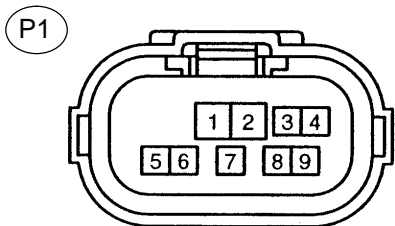
- (c) Reinstall the starter relay.

NG → **REPLACE STARTER RELAY ASSY**

OK

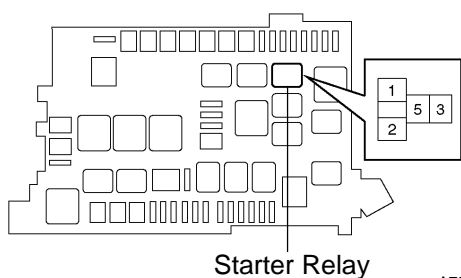
6 CHECK HARNESS AND CONNECTOR(PARK/NEUTRAL POSITION SWITCH - STARTER RELAY, STARTER RELAY)

Wire Harness Side



Park/Neutral position switch Connector G40738

Engine Room R/B:



Y

Starter Relay

A72892

- (a) Check the harness and connector between the park/neutral position switch and starter relay.
- (1) Disconnect the P1 park/neutral position switch connector.
 - (2) Remove the starter relay from the engine room R/B.
 - (3) Check for continuity between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Park/neutral position switch (P1-5) - Engine room R/B (Starter relay terminal 2)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Park/neutral position switch (P1-5) or Engine room R/B (Starter relay terminal 2) - Body ground	10 k Ω or higher

- (4) Reconnect the park/neutral position switch connector.
 - (5) Reinstall the starter relay.
- (b) Check the harness and connector between the starter relay and body ground.
- (1) Remove the starter relay from the engine room R/B.
 - (2) Check for continuity between the starter relay and body ground.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (Starter relay terminal 1) - Body ground	Below 1 Ω

- (3) Reinstall the starter relay.

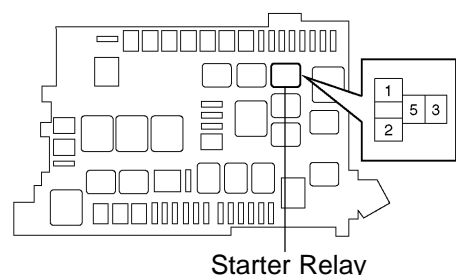
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7 INSPECT ENGINE ROOM RELAY BLOCK(STARTER RELAY VOLTAGE)

Engine Room R/B:



Y

Starter Relay

A72892

- (a) Remove the starter relay from the engine room R/B.
- (b) Measure the voltage between the terminal of the engine room R/B and body ground.

Standard:

Tester Connection	Specified Condition
Engine room R/B (Starter relay terminal 5) - Body ground	9 to 14 V

- (1) Reinstall the starter relay.

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (STARTER RELAY - BATTERY)

OK

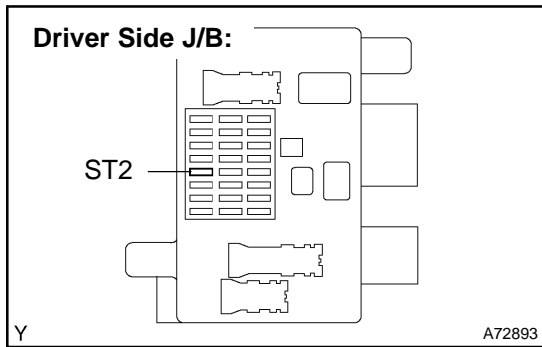
8 INSPECT STARTER ASSY (See page 19-1)

NG REPAIR OR REPLACE STARTER ASSY

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (STARTER RELAY - STARTER, STARTER - BATTERY)

9 CHECK FUSE(ST2)

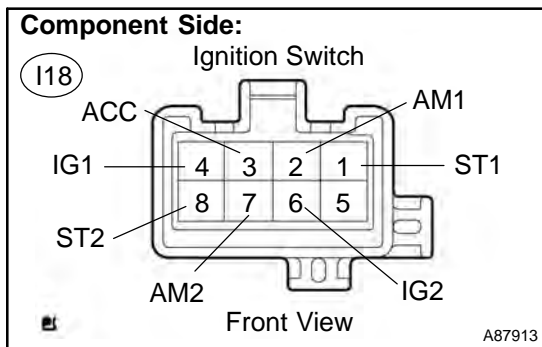


- (a) Remove the ST2 fuse from the driver side J/B.
- (b) Check for continuity in the ST2 fuse.
Standard: Continuity
- (c) Reinstall the ST2 fuse.

NG CHECK FOR SHORT IN ALL HARNESS AND COPONENTS CONNECTED ST2 FUSE, AND REPLACE ST2 FUSE

OK

10 INSPECT IGNITION OR STARTER SWITCH ASSY



- (a) Disconnect the I18 ignition switch connector.
- (b) Measure the resistance between the connector terminals shown in the chart below.
Standard:

Switch Position	Tester Connection	Specified Condition
LOCK	All Terminals	10 kΩ or higher
ACC	2-3	Below 1 Ω
ON	2-3, 2-4, 6-7	Below 1 Ω
START	1-2, 2-4, 6-7, 6-8	Below 1 Ω

- (c) Reconnect the I18 ignition switch connector.

NG REPLACE IGNITION OR STARTER SWITCH ASSY

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (ECM - IGNITION SWITCH, IGNITION SWITCH - BATTERY)

FUEL PUMP CONTROL CIRCUIT

CIRCUIT DESCRIPTION

Refer to DTC P0230 on page 05-168.

WIRING DIAGRAM

Refer to DTC P0230 on page 05-168.

INSPECTION PROCEDURE

Hand-held tester:

1 CHECK FUEL PUMP OPERATION (See page 11-6)

(a) Check if there is pressure in the fuel inlet hose.

HINT:

If there is fuel pressure, you will hear the fuel flowing sound.

OK Go to step 10

NG

2 PERFORM ACTIVE TEST BY HAND-HELD TESTER(OPERATE CIRCUIT OPENING RELAY)

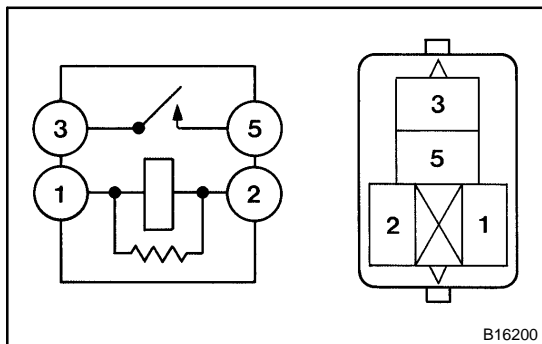
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) Selsct the item: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / FUEL PUMP / SPD.
- (d) Check the relay operation when it is operated by the hand-held tester.

Standard: Operating sound can be heard from the relay.

OK Go to step 5

NG

3 INSPECT CIRCUIT OPENING RELAY



(a) Remove the circuit opening relay from the engine room R/B.

(b) Check for continuity in the circuit opening relay.

Standard:

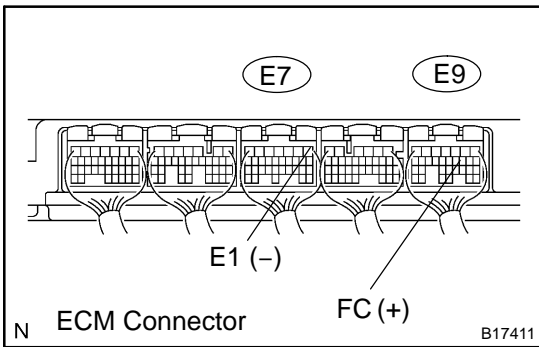
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

(c) Reinstall the circuit opening relay.

NG REPLACE CIRCUIT OPENING RELAY

OK

4 INSPECT ECM(FC VOLTAGE)



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the terminals of the E7 and E9 ECM connectors.

Standard:

Tester Connection	Specified Condition
FC (E9-10) - E1 (E7-1)	9 to 14 V

OK → **REPLACE ECM (See page 10-16)**

NG

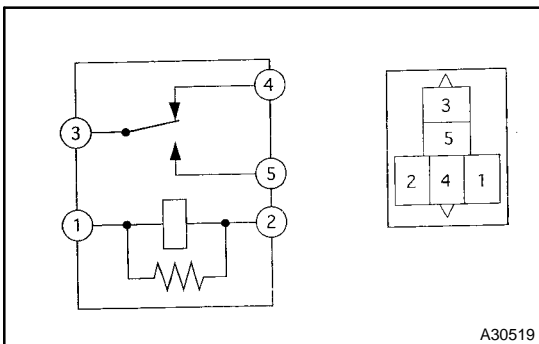
CHECK AND REPAIR HARNESS AND CONNECTOR (ECM - CIRCUIT OPENING RELAY, CIRCUIT OPENING RELAY - IGNITION SWITCH)

5 CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05-442)

NG → **REPAIR OR REPLACE**

OK

6 INSPECT FUEL PUMP RELAY ASSY



- (a) Remove the fuel pump relay from the engine room R/B.
- (b) Check for continuity in the fuel pump relay.

Standard:

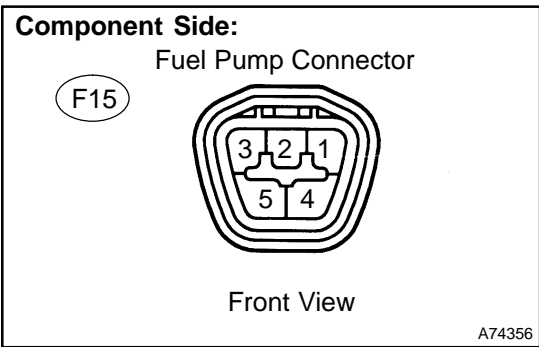
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 4	
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the fuel pump relay.

NG → **REPLACE FUEL PUMP RELAY ASSY**

OK

7 INSPECT FUEL PUMP



- (a) Inspect fuel pump resistance.
 - (1) Disconnect the F15 fuel pump connector.
 - (2) Measure the resistance between the terminals of the fuel pump connector.

Standard:

Tester Connection	Specified Condition
4 - 5	0.2 to 3.0 Ω at 20°C (68°F)

- (3) Reconnect the fuel pump connector.
- (b) Inspect fuel pump operation
 - (1) Apply battery voltage to F15-4 (+) and F15-5 (-) terminals. Check that the pump operates.

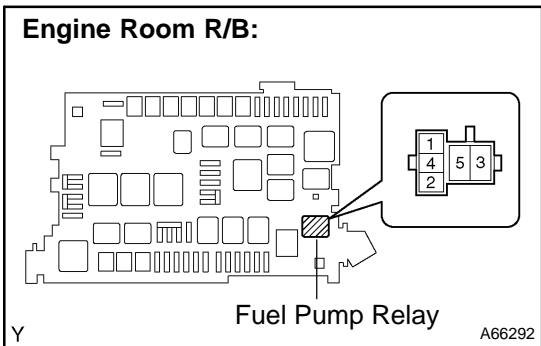
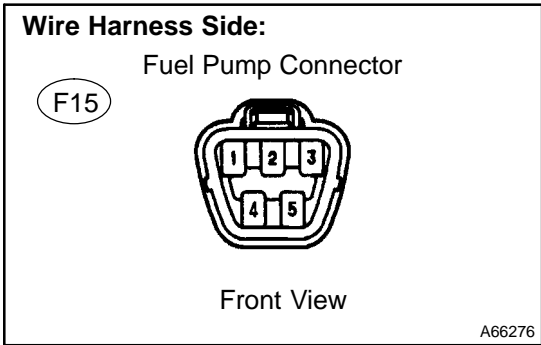
NOTICE:

- These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.
- Keep fuel pump as far away from the battery as possible.
- Always do the switching at the battery side.

NG → REPLACE FUEL PUMP

OK

8 CHECK HARNESS AND CONNECTOR(FUEL PUMP - FUEL PUMP RELAY, FUEL PUMP - BODY GROUND)



- (a) Check the harness and connector between the fuel pump and fuel pump relay.
- (1) Disconnect the F15 fuel pump connector.
 - (2) Remove the fuel pump relay from the engine room R/B.
 - (3) Check for continuity between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Fuel pump (F15-4) - Engine room R/B (Fuel pump relay terminal 4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Fuel pump (F15-4) or Engine room R/B (Fuel pump relay terminal 4) - Body ground	10 kΩ or higher

- (b) Check the harness and connector between the fuel pump and body ground.
- (1) Disconnect the F15 fuel pump connector.
 - (2) Check for continuity between the wire harness side connector and body ground.

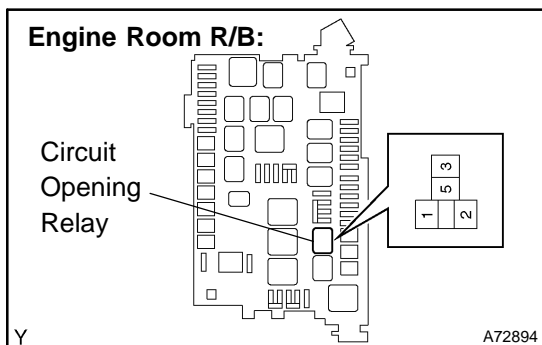
Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (Fuel pump relay terminal 5) - Body ground	Below 1 Ω

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

9 CHECK HARNESS AND CONNECTOR(CIRCUIT OPENING RELAY - FUEL PUMP RELAY)



- Remove the circuit opening relay from the engine room R/B.
- Remove the fuel pump relay from the engine room R/B.
- Check for continuity between the wire harness side connectors.

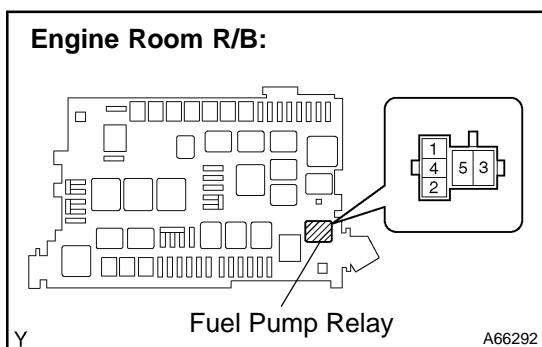
Standard (Check for open):

Tester Connection	Specified Condition
Circuit opening relay (3) - Engine room R/B (Fuel pump relay terminal 3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Circuit opening relay (3) or Engine room R/B (Fuel pump relay terminal 3) - Body ground	10 k Ω or higher

- Reinstall the circuit opening relay.
- Reinstall the fuel pump relay.



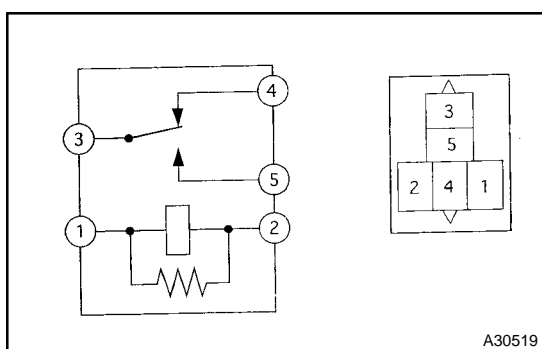
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPAIR HARNESS AND CONNECTOR (EFI RELAY - CIRCUIT OPENING RELAY)

10 INSPECT FUEL PUMP RELAY ASSY



- Remove the fuel pump relay from the engine room R/B.
- Check for continuity in the fuel pump relay.

Standard:

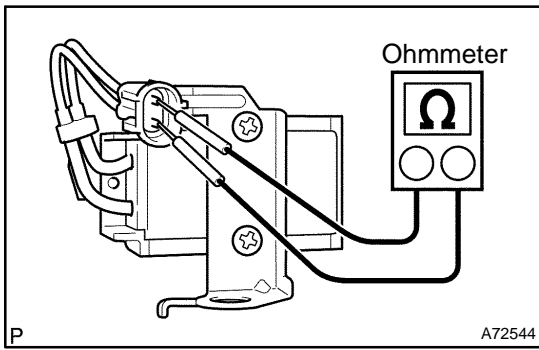
Tester Connection	Specified Condition
1 - 2	Continuity
3 - 4	
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage to terminals 1 and 2)

- Reinstall the fuel pump relay.

NG

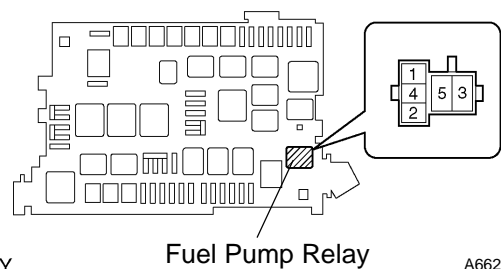
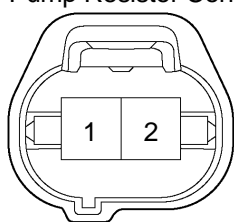
REPLACE FUEL PUMP RELAY ASSY

OK

11 INSPECT FUEL PUMP RESISTER(RESISTANCE)

- (a) Inspect the fuel pump resistor resistance.
(1) Measure the resistance between the terminals.
Resistance: 0.70 to 0.76 Ω at 20°C (68°F)

NG**REPLACE FUEL PUMP RESISTER****OK**

12 CHECK HARNESS AND CONNECTOR(FUEL PUMP RELAY - FUEL PUMP RESISTOR, FUEL PUMP RESISTOR - F)
Engine Room R/B:

Wire Harness Side:
Fuel Pump Resistor Connector
F6

Wire Harness Side:
Fuel Pump Connector
F15


- (a) Check the harness and connector between the fuel pump relay and fuel pump resistor.
- (1) Remove the fuel pump relay from the engine room R/B.
 - (2) Disconnect the F6 fuel pump resistor connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Engine room R/B (Fuel pump relay terminal 5) - Fuel pump resistor (F6-1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Engine room R/B (Fuel pump relay terminal 5) or Fuel pump resistor (F6-1) - Body ground	10 k Ω or higher

- (4) Reinstall the fuel pump relay.
 - (5) Reconnect the fuel pump resistor connector.
- (b) Check the harness and connector between the fuel pump resistor and fuel pump.
- (1) Disconnect the F6 fuel pump resistor connector.
 - (2) Disconnect the F15 fuel pump connector.
 - (3) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Fuel pump resistor (F6-2) - Fuel pump (F15-4)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Fuel pump resistor (F6-2) or Fuel pump (F15-4) - Body ground	10 k Ω or higher

- (c) Reconnect the fuel pump resistor connector.
- (d) Reconnect the fuel pump connector.

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-34)

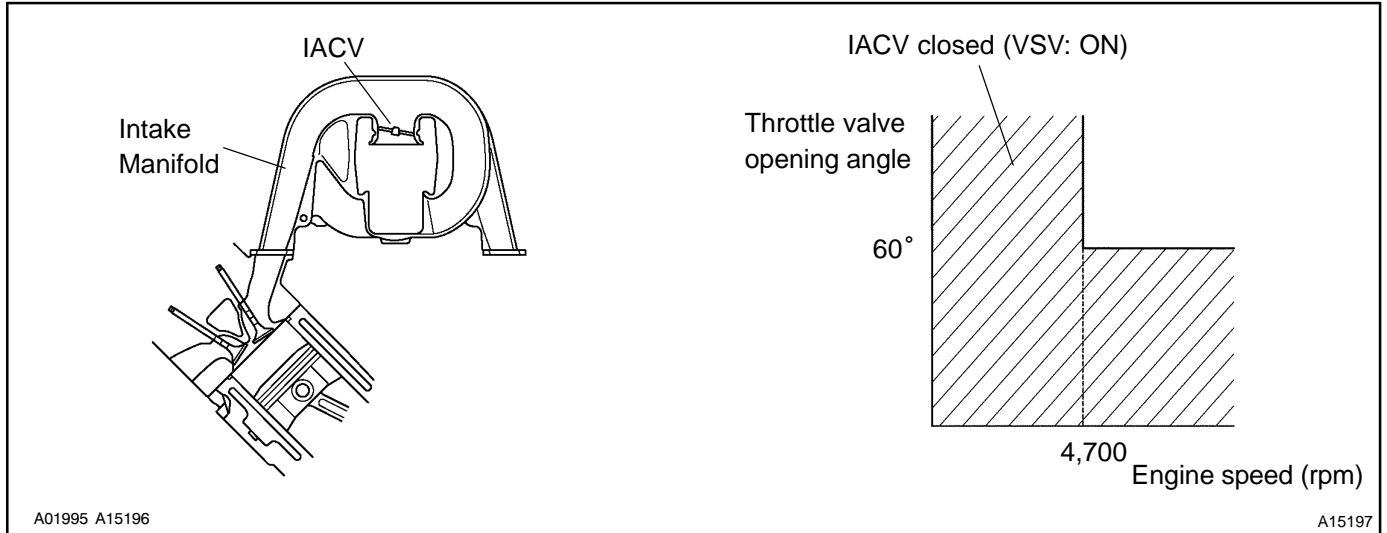
NG
REPAIR OR REPLACE HARNESS OR CONNECTOR

IACV CONTROL CIRCUIT

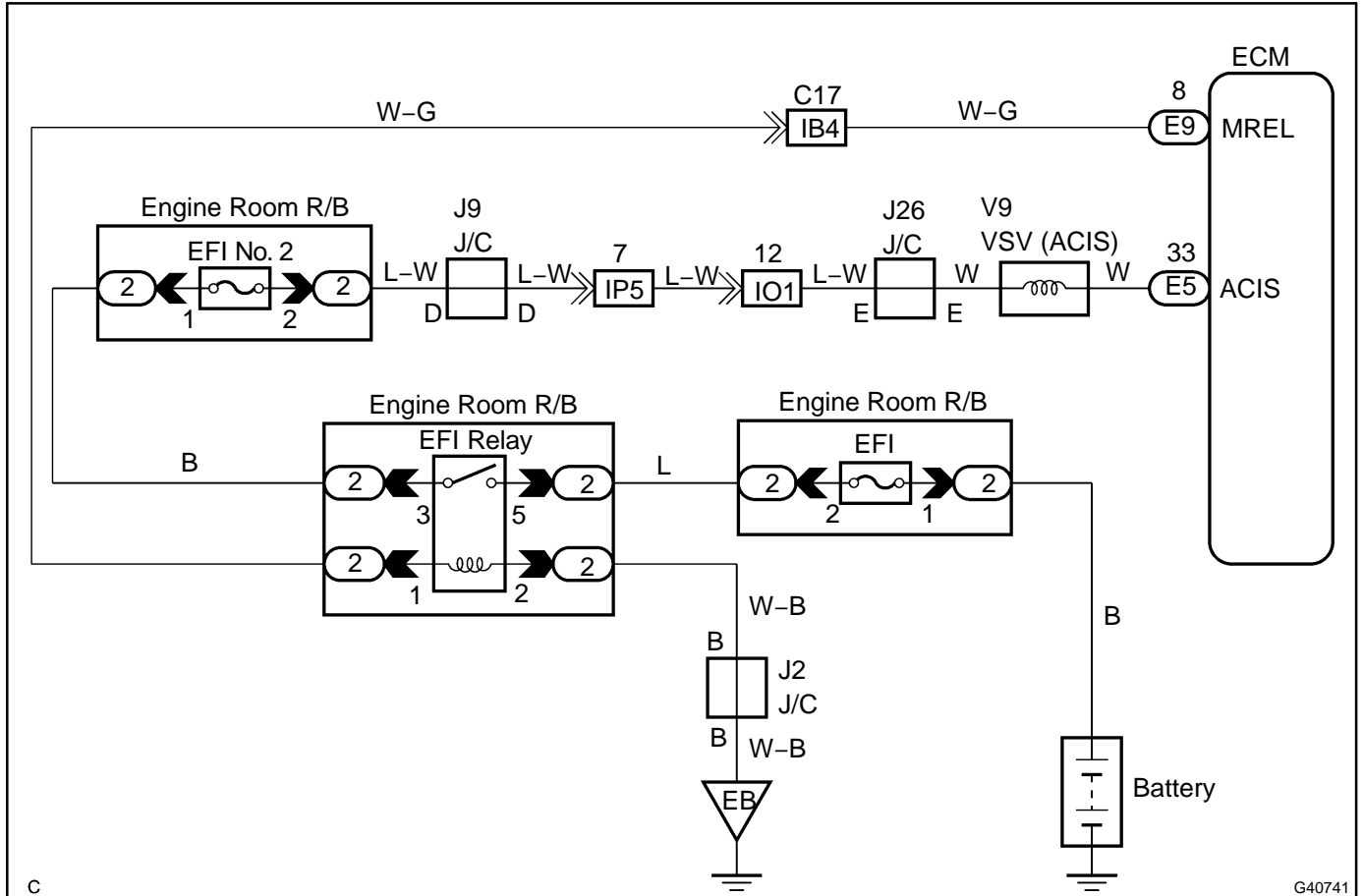
CIRCUIT DESCRIPTION

This circuit opens and closes the Intake Air Control Valve (IACV) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).

When the engine speed is 4,700 rpm or more and the throttle valve opening angle is 60° or more, the VSV is OFF, so the IACV is open. All the other times, the ECM turns the VSV ON and closes the IACV.

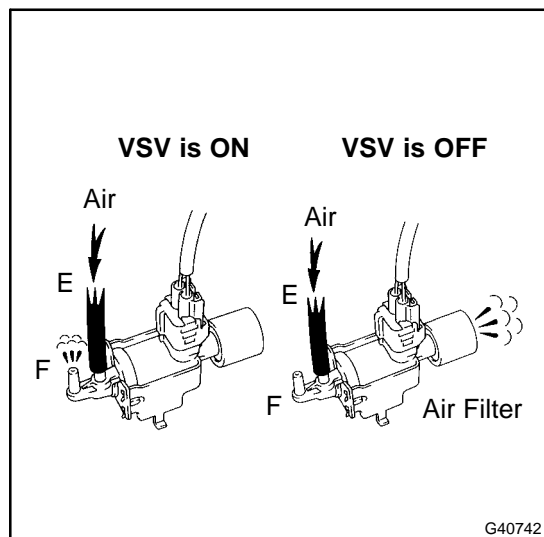


WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST USING HAND-HELD TESTER(OPERATE VSV FOR ACIS)



- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.
- (d) Check the operation of the VSV when the VSV is operated by the hand-held tester.

OK:

VSV is ON:

Air from port E flows out through port F.

VSV is OFF:

Air from port E flows out through the air filter.

OK

CHECK VACUUM TANK

NG

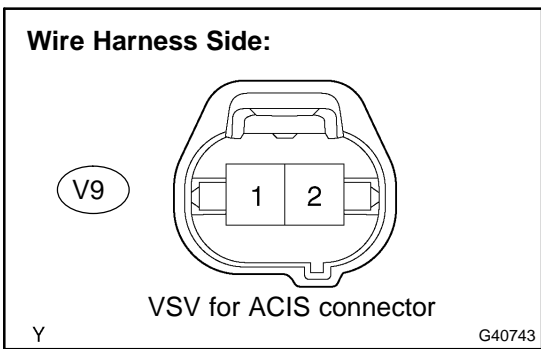
2 CHECK VSV FOR ACIS(OPERATION) (See page 13-2)

NG

REPLACE VSV FOR ACIS

OK

3 CHECK HARNESS AND CONNECTOR(EFI RELAY - ECM)



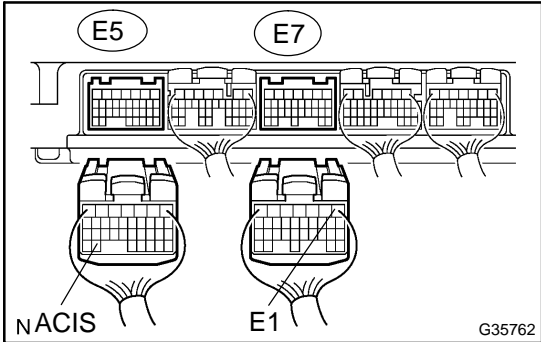
- (a) Check the wire harness between the VSV for ACIS and connector the ECM connector.
 - (1) Disconnect the V9 VSV for ACIS connector.
 - (2) Disconnect the E5 and E7 ECM connectors.
 - (3) Check for resistance between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VSV for ACIS (V9-2) - ACIS (E5-33)	Below 1 Ω

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
VSV for ACIS (V9-2) or ACIS (E5-33) - E1 (E7-1)	10 kΩ or higher



- (4) Reconnect the VSV connector.
- (5) Reconnect the ECM connector.

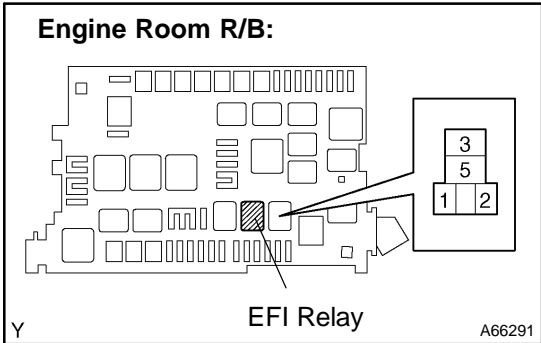
- (b) Check the wire harness between the VSV for ACIS connector and the EFI relay.

- (1) Disconnect the V9 VSV for ACIS connector.
- (2) Remove the EFI relay from the engine room R/B.
- (3) Check for resistance between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VSV for ACIS (V9-1) - EFI relay terminal 3 of R/B	Below 1 Ω

- (4) Reconnect the VSV connector.
- (5) Reinstall the EFI relay.



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM (See page 10-16)

MIL CIRCUIT

CIRCUIT DESCRIPTION

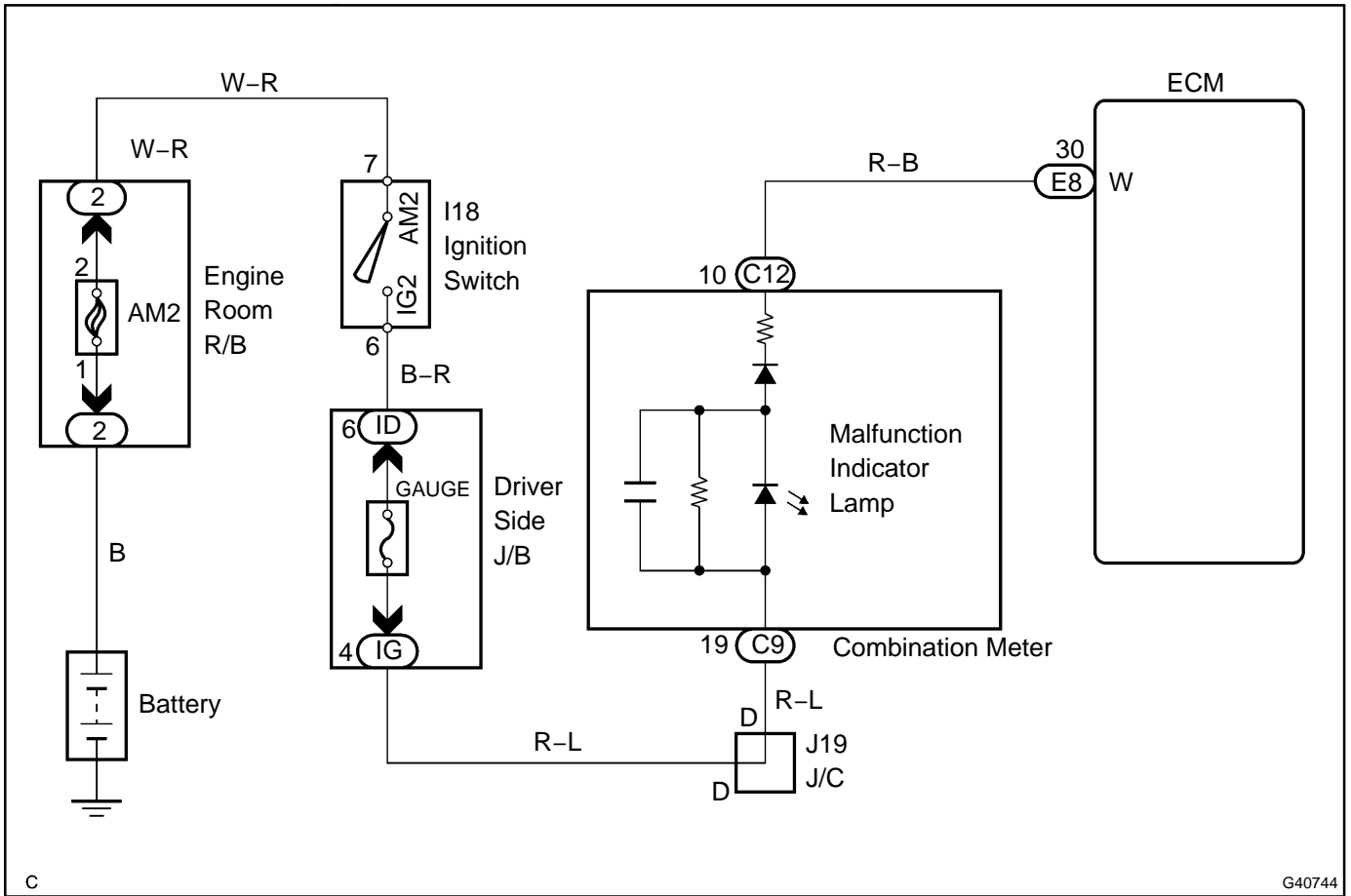
The MIL is used to indicate the ECM's detection of a vehicle malfunction.

The instrument panel GAUGE fuse provides the circuit power and the ECM provides the circuit ground that illuminates the MIL.

MIL operations should be checked visually:

The MIL should be illuminated when the ignition switch is first turned to on. If the MIL is always ON or OFF, use the hand-held tester or OBD II scan tool and follow the procedures below to determine the cause of the problem.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshoot each trouble symptom in accordance with the chart below.

MIL remains on	Start inspection from step 1
MIL is not illuminated	Start inspection from step 3

1 CLEAR DTC

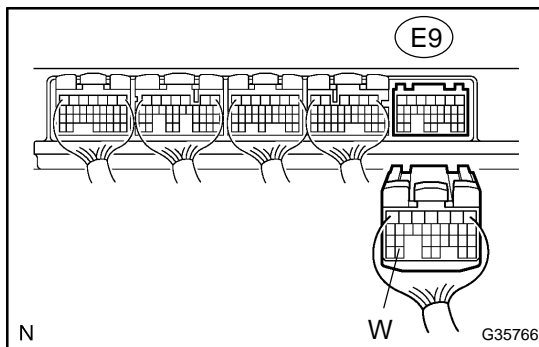
- (a) Connect the hand-held tester to the DLC 3.
- (b) Turn the ignition switch to ON and turn the hand-held tester ON.
- (c) Read the DTC (see page 05-44).
- (d) Clear the DTC (see page 05-44).
- (e) Check that MIL is not illuminated.

Standard: MIL is not illuminated

OK

**REPAIR CIRCUIT INDICATED BY OUTPUT DTC
(See page 05-60)**

NG

2 CHECK HARNESS AND CONNECTOR(CHECK FOR SHORT IN WIRE HARNESS)

- (a) Disconnect the E9 ECM connector.
 - (b) Turn the ignition switch to ON.
 - (c) Check that MIL is not illuminated.
- Standard: MIL is not illuminated**
- (d) Reconnect the ECM connector.

OK

REPLACE ECM (See page 10-16)

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)**3 CHECK MIL**

- (a) Check that MIL lights up when turning the ignition switch ON.

OK:

Standard: MIL lights up

OK

SYSTEM OK

NG

4 INSPECT COMBINATON METER

- (a) See the combination meter troubleshooting on page 05-2048.

OK

**REPAIR OR REPLACE BULB OR COMBINATION
METER**

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)

ELECTRONIC MODULATED SUSPENSION & REAR AIR SUSPENSION SYSTEM

056A4-04

HOW TO PROCEED WITH TROUBLESHOOTING

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS (See page [05-467](#))



3 CHECK AND CLEAR DTCs (See page [05-468](#))



4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (Go to step 5)

SYMPTOM OCCURS (Go to step 6)

5 SYMPTOM SIMULATION (See page [01-26](#))



6 DTC CHECK (See page [05-468](#))

NORMAL CODE (Go to step 7)

MALFUNCTION CODE (Go to step 8)

7 PROBLEM SYMPTOMS TABLE (See page [05-484](#))



8 DTC CHART (See page [05-477](#))



9 CIRCUIT INSPECTION (See page [05-486](#) to [05-554](#))



10	IDENTIFICATION OF PROBLEM
-----------	----------------------------------



11	REPAIR
-----------	---------------



12	CONFIRMATION TEST
-----------	--------------------------



END

HINT:

Step 3, 6, 9, 12:

Diagnostic steps permitting the use of the hand-held tester.

CUSTOMER PROBLEM ANALYSIS CHECK

Electronic Modulated Suspension & Rear Air Suspension System Check Sheet

Inspector's Name : _____

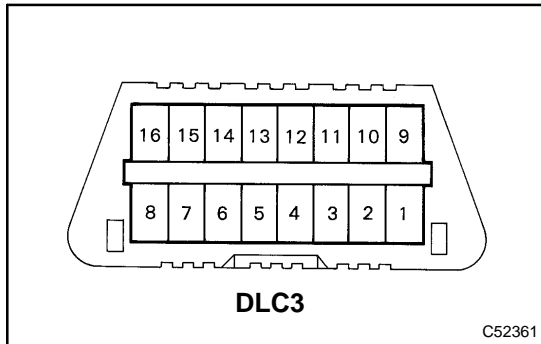
Customer's Name	_____	VIN	_____
		Production Date	/ /
		Licence No.	/ /
Date Vehicle Brought In	/ /	Odometer Reading	_____

Date Problem First Occurred		_____
How often Problem Occurs		<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times per day, month) <input type="checkbox"/> Once only
Conditions at Time of Problem Occurrence	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F (°C))
	Place	<input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner City <input type="checkbox"/> Hill (Up, Down) <input type="checkbox"/> Rough Road <input type="checkbox"/> Others

Symptoms	<input type="checkbox"/> Malfunction in vehicle height control	<input type="checkbox"/> Vehicle height cannot be changed by operating the height control switch <input type="checkbox"/> High speed control does not operate <input type="checkbox"/> Others ()
	<input type="checkbox"/> Malfunction in damping force control	<input type="checkbox"/> Damping force control does not operate
	<input type="checkbox"/> Indicator lamp does not come on	<input type="checkbox"/> Height control OFF indicator lamp does not come on <input type="checkbox"/> Height control indicator lamp does not come on
	<input type="checkbox"/> Others	_____

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)

PRE-CHECK



1. DIAGNOSIS SYSTEM

(a) Inspect the battery voltage.

Battery voltage: 11 to 14 V

If voltage is below 11 V, recharge the battery before proceeding.

(b) Check DLC3.

The vehicle's suspension control ECU uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

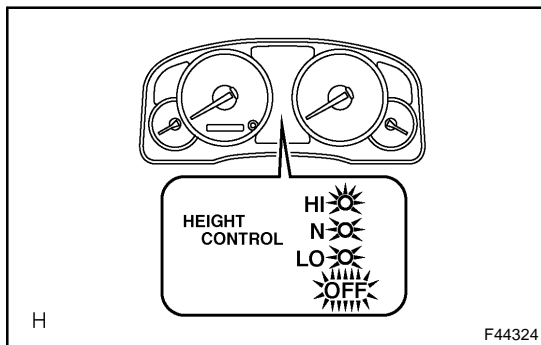
Verify conditions listed in table below:

Terminal No.	Connection / Voltage or Resistance	Condition
7	Bus + Line / Pulse generation	During transmission
4	Chassis Ground to Body Ground / 1 Ω or less	Always
16	Battery Positive to Body Ground / 9 to 14 V	Always

HINT:

If the hand-held tester display shows **UNABLE TO CONNECT TO VEHICLE** when the cable of the hand-held tester is connected to DLC3, the ignition switch is turned to ON and the tester is operated, there is a problem on the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's instruction manual.

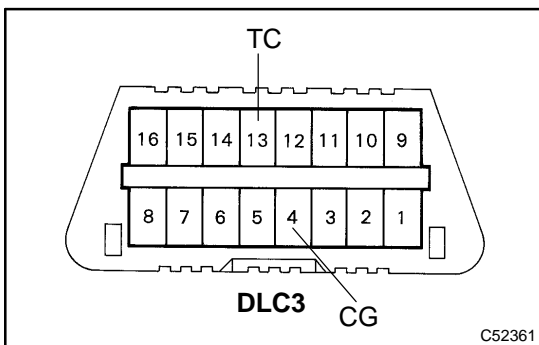
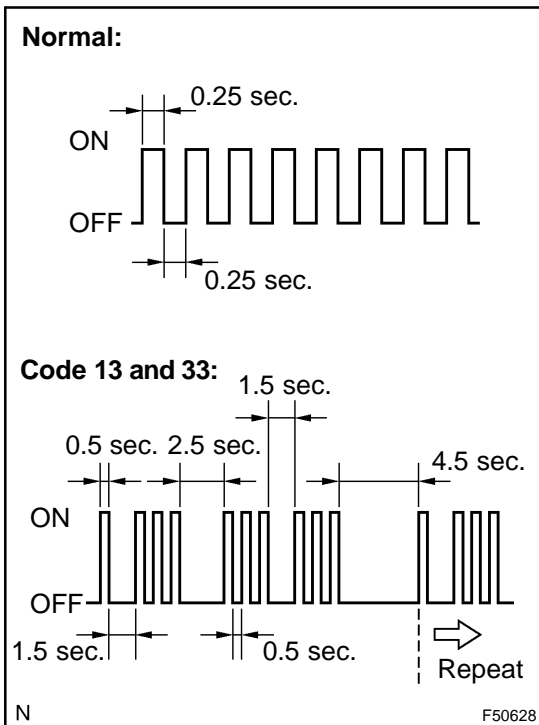
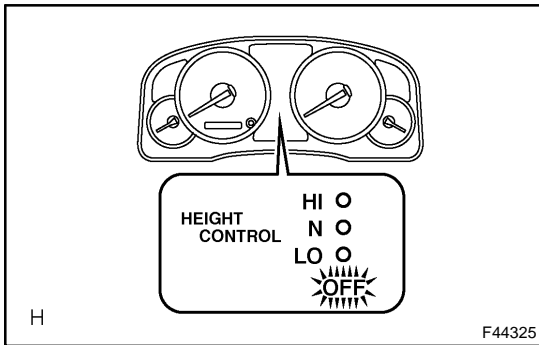
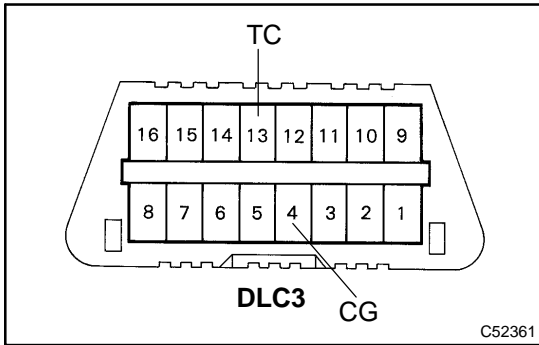


(c) Check the indicator lamp.

(1) Turn the ignition switch ON.

(2) Check that the height control OFF indicator lamp and the height control indicator lamp come on for 2 sec.

If the indicator check result is not normal, proceed to troubleshooting for the height control indicator lamp circuit (See page [05-547](#)) and the height control OFF indicator lamp circuit (See page [05-549](#)).



2. DTC CHECK (USING SST CHECK WIRE)

(a) Checking DTCs using a SST check wire.

SST 09843-18040

- (1) Using the SST, connect terminals TC and CG of DLC3.
- (2) Turn the ignition switch ON.

- (3) Read and record any DTCs from the height control OFF indicator lamp on the combination meter. Refer to the chart on the left for examples of a normal code and codes 13 and 33.

HINT:

- If the height control OFF indicator lamp does not blink any DTC codes or the normal code, inspect the height control OFF indicator lamp circuit (See page 05-549) and the TC terminal circuit (See page 05-552).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is displayed first.

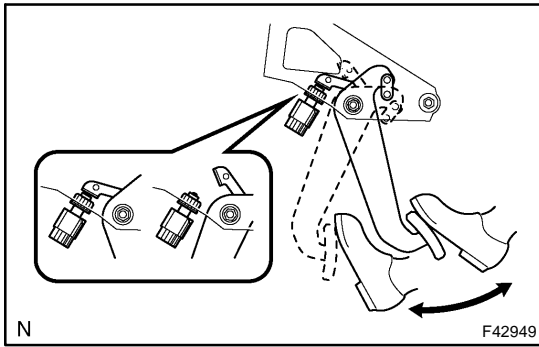
- (4) Refer to the Diagnostic Trouble Code Chart (See page 05-477) for DTC information.
- (5) After completing the check, remove SST check wire from DLC3.

SST 09843-18040

(b) Clearing the DTCs using the SST check wire.

SST 09843-18040

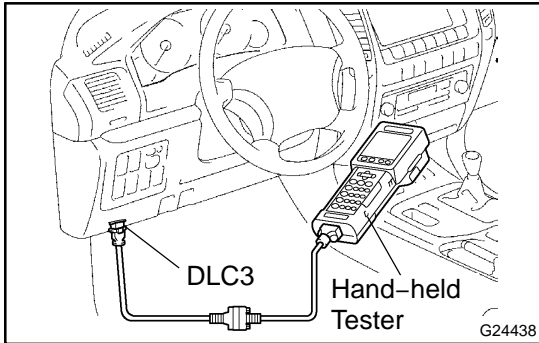
- (1) Using SST, connect terminals TC and CG of DLC3.
- (2) Turn the ignition switch ON.



- (3) Clear DTC stored in ECU by depressing the brake pedal 8 times or more within 5 sec.
 - (4) Check that the height control OFF indicator lamp shows the normal code.
 - (5) Remove SST check wire from DLC3.
- SST 09843-18040

HINT:

Disconnect the battery cable during the operation will not erase DTC in ECU.

**3. DTC CHECK (USING HAND-HELD TESTER)****(a) Checking DTCs using the hand-held tester.**

- (1) Connect the hand-held tester to DLC3.
- (2) Turn the ignition switch ON.
- (3) Read DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

(b) Clearing the DTCs using the hand-held tester.

- (1) Connect the hand-held tester to DLC3
- (2) Turn the ignition switch ON.
- (3) Erase the DTCs following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

4. DATA LIST

HINT:

By accessing the DATA LIST displayed by the hand-held tester, you can read the value of the switches and sensors and so on without removing any parts. Reading the DATA LIST is the first step of troubleshooting and is one method to shorten labor time.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON.
- (c) Following the display on the tester, read the "DATA LIST".

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed reading / min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Vehicle speed: 0 km/h (0 mph)	-
IG VOLTAGE	ECU power supply voltage / min.: 0 V, max.: 25.5 V	Actual ECU power supply voltage: 10 to 14 V	-
STEERING ANGLE	Steering angle sensor reading / min.: -49152 deg, max.: 49150.5 deg	Actual steering angle Left turn: Reading increases Right turn: Reading decreases	Zero point is set at the point when battery is connected
ENGINE SPD	Cam position sensor reading / min.: 0 rpm, max.: 25,500 rpm	Actual engine speed	Speed indicated on the combination meter
HEIGHT SW DOWN	Height control switch (DOWN) / ON or OFF	ON: Height control switch while pressing "DOWN" button OFF: -	-
HEIGHT SW UP	Height control switch (UP) / ON or OFF	ON: Height control switch while pressing "UP" button OFF: -	-
HEIGHT SW HOLD	Height control OFF switch / ON or OFF	ON: Height control OFF switch pressing OFF: -	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
DOOR SW	Door switch / ON or OFF	ON: Open each door OFF: Close all doors	-
DAMPER SW1	Damping force switch 1 / ON or OFF	The same as absorber control switch position	Operate the absorber control switch
TS	TS terminal / ON or OFF	ON: During test mode OFF: Normal mode	-
TC	TC terminal / ON or OFF	ON: DTC recorded OFF: No DTC recorded	-
SOL SLRL	Height control valve solenoid (SLRL) / ON or OFF	ON or OFF	-
SOL SLRG	Height control valve solenoid (SLRG) / ON or OFF	ON or OFF	-
LOW PRS TNK SOL	Tank solenoid valve (SLLO) / ON or OFF	ON or OFF	-
MOTOR RELAY	AIR SUS relay / ON or OFF	ON: Compressor operated OFF: Compressor not operated	-
EXHAUST SOL	Exhaust solenoid valve (SLEX) / ON or OFF	ON or OFF	-
G (UP & DOWN) FR	G (up & down) FR sensor reading / min.: -1045267.3 mm/s ² , max.: 1045299.2 mm/s ²	0 ± 0.1 G at still condition	Reading changes when vehicle (FR) is bounced
G (UP & DOWN) FL	G (up & down) FL sensor reading / min.: -1045267.3 mm/s ² , max.: 1045299.2 mm/s ²	0 ± 0.1 G at still condition	Reading changes when vehicle (FL) is bounced

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
G (UP & DOWN) R	G (up & down) rear sensor reading / min.: -1045267.3 mm/s ² , max.: 1045299.2 mm/s ²	0 ± 0.1 G at still condition	Reading changes when vehicle (rear) is bounced
RR HEIGHT	Right rear height control sensor reading / min.: -3276.7 mm (-129.004 in.), max.: 3276.8 mm (129.007 in.)	Min.: -20 mm (-0.79 in.) Max.: 40 mm (1.57 in.)	-
RL HEIGHT	Left rear height control sensor reading / min.: -32776.7 mm (-129.004 in.), max.: 3276.8 mm (129.007 in.)	Min.: -20 mm (-0.79 in.) Max.: 40 mm (1.57 in.)	-
DAMPER FR	Damper step FR / min.: 0 step, max.: 255 step	Min.: 0 step, max.: 16 step	-
DAMPER FL	Damper step FL / min.: 0 step, max.: 255 step	Min.: 0 step, max.: 16 step	-
DAMPER RR	Damper step RR / min.: 0 step, max.: 255 step	Min.: 0 step, max.: 16 step	-
DAMPER RL	Damper step RL / min.: 0 step, max.: 255 step	Min.: 0 step, max.: 16 step	-
MAX DMP STEP FR	Max. damper step FR / min.: 0 step, max.: 255 step	16 step	-
MAX DMP STEP FL	Max. damper step FL / min.: 0 step, max.: 255 step	16 step	-
MAX DMP STEP RR	Max. damper step RR / min.: 0 step, max.: 255 step	16 step	-
MAX DMP STEP RL	Max. damper step RL / min.: 0 step, max.: 255 step	16 step	-
#CODES	Number of DTC recorded / min.: 0, max.: 255	Min.: 0, Max.: XX	-

5. ACTIVE TEST LIST

HINT:

Perform the ACTIVE TEST using the hand-held tester to operate the sensors, relay and solenoid without removing any parts. Performing the ACTIVE TEST is the first step of troubleshooting is one of the methods to shorten labor time. It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON.
- (c) Following the display on tester, perform the "ACTIVE TEST".

Item	Vehicle Condition / Test Details	Diagnostic Note
RR HEIGHT	Turn height control switch / UP or DOWN	-
DAMPER FR	Changes damper step / min.: 1 step, max.: 16 step	Shock absorber hardens as damper step increases
DAMPER FL	Changes damper step / min.: 1 step, max.: 16 step	Shock absorber hardens as damper step increases
DAMPER RR	Changes damper step / min.: 1 step, max.: 16 step	Shock absorber hardens as damper step increases
DAMPER RL	Changes damper step / min.: 1 step, max.: 16 step	Shock absorber hardens as damper step increases
MOTOR RELAY	Turn AIR SUS relay / ON or OFF	Operation of motor can be heard
LEVEL SOL REAR	Turn leveling solenoid valve / ON or OFF	Operation of solenoid (clicking sound) can be heard

Item	Vehicle Condition / Test Details	Diagnostic Note
GATE SOL REAR	Turn gate solenoid valve / ON or OFF	Operation of solenoid (clicking sound) can be heard
LOW PRS TNK SOL	Turn tank solenoid valve / ON or OFF	Operation of solenoid (clicking sound) can be heard

6. INPUT SIGNAL CHECK (TEST MODE CHECK)

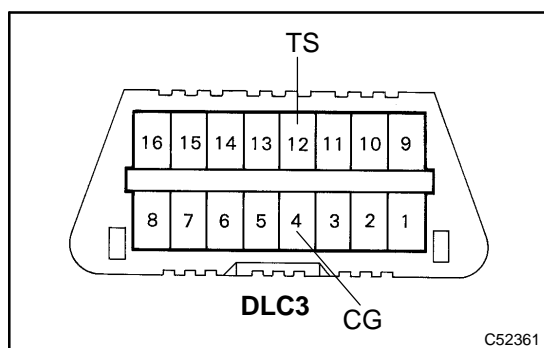
HINT:

This function checks that whether signals from the stop lamp switch assy and the door courtesy switch, etc. are being input normally to the ECU.

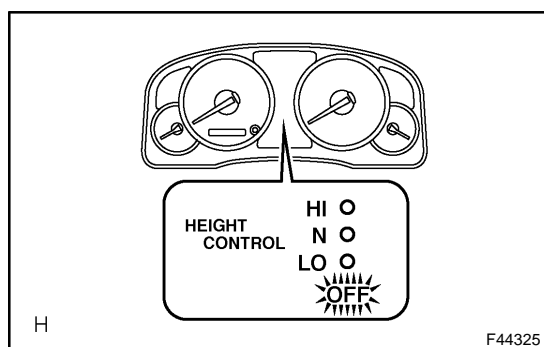
(a) Procedure for Input Signal Check Mode (Test Mode) using SST check wire.

SST 09843-18040

- (1) Make sure the ignition switch is OFF.
- (2) Set each of the check items in the table below to the condition in Operation (A).



- (3) Using SST, connect the terminals TS and CG of DLC3.
- (4) Turn the ignition switch ON.



- (5) Check that the height control OFF indicator lamp is blinking.

HINT:

- At this time, the height control OFF indicator lamp blinks at 0.125 sec. intervals.
- If the height control OFF indicator lamp does not blink, inspect the height control OFF indicator lamp circuit (See page 05-549) and the TS terminal circuit (See page 05-554).

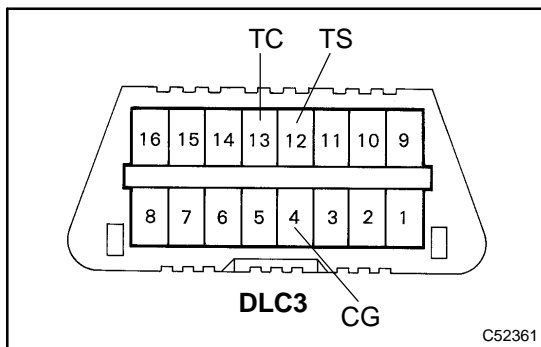
- (6) Set each of the check items to the condition in Operation (B).

HINT:

When checking each item, the height control OFF indicator lamp should come on for 1 sec.

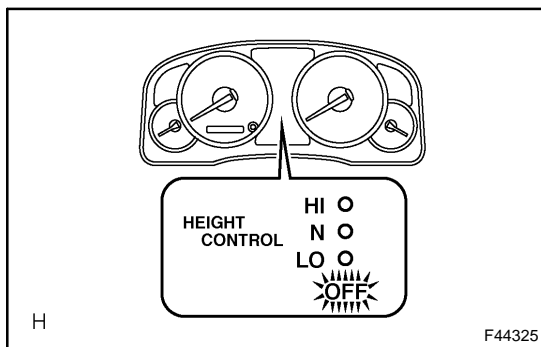
Check Item	Operation (A)	Operation (B)
Stop lamp switch signal	OFF (Brake pedal not depressed)	ON (Brake pedal depressed)
Door courtesy switch signal	ON (Each door opened)	OFF (All doors closed)
Height control switch signal	-	Press the height control switch "UP" first and then press "DOWN"

Absorber control switch signal	-	Slowly move the absorber control switch "COMFORT" to "SPORT" and "COMFORT"
Height control OFF switch signal	OFF (Height control OFF switch not pushed in)	ON to OFF (Height control OFF switch pushed in and released)
Right front acceleration sensor signal	-	Keep the vehicle still without any vertical movement for 1 second
Left front acceleration sensor signal	-	Keep the vehicle still without any vertical movement for 1 second
Rear acceleration sensor signal	-	Keep the vehicle still without any vertical movement for 1 second
Right front speed sensor signal	Vehicle speed below 20 km/h (12 mph)	Vehicle speed 20 km/h (12 mph) or higher
Left front speed sensor signal	Vehicle speed below 20 km/h (12 mph)	Vehicle speed 20 km/h (12 mph) or higher
Crankshaft position sensor signal	Engine speed below 2,000 rpm	Engine speed 2,000 rpm or higher



(7) Using SST, connect the 3rd terminal of the SST check wire to terminal TC in DLC3.

SST 09843-18040

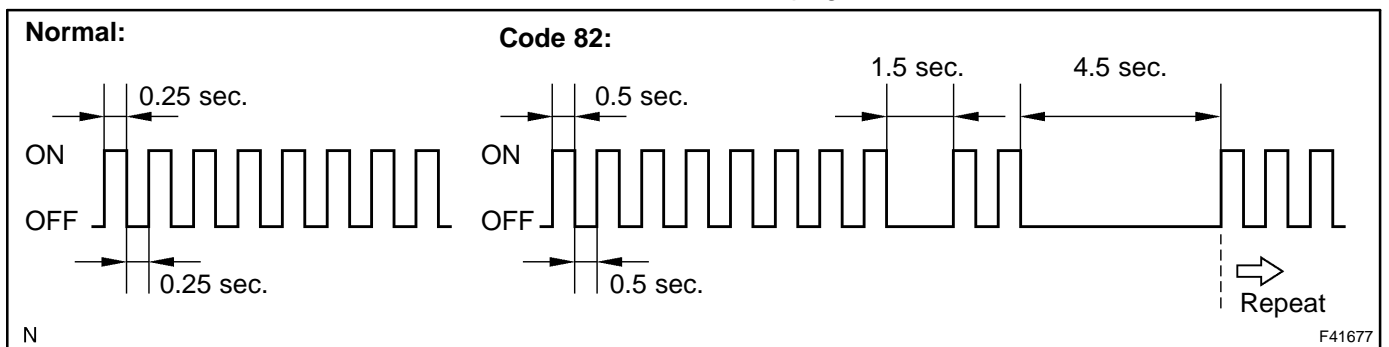


(8) Read the number of blinks of the height control OFF indicator lamp.

HINT:

- As an example, the blinking patterns of normal code and code 82 are shown in the illustration.
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code is displayed first.
- When DTC is not output, check the TC terminal circuit on page 05-552.

(9) Check the malfunction using the code table on the next page.



(b) Ending the Input Signal Check Mode (Test Mode) using SST check wire.

SST 09843-18040

- (1) With the ignition switch to OFF, disconnect the SST check wire from the terminals of DLC3 and then turn the ignition switch ON.
- (c) Procedure for Sensor Test Mode (Test Mode) using the hand-held tester.
 - (1) Make sure the ignition switch OFF.
 - (2) Set each of the check items to the condition in Operation (A) on the previous page.
 - (3) Connect the hand-held tester to DLC3.
 - (4) Turn the ignition switch ON.
 - (5) Select the SIGNAL CHECK mode on the hand-held tester.
 - (6) Set each of the check items to the condition in Operation (B) on the previous page.

HINT:

In step (6), all signals can be checked together.

- (7) Read the DTCs by following the prompts on the tester screen.

HINT:

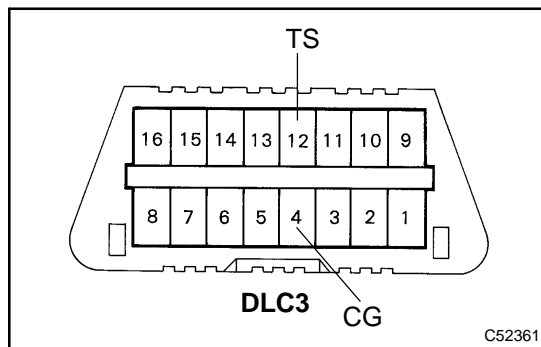
Refer to the hand-held tester operator's manual for further details.

DTC from input signal check

If a malfunction code is displayed during the test mode DTC check, check the circuit listed for that code. For details of each code, refer to the "See page" under respective "DTC No." in the chart.

DTC No. (See Page)	Detection Item	Trouble Area
C1782/82 (05-533)	Stop light switch circuit malfunction	<ul style="list-style-type: none"> • Stop lamp switch assy • Stop light switch circuit • Suspension control ECU
C1783/83 (05-536)	Door courtesy switch circuit malfunction	<ul style="list-style-type: none"> • Door courtesy switch assy • Back door courtesy switch assy • Door courtesy switch circuit • Multiplex network body ECU • Suspension control ECU
C1786/86 (05-538)	Height control switch circuit malfunction	<ul style="list-style-type: none"> • Height control switch (Suspension control switch) • Height control switch circuit • Suspension control ECU
C1787/87 (05-541)	Absorber control switch malfunction	<ul style="list-style-type: none"> • Absorber control switch assy (Suspension control switch) • Absorber control switch circuit • Suspension control ECU
C1788/88 (05-544)	Height control OFF switch circuit malfunction	<ul style="list-style-type: none"> • Height control OFF switch (Suspension control switch) • Height control OFF switch circuit • Suspension control ECU
C1791/91 (05-491)	Open or short circuit in right front acceleration sensor circuit	<ul style="list-style-type: none"> • Acceleration sensor assy front RH • Right front acceleration sensor circuit • Suspension control ECU
C1792/92 (05-491)	Open or short circuit in left front acceleration sensor circuit	<ul style="list-style-type: none"> • Suspension control ECU (Acceleration sensor LH is a built-in equipment)
C1793/93 (05-491)	Open or short circuit in rear acceleration sensor circuit	<ul style="list-style-type: none"> • Acceleration sensor rear • Rear acceleration sensor circuit • Suspension control ECU

C1794/94 (05-525)	Right front speed sensor circuit malfunction	<ul style="list-style-type: none"> • Right front speed sensor • Right front speed sensor circuit • Skid control ECU assy • Suspension control ECU
C1795/95 (05-525)	Left front speed sensor circuit malfunction	<ul style="list-style-type: none"> • Left front speed sensor • Left front speed sensor circuit • Skid control ECU assy • Suspension control ECU
C1797/97 (05-531)	Crankshaft position sensor circuit malfunction	<ul style="list-style-type: none"> • Crankshaft position sensor • Crankshaft position sensor circuit • ECM • Suspension control ECU



7. CHECK DAMPING FORCE CONTROLLING CONDITION (USING SST CHECK WIRE)

- (a) Checking the damping force controlling condition using the SST check wire.

SST 09843-18040

- (1) Using SST, connect terminals TS and CG of DLC3 with the ignition switch at OFF (Test Mode).
- (2) Start the engine.
Under this condition, the absorber control actuator position is 1 (Soft).
- (3) Starting from the above mentioned position, as the brake pedal is depressed, the absorber control actuator position increases (1 → 2 → 3 → ... 15 → 16). At this time, bounce the vehicle and check that the shock absorber becomes harder.

HINT:

- To hold the absorber control actuator at a specific position, adjust it to the position using the above mentioned procedure, and then increase the vehicle speed to over 5 km/h.
After that speed is reached, the absorber control actuator position does not change until the ignition switch is turned to OFF.
- If the absorber control actuator does not operate, inspect the absorber control actuator circuit and the suspension control ECU.

8. FAIL-SAFE FUNCTION

- (a) In the normal control operation, if there is short or open in the sensors, actuators, etc., the suspension control ECU suspends the damping force control operation and the vehicle height control operation.

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843-18040, connect terminal TC and CG of DLC3.
- If no abnormality is found when the parts are inspected, inspect the suspension control ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for that code. For details of each code, refer to the "See page" under respective "DTC No." in the DTC chart.

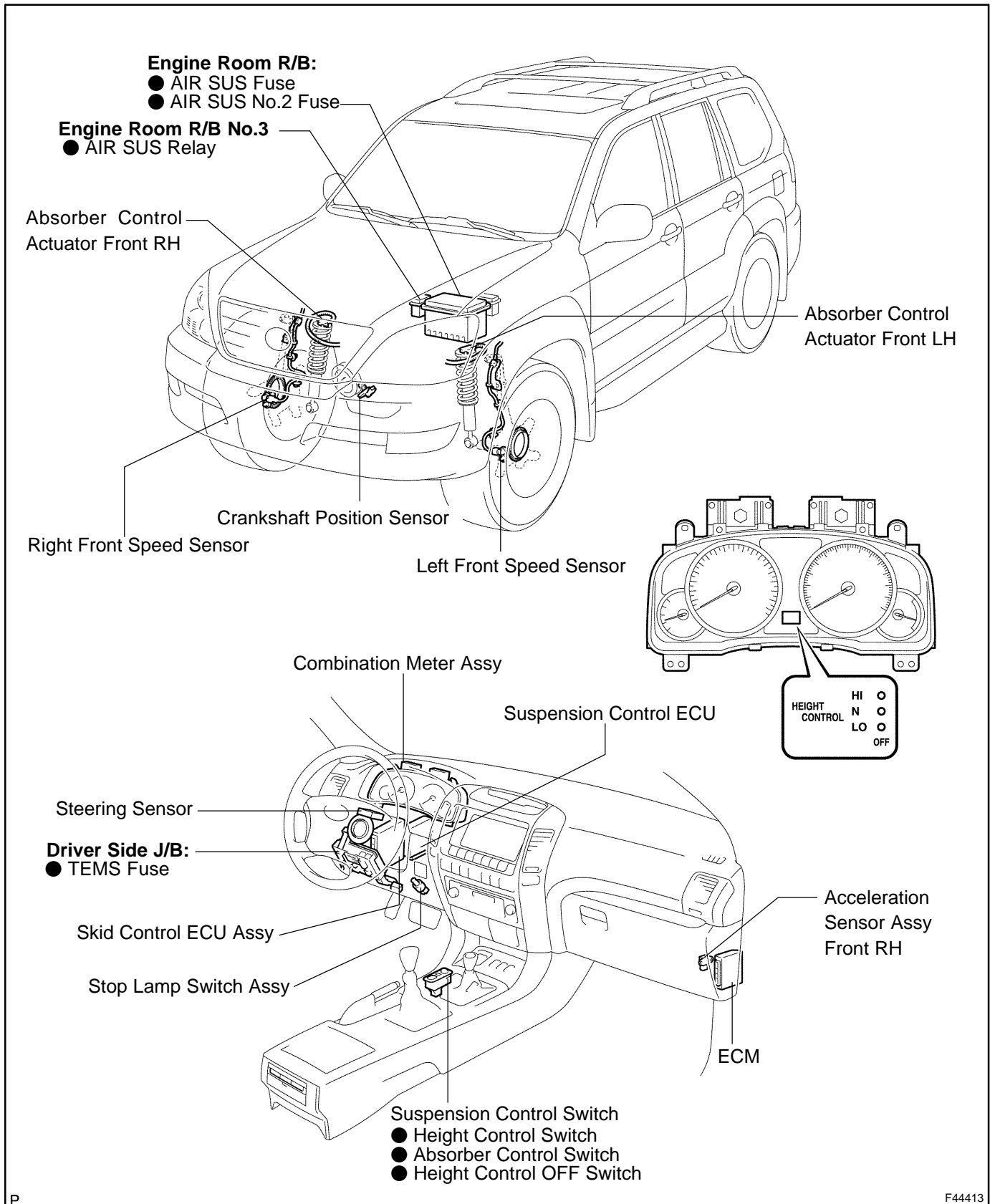
DTC No. (See Page)	Detection Item	Trouble Area	OFF Indicator Lamp*1	Memory*2
C1713/13 (05-486)	Open or short circuit in right rear height control sensor circuit	<ul style="list-style-type: none"> • Height control sensor sub-assy rear RH • Right rear height control sensor circuit • Suspension control ECU 	○*3	○
C1714/14 (05-486)	Open or short circuit in left rear height control sensor circuit	<ul style="list-style-type: none"> • Height control sensor sub-assy rear LH • Left rear height control sensor circuit • Suspension control ECU 	○*3	○
C1715/15 (05-491)	Open or short circuit in right front acceleration sensor circuit	<ul style="list-style-type: none"> • Acceleration sensor assy front RH • Right front acceleration sensor circuit • Suspension control ECU 	X	○
C1716/16 (05-491)	Open or short circuit in left front acceleration sensor circuit	<ul style="list-style-type: none"> • Suspension control ECU (Acceleration sensor front LH is a built-in equipment) 	X	○
C1717/17 (05-491)	Open or short circuit in rear acceleration sensor circuit	<ul style="list-style-type: none"> • Acceleration sensor rear • Rear acceleration sensor circuit • Suspension control ECU 	X	○
C1725/21 (05-497)	Open or short circuit in right front absorber control actuator circuit	<ul style="list-style-type: none"> • Absorber control actuator front RH • Right front absorber control actuator circuit • Suspension control ECU 	X	○
C1726/22 (05-497)	Open or short circuit in left front absorber control actuator circuit	<ul style="list-style-type: none"> • Absorber control actuator front LH • Left front absorber control actuator circuit • Suspension control ECU 	X	○
C1727/23 (05-497)	Open or short circuit in right rear absorber control actuator circuit	<ul style="list-style-type: none"> • Absorber control actuator rear RH • Right rear absorber control actuator circuit • Suspension control ECU 	X	○
C1728/24 (05-497)	Open or short circuit in left rear absorber control actuator circuit	<ul style="list-style-type: none"> • Absorber control actuator rear LH • Left rear absorber control actuator circuit • Suspension control ECU 	X	○
C1733/33 (05-501)	Open or short circuit in gate solenoid valve circuit	<ul style="list-style-type: none"> • Gate solenoid valve • Gate solenoid valve circuit • Suspension control ECU 	○	○
C1734/34 (05-501)	Open or short circuit in leveling solenoid valve circuit	<ul style="list-style-type: none"> • Leveling solenoid valve • Leveling solenoid valve circuit • Suspension control ECU 	○	○
C1735/35 (05-501)	Open or short circuit in exhaust solenoid valve circuit	<ul style="list-style-type: none"> • Exhaust solenoid valve • Exhaust solenoid valve circuit • Suspension control ECU 	○	○
C1741/41 (05-506)	Open or short circuit in AIR SUS relay circuit	<ul style="list-style-type: none"> • AIR SUS relay • AIR SUS relay circuit • Suspension control ECU 	○	○
C1742/42 (05-510)	Lock, open or short circuit in height control compressor circuit	<ul style="list-style-type: none"> • Height control compressor assy • Height control compressor circuit • Suspension control ECU 	○	○
C1744/44 (05-501)	Open or short circuit in tank solenoid valve circuit	<ul style="list-style-type: none"> • Tank solenoid valve • Tank solenoid valve circuit • Suspension control ECU 	X	○

C1751/51*4 (05-515)	Continuous electric current to height control compressor circuit	<ul style="list-style-type: none"> • Height control compressor assy • Height control compressor circuit • Height control sensor link sub-assy rear • Height control sensor sub-assy rear • Relief valve • AIR SUS relay comes off • Air leakage from the air tube or each valve • Clogging in the air tube or each valve • Suspension control ECU 	○	○
C1761/61 (05-518)	ECU malfunction	<ul style="list-style-type: none"> • Suspension control ECU 	○	○
C1774/74 (05-520)	Power voltage drop	<ul style="list-style-type: none"> • Battery • Power source circuit • Suspension control ECU 	X	○
C1776/76 (05-525)	Speed sensor circuit malfunction	<ul style="list-style-type: none"> • Speed sensor • Speed sensor circuit • Skid control ECU assy • Suspension control ECU 	X	○
C1777/77 (05-528)	Open or short circuit in steering angle sensor circuit	<ul style="list-style-type: none"> • Steering sensor • Steering angle sensor circuit • Suspension control ECU 	X	○
C1779/79 (05-531)	Crankshaft position sensor circuit	<ul style="list-style-type: none"> • Crankshaft position sensor • Crankshaft position sensor circuit • ECM • Suspension control ECU 	X	○

HINT:

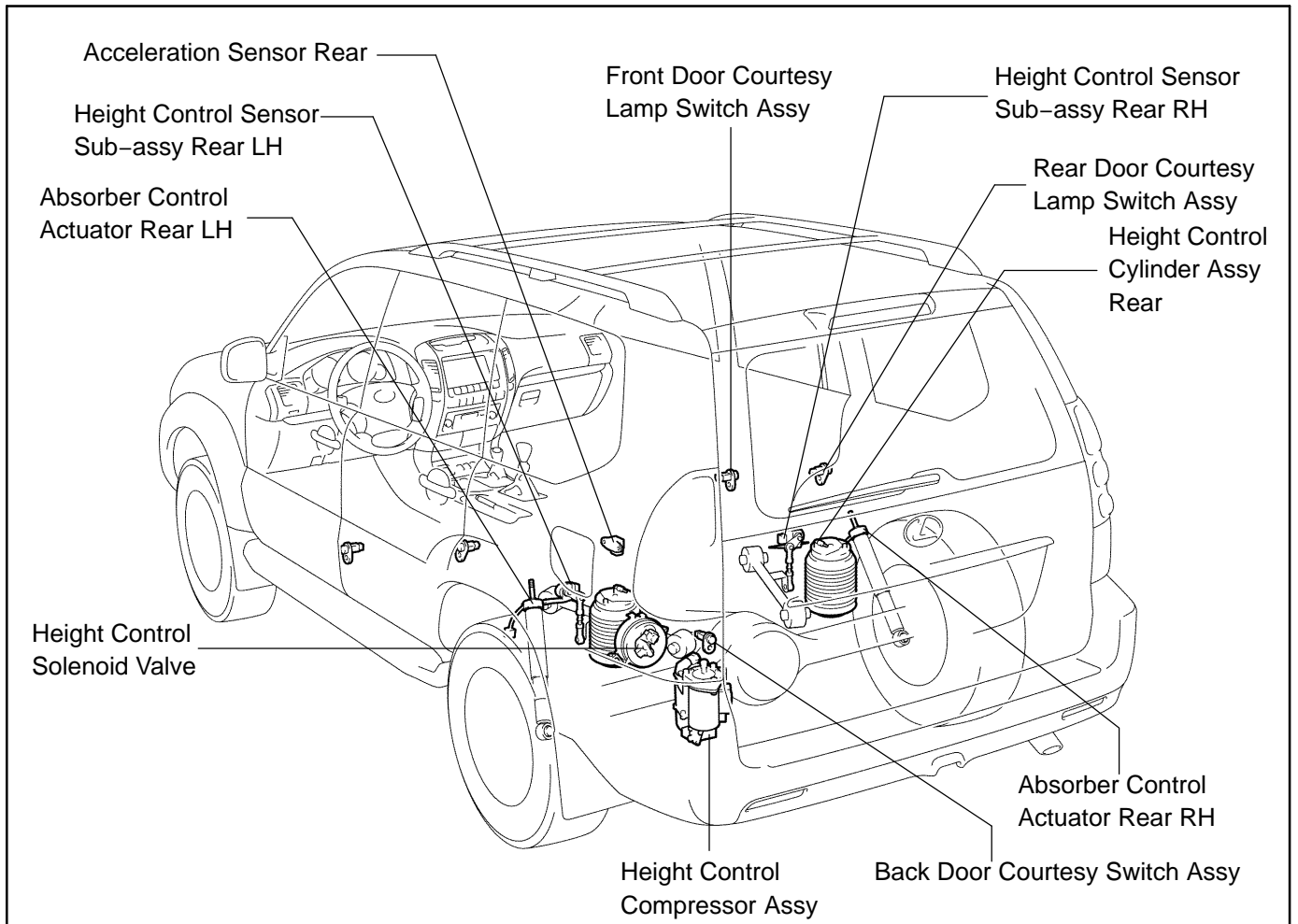
- *1: For codes with "○" mark in the "OFF Indicator Light" column, the height control OFF indicator lamp blinks at 1 second intervals.
- *2: The codes with "○" mark in the "Memory" column are stored in the memory even when the ignition switch is OFF, but the codes with "X" mark are not.
- *3: Height control OFF indicator lamp blinks when the vehicle speed is at 3 km/h (1.9 mph) or higher.
- *4: Since the relief pressure of the compressed air is 980 kPa (10 kgf/cm², 142 psi), if the vehicle height control is attempted on a steeply sloping road, when the vehicle is overloaded, or when the vehicle is jacked up with the engine running, code "C1751/51" may be output and the vehicle height control may be suspended (This is not abnormal). In this case, however, the vehicle height operation resumes approx. 10 min. after the ignition switch is turned ON after the ECU detects the first error. If ECU detects another error, it takes 70 minutes until the vehicle height control is resumed.

LOCATION

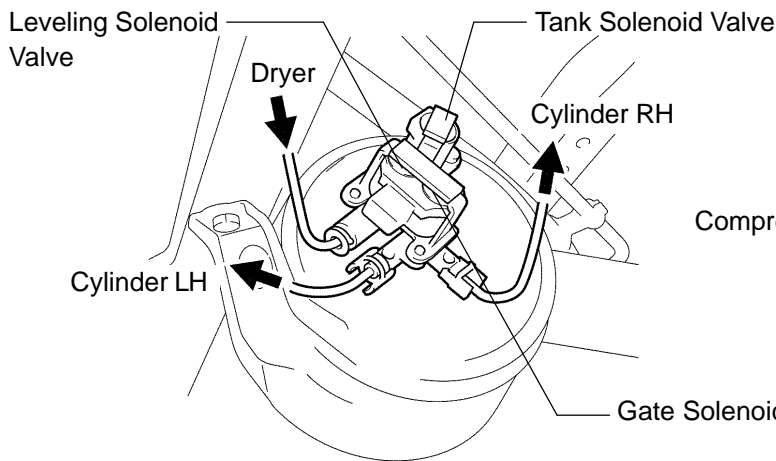


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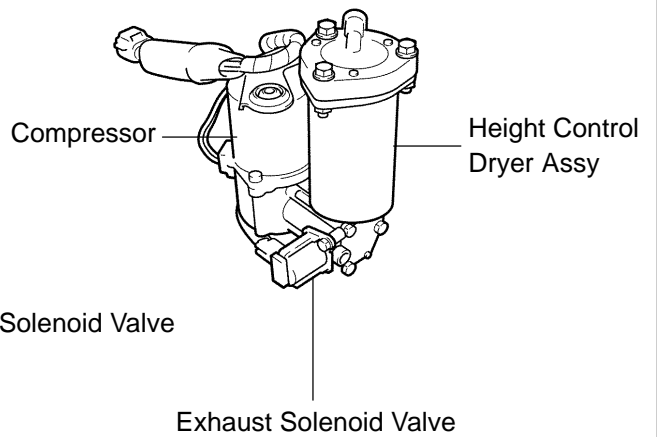
F44413



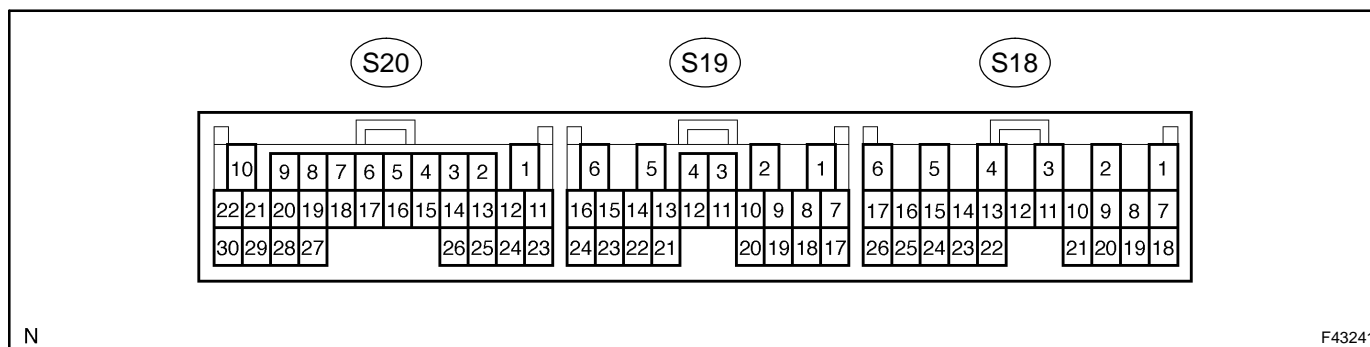
Height Control Solenoid Valve:



Height Control Compressor Assy:



TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	Specified Condition
SLRL (S18-1) – GND (S20-1)	V-W – W-B	IG switch ON	Below 1.0 V
		Engine idling, button of height control switch is pushed from "N" to "UP" or "DOWN"	8 V or more
SLRR (S18-2) – GND (S20-1)	V – W-B	IG switch ON	Below 1.0 V
		Engine idling, button of height control switch is pushed from "N" to "UP" or "DOWN"	8 V or more
RAL+ (S18-3) – RAL- (S18-12)	B-Y – G-W	IG switch ON	Continuity (Ω)
RBL+ (S18-4) – RBL- (S18-14)	GR – L	IG switch ON	Continuity (Ω)
RAR+ (S18-5) – RAR- (S18-16)	GR-B – R-Y	IG switch ON	Continuity (Ω)
RBR+ (S18-6) – RBR- (S18-17)	L-W – L-B	IG switch ON	Continuity (Ω)
SLLO (S18-7) – GND (S20-1)	P-G – W-B	IG switch ON	Below 1.0 V
		Engine idling, height control switch from "UP" to "DOWN"	8 V or more
SLEX (S18-8) – GND (S20-1)	LG – W-B	IG switch ON	Below 1.0 V
		Engine idling, height control switch from "UP" to "DOWN"	8 V more
RC (S18-18) – GND (S20-1)	BR-Y – W-B	IG switch ON	Below 1.0 V
		Engine idling, button of height control switch is pushed from "N" to "UP" or "DOWN"	8 V or more
SGR2 (S18-19) – GND (S20-1)	R-B – W-B	Always	Continuity (Ω)
SBR2 (S18-20) – GND (S20-1)	BR-W – W-B	IG switch ON	4.5 to 5.5 V
SGL2 (S18-21) – GND (S20-1)	R-W – W-B	Always	Continuity (Ω)
SBL2 (S18-22) – GND (S20-1)	BR-W – W-B	IG switch ON	4.5 to 5.5 V
SHRL (S18-23) – GND (S20-1)	GR-G – W-B	IG switch ON	0.5 to 4.5 V
		Engine idling, vehicle height is changed from "HIGH" to "NORMAL" by pressing the height control switch	Approx. 2.5 V
SHRR (S18-24) – GND (S20-1)	W – W-B	IG switch ON	0.5 to 4.5 V
		Engine idling, vehicle height is changed from "HIGH" to "NORMAL" by pressing the height control switch	Approx. 2.5 V
RM+ (S18-25) – GND (S20-1)	L-Y – W-B	Engine idling, vehicle height is changed from "NORMAL" to "HIGH" by pressing the height control switch (While height control compressor assy is working).	Below 1.0 V
RM- (S18-26) – GND (S20-1)	P – W-B	Always	Continuity (Ω)

FBR+ (S19-3) – FBR- (S19-4)	Y-R – V-R	IG switch ON	Continuity (Ω)
GND2 (S19-5) – Body ground	W-B – Body ground	Always	Continuity (Ω)
B (S19-6) – GND (S20-1)	B-R – W-B	IG switch ON	10 to 14 V
FBL+ (S19-8) – FBL- (S19-1)	P-G – R-B	IG switch ON	Continuity (Ω)
FAR+ (S19-9) – FAR- (S19-2)	LG-B – P-L	IG switch ON	Continuity (Ω)
FAL+ (S19-17) – FAL- (S19-7)	V-G – B-O	IG switch ON	Continuity (Ω)
STP (S19-12) – GND (S20-1)	G-Y – W-B	Brake pedal depressed	10 to 14 V
		Brake pedal released	Below 1.5 V
TACH (S19-13) – GND (S20-1)	B-W – W-B	Engine idling	Pulse generation
DNSW (S19-15) – GND (S20-1)	L-W – W-B	IG switch ON, "DOWN" button of height control switch pushed in	Below 1.5 V
		IG switch ON, "DOWN" button of height control switch free	10 to 14 V
UPSW (S19-16) – GND (S20-1)	L – W-B	IG switch ON, "UP" button of height control switch pushed in	Below 1.5 V
		IG switch ON, "DOWN" button of height control switch free	10 to 14 V
SBR (S19-18) – GND (S20-1)	G-B – W-B	IG switch ON	4.5 to 5.5 V
SBR3 (S19-21) – GND (S20-1)	G-R – W-B	IG switch ON	4.5 to 5.5 V
SGR (S19-22) – GND (S20-1)	L-Y – W-B	Always	Continuity (Ω)
TD (S19-24) – GND (S20-1)	G – W-B	IG switch ON, height control OFF switch pushed in	Below 1.5 V
		IG switch ON, height control OFF switch released	10 to 14 V
GND (S20-1) – Body ground	W-B – Body ground	Always	Continuity (Ω)
TSW2 (S20-2) – GND (S20-1)	L-Y – W-B	IG switch ON and absorber control switch "SPORT2 (S2)" or "COMFORT (C)"	0 to 1.5 V
		IG switch ON and absorber control switch "SPORT1 (S1)" or "NORM (M)"	10 to 14 V
TSW1 (S20-3) – GND (S20-1)	L-B – W-B	IG switch ON and absorber control switch "SPORT1 (S1)" or "SPORT1 (S1)"	0 to 1.5 V
		IG switch ON and absorber control switch "NORM (M)" or "COMFORT (C)"	10 to 14 V
DOOR (S20-4) – GND (S20-1)	R-G – W-B	IG switch ON, each door opened	Below 1.5 V
		IG switch ON, all doors closed	10 to 14 V
TS (S20-5) – GND (S20-1)	R-B – W-B	IG switch ON and terminals TS – CG connected	Below 1.0 V
		IG switch ON and terminals TS – CG not connected	10 to 14 V
TC (S20-6) – GND (S20-1)	P-L – W-B	IG switch ON and terminals TC – CG connected	Below 1.0 V
		IG switch ON and terminals TC – CG not connected	10 to 14 V
FLO (S20-8) – GND (S20-1)	L-O – W-B	Vehicle speed 12 mph (20 km/h) or higher	Pulse generation
FRO (S20-9) – GND (S20-1)	L-R – W-B	Vehicle speed 12 mph (20 km/h) or higher	Pulse generation
IG (S20-10) – GND (S20-1)	B-R – W-B	IG switch ON	10 to 14 V
VN (S20-15) – GND (S20-1)	Y-G – W-B	IG switch ON, height control OFF indicator lamp ON	8 V or more
		IG switch ON, height control OFF indicator lamp OFF	Below 1.5 V
HI (S20-16) – GND (S20-1)	Y – W-B	IG switch ON, height control "HI" indicator lamp ON	8 V or more
		IG switch ON, height control "N" or "LO" indicator lamp ON	Below 1.5 V
NR (S20-17) – GND (S20-1)	Y-B – W-B	IG switch ON, height control "N" indicator lamp ON	8 V or more
		IG switch ON, height control "LO" or "HI" indicator lamp ON	Below 1.5 V
LO (S20-18) – GND (S20-1)	BR-B – W-B	IG switch ON, height control "LO" indicator lamp ON	8 V or more
		IG switch ON, height control "HI" or "N" indicator lamp ON	Below 1.5 V

SIL (S20-20) – GND (S20-1)	R-Y – W-B	IG switch ON	8 V or more
HARD (S20-7) – GND (S20-1)	B-L – W-B	Vehicle stop	Pulse generation
SGR3 (S20-25) – GND (S20-1)	Y-B – W-B	Always	Continuity (Ω)
SGFR (S20-27) – GND (S20-1)	R-L – W-B	Observe data list on hand-held tester G (UP & DOWN) R	-
SGRR (S20-28) – GND (S20-1)	W-L – W-B	Observe data list on hand-held tester G (UP & DOWN) R	-
SS2- (S20-29) – GND (S20-1)	W – W-B	IG switch ON and steering wheel is being turned slowly	Repeat 1.5 to 3.5 V
SS2+ (S20-30) – GND (S20-1)	R – W-B	IG switch ON and steering wheel is being turned slowly	Repeat 1.5 to 3.5 V

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

HINT:

Inspect each malfunction circuit in numerical order for the corresponding symptom.

If the malfunction still exist even after checking and confirming that all the circuit are normal, replace the suspension control ECU.

Symptom	Suspected Area	See page
Vehicle height control function does not operate	<ol style="list-style-type: none"> Freezing of the air tube Power source circuit Crankshaft position sensor circuit Height control OFF switch circuit Height control switch circuit Height control sensor circuit Height control solenoid valve circuit Gate solenoid valve circuit Exhaust solenoid valve circuit AIR SUS relay circuit Height control compressor circuit Suspension control ECU 	<p>–</p> <p>05-520</p> <p>05-531</p> <p>05-544</p> <p>05-538</p> <p>05-486</p> <p>05-501</p> <p>05-501</p> <p>05-501</p> <p>05-506</p> <p>05-510</p> <p>01-36</p>
Illuminated up position of height control indicator lamp does not change by the height control switch operation	<ol style="list-style-type: none"> Power source circuit Crankshaft position sensor circuit Height control OFF switch circuit Height control switch circuit Height control sensor circuit Height control solenoid valve circuit Gate solenoid valve circuit Exhaust solenoid valve circuit AIR SUS relay circuit Height control compressor circuit Speed sensor circuit Suspension control ECU 	<p>05-520</p> <p>05-531</p> <p>05-544</p> <p>05-538</p> <p>05-486</p> <p>05-501</p> <p>05-501</p> <p>05-501</p> <p>05-506</p> <p>05-510</p> <p>05-525</p> <p>01-36</p>
Hunting of vehicle height occurs	<ol style="list-style-type: none"> Air leakage (Height control cylinder assy rear) Height control sensor circuit Suspension control ECU 	<p>25-3</p> <p>05-486</p> <p>01-36</p>
Vehicle height control operates, but vehicle height is uneven	<ol style="list-style-type: none"> Air leakage Clogging of the air tube Height control sensor link sub-assy Height control sensor circuit Gate solenoid valve circuit Suspension control ECU 	<p>25-3</p> <p>–</p> <p>25-3</p> <p>05-486</p> <p>05-501</p> <p>01-36</p>
Vehicle height control operates, but vehicle height is high or low. (Vehicle height in NORMAL mode differs from the standard value)	<ol style="list-style-type: none"> Height control sensor link sub-assy Height control sensor circuit Suspension control ECU 	<p>25-3</p> <p>05-486</p> <p>01-36</p>
When vehicle height control is adjusted, it stops at extremely high or extremely low position	<ol style="list-style-type: none"> Height control sensor circuit Height control sensor link sub-assy Suspension control ECU 	<p>05-486</p> <p>25-3</p> <p>01-36</p>
Height control OFF indicator lamp condition is abnormal	<ol style="list-style-type: none"> Power source circuit Height control OFF switch circuit Height control OFF indicator lamp circuit Suspension control ECU 	<p>05-520</p> <p>05-544</p> <p>05-549</p> <p>01-36</p>
Height control indicator lamp condition is abnormal	<ol style="list-style-type: none"> Power source circuit Height control indicator lamp circuit Suspension control ECU 	<p>05-520</p> <p>05-547</p> <p>01-36</p>

DTC check cannot be completed	<ol style="list-style-type: none"> 1. Power source circuit 2. TC terminal circuit 3. Height control OFF indicator lamp circuit 4. Suspension control ECU 	<p>05-520 05-552 05-549 01-36</p>
Input signal check (Test mode) cannot be completed	<ol style="list-style-type: none"> 1. Power source circuit 2. TS terminal circuit 3. Suspension control ECU 	<p>05-520 05-554 01-36</p>
Vehicle height is extremely low when vehicle is parked	<p>Although, especially in a cold district, the vehicle height may become lower due to the air temperature drop in the height control cylinder assy, that is not abnormal.</p> <ol style="list-style-type: none"> 1. Air leakage 2. Height control cylinder assy rear 3. Height control sensor link sub-assy 4. Height control solenoid valve circuit 5. Exhaust valve circuit 	<p>25-3 27-7 25-3 05-501 05-501</p>
Compressor motor continues to operate	<p>Due to the air tube freezing, vehicle height may not rise all the time.</p> <ol style="list-style-type: none"> 1. Air leakage 2. Air tube clogged 3. Height control cylinder assy rear 4. Height control sensor link sub-assy 5. Height control solenoid valve circuit 6. Exhaust valve circuit 7. Tank solenoid valve circuit 8. AIR SUS relay circuit 9. Height control compressor circuit 10. Suspension control ECU 	<p>25-3 - 27-7 25-3 05-501 05-501 05-501 05-506 05-510 01-36</p>
Damping force control does not operate at all	<ol style="list-style-type: none"> 1. Absorber control actuator circuit 2. TS terminal circuit 3. Shock absorber 4. Suspension control ECU 	<p>05-497 05-554 26-11 27-7 01-36</p>

DTC	C1713/13	RIGHT REAR HEIGHT CONTROL SENSOR CIRCUIT
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DTC	C1714/14	LEFT REAR HEIGHT CONTROL SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

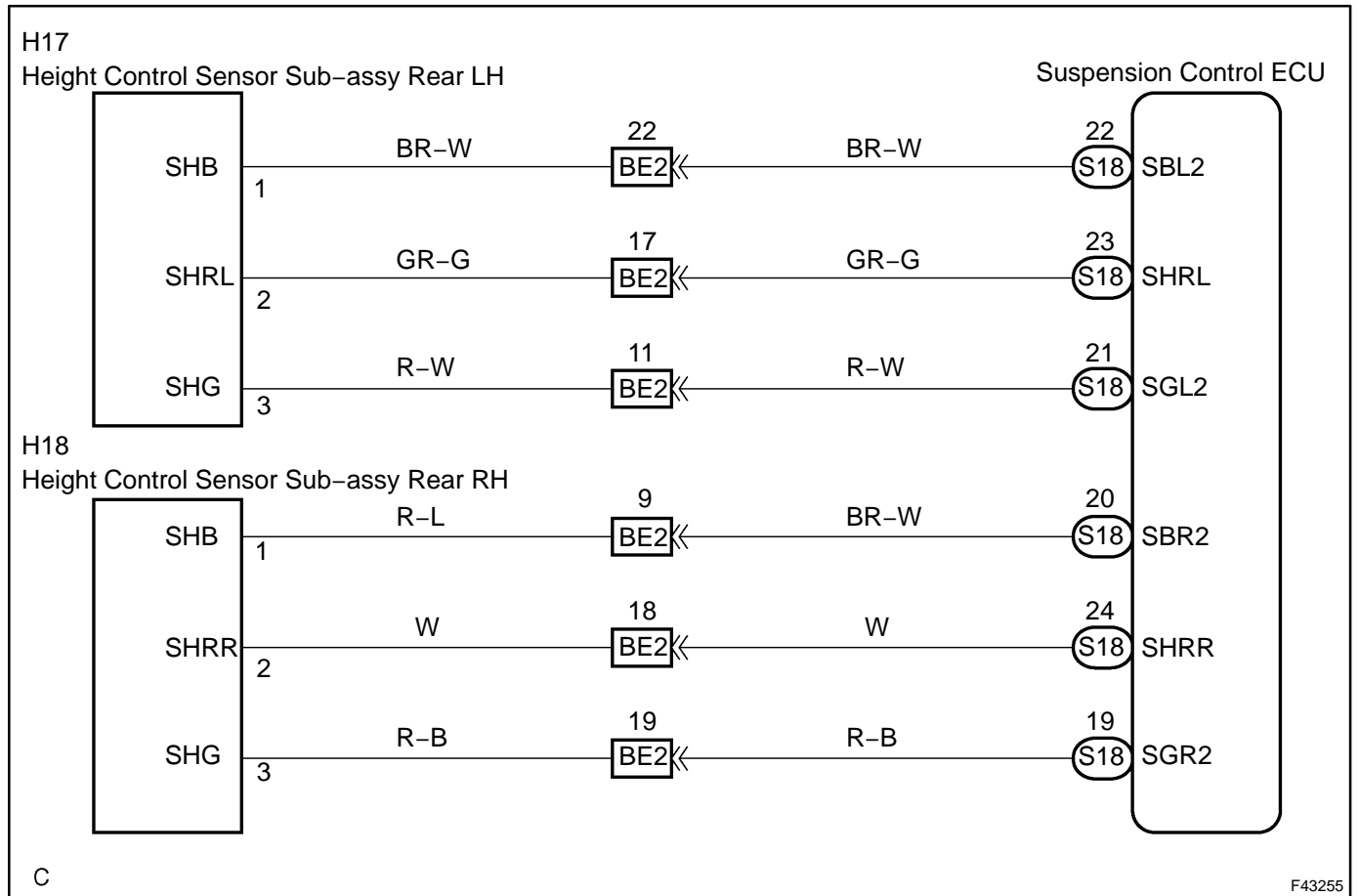
Inside the sensor, a brush integrated with the control sensor rotor shaft moves above the resistor, providing linear output. Since the resistance value between the brush and resistor terminal changes in proportion to the shaft rotation angle, the fixed voltage applied to the resistor by ECU is modified by the sensor and output to the ECU as a voltage indicating the shaft rotation angle.

DTC No.	DTC Detecting Condition	Trouble Area
C1713/13	With the ignition switch ON, a voltage of 4.7 V or more or 0.3 V or less at each height control sensor sub-assy rear is detected for 1 sec.	<ul style="list-style-type: none"> • Height control sensor sub-assy rear RH • Right rear height control sensor circuit • Suspension control ECU
C1714/14		<ul style="list-style-type: none"> • Height control sensor sub-assy rear LH • Left rear height control sensor circuit • Suspension control ECU

HINT:

- Once the ECU stores DTC C1713/13 or C1714/14 in the memory, vehicle height control is suspended not carried out until a normal signal is input to the ECU from the height control sensor sub-assy. However, the control resumes if the ignition switch is once turned OFF, and then turned ON again.
- When the suspension control ECU detects a malfunction in the height control sensor, the height control indicator lamp "N" comes on or blinks, and the height control switch ("HI" and "LO") is suspended.
- When either one of the right or left height control sensor sub-assy is faulty, the suspension control ECU uses the other one (functioning one) to adjust the vehicle height to the normal height. When both of the height control sensor sub-assy are faulty, the suspension control ECU suspend the height control function immediately.

WIRING DIAGRAM



INSPECTION PROCEDURE**HINT:**

- Proceed to troubleshooting following the flow chart, regardless of whether or not DTC C1713/13 or C1714/14 is displayed.
- If DTC C1761/61 (ECU malfunction) and/or C1774/74 (power source circuit) is displayed, perform the inspection necessary for DTC C1761/61 (See page 05-518) and/or C1774/74 (See page 05-520) first.
(If DTC C1761/61 and C1774/74 are output at the same time, perform the inspection necessary for DTC C1774/74 first.)
- Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch ON, and push the hand-held tester main switch ON.
- Select the item "RL HEIGHT" or "RR HEIGHT" in the DATA LIST, and read its value displayed on the hand-held tester.
- Check the vehicle height value of the height control sensor sub-assy rear with the hand-held tester while pressing the height control switch "UP" and "DOWN".

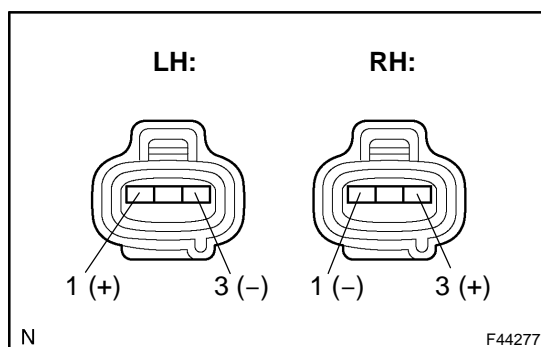
Standard:

Vehicle height value changes.

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL SENSOR SUB-ASSY REAR POWER SOURCE)

- Disconnect the height control sensor sub-assy rear connector.
- Height control sensor sub-assy rear LH:
Turn the ignition switch ON, and measure voltage between terminals 1 (SHB) and 3 (SHG) of the height control sensor sub-assy rear wire harness side connector.
Standard:
4.5 to 5.5 V
- Height control sensor sub-assy rear RH:
Turn the ignition switch ON, and measure voltage between terminals 1 (SHG) and 3 (SHB) of the height control sensor sub-assy rear wire harness side connector.
Standard:
4.5 to 5.5 V

OK

Go to step 4

NG

3	CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL SENSOR SUB-ASSY REAR - SUSPENSION CONTROL ECU)
----------	--

Height control sensor sub-assy rear LH:

- (a) Check for open and short circuit in the harness and the connector between terminal 1 (SHB) of the height control sensor sub-assy rear and S18-22 (SBL2) of the suspension control ECU (See page 01-36).
- (b) Check for open and short circuit in the harness and the connector between terminal 3 (SHG) of the height control sensor sub-assy rear and S18-21 (SGL2) of the suspension control ECU (See page 01-36).

Height control sensor sub-assy rear RH:

- (a) Check for open and short circuit in the harness and the connector between terminal 1 (SHG) of the height control sensor sub-assy rear and S18-19 (SGR2) of the suspension control ECU (See page 01-36).
- (b) Check for open and short circuit in the harness and the connector between terminal 3 (SHB) of the height control sensor sub-assy rear and S18-20 (SBR2) of the suspension control ECU (See page 01-36).

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
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OK

4	CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL SENSOR SUB-ASSY REAR - SUSPENSION CONTROL ECU)
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Height control sensor sub-assy rear LH:

- (a) Check for open and short circuit in the harness and the connector between terminal 2 (SHRL) of the height control sensor sub-assy rear and S18-23 (SHRL) of the suspension control ECU (See page 01-36).

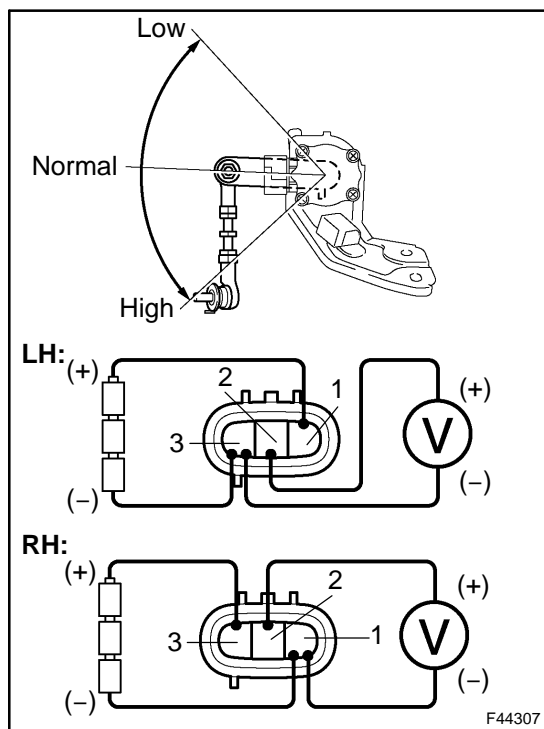
Height control sensor sub-assy rear RH:

- (a) Check for open and short circuit in the harness and the connector between terminal 2 (SHRR) of the height control sensor sub-assy rear and S18-24 (SHRR) of the suspension control ECU (See page 01-36).

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

5 INSPECT HEIGHT CONTROL SENSOR SUB-ASSY REAR



- (a) Remove the height control sensor sub-assy rear LH or RH.
- (b) Connect 3 dry batteries of 1.5 V in series.
- (c) Height control sensor sub-assy rear LH: Connect terminal 1 (SHB) to the batteries' positive (+) terminal, and terminal 3 (SHG) to the batteries' negative (-) terminal, then apply approximately 4.5 V between terminal 2 (SHRL) and 3 (SHG) in the following conditions.

Standard:

Position	Voltage
High (0° to 45°)	Approx. 2.53 to 4.33 V
Normal (0°)	Approx. 2.53 V
Low (0° to -45°)	Approx. 0.81 to 2.53 V

Result:

OK	A
NG	B

- (d) Height control sensor sub-assy rear RH: Connect terminal 3 (SHB) to the batteries' positive (+) terminal, and terminal 1 (SHG) to the batteries' negative (-) terminal, then apply approximately 4.5 V between terminal 1 (SHG) and 2 (SHRR) in the following conditions.

Standard:

Position	Voltage
High (0° to 45°)	Approx. 2.53 to 4.33 V
Normal (0°)	Approx. 2.53 V
Low (0° to -45°)	Approx. 0.81 to 2.53 V

Result:

OK	A
NG	C

B → REPLACE HEIGHT CONTROL SENSOR SUB-ASSY REAR LH

C → REPLACE HEIGHT CONTROL SENSOR SUB-ASSY REAR RH

A

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1715/15	RIGHT FRONT ACCELERATION SENSOR CIRCUIT
DTC	C1716/16	LEFT FRONT ACCELERATION SENSOR CIRCUIT
DTC	C1717/17	REAR ACCELERATION SENSOR CIRCUIT
DTC	C1791/91	RIGHT FRONT ACCELERATION SENSOR CIRCUIT
DTC	C1792/92	LEFT FRONT ACCELERATION SENSOR CIRCUIT
DTC	C1793/93	REAR ACCELERATION SENSOR CIRCUIT

CIRCUIT DESCRIPTION

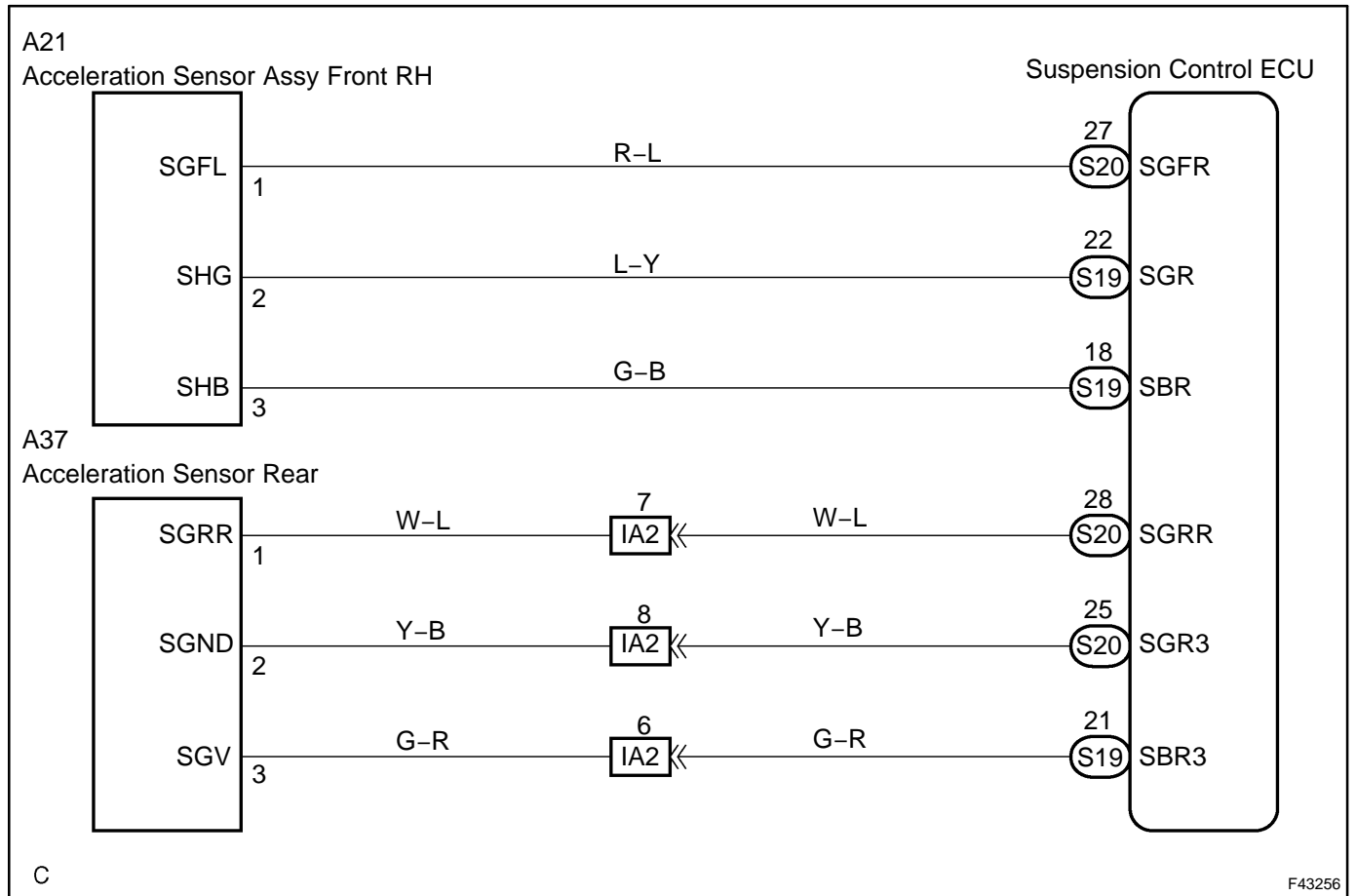
The acceleration sensors detect the up-and-down acceleration of the vehicle. The acceleration sensors (3 in total) are mounted in the suspension control ECU, at the LH side of the cowl and in the rear quarter area, and detect the up-and-down acceleration of the vehicle, respectively. The acceleration sensors convert the resistance into an electrical signal and output to the suspension control ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1715/15	After turning the ignition switch to ON, acceleration sensor voltage is continuously output for 1 sec. at 0.3 V or less or at 4.7 V or more.	<ul style="list-style-type: none"> • Acceleration sensor assy front RH • Right front acceleration sensor circuit • Suspension control ECU
C1716/16		<ul style="list-style-type: none"> • Suspension control ECU (Acceleration sensor front LH is a built-in equipment)
C1717/17		<ul style="list-style-type: none"> • Acceleration sensor rear • Rear acceleration sensor circuit • Suspension control ECU

HINT:

- When DTC C1791/91 is output, follow the same procedure as DTC C1715/15.
- When DTC C1793/93 is output, follow the same procedure as DTC C1717/17.
- Since the acceleration sensor front LH is built into the suspension control ECU, replace suspension control ECU when DTC C1716/16 and C1792/92 are output.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC C1761/61 (ECU malfunction) and/or C1774/74 (power source circuit) is displayed, perform the inspection necessary for DTC C1761/61 (See page 05-518) and/or C1774/74 (See page 05-520) first.
(If DTC C1761/61 and C1774/74 are output at the same time, perform the inspection necessary for DTC C1774/74 first.)
- Start the inspection from the step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch ON, and push the hand-held tester main switch ON.
- Select the item "G (UP & DOWN) FR" or "G (UP & DOWN) R" in the DATA LIST, and read its value displayed on the hand-held tester.
- Check that the acceleration value of the acceleration sensor which is displayed in the hand-held tester changes while bouncing the vehicle.

Standard:

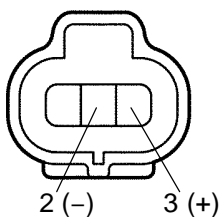
Acceleration value changes.

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 CHECK HARNESS AND CONNECTOR (ACCELERATION SENSOR POWER SOURCE)



F44278

- Disconnect the suspect acceleration sensor connector.
- Turn the ignition switch ON, and measure voltage between terminals 2 and 3 of the acceleration sensor wire harness side connector.

Standard:

4.5 to 5.5 V

OK

Go to step 4

NG

3 CHECK HARNESS AND CONNECTOR(ACCELERATION SENSOR – SUSPENSION CONTROL ECU)

Acceleration sensor assy front RH:

- (a) Check for open and short circuit in the harness and the connector between terminal 2 (SHG) of the acceleration sensor front RH and S19-22 (SGR) of the suspension control ECU (See page 01-36).
- (b) Check for open and short circuit in the harness and the connector between terminal 3 (SHB) of the acceleration sensor front RH and S19-18 (SBR) of the suspension control ECU (See page 01-36).

Acceleration sensor rear:

- (a) Check for open and short circuit in the harness and the connector between terminal 2 (SGND) of the acceleration sensor rear and S20-25 (SGR3) of the suspension control ECU (See page 01-36).
- (b) Check for open and short circuit in the harness and the connector between terminal 3 (SGV) of the acceleration sensor rear and S19-21 (SBR3) of the suspension control ECU (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(ACCELERATION SENSOR – SUSPENSION CONTROL ECU)

Acceleration sensor assy front RH:

- (a) Check for open and short circuit in the harness and the connector between terminal 1 (SGFL) of the acceleration sensor front RH and S20-27 (SGFR) of the suspension control ECU (See page 01-36).

Result:

OK	A
NG	C

Acceleration sensor rear:

- (a) Check for open and short circuit in the harness and the connector between terminal 1 (SGRR) of the acceleration sensor front RH and S20-28 (SGRR) of the suspension control ECU (See page 01-36).

Result:

OK	B
NG	C

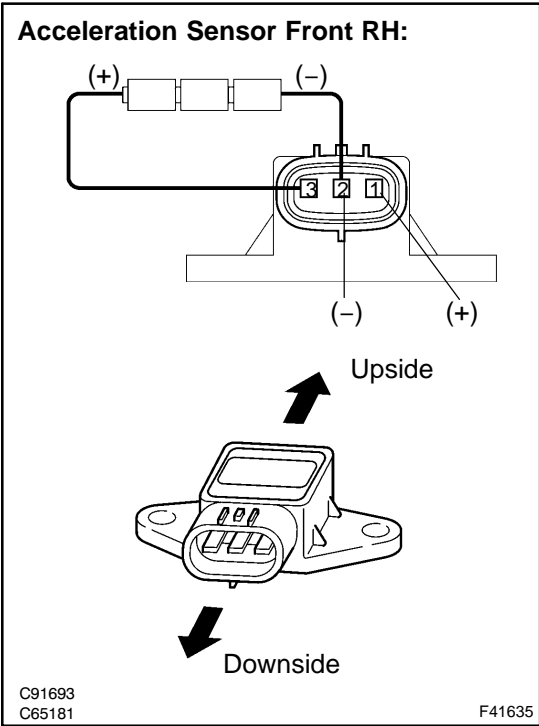
A Go to step 5

B Go to step 6

C

REPAIR OR REPLACE HARNESS OR CONNECTOR

5 INSPECT ACCELERATION SENSOR ASSY(FRONT RH)



- (a) Remove the acceleration sensor assy front RH.
- (b) Connect 3 dry batteries of 1.5 V in series.
- (c) Connect terminal 3 (SHB) to the batteries' positive (+) terminal, and terminal 2 (SHG) to the batteries' negative (-) terminal, then measure the voltage between terminals 1 (SGFL) and 2 (SHB) in the following conditions.

Standard:

Sensor condition	Voltage
Sensor stationary	Approx. 2.3 V
Sensor vibrating vertically	Change between approx. 1.0 to 4.0 V

NOTICE:

- Do not apply more than 6 V.
- Do not drop the acceleration sensor assy. If it is dropped, replace it with a new one.
- Never place the acceleration sensor assy removed from the vehicle upside down.

HINT:

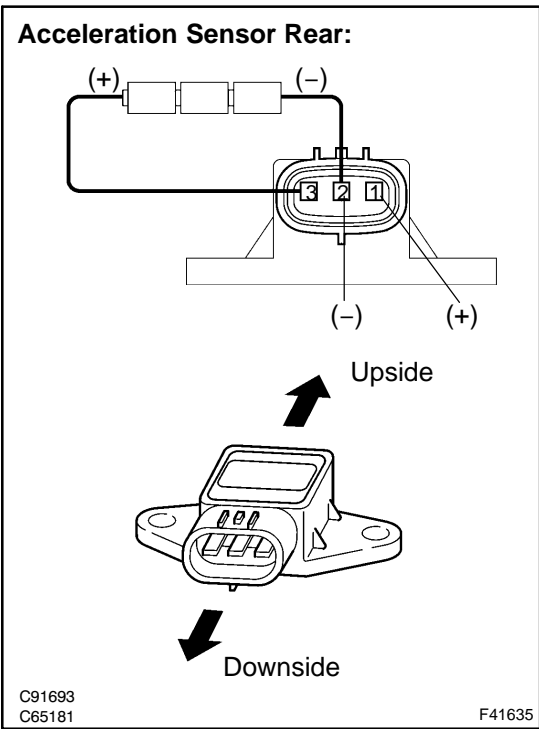
When the acceleration sensor assy is tilted, it may output a different value.

NG → **REPLACE ACCELERATION SENSOR ASSY**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

6 INSPECT ACCELERATION SENSOR(REAR)



- (a) Remove the acceleration sensor rear.
- (b) Connect 3 dry batteries of 1.5 V in series.
- (c) Connect terminal 3 (SGV) to the batteries' positive (+) terminal, and terminal 2 (SGMD) to the batteries' negative (-) terminal, then measure the voltage between terminals 1 (SGRR) and 2 (SGMD) in the following conditions.

Standard:

Sensor condition	Voltage
Sensor stationary	Approx. 2.3 V
Sensor vibrating vertically	Change between approx. 1.0 to 4.0 V

NOTICE:

- Do not apply more than 6 V.
- Do not drop the acceleration sensor. If it is dropped, replace it with a new one.
- Never place the acceleration sensor assy removed from the vehicle upside down.

HINT:

When the acceleration sensor is tilted, it may output the different value.

NG → **REPLACE ACCELERATION SENSOR**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1725/21	RIGHT FRONT ABSORBER CONTROL ACTUATOR CIRCUIT
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DTC	C1726/22	LEFT FRONT ABSORBER CONTROL ACTUATOR CIRCUIT
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DTC	C1727/23	RIGHT REAR ABSORBER CONTROL ACTUATOR CIRCUIT
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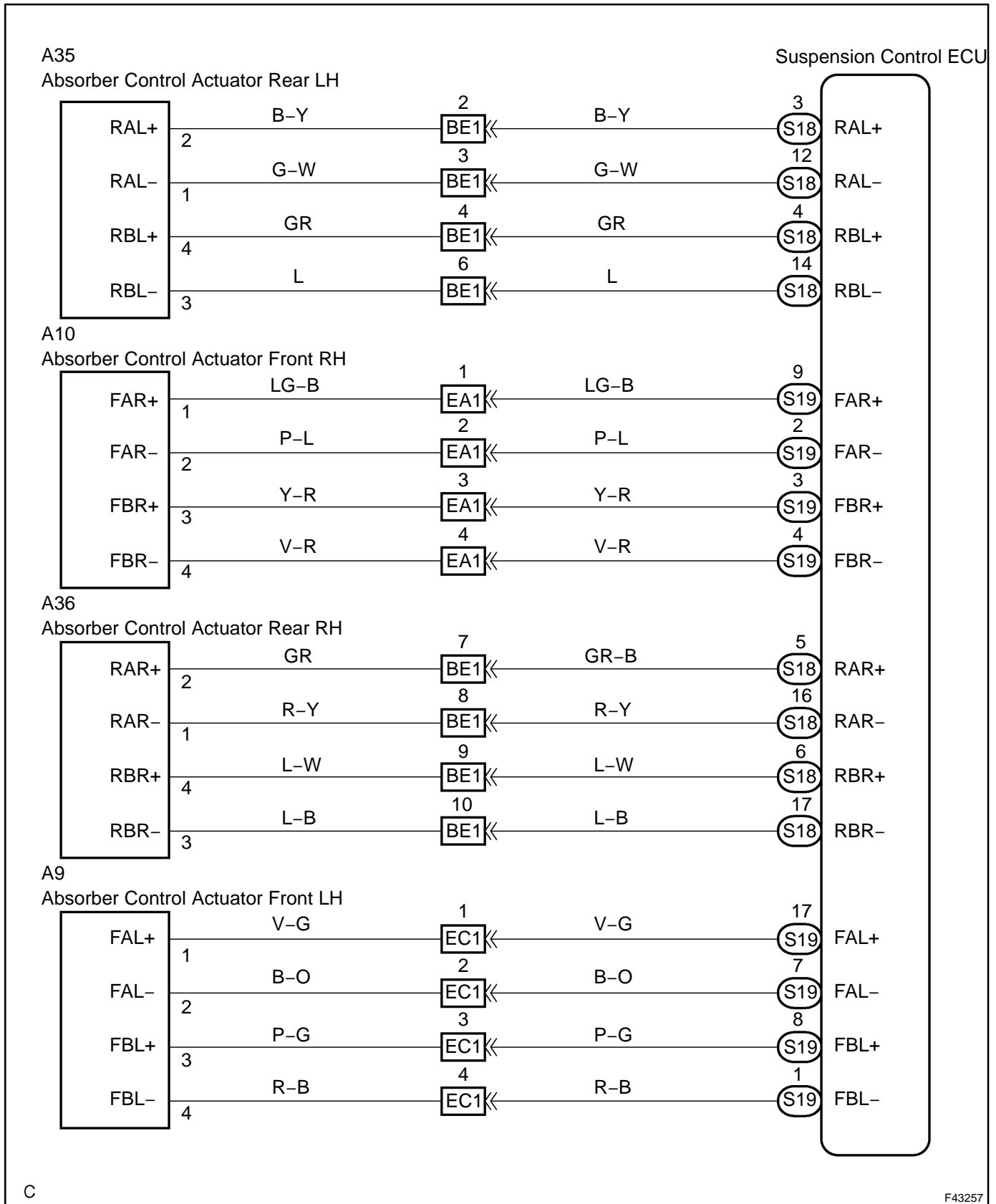
DTC	C1728/24	LEFT REAR ABSORBER CONTROL ACTUATOR CIRCUIT
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CIRCUIT DESCRIPTION

Absorber control actuator switches the damping force depending on the suspension control ECU signals.

DTC No.	DTC Detecting Condition	Trouble Area
C1725/21	Either of the following 1. or 2. is detected: 1. After starting the engine, the breakage signal of absorber control actuator is continuously detected for 1.0 second. 2. After turning ignition switch to ON, the short circuit signal of absorber control actuator is continuously detected 8 times.	<ul style="list-style-type: none"> • Absorber control actuator front RH • Right front absorber control actuator circuit • Suspension control ECU
C1726/22		<ul style="list-style-type: none"> • Absorber control actuator front LH • Left front absorber control actuator circuit • Suspension control ECU
C1727/23		<ul style="list-style-type: none"> • Absorber control actuator rear RH • Right rear absorber control actuator circuit • Suspension control ECU
C1728/24		<ul style="list-style-type: none"> • Absorber control actuator rear LH • Left rear absorber control actuator circuit • Suspension control ECU

WIRING DIAGRAM



C

F43257

INSPECTION PROCEDURE

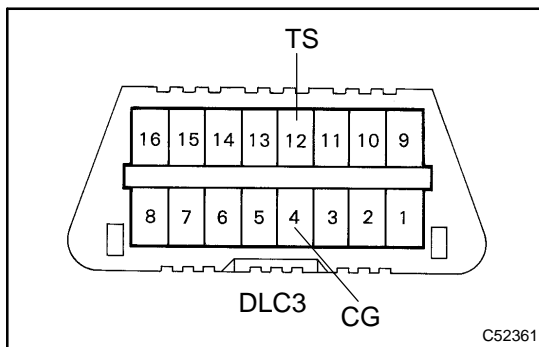
1 INSPECT ABSORBER CONTROL ACTUATOR OPERATION

When using hand-held tester:

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "DAMPER FR", "DAMPER FL", "DAMPER RR" or "DAMPER RL" in the ACTIVE TEST, and operate it on the hand-held tester.
- (d) With hand-held tester, check if the absorber control actuator operates making the suspension harder or softer.

Standard:

The absorber control actuator operates making the suspension harder or softer.



When using SST check wire:

- (a) Using SST, connect terminal TS and CG of DLC3 with the ignition switch at OFF (TEST mode).
SST 09843-18040
- (b) Start the engine.
 - (1) Under this condition, the absorber control actuator position is 1 (Soft).
- (c) Starting from the above mentioned position, as the brake pedal is depressed, the absorber control actuator position increases (1 → 2 → 3 → ... 15 → 16).
Bounce the vehicle and check that the shock absorber becomes harder.

Standard:

The shock absorber becomes harder.

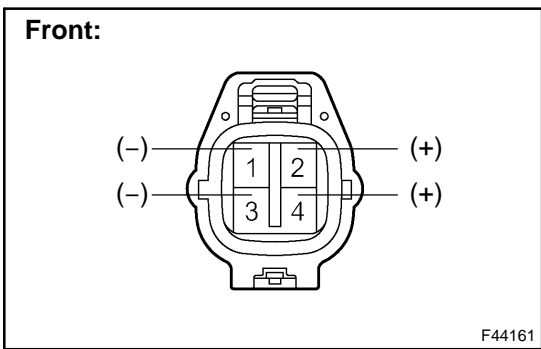
NG

Go to step 2

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU

2 INSPECT ABSORBER CONTROL ACTUATOR



Absorber control actuator front:

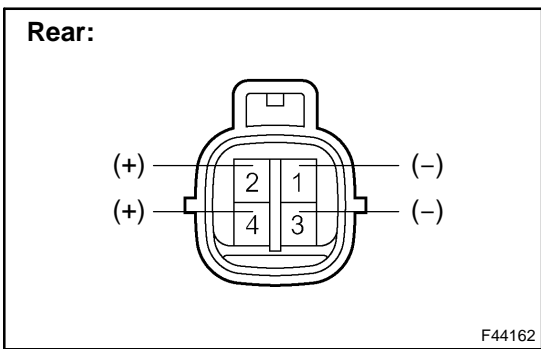
- (a) Disconnect the absorber control actuator connector.
- (b) Measure the resistance between each terminal of the front absorber control actuator.

Standard:

Terminal connection	Resistance
1 - 2	6.8 ± 0.4 Ω
3 - 4	6.8 ± 0.4 Ω

Result:

OK	A
NG	B



Absorber control actuator rear:

- (a) Disconnect the absorber control actuator connector.
- (b) Measure the resistance between each terminal of the front absorber control actuator.

Standard:

Terminal connection	Resistance
1 - 2	6.8 ± 0.4 Ω
3 - 4	6.8 ± 0.4 Ω

Result:

OK	A
NG	C

B → REPLACE ABSORBER CONTROL ACTUATOR

C → REPLACE SHOCK ABSORBER ASSY REAR LH

A

3 CHECK HARNESS AND CONNECTOR(ABSORBER CONTROL ACTUATOR - SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between the absorber control actuator and the suspension control ECU (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1733/33	GATE SOLENOID VALVE CIRCUIT
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DTC	C1734/34	LEVELING SOLENOID VALVE CIRCUIT
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DTC	C1735/35	EXHAUST SOLENOID VALVE CIRCUIT
------------	-----------------	---------------------------------------

DTC	C1744/44	TANK SOLENOID VALVE CIRCUIT
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CIRCUIT DESCRIPTION

The suspension control ECU opens the height control valve to lead the compressed air to the pneumatic cylinder and raise the vehicle height.

When the vehicle height is lowered, the suspension control ECU opens the height control valve to store the compressed air in the low pressure tank temporarily, and then operates the exhaust solenoid valve to release the compressed air to the outside.

Further, the height control solenoid valve (gate solenoid valve) opens and closes the passage between the right and left pneumatic cylinder.

The height control valve is on the low pressure tank and consists of 3 valves in total, leveling solenoid valve, gate solenoid valve and tank solenoid valve.

The leveling solenoid valve opens and closes the passage between the compressor and the pneumatic cylinder. The gate solenoid valve opens and close the passage between the right and left pneumatic cylinder.

The tank solenoid valve opens and closes the passage between pneumatic cylinder and the low pressure tank. The exhaust solenoid valve is on the compressor unit and has only one valve.

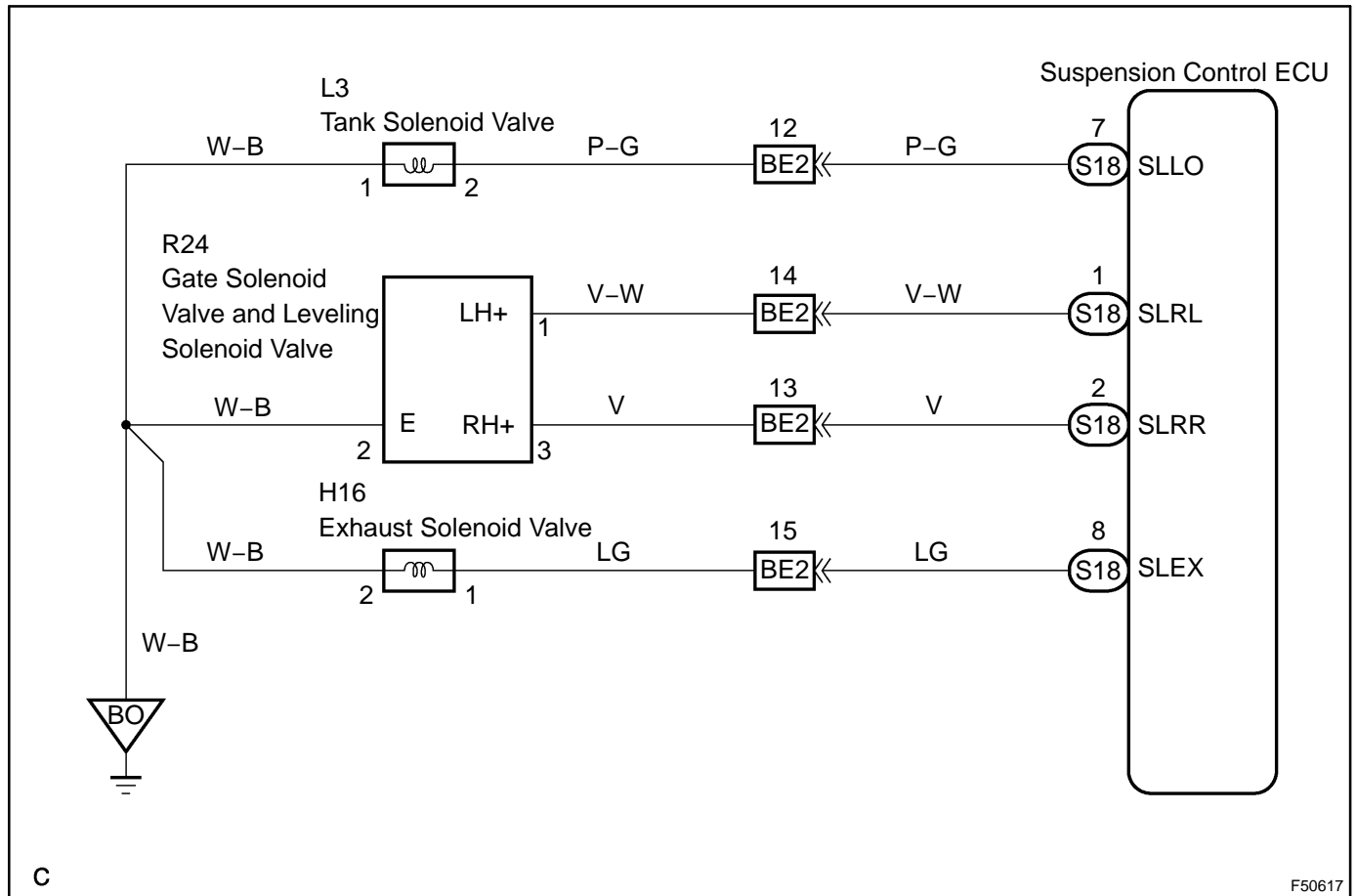
DTC No.	DTC Detecting Condition	Trouble Area
C1733/33	Either the condition 1 or 2. is detected: 1. With the height control solenoid valve (or exhaust solenoid valve) inactivated, an open signal of the height control solenoid valve is detected for 1 sec. or more. 2. With the height control solenoid valve (or exhaust solenoid valve) activated, a short signal of the valve is detected 8 times successively.	• Gate solenoid valve • Gate solenoid valve circuit • Suspension control ECU
C1734/34		• Leveling solenoid valve • Leveling solenoid valve circuit • Suspension control ECU
C1735/35		• Exhaust solenoid valve • Exhaust solenoid valve circuit • Suspension control ECU
C1744/44		• Tank solenoid valve • Tank solenoid valve circuit • Suspension control ECU

HINT:

- Once ECU stores DTC C1733/33, C1734/34, C1735/35 or C1744/44 in the memory, the vehicle height control is suspended out until a normal signal is input to ECU from the height control solenoid valves and the exhaust solenoid valve. However, control is resumed if the ignition switch is turned OFF, then ON again.
- Malfunction in the gate solenoid valve and the leveling solenoid valve:
The height control operation is suspended, and the height control indicator lamp does not change by operating the height control switch.

- Malfunction in the exhaust solenoid valve:
The vehicle height is lowered to the normal height within 30 sec., and then the height control operation is suspended. The height control indicator lamp "N" comes on or blinks, and that of "HI" and "LO" do not illuminated by operating the height control switch "UP" and "DOWN".
- Abnormality of the tank solenoid valve:
Although the height control is still possible, the vehicle lowering speed may be slower.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Proceed to troubleshooting following the flow chart, regardless of whether or not DTC C1733/33, C1734/34, C1735/35 or C1744/44 is displayed.
- If DTC C1761/61 (ECU malfunction) and/or C1774/74 (power source circuit) is displayed, perform the inspection necessary for DTC C1761/61 (See page 05-518) and/or C1774/74 (See page 05-520) first.
(If DTC C1761/61 and C1774/74 are output at the same time, perform the inspection necessary for DTC C1774/74 first.)
- Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1	PERFORM ACTIVE TEST BY HAND-HELD TESTER
----------	--

- Connect the hand-held tester to DLC3.
- Turn the ignition switch ON, and push the hand-held tester main switch ON.
- Select the item "LEVEL SOL REAR", "GATE SOL REAR", "LOW PRS TNK SOL", "EXHAUST SOL" in the ACTIVE TEST, and operate it with the hand-held tester.
- Check whether the solenoid makes sound.
- Check whether the height control solenoid valve has a continuity (will vibrate).

Standard:

The solenoid makes sound, and the height control solenoid valve has a continuity (will vibrate).

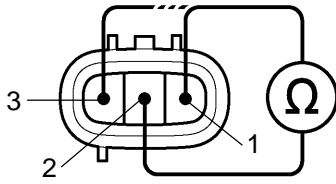
OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

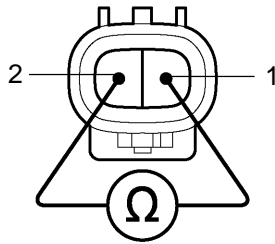
NG

2 INSPECT HEIGHT CONTROL SOLENOID VALVE OR EXHAUST SOLENOID VALVE

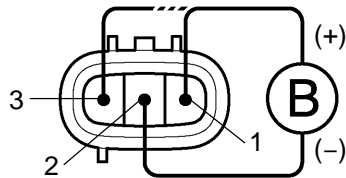
**Gate Solenoid Valve:
Leveling Solenoid Valve:**



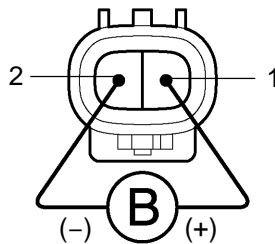
**Exhaust Solenoid Valve:
Tank Solenoid Valve:**



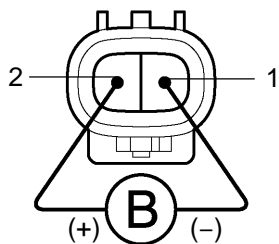
**Gate Solenoid Valve:
Leveling Solenoid Valve:**



Exhaust Solenoid Valve:



Tank Solenoid Valve:



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- (a) Disconnect the valve connector.
- (b) Measure resistance between terminals.

Standard:

Solenoid valve	Tester connection	Resistance
Gate solenoid valve	1 - 2	17.5 to 21.5 Ω
Leveling solenoid valve	2 - 3	10 to 14 Ω
Exhaust solenoid valve	1 - 2	10 to 14 Ω
Tank solenoid valve	1 - 2	10 to 14 Ω

HINT:

The height control solenoid valve has 2 connectors.

- The gate solenoid valve and the leveling solenoid valve have a 3-pole connector.
 - Tank solenoid valve connector has a 2-pole connector.
- (c) Check the operating sound of the valves when battery positive voltage is applied to the terminals as shown below.

Solenoid valve	Battery positive	Battery negative
Gate solenoid valve	1	2
Leveling solenoid valve	3	2
Exhaust solenoid valve	1	2
Tank solenoid valve	2	1

Standard:

It should make an operating sound (click).

HINT:

- When a malfunction is found in the gate solenoid valve, the leveling valve or the tank solenoid valve, replace the height control reservoir assy.
- When a malfunction is found in the exhaust solenoid valve, replace the height control compressor assy.

NG → **REPLACE HEIGHT CONTROL RESERVOIR ASSY**

NG → **REPLACE HEIGHT CONTROL COMPRESSOR ASSY**

OK

3	CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL SOLENOID VALVE OR EXHAUST SOLENOID VALVE - SUSPENSION CONTROL ECU)
----------	--

- (a) Check for open and short circuit in the harness and the connectors between height control solenoid valve or the exhaust solenoid valve and the suspension control ECU (See page [01-36](#)).

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)
--

DTC	C1741/41	AIR SUS RELAY CIRCUIT
------------	-----------------	------------------------------

CIRCUIT DESCRIPTION

When "UP" side of the height control switch is pressed, a signal is sent from terminal RC of the suspension control ECU to the AIR SUS relay to turn it on.

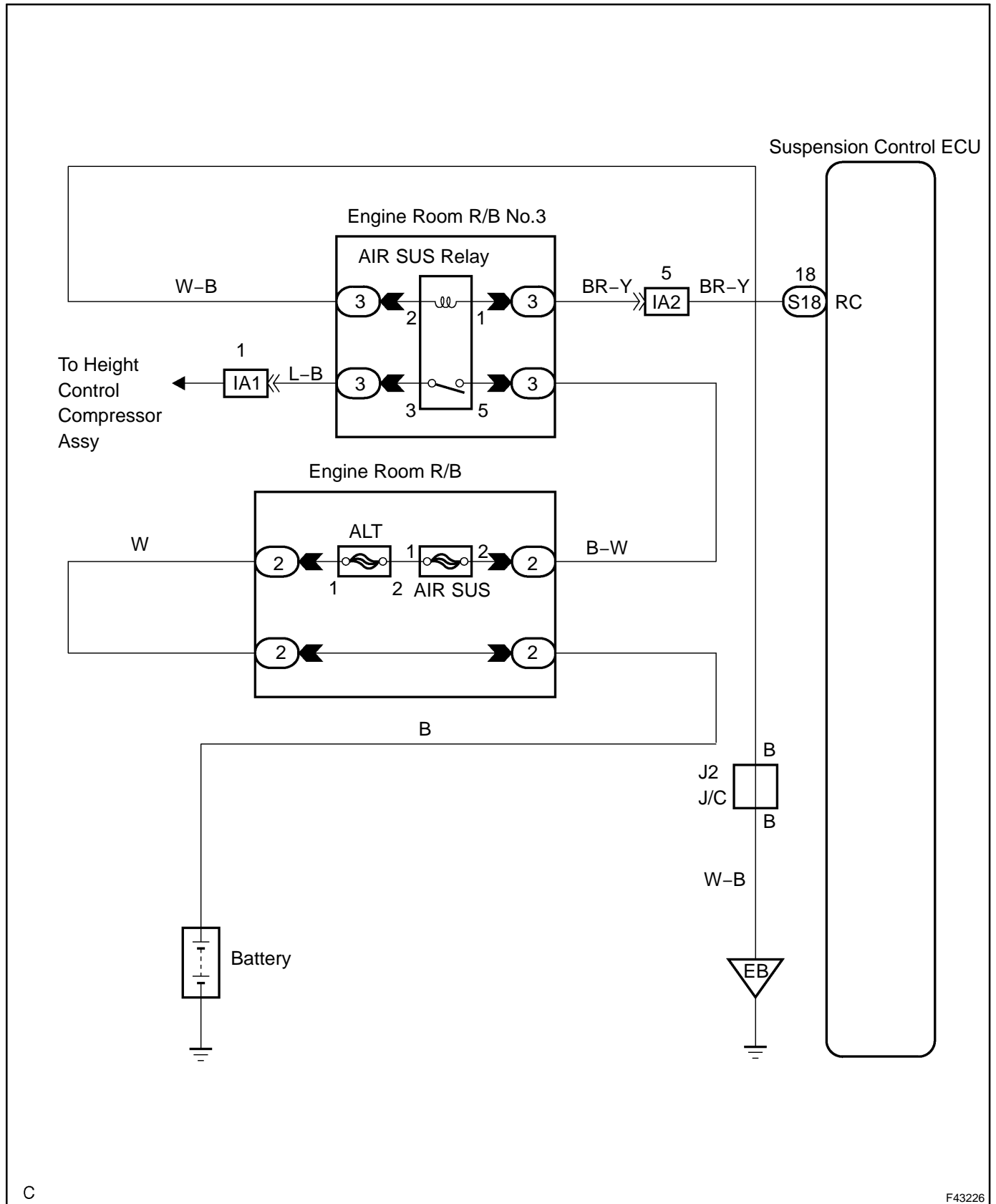
As a result, the current flows to the AIR SUS relay coil, closing the relay contact, and then the battery positive voltage is applied to the compressor, which causes the compressed air to raise the vehicle height.

DTC No.	DTC Detecting Condition	Trouble Area
C1741/41	Either the condition 1. or 2. is detected. 1. With the AIR SUS relay inactivated, an open signal of the AIR SUS relay is detected for 1 sec. or more. 2. With the AIR SUS relay activated, a short signal of the AIR SUS relay is detected 8 times successively.	<ul style="list-style-type: none"> • AIR SUS relay • AIR SUS relay circuit • Suspension control ECU

HINT:

Once ECU stores DTC C1741/41 in the memory, the vehicle height control is suspended until a normal signal is input to ECU from the AIR SUS relay. However, the control resumes if the ignition switch is once turned OFF, and then turned ON again.

WIRING DIAGRAM



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INSPECTION PROCEDURE**HINT:**

- If DTC C1761/61 (ECU malfunction) and/or C1774/74 (power source circuit) is displayed, perform the inspection necessary for DTC C1761/61 (See page 05-518) and/or C1774/74 (See page 05-520) first.
(If DTC C1761/61 and C1774/74 are output at the same time, perform the inspection necessary for DTC C1774/74 first.)
- Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 | PERFORM ACTIVE TEST BY HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch ON, and push the hand-held tester main switch ON.
- Select the item "MOTOR RELAY" in the ACTIVE TEST, and operate it with the hand-held tester.
- Check the operation sound of the AIR SUS relay when operating it with the hand-held tester.

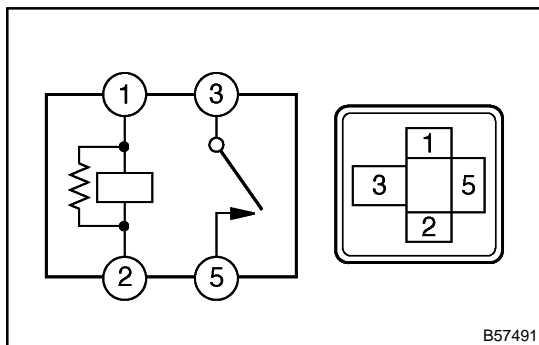
Standard:

The operation sound of the AIR SUS relay can be heard.

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 | INSPECT AIR SUS RELAY

- Remove the AIR SUS relay from the engine room R/B No.3.
- Check continuity between each terminal of the AIR SUS relay.

Standard:

Tester connection	Specification
1 - 2	Continuity (Reference value 62 Ω)
3 - 5	No continuity

- Apply battery positive voltage between terminals 1 and 2.
- Check continuity between terminals 3 and 5 of the AIR SUS relay.

Standard:

Tester connection	Specification
3 - 5	Continuity

NG

REPLACE AIR SUS RELAY

OK

3 CHECK HARNESS AND CONNECTOR(AIR SUS RELAY - SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between the AIR SUS relay and the suspension control ECU (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(AIR SUS RELAY - BODY GROUND)

- (a) Check for open and short circuit in the harness and the connector between the AIR SUS relay and the body ground (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1742/42	HEIGHT CONTROL COMPRESSOR CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

When "UP" side of the height control is pressed, a signal is sent from terminal RC of the suspension control ECU to switch the AIR SUS relay ON. As a result, the relay contacts close and the compressor motor turns on, producing compressed air.

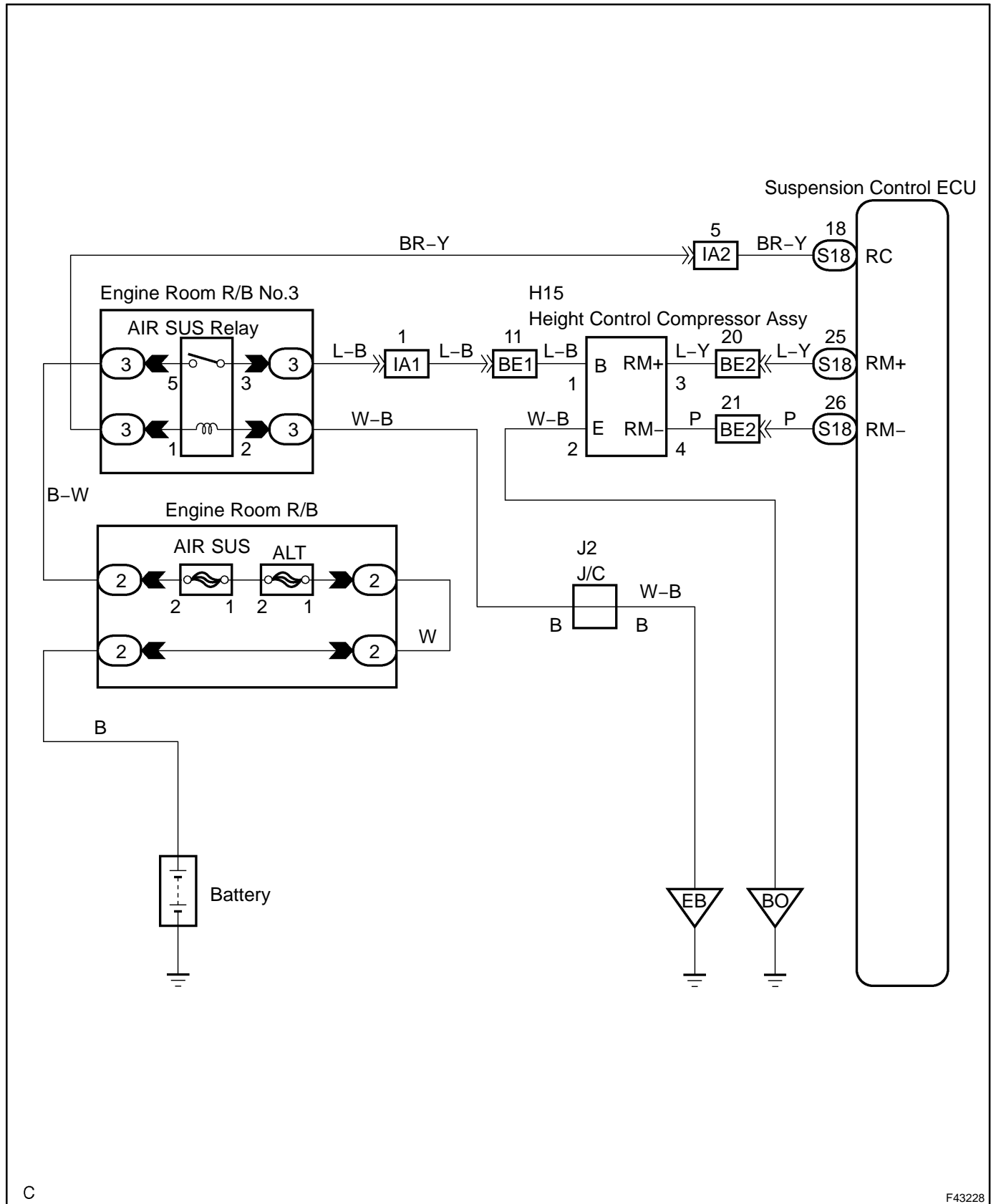
At this time, the suspension control ECU detects the amount of current flow to the compressor motor by means of the differences in potential at terminal RM+ and RM- of the suspension control ECU. In this way, the suspension control ECU monitors the compressor circuit for abnormalities.

DTC No.	DTC Detecting Condition	Trouble Area
C1742/42	With the AIR SUS relay activated, a lock, open or short signal of the height control compressor motor is detected for 4 sec. or more.	<ul style="list-style-type: none"> • Height control compressor assy • Height control compressor circuit • Suspension control ECU

HINT:

Once ECU stores DTC C1742/42 in the memory, the vehicle height control is not carried out until the normal signal is input to ECU from the compressor motor. However, the control automatically resumes approx. 70 min. after the ignition switch is turned ON.

WIRING DIAGRAM



C

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INSPECTION PROCEDURE

1 RECONFIRM DTC

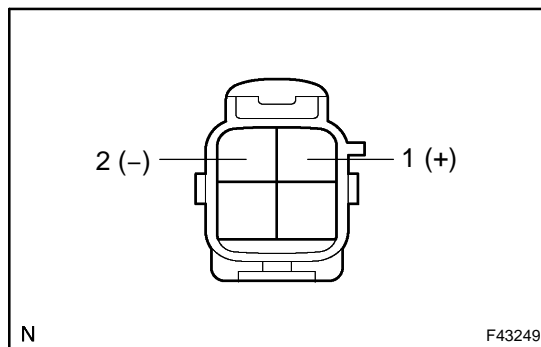
- (a) Check if the other DTCs are recorded (See page 05-468).

YES

REPAIR CIRCUIT INDICATED BY OUTPUT
CODE

NO

2 INSPECT HEIGHT CONTROL COMPRESSOR ASSY



- (a) Disconnect the height control compressor assy connector.
 (b) Apply battery voltage between terminals 1 and 2 of the height control compressor assy.

Standard:**Compressor motor operates.****NOTICE:**

- Do not operate the height control compressor assy 90 sec. or more.
- Since short and lock inside the height control compressor assy causes enormous current to flow, stop the operation immediately when it does not rotate.

NG

REPLACE HEIGHT CONTROL COMPRESSOR
ASSY

OK

3 CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL COMPRESSOR ASSY –
SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between the height control compressor assy and the suspension control ECU (See page 01-36).

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL COMPRESSOR ASSY –
AIR SUS RELAY)

- (a) Check for open and short circuit in the harness and the connector between the height control compressor assy and the AIR SUS relay (See page 01-36).

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

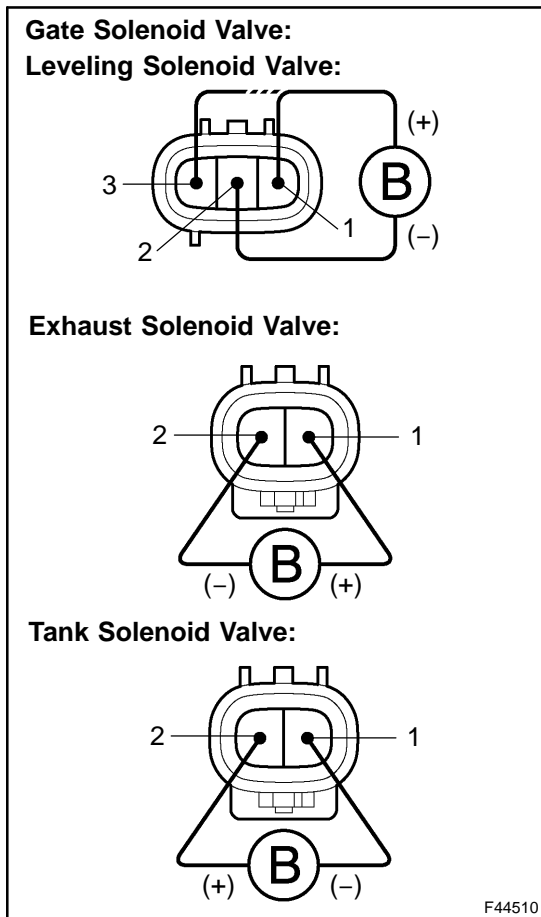
5 INSPECT HEIGHT CONTROL SOLENOID VALVE OR EXHAUST SOLENOID VALVE

When using hand-held tester:

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "LEVEL SOL REAR", "GATE SOL REAR", "LOW PRS TNK SOL", "EXHAUST SOL" in the ACTIVE TEST, and operate it with the hand-held tester.
- (d) Check whether the solenoid makes sound.
- (e) Check whether the height control solenoid valve has a continuity (will vibrate).

Standard:

The solenoid makes sound, the height control solenoid valve has a continuity (will vibrate).



When not using hand-held tester:

- (a) Disconnect the valve connector.
- (b) Check the operating sound of the valves when battery positive voltage is applied to the terminals as shown below.

Solenoid valve	Battery positive	Battery negative
Gate solenoid valve	1	2
Leveling solenoid valve	3	2
Exhaust solenoid valve	1	2
Tank solenoid valve	2	1

Standard:

It should make an operating sound (click).

HINT:

- When a malfunction is found in the gate solenoid valve, the leveling valve or the tank solenoid valve, replace the height control reservoir assy.
- When a malfunction is found in the exhaust solenoid valve, replace the height control compressor assy.

NG → **REPLACE HEIGHT CONTROL RESERVOIR ASSY**

NG → **REPLACE HEIGHT CONTROL COMPRESSOR ASSY**

OK

6 INSPECT FOR AIR TUBE CLOGGED

(a) Check visually for clog, damage or breakage on the air tube (See page [25-3](#)).

NG**REPAIR OR REPLACE AIR TUBE****OK****CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))**

DTC	C1751/51	CONTINUOUS ELECTRIC CURRENT TO HEIGHT CONTROL COMPRESSOR
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CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1751/51*1	With the AIR SUS relay activated, the vehicle does not go up to the standard vehicle height after the 100 sec. elapsed.	<ul style="list-style-type: none"> • Height control compressor assy • Height control compressor circuit • Height control sensor link sub-assy rear • Height control sensor sub-assy rear • Relief valve • AIR SUS relay comes off • Air leakage from the air tube or each valve • Clogging in the air tube or each valve • Suspension control ECU

*1: The relief pressure of the compressed air is 980 kPa (10 kgf/cm², 142 psi). If the vehicle height control is attempted on a steeply sloping road, when the vehicle is overloaded, or when the vehicle is jacked up with the engine running, the compressor motor operates continuously to raise vehicle height, and causes electric current to flow to the AIR SUS relay for 100 sec. or longer.

Thus DTC C1751/51 may be output and vehicle height control may be suspended (This is not abnormal). In this case, however, the vehicle height operation is resumed approx. 10 min. after the ignition switch is turned ON after the ECU detects the first error. If ECU detects another error, it takes 70 minutes until the control is resumed.

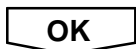
INSPECTION PROCEDURE

1	INSPECT HEIGHT CONTROL COMPRESSOR CIRCUIT (See page 05-510)
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2	INSPECT AIR LEAKAGE (See page 25-3)
----------	--

NG	REPAIR OR REPLACE AIR TUBE
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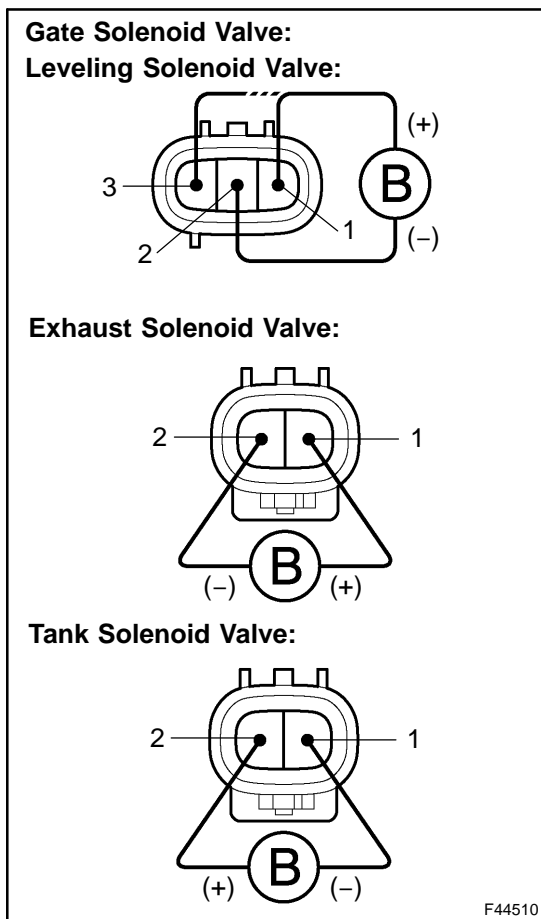
3 INSPECT HEIGHT CONTROL SOLENOID VALVE OR EXHAUST SOLENOID VALVE

When using hand-held tester:

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "LEVEL SOL REAR", "GATE SOL REAR", "LOW PRS TNK SOL", "EXHAUST SOL" in the ACTIVE TEST, and operate it with the hand-held tester.
- (d) Check whether the solenoid makes sound.
- (e) Check whether the height control solenoid valve has a continuity (will vibrate).

Standard:

The solenoid makes sound, the height control solenoid valve has a continuity (will vibrate).



When not using hand-held tester:

- (a) Disconnect the valve connector.
- (b) Check the operating sound of the valves when battery positive voltage is applied to the terminals as shown below.

Solenoid valve	Battery positive	Battery negative
Gate solenoid valve	1	2
Leveling solenoid valve	3	2
Exhaust solenoid valve	1	2
Tank solenoid valve	2	1

Standard:

It makes an operating sound (click).

HINT:

- When a malfunction is found in the gate solenoid valve, the leveling valve or the tank solenoid valve, replace the height control reservoir assy.
- When a malfunction is found in the exhaust solenoid valve, replace the height control compressor assy.

NG → **REPLACE HEIGHT CONTROL RESERVOIR ASSY**

NG → **REPLACE HEIGHT CONTROL COMPRESSOR ASSY**

OK

4 INSPECT HEIGHT CONTROL SENSOR LINK SUB-ASSY

- (a) Inspect and adjust the height control sensor link sub-assy (See page 25-3).

OK

5 RECONFIRM DTC

(a) Clear the DTC and repeat the procedure to re-check it (See page [05-468](#)).

HINT:

If the DTC C1751/51 is still output, proceed to the next step.

**6 CHECK AND REPAIR OR REPLACE PARTS OF MALFUNCTION CAUSES**

- (a) Air tube is clogged (See page [25-3](#)).
- (b) Compressor is faulty (See page [25-11](#)).
- (c) Relief valve is faulty (See page [25-15](#)).
- (d) Height control sensor sub-assy rear is faulty (See page [25-17](#)).
- (e) Foreign material entered in the height control solenoid valve (gate solenoid valve) and the exhaust solenoid valve.
- (f) Suspension control ECU malfunctions (See page [05-481](#)).

DTC	C1761/61	ECU MALFUNCTION
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CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1761/61	Suspension control ECU malfunction	• Suspension control ECU

INSPECTION PROCEDURE

HINT:

- If DTC C1774/74 (power source circuit) is displayed, perform the inspection necessary for DTC C1774/74 first (See page 05-520).
- If DTC C1713/13 (right rear height control sensor circuit), C1714/14 (left rear height control sensor circuit) and C1761/61 (ECU malfunction) are output at the same time, perform the inspection necessary for DTC C1761/61 first.

1 INSPECT HEIGHT CONTROL OFF INDICATOR LAMP

- (a) Turn the ignition switch ON, and check the height control OFF indicator lamp.

Result:

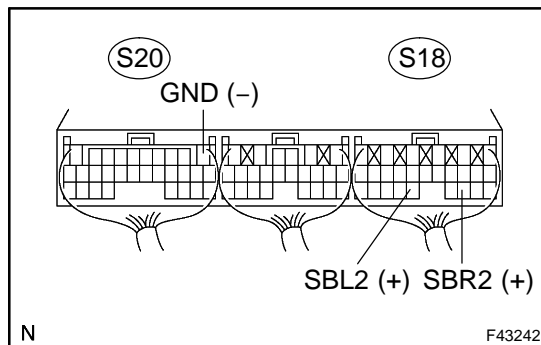
A: Height control OFF indicator lamp comes on

B: Height control OFF indicator lamp does not come on

B → REPLACE SUSPENSION CONTROL ECU

A

2 INSPECT SUSPENSION CONTROL ECU(HEIGHT CONTROL SENSOR SUB-ASSY REAR POWER SOURCE)



- (a) Remove the suspension control ECU with connectors being connected.
- (b) Turn the ignition switch ON, and measure voltage between terminals S18-20 (SBR2) and S20-1 (GND) and between terminals S18-22 (SBL2) and S20-1 (GND) of the suspension control ECU connector.

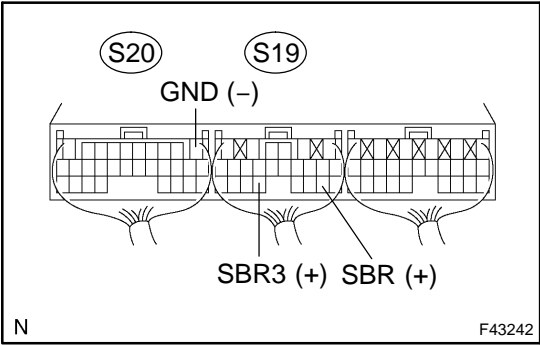
Standard:

4.5 to 5.5 V

NG → CHECK HEIGHT CONTROL SENSOR SUB-ASSY CIRCUIT (See page 05-486)

OK

3 INSPECT SUSPENSION CONTROL ECU(ACCELERATION SENSOR POWER SOURCE)

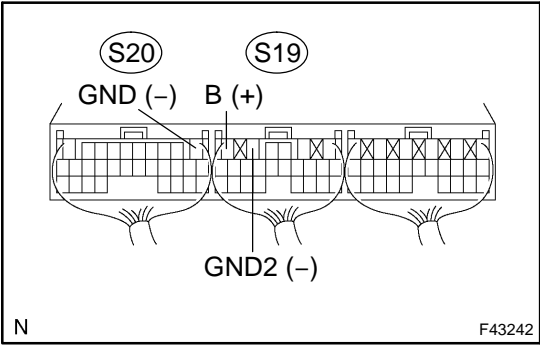


- (a) Turn the ignition switch ON, and measure voltage between terminals S19-18 (SBR) and S20-1 (GND) and between terminals S19-21 (SBR3) and S20-1 (GND) of the suspension control ECU connector.
Standard:
4.5 to 5.5 V

NG → **CHECK ACCELERATION SENSOR CIRCUIT (See page 05-491)**

OK

4 INSPECT SUSPENSION CONTROL ECU(ECU POWER SOURCE)



- (a) Turn the ignition switch OFF, and measure voltage between terminals S19-6 (B) and S20-1 (GND) and between terminals S19-6 (B) and S20-5 (GND2) of the suspension control ECU connector.
Standard:
10 to 14 V

NG → **CHECK POWER SOURCE CIRCUIT (See page 05-520)**

OK

REPLACE SUSPENSION CONTROL ECU

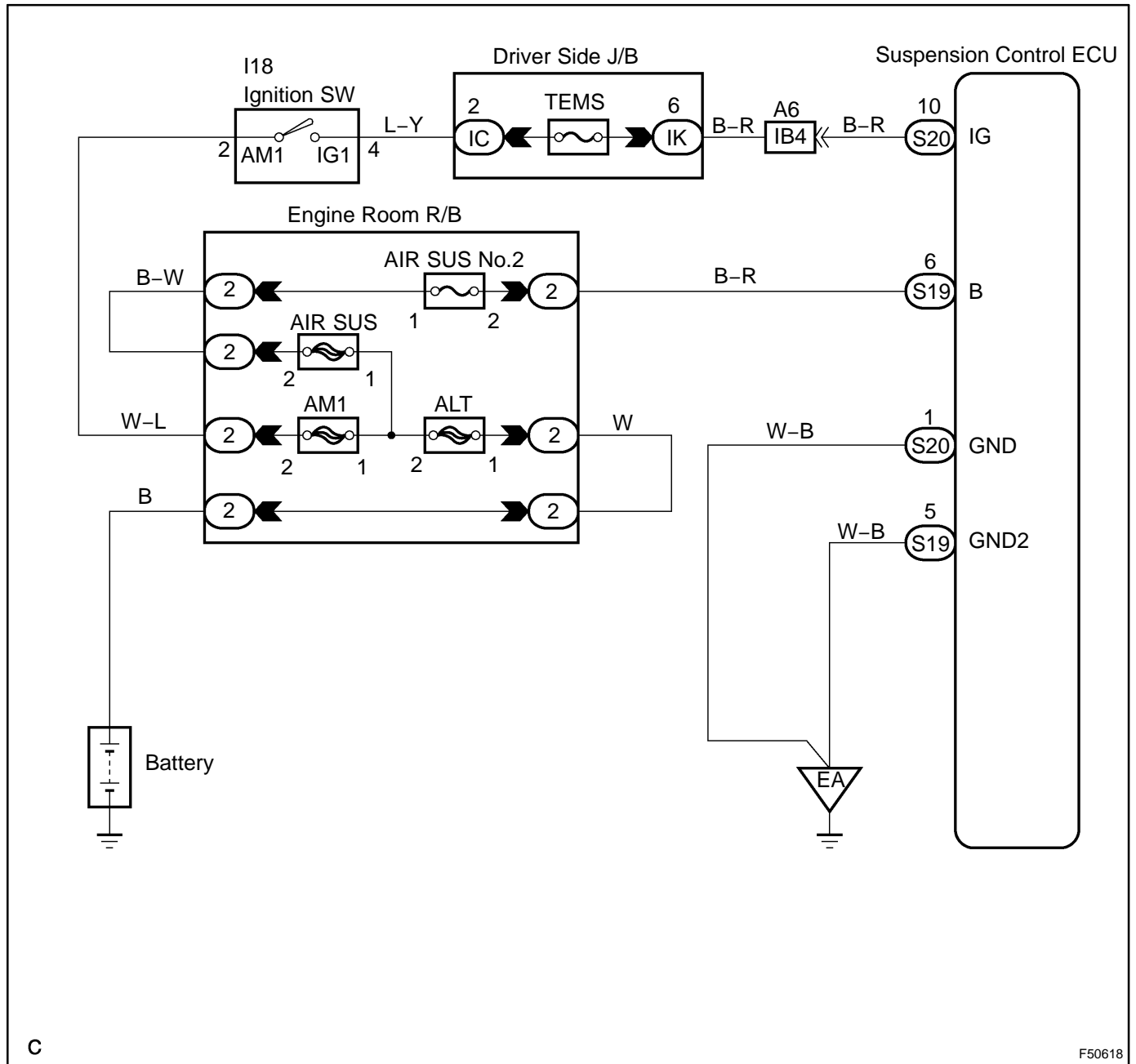
DTC	C1774/74	POWER SOURCE CIRCUIT
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CIRCUIT DESCRIPTION

When turning the ignition switch to ON, the battery positive voltage is input to terminals B and IG of the suspension control ECU. By turning the ignition switch to OFF, the supply of the battery positive voltage to terminals B and IG stops, and the power is turned OFF.

DTC No.	DTC Detecting Condition	Trouble Area
C1774/74	The terminal B or IG voltage is detected being below or above a constant voltage for 0.5 seconds.	<ul style="list-style-type: none">• Battery• Power source circuit• Suspension control ECU

WIRING DIAGRAM

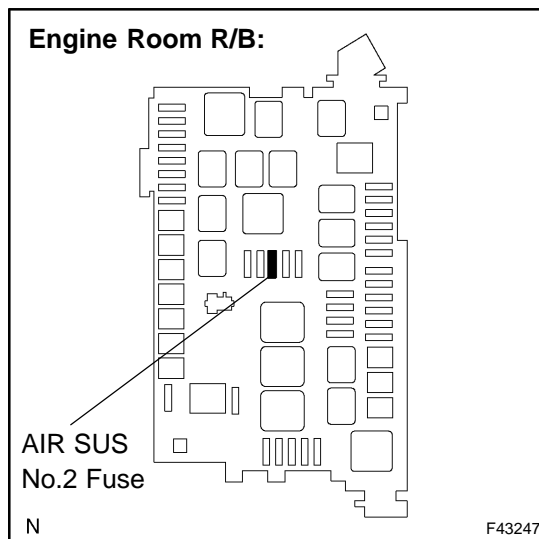


C

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INSPECTION PROCEDURE**1 INSPECT SOURCE VOLTAGE**

- (a) Check the battery positive voltage.

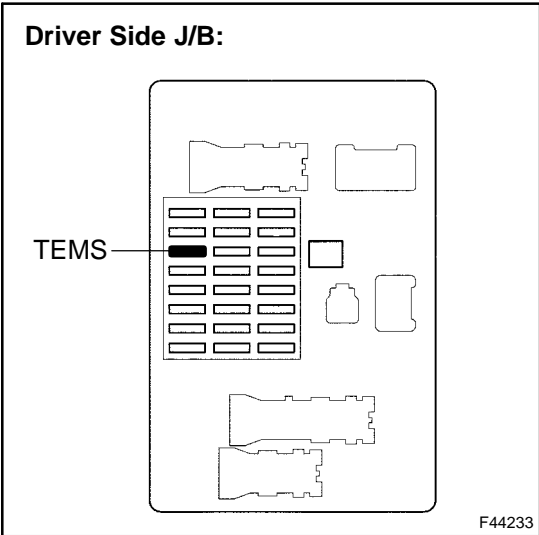
Standard:**10 to 14 V****NG****REPLACE BATTERY****OK****2 INSPECT FUSE(AIR SUS NO.2)**

- (a) Remove the AIR SUS No.2 fuse from the engine room R/B.

- (b) Check continuity of the AIR SUS No.2 fuse.

Standard:**Continuity****NG****INSPECT FOR SHORT CIRCUIT IN ALL
HARNESS AND COMPONENTS CONNECTED
TO AIR SUS NO.2 FUSE****OK**

3 INSPECT FUSE(TEMS)

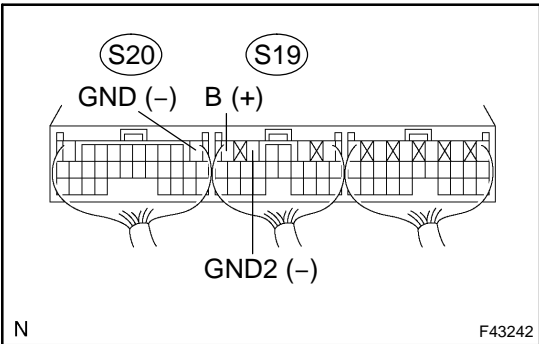


- (a) Remove the TEMS fuse from the driver side J/B.
 - (b) Check continuity of the TEMS fuse.
- Standard:**
Continuity

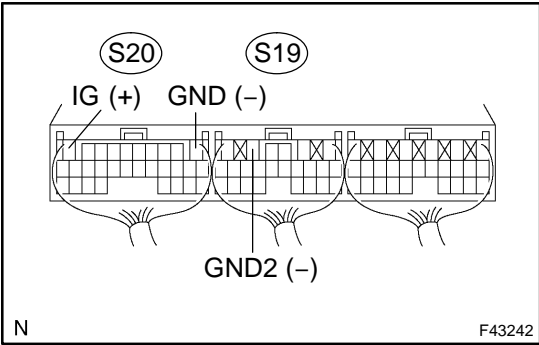
NG INSPECT FOR SHORT CIRCUIT IN ALL HARNESS AND COMPONENTS CONNECTED TO TEMS FUSE

OK

4 INSPECT SUSPENSION CONTROL ECU



- (a) Remove the suspension control ECU with connectors being connected.
 - (b) Turn the ignition switch ON, and measure voltage between terminals S19-6 (B) and S20-1 (GND) and between terminals S19-6 (B) and S19-5 (GND2) of the suspension control ECU connector.
- Standard:**
10 to 14 V

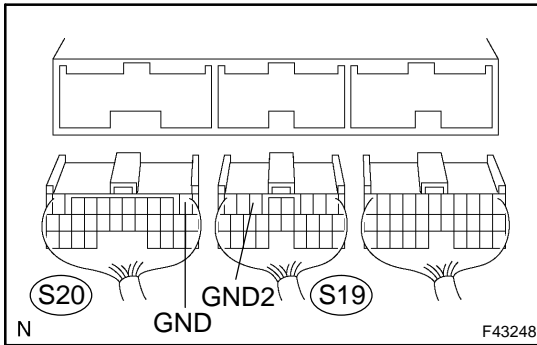


- (c) Turn the ignition switch ON, measure voltage between terminals S20-10 (IG) and S20-1 (GND) and between terminals S20-10 (IG) and S19-5 (GND2) of the suspension control ECU connector.
- Standard:**
10 to 14 V

OK CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

5	CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU - BODY GROUND)
----------	--



- (a) Disconnect the suspension control ECU connectors.
- (b) Turn the ignition switch ON, and check continuity between terminal S20-1 (GND) and body ground and between terminal S19-5 (GND2) and body ground.

Standard:
Continuity

HINT:

- OK:
Repair or replace the harness or the connector between the AIR SUS fuse and the suspension control ECU and/or the TEMS fuse and the suspension control ECU.
- NG:
Repair or replace the harness or the connector between the suspension control ECU and body ground.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC	C1776/76	SPEED SENSOR CIRCUIT
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DTC	C1794/94	RIGHT FRONT SPEED SENSOR CIRCUIT
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DTC	C1795/95	LEFT FRONT SPEED SENSOR CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

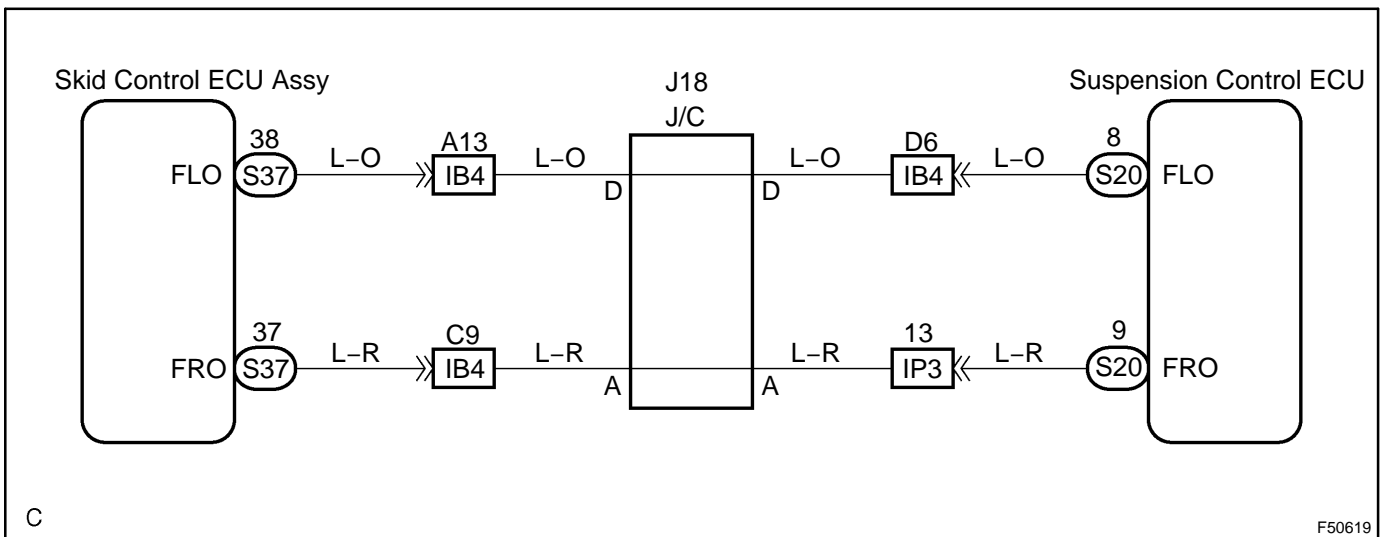
The speed sensor detects the wheel speed and transmits the appropriate vehicle speed signal to the suspension control ECU through the skid control ECU assy.

DTC No.	DTC Detecting Condition	Trouble Area
C1776/76	Speed sensor circuit malfunction.	<ul style="list-style-type: none"> • Speed sensor • Speed sensor circuit • Skid control ECU assy • Suspension control ECU

HINT:

When DTC C1794/94 and C1795/95 are output, follow the same procedure as DTC1776/76.

WIRING DIAGRAM



INSPECTION PROCEDURE**HINT:**

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "VEHICLE SPEED" in the DATA LIST, and read its value displayed on the hand-held tester.
- (d) Check that there is no difference between the speed value output from the speed sensor displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

Standard:

There is almost no difference in the displayed speed values.

HINT:

There is tolerance of $\pm 10\%$ in the speedometer indication.

OK**CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)****NG****2 CHECK DIAGNOSTIC CODE OUTPUT**

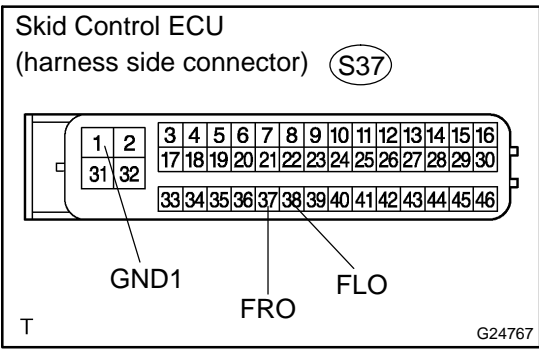
- (a) Check if the normal code is output by VSC (See page 05-767).

NG**REPAIR CIRCUIT INDICATED BY OUTPUT CODE****OK****3 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU – SKID CONTROL ECU ASSY)**

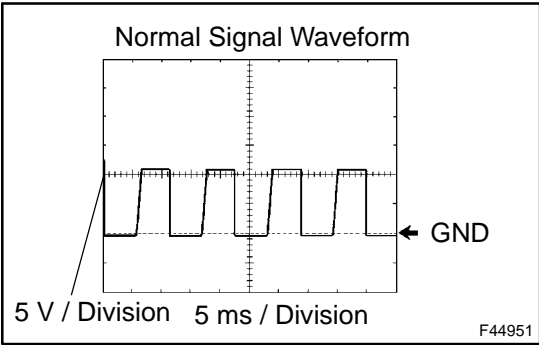
- (a) Check for open and short circuit in the harness and the connector between the suspension control ECU and the skid control ECU assy (See page 01-36).

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

4 INSPECT SKID CONTROL ECU ASSY(FLO OUTPUT, FRO OUTPUT)



- (a) Remove the skid control ECU with connector being connected.
- (b) Turn the ignition switch ON.
- (c) Connect an oscilloscope to between terminals S37-38 (FLO) and S37-1 (GND1) and between terminals S37-37 (FRO) and S37-1 (GND1) of the skid control ECU harness side connector.



- (d) Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

Standard:
Signal waveform appears as shown in the illustration.

HINT:
As the engine speed becomes higher, the waveform cycle gets shorter.

NG → **CHECK AND REPLACE SKID CONTROL ECU ASSY (See page 01-36)**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

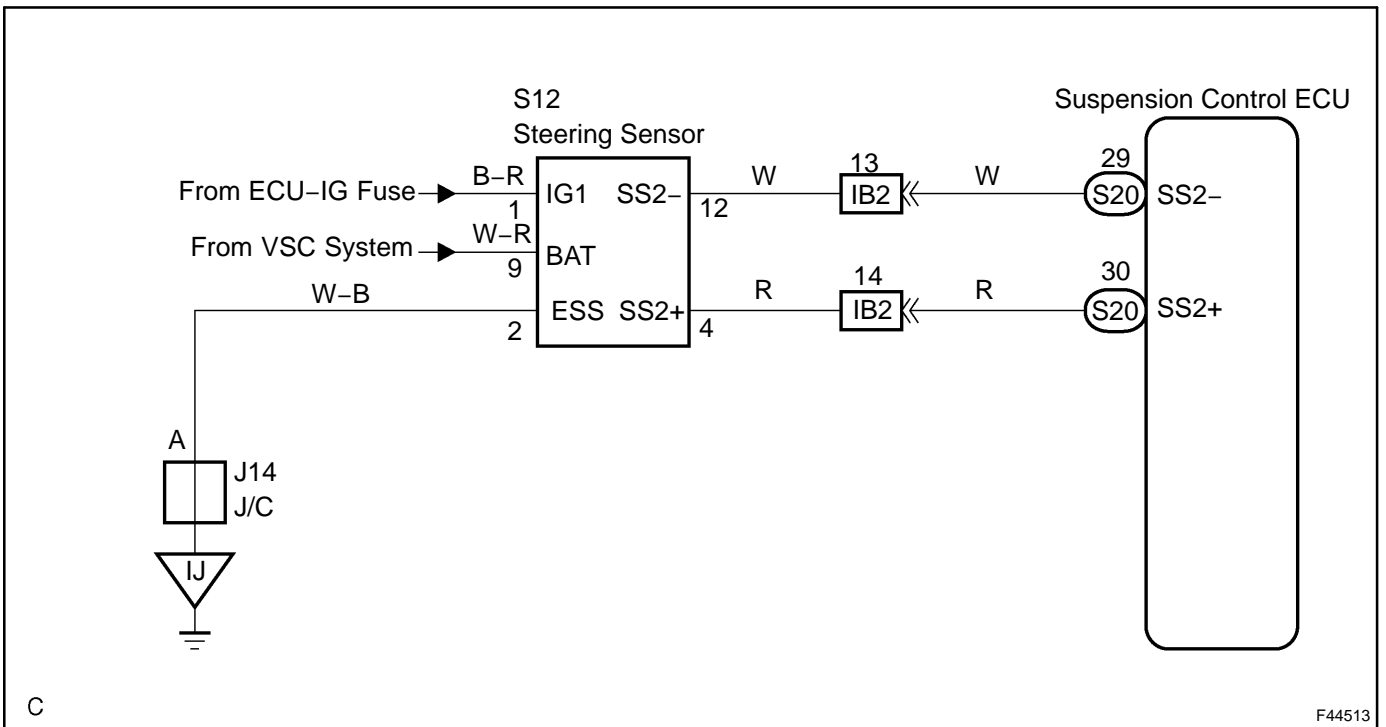
DTC	C1777/77	STEERING ANGLE SENSOR CIRCUIT
------------	-----------------	--------------------------------------

CIRCUIT DESCRIPTION

The steering sensor is mounted on the combination switch assy and detects the steering wheel angle and its direction.

DTC No.	DTC Detecting Condition	Trouble Area
C1777/77	Steering sensor system signal is abnormal.	<ul style="list-style-type: none"> • Steering sensor • Steering angle sensor circuit • Suspension control ECU

WIRING DIAGRAM



C

F44513

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "STEERING ANGLE" in the DATA LIST, and read its value displayed on the hand-held tester.
- (d) Check that the steering wheel turning angle value of the steering angle position sensor displayed on the hand-held tester changes when turning the steering wheel.

Standard:

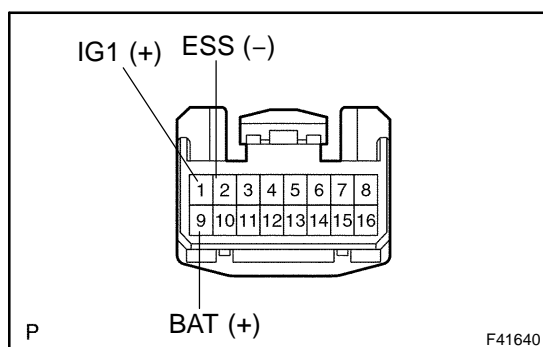
Steering wheel turning angle value changes.

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 CHECK HARNESS AND CONNECTOR(STEERING SENSOR)



- (a) Disconnect the steering sensor connector.
- (b) Turn the ignition switch to ON, and measure voltage between terminals 1 (IG1) and 2 (ESS) and between terminals 2 (ESS) and 9 (BAT) of the steering sensor harness side connector.

Standard:

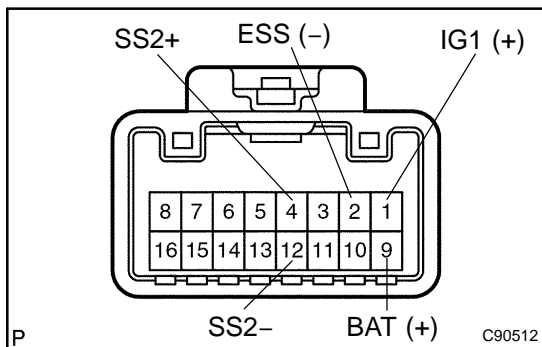
10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

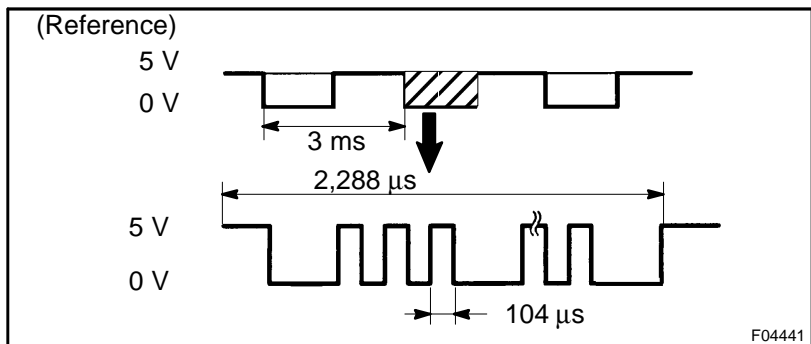
OK

3 INSPECT STEERING SENSOR



- (a) Disconnect the steering angle sensor connector.
- (b) Apply battery positive voltage between terminals 1 (IG1) and 2 (ESS) and between terminals 2 (ESS) and 9 (BAT).
- (c) Connect the oscilloscope to the terminals 4 (SS2+) and 12 (SS2-) of the steering angle sensor.
- (d) Turn the steering column shaft slowly and check the signal waveform.

Standard:



HINT:

Above signal waveform does not repeat ON and OFF regularly and this ON-OFF interval changes depending on the data.

NG → **REPLACE STEERING SENSOR**

OK

4 CHECK HARNESS AND CONNECTOR(STEERING SENSOR - SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between the steering sensor and the suspension control ECU (See page 01-36).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1779/79	CRANKSHAFT POSITION SENSOR CIRCUIT
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DTC	C1797/97	CRANKSHAFT POSITION SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

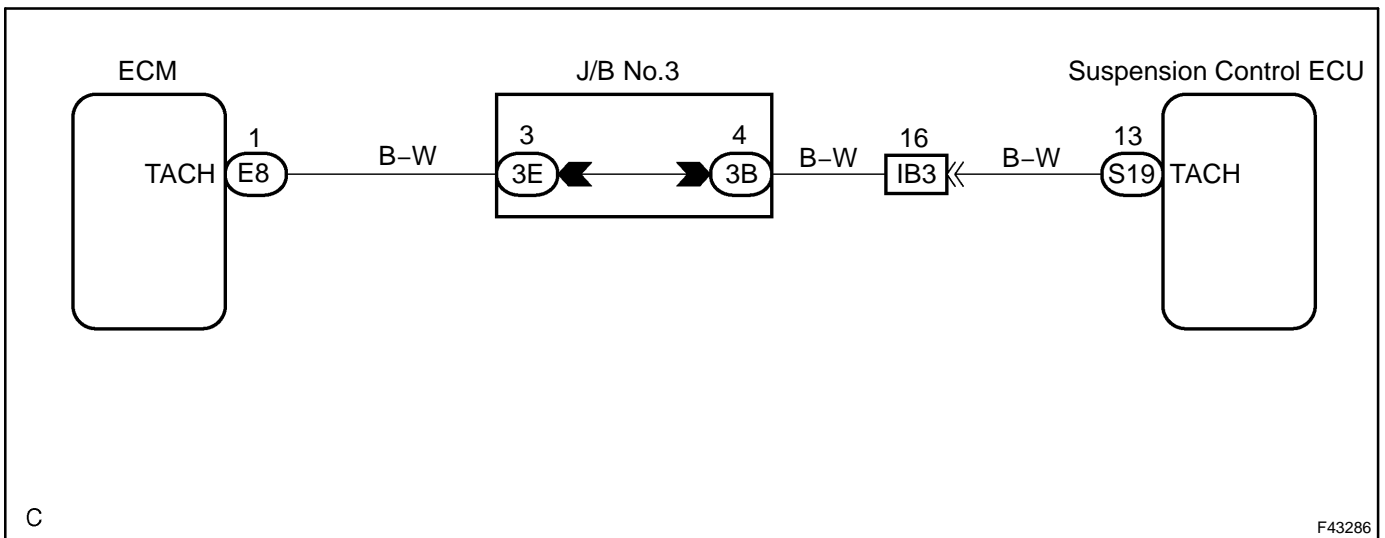
The suspension control ECU receives the engine speed signal from ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1779/79	TACH signal is not sent to suspension control ECU, and the vehicle is driven for 10 sec. or more at the speed of 30 km/h or higher.	<ul style="list-style-type: none"> • Crankshaft position sensor • Crankshaft position sensor circuit • ECM • Suspension control ECU

HINT:

When DTC C1797/97 is output, follow the same procedure as that of DTC1779/79.

WIRING DIAGRAM



C

F43286

INSPECTION PROCEDURE

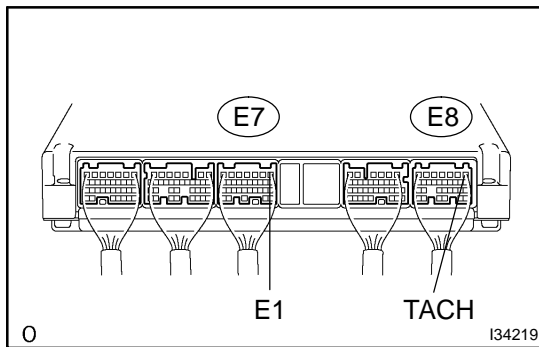
1 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU - ECM)

- (a) Check for open and short circuit in the harness and the connector between the suspension control ECU and ECM (See page [01-36](#)).

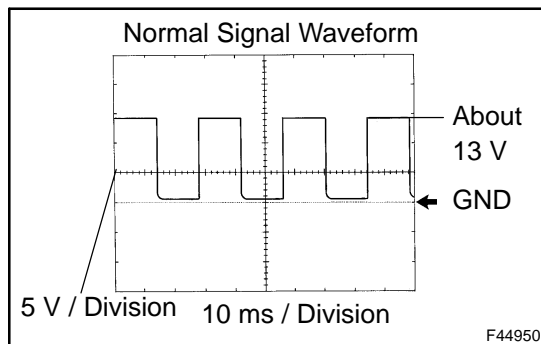
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT ECM(TACH OUTPUT)

- (a) Remove the ECM with connectors being connected.
 (b) Turn the ignition switch ON.
 (c) Connect an oscilloscope to terminals E8-1 (TACH) and E7-1 (E1) of the ECM harness side connector.



- (d) With the engine idling, check the signal waveform.
Standard:
Signal waveform appears as shown in the illustration.
 HINT:
 As the engine speed becomes higher, the waveform cycle gets shorter.

NG

CHECK AND REPLACE ECM (See page [01-36](#))

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))

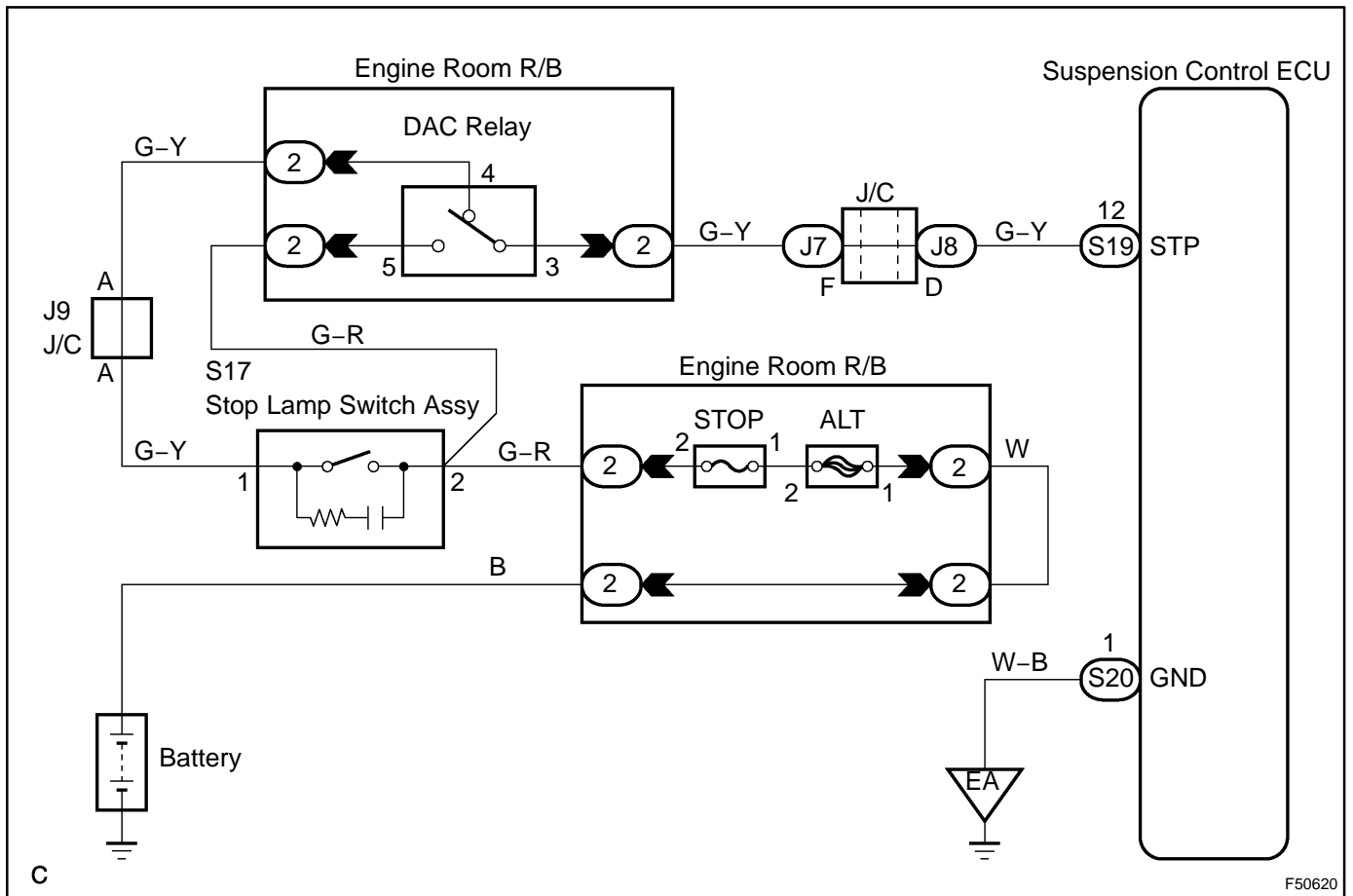
DTC	C1782/82	STOP LIGHT SWITCH CIRCUIT
------------	-----------------	----------------------------------

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop lamp comes on and the signal is input to the STP terminal of the suspension control ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1782/82	The signal from the stop lamp switch assy does not change.	<ul style="list-style-type: none"> • Stop lamp switch assy • Stop light switch circuit • Suspension control ECU

WIRING DIAGRAM



C

F50620

INSPECTION PROCEDURE

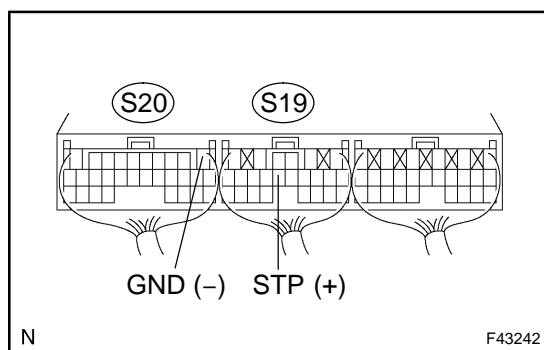
1 INSPECT STOP LAMP

- (a) Check that the stop lamp comes on when the brake pedal is depressed and goes off when the brake pedal is released.

NG Go to step 3

OK

2 INSPECT SUSPENSION CONTROL ECU



- (a) Remove the suspension control ECU with connectors being connected.
 (b) Measure voltage between terminals S19-12 (STP) and S20-1 (GND) of the suspension control ECU when stop lamp switch assy switch is ON and OFF.

Standard:

Switch condition	Voltage
ON	10 to 14 V
OFF	Below 1.5 V

HINT:

NG:

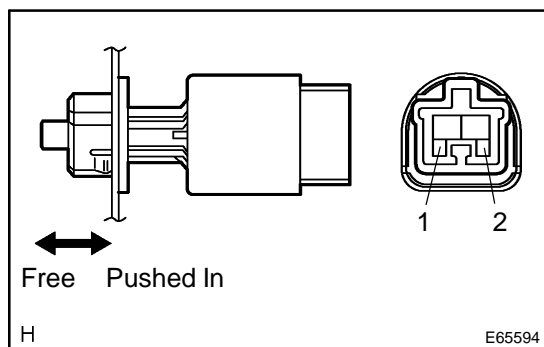
Repair or replace the harness or the connector between the stop lamp switch assy and the suspension control ECU.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

3 INSPECT STOP LAMP SWITCH ASSY



- (a) Disconnect the stop lamp switch assy connector.
 (b) Check continuity between terminals 1 and 2 of the stop lamp switch assy.

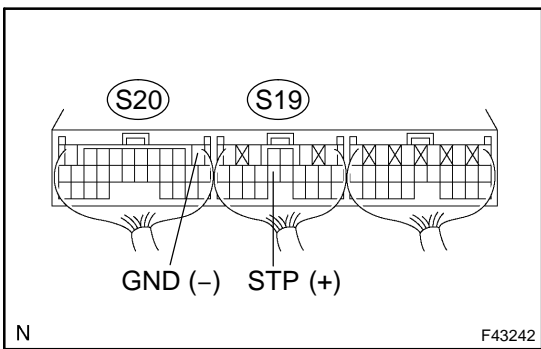
Standard:

Switch condition	Tester connection	Specification
Switch pin free	1 - 2	No continuity
Switch pin pushed in	1 - 2	Continuity

NG REPLACE STOP LAMP SWITCH ASSY

OK

4 INSPECT SUSPENSION CONTROL ECU



- (a) Remove the suspension control ECU with connectors being connected.
- (b) Measure voltage between terminals S19-12 (STP) and S20-1 (GND) of the suspension control ECU when stop lamp switch assy switch pin is free and pushed in.

Standard:

Switch condition	Voltage
Switch pin free	10 to 14 V
Switch pin pushed in	Below 1.5 V

HINT:

NG:

Repair or replace the harness or the connector between the STOP fuse and the suspension control ECU.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

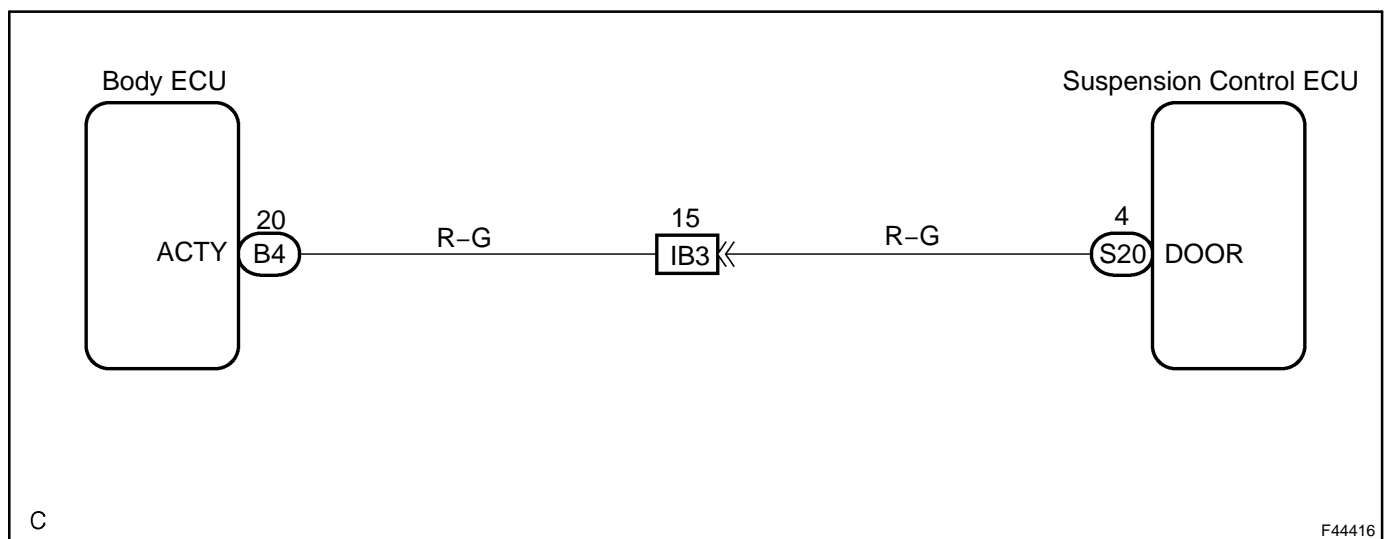
DTC	C1783/83	DOOR COURTESY SWITCH CIRCUIT
------------	-----------------	-------------------------------------

CIRCUIT DESCRIPTION

The door courtesy switch assy turns on when the door is opened and turns off when the door is closed. The signal is sent from the multiplex network body ECU into the DOOR terminal of the suspension control ECU when all the doors are open.

DTC No.	DTC Detecting Condition	Trouble Area
C1783/83	Door courtesy switch signal does not change.	<ul style="list-style-type: none"> • Door courtesy switch assy • Back door courtesy switch assy • Door courtesy switch circuit • Multiplex network body ECU • Suspension control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT DOOR COURTESY LAMP SWITCH ASSY
----------	---

- (a) Check that the open door warning light comes on when each door and back door is opened and goes off when all the doors are closed.

NG	CHECK DOOR COURTESY SWITCH CIRCUIT (See page 05-2143)
-----------	--

OK

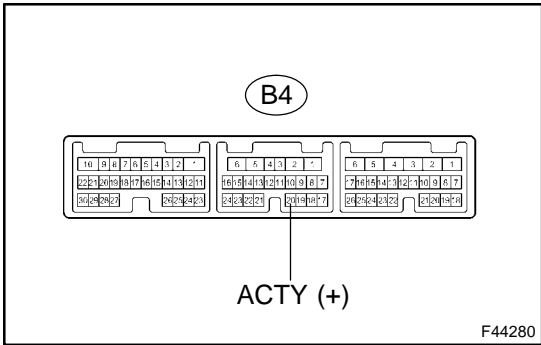
2 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU – MULTIPLEX NETWORK BODY ECU)

- (a) Check for open and short circuit in the harness and the connector between the suspension control ECU and the multiplex network body ECU (See page 01-36).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT MULTIPLEX NETWORK BODY ECU(ACTY OUTPUT)



- (a) Remove the multiplex network body ECU with connectors being connected.
 (b) Measure voltage between terminal B4-20 (ACTY) and body ground of the multiplex network body ECU when door is opened and closed.

Standard:

Door condition	Voltage
Each door opened	Below 1.5 V
All doors closed	10 to 14 V

NG → **CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (See page 01-36)**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

DTC	C1786/86	HEIGHT CONTROL SWITCH CIRCUIT
------------	-----------------	--------------------------------------

CIRCUIT DESCRIPTION

The height control switch is integrated in the suspension control switch.

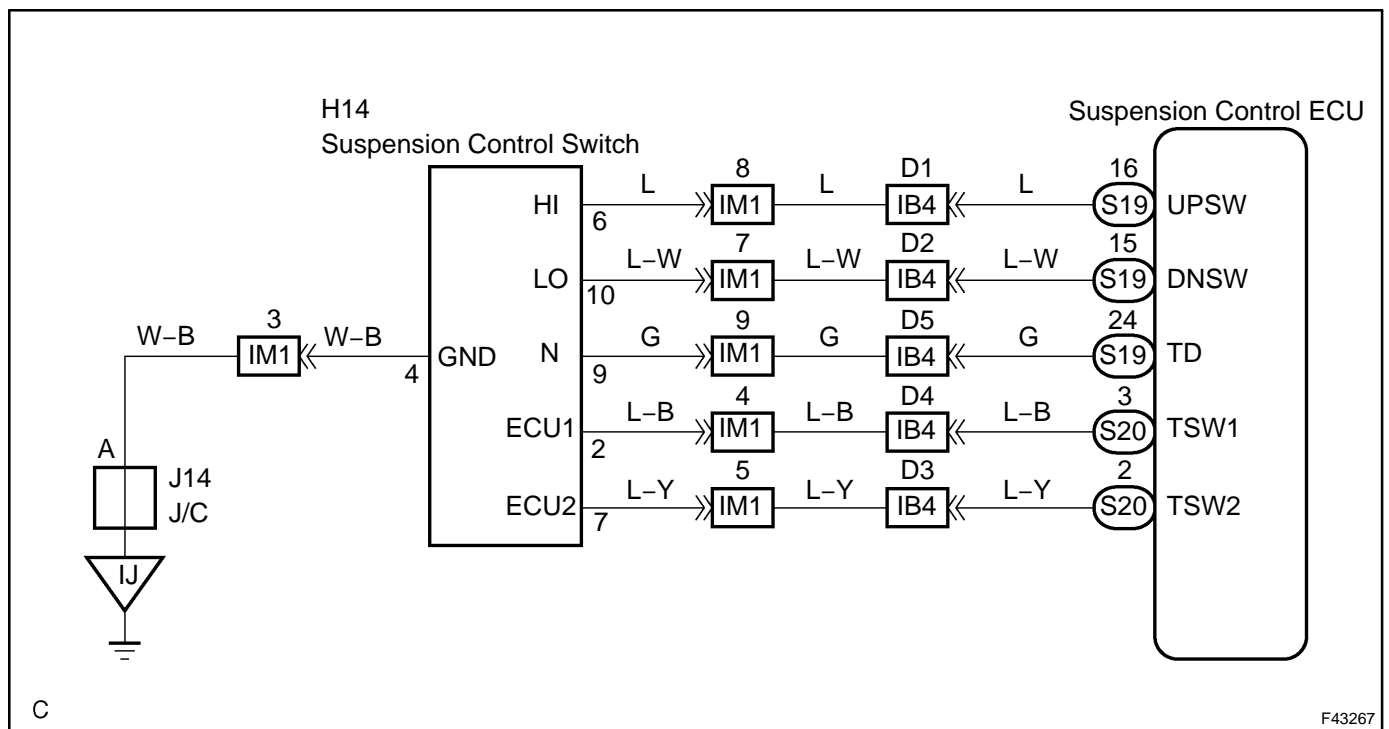
Vehicle height can be chosen by pressing the height control switch.

By pressing "UP" side, vehicle height goes up.

By pressing "DOWN" side, vehicle height goes down.

DTC No.	DTC Detecting Condition	Trouble Area
C1786/86	Height control switch signal does not change.	<ul style="list-style-type: none"> • Height control switch (Suspension control switch) • Height control switch circuit • Suspension control ECU

WIRING DIAGRAM



C

F43267

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and turn the hand-held tester main switch ON.
- (c) Select the item "HEIGHT SW DOWN" or "HEIGHT SW UP" in the DATA LIST, and read its value displayed on the hand-held tester.
- (d) Check that the value displayed on the hand-held tester changes by pressing the height control switch "UP" and "DOWN".

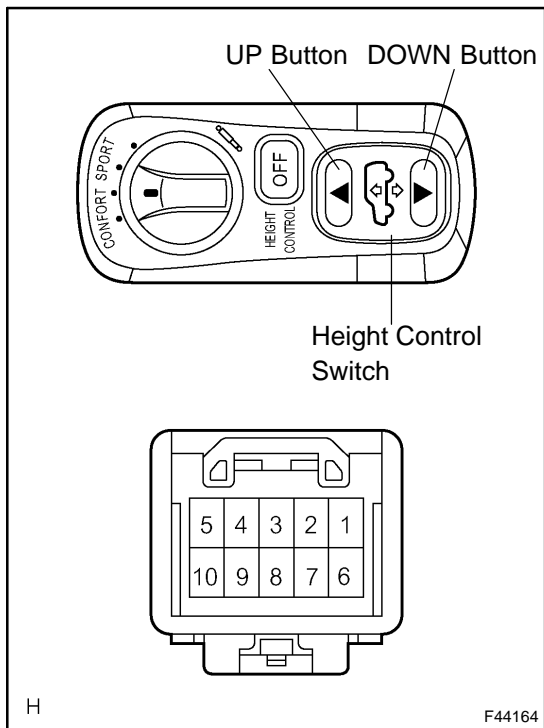
Standard:

Height control switch value changes.

OK CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 INSPECT HEIGHT CONTROL SWITCH



- (a) Remove the suspension control switch connector.
- (b) Check continuity between each terminal of the height control switch when the height control switch position is "UP", "OFF" and "DOWN".

Standard:

Switch condition	Tester connection	Specification
"UP" button	4 - 6	Continuity
OFF	4 - 6, 4 - 10	No continuity
"DOWN" button	4 - 10	Continuity

HINT:

When the height control switch is faulty, replace the suspension control switch.

NG REPLACE SUSPENSION CONTROL SWITCH

OK

**3 CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL SWITCH –
SUSPENSION CONTROL ECU)**

- (a) Check for open and short circuit in the harness and the connector between the height control switch and the suspension control ECU (See page [01-36](#)).

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK****CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))**

DTC	C1787/87	ABSORBER CONTROL SWITCH CIRCUIT
------------	-----------------	--

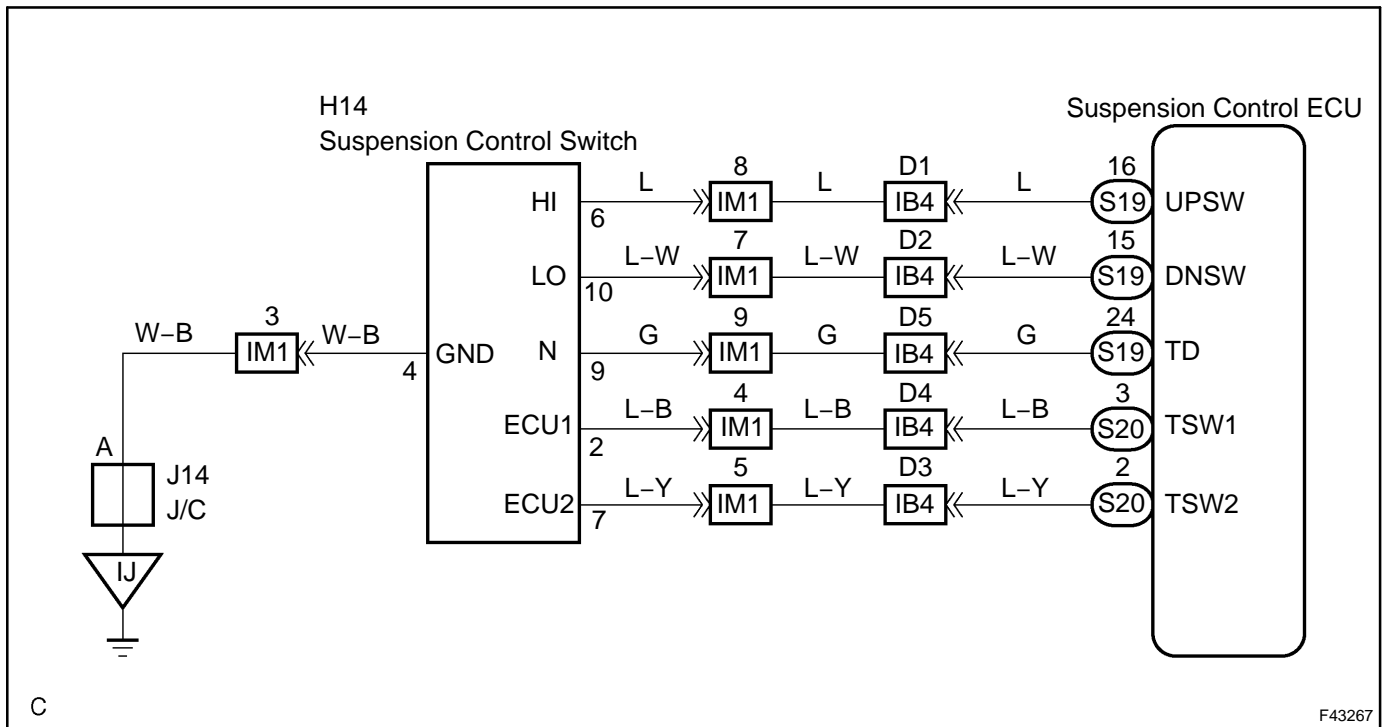
CIRCUIT DESCRIPTION

The absorber control switch is integrated in the suspension control switch.

The absorber control switch is used to select the damping force mode of the shock absorber.

DTC No.	DTC Detecting Condition	Trouble Area
C1787/87	Absorber control switch signal does not change.	<ul style="list-style-type: none"> • Absorber control switch (Suspension control switch) • Absorber control switch circuit • Suspension control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and turn the hand-held tester main switch to ON.
- (c) Select the item "DAMPER SW1" in the DATA LIST, and read its value displayed on the hand-held tester.
- (d) Check that the acceleration value of the acceleration sensor displayed in the hand-held tester changes when the vehicle is bounced.

Standard:

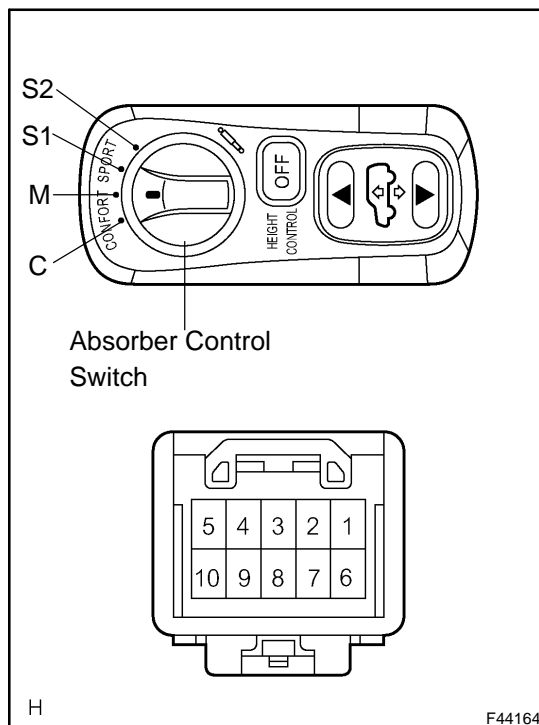
Suspension control switch value changes.

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 INSPECT ABSORBER CONTROL SWITCH



- (a) Disconnect the suspension control switch connector.
- (b) Check the continuity between each terminal of the absorber control at each switch position.

Standard:

Switch condition	Tester connection	Specification
SPORT2 (S2)	2 - 4, 4 - 7	No continuity
SPORT1 (S1)	4 - 7	Continuity
NORM (M)	2 - 4, 4 - 7	Continuity
COMFORT (C)	2 - 4	Continuity

HINT:

When the absorber control switch is faulty, replace the suspension control switch.

NG

REPLACE SUSPENSION CONTROL SWITCH

OK

3	CHECK HARNESS AND CONNECTOR(ABSORBER CONTROL SWITCH - SUSPENSION CONTROL ECU)
----------	--

- (a) Check for open and short circuit in the harness and the connector between the absorber control switch and the suspension control ECU (See page [01-36](#)).

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)
--

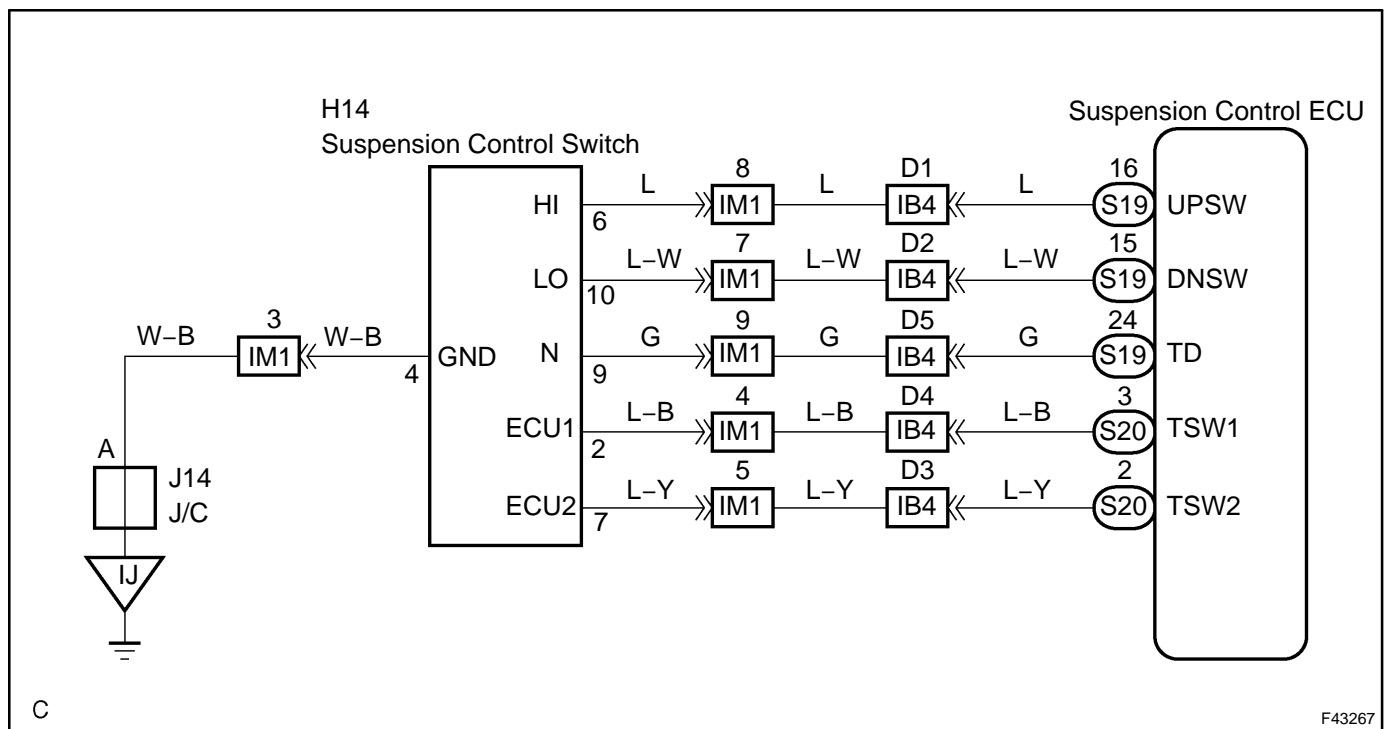
DTC	C1788/88	HEIGHT CONTROL OFF SWITCH CIRCUIT
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CIRCUIT DESCRIPTION

The height control OFF switch is integrated in the suspension control switch.
 Height control can be operated or suspended by pressing the height control OFF switch.
 By pressing the switch once, height control is suspended.
 By pressing the switch one more time, height control is operated.

DTC No.	DTC Detecting Condition	Trouble Area
C1788/88	Height control OFF switch signal does not change.	<ul style="list-style-type: none"> • Height control OFF switch (Suspension control switch) • Height control OFF switch circuit • Suspension control ECU

WIRING DIAGRAM



C

F43267

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Select the item "HEIGHT SW HOLD" in the DATA LIST, and read its value displayed on the hand-held tester.
- (d) Check that the value displayed on the hand-held tester changes by pressing the height control OFF switch.

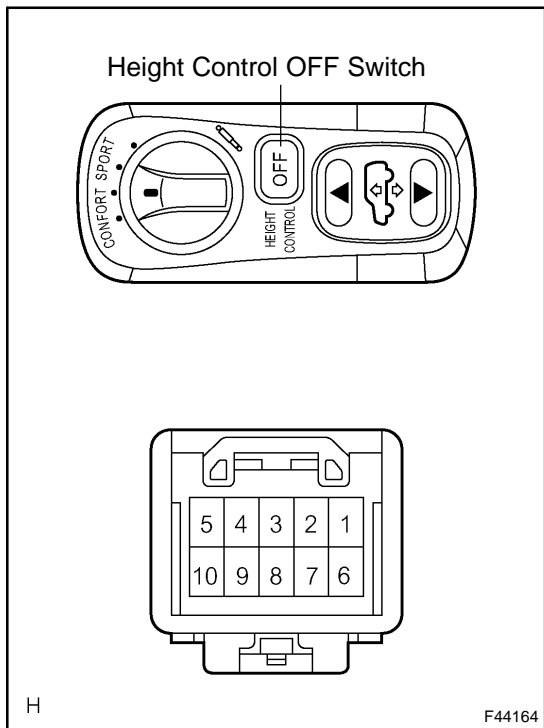
Standard:

Height control OFF switch value changes.

OK → CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

NG

2 INSPECT HEIGHT CONTROL OFF SWITCH



- (a) Disconnect the suspension control switch connector.
- (b) Check continuity between terminals 4 and 9 of the height control OFF switch when height control OFF switch is pushed in and free.

Standard:

Switch condition	Specification
Pushed in	Continuity
Free	No continuity

HINT:

When the height control OFF switch is faulty, replace the suspension control switch.

NG → REPLACE SUSPENSION CONTROL SWITCH

OK

**3 CHECK HARNESS AND CONNECTOR(HEIGHT CONTROL OFF SWITCH -
SUSPENSION CONTROL ECU)**

- (a) Check for open and short circuit in the harness and the connector between the height control OFF switch and the suspension control ECU (See page [01-36](#)).

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK****CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))**

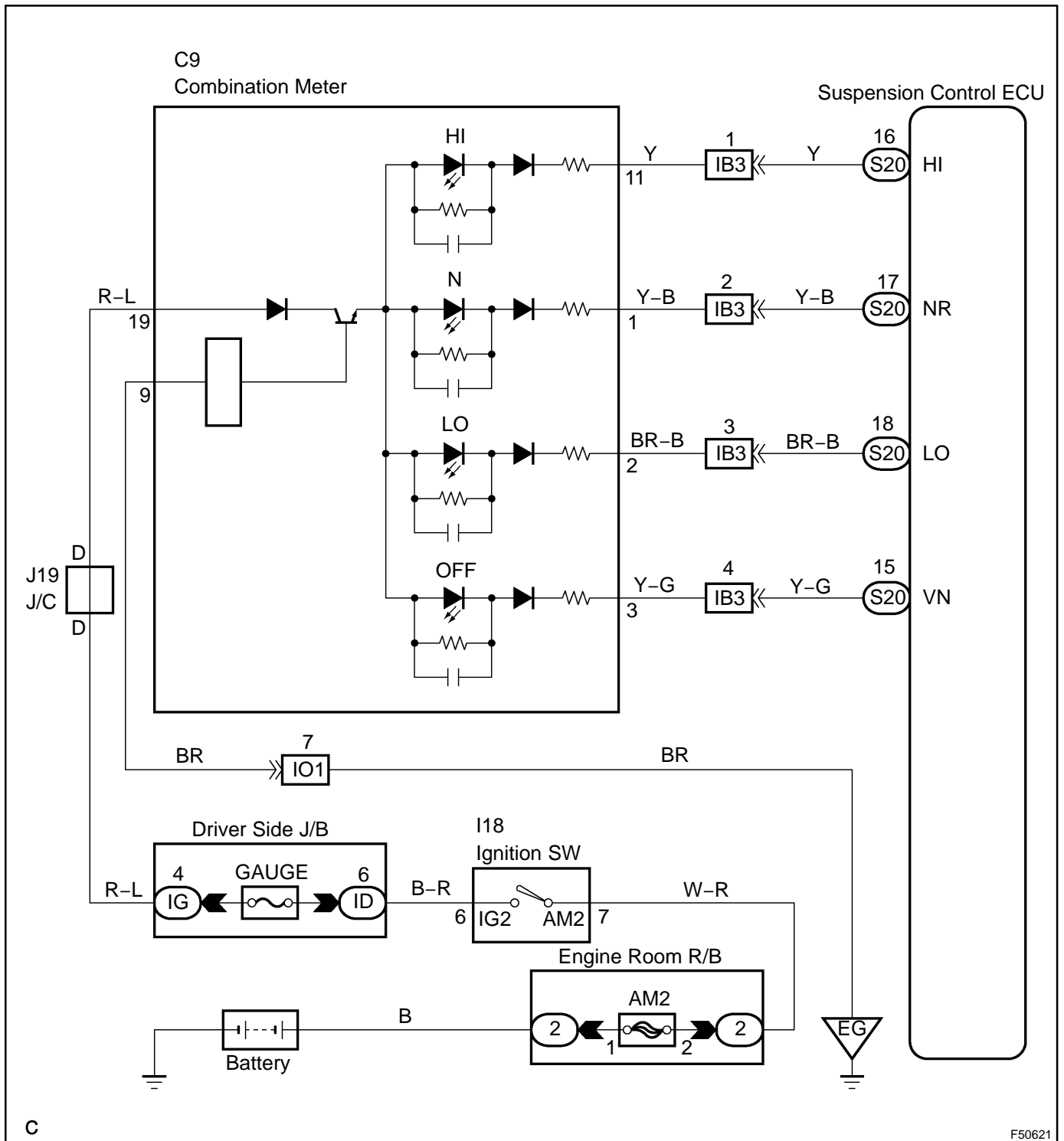
HEIGHT CONTROL INDICATOR LAMP CIRCUIT

CIRCUIT DESCRIPTION

The height control indicator lamp indicates the target height, not the actual height.

It blinks when the height control is operated by pressing the height control switch and stays on when the operation is completed.

WIRING DIAGRAM



C

F50621

INSPECTION PROCEDURE**1 INSPECT HEIGHT CONTROL INDICATOR LAMP**

HINT:

See combination meter troubleshooting on page [05-2033](#).**NG****REPAIR OR REPLACE BULB OR COMBINATION
METER ASSEMBLY****OK****2 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU –
COMBINATION METER ASSY)**

- (a) Check for open and short circuit in the harness and the connector between the suspension control ECU and the combination meter assy (height control indicator lamp) (See page [01-36](#)).

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK****CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))**

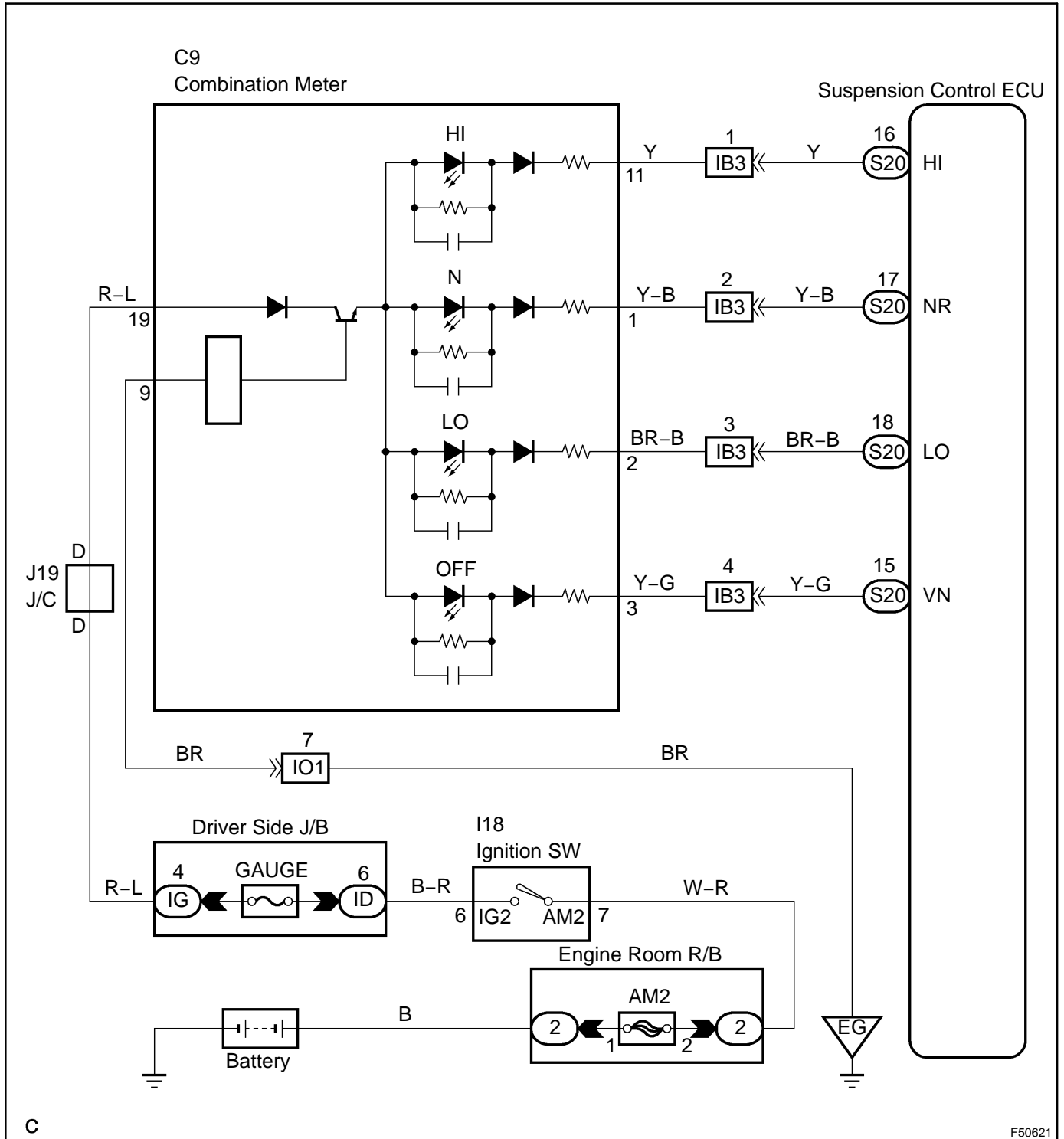
HEIGHT CONTROL OFF INDICATOR LAMP CIRCUIT

CIRCUIT DESCRIPTION

If the suspension control ECU detects a problem, the height control OFF indicator lamp comes on while suspending the height control function at the same time. At this time, the suspension control ECU records a DTC in the memory.

Connect terminals TC and CG of the DLC3 to make the height control OFF indicator lamp flash and output DTC.

WIRING DIAGRAM



C

F50621

INSPECTION PROCEDURE**1 INSPECT HEIGHT CONTROL OFF INDICATOR LAMP OPERATION**

- (a) Turn the ignition switch ON, and check the operation of the height control OFF indicator lamp.

Result:

A: Height control OFF indicator lamp does not come on

B: Height control OFF indicator lamp flashes

B

Go to step 4

A

2 INSPECT HEIGHT CONTROL OFF INDICATOR LAMP

HINT:

See combination meter troubleshooting on page [05-2033](#).

NG

**REPAIR OR REPLACE BULB OR COMBINATION
METER ASSEMBLY**

OK

**3 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU –
COMBINATION METER ASSY)**

- (a) Check for open and short circuit in the harness and the connector between the suspension control ECU and the combination meter assy (height control OFF indicator lamp) (See page [01-36](#)).

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

CHECK AND REPLACE SUSPENSION CONTROL ECU (See page [01-36](#))

4 CHECK SUSPENSION CONTROL ECU CONNECTORS SECURELY CONNECTED

NG

CONNECT CONNECTOR TO ECU

OK

5 RECONFIRM DTC

(a) Clear and check the DTC (See page 05-468).

Result:

Normal code	A
Malfunction code	B

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

6 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU - COMBINATION METER ASSY)

(a) Check for open and short circuit in the harness and the connector between the suspension control ECU and the combination meter assy (height control OFF indicator lamp) (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

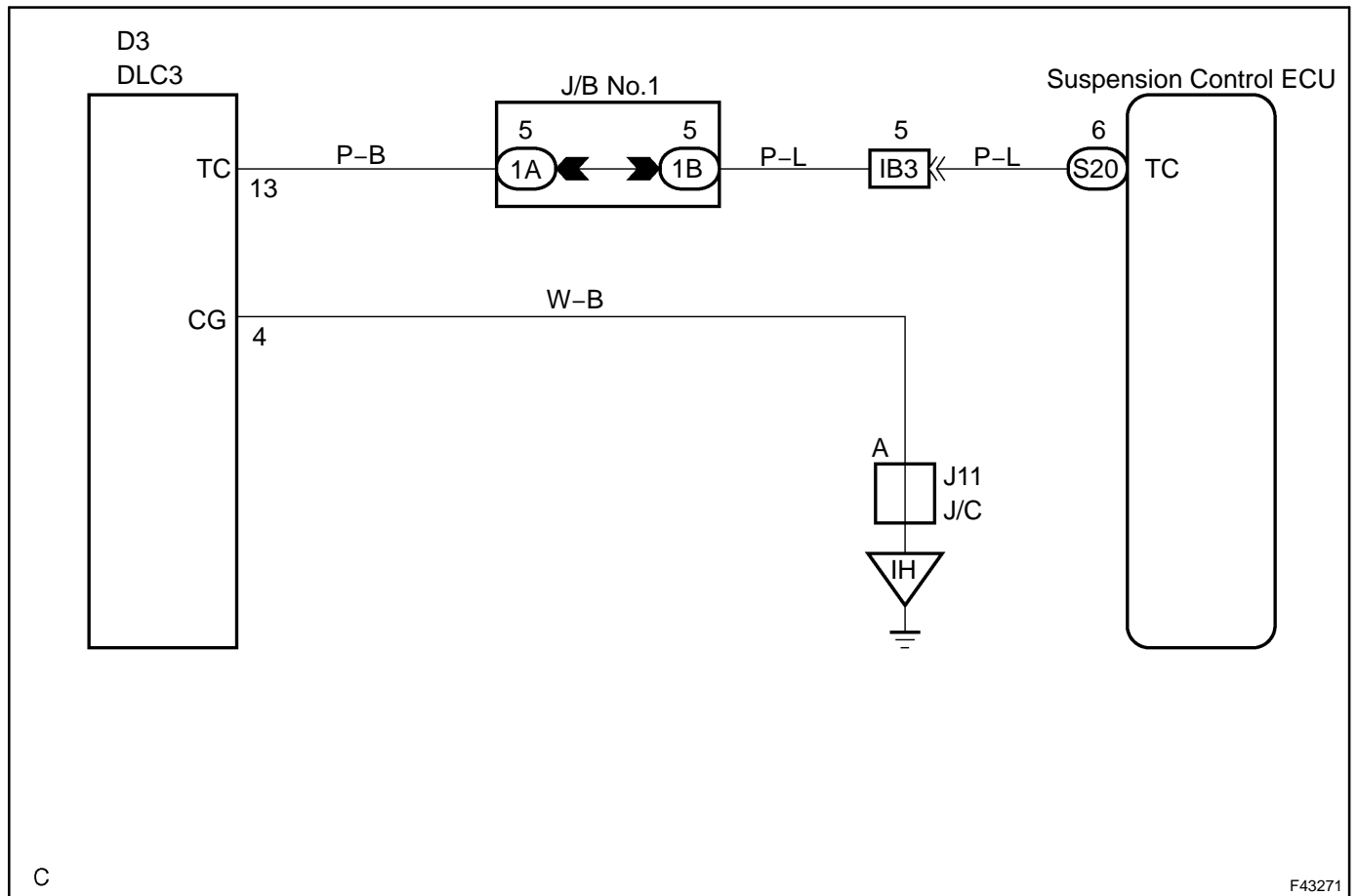
CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

DTC is output when there is a short circuit between terminals TC and CG of DLC3.

WIRING DIAGRAM

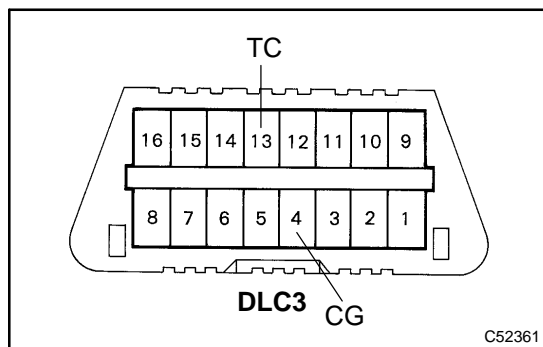


C

F43271

INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TC TERMINAL)



- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals TC and CG of DLC3.

Standard:
10 to 14 V

OK → Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND)

- (a) Check for open and short circuit in the harness and the connector between terminal CG of DLC3 and body ground (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(DLC3 - SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between terminal TC of DLC3 and the suspension control ECU (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

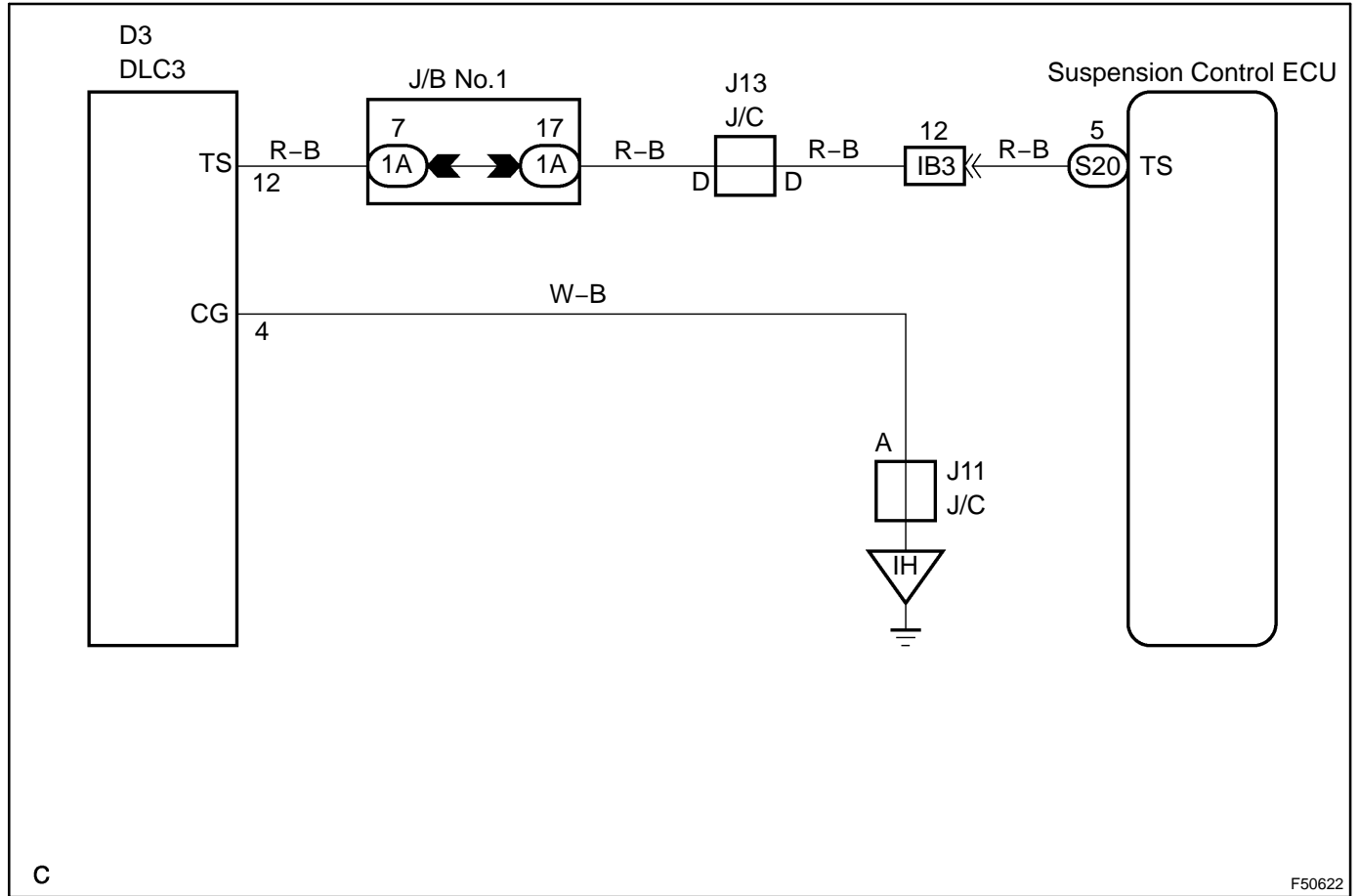
CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

TS TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

After making short circuit between terminals TS and CG of DLC3 with the ignition switch OFF, the mode changes from normal mode to test mode when the ignition switch is turned to ON, and then DTC is output.

WIRING DIAGRAM

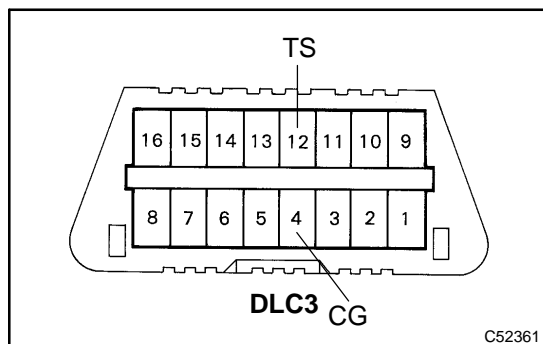


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INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TS TERMINAL)



- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals TS and CG of DLC3.

Standard:
10 to 14 V

OK → Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND)

- (a) Check for open and short circuit in the harness and the connector between terminal CG of DLC3 and body ground (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(DLC3 - SUSPENSION CONTROL ECU)

- (a) Check for open and short circuit in the harness and the connector between terminal TS of DLC3 and the suspension control ECU (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

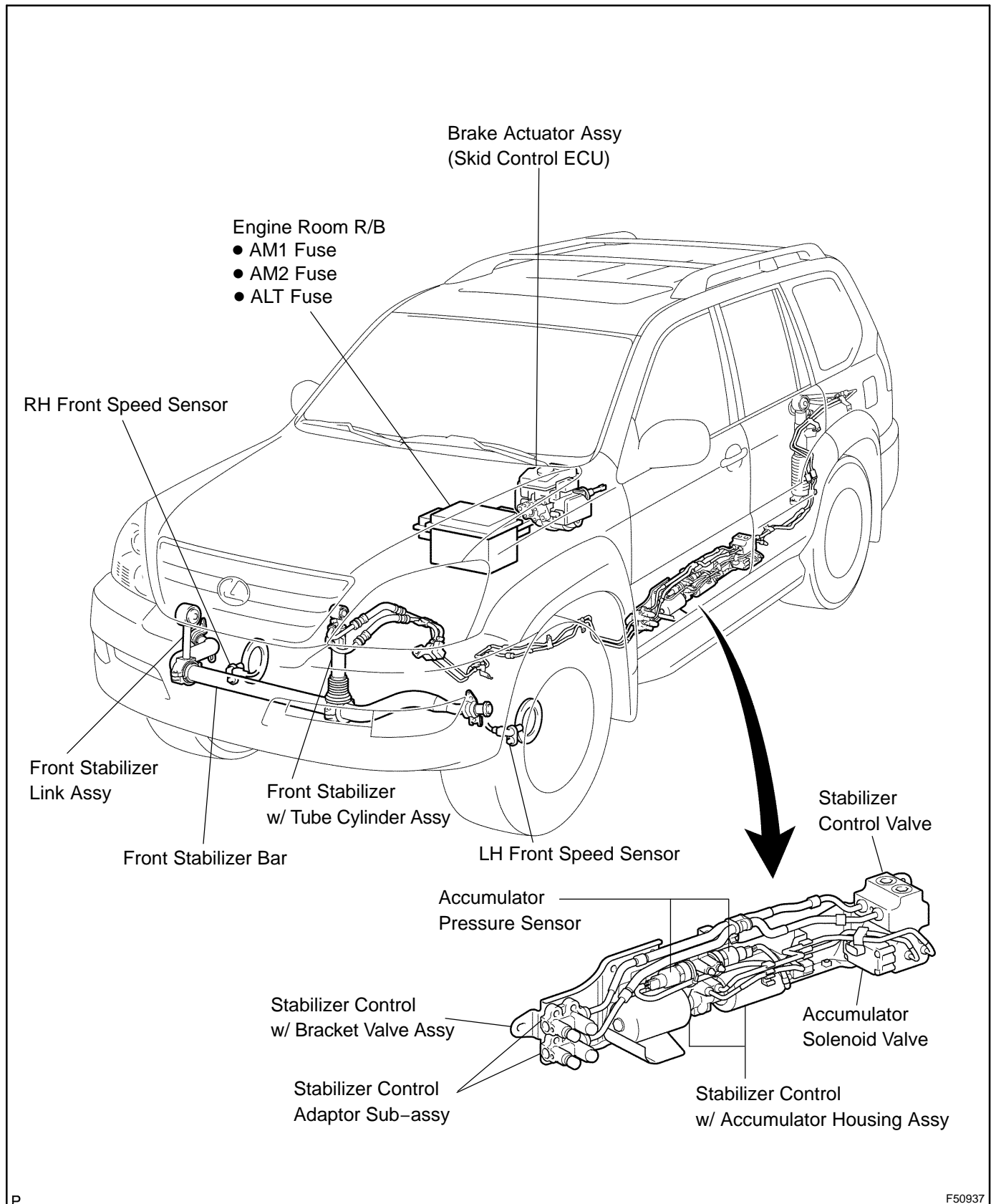
OK

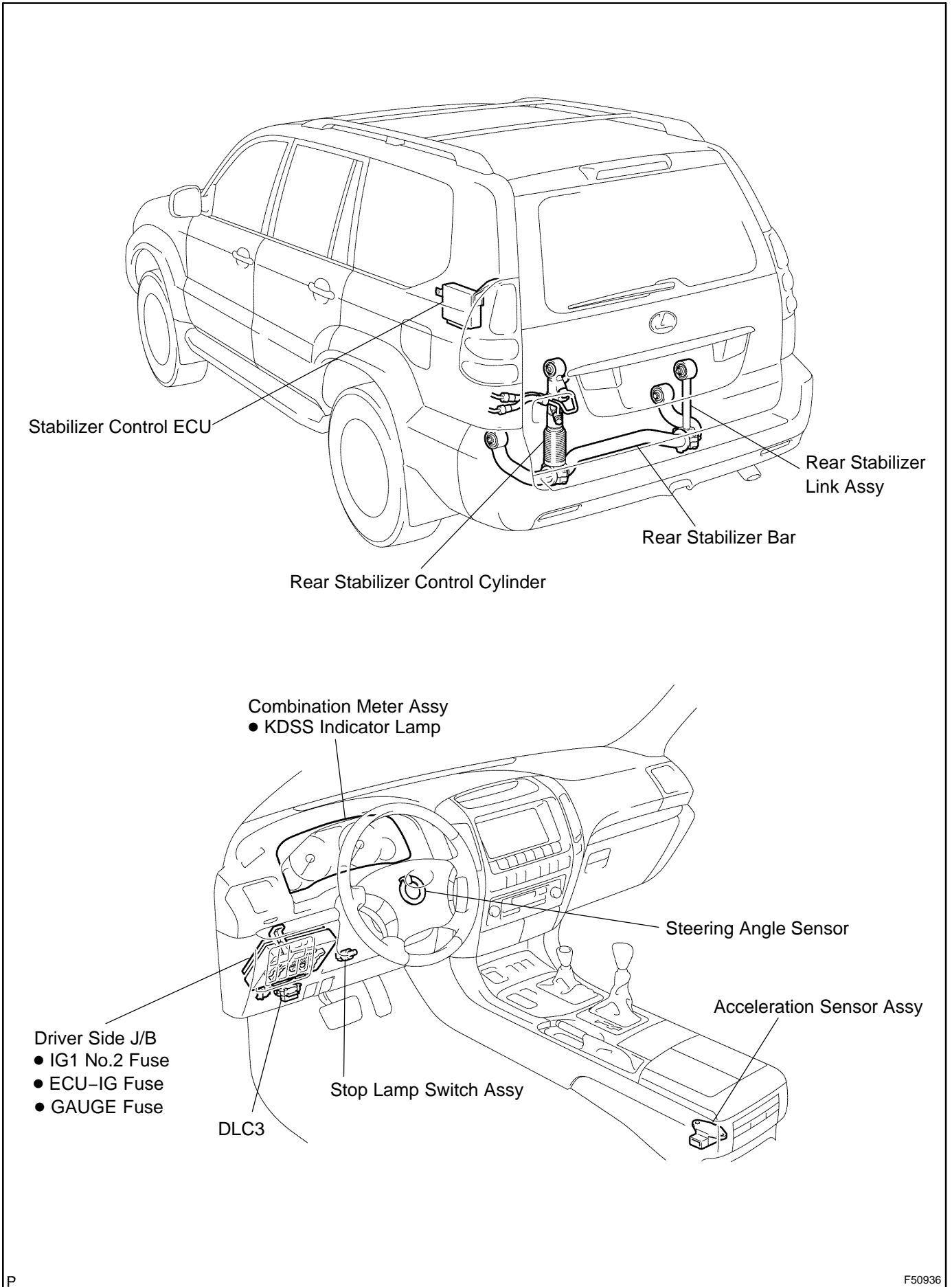
CHECK AND REPLACE SUSPENSION CONTROL ECU (See page 01-36)

KINETIC DYNAMIC SUSPENSION SYSTEM

05KLH-02

LOCATION

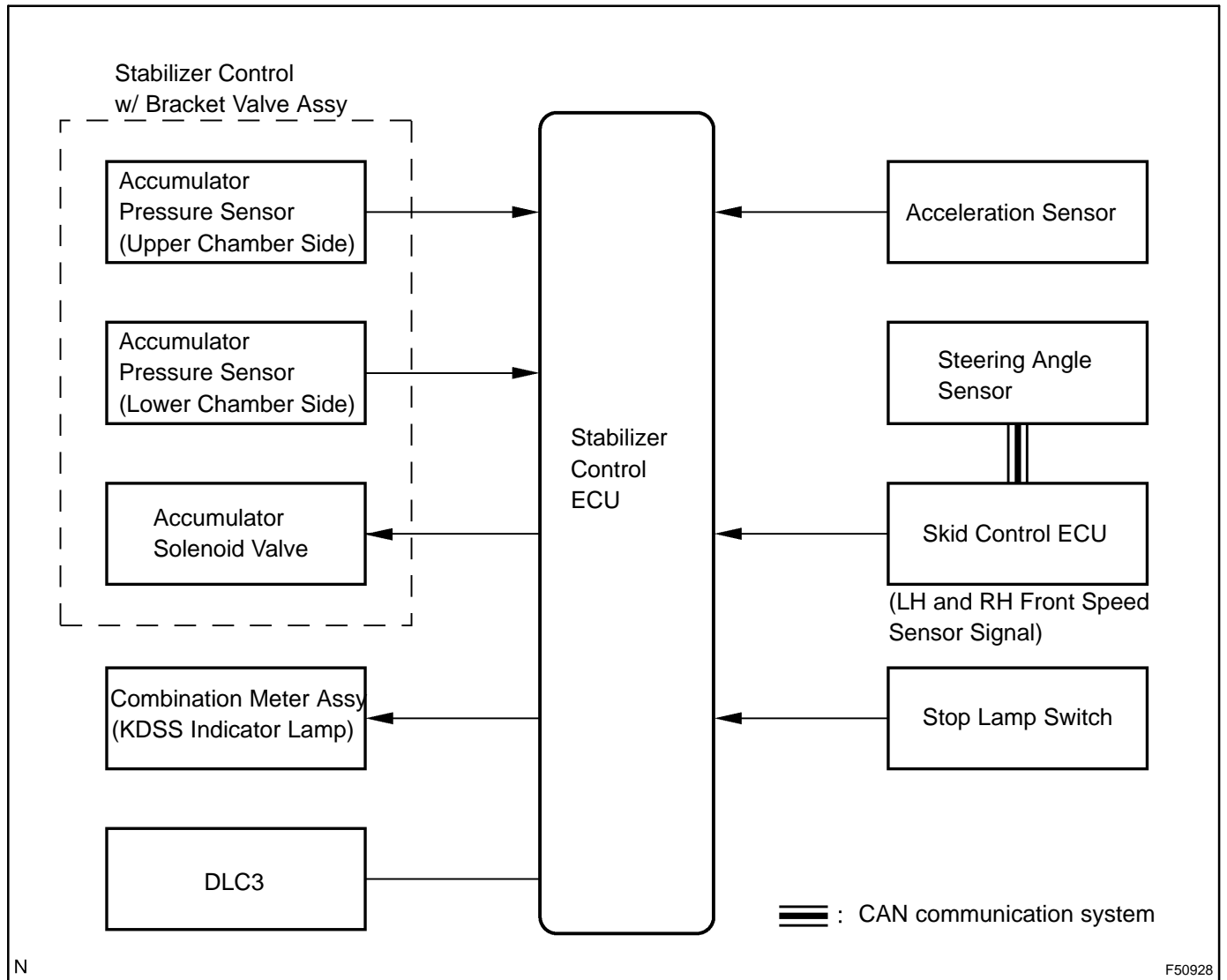




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SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. DESCRIPTION

(a) System description

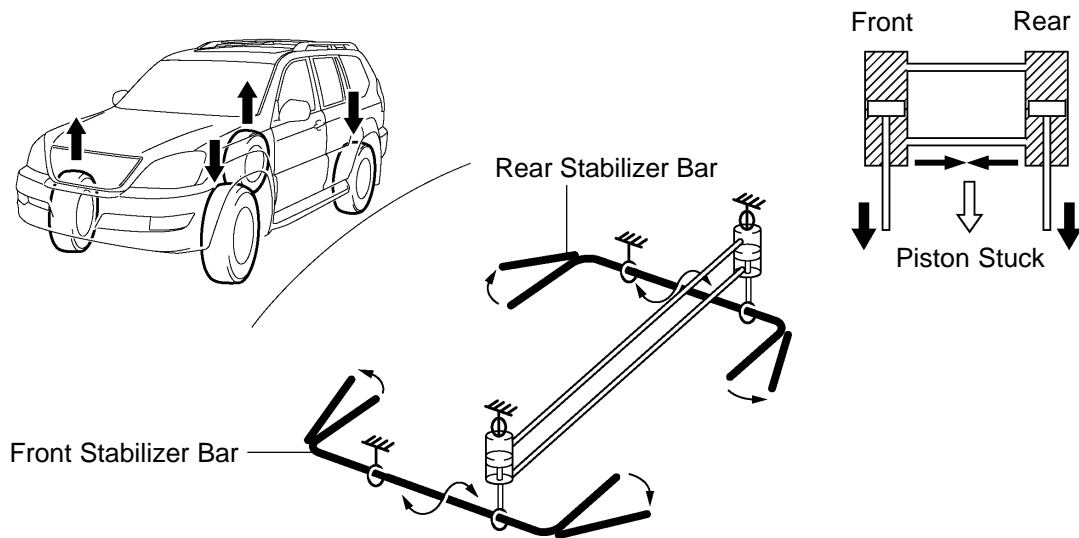
In the KDSS (Kinetic Dynamic Suspension System), a cylinder is installed to each of the front and rear stabilizer bars. The front and rear cylinder upper chambers and the front and rear lower chambers are each connected by a pipe. The hydraulic circuit is filled with high-pressure (3 MPa) suspension fluid. The ECU controls the accumulator solenoid valves according to input signals from each sensor. The suspension roll stiffness increases and the vertical load fluctuation decreases (off-road drivability increases) through operation of this system.

(b) Operation description

(1) Operation when the vehicle rolls:

When the vehicle rolls, the accumulator solenoid valves close to cause the front and rear hydraulic pressure to be equal (both upper and lower chambers) so that the front and rear pistons do not stroke. By doing this, the stabilizer bars twist as those on vehicles without a KDSS to reduce vehicle body roll.

Operation when the vehicle rolls:

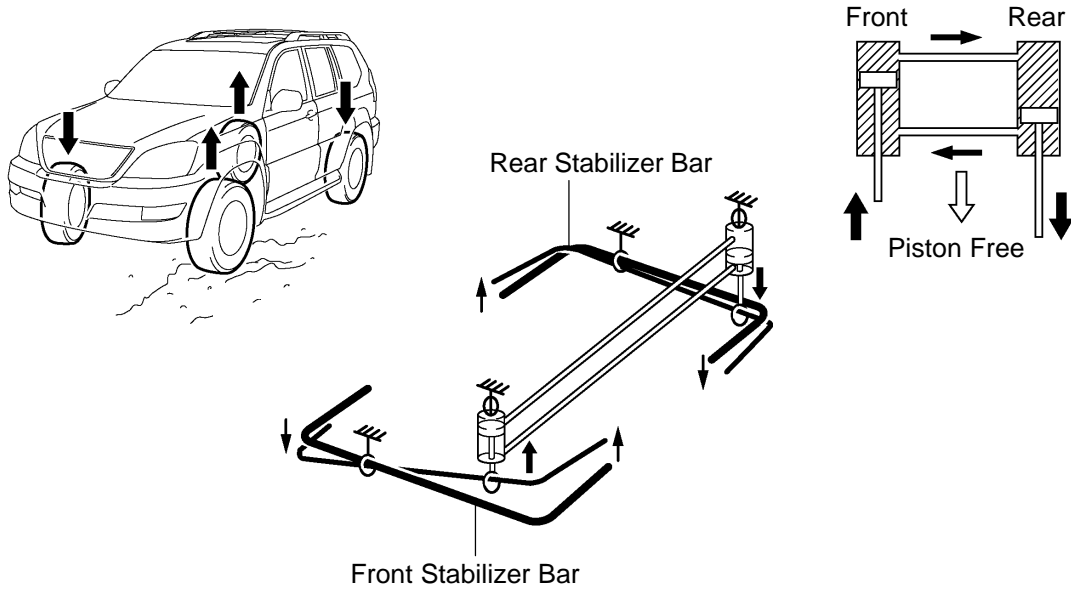


Y

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- (2) Operation when driving off-road (when one wheel rises up):
 When driving off-road (when one wheel rises up), the accumulator solenoid valves open to cause the front and rear pistons to stroke in opposite directions. Because of this, the stabilizers do not twist (the effort required of the stabilizers is reduced) and allow the wheel to stroke when a shock is received from the ground.

Operation when driving off-road (when one wheel rises up):



Y

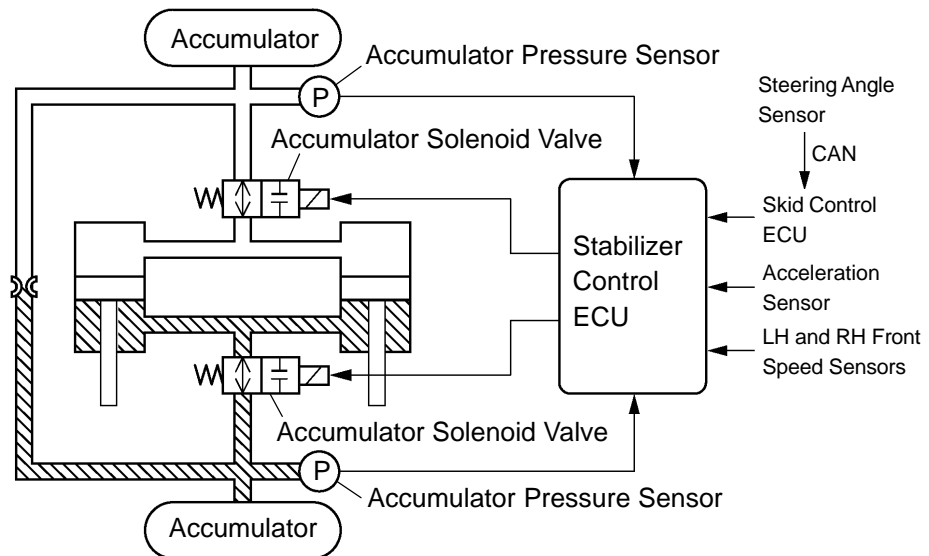
F47626

2. FUNCTION OF COMPONENTS

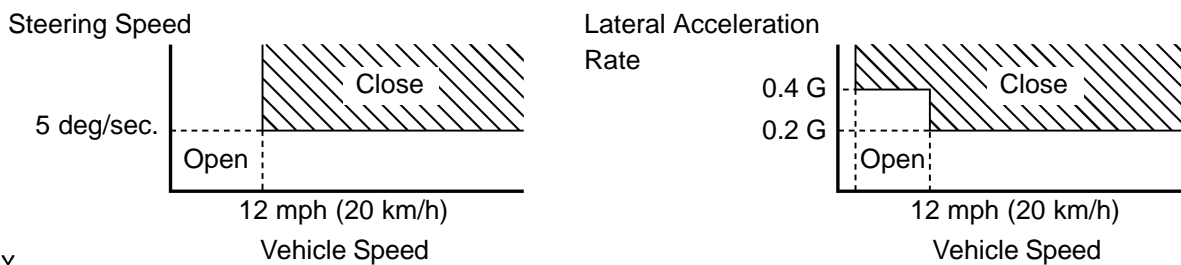
Part Name	Function
Stabilizer bar	Reduces vehicle body roll to increase turning ability and steering stability.
Stabilizer control cylinder	Expands and contracts according to the movement of the front and rear stabilizers to dampen their movement.
Stabilizer control ECU	<ul style="list-style-type: none"> • Closes the accumulator solenoid valves according to input signals from each sensor to cut the fluid flow to the accumulators. • Turns on the KDSS indicator lamp in the combination meter to inform the driver when an abnormality is detected in the KDSS. When this happens, a DTC is stored.
Accumulator pressure sensor	Detects the pressure in the hydraulic circuit and sends signals to the stabilizer control ECU.
Accumulator solenoid valve	Cuts the fluid flow to the accumulator according to a signal from the stabilizer control ECU.
Accumulator	<ul style="list-style-type: none"> • Absorbs fluid inputs from the cylinder to improve the ride quality (when the accumulator solenoid valve is open). • Absorbs changes in the fluid volume caused by temperature changes (prevents high/low pressure). • Provides a stable initial pressure to the system.
Speed sensor	Detects the right and left front wheel speed.
Steering angle sensor	Detects the steering speed and angle.
Acceleration sensor	Detects the lateral acceleration of the vehicle.
Stop lamp switch	Detects that the brake pedal is depressed in order to clear DTCs.

3. SYSTEM CONTROL

- The stabilizer control ECU controls the opening/closing of the accumulator solenoid valves based on the information from the speed sensors, acceleration sensor, and steering angle sensor.
- The 2 accumulator solenoid valves are opened/closed at the same time.



Accumulator Solenoid Valve Switching Timing:



Y

F47627

- Switching from "Close" to "Open" of the solenoid valves occurs when all sensor values deviate for a specified time from the "Close" range shown in the above illustration.

HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used during steps 3, 6 and 9.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE [05-565](#))

NEXT

3 CHECK AND CLEAR DTCs (SEE PAGE [05-578](#))

NEXT

4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (Go to step 5)

SYMPTOM OCCURS (Go to step 6)

5 SYMPTOM SIMULATION (SEE PAGE [05-563](#))

NEXT

6 DTC CHECK (SEE PAGE [05-578](#))

DTC IS NOT OUTPUT (Go to step 7)

DTC IS OUTPUT (Go to step 8)

7 PROBLEM SYMPTOMS TABLE (SEE PAGE [05-575](#))

Go to step 9

8 DTC CHART (SEE PAGE [05-582](#))

NEXT

9 CIRCUIT INSPECTION (SEE PAGE [05-584](#) to [05-632](#))

NEXT

10 PROBLEM IDENTIFICATION

NEXT

11	REPAIR OR REPLACEMENT
----	-----------------------

NEXT

12	CONFIRMATION TEST
----	-------------------

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

KDSS Check Sheet

Inspector's
Name : _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	mile km

Date Problem First Occurred	
Frequency Problem Occurs	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times per day, month) <input type="checkbox"/> Once only
Conditions Problem Occurs	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F (°C))
	Place <input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner City <input type="checkbox"/> Hill (Up, Down) <input type="checkbox"/> Rough Road <input type="checkbox"/> Others

Symptoms	<input type="checkbox"/> The right and left sides of the vehicle are not level.
	<input type="checkbox"/> The vehicle rolls excessively during driving.
	<input type="checkbox"/> There is trouble with the KDSS indicator lamp.

DTC Check	1st Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code (Code)
	2nd Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code (Code)

CALIBRATION

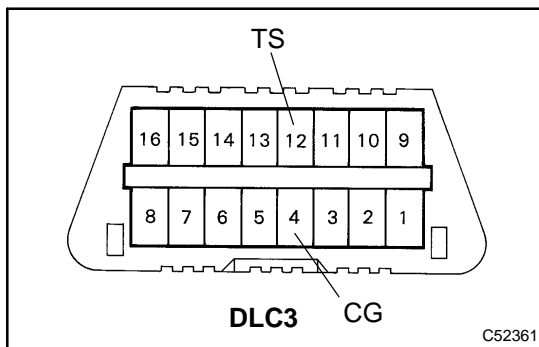
HINT:

Perform the calibration of the acceleration sensor zero point by following the procedures below after replacing the acceleration sensor assy or stabilizer control ECU, or after clearing the ECU memory.

1. PERFORM ZERO POINT CALIBRATION (USING SST CHECK WIRE)

NOTICE:

- Do not tilt, move or shake the vehicle during the zero point calibration. Keep it stationary.
- Be sure to perform the procedures on level ground (inclination of 1% or less).



- (a) Clear the zero point calibration value.
- (1) Turn the ignition switch to the ON position.
 - (2) Connect terminals TS and CG of the DLC3 using SST. Perform this procedure 4 times or more within 8 seconds.

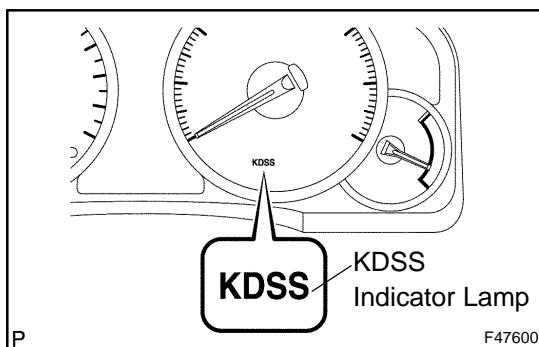
SST 09843-18040

- (b) Obtain the zero point calibration value.
- (1) Turn the ignition switch off.
 - (2) Connect terminals TS and CG of the DLC3 using SST.

SST 09843-18040

- (3) Turn the ignition switch to the ON position to enter the test mode.

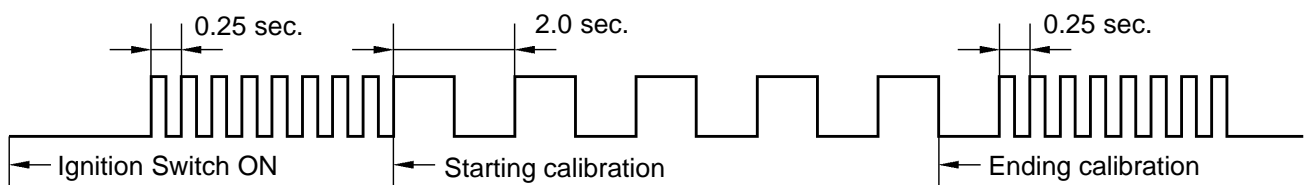
- (4) Check that the KDSS indicator lamp blinks in the pattern shown in the illustration.



HINT:

- The KDSS indicator lamp blinking pattern changes when the zero point calibration starts and returns to the normal pattern when the calibration ends.
- The KDSS indicator lamp does not return to the normal blinking pattern when the zero point calibration cannot be completed.

Blinking Pattern:



N

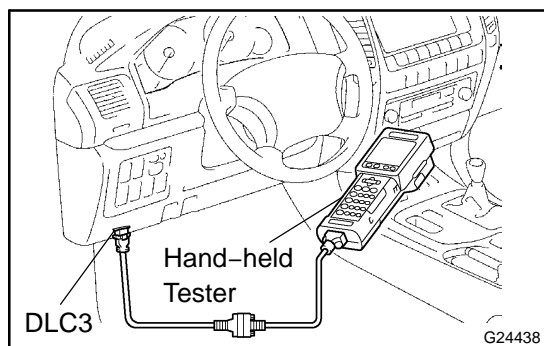
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- When the zero point calibration cannot be completed, check if the following conditions necessary for performing the calibration are met:
 - **Vehicle speed is 0 mph (0 km/h).**
 - **The acceleration sensor assy is normal.**
 - **Acceleration sensor assy power source voltage is normal.**
- (5) Disconnect the SST from the DLC3 terminals.
- (6) Check that DTC C1779/79 is not output (see page [05-578](#)).
- (7) Turn the ignition switch off.

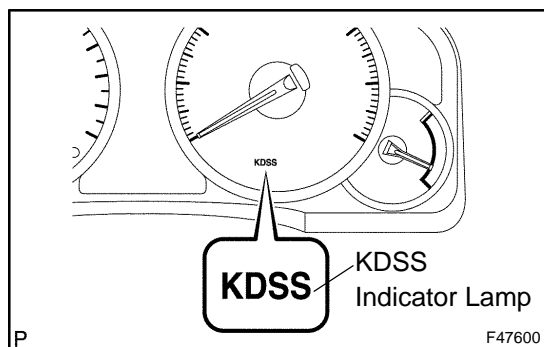
2. PERFORM ZERO POINT CALIBRATION (USING HAND-HELD TESTER)

NOTICE:

- **Do not tilt, move or shake the vehicle during the zero point calibration. Keep it stationary.**
- **Be sure to perform the procedures on level ground (inclination of 1% or less).**



- (a) Clear and obtain the zero point calibration value.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Turn the hand-held tester main switch on.
 - (4) Select the SENSOR ADJUST mode on the hand-held tester.
 - (5) Clear and obtain the zero point calibration value.

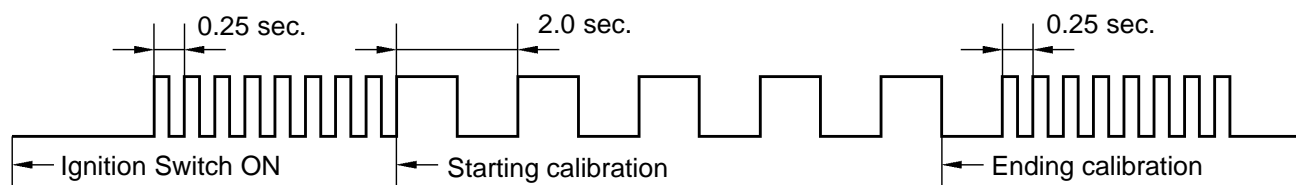


- (6) Check that the KDSS indicator lamp blinks in the pattern shown in the illustration.

HINT:

- The KDSS indicator lamp blinking pattern changes when the zero point calibration starts and returns to the normal pattern when the calibration ends.
- The KDSS indicator lamp does not return to the normal blinking pattern when the zero point calibration cannot be completed.

Blinking Pattern:



N

F47629

- When the zero point calibration cannot be completed, check if the following conditions necessary for performing the calibration are met:
 - **Vehicle speed is 0 mph (0 km/h).**
 - **The acceleration sensor assy is normal.**
 - **Acceleration sensor assy power source voltage is normal.**
- (7) Check that DTC C1779/79 is not output (see page [05-578](#)).
 - (8) Disconnect the hand-held tester from the DLC3.
 - (9) Turn the ignition switch off.

TEST MODE PROCEDURE

HINT:

- By switching from normal mode into test mode, you can inspect the stop lamp switch and the RH and LH front wheel speed sensors.
- When entering the test mode, the stabilizer control ECU sets all the test DTCs first. After completing the input signal operation for each inspection item, the DTCs that are determined to be normal by the stabilizer control ECU will be erased. The DTCs for other inspection items may not be erased when only a certain signal is inspected.
- When the test mode returns back to the normal mode, all the test DTCs will be erased.

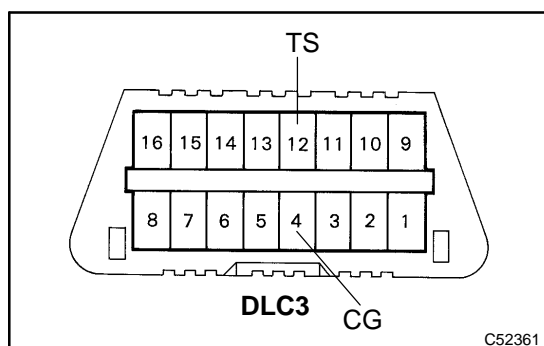
1. TEST MODE (USING SST CHECK WIRE)

(a) Procedure for Test Mode.

- (1) Make sure that the ignition switch is off.
- (2) Set each of the check items to the condition in Operation (A) in the test mode table below.

Test mode table:

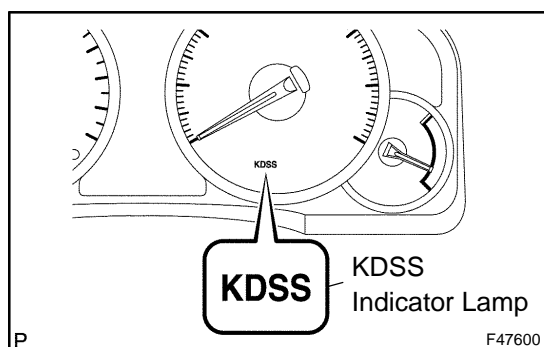
Check Item	Operation (A)
Stop lamp switch signal	Brake pedal not depressed
RH front wheel speed sensor signal	Vehicle is stopped
LH front wheel speed sensor signal	Vehicle is stopped



- (3) Using SST, connect terminals TS and CG of the DLC3.

SST 09843-18040

- (4) Turn the ignition switch to the ON position.



- (5) Check that the KDSS indicator lamp blinks.

HINT:

- At this time, the KDSS indicator lamp should come on for 2 seconds. After that, it blinks at 0.25 second intervals.
- If the KDSS indicator lamp does not blink, inspect the KDSS indicator lamp circuit or the TS terminal circuit.

Trouble Area	See page
KDSS indicator lamp circuit	05-625
TS terminal circuit	05-632

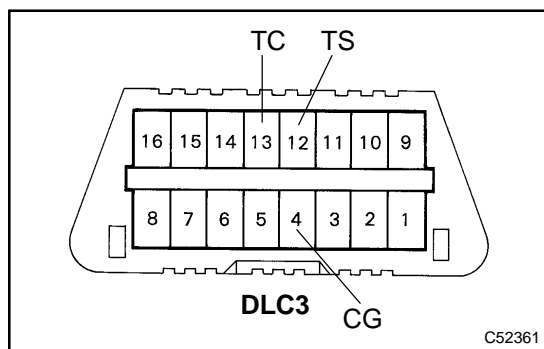
- (6) Set each of the check items to the condition in Operation (B) in the test mode table below.

Test mode table:

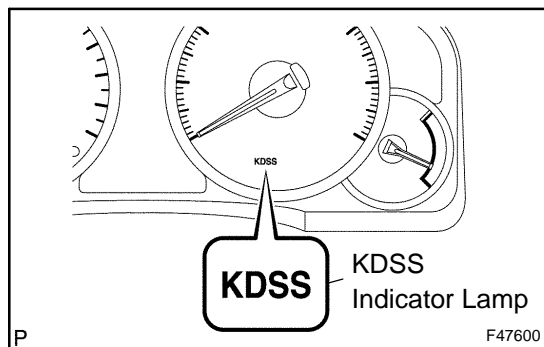
Check Item	Operation (B)
Stop lamp switch signal	Brake pedal depressed once
RH front wheel speed sensor signal	Vehicle speed 20 km/h (12 mph) or higher
LH front wheel speed sensor signal	Vehicle speed 20 km/h (12 mph) or higher

HINT:

- In step (6), all signals can be checked together.
 - When checking each item, the KDSS indicator lamp should come on for 1 second then continue blinking.
- (7) Vehicle is stopped.



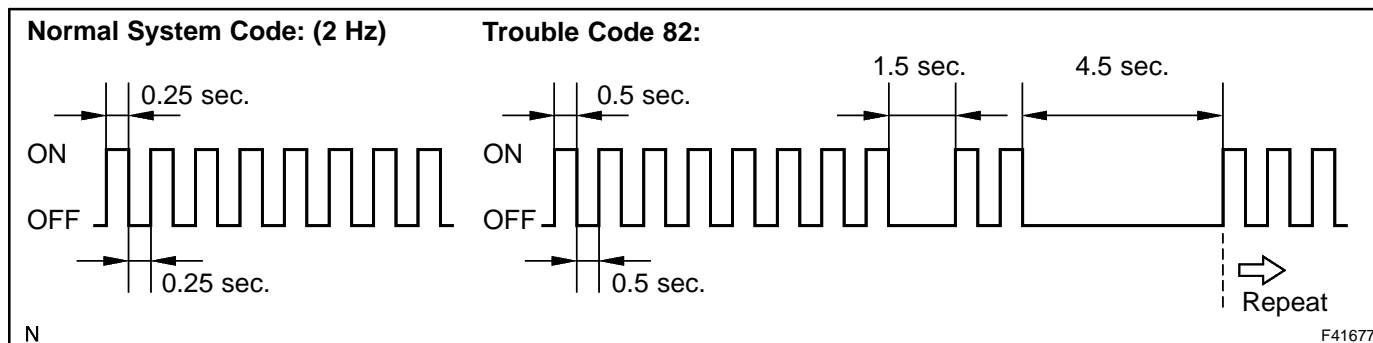
- (8) Connect the 3rd terminal of the SST to terminal TC of the DLC3.
- SST 09843-18040



- (9) Read the number of blinks of the KDSS indicator lamp.

HINT:

- As an example, the blinking patterns of a normal system code and trouble code 82 are shown in the illustration.
 - If 2 or more malfunctions are indicated at the same time, the lowest numbered code is displayed first.
 - When a DTC or normal system code is not output, check the TC terminal circuit on page 05-629.
- (10) Check the malfunction using the code table on the next page.



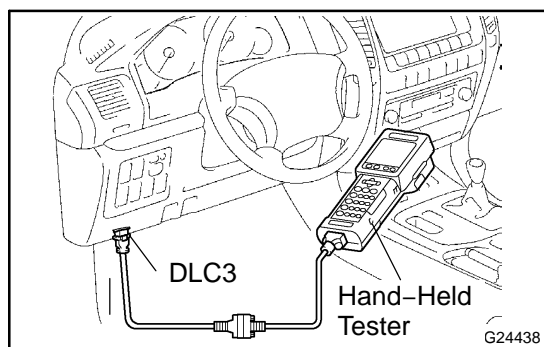
DTC of KDSS test mode function:

If a trouble code is displayed during the test mode DTC check, check the circuit listed for that code. For details of each code, refer to the "See page" under respective "DTC No." in the chart.

DTC No. (See Page)	Detection Item	Trouble Area
C1782/82 (05-598)	Stop light switch circuit malfunction	<ul style="list-style-type: none"> • Wire harness • Stop lamp switch assy • Stabilizer control ECU
C1794/94 (05-590)	RH front wheel speed circuit malfunction	<ul style="list-style-type: none"> • Wire harness • RH front speed sensor • Skid control ECU assy • Stabilizer control ECU
C1795/95 (05-590)	LH front wheel speed circuit malfunction	<ul style="list-style-type: none"> • Wire harness • LH front speed sensor • Skid control ECU assy • Stabilizer control ECU

(b) Ending the Test Mode.

- (1) Turn the ignition switch off.
- (2) Disconnect the SST from the terminals of the DLC3.
SST 09843-18040

**2. TEST MODE (USING HAND-HELD TESTER)**

(a) Procedure for Test Mode.

- (1) Make sure that the ignition switch is off.
- (2) Set each of the check items to the condition in Operation (A) in the test mode table below.

Test mode table:

Check Item	Operation (A)
Stop lamp switch signal	Brake pedal not depressed
RH front wheel speed sensor signal	Vehicle is stopped
LH front wheel speed sensor signal	Vehicle is stopped

- (3) Connect the hand-held tester to the DLC3.
- (4) Turn the ignition switch to the ON position.
- (5) Select the SIGNAL CHECK mode on the hand-held tester.
- (6) Set each of the check items to the condition in Operation (B) in the test mode table below.

Test mode table:

Check Item	Operation (B)
Stop lamp switch signal	Brake pedal depressed once
RH front wheel speed sensor signal	Vehicle speed 20 km/h (12 mph) or higher
LH front wheel speed sensor signal	Vehicle speed 20 km/h (12 mph) or higher

HINT:

In step (6), all signals can be checked together.

- (7) Vehicle is stopped.
- (8) Read the DTCs by following the prompts on the tester screen and check the malfunction using the code table below.

HINT:

Refer to the hand-held tester operator's manual for further details.

- (9) After completing the input signal check, disconnect the tester and turn the ignition switch off.

DTC of KDSS test mode function:

If a trouble code is displayed during the test mode DTC check, check the circuit listed for that code. For details of each code, refer to the "See page" under respective "DTC No." in the chart.

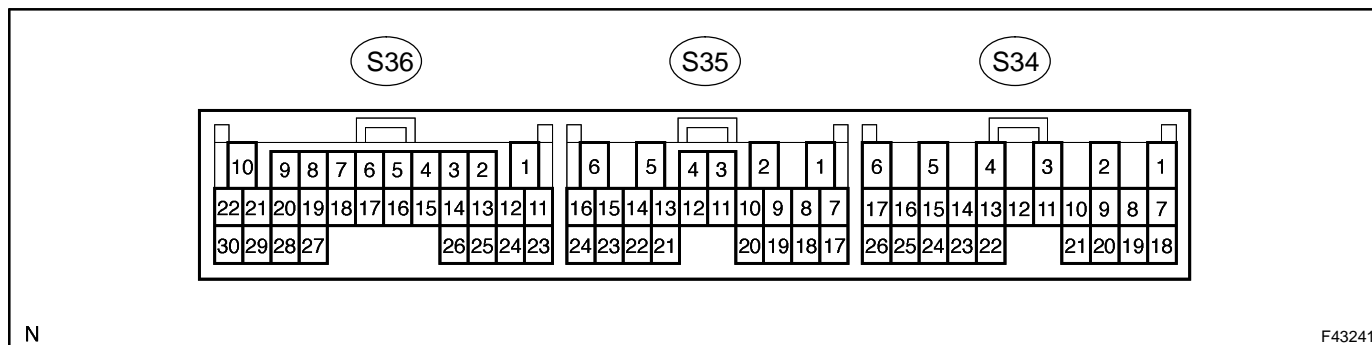
DTC No. (See Page)	Detection Item	Trouble Area
C1782/82 (05-598)	Stop light switch circuit malfunction	<ul style="list-style-type: none"> • Wire harness • Stop lamp switch assy • Stabilizer control ECU
C1794/94 (05-590)	RH front wheel speed circuit malfunction	<ul style="list-style-type: none"> • Wire harness • RH front speed sensor • Skid control ECU assy • Stabilizer control ECU
C1795/95 (05-590)	LH front wheel speed circuit malfunction	<ul style="list-style-type: none"> • Wire harness • LH front speed sensor • Skid control ECU assy • Stabilizer control ECU

TERMINALS OF ECU

HINT:

Inspect the connectors from the back side while connectors are connected.

STABILIZER CONTROL ECU:



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Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (S36-1) – Body ground	W-B – Body ground	Ground	Always	Below 1 V
TS (S36-5) – GND (S36-1)	R-B – W-B	Test mode input signal	Ignition switch ON, terminals TS and CG of DLC3 connected	Below 1 V
TS (S36-5) – GND (S36-1)	R-B – W-B	Test mode input signal	Ignition switch ON, terminals TS and CG of DLC3 not connected	10 to 14 V
TC (S36-6) – GND (S36-1)	P-L – W-B	Diagnosis mode input signal	Ignition switch ON, terminals TC and CG of DLC3 connected	Below 1 V
TC (S36-6) – GND (S36-1)	P-L – W-B	Diagnosis mode input signal	Ignition switch ON, terminals TC and CG of DLC3 not connected	10 to 14 V
FLO (S36-8) – GND (S36-1)	L-O – W-B	Front left speed sensor input signal	Vehicle speed 12 mph (20 km/h) or higher	Pulse generation
FRO (S36-9) – GND (S36-1)	L-R – W-B	Front right speed sensor input signal	Vehicle speed 12 mph (20 km/h) or higher	Pulse generation
IG (S36-10) – GND (S36-1)	GR – W-B	Power source	Ignition switch ON	10 to 14 V
K1 (S36-15) – GND (S36-1)	L – W-B	KDSS indicator lamp	Ignition switch ON, KDSS indicator lamp OFF	10 to 14 V
SIL (S36-20) – GND (S36-1)	W – W-B	Diagnosis tester communication signal	Ignition switch ON, communication not established	8 V or higher
SGG1 (S36-25) – GND (S36-1)	L-Y – W-B	Acceleration sensor ground	Always	Below 1 V
SOP2 (S36-27) – GND (S36-1)	Y – W-B	Pressure sensor input signal	Ignition switch ON	0.4 to 4.6 V
SOG1 (S36-28) – GND (S36-1)	R-L – W-B	Acceleration sensor input signal	Ignition switch ON, vehicle is level	Approx. 2.5 V
SS3- (S36-29) – GND (S36-1)	W – W-B	Steering angle sensor input signal	Ignition switch ON	Pulse generation
SS3+ (S36-30) – GND (S36-1)	R – W-B	Steering angle sensor input signal	Ignition switch ON	Pulse generation
SLAL (S34-7) – GND (S36-1)	LG – W-B	Accumulator solenoid valve output signal (Lower)	Ignition switch ON, vehicle is stopped	Below 1 V
SLAU (S34-8) – GND (S36-1)	P-G – W-B	Accumulator solenoid valve output signal (Upper)	Ignition switch ON, vehicle is stopped	Below 1 V

SGP1 (S34-21) - GND (S36-1)	G - W-B	Pressure sensor ground	Always	Below 1 V
SBP1 (S34-22) - GND (S36-1)	V - W-B	Power source (Pressure sensor)	Ignition switch ON	4.4 to 5.4 V
SOP1 (S34-23) - GND (S36-1)	B - W-B	Pressure sensor input signal	Ignition switch ON	0.4 to 4.6 V
GND2 (S35-5) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
IG2 (S35-6) - GND (S36-1)	GR - W-B	Power source	Ignition switch ON	10 to 14 V
STP (S35-12) - GND (S36-1)	G-Y - W-B	Stop lamp switch input signal	<ul style="list-style-type: none"> • Brake pedal depressed • Brake pedal released 	10 to 14 V Below 1 V
SBP2 (S35-18) - GND (S36-1)	GR-B - W-B	Power source (Pressure sensor)	Ignition switch ON	4.4 to 5.4 V
SBG1 (S35-21) - GND (S36-1)	G-B - W-B	Power source (Acceleration sensor)	Ignition switch ON	4.4 to 5.4 V
SGP2 (S35-22) - GND (S36-1)	LG - W-B	Pressure sensor ground	Always	Below 1 V

PROBLEM SYMPTOMS TABLE

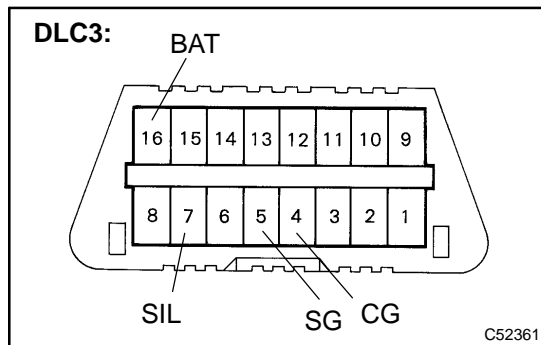
If a normal system code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Suspected Area	See page
The right and left sides of the vehicle are not level.	<ol style="list-style-type: none"> 1. Accumulator solenoid valve circuit 2. System fluid pressure 3. Charge fluid and bleed air 4. Stabilizer control w/ bracket valve assy 	05-623 25-21 25-21 25-21
The vehicle rolls excessively during driving.	<ol style="list-style-type: none"> 1. Accumulator solenoid valve circuit 2. Suspension fluid pressure leak 3. Disconnection or permanent deformation of bushes 4. Charge fluid and bleed air 5. Front speed sensor circuit 6. Steering angle sensor circuit 7. Skid control ECU 8. Acceleration sensor circuit 9. Stabilizer control w/ bracket valve assy (*1) 10. Stabilizer control cylinder (*2) 11. Stabilizer control ECU 	05-611 25-21 25-21 25-21 05-590 05-594 32-23 05-602 25-21 25-21 25-62
There is trouble with the KDSS indicator lamp.	<ol style="list-style-type: none"> 1. KDSS indicator lamp circuit 2. Stabilizer control ECU 	05-625 25-62

*1: Replace the stabilizer control w/ bracket valve assy, as the valve may be malfunctioning.

*2: Replace the front and rear cylinders, as there may be fluid leaks from the upper/lower chambers of the cylinder.

DIAGNOSIS SYSTEM



1. DIAGNOSIS SYSTEM

- (a) Inspect the battery voltage.

Battery voltage: 11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

- (b) Check DLC3.

The stabilizer control ECU uses the ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

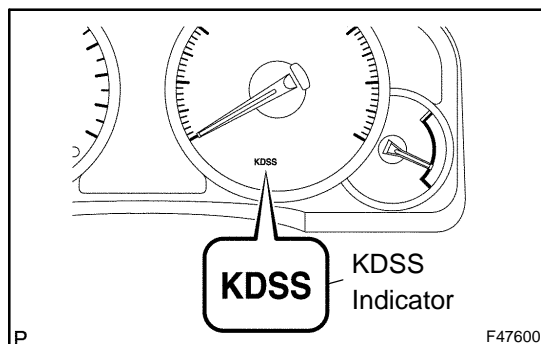
Verify the conditions listed in the table below:

Symbols (Terminals No.)	Terminal Description	Condition	Specified Condition
SIL(7) - SG(5)	Bus "+" line	During communication	Pulse generation
CG(4) - Body ground	Chassis ground	Always	Below 1 Ω
SG(5) - Body ground	Signal ground	Always	Below 1 Ω
BAT(16) - Body ground	Battery positive	Always	11 to 14 V

HINT:

If the hand-held tester display shows UNABLE TO CONNECT TO VEHICLE when the cable of the hand-held tester is connected to the DLC3, the ignition switch is turned to the ON position and the tester is operated, there is a problem either on the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's instruction manual.



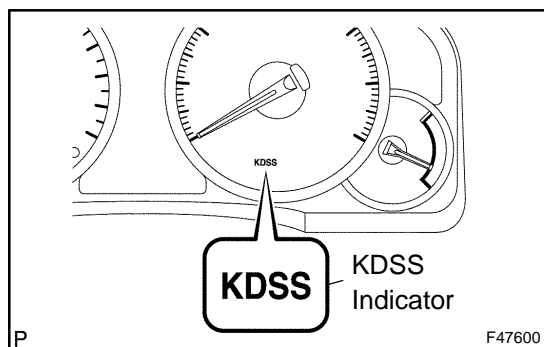
- (c) Indicator lamp

- (1) During vehicle stabilizer control operation, the KDSS indicator lamp comes on when there is any malfunction in the KDSS.

NOTICE:

- **When the malfunction has been corrected, the KDSS indicator lamp goes off.**
- **There are some malfunctions which do not cause the KDSS indicator lamp to come on (see page 05-582 for the items that cause the KDSS indicator lamp to come on).**

- (d) DTCs (Normal mode)
 - (1) DTCs are memorized in the stabilizer control ECU and read by counting the number of blinks of the KDSS indicator lamp or using the hand-held tester (see page 05-578 for the procedure of DTC check).
- (e) Test mode
 - (1) By switching from normal mode to test mode, the stop lamp switch and front wheel speed sensors can be inspected (see page 05-569).



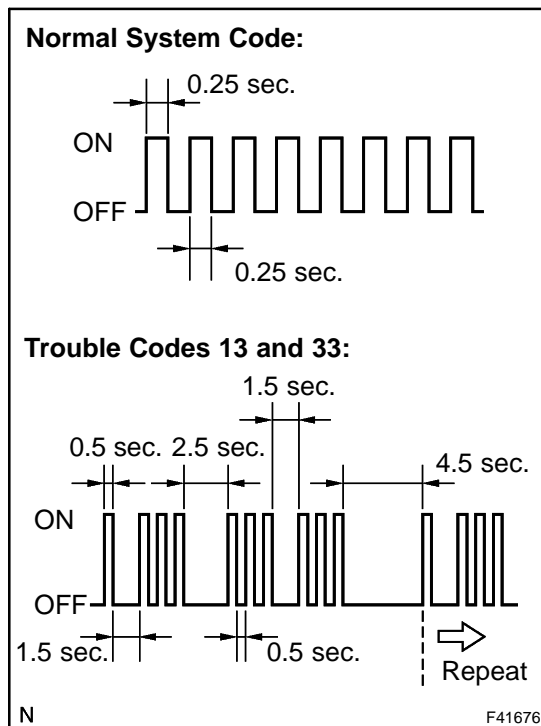
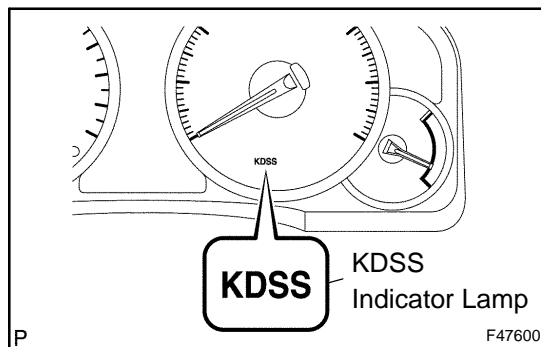
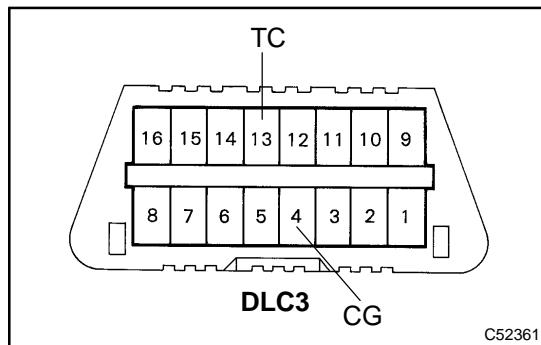
2. CHECK INDICATOR LAMP

- (2) Turn the ignition switch to the ON position.
- (3) Check that the KDSS indicator lamp comes on for 2 seconds.

If the indicator check result is not normal, proceed to troubleshooting for the indicator lamp circuit.

Trouble Area	See page
KDSS indicator lamp circuit	05-625

DTC CHECK/CLEAR



1. DTC CHECK (USING SST CHECK WIRE)

(a) Check DTCs.

(1) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

(2) Turn the ignition switch to the ON position.

(3) Read and record any DTCs from the KDSS indicator lamp on the combination meter. As examples, refer to the illustration on the left for the blinking patterns of the normal system code and trouble codes 13 and 33.

HINT:

- If the KDSS indicator lamp does not indicate any DTC or the normal system code, inspect the KDSS indicator lamp circuit or TC terminal circuit.

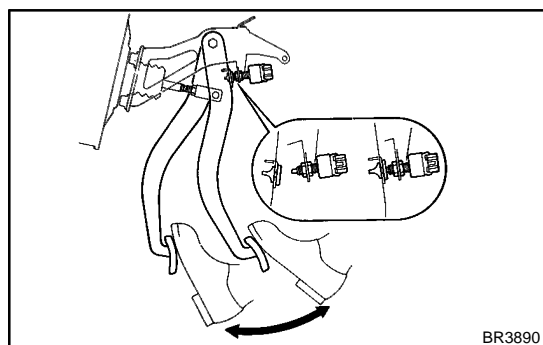
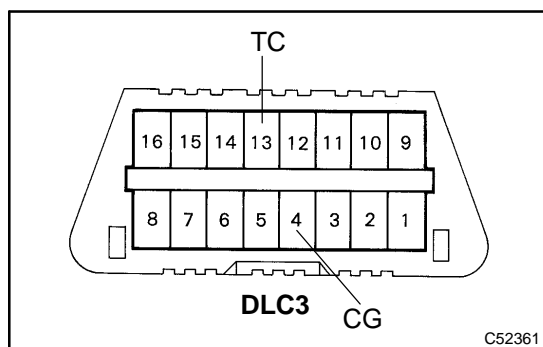
Trouble Area	See page
KDSS indicator lamp circuit	05-625
TC terminal circuit	05-629

- If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is displayed first.

(4) Refer to the Diagnostic Trouble Code Chart (see page 05-582) for DTC information.

(5) After completing the check, remove the SST from the DLC3.

SST 09843-18040



- (b) Clear the DTCs.
- (1) Make sure the ignition switch is off.
 - (2) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

- (3) Turn the ignition switch to the ON position.

- (4) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
- (5) Check that the KDSS indicator lamp blinks in the normal system code blinking pattern.

HINT:

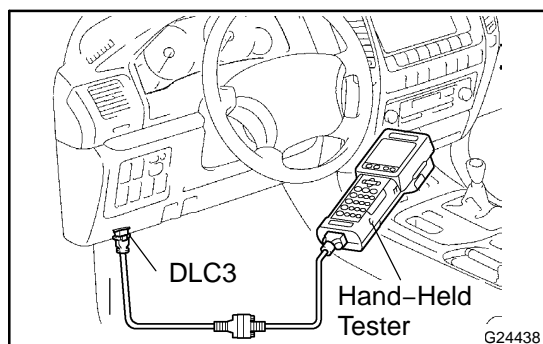
If the fault has not been repaired, the DTC code may still be displayed.

- (6) Turn the ignition switch off.
- (7) Remove the SST from the DLC3.

SST 09843-18040

HINT:

Disconnecting the battery cable during the operation will not erase DTCs in the ECU.



2. DTC CHECK (USING HAND-HELD TESTER)

- (a) Check DTCs.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Read the DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

- (b) Clear the DTCs using the hand-held tester.

HINT:

After repairing the malfunctions, clear the DTCs.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch to the ON position.
- (3) Erase the DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

FAIL-SAFE CHART

1. FAIL-SAFE FUNCTION

- (a) If the stabilizer control ECU detects a malfunction, the fail-safe functions shown in the table below operate.

Malfunction Item	Fail-safe Function
Front Speed Sensor (One Side)	KDSS control continues only on the normal side.
Front Speed Sensor (Both Sides)	KDSS control stops.
Acceleration Sensor	KDSS control continues using vehicle speed sensor and steering angle sensor.
Accumulator Pressure Sensor	KDSS control stops.
Steering Angle Sensor	KDSS control continues using vehicle speed sensor and acceleration sensor.
Accumulator Solenoid Valve	KDSS control stops.
Power Supply	KDSS control stops.
Stabilizer Control ECU	KDSS control stops.

DATA LIST/ACTIVE TEST

1. DATA LIST

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position.
- Following the display on the hand-held tester, read the "DATA LIST".

KDSS:

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle Speed/min.: 0 km/h, max.: 255 km/h	Actual vehicle speed	Speed indicated on the combination meter
FR WHEEL SPD	FR Wheel Speed/min.: 0 km/h, max.: 255 km/h	Actual wheel speed	-
FL WHEEL SPD	FL Wheel Speed/min.: 0 km/h, max.: 255 km/h	Actual wheel speed	-
IG VOLTAGE	IG Power Source Voltage/min.: 0 V, max.: 25.5 V	Actual IG power source voltage 10 to 14 V	-
POWER VOLTAGE	+B Power Source Voltage/min.: 0 V, max.: 25.5 V	Actual +B power source voltage 10 to 14 V	-
STEERING ANG	Steering Angle/min.: -49150.5 deg, max.: 49152 deg	Continuously changes while steering wheel is turned	-
ACCELERATE SENS	Acceleration Sensor/min.: -1176.33 m/sec ² , max.: 1176.37 m/sec ²	Approx. -0.98 to 0.98 m/sec ²	When vehicle is stationary (Value changes when vehicle tilts)
ACC PRESS (UP)	Accumulator Pressure Sensor (Upside)/min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa	When vehicle is stopped and fluid temperature is 20 °C
ACC PRESS (DWN)	Accumulator Pressure Sensor (Downside)/min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa	When vehicle is stopped and fluid temperature is 20 °C
STOP LIGHT SW	Stop Light Switch/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
TC	TC Terminal/ON or OFF	ON: Terminals TC and CG are connected OFF: Terminals TC and CG are not connected	-
TS	TS Terminal/ON or OFF	ON: Terminals TS and CG are connected OFF: Terminals TS and CG are not connected	-
#CODES	Number of Trouble Codes/min.: 0, max.: 255	Actual number of trouble codes	-
ACC VALVE (DWN)	Accumulator Valve (Downside)/ON or OFF	ON: Accumulator valve is closed OFF: Accumulator valve is open	-
ACC VALVE (UP)	Accumulator Valve (Upside)/ON or OFF	ON: Accumulator valve is closed OFF: Accumulator valve is open	-

2. ACTIVE TEST

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position.
- Following the display on the hand-held tester, perform the "ACTIVE TEST".

KDSS:

Item	Vehicle Condition / Test Details	Diagnostic Note
ACC VALVE (UP)	Accumulator Valve (Upside)/ON or OFF	-
ACC VALVE (DWN)	Accumulator Valve (Downside)/ON or OFF	-

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If an abnormality is not found when the parts are inspected, inspect the stabilizer control ECU.
- If a trouble code is displayed during the DTC check, check the circuit listed for that code. For details of each code, turn to the page mentioned below "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area	Indicator Lamp
C1761/61 (05-584)	KDSS ECU malfunction	<ul style="list-style-type: none"> • Wire harness • Stabilizer control ECU 	x
C1774/74 (05-587)	Low battery positive voltage	<ul style="list-style-type: none"> • Wire harness • Stabilizer control ECU 	x
C1776/76 (05-590)	Wheel speed sensor malfunction	<ul style="list-style-type: none"> • Wire harness • RH and LH front speed sensors • Skid control ECU • Stabilizer control ECU 	x
C1777/77 (05-594)	Steering sensor signal malfunction	<ul style="list-style-type: none"> • Wire harness • Steering angle sensor • Skid control ECU • Stabilizer control ECU • CAN communication system 	x
C1779/79 (05-621)	Zero point calibration of acceleration sensor undone	<ul style="list-style-type: none"> • Stabilizer control ECU (Acceleration sensor zero point calibration) • Wire harness • Acceleration sensor 	○
C1811/11 (05-602)	Acceleration sensor malfunction	<ul style="list-style-type: none"> • Wire harness • Acceleration sensor assy • Stabilizer control ECU 	x
C1812/12 (05-606)	Pressure sensor malfunction/Upside	<ul style="list-style-type: none"> • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○
C1813/13 (05-606)	Pressure sensor malfunction/Downside	<ul style="list-style-type: none"> • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○
C1831/31 (05-611)	Accumulator solenoid malfunction/Upside	<ul style="list-style-type: none"> • Wire harness • Accumulator solenoid valve • Stabilizer control ECU 	○
C1832/32 (05-611)	Accumulator solenoid malfunction/Downside	<ul style="list-style-type: none"> • Wire harness • Accumulator solenoid valve • Stabilizer control ECU 	○
C1851/51 (05-616)	Low pressure malfunction in upside of KDSS system	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○
C1852/52 (05-616)	Low pressure malfunction in downside of KDSS system	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○
C1853/53 (05-616)	High pressure malfunction in upside of KDSS system	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○
C1854/54 (05-616)	High pressure malfunction in downside of KDSS system	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor • Stabilizer control ECU 	○

HINT:

- "○": The KDSS indicator lamp comes on.
- "X": The KDSS indicator lamp does not come on.

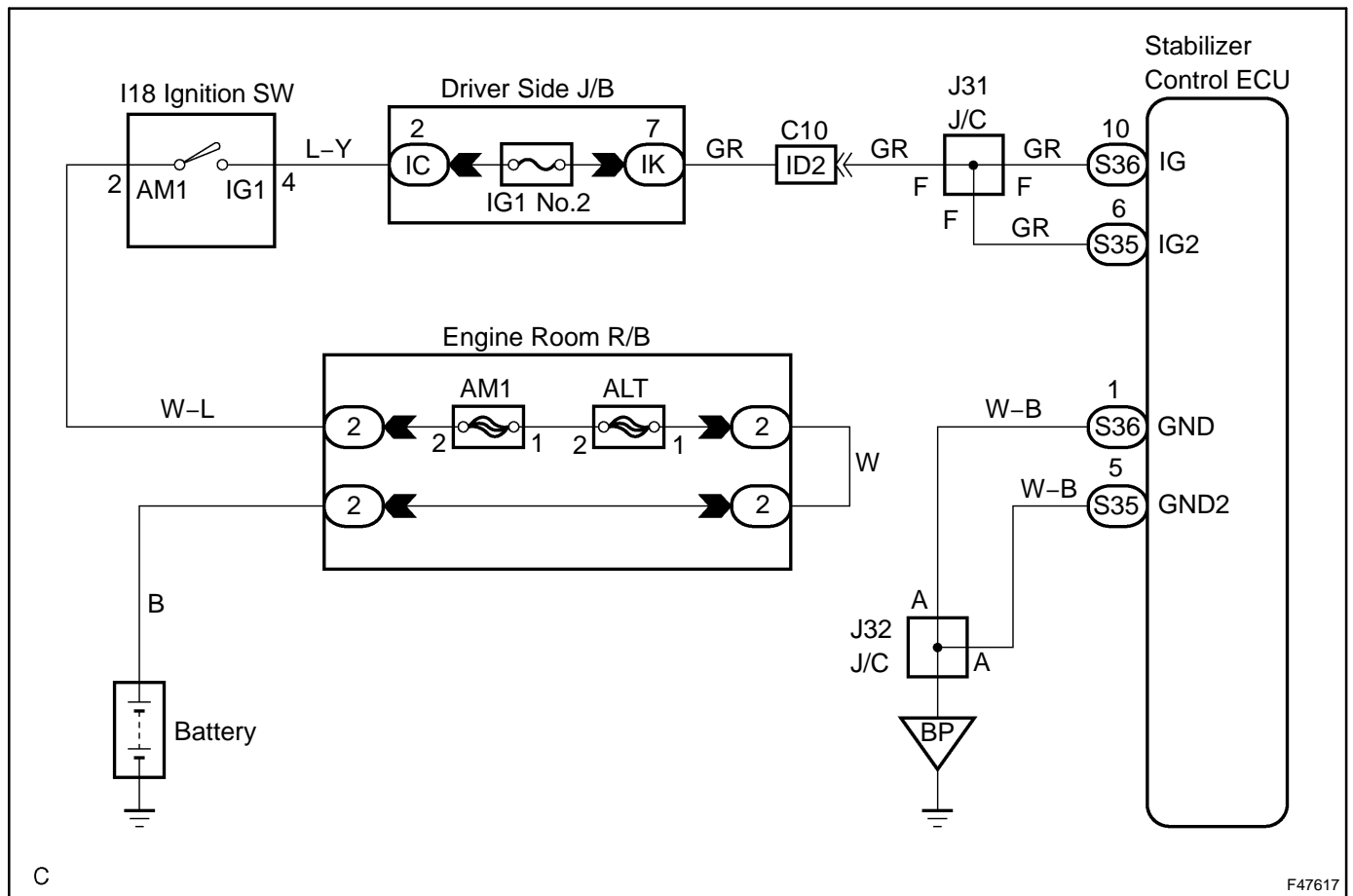
DTC	C1761/61	KDSS ECU MALFUNCTION
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CIRCUIT DESCRIPTION

The stabilizer control ECU recognizes the ignition switch ON signal based on voltage input to terminal IG. It also activates the system based on voltage input to terminal IG2.

DTC No.	DTC Detecting Condition	Trouble Area
C1761/61	Terminal IG2 voltage is below 2.0 V for 0.5 sec. with the ignition switch on.	<ul style="list-style-type: none"> • Wire harness • Stabilizer control ECU

WIRING DIAGRAM



C

F47617

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE ON HAND-HELD TESTER

- (a) Connect the the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
- (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

KDSS:

Item	Measurement Item/ Range (Display)	Normal Condition
POWER VOLTAGE	+B Power Source Voltage (Terminal IG2)/min.: 0 V, max.: 25.5 V	Actual +B power source voltage 10 to 14 V

- (d) Check the voltage.

Standard:
10 to 14 V

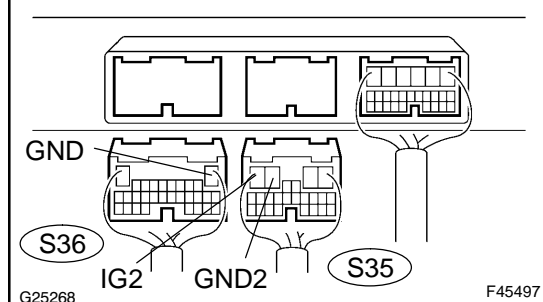
OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

2 INSPECT STABILIZER CONTROL ECU

Stabilizer Control ECU:



- (a) Disconnect the S35 and S36 connectors from the stabilizer control ECU.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

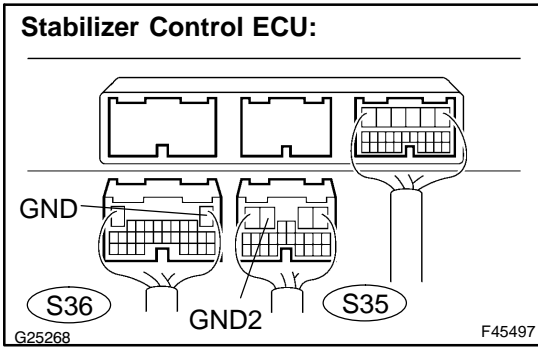
Tester connection (Symbols)	Condition	Specified condition
S35-6 (IG2) - S36-1 (GND)	IG switch on	10 to 14 V
S35-6 (IG2) - S35-5 (GND2)	IG switch on	10 to 14 V

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-1 (GND) - Body ground	Always	Below 1 Ω
S35-5 (GND2) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - BODY GROUND)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - J31 J/C)

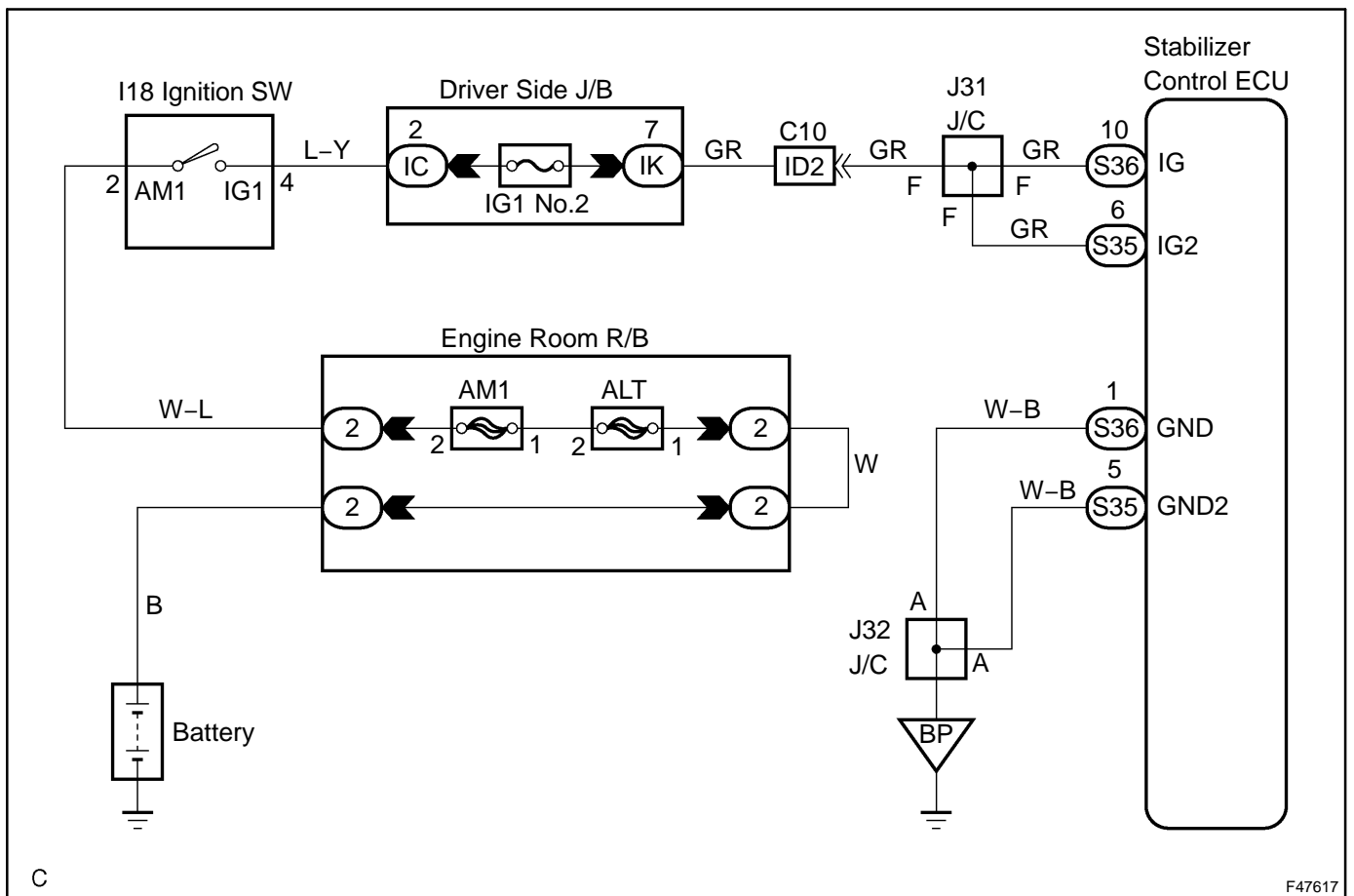
DTC	C1774/74	LOW BATTERY POSITIVE VOLTAGE
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CIRCUIT DESCRIPTION

The stabilizer control ECU recognizes the ignition switch ON signal based on voltage input to terminal IG. It also activates the system based on voltage input to terminal IG2.

DTC No.	DTC Detecting Condition	Trouble Area
C1774/74	Voltage of terminals IG and IG2 is 10.0 V or less for 0.5 sec. with the ignition switch on. ("ON" status of the ignition switch is recognized when the IG terminal voltage reaches 10.0 V.)	<ul style="list-style-type: none"> • Wire harness • Stabilizer control ECU

WIRING DIAGRAM



C

F47617

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
- (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

KDSS:

Item	Measurement Item/ Range (Display)	Normal Condition
IG VOLTAGE	IG Power Source Voltage (Terminal IG)/min.: 0 V, max.: 25.5 V	Actual IG power source voltage 10 to 14 V
POWER VOLTAGE	+B Power Source Voltage (Terminal IG2)/min.: 0 V, max.: 25.5 V	Actual +B power source voltage 10 to 14 V

- (d) Check the voltage.

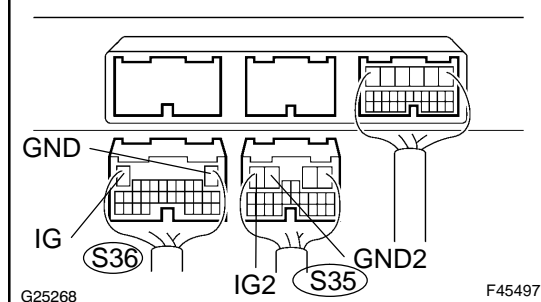
Standard:
10 to 14 V

OK → **REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

2 INSPECT STABILIZER CONTROL ECU

Stabilizer Control ECU:



- (a) Disconnect the S36 and S35 connectors from the stabilizer control ECU.
- (b) Measure the voltage according to the value(s) in the table below.

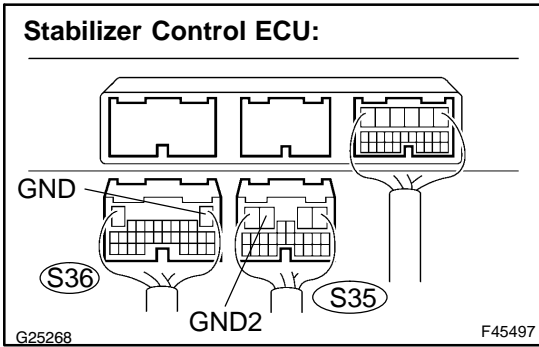
Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-10 (IG) - S36-1 (GND)	IG switch on	10 to 14 V
S36-10 (IG) - S35-5 (GND2)	IG switch on	10 to 14 V
S35-6 (IG2) - S36-1 (GND)	IG switch on	10 to 14 V
S35-6 (IG2) - S35-5 (GND2)	IG switch on	10 to 14 V

OK → **REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-1 (GND) - Body ground	Always	Below 1 Ω
S35-5 (GND2) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - BODY GROUND)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - BATTERY)

DTC	C1776/76	WHEEL SPEED SENSOR MALFUNCTION
DTC	C1794/94	RH FRONT WHEEL SPEED CIRCUIT MALFUNCTION (TEST DIAGNOSIS)
DTC	C1795/95	LH FRONT WHEEL SPEED CIRCUIT MALFUNCTION (TEST DIAGNOSIS)

CIRCUIT DESCRIPTION

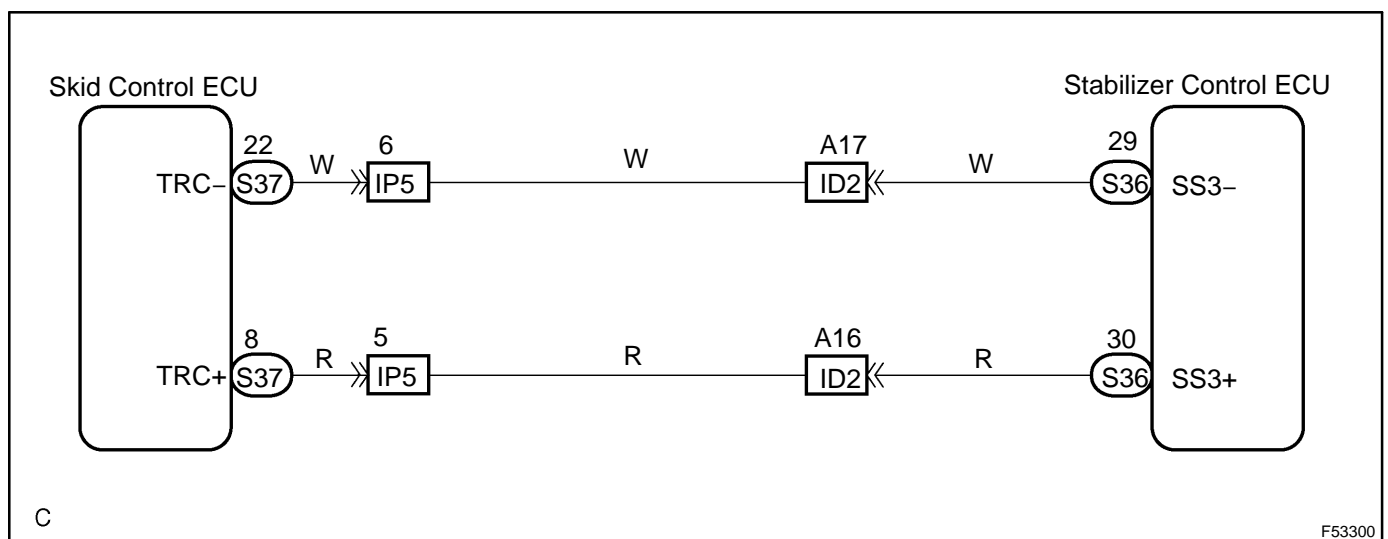
The speed sensors monitor the speed of the front wheels, and send appropriate speed signals to the stabilizer control ECU through the skid control ECU.

If trouble occurs either in the right front or left front speed sensor, the DTC (C1776/76) is output.

When inspecting in test mode, the stabilizer control ECU scans changes of the signals. If there is no change, the ECU outputs the test DTC (C1794/94, C1795/95).

DTC No.	DTC Detecting Condition	Trouble Area
C1776/76	One signal detects a vehicle speed of 19 mph (30 km/h), and the other detects a vehicle speed of 0 mph (0 km/h) for 100 seconds.	<ul style="list-style-type: none"> • Wire harness • RH and LH front speed sensors • Skid control ECU • Stabilizer control ECU
C1794/94	During test mode, a vehicle speed of 12 mph (20 km/h) or higher is not detected.	<ul style="list-style-type: none"> • Wire harness • RH front speed sensor • Skid control ECU • Stabilizer control ECU
C1795/95	During test mode, a vehicle speed of 12 mph (20 km/h) or higher is not detected.	<ul style="list-style-type: none"> • Wire harness • LH front speed sensor • Skid control ECU • Stabilizer control ECU

WIRING DIAGRAM



C

F53300

INSPECTION PROCEDURE

HINT:

Proceed to troubleshooting by following the flow chart, regardless of whether or not DTC C1776/76, C1794/94 or C1795/95 is displayed.

1 CHECK OTHER DTC OUTPUT

(a) Check if DTC C0200/31 or C0205/32 is output.

Result:

DTC Condition	Proceed to
No output	A
C0200/31 or C0205/32 is output	B

HINT:

- If any other codes besides C1776/76, C1794/94 and C1795/95 are output, perform troubleshooting for those DTCs first.
- DTC C0200/31 indicates a right front speed sensor circuit malfunction for the ABS with EBD & BA & TRAC & VSC system.
- DTC C0205/32 indicates a left front speed sensor circuit malfunction for the ABS with EBD & BA & TRAC & VSC system.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

HINT:

Start the inspection from step 2 when using the hand-held tester, and start from step 3 when not using the hand-held tester.

2 READ VALUE ON HAND-HELD TESTER

- (a) Connect the the hand-held tester to the DLC3.
 (b) Turn the ignition switch to the ON position and turn the hand-held tester main switch on.
 (c) Select the item below in the DATA LIST and read its value displayed on the hand-held tester.

KDSS:

Item	Measurement Item/Range (Display)	Normal Condition
FR WHEEL SPD	FR Wheel Speed/min.: 0 km/h, max.: 255 km/h	Actual vehicle speed
FL WHEEL SPD	FL Wheel Speed/min.: 0 km/h, max.: 255 km/h	Actual vehicle speed

- (d) Check that there is no difference between the value output from the speed sensor displayed on the hand-held tester and the value displayed on the speedometer while driving the vehicle.

OK:

There is almost no difference in the displayed speed values.

HINT:

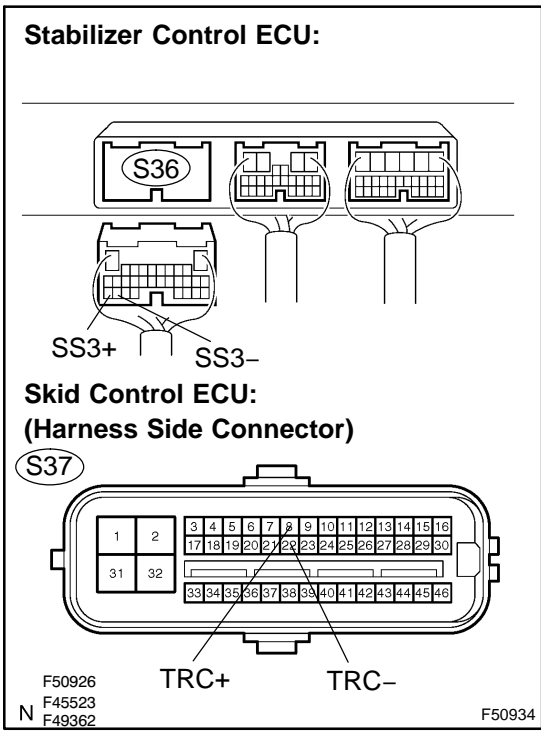
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - SKID CONTROL ECU)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Disconnect the S37 connector from the skid control ECU.
- (c) Measure the resistance according to the value(s) in the table below.

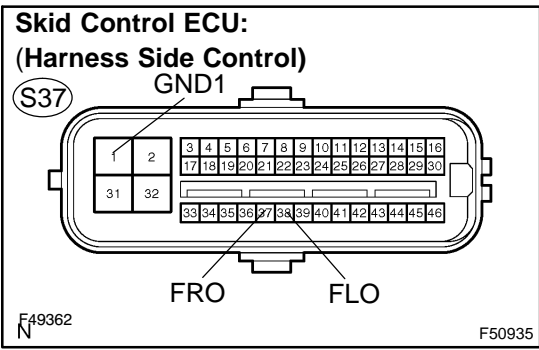
Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-29 (SS3-) - S37-22 (TRC-)	Always	Below 1 Ω
S36-30 (SS3+) - S37-8 (TRC+)	Always	Below 1 Ω
S36-29 (SS3-) - Body ground	Always	10 kΩ or higher
S36-30 (SS3+) - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - SKID CONTROL ECU)**

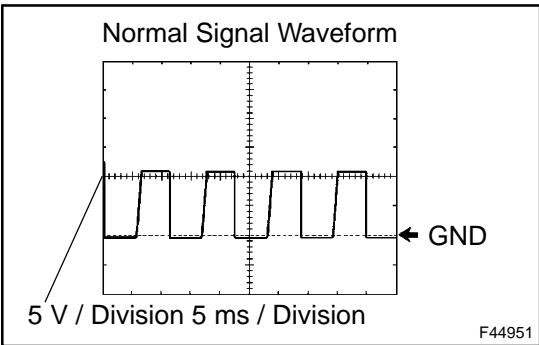
OK

4 INSPECT SKID CONTROL ECU(FLO, FRO OUTPUT)



- (a) Connect the S36 connector to the stabilizer control ECU.
- (b) Connect the S37 connector to the skid control ECU.
- (c) Turn the ignition switch to the ON position.
- (d) Check output waveform.
 - (1) Using an oscilloscope, connect the terminals, as shown in the chart.

Measure Point	Tester Connection (Symbols)
Front RH	S37-37 (FRO) - S37-1 (GND1)
Front LH	S37-38 (FLO) - S37-1 (GND1)



- (2) Drive the vehicle at approximately 12 mph (20 km/h), and check the output waveform.

OK:
The output waveform appears as shown in the illustration.

Item	Contents
Tool setting	5 V / DIV, 5 ms / DIV
Vehicle condition	While driving the vehicle at approx. 12 mph (20 km/h)

HINT:

As vehicle speed increases, the waveform cycle narrows.

NG **REPLACE SKID CONTROL ECU (SEE PAGE 32-23)**

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

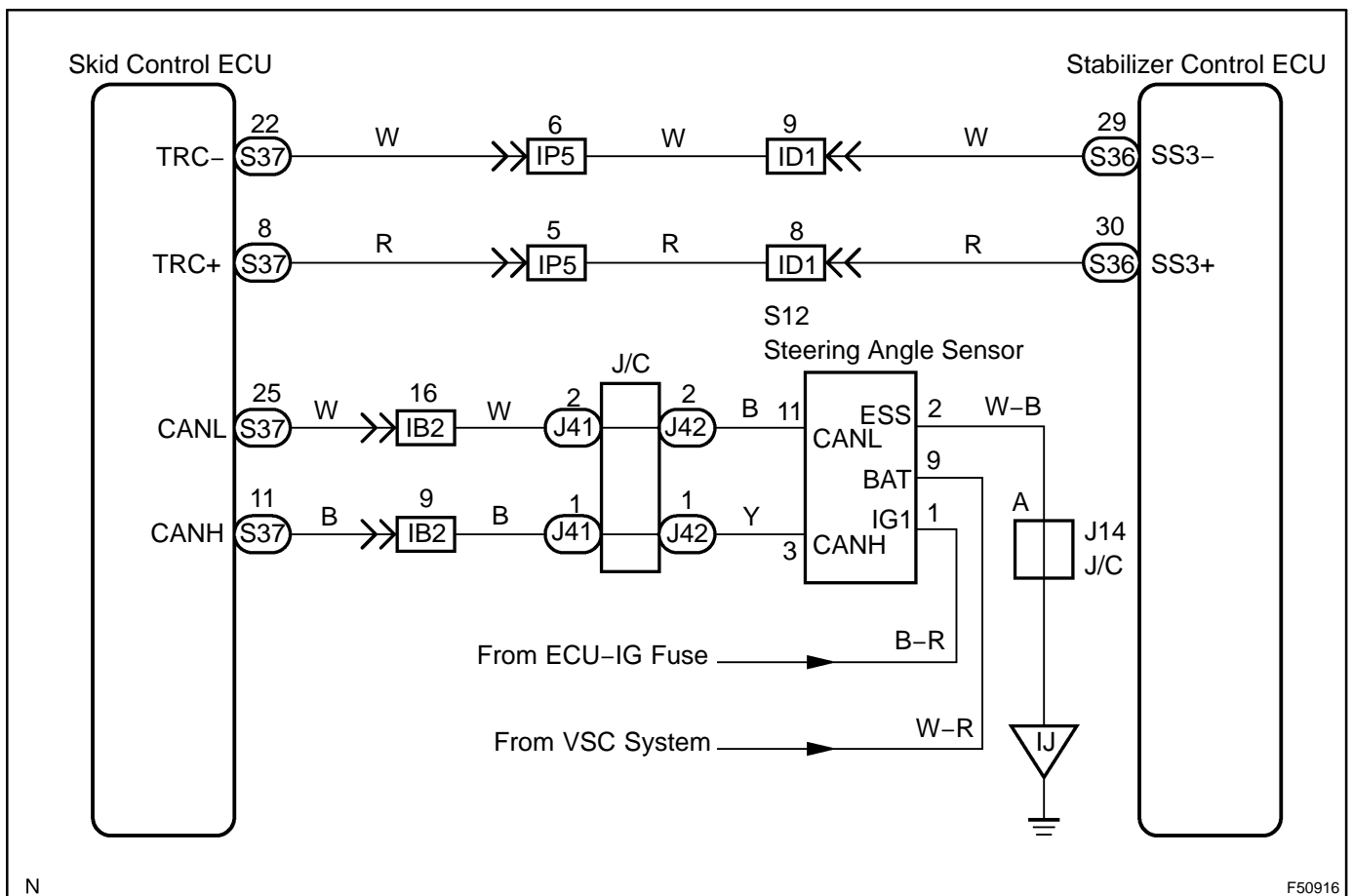
DTC	C1777/77	STEERING SENSOR SIGNAL MALFUNCTION
------------	-----------------	---

CIRCUIT DESCRIPTION

The steering angle sensor signal is sent to the skid control ECU through the CAN communication system. When there is a malfunction in the communication, it will be detected by the diagnosis function.

DTC No.	DTC Detecting Condition	Trouble Area
C1777/77	A communication error resulting from the steering angle sensor continues for 5 sec. with the ignition switch on.	<ul style="list-style-type: none"> • Wire harness • Steering angle sensor • Skid control ECU • Stabilizer control ECU • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DIAGNOSTIC CODE OUTPUT

Check the DTC (CAN communication, brake, and kinetic codes).

Result:

Only C1777/77 is output.	A
<ul style="list-style-type: none"> • C1777/77, CAN communication system DTC and brake system DTC are output. • C1777/77 and CAN communication system DTC are output. 	B
Brake system DTC is output.	C

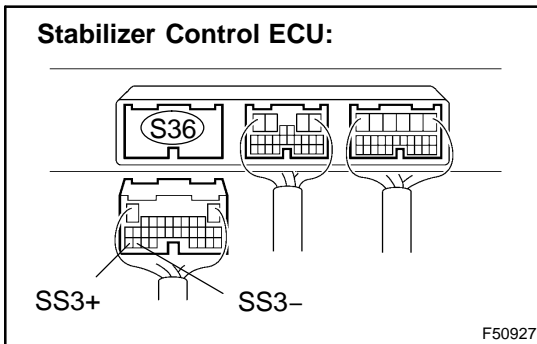
B REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE [05-2320](#))

C REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE [05-728](#))

A

2 INSPECT STABILIZER CONTROL ECU(STEERING ANGLE SENSOR INPUT SIGNAL) (SEE PAGE xx-xxx)

Stabilizer Control ECU:



- Disconnect the S36 connector from the stabilizer control ECU.
- Turn the ignition switch to the ON position.
- Check the signal waveform between terminals SS3+ and SS3- conditions below.

Standard:

Tester Connection (Symbols)	Condition	Specified Condition
S36-29 (SS3-) - Body ground	IG switch ON	1.65 V or less ⇔ 3.15 V or more
S36-30 (SS3+) - Body ground	IG switch ON	1.65 V or less ⇔ 3.15 V or more

HINT:

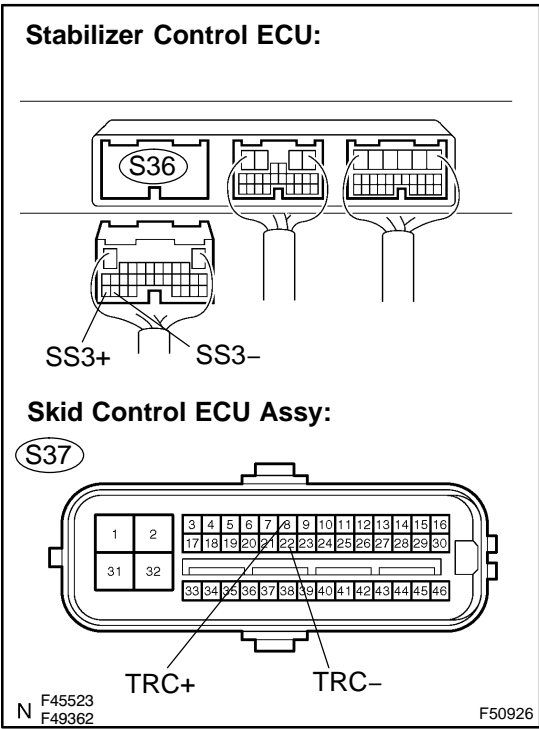
If the voltage is stuck at 1.65 or 3.15 V or changes between 1.65 and 3.15 V, an error is determined.

NG → Go to step 3

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

3 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU - STABILIZER CONTROL ECU)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Disconnect the S37 connector from the skid control ECU.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection (Symbols)	Condition	Specified Condition
S36-29 (SS3-) - S37-22 (TRC-)	Always	Below 1 Ω
S36-30 (SS3+) - S37-8 (TRC+)	Always	Below 1 Ω
S36-29 (SS3-) - Body ground	Always	10 kΩ or higher
S36-30 (SS3+) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - STABILIZER CONTROL ECU)

OK

REPLACE SKID CONTROL ECU (SEE PAGE 32-23)

DTC	C1782/82	STOP LIGHT SWITCH CIRCUIT MALFUNCTION (TEST DIAGNOSIS)
------------	-----------------	---

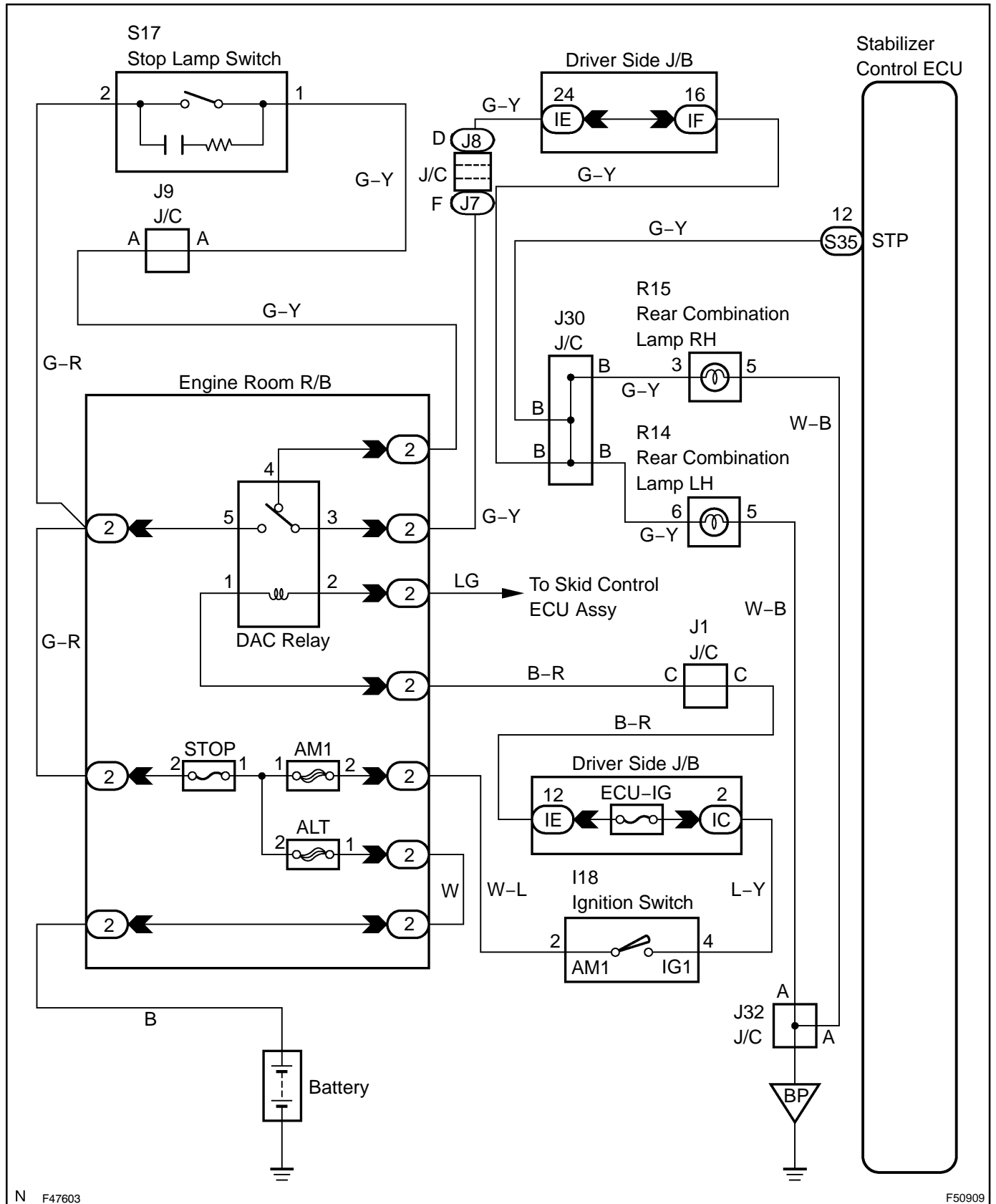
CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop lamps come on and the signal is sent to the STP terminal of the stabilizer control ECU.

When inspecting in test mode, the stabilizer control ECU scans changes of the signals. If there is no change, the ECU outputs the test DTC (C1782/82).

DTC No.	DTC Detecting Condition	Trouble Area
C1782/82	The signal from the stop lamp switch assy does not change in the test mode.	<ul style="list-style-type: none"> • Wire harness • Stop lamp switch assy • Stabilizer control ECU

WIRING DIAGRAM



N F47603

F50909

INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT

- (a) Check if DTC C1380/64 is output.

Result:

DTC Condition	Proceed to
No output	A
C1380/64 is output	B

HINT:

- If C1380/64 besides C1782/82 is output, perform troubleshooting for the DTC first.
- DTC C1380/64 indicates a stop light operation relay malfunction for the ABS with EBD & BA & TRAC & VSC system.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

2 CHECK STOP LAMP SWITCH OPERATION

- (a) Check that the stop lamps come on when the brake pedal is depressed and go off when the brake pedal is released.

OK:

Stop lamp switch functions normally.

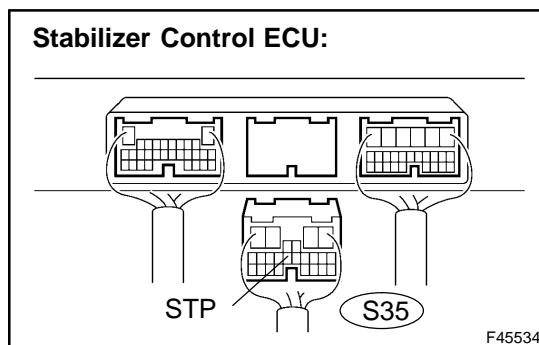
NG

Go to step 4

OK

3 INSPECT STABILIZER CONTROL ECU

Stabilizer Control ECU:



- (a) Disconnect the S35 connector from the stabilizer control ECU.

- (b) Measure the voltage according to the value(s) in the table below.

Standard:

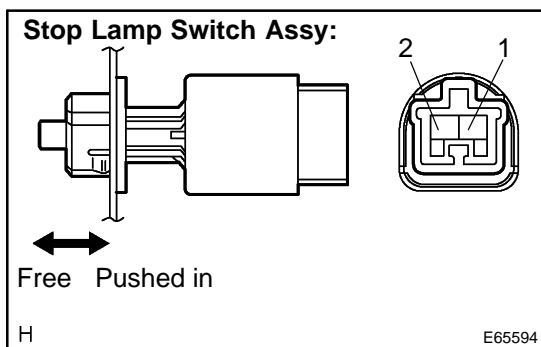
Tester connection (Symbols)	Condition	Specified condition
S35-12 (STP) - Body ground	Brake pedal depressed	10 to 14 V
S35-12 (STP) - Body ground	Brake pedal released	Below 1 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - J30 J/C)

OK

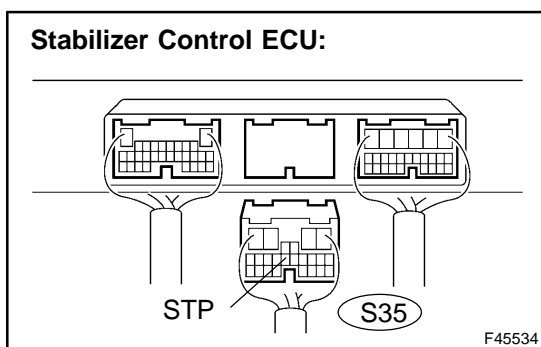
REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

4 INSPECT STOP LAMP SWITCH ASSY

- Disconnect the S17 connector from the stop lamp switch assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

Switch Condition	Tester Connection	Specified Condition
Switch pin free	1 - 2	Below 1 Ω
Switch pin pushed in	1 - 2	10 k Ω or higher

NG**REPLACE STOP LAMP SWITCH ASSY
(SEE PAGE 32-10)****OK****5 INSPECT STABILIZER CONTROL ECU**

- Disconnect the S35 connector from the stabilizer control ECU.
- Measure the voltage according to the value(s) in the table below.

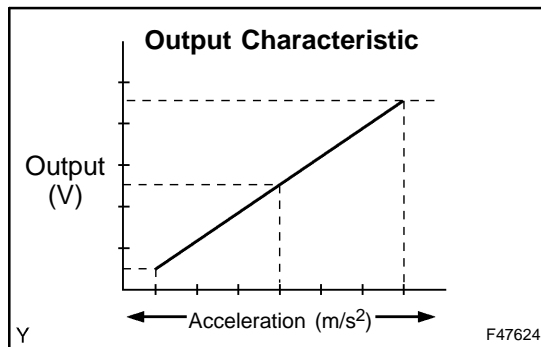
Standard:

Tester connection (Symbols)	Condition	Specified condition
S35-12 (STP) - Body ground	Brake pedal depressed	10 to 14 V
S35-12 (STP) - Body ground	Brake pedal released	Below 1 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR (STABILIZER CONTROL ECU - BATTERY)****OK****REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)**

DTC	C1811/11	ACCELERATION SENSOR MALFUNCTION
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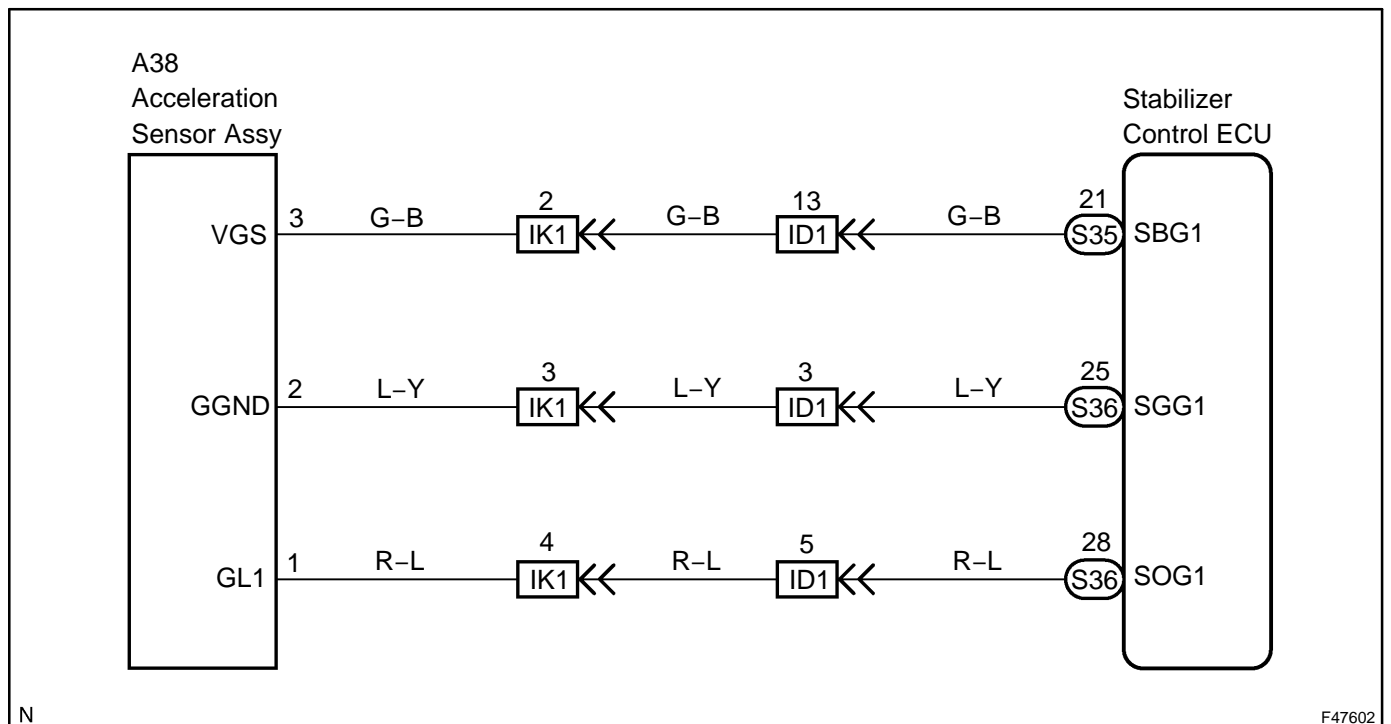
CIRCUIT DESCRIPTION



The acceleration sensor detects the left and right acceleration of the vehicle. When the vehicle accelerates, the acceleration sensor tilts, thus changing its resistance. The resistance is then converted into an electrical signal in order to output the voltage that is proportionate to the acceleration.

DTC No.	DTC Detecting Condition	Trouble Area
C1811/11	Any of the following conditions continues for 1 second with the ignition switch on: 1. Sensor power source voltage (SBG1 terminal) is 4.3 V or less. 2. Sensor power source voltage (SBG1 terminal) is 5.5 V or more. 3. Sensor output (SOG1 terminal) is -1.63 G or less. 4. Sensor output (SOG1 terminal) is 1.63 G or more.	<ul style="list-style-type: none"> • Wire harness • Acceleration sensor assy • Stabilizer control ECU

WIRING DIAGRAM



N

F47602

INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT

(a) Check if DTC C1761/61 or C1774/74 is output.

Result:

DTC Condition	Proceed to
No output	A
C1761/61 or C1774/74 is output	B

HINT:

- If any other codes besides C1811/11 are output, perform troubleshooting for those DTCs first.
- DTC C1761/61 indicates a KDSS ECU malfunction.
- DTC C1774/74 indicates a low battery positive voltage malfunction.
- If DTCs C1761/61 and C1774/74 are output at the same time, perform troubleshooting necessary for DTC C1774/74 first.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

HINT:

Start the inspection from step 2 when using the hand-held tester, and start from step 3 when not using the hand-held tester.

2 READ VALUE ON HAND-HELD TESTER

- Connect the the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
- Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.
- Check the acceleration.

KDSS:

Item	Measurement Item/ Range (Display)	Normal Condition
ACCELERATE SENS	Acceleration sensor/ min.: -1176.33 m/sec ² , max.: 1176.37 m/sec ²	Approx. -0.98 to 0.98 m/sec ² (when vehicle is stationary)

Standard:

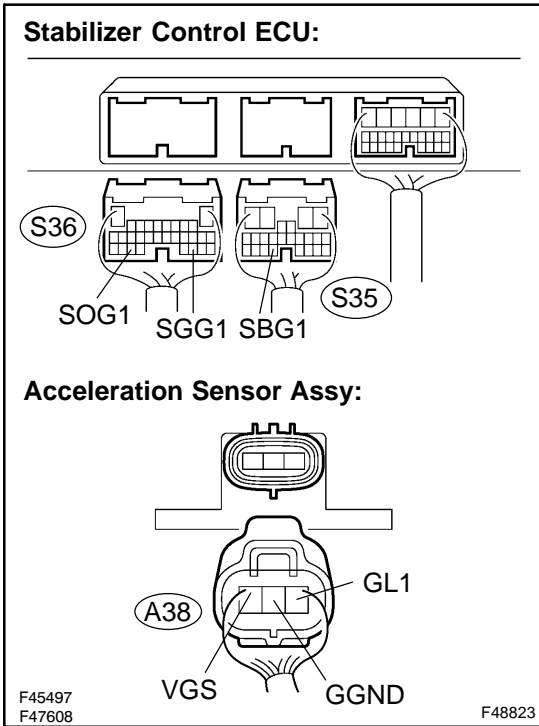
The value displayed on the tester is approx. -0.98 to 0.98 m/sec² when the vehicle is stationary.

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - ACCELERATION SENSOR ASSY)



- (a) Disconnect the S35 and S36 connectors from the stabilizer control ECU.
- (b) Disconnect the A38 connector from the acceleration sensor assy.
- (c) Measure the resistance according to the value(s) in the table below.

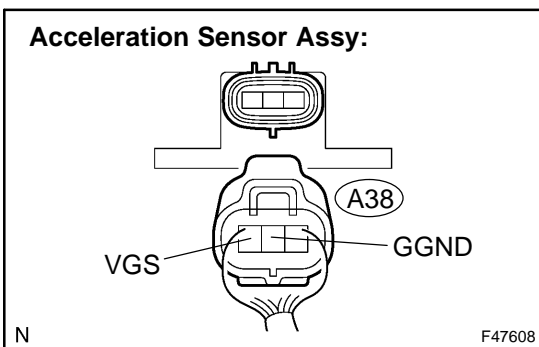
Standard:

Tester connection (Symbols)	Condition	Specified condition
S35-21 (SBG1) - A38-3 (VGS)	Always	Below 1 Ω
S36-25 (SGG1) - A38-2 (GGND)	Always	Below 1 Ω
S36-28 (SOG1) - A38-1 (GL1)	Always	Below 1 Ω
S35-21 (SBG1) - Body ground	Always	10 kΩ or higher
S36-25 (SGG1) - Body ground	Always	10 kΩ or higher
S36-28 (SOG1) - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT STABILIZER CONTROL ECU



- (a) Connect the S35 and S36 connectors to the stabilizer control ECU.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

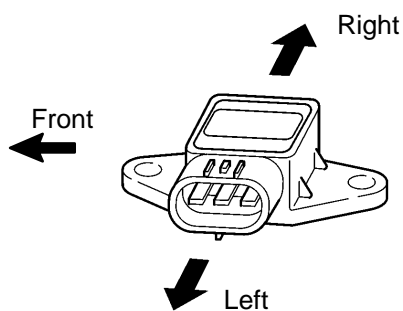
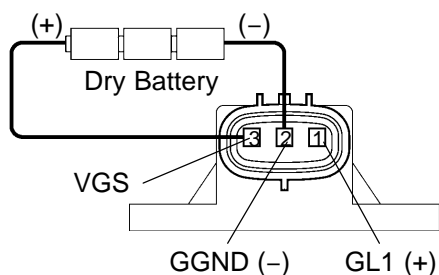
Tester connection (Symbols)	Condition	Specified condition
A38-3 (VGS) - A38-2 (GGND)	IG switch on	4.4 to 5.4 V

NG → **REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)**

OK

5 INSPECT ACCELERATION SENSOR ASSY

Acceleration Sensor Assy:

C91693
C65181

F41635

- Check that the sensor bracket is not deformed.
- Remove the acceleration sensor assy.
- Connect 3 dry batteries of 1.5 V in series.
- Connect terminal 3 (VGS) to the battery positive (+) terminal, and terminal 2 (GGND) to the battery negative (-) terminal, then measure the voltage between terminals 1 (GL1) and 2 (GGND) in the following conditions.

Standard:

Sensor condition	Voltage
Sensor stationary	Approx. 2.3 V
Tilted to the left or right of the vehicle	Changes between approx. 0.4 and 4.0 V

NOTICE:

- Do not apply more than 6 V.
- Do not drop the acceleration sensor assy. If it is dropped, replace it with a new one.
- Never place the acceleration sensor assy removed from the vehicle upside down.
- To prevent deformation of the bracket, do not apply excessive force when assembling the RR console box assy.

HINT:

When the acceleration sensor assy is tilted, it may output a different value.

NG
**REPLACE ACCELERATION SENSOR ASSY
(SEE PAGE 25-61)**

HINT:

When replacing the acceleration sensor assy, perform the zero point calibration of the acceleration sensor assy (see page 05-566).

OK
REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

DTC	C1812/12	PRESSURE SENSOR MALFUNCTION/UPSIDE
------------	-----------------	---

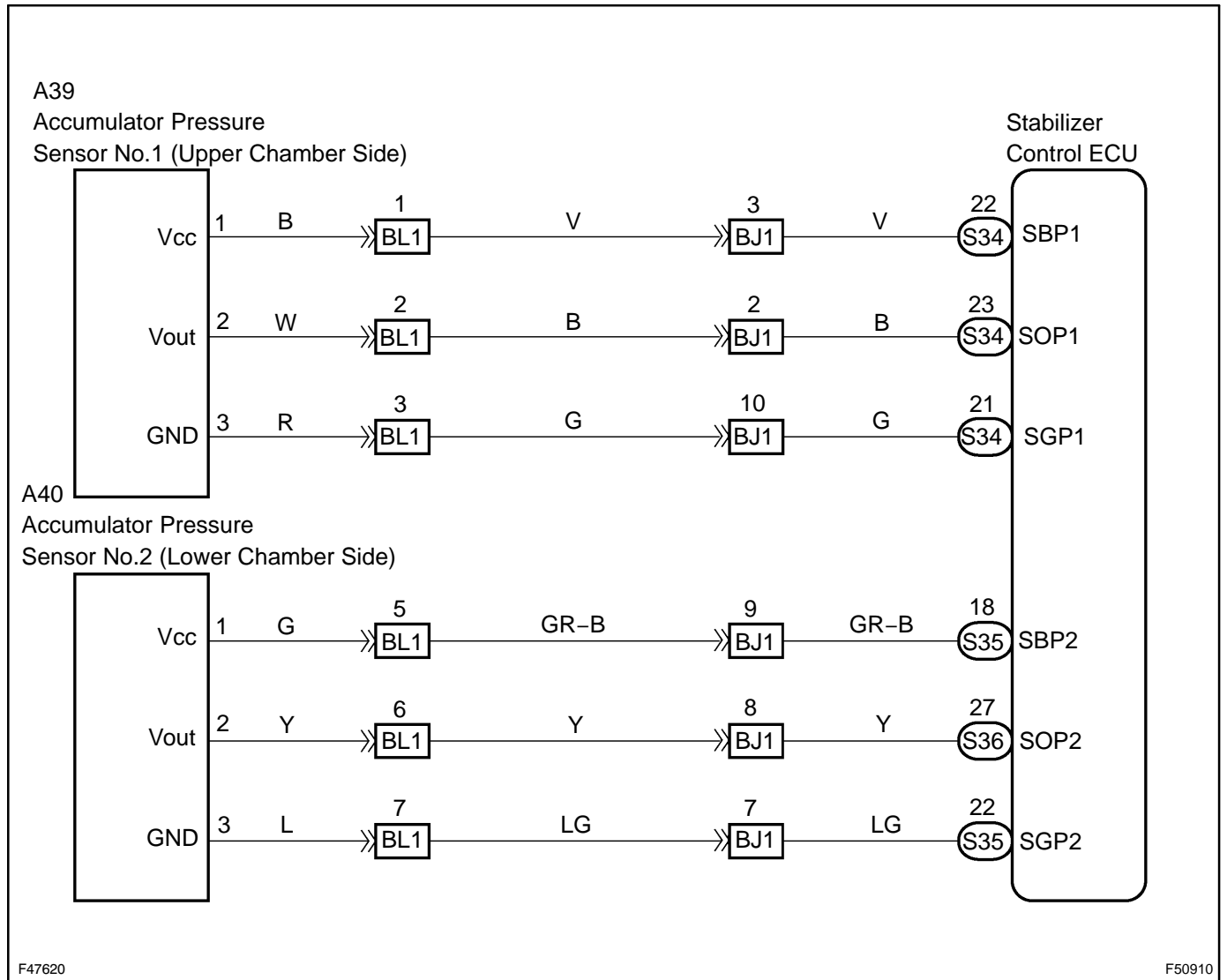
DTC	C1813/13	PRESSURE SENSOR MALFUNCTION/DOWNSIDE
------------	-----------------	---

CIRCUIT DESCRIPTION

- The accumulator pressure sensors are located in the upper and lower chambers of the cylinder. This sensor detects the pressure in the hydraulic circuit and sends a signal to the stabilizer control ECU.
- This DTC indicates a malfunction in the accumulator pressure sensor and does not indicate abnormal pressure in the hydraulic circuit.

DTC No.	DTC Detecting Condition	Trouble Area
C1812/12	Any of the following conditions continues for 1 second with the ignition switch on: 1. Sensor power source voltage (SBP1 terminal) is 4.3 V or less. 2. Sensor power source voltage (SBP1 terminal) is 5.5 V or more. 3. Sensor output (SOP1 terminal) is 0.3 V or less. 4. Sensor output (SOP1 terminal) is 4.7 V or more.	<ul style="list-style-type: none"> • Wire harness • Accumulator pressure sensor • Stabilizer control ECU
C1813/13	Any of the following conditions continues for 1 second with the ignition switch on: 1. Sensor power source voltage (SBP2 terminal) is 4.3 V or less. 2. Sensor power source voltage (SBP2 terminal) is 5.5 V or more. 3. Sensor output (SOP2 terminal) is 0.3 V or less. 4. Sensor output (SOP2 terminal) is 4.7 V or more.	<ul style="list-style-type: none"> • Wire harness • Accumulator pressure sensor • Stabilizer control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT

(a) Check if DTC C1761/61 or C1774/74 is output.

Result:

DTC Condition	Proceed to
No output	A
C1761/61 or C1774/74 is output	B

HINT:

- If any other codes besides C1812/12 and C1813/13 are output, perform troubleshooting for those DTCs first.
- DTC C1761/61 indicates a KDSS ECU malfunction.
- DTC C1774/74 indicates a low battery positive voltage malfunction.
- If DTCs C1761/61 and C1774/74 are output at the same time, perform troubleshooting necessary for DTC C1774/74 first.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

HINT:

Start the inspection from step 2 when using the hand-held tester, and start from step 3 when not using the hand-held tester.

2 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
 (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

KDSS:

Item	Measurement Item/ Range (Display)	Normal Condition
ACC PRESS (UP)	Accumulator Pressure Sensor (Upside)/ min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20°C
ACC PRESS (DWN)	Accumulator Pressure Sensor (Downside)/ min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20°C

(d) Check the pressure.

Standard:

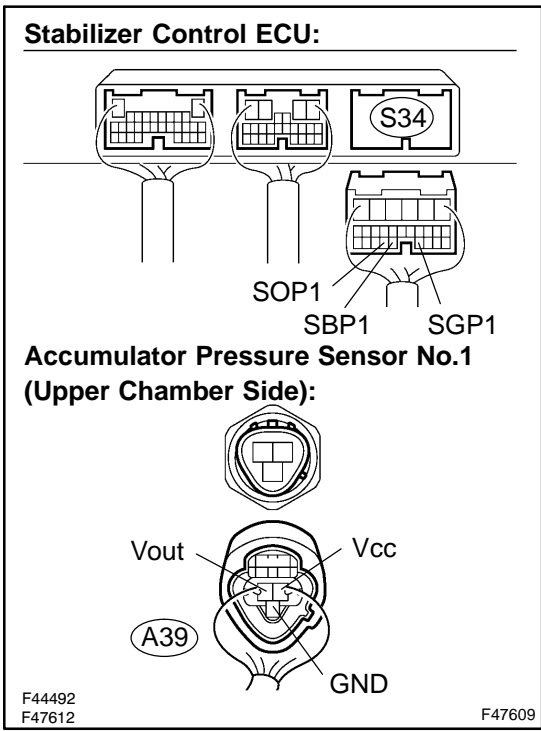
2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20°C

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - ACCUMULATOR PRESSURE SENSOR)

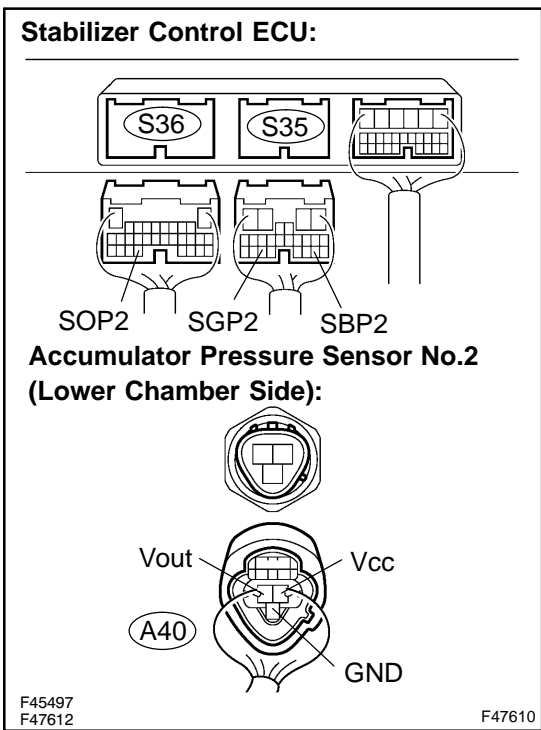


- (a) Disconnect the S34, S35 and S36 connectors from the stabilizer control ECU.
- (b) Disconnect the A39 and A40 connectors from the accumulator pressure sensors.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Accumulator pressure sensor No.1 (Upper Chamber Side):

Tester connection (Symbols)	Condition	Specified condition
S34-21 (SGP1) - A39-3 (GND)	Always	Below 1 Ω
S34-22 (SBP1) - A39-1 (Vcc)	Always	Below 1 Ω
S34-23 (SOP1) - A39-2 (Vout)	Always	Below 1 Ω
S34-21 (SGP1) - Body ground	Always	10 kΩ or higher
S34-22 (SBP1) - Body ground	Always	10 kΩ or higher
S34-23 (SOP1) - Body ground	Always	10 kΩ or higher



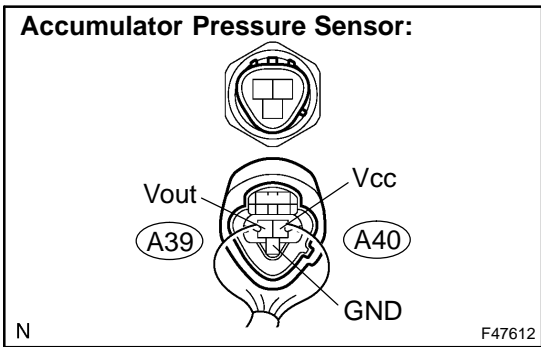
Accumulator pressure sensor No.2 (Lower Chamber Side):

Tester connection (Symbols)	Condition	Specified condition
S35-18 (SBP2) - A40-1 (Vcc)	Always	Below 1 Ω
S35-22 (SGP2) - A40-3 (GND)	Always	Below 1 Ω
S36-27 (SOP2) - A40-2 (Vout)	Always	Below 1 Ω
S35-18 (SBP2) - Body ground	Always	10 kΩ or higher
S35-22 (SGP2) - Body ground	Always	10 kΩ or higher
S36-27 (SOP2) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT STABILIZER CONTROL ECU



- (a) Connect the S34, S35 and S36 connectors to the stabilizer control ECU.
- (b) Measure the voltage according to the value(s) in the table below.

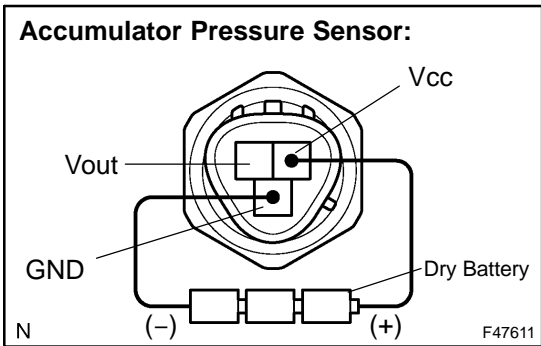
Standard:

Tester connection (Symbols)	Condition	Specified condition
A39-1 (Vcc) - A39-3 (GND)	IG switch on	4.4 to 5.4 V
A40-1 (Vcc) - A40-3 (GND)	IG switch on	4.4 to 5.4 V

NG → **REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)**

OK

5 INSPECT ACCUMULATOR PRESSURE SENSOR



- (a) Connect 3 dry batteries of 1.5 V in series.
- (b) Connect terminal 1 (Vcc) to the battery positive (+) terminal, and terminal 3 (GND) to the battery negative (-) terminal, then measure the voltage between terminals 2 (Vout) and 3 (GND) in the following conditions.

Standard:

Sensor condition	Voltage
Installed in vehicle	Approx. 0.4 to 4.6 V

NOTICE:

Do not apply more than 6 V.

NG → **REPLACE ACCUMULATOR PRESSURE SENSOR (SEE PAGE 25-48)**

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

DTC	C1831/31	ACCUMULATOR SOLENOID MALFUNCTION/UPSIDE
------------	-----------------	--

DTC	C1832/32	ACCUMULATOR SOLENOID MALFUNCTION/DOWNSIDE
------------	-----------------	--

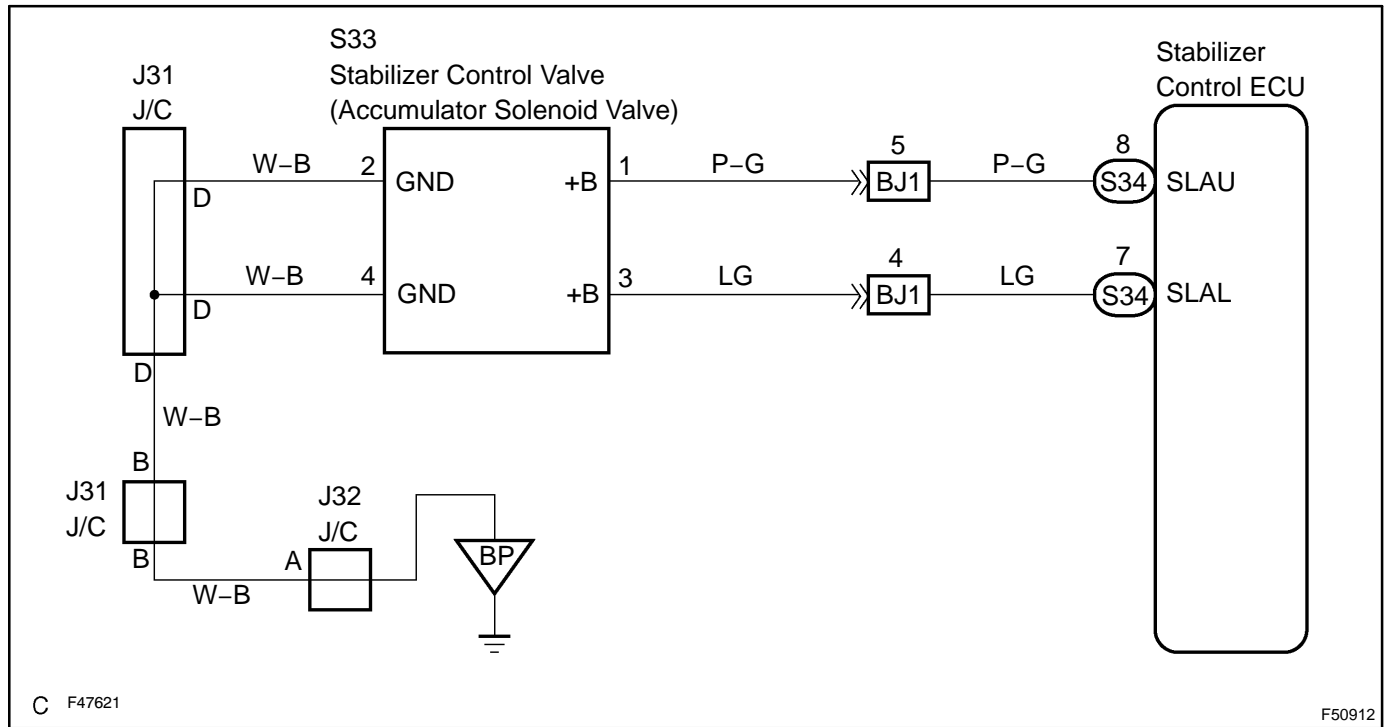
CIRCUIT DESCRIPTION

By receiving signals from the stabilizer control ECU, the accumulator solenoid valve closes to cut the fluid flow to the accumulator (the valve closes when current is applied to the solenoid valve and opens when current is not applied).

The stabilizer control ECU controls the opening/closing of the accumulator solenoid valve based on the vehicle speed, lateral acceleration and steering speed sent from each sensor.

DTC No.	DTC Detecting Condition	Trouble Area
C1831/31	1. When open: An open circuit signal is detected for 1 sec. continuously when current is not applied to the solenoid valve. 2. When short: A short circuit signal is detected for 8 sec. continuously when current is applied to the solenoid valve.	<ul style="list-style-type: none"> • Wire harness • Accumulator solenoid valve (Upper chamber side) • Stabilizer control ECU
C1832/32	1. When open: An open circuit signal is detected for 1 sec. continuously when current is not applied to the solenoid valve. 2. When short: A short circuit signal is detected for 8 sec. continuously when current is applied to the solenoid valve.	<ul style="list-style-type: none"> • Wire harness • Accumulator solenoid valve (Lower chamber side) • Stabilizer control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK OTHER DTC OUTPUT

- (a) Check if DTC C1761/61 or C1774/74 is output.

Result:

DTC Condition	Proceed to
No output	A
C1761/61 or C1774/74 is output	B

HINT:

- If any other codes besides C1831/31 and C1832/32 are output, perform troubleshooting for those DTCs first.
- DTC C1761/61 indicates a KDSS ECU malfunction.
- DTC C1774/74 indicates a low battery positive voltage malfunction.
- If DTCs C1761/61 and C1774/74 are output at the same time, perform troubleshooting necessary for DTC C1774/74 first.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

HINT:

Start the inspection from step 2 when using the hand-held tester, and start from step 3 when not using the hand-held tester.

2 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
 (c) Select the item below in the ACTIVE TEST, and operate it with the hand-held tester.

KDSS:

Item	Vehicle Condition/Test Details	Diagnostic Note
ACC VALVE (UP)	Accumulator Valve (Upside)/ON or OFF	-
ACC VALVE (DWN)	Accumulator Valve (Downside)/ON or OFF	-

- (d) Check for an operating sound of the accumulator solenoid valve.

OK:

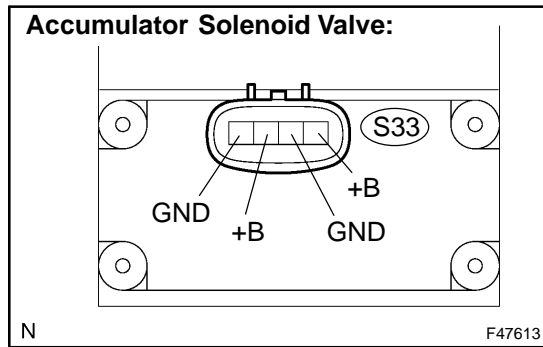
An operating sound (click sound) can be heard.

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 INSPECT ACCUMULATOR SOLENOID VALVE



- Disconnect the S33 connector from the accumulator solenoid valve.
- Measure the resistance according to the value(s) in the table below.

Standard (Upside): C1831/31

Tester connection	Specified condition
S33-1 (+B) - S33-2 (GND)	24.3 to 25.7 Ω

Standard (Downside): C1832/32

Tester connection	Specified condition
S33-3 (+B) - S33-4 (GND)	24.3 to 25.7 Ω

- Upside:
Connect terminal 1 (+B) to the battery positive (+) terminal, and terminal 2 (GND) to the battery negative (-) terminal.
- Downside:
Connect terminal 3 (+B) to the battery positive (+) terminal, and terminal 4 (GND) to the battery negative (-) terminal.
- Check for an operating sound of the accumulator solenoid valve.

OK:

An operating sound (click sound) can be heard.

NG

**REPLACE STABILIZER CONTROL VALVE
(SEE PAGE 25-48)**

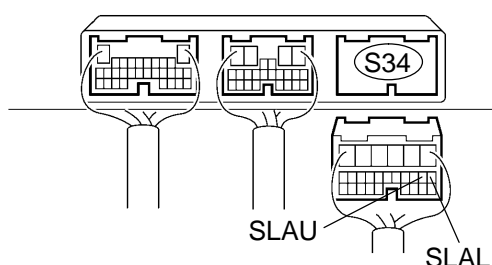
HINT:

The accumulator solenoid valve and stabilizer control valve are supplied as a unit.

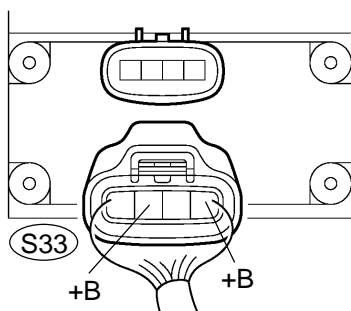
OK

4 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - ACCUMULATOR SOLENOID VALVE)

Stabilizer Control ECU:



Accumulator Solenoid Valve:

F44492
F47614

F47628

- Disconnect the S34 connector from the stabilizer control ECU.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S34-7 (SLAL) - S33-3 (+B)	Always	Below 1 Ω
S34-8 (SLAU) - S33-1 (+B)	Always	Below 1 Ω
S34-7 (SLAL) - Body ground	Always	10 k Ω or higher
S34-8 (SLAU) - Body ground	Always	10 k Ω or higher

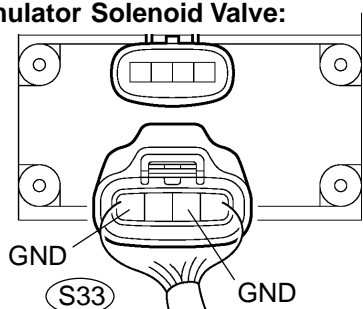
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 CHECK HARNESS AND CONNECTOR(ACCUMULATOR SOLENOID VALVE - BODY GROUND)

Accumulator Solenoid Valve:



N

F47614

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S33-2 (GND) - Body ground	Always	Below 1 Ω
S33-4 (GND) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

DTC	C1851/51	LOW PRESSURE MALFUNCTION IN UPSIDE OF KDSS SYSTEM
------------	-----------------	--

DTC	C1852/52	LOW PRESSURE MALFUNCTION IN DOWNSIDE OF KDSS SYSTEM
------------	-----------------	--

DTC	C1853/53	HIGH PRESSURE MALFUNCTION IN UPSIDE OF KDSS SYSTEM
------------	-----------------	---

DTC	C1854/54	HIGH PRESSURE MALFUNCTION IN DOWNSIDE OF KDSS SYSTEM
------------	-----------------	---

CIRCUIT DESCRIPTION

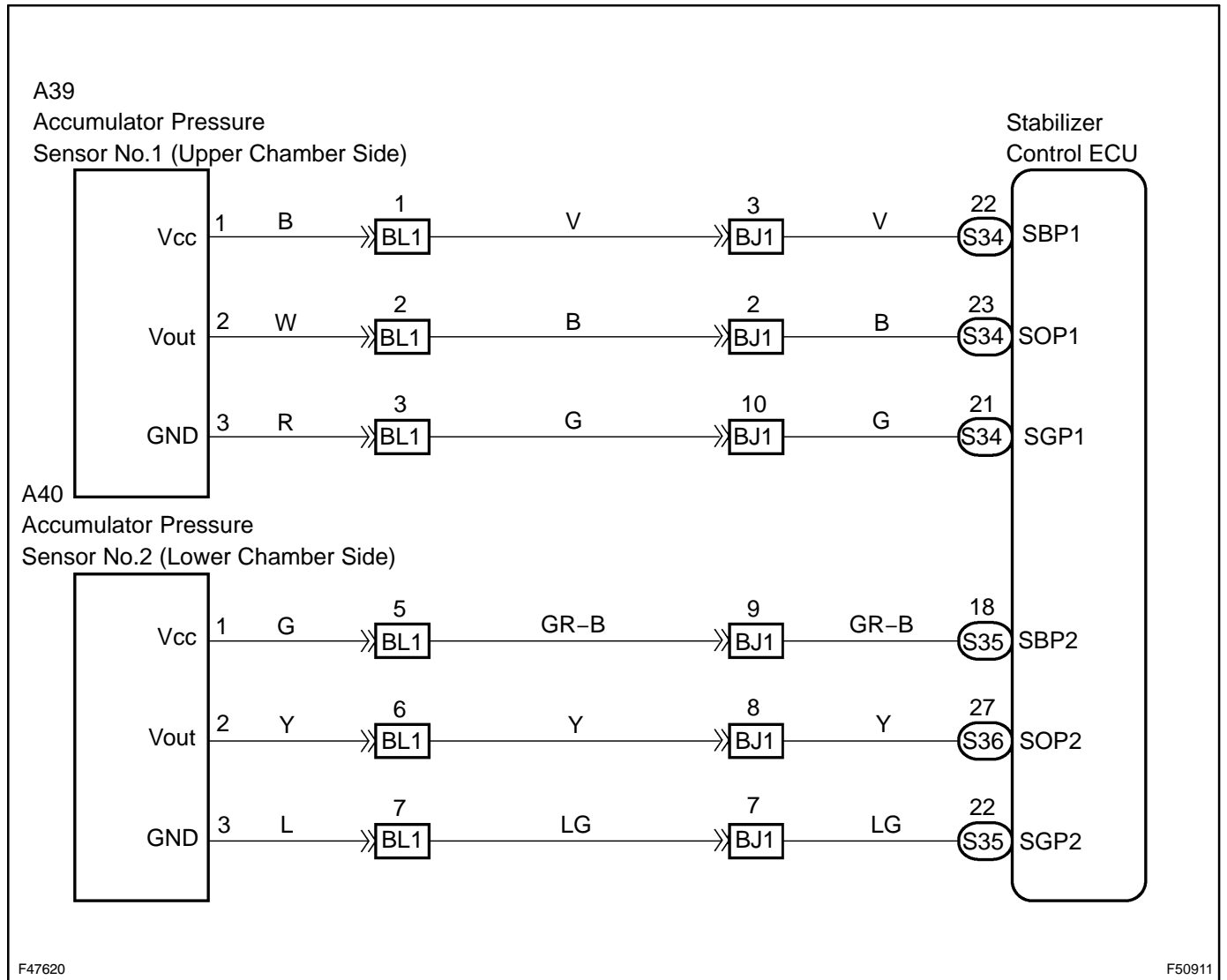
- The accumulator pressure sensor is located in each of the upper and lower chambers of the cylinder. This sensor detects the pressure in the hydraulic circuit and sends a signal to the stabilizer control ECU.
- The stabilizer control ECU turns on the KDSS indicator lamp and stops KDSS control when the accumulator pressure sensor detects abnormal pressure in the hydraulic circuit.

HINT:

This DTC does not indicate a malfunction in an electrical circuit. This DTC is output when the accumulator pressure sensor detects abnormal pressure in a hydraulic circuit.

DTC No.	DTC Detecting Condition	Trouble Area
C1851/51	Sensor output is 0.9 Mpa or less for 5 min. continuously with the ignition switch on.	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor (Upper chamber side) • Stabilizer control ECU
C1852/52	Sensor output is 0.9 Mpa or less for 5 min. continuously with the ignition switch on.	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor (Lower chamber side) • Stabilizer control ECU
C1853/53	Sensor output is 8.8 Mpa or more for 20 min. continuously with the ignition switch on.	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor (Upper chamber side) • Stabilizer control ECU
C1854/54	Sensor output is 8.8 Mpa or more for 20 min. continuously with the ignition switch on.	<ul style="list-style-type: none"> • Hydraulic circuit • Wire harness • Accumulator pressure sensor (Lower chamber side) • Stabilizer control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- When these DTCs are output, perform the hydraulic circuit inspection first by following "HOW TO PROCEED WITH TROUBLESHOOTING" (see page 25-21).
- If the DTCs cannot be erased even after the hydraulic circuit inspection, perform the electrical circuit inspection by following the procedures below.

1 CHECK OTHER DTC OUTPUT

- (a) Check if DTC C1761/61 or C1774/74 is output.

Result:

DTC Condition	Proceed to
No output	A
C1761/61 or C1774/74 is output	B

HINT:

- If any other codes besides C1851/51, C1852/52, C1853/53 and C1854/54 are output, perform troubleshooting for those DTCs first.
- DTC C1761/61 indicates a KDSS ECU malfunction.
- DTC C1774/74 indicates a low battery positive voltage malfunction.
- If DTCs C1761/61 and C1774/74 are output at the same time, perform troubleshooting necessary for DTC C1774/74 first.

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

HINT:

Start the inspection from step 2 when using the hand-held tester, and start from step 3 when not using the hand-held tester.

2 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the ignition switch to the ON position, and turn the hand-held tester main switch on.
 (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

KDSS:

Item	Measurement Item/ Range (Display)	Normal Condition
ACC PRESS (UP)	Accumulator Pressure Sensor (Upside)/ min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20 °C
ACC PRESS (DWN)	Accumulator Pressure Sensor (Downside)/ min.: -784.77 MPa, max.: 784.79 MPa	2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20 °C

- (d) Check the pressure.

Standard:

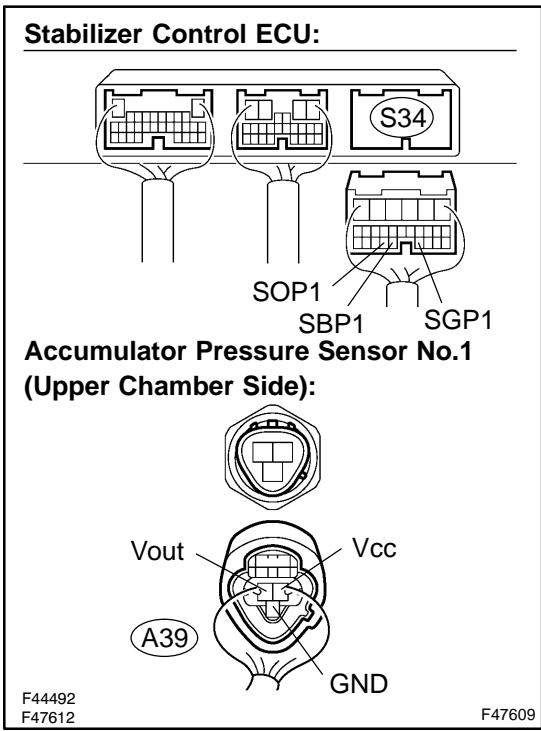
2.6 to 3.0 MPa when vehicle is stopped and fluid temperature is 20 °C

OK

**REPLACE STABILIZER CONTROL ECU
(SEE PAGE 25-62)**

NG

3 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - ACCUMULATOR PRESSURE SENSOR)

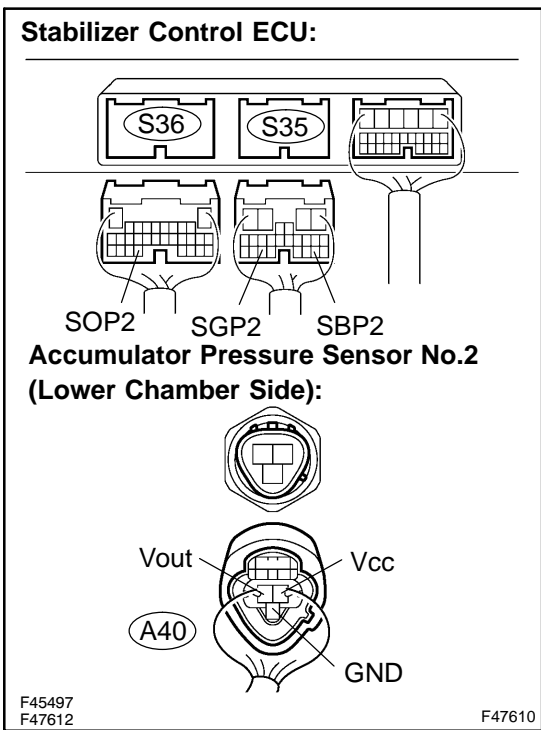


- (a) Disconnect the S34, S35 and S36 connectors from the stabilizer control ECU.
- (b) Disconnect the A39 and A40 connectors from the accumulator pressure sensor.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Accumulator pressure sensor No.1 (Upper Chamber Side):

Tester connection (Symbols)	Condition	Specified condition
S34-21 (SGP1) - A39-3 (GND)	Always	Below 1 Ω
S34-22 (SBP1) - A39-1 (Vcc)	Always	Below 1 Ω
S34-23 (SOP1) - A39-2 (Vout)	Always	Below 1 Ω
S34-21 (SGP1) - Body ground	Always	10 kΩ or higher
S34-22 (SBP1) - Body ground	Always	10 kΩ or higher
S34-23 (SOP1) - Body ground	Always	10 kΩ or higher



Accumulator pressure sensor No.2 (Lower Chamber Side):

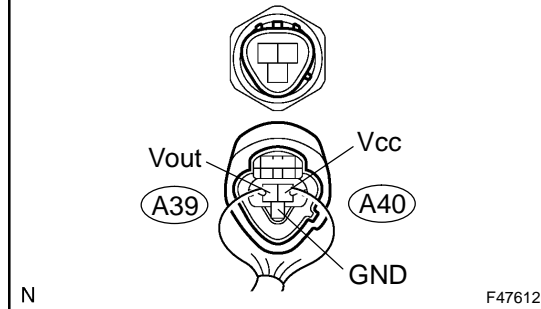
Tester connection (Symbols)	Condition	Specified condition
S35-18 (SBP2) - A40-1 (Vcc)	Always	Below 1 Ω
S35-22 (SGP2) - A40-3 (GND)	Always	Below 1 Ω
S36-27 (SOP2) - A40-2 (Vout)	Always	Below 1 Ω
S35-18 (SBP2) - Body ground	Always	10 kΩ or higher
S35-22 (SGP2) - Body ground	Always	10 kΩ or higher
S36-27 (SOP2) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT STABILIZER CONTROL ECU

Accumulator Pressure Sensor:



- Connect the S34, S35 and S36 connectors to the stabilizer control ECU.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
A39-1 (Vcc) - A39-3 (GND)	IG switch on	4.4 to 5.4 V
A40-1 (Vcc) - A40-3 (GND)	IG switch on	4.4 to 5.4 V

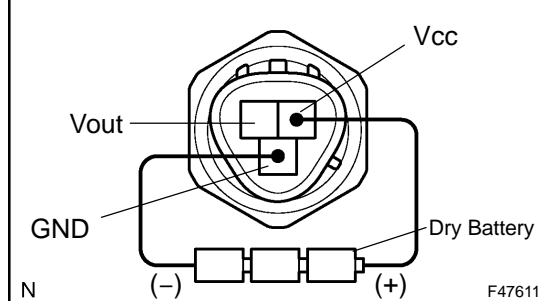
NG

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

OK

5 INSPECT ACCUMULATOR PRESSURE SENSOR

Accumulator Pressure Sensor:



- Connect 3 dry batteries of 1.5 V in series.
- Connect terminal 1 (Vcc) to the battery positive (+) terminal, and terminal 3 (GND) to the battery negative (-) terminal, then measure the voltage between terminals 2 (Vout) and 3 (GND) in the following conditions.

Standard:

Sensor condition	Voltage
Installed in vehicle	Approx. 0.4 to 4.6 V

NOTICE:

Do not apply more than 6 V.

NG

REPLACE ACCUMULATOR PRESSURE SENSOR (SEE PAGE 25-48)

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

DTC	C1779/79	ZERO POINT CALIBRATION OF ACCELERATION SENSOR UNDONE
------------	-----------------	---

CIRCUIT DESCRIPTION

This DTC does not indicate a malfunction. This DTC is stored when the calibration value of the acceleration sensor zero point cannot be obtained.

HINT:

When this DTC is output, obtain the calibration value of the acceleration sensor zero point first.

DTC No.	DTC Detecting Condition	Trouble Area
C1779/79	Acceleration sensor zero point calibration is incomplete with the ignition switch on.	<ul style="list-style-type: none"> • Wire harness • Acceleration sensor assy • Stabilizer control ECU (Acceleration sensor zero point recalibration)

INSPECTION PROCEDURE

1 PERFORM ACCELERATION SENSOR ASSY ZERO POINT CALIBRATION

- (a) Perform the acceleration sensor assy zero point calibration (see page [05-566](#)).

NEXT

2 RECONFIRM DTC

- (a) Check for DTCs (see page [05-578](#)).
 (b) Is DTC C1779/79 output?

NO → **END**

YES

3 CHECK ACCELERATION SENSOR ASSY

- (a) Remove the RR console box assy.
 (b) Check that the acceleration sensor assy is not installed at an angle.

OK:

The acceleration sensor assy is not installed at an angle.

NG → **REPAIR OR REPLACE ACCELERATION SENSOR ASSY**

OK

4 INSPECT ACCELERATION SENSOR ASSY CIRCUIT (SEE PAGE [05-602](#))

NEXT

5 RECONFIRM DTC

- (a) Check for DTCs (see page [05-578](#)).
(b) Is DTC C1779/79 output?

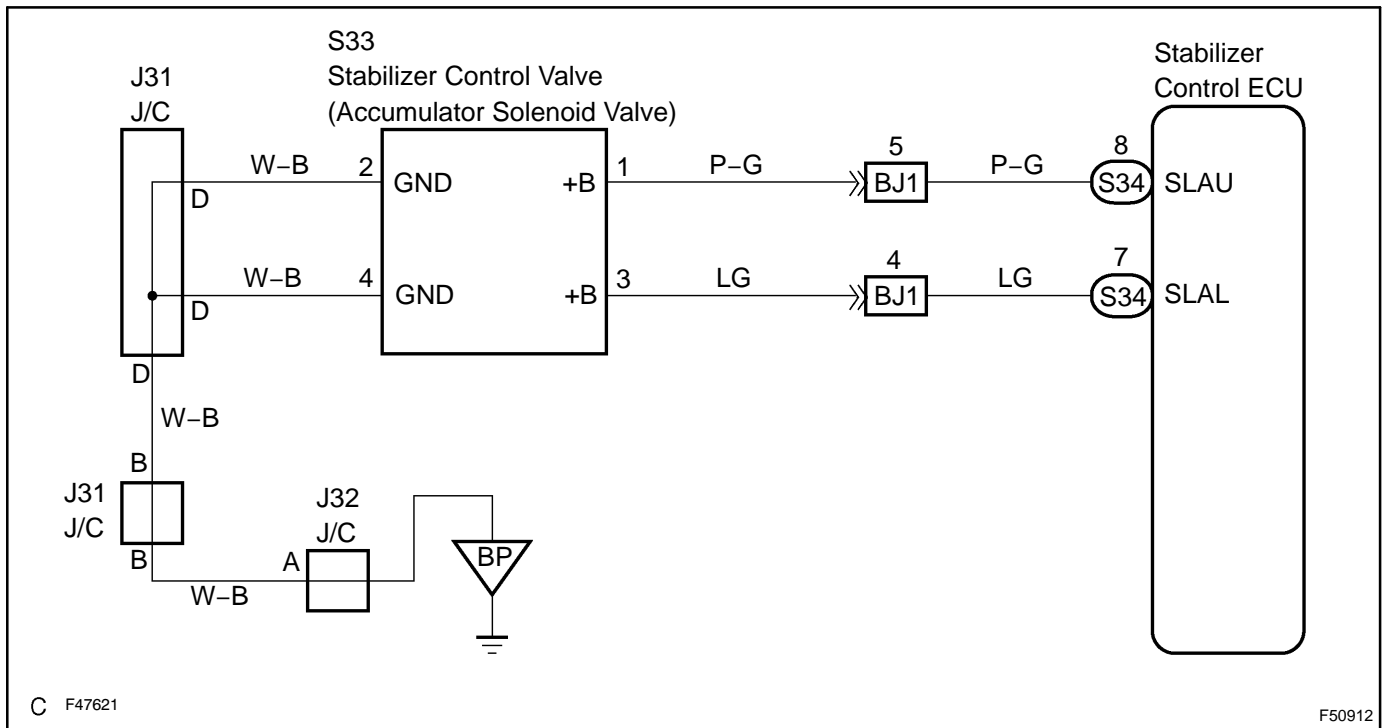
NO **END****YES****REPLACE STABILIZER CONTROL ECU (SEE PAGE [25-62](#))**

ACCUMULATOR SOLENOID VALVE CIRCUIT

CIRCUIT DESCRIPTION

By receiving signals from the stabilizer control ECU, the accumulator solenoid valve closes to cut the fluid flow to the accumulator (the valve closes when current is applied to the solenoid valve and opens when current is not applied).

WIRING DIAGRAM



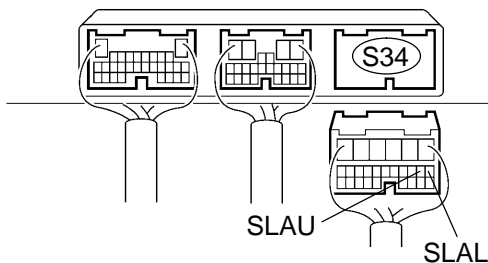
INSPECTION PROCEDURE

HINT:

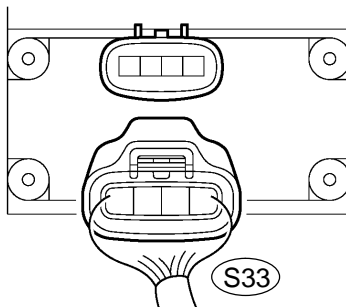
The following procedures confirm that the ECU does not apply current to the accumulator solenoid valves when the vehicle is stopped.

1 CHECK HARNESS AND CONNECTOR (STABILIZER CONTROL ECU - ACCUMULATOR SOLENOID VALVE)

Stabilizer Control ECU:



Accumulator Solenoid Valve:

F44492
F47614

F47628

- Disconnect the S34 connector from the stabilizer control ECU.
- Disconnect the S33 connector from the accumulator solenoid valve.
- Measure the voltage according to the value(s) in the table below.

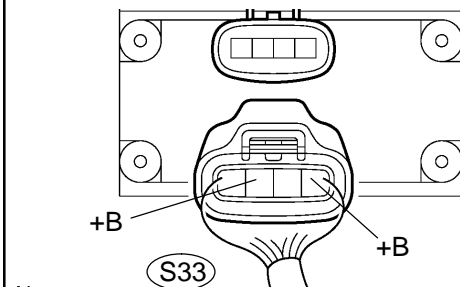
Standard:

Tester connection (Symbols)	Condition	Specified condition
S34-7 (SLAL) - Body ground	Always	Below 1 V
S34-8 (SLAU) - Body ground	Always	Below 1 V

NG
REPLACE HARNESS OR CONNECTOR
OK

2 INSPECT STABILIZER CONTROL ECU (SLAU, SLAL TERMINALS)

Accumulator Solenoid Valve:



N

F47614

- Connect the S34 connector to the stabilizer control ECU.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Symbols)	Condition	Specified condition
S33-1 (+B) - Body ground	Always	Below 1 V
S33-3 (+B) - Body ground	Always	Below 1 V

NG
REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)
OK

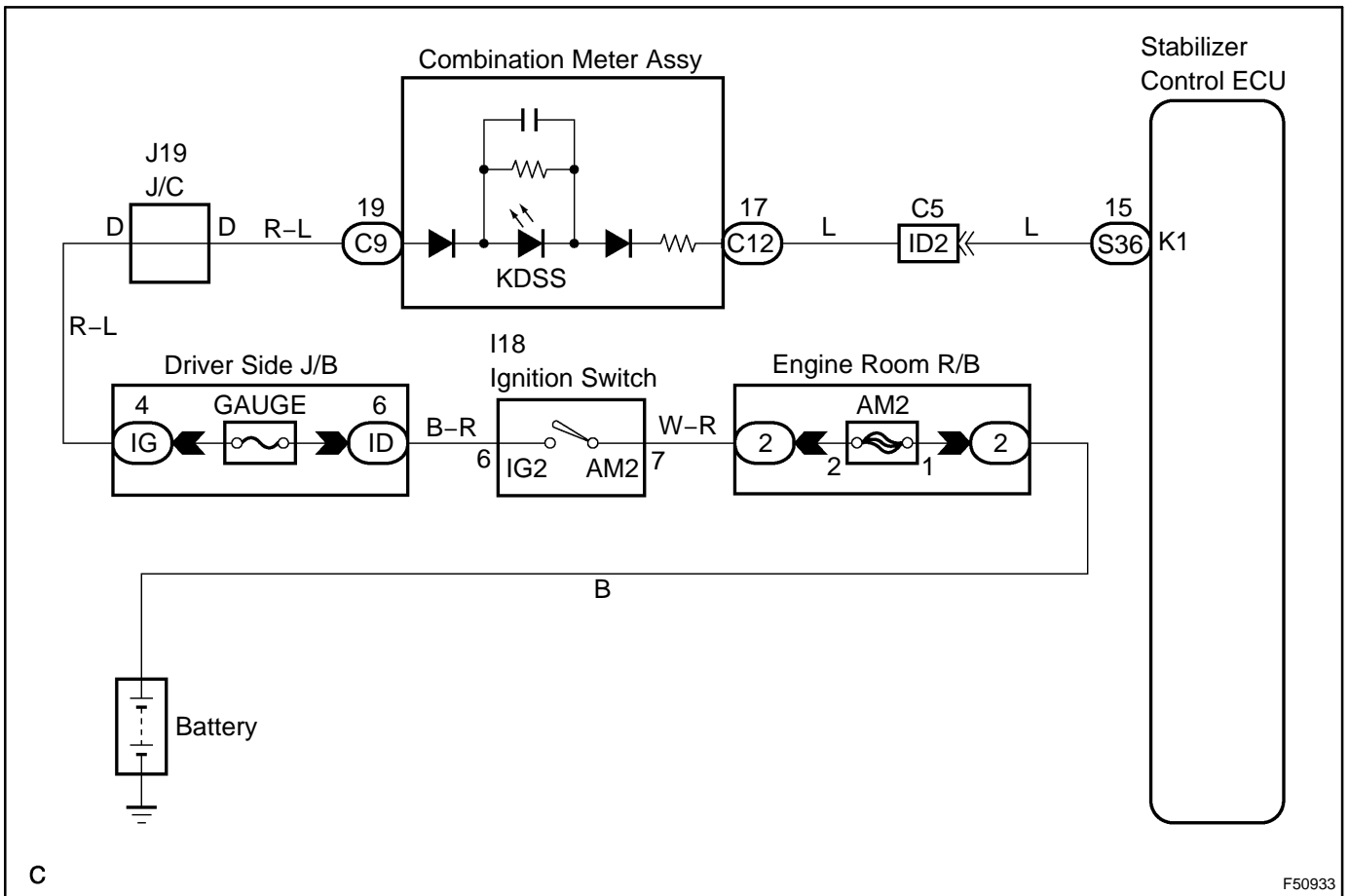
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-575)

KDSS INDICATOR LAMP CIRCUIT

CIRCUIT DESCRIPTION

If the stabilizer control ECU detects a malfunction in the KDSS, the KDSS indicator lamp comes on. At this time, the stabilizer control ECU records a DTC. Connect terminals TC and CG of the DLC3 to cause the KDSS indicator lamp to flash and a DTC to be output.

WIRING DIAGRAM



C

F50933

INSPECTION PROCEDURE

1 CHECK KDSS INDICATOR LAMP

(a) Confirm the KDSS indicator lamp condition.

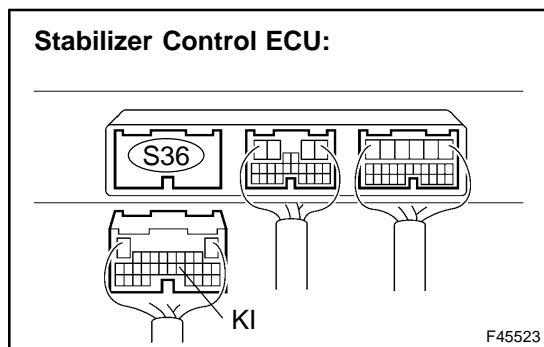
Result:

Condition	Proceed to
Indicator lamp does not go off.	A
Indicator lamp does not come on.	B

B Go to step 3

A

2 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - COMBINATION METER ASSY)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Disconnect the C12 connector from the combination meter assy.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

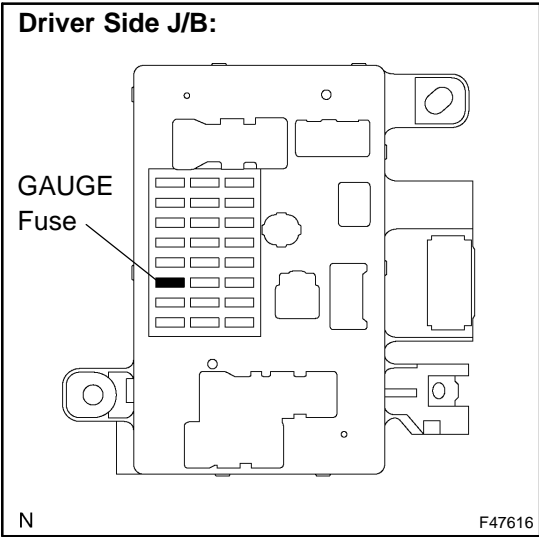
Tester connection (Symbols)	Condition	Specified condition
S36-15 (KI) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

3 INSPECT FUSE

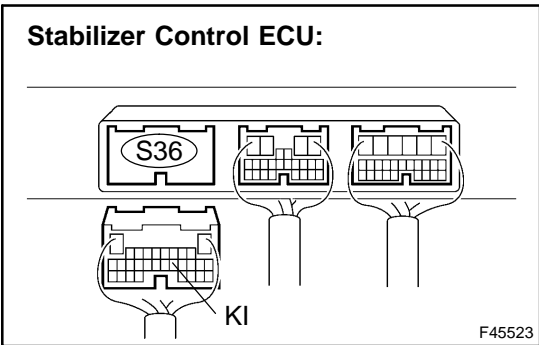


- (a) Remove the GAUGE fuse from the driver side J/B.
 - (b) Check for continuity of the GAUGE fuse.
- Standard: Continuity**

NG INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

4 INSPECT STABILIZER CONTROL ECU(KI TERMINAL)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Measure the voltage according to the value(s) in the table below.

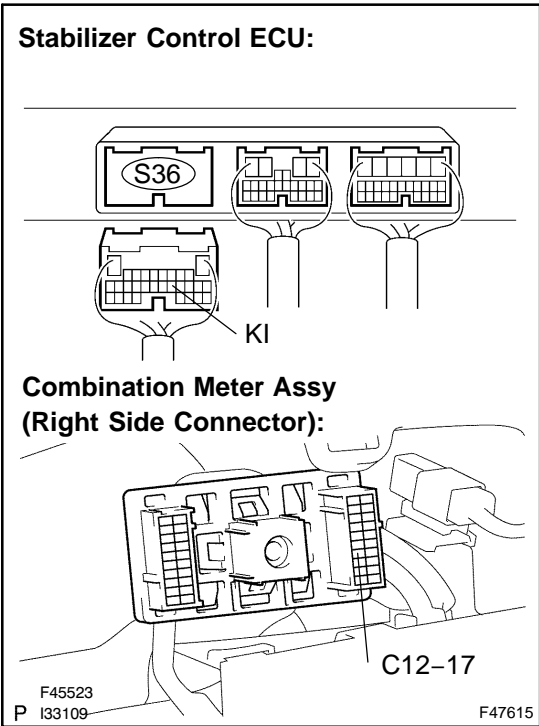
Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-15 (KI) - Body ground	IG switch on, KDSS indicator lamp off	10 to 14 V

OK REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

NG

5 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - COMBINATION METER ASSY)



- (a) Disconnect the C12 connector from the combination meter assy.
- (b) Measure the resistance according to the value(s) in the table below.

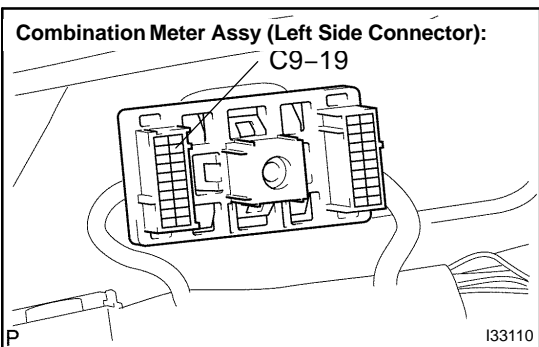
Standard:

Tester connection (Symbols)	Condition	Specified condition
S36-15 (KI) - C12-17	Always	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - BATTERY)



- (a) Disconnect the C9 connector from the combination meter assy.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C9-19 - Body ground	IG switch on	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

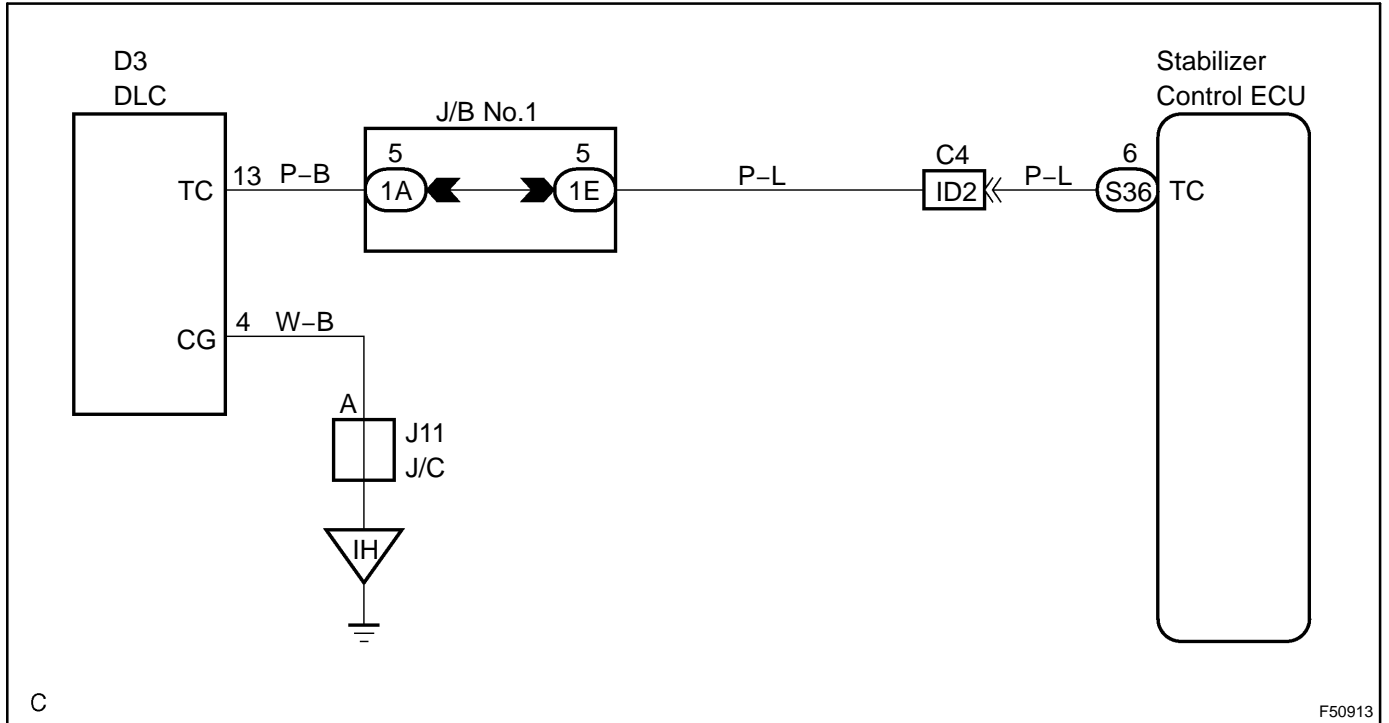
REPLACE COMBINATION METER ASSY (SEE PAGE 71-13)

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

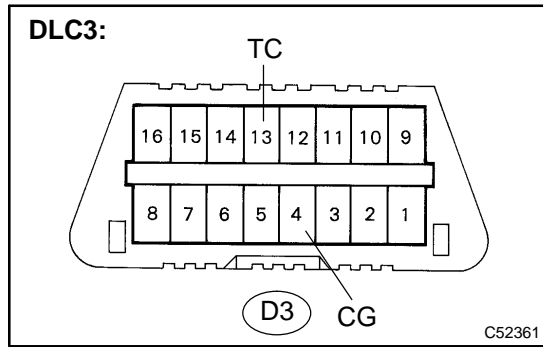
A DTC is output when there is a short circuit between terminals TC and CG of the DLC3.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TC TERMINAL)



- (a) Turn the ignition switch to the ON position.
- (b) Measure the voltage according to the value(s) in the table below.

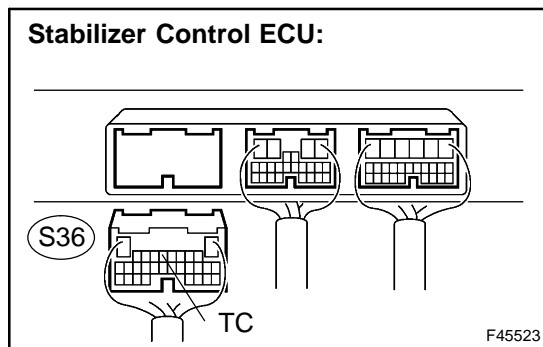
Standard:

Tester Connection	Specified Condition
D3-13 (TC) - D3-4 (CG)	10 to 14 V

NG → Go to step 3

OK

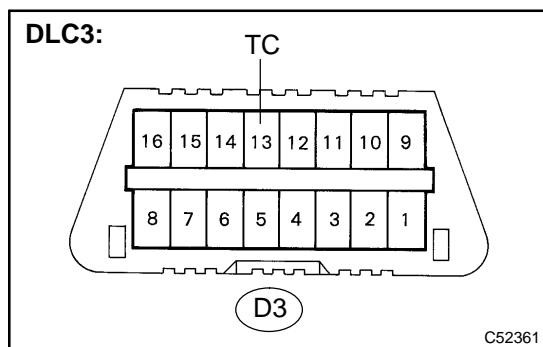
2 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - DLC3)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection (Symbols)	Specified Condition
S36-6 (TC) - D3-13 (TC)	Below 1 Ω
S36-6 (TC) - Body ground	10 kΩ or higher

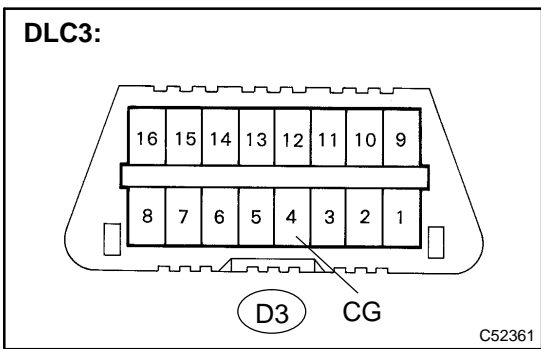


NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

3 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

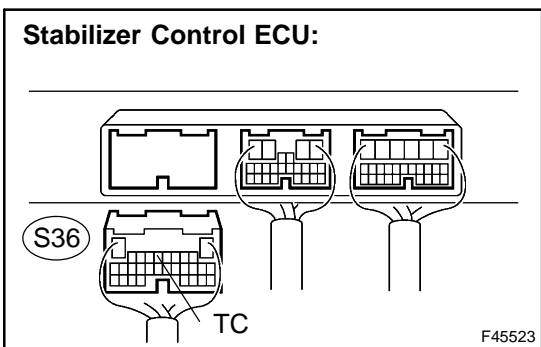
Standard:

Tester Connection	Specified Condition
D3-4 (CG) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

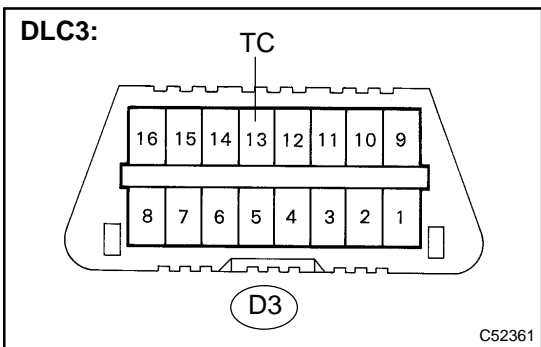
4 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - DLC3)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection (Symbols)	Specified Condition
S36-6 (TC) - D3-13 (TC)	Below 1 Ω
S36-6 (TC) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

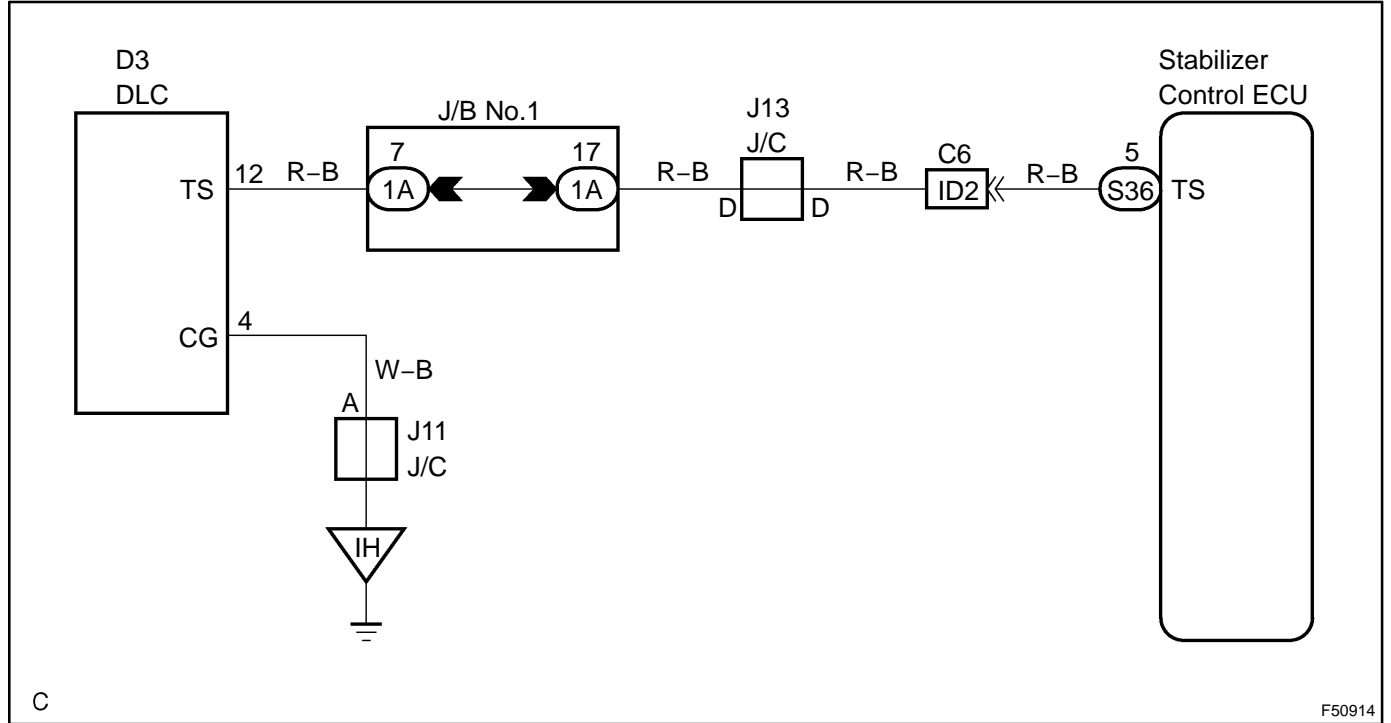
TS TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

Connect terminals TS and CG of the DLC3 with the ignition switch off.

When the ignition switch is turned to the ON position, test mode will be started and DTCs will be output.

WIRING DIAGRAM

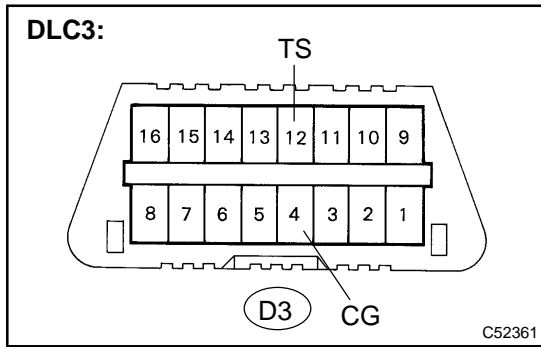


C

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INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TS TERMINAL)



- (a) Turn the ignition switch to the ON position.
- (b) Measure the voltage according to the value(s) in the table below.

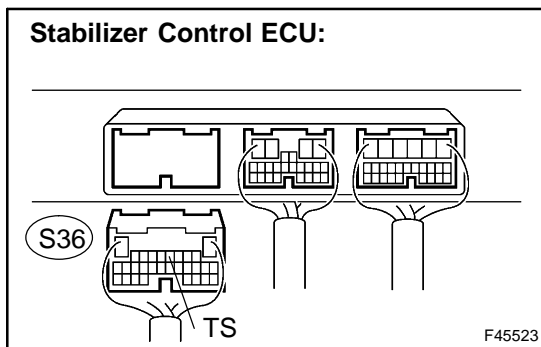
Standard:

Tester Connection	Specified Condition
D3-12 (TS) - D3-4 (CG)	10 to 14 V

NG → Go to step 3

OK

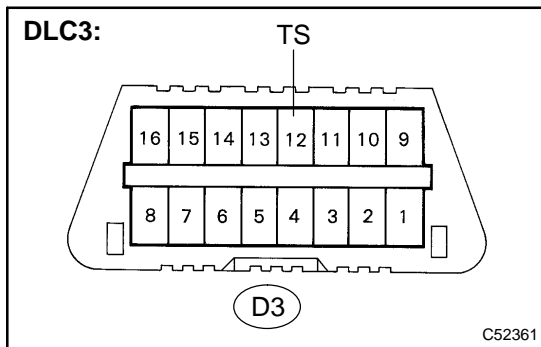
2 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - DLC3)



- (a) Disconnect the S36 connector from the stabilizer control ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S36-5 (TS) - D3-12 (TS)	Below 1 Ω
S36-5 (TS) - Body ground	10 kΩ or higher

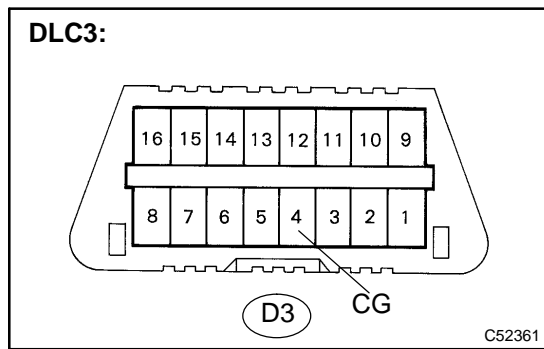


NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

3 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

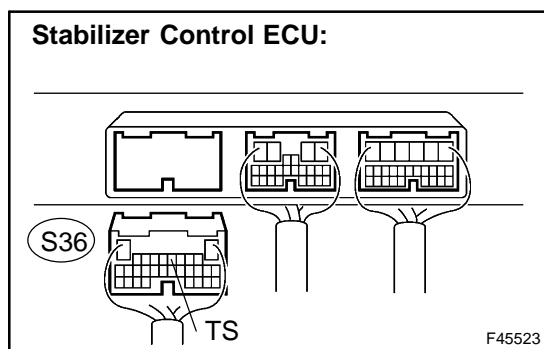
Standard:

Tester Connection	Specified Condition
D3-4 (CG) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(STABILIZER CONTROL ECU - DLC3)

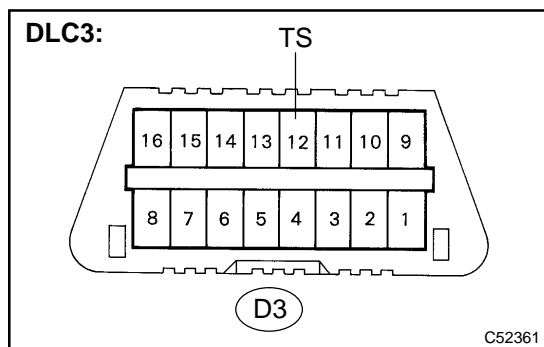


- (a) Disconnect the S36 connector from the stabilizer control ECU.

- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S36-5 (TS) - D3-12 (TS)	Below 1 Ω
S36-5 (TS) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

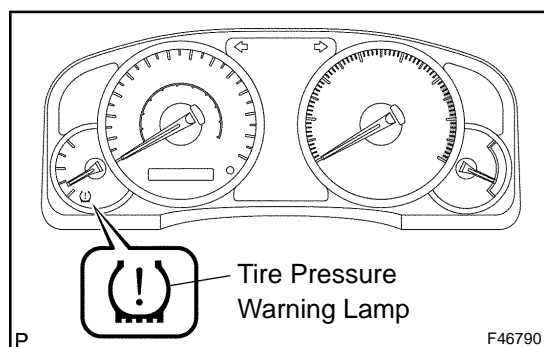
OK

REPLACE STABILIZER CONTROL ECU (SEE PAGE 25-62)

TIRE PRESSURE WARNING SYSTEM

PRECAUTION

05GCS-04



1. TIRE PRESSURE WARNING SYSTEM PRECAUTION

- (a) When the tire pressure warning lamp comes on, immediately check the tire pressure and adjust it to the specified value. (The tire pressure warning lamp comes on if there is an open in the tire pressure warning lamp circuit.)

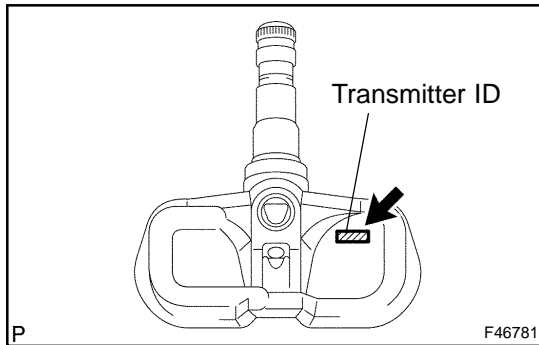
NOTICE:

Check the spare tire as well since this system monitors pressure of all tires.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

- (b) When the tire pressure warning lamp blinks, there is a malfunction in the system. Check for DTCs.
- (c) Changing the tire pressure warning switch between "MAIN" and "2nd" allows registration of 2 transmitter ID sets. Check the tire pressure warning switch to see whether the tire is registered in "MAIN" or "2nd". If the vehicle is driven without selecting switch state correctly, the tire pressure monitor ECU determines the system is malfunctioning and causes the tire pressure warning lamp to blink.
- (d) It is necessary to register the transmitter ID in the tire pressure monitor ECU when replacing the tire pressure monitor valve sub-assy and/or tire pressure monitor ECU (see page 05-642).
- (e) When replacing the tire pressure monitor ECU:
- (1) Using the DATA LIST, read the transmitter IDs registered in the ECU and make a record of them before removing the tire pressure monitor ECU.
 - (2) Register the transmitter IDs after installing a new tire pressure monitor ECU.

- (f) When replacing the tire pressure monitor valve sub-assy:
 - (1) Make a record of the 7 digit number (transmitter ID) written on the tire pressure monitor valve sub-assy when replacing the tire pressure monitor valve sub-assy. Register the transmitter IDs in the tire pressure monitor ECU after replacing the tire pressure monitor valve sub-assy and installing the tires and wheels on the vehicle.

**NOTICE:**

The transmitter ID is written on the tire pressure monitor valve sub-assy and ID can not be seen after installing the tire pressure monitor valve sub-assy on the tire and wheel. Therefore, make a record of the transmitter ID before installing the tire pressure monitor valve sub-assy.

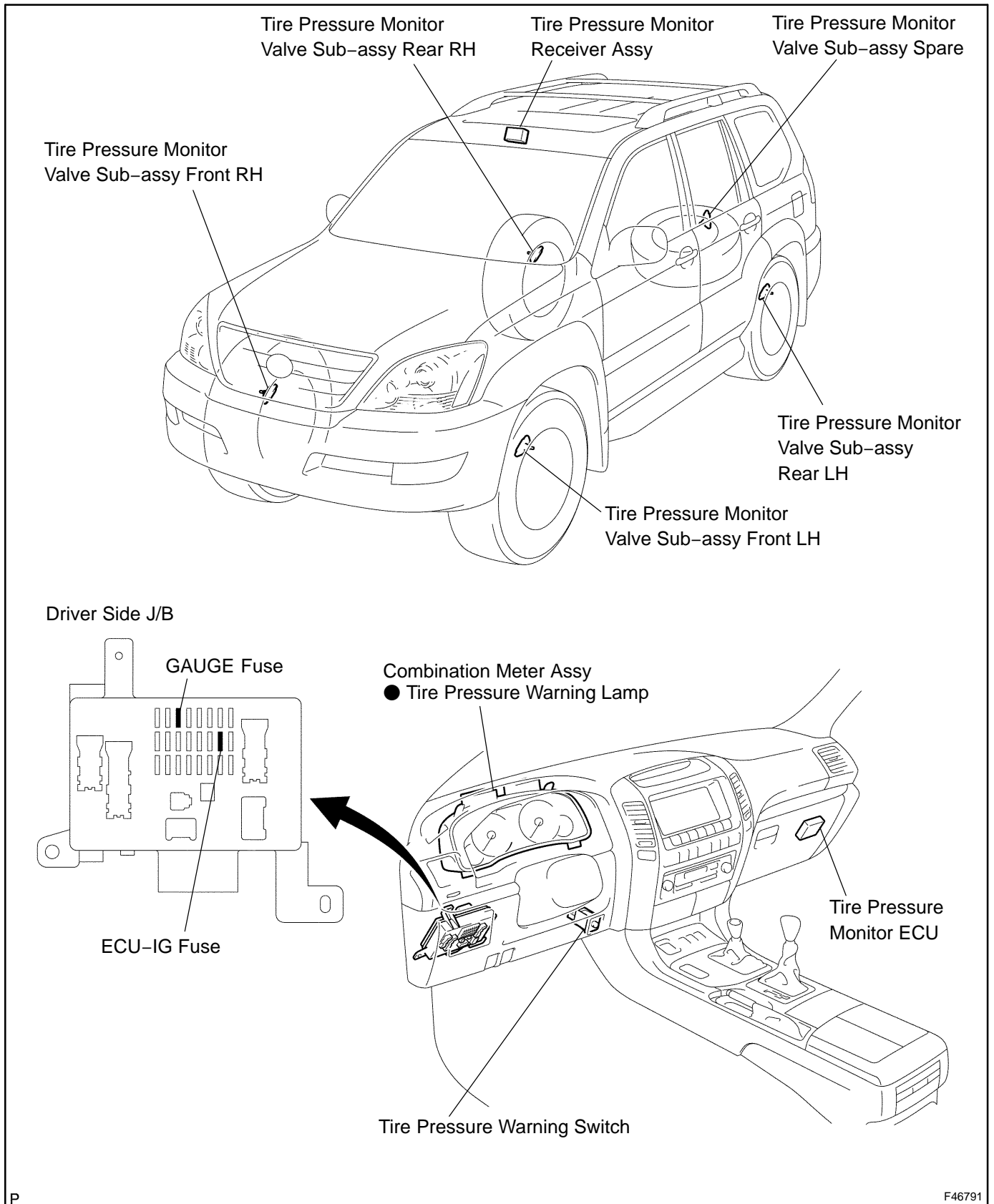
2. IN CASE OF TIRE AND WHEEL REPLACEMENT

- (a) When tires and wheels are replaced, always register the transmitter ID.

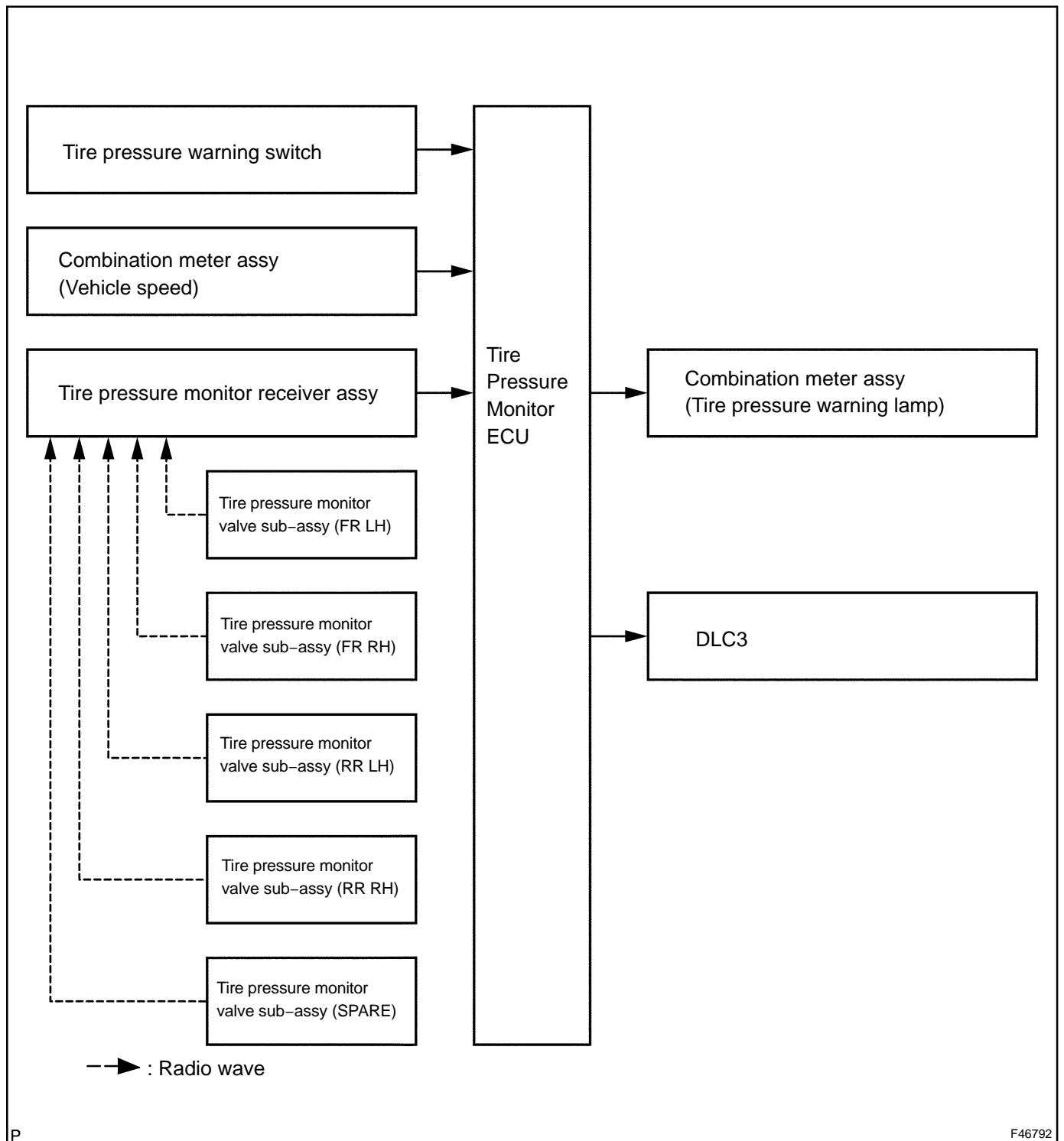
3. FAIL-SAFE FUNCTION

- (a) If there is a malfunction in the tire pressure monitor ECU, the ECU blinks the tire pressure warning lamp and prohibits operating the tire pressure warning system.
- (b) The result of this diagnosis is stored in the tire pressure monitor ECU.

LOCATION



SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. DESCRIPTION OF SYSTEM

- (a) A tire pressure monitor valve sub-assy equipped with tire pressure sensor, transmitter is installed in a tire wheel assy. The sensor measures the tire pressure and the measured value and transmitter ID are transmitted to the tire pressure monitor receiver assy on the body as radio waves and then sent to the tire pressure monitor ECU from the tire pressure monitor receiver. If the transmitter ID has already been registered, the ECU compares the measured tire pressure value and the warning threshold pressure value. When the value is less than the warning threshold pressure value registered in the tire pressure monitor ECU, the tire pressure warning lamp on the combination meter comes on.

2. WHEN TIRE PRESSURE WARNING LAMP IS LIT

- (a) When the tire pressure warning lamp does not go off, or when it comes on during driving, check tire pressure. If the tire pressure warning lamp comes on within several hours after adjusting the tire pressure, the tire may have a slow air leak. If the tire pressure warning lamp comes on even after adjusting the tire pressure, selection of the tire pressure warning switch "MAIN" / "2nd" may be incorrect.
- (b) Under the following conditions, the system may not function properly.
- The areas, facilities or devices that use similar radio wave frequencies are located in the vicinity of the vehicle.
 - A radio device of similar frequency is used near the vehicle.
 - A lot of snow or ice is stuck to the vehicle, especially the wheels and around the wheel houses.
 - The battery of the sensor has been depleted.
 - The tires without tire pressure monitor valve sub-assy are used.
 - Tire chains are used.
 - Wheels other than manufacturer spec LEXUS GX470 wheels are used.
 - Although the tires with tire pressure sensors are used, another tire set has been selected by the tire pressure warning switch.

HINT:

- If any other wheels than the specified ones are used, the system may not function properly because the radio waves are differently transmitted from the tire pressure sensor.
 - Depending on the tire type, the system may not function properly even though the specified wheels are used.
- (c) The average life of the grommet of the tire pressure monitor valve sub-assy is approximately 5 years, at which time it must be replaced.

Re-tighten the valve nut if the valve is air leaking, is less than 5 years old and there is no problem with grommets.

Torque: 4 N·m (41 kgf·cm, 36 in.·lbf)

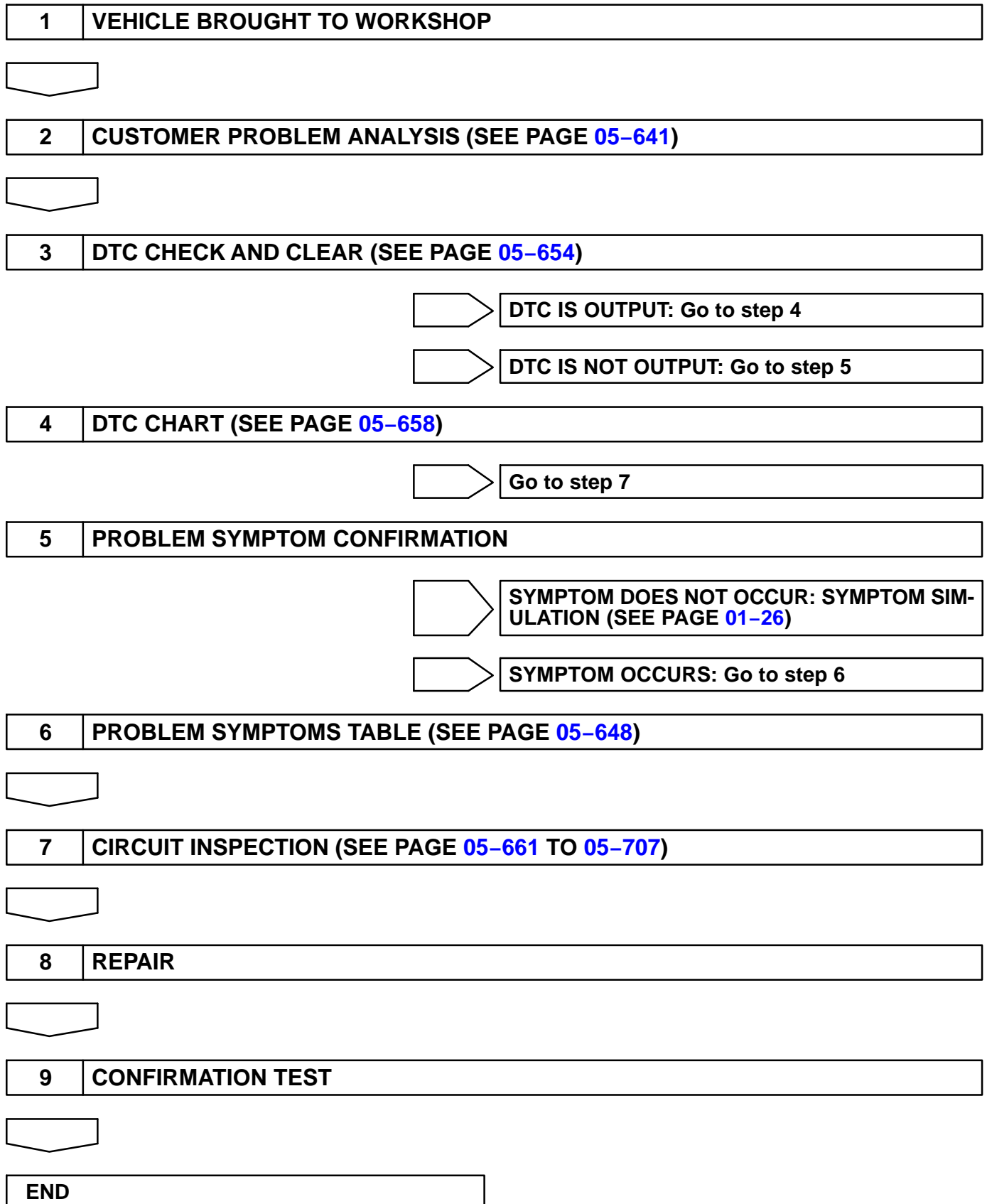
- (d) After removing and installing the ECU or a sensor, output a diagnosis code and check that it is a normal system code.

3. FUNCTION OF COMPONENTS

Components	Function
Tire pressure monitor valve sub-assy	Combined as a single unit with a disc wheel air valve, it measures tire pressure and temperature and transmits an ID number for measurement value and identification. Built-in the battery.
Tire pressure monitor receiver assy	Receives and transmits a necessary signal from the transmitter to the tire pressure monitor ECU.
Tire pressure monitor ECU	Receives the signal from the receiver and identifies it as vehicle's own signal. If the measurement value is equal to or lower than the specified value, it transmits a signal so that the air pressure warning lamp on the combination meter comes on.
Tire pressure warning switch	When 2 sets of IDs are registered in the tire pressure monitor ECU, either of the sets can be selected by changing the switch between "MAIN" and "2nd".
Tire warning lamp	Located in the instrument panel, it informs the driver of lowered tire air pressure and system failure.

HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used at steps 3, 7 and 9.



CUSTOMER PROBLEM ANALYSIS CHECK

Tire Pressure Warning System Check Sheet

Inspector's Name : _____

Customer's Name	VIN		
	Production Date		/ /
	Licence Plate No.		
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date of First Occurrence	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (times a day)

Symptoms	<input type="checkbox"/> In spite of abnormal low tire pressure, the warning lamp does not come on.	
	<input type="checkbox"/> The warning lamp was lighted and the tire was filled up with air, but the warning lamp does not go off.	
	Tire Pressure Warning Lamp Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not come on

Check Item	Tire Pressure Warning Lamp	<input type="checkbox"/> Normal <input type="checkbox"/> Malfunction Code (Code)
	Tire	<input type="checkbox"/> Tire Pressure FR () FL () RR () RL () <input type="checkbox"/> Tire Size FR () FL () RR () RL () <input type="checkbox"/> Tire Type FR () FL () RR () RL () <input type="checkbox"/> Tire Wear Condition FR () FL () RR () RL () <input type="checkbox"/> History of changing tires or wheels When () <input type="checkbox"/> History of rotating tires When ()

REGISTRATION

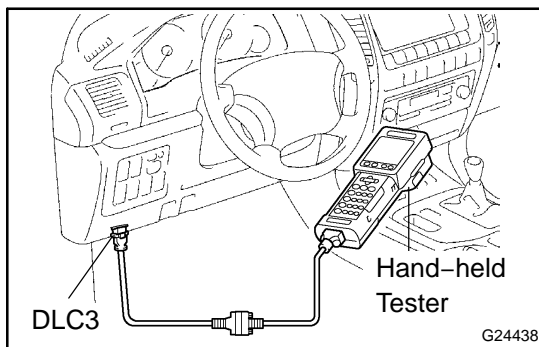
1. REGISTER TRANSMITTER ID

NOTICE:

It is necessary to register the transmitter ID in the tire pressure monitor ECU when replacing the tire pressure monitor valve sub-assy and/or tire pressure monitor ECU.

- (a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)



- (b) Connect the hand-held tester to DLC3.
 (c) Turn the ignition switch to the ON position.
 (d) Read and record the transmitter ID by using the DATA LIST.

- (e) Select the registration mode "MAIN".

HINT:

Select "2nd" when registering in 2nd.

- (f) Input the transmitter ID using the hand-held tester and transmit it to the tire pressure monitor ECU.
 (g) Check that the transmitter ID registration is completed correctly.

HINT:

If the operation of step (d) to (g) does not complete within 5 min., the mode will return to the normal operation mode.

Tester Menu Flow:

DIAGNOSTIC MENU
TIRE PRESSURE

1 : DATA LIST
2 : DTC INFO
4 : SNAPSHOT
5 : UTILITY
7 : SIGNAL CHECK

[ENTER]

UTILITY
TIRE PRESSURE

1 : REGISTER TIRE SET

[ENTER]

UTILITY
REGIST TIRE SET

1 : MAIN SET
2 : 2nd SET

Select the tire set that you want to register tires in.

PRESS [ENTER]

[ENTER]

UTILITY
REGIST TIRE SET

Tires are registered in the MAIN SET
The registration process will take 300seconds. DO you wish to continue?

PRESS [YES] or [NO]

[YES]

UTILITY
REGIST TIRE SET

Register all transmitter ID for all tires including the spare tire within 300 seconds. Codes are printed on each transmitter.

PRESS [ENTER]

[ENTER]

UTILITY
REGIST TIRE SET

Total Tires:5
Number of inputted ID codes:0
Time:300 seconds

PRESS [ENTER]

[ENTER]

UTILITY
REGIST TIRE SET

THE REGISTRATION SUCCEEDED.

PRESS [ENTER]

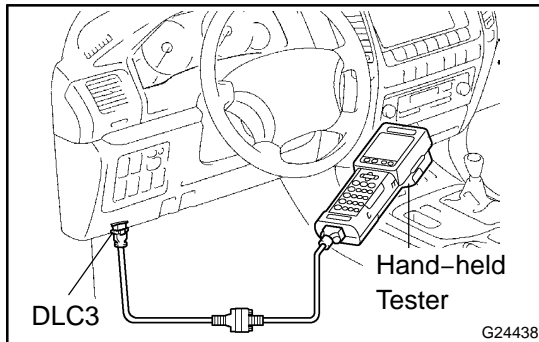
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2. CONFIRMATION OF TRANSMITTER ID REGISTRATION

- (a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)



- (b) Connect the hand-held tester to DLC3.
 (c) Turn the ignition switch to the ON position.
 (d) Select the "SIGNAL CHECK" mode on the hand-held tester (see page 05-645).
 (e) Forcibly transmit the transmitter IDs for all wheels.

HINT:

- The transmitter ID can be transmitted by rapidly reducing the tire pressure.
 - When rapidly reducing the pressure, loosen the valve core (above 40 kPa (0.4 kgf/cm², 5.8 psi) / 30 sec.).
- (f) Check that test mode DTCs C2181/81, C2182/82, C2183/83, C2184/84 and C2185/85 are all erased.

HINT:

If they haven't been erased, reset the tire pressure to the specified value and rotate the tire 90 to 270 degrees. Then forcibly transmit the transmitter IDs of all wheels. If they are still output, register the transmitter IDs again.

- (g) Set the tire pressure of all wheels to the specified value.

3. PROCEDURE FOR DETERMINING THE INSTALLED WHEEL'S TRANSMITTER ID STATUS ("MAIN" or "2nd")

- (a) Turn the ignition switch to the ON position.
 (b) Set the tire pressure warning switch "MAIN" position.
 (c) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

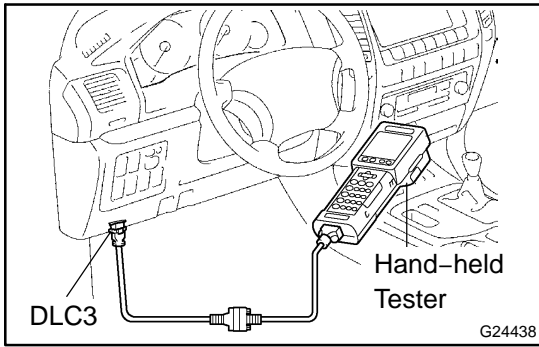
- (d) Rapidly reduce the pressure of any wheel to 120 kPa (1.2 kgf/cm², 17 psi).
 (e) Check the following items. If both of them are true, the transmitter ID of the currently installed wheel is registered in the "MAIN".
- Tire pressure warning lamp comes on.
 - The tire pressure of any tire is 120 kPa (1.2 kgf/cm², 17 psi) when measured with the hand-held tester.
- (f) If either of the above conditions is not true, switch the tire pressure warning switch to "2nd" and perform steps (c) to (e). If both are true, the transmitter ID of the currently installed wheel is registered in "2nd".

TEST MODE PROCEDURE

1. TEST MODE CHECK

HINT:

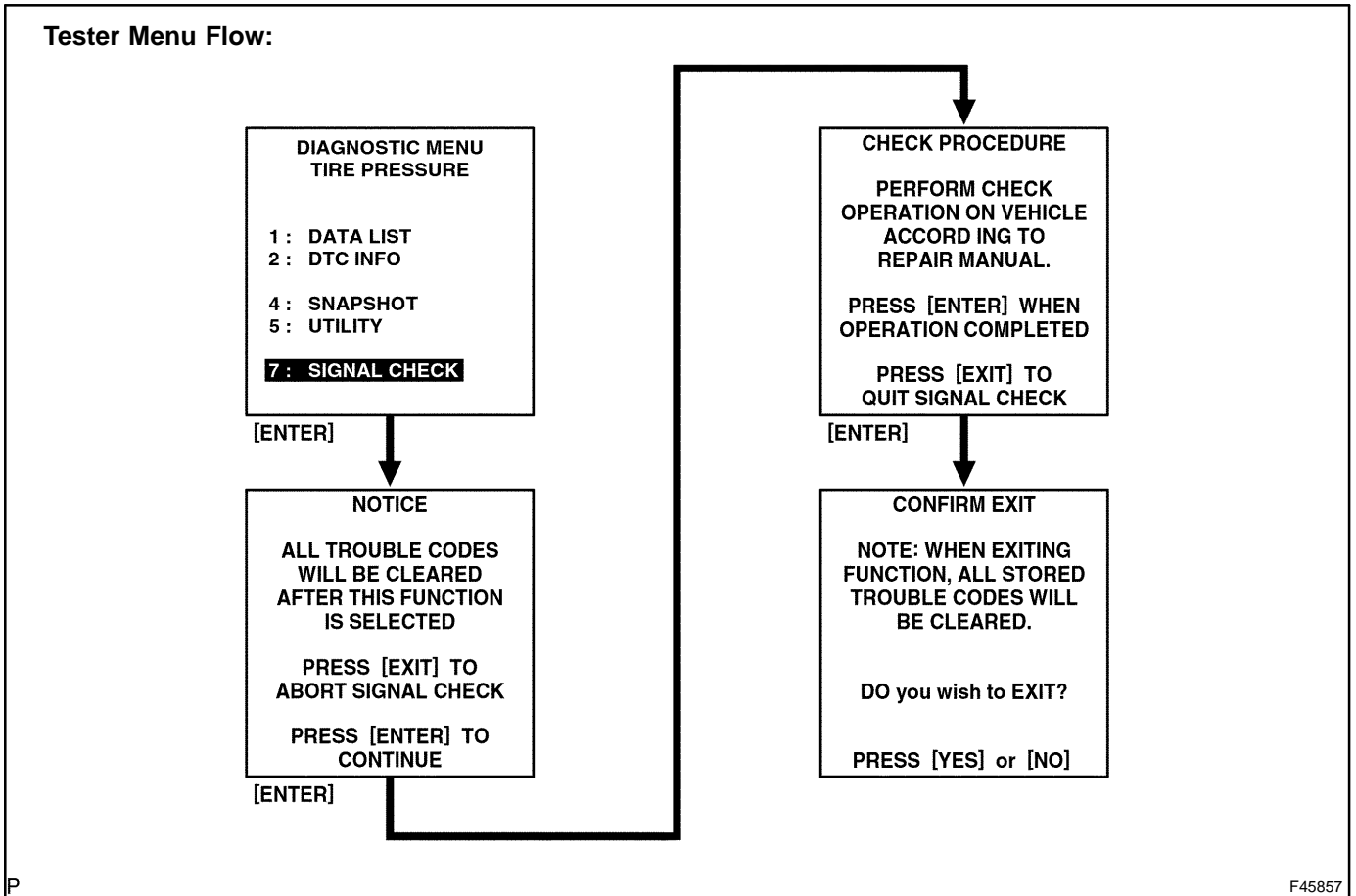
- When entering the test mode, the tire pressure monitor ECU sets all the test DTCs first.
After completing the test mode for each inspection item, the DTCs that are determined normal by the tire pressure monitor ECU will be erased.
The DTCs for other inspection items may not be erased when only a certain signal is inspected.
- When the test mode returns to the normal mode, all the test DTCs will be erased.
- By switching from normal mode into test mode, you can inspect the tire pressure monitor receiver assy, each tire pressure monitor valve sub-assy, vehicle speed sensor, tire pressure monitor ECU and tire pressure warning switch.



- (a) Procedure for test mode.
- (1) Make sure that the ignition switch is off.
 - (2) Connect the hand-held tester to DLC3.
 - (3) Turn the ignition switch to the ON position.
 - (4) Perform the test mode (SIGNAL CHECK) procedure.

HINT:

If a DTC is output, perform troubleshooting according to the table on the next page.



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- (5) After completing the test mode, disconnect the hand-held tester and turn the ignition switch off.

DTC of Tire Pressure Warning System test mode function:

If a malfunction code is displayed during the test DTC check, check the circuit listed for that code. For details of each code, refer to the "See Page" under respective "DTC No." in the chart.

DTC No. (See Page)	Detection Item	Trouble Area
C2181/81 (05-669)	Transmitter ID1 not received	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2182/82 (05-669)	Transmitter ID2 not received	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2183/83 (05-669)	Transmitter ID3 not received	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2184/84 (05-669)	Transmitter ID4 not received	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2185/85 (05-669)	Transmitter ID5 not received	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2191/91 (05-695)	Vehicle speed signal error	<ul style="list-style-type: none"> • Combination meter assy • Vehicle speed sensor • Tire pressure monitor ECU • Wire harness
C2192/92 (05-698)	Select switch error	<ul style="list-style-type: none"> • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

PROBLEM SYMPTOMS TABLE

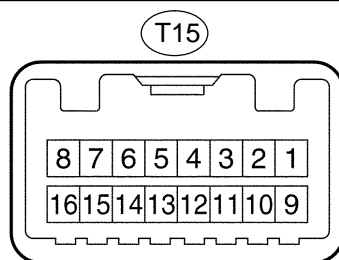
If a normal code is displayed during DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Suspected Area	See page
Tire pressure warning system does not operate.	<ol style="list-style-type: none"> 1. Tire pressure monitor valve sub-assy 2. Tire pressure monitor receiver assy 3. Power source circuit 4. TC terminal circuit 5. Combination meter assy 6. Tire pressure monitor ECU 	<p style="text-align: center;">-</p> <p style="text-align: center;">-</p> <p style="text-align: center;">05-704</p> <p style="text-align: center;">05-707</p> <p style="text-align: center;">05-2048</p> <p style="text-align: center;">-</p>
DTC check cannot be done.	<ol style="list-style-type: none"> 1. Power source circuit 2. TC terminal circuit 3. Tire pressure monitor ECU 	<p style="text-align: center;">05-704</p> <p style="text-align: center;">05-707</p> <p style="text-align: center;">-</p>
Tire pressure warning lamp malfunctions.	<ol style="list-style-type: none"> 1. Power source circuit 2. Tire pressure warning lamp circuit 3. Combination meter assy 4. Tire pressure monitor ECU 	<p style="text-align: center;">05-704</p> <p style="text-align: center;">05-701</p> <p style="text-align: center;">05-2048</p> <p style="text-align: center;">-</p>

TERMINALS OF ECU

HINT:

Inspect the connectors from the back side while the connector is connected.

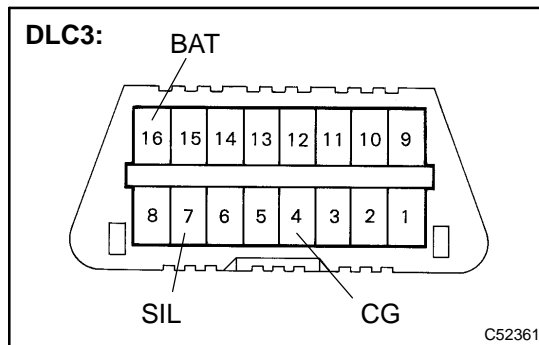


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Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
IG (T15-2) – GND (T15-11)	B-R – W-B	IG power source	IG switch ON	10 to 14 V
SPD (T15-3) – GND (T15-11)	V-R – W-B	Vehicle speed signal	Vehicle is running	Pulse generation
SIL (T15-4) – GND (T15-11)	W – W-B	Diagnosis tester communication line	IG switch ON, when communication is not performed with a tester	8 V or more
IND (T15-6) – GND (T15-11)	L – W-B	Tire pressure warning lamp output signal	IG switch ON, tire pressure warning lamp ON	8 V or more
IND (T15-6) – GND (T15-11)	L – W-B	Tire pressure warning lamp output signal	IG switch ON, tire pressure warning lamp OFF	Below 1.5 V
RDA (T15-7) – GND (T15-11)	G-B – W-B	Tire pressure monitor receiver input signal	IG switch ON, when the tire pressure monitor receiver is not connected	10 to 14 V
RF5V (T15-8) – GND (T15-11)	G-R – W-B	Tire pressure monitor receiver power source	IG switch ON	4.5 to 5.5 V
IDSW (T15-9) – GND (T15-11)	Y – W-B	Tire pressure warning switch input signal	IG switch ON, tire pressure warning switch pushed in	Below 1.5 V
IDSW (T15-9) – GND (T15-11)	Y – W-B	Tire pressure warning switch input signal	IG switch ON, tire pressure warning switch released	10 to 14 V
GND (T15-11) – Body ground	W-B – Body ground	Ground	Always	Below 1 Ω
TC (T15-12) – GND (T15-11)	P-B – W-B	TC terminal	When terminal TC is not connected.	8 V or more
GND2 (T15-16) – GND (T15-11)	BR – W-B	Tire pressure monitor receiver ground	Always	Below 1 Ω

DIAGNOSIS SYSTEM



1. DIAGNOSIS SYSTEM

- (a) Inspect the battery voltage.

Battery voltage: 11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

- (b) Check DLC3.

The vehicle's tire pressure monitor ECU uses ISO 9141-2 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

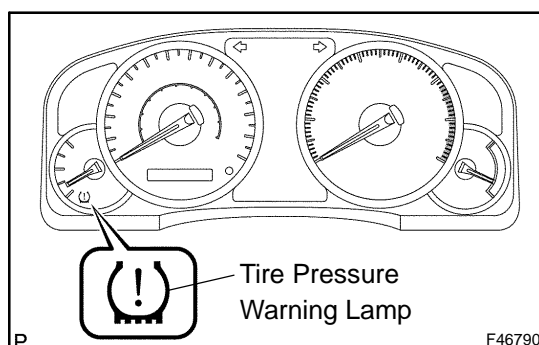
Verify the conditions listed in the table below:

Terminal No.	Disc.	Connection / Voltage or Resistance	Condition
7	SIL	Bus + Line / Pulse generation	During transmission
4	CG	Chassis Ground to Body Ground / 1 Ω or less	Always
16	BAT	Battery Positive to Body Ground / 10 to 14 V	Always

HINT:

If the hand-held tester display shows "UNABLE TO CONNECT TO VEHICLE" when the cable of the hand-held tester is connected to the DLC3, the ignition switch is turned to the ON position and the tester is operated, there is a problem on the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's instruction manual.



- (c) Warning lamp

- (1) The tire pressure warning lamp blinks when there is any malfunction in the tire pressure warning system.

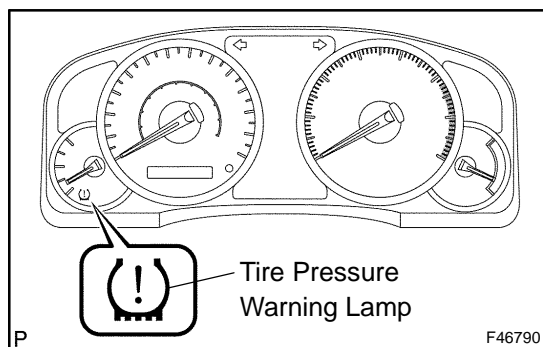
NOTICE:

When the malfunction has been corrected, the tire pressure warning lamp does not come on.

- (d) DTCs (Normal mode)

- (1) DTCs are memorized in the tire pressure monitor ECU and read by the blinks of the tire pressure warning lamp or using the hand-held tester (see page 05-654 for the procedure of DTCs check).

- (e) Test mode
- (1) By switching from normal mode into test mode, you can inspect the tire pressure monitor receiver assy, each tire pressure monitor valve sub-assy, vehicle speed sensor, tire pressure monitor ECU and tire pressure warning switch (see page [05-645](#)).



2. CHECK WARNING LAMP

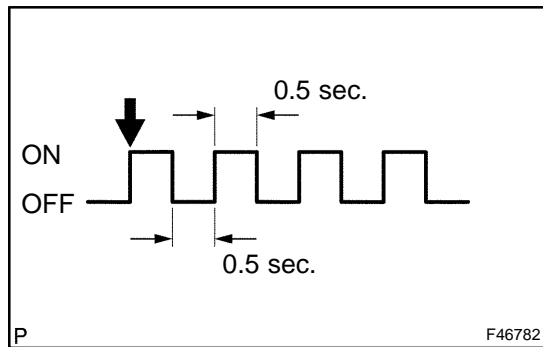
- (a) Turn the ignition switch to the ON position.
- (b) Check that the tire pressure warning lamp comes on for 3 seconds.

If the warning check result is not normal, proceed to the troubleshooting for the tire pressure warning lamp circuit.

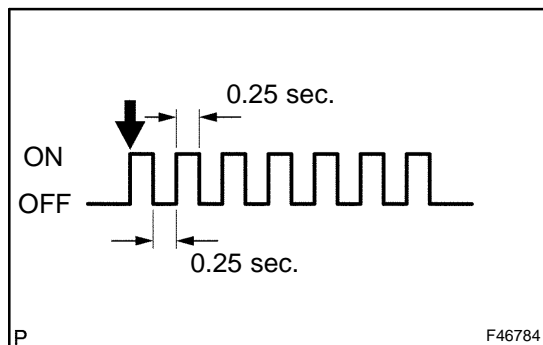
Trouble Area	See page
Tire pressure warning lamp circuit	05-701

3. TIRE PRESSURE WARNING LAMP CHART

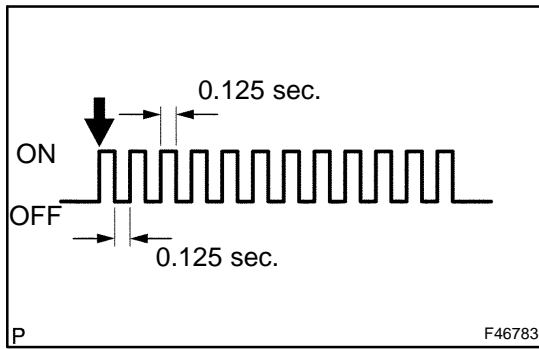
	Immediately after turning the IG ON	Always					
	Comes on for 3 sec.	Goes off	Comes on	Blinks (*1)	Blinks (*2)	Blinks (*3)	Output DTC
Normal	○	○					
Low tire pressure	○		○				
System fail	○			○			
ECU Connector poorly connected	○		○				
TC ground (There is no DTC)	○				○		
TC ground (There is DTC)	○						○
Test mode	○					○	



*1: Comes on and goes off repeatedly at 0.5 second intervals.

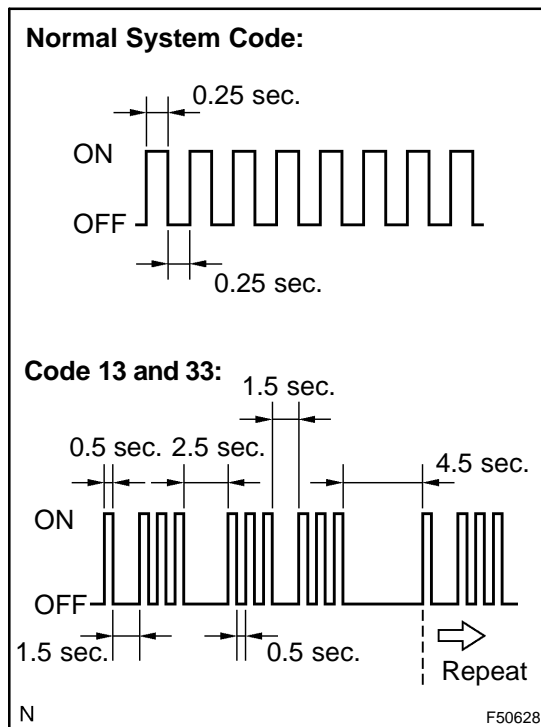
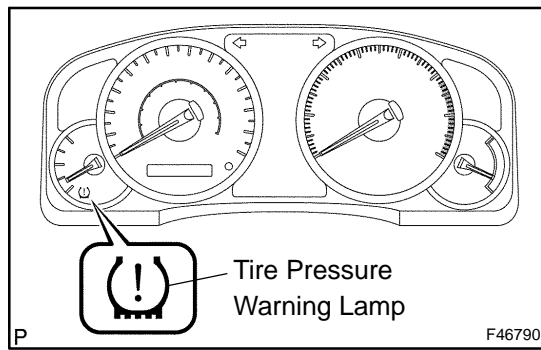
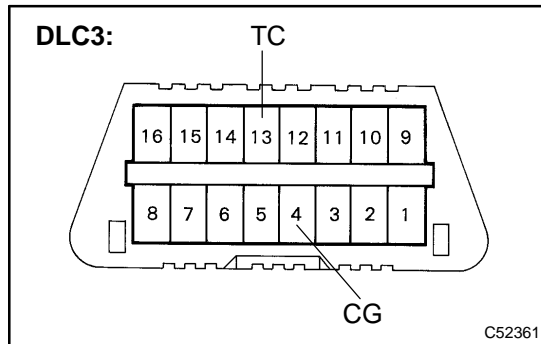


*2: Comes on and goes off repeatedly at 0.25 second intervals.



*3: Comes on and goes off repeatedly at 0.125 second intervals.

DTC CHECK/CLEAR



1. DTC CHECK (USING SST CHECK WIRE)

- (a) Check DTCs.
 - (1) Using the SST, connect terminals TC and CG of the DLC3.
- SST 09843-18040
- (2) Turn the ignition switch to the ON position.

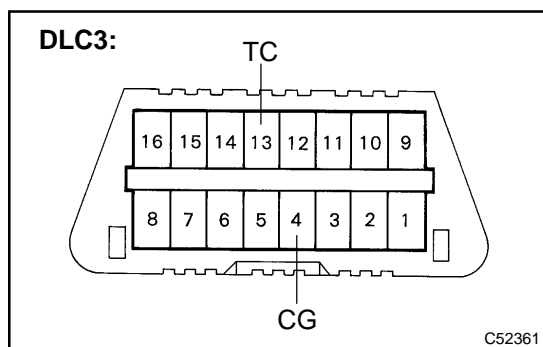
- (3) Read and record any DTCs from the tire pressure warning lamp on the combination meter. Refer to the illustration on the left for examples of a normal system code and codes 13 and 33.

HINT:

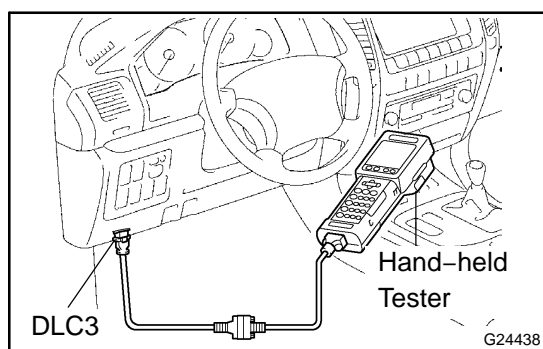
- If the tire pressure warning lamp does not output any DTCs or the normal system code, inspect the tire pressure warning lamp circuit or TC terminal circuit.

Trouble Area	See page
Tire pressure warning lamp circuit	05-701
TC terminal circuit	05-707

- If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is displayed first.
- (4) Refer to the diagnostic trouble code chart (see page 05-658) for DTC information.
 - (5) After completing the check, turn the ignition switch off and remove the SST from the DLC3.
- SST 09843-18040



- (b) Clear the DTCs.
- (1) Using the SST, connect terminals TC and CG of the DLC3.
- SST 09843-18040
- (2) Turn the ignition switch to the ON position.
 - (3) Within 15 seconds after connecting terminals TC and CG, change the tire pressure warning switch between "MAIN" and "2nd" 4 cycles or more.
 - (4) Check that the blinking pattern of the tire pressure warning lamp shows the normal system code.
 - (5) Disconnect the SST from the terminals of the DLC3.



2. DTC CHECK (USING HAND-HELD TESTER)

- (a) Check DTCs.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Read the DTCs following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

- (b) Clear the DTCs.

HINT:

After repairing the malfunctions, clear the DTC.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch to the ON position.
- (3) Erase the DTCs following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

DATA LIST/ACTIVE TEST

1. DATA LIST

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Following the display on the hand-held tester, read the "DATA LIST".

Item	Measurement item/ Range (Display)	Normal Condition	Diagnostic Note
MODE STATUS	Tire pressure warning system mode/NORMAL or TEST	NORMAL: Normal mode TEST: Test mode	-
MAIN TIRE	Number of main tire ID to be registered/0 or 1 or 2 or 3 or 4 or 5	0 to 5 should be displayed	-
2ND TIRE	Number of 2nd tire ID to be registered/0 or 1 or 2 or 3 or 4 or 5	0 to 5 should be displayed	-
SELECT SW	Select switch condition/ MAIN or 2nd	No pressing: MAIN Pressing: 2nd	-
INITIAL SW	Initialization switch condition/ ON or OFF	OFF	-
VEHICLE SPD	Vehicle speed reading/ min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	Speed indicated on the combination meter
REGIT ID1 CODE	Registered ID1 code/min.: 0, max.: FFFFFFFF	The ID No. registered in the transmitter ID1 is displayed	-
REGIT ID2 CODE	Registered ID2 code/min.: 0, max.: FFFFFFFF	The ID No. registered in the transmitter ID2 is displayed	-
REGIT ID3 CODE	Registered ID3 code/min.: 0, max.: FFFFFFFF	The ID No. registered in the transmitter ID3 is displayed	-
REGIT ID4 CODE	Registered ID4 code/min.: 0, max.: FFFFFFFF	The ID No. registered in the transmitter ID4 is displayed	-
REGIT ID5 CODE	Registered ID5 code/min.: 0, max.: FFFFFFFF	The ID No. registered in the transmitter ID5 is displayed	-
TRANS STATUS	ID code transmission status/ FINISH or NOW	FINISH or NOW	-
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf-cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf-cm ² , 92.2 psi)	Actual tire inflation pressure	-
TIREPRESS2	ID2 tire pressure/ min.: 0 kPa (0 kgf-cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf-cm ² , 92.2 psi)	Actual tire inflation pressure	-
TIREPRESS3	ID3 tire pressure/ min.: 0 kPa (0 kgf-cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf-cm ² , 92.2 psi)	Actual tire inflation pressure	-
TIREPRESS4	ID4 tire pressure/ min.: 0 kPa (0 kgf-cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf-cm ² , 92.2 psi)	Actual tire inflation pressure	-
TIREPRESS5	ID5 tire pressure/ min.: 0 kPa (0 kgf-cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf-cm ² , 92.2 psi)	Actual tire inflation pressure	-
TIRE TEMP1	ID1 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	-

DIAGNOSTICS - TIRE PRESSURE WARNING SYSTEM

Item	Measurement item/ Range (Display)	Normal Condition	Diagnostic Note
TIRE TEMP2	ID2 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	-
TIRE TEMP3	ID3 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	-
TIRE TEMP4	ID4 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	-
TIRE TEMP5	ID5 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	-
BATT VOLT1	ID1 battery voltage/ OVER or LESS	OVER	-
BATT VOLT2	ID2 battery voltage/ OVER or LESS	OVER	-
BATT VOLT3	ID3 battery voltage/ OVER or LESS	OVER	-
BATT VOLT4	ID4 battery voltage/ OVER or LESS	OVER	-
BATT VOLT5	ID5 battery voltage/ OVER or LESS	OVER	-
SELECT SW INFO	Select switch setting information/ WITH or WITHOUT	WITH or WITHOUT	-
INITIAL SW INFO	Initialization switch setting informa- tion/WITH or WITHOUT	WITHOUT	-
# CODES	Number of DTC recorded/ min.: 0, max.: 255	Min.: 0, Max.: -	-

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If no abnormality is found when the parts are inspected, inspect the tire pressure monitor ECU.
- If a malfunction code is displayed during the DTC check, inspect the circuit listed for that code. For details of each code, refer to the "See Page" under respective "DTC No." in the DTC chart.

DTC chart of Tire Pressure Warning:

DTC No. (See Page)	Detection Item	Trouble Area
C2111/11 (05-661)	Transmitter ID1 operation stop	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2112/12 (05-661)	Transmitter ID2 operation stop	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2113/13 (05-661)	Transmitter ID3 operation stop	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2114/14 (05-661)	Transmitter ID4 operation stop	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2115/15 (05-661)	Transmitter ID5 operation stop	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2121/21 (05-669)	Transmitter ID1 not received (Main)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2122/22 (05-669)	Transmitter ID2 not received (Main)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2123/23 (05-669)	Transmitter ID3 not received (Main)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2124/24 (05-669)	Transmitter ID4 not received (Main)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2125/25 (05-669)	Transmitter ID5 not received (Main)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

DIAGNOSTICS - TIRE PRESSURE WARNING SYSTEM

C2131/31 (05-669)	Transmitter ID1 not received (2nd)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2132/32 (05-669)	Transmitter ID2 not received (2nd)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2133/33 (05-669)	Transmitter ID3 not received (2nd)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2134/34 (05-669)	Transmitter ID4 not received (2nd)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2135/35 (05-669)	Transmitter ID5 not received (2nd)	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness
C2141/41 (05-681)	Transmitter ID1 error	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2142/42 (05-681)	Transmitter ID2 error	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2143/43 (05-681)	Transmitter ID3 error	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2144/44 (05-681)	Transmitter ID4 error	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2145/45 (05-681)	Transmitter ID5 error	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2165/65 (05-684)	Abnormal temperature inside ID1 tire	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2166/66 (05-684)	Abnormal temperature inside ID2 tire	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2167/67 (05-684)	Abnormal temperature inside ID3 tire	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2168/68 (05-684)	Abnormal temperature inside ID4 tire	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2169/69 (05-684)	Abnormal temperature inside ID5 tire	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy
C2171/71 (05-687)	Transmitter ID not registered (Main)	<ul style="list-style-type: none"> • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

C2172/72 (05-687)	Transmitter ID not registered (2nd)	<ul style="list-style-type: none">• Tire pressure warning switch• Tire pressure monitor ECU• Wire harness
C2176/76 (05-692)	Receiver error	<ul style="list-style-type: none">• Tire pressure monitor receiver assy• Tire pressure monitor ECU• Wire harness

DTC	C2111/11	TRANSMITTER ID1 OPERATION STOP
DTC	C2112/12	TRANSMITTER ID2 OPERATION STOP
DTC	C2113/13	TRANSMITTER ID3 OPERATION STOP
DTC	C2114/14	TRANSMITTER ID4 OPERATION STOP
DTC	C2115/15	TRANSMITTER ID5 OPERATION STOP

CIRCUIT DESCRIPTION

The tire pressure monitor valve sub-assy stops transmitting signals when receiving specific signals. The ECU stores the DTC when the tire pressure monitor valve sub-assy receives the signals for some reason, and stops transmitting signals. As this is not a system malfunction, the DTC is erased when signal transmission is resumed.

HINT:

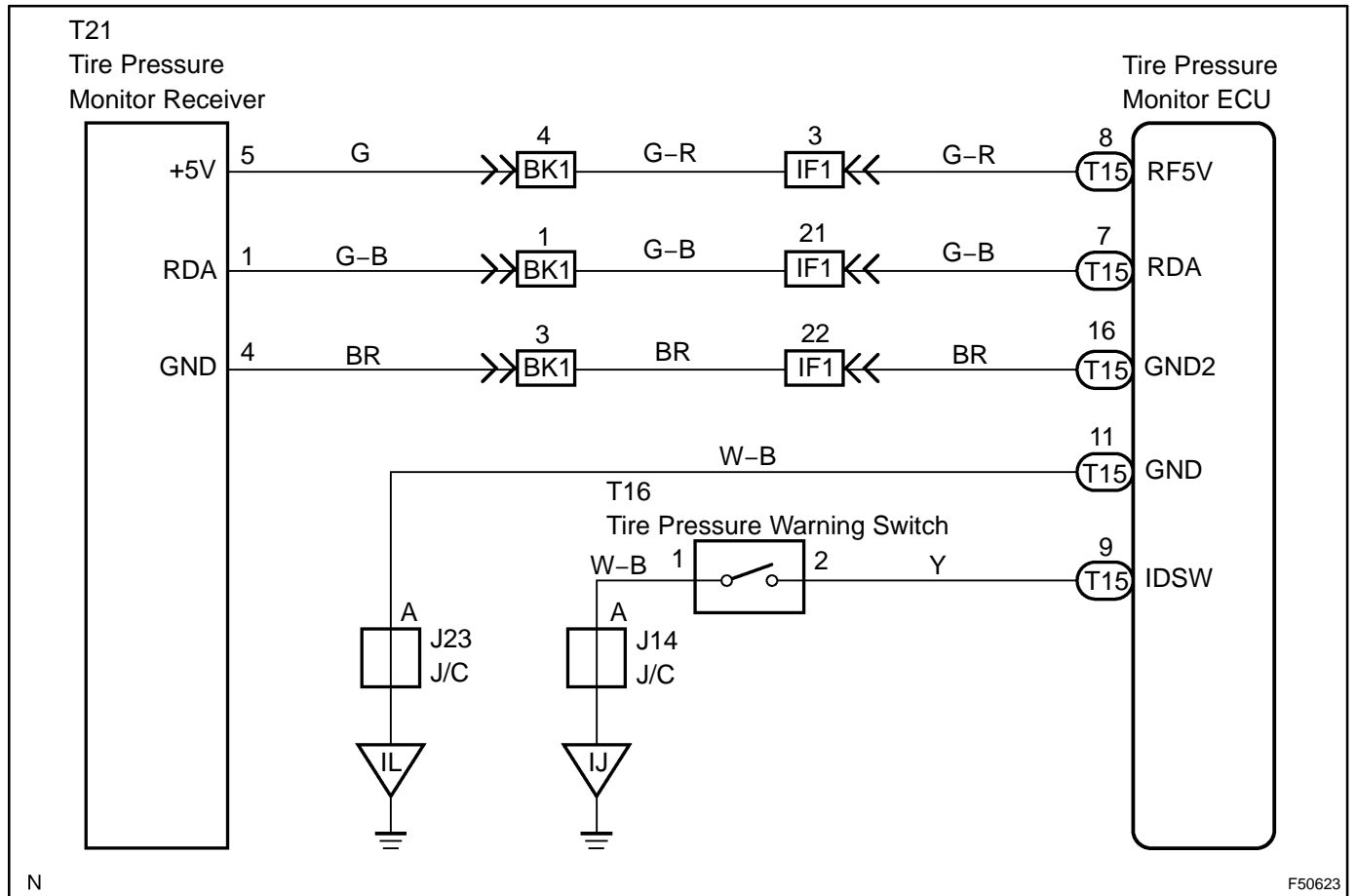
The radio wave is stopped at assembly plant, because the strength of the radio wave emitting from the tire pressure sensing transmitter does not comply with the Japan Wireless Telegraphy Act.

DTC No.	DTC Detecting Condition	Trouble Area
C2111/11 C2112/12 C2113/13 C2114/14 C2115/15	When any signal similar to the stop signal is received for some reason, this DTC will be output.	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor receiver assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

HINT:

It is necessary to perform the procedure to identify the tire pressure monitor valve sub-assy that is malfunctioning because it cannot be identified by the output DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value. Ensure the tire pressure warning switch is set to "MAIN".

1 | FORCIBLY TRANSMIT TRANSMITTER ID OF ALL WHEELS

- (a) Remove the valve cores of the wheels to rapidly reduce the pressure of all tires to 120 kPa (1.2 kgf/cm², 17 psi).

HINT:

The transmitter ID can be transmitted forcibly by rapidly reducing tire pressure.



2 | CHECK DTC

- (a) Check for DTC.
OK: DTC is not output.

OK	SET TIRE PRESSURE TO NORMAL VALUE (TRANSMITTER STOP CONDITON IS COMPLETELY RESET)
-----------	--



3 | SET TIRE PRESSURE TO NORMAL VALUE

- (a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)



4 | FORCIBLY TRANSMIT TRANSMITTER ID

- (a) Forcibly transmit the transmitter ID by performing the following: Set the tire pressure to the specified value and rotate the tire 90 to 270 degrees. Rapidly reduce the tire pressure of all wheels.

NOTICE:

Rapidly reduce the pressure of all tires respectively.



5 CHECK DTC

(a) Check for DTC.

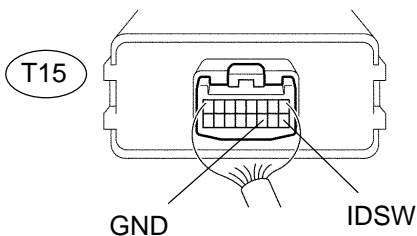
OK: DTC is not output.

HINT:

In the case of NG, system error is probable. Perform troubleshooting according to other DTC.

OK**SET TIRE PRESSURE TO NORMAL VALUE
(TRANSMITTER STOP CONDITON IS
COMPLETELY RESET)****NG****6 CHECK DTC**

(a) Are DTCs C2111/11, C2112/12, C2113/13, C2114/14 and C2115/15 all output?

NO**Go to step 12****YES****7 INSPECT TIRE PRESSURE MONITOR ECU****Tire Pressure Monitor ECU:**

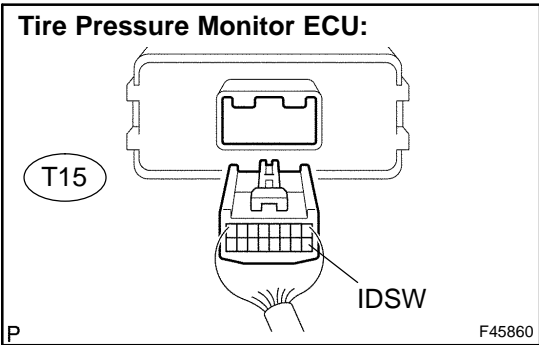
- (a) Connect the tire pressure monitor ECU T15 connector.
 (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-9 (IDSW) - T15-11 (GND)	10 V or higher

NG**Go to step 8****OK****Go to step 10**

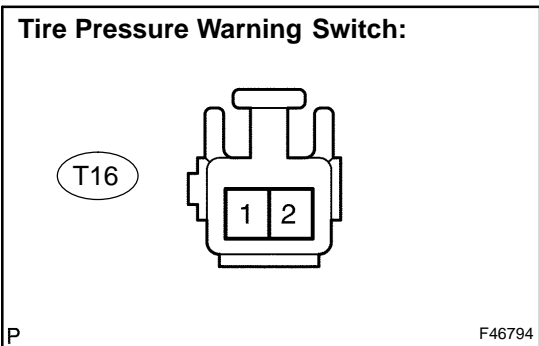
8 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector and tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

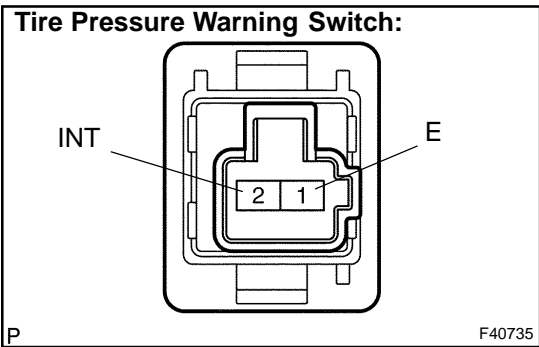
Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9 INSPECT TIRE PRESSURE WARNING SWITCH



- (a) Disconnect tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

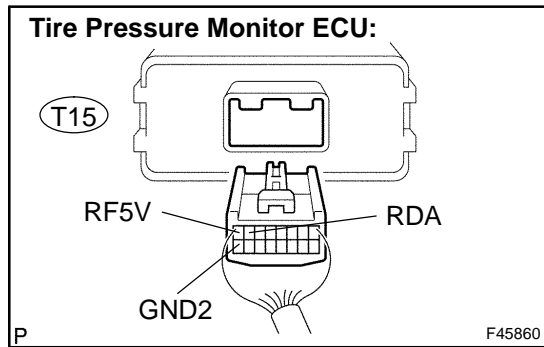
Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 kΩ or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

NG REPLACE TIRE PRESSURE WARNING SWITCH

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

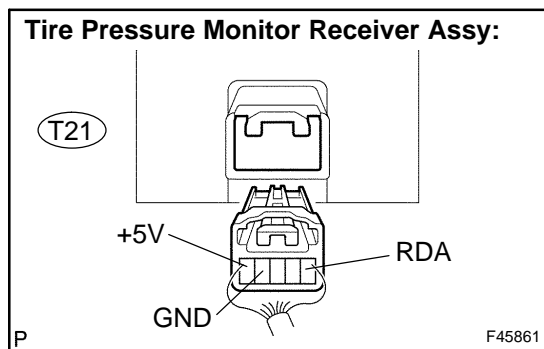
10 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR RECEIVER ASSY - TIRE PRESSURE MONITOR ECU) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor receiver assy T21 connector and tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

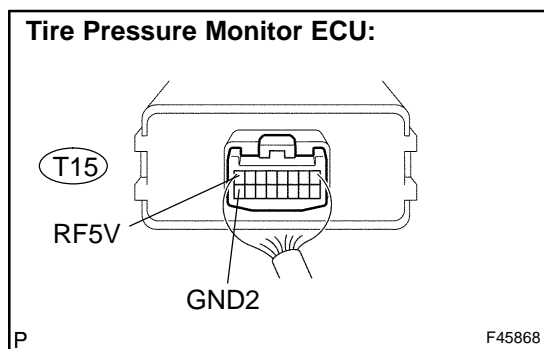
Tester Connection	Specified Condition
T15-7 (RDA) - T21-1 (RDA)	Below 1 Ω
T15-8 (RF5V) - T21-5 (+5V)	Below 1 Ω
T15-16 (GND2) - T21-4 (GND)	Below 1 Ω
T15-7 (RDA) - Body ground	10 kΩ or higher
T15-8 (RF5V) - Body ground	10 kΩ or higher
T15-16 (GND2) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

11 INSPECT TIRE PRESSURE MONITOR ECU



- (a) Connect the tire pressure monitor ECU T15 connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-8 (RF5V) - T15-16 (GND2)	4.5 to 5.5 V

NG CHECK POWER SOURCE CIRCUIT(SEE PAGE 05-704)

OK

REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)

12 SET TIRE PRESSURE TO NORMAL VALUE

(a) Set the tire pressure of all wheels to the specified value.

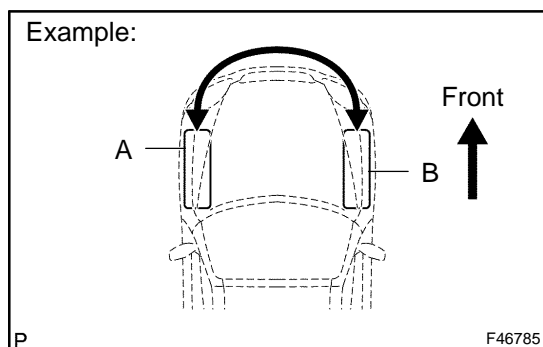
Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

**13 IDENTIFY TRANSMITTER CORRESPONDING TO DTC (SEE PAGE 05-710)****14 INTERCHANGE TIRES**

HINT:

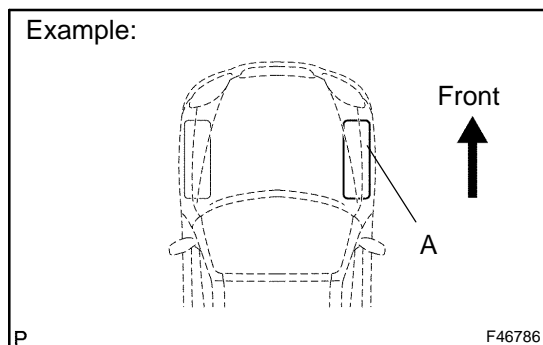
When "A" (left front) is identified at step 13:

(a) Interchange tire "A" with normal tire "B".

**15 SET TIRE PRESSURE TO NORMAL VALUE**

(a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

**16 FORCIBLY TRANSMIT TRANSMITTER ID**

(a) Remove the valve core of tire "A", rapidly reduce the tire pressure, and forcibly transmit the transmitter ID of the tire pressure monitor valve sub-assy.



17 | **CHECK DTC AGAIN**

(a) Check for DTC.

OK: DTC is not output

HINT:

- If a DTC is output, replace the identified tire pressure monitor valve sub-assy.
- Register the transmitter ID after replacement, and then set the tire pressure to the specified value.

NG**REPLACE TIRE PRESSURE MONITOR VALVE
SUB-ASSY (SEE PAGE 28-6)****OK****REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)**

DTC	C2121/21	TRANSMITTER ID1 NOT RECEIVED(MAIN)
DTC	C2122/22	TRANSMITTER ID2 NOT RECEIVED(MAIN)
DTC	C2123/23	TRANSMITTER ID3 NOT RECEIVED(MAIN)
DTC	C2124/24	TRANSMITTER ID4 NOT RECEIVED(MAIN)
DTC	C2125/25	TRANSMITTER ID5 NOT RECEIVED(MAIN)
DTC	C2131/31	TRANSMITTER ID1 NOT RECEIVED(2ND)
DTC	C2132/32	TRANSMITTER ID2 NOT RECEIVED(2ND)
DTC	C2133/33	TRANSMITTER ID3 NOT RECEIVED(2ND)
DTC	C2134/34	TRANSMITTER ID4 NOT RECEIVED(2ND)
DTC	C2135/35	TRANSMITTER ID5 NOT RECEIVED(2ND)
DTC	C2181/81	TRANSMITTER ID1 NOT RECEIVED(TEST DIAGNOSIS)
DTC	C2182/82	TRANSMITTER ID2 NOT RECEIVED(TEST DIAGNOSIS)
DTC	C2183/83	TRANSMITTER ID3 NOT RECEIVED(TEST DIAGNOSIS)
DTC	C2184/84	TRANSMITTER ID4 NOT RECEIVED(TEST DIAGNOSIS)
DTC	C2185/85	TRANSMITTER ID5 NOT RECEIVED(TEST DIAGNOSIS)

CIRCUIT DESCRIPTION

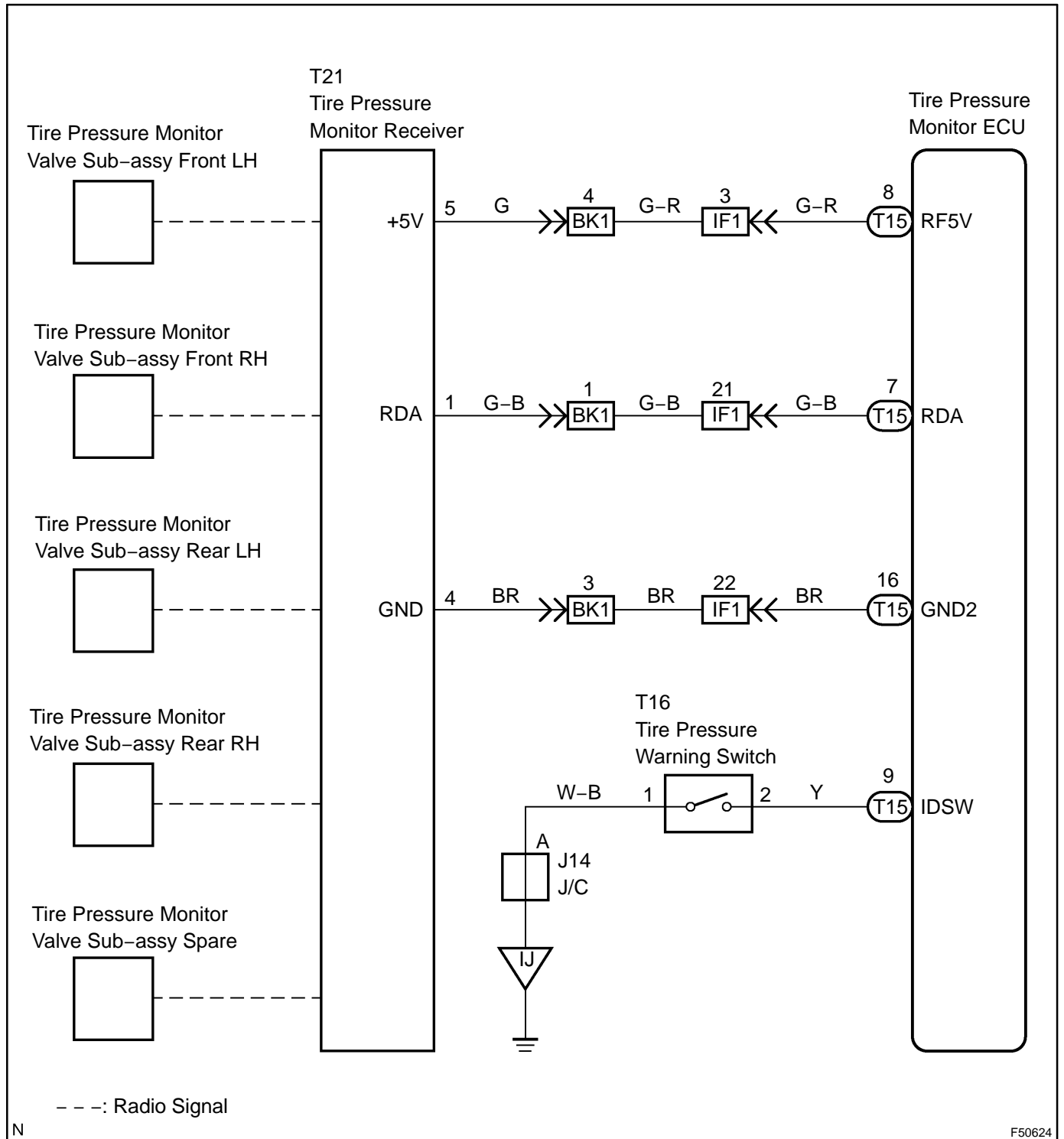
The tire pressure monitor valve sub-assy constantly sends radio waves to the tire pressure monitor receiver assy. If the battery for the tire pressure monitor valve sub-assy is depleted, or if the tire pressure monitor receiver assy is defective or comes off, the DTC will be output. DTCs C2121/21 to C2125/25 and C2131/31 to C2135/35 can only be deleted by the tester. DTCs C2181/81 to C2185/85 can be deleted when the transmitter sends a force transmission signal or the test mode ends. DTCs C2181/81 to C2185/85 are output only in the test mode.

DTC No.	DTC Detecting Condition	Trouble Area
C2121/21 C2122/22 C2123/23 C2124/24 C2125/25 C2131/31 C2132/32 C2133/33 C2134/34 C2135/35 C2181/81 C2182/82 C2183/83 C2184/84 C2185/85	These DTCs are detected when no signals are received for 51 minutes or more, after which a vehicle speed of 5 mph (8 km/h) or more is detected and no signals are still received for 12 minutes or more.	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor valve sub-assy • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

HINT:

It is necessary to perform the procedure to identify the tire pressure monitor valve sub-assy that is malfunctioning because it cannot be identified by the output DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value.

1 CHECK TIRE PRESSURE WARNING LAMP

- (a) Turn the ignition switch to the ON position.
- (b) Check the tire pressure warning lamp.

Result:

A	Does not blink
B	Comes on and goes off repeatedly at 0.5 second intervals

B → Go to step 4

A

2 CLEAR DTC (SEE PAGE 05-654)

3 CHECK DTC

- (a) Check for DTC.
OK: DTC is not output.

NG → Go to step 4

OK

REFER TO PROBLEM SYMPTOMS TABLE

4 CHECK DTC

- (a) Is DTC C2121/21, C2122/22, C2123/23, C2124/24, or C2125/25 output?

NO → Go to step 12

YES

5 CHECK DTC

- (a) Are DTCs C2121/21, C2122/22, C2123/23, C2124/24, and C2125/25 all output?

NO → Go to step 19

YES

6 CHECK TIRE PRESSURE WARNING SWITCH MAIN POSITION

OK:

Tire pressure warning switch is set to "MAIN".

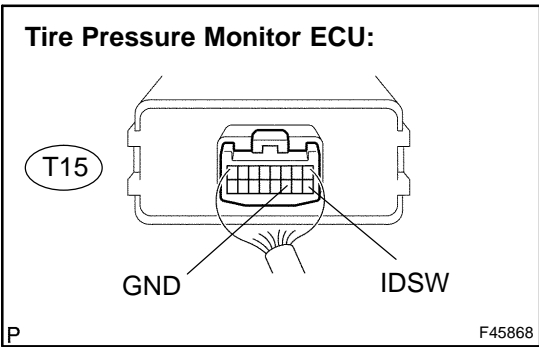
HINT:

If the tire pressure warning switch is not set to "MAIN", set the tire pressure to the specified value and set the tire pressure warning switch to the "MAIN". Afterwards, forcibly transmit the transmitter ID by rapidly reducing the all tire pressure and go to step 1.

NG Go to step 1

OK

7 INSPECT TIRE PRESSURE MONITOR ECU



- (a) Connect the tire pressure monitor ECU T15 connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

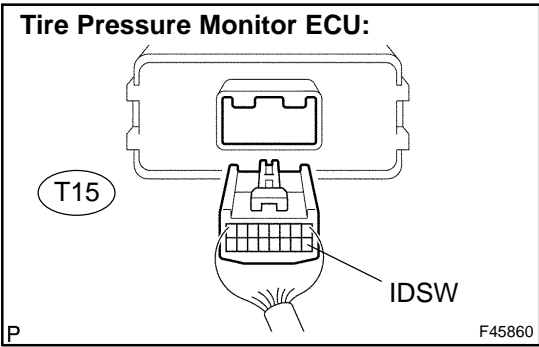
Tester Connection	Specified Condition
T15-9 (IDSW) – T15-11 (GND)	10 V or higher

NG Go to step 8

OK

Go to step10

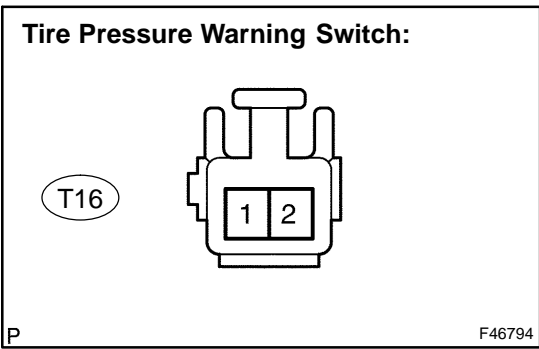
8 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector and tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

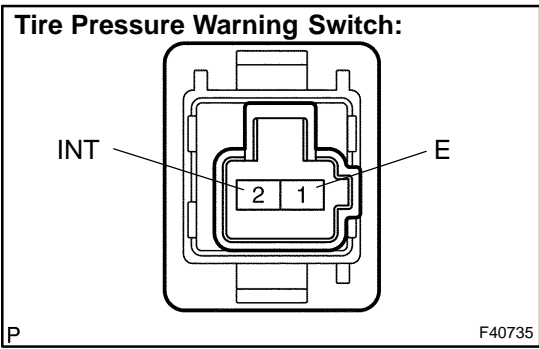
Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9 INSPECT TIRE PRESSURE WARNING SWITCH



- (a) Disconnect tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 kΩ or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

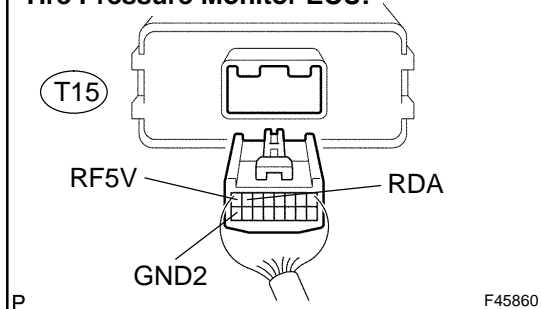
NG REPLACE TIRE PRESSURE WARNING SWITCH

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

10 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR RECEIVER ASSY - TIRE PRESSURE MONITOR ECU) (SEE PAGE 01-36)

Tire Pressure Monitor ECU:

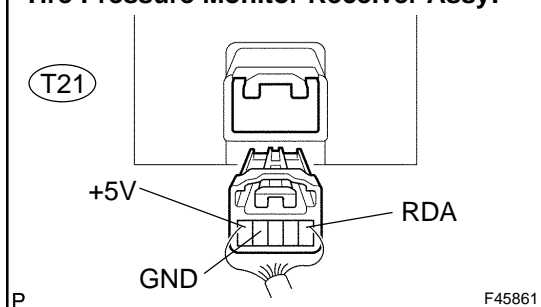


- Disconnect the tire pressure monitor receiver assy T21 connector and tire pressure monitor ECU T15 connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-7 (RDA) - T21-1 (RDA)	Below 1 Ω
T15-8 (RF5V) - T21-5 (+5V)	Below 1 Ω
T15-16 (GND2) - T21-4 (GND)	Below 1 Ω
T15-7 (RDA) - Body ground	10 k Ω or higher
T15-8 (RF5V) - Body ground	10 k Ω or higher
T15-16 (GND2) - Body ground	10 k Ω or higher

Tire Pressure Monitor Receiver Assy:



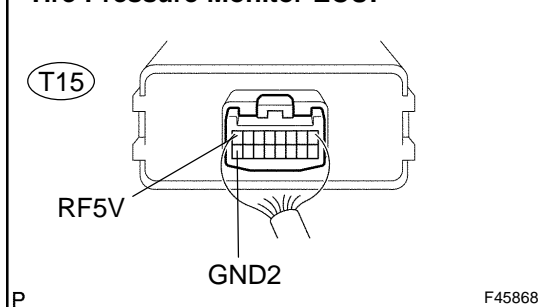
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

11 INSPECT TIRE PRESSURE MONITOR ECU

Tire Pressure Monitor ECU:



- Connect the tire pressure monitor ECU T15 connector.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-8 (RF5V) - T15-16 (GND2)	4.5 to 5.5 V

NG

CHECK POWER SOURCE CIRCUIT (SEE PAGE 05-704)

OK

REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)

12 CHECK DTC

- Are DTCs C2131/31, C2132/32, C2133/33, C2134/34 and C2135/35 all output?

NO

Go to step 19

YES

13	CHECK TIRE PRESSURE WARNING SWITCH 2ND POSITION
-----------	--

OK:

Tire pressure warning switch is set to "2nd".

HINT:

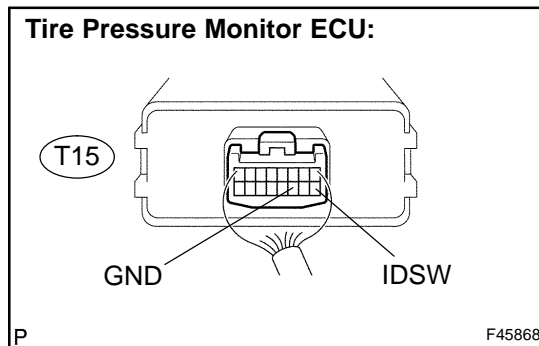
If the tire pressure warning switch is not set to "2nd", set the tire pressure to the specified value and set the tire pressure warning switch to the "2nd". Afterwards, forcibly transmit the transmitter ID by rapidly reducing the all tire pressure and go to step 1.

NG	Go to step 1
-----------	---------------------

OK

14	INSPECT TIRE PRESSURE MONITOR ECU
-----------	--

Tire Pressure Monitor ECU:



- (a) Connect the tire pressure monitor ECU T15 connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-9 (IDSW) – T15-11 (GND)	Below 6 V

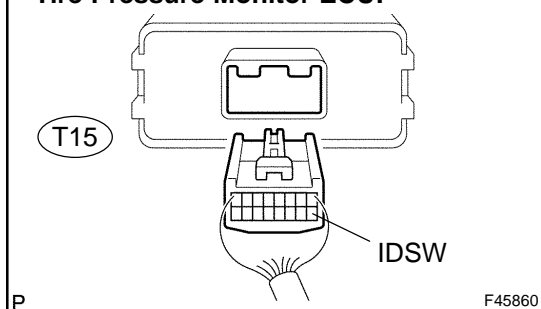
NG	Go to step 15
-----------	----------------------

OK

Go to step 17

15 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)

Tire Pressure Monitor ECU:

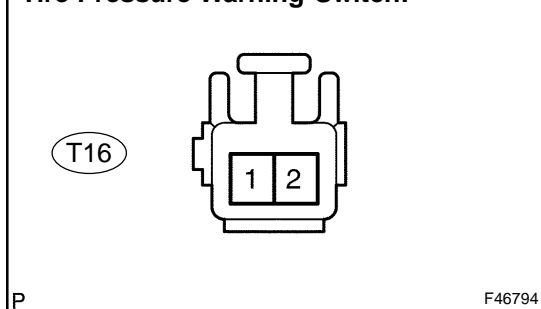


- Disconnect the tire pressure monitor ECU T15 connector and tire pressure warning switch T16 connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 k Ω or higher

Tire Pressure Warning Switch:



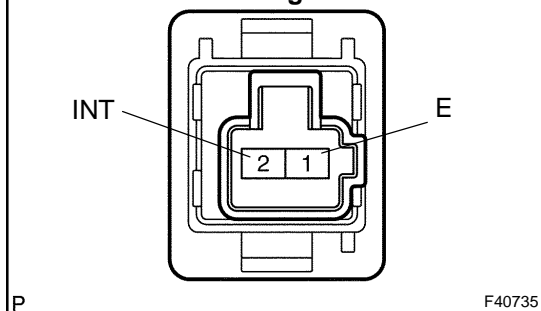
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

16 INSPECT TIRE PRESSURE WARNING SWITCH

Tire Pressure Warning Switch:



- Disconnect tire pressure warning switch T16 connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 k Ω or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

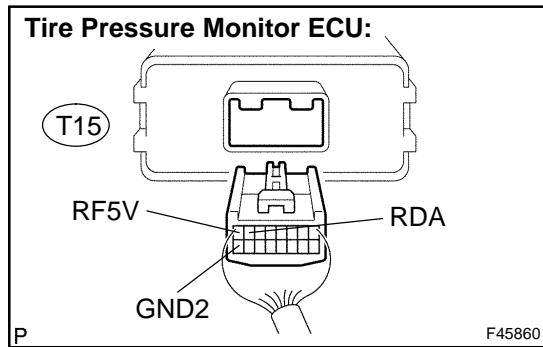
NG

REPLACE TIRE PRESSURE WARNING SWITCH

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

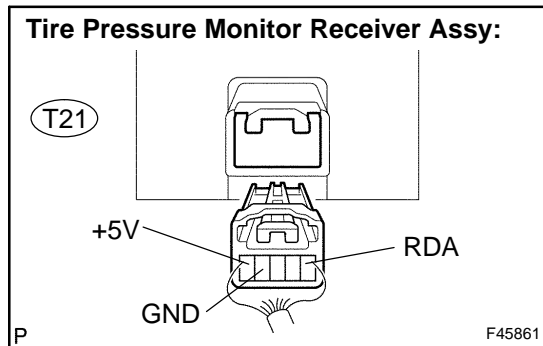
17 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR RECEIVER ASSY - TIRE PRESURE MONITOR ECU) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor receiver assy T21 connector and tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

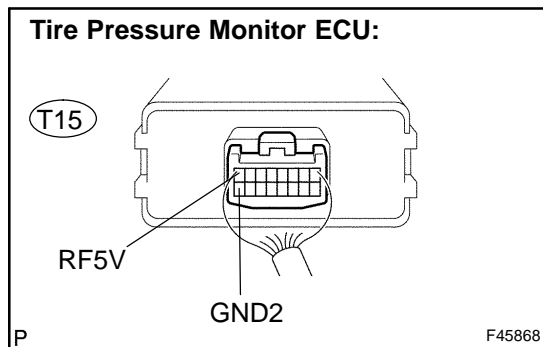
Tester Connection	Specified Condition
T15-7 (RDA) - T21-1 (RDA)	Below 1 Ω
T15-8 (RF5V) - T21-5 (+5V)	Below 1 Ω
T15-16 (GND2) - T21-4 (GND)	Below 1 Ω
T15-7 (RDA) - Body ground	10 kΩ or higher
T15-8 (RF5V) - Body ground	10 kΩ or higher
T15-16 (GND2) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

18 INSPECT TIRE PRESSURE MONITOR ECU



- (a) Connect the tire pressure monitor ECU T15 connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-8 (RF5V) - T15-16 (GND2)	4.5 to 5.5 V

NG CHECK POWER SOURCE CIRCUIT (SEE PAGE 05-704)

OK

REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)

19 SET TIRE PRESSURE TO NORMAL VALUE

(a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

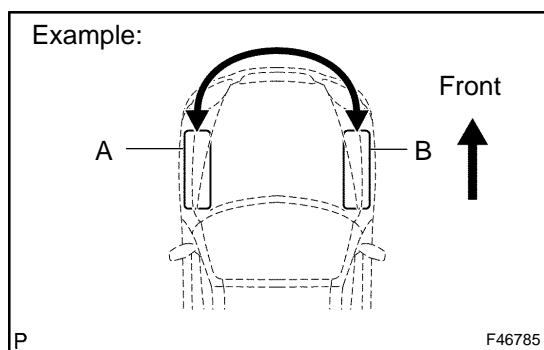
20 IDENTIFY TRANSMITTER CORRESPONDING TO DTC (SEE PAGE 05-710)

21 INTERCHANGE TIRES

HINT:

When "A" (left front) is identified at step 20:

(a) Interchange tire "A" with normal tire "B".

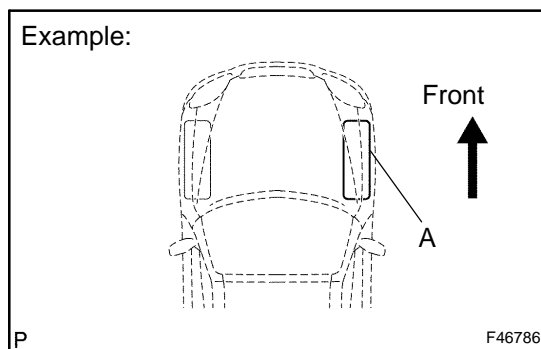


22 SET TIRE PRESSURE TO NORMAL VALUE

(a) Set the tire pressure of all wheels to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

23	FORCIBLY TRANSMIT TRANSMITTER ID
-----------	---



- (a) Remove the valve core of the tire "A", rapidly reduce the tire pressure, and forcibly transmit the transmitter ID of the tire pressure monitor valve sub-assy.



24	CHECK DTC AGAIN
-----------	------------------------

- (a) Check for DTC.
OK: DTC is not output.

HINT:

- If a DTC is output, replace the identified tire pressure monitor valve sub-assy.
- Register the transmitter ID after replacement, and then set the tire pressure to the specified value.

NG

REPLACE TIRE PRESSURE MONITOR VALVE SUB-ASSY (SEE PAGE 28-6)

OK

REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)

DTC	C2141/41	TRANSMITTER ID1 ERROR
------------	-----------------	------------------------------

DTC	C2142/42	TRANSMITTER ID2 ERROR
------------	-----------------	------------------------------

DTC	C2143/43	TRANSMITTER ID3 ERROR
------------	-----------------	------------------------------

DTC	C2144/44	TRANSMITTER ID4 ERROR
------------	-----------------	------------------------------

DTC	C2145/45	TRANSMITTER ID5 ERROR
------------	-----------------	------------------------------

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C2141/41 C2142/42 C2143/43 C2144/44 C2145/45	If an "ERROR" signal is received 3 times consecutively, the tire pressure monitor valve sub-assy will be judged as defective and this DTC will be output. This will happen in situations where the inflation pressure is outside the range 0 to 637.5 kPa (0 to 6.48 kgf/cm ² , 0 psi to 92.2 psi), the temperature inside the tire is outside the specified range -40 to 215 °C (-40 to 419 °F), or an error occurs in the tire pressure monitor valve sub-assy or the area.	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy

HINT:

It is necessary to perform the procedure to identify the tire pressure monitor valve sub-assy that is malfunctioning because it cannot be identified by the output DTC.

INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value.

1	CHECK TIRE PRESSURE WARNING LAMP
----------	---

(a) Check the tire pressure warning lamp.

Result:

A	Does not blink
B	Comes on and goes off repeatedly at 0.5 second intervals

B	Go to step 5
----------	---------------------

A

2	IDENTIFY TRANSMITTER CORRESPONDING TO DTC (SEE PAGE 05-710)
----------	--

--

3	CLEAR DTC (SEE PAGE 05-654)
----------	------------------------------------

--

4	CHECK DTC
----------	------------------

(a) Check for DTC.

OK: DTC is not output

HINT:

- If the result is OK, replace the tire pressure monitor valve sub-assy specified in STEP 2.
- Register the transmitter ID after replacement, and then set the tire pressure to the specified value.

NG

Go to step 9

OK

REPLACE TIRE PRESSURE MONITOR VALVE SUB-ASSY (SEE PAGE 28-6)

5	IDENTIFY TRANSMITTER CORRESPONDING TO RECORDED DTC (SEE PAGE 05-710)
----------	---

6	REPLACE TIRE PRESSURE MONITOR VALVE SUB-ASSY
----------	---

(a) Replace the identified tire pressure monitor valve sub-assy with a new one.

7	REGISTRATION OF TRANSMITTER ID (SEE PAGE 05-642)
----------	---

- (a) Register the transmitter ID for all wheels.
 (b) Set tire pressure to the specified value.

8	CHECK DTC
----------	------------------

(a) Check for DTC.

OK: DTC is not output.

NG

Go to step 9

OK

END

9	REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)
----------	--

HINT:

Perform the inspection using parts from a normal vehicle when possible.

10	CHECK DTC
-----------	------------------

- (a) Check for DTC.
OK: DTC is not output.

NG	REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)
-----------	--

OK

END

DTC	C2165/65	ABNORMAL TEMPERATURE INSIDE ID1 TIRE
------------	-----------------	---

DTC	C2166/66	ABNORMAL TEMPERATURE INSIDE ID2 TIRE
------------	-----------------	---

DTC	C2167/67	ABNORMAL TEMPERATURE INSIDE ID3 TIRE
------------	-----------------	---

DTC	C2168/68	ABNORMAL TEMPERATURE INSIDE ID4 TIRE
------------	-----------------	---

DTC	C2169/69	ABNORMAL TEMPERATURE INSIDE ID5 TIRE
------------	-----------------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C2165/65 C2166/66 C2167/67 C2168/68 C2169/69	The temperature inside the tire is outside the range -40 to 215°C (-40 to 419°F).	<ul style="list-style-type: none"> • Tire pressure monitor valve sub-assy • Tire pressure monitor ECU • Tire pressure monitor receiver assy

HINT:

It is necessary to perform the procedure to identify the tire pressure monitor valve sub-assy that is malfunctioning because it cannot be identified by the output DTC.

INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value.

1	CHECK TIRE PRESSURE WARNING LAMP
----------	---

(a) Check the tire pressure warning lamp.

Result:

A	Does not blink
B	Comes on and goes off repeatedly at 0.5 second intervals

B	Go to step 7
----------	---------------------

A

2	IDENTIFY TRANSMITTER CORRESPONDING TO DTC (SEE PAGE 05-710)
----------	--

3 CHECK TIRES

- (a) Check the tire is not punctured, and there is no indication of air pressure drop.
OK: Tire is normal.

NG → **REPLACE TIRES**

OK

4 CLEAR DTC (SEE PAGE 05-654)**5 CHECK DTC**

- (a) Check for DTC.
OK: DTC is not output.

HINT:

- If the result is OK, replace the tire pressure monitor valve sub-assy specified in STEP 2.
- Register the transmitter ID after replacement, and then set the tire pressure to the specified value.

NG → **Go to step 11**

OK

REPLACE TIRE PRESSURE MONITOR VALVE SUB-ASSY (SEE PAGE 28-6)**6 IDENTIFY TRANSMITTER CORRESPONDING TO DTC (SEE PAGE 05-710)****7 CHECK TIRES**

- (a) Check the tire is not punctured, and there is no indication of air pressure drop.
OK: Tire is normal.

NG → **REPLACE TIRES**

OK

8 REPLACE TIRE PRESSURE MONITOR VALVE SUB-ASSY (SEE PAGE 28-6)

- (a) Replace the identified tire pressure monitor valve sub-assy with a new one.

9 REGISTRATION OF TRANSMITTER ID (SEE PAGE 05-642)

- (a) Register the transmitter ID for all wheels.
(b) Set the tire pressure to the specified value.

**10 CHECK DTC**

- (a) Check for DTC.
OK: DTC is not output.

NG**Go to step 11****OK****END****11 REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY (SEE PAGE 28-5)**

HINT:

Perform the inspection using parts from a normal vehicle when possible.

**12 CHECK DTC**

- (a) Check for DTC.
OK: DTC is not output.

NG**REPLACE TIRE PRESSURE MONITOR ECU
(SEE PAGE 28-9)****OK****END**

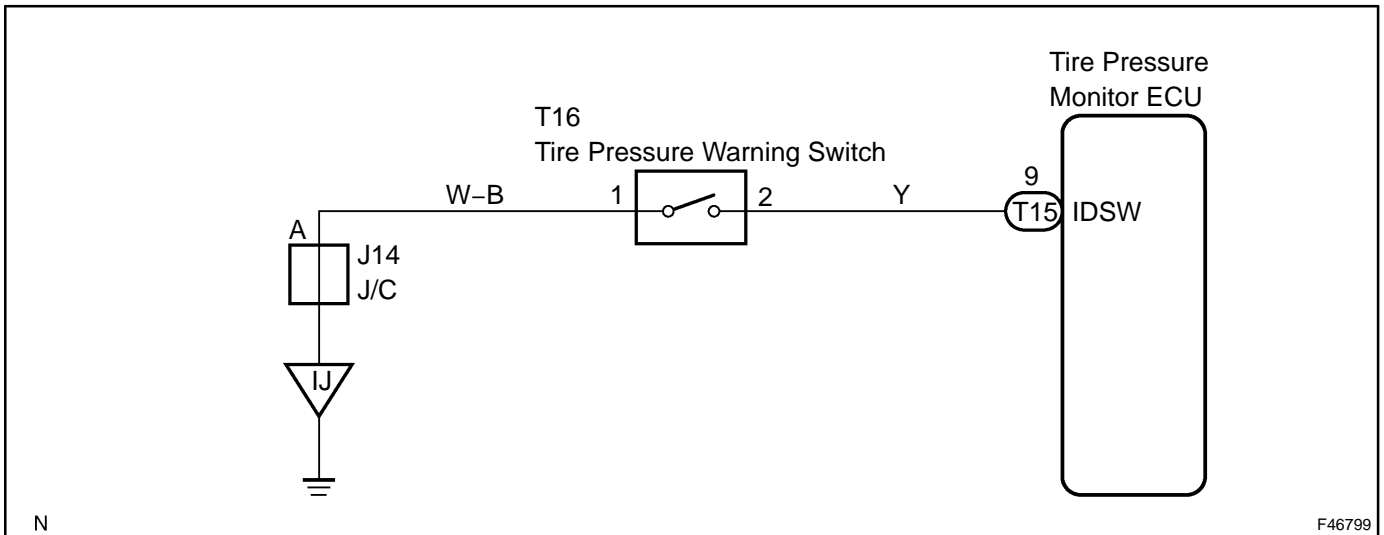
DTC	C2171/71	TRANSMITTER ID NOT REGISTERED(MAIN)
------------	-----------------	--

DTC	C2172/72	TRANSMITTER ID NOT REGISTERED(2ND)
------------	-----------------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C2171/71 C2172/72	Transmitter ID code is not registered. (When an ID code is unregistered for 51 minutes or more.)	<ul style="list-style-type: none"> • Tire pressure monitor ECU • Tire pressure warning switch • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value.

1	CHECK TIRE PRESSURE WARNING LAMP
----------	---

(a) Check the tire pressure warning lamp.

Result:

A	Does not blink
B	Comes on and goes off repeatedly at 0.5 second intervals

B	Go to step 4
----------	---------------------

A

2	CLEAR DTC (SEE PAGE 05-654)
----------	------------------------------------

--

3 CHECK DTC

- (a) Check for DTC.
OK: DTC is not output.

NG REPLACE TIRE PRESSURE MONITOR ECU
(SEE PAGE 28-9)

OK

END (Perform procedures to check if the transmitter ID is registered (see page 05-642).)

4 CHECK DTC

- (a) Check if DTC C2171/71 is output.

NO Go to step 9

YES

5 CHECK TIRE PRESSURE WARNING SWITCH MAIN POSITION

OK:
Tire pressure warning switch is set to "MAIN".

HINT:

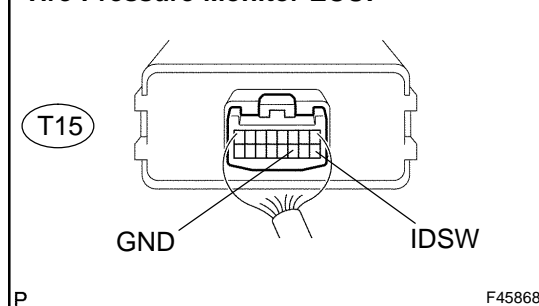
If the tire pressure warning switch is not set to "MAIN", set the tire pressure warning switch to the "MAIN" and go to step 1.

NG Go to step 1

OK

6 INSPECT TIRE PRESSURE MONITOR ECU

Tire Pressure Monitor ECU:



- (a) Connect the tire pressure monitor ECU T15 connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard:

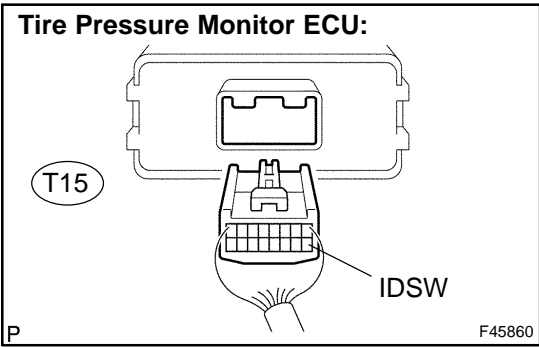
Tester Connection	Specified Condition
T15-9 (IDSW) - T15-11 (GND)	10 V or higher

NG Go to step 7

OK

REGISTRATION OF TRANSMITTER ID (SEE PAGE 05-642)

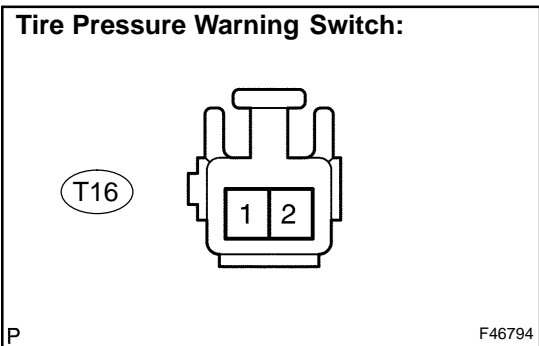
7 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector and tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

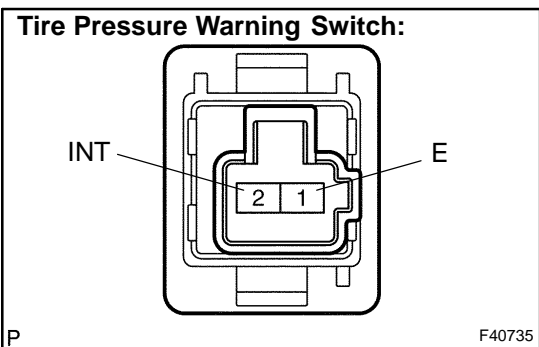
Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8 INSPECT TIRE PRESSURE WARNING SWITCH



- (a) Disconnect tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 kΩ or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

NG REPLACE TIRE PRESSURE WARNING SWITCH

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

9 CHECK TIRE PRESSURE WARNING SWITCH 2ND POSITION

OK:

Tire pressure warning switch is set to "2nd".

HINT:

If the tire pressure warning switch is not set to "2nd", set the tire pressure warning switch to the "2nd" and go to step 1.

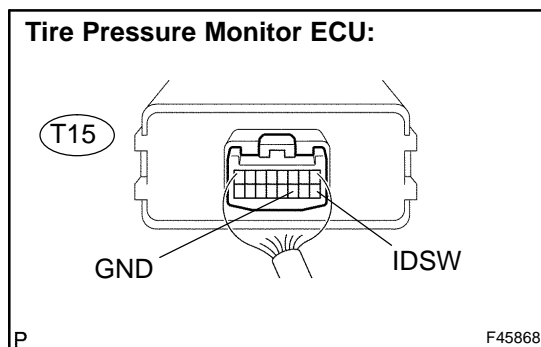
NG

Go to step 1

OK

10 INSPECT TIRE PRESSURE MONITOR ECU

Tire Pressure Monitor ECU:



- Connect the tire pressure monitor ECU T15 connector.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-9 (IDSW) - T15-11 (GND)	Below 6 V

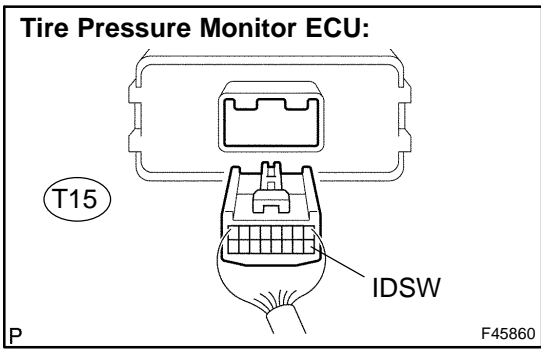
NG

Go to step 11

OK

REGISTRATION OF TRANSMITTER ID (SEE PAGE 05-642)

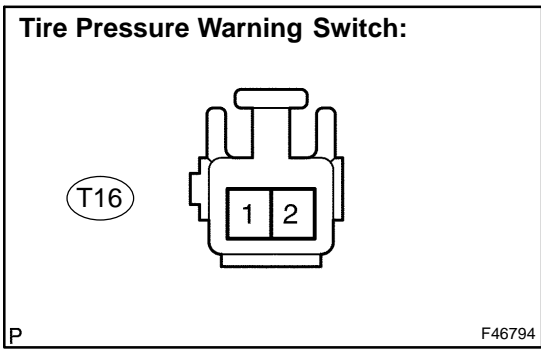
11 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector and tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

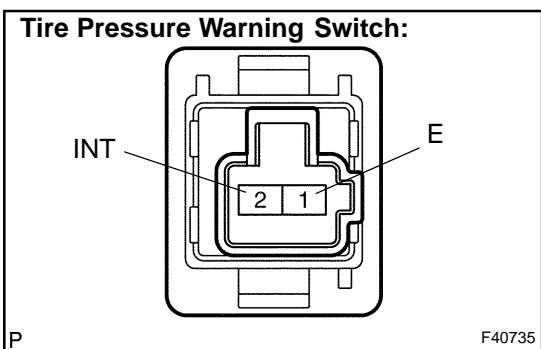
Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

12 INSPECT TIRE PRESSURE WARNING SWITCH



- (a) Disconnect tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 kΩ or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

NG REPLACE TIRE PRESSURE WARNING SWITCH

OK

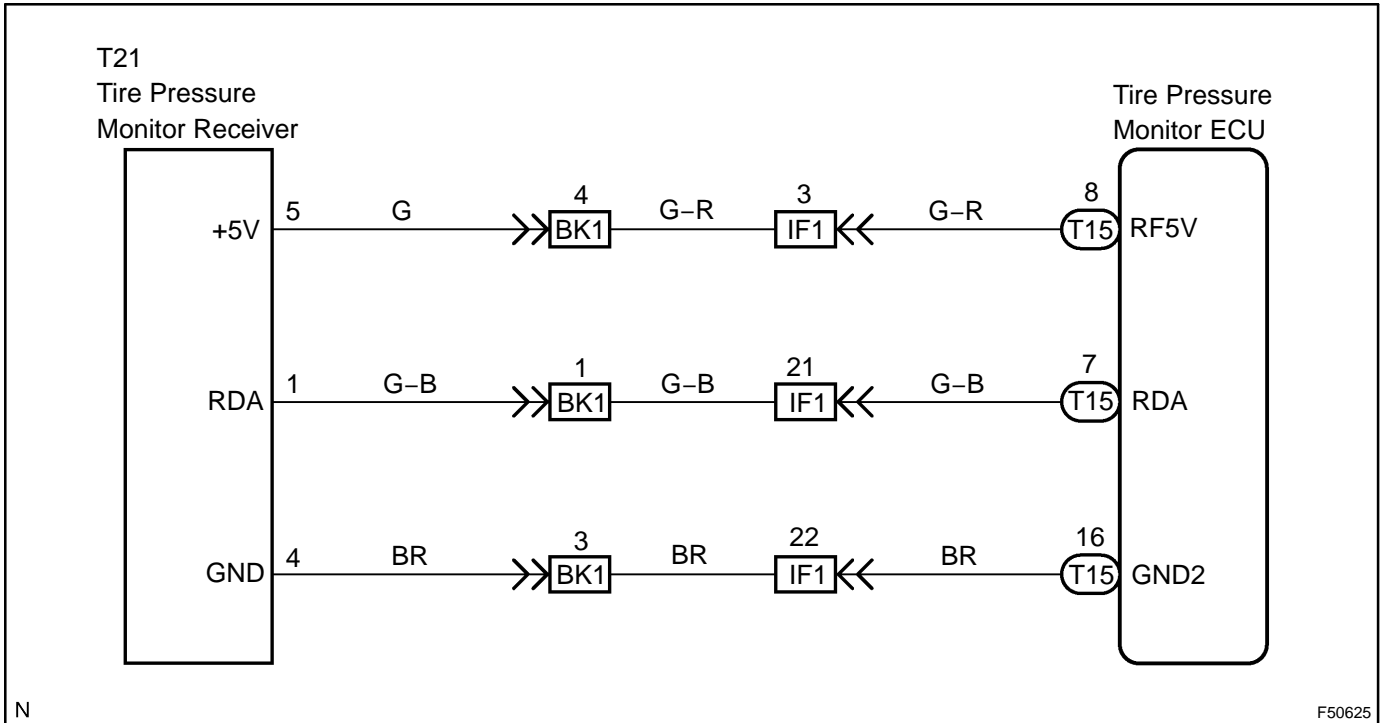
REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

DTC	C2176/76	RECEIVER ERROR
------------	-----------------	-----------------------

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C2176/76	DTC is stored when either of the following is detected: <ul style="list-style-type: none"> • EEPROM data is invalid to use. • Terminal RF5V is shorted to ground. 	<ul style="list-style-type: none"> • Tire pressure monitor receiver assy • Tire pressure monitor ECU • Wire harness

WIRING DIAGRAM

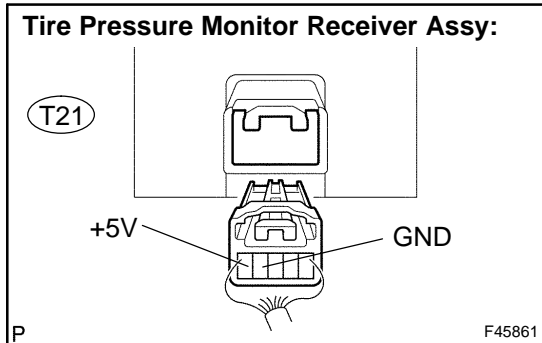


INSPECTION PROCEDURE

HINT:

Set the tire pressure to the specified value.

1 INSPECT TIRE PRESSURE MONITOR RECEIVER ASSY



- (a) Disconnect the tire pressure monitor receiver assy T21 connector.
- (b) Measure the voltage according to the value(s) in the table below.

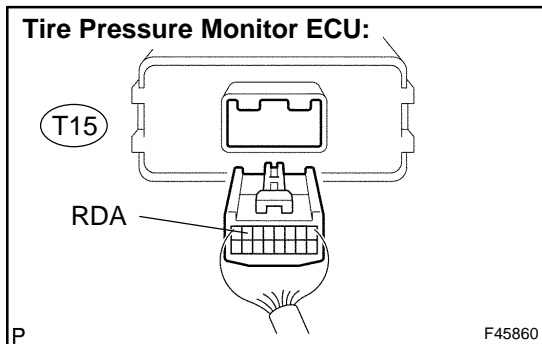
Standard:

Tester Connection	Specified Condition
T21-4 (GND) - T21-5 (+5V)	4.5 to 5.5 V

NG Go to step 3

OK

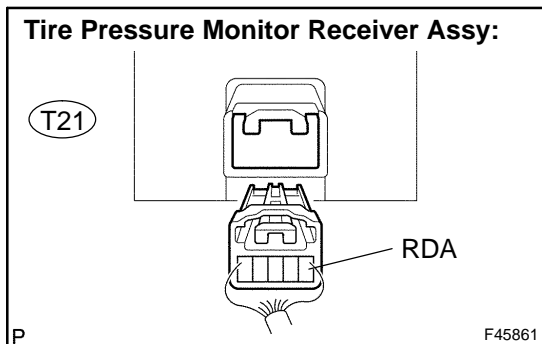
2 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR RECEIVER ASSY - TIRE PRESSURE MONITOR ECU) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor receiver assy T21 connector and tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

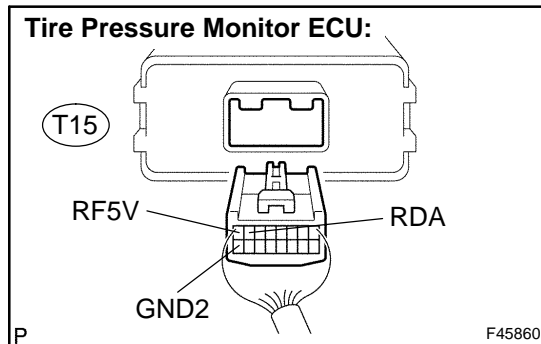
Tester Connection	Specified Condition
T15-7 (RDA) - T21-1 (RDA)	Below 1 Ω



OK Go to step 5

NG

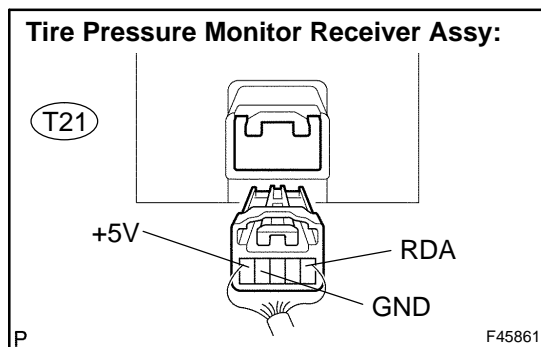
3 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR RECEIVER ASSY - TIRE PRESSURE MONITOR ECU)(SEE PAGE 01-36)



- Disconnect the tire pressure monitor receiver assy T21 connector and tire pressure monitor ECU T15 connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-7 (RDA) - T21-1 (RDA)	Below 1 Ω
T15-8 (RF5V) - T21-5 (+5V)	Below 1 Ω
T15-16 (GND2) - T21-4 (GND)	Below 1 Ω
T15-7 (RDA) - Body ground	10 k Ω or higher
T15-8 (RF5V) - Body ground	10 k Ω or higher
T15-16 (GND2) - Body ground	10 k Ω or higher



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK POWER SOURCE CIRCUIT(SEE PAGE 05-704)

NG

REPAIR OR REPLACE POWER SOURCE CIRCUIT

OK

5 REPLACE TIRE PRESSURE MONITOR RECEIVER ASSY

HINT:

Perform the inspection using parts from a normal vehicle when possible.

6 CHECK DTC

- Check for DTC.
OK: DTC is not output.

NG

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

OK

END

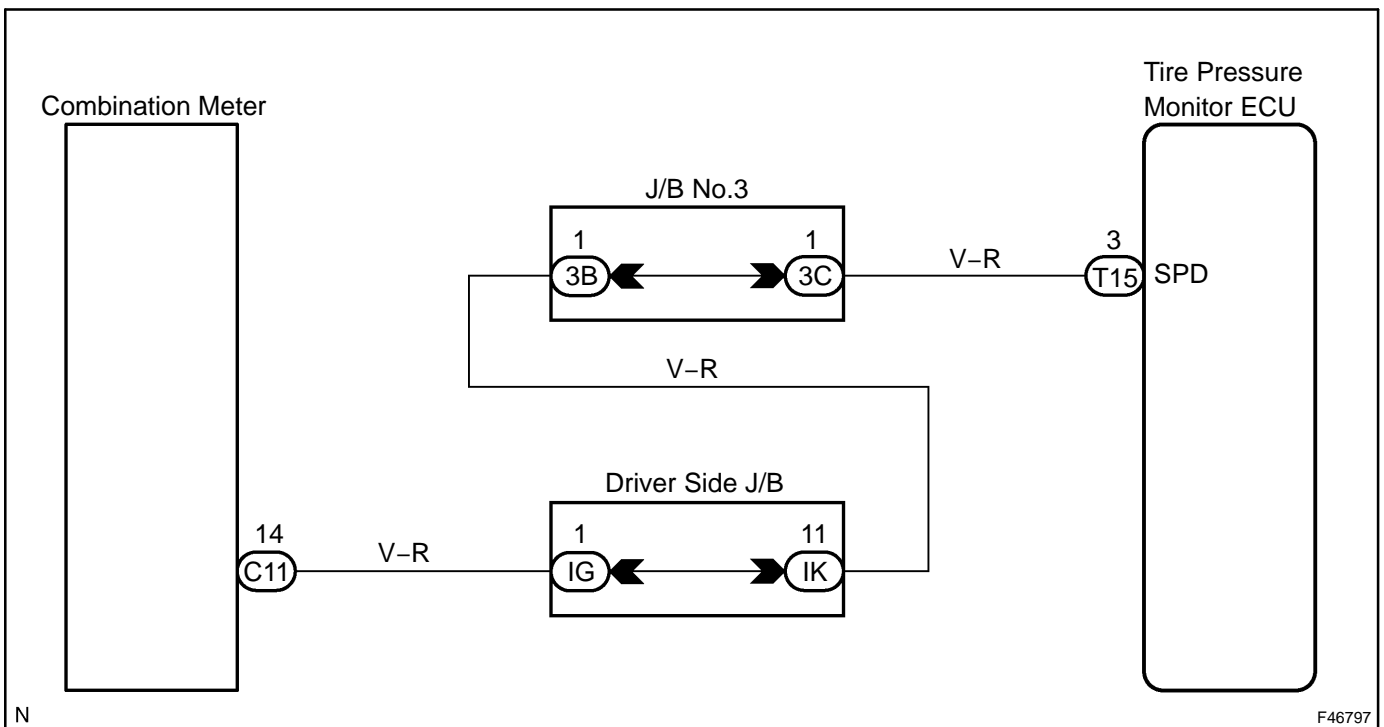
DTC	C2191/91	VEHICLE SPEED SIGNAL ERROR(TEST DIAGNOSIS)
------------	-----------------	---

CIRCUIT DESCRIPTION

The tire pressure monitor ECU receives a speed signal from the combination meter. This DTC is stored upon entering the test mode but erased when a vehicle speed signal of 12 mph (20 km/h) is detected for 3 seconds or more. The DTC is output only in the test mode.

DTC No.	DTC Detecting Condition	Trouble Area
C2191/91	Speed sensor circuit malfunction.	<ul style="list-style-type: none"> • Vehicle speed sensor • Combination meter assy • Tire pressure monitor ECU • Wire harness

WIRING DIAGRAM



N

F46797

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE ON HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

TIRE PRESSURE:

Item	Normal Condition
VEHICLE SPEED	Actual vehicle speed

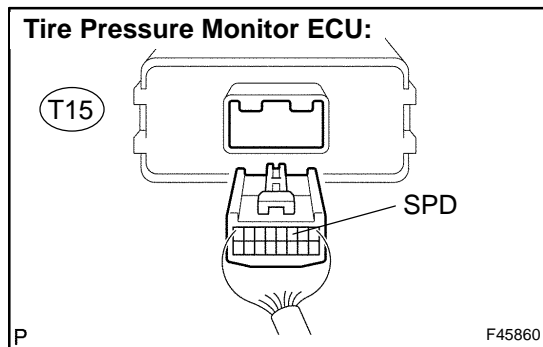
- (d) Check that the values indicated on the tester and the combination meter are the same.

OK: Indicates actual speed

OK → **REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)**

NG

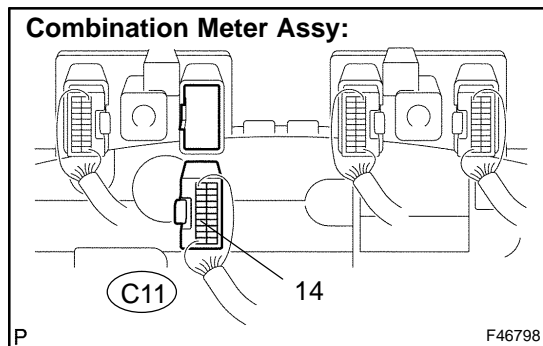
2 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - COMBINATION METER ASSY) (SEE PAGE 01-36)



- (a) Disconnect the combination meter assy C11 connector and tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-3 (SPD) - C11-14	Below 1 Ω
T15-3 (SPD) - Body ground	10 kΩ or higher

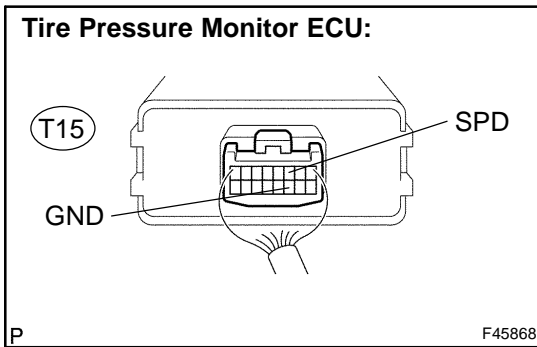


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 INSPECT TIRE PRESSURE MONITOR ECU

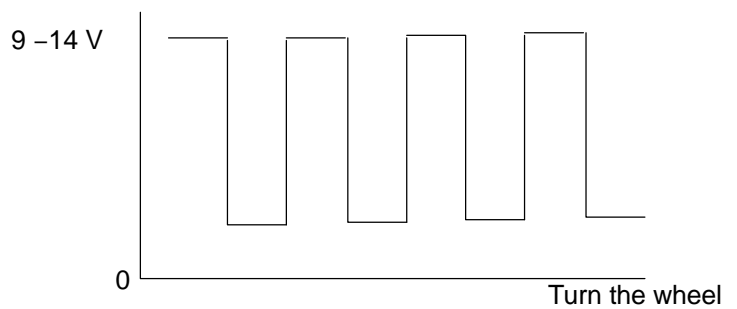
Tire Pressure Monitor ECU:



- (a) Remove the tire pressure monitor ECU with connectors still connected.
- (b) Check voltage.
 - (1) Move the shift lever to the N position.
 - (2) Jack up one of the front wheels.
 - (3) Turn the ignition switch to the ON position.
 - (4) Measure the voltage between terminals T15-3 (SPD) and T15-11 (GND) of the tire pressure monitor ECU when the front wheel is turned slowly.

OK:

Voltage is generated intermittently.



NG

**REPLACE COMBINATION METER ASSY
(SEE PAGE 71-24)**

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

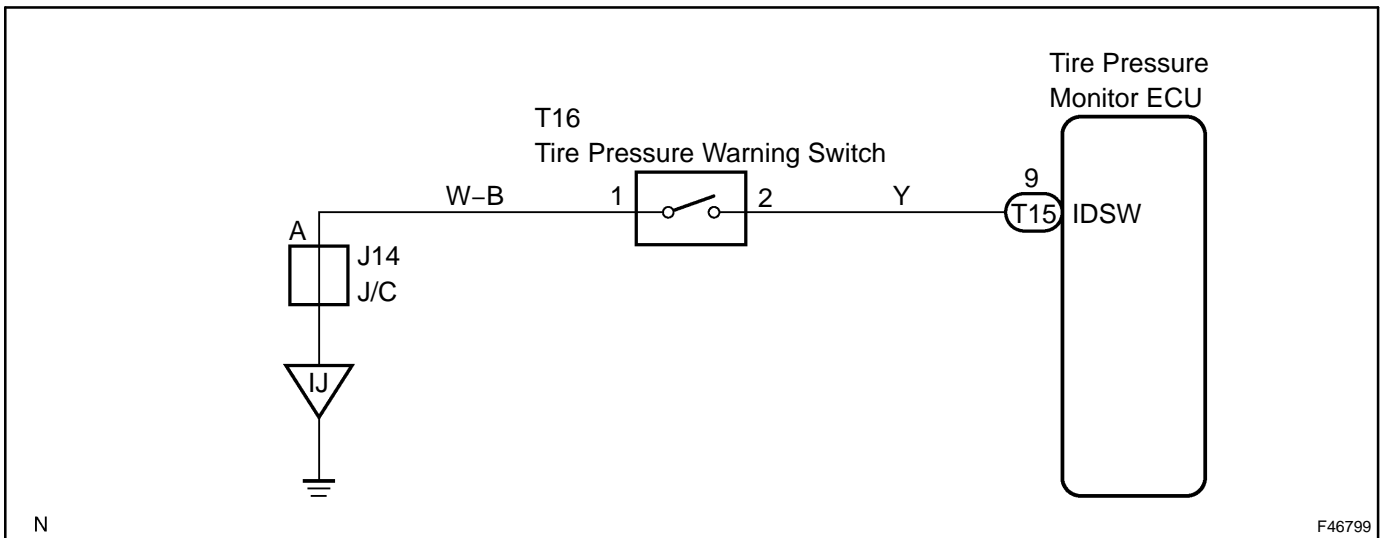
DTC	C2192/92	SELECT SWITCH ERROR(TEST DIAGNOSIS)
------------	-----------------	--

CIRCUIT DESCRIPTION

The tire pressure warning switch has 2 positions: "MAIN" and "2nd". 2 kinds of IDs (2 types of tires) for the tire pressure monitor valve sub-assy can be registered to the tire pressure monitor ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C2192/92	In test mode, switch position is not detected in the order: "MAIN", "2nd", "MAIN".	<ul style="list-style-type: none"> • Tire pressure warning switch • Tire pressure monitor ECU • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from step 2 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Select the item below in the DATA LIST, and read its value displayed on the hand-held tester.

TIRE PRESSURE:

Item	Normal Condition
SELECT SW	No pressing: MAIN Pressing: 2nd

- (d) Check that the value displayed on the hand-held tester changes by pressing the tire pressure warning switch.

OK:

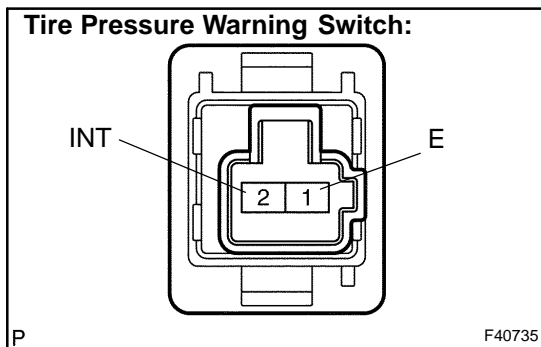
Tire pressure warning switch value changes.

NG → Go to step 2

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

2 INSPECT TIRE PRESSURE WARNING SWITCH



- (a) Disconnect the tire pressure warning switch T16 connector.
- (b) Measure the resistance according to the value(s) in the table below.

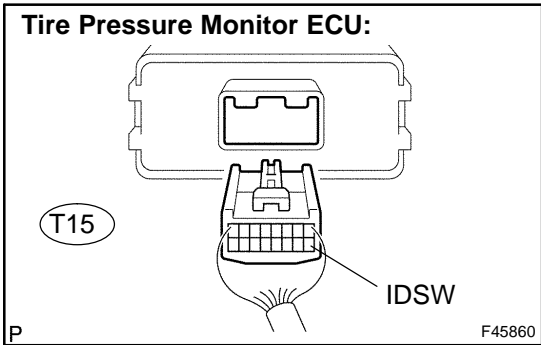
Standard:

Switch Position	Tester Connection	Specified Condition
MAIN	2 (INT) - 1 (E)	10 kΩ or higher
2nd	2 (INT) - 1 (E)	Below 1 Ω

NG → REPLACE TIRE PRESSURE WARNING SWITCH

OK

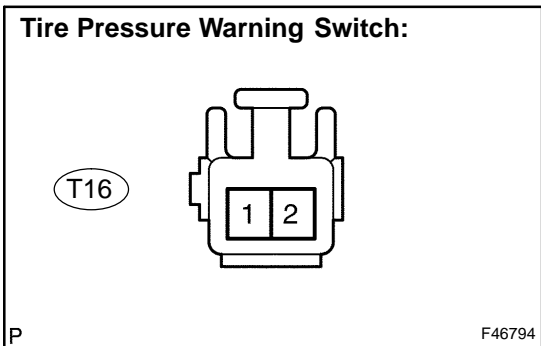
3 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - TIRE PRESSURE WARNING SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

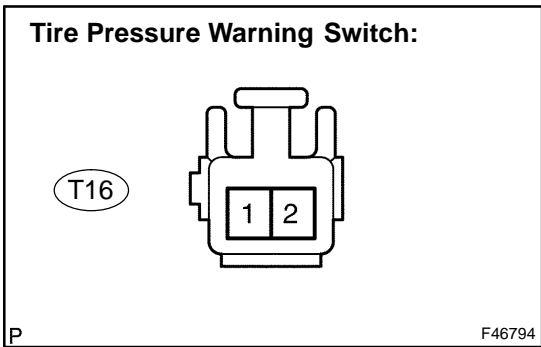
Tester Connection	Specified Condition
T15-9 (IDSW) - T16-2	Below 1 Ω
T15-9 (IDSW) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE WARNING SWITCH - BODY GROUND) (SEE PAGE 01-36)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T16-1 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

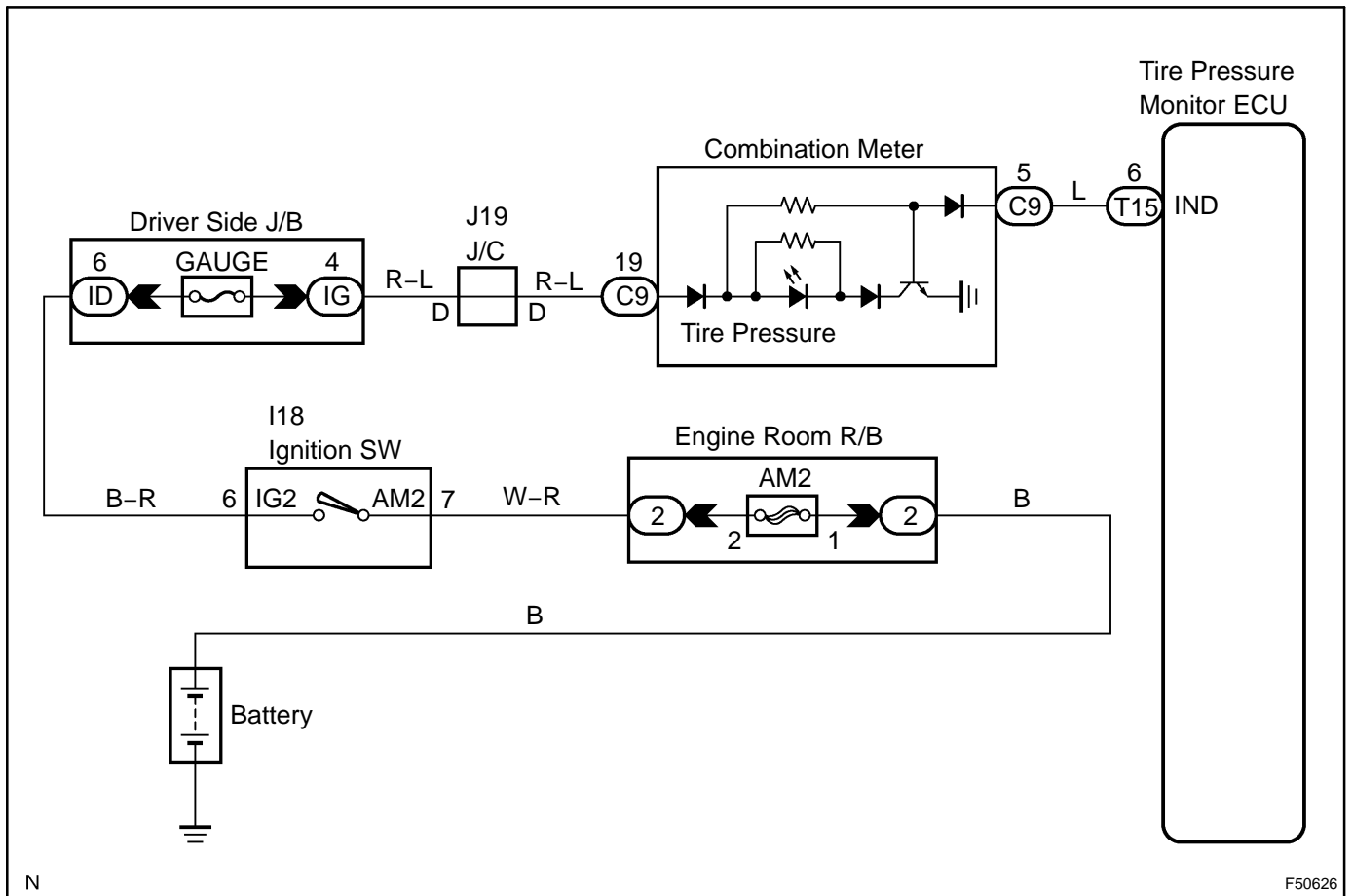
TIRE PRESSURE WARNING LAMP CIRCUIT

CIRCUIT DESCRIPTION

If the ECU detects trouble, it blinks the tire pressure warning lamp while prohibiting tire pressure monitor operation. At this time, the ECU records a DTC in memory.

Connect terminals Tc and CG of the DLC3 to make the tire pressure warning light blink and output the DTC.

WIRING DIAGRAM



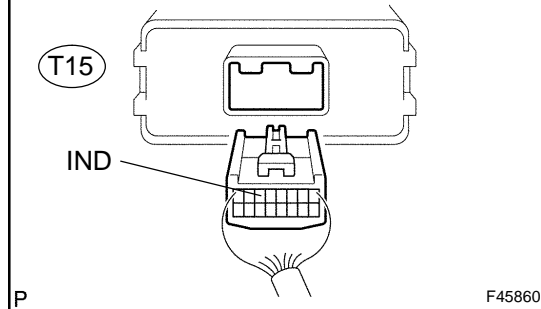
N

F50626

INSPECTION PROCEDURE

1 INSPECT TIRE PRESSURE WARNING LAMP CIRCUIT

Tire Pressure Monitor ECU:



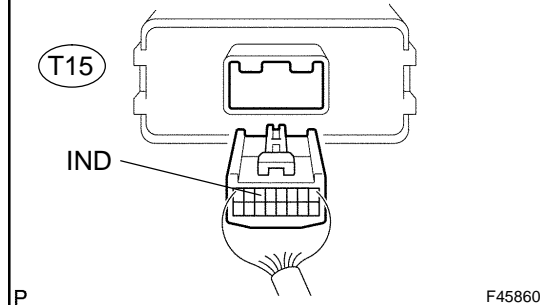
- Disconnect the tire pressure monitor ECU T15 connector.
- Connect terminal T15-6 (IND) of the tire pressure monitor ECU and body ground.
- Turn the ignition switch to the ON position.
- Check that the tire pressure warning lamp goes off.

OK:**Tire pressure warning lamp goes off****NG****Go to step 2****OK**

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

2 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - COMBINATION METER ASSY) (SEE PAGE 01-36)

Tire Pressure Monitor ECU:

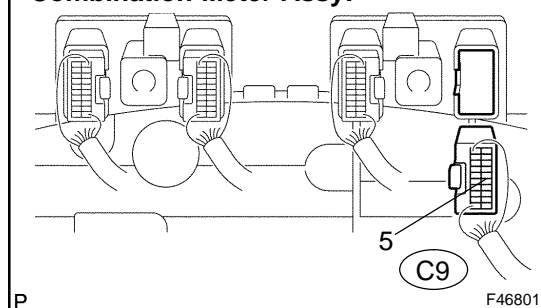


- Disconnect the tire pressure monitor ECU T15 connector and combination meter assy C9 connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

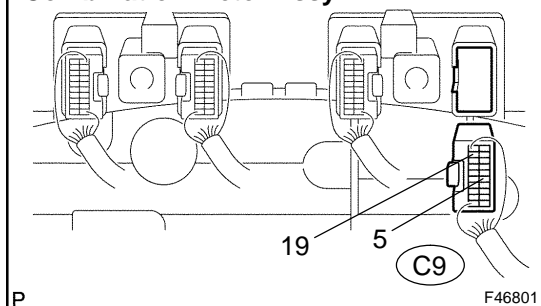
Tester Connection	Specified Condition
T15-6 (IND) - C9-5	Below 1 Ω
T15-6 (IND) - Body ground	10 k Ω or higher

Combination Meter Assy:

**NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

3 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY POWER SOURCE CIRCUIT) (SEE PAGE 01-36)

Combination Meter Assy:



- Remove the combination meter assy.
- Disconnect the combination meter assy C9 connector.
- Measure the voltage according to the value(s) in the table below.

Tester Connection	Specified Condition
C9-5 - C9-19	10 to 14 V

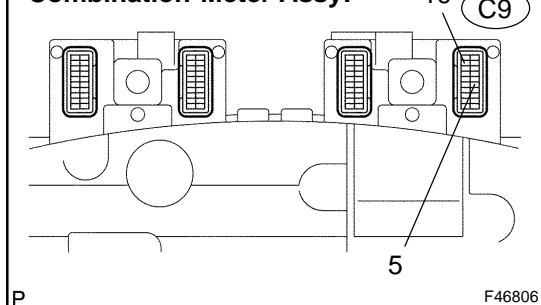
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT COMBINATION METER ASSY(TIRE PRESSURE WARNING LAMP)

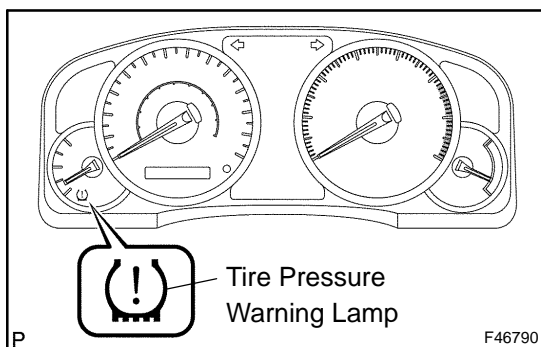
Combination Meter Assy:



- Remove the combination meter assy.
- Check warning lamp on the combination meter assy.
 - Connect terminal C9-5 to the battery positive (+) terminal, and terminal C9-19 to the battery negative (-) terminal.
 - Check that the tire pressure warning lamp comes on.

OK:

Tire pressure warning lamp comes on.



NG

REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

OK

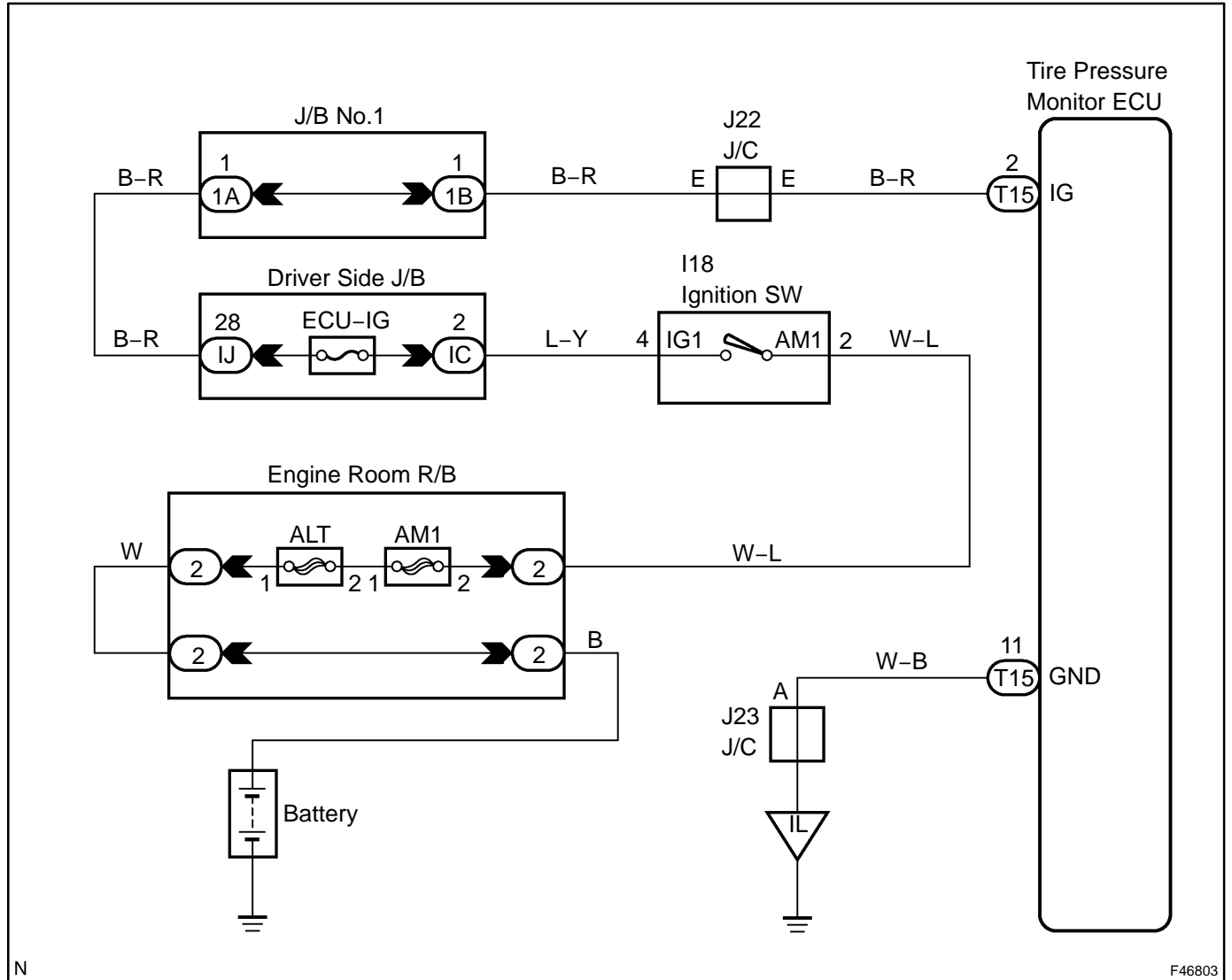
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-648)

ECU POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This is the power source for the tire pressure monitor ECU. It also supplies the power to the tire pressure monitor receiver via the ECU.

WIRING DIAGRAM



N

F46803

INSPECTION PROCEDURE

1 INSPECT BATTERY

(a) Check the battery voltage.

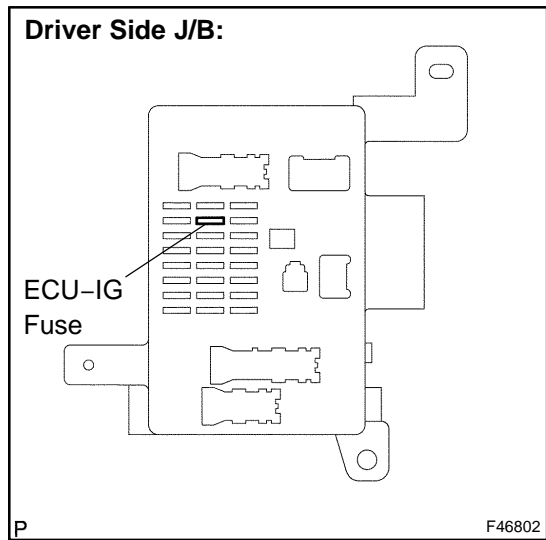
Standard:

Voltage: 11 to 14 V

NG → REPLACE BATTERY

OK

2 INSPECT FUSE(ECU-IG)



(a) Remove the ECU-IG fuse from the driver side J/B.

(b) Check continuity of the ECU-IG fuse.

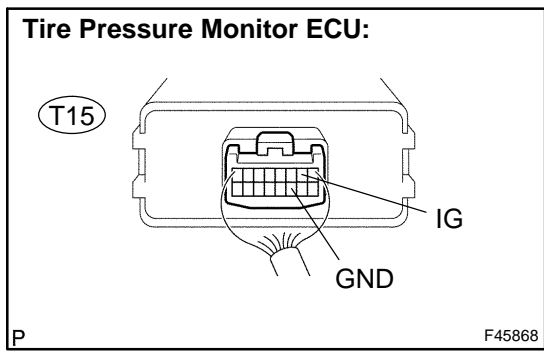
Standard:

Continuity

NG → CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE

OK

3 INSPECT TIRE PRESSURE MONITOR ECU



- (a) Remove the tire pressure monitor ECU with connectors being connected.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

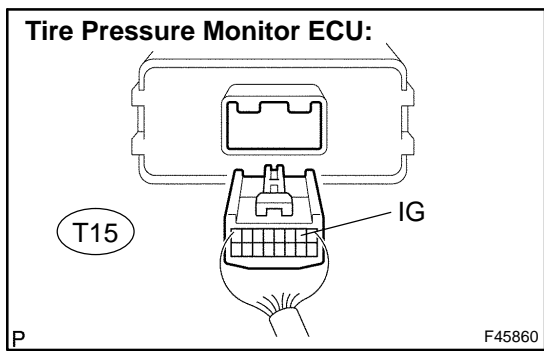
Tester Connection	Specified Condition
T15-2 (IG) - T15-11 (GND)	10 to 14 V

NG → **Go to step 4**

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

4 CHECK HARNESS AND CONNECTOR(BATTERY - TIRE PRESSURE MONITOR ECU) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

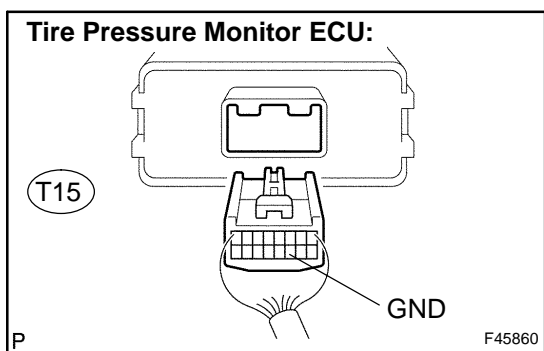
Standard:

Tester Connection	Specified Condition
T15-2 (IG) - Body ground	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - BODY GROUND) (SEE PAGE 01-36)



- (a) Disconnect the tire pressure monitor ECU T15 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
T15-11 (GND) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

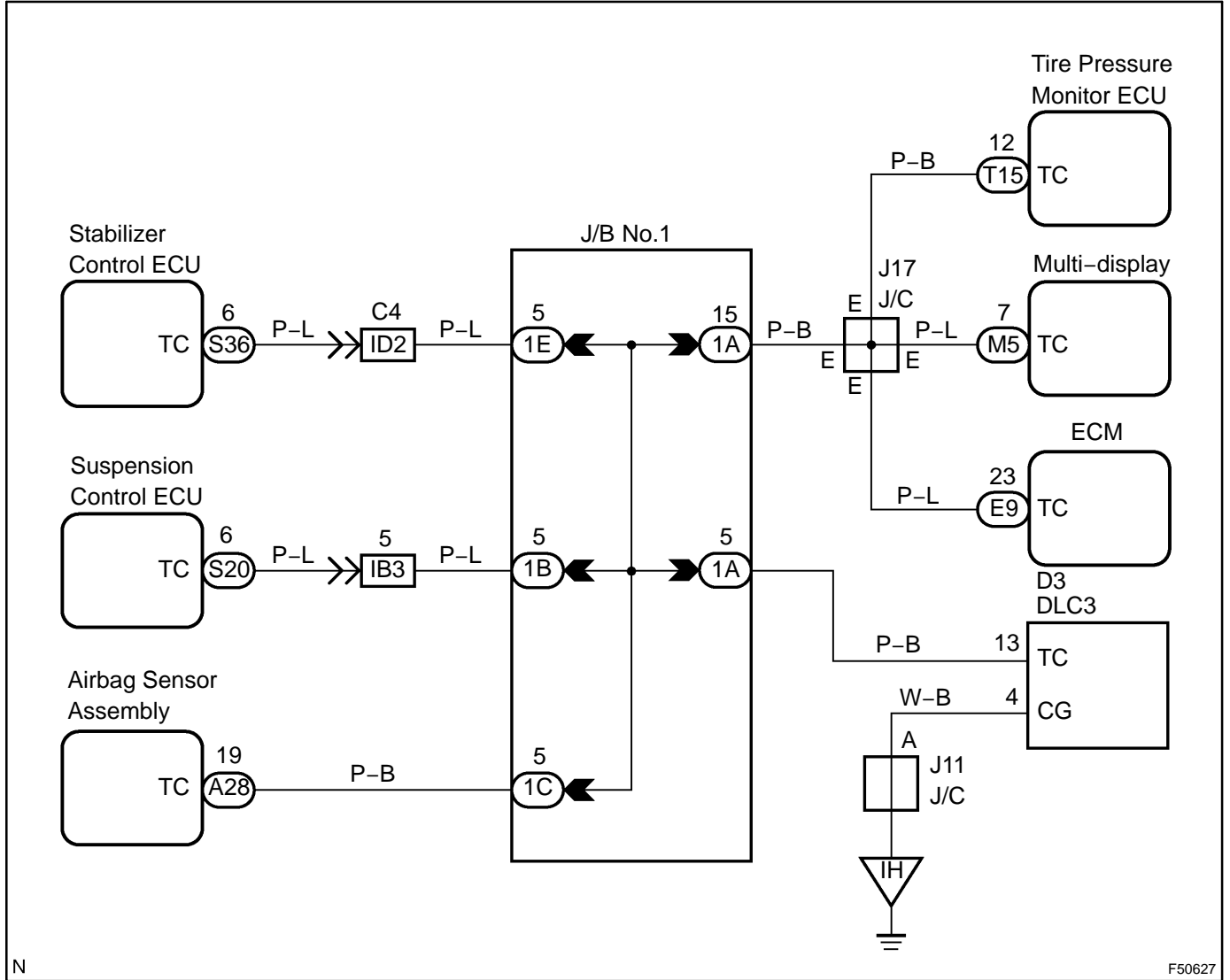
REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.
 The DTCs are displayed by blinking the tire pressure warning lamp.

WIRING DIAGRAM

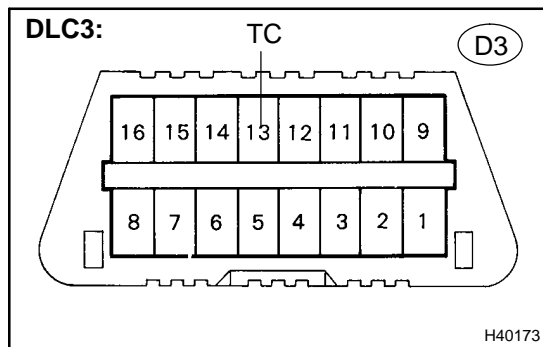


HINT:

When each warning lamp stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

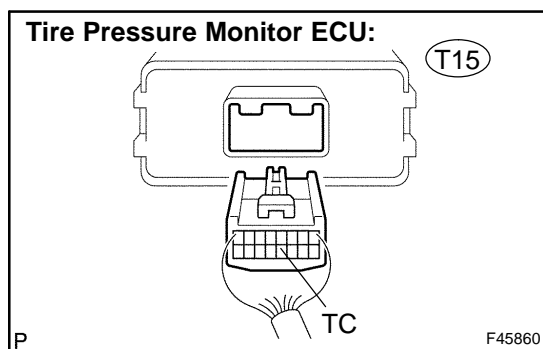
1 CHECK HARNESS AND CONNECTOR(DLC3 - TIRE PRESSURE MONITOR ECU) (SEE PAGE 01-36)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the tire pressure monitor ECU T15 connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

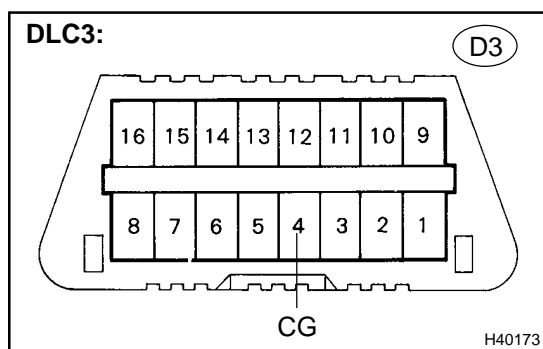
Tester connection	Condition	Specified condition
D3-13 (TC) - T15-12 (TC)	Always	Below 1 Ω



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND) (SEE PAGE 01-36)



- (a) Measure the resistance according to the value(s) in the table below.

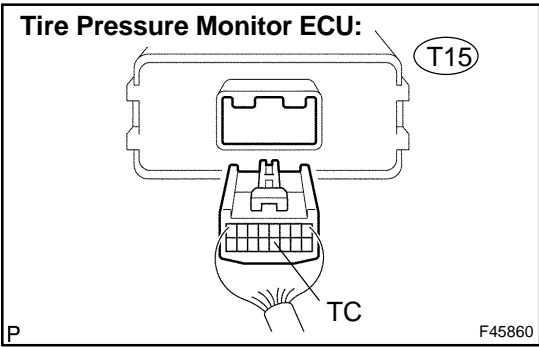
Standard:

Tester connection	Condition	Specified condition
D3-4 (CG) - Body ground	Always	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(TIRE PRESSURE MONITOR ECU - BODY GROUND) (SEE PAGE 01-36)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
T15-12 (TC) - Body ground	Always	10 kΩ or Higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR AND EACH ECU

OK

REPLACE TIRE PRESSURE MONITOR ECU (SEE PAGE 28-9)

IDENTIFY TRANSMITTER (ERROR IN PRESENT)

HINT:

- Refer to this section if a DTC is currently output. If a DTC in the range C2165/65 to C2169/69 is output previously and currently or any other DTC was output previously but not currently, refer to "IDENTIFY TRANSMITTER (ERROR IN PAST)".
- DTCs relevant to the transmitters are corresponding to each transmitter ID. It is impossible to identify which tire is malfunctioning according to each transmitter ID. Therefore the following procedure must be done to confirm the ID No. and tire location.

IDENTIFY PROCEDURE

1 Set the pressure of all tires to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)



2 Rapidly reduce the pressure of front right wheel to 120 kPa (1.2 kgf/cm², 17 psi).



3 Using hand-held tester, check the tire pressure data of each wheel.

(a) Do any of TIREPRESS1 through 5 indicate 120 kPa (1.2 kgf/cm², 17 psi)?

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS2	ID2 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS3	ID3 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS4	ID4 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS5	ID5 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

NO

The detected DTC is for the front right wheel transmitter.

YES

4 Rapidly reduce the pressure of front left wheel to 120 kPa (1.2 kgf/cm², 17 psi).



5 Using hand-held tester, check the tire pressure data of each wheel.

(a) Do any of TIREPRESS1 through 5 indicate 120 kPa (1.2 kgf/cm², 17 psi)?

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS2	ID2 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS3	ID3 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS4	ID4 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS5	ID5 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

NO
The detected DTC is for the front left wheel transmitter.
YES
6 Rapidly reduce the pressure of rear right wheel to 120 kPa (1.2 kgf/cm², 17 psi).
7 Using hand-held tester, check the tire pressure data of each wheel.

(a) Do any of TIREPRESS1 through 5 indicate 120 kPa (1.2 kgf/cm², 17 psi)?

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS2	ID2 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS3	ID3 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS4	ID4 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS5	ID5 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

NO
The detected DTC is for the rear right wheel transmitter.
YES

8 Rapidly reduce the pressure of rear left wheel to 120 kPa (1.2 kgf/cm², 17 psi).



9 Using hand-held tester, check the tire pressure data of each wheel.

(a) Do any of TIREPRESS1 through 5 indicate 120 kPa (1.2 kgf/cm², 17 psi)?

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS2	ID2 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS3	ID3 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS4	ID4 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure
TIREPRESS5	ID5 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

NO

The detected DTC is for the rear left wheel transmitter.

YES

The detected DTC is for the spare tire transmitter.

IDENTIFY TRANSMITTER (ERROR IN PAST)

HINT:

- Refer to "IDENTIFY TRANSMITTER (ERROR IN PRESENT)" if a DTC is currently output. If a DTC in the range C2165/65 to C2169/69 is output previously and currently or any other DTC was output previously but not currently, refer to "IDENTIFY TRANSMITTER (ERROR IN PAST)".
- DTCs relevant to the transmitters are corresponding to each transmitter ID. It is impossible to identify which tire is malfunctioning according to each transmitter ID. Therefore the following procedure must be done to confirm the ID No. and tire location.
- The following procedure is used to identify which wheel's transmitter the ID1 is resulting from when C2141/41 (Transmitter ID1 error) or C2165/65 (Abnormal temperature inside ID1 tire) is detected. Identify the corresponding transmitter using the same procedure when DTCs C2142/42 to C2145/45, C2166/66 to C2169/69 are detected.

IDENTIFY PROCEDURE

1 Set the pressure of all tires to the specified value.

Front	Rear	Spare
220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)	220 kPa (2.2 kgf/cm ² , 32 psi)

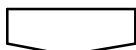


2 Rapidly reduce the pressure of front right wheel to 120 kPa (1.2 kgf/cm², 17 psi).



3 Using hand-held tester, check the ID1 tire pressure data.

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure



4 Is ID1 tire pressure 120 kPa (1.2 kgf/cm², 17 psi)?

YES The ID1 is for the front right wheel transmitter.

NO

5 Rapidly reduce the pressure of front left wheel to 120 kPa (1.2 kgf/cm², 17 psi).



6 Using hand-held tester, check the ID1 tire pressure data.

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

7 Is ID1 tire pressure 120 kPa (1.2 kgf/cm², 17 psi)?

YES The ID1 is for the front left wheel transmitter.

NO

8 Rapidly reduce the pressure of rear right wheel to 120 kPa (1.2 kgf/cm², 17 psi).**9 Using hand-held tester, check the ID1 tire pressure data.**

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

10 Is ID1 tire pressure 120 kPa (1.2 kgf/cm², 17 psi)?

YES The ID1 is for the rear right wheel transmitter.

NO

11 Rapidly reduce the pressure of rear left wheel to 120 kPa (1.2 kgf/cm², 17 psi).**12 Using hand-held tester, check the ID1 tire pressure data.**

Item	Measurement item / Range (Display)	Normal Condition
TIREPRESS1	ID1 tire pressure/ min.: 0 kPa (0 kgf·cm ² , 0 psi), max.: 637.5 kPa (6.48 kgf·cm ² , 92.2 psi)	Actual tire pressure

13 Is ID1 tire pressure 120 kPa (1.2 kgf/cm², 17 psi)?

YES

The ID1 is for the rear left wheel transmitter.

NO

The ID1 is for the spare tire transmitter.

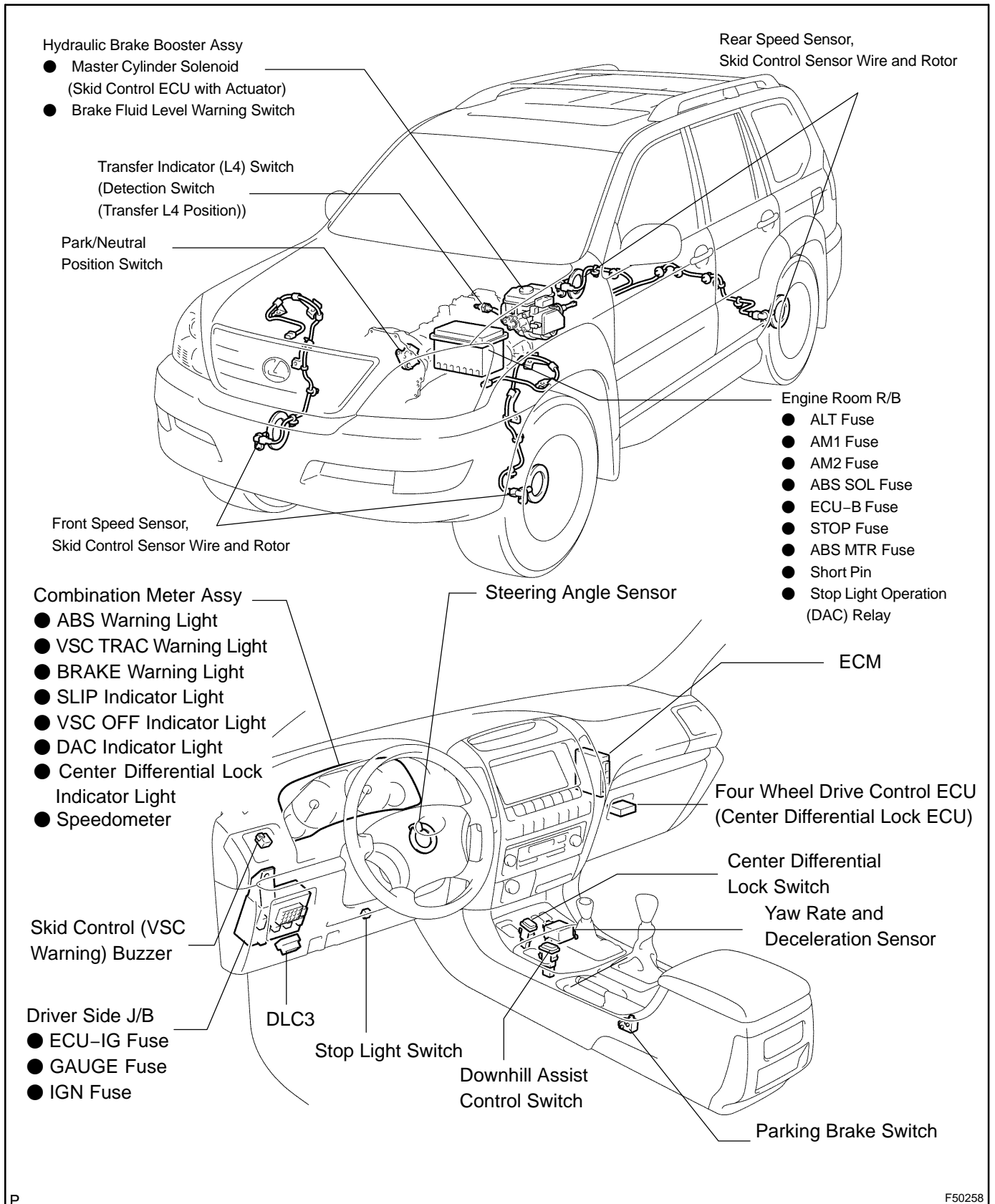
ABS WITH EBD & BA & TRAC & VSC SYSTEM

05NHB-02

PRECAUTION

- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Since the ABS with EBD & BA & TRAC & VSC systems may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.
- Be sure to remove and install the hydraulic brake booster and each sensor with the ignition switch off unless specified in the inspection procedure.
- When removing and installing the hydraulic brake booster and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the master cylinder solenoid and/or the yaw rate and deceleration sensor, make sure to perform yaw rate and deceleration sensor zero point calibration (see page [05-734](#)).
- The CAN communication system is used for data communication between the skid control ECU (included in the master cylinder solenoid), the steering angle sensor, and the yaw rate sensor (the deceleration sensor is included). If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If the DTC of the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the ABS with EBD & BA & TRAC & VSC systems.
- Since the CAN communication line has its own length and route, it can not be repaired temporarily with the bypass wire, etc.

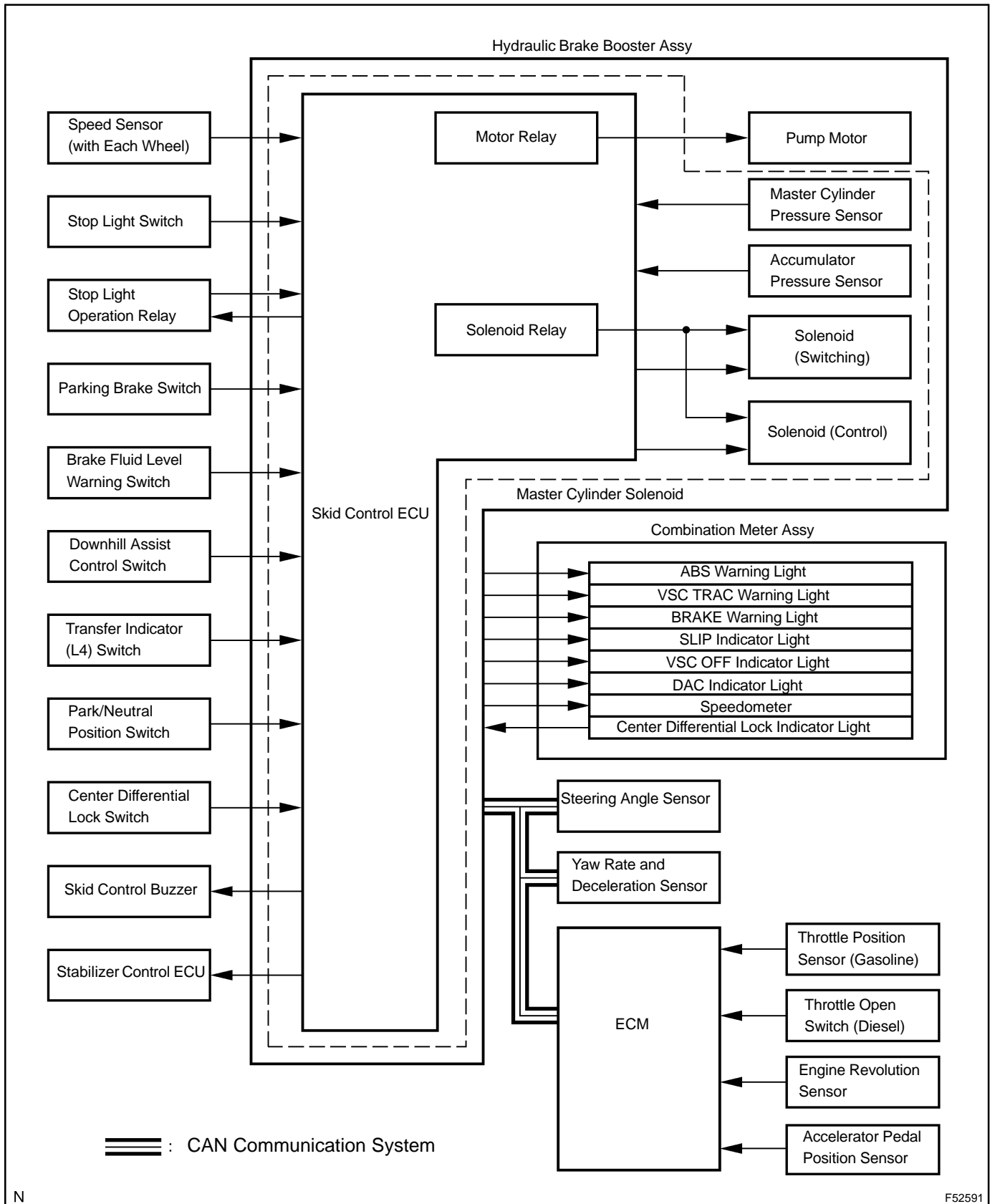
LOCATION



P

F50258

SYSTEM DIAGRAM



DIAGNOSTICS - ABS WITH EBD & BA & TRAC & VSC SYSTEM

Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication Method
Skid control ECU	ECM	<ul style="list-style-type: none"> • Steering angle signal • Yaw rate and deceleration signal • Engine torque request signal 	CAN communication system
ECM	Skid control ECU	<ul style="list-style-type: none"> • Throttle position signal • Engine revolution signal • Accelerator pedal position signal 	CAN communication system

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

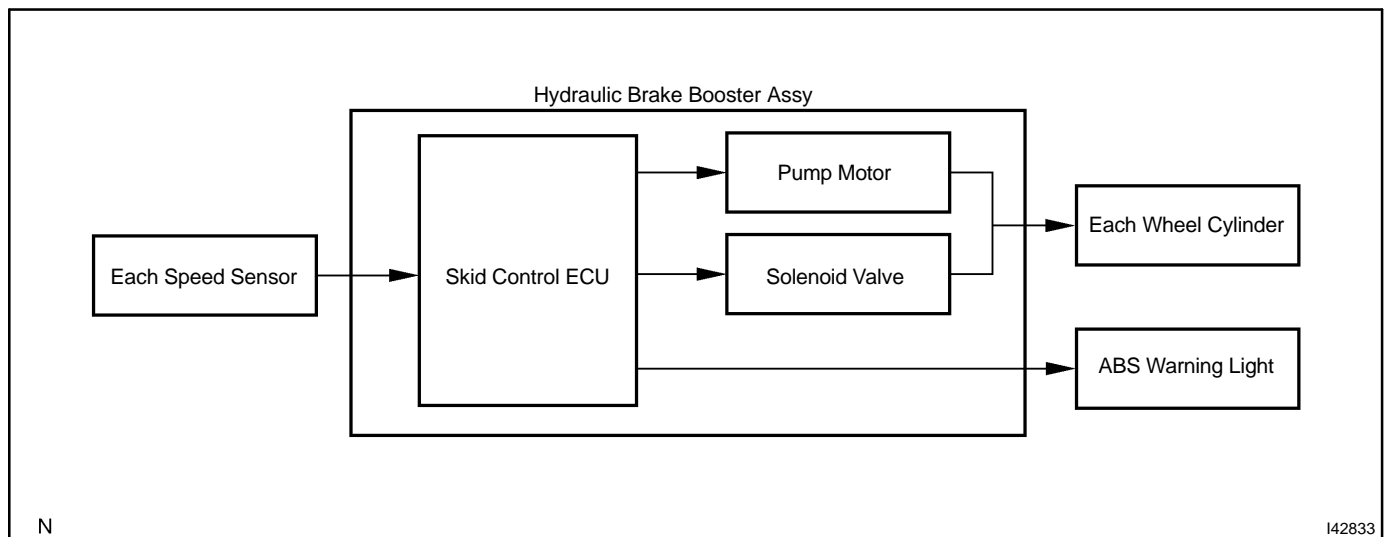
HINT:

- The skid control ECU is a single unit with hydraulic brake booster.
 - The yaw rate and deceleration sensors are combined in a single unit. This unit communicates with the skid control ECU through CAN communication.
- (a) ABS with EBD & BA & TRAC & VSC operation
- (1) The skid control ECU calculates vehicle stability tendency based on the signals from the speed sensor, yaw rate and deceleration sensor and steering angle sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and of the wheel brake pressure by the brake actuator) should be implemented.
 - (2) The slip indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The slip indicator also blinks when TRAC is operating, and the operation being performed is displayed.

2. ACTIVE SAFETY

- (a) ABS (Anti-lock Brake System)

The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.



Operation description

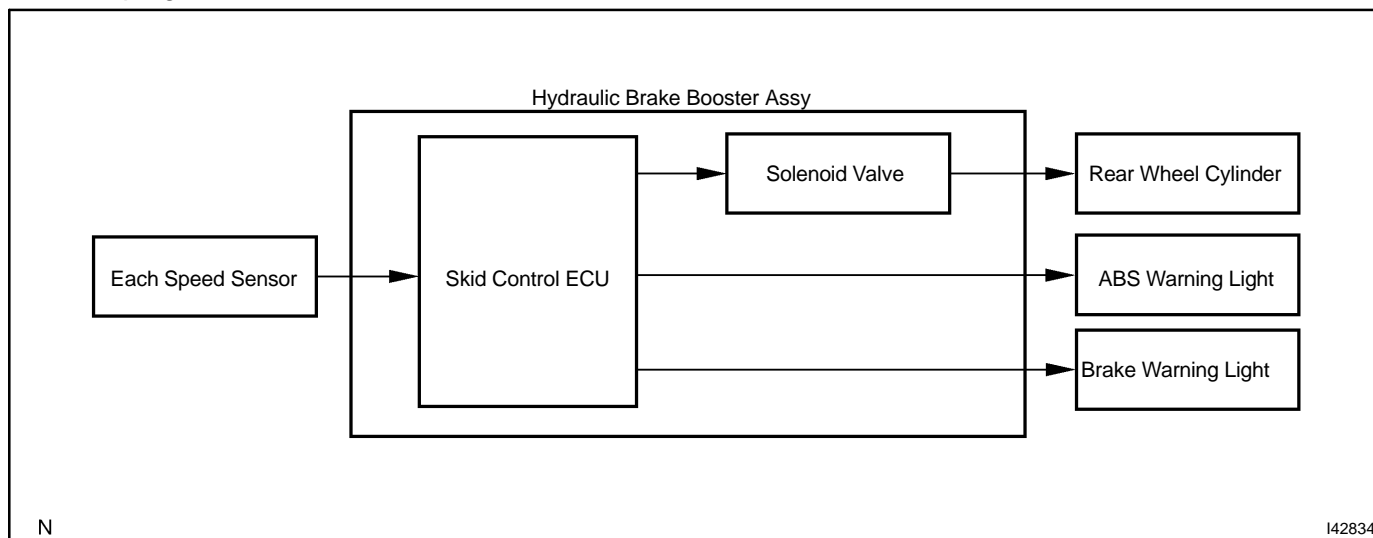
The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the oil pressure of each wheel cylinder.

The ABS warning light comes on when the ABS system is malfunctioning.

(b) EBD (Electronic Brake force Distribution)

The EBD control utilizes ABS, realizing proper brake force distribution between the front and rear wheels in accordance with driving conditions.

In addition, when braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain vehicle behavior.

**Operation description**

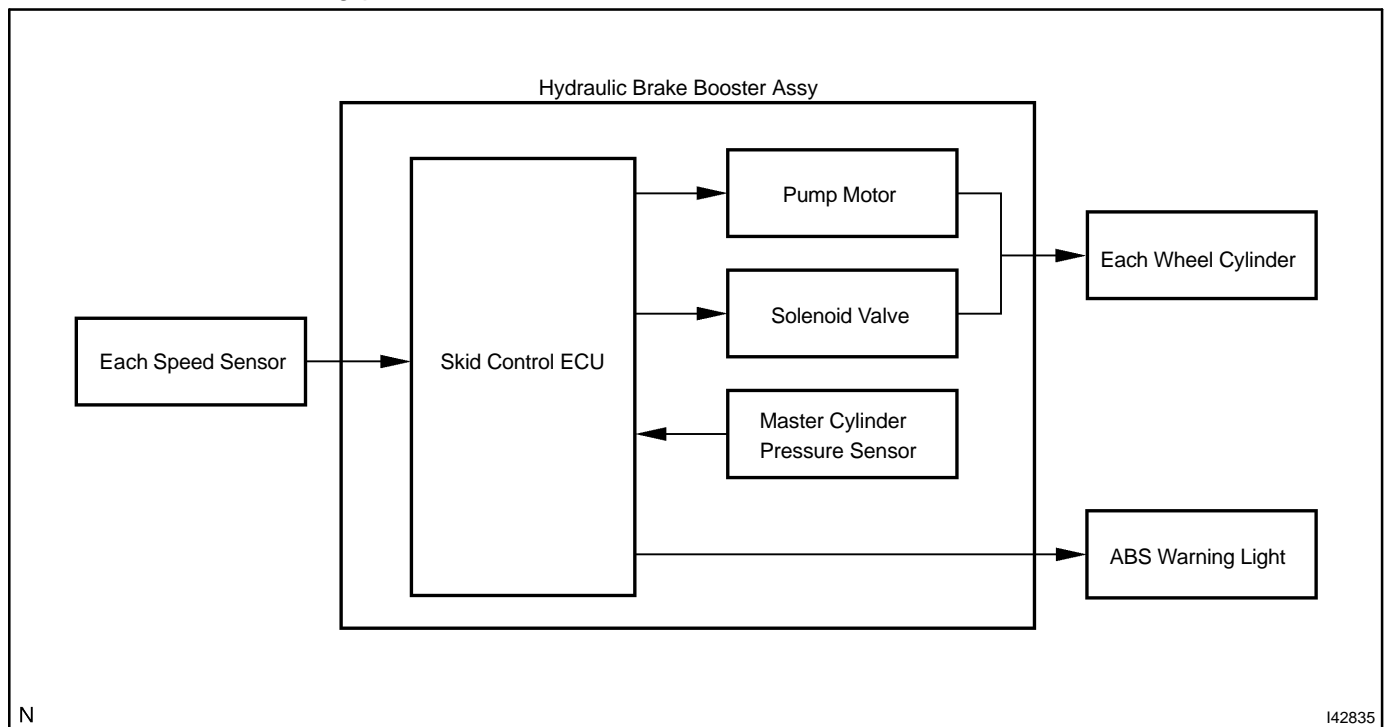
The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

The solenoid valve controls oil pressure of the rear wheel cylinder and splits the control power properly between the rear wheels and the right and left wheels.

Both of the ABS and brake warning lights come on to indicate a malfunction in the EBD system.

(c) BA (Brake Assist)

The primary purpose of the brake assist system is to provide auxiliary brake force to assist the driver who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle's braking performance.

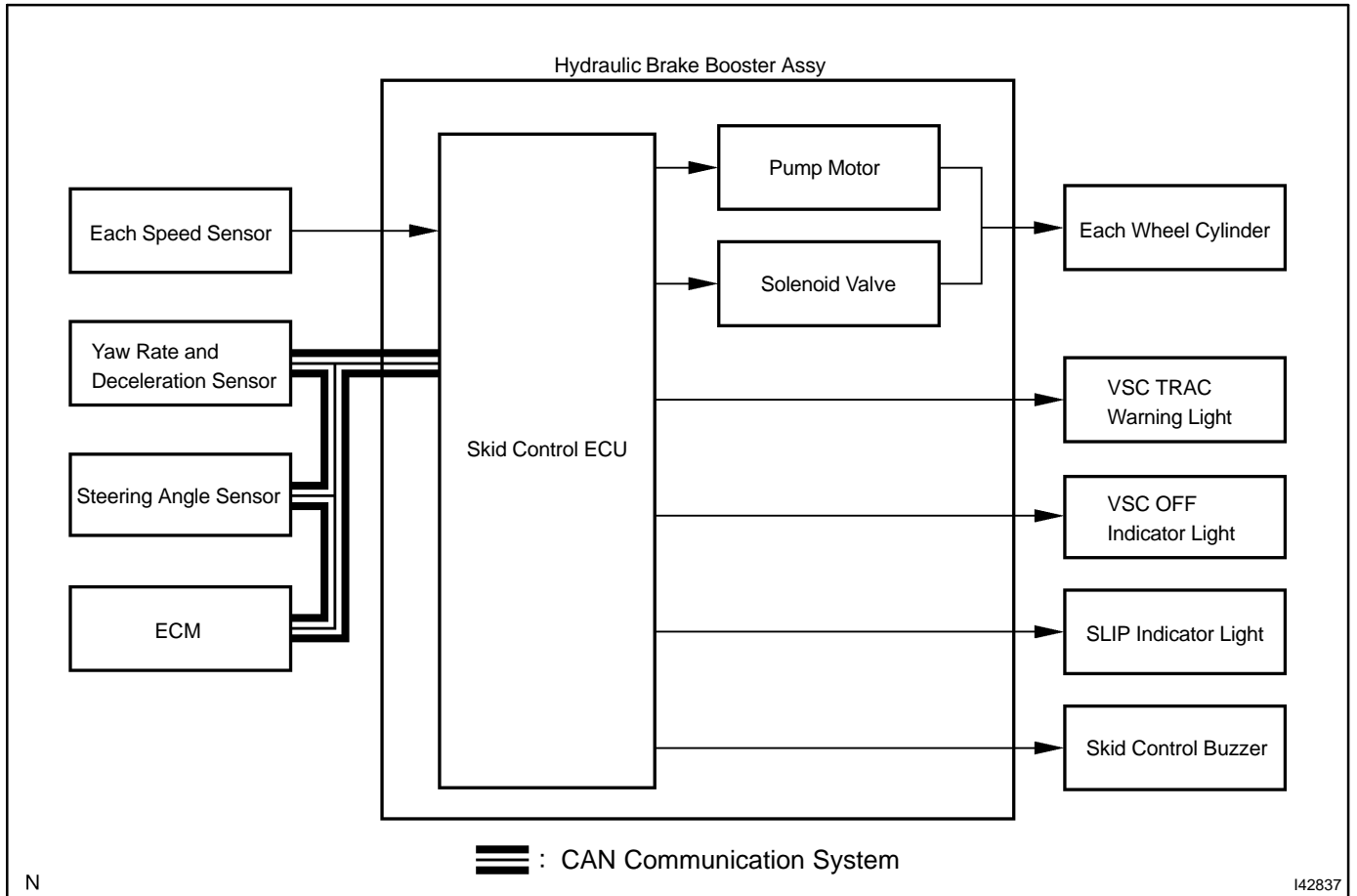
**Operation description**

The skid control ECU receives the speed signal from each speed sensor and the oil pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary or not. If brake assist is deemed necessary, the ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder.

The ABS warning light comes on to indicate a malfunction in the BA system.

(d) VSC (Vehicle Stability Control)

The VSC system helps prevent the vehicle from slipping sideways as a result of strong front wheel skid or strong rear wheel skid during cornering.



Operation description

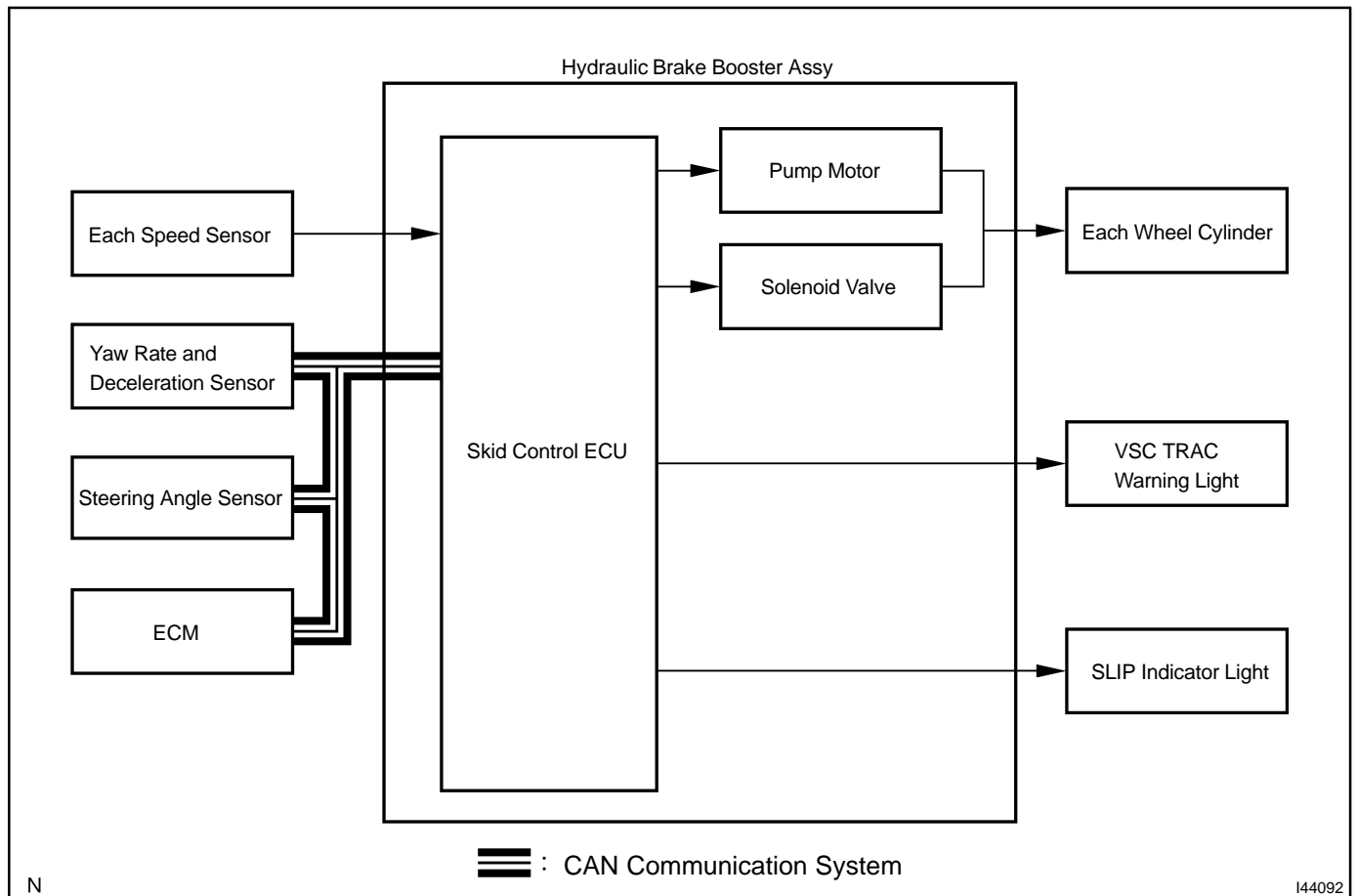
The skid control ECU determines vehicle condition by receiving signals from the speed sensor, yaw rate and deceleration sensor and steering angle sensor. The skid control ECU controls engine torque through the ECM via CAN communication, and oil pressure through the pump and solenoid valve.

The SLIP indicator light blinks and the skid control buzzer sounds when the system is operating. Both of the VSC TRAC warning light and the VSC OFF indicator light come on to indicate a malfunction in the VSC system.

3. DRIVING PERFORMANCE

(a) TRAC (Traction Control)

The TRAC system helps prevent the drive wheels from slipping if the driver presses down on the accelerator pedal excessively when starting off or accelerating on a slippery surface.



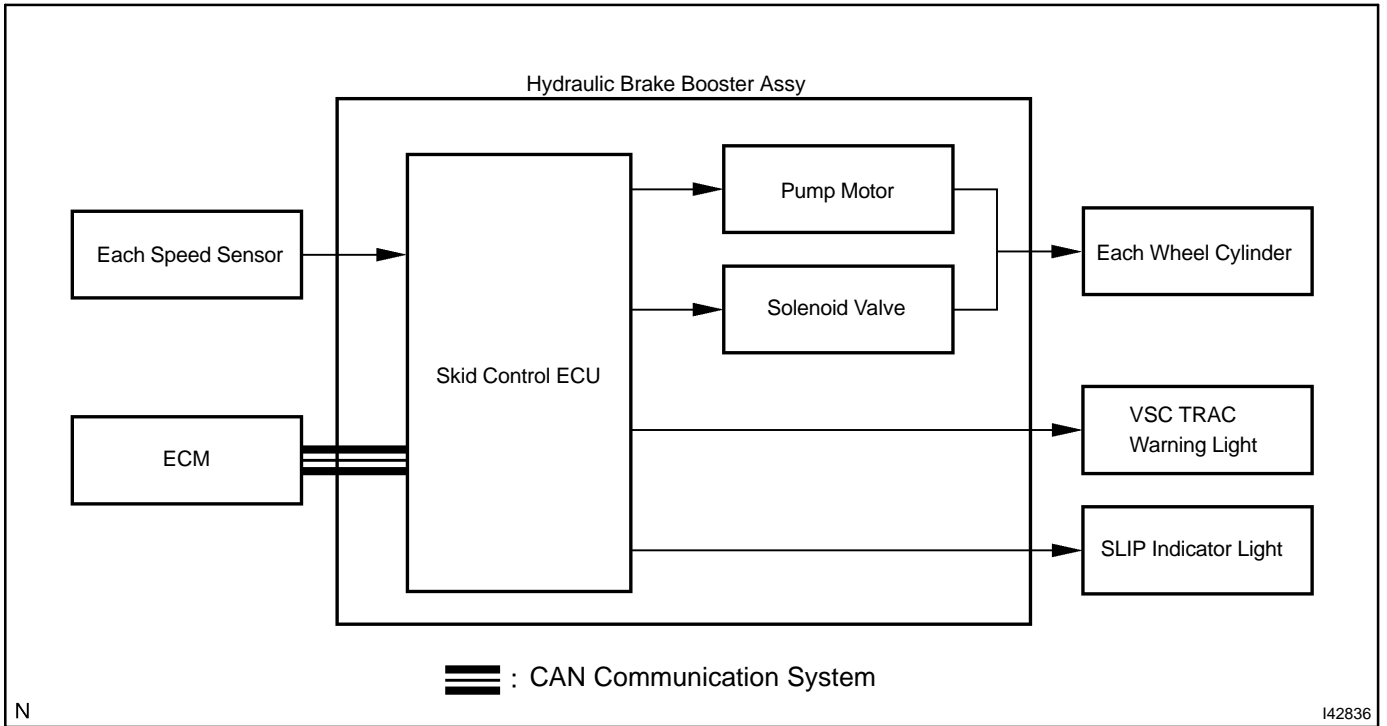
Operation description

The skid control ECU detects vehicle's slip condition by receiving signals from the speed sensor and ECM via CAN communication. The skid control ECU controls engine torque through the ECM via CAN communication, and oil pressure through the pump and solenoid valve.

The SLIP indicator light blinks when the system is operating. Both of the VSC TRAC warning light and SLIP indicator light come on to indicate a malfunction in the TRAC system.

(b) A-TRAC (Active Traction Control)

During rugged offroad driving, this function controls the engine output and the brake fluid pressure that is applied to the slipping wheel, and distributes the drive force that would have been lost through the slippage to the remaining wheels in order to achieve an LSD (Limited Slip Differential) effect. As a result, the vehicle's offroad drivability and ability to get out of a hollow have been increased.



Operation description

The SLIP indicator light blinks when the system is operating. Both of the VSC TRAC warning light and SLIP indicator light come on to indicate a malfunction in the A-TRAC system.

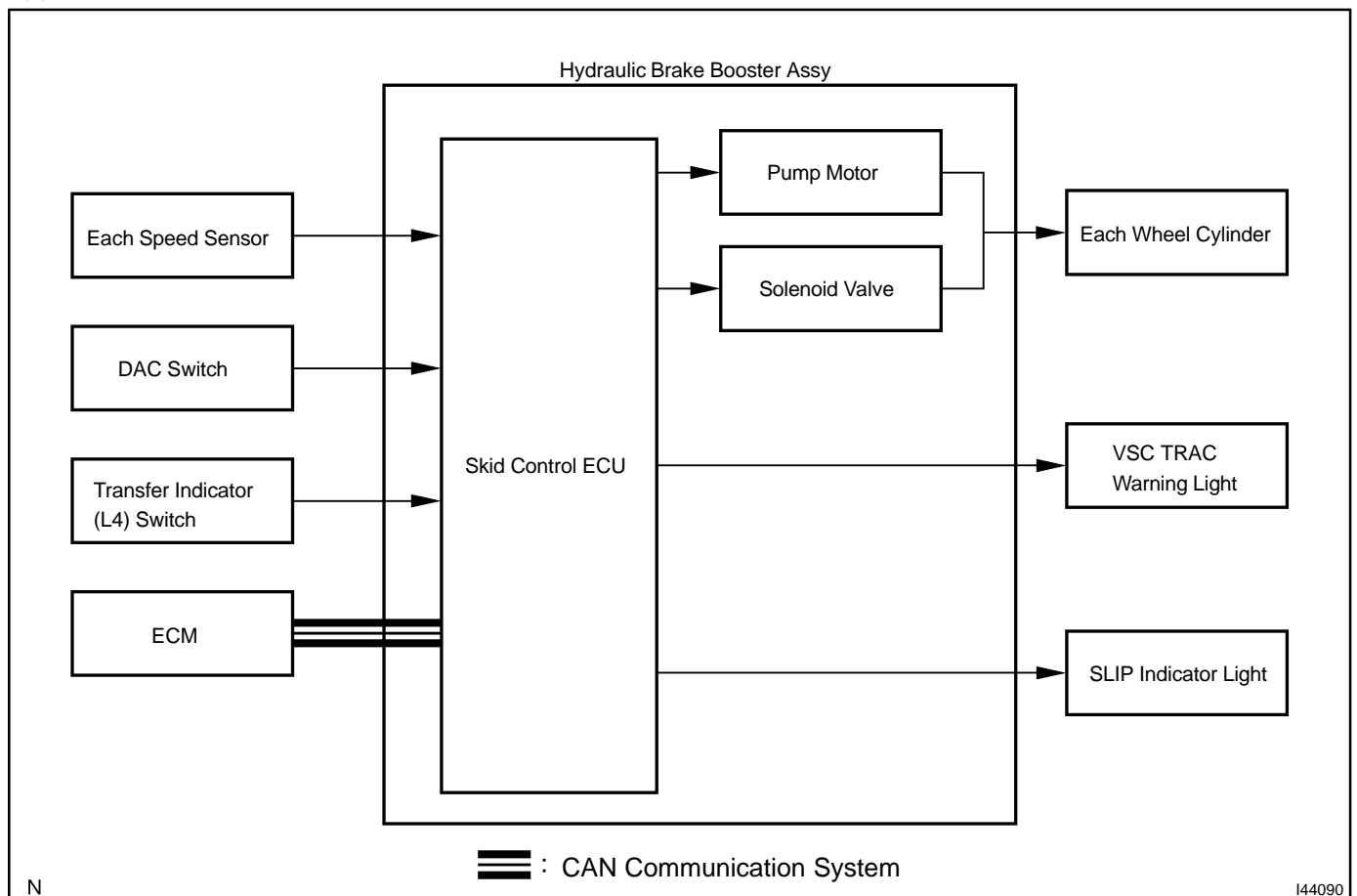
(c) DAC (Downhill Assist Control)

When the DAC switch is pressed with transfer in low (L4) range and without accelerator and brake pedals operation, DAC is activated to effect 4-wheel hydraulic pressure control, in order to maintain a constant low vehicle speed without causing the wheels to become locked. Thus, the vehicle can descend a steep hill in a stable manner.

HINT:

Depressing the accelerator and brake pedal cancels control of the DAC system.

Begins operating when driving down on a slope at a speed of 16 mph (25 km/h) or less with the engine brake applied.

**Operation description**

The slip indicator light blinks and the DAC indicator light and brake light come on when the system is in operation.

The VSC TRAC warning light comes on and the DAC indicator light blinks to indicate a malfunction in the DAC system.

(d) HAC (Hill-start Assist Control)

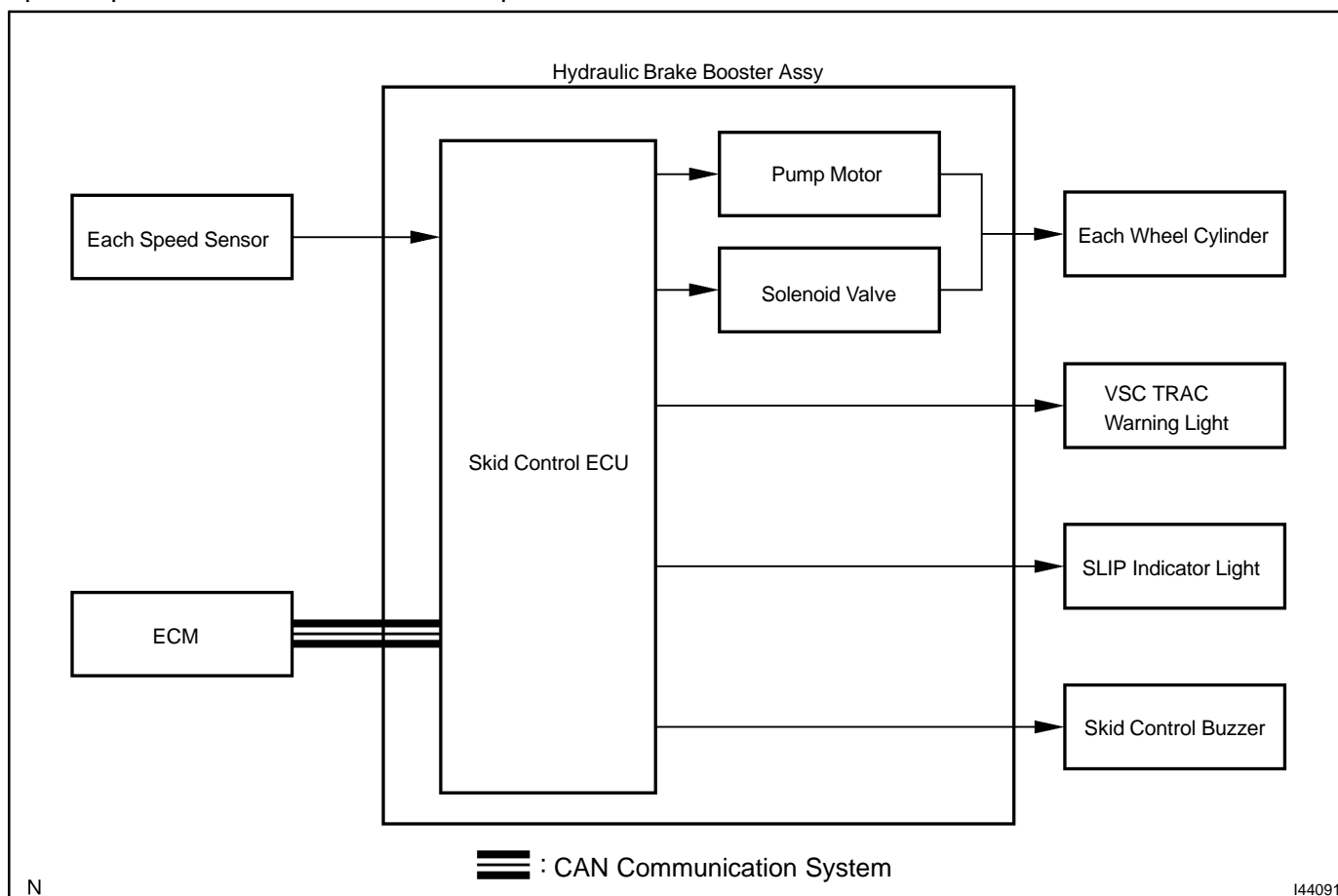
When the vehicle starts off on a steep hill, HAC detects the backward descent of the vehicle and effects 4-wheel hydraulic pressure control to reduce the backward speed of the vehicle.

Maximum 5 seconds after the control has started, fluid pressure is gradually released and control will be complete.

HINT:

Depressing the brake pedal cancels control of the HAC system.

Does not operate when the shift lever is in the P or N position, or when the vehicle is running/rolling back up a slope with the shift lever in the R position.

**Operation description**

The SLIP indicator light blinks, the brake light comes on, and the skid control buzzer sounds when the system is in operation.

The VSC TRAC warning light comes on when the HAC system is malfunctioning.

HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used at step 3, 4, 6, 10, 13, and 16.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-730)

NEXT

3 CHECK DTC AND FREEZE FRAME DATA (SEE PAGE 05-757 AND 05-759)

NEXT

4 CLEAR DTC AND FREEZE FRAME DATA (SEE PAGE 05-757 AND 05-759)

NEXT

5 PROBLEM SYMPTOM CONFIRMATION

NEXT

6 CHECK CAN COMMUNICATION SYSTEM (SEE PAGE 05-2315)

(a) Check for output DTCs.

HINT:

The ECU of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.

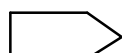
 **CAN COMMUNICATION SYSTEM DTC IS OUTPUT: PROCEED TO CAN COMMUNICATION SYSTEM (SEE PAGE 05-2320)**

 **NO CAN COMMUNICATION SYSTEM DTC IS OUTPUT: GO TO STEP 7**

7 DTC CHECK AND CLEAR (SEE PAGE 05-757)

NEXT

8 PROBLEM SYMPTOM SIMULATION

 **SYMPTOM DOES NOT OCCUR: GO TO STEP 9**

 **SYMPTOM OCCURS: GO TO STEP 10**

9 SYMPTOM SIMULATION (SEE PAGE [01-26](#))

NEXT

10 DTC CHECK (OTHER THAN CAN SYSTEM DTC) (SEE PAGE [05-757](#))

 NORMAL SYSTEM CODE: GO TO STEP 11

 TROUBLE CODE: GO TO STEP 12

11 PROBLEM SYMPTOMS TABLE (SEE PAGE [05-750](#))

NEXT

GO TO STEP 13

12 DTC CHART (SEE PAGE [05-767](#))

NEXT

13 CIRCUIT INSPECTION (SEE PAGE [05-771](#) TO [05-901](#))

NEXT

14 IDENTIFICATION OF PROBLEM

NEXT

15 REPAIR OR REPLACE

NEXT

16 CONFIRMATION TEST

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

**ABS & EBD & BA & TRAC & A-TRAC
& VSC & DAC & HAC Check Sheet**

Inspector's
Name _____

Customer's Name	_____	VIN	_____
	_____	Production Date	____ / ____ / ____
	_____	Licence Plate No.	_____
Date Vehicle Brought In	____ / ____ / ____	Odometer Reading	_____ km _____ miles

Date Problem First Occurred	____ / ____ / ____
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (_____ times a day)

Symptoms	<input type="checkbox"/> ABS does not operate.	
	<input type="checkbox"/> ABS does not operate efficiently.	
	<input type="checkbox"/> BA does not operate.	
	<input type="checkbox"/> EBD does not operate.	
	<input type="checkbox"/> TRAC does not operate. (Wheels spin when starting rapidly.)	
	<input type="checkbox"/> A-TRAC does not operate. (Drive force is lost when the wheels slip while accelerating.)	
	<input type="checkbox"/> VSC does not operate. (Wheels sideslip when turning sharply.)	
	<input type="checkbox"/> DAC does not operate. (Drive speed does not decrease when driving down a slope, or when wheels become locked.)	
	<input type="checkbox"/> HAC does not operate. (Roll back speed does not decrease when starting off on an uphill.)	
	ABS Warning Light Abnormal	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on
	VSC TRAC Warning Light Abnormal	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on
	Brake Warning Light Abnormal (PKB released)	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on
	SLIP Indicator Light Abnormal	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on
VSC OFF Indicator Light Abnormal	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on	
DAC Indicator Light Abnormal	<input type="checkbox"/> Remains on <input type="checkbox"/> Does not come on	
Skid Control Buzzer Abnormal	<input type="checkbox"/> Sounds <input type="checkbox"/> Does not sound	

DTC Check	1st Time	<input type="checkbox"/> Normal system code <input type="checkbox"/> Trouble code (Code _____)
	2nd Time	<input type="checkbox"/> Normal system code <input type="checkbox"/> Trouble code (Code _____)

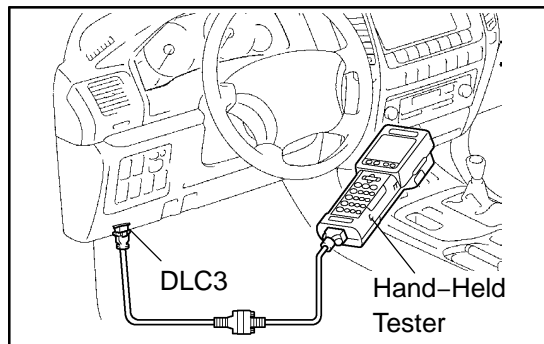
Freeze Frame Data	STOP LIGHT SW	<input type="checkbox"/> ON	<input type="checkbox"/> OFF		
	RESERVOIR SW	<input type="checkbox"/> ON	<input type="checkbox"/> OFF		
	PKB SW	<input type="checkbox"/> ON	<input type="checkbox"/> OFF		
	#IG ON				
	VEHICLE SPD			mph km/h	
	MAS CYL PRESS			V	
	MAS PRESS GRADE			MPa/s	
	SYSTEM	<input type="checkbox"/> ABS	<input type="checkbox"/> BA	<input type="checkbox"/> VSC/TRAC	<input type="checkbox"/> NO SYS
	YAW RATE			deg/s	
	STEERING ANG			deg	
	G (RIGHT&LEFT)			G	
	G (BACK&FORTH)			G	
	BUZZER	<input type="checkbox"/> ON	<input type="checkbox"/> OFF		
	SHIFT POSITION	<input type="checkbox"/> P, N <input type="checkbox"/> 3	<input type="checkbox"/> R <input type="checkbox"/> 2	<input type="checkbox"/> D/M <input type="checkbox"/> L	<input type="checkbox"/> 4 <input type="checkbox"/> FAIL
	WHEEL DIR FR	<input type="checkbox"/> FORWARD	<input type="checkbox"/> BACK		
	WHEEL DIR FL	<input type="checkbox"/> FORWARD	<input type="checkbox"/> BACK		
	WHEEL DIR RR	<input type="checkbox"/> FORWARD	<input type="checkbox"/> BACK		
	WHEEL DIR RL	<input type="checkbox"/> FORWARD	<input type="checkbox"/> BACK		
	THROTTLE			deg	

CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

HINT:

A momentary interruption (open circuit) in the connectors and/or wire harness between the sensors and ECUs can be detected in the ECU data monitor function of the hand-held tester.

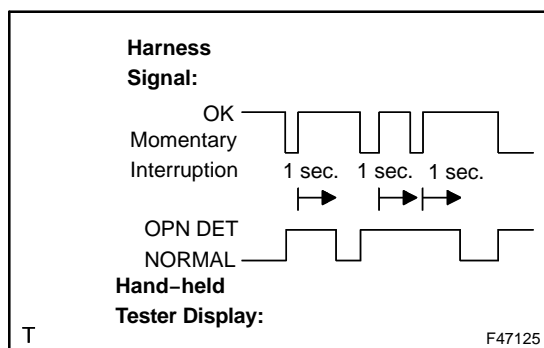


- (a) Turn the ignition switch off and connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch on. Follow the on-screen directions on the hand-held tester to display the DATA LIST and select areas where momentary interruption should be monitored.

HINT:

A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned on (initial check).

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	Speed sensor open detection (FR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	Speed sensor open detection (FL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RR	Speed sensor open detection (RR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RL	Speed sensor open detection (RL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-



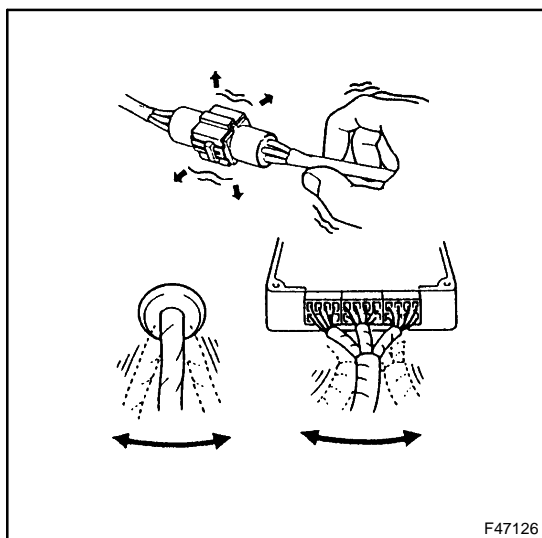
HINT:

- If the hand-held tester status remains on, check the continuity between the ECU and the sensors, or between ECUs.
- The OPN DET display on the hand-held tester remains on for 1 second after the harness signal changes from momentary interruption (open circuit) to normal condition.

- (c) While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs.

Result:**OPN DET display does not change.****HINT:**

- The connector and/or wire harness will be in momentary interruption (open circuit) if the display changes. Repair or replace connector and/or wire harness as one of them is faulty.



F47126

CALIBRATION

1. DESCRIPTION

After replacing the VSC relevant components or performing "Front wheel alignment adjustment", clearing and reading the sensor calibration data are necessary.

Follow the chart to perform calibration.

HINT:

For a rear air suspension vehicle, it is necessary to obtain zero point calibration data (again) after adjusting vehicle height.

Replacement/Adjustment Parts	Necessary Operation
Master cylinder solenoid (Skid control ECU)	Yaw rate and deceleration sensor zero point calibration.
Yaw rate and deceleration sensor	5. Clearing zero point calibration data. 6. Yaw rate and deceleration sensor zero point calibration.
Front wheel alignment	1. Clearing zero point calibration data. 2. Yaw rate and deceleration sensor zero point calibration.

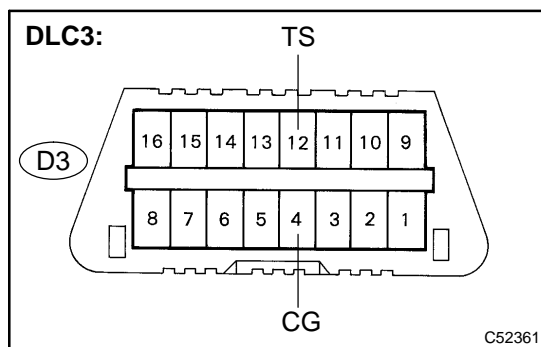
USING SST CHECK WIRE:

2. CLEAR ZERO POINT CALIBRATION

HINT:

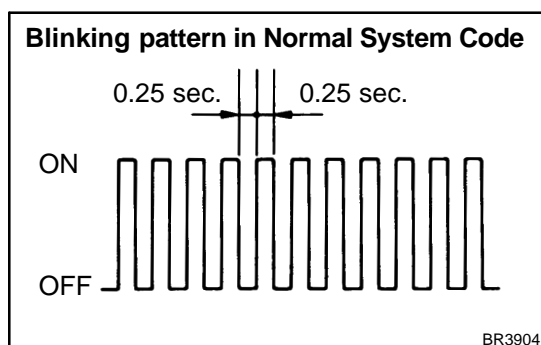
After replacing the yaw rate and deceleration sensor, make sure to clear zero point calibration data in the master cylinder solenoid (skid control ECU) and perform zero point calibration.

(a) Turn the ignition switch to the ON position.



(b) Using SST, connect and disconnect terminals TS and CG of the DLC3 4 times or more within 8 seconds.

SST 09843-18040



(c) Check that the warning light indicates the normal system code.

(d) Remove the SST from the terminals of the DLC3.

(e) Using a check wire, perform the zero point calibration of the yaw rate and deceleration sensor (refer to step 3).

3. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR

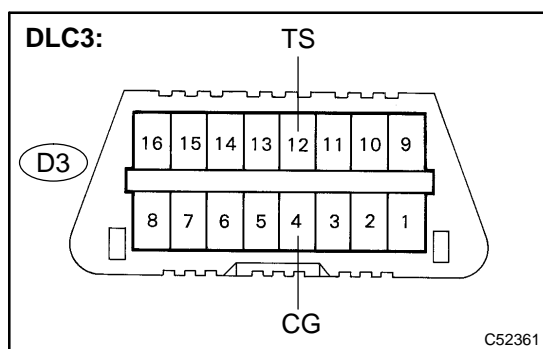
After replacing the master cylinder solenoid and/or yaw rate and deceleration sensor, make sure to perform yaw rate and deceleration sensor zero point calibration.

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)
- Be sure to do this on a level surface (with an inclination of less than 1 degree).

(a) Procedures for test mode.

(1) Turn the ignition switch off.



(2) Using SST, connect terminals TS and CG of the DLC3.

SST 09843-18040

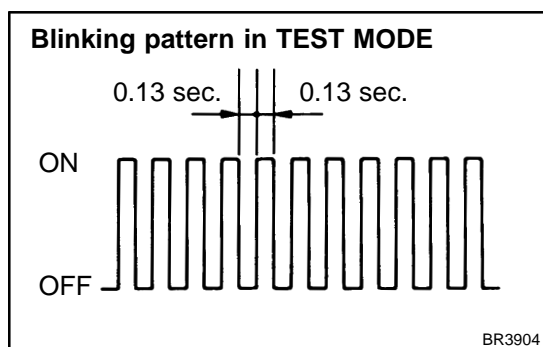
(3) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.

NOTICE:

DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position (see page 05-799).

(4) Turn the ignition switch to the ON position.

(5) Keep the vehicle in a stationary condition on a level surface for 2 seconds or more.



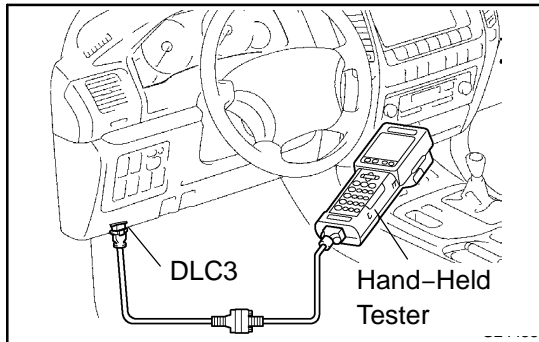
(6) Check that the VSC TRAC warning light is blinking in test mode.

NOTICE:

The VSC TRAC warning light stays on when obtaining the zero point.

HINT:

- If the VSC TRAC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

**USING HAND-HELD TESTER:****4. CLEAR ZERO POINT CALIBRATION**

After replacing the yaw rate and deceleration sensor, make sure to clear zero point calibration data in the master cylinder solenoid (skid control ECU) and perform zero point calibration.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Operate the hand-held tester to erase the codes.

HINT:

Refer to the hand-held tester operator's manual for further details.

- (d) Using the hand-held tester, perform the zero point calibration of the yaw rate and deceleration sensor (refer to step 5).

5. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR

After replacing the master cylinder solenoid and/or yaw rate and deceleration sensor, make sure to perform yaw rate and deceleration sensor zero point calibration.

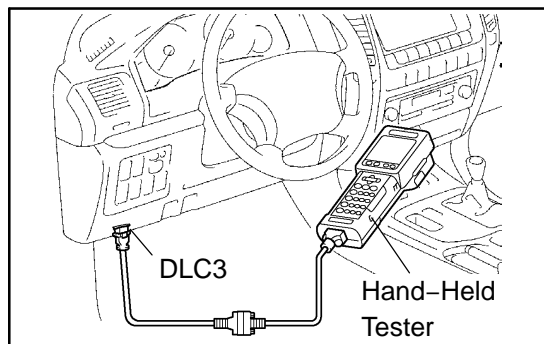
NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (with an inclination of less than 1 degree).**

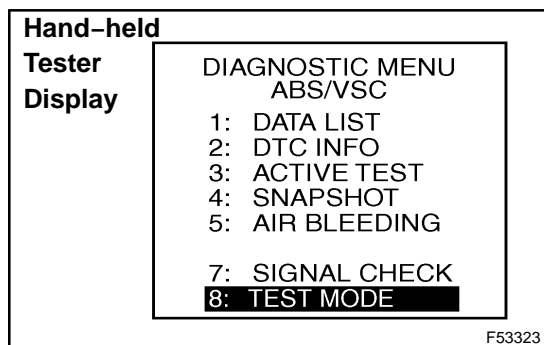
- (a) Procedures for test mode.
 - (1) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.

NOTICE:

DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position (see page 05-799).



(2) Connect the hand-held tester to the DLC3.



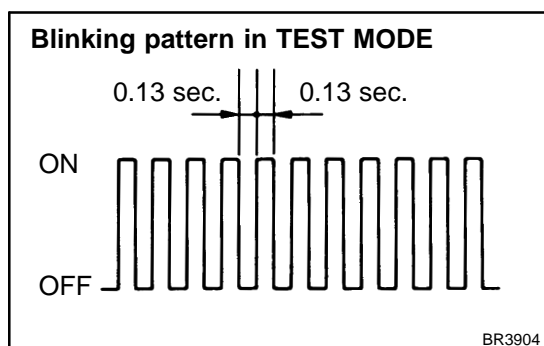
(3) Turn the ignition switch to the ON position.

(4) Set the hand-held tester to test mode (TEST MODE).

HINT:

Refer to the hand-held tester operator's manual for further details.

(5) Keep the vehicle in a stationary condition on a level surface for 2 seconds or more.



(6) Check that the VSC TRAC warning light is blinking in test mode.

NOTICE:

The VSC TRAC warning light stays on when obtaining the zero point.

HINT:

- If the VSC TRAC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

TEST MODE PROCEDURE

USING SST CHECK WIRE:

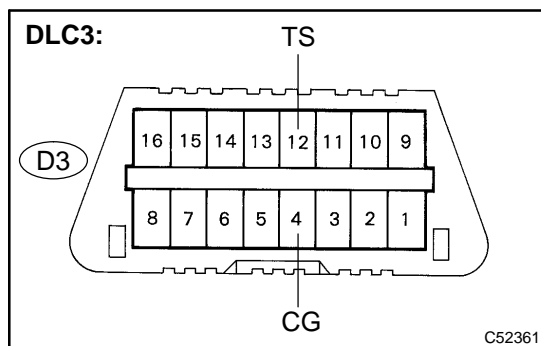
1. TEST MODE (SIGNAL CHECK) PROCEDURE

When having replaced the master cylinder solenoid and/or yaw rate and deceleration sensor, perform zero point calibration of the yaw rate and deceleration sensor (see page 05-734).

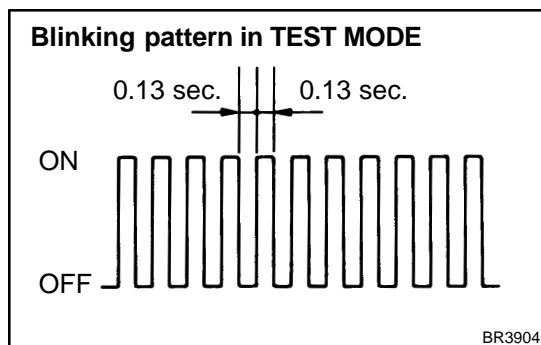
HINT:

- If the ignition switch is turned from the ON to the ACC or LOCK position during test mode (SIGNAL CHECK), DTCs of the signal check function will be erased.
- During test mode (SIGNAL CHECK), the skid control ECU records all DTCs of the test mode (SIGNAL CHECK) function. By performing the test mode (SIGNAL CHECK), the codes are erased if normality is confirmed. The codes left over are the codes where an abnormality was found.

- (a) Turn the ignition switch off.
- (b) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.



- (c) Using SST, connect terminals TS and CG of the DLC3. SST 09843-18040
- (d) Turn the ignition switch to the ON position.



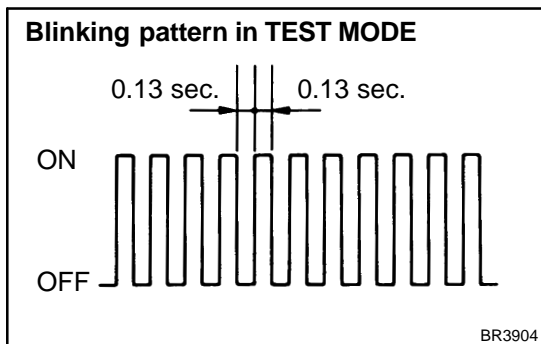
- (e) Check that the ABS and VSC TRAC warning lights blink in test mode.

HINT:

If the ABS and VSC TRAC warning lights do not blink, inspect the TS and CG terminal circuit and the ABS and VSC TRAC warning light circuits.

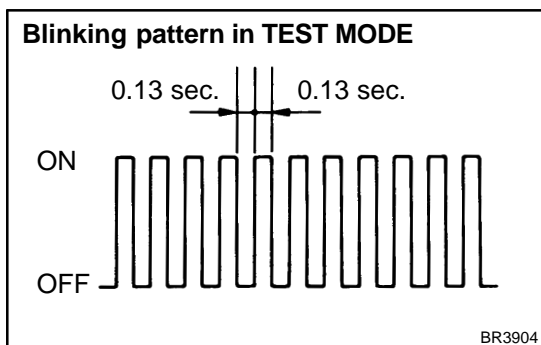
Trouble Area	See Page
TS and CG terminal circuit	05-901
ABS warning light circuit	05-858 05-863
VSC TRAC warning light circuit	05-865 05-868

- (f) Start the engine.
- (g) Using a check wire, perform the ABS sensor (deceleration sensor, master cylinder pressure sensor, center diff. lock detection switch, L4 detection switch and speed sensor) and VSC sensor (yaw rate sensor and DAC operation switch) signal checks in test mode (ABS sensor: refer to step 2 to 7, VSC sensor: refer to step 8 to 10).



2. DECELERATION SENSOR SIGNAL CHECK

- Check that the ABS warning light is blinking in test mode.
- Keep the vehicle in a stationary condition on a level surface for 1 second or more.

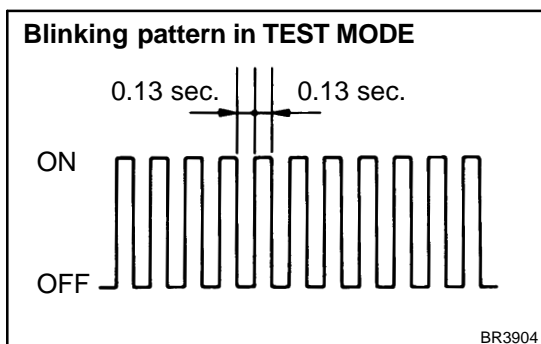


3. MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK

- Check that the ABS warning light is blinking in test mode.
- Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.

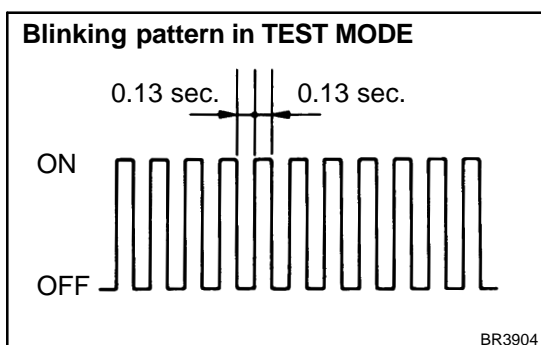
HINT:

- At this time, the ABS warning light stays on for 3 seconds.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.



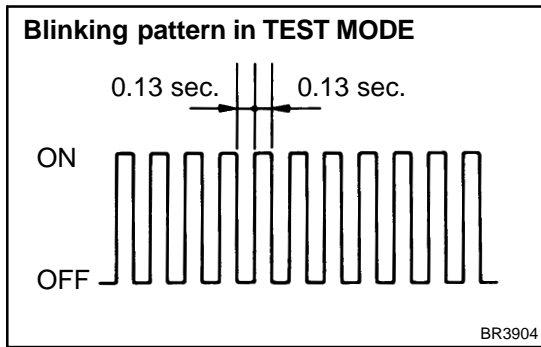
4. CENTER DIFF. LOCK DETECTION SWITCH SIGNAL CHECK

- Check that the ABS warning light is blinking in test mode.
- Check the center diff. lock switch.
 - Push the center diff. lock switch on to lock the center differential.
 - Push the center diff. lock switch off to unlock the center differential.



5. L4 DETECTION SWITCH SIGNAL CHECK

- Check that the ABS warning light is blinking in test mode.
- Check the transfer indicator (L4) switch.
 - Turn the H-L switch to the L position to put the vehicle in L4 mode.
 - Turn the H-L switch to the H position to put the vehicle in H4 mode.



6. SPEED SENSOR SIGNAL CHECK

- (a) Check that the ABS warning light is blinking in test mode.
- (b) Check the backward signal.
 - (1) Drive the vehicle in reverse for more than 1 second at 2 mph (3 km/h) or higher.

HINT:

Drive the vehicle in reverse and check the speed sensor signal. Note that the signal check cannot be complete if the vehicle speed is 28 mph (45 km/h) or more.

- (c) Check the forward signal.
 - (1) Drive the vehicle straight forward.
 - Drive the vehicle at a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.

HINT:

The signal check may not be completed if the vehicle has its wheels spun or the steering wheel turned during this check.

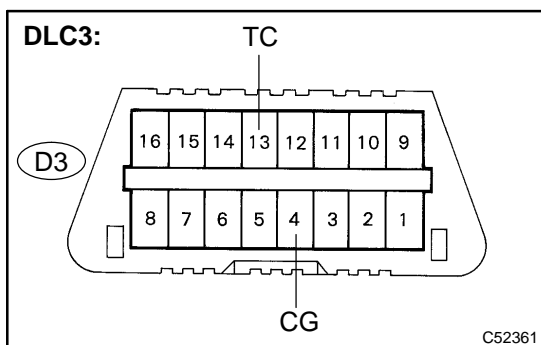
- (d) Stop the vehicle.

NOTICE:

- Before performing the speed sensor signal check, complete the deceleration sensor, master cylinder pressure sensor, center diff. lock detection switch and L4 detection switch signal checks.
- The speed sensor signal check may not be completed if the speed sensor signal check is started while turning the steering wheel or spinning the wheels.
- After the ABS warning light goes off, if the vehicle speed exceeds 50 mph (80 km/h), signal check code will be stored again. Decelerate or stop before the speed reaches 50 mph (80 km/h).
- If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.

HINT:

When the signal check has been completed, the ABS warning light goes off while driving and blinks in the test mode pattern while stationary.



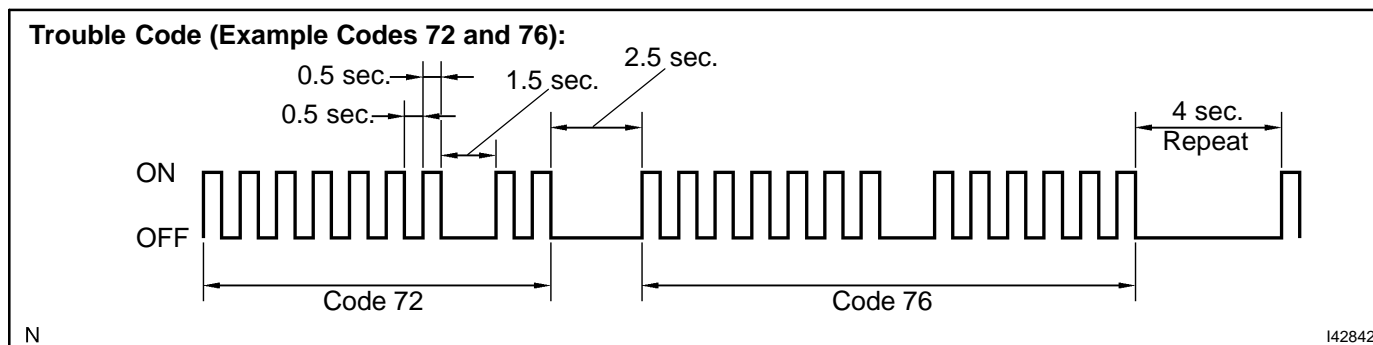
7. READ DTC OF ABS SENSOR

- (a) Using SST, connect terminals TC and CG of the DLC3.
 - SST 09843-18040
- (b) Read the number of blinks of the ABS warning light.

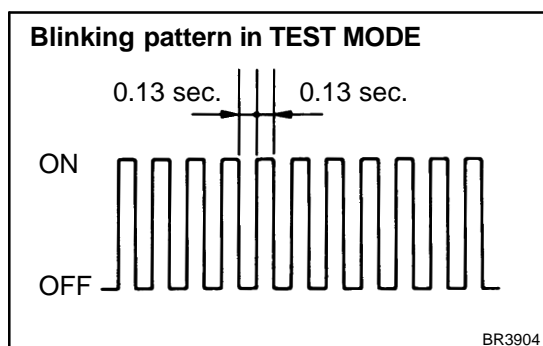
HINT:

- See the list of DTC (refer to step 11).
- If every sensor is normal, the normal system code is output. (A cycle of 0.25 second ON and 0.25 second OFF is repeated.)

- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.

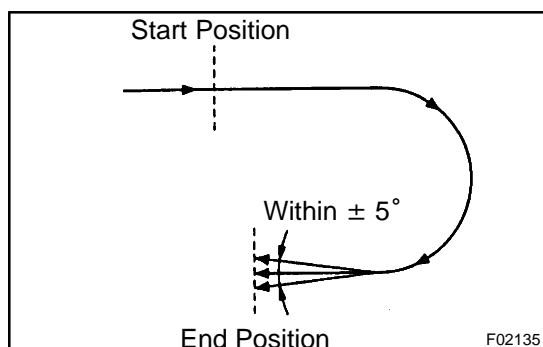


- (c) After the check, disconnect the SST from terminals TC and CG of the DLC3.



8. YAW RATE SENSOR SIGNAL CHECK

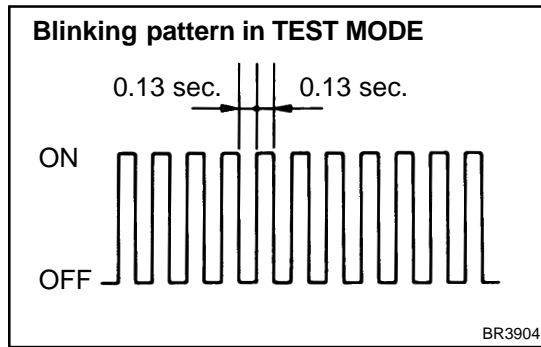
- (a) Check that the VSC TRAC warning light is blinking in test mode.
- (b) Check the zero point voltage of the yaw rate sensor.
- (1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.
- (c) Check the output of the yaw rate sensor and the direction of the steering angle sensor.



- (1) Shift the shift lever to the D position and drive the vehicle at a vehicle speed of approx. 3 mph (5 km/h), turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
- (2) Stop the vehicle and shift the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

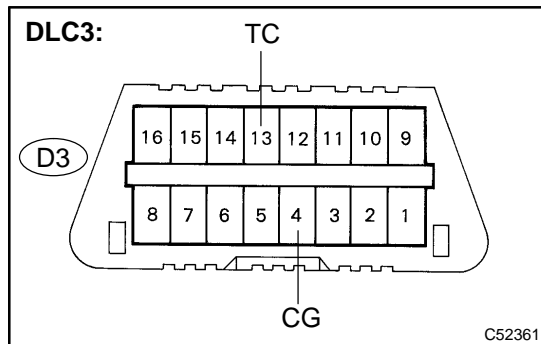
HINT:

- If the skid control buzzer sounds, the signal check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page 05-894), then perform the signal check again.
- If the skid control buzzer still won't sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Drive the vehicle in a 180° circle. At the end of the turn, the direction of the vehicle should be within $180^\circ \pm 5^\circ$ of its start position.
- Do not spin the wheels.



9. DAC OPERATION SWITCH SIGNAL CHECK

- (a) Check that the VSC TRAC warning light is blinking in test mode.
- (b) Check the DAC switch.
 - (1) Push the DAC switch on.
 - (2) Push the DAC switch off.

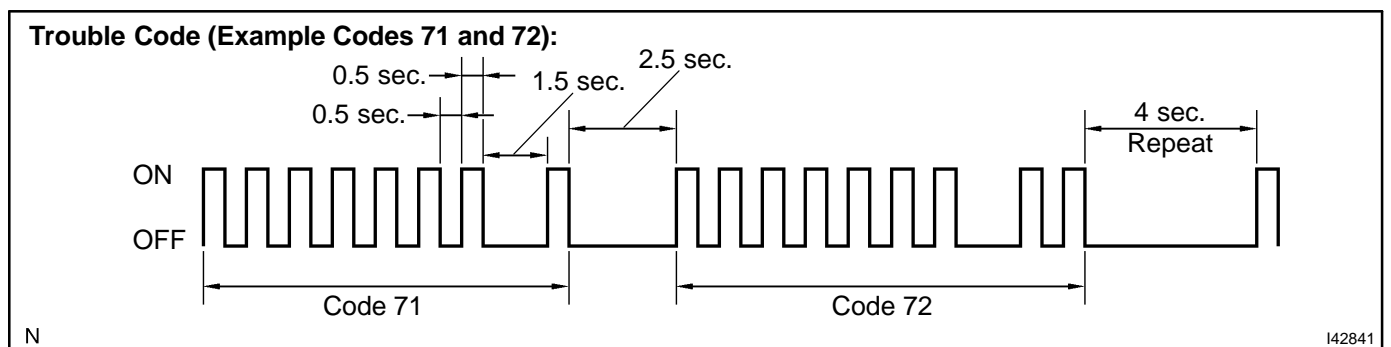


10. READ DTC OF VSC SENSOR

- (a) Using SST, connect terminals TC and CG of the DLC3. SST 09843-18040
- (b) Read the number of blinks of the VSC TRAC warning light.

HINT:

- See the list of DTC (refer to step 11).
- If every sensor is normal, the normal system code is output. (A cycle of 0.25 second ON and 0.25 second OFF is repeated.)
- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.



- (c) After performing the check, disconnect the SST from terminals TS and CG, TC and CG of the DLC3 and turn the ignition switch off.
- (d) Turn the ignition switch to the ON position.

11. DTC OF SIGNAL CHECK FUNCTION**ABS sensor:**

Code No. (See Page)	Diagnosis	Trouble Area
C1271/71 (05-771)	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> • Right front speed sensor • Sensor installation • Speed sensor rotor
C1272/72 (05-771)	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> • Left front speed sensor • Sensor installation • Speed sensor rotor
C1273/73 (05-779)	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> • Right rear speed sensor • Sensor installation • Speed sensor rotor
C1274/74 (05-779)	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> • Left rear speed sensor • Sensor installation • Speed sensor rotor
C1275/75 (05-771)	Abnormal change in output voltage of right front speed sensor	Speed sensor rotor
C1276/76 (05-771)	Abnormal change in output voltage of left front speed sensor	Speed sensor rotor
C1277/77 (05-779)	Abnormal change in output voltage of right rear speed sensor	Speed sensor rotor
C1278/78 (05-779)	Abnormal change in output voltage of left rear speed sensor	Speed sensor rotor
C1279/79 (05-807)	Deceleration sensor is faulty	Yaw rate and deceleration sensor
C1281/81 (05-818)	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C1282/82 (05-847)	Center differential lock position switch malfunction	Center diff. lock switch
C1283/83 (05-840)	L4 position switch malfunction	Transfer indicator (L4) switch

VSC sensor:

Code No. (See Page)	Diagnosis	Trouble Area
C0371/71 (05-807)	Yaw rate sensor output signal malfunction	Yaw rate and deceleration sensor
C1379/74 (05-887, 05-891)	Malfunction in DAC operation switch	DAC switch

HINT:

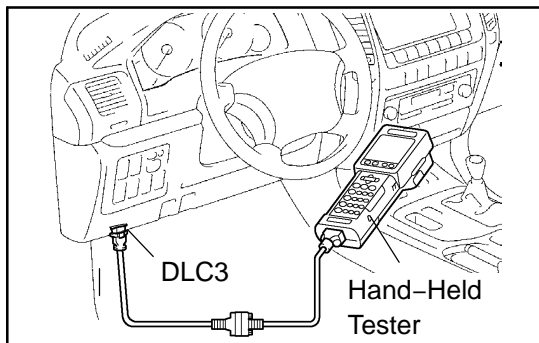
The codes in this table are output only in test mode (signal check).

USING HAND-HELD TESTER:**12. TEST MODE (SIGNAL CHECK) PROCEDURE**

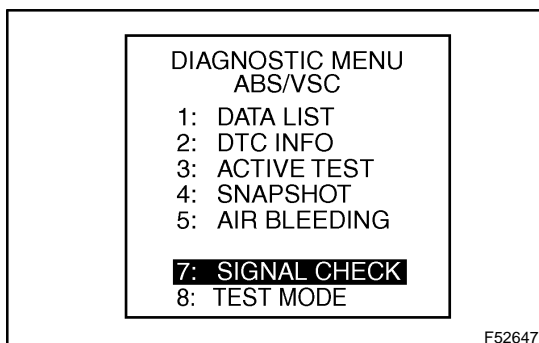
When having replaced the master cylinder solenoid and/or yaw rate and deceleration sensor, perform zero point calibration of the yaw rate and deceleration sensor (see page 05-734).

HINT:

- If the ignition switch is turned from the ON to the ACC or LOCK position during test mode (SIGNAL CHECK), DTCs of the signal check function will be erased.
 - During test mode (SIGNAL CHECK), the skid control ECU records all DTCs of the signal check function. By performing the test mode (SIGNAL CHECK), the codes are erased if normality is confirmed. The codes left over are the codes where an abnormality was found.
- (a) Turn the ignition switch off.
 - (b) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.



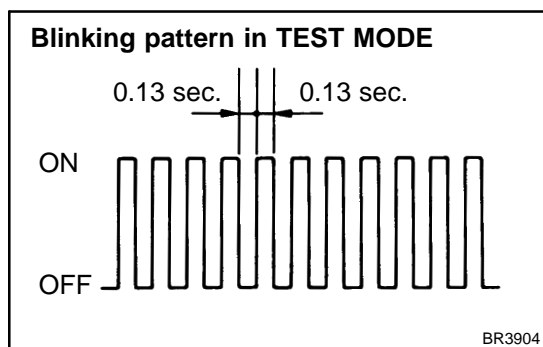
- (c) Connect the hand-held tester to the DLC3.
- (d) Turn the ignition switch to the ON position.



- (e) Operate the hand-held tester in test mode (SIGNAL CHECK).

HINT:

Refer to the hand-held tester operator's manual for further details.



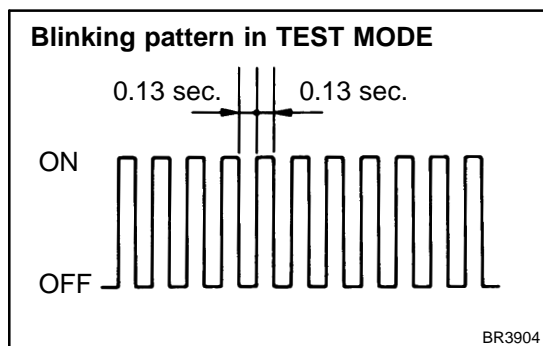
- (f) Check that the ABS and VSC TRAC warning lights blink in test mode.

HINT:

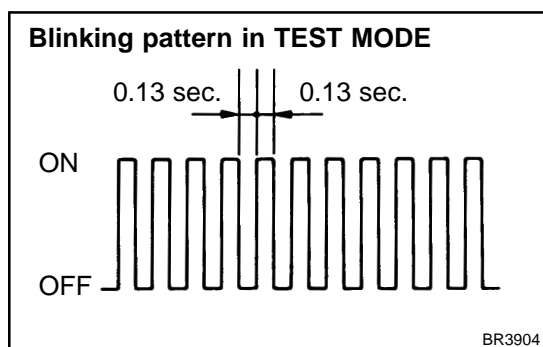
If the ABS and VSC TRAC warning lights do not blink, inspect the TS and CG terminal circuit and the ABS and VSC TRAC warning light circuits.

Trouble Area	See Page
TS and CG terminal circuit	05-901
ABS warning light	05-858 05-863
VSC TRAC warning light	05-865 05-868

- (g) Start the engine.
- (h) Using the hand-held tester, perform the ABS sensor (deceleration sensor, master cylinder pressure sensor, center diff. lock detection switch, L4 detection switch and speed sensor) and VSC sensor (yaw rate sensor and DAC operation switch) signal checks in test mode (ABS sensor: refer to step 13 to 18, VSC sensor: refer to step 19 to 21).

**13. DECELERATION SENSOR SIGNAL CHECK**

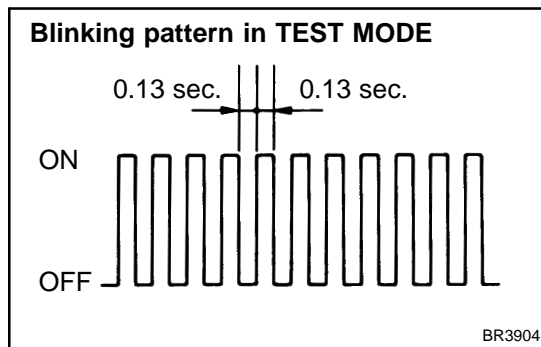
- (a) Check that the ABS warning light is blinking in test mode.
- (b) Keep the vehicle in a stationary condition on a level surface for 1 second or more.

**14. MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK**

- (a) Check that the ABS warning light is blinking in test mode.
- (b) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.

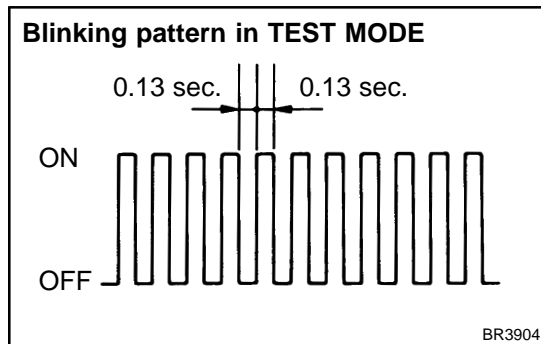
HINT:

- At this time, the ABS warning light stays on for 3 seconds.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.



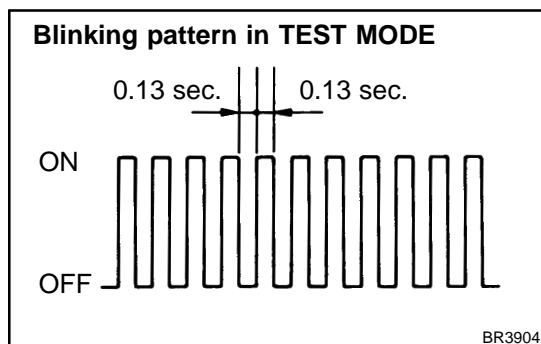
15. CENTER DIFF. LOCK DETECTION SWITCH SIGNAL CHECK

- (a) Check that the ABS warning light is blinking in test mode.
- (b) Check the center diff. lock switch.
 - (1) Push the center diff. lock switch on to lock the center differential.
 - (2) Push the center diff. lock switch off to unlock the center differential.



16. L4 DETECTION SWITCH SIGNAL CHECK

- (a) Check that the ABS warning light is blinking in test mode.
- (b) Check the transfer indicator (L4) switch.
 - (1) Turn the H-L switch to the L position to put the vehicle in L4 mode.
 - (2) Turn the H-L switch to the H position to put the vehicle in H4 mode.



17. SPEED SENSOR SIGNAL CHECK

- (a) Check that the ABS warning light is blinking in test mode.
- (b) Check the backward signal.
 - (1) Drive the vehicle in reverse for more than 1 second at 2 mph (3 km/h) or higher.

HINT:

Drive the vehicle in reverse and check the speed sensor signal. Note that the signal check cannot be complete if the vehicle speed is 28 mph (45 km/h) or more.

- (c) Check the forward signal.
 - (1) Drive the vehicle straight forward. Drive the vehicle at a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.

HINT:

The signal check may not be completed if the vehicle has its wheels spun or the steering wheel turned during this check.

(d) Stop the vehicle.

NOTICE:

- Before performing the speed sensor signal check, complete the deceleration sensor, master cylinder pressure sensor, center diff. lock detection switch and L4 detection switch signal checks.
- The speed sensor signal check may not be completed if the speed sensor signal check is started while turning the steering wheel or spinning the wheels.
- After the ABS warning light goes off, if the vehicle speed exceeds 50 mph (80 km/h), a signal check code will be stored again. Decelerate or stop before the speed reaches 50 mph (80 km/h).
- If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.

HINT:

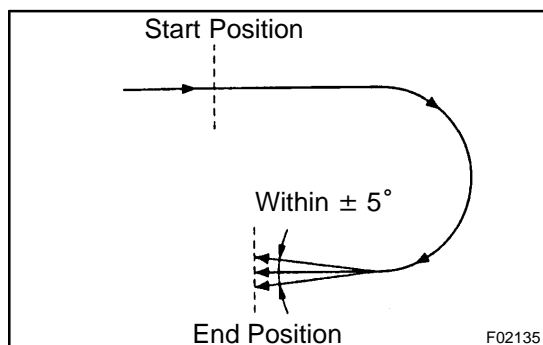
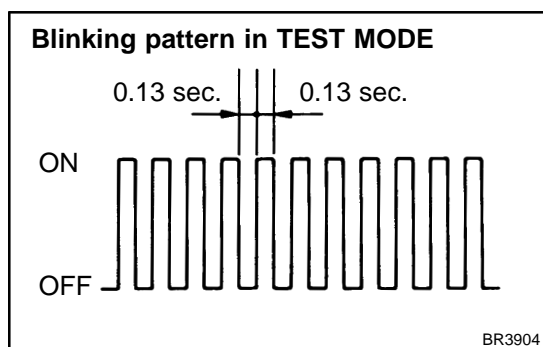
When the signal check has been completed, the ABS warning light goes off while driving and blinks in the test mode pattern while stationary.

18. READ DTC OF ABS SENSOR

(a) Read the DTC(s) by following the tester screen.

HINT:

- Refer to the hand-held tester operator's manual for further details.
- See the list of DTC (refer to step 22).

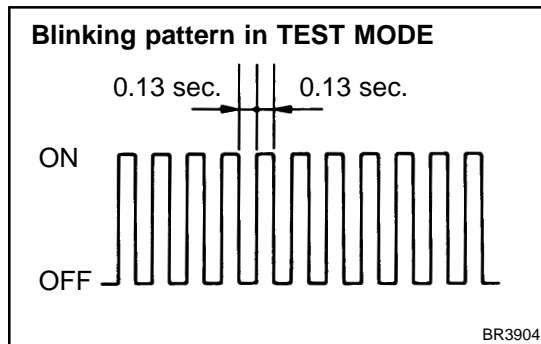
**19. YAW RATE SENSOR SIGNAL CHECK**

- (a) Check that the VSC TRAC warning light is blinking in test mode.
- (b) Check the zero point voltage of the yaw rate sensor.
- (1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.
- (c) Check the output of the yaw rate sensor and the direction of the steering angle sensor.
- (1) Shift the shift lever to the D position and drive the vehicle at a vehicle speed of approx. 3 mph (5 km/h), turn the steering wheel either to the left or right 90° or more until the vehicle makes 180° turn.
 - (2) Stop the vehicle and shift the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

HINT:

- If the skid control buzzer sounds, the signal check is completed normally.

- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page 05-894), then perform the signal check again.
- If the skid control buzzer still won't sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Drive the vehicle in a 180° circle. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the wheels.



20. DAC OPERATION SWITCH SIGNAL CHECK

- Check that the VSC TRAC warning light is blinking in test mode.
- Check the DAC switch.
 - Push the DAC switch on.
 - Push the DAC switch off.

21. READ DTC OF VSC SENSOR

- Read the DTC(s) by following the tester screen.

HINT:

- Refer to the hand-held tester operator's manual for further details.
- See the list of DTC (refer to step 22).

22. DTC OF SIGNAL CHECK FUNCTION**ABS sensor:**

Code No. (See Page)	Diagnosis	Trouble Area
C1271/71 (05-771)	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> • Right front speed sensor • Sensor installation • Speed sensor rotor
C1272/72 (05-771)	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> • Left front speed sensor • Sensor installation • Speed sensor rotor
C1273/73 (05-779)	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> • Right rear speed sensor • Sensor installation • Speed sensor rotor
C1274/74 (05-779)	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> • Left rear speed sensor • Sensor installation • Speed sensor rotor
C1275/75 (05-771)	Abnormal change in output voltage of right front speed sensor	Speed sensor rotor
C1276/76 (05-771)	Abnormal change in output voltage of left front speed sensor	Speed sensor rotor
C1277/77 (05-779)	Abnormal change in output voltage of right rear speed sensor	Speed sensor rotor
C1278/78 (05-779)	Abnormal change in output voltage of left rear speed sensor	Speed sensor rotor
C1279/79 (05-807)	Deceleration sensor is faulty	Yaw rate and deceleration sensor
C1281/81 (05-818)	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C1282/82 (05-847)	Center differential lock position switch malfunction	Center diff. lock switch
C1283/83 (05-840)	L4 position switch malfunction	Transfer indicator (L4) switch

VSC sensor:

Code No. (See Page)	Diagnosis	Trouble Area
C0371/71 (05-807)	Yaw rate sensor output signal malfunction	Yaw rate and deceleration sensor
C1379/74 (05-887, 05-891)	Malfunction in DAC operation switch	DAC switch

HINT:

The codes in this table are output only in test mode (signal check).

PROBLEM SYMPTOMS TABLE

If there are no DTCs output but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing the master cylinder solenoid (skid control ECU), sensor, etc., turn the ignition switch off.

HINT:

Inspect the fuse and relay before investigating the suspected areas as shown in the table below. Inspect each malfunctioning circuit in numerical order for the corresponding symptom.

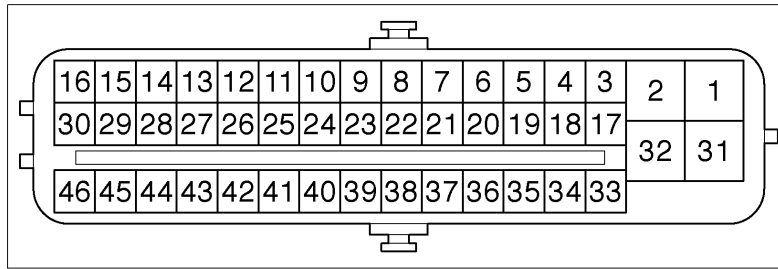
Symptoms	Suspected Areas	See Page
ABS does not operate BA does not operate EBD does not operate	<ol style="list-style-type: none"> 1. Check the DTC again and make sure that the normal system code is output. 2. IG power source circuit 3. Front speed sensor circuit Rear speed sensor circuit 4. Check the hydraulic brake booster with the hand-held tester. If abnormal, check the hydraulic circuit for leakage. 5. Front speed sensor Rear speed sensor 6. Front axle w/ ABS rotor bearing assy (Speed sensor rotor) Rear axle bearing assy (Speed sensor rotor) 7. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid (skid control ECU). 	05-757 05-811 05-771 05-779 32-14 32-48 32-50 30-28 30-38 32-23
ABS does not operate efficiently BA does not operate efficiently EBD does not operate efficiently	<ol style="list-style-type: none"> 1. Check the DTC again and make sure that the normal system code is output. 2. Front speed sensor circuit Rear speed sensor circuit 3. Stop light switch circuit 4. Check the hydraulic brake booster with the hand-held tester. If abnormal, check the hydraulic circuit for leakage. 5. Front speed sensor Rear speed sensor 6. Front axle w/ ABS rotor bearing assy (Speed sensor rotor) Rear axle bearing assy (Speed sensor rotor) 7. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid (skid control ECU). 	05-757 05-771 05-779 05-821 32-14 32-48 32-50 30-28 30-38 32-23
ABS warning light abnormal (Remains on)	<ol style="list-style-type: none"> 1. ABS warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-858 32-23
ABS warning light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. ABS warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-863 32-23
ABS sensor DTC check cannot be done	<ol style="list-style-type: none"> 1. Check the DTC again and make sure that the normal system code is output. 2. TC and CG terminal circuit 3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid (skid control ECU). 	05-757 05-897 32-23

Symptoms	Suspected Areas	See Page
VSC and/or TRAC does not operate	<ol style="list-style-type: none"> 1. Check the DTC again and make sure that the normal system code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Front speed sensor circuit Rear speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit 8. Yaw rate and deceleration sensor 9. Steering angle sensor 10. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid (skid control ECU). 	05-757 05-811 32-14 05-771 05-779 05-807 05-807 05-803 32-52 32-53 32-23
VSC TRAC warning light abnormal (Remains on)	<ol style="list-style-type: none"> 1. VSC TRAC warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-865 32-23
VSC TRAC warning light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. VSC TRAC warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-868 32-23
VSC sensor DTC check cannot be done	<ol style="list-style-type: none"> 1. Check the DTC again and make sure that the normal system code is output. 2. TC and CG terminal circuit 3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid (skid control ECU). 	05-757 05-897 32-23
Sensor and switch signal check cannot be done	<ol style="list-style-type: none"> 1. TS and CG terminal circuit 2. Master cylinder solenoid (Skid control ECU) 	05-901 32-23
BRAKE warning light abnormal (Remains on)	<ol style="list-style-type: none"> 1. Brake warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-870 32-23
BRAKE warning light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. Brake warning light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-875 32-23
SLIP indicator light abnormal (Remains on)	<ol style="list-style-type: none"> 1. SLIP indicator light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-877 32-23
SLIP indicator light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. SLIP indicator light circuit 2. Master cylinder solenoid (Skid control ECU) 	05-880 32-23
VSC OFF indicator light abnormal (Remains on)	<ol style="list-style-type: none"> 1. Transfer indicator (L4) switch circuit 2. VSC OFF indicator light circuit 3. Master cylinder solenoid (Skid control ECU) 	05-840 05-882 32-23
VSC OFF indicator light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. Transfer indicator (L4) switch circuit 2. VSC OFF indicator light circuit 3. Master cylinder solenoid (Skid control ECU) 	05-840 05-885 32-23
DAC indicator light abnormal (Remains on)	<ol style="list-style-type: none"> 1. Transfer indicator (L4) switch circuit 2. DAC indicator light circuit 3. Master cylinder solenoid (Skid control ECU) 	05-840 05-887 32-23
DAC indicator light abnormal (Does not come on)	<ol style="list-style-type: none"> 1. Transfer indicator (L4) switch circuit 2. DAC indicator light circuit 3. Master cylinder solenoid (Skid control ECU) 	05-840 05-891 32-23
Skid control buzzer abnormal	<ol style="list-style-type: none"> 1. Skid control buzzer circuit 2. Master cylinder solenoid (Skid control ECU) 	05-894 32-23

TERMINALS OF ECU

1. TERMINALS OF ECU

Skid Control ECU:



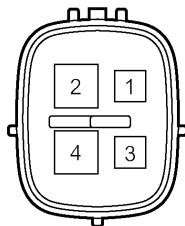
N

F45080

Symbols (Terminal No.)	Terminal Description
GND1 (1)	Skid control ECU ground
+BM1 (2)	Power supply for motor
FR+ (3)	Front RH wheel speed sensor power supply output
FL- (4)	Front LH wheel speed sensor input
RR+ (5)	Rear RH wheel speed sensor power supply output
RL- (6)	Rear LH wheel speed sensor input
STP (7)	Stop light switch input
TRC+ (8)	Kinetic suspension output
NEO (10)	Center diff. lock indicator light input
CANH (11)	CAN communication line H
SP1 (12)	Speed signal output for combination meter
D/G (13)	Diagnosis tester communication line
P (14)	Shift position indicator P signal input
INFR (15) (*)	Electronic modulated suspension demand output
STPO (16)	Stop light operation relay output
FR- (17)	Front RH wheel speed sensor input
FL+ (18)	Front LH wheel speed sensor power supply output
RR- (19)	Rear RH wheel speed sensor input
RL+ (20)	Rear LH wheel speed sensor power supply output
EXI4 (21)	Transfer indicator (L4) switch input
TRC- (22)	Kinetic suspension output
TS (24)	Sensor test terminal (Signal check switch) input
CANL (25)	CAN communication line L
EXI (27)	Center diff. lock switch input
PKB (28)	Parking brake switch input
WA (29)	ABS warning light output
BZ (30)	Skid control buzzer output
+BS (31)	Power supply for solenoid
GND2 (32)	Skid control ECU ground
HDCW (33)	DAC indicator light output
IND (34)	Slip indicator light output
WT (35)	VSC OFF indicator light output
VSCW (36)	VSC TRAC warning light output
FRO (37) (*)	Front RH wheel speed output
FLO (38) (*)	Front LH wheel speed output
LBL (41)	Brake fluid level warning switch input
WFSE (42)	Write flash enable input
CSW (43) (*)	Suspension control ECU monitor input

Symbols (Terminal No.)	Terminal Description
HDCS (44)	DAC switch input
STP2 (45)	Stop light switch input
IG1 (46)	IG1 power supply

Skid Control ECU:



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142830

Symbols (Terminal No.)	Terminal Description
IG2 (1)	IG2 power supply
+BM2 (2)	Power supply for motor
BRL (3)	Brake warning light output
GND3 (4)	Skid control ECU ground

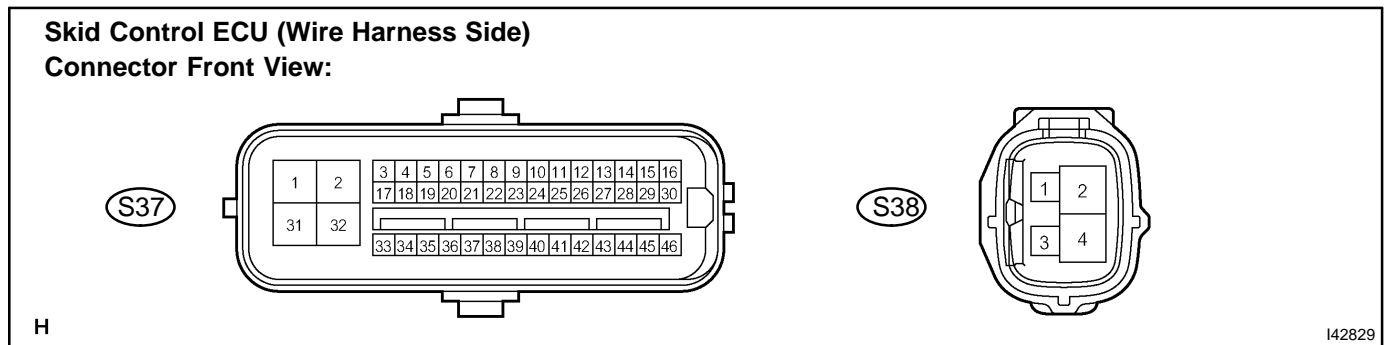
(*): Electronic modulated suspension & rear air suspension system

2. TERMINAL INSPECTION

Disconnect the connector and measure the voltage or resistance on the wire harness side.

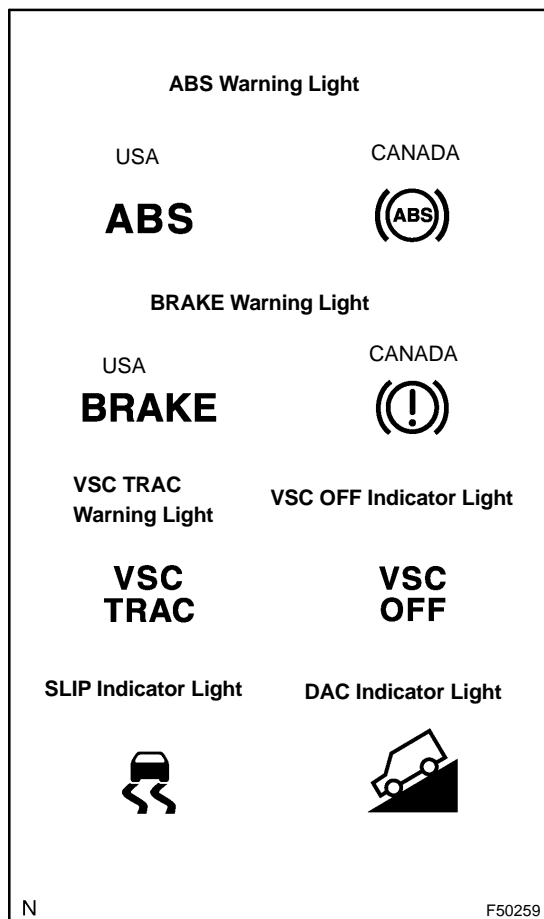
HINT:

Voltage can not be measured with the connector connected to the skid control ECU as the connector is watertight.



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BM1 (S37-2) – GND (S37-1, 32) (S38-4)	B-Y – W-B	Power supply for motor (From battery)	Always	10 to 14 V
STP (S37-7) – GND (S37-1, 32) (S38-4)	G-Y – W-B	Stop light switch input	Stop light switch ON → OFF (Brake pedal depressed → released)	8 to 14 V → Below 1.5 V
P (S37-14) – GND (S37-1, 32) (S38-4)	G-B – W-B	Shift position indicator P signal input	Ignition switch ON, shift P position → any shift position except P	8 to 14 V → Below 1.5 V
PKB (S37-28) – GND (S37-1, 32) (S38-4)	LG – W-B	Parking brake switch in- put	Ignition switch ON, parking brake switch ON → OFF	Below 1.5 V → 10 to 14 V
+BS (S37-31) – GND (S37-1, 32) (S38-4)	Y – W-B	Power supply for solenoid (From battery)	Always	10 to 14 V
LBL (S37-41) – GND (S37-1, 32) (S38-4)	LG – W-B	Brake fluid level warning switch input	Brake fluid level is –5 mm from the minimum level → maximum level	Below 1 Ω → 1.9 to 2.1 kΩ
STP2 (S37-45) – GND (S37-1, 32) (S38-4)	G – W-B	Stop light switch input	Stop light switch ON → OFF (Brake pedal depressed → released)	8 to 14 V → Below 1.5 V
IG1 (S37-46) – GND (S37-1, 32) (S38-4)	B-R – W-B	IG1 power supply	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
IG2 (S38-1) – GND (S37-1, 32) (S38-4)	B-O – W-B	IG2 power supply	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
+BM2 (S38-2) – GND (S37-1, 32) (S38-4)	B-Y – W-B	Power supply for motor (From battery)	Always	10 to 14 V

DIAGNOSIS SYSTEM



1. DIAGNOSIS

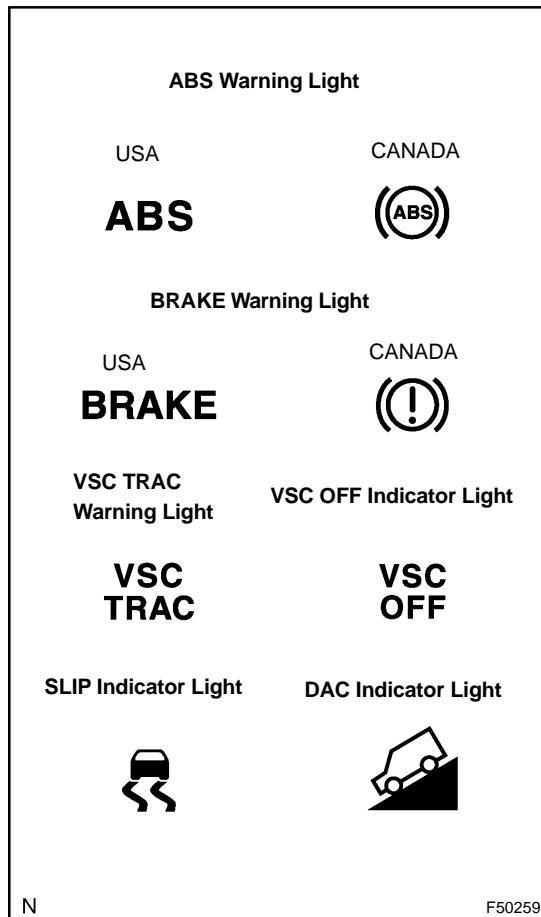
(a) If the skid control ECU detects a malfunction, the ABS, BRAKE, VSC TRAC warning lights and the VSC OFF, SLIP, DAC indicator lights will come on to warn the driver. The table below indicates which lights will come on when there is a malfunction in a particular function.

Item/ Trouble Area	ABS	EBD	BA	VSC	TRAC	A-TRAC	DAC	HAC
ABS warning light	○	○	○	-	-	-	-	-
BRAKE warn- ing light	-	○	-	-	-	-	-	-
VSC TRAC warning light	○	○	○	○	○	○	○	○
VSC OFF in- dicator light	○	○	○	○	○	○	○	○
SLIP indicator light	○	○	○	○	○	○	○	○
DAC indicator light (A/T)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)

○: Light ON ●: Light ON (Blinking) -: Light OFF

- The DTCs are simultaneously stored in the memory. The DTCs can be read by connecting the SST between terminals TC and CG of the DLC3 and observing the blinking of the ABS and VSC TRAC warning lights, or by connecting the hand-held tester.

- This system has a signal check function (test mode).
The DTC can be read by connecting the hand-held tester and observing the blinking of the ABS and VSC TRAC warning lights.



2. WARNING LIGHT AND INDICATOR LIGHT CHECK

(a) Release the parking brake lever.

NOTICE:

When releasing the parking brake, set the chocks to hold the vehicle for safety.

HINT:

When the parking brake is applied or the level of the brake fluid is low, the brake warning light comes on.

(b) When the ignition switch is turned to the ON position, check that the ABS, BRAKE, and VSC TRAC warning lights and the VSC OFF, SLIP and DAC indicator lights come on for approximately 3 seconds.

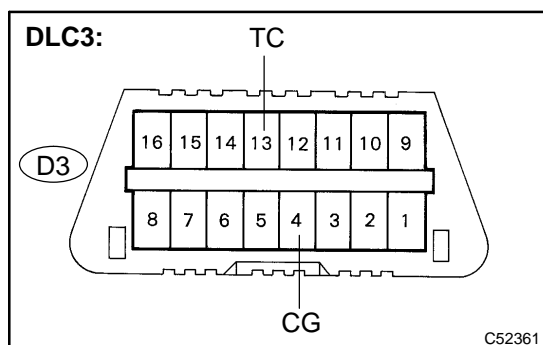
HINT:

If the warning light and indicator light check result is not normal, proceed to troubleshooting for the ABS, BRAKE, and VSC TRC warning light circuits, and the VSC OFF, SLIP, and DAC indicator light circuits.

If the indicator remains on, proceed to troubleshooting for the light circuit below.

Trouble Area	See Page
ABS warning light circuit	05-858
BRAKE warning light circuit	05-870
VSC TRAC warning light circuit	05-865
VSC OFF indicator light circuit	05-882
SLIP indicator light circuit	05-877
DAC indicator light circuit	05-887

DTC CHECK/CLEAR



1. DTC CHECK/CLEAR USING SST CHECK WIRE:

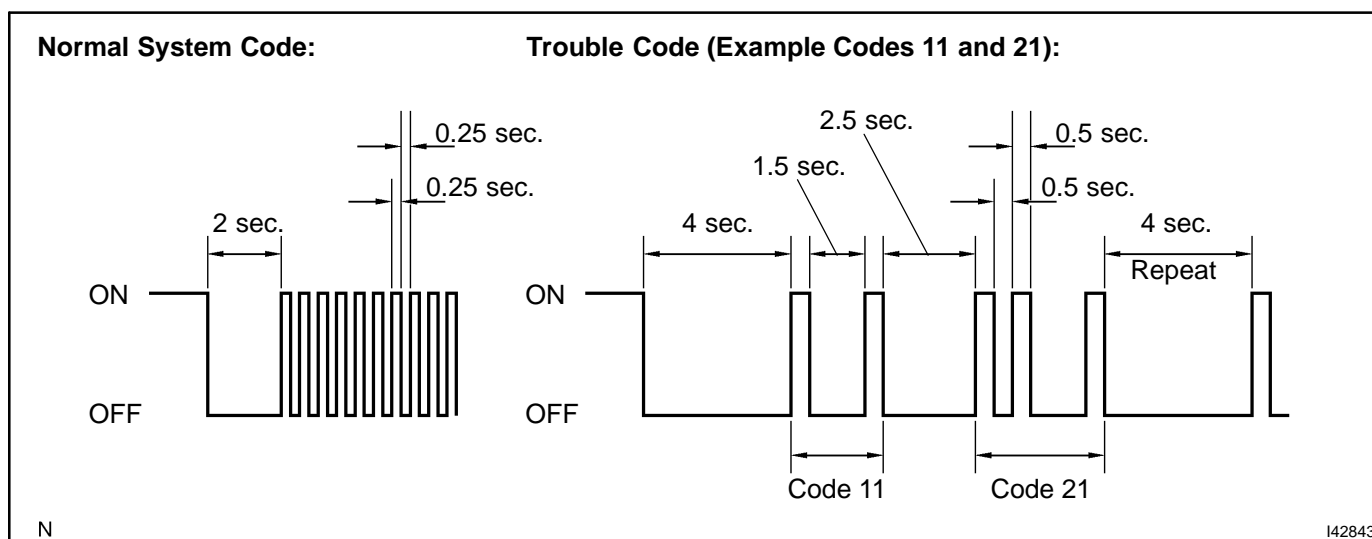
- (a) DTC check
- (1) Using SST, connect terminals TC and CG of the DLC3.
- SST 09843-18040
- (2) Turn the ignition switch to the ON position.
 - (3) Read the DTCs from the ABS and VSC TRAC warning lights on the combination meter.

HINT:

- If no code appears, inspect the TC and CG terminal circuit, and the ABS and VSC TRAC warning light circuits.

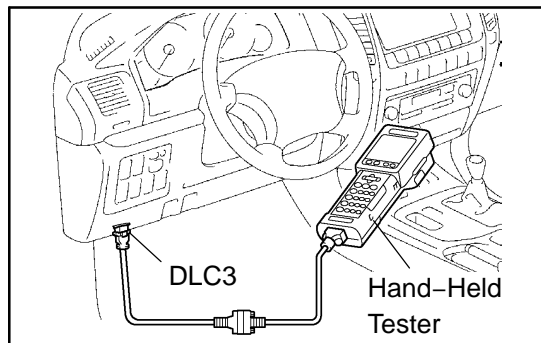
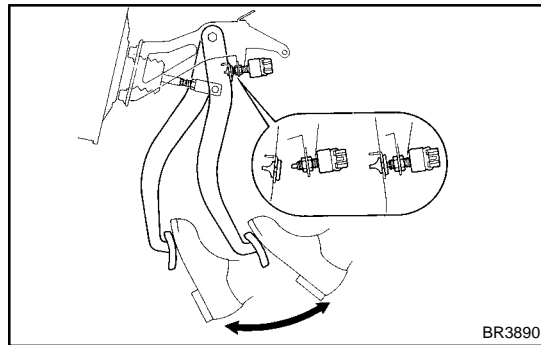
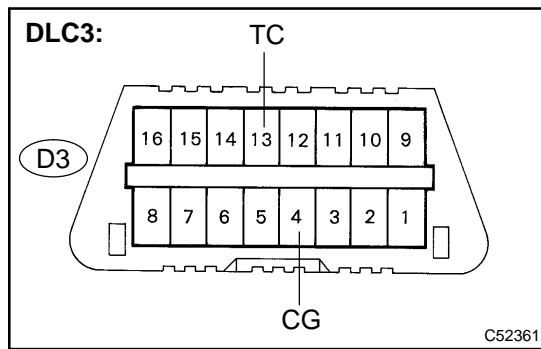
Trouble Area	See Page
TC and CG terminal circuit	05-897
ABS warning light circuit	05-858 05-863
VSC TRAC warning light circuit	05-865 05-868

- As examples, refer to the chart below for the blinking patterns of the normal system code and trouble codes 11 and 21.



- (4) Codes are explained in the code table on page [05-767](#).
- (5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the display.

If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.



- (b) DTC clear
- (1) Using SST, connect terminals TC and CG of the DLC3.
- SST 09843-18040
- (2) Turn the ignition switch to the ON position.

- (3) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
- (4) Check that the warning light indicates a normal system code.
- (5) Remove the SST from the terminals of the DLC3.

HINT:

Clearing the DTCs cannot be performed by removing the battery cable or the ECU-IG fuse.

2. DTC CHECK/CLEAR**USING HAND-HELD TESTER:**

- (a) DTC check
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Read the DTCs following the prompts on the tester screen.
- (b) DTC clear
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Operate the hand-held tester to clear the codes.

HINT:

Refer to the hand-held tester operator's manual for further details.

3. END OF DTC CHECK/CLEAR

- (a) Turn the ignition switch to the ON position.
- (b) Check that the ABS and VSC TRAC warning lights go off within approximately 3 seconds.

FREEZE FRAME DATA

1. FREEZE FRAME DATA

Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.

The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to the ON position since the last time the ABS was activated.

HINT:

- However, if the vehicle was stopped or at low speed (4.3 mph (7 km/h) or less), or if a DTC is detected, the skid control ECU will not count the number since then.
 - Freeze frame data at the time the ABS operates:
The skid control ECU stores and updates data whenever the ABS system operates.
When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is erased.
 - Freeze frame data at the time a DTC is detected:
When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.
- (a) Connect the hand-held tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) From the display on the tester, select the "DTC".

Hand-held Tester Display	Measurement Item	Reference Value
VEHICLE SPD	Vehicle speed reading	Min.: 0 mph (0 km/h), Max.: 202 mph (326.4 km/h)
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
#IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 to 31
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal released: 0.3 to 0.9 V Brake pedal depressed: 0.8 to 4.5 V
MAS PRESS GRADE	Master cylinder pressure sensor change	Min.: -30 Mpa/s, Max.: 225 Mpa/s
SYSTEM	System status	ABS activated: ABS VSC/TRAC activated: VSC/TRAC BA activated: BA No system activated: NO SYS
YAW RATE	Yaw rate sensor reading	Min.: -128 deg/s, Max.: 127 deg/s
STEERING ANG	Steering angle sensor reading	Min.: -1152 Max.: 1143
G (RIGHT&LEFT)	Right and left G	Min.: -1.869 G, Max.: 1.869 G
G (BACK&FORTH)	Back and forth G	Min.: -1.869 G, Max.: 1.869 G
SHIFT POSITION	Shift lever position	FAIL P,N R D/M 4 3 2 L
TROUBLE CODE	Freeze DTC (Trouble code)	0 to 65535
BUZZER	Skid control buzzer signal	Skid control buzzer ON: ON, OFF: OFF
RESERVOIR SW	Brake fluid level warning switch signal	Brake fluid level warning switch ON: ON, OFF: OFF
PKB SW	Parking brake switch signal	Parking brake switch ON: ON, OFF: OFF
WHEEL DIR FR	Front right wheel direction signal	Front right wheel direction FORWARD: Forward, BACK: Back
WHEEL DIR FL	Front left wheel direction signal	Front left wheel direction FORWARD: Forward, BACK: Back

Hand-held Tester Display	Measurement Item	Reference Value
WHEEL DIR RR	Rear right wheel direction signal	Rear right wheel direction FORWARD: Forward, BACK: Back
WHEEL DIR RL	Rear left wheel direction signal	Rear left wheel direction FORWARD: Forward, BACK: Back
THROTTLE	Throttle position sensor reading	Accelerator pedal released: approx. 0 % Accelerator pedal depressed: approx. 100 %

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

- If there is a problem with sensor signals or hydraulic brake booster systems, the skid control ECU prohibits power supply to the hydraulic brake booster and informs the ECM of VSC system failure. The hydraulic brake booster turns off each solenoid and the ECM shuts off VSC control (traction control signal) from the skid control ECU accordingly, which turns out to be as if the ABS, TRAC and VSC systems were not installed. The ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (see page 05-755).
- If system components have any malfunction before starting control, immediately stop the operation. If system components have any malfunction during control, gradually stop the control so as not to trigger a sudden change in vehicle conditions. If it is impossible to control the systems, the warning light comes on to inform the driver of termination of the systems (see page 05-755).

HINT:

If the hydraulic brake booster encounters a malfunction, brake performance is gradually lost and ABS, BA, TRAC, A-TRAC, VSC, DAC and HAC system control is prohibited.

ABS & EBD & BA system:

HINT:

A malfunction in either the ABS or BA system will result in an identical operation, with ABS, BA, TRAC, A-TRAC, VSC, DAC and HAC system control prohibited.

Malfunction Area	Control Method
ABS system	ABS, BA, TRAC, A-TRAC, VSC, DAC and HAC control prohibited
BA system	ABS, BA, TRAC, A-TRAC, VSC, DAC and HAC control prohibited
EBD system	ABS, EBD, BA, TRAC, A-TRAC, VSC, DAC and HAC control prohibited

TRAC & A-TRAC & VSC & DAC & HAC system:

HINT:

As for the TRAC, A-TRAC, VSC, DAC and HAC systems, different systems prohibit different controls according to a malfunctioning part.

Malfunction Area	Control Method
Engine control system (TRAC, A-TRAC and VSC systems)	Before control: Disables control During control: Uses only the brakes to effect control
Brake control system (VSC system)	Before control: Disables control During control: Uses only the engine to effect control
Brake control system (TRAC, A-TRAC, DAC and HAC systems)	Before control: Disables control During control: Disables control (by gradually ending control)

2. SYSTEM TEMPERATURE PROTECTION OPERATION

If the TRAC, A-TRAC, DAC, or HAC system has been used constantly for a long time, the temperature of the hydraulic brake booster may excessively increase. If the temperature excessively increases, the skid control buzzer will sound intermittently. If the temperature increases more, the skid control buzzer sounds for 3 seconds and the indicator light either comes on or blinks.

System	Indicator Condition
TRAC, A-TRAC and HAC systems	SLIP indicator light comes on
DAC system	SLIP indicator light comes on DAC indicator light blinks

HINT:

- If the SLIP indicator light goes off (as for the DAC system, the DAC indicator light also comes on), the systems automatically return to normal operating conditions.
- As this is not a malfunction, no DTC will be recorded.

DATA LIST/ACTIVE TEST

1. DATA LIST

- (a) While the hand-held tester is connected to the DLC3 with the ignition switch turned to the ON position, the ABS, TRAC and VSC data list can be displayed. Follow the prompts on the tester screen to access the "DATA LIST".

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
HB MOT RELAY	HB motor relay/ON or OFF	ON: During pump motor operation OFF: No pump motor operation	-
SOL RELAY	Solenoid relay/ON or OFF	ON: Solenoid relay ON OFF: Solenoid relay OFF	-
AIR BLD SUPPORT	Air bleed availability/SUPPORT or NOT SUP	SUPPORT: Support ON NOT SUP: Support OFF	-
IDLE SW	Main idle switch/ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
STOP LIGHT SW	Stop light switch/ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
PKB SW	Parking brake switch/ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
ABS OPERT FR	ABS operation (FR)/BEFORE or OPERATE	BEFORE: No ABS operation (FR) OPERATE: During ABS operation (FR)	-
ABS OPERT FL	ABS operation (FL)/BEFORE or OPERATE	BEFORE: No ABS operation (FL) OPERATE: During ABS operation (FL)	-
ABS OPERT RR	ABS operation (RR)/BEFORE or OPERATE	BEFORE: No ABS operation (RR) OPERATE: During ABS operation (RR)	-
ABS OPERT RL	ABS operation (RL)/BEFORE or OPERATE	BEFORE: No ABS operation (RL) OPERATE: During ABS operation (RL)	-
WHEEL SPD FR	Wheel speed sensor (FR) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
DECELERAT SEN	Deceleration sensor 1 reading /min.: -1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G while stationary	Reading changes when vehicle is bounced
DECELERAT SEN2	Deceleration sensor 2 reading /min.: -1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G while stationary	Reading changes when vehicle is bounced
IG VOLTAGE	ECU IG power supply voltage / TOO LOW/NORMAL/TOO HIGH	TOO LOW: 9.5 V or less NORMAL: 9.5 to 14.0 V TOO HIGH: 14.0 V or more	-
SFRR	ABS solenoid (SFRR)/ON or OFF	ON: Operates	-
SFRH	ABS solenoid (SFRH)/ON or OFF	ON: Operates	-
SFLR	ABS solenoid (SFLR)/ON or OFF	ON: Operates	-
SFLH	ABS solenoid (SFLH)/ON or OFF	ON: Operates	-
SRRR (SRR)	ABS solenoid (SRRR)/ON or OFF	ON: Operates	-
SRRH (SRH)	ABS solenoid (SRRH)/ON or OFF	ON: Operates	-

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SRLR	ABS solenoid (SRLR)/ON or OFF	ON: Operates	-
SRLH	ABS solenoid (SRLH)/ON or OFF	ON: Operates	-
SRCF (SA1)	TRAC solenoid (SMCF)/ON or OFF	-	-
SRCR (SA2)	TRAC solenoid (SREA)/ON or OFF	-	-
SRMF (SMCF, SA3)	TRAC solenoid (SREC)/ON or OFF	-	-
SRMR (SMCR, STR)	TRAC solenoid (STR)/ON or OFF	-	-
ENGINE SPD	Engine speed/ min.: 0 rpm, max.: 6000 rpm	Actual engine speed	-
VEHICLE SPD	Vehicle speed reading/min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual vehicle speed	-
YAW RATE	Yaw rate sensor/ min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
YAW ZERO VALUE	Memorized zero value/ min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
STEERING ANG	Steering angle sensor/ min.: -1152 deg/s, max.: 1150.875 deg/s	Left turn: Increase Right turn: Decrease	-
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading/min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
TEST MODE	Test mode operation/NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
#CODES	Number of DTC recorded/ min.: 0, max.: 255	-	-
WHEEL DIR FR	Wheel direction (FR)/FORWARD or BACK	FORWARD: Forward BACK: Back	-
WHEEL DIR FL	Wheel direction (FL)/FORWARD or BACK	FORWARD: Forward BACK: Back	-
WHEEL DIR RR	Wheel direction (RR)/FORWARD or BACK	FORWARD: Forward BACK: Back	-
WHEEL DIR RL	Wheel direction (RL)/FORWARD or BACK	FORWARD: Forward BACK: Back	-
RESERVOIR SW	Brake fluid level warning switch/ ON or OFF	ON: Switch ON OFF: Switch OFF	-
ACC PRESS SENS	Accumulator pressure sensor/ min.: 0 V max.: 5 V	3.58 to 5 V	If the value is constant regardless of pump operation, accumulator pressure sensor malfunction is suspected
THROTTLE	Throttle position sensor/ min.: 0, max.: 125	-	-
PRESS LOW	Low hydraulic brake booster pressure switch/ ON, OFF	ON: Low pressure OFF: Normal	-
PRESS HIGH	High hydraulic brake booster pressure switch/ ON, OFF	ON: High pressure OFF: Normal	-
VSC/TRC OFF SW	VSC/TRAC OFF switch/ ON or OFF	ON: Switch ON OFF: Switch OFF	-
SPD SEN FR	Speed sensor open detection (FR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	Speed sensor open detection (FL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RR	Speed sensor open detection (RR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SPD SEN RL	Speed sensor open detection (RL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
ACCELERATOR %	The difference of a present accelerator/min.: 0 %, max.: 128 %	-	-
TORQUE	Real output torque/min.: -1024 Nm, max.: 1016 Nm	-	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, actuator, etc. to operate without removing any parts. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

The ignition switch must be turned to the ON position to proceed to the ACTIVE TEST using the hand-held tester.

Item	Vehicle Condition/Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRCF (SA1)	Turns TRAC solenoid (SRCF (SA1)) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRCR (SA2)	Turns TRAC solenoid (SRCR (SA2)) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRMF (SMCF, SA3)	Turns TRAC solenoid (SRMF (SMCF, SA3)) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRMR (SMCR, STR)	Turns TRAC solenoid (SRMR (SMCR, STR)) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SFRR & SFRH	Turns ABS solenoid (SFRR & SFRH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SFLR & SFLH	Turns ABS solenoid (SFLR & SFLH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid (SRH & SRR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid (SRLR & SRLH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard

Item	Vehicle Condition/Test Details	Diagnostic Note
SFRH & SFLH	Turns ABS solenoid (SFRH & SFLH) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRCF & SRCR	Turns TRAC solenoid (SRCF & SRCR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
SRMF & SRMR	Turns TRAC solenoid (SRMF & SRMR) ON/OFF	Operation sound of solenoid (clicking sound) can be heard
ABS MOR RELAY	Turns H/B motor relay ON/OFF	Operation sound of motor can be heard
TRAC MOT RELAY	Turns TRAC motor relay ON/OFF	Operation sound of motor can be heard
SOL RELAY	Turns SOL relay ON/OFF	Operation sound of motor can be heard
ABS WARN LIGHT	Turns ABS warning light ON/OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC TRAC warning light ON/OFF	Observe combination meter
VSC/TRC OFF IND	Turns VSC OFF indicator light ON/OFF	Observe combination meter
SLIP INDI LIGHT	Turns slip indicator light ON/OFF	Observe combination meter
BRAKE WRN LIGHT	Turns brake warning light ON/OFF	Observe combination meter
VSC/BR WARN BUZ	Turns skid control buzzer ON/OFF	Buzzer can be heard
STP LIGHT RELAY	Turns stop light operation relay ON/OFF	Observe rear combination lamp (Does not come on for 5 sec. or more)

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If a trouble code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, turn to the page for the respective DTC No. in the DTC chart.
- Inspect the fuse and relay before investigating the trouble areas as shown in the table below.

DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200/31 (*1) (05-771)	Right front wheel speed sensor signal malfunction	<ul style="list-style-type: none"> • Right front speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C0205/32 (*1) (05-771)	Left front wheel speed sensor signal malfunction	<ul style="list-style-type: none"> • Left front speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C0210/33 (*1) (05-779)	Right rear wheel speed sensor signal malfunction	<ul style="list-style-type: none"> • Right rear speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C0215/34 (*1) (05-779)	Left rear wheel speed sensor signal malfunction	<ul style="list-style-type: none"> • Left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C0226/21 (05-788)	Open or short circuit in hydraulic brake booster solenoid circuit (SFR circuit)	<ul style="list-style-type: none"> • SFRH or SFRR circuit • Master cylinder solenoid (Skid control ECU)
C0236/22 (05-788)	Open or short circuit in hydraulic brake booster solenoid circuit (SFL circuit)	<ul style="list-style-type: none"> • SFLH or SFLR circuit • Master cylinder solenoid (Skid control ECU)
C0246/23 (05-788)	Open or short circuit in hydraulic brake booster solenoid circuit (SRR circuit)	<ul style="list-style-type: none"> • SRRH or SRRR circuit • Master cylinder solenoid (Skid control ECU)
C0256/24 (05-788)	Open or short circuit in hydraulic brake booster solenoid circuit (SRL circuit)	<ul style="list-style-type: none"> • SRLH or SRLR circuit • Master cylinder solenoid (Skid control ECU)
C0278/11 (05-791)	Open or short circuit in ABS solenoid relay circuit	<ul style="list-style-type: none"> • ABS SOL fuse • ABS solenoid relay • ABS solenoid relay circuit • Master cylinder solenoid (Skid control ECU)
C0279/12 (05-791)	+B short circuit in ABS solenoid relay circuit	<ul style="list-style-type: none"> • ABS SOL fuse • ABS solenoid relay • ABS solenoid relay circuit • Master cylinder solenoid (Skid control ECU)
C1202/58 (05-795)	Brake fluid level low/Open circuit in brake fluid level warning switch circuit	<ul style="list-style-type: none"> • Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit
C1225/25 (05-788)	Open or short in hydraulic brake booster solenoid circuit (SMC (SA1) circuit)	<ul style="list-style-type: none"> • SMCF circuit • Master cylinder solenoid (Skid control ECU)
C1226/26 (05-788)	Open or short in hydraulic brake booster solenoid circuit (SPC (SA2) circuit)	<ul style="list-style-type: none"> • SREA circuit • Master cylinder solenoid (Skid control ECU)
C1227/27 (05-788)	Open or short in hydraulic brake booster solenoid circuit (SRC (SA3) circuit)	<ul style="list-style-type: none"> • SREC circuit • Master cylinder solenoid (Skid control ECU)

DTC No. (See Page)	Detection Item	Trouble Area
C1228/28 (05-788)	Open or short in hydraulic brake solenoid circuit (STR circuit)	<ul style="list-style-type: none"> • STR circuit • Master cylinder solenoid (Skid control ECU)
C1235/35 (05-771)	Metal stick to speed sensor (FR)	<ul style="list-style-type: none"> • Right front speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1236/36 (05-771)	Metal stick to speed sensor (FL)	<ul style="list-style-type: none"> • Left front speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 (05-779)	Metal stick to speed sensor (RR)	<ul style="list-style-type: none"> • Right rear speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1239/39 (05-779)	Metal stick to speed sensor (RL)	<ul style="list-style-type: none"> • Left rear speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1241/41 (05-811)	Low battery positive voltage or abnormally high battery positive voltage	<ul style="list-style-type: none"> • Battery • ECU-IG fuse • Charging system • Power source circuit
C1242/42 (05-815)	Open circuit in IG2 circuit	<ul style="list-style-type: none"> • Battery • IGN fuse • IC regulator • Power source circuit
C1243/43 (*1) (05-807)	Malfunction in deceleration sensor (constant output)	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1244/44 (05-807)	Open or short circuit in deceleration sensor circuit	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1245/45 (*1) (05-807)	Malfunction in deceleration sensor	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1246/46 (05-818)	Malfunction in master cylinder pressure sensor	<ul style="list-style-type: none"> • Master cylinder pressure sensor • Master cylinder pressure sensor circuit • Master cylinder solenoid (Skid control ECU)
C1249/49 (05-821)	Open circuit in stop light switch circuit	<ul style="list-style-type: none"> • Stop light switch • Stop light switch circuit • Rear combination lamp (stop light) assy
C1251/51 (*1, 3) (05-826)	Pump motor is locked/Open circuit in pump motor ground	Hydraulic brake booster pump motor circuit
C1252/52 (*2, 3) (05-828)	Hydro-booster pump motor malfunction	<ul style="list-style-type: none"> • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor
C1253/53 (*2) (05-831)	Hydro-booster pump motor relay malfunction	<ul style="list-style-type: none"> • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit
C1254/54 (05-834)	Pressure sensor or switch malfunction	<ul style="list-style-type: none"> • Hydraulic brake booster • Accumulator pressure sensor • Master cylinder pressure sensor

DTC No. (See Page)	Detection Item	Trouble Area
C1256/56 (*2, 3) (05-837)	Accumulator low pressure malfunction	<ul style="list-style-type: none"> Hydraulic brake booster Hydraulic brake booster pump motor Hydraulic brake booster pump motor circuit Accumulator pressure sensor
C1257/57 (*2) (05-839)	Power supply drive circuit malfunction	Hydraulic brake booster pump motor circuit
C1268/68 (05-840)	L4 signal pickup malfunction	<ul style="list-style-type: none"> Transfer indicator (L4) switch Transfer indicator (L4) switch circuit
C1337/37 (05-845)	Different diameter tire malfunction	<ul style="list-style-type: none"> Tire size Speed sensor Speed sensor rotor Speed sensor circuit
C1381/97 (05-807)	Malfunction in power supply voltage of yaw/deceleration sensor	<ul style="list-style-type: none"> Yaw rate and deceleration sensor Yaw rate and deceleration sensor power source circuit CAN communication system
U0073/94 (05-2331)	Control module communication bus off	Wire harness
U0124/95 (05-2331)	Lost communication with lateral acceleration sensor module	<ul style="list-style-type: none"> Wire harness Yaw rate and deceleration sensor

(*1), (*2):

Even after the trouble areas are repaired, the ABS warning light will not go off unless the following operations are performed.

- (*1):
 - Drive the vehicle at 12 mph (20 km/h) for 30 seconds or more and check that the ABS warning light goes off.
 - Clear the DTC (see page 05-757).
- (*2):
 - Keep the vehicle in a stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
 - Repeat the above operations 3 times or more and check that the ABS warning light goes off.
 - Clear the DTC (see page 05-757).

HINT:

- In some cases, the hand-held tester cannot be used when the ABS warning light remains on.
- When U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 is output, inspect and repair the trouble areas indicated by these codes first.

(*3): The skid control buzzer sounds.

DTC chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201/51 (05-794)	Engine control system malfunction	Engine control system
C1202/52 (05-795)	Brake fluid level low/Open circuit in brake fluid level warning switch circuit	<ul style="list-style-type: none"> Brake fluid level Brake fluid level warning switch Brake fluid level warning switch circuit
C1203/53 (05-798)	Engine control system communication circuit malfunction	ECM

DTC No. (See Page)	Detection Item	Trouble Area
C1210/36 (05-799)	Zero point calibration of yaw rate sensor undone	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Zero point calibration undone • Park/Neutral position switch (P position) circuit
C1223/43 (05-802)	Malfunction in ABS control system	ABS control system
C1231/31 (05-803)	Malfunction in steering angle sensor	<ul style="list-style-type: none"> • Steering angle sensor • Steering angle sensor circuit • Steering angle sensor power supply • CAN communication system
C1232/32 (05-807)	Malfunction in deceleration sensor	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1234/34 (05-807)	Malfunction in yaw rate sensor	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1290/66 (05-803)	Malfunction in zero point of steering sensor	Steering angle sensor
C1336/39 (05-799)	Zero point calibration of deceleration sensor undone	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Zero point calibration undone • Park/Neutral position switch (P position) circuit
C1340/47 (05-847)	Open circuit in center differential lock signal (during center differential lock ON)	<ul style="list-style-type: none"> • Center diff. lock switch • Center diff. lock switch circuit • 4WD control ECU
C1380/64 (05-851)	Malfunction in stop light relay system	<ul style="list-style-type: none"> • Stop light operation relay • Stop light operation relay circuit
U0100/65 (05-2331)	Lost communication with ECM/PCM "A"	Wire harness
U0123/62 (05-2331)	Lost communication with yaw rate sensor module	<ul style="list-style-type: none"> • Wire harness • Yaw rate and deceleration sensor
U0126/63 (05-2331)	Lost communication with steering angle sensor module	<ul style="list-style-type: none"> • Wire harness • Steering angle sensor

HINT:

In some cases, the hand-held tester cannot be used when the VSC TRAC warning light remains on.

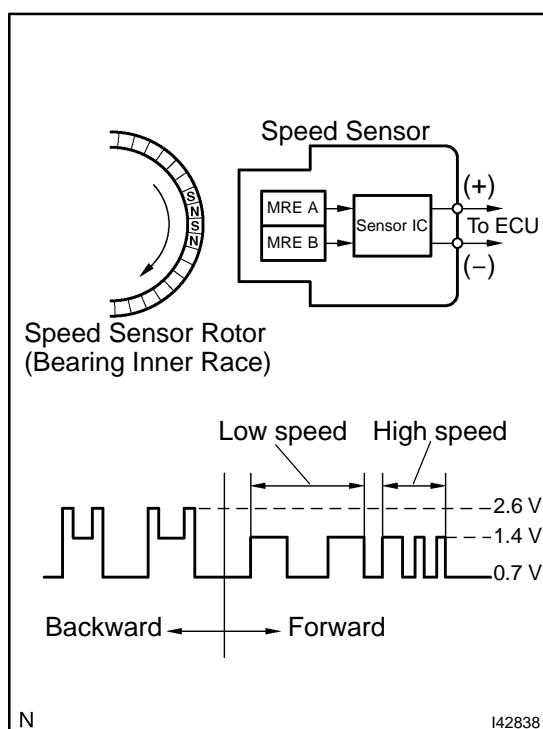
DTC	C0200/31	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL MALFUNCTION
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DTC	C0205/32	LEFT FRONT WHEEL SPEED SENSOR SIGNAL MALFUNCTION
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DTC	C1235/35	METAL STICK TO SPEED SENSOR (FR)
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DTC	C1236/36	METAL STICK TO SPEED SENSOR (FL)
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CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS, BA, TRAC, A-TRAC, VSC, DAC and HAC control systems. This speed sensor contains a sensor IC, which consists of two MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

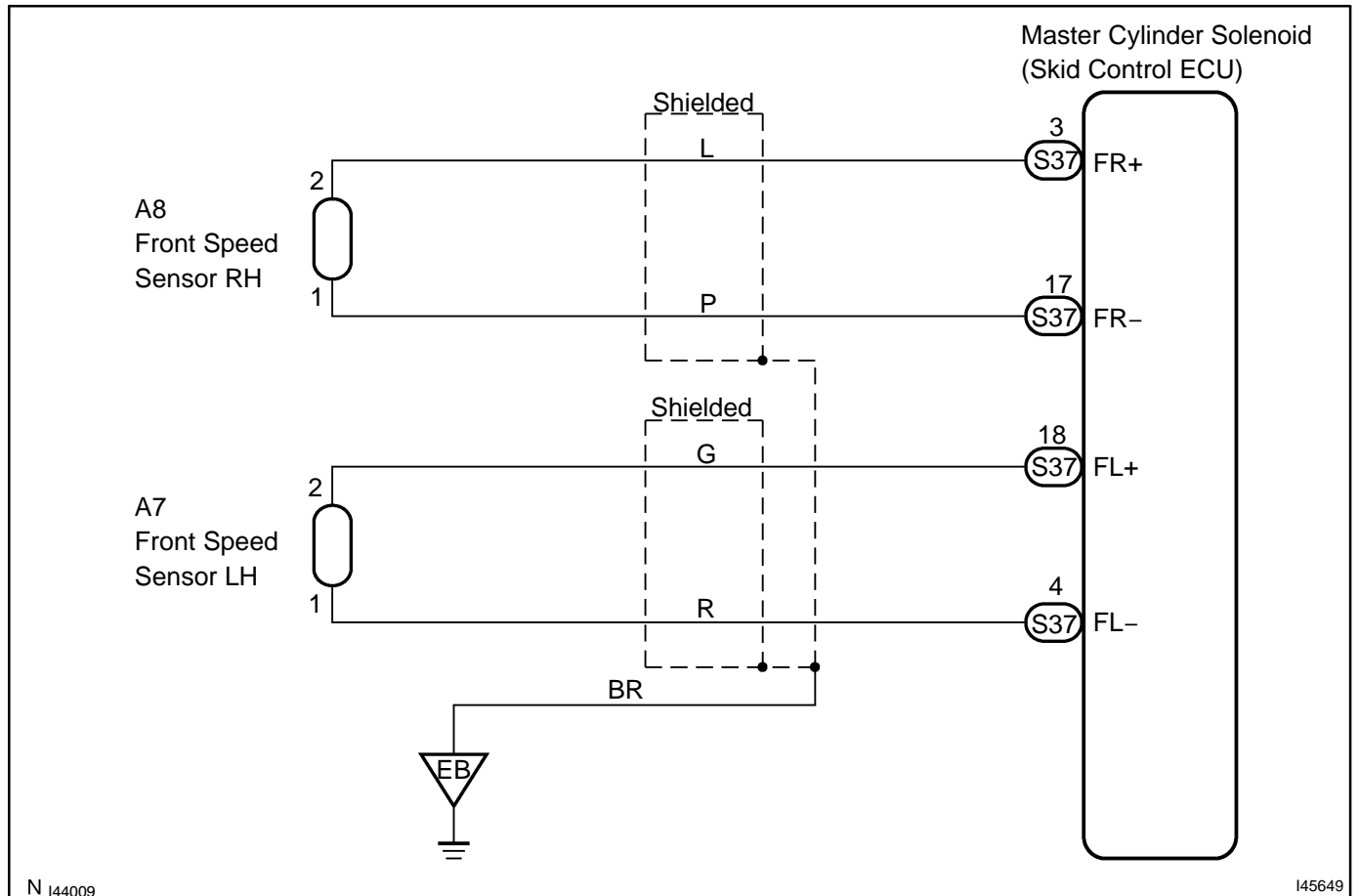
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 6 mph (10 km/h) or more, pulses are not input for 1 second. 2. Momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and OFF. 3. Continuous noise occurs in speed sensor signals at a vehicle speed of 12 mph (20 km/h) or more. 4. Speed sensor signal circuit is open for 0.12 seconds or more.	<ul style="list-style-type: none"> • Right front and left front speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Continuous noise occurs in speed sensor signals when vehicle speed is 12 mph (20 km/h) or more for 5 seconds or more.	<ul style="list-style-type: none"> • Right front and left front speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- DTC C0200/31 and C1235/35 are for the right front speed sensor.
- DTC C0205/32 and C1236/36 are for the left front speed sensor.

WIRING DIAGRAM



N 144009

145649

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 3 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (MOMENTARY INTERRUPTION OF FRONT SPEED SENSOR) (SEE PAGE 01-36)
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (c) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	Speed sensor open detection (FR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	Speed sensor open detection (FL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-

- (d) Check for any momentary interruption in the wire harness and connector corresponding to a DTC.

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (FRONT SPEED SENSOR CIRCUIT)

OK

2	READ VALUE OF HAND-HELD TESTER (FRONT SPEED SENSOR)
----------	--

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD FR	Wheel speed sensor (FR) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer

- (a) Check that there is no difference between the speed value output from the speed sensor displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

The speed value output from the speed sensor displayed on the hand-held tester is the same as the actual vehicle speed.

NG

Go to step 4

OK

3 PERFORM TEST MODE (SIGNAL CHECK) (SEE PAGE 05-738)

(a) Check if test mode (signal check) DTCs are detected.

Result:

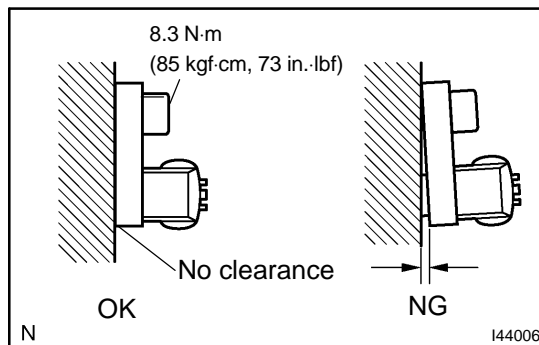
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B

Go to step 9

A

4 INSPECT FRONT SPEED SENSOR INSTALLATION



(a) Check the speed sensor installation.

OK:

- The installation bolt is tightened properly.

Torque: 8.3 N·m (85 kgf·cm, 73 in.-lbf)

- There is no clearance between the sensor and the front steering knuckle.

NG

INSTALL FRONT SPEED SENSOR CORRECTLY OR REPLACE FRONT SPEED SENSOR (SEE PAGE 32-48)

NOTICE:

Check the speed sensor signal after replacement (see page 05-738).

OK

5 INSPECT SPEED SENSOR TIP

(a) Remove the front speed sensor (see page 32-48).

(b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NG

CLEAN OR REPLACE FRONT SPEED SENSOR (SEE PAGE 32-48)

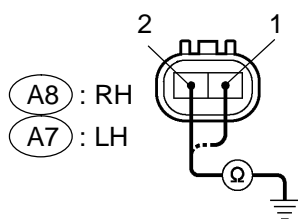
NOTICE:

Check the speed sensor signal after cleaning/replacement (see page 05-738).

OK

6 INSPECT FRONT SPEED SENSOR AND SKID CONTROL SENSOR WIRE

Front Speed Sensor:



I44002

I45651

- (a) Install the front speed sensor.
- (b) Turn the ignition switch off.
- (c) Disconnect the front speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

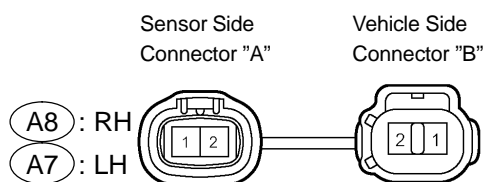
RH:

Tester Connection	Specified Condition
A8-2 (FR+) - Body ground	10 k Ω or higher
A8-1 (FR-) - Body ground	10 k Ω or higher

LH:

Tester Connection	Specified Condition
A7-2 (FL+) - Body ground	10 k Ω or higher
A7-1 (FL-) - Body ground	10 k Ω or higher

Skid Control Sensor Wire:



H

I44003

Skid Control Sensor Wire:

- (e) Disconnect the skid control sensor wire.
- (f) Measure the resistance according to the value(s) in the table below.

Standard:

RH:

Tester Connection	Specified Condition
A8 ("A"-2) - A8 ("B"-2)	Below 1 Ω
A8 ("A"-2) - A8 ("B"-1)	10 k Ω or higher
A8 ("A"-2) - Body ground	10 k Ω or higher
A8 ("A"-1) - A8 ("B"-1)	Below 1 Ω
A8 ("A"-1) - A8 ("B"-2)	10 k Ω or higher
A8 ("A"-1) - Body ground	10 k Ω or higher

LH:

Tester Connection	Specified Condition
A7 ("A"-2) - A7 ("B"-2)	Below 1 Ω
A7 ("A"-2) - A7 ("B"-1)	10 k Ω or higher
A7 ("A"-2) - Body ground	10 k Ω or higher
A7 ("A"-1) - A7 ("B"-1)	Below 1 Ω
A7 ("A"-1) - A7 ("B"-2)	10 k Ω or higher
A7 ("A"-1) - Body ground	10 k Ω or higher

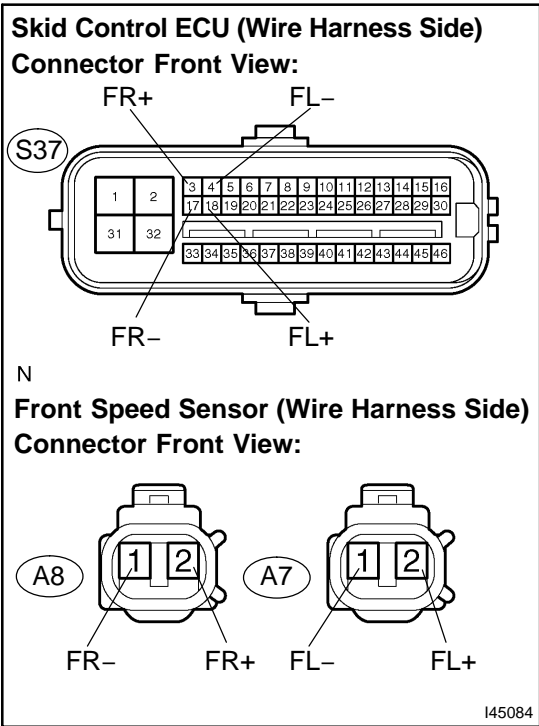
NG
REPLACE FRONT SPEED SENSOR OR SKID CONTROL SENSOR WIRE

NOTICE:

Check the speed sensor signal after replacement (see page 05-738).

OK

7 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND FRONT SPEED SENSOR) (SEE PAGE 01-36)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:
RH:

Tester Connection	Specified Condition
S37-3 (FR+) - A8-2 (FR+)	Below 1 Ω
S37-3 (FR+) - Body ground	10 kΩ or higher
S37-17 (FR-) - A8-1 (FR-)	Below 1 Ω
S37-17 (FR-) - Body ground	10 kΩ or higher

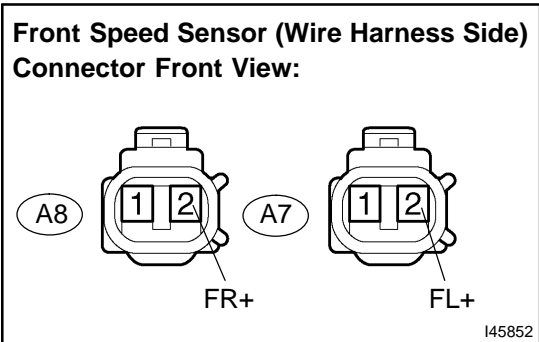
LH:

Tester Connection	Specified Condition
S37-18 (FL+) - A7-2 (FL+)	Below 1 Ω
S37-18 (FL+) - Body ground	10 kΩ or higher
S37-4 (FL-) - A7-1 (FL-)	Below 1 Ω
S37-4 (FL-) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8 INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)



- (a) Reconnect the skid control ECU connector.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:
RH:

Tester Connection	Specified Condition
A8-2 (FR+) - Body ground	7.5 to 12 V

LH:

Tester Connection	Specified Condition
A7-2 (FL+) - Body ground	7.5 to 12 V

NG REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

OK

9 RECONFIRM DTC

- (a) Clear the DTCs (see page [05-757](#)).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same pending DTCs are detected (see page [05-757](#)).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output (When troubleshooting in accordance with the DTC CHART.)	B
DTC is not output (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	C

B → **END**

C → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE [05-750](#))**

A

10 REPLACE FRONT SPEED SENSOR (SEE PAGE [32-48](#))

- (a) Replace the front speed sensor.

NOTICE:

Check the speed sensor signal after replacement (see page [05-738](#)).

NEXT

11 RECONFIRM DTC

- (a) Clear the DTCs (see page [05-757](#)).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same pending DTCs are detected (see page [05-757](#)).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

A

12 INSPECT SPEED SENSOR ROTOR

- (a) Remove the front axle w/ ABS rotor bearing assy.
- (b) Check the sensor rotor.

OK:**No scratches, oil, or foreign matter on the rotors.****NG****CLEAN OR REPLACE FRONT AXLE W/ ABS ROTOR BEARING ASSY (SPEED SENSOR ROTOR) (SEE PAGE 30-28)****NOTICE:****Check the speed sensor signal after cleaning/replacement (see page 05-738).****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

DTC	C0210/33	RIGHT REAR WHEEL SPEED SENSOR SIGNAL MALFUNCTION
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DTC	C0215/34	LEFT REAR WHEEL SPEED SENSOR SIGNAL MALFUNCTION
------------	-----------------	--

DTC	C1238/38	METAL STICK TO SPEED SENSOR (RR)
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DTC	C1239/39	METAL STICK TO SPEED SENSOR (RL)
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CIRCUIT DESCRIPTION

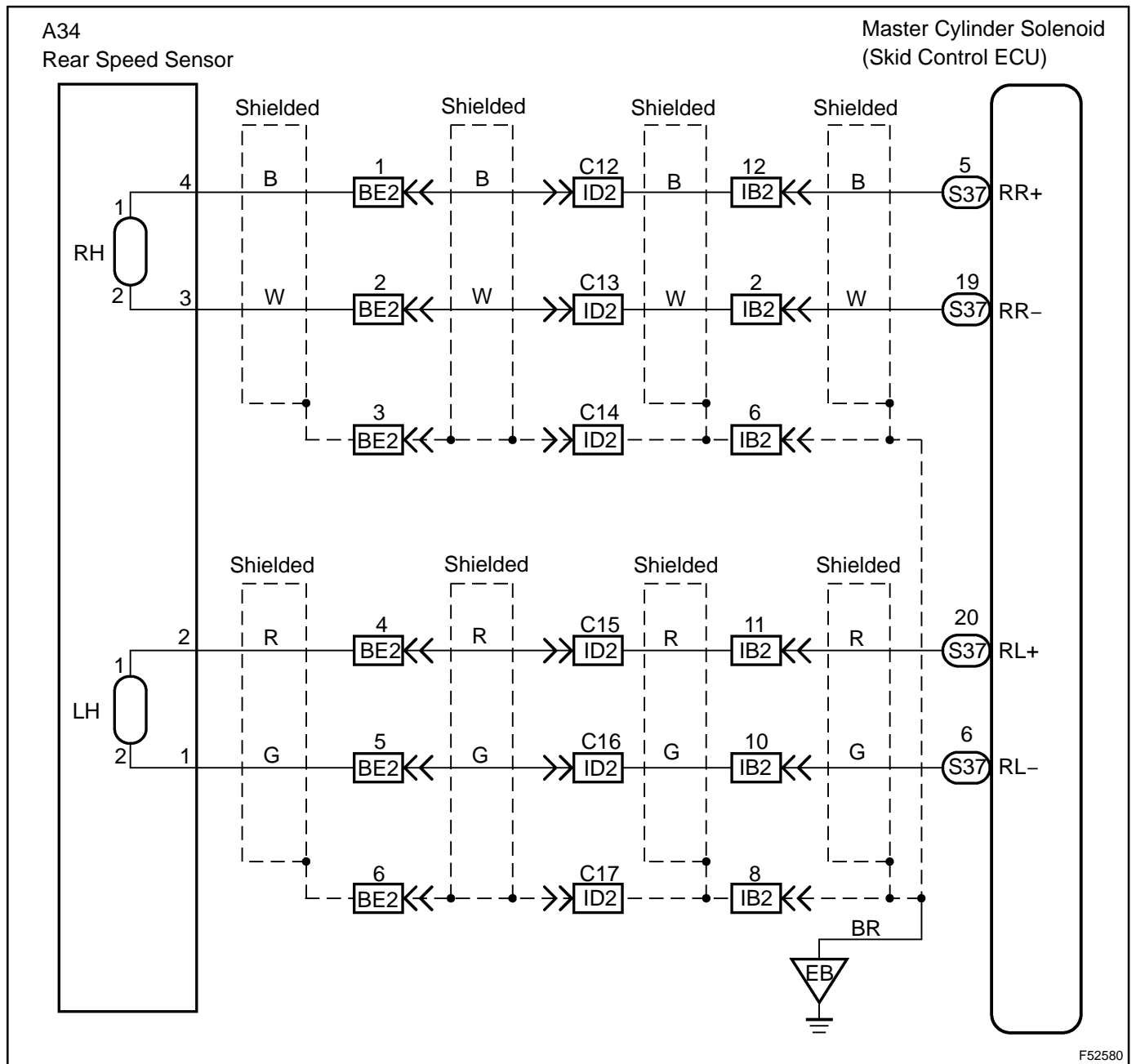
Refer to DTC C0200/31, C0205/32, C1235/35, and C1236/36 on page [05-771](#).

DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 6 mph (10 km/h) or more, pulses are not input for 1 second. 2. Momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and OFF. 3. Continuous noise occurs in speed sensor signals at a vehicle speed of 12 mph (20 km/h) or more. 4. Speed sensor signal circuit is open for 0.12 seconds or more.	<ul style="list-style-type: none"> • Right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Continuous noise occurs in speed sensor signals when vehicle speed is 12 mph (20 km/h) or more for 5 seconds or more.	<ul style="list-style-type: none"> • Right rear and left rear speed sensor • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- DTC C0210/33 and C1238/38 are for the right rear speed sensor.
- DTC C0215/34 and C1239/39 are for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 3 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER (MOMENTARY INTERRUPTION OF REAR SPEED SENSOR) (SEE PAGE 05-732)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (c) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
SPD SEN RR	Speed sensor open detection (RR)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RL	Speed sensor open detection (RL)/OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-

- (d) Check for any momentary interruption in the wire harness and connector corresponding to a DTC.

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (REAR SPEED SENSOR CIRCUIT)

OK

2 READ VALUE OF HAND-HELD TESTER (REAR SPEED SENSOR)

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD RR	Wheel speed sensor (RR) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading /min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer

- (a) Check that there is no difference between the speed value output from the speed sensor displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

The speed value output from the speed sensor displayed on the hand-held tester is the same as the actual vehicle speed.

NG

Go to step 4

OK

3 | PERFORM TEST MODE (SIGNAL CHECK) (SEE PAGE 05-738)

(a) Check if test mode (signal check) DTCs are detected.

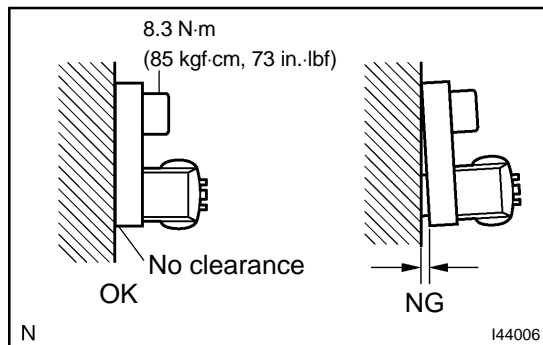
Result:

Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → Go to step 9

A

4 | INSPECT REAR SPEED SENSOR INSTALLATION



(a) Check the speed sensor installation.

OK:

- The installation nut is tightened properly.
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)
- There is no clearance between the sensor and the rear axle.

NG → **INSTALL REAR SPEED SENSOR CORRECTLY OR REPLACE REAR SPEED SENSOR (SEE PAGE 32-50)**

NOTICE:

Check the speed sensor signal after replacement (see page 05-738).

OK

5 INSPECT SPEED SENSOR TIP

- (a) Remove the rear speed sensor (see page 32-50).
- (b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

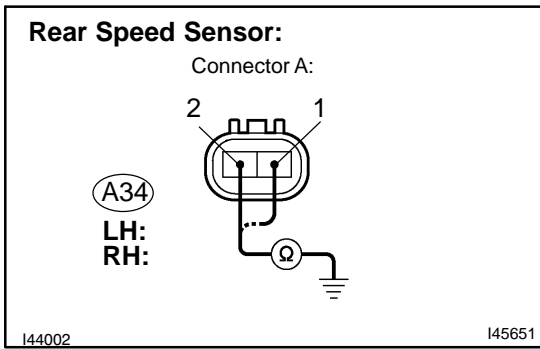
NG **CLEAN OR REPLACE REAR SPEED SENSOR (SEE PAGE 32-50)**

NOTICE:

Check the speed sensor signal after cleaning/replacement (see page 05-738).

OK

6 INSPECT REAR SPEED SENSOR AND SKID CONTROL SENSOR WIRE



- (a) Install the rear speed sensor.
- (b) Turn the ignition switch off.
- (c) Disconnect the rear speed sensor connector.
- (d) Measure the resistance according to the value(s) in the table below.

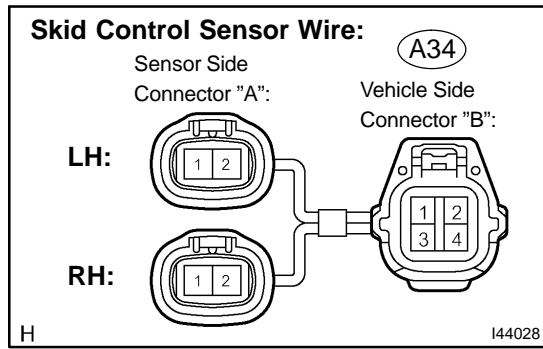
Standard:

RH:

Tester Connection	Specified Condition
A34 (A-2) (RR+) - Body ground	10 kΩ or higher
A34 (A-1) (RR-) - Body ground	10 kΩ or higher

LH:

Tester Connection	Specified Condition
A34 (A-2) (RL+) - Body ground	10 kΩ or higher
A34 (A-1) (RL-) - Body ground	10 kΩ or higher



Skid Control Sensor Wire:

- (e) Disconnect the skid control sensor wire.
- (f) Measure the resistance according to the value(s) in the table below.

Standard:

RH:

Tester Connection	Specified Condition
A34 ("A"-2) – A34 ("B"-3)	Below 1 Ω
A34 ("A"-2) – A34 ("B"-4)	10 kΩ or higher
A34 ("A"-2) – Body ground	10 kΩ or higher
A34 ("A"-1) – A34 ("B"-4)	Below 1 Ω
A34 ("A"-1) – A34 ("B"-3)	10 kΩ or higher
A34 ("A"-1) – Body ground	10 kΩ or higher

LH:

Tester Connection	Specified Condition
A34 ("A"-2) – A34 ("B"-1)	Below 1 Ω
A34 ("A"-2) – A34 ("A"-2)	10 kΩ or higher
A34 ("A"-2) – Body ground	10 kΩ or higher
A34 ("A"-1) – A34 ("B"-2)	Below 1 Ω
A34 ("A"-1) – A34 ("B"-1)	10 kΩ or higher
A34 ("A"-1) – Body ground	10 kΩ or higher

NG	REPLACE REAR SPEED SENSOR OR SKID CONTROL SENSOR WIRE
-----------	--

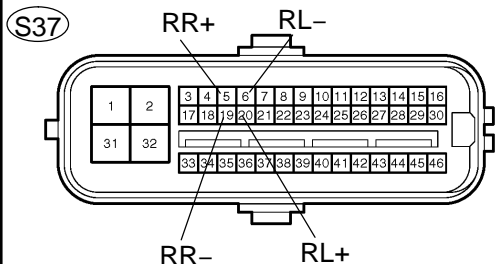
NOTICE:

Check the speed sensor signal after replacement (see page 05-738).

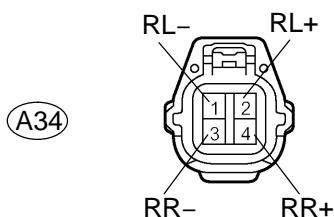
OK

7 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND REAR SPEED SENSOR) (SEE PAGE 01-36)

**Skid Control ECU (Wire Harness Side)
Connector Front View:**



**Rear Speed Sensor (Wire Harness Side)
Connector Front View:**



H 144029

F50261

- (a) Disconnect the skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

RH:

Tester Connection	Specified Condition
S37-5 (RR+) - A34-4 (RR+)	Below 1 Ω
S37-5 (RR+) - Body ground	10 kΩ or higher
S37-19 (RR-) - A34-3 (RR-)	Below 1 Ω
S37-19 (RR-) - Body ground	10 kΩ or higher

LH:

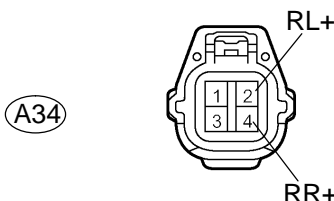
Tester Connection	Specified Condition
S37-20 (RL+) - A34-2 (RL+)	Below 1 Ω
S37-20 (RL+) - Body ground	10 kΩ or higher
S37-6 (RL-) - A34-1 (RL-)	Below 1 Ω
S37-6 (RL-) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

8 INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

**Rear Speed Sensor (Wire Harness Side)
Connector Front View:**



H

F50260

- (a) Reconnect the skid control ECU connector.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

RH:

Tester Connection	Specified Condition
A34-4 (RR+) - Body ground	7.5 to 12 V

LH:

Tester Connection	Specified Condition
A34-2 (RL+) - Body ground	7.5 to 12 V

NG → **REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

OK

9	RECONFIRM DTC
----------	----------------------

- (a) Clear the DTCs (see page [05-757](#)).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same pending DTCs are detected (see page [05-757](#)).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output (When troubleshooting in accordance with the DTC CHART.)	B
DTC is not output (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	C

B → **END**

C → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE [05-750](#))**

A

10	REPLACE REAR SPEED SENSOR (SEE PAGE 32-50)
-----------	---

- (a) Replace the rear speed sensor.

NOTICE:

Check the speed sensor signal after replacement (see page [05-738](#)).

NEXT

11	RECONFIRM DTC
-----------	----------------------

- (a) Clear the DTCs (see page [05-757](#)).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same pending DTCs are detected (see page [05-757](#)).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

A

12 INSPECT SPEED SENSOR ROTOR

- (a) Remove the rear axle bearing assy.
- (b) Check the sensor rotor.

OK:**No scratches, oil, or foreign matter on the rotors.****NG****CLEAN OR REPLACE REAR AXLE BEARING
ASSY (SPEED SENSOR ROTOR)
(SEE PAGE 30-38)****NOTICE:****Check the speed sensor signal after cleaning/replacement
(see page 05-738).****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

DTC	C0226/21	OPEN OR SHORT CIRCUIT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SFR CIRCUIT)
DTC	C0236/22	OPEN OR SHORT CIRCUIT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SFL CIRCUIT)
DTC	C0246/23	OPEN OR SHORT CIRCUIT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SRR CIRCUIT)
DTC	C0256/24	OPEN OR SHORT CIRCUIT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SRL CIRCUIT)
DTC	C1225/25	OPEN OR SHORT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SMC(SA1) CIRCUIT)
DTC	C1226/26	OPEN OR SHORT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SPC(SA2) CIRCUIT)
DTC	C1227/27	OPEN OR SHORT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (SRC(SA3) CIRCUIT)
DTC	C1228/28	OPEN OR SHORT IN HYDRAULIC BRAKE BOOSTER SOLENOID CIRCUIT (STR CIRCUIT)

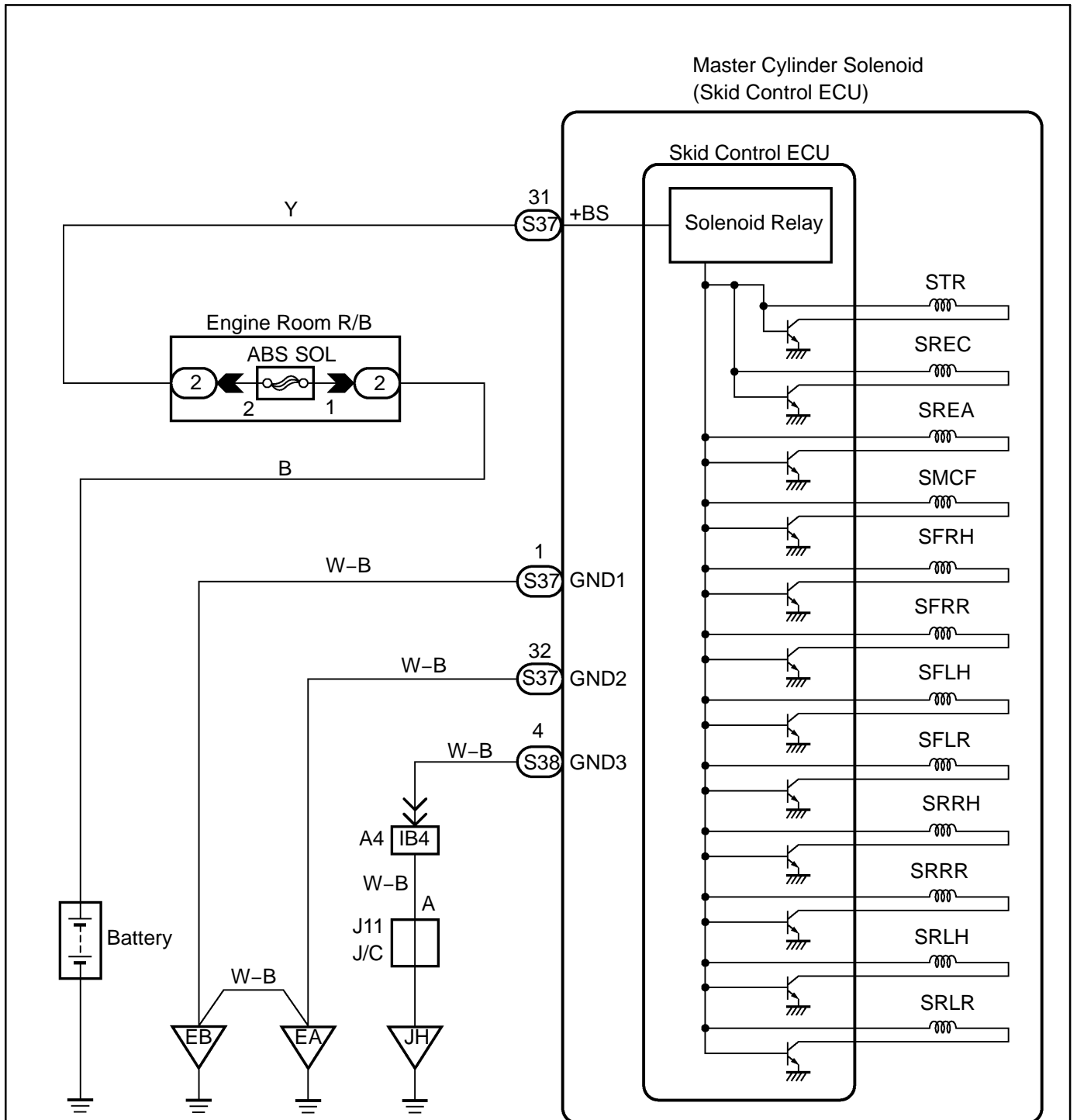
CIRCUIT DESCRIPTION

The solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21	Open or short circuit in SFRH or SFRR circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SFRH or SFRR circuit • Master cylinder solenoid (Skid control ECU)
C0236/22	Open or short circuit in SFLH or SFLR circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SFLH or SFLR circuit • Master cylinder solenoid (Skid control ECU)
C0246/23	Open or short circuit in SRRH or SRRR circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SRRH or SRRR circuit • Master cylinder solenoid (Skid control ECU)

C0256/24	Open or short circuit in SRLH or SRLR circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SRLH or SRLR circuit • Master cylinder solenoid (Skid control ECU)
C1225/25	Open or short circuit in SMCF circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SMCF circuit • Master cylinder solenoid (Skid control ECU)
C1226/26	Open or short circuit in SREA circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SREA circuit • Master cylinder solenoid (Skid control ECU)
C1227/27	Open or short circuit in SREC circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • SREC circuit • Master cylinder solenoid (Skid control ECU)
C1228/28	Open or short circuit in STR circuit continues for 0.05 seconds or more.	<ul style="list-style-type: none"> • STR circuit • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



N

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INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1	RECONFIRM DTC
----------	----------------------

HINT:

These codes are detected when a problem is determined in the master cylinder solenoid.

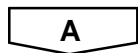
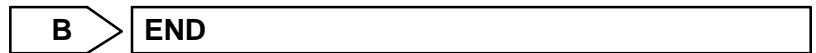
The solenoid circuit is in the master cylinder solenoid.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

- (a) Clear the DTCs (see page 05-757).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same DTCs are detected (see page 05-757).

Result:

DTC is output	A
DTC is not output	B



REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)
--

DTC	C0278/11	OPEN OR SHORT CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
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DTC	C0279/12	+B SHORT CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

The ABS solenoid relay is built in the master cylinder solenoid. This relay supplies power to each ABS solenoid. If the initial check is OK, after the ignition switch is turned to the ON position, the relay goes on.

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	<p>When either of the following conditions is detected:</p> <ol style="list-style-type: none"> Both of the following conditions continue for at least 0.2 seconds. <ul style="list-style-type: none"> IG voltage is between 9.5 and 17 V. Relay contact is open when the relay is ON. Both of the following conditions continue for at least 0.2 seconds. <ul style="list-style-type: none"> IG voltage is 9.5 V or less when the relay is ON. Relay contact remains open. 	<ul style="list-style-type: none"> ABS SOL fuse ABS solenoid relay ABS solenoid relay circuit Master cylinder solenoid (Skid control ECU)
C0279/12	<p>The following condition continues for at least 0.2 seconds.</p> <ul style="list-style-type: none"> Relay contact is closed immediately after turning IG switch to the ON position when the relay is OFF. 	<ul style="list-style-type: none"> ABS SOL fuse ABS solenoid relay ABS solenoid relay circuit Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM

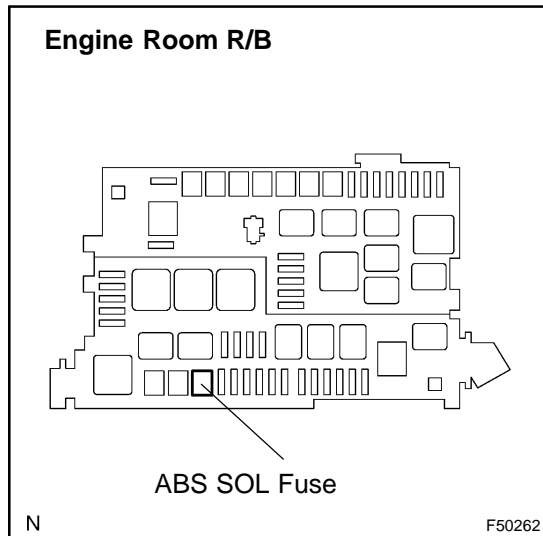
Refer to DTC C0226/21, C0236/22, C0246/23, C0256/24, C1225/25, C1226/26, C1227/27, and C1228/28 on page 05-788.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT FUSE (ABS SOL FUSE)



- (a) Remove the ABS SOL fuse from the engine room R/B.
- (b) Check the ABS SOL fuse.

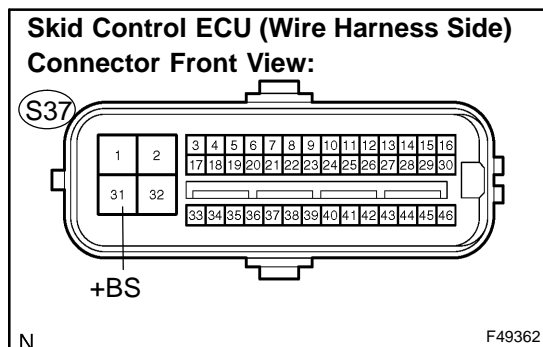
Standard:

Below 1 Ω (Continuity)

NG CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE

OK

2 INSPECT SKID CONTROL ECU (+BS TERMINAL VOLTAGE)



- (a) Install the ABS SOL fuse.
- (b) Disconnect the skid control ECU connector.
- (c) Measure the voltage according to the value(s) in the table below.

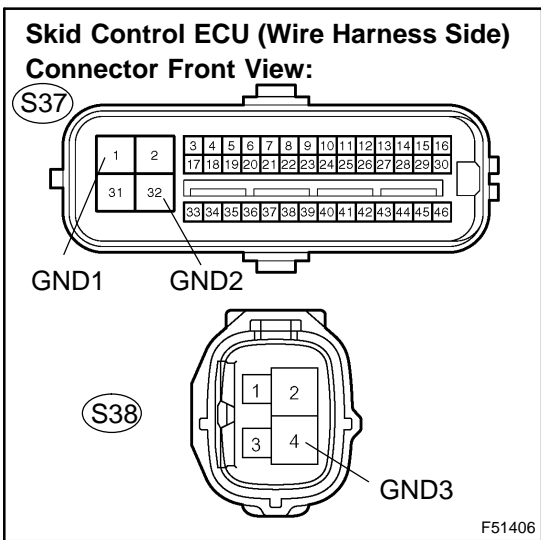
Standard:

Tester Connection	Condition	Specified Condition
S37-31 (+BS) - Body ground	Always	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS CIRCUIT)

OK

3 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



- (a) Disconnect the skid control ECU (S38) connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-1 (GND1) - Body ground	Below 1 Ω
S37-32 (GND2) - Body ground	Below 1 Ω
S38-4 (GND3) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

4 RECONFIRM DTC

HINT:

These codes are detected when a problem is determined in the master cylinder solenoid. The ABS solenoid relay is in the master cylinder solenoid. Therefore, solenoid relay circuit inspection and relay unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

- (a) Clear the DTCs (see page 05-757).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same DTCs are detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1201/51	ENGINE CONTROL SYSTEM MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECM transmits the abnormality to the skid control ECU. The skid control ECU sets this DTC and the skid control ECU prohibits TRAC and VSC control.

DTC No.	DTC Detection Condition	Trouble Area
C1201/51	Malfunction signal is received from ECM	Engine control system

INSPECTION PROCEDURE

1	CHECK DTC (FOR ENGINE CONTROL SYSTEM)
----------	--

(a) Check if the normal system code is recorded for the engine control system (see page 05-44).

Result:

Normal system code	A
Trouble code	B

B	REPAIR ENGINE CONTROL SYSTEM ACCORDING TO OUTPUT CODE (SEE PAGE 05-60)
----------	---

A

REPLACE ECM (SEE PAGE 10-16)

DTC	C1202/52	BRAKE FLUID LEVEL LOW/OPEN CIRCUIT IN BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT
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DTC	C1202/58	BRAKE FLUID LEVEL LOW/OPEN CIRCUIT IN BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the skid control ECU when the brake fluid level drops.

DTC No.	DTC Detection Condition	Trouble Area
C1202/52 C1202/58	When either of the following conditions is detected: 1. Fluid level of the reservoir tank is LOW for 4 seconds or 40 seconds after the ignition switch is turned ON, or for 7 seconds during pump motor operation. 2. With ECU terminal IG1 voltage at 9.5 V to 17.0 V, an open in the brake fluid level warning switch circuit continues for 2 seconds or more.	<ul style="list-style-type: none"> • Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit

HINT:

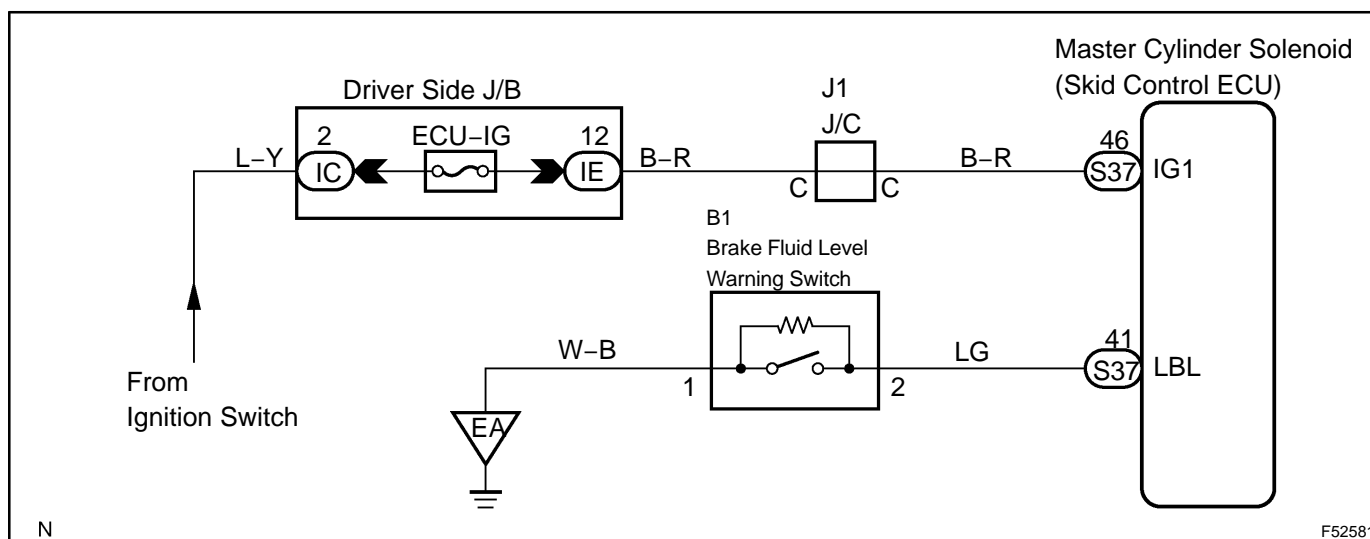
If this code (C1202/52) is output, the following situations will occur:

- The VSC TRAC and brake warning lights, and the VSC OFF indicator light will come on.
- Control of all systems other than ABS and EBD is canceled.

If this code (C1202/58) is output, the following situations will occur:

- The ABS, VSC TRAC, and BRAKE warning lights, and the SLIP and VSC OFF indicator lights will come on.
- Control of all systems other than EBD is canceled.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

When C1241/41 is output together with C1202/52 or C1202/58, inspect and repair the trouble areas indicated by C1241/41 first.

1 CHECK BRAKE FLUID LEVEL

- Turn the ignition switch off.
- Depress the brake pedal 20 times or more (until the pedal reaction feels light and pedal stroke becomes longer).
- Check the amount of fluid in the brake reservoir.

HINT:

When the ignition switch is turned to the ON position, brake fluid is sent to the accumulator and the fluid level decreases by approximately 5 mm from the level when the ignition switch is off (normal).

NOTICE:

Do not move the wheels with the ignition switch off.

OK:

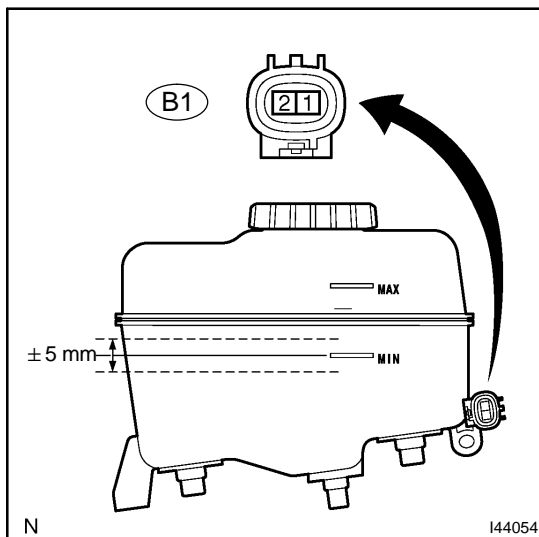
Brake fluid level is proper.

NG

CHECK AND REPAIR BRAKE FLUID LEAKAGE

OK

2 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



- Disconnect the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

HINT:

- A float is placed inside the reservoir. Its position can be changed by increasing/decreasing the level of brake fluid.
- The warning switch is switched ON/OFF at ± 5 mm from the MIN level.

Standard:

Tester Connection	Condition	Specified Condition
B1-1 - B1-2	Float up (Switch OFF)	1.9 to 2.1 k Ω
B1-1 - B1-2	Float down (Switch ON)	Below 1 Ω

HINT:

If there is no problem after finishing the above check, adjust the brake fluid level to the MAX level.

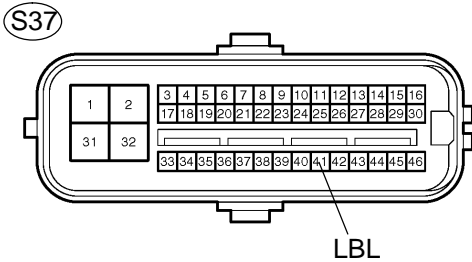
NG

REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY (SEE PAGE 32-23)

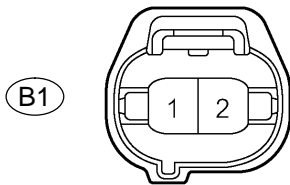
OK

3 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU, BODY GROUND AND BRAKE FLUID LEVEL WARNING SWITCH) (SEE PAGE 01-36)

Skid Control ECU (Wire Harness Side) Connector Front View:



Brake Fluid Level Warning Switch (Wire Harness Side) Connector Front View:



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- (a) Disconnect the skid control ECU connector and brake fluid level warning switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-41 (LBL) - B1-2	Below 1 Ω
S37-41 (LBL) - Body ground	10 kΩ or higher
B1-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (LBL CIRCUIT)**

OK

4 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
- (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
- (c) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

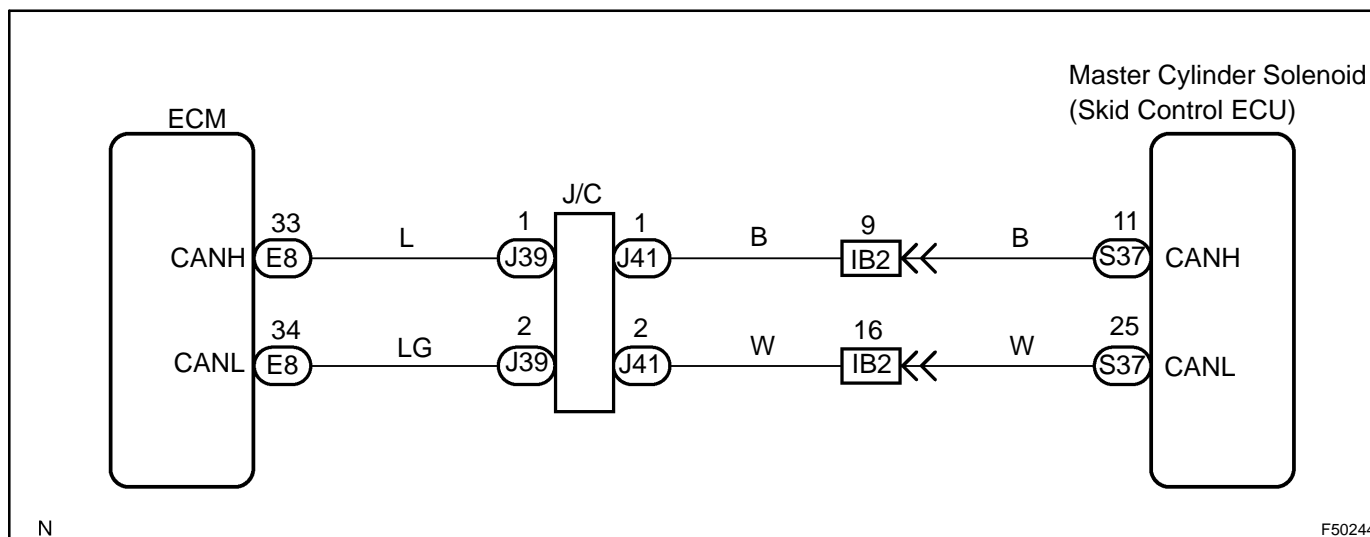
DTC	C1203/53	ENGINE CONTROL SYSTEM COMMUNICATION CIRCUIT MALFUNCTION
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CIRCUIT DESCRIPTION

The circuit is used to send TRAC & VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU via the CAN communication system.

DTC No.	DTC Detection Condition	Trouble Area
C1203/53	Engine drive source and destination variation that are sent from the ECM do not match the one of the ECU.	ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DTC (FOR ENGINE CONTROL SYSTEM)
----------	--

(a) Check if the normal system code is recorded for the engine control system (see page 05-44).

Result:

Normal system code	A
Trouble code	B

B → **REPAIR ENGINE CONTROL SYSTEM
ACCORDING TO OUTPUT CODE
(SEE PAGE 05-60)**

A

REPLACE ECM (SEE PAGE 10-16)

DTC	C1210/36	ZERO POINT CALIBRATION OF YAW RATE SENSOR UNDONE
------------	-----------------	---

DTC	C1336/39	ZERO POINT CALIBRATION OF DECELERATION SENSOR UNDONE
------------	-----------------	---

CIRCUIT DESCRIPTION

The skid control ECU receives signals from the yaw rate and deceleration sensor via the CAN communication system.

The yaw rate sensor has a built-in deceleration sensor.

If there is trouble in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, the DTC U0123/62 (yaw rate sensor communication trouble) and U0124/95 (deceleration sensor communication trouble) are output.

These DTCs are also output when the calibration has not been completed.

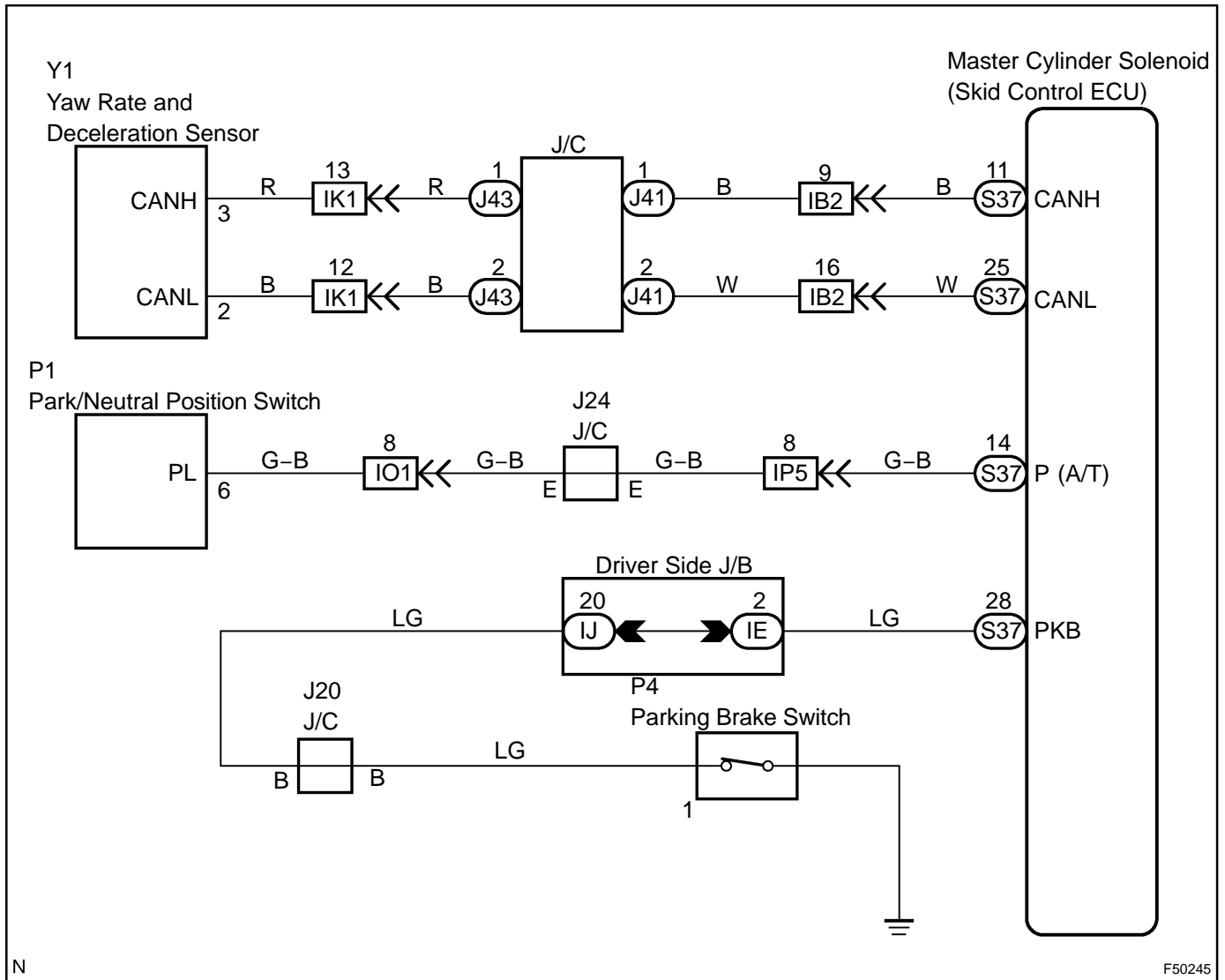
DTC No.	DTC Detection Condition	Trouble Area
C1210/36	When either of the following conditions is detected: 1. When battery terminal was connected, shift lever was moved to non-P position (A/T) within 15 seconds after ECU terminal IG1 became ON first. 2. Yaw rate sensor zero point recorded in ECU is deleted.	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Zero point calibration undone • Park/Neutral position switch (P position) circuit
C1336/39	When either of the following conditions is detected: 1. In test mode, shift lever is shifted to non-P position (A/T) 2 seconds after ECU terminal IG1 is turned ON first. 2. Deceleration sensor zero point recorded in ECU is deleted.	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Zero point calibration undone • Park/Neutral position switch (P position) circuit

HINT:

If these codes (C1210/36 and/or C1336/39) are output, the following situations will occur:

- The VSC TRAC warning light and the VSC OFF and SLIP indicator lights will come on.
- Control of all systems other than ABS, EBD, and BA is canceled.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

When U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 is output together with C1210/36 or C1336/39, inspect and repair the trouble areas indicated by U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 first.

1	CHECK SENSOR INSTALLATION (SEE PAGE 32-52)
----------	---

(a) Check that the yaw rate and deceleration sensor has been installed properly.

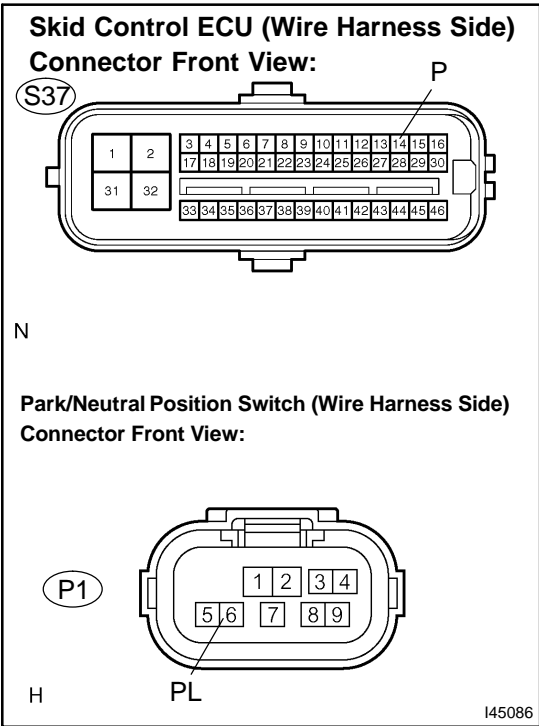
OK:

- The sensor should be tightened to the specified torque.
- The sensor should not be tilted.

NG	INSTALL YAW RATE AND DECELERATION SENSOR CORRECTLY (SEE PAGE 32-52)
-----------	--

OK

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND PARK/NEUTRAL POSITION SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the skid control ECU connector and park/neutral position switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-14 (P) - P1-6 (PL)	Below 1Ω
S37-14 (P) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (P CIRCUIT)

OK

3 PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (SEE PAGE 05-734)

NEXT

4 RECONFIRM DTC

- (a) Clear the DTCs (see page 05-757).
- (b) Check if the same DTCs are detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B END

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1223/43	MALFUNCTION IN ABS CONTROL SYSTEM
------------	-----------------	--

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1223/43	ABS control system is abnormal	ABS control system

HINT:

- This DTC is output when the VSC system detects a malfunction in the ABS system.
- When DTC C1223/43 is memorized, there is no malfunction in the skid control ECU.

INSPECTION PROCEDURE

1	CHECK DTC (FOR ABS SYSTEM) (SEE PAGE 05-757)
----------	---

- Clear the DTCs.
- Check if DTCs are recorded.

Result:

DTC is output	A
DTC is not output	B



REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE 05-767)
--

DTC	C1231/31	MALFUNCTION IN STEERING ANGLE SENSOR
------------	-----------------	---

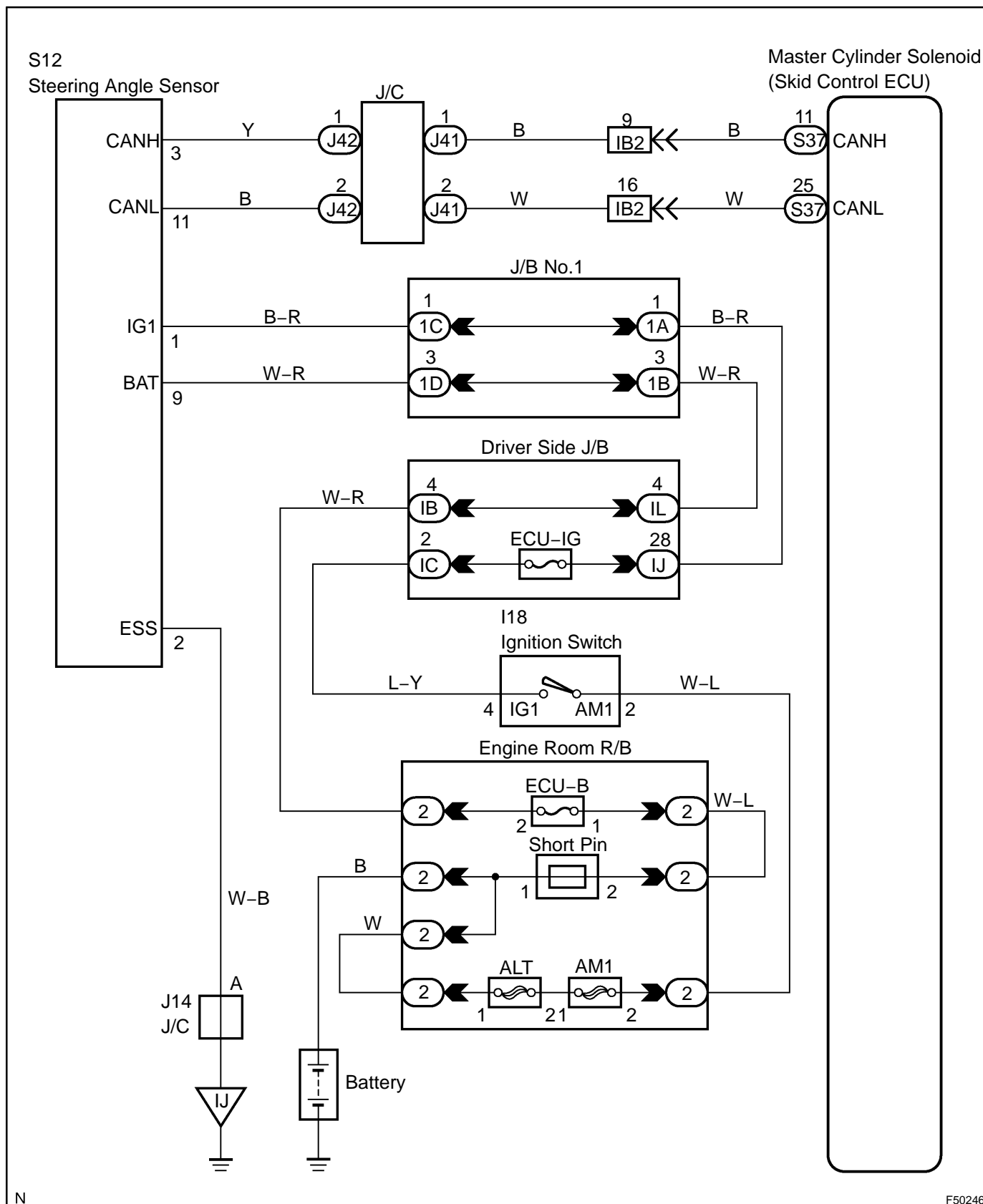
DTC	C1290/66	MALFUNCTION IN ZERO POINT OF STEERING SENSOR
------------	-----------------	---

CIRCUIT DESCRIPTION

The steering angle sensor signal is sent to the skid control ECU through the CAN communication system. When there is a malfunction in the communication system, it will be detected by the diagnosis function.

DTC No.	DTC Detection Condition	Trouble Area
C1231/31	When ECU IG1 terminal voltage is 9.5 V or more, the steering angle sensor malfunction signal is received.	<ul style="list-style-type: none"> • Steering angle sensor • Steering angle sensor circuit • Steering angle sensor power supply • CAN communication system
C1290/66	The steering angle sensor zero point calibration position vastly differs from the recorded value.	Steering angle sensor

WIRING DIAGRAM



N

F50246

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

- When U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 is output together with C1231/31 and C1290/66, inspect and repair the trouble areas indicated by U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 first.
- When the speed sensor or the yaw rate and deceleration sensor has trouble, DTCs of the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs of the speed sensor (C0200/31, C0205/32, C0210/33, C0215/34, C1235/35, C1236/36, C1238/38, C1239/39) or yaw rate and deceleration sensor (C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, C1381/97) are output together with other DTCs of the steering angle sensor, inspect and repair the speed sensor and yaw rate and deceleration sensor first, and then inspect and repair the steering angle sensor.
- Start the inspection from step 1 when using the hand-held tester and start from step 3 when not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER (STEERING ANGLE SENSOR)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
STEERING ANG	Steering angle sensor/ min.: -1152 deg/s, max.: 1150.875 deg/s	Left turn: Increase Right turn: Decrease	-

- Check that the steering wheel turning angle value of the steering angle sensor displayed on the hand-held tester changes when turning the steering wheel.

OK:

Steering angle sensor value changes.

Result:

OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)

C

Go to step 3

A

2 RECONFIRM DTC

- Clear the DTCs (see page 05-757).
- Drive the vehicle at a speed of approximately 6 mph (10 km/h) or more for 10 seconds or more.
- Check if the same pending DTCs are detected (see page 05-757).

Result:

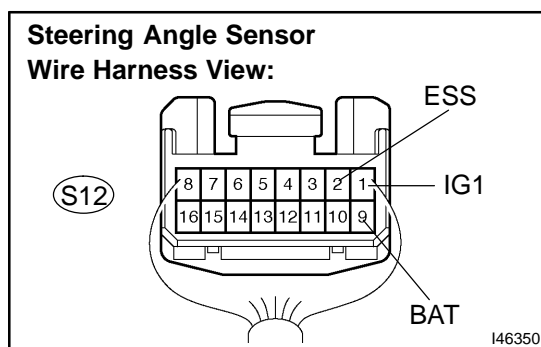
DTC is output	A
DTC is not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

3 INSPECT STEERING ANGLE SENSOR (TERMINAL VOLTAGE AND CONTINUITY)



- Remove the steering wheel and the column cover lower.
- Disconnect the steering angle sensor connector.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S12-1 (IG1) – Body ground	Ignition switch ON	10 to 14 V
S12-9 (BAT) – Body ground	Always	10 to 14 V

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S12-2 (ESS) – Body ground	Ignition switch OFF	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1, BAT OR ESS CIRCUIT)

OK

REPLACE STEERING ANGLE SENSOR (SEE PAGE 32-53)

HINT:

- When troubleshooting in accordance with the DTC CHART, check DTCs before replacing the steering angle sensor (see page 05-767).
- When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE, be sure to follow the table before replacing the steering angle sensor (see page 05-750).

DTC	C1232/32	MALFUNCTION IN DECELERATION SENSOR
DTC	C1234/34	MALFUNCTION IN YAW RATE SENSOR
DTC	C1243/43	MALFUNCTION IN DECELERATION SENSOR (CONSTANT OUTPUT)
DTC	C1244/44	OPEN OR SHORT CIRCUIT IN DECELERATION SENSOR CIRCUIT
DTC	C1245/45	MALFUNCTION IN DECELERATION SENSOR
DTC	C1381/97	MALFUNCTION IN POWER SUPPLY VOLTAGE OF YAW/DECELERATION SENSOR

CIRCUIT DESCRIPTION

The skid control ECU receives signals from the yaw rate and deceleration sensor via the CAN communication system.

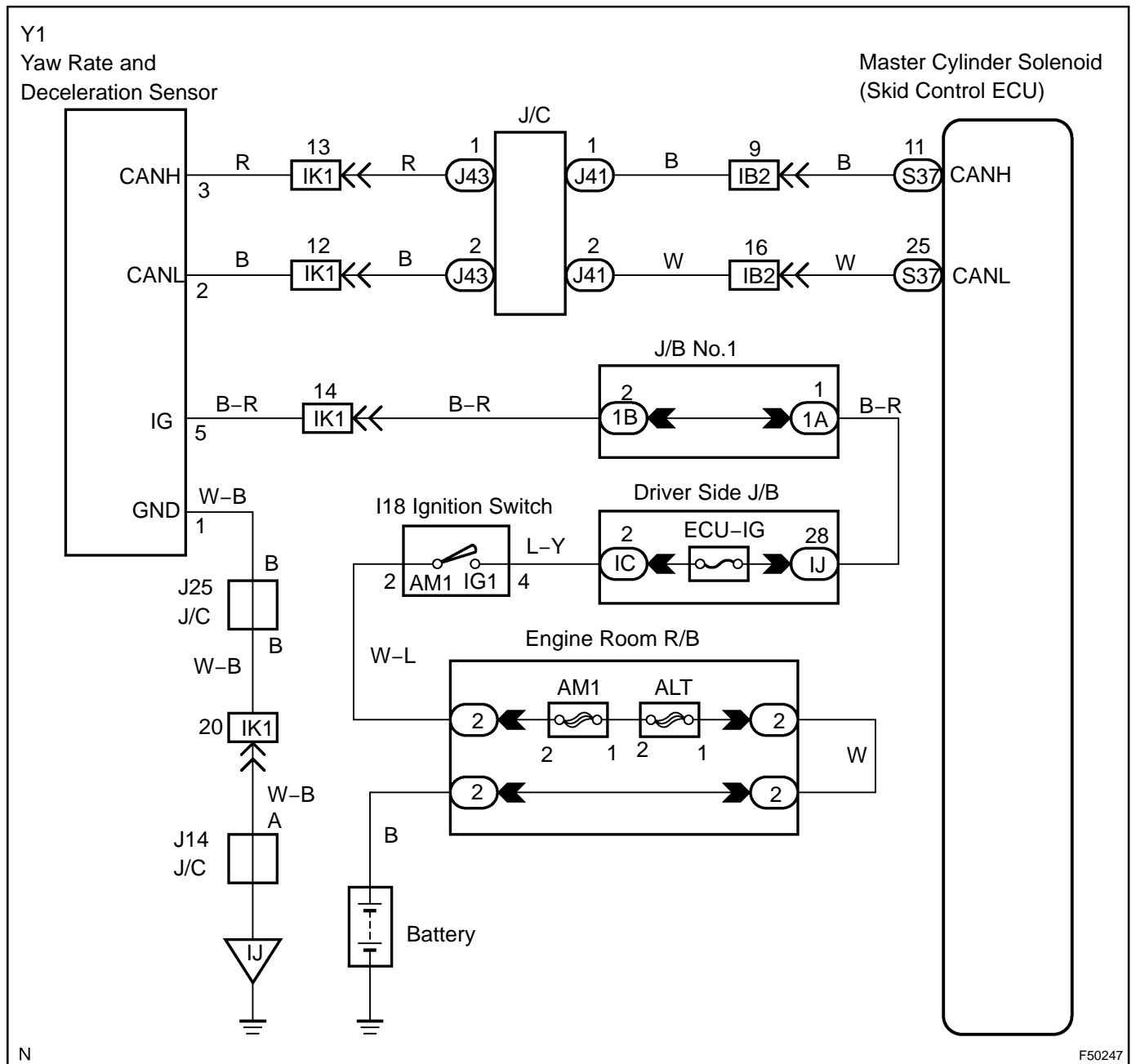
The yaw rate sensor has a built-in deceleration sensor.

If there is trouble in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, the DTC U0123/62 (lost communication with yaw rate sensor module) and U0124/95 (lost communication with lateral acceleration sensor module) are output.

These DTCs are also output when the calibration has not been completed.

DTC No.	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 6 mph (10 km/h) or more, the fluctuation range of the signal from either GL1 or GL2 is under 80 mV and the other is above 1.9 V for 30 seconds or more.	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1234/34	Sensor malfunction signal is received from yaw rate sensor.	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1243/43	The following condition repeats 16 times. <ul style="list-style-type: none"> • GL1 and GL2 do not change by more than 2LSB when the vehicle decelerates from 19 mph (30 km/h) to 0 mph (0 km/h). 	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1244/44	When either of the following conditions is detected: <ol style="list-style-type: none"> Both of the following conditions continue for at least 60 seconds. <ul style="list-style-type: none"> • Vehicle is stopped. • Difference between GL1 and GL2 does not drop below 0.4 G once it reaches 0.6 G or more. Data malfunction signal is received from deceleration sensor. 	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. <ul style="list-style-type: none"> • Difference between the values calculated from deceleration sensor value and vehicle speed exceeds 0.35 G. 	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1381/97	Deceleration sensor power source malfunction signal is received for at least 10 sec. at a speed of more than 2 mph (3 km/h).	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor • Yaw rate and deceleration sensor power source circuit • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and deceleration sensor, perform zero point calibration (see page 05-734).

1	CHECK DTC
----------	------------------

- (a) Clear the DTCs (see page 05-757).
- (b) Turn the ignition switch off.
- (c) Turn the ignition switch to the ON position.
- (d) Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/39) are detected (see page 05-757).

Result:

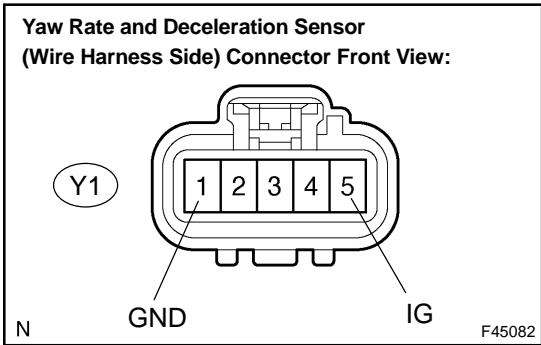
DTC U0073/94, U0123/62, C1210/36 and/or C1336/39 are not output	A
DTC U0073/94 and/or U0123/62 are output	B
DTC C1210/36 and/or C1336/39 are output	C

B → REPAIR CAN COMMUNICATION SYSTEM ACCORDING TO OUTPUT CODE (SEE PAGE 05-2331)

C → REPAIR CIRCUIT ACCORDING TO OUTPUT CODE (SEE PAGE 05-799)

A →

2 INSPECT YAW RATE AND DECELERATION SENSOR (TERMINAL VOLTAGE AND CONTINUITY)



- (a) Disconnect the yaw rate and deceleration sensor connector.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
Y1-5 (IG) - Body ground	Ignition switch ON	10 to 14 V

- (d) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
Y1-1 (GND) - Body ground	Ignition switch OFF	Below 1 Ω

Result:

OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

B PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)

C REPAIR OR REPLACE HARNESS OR CONNECTOR (IG OR GND CIRCUIT)

A

REPLACE YAW RATE AND DECELERATION SENSOR (SEE PAGE 32-52)

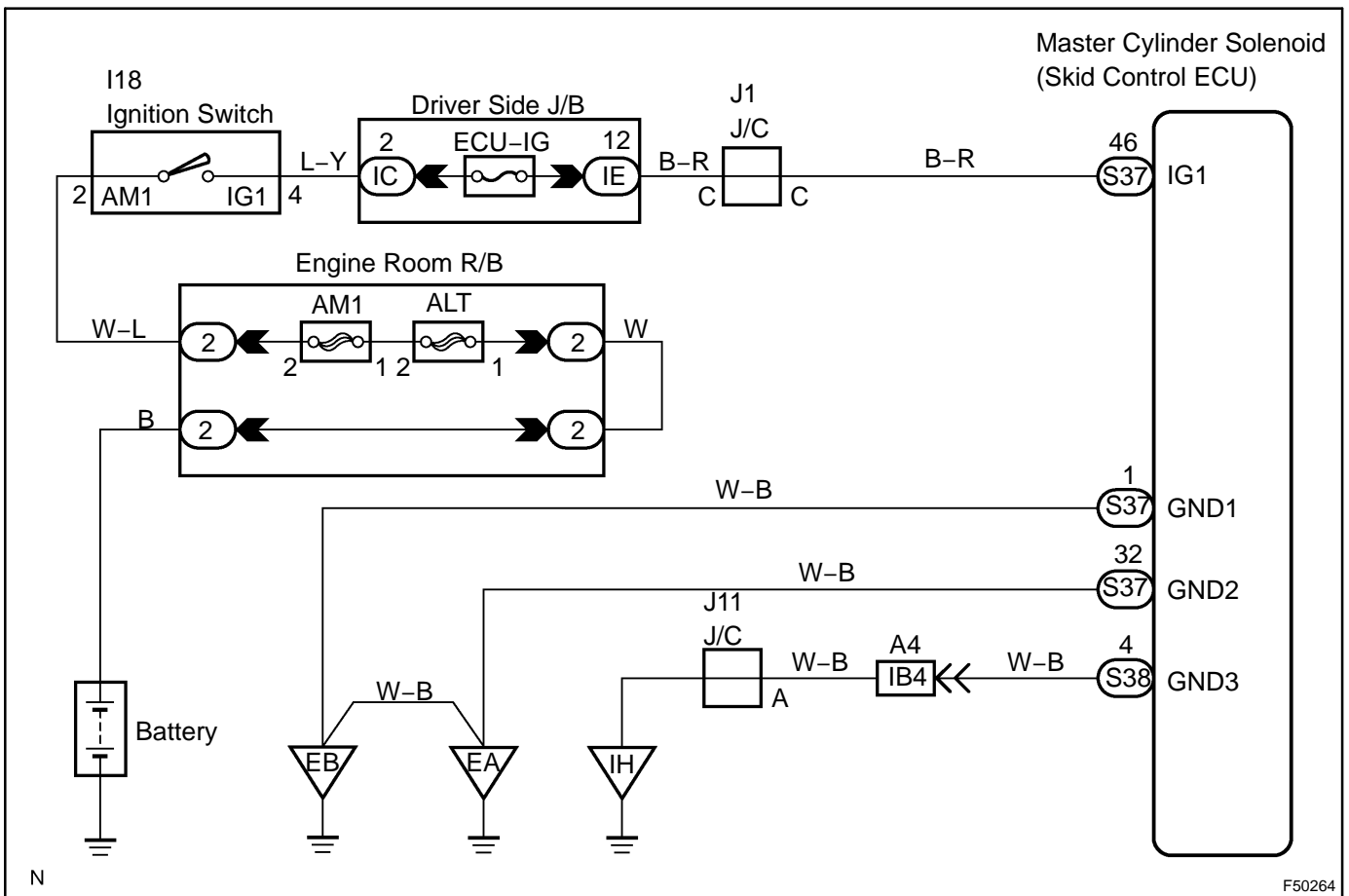
DTC	C1241/41	LOW BATTERY POSITIVE VOLTAGE OR ABNORMALLY HIGH BATTERY POSITIVE VOLTAGE
------------	-----------------	---

CIRCUIT DESCRIPTION

If the voltage supplied to the IG1 terminal is not within the DTC detection threshold due to malfunctions in such as the battery and alternator circuit, this DTC is stored.

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 10 seconds. • Vehicle speed is more than 2 mph (3 km/h). • IG1 terminal voltage is less than 9.5 V. 2. All of the following conditions continue for at least 0.2 seconds. • Solenoid relay remains ON. • IG1 terminal voltage is less than 9.5 V. • Relay contact is open.	<ul style="list-style-type: none"> • Battery • ECU-IG fuse • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

After steps 1 and 2 are completed, start the inspection from step 3 when using the hand-held tester and start from step 4 when not using the hand-held tester.

1 INSPECT BATTERY

- (a) Check the battery voltage.

Standard:

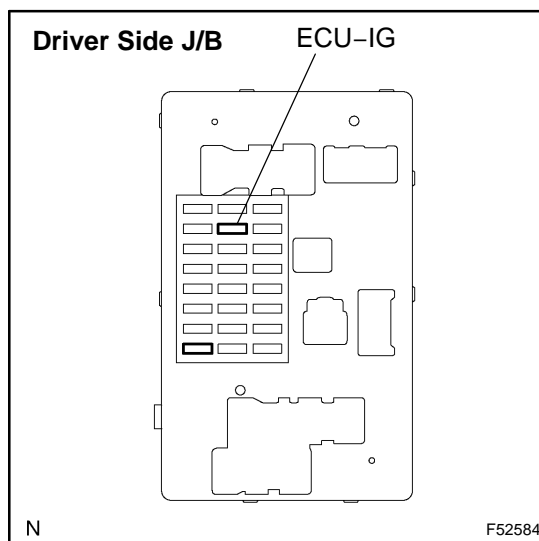
Voltage: 11 to 14 V

NG

**INSPECT CHARGING SYSTEM
(SEE PAGE 19-13)**

OK

2 INSPECT FUSE (ECU-IG FUSE)



- (a) Remove the ECU-IG fuse from the driver side J/B.

- (b) Check the ECU-IG fuse.

Standard:

Below 1 Ω (Continuity)

NG

**CHECK FOR SHORT IN ALL HARNESS AND
CONNECTOR CONNECTED TO FUSE AND
REPLACE FUSE**

OK

3 | READ VALUE OF HAND-HELD TESTER (IG1 POWER SUPPLY)

- (a) Install the ECU-IG fuse.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (d) Start the engine.
- (e) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU IG power supply voltage/ TOO LOW/NORMAL/TOO HIGH	TOO LOW: 9.5 V or less NORMAL: 9.5 to 14.0 V TOO HIGH: 14.0 V or more	-

- (f) Measure the voltage output from the ECU displayed on the hand-held tester.

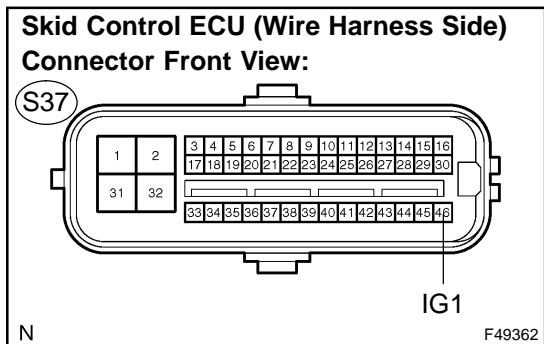
OK:

"Normal" is displayed.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

OK

4 | INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)



- (a) Install the ECU-IG fuse.
- (b) Disconnect the skid control ECU connector.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

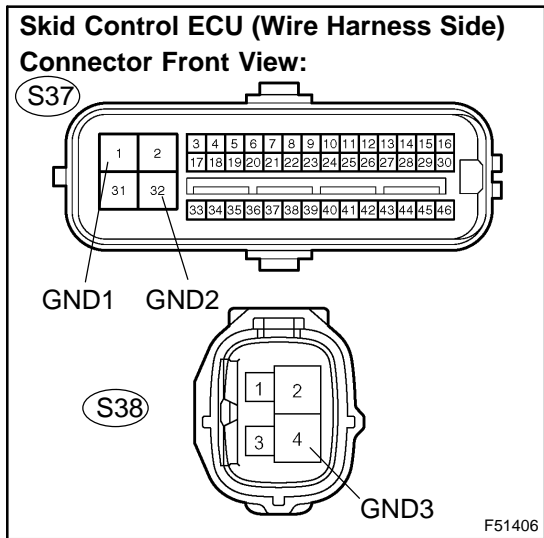
Standard:

Tester Connection	Condition	Specified Condition
S37-46 (IG1) - Body ground	IG switch ON	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

OK

5 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



- (a) Disconnect the skid control ECU (S38) connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-1 (GND1) - Body ground	Below 1 Ω
S37-32 (GND2) - Body ground	Below 1 Ω
S38-4 (GND3) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

6 RECONFIRM DTC

- (a) Clear the DTCs (see page 05-757).
- (b) Check if the same DTCs are detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output (When troubleshooting in accordance with the DTC CHART.)	B
DTC is not output (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	C

B → **END**

C → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1242/42	OPEN CIRCUIT IN IG2 CIRCUIT
------------	-----------------	------------------------------------

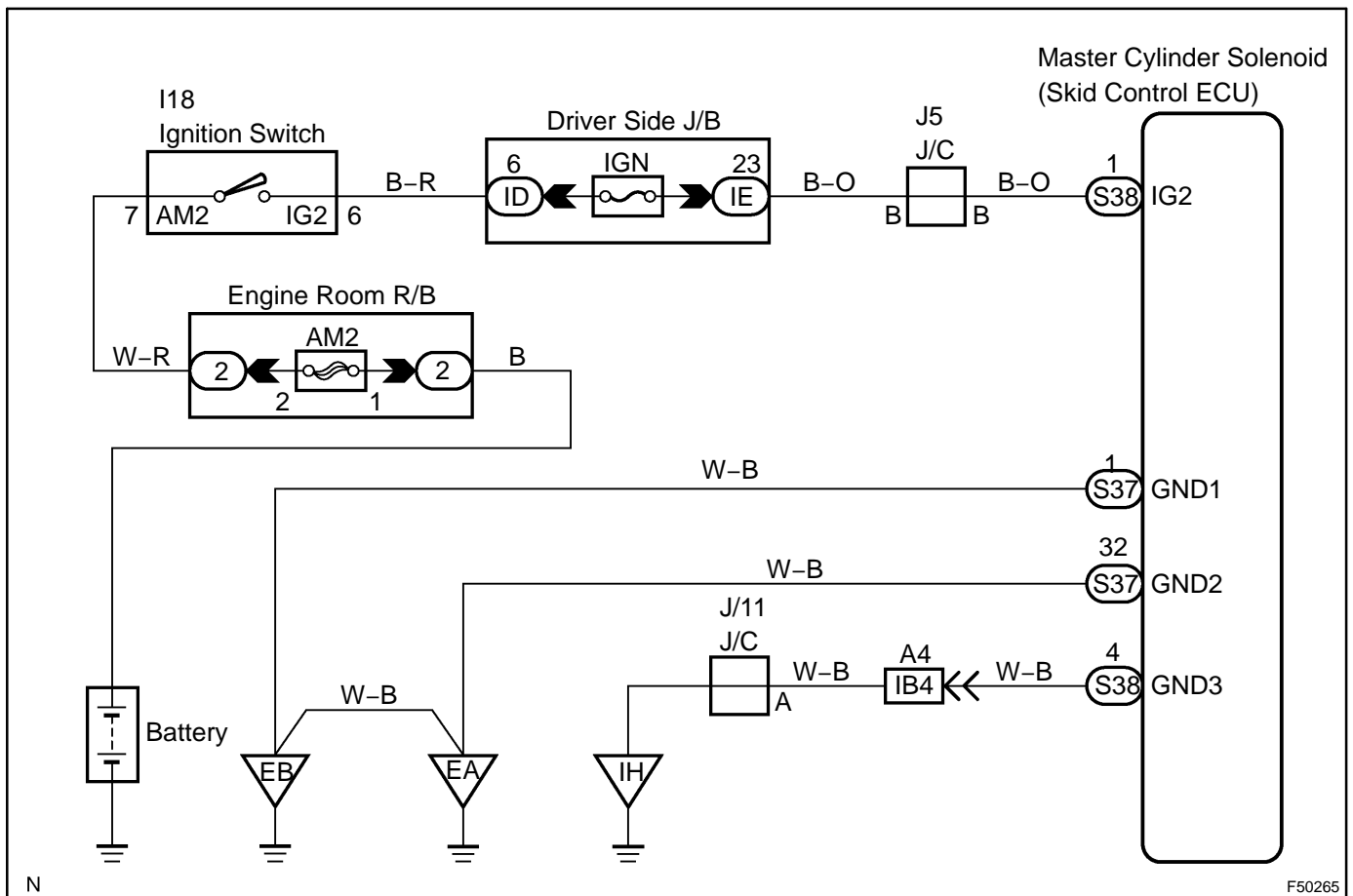
CIRCUIT DESCRIPTION

If there is a problem with the master cylinder solenoid (skid control ECU) power supply circuit, the skid control ECU outputs DTCs and prohibits operation under the fail safe function.

If the voltage supplied to the IG2 terminal is not within the DTC detection threshold due to malfunctions in such as the battery and alternator circuit, this DTC is stored.

DTC No.	DTC Detection Condition	Trouble Area
C1242/42	Vehicle speed is 1.9 mph (3 km/h) or more and voltage of ECU IG2 terminal remains at below 6.5 V for more than 7 seconds.	<ul style="list-style-type: none"> • Battery • IGN fuse • IC regulator • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT BATTERY

- (a) Check the battery voltage.

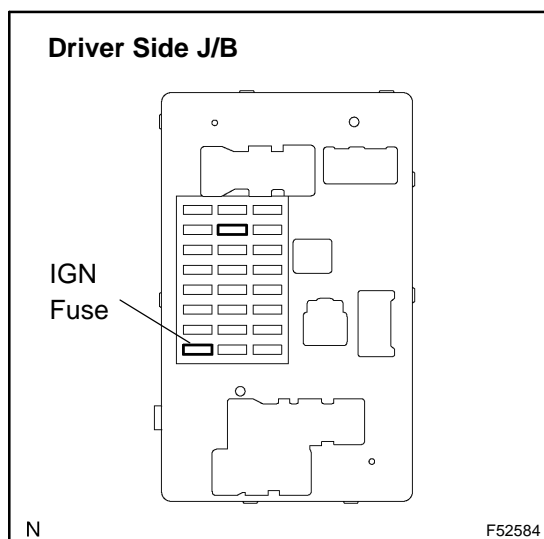
Standard:

Voltage: 11 to 14 V

NG INSPECT CHARGING SYSTEM
(SEE PAGE 19-13)

OK

2 INSPECT FUSE (IGN FUSE)



- (a) Remove the IGN fuse from the driver side J/B.
(b) Check the IGN fuse.

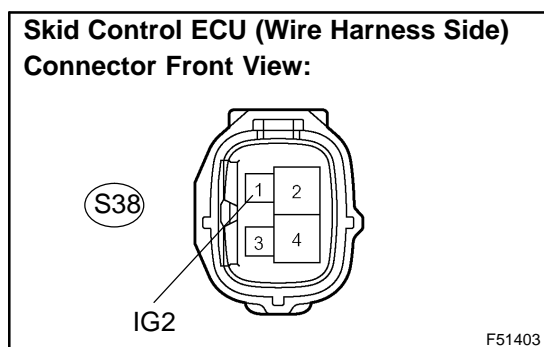
Standard:

Below 1 Ω (Continuity)

NG CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE

OK

3 INSPECT SKID CONTROL ECU (IG2 TERMINAL VOLTAGE)



- (a) Install the IGN fuse.
(b) Disconnect the skid control ECU (S38) connector.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

Standard:

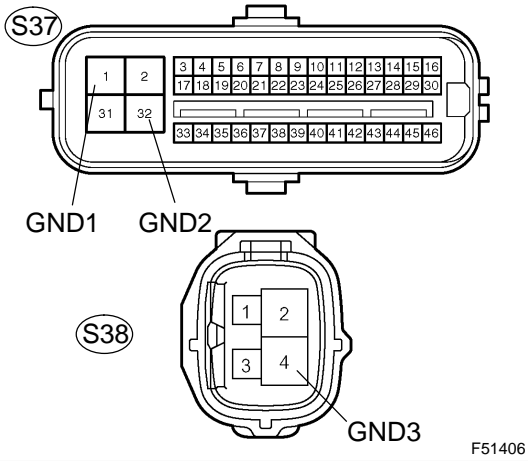
Tester Connection	Condition	Specified Condition
S38-1 (IG2) - Body ground	IG switch ON	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (IG2 CIRCUIT)

OK

4 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)

**Skid Control ECU (Wire Harness Side)
Connector Front View:**



- (a) Disconnect the skid control ECU connector.
- (b) Measure the resistance according to the value (s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-1 (GND1) - Body ground	Below 1 Ω
S37-32 (GND2) - Body ground	Below 1 Ω
S38-4 (GND3) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

5 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
- (b) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

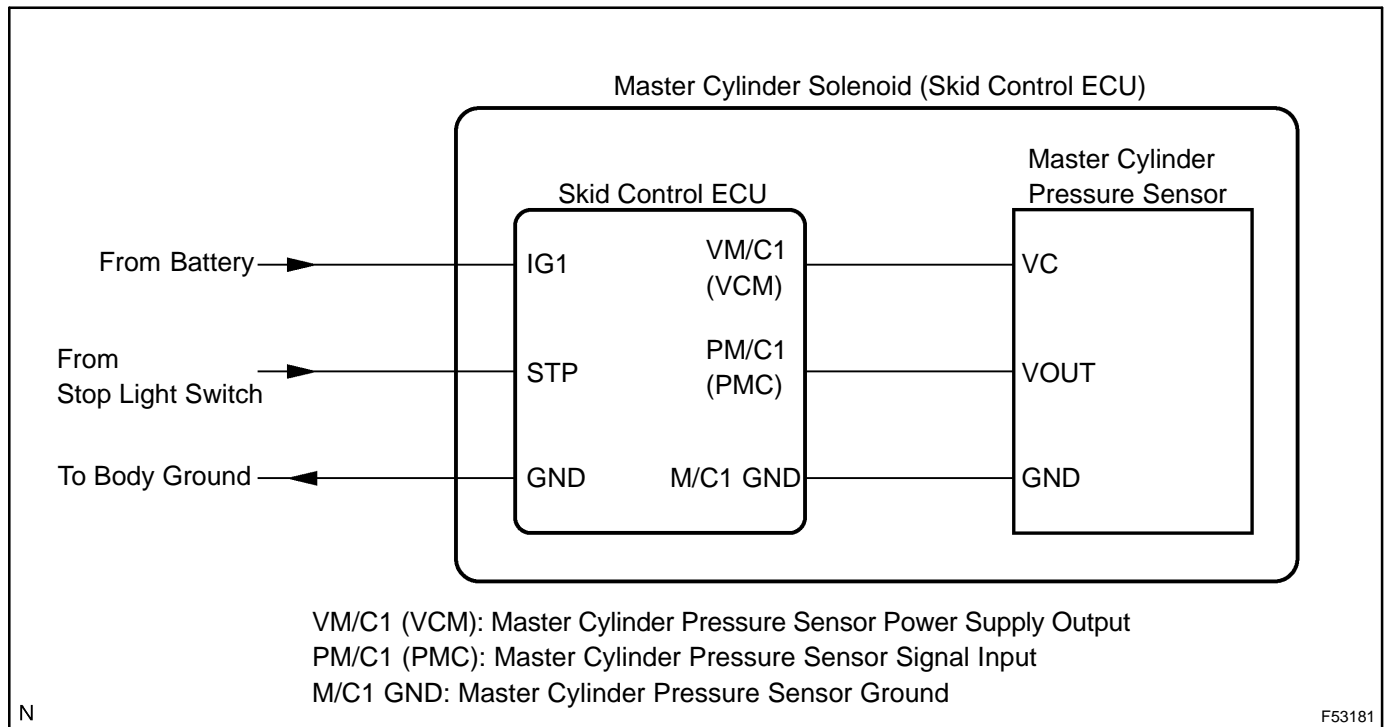
A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1246/46	MALFUNCTION IN MASTER CYLINDER PRESSURE SENSOR
------------	-----------------	---

CIRCUIT DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the master cylinder solenoid.



DTC No.	DTC Detection Condition	Trouble Area
C1246/46	When any of the following conditions is detected: 1. Both of the following conditions continue for at least 30 seconds. • Vehicle speed is more than 4 mph (7 km/h). • PMC terminal voltage does not change by more than 0.005 V once it exceeds 0.86 V. 2. PMC terminal receives interference at least 7 times within 5 sec. 3. Both of the following conditions continue for at least 1.2 seconds. • Stop light switch is OFF. • PMC terminal voltage is more than 0.86 V or less than 0.3 V. 4. Both of the following conditions continue for at least 1.2 sec. • IG1 terminal voltage is between 9.5 and 17 V. • VCM terminal voltage is not between 4.4 and 5.6 V. 5. Both of the following conditions continue for at least 1.2 sec. • VCM terminal voltage is between 4.4 and 5.6 V. • PMC terminal voltage is not between 0.14 and 4.85 V.	<ul style="list-style-type: none"> • Master cylinder pressure sensor • Master cylinder pressure sensor circuit • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (MASTER CYLINDER PRESSURE SENSOR)
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (c) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRES 1	Master cylinder pressure sensor 1 reading/min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed

- (d) Check that the master cylinder pressure value of the master cylinder pressure sensor displayed on the hand-held tester changes when depressing the brake pedal.

Result:

Master cylinder pressure sensor value does not change	A
Master cylinder pressure sensor value changes but it is not normal	B
Master cylinder pressure sensor value becomes normal	C

B → Go to step 2

C → Go to step 4

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)
--

2	CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION (SEE PAGE 32-6)
----------	---

- (a) Check the brake pedal height.
- (b) Check the stop light switch installation.

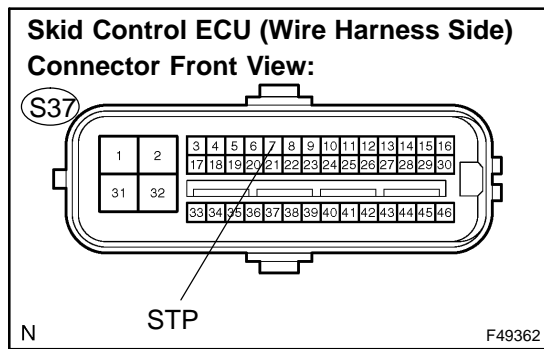
OK:

The brake pedal and stop light switch are normal.

NG → ADJUST BRAKE PEDAL AND/OR STOP LIGHT SWITCH (SEE PAGE 32-6)

OK

3 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
S37-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STP CIRCUIT)**

OK

4 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
- (b) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

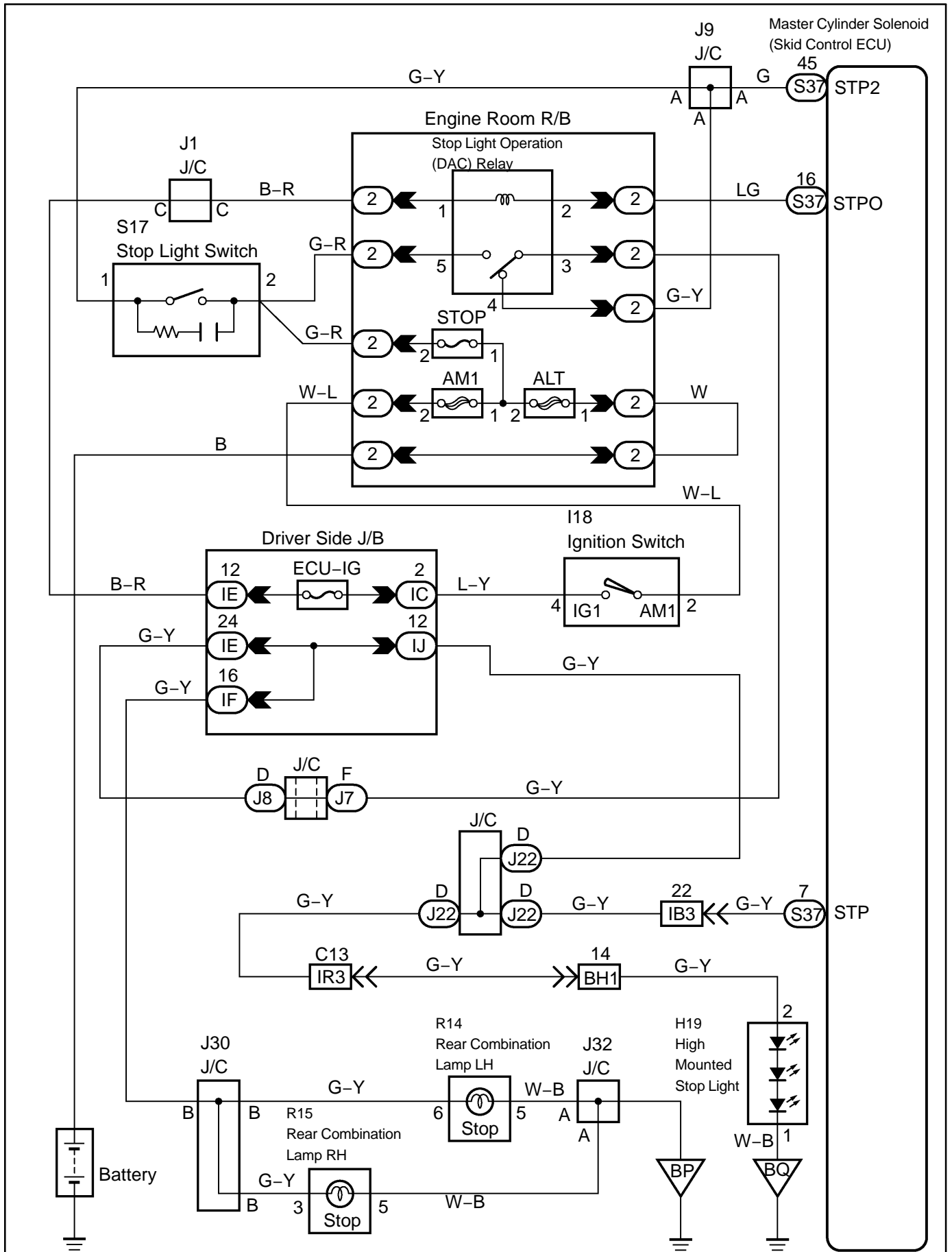
DTC	C1249/49	OPEN CIRCUIT IN STOP LIGHT SWITCH CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

This skid control ECU inputs the stop light switch signal and detects the status of brake operation. The skid control ECU has an open detection circuit. If an open in the stop light switch input line or GND side stop light circuit is detected when the stop light switch is off, this DTC is output.

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	ECU terminal IG1 voltage is 9.5 to 17.0 V, ABS is in non-operation, and an open in stop light switch circuit continues for 0.3 seconds or more.	<ul style="list-style-type: none"> • Stop light switch • Stop light switch circuit • Rear combination lamp (stop light) assy

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 CHECK STOP LIGHT SWITCH OPERATION

- (a) Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

OK:

Stop light switch function is normal.

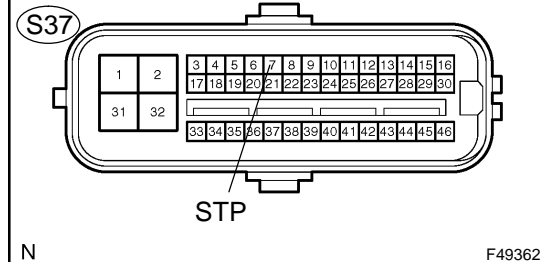
NG

Go to step 4

OK

2 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)

Skid Control ECU (Wire Harness Side) Connector Front View:



- (a) Disconnect the skid control ECU connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
S37-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

Result:

OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)

C

REPAIR OR REPLACE HARNESS OR CONNECTOR (STP CIRCUIT)

A

3 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
- (b) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

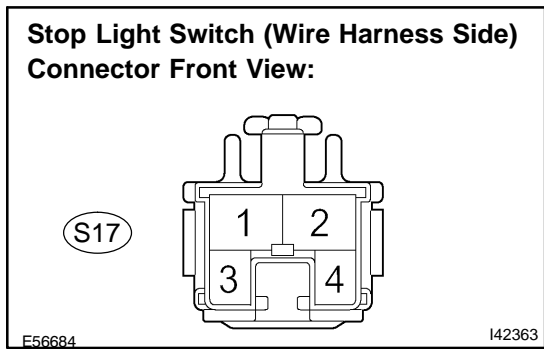
DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

4 INSPECT STOP LIGHT SWITCH ASSY (POWER SOURCE TERMINAL VOLTAGE)



- (a) Disconnect the stop light switch connector.
- (b) Measure the voltage according to the value(s) in the table below.

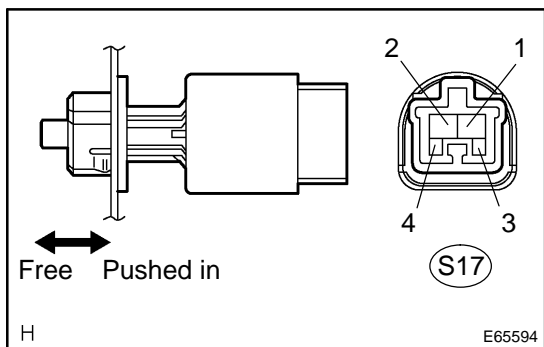
Standard:

Tester Connection	Condition	Specified Condition
S17-2 - Body ground	Always	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

5 INSPECT STOP LIGHT SWITCH ASSY



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

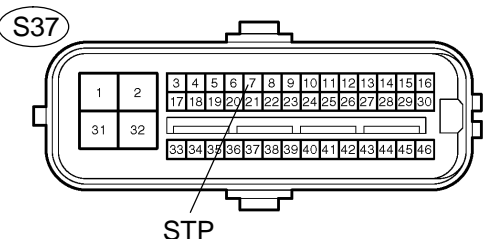
Tester Connection	Condition	Specified Condition
S17-1 - S17-2	Switch pin free	Below 1 Ω
S17-1 - S17-2	Switch pin pushed in	10 kΩ or higher

NG → **REPLACE STOP LIGHT SWITCH ASSY**

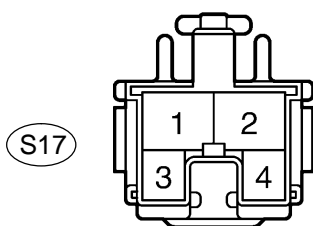
OK

6 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND STOP LIGHT SWITCH) (SEE PAGE 01-36)

Skid Control ECU (Wire Harness Side) Connector Front View:



Stop Light Switch (Wire Harness Side) Connector Front View:

F49362
C82562

F49379

- Disconnect the skid control ECU connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-7 (STP) - S17-1	Below 1 Ω
S37-7 (STP) - Body ground	10 k Ω or higher

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR (STP CIRCUIT)**

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

HINT:

- When troubleshooting in accordance with the DTC CHART, check DTCs before replacing the master cylinder solenoid (see page 05-767).
- When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE, be sure to follow the table before replacing the master cylinder solenoid (see page 05-750).

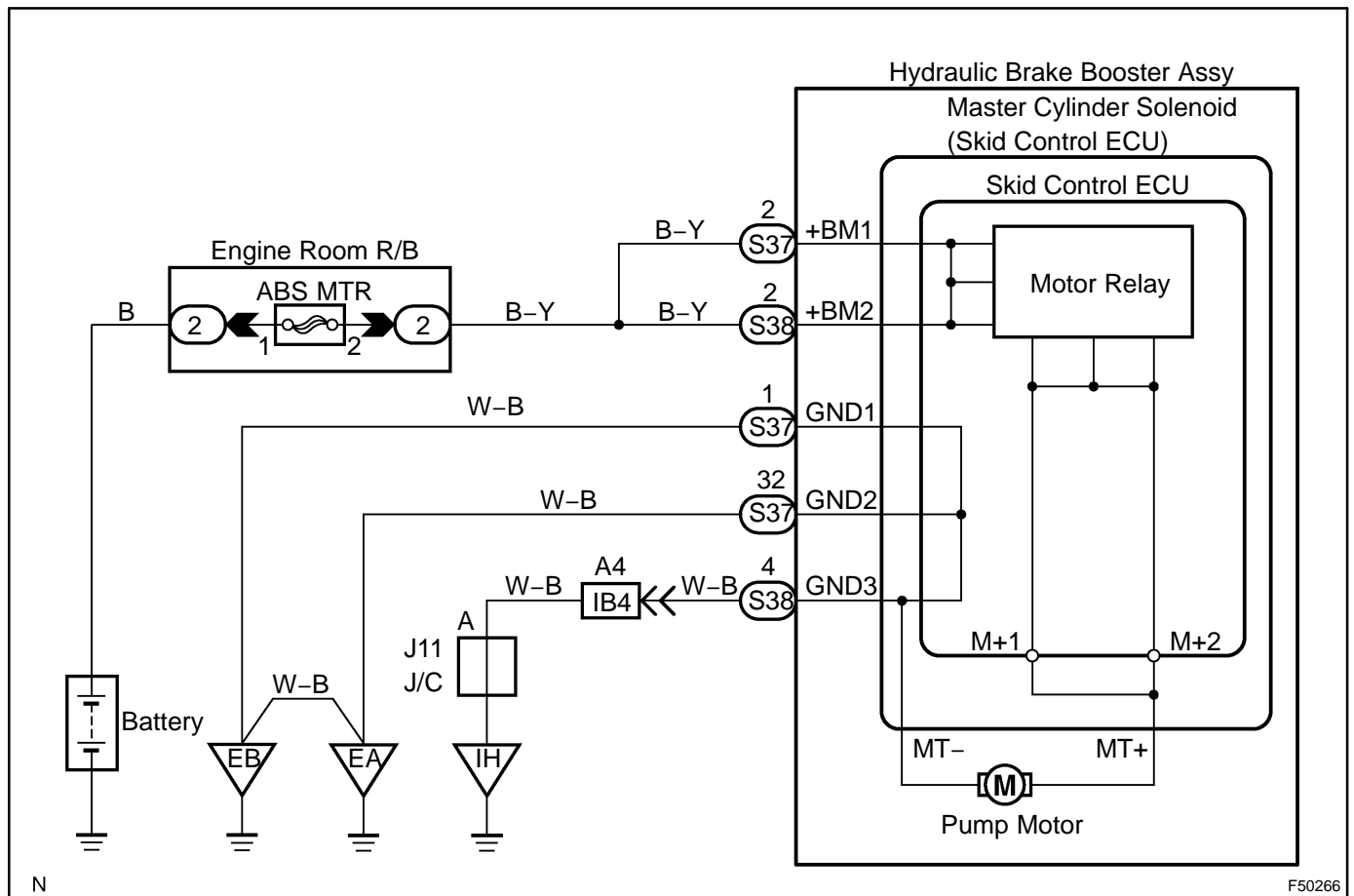
DTC	C1251/51	PUMP MOTOR IS LOCKED/OPEN CIRCUIT IN PUMP MOTOR GROUND
------------	-----------------	---

CIRCUIT DESCRIPTION

The motor relay (semiconductor relay) is built in the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	Open in motor system circuit (motor input circuit).	Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

HINT:

Remove the hydraulic brake booster before the inspection (see page 32-23).

1 CHECK CONNECTION OF THE PUMP MOTOR WIRE HARNESS (MT+/MT-)

- Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assy (see page 32-23).
- Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assy and the brake booster pump (see page 32-23).

OK:

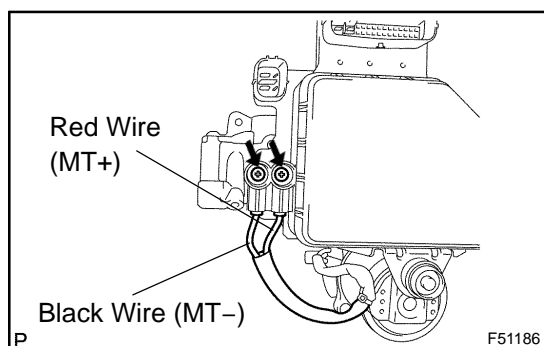
Torque: 2.9 N·m (30 kgf·cm, 26 in·lbf)

NG

TIGHTEN THE SCREWS UP, THEN GO TO STEP 3

OK

2 CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS (MT+/MT-)



- Using a screwdriver, remove the 2 screws and pull the wire harness from the hydraulic brake booster assy (see page 32-23).
- Measure the resistance between the red wire (MT+) and the black wire (MT-).

Standard:

Resistance: 2 Ω

NG

REPLACE BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)

OK

3 RECONFIRM DTC

- Reassemble the hydraulic brake booster assy (see page 32-23).
- Install the hydraulic brake booster assy (see page 32-23).
- Clear the DTC (see page 05-757).
- Check if the same DTC is detected (see page 05-757).

Result:

DTC is output	A
DTC is not output	B

B

END

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1252/52	HYDRO-BOOSTER PUMP MOTOR MALFUNCTION
------------	-----------------	---

CIRCUIT DESCRIPTION

Refer to DTC C1251/51 on page [05-826](#).

DTC No.	DTC Detection Condition	Trouble Area
C1252/52	Motor operates for 5 minutes or more.	<ul style="list-style-type: none"> • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

HINT:

The pump motor continues operation for the first 3 minutes, then repeats start and stop.

WIRING DIAGRAM

Refer to DTC C1251/51 on page [05-826](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster (master cylinder solenoid), perform zero point calibration (see page [05-734](#)).

HINT:

When C1253/53, C1254/54, or C1256/56 is output together with C1252/52, inspect and repair the trouble area indicated by C1253/53, C1254/54, or C1256/56 first.

1	CHECK PUMP MOTOR OPERATION
----------	-----------------------------------

- (a) Turn the ignition switch off.
- (b) Depress the brake pedal more than 20 times.
- (c) Turn the ignition switch to the ON position.
- (d) Check how the pump motor operates.

Result:

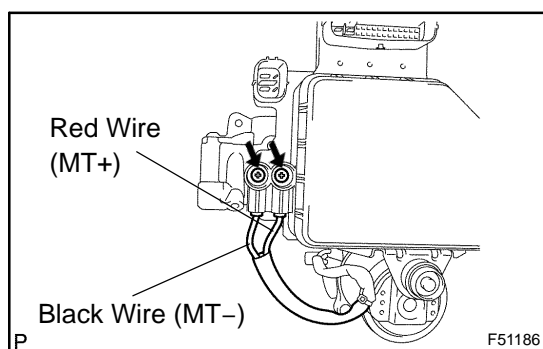
Pump motor does not operate	A
Pump motor operates continuously, and does not stop	B
Pump motor operates intermittently	C
Pump motor operates, then stops	D

B	REPLACE MASTER CYLINDER SOLENOID AND BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)
C	Go to step 4
D	Go to step 5

A

2 CHECK CONNECTION OF THE PUMP MOTOR WIRE HARNESS (MT+/MT-)

- (a) Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assy (see page 32-23).
 (b) Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assy and the brake booster pump (see page 32-23).

OK:**Torque: 2.9 N·m (30 kgf·cm, 26 in·lbf)****NG****TIGHTEN THE SCREWS UP, THEN GO TO STEP 5****OK****3 CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS (MT+/MT-)**

- (a) Using a screwdriver, remove the 2 screws and pull the wire harness from the hydraulic brake booster assy (see page 32-23).
 (b) Measure the resistance between the red wire (MT+) and the black wire (MT-).

OK:**Resistance: 2 Ω****NG****REPLACE BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)****OK**

4 READ VALUE OF HAND-HELD TESTER (ACCUMULATOR PRESSURE SENSOR)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
ACC PRESS SENS	Accumulator pressure sensor reading/min.: 0 V, max.: 5 V	3.58 to 5 V	If the value is constant regardless of pump operation, accumulator pressure sensor malfunction is suspected

- Check the accumulator output value.

Result:

Output value is within the "Normal Condition" range	A
Output value is out of the "Normal Condition" range	B
Output value is constant regardless of pump operation	C

B

REPLACE HYDRAULIC BRAKE BOOSTER (SEE PAGE 32-23)

C

REPLACE MASTER CYLINDER SOLENOID AND BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)

A

5 RECONFIRM DTC

- Clear the DTC (see page 05-757).
- Turn the ignition switch off.
- Turn the ignition switch to the ON position.
- Wait for more than 5 minutes.
- Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B

REPLACE BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)

A

REPLACE MASTER CYLINDER SOLENOID AND BRAKE BOOSTER W/ ACCUMULATOR PUMP ASSY (SEE PAGE 32-23)

DTC	C1253/53	HYDRO-BOOSTER PUMP MOTOR RELAY MALFUNCTION
------------	-----------------	---

CIRCUIT DESCRIPTION

Refer to DTC C1251/51 on page [05-826](#).

DTC No.	DTC Detection Condition	Trouble Area
C1253/53	Motor system circuit (motor input circuit).	<ul style="list-style-type: none"> Hydraulic brake booster pump motor Hydraulic brake booster pump motor circuit

WIRING DIAGRAM

Refer to DTC C1251/51 on page [05-826](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster (master cylinder solenoid), perform zero point calibration (see page [05-734](#)).

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER (H/B MOTOR RELAY)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- Start the engine.
- Select "ACTIVE TEST" mode on the hand-held tester.

Item	Vehicle Condition/Test Details	Diagnostic Note
HB MOT RELAY	Turns H/B motor relay ON/OFF	Operation sound of motor can be heard

- Check operation sound of the H/B motor individually when operating it with the hand-held tester.

OK:

The operation sound of the H/B motor can be heard.

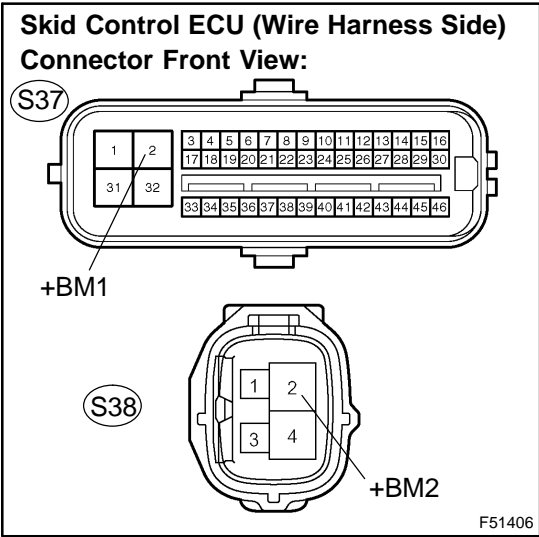
NG

Go to step 2

OK

Go to step 4

2 INSPECT SKID CONTROL ECU (+BM TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connectors.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

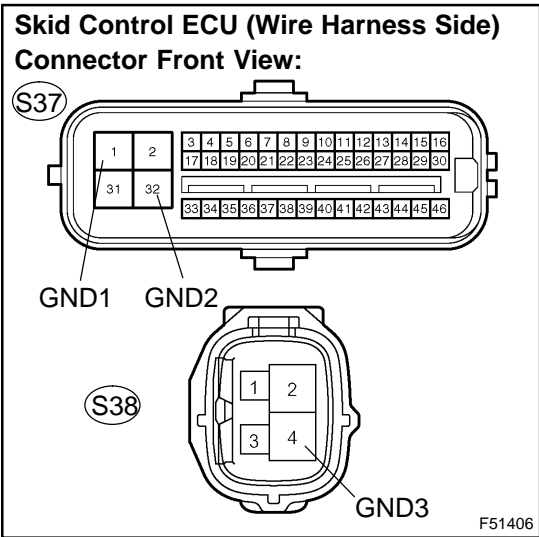
Standard:

Tester Connection	Condition	Specified Condition
S37-2 (+BM1) – Body ground	IG switch ON	10 to 14 V
S38-2 (+BM2) – Body ground	IG switch ON	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (+BM CIRCUIT)

OK

3 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-1 (GND1) – Body ground	Below 1 Ω
S37-32 (GND2) – Body ground	Below 1 Ω
S38-4 (GND3) – Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

4	RECONFIRM DTC
----------	----------------------

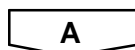
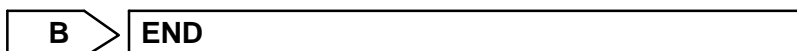
- (a) Clear the DTC (see page [05-757](#)).
- (b) Turn the ignition switch off.
- (c) Depress the brake pedal more than 20 times.
- (d) Turn the ignition switch to the ON position.
- (e) Wait until the pump motor stops.
- (f) Depress the brake pedal several times until the pump motor turns on.
- (g) Wait until the pump stops.
- (h) Repeat (f) and (g) 3 more times.
- (i) Check if the same DTC is detected (see page [05-757](#)).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

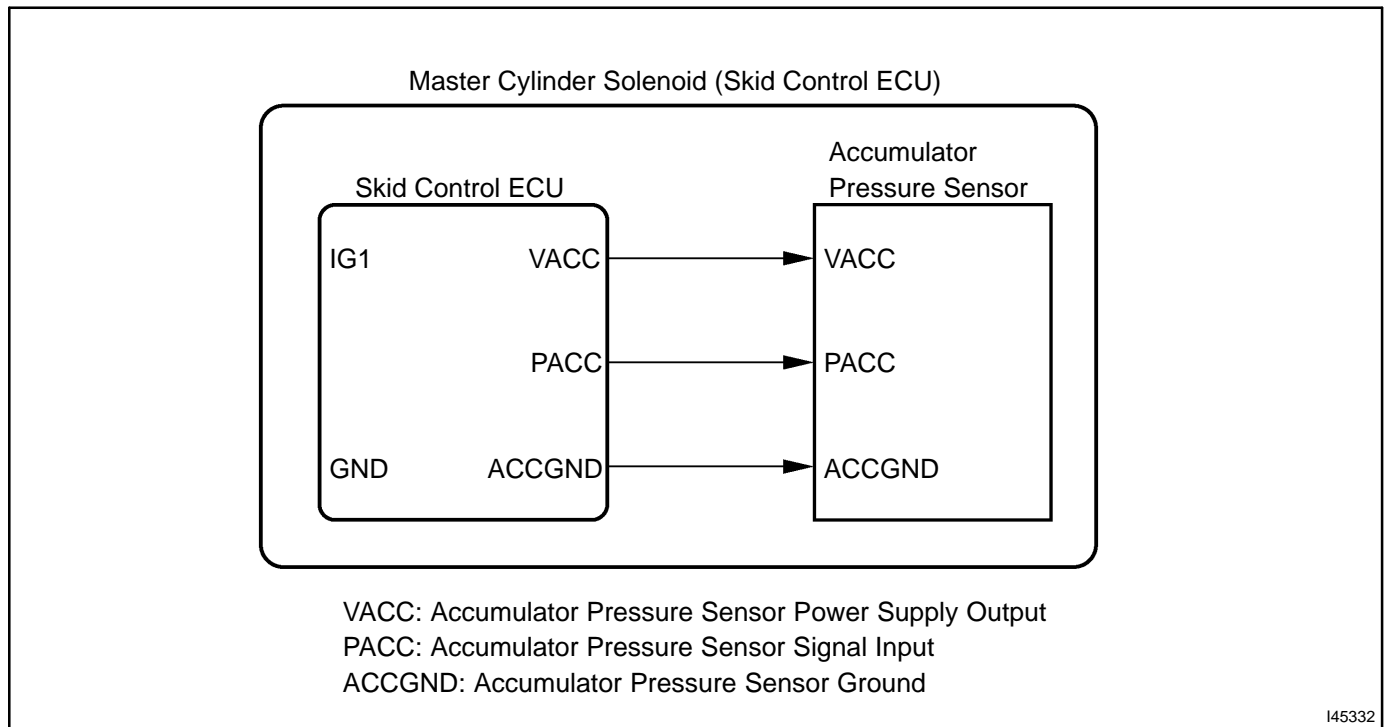


REPLACE HYDRAULIC BRAKE BOOSTER (SEE PAGE 32-23)

DTC	C1254/54	PRESSURE SENSOR OR SWITCH MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

The accumulator pressure sensor is connected to the skid control ECU in the master cylinder solenoid.



HINT:

If this code (C1254/54) is output, the following conditions will occur:

- The ABS, VSC TRAC, and brake warning lights and slip and VSC OFF indicator lights will come on.
- The skid control buzzer sounds.
- Control of all systems other than EBD is canceled.

DTC No.	DTC Detection Condition	Trouble Area
C1254/54	Accumulator pressure sensor malfunction. (Fluid pressure does not change when the pump operates or when the brake is applied.)	<ul style="list-style-type: none"> • Hydraulic brake booster • Accumulator pressure sensor • Master cylinder pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 READ VALUE OF HAND-HELD TESTER (ACCUMULATOR PRESSURE SENSOR)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch off.
- (c) Depress the brake pedal more than 20 times.
- (d) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (e) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
ACC PRESS SENS	Accumulator pressure sensor reading/min.: 0 V, max.: 5 V	3.58 to 5 V	If the value is constant regardless of pump operation, accumulator pressure sensor malfunction is suspected

- (f) Check the accumulator output value.

Result:

Output value is within the "Normal Condition" range	A
Output value is out of the "Normal Condition" range	B
Output value is constant regardless of pump operation	B

B

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

A

2 READ VALUE OF HAND-HELD TESTER (MASTER CYLINDER PRESSURE SENSOR)

- (a) Turn the ignition switch off.
- (b) Depress the brake pedal more than 20 times.
- (c) Install the brake pedal effort gauge (SST), and bleed air.
SST 09709-29018
- (d) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (e) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRES 1	Master cylinder pressure sensor 1 reading/min.: 0 V, max.: 5 V	0.3 to 1.8 V With pedal effort of 49 N (5 kgf, 11 in.·lbf)	Front brake pressure: 930 to 2130 kPa (9.5 to 21.7 kgf/cm ² , 135 to 309 psi)

- (f) Check that the master cylinder pressure sensor's output value is normal.

OK:

Master cylinder pressure sensor value is normal.

NG

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

OK

3	RECONFIRM DTC
----------	----------------------

- (a) Clear the DTC (see page [05-757](#)).
- (b) Turn the ignition switch off.
- (c) Depress the brake pedal more than 20 times.
- (d) Turn the ignition switch to the ON position.
- (e) Wait until the pump motor stops.
- (f) Depress the brake pedal and release it.
- (g) Wait for 25 minutes.
- (h) Check if the same DTC is detected (see page [05-757](#)).

Result:

DTC is output	A
DTC is not output	B

B	END
----------	------------

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)
--

DTC	C1256/56	ACCUMULATOR LOW PRESSURE MALFUNCTION
------------	-----------------	---

CIRCUIT DESCRIPTION

Refer to DTC C1254/54 on page [05-834](#).

DTC No.	DTC Detection Condition	Trouble Area
C1256/56	Fluid pressure inside the accumulator is below the standard value.	<ul style="list-style-type: none"> • Hydraulic brake booster • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page [05-734](#)).

HINT:

When C1251/51, C1253/53, or C1254/54 is output together with C1256/56, inspect and repair the trouble area indicated by C1251/51, C1253/53, or C1254/54 first.

1	RECONFIRM DTC
----------	----------------------

- (a) Clear the DTC (see page [05-757](#)).
- (b) Turn the ignition switch off.
- (c) Depress the brake pedal more than 20 times.
- (d) Turn the ignition switch to the ON position.
- (e) Wait for 99 seconds.
- (f) Check if the same DTC is detected (see page [05-757](#)).

Result:

DTC is output	A
DTC is not output	B

B →	END
------------	------------

HINT:

Excessive brake pedal operation results in abnormal accumulator pressure consumption. This is normal.

A

2	CHECK HYDRAULIC CIRCUIT
----------	--------------------------------

- (a) Check the hydraulic circuit (see page [32-14](#)).

OK:

Hydraulic circuit is normal (No leakage).

NG →	REPAIR HYDRAULIC CIRCUIT (SEE PAGE 32-14)
-------------	--

OK

3 READ VALUE OF HAND-HELD TESTER (ACCUMULATOR PRESSURE SENSOR)

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
 (c) Select "DATA LIST" mode on the hand-held tester.

Item	Measurement Item/Range (Display)	Normal Condition	Diagnostic Note
ACC PRESS SENS	Accumulator pressure sensor reading/min.: 0 V, max.: 5 V	3.58 to 5 V	If the value is constant regardless of pump operation, accumulator pressure sensor malfunction is suspected

- (d) Check that the accumulator's output value is normal.

OK:

Accumulator pressure sensor value is normal.

NG

**REPLACE MASTER CYLINDER SOLENOID
(SEE PAGE 32-23)**

OK

4 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
 (b) Check if the same DTC is detected (see page 05-757).

Result:

DTC is output	A
DTC is not output	B

B

END

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1257/57	POWER SUPPLY DRIVE CIRCUIT MALFUNCTION
------------	-----------------	---

CIRCUIT DESCRIPTION

Refer to DTC C1251/51 on page 05-826.

DTC No.	DTC Detection Condition	Trouble Area
C1257/57	Open in motor system circuit (motor input circuit).	Hydraulic brake booster pump motor circuit

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page 05-734).

1 CHECK PUMP MOTOR OPERATION

- Turn the ignition switch off.
- Disconnect the skid control ECU (S37) connector.
- Depress the brake pedal more than 20 times.
- Turn the ignition switch to the ON position.
- Check the pump motor operation.

OK:

The pump motor operates normally.

NG

REPLACE MASTER CYLINDER SOLENOID (See page 32-23)

OK

2 RECONFIRM DTC

- Turn the ignition switch off.
- Reconnect the skid control ECU connector.
- Turn the ignition switch to the ON position.
- Clear the DTC (See page 05-757).
- Check if the same DTC is detected (See page 05-757).

Result:

DTC is output	A
DTC is not output	B

B

END

A

REPLACE MASTER CYLINDER SOLENOID (See page 32-23)

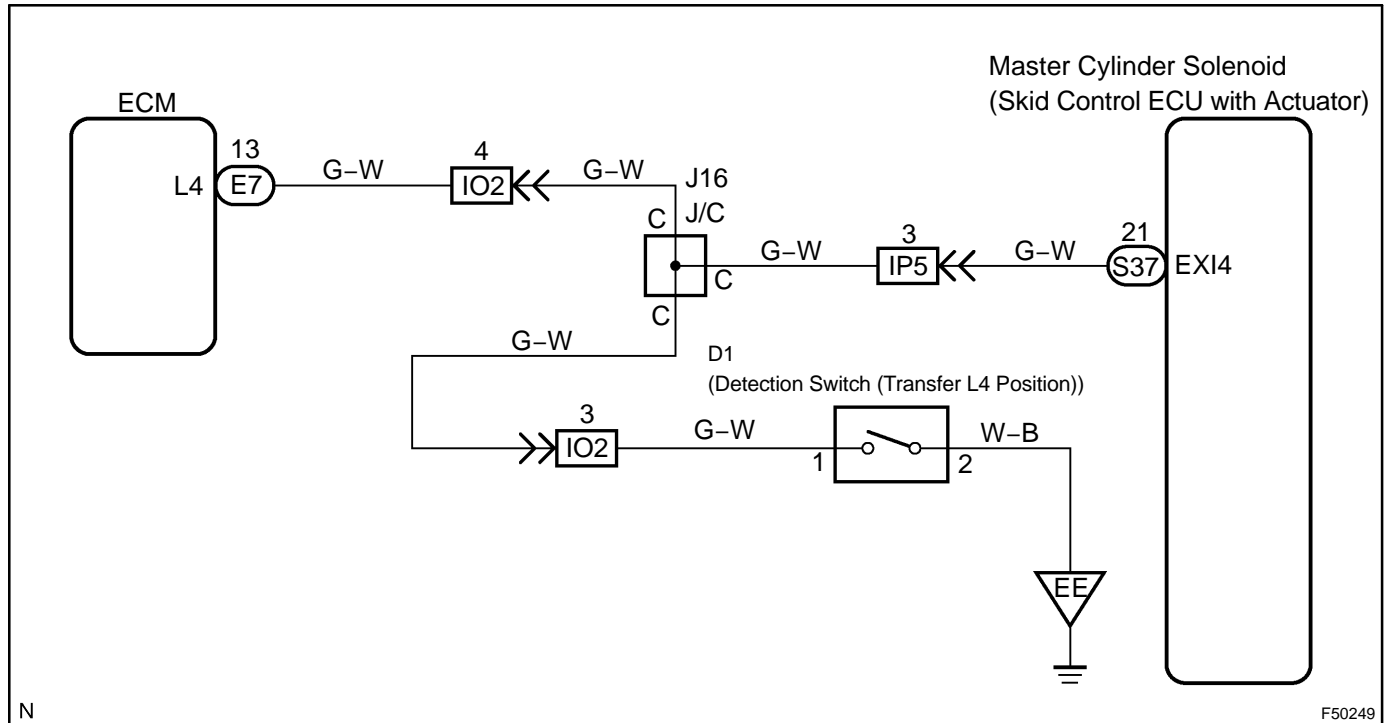
DTC	C1268/68	L4 SIGNAL PICKUP MALFUNCTION
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CIRCUIT DESCRIPTION

After confirming that the transfer is in the L4 position, A-TRAC and DAC will be activated according to the vehicle conditions (see page 05-720).

DTC No.	DTC Detection Condition	Trouble Area
C1268/68	The L4 signal input to the ECU does not match the L4 signal output from the ECM	<ul style="list-style-type: none"> • Transfer indicator (L4) switch • Transfer indicator (L4) switch circuit

WIRING DIAGRAM



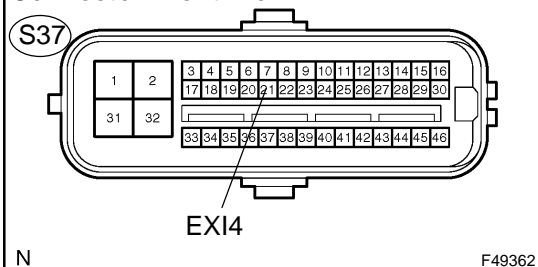
INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT SKID CONTROL ECU (EXI4 TERMINAL VOLTAGE)

Skid Control ECU (Wire Harness Side) Connector Front View:



- Disconnect the skid control ECU connector.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-21 (EXI4) - Body ground	Transfer indicator switch ON (Shift L4 position)	Below 1.5 V
S37-21 (EXI4) - Body ground	Transfer indicator switch OFF (Any shift position except L4)	8 to 14 V

NG → Go to step 4

OK

2 PERFORM TEST MODE (SIGNAL CHECK) (SEE PAGE 05-738)

- Reconnect the skid control ECU connector.
- Check test mode (signal check) DTC is detected.

Result:

Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output (When troubleshooting in accordance with the DTC CHART.)	B
Test mode (signal check) DTC is not output (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	C

B → REPAIR OR REPLACE HARNESS OR CONNECTOR (L4 CIRCUIT)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)

A

3 RECONFIRM DTC

- (a) Clear the DTC (see page 05-757).
- (b) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

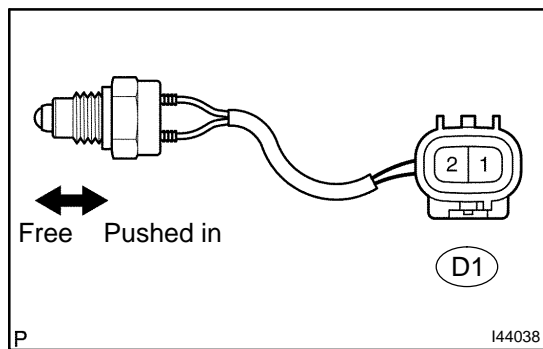
DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

4 INSPECT TRANSFER INDICATOR SWITCH



- (a) Disconnect the transfer indicator (L4) switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

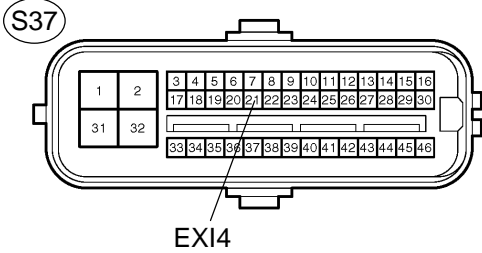
Tester Connection	Condition	Specified Condition
D1-1 - D1-2	Switch pin pushed in	Below 1 Ω
D1-1 - D1-2	Switch pin free	10 kΩ or higher

NG → **REPLACE TRANSFER INDICATOR SWITCH**

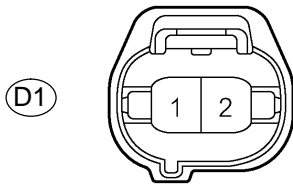
OK

5 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU, BODY GROUND AND TRANSFER INDICATOR SWITCH) (SEE PAGE 01-36)

**Skid Control ECU (Wire Harness Side)
Connector Front View:**



**Transfer Indicator (L4) Switch (Wire Harness Side)
Connector Front View:**



F49362
I44031

I45333

(a) Measure the resistance according to the value(s) in the table below.

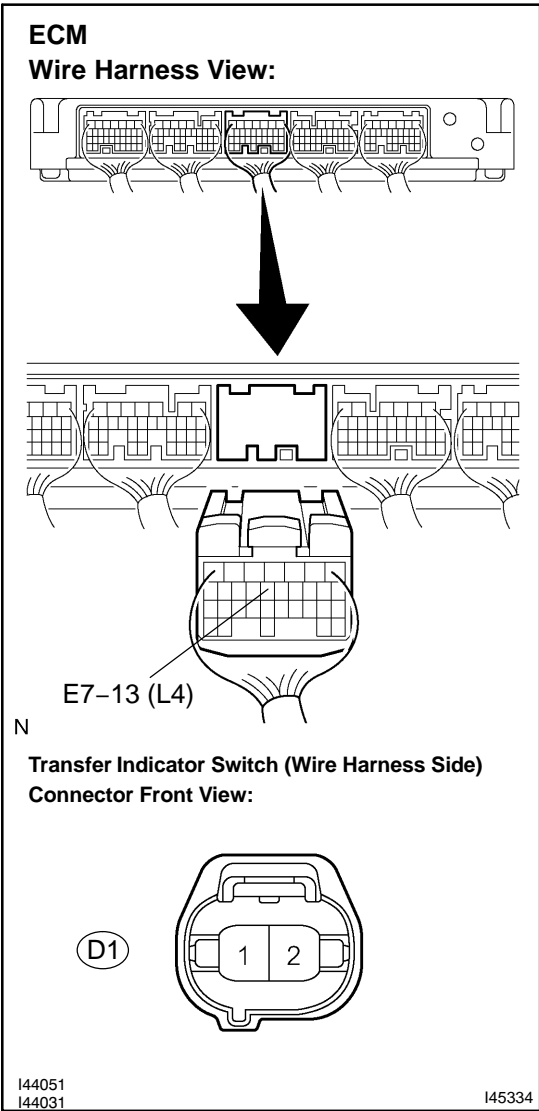
Standard:

Tester Connection	Specified Condition
S37-21 (EX14) - D1-1	Below 1 Ω
S37-21 (EX14) - Body ground	10 kΩ or higher
D1-2 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (EX14 CIRCUIT)

OK

6 CHECK HARNESS AND CONNECTOR (BETWEEN ECM AND TRANSFER INDICATOR SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the ECM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
E7-13 (L4) - D1-1	Below 1 Ω
E7-13 (L4) - Body ground	10 kΩ or higher

Result:

OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-750)**

C → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

A

END

DTC	C1337/37	DIFFERENT DIAMETER TIRE MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

The skid control ECU measures the speed of each wheel by receiving signals from the speed sensor. These signals are used for recognizing that all 4 wheels are operating properly. Therefore, all wheel signals must be equal.

DTC No.	DTC Detection Condition	Trouble Area
C1337/37	When either of the following conditions is detected: <ul style="list-style-type: none"> • Diameter is different between the 2 front wheels and the 2 rear wheels. • Wheel speed sensor fault. 	<ul style="list-style-type: none"> • Tire size • Speed sensor • Speed sensor rotor • Speed sensor circuit

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 CHECK TIRE SIZE

- (a) Check tire size and condition of all 4 wheels.

NG

REPLACE TIRES SO THAT ALL 4 TIRES ARE SAME IN SIZE

OK

2 INSPECT SPEED SENSOR ROTOR

- (a) Check the front speed sensor circuit (see page 05-771) and rear speed sensor circuit (see page 05-779).

NG

REPLACE SPEED SENSOR ROTOR
 Front: (SEE PAGE 30-28)
 Rear: (SEE PAGE 30-38)

OK

3 INSPECT SPEED SENSOR

- (a) Check the front speed sensor circuit (see page 05-771) and rear speed sensor circuit (see page 05-779).

NG

REPLACE SPEED SENSOR
 Front: (SEE PAGE 32-48)
 Rear: (SEE PAGE 32-50)

OK

4	CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND SPEED SENSOR) (SEE PAGE 01-36)
----------	---

- (a) Check the front speed sensor circuit (see page 05-771) and rear speed sensor circuit (see page 05-779).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (SPEED SENSOR CIRCUIT)

OK

5	RECONFIRM DTC
----------	----------------------

- (a) Clear the DTCs (see page 05-757).
 (b) Drive the vehicle at a speed of approximately 20 mph (32 km/h) or more for 60 seconds or more.
 (c) Check if the same pending DTCs are detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

DTC is output	A
DTC is not output	B

B

END

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)
--

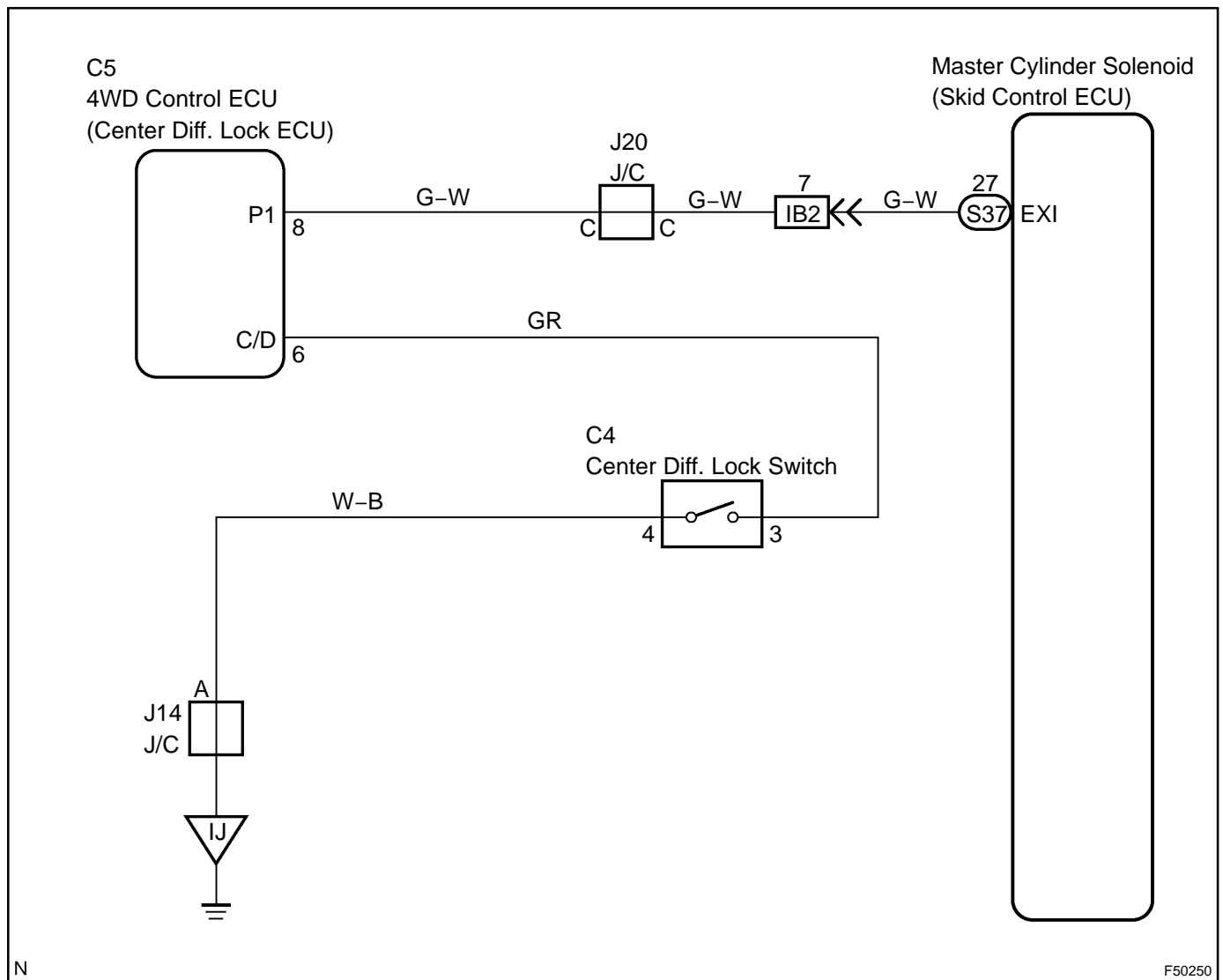
DTC	C1340/47	OPEN CIRCUIT IN CENTER DIFFERENTIAL LOCK SIGNAL (DURING CENTER DIFFERENTIAL LOCK ON)
------------	-----------------	---

CIRCUIT DESCRIPTION

When the center differential is locked, VSC control turns off and the VSC OFF indicator illuminates.

DTC No.	DTC Detection Condition	Trouble Area
C1340/47	When the terminal IG1 voltage is between 10 and 14 V, there is an open in the center differential lock circuit for 2 seconds or more.	<ul style="list-style-type: none"> Center diff. lock switch Center diff. lock switch circuit 4WD control ECU

WIRING DIAGRAM



N

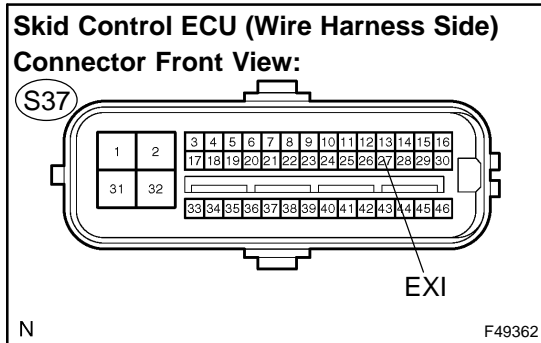
F50250

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT SKID CONTROL ECU (EXI TERMINAL VOLTAGE)



- (a) Set the vehicle in the center differential locked state using the center differential lock switch.
- (b) Disconnect the skid control ECU connector.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-27 (EXI) - Body ground	Center diff. locked (center diff. lock switch ON)	Below 1.5 V

- (e) Connect the skid control ECU connector.
- (f) Set the vehicle in the center differential free state using the center differential lock switch.
- (g) Disconnect the skid control ECU connector.
- (h) Turn the ignition switch to the ON position.
- (i) Measure the voltage according to the value(s) in the table below.

Standard:

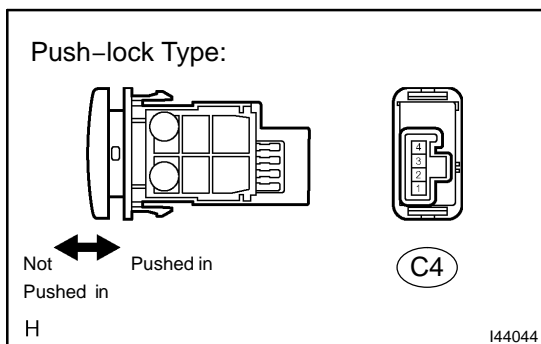
Tester Connection	Condition	Specified Condition
S37-27 (EXI) - Body ground	Center diff. free (center diff. lock switch OFF)	10 to 14 V

NG → Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 INSPECT CENTER DIFFERENTIAL LOCK SWITCH



- (a) Disconnect the center diff. lock switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
C4-3 - C4-4	Switch is pushed in	Below 1 Ω
C4-3 - C4-4	Switch is not pushed in	10 kΩ or higher

NG → REPLACE CENTER DIFFERENTIAL LOCK SWITCH

OK

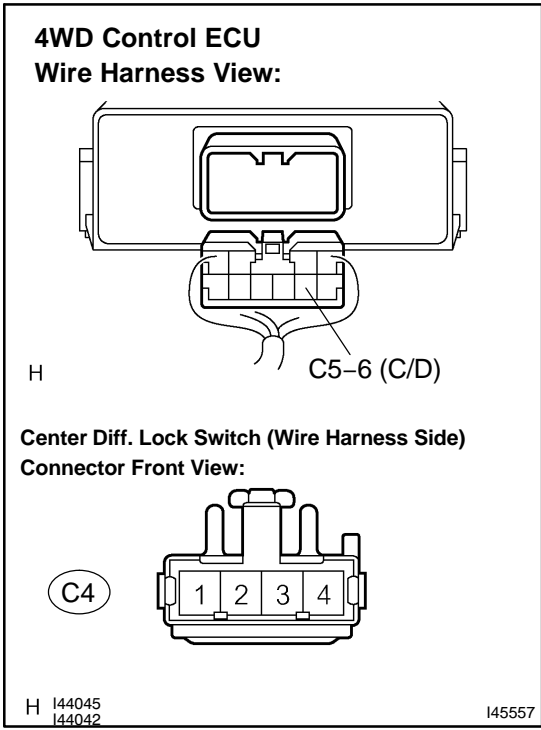
3 INSPECT FOUR WHEEL DRIVE CONTROL ECU

(a) Check the center diff. lock system (see page 31-38).

NG → **REPLACE FOUR WHEEL DRIVE CONTROL ECU**

OK

4 CHECK HARNESS AND CONNECTOR (BETWEEN FOUR WHEEL DRIVE CONTROL ECU, BODY GROUND AND CENTER DIFFERENTIAL LOCK SWITCH) (SEE PAGE 01-36)



- (a) Disconnect the 4WD control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

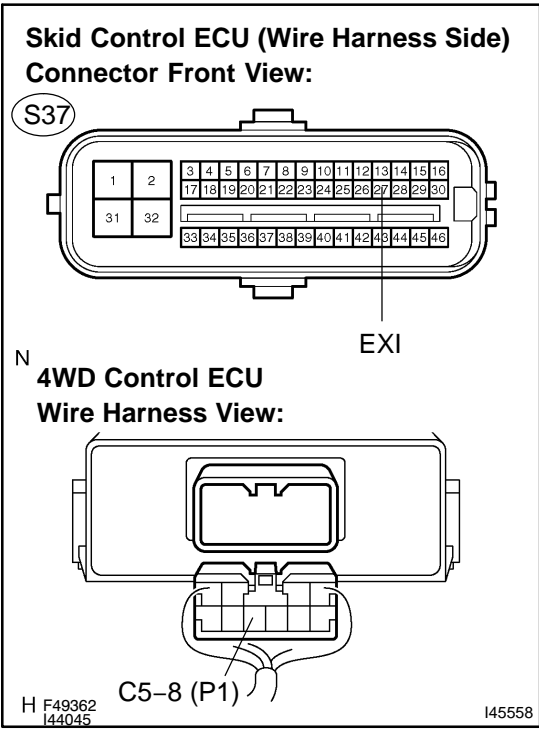
Standard:

Tester Connection	Specified Condition
C5-6 (C/D) - C4-3	Below 1 Ω
C5-6 (C/D) - Body ground	10 kΩ or higher
C4-4 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND FOUR WHEEL DRIVE CONTROL ECU) (SEE PAGE 01-36)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-27 (EXI) - C5-8 (P1)	Below 1 Ω
S37-27 (EXI) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

DTC	C1380/64	MALFUNCTION IN STOP LIGHT RELAY SYSTEM
------------	-----------------	---

CIRCUIT DESCRIPTION

Upon receiving the DAC or HAC operating signal from the skid control ECU, the relay contact turns on and the stop light comes on.

DTC No.	DTC Detection Condition	Trouble Area
C1380/64	<ul style="list-style-type: none"> When the voltage at the IG1 terminal is between 10 V and 14 V and the stop light driving output (STPO) is on, a signal has not been input to the STP terminal for 5 sec. or more. When the voltage at the IG1 terminal is between 10 V and 14 V and stop light driving output (STPO) is off, the input signal at the STP is different from the input signal at the STP2 for 5 sec. or more. 	<ul style="list-style-type: none"> Stop light operation relay Stop light operation relay circuit

WIRING DIAGRAM

Refer to DTC C1249/49 on page [05-821](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page [05-734](#)).

HINT:

After steps 1, 2 and 3 are completed, start the inspection from step 4 when using the hand-held tester and start from step 5 when not using the hand-held tester.

1	CHECK STOP LIGHT SWITCH OPERATION
----------	--

- (a) Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

OK:

Stop light switch function is normal.

NG

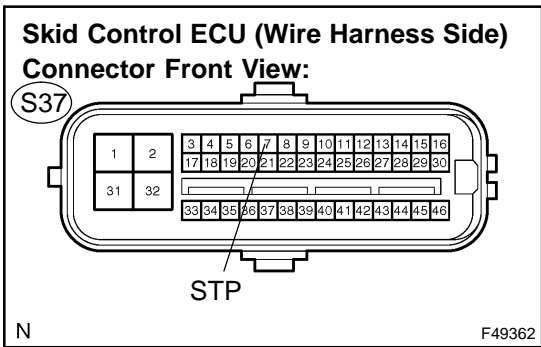
Go to step 9

HINT:

Check the stop light bulb as it may have burnt out.

OK

2 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the voltage according to the value(s) in the table below.

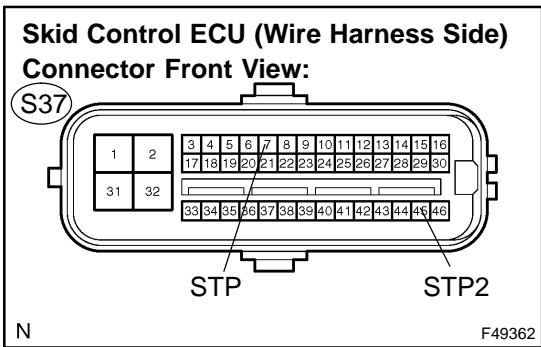
Standard:

Tester Connection	Condition	Specified Condition
S37-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
S37-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STP CIRCUIT)

OK

3 INSPECT SKID CONTROL ECU (STP2 TERMINAL)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-7 (STP) - S37-45 (STP2)	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STP2 CIRCUIT)

OK

4 PERFORM ACTIVE TEST BY HAND-HELD TESTER (STOP LIGHT OPERATION RELAY)

- (a) Reconnect the skid control ECU connector.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- (d) Select "ACTIVE TEST" mode on the hand-held tester.

Item	Vehicle Condition/Test Details	Diagnostic Note
STP LIGHT RELAY	Turns stop light operation relay ON/OFF	Observe rear combination lamp (Does not come on for 5 sec. or more)

- (e) Check that "ON" and "OFF" of the stop light can be shown on the rear combination lamp by the hand-held tester.

OK:

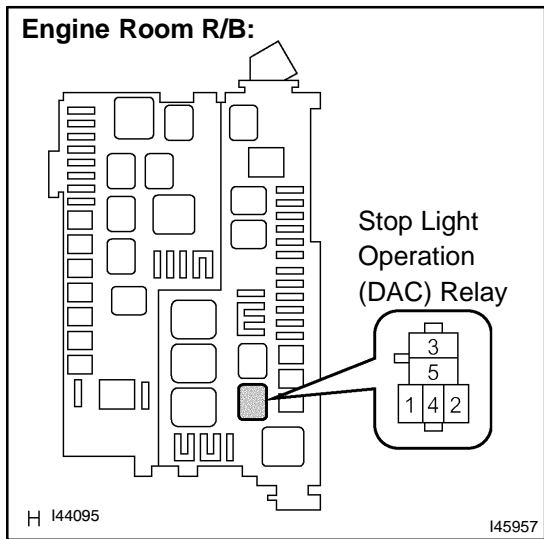
The stop light turns on or off in accordance with the hand-held tester.

NG → Go to step 5

OK

Go to step 8

5 INSPECT STOP LIGHT OPERATION RELAY (POWER SOURCE TERMINAL VOLTAGE)



- (a) Remove the stop light operation (DAC) relay.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

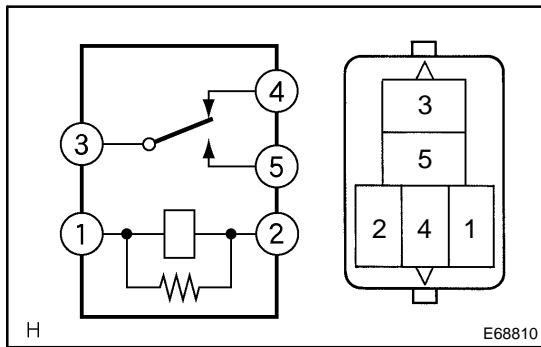
Standard:

Tester Connection	Condition	Specified Condition
1 - Body ground	IG switch ON	8 to 14 V
5 - Body ground	IG switch ON	8 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

6 INSPECT STOP LIGHT OPERATION RELAY (DAC RELAY)



(a) Measure the resistance according to the value(s) in the table below.

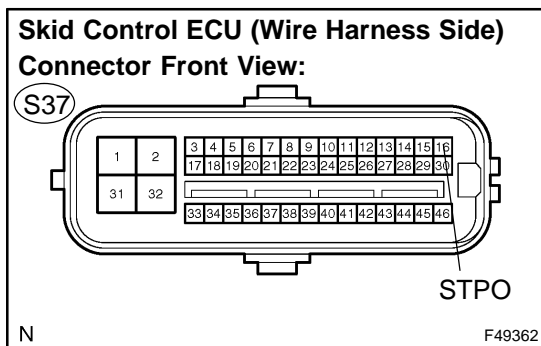
Standard:

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 kΩ or higher
3 - 4	10 kΩ or higher (When battery positive voltage is applied to terminal 1 and battery negative voltage to terminal 2.)
3 - 5	Below 1 Ω (When battery positive voltage is applied to terminal 1 and battery negative voltage to terminal 2.)

NG → **REPLACE STOP LIGHT OPERATION RELAY (DAC RELAY)**

OK

7 INSPECT SKID CONTROL ECU (STPO TERMINAL VOLTAGE)



(a) Install the stop light operation (DAC) relay.
 (b) Disconnect the skid control ECU connector.
 (c) Turn the ignition switch to the ON position.
 (d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-16 (STPO) - Body ground	IG switch ON	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STPO CIRCUIT)**

OK

8 RECONFIRM DTC

(a) Clear the DTC (see page 05-757).
 (b) Check if the same DTC is detected (see page 05-757).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result:

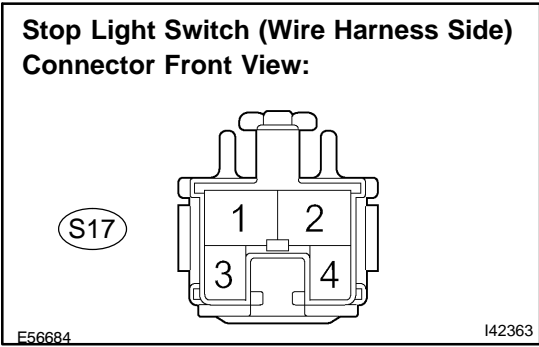
DTC is output	A
DTC is not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

9 INSPECT STOP LIGHT SWITCH ASSY (POWER SOURCE TERMINAL VOLTAGE)



- (a) Disconnect the stop light switch connector.
- (b) Measure the voltage according to the value(s) in the table below.

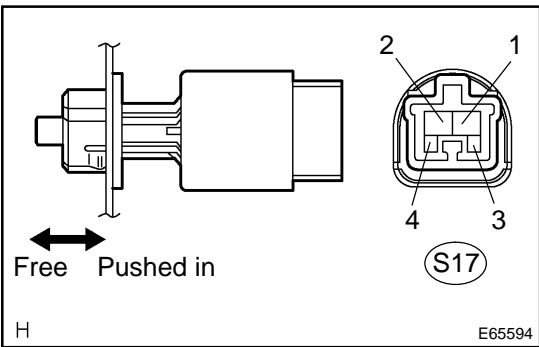
Standard:

Tester Connection	Condition	Specified Condition
S17-2 - Body ground	Always	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

10 INSPECT STOP LIGHT SWITCH ASSY



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

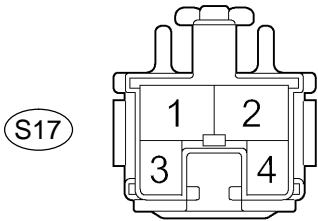
Tester Connection	Condition	Specified Condition
S17-1 - S17-2	Switch pin free	Below 1 Ω
S17-1 - S17-2	Switch pin pushed in	10 kΩ or higher

NG REPLACE STOP LIGHT SWITCH ASSY

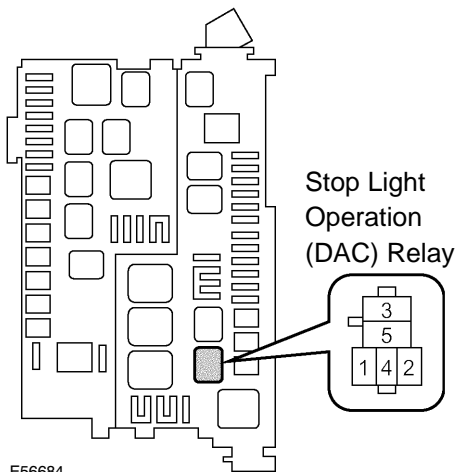
OK

11 CHECK HARNESS AND CONNECTOR (BETWEEN STOP LIGHT SWITCH AND STOP LIGHT OPERATION RELAY) (SEE PAGE 01-36)

**Stop Light Switch (Wire Harness Side)
Connector Front View:**



Engine Room R/B:



H E56684
I45957

I45946

- (a) Remove the stop light operation (DAC) relay.
- (b) Measure the resistance according to the value(s) in the table below.

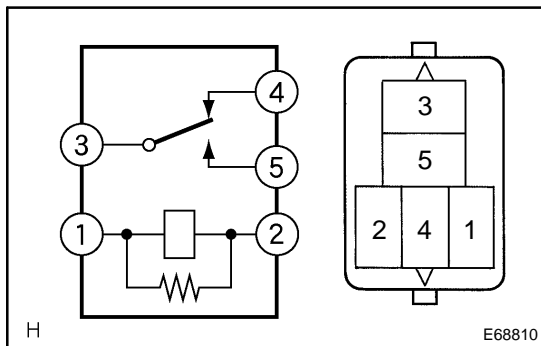
Standard:

Tester Connection	Specified Condition
S17-1 - Stop light operation (DAC) relay 4	Below 1 Ω
S17-1 - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

12 INSPECT STOP LIGHT OPERATION RELAY (DAC RELAY)



H

E68810

- (a) Measure the resistance according to the value(s) in the table below.

Standard:

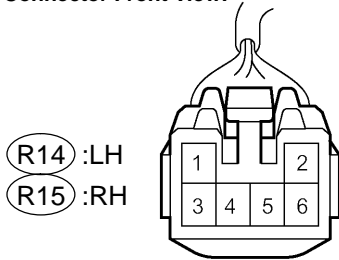
Tester Connection	Specified Condition
3 - 4	Below 1 Ω

NG REPLACE STOP LIGHT OPERATION RELAY (DAC RELAY)

OK

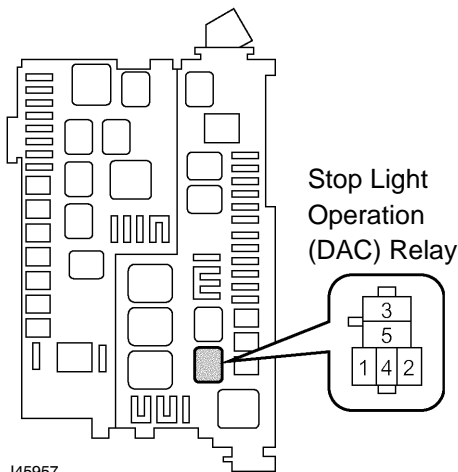
13 CHECK HARNESS AND CONNECTOR (BETWEEN REAR COMBINATION LAMP, BODY GROUND AND STOP LIGHT OPERATION RELAY) (SEE PAGE 01-36)

Rear Combination Lamp (Wire Harness Side)
Connector Front View:



H

Engine Room R/B:



H I45957
I44094

I45947

- (a) Disconnect the rear combination lamp connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

LH:

Tester Connection	Specified Condition
R14-6 - Stop light operation (DAC) relay 3	Below 1 Ω
R14-6 - Body ground	10 kΩ or higher
R14-5 - Body ground	Below 1 Ω

RH:

Tester Connection	Specified Condition
R15-3 - Stop light operation (DAC) relay 3	Below 1 Ω
R15-3 - Body ground	10 kΩ or higher
R15-5 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CIRCUIT)

OK

END

ABS WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

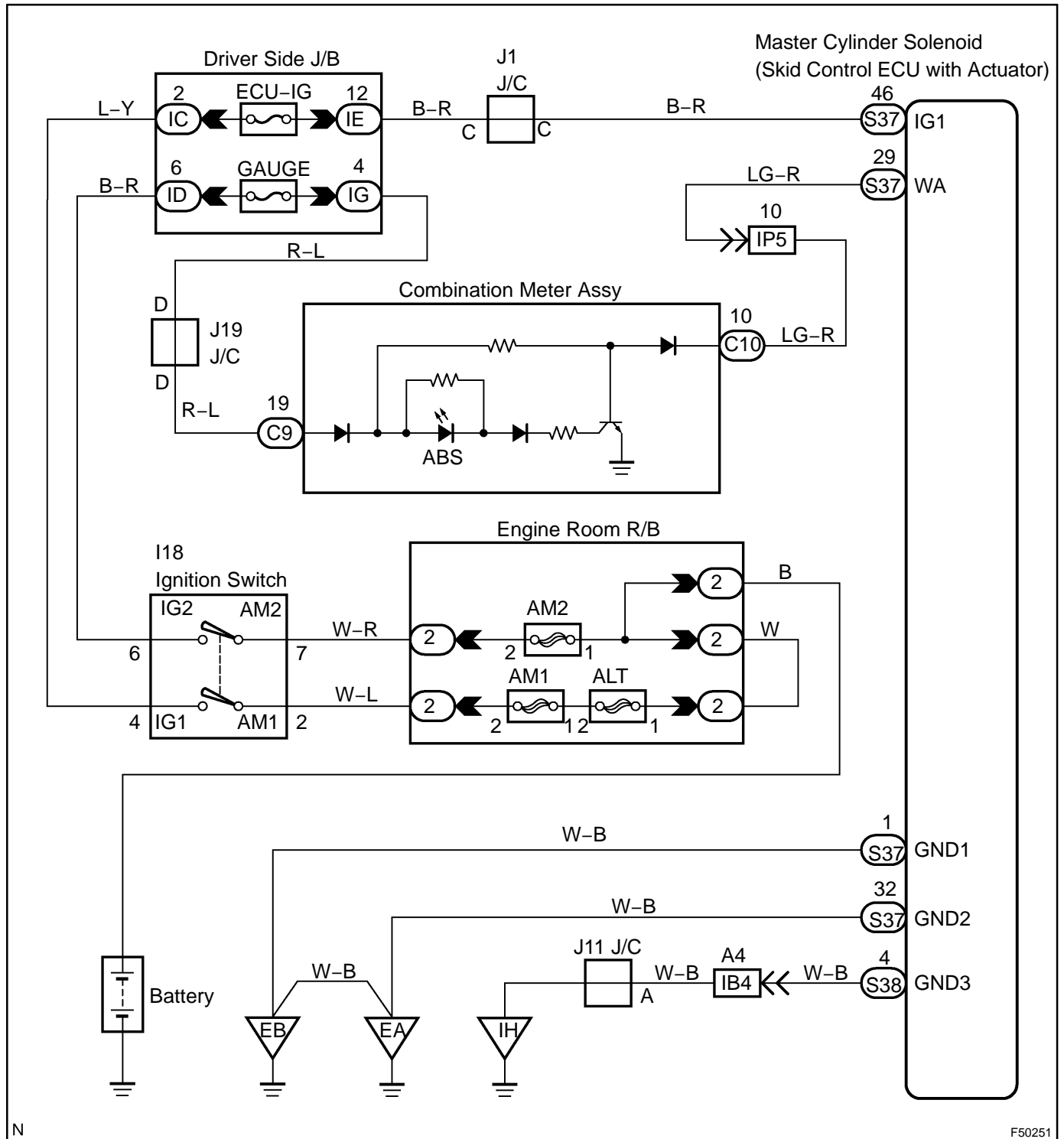
If any of the following is detected, the ABS warning light remains on.

- The skid control ECU connectors are disconnected from the skid control ECU.
- There is a malfunction in the skid control ECU internal circuit.
- There is an open in the harness between the combination meter and skid control ECU.

HINT:

There is a case that the hand-held tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



N

F50251

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

- (a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

2 INSPECT BATTERY

- (a) Check the battery voltage.

Standard:

Voltage: 11 to 14 V

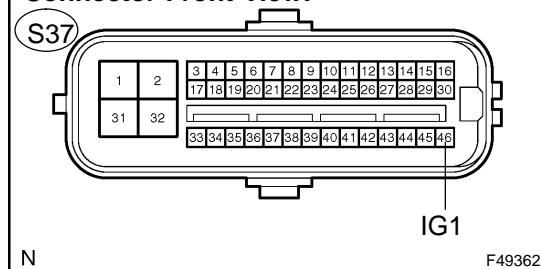
NG

GO TO CHARGING SYSTEM
(SEE PAGE 19-13)

OK

3 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

Skid Control ECU (Wire Harness Side) Connector Front View:



- (a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

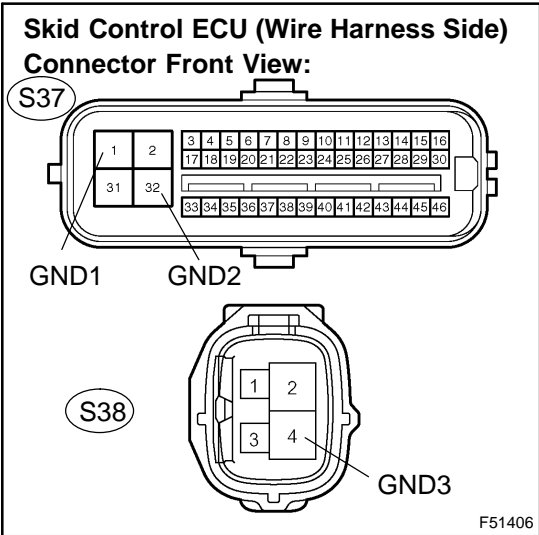
Tester Connection	Condition	Specified Condition
S37-46 (IG1) - Body ground	IG switch ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK

4 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



- (a) Disconnect the skid control ECU (S38) connector.
- (b) Measure the resistance according to the value(s) in the table below.

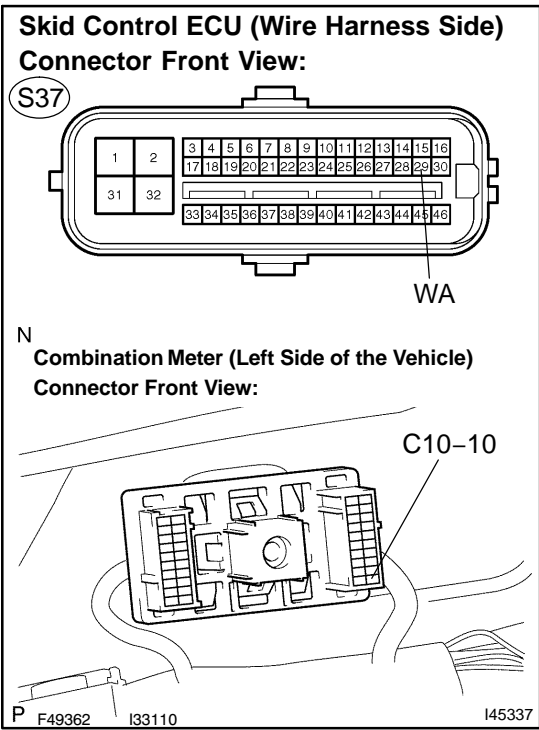
Standard:

Tester Connection	Specified Condition
S37-1 (GND1) - Body ground	Below 1 Ω
S37-32 (GND2) - Body ground	Below 1 Ω
S38-4 (GND3) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

5 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-29 (WA) - C10-10	Below 1 Ω
S37-29 (WA) - Body ground	10kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (WA CIRCUIT)

OK

6 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE [32-23](#))**

ABS WARNING LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-858.

WIRING DIAGRAM

See page 05-858.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT ABS WARNING LIGHT

- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch to the ON position.
- (c) Check that the ABS warning light comes on.

OK:

ABS warning light comes on.

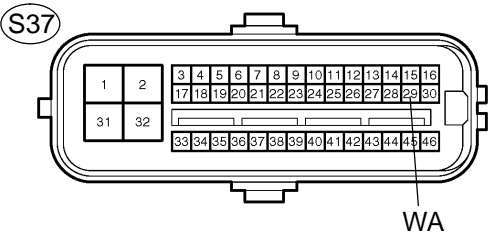
NG Go to step 2

OK

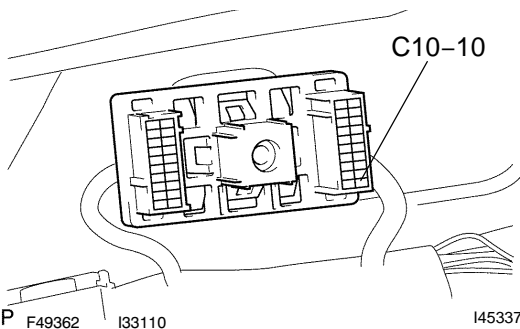
REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)

Skid Control ECU (Wire Harness Side) Connector Front View:



Combination Meter (Left Side of the Vehicle) Connector Front View:



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-29 (WA) - C10-10	Below 1 Ω
S37-29 (WA) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (WA CIRCUIT)

OK

3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

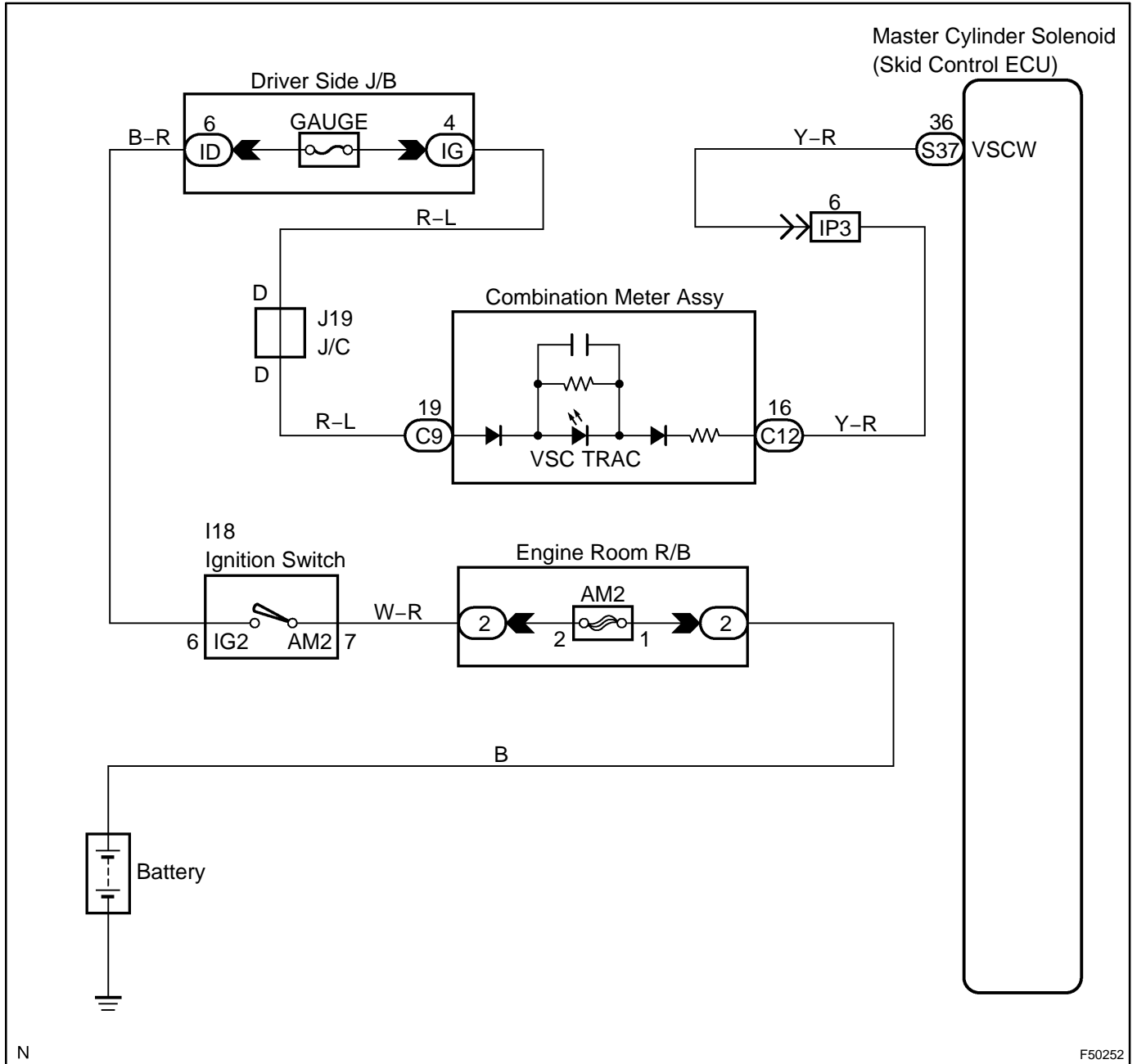
NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****END**

VSC TRAC WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

If the skid control ECU stores DTCs to shut down VSC & TRAC operation, the VSC TRAC warning light comes on in the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

- (a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2 INSPECT BATTERY

- (a) Check the battery voltage.

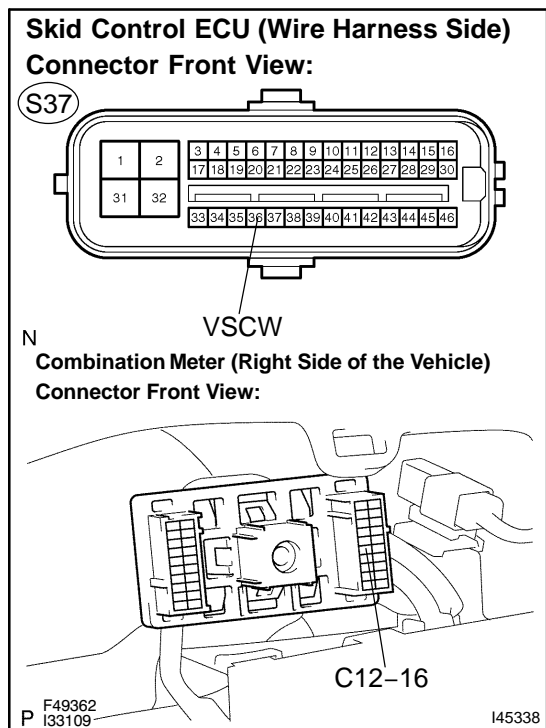
Standard:

Voltage: 11 to 14 V

NG → GO TO CHARGING SYSTEM (SEE PAGE 19-13)

OK

3 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the skid control ECU connector and combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-36 (VSCW) - C12-16	Below 1 Ω
S37-36 (VSCW) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (VSCW CIRCUIT)

OK

4 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE [32-23](#))**

VSC TRAC WARNING LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-865.

WIRING DIAGRAM

See page 05-865.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT VSC TRAC WARNING LIGHT

- (a) Disconnect the skid control ECU connector.
- (b) Ground terminal VSCW of the skid control ECU.
- (c) Turn the ignition switch to the ON position.
- (d) Check that the VSC TRAC warning light comes on.

OK:

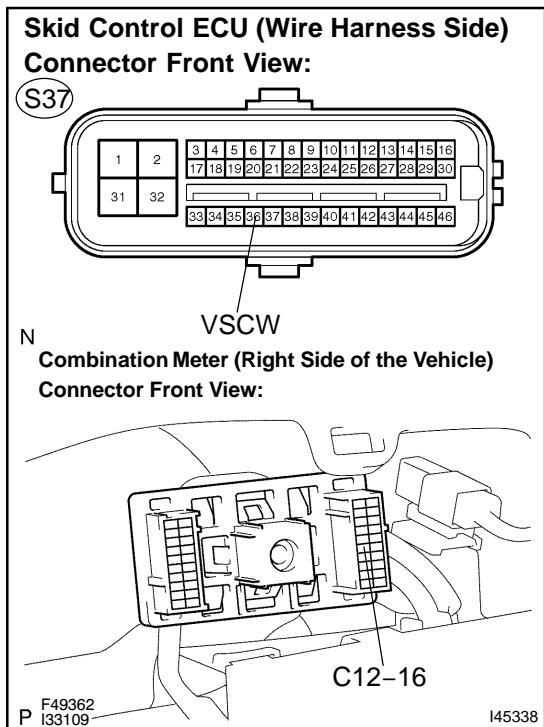
VSC TRAC warning light comes on.

NG → Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-36 (VSCW) - C12-16	Below 1 Ω
S37-36 (VSCW) - Body ground	10kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (VSCW CIRCUIT)

OK

3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

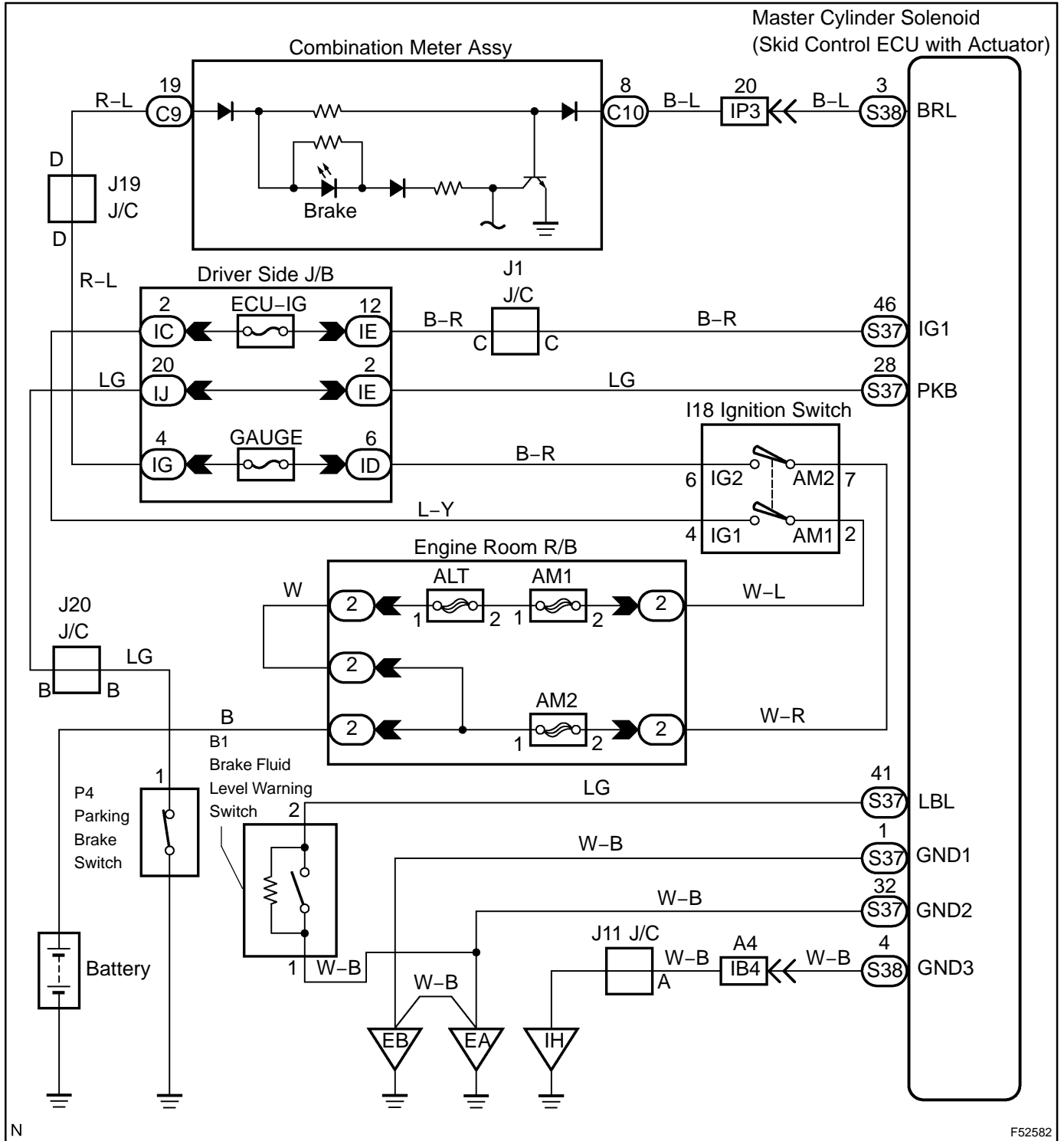
NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****END**

BRAKE WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

The brake warning light comes on when brake fluid is insufficient, the parking brake is applied or the EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 CHECK DTC

(a) Check the DTCs (see page 05-757).

Result:

DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT ACCORDING TO OUTPUT CODE (SEE PAGE 05-767)

A

2 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

3 INSPECT BATTERY

(a) Check the battery voltage.

Standard:

Voltage: 11 to 14 V

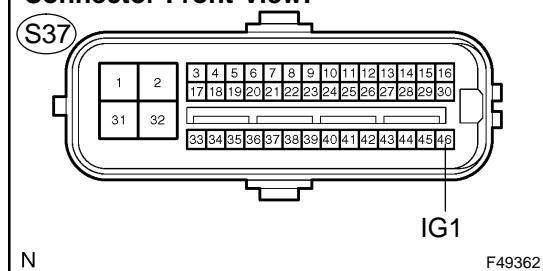
NG

GO TO CHARGING SYSTEM (SEE PAGE 19-13)

OK

4 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

Skid Control ECU (Wire Harness Side) Connector Front View:



- Disconnect the skid control ECU connector.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

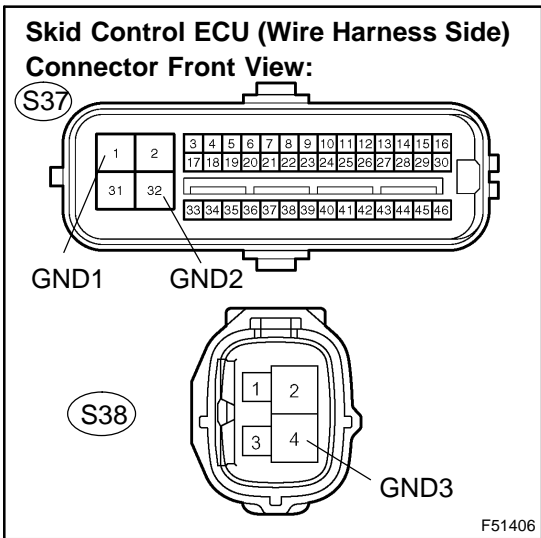
Tester Connection	Condition	Specified Condition
S37-46 (IG1) - Body ground	IG switch ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK

5 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



- (a) Disconnect the skid control ECU (S38) connector.
- (b) Measure the resistance according to the value(s) in the table below.

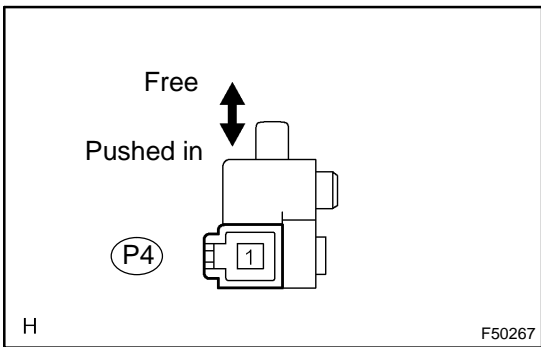
Standard:

Tester Connection	Specified Condition
S37-1 (GND1) - Body ground	Below 1 Ω
S37-32 (GND2) - Body ground	Below 1 Ω
S38-4 (GND3) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

6 INSPECT PARKING BRAKE SWITCH



- (a) Disconnect the parking brake switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

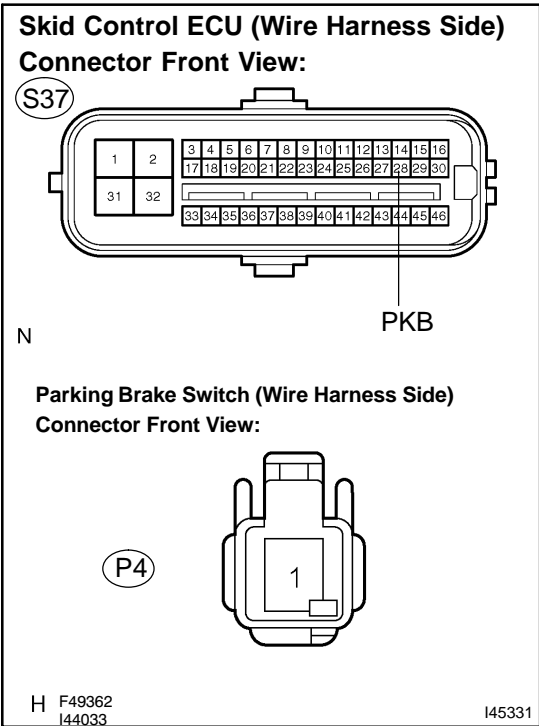
Standard:

Tester Connection	Condition	Specified Condition
P4-1 - Body ground	Parking brake switch ON (Switch pin free)	Below 1 Ω
P4-1 - Body ground	Parking brake switch OFF (Switch pin pushed in)	10 kΩ or higher

NG REPLACE PARKING BRAKE SWITCH

OK

7 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND PARKING BRAKE SWITCH) (SEE PAGE 01-36)



(a) Measure the resistance according to the value(s) in the table below.

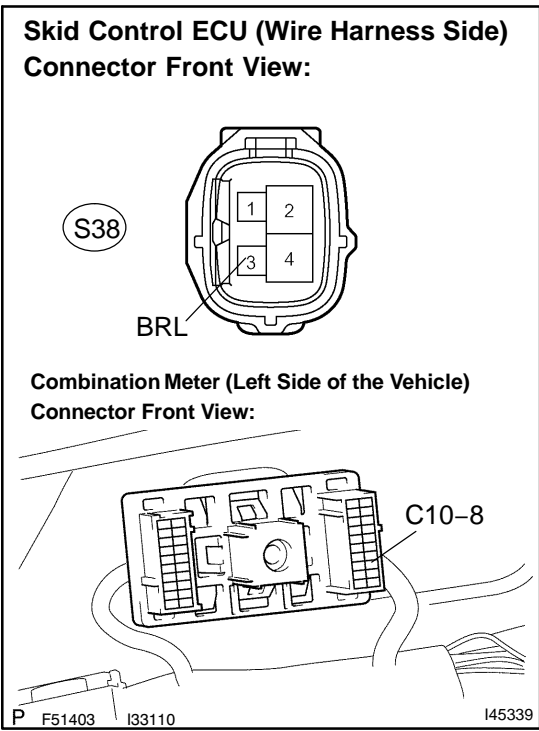
Standard:

Tester Connection	Specified Condition
S37-28 (PKB) - P4-1	Below 1 Ω
S37-28 (PKB) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (PKB CIRCUIT)

OK

8 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



(a) Disconnect the combination meter connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S38-3 (BRL) - C10-8	Below 1 Ω
S38-3 (BRL) - Body ground	10kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (BRL CIRCUIT)

OK

9 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE [32-23](#))**

BRAKE WARNING LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-870.

WIRING DIAGRAM

See page 05-870.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT BRAKE WARNING LIGHT

- (a) Disconnect the skid control ECU (S38) connector.
- (b) Turn the ignition switch to the ON position.
- (c) Check that the brake warning light comes on.

OK:

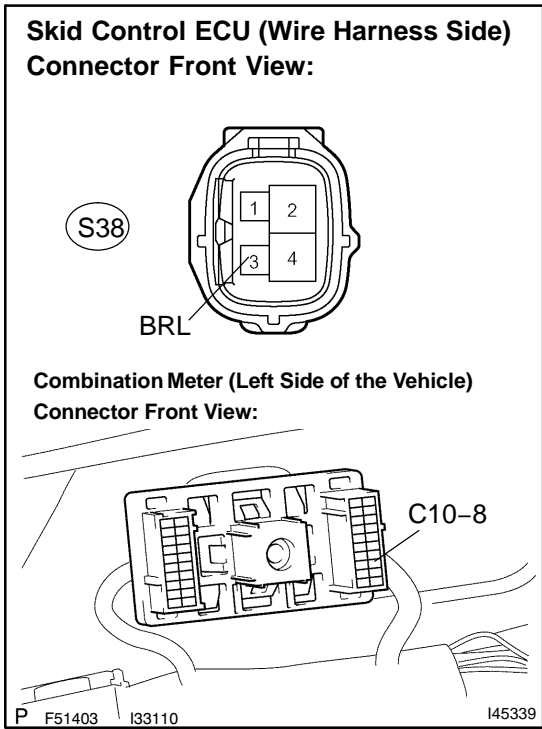
Brake warning light comes on.

NG Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-26)



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S38-3 (BRL) - C10-8	Below 1 Ω
S38-3 (BRL) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (BRL CIRCUIT)

OK

3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

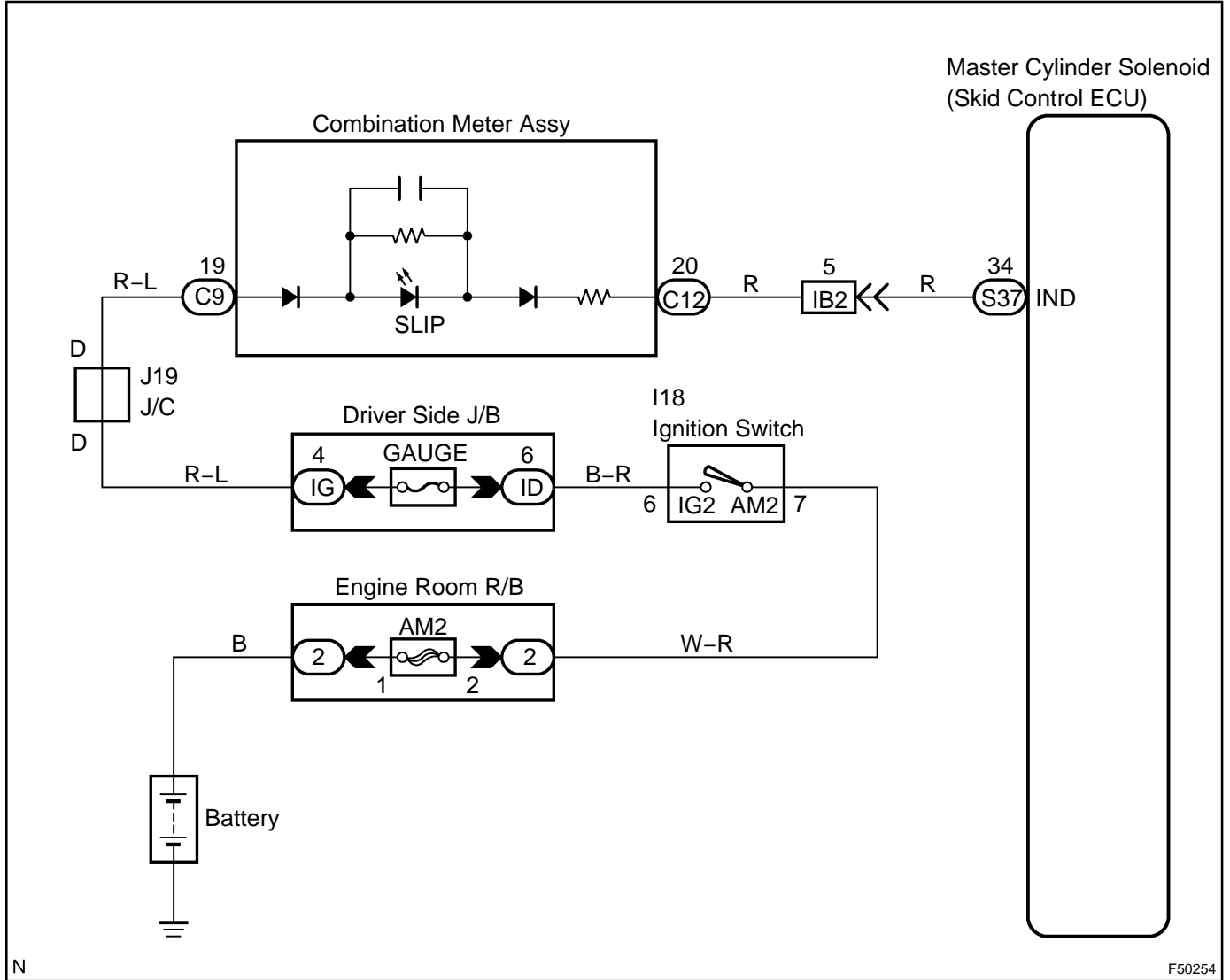
NG**REPLACE COMBINATION METER ASSY
(SEE PAGE xx-xxx)****OK****END**

SLIP INDICATOR LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

The SLIP indicator blinks during VSC, TRAC, A-TRAC, DAC or HAC operation. When the system fails, the slip indicator comes on to warn the driver (see page 05-755).

WIRING DIAGRAM



N

F50254

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

- (a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2 INSPECT BATTERY

- (a) Check the battery voltage.

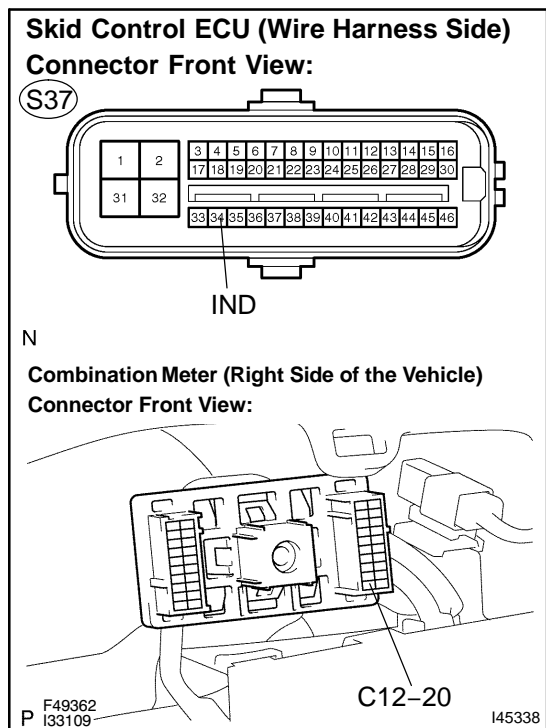
Standard:

Voltage: 11 to 14 V

NG → GO TO CHARGING SYSTEM (SEE PAGE 19-13)

OK

3 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the skid control ECU connector and combination meter connector.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-34 (IND) - C12-20	Below 1 Ω
S37-34 (IND) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (IND CIRCUIT)

OK

4 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****REPLACE MASTER CYLINDER SOLENOID (SEE PAGE [32-23](#))**

SLIP INDICATOR LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-877.

WIRING DIAGRAM

See page 05-877.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT SLIP INDICATOR LIGHT

- Disconnect the skid control ECU connector.
- Ground terminal IND of the skid control ECU.
- Turn the ignition switch to the ON position.
- Check that the SLIP indicator light comes on.

OK:

SLIP indicator light comes on.

NG

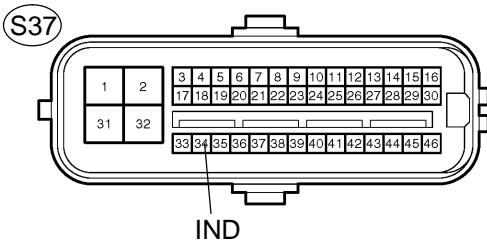
Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

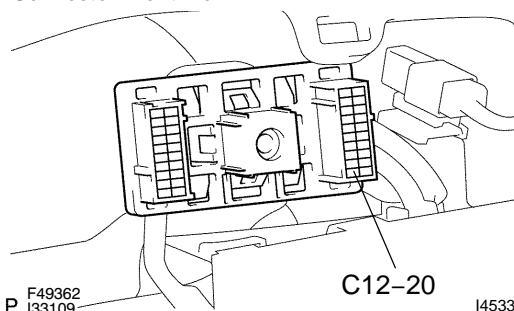
2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)

Skid Control ECU (Wire Harness Side) Connector Front View:



N

Combination Meter (Right Side of the Vehicle) Connector Front View:



- Disconnect the combination meter connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-34 (IND) - C12-20	Below 1 Ω
S37-34 (IND) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (IND CIRCUIT)

OK

3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

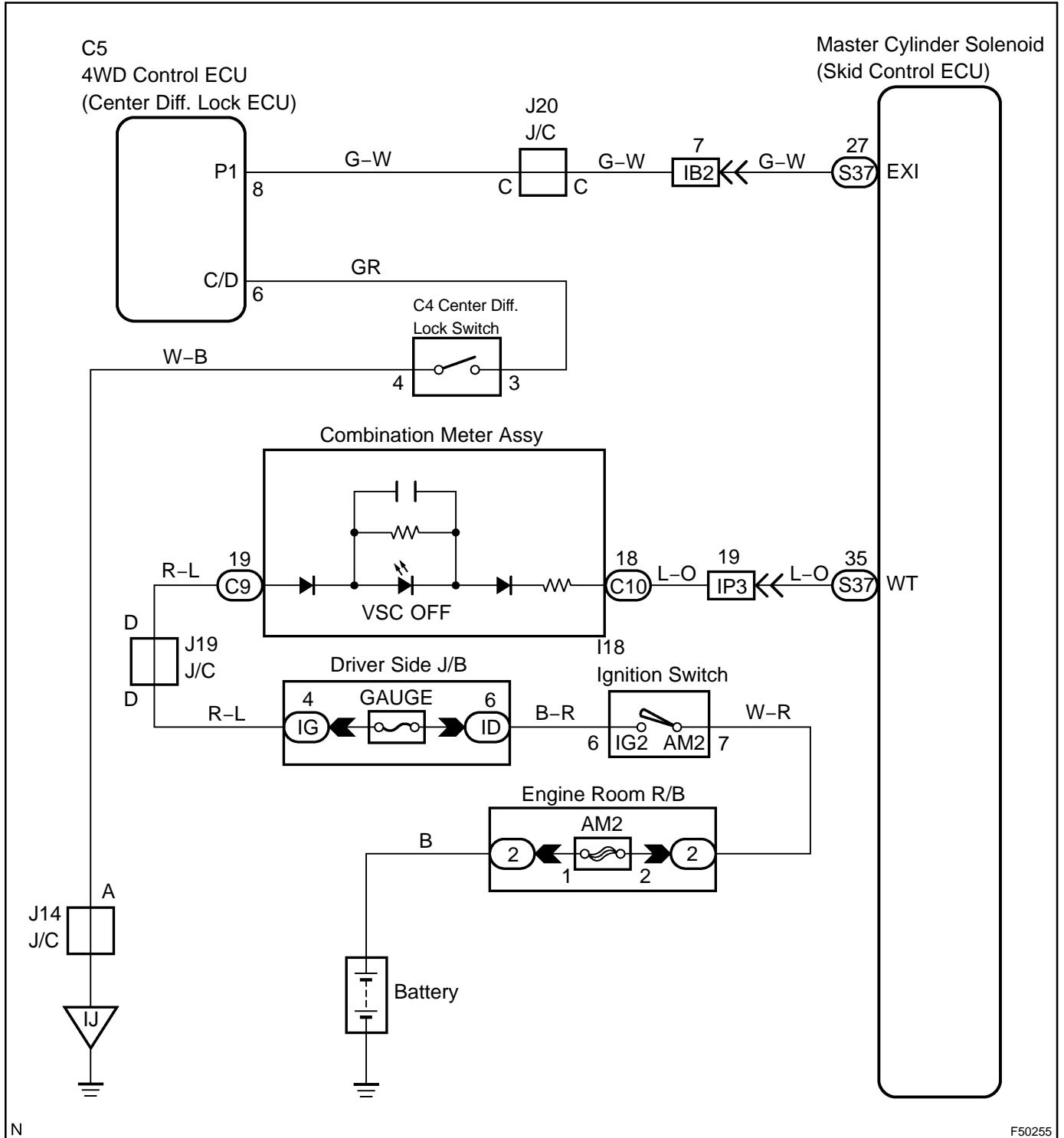
NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****END**

VSC OFF INDICATOR LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

When the center differential is locked, VSC control turns off and the VSC OFF indicator illuminates.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 CHECK DTC

(a) Check the DTCs (see page 05-757).

Result:

DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT ACCORDING TO OUTPUT CODE (SEE PAGE 05-767)

A

2 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

3 INSPECT BATTERY

(a) Check the battery voltage.

Standard:

Voltage: 11 to 14 V

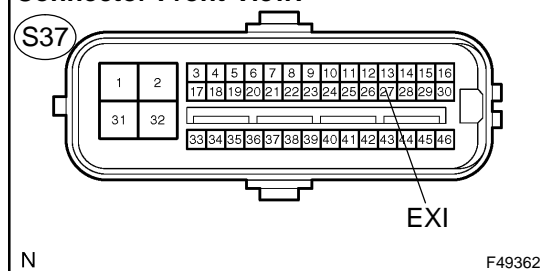
NG

GO TO CHARGING SYSTEM (SEE PAGE 19-13)

OK

4 INSPECT SKID CONTROL ECU (EXI TERMINAL VOLTAGE)

Skid Control ECU (Wire Harness Side) Connector Front View:



- Disconnect the skid control ECU connector.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-27 (EXI) - Body ground	Center diff. free (center diff. lock switch OFF)	10 to 14 V

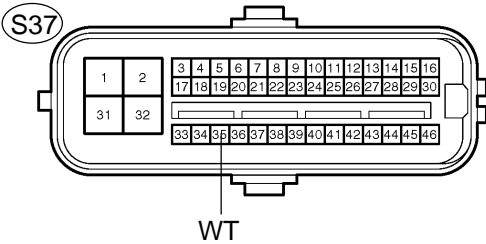
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (EXI CIRCUIT)

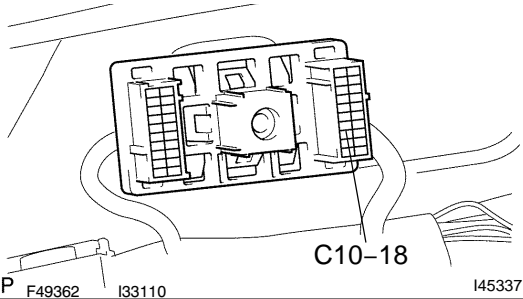
OK

5 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)

**Skid Control ECU (Wire Harness Side)
Connector Front View:**



**Combination Meter (Left Side of the Vehicle)
Connector Front View:**



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-35 (WT) - C10-18	Below 1 Ω
S37-35 (WT) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (WT CIRCUIT)

OK

6 INSPECT COMBINATION METER ASSY

- (a) Check the combination meter system (see page 05-2033).

NG REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

VSC OFF INDICATOR LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-882.

WIRING DIAGRAM

See page 05-882.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT VSC OFF INDICATOR LIGHT

- (a) Disconnect the skid control ECU connector.
- (b) Ground terminal WT of the skid control ECU.
- (c) Turn the ignition switch to the ON position.
- (d) Check that the VSC OFF indicator light comes on.

OK:

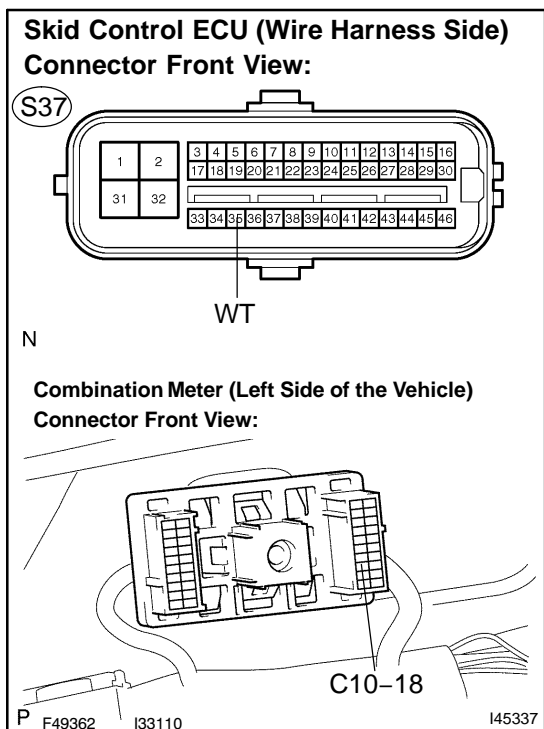
VSC OFF indicator light comes on.

NG → Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-35 (WT) - C10-18	Below 1 Ω
S37-35 (WT) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (WT CIRCUIT)

OK

3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page [05-2033](#)).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-24](#))****OK****END**

DAC INDICATOR LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

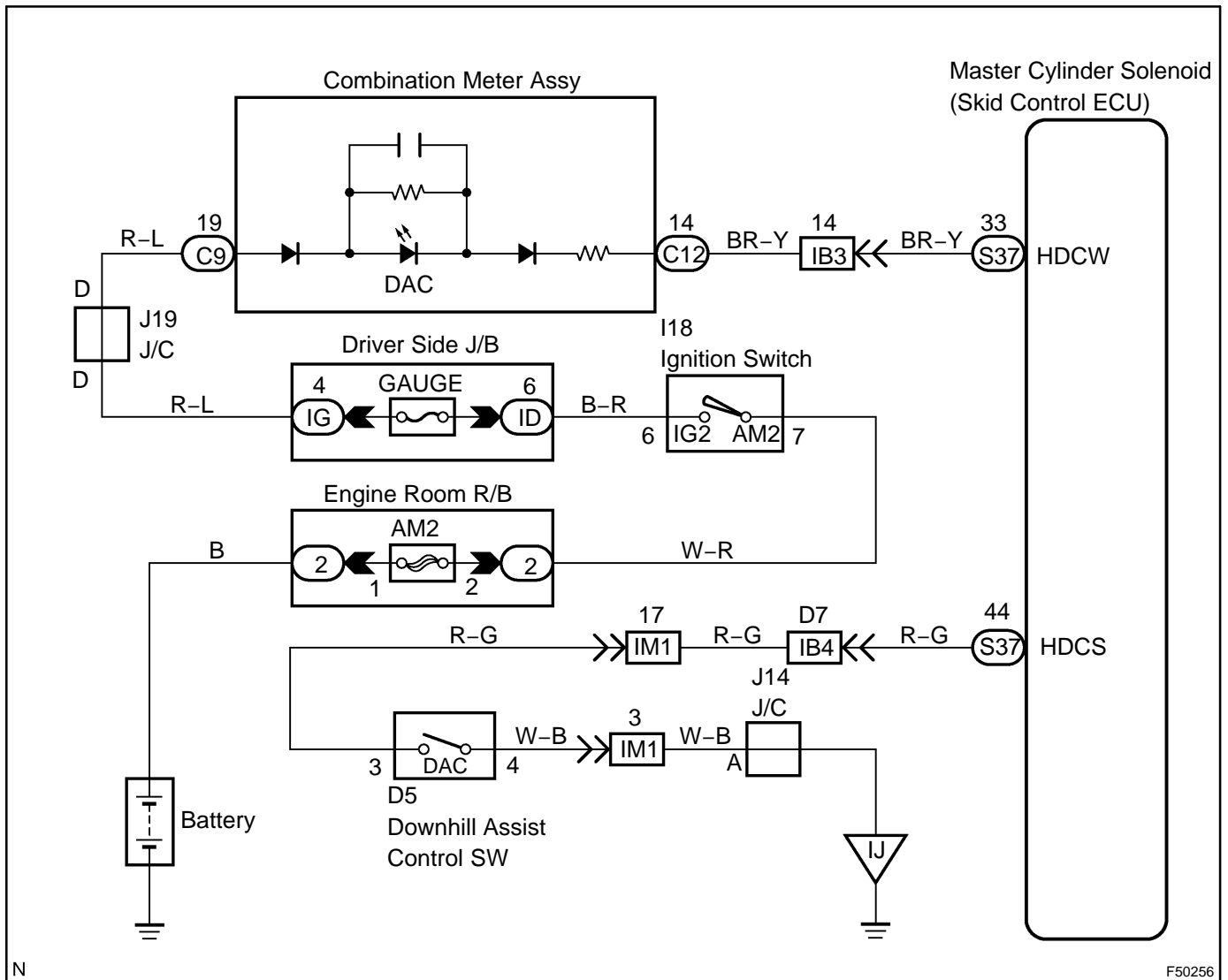
The DAC indicator light comes on when the downhill assist control is ready (see page 05-720).

HINT:

Even if the DAC switch is pressed, the DAC indicator light will blink and DAC will not be activated under the following conditions:

- The transfer indicator switch is in the H4 position.
- The ABS system is malfunctioning.
- Temperature of the hydraulic brake booster increases and DAC is temporarily canceled.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

- (a) Check the skid control ECU connector's connecting condition.

OK:

The connector is securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

2 INSPECT BATTERY

- (a) Check the battery voltage.

Standard:

Voltage: 11 to 14 V

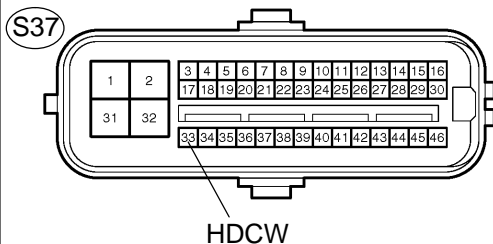
NG

GO TO CHARGING SYSTEM
(SEE PAGE 19-13)

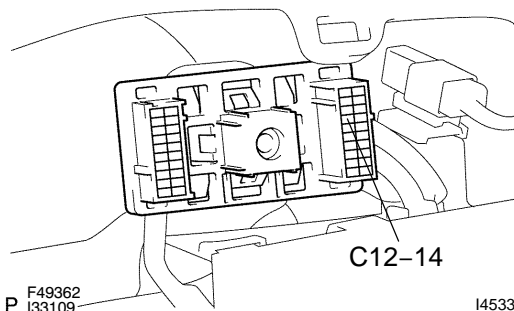
OK

3 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)

Skid Control ECU (Wire Harness Side) Connector Front View:



Combination Meter (Right Side of the Vehicle) Connector Front View:



- (a) Disconnect the skid control ECU connector and combination meter connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-33 (HDCW) - C12-14	Below 1 Ω
S37-33 (HDCW) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (HDCW CIRCUIT)

OK

4 INSPECT COMBINATION METER ASSY

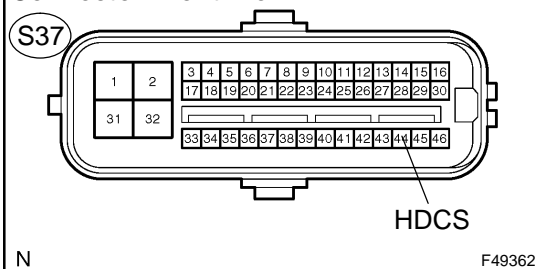
- (a) Check the combination meter system (see page 05-2033).

NG → **REPLACE COMBINATION METER ASSY
(SEE PAGE 71-24)**

OK

5 INSPECT SKID CONTROL ECU (HDCS TERMINAL)

Skid Control ECU (Wire Harness Side) Connector Front View:



- (a) Disconnect the skid control ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S37-44 (HDCS) - Body ground	DAC switch is not pushed in	10 kΩ or higher

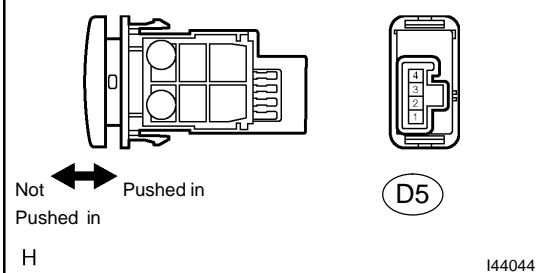
NG → **Go to step 6**

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

6 INSPECT DOWNHILL ASSIST CONTROL SWITCH

Push-lock Type:



- (a) Disconnect the DAC switch connector.
(b) Measure the resistance according to the value(s) in the table below.

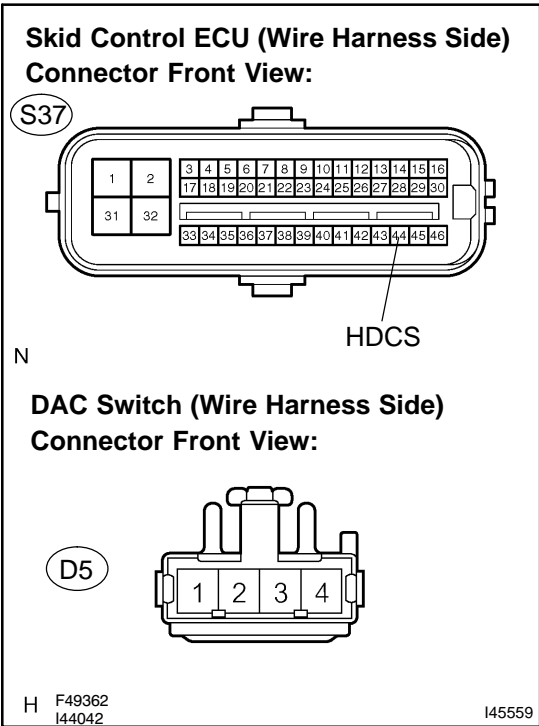
Standard:

Tester Connection	Condition	Specified Condition
D5-3 - D5-4	Switch is pushed in	Below 1 Ω
D5-3 - D5-4	Switch is not pushed in	10 kΩ or higher

NG → **REPLACE DOWNHILL ASSIST CONTROL
SWITCH**

OK

7 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU, BODY GROUND AND DOWNHILL ASSIST CONTROL SWITCH) (SEE PAGE 01-36)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-44 (HDCS) - D5-3	Below 1 Ω
S37-44 (HDCS) - Body ground	10 kΩ or higher
D5-4 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (HDCS CIRCUIT)

OK

END

DAC INDICATOR LIGHT CIRCUIT (DOES NOT COME ON)

CIRCUIT DESCRIPTION

See page 05-887.

WIRING DIAGRAM

See page 05-887.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT DAC INDICATOR LIGHT

- (a) Disconnect the skid control ECU connector.
- (b) Ground terminal HDCW of the skid control ECU.
- (c) Turn the ignition switch to the ON position.
- (d) Check that the DAC indicator light comes on.

OK:

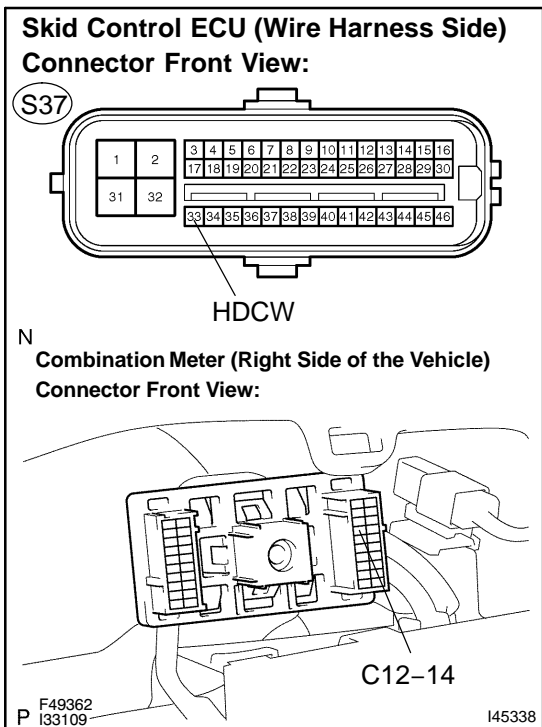
DAC indicator light comes on.

NG → Go to step 2

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

2 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND COMBINATION METER) (SEE PAGE 01-36)



- (a) Disconnect the combination meter connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-33 (HDCW) - C12-14	Below 1 Ω
S37-33 (HDCW) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (HDCW CIRCUIT)

OK

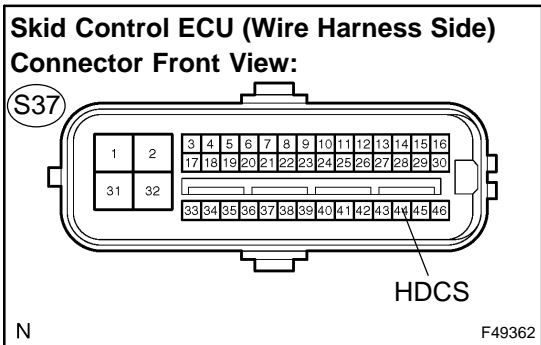
3 INSPECT COMBINATION METER ASSY

(a) Check the combination meter system (see page 05-2033).

NG → **REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)**

OK

4 INSPECT SKID CONTROL ECU (HDCS TERMINAL)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

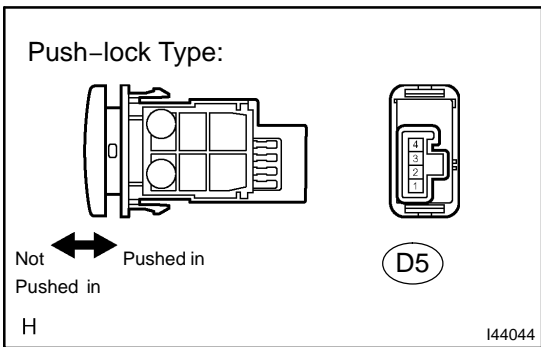
Tester Connection	Condition	Specified Condition
S37-44 (HDCS) - Body ground	DAC switch is pushed in	Below 1 Ω

NG → **Go to step 5**

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

5 INSPECT DOWNHILL ASSIST CONTROL SWITCH



- (a) Disconnect the DAC switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

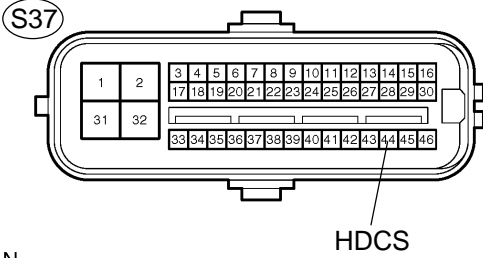
Tester Connection	Condition	Specified Condition
D5-3 - D5-4	Switch is pushed in	Below 1 Ω
D5-3 - D5-4	Switch is not pushed in	10 kΩ or higher

NG → **REPLACE DOWNHILL ASSIST CONTROL SWITCH**

OK

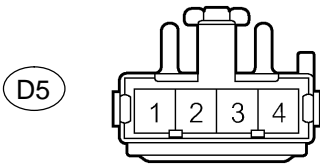
6 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU, BODY GROUND AND DOWNHILL ASSIST CONTROL SWITCH) (SEE PAGE 01-36)

**Skid Control ECU (Wire Harness Side)
Connector Front View:**



N

**DAC Switch (Wire Harness Side)
Connector Front View:**



H F49362
I44042

I45559

(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-44 (HDCS) - D5-3	Below 1 Ω
S37-44 (HDCS) - Body ground	10 kΩ or higher
D5-4 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (HDCS CIRCUIT)

OK

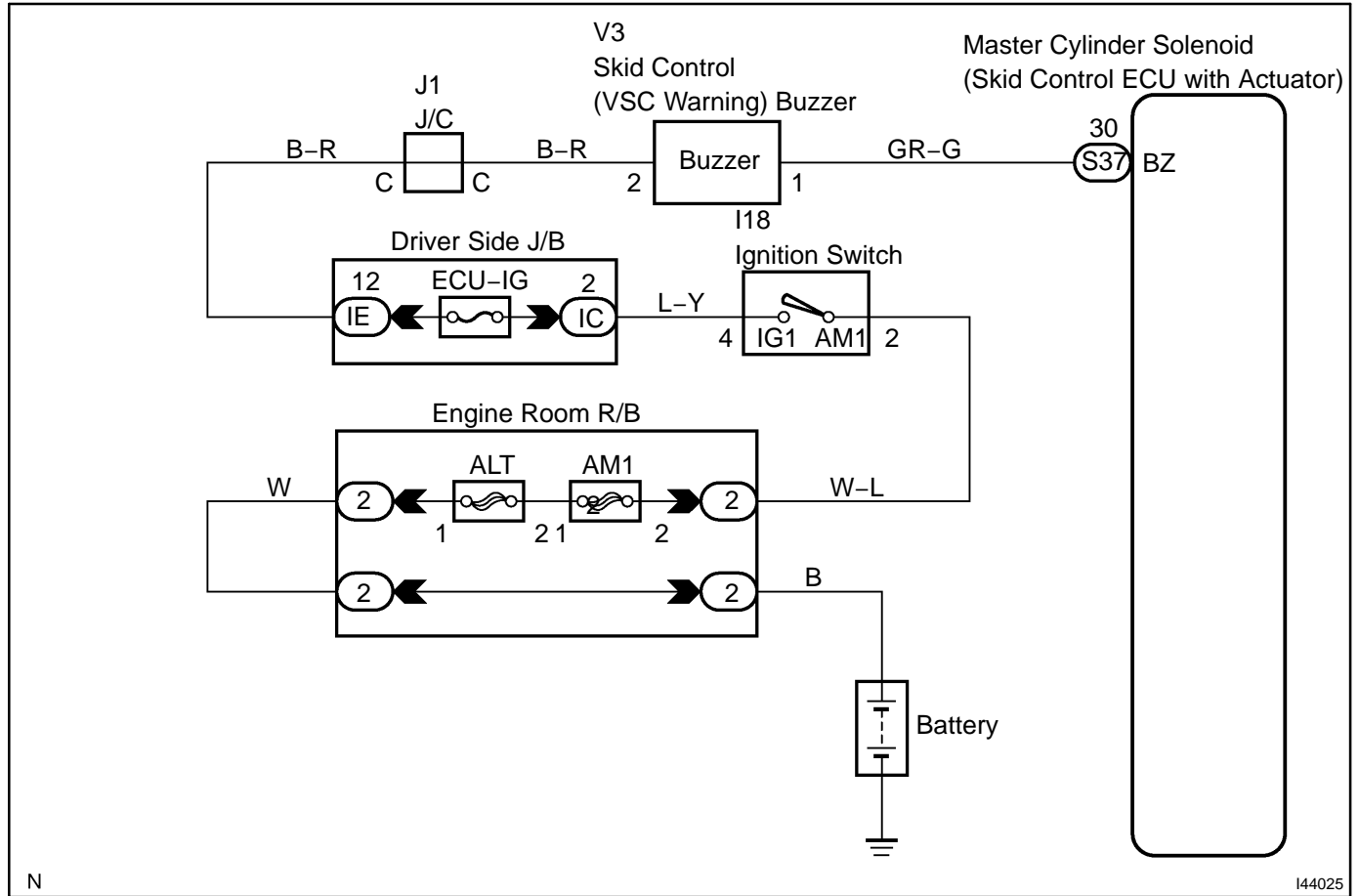
END

SKID CONTROL BUZZER CIRCUIT

CIRCUIT DESCRIPTION

The skid control buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs, and then VSC is activated.

WIRING DIAGRAM



N

I44025

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 | PERFORM ACTIVE TESTE BY HAND-HELD TESTER (SKID CONTROL BUZZER)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position and push the hand-held tester main switch ON.
- Select "ACTIVE TEST" mode on the hand-held tester.

Item	Vehicle Condition/Test Details	Diagnostic Note
VSC/BR WARN BUZ	Turns skid control buzzer ON/OFF	Buzzer can be heard

- Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the hand-held tester.

Result:

Buzzer sounds/stops	A
Buzzer does not sound or sounds constantly	B

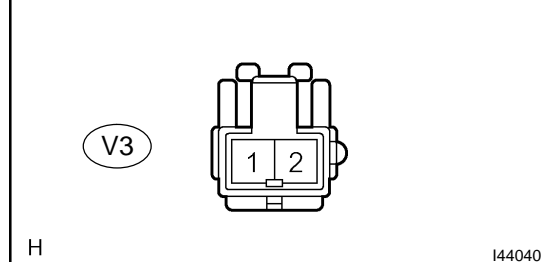
B → Go to step 2

A

END

2 | INSPECT SKID CONTROL BUZZER (POWER SOURCE TERMINAL VOLTAGE)

Skid Control Buzzer (Wire Harness Side) Connector Front View:



- Disconnect the skid control buzzer connector.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

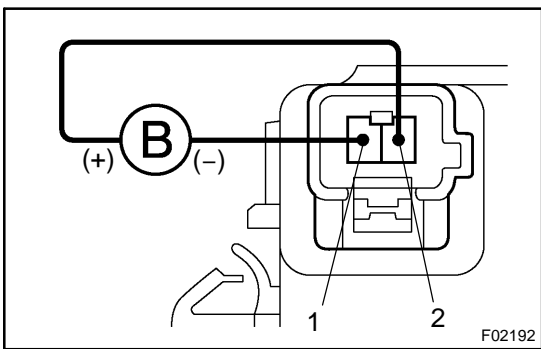
Standard:

Tester Connection	Condition	Specified Condition
V3-2 - Body ground	IG switch ON	10 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

3 INSPECT SKID CONTROL BUZZER



- (a) Apply battery negative voltage to terminal 1, and battery positive voltage to terminal 2 of the skid control buzzer, and then check that the buzzer sounds.

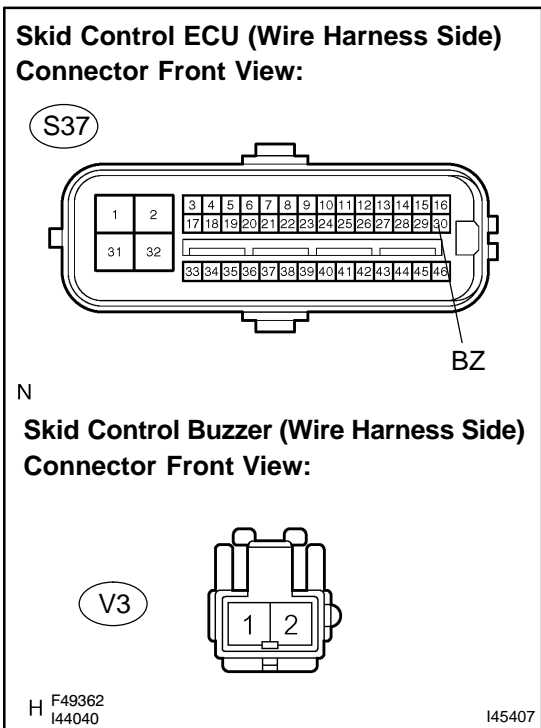
OK:

Skid control buzzer sounds.

NG → **REPLACE SKID CONTROL BUZZER**

OK

4 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND SKID CONTROL BUZZER) (SEE PAGE 01-36)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S37-30 (BZ) - V3-1	Below 1 Ω
S37-30 (BZ) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (BZ CIRCUIT)**

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

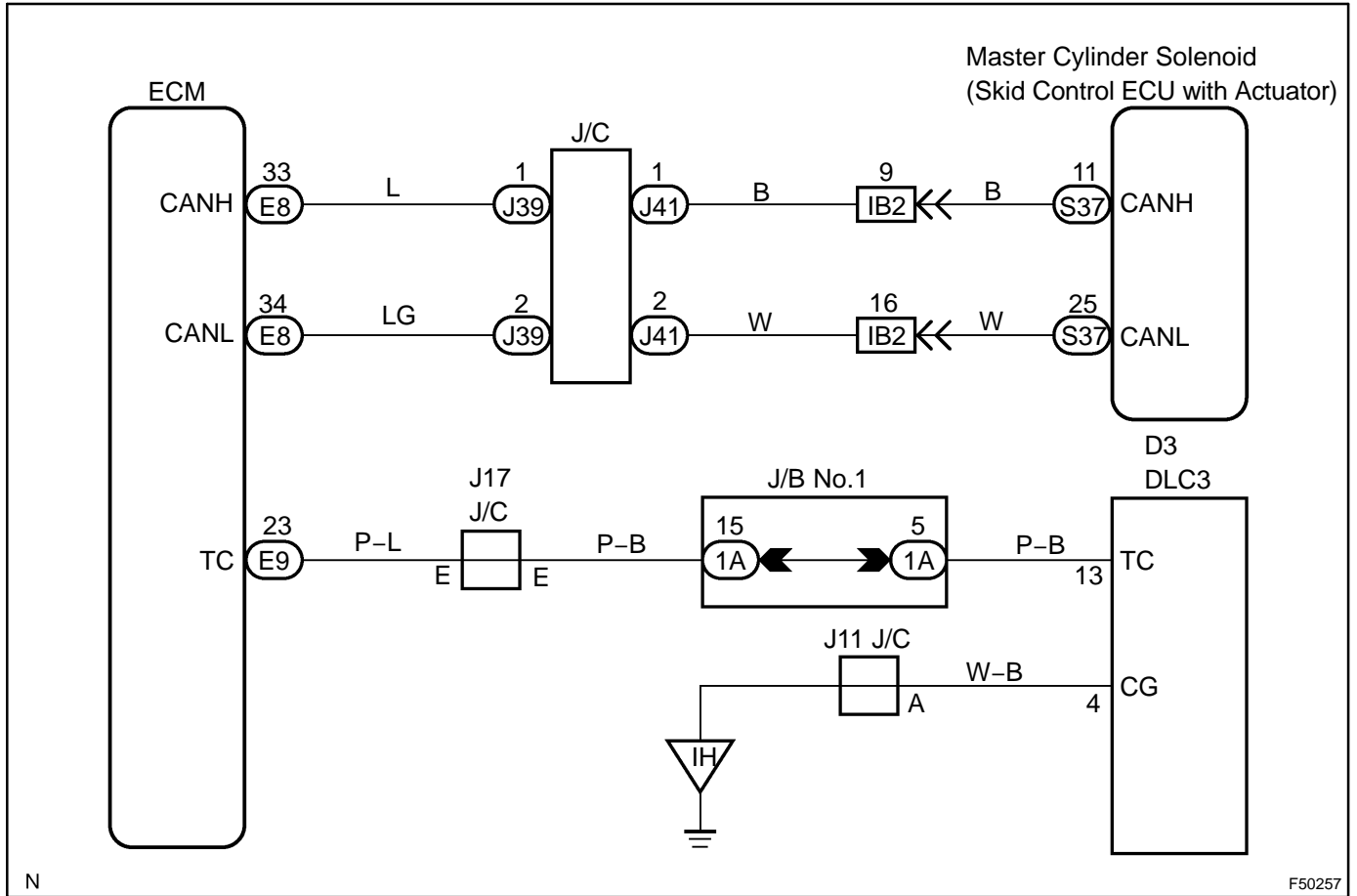
TC AND CG TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.

The DTCs are displayed by blinking the ABS warning light and VSC TRAC warning light.

WIRING DIAGRAM



HINT:

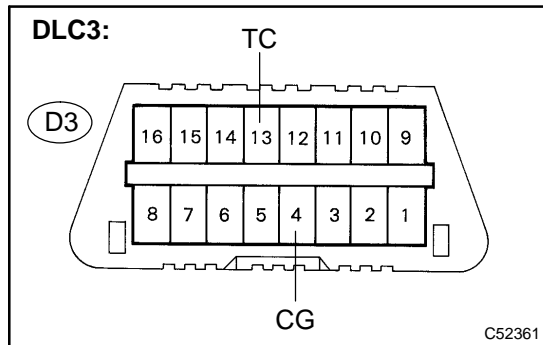
When each warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 INSPECT DLC3 (BETWEEN DLC3 (TC) AND DLC3 (CG))



- (a) Turn the ignition switch to the ON position.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
D3-13 (TC) - D3-4 (CG)	IG switch ON	10 to 14 V

NG → Go to step 3

OK

2 CHECK DTC (FOR CAN COMMUNICATION SYSTEM)

- (a) Check for CAN communication system DTC (see page 05-2320).

Result:

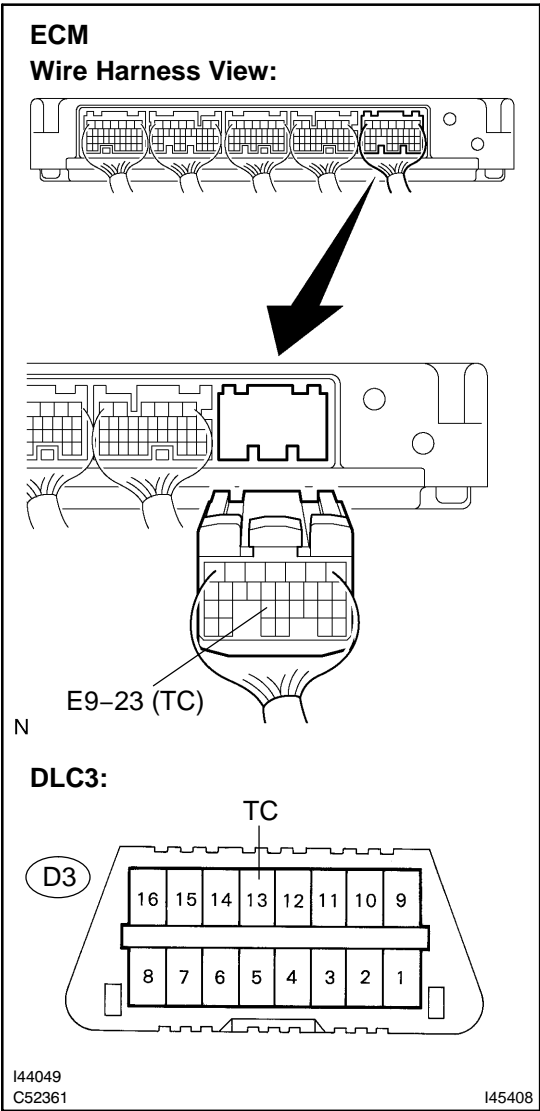
DTC is not output	A
DTC is output	B

B → REPAIR CAN COMMUNICATION SYSTEM ACCORDING TO OUTPUT CODE (SEE PAGE 05-2331)

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

**3 CHECK HARNESS AND CONNECTOR (BETWEEN ECM AND DLC3 (TC))
(SEE PAGE 01-36)**



- (a) Turn the ignition switch off.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

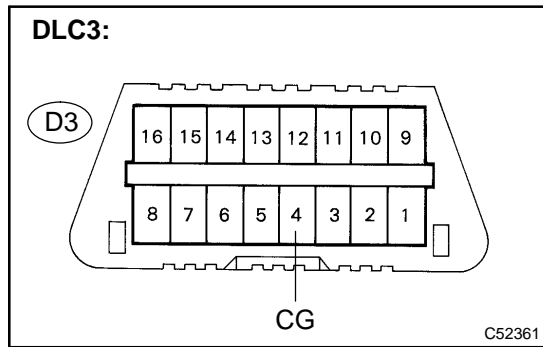
Standard:

Tester Connection	Specified Condition
E9-23 (TC) - D3-13 (TC)	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (TC CIRCUIT)

OK

4 CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (CG) AND BODY GROUND) (SEE PAGE 01-36)



- (a) Measure the resistance according to the value(s) in the table below.

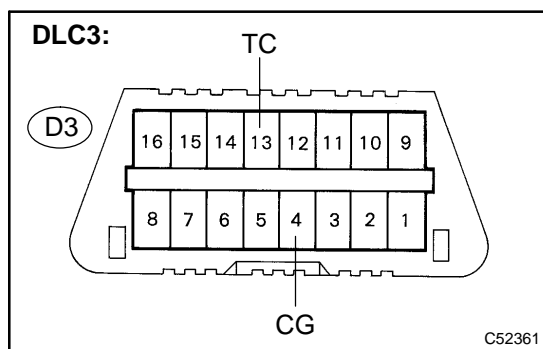
Standard:

Tester Connection	Specified Condition
D3-4 (CG) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (CG CIRCUIT)

OK

5 CHECK ECM (DLC3 (TC) INPUT)



- (a) Using SST, connect terminals TC and CG of the DLC3.
SST 09843-18040
- (b) Check that the engine warning light is blinking.

Result:

Engine warning light is blinking	A
Engine warning light is not blinking	B

B REPAIR OR REPLACE WIRE HARNESS OR ECM (TC AND/OR ECM CIRCUIT)

A

6 CHECK DTC (FOR CAN COMMUNICATION SYSTEM)

- (a) Check for CAN communication system DTC (see page 05-2320).

Result:

DTC is not output	A
DTC is output	B

B REPAIR CAN COMMUNICATION SYSTEM ACCORDING TO OUTPUT CODE (SEE PAGE 05-2331)

A

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

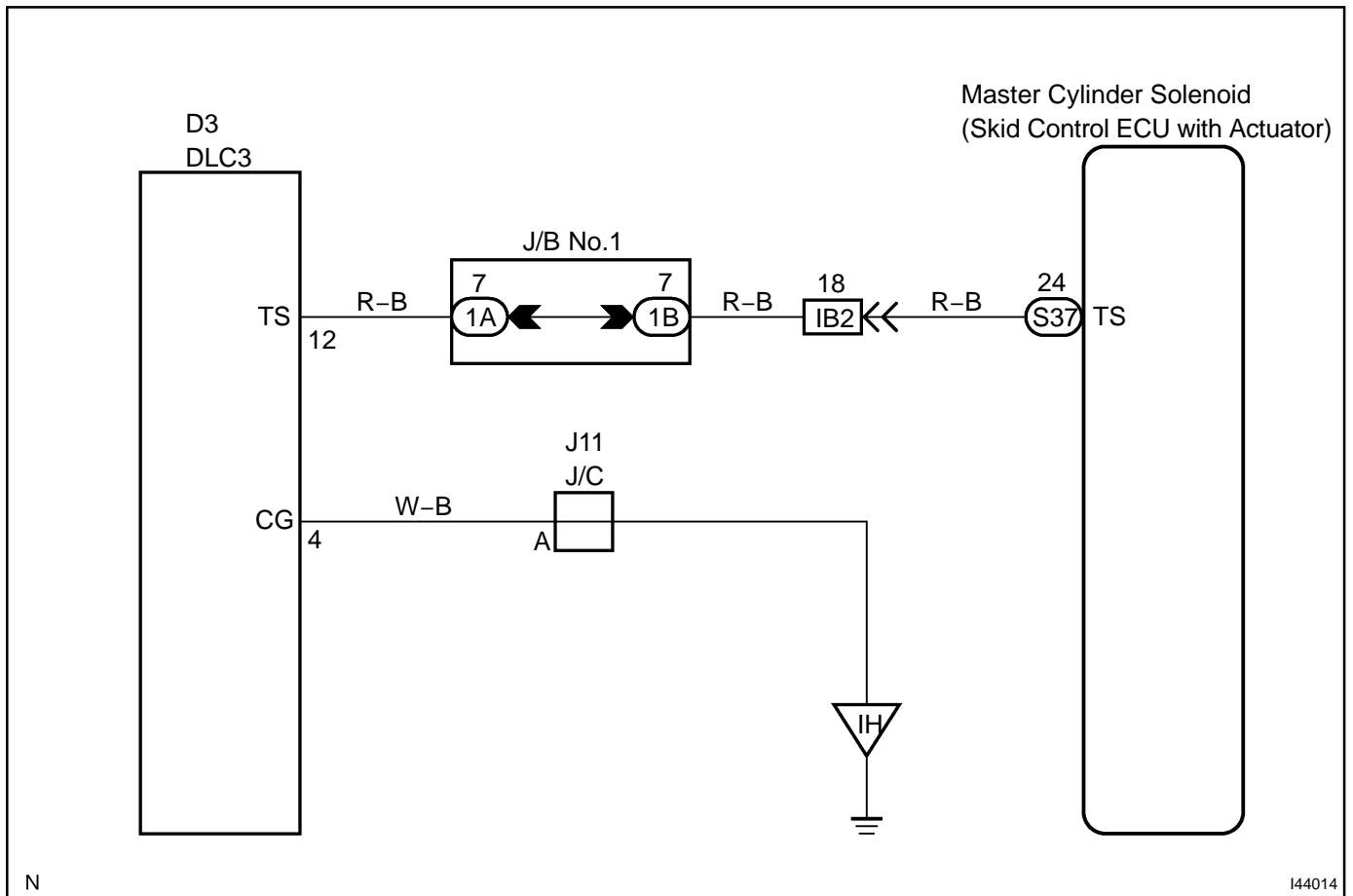
TS AND CG TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

The signal check circuit detects trouble in the sensor or switch signal which cannot be detected by the DTC check.

Connecting terminals TS and CG of the DLC3 starts the check.

WIRING DIAGRAM



N

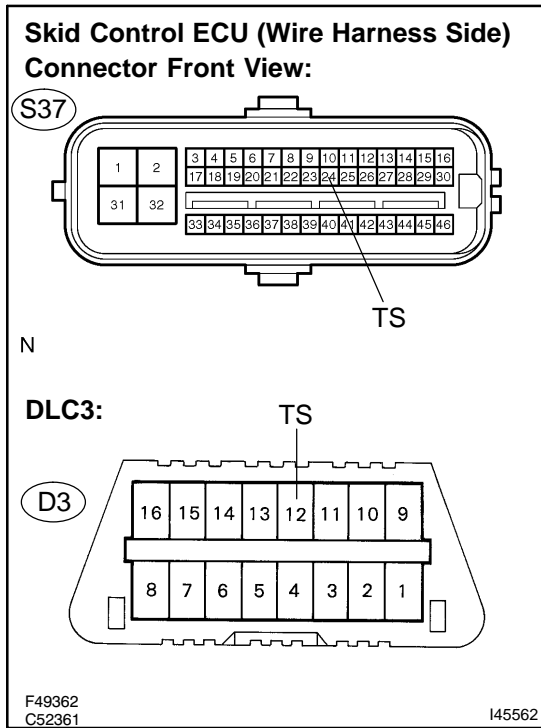
I44014

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (see page 05-734).

1 CHECK HARNESS AND CONNECTOR (BETWEEN SKID CONTROL ECU AND DLC3 (TS)) (SEE PAGE 01-36)



- (a) Turn the ignition switch off.
- (b) Disconnect the skid control ECU connector.
- (c) Measure the resistance according to the value(s) in the table below.

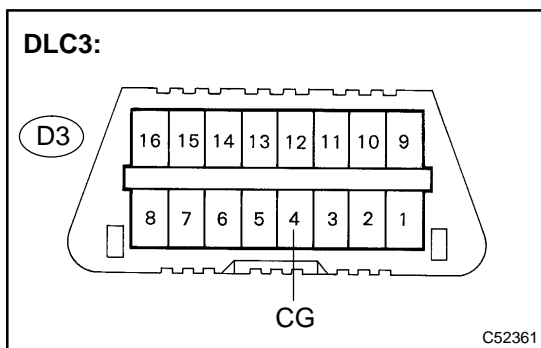
Standard:

Tester Connection	Specified Condition
S37-24 (TS) - D3-12 (TS)	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (TS CIRCUIT)

OK

2 CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (CG) AND BODY GROUND) (SEE PAGE 01-36)



- (a) Measure the resistance according to the value(s) in the table below.

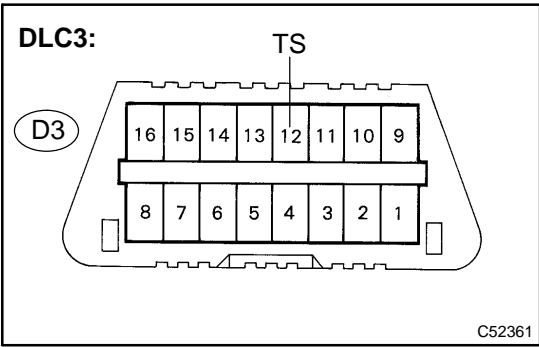
Standard:

Tester Connection	Specified Condition
D3-4 (CG) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (CG CIRCUIT)

OK

3 CHECK HARNESS AND CONNECTOR (BETWEEN DLC3 (TS) AND BODY GROUND) (SEE PAGE 01-36)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D3-12 (TS) – Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (TS CIRCUIT)

OK

REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

ELECTRONIC CONTROLLED AUTOMATIC TRANSMISSION [ECT]

05GBE-04

PRECAUTION

NOTICE:

Perform the RESET MEMORY (AT initialization) when replacing the automatic transmission assy, engine assy or ECM (see page [05-923](#)).

HINT:

RESET MEMORY can not be completed by only disconnecting the battery terminal.

DEFINITION OF TERMS

Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	A group of diagnostic trouble codes that are output by the ECM based on the same malfunction detection logic.
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM sets the DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring, if multiple sensors and components are used to detect the malfunction. While a sensor is being monitored, a sensor or component will not be monitored until the previous monitoring has concluded.
Required sensor/components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects a malfunction only one time during a single driving cycle. "Continuous" means that the ECM detects a malfunction every time when the enabling condition is met.
Duration	The minimum time that the ECM must sense a continuous deviation in the monitored value(s) before setting a DTC. This timing begins after the "typical enabling conditions" are met.
Malfunction thresholds	Beyond this value, the ECM will conclude that there is a malfunction and set a DTC.
MIL operation	MIL illumination timing after a defect is detected. "Immediately" means that the ECM illuminates the MIL the instant the ECM determines that there is a malfunction. "2 driving cycle" means that the ECM illuminates the MIL if the same malfunction is detected again in the 2nd driving cycle.
Component operating range	Normal operation range of sensors and solenoids under normal driving conditions. Use these ranges as a reference. They cannot be used to judge if a sensor or solenoid is defective or not.

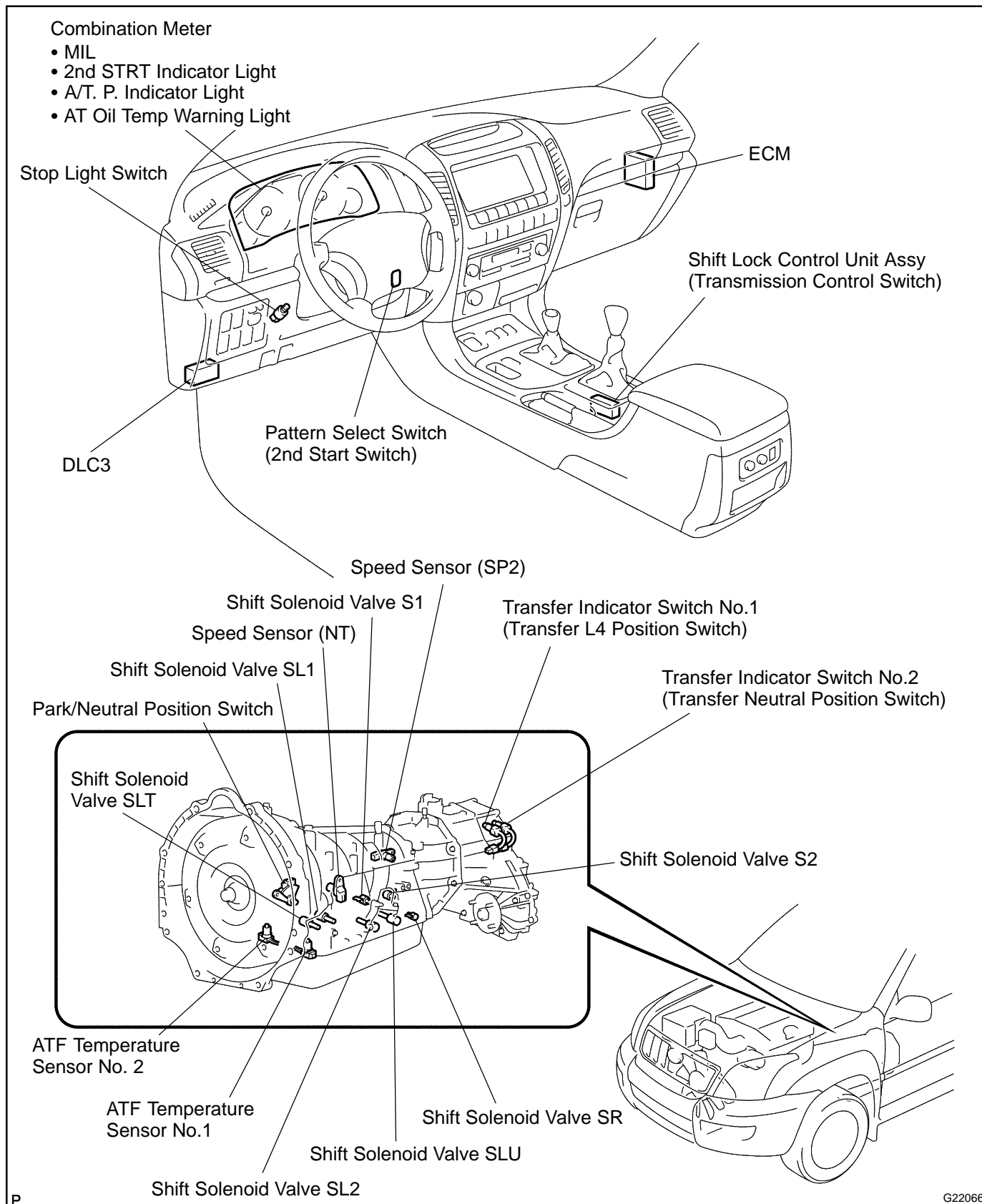
PART AND SYSTEM NAME LIST

This reference list indicates the part names used in this manual along with their definitions.

Part and system name	Definition
Toyota HCAC system, Hydrocarbon adsorptive Catalyst (HCAC) system, HC adsorptive three-way catalyst	HC adsorptive three-way catalytic converter
Variable Valve Timing sensor, VVT sensor	Camshaft position sensor
Variable valve timing system, VVT system	Camshaft timing control system
Camshaft timing oil control valve, Oil control valve OCV, VVT, VSV	Camshaft timing oil control valve
Variable timing and lift, VVTL	Camshaft timing and lift control
Crankshaft position sensor "A"	Crankshaft position sensor
Engine speed sensor	Crankshaft position sensor
THA	Intake air temperature
Knock control module	Engine knock control module
Knock sensor	Engine knock sensor
Mass or volume air flow circuit	Mass air flow sensor circuit
Vacuum sensor	Manifold air pressure sensor
Internal control module, Control module, Engine control ECU, PCM	Power train control module
FC idle	Deceleration fuel cut
Idle air control valve	Idle speed control
VSV for CCV, Canister close valve VSV for canister control	Evaporative emissions canister vent valve
VSV for EVAP, Vacuum switching valve assembly No.1, EVAP VAV, Purge VSV	Evaporative emissions canister purge valve
VSV for pressure switching valve, Bypass VSV	Evaporative emission pressure switching valve
Vapor pressure sensor, EVAP pressure sensor, Evaporative emission control system pressure sensor	Fuel tank pressure sensor
Charcoal canister	Evaporative emissions canister
ORVR system	On-board refueling vapor recovery system
Intake manifold runner control	Intake manifold tuning system
Intake manifold runner valve, IMRV, IACV (runner valve)	Intake manifold tuning valve
Intake control VSV	Intake manifold tuning solenoid valve
AFS	Air fuel ratio sensor
O2 sensor	Heater oxygen sensor
Oxygen sensor pumping current circuit	Oxygen sensor output signal
Oxygen sensor reference ground circuit	Oxygen sensor signal ground
Accel position sensor	Accelerator pedal position sensor
Throttle actuator control motor, Actuator control motor, Electronic throttle motor, Throttle control motor	Electronic throttle actuator
Electronic throttle control system, Throttle actuator control system	Electronic throttle control system
Throttle/pedal position sensor, Throttle/pedal position switch, Throttle position sensor/switch	Throttle position sensor
Turbo press sensor	Turbocharger pressure sensor
Turbo VSV	Turbocharger pressure control solenoid valve
P/S pressure switch	Power-steering pressure switch
VSV for ACM	Active control engine mount
Speed sensor, Vehicle speed sensor "A", Speed sensor for skid control ECU	Vehicle speed sensor
ATF temperature sensor, Trans. fluid temp. sensor, ATF temperature sensor "A"	Transmission fluid temperature sensor
Electronic controlled automatic transmission, ECT	Electronically controlled automatic
Intermediate shaft speed sensor "A"	Couter gear speed sensor

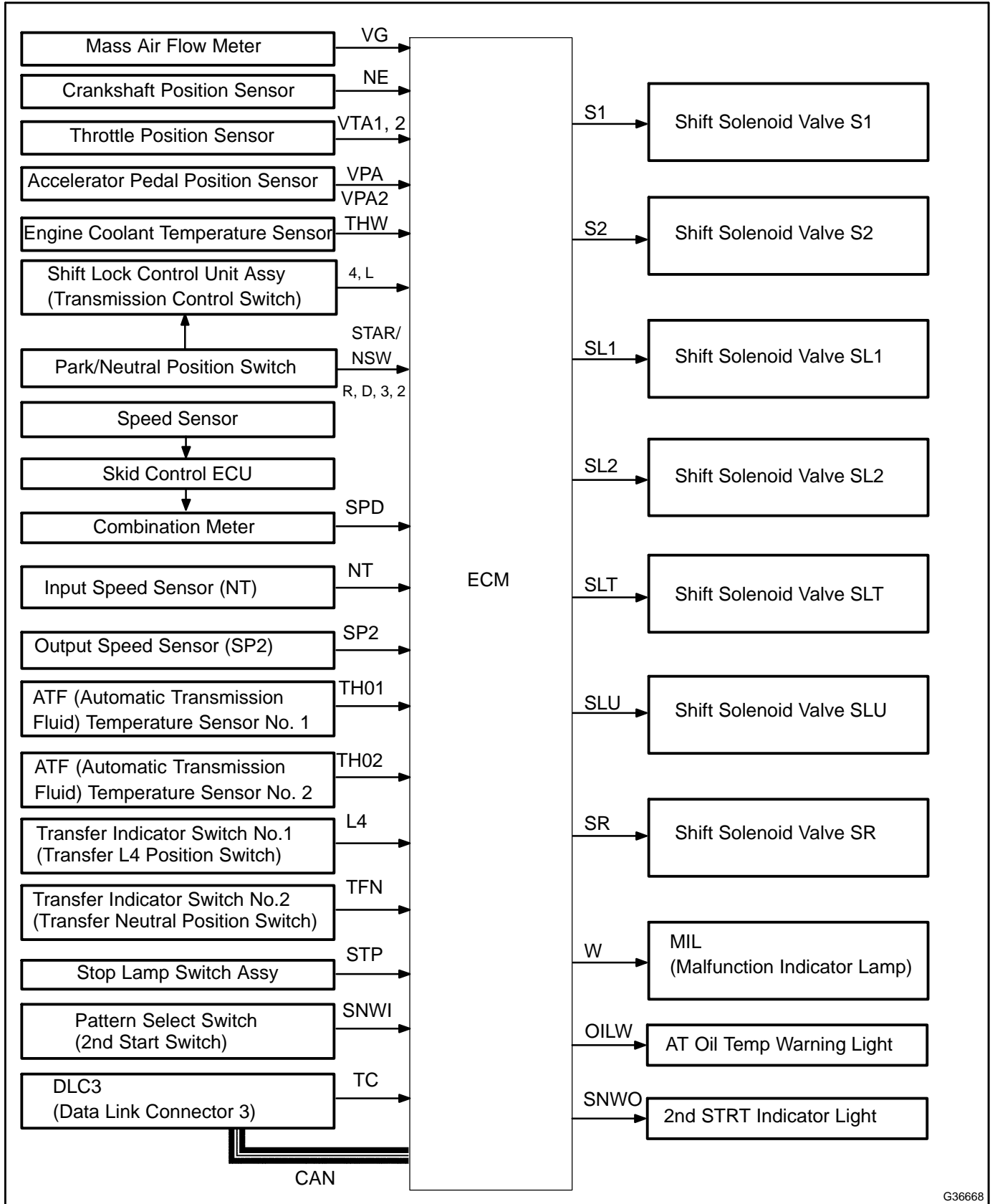
Part and system name	Definition
Output speed sensor	Output shaft speed sensor
Input speed sensor, Input turbine speed sensor "A", Speed sensor (NT), Turbine speed sensor	Input turbine speed sensor
PNP switch, NSW	Park/neutral position switch
Pressure control solenoid	Transmission pressure control solenoid
Shift solenoid	Transmission shift solenoid valve
Transmission control switch, Shift lock control unit	Shift lock control module
Engine immobilizer system, Immobilizer system	Vehicle anti-theft system

LOCATION



SYSTEM DIAGRAM

The configuration of the electronic control system in the A750F automatic transmission is as shown in the following chart.



SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

- (a) The ECT (Electronic controlled automatic transmission) is an automatic transmission that electronically controls shift timing using the ECM. The ECM detects electrical signals that indicate engine and driving conditions, and controls the shift point, based on driver habits and road conditions. As a result, fuel efficiency and power transmission performance are improved.

Shift shock has been reduced by controlling the engine and transmission simultaneously.

In addition, the ECT has features such as follows:

- Diagnostic function.
- Fail-safe function when a malfunction occurs.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM of this system is connected to the CAN system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN system.
- The hand-held tester can be used at steps 3, 4, 6, and 9.

1 Vehicle Brought to Workshop

NEXT

2 Customer Problem Analysis (SEE PAGE 05-914)

NEXT

3 Connect the OBD II scan tool or hand-held tester to DLC3

NEXT

4 Check and Clear DTC and Freeze Frame Data (SEE PAGE 05-946)

NEXT

5 Visual Inspection

NEXT

6 Setting the Check Mode Diagnosis (SEE PAGE 05-947)

NEXT

7 Problem Symptom Confirmation (SEE PAGE 05-915)

➤ **Symptom does not occur: Go to step 8**

➤ **Symptom occur: Go to step 9**

8 Symptom Simulation (SEE PAGE 01-26)

NEXT

9 DTC Check (SEE PAGE 05-946)

➤ **DTC is not output: Go to step 10**

➤ **DTC is output: Go to step 18**

10	Basic Inspection (SEE PAGE 40-2, 40-12 and 40-45)
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NG	Go to step 20
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OK

11	Mechanical System Test (SEE PAGE 05-918)
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NG	Go to step 17
----	---------------

OK

12	Hydraulic Test (SEE PAGE 05-920)
----	----------------------------------

NG	Go to step 17
----	---------------

OK

13	Manual Shifting Test (SEE PAGE 05-922)
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NG	Go to step 15
----	---------------

OK

14	Problem Symptoms Table Chapter 1 (SEE PAGE 05-934)
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NG	Go to step 19
----	---------------

OK

15	Problem Symptoms Table Chapter 2 (SEE PAGE 05-934)
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NG	Go to step 17
----	---------------

OK

16	Problem Symptoms Table Chapter 3 (SEE PAGE 05-934)
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NEXT

17	Part Inspection
----	-----------------

	Go to step 20
--	---------------

18	DTC Chart (SEE PAGE 05-955)
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NEXT

19	Circuit Inspection
-----------	---------------------------

NEXT

20	Repair or Replace
-----------	--------------------------

NEXT

21	Confirmation Test
-----------	--------------------------

NEXT

End

CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transmission System Check Sheet

Inspector's Name _____ :

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred	/ /
How Often Does Problem Occur?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (times a day)

Symptoms	<input type="checkbox"/> Vehicle does not move (<input type="checkbox"/> Any position <input type="checkbox"/> Particular position)
	<input type="checkbox"/> No up-shift (<input type="checkbox"/> 1st → 2nd <input type="checkbox"/> 2nd → 3rd <input type="checkbox"/> 3rd → 4th <input type="checkbox"/> 4th → 5th)
	<input type="checkbox"/> No down-shift (<input type="checkbox"/> 5th → 4th <input type="checkbox"/> 4th → 3rd <input type="checkbox"/> 3rd → 2nd <input type="checkbox"/> 2nd → 1st)
	<input type="checkbox"/> Lock-up malfunction
	<input type="checkbox"/> Shift point too high or too low
	<input type="checkbox"/> Harsh engagement (<input type="checkbox"/> N → D <input type="checkbox"/> Lock-up <input type="checkbox"/> Any drive position)
	<input type="checkbox"/> Slip or shudder
	<input type="checkbox"/> No kick-down
	<input type="checkbox"/> Others ()

Check Item	Malfunction Indicator Lamp	<input type="checkbox"/> Normal <input type="checkbox"/> Remains ON
------------	----------------------------	---

DTC Check	1st Time	<input type="checkbox"/> Normal system code <input type="checkbox"/> Trouble code (DTC)
	2nd Time	<input type="checkbox"/> Normal system code <input type="checkbox"/> Trouble code (DTC)

ROAD TEST

1. PROBLEM SYMPTOM CONFIRMATION

- (a) Based on the result of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transaxle does not shift up, shift down, or the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

2. ROAD TEST

NOTICE:

Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 50 to 80°C (122 to 176°F).

- (a) D position test:

Shift into the D position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.

Check that 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts take place, and that the shift points conform to the automatic shift schedule (see page 03-45).

HINT:

5th Gear Up-shift Prohibition Control

- Engine coolant temperature is 55°C (131°F) or less and vehicle speed is at 51 km/h (32 mph) or less.

4th Gear Up-shift Prohibition Control

- Engine coolant temperature is 40°C (104°F) or less and vehicle speed is at 45 km/h (28 mph) or less.

5th Gear Lock-up Prohibition Control

- Brake pedal is depressed.
- Accelerator pedal is released.
- Engine coolant temperature is 60°C (140°F) or less.

When the 2nd start switch is ON, there is no 1 → 2 up-shift and 2 → 1 down-shift.

- (2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts.

- (3) Check for abnormal noise and vibration.

Check for abnormal noise and vibration when up-shifting from 1 → 2, 2 → 3, 3 → 4 and 4 → 5 while driving with the shift lever in the D position, and check while driving in the lock-up condition.

HINT:

The check for the cause of abnormal noise and vibration must be done thoroughly as it could also be due to loss of balance in the differential, torque converter clutch, etc.

- (4) Check kick-down operation.

Check vehicle speeds when the 2nd to 1st, 3rd to 2nd, 4th to 3rd, and 5th to 4th kick-downs take place while driving with the shift lever in the D position. Confirm that each speed is within the applicable vehicle speed range indicated in the automatic shift schedule (see page 03-45).

- (5) Check abnormal shock and slip at kick-down.

- (6) Check the lock-up mechanism.

- Drive in the D position (5th gear), at a steady speed (lock-up ON).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

If there is a big jump in engine speed, there is no lock-up.

(b) 4 position test:

Shift into the 4 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that the 1 → 2, 2 → 3 and 3 → 4 up-shifts takes place and that the shift point conforms to the automatic shift schedule (see page 03-45).

HINT:

- There is no 5th up-shift in the 4 position.
 - 4th Gear Lock-up Prohibition Control
 - Brake pedal is depressed.
 - Accelerator pedal is released.
 - Engine coolant temperature is 60°C (140°F) or less.
 - When the 2nd start switch is ON, there is no 1 → 2 up-shift and 2 → 1 down-shift.
- (1) Check engine braking.
While driving in the 4 position and 4th gear, release the accelerator pedal and check the engine braking effect.
- (2) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.
- (3) Check the lock-up mechanism.
 - Drive in 4 position 4th gear, at a steady speed (lock-up ON).
 - Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

If there is a big jump in engine speed, there is no lock-up.

(c) 3 position test:

Shift into the 3 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that the 1 → 2 and 2 → 3 up-shifts takes place and that the shift point conforms to the automatic shift schedule (see page 03-45).

HINT:

- There is no 4th up-shift and lock-up in the 3 position.
 - When the 2nd start switch is ON, there is no 1 → 2 up-shift and 2 → 1 down-shift.
- (2) Check engine braking.
While running in the 3 position and 3rd gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(d) 2 position test:

Shift into the 2 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (see page 03-45).

HINT:

- There is no 3rd up-shift and lock-up in the 2 position.
- When the 2nd start switch is ON, there is no 1 → 2 up-shift and 2 → 1 down-shift.

- (2) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
 - (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.
- (e) L position test:
Shift into the L position and fully depress the accelerator pedal and check the following points.
- (1) Check no up-shift.
While running in the L position, check that there is no up-shift to 2nd gear.
 - (2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
 - (3) Check for abnormal noises during acceleration and deceleration.
- (f) R position test:
Shift into the R position, lightly depress the accelerator pedal, and check that the vehicle moves backward without any abnormal noise or vibration.
- CAUTION:**
Before conducting this test, ensure that the test area is free from people and obstruction.
- (g) P position test:
Stop the vehicle on a grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check that the parking lock pawl holds the vehicle in place.

MECHANICAL SYSTEM TESTS

1. PERFORM MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D position.

NOTICE:

- **Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature 50 to 80°C (122 to 176°F).**
- **Do not continuously run this test for longer than 5 seconds.**
- **To ensure safety, do this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
 - (1) Chock the 4 wheels.
 - (2) Connect an OBD II scan tool or hand-held tester to DLC3.
 - (3) Fully apply the parking brake.
 - (4) Using your left foot, keep the brake pedal firmly depressed.
 - (5) Start the engine.
 - (6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot.
 - (7) Quickly read the stall speed at this time.

Stall speed: 2,150 ± 150 rpm

Evaluation:

Problem	Possible cause
(a) Stall engine speed is low in D position	<ul style="list-style-type: none"> • Engine power output may be insufficient • Stator one-way clutch is not operating properly <p>HINT: If the value is less than the specified value by 600 rpm or more, the torque converter could be faulty.</p>
(b) Stall engine speed is high in D position	<ul style="list-style-type: none"> • Line pressure is too low • Clutch No.1 (C₁) slipping • One-way clutch No.3 (F₃) is not operating properly • Improper fluid level

- (b) Measure the time lag.
- (1) When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the direct clutch, forward clutch, and 1st and reverse brake.

NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 50 to 80°C (122 to 176°F).
- Be sure to allow for a 1 minute interval between tests.
- Perform the test three times, and measure the time lags. Calculate the average value of the three time lags.

(2) Connect an OBD II scan tool or hand-held tester to DLC3.

(3) Fully apply the parking brake.

(4) Start and warm up the engine and check idle speed.

Idle speed: approx. 700 rpm (In N position and A/C OFF)

(5) Shift the lever from the N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag: N → D less than 1.2 seconds

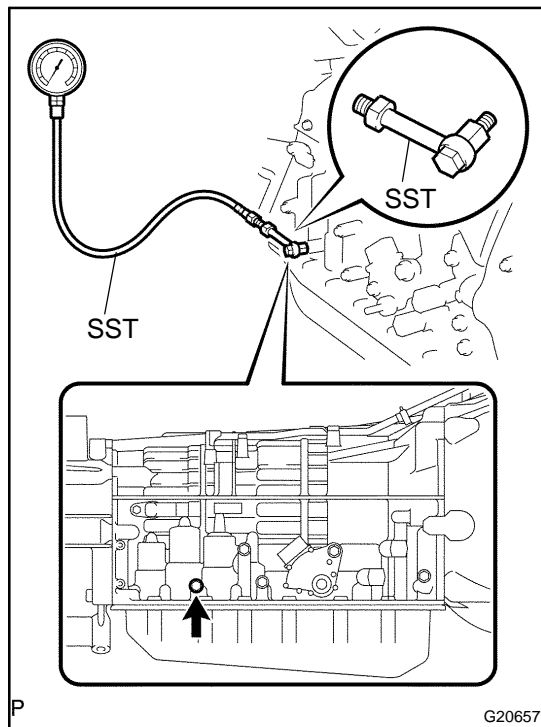
(6) In the same way, measure the time lag for N → R.

Time lag: N → R less than 1.5 seconds

Evaluation (If N → D or N → R time lag is longer than the specified):

Problem	Possible cause
N → D time lag is longer than specified	<ul style="list-style-type: none"> • Line pressure is too low • Clutch No.1 (C₁) worn • One-way clutch No.3 (F₃) is not operating properly
N → R time lag is longer than specified	<ul style="list-style-type: none"> • Line pressure is too low • Clutch No.3 (C₃) worn • Brake No.4 (B₄) worn • One-way clutch No.1 (F₁) is not operating properly

HYDRAULIC TEST



1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.

NOTICE:

- Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 50 to 80°C (122 to 176°F).
- The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.
- Be careful to prevent SST hose from interfering with the exhaust pipe.
- This check must be conducted after checking and adjusting engine.
- Perform under condition that A/C is OFF.
- When conducting stall test, do not continue more than 10 seconds.

- (1) Warm up the ATF (Automatic Transmission Fluid).
- (2) Lift the vehicle up.
- (3) Remove the test plug on the transmission case center right side and connect SST.

SST 09992-00095 (09992-00231, 09992-00271)

- (4) Fully apply the parking brake and chock the 4 wheels.
- (5) Start the engine and check idling speed.
- (6) Keep your left foot pressing firmly on the brake pedal and shift into the D position.
- (7) Measure the line pressure when the engine is idling.
- (8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
- (9) In the same manner, do the test in the R position.

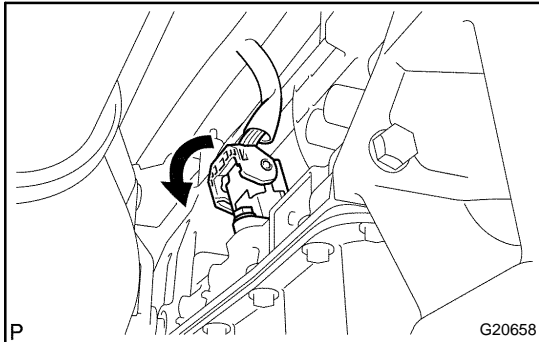
Specified line pressure:

Condition	D position kPa (kgf / cm ² , psi)	R position kPa (kgf / cm ² , psi)
Idling	362 to 420 kPa (3.7 to 4.2 kgf/cm ² , 53 to 59 psi)	500 to 580 kPa (5.1 to 5.9 kgf/cm ² , 73 to 84 psi)
Stall test	1,360 to 1,460 kPa (13.8 to 14.9 kgf/cm ² , 196 to 212 psi)	1,295 to 1,415 kPa (13.2 to 14.4 kgf/cm ² , 188 to 205 psi)

Evaluation:

Problem	Possible cause
Measured values are higher than specified in all positions	<ul style="list-style-type: none"> • Shift solenoid valve (SLT) defective • Regulator valve defective
Measured values are lower than specified in all positions	<ul style="list-style-type: none"> • Shift solenoid valve (SLT) defective • Regulator valve defective • Oil pump defective
Pressure is low in the D position only	<ul style="list-style-type: none"> • D position circuit fluid leak • Clutch No.1 (C₁) defective
Pressure is low in the R position only	<ul style="list-style-type: none"> • R position circuit fluid leak • Clutch No.3 (C₃) defective • Brake No.4 (B₄) defective

MANUAL SHIFTING TEST



1. PERFORM MANUAL SHIFTING TEST

HINT:

- With this test, it can be determined whether the trouble occurs in the electrical circuit or is a mechanical problem in the transmission.
- If any abnormalities are found in the following test, the problem is in the transmission itself.

- (a) Disconnect the connector of the transmission wire.
- (b) Drive with the transmission wire disconnected.

Shifting the shift lever to the L, 2, 3, 4 and D position to check whether the shifting condition changes the table below.

Shift Position	Shifting Condition
L ↔ 2	No Shift (Not Change)
2 ↔ 3	Down Shift ↔ Up Shift
3 ↔ 4	Down Shift ↔ Up Shift
4 ↔ D	No Shift (Not Change)

HINT:

When driving with the transmission wire disconnected, the gear position will be as follows:

- When the shift lever is in the L or the 2 position, the gear is held in the 1st position.
- When the shift lever is in the 3rd position, the gear is held in the 3rd position.
- When the shift lever is in the 4 or the D position, the gear is held in the 4th position.
- When the shift lever is in the R or the P position, the gear is also in the R or the P position respectively.

- (c) Connect the connector of the transmission wire.
- (d) Clear the DTC (see page [05-946](#)).

INITIALIZATION

1. RESET MEMORY

NOTICE:

- **Perform the RESET MEMORY (AT initialization) when replacing the automatic transmission assy, engine assy or ECM.**
- **The RESET MEMORY can be performed only with the Hand-held tester.**

HINT:

The ECM memorizes the condition that the ECT controls the automatic transaxle assy and engine assy according to those characteristics. Therefore, when the automatic transaxle assy, engine assy, or ECM has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

Reset procedure is as follows.

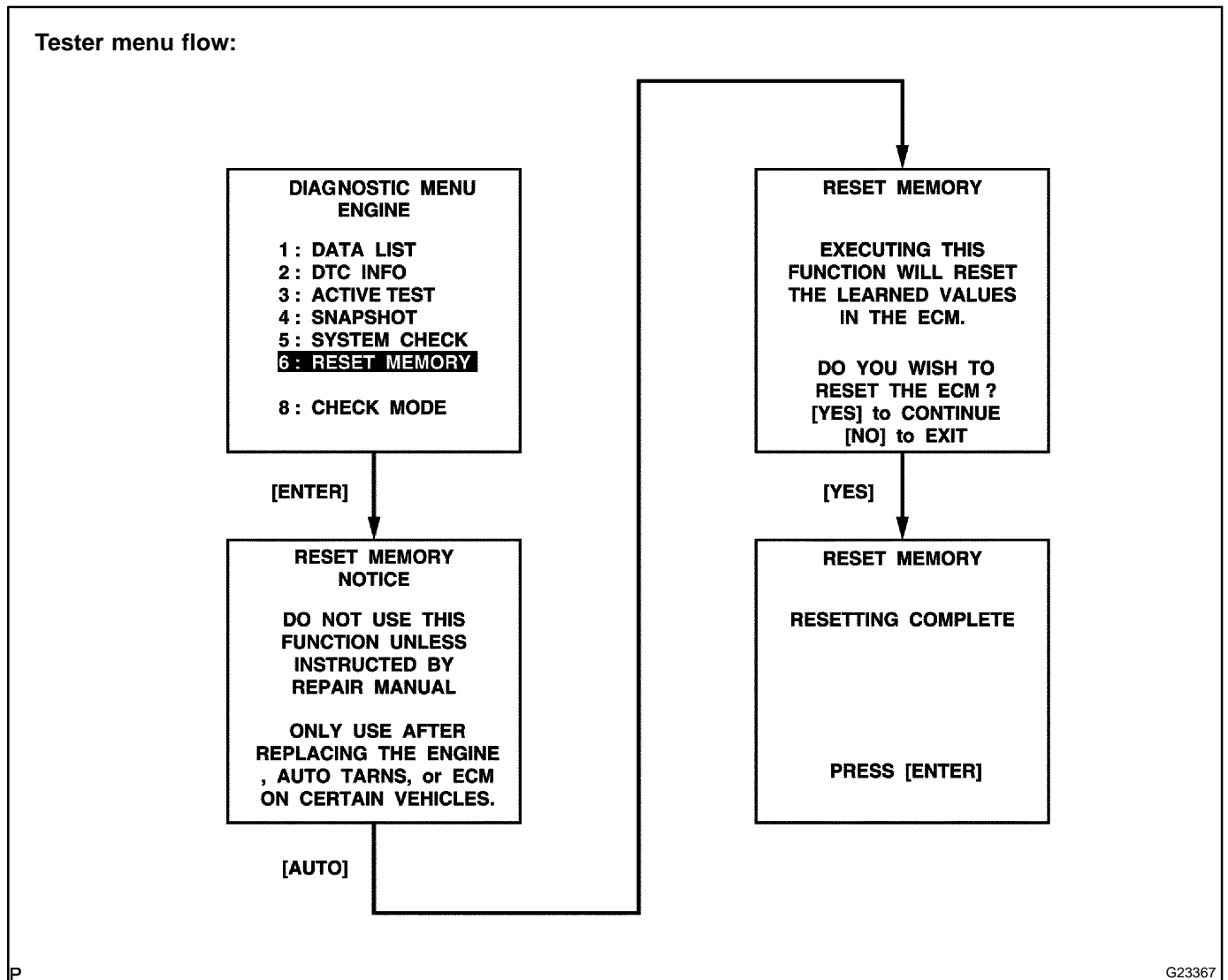
- (a) Turn the ignition switch off.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position and push the hand-held tester main switch on.
- (d) Select the item "DIAGNOSIS / ENHANCED OBD II".
- (e) Perform the reset memory procedure from the ENGINE menu.

CAUTION:

After performing the RESET MEMORY, be sure to perform the ROAD TEST (see page 05-915) described earlier.

HINT:

The ECM is learned by performing the ROAD TEST.



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LIST OF DISABLE A MONITOR

HINT:

This table indicates ECM monitoring status for the items in the upper columns if the DTCs in each line on the left are being set.

As for the "X" mark, when the DTC on the left is stored, detection of the DTC in the upper column is not performed.

Monitor detected malfunction	Fault code		Component/ system	Monitor disablement (X - disabled)																													
	Fault code	Fault code		P0010,P0020	P0011	P0012	P0016,P0018	P0021	P0022	P0030,50	P0135,P0155	P0036,56	P0043,44,63,64	P0100	P0101	P0105	P0106	P0110	P0115	P0116	P0120,P0121	P0125	P0128	P0130-P0153	P0134,P0154	P0136,P0156	P0142,P0162	P0171,P0172	P0300-P0308				
				VVT VSV 1, 2	VVT System 1 - Advance	VVT System 1 - Retard	VVT System - Misalignment	VVT System 2 - Advance	VVT System 2 - Retard	O2 Sensor Heater-Sensor1	A/F Sensor Heater-Sensor1	O2 Sensor Heater-Sensor2	O2 Sensor Heater-Sensor3	MAF sensor	MAP sensor	MAP sensor	IAT sensor	ECT sensor	ECT sensor	TP sensor	Insufficient ECT for Closed Loop	Thermostat	O2 Sensor-Sensor1	O2 Sensor, A/F sensor (No Activity)-Sensor1	O2 Sensor-Sensor2	O2 Sensor-Sensor3	Fuel system	Misfire					
P0010,P0020	P0010,P0020	VVT VSV 1, 2																															
P0011	P0011	VVT System 1 - Advance																															
P0012	P0012	VVT System 1 - Retard																															
P0016,P0018	P0016,P0018	VVT System - Misalignment																															
P0021	P0021	VVT System 2 - Advance																															
P0022	P0022	VVT System 2 - Retard																															
P0030,50	P0031,32,51,52	O2 Sensor Heater-Sensor1																															
P0135,P0155	P0031,32,51,52	A/F Sensor Heater-Sensor1																															
P0036,56	P0037,38,57,58	O2 Sensor Heater-Sensor2																															
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater-Sensor3																															
P0100,P0101	P0100-P0103	MAF sensor																															
P0105,P0106	P0105-P0108	MAP sensor																															
P0110	P0110-P0113	IAT sensor																															
P0115,P0116	P0115-P0118	ECT sensor																															
P0120,P0121	P0120-P0223,P2135	TP sensor																															
P0125	P0125	Insufficient ECT for Closed Loop																															
P0128	P0128	Thermostat																															
P0130-P0153	P0130-P0153	O2 Sensor-Sensor1																															
P0134,P0154	P0134,P0154	O2 Sensor, A/F sensor (No Activity)-Sensor1																															
P0136,P0156	P0136,P0156	O2 Sensor-Sensor2																															
P0142,P0162	P0142,P0162	O2 Sensor-Sensor3																															
P0171,P0172	P0171,P0172	Fuel system																															
P0300-P0308	P0300-P0308	Misfire																															
P0325,P0330	P0325-P0333	Knock sensor																															
P0335	P0335	CKP sensor																															
P0340,P0341	P0340,P0341	CMP sensor																															
P0340-P0346	P0340-P0346	VVT sensor 1, 2																															
P0351-P0358	P0351-P0358	Ignitor																															
P0385	P0385	CKP sensor 2																															
P0401	P0401	EGR system (closed)																															
P0402	P0402	EGR system (open)																															
P0405,P0409	P0405-P0409	Lift sensor																															
P0420,P0430	P0420,P0430	Catalyst																															
P0442-P0456	P0442-P0456	EVAP system																															
P0450,P0451	P0450-P0453	EVAP press sensor																															

Monitor detected malfunction	Fault code	Component/ system	Monitor disablement (X – disabled)	
			Fault code	Component/ system
	P0500	VSS	P0010,P0020	P0010,P0020
	P0511	IAC valve	P0011	P0011
	P0510	Idle switch	P0012	P0012
	P0560	System Voltage	P0016,P0018	P0016,P0018
	P0617	Starter signal	P0021	P0021
	P0705	Shift lever position switch	P0022	P0022
	P0710	Trans fluid temp sensor	P0031,32,51,52	P0030,50
	P0720-P0793	Output speed sensor	P0031,32,51,52	P0135,P0155
	P0715-P0717	Input speed sensor	P0037,38,57,58	P0036,56
	P0724	Stop lamp switch	P0043,44,63,64	P0043,44,63,64
	P0741-P0796	Trans solenoid (function)	P0100-P0103	P0100
	P0748-P0798	Trans solenoid (range)	P0101	P0101
	P0850	PNP switch	P0105-P0108	P0105
	P1010,P1020	VVTL	P0106	P0106
	P1011,12(,21,22)	VVTL system1(,2)	P0110-P0113	P0110
	P1126	Electronic magnet clutch	P0115-P0118	P0115
	P1129	Electronic throttle system	P0116	P0116
	P1430	HC absorber ACT press sensor	P0120-P0223,P2135	P0120,P0121
	P2004,6	Intake Manifold Runner Control	P0125	P0125
	P2009,10	Intake Manifold Runner Control Circuit	P0128	P0128
	P2014,16,17	Intake Manifold Runner Position Sensor	P0130-P0153	P0130-P0153
	P2102,P2103	Throttle motor	P0134,P0154	P0134,P0154
	P2120-P2138	Accel position sensor	P0136,P0156	P0136,P0156
	P2196,P2198	A/F sensor (rationality)	P0142,P0162	P0142,P0162
	P2226	BARO sensor	P0171,P0172	P0171,P0172
	P2237,2240	A/F sensor (open)	P0300-P0308	P0300-P0308
	P2423,24	HC Absorption Catalyst		
	P2430,2,3	A/R Pressure Sensor (Low/High)		
	P2431	A/R Pressure Sensor (Rationality)		
	P2440	A/R control valve stuck open		
	P2441	A/R control valve stuck close		
	P2444	AIP stuck On		
	P2445	AIP stuck Off		
	P2714-P2759	Trans solenoid (SLU-SLD)		
	P2A00,P2A03	A/F sensor (slow response)		

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Monitor detected malfunction	Fault code		Monitor disablement (X – disabled)																										
	Fault code	Component/ system	P0325-P0330	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405	P0409	P0420-P0430	P0440-P0446	P0450-P0451	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710	P0720-P0793	P0715-P0717	P0724	P0741-P0796	
			P0325-P0333	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405-P0406	P0409	P0420-P0430	P0440-P0446	P0450-P0453	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796	
P0010,P0020	P0010,P0020	VVT VSV 1, 2																										X	
P0011	P0011	VVT System 1 – Advance							X	X		X	X					X											
P0012	P0012	VVT System 1 – Retard							X	X		X	X					X											
P0016,P0018	P0016,P0018	VVT System – Misalignment																											
P0021	P0021	VVT System 2 – Advance							X	X		X	X					X											
P0022	P0022	VVT System 2 – Retard							X	X		X	X					X											
P0030,50	P0031,32,51,52	O2 Sensor Heater–Sensor1							X	X		X						X										X	
P0135,P0155	P0031,32,51,52	A/F Sensor Heater–Sensor1							X	X		X						X											
P0036,56	P0037,38,57,58	O2 Sensor Heater–Sensor2										X																	
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater–Sensor3										X																	
P0100,P0101	P0100-P0103	MAF sensor							X	X		X	X				X	X										X	
P0105,P0106	P0105-P0108	MAP sensor							X	X		X	X				X	X										X	
P0110	P0110-P0113	IAT sensor							X	X		X	X															X	
P0115,P0116	P0115-P0118	ECT sensor							X	X		X	X				X	X										X	
P0120,P0121	P0120-P0223,P2135	TP sensor							X	X		X	X			X		X	X									X	
P0125	P0125	Insufficient ECT for Closed Loop							X	X		X	X				X	X										X	
P0128	P0128	Thermostat																											
P0130-P0153	P0130-P0153	O2 Sensor–Sensor1							X	X		X						X										X	
P0134,P0154	P0134,P0154	O2 Sensor, A/F sensor (No Activity)–Sensor1							X	X		X						X										X	
P0136,P0156	P0136,P0156	O2 Sensor–Sensor2										X																	
P0142,P0162	P0142,P0162	O2 Sensor–Sensor3										X																	
P0171,P0172	P0171,P0172	Fuel system							X	X		X	X					X										X	
P0300-P0308	P0300-P0308	Misfire										X	X					X										X	
P0325,P0330	P0325-P0333	Knock sensor							X	X		X	X					X										X	
P0335	P0335	CKP sensor							X	X		X	X					X										X	
P0340,P0341	P0340,P0341	CMP sensor							X	X		X	X					X										X	
P0340-P0346	P0340-P0346	VVT sensor 1, 2							X	X		X	X					X										X	
P0351-P0358	P0351-P0358	Ignitor							X	X		X	X					X										X	
P0385	P0385	CKP sensor 2							X	X		X	X					X										X	
P0401	P0401	EGR system (closed)							X	X		X																X	
P0402	P0402	EGR system (open)										X	X					X										X	
P0405,P0409	P0405-P0409	Lift sensor										X	X															X	
P0420,P0430	P0420,P0430	Catalyst										X	X															X	
P0442-P0456	P0442-P0456	EVAP system											X	X					X										
P0450,P0451	P0450-P0453	EVAP press sensor											X	X															

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Monitor detected malfunction	Fault code			Monitor disablement (X – disabled)																									
	Fault code	Component/ system	Fault code	P0325-P0330	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405	P0409	P0420-P0430	P0440-P0446	P0450-P0451	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710	P0720-P0793	P0715-P0717	P0724	P0741-P0796
				P0325-P0333	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405-P0406	P0409	P0420-P0430	P0440-P0446	P0450-P0453	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796
				Knock sensor	CKP sensor	CMP sensor	VVT sensor 1, 2	Ignitor	CKP sensor 2	EGR system (closed)	EGR system (open)	EGR Lift sensor	EGR Lift sensor	Catalyst	EVAP system	EVAP press sensor	VSS (ECT2 sensor)	VSS (ECT1 sensor, non-ECT)	VSS (M/T)	IAC valve	Idle switch	System Voltage	Starter signal	Shift lever position switch	Trans fluid temp sensor	Output speed sensor	Input speed sensor	Stop lamp switch	Trans solenoid (function)*1
P0500	P0500	VSS								X	X			X	X					X							X		
P0511	P0511	IAC valve								X	X																		
P0510	P0510	Idle switch									X		X					X										X	
P0560	P0560	System Voltage																											
P0617	P0617	Starter signal																											
P0705	P0705	Shift lever position switch																											
P0710	P0710-P0713	Trans fluid temp sensor																											
P0720-P0793	P0720-P0793	Output speed sensor																										X	
P0715-P0717	P0715-P0717	Input speed sensor																											
P0724	P0724	Stop lamp switch																											
P0741-P0796	P0741-P0796	Trans solenoid (function)																											
P0748-P0798	P0748-P0798	Trans solenoid (range)																											
P0850	P0850	PNP switch																										X	
P1010,P1020	P1010,P1020	VVTL																											
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1,(2)							X	X			X	X						X									
P1126	P1126	Electronic magnet clutch																											
P1129	P1129	Electronic throttle system																											
P1430	P1430	HC absorber ACT press sensor													X	X													
P2004,6	P2004,6	Intake Manifold Runner Control																											
P2009,10	P2009,10	Intake Manifold Runner Control Circuit																											
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor																											
P2102,P2103	P2102,P2103	Throttle motor																											
P2120-P2138	P2120-P2138	Accel position sensor																											
P2196,P2198	P2196,P2198	A/F sensor (rationality)							X	X			X							X								X	
P2226	P2226	BARO sensor																										X	
P2237,2240	P2237,2240	A/F sensor (open)							X	X			X							X								X	
P2423,24	P2423,24	HC Absorption Catalyst																											
P2430,2,3	P2430,2,3	A/R Pressure Sensor (Low/High)																											
P2431	P2431	A/R Pressure Sensor (Rationality)																											
P2440	P2440	A/R control valve stuck open								X	X			X															
P2441	P2441	A/R control valve stuck close								X	X			X															
P2444	P2444	AIP stuck On							X	X			X																
P2445	P2445	AIP stuck Off							X	X			X																
P2714-P2759	P2714-P2759	Trans solenoid (SLU-SLD)																										X	
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)							X	X			X							X								X	

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Monitor detected malfunction	Fault code		Monitor disablement (X – disabled)																										
	Fault code	Component/ system	Fault code																										
			P0741-P0796	P0746-P0799	P0850	P1010,P1020	P1011,12,(21,22)	P1126	P1129	P1430	P2004,6	P2009,10	P2014,16,17	P2102,P2103	P2120-P2138	P2196,P2198	P2226	P2237,P2240	P2423,24	P2430,2,3	P2431	P2440	P2441	P2444	P2445	P2714-P2759	P2A00,P2A03		
			Trans solenoid (function) *2	Trans solenoid (range)	PNP switch	VVTL	VVTL system1,(2)	Electronic magnet clutch	Electronic throttle system	HC adsorber ACT press sensor	Intake Manifold Runner Control	Intake Manifold Runner Control Circuit	Intake Manifold Runner Position Sensor	Throttle motor	Accel position sensor	A/F Sensor (Rationality) -Sensor1	A/F Sensor (Rationality) -Sensor1	BARO sensor	A/F Sensor (Open) -Sensor1	A/F Sensor (Open) -Sensor1	HC Absorption Catalyst	A/R Pressure Sensor (Low/High)	A/R Pressure Sensor (Rationality)	A/R Pressure Sensor (Rationality)	A/R control valve stuck open	A/R control valve stuck close	A/P stuck On	A/P stuck Off	Trans solenoid (SLU-SLD)
P0010,P0020	P0010,P0020	VVT VSV 1, 2																											
P0011	P0011	VVT System 1 – Advance																				X	X	X	X				
P0012	P0012	VVT System 1 – Retard																					X	X	X	X			
P0016,P0018	P0016,P0018	VVT System – Misalignment																					X	X	X	X			
P0021	P0021	VVT System 2 – Advance																					X	X	X	X			
P0022	P0022	VVT System 2 – Retard																					X	X	X	X			
P0030,50	P0031,32,51,52	O2 Sensor Heater-Sensor1																				X	X	X	X				
P0135,P0155	P0031,32,51,52	A/F Sensor Heater-Sensor1														X			X	X		X	X	X	X			X	
P0036,56	P0037,38,57,58	O2 Sensor Heater-Sensor2													X				X	X									
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater-Sensor3																		X	X								
P0100,P0101	P0100-P0103	MAF sensor				X	X							X			X	X				X	X	X	X	X		X	
P0105,P0106	P0105-P0108	MAP sensor				X	X							X			X	X				X	X	X	X	X		X	
P0110	P0110-P0113	IAT sensor									X			X			X	X				X	X	X	X	X		X	
P0115,P0116	P0115-P0118	ECT sensor	X			X	X			X				X			X	X				X	X	X	X	X		X	
P0120,P0121	P0120-P0223,P2135	TP sensor												X			X	X				X	X	X	X	X		X	
P0125	P0125	Insufficient ECT for Closed Loop	X			X								X			X	X				X	X	X	X	X		X	
P0128	P0128	Thermostat																											
P0130-P0153	P0130-P0153	O2 Sensor-Sensor1																				X	X	X	X				
P0134,P0154	P0134,P0154	O2 Sensor, A/F sensor (No Activity)-Sensor1													X			X	X			X	X	X	X			X	
P0136,P0156	P0136,P0156	O2 Sensor-Sensor2												X			X	X											
P0142,P0162	P0142,P0162	O2 Sensor-Sensor3																				X	X	X	X				
P0171,P0172	P0171,P0172	Fuel system												X			X	X				X	X	X	X			X	
P0300-P0308	P0300-P0308	Misfire												X			X	X				X	X	X	X			X	
P0325,P0330	P0325-P0333	Knock sensor																				X	X	X	X				
P0335	P0335	CKP sensor				X	X							X			X	X				X	X	X	X	X		X	
P0340,P0341	P0340,P0341	CMP sensor				X	X							X			X	X				X	X	X	X	X		X	
P0340-P0346	P0340-P0346	VVT sensor 1, 2																				X	X	X	X				
P0351-P0358	P0351-P0358	Ignitor																				X	X	X	X				
P0385	P0385	CKP sensor 2				X	X							X			X	X				X	X	X	X			X	
P0401	P0401	EGR system (closed)																											
P0402	P0402	EGR system (open)												X			X	X				X	X	X	X			X	
P0405,P0409	P0405-P0409	Lift sensor																				X	X	X	X				
P0420,P0430	P0420,P0430	Catalyst																				X	X	X	X				
P0442-P0456	P0442-P0456	EVAP system												X			X					X	X	X	X			X	
P0450,P0451	P0450-P0453	EVAP press sensor																				X	X	X	X				

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Monitor detected malfunction	Fault code			Monitor disablement (X - disabled)	
	Fault code	Component/system	Fault code	Fault code	
P0500	P0500	VSS	X		
P0511	P0511	IAC valve			
P0510	P0510	Idle switch			
P0560	P0560	System Voltage			
P0617	P0617	Starter signal			
P0705	P0705	Shift lever position switch			
P0710	P0710-P0713	Trans fluid temp sensor			
P0720-P0793	P0720-P0793	Output speed sensor			
P0715-P0717	P0715-P0717	Input speed sensor			
P0724	P0724	Stop lamp switch			
P0741-P0796	P0741-P0796	Trans solenoid (function)			
P0748-P0798	P0748-P0798	Trans solenoid (range)	X		
P0850	P0850	PNP switch			
P1010,P1020	P1010,P1020	VVTL			
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1(,2)			
P1126	P1126	Electronic magnet clutch			
P1129	P1129	Electronic throttle system			
P1430	P1430	HC adsorber ACT press sensor			
P2004,6	P2004,6	Intake Manifold Runner Control			
P2009,10	P2009,10	Intake Manifold Runner Control Circuit			
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor			
P2102,P2103	P2102,P2103	Throttle motor			
P2120-P2138	P2120-P2138	Accel position sensor			
P2196,P2198	P2196,P2198	A/F sensor (rationality)			
P2226	P2226	BARO sensor			
P2237,2240	P2237,2240	A/F sensor (open)			
P2423,24	P2423,24	HC Absorption Catalyst			
P2430,2,3	P2430,2,3	A/R Pressure Sensor (Low/High)			
P2431	P2431	A/R Pressure Sensor (Rationality)			
P2440	P2440	A/R control valve stuck open			
P2441	P2441	A/R control valve stuck close			
P2444	P2444	AIP stuck On			
P2445	P2445	AIP stuck Off			
P2714-P2759	P2714-P2759	Trans solenoid (SLU-SLD)			
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)			

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MONITOR DRIVE PATTERN

1. MONITOR DRIVE PATTERN FOR ECT TEST

- (a) Perform this drive pattern as one method to simulate the detection conditions of the ECT malfunctions. (The DTCs may not be detected due to the actual driving conditions. And some codes may not be detected through this drive pattern.)

HINT:

Preparation for driving

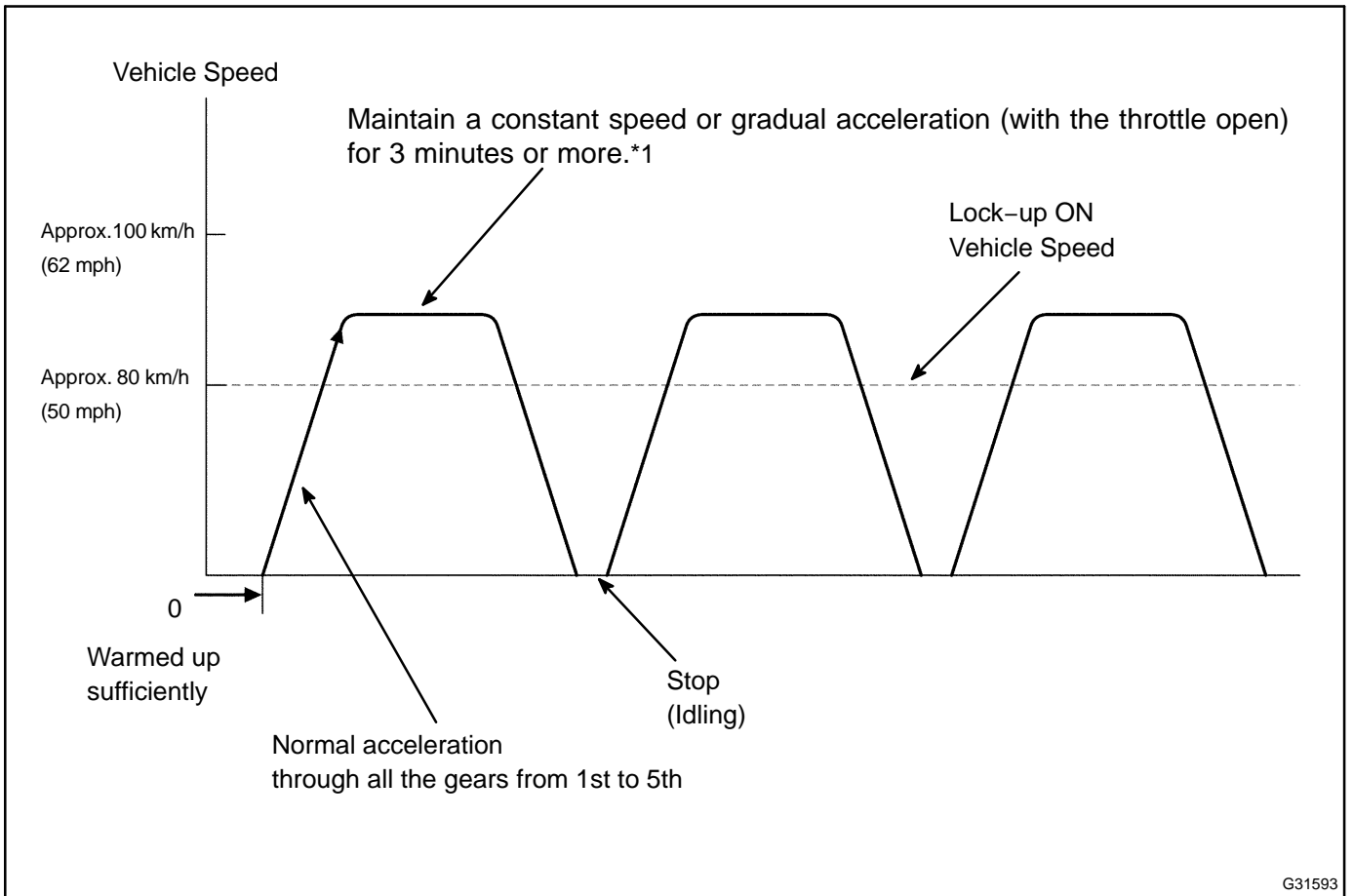
- Warm up the engine sufficiently. (Engine coolant temperature is 60°C (140°F) or higher).
- Drive the vehicle when the atmospheric temperature is –10°C (14°F) or higher. (Malfunction is not detected when the atmospheric temperature is less than –10°C (14°F)).

Notice in driving

- Drive the vehicle through all gears.
Stop → 1st → 2nd → 3rd → 4th → 5th → 5th (lock-up ON).
- Repeat the above driving pattern three times or more.

NOTICE:

- **The monitor status can be checked using the OBD II scan tool. When using the hand-held tester, monitor status can be found in the "ENHANCED OBD II/DATA LIST" or under "CARB OBD II".**
- **In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors), the drive pattern can be resumed and, in most cases, the monitor can be completed.**
- **Perform this drive pattern on a level road as much as possible and strictly observe the posted speed limits and traffic laws while driving.**



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HINT:

*1: Drive at such a speed in the uppermost gear, to engage lock-up. The vehicle can be driven at a speed lower than that in the above diagram under the lock-up condition.

NOTICE:

It is necessary to drive the vehicle for approximately 30 minutes to detect DTC P0711 (ATF temperature sensor malfunction).

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check although the trouble still occurs, check the electrical circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

1. Chapter 1: Electronic Circuit Matrix Chart

- Refer to the table below when the trouble cause is considered to be electrical.
- If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart of each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, check and replace the ECM.

HINT:

*1: When the circuit on which mark *1 is attached is defective, DTC could be output (see page 05-955).

Symptom	Suspected Area	See page
No up-shift (A particular gear, from 1st to 4th gear, is not up-shifted)	6. Shift solenoid valve (S1) circuit *1 7. Shift solenoid valve (S2) circuit *1 8. ECM	05-1021 05-1024 01-36
No up-shift (4th → 5th)	1. Transmission control switch circuit (D - 4) *1 2. Engine coolant temp. sensor circuit *1 3. Speed sensor NT circuit *1 4. Shift solenoid valve (SL1) circuit *1 5. Shift solenoid valve (SL2) circuit *1 6. Shift solenoid valve (SR) circuit *1 7. ECM	05-958 05-60 05-972 05-984 05-1009 05-1027 01-36
No up-shift (3rd → 4th)	1. Engine coolant temp. sensor circuit *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	05-60 05-1024 01-36
No up-shift (1st → 2nd)	1. Transmission control switch circuit (2 - L) *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	05-958 05-1024 01-36
No down-shift (5th → 4th)	1. Transmission control switch circuit (D - 4) *1 2. Shift solenoid valve (SL1) circuit *1 3. Shift solenoid valve (SL2) circuit *1 4. Shift solenoid valve (SR) circuit *1 5. ECM	05-958 05-984 05-1009 05-1027 01-36
No down-shift (2nd → 1st)	1. Transmission control switch circuit (2 - L) *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	05-958 05-1024 01-36
No down-shift (A particular gear, from 1st to 4th gear, is not down-shifted)	1. Shift solenoid valve (S1) circuit *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	05-1021 05-1024 01-36
No lock-up	1. ATF temperature sensor circuit *1 2. Transfer L4 position switch circuit *1 3. Stop light switch circuit *1 4. Speed sensor NT circuit *1 5. Shift solenoid valve (SLU) circuit *1 6. Engine coolant temp. sensor circuit *1 7. ECM	05-964 05-1053 05-981 05-972 05-1049 05-60 01-36
No lock-up off	1. Shift solenoid valve (SLU) circuit *1 2. ECM	05-1049 01-36

Shift point too high or too low	<ol style="list-style-type: none"> 1. Shift solenoid valve (SLT) circuit *1 2. Speed sensor NT circuit *1 3. Speed sensor SP2 circuit *1 4. Throttle position sensor circuit *1 5. ATF temperature sensor circuit *1 6. Transfer L4 position switch circuit *1 7. ECM 	<p>05-1036</p> <p>05-972</p> <p>05-977</p> <p>05-60</p> <p>05-964</p> <p>05-1053</p> <p>01-36</p>
Up-shift to 5th from 4th while shift lever is in 4 position	<ol style="list-style-type: none"> 1. Transmission control switch circuit (D - 4) *1 2. ECM 	<p>05-958</p> <p>01-36</p>
Up-shift to 5th from 4th while engine is cold	<ol style="list-style-type: none"> 1. Engine coolant temp. sensor circuit *1 2. ECM 	<p>05-60</p> <p>01-36</p>
Up-shift to 4th from 3rd while shift lever is in 3 position	<ol style="list-style-type: none"> 1. Park/neutral position switch circuit *1 2. ECM 	<p>05-958</p> <p>01-36</p>
Up-shift to 3rd from 2nd while shift lever is in 2 position	<ol style="list-style-type: none"> 1. Park/neutral position switch circuit *1 2. ECM 	<p>05-958</p> <p>01-36</p>
Up-shift to 2nd from 1st while shift lever is in L position	<ol style="list-style-type: none"> 1. Transmission control switch circuit (2 - L) *1 2. ECM 	<p>05-958</p> <p>01-36</p>
Harsh engagement (N → D)	<ol style="list-style-type: none"> 1. Speed sensor NT circuit *1 2. Shift solenoid valve (SL1) circuit *1 3. Shift solenoid valve (SLT) circuit *1 4. ECM 	<p>05-972</p> <p>05-984</p> <p>05-1036</p> <p>01-36</p>
Harsh engagement (Lock-up)	<ol style="list-style-type: none"> 1. Speed sensor NT circuit *1 2. Speed sensor SP2 circuit *1 3. Shift solenoid valve (SLU) circuit *1 4. ECM 	<p>05-972</p> <p>05-977</p> <p>05-1049</p> <p>01-36</p>
Harsh engagement (Any driving position)	ECM	01-36
Poor acceleration	<ol style="list-style-type: none"> 1. ATF temperature sensor No.2 circuit 2. Engine coolant temp. sensor circuit *1 3. Shift solenoid valve (SLT) circuit *1 4. ECM 	<p>05-1039</p> <p>05-60</p> <p>05-1036</p> <p>01-36</p>
No engine braking	ECM	01-36
No kick-down	ECM	01-36
Engine stalls when starting off or stopping	<ol style="list-style-type: none"> 1. Shift solenoid valve (SLU) circuit *1 2. ECM 	<p>05-1049</p> <p>01-36</p>
AT Oil Temp. warning light remains on	<ol style="list-style-type: none"> 1. ATF temperature sensor No.2 circuit 2. Engine coolant temp. sensor circuit *1 3. ECM 	05-1039
Lock-up at 3rd gear		05-60
Shift point too high		01-36
No 2nd start	<ol style="list-style-type: none"> 1. Pattern select switch circuit (2nd start switch) 2. Park/neutral position switch circuit *1 3. ECM 	<p>05-1057</p> <p>05-958</p> <p>01-36</p>
A/T.P. indicator light does not light up	<ol style="list-style-type: none"> 1. A/T.P. indicator light circuit 2. Combination meter circuit 	<p>05-1060</p> <p>05-2042</p>
Malfunction in shifting	<ol style="list-style-type: none"> 1. Park/neutral position switch circuit *1 2. ECM 	<p>05-958</p> <p>01-36</p>

2. Chapter 2: On-Vehicle Repair

(★: A750E, A750F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM999U)

Symptom	Suspected Area	See page
Vehicle does not move with shift lever in any forward position and reverse position	1. Transmission control cable 2. Manual valve 3. Parking lock pawl 4. Off-vehicle repair matrix chart	40-45 ★ ★ -
Vehicle does not move with shift lever in R position	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No up-shift (1st → 2nd)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No up-shift (2nd → 3rd)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No up-shift (3rd → 4th)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No up-shift (4th → 5th)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No down-shift (5th → 4th)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No down-shift (4th → 3rd)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No down-shift (3rd → 2nd)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No down-shift (2nd → 1st)	1. Valve body assy 2. Off-vehicle repair matrix chart	40-31 -
No lock-up or No lock-up off	1. Shift solenoid valve (SLU) 2. Valve body assy 3. Off-vehicle repair matrix chart	05-1043 40-31 -
Harsh engagement (N → D)	1. Shift solenoid valve (SL1) 2. Valve body assy 3. C ₁ accumulator 4. Off-vehicle repair matrix chart	05-984 40-31 ★ -
Harsh engagement (Lock-up)	1. Shift solenoid valve (SLU) 2. Valve body assy 3. Off-vehicle repair matrix chart	05-1043 40-31 -
Harsh engagement (N → R)	1. Shift solenoid valve (SLT) 2. Shift solenoid valve (SLU) 3. Valve body assy 4. C ₃ accumulator 5. Off-vehicle repair matrix chart	05-1031 05-1043 40-31 ★ -
Harsh engagement (1st → 2nd → 3rd → 4th → 5th)	1. Shift solenoid valve (SLT) 2. Shift solenoid valve (SL1) 3. Valve body assy	05-1031 05-984 40-31
Harsh engagement (1st → 2nd)	1. Valve body assy 2. B ₃ accumulator 3. Off-vehicle repair matrix chart	40-31 ★ -
Harsh engagement (2nd → 3rd)	1. Valve body assy 2. C ₃ accumulator 3. Off-vehicle repair matrix chart	40-31 ★ -
Harsh engagement (3rd → 4th)	1. Valve body assy 2. C ₂ accumulator 3. Off-vehicle repair matrix chart	40-31 ★ -

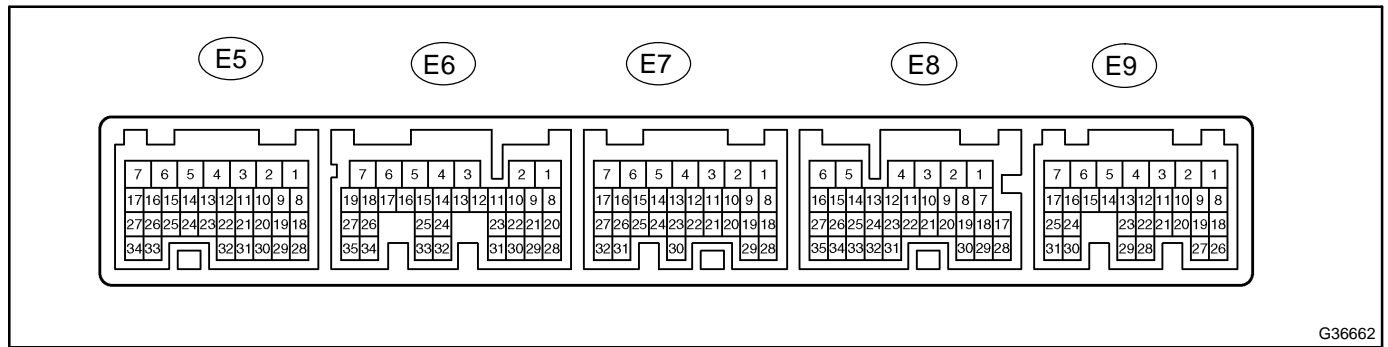
Harsh engagement (4th → 5th)	<ol style="list-style-type: none"> 1. Shift solenoid valve (SL1) 2. Shift solenoid valve (SL2) 3. Valve body assy 4. Off-vehicle repair matrix chart 	<p>05-984 05-1003 40-31 -</p>
Harsh engagement (5th → 4th)	<ol style="list-style-type: none"> 1. Shift solenoid valve (SL1) 2. Shift solenoid valve (SL2) 3. Valve body assy 4. Off-vehicle repair matrix chart 	<p>05-984 05-1003 40-31 -</p>
Slip or shudder (Forward and reverse)	<ol style="list-style-type: none"> 1. Transmission control cable 2. Valve body assy 3. Oil strainer 4. Off-vehicle repair matrix chart 	<p>40-45 40-31 40-31 -</p>
No engine braking (1st: L position)	<ol style="list-style-type: none"> 1. Valve body assy 2. Off-vehicle repair matrix chart 	<p>40-31 -</p>
No engine braking (2nd: 2 position)	<ol style="list-style-type: none"> 1. Valve body assy 2. Off-vehicle repair matrix chart 	<p>40-31 -</p>
No kick-down	Valve body assy	40-31
Shift point too high or too low	<ol style="list-style-type: none"> 1. Shift solenoid valve (SLT) 2. Shift solenoid valve (SL1) 3. Valve body assy 	<p>05-1031 05-984 40-31</p>
Poor acceleration	<ol style="list-style-type: none"> 1. Shift solenoid valve (SLT) 2. Valve body assy 	<p>05-1031 40-31</p>
Engine stalls when starting off or stopping	<ol style="list-style-type: none"> 1. Shift solenoid valve (SLU) 2. Valve body assy 	<p>05-1043 40-31</p>

3. Chapter 3: Off-Vehicle Repair (★: A750E, A750F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM999U)

Symptom	Suspected Area	See page
Vehicle does not move with shift lever in any forward position and reverse position	1. Rear planetary gear unit 2. Torque converter clutch	★ 40-24
Vehicle does not move with shift lever in R position	1. Brake No.4 (B ₄) 2. Clutch No.3 (C ₃) 3. One-way clutch No.1 (F ₁)	★ ★ ★
No up-shift (1st → 2nd)	1. Brake No.3 (B ₃) 2. One-way clutch No.1 (F ₁) 3. One-way clutch No.2 (F ₂)	★ ★ ★
No up-shift (2nd → 3rd)	Clutch No.3 (C ₃)	★
No up-shift (3rd → 4th)	Clutch No.2 (C ₂)	★
No up-shift (4th → 5th)	1. Brake No.1 (B ₁) 2. Clutch No.1 (C ₁)	★ ★
No lock-up or No lock-up off	Torque converter clutch	40-24
Harsh engagement (N → D)	1. Clutch No.1 (C ₁) 2. One-way clutch No.3 (F ₃)	★ ★
Harsh engagement (N → R)	1. Clutch No.3 (C ₃) 2. Brake No.4 (B ₄) 3. One-way clutch No.1 (F ₁)	★ ★ ★
Harsh engagement (1 → 2)	1. Brake No.3 (B ₃) 2. One-way clutch No.1 (F ₁) 3. One-way clutch No.2 (F ₂)	★ ★ ★
Harsh engagement (2 → 3)	Clutch No.3 (C ₃)	★
Harsh engagement (3 → 4)	Clutch No.2 (C ₂)	★
Harsh engagement (4 → 5th)	1. Brake No.1 (B ₁) 2. Clutch No.1 (C ₁)	★ ★
Harsh engagement (Lock-up)	Torque converter clutch	40-24
Slip or shudder (Forward and reverse: After warm-up)	1. One-way clutch No.1 (F ₁) 2. Clutch No.3 (C ₃) 3. Torque converter clutch	★ ★ ★
Slip or shudder (Particular position: Just after engine starts)	Torque converter clutch	40-24
Slip or shudder (R position)	1. Brake No.4 (B ₄) 2. One-way clutch No.1 (F ₁) 3. Clutch No.3 (C ₃)	★ ★ ★
Slip or shudder (1st)	1. Clutch No.1 (C ₁) 2. One-way clutch No.3 (F ₃)	★ ★
Slip or shudder (2nd)	1. Clutch No.1 (C ₁) 2. Brake No.3 (B ₃) 3. One-way clutch No.1 (F ₁) 4. One-way clutch No.2 (F ₂)	★ ★ ★ ★
Slip or shudder (3rd)	1. Clutch No.1 (C ₁) 2. Clutch No.3 (C ₃) 3. One-way clutch No.1 (F ₁)	★ ★ ★
Slip or shudder (4th)	1. Clutch No.1 (C ₁) 2. Clutch No.2 (C ₂)	★ ★
Slip or shudder (5th)	1. Clutch No.2 (C ₂) 2. Clutch No.3 (C ₃) 3. Brake No.1 (B ₁)	★ ★ ★
No engine braking (1st – 4th: D position)	Clutch No.1 (C ₁)	★

No engine braking (1st: L position)	Brake No.4 (B ₄)	★
No engine braking (2nd: 2 position)	Brake No.2 (B ₂)	★
No engine braking (3rd: 3 position)	Brake No.1 (B ₁)	★
Poor acceleration (All positions)	Torque converter clutch	40-24
Poor acceleration (5th)	1. Clutch No.1 (C ₁)	★
	2. Clutch No.3 (C ₃)	★
	3. Brake No.1 (B ₁)	★
	4. Front planetary gear unit	★
Engine stalls when starting off or stopping	Torque converter clutch	40-24

TERMINALS OF ECM



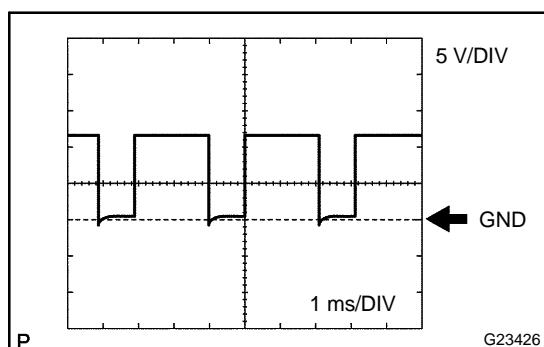
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HINT:

Each ECM terminal's standard voltage is shown in the table below. In the table, first follow the information under "Condition". Look under "Symbols (Terminal No.)" for the terminals to be inspected. The standard voltage between the terminals is shown under "Specific Condition". Use the illustration above as a reference for the ECM terminals.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
L4 (E7-13) – E1 (E7-1)	G-W – BR	Transfer L position switch signal	IG switch ON and transfer shift lever L position	Below 1 V
↑	↑	↑	IG switch ON and transfer shift lever except L position	10 to 14 V
TFN (E6-25) – E1 (E7-1)	G – BR	Transfer N position switch signal	IG switch ON and transfer shift lever N position	Below 1 V
↑	↑	↑	IG switch ON and transfer shift lever except N position	10 to 14 V
L (E8-9) – E1 (E7-1)	G-R – BR	L shift position switch signal	IG switch ON and shift lever L position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except L position	Below 1 V
2 (E8-10) – E1 (E7-1)	G-R – BR	2 shift position switch signal	IG switch ON and shift lever 2 and L position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except 2 and L position	Below 1 V
R (E8-11) – E1 (E7-1)	R-B – BR	R shift position switch signal	IG switch ON and shift lever R position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except R position	Below 1 V
D (E8-21) – E1 (E7-1)	G – BR	D shift position switch signal	IG switch ON and shift lever D and 4 position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except D and 4 position	Below 1 V
3 (E8-19) – E1 (E7-1)	G-O – BR	3 shift position switch signal	IG switch ON and shift lever 3 position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except 3 position	Below 1 V
4 (E8-20) – E1 (E7-1)	P-L – BR	4 shift position switch signal	IG switch ON and shift lever 4 position	10 to 14 V
↑	↑	↑	IG switch ON and shift lever except 4 position	Below 1 V

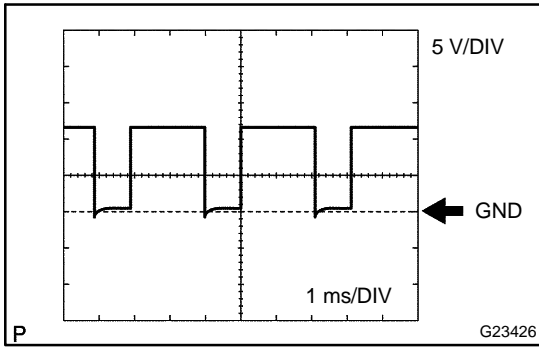
STP (E9-15) – E1 (E7-1)	G-Y – BR	Stop lamp switch signal	Brake pedal is depressed	7.5 to 14 V
↑	↑	↑	Brake pedal is released	Below 1.5 V
SLU+ (E6-15) – SLU- (E6-14)	G-B – R-L	SLU solenoid signal	5th (lock-up) gear	Pulse generation (See waveform 2)
S2 (E6-10) – E1 (E7-1)	W-L – BR	S2 solenoid signal	2nd or 3rd gear	10 to 14 V
↑	↑	↑	1st, 4th or 5th gear	Below 1 V
S1 (E6-11) – E1 (E7-1)	GR – BR	S1 solenoid signal	1st or 2nd gear	10 to 14 V
↑	↑	↑	3rd, 4th or 5th gear	Below 1 V
SLT+ (E6-13) – SLT- (E6-12)	W-G – B-Y	SLT solenoid signal	Engine idle speed	Pulse generation (See waveform 1)
SR (E6-9) – E1 (E7-1)	Y-R – BR	SR solenoid signal	5th gear	10 to 14 V
↑	↑	↑	1st gear	Below 1 V
SL2+ (E6-17) – SL2- (E6-16)	LG-B – P-L	SL2 solenoid signal	Engine idle speed	Pulse generation (See waveform 3)
SL1+ (E6-19) – SL1- (E6-18)	Y-G – L-Y	SL1 solenoid signal	Engine idle speed	Pulse generation (See waveform 4)
THO1 (E6-24) – E2 (E5-28)	L-R – BR	No.1 ATF temperature sensor signal	No.1 ATF temperature: 115°C (239 °F) or more	Below 1.5 V
THO2 (E6-32) – E2 (E5-28)	Y-G – BR	No.2 ATF temperature sensor signal	No.2 ATF temperature: 115°C (239 °F) or more	Below 1.5 V
SP2+ (E6-34) – SP2- (E6-26)	R – G	Speed sensor (SP2) signal	Vehicle speed 20 km/h (12 mph)	Pulse generation (See waveform 6)
NT+ (E6-35) – NT- (E6-27)	L – Y	Speed sensor (NT) signal	Engine idle speed	Pulse generation (See waveform 5)
STAR/NSW (E6-8) – E1 (E7-1)	L-Y – BR	Park neutral switch signal	IG switch ON and shift lever P and N position	Below 2 V
↑	↑	↑	IG switch ON and shift lever except P and N position	10 to 14 V
SNWI (E8-27) – E1 (E7-1)	GR-L – BR	2nd STRT switch signal	IG switch ON	10 to 14 V
↑	↑	↑	IG switch ON and Press continuously 2nd STRT switch	Below 1 V



Waveform 1

Reference:

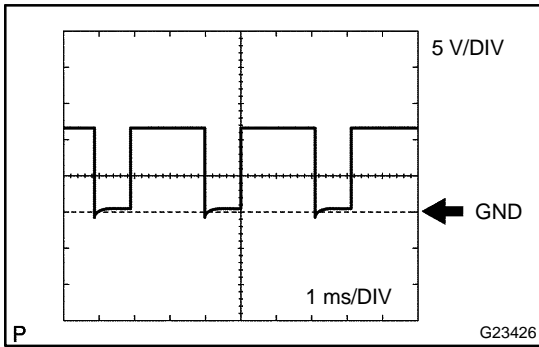
Terminal	SLT+ – SLT-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Waveform 2

Reference:

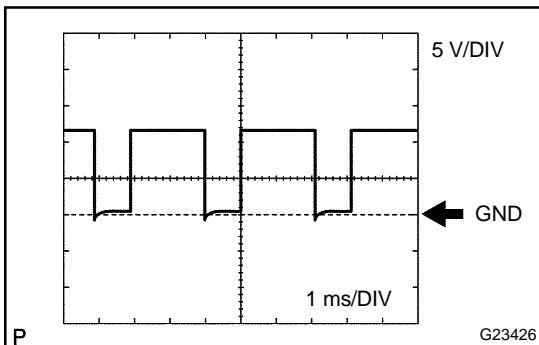
Terminal	SLU+ - SLU-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	5th (lock-up) or 6th (lock-up) gear



Waveform 3

Reference:

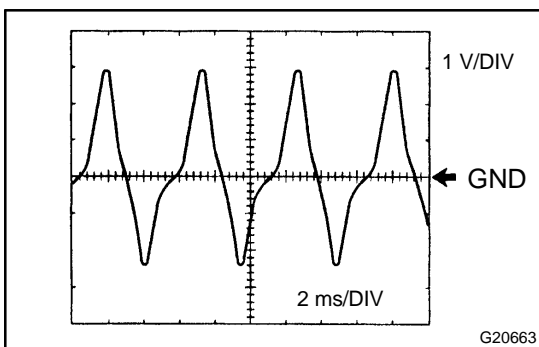
Terminal	SL2+ - SL2-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Waveform 4

Reference:

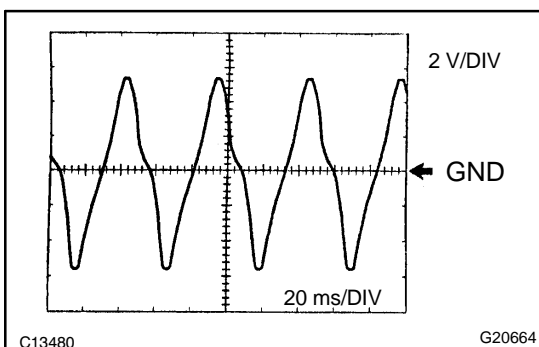
Terminal	SL1+ - SL1-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Waveform 5

Reference:

Terminal	NT+ - NT-
Tool setting	1V/DIV, 2ms/DIV
Vehicle condition	Engine idle speed (P or N position)



Waveform 6

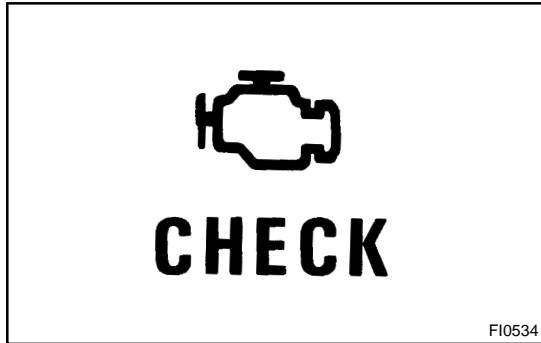
Reference:

Terminal	SP2+ - SP2-
Tool setting	2V/DIV, 20ms/DIV
Vehicle condition	Vehicle speed 20 km/h (12 mph)

DIAGNOSIS SYSTEM

DESCRIPTION

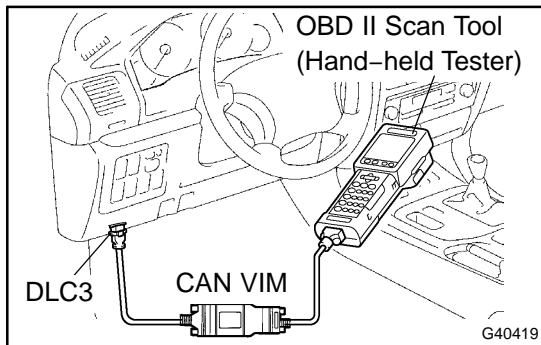
When troubleshooting On-Board Diagnostic (OBD II) vehicles, the vehicle must be connected to the OBD II scan tool (complying with SAE J1987). Various data output from the vehicle's ECM can then be read.



OBD II regulations require that the vehicle's on-board computer illuminates the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in:

- 1) The emission control system/components
- 2) The powertrain control components (which affect vehicle emissions)
- 3) The computer

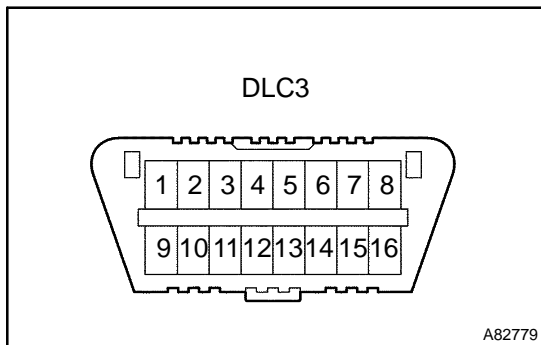
In addition, the applicable Diagnostic Trouble Codes (DTCs) prescribed by SAE J2012 are recorded in the ECM memory. If the malfunction does not reoccur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.



To check DTCs, connect the scan tool to the Data Link Connector 3 (DLC3) of the vehicle. The scan tool displays DTCs, the freeze frame data and a variety of the engine data. The DTCs and freeze frame data can be erased with the scan tool (see page 05-946).

NORMAL MODE AND CHECK MODE

The diagnosis system operates in "normal mode" during normal vehicle use. In normal mode, "2-trip detection logic" is used to ensure accurate detection of malfunctions. "Check mode" is also available to technicians as an option. In check mode, "1-trip detection logic" is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent malfunctions.

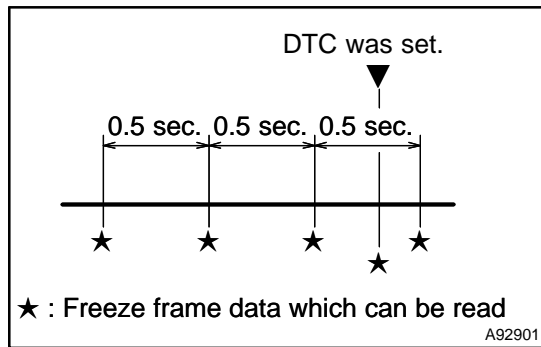


2-TRIP DETECTION LOGIC

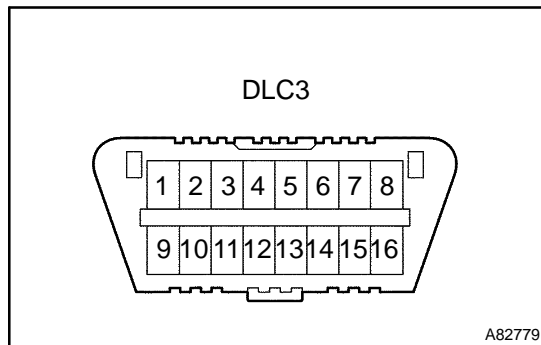
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the ignition switch is turned OFF and then ON again, and the same malfunction is detected again, the MIL will illuminate.

FREEZE FRAME DATA

Freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air/fuel ratio was Lean or Rich, and other data from the time the malfunction occurred.



The hand-held tester records freeze frame data in five different instances: 1) 3 times before the DTC is set, 2) once when the DTC is set, and 3) once after the DTC is set. These data can be used to simulate the vehicle's condition around the time when the malfunction occurred. The data may help find the cause of the malfunction, or judge if the DTC is being caused by a temporary malfunction or not.



DLC3 (Data Link Connector 3)

The vehicle's ECM uses the ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

HINT:

Connect the cable of the hand-held tester to the DLC3, turn the ignition switch ON and attempt to use the hand-held tester. If the screen displays UNABLE TO CONNECT TO VEHICLE, a problem exists in the vehicle side or the tester side.

If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.

If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.

Symbol	Terminal No.	Name	Reference terminal	Result	Condition
SIL	7	Bus "+" line	5 – Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	Below 1 Ω	Always
SG	5	Signal ground	Body ground	Below 1 Ω	Always
BAT	16	Battery positive	Body ground	11 to 14 V	Always
CANH	6	HIGH-level CAN bus line	CANL	54 to 69 Ω	IG switch OFF
CANH	6	HIGH-level CAN bus line	Battery positive	1 MΩ or higher	IG switch OFF
CANH	6	HIGH-level CAN bus line	CG	1 kΩ or higher	IG switch OFF
CANL	14	LOW-level CAN bus line	Battery positive	1 MΩ or higher	IG switch OFF
CANL	14	LOW-level CAN bus line	CG	1 kΩ or higher	IG switch OFF

CHECK BATTERY VOLTAGE**Battery voltage: 11 to 14 V**

If voltage is below 11 V, replace the battery before proceeding.

CHECK MIL

- (a) Check that the MIL illuminates when turning the ignition switch ON.

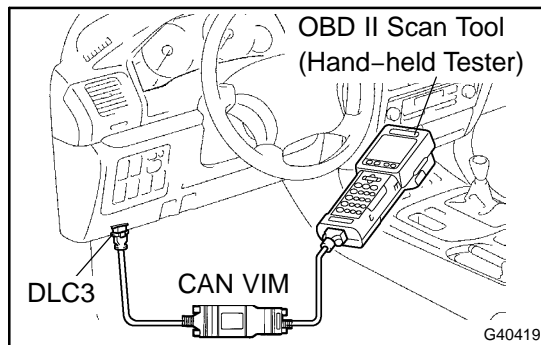
If the MIL does not illuminate, there is a problem in the MIL circuit (refer to MIL CIRCUIT on page [05-463](#))

- (b) When the engine is started, the MIL should turn off.

ALL READINESS

For this vehicle, using the hand-held tester allows readiness codes corresponding to all DTCs to be read. When diagnosis (normal or malfunctioning) has been complete, readiness codes are set. Enter the following menus: ENHANCED OBD II/ MONITOR STATUS on the hand-held tester.

DTC CHECK/CLEAR



1. CHECK DTC

DTCs which are stored in the ECM can be displayed with the hand-held tester or generic OBD II scan tool.

These scan tools can display pending DTCs and current DTCs. Some DTC aren't stored if the ECM doesn't detect a malfunction during consecutive driving. However, the detected malfunction during once driving is stored as pending DTC.

- (a) Connect the hand-held tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the Data Link Connector 3 (DLC3).
- (b) Turn the ignition switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES (or PENDING CODE).
- (d) Confirm the DTCs and freeze frame data and then write them down.
- (e) See page 05-955 to confirm the details of the DTCs.

NOTICE:

When simulating a symptom with the scan tool to check for DTCs, use normal mode. For codes on DIAGNOSTIC TROUBLE CODE CHART subject to "2-trip detection logic", perform the following actions.

Turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL illuminates and the DTCs are recorded in the ECM.

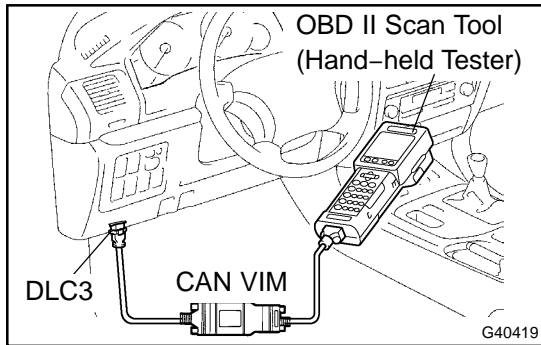
2. CLEAR DTC

- (a) Connect the hand-held tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES and press YES.

CHECK MODE PROCEDURE

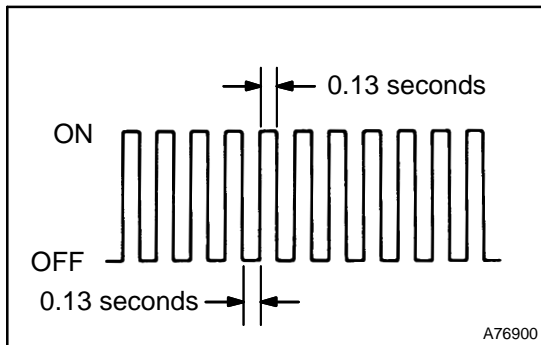
DESCRIPTION

Check mode has a higher sensitivity to malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect. In check mode, DTCs are detected with 1-trip detection logic.



CHECK MODE PROCEDURE

- (a) Make sure that the items below are true:
 - (1) Battery positive voltage 11 V or more
 - (2) Throttle valve fully closed
 - (3) Transmission in the P or N position
 - (4) A/C switched OFF
- (b) Turn the ignition switch OFF.
- (c) Connect the hand-held tester together with the Controller Area Network Vehicle Interface Module (CAN VIM) to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / CHECK MODE.
- (f) Change the ECM to check mode. Make sure the MIL flashes as shown in the illustration.



NOTICE:

All DTCs and freeze frame data recorded will be erased if:
1) the hand-held tester is used to change the ECM from normal mode to check mode or vice-versa; or 2) during check mode, the ignition switch is turned from ON to ACC or LOCK.

Before check mode, make notes of the DTCs and freeze frame data.

- (g) Start the engine. The MIL should turn off after the engine starts.
- (h) Perform "MONITOR DRIVE PATTERN" for the ECT test (see page 05-932).
 (Or, simulate the conditions of the malfunction described by the customer).
- (i) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTC and freeze frame data.

FAIL-SAFE CHART**1. FAIL-SAFE**

This function minimizes the loss of the ECT functions when any malfunction occurs in a sensor or solenoid.

Malfunction Part	Function
Output Speed Sensor (SP2)	During an output speed sensor malfunction, shift control is effected through the input speed sensor signal (NT).
ATF Temp. Sensor No. 1	During an ATF temperature sensor No. 1 malfunction, up-shift to the 5th and flex lock-up clutch control are prohibited.
Shift Solenoid Valve S1, S2 and SR	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves with normal operation. Shift control is effected depending on the failed solenoid as described in the table on the next page.
Shift Solenoid Valve SL1 and SL2	During a solenoid valve SL1 or SL2 malfunction, up-shift to the 5th is prohibited.
Shift Solenoid Valve SLU	During a solenoid valve SLU malfunction, the current to the solenoid valve is stopped. This stops lock-up control and flex lock-up control, fuel economy decreases.
Shift Solenoid Valve SLT	During a solenoid valve SLT malfunction, the current to the solenoid valve is stopped. This stops line pressure optimal control, the shift shock increases. However, shifting is effected through normal clutch pressure control.

Fail Safe Function:

If either of the shift solenoid valve circuits has an open or short failure, the ECM turns the other shift solenoid "ON" and "OFF" in order to shift into the gear positions shown in the table below.

In case of a short circuit, the ECM stops sending current to the short circuited solenoid.

Even if starting the engine again in the fail-safe mode, the gear position remains in the same position.

○: ON

X: OFF

→: Condition in the electrical malfunction is shown on the left of "→".

Condition in the fail-safe mode is shown on the right of "→".

(E/B): Engine brake.

Position	NORMAL						S1 OFF						S2 OFF						SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	○	X	X	X	○	R	X	X	X	X	○	R	○	X	X	X	○	R	○	X	X	X	○
"D"	1 st	○	X	X	X	○	4 th ↓ 3 rd	X	X	X	X	○	1 st	○	X	X	X	○	1 st	○	X	X	X	○
	2 nd	○	○	X	X	○	3 rd	X	○	X	X	○	1 st ↓ 4 th	○	X	X	X	○	2 nd	○	○	X	X	○
	3 rd	X	○	X	X	○	3 rd	X	○	X	X	○	4 th	X	X	X	X	○	3 rd	X	○	X	X	○
	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○
	5 th	X	X	○	○	X	5 th	X	X	○	○	X	5 th	X	X	○	○	X	4 th	X	X	X	○	X
"3"	1 st	○	X	X	X	○	3 rd ↓ 3 rd E/B	X	X	X	X	○	1 st	○	X	X	X	○	1 st	○	X	X	X	○
	2 nd	○	○	X	X	○	3 rd ↓ 3 rd E/B	X	○	X	X	○	1 st ↓ 3 rd E/B	○	X	X	X	○	2 nd	○	○	X	X	○
	3 rd E/B	X	○	X	X	X	3 rd E/B	X	○	X	X	X	3 rd E/B	X	X	X	X	X	3 rd E/B ↓ 3 rd	X	○	X	X	X
	4 th	X	X	○	X	○	4 th	X	X	○	X	○	4 th	X	X	○	X	○	3 rd	X	X	X	X	○
	5 th	X	X	○	○	X	5 th	X	X	○	○	X	5 th	X	X	○	○	X	3 rd E/B ↓ 3 rd	X	X	X	○	X
"2"	1 st	○	X	X	X	○	1 st	X	X	X	X	○	1 st	○	X	X	X	○	1 st	○	X	X	X	○
	2 nd E/B	○	○	○	X	X	3 rd E/B	X	○	○	X	X	2 nd E/B ↓ 4 th	○	X	○	X	X	2 nd	○	○	X	X	X
	3 rd E/B	X	○	○	X	X	3 rd E/B	X	○	○	X	X	Fail 4th	X	X	○	X	X	2 nd	X	○	X	X	X
	4 th	X	X	○	X	○	4 th	X	X	○	X	○	4 th	X	X	○	X	○	1 st ↓ 2 nd	X	X	X	X	○
	5 th	X	X	○	○	X	5 th	X	X	○	○	X	5 th	X	X	○	○	X	1 st E/B ↓ 2 nd	X	○	X	○	X
"L"	1 st E/B	○	X	X	X	X	1 st E/B	X	X	X	X	X	1 st E/B	○	X	X	X	X	1 st E/B	○	X	X	X	X
	2 nd E/B	○	○	○	X	X	3 rd E/B	X	○	○	X	X	2 nd E/B ↓ 4 th	○	X	○	X	X	2 nd	○	○	X	X	X
	3 rd E/B	X	○	○	X	X	3 rd E/B	X	○	○	X	X	Fail 4 th	X	X	○	X	X	2 nd	X	○	X	X	X
	4 th	X	X	○	X	○	4 th	X	X	○	X	○	4 th	X	X	○	X	○	1 st ↓ 2 nd	X	X	X	X	○
	5 th	X	X	○	○	X	5 th	X	X	○	○	X	5 th	X	X	○	○	X	1 st E/B ↓ 2 nd	X	X	X	○	X

○: ON

X: OFF

→: Condition in the electrical malfunction is shown on the left of "→".

Condition in the fail-safe mode is shown on the right of "→".

(E/B): Engine brake.

Position	S1 S2 OFF						S2 SR OFF						S1 SR OFF						S1 S2 SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	X	X	X	X	○	R	○	X	X	X	○	R	X	X	X	X	○	R	X	X	X	X	○
"D"	4 th	X	X	X	X	○	1 st	○	X	X	X	○	4 th ↓ 3 rd	X	X	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	1 st ↓ 4 th	○	X	X	X	○	3 rd	X	○	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	4 th	X	X	X	X	○	3 rd	X	○	X	X	○	4 th	X	X	X	X	○
	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○	4 th	X	X	X	X	○
	5 th	X	X	○	○	X	4 th	X	X	X	○	X	4 th	X	X	X	○	X	4 th	X	X	X	○	X
"3"	3 rd ↓ 3 rd E/B	X	X	X	X	○	1 st	○	X	X	X	○	3 rd	X	X	X	○	3 rd	X	X	X	X	○	
	3 rd ↓ 3 rd E/B	X	X	X	X	○	1 st ↓ 3 rd	○	X	X	X	○	3 rd	X	○	X	X	○	3 rd	X	X	X	X	○
	3 rd E/B	X	X	X	X	X	3 rd E/B ↓ 3 rd	X	X	X	X	○	3 rd E/B ↓ 3 rd	X	○	X	X	○	3 rd E/B ↓ 3 rd	X	X	X	X	○
	4 th	X	X	○	X	○	3 rd	X	X	X	X	○	3 rd	X	X	X	○	3 rd	X	X	X	X	○	
	5 th	X	X	○	○	X	1 st E/B ↓ 3 rd	X	X	X	○	X	3 rd E/B ↓ 3 rd	X	X	X	○	X	3 rd E/B ↓ 3 rd	X	X	X	○	X
"2"	1 st	X	X	X	X	○	1 st	○	X	X	X	○	1 st	X	X	X	X	○	1 st	X	X	X	X	○
	Fail 4 th	X	X	○	X	X	1 st E/B ↓ 1 st	○	X	X	X	○	2 nd	X	○	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	○
	Fail 4 th	X	X	○	X	X	1 st E/B ↓ 1 st	X	X	X	X	○	2 nd	X	○	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	○
	4 th	X	X	○	X	○	1 st	○	X	X	X	○	1 st ↓ 2nd	X	X	X	○	1 st	X	X	X	X	○	
	5 th	X	X	○	○	X	1 st E/B ↓ 1 st	X	X	X	○	X	1 st E/B ↓ 2nd	X	X	X	○	X	1 st E/B ↓ 1 st	X	X	X	○	X
"L"	1 st E/B	X	X	X	X	X	1 st E/B	○	X	X	X	X	1 st E/B	X	X	X	X	X	1 st E/B	X	X	X	X	X
	Fail 4 th	X	X	○	X	X	1 st E/B ↓ 1 st	○	X	X	X	○	2 nd	X	○	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	○
	Fail 4 th	X	X	○	X	X	1 st E/B ↓ 1 st	X	X	X	X	○	2 nd	X	○	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	○
	4 th	X	X	○	X	○	1 st	○	X	X	X	○	1 st ↓ 2nd	X	X	X	○	1 st	X	X	X	X	○	
	5 th	X	X	○	○	X	1 st E/B ↓ 1 st	X	X	X	○	X	1 st E/B ↓ 2nd	X	X	X	○	X	1 st E/B ↓ 1 st	X	X	X	○	X

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Warm up the engine.
- Turn the ignition switch off.
- Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- Turn the ignition switch to the ON position.
- Turn on the tester.
- Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop light SW Status/ ON or OFF	<ul style="list-style-type: none"> Brake Pedal is depressed: ON Brake Pedal is released: OFF 	–
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P and N: ON Except P and N: OFF	When the shift lever position displayed on the hand-held tester differs from the actual position, adjustment of the PNP switch or the shift cable may be incorrect. HINT: When the failure still occurs even after adjusting these parts, see page 05-958 .
LOW	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	↑
2ND	PNP SW Status/ ON or OFF	Shift lever position is; 2 and L: ON Except 2 and L: OFF	↑
3RD	PNP SW Status/ ON or OFF	Shift lever position is; 3: ON Except 3: OFF	↑
4th/DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; 4: ON Except 4: OFF	↑
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	↑
DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	↑
SHIFT	Actual Gear Position/ 1st, 2nd, 3rd, 4th or 5th	Shift lever position is; <ul style="list-style-type: none"> L: 1st 2: 1st or 2nd 3: 1st, 2nd or 3rd 4: 1st, 2nd, 3rd or 4th D: 1st, 2nd, 3rd, 4th or 5th 	–
LOCK UP SOL	Lock Up Solenoid Status/ ON or OFF	<ul style="list-style-type: none"> Lock Up: ON Except Lock Up: OFF 	–

SOLENOID (SLT)	Shift Solenoid SLT Status/ ON or OFF	<ul style="list-style-type: none"> • Accelerator pedal is depressed: OFF • Accelerator pedal is released: ON 	-
SOLENOID (SLU)	Shift Solenoid SLU Status/ ON or OFF	<ul style="list-style-type: none"> • Lock Up: ON • Except Lock Up: OFF 	-
AT FLUID TEMP	ATF Temp. Sensor No.1 Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak 	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor No.1 circuit is open or shorted.
AT FLUID TEMP 2	ATF Temp. Sensor No.2 Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak 	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor No.2 circuit is open or shorted.
SPD (SP2)	Output shaft Speed/ min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Vehicle stopped: 0 km/h (0 mph) [HINT] Equal to vehicle speed	-
SPD (NT)	Input Turbine Speed/ display: 50 r/min	<p>[HINT]</p> <ul style="list-style-type: none"> • Lock-up ON (After warming up the engine); Input Turbine speed (NT) equal to the engine speed. • Lock-up OFF (Idling at N position); Input Turbine speed (NT) nearly equal to the engine speed. 	-
SNOW SW	Pattern SW (2nd STRT) Status/ ON or OFF	<ul style="list-style-type: none"> • IG SW ON: OFF ↓ • Pattern SW (2nd STRT) Push: ON ↓ • Pattern SW (2nd STRT) Push: OFF 	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] <ul style="list-style-type: none"> • IDL: ON • Less than 50 km/h (31 mph) [Others] <ul style="list-style-type: none"> • Press "→" button: Shift up • Press "←" button: Shift down 	Possible to check the operation of the shift solenoid valves.
LOCK UP	[Test Details] Control the shift solenoid SLU to set the automatic transmission to the lock-up condition. [Vehicle Condition] <ul style="list-style-type: none"> • Throttle valve opening angle: Less than 35% • Vehicle Speed: 60 km/h (37 mph) or more 	Possible to check the SLU operation.
LINE PRESS UP *	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] <ul style="list-style-type: none"> • Vehicle Stopped. • IDL: ON [HINT] OFF: Line pressure up (When the active test of "Control the Line Pressure Up" is performed, the ECM commands the SLT solenoid to turn off). ON: No action (normal operation)	-

*: "LINE PRESS UP" in the ACTIVE TEST is performed to check the line pressure changes by connecting the SST to the automatic transmission, which is used in the HYDRAULIC TEST (see page 05-920) as well.

HINT:

The pressure values in ACTIVE TEST and HYDRAULIC TEST are different from each other.

DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the page given.

HINT:

- *1: ● ... The MIL (Malfunction Indicator Lamp) lights up
- *2: ○ ... The ECM memorizes the trouble code if the ECM detects the DTC detection condition.
- This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

DTC No. (See Page)	Detection Item	Trouble Area	MIL *1	Memory *2
P0500 (05-261)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> • Open or short in speed sensor (SP2) circuit • Speed sensor (SP2) • ECM 	●	○
P0705 (05-958)	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	<ul style="list-style-type: none"> • Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM 	●	○
P0710 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit	<ul style="list-style-type: none"> • Open or short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM 	●	○
P0711 (05-969)	Transmission Fluid Temperature Sensor "A" Performance	<ul style="list-style-type: none"> • Transmission wire (ATF temperature sensor No.1) 	●	○
P0712 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit Low Input	<ul style="list-style-type: none"> • Short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM 	●	○
P0713 (05-964)	Transmission Fluid Temperature Sensor "A" Circuit High Input	<ul style="list-style-type: none"> • Open in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM 	●	○
P0717 (05-972)	Input Speed Sensor Circuit No Signal	<ul style="list-style-type: none"> • Open or short in speed sensor (NT) circuit • Speed sensor (NT) • ECM • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0722 (05-977)	Output Speed Sensor Circuit No Signal	<ul style="list-style-type: none"> • Open or short in speed sensor (SP2) circuit • Speed sensor (SP2) • ECM • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0724 (05-981)	Brake Switch "B" Circuit High	<ul style="list-style-type: none"> • Short in stop light switch signal circuit • Stop light switch • ECM 	●	○
P0748 (05-984)	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM 	●	○
P0751 (05-987)	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	<ul style="list-style-type: none"> • Shift solenoid valve S1 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0756 (05-992)	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	<ul style="list-style-type: none"> • Shift solenoid valve S2 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0771 (05-997)	Shift Solenoid "E" Performance (Shift Solenoid Valve SR)	<ul style="list-style-type: none"> • Shift solenoid valve SR remains open or closed • Shift solenoid valve SL1 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.) 	●	○

P0776 (05-1003)	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	<ul style="list-style-type: none"> • Shift solenoid valve SL2 remains open • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0778 (05-1009)	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM 	●	○
P0781 (05-1012)	1-2 Shift (1-2 Shift Valve)	<ul style="list-style-type: none"> • Valve body is blocked up or stuck (1-2 shift valve) • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P0818 (05-1017)	Driveline Disconnect Switch In- put Circuit	<ul style="list-style-type: none"> • Short in transfer neutral position switch circuit • Transfer neutral position switch • ECM 	●	○
P0973 (05-1021)	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	<ul style="list-style-type: none"> • Short in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM 	●	○
P0974 (05-1021)	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)	<ul style="list-style-type: none"> • Open in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM 	●	○
P0976 (05-1024)	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	<ul style="list-style-type: none"> • Short in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM 	●	○
P0977 (05-1024)	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)	<ul style="list-style-type: none"> • Open in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM 	●	○
P0985 (05-1027)	Shift Solenoid "E" Control Circuit Low (Shift Solenoid Valve SR)	<ul style="list-style-type: none"> • Short in shift solenoid valve SR circuit • Shift solenoid valve SR • ECM 	●	○
P0986 (05-1027)	Shift Solenoid "E" Control Circuit High (Shift Solenoid Valve SR)	<ul style="list-style-type: none"> • Open in shift solenoid valve SR circuit • Shift solenoid valve SR • ECM 	●	○
P2714 (05-1031)	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> • Shift solenoid valve SLT remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.) 	●	○
P2716 (05-1036)	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM 	●	○
P2740 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit	<ul style="list-style-type: none"> • Open or short in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM 	●	○
P2742 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit Low Input	<ul style="list-style-type: none"> • Short in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM 	●	○
P2743 (05-1039)	Transmission Fluid Temperature Sensor "B" Circuit High Input	<ul style="list-style-type: none"> • Open in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM 	●	○
P2757 (05-1043)	Torque Converter Clutch Pres- sure Control Solenoid Perfor- mance (Shift Solenoid Valve SLU)	<ul style="list-style-type: none"> • Shift solenoid valve SLU remains open or closed • Valve body is blocked • Torque converter clutch • Automatic transmission (clutch, brake or gear, etc.) • Line pressure is too low 	●	○
P2759 (05-1049)	Torque Converter Clutch Pres- sure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM 	●	○

<p>P2772 (05-1053)</p>	<p>Transfer L4 SW Circuit</p>	<ul style="list-style-type: none"> • Short in transfer L4 position switch circuit • Transfer L4 position switch • ECM 	<p>●</p>	<p>○</p>
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DTC	P0705	TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION (PRNDL INPUT)
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CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0705	(2-trip detection logic) • All switches are OFF simultaneously for P(NSW), R, N(NSW), D, 3 and 2 positions. • 2 or more switches are ON simultaneously for P(NSW), R, N(NSW), (D 4), 3 and (2 L) positions.	<ul style="list-style-type: none"> • Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM

MONITOR DESCRIPTION

These DTCs indicate a problem with the park/neutral position switch and the wire harness in the park/neutral position switch circuit.

The park/neutral position switch detects the shift lever position and sends a signal to the ECM.

For security, the park/neutral position switch detects the shift lever position so that engine can be started only when the shift lever is in the P or N position.

The park/neutral position switch sends a signal to the ECM according to the shift position (R, D, 4, 3, 2 or L).

The ECM determines that there is a problem with the switch or related parts if it receives more than 1 position signal simultaneously. The ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	Condition (A) and (C) 2 sec. Condition (B) 60 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

The monitor will run whenever this DTC is not present.	See page 05-925
Ignition switch	ON
Battery voltage	10.5 V or more

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met: Condition (A) or (B)

Condition (A)

Number of the following signal input at the same time	2 or more
NSW switch	ON
R switch	ON
D switch	ON
3 switch	ON
2 switch	ON

Condition (B)

All of the following conditions are met	-
NSW switch	OFF
R switch	OFF
D switch	OFF
3 switch	OFF
2 switch	OFF

Condition (C)

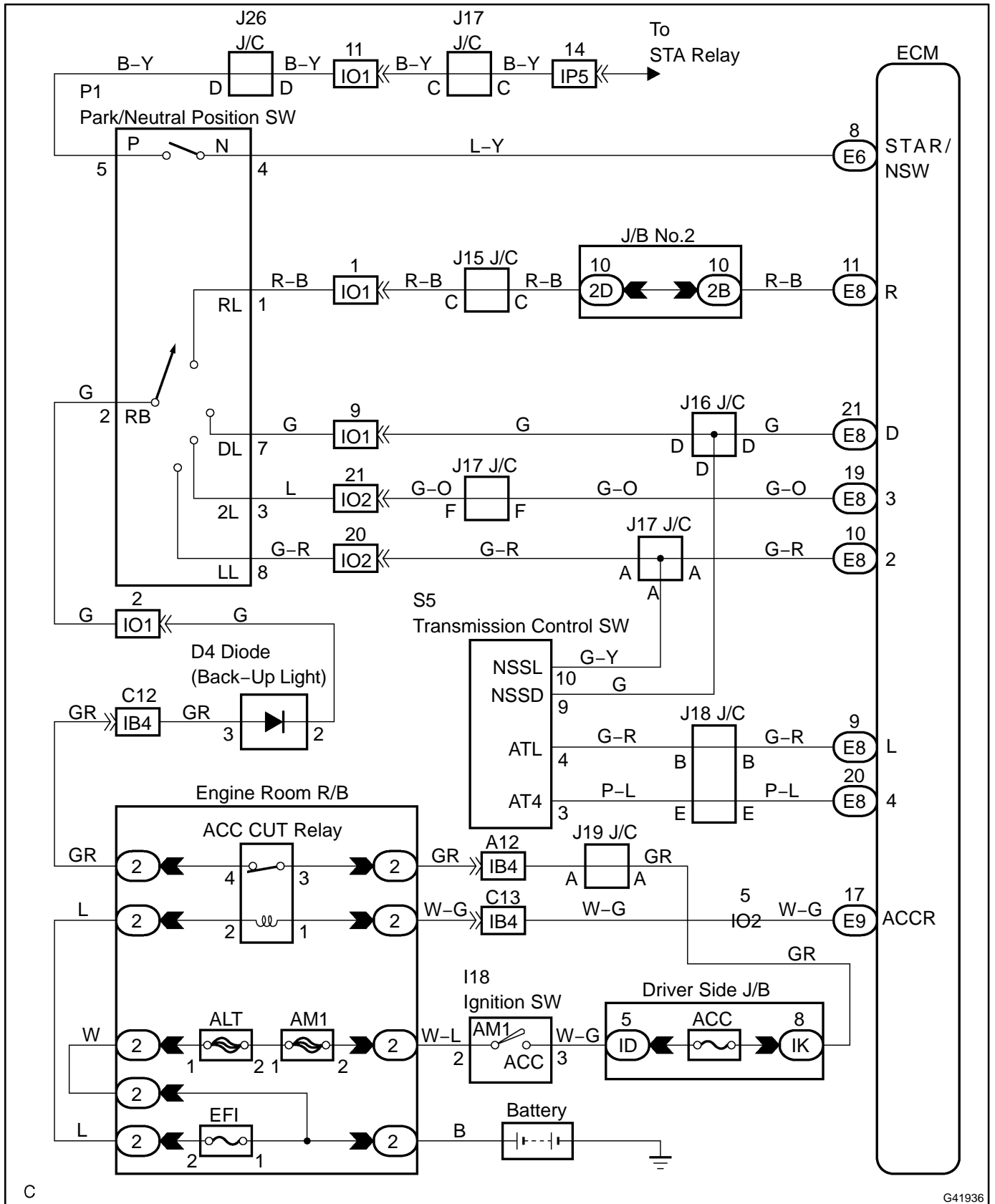
Both of the following conditions is met: Condition 1 or 2

1. One of the following conditions is met	-
NSW switch	ON
R switch	ON
2. One of the following conditions is met	-
4 shift position switch	ON
L shift position switch	ON

COMPONENT OPERATING RANGE

Park/neutral Position switch	The park/neutral position switch sends only one signal to the ECM.
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WIRING DIAGRAM



C

G41936

INSPECTION PROCEDURE

1. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

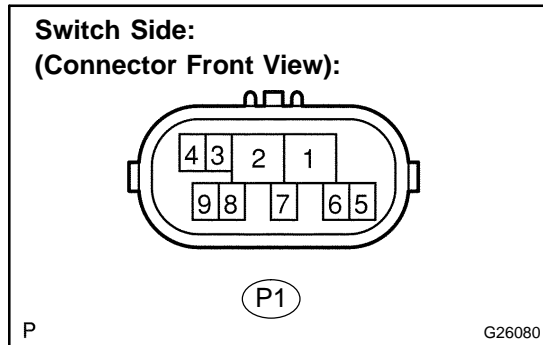
In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition	Diagnostic Note
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P and N: ON Except P and N: OFF	When the shift lever position displayed on the hand-held tester differs from the actual position, adjustment of the PNP switch or the shift cable may be incorrect.
LOW	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	↑
2ND	PNP SW Status/ ON or OFF	Shift lever position is; 2 and L: ON Except 2 and L: OFF	↑
3RD	PNP SW Status/ ON or OFF	Shift lever position is; 3: ON Except 3: OFF	↑
4th/DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; 4: ON Except 4: OFF	↑
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	↑
DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	↑

INSPECTION PROCEDURE

1 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



- (a) Jack up the vehicle.
- (b) Disconnect the park/neutral position switch connector.
- (c) Measure the resistance according to the value(s) in the table below when the shift lever is moved to each position.

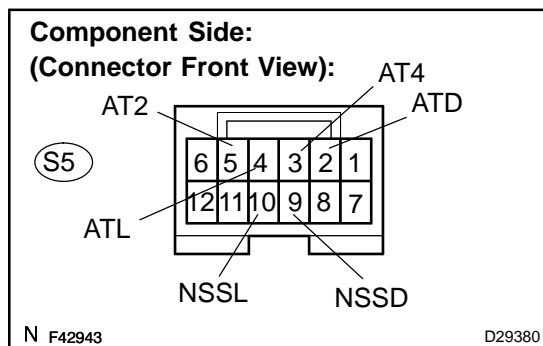
Standard:

Shift Position	Tester Connection	Specified Condition
P	2 – 6 and 4 – 5	Below 1 Ω
Except P	↑	10 kΩ or higher
R	2 – 1	Below 1 Ω
Except R	↑	10 kΩ or higher
N	2 – 9 and 4 – 5	Below 1 Ω
Except N	↑	10 kΩ or higher
D and 4	2 – 7	Below 1 Ω
Except D and 4	↑	10 kΩ or higher
3	2 – 3	Below 1 Ω
Except 3	↑	10 kΩ or higher
2 and L	2 – 8	Below 1 Ω
Except 2 and L	↑	10 kΩ or higher

NG → REPLACE PARK/NEUTRAL POSITION SWITCH ASSY (SEE PAGE 40-10)

OK

2 INSPECT SHIFT LOCK CONTROL ECU SUB-ASSY(TRANSMISSION CONTROL SWITCH)



- (a) Connect the park/neutral position switch connector.
- (b) Disconnect the shift lock control ECU connector.
- (c) Measure the resistance according to the value(s) in the table below when the shift lever is moved to each position.

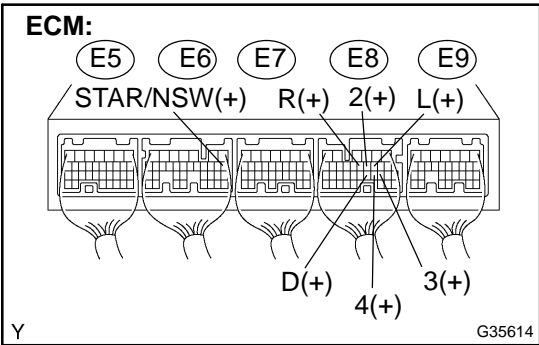
Standard:

Shift position	Tester connection	Specified condition
D	9 – 2 (NSSD – ATD)	Below 1 Ω
4		10 kΩ or higher
D	9 – 3 (NSSD – AT4)	10 kΩ or higher
4		Below 1 Ω
2	10 – 5 (NSSL – AT2)	Below 1 Ω
L		10 kΩ or higher
2	10 – 4 (NSSL – ATL)	10 kΩ or higher
L		Below 1 Ω

NG → REPLACE SHIFT LOCK CONTROL ECU SUB-ASSY (SEE PAGE 40-37)

OK

3 CHECK HARNESS AND CONNECTOR(PARK/NEUTRAL POSITION SWITCH – ECM)



- (a) Connect the shift lock control ECU connector.
- (b) Turn the ignition switch to the ON position, and measure the voltage according to the value(s) in the table below when the shift lever is moved to each position.

Standard:

Shift Position	Tester connection	Specified condition
P and N	E6 – 8 (STAR/NSW) – Body ground	Below 2 V
Except P and N	↑	10 to 14 V
R	E8 – 11 (R) – Body ground	10 to 14 V*
Except R	↑	Below 1 V
D and 4	E8 – 21 (D) – Body ground	10 to 14 V
Except D and 4	↑	Below 1 V
4	E8 – 20 (4) – Body ground	10 to 14 V
Except 4	↑	Below 1 V
3	E8 – 19 (3) – Body ground	10 to 14 V
Except 3	↑	Below 1 V
2 and L	E8 – 10 (2) – Body ground	10 to 14 V
Except 2 and L	↑	Below 1 V
L	E8 – 9 (L) – Body ground	10 to 14 V
Except L	↑	Below 1 V

HINT:
 *: The voltage will drop slightly due to the turning on of the back up light.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

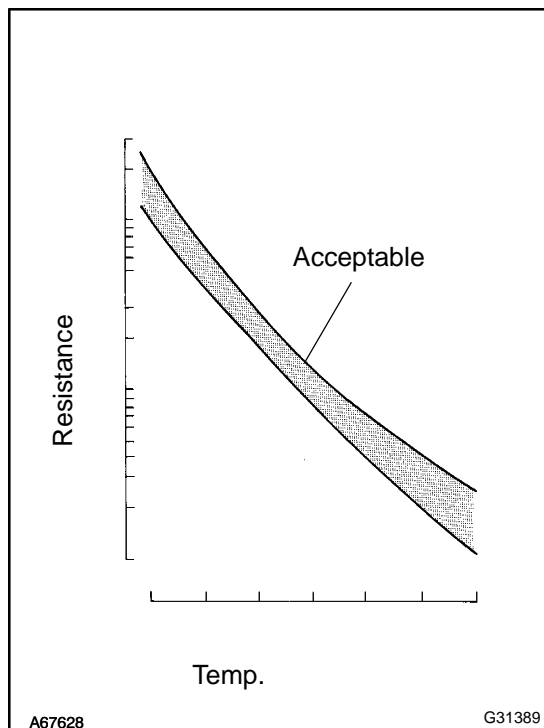
REPLACE ECM (SEE PAGE 10-16)

DTC	P0710	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT
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DTC	P0712	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT LOW INPUT
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DTC	P0713	TRANSMISSION FLUID TEMPERATURE SENSOR "A" CIRCUIT HIGH INPUT
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CIRCUIT DESCRIPTION



The ATF (Automatic Transmission Fluid) temperature sensor converts the fluid temperature into a resistance value which is input into the ECM.

The ECM applies a voltage to the temperature sensor through ECM terminal THO1.

The sensor resistance changes with the transmission fluid temperature. As the temperature becomes higher, the sensor resistance decreases.

One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.

The ECM calculates the fluid temperature based on the voltage signal.

DTC No.	DTC Detection Condition	Trouble Area
P0710	(a) and (b) are detected momentarily within 0.5 sec. when neither P0712 nor P0713 is detected (1-trip detection logic) (a) ATF temperature sensor No.1 resistance is less than 79 Ω. (b) ATF temperature sensor No.1 resistance is more than 156 kΩ. HINT: Within 0.5 sec., the malfunction switches from (a) to (b) or from (b) to (a)	<ul style="list-style-type: none"> • Open or short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM
P0712	ATF temperature sensor No.1 resistance is less than 79 Ω for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Short in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM
P0713	ATF temperature No.1 sensor resistance is more than 156 kΩ when 15 minutes or more have elapsed after the engine start DTC is detected for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Open in ATF temperature sensor No.1 circuit • Transmission wire (ATF temperature sensor No.1) • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the automatic transmission fluid (ATF) temperature sensor circuit. The automatic transmission fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an open or short in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 79 Ω^{*1} or more than 156 kΩ^{*2}, the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.

*1: 150°C (302°F) or more is indicated regardless of the actual ATF temperature.

*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the OBD II scan tool or hand-held tester display.

MONITOR STRATEGY

Related DTCs	P0710: ATF temperature sensor/Range check (Fluttering) P0712: ATF temperature sensor/Range check (Low resistance) P0713: ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0710: Range check (Fluttering)

P0712: Range check (Low resistance)

The monitor will run whenever these DTCs are not present.	See page 05-925
The typical enabling condition is not available.	–

P0713: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Time after engine start	15 min. or more

TYPICAL MALFUNCTION THRESHOLDS

P0710: Range check (Fluttering)

TFT (Transmission fluid temperature) sensor resistance	Less than 79 Ω or More than 156 kΩ
--	--

P0712: Range check (Low resistance)

TFT (Transmission fluid temperature) sensor resistance	Less than 79 Ω
--	----------------

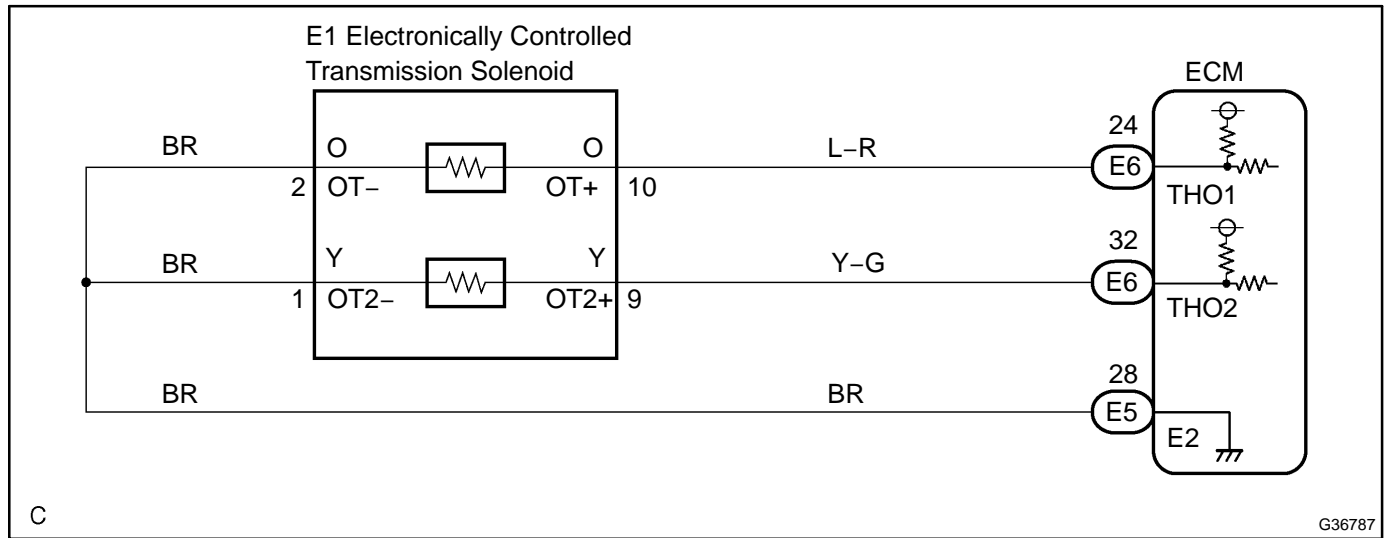
P0713: Range check (High resistance)

TFT (Transmission fluid temperature) sensor resistance	More than 156 kΩ
--	------------------

COMPONENT OPERATING RANGE

TFT (Transmission fluid temperature) sensor	Atmospheric temperature – approx. 130°C (266°F)
---	---

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:

When DTC P0712 is output and OBD II scan tool or hand-held tester output is 150°C (302°F) or more, there is a short circuit.

When DTC P0713 is output and OBD II scan tool or hand-held tester output is -40°C (-40°F), there is an open circuit.

Measure the resistance between terminal THO1 (OT) and body ground.

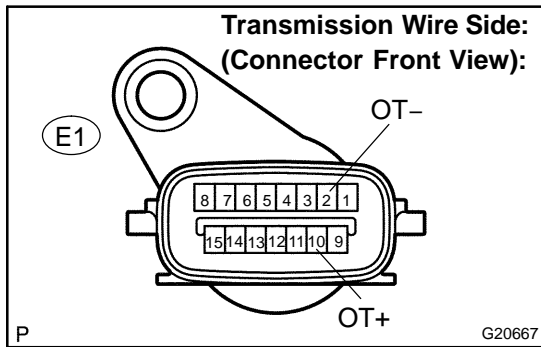
Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

HINT:

If a circuit related to the ATF temperature sensor becomes open, P0713 is immediately set (in 0.5 second). When P0713 is set, P0711 cannot be detected.

It is not necessary to inspect the circuit when P0711 is set.

1 INSPECT TRANSMISSION WIRE(ATF TEMPERATURE SENSOR)



- (a) Disconnect the transmission wire connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
2 (OT-) - 10 (OT+)	79 Ω to 156 kΩ
2 (OT-) - Body ground	10 kΩ or higher
10 (OT+) - Body ground	10 kΩ or higher

HINT:

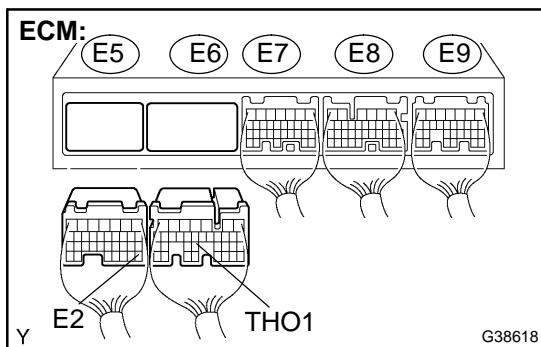
If the resistance is out of the specified range with either the ATF temperature shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
20°C (68°F)	3 to 4 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

NG REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission wire connector to the transmission.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
E6 - 24 (THO1) - E5 - 28 (E2)	79 Ω to 156 kΩ

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

Tester Connection	Specified Condition
E6 - 24 (THO1) - Body ground	10 kΩ or higher
E5 - 28 (E2) - Body ground	↑

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

DTC	P0711	TRANSMISSION FLUID TEMPERATURE SENSOR "A" PERFORMANCE
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CIRCUIT DESCRIPTION

See page [05-964](#).

DTC No.	DTC Detection Condition	Trouble Area
P0711	Both (a) and (b) are detected: (2-trip detection logic) (a) Intake air and engine coolant temps. are more than -10°C (14°F) at engine start (b) After normal driving for over 22 min. and 9 km (6 mile) or more, ATF temp. is less than 10°C (50°F)	• Transmission wire (ATF temperature sensor No.1)

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output from the automatic transmission fluid (ATF) temperature sensor and that the sensor itself is defective. The ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an open or short in the ATF temperature circuit or a fault in the ATF temperature sensor. After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 10°C (50°F) after running the vehicle for a certain period, the ECM interprets this as a fault, and turns on the MIL.

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	3 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
TFT (Transmission fluid temperature) sensor circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
IAT (Intake air temperature) sensor circuit	Not circuit malfunction
Time after engine start	21 min. and 40 sec.
Driving distance after engine start	9 km (5.6 mile) or more
IAT (12 sec. after starting engine)	-10°C (14°F) or more
ECT (12 sec. after starting engine)	-10°C (14°F) or more

TYPICAL MALFUNCTION THRESHOLDS

TFT (Transmission fluid temperature)	Less than 10°C (50°F) (varies with TFT (Transmission fluid temperature) at engine start)
--------------------------------------	---

WIRING DIAGRAM

See page [05-964](#).

INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:

When DTC P0712 is output and OBD II scan tool or hand-held tester output is 150°C (302°F) or more, there is a short circuit.

When DTC P0713 is output and OBD II scan tool or hand-held tester output is -40°C (-40°F), there is an open circuit.

Measure the resistance between terminal THO1 (OT) and body ground.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

HINT:

If a circuit related to the ATF temperature sensor becomes open, P0713 is immediately set (in 0.5 second). When P0713 is set, P0711 cannot be detected.

It is not necessary to inspect the circuit when P0711 is set.

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0711)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0711" is output	A
"P0711" and other DTCS	B

HINT:

If any other codes besides "P0711" are output, perform the troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 CHECK TRANSMISSION FLUID LEVEL (SEE PAGE 40-2)

OK:

Automatic transmission fluid level is correct.

NG → **ADD FLUID**

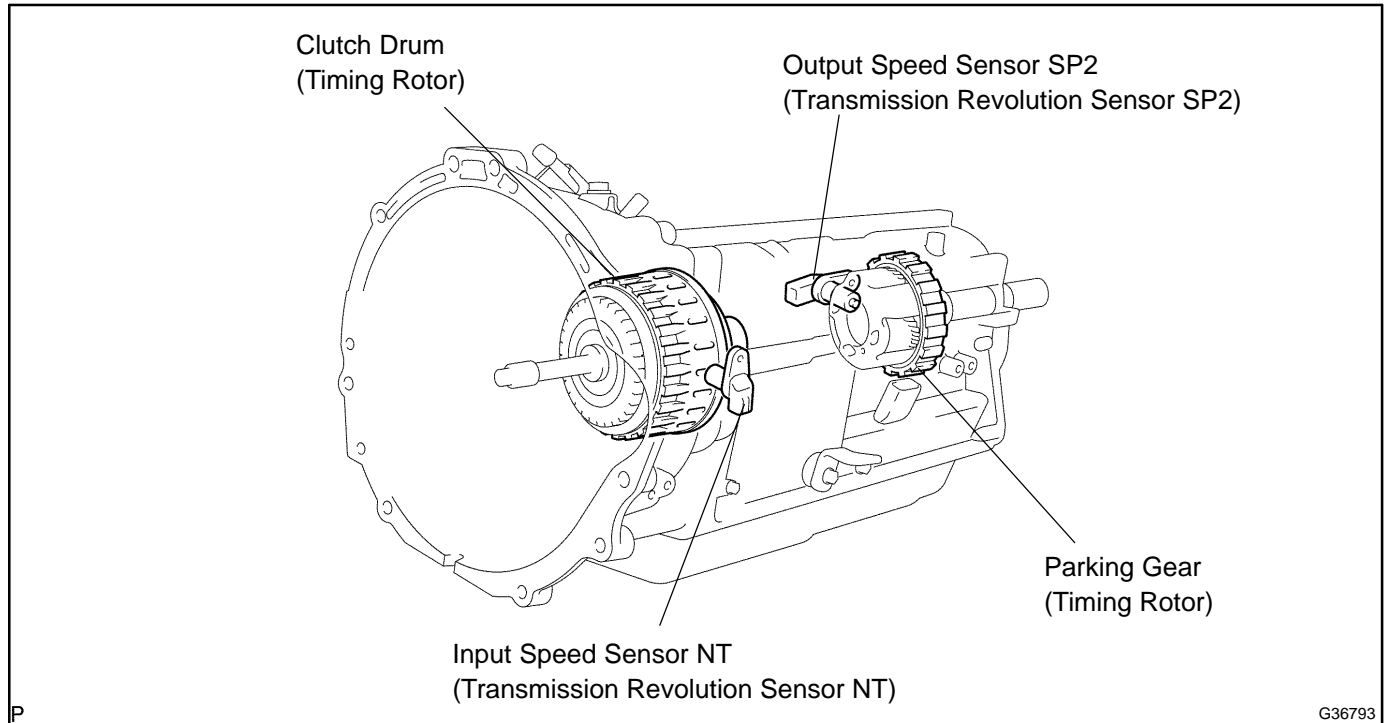
OK

REPLACE TRANSMISSION WIRE (ATF TEMPERATURE SENSOR) (SEE PAGE 40-28)

DTC	P0717	INPUT SPEED SENSOR CIRCUIT NO SIGNAL
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CIRCUIT DESCRIPTION

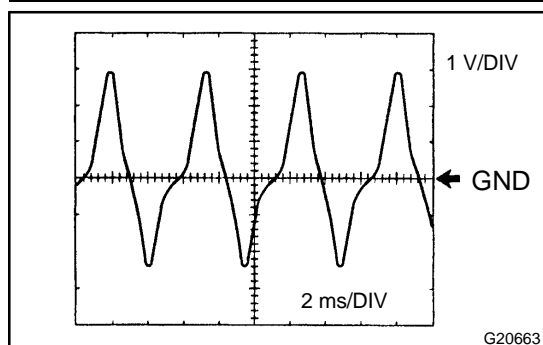
This sensor detects the rotation speed of the turbine which shows the input revolution of transmission. By comparing the input turbine speed signal (NT) with the counter gear speed sensor signal (SP2), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. Thus, providing smooth gear shift.



P

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DTC No.	DTC Detection Condition	Trouble Area
P0717	All conditions below are detected for 5 secs. or more (1-trip detection logic) (a) Gear change is not performed (b) Gear position: 4th or 5th (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Park/neutral position switch: • NSW input signal is OFF • R input signal is OFF • L input signal is OFF (f) Shift solenoid valves and park/neutral position switch are in normal operation	<ul style="list-style-type: none"> • Open or short in speed sensor (NT) circuit • Speed sensor (NT) • ECM • Automatic transmission (clutch, brake or gear, etc.)



Reference (Using an oscilloscope):

Check the waveform between terminals NT+ and NT- of the ECM connector.

Standard: Refer to the illustration.

Terminal	NT+ - NT-
Tool setting	1V/DIV, 2ms/DIV
Vehicle condition	Engine idle speed (P or N position)

MONITOR DESCRIPTION

This DTC indicates that pulse is not output from the speed sensor NT (Turbine (input) speed sensor) or is output only little. The NT terminal of the ECM detects the revolving signal from speed sensor (NT) (input RPM). The ECM outputs a gearshift signal comparing the input speed sensor (NT) with the output speed sensor (SP2).

While the vehicle is operating in the 4th or 5th gear position in the shift position of D, if the input shaft revolution is less than 300 rpm^{*1} although the output shaft revolution is more than 1000 rpm or more^{*2}, the ECM detects the trouble, illuminates the MIL and stores the DTC.

*1: Pulse is not output or is irregularly output.

*2: The vehicle speed is approx. 50 km/h (31 mph) or more.

MONITOR STRATEGY

Related DTCs	P0717: Speed sensor (NT)/Verify pulse input
Required sensors/Components	Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Shift change	Shift change is completed and before starting next shift change operation
ECM selected gear	4th or 5th
Output shaft rpm	1,000 rpm or more
NSW switch	OFF
R switch	OFF
L switch	OFF
Engine	Running
Ignition switch	ON
Starter	OFF

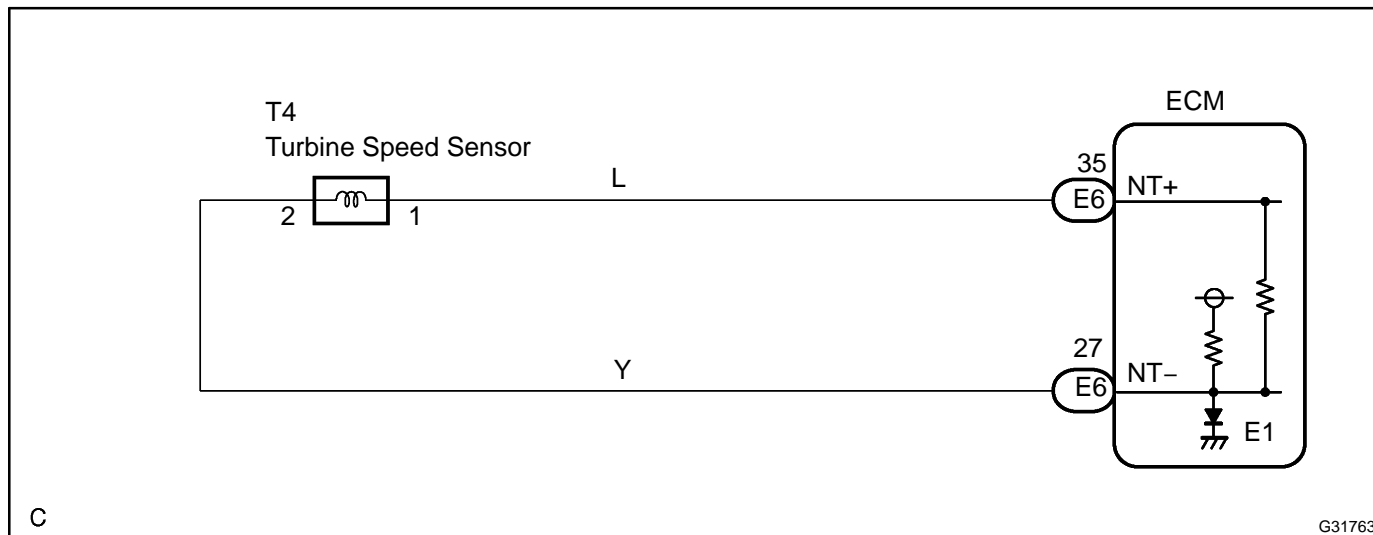
TYPICAL MALFUNCTION THRESHOLDS

Sensor signal rpm	Less than 300 rpm
-------------------	-------------------

COMPONENT OPERATING RANGE

Speed sensor (NT)	Turbine speed is equal to engine speed when lock-up ON
-------------------	--

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

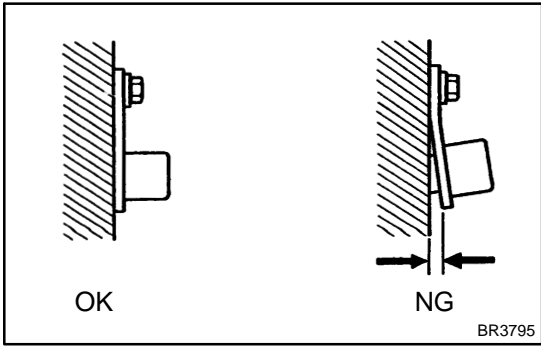
- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
SPD (NT)	Input Turbine Speed/ display: 50 r/min	[HINT] • Lock-up ON (After warming up the engine); Input Turbine speed (NT) equal to the engine speed. • Lock-up OFF (Idling at N position); Input Turbine speed (NT) nearly equal to the engine speed.

HINT:

- SPD (NT) is always 0 while driving:
Open or short in the sensor or circuit.
- SPD (NT) is always more than 0 and less than 300 rpm while driving the vehicle at 50 km/h (31 mph) or more:
Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

1 INSPECT SPEED SENSOR INSTALLATION

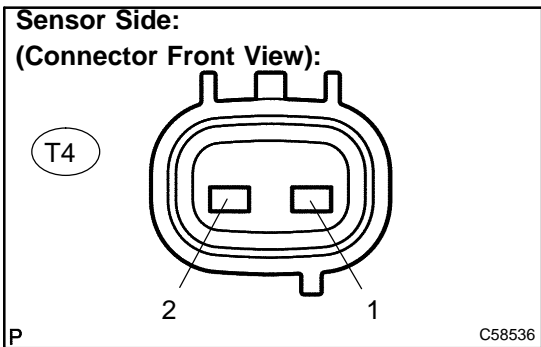


- (a) Check the speed sensor installation.
Standard:
The installation bolt is tightened properly and there is no clearance between the sensor and transaxle case.

NG REPLACE SPEED SENSOR(NT)
(SEE PAGE 40-27)

OK

2 INSPECT SPEED SENSOR(NT)



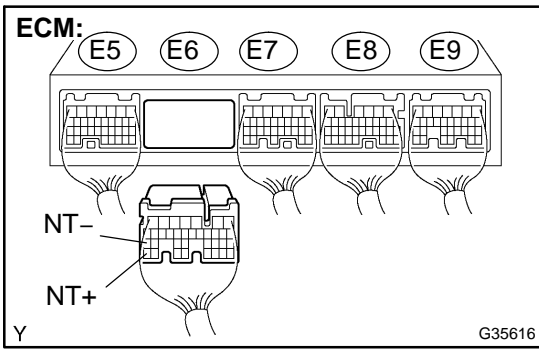
- (a) Disconnect the speed sensor connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.
Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	560 to 680 Ω

NG REPLACE SPEED SENSOR(NT)
(SEE PAGE 40-27)

OK

3 CHECK HARNESS AND CONNECTOR(SPEED SENSOR - ECM)



- (a) Connect the speed sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
	20°C (68°F)
E6 - 35 (NT+) - E6 - 27 (NT-)	560 to 680 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

Tester Connection	Specified Condition
E6 - 35 (NT+) - Body ground	10 kΩ or higher
E6 - 27 (NT-) - Body ground	↑

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

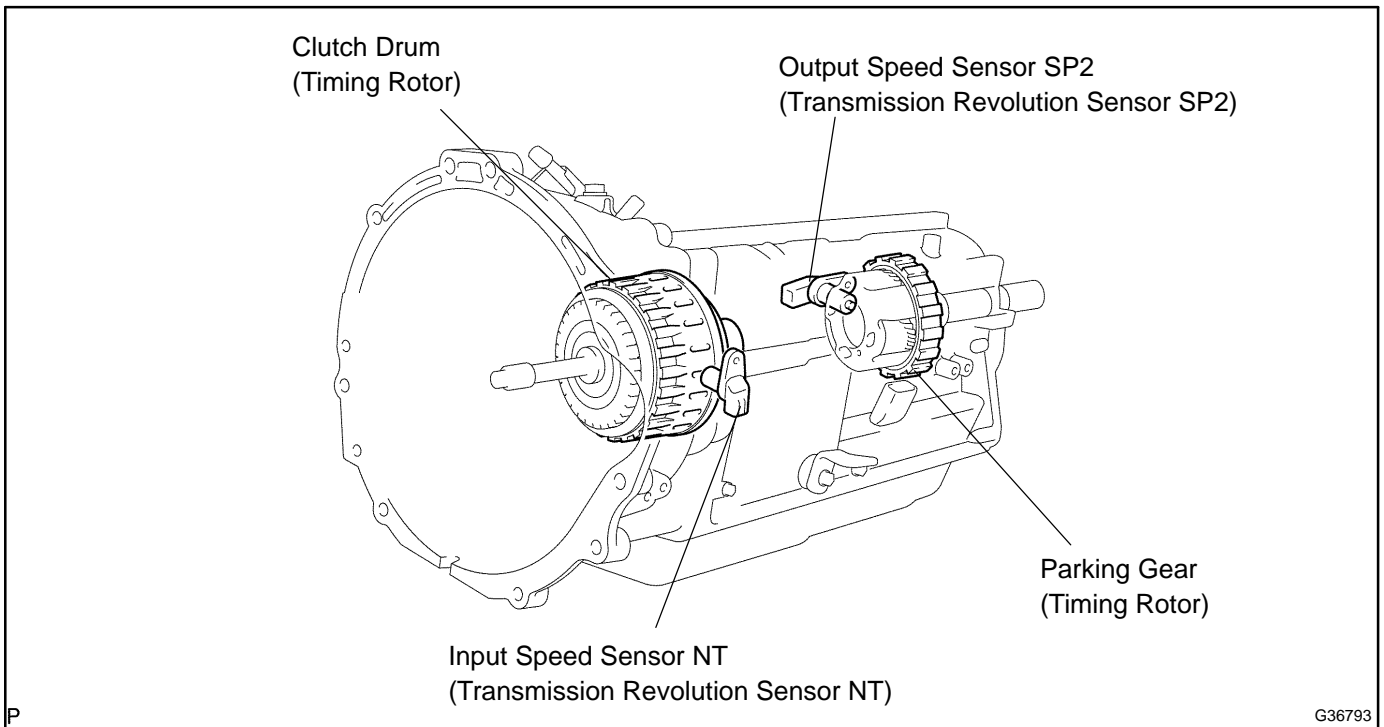
OK

REPLACE ECM (SEE PAGE 10-16)

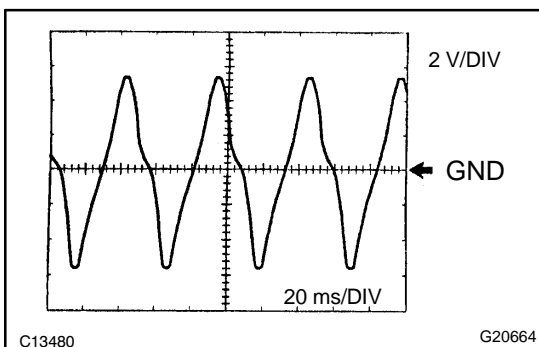
DTC	P0722	OUTPUT SPEED SENSOR CIRCUIT NO SIGNAL
------------	--------------	--

CIRCUIT DESCRIPTION

The speed sensor SP2 detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on these signals. An AC voltage is generated in the speed sensor SP2 coil as the parking gear mounted on the rear planetary gear assembly rotates, and this voltage is sent to the ECM. The parking gear on the rear planetary gear is used as the timing rotor for this sensor. The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal.



DTC No.	DTC Detection Condition	Trouble Area
P0722	All conditions below are detected 500 times or more continuously (1-trip detection logic) (a) No signal from speed sensor (SP2) is input to ECM while 4 pulses of No. 1 vehicle speed sensor signal are sent (b) Vehicle speed is 9 km/h (6 mph) or more for at least 4 sec. (c) Park/neutral position switch is OFF. (d) Transfer position is except neutral (4WD).	<ul style="list-style-type: none"> • Open or short in speed sensor (SP2) circuit • Speed sensor (SP2) • ECM • Automatic transmission (clutch, brake or gear, etc.)



Reference (Using an oscilloscope):

Check the waveform between terminals SP2+ and SP2- of the ECM connector.

Standard: Refer to the illustration.

Terminal	SP2+ - SP2-
Tool setting	2V/DIV, 20ms/DIV
Vehicle condition	Vehicle speed 20 km/h (12 mph)

MONITOR DESCRIPTION

The output speed sensor SP2 monitors the output shaft speed. The ECM controls the gearshift point and the lock up timing based on the signals from the output speed sensor SP2 and throttle position sensor. If the ECM detects no signal from the output shaft speed sensor SP2 even while the vehicle is moving, it will conclude that is a malfunction of the output speed sensor SP2. The ECM will illuminate the MIL and set a DTC.

MONITOR STRATEGY

Related DTCs	P0722: Speed sensor SP2/Verify pulse input
Required sensors/Components	Speed sensor SP2
Frequency of operation	Continuous
Duration	500 output shaft revolution
MIL operation	Immediate
Sequence of operation	None

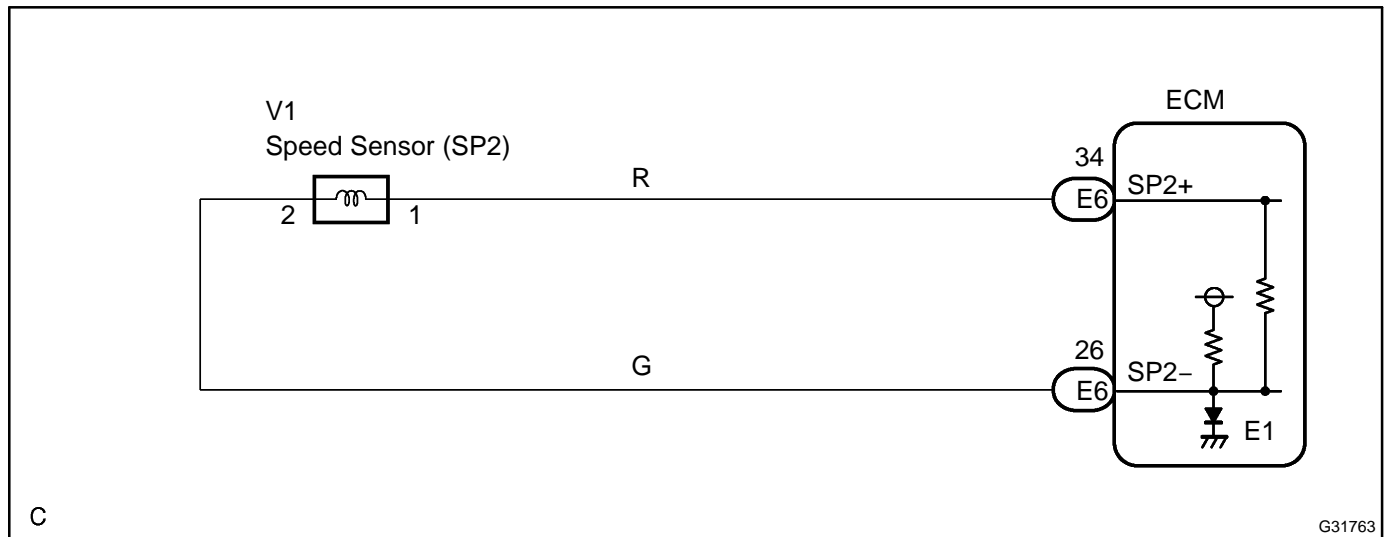
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Vehicle speed sensor pulse input	4
Vehicle speed range (4 sec. or more)	9 km/h (5.59 mph) or more
NSW switch	OFF
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Output speed sensor pulse input	No input
---------------------------------	----------

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

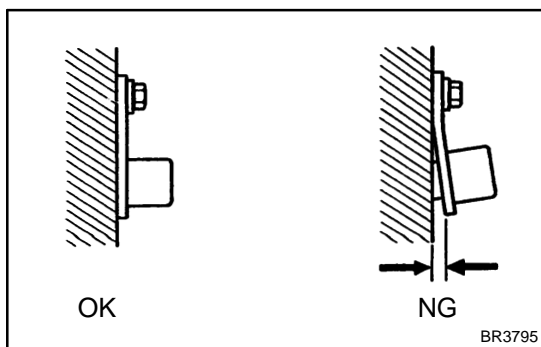
- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
SPD (SP2)	Output shaft Speed/ min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Vehicle stopped: 0 km/h (0 mph) [HINT] Equal to vehicle speed

HINT:

- SPD (SP2) is always 0 while driving:
Open or short in the sensor or circuit.
- The SPD (SP2) value displayed on the tester is much lower than the actual vehicle speed:
Sensor trouble, improper installation, or intermittent connection trouble of the circuit.

1 INSPECT SPEED SENSOR INSTALLATION

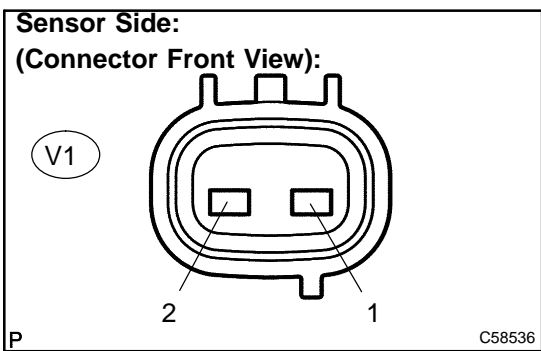


- (a) Check the speed sensor (SP2) installation.
OK:
The installation bolt is tightened properly and there is no clearance between the sensor and transmission case.

NG → REPLACE SPEED SENSOR(SP2) (SEE PAGE 40-27)

OK

2 INSPECT SPEED SENSOR(SP2)



- (a) Disconnect the speed sensor connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.

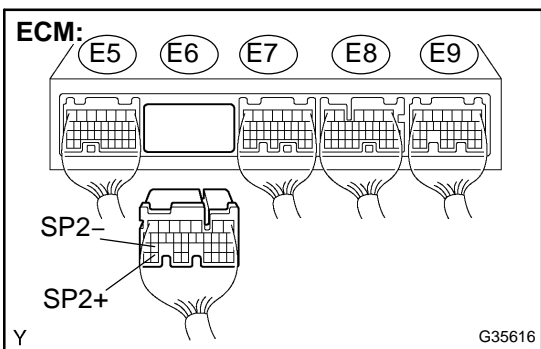
Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	560 to 680 Ω

NG → **REPLACE SPEED SENSOR(SP2)
(SEE PAGE 40-27)**

OK

3 CHECK HARNESS AND CONNECTOR(SPEED SENSOR - ECM)



- (a) Connect the speed sensor connector.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E6 - 34 (SP2+) - E6 - 26 (SP2-)	560 to 680 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

Tester Connection	Specified Condition
E6 - 34 (SP2+) - Body ground	10 kΩ or higher
E6 - 26 (SP2-) - Body ground	↑

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

REPLACE ECM (SEE PAGE 10-16)

DTC	P0724	BRAKE SWITCH "B" CIRCUIT HIGH
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CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up condition when brakes are suddenly applied.

When the brake pedal is depressed, this switch sends a signal to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detection Condition	Trouble Area
P0724	The stop light switch remains ON even when the vehicle is driven in a STOP (less than 3 km/h (2 mph)) and GO (30 km/h (19 mph) or more) fashion 5 times. (2-trip detection logic).	<ul style="list-style-type: none"> • Short in stop light switch signal circuit • Stop light switch • ECM

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains on. When the stop light switch remains ON during "stop and go" driving, the ECM interprets this as a fault in the stop light switch and the MIL comes on and the ECM stores the DTC. The vehicle must stop (less than 3 km/h (2 mph)) and go (30 km/h (19 mph) or more) five times for two driving cycles in order to detect a malfunction.

MONITOR STRATEGY

Related DTCs	P0724: Stop light switch/Rationality
Required sensors/Components	Stop light switch, Vehicle speed sensor
Frequency of operation	Continuous
Duration	GO and STOP 5 times
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF
GO (Vehicle speed is 30 km/h (18.63 mph) or more)	Once
STOP (Vehicle speed is less than 3 km/h (1.86 mph))	Once

TYPICAL MALFUNCTION THRESHOLDS

Brake switch	Remain ON during GO and STOP 5 times
--------------	--------------------------------------

WIRING DIAGRAM

See page [05-264](#).

INSPECTION PROCEDURE

1 READ VALUE OF DATA LIST(STP SIGNAL)

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on tester, read the "DATA LIST".

Standard:

Item	Measurement Item/ Range (display)	Normal Condition
STOP LIGHT SW	Stop light SW Status/ ON or OFF	<ul style="list-style-type: none"> • Brake Pedal is depressed: ON • Brake Pedal is released: OFF

NOTICE:

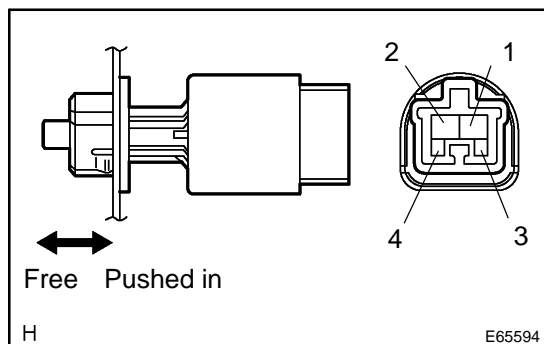
In the table above, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

NG → Go to step 2

OK

Go to step 3

2 INSPECT STOP LAMP SWITCH ASSY



- (a) Remove the stop lamp switch assy.
- (b) Measure the resistance according to the value(s) in the table below.

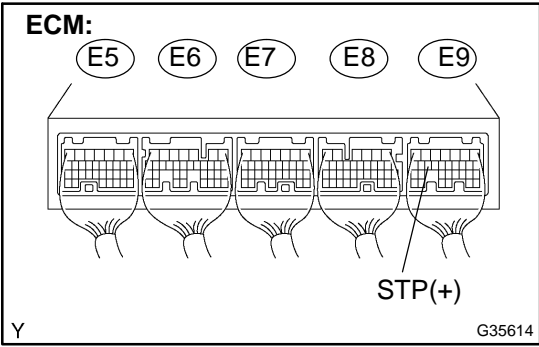
Standard:

Switch position	Tester Connection	Specified Condition
Switch pin free	1 – 2	Below 1 Ω
Switch pin pushed in	↑	10 kΩ or higher
Switch pin free	3 – 4	10 kΩ or higher
Switch pin pushed in	↑	Below 1 Ω

NG → REPLACE STOP LAMP SWITCH ASSY

OK

3 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH ASSY - ECM)



- (a) Install the stop lamp switch assy.
- (b) Measure the voltage according to the value(s) in the table below when the brake pedal is depressed and released.

Standard:

Condition	Tester Connection	Specified Condition
Brake pedal is depressed	E9 - 15 (STP) - Body ground	10 to 14 V
Brake pedal is released	↑	Below 1 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

DTC	P0748	PRESSURE CONTROL SOLENOID "A" ELECTRICAL (SHIFT SOLENOID VALVE SL1)
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CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1, SL2, S1, S2 and SR which are controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated smoothly (see page [05-948](#)).

DTC No.	DTC Detection Condition	Trouble Area
P0748	The ECM checks for an open or short in the shift solenoid valve SL1 circuit while driving and shifting between 4th and 5th gear. (1-trip detection logic) <ul style="list-style-type: none"> • Output signal duty equals to 100%. (NOTE: SL1 output signal duty is less than 100% under normal condition.)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL1 circuit. The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other normal shift solenoid valves "ON/OFF". (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting between 4th and 5th gears, if the ECM detects an open or short in the shift solenoid valve SL1 circuit, the ECM determines there is a malfunction (see page [05-948](#)).

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Battery voltage	10 V or more
CPU commanded duty	Less than 75%
Ignition switch	ON
Starter	OFF

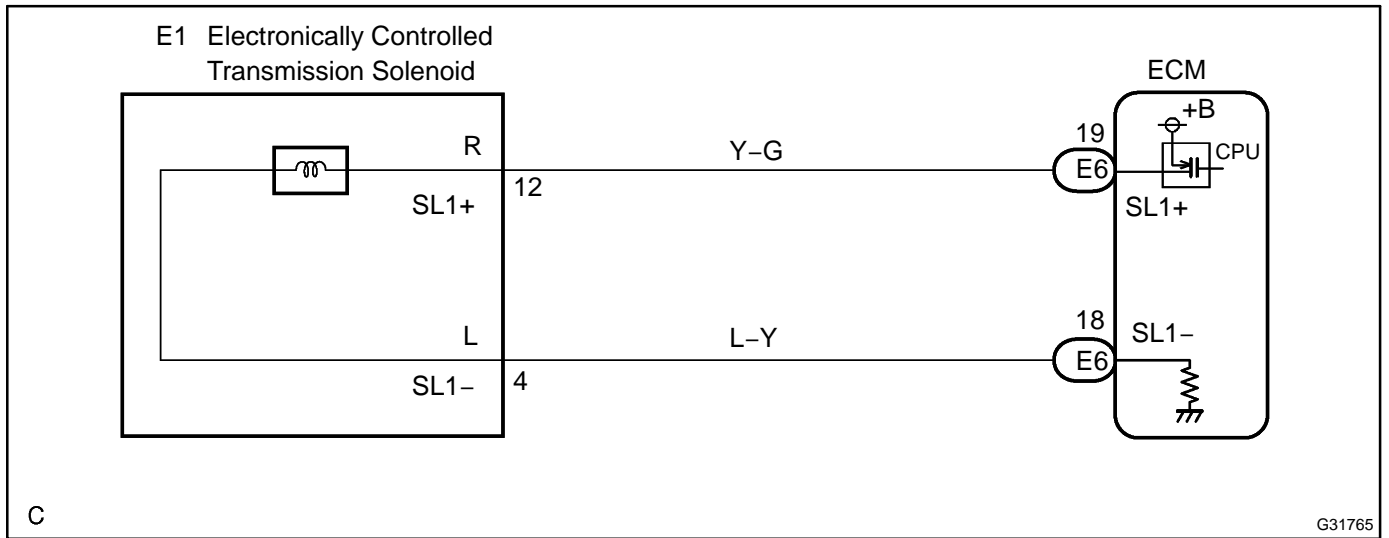
TYPICAL MALFUNCTION THRESHOLDS

Output signal duty	100%
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COMPONENT OPERATING RANGE

Output signal duty	Less than 100%
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WIRING DIAGRAM



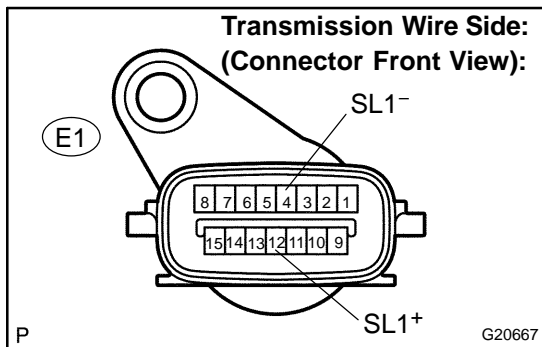
INSPECTION PROCEDURE

HINT:

- The shift solenoid valve SL1 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve SL1	OFF	OFF	OFF	OFF	ON

1 INSPECT TRANSMISSION WIRE(SL1)



- Disconnect the transmission wire connector from the transmission.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
12 (SL1+) - 4 (SL1-)	5.0 to 5.6 Ω

- Measure the resistance according to the value(s) in the table below.

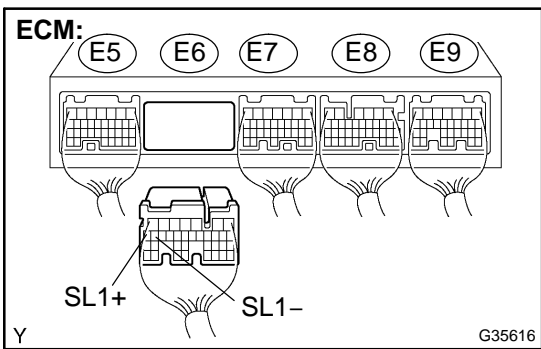
Standard (Check for short):

Tester Connection	Specified Condition
12 (SL1+) - Body ground	10 kΩ or higher
4 (SL1-) - Body ground	↑

NG → Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission connector to the transmission.
- (b) Disconnect the connector from the ECM.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E6 - 19 (SL1+) - E6 - 18 (SL1-)	5.0 to 5.6 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

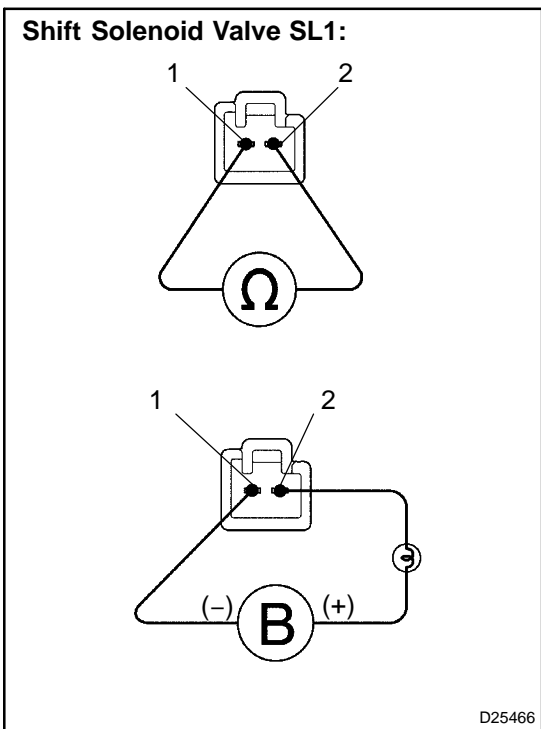
Tester Connection	Specified Condition
E6 - 19 (SL1+) - Body ground	10 kΩ or higher
E6 - 18 (SL1-) - Body ground	↑

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(SL1)



- (a) Remove the shift solenoid valve SL1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG REPLACE SHIFT SOLENOID VALVE(SL1) (SEE PAGE 40-31)

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P0751	SHIFT SOLENOID "A" PERFORMANCE (SHIFT SOLENOID VALVE S1)
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SYSTEM DESCRIPTION

The ECM uses signals from the output shaft speed sensor and input speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0751	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve S1 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S1. The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0751: Shift solenoid valve S1/OFF malfunction P0751: Shift solenoid valve S1/ON malfunction
Required sensors/Components	Shift solenoid valve S1, Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous
Duration	OFF malfunction (A) and (B) 0.4 sec. OFF malfunction (C) Immediate ON malfunction (A), (B) and (C) 0.4 sec. ON malfunction (D) 3 sec. ON malfunction (E) 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT	40°C (104°F) or more

Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	–
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 to 1.1

OFF malfunction (A)

ECM selected gear	1st
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)
Throttle valve opening angle	8% or more and 7.0% or more at 2,000 rpm (Conditions vary with engine speed)

OFF malfunction (B)

Current ECM selected gear	5th
Last ECM selected gear	4th
Continuous time for ECM selecting 4th gear	2 sec. or more
Actual gear when ECM selected 4th gear	4th

OFF malfunction (C)

Current ECM selected gear	5th
Last ECM selected gear	4th

ON malfunction (A)

ECM selected gear	1st
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (B)

ECM selected gear	4th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (C)

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (D)

Current ECM selected gear	5th
Last ECM selected gear	4th
Vehicle speed (During transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

ON malfunction (E)

ECM selected gear	5th
Engine speed – Turbine speed (NE – NT) (After transition from 4th to 5th gear)	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction

All of the following conditions are met: Conditions (A), (B) and (C)

2 detections are necessary per driving cycle:

1st detection; temporary flag ON

2nd detection; pending fault code ON

OFF malfunction (A)

Turbine speed/Output speed	0.93 to 1.07
----------------------------	--------------

OFF malfunction (B)

Turbine speed/Output speed	0.65 to 0.79
----------------------------	--------------

OFF malfunction (C)

Output record from ECM for 4th → 5th upshifting	Recorded
---	----------

ON malfunction

Either of the following conditions is met:

- ON malfunction (A) and (B)
- ON malfunction (B) or (C), and ON malfunction (D) or (E)

ON malfunction (A) and (B)

Turbine speed/Output speed	3.30 to 7.50
----------------------------	--------------

ON malfunction (C)

Turbine speed/Output speed	1.91 to 2.35
----------------------------	--------------

ON malfunction (D)

Turbine speed – Output speed x 4th gear ratio (NT – NO x 4th gear ratio)	1,000 rpm or more
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ON malfunction (E)

Turbine speed – Output speed x 5th gear ratio (NT – NO x 5th gear ratio)	1,000 rpm or more
---	-------------------

INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / SHIFT".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-948).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the hand-held tester.
- The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve S1	ON	ON	OFF	OFF	OFF

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0751)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0751" is output	A
"P0751" and other DTCS	B

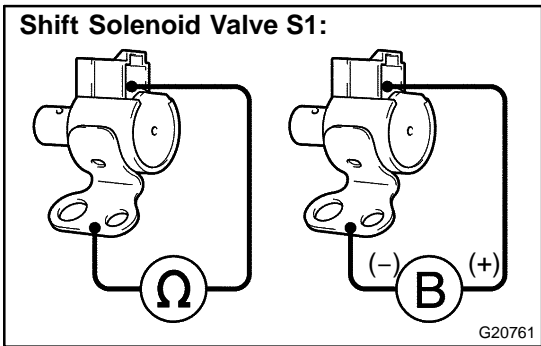
HINT:

If any other codes besides "P0751" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(S1)



- (a) Remove the shift solenoid valve S1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S1) – Solenoid Body (S1)	11 to 15 Ω

- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S1) (SEE PAGE 40-31)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)

OK:

There are no foreign objects on each valve.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-13)

DTC	P0756	SHIFT SOLENOID "B" PERFORMANCE (SHIFT SOLENOID VALVE S2)
------------	--------------	---

SYSTEM DESCRIPTION

The ECM uses signals from the output shaft speed sensor and input speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0756	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve S2 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve S2. The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0756: Shift solenoid valve S2/OFF malfunction Shift solenoid valve S2/ON malfunction
Required sensors/Components	Shift solenoid valve S2, Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous
Duration	OFF malfunction (A), (B), (C): 0.4 sec. OFF malfunction (D): Immediate ON malfunction (A) and (B): 0.4 sec. ON malfunction (C): 3 sec. ON malfunction (D): 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	-
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOTf (Transfer input speed/Transfer output speed)	0.9 to 1.1

OFF malfunction (A)

ECM selected gear	1st
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

OFF malfunction (B)

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Output speed	2nd → 1st down shift point or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

OFF malfunction (C)

Current ECM selected gear	5th
Last ECM selected gear	4th
Continuous time for ECM selecting 4th gear	2 sec. or more
Actual gear when ECM selected 4th gear	4th

OFF malfunction (D)

Current ECM selected gear	5th
Last ECM selected gear	4th

ON malfunction (A)

ECM selected gear	1st
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (B)

ECM selected gear	4th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (C)

Current ECM selected gear	5th
Last ECM selected gear	4th
Vehicle speed (During transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

ON malfunction (D)

ECM selected gear	5th
Engine speed – Turbine speed (NE – NT) (After transition from 4th to 5th gear)	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

TYPICAL MALFUNCTION THRESHOLDS**OFF malfunction**

All of the following conditions are met: Conditions (A), (B), (C) and (D)

2 detections are necessary per driving cycle:

1st detection; temporary flag ON

2nd detection; pending fault code ON

OFF malfunction (A) and (B)

Turbine speed/Output speed	3.30 to 7.50
----------------------------	--------------

OFF malfunction (C)

Turbine speed/Output speed	0.65 to 0.79
----------------------------	--------------

OFF malfunction (D)

Output record from ECM for 4th → 5th upshifting	Recorded
---	----------

ON malfunction

Both of the following conditions are met: ON malfunction (A) or (B), and ON malfunction (C) or (D)

ON malfunction (A)

Turbine speed/Output speed	1.91 to 2.35
----------------------------	--------------

ON malfunction (B)

Turbine speed/Output speed	1.28 to 1.53
----------------------------	--------------

ON malfunction (C)

Turbine speed – Output speed x 4th gear ratio (NT – NO x 4th gear ratio)	1,000 rpm or more
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ON malfunction (D)

Turbine speed – Output speed x 5th gear ratio (NT – NO x 5th gear ratio)	1,000 rpm or more
---	-------------------

INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / SHIFT".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-948).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the hand-held tester.
- The shift solenoid valve S2 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve S2	OFF	ON	ON	OFF	OFF

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0756)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0756" is output	A
"P0756" and other DTCS	B

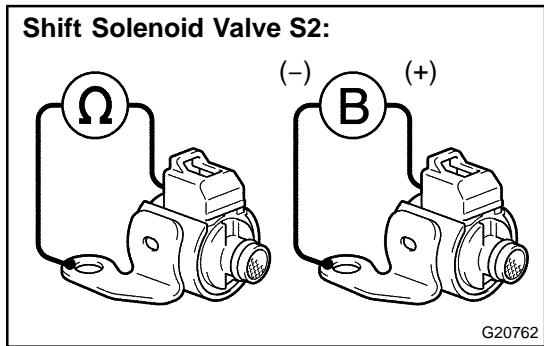
HINT:

If any other codes besides "P0756" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(S2)



- (a) Remove the shift solenoid valve S2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S2) – Solenoid Body (S2)	11 to 15 Ω

- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S2) (SEE PAGE 40-31)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)

OK:

There are no foreign objects on each valve.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-13)

DTC	P0771	SHIFT SOLENOID "E" PERFORMANCE (SHIFT SOLENOID VALVE SR)
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SYSTEM DESCRIPTION

The ECM uses signals from the output shaft speed sensor and input speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0771	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve SR remains open or closed • Shift solenoid valve SL1 remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" or "stuck OFF malfunction" of the shift solenoid valve SR or SL1. The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0771: Shift solenoid valve SR/Rationality check
Required sensors/Components	Shift solenoid valve SR, Speed sensor (NT), Speed sensor (NO), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction (A) 0.4 sec. OFF malfunction (B) and (C) Immediate ON malfunction 0.15 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS**ALL:**

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	-
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOTf (Transfer input speed/Transfer output speed)	0.9 to 1.1

OFF malfunction (A)

ECM selected gear	5th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

OFF malfunction (B)

Current ECM selected gear	5th
Last ECM selected gear	4th
Continuous time for ECM selecting 4th gear	2 sec. or more

OFF malfunction (C)

Current ECM selected gear	5th
Last ECM selected gear	4th

ON malfunction

Current ECM selected gear	2th
Last ECM selected gear	1st
Throttle valve opening angle (During transition from 1st to 2nd gear)	6.0% or more at 3,000 rpm (Conditions vary with engine speed)

TYPICAL MALFUNCTION THRESHOLDS**OFF malfunction**

All of the following conditions are met: Conditions (A), (B) and (C)

2 detections are necessary per driving cycle:

1st detection; temporary flag ON

2nd detection; pending fault code ON

OFF malfunction (A)

Turbine speed/Output speed	0.93 to 1.07
----------------------------	--------------

OFF malfunction (B)

Turbine speed/Output speed	Not change as follow 0.93 to 1.07 ↓ 0.65 to 0.79
----------------------------	---

OFF malfunction (C)

Output record from ECM for 4th → 5th upshifting	Recorded
---	----------

ON malfunction

2 detections are necessary per driving cycle:

1st detection; temporary flag ON

2nd detection; pending fault code ON

Turbine speed – Output speed x 1st gear ratio (NT – NO x 1st gear ratio)	150 rpm or more
---	-----------------

INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / SHIFT".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-948).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the hand-held tester.
- The shift solenoid valve SR and SL1 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve SR	OFF	OFF	OFF	OFF	ON
Shift solenoid valve SL1	OFF	OFF	OFF	OFF	ON

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0771)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0771" is output	A
"P0771" and other DTCS	B

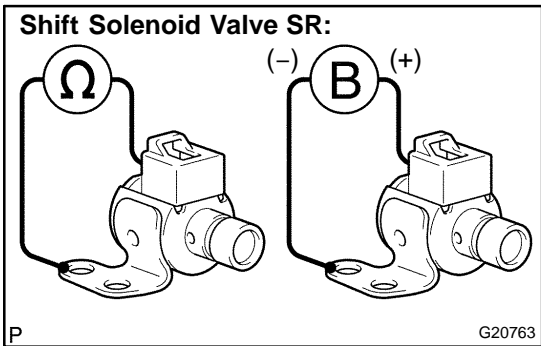
HINT:

If any other codes besides "P0771" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(SR)



- (a) Remove the shift solenoid valve S2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (SR) - Solenoid Body (SR)	11 to 15 Ω

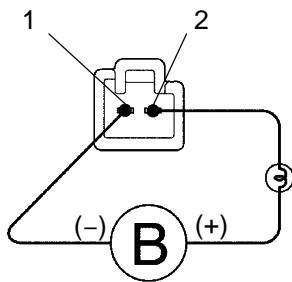
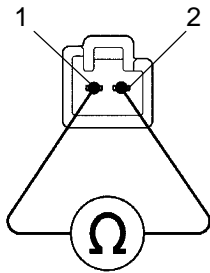
- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE(SR) (SEE PAGE 40-31)**

OK

3 INSPECT SHIFT SOLENOID VALVE(SL1)**Shift Solenoid Valve SL1:**

D25466

- (a) Remove the shift solenoid valve SL1.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG

**REPLACE SHIFT SOLENOID VALVE(SL1)
 (SEE PAGE 40-31)**

OK**4 INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)****OK:**

There are no foreign objects on each valve.

NG

**REPAIR OR REPLACE TRANSMISSION VALVE
 BODY ASSY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-13)

DTC	P0776	PRESSURE CONTROL SOLENOID "B" PERFORMANCE (SHIFT SOLENOID VALVE SL2)
------------	--------------	---

SYSTEM DESCRIPTION

The ECM uses signals from the output shaft speed sensor and input speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear).

Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear, etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0776	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve SL2 remains open • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

This DTC indicates "stuck ON malfunction" of the shift solenoid valve SL2.

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Speed sensor (NT), Speed sensor (NO), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	ON malfunction (A), (B) and (C) 0.4 sec. ON malfunction (D) 3 sec. ON malfunction (E) 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS**ALL:**

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	–
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOTf (Transfer input speed/Transfer output speed)	0.9 to 1.1

ON malfunction (A)

ECM selected gear	1st
Vehicle speed	2 to 40 km/h (1.2 to 24.9 mph)
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (B)

ECM selected gear	3rd
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (C)

ECM selected gear	4th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction (D)

Current ECM selected gear	5th
Last ECM selected gear	4th
Vehicle speed (During transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

ON malfunction (E)

ECM selected gear	5th
Engine speed – Turbine speed (NE – NT) (After transition from 4th to 5th gear)	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

TYPICAL MALFUNCTION THRESHOLDS

ON malfunction

Both of the following conditions is met:

- ON malfunction (A) and (B), or ON malfunction (C)
- ON malfunction (D) or (E)

ON malfunction (A)

Turbine speed/Output speed	3.30 to 7.50
----------------------------	--------------

ON malfunction (B)

Turbine speed/Output speed	1.28 to 1.53
----------------------------	--------------

ON malfunction (C)

Turbine speed/Output speed	0.93 to 1.07
----------------------------	--------------

ON malfunction (D)

Turbine speed – Output speed x 4th gear ratio (NT – NO x 4th gear ratio)	1,000 rpm or more
---	-------------------

ON malfunction (E)

Turbine speed – Output speed x 5th gear ratio (NT – NO x 5th gear ratio)	1,000 rpm or more
---	-------------------

INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / SHIFT".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-948).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the hand-held tester.
- The shift solenoid valve SL2 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve SL2	ON	ON	ON	ON	OFF

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0776)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0776" is output	A
"P0776" and other DTCS	B

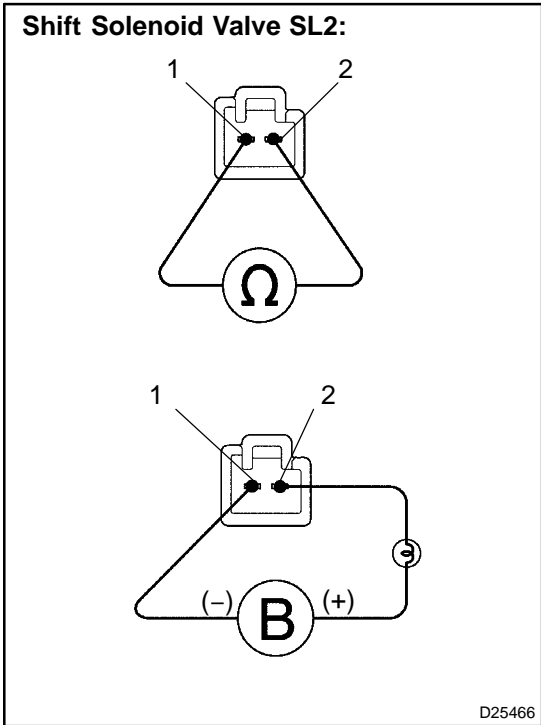
HINT:

If any other codes besides "P0776" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(SL2)



- (a) Remove the shift solenoid valve SL2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE(SL2) (SEE PAGE 40-31)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)**OK:**

There are no foreign objects on each valve.

NG**REPAIR OR REPLACE TRANSMISSION VALVE
BODY ASSY****OK****REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-13)**

DTC	P0778	PRESSURE CONTROL SOLENOID "B" ELECTRICAL (SHIFT SOLENOID VALVE SL2)
------------	--------------	--

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1, SL2, S1, S2 and SR which are controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated smoothly (see page 05-948).

DTC No.	DTC Detection Condition	Trouble Area
P0778	The ECM checks for an open or short in the shift solenoid valve SL2 circuit while driving and shifting gears. (1-trip detection logic) <ul style="list-style-type: none"> • Output signal duty equals to 100%. (NOTE: SL2 output signal duty is less than 100% under normal condition.)	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM

MONITOR DESCRIPTION

This DTC indicates an open or short in the shift solenoid valve SL2 circuit. The ECM commands gear shift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other normal shift solenoid valves "ON/OFF". (In case of an open or short circuit, the ECM stops sending current to the circuit.)

While driving and shifting gears, if the ECM detects an open or short in the shift solenoid valve SL2 circuit, the ECM determines there is a malfunction (see page 05-948).

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Battery voltage	10 V or more
CPU commanded duty	Less than 75%
Ignition switch	ON
Starter	OFF

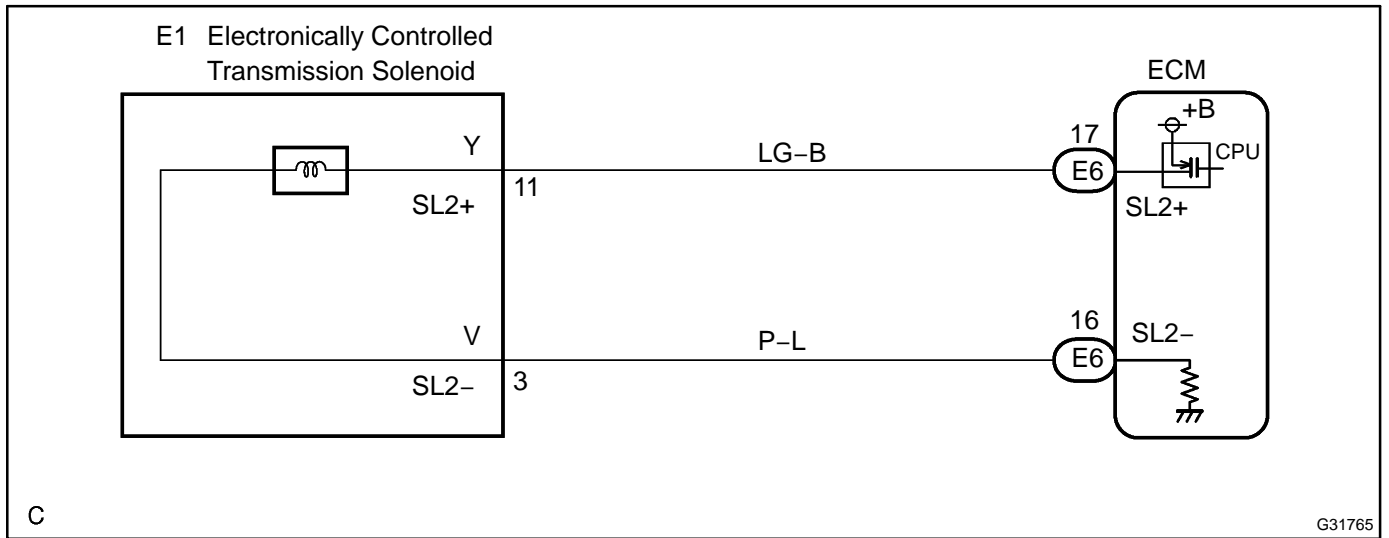
TYPICAL MALFUNCTION THRESHOLDS

Output signal duty	100%
--------------------	------

COMPONENT OPERATING RANGE

Output signal duty	Less than 100%
--------------------	----------------

WIRING DIAGRAM



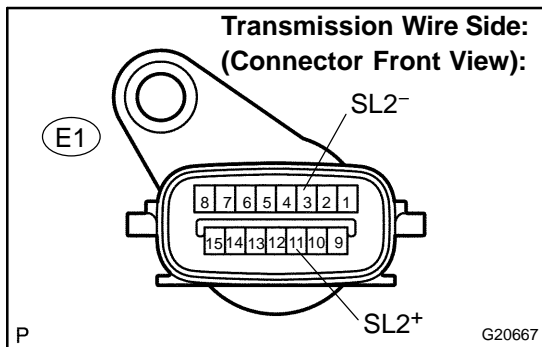
INSPECTION PROCEDURE

HINT:

- The shift solenoid valve SL2 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve SL2	ON	ON	ON	ON	OFF

1 INSPECT TRANSMISSION WIRE(SL2)



- Disconnect the transmission wire connector from the transmission.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
11 (SL2+) - 3 (SL2-)	5.0 to 5.6 Ω

- Measure the resistance according to the value(s) in the table below.

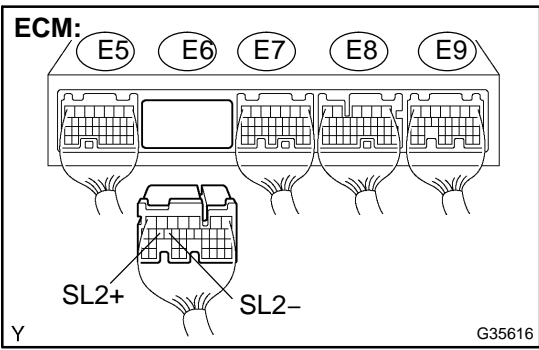
Standard (Check for short):

Tester Connection	Specified Condition
11 (SL2+) - Body ground	10 kΩ or higher
3 (SL2-) - Body ground	↑

NG → Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission connector to the transmission.
- (b) Disconnect the connector from the ECM.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
	20°C (68°F)
E6 - 17 (SL2+) - E6 - 16 (SL2-)	5.0 to 5.6 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

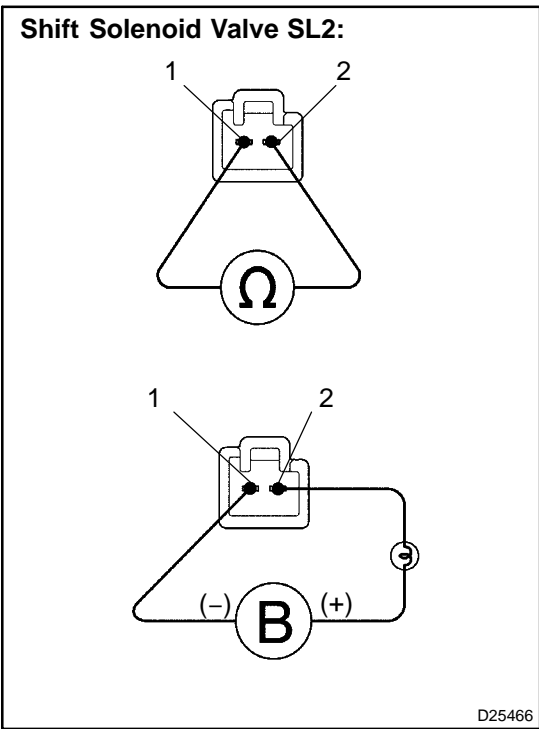
Tester Connection	Specified Condition
E6 - 17 (SL2+) - Body ground	10 kΩ or higher
E6 - 16 (SL2-) - Body ground	↑

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(SL2)



- (a) Remove the shift solenoid valve SL2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
	20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

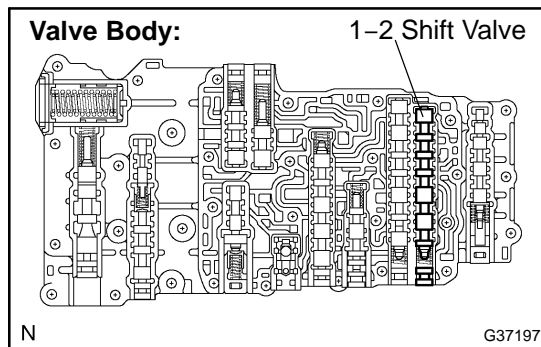
The solenoid makes an operating sound.

NG REPLACE SHIFT SOLENOID VALVE(SL2) (SEE PAGE 40-31)

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P0781	1-2 SHIFT (1-2 SHIFT VALVE)
------------	--------------	------------------------------------



SYSTEM DESCRIPTION

The 1-2 shift valve performs shifting to 1st gear and other gears.

DTC No.	DTC Detection Condition	Trouble Area
P0781	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> • Valve body is blocked up or stuck (1-2 shift valve) • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

This DTC indicates that the 1-2 shift valve in the valve body is locked in the direction the spring compresses. The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF" and switching oil pressure to the valves in the valve body.

The ECM calculates the "actual" transmission gear by comparing the signals from the input speed sensor (NT) and the output speed sensor (SP2). The ECM can detect many mechanical problems in the shift solenoids, valve body, and the transmission clutches, brakes, and gears. If the ECM detects that the actual gear position and the commanded gear position are different, it will illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0781: Valve body/Rationality check
Required sensors/Components	Valve body, Automatic transmission assembly, Speed sensor (NT), Speed sensor (NO), Vehicle speed sensor, Throttle speed sensor
Frequency of operation	Continuous
Duration	Condition (A) and (B) 0.4 sec. Condition (C) 3 sec. Condition (D) 0.5 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"

ECT	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	–
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 to 1.1

Condition (A)

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Output speed	2nd → 1st down shift point or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

Condition (B)

ECM selected gear	4th
Vehicle speed	2 km/h (1.2 mph) or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

Condition (C)

Current ECM selected gear	5th
Last ECM selected gear	4th
Vehicle speed (During transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

Condition (D)

ECM selected gear	5th
Engine speed – Turbine speed (NE – NT) (After transition from 4th to 5th gear)	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	Less than 100 km/h (62.2 mph)

TYPICAL MALFUNCTION THRESHOLDS

Both of the following conditions is met:

Condition (A), and Condition (B), (C) or (D)

Condition (A)

Turbine speed/Output speed	3.30 to 7.50
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Condition (B)

Turbine speed/Output speed	1.28 to 1.53
----------------------------	--------------

Condition (C)

Turbine speed – Output speed x 4th gear ratio (NT – NO x 4th gear ratio)	1,000 rpm or more
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Condition (D)

Turbine speed – Output speed x 5th gear ratio (NT – NO x 5th gear ratio)	1,000 rpm or more
---	-------------------

INSPECTION PROCEDURE**1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P0781)**

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCs using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P0781" is output	A
"P0781" and other DTCs	B

HINT:

If any other codes besides "P0781" are output, perform troubleshooting for those DTCs first.

B**GO TO DTC CHART (SEE PAGE 05-955)****A**

2 | PERFORM ACTIVE TEST BY HAND-HELD TESTER

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / SHIFT".
- (g) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

While driving, the shift position can be forcibly changed with the hand-held tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (see page 05-948).

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	Possible to check the operation of the shift solenoid valves.

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The 4th to 5th up-shiftings must be performed with the accelerator pedal released.
- The 5th to 4th down-shiftings must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the DATA LIST (SHIFT) display on the hand-held tester.

OK:

Gear position changes in accordance with the tester command.

NG	REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)
-----------	--

OK

3 CLEAR THE DTC AND RUNNING TEST

- (a) Clear the DTC, and check DTC again after conducting the "MONITOR DRIVE PATTERN FOR ECT TEST" (see page [05-932](#)).

OK:**No DTC code****NG****REPAIR OR REPLACE TRANSMISSION VALVE
BODY ASSY (SEE PAGE [40-31](#))****OK****END**

DTC	P0818	DRIVELINE DISCONNECT SWITCH INPUT CIRCUIT
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CIRCUIT DESCRIPTION

The ECM detects the signal from the transfer neutral position switch. This DTC indicates that the transfer neutral position switch remains on.

DTC No.	DTC Detecting Condition	Trouble Area
P0818	Transfer neutral position switch remains ON while vehicle is running under following conditions for 30 sec. (2-trip detection logic) <ul style="list-style-type: none"> • Vehicle speed is 25 km/h or more • Transfer shift position is H 	<ul style="list-style-type: none"> • Short in transfer neutral position switch circuit • Transfer neutral position switch • ECM

MONITOR DESCRIPTION

The ECM detects whether or not the transfer gear is in the neutral position by monitoring the signal from the transfer neutral position switch.

If the ECM detects that the transfer-case is in neutral under the following conditions, the ECM will conclude that there is a malfunction of the transfer-case neutral position switch:

- Transfer-case neutral position switch indicates that the transfer-case is in neutral.
- Transfer-case shifter is in the "H" position.
- The vehicle is traveling at 25 km/h (16 mph) or more.
- The neutral switch has been on for more than thirty seconds.

If all of the above conditions are detected, the ECM will conclude that there is a malfunction of the transfer-case neutral position switch, illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P0818 : Transfer neutral position switch/Verify switch cycling
Required sensors/Components	Transfer neutral position switch, Vehicle speed sensor
Frequency of operation	Continuous
Duration	30 sec.
MIL operation	2 driving cycles
Sequence of operation	None

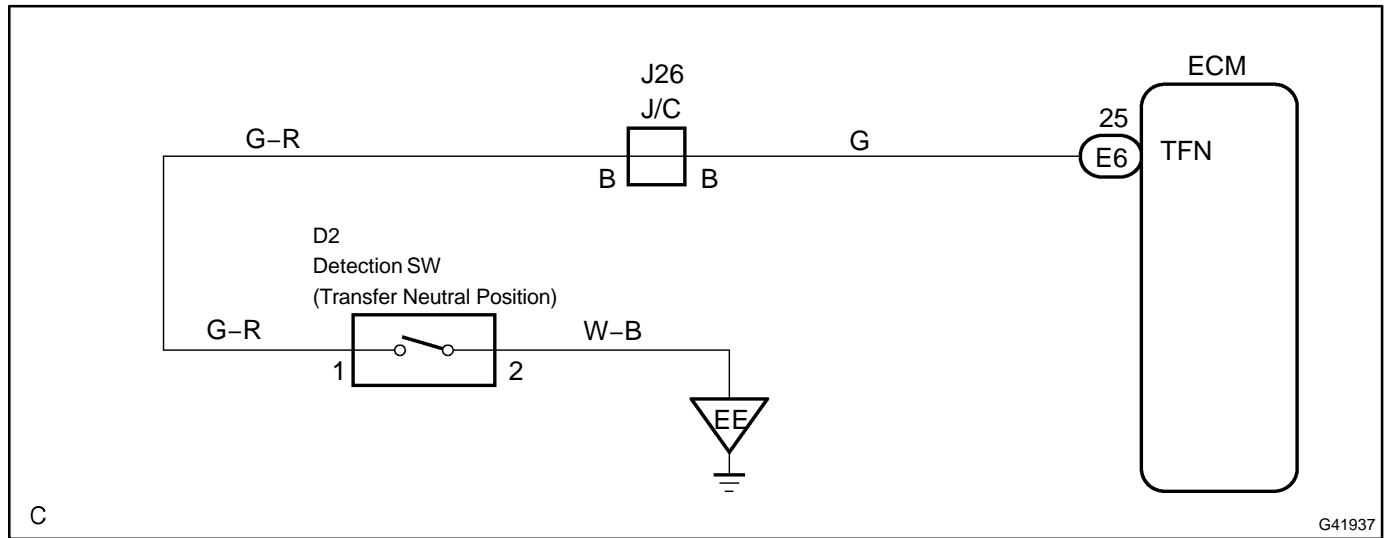
TYPICAL ENABLING CONDITION

The monitor will run whenever this DTC is not present.	See page 05-925
Vehicle speed	25 km/h (15.52 mph) or more
Transfer position	High
Ignition switch ON and time after OFF to ON	0.5 sec. or more
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

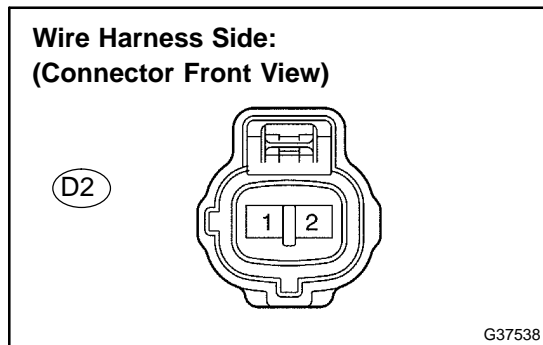
Transfer neutral switch signal	ON
--------------------------------	----

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(TRANSFER INDECATOR SWITCH-BODY GROUND)



- (a) Disconnect the transfer indicator switch No.2 connector.
- (b) Measure the resistance according to the value(s) in the table below.

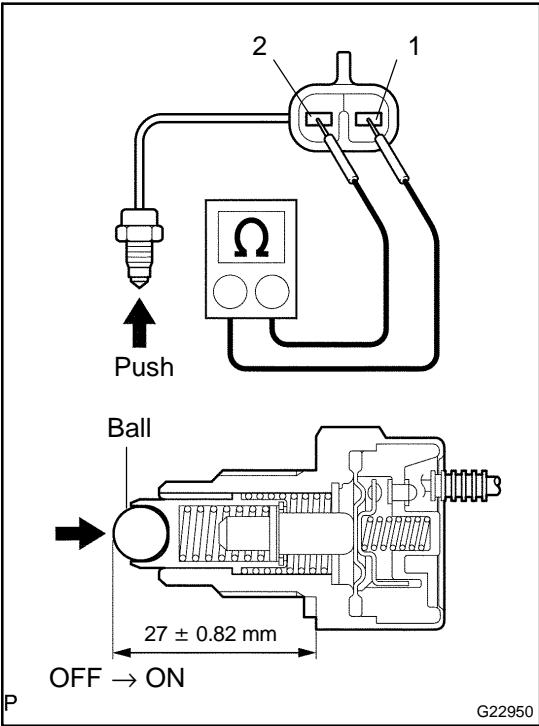
Standard:

Tester Connection	Specified Condition
2 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

2 INSPECT TRANSFER INDICATOR SWITCH NO.2



- (a) Remove the transfer indicator switch No.2.
- (b) Measure the resistance according to the value(s) in the table below.

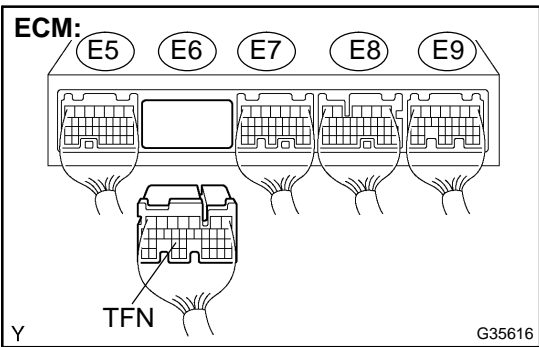
Standard:

Switch position	Tester Connection	Specified Condition
Free	1 - 2	10 kΩ or higher
Pushed in	↑	Below 1 Ω

NG → **REPLACE TRANSFER INDICATOR SWITCH NO.2(TRANSFER NEUTRAL POSITION SWITCH)**

OK

3 CHECK HARNESS AND CONNECTOR(TRANSFER INDICATOR SWITCH-ECM)



- (a) Disconnect the connector from the ECM.
- (b) Measure the resistance according to the value(s) in the table below.

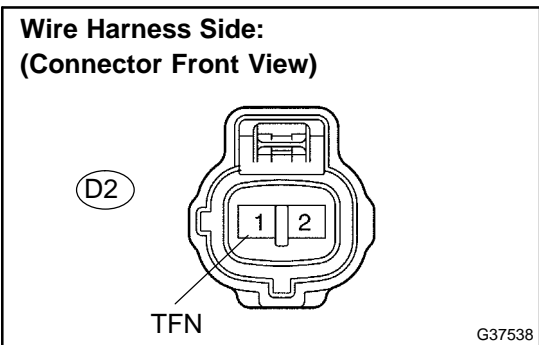
Standard (Check for open):

Tester Connection	Specified Condition
E6 - 25 (TFN) - D2 - 1 (TFN)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

Tester Connection	Specified Condition
E6 - 25 (TFN) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

DTC	P0973	SHIFT SOLENOID "A" CONTROL CIRCUIT LOW (SHIFT SOLENOID VALVE S1)
------------	--------------	---

DTC	P0974	SHIFT SOLENOID "A" CONTROL CIRCUIT HIGH (SHIFT SOLENOID VALVE S1)
------------	--------------	--

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1, SL2, S1, S2 and SR which are controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated smoothly (see page 05-948).

DTC No.	DTC Detection Condition	Trouble Area
P0973	ECM detects short in solenoid valve S1 circuit 2 times when solenoid valve S1 is operated (1-trip detection logic)	<ul style="list-style-type: none"> • Short in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM
P0974	ECM detects open in solenoid valve S1 circuit 2 times when solenoid valve S1 is not operated (1-trip detection logic)	<ul style="list-style-type: none"> • Open in shift solenoid valve S1 circuit • Shift solenoid valve S1 • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S1 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. When the shift solenoid valve S1 is on, if resistance is 8 Ω or less, the ECM determines there is a short in the shift solenoid valve S1 circuit.

When the shift solenoid valve S1 is off, if resistance is 100 kΩ or more, the ECM determines there is an open in the shift solenoid valve S1 circuit (see page 05-948).

MONITOR STRATEGY

Related DTCs	P0973: Shift solenoid valve S1/Range check (Low resistance) P0974: Shift solenoid valve S1/Range check (High resistance)
Required sensors/Components	Shift solenoid valve S1
Frequency of operation	Continuous
Duration	0.064 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0973: Range check (Low resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve S1	ON

P0974: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve S1	OFF

TYPICAL MALFUNCTION THRESHOLDS

P0973: Range check (Low resistance)

Shift solenoid valve S1 resistance	8 Ω or less
------------------------------------	-------------

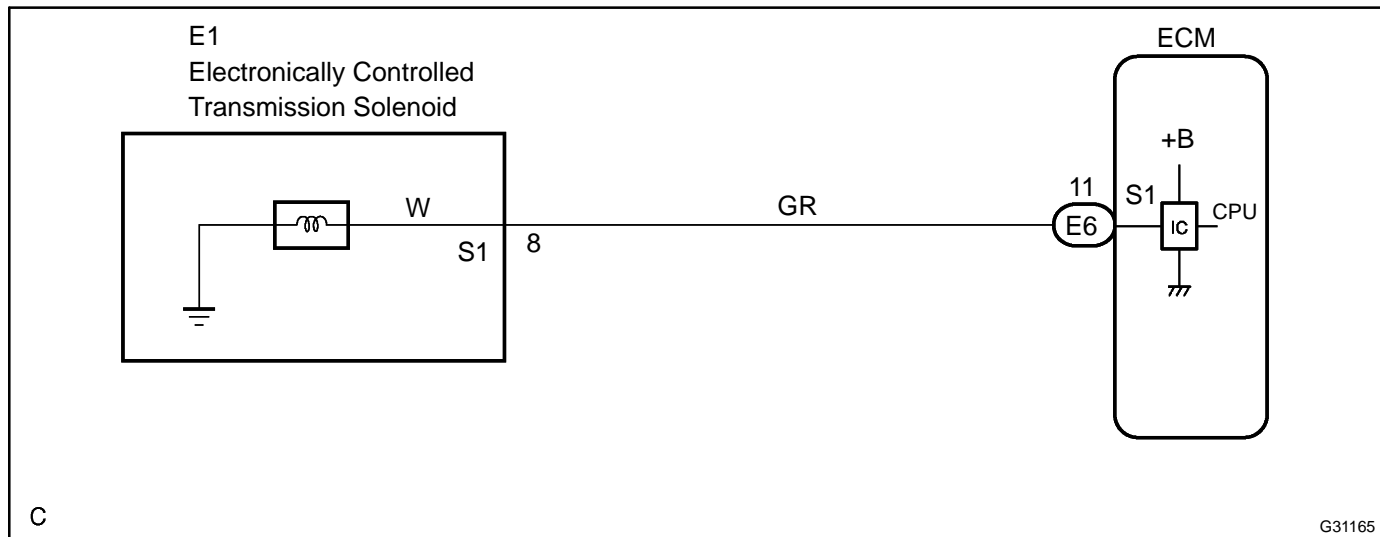
P0974: Range check (High resistance)

Shift solenoid valve S1 resistance	100 kΩ or more
------------------------------------	----------------

COMPONENT OPERATING RANGE

Shift solenoid valve S1	Resistance: 11 to 15 Ω at 20°C (68°F)
-------------------------	---------------------------------------

WIRING DIAGRAM



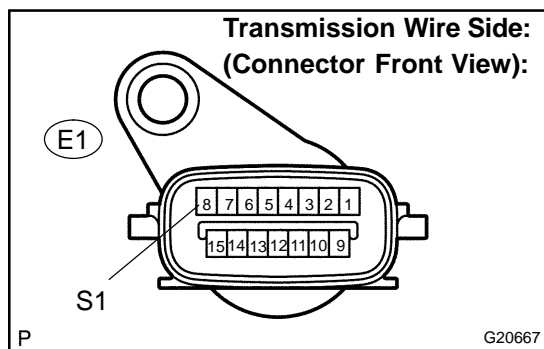
INSPECTION PROCEDURE

HINT:

- The shift solenoid valve S1 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve S1	ON	ON	OFF	OFF	OFF

1 INSPECT TRANSMISSION WIRE(S1)



- Disconnect the transmission wire connector from the transmission.
- Measure the resistance according to the value(s) in the table below.

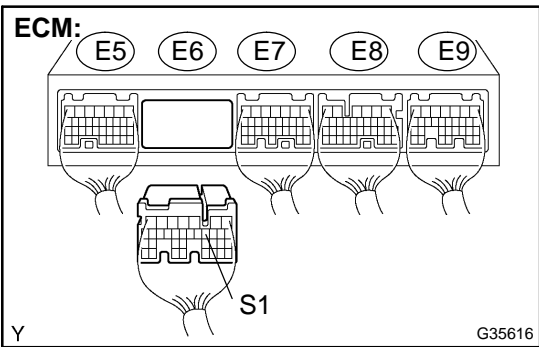
Standard:

Tester Connection	Specified Condition 20°C (68°F)
8 - Body ground	11 to 15 Ω

NG Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission connector to the transmission.
- (b) Disconnect the connector from the ECM.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

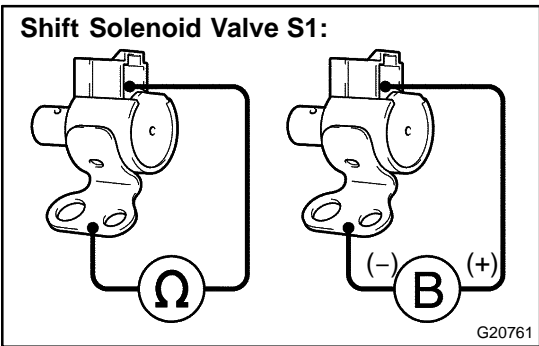
Tester Connection	Specified Condition 20°C (68°F)
E6 - 11 (S1) - Body ground	11 to 15 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(S1)



- (a) Remove the shift solenoid valve S1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S1) - Solenoid Body (S1)	11 to 15 Ω

- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S1) (SEE PAGE 40-31)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P0976	SHIFT SOLENOID "B" CONTROL CIRCUIT LOW (SHIFT SOLENOID VALVE S2)
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DTC	P0977	SHIFT SOLENOID "B" CONTROL CIRCUIT HIGH (SHIFT SOLENOID VALVE S2)
------------	--------------	--

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1, SL2, S1, S2 and SR which are controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated smoothly (see page [05-948](#)).

DTC No.	DTC Detection Condition	Trouble Area
P0976	ECM detects short in solenoid valve S2 circuit 2 times when solenoid valve S2 is operated (1-trip detection logic)	<ul style="list-style-type: none"> • Short in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM
P0977	ECM detects open in solenoid valve S2 circuit 2 times when solenoid valve S2 is not operated (1-trip detection logic)	<ul style="list-style-type: none"> • Open in shift solenoid valve S2 circuit • Shift solenoid valve S2 • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve S2 circuit. When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. When the shift solenoid valve S2 is on, if resistance is 8 Ω or less, the ECM determines there is a short in the shift solenoid valve S2 circuit.

When the shift solenoid valve S2 is off, if resistance is 100 kΩ or more, the ECM determines there is an open in the shift solenoid valve S2 circuit (see page [05-948](#)).

MONITOR STRATEGY

Related DTCs	P0976: Shift solenoid valve S2/Range check (Low resistance) P0977: Shift solenoid valve S2/Range check (High resistance)
Required sensors/Components	Shift solenoid valve S2
Frequency of operation	Continuous
Duration	0.064 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0976: Range check (Low resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve S2	ON

P0977: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve S2	OFF

TYPICAL MALFUNCTION THRESHOLDS

P0976: Range check (Low resistance)

Shift solenoid valve S2 resistance	8 Ω or less
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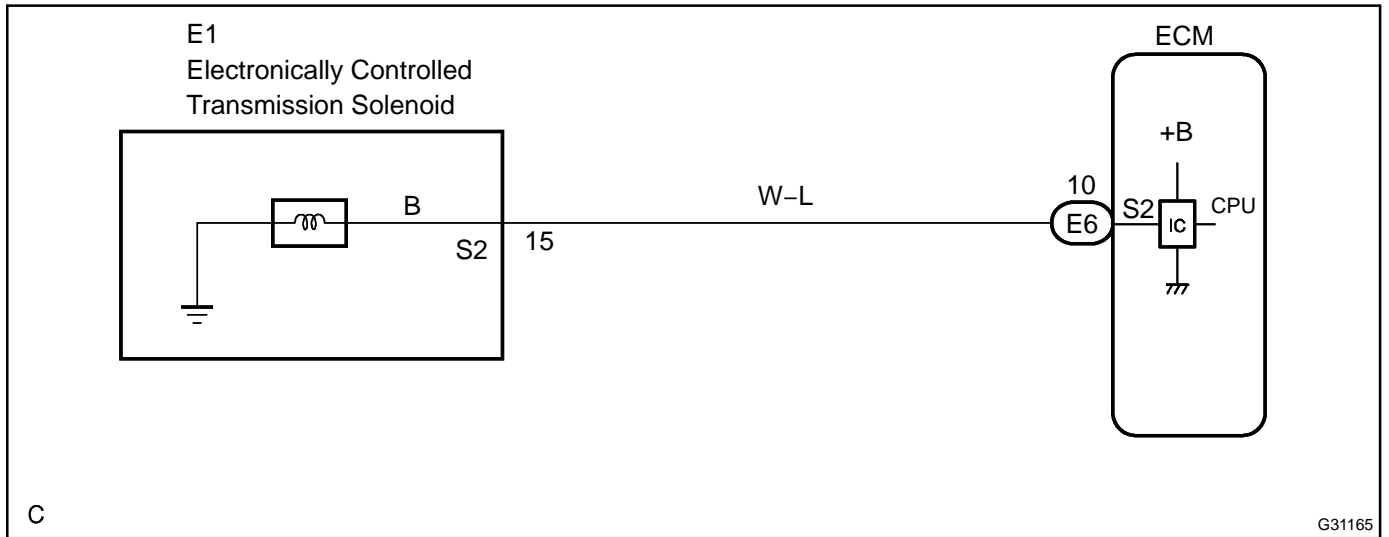
P0977: Range check (High resistance)

Shift solenoid valve S2 resistance	100 kΩ or more
------------------------------------	----------------

COMPONENT OPERATING RANGE

Shift solenoid valve S2	Resistance: 11 to 15 Ω at 20°C (68°F)
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WIRING DIAGRAM



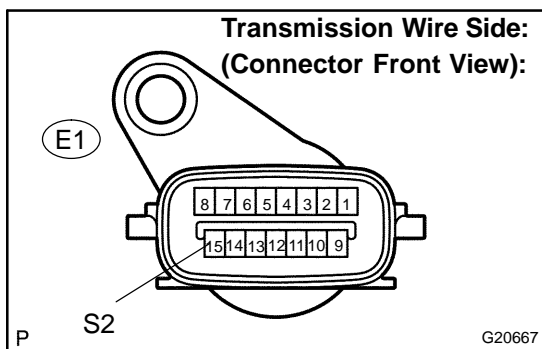
INSPECTION PROCEDURE

HINT:

- The shift solenoid valve S2 is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve S2	OFF	ON	ON	OFF	OFF

1 INSPECT TRANSMISSION WIRE(S2)



- Disconnect the transmission wire connector from the transmission.
- Measure the resistance according to the value(s) in the table below.

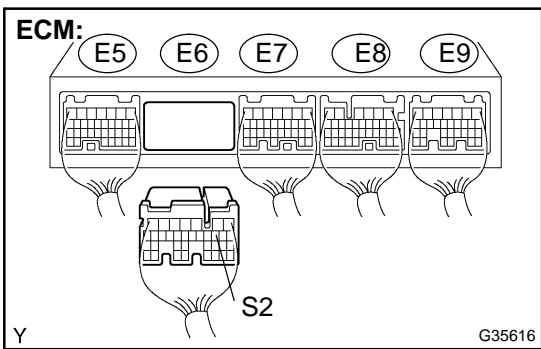
Standard:

Tester Connection	Specified Condition 20°C (68°F)
15 - Body ground	11 to 15 Ω

NG → Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission connector to the transmission.
- (b) Disconnect the connector from the ECM.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

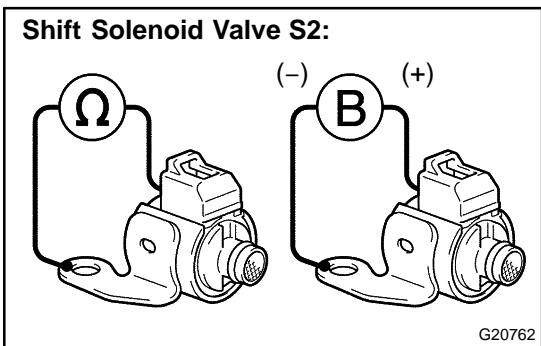
Tester Connection	Specified Condition 20°C (68°F)
E6 - 10 (S2) - Body ground	11 to 15 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(S2)



- (a) Remove the shift solenoid valve S2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S2) - Solenoid Body (S2)	11 to 15 Ω

- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (S2) (SEE PAGE 40-31)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P0985	SHIFT SOLENOID "E" CONTROL CIRCUIT LOW (SHIFT SOLENOID VALVE SR)
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DTC	P0986	SHIFT SOLENOID "E" CONTROL CIRCUIT HIGH (SHIFT SOLENOID VALVE SR)
------------	--------------	--

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1, SL2, S1, S2 and SR which are controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valves to allow the vehicle to be operated smoothly (see page 05-948).

DTC No.	DTC Detection Condition	Trouble Area
P0985	ECM detects short in solenoid valve SR circuit 2 times when solenoid valve SR is operated (1-trip detection logic)	<ul style="list-style-type: none"> • Short in shift solenoid valve SR circuit • Shift solenoid valve SR • ECM
P0986	ECM detects open in solenoid valve SR circuit 2 times when solenoid valve SR is not operated (1-trip detection logic)	<ul style="list-style-type: none"> • Open in shift solenoid valve SR circuit • Shift solenoid valve SR • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the shift solenoid valve SR circuit. When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. When the shift solenoid valve SR is on, if resistance is 8 Ω or less, the ECM determines there is a short in the shift solenoid valve SR circuit.

When the shift solenoid valve SR is off, if resistance is 100 kΩ or more, the ECM determines there is an open in the shift solenoid valve SR circuit (see page 05-948).

MONITOR STRATEGY

Related DTCs	P0985: Shift solenoid valve SR/Range check (Low resistance) P0986: Shift solenoid valve SR/Range check (High resistance)
Required sensors/Components	Shift solenoid valve SR
Frequency of operation	Continuous
Duration	0.064 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0985: Range check (Low resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve SR	ON
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

P0986: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Shift solenoid valve SR	OFF
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P0985: Range check (Low resistance)

Shift solenoid valve SR resistance	8 Ω or less
------------------------------------	-------------

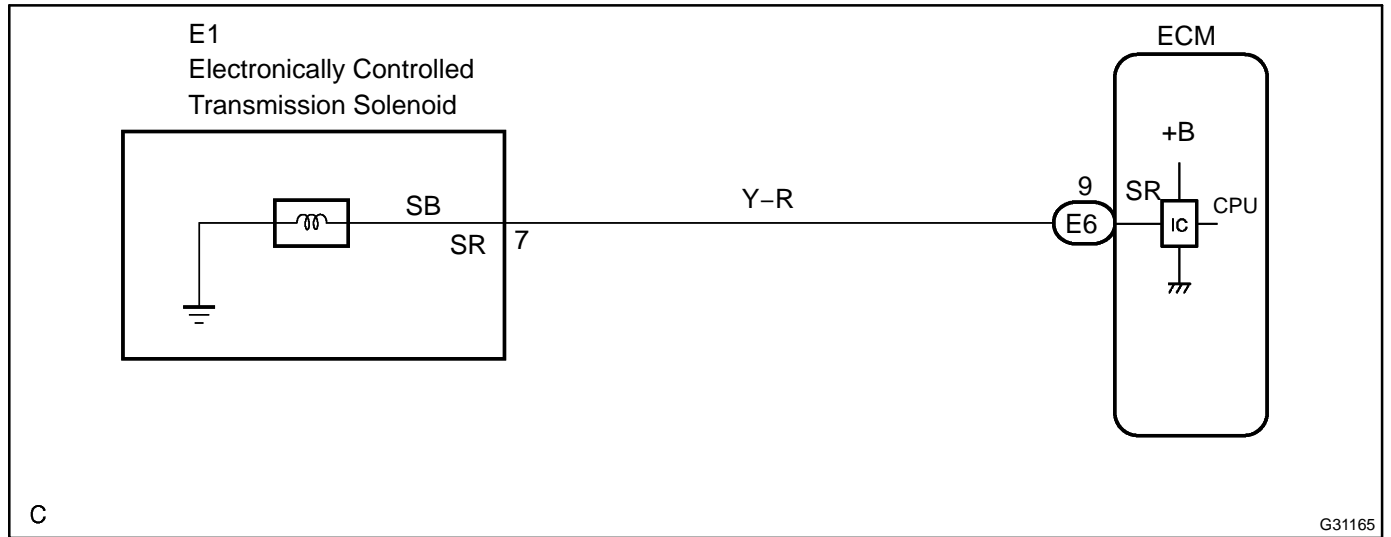
P0986: Range check (High resistance)

Shift solenoid valve SR resistance	100 kΩ or more
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COMPONENT OPERATING RANGE

Shift solenoid valve SR	Resistance: 11 to 15 Ω at 20°C (68°F)
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WIRING DIAGRAM



C

G31165

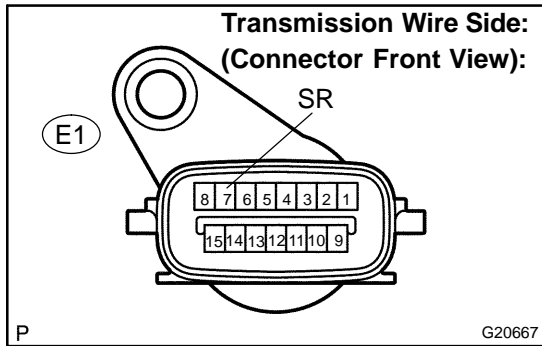
INSPECTION PROCEDURE

HINT:

- The shift solenoid valve SR is turned on/off normally when the shift lever is in the D position:

ECM command gearshift	1st	2nd	3rd	4th	5th
Shift solenoid valve SR	OFF	OFF	OFF	OFF	ON

1 INSPECT TRANSMISSION WIRE(SR)



- Disconnect the transmission wire connector from the transmission.
- Measure the resistance according to the value(s) in the table below.

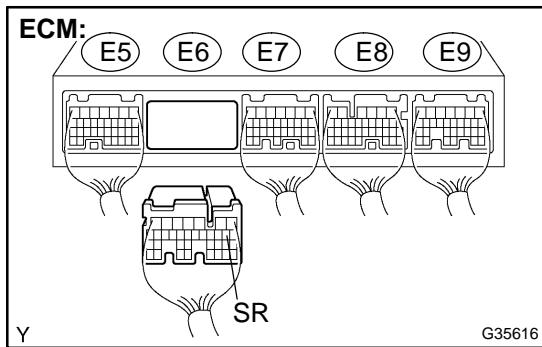
Standard:

Tester Connection	Specified Condition
7 – Body ground	20°C (68°F) 11 to 15 Ω

NG → Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE – ECM)



- Connect the transmission connector to the transmission.
- Disconnect the connector from the ECM.
- Measure the resistance according to the value(s) in the table below.

Standard:

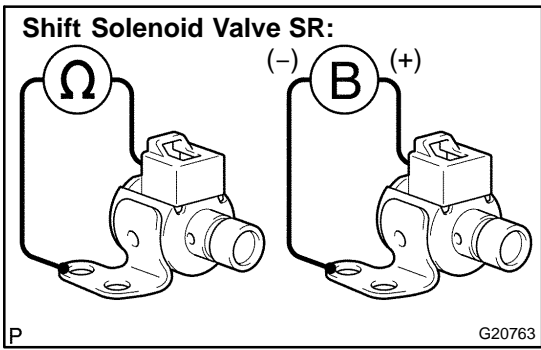
Tester Connection	Specified Condition
E6 – 9 (SR) – Body ground	20°C (68°F) 11 to 15 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(SR)



- (a) Remove the shift solenoid valve SR.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (SR) - Solenoid Body (SR)	11 to 15 Ω

- (c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

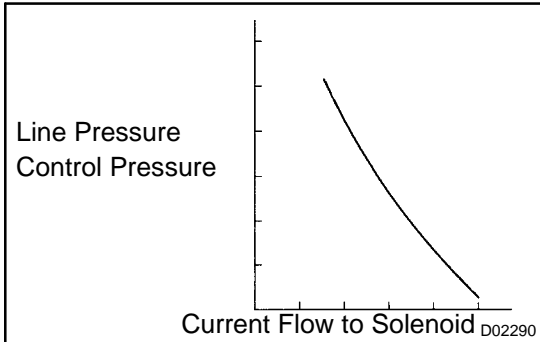
The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SR) (SEE PAGE 40-31)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P2714	PRESSURE CONTROL SOLENOID "D" PERFORMANCE (SHIFT SOLENOID VALVE SLT)
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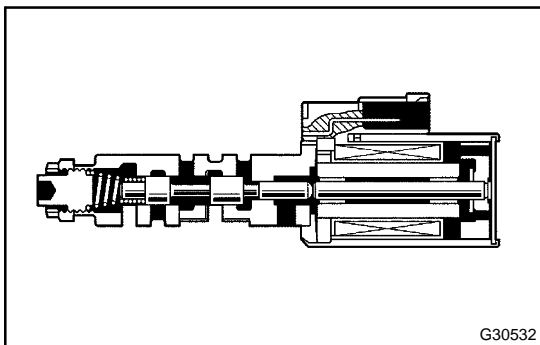
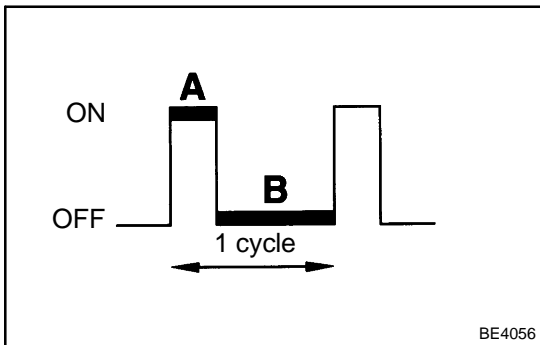
SYSTEM DESCRIPTION

The linear solenoid valve (SLT) controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the duty cycle of the SLT solenoid valve to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.

(*): Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

$$\text{Duty Ratio} = A / (A + B) \times 100 (\%)$$



DTC No.	DTC Detection Condition	Trouble Area
P2714	ECM detects a malfunction on SLT (ON side) according to the revolution difference of the turbine and the output shaft, and also by the oil pressure. (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve SLT remains open or closed • Valve body is blocked • Automatic transmission (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

The ECM calculates the amount of heat absorbed by the friction material based on the difference in revolution (clutch slippage) between the turbine and output shaft. The ECM turns on the MIL and outputs this DTC when the amount of heat absorption exceeds the specified value.

When the shift solenoid valve SLT remains on, oil pressure goes down and clutch engagement force decreases.

NOTE: If you continue driving under these conditions, the clutch will burn out and the vehicle will no longer be drivable.

MONITOR STRATEGY

Related DTCs	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT, Valve body, ATF temperature sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous
Duration	Immediate
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Transmission Fluid Temperature Sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
ECT (Engine coolant temperature) sensor circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
TFT (transmission fluid temperature)	10°C or more
Transfer range	"HIGH"*1

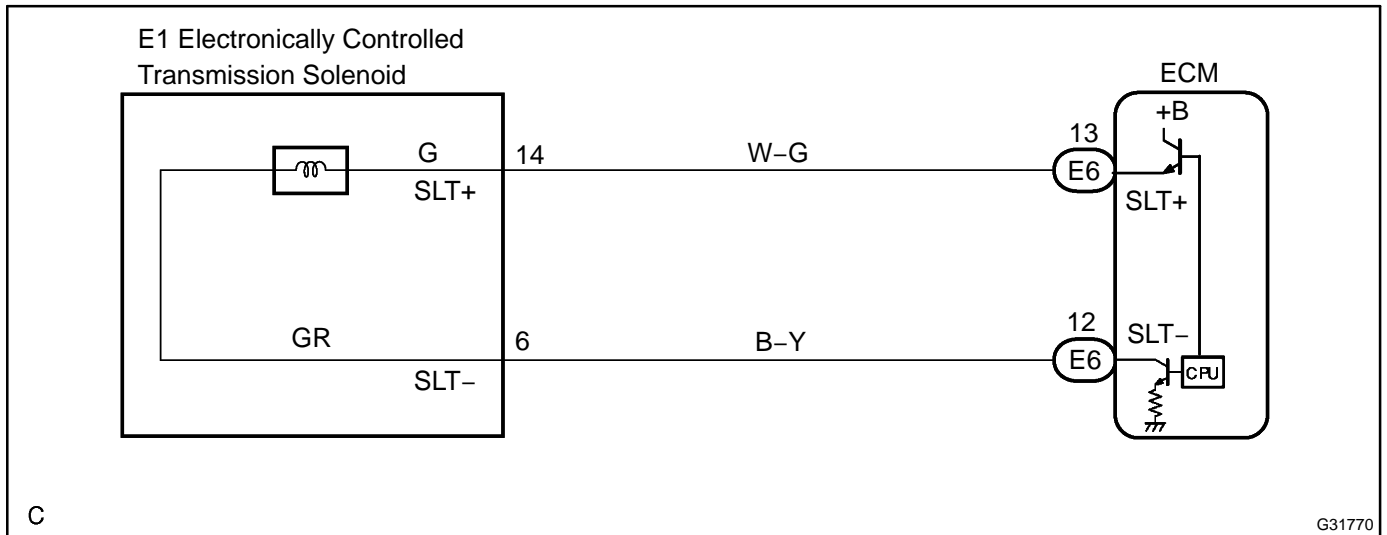
Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	–
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 to 1.1

TYPICAL MALFUNCTION THRESHOLDS

Summation of C1 clutch heat generations = Σ (Turbine speed – Output speed x Temporary ratio)	Specified value
--	-----------------

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST".
- (g) According to the display on tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
LINE PRESS UP *	<p>[Test Details] Operate the shift solenoid SLT and raise the line pressure.</p> <p>[Vehicle Condition]</p> <ul style="list-style-type: none"> • Vehicle Stopped. • IDL: ON <p>[HINT] OFF: Line pressure up (When the active test of "Control the Line Pressure Up" is performed, the ECM commands the SLT solenoid to turn off). ON: No action (normal operation)</p>	-

*: "LINE PRESS UP" in the ACTIVE TEST is performed to check the line pressure changes by connecting the SST to the automatic transmission, which is used in the HYDRAULIC TEST (see page 05-920) as well.

HINT:

- The pressure values in ACTIVE TEST and HYDRAULIC TEST are different from each other.
- Normally, the line pressure detected in the ACTIVE TEST is approximately half of the value detected in the HYDRAULIC TEST's stall test.

1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P2714)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P2714" is output	A
"P2714" and other DTCS	B

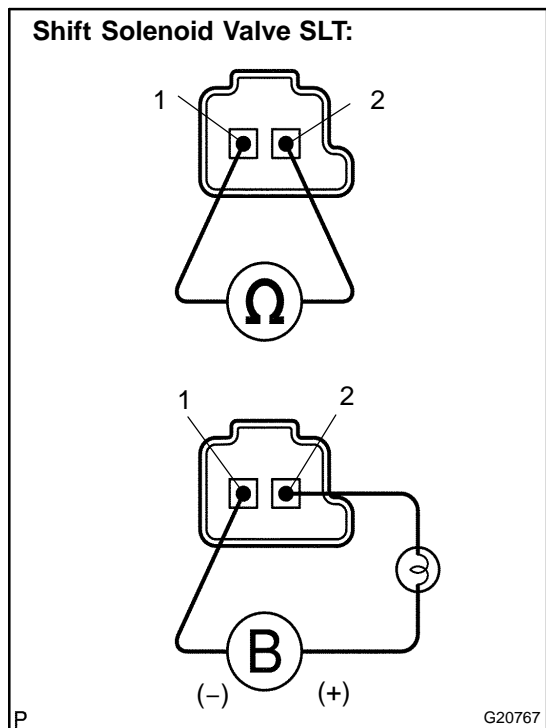
HINT:

If any other codes besides "P2714" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(SLT)



- (a) Remove the shift solenoid valve SLT.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SLT) (SEE PAGE 40-31)**

OK

3 | **INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)**

OK:

There are no foreign objects on each valve.



**REPAIR OR REPLACE TRANSMISSION VALVE
BODY ASSY**



REPAIR OR REPLACE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-13)

DTC	P2716	PRESSURE CONTROL SOLENOID "D" ELECTRICAL (SHIFT SOLENOID SLT)
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CIRCUIT DESCRIPTION

See page [05-1031](#).

DTC No.	DTC Detection Condition	Trouble Area
P2716	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1-trip detection logic).	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM

MONITOR DESCRIPTION

When an open or short in the linear solenoid valve (SLT) circuit is detected, the ECM interprets this as a fault. The ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

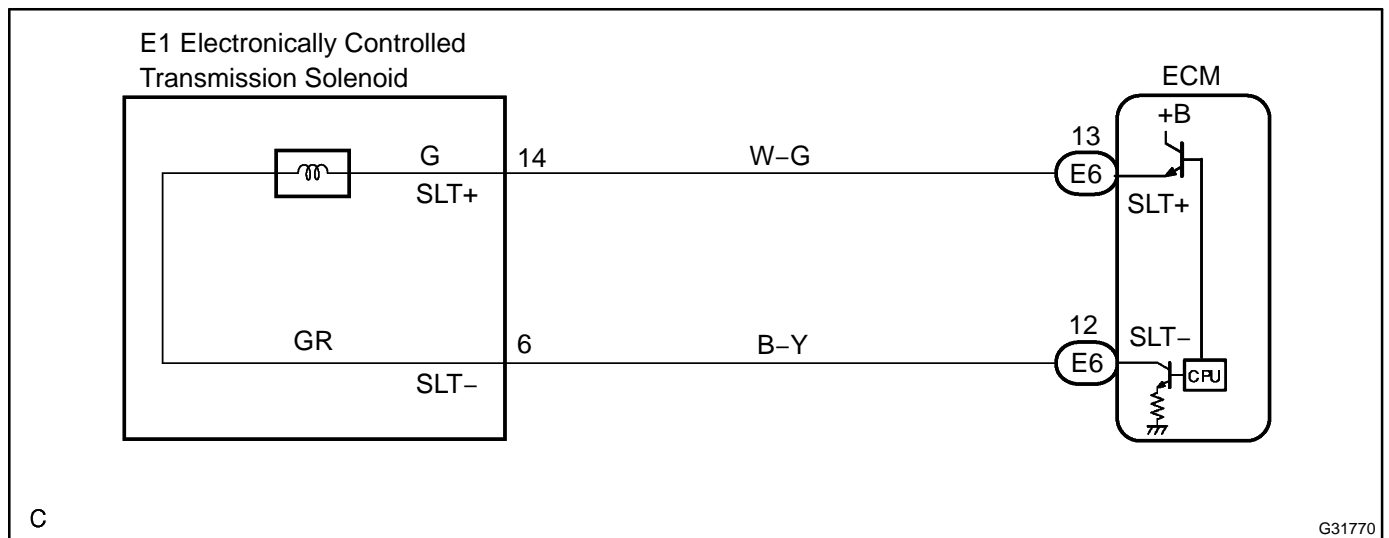
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Solenoid current cut status	Not cut
Battery voltage	11 V or more
CPU commanded duty ratio to SLT	19% or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

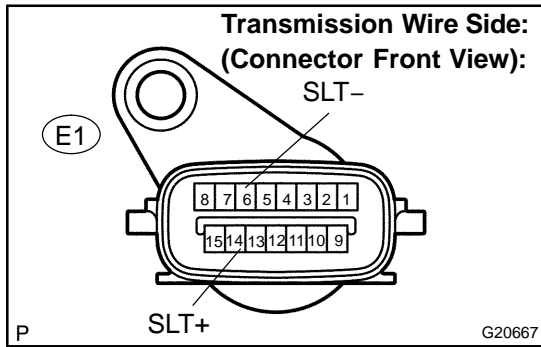
Solenoid status from IC	Fail (Open or short)
-------------------------	----------------------

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION WIRE(SLT)



- (a) Disconnect the transmission wire connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
14 (SLT+) - 6 (SLT-)	5.0 to 5.6 Ω

- (c) Measure the resistance according to the value(s) in the table below.

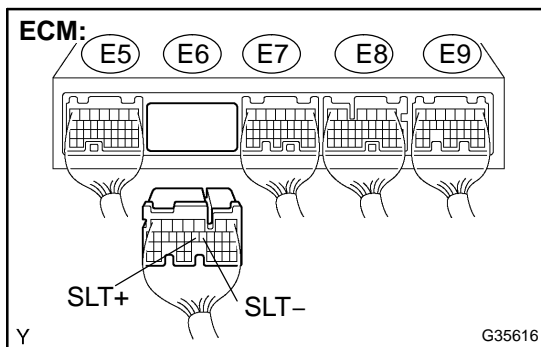
Standard (Check for short):

Tester Connection	Specified Condition
14 (SLT+) - Body ground	10 kΩ or higher
6 (SLT-) - Body ground	↑

NG → Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission wire connector to the transmission.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E6 - 13 (SLT+) - E6 - 12 (SLT-)	5.0 to 5.6 Ω

- (d) Measure the resistance according to the value(s) in the table below.

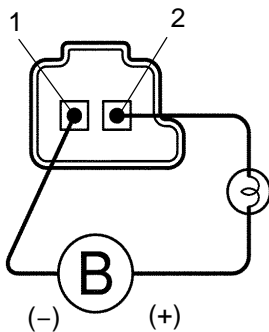
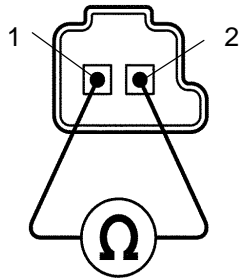
Standard (Check for short):

Tester Connection	Specified Condition
E6 - 13 (SLT+) - Body ground	10 kΩ or higher
E6 - 12 (SLT-) - Body ground	↑

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(SLT)**Shift Solenoid Valve SLT:**

P

G20767

- (a) Remove the shift solenoid valve (SLT).
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG

**REPLACE SHIFT SOLENOID VALVE(SLT)
 (SEE PAGE 40-31)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P2740	TRANSMISSION FLUID TEMPERATURE SENSOR "B" CIRCUIT
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DTC	P2742	TRANSMISSION FLUID TEMPERATURE SENSOR "B" CIRCUIT LOW INPUT
------------	--------------	--

DTC	P2743	TRANSMISSION FLUID TEMPERATURE SENSOR "B" CIRCUIT HIGH INPUT
------------	--------------	---

CIRCUIT DESCRIPTION

ATF (Automatic Transmission Fluid) temperature sensor No.2 is on the transmission and just in front of the oil cooler inlet pipeline.

If ECM detects the abnormally high temperature of ATF by this sensor, it draws driver's attention by illuminating the warning lamp.

HINT:

- The temperature of ATF easily rises when towing, climbing hills and in traffic, etc.
- If the ATF temperature sensor No.2 becomes short-circuited, the signal that indicates the ATF temperature is 150°C (302°F) or higher is input in ECM.

Vehicle conditions when sensor is normal and when the sensor is short-circuited are indicated in the table below.

ATF temperature Sensor No.2 State	Detection Condition	Symptom	Recovery Condition
Sensor is normal	• AT fluid temp. more than 150°C (302°F).	• AT Oil Temp. warning light remains on	• AT fluid temp. less than 135°C (275°F). *2
	• AT fluid temp. more than 130°C (266°F).	• Shift point too high.	• AT fluid temp. less than 110°C (230°F).
	When the conditions (a) and (b) are satisfied. (a) AT fluid temp. more than 130°C (266°F). (b) Engine coolant temp. more than 95°C (203°F).	• Lock-up at 3rd gear. *1	• AT fluid temp. less than 110°C (230°F) *2 and engine coolant temp. less than 95°C (203°F).
Sensor is short-circuited	• Any conditions.	• AT Oil Temp. warning light remains on • Shift point too high.	• Symptoms still occur
	• Engine coolant temp. more than 95°C (203°F).	• Lock-up at 3rd gear. *1	• Symptoms still occur

HINT:

*1: When AT fluid temperature is normal, transmission locks up at 5th gear with the shift lever in D position and at 4th gear with the shift lever in 4 position.

*2: When AT fluid temperature is in normal range, it decreases to less than 135°C (275°F) within 5 minutes with the shift lever in P or N position in an idling state.

DTC No.	DTC Detecting Condition	Trouble Area
P2740	(a) and (b) are detected momentarily within 0.5 sec. when neither P2742 nor P2743 is detected (1-trip detection logic) (a) ATF temperature sensor No.2 resistance is less than 25 Ω (0.046 V) (b) ATF temperature sensor No.2 resistance is more than 156 k Ω (4.915 V) HINT: Within 0.5 sec. the malfunction switches from (a) to (b) or from (b) to (a)	<ul style="list-style-type: none"> • Open or short in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM
P2742	ATF temperature sensor No.2 resistance is less than 25 Ω (0.046 V) for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Short in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM
P2743	ATF temperature No.2 sensor resistance is more than 156 k Ω (4.915 V) when 15 minutes or more after the engine start DTC is detected for 0.5 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> • Open in ATF temperature sensor No.2 circuit • Transmission wire (ATF temperature sensor No.2) • ECM

MONITOR DESCRIPTION

The Automatic Transmission Fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an open or short in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 25 Ω (0.046 V) or more than 156 k Ω (4.915 V), the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2740: ATF temperature sensor/Range check (Fluttering) P2742: ATF temperature sensor/Range check (Low resistance) P2743: ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P2740: Range check (Fluttering)

P2742: Range check (Low resistance)

The monitor will run whenever these DTCs are not present.	See page 05-925
The typical enabling condition is not available.	–

P2743: Range check (High resistance)

The monitor will run whenever this DTC is not present.	See page 05-925
Time after engine start	15 min. or more

TYPICAL MALFUNCTION THRESHOLDS

P0710: Range check (Fluttering)

TFT (Transmission fluid temperature) sensor voltage	Less than 0.046 V or More than 4.915 V
---	--

P0712: Range check (Low resistance)

TFT (Transmission fluid temperature) sensor voltage	Less than 0.046 V
---	-------------------

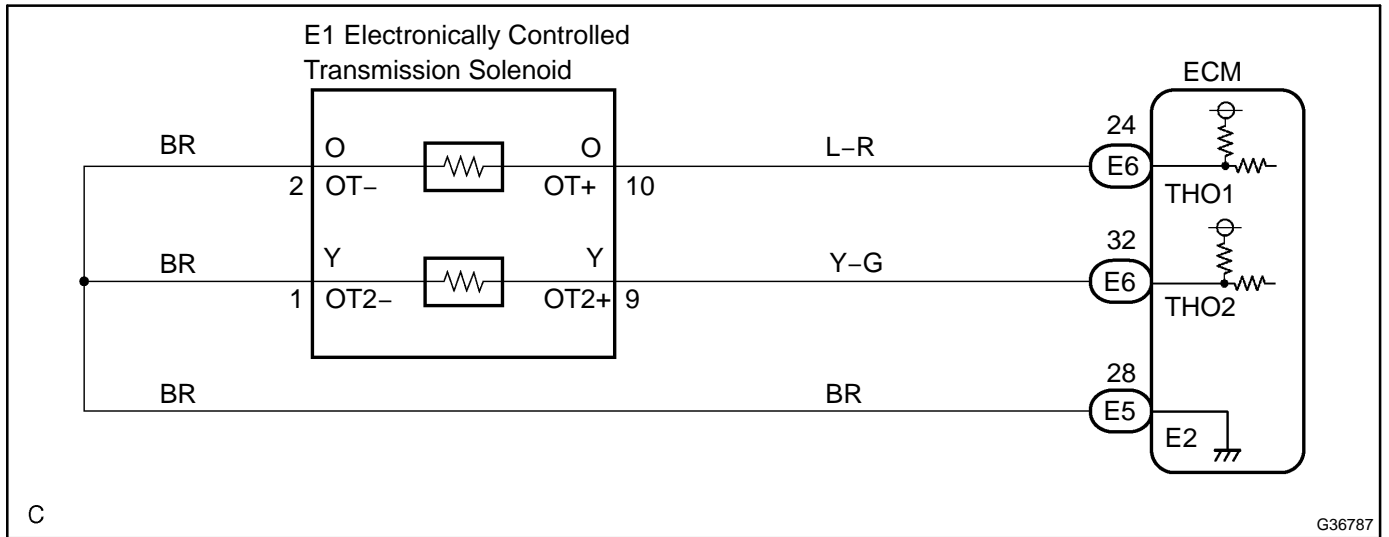
P0713: Range check (High resistance)

TFT (Transmission fluid temperature) sensor voltage	More than 4.915 V
---	-------------------

COMPONENT OPERATING RANGE

TFT (Transmission fluid temperature) sensor	Atmospheric temperature – approx. 130°C (266°F)
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WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST".
- (g) According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/ Range (display)	Normal Condition
AT FLUID TEMP	ATF Temp. Sensor Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	<ul style="list-style-type: none"> • After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak

HINT:

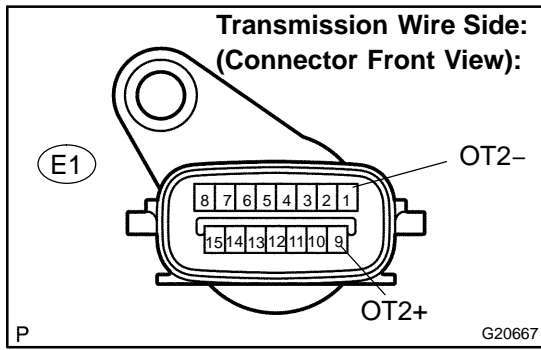
When DTC P2742 is output and OBD II scan tool or hand-held tester output is 150°C (302°F) or more, there is a short circuit.

When DTC P2743 is output and OBD II scan tool or hand-held tester output is -40°C (-40°F), there is an open circuit.

Measure the resistance between terminal THO2 (OT2) and body ground.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

1 INSPECT TRANSMISSION WIRE(ATF TEMPERATURE SENSOR)



- (a) Disconnect the transmission wire connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
1 (OT2-) - 9 (OT2+)	25 Ω to 156 kΩ
1 (OT2-) - Body ground	10 kΩ or higher
9 (OT2+) - Body ground	10 kΩ or higher

HINT:

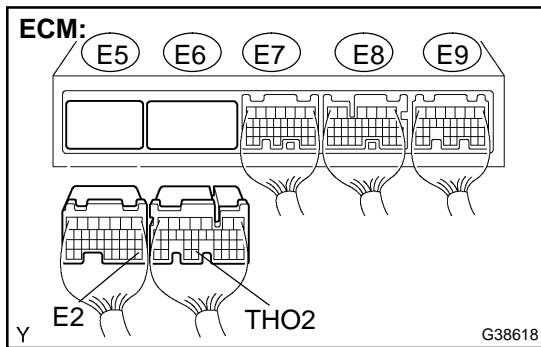
If the resistance is out of the specified range with either the ATF temperature shown in the table below, the driveability of the vehicle may decrease.

ATF Temperature	Specified Condition
20°C (68°F)	3 to 4 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

NG REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

OK

2 CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission wire connector to the transmission.
- (b) Disconnect the ECM connectors.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
E6 - 32 (THO2) - E5 - 28 (E2)	25 Ω to 156 kΩ

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

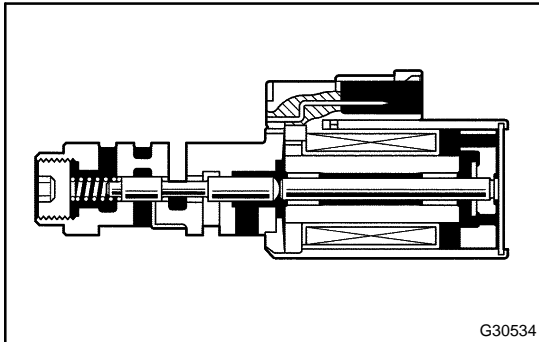
Tester Connection	Specified Condition
E6 - 32 (THO2) - Body ground	10 kΩ or higher
E5 - 28 (E2) - Body ground	↑

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

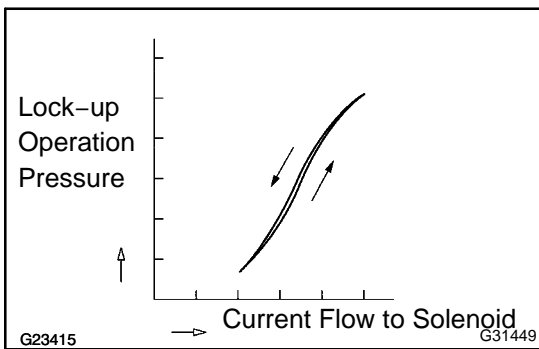
DTC	P2757	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID PERFORMANCE (SHIFT SOLENOID VALVE SLU)
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SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, Air-flow meter, turbine (input) speed sensor, output speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect a mechanical problems of the shift solenoid valve SLU, valve body and torque converter clutch.



DTC No.	DTC Detection Condition	Trouble Area
P2757	Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range. (2-trip detection logic)	<ul style="list-style-type: none"> • Shift solenoid valve SLU remains open or closed • Valve body is blocked • Torque converter clutch • Automatic transmission (clutch, brake or gear, etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the turbine (input) speed sensor NT, output speed sensor SP2, engine rpm, engine load, engine temperature, vehicle speed, transmission temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine rpm (NE) to the input turbine rpm (NT). The ECM calculates the actual transmission gear by comparing input turbine rpm (NT) to output shaft rpm (SP2). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to the shift solenoid SLU. When the SLU is turned on, it applies pressure to the lock-up relay valve and locks the torque converter clutch.

If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in the shift solenoid valve SLU or lock-up system performance. The ECM will turn on the MIL and store the DTC.

Example:

When any of the following is met, the system judges it as a malfunction.

- (a) There is a difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.
(Engine speed is at least 70 rpm greater than input turbine speed.)
- (b) There is no difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.
(The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P2757: Shift solenoid valve SLU/OFF malfunction P2757: Shift solenoid valve SLU/ON malfunction
Required sensors/Components	Shift solenoid valve SLU, Valve body, Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous
Duration	OFF malfunction (A) 2 sec. OFF malfunction (B) 0.4 sec. ON malfunction 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

Turbine speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve S1 circuit	Not circuit malfunction
Shift solenoid valve S2 circuit	Not circuit malfunction
Shift solenoid valve SR circuit	Not circuit malfunction
Torque converter clutch pressure control solenoid circuit	Not circuit malfunction
KCS sensor circuit	Not circuit malfunction
ETCS (Electric throttle control system)	Not system down
Transmission range	"D"
ECT (Engine coolant temperature)	40°C (104°F) or more
Spark advance from Max. retard timing by KCS control	0° CA or more
Engine	Starting
ECM selected gear	4th or 5th
Vehicle speed	25 km/h (15.5 mph) or more
Shift solenoid valve S1 circuit	Not on malfunction

Shift solenoid valve S2 circuit	Not on malfunction
Shift solenoid valve SL2 circuit	Not on malfunction
1-2 Shift valve	Not on malfunction
Transfer neutral position switch	OFF
Transfer range	"HIGH"*1

Transfer range "HIGH" *1 (This condition is applied only 4WD)

*1 Following conditions met	-
Vehicle speed sensor circuit	Not circuit malfunction
Output shaft speed sensor circuit	Not circuit malfunction
Transfer output speed	143 rpm or more
NO/NOTf (Transfer input speed/Transfer output speed)	0.9 to 1.1

OFF malfunction (A)

ECM lock-up command	ON (SLU pressure: 513kpa or more)
Vehicle speed	Less than 100 km/h (62.2 mph)

OFF malfunction (B)

ECM selected gear	2nd
Vehicle speed	2 km/h (1.2 mph) or more
Output speed	2nd → 1st down shift point or more
Throttle valve opening angle	7.0% or more at 2,000 rpm (Conditions vary with engine speed)

ON malfunction

ECM lock-up command	OFF (SLU pressure: less than 4kpa)
Throttle valve opening angle	9% or more
Vehicle speed	Less than 60 km/h (37.3 mph)

TYPICAL MALFUNCTION THRESHOLDS

OFF malfunction

Both of the following conditions is met: OFF malfunctions (A) and (B)

OFF malfunction (A)

Engine speed – Turbine speed	70 rpm or more
------------------------------	----------------

OFF malfunction (B)

Turbine speed/Output speed	Not 3.30 to 7.50
----------------------------	---------------------

ON malfunction

2 detections are necessary per driving cycle:

1st detection; temporary flag ON

2nd detection; pending fault code ON

Vehicle speed must be under 10 km/h (6.2 mph) once before 2nd detection	-
Difference between engine speed and turbine speed	Less than 35 rpm

INSPECTION PROCEDURE

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the hand-held tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Turn on the tester.
- (f) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST".
- (g) According to the display on tester, perform the "ACTIVE TEST".

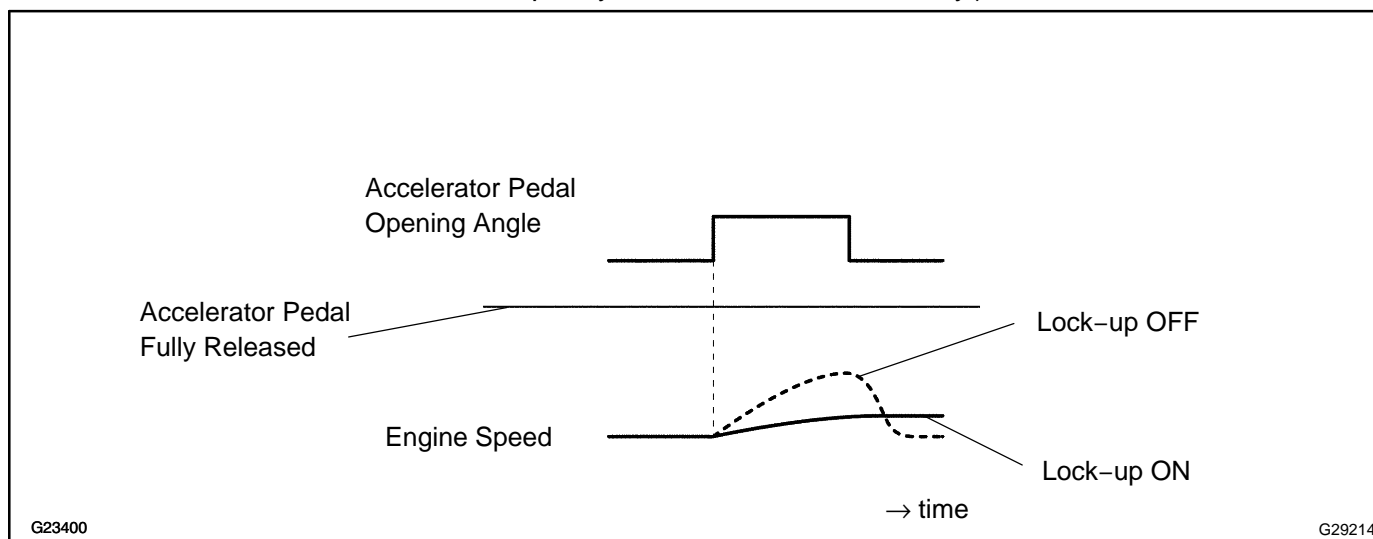
Item	Test Details	Diagnostic Note
LOCK UP	[Test Details] Control the shift solenoid SLU to set the automatic transmission to the lock-up condition. [Vehicle Condition] <ul style="list-style-type: none"> • Throttle valve opening angle: Less than 35% • Vehicle Speed: 60 km/h (37 mph) or more 	Possible to check the SLU operation.

HINT:

- This test can be conducted when the vehicle speed is 60 km/h (37 mph) or more.
- This test can be conducted in the 5th gear.
- (h) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:

- When changing the accelerator pedal opening angle while driving, if the engine speed does not change, lock-up is on.
- Slowly release, but not fully, the accelerator pedal in order to decelerate. (Fully releasing the pedal will close the throttle valve and lock-up may be turned off automatically.)



1 CHECK OTHER DTCS OUTPUT(IN ADDITION TO DTC P2757)

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When you use hand-held tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
- (d) Read the DTCS using the OBD II scan tool or the hand-held tester.

Result:

Display (DTC output)	Proceed to
Only "P2757" is output	A
"P2757" and other DTCS	B

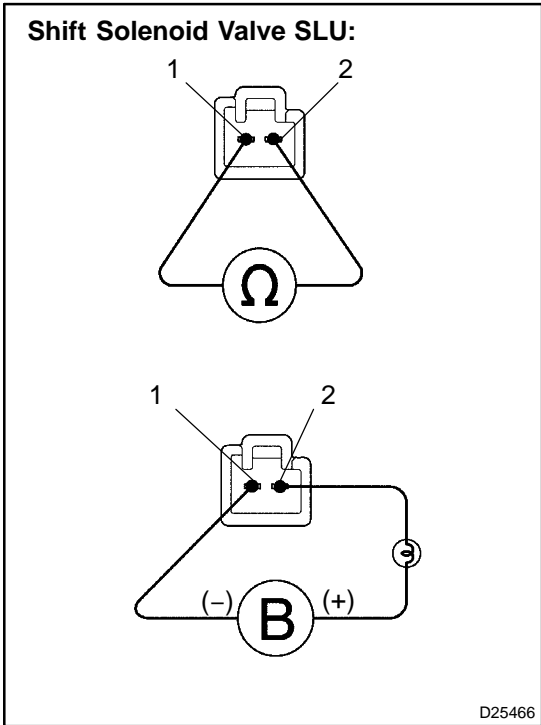
HINT:

If any other codes besides "P2757" are output, perform troubleshooting for those DTCS first.

B → **GO TO DTC CHART (SEE PAGE 05-955)**

A

2 INSPECT SHIFT SOLENOID VALVE(SLU)



- (a) Remove the shift solenoid valve SLU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SLU) (SEE PAGE 40-31)**

OK

3 INSPECT TRANSMISSION VALVE BODY ASSY (SEE PAGE 40-31)

OK:

There are no foreign objects on each valve.

NG

**REPAIR OR REPLACE TRANSMISSION VALVE
BODY ASSY**

OK

4 INSPECT TORQUE CONVERTER CLUTCH ASSY (SEE PAGE 40-24)

OK:

The torque converter clutch operates normally.

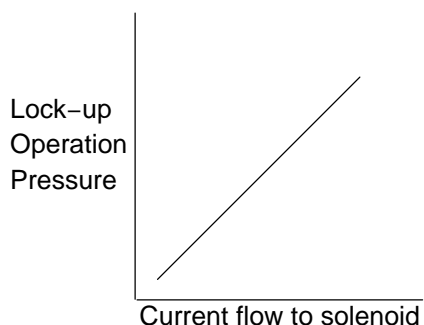
OK

**REPAIR OR REPLACE AUTOMATIC
TRANSMISSION ASSY (SEE PAGE 40-13)**

NG

REPLACE TORQUE CONVERTER CLUTCH ASSY

DTC	P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID CONTROL CIRCUIT ELECTRICAL (SHIFT SOLENOID VALVE SLU)
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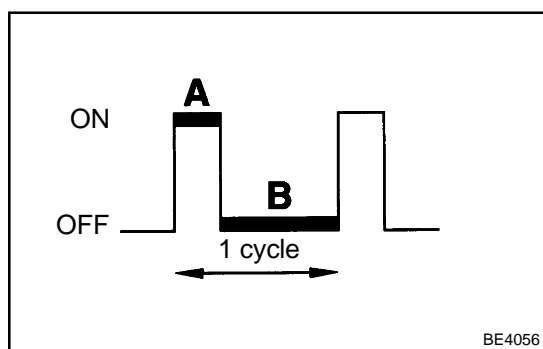


CIRCUIT DESCRIPTION

The amount of current flow to the solenoid is controlled by the (*) duty ratio of the ECM output signal. The higher the duty ratio becomes, the higher the lock-up hydraulic pressure becomes during the lock-up operation.

(*) Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then Duty Ratio = $A/(A+B) \times 100(\%)$.



DTC No.	DTC detection condition	Trouble Area
P2759	Open or short is detected in shift solenoid valve SLU circuit for 1 second or more while driving (1-trip detection logic).	<ul style="list-style-type: none"> • Open or short in shift solenoid valve SLU circuit • Shift solenoid valve SLU • ECM

MONITOR DESCRIPTION

When an open or short in a shift solenoid valve (SLU) circuit is detected, the ECM determines there is a malfunction. The ECM will turn on the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P2759: Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

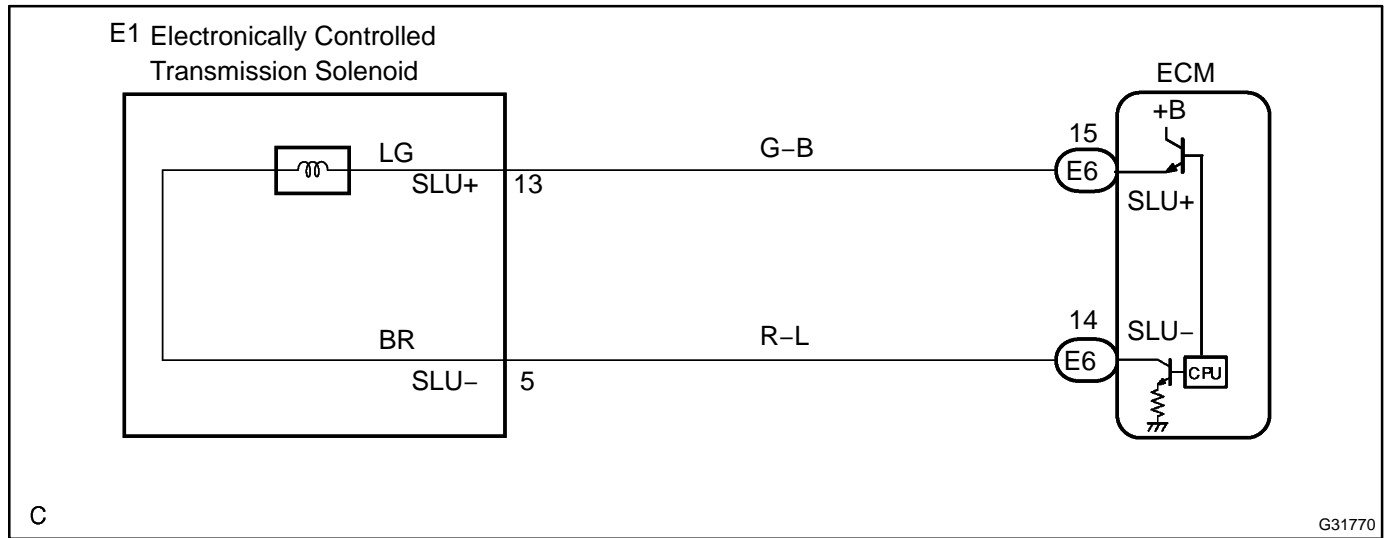
TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	See page 05-925
Solenoid current cut status	Not cut
Battery voltage	11 V or more
CPU commanded duty ratio to SLU	19% or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

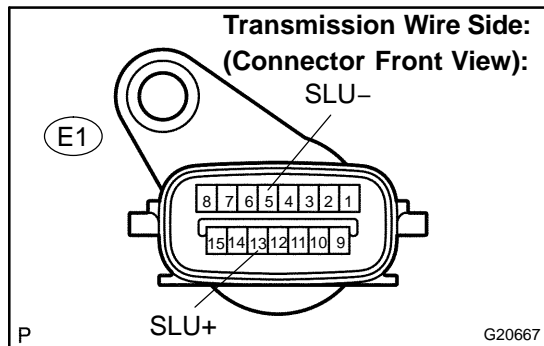
Solenoid status from IC	Fail (Open or short)
-------------------------	----------------------

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TRANSMISSION WIRE(SLU)



- (a) Disconnect the transmission wire connector from the transmission.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
13 (SLU+) - 5 (SLU-)	5.0 to 5.6 Ω

- (c) Measure the resistance according to the value(s) in the table below.

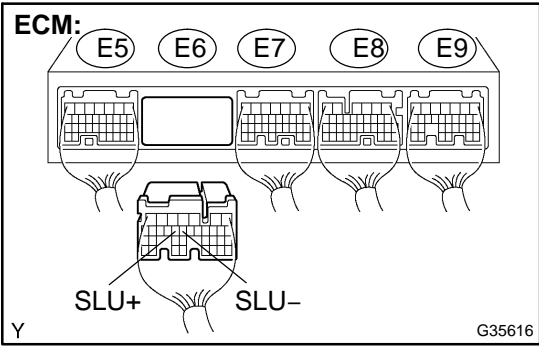
Standard (Check for short):

Tester Connection	Specified Condition
13 (SLU+) - Body ground	10 kΩ or higher
5 (SLU-) - Body ground	↑

NG → Go to step 3

OK

2 | CHECK HARNESS AND CONNECTOR(TRANSMISSION WIRE - ECM)



- (a) Connect the transmission wire connector to the transmission.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
E6 - 15 (SLU+) - E6 - 14 (SLU-)	5.0 to 5.6 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

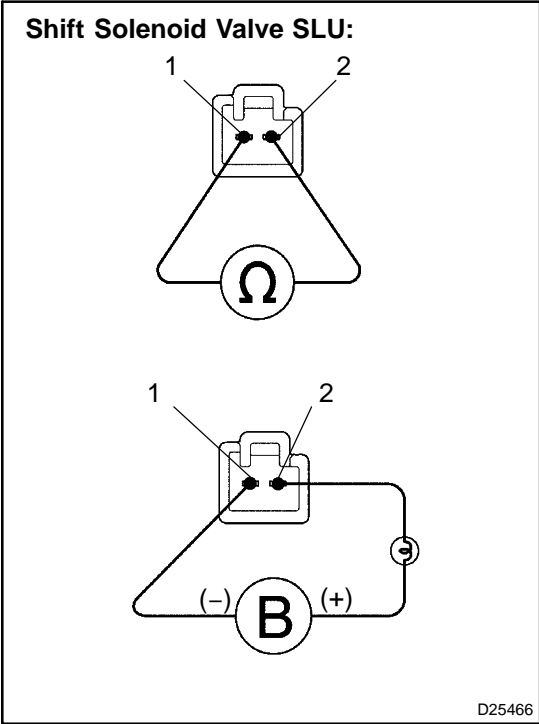
Tester Connection	Specified Condition
E6 - 15 (SLU+) - Body ground	10 kΩ or higher
E6 - 14 (SLU-) - Body ground	↑

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

REPLACE ECM (SEE PAGE 10-16)

3 INSPECT SHIFT SOLENOID VALVE(SLU)



- (a) Remove the shift solenoid valve SLU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

- (c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (SLU)
(SEE PAGE 40-31)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE (SEE PAGE 40-28)

DTC	P2772	TRANSFER L4 SW CIRCUIT
------------	--------------	-------------------------------

CIRCUIT DESCRIPTION

The ECM detects the signal from the transfer L4 position switch.
This DTC indicates that the transfer L4 position switch remains on.

DTC No.	DTC Detecting Condition	Trouble Area
P2772	Transfer L4 position switch remains ON while vehicle is running under following conditions for 1.8 seconds or more (1-trip detection logic) (a) Output shaft speed 3,000 rpm or less (b) Transfer shift position is H	<ul style="list-style-type: none"> • Short in transfer L4 position switch circuit • Transfer L4 position switch • ECM

MONITOR DESCRIPTION

The ECM monitors the transfer-case L4 position switch to determine when the transfer-case L4 gear is engaged. If the transfer-case L4 gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 position switch:

- L4 switch indicated that the L4 transfer-case gears are engaged.
- Transfer-case shifter is in the "H" position.
- Transfer-case output shaft rpm is between 750 and 3,000 rpm.
- The specified time period has elapsed.

If all of the above conditions are detected, the ECM will conclude that there is a malfunction of the L4 switch, illuminate the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2772: Transfer L4 position switch/ON malfunction
Required sensors/Components	Transfer L4 position switch
Frequency of operation	Continuous
Duration	ON malfunction (A): 1.8 sec. ON malfunction (B): 0.5 sec.
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

Output speed sensor circuit	Not circuit malfunction
Vehicle speed sensor circuit	Not circuit malfunction
Transfer neutral position switch	OFF

ON malfunction (A)

Output speed (Transfer output speed)	1,000 to 3,000 rpm
--------------------------------------	--------------------

ON malfunction (B)

Output speed (Transfer output speed)	143 rpm or more
--------------------------------------	-----------------

TYPICAL MALFUNCTION THRESHOLDS

Both of the following conditions is met: ON malfunctions (A) and (B)

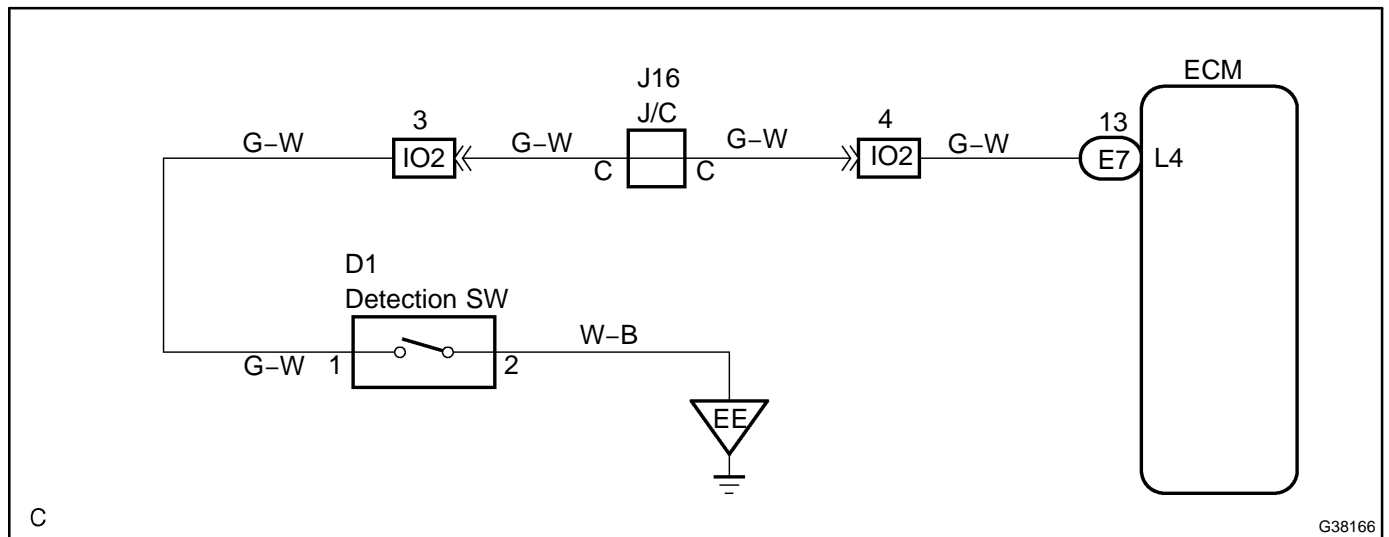
ON malfunction(A)

L4 switch	ON
-----------	----

ON malfunction(B)

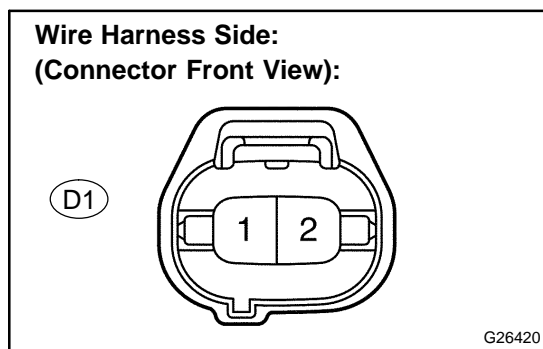
Actual Transfer gear ratio Transfer input speed/Transfer output speed	0.9 to 1.1
--	------------

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(TRANSFER INDECATOR SWITCH-BODY GROUND)



- (a) Disconnect the transfer indicator switch No.1 connector.
- (b) Measure the resistance according to the value(s) in the table below.

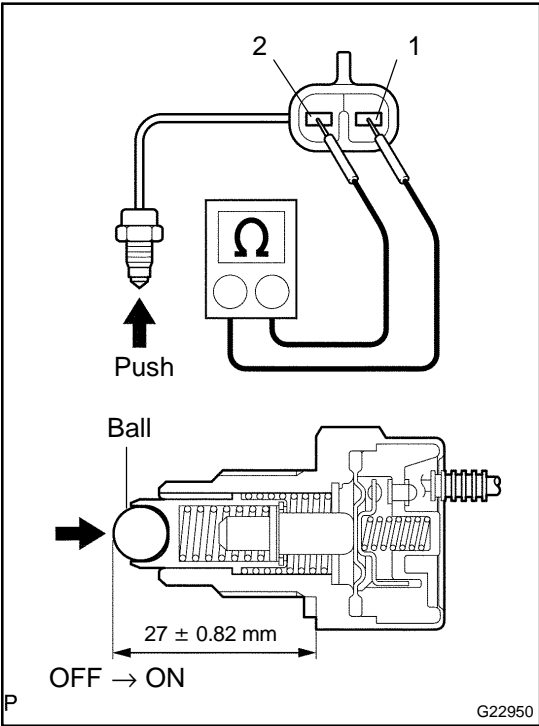
Standard:

Tester Connection	Specified Condition
2 - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

2 INSPECT TRANSFER INDICATOR SWITCH NO.1(L4 POSITION SWITCH)



- (a) Remove the transfer indicator switch No.1.
- (b) Measure the resistance according to the value(s) in the table below.

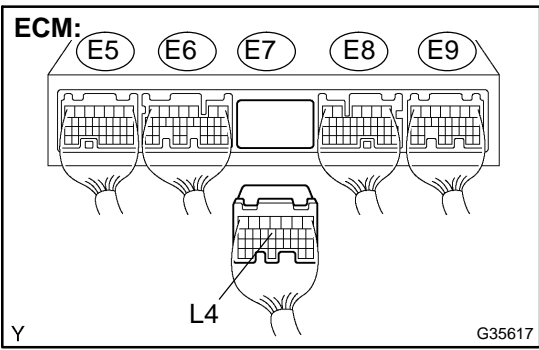
Standard:

Switch position	Tester Connection	Specified Condition
Free	1 - 2	10 kΩ or higher
Pushed in	↑	Below 1 Ω

NG REPLACE TRANSFER INDICATOR SWITCH NO.1

OK

3 CHECK HARNESS AND CONNECTOR(TRANSFER INDICATOR SWITCH-ECM)



- (a) Disconnect the connector from the ECM.
- (b) Measure the resistance according to the value(s) in the table below.

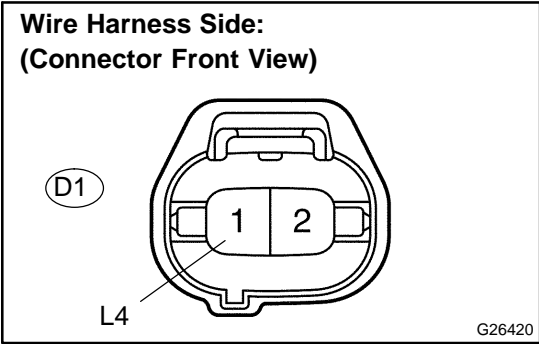
Standard (Check for open):

Tester Connection	Specified Condition
E7 - 13 (L4) - D2 - 1 (L4)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

Standard (Check for short):

Tester Connection	Specified Condition
E7 - 13 (L4) - Body ground	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

REPLACE ECM (SEE PAGE 10-16)

PATTERN SELECT SWITCH CIRCUIT

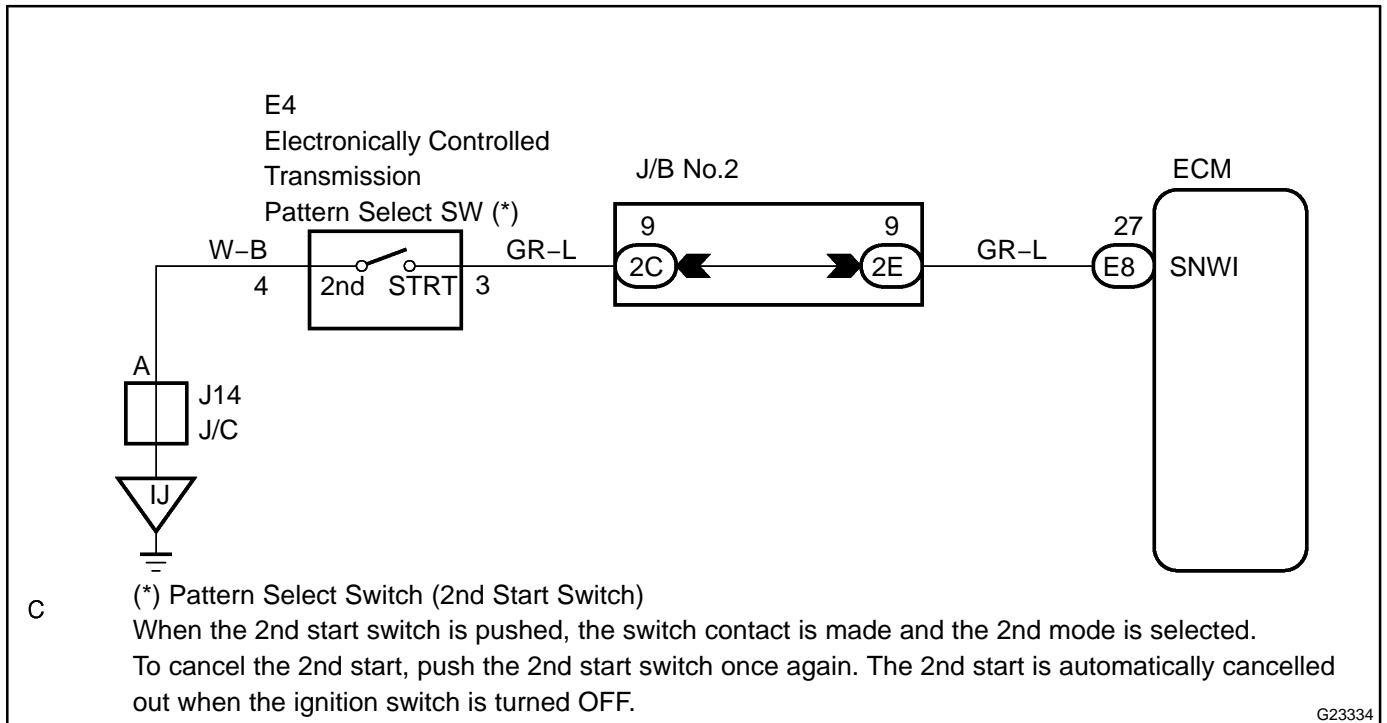
CIRCUIT DESCRIPTION

When 2nd start mode is selected with the pattern select switch, the ECM controls the solenoid valves and the transmission starts from 2nd gear.

In D position, the transmission automatically shifts up through 3rd to 5th as usual.

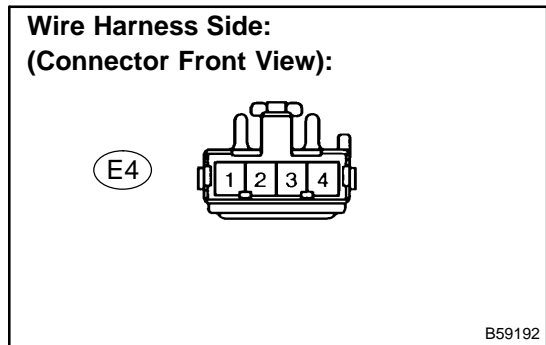
In 2nd position, the transmission is held in 2nd gear.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(PATTERN SELECT SWITCH - BODY GROUND)



- (a) Disconnect the connector of pattern select switch.
- (b) Measure the resistance according to the value(s) in the table below.

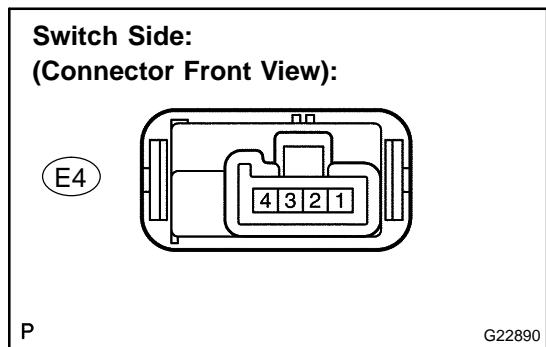
Standard:

Tester Connection	Specified Condition
4 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)**

OK

2 INSPECT PATTERN SELECT SWITCH ASSY



- (a) Measure the resistance according to the value(s) in the table below.

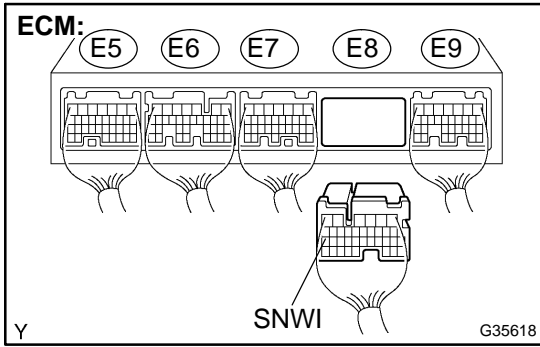
Standard:

Switch Condition	Tester Connection	Specified Condition
Press continuously Pattern select switch (2nd STRT)	3 - 4	Below 1 Ω
Release Pattern select switch (2nd STRT)	↑	10 kΩ or higher

NG → **REPLACE PATTERN SELECT SWITCH ASSY**

OK

3 CHECK HARNESS AND CONNECTOR(PATTERN SEECT SWITCH - ECM)



- (a) Connect the connector of pattern select switch.
- (b) Disconnect the ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Switch Condition	Tester Connection	Specified Condition
Press continuously Pattern select switch (2nd STRT)	E8 - 27 (SNWI) - Body ground	Below 1 Ω
Release Pattern select switch (2nd STRT)	↑	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE 01-36)

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (SEE PAGE 05-934)

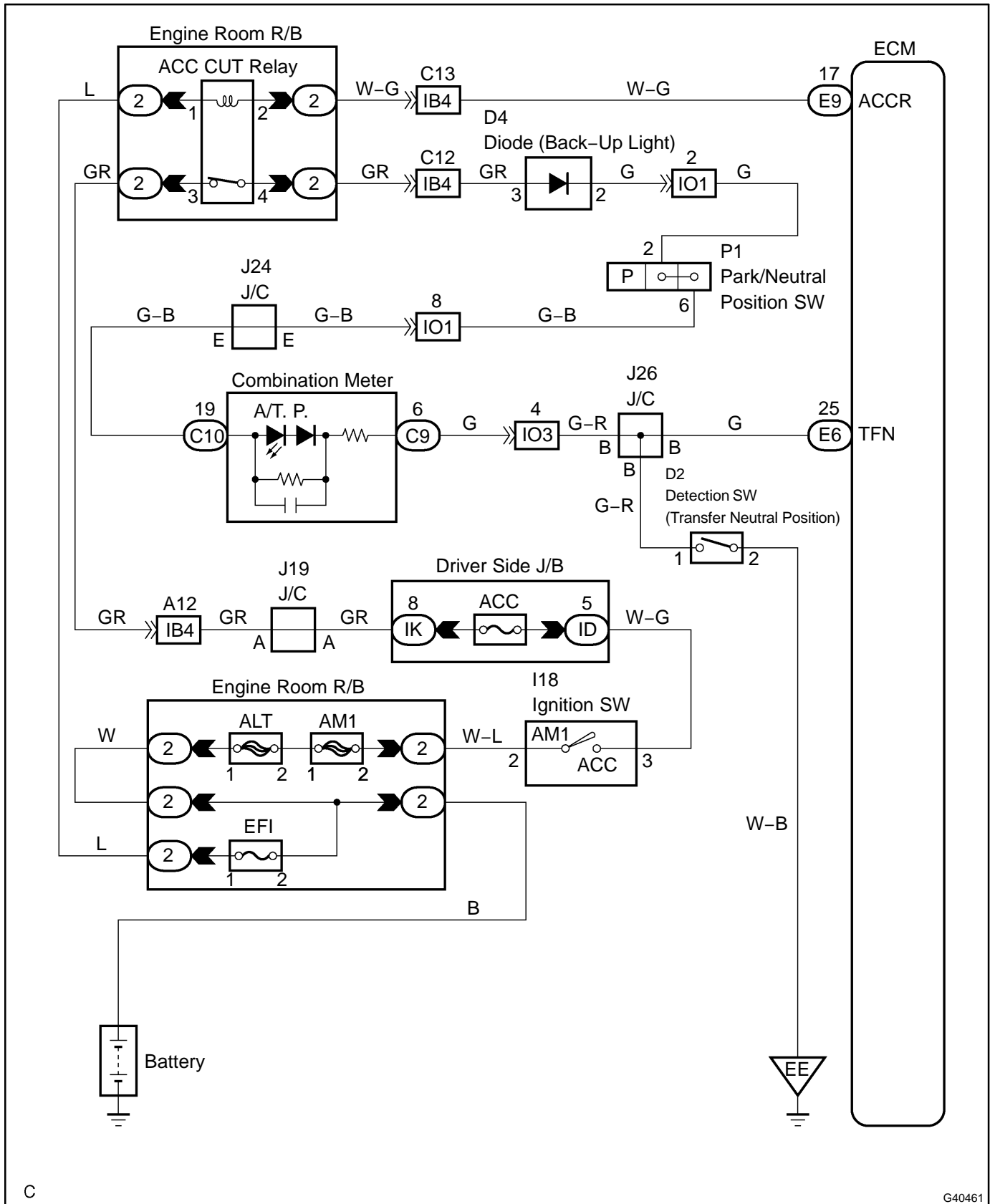
A/T.P. INDICATOR CIRCUIT

CIRCUIT DESCRIPTION

The propeller shaft and wheels are free even when the transmission shift lever is set to P as long as the transfer shift lever is in Neutral position. The A/T.P. indicator light lights up to warn the driver that the propeller shaft and wheels are not locked.

If the A/T.P. indicator light comes on, the transfer shift lever should be shifted out of N position.

WIRING DIAGRAM

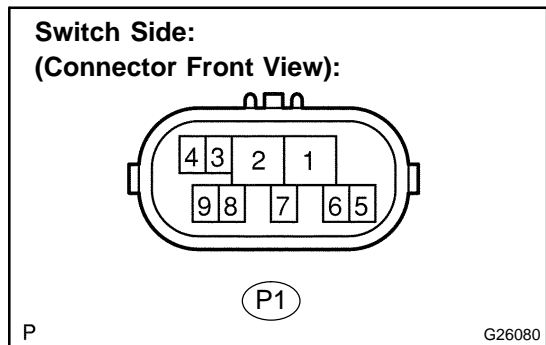


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INSPECTION PROCEDURE

1 INSPECT PARK/NEUTRAL POSITION SWITCH ASSY



- (a) Jack up the vehicle.
- (b) Disconnect the park/neutral position switch connector.
- (c) Measure the resistance according to the value(s) in the table below when the shift lever is moved to each position.

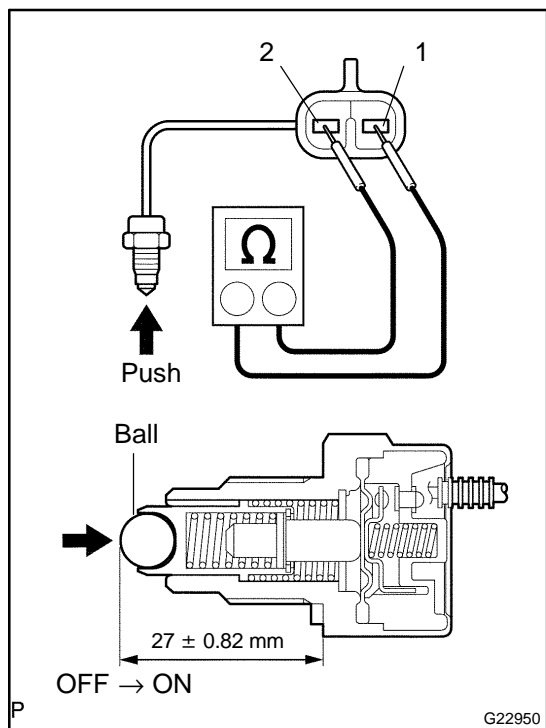
Standard:

Shift Position	Tester Connection	Specified Condition
P	2 - 6	Below 1 Ω
Except P	↑	10 kΩ or higher

NG → REPLACE PARK/NEUTRAL POSITION SWITCH ASSY (SEE PAGE 40-10)

OK

2 INSPECT TRANSFER INDICATOR SWITCH NO.2



- (a) Remove the transfer indicator switch No.2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Switch position	Tester Connection	Specified Condition
Free	1 - 2	10 kΩ or higher
Pushed in	↑	Below 1 Ω

NG → REPLACE TRANSFER INDICATOR SWITCH NO.2

OK

3 INSPECT COMBINATION METER ASSY (A/T. P. INDICATOR CIRCUIT)

(a) See the combination meter troubleshooting section on page [05-2042](#).

NG**REPLACE COMBINATION METER ASSY
(SEE PAGE [71-23](#))****OK****REPAIR OR REPLACE HARNESS OR CONNECTOR (SEE PAGE [01-36](#))**

POWER TILT AND POWER TERESCOPIC STEERING COLUMN

052K3-06

HOW TO PROCEED WITH TROUBLESHOOTING

1	VEHICLE BROUGHT WORKSHOP
---	--------------------------



2	CUSTOMER PROBLEM ANALYSIS (See page 05-1066)
---	---



3	CHECK MULTIPLEX COMMUNICATION SYSTEM (See page 05-2255)
---	--



4	CHECK AND CLEAR DTCs (See page 05-1067)
---	--



5	PROBLEM SYMPTOM CONFIRMATION
---	------------------------------

	SYMPTOM DOES NOT OCCUR (Go to step 6)
--	---------------------------------------

	SYMPTOM OCCURS (Go to step 7)
--	-------------------------------

6	SYMPTOM SIMULATION (See page 01-26)
---	--



7	DTC CHECK (See page 05-1067)
---	---

	NORMAL CODE (Go to step 7)
--	----------------------------

	MALFUNCTION CODE (Go to step 8)
--	---------------------------------

8	PROBLEM SYMPTOMS TABLE (See page 05-1076)
---	--



9	DTC CHART (See page 05-1072)
---	---



10	CIRCUIT INSPECTION (See page 05-1077 to 05-1095)
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11	IDENTIFICATION OF PROBLEM
----	---------------------------



12	REPAIR
----	--------



13	CONFIRMATION TEST
----	-------------------



END

HINT:

Step 4, 7, 9, 10:

Diagnostic steps where the hand-held tester can be used.

CUSTOMER PROBLEM ANALYSIS CHECK

POWER TILT AND POWER TELESCOPIC STEERING COLUMN CHECK SHEET

Inspector's Name _____

Customer's Name		Registration No.	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (times a day)

Symptoms	Manual Function does not Operate	<input type="checkbox"/> Both Tilt and Telescopic <input type="checkbox"/> Tilt only <input type="checkbox"/> Telescopic only
	Auto Away/Return Function does not Operate	<input type="checkbox"/> Both Auto Away and Auto Return <input type="checkbox"/> Auto Away only <input type="checkbox"/> Auto Return only
	<input type="checkbox"/> Memory Function does not Operate	

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)

PRE-CHECK

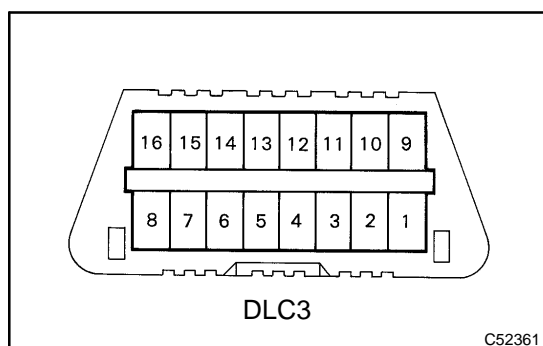
1. DESCRIPTION

(a) DIAGNOSIS SYSTEM

When troubleshooting vehicles with the diagnosis system, only the difference from the usual troubleshooting procedure is connecting the hand-held tester to vehicle in order to read off various data output from the vehicle's multiplex tilt & telescopic ECU.

The multiplex tilt & telescopic ECU records the applicable DTCs when the computer detects a malfunction in the computer itself or its circuit.

To check the DTCs, connect the hand-held tester to DLC3 on the vehicle. The hand-held tester enables you to erase the DTCs, activate the several actuators, and check freeze frame data and various forms on steering data.



(b) DATA LINK CONNECTOR 3 (DLC3)

The vehicle's multiplex tilt & telescopic ECU uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection	Voltage or Resistance	Condition
4	Chassis Ground	↔ Body Ground 1 Ω or less	Always
5	Signal Ground	↔ Body Ground 1 Ω or less	Always
7	Bus + Line	Pulse generation	During transmission
16	Battery Positive	↔ Body Ground 10 - 14 V	Always

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" when connecting the cable of the hand-held tester to DLC3, turned the ignition switch ON and operated the hand-held tester, there is a problem on the vehicle side or the tester side.

- If communication is normal when connecting the tester to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible when connecting the tester to another vehicle, the problem is probably on the tester itself, so consult the Service Department listed in the tester's Operator's Manual.

2. DIAGNOSIS INSPECTION

- (a) Check DTC.
- (1) Prepare the hand-held tester.
 - (2) Connect the hand-held tester to DLC3 at the lower part of the instrument panel.
 - (3) Turn the ignition switch to ON and turn the hand-held tester switch ON.
 - (4) Use the hand-held tester to check the DTCs and the freeze frame data, and note or print the result (See the Operator's Manual for operating instructions).
 - (5) See page 05-1072 to confirm the details of the DTC.
- (b) Clear the DTC.
- (1) Following actions erase the DTC and the freeze frame data.
 - When using the hand-held tester:
Operating the hand-held tester. (See the Operator's Manual for operating instructions).
 - When not using the hand-held tester:
Disconnecting the battery terminals.

3. DATA LIST

HINT:

By the DATA LIST displayed by the hand-held tester, you can read the value of the switch and the sensor and so on without removing any parts. Reading the DATA LIST as a first step of troubleshooting is one of the methods to shorten labor time.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON.
- (c) Following to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
T&T AUTO AWAY	Auto away and return function/ON or OFF	ON: Auto away and return function is allowed OFF: Auto away and return function is restrained	-
TILT POS	Current tilt position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
TELSC POS	Current telescopic position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
TILT RETURN POS	Memorized tilt return position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
TELSC RETURN POS	Memorized telescopic return position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
T&T MEM 1	Tilt & telescopic memory position 1/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
TILT MEM 1 POS	Tilt data of memory position 1/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
TELSC MEM 1 POS	Telescopic data of memory position 1/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-
T&T MEM 2	Tilt & telescopic memory position 2/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	-
TILT MEM 2 POS	Tilt data of memory position 2/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	-

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
TELSC MEM 2 POS	Telescopic data of memory position 2/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	–
UP LIMIT	Uppermost tilt position/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	–
UP LIMIT POS	Uppermost tilt position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	–
DOWN LIMIT	Lowermost tilt position/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	–
DOWN LIMIT POS	Lowermost tilt position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	–
SHORT LIMIT	Shortest telescopic position/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	–
SHORT LIMIT POS	Shortest telescopic position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	–
LONG LIMIT	Longest telescopic position/NOT MEM or MEM	NOT MEM: Position is not memorized MEM: Position is memorized	–
LONG LIMIT POS	Longest telescopic position data/min.: 0000 H (0 edge), max.: FFFF H (65535 edge)	7000 – 9000 H (28672 – 36864 edge)	–
UP SW	Tilt up input by manual switch/ON or OFF	ON: Tilt up is activated by manual switch OFF: –	–
DOWN SW	Tilt down input by manual switch/ON or OFF	ON: Tilt down is activated by manual switch OFF: –	–
SHORT SW	Telescopic short input by manual switch/ON or OFF	ON: Telescopic short is activated by manual switch OFF: –	–
LONG SW	Telescopic long input by manual switch/ON or OFF	ON: Telescopic long is activated by manual switch OFF: –	–
T&T MANUAL SW	Voltage data of manual switch/min.: 0 V, max.: 5 V	Neutral position: Below 0.2 V Tilt up: 1.67 – 2.13 V Tilt down: 0.54 – 0.74 V Telescopic contract: 1.08 – 1.40 V Telescopic extend: 2.22 – 2.77 V	–
POWER VOLTAGE	Voltage data of power supply/min.: 0 V, max.: 20 V	Actual power supply voltage 10 – 14 V	–
FREEZ SPD INFO	Vehicle speed data/0 km/h (0 mph), max.: 255 km/h (158 mph)	Available only for vehicles had the freeze frame data	–
IG SW (MPX)	Communication state of ignition switch/ON or OFF	ON: Ignition switch ON OFF: –	–
IG SW	Input state of ignition switch/ON or OFF	ON: Ignition switch ON OFF: –	–
KEYSW (MPX)	Communication state of un-lock warning switch/ON or OFF	ON: Un-lock warning switch ON OFF: –	–

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
BODY1 ECU INFO	Communication state of body ECU signal/OK or Interruption	OK: Communication is normal Interruption: Communication is in- terrupted	-
SEAT ECU INFO	Communication state of seat ECU signal/OK or Interruption	OK: Communication is normal Interruption: Communication is in- terrupted	-

CUSTOMIZE PARAMETERS

HINT:

The following item can be customized.

NOTICE:

- **Be sure to record the current value before customizing.**
- **In case of performing the troubleshooting, pay attention as there is a possibility that the function is OFF by customizing. (Example: In case of the symptom in which "The wireless operation does not function", check that the wireless operation is not OFF by customizing, then perform the troubleshooting.)**

TILT & TELESCO

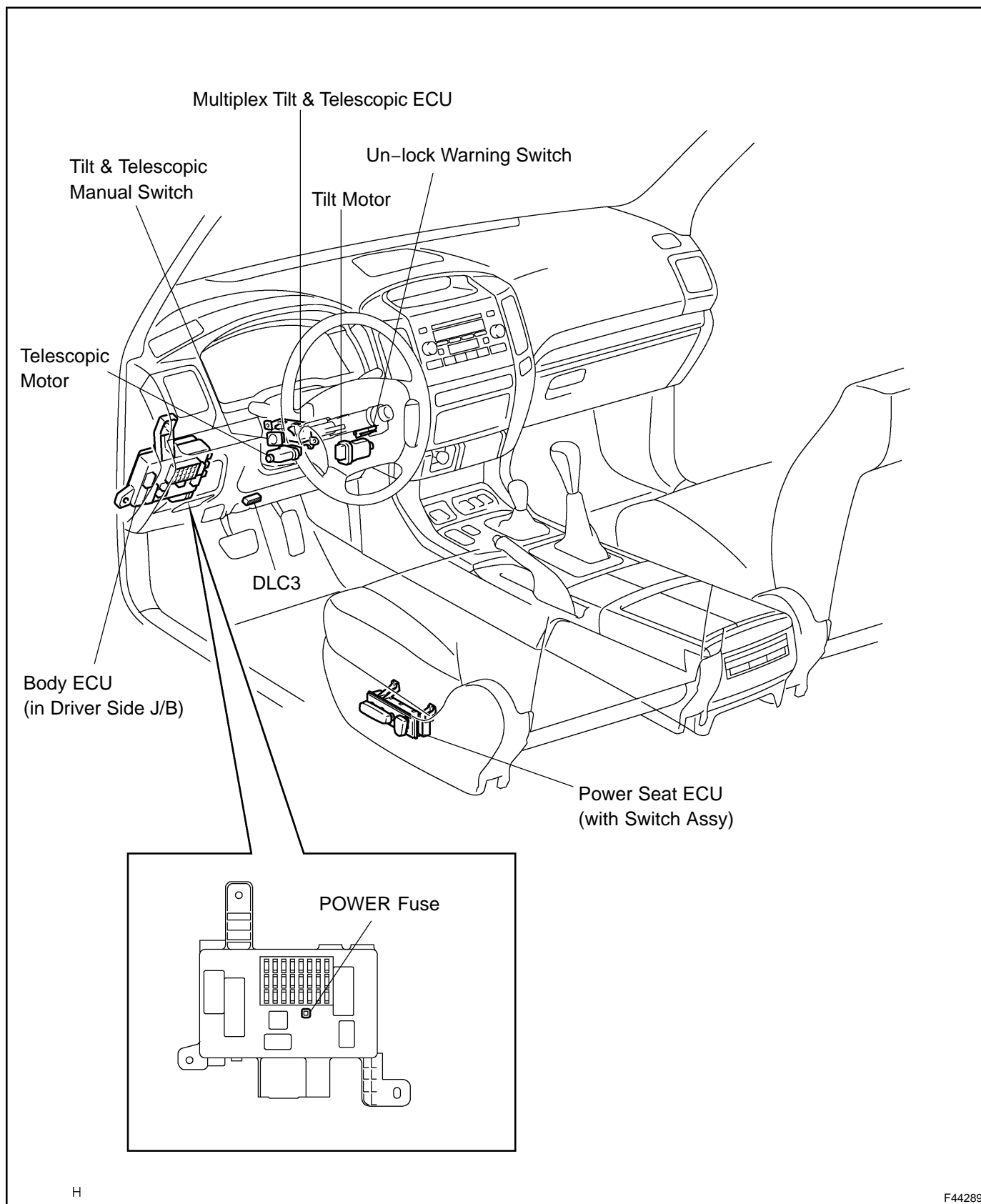
DISPLAY(ITEM)	DEFAULT	CONTENTS	SETTING
AUTO TILT AWAY (Auto Away / Return Function)	ON	ON / OFF of the Auto away / return function.	ON / OFF

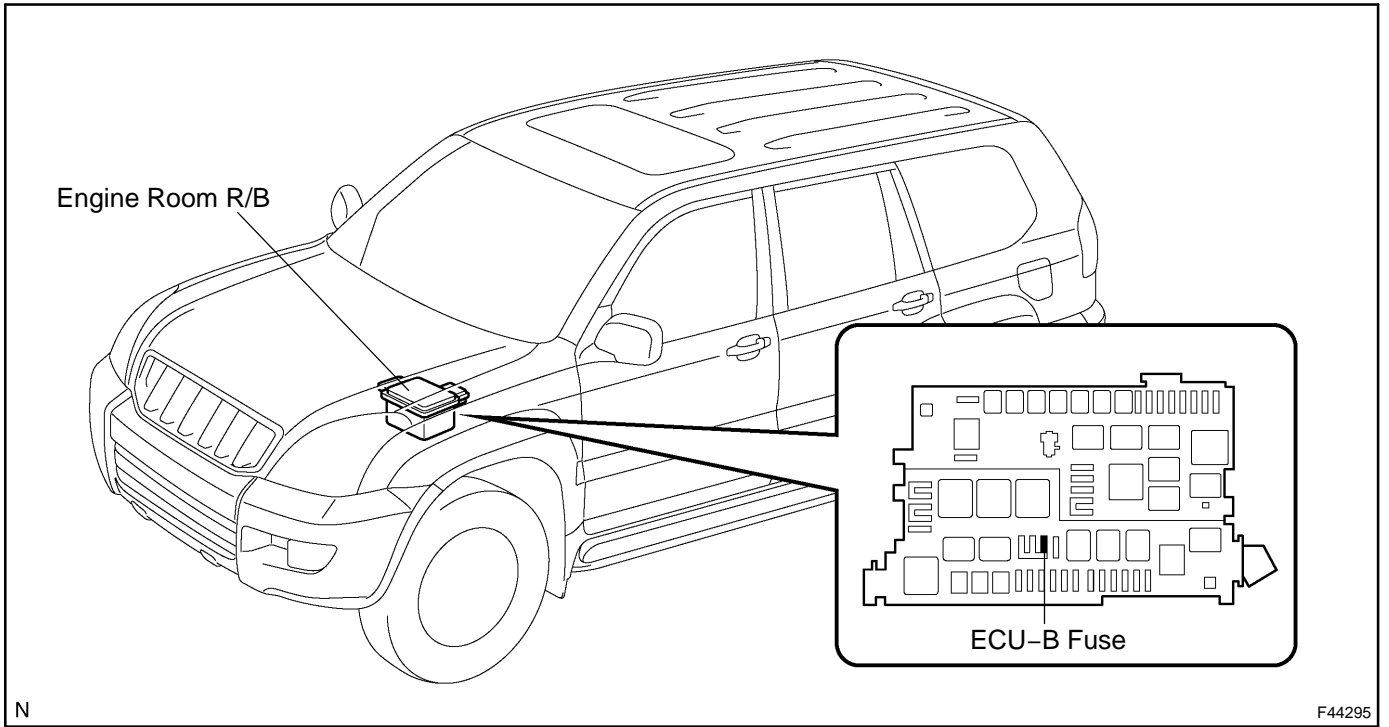
DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the circuit for that code listed in the table below. For details of each code, turn the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

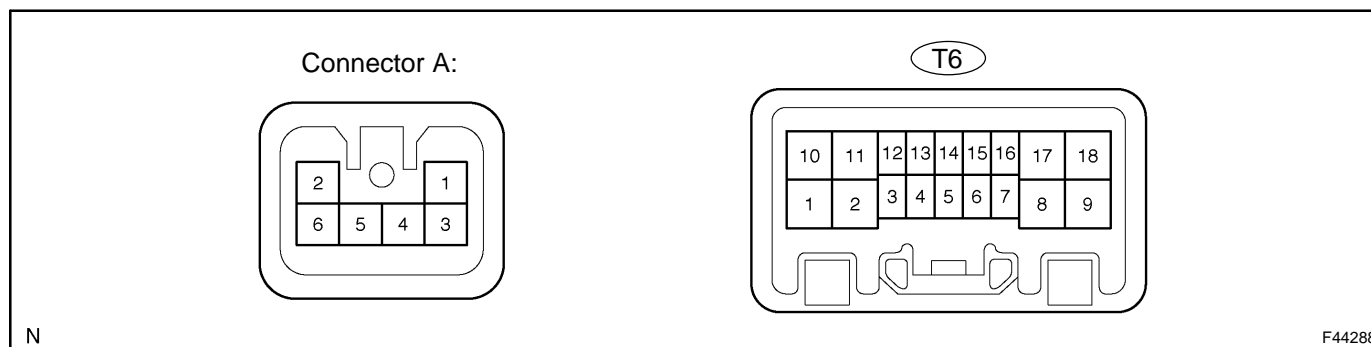
DTC No. (See Page)	Detection Item	Trouble Area
B2602 (05-1077)	Key un-lock warning switch circuit malfunction	<ul style="list-style-type: none"> • Un-lock warning switch assy • Un-lock warning switch circuit • Body ECU • Multiplex tilt & telescopic ECU
B2603 (05-1079)	Tilt & telescopic manual switch circuit malfunction	<ul style="list-style-type: none"> • Tilt & telescopic manual switch • Tilt & telescopic manual switch circuit • Multiplex tilt & telescopic ECU
B2610 (05-1082)	Tilt position sensor or tilt motor circuit malfunction	<ul style="list-style-type: none"> • Tilt steering gear assy w/ motor • Actuator power source circuit • Tilt position sensor or tilt motor circuit • Multiplex tilt & telescopic ECU
B2611 (05-1086)	Telescopic position sensor or telescopic motor circuit malfunction	<ul style="list-style-type: none"> • Tilt steering gear assy w/ motor • Actuator power source circuit • Telescopic position sensor or telescopic motor circuit • Multiplex tilt & telescopic ECU
B2620 (05-1090)	ECU power source circuit malfunction	<ul style="list-style-type: none"> • Battery • ECU power source circuit • Multiplex tilt & telescopic ECU
B2621 (05-1093)	Communication interruption	<ul style="list-style-type: none"> • Multiplex communication system • Body ECU • Power seat ECU • Multiplex tilt & telescopic ECU

LOCATION





TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TEM+ (A-2) ⇔ GND (T6-11)	- ⇔ W-B	Un-lock warning switch ON, telescopic contracted	10 - 14
		Telescopic is not operating	Below 1
VCE (A-3) ⇔ E2 (A-5)	-	IG switch ON	8 - 16
TES (A-4) ⇔ E2 (A-5)	-	Telescopic is operating	Pulse generation HI: 8 - 16 LOW: 0
E2 (A-5) ⇔ Body Ground	- ⇔ Body Ground	Always	Below 1
TEM- (A-6) ⇔ GND (T6-11)	- ⇔ W-B	Un-lock warning switch ON, telescopic extended	10 - 14
		Telescopic is not operating	Below 1
TIM- (T6-1) ⇔ GND (T6-11)	R-L ⇔ W-B	Un-lock warning switch ON, tilt down	10 - 14
		Tilt is not operating	Below 1
+B (T6-2) ⇔ GND (T6-11)	G-B ⇔ W-B	Always	10 - 14
MSW (T6-3) ⇔ GND (T6-11)	V-Y ⇔ W-B	IG switch ON, tilt up by manual switch	1.67 - 2.13
		IG switch ON, tilt down by manual switch	0.54 - 0.74
		IG switch ON, telescopic contracted by manual switch	1.08 - 1.40
		IG switch ON, telescopic extended by manual switch	2.22 - 2.77
		Manual switch is not operating	Below 0.2
VC (T6-4) ⇔ GND (T6-11)	V ⇔ W-B	IG switch ON	4.9 - 5.1
VCI (T6-6) ⇔ E1 (T6-17)	W ⇔ L-B	IG switch ON	8 - 16
TIS (T6-7) ⇔ E1 (T6-17)	L-W ⇔ L-B	Tilt is operating	Pulse generation HI: 8 - 16 LOW: 0
IG (T6-8) ⇔ GND (T6-11)	B-R ⇔ W-B	IG switch ON	10 - 14
		IG switch OFF	Below 1
ECUB (T6-9) ⇔ GND (T6-11)	W-R ⇔ W-B	Always	10 - 14
TIM+ (T6-10) ⇔ GND (T6-11)	R-B ⇔ W-B	Un-lock warning switch ON, tilt up	10 - 14
		Tilt is not operating	Below 1
GND (T6-11) ⇔ Body Ground	W-B ⇔ Body Ground	Always	Below 1
E1 (T6-17) ⇔ Body Ground	L-B ⇔ Body Ground	Always	Below 1

PROBLEM SYMPTOMS TABLE

Power tilt & power telescopic steering column system uses the multiplex communication system, so check diagnosis system of it before proceeding to troubleshooting.

The table below will be useful in troubleshooting these electrical systems. The numbers indicate the likelihood of the cause in the descending order. Inspect each part in the order shown, and replace the part when it is found to be faulty.

- If the instruction "Proceed to next circuit inspection shown on the chart" is given in the flow chart on the following page, proceed to the circuit with the next highest number in the table to continue the check.
- If the problem still occurs even though there is no abnormality in the related circuits, then check and replace multiplex tilt & telescopic ECU.

Symptom	Suspect Area	See page
Both tilt and telescopic: Manual, auto away/return and memory functions <ul style="list-style-type: none"> • Do not operate • Stop at halfway • Do not stop 	5. Multiplex communication system 6. ECU power source circuit 7. Un-lock warning switch circuit 8. Actuator power source circuit 9. Tilt position sensor or tilt motor circuit 10. Telescopic position sensor or telescopic motor circuit	05-2255 05-1090 05-1077 05-1095 05-1082 05-1086
Tilt only: Manual, auto away/return and memory functions <ul style="list-style-type: none"> • Do not operate • Stop at halfway • Do not stop 	1. Tilt position sensor or tilt motor circuit	05-1082
Telescopic only: Manual, auto away/return and memory functions <ul style="list-style-type: none"> • Do not operate • Stop at halfway • Do not stop 	1. Telescopic position sensor or telescopic motor circuit	05-1086
Both tilt and telescopic: Only tilt and telescopic manual switch function does not operate	1. Tilt & telescopic manual switch circuit	05-1079
Tilt only: Only tilt and telescopic manual switch function does not operate	1. Tilt & telescopic manual switch circuit	05-1079
Telescopic only: Only tilt and telescopic manual switch function does not operate	1. Tilt & telescopic manual switch circuit	05-1079
Both away and return: Only auto away/return function does not operate	1. Check status of auto away function using hand-held tester 2. Multiplex communication system 3. Ignition switch 4. Un-lock warning switch circuit	– 05-2255 80-2 05-1077
Only away: Only auto away/return function does not operate	1. Un-lock warning switch circuit 2. Ignition switch	05-1077 80-2
Only return: Only auto away/return function does not operate	1. Un-lock warning switch circuit 2. Ignition switch	05-1077 80-2
Only memory function does not operate	1. Multiplex communication system	05-2255

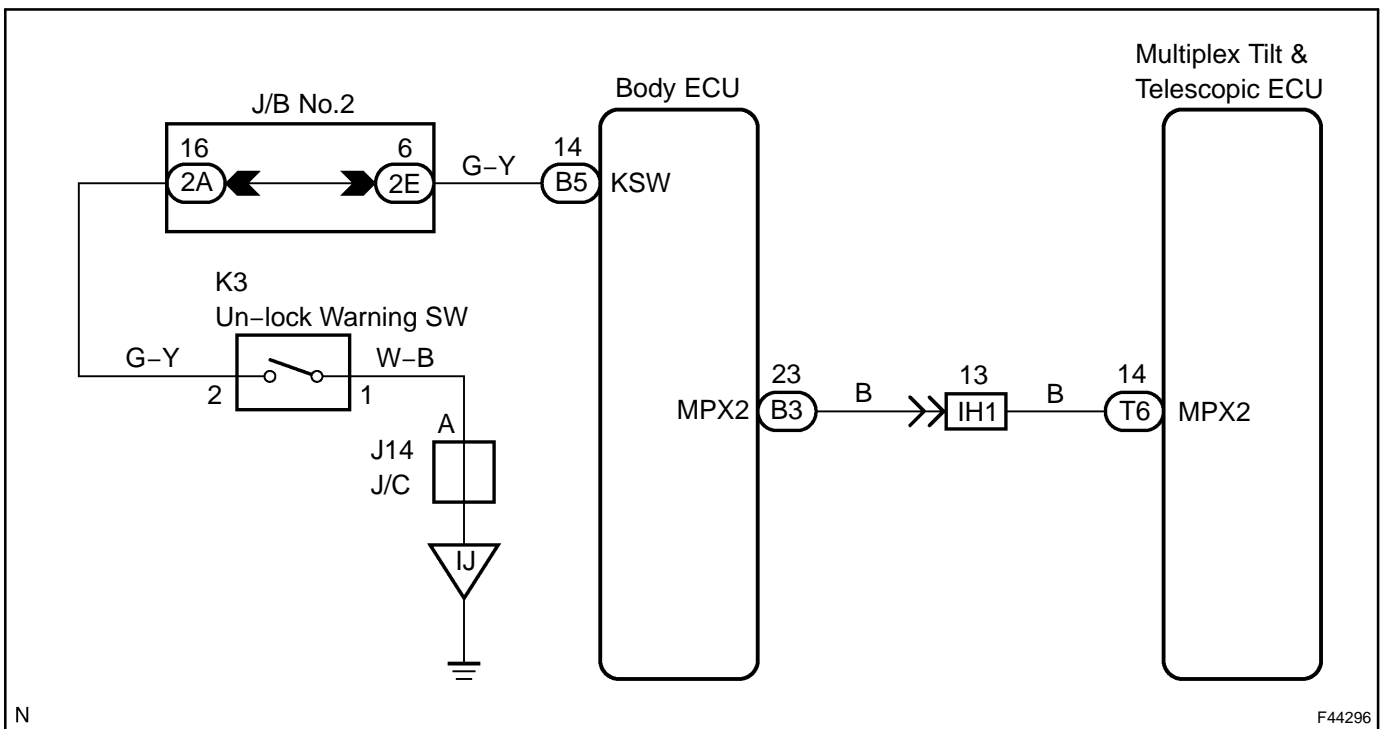
DTC	B2602	KEY UNLOCK WARNING SWITCH CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

The different signal (ON or OFF) is sent from the body ECU to the multiplex tilt & telescopic ECU via the communication bus when the ignition key is inserted into the key cylinder. The multiplex tilt & telescopic ECU uses this signal to operate the auto away function or the auto return function.

DTC No.	Detection Item	Trouble Area
B2602	The signal (OFF) is sent to multiplex tilt & telescopic ECU when the ignition switch is turned to ACC, ON or START position.	<ul style="list-style-type: none"> • Un-lock warning switch assy • Un-lock warning switch circuit • Body ECU • Multiplex tilt & telescopic ECU

WIRING DIAGRAM



N

F44296

INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER

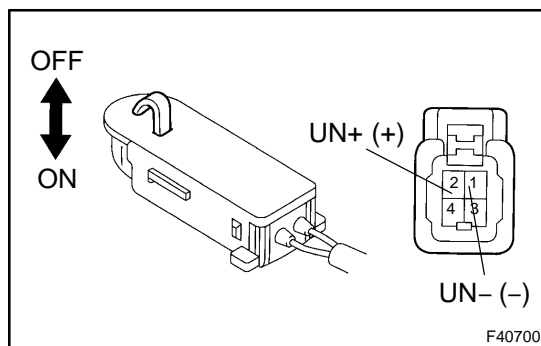
- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the item "KEYSW (MPX)" in the DATA LIST.
- Check the signal communication state of the un-lock warning switch on the tester screen.
Standard: "ON" is displayed.

OK

CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

NG

2 INSPECT UN-LOCK WARNING SWITCH ASSY



- Disconnect un-lock warning switch assy connector.
- Check continuity between terminal UN- and UN+ of the un-lock warning switch assy shown below.

Standard:

Switch position	Tester connection	Specified condition
OFF (Ignition key is removed)	1 - 2	No continuity
ON (Ignition key is inserted)	1 - 2	Continuity

NG

REPLACE UN-LOCK WARNING SWITCH ASSY

OK

3 CHECK HARNESS AND CONNECTOR(BODY ECU – BODY GROUND)

- Check for open and short circuit in the harness and the connector between the body ECU and the body ground (See page 01-36).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE BODY ECU (See page 01-36)

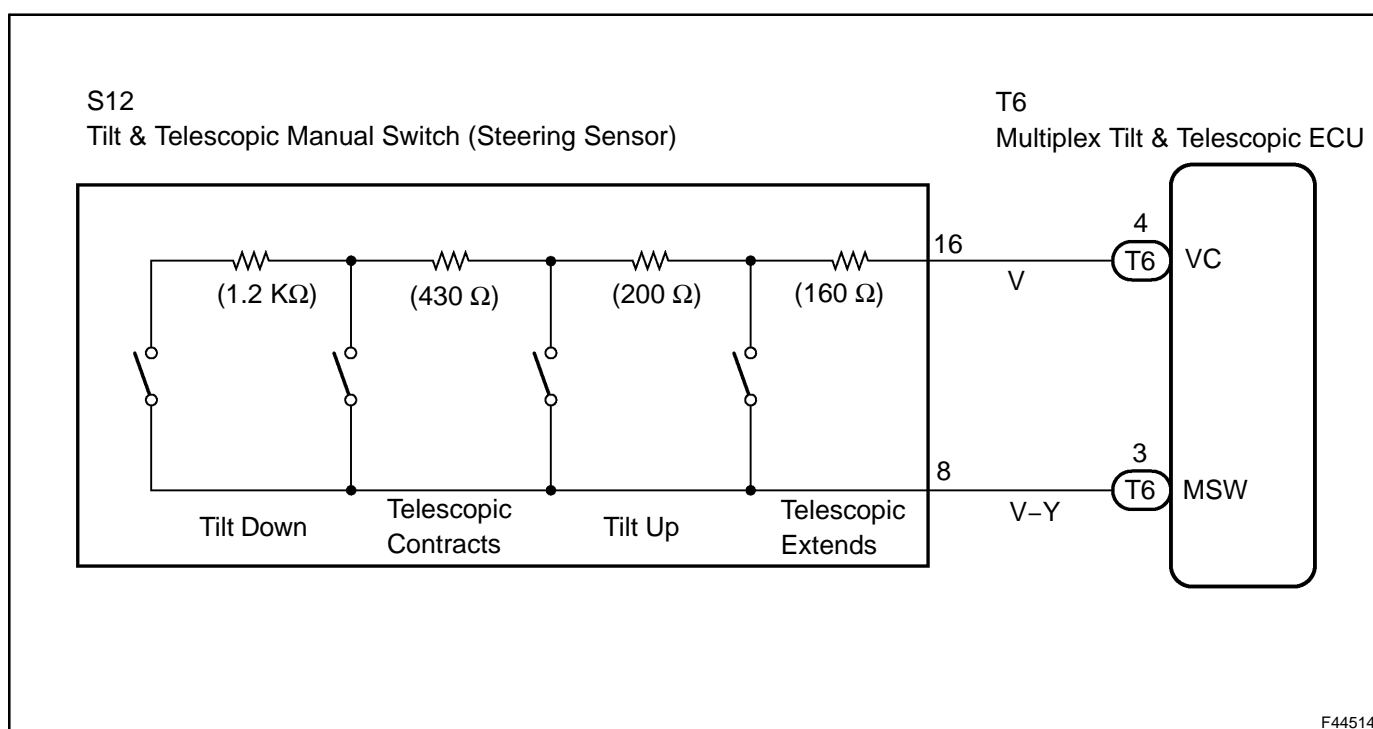
DTC	B2603	TILT AND TELESCOPIC MANUAL SWITCH CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

Different voltage values are input to the multiplex tilt & telescopic ECU by operating the manual switch. Then the multiplex tilt & telescopic ECU judges which motor and which direction tilt motor or telescopic motor should be moved based on the voltage value.

DTC No.	Detection Item	Trouble Area
B2603	Abnormal voltage value which is not within the specification is input to multiplex tilt & telescopic ECU when being operated with the manual switch.	<ul style="list-style-type: none"> • Tilt & telescopic manual switch • Tilt & telescopic manual switch circuit • Multiplex tilt & telescopic ECU

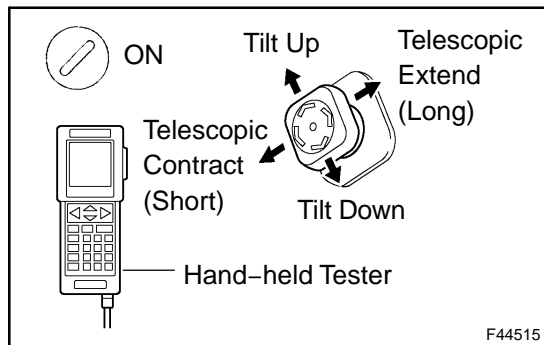
WIRING DIAGRAM



F44514

INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER



- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item "T & T MANUAL SW" in the DATA LIST.
- (d) Read voltages on the tester screen when operating the manual switch.

Standard:

Manual switch position	Standard voltage
Neutral position	Below 0.2 V
Tilt up	1.67 - 2.13 V
Tilt down	0.54 - 0.74 V
Telescopic contract	1.08 - 1.40 V
Telescopic extend	2.22 - 2.77 V

Result:

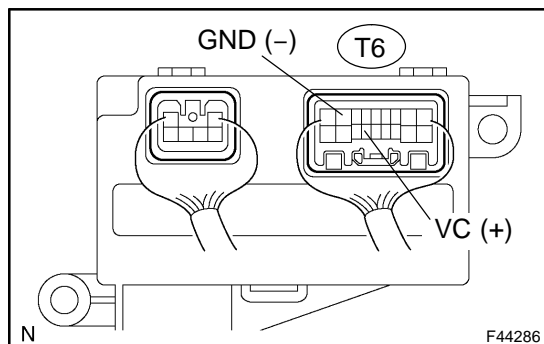
A	Switch voltages in all directions are within the standard.
B	Switch voltage in certain direction is outside the standard.
C	Switch voltages in all directions are outside the standard.

A CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

B REPLACE TILT & TELESCOPIC MANUAL SWITCH

C

2 INSPECT MULTIPLEX TILT & TELESCOPIC ECU(VC TERMINAL VOLTAGE)



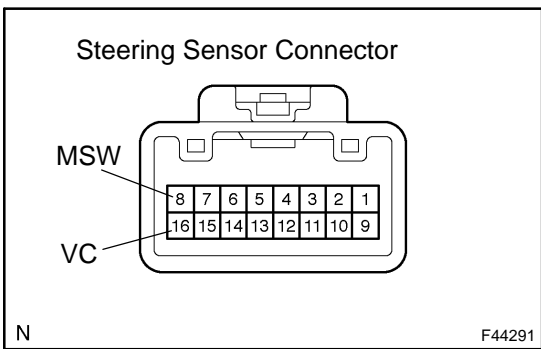
- (a) Remove multiplex tilt & telescopic ECU with the connector being connected.
- (b) Turn the ignition switch to ON.
- (c) Measure voltage between terminal VC and GND of ECU connector.

Standard: 4.9 - 5.1 V

NG CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

OK

3 INSPECT TILT & TELESCOPIC MANUAL SWITCH



- (a) Disconnect the steering sensor connector.
- (b) Measure resistance between terminal VC and MSW of steering sensor connector when operating the manual switch.

Standard:

Manual switch position	Standard resistance
Tilt up	360 Ω
Tilt down	1,990 Ω
Telescopic contract	790 Ω
Telescopic extend	160 Ω

NG → **REPLACE TILT & TELESCOPIC MANUAL SWITCH**

OK

4 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU - TILT & TELESCOPIC MANUAL SWITCH)

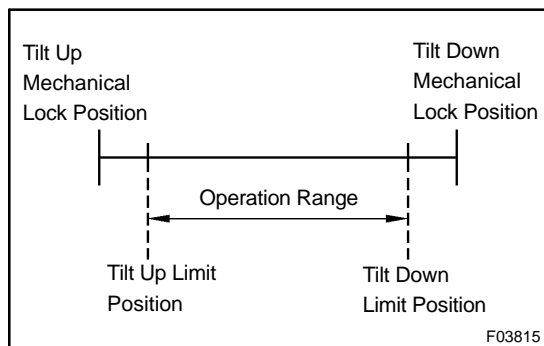
- (a) Check for open and short circuit in the harness and the connector between the multiplex tilt & telescopic ECU and the tilt & telescopic manual switch (See page 01-36).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

DTC	B2610	TILT POSITION SENSOR OR TILT MOTOR CIRCUIT MALFUNCTION
------------	--------------	---



CIRCUIT DESCRIPTION

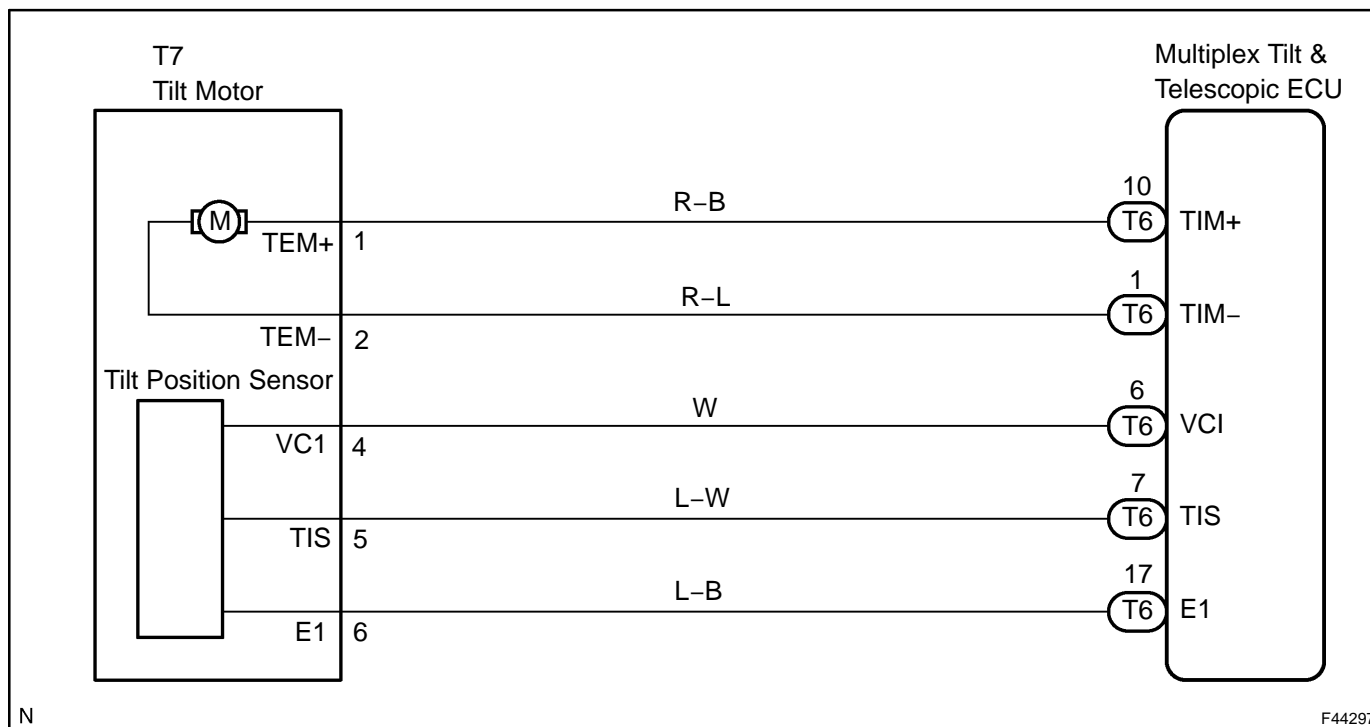
Tilt motor is operated by the power voltage supplied from the multiplex tilt & telescopic ECU and makes the steering column tilt upward and downward. Tilt position sensor (hole IC) in the tilt motor detects the tilt of the steering column and outputs the signal to the CPU in response to that tilt.

HINT:

Limit positions can be confirmed on the screen of the hand-held tester.

DTC No.	Detection Item	Trouble Area
B2610	During tilt function operation, tilt operation stops within the operation range.	<ul style="list-style-type: none"> • Tilt steering gear assy w/ motor • Actuator power source circuit • Tilt position sensor or tilt motor circuit • Multiplex tilt & telescopic ECU

WIRING DIAGRAM

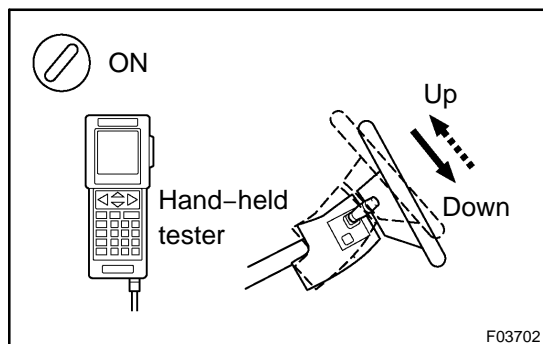


N

F44297

INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER



- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item "TILT" in the ACTIVE TEST, and operate it with the hand-held tester.
- (d) Check that the steering wheel tilt up (down) when the ACTIVE TEST carried out.

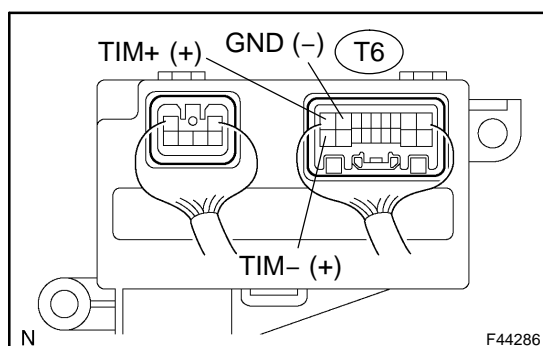
Standard:

Steering wheel moves upward (downward).

OK Go to step 4

NG

2 INSPECT MULTIPLEX TILT & TELESCOPIC ECU(TIM+, TIM- TERMINAL VOLTAGE)



- (a) Remove multiplex tilt & telescopic ECU with the connector being connected.
- (b) Turn the ignition switch to ON.
- (c) Measure voltage between terminal TIM+ and GND, TIM- and GND of the ECU connector.

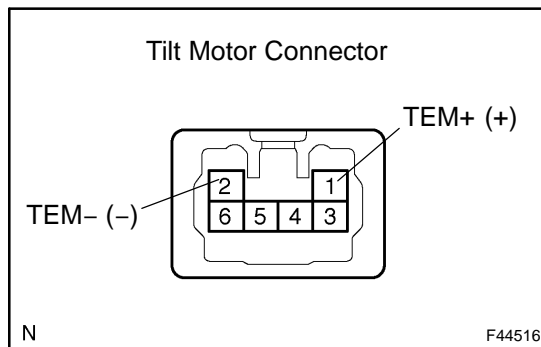
Standard:

Manual switch position	Symbols	Standard voltage
Tilt up	TIM+ ↔ GND	10 - 14 V
Tilt down	TIM- ↔ GND	10 - 14 V

NG CHECK ACTUATOR POWER SOURCE CIRCUIT (See page 05-1095)

OK

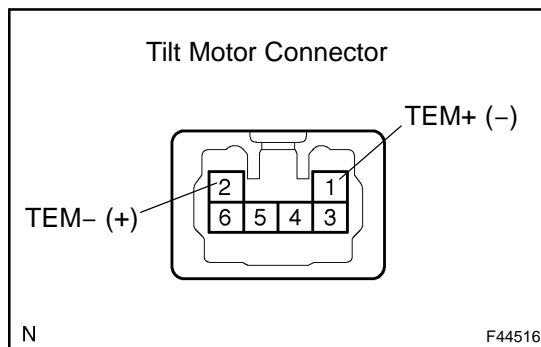
3 INSPECT TILT STEERING GEAR ASSY W/MOTOR



- (a) Disconnect tilt motor connector.
 (b) Connect the battery positive \oplus terminal to terminal TEM+ and the battery negative \ominus terminal to terminal TEM- of the tilt motor connector. Then confirm that steering wheel tilt up.

Standard:

Steering wheel moves upward.



- (c) Connect the battery negative \ominus terminal to terminal TEM+ and the battery positive \oplus terminal to terminal TEM- of the tilt motor connector. Then confirm that steering wheel tilt down.

Standard:

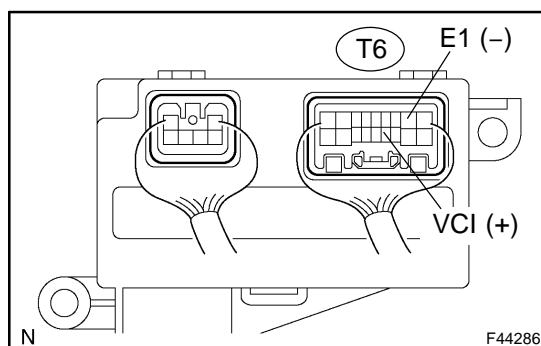
Steering wheel moves downward.

NG

REPLACE TILT STEERING GEAR ASSY W/MOTOR

OK

4 INSPECT MULTIPLEX TILT & TELESCOPIC ECU(VCI TERMINAL VOLTAGE)



- (a) Measure voltage between terminal VCI and E1 of the ECU connector.

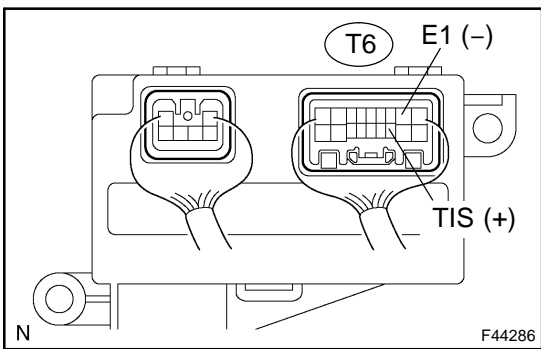
Standard: 8 - 16 V

NG

CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

OK

5 INSPECT TILT POSITION SENSOR(TIS TERMINAL OF ECU INPUT VOLTAGE)



- (a) Measure voltage between terminal TIS and E1 of the ECU connector.
Standard:
Pulse HI: 8 - 16 V
Pulse LOW: 0 V

OK CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

NG

6 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU - TILT MOTOR AND POSITION SENSOR)

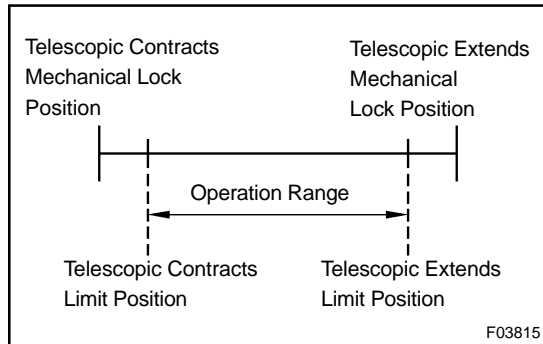
- (a) Check for open and short circuit in the harness and the connector between the multiplex tilt & telescopic ECU and the tilt motor and position sensor (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE TILT STEERING GEAR ASSY W/MOTOR

DTC	B2611	TELESCOPIC POSITION SENSOR OR TELESCOPIC MOTOR CIRCUIT MALFUNCTION
------------	--------------	---



CIRCUIT DESCRIPTION

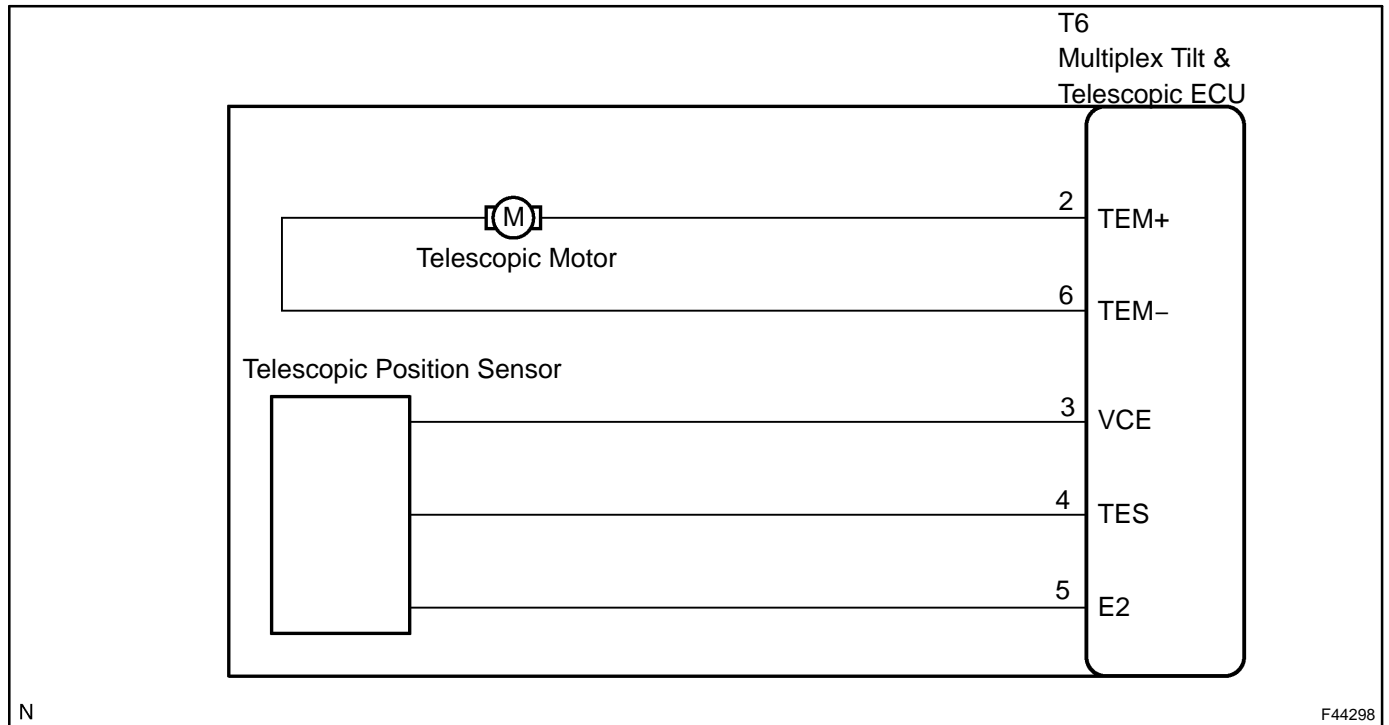
Telescopic motor is operated by the power voltage supplied from the multiplex tilt & telescopic ECU and makes the steering column slide forward and rearward. Telescopic position sensor (Hole IC) in the telescopic motor detects the sliding position of the forward and rearward direction of the steering column and outputs the signal to the CPU in response to that sliding amount.

HINT:

Limit positions can be confirmed on the screen of the hand-held tester.

DTC No.	Detection Item	Trouble Area
B2611	During telescopic function operation, telescopic operation stops within the operation range.	<ul style="list-style-type: none"> • Tilt steering gear assy w/ motor • Actuator power source circuit • Telescopic position sensor or telescopic motor circuit • Multiplex tilt & telescopic ECU

WIRING DIAGRAM

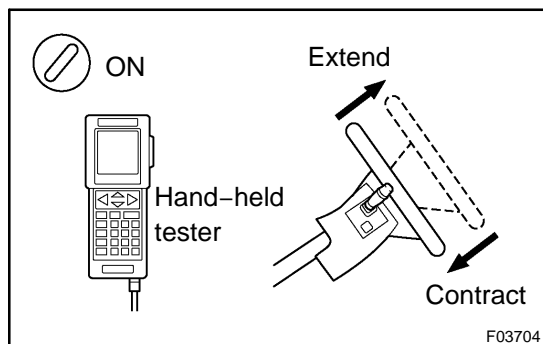


N

F44298

INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER



- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the item "TELESCO" in the ACTIVE TEST, and operate it with the hand-held tester.
- Check that the steering column contracts (extends) when the ACTIVE TEST carried out.

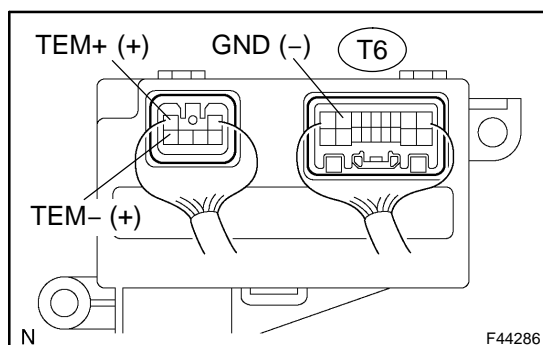
Standard:

Steering column contracts (extends).

OK → Go to step 4

NG

2 INSPECT MULTIPLEX TILT & TELESCOPIC ECU(TEM+, TEM- TERMINAL VOLTAGE)



- Remove multiplex tilt & telescopic ECU with the connectors being connected.
- Turn the ignition switch to ON.
- Measure voltage between terminal TEM+ and GND, TEM- and GND of the ECU connector.

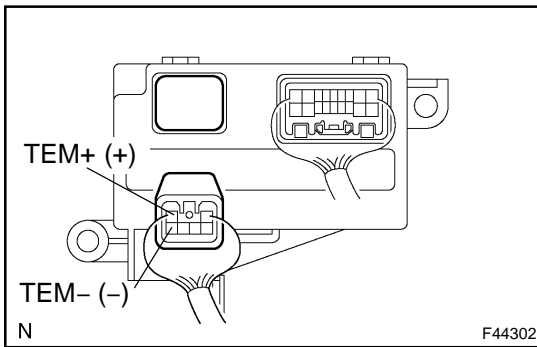
Standard:

Manual switch position	Symbols (Terminal No.)	Standard voltage
Telescopic contract	TEM+ ↔ GND	10 - 14 V
Telescopic extend	TEM- ↔ GND	10 - 14 V

NG → **CHECK ACTUATOR POWER SOURCE CIRCUIT (See page 05-1095)**

OK

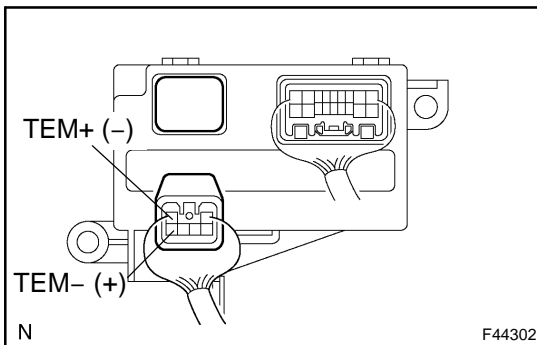
3 INSPECT TILT STEERING GEAR ASSY W/MOTOR



- (a) Disconnect the multiplex tilt & telescopic ECU connector.
 (b) Connect the battery positive \oplus terminal to terminal TEM+ and the battery negative \ominus terminal to terminal TEM- of the telescopic motor connector. Then confirm that steering column contracts.

Standard:

Steering column contracts.



- (c) Connect the battery negative \ominus terminal to terminal TEM+ and the battery positive \oplus terminal to terminal TEM- of the telescopic motor connector. Then confirm that steering column extends.

Standard:

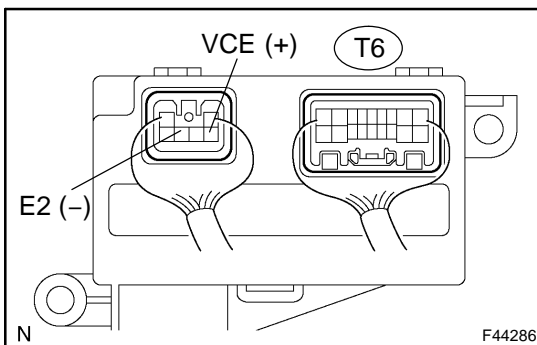
Steering column extends.

NG

REPLACE TILT STEERING GEAR ASSY W/MOTOR

OK

4 INSPECT MULTIPLEX TILT & TELESCOPIC ECU(VCE TERMINAL VOLTAGE)



- (a) Measure voltage between terminals VCE and E2 of the ECU connector.

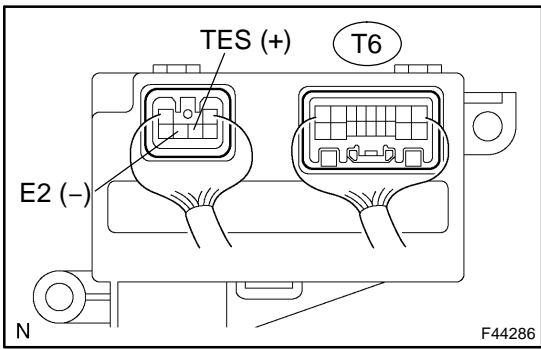
Standard: 8 - 16 V

NG

CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

OK

5 INSPECT TELESCOPIC POSITION SENSOR(TES TERMINAL OF ECU INPUT VOLTAGE)



- (a) Measure voltage between terminals TES and E2 of the ECU connector.
Standard:
Pulse HI: 8 - 16 V
Pulse LOW: 0 V

OK → **CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)**

NG

6 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU - TELESCOPIC MOTOR AND POSITION SENSOR)

- (a) Check for open and short circuit in the harness and the connector between the multiplex tilt & telescopic ECU and the telescopic motor and position sensor (See page 01-36).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE TILT STEERING GEAR ASSY W/MOTOR

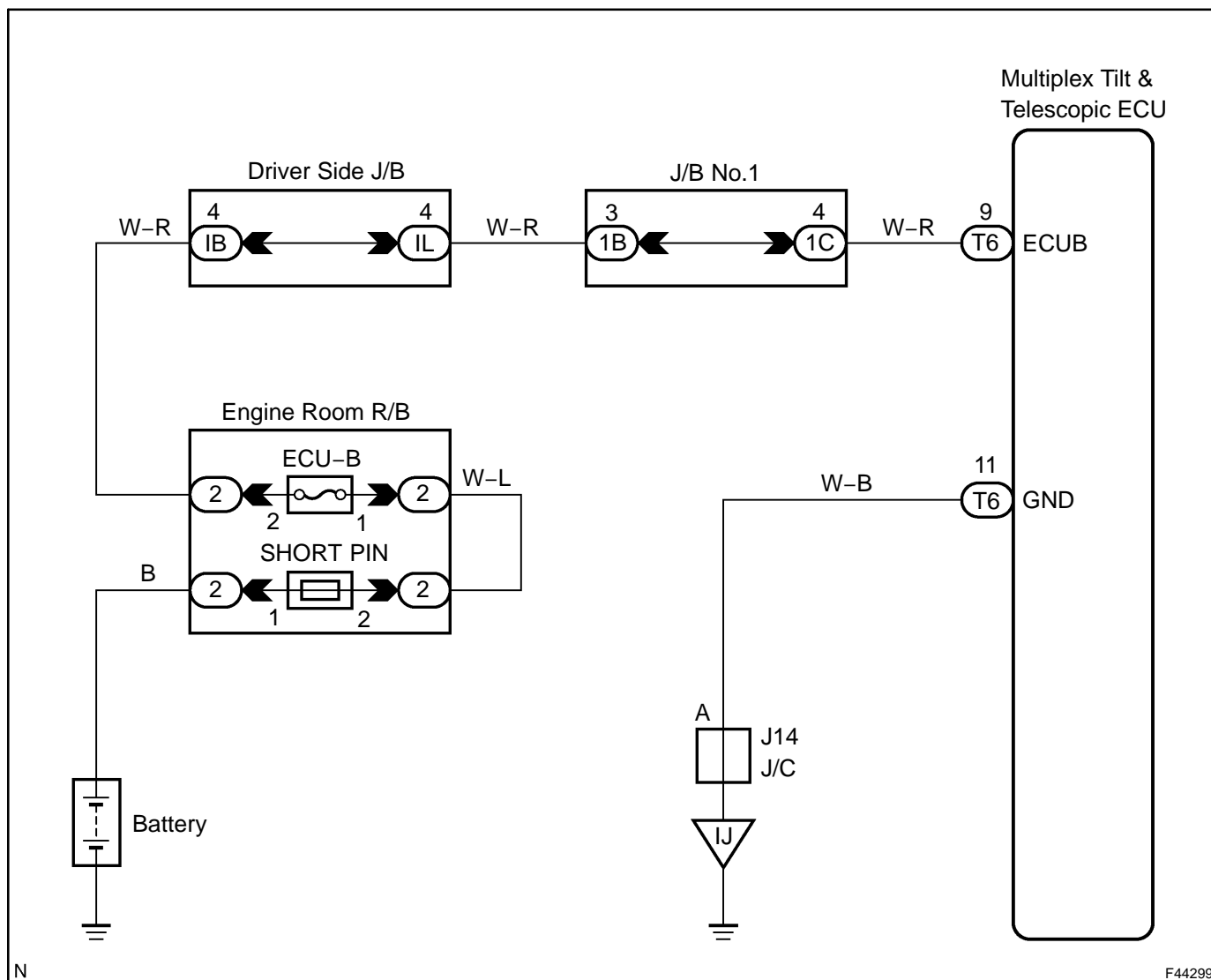
DTC	B2620	ECU POWER SOURCE CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

ECU power source circuit supply the battery positive voltage to the multiplex tilt & telescopic ECU.

DTC No.	Detection Item	Trouble Area
B2620	The condition that the voltage of the ECU power source circuit drop to be 8 V or less continues for 10 seconds or more.	<ul style="list-style-type: none"> • Battery • ECU power source circuit • Multiplex tilt & telescopic ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

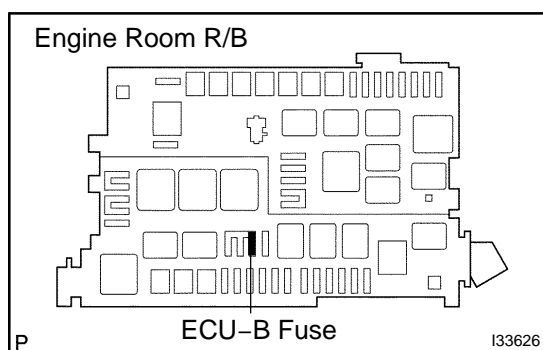
1 INSPECT BATTERY

Standard: 10 - 14 V

NG INSPECT CHARGING SYSTEM

OK

2 INSPECT FUSE(ECU-B)



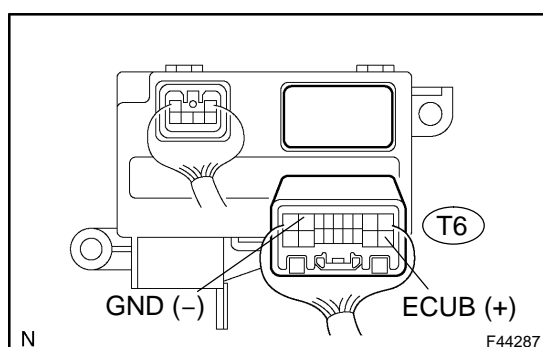
- (a) Remove the ECU-B fuse from the engine room R/B.
- (b) Check continuity of the ECU-B fuse.

Standard: Continuity

NG INSPECT FOR SHORT CIRCUIT IN ALL HARNESS AND COMPONENTS CONNECTED TO ECU-B FUSE

OK

3 CHECK HARNESS AND CONNECTOR(MULTIPLEX TLT & TELESCOPIC ECU - BATTERY)

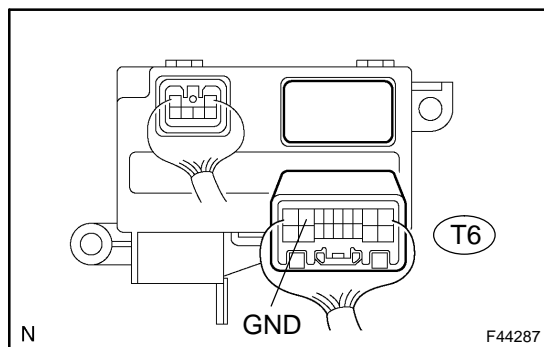


- (a) Disconnect the multiplex tilt & telescopic ECU connector.
- (b) Measure voltage between terminal ECUB and GND of the ECU connector.

Standard: 10 - 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

**4 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU -
BODY GROUND)**

- (a) Measure resistance between terminal GND of the ECU connector and body ground.

Standard: 1 Ω or less

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

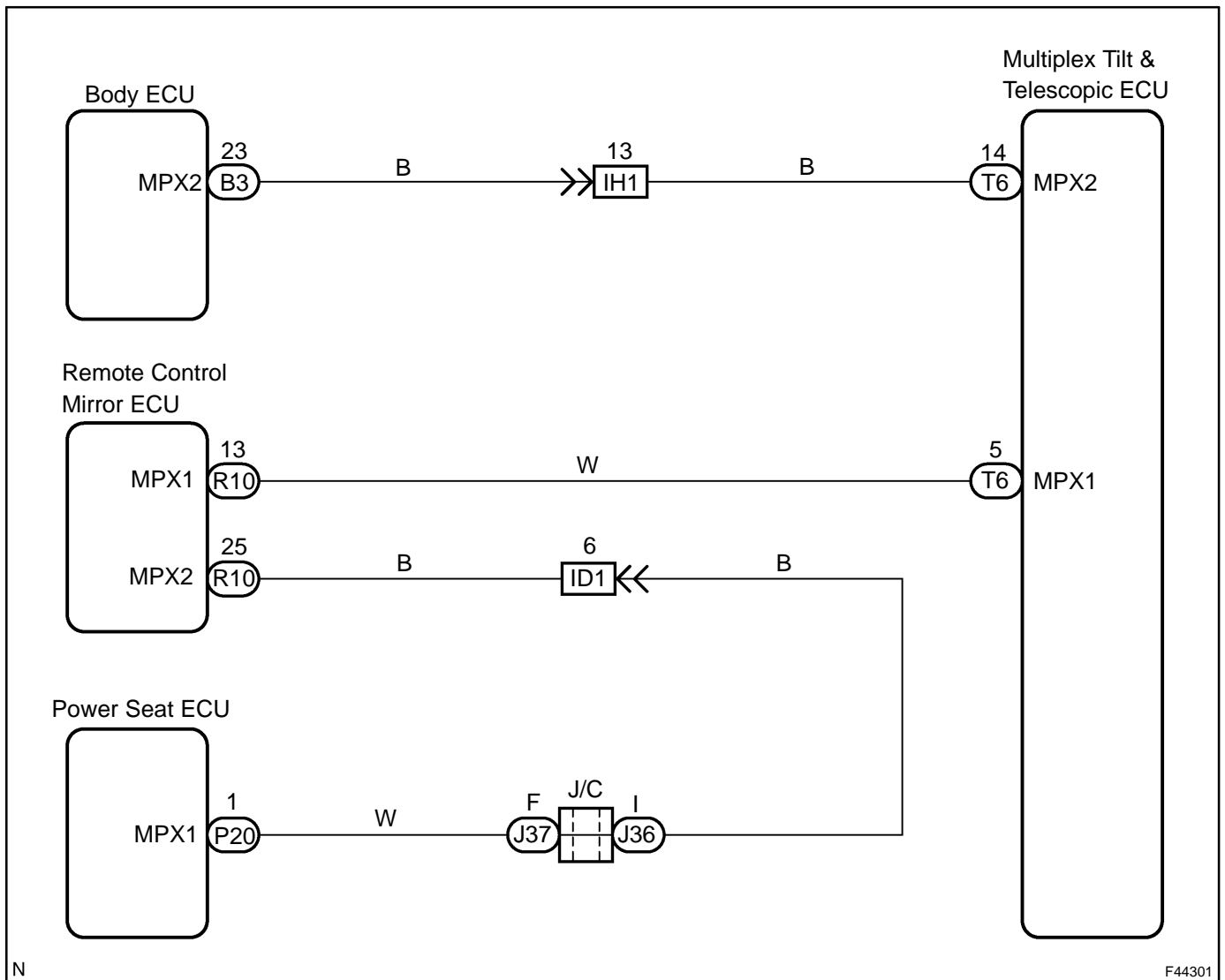
DTC	B2621	COMMUNICATION INTERRUPTION
------------	--------------	-----------------------------------

CIRCUIT DESCRIPTION

Multiplex tilt & telescopic ECU forms the network with ECU of other systems through the communication bus. Each ECU informs to other ECU of the connection of itself to the network by outputting the specified signal (periodical signal) onto the communication bus with every fixed period of time. Multiplex tilt & telescopic ECU detects the connected condition of each ECU based on the signal.

DTC No. (See Page)	Detection Item	Trouble Area
B2621	<ul style="list-style-type: none"> • Periodical signal from the specified ECU has stopped. • Periodical signals from the ECU have stopped. 	<ul style="list-style-type: none"> • Multiplex communication system • Body ECU • Power seat ECU • Multiplex tilt & telescopic ECU

WIRING DIAGRAM



N

F44301

INSPECTION PROCEDURE**1 READ VALUE OF HAND-HELD TESTER(MULTIPLEX TILT & TELESCOPIC ECU - BODY ECU)**

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item "BODY1 ECU INFO" in the DATA LIST.
- (d) Check the signal communication state of the body ECU on the tester screen.

Standard: "OK" is displayed.

NG

CHECK AND REPLACE BODY ECU (See page 01-36)

OK

2 READ VALUE OF HAND-HELD TESTER(MULTIPLEX TILT & TELESCOPIC ECU - POWER SEAT ECU)

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item "SEAT ECU INFO" in the DATA LIST.
- (d) Check the signal communication state of the power seat ECU on the tester screen.

Standard: "OK" is displayed.

NG

CHECK AND REPLACE POWER SEAT ECU (See page 01-36)

OK

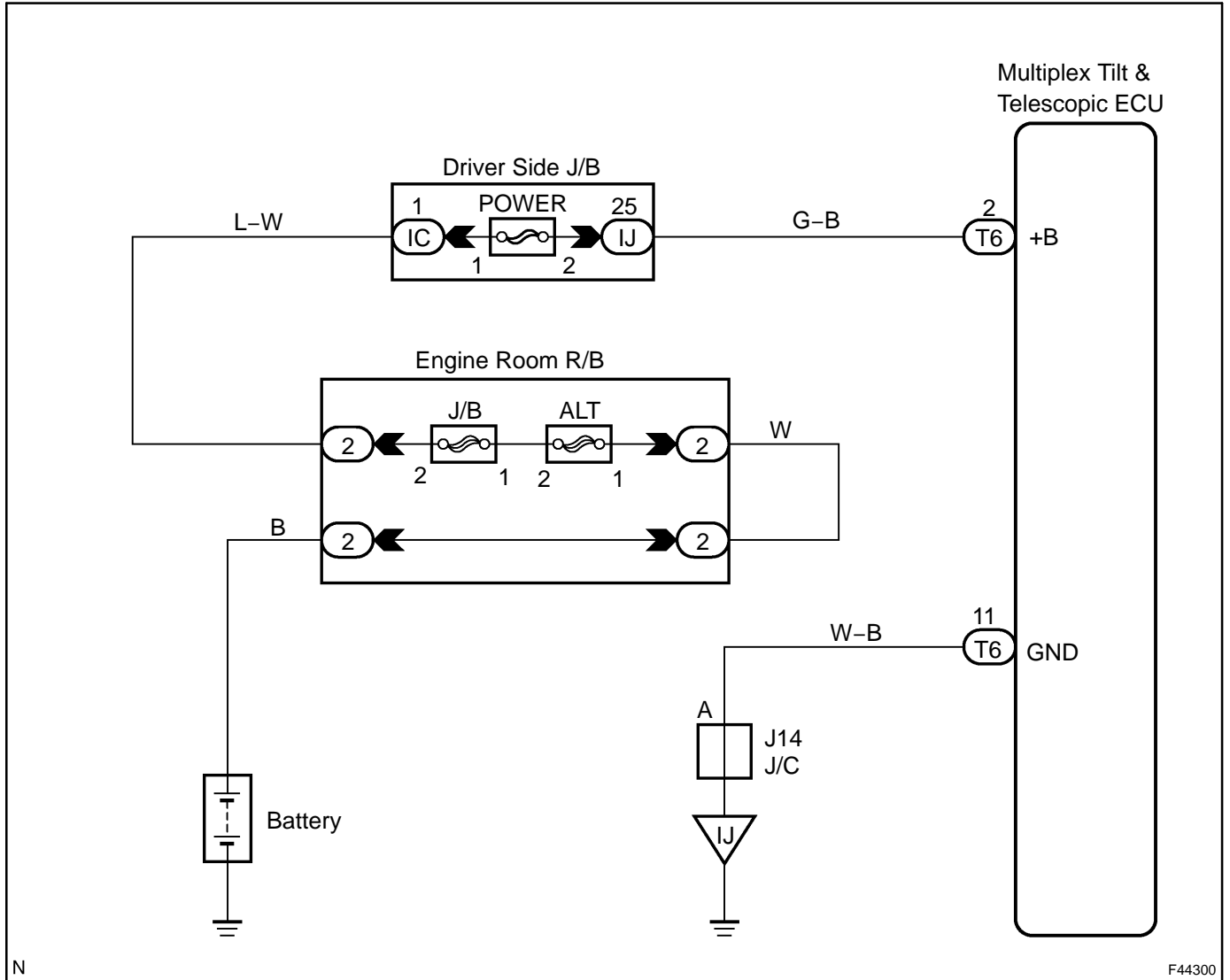
CHECK AND REPLACE MULTIPLEX TILT & TELESCOPIC ECU (See page 01-36)

ACTUATOR POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This circuit is the power source for the motors.

WIRING DIAGRAM

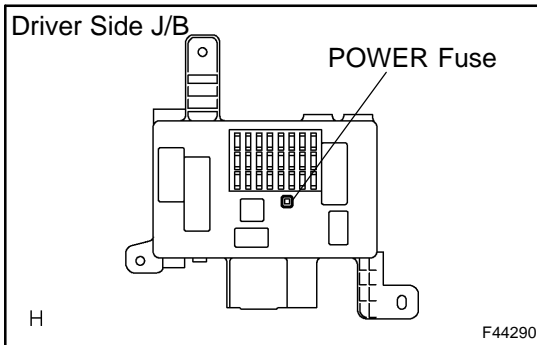


N

F44300

INSPECTION PROCEDURE

1 INSPECT FUSE(POWER)



- (a) Remove POWER fuse from the driver side J/B.
- (b) Check continuity of the POWER fuse.

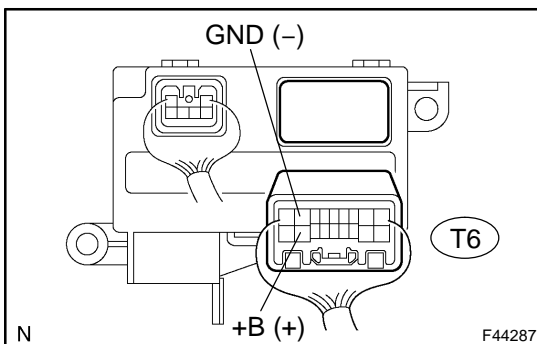
Standard: Continuity

NG

INSPECT FOR SHORT CIRCUIT IN ALL HARNESS AND COMPONENTS CONNECTED TO POWER FUSE

OK

2 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU - BATTERY)



- (a) Disconnect the multiplex tilt & telescopic ECU connector.
- (b) Measure voltage between terminals +B and GND of the ECU connector.

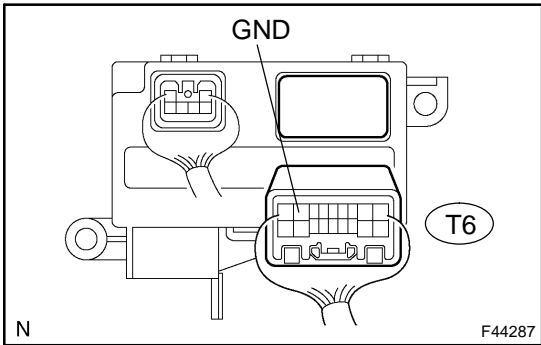
Standard: 10 - 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(MULTIPLEX TILT & TELESCOPIC ECU - BODY GROUND)



(a) Measure resistance between terminal GND of the ECU connector and body ground.
Standard: 1 Ω or less

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1076)

AIR CONDITIONING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

055TY-07

1 VEHICLE BROUGHT TO WORK SHOP



2 CUSTOMER PROBLEM ANALYSIS (See page [05-1100](#))



3 CHECK AND CLEAR DTC (See page [05-1101](#))



4 PROBLEM SYMPTOM CONFIRMATION



SYMPTOM OCCUR (GO TO STEP 6)

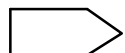


SYMPTOM DOES NOT OCCUR (GO TO STEP 5)

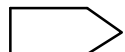
5 SYMPTOM SIMULATION (See page [05-1101](#))



6 DTC CHECK (See page [05-1101](#))

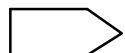


MALFUNCTION CODE (GO TO STEP 7)



NORMAL CODE (GO TO STEP 8)

7 DTC CHART (See page [05-1106](#))

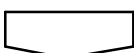


GO TO STEP 10

8 PROBLEM SYMPTOMS TABLE (See page [05-1118](#))



9 ACTUATOR CHECK (See page [05-1101](#))



10	CIRCUIT INSPECTION (See page 05-1120 to 05-1197)
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11	IDENTIFICATION OF PROBLEM
-----------	----------------------------------



12	PARTS INSPECTION
-----------	-------------------------



13	REPAIR
-----------	---------------



14	CONFIRMATION TEST
-----------	--------------------------



15	END
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CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name: _____

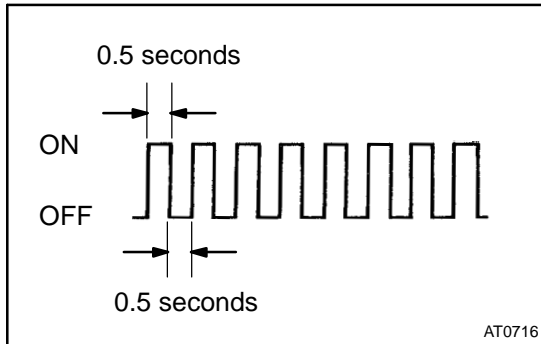
Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Date vehicle Brought In	/ /	Odometer Reading	km Miles

Date of Problem Occurrence	/ /
How Often does Problem Occur?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (times a day)
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Snowy <input type="checkbox"/> Various / Other
Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F / °C)

Symptoms	Air Flow Control Faulty	<input type="checkbox"/> Blower motor does not operation <input type="checkbox"/> Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	<input type="checkbox"/> Cabin temperature does not go down <input type="checkbox"/> Cabin temperature does not rise <input type="checkbox"/> Response is slow
	Air Inlet Control Faulty	<input type="checkbox"/> Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control Faulty	<input type="checkbox"/> Mode will not change <input type="checkbox"/> Will not enter the desired mode

DTC Check	1st Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Malfunction Code (Code)
	2nd Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Malfunction Code (Code)

PRE-CHECK

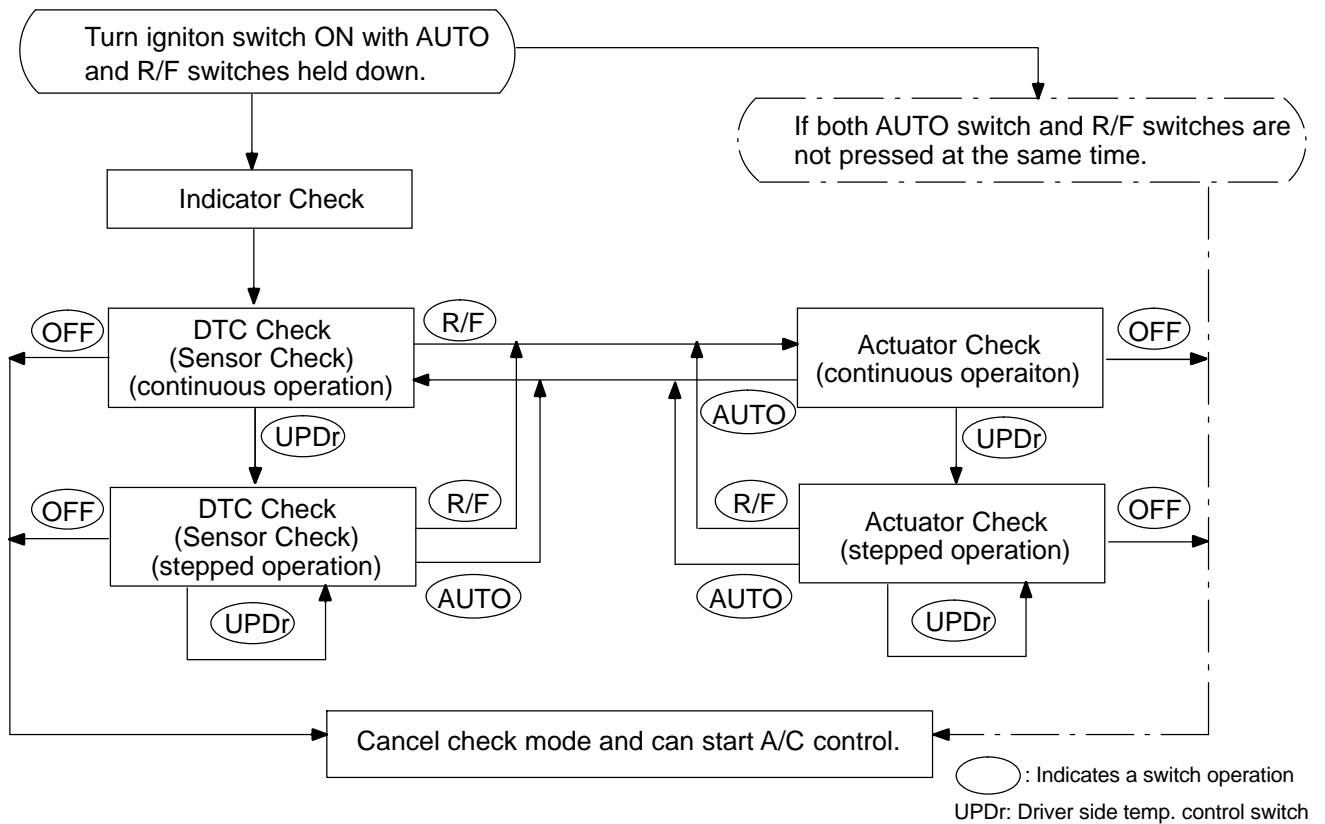


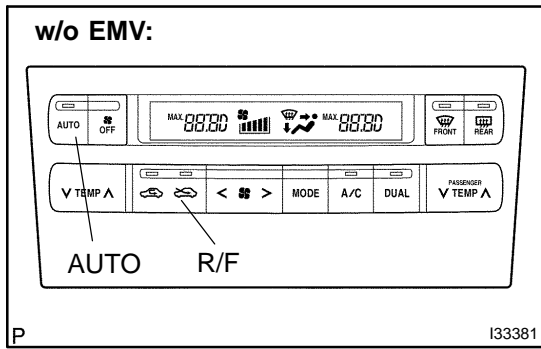
1. WARNING FOR A/C COMPRESSOR LOCK

If compressor lock occurs during A/C operation, the A/C switch indicator on the A/C control assembly starts blinking. When this occurs, check for compressor lock (22) using diagnosis trouble code check then proceed to inspect the circuit or the component. Compressor lock sensor circuit. (See page 05-1139)

2. LIST OF OPERATION METHODS

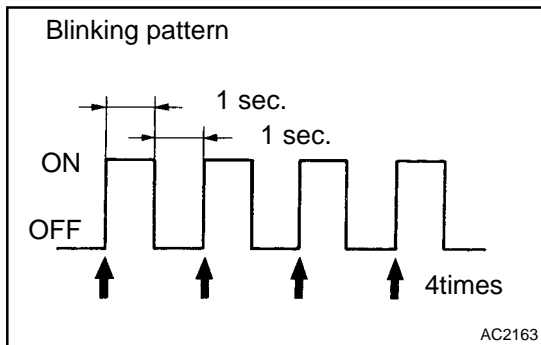
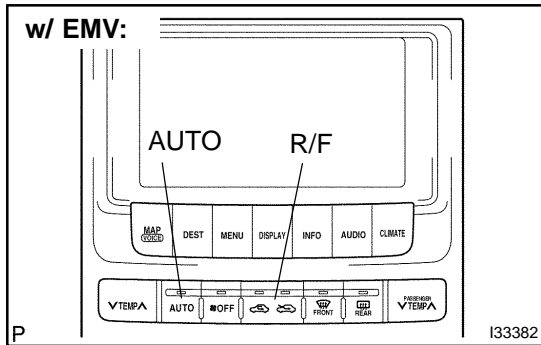
By operating each of the A/C control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.





3. INDICATOR CHECK

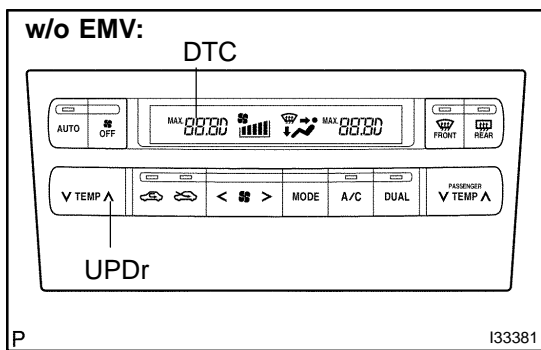
- (a) Turn the ignition switch ON while pressing the A/C control AUTO switch and R/F switch simultaneously.



- (b) Check that the indicators come on and go off 4 times in succession at a interval of a second.

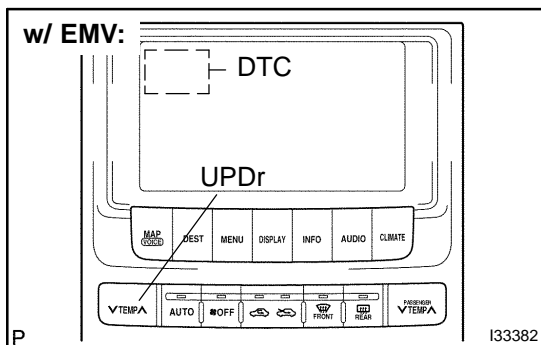
HINT:

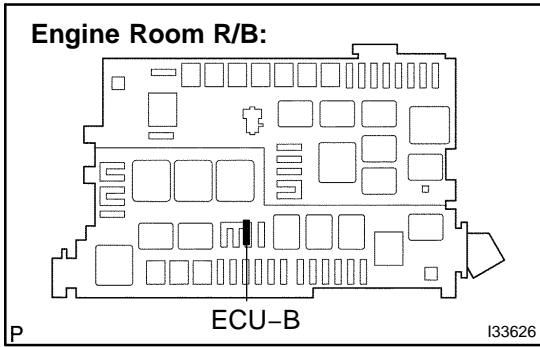
- After the indicator check is completed, the system enters the DTC begins automatically.
- Press the OFF switch when desiring to cancel the check mode.



4. DTC CHECK (SENSOR CHECK)

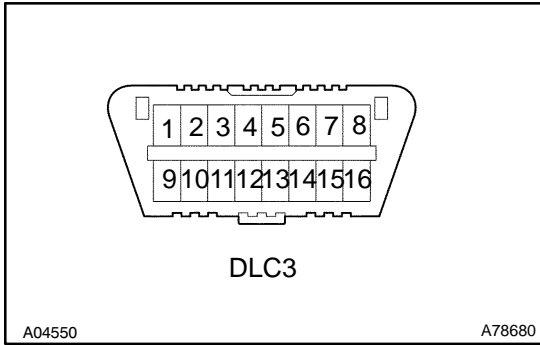
- (a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.
- (b) Read the code displayed on the panel. Refer to the list of codes on page 05-1106 when reading the codes. (Trouble codes are output at the temperature display.)
- (c) If the slower display is desired, press the UPDr switch and change it to stepped operation. Each time the UPDr switch is pressed, the display changes by 1 step.





5. CLEARING DTC

- (a) To clear diagnostic trouble code, there are 2 ways.
 - (1) During sensor check, press the "FRONT DEF" switch and "REAR. DEF" switch at the same time.
 - (2) Pull the ECU-B fuse in engine room J/B for 20 sec. or longer to clear the DTC memory.



6. CHECK DLC3

- (a) The vehicle's ECM uses the ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus + Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
5	Signal Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/9 - 14 V	Always

7. DATA LIST

HINT:

According to the DATA LIST displayed by hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the methods to shorten the labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
A/C SIG	A/C SW Status/ ON or OFF	<ul style="list-style-type: none"> • A/C SW Push: ON • A/C SW Release: OFF 	←
A/C CUT SIG	A/C cut signal status/ ON or OFF	<ul style="list-style-type: none"> • A/C SW Push: ON • A/C SW Release: OFF 	←

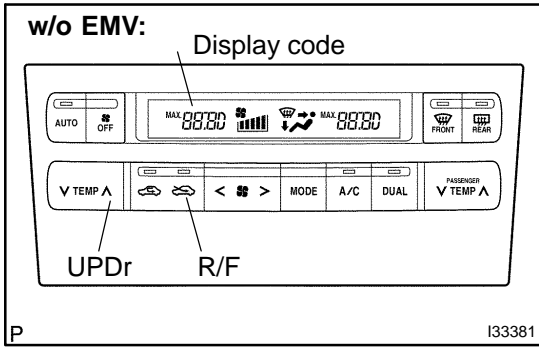
8. ACTIVE TEST**HINT:**

Performing the ACTIVE TEST using hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the methods to shorten the labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) According to the display on tester, read the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
A/C CUT SIG	Control the A/C cut signal ON/OFF	—



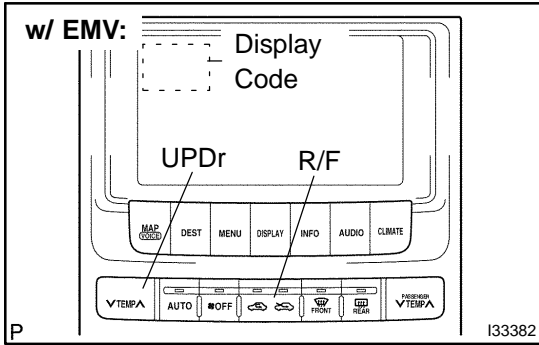
9. ACTUATOR CHECK

- (a) After entering the DTC check mode (Sensor Check Mode) press the R/F switch.
- (b) Since each damper, motor and relay automatically operates at 1 sec. intervals beginning in order from 10 in the temperature display, check the temperature and air flow visually and manually.

If the slower display is desired, press the UPDr switch and change it to step operation. Each time the UPDr switch is pressed, the display changes by 1 step.

HINT:

- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the OFF switch.



Step No.	Display code	Conditions					
		Blower level	Rear blower level	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	0	0	FACE	RECIRCULATION	OFF	"COLD" side (Full closed)
2	1	1	1	FACE	RECIRCULATION	OFF	"COLD" side (Full closed)
3	2	17	1	FACE	FRESH/RECIRCULATION	ON	"COLD" side (Full closed)
4	3	17	1	B/L	FRESH/RECIRCULATION	ON	"COLD"/ "HOT" (50% open)
5	4	17	13	AUTO FOOT	FRESH	ON	"COLD"/ "HOT" (50 % open)
6	5	17	13	MANUAL FOOT	FRESH	ON	"HOT" side (Full opened)
7	6	17	13	MANUAL FOOT	FRESH	ON	"HOT" side (Full opened)
8	7	17	13	FOOT/ DEF	FRESH	ON	"HOT" side (Full opened)
9	8	17	26	FOOT/ DEF	FRESH	ON	"HOT" side (Full opened)
10	9	31	26	DEF	FRESH	ON	"HOT" side (Full opened)

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

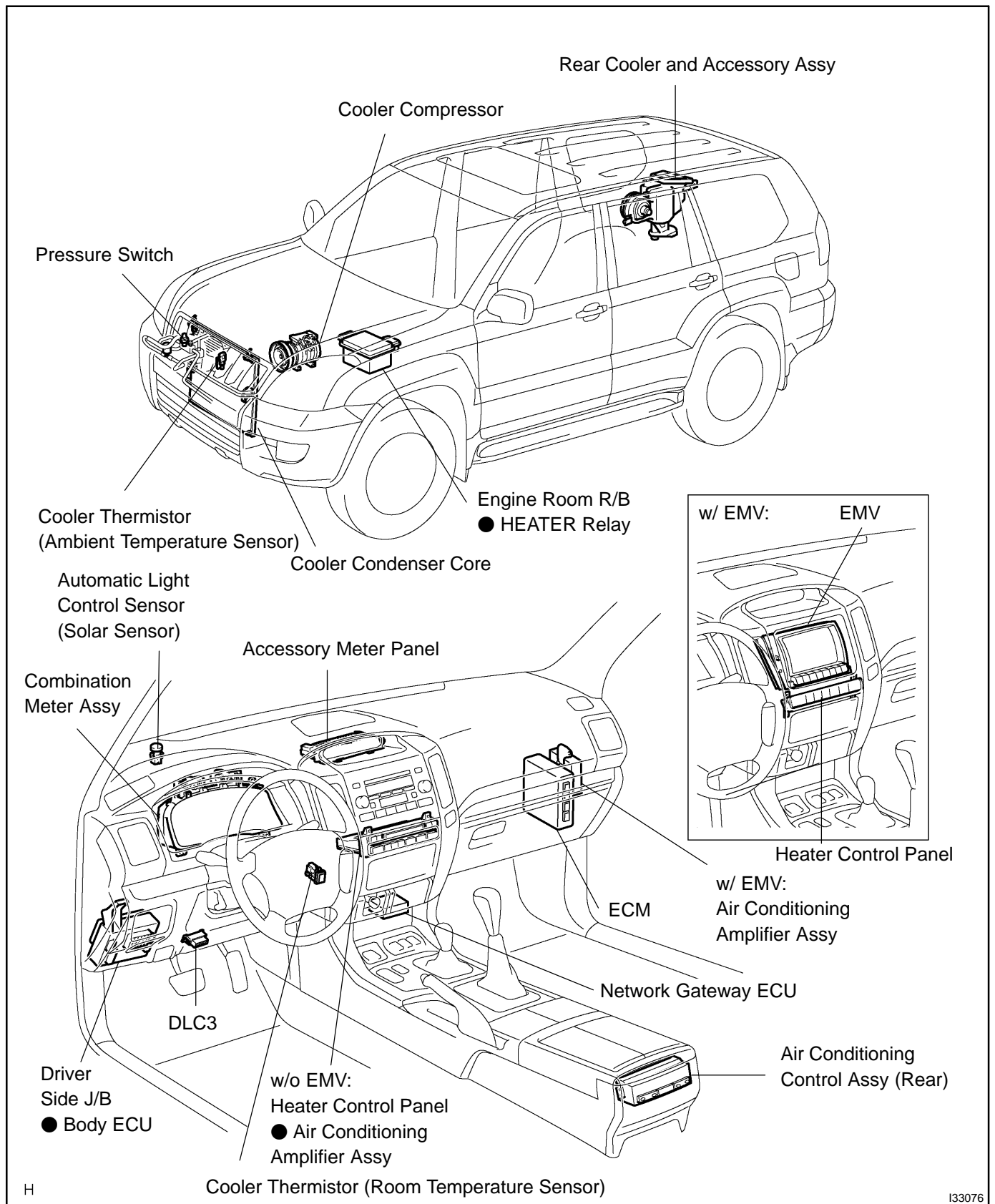
DTC No. (See Page)	Detection Item	Trouble Area	Memory
00	Normal	-	-
11 *1 (05-1120)	Room temperature sensor circuit	<ul style="list-style-type: none"> Cooler thermistor (room temp. sensor) Harness or connector between cooler thermistor (room temp. sensor) and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
12 *2 (05-1123)	Ambient temperature sensor circuit (Signal)	<ul style="list-style-type: none"> Thermistor assy (ambient temp. sensor) Harness or connector between thermistor assy (ambient temp. sensor) and multi information display panel or clock assy 	-
	Ambient temperature sensor circuit (Sensor)	<ul style="list-style-type: none"> Multi information display panel or clock assy Harness or connector between multi information display panel or clock assy and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
13 (05-1127)	Evaporator temperature sensor circuit	<ul style="list-style-type: none"> Cooler thermistor No.1 (evaporator temp. sensor) Harness or connector between cooler thermistor No.1 (evaporator temp. sensor) and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
14 (05-1130)	Water temperature sensor circuit	<ul style="list-style-type: none"> E. F. I. engine coolant temperature sensor Harness or connector between E. F. I. engine coolant temperature sensor and ECM ECM Harness or connector between ECM and A/C amplifier assy A/C amplifier assy 	-
17 (05-1133)	Rear evaporator temperature sensor circuit	<ul style="list-style-type: none"> Cooler No.2 thermistor (rear evaporator temp. sensor) Harness or connector between cooler No.2 thermistor (rear evaporator temp. sensor) and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
21 *3 (05-1136)	Solar sensor circuit (short) (Passenger side)	<ul style="list-style-type: none"> Automatic light control sensor (solar sensor) Harness or connector between automatic light control sensor (solar sensor) and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
	Solar sensor circuit (open) (Passenger side)		-
22 *4 (05-1139)	Compressor lock sensor circuit	<ul style="list-style-type: none"> Compressor drive belt Compressor lock sensor Compressor assy Harness or connector between compressor lock sensor and A/C amplifier assy A/C amplifier assy 	-
23 (05-1142)	Pressure switch circuit	<ul style="list-style-type: none"> A/C tube assy (pressure switch) Harness or connector between A/C tube assy (pressure switch) and A/C amplifier assy A/C amplifier assy 	-
24 *3 (05-1145)	Solar sensor circuit (short) (Driver side)	<ul style="list-style-type: none"> Automatic light control sensor (solar sensor) Harness or connector between automatic light control sensor (solar sensor) and A/C amplifier assy A/C amplifier assy 	○ (8.5 min. or more)
	Solar sensor circuit (open) (Driver side)		-

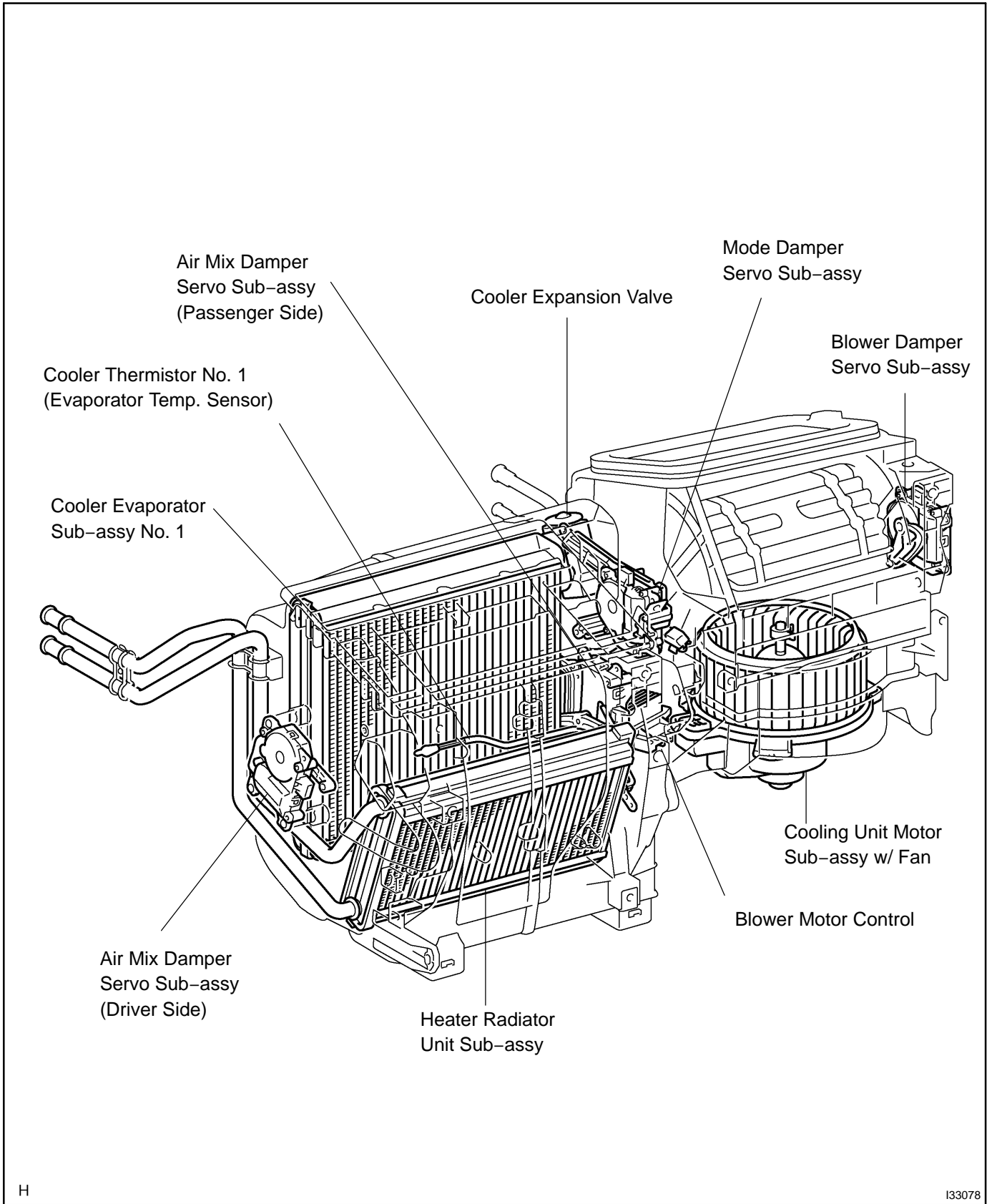
31 (05-1148)	Air mix damper position sensor circuit (Passenger side)	<ul style="list-style-type: none"> • Air mix damper servo motor (air mix damper position sensor) • Harness or connector between air mix damper servo motor (air mix damper position sensor) and A/C amplifier assy • A/C amplifier assy 	○ (1 min. or more)
32 (05-1151)	Air inlet damper position sensor circuit	<ul style="list-style-type: none"> • Blower damper servo sub-assy (blower damper position sensor) • Harness or connector between blower damper servo sub-assy (blower damper position sensor) and A/C amplifier assy • A/C amplifier assy 	○ (1 min. or more)
33 (05-1154)	Air outlet damper position sensor circuit	<ul style="list-style-type: none"> • Mode damper servo sub-assy (mode damper position sensor) • Harness or connector between mode damper servo sub-assy (mode damper position sensor) and A/C amplifier assy • A/C amplifier assy 	○ (1 min. or more)
36 (05-1157)	Air mix damper position sensor circuit (Driver side)	<ul style="list-style-type: none"> • Air mix damper servo sub-assy (Air mix damper position sensor) • Harness or connector between air mix damper servo sub-assy (air mix damper position sensor) and A/C amplifier assy • A/C amplifier assy 	○ (1 min. or more)
41 (05-1160)	Air mix damper control servomotor (Passenger side)	<ul style="list-style-type: none"> • Air mix damper servo sub-assy (air mix damper control) • Harness or connector between air mix damper servo sub-assy (air mix damper control) and A/C amplifier assy • A/C amplifier assy 	○ (15 sec.)
42 (05-1163)	Air inlet damper control servomotor	<ul style="list-style-type: none"> • Blower damper servo sub-assy (blower damper control) • Harness or connector between blower damper servo sub-assy (blower damper control) and A/C amplifier assy • A/C amplifier assy 	○ (15 sec.)
43 (05-1166)	Air outlet damper control servomotor	<ul style="list-style-type: none"> • Mode damper servo sub-assy (mode damper control) • Harness or connector between mode damper servo sub-assy (mode damper control) and A/C amplifier assy • A/C amplifier assy 	○ (15 sec.)
46 (05-1169)	Air mix damper control servomotor (Driver side)	<ul style="list-style-type: none"> • Air mix damper servo sub-assy (air mix damper control) • Harness or connector between air mix damper servo sub-assy (air mix damper control servomotor) and A/C amplifier • A/C amplifier assy 	○ (15 sec.)

HINT:

- *1: If the room temp. is approx. -18.6°C (-3.7°F) or lower, trouble code 11 may be output even though the system is normal.
- *2: If the ambient temp. is approx. -52.9°C (-61.4°F) or lower, a malfunction code may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC 21, 24 (solar sensor circuit abnormal) could be displayed.
- *4: Compressor lock (DTC22) is indicated only for a current occurring malfunction (See page 05-1139). To confirm DTC 22, perform the following steps.
 - (1) With the engine ON, enter the DTC check mode.
 - (2) Press the F/R switch to enter actuator check mode, and set the operation to Step No.3.
 - (3) Press the AUTO switch to return to DTC check mode.
 - (4) The DTC is displayed after approx. 3 sec.

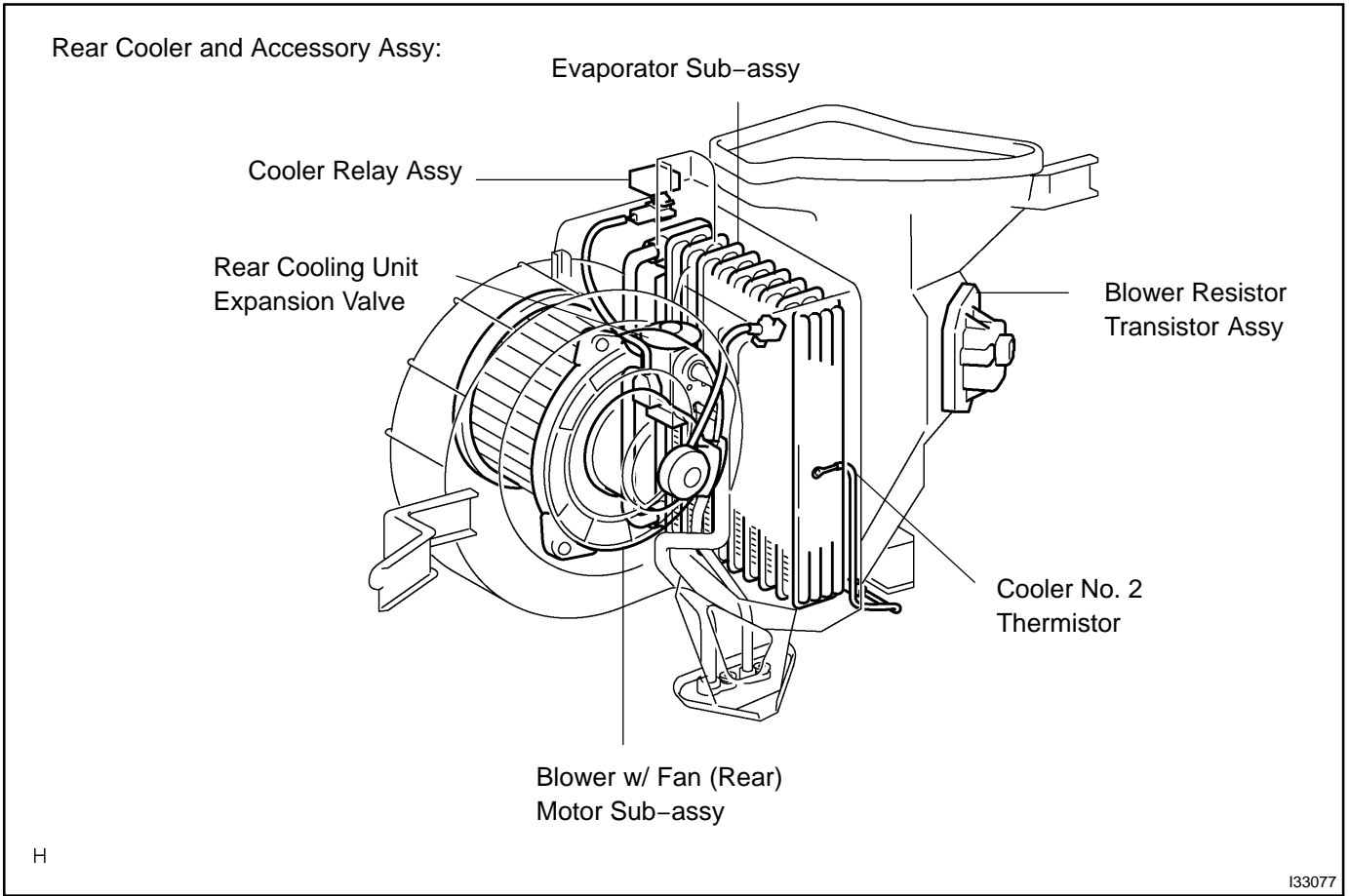
LOCATION





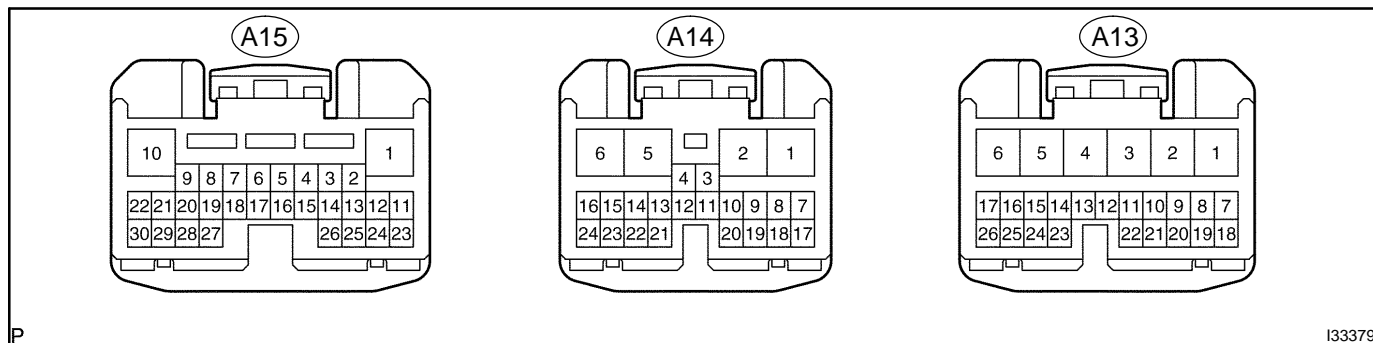
H

I33078



TERMINALS OF ECU

1. AIR CONDITIONER AMPLIFIER ASSY:



P

I33379

Terminal No. (Symbols)	Wiring Color	Condition	Specification
A15-3 - A13-6 (SPD - GND)	V-R - W-B	Start engine and turn wheel	0 → 4.5 to 5.5 V (Voltage is generated intermittently)
A15-4 - A13-17 (LOCK - SG)	W-G - W-B	Engine running: Idle speed, A/C system: Operate	Pulse generation (*4)
A15-5 - A13-17 (TAMIN - SG)	G-O - Y-G	Ambient temperature communication circuit	-
A15-6 - A13-6 (BLC - GND)	LG-B - W-B	Ignition switch: ON Front blower: Operate	Pulse generation (*5)
A15-7 - A13-6 (PSW - GND)	LG-R - W-B	Start engine Refrigerant pressure: Normal → Less than 196 kPa (2.0 kgf/cm ² , 28 psi) or more than 3140 kPa (32.0 kgf/cm ² , 455 psi)	10 to 14 V → below 1 V
A15-8 - A13-6 (ACLD - GND)	Y-G - W-B	Start engine Blower speed: LO Magnetic clutch: Engaged	10 to 14 V
		Start engine Blower speed: LO Magnetic clutch: Not engaged	Below 1.0 V
A15-9 - A13-6 (TWI - GND)	P-B - W-B	Ignition switch: ON	Pulse generation (*6)
A15-17 - A13-6 *1 (S-OFF - GND)	L - W-B	Ignition switch: ON OFF switch: OFF → ON	5.0 → Below 1.0 V
A15-18 - A13-6 *1 (S-TEMPD+ - GND)	W - W-B	Ignition switch: ON Driver side TEMP switch: OFF → ON	5.0 → Below 1.0 V
A15-19 - A13-6 *1 (S-TEMPD- - GND)	B-O - W-B	Ignition switch: ON Driver side TEMP switch: OFF → ON	5.0 → Below 1.0 V
A15-20 - A13-6 *1 (S-R/F - GND)	G - W-B	Ignition switch: ON R/F switch: OFF → ON	5.0 → Below 1.0 V
A15-22 (MPX-)	B	Multiplex communication circuit	-
A15-23 - A13-6 *1 (S-TEMPPP+ - GND)	LG - W-B	Ignition switch: ON Passenger side TEMP switch: OFF → ON	5.0 → Below 1.0 V
A15-24 - A13-6 *1 (S-TEMPPP- - GND)	O - W-B	Ignition switch: ON Passenger side TEMP switch: OFF → ON	5.0 → Below 1.0 V
A15-25 - A13-6 *1 (S-FDEF - GND)	Y-B - W-B	Ignition switch: ON FRONT DEF switch: OFF → ON	5.0 → Below 1.0 V
A15-26 - A13-6 *1 (S-RDEF - GND)	GR - W-B	Ignition switch: ON REAR DEF switch: OFF → ON	5.0 → Below 1.0 V
A15-27 - A13-6 *2 (ILL- - GND)	W-G - W-B	Always	Below 1.0 Ω
A15-27 - A13-6 *1 (S-AUTO - GND)	R-B - W-B	Ignition switch: ON AUTO switch: OFF → ON	5.0 → Below 1.0 V

Terminal No. (Symbols)	Wiring Color	Condition	Specification
A15-30 (MPX+)	W-G	Multiplex communication circuit	-
A14-1 - A13-6 (AIF - GND)	P-G - W-B	Ignition switch: ON R/F switch: RECIRCULATION → FRESH	Below 1.0 → 10 to 14 V *3
A14-2 - A13-6 (AIR - GND)	GR - W-B	Ignition switch: ON R/F switch: FRESH → RECIRCULATION	Below 1.0 → 10 to 14 V *3
A14-3 - A13-6 (RRDEF - GND)	R - W-B	Rear defogger switch: ON → OFF	Below 1.0 → 10 to 14 V
A14-4 - A13-6 (FRHR - GND)	L - W-B	Ignition switch: ON Front blower: OFF → Operate	10 to 14 → Below 1.0 V
A14-5 - A13-6 (FACE - GND)	LG-R - W-B	Ignition switch: ON Mode switch: DEF → FACE	Below 1.0 → 10 to 14 V *3
A14-6 - A13-6 (DEF - GND)	LG - W-B	Ignition switch: ON Mode switch: FACE → DEF	Below 1.0 → 10 to 14 V *3
A14-8 - A13-6 (THE - GND)	Y-R - W-B	Start engine Blower speed: LO Magnetic clutch: Engaged	Below 1.0 V
		Start engine Blower speed: LO Magnetic clutch: Not engaged	10 to 14 V
A14-11 - A13-6 *1 (L-FDEF - GND)	G-R - W-B	Ignition switch: ON Light control switch: OFF FDEF switch: OFF → ON	10 to 14 → Below 1.0 V
A14-12 - A13-6 *1 (L-RDEF - GND)	L-R - W-B	Ignition switch: ON Light control switch: OFF RDEF switch: OFF → ON	10 to 14 → Below 1.0 V
A14-13 - A13-6 *1 (L-REC - GND)	V - W-B	Ignition switch: ON Light control switch: OFF REC switch: OFF → ON	10 to 14 → Below 1.0 V
A14-14 - A13-6 *1 (L-FRS - GND)	R - W-B	Ignition switch: ON Light control switch: OFF FRS switch: OFF → ON	10 to 14 → Below 1.0 V
A14-17 - A13-6 (RRMGV - GND)	V-Y - W-B	Ignition switch: ON Rear cool switch: OFF → ON	10 to 14 → Below 1.0 V
A14-18 - A13-6 *1 (L-AUTO - GND)	P - W-B	Ignition switch: ON Light control switch: OFF AUTO switch: OFF → ON	10 to 14 → Below 1.0 V
A14-19 - A13-6 (RRVM - GND)	B-R - W-B	Ignition switch: ON Rear cool blower: Operate	Below 1.0 → 10 to 14 V
A14-20 - A13-6 (RRBLW - GND)	B - W-B	Ignition switch: ON Rear cool blower: Operate	1.0 to 8.0 V
A14-21 - A13-6 (MGC - GND)	BR-Y - W-B	Engine running: Idle speed, A/C system: Operate Magnetic clutch: Not engaged	10 to 14 V
		Engine running: Idle speed, A/C system: Operate Magnetic clutch: Engaged	Below 1.0 V
A14-22 - Body ground (VER1 - Body ground)	W-B - Body ground	Always	Below 1.0 Ω
A14-24 - A13-6 (RRHR - GND)	G-B - W-B	Ignition switch: ON Front blower: OFF → ON	10 to 14 → Below 1.0 V
A13-1 - A13-6 (IG - GND)	GR-L - W-B	Ignition switch: LOCK → ON	Below 1.0 → 10 to 14 V
A13-2 - A13-6 (AMHP - GND)	L-R - W-B	Ignition switch: ON Set temp.: MAX. COOL → MAX. HOT	Below 1.0 → 10 to 14 V *3
A13-3 - A13-6 (AMCP - GND)	L-Y - W-B	Ignition switch: Set temp.: MAX. HOT → MAX. COOL	Below 1.0 → 10 to 14 V *3
A13-4 - A13-6 (AMHD - GND)	V-W - W-B	Ignition switch: Set temp.: MAX. COOL → MAX. HOT	Below 1.0 → 10 to 14 V *3

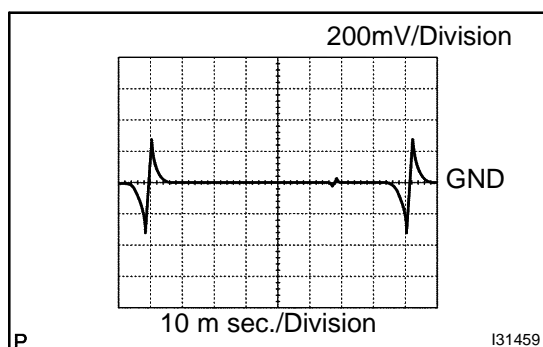
Terminal No. (Symbols)	Wiring Color	Condition	Specification
A13-5 - A13-6 (AMCD - GND)	V-R - W-B	Ignition switch: Set temp.: MAX. HOT → MAX. COOL	Below 1.0 → 10 to 14 V *3
A13-6 - Body ground (GND - Body ground)	W-B - Body ground	Always	Below 1.0 Ω
A13-7 - A13-6 (+B - GND)	W-R - W-B	Always	10 to 14 V
A13-9 - A13-17 (TPD - SG)	V-W - Y-G	Ignition switch: ON Set temp.: MAX. HOT → MAX. COOL	Below 1.0 → 4.0 V *3
A13-10 - A13-17 (TPP - SG)	L-W - Y-G	Ignition switch: ON Set temp.: MAX. HOT → MAX. COOL	Below 1.0 → 4.0 V *3
A13-11 - Body ground (TSD - Body ground)	B - Body ground	Ignition switch: ON Solar sensor subject to electric light	0.8 to 3.3 V
A13-12 - Body ground (TSP - Body ground)	R - Body ground	Ignition switch: ON Solar sensor subject to electric light	0.8 to 3.3 V
A13-13 - A13-17 (TR - SG)	V-Y - Y-G	Ignition switch: ON Cabin temp.: 25°C (77°F) → 40°C (104°F)	See page 05-1120
A13-14 - A13-17 (FRTE - SG)	G - Y-G	Evaporator temp.: 0°C (32°F) → 15°C (59°F)	See page
A13-17 - Body ground (SG - Body ground)	Y-G - Body ground	Always	Below 1.0 Ω
A13-18 - A13-6 *2 (ILL+ - GND)	G - W-B	Light control switch TAIL or HEAD	10 to 14 V
A13-21 - A13-17 (RRTE - SG)	L-O - Y-G	Rear evaporator temp.: 0°C (32°F) → 15°C (59°F)	See page
A13-22 - A13-17 (TPI - SG)	P-B - Y-G	Ignition switch: ON R/F switch FRESH → RECIRCULATION	Below 1.0 → 4.0 V
A13-23 - A13-17 (TPM - SG)	LG-R - Y-G	Ignition switch: ON Set air flow setting: DEF → FACE	Below 1.0 → 4.0 V
A13-26 - A13-17 (S5 - SG)	P - Y-G	Ignition switch: LOCK → ON	Below 1.0 → 5.0 V

*1: w/ LEXUS Navigation System

*2: w/o LEXUS Navigation System

*3: When the servomotor is in operation.

If the value is not within the standard range, some defect on the vehicle side is plausible. Inspect the fuse, wire harness and connector.

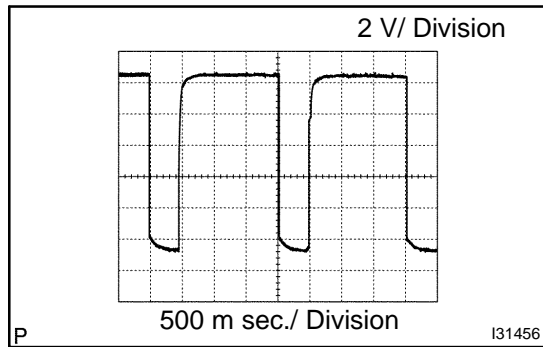


(*4): Oscilloscope waveform:

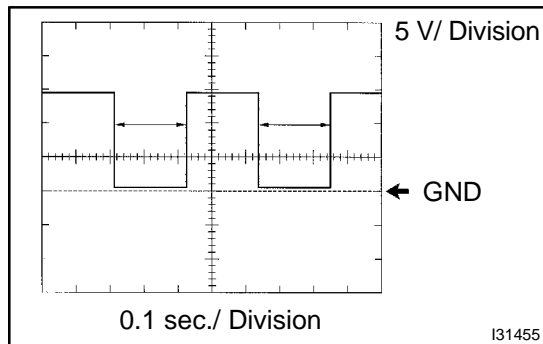
Terminal to be measured: THE of A/C amplifier

Setting for measurement: 200 mV/DIV 10 m sec./DIV

Condition: Ignition switch ON

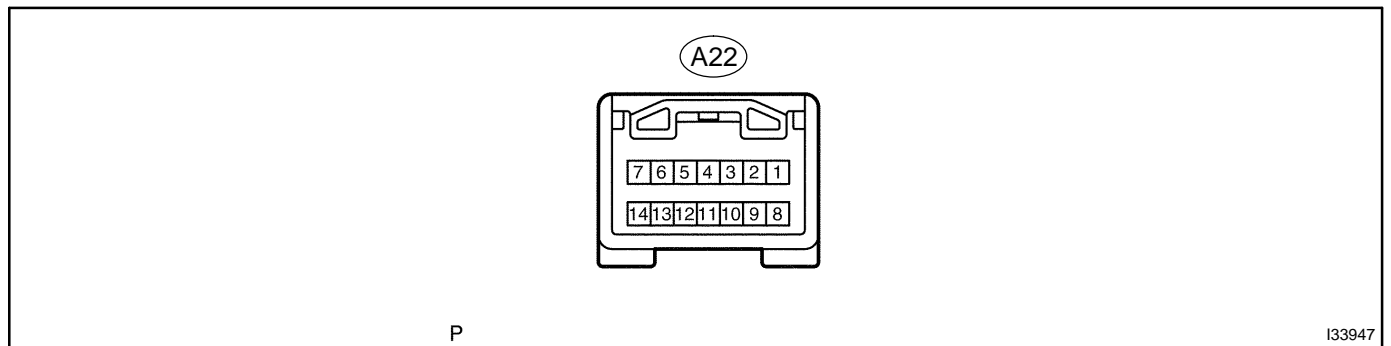


(*5): Oscilloscope waveform:
 Terminal to be measured: BLC of A/C amplifier assy
 Setting for measurement: 2 V/DIV 500 m sec./DIV
 Condition: Ignition switch ON



(*6): Oscilloscope waveform:
 Terminal to be measured: TWI of A/C amplifier assy
 Setting for measurement: 5 V/DIV 0.1 sec./DIV
 Condition: Ignition switch ON

2. ACCESSORY METER:

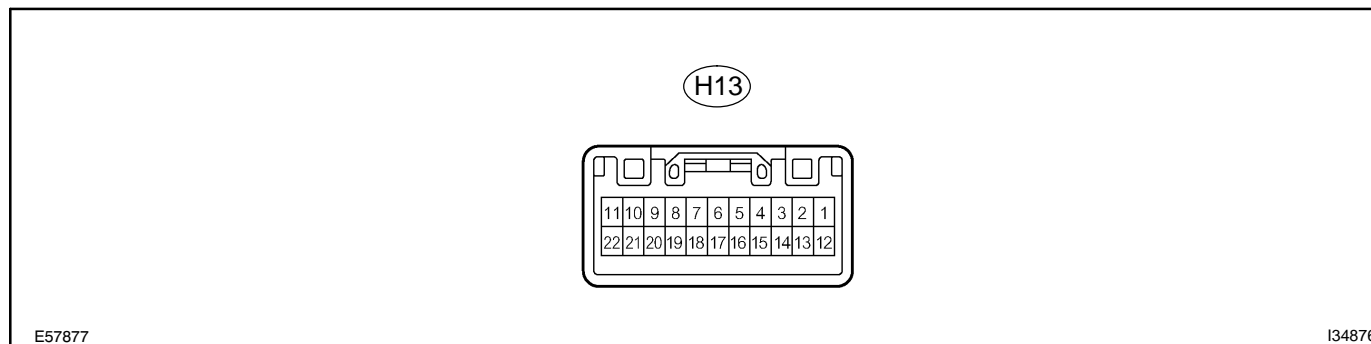


Terminal No. (Symbols)	Wiring Color	Condition	Specification
A22-1 - Body ground (GND - Body ground)	W-B - Body ground	Always	Below 1.0 Ω
A22-2 - Body ground (SG - Body ground)	Y-G - Body ground	Always	Below 1.0 Ω
A22-3 - A22-2 (TH+ - SG)	Y-R (*1), GR (*2) - Y-G	Ignition switch: ON Ambient temp.: 25°C (77°F) → 40°C (104°F)	See page
A22-9 - A22-1 (DATA - GND)	G-O (*1), GR (*2) - W-B	Ignition switch: ON	Pulse generation

*1: w/ LEXUS Navigation System

*2: w/o LEXUS Navigation System

3. HEATER CONTROL SWITCH (w/ LEXUS Navigation System):

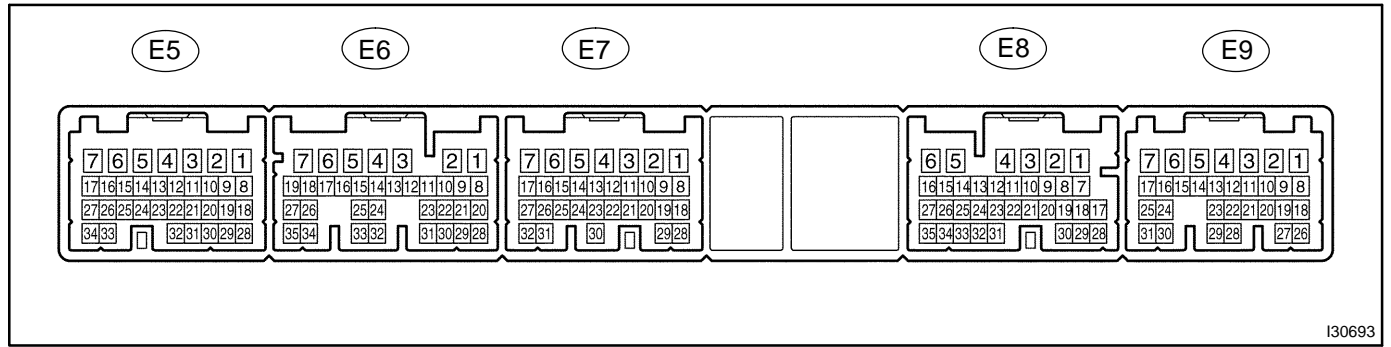


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Terminal No. (Symbols)	Wiring Color	Condition	Specification
H13-1 - H13-11 (IG - GND)	GR-L - W-B	Ignition switch: ON	10 to 14 V
H13-2 - H13-11 (S-TEMPD+ - GND)	W - W-B	Ignition switch: ON Driver side TEMP switch: OFF → ON	5.0 → Below 1.0 V
H13-3 - H13-11 (S-TEMPD- - GND)	B-O - W-B	Ignition switch: ON Driver side TEMP switch: OFF → ON	5.0 → Below 1.0 V
H13-4 - H13-11 (S-AUTO - GND)	R-B - W-B	Ignition switch: ON AUTO switch: OFF → ON	5.0 → Below 1.0 V
H13-5 - H13-11 (S-OFF - GND)	L - W-B	Ignition switch: ON OFF switch: OFF → ON	5.0 → Below 1.0 V
H13-6 - H13-11 (S-F/R - GND)	G - W-B	Ignition switch: ON R/F switch: OFF → ON	5.0 → Below 1.0 V
H13-7 - H13-11 (S-RDEF - GND)	GR - W-B	Ignition switch: ON Rear DEF switch: OFF → ON	5.0 → Below 1.0 V
H13-8 - H13-11 (S-FDEF - GND)	Y-B - W-B	Ignition switch: ON Front DEF switch: OFF → ON	5.0 → Below 1.0 V
H13-9 - H13-11 (S-TEMP+ - GND)	LG - W-B	Ignition switch: ON Passenger side TEMP switch: OFF → ON	5.0 → Below 1.0 V
H13-10 - H13-11 (S-TEMP- - GND)	O - W-B	Ignition switch: ON Passenger side TEMP switch: OFF → ON	5.0 → Below 1.0 V
H13-11 - Body ground (GND - Body ground)	W-B - Body ground	Always	Below 1.0 Ω
H13-12 - H13-11 (ILL+ - GND)	G - W-B	Light control switch TAIL or HEAD	10 to 14 V
H13-13 - H13-11 (A CAN - GND)	G-R - W-B	Ignition switch: ON Light control switch: OFF Automatic light control sensor: Covered → Not covered	Below 3.0 → 10 to 14 V
H13-14 - H13-11 (L-AUTO - GND)	P - W-B	Ignition switch: ON AUTO switch: OFF → ON	5.0 → Below 1.0 V
H13-15 - H13-11 (L-FRS - GND)	R - W-B	Ignition switch: ON Light control switch: OFF FRS switch: OFF → ON	10 to 14 → Below 1.0 V
H13-17 - H13-11 (L-REC - GND)	V - W-B	Ignition switch: ON Light control switch: OFF REC switch: OFF → ON	10 to 14 → Below 1.0 V
H13-18 - H13-11 (L-RDEF - GND)	L-R - W-B	Ignition switch: ON Light control switch: OFF Rear DEF switch: OFF → ON	10 to 14 → Below 1.0 V
H13-19 - H13-11 (L-FDEF - GND)	G-R - W-B	Ignition switch: ON Light control switch: OFF Front DEF switch: OFF → ON	10 to 14 → Below 1.0 V
H13-22 - H13-11 (ILL- - GND)	W-G - W-B	Always	Below 1.0 Ω

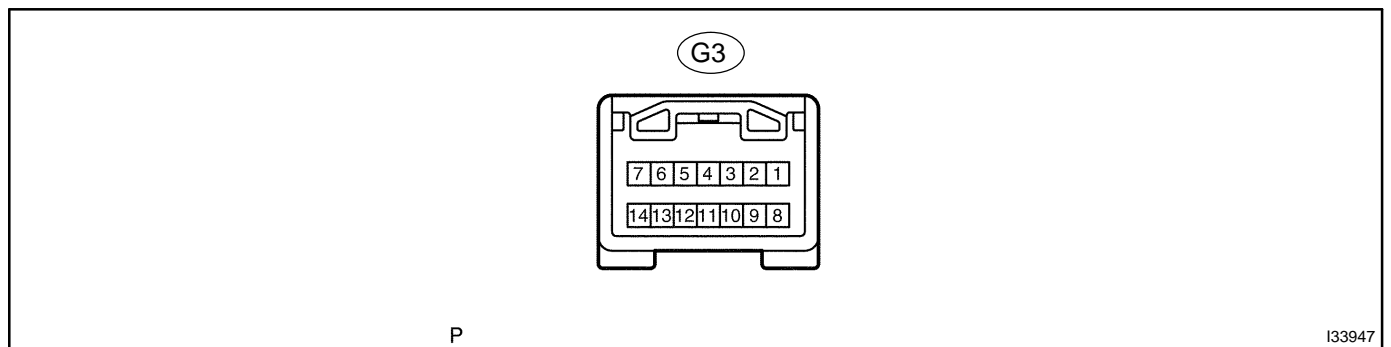
4. ECM:



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Terminal No. (Symbols)	Wiring Color	Condition	Specification
E5-21 - E7-1 (THW - E1)	R-L - BR	Start engine Engine coolant temp. 80°C (176°C)	0.2 to 1.0 V
E8-14 - E8-1 (THWO - HP)	P-B - B-W	Ignition switch: ON	Pulse generation
E7-1 - Body ground (E1 - Body ground)	BR - Body ground	Always	Below 1.0 Ω
E8-24 - E7-1 (AC1 - E1)	Y-R - BR	Start engine Blower speed: LO Magnetic clutch: Engaged	Below 1.0 V
		Start engine Blower speed: LO Magnetic clutch: Not engaged	10 to 14 V
E8-25 - E7-1 (ACT - E1)	Y-G - BR	Start engine Blower speed: LO Magnetic clutch: Engaged	10 to 14 V
		Start engine Blower speed: LO Magnetic clutch: Not engaged	Below 1.0 V

5. NETWORK GATEWAY ECU:

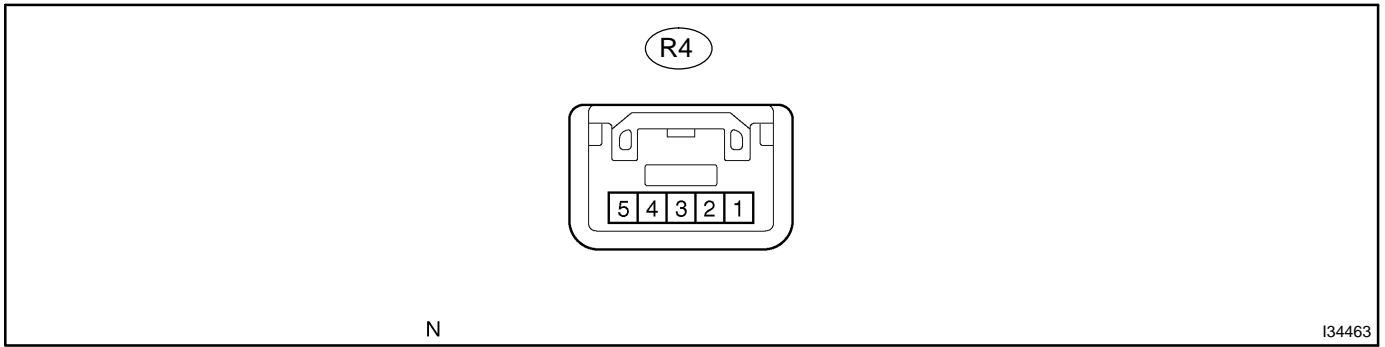


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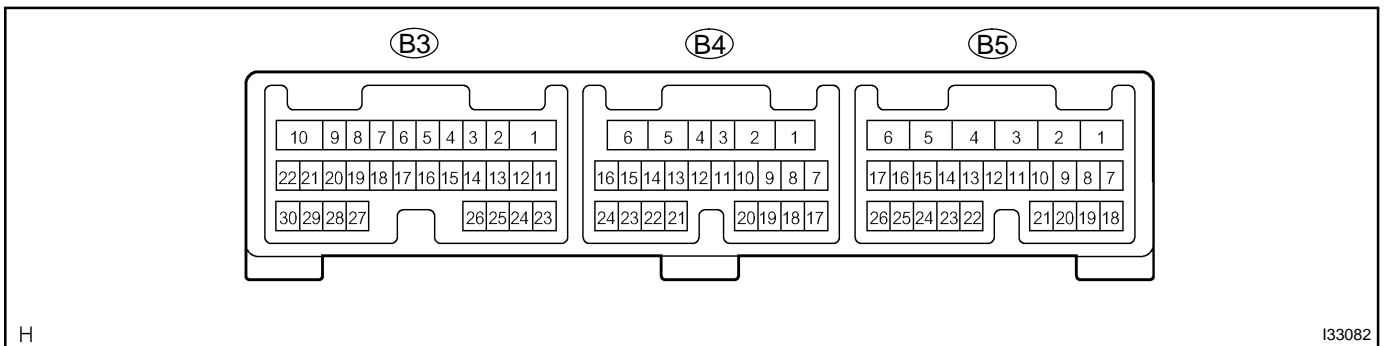
Terminal No. (Symbols)	Wiring Color	Condition	Specification
G3-4 (MPD1)	W-G	Multiplex communication circuit	-
G3-11 (MPD2)	B	Multiplex communication circuit	-
G3-14 - Body ground (GND - Body ground)	W-B - Body ground	Always	Below 1.0 Ω

6. COOLER CONTROL PANEL:



Terminal No. (Symbols)	Wiring Color	Condition	Specification
R4-1 - R4-5 (IG+ - GND)	GR-L - W-B	Ignition switch: ON	10 to 14 V
R4-2 - R4-5 (ILL+ - GND)	G - W-B	Ignition switch: ON Light control switch: TAIL or HEAD	10 to 14 V
R4-4 (MPX-)	B	Multiplex communication circuit	-
R4-5 - Body ground (GND - Body ground)	W-B - Body ground	Always	Below 1.0 Ω

7. BODY ECU:



Terminal No. (Symbols)	Wiring Color	Condition	Specification
B5-6 - B5-21 (CLTB - CLTE)	G-Y - Y-G	Ignition switch: ON Light control switch: AUTO	10 to 14 V

PROBLEM SYMPTOMS TABLE

Front A/C

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	1. IG power source circuit 2. Heater control panel communication circuit 3. Heater relay circuit 4. A/C amplifier assy	05-1172 05-1197 05-1176 05-1111
Air Flow Control : No blower operation	1. Blower motor circuit 2. A/C amplifier assy	05-1182 05-1111
Air Flow Control : No blower control	1. Blower motor circuit	05-1182
Air Flow Control : Insufficient air out	1. Blower motor circuit 2. A/C amplifier assy	05-1182 05-1111
Temperature Control : Cool air does not come out	1. Volume of refrigerant 2. Drive belt tension 3. Refrigerant pressure 4. Compressor lock sensor circuit 5. Compressor circuit 6. Pressure switch circuit 7. Air mix control servomotor circuit Driver side Passenger side 8. Air mix damper position sensor circuit Driver side Passenger side 9. Room temp. sensor circuit 10. Ambient temp. sensor circuit 11. Vehicle speed signal circuit 12. A/C amplifier assy	55-2 14-5 55-2 05-1139 05-1178 05-1142 05-1169 05-1160 05-1157 05-1148 05-1120 05-1123 05-1186 05-1111
Temperature Control : Warm air does not come out	1. Air mix control servomotor circuit Driver side Passenger side 2. Air mix damper position sensor circuit Driver side Passenger side 3. Ambient temp. sensor circuit 4. Vehicle speed signal circuit 5. Room temp. sensor circuit 6. Evaporator temp. sensor circuit 7. A/C amplifier assy 8. Heater radiator	05-1169 05-1160 05-1157 05-1148 05-1123 05-1186 05-1120 05-1127 01-36 -
Temperature Control : Output air is warmer or cooler than the set temperature or response is slow.	1. Room temp. sensor circuit 2. Ambient temp. sensor circuit 3. Vehicle speed signal circuit 4. Solar sensor circuit Driver side Passenger side 5. Air mix damper position sensor circuit Driver side Passenger side 6. Air mix control servomotor circuit Driver side Passenger side 7. Water temp. sensor circuit 8. A/C amplifier assy	05-1120 05-1123 05-1186 05-1145 05-1136 05-1169 05-1160 05-1157 05-1148 05-1130 01-36
Temperature Control : No temperature control (only Max. cool or Max. warm)	1. Air mix control servomotor circuit Driver side Passenger side 2. Air mix damper position sensor circuit Driver side Passenger side 3. A/C amplifier assy	05-1169 05-1160 05-1157 05-1148 01-36
No air inlet control	1. Air inlet damper control servomotor circuit 2. Air inlet damper position circuit 3. A/C amplifier assy	05-1163 05-1151 01-36

DIAGNOSTICS - AIR CONDITIONING SYSTEM

No air outlet control	1. Air outlet damper position sensor circuit 2. Air outlet control servomotor circuit 3. A/C amplifier assy	05-1154 05-1166 01-36
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C amplifier assy	05-1178 01-36
Set temperature value displayed does not much up with operation of temperature control switch.	1. A/C amplifier assy	01-36
Brightness does not change when rheostat volume or light control switch it turned.	1. A/C amplifier assy	01-36
Unable to access the diagnosis mode.	1. Heater control panel communication circuit 2. A/C amplifier assy	05-1197 01-36
DTC is not recorded. Set mode is cleared when IG switch is turned off.	1. Back-up power source circuit 2. A/C amplifier assy	05-1174 01-36

Rear cooler

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	1. Rear cooler control panel circuit 2. Rear cooler relay circuit 3. A/C amplifier assy	05-1190 05-1188 01-36
Air Flow Control : No blower operation	1. Rear blower motor circuit 2. A/C amplifier assy	05-1194 01-36
Air Flow Control : No blower control	1. Rear blower motor circuit 2. A/C amplifier assy	05-1194 01-36
Air Flow Control : Insufficient air out	1. Rear blower motor circuit 2. A/C amplifier assy	05-1194 01-36
Temperature Control : Cool air does not come out	1. Volume of refrigerant 2. Drive belt tension 3. Refrigerant pressure 4. Compressor lock sensor circuit 5. Compressor circuit 6. Rear magnetic valve circuit 7. Pressure switch circuit 8. Ambient temp. sensor circuit 9. Vehicle speed signal circuit 10. Rear evaporator temperature sensor circuit 11. A/C amplifier assy	55-2 14-5 55-2 05-1139 05-1178 05-1192 05-1142 05-1123 05-1186 05-1133 01-36

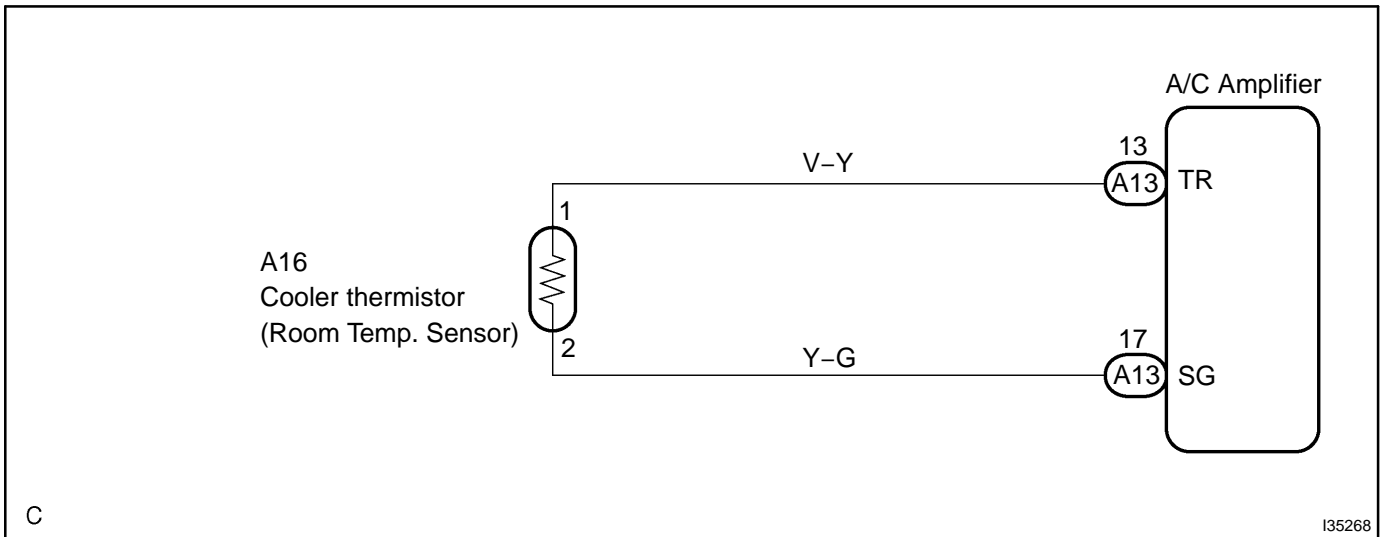
DTC	11	ROOM TEMPERATURE SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection item	Trouble Area
11	Open or short in room temperature sensor circuit	<ul style="list-style-type: none"> • Cooler thermistor (room temp. sensor) • Harness or connector between cooler thermistor (room temp. sensor) and A/C amplifier • A/C amplifier

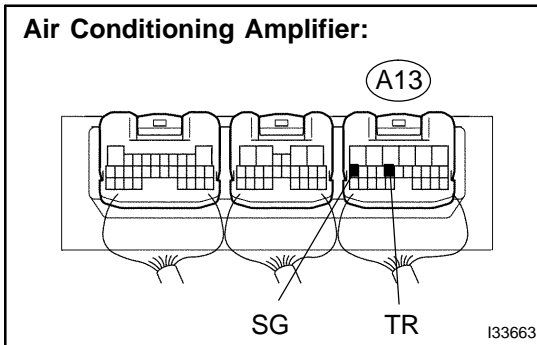
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(TR, SG)

Air Conditioning Amplifier:



- (a) Remove A/C amplifier with the connectors being connected.
- (b) Turn ignition switch to ON.
- (c) Measure voltage between terminal TR and SG of A/C amplifier connector at each temperature.

Voltage:

at 25°C (77°F): 1.8 to 2.2 V

at 40°C (104°F): 1.2 to 1.6 V

HINT:

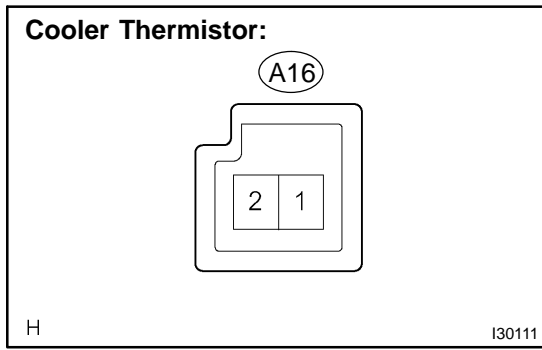
As the temperature increases, the voltage decreases.

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)**

NG

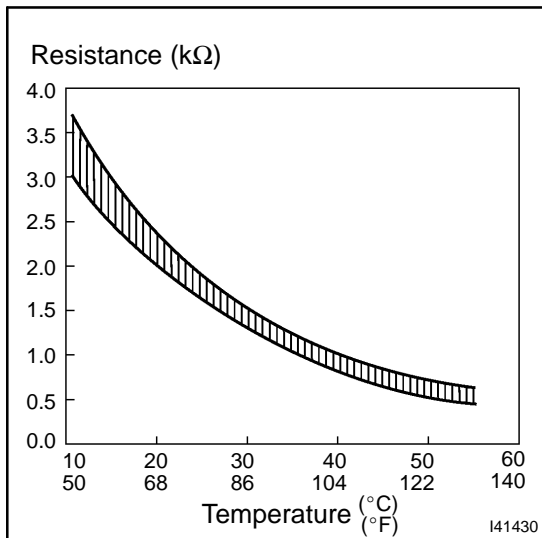
2 INSPECT COOLER THERMISTOR(ROOM TEMP. SENSOR)



- (a) Remove the cooler thermistor (room temp. sensor).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A16-1 - A16-2	10°C (50°F)	3.00 to 3.73 kΩ
A16-1 - A16-2	15°C (59°F)	2.45 to 2.88 kΩ
A16-1 - A16-2	20°C (68°F)	1.95 to 2.30 kΩ
A16-1 - A16-2	25°C (77°F)	1.60 to 1.80 kΩ
A16-1 - A16-2	30°C (86°F)	1.28 to 1.47 kΩ
A16-1 - A16-2	35°C (95°F)	1.00 to 1.22 kΩ
A16-1 - A16-2	40°C (104°F)	0.80 to 1.00 kΩ
A16-1 - A16-2	45°C (113°F)	0.65 to 0.85 kΩ
A16-1 - A16-2	50°C (122°F)	0.50 to 0.70 kΩ
A16-1 - A16-2	55°C (131°F)	0.44 to 0.60 kΩ
A16-1 - A16-2	60°C (140°F)	0.36 to 0.50 kΩ



NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring the sensor temperature, it must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph on the left).

NG → REPLACE COOLER THERMISTOR (ROOM TEMP. SENSOR)

OK

3 CHECK HARNESS AND CONNECTOR(COOLER THERMISTOR (ROOM TEMP. SENSOR) - A/C AMPLIFIER) (See page 01-36)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 READ OUTPUT DTC

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK → SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)

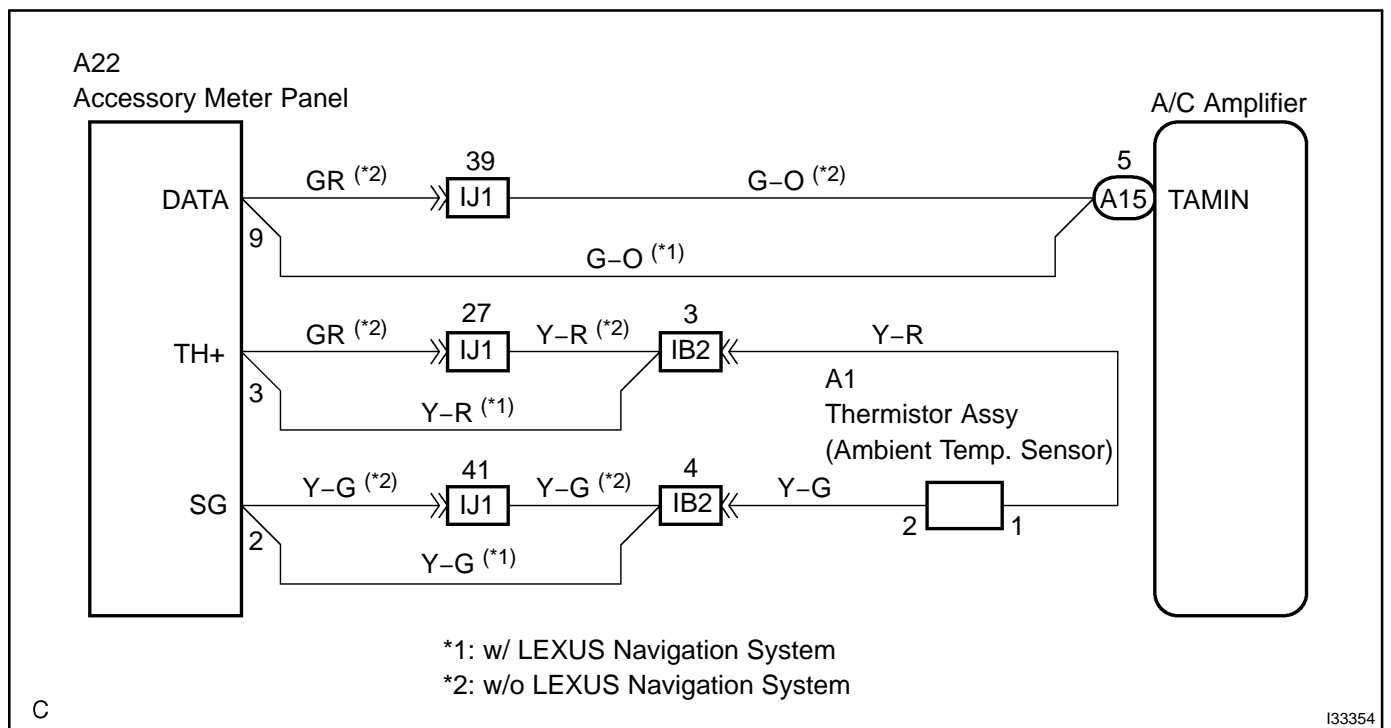
DTC	12	AMBIENT TEMPERATURE SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

This sensor detects the temperature outside the cabin and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection item	Trouble Area
12	Open or short in ambient temperature sensor circuit	<ul style="list-style-type: none"> • Thermistor assy (ambient temp. sensor) • Harness or connector between thermistor assy (ambient temp. sensor) and multi information display panel • Accessory meter panel • Harness or connector between accessory meter panel and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK ACCESSORY METER PANEL

(a) Check that the accessory meter panel display is correct.

Standard: Display is correct

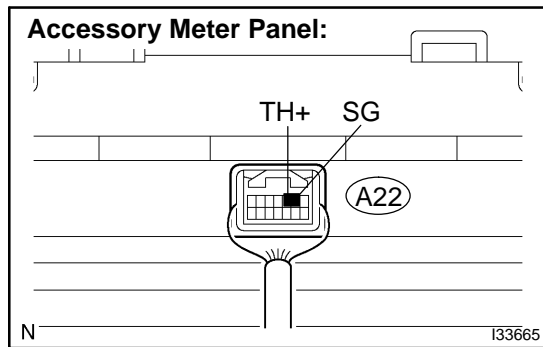
Result:

A	Display is not correct
B	Display is correct

B Go to step 5

A

2 INSPECT ACCESSORY METER PANEL(TH+, SG)



- (a) Remove accessory meter panel with the connector being connected.
- (b) Turn ignition switch to ON.
- (c) Measure voltage between terminal TH+ and SG of accessory meter panel connector at each temperature.

Voltage:

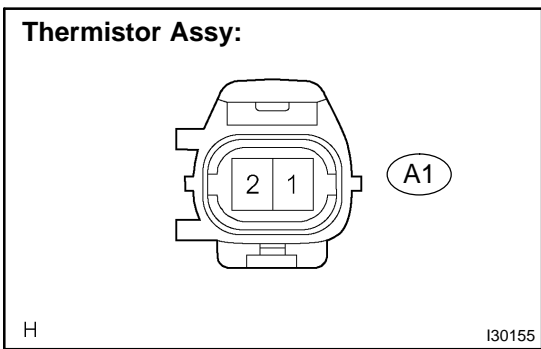
AT 25 °C (77 °F): 1.35 to 1.75 V

AT 40 °C (104 °F): 0.85 to 1.25 V

OK Go to step 5

NG

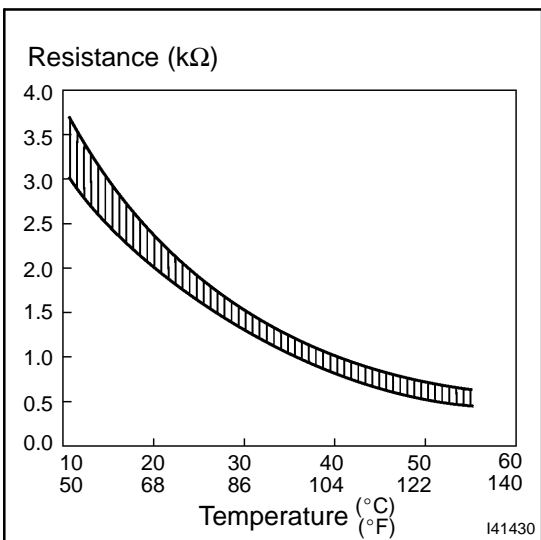
3 INSPECT THERMISTOR ASSY(AMBIENT TEMP. SENSOR)



- (a) Remove the thermistor assy (ambient temp. sensor).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A1-1 - A1-2	10°C (50°F)	3.00 to 3.73 kΩ
A1-1 - A1-2	15°C (59°F)	2.45 to 2.88 kΩ
A1-1 - A1-2	20°C (68°F)	1.95 to 2.30 kΩ
A1-1 - A1-2	25°C (77°F)	1.60 to 1.80 kΩ
A1-1 - A1-2	30°C (86°F)	1.28 to 1.47 kΩ
A1-1 - A1-2	35°C (95°F)	1.00 to 1.22 kΩ
A1-1 - A1-2	40°C (104°F)	0.80 to 1.00 kΩ
A1-1 - A1-2	45°C (113°F)	0.65 to 0.85 kΩ
A1-1 - A1-2	50°C (122°F)	0.50 to 0.70 kΩ
A1-1 - A1-2	55°C (131°F)	0.44 to 0.60 kΩ
A1-1 - A1-2	60°C (140°F)	0.36 to 0.50 kΩ



NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring the sensor temperature, it must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph on the left).

NG → **REPLACE THERMISTOR ASSY**

OK

4 CHECK HARNESS AND CONNECTOR(Accessory Meter Panel - Thermistor Assy (Ambient Temp. Sensor)) (See page 01-36)

NG

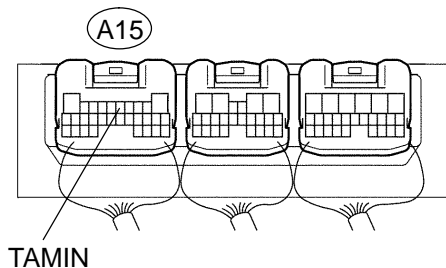
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ACCESSORY METER PANEL

5 INSPECT AIR CONDITIONING AMPLIFIER(TAMIN)

Air Conditioning Amplifier:



- (a) Remove A/C amplifier with the connectors being connected.
- (b) Turn the ignition switch to ON.
- (c) Measure the waveform between terminal TAMIN of the A/C amplifier connector and body ground.

OK:

Pulse generation

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

6 CHECK HARNESS AND CONNECTOR(Accessory Meter Panel - A/C Amplifier) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ACCESSORY METER PANEL (See page 01-36)

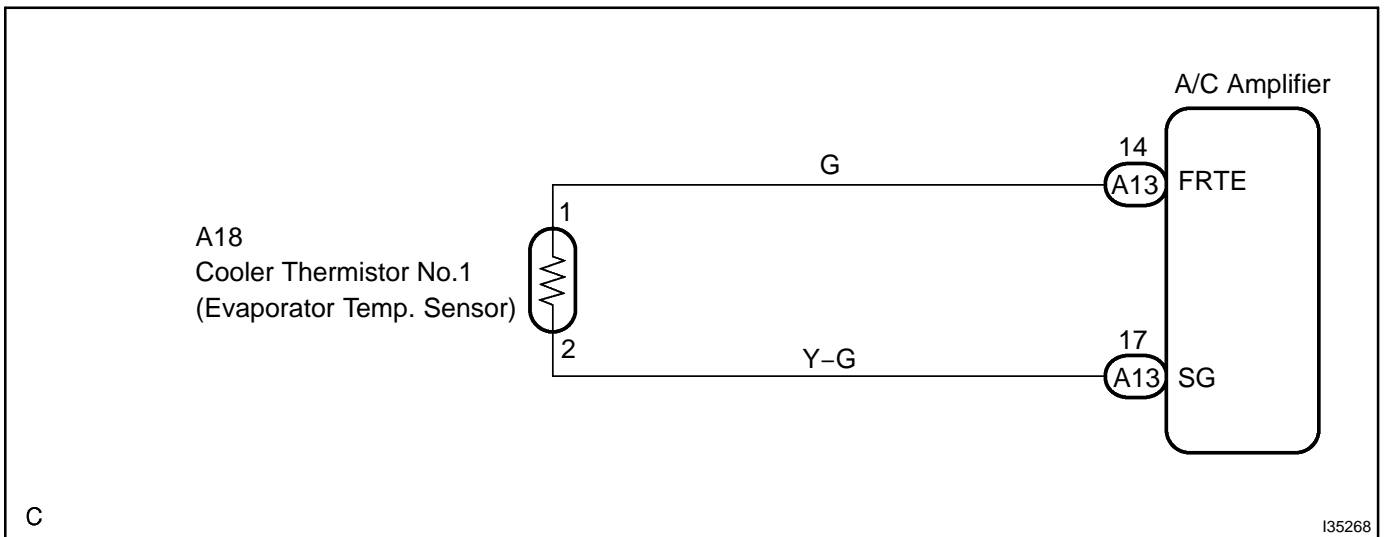
DTC	13	EVAPORATOR TEMPERATURE SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the A/C amplifier.

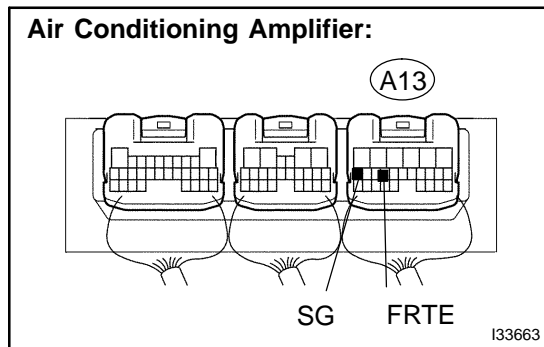
DTC No.	Detection Item	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	<ul style="list-style-type: none"> • Cooler thermistor No.1 (evaporator temp. sensor) • Harness or connector between cooler thermistor No.1 (evaporator temp. sensor) and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(FRTE, SG)



- (a) Remove A/C amplifier with being connected.
- (b) Turn ignition switch to ON.
- (c) Measure voltage between terminal FRTE and SG of A/C amplifier connector at each temperature.

Voltage:

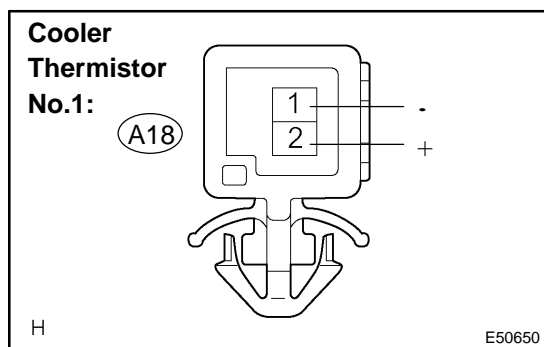
at 0°C (32°F): 2.0 to 2.4 V

at 15°C (59°F): 1.4 to 1.8 V

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

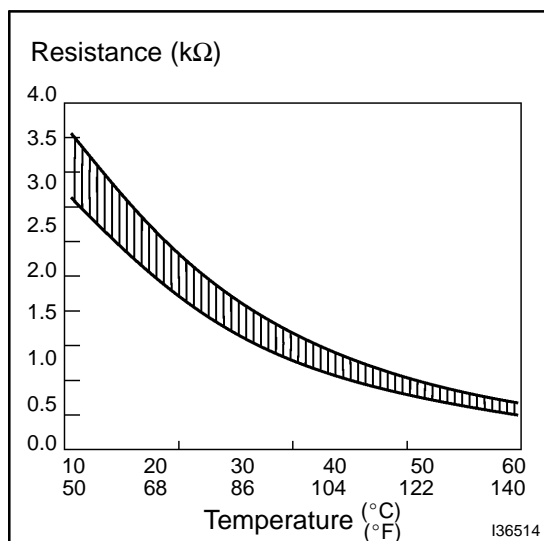
2 INSPECT COOLER THERMISTOR NO.1(EVAPORATOR TEMP. SENSOR)



- (a) Remove the cooler thermistor No.1 (evaporator temp. sensor).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A18-1 - A18-2	-10°C (14°F)	8.80 to 9.65 kΩ
A18-1 - A18-2	-5°C (23°F)	6.80 to 7.55 kΩ
A18-1 - A18-2	0°C (32°F)	5.28 to 5.86 kΩ
A18-1 - A18-2	5°C (41°F)	4.11 to 4.56 kΩ
A18-1 - A18-2	10°C (50°F)	3.22 to 3.56 kΩ
A18-1 - A18-2	15°C (59°F)	2.56 to 2.82 kΩ
A18-1 - A18-2	20°C (68°F)	2.04 to 2.24 kΩ
A18-1 - A18-2	25°C (77°F)	1.64 to 1.80 kΩ
A18-1 - A18-2	30°C (86°F)	1.32 to 1.46 kΩ



NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring the sensor temperature, it must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph on the left).

NG → REPLACE COOLER THERMISTOR NO.1

OK

3	CHECK HARNESS AND CONNECTOR(COOLER THERMISTOR NO. 1 (EVAPORATOR TEMP. SENSOR) - A/C AMPLIFIER) (See page 01-36)
----------	--

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
 (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

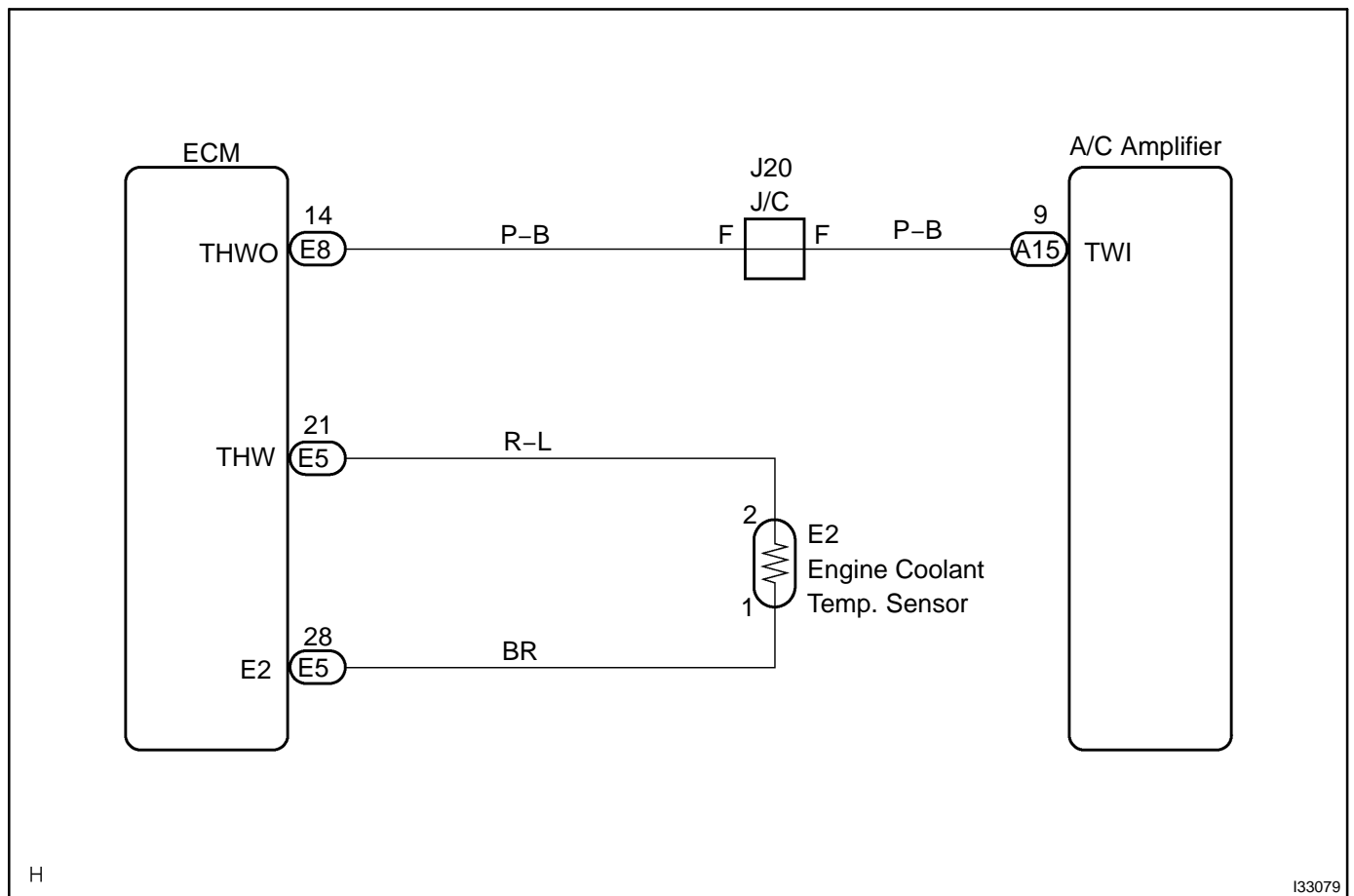
DTC	14	ENGINE COOLANT TEMPERATURE COMMUNICATION CIRCUIT
------------	-----------	---

CIRCUIT DESCRIPTION

This sensor detects the temperature and sends the appropriate signals to the A/C amplifier. These signals are used for warm up control when engine is cold.

DTC No.	Detection Item	Trouble Area
14	Open or short in water temperature circuit.	<ul style="list-style-type: none"> • Thermistor (engine coolant temp. sensor) • Harness or connector between thermistor (engine coolant temp. sensor) and ECM • ECM • Harness or connector between ECM and A/C amplifier • A/C amplifier

WIRING DIAGRAM



H

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INSPECTION PROCEDURE

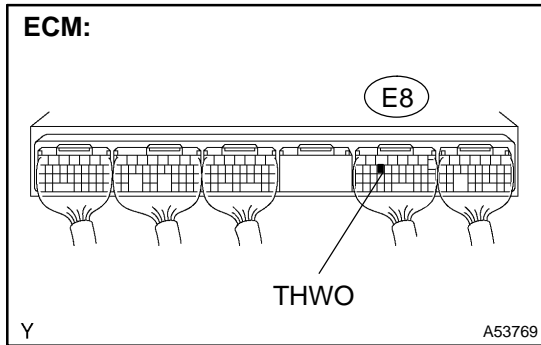
1 | DIAGNOSTIC TROUBLE CODE CHECK

(a) Check that the DTC P0115, P0117 and P0118 does not output.

NG → **GO TO ENGINE CONTROL SYSTEM**

OK

2 | INSPECT ECM(THWO)



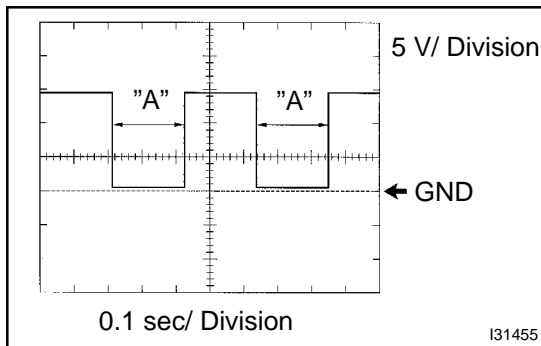
- (a) Remove ECM with the connectors being connected.
- (b) Turn the ignition switch to ON.
- (c) Check the signal waveform between terminal THWO of the ECM connector and body ground.

Standard:

The correct signal waveform appears, as shown in the illustration.

HINT:

The waveform "A" becomes longer as the engine coolant temperature becomes higher.



Engine Coolant temp.	Below 30 °C (86 °F)	Approx. 75 °C (167 °F)	90 °C – 100 °C (194 – 212 °F)
A	16 ms	102 ms	262 ms

NG → **CHECK AND REPLACE ECM**

OK

3 | CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - ECM) (See page 01-36)

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 | **DIAGNOSTIC TROUBLE CODE CHECK**

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK**SYSTEM OK****NG****CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page [05-1111](#))**

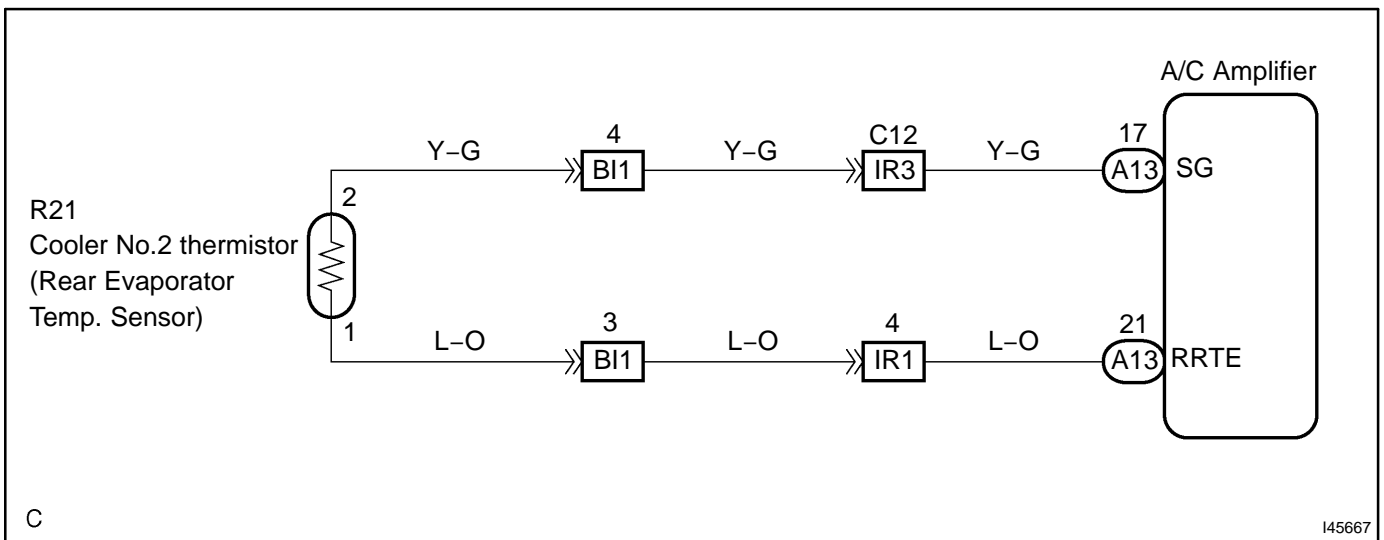
DTC	17	REAR EVAPORATOR TEMPERATURE SENSOR CIRCUIT
------------	-----------	---

CIRCUIT DESCRIPTION

This sensor detects the rear evaporator temperature and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
17	Open or short in rear evaporator temperature sensor circuit.	<ul style="list-style-type: none"> • Cooler No.2 thermistor (rear evaporator temp. sensor) • Harness or connector between cooler No.2 thermistor (rear evaporator temp. sensor) and A/C amplifier • A/C amplifier

WIRING DIAGRAM

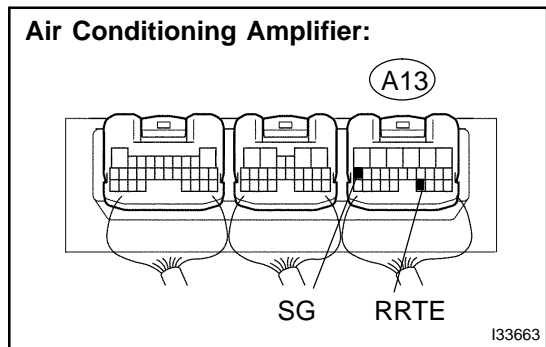


C

I45667

INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(RRTE, SG)



- Remove A/C amplifier with the connectors being connected.
- Turn ignition switch to ON.
- Measure voltage between terminal RRTE and SG of A/C amplifier connector at each temperature.

Voltage:

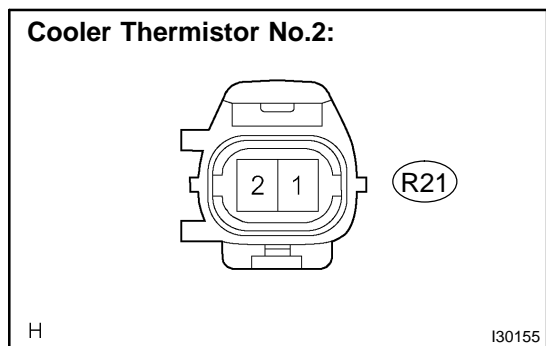
At 0°C (32°F): 2.0 to 2.4 V

At 15°C (59°F): 1.4 to 1.8 V

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

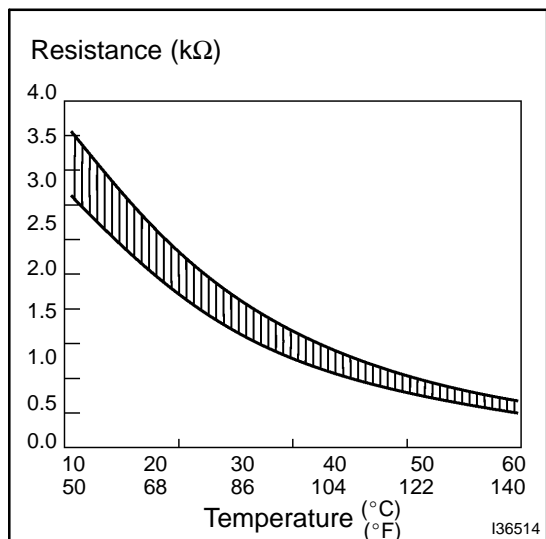
2 INSPECT COOLER NO.2 THERMISTOR(REAR EVAPORATOR TEMP. SENSOR)



- Remove the cooler thermistor No.2 (rear evaporator temp. sensor).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
R21-1 - R21-2	-10°C (14°F)	8.80 to 9.65 kΩ
R21-1 - R21-2	-5°C (23°F)	6.80 to 7.55 kΩ
R21-1 - R21-2	0°C (32°F)	5.28 to 5.86 kΩ
R21-1 - R21-2	5°C (41°F)	4.11 to 4.56 kΩ
R21-1 - R21-2	10°C (50°F)	3.22 to 3.56 kΩ
R21-1 - R21-2	15°C (59°F)	2.56 to 2.82 kΩ
R21-1 - R21-2	20°C (68°F)	2.04 to 2.24 kΩ
R21-1 - R21-2	25°C (77°F)	1.64 to 1.80 kΩ
R21-1 - R21-2	30°C (86°F)	1.32 to 1.46 kΩ



NOTICE:

- Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.
- When measuring the sensor temperature, it must be the same as the ambient temperature.

HINT:

As the temperature increases, the resistance decreases (see the graph on the left).

NG → REPLACE COOLER NO.2 THERMISTOR

OK

3	CHECK HARNESS AND CONNECTOR(COOLER NO. 2 THERMISTOR (REAR EVAPORATOR TEMP. SENSOR) - A/C AMPLIFIER) (See page01-36)
----------	--

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
 (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

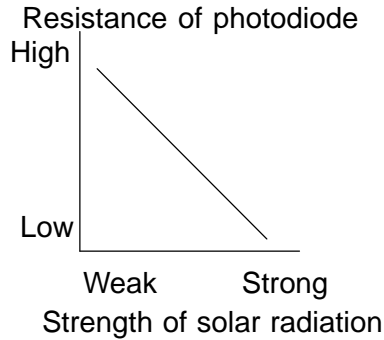
SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

DTC	21	SOLAR SENSOR CIRCUIT(PASSENGER SIDE)
------------	-----------	---

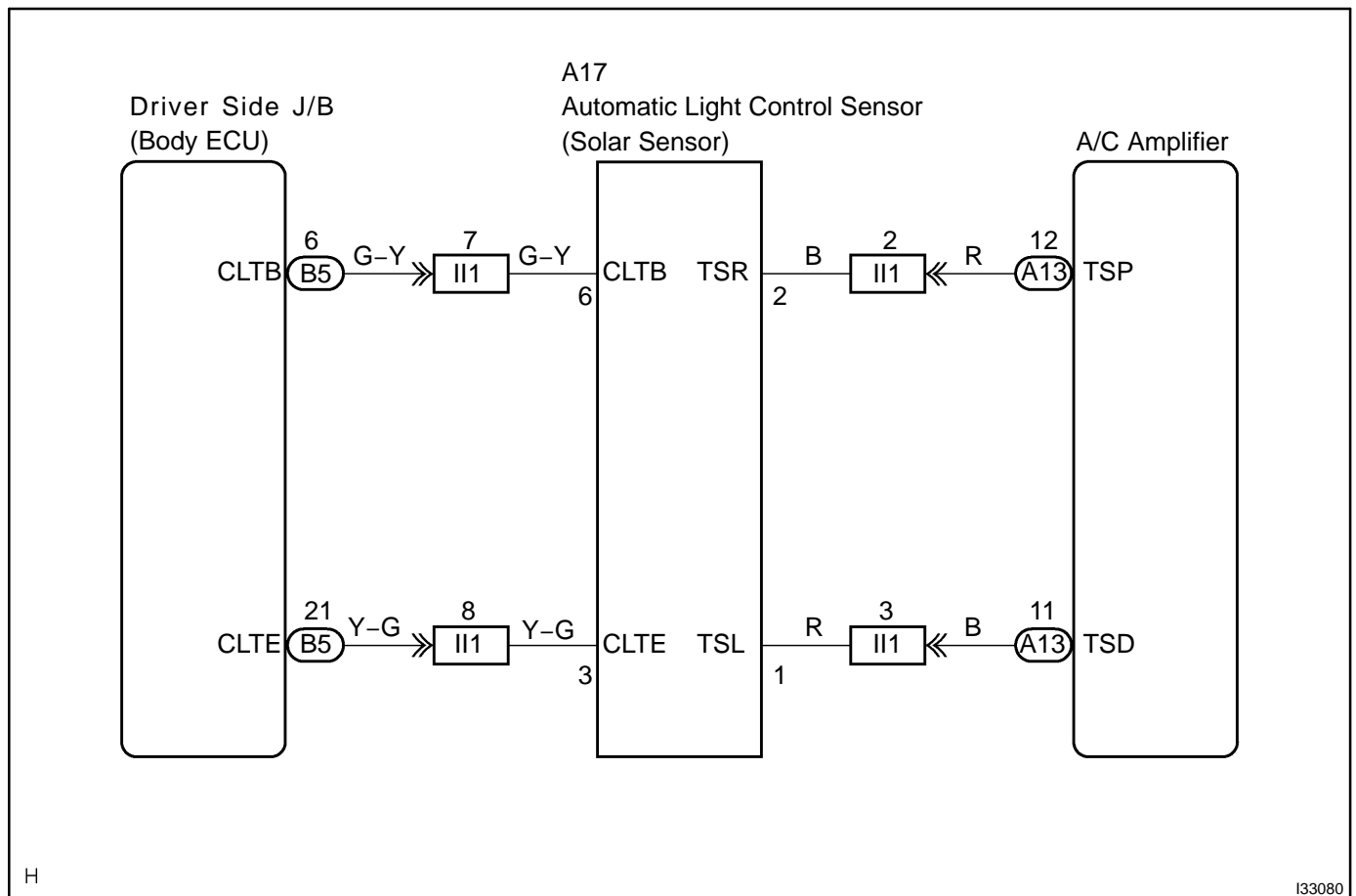
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
21	Open or short in solar sensor circuit. (Please note that display of DTC 21 is not abnormal when the sensor is not receiving solar radiation.)	<ul style="list-style-type: none"> • Automatic light control sensor (Solar sensor) • Harness or connector between automatic light control sensor (solar sensor) and A/C amplifier • A/C amplifier • Harness or connector between automatic light control sensor(solar sensor) and body ECU • Body ECU

WIRING DIAGRAM

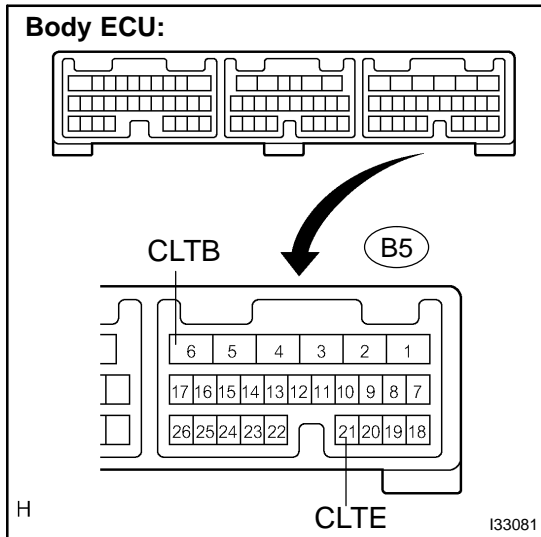


H

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INSPECTION PROCEDURE

1 INSPECT BODY ECU

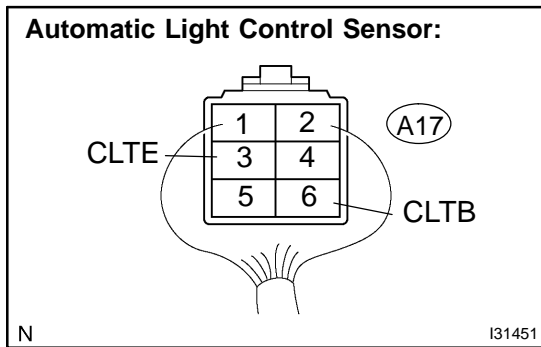


- (a) Remove driver side junction block with the connectors being connected.
- (b) Turn the light control switch AUTO.
- (c) Measure voltage between terminals CLTB and CLTE of driver side junction block.
Voltage: 10 to 14V

NG → REPLACE BODY ECU

OK

2 CHECK HARNESS AND CONNECTOR(BODY ECU - SOLAR SENSOR)



- (a) Remove solar sensor with connector being connected.
- (b) Turn the ignition switch to ON.
- (c) Vehicle's surroundings are bright.

HINT:

Connect the wire harness side connector to the solar sensor and inspect wire harness side connector from the back side, as shown.

Standard:

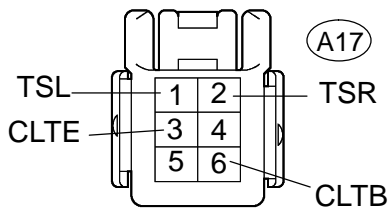
Tester connection	Condition	Specified condition
CLTB - Body ground	Ignition switch ON	10 to 14V
CLTE - Body ground	Always	Continuity

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT AUTOMATIC LIGHT CONTROL SENSOR(SOLAR SENSOR)

Automatic Light Control Sensor:



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I31450

- (a) Remove solar sensor.
- (b) Cover sensor with a cloth.
- (c) Measure resistance between terminals 1 and 2 of solar sensor connector.

Resistance: $\infty \Omega$ (No continuity)

HINT:

Connect the positive (+) lead to ohmmeter to terminal 1 and negative (-) lead to terminal 2 of the solar sensor.

- (d) Remove the cloth from the solar sensor and subject the sensor to electric light.
- (e) Measure resistance between terminals 1 and 2 of solar sensor.

Resistance: Approx. 10 k Ω (Continuity)

HINT:

Connect the positive (+) lead to ohmmeter to terminal 1 and negative (-) lead to terminal 2 of the solar sensor.

NG

REPLACE AUTOMATIC LIGHT CONTROL SENSOR

OK

4 CHECK HARNESS AND CONNECTOR(SOLAR SENSOR - A/C AMPLIFIER) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)

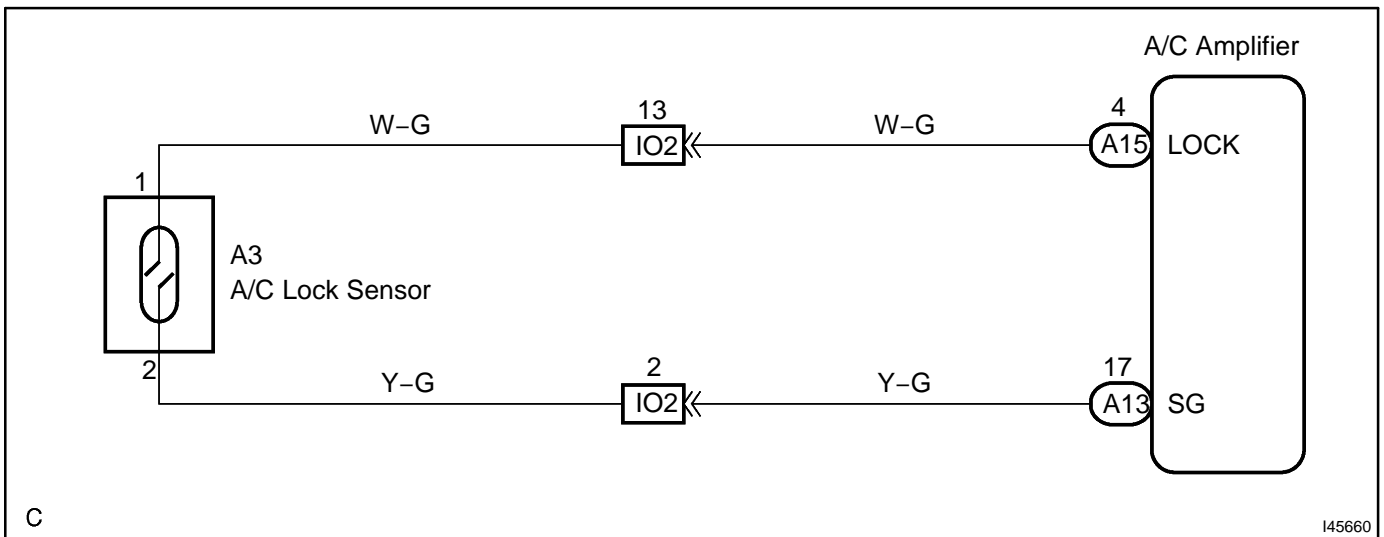
DTC	22	COMPRESSOR LOCK SENSOR CIRCUIT
------------	-----------	---------------------------------------

CIRCUIT DESCRIPTION

This sensor sends 4 pulses per engine revolution to the A/C amplifier. If the ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the A/C amplifier turns the compressor off, and the indicator flashes at about 1 sec. intervals.

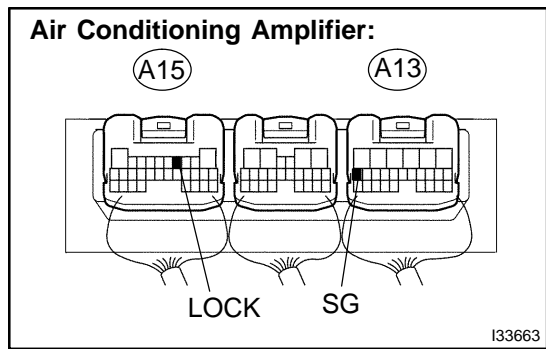
DTC No.	Detection Item	Trouble Area
22	All conditions below are detected for 3 sec. or more. (a) Engine speed : 450 rpm or more. (b) Ratio between engine and compressor speed deviates 20 % or more in comparison to normal operation.	<ul style="list-style-type: none"> • Compressor drive belt • Compressor lock sensor • Cooler compressor assy • Harness or connector between compressor lock sensor and A/C amplifier assy • A/C amplifier assy

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(LOCK)



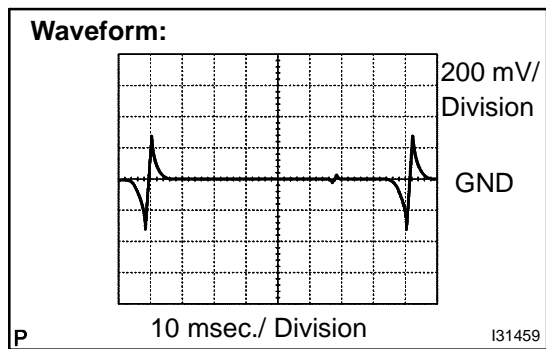
- (a) Remove A/C amplifier assy with connectors still connected.
- (b) Turn the ignition switch to the ON position.
- (c) Measure voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A15-4 (LOCK) - A13-17 (SG)	Ignition switch ON Magnet clutch ON	Pulse generation (see waveform)

Result:

A	NG
B	OK (Checking from DTC)
C	OK (When checking from the PROBLEM SYMPTOMS TABLE)

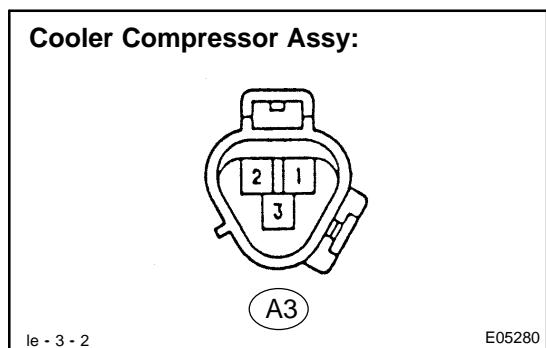


B → REPLACE AIR CONDITIONING AMPLIFIER (See page 55-54)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-1118)

A

2 INSPECT COOLER COMPRESSOR ASSY



- (a) Disconnect cooler compressor assy connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Terminal No.	Condition	Specified Condition
A3-1 - A3-2	at 20°C (68°F)	165 to 205 Ω

NG → REPLACE COOLER COMPRESSOR ASSY

OK

3 CHECK HARNESS AND CONNECTOR(COOLER COMPRESSOR ASSY - AIR CONDITIONING AMPLIFIER) (See page 01-36)

- (a) Check for open and short circuit in the harness and the connector between the cooler compressor assy and the A/C amplifier (See page 01-36).

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(See page 05-1118)**

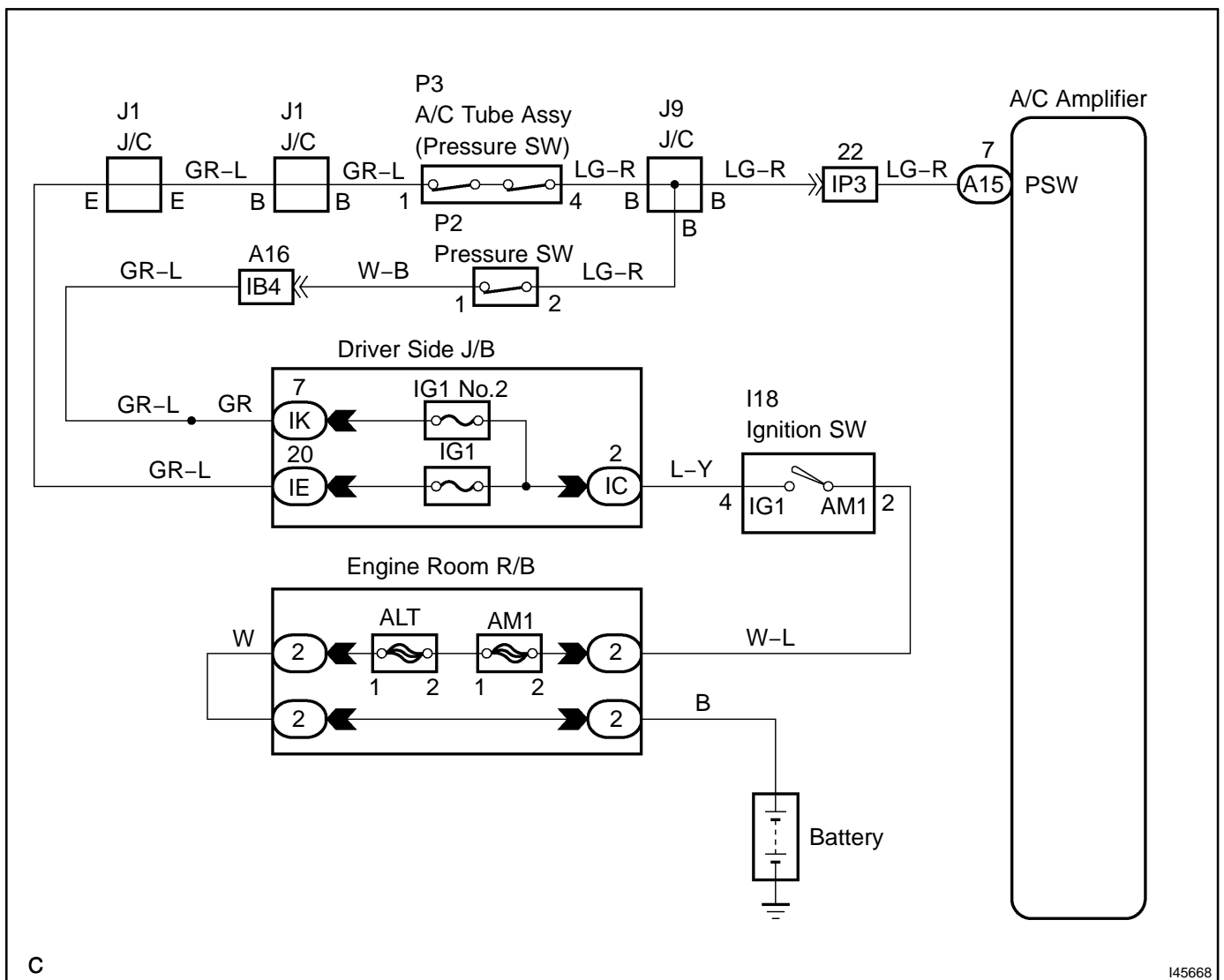
DTC	23	PRESSURE SWITCH CIRCUIT
------------	-----------	--------------------------------

CIRCUIT DESCRIPTION

The pressure switch sends the appropriate signals to the A/C amplifier assy when the A/C refrigerant pressure drops too low or rises too high. When the A/C amplifier receives these signals, it outputs signals via the A/C amplifier to switch OFF the compressor relay and turns the magnetic clutch OFF.

DTC No.	Detection Item	Trouble Area
23	<ul style="list-style-type: none"> • Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm², 28 psi) over 3,140 kPa (32.0 kgf/cm², 455 psi) 	<ul style="list-style-type: none"> • A/C tube assy (pressure switch) • Harness or connector between A/C tube assy (pressure switch) and A/C amplifier assy • Refrigerant pipe line • A/C amplifier assy

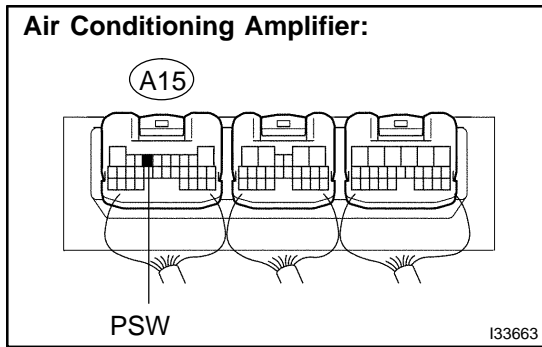
WIRING DIAGRAM



145668

INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(PSW)



- (a) Install the manifold gauge set.
- (b) Remove A/C amplifier with connector being connected.
- (c) Turn ignition switch to ON.
- (d) Check voltage between terminal PSW of A/C amplifier connector and body ground when refrigerant pressure is changed.
- (e) The voltage changes with refrigerant pressure, as shown in the diagram below.

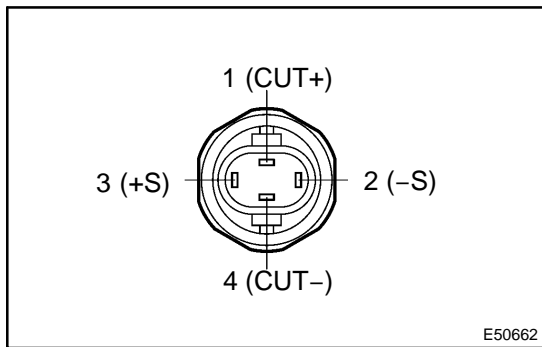
Voltage:

Low Pressure Cut Side	Reference : High Pressure Cut Side
ON (0V) 196 kPa OFF (12V)	ON (0V) 2,550 kPa 3,140 kPa OFF (12V)

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)**

NG

2 INSPECT AIR CONDITIONING TUBE ASSY(PRESURE SW)



- (a) Disconnect pressure SW connector.
- (b) Turn ignition switch to ON.
- (c) Check continuity between terminal 1 and 4 of pressure SW when refrigerant pressure is changed.
- (d) The continuity changes with refrigerant pressure as shown in the diagram below.

Continuity:

Low Pressure Cut Side	Reference : High Pressure Cut Side
ON (continuity) 196 kPa OFF (continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (continuity)

NG → **REPLACE AIR CONDITIONING TUBE ASSY**

OK

3	CHECK HARNESS AND CONNECTOR(PRESSURE SW - A/C AMPLIFIER) (See page 01-36)
----------	--

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

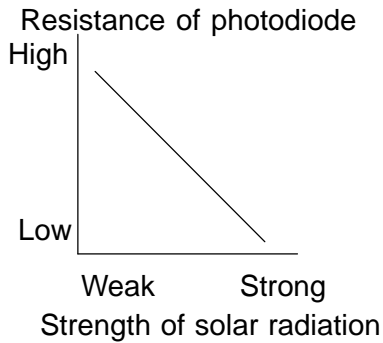
SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

DTC	24	SOLAR SENSOR CIRCUIT (DRIVER SIDE)
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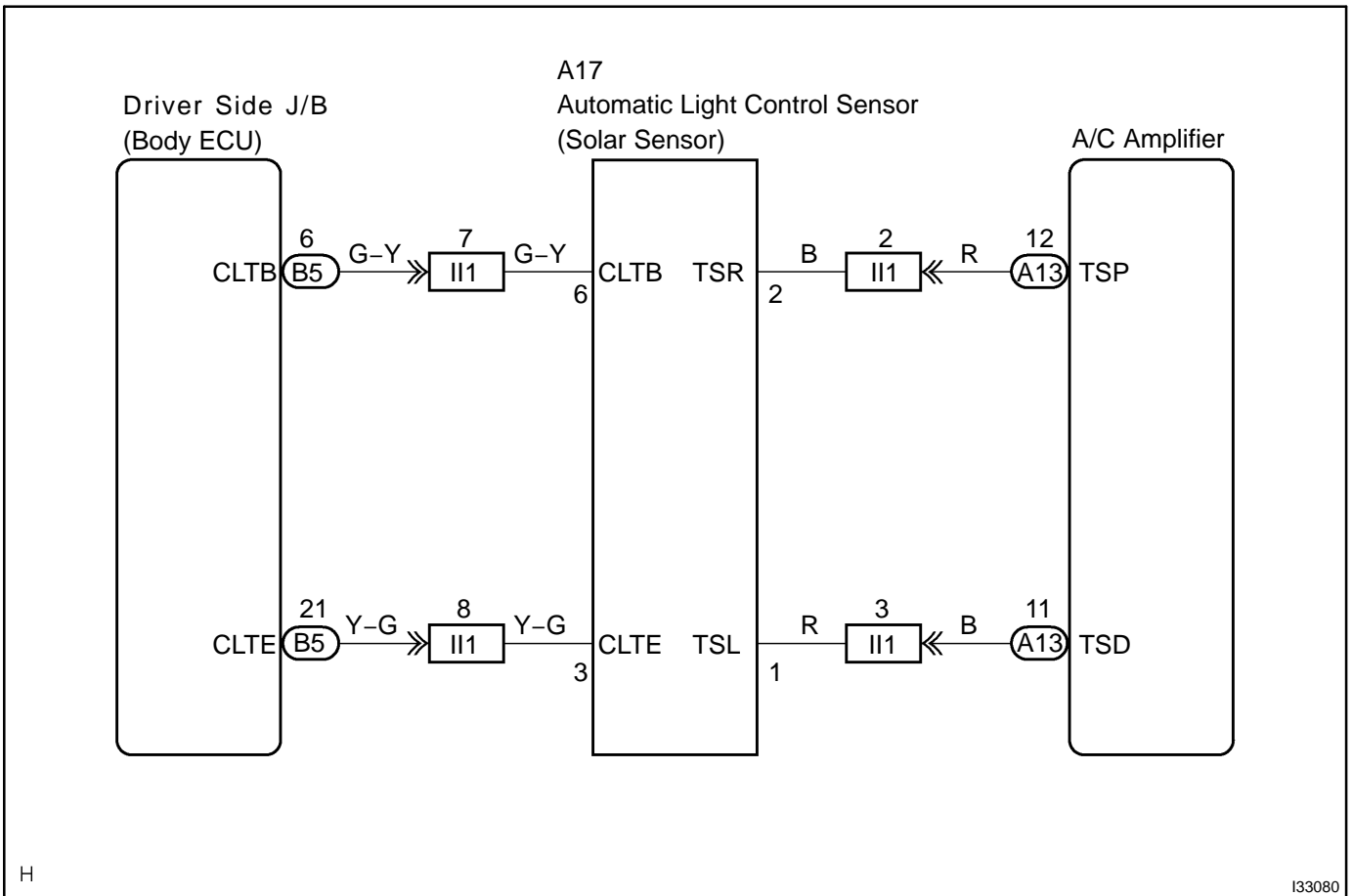
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
24	Open or short in solar sensor circuit. (Please note that display of DTC 24 is not abnormal when the sensor is not receiving solar radiation.)	<ul style="list-style-type: none"> • Automatic light control sensor (Solar sensor) • Harness or connector between automatic light control sensor (solar sensor) and A/C amplifier • A/C amplifier • Harness or connector between automatic light control sensor(solar sensor) and body ECU • Body ECU

WIRING DIAGRAM

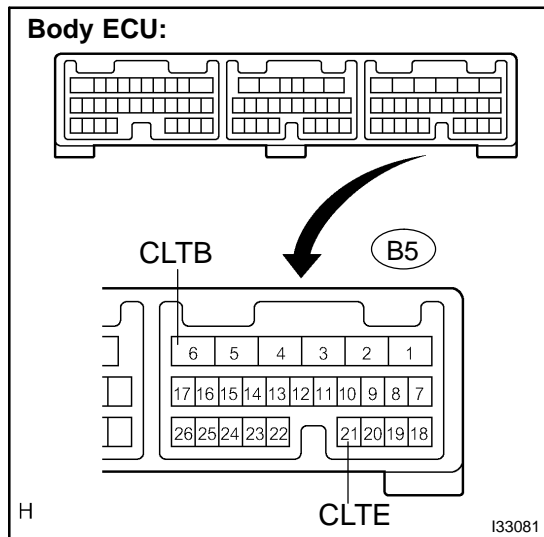


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INSPECTION PROCEDURE

1 INSPECT BODY ECU

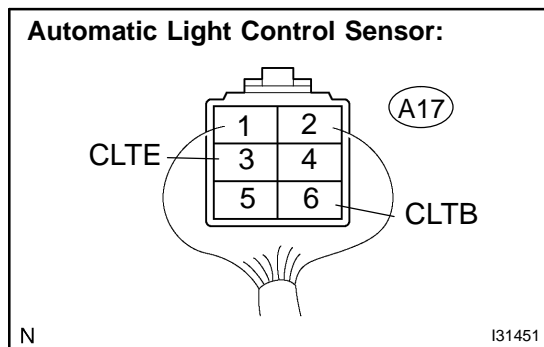


- (a) Remove driver side junction block with the connectors being connected.
 - (b) Turn the light control switch AUTO.
 - (c) Measure voltage between terminals CLTB and CLTE of driver side junction block.
- Voltage: 10 to 14V**

NG → REPLACE BODY ECU

OK

2 CHECK HARNESS AND CONNECTOR(BODY ECU - SOLAR SENSOR)



- (a) Remove solar sensor with the connector being connected.
- (b) Turn the ignition switch to ON.
- (c) Vehicle's surroundings are bright.

HINT:

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side, as shown.

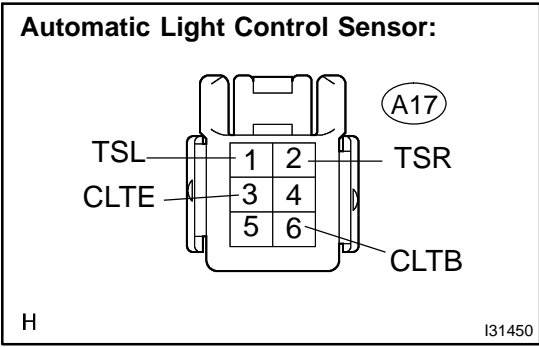
Standard:

Tester connection	Condition	Specified condition
CLTB - Body ground	Ignition switch ON	10 to 14V
CLTE - Body ground	Always	Continuity

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT AUTOMATIC LIGHT CONTROL SENSOR(SOLAR SENSOR)



- (a) Remove solar sensor.
- (b) Cover sensor with a cloth.
- (c) Measure resistance between terminals 1 and 2 of solar sensor connector.

Resistance: $\infty \Omega$ (No continuity)

HINT:
Connect the positive (+) lead to ohmmeter to terminal 2 and negative (-) lead to terminal 1 of the solar sensor.

- (d) Remove the cloth from the solar sensor and subject the sensor to electric light.
- (e) Measure resistance between terminals 1 and 2 of solar sensor.

Resistance: Approx. 10 k Ω (Continuity)

HINT:
Connect the positive (+) lead to ohmmeter to terminal 2 and negative (-) lead to terminal 1 of the solar sensor.

NG → **REPLACE AUTOMATIC LIGHT CONTROL SENSOR**

OK

4 CHECK HARNESS AND CONNECTOR(SOLAR SENSOR - A/C AMPLIFIER)
(See page 01-36)

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

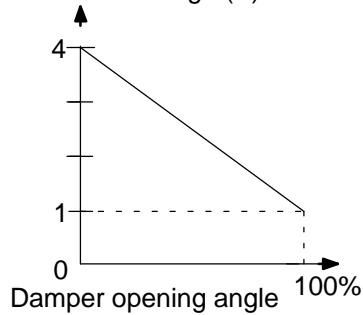
OK

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)

DTC	31	AIR MIX DAMPER POSITION SENSOR CIRCUIT(PASSENGER SIDE)
------------	-----------	---

CIRCUIT DESCRIPTION

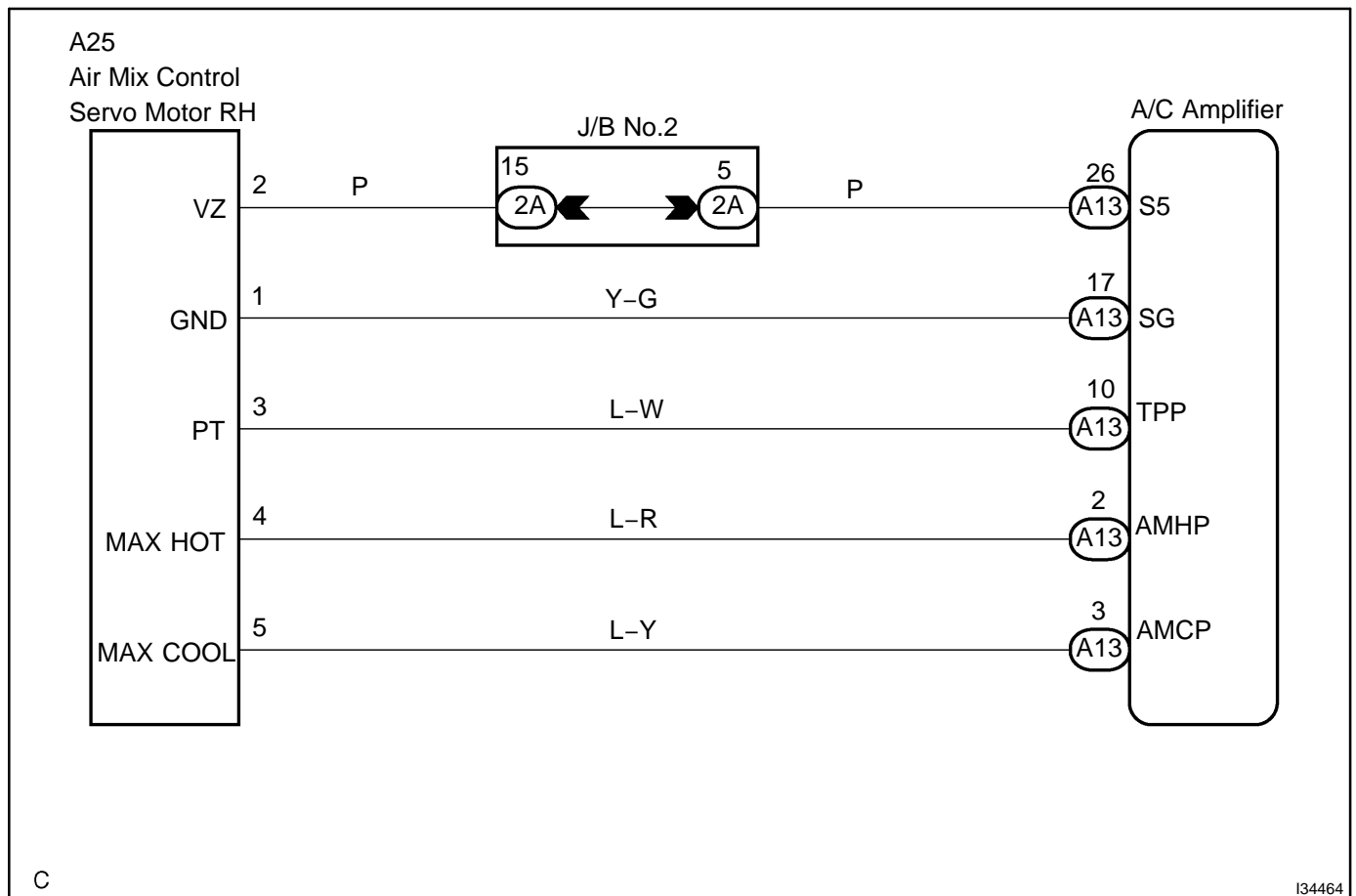
TPP terminal voltage (V)



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the air mix damper servo sub-assy.

DTC No.	Detection Item	Trouble Area
31	Short to ground or power source circuit in air mix damper position sensor circuit.	<ul style="list-style-type: none"> • Air mix damper servo sub-assy • Harness of connector between air mix damper servo sub-assy and A/C amplifier • A/C amplifier

WIRING DIAGRAM



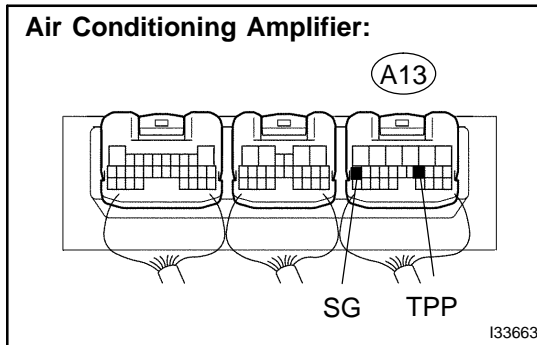
C

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INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(TPP, SG)

Air Conditioning Amplifier:



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Turn ignition switch ON.
- (c) Change the set temperature to activate the air mix damper and measure the voltage between terminal TPP and SG of A/C amplifier assy.

Voltage:**MAX. COLD: 3.5 to 4.5 V****MAX. HOT: 0.5 to 1.8 V****HINT:**

As the set temperature increases, the voltage decreases gradually without interruption.

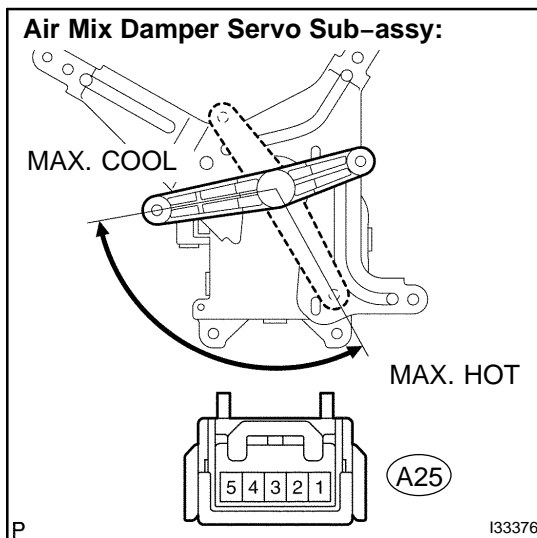
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

2 INSPECT AIRMIX DAMPER SERVO SUB-ASSY

Air Mix Damper Servo Sub-assy:



- (a) Remove the air mix damper servo sub-assy.
- (b) Measure resistance between terminal 1 and 2 of air mix damper servo sub-assy connector.

Resistance: 4.2 to 7.8 kΩ

- (c) While operating air mix damper servo sub-assy as shown in the procedure on page 05-1160, measure resistance between terminal 1 and 3 of air mix damper servo sub-assy.

Resistance:**MAX. COLD: 3.4 to 6.2 kΩ****MAX. HOT: 0.8 to 1.6 kΩ****HINT:**

As the air mix damper servo sub-assy moves from cool side to warm side, the resistance decreases gradually without interruption.

NG

REPLACE AIRMIX DAMPER SERVO SUB-ASSY

OK

3	CHECK HARNESS AND CONNECTOR(AIR MIX DAMPER POSITION SENSOR – A/C AMPLIFIER) (See page 01-36)
----------	---

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

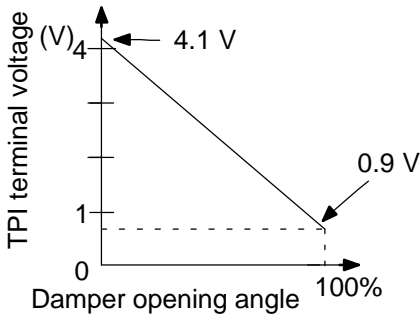
SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

DTC	32	AIR INLET DAMPER POSITION SENSOR CIRCUIT
------------	-----------	---

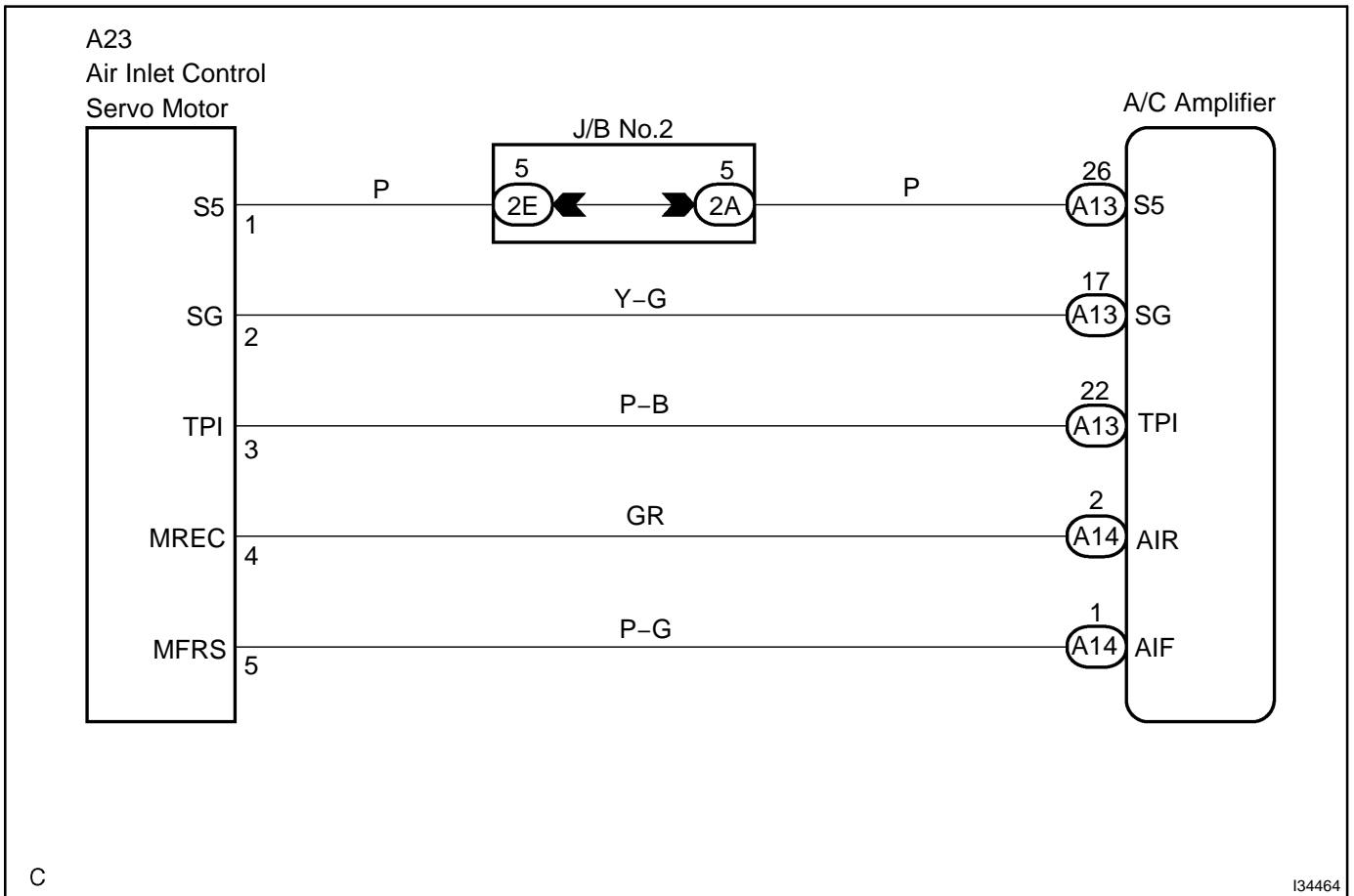
CIRCUIT DESCRIPTION



This sensor detects the position of the blower damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the blower damper servo sub-assy.

DTC No.	Detection Item	Trouble Area
32	Short to ground or power source circuit in blower damper position sensor circuit.	<ul style="list-style-type: none"> • Blower damper servo sub-assy • Harness or connector between blower damper servo sub-assy and A/C amplifier • A/C amplifier

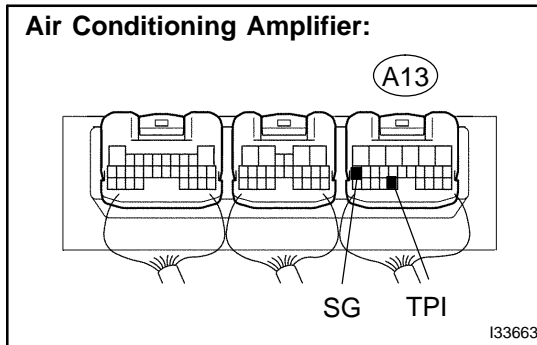
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(TPI, SG)

Air Conditioning Amplifier:



- Remove A/C amplifier with the connectors being connected.
- Turn ignition switch to ON.
- Change the set REC/FRS to activate the blower damper servo sub-assy and measure the voltage between terminal TPI and SG of A/C amplifier.

Voltage:**REC: 3.5 to 4.5 V****FRS: 0.5 to 1.8 V****HINT:**

As the blower damper servo sub-assy is moved from REC side to FRS side, the voltage decreases gradually without interruption.

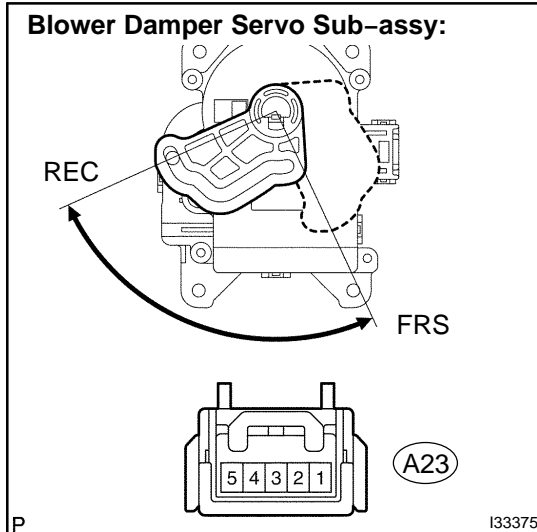
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

2 INSPECT BLOWER DAMPER SERVO SUB-ASSY

Blower Damper Servo Sub-assy:



- Remove the blower damper servo sub-assy.
- Measure resistance between terminal 1 and 2 of blower damper servo sub-assy connector.

Resistance: 4.2 to 7.8 kΩ

- While operating blower damper servo sub-assy as shown in the procedure on page 05-1163, measure resistance between terminal 1 and 3 of blower damper servo sub-assy.

Resistance:**FRS: 3.4 to 6.2 kΩ****REC: 0.8 to 1.6 kΩ****HINT:**

As the blower damper servo sub-assy moves from REC side to FRS side, the resistance decreases gradually without interruption.

NG

REPLACE BLOWER DAMPER SERVO SUB-ASSY

OK

3 CHECK HARNESS AND CONNECTOR(BLOWER DAMPER POSITION SENSOR – A/C AMPLIFIER) (See page [01-36](#))

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 READ OUTPUT DTC

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

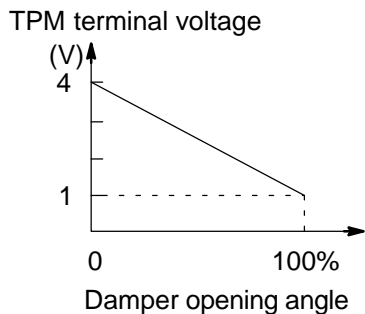
SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page [05-1111](#))

DTC	33	AIR OUTLET DAMPER POSITION SENSOR CIRCUIT
------------	-----------	--

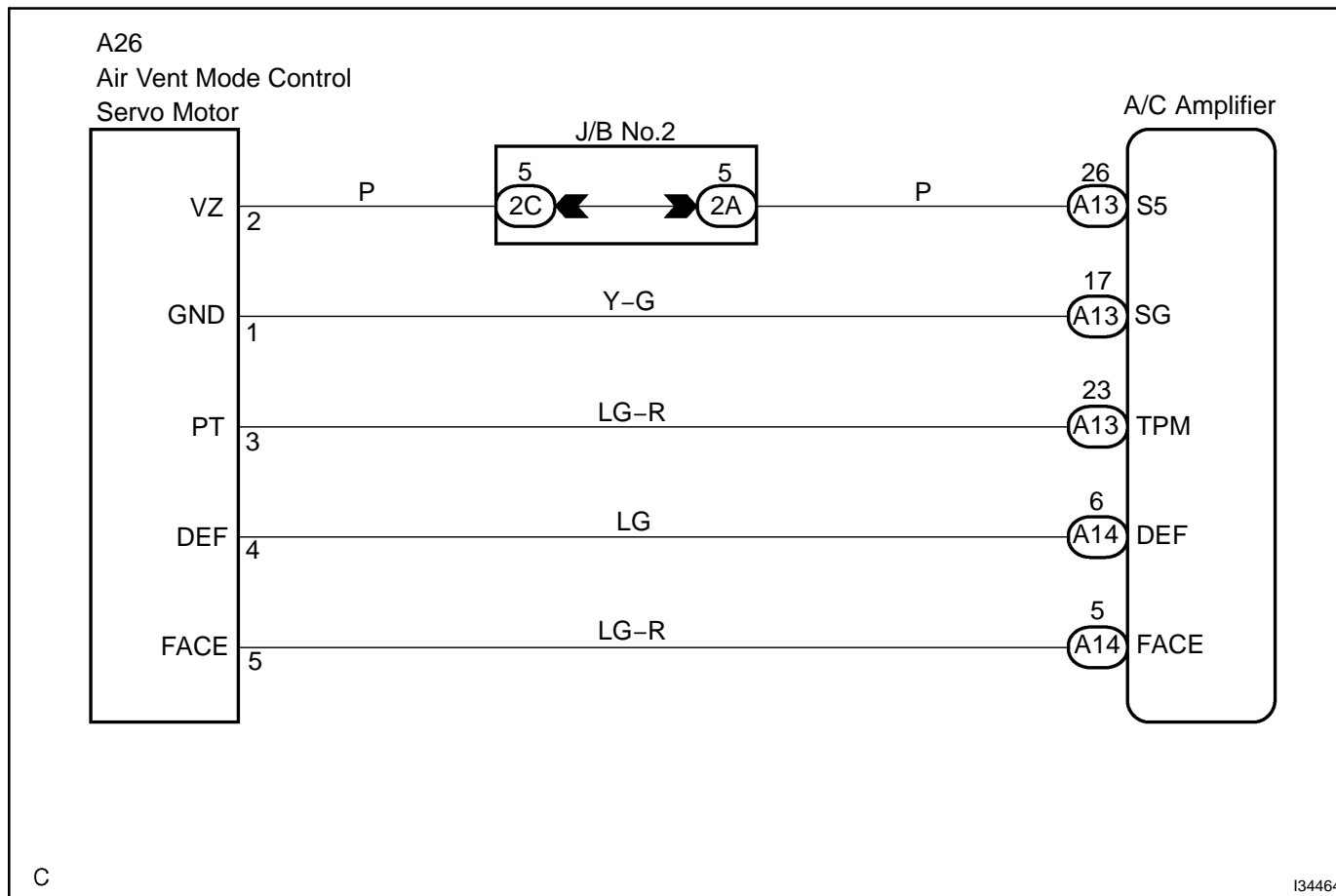
CIRCUIT DESCRIPTION



This sensor detects the position of the air outlet damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the mode damper servo sub-assy.

DTC No.	Detection Item	Trouble Area
33	Short to ground or power source circuit in mode damper position sensor circuit.	<ul style="list-style-type: none"> • Mode damper servo sub-assy • Harness or connector between mode damper servo sub-assy and A/C amplifier • A/C amplifier

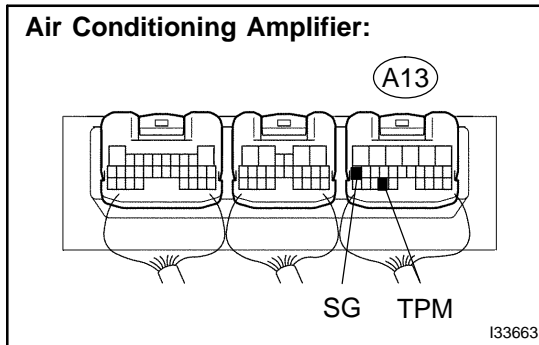
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(TPM, SG)

Air Conditioning Amplifier:



- Remove the A/C amplifier with the connectors being connected.
- Turn ignition switch to ON.
- Change the set FACE/DEF to activate the mode damper servo sub-assy and measure voltage between terminal TPM and SG of A/C amplifier assy.

Voltage:**FACE: 3.5 to 4.5 V****DEF: 0.5 to 1.5 V****HINT:**

As the mode damper servo sub-assy is moved from FACE side to DEF side, the voltage decreases gradually with out interruption.

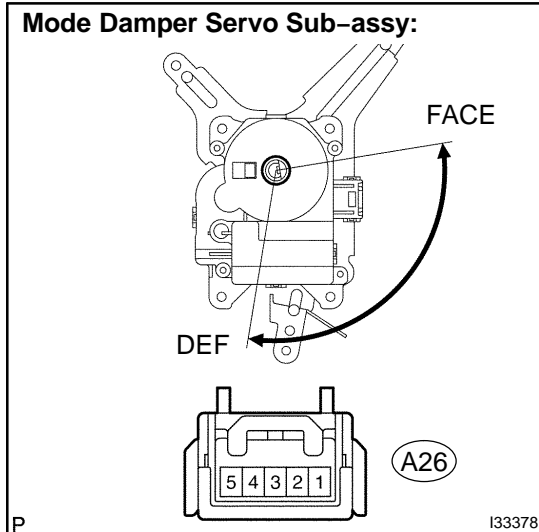
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

2 INSPECT MODE DAMPER SERVO SUB-ASSY

Mode Damper Servo Sub-assy:



- Remove the mode damper servo sub-assy.
- Measure resistance between terminal 1 and 2 of mode damper servo sub-assy connector.

Resistance: 4.2 to 7.8 kΩ

- While operating mode damper servo sub-assy as in the procedure on page 05-1166, measure resistance between terminal 1 and 3 of mode damper servo sub-assy.

Resistance:**FACE: 3.4 to 6.2 kΩ****DEF: 0.8 to 1.6 kΩ****HINT:**

As the mode damper servo sub-assy moved from DEF side to FACE side, the resistance decreases gradually with out interruption.

NG

REPLACE MODE DAMPER SERVO SUB-ASSY

OK

3 CHECK HARNESS AND CONNECTOR(MODE DAMPER POSITION SENSOR - A/C AMPLIFIER) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 READ OUTPUT DTC

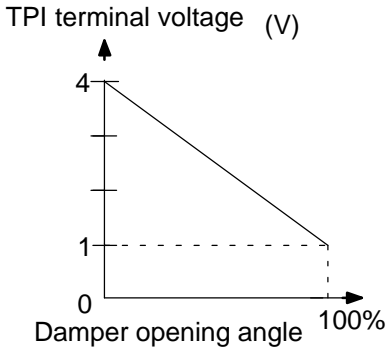
- (a) Clear the sensor check codes.
(b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK**SYSTEM OK****NG****CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page [05-1111](#))**

DTC	36	AIR MIX DAMPER POSITION SENSOR CIRCUIT (DRIVER SIDE)
------------	-----------	---

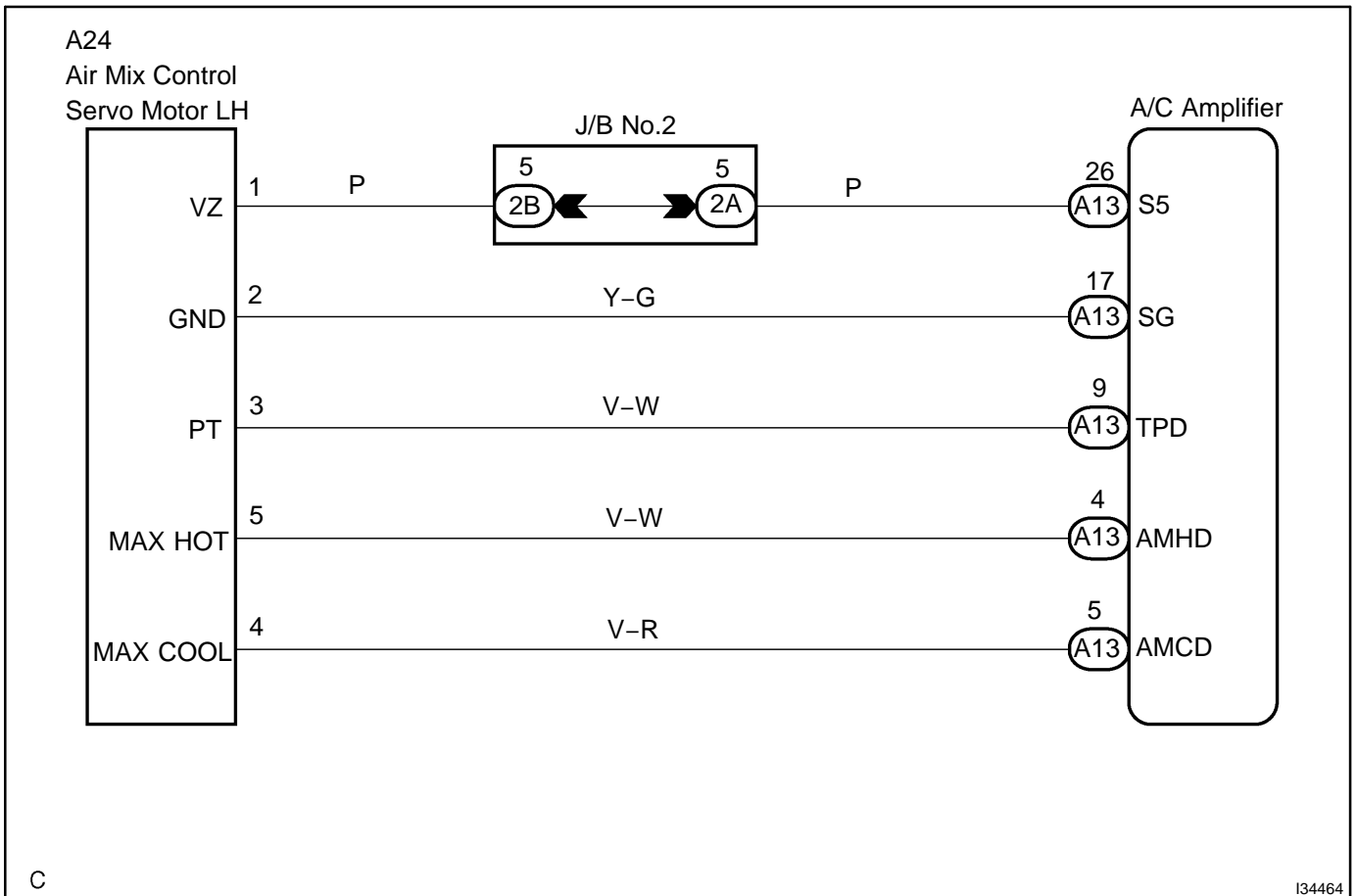
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C amplifier. The position sensor is built into the air mix damper servo sub-assy.

DTC No.	Detection Item	Trouble Area
36	Short to ground or power source circuit in air mix damper position sensor circuit.	<ul style="list-style-type: none"> • Air mix damper servo sub-assy • Harness of connector between air mix damper servo sub-assy and A/C amplifier • A/C amplifier

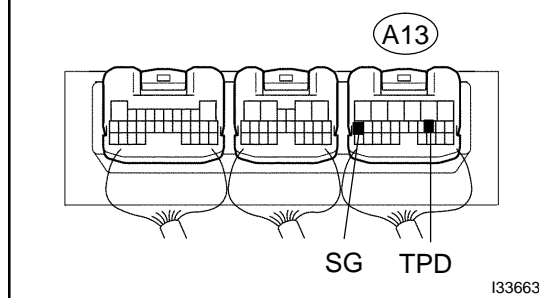
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(TPD, SG)

Air Conditioning Amplifier:



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Turn ignition switch to ON.
- (c) Change the set temperature to activate the air mix damper and measure the voltage between terminal TPD and SG of A/C amplifier.

Voltage:**MAX. COLD: 3.5 to 4.5 V****MAX HOT: 0.5 to 1.8 V****HINT:**

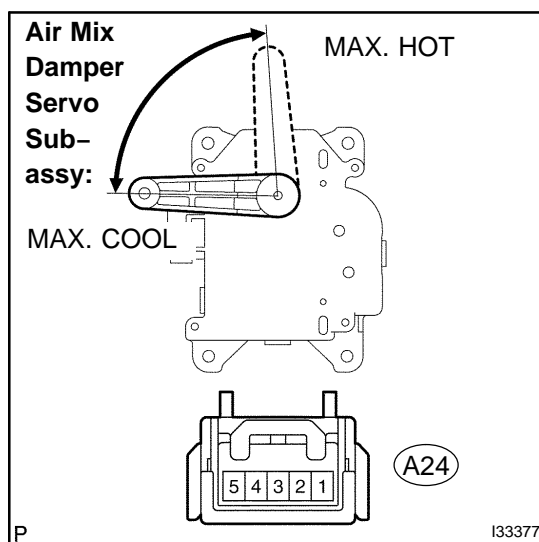
As the set temperature increases, the voltage decreases gradually without interruption.

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

2 INSPECT AIRMIX DAMPER SERVO SUB-ASSY



- (a) Remove the air mix damper servo sub-assy.
- (b) Measure resistance between terminal 1 and 2 of air mix damper servo sub-assy connector.

Resistance: 4.2 to 7.8 kΩ

- (c) While operating air mix damper servo sub-assy as shown in the procedure on page 05-1169, measure resistance between terminal 1 and 3 of air mix damper servo sub-assy.

Resistance:**MAX. COLD: 3.4 to 6.2 kΩ****MAX. HOT: 0.8 to 1.6 kΩ****HINT:**

As the air mix damper servo sub-assy moves from COLD side to HOT side, the resistance decreases gradually without interruption.

NG

REPLACE AIRMIX DAMPER SERVO SUB-ASSY

OK

3 CHECK HARNESS AND CONNECTOR(AIR MIX DAMPER POSITION SENSOR - A/C AMPLIFIER) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 READ OUTPUT DTC

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK**SYSTEM OK****NG****CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page [05-1111](#))**

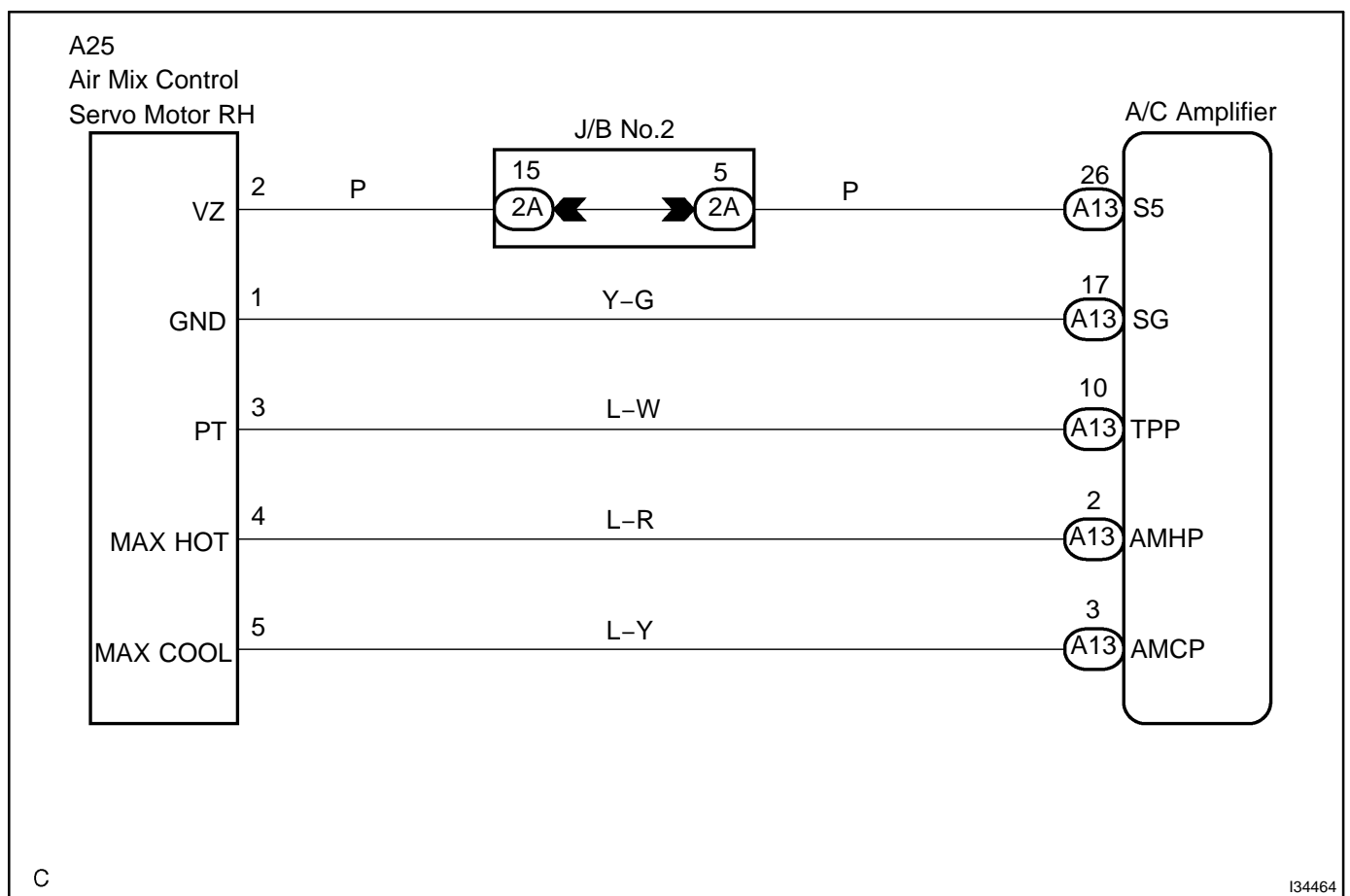
DTC	41	AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT(PASSENGER SIDE)
------------	-----------	---

CIRCUIT DESCRIPTION

This air mix damper servo sub-assy is controlled by the A/C amplifier and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
41	Air mix damper position sensor value does not change even if air conditioner amplifier assy operates air mix servomotor.	<ul style="list-style-type: none"> • Air mix damper servo sub-assy • Harness or connector between air mix damper control and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 | PERFORM ACTUATOR CHECK

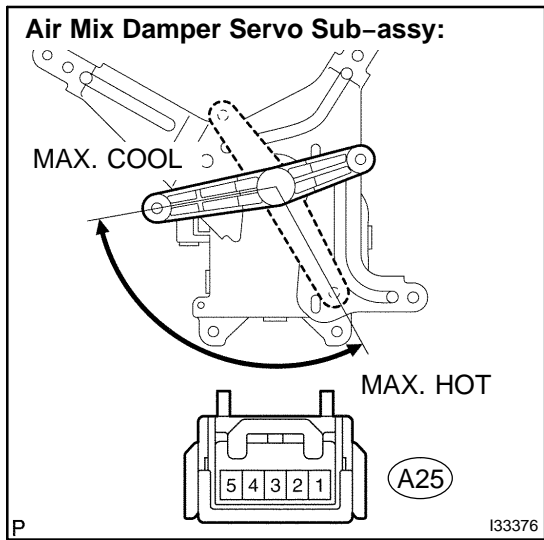
- (a) Set to actuator check mode (See page 05-1101).
- (b) Press the driver side temp. control switch and change to step operation.
- (c) Check the air flow temperature by hand.

Display Code	Air Mix Damper Operation
0	COLD side (0 % open)
1	↑
2	↑
3	COLD/HOT (50 % open)
4	↑
5	HOT side (100 % open)
6	↑
7	↑
8	↑
9	↑

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

NG

2 | INSPECT AIRMIX DAMPER SERVO SUB-ASSY



- (a) Remove the air mix damper servo sub-assy.
- (b) Connect the positive (+) lead from the battery to terminal 4 and negative (-) lead to terminal 5, then check that the lever turns to "HOT" side smoothly.
- (c) Connect the positive (+) lead from the battery to terminal 5 and negative (-) lead to terminal 4, then check that the lever turns to "COLD" side smoothly.

NG → REPLACE AIRMIX DAMPER SERVO SUB-ASSY

OK

3	CHECK HARNESS AND CONNECTOR(AIR MIX DAMPER CONTROL SERVOMOTOR - A/C AMPLIFIER) (See page 01-36)
----------	--

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK	SYSTEM OK
-----------	------------------

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

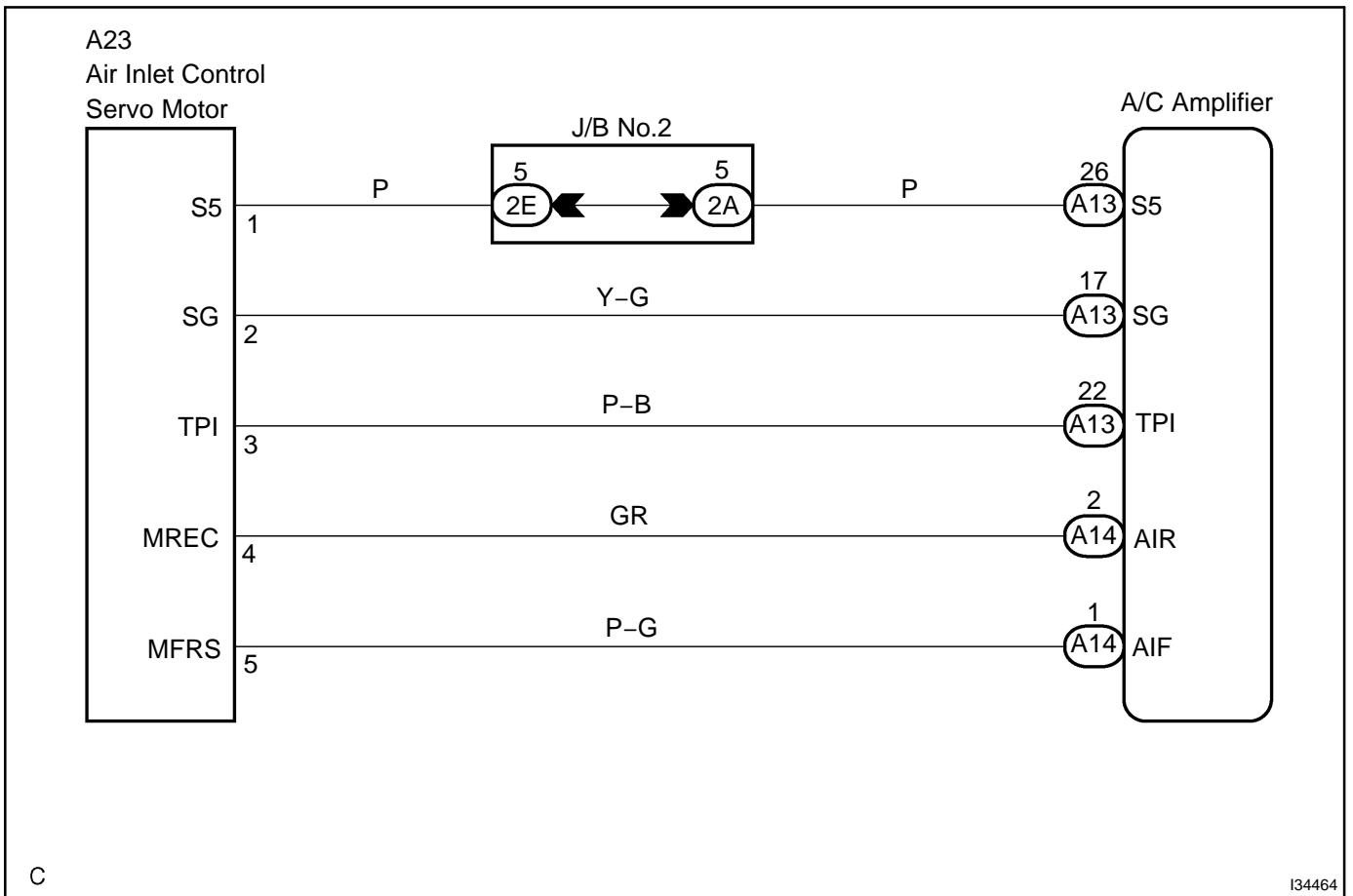
DTC	42	AIR INLET DAMPER CONTROL SERVOMOTOR CIRCUIT
------------	-----------	--

CIRCUIT DESCRIPTION

The blower damper servo sub-assy is controlled by the A/C amplifier and moves the blower damper servo sub-assy to the desired position.

DTC No.	Detection Item	Trouble Area
42	Short to ground or power source circuit in blower damper position sensor circuit.	<ul style="list-style-type: none"> • Blower damper servo sub-assy • Harness or connector between blower damper servo sub-assy and A/C amplifier • A/C amplifier

WIRING DIAGRAM



C

I34464

INSPECTION PROCEDURE

1 PERFORM ACTUATOR CHECK

- Remove the glove box to see and check the blower damper operation.
- Set to actuator check mode (See page 05-1101).
- Press the drive side temp. control switch and change it to step operation.
- Press the drive side temp. control switch in order and check the operation of blower damper.

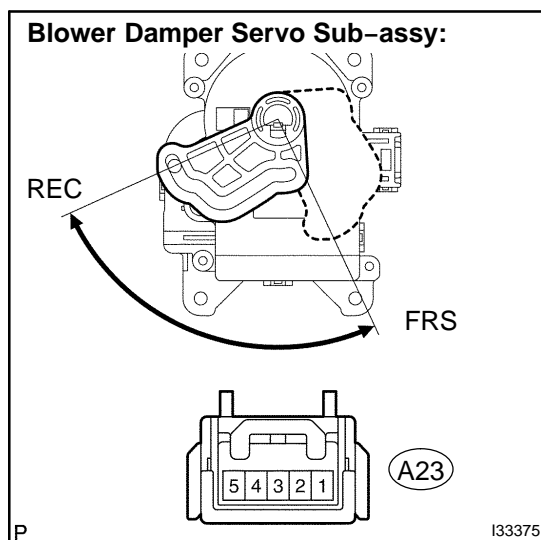
Display Code	Air inlet damper position
0	RECIRCULATION
1	↑
2	FRESH/RECIRCULATION
3	↑
4	FRESH
5	↑
6	↑
7	↑
8	↑
9	↑

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)**

NG

2 INSPECT BLOWER DAMPER SERVO SUB-ASSY



- Remove the blower damper servo sub-assy.
- Connect the positive (+) lead from the battery to terminal 5 and negative (-) lead to terminal 4, then check that the lever turns to "FRS" side smoothly.
- Connect the positive (+) lead from the battery to terminal 4 and negative (-) lead to terminal 5, then check that the lever turns to "REC" side smoothly.

NG

**REPLACE BLOWER DAMPER SERVO
SUB-ASSY**

OK

3	CHECK HARNESS AND CONNECTOR(BLOWER DAMPER SERVOMOTOR - A/C AMPLIFIER) (See page 01-36)
----------	---

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
 (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

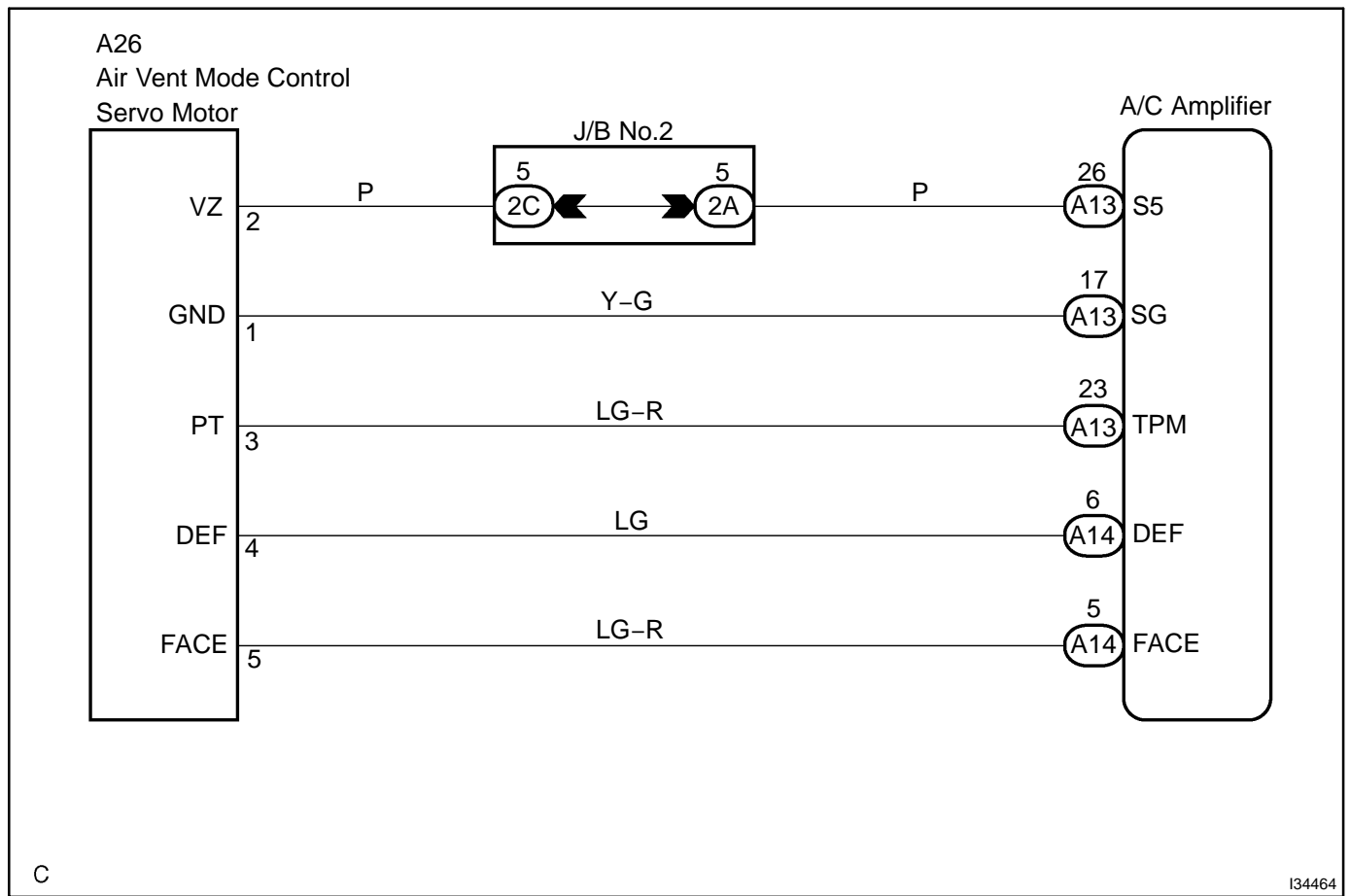
DTC	43	AIR OUTLET DAMPER CONTROL SERVOMOTOR CIRCUIT
------------	-----------	---

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by the signals from the A/C amplifier assy. When the AUTO switch is on, the A/C amplifier changes the mode automatically between (FACE), (BI-LEVEL) and (FOOT) according to the temperature setting.

DTC No.	Detection Item	Trouble Area
43	Air mode damper position sensor value does not change even if A/C amplifier operated mode damper control servomotor.	<ul style="list-style-type: none"> • Mode damper servo sub-assy • Harness or connector between mode damper servo sub-assy and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 | PERFORM ACTUATOR CHECK

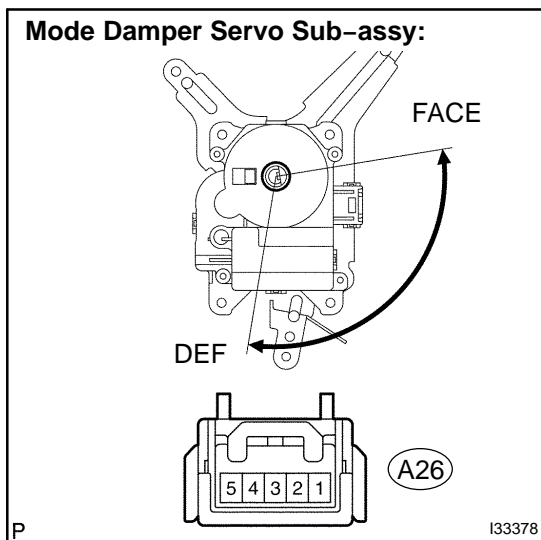
- (a) Warm up engine.
- (b) Set to actuator check mode (See page 05-1101).
- (c) Press the driver side temp. control switch and change it to step operation.
- (d) Press the driver side temp. control switch and check that the air flow by hand.

Display code	Air flow condition
0	FACE
1	↑
2	↑
3	B/L
4	AUTO FOOT
5	MANUAL FOOT
6	↑
7	FOOT/DEF
8	↑
9	DEF

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)**

NG

2 | INSPECT MODE DAMPER SERVO SUB-ASSY



- (a) Remove the mode damper servo sub-assy.
- (b) Connect the positive (+) lead from the battery to terminal 4 and negative (-) lead to terminal 5 then check that the lever turns to "DEF" position.
- (c) Connect the positive (+) lead from the battery to terminal 5 and negative (-) lead to terminal 4 then check that the lever turn to "FACE" position.

NG → **REPLACE MODE DAMPER SERVO SUB-ASSY**

OK

3	CHECK HARNESS AND CONNECTOR(MODE DAMPER SERVO SUB-ASSY - A/C AMPLIFIER) (See page 01-36)
----------	---

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
- (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

OK

SYSTEM OK

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

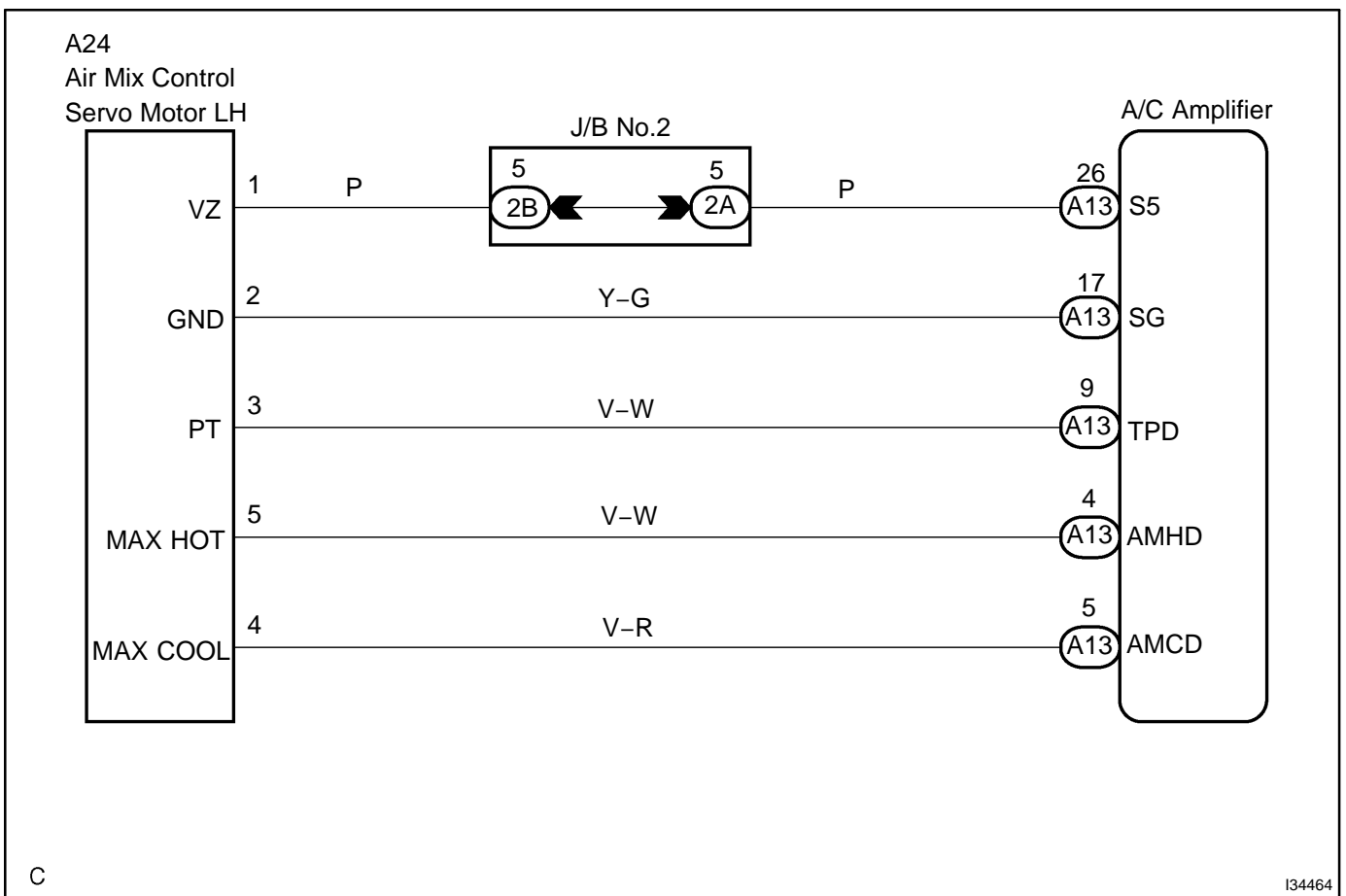
DTC	46	AIR MIX DAMPER CONTROL SERVO MOTOR CIRCUIT (DRIVER SIDE)
------------	-----------	---

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlled by the A/C amplifier and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
46	Air mix damper position sensor value does not change even if A/C amplifier operated air mix damper control servomotor.	<ul style="list-style-type: none"> • Air mix damper servo sub-assy • Harness or connector between air mix damper servo sub-assy and A/C amplifier • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTUATOR CHECK

- Set to actuator check mode (See page 05-1101).
- Press the drive side temp. control switch and change to step operation.
- Check the air flow temperature by hand.

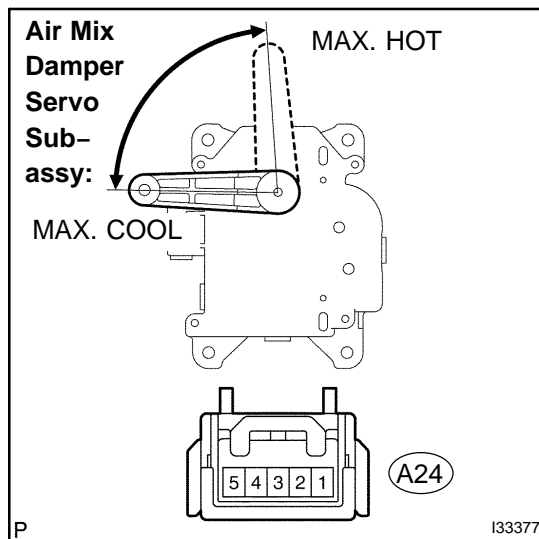
Display Code	Air Mix Damper Operation
0	COLD side (0 % open)
1	↑
2	↑
3	COLD/HOT (50 % open)
4	↑
5	HOT side (100 % open)
6	↑
7	↑
8	↑
9	↑

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

OK

2 INSPECT AIRMIX DAMPER SERVO SUB-ASSY



- Remove the air mix damper servo sub-assy.
- Connect the positive (+) lead from the battery to terminal 4 and negative (-) lead to terminal 5, then check that the lever turns to "COLD" side smoothly.
- Connect the positive (+) lead from the battery to terminal 5 and negative (-) lead to terminal 4, then check that the lever turns to "HOT" side smoothly.

NG

REPLACE AIRMIX DAMPER SERVO SUB-ASSY

OK

3	CHECK HARNESS AND CONNECTOR(AIR MIX DAMPER CONTROL SERVOMOTOR - A/C AMPLIFIER) (See page 01-36)
----------	--

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	READ OUTPUT DTC
----------	------------------------

- (a) Clear the sensor check codes.
 (b) At least 8.5 minutes pass after turning the IG switch to ON position, read DTC.

Standard: Normal codes are output.

NG

SYSTEM OK

NG

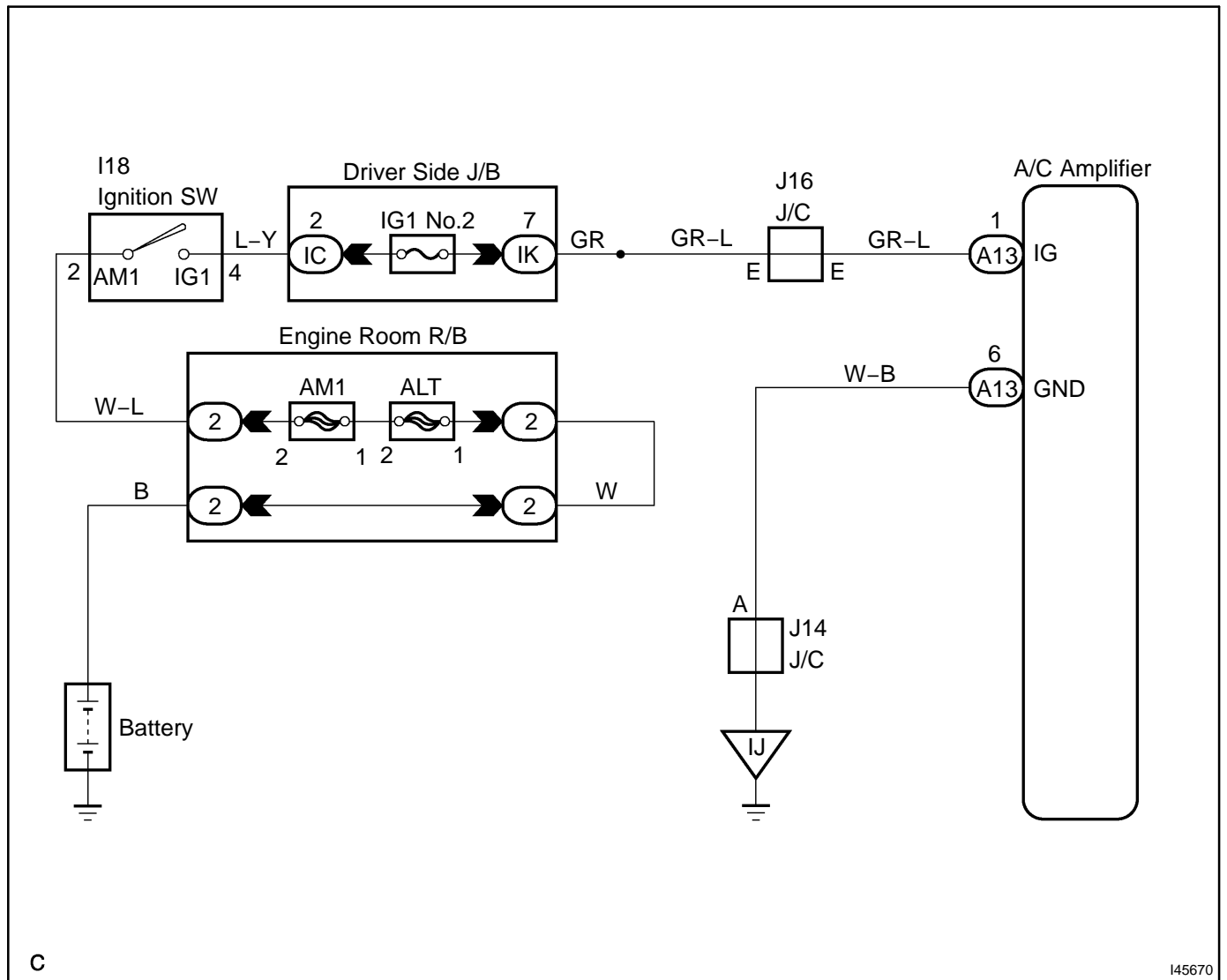
CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)
--

IG POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This is the power source for the A/C amplifier and servomotor, etc.

WIRING DIAGRAM



C

145670

INSPECTION PROCEDURE

1 CHECK FUSE(IG1 FUSE)

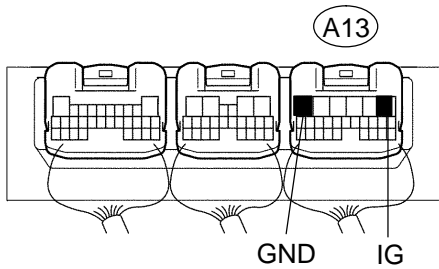
- (a) Remove the IG1 No.2 fuse from the driver side J/B.
- (b) Check that the continuity exists of IG1 fuse.

NG → REPLACE FUSE

OK

2 CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - BATTERY)

Air Conditioning Amplifier:



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Turn the ignition switch to ON.
- (c) Measure voltage between terminal IG and GND of the A/C amplifier.

Voltage: 10 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

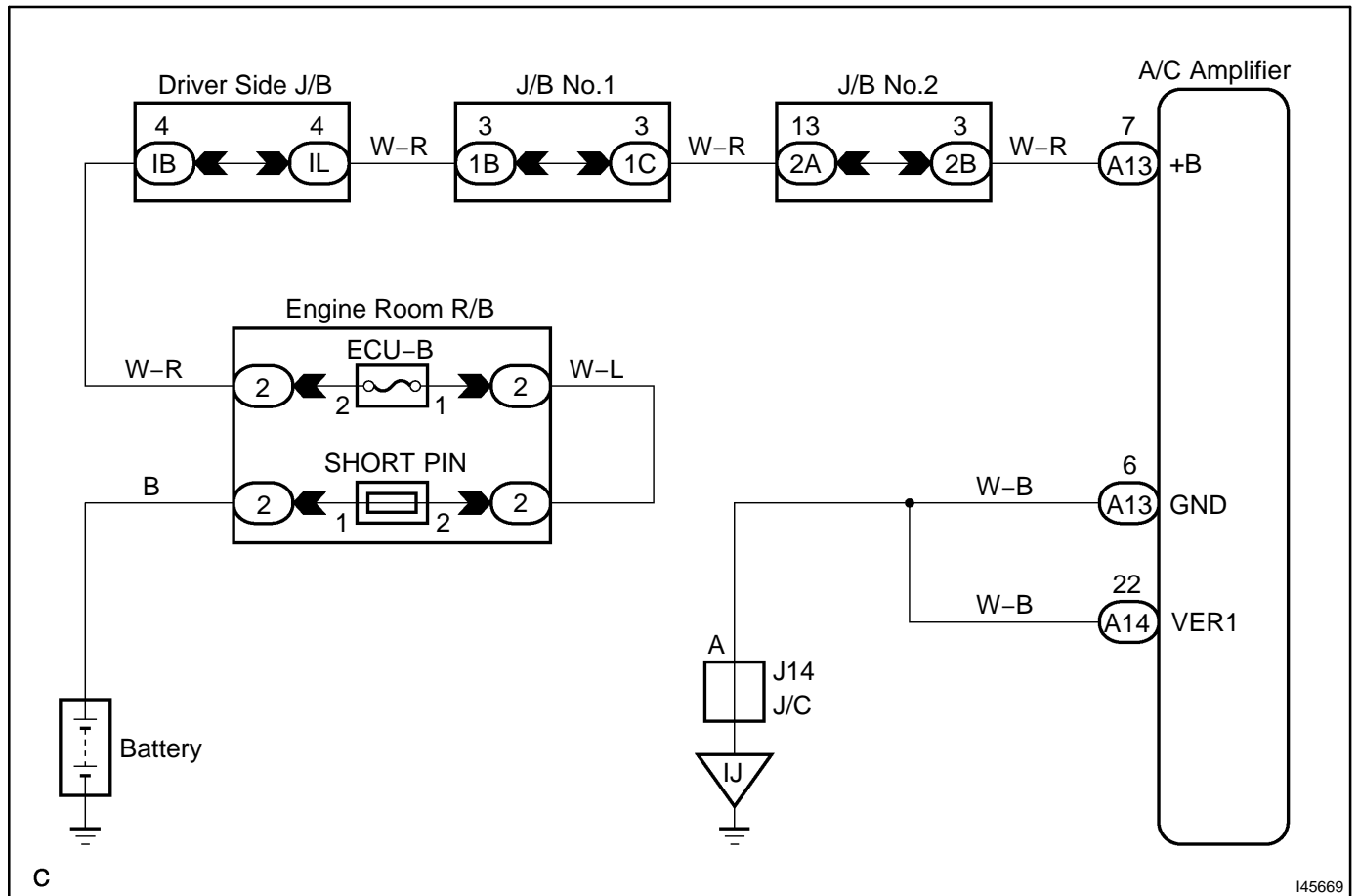
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page [05-1118](#))

BACK-UP POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This is the back-up power source for the A/C amplifier. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

WIRING DIAGRAM



C

I45669

INSPECTION PROCEDURE

1 CHECK FUSE(ECU-B FUSE)

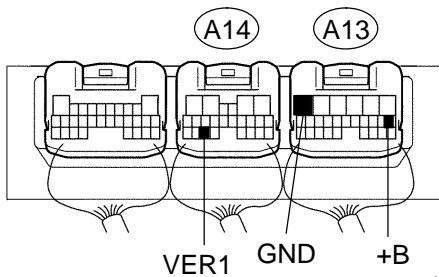
- (a) Remove the ECU-B fuse from the engine room R/B.
- (b) Check that the continuity exists of ECU-B fuse.

NG → REPLACE FUSE

OK

2 CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - BATTERY)

Air Conditioning Amplifier:



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Measure voltage between terminal +B and GND of A/C amplifier.
Voltage: 10 to 14 V
- (c) Measure continuity between terminal VER1 of A/C amplifier and body ground.
OK: Continuity

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

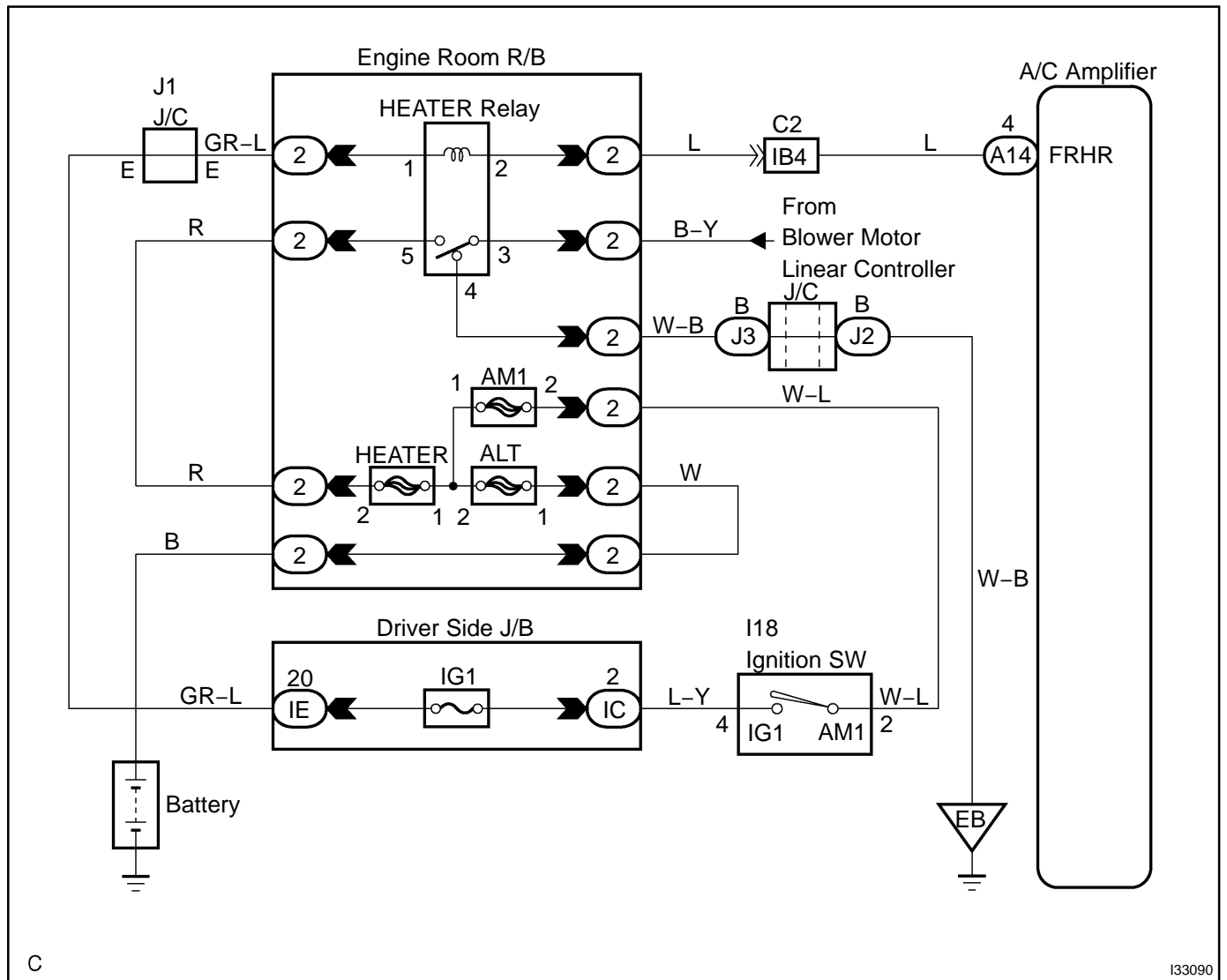
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page [05-1118](#))

HEATER RELAY CIRCUIT

CIRCUIT DESCRIPTION

The heater relay is switched on by signals from the A/C amplifier. It supplies power to the blower motor.

WIRING DIAGRAM



C

133090

INSPECTION PROCEDURE

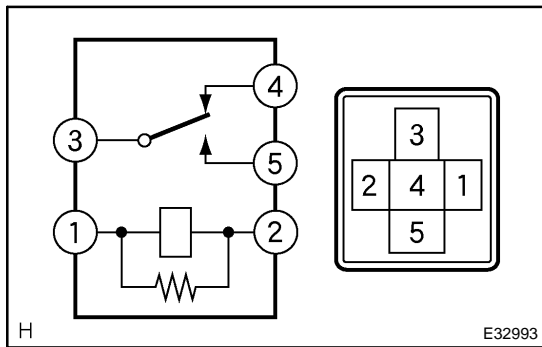
1 CHECK FUSE(IG1)

- (a) Remove the IG1 fuse from the driver side J/B.
- (b) Check that the continuity exists of IG1 fuse.

NG → REPLACE FUSE

OK

2 INSPECT HEATER RELAY NO.1



- (a) Check that the continuity exists between each pair of terminals of heater relay No.1, as shown in the chart.

Standard:

Tester connection	Specified condition
3 - 5	No continuity
3 - 4	Continuity
1 - 2	62.5 to 90.9 Ω

- (b) Apply battery voltage between terminal 1 and 2.
- (c) Check continuity each pair of terminals, as shown the chart.

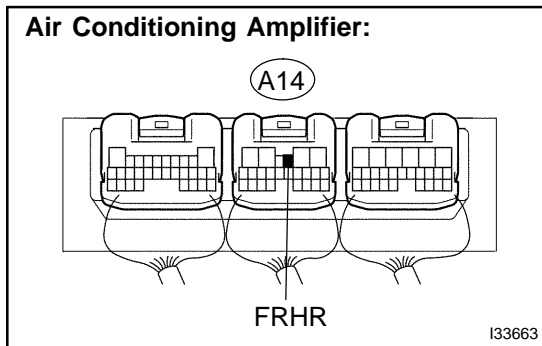
Standard:

Tester connection	Specified condition
3 - 5	Continuity
3 - 4	No continuity

NG → REPLACE HEATER RELAY NO.1

OK

3 CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - BATTERY)



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Measure voltage between terminal FRHR of A/C amplifier and body ground when ignition switch is ON and OFF.

Voltage:

- Ignition switch OFF: 0V
- Ignition switch ON (Blower switch ON): Below 1 V
- Ignition switch ON (Blower switch OFF): 10 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

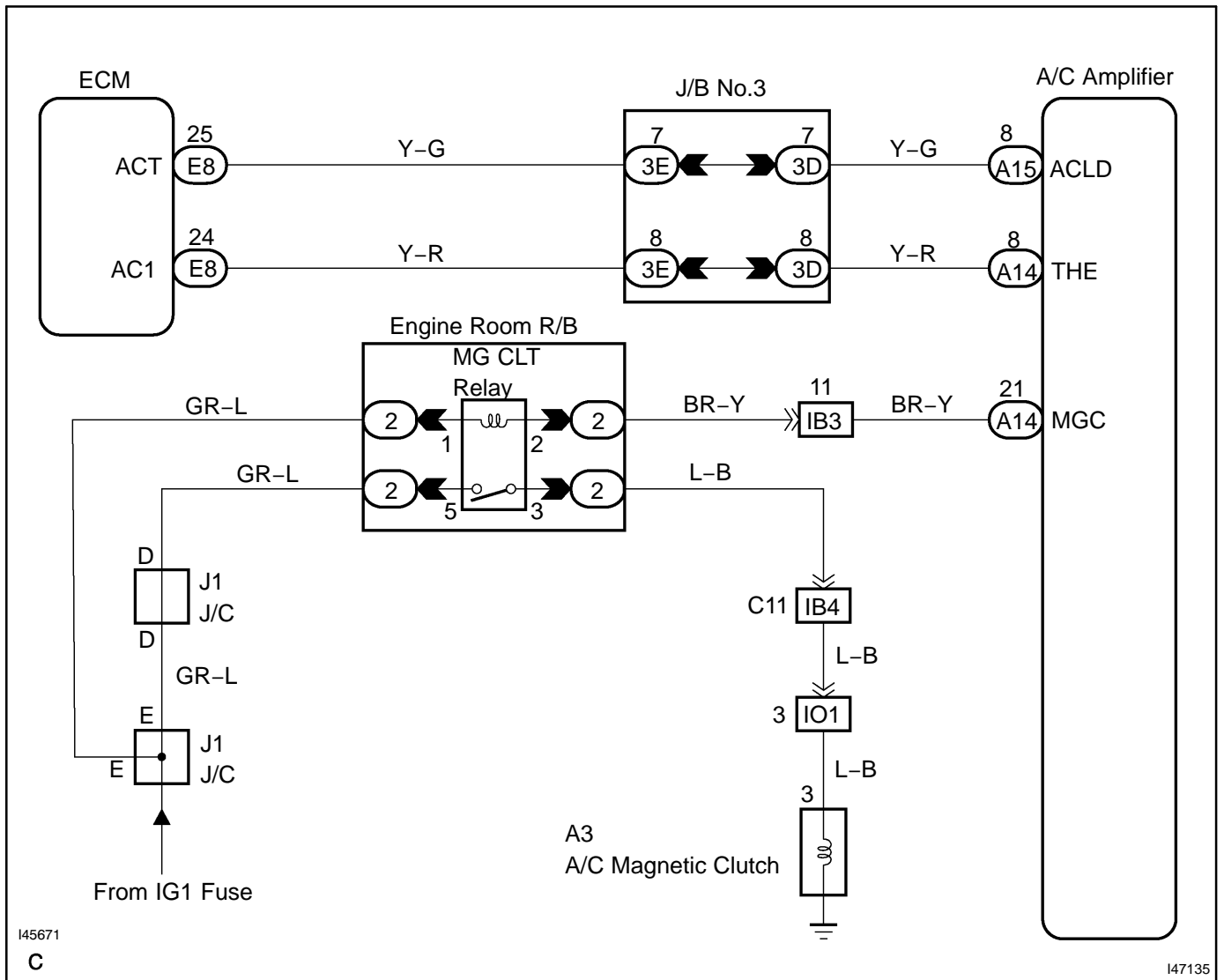
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)

COMPRESSOR CIRCUIT

CIRCUIT DESCRIPTION

The A/C amplifier outputs the magnetic clutch ON signal from THE terminal to the ECM. When the ECM receives this signal, it sends a signal from ACT terminal and the A/C amplifier switches the A/C magnetic clutch relay ON. This turns the A/C magnetic clutch on.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main SW ON.
- (c) Check the A/C magnet clutch input signal using DATA LIST.

ECM:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
A/C SIG	A/C signal / ON or OFF	A/C switch pushed: ON A/C switch released: OFF	-

NG → Go to step 8

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main SW ON.
- (c) Check the A/C magnet clutch operation permission signal using DATA LIST.

ECM:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
A/C MAG CLUTCH	A/C magnet clutch / ON or OFF	A/C switch ON: ON A/C switch OFF: OFF	-

NG → REPLACE ECM

OK

3 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main SW ON.
- (c) Check the A/C magnet clutch operation using ACTIVE TEST.

AIR CONDITIONER:

Description	Test Details / Display (Range)	Diagnostic Note
A/C MAG CLUTCH	Magnet clutch relay / OFF, ON	Operating sound can be heard

NG → Go to step 5

OK

4 CHECK HARNESS AND CONNECTOR(AIR CONDITIONING AMPLIFIER (ACLD TERMINAL) - ECM(ACT TERMINAL))

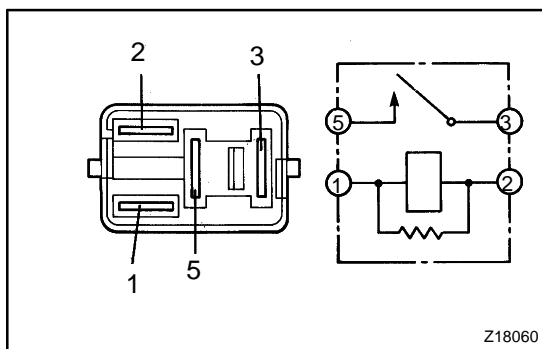
(a) Check for open and short circuit in the harness and the connector between A/C amplifier and the ECM (See page 01-36).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(See page 05-1118)

5 INSPECT COOLER RELAY ASSY



(a) Remove the cooler relay assy from the engine room J/B.
(b) Check continuity between each pair of terminals as shown in the chart.

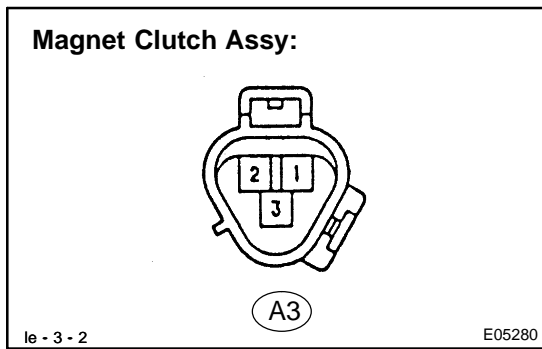
Standard:

Tester connection	Condition	Specified condition
3 - 5	Always	10 kΩ or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω (Battery voltage is applied between terminals 1 and 2)

NG REPLACE COOLER RELAY ASSY

OK

6 INSPECT MAGNET CLUTCH ASSY



(a) Disconnect the connector from the compressor.
(b) Connect the battery positive (+) lead to terminal 3 and the battery negative (-) lead to terminal body ground, then check that the magnetic clutch is engaged.

Standard: Magnetic clutch is engaged.

NG REPLACE MAGNET CLUTCH ASSY

OK

7 CHECK HARNESS AND CONNECTOR(AIR CONDITIONING AMPLIFIER (MGC TERMINAL) - BODY GROUND)

(a) Check for open and short circuit in the harness and the connector between A/C amplifier and body ground (See page 01-36).

NG → **REPLACE HARNESS OR CONNECTOR**

OK

REPLACE AIR CONDITIONING AMPLIFIER (See page 55-54)

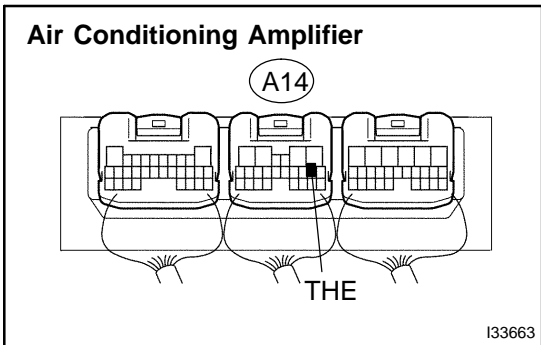
8 CHECK HARNESS AND CONNECTOR(AIR CONDITIONING AMPLIFIER (THE TERMINAL) - ECM(AC1 TERMINAL))

(a) Check for open and short circuit in the harness and the connector between A/C amplifier and the ECM (See page 01-36).

NG → **REPLACE HARNESS OR CONNECTOR**

OK

9 INSPECT AIR CONDITIONING AMPLIFIER(THE)



- (a) Remove the A/C amplifier with the connectors being connected.
- (b) Start the engine and push AUTO switch.
- (c) Measure voltage between terminal THE of the A/C amplifier and body ground when the magnetic clutch is turned ON and OFF by operating the A/C switch.

Standard:

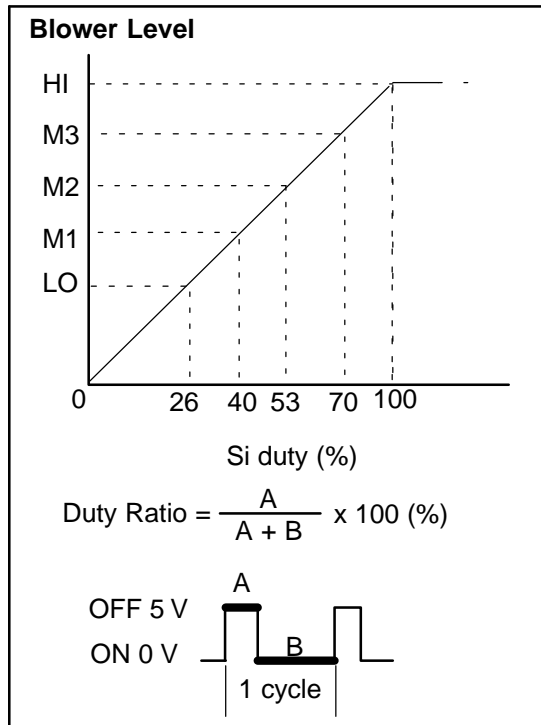
Switch operation	Tester connection	Specified condition
ON	THE - Body ground	Below 1.0 V
OFF	THE - Body ground	10 to 14 V

NG → **REPLACE AIR CONDITIONING AMPLIFIER**

OK

REPLACE ECM (See page 10-16)

BLOWER MOTOR CIRCUIT



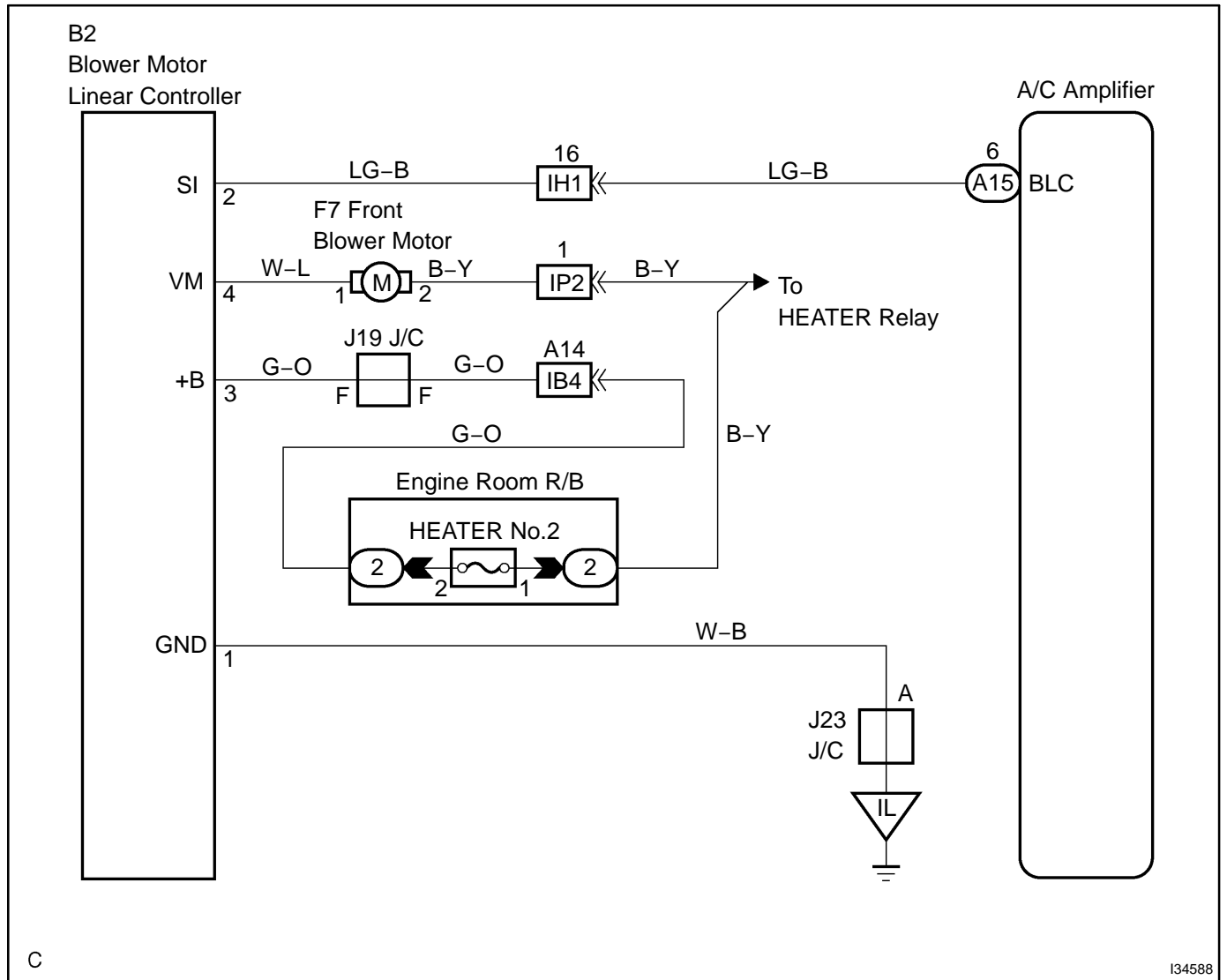
CIRCUIT DESCRIPTION

The blower motor is operated by signals from the A/C amplifier. Blower motor speed signals are transmitted by changes in the Duty Ratio.

Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PERFORM ACTUATOR CHECK

- (a) Set to actuator check mode (See page 05-1101).
- (b) Press the blower switch and change to step operation.
- (c) Check the air flow level by hand.

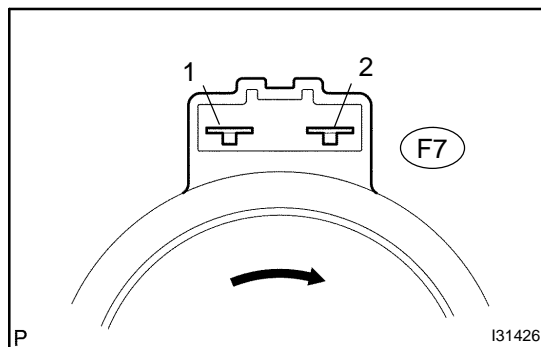
Display Code	Blower level
0	0
1	1
2	17
3	17
4	17
5	17
6	17
7	17
8	17
9	31

OK

PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)

NG

2 INSPECT COOLING UNIT MOTOR SUB-ASSY W/FAN



- (a) Remove cooling unit motor sub-assy w/ fan.
- (b) Connect positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1.

Standard: Blower motor operates smoothly.

NG

REPLACE COOLING UNIT MOTOR SUB-ASSY
W/FAN

OK

3 CHECK HARNESS AND CONNECTOR(COOLING UNIT MOTOR SUB-ASSY W/ FAN - BLOWER MOTOR CONTROL) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

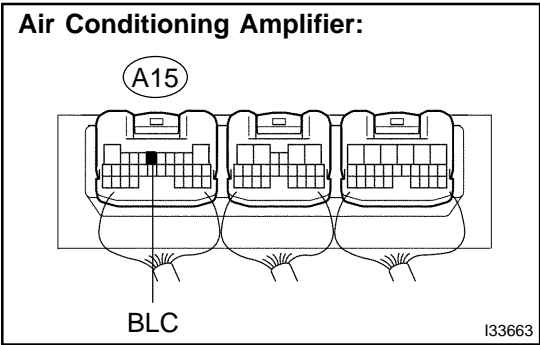
OK

4 CHECK HARNESS AND CONNECTOR(BLOWER MOTOR CONTROL - BODY GROUND) (See page 01-36)

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT AIR CONDITIONING AMPLIFIER(BLC)

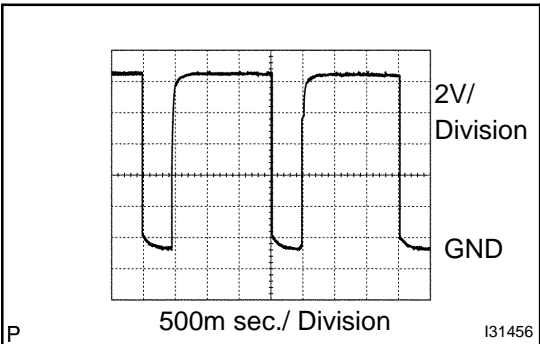


- (a) Remove A/C amplifier with the connectors being connected.
- (b) Turn the ignition switch to ON.
- (c) Operate blower motor.
- (d) Measure waveform between terminal BLC of A/C amplifier and body ground.

OK: Pulse generation

HINT:

- The correct waveform is as shown.
- Blower level changes waveform.



NG CHECK AND REPLACE AIR CONDITIONING AMPLIFIER

OK

6 CHECK HARNESS OR CONNECTOR(A/C AMPLIFIER - BLOWER MOTOR CONTROL) (See page 01-36)

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

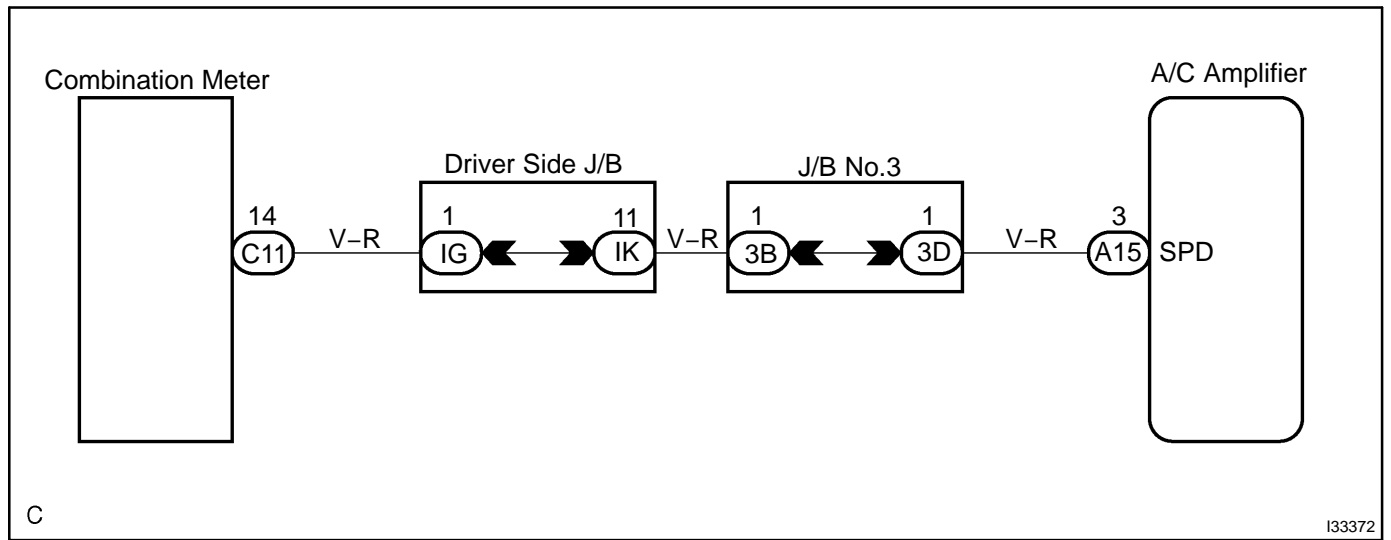
REPLACE BLOWER MOTOR CONTROL

VEHICLE SPEED SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

This A/C amplifier monitors the vehicle speed through signals sent from the speed sensor. The A/C amplifier uses these signals to revise the ambient temperature sensor signal.

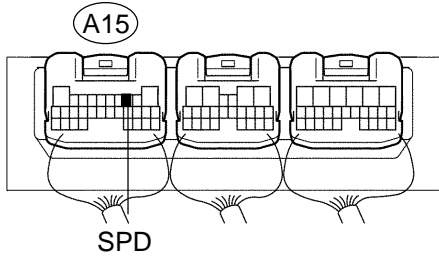
WIRING DIAGRAM



INSPECTION PROCEDURE

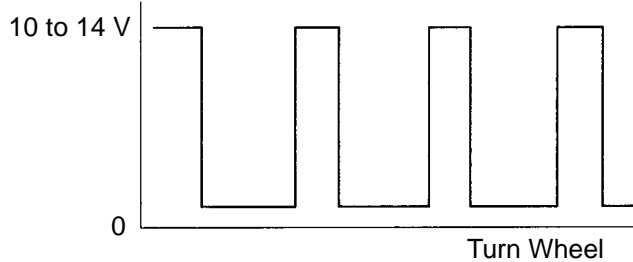
1 INSPECT AIR CONDITIONING AMPLIFIER(SPD)

Air Conditioning Amplifier:



I33663

- (a) Remove A/C amplifier with the connectors being connected.
- (b) Shift the shift lever to neutral.
- (c) Lift up the vehicle.
- (d) Turn the ignition switch to ON.
- (e) Measure voltage between terminal SPD of the A/C amplifier connector and body ground when the front wheel is turned slowly.

Voltage is generated intermittently.

A07133

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)**

NG

2 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - A/C AMPLIFIER) (See page 01-36)

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

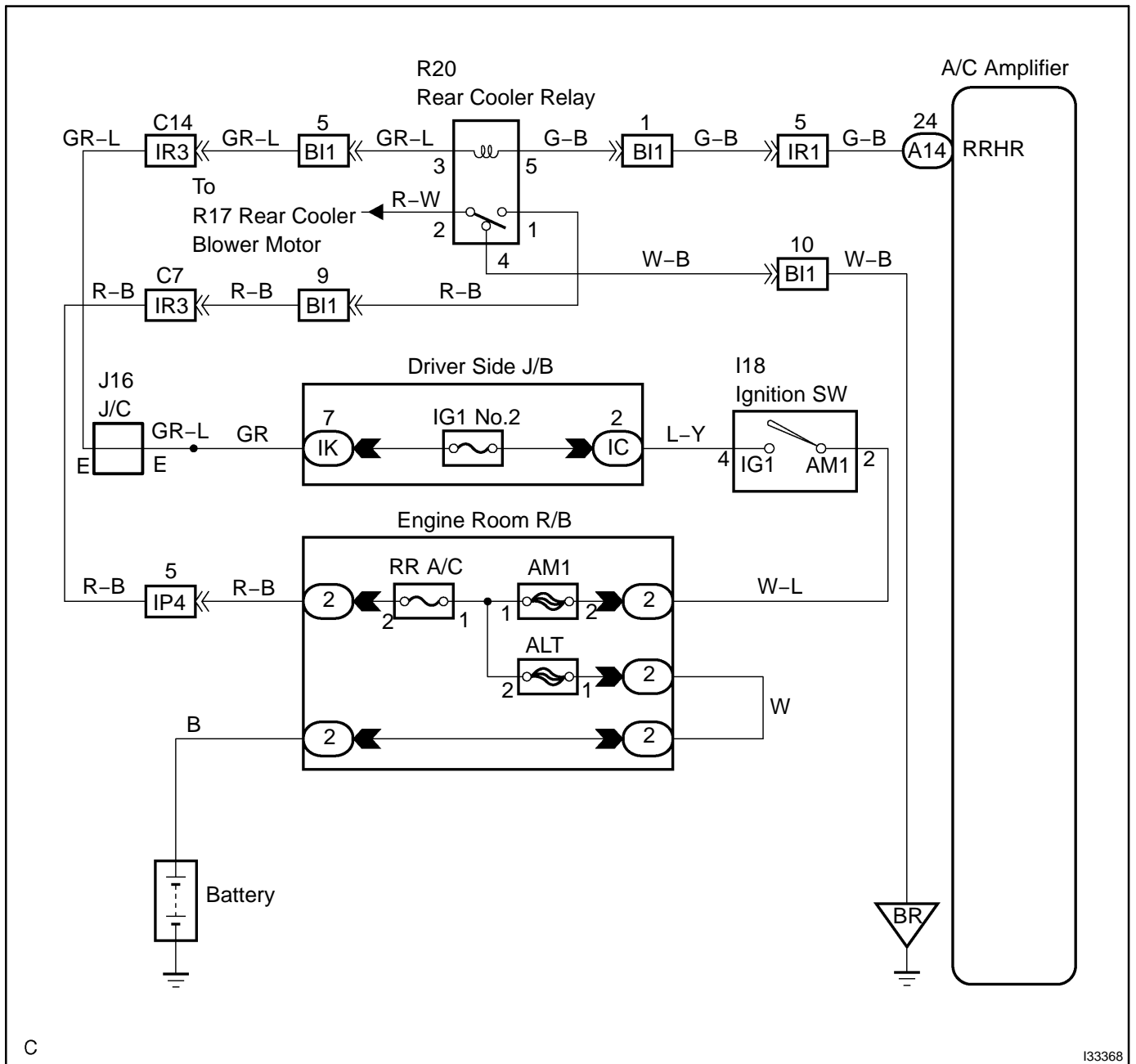
REPLACE COMBINATION METER ASSY

REAR COOLER RELAY CIRCUIT

CIRCUIT DESCRIPTION

The rear A/C relay is switched on by signals from the A/C amplifier. It supplies power to the rear blower motor.

WIRING DIAGRAM



C

I33368

INSPECTION PROCEDURE

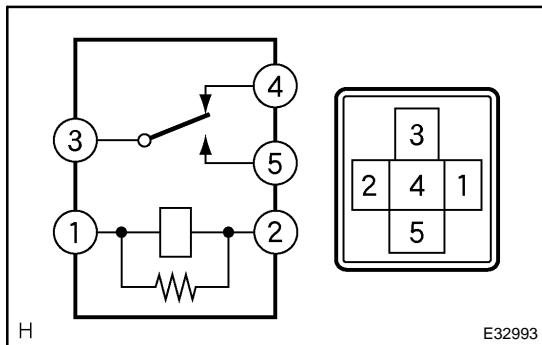
1 CHECK FUSE(RR A/C)

- (a) Remove the RR A/C fuse from the engine room R/B.
- (b) Check that the continuity exists of RR A/C fuse.

NG → REPLACE FUSE

OK

2 INSPECT COOLER RELAY ASSY



- (a) Check that the continuity exists between each pair of terminals of cooler relay assy, as shown in the chart.

Standard:

Tester connection	Specified condition
3 - 5	No continuity
3 - 4	Continuity
1 - 2	62.5 - 90.9 Ω

- (b) Apply battery voltage between terminal 1 and 2.
- (c) Check continuity each pair of terminals, as shown in the chart.

Standard:

Tester connection	Specified condition
3 - 5	Continuity
3 - 4	No continuity

NG → REPLACE COOLER RELAY ASSY

OK

3 CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - BATTERY) (See page 01-36)

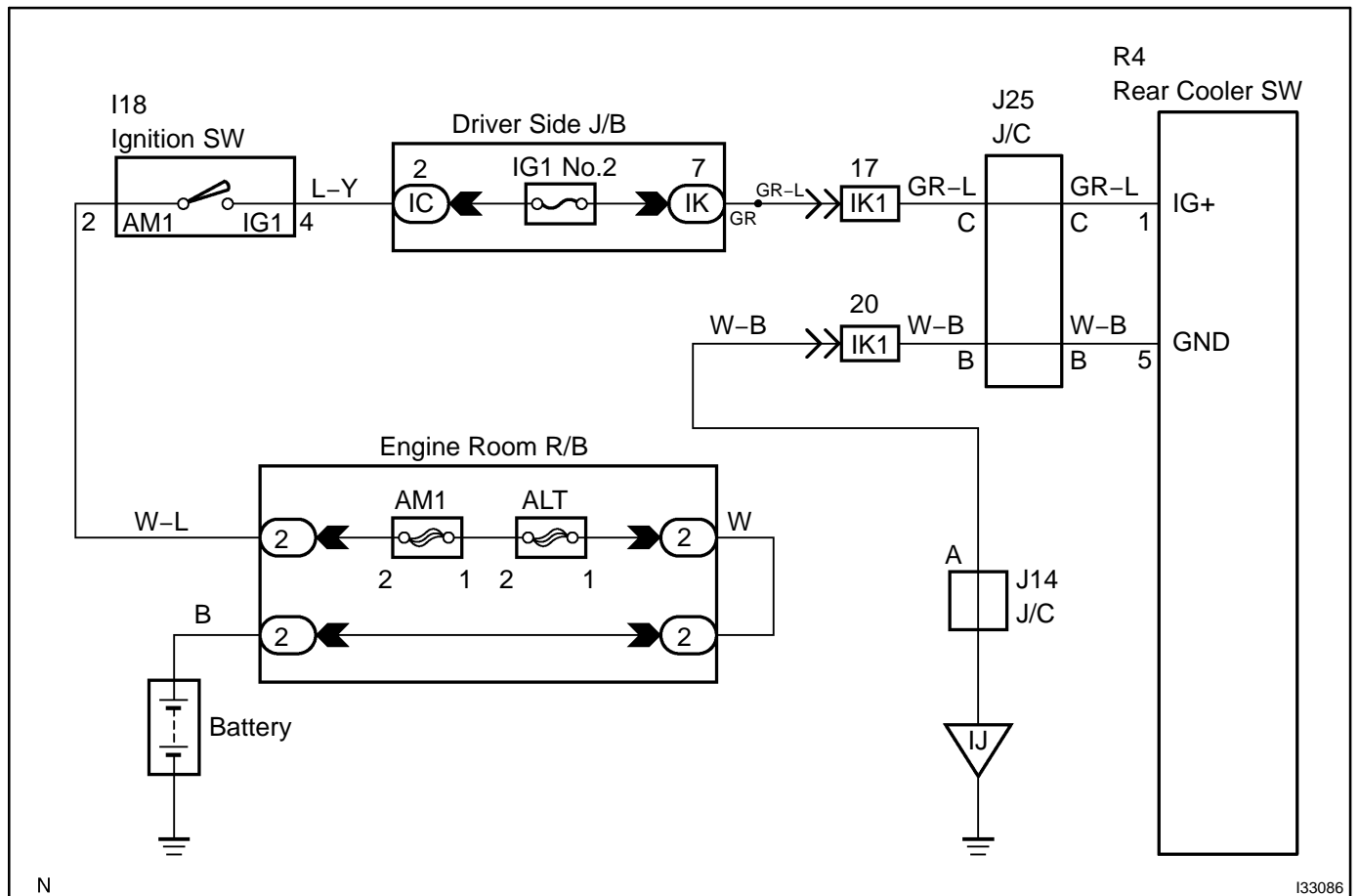
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)**

REAR COOLER CONTROL PANEL CIRCUIT

WIRING DIAGRAM

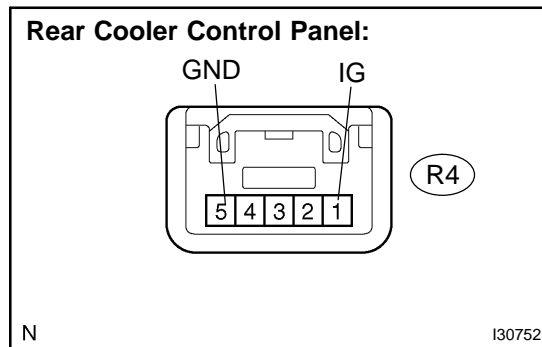


N

I33086

INSPECTION PROCEDURE

1 CHECK REAR COOLER CONTROL PANEL(IG, GND)



- (a) Remove rear cooler control panel with being connected.
 - (b) Turn ignition switch ON.
 - (c) Measure voltage between terminal IG and GND of rear cooler control panel.
- Voltage: 10 to 14 V**

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

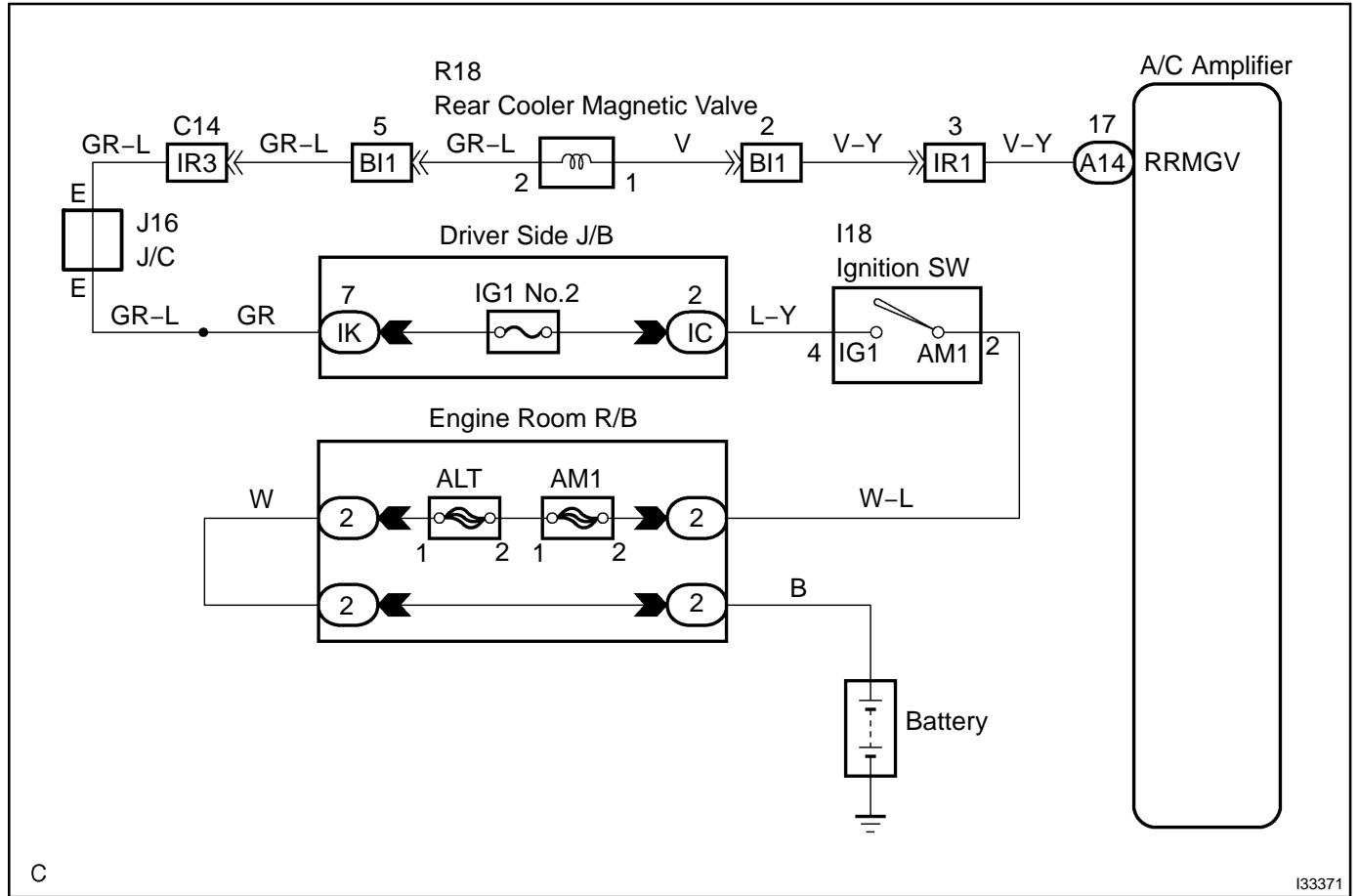
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-1118)

REAR MAGNETIC VALVE CIRCUIT

CIRCUIT DESCRIPTION

The rear magnetic valve (rear cooling unit expansion valve) is controlled by A/C amplifier and rear A/C switch operation.

WIRING DIAGRAM

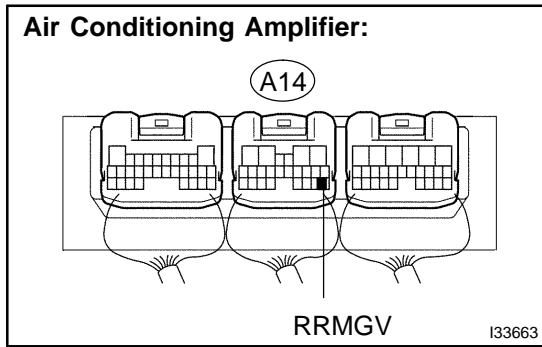


C

I33371

INSPECTION PROCEDURE

1 INSPECT AIR CONDITIONING AMPLIFIER(RRMGV)



- (a) Remove A/C amplifier with the connectors being connected.
- (b) Turn ignition switch to ON.
- (c) Rear cooler SW ON.
- (d) Measure voltage between terminal RRMGV of A/C amplifier connector and body ground.

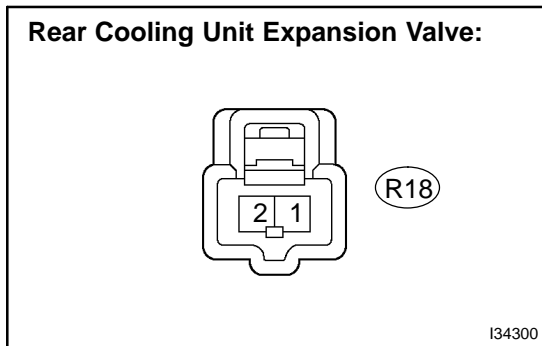
OK:

Voltage: Below 1.0 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-1118)**

NG

2 CHECK REAR COOLING UNIT EXPANSION VALVE



- (a) Remove the rear cooling unit expansion valve.
 - (1) Check the air passage through the valve with and without the battery positive voltage applied between terminals as shown in the chart.

Standard:

Condition	Air passage
Apply B+ between terminals	Free passage
Not apply B+ between terminals	No passage

NG → **REPLACE REAR COOLING UNIT EXPANSION VALVE**

OK

3 CHECK HARNESS AND CONNECTOR(A/C AMPLIFIER - BATTERY) (See page 01-36)

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

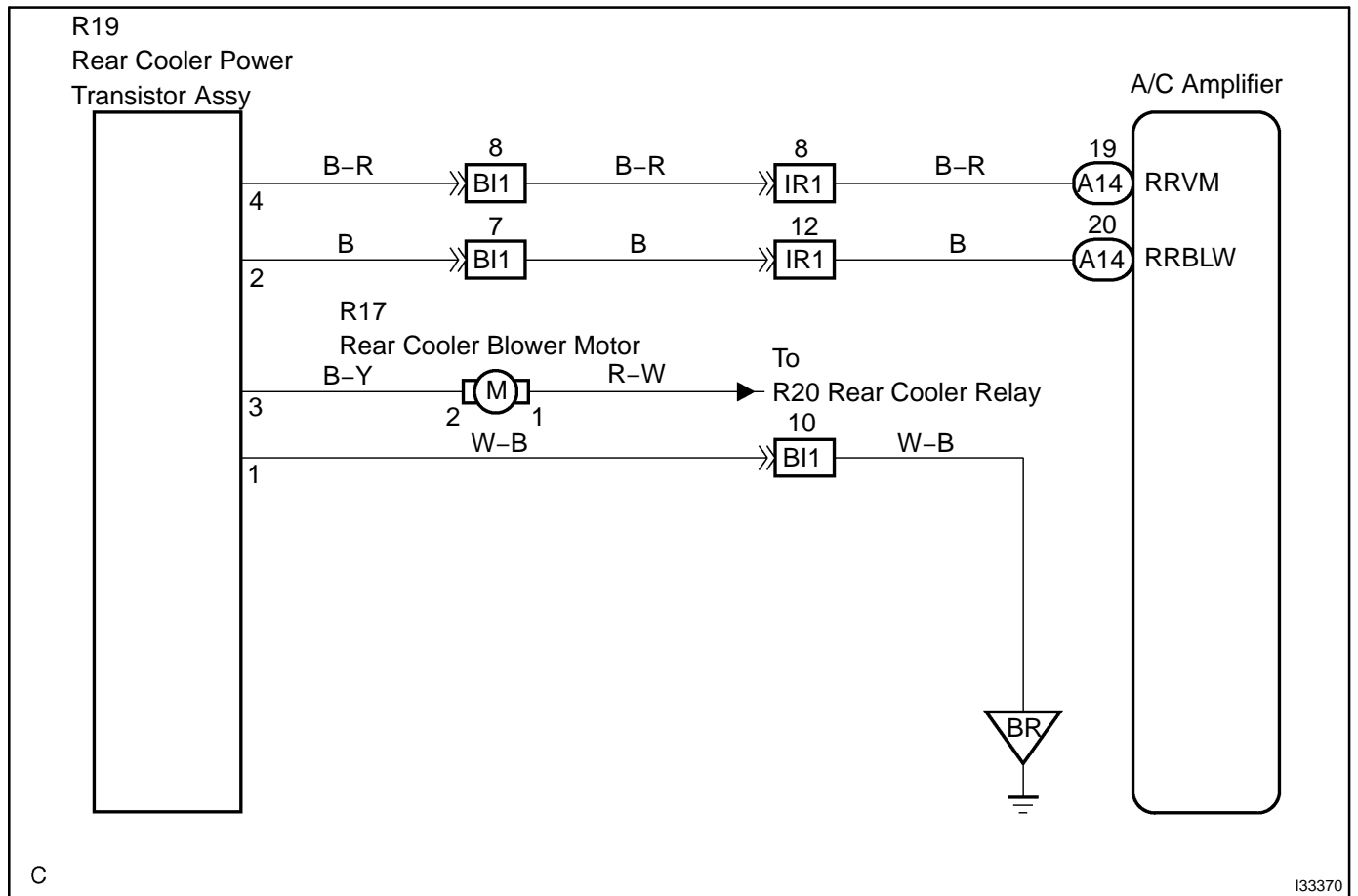
CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)

REAR BLOWER MOTOR CIRCUIT

CIRCUIT DESCRIPTION

This is the power source for rear blower motor.

WIRING DIAGRAM

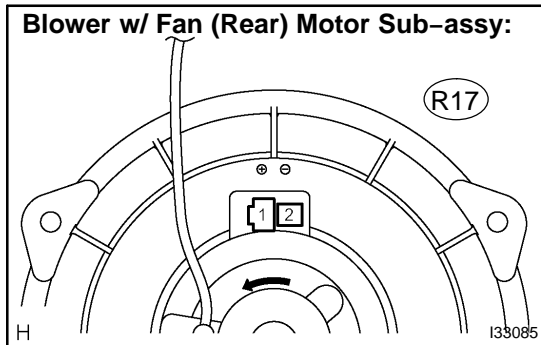


C

133370

INSPECTION PROCEDURE

1 INSPECT BLOWER W/FAN (REAR) MOTOR SUB-ASSY



- (a) Remove the blower w/fan (rear) motor sub-assy.
 (b) Connect positive (+) lead connected to terminal 2 of blower w/fan (rear) motor sub-assy connector, negative (-) lead to terminal 1.

Standard: Blower w/fan (rear) motor sub-assy operates smoothly.

NG

REPLACE BLOWER W/FAN (REAR) MOTOR SUB-ASSY

OK

2 CHECK HARNESS AND CONNECTOR(BLOWER RESISTOR TRANSISTOR ASSY - BODY GROUND) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(BLOWER RESISTOR TRANSISTOR ASSY - BLOWER W/ FAN (REAR) MOTOR SUB-ASSY) (See page 01-36)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(BLOWER RESISTOR TRANSISTOR ASSY - A/C AMPLIFIER) (See page 01-36)

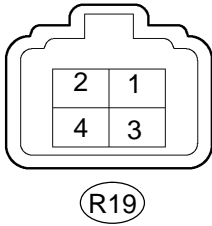
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT BLOWER RESISTOR TRANSISTOR ASSY

Blower Resistor Transistor Assy:



N

I34251

- (a) Remove the blower resistor transistor assy with connector.
- (b) Check the blower resistor transistor assy.

Standard:

Tester connection	Condition	Specified condition
2 - 1	Ignition SW ON	5V
3 - 4	Always	1.98 to 2.42 Ω
1 - Body ground	Always	Continuity

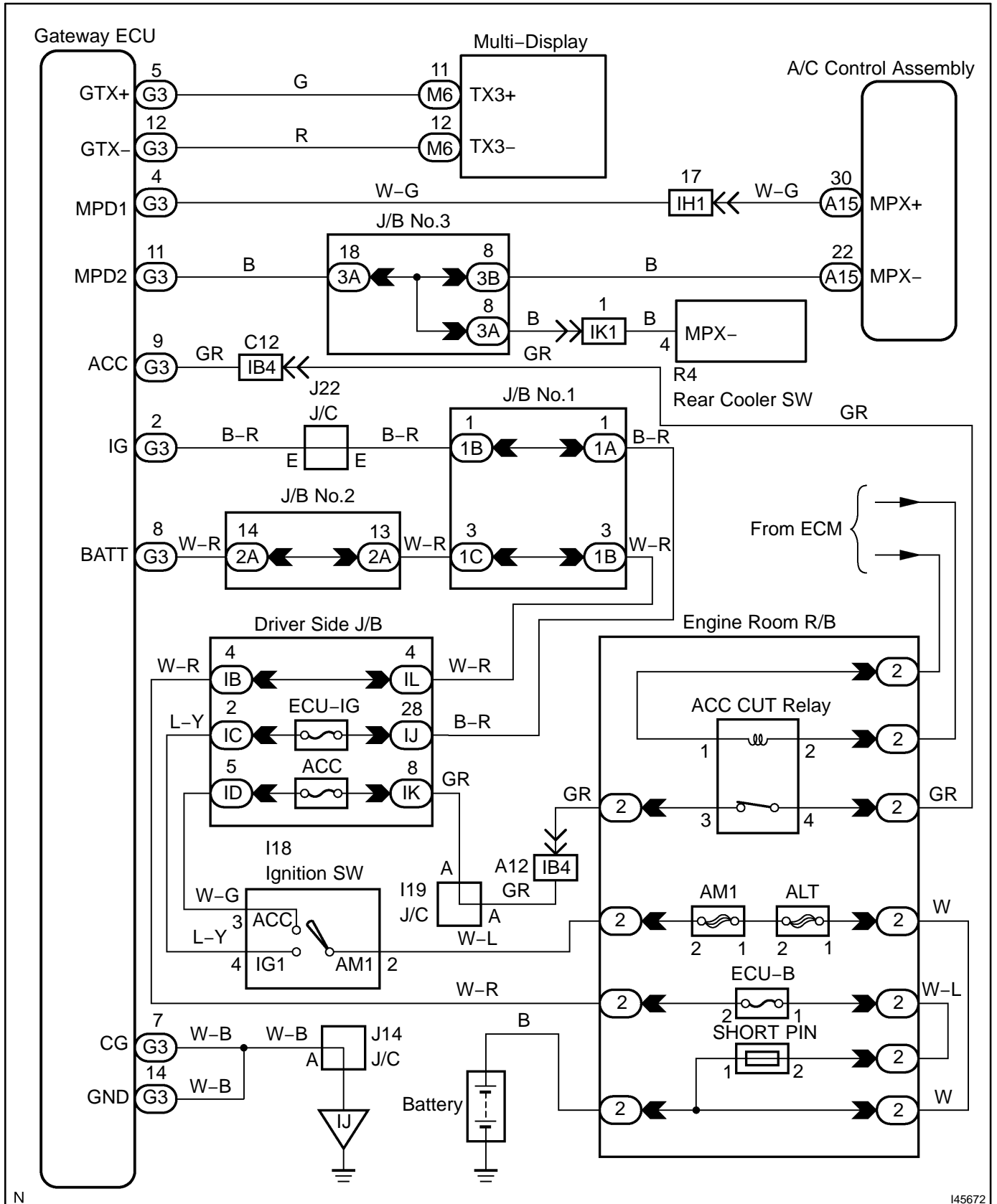
NG → **REPLACE BLOWER RESISTOR TRANSISTOR ASSY**

OK

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page 05-1111)

HEATER CONTROL PANEL COMMUNICATION CIRCUIT

WIRING DIAGRAM



N

I45672

INSPECTION PROCEDURE**1 SERVICE CHECK MODE(NETWORK GATEWAY ECU)**(a) Perform service check (See page [05-1722](#)).

A	B
"NCON" is display or "G/W" is not displayed	"G/W: OK" is displayed

B → **Go to step 5**

A

2 CHECK HARNESS AND CONNECTOR(NETWORK GATEWAY ECU - A/C AMPLIFIER) (See page [01-36](#))

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 CHECK HARNESS AND CONNECTOR(NETWORK GATEWAY ECU - REAR A/C SWITCH) (See page [01-36](#))

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

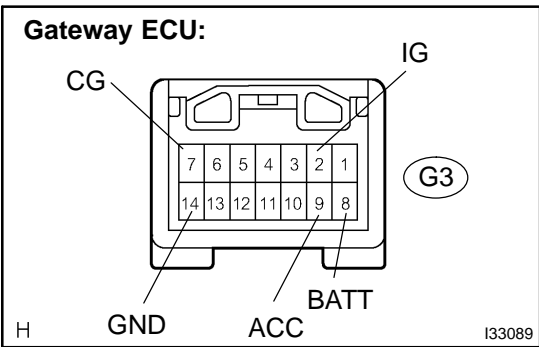
4 CHECK AND REPLACE NETWORK GATEWAY ECU (See page [01-36](#))

OK → **REPLACE NETWORK GATEWAY ECU**

NG

CHECK AND REPLACE AIR CONDITIONING AMPLIFIER (See page [05-1111](#))

5 CHECK HARNESS AND CONNECTOR(BATT, ACC, IG, CG, GND)



- (a) Remove the network gateway ECU with the connector being connected.
- (b) Check voltage
 - (1) Measure voltage between terminal BATT, ACC, IG and GND of network gateway ECU at each conditions, as shown in the chart.

Standard:

Terminal	Condition	Voltage (V)
BATT - GND	Always	10 to 14
ACC - GND	Turn ignition SW: ACC	10 to 14
IG - GND	Turn ignition SW: ON	10 to 14

- (c) Check continuity
 - (1) Check that the continuity exists between terminal CG, GND of network gateway ECU and body ground.

Standard: Continuity exists.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY (CRT DISPLAY) DISPLAY - NETWORK GATEWAY ECU) (See page 01-36)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7 CHECK AND REPLACE NETWORK GATEWAY ECU (See page 01-36)

OK → REPLACE NETWORK GATEWAY ECU

NG

CHECK AND REPLACE MULTI-DISPLAY (CRT DISPLAY) DISPLAY

SUPPLEMENTAL RESTRAINT SYSTEM

05IV0-05

PRECAUTION

1. HANDLING PRECAUTIONS AIRBAG SENSOR

HINT:

In this section, the airbag sensor assy center, airbag sensor front LH, airbag sensor front RH, side airbag sensor assy LH, side airbag sensor assy RH, airbag sensor rear LH, airbag sensor rear RH and seat position airbag sensor are collectively referred to as the airbag sensor.

- (a) Before starting the following operations, wait at least 90 seconds after disconnecting the negative (-) terminal of the battery:
 - (1) Replacement of the airbag sensor.
 - (2) Adjustment of the front/rear door of the vehicle equipped with the side airbag and curtain shield airbag (fitting adjustment).
- (b) When connecting or disconnecting the airbag sensor connector, ensure that all of the sensors are installed in the vehicle.
- (c) Do not use an airbag sensor which has been dropped during the operation or transportation.
- (d) Do not disassemble the airbag sensor.

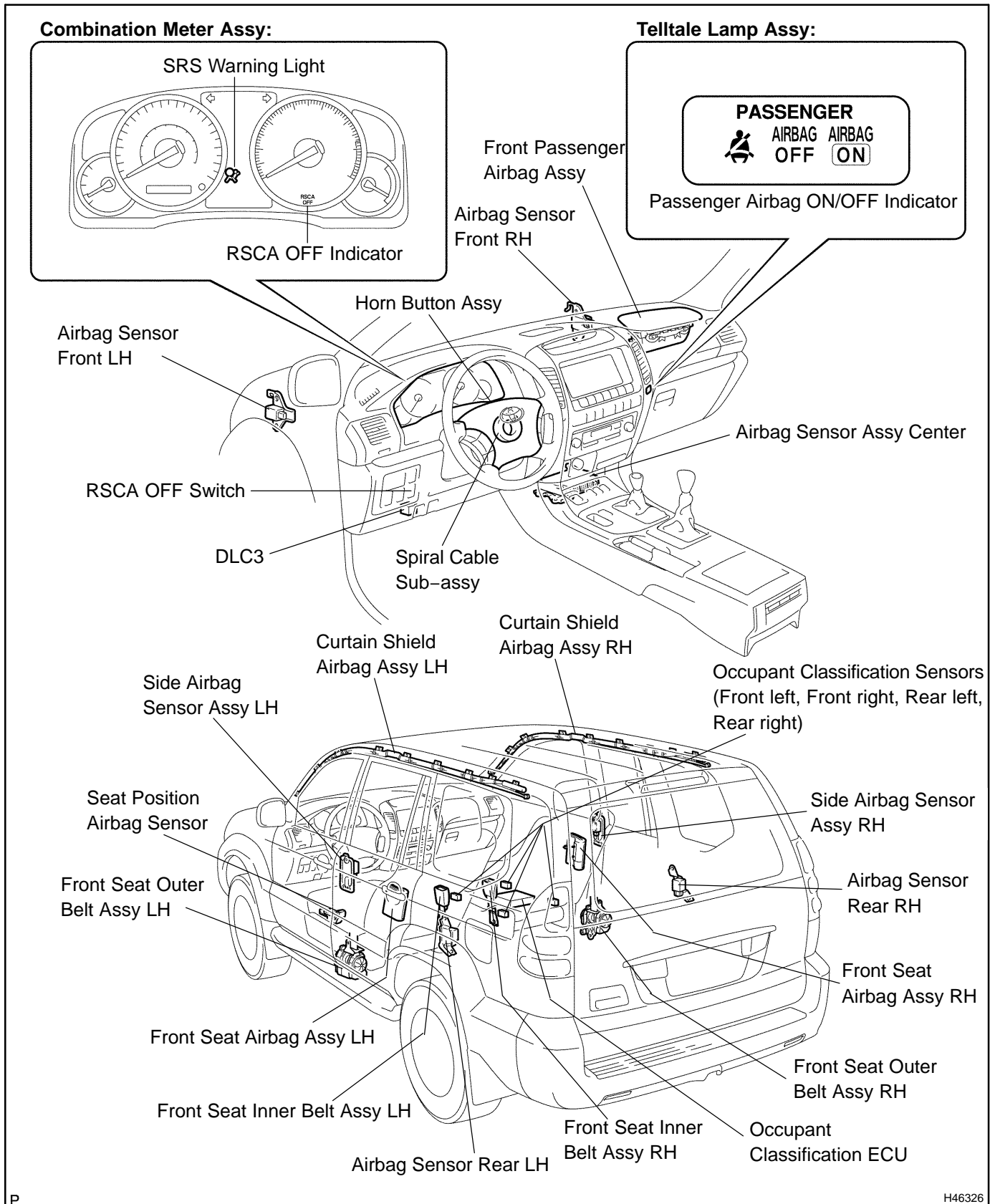
2. INSPECTION PROCEDURE FOR VEHICLE INVOLVED IN ACCIDENT

- (a) When the airbag has not deployed, confirm the DTC by checking the SRS warning light. If there is any malfunction in the SRS airbag system, perform troubleshooting.
- (b) When any of the airbags have deployed, replace the airbag sensor and check the installation condition.
- (c) Perform the zero point calibration and sensitivity check if any of the following conditions occur.
 - The occupant classification ECU is replaced.
 - Accessories (seatback tray and seat cover, etc.) are installed.
 - The passenger seat is removed from the vehicle.
 - The passenger airbag ON/OFF indicator ("OFF") comes on when the passenger seat is not occupied.
 - The vehicle is brought to the workshop for repair due to an accident or collision.

NOTICE:

When an accident vehicle is brought into the workshop for repair, check the flatness of the body side that is equipped with the passenger seat. If the flatness is not within ± 3.0 mm (0.118 in.), adjust it to the specified range.

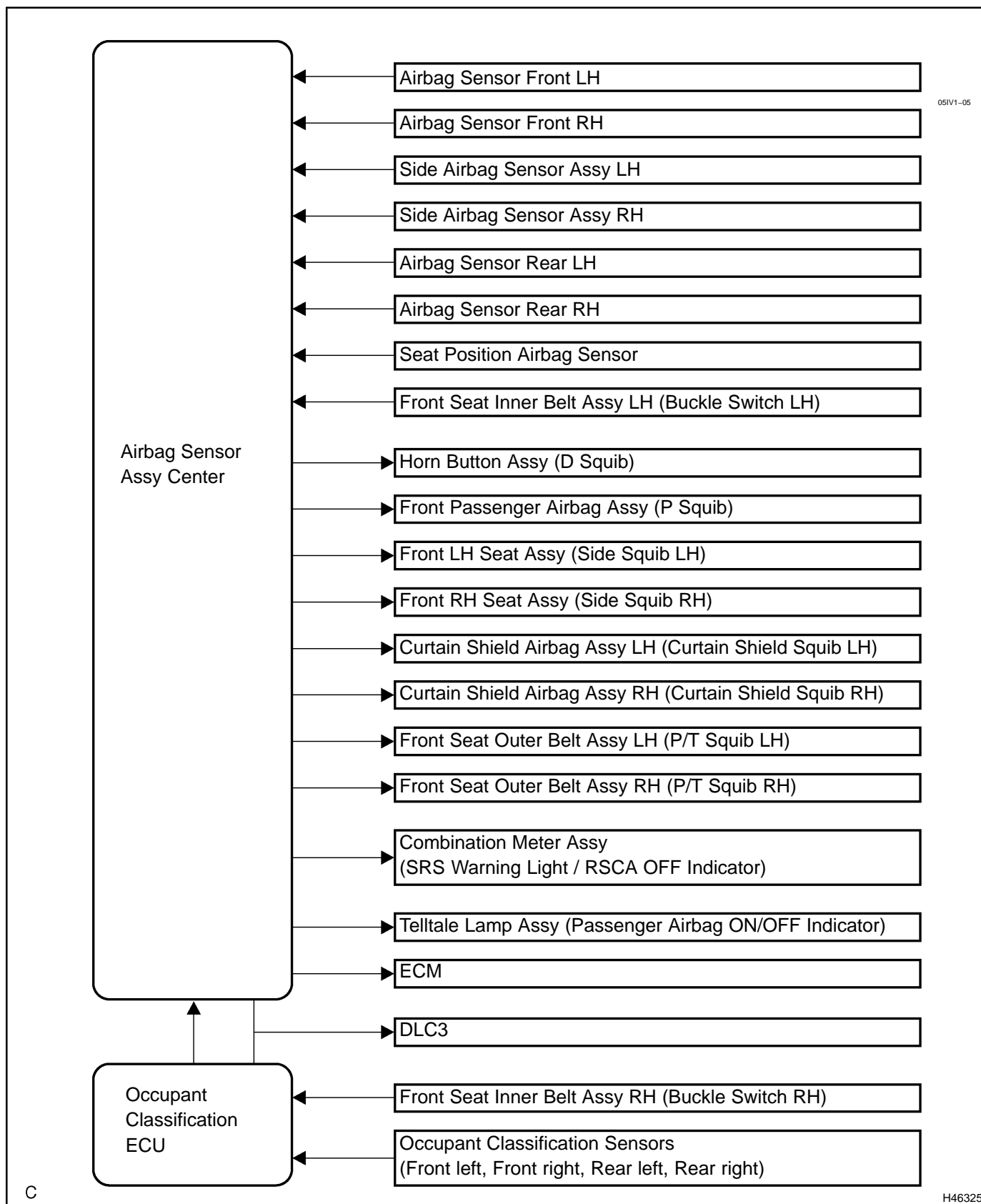
LOCATION



P

H46326

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. DESCRIPTION OF SUPPLEMENTAL RESTRAINT SYSTEM

(a) General description.

- (1) In this system, the airbag sensor assy center installed on the floor under the A/C unit determines whether or not to activate the SRS airbags (driver airbag, passenger airbag, front seat airbags and curtain shield airbags) and seat belt pretensioners by receiving the collision signal from each sensor (excluding the airbag sensor assy center). When there is trouble in the system, the airbag sensor assy center turns on the SRS warning light on the combination meter assy to inform the driver.

(b) Description of the dual stage control.

- (1) The airbag sensor assy center controls the dual stage deployment of the driver airbag in the horn button assy and the passenger airbag on the instrument panel. The airbag sensor assy center controls the dual stage deployment of the driver airbag according to the collision impact, seat position and seat belt ON/OFF state. It also controls the dual stage deployment of the passenger airbag according to the collision impact and seat belt ON/OFF state.

(c) Description of check mode (signal check).

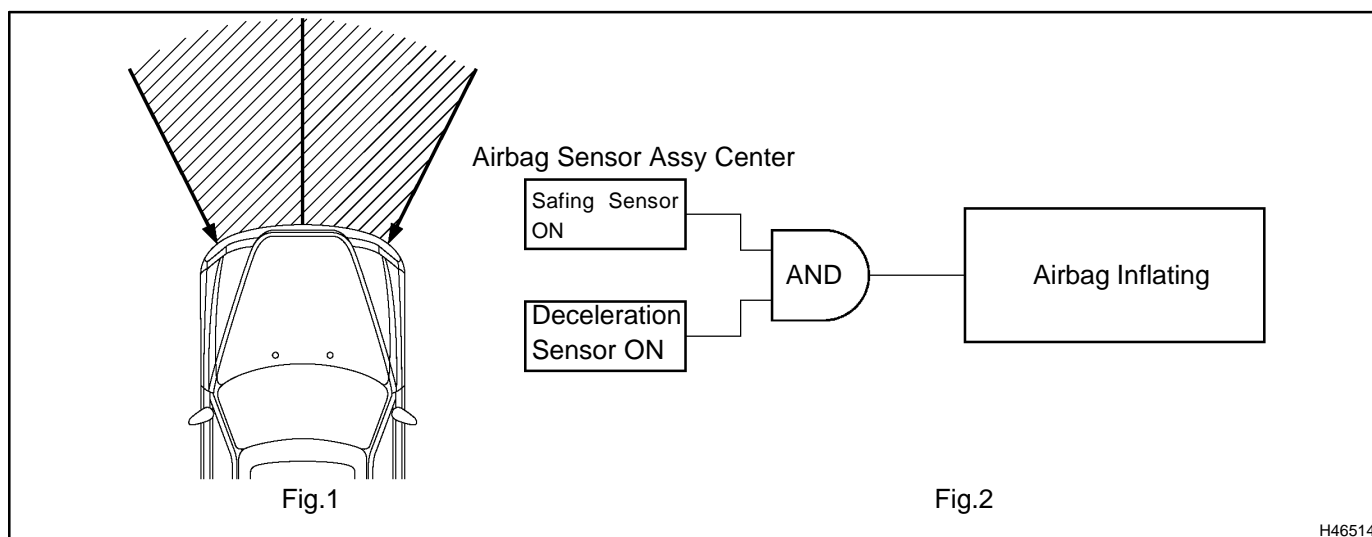
- (1) This airbag sensor assy center is operable using the check mode of the hand-held tester function. Check mode can detect and output DTC by using a hand-held tester to switch the airbag sensor assy center to the check mode.

A simulation method is used if the malfunction cannot be reproduced during troubleshooting (the malfunction is temporarily solved, etc.). In this case, joggling each connector, or driving on a city or rough road with the airbag sensor assy center in check mode makes it possible to obtain a more accurate malfunction condition.

2. IGNITION JUDGEMENT AND CONDITIONS

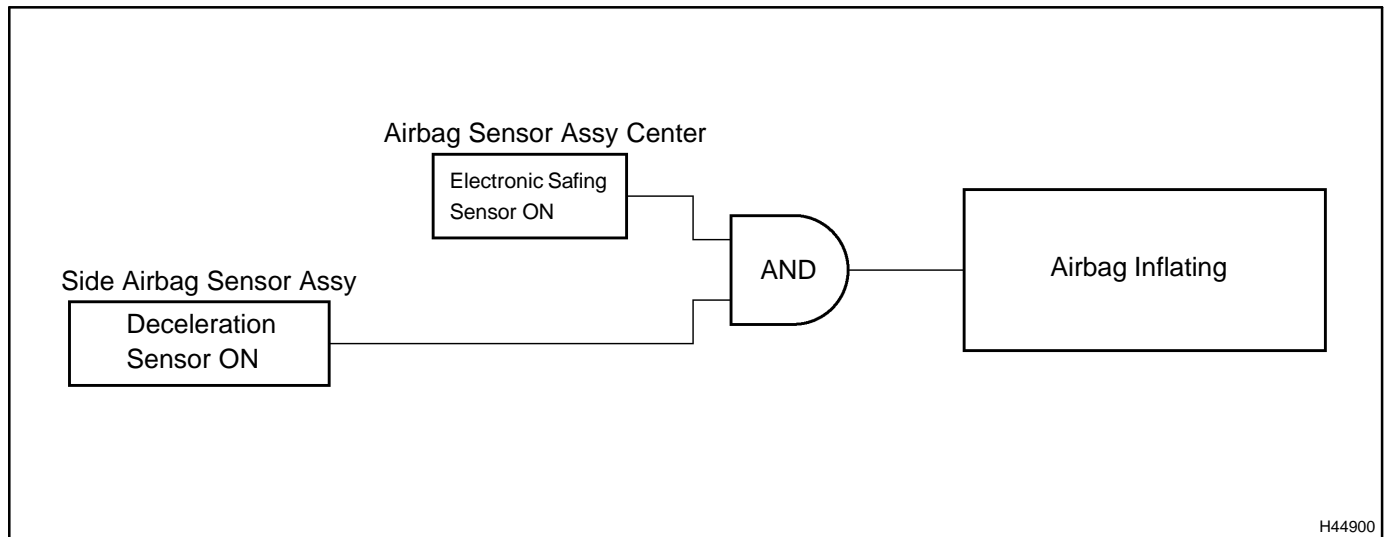
(a) Operation in case of front collision.

- (1) When the vehicle collides in the hatched area (Fig.1) and shock is larger than a predetermined level, the airbags (driver and front passenger) are activated automatically. The deceleration sensor of the airbag sensor assy center determines the need for ignition in response to collisions within the hatched area based on the signal from the deceleration sensor of the front airbag sensor.
- (2) The safing sensor of the airbag sensor assy center is designed to activate at a smaller deceleration rate than the deceleration sensor. As illustrated in Fig.2 below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.

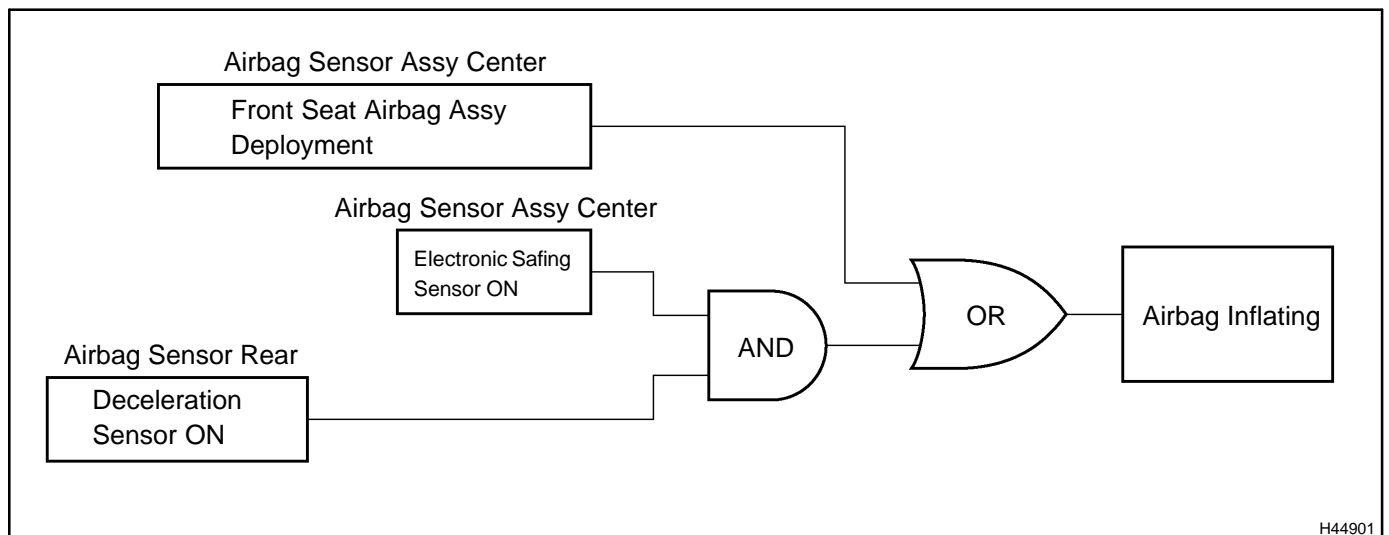


H46514

- (b) Operation in case of front side collision.
- (1) Electronic safing sensor of the side airbag sensor assy is designed to activate at a smaller deceleration rate than the deceleration sensor of the side airbag sensor assy. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



- (c) Operation in case of rear side collision.
- (1) Electronic safing sensor of the airbag sensor assy center is designed to activate at a smaller deceleration rate than the deceleration sensor of the airbag sensor rear. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



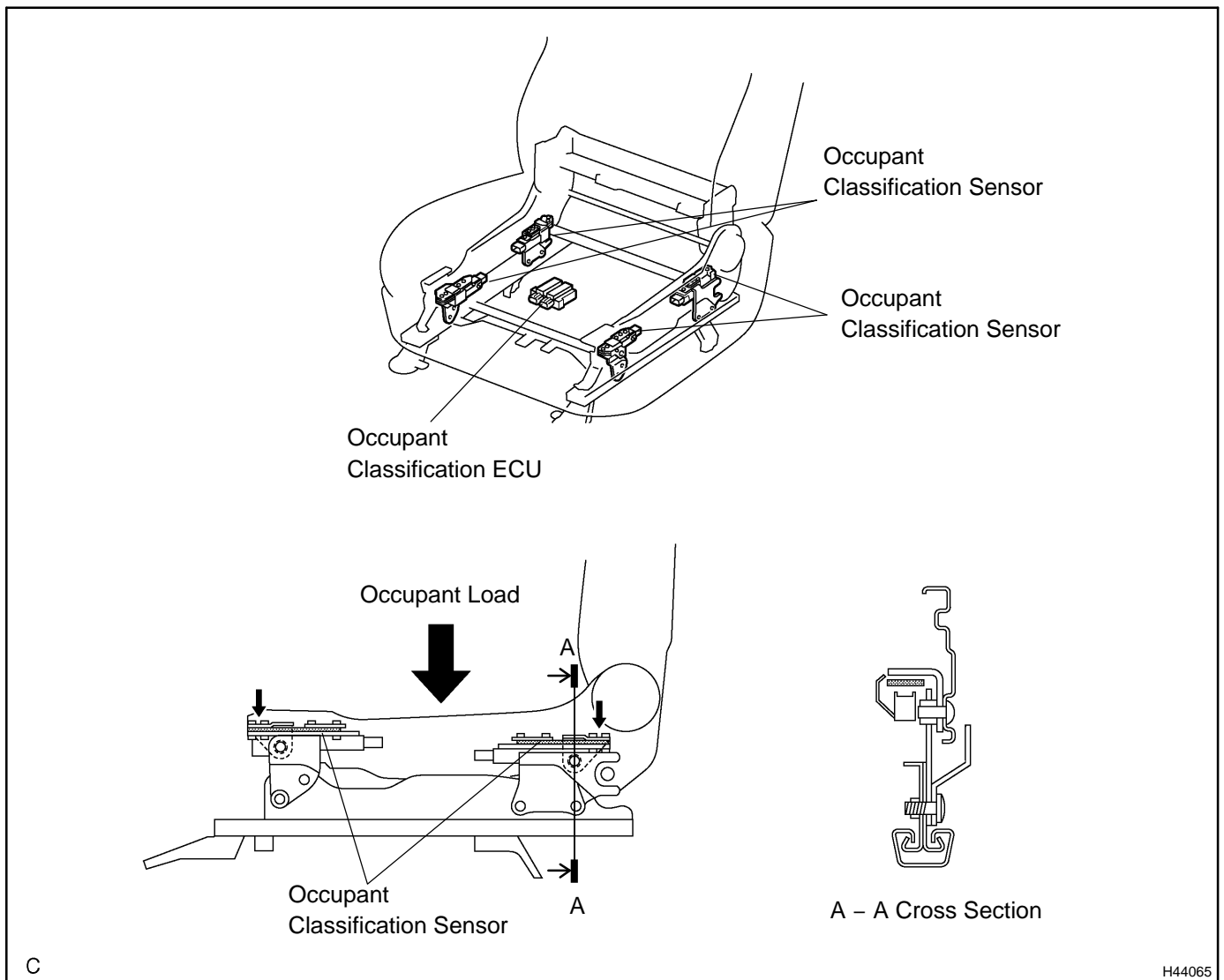
3. DESCRIPTION OF PASSENGER OCCUPANT CLASSIFICATION SYSTEM

(a) GENERAL DESCRIPTION.

- (1) In the passenger occupant classification system, the occupant classification ECU calculates the weight of the occupant based on a signal from the occupant classification sensor. This system recognizes the occupant to be a child if it detects a weight of less than 36 kg (79.37 lb), and disables the front and side airbags.
- (2) This system is mainly comprised of 4 occupant classification sensors that detect the load on the front passenger seat. The occupant classification ECU controls the system, and the passenger airbag ON/OFF indicator indicates the ON/OFF condition of the front passenger airbag assy and front passenger seat airbag assy.

(b) OCCUPANT CLASSIFICATION SENSOR.

- (1) The occupant classification sensors are installed on the 4 brackets connecting the seat rail and seat frame. Accordingly, when a load is applied to the passenger seat by an occupant sitting in it, the occupant classification sensors register a distortion.



HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used in steps 3, 4, 6, 9 and 10.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE [05-1208](#))

NEXT

3 CHECK DTC (Present and Past DTC) (SEE PAGE [05-1219](#))

DTC IS OUTPUT: Go to step 4

DTC IS NOT OUTPUT: PROBLEM SYMPTOMS TABLE (SEE PAGE [05-1229](#))

DTC B1150/23 IS OUTPUT: Go to step 4

4 DTC CHART (SEE PAGE [05-1230](#))

NEXT

5 CIRCUIT INSPECTION (SEE PAGE [05-1235](#) TO [05-1524](#))

TROUBLE CODE IS OUTPUT: Go to step 7

NORMAL SYSTEM CODE IS OUTPUT: Go to step 11

6 IDENTIFICATION OF PROBLEM

NEXT

7 REPAIR

NEXT

8 CLEAR DTC (Present and Past DTC) (SEE PAGE [05-1219](#))

NEXT

9 CHECK DTC (SEE PAGE [05-1219](#))

DTC CODE IS NOT OUTPUT: Go to step 10

DTC CODE IS OUTPUT: Go to step 5

10	SYMPTOM SIMULATION (SEE PAGE 01-36)
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 **WARNING LIGHT REMAINS OFF: Go to step 11**

 **WARNING LIGHT IS ON: Go to step 4**

11	CONFIRMATION TEST
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NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's
Name _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In		Odometer Reading	km miles

Date Problem Occurred	
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Other
Temperature	Approx.

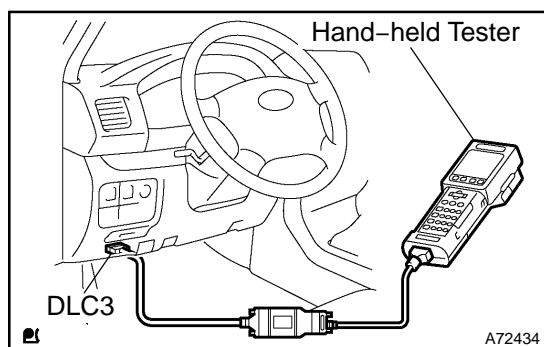
Vehicle Operation	<input type="checkbox"/> Starting <input type="checkbox"/> Idling <input type="checkbox"/> Driving [<input type="checkbox"/> Constant speed <input type="checkbox"/> Acceleration <input type="checkbox"/> Deceleration <input type="checkbox"/> Other]
Road Condition	
Details of Problem	

Vehicle Inspection, and Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	
---	--

Diagnostic System Inspection

SRS Warning Light Inspection	1st Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Sometimes comes on <input type="checkbox"/> Does not come on
	2nd Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Sometimes comes on <input type="checkbox"/> Does not come on
Passenger Airbag ON/OFF Indicator Inspection	1st Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not come on
	2nd Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not come on
DTC Inspection	1st Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code [Code.]
	2nd Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code [Code.]

INITIALIZATION



1. ZERO POINT CALIBRATION AND SENSITIVITY CHECK

NOTICE:

Make sure that the seat is not occupied before performing the operation.

HINT:

Perform zero point calibration and sensitivity check if any of the following conditions occur:

- The occupant classification ECU is replaced.
- Accessories (seatback tray and seat cover, etc.) are installed.
- The passenger seat is removed from the vehicle.
- The passenger airbag ON/OFF indicator ("OFF") comes on when the front passenger seat is not occupied.
- The vehicle is brought to the workshop for repair due to an accident or a collision.

(a) Zero point calibration and sensitivity check procedures.

HINT:

Make sure that zero point calibration has finished normally, and then perform sensitivity check.

- (1) Adjust the seat position according to the table below.

Adjustment Component	Position
Slide Direction	Rearmost position
Reclining Angle	Upright position
Headrest Height	Lowest position
Lifter Height	Lowest position

- (2) Connect the hand-held tester to the DLC3.
- (3) Turn the ignition switch to the ON position.
- (4) Perform zero point calibration by following the prompts on the tester screen shown in 2 pages later.

HINT:

Refer to the hand-held tester operator's manual for further details.

OK: "COMPLETE" is displayed.

- (5) Perform sensitivity check by following the prompts on the tester screen shown in 2 pages later.
- (6) Confirm that the beginning sensor reading is within the standard value.

Standard value: -3.2 to 3.2 kg (-7 to 7 lb)

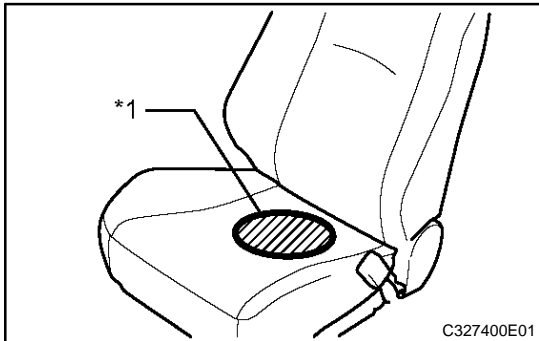
- (7) Place a 30 kg (66.14 lb) weight (eg. a 30 kg (66.14 lb) of lead mass) onto the passenger seat.

NOTICE:

- **Do not allow the weight to come into contact with the seatback when placing it on the seat cushion.**
- **Place the weight in the area shown in the illustration.**

Text in Illustration

*1	Weight Position
----	-----------------



- (8) Confirm that the sensitivity is within the standard value.

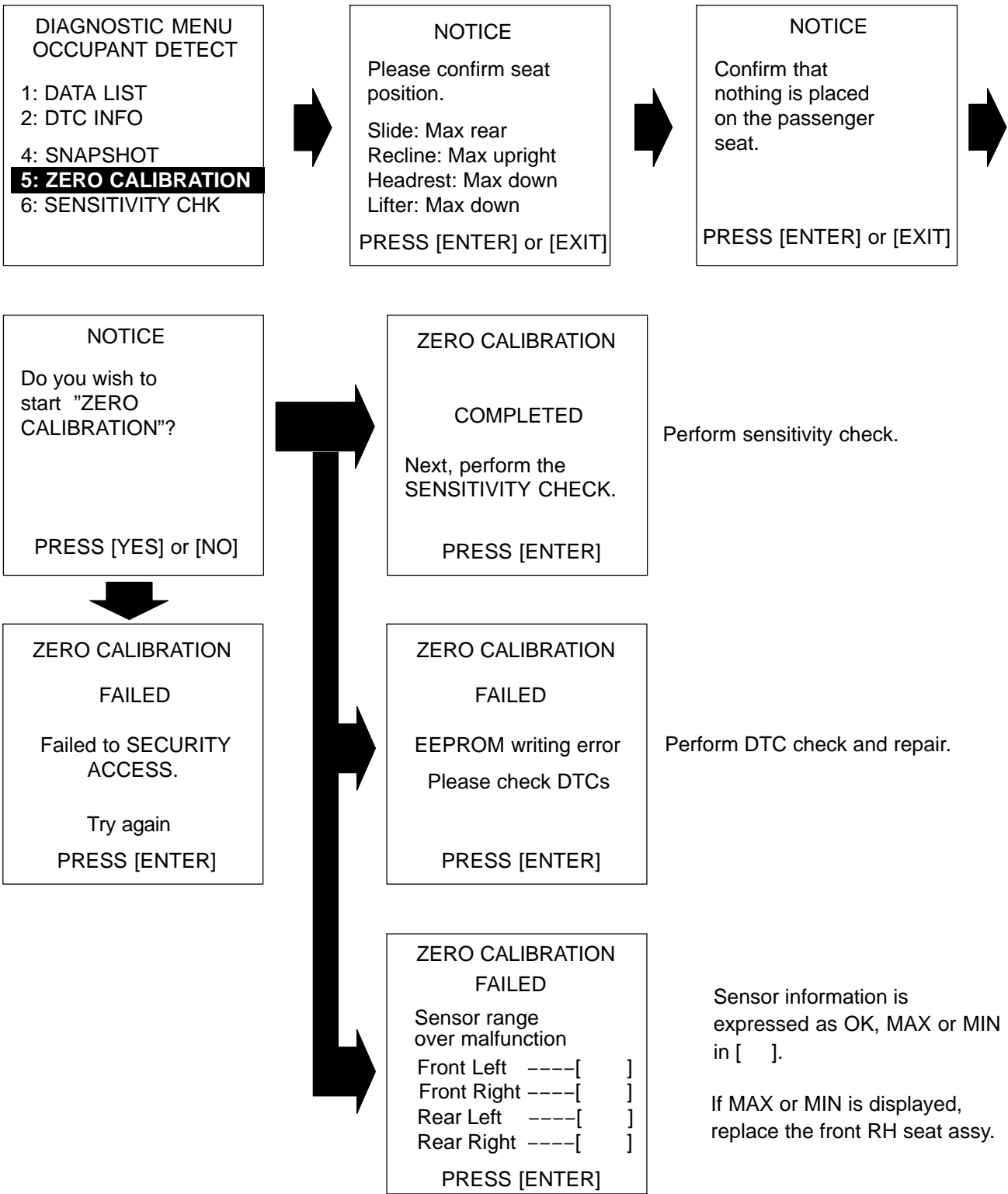
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

HINT:

- When performing sensitivity check, use a solid metal weight (the check result may not appear properly if the weight made from liquid is used).
- When the sensitivity deviates from the standard value, retighten the bolts of the passenger seat taking care not to deform the seat rail. After performing this procedure, if the sensitivity is not within the standard value, replace the front RH seat assy.
- When zero point calibration has not finished normally, replace the front RH seat assy.

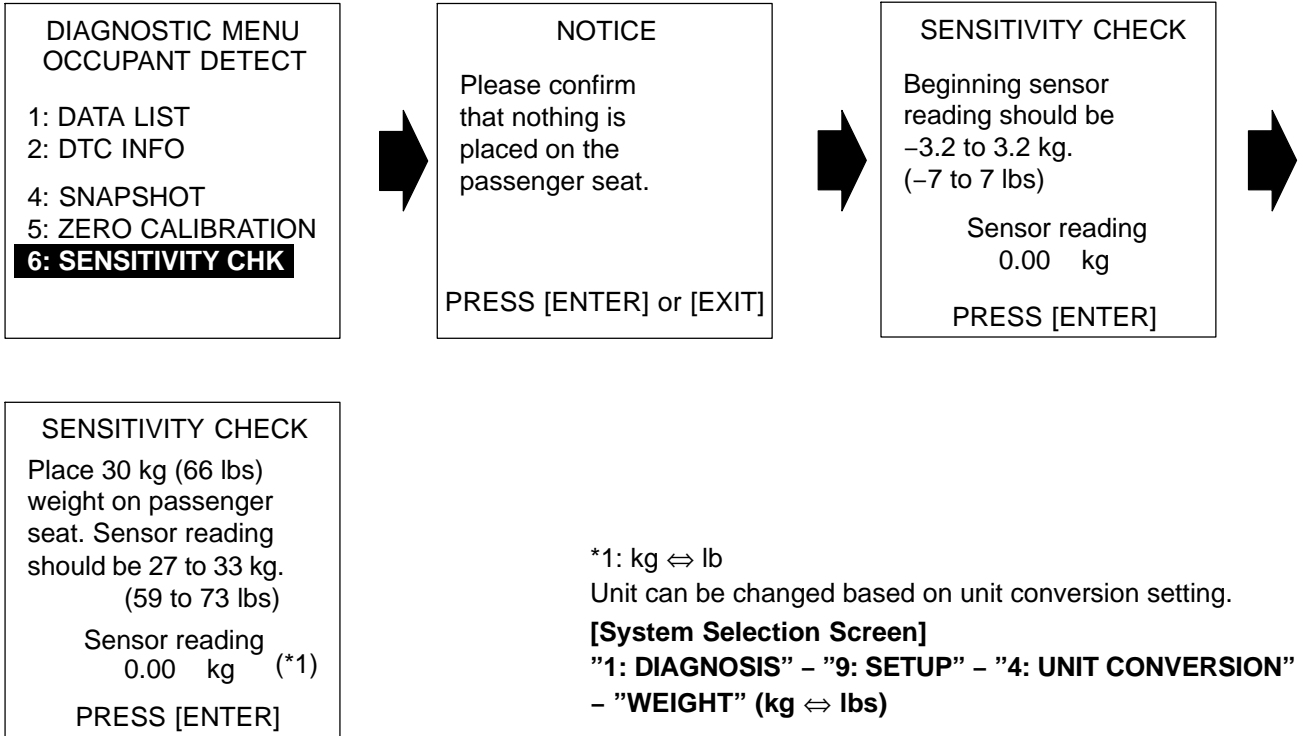
ZERO POINT CALIBRATION PROCEDURE

"1: DIAGNOSIS" - "1: OBD/MOBD" - "MODEL YEAR" - "MODEL SELECTION = LEXUS GX470" -
Select the option parts - "9: OCCUPANT DETECT" - Refer to the following screen flow.



SENSITIVITY CHECK PROCEDURE

"1: DIAGNOSIS" - "1: OBD/MOBD" - "MODEL YEAR" - "MODEL SELECTION = LEXUS GX470" -
 Select the option parts - "9: OCCUPANT DETECT" - Refer to the following screen flow.



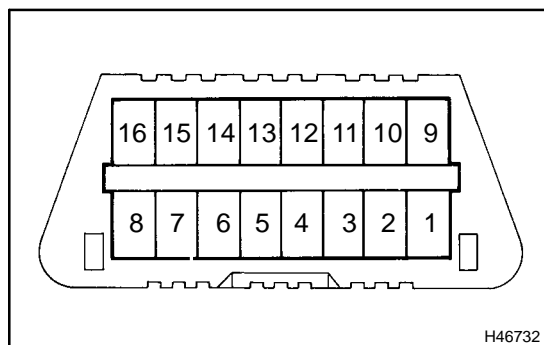
*1: kg ⇔ lb

Unit can be changed based on unit conversion setting.

[System Selection Screen]

"1: DIAGNOSIS" - "9: SETUP" - "4: UNIT CONVERSION"
 - "WEIGHT" (kg ⇔ lbs)

DIAGNOSIS SYSTEM



1. CHECK DLC3

- (a) The vehicle's ECM conforms to ISO 9141-2 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and meets the ISO 9141-2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus + Line/Pulse generation	During Transmission
4	Chassis Ground \leftrightarrow Body Ground/Below 1 Ω	Always
16	Battery Positive \leftrightarrow Body Ground/10 to 14 V	Always

HINT:

If the display shows UNABLE TO CONNECT TO VEHICLE when you connect the cable of the hand-held tester to the DLC3, turn the ignition switch to the ON position and operate the hand-held tester, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.

2. FUNCTION OF SRS WARNING LIGHT

- (a) Primary check.

- (1) Turn the ignition switch to the LOCK position. Wait for at least 2 seconds, then turn the ignition switch to the ON position. The SRS warning light comes on for approximately 6 seconds and the airbag system diagnosis (including the seat belt pretensioner and occupant classification system) is performed.

HINT:

If trouble is detected during the primary check, the SRS warning light remains on or blinks even after the primary check period (for approximately 6 seconds) has elapsed.

- (b) Constant check.

- (1) After the primary check, the airbag sensor assy center constantly monitors the SRS airbag system for trouble.

HINT:

If trouble is detected during the constant check, the airbag sensor assy center functions as follows:

- The SRS warning light comes on or blinks.
- The SRS warning light goes off, and then comes on. This blinking pattern indicates the source voltage drop. The SRS warning light goes off 10 seconds after the source voltage returns to normal.

- (c) Review.

- (1) When the airbag system is normal:
The SRS warning light comes on only during the primary check period (for approximately 6 seconds after the ignition switch is turned to the ON position).

- (2) When the airbag system has trouble:
 - The SRS warning light remains on or blinks even after the primary check period has elapsed.
 - The SRS warning light goes off after the primary check, but comes on or blinks again during the constant check.
 - The SRS warning light does not come on when turning the ignition switch from the LOCK to ON position.

HINT:

The airbag sensor assy center keeps the SRS warning light on if the airbag has been deployed.

3. FUNCTION OF PASSENGER AIRBAG ON/OFF INDICATOR

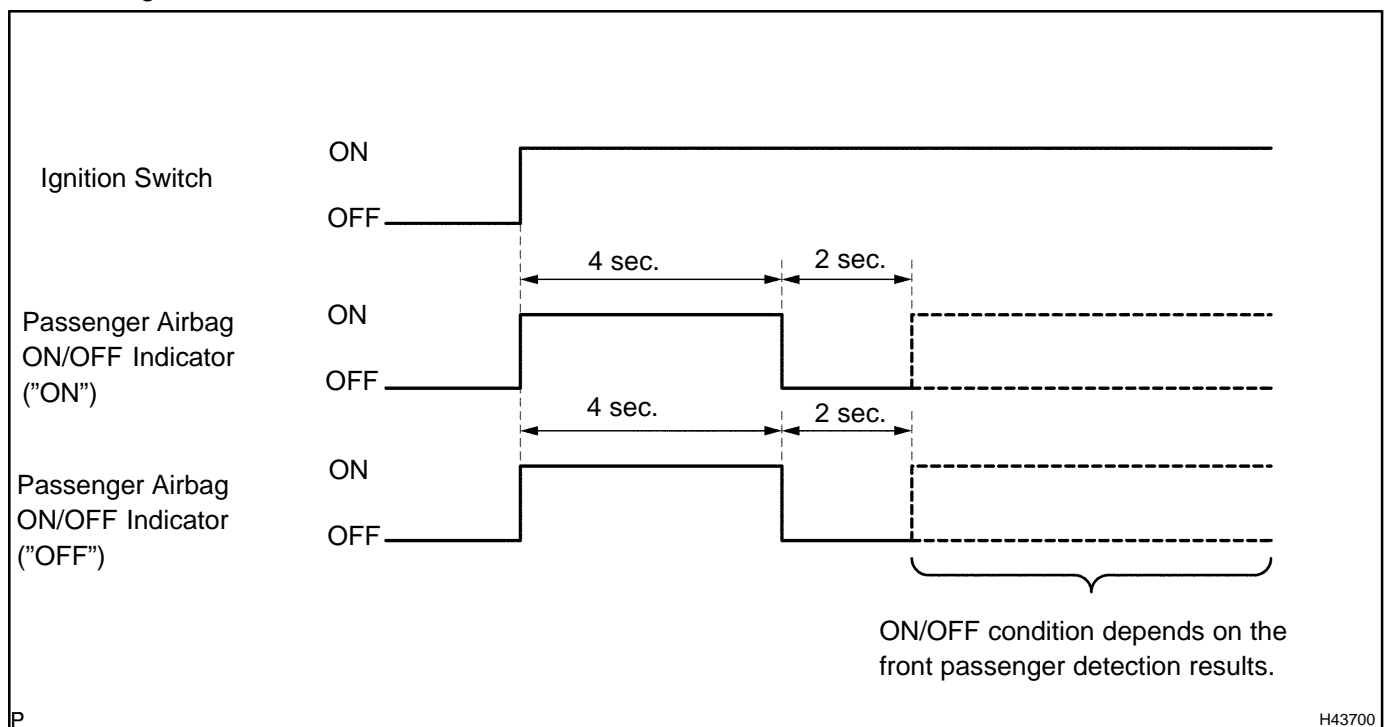
- (a) Initial check.
 - (1) Turn the ignition switch to the ON position.
 - (2) The passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 4 seconds, then goes off for approximately 2 seconds.
 - (3) Approximately 6 seconds after the ignition switch is turned to the ON position, the passenger airbag ON/OFF indicator will be ON/OFF depending on the conditions listed below.

HINT:

- If the front passenger seat condition and the indication by the passenger airbag ON/OFF indicator differ from those shown in the table below, and the SRS warning light is off, then the DTC is not output. If this occurs, perform troubleshooting of "Trouble in indicator of Passenger airbag ON/OFF indicator" (see page 05-1513).

Condition	"ON" indicator	"OFF" indicator
Vacant	OFF	OFF
Adult is seated.	ON	OFF
Child is seated.	OFF	ON
Child restraint system is set.	OFF	ON
Front passenger occupant classification system failure.	OFF	ON

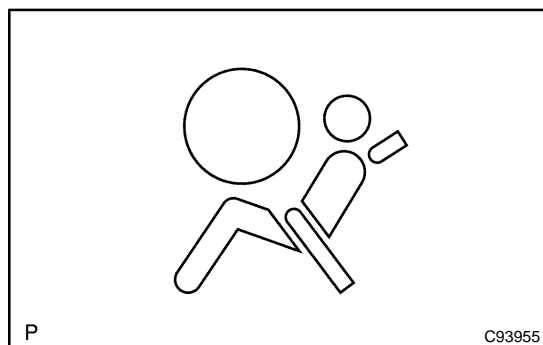
- The passenger airbag ON/OFF indicator is based on the timing chart below in order to check the indicator light circuit



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- When the occupant classification system has trouble, both the SRS warning light and the passenger airbag ON/OFF indicator "OFF" come on. In this case, check the DTCs in the supplemental restraint system first. Then troubleshoot the occupant classification system if DTC B1150/23 is indicated and troubleshoot the passenger airbag ON/OFF indicator (supplemental restraint system) if DTC B1152/28 is detected.



4. SRS WARNING LIGHT CHECK

- Turn the ignition switch to the ON position, and check that the SRS warning light comes on for approximately 6 seconds (primary check).
- Check that the SRS warning light goes off approximately 6 seconds after the ignition switch is turned to the ON position (constant check).

HINT:

When any of the following symptoms occur, refer to the "Problem Symptoms Table" (see page 05-1229).

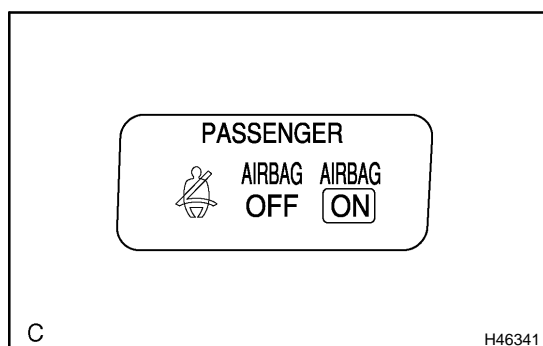
- The SRS warning light comes on occasionally, even after the primary check period has elapsed.
- The SRS warning light comes on, but a DTC is not output.
- The ignition switch is turned from the LOCK to ON position, but the SRS warning light does not come on.

5. PASSENGER AIRBAG ON/OFF INDICATOR CHECK

- Turn the ignition switch to the ON position.
- Check that the passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 4 seconds, then goes off for approximately 2 seconds.

HINT:

Refer to the table in step 3 regarding the passenger airbag ON/OFF indicator when the ignition switch is turned to the ON position and approximately 6 seconds pass.



6. RELEASE METHOD OF ACTIVATION PREVENTION MECHANISM

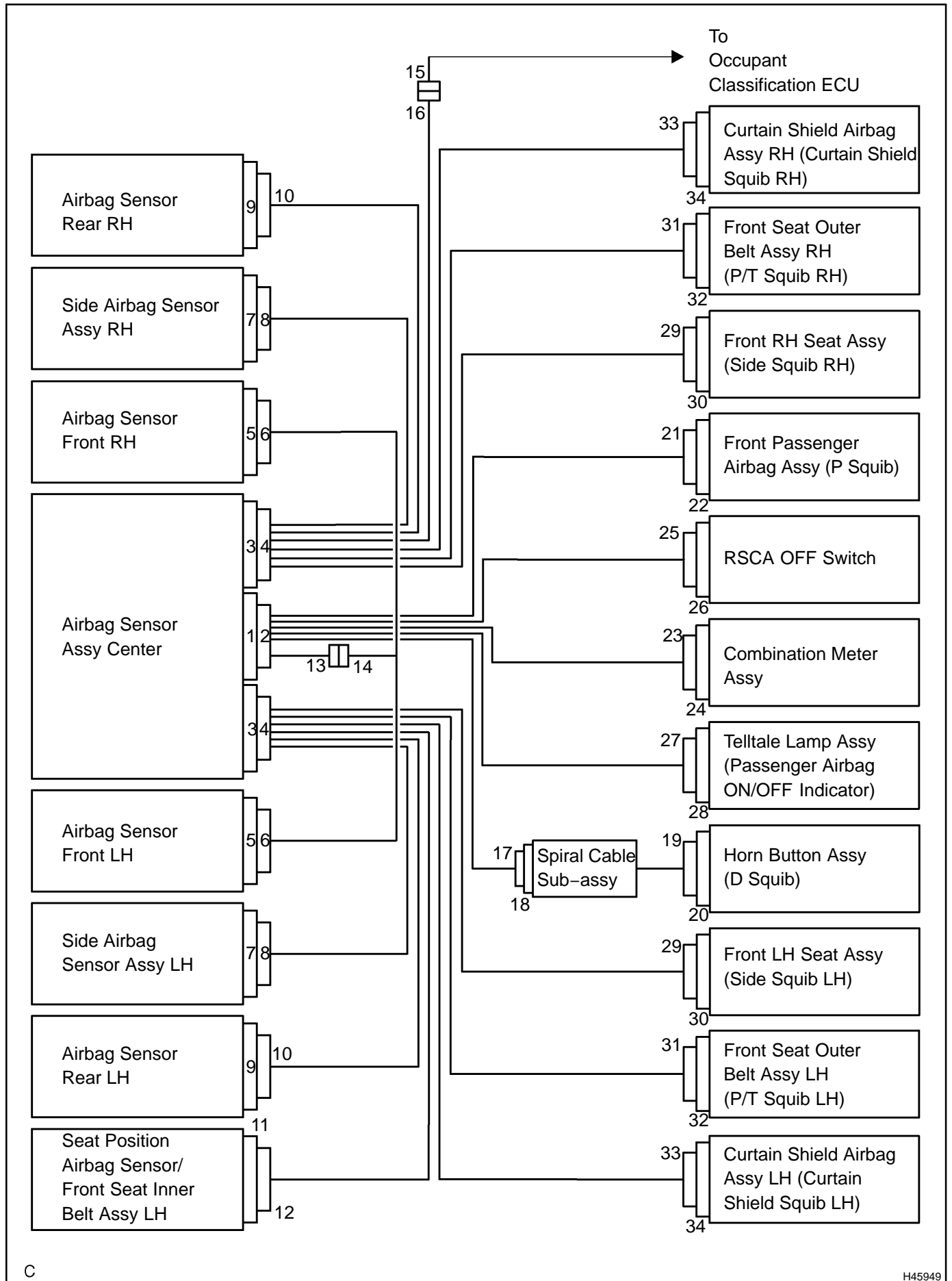
- The activation prevention mechanism is built into the connector for the squib circuit of the SRS. As explained in the troubleshooting section, insert a piece of paper that is the same thickness as the male terminal between the terminal and the short spring to release it (Refer to the illustrations on the next 3 pages).

CAUTION:

Never release the activation prevention mechanism on the squib connector even when inspecting with the squib disconnected.

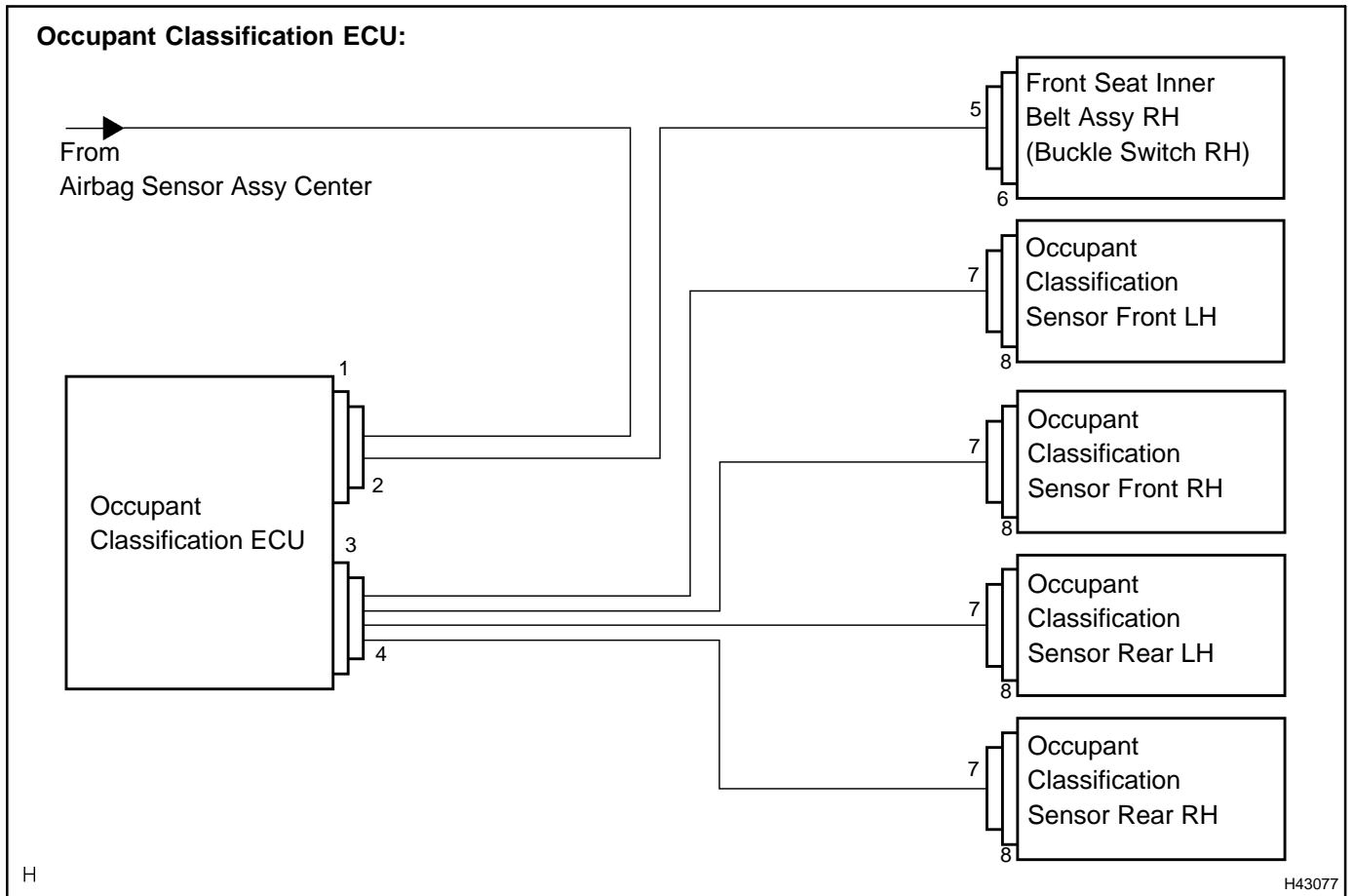
NOTICE:

- Never release the activation prevention mechanism unless specially directed by the troubleshooting procedure.
- To prevent the terminal and the short spring from being damaged, always use a piece of paper that is the same thickness as the male terminal.

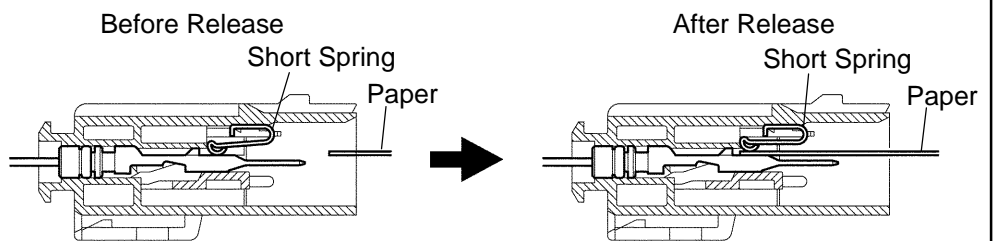
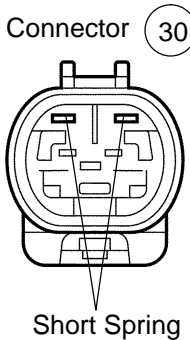
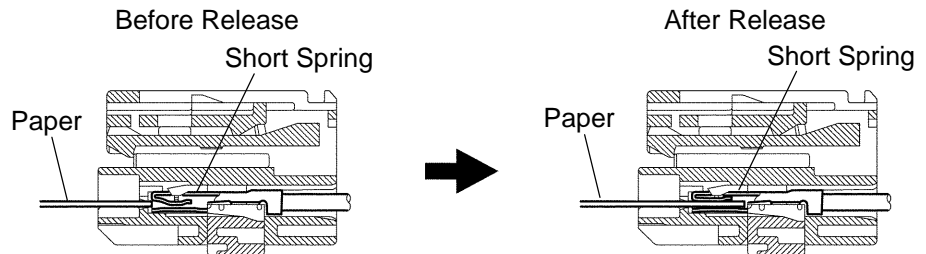
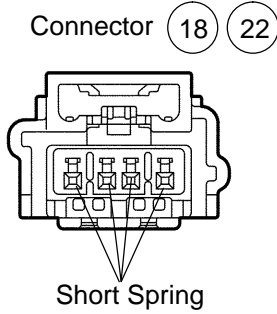
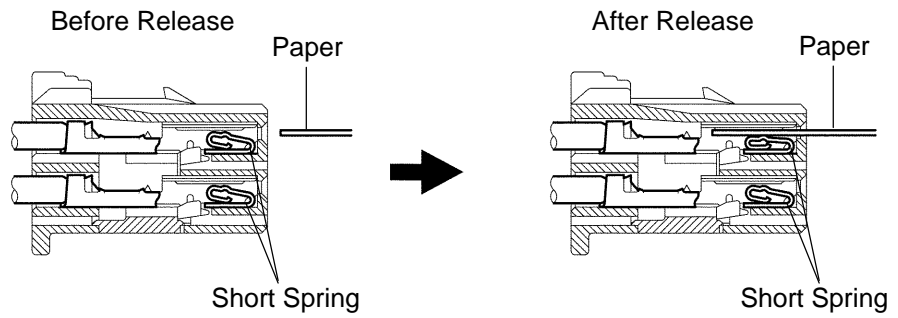
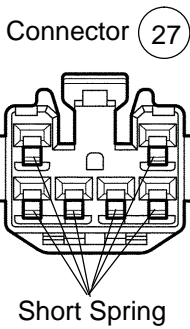
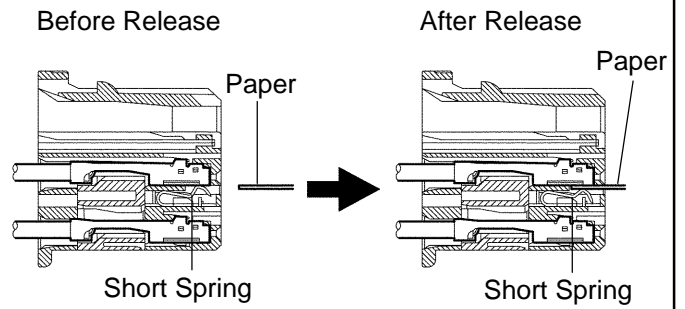
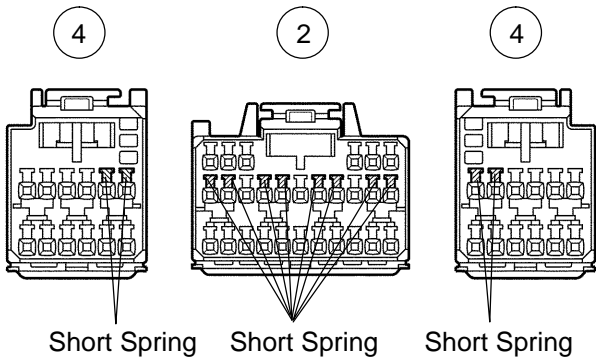


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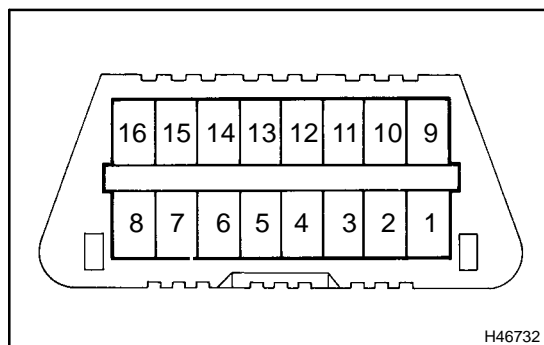
Airbag Sensor Assy Center Side Connector



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DTC CHECK/CLEAR



1. SUPPLEMENTAL RESTRAINT SYSTEM DTC CHECK (USING SST CHECK WIRE)

- (a) Check the DTCs (Present trouble code).
- (1) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.
 - (2) Using SST, connect terminals TC and CG of the DTC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

- (b) Check the DTCs (Past trouble code).
- (1) Using SST, connect terminals TC and CG of the DTC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

- (2) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.

- (c) Read the DTCs.

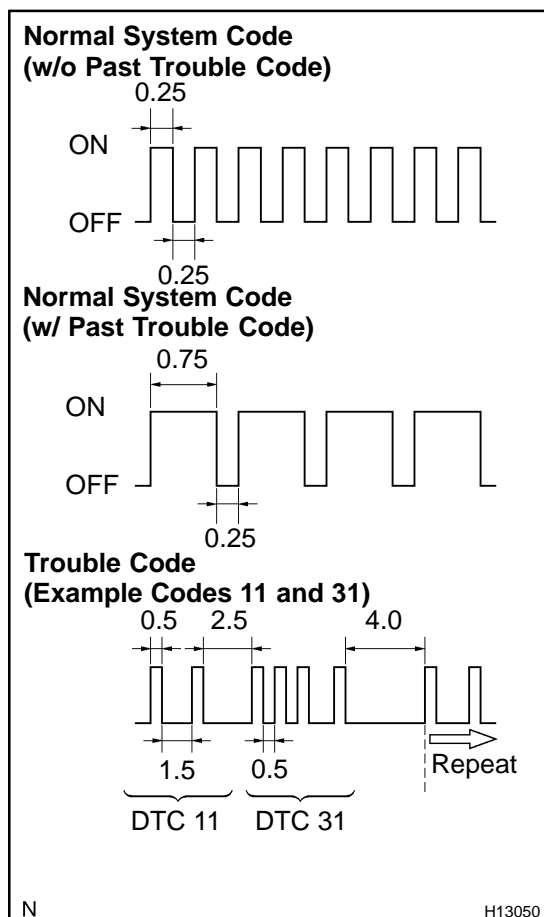
- (1) Read the blinking patterns of the DTCs. As examples, the blinking patterns for the normal system code and trouble codes 11 and 31 are shown in the illustration to the left.

- Normal system code indication (w/o past trouble code)
The light blinks twice per second.
- Normal system code indication (w/ past trouble code)
When the past trouble code is stored in the airbag sensor assy center, the light blinks only once per second.
- Trouble code indication
The first blinking indicates the first DTC. The second blinking occurs after a 1.5-second pause.

If there are more than 1 code, there will be a 2.5-second pause between each code. After all the codes are shown, there will be a 4.0-second pause, and they will all be repeated.

HINT:

- If 2 or more malfunctions are found, the indication begins with the smallest numbered code.
- If DTCs are indicated without connecting the terminals, proceed to the "TC terminal circuit" on page 05-1524.



2. DTC CLEAR (USING SST CHECK WIRE)

(a) Clear the DTCs.

(1) When the ignition switch is turned off, the DTCs are cleared.

HINT:

Depending on the DTC, the code may not be cleared by turning off the ignition switch. In this case, proceed to the next procedure.

(2) Using SST, connect terminals TC and CG of the DLC3, and then turn the ignition switch to the ON position.

SST 09843-18040

(3) Disconnect terminal TC of the DLC3 within 3 to 10 seconds after the DTCs are output, and check if the SRS warning light comes on after 3 seconds.

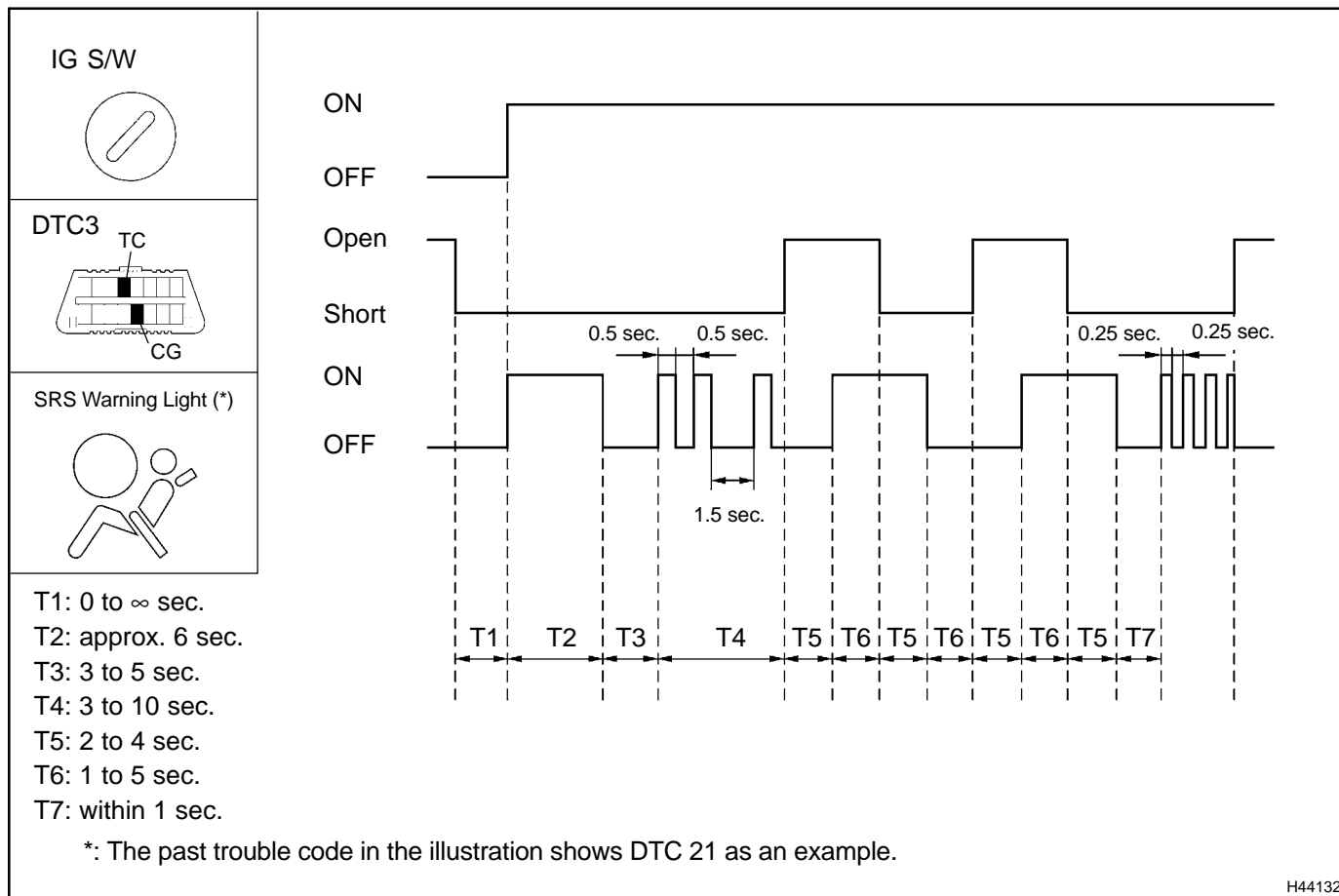
(4) Within 2 to 4 seconds after the SRS warning light comes on, connect terminals TC and CG of the DLC3.

(5) The SRS warning light should go off within 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Then, disconnect terminal TC within 2 to 4 seconds after the SRS warning light goes off.

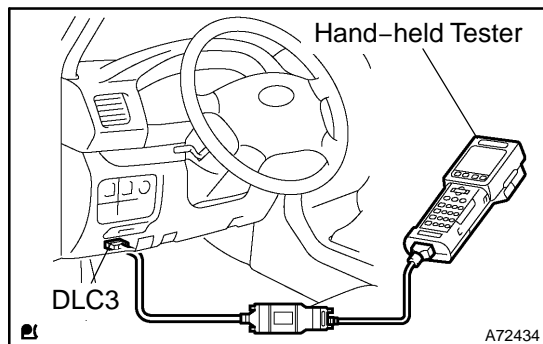
(6) The SRS warning light comes on again within 2 to 4 seconds after disconnecting terminal TC. Then, reconnect terminals TC and CG of the DLC3 within 2 to 4 seconds after the SRS warning light comes on.

(7) Check if the SRS warning light goes off 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Also check if the normal system code is output within 1 second after the SRS warning light goes off.

If DTCs are not cleared, repeat this procedure until the codes are cleared.



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3. SUPPLEMENTAL RESTRAINT SYSTEM DTC CHECK (USING A HAND-HELD TESTER)

- (a) Check the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Check the DTCs by following the prompts on the tester screen.

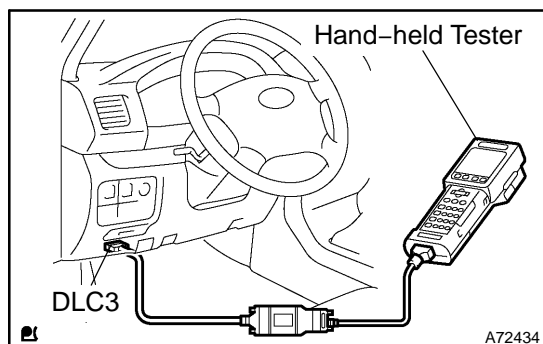
HINT:

Refer to the hand-held tester operator's manual for further details.

- (b) Clear the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Clear the DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.



4. OCCUPANT CLASSIFICATION SYSTEM DTC CHECK (USING A HAND-HELD TESTER)

HINT:

- When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for the occupant classification system.
- Since the DTCs for the occupant classification system can only be checked or cleared by the hand-held tester, use the hand-held tester to check or clear the DTCs.

- (a) Check the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Check the DTCs by following the prompts on the tester screen.

HINT:

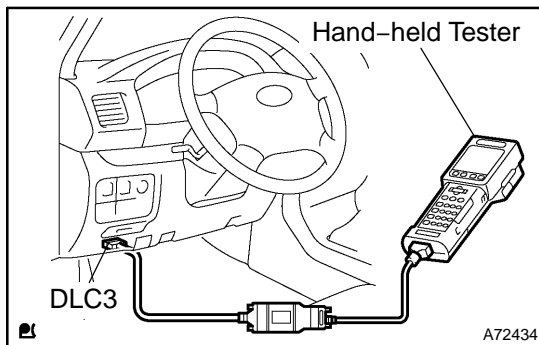
Refer to the hand-held tester operator's manual for further details.

- (b) Clear the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch to the ON position.
 - (3) Clear the DTCs by following the prompts on the tester screen.

HINT:

Refer to the hand-held tester operator's manual for further details.

CHECK MODE PROCEDURE



1. **SIGNAL CHECK (CHECK MODE)
(USING A HAND-HELD TESTER)**
 - (a) Connect the hand-held tester to the DLC3.
 - (b) Turn the ignition switch to the ON position.
 - (c) Select the "SIGNAL CHECK", and proceed checking with the hand-held tester.

DATA LIST/ACTIVE TEST

HINT:

By accessing the DATA LIST displayed by the hand-held tester, you can perform such functions as reading the values of switches and sensors without removing any parts. Reading the DATA LIST is the first step of troubleshooting and is one method to shorten labor time.

1. DATA LIST FOR OCCUPANT CLASSIFICATION ECU

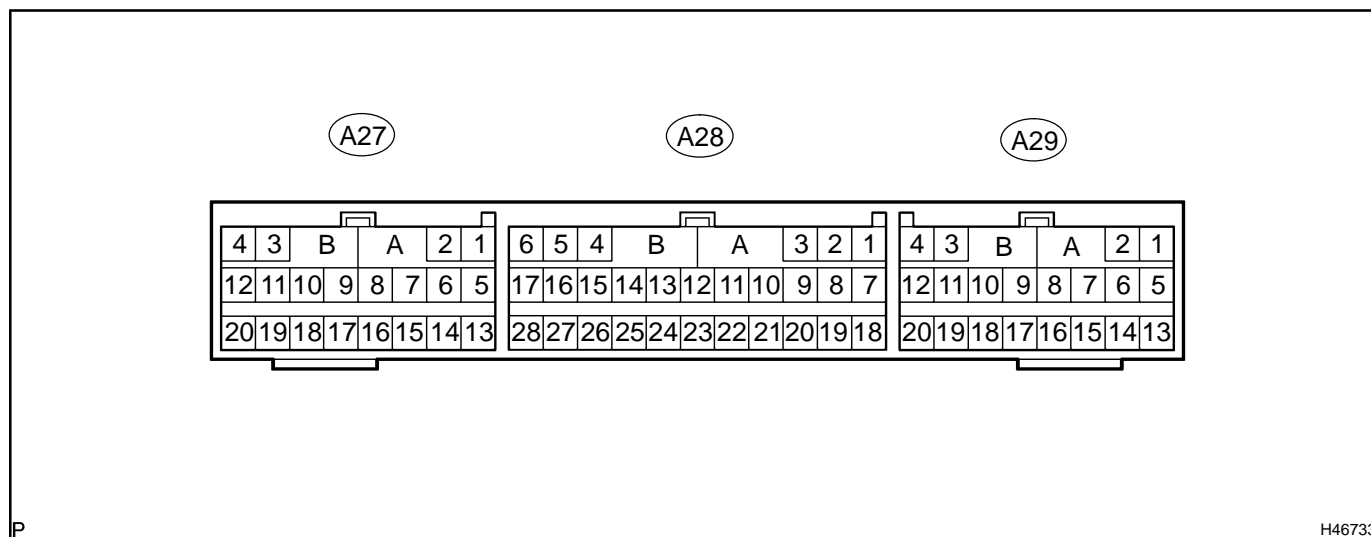
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Following the display on the tester screen, read the "DATA LIST".

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
IG SW	Ignition switch condition/ ON: Ignition switch ON OFF: Ignition switch OFF	ON/OFF	-
PASSENGER CLASS	Passenger classification/ AM50: Adult (more than 54 kg (119.05 lb) is seated AF05: Adult (36 to 54 kg (79.37 to 119.05 lb) is seated CHILD: Child (less than 36 kg (79.37 lb) is seated CRS: Child restraint sys- tem (less than 7 kg (15.43 lb) and passenger side buckle switch is ON, then 7 to 36 kg (15.43 to 79.37 lb) is set OFF: Vacant	AM50/AF05/CHILD/CRS/ OFF	-
P BUCKLE SW	Buckle switch (Passenger side)/ UNSET: Unfasten the pas- senger side seat belt SET: Fasten the passen- ger side seat belt NG: Passenger side seat belt has trouble	UNSET/SET	-
SENS RANGE INF	Sensor range information/ OK: The value of a sensor is within the range NG: The value of a sensor is out of the range	OK	-
FL SENS RANGE	Front left sensor range in- formation/ OK: Sensor range is -17 to 27 kg (-37.48 to 59.52 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 27 kg (59.52 lb)	OK	-
FR SENS RANGE	Front right sensor range in- formation/ OK: Sensor range is -17 to 27 kg (-37.48 to 59.52 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 27 kg (59.52 lb)	OK	-

Item	Measurement Item/ Range (Display)	Normal Condition	Diagnostic Note
RL SENS RANGE	Rear left sensor range information/ OK: Sensor range is –17 to 37 kg (–37.48 to 81.57 lb) Min.: Less than –17 kg (–37.48 lb) Max.: More than 37 kg (81.57 lb)	OK	–
RR SENS RANGE	Rear right sensor range information/ OK: Sensor range is –17 to 37 kg (–37.48 to 81.57 lb) Min.: Less than –17 kg (–37.48 lb) Max.: More than 37 kg (81.57 lb)	OK	–
FL SENS VOL	Front left sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	–
FR SENS VOL	Front right sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	–
RL SENS VOL	Rear left sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	–
RR SENS VOL	Rear right sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	–
FL SENS WEIGHT	Front left sensor weight information/ Min.: –17 kg (–37.48 lb) Max.: 27 kg (59.52 lb)	–17 to 27 kg (–37.48 to 59.52 lb)	–
FR SENS WEIGHT	Front right sensor weight information/ Min.: –17 kg (–37.48 lb) Max.: 27 kg (59.52 lb)	–17 to 27 kg (–37.48 to 59.52 lb)	–
RL SENS WEIGHT	Rear left sensor weight information/ Min.: –17 kg (–37.48 lb) Max.: 37 kg (81.57 lb)	–17 to 37 kg (–37.48 to 81.57 lb)	–
RR SENS WEIGHT	Rear right sensor weight information/ Min.: –17 kg (–37.48 lb) Max.: 37 kg (81.57 lb)	–17 to 37 kg (–37.48 to 81.57 lb)	–
TOTAL WEIGHT	Total weight information/ Min.: –68 kg (–149.91 lb) Max.: 128 kg (282.19 lb)	–68 to 128 kg (–149.91 to 282.19 lb)	–
#PRESENT CODES	Number of present trouble codes Min.: 0, Max.: 255	0	–
#PAST CODES	Number of Past DTC recorded/ Min.: 0, MAX.: 255	0	–

TERMINALS OF ECU

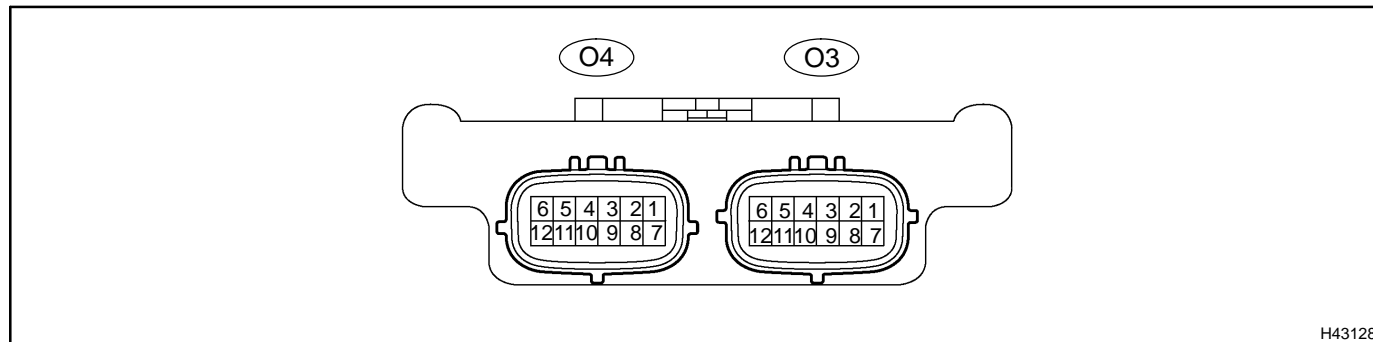
1. AIRBAG SENSOR ASSY CENTER



No.	Symbol	Destination
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
A27-1	CSL-	Airbag Sensor Rear LH
A27-2	LBE-	Front Seat Inner Belt Assy LH (Buckle SW)
A27-3	LSP-	Seat Position Airbag Sensor
A27-4	LSP+	Seat Position Airbag Sensor
A27-7	PL-	Front Seat Outer Belt Assy LH (P/T Squib LH)
A27-8	PL+	Front Seat Outer Belt Assy LH (P/T Squib LH)
A27-9	ICL+	Curtain Shield Airbag Assy LH (Curtain Shield Squib LH)
A27-10	ICL-	Curtain Shield Airbag Assy LH (Curtain Shield Squib LH)
A27-11	SFL-	Front Seat Airbag Assy LH (Side Squib LH)
A27-12	SFL+	Front Seat Airbag Assy LH (Side Squib LH)
A27-13	ESCL	Airbag Sensor Rear LH
A27-14	VUCL	Airbag Sensor Rear LH
A27-15	CSL+	Airbag Sensor Rear LH
A27-16	VUPL	Side Airbag Sensor Assy LH
A27-17	SSL+	Side Airbag Sensor Assy LH
A27-18	ESL	Side Airbag Sensor Assy LH
A27-19	LBE+	Front Seat Inner Belt Assy LH (Buckle SW)
A27-20	SSL-	Side Airbag Sensor Assy LH
A28-1	P-AB	Telltale Lamp Assy (Passenger Airbag ON/OFF Indicator)
A28-2	PBEW	Passenger Seat Belt Warning Light
A28-3	LA	Combination Meter Assy (SRS Warning Light)
A28-5	IG2	IGN Fuse
A28-6	RMIL	Combination Meter Assy (RSCA OFF Indicator)
A28-7	P2-	Front Passenger Airbag Assy (P Squib, Dual stage - 2nd step)
A28-8	P2+	Front Passenger Airbag Assy (P Squib, Dual stage - 2nd step)
A28-9	+SR	Airbag Sensor Front RH
A28-10	P+	Front Passenger Airbag Assy (P Squib)
A28-11	P-	Front Passenger Airbag Assy (P Squib)
A28-12	SIL	DLC3

No.	Symbol	Destination
A28-13	D-	Horn Button Assy (D Squib)
A28-14	D+	Horn Button Assy (D Squib)
A28-15	+SL	Airbag Sensor Front LH
A28-16	D2+	Horn Button Assy (D Squib, Dual stage - 2nd step)
A28-17	D2-	Horn Button Assy (D Squib, Dual stage - 2nd step)
A28-19	TC	DLC3
A28-20	-SR	Airbag Sensor Front RH
A28-21	RMSW	RSCA OFF Switch
A28-23	GSW2	ECM
A28-25	PAON	Telltale Lamp Assy (Passenger Airbag ON/OFF Indicator)
A28-26	-SL	Airbag Sensor Front LH
A28-27	E1	Ground
A28-28	E2	Ground
A29-1	FSR+	Occupant Classification ECU
A29-2	FSR-	Occupant Classification ECU
A29-4	CSR-	Airbag Sensor Rear RH
A29-5	SFR+	Front Seat Airbag Assy RH (Side Squib RH)
A29-6	SFR-	Front Seat Airbag Assy RH (Side Squib RH)
A29-7	ICR-	Curtain Shield Airbag Assy RH (Curtain Shield Squib RH)
A29-8	ICR+	Curtain Shield Airbag Assy RH (Curtain Shield Squib RH)
A29-9	PR+	Front Seat Outer Belt Assy RH (P/T Squib RH)
A29-10	PR-	Front Seat Outer Belt Assy RH (P/T Squib RH)
A29-13	SSR-	Side Airbag Sensor Assy RH
A29-15	ESR	Side Airbag Sensor Assy RH
A29-16	SSR+	Side Airbag Sensor Assy RH
A29-17	VUPR	Side Airbag Sensor Assy RH
A29-18	CSR+	Airbag Sensor Rear RH
A29-19	VUCR	Airbag Sensor Rear RH
A29-20	ESCR	Airbag Sensor Rear RH

2. OCCUPANT CLASSIFICATION ECU



H43128

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specification
+B (O3-1) - GND (O3-3)	R - W-B	Power Source	Always	10 to 14 V
DIA (O3-2) - GND (O3-3)	V - W-B	Diagnosis (DLC3)	IG switch ON	Pulse generation
GND (O3-3) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
FSR- (O3-4) - GND (O3-3)	B - W-B	Airbag sensor assy center communication line (-)	Always	Below 1 V
BGND (O3-5) - GND (O3-3)	GR - W-B	Passenger side buckle switch ground line	Always	Below 1 V
IG (O3-7) - GND (O3-3)	BR - W-B	Power source	IG switch ON	10 to 14 V
FSR+ (O3-8) - FSR- (O3-4)	W - B	Airbag sensor assy center communication line	IG switch ON	Pulse generation
BSW (O3-9) - BGND (O3-5)	L - GR	Passenger side buckle switch line	Buckle switch ON Buckle switch OFF	10 to 14 V Below 1 V
SGD1 (O4-1) - GND (O3-3)	G - W-B	Occupant classification sensor front LH ground line	Always	Below 1 V
SGD2 (O4-2) - GND (O3-3)	O - W-B	Occupant classification sensor front RH ground line	Always	Below 1 V
SGD3 (O4-3) - GND (O3-3)	W - W-B	Occupant classification sensor rear LH ground line	Always	Below 1 V
SGD4 (O4-4) - GND (O3-3)	BR - W-B	Occupant classification sensor rear RH ground line	Always	Below 1 V
SVC3 (O4-5) - SGD3 (O4-3)	GR - W	Occupant classification sensor rear LH power supply line	IG switch ON, a load is applied to occupant classification sensor rear LH	4.5 to 5.1 V
SVC4 (O4-6) - SGD4 (O4-4)	V - BR	Occupant classification sensor rear RH power supply line	IG switch ON, a load is applied to occupant classification sensor rear RH	4.5 to 5.1 V
SIG1 (O4-7) - SGD1 (O4-1)	BR - G	Occupant classification sensor front LH signal line	IG switch ON, a load is applied to occupant classification sensor front LH	0.2 to 4.9 V
SIG2 (O4-8) - SGD2 (O4-2)	L - O	Occupant classification sensor front RH signal line	IG switch ON, a load is applied to occupant classification sensor front RH	0.2 to 4.9 V
SIG3 (O4-9) - SGD3 (O4-3)	Y - W	Occupant classification sensor rear LH signal line	IG switch ON, a load is applied to occupant classification sensor rear LH	0.2 to 4.9 V

SIG4 (O4-10) - SGD4 (O4-4)	B - BR	Occupant classification sensor rear RH signal line	IG switch ON, a load is applied to occupant classification sensor rear RH	0.2 to 4.9 V
SVC1 (O4-11) - SGD1 (O4-1)	R - BR	Occupant classification sensor front LH power supply line	IG switch ON, a load is applied to occupant classification sensor front LH	4.5 to 5.1 V
SVC2 (O4-12) - SGD2 (O4-2)	W - O	Occupant classification sensor front RH power supply line	IG switch ON, a load is applied to occupant classification sensor front RH	4.5 to 5.1 V

PROBLEM SYMPTOMS TABLE

HINT:

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspected Area	See Page
The front passenger seat condition differs from the indication by the passenger airbag ON/OFF indicator (DTC is not output).	Trouble in indicator of passenger airbag ON/OFF indicator	05-1513
When the ignition switch is in the ON position, the SRS warning light sometimes comes on after approximately 6 seconds.	SRS warning light circuit malfunction (Always light up, when DTC is not output).	05-1517
SRS warning light always comes on even when DTC is not output.	SRS warning light circuit malfunction (Always light up, when DTC is not output).	05-1517
With the ignition switch is in the ON position, the SRS warning light does not come on.	SRS warning light circuit malfunction (Does not light up, when ignition switch is turned to ON position).	05-1522
Although the SRS warning light operates normal, DTC or a normal system code is not displayed.	TC Terminal Circuit	05-1524
Although terminals TC and CG are not connected, DTC or normal system code is displayed.	TC Terminal Circuit	05-1524

DIAGNOSTIC TROUBLE CODE CHART

1. DTCS FOR SUPPLEMENTAL RESTRAINT SYSTEM

If a trouble code is displayed during the DTC check, check the circuit listed for the code in the table below (Proceed to the page listed for that circuit.).

HINT:

- When the SRS warning light remains on and the DTC output is the normal system code, a voltage source drop is likely to occur. This malfunction is not stored in memory by the airbag sensor assy center. If the power source voltage returns to normal, the SRS warning light will automatically go off.
- When 2 or more codes are indicated, the code with the lower number appears first.
- If a code is not listed on the display chart, the airbag sensor assy center may have failed.
- In the case of any malfunction concerning an open circuit, short to ground, or short to B+ due to a squib, other trouble codes may not be detected. In this case, repair the malfunction currently indicated and then perform malfunction diagnosis again.
- Mark in the check mode column:
 "○": DTC is corresponding to the check mode.
 "—": DTC is not corresponding to the check mode.
- When DTC B1150/23 is detected as a result of troubleshooting for the Supplemental Restraint System, perform troubleshooting for the occupant classification system as shown in the chart below.

DTC No. (See Page)	Detection Item	Trouble Area	Check Mode	SRS Warning Light
B0100/13 (05-1235)	• Short in D squib circuit	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B0101/14 (05-1240)	• Open in D squib circuit	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B0102/11 (05-1244)	• Short in D squib circuit (to ground)	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B0103/12 (05-1248)	• Short in D squib circuit (to B+)	• Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B0105/53 (05-1253)	• Short in P squib circuit	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B0106/54 (05-1256)	• Open in P squib circuit	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B0107/51 (05-1259)	• Short in P squib circuit (to ground)	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B0108/52 (05-1262)	• Short in P squib circuit (to B+)	• Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire	○	ON
B0110/43 (05-1265)	• Short in side squib (RH) circuit	• Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0111/44 (05-1268)	• Open in side squib (RH) circuit	• Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire	○	Blink

DIAGNOSTICS - SUPPLEMENTAL RESTRAINT SYSTEM

B0112/41 (05-1271)	• Short in side squib (RH) circuit (to ground)	• Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0113/42 (05-1274)	• Short in side squib (RH) circuit (to B+)	• Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0115/47 (05-1277)	• Short in side squib (LH) circuit	• Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0116/48 (05-1280)	• Open in side squib (LH) circuit	• Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0117/45 (05-1283)	• Short in side squib (LH) circuit (to ground)	• Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0118/46 (05-1286)	• Short in side squib (LH) circuit (to B+)	• Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0126/B0127/ 27 (05-1289)	• Seat belt buckle switch (LH) malfunction	• Front seat inner belt assy LH (Seat belt buckle switch LH) • Airbag sensor assy center • Floor wire No.2	-	ON
B0130/63 (05-1294)	• Short in P/T squib (RH) circuit	• Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0131/64 (05-1298)	• Open in P/T squib (RH) circuit	• Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0132/61 (05-1301)	• Short in P/T squib (RH) circuit (to ground)	• Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0133/62 (05-1304)	• Short in P/T squib (RH) circuit (to B+)	• Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B0135/73 (05-1307)	• Short in P/T squib (LH) circuit	• Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0136/74 (05-1311)	• Open in P/T squib (LH) circuit	• Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0137/71 (05-1314)	• Short in P/T squib (LH) circuit (to ground)	• Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B0138/72 (05-1317)	• Short in P/T squib (LH) circuit (to B+)	• Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B1100/31 (05-1320)	• Airbag sensor assy malfunction	• Airbag sensor assy center • Instrument panel wire • Engine room main wire	-	ON
B1135/24 (05-1328)	• Half connection in airbag sensor assy center connector	• Electrical connection check mechanism • Airbag sensor assy center	○	ON
B1140/32 (05-1330)	• Side airbag sensor assy (RH) malfunction	• Side airbag sensor assy RH • Airbag sensor assy center • Floor wire	-	Blink
B1141/33 (05-1335)	• Side airbag sensor assy (LH) malfunction	• Side airbag sensor assy LH • Airbag sensor assy center • Floor wire No.2	-	Blink
B1148/36 (05-1340)	• Front airbag sensor (RH) malfunction	• Airbag sensor front RH • Airbag sensor assy center • Engine room main wire • Instrument panel wire	-	ON

B1149/37 (05-1344)	• Front airbag sensor (LH) malfunction	• Airbag sensor front LH • Airbag sensor assy center • Instrument panel wire • Engine room main wire	-	ON
B1150/23 (05-1348)	• Occupant classification system malfunction	• Occupant classification system • Airbag sensor assy center • Front seat wire RH • Floor wire	-	ON
B1152/28 (05-1354)	• Passenger airbag ON/OFF indicator light circuit malfunction	• Telltale lamp assy (Passenger airbag ON/OFF indicator) • Airbag sensor assy center • Instrument panel wire	○	ON
B1153/25 (05-1365)	• Seat position airbag sensor malfunction	• Seat position airbag sensor • Airbag sensor assy center • Front seat inner belt assy LH • Floor wire No.2	-	ON
B1154/38 (05-1371)	• Curtain shield airbag sensor (RH) malfunction	• Airbag sensor rear RH • Airbag sensor assy center • Floor wire	-	Blink
B1155/39 (05-1376)	• Curtain shield airbag sensor (LH) malfunction	• Airbag sensor rear LH • Airbag sensor assy center • Floor wire No.2	-	Blink
B1160/83 (05-1381)	• Short in curtain shield airbag (RH) squib circuit	• Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B1161/84 (05-1385)	• Open in curtain shield airbag (RH) squib circuit	• Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B1162/81 (05-1388)	• Short in curtain shield airbag (RH) squib circuit (to ground)	• Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B1163/82 (05-1391)	• Short in curtain shield airbag (RH) squib circuit (to B+)	• Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire	○	Blink
B1165/87 (05-1394)	• Short in curtain shield airbag (LH) squib circuit	• Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B1166/88 (05-1398)	• Open in curtain shield airbag (LH) squib circuit	• Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B1167/85 (05-1401)	• Short in curtain shield airbag (LH) squib circuit (to ground)	• Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B1168/86 (05-1404)	• Short in curtain shield airbag (LH) squib circuit (to B+)	• Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2	○	Blink
B1180/17 (05-1407)	• Short in D squib (Dual stage - 2nd step) circuit	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1181/18 (05-1412)	• Open in D squib (Dual stage - 2nd step) circuit	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON
B1182/19 (05-1416)	• Short in D squib (Dual stage - 2nd step) circuit (to ground)	• Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire	○	ON

DIAGNOSTICS – SUPPLEMENTAL RESTRAINT SYSTEM

B1183/22 (05-1420)	• Short in D squib (Dual stage – 2nd step) circuit (to B+)	• Horn button assy (D squib, Dual stage – 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument wire	○	ON
B1185/57 (05-1425)	• Short in P squib (Dual stage – 2nd step) circuit	• Front passenger airbag assy (P squib, Dual stage – 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1186/58 (05-1428)	• Open in P squib (Dual stage – 2nd step) circuit	• Front passenger airbag assy (P squib, Dual stage – 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1187/55 (05-1431)	• Short in P squib (Dual stage – 2nd step) circuit (to ground)	• Front passenger airbag assy (P squib, Dual stage – 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1188/56 (05-1434)	• Short in P squib (Dual stage – 2nd step) circuit (to B+)	• Front passenger airbag assy (P squib, Dual stage – 2nd step) • Airbag sensor assy center • Instrument panel wire	○	ON
B1628/29 (05-1437)	• Roll over cut off indicator malfunction	• Combination meter assy (RSCA OFF indicator) • Airbag sensor assy center • Instrument panel wire	–	Blink
Normal (05-1511)	• System normal	–	–	OFF
	• Source voltage drop	• Battery • Airbag sensor assy center	–	ON

2. DTCS FOR FRONT PASSENGER OCCUPANT CLASSIFICATION SYSTEM

HINT:

- Use the hand-held tester to check the DTC of the occupant classification ECU, otherwise the DTC cannot be read.
- When DTC B1150/23 is detected as a result of troubleshooting for the Supplemental Restraint System, perform troubleshooting for the occupation classification system as shown in the chart below.

DTC No. (See page)	Detection Item	Trouble Area	Passenger Airbag OFF Indicator
B1771 (05-1442)	• Passenger side buckle switch circuit malfunction	• Front RH seat assy • Occupant classification ECU • Front seat wire RH	ON
B1780 (05-1448)	• Occupant classification sensor front LH circuit malfunction	• Front RH seat assy (Occupant classification sensor front LH) • Occupant classification ECU • Front seat wire RH	ON
B1781 (05-1455)	• Occupant classification sensor front RH circuit malfunction	• Front RH seat assy (Occupant classification sensor front RH) • Occupant classification ECU • Front seat wire RH	ON
B1782 (05-1462)	• Occupant classification sensor rear LH circuit malfunction	• Front RH seat assy (Occupant classification sensor rear LH) • Occupant classification ECU • Front seat wire RH	ON
B1783 (05-1469)	• Occupant classification sensor rear RH circuit malfunction	• Front RH seat assy (Occupant classification sensor rear RH) • Occupant classification ECU • Front seat wire RH	ON
B1785 (05-1476)	• Occupant classification sensor front LH collision detection	• Occupant classification ECU • Front RH seat assy (Occupant classification sensor front LH)	ON
B1786 (05-1479)	• Occupant classification sensor front RH collision detection	• Occupant classification ECU • Front RH seat assy (Occupant classification sensor front RH)	ON
B1787 (05-1482)	• Occupant classification sensor rear LH collision detection	• Occupant classification ECU • Front RH seat assy Occupant classification sensor rear LH)	ON

B1788 (05-1485)	• Occupant classification sensor rear RH collision detection	• Occupant classification ECU • Front RH seat assy (Occupant classification sensor rear RH)	ON
B1790 (05-1488)	• Airbag sensor assy center communication circuit malfunction	• Occupant classification ECU • Airbag sensor assy center • Floor wire • Front seat wire RH	ON
B1793 (05-1496)	• Occupant classification sensor power supply circuit malfunction	• Front RH seat assy (Occupant classification sensors) • Front seat wire RH • Occupant classification ECU	ON
B1794 (05-1503)	• Occupant classification ECU battery positive line open	• Battery • ECU-B Fuse • Front seat wire RH • Occupant classification ECU	ON
B1795 (05-1507)	• Occupant classification ECU malfunction	• Front seat wire RH • Front seat inner belt assy RH (Buckle switch RH) • Occupant classification ECU	ON
B1796 (05-1509)	• Sleep operation failure of occupant classification ECU	• Occupant classification ECU	ON

DTC	B0100/13	SHORT IN D SQUIB CIRCUIT
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CIRCUIT DESCRIPTION

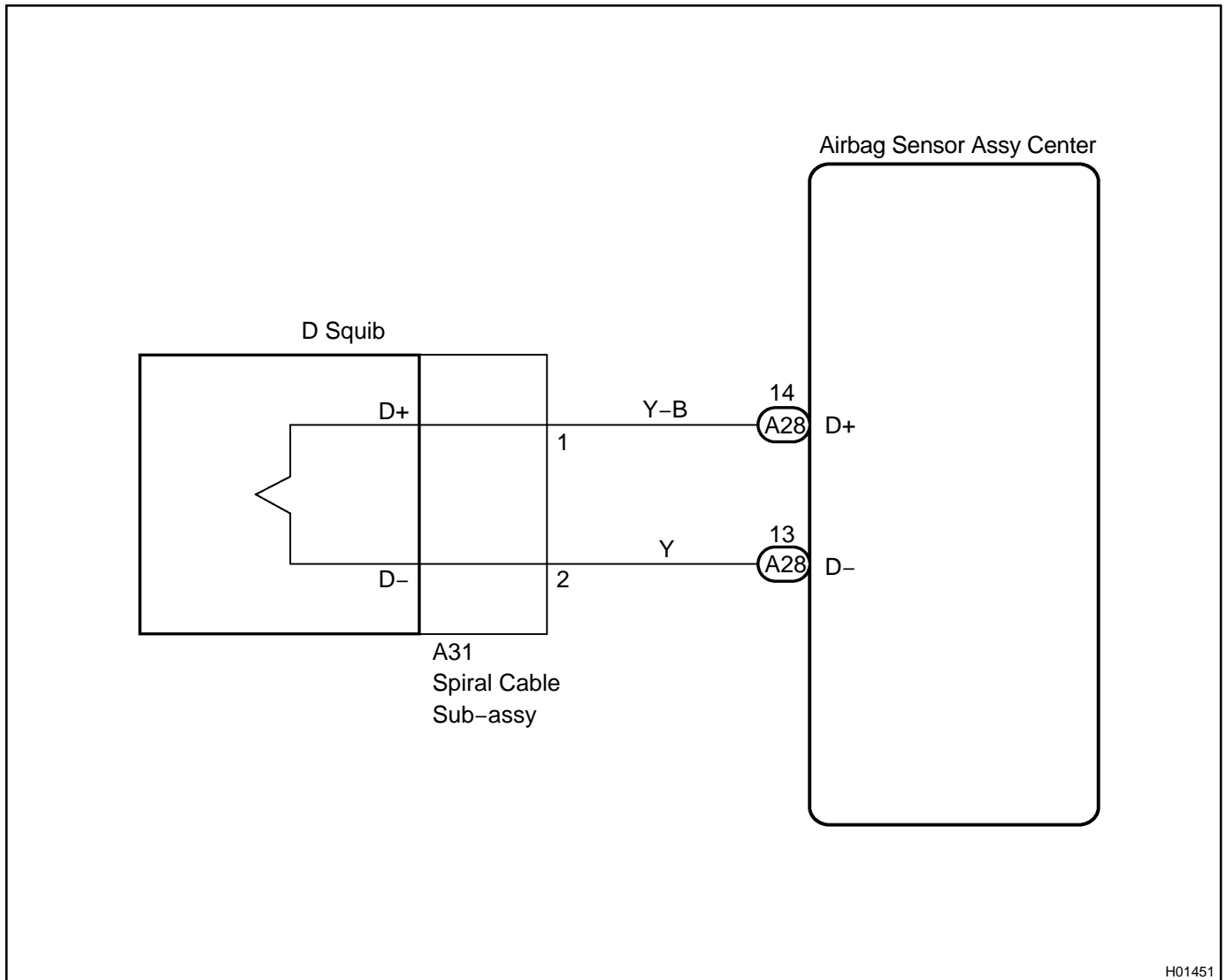
The D squib circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0100/13 is recorded when a short circuit is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	<ul style="list-style-type: none"> • Short circuit between D+ wire harness and D- wire harness of D squib • D squib malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the horn button assy.
- (d) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.

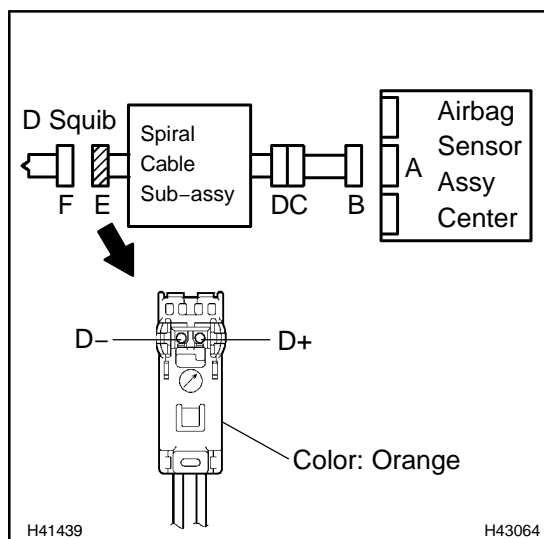
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)

OK

2 CHECK D SQUIB CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)



- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (c) Measure the resistance according to the value(s) in the table below.

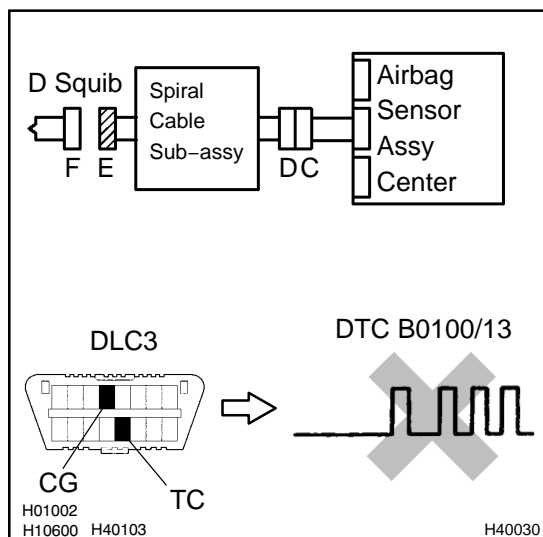
Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or Higher

NG → Go to step 5

OK

3 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0100/13 is not output.

HINT:

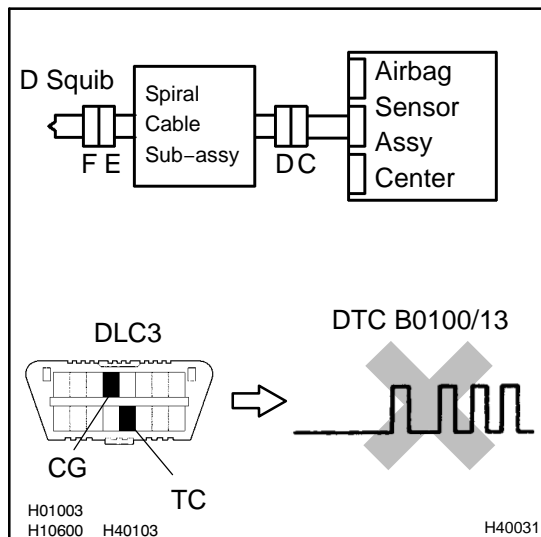
Codes other than code B0100/13 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

4 CHECK HORN BUTTON ASSY(D SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connectors to the horn button assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0100/13 is not output.

HINT:

Codes other than code B0100/13 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)05-1222**

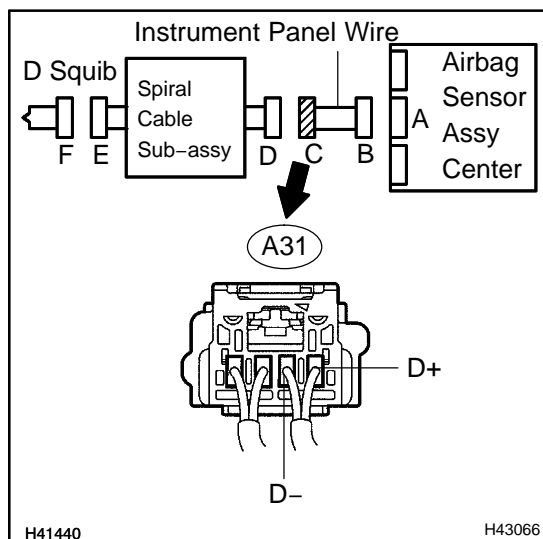
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

5 CHECK INSTRUMENT PANEL WIRE



OK

- (a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

HINT:

The activation prevention mechanism of connector "B" has already been released.

- (b) Measure the resistance according to the value(s) in the table below.

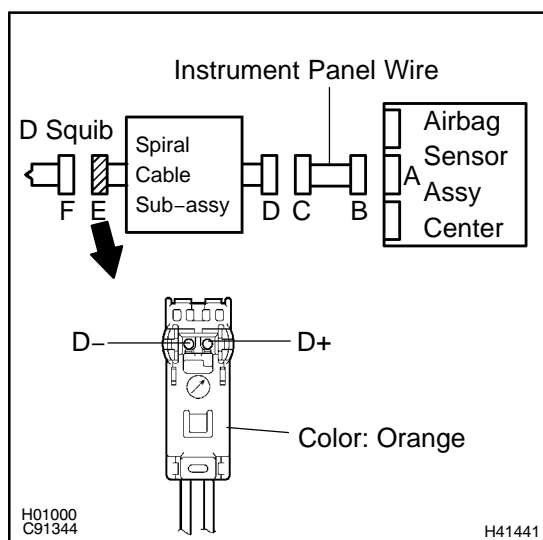
Standard:

Tester connection	Condition	Specified condition
A31-1 (D+) - A31-2 (D-)	Always	1 MΩ or Higher

NG

REPLACE INSTRUMENT PANEL WIRE

6 CHECK SPIRAL CABLE SUB-ASSY



OK

- (a) Release the activation prevention mechanism built into connector "D" (see page 05-1213).

- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	1 MΩ or Higher

NG

REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0101/14	OPEN IN D SQUIB CIRCUIT
------------	-----------------	--------------------------------

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0101/14 is recorded when an open circuit is detected in the D squib circuit.

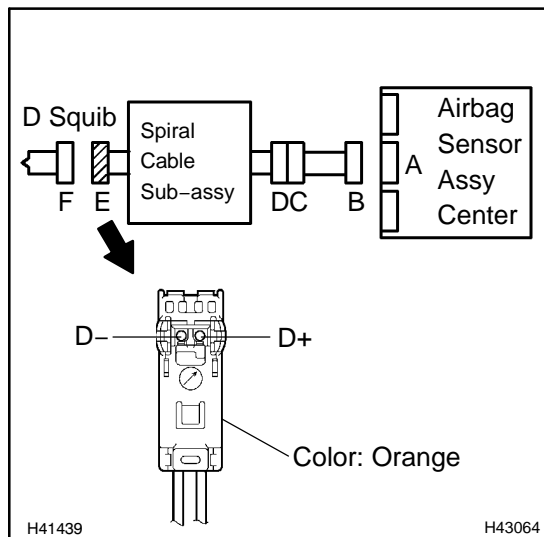
DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	<ul style="list-style-type: none"> • Open circuit in D+ wire harness or D- wire harness of D squib • D squib malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page [05-1235](#).

INSPECTION PROCEDURE

1	CHECK D SQUIB CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Measure the resistance according to the value(s) in the table below.

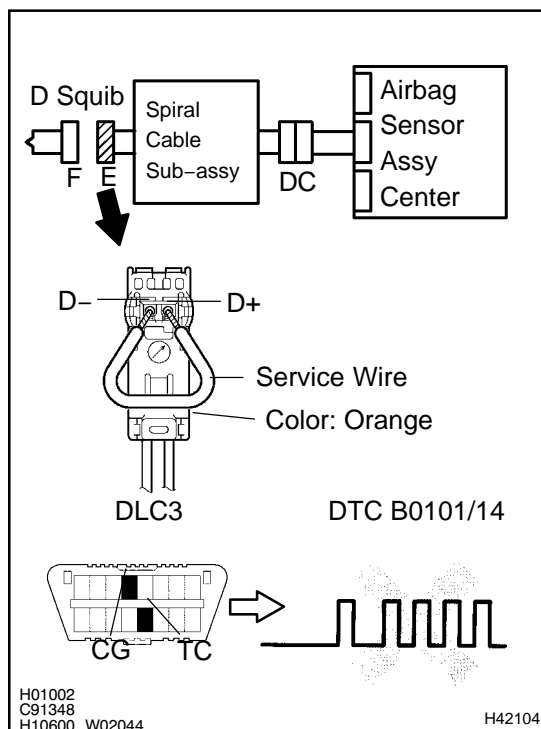
Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

NG	Go to step 4
-----------	---------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect D+ and D- of connector "E".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0101/14 is not output.

HINT:

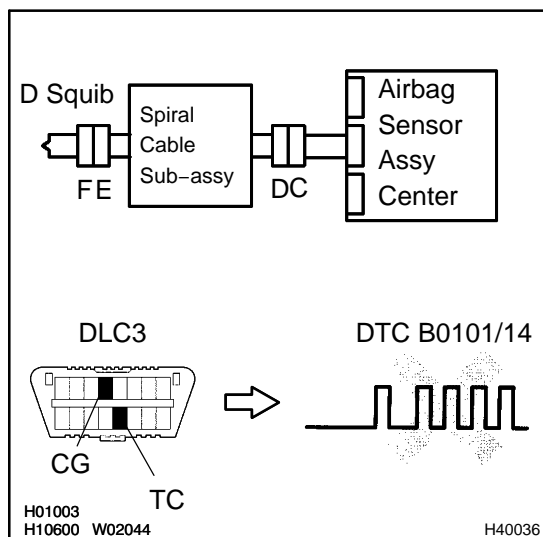
Codes other than code B0101/14 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "E".
- Connect the connectors to the horn button assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0101/14 is not output.

HINT:

Codes other than code B0101/14 may be output at this time, but they are not related to this check.

NG

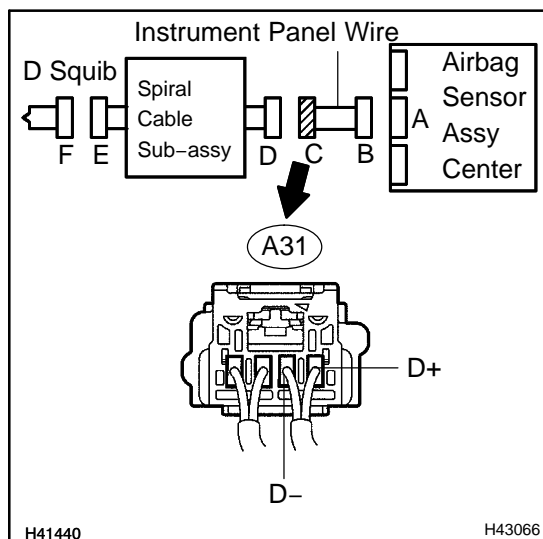
**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

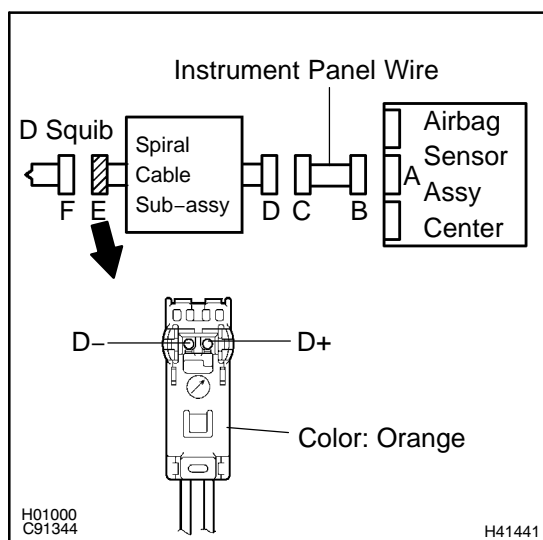
- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE

- (a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A31-1 (D+) - A31-2 (D-)	Always	Below 1 Ω

NG**REPLACE INSTRUMENT PANEL WIRE****OK****5 CHECK SPIRAL CABLE SUB-ASSY**

- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - D-	Always	Below 1 Ω

NG**REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-28)****OK****USE SIMULATION METHOD TO CHECK****HINT:**

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0102/11	SHORT IN D SQUIB CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0102/11 is recorded when a short to ground is detected in the D squib circuit.

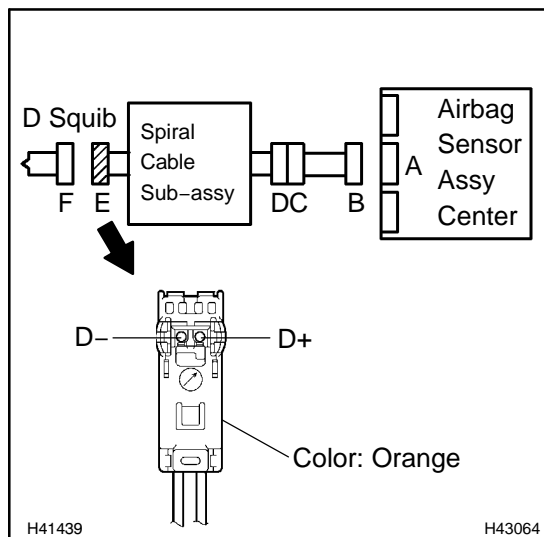
DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	<ul style="list-style-type: none"> • Short circuit in D squib wire harness (to ground) • D squib malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1235.

INSPECTION PROCEDURE

1	CHECK D SQUIB CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Measure the resistance according to the value(s) in the table below.

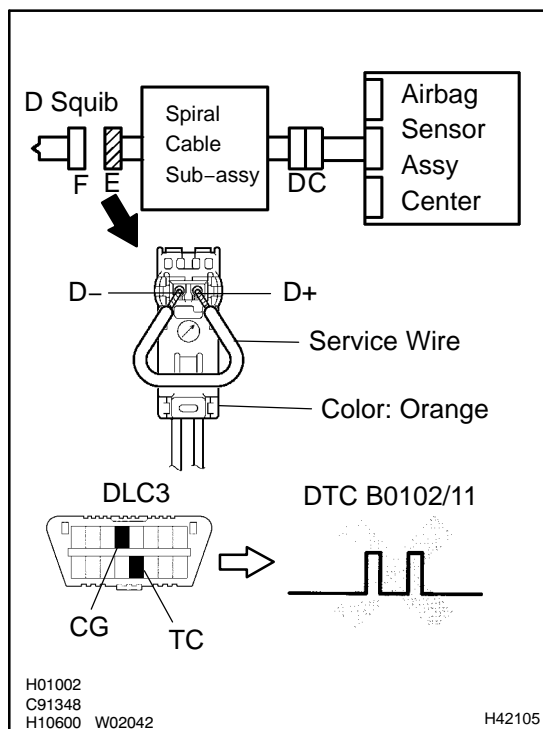
Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

NG → Go to step 4

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect D+ and D- of connector "E".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1219).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1219).

OK:

DTC B0102/11 is not output.

HINT:

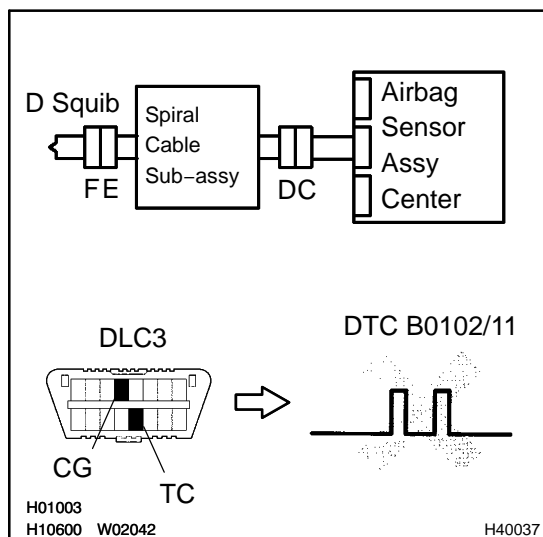
Codes other than code B0102/11 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "E".
- (d) Connect the connectors to the horn button assy.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0102/11 is not output.

HINT:

Codes other than code B0102/11 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

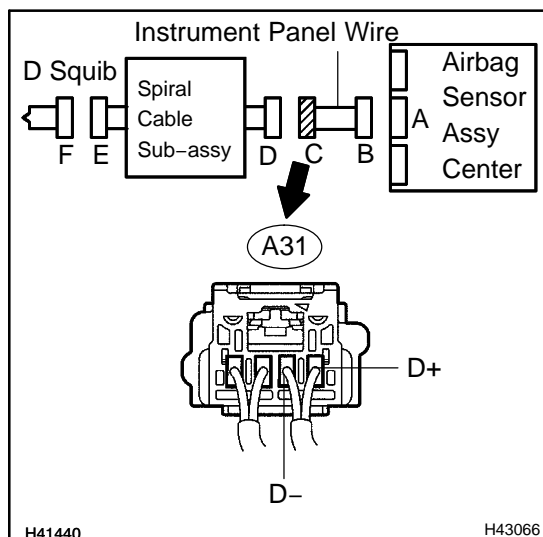
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE



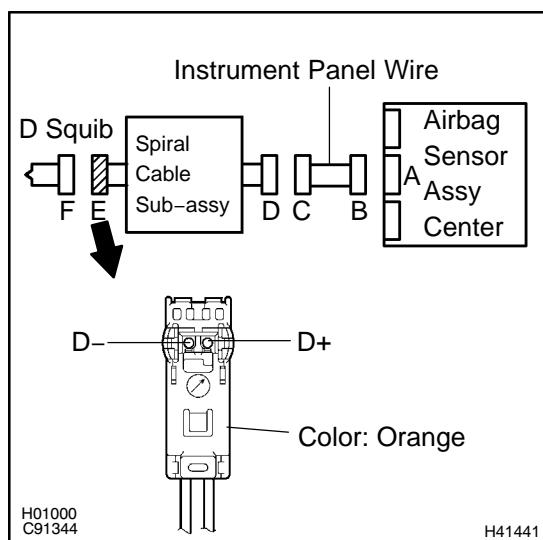
- Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A31-1 (D+) - Body ground	Always	1 MΩ or Higher
A31-2 (D-) - Body ground	Always	1 MΩ or Higher

NG
REPLACE INSTRUMENT PANEL WIRE
OK

5 CHECK SPIRAL CABLE SUB-ASSY



- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Always	1 MΩ or Higher
D- - Body ground	Always	1 MΩ or Higher

NG
**REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-28)**
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0103/12	SHORT IN D SQUIB CIRCUIT (TO B+)
------------	-----------------	---

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0103/12 is recorded when a short to B+ is detected in the D squib circuit.

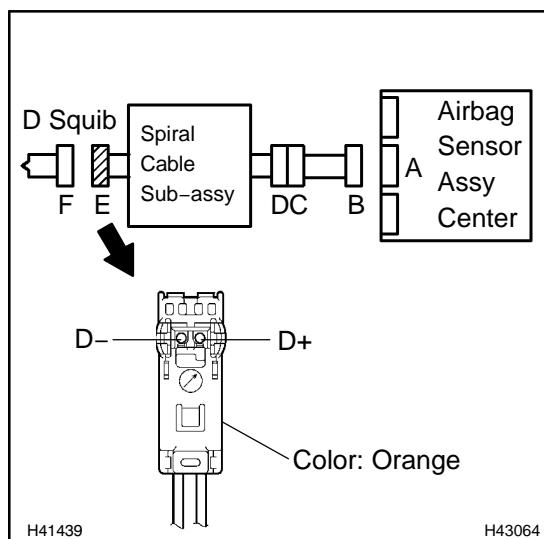
DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	<ul style="list-style-type: none"> • Short circuit in D squib wire harness (to B+) • D squib malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1235.

INSPECTION PROCEDURE

1	CHECK D SQUIB CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

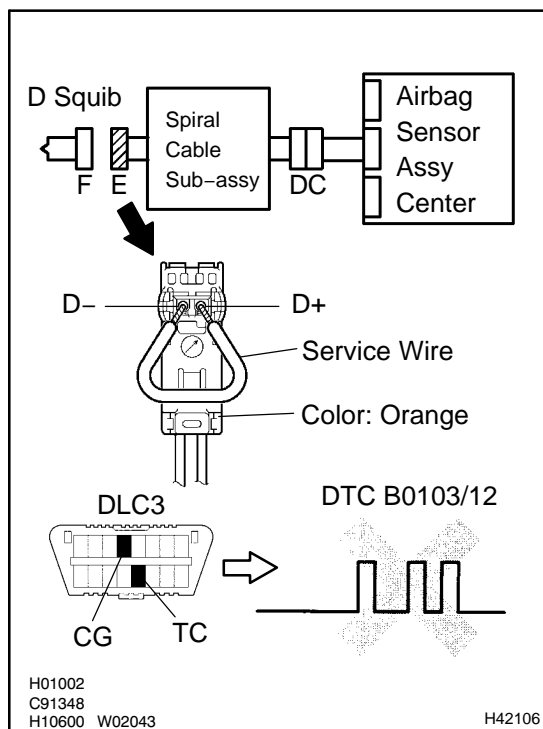
Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

NG	Go to step 4
-----------	---------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect D+ and D- of connector "E".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0103/12 is not output.

HINT:

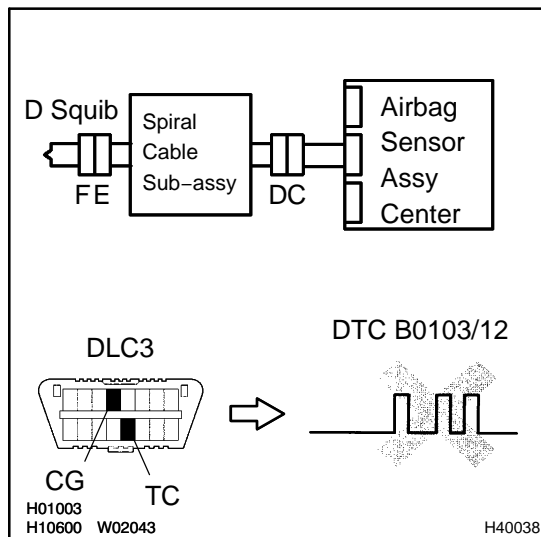
Codes other than code B0103/12 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "E".
- Connect the connectors to the horn button assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0103/12 is not output.

HINT:

Codes other than code B0103/12 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

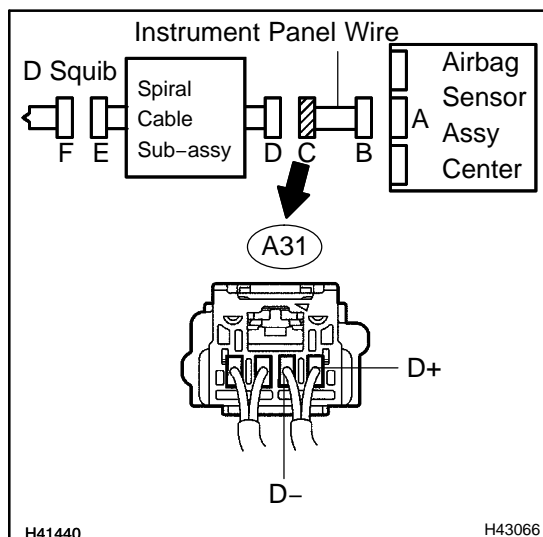
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

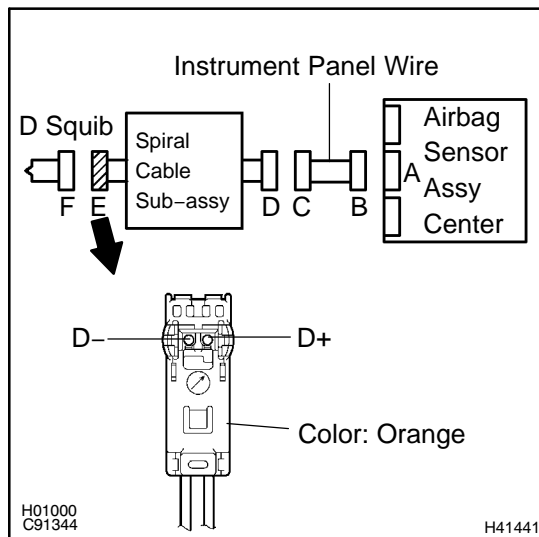
Tester connection	Condition	Specified condition
A31-1 (D+) - Body ground	Ignition switch ON	Below 1 V
A31-2 (D-) - Body ground	Ignition switch ON	Below 1 V

NG

REPLACE INSTRUMENT PANEL WIRE

OK

5 CHECK SPIRAL CABLE SUB-ASSY



- (a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard:

Tester connection	Condition	Specified condition
D+ - Body ground	Ignition switch ON	Below 1 V
D- - Body ground	Ignition switch ON	Below 1 V

NG

**REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-28)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0105/53	SHORT IN P SQUIB CIRCUIT
------------	-----------------	---------------------------------

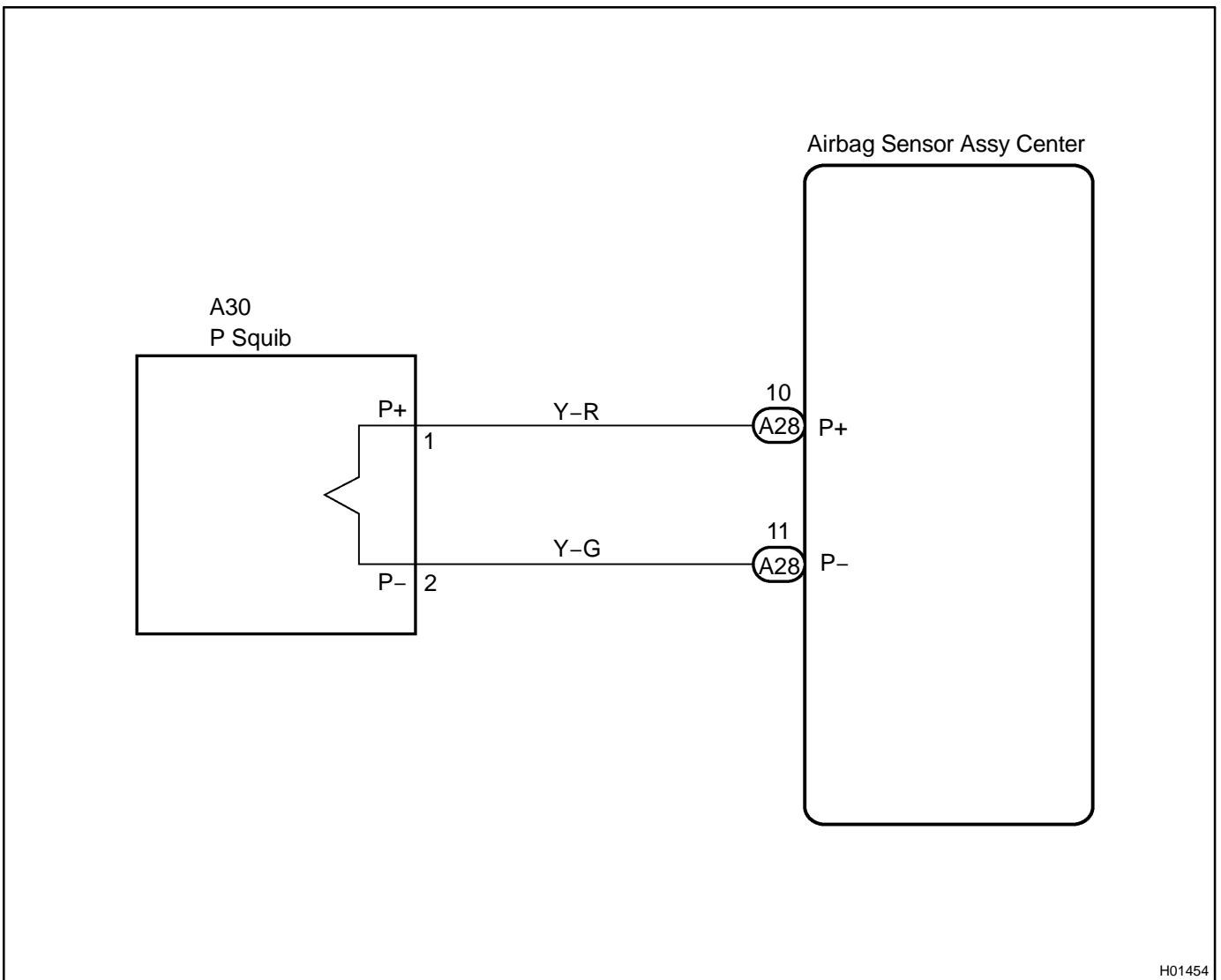
CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assy center and the front passenger airbag assy. The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0105/53 is recorded when a short circuit is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	<ul style="list-style-type: none"> • Short circuit between P+ wire harness and P- wire harness of P squib • P squib malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire

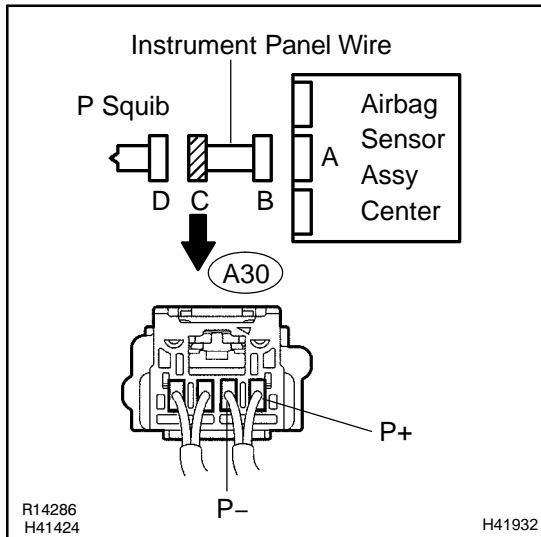
WIRING DIAGRAM



H01454

INSPECTION PROCEDURE

1 CHECK INSTRUMENT PANEL WIRE(P SQUIB CIRCUIT)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- Measure the resistance according to the value(s) in the table below.

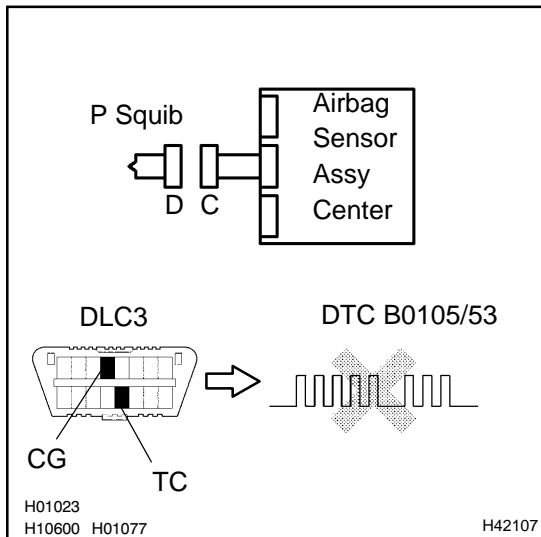
Standard:

Tester connection	Condition	Specified condition
A30-1 (P+) - A30-2 (P-)	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0105/53 is not output.

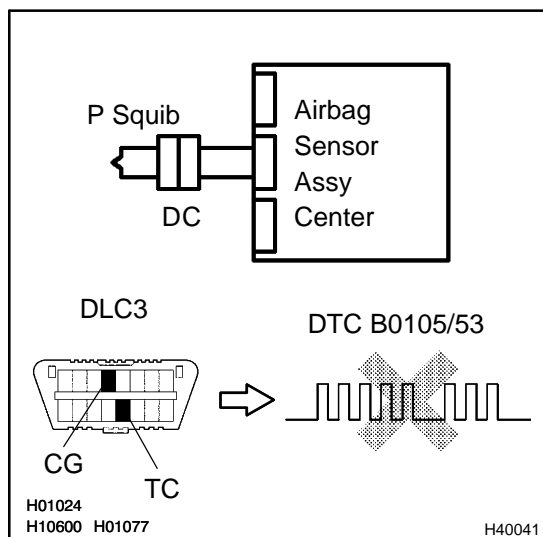
HINT:

Codes other than code B0105/53 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0105/53 is not output.

HINT:

Codes other than code B0105/53 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0106/54	OPEN IN P SQUIB CIRCUIT
------------	-----------------	--------------------------------

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assy center and the front passenger airbag assy. The circuit instructs the SRS to deploy when deployment conditions are met. DTC B0106/54 is recorded when an open circuit is detected in the P squib circuit.

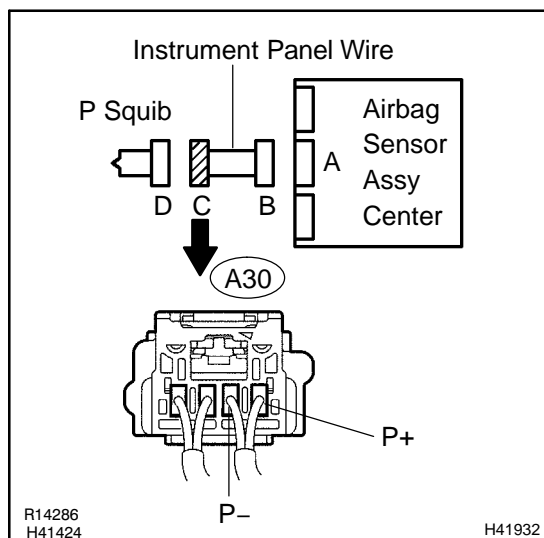
DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	<ul style="list-style-type: none"> • Open circuit in P+ wire harness or P- wire harness of P squib • P squib malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1253.

INSPECTION PROCEDURE

1	CHECK INSTRUMENT PANEL WIRE(P SQUIB CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- (d) Measure the resistance according to the value(s) in the table below.

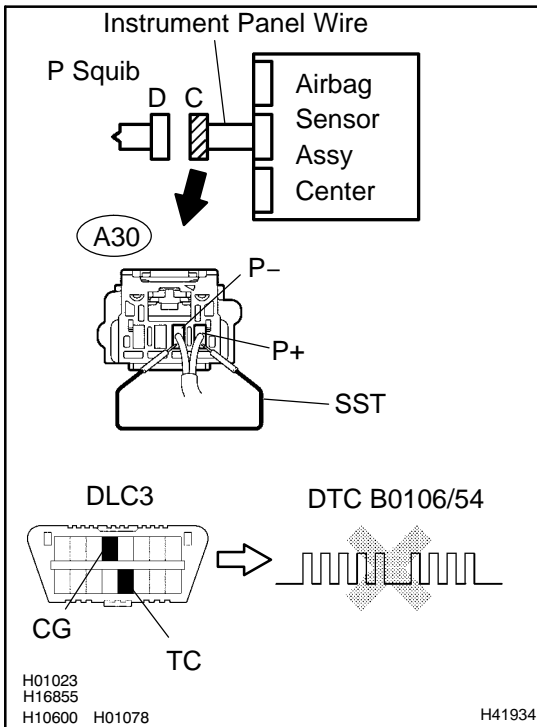
Standard:

Tester connection	Condition	Specified condition
A30-1 (P+) - A30-2 (P-)	Always	Below 1 Ω

OK

NG **REPLACE INSTRUMENT PANEL WIRE**

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using SST, connect A30-1 (P+) and A30-2 (P-) of connector "C".
SST 09843-18040
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0106/54 is not output.

HINT:

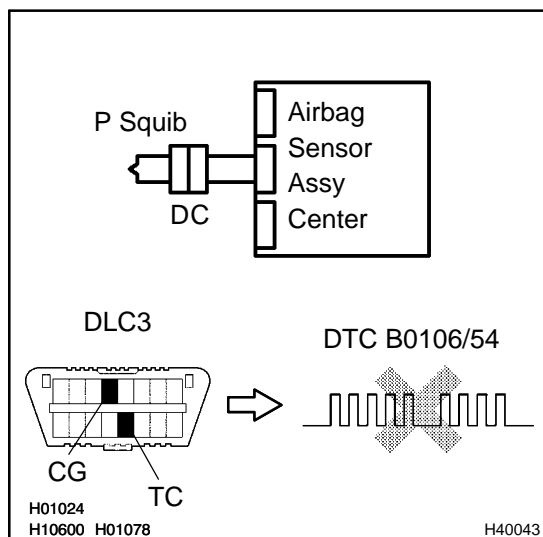
Codes other than code B0106/54 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the SST from connector "C".
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0106/54 is not output.

HINT:

Codes other than code B0106/54 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0107/51	SHORT IN P SQUIB CIRCUIT (TO GROUND)
------------	-----------------	---

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assy center and the front passenger airbag assy. The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0107/51 is recorded when a short to ground is detected in the P squib circuit.

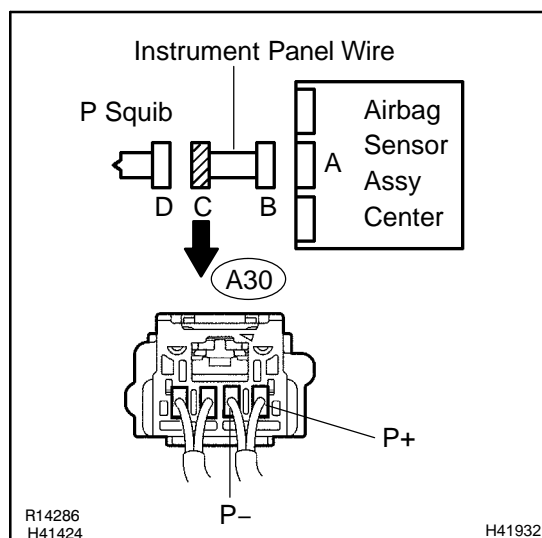
DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	<ul style="list-style-type: none"> • Short circuit in P squib wire harness (to ground) • P squib malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1253.

INSPECTION PROCEDURE

1 CHECK INSTRUMENT PANEL WIRE(P SQUIB CIRCUIT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

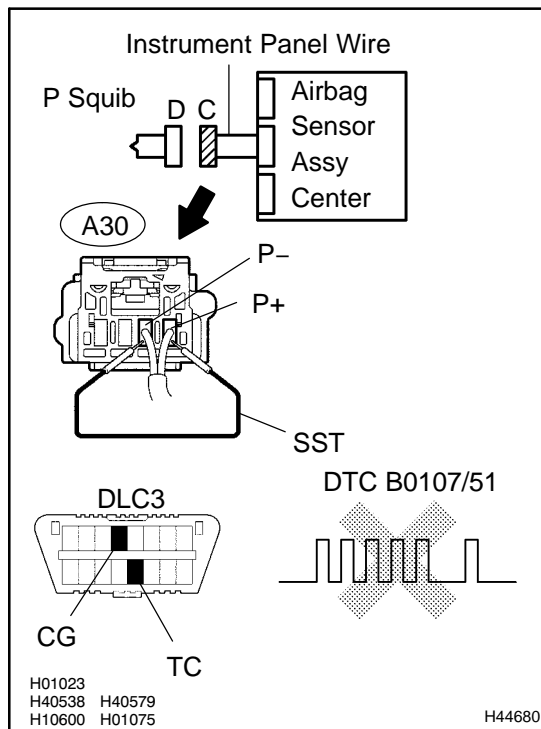
Tester connection	Condition	Specified condition
A30-1 (P+) - Body ground	Always	1 MΩ or Higher
A30-2 (P-) - Body ground	Always	1 MΩ or Higher

NG

REPLACE INSTRUMENT PANEL WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using SST, connect A19-1 (P+) and A19-2(P-) of connector "C".
SST 09843-18040
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0107/51 is not output.

HINT:

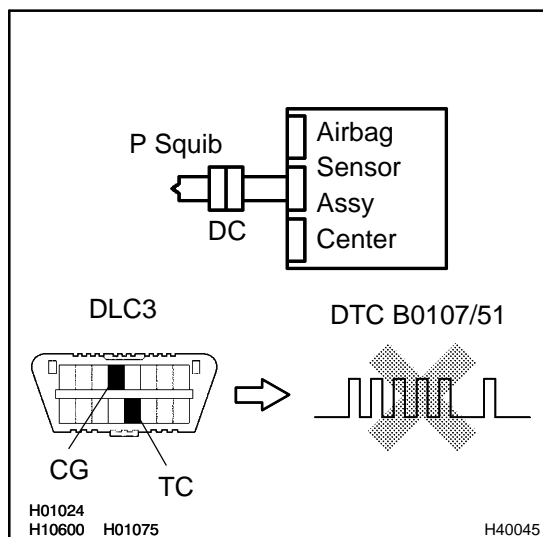
Codes other than code B0107/51 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the SST from connector "C".
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0107/51 is not output.

HINT:

Codes other than code B0107/51 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0108/52	SHORT IN P SQUIB CIRCUIT (TO B+)
------------	-----------------	---

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assy center and the front passenger airbag assy. The circuit instructs the SRS to deploy when deployment conditions are met. DTC B0108/52 is recorded when a short to B+ is detected in the P squib circuit.

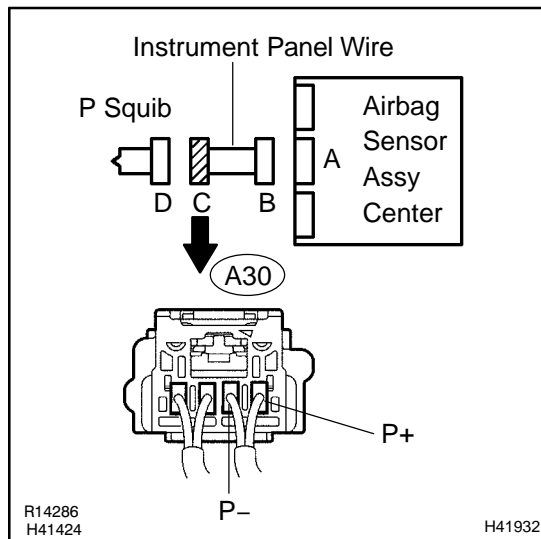
DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	<ul style="list-style-type: none"> • Short circuit in P squib wire harness (to B+) • P squib malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1253.

INSPECTION PROCEDURE

1	CHECK INSTRUMENT PANEL WIRE(P SQUIB CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

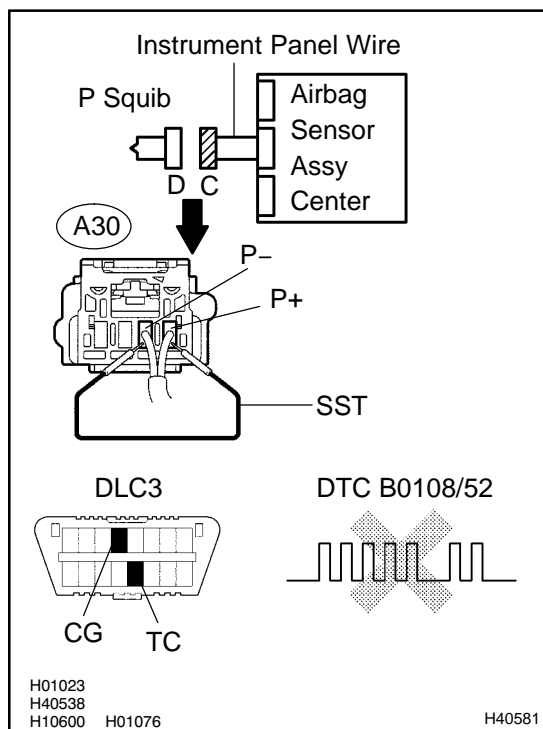
Standard:

Tester connection	Condition	Specified condition
A30-1 (P+) - Body ground	Ignition switch ON	Below 1 V
A30-2 (P-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE INSTRUMENT PANEL WIRE
-----------	--------------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using SST, connect A30-1 (P+) and A30-2 (P-) of connector "C".
SST 09843-18040
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0108/52 is not output.

HINT:

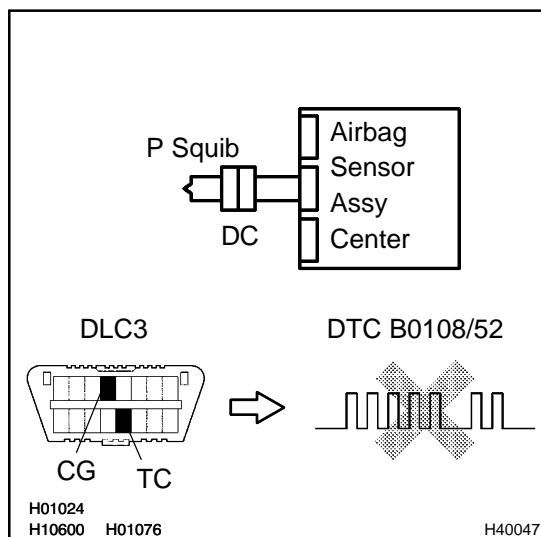
Codes other than code B0108/52 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the SST from connector "C".
- (d) Connect the connector to the front passenger airbag assy.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0108/52 is not output.

HINT:

Codes other than code B0108/52 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0110/43	SHORT IN SIDE SQUIB (RH) CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

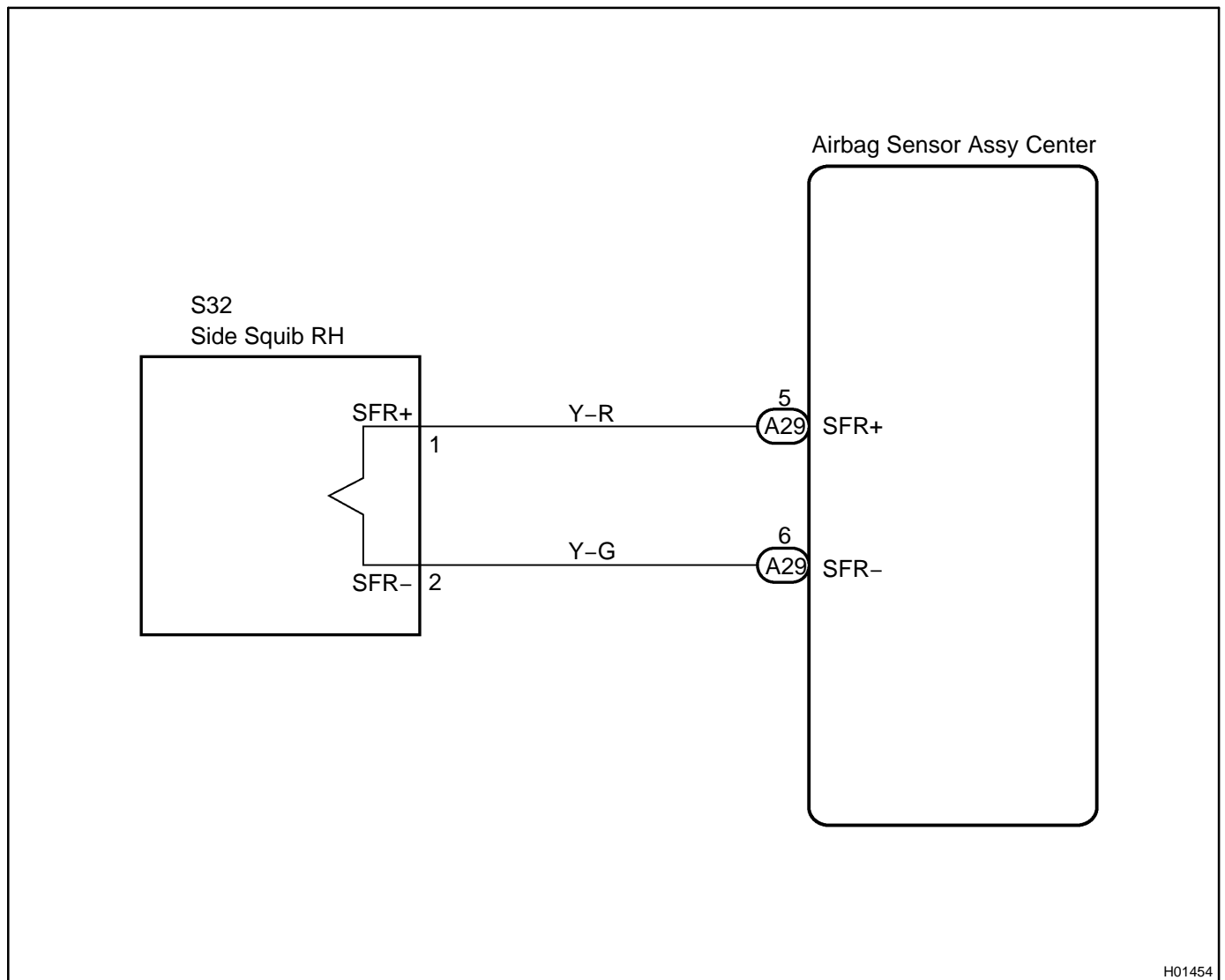
The side squib RH circuit consists of the airbag sensor assy center and the front seat airbag assy RH (side squib RH).

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0110/43 is recorded when a short circuit is detected in the side squib RH circuit.

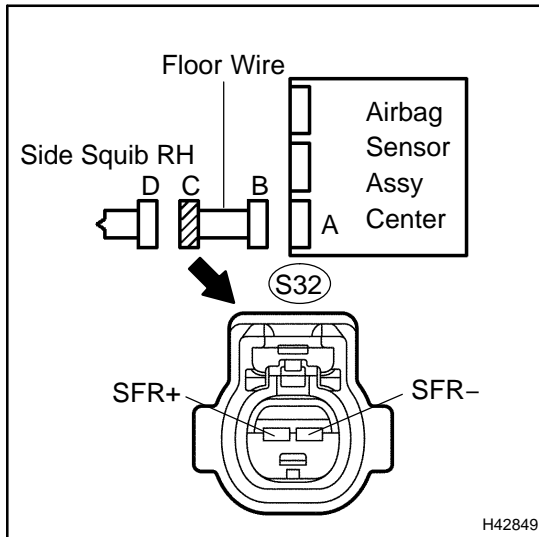
DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	<ul style="list-style-type: none"> • Short circuit between SFR+ wire harness and SFR- wire harness of side squib RH • Side squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK FLOOR WIRE (SIDE SQUIB RH CIRCUIT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy RH (side squib RH).
- (d) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (e) Measure the resistance according to the value(s) in the table below.

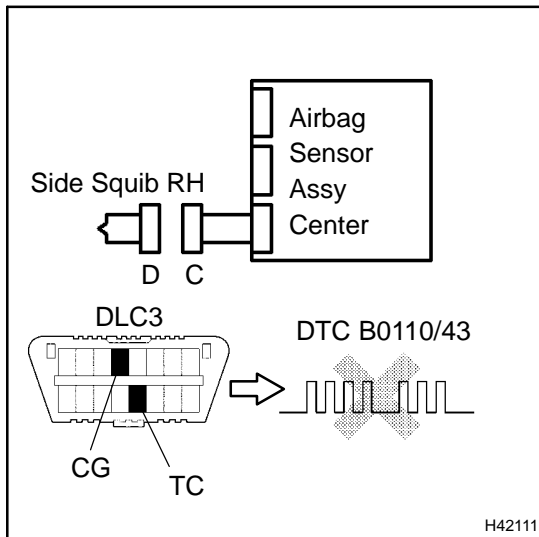
Standard:

Tester connection	Condition	Specified condition
S32-1 (SFR+) - S32-2 (SFR-)	Always	1 MΩ or Higher

NG → **REPLACE FLOOR WIRE**

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1222).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1222).

OK:

DTC B0110/43 is not output.

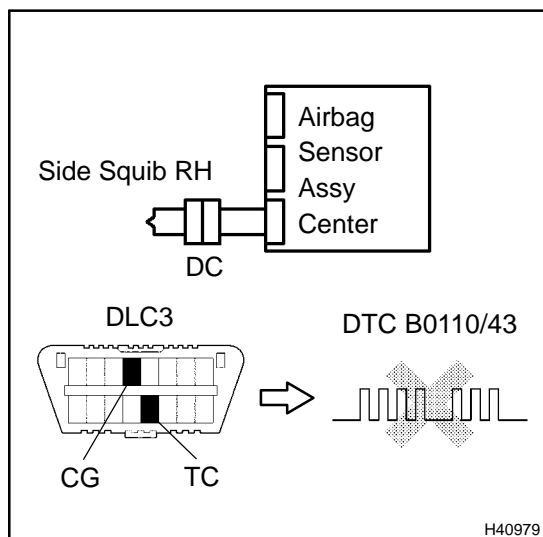
HINT:

Codes other than code B0110/43 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY RH (SIDE SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the front seat airbag assy RH (side squib RH).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B0110/43 is not output.

HINT:

Codes other than code B0110/43 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY RH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0111/44	OPEN IN SIDE SQUIB (RH) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

The side squib RH circuit consists of the airbag sensor assy center and the front seat airbag assy RH (side squib RH).

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0111/44 is recorded when an open circuit is detected in the side squib RH circuit.

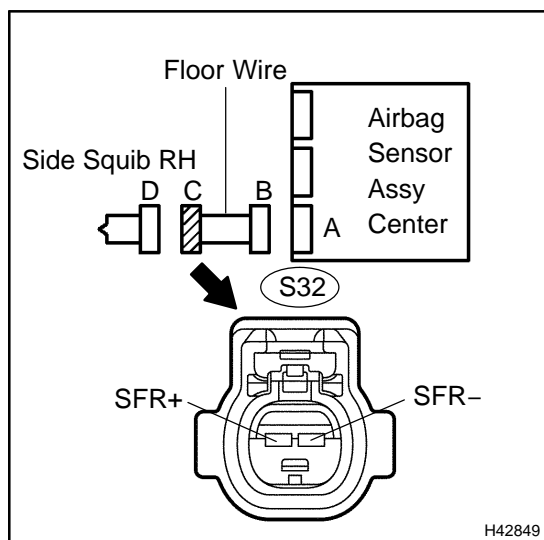
DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	<ul style="list-style-type: none"> • Open circuit in SFR+ wire harness or SFR- wire harness of side squib RH • Side squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page [05-1265](#).

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(SIDE SQUIB RH CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy RH (side squib RH).
- (d) Measure the resistance according to the value(s) in the table below.

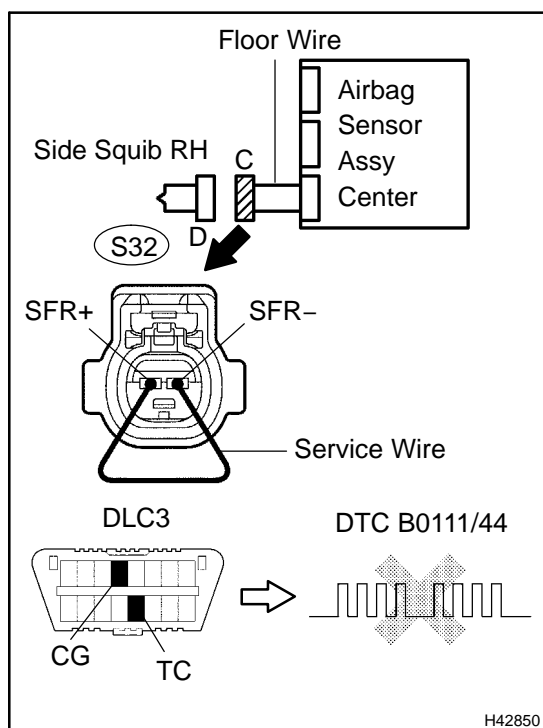
Standard:

Tester connection	Condition	Specified condition
S32-1 (SFR+) - S32-2 (SFR-)	Always	Below 1 Ω

NG	REPLACE FLOOR WIRE
-----------	---------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect S32-1 (SFR+) and S32-2 (SFR-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0111/44 is not output.

HINT:

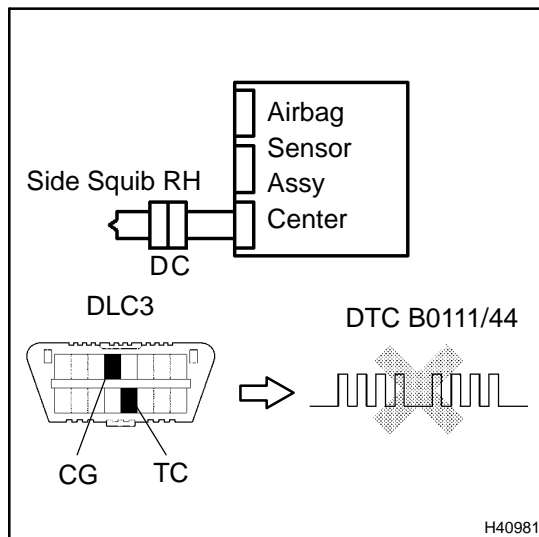
Codes other than code B0111/44 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY RH (SIDE SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat airbag assy RH (side squib RH).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0111/44 is not output.

HINT:

Codes other than code B0111/44 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY RH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0112/41	SHORT IN SIDE SQUIB (RH) CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The side squib RH circuit consists of the airbag sensor assy center and the front seat airbag assy RH (side squib RH).

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0112/41 is recorded when a short to ground is detected in the side squib RH circuit.

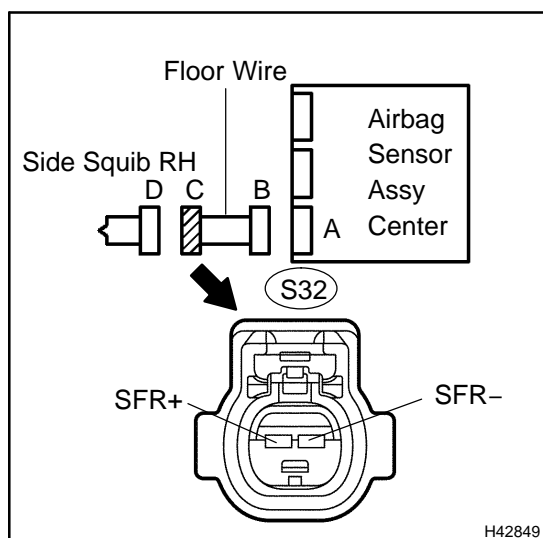
DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	<ul style="list-style-type: none"> • Short circuit in side squib RH wire harness (to ground) • Side squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1265.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE (SIDE SQUIB RH CIRCUIT)
----------	---



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy RH (side squib RH).
- Measure the resistance according to the value(s) in the table below.

Standard:

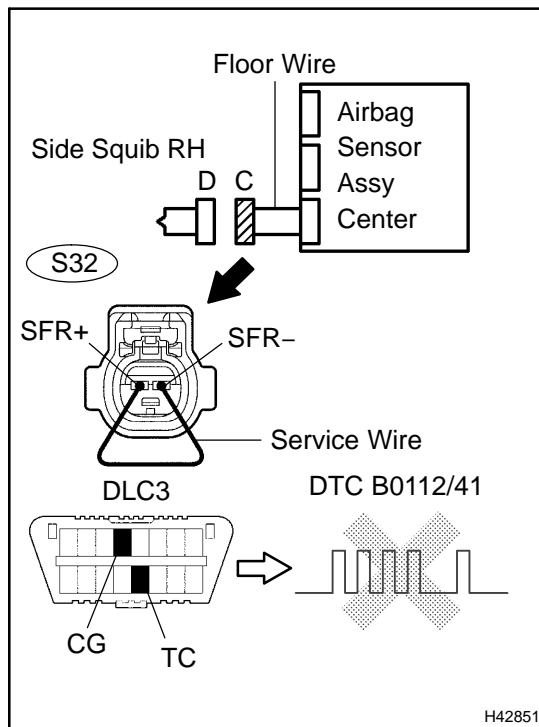
Tester connection	Condition	Specified condition
S32-1 (SFR+) - Body ground	Always	1 M Ω or Higher
S32-2 (SFR-) - Body ground	Always	1 M Ω or Higher

NG

REPLACE FLOOR WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect S32-1 (SFR+) and S32-2 (SFR-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

OK:

DTC B0112/41 is not output.

HINT:

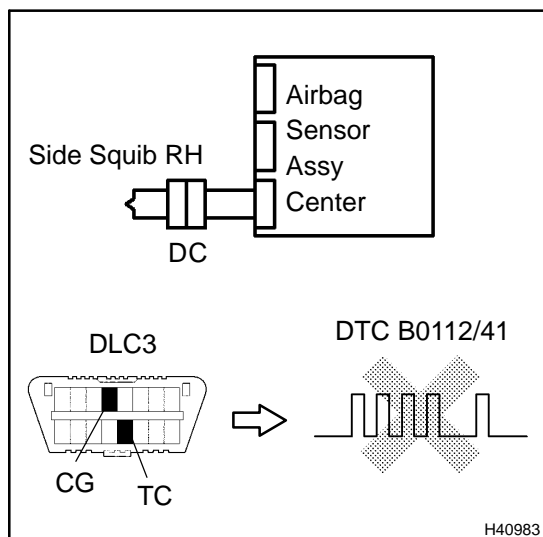
Codes other than code B0112/41 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY RH (SIDE SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat airbag assy RH (side squib RH).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0112/41 is not output.

HINT:

Codes other than code B0112/41 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY RH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0113/42	SHORT IN SIDE SQUIB (RH) CIRCUIT (TO B+)
------------	-----------------	---

CIRCUIT DESCRIPTION

The side squib RH circuit consists of the airbag sensor assy center and the front seat airbag assy RH (side squib RH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0113/42 is recorded when a short to B+ is detected in the side squib RH circuit.

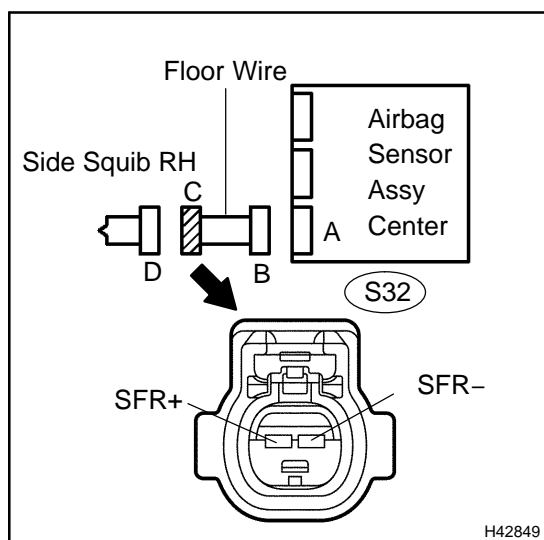
DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	<ul style="list-style-type: none"> • Short circuit in side squib RH wire harness (to B+) • Side squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy RH (Side squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1265.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE (SIDE SQUIB RH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy RH (side squib RH).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

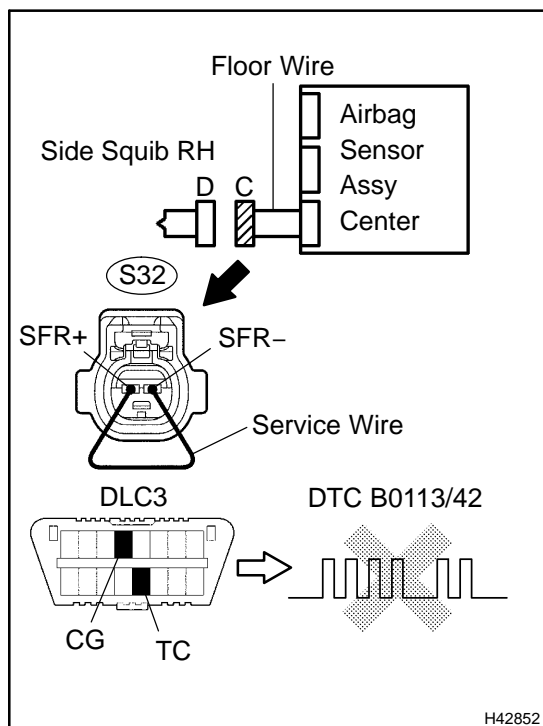
Standard:

Tester connection	Condition	Specified condition
S32-1 (SFR+) - Body ground	Ignition switch ON	Below 1 V
S32-2 (SFR-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE FLOOR WIRE
-----------	---------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least for 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect S32-1 (SFR+) and S32-2 (SFR-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0113/42 is not output.

HINT:

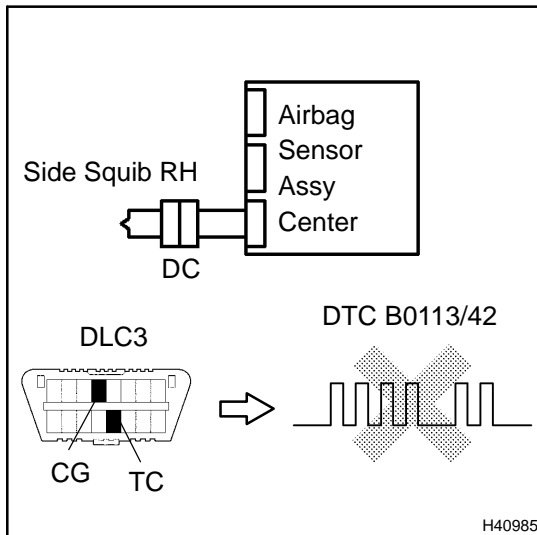
Codes other than code B0113/42 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY RH (SIDE SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat airbag assy RH (side squib RH).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0113/42 is not output.

HINT:

Codes other than code B0113/42 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY RH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0115/47	SHORT IN SIDE SQUIB (LH) CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

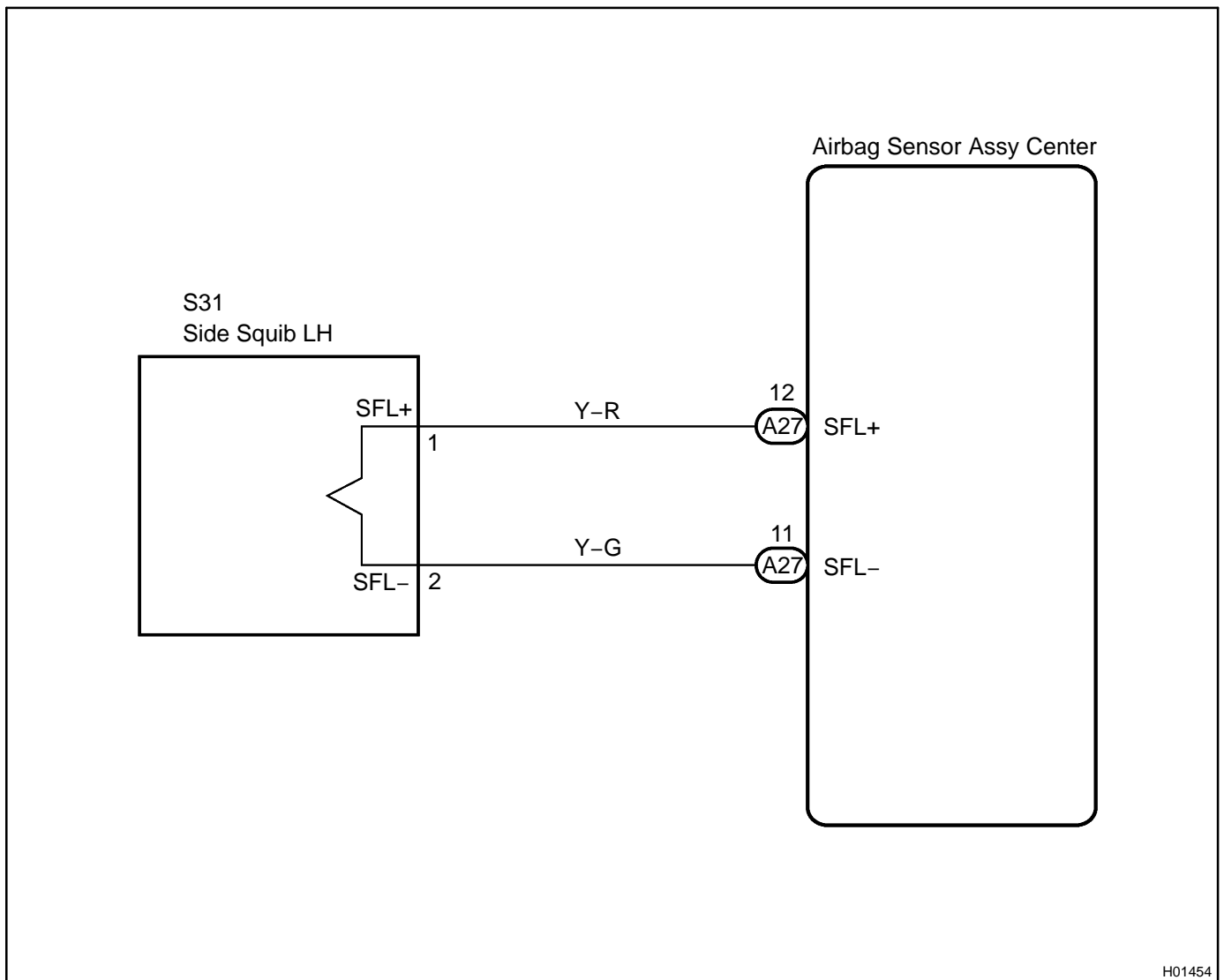
The side squib LH circuit consists of the airbag sensor assy center and the front seat airbag assy LH (side squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0115/47 is recorded when a short circuit is detected in the side squib LH circuit.

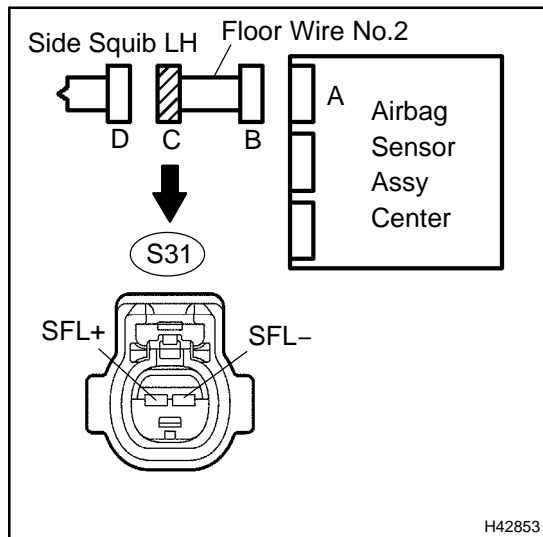
DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	<ul style="list-style-type: none"> • Short circuit between SFL+ wire harness and SFL- wire harness of side squib LH • Side squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK FLOOR WIRE NO.2 (SIDE SQUIB LH CIRCUIT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy LH (side squib LH).
- (d) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (e) Measure the resistance according to the value(s) in the table below.

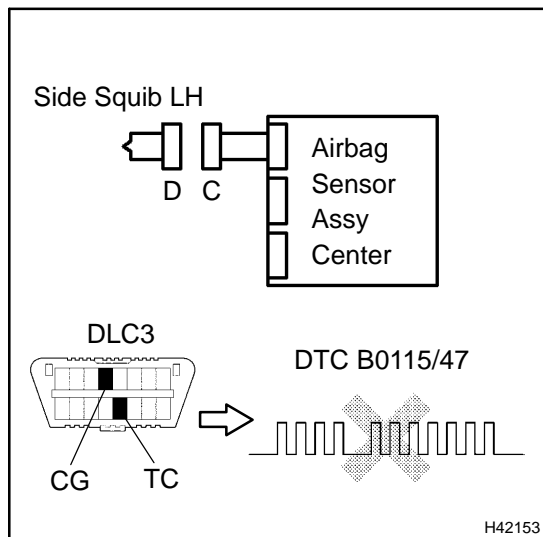
Standard:

Tester connection	Condition	Specified condition
S31-1 (SFL+) - S31-2 (SFL-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE NO.2

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1219).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1219).

OK:

DTC B0115/47 is not output.

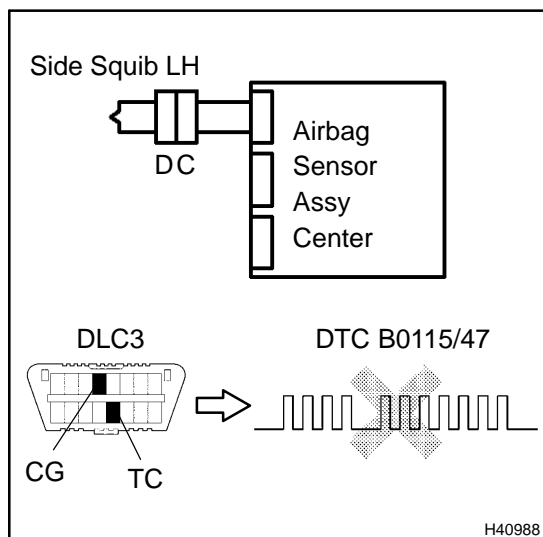
HINT:

Codes other than code B0115/47 may be output at this time, but they are not related to this check.

NG → REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

OK

3 CHECK FRONT SEAT AIRBAG ASSY LH (SIDE SQUIB LH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the front seat airbag assy LH (side squib LH).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B0115/47 is not output.

HINT:

Codes other than code B0115/47 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY LH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0116/48	OPEN IN SIDE SQUIB (LH) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

The side squib LH circuit consists of the airbag sensor assy center and the front seat airbag assy LH (side squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0116/48 is recorded when an open circuit is detected in the side squib LH circuit.

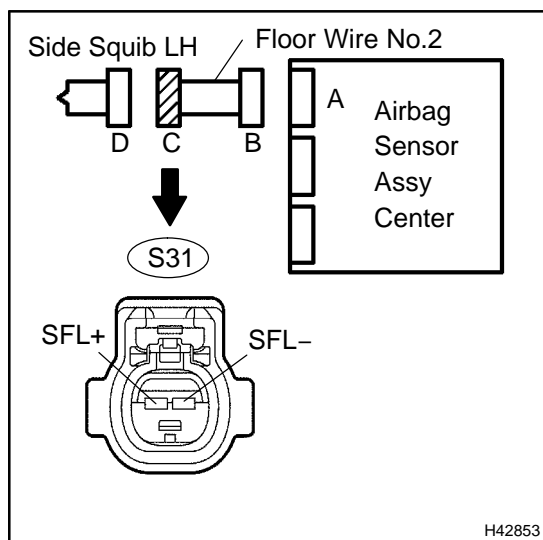
DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	<ul style="list-style-type: none"> • Open circuit in SFL+ wire harness or SFL- wire harness of side squib LH • Side squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1277.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2 (SIDE SQUIB LH CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy LH (side squib LH).
- (d) Measure the resistance according to the value(s) in the table below.

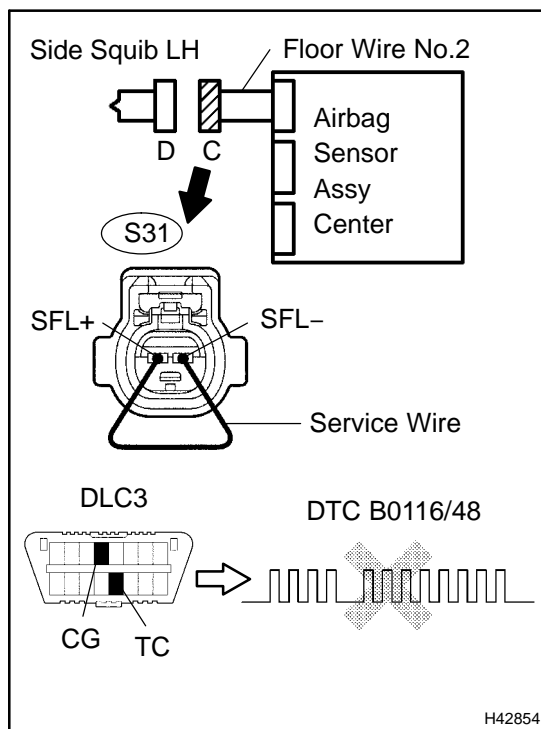
Standard:

Tester connection	Condition	Specified condition
S31-1 (SFL+) - S31-2 (SFL-)	Always	Below 1 Ω

NG	REPLACE FLOOR WIRE NO.2
-----------	--------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect S31-1 (SFL+) and S31-2 (SFL-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

OK:

DTC B0116/48 is not output.

HINT:

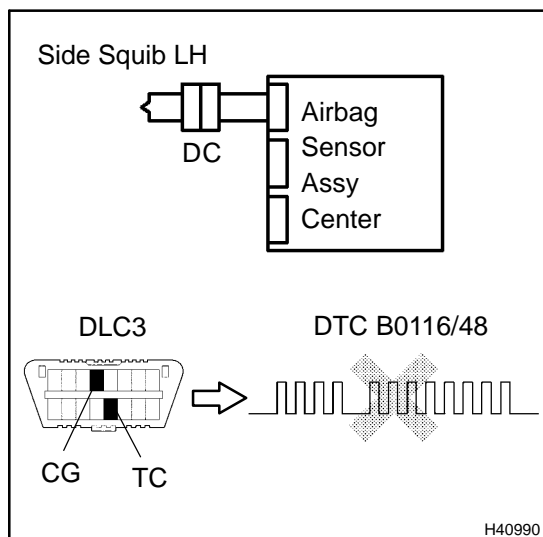
Codes other than code B0116/48 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY LH (SIDE SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat airbag assy LH (side squib LH).
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0116/48 is not output.

HINT:

Codes other than code B0116/48 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY LH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0117/45	SHORT IN SIDE SQUIB (LH) CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The side squib LH circuit consists of the airbag sensor assy center and the front seat airbag assy LH (side squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0117/45 is recorded when a short to ground is detected in the side squib LH circuit.

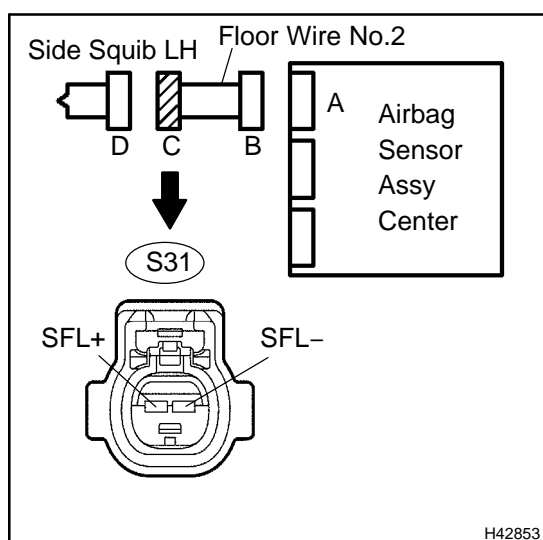
DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	<ul style="list-style-type: none"> • Short circuit in side squib LH wire harness (to ground) • Side squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1277.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2 (SIDE SQUIB LH CIRCUIT)
----------	--



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy LH (side squib LH).
- Measure the resistance according to the value(s) in the table below.

Standard:

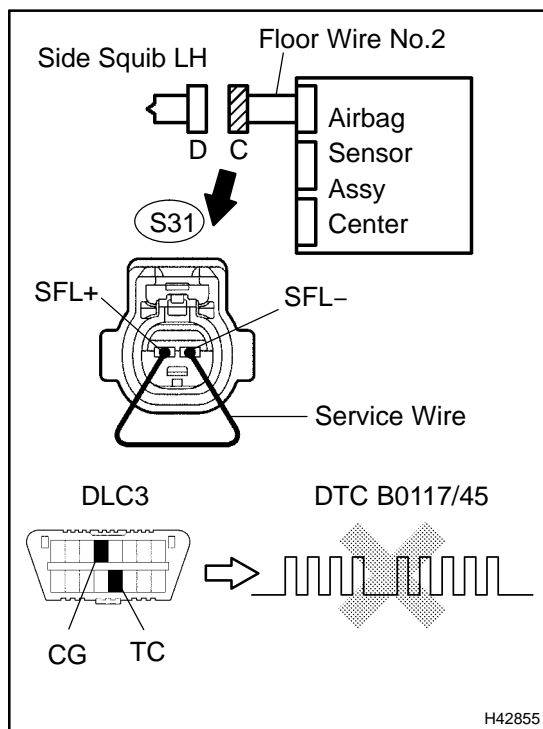
Tester connection	Condition	Specified condition
S31-1 (SFL+) - Body ground	Always	1 M Ω or Higher
S31-2 (SFL-) - Body ground	Always	1 M Ω or Higher

NG

REPLACE FLOOR WIRE NO.2

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect S31-1 (SFL+) and S31-2 (SFL-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0117/45 is not output.

HINT:

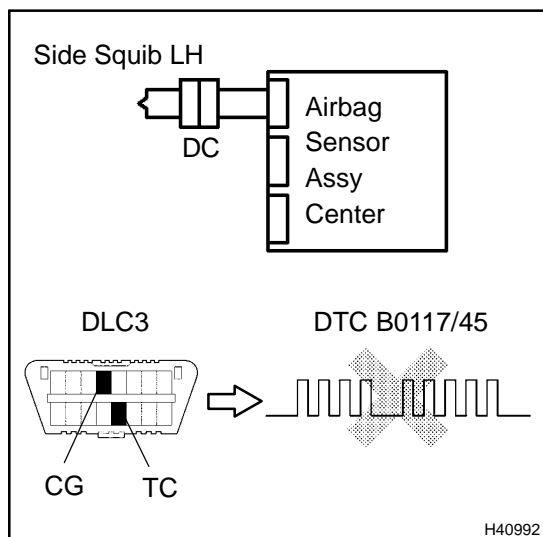
Codes other than code B0117/45 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY LH (SIDE SQUIB LH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat airbag assy LH (side squib LH).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0117/45 is not output.

HINT:

Codes other than code B0117/45 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT AIRBAG ASSY LH
(SEE PAGE 72-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0118/46	SHORT IN SIDE SQUIB (LH) CIRCUIT (TO B+)
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CIRCUIT DESCRIPTION

The side squib LH circuit consists of the airbag sensor assy center and the front seat airbag assy LH (side squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0118/46 is recorded when a short to B+ is detected in the side squib LH circuit.

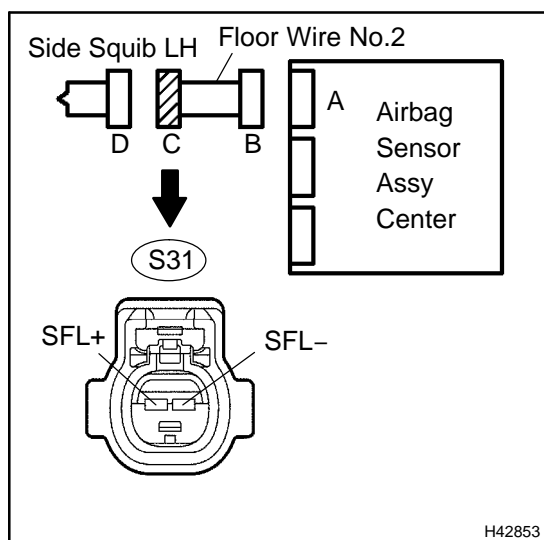
DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	<ul style="list-style-type: none"> • Short circuit in side squib LH wire harness (to B+) • Side squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat airbag assy LH (Side squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 72-20.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(SIDE SQUIB LH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat airbag assy LH (side squib LH).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

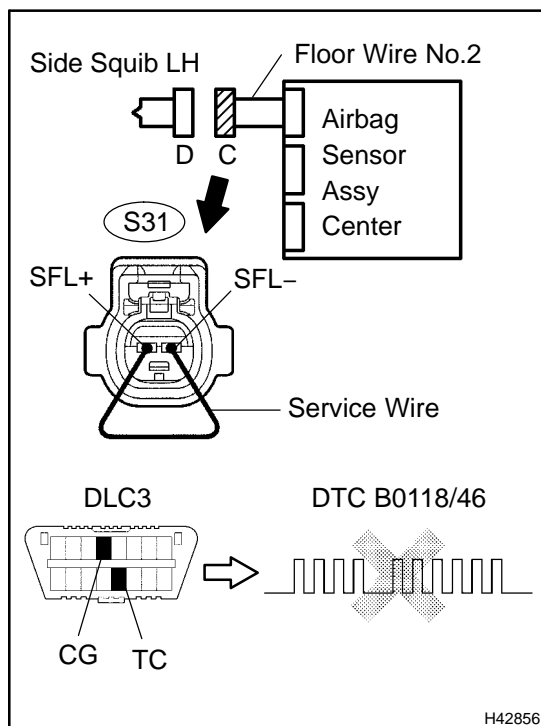
Standard:

Tester connection	Condition	Specified condition
S31 -1 (SFL+) - Body ground	Ignition switch ON	Below 1 V
S31 -2 (SFL-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE FLOOR WIRE NO.2
-----------	--------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect S31 -1 (SFL+) and S31 -2 (SFL-) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0118/46 is not output.

HINT:

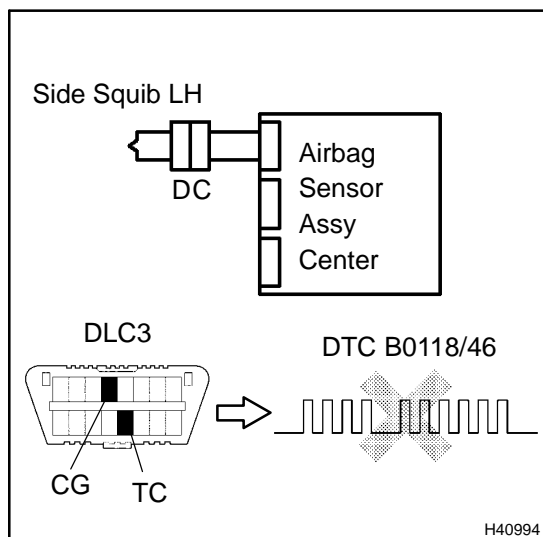
Codes other than code B0118/46 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT AIRBAG ASSY LH (SIDE SQUIB LH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat airbag assy LH (side squib LH).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0118/46 is not output.

HINT:

Codes other than code B0118/46 may be output at this time, but they are not related to this check.

NG

REPLACE FRONT SEAT AIRBAG ASSY LH (SEE PAGE 72-20)

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0126/27	SEAT BELT BUCKLE SWITCH (LH) MALFUNCTION
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DTC	B0127/27	SEAT BELT BUCKLE SWITCH (LH) MALFUNCTION
------------	-----------------	---

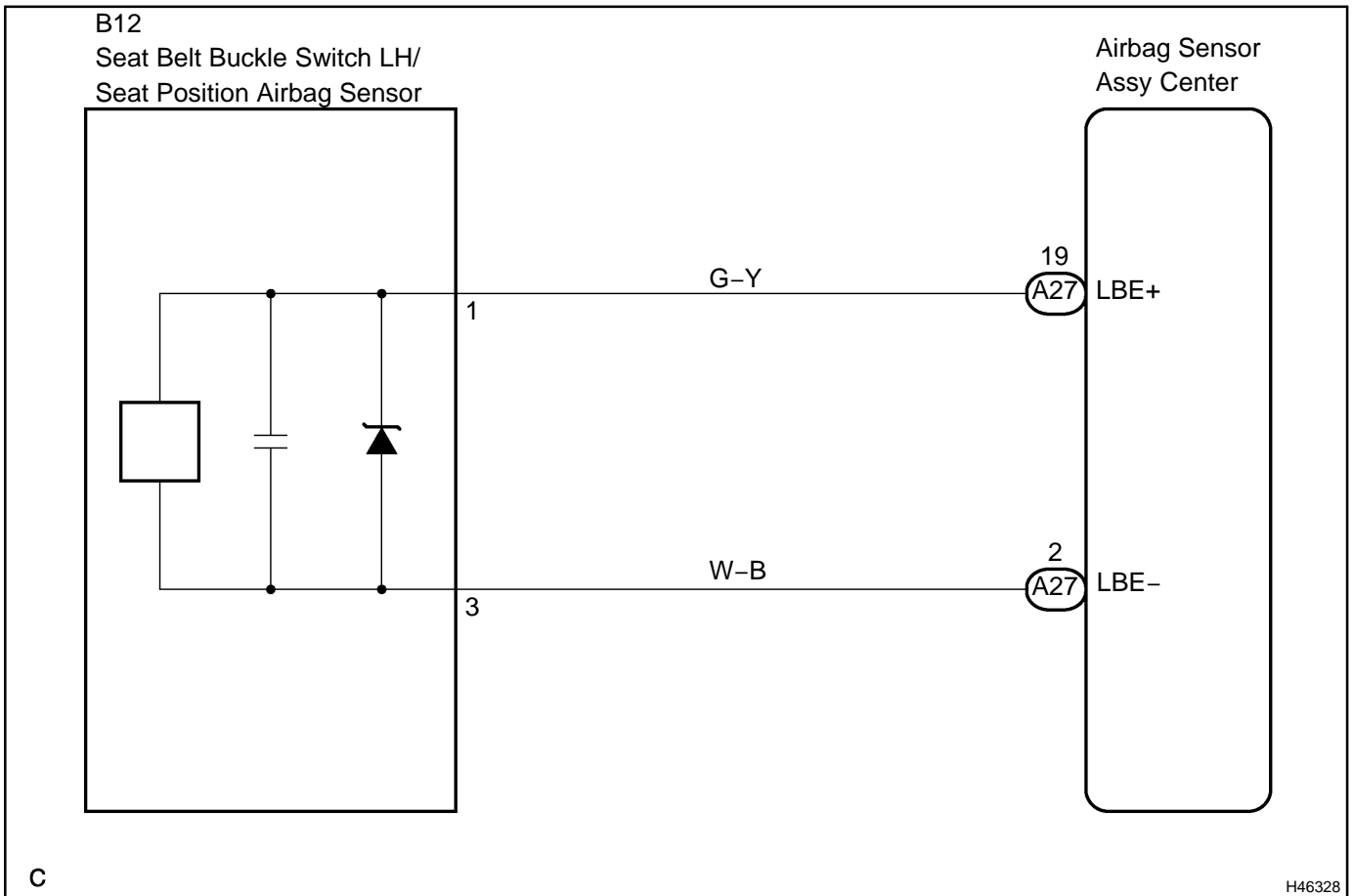
CIRCUIT DESCRIPTION

The seat belt buckle switch LH circuit consists of the airbag sensor assy center and the front seat inner belt assy LH (seat belt buckle switch LH).

DTC B0126/B0127/27 is recorded when a malfunction is detected in the seat belt buckle switch LH circuit.

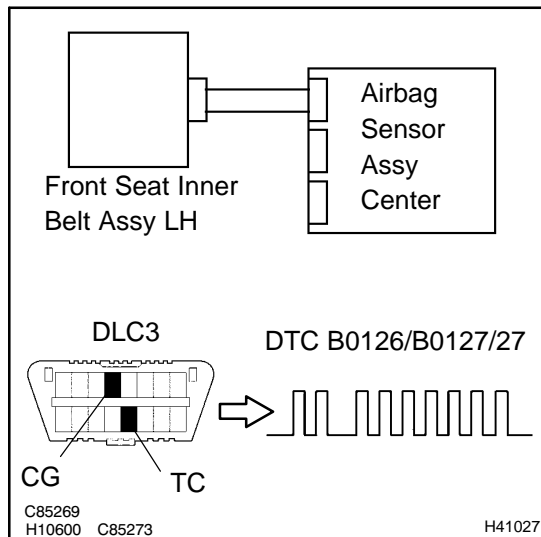
DTC No.	DTC Detecting Condition	Trouble Area
B0126/B0127/27	<ul style="list-style-type: none"> • Short circuit in front seat inner belt assy LH wire harness (to B+) • Short circuit in front seat inner belt assy LH wire harness (to ground) • Open circuit in LBE+ wire harness or LBE- wire harness of front seat inner belt assy LH • Front seat inner belt assy LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat inner belt assy LH (Seat belt buckle switch LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DTC



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:**DTC B0126/B0127/27 is not output.****HINT:**

Codes other than code B0126/B0127/27 may be output at this time, but they are not related to this check.

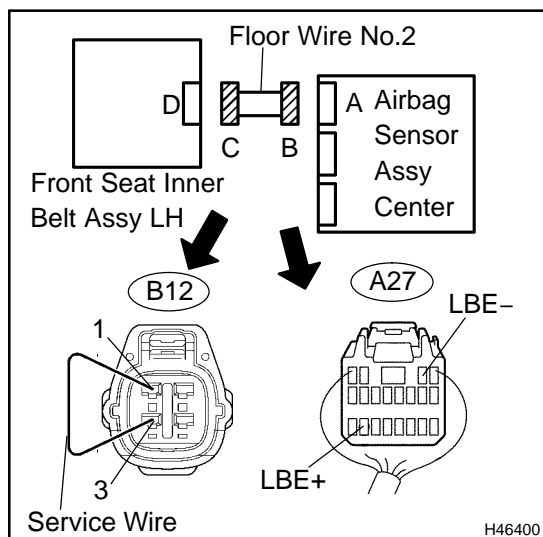
NG**Go to step 2****OK**

USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center and the front seat inner belt assy LH.

OK:**The connectors are connected.****NG****CONNECT CONNECTORS, THEN GO TO STEP 1****OK**

3 CHECK FLOOR WIRE NO.2(OPEN)

- Disconnect the connectors from the airbag sensor assy center and the front seat inner belt assy LH.
- Using a service wire, connect B12-1 and B12-3 of connector "C".

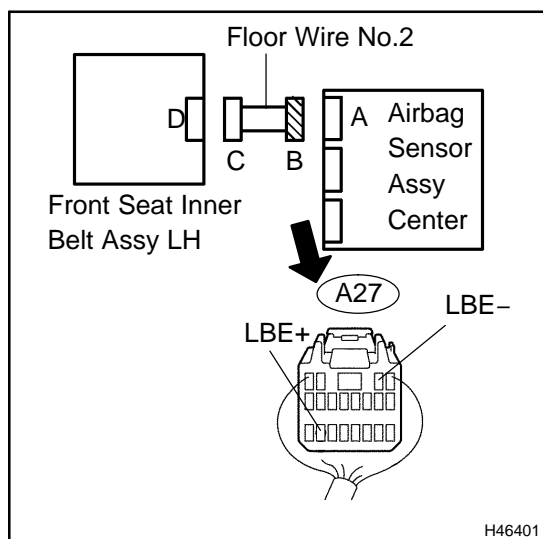
NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A27-19 (LBE+) - A27-2 (LBE-)	Always	Below 1 Ω

NG**REPLACE FLOOR WIRE NO.2****OK****4 CHECK FLOOR WIRE NO.2(TO B+)**

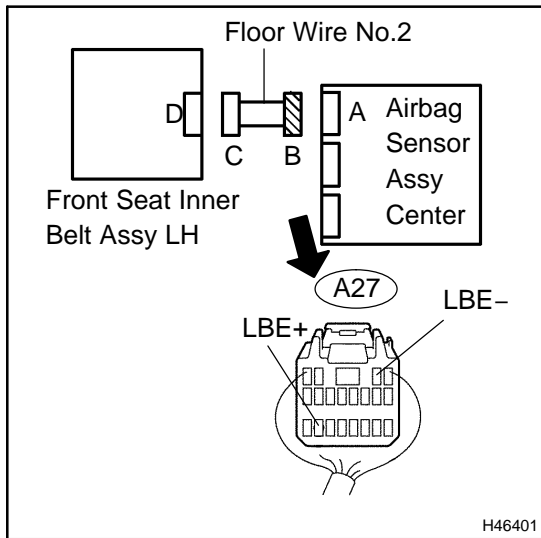
- Disconnect the service wire from connector "C".
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A27-19 (LBE+) - Body ground	Ignition switch ON	Below 1 V
A27-2 (LBE-) - Body ground	Ignition switch ON	Below 1 V

NG**REPLACE FLOOR WIRE NO.2****OK**

5 CHECK FLOOR WIRE NO.2(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

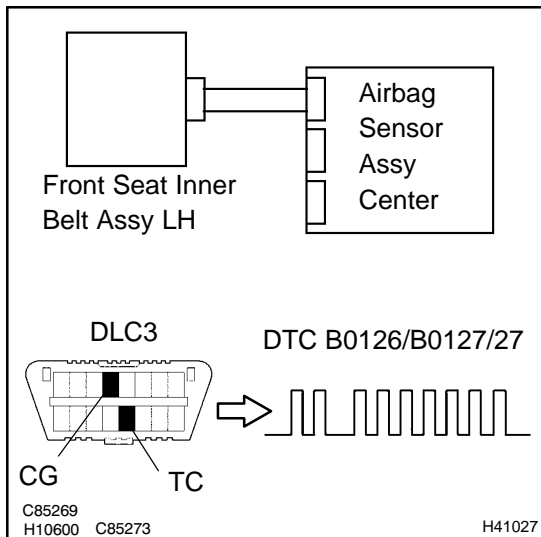
Standard:

Tester connection	Condition	Specified condition
A27-19 (LBE+) - Body ground	Always	1 MΩ or Higher
A27-2 (LBE-) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE FLOOR WIRE NO.2**

OK

6 CHECK FRONT SEAT INNER BELT ASSY LH



- (a) Connect the connectors to the front seat inner belt assy LH and the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1219).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1219).

OK:

DTC B0126/B0127/27 is not output.

HINT:

Codes other than code B0126/B0127/27 may be output at this time, but they are not related to this check.

NG → **Go to step 7**

OK

USE SIMULATION METHOD TO CHECK

7 REPLACE FRONT SEAT INNER BELT ASSY LH

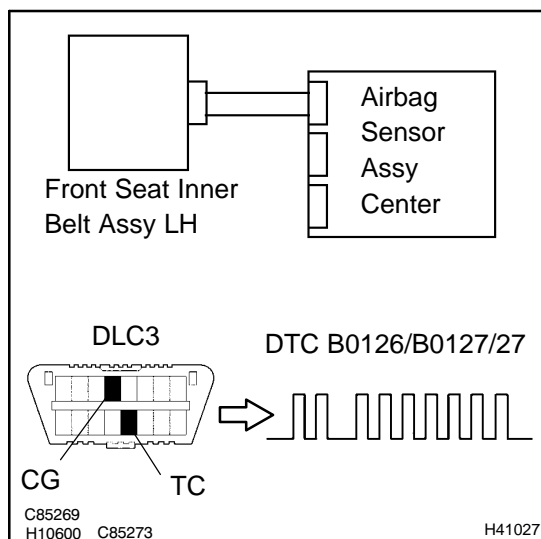
- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Replace the front seat inner belt assy LH (see page 61-13).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

8 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0126/B0127/27 is not output.

HINT:

Codes other than code B0126/B0127/27 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B0130/63	SHORT IN P/T SQUIB (RH) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

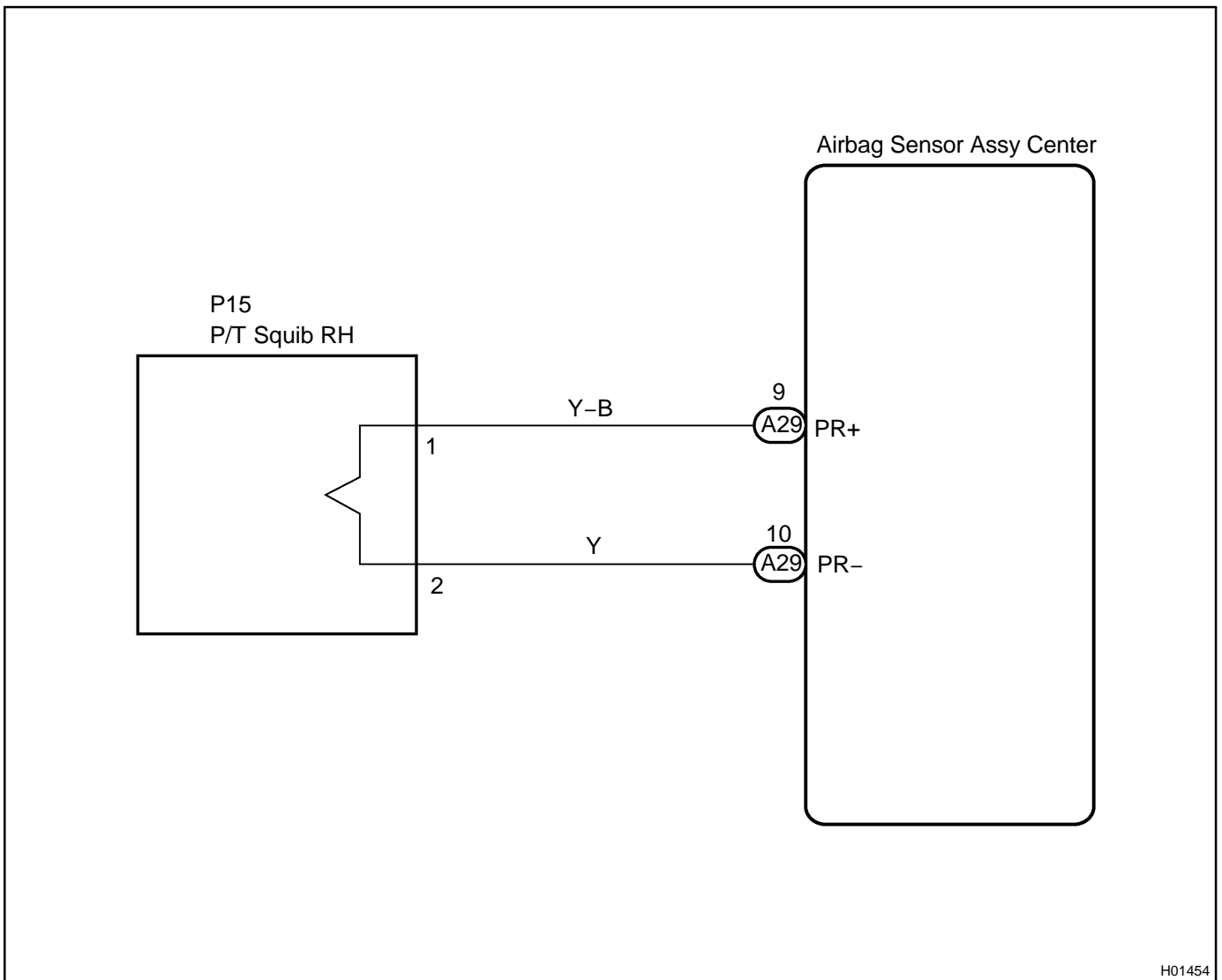
The P/T squib RH circuit consists of the airbag sensor assy center and the front seat outer belt assy RH (P/T squib RH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0130/63 is recorded when a short circuit is detected in the P/T squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	<ul style="list-style-type: none"> • Short circuit between PR+ wire harness and PR- wire harness of squib • P/T squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the front seat outer belt assy RH.
- (d) Check that the floor wire connector (on the front seat outer belt assy RH side) is not damaged.

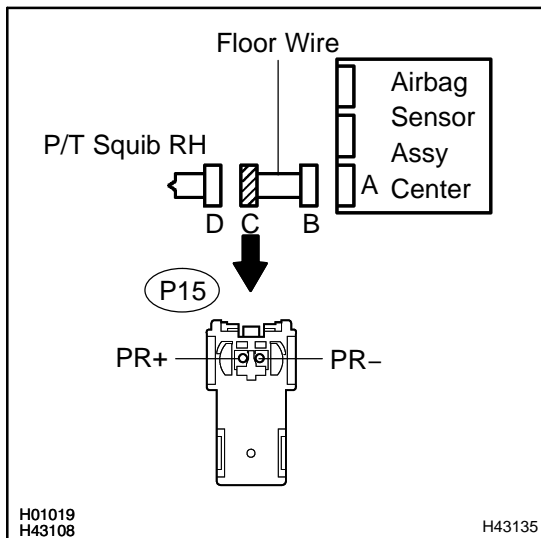
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → REPLACE FLOOR WIRE

OK

2 CHECK FLOOR WIRE(P/T SQUIB RH CIRCUIT)



- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (c) Measure the resistance according to the value(s) in the table below.

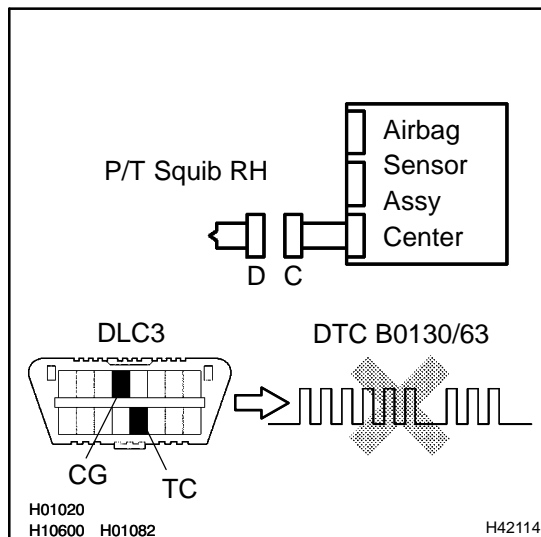
Standard:

Tester connection	Condition	Specified condition
P15-1 (PR+) - P15-2 (PR-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE

OK

3 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1219).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1219).

OK:

DTC B0130/63 is not output.

HINT:

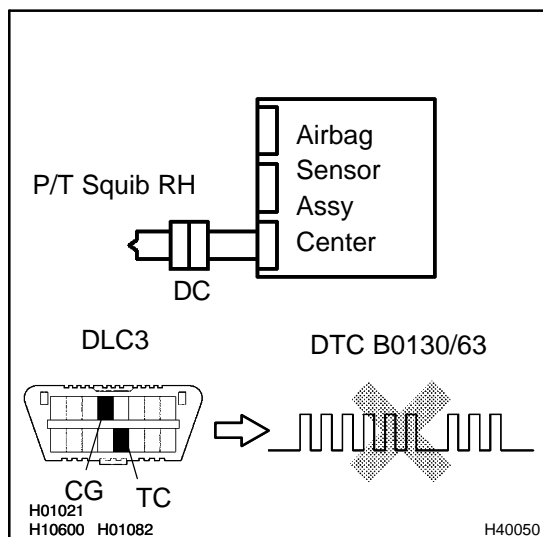
Codes other than code B0130/63 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

4 CHECK FRONT SEAT OUTER BELT ASSY RH(P/T SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the front seat outer belt assy RH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B0130/63 is not output.

HINT:

Codes other than code B0130/63 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY RH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0131/64	OPEN IN P/T SQUIB (RH) CIRCUIT
------------	-----------------	---------------------------------------

CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assy center and the front seat outer belt assy RH (P/T squib RH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0131/64 is recorded when an open circuit is detected in the P/T squib RH circuit.

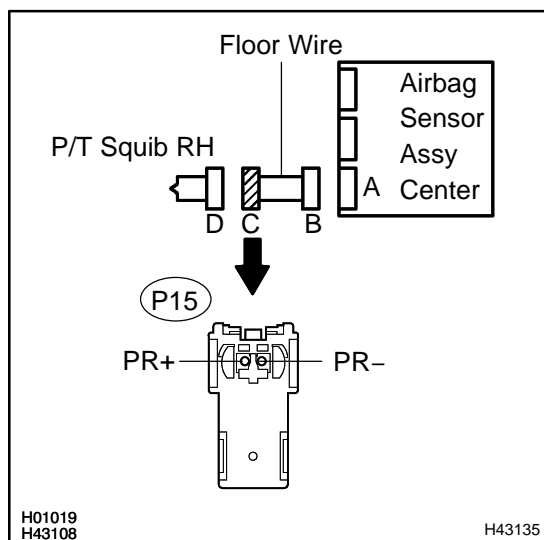
DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	<ul style="list-style-type: none"> • Open circuit in PR+ wire harness or PR- wire harness of P/T squib RH • P/T squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1294.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(P/T SQUIB RH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy RH.
- (d) Measure the resistance according to the value(s) in the table below.

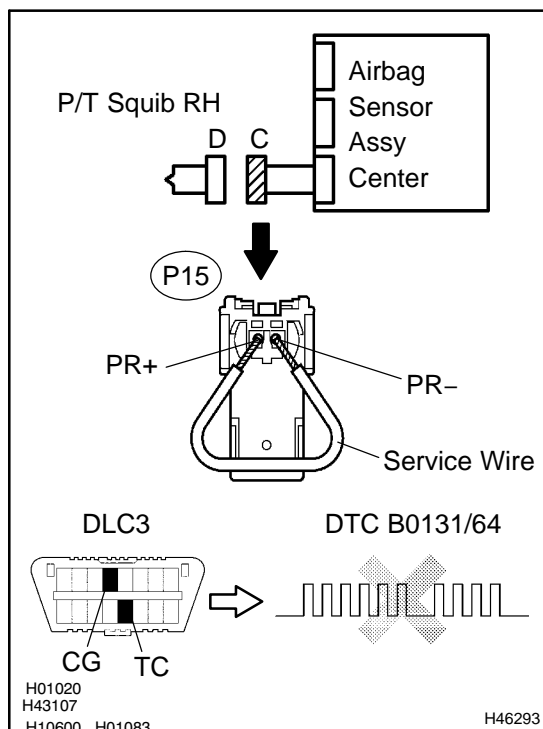
Standard:

Tester connection	Condition	Specified condition
P15-1 (PR+) - P15-2 (PR-)	Always	Below 1 Ω

NG	REPLACE FLOOR WIRE
-----------	---------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect P15-1 (PR+) and P15-2 (PR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0131/64 is not output.

HINT:

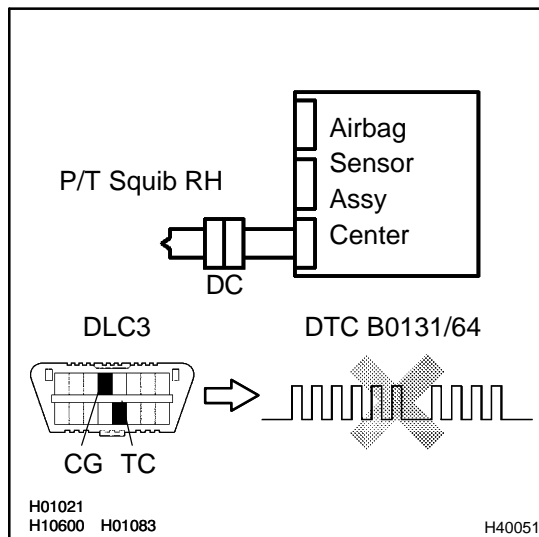
Codes other than code B0131/64 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY RH(P/T SQUIB RH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat outer belt assy RH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0131/64 is not output.

HINT:

Codes other than code B0131/64 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY RH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0132/61	SHORT IN P/T SQUIB (RH) CIRCUIT (TO GROUND)
------------	-----------------	--

CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assy center and the front seat outer belt assy RH (P/T squib RH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0132/61 is recorded when a short to ground is detected in the P/T squib RH circuit.

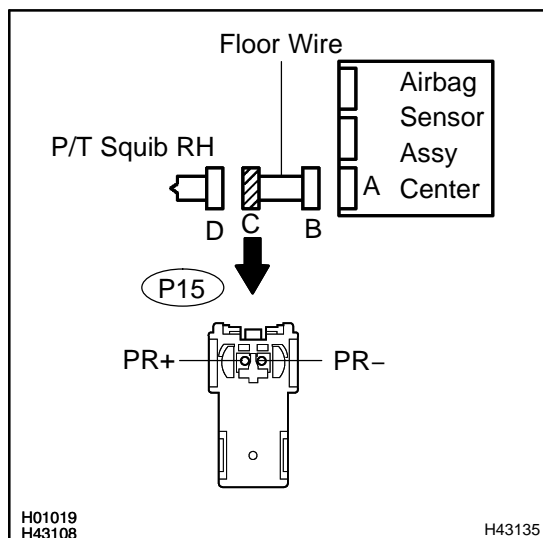
DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	<ul style="list-style-type: none"> • Short circuit in P/T squib RH wire harness (to ground) • P/T squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1294.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(P/T SQUIB RH CIRCUIT)
----------	---



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy RH.
- Measure the resistance according to the value(s) in the table below.

Standard:

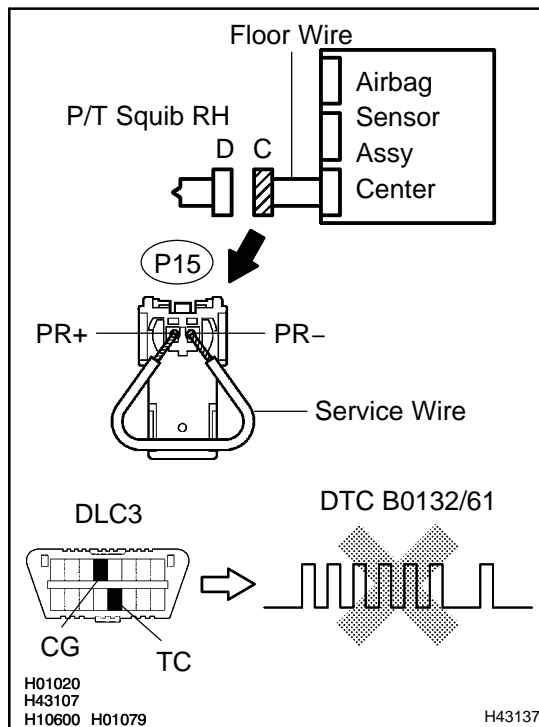
Tester connection	Condition	Specified condition
P15-1 (PR+) - Body ground	Always	1 MΩ or Higher
P15-2 (PR-) - Body ground	Always	1 MΩ or Higher

NG

REPLACE FLOOR WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect P15-1 (PR+) and P15-2 (PR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0132/61 is not output.

HINT:

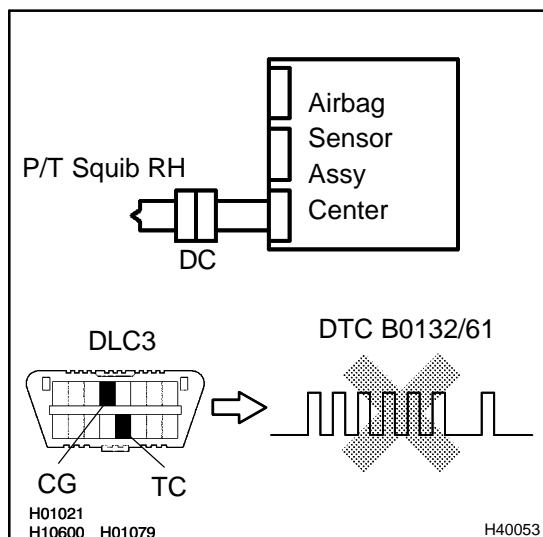
Codes other than code B0132/61 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY RH(P/T SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the front seat outer belt assy RH.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B0132/61 is not output.

HINT:

Codes other than code B0132/61 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY RH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0133/62	SHORT IN P/T SQUIB (RH) CIRCUIT (TO B+)
------------	-----------------	--

CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assy center and the front seat outer belt assy RH (P/T squib RH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0133/62 is recorded when a short to B+ is detected in the P/T squib RH circuit.

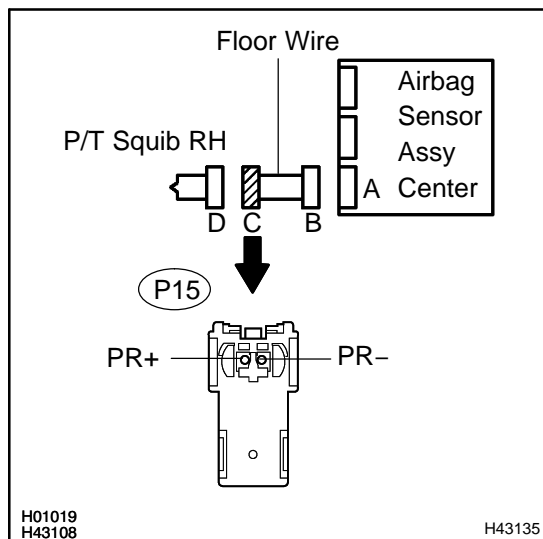
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	<ul style="list-style-type: none"> • Short circuit in P/T squib RH wire harness (to B+) • P/T squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy RH (P/T squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1294.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(P/T SQUIB RH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy RH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

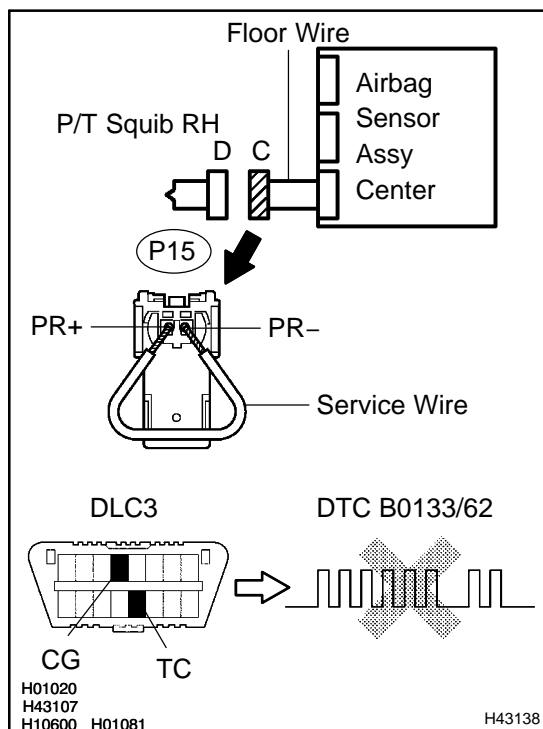
Standard:

Tester connection	Condition	Specified condition
P15-1 (PR+) - Body ground	Ignition switch ON	Below 1 V
P15-2 (PR-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE FLOOR WIRE
-----------	---------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect P15-1 (PR+) and P15-2 (PR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0133/62 is not output.

HINT:

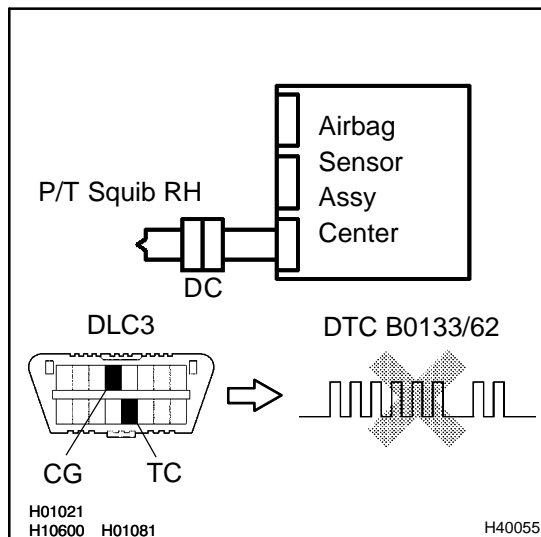
Codes other than code B0133/62 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY RH(P/T SQUIB RH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat outer belt assy RH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0133/62 is not output.

HINT:

Codes other than code B0133/62 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY RH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0135/73	SHORT IN P/T SQUIB (LH) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

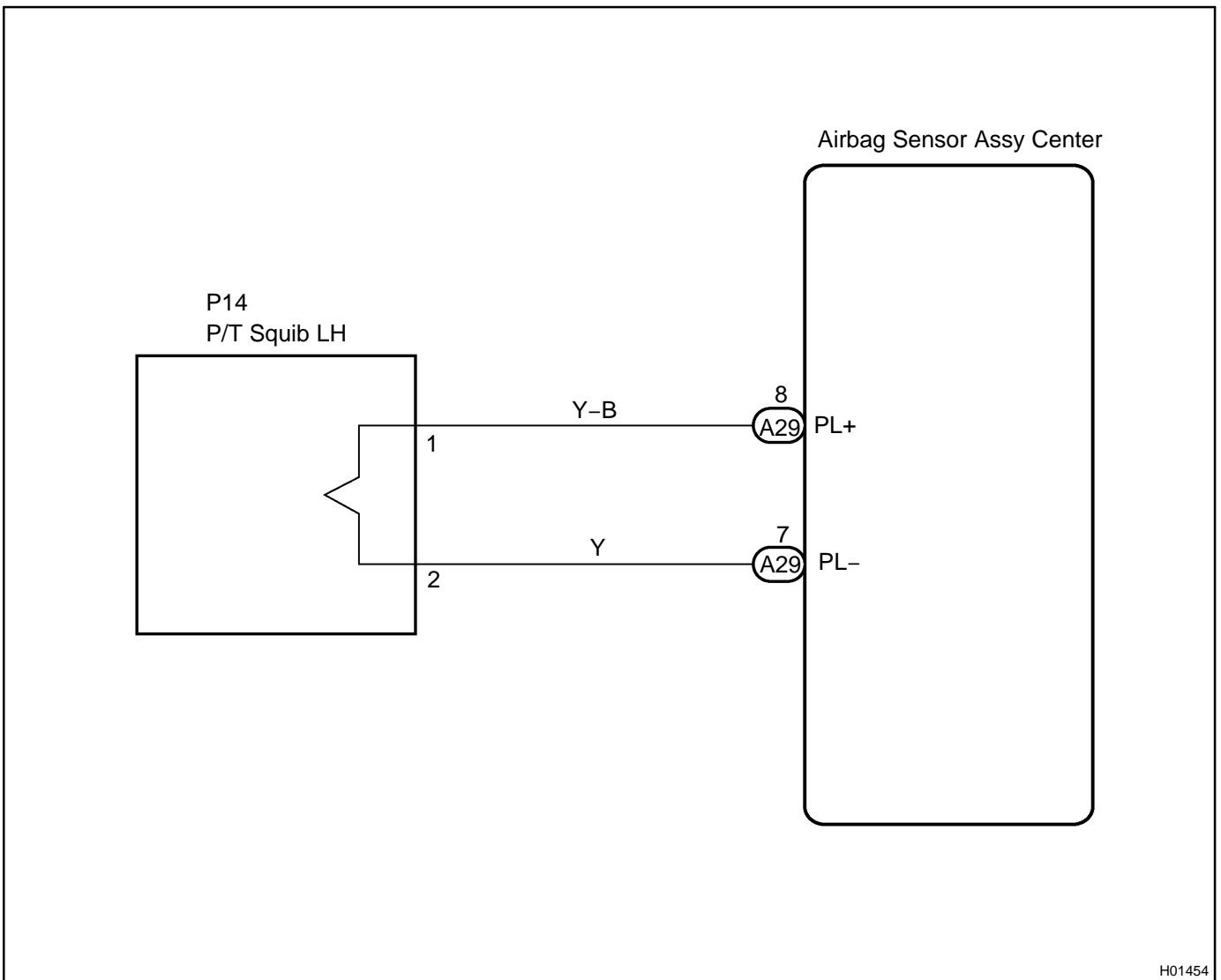
The P/T squib LH circuit consists of the airbag sensor assy center and the front seat outer belt assy LH (P/T squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0135/73 is recorded when a short circuit is detected in the P/T squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	<ul style="list-style-type: none"> • Short circuit between PL+ wire harness and PL- wire harness of P/T squib LH • P/T squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connector from the front seat outer belt assy LH.
- (d) Check that the floor wire No.2 connector (on the front seat outer belt assy LH side) is not damaged.

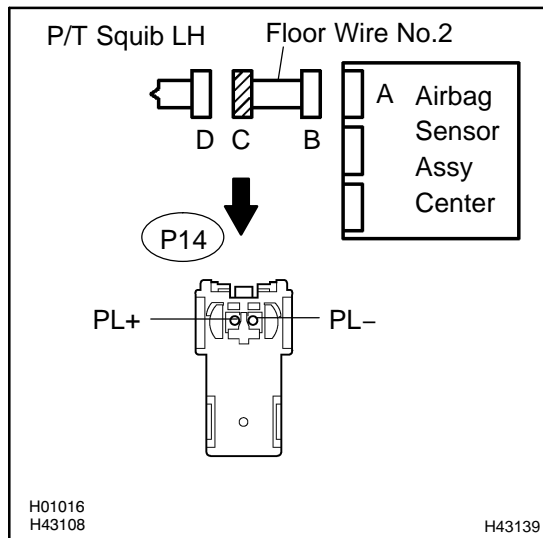
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → REPLACE FLOOR WIRE NO.2

OK

2 CHECK FLOOR WIRE NO.2(P/T SQUIB LH CIRCUIT)



- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (c) Measure the resistance according to the value(s) in the table below.

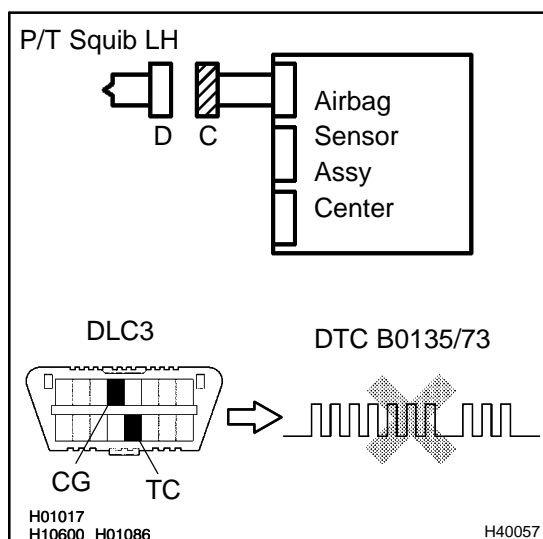
Standard:

Tester connection	Condition	Specified condition
P14-1 (PL+) - P14-2 (PL-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE NO.2

OK

3 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1219).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1219).

OK:

DTC B0135/73 is not output.

HINT:

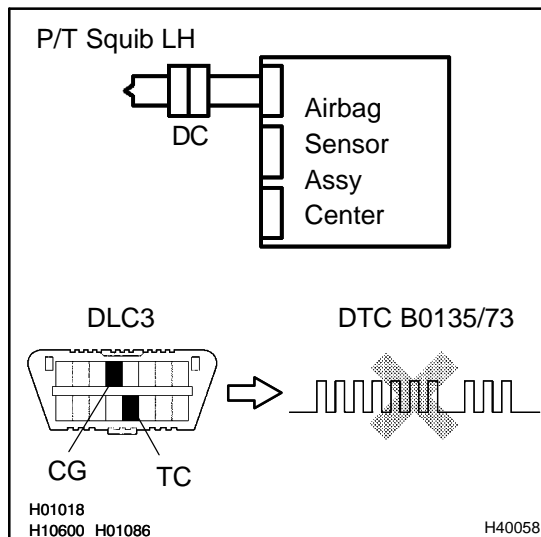
Codes other than code B0135/73 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

4 CHECK FRONT SEAT OUTER BELT ASSY LH(P/T SQUIB LH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the front seat outer belt assy LH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B0135/73 is not output.

HINT:

Codes other than code B0135/73 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY LH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0136/74	OPEN IN P/T SQUIB (LH) CIRCUIT
------------	-----------------	---------------------------------------

CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assy center and the front seat outer belt assy LH (P/T squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0136/74 is recorded when an open circuit is detected in the P/T squib LH circuit.

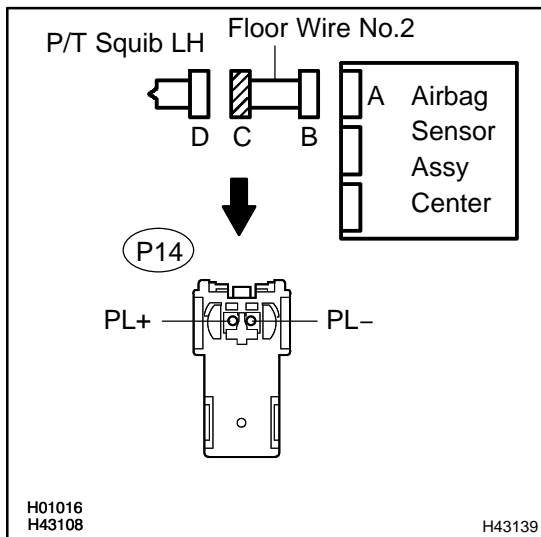
DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	<ul style="list-style-type: none"> • Open circuit in PL+ wire harness or PL- wire harness of P/T squib LH • P/T squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1307.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(P/T SQUIB LH CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy LH.
- (d) Measure the resistance according to the value(s) in the table below.

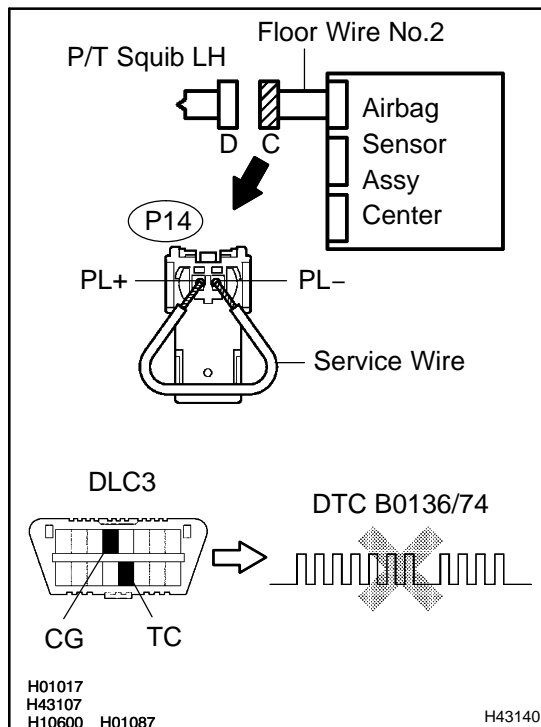
Standard:

Tester connection	Condition	Specified condition
P14-1 (PL+) - P14-2 (PL-)	Always	Below 1 Ω

NG	REPLACE FLOOR WIRE NO.2
-----------	--------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect P14-1 (PL+) and P14-2 (PL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1219).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1219).

OK:

DTC B0136/74 is not output.

HINT:

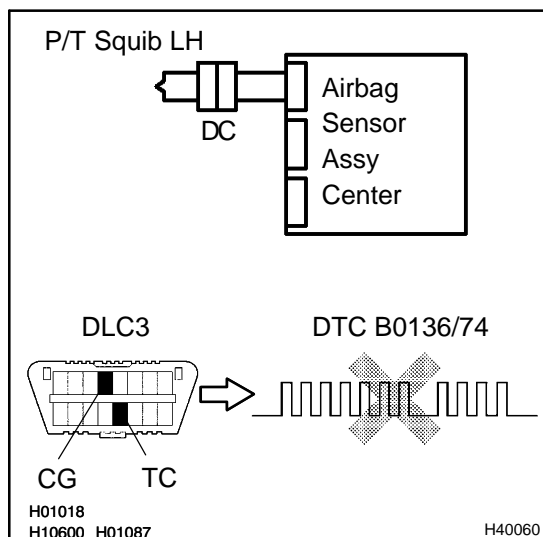
Codes other than code B0136/74 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY LH(P/T SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat outer belt assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0136/74 is not output.

HINT:

Codes other than code B0136/74 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY LH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0137/71	SHORT IN P/T SQUIB (LH) CIRCUIT (TO GROUND)
------------	-----------------	--

CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assy center and the front seat outer belt assy LH (P/T squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0137/71 is recorded when a short to ground is detected in the P/T squib LH circuit.

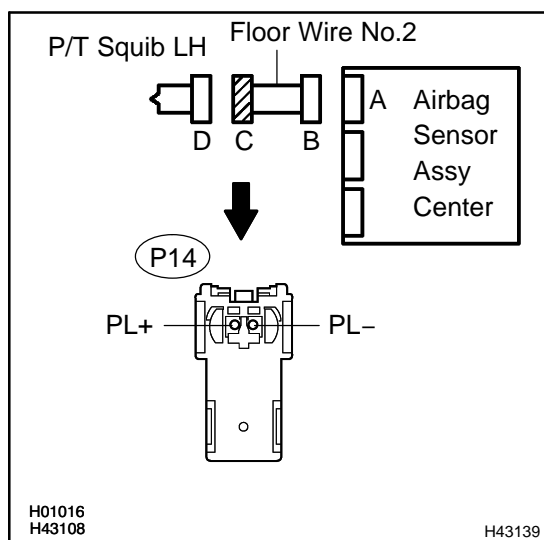
DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	<ul style="list-style-type: none"> • Short circuit in P/T squib LH wire harness (to ground) • P/T squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1307.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(P/T SQUIB LH CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy LH.
- (d) Measure the resistance according to the value(s) in the table below.

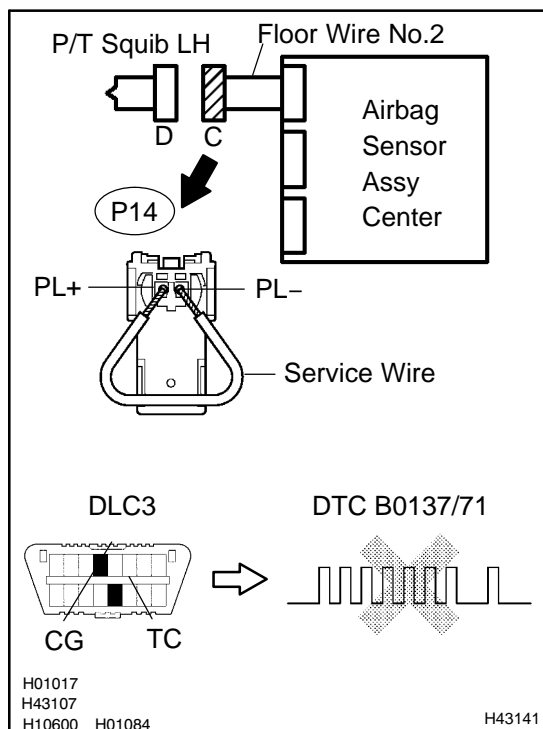
Standard:

Tester connection	Condition	Specified condition
P14-1 (PL+) - Body ground	Always	1 MΩ or Higher
P14-2 (PL-) - Body ground	Always	1 MΩ or Higher

NG	REPLACE FLOOR WIRE NO.2
-----------	--------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect P14-1 (PL+) and P14-2 (PL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1219).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1219).

OK:

DTC B0137/71 is not output.

HINT:

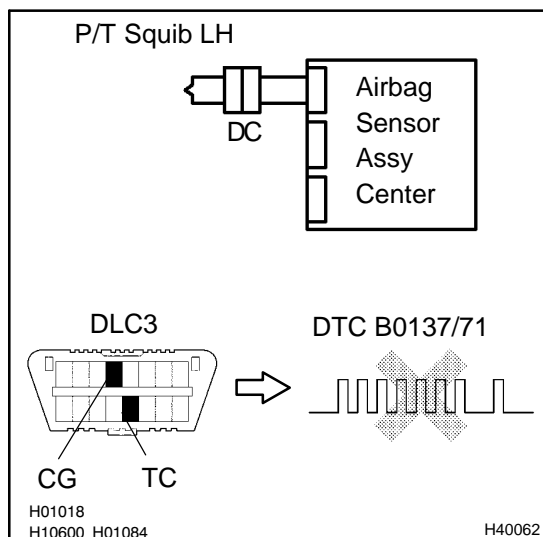
Codes other than code B0137/71 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY LH(P/T SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat outer belt assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0137/71 is not output.

HINT:

Codes other than code B0137/71 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY LH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B0138/72	SHORT IN P/T SQUIB (LH) CIRCUIT (TO B+)
------------	-----------------	--

CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assy center and the front seat outer belt assy LH (P/T squib LH).

This circuit instructs the SRS to deploy when deployment conditions are met.

DTC B0137/71 is recorded when a short to ground is detected in the P/T squib LH circuit.

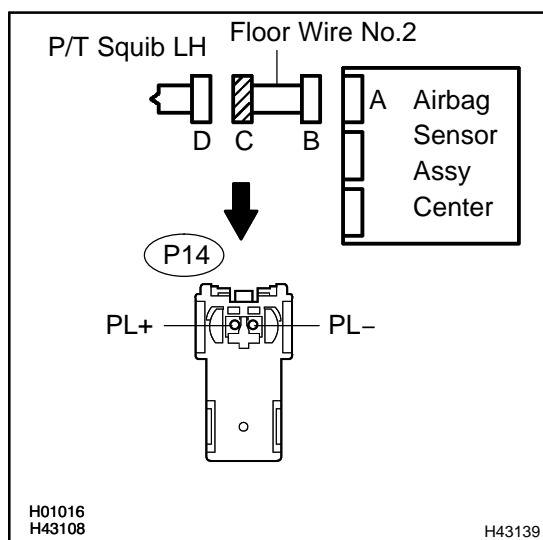
DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	<ul style="list-style-type: none"> • Short circuit in P/T squib LH wire harness (to B+) • P/T squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front seat outer belt assy LH (P/T squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1307.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(P/T SQUIB CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front seat outer belt assy LH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard:

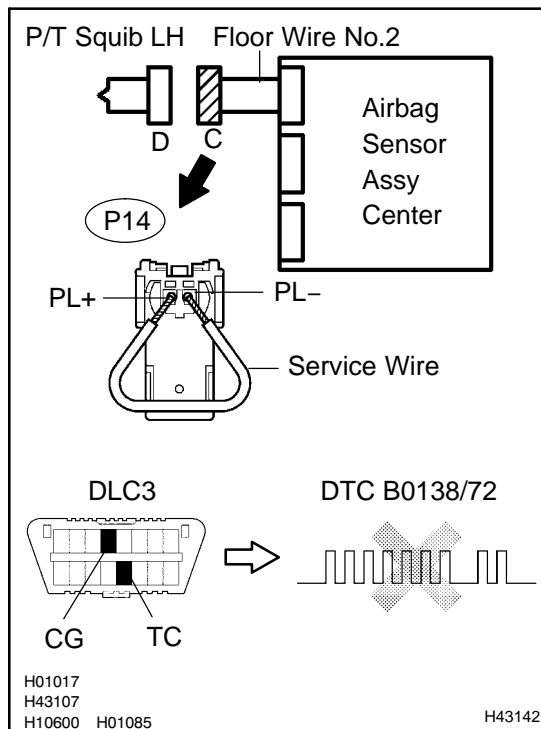
Tester connection	Condition	Specified condition
P14-1 (PL+) - Body ground	Ignition switch ON	Below 1 V
P14-2 (PL-) - Body ground	Ignition switch ON	Below 1 V

NG →

REPLACE FLOOR WIRE NO.2

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect P14-1 (PL+) and P14-2 (PL-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B0138/72 is not output.

HINT:

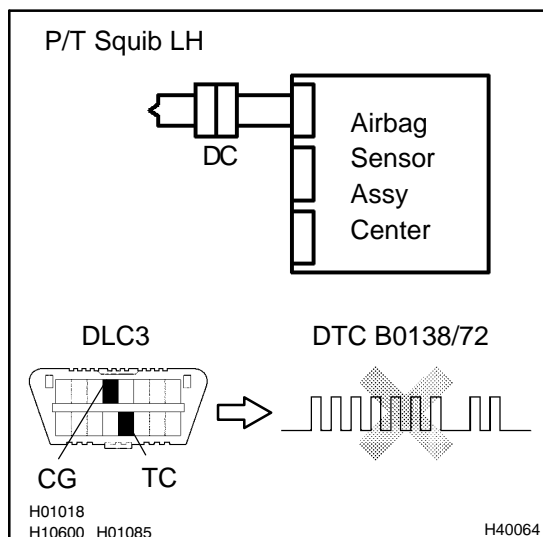
Codes other than code B0138/72 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT SEAT OUTER BELT ASSY LH(P/T SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the front seat outer belt assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B0138/72 is not output.

HINT:

Codes other than code B0138/72 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT SEAT OUTER BELT ASSY LH
(SEE PAGE 61-13)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1100/31	AIRBAG SENSOR ASSY MALFUNCTION
------------	-----------------	---------------------------------------

CIRCUIT DESCRIPTION

The airbag sensor assy center consists of the airbag sensor assy center, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.

It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

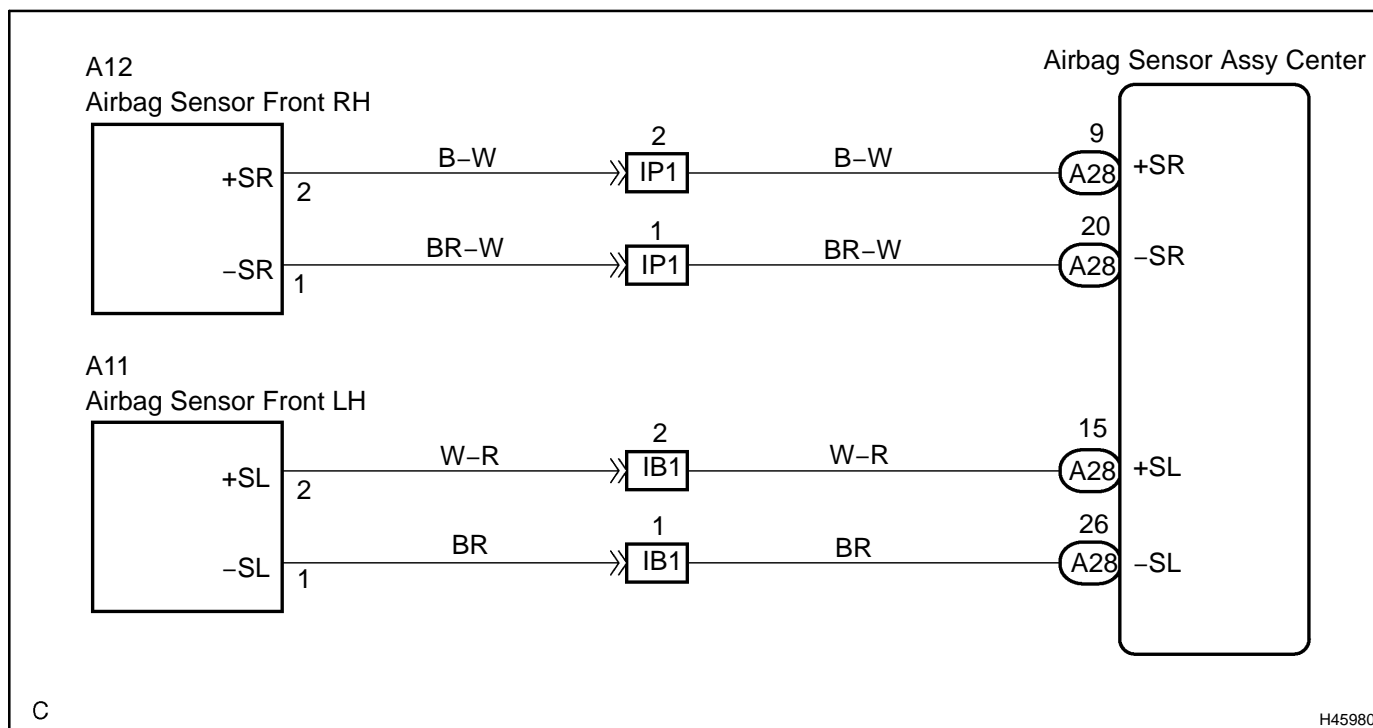
DTC B1100/31 is recorded when a malfunction in the airbag sensor assy center is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	<ul style="list-style-type: none"> • Short in airbag sensor front RH circuit (to ground) • Short in airbag sensor front RH circuit (to B+) • Short in airbag sensor front RH circuit • Short in airbag sensor front LH circuit (to ground) • Short in airbag sensor front LH circuit (to B+) • Short in airbag sensor front LH circuit • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Airbag sensor assy center • Engine room main wire • Instrument panel wire

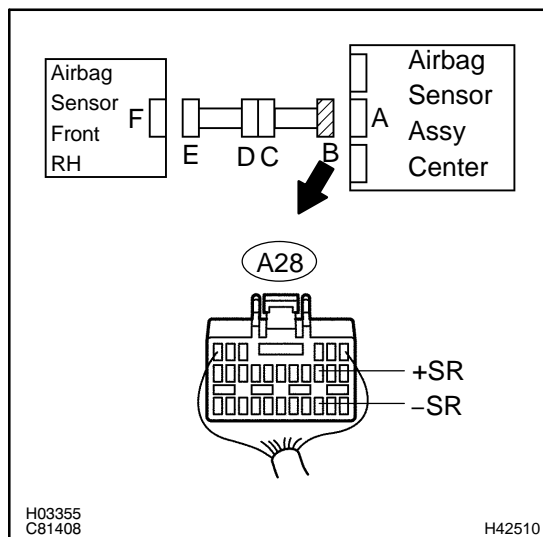
HINT:

When a trouble code is displayed simultaneously with B1100/31, repair the malfunction indicated by this code (except B1100/31) first.

WIRING DIAGRAM



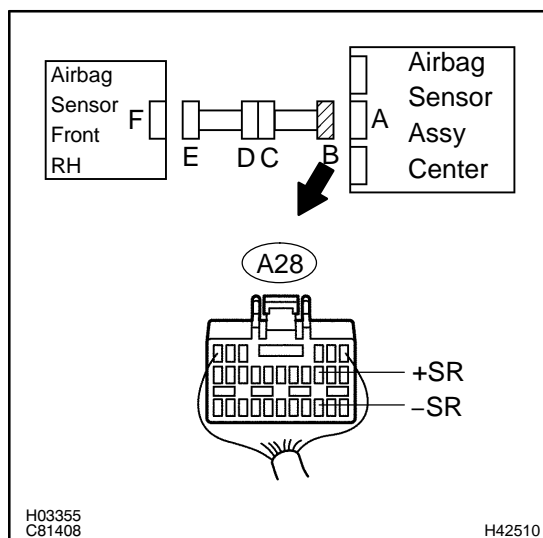
INSPECTION PROCEDURE

1 CHECK AIRBAG SENSOR FRONT RH CIRCUIT(TO GROUND)

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor front RH and the airbag sensor assy center.
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-9 (+SR) - Body ground	Always	1 M Ω or Higher
A28-20 (-SR) - Body ground	Always	1 M Ω or Higher

NG**Go to step 8****OK****2 CHECK AIRBAG SENSOR FRONT RH CIRCUIT(TO B+)**

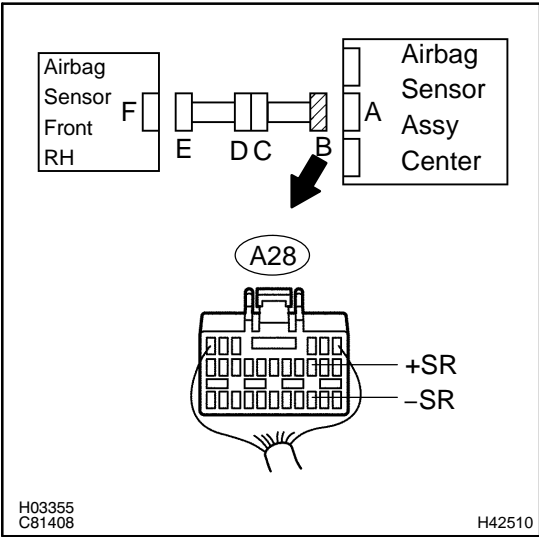
- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-9 (+SR) - Body ground	Ignition switch ON	Below 1 V
A28-20 (-SR) - Body ground	Ignition switch ON	Below 1 V

NG**Go to step 9****OK**

3 CHECK AIRBAG SENSOR FRONT RH CIRCUIT(SHORT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

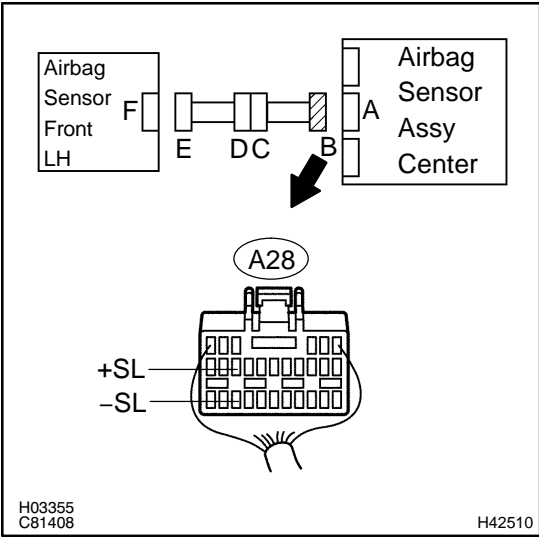
Standard:

Tester connection	Condition	Specified condition
A28-9 (+SR) - A28-20 (-SR)	Always	1 MΩ or Higher

NG Go to step 10

OK

4 CHECK AIRBAG SENSOR FRONT LH CIRCUIT(TO GROUND)



- (a) Disconnect the connector from the airbag sensor front LH.
- (b) Measure the resistance according to the value(s) in the table below.

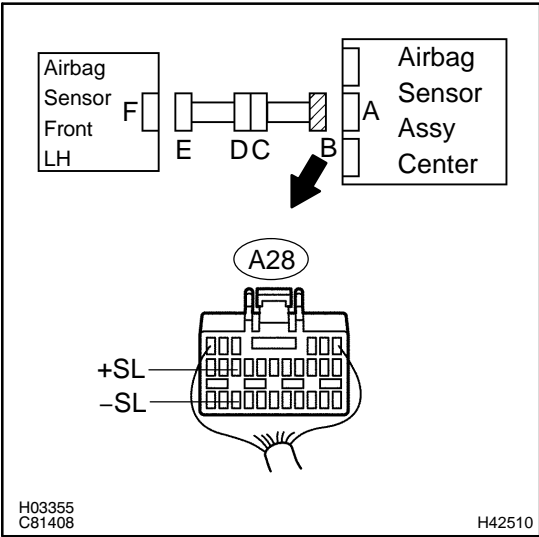
Standard:

Tester connection	Condition	Specified condition
A28-15 (+SL) - Body ground	Always	1 MΩ or Higher
A28-26 (-SL) - Body ground	Always	1 MΩ or Higher

NG Go to step 11

OK

5 CHECK AIRBAG SENSOR FRONT LH CIRCUIT(TO B+)



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

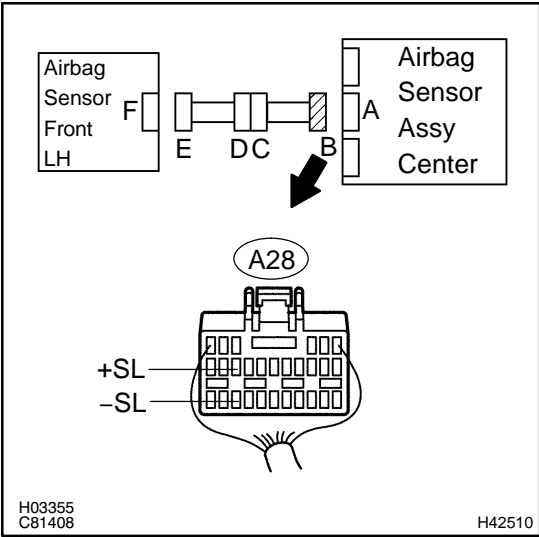
Standard:

Tester connection	Condition	Specified condition
A28-15 (+SL) - Body ground	Always	Below 1 V
A28-26 (-SL) - Body ground	Always	Below 1 V

NG Go to step 12

OK

6 CHECK AIRBAG SENSOR FRONT LH CIRCUIT(SHORT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

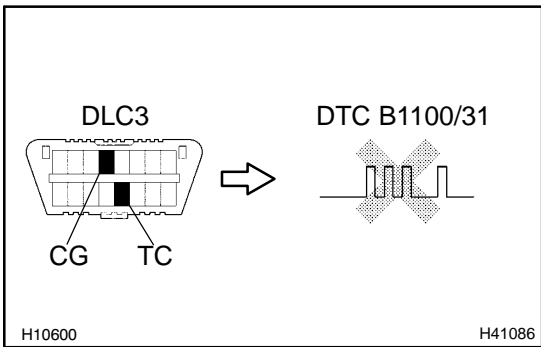
Standard:

Tester connection	Condition	Specified condition
A28-15 (+SL) - A28-26 (-SL)	Always	1 MΩ or Higher

NG Go to step 13

OK

7 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (c) Clear the DTCs stored in memory (see page 05-1219).
- (d) Turn the ignition switch to the LOCK position.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Check the DTCs (see page 05-1219).

OK:

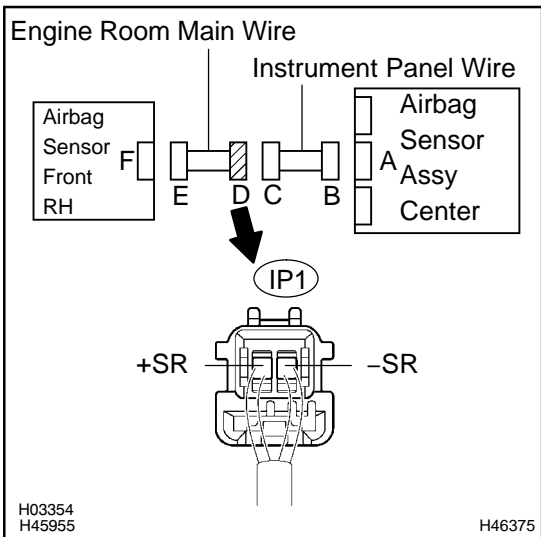
DTC B1100/31 is not output.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

8 CHECK ENGINE ROOM MAIN WIRE (TO GROUND)



- (a) Disconnect the engine room main wire connector from the instrument panel wire.
- (b) Measure the resistance according to the value(s) in the table below.

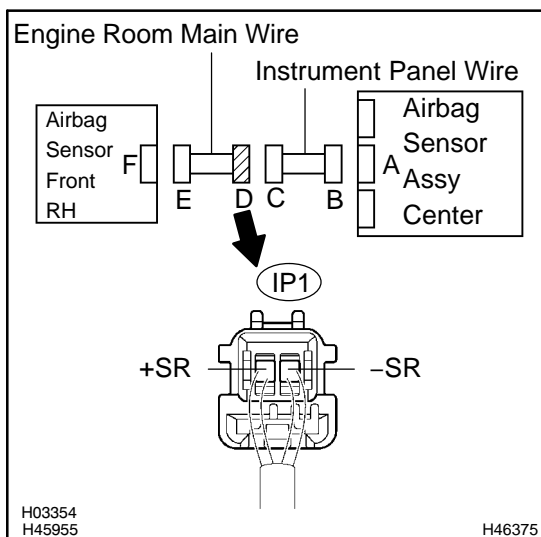
Standard:

Tester connection	Condition	Specified condition
IP1-2 (+SR) - Body ground	Always	1 MΩ or Higher
IP1-1 (-SR) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE ENGINE ROOM MAIN WIRE**

OK

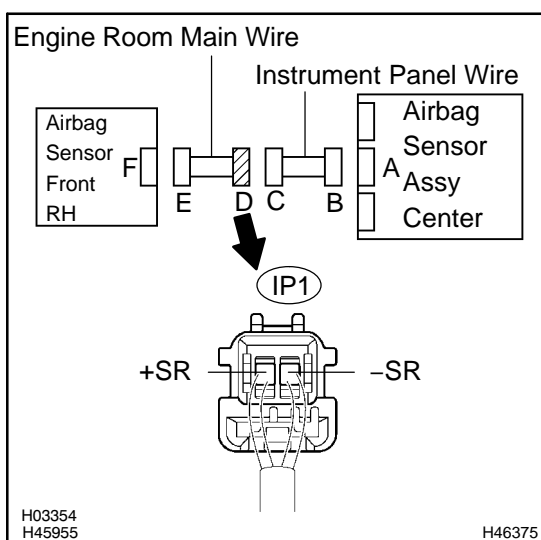
REPLACE INSTRUMENT PANEL WIRE

9 CHECK ENGINE ROOM MAIN WIRE (TO B+)

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the engine room main wire connector from the instrument panel wire.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IP1-2 (+SR) - Body ground	Ignition switch ON	Below 1 V
IP1-1 (-SR) - Body ground	Ignition switch ON	Below 1 V

NG**REPLACE ENGINE ROOM MAIN WIRE****OK****REPLACE INSTRUMENT PANEL WIRE****10 CHECK ENGINE ROOM MAIN WIRE (SHORT)**

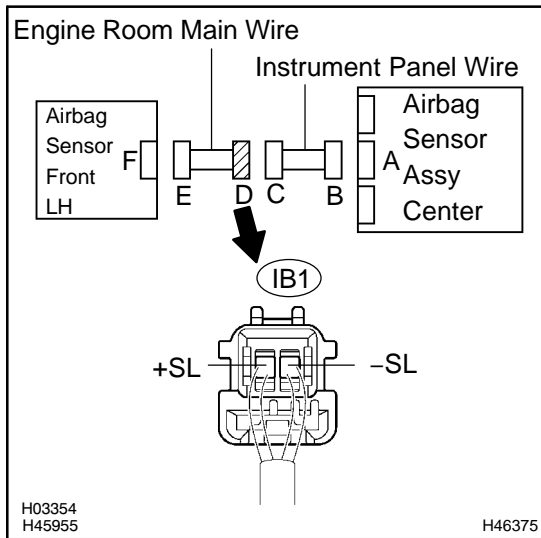
- Disconnect the engine room main wire connector from the instrument panel wire.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IP1-2 (+SR) - IP1-1 (-SR)	Always	1 M Ω or Higher

NG**REPLACE ENGINE ROOM MAIN WIRE****OK****REPLACE INSTRUMENT PANEL WIRE**

11 CHECK ENGINE ROOM MAIN WIRE (TO GROUND)



- (a) Disconnect the engine room main wire connector from the instrument panel wire.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

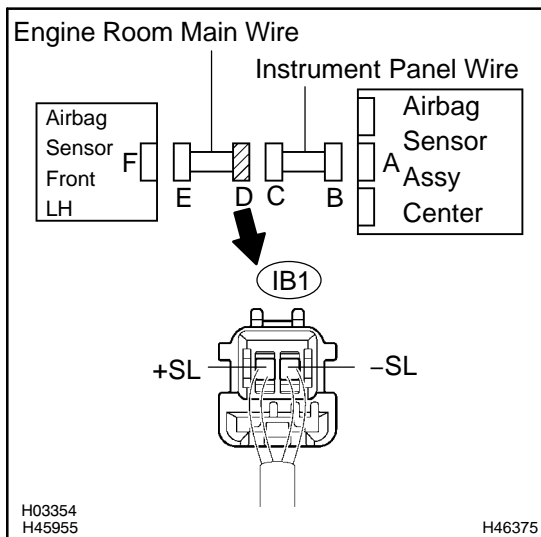
Tester connection	Condition	Specified condition
IB1-2 (+SL) - Body ground	Always	1 MΩ or Higher
IB1-1 (-SL) - Body ground	Always	1 MΩ or Higher

OK

NG REPLACE ENGINE ROOM MAIN WIRE

REPLACE INSTRUMENT PANEL WIRE

12 CHECK ENGINE ROOM MAIN WIRE (TO B+)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the engine room main wire connector from the instrument panel wire.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard:

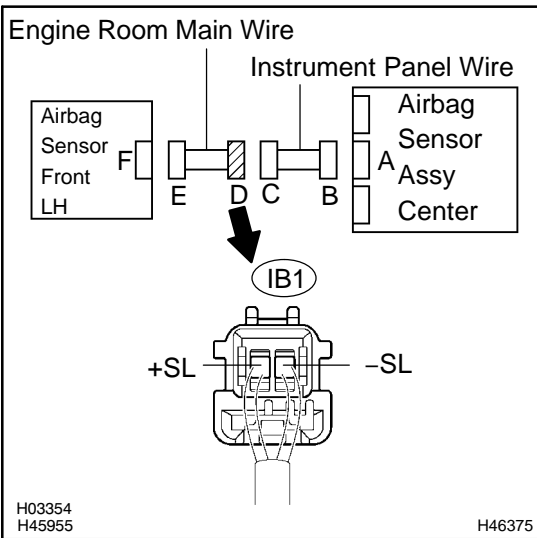
Tester connection	Condition	Specified condition
IB1-2 (+SL) - Body ground	Ignition switch ON	Below 1 V
IB1-1 (-SL) - Body ground	Ignition switch ON	Below 1 V

OK

NG REPLACE ENGINE ROOM MAIN WIRE

REPLACE INSTRUMENT PANEL WIRE

13 CHECK ENGINE ROOM MAIN WIRE



- (a) Disconnect the engine room main wire connector from the instrument panel wire.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IB1-2 (+SL) - IB1-1 (-SL)	Always	1 MΩ or Higher

OK

NG → **REPLACE ENGINE ROOM MAIN WIRE**

REPLACE INSTRUMENT PANEL WIRE

DTC	B1135/24	HALF CONNECTION IN AIRBAG SENSOR ASSY CENTER CONNECTORS
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CIRCUIT DESCRIPTION

The airbag sensor assy center detects partial connection of the connectors.

DTC B1135/24 is recorded when the airbag sensor assy center detects an open in the electrical connection check mechanism of the airbag sensor connector or in the airbag sensor circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1135/24	<ul style="list-style-type: none"> • Malfunction of electrical connection check mechanism of airbag sensor assy center connector • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Electrical connection check mechanism • Airbag sensor assy center

INSPECTION PROCEDURE

1 CHECK AIRBAG SENSOR ASSY CENTER CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Check the connection of the airbag sensor assy center connectors.

OK:

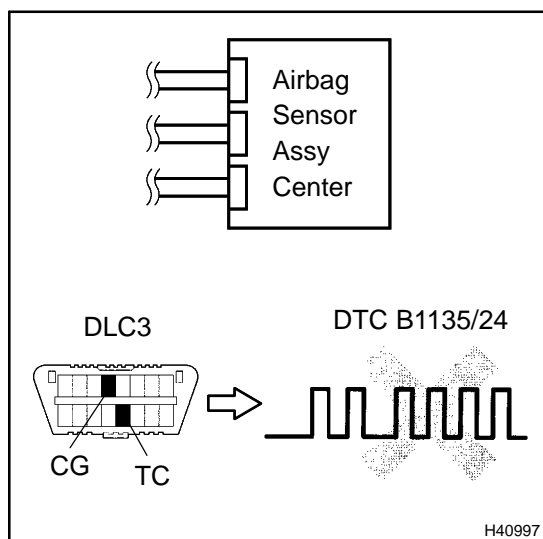
The connectors are connected.

HINT:

When the connectors are not firmly connected, disconnect them once and reconnect them securely.

NEXT

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (c) Clear the DTCs stored in memory (see page 05-1219).
- (d) Turn the ignition switch to the LOCK position.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Check the DTCs (see page 05-1219).

OK:

DTC B1135/24 is not output.

HINT:

Codes other than code B1135/24 may be output at this time, but they are not related to this check.

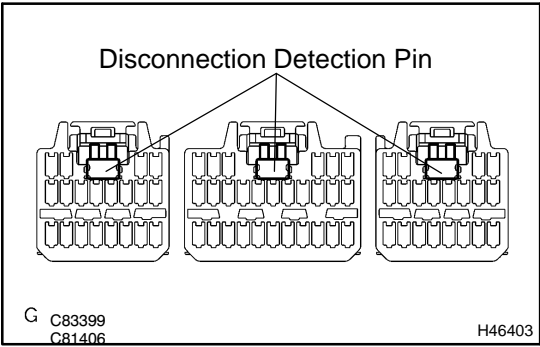
NG

Go to step 3

OK

USE SIMULATION METHOD TO CHECK

3 | PERFORM A VISUAL CHECK OF THE DISCONNECTION DETECTION PIN



(a) Check the disconnection detection pin of the connector.

HINT:

Compare one connector with the other 2 connectors.

OK:

No deformation is identified.

NG

REPLACE AIRBAG SENSOR ASSY CENTER CONNECTOR

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

DTC	B1140/32	SIDE AIRBAG SENSOR ASSY (RH) MALFUNCTION
------------	-----------------	---

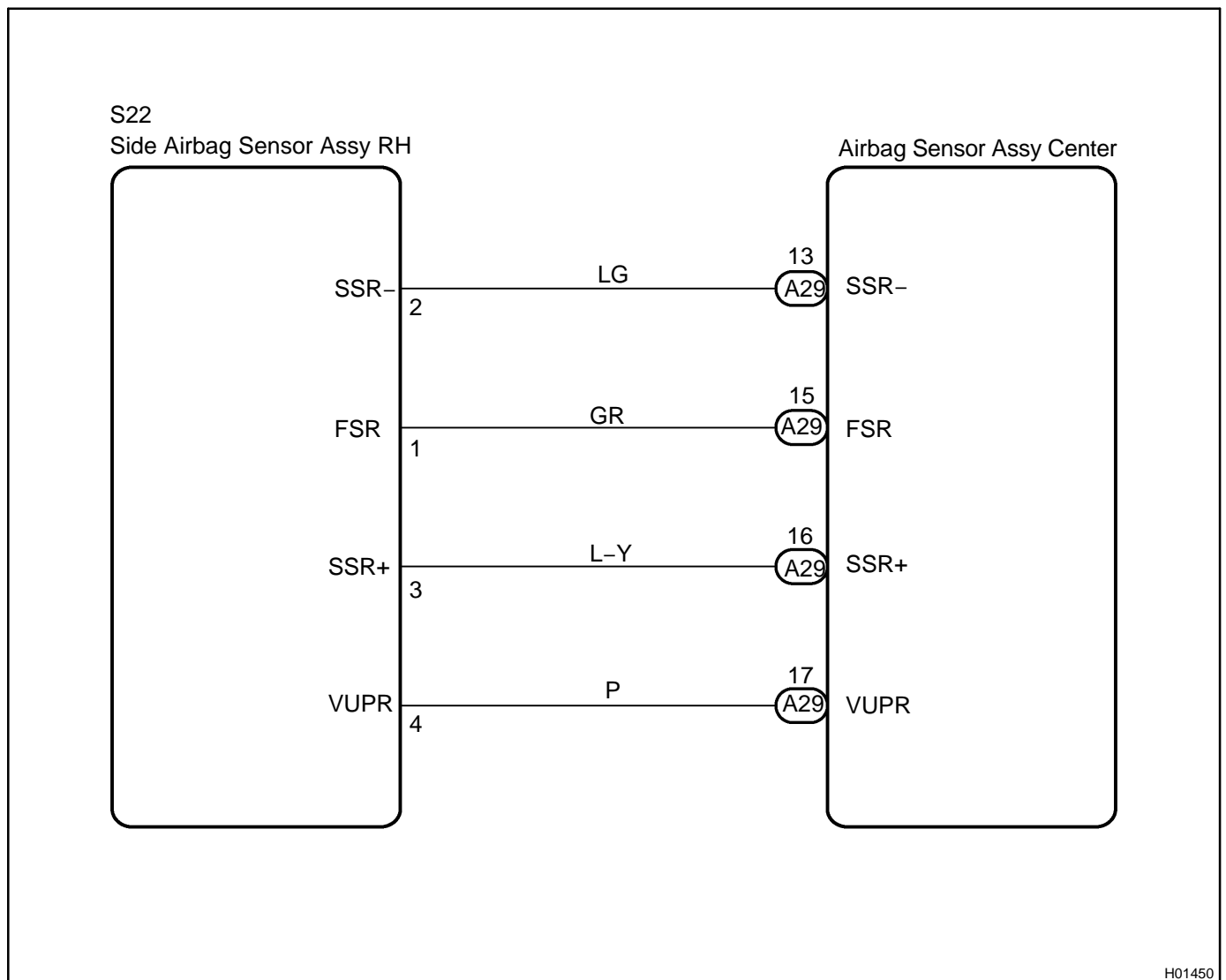
The side airbag sensor assy RH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1140/32 is recorded when a malfunction is detected in the side airbag sensor assy RH.

DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	<ul style="list-style-type: none"> • Short in side airbag sensor assy RH circuit (to ground) • Short in side airbag sensor assy RH circuit (to B+) • Short in side airbag sensor assy RH circuit • Open in side airbag sensor assy RH circuit • Side airbag sensor assy RH circuit malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Side airbag sensor assy RH • Airbag sensor assy center • Floor wire

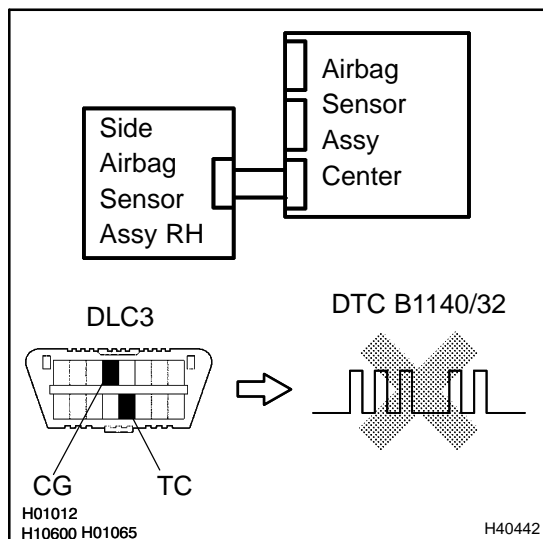
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 CHECK DTC



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:**DTC B1140/32 is not output.****HINT:**

Codes other than code B1140/32 may be output at this time, but they are not related to this check.

NG**Go to step 2****OK**

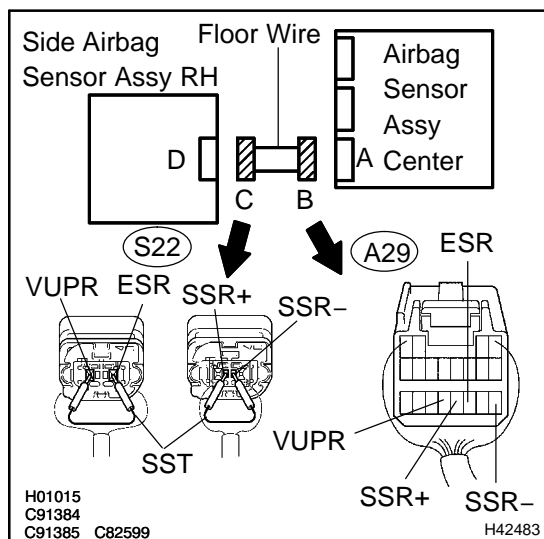
USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connector is properly connected to the airbag sensor assy center and the side airbag sensor assy RH.

OK:**The connectors is connected.****NG****CONNECT CONNECTORS, THEN GO TO STEP 1****OK**

3 CHECK FLOOR WIRE(OPEN)



- (a) Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy RH.
- (b) Using SST, connect S22-4 (VUPR) and S22-1 (ESR), and connect S22-3 (SSR+) and S22-2 (SSR-) of connector "C".
SST 09843-18040
- (c) Measure the resistance according to the value(s) in the table below.

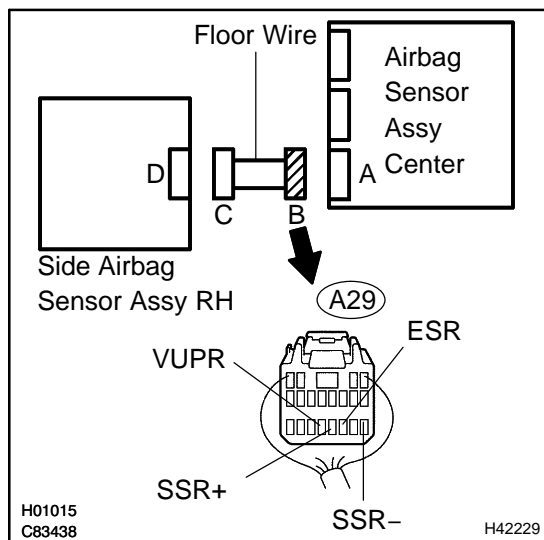
Standard:

Tester connection	Condition	Specified condition
A29-17 (VUPR) - A29-15 (ESR)	Always	Below 1 Ω
A29-16 (SSR+) - A29-13 (SSR-)	Always	Below 1 Ω

NG → REPLACE FLOOR WIRE

OK

4 CHECK FLOOR WIRE(TO GROUND)



- (a) Disconnect the SST from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

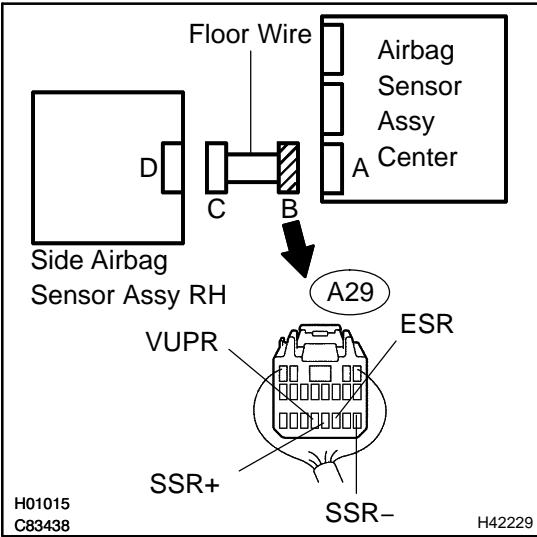
Standard:

Tester connection	Condition	Specified condition
A29-17 (VUPR) - Body ground	Always	1 MΩ or Higher
A29-15 (ESR) - Body ground	Always	1 MΩ or Higher
A29-16 (SSR+) - Body ground	Always	1 MΩ or Higher
A29-13 (SSR-) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE

OK

5 CHECK FLOOR WIRE(TO B+)



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

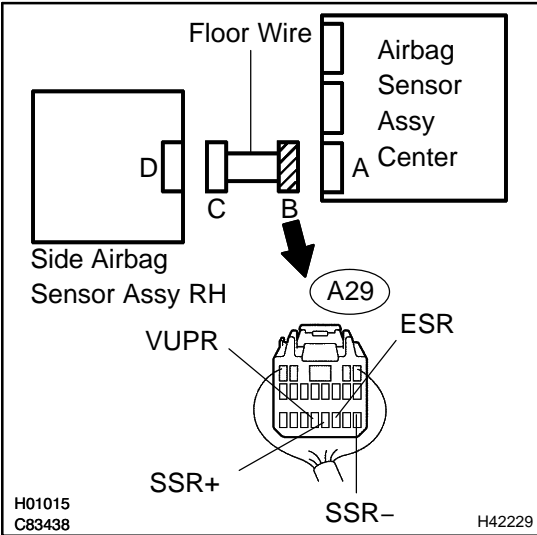
Standard:

Tester connection	Condition	Specified condition
A29-17 (VUPR) - Body ground	Ignition switch ON	Below 1 V
A29-15 (ESR) - Body ground	Ignition switch ON	Below 1 V
A29-16 (SSR+) - Body ground	Ignition switch ON	Below 1 V
A29-13 (SSR-) - Body ground	Ignition switch ON	Below 1 V

NG → REPLACE FLOOR WIRE

OK

6 CHECK FLOOR WIRE(SHORT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

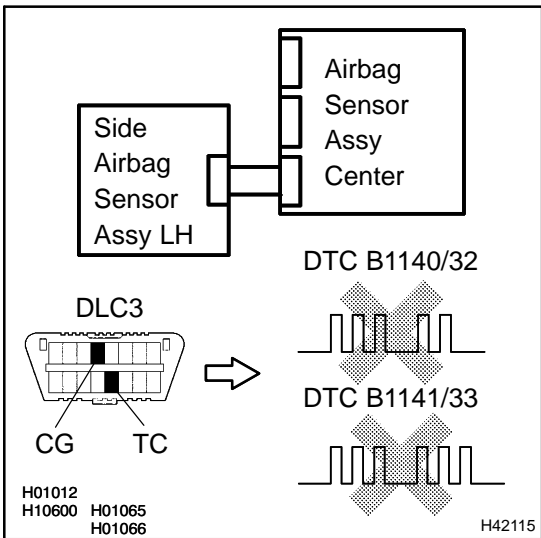
Standard:

Tester connection	Condition	Specified condition
A29-17 (VUPR) - A29-15 (ESR)	Always	1 MΩ or Higher
A29-16 (SSR+) - A29-13 (SSR-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE

OK

7 CHECK SIDE AIR BAG SENSOR ASSY RH



- (a) Connect the connector to the airbag sensor assy center.
- (b) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1140/32 is output.
NG: B	DTC B1141/33 is output.
OK	DTC B1140/32 and B1141/33 are not output.

NG:A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

NG:B → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-59)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1141/33	SIDE AIRBAG SENSOR ASSY (LH) MALFUNCTION
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CIRCUIT DESCRIPTION

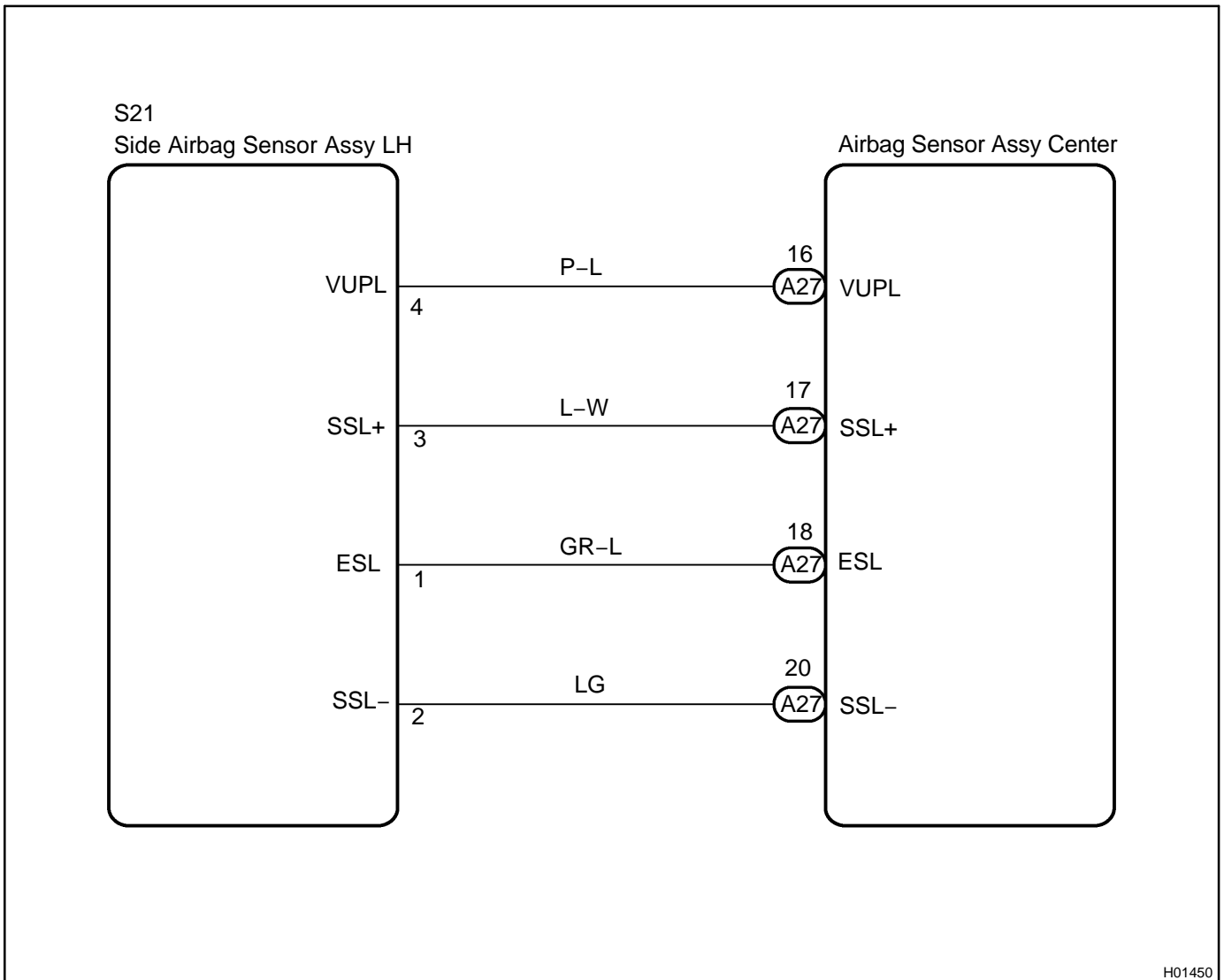
The side airbag sensor assy LH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1141/33 is recorded when a malfunction is detected in the side airbag sensor assy LH.

DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	<ul style="list-style-type: none"> • Open in side airbag sensor assy LH circuit • Short in side airbag sensor assy LH circuit (to ground) • Short in side airbag sensor assy LH circuit • Short in side airbag sensor assy LH circuit (to B+) • Side airbag sensor assy LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Side airbag sensor assy LH • Airbag sensor assy center • Floor wire No.2

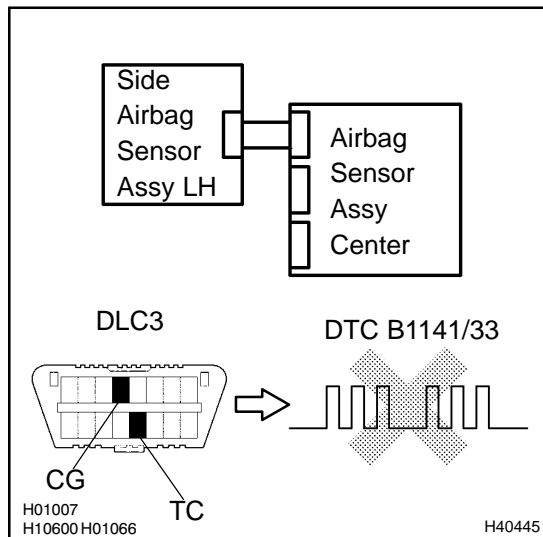
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 CHECK DTC



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:**DTC B1141/33 is not output.****HINT:**

Codes other than code B1141/33 may be output at this time, but they are not related to this check.

NG**Go to step 2****OK**

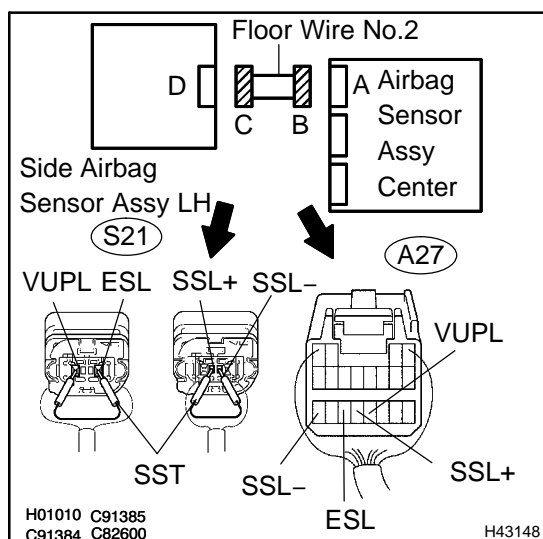
USE SIMULATION METHOD TO CHECK

2 CHECK AIRBAG SENSOR ASSY CENTER CONNECTOR

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center and the side airbag sensor assy LH.

OK:**The connectors is connected.****NG****CONNECT CONNECTORS, THEN GO TO STEP 1****OK**

3 CHECK FLOOR WIRE NO.2(OPEN)



- Disconnect the connectors from the airbag sensor assy center and the side airbag sensor assy LH.
- Using SST, connect S21-4 (VUPL) and S21-1 (ESL), and connect S21-3 (SSL+) and S21-2 (SSL-) of connector "C".
SST 09843 - 18040
- Measure the resistance according to the value(s) in the table below.

Standard:

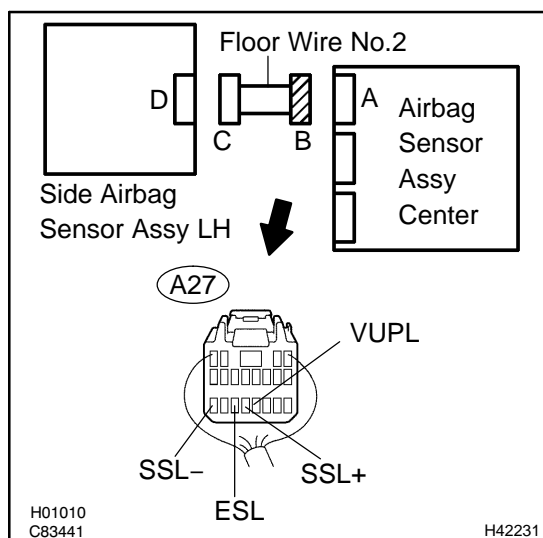
Tester connection	Condition	Specified condition
A27-16 (VUPL) - A27-18 (ESL)	Always	Below 1 Ω
A27-17 (SSL+) - A27-20 (SSL-)	Always	Below 1 Ω

NG

REPLACE FLOOR WIRE NO.2

OK

4 CHECK FLOOR WIRE NO.2(TO GROUND)



- Disconnect the SST from connector "C"
- Measure the resistance according to the value(s) in the table below.

Standard:

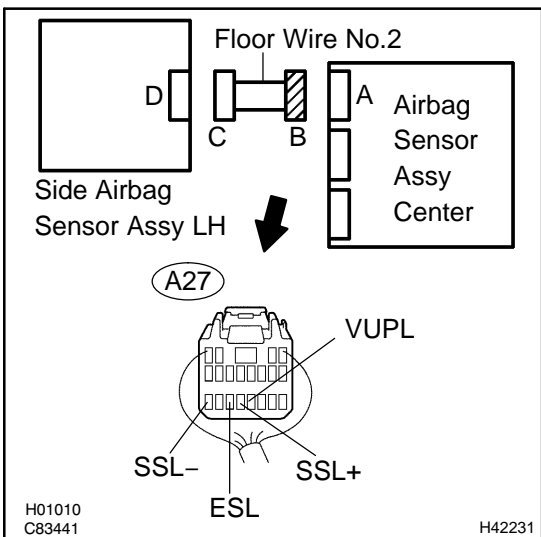
Tester connection	Condition	Specified condition
A27-16 (VUPL) - Body ground	Always	1 M Ω or Higher
A27-18 (ESL) - Body ground	Always	1 M Ω or Higher
A27-17 (SSL+) - Body ground	Always	1 M Ω or Higher
A27-20 (SSL-) - Body ground	Always	1 M Ω or Higher

NG

REPLACE FLOOR WIRE NO.2

OK

5 CHECK FLOOR WIRE NO.2(TO B+)



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

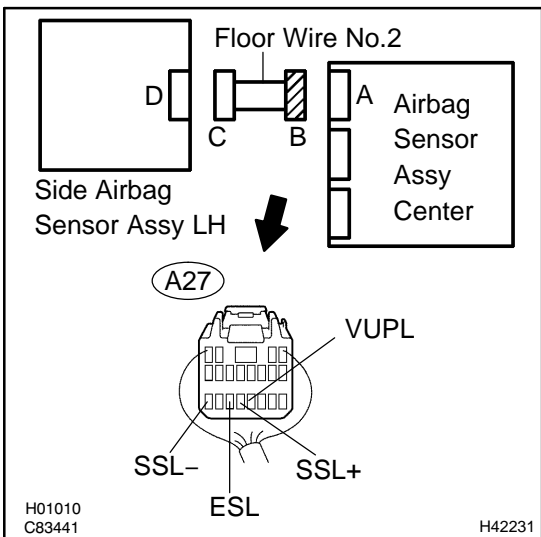
Standard:

Tester connection	Condition	Specified condition
A27-16 (VUPL) - Body ground	Ignition switch ON	Below 1 V
A27-18 (ESL) - Body ground	Ignition switch ON	Below 1 V
A27-17 (SSL+) - Body ground	Ignition switch ON	Below 1 V
A27-20 (SSL-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FLOOR WIRE NO.2**

OK

6 CHECK FLOOR WIRE NO.2(SHORT)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

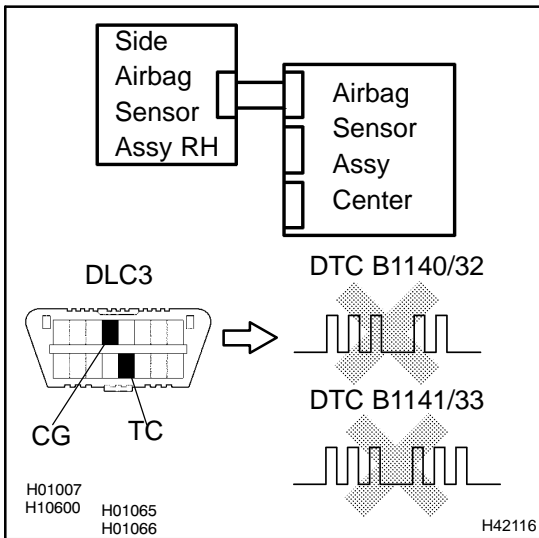
Standard:

Tester connection	Condition	Specified condition
A27-16 (VUPL) - A27-18 (ESL)	Always	1 MΩ or Higher
A27-17 (SSL+) - A27-20 (SSL-)	Always	1 MΩ or Higher

NG → **REPLACE FLOOR WIRE NO.2**

OK

7 CHECK DTC



- (a) Connect the connector to the airbag sensor assy center.
- (b) Interchange the side airbag sensor assy RH with LH and connect the connectors to them.
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1140/32 is output.
NG: B	DTC B1141/33 is output.
OK	DTC B1140/32 and B1141/33 are not output.

NG:A → **REPLACE SIDE AIR BAG SENSOR ASSY RH (SEE PAGE 60-59)**

NG:B → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1148/36	FRONT AIRBAG SENSOR (RH) MALFUNCTION
------------	-----------------	---

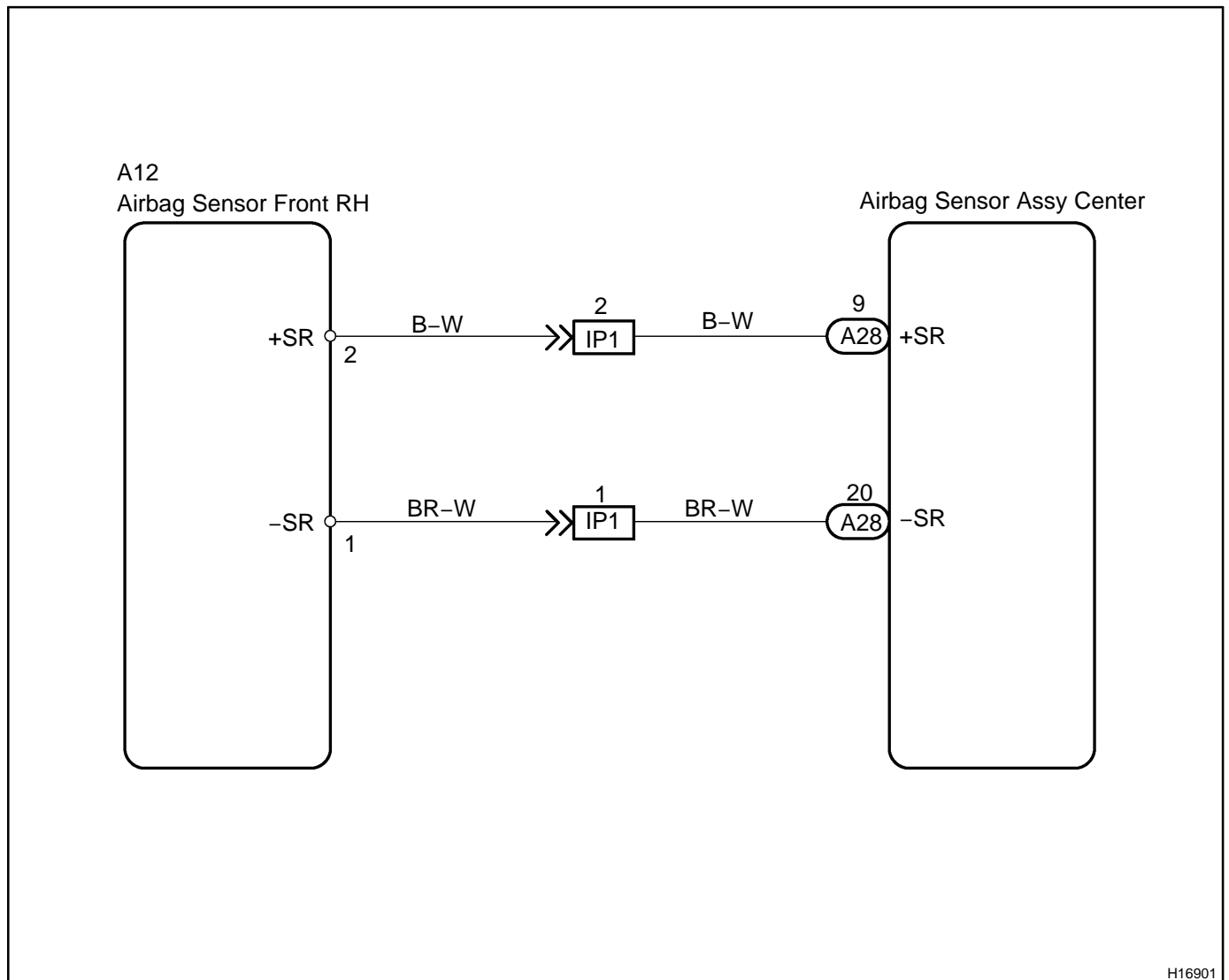
CIRCUIT DESCRIPTION

The airbag sensor front RH circuit consists of the diagnosis circuit and the frontal deceleration sensor, etc. If the airbag sensor assy center receives signals from the frontal deceleration sensor, it judges whether or not the SRS should be activated.

DTC B1148/36 is recorded when a malfunction is detected in the front airbag sensor RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1148/36	<ul style="list-style-type: none"> • Open circuit in +SR wire harness or -SL wire harness of front airbag sensor RH circuit • Airbag sensor front RH sensor malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Airbag sensor front RH • Airbag sensor assy center • Engine room main wire • Instrument panel wire

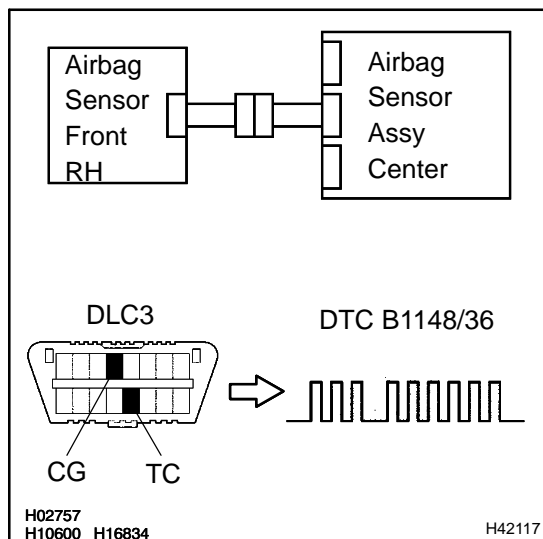
WIRING DIAGRAM



H16901

INSPECTION PROCEDURE

1 CHECK AIRBAG SENSOR FRONT RH



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1148/36 is not output.

HINT:

Codes other than code B1148/36 may be output at this time, but they are not related to this check.

OK

USE SIMULATION METHOD TO CHECK

NG

2 CHECK AIRBAG SENSOR ASSY CENTER CONNECTOR

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors is properly connected to the airbag sensor assy center.

OK:

The connector is connected.

NG

CONNECT CONNECTORS

OK

3 CHECK AIRBAG SENSOR FRONT RH CONNECTOR

- Check that the connector is properly connected to the airbag sensor front RH.

OK:

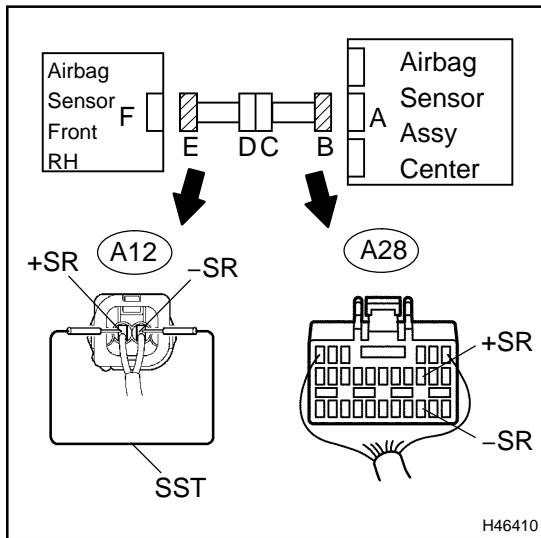
The connector is connected.

NG

CONNECT CONNECTORS

OK

4 CHECK AIRBAG SENSOR FRONT RH CIRCUIT(OPEN)



- (a) Disconnect the connectors from the airbag sensor assy center and the airbag sensor front RH.
- (b) Using SST, connect A12-2 (+SR) and A12-1 (-SR) of connector "E".
SST 09843-18040
- (c) Measure the resistance according to the value(s) in the table below.

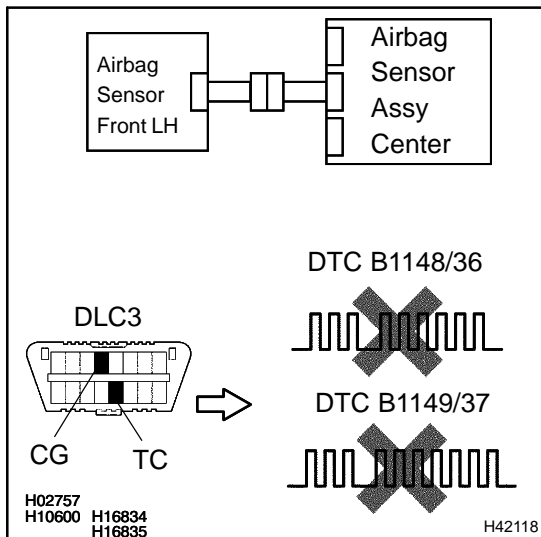
Standard:

Tester connection	Condition	Specified condition
A28-9 (+SR) - A28-20 (-SR)	Always	Below 1 Ω

NG → Go to step 6

OK

5 CHECK AIRBAG SENSOR FRONT RH



- (a) Disconnect the SST from connector "E".
- (b) Connect the connector to the airbag sensor assy center.
- (c) Interchange the airbag sensor front RH with LH, and connect the connectors to them.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1148/36 is output.
NG: B	DTC B1149/37 is output.
OK	DTC B1148/36 and B1149/37 are not output.

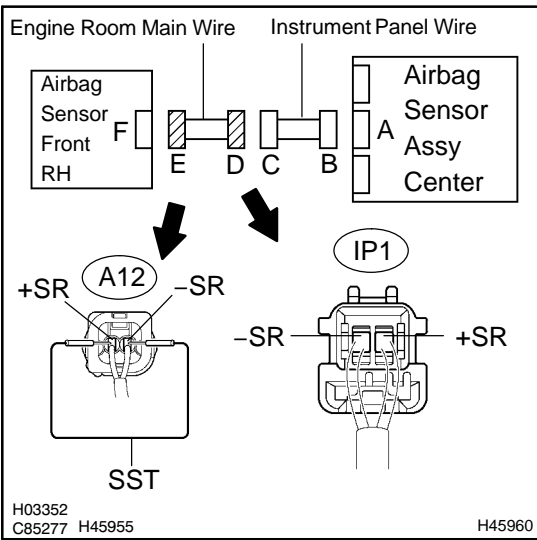
NG:A → REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

NG:B → REPLACE AIRBAG SENSOR FRONT RH (SEE PAGE 60-59)

OK

USE SIMULATION METHOD TO CHECK

6 CHECK ENGINE ROOM MAIN WIRE(OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

HINT:

The SST has already been inserted into connector "E".

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IP1-2 (+SR) - IP1-1 (-SR)	Always	Below 1 Ω

NG → **REPLACE ENGINE ROOM MAIN WIRE**

OK

REPLACE INSTRUMENT PANEL WIRE

DTC	B1149/37	FRONT AIRBAG SENSOR (LH) MALFUNCTION
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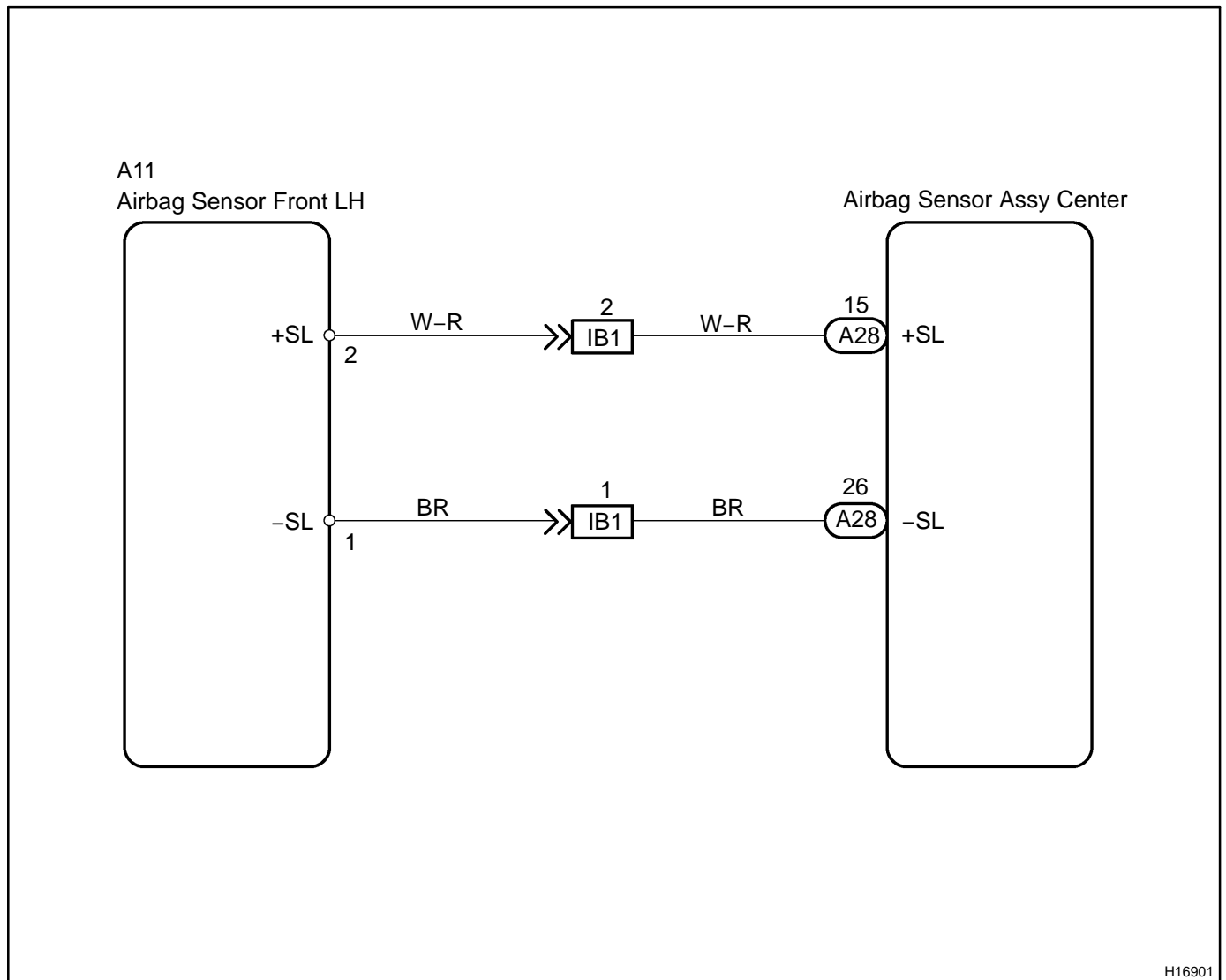
CIRCUIT DESCRIPTION

The airbag sensor front LH circuit consists of the diagnosis circuit and the frontal deceleration sensor, etc. If the airbag sensor assy center receives signals from the frontal deceleration sensor, it judges whether or not the SRS should be activated.

DTC B1149/37 is recorded when a malfunction is detected in the front airbag sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1149/37	<ul style="list-style-type: none"> • Open circuit in +SL wire harness or -SL wire harness of front airbag sensor LH circuit • Airbag sensor front LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Airbag sensor front LH • Airbag sensor assy center • Engine room main wire • Instrument panel wire

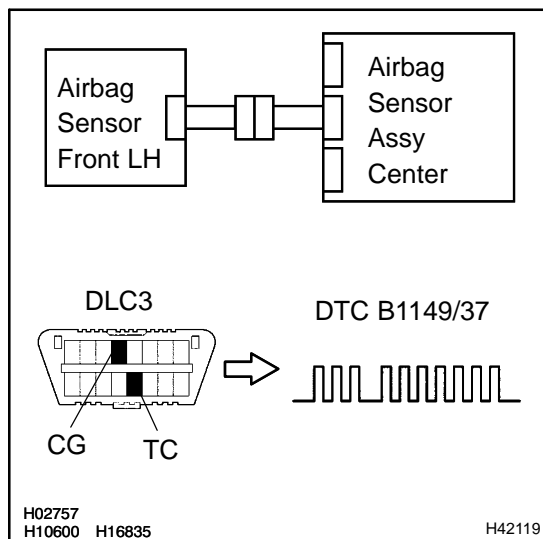
WIRING DIAGRAM



H16901

INSPECTION PROCEDURE

1 CHECK AIR BAG SENSOR FRONT LH



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1149/37 is not output.

HINT:

Codes other than code B1149/37 may be output at this time, but they are not related to this check.

OK

USE SIMULATION METHOD TO CHECK

NG

2 CHECK AIRBAG SENSOR ASSY CENTER CONNECTOR

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connector is properly connected to the airbag sensor assy center.

OK:

The connectors is connected.

NG

CONNECT CONNECTORS

OK

3 CHECK AIRBAG SENSOR FRONT LH CONNECTOR

- Check that the connector is properly connected to the airbag sensor front LH.

OK:

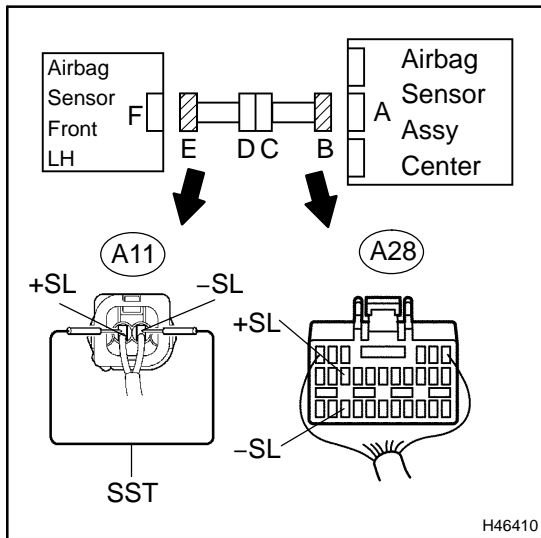
The connector is connected.

NG

CONNECT CONNECTORS

OK

4 CHECK AIRBAG SENSOR FRONT LH CIRCUIT(OPEN)



- (a) Disconnect the connectors from the airbag sensor assy center and the airbag sensor front LH.
- (b) Using SST, connect A11-2 (+SL) and A11-1 (-SL) of connector "E".
SST 09843-18040
- (c) Measure the resistance according to the value(s) in the table below.

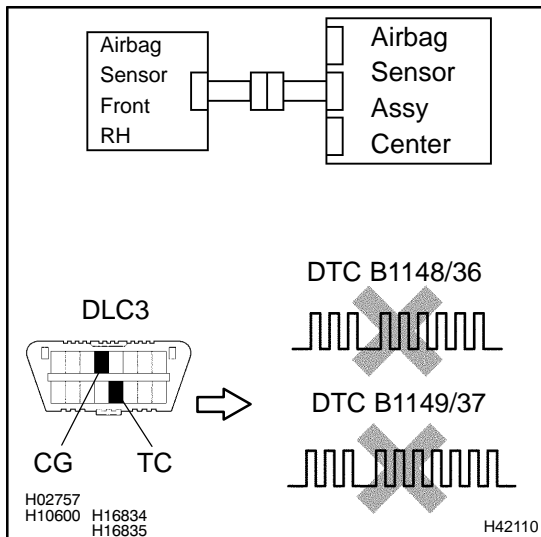
Standard:

Tester connection	Condition	Specified condition
A28-15 (+SL) - A28-26 (-SL)	Always	Below 1 Ω

NG → Go to step 6

OK

5 CHECK AIR BAG SENSOR FRONT LH



- (a) Disconnect the SST from connector "E".
- (b) Connect the connector to the airbag sensor assy center.
- (c) Interchange the airbag sensor front RH with LH and connect the connectors to them.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1148/36 is output.
NG: B	DTC B1149/37 is output.
OK	DTC B1148/36 and B1149/37 are not output.

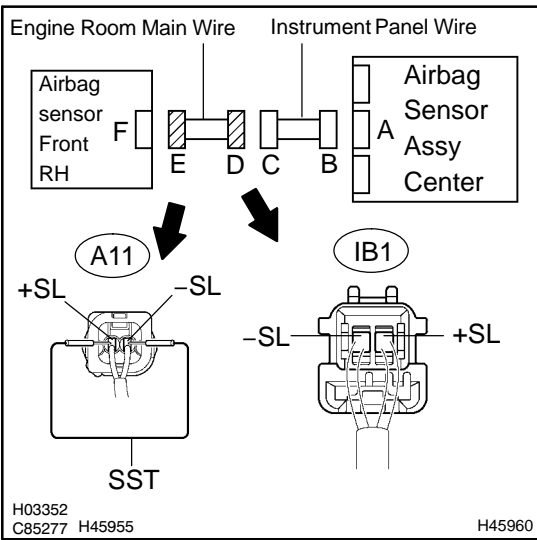
NG:A → REPLACE AIR BAG SENSOR FRONT LH (SEE PAGE 60-59)

NG:B → REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

OK

USE SIMULATION METHOD TO CHECK

6 CHECK ENGINE ROOM MAIN WIRE(OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

HINT:
The SST has already been inserted into connector "E".

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IB1-2 (+SL) - IB1-1 (-SL)	Always	Below 1 Ω

NG → **REPLACE ENGINE ROOM MAIN WIRE**

OK

REPLACE INSTRUMENT PANEL WIRE

DTC	B1150/23	OCCUPANT CLASSIFICATION SYSTEM MALFUNCTION
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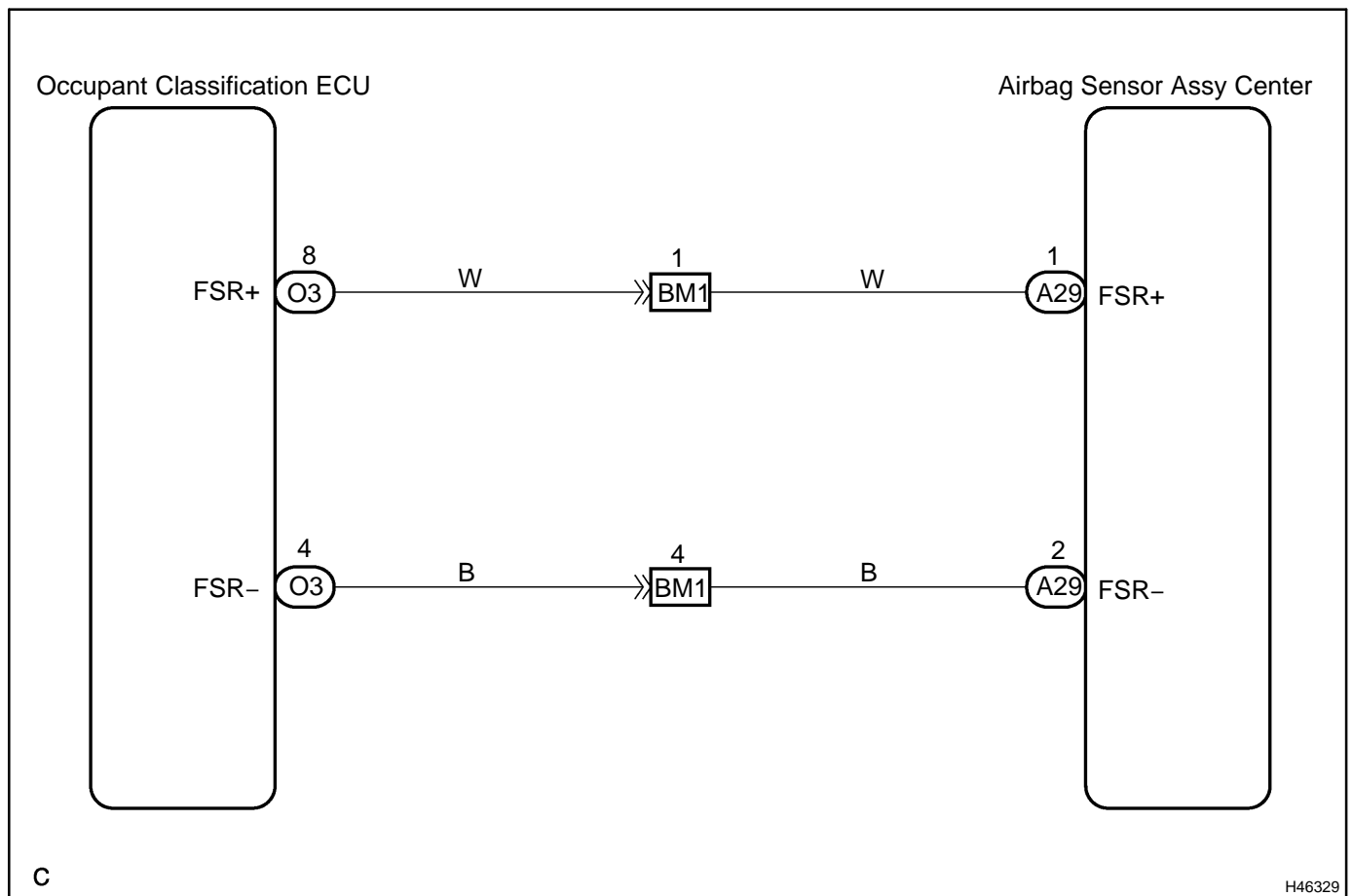
CIRCUIT DESCRIPTION

The occupant classification system circuit consists of the airbag sensor assy center and the occupant classification system.

DTC B1150/23 is recorded when a malfunction is detected in the occupant classification system circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1150/23	<ul style="list-style-type: none"> The airbag sensor assy center receives a line short signal, open signal, short to ground signal or B+ short signal in the occupant classification system circuit for 2 seconds. Occupant classification system malfunction Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> Occupant classification ECU Airbag sensor assy center Floor wire Front seat wire RH

WIRING DIAGRAM



C

H46329

INSPECTION PROCEDURE

1 CHECK DTC(OCCUPANT CLASSIFICATION ECU)

- Turn the ignition switch to the ON position, and wait for at least 10 seconds.
- Using the hand-held tester, check the DTCs of the occupant classification ECU (see page 05-1219).

OK:

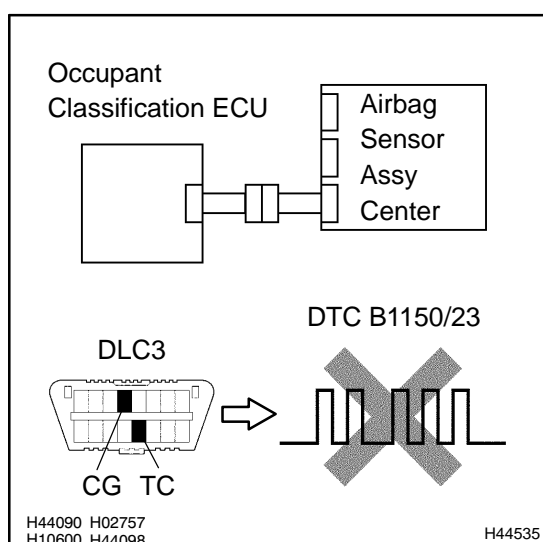
DTC is not output.

NG

GO TO INSPECTION PROCEDURE OF DTC OUTPUT (SEE PAGE 05-1230)

OK

2 CHECK DTC(AIRBAG SENSOR ASSY CENTER)



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1150/23 is not output.

HINT:

Codes other than code B1150/23 may be output at this time, but they are not related to this check.

NG

Go to step 3

OK

USE SIMULATION METHOD TO CHECK

3 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center and the occupant classification ECU.

OK:

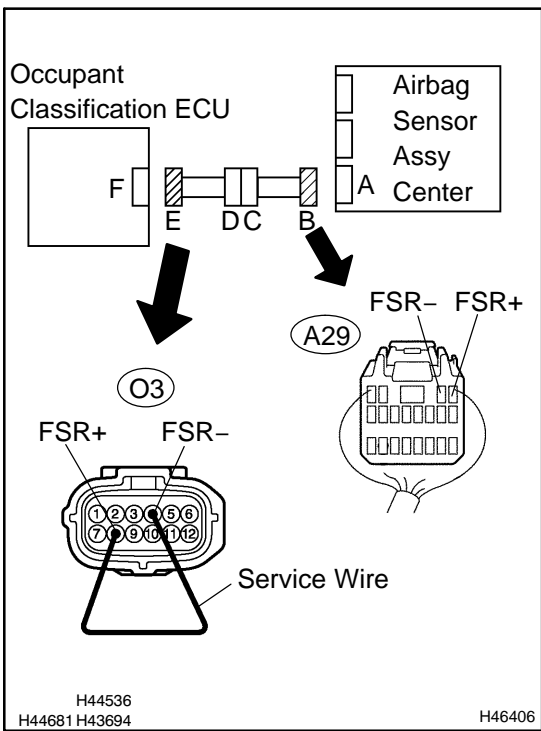
The connectors are connected.

NG

CONNECT CONNECTORS, THEN GO TO STEP 1

OK

4 CHECK OCCUPANT CLASSIFICATION ECU CIRCUIT(OPEN)



- (a) Disconnect the connectors from the airbag sensor assy center and the occupant classification ECU.
- (b) Using a service wire, connect O3-8 (FSR+) and O3-4 (FSR-) of connector "E".

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (c) Measure the resistance according to the value(s) in the table below.

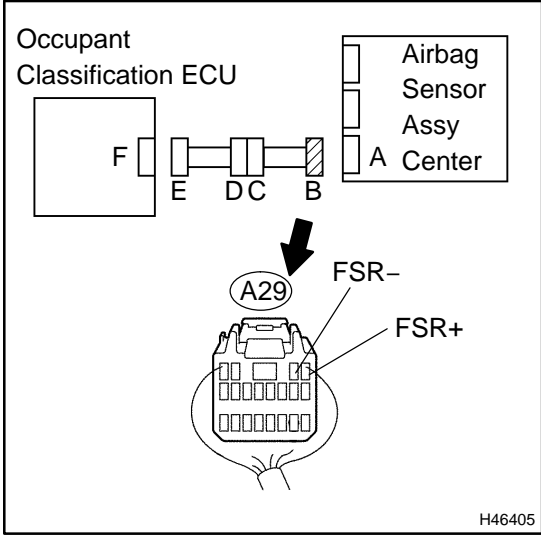
Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - A29-2 (FSR-)	Always	Below 1 Ω

NG Go to step 8

OK

5 CHECK OCCUPANT CLASSIFICATION ECU CIRCUIT (SHORT)



- (a) Disconnect the service wire from connector "E".
- (b) Measure the resistance according to the value(s) in the table below.

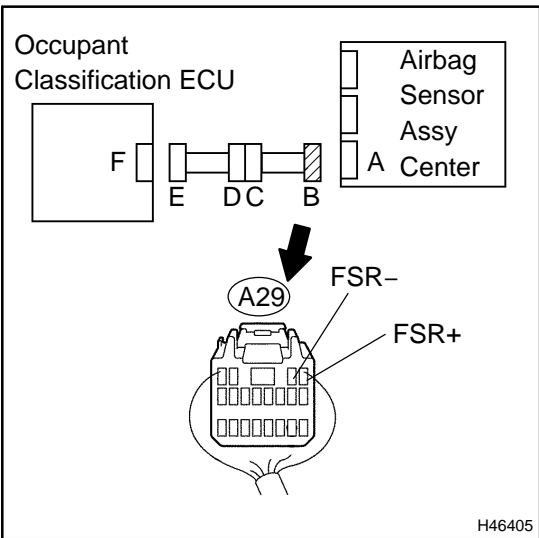
Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - A29-2 (FSR-)	Always	1 MΩ or Higher

NG Go to step 9

OK

6 CHECK OCCUPANT CLASSIFICATION ECU CIRCUIT (TO B+)



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

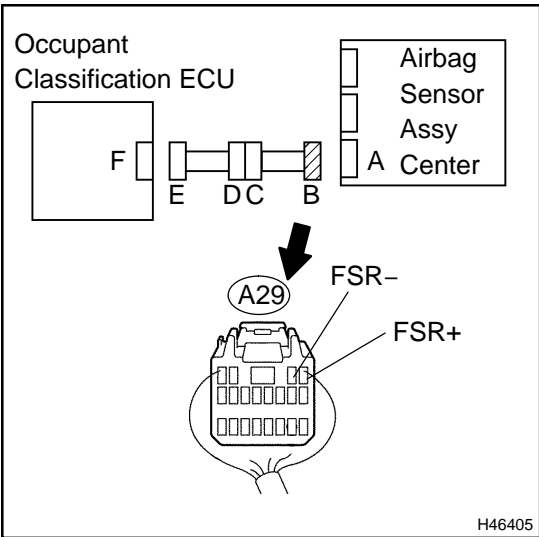
Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - Body ground	Ignition switch ON	Below 1 V
A29-2 (FSR-) - Body ground	Ignition switch ON	Below 1 V

NG Go to step 10

OK

7 CHECK OCCUPANT CLASSIFICATION ECU CIRCUIT (TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

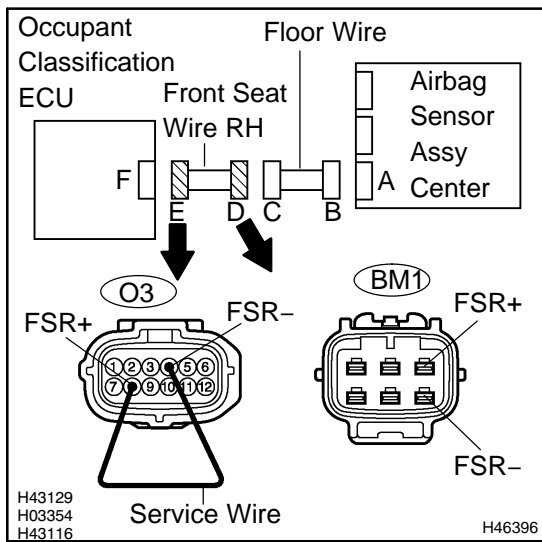
Tester connection	Condition	Specified condition
A29-1 (FSR+) - Body ground	Always	1 MΩ or Higher
A29-2 (FSR-) - Body ground	Always	1 MΩ or Higher

NG Go to step 11

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

8 CHECK FRONT SEAT WIRE RH(OPEN)



(a) Disconnect the front seat wire RH connector from the floor wire.

HINT:

The service wire has already been inserted into connector "E".

(b) Measure the resistance according to the value(s) in the table below.

Standard:

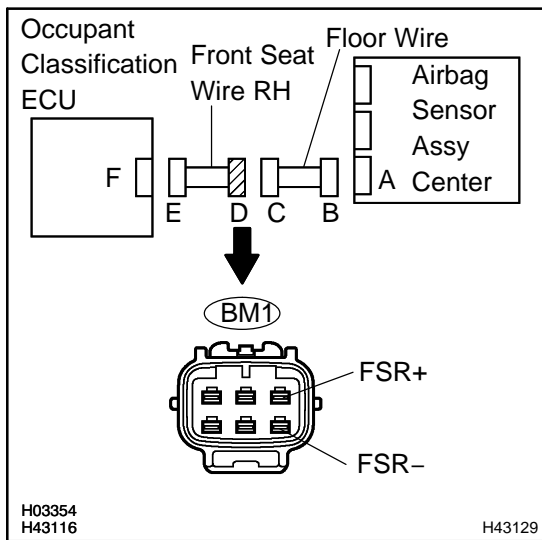
Tester connection	Condition	Specified condition
BM1-1 (FSR+) - BM1-4 (FSR-)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

REPLACE FLOOR WIRE

9 CHECK FRONT SEAT WIRE RH(SHORT)



(a) Disconnect the front seat wire RH connector from the floor wire.

(b) Measure the resistance according to the value(s) in the table below.

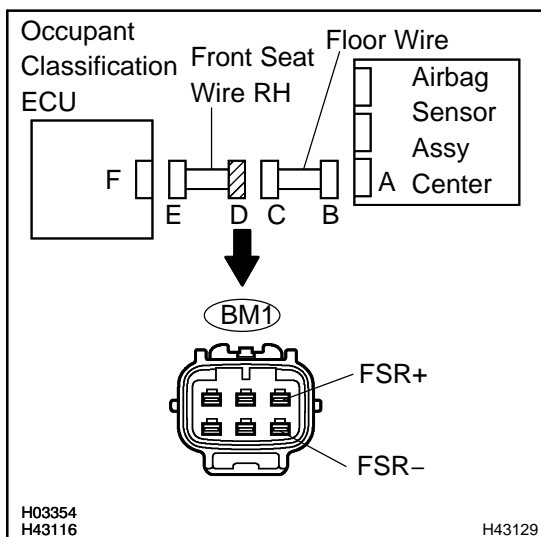
Standard:

Tester connection	Condition	Specified condition
BM1-1 (FSR+) - BM1-4 (FSR-)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

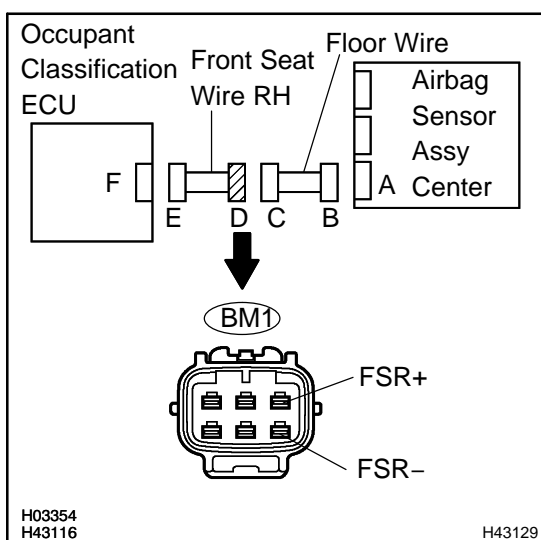
REPLACE FLOOR WIRE

10 CHECK FRONT SEAT WIRE RH(TO B+)

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from battery, and wait for at least 90 seconds.
- Disconnect the front seat wire RH connector from the floor wire.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BM1-1 (FSR+) - Body ground	Ignition switch ON	Below 1 V
BM1-4 (FSR-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH****OK****REPLACE FLOOR WIRE****11 CHECK FRONT SEAT WIRE RH(TO GROUND)**

- Disconnect the front seat wire RH connector from the floor wire.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BM1-1 (FSR+) - Body ground	Always	1 M Ω or Higher
BM1-4 (FSR-) - Body ground	Always	1 M Ω or Higher

NG → **REPLACE FRONT SEAT WIRE RH****OK****REPLACE FLOOR WIRE**

DTC	B1152/28	PASSENGER AIRBAG ON/OFF INDICATOR LIGHT CIRCUIT MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

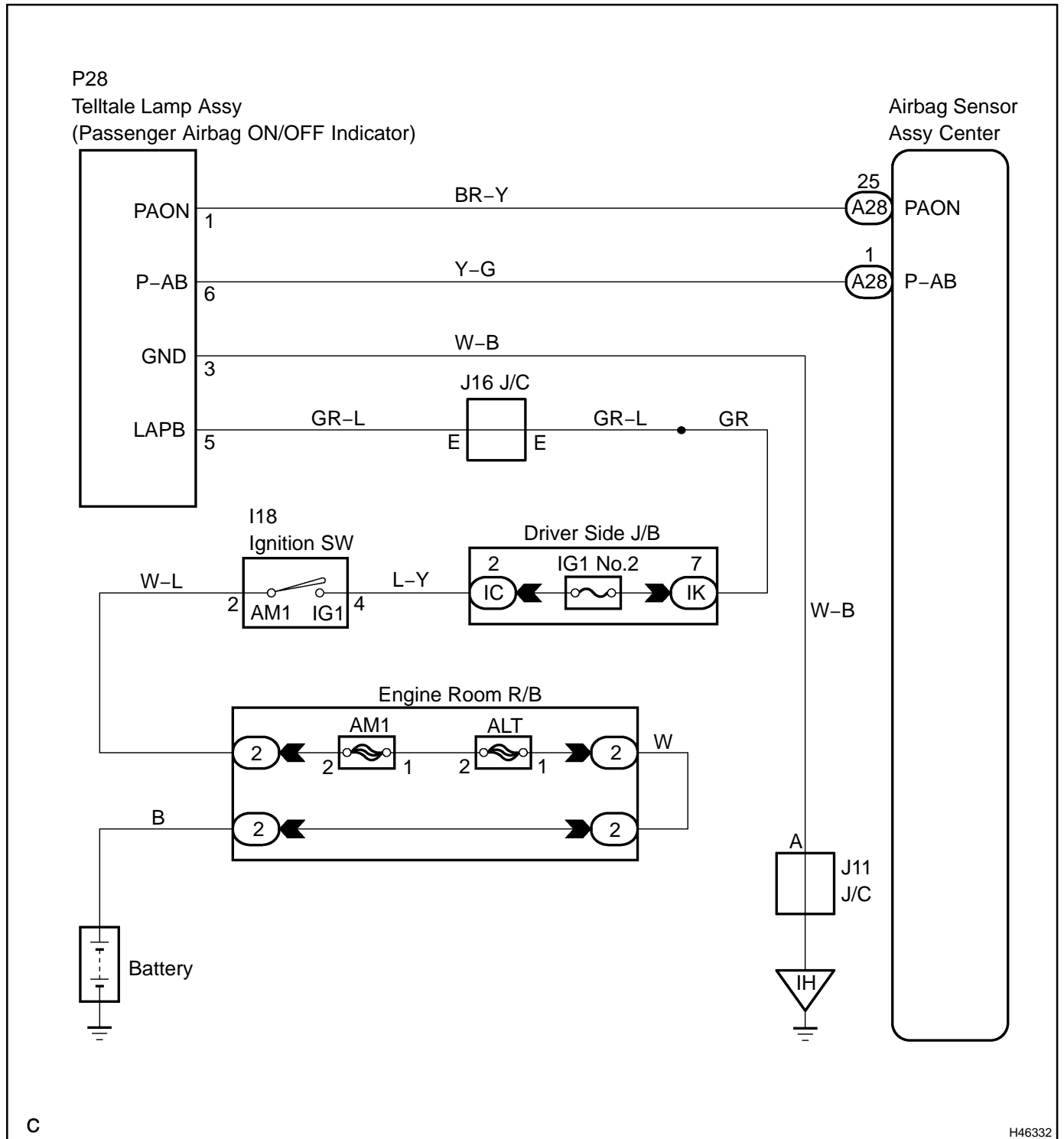
The passenger airbag ON/OFF indicator light circuit consists of the airbag sensor assy center and the telltale lamp assy (passenger airbag ON/OFF indicator).

This circuit indicates the operation condition of the front passenger airbag assy, the front seat airbag assy RH and passenger side seat belt pretensioner.

DTC B1152/28 is recorded when a malfunction is detected in the passenger airbag ON/OFF indicator light circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1152/28	<ul style="list-style-type: none"> • The airbag sensor assy center receives a line short signal, open signal, short to ground signal or B+ short signal in the passenger airbag ON/OFF indicator light circuit for 2 seconds. • Telltale lamp assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Telltale lamp (Passenger airbag ON/OFF indicator) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



C

H46332

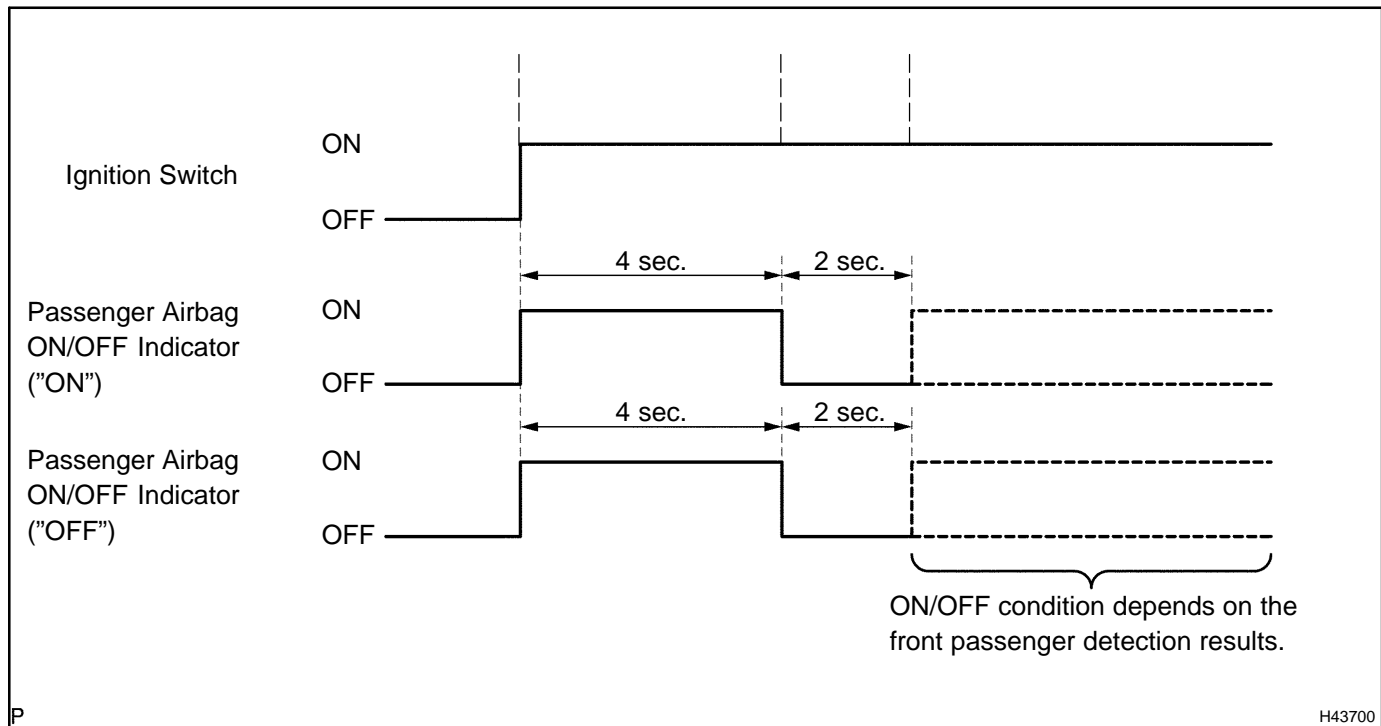
INSPECTION PROCEDURE

1 CHECK PASSENGER AIRBAG ON/OFF INDICATOR OPERATION

- (a) Turn the ignition switch to the ON position.
- (b) Check the passenger airbag ON/OFF indicator operation.

HINT:

Refer to the normal condition of the passenger airbag ON/OFF indicator (see page 05-1213).



Result:

ON/OFF Indicator Illumination	Proceed to
Always ON	A
OFF	B

B Go to step 10

A

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center and the telltale lamp assy.

OK:

The connectors are connected.

NG

CONNECT CONNECTORS

OK

3 CHECK CONNECTORS

- Disconnect the connectors from the airbag sensor assy center and the telltale lamp assy.
- Check that the connectors (on the airbag sensor assy center side and telltale lamp assy side) are not damaged.

OK:

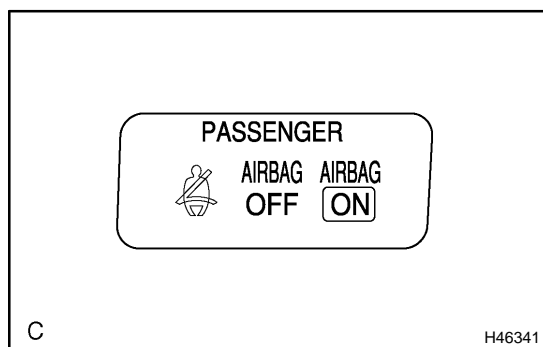
The connectors are not deformed or damaged.

NG

REPLACE WIRE HARNESS

OK

4 CHECK TELLTALE LAMP ASSY(PASSENGER AIRBAG ON/OFF INDICATOR LIGHT)



- Connect the connectors to the telltale lamp assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Check the passenger airbag ON/OFF indicator operation.

OK:

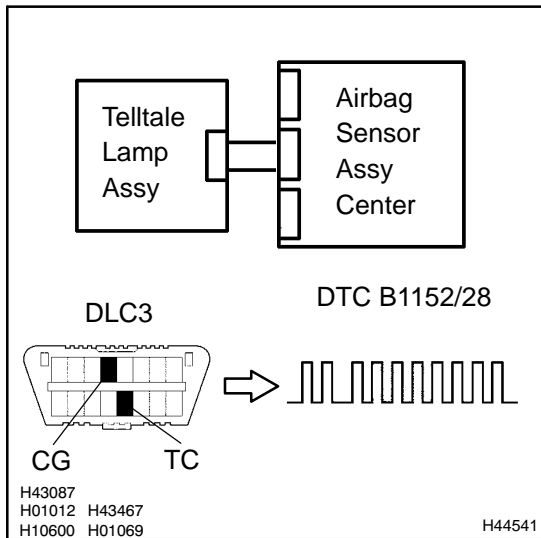
The passenger airbag ON/OFF indicator ("ON" and "OFF") does not come on.

NG

Go to step 6

OK

5 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the airbag sensor assy center.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B1152/28 is not output.

HINT:

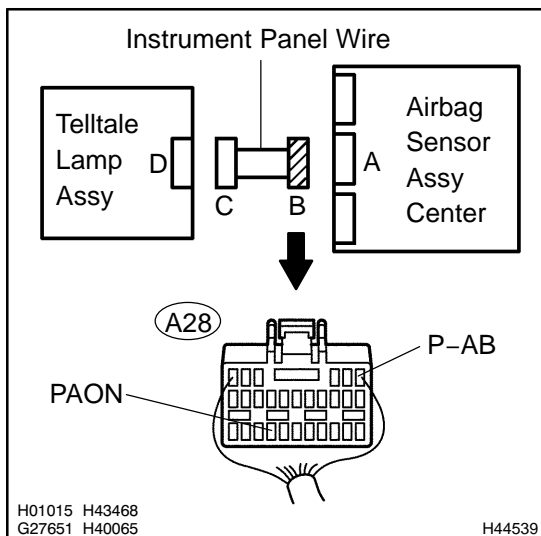
Codes other than code B1152/28 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

6 CHECK INSTRUMENT PANEL WIRE(OPEN)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connector from the telltale lamp assy.
- (d) Measure the resistance according to the value(s) in the table below.

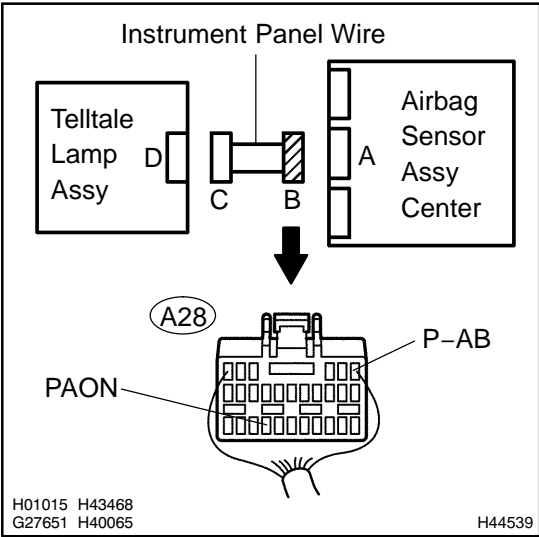
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - A28-25 (PAON)	Always	Below 1 Ω

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

7 CHECK INSTRUMENT PANEL WIRE(SHORT)



- (a) Release the activation prevention mechanism built into connector "C" (see page 05-1213).
- (b) Measure the resistance according to the value(s) in the table below.

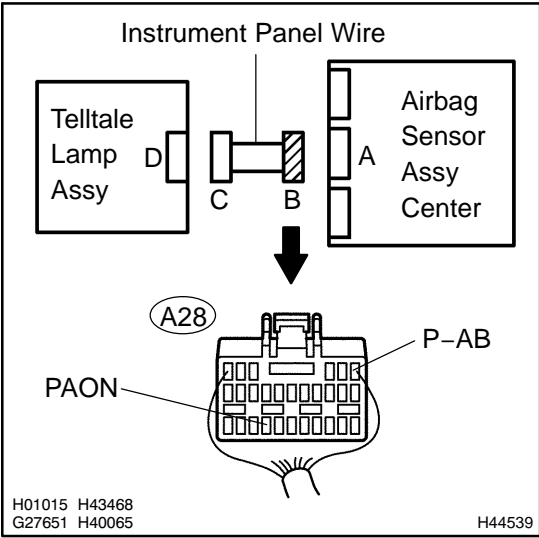
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - A28-25 (PAON)	Always	1 MΩ or Higher

NG → REPLACE INSTRUMENT PANEL WIRE

OK

8 CHECK INSTRUMENT PANEL WIRE(TO GROUND)



HINT:
The activation prevention mechanism of connector "C" has already been released.

- (a) Measure the resistance according to the value(s) in the table below.

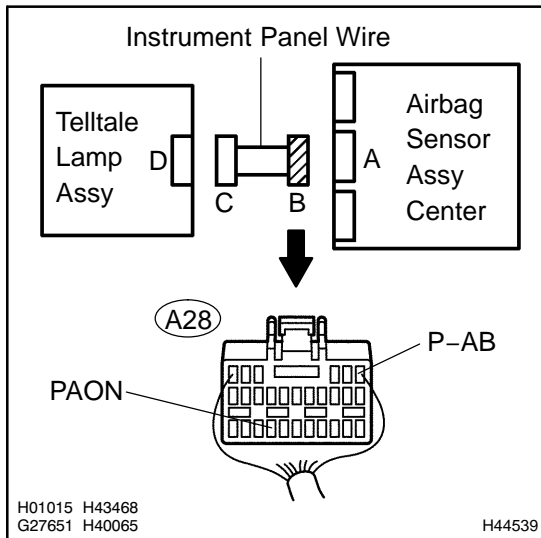
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - Body ground	Always	1 MΩ or Higher
A28-25 (PAON) - Body ground	Always	1 MΩ or Higher

NG → REPLACE INSTRUMENT PANEL WIRE

OK

9 CHECK INSTRUMENT PANEL WIRE(TO B+)



HINT:

The activation prevention mechanism of connector "C" has already been released.

- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-25 (PAON) - Body ground	Ignition switch ON	Below 1 V
A28-1 (P-AB) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

REPLACE TELLTALE LAMP ASSY (SEE PAGE 71-13)

10 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Check that the connectors are properly connected to the airbag sensor assy center and the telltale lamp assy.

OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

11 CHECK CONNECTORS

- (a) Disconnect the connectors from the airbag sensor assy center and the telltale lamp assy.
- (b) Check that the connectors (on the airbag sensor assy center side and telltale lamp assy side) are not damaged.

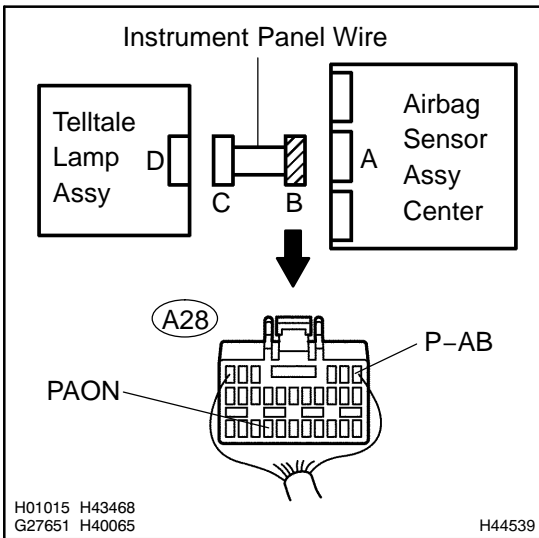
OK:

The connectors are not deformed or damaged.

NG → **REPLACE WIRE HARNESS**

OK

12 CHECK INSTRUMENT PANEL WIRE(OPEN)



- (a) Measure the resistance according to the value(s) in the table below.

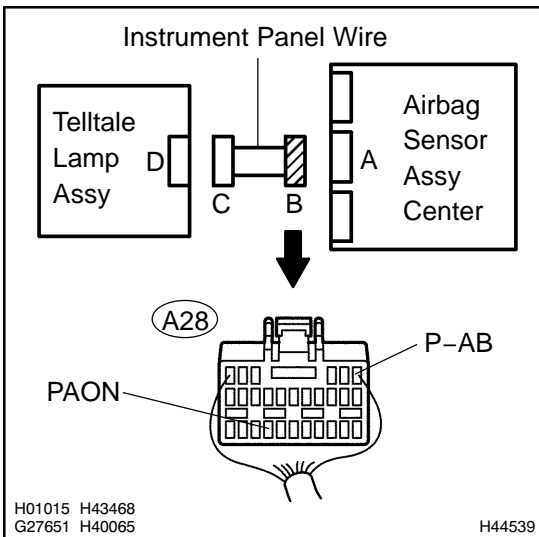
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - A28-25 (PAON)	Always	Below 1 Ω

OK

NG → REPLACE INSTRUMENT PANEL WIRE

13 CHECK INSTRUMENT PANEL WIRE(SHORT)



- (a) Release the activation prevention mechanism built into connector "C" (see page 05-1213).
- (b) Measure the resistance according to the value(s) in the table below.

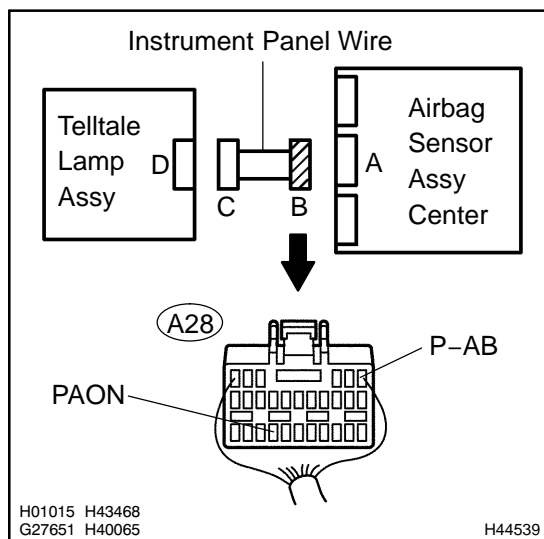
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - A28-25 (PAON)	Always	1 MΩ or Higher

OK

NG → REPLACE INSTRUMENT PANEL WIRE

14 CHECK INSTRUMENT PANEL WIRE(TO GROUND)



HINT:

The activation prevention mechanism of connector "C" has already been released.

- (a) Measure the resistance according to the value(s) in the table below.

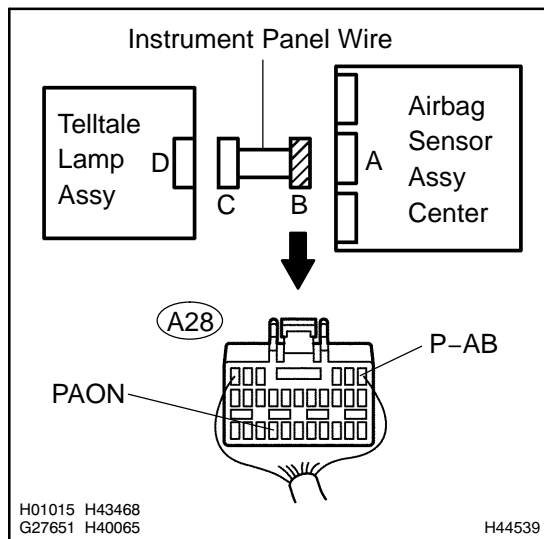
Standard:

Tester connection	Condition	Specified condition
A28-1 (P-AB) - Body ground	Always	1 MΩ or Higher
A28-25 (PAON) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

15 CHECK INSTRUMENT PANEL WIRE(TO B+)



HINT:

The activation prevention mechanism of connector "C" has already been released.

- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

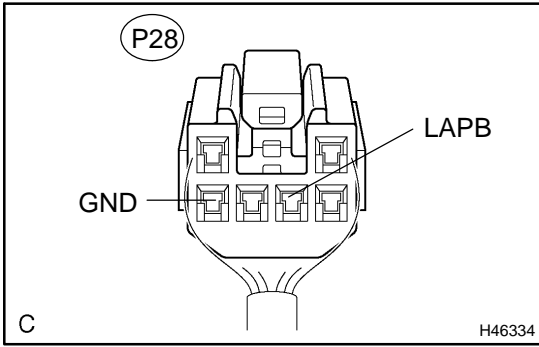
Standard:

Tester connection	Condition	Specified condition
A28-25 (PAON) - Body ground	Ignition switch ON	Below 1 V
A28-1 (P-AB) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK WIRE HARNESS(POWER SOURCE)



- (a) Turn the ignition switch to the ON position.
- (b) Measure the voltage and resistance according to the value(s) in the table below.

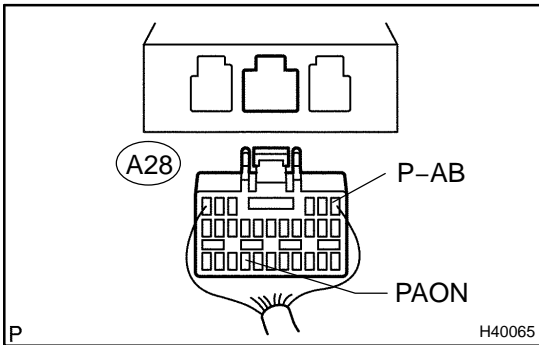
Standard:

Tester connection	Condition	Specified condition
P28-5 (LAPB) - Body ground	Ignition switch ON	10 to 14 V
P28-3 (GND) - Body ground	Always	Below 1 Ω

NG → **REPLACE POWER SOURCE CIRCUIT**

OK

17 CHECK TELLTALE LAMP ASSY(PASSENGER AIRBAG ON/OFF INDICATOR)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the telltale lamp assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Check the passenger airbag ON/OFF indicator condition.

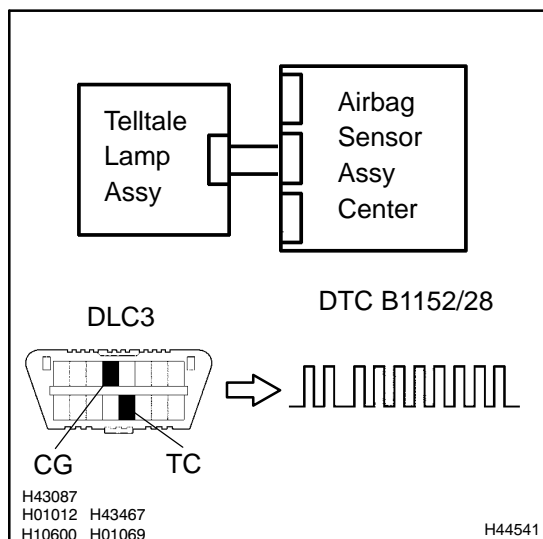
Standard:

Tester connection	Condition	Passenger airbag ON/OFF indicator condition
A28-25 (PAON) - Body ground	Ignition switch ON	"ON" comes on
A28-1 (P-AB) - Body ground	Ignition switch ON	"OFF" comes on

NG → **REPLACE TELLTALE LAMP ASSY (SEE PAGE 71-13)**

OK

18 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connectors to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1152/28 is not output.

HINT:

Codes other than code B1152/28 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1153/25	SEAT POSITION AIRBAG SENSOR MALFUNCTION
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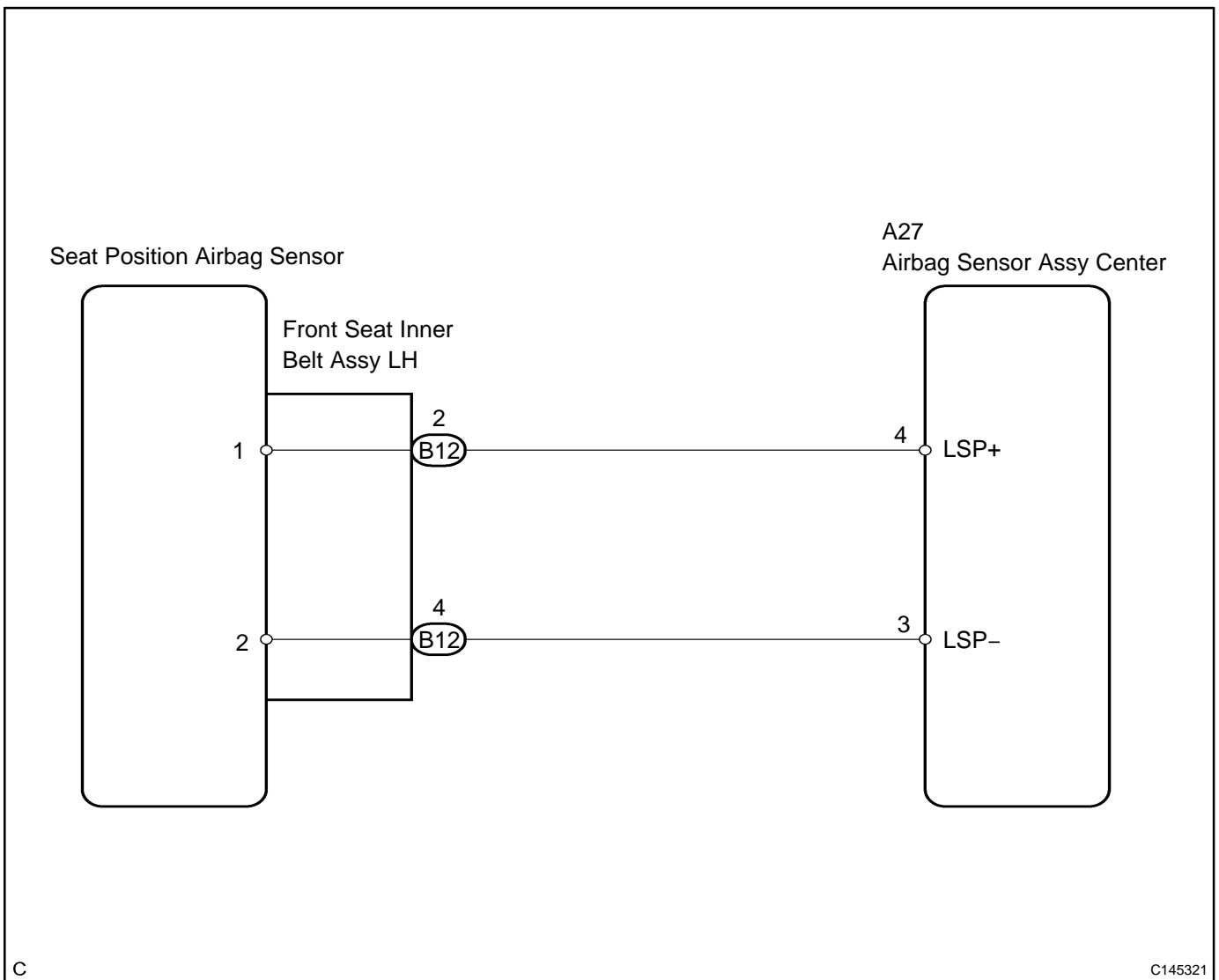
CIRCUIT DESCRIPTION

The seat position airbag sensor circuit consists of the airbag sensor assy center and the seat position airbag sensor.

DTC B1153/25 is recorded when a malfunction is detected in the seat position airbag sensor circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1153/25	When one of the following conditions is met: <ul style="list-style-type: none"> • The airbag sensor assy center detects a line short signal, open signal, short to ground signal or short to B+ signal in the seat position airbag sensor circuit. • Seat position airbag sensor malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Seat position airbag sensor • Airbag sensor assy center • Front seat inner belt assy LH • Floor wire No.2

WIRING DIAGRAM

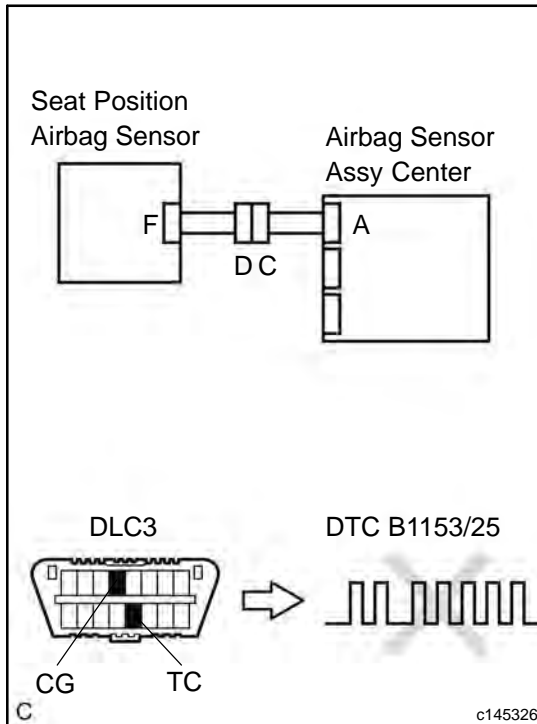


C

C145321

INSPECTION PROCEDURE

1 CHECK DTC



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1153/25 is not output.

HINT:

Codes other than code B1153/25 may be output at this time, but they are not related to this check.

NG

GO TO STEP 2

OK

USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center, seat position airbag sensor and front seat inner belt assy LH.

OK:

The connectors are properly connected.

HINT:

If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

- Disconnect the connectors from the airbag sensor assy center, seat position airbag sensor and front seat inner belt assy LH.
- Check that the terminals of the connectors are not damaged.

OK:

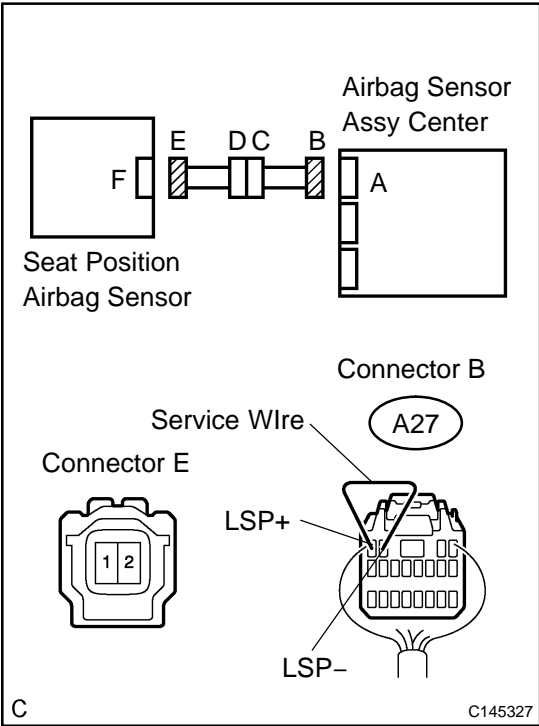
The terminals are not deformed or damaged.

NG

REPLACE WIRE HARNESS OR CONNECTORS

OK

3 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (OPEN)



- (a) Using a service wire, connect A27-4 (LSP+) and A27-3 (LSP-) of connector B.

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (b) Measure the resistance between the terminals of connector E according to the value(s) in the table below.

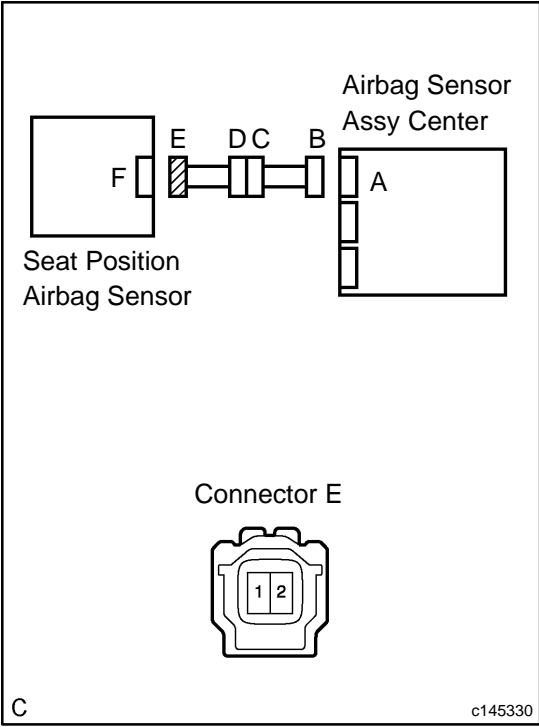
Standard resistance:

Tester connection	Condition	Specified condition
1 - 2	Always	Below 1 Ω

NG → GO TO STEP 10

OK

4 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT TO GROUND)



- (a) Disconnect the service wire from connector B.
- (b) Measure the resistance according to the value(s) in the table below.

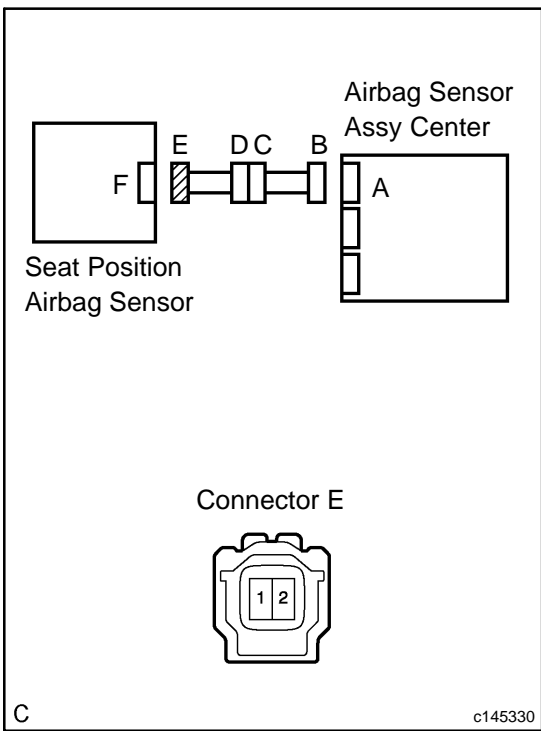
Standard resistance:

Tester connection	Condition	Specified condition
1 - Body ground	Always	1 MΩ or higher
2 - Body ground	Always	1 MΩ or higher

NG → GO TO STEP 11

OK

5 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT)



(a) Measure the resistance according to the value(s) in the table below.

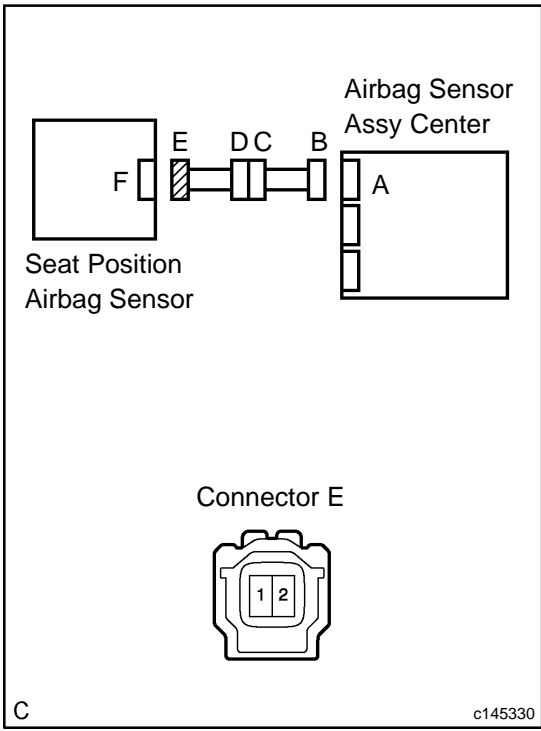
Standard resistance:

Tester connection	Condition	Specified condition
1 - 2	Always	1 MΩ or higher

NG → GO TO STEP 12

OK

6 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.

(b) Turn the ignition switch to the ON position.

(c) Measure the voltage according to the value(s) in the table below.

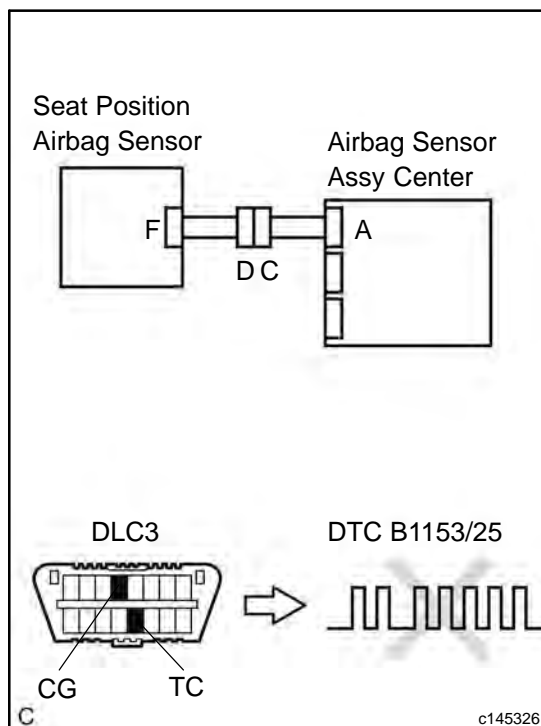
Standard voltage:

Tester connection	Condition	Specified condition
1 - Body ground	Ignition switch ON	Below 1 V
2 - Body ground	Ignition switch ON	Below 1 V

NG → GO TO STEP 13

OK

7 CHECK SEAT POSITION AIR BAG SENSOR



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connectors to the seat position airbag sensor and the airbag sensor assy center.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B1153/25 is not output.

HINT:

Codes other than code B1153/25 may be output at this time, but they are not related to this check.

NG

GO TO STEP 8

OK

USE SIMULATION METHOD TO CHECK

8 REPLACE SEAT POSITION AIR BAG SENSOR

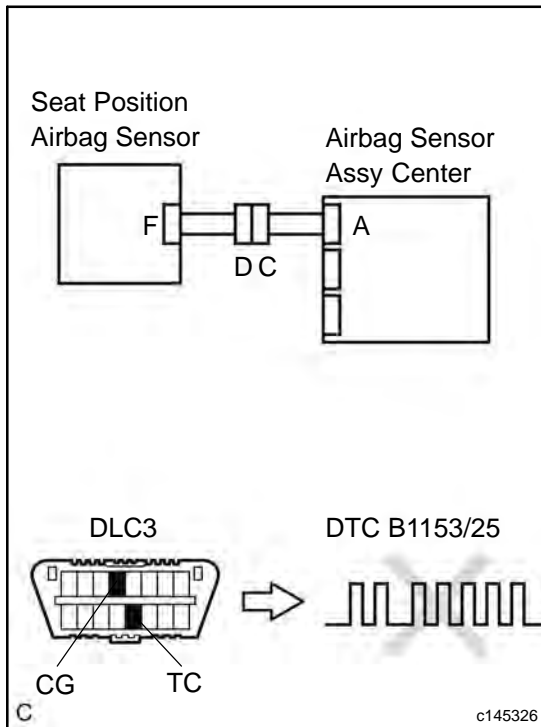
- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the seat position airbag sensor (see page 60-64).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

9 CHECK AIRBAG SENSOR ASSY CENTER



- (a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (c) Clear the DTCs stored in memory (see page 05-1219).
- (d) Turn the ignition switch to the LOCK position.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Check the DTCs (see page 05-1219).

OK:

DTC B1153/25 is not output.

HINT:

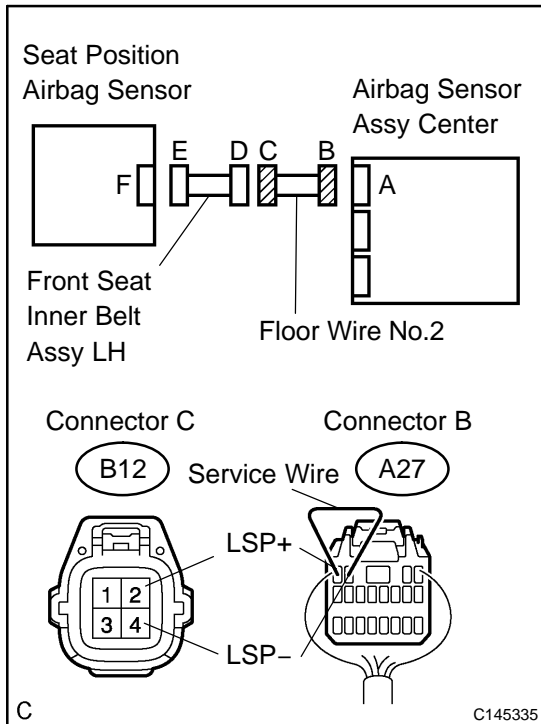
Codes other than code B1153/25 may be output at this time, but they are not related to this check.

NG → **REPLACE AIRBAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

END

10 CHECK FLOOR WIRE NO.2 (OPEN)



- (a) Disconnect the front seat inner belt assy LH connector from the floor wire No.2 connector.

HINT:

The service wire has already been inserted into connector B.

- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

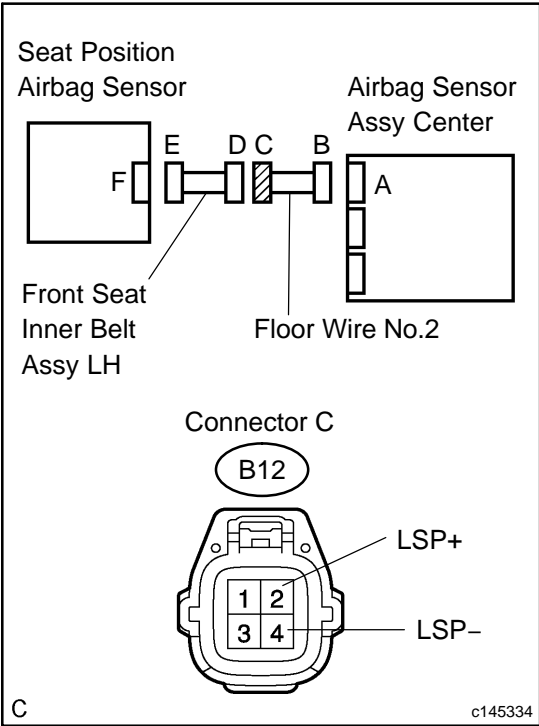
Tester connection	Condition	Specified condition
B12-2 (LSP+) - B12-4 (LSP-)	Always	Below 1 Ω

NG → **REPLACE FLOOR WIRE NO.2**

OK

REPLACE FRONT SEAT INNER BELT ASSY LH

11 CHECK FLOOR WIRE NO.2 (SHORT TO GROUND)



- (a) Disconnect the front seat inner belt assy LH connector from the floor wire No.2 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

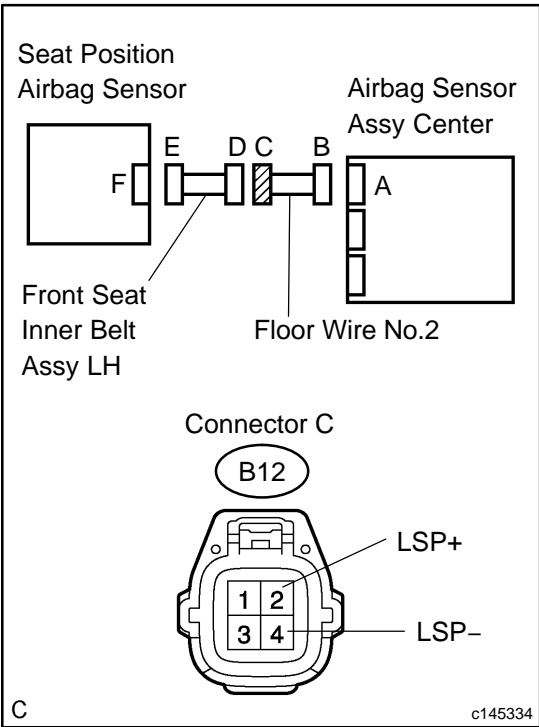
Tester connection	Condition	Specified condition
B12-2 (LSP+) - Body ground	Always	1 MΩ or higher
B12-4 (LSP-) - Body ground	Always	1 MΩ or higher

NG → REPLACE FLOOR WIRE NO.2

OK

REPLACE FRONT SEAT INNER BELT ASSY LH

12 CHECK FLOOR WIRE NO.2 (SHORT)



- (a) Disconnect the front seat inner belt assy LH connector from the floor wire No.2 connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

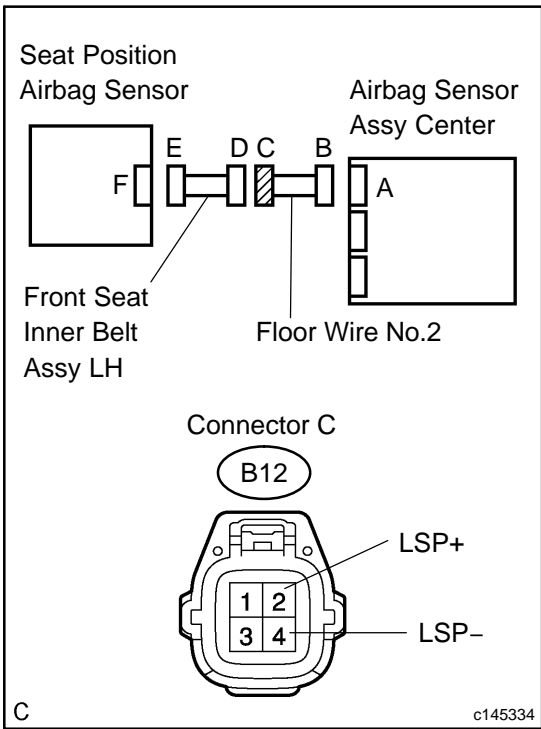
Tester connection	Condition	Specified condition
B12-2 (LSP+) - B12-4 (LSP-)	Always	1 MΩ or higher

NG → REPLACE FLOOR WIRE NO.2

OK

REPLACE FRONT SEAT INNER BELT ASSY LH

13 CHECK FLOOR WIRE NO.2 (SHORT TO B+)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the front seat inner belt assy LH connector from the floor wire No.2 connector.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard voltage:

Tester connection	Condition	Specified condition
B12-2 (LSP+) - Body ground	Ignition switch ON	Below 1 V
B12-4 (LSP-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FLOOR WIRE NO.2**

OK

REPLACE FRONT SEAT INNER BELT ASSY LH

DTC	B1154/38	CURTAIN SHIELD AIRBAG SENSOR (RH) MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

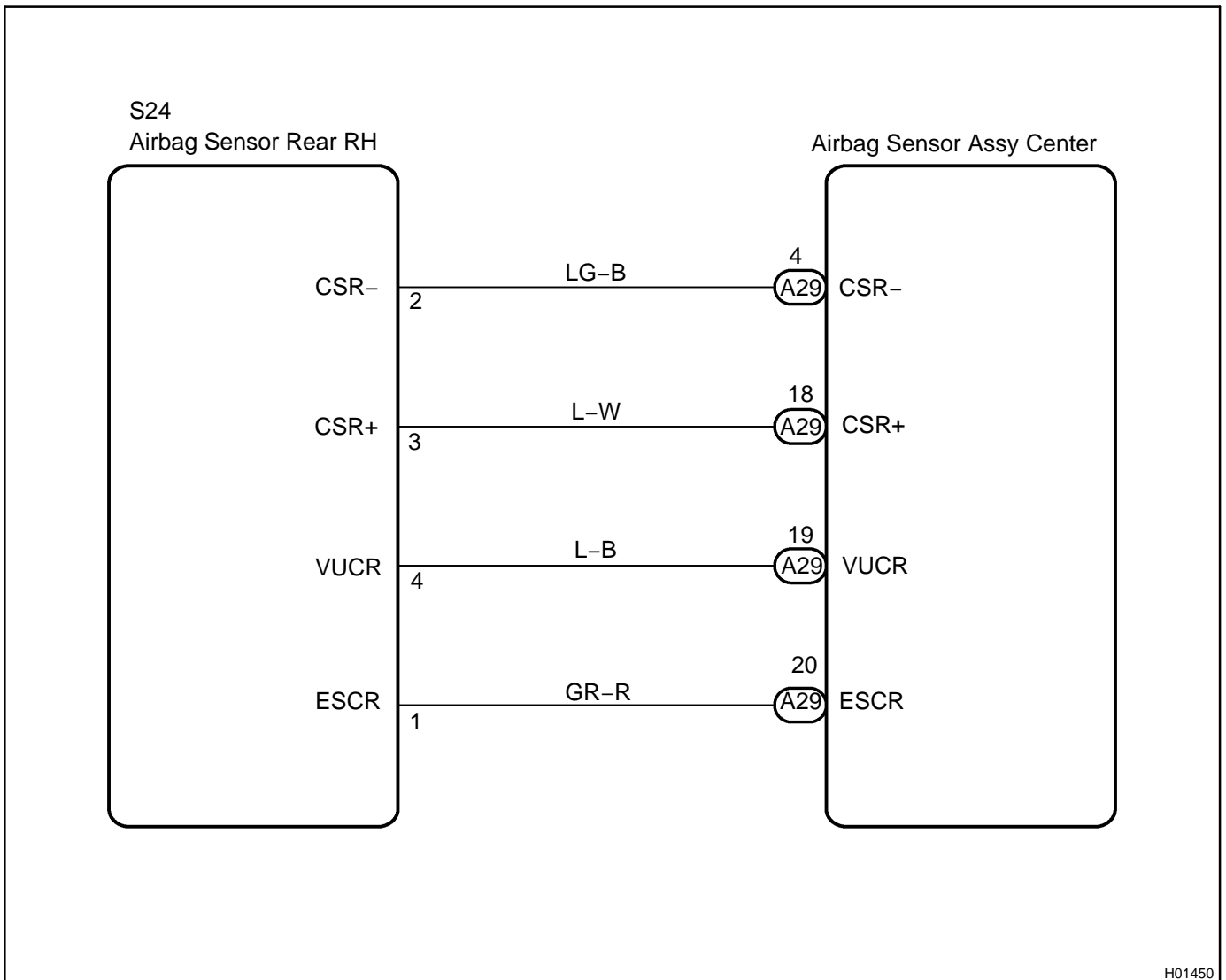
The airbag sensor rear RH consists of the safing sensor, the diagnostic circuit and the lateral deceleration sensor, etc.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it judges whether or not the SRS should be activated.

DTC B1154/38 is recorded when a malfunction is detected in the curtain shield airbag sensor RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1154/38	<ul style="list-style-type: none"> • Short circuit in airbag sensor rear RH wire harness (to ground) • Short circuit in airbag sensor rear RH wire harness (to B+) • Open circuit in airbag sensor rear RH wire harness • Short circuit in airbag sensor rear RH wire harness • Airbag sensor rear RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Airbag sensor rear RH • Airbag sensor assy center • Floor wire

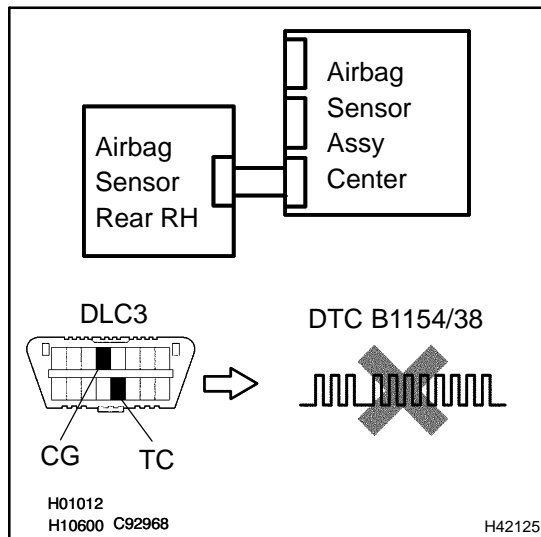
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 CHECK DTC



- (a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (b) Clear the DTCs stored in memory (see page 05-1219).
- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Check the DTCs (see page 05-1219).

OK:**DTC B1154/38 is not output.****HINT:**

Codes other than code B1154/38 may be output at this time, but they are not related to this check.

NG**Go to step 2****OK**

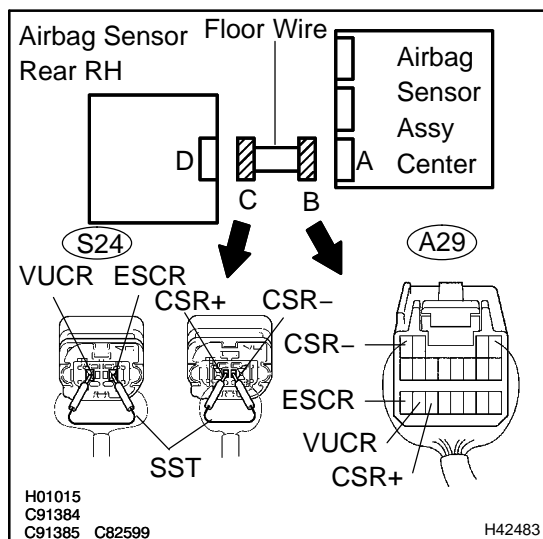
USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear RH.

OK:**The connectors are connected.****NG****CONNECT CONNECTORS, THEN GO TO STEP 1****OK**

3 CHECK FLOOR WIRE(OPEN)



- Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear assy RH.
- Using SST, connect S24-4 (VUCR) to S24-1 (ESCR), and connect S24-3 (CSR+) to S24-2 (CSR-) of connector "C".
SST 09843-18040
- Measure the resistance according to the value(s) in the table below.

Standard:

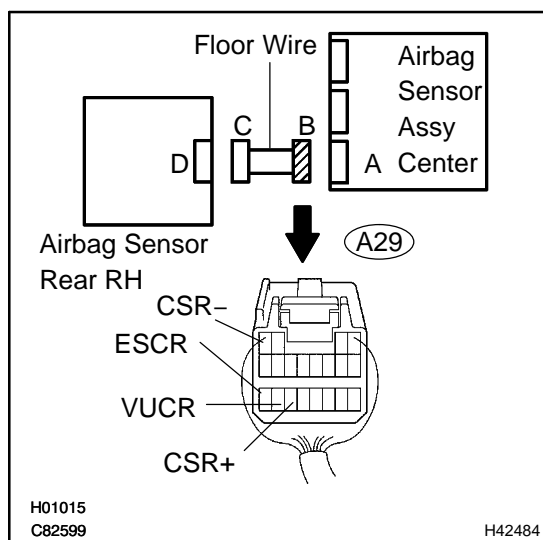
Tester connection	Condition	Specified condition
A29-19 (VUCR) - A29-20 (ESCR)	Always	Below 1 Ω
A29-18 (CSR+) - A29-4 (CSR-)	Always	Below 1 Ω

NG

REPLACE FLOOR WIRE

OK

4 CHECK FLOOR WIRE(TO B+)



- Disconnect the SST from connector "C".
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

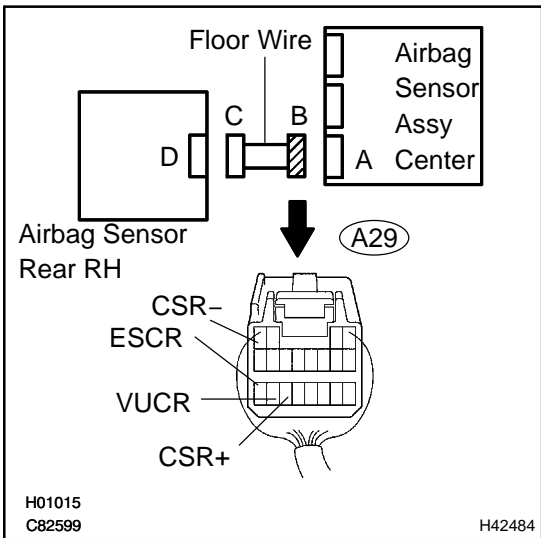
Tester connection	Condition	Specified condition
A29-19 (VUCR) - Body ground	Ignition switch ON	Below 1 V
A29-20 (ESCR) - Body ground	Ignition switch ON	Below 1 V
A29-18 (CSR+) - Body ground	Ignition switch ON	Below 1 V
A29-4 (CSR-) - Body ground	Ignition switch ON	Below 1 V

NG

REPLACE FLOOR WIRE

OK

5 CHECK FLOOR WIRE(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

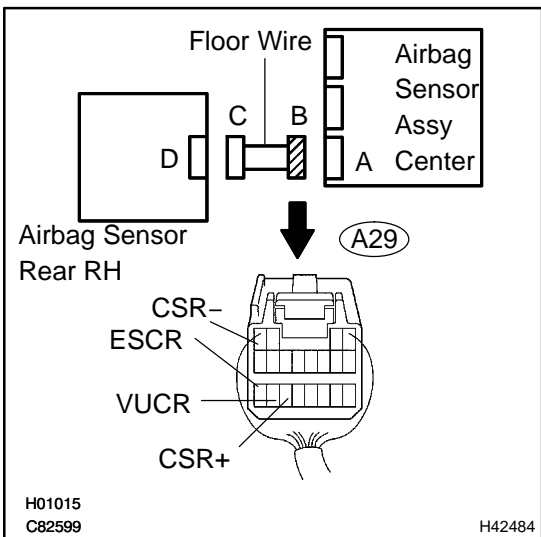
Standard:

Tester connection	Condition	Specified condition
A29-19 (VUCR) - Body ground	Always	1 MΩ or Higher
A29-20 (ESCR) - Body ground	Always	1 MΩ or Higher
A29-18 (CSR+) - Body ground	Always	1 MΩ or Higher
A29-4 (CSR-) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE

OK

6 CHECK FLOOR WIRE(SHORT)



- (a) Measure the resistance according to the value(s) in the table below.

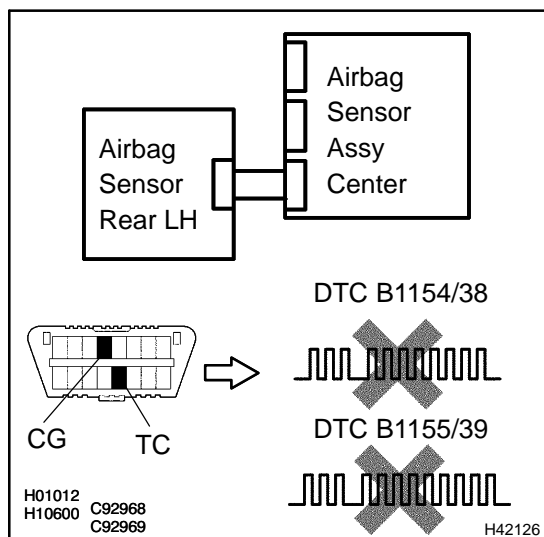
Standard:

Tester connection	Condition	Specified condition
A29-19 (VUCR) - A29-20 (ESCR)	Always	1 MΩ or Higher
A29-18 (CSR+) - A29-4 (CSR-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE

OK

7 CHECK AIR BAG SENSOR REAR RH



- (a) Connect the connector to the airbag sensor assy center.
- (b) Interchange the airbag sensor rear LH with RH and connect the connectors to them.
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1154/38 is output.
NG: B	DTC B1155/39 is output.
OK	DTC B1154/38 and B1155/39 are not output.

NG:A → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

NG:B → **REPLACE AIR BAG SENSOR REAR RH (SEE PAGE 60-62)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1155/39	CURTAIN SHIELD AIRBAG SENSOR (LH) MALFUNCTION
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CIRCUIT DESCRIPTION

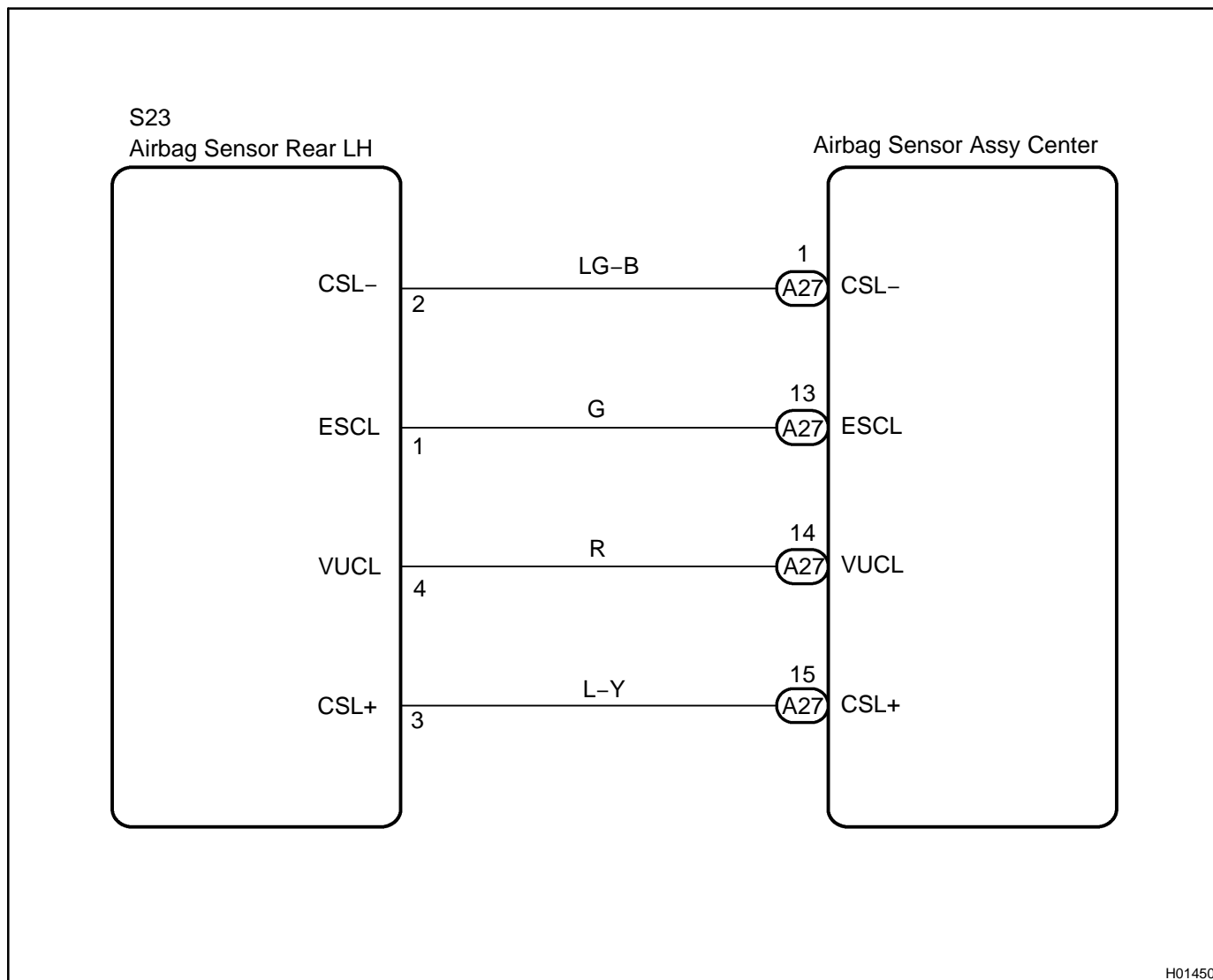
The airbag sensor rear LH consists of the safing sensor, the diagnostic circuit and the lateral deceleration sensor, etc.

If the airbag sensor assy center receives signals from the lateral deceleration sensor, it judges whether or not the SRS should be activated.

DTC B1155/39 is recorded when a malfunction is detected in the curtain shield airbag sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1155/39	<ul style="list-style-type: none"> • Short circuit in airbag sensor rear LH wire harness (to ground) • Short circuit in airbag sensor rear LH wire harness (to B+) • Open circuit in airbag sensor rear LH wire harness • Short circuit in airbag sensor rear LH wire harness • Airbag sensor rear LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Airbag sensor rear LH • Airbag sensor assy center • Floor wire No.2

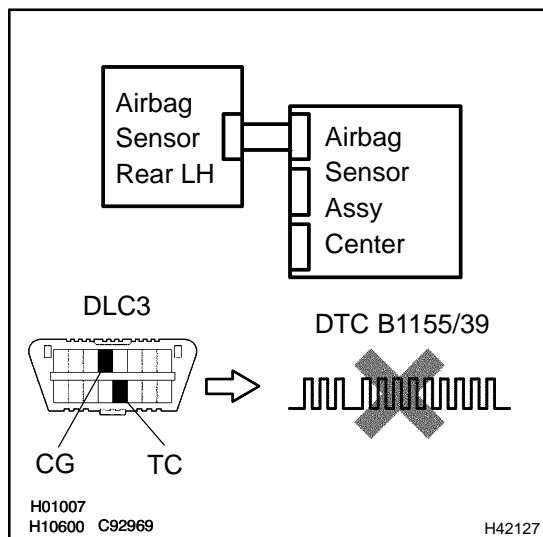
WIRING DIAGRAM



H01450

INSPECTION PROCEDURE

1 CHECK DTC



- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:**DTC B1155/39 is not output.****HINT:**

Codes other than code B1155/39 may be output at this time, but they are not related to this check.

NG**Go to step 2****OK**

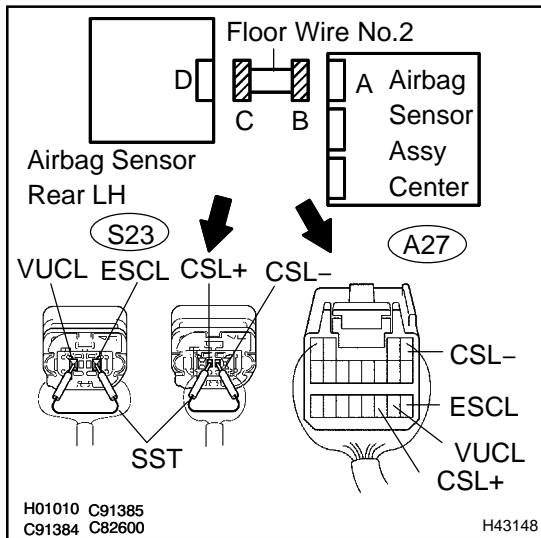
USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the airbag sensor assy center and the airbag sensor rear LH.

OK:**The connectors are connected.****NG****CONNECT CONNECTORS, THEN GO TO STEP 1****OK**

3 CHECK FLOOR WIRE NO.2(OPEN)



- (a) Disconnect the connectors from the airbag sensor assy center and the airbag sensor rear assy LH.
- (b) Using SST, connect S23-4 (VUCL) to S23-1 (ESCL), and connect S23-3 (CSL+) to S23-2 (CSL-) of connector "C". SST 09843-18040
- (c) Measure the resistance according to the value(s) in the table below.

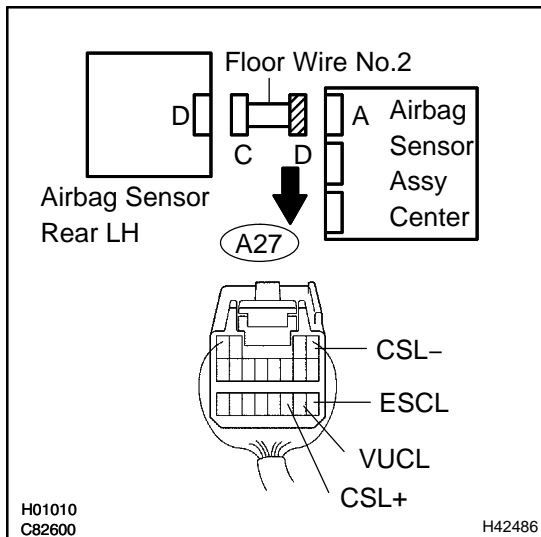
Standard:

Tester connection	Condition	Specified condition
A27-14 (VUCL) - A27-13 (ESCL)	Always	Below 1 Ω
A27-15 (CSL+) - A27-1 (CSL-)	Always	Below 1 Ω

NG → REPLACE FLOOR WIRE NO.2

OK

4 CHECK FLOOR WIRE NO.2(TO B+)



- (a) Disconnect the SST from connector "C".
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

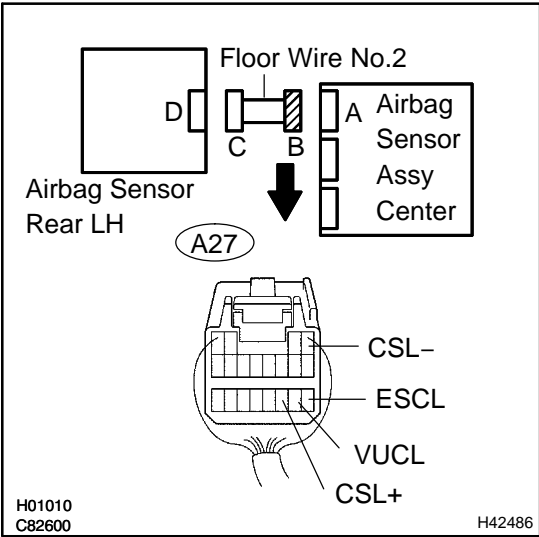
Standard:

Tester connection	Condition	Specified condition
A27-14 (VUCL) - Body ground	Ignition switch ON	Below 1 V
A27-13 (ESCL) - Body ground	Ignition switch ON	Below 1 V
A27-15 (CSL+) - Body ground	Ignition switch ON	Below 1 V
A27-1 (CSL-) - Body ground	Ignition switch ON	Below 1 V

NG → REPLACE FLOOR WIRE NO.2

OK

5 CHECK FLOOR WIRE NO.2(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

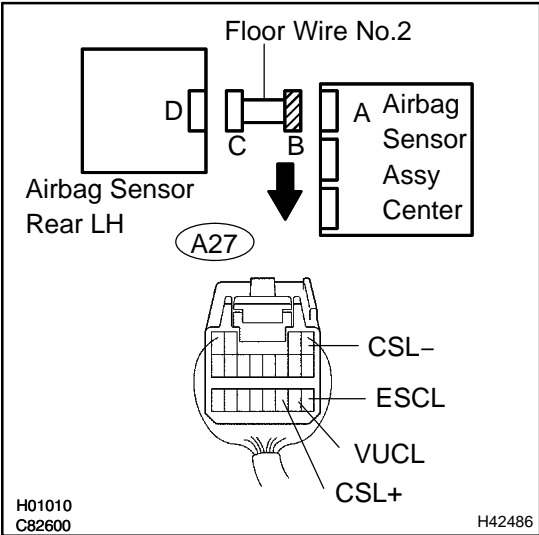
Standard:

Tester connection	Condition	Specified condition
A27-14 (VUCL) - Body ground	Always	1 MΩ or Higher
A27-13 (ESCL) - Body ground	Always	1 MΩ or Higher
A27-15 (CSL+) - Body ground	Always	1 MΩ or Higher
A27-1 (CSL-) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE NO.2

OK

6 CHECK FLOOR WIRE NO.2(SHORT)



- (a) Measure the resistance according to the value(s) in the table below.

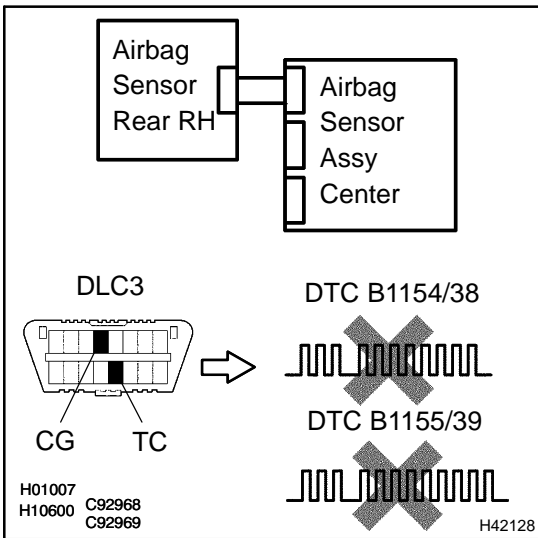
Standard:

Tester connection	Condition	Specified condition
A27-14 (VUCL) - A27-13 (ESCL)	Always	1 MΩ or Higher
A27-15 (CSL+) - A27-1 (CSL-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE NO.2

OK

7 CHECK AIR BAG SENSOR REAR LH



- (a) Connect the connector to the airbag sensor assy center.
- (b) Interchange the airbag sensor rear LH with RH and connect the connectors to them.
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

Result:

NG: A	DTC B1154/38 is output.
NG: B	DTC B1155/39 is output.
OK	DTC B1154/38 and B1155/39 are not output.

NG:A → **REPLACE AIR BAG SENSOR REAR LH (SEE PAGE 60-62)**

NG:B → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1160/83	SHORT IN CURTAIN SHIELD AIRBAG (RH) SQUIB CIRCUIT
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CIRCUIT DESCRIPTION

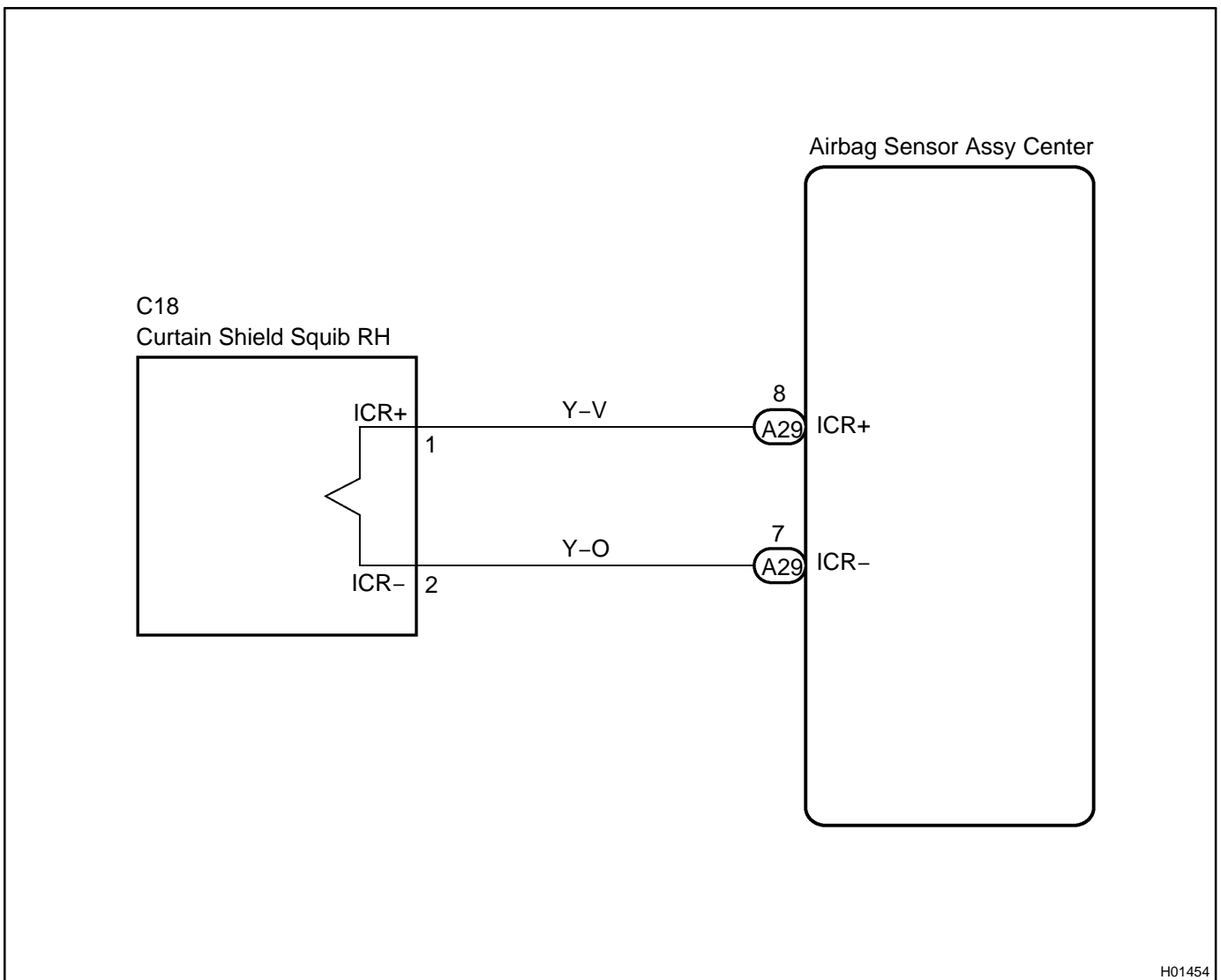
The curtain shield squib RH circuit consists of the airbag sensor assy center and the curtain shield airbag assy RH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1160/83 is recorded when a short circuit is detected in the curtain shield squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1160/83	<ul style="list-style-type: none"> • Short circuit between ICR+ wire harness and ICR- wire harness of curtain shield squib RH • Curtain shield squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the curtain shield airbag assy RH.
- Check that the floor wire connector (on the curtain shield airbag assy RH side) is not damaged.

OK:

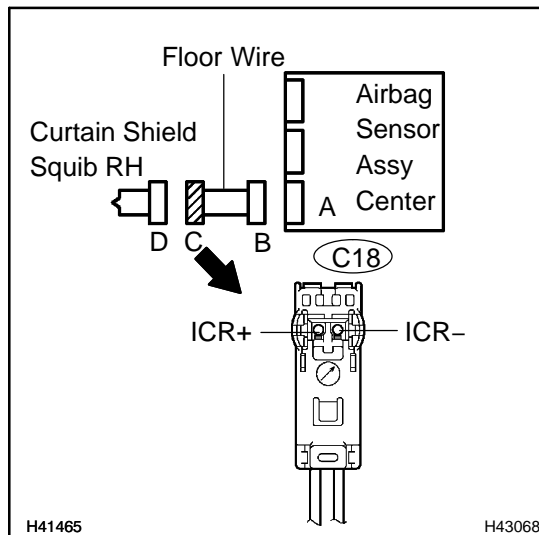
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG

REPLACE FLOOR WIRE

OK

2 CHECK FLOOR WIRE(CURTAIN SHIELD SQUIB RH CIRCUIT)



- Disconnect the connector from the airbag sensor assy center.
- Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- Measure the resistance according to the value(s) in the table below.

Standard:

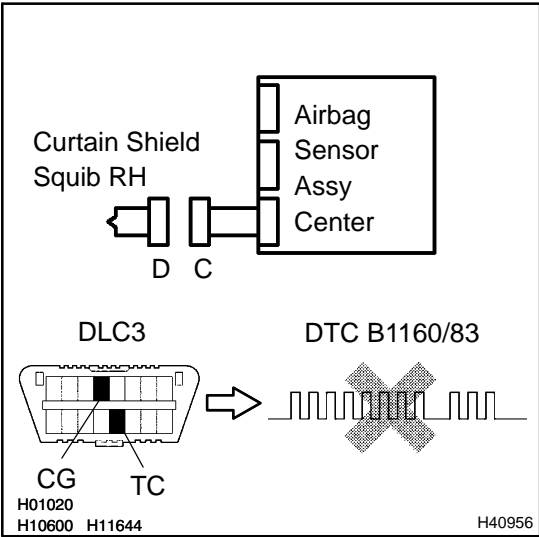
Tester connection	Condition	Specified condition
C18-1 (ICR+) - C18-2 (ICR-)	Always	1 MΩ or Higher

NG

REPLACE FLOOR WIRE

OK

3 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (d) Clear the DTCs stored in memory (see page 05-1219).
- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Check the DTCs (see page 05-1219).

OK:

DTC B1160/83 is not output.

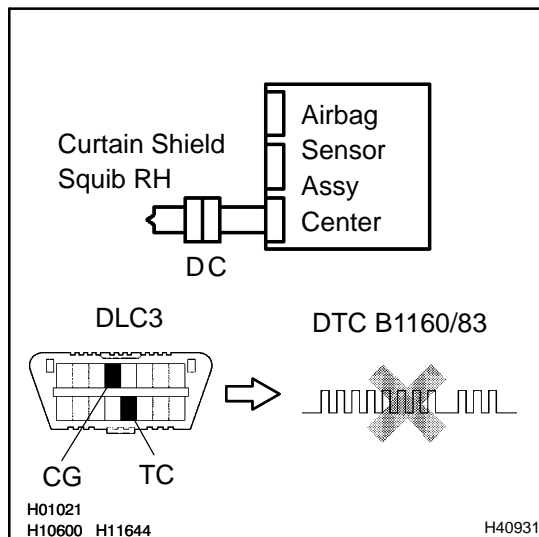
HINT:

Codes other than code B1160/83 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

4 CHECK CURTAIN SHIELD AIR BAG ASSY RH(CURTAIN SHIELD SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Connect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the curtain shield airbag assy RH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B1160/83 is not output.

HINT:

Codes other than code B1160/83 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY RH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1161/84	OPEN IN CURTAIN SHIELD AIRBAG (RH) SQUIB CIRCUIT
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CIRCUIT DESCRIPTION

The curtain shield squib RH circuit consists of the airbag sensor assy center and the curtain shield airbag assy RH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1161/84 is recorded when an open circuit is detected in the curtain shield squib RH circuit.

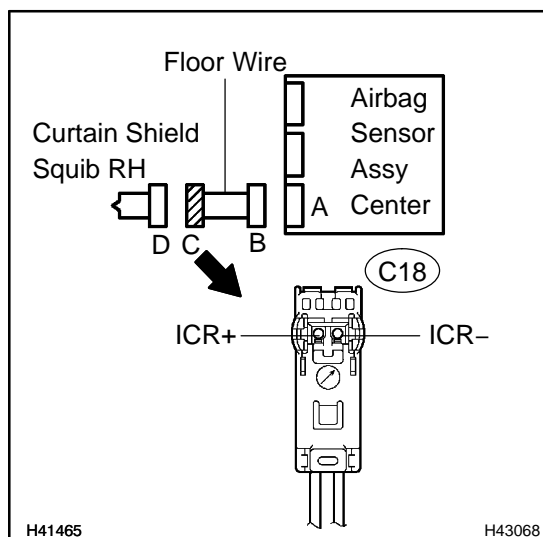
DTC No.	DTC Detecting Condition	Trouble Area
B1161/84	<ul style="list-style-type: none"> • Open circuit in ICR+ wire harness or ICR- wire harness of curtain shield squib RH • Curtain shield squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1381.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(CURTAIN SHIELD SQUIB RH CIRCUIT)
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- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy RH.
- Measure the resistance according to the value(s) in the table below.

Standard:

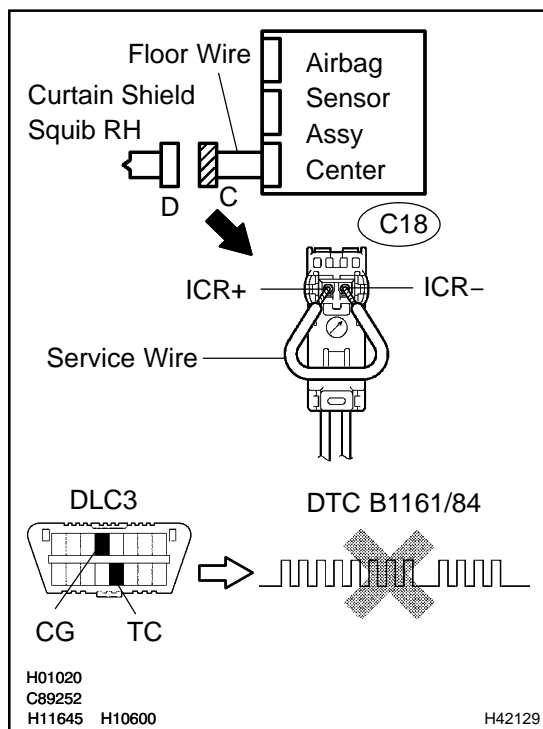
Tester connection	Condition	Specified condition
C18-1 (ICR+) - C18-2 (ICR-)	Always	Below 1 Ω

NG

REPLACE FLOOR WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect C18-1 (ICR+) and C18-2 (ICR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1161/84 is not output.

HINT:

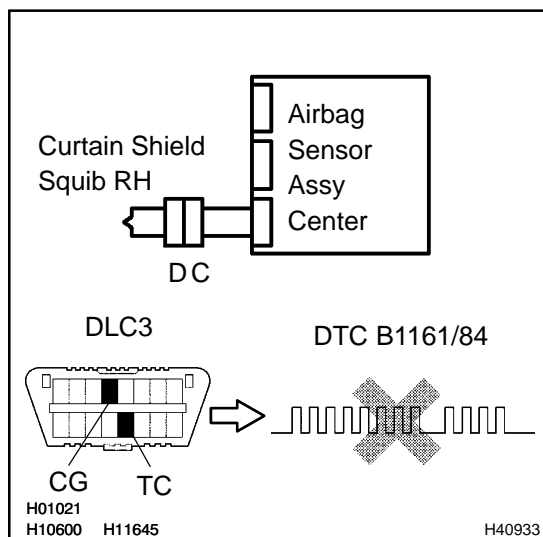
Codes other than code B1161/84 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY RH(CURTAIN SHIELD SQUIB RH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the curtain shield airbag assy RH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1161/84 is not output.

HINT:

Codes other than code B1161/84 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY RH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1162/81	SHORT IN CURTAIN SHIELD AIRBAG (RH) SQUIB CIRCUIT (TO GROUND)
------------	-----------------	--

CIRCUIT DESCRIPTION

The curtain shield squib RH circuit consists of the airbag sensor assy center and the curtain shield airbag assy RH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1162/81 is recorded when a short to ground is detected in the curtain shield squib RH circuit.

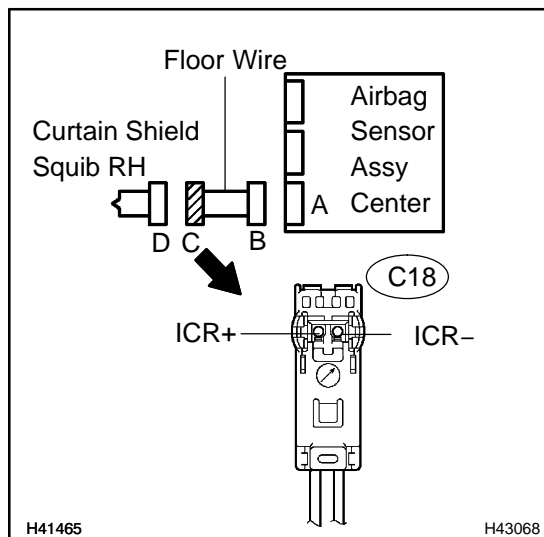
DTC No.	DTC Detecting Condition	Trouble Area
B1162/81	<ul style="list-style-type: none"> • Short circuit in curtain shield squib RH wire harness (to ground) • Curtain shield squib RH malfunction • Airbag sensor assy malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1381.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(CURTAIN SHIELD SQUIB RH CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy RH.
- (d) Measure the resistance according to the value(s) in the table below.

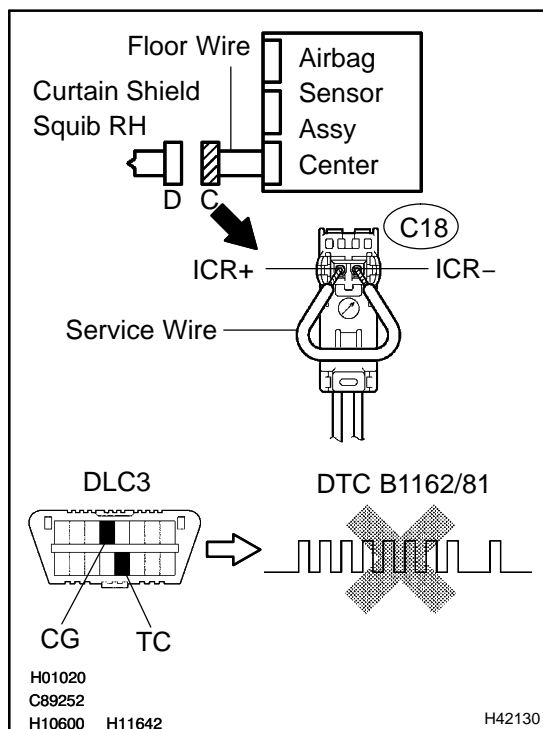
Standard:

Tester connection	Condition	Specified condition
C18-1 (ICR+) - Body ground	Always	1 MΩ or Higher
C18-2 (ICR-) - Body ground	Always	1 MΩ or Higher

NG	REPLACE FLOOR WIRE
-----------	---------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect C18-1 (ICR+) and C18-2 (ICR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1162/81 is not output.

HINT:

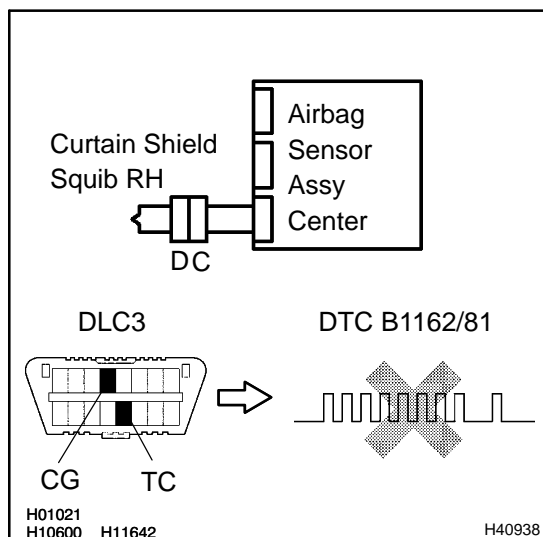
Codes other than code B1162/81 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY RH(CURTAIN SHIELD SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the curtain shield airbag assy RH.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B1162/81 is not output.

HINT:

Codes other than code B1162/81 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY RH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1163/82	SHORT IN CURTAIN SHIELD AIRBAG (RH) SQUIB CIRCUIT (TO B+)
------------	-----------------	--

CIRCUIT DESCRIPTION

The curtain shield squib RH circuit consists of the airbag sensor assy center and the curtain shield airbag assy RH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1163/82 is recorded when a short to B+ is detected in the curtain shield squib RH circuit.

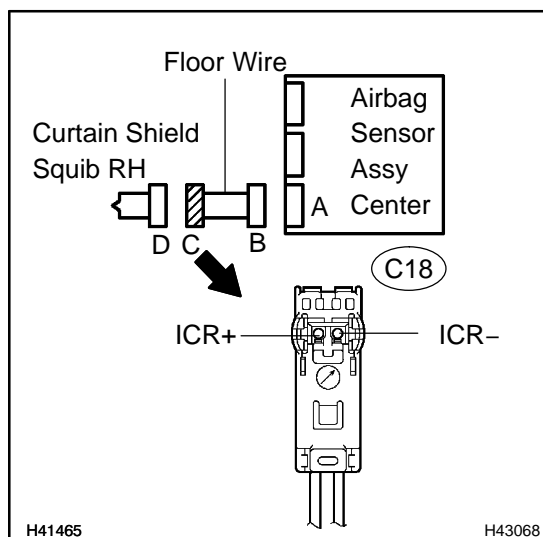
DTC No.	DTC Detecting Condition	Trouble Area
B1163/82	<ul style="list-style-type: none"> • Short circuit in curtain shield squib RH wire harness (to B+) • Curtain shield squib RH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy RH (Curtain shield squib RH) • Airbag sensor assy center • Floor wire

WIRING DIAGRAM

See page 05-1381.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE(CURTAIN SHIELD SQUIB RH CIRCUIT)
----------	--



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy RH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

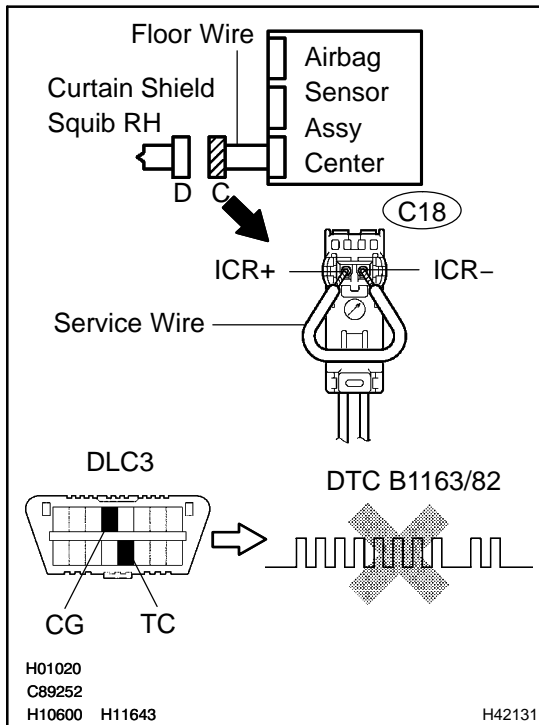
Tester connection	Condition	Specified condition
C18-1 (ICR+) - Body ground	Ignition switch ON	Below 1 V
C18-2 (ICR-) - Body ground	Ignition switch ON	Below 1 V

NG

REPLACE FLOOR WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect C18-1 (ICR+) and C18-2 (ICR-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1163/82 is not output.

HINT:

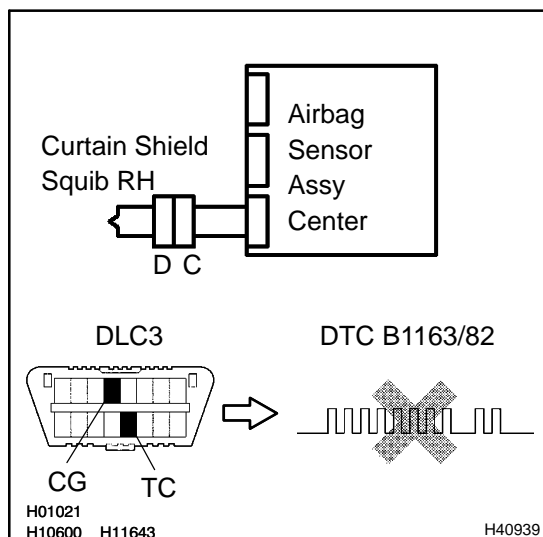
Codes other than code B1163/82 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY RH(CURTAIN SHIELD SQUIB RH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "C".
- (d) Connect the connector to the curtain shield airbag assy RH.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B1163/82 is not output.

HINT:

Codes other than code B1163/82 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY RH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1165/87	SHORT IN CURTAIN SHIELD AIRBAG (LH) SQUIB CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

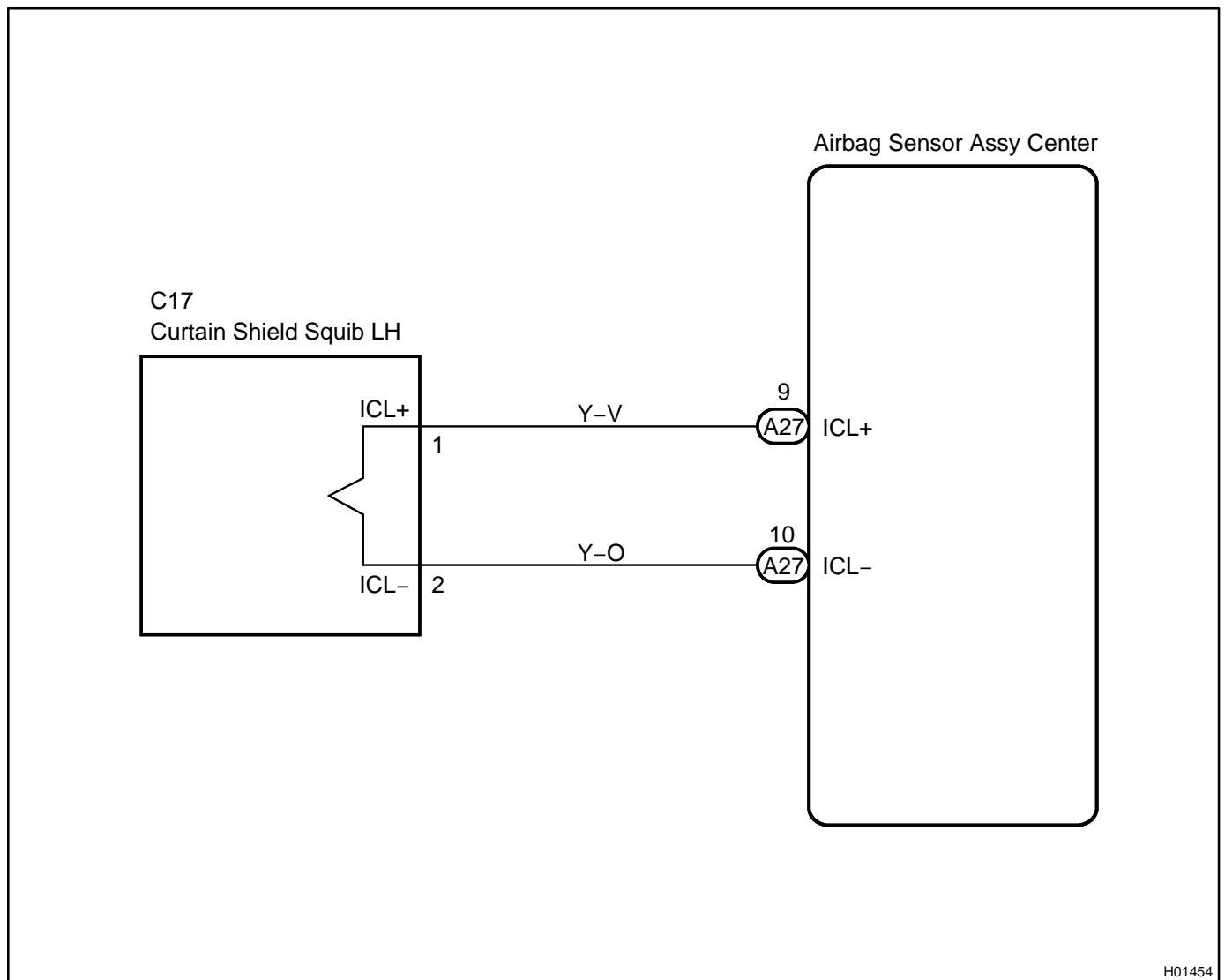
The curtain shield squib LH circuit consists of the airbag sensor assy center and the curtain shield airbag assy LH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1165/87 is recorded when a short circuit is detected in the curtain shield squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1165/87	<ul style="list-style-type: none"> • Short circuit between ICL+ wire harness and ICL- wire harness of curtain shield squib LH • Curtain shield squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the curtain shield airbag assy LH.
- (d) Check that the floor wire No.2 connector (on the curtain shield airbag assy LH side) is not damaged.

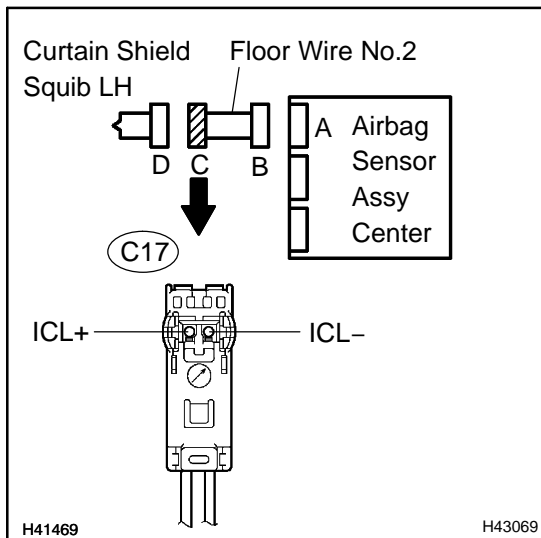
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → REPLACE FLOOR WIRE NO.2

OK

2 CHECK FLOOR WIRE NO.2(CURTAIN SHIELD SQUIB LH CIRCUIT)



- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (c) Measure the resistance according to the value(s) in the table below.

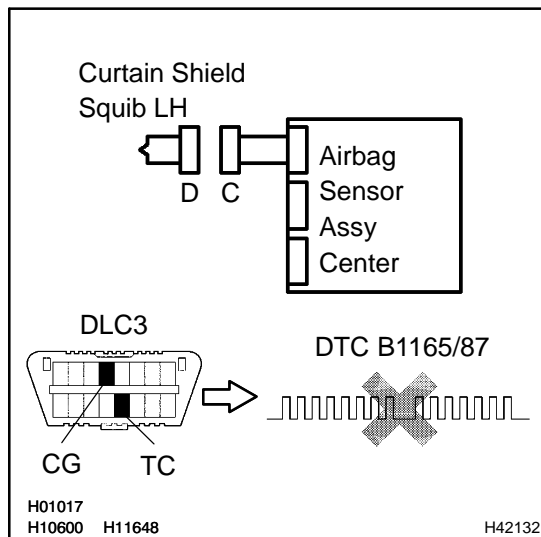
Standard:

Tester connection	Condition	Specified condition
C17-1 (ICL+) - C17-2 (ICL-)	Always	1 MΩ or Higher

NG → REPLACE FLOOR WIRE NO.2

OK

3 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1165/87 is not output.

HINT:

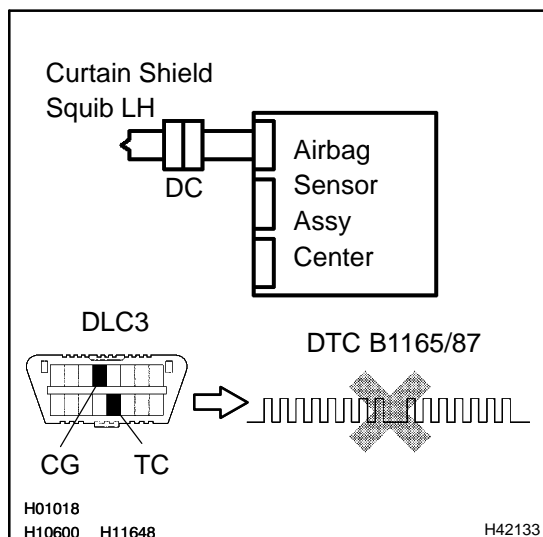
Codes other than code B1165/87 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

4 CHECK CURTAIN SHIELD AIR BAG ASSY LH(CURTAIN SHIELD SQUIB LH)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the curtain shield airbag assy LH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B1165/87 is not output.

HINT:

Codes other than code B1165/87 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY LH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1166/88	OPEN IN CURTAIN SHIELD AIRBAG (LH) SQUIB CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

The curtain shield squib LH circuit consists of the airbag sensor assy center and the curtain shield airbag assy LH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1166/88 is recorded when an open circuit is detected in the curtain shield squib LH circuit.

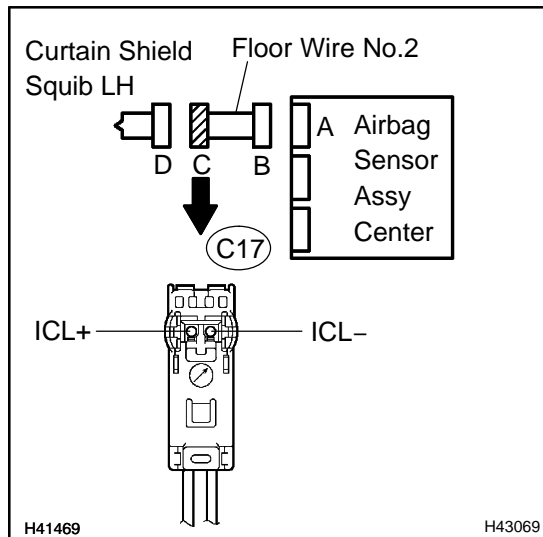
DTC No.	DTC Detecting Condition	Trouble Area
B1166/88	<ul style="list-style-type: none"> • Open circuit in ICL+ wire harness or ICL- wire harness of curtain shield squib LH • Curtain shield squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1394.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(CURTAIN SHIELD SQUIB LH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy LH.
- (d) Measure the resistance according to the value(s) in the table below.

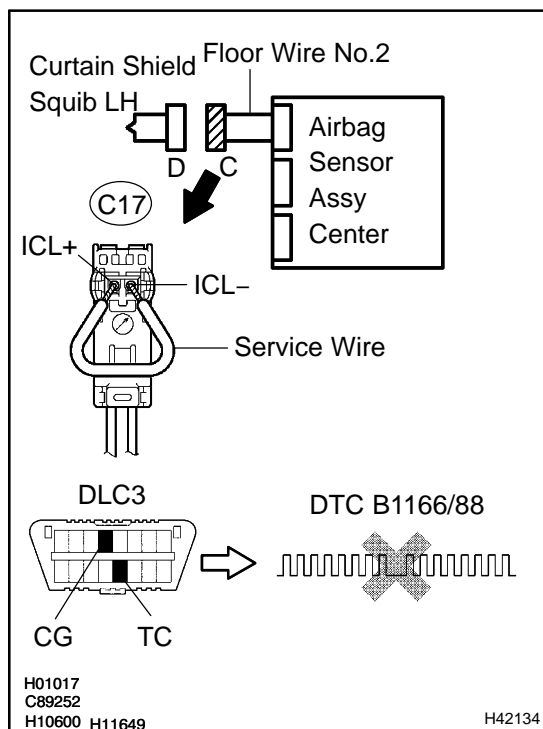
Standard:

Tester connection	Condition	Specified condition
C17-1 (ICL+) - C17-2 (ICL-)	Always	Below 1 Ω

NG → **REPLACE FLOOR WIRE NO.2**

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect C17-1 (ICL+) and C17-2 (ICL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1219).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1219).

OK:

DTC B1166/88 is not output.

HINT:

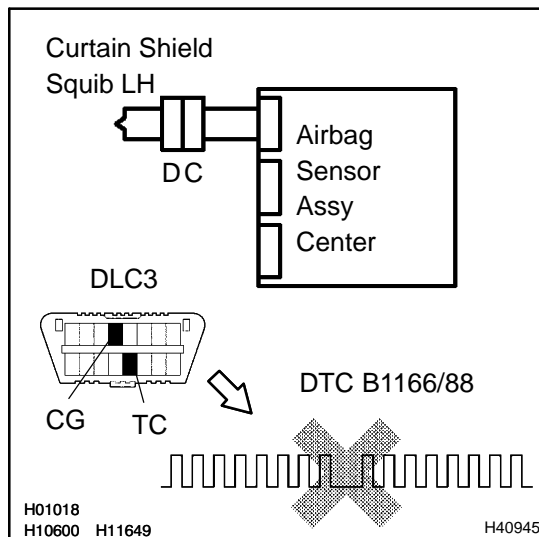
Codes other than code B1166/88 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY LH(CURTAIN SHIELD SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the curtain shield airbag assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1166/88 is not output.

HINT:

Codes other than code B1166/88 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY LH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1167/85	SHORT IN CURTAIN SHIELD AIRBAG (LH) SQUIB CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The curtain shield squib LH circuit consists of the airbag sensor assy center and the curtain shield airbag assy LH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1167/85 is recorded when a short to ground is detected in the curtain shield squib LH circuit.

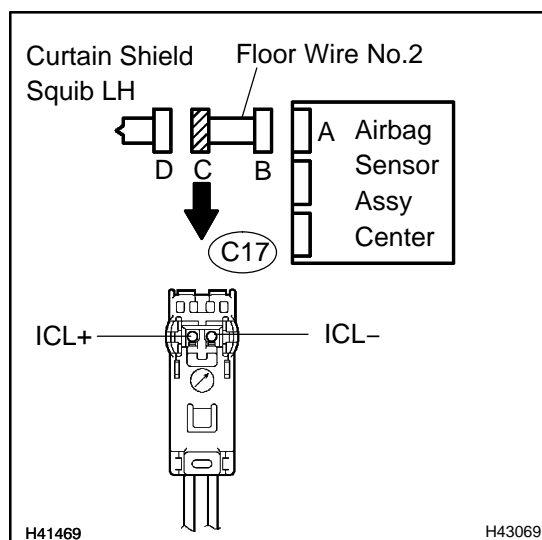
DTC No.	DTC Detecting Condition	Trouble Area
B1167/85	<ul style="list-style-type: none"> • Short circuit in curtain shield squib LH wire harness (to ground) • Curtain shield squib LH malfunction • Airbag sensor assy malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1394.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(CURTAIN SHIELD SQUIB LH CIRCUIT)
----------	---



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy LH.
- Measure the resistance according to the value(s) in the table below.

Standard:

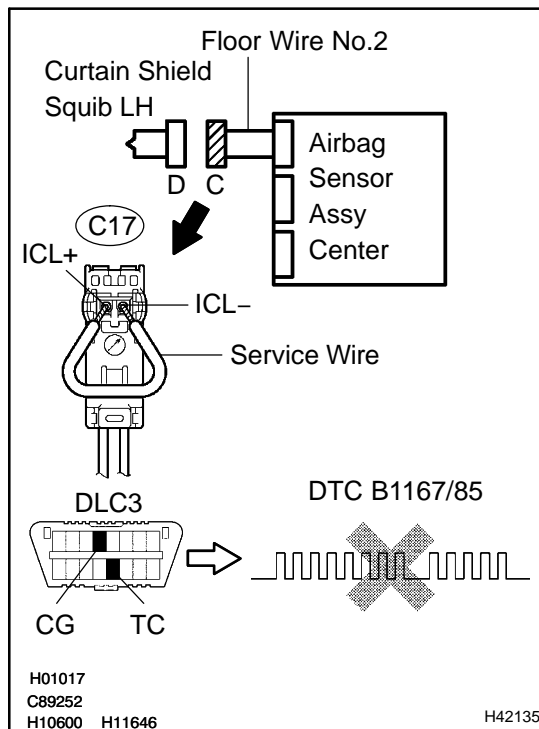
Tester connection	Condition	Specified condition
C17-1 (ICL+) - Body ground	Always	1 MΩ or Higher
C17-2 (ICL-) - Body ground	Always	1 MΩ or Higher

NG

REPLACE FLOOR WIRE NO.2

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect C17-1 (ICL+) and C17-2 (ICL-) of connector "C".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1219).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1219).

OK:

DTC B1167/85 is not output.

HINT:

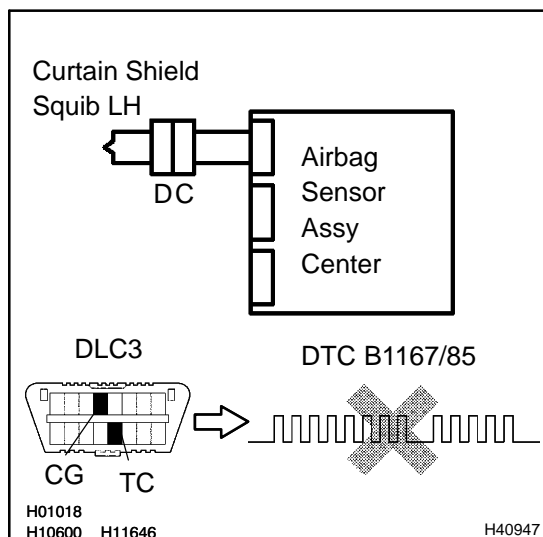
Codes other than code B1167/85 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY LH(CURTAIN SHIELD SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the curtain shield airbag assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1167/85 is not output.

HINT:

Codes other than code B1167/85 may be output at this time, but they are not related to this check.

NG

**REPLACE CURTAIN SHIELD AIR BAG ASSY LH
(SEE PAGE 60-40)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1168/86	SHORT IN CURTAIN SHIELD AIRBAG (LH) SQUIB CIRCUIT (TO B+)
------------	-----------------	--

CIRCUIT DESCRIPTION

The curtain shield squib LH circuit consists of the airbag sensor assy center and the curtain shield airbag assy LH.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1168/86 is recorded when a short to B+ is detected in the curtain shield squib LH circuit.

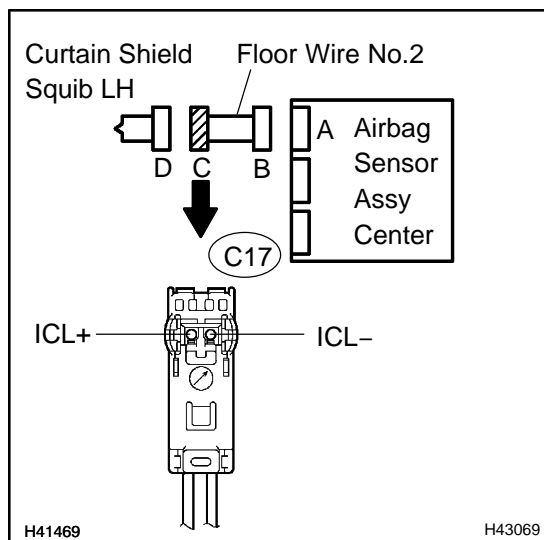
DTC No.	DTC Detecting Condition	Trouble Area
B1168/86	<ul style="list-style-type: none"> • Short circuit in curtain shield squib LH wire harness (to B+) • Curtain shield squib LH malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Curtain shield airbag assy LH (Curtain shield squib LH) • Airbag sensor assy center • Floor wire No.2

WIRING DIAGRAM

See page 05-1394.

INSPECTION PROCEDURE

1	CHECK FLOOR WIRE NO.2(CURTAIN SHIELD SQUIB LH CIRCUIT)
----------	---



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the curtain shield airbag assy LH.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

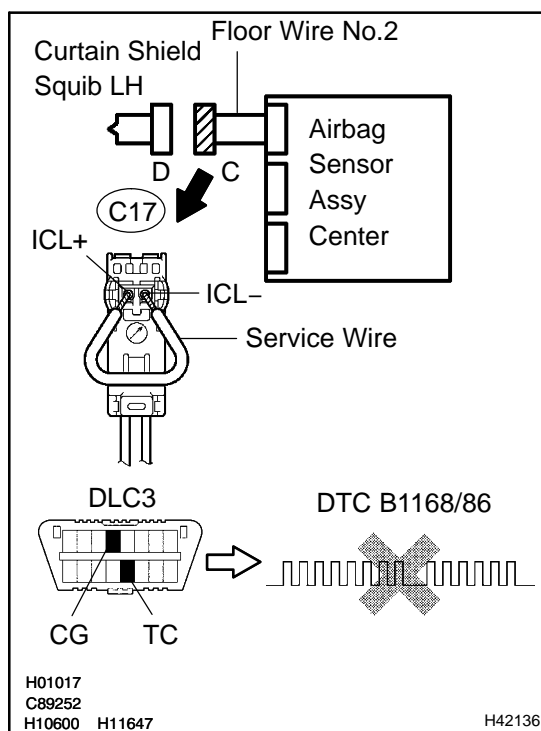
Standard:

Tester connection	Condition	Specified condition
C17-1 (ICL+) - Body ground	Ignition switch ON	Below 1 V
C17-2 (ICL-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE FLOOR WIRE NO.2
-----------	--------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect C17-1 (ICL+) and C17-2 (ICL-) of connector "C".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1168/86 is not output.

HINT:

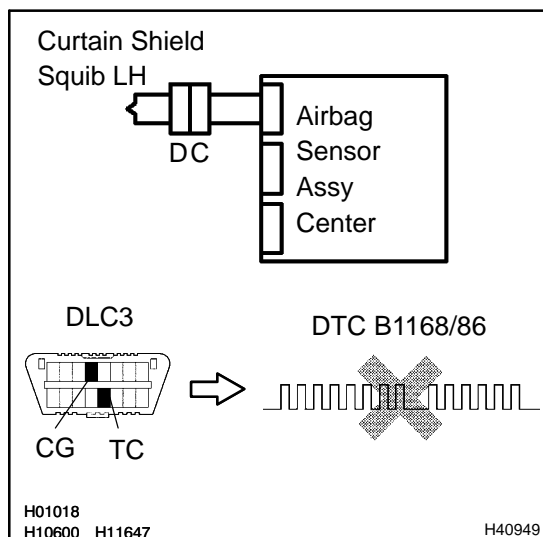
Codes other than code B1168/86 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK CURTAIN SHIELD AIR BAG ASSY LH(CURTAIN SHIELD SQUIB LH)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "C".
- Connect the connector to the curtain shield airbag assy LH.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1168/86 is not output.

HINT:

Codes other than code B1168/86 may be output at this time, but they are not related to this check.

NG

REPLACE CURTAIN SHIELD AIR BAG ASSY LH (SEE PAGE 60-40)

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1180/17	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT
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CIRCUIT DESCRIPTION

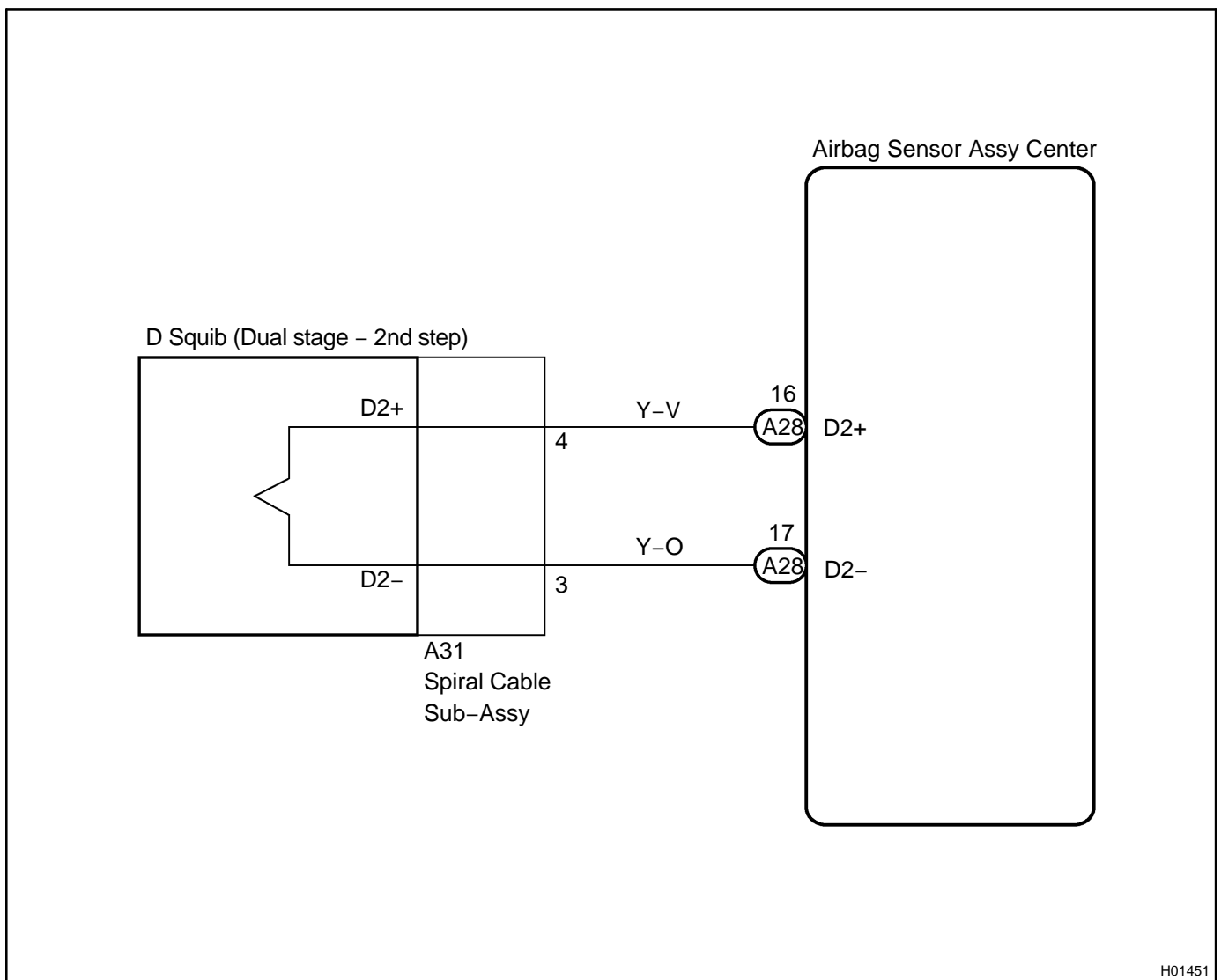
The D squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1180/17 is recorded when a short circuit is detected in the D squib (Dual stage - 2nd step) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1180/17	<ul style="list-style-type: none"> • Short circuit between D2+ wire harness and D2- wire harness of D squib (Dual stage - 2nd step) • D squib (Dual stage - 2nd step) malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



H01451

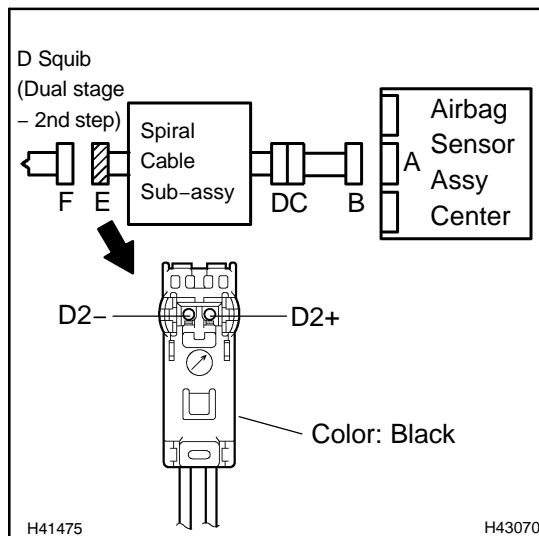
INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the horn button assy.
- (d) Check that the spiral cable sub-assy connectors (on the horn button assy side) are not damaged.

OK:**The lock button is not disengaged, or the claw of the lock is not deformed or damaged.****NG****REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-28)****OK**

2 CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)



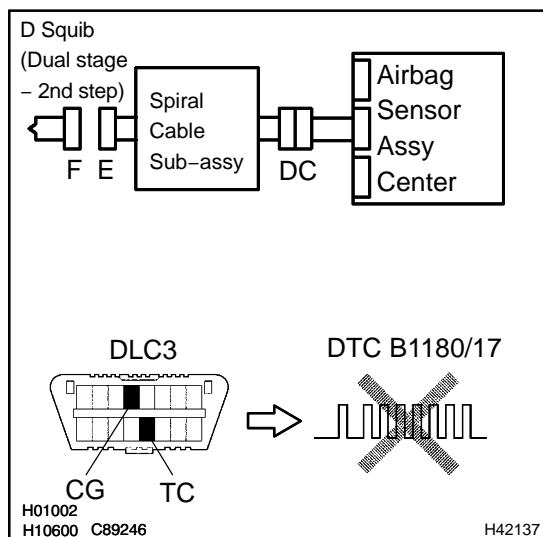
- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG**Go to step 5****OK**

3 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1180/17 is not output.

HINT:

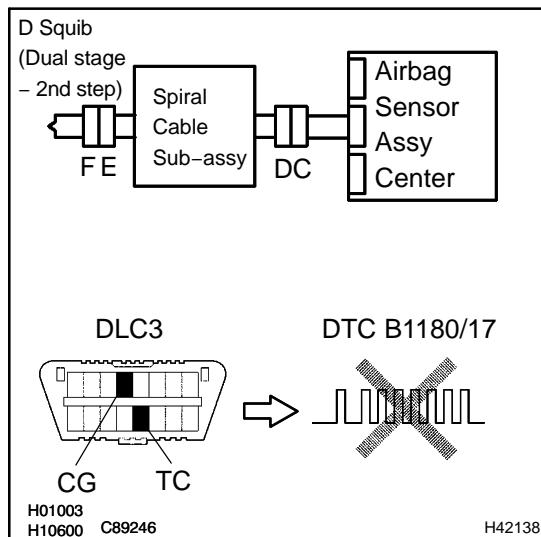
Codes other than code B1180/17 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

4 CHECK HORN BUTTON ASSY(D SQUIB, DUAL STAGE - 2ND STEP)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connectors to the horn button assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (f) Clear the DTCs stored in memory (see page 05-1219).
- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (i) Check the DTCs (see page 05-1219).

OK:

DTC B1180/17 is not output.

HINT:

Codes other than code B1180/17 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

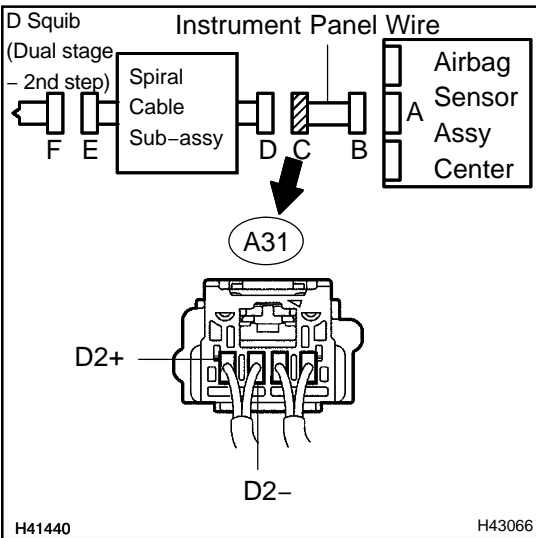
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

5 CHECK INSTRUMENT PANEL WIRE



(a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.

HINT:

The activation prevention mechanism of connector "B" has already been released.

(b) Measure the resistance according to the value(s) in the table below.

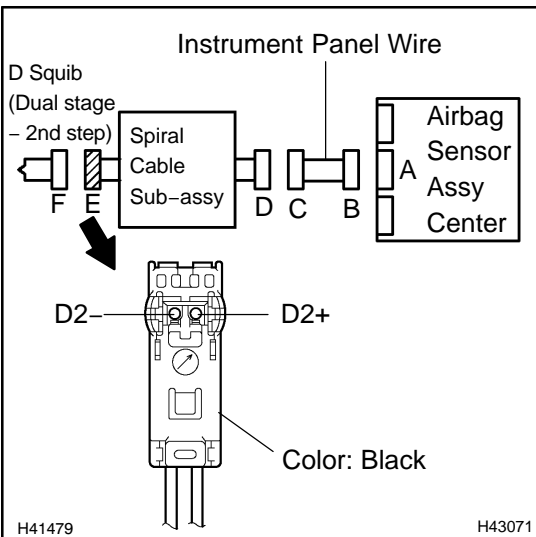
Standard:

Tester connection	Condition	Specified condition
A31-4 (D2+) - A31-3 (D2-)	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

6 CHECK SPIRAL CABLE SUB-ASSY



(a) Release the activation prevention mechanism built into connector "D" (see page 05-1213).

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	1 MΩ or Higher

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1181/18	OPEN IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

The D squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1182/19 is recorded when a short to ground is detected in the D squib (Dual stage - 2nd step) circuit.

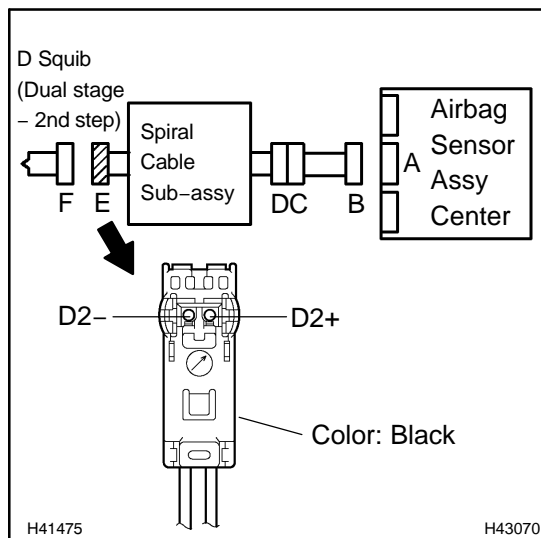
DTC No.	DTC Detecting Condition	Trouble Area
B1182/19	<ul style="list-style-type: none"> • Short circuit in D squib (Dual stage - 2nd step) wire harness (to ground) • D squib (Dual stage - 2nd step) malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1407.

INSPECTION PROCEDURE

1	CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Measure the resistance according to the value(s) in the table below.

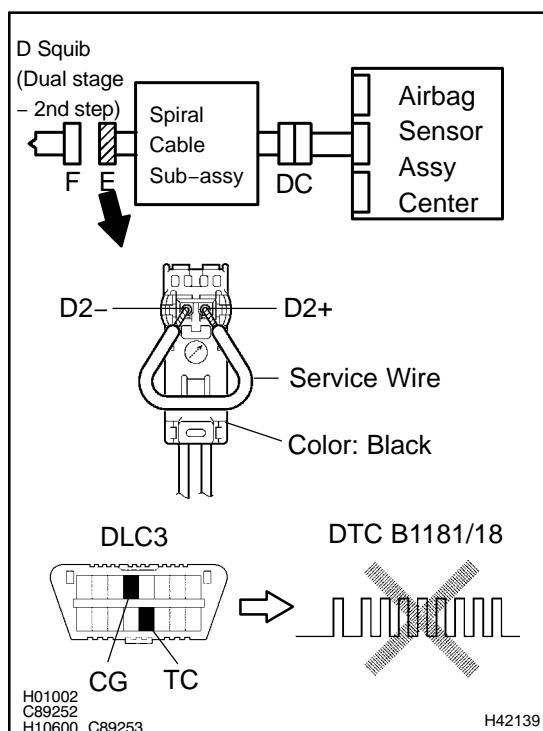
Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

NG	Go to step 4
-----------	---------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using a service wire, connect D2+ and D2- of connector "E".

NOTICE:

- **Twist the end of the service wire in order to insert it into the connector.**
 - **Do not forcibly insert the twisted service wire into the terminals, of the connector when connecting.**
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (e) Clear the DTCs stored in memory (see page 05-1222).
 - (f) Turn the ignition switch to the LOCK position.
 - (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - (h) Check the DTCs (see page 05-1222).

OK:

DTC B1181/18 is not output.

HINT:

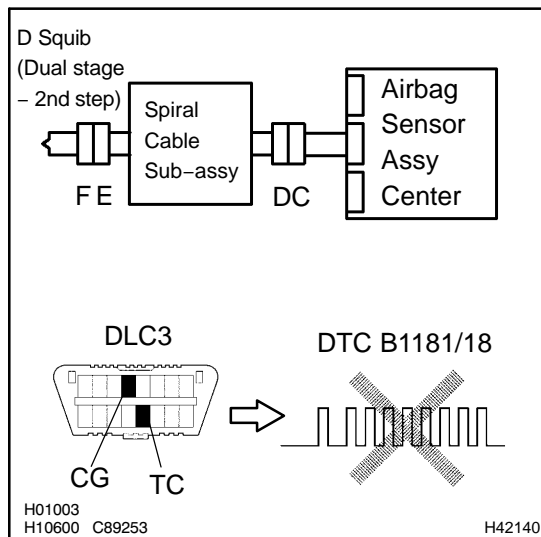
Codes other than code B1181/18 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "E".
- Connect the connectors to the horn button assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1181/18 is not output.

HINT:

Codes other than code B1181/18 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

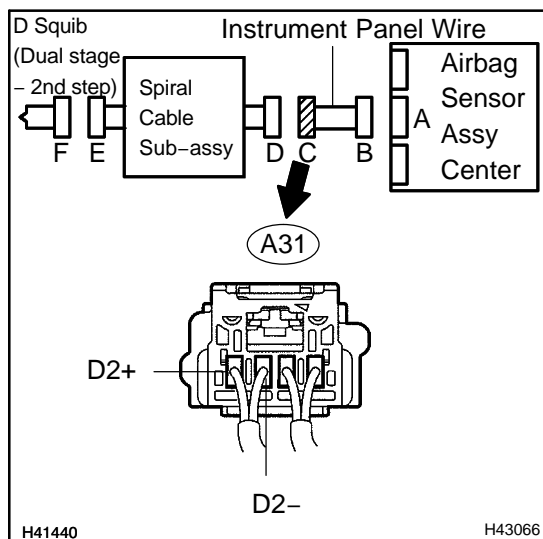
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE



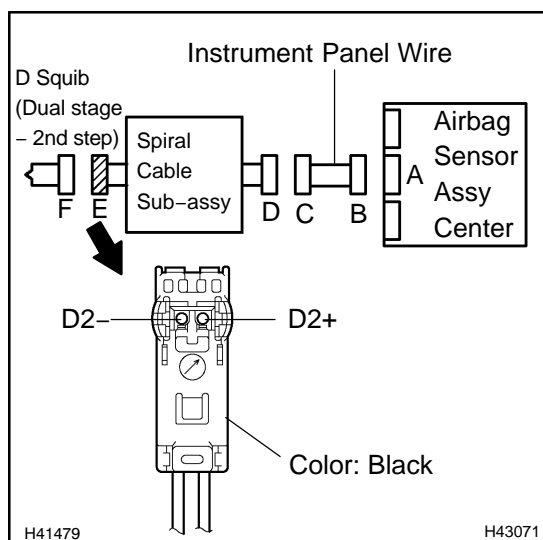
- Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A31-4 (D2+) - A31-3 (D2-)	Always	Below 1 Ω

NG
REPLACE INSTRUMENT PANEL WIRE
OK

5 CHECK SPIRAL CABLE SUB-ASSY



- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - D2-	Always	Below 1 Ω

NG
REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1182/19	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The D squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1182/19 is recorded when a short to ground is detected in the D squib (Dual stage - 2nd step) circuit.

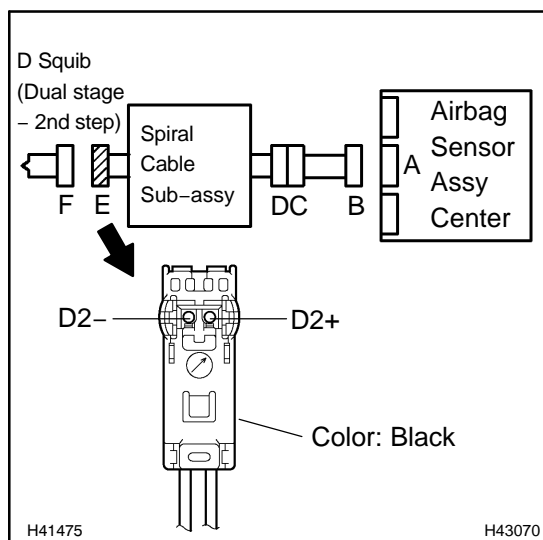
DTC No.	DTC Detecting Condition	Trouble Area
B1182/19	<ul style="list-style-type: none"> • Short circuit in D squib (Dual stage - 2nd step) wire harness (to ground) • D squib (Dual stage - 2nd step) malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1407.

INSPECTION PROCEDURE

1	CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Measure the resistance according to the value(s) in the table below.

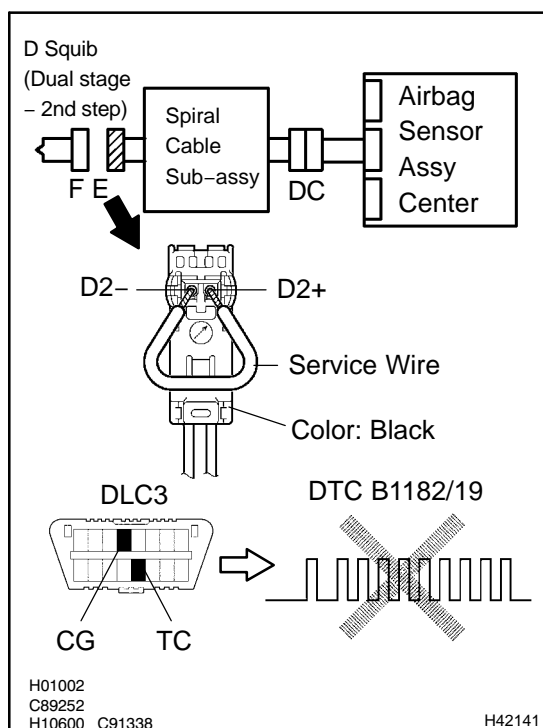
Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

NG	Go to step 4
-----------	---------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect D2+ and D2- of connector "E".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1182/19 is not output.

HINT:

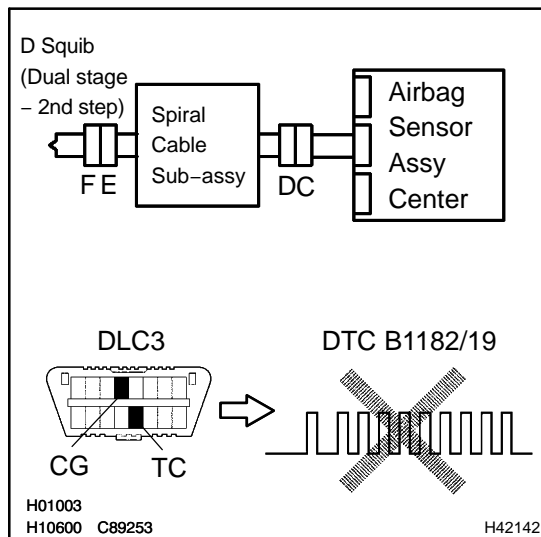
Codes other than code B1182/19 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB, DUAL STAGE - 2ND STEP)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the service wire from connector "E".
- (d) Connect the connectors to the horn button assy.
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B1182/19 is not output.

HINT:

Codes other than code B1182/19 may be output at this time, but they are not related to this check.

NG

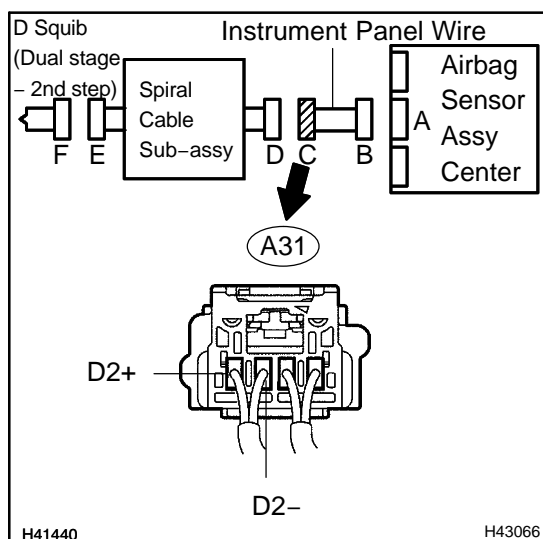
**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

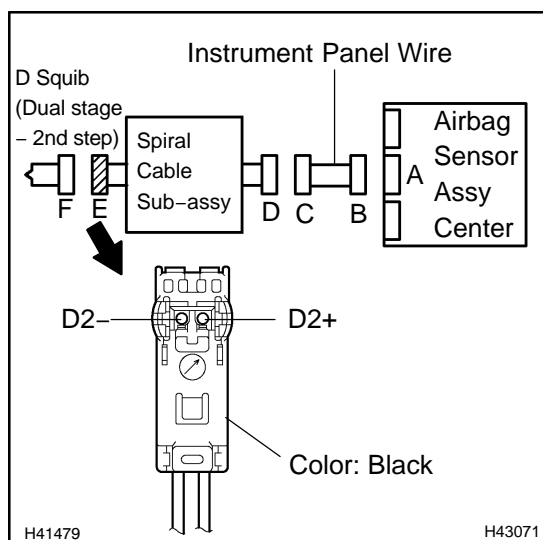
- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE

- (a) Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A31-4 (D2+) - Body ground	Always	1 MΩ or Higher
A31-3 (D2-) - Body ground	Always	1 MΩ or Higher

NG**REPLACE INSTRUMENT PANEL WIRE****OK****5 CHECK SPIRAL CABLE SUB-ASSY**

- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Always	1 MΩ or Higher
D2- - Body ground	Always	1 MΩ or Higher

NG**REPAIR SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)****OK****USE SIMULATION METHOD TO CHECK****HINT:**

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1183/22	SHORT IN D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO B+)
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CIRCUIT DESCRIPTION

The D squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center, the spiral cable sub-assy and the horn button assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1183/22 is recorded when a short to B+ is detected in the D squib (Dual stage - 2nd step) circuit.

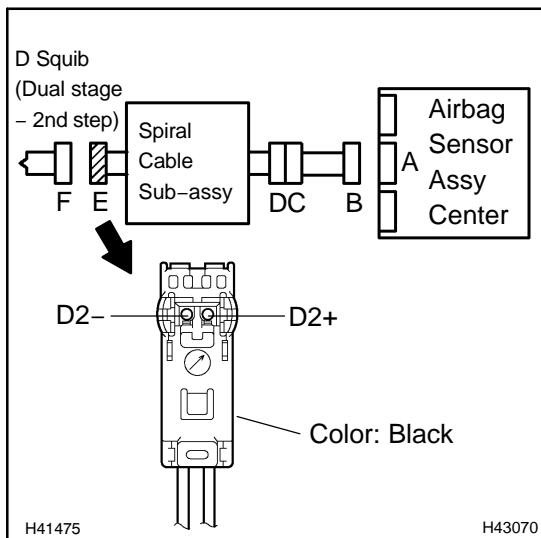
DTC No.	DTC Detecting Condition	Trouble Area
B1183/22	<ul style="list-style-type: none"> • Short circuit in D squib (Dual stage - 2nd step) wire harness (to B+) • D squib (Dual stage - 2nd step) malfunction • Spiral cable sub-assy malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Horn button assy (D squib, Dual stage - 2nd step) • Spiral cable sub-assy • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1407.

CIRCUIT INSPECTION

1	CHECK D SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT(AIRBAG SENSOR ASSY CENTER - HORN BUTTON ASSY)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the horn button assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

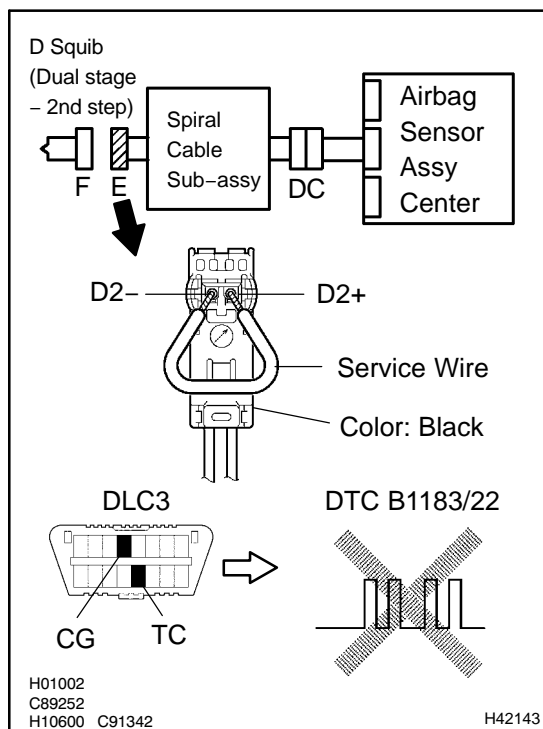
Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

NG	Go to step 4
-----------	---------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the airbag sensor assy center.
- Using a service wire, connect D2+ and D2- of connector "E".

NOTICE:

- Twist the end of the service wire in order to insert it into the connector.
 - Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Clear the DTCs stored in memory (see page 05-1219).
 - Turn the ignition switch to the LOCK position.
 - Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 - Check the DTCs (see page 05-1219).

OK:

DTC B1183/22 is not output.

HINT:

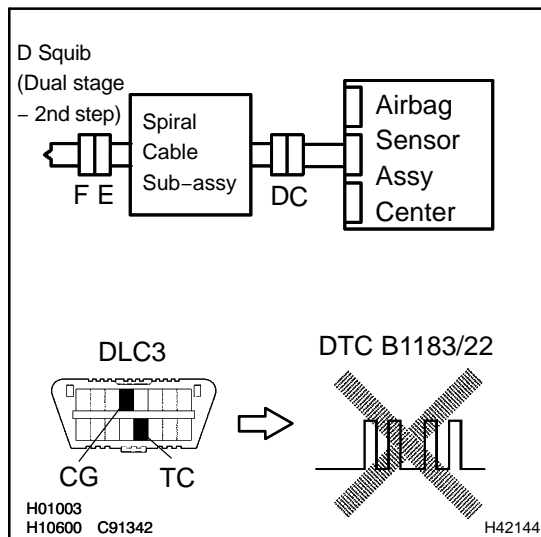
Codes other than code B1183/22 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK HORN BUTTON ASSY(D SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the service wire from connector "E".
- Connect the connectors to the horn button assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1183/22 is not output.

HINT:

Codes other than code B1183/22 may be output at this time, but they are not related to this check.

NG

**REPLACE HORN BUTTON ASSY
(SEE PAGE 60-20)**

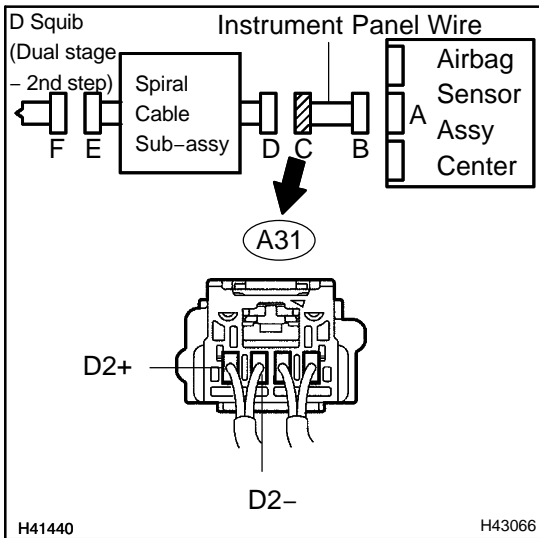
OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

4 CHECK INSTRUMENT PANEL WIRE



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the instrument panel wire connector from the spiral cable sub-assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

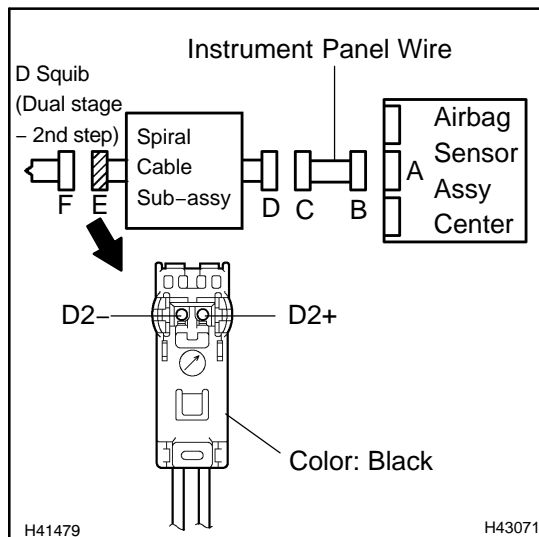
Standard:

Tester connection	Condition	Specified condition
A31-4 (D2+) - Body ground	Ignition switch ON	Below 1 V
A31-3 (D2-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

5 CHECK SPIRAL CABLE SUB-ASSY



- (a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard:

Tester connection	Condition	Specified condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

NG

**REPLACE SPIRAL CABLE SUB-ASSY
(SEE PAGE 60-28)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the air-bag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1185/57	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT
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CIRCUIT DESCRIPTION

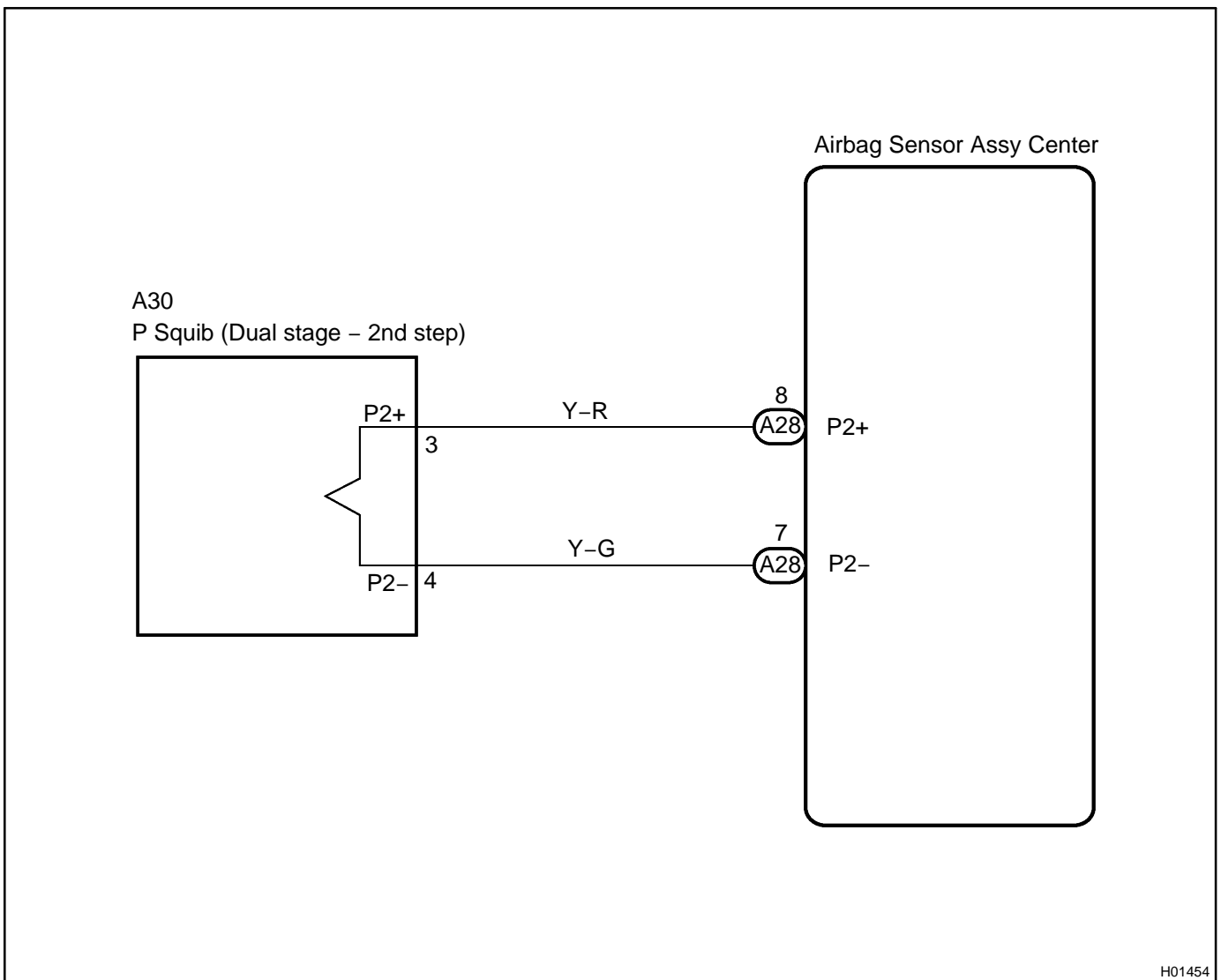
The P squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center and the front passenger airbag assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1185/57 is recorded when a short circuit is detected in the P squib (Dual stage - 2nd step) circuit.

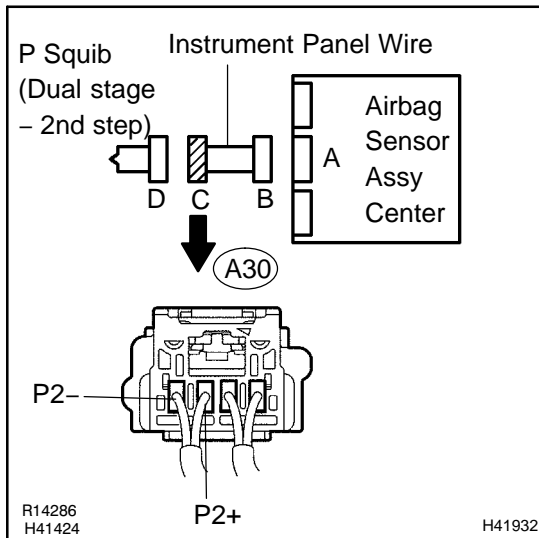
DTC No.	DTC Detecting Condition	Trouble Area
B1185/57	<ul style="list-style-type: none"> • Short circuit between P2+ wire harness and P2- wire harness of P squib (Dual stage - 2nd step) • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK INSTRUMENT PANEL WIRE(P SQUIB, DUAL STAGE - 2ND STEP CIRCUIT)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- Release the activation prevention mechanism built into connector "B" (see page 05-1213).
- Measure the resistance according to the value(s) in the table below.

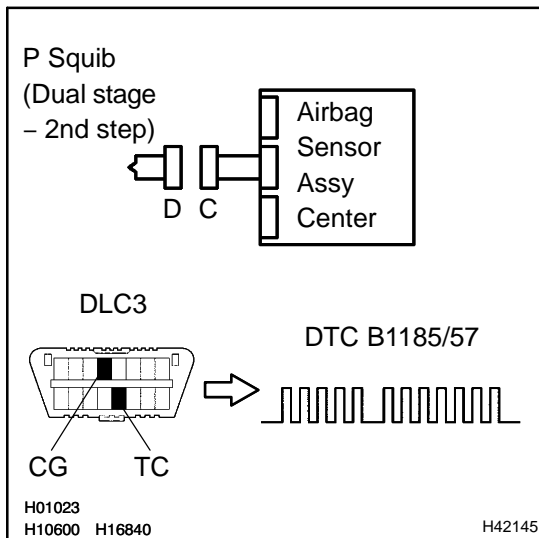
Standard:

Tester connection	Condition	Specified condition
A30-3 (P2+) - A30-4 (P2-)	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1185/57 is not output.

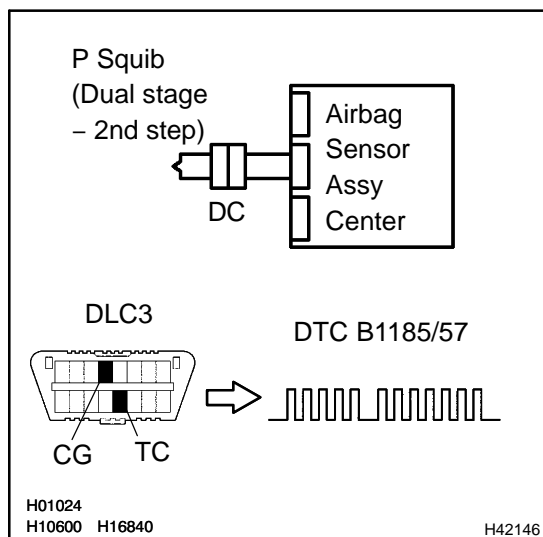
HINT:

Codes other than code B1185/57 may be output at this time, but they are not related to this check.

NG → **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1185/57 is not output.

HINT:

Codes other than code B1185/57 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1186/58	OPEN IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

The P squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center and the front passenger airbag assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1186/58 is recorded when an open circuit is detected in the P squib (Dual stage - 2nd step) circuit.

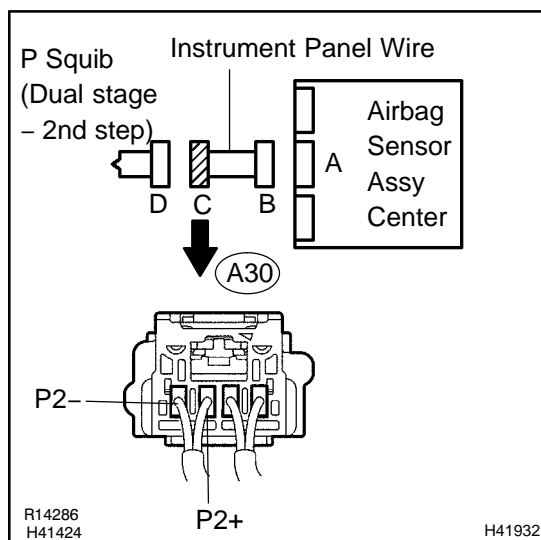
DTC No.	DTC Detecting Condition	Trouble Area
B1186/58	<ul style="list-style-type: none"> Open circuit in P2+ wire harness or P2- wire harness of P squib (Dual stage - 2nd step) P squib (Dual stage - 2nd step) malfunction Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> Front passenger airbag assy (P squib, Dual stage - 2nd step) Airbag sensor assy center Instrument panel wire

WIRING DIAGRAM

See page 05-1425.

INSPECTION PROCEDURE

1	CHECK INSTRUMENT PANEL WIRE(P SQUIB, DUAL STAGE - 2ND STEP CIRCUIT)
----------	--



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

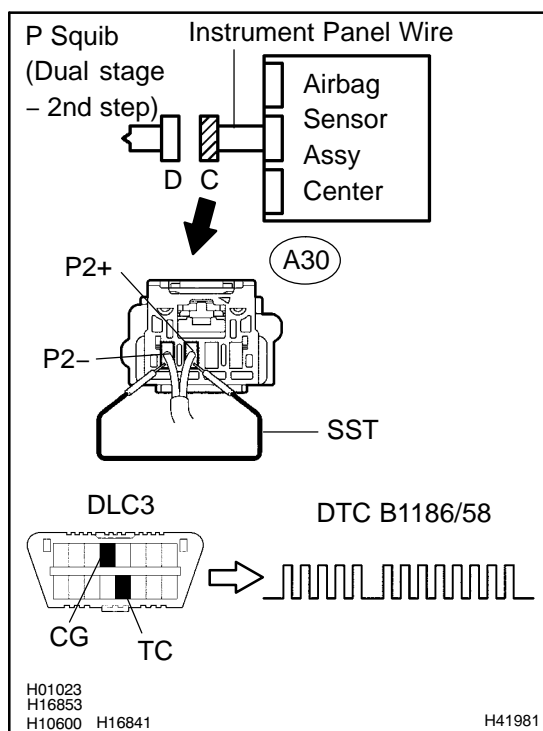
Tester connection	Condition	Specified condition
A30-3 (P2+) - A30-4 (P2-)	Always	Below 1 Ω

NG

REPLACE INSTRUMENT PANEL WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Connect the connector to the airbag sensor assy center.
- Using SST, connect A30-3 (P2+) and A30-4 (P2-) of connector "C".
SST 09843-18040
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1186/58 is not output.

HINT:

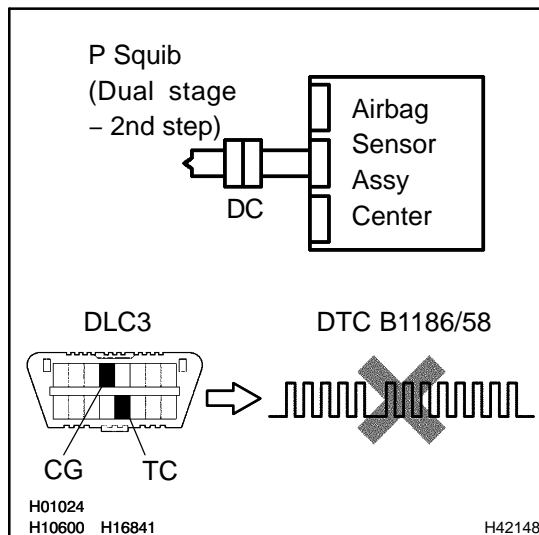
Codes other than code B1186/58 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the SST from connector "C".
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1186/58 is not output.

HINT:

Codes other than code B1186/58 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1187/55	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)
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CIRCUIT DESCRIPTION

The P squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center and the front passenger airbag assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1187/55 is recorded when a short to ground is detected in the P squib (Dual stage - 2nd step) circuit.

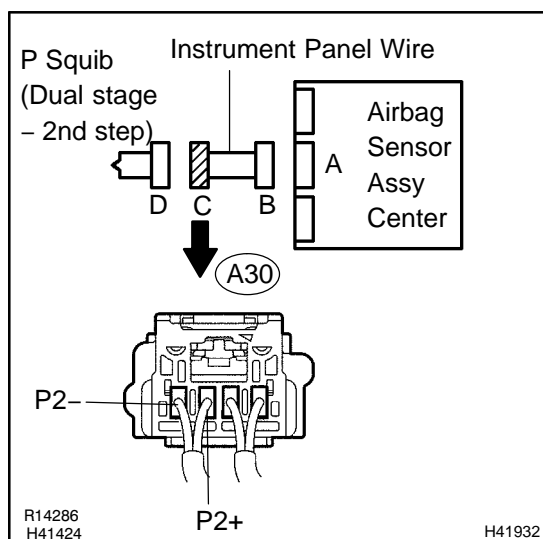
DTC No.	DTC Detecting Condition	Trouble Area
B1187/55	<ul style="list-style-type: none"> • Short circuit in P squib (Dual stage - 2nd step) wire harness (to ground) • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1425.

INSPECTION PROCEDURE

1	CHECK INSTRUMENT PANEL WIRE(P SQUIB, DUAL STAGE - 2ND STEP CIRCUIT)
----------	--



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- Measure the resistance according to the value(s) in the table below.

Standard:

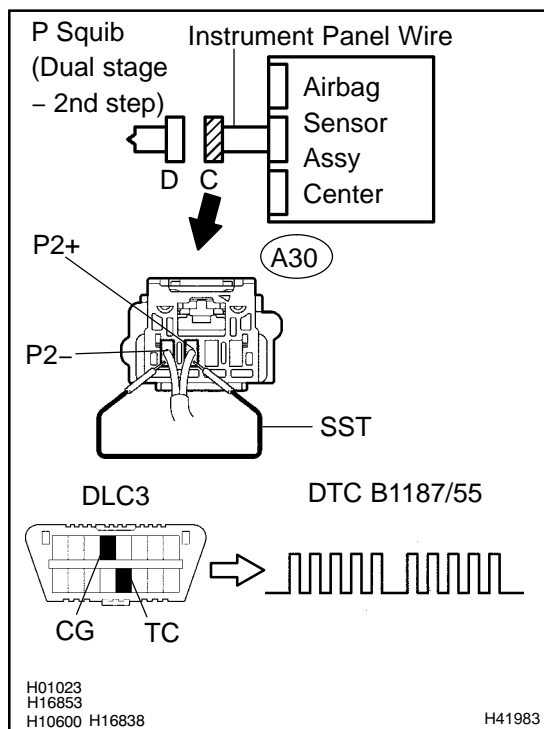
Tester connection	Condition	Specified condition
A30-3 (P2+) - Body ground	Always	1 MΩ or Higher
A30-4 (P2-) - Body ground	Always	1 MΩ or Higher

NG

REPLACE INSTRUMENT PANEL WIRE

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Connect the connector to the airbag sensor assy center.
- (b) Using SST, connect A30-3 (P2+) and A30-4 (P2-) of connector "C".
SST 09843-18040
- (c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (e) Clear the DTCs stored in memory (see page 05-1219).
- (f) Turn the ignition switch to the LOCK position.
- (g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (h) Check the DTCs (see page 05-1219).

OK:

DTC B1187/55 is not output.

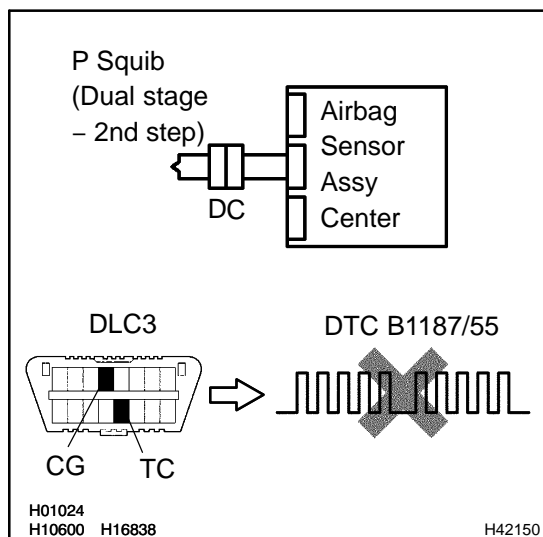
HINT:

Codes other than code B1187/55 may be output at this time, but they are not related to this check.

NG **REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the SST from connector "C".
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1187/55 is not output.

HINT:

Codes other than code B1187/55 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1188/56	SHORT IN P SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO B+)
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CIRCUIT DESCRIPTION

The P squib (Dual stage - 2nd step) circuit consists of the airbag sensor assy center and the front passenger airbag assy.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1188/56 is recorded when a short to B+ is detected in the P squib (Dual stage - 2nd step) circuit.

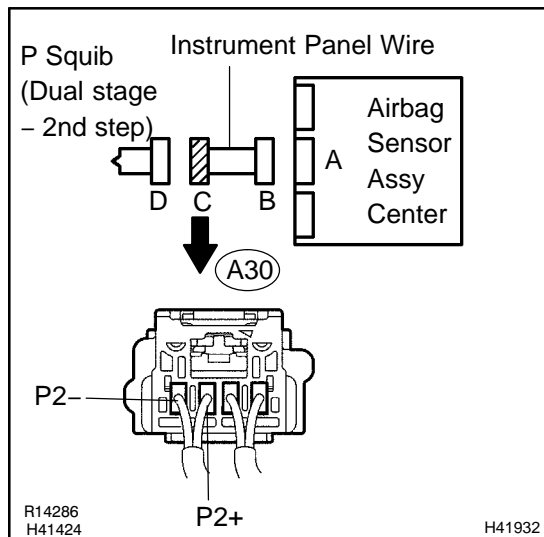
DTC No.	DTC Detecting Condition	Trouble Area
B1188/56	<ul style="list-style-type: none"> • Short circuit in P squib (Dual stage - 2nd step) wire harness (to B+) • P squib (Dual stage - 2nd step) malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Front passenger airbag assy (P squib, Dual stage - 2nd step) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM

See page 05-1425.

INSPECTION PROCEDURE

1	CHECK INSTRUMENT PANEL WIRE(P SQUIB, DUAL STAGE - 2ND STEP CIRCUIT)
----------	--



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connectors from the airbag sensor assy center and the front passenger airbag assy.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

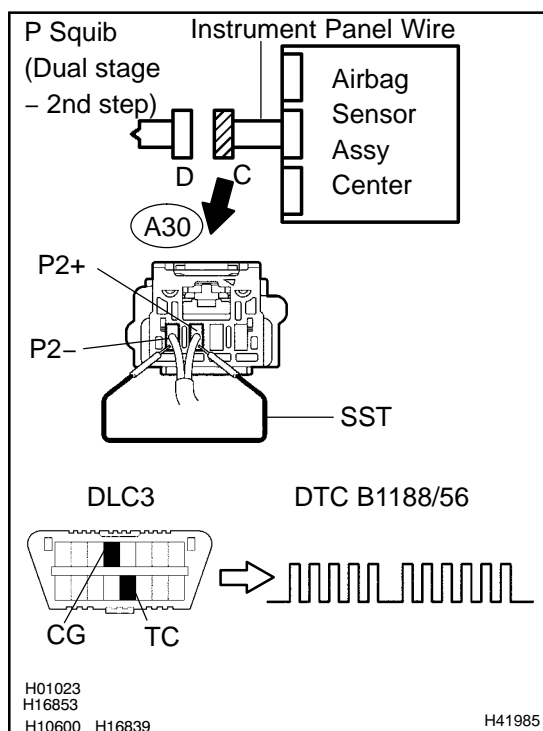
Standard:

Tester connection	Condition	Specified condition
A30-3 (P2+) - Body ground	Ignition switch ON	Below 1 V
A30-4 (P2-) - Body ground	Ignition switch ON	Below 1 V

NG	REPLACE INSTRUMENT PANEL WIRE
-----------	--------------------------------------

OK

2 CHECK AIR BAG SENSOR ASSY CENTER



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
SST 09843-18040
- Connect the connector to the airbag sensor assy center.
- Using SST, connect A30-3 (P2+) and A30-4 (P2-) of connector "C".
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1188/56 is not output.

HINT:

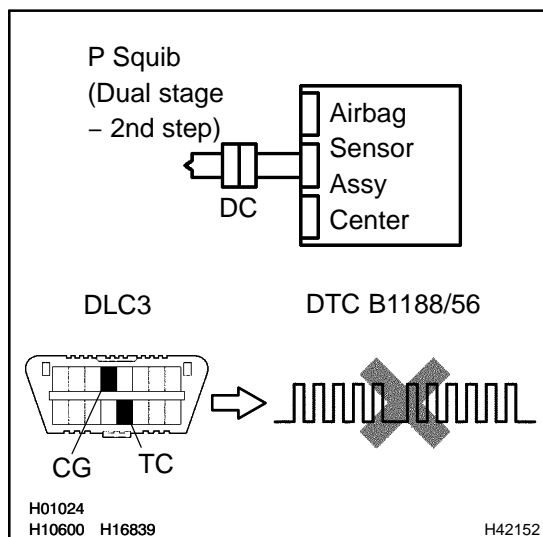
Codes other than code B1188/56 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

3 CHECK FRONT PASSENGER AIRBAG ASSY(P SQUIB, DUAL STAGE - 2ND STEP)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the SST from connector "C".
- Connect the connector to the front passenger airbag assy.
- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Clear the DTCs stored in memory (see page 05-1219).
- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- Check the DTCs (see page 05-1219).

OK:

DTC B1188/56 is not output.

HINT:

Codes other than code B1188/56 may be output at this time, but they are not related to this check.

NG

**REPLACE FRONT PASSENGER AIRBAG ASSY
(SEE PAGE 60-31)**

OK

USE SIMULATION METHOD TO CHECK

HINT:

- Before performing the simulation method, check that the airbag sensor assy center is in check mode (see page 05-1222).
- Perform the simulation method by selecting the check mode with the hand-held tester (see page 05-1222).
- After selecting the check mode, perform the simulation method by wiggling each connector of the airbag system or driving the vehicle on a city or rough road (see page 05-1222).

DTC	B1628/29	ROLL OVER CUT OFF INDICATOR MALFUNCTION
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CIRCUIT DESCRIPTION

The RSCA OFF switch is a mechanism that operates both right and left side of the curtain shield airbag assy and the seat belt pretensioner when the airbag sensor assy center detects a roll-over.

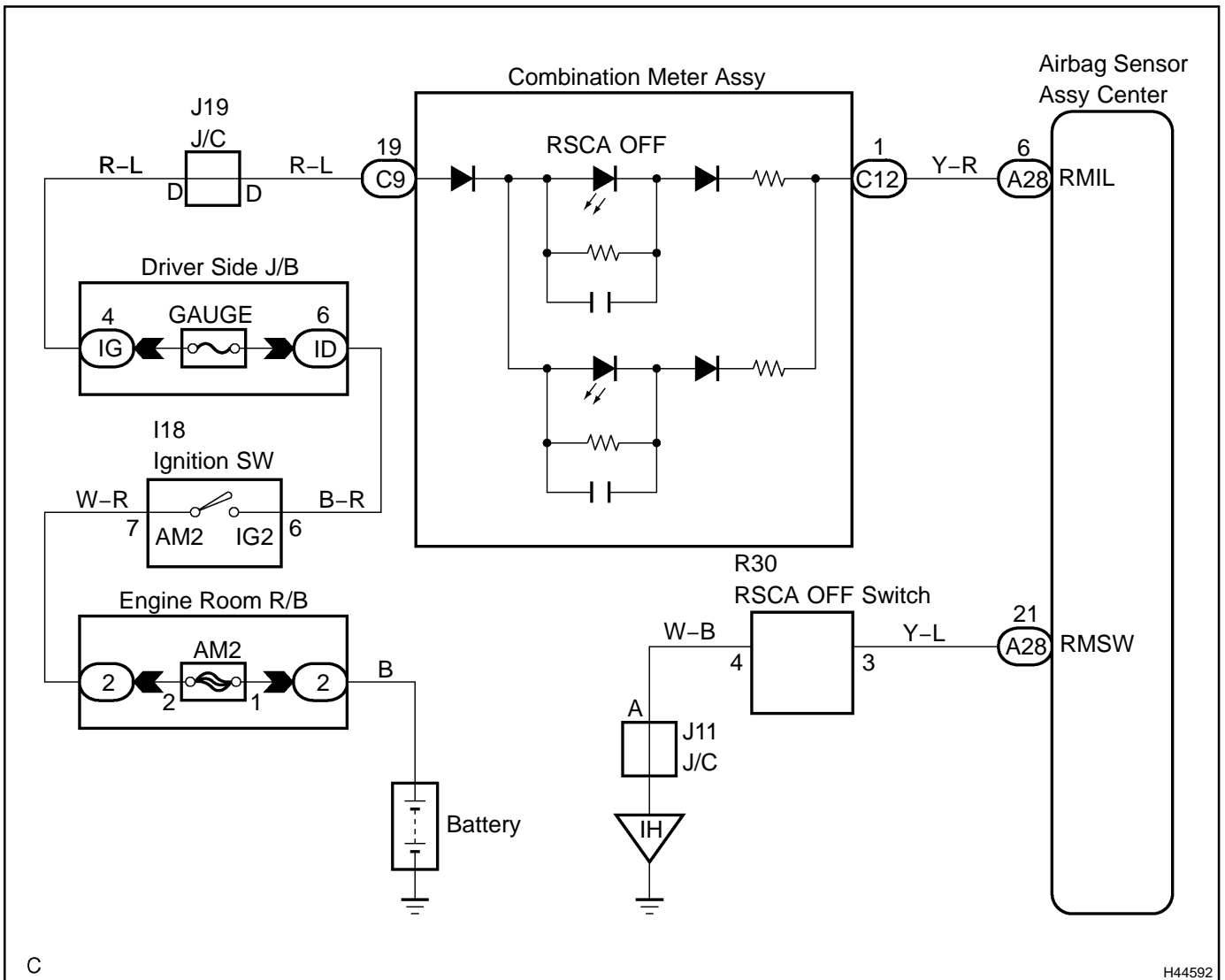
The RSCA OFF indicator is installed in the combination meter assy.

If the RSCA OFF switch is operated, the indicator light comes on to inform the driver that the roll-over detection system is not working.

The initial setting of the roll-over detection system is on. It automatically operates every time the ignition switch is turned on.

DTC No.	DTC Detecting Condition	Trouble Area
B1628/29	<ul style="list-style-type: none"> • The airbag sensor assy center receives an open signal or short to ground in the RSCA OFF indicator circuit. • RSCA OFF indicator malfunction • Airbag sensor assy center malfunction 	<ul style="list-style-type: none"> • Combination meter assy (RSCA OFF indicator) • Airbag sensor assy center • Instrument panel wire

WIRING DIAGRAM



C

H44592

INSPECTION PROCEDURE

1 CHECK RSCA OFF INDICATOR CONDITION

- (a) Turn the ignition switch to the ON position, and push the RSCA OFF switch for 2 seconds.
- (b) Check the RSCA OFF indicator condition according to the table below.

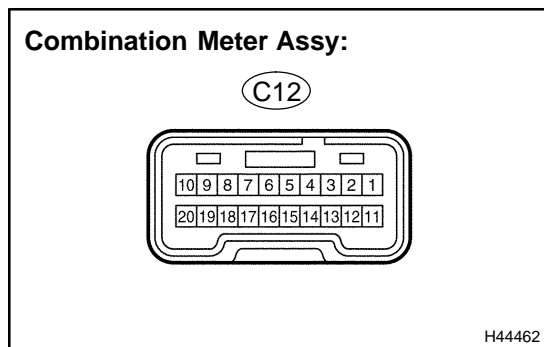
Result:

A	RSCA OFF indicator does not come on (remains off) when the RSCA OFF switch is operated.
B	RSCA OFF indicator remains on when the RSCA OFF switch is not operated.

B **Go to step 6**

A

2 CHECK COMBINATION METER ASSY (SOURCE VOLTAGE)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Remove the combination meter assy (see page 71-13).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard:

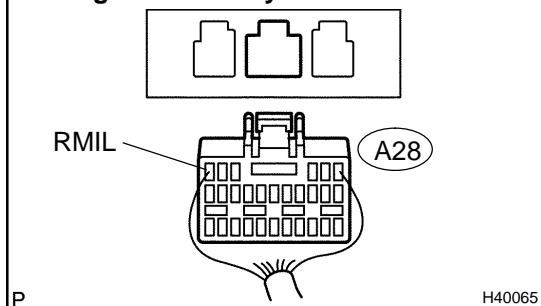
Tester connection	Condition	Specified condition
C12-1 - Body ground	Ignition switch ON	10 to 14 V

NG **GO TO COMBINATION METER SYSTEM (SEE PAGE 05-2033)**

OK

3 CHECK INSTRUMENT PANEL WIRE(AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)

Airbag Sensor Assy Center:

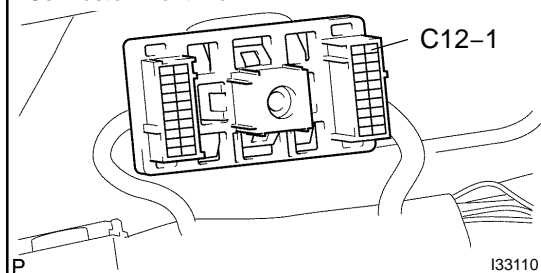


- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connector from the airbag sensor assy center.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-6 (RMIL) - C12-1	Always	Below 1 Ω

Combination Meter Assy (Right Side of Vehicle) Connector Front View:

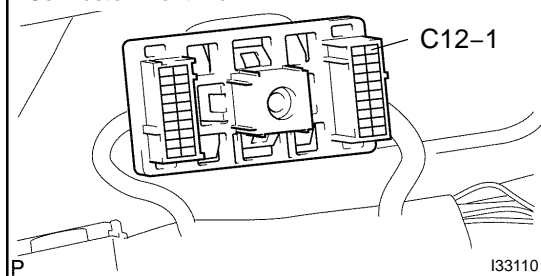


NG REPLACE INSTRUMENT PANEL WIRE

OK

4 CHECK INSTRUMENT PANEL WIRE(TO B+)

Combination Meter Assy (Right Side of Vehicle) Connector Front View:



- Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

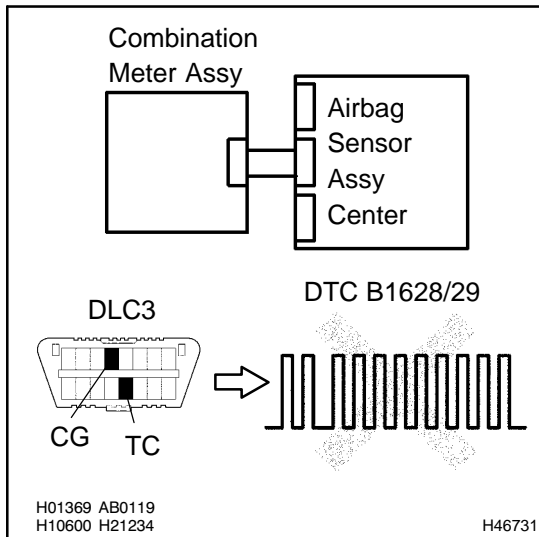
Standard:

Tester connection	Condition	Specified condition
C12-1 - Body ground	Ignition switch ON	Below 1 V

NG REPLACE INSTRUMENT PANEL WIRE

OK

5 CHECK AIR BAG SENSOR ASSY CENTER



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connectors to the airbag sensor assy center.
- (d) Install the combination meter assy (see page 71-13).
- (e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (g) Clear the DTCs stored in memory (see page 05-1219).
- (h) Turn the ignition switch to the LOCK position.
- (i) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
- (j) Check the DTCs (see page 05-1219).

OK:

DTC B1628/29 is not output.

HINT:

Codes other than code B1628/29 may be output at this time, but they are not related to this check.

NG	REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)
-----------	--

HINT:

If the DTC B1628/29 is output after the airbag sensor assy center is replaced, there may be trouble in the combination meter assy (RSCA OFF indicator).

OK

USE SIMULATION METHOD TO CHECK

HINT:

If RSCA OFF indicator remains off when DTC B1628/29 is output, there may be trouble in the combination meter assy (RSCA OFF indicator).

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connector from the airbag sensor assy center.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Check the RSCA OFF indicator condition.

OK:

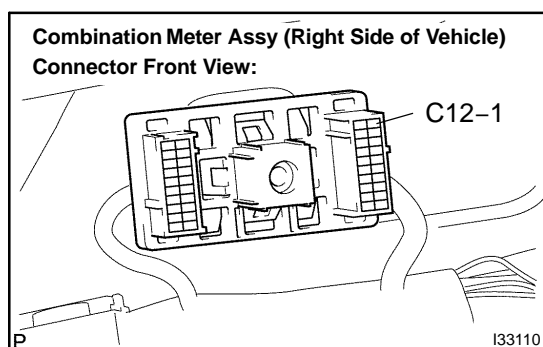
The RSCA OFF indicator does not come on.

NG → Go to step 7

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

7 CHECK INSTRUMENT PANEL WIRE(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Remove the combination meter assy (see page 71-13).
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C12-1 - Body ground	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE**

OK

REPLACE COMBINATION METER ASSY (SEE PAGE 71-13)

DTC	B1771	PASSENGER SIDE BUCKLE SWITCH CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

The passenger side buckle switch circuit consists of the occupant classification ECU and the front seat inner belt assy RH (buckle switch RH).

DTC B1771 is recorded when a malfunction is detected in the passenger side buckle switch circuit.

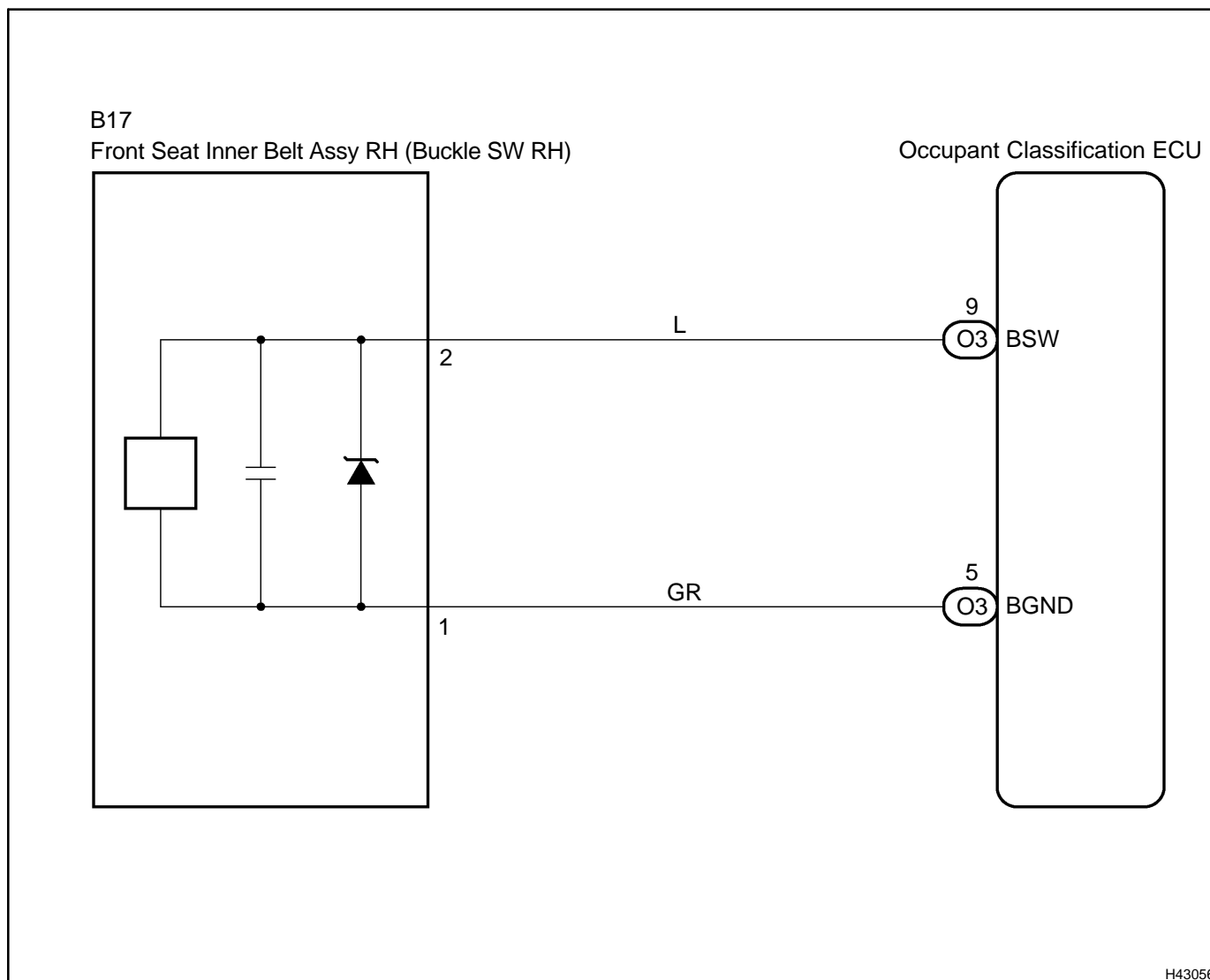
Troubleshoot DTC B1771 first when the DTCs B1771 and B1795 are output simultaneously.

DTC No.	DTC Detecting Condition	Trouble Area
B1771	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the passenger side buckle switch circuit for 2 seconds. • Passenger side buckle switch malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Front seat inner belt assy RH (Buckle switch RH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1771 of the occupant classification system.

WIRING DIAGRAM



H43056

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- (a) Turn the ignition switch to the ON position.
 (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
 (d) Turn the ignition switch to the ON position.
 (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1771 is not output.

HINT:

Codes other than code B1771 may be output at this time, but they are not related to this check.

NG → Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Check that the connectors are properly connected to the occupant classification ECU and the front seat inner belt assy RH.

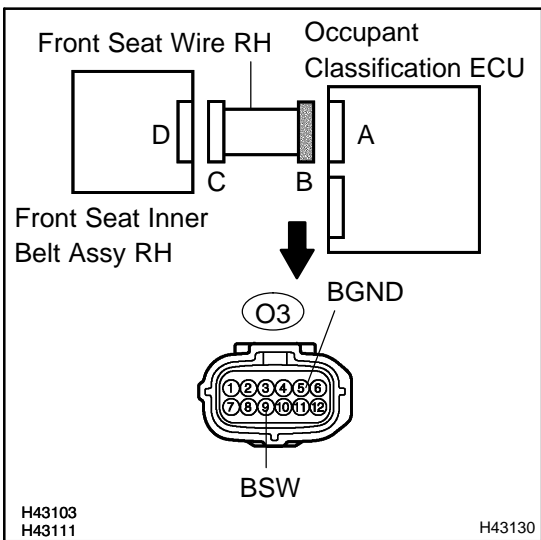
OK:

The connectors are connected.

NG → CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- (a) Disconnect the connectors from the occupant classification ECU and the front seat inner belt assy RH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

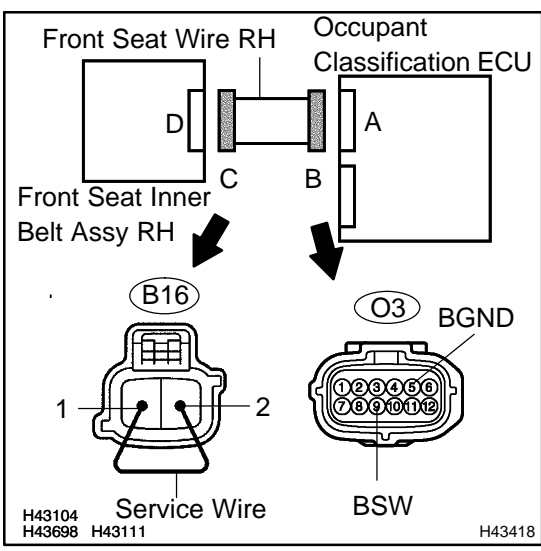
Standard:

Tester connection	Condition	Specified condition
O3-9 (BSW) - Body ground	Ignition switch ON	Below 1 V
O3-5 (BGND) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH(OPEN)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Using a service wire, connect B16-1 and B16-2 of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (d) Measure the resistance according to the value(s) in the table below.

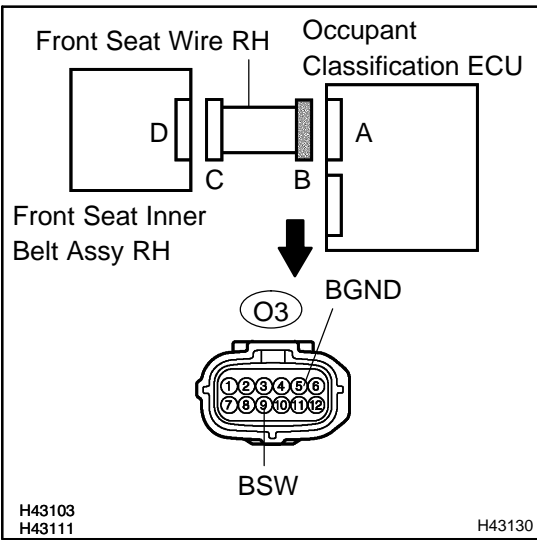
Standard:

Tester connection	Condition	Specified condition
O3-9 (BSW) - O3-5 (BGND)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT WIRE RH**

OK

5 CHECK FRONT SEAT WIRE RH(SHORT)



- (a) Disconnect the service wire from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

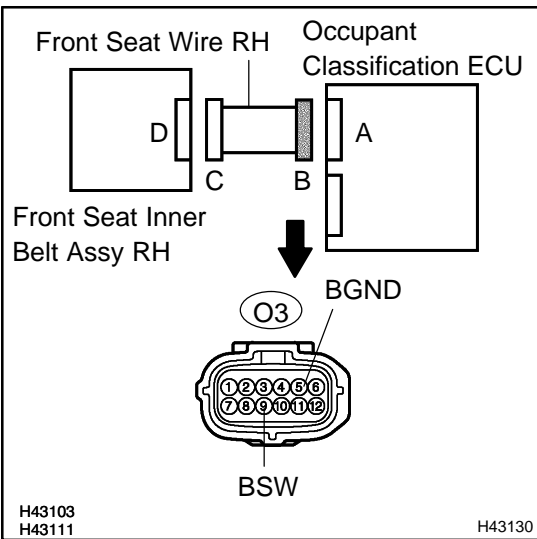
Standard:

Tester connection	Condition	Specified condition
O3-9 (BSW) - O3-5 (BGND)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O3-9 (BSW) - Body ground	Always	1 MΩ or Higher
O3-5 (BGND) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the front seat inner belt assy RH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1771 is not output.

HINT:

Codes other than code B1771 may be output at this time, but they are not related to this check.

NG	Go to step 8
-----------	---------------------

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)
--

8	REPLACE FRONT SEAT INNER BELT ASSY RH
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front seat inner belt assy RH (see page 61-13).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

- (d) Connect the negative (-) terminal cable to the battery.
- (e) Turn the ignition switch to the ON position.
- (f) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (g) Turn the ignition switch to the LOCK position.
- (h) Turn the ignition switch to the ON position.
- (i) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1771 is not output.

HINT:

Codes other than code B1771 may be output at this time, but they are not related to this check.

NG	Go to step 9
-----------	---------------------

OK

END

9 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page [60-67](#)).

NEXT**10 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****11 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1780	OCCUPANT CLASSIFICATION SENSOR FRONT LH CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

The occupant classification sensor front LH circuit consists of the occupant classification ECU and the occupant classification sensor front LH.

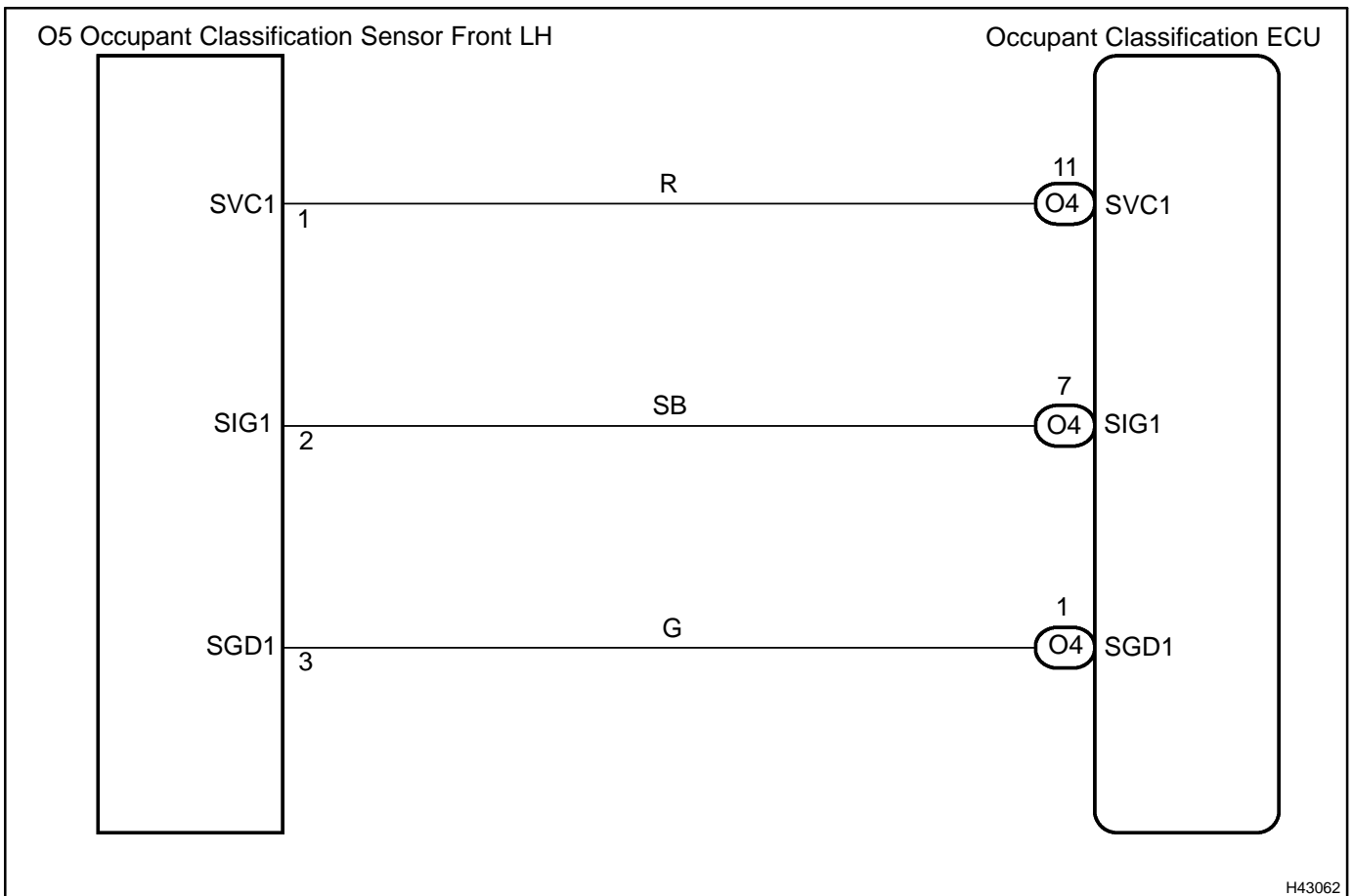
DTC B1780 is recorded when a malfunction is detected in the occupant classification sensor front LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1780	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the occupant classification sensor front LH circuit for 2 seconds. • Occupant classification sensor front LH malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Front RH seat assy (Occupant classification sensor front LH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for the DTC B1780 of the occupant classification system.

WIRING DIAGRAM



H43062

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- (a) Turn the ignition switch to the ON position.
 (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
 (d) Turn the ignition switch to the ON position.
 (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1780 is not output.

HINT:

Codes other than code B1780 may be output at this time, but they are not related to this check.

NG → Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensor front LH.

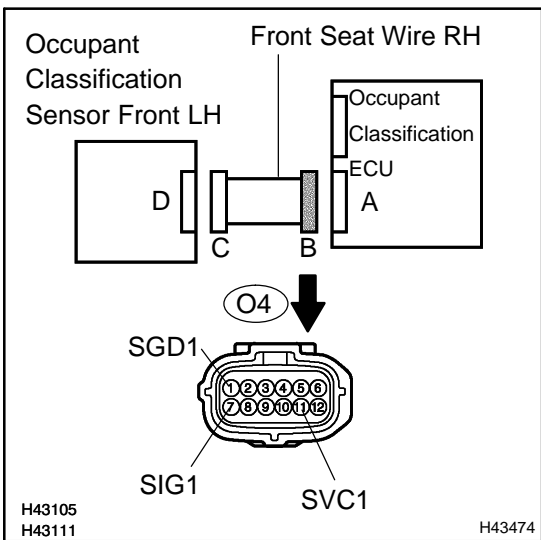
OK:

The connectors are connected.

NG → CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- (a) Disconnect the connectors from the occupant classification ECU and the occupant classification sensor front LH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

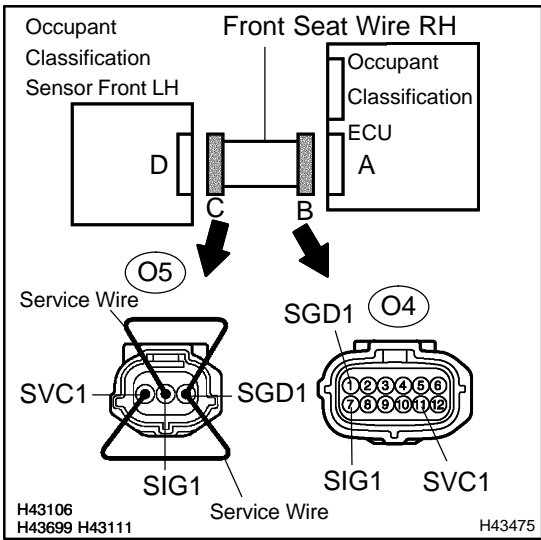
Standard:

Tester connection	Condition	Specified condition
O4-1 (SGD1) – Body ground	Ignition switch ON	Below 1 V
O4-7 (SIG1) – Body ground	Ignition switch ON	Below 1 V
O4-11 (SVC1) – Body ground	Ignition switch ON	Below 1 V

NG → REPLACE FRONT SEAT WIRE RH

OK

4 CHECK FRONT SEAT WIRE RH(OPEN)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Using a service wire, connect O5-1 (SVC1) and O5-3 (SGD1), and connect O5-2 (SIG1) and O5-3 (SGD1) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (d) Measure the resistance according to the value(s) in the table below.

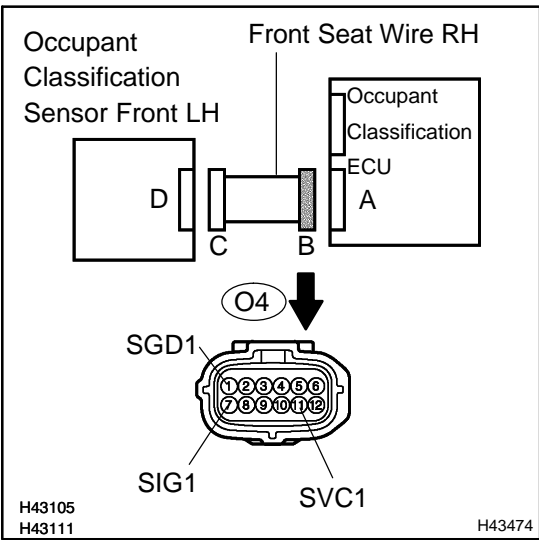
Standard:

Tester connection	Condition	Specified condition
O4-7 (SIG1) – O4-1 (SGD1)	Always	Below 1 Ω
O4-11 (SVC1) – O4-1 (SGD1)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

5 CHECK FRONT SEAT WIRE RH(SHORT)



- (a) Disconnect the service wire from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

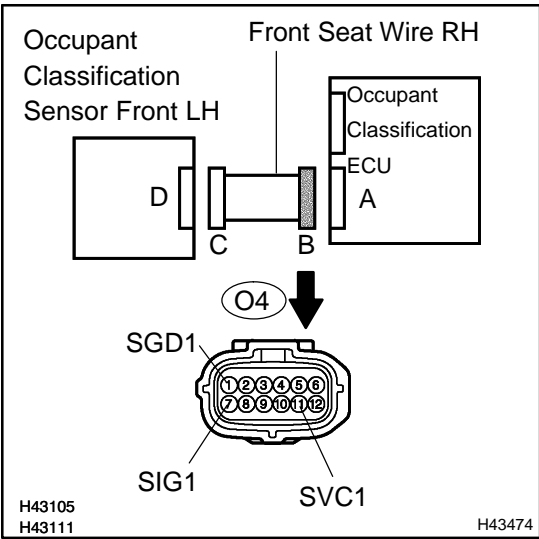
Standard:

Tester connection	Condition	Specified condition
O4-7 (SIG1) - O4-1 (SGD1)	Always	1 MΩ or Higher
O4-11 (SVC1) - O4-1 (SGD1)	Always	1 MΩ or Higher
O4-7 (SIG1) - O4-11 (SVC1)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O4-1 (SGD1) - Body ground	Always	1 MΩ or Higher
O4-7 (SIG1) - Body ground	Always	1 MΩ or Higher
O4-11 (SVC1) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the occupant classification sensor front LH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1780 is not output.

HINT:

Codes other than code B1780 may be output at this time, but they are not related to this check.

NG 

Go to step 8

OK 

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT 

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG 

Go to step 12

OK 

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG Go to step 12

OK

11 RECHECK DTC

- (a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1780 is not output.

HINT:

Codes other than code B1780 may be output at this time, but they are not related to this check.

NG Go to step 12

OK

END

12 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page [72-20](#)).

NEXT**13 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****14 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1781	OCCUPANT CLASSIFICATION SENSOR FRONT RH CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

The occupant classification sensor front RH circuit consists of the occupant classification ECU and the occupant classification sensor front RH.

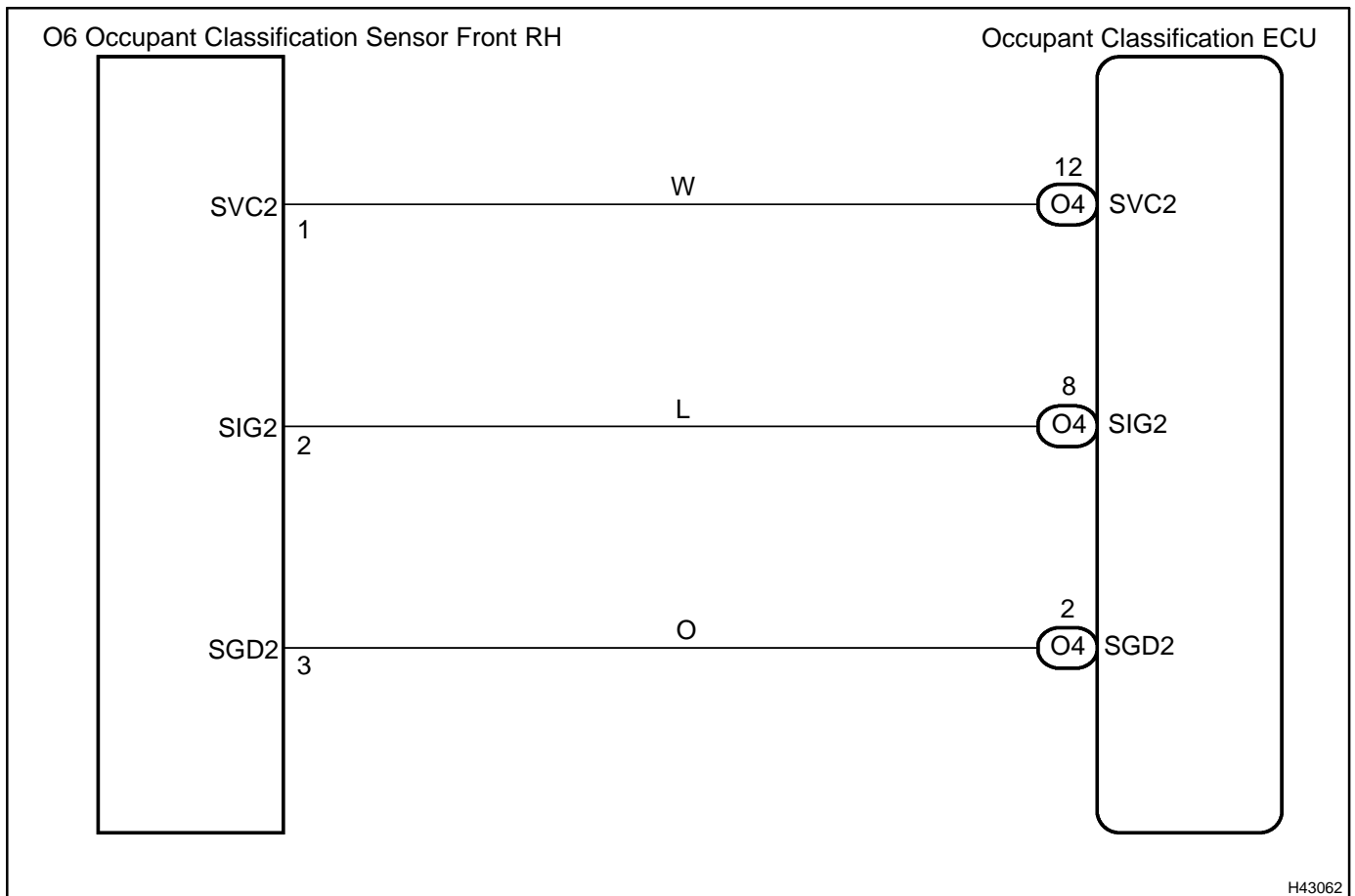
DTC B1781 is recorded when a malfunction is detected in the occupant classification sensor front RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1781	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the occupant classification sensor front RH circuit for 2 seconds. • Occupant classification sensor front RH malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Front RH seat assy (Occupant classification sensor front RH) • Front seat wire RH • Occupant classification ECU

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1781 of the occupant classification system.

WIRING DIAGRAM



H43062

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- Turn the ignition switch to the ON position.
- Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position.
- Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1781 is not output.

HINT:

Codes other than code B1781 may be output at this time, but they are not related to this check.

NG

Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensor front RH.

OK:

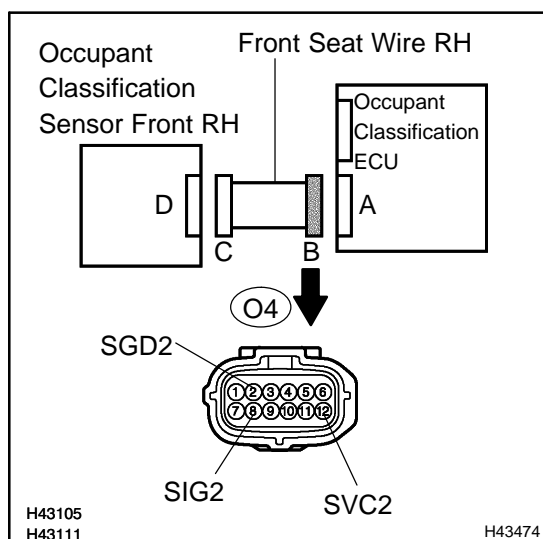
The connectors are connected.

NG

CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- Disconnect the connectors from the occupant classification ECU and the occupant classification sensor front RH.
- Connect the negative (-) terminal cable to the battery.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

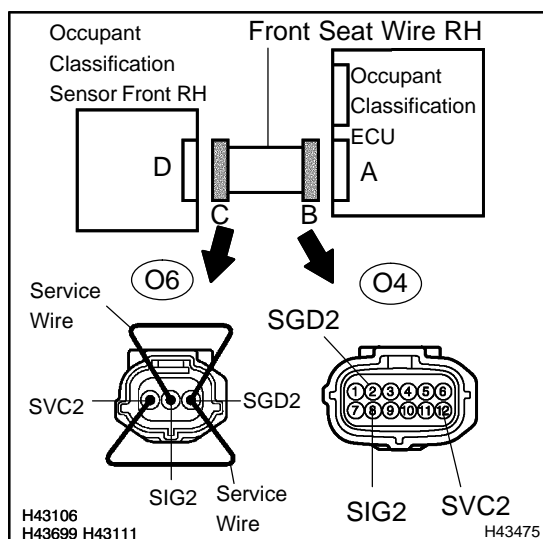
Tester connection	Condition	Specified condition
O4-2 (SGD2) - Body ground	Ignition switch ON	Below 1 V
O4-8 (SIG2) - Body ground	Ignition switch ON	Below 1 V
O4-12 (SVC2) - Body ground	Ignition switch ON	Below 1 V

NG

REPLACE FRONT SEAT WIRE RH

OK

4 CHECK FRONT SEAT WIRE RH(OPEN)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Using a service wire, connect O6-1 (SVC2) and O6-3 (SGD2), and connect O6-2 (SIG2) and O6-3 (SGD2) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Measure the resistance according to the value(s) in the table below.

Standard:

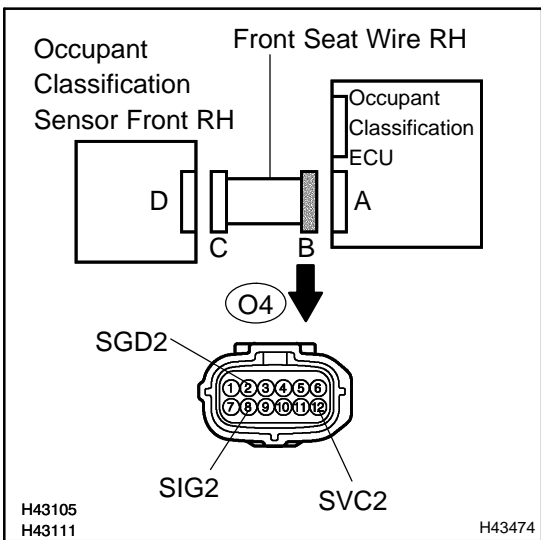
Tester connection	Condition	Specified condition
O4-8 (SIG2) - O4-2 (SGD2)	Always	Below 1 Ω
O4-12 (SVC2) - O4-2 (SGD2)	Always	Below 1 Ω

NG

REPLACE FRONT SEAT WIRE RH

OK

5 CHECK FRONT SEAT WIRE RH(SHORT)



- (a) Disconnect the service wire from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

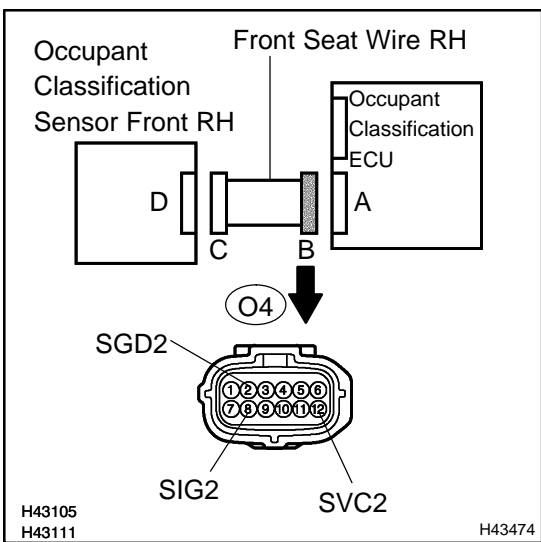
Standard:

Tester connection	Condition	Specified condition
O4-8 (SIG2) - O4-2 (SGD2)	Always	1 MΩ or Higher
O4-12 (SVC2) - O4-2 (SGD2)	Always	1 MΩ or Higher
O4-8 (SIG2) - O4-12 (SVC2)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O4-2 (SGD2) - Body ground	Always	1 MΩ or Higher
O4-8 (SIG2) - Body ground	Always	1 MΩ or Higher
O4-12 (SVC2) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the occupant classification sensor front RH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1781 is not output.

HINT:

Codes other than code B1781 may be output at this time, but they are not related to this check.

NG	Go to step 8
-----------	---------------------

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)
--

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG	Go to step 12
-----------	----------------------

OK

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG Go to step 12

OK

11 RECHECK DTC

- (a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1781 is not output.

HINT:

Codes other than code B1781 may be output at this time, but they are not related to this check.

NG Go to step 12

OK

END

12 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page [72-20](#)).

NEXT**13 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEX****14 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1782	OCCUPANT CLASSIFICATION SENSOR REAR LH CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

The occupant classification sensor rear LH circuit consists of the occupant classification ECU and the occupant classification sensor rear LH.

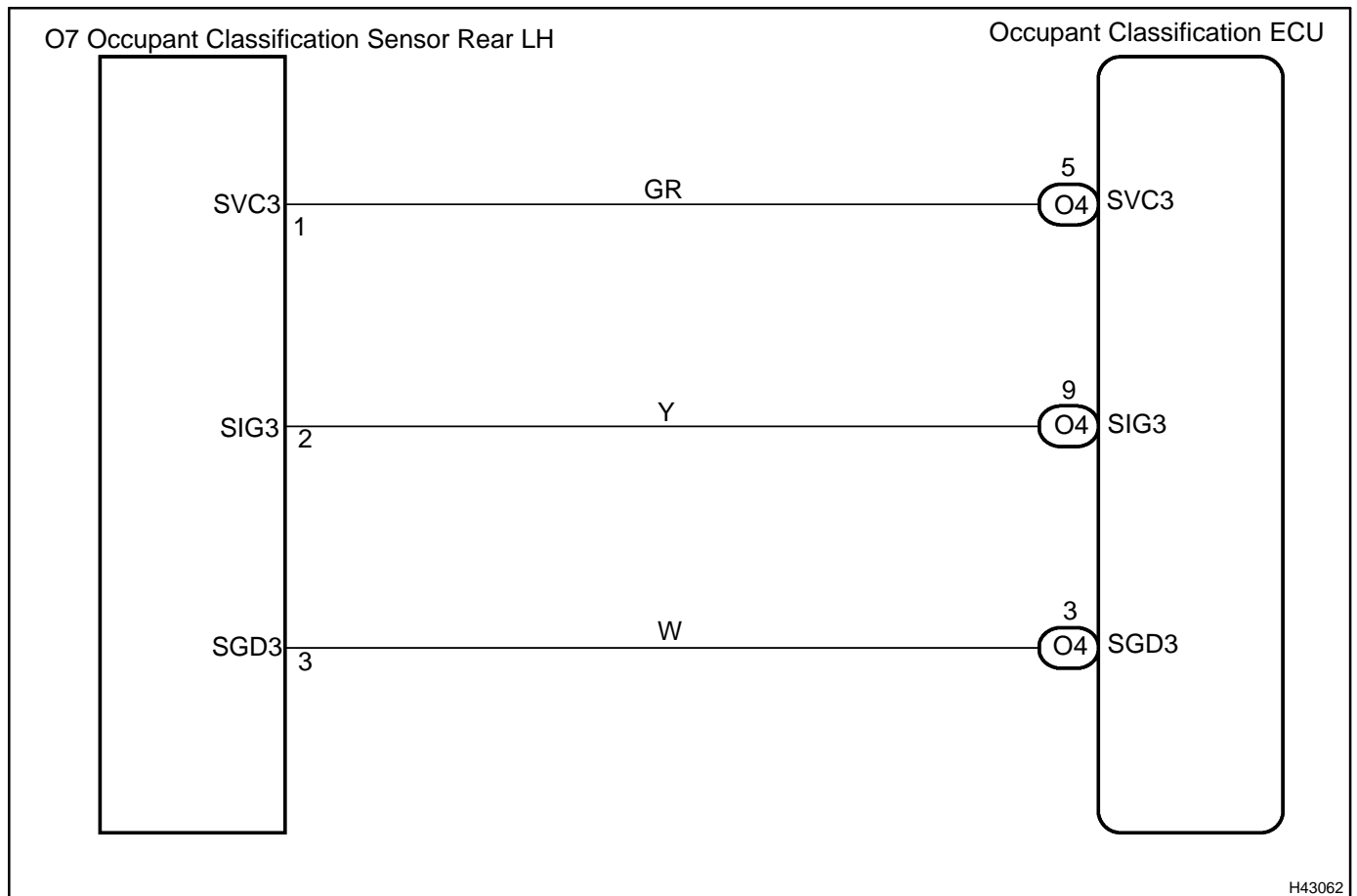
DTC B1782 is recorded when a malfunction is detected in the occupant classification sensor rear LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1782	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the occupant classification sensor rear LH circuit for 2 seconds. • Occupant classification sensor rear LH malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Front RH seat assy (Occupant classification sensor rear LH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1782 of the occupant classification system.

WIRING DIAGRAM



H43062

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- Turn the ignition switch to the ON position.
- Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position.
- Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1782 is not output.

HINT:

Codes other than code B1782 may be output at this time, but they are not related to this check.

NG → Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensor rear LH.

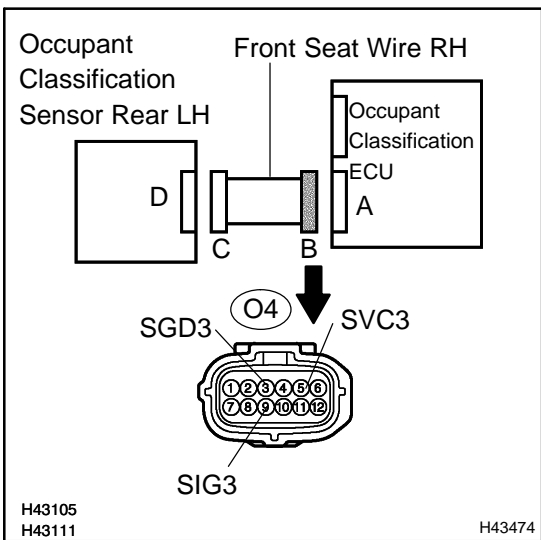
OK:

The connectors are connected.

NG → CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- (a) Disconnect the connectors from the occupant classification ECU and the occupant classification sensor rear LH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

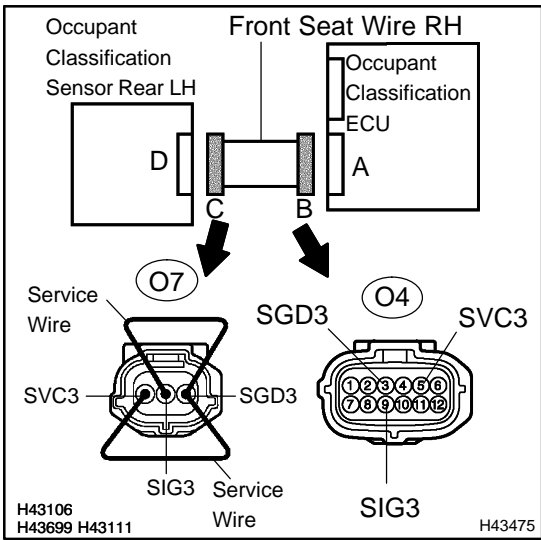
Standard:

Tester connection	Condition	Specified condition
O4-3 (SGD3) - Body ground	Ignition switch ON	Below 1 V
O4-5 (SVC3) - Body ground	Ignition switch ON	Below 1 V
O4-9 (SIG3) - Body ground	Ignition switch ON	Below 1 V

NG → REPLACE FRONT SEAT WIRE RH

OK

4 CHECK FRONT SEAT WIRE RH(OPEN)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Using a service wire, connect O7-1 (SVC3) and O7-3 (SGD3), and connect O7-2 (SIG3) and O7-3 (SGD3) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- (d) Measure the resistance according to the value(s) in the table below.

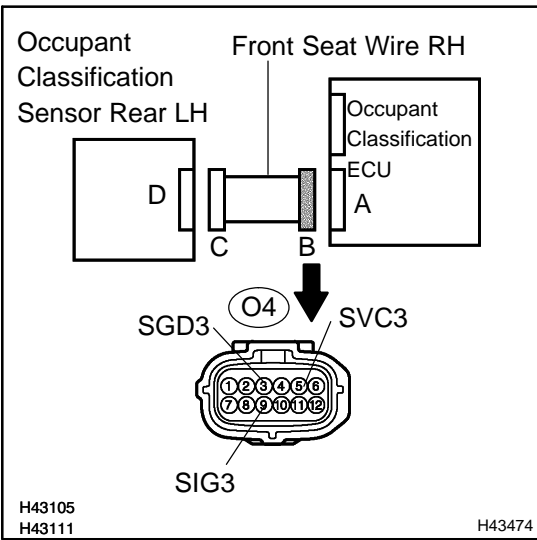
Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - O4-3 (SGD3)	Always	Below 1 Ω
O4-9 (SIG3) - O4-3 (SGD3)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

5 CHECK FRONT SEAT WIRE RH(SHORT)



- (a) Disconnect the service wire from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

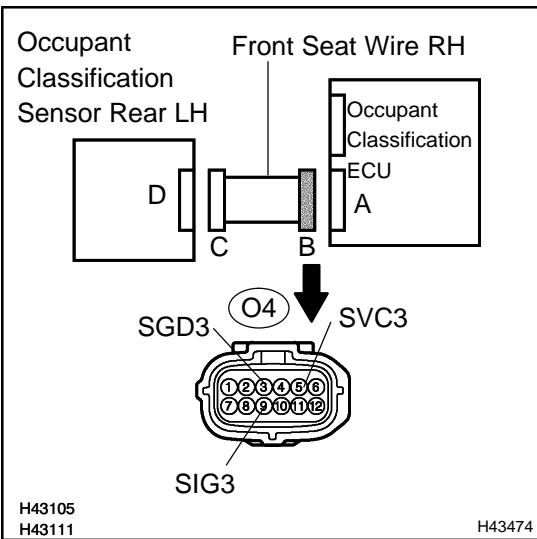
Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - O4-3 (SGD3)	Always	1 MΩ or Higher
O4-9 (SIG3) - O4-3 (SGD3)	Always	1 MΩ or Higher
O4-5 (SVC3) - O4-9 (SIG3)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Measure the resistance according to value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O4-3 (SGD3) - Body ground	Always	1 MΩ or Higher
O4-5 (SVC3) - Body ground	Always	1 MΩ or Higher
O4-9 (SIG3) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the occupant classification sensor rear LH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1782 is not output.

HINT:

Codes other than code B1782 may be output at this time, but they are not related to this check.

NG 

Go to step 8

OK 

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT 

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG 

Go to step 12

OK 

10 | PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG **Go to step 12**

OK

11 | RECHECK DTC

- (a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in memory (see page [05-1219](#)).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Using the hand-held tester, check the DTCs (see page [05-1219](#)).

OK:

DTC B1782 is not output.

HINT:

Codes other than code B1782 may be output at this time, but they are not related to this check.

NG **Go to step 12**

OK

END

12 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page [72-20](#)).

NEXT**13 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****14 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1783	OCCUPANT CLASSIFICATION SENSOR REAR RH CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

The occupant classification sensor rear RH circuit consists of the occupant classification ECU and the occupant classification sensor rear RH.

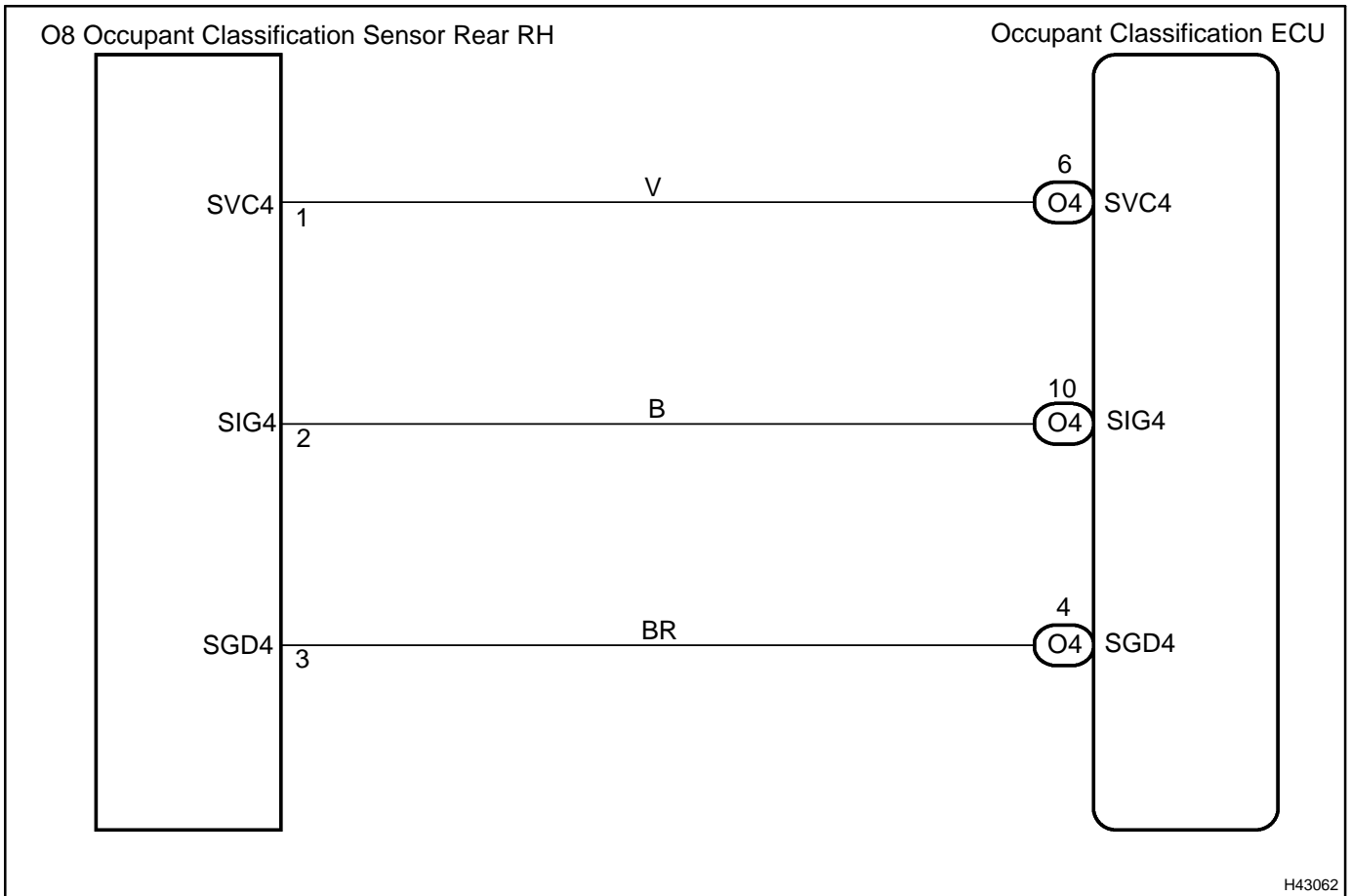
DTC B1783 is recorded when a malfunction is detected in the occupant classification sensor rear RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1783	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the occupant classification sensor rear RH circuit for 2 seconds. • Occupant classification sensor rear RH malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Front RH seat assy (Occupant classification sensor rear RH) • Front seat wire RH • Occupant classification ECU

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1783 of the occupant classification system.

WIRING DIAGRAM



H43062

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- Turn the ignition switch to the ON position.
- Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- Turn the ignition switch to the LOCK position.
- Turn the ignition switch to the ON position.
- Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1783 is not output.

HINT:

Codes other than code B1783 may be output at this time, but they are not related to this check.

NG

Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensor rear RH.

OK:

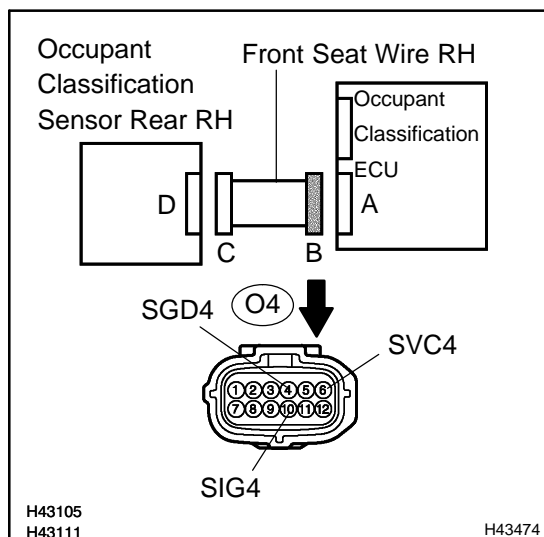
The connectors are connected.

NG

CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- Disconnect the connectors from the occupant classification ECU and the occupant classification sensor rear RH.
- Connect the negative (-) terminal cable to the battery.
- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

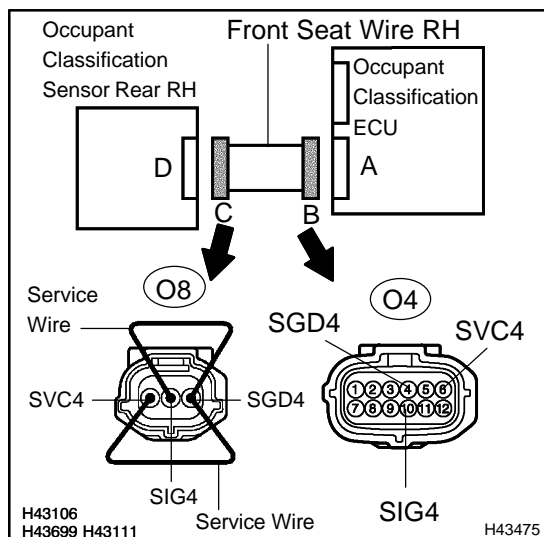
Tester connection	Condition	Specified condition
O4-4 (SGD4) - Body ground	Ignition switch ON	Below 1 V
O4-6 (SVC4) - Body ground	Ignition switch ON	Below 1 V
O4-10 (SIG4) - Body ground	Ignition switch ON	Below 1 V

NG

REPLACE FRONT SEAT WIRE RH

OK

4 CHECK FRONT SEAT WIRE RH(OPEN)



- Turn the ignition switch to the LOCK position.
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Using a service wire, connect O8-1 (SVC4) and O8-3 (SGD4), and connect O8-2 (SIG4) and O8-3 (SGD4) of connector "C".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

- Measure the resistance according to the value(s) in the table below.

Standard:

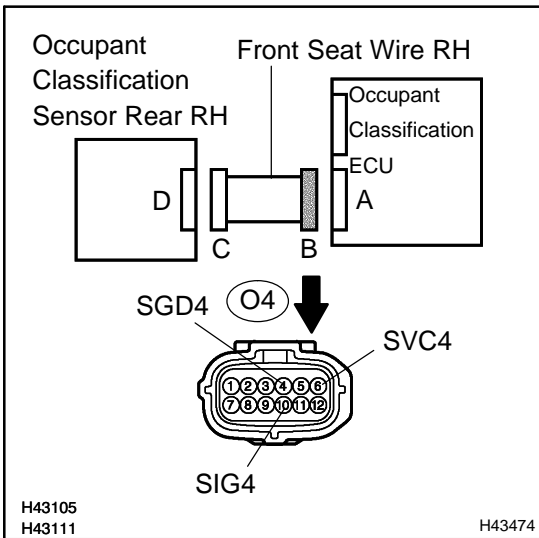
Tester connection	Condition	Specified condition
O4-6 (SVC4) - O4-4 (SGD4)	Always	Below 1 Ω
O4-10 (SIG4) - O4-4 (SGD4)	Always	Below 1 Ω

NG

REPLACE FRONT SEAT WIRE RH

OK

5 CHECK FRONT SEAT WIRE RH(SHORT)



- (a) Disconnect the service wire from connector "C".
- (b) Measure the resistance according to the value(s) in the table below.

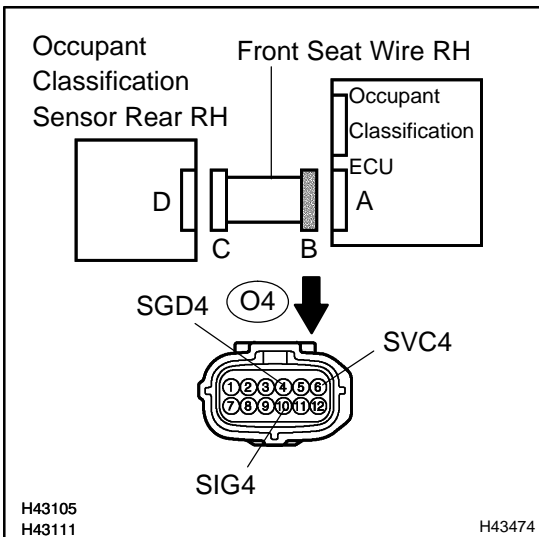
Standard:

Tester connection	Condition	Specified condition
O4-6 (SVC4) - O4-4 (SGD4)	Always	1 MΩ or Higher
O4-10 (SIG4) - O4-4 (SGD4)	Always	1 MΩ or Higher
O4-6 (SVC4) - O4-10 (SIG4)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O4-4 (SGD4) - Body ground	Always	1 MΩ or Higher
O4-6 (SVC4) - Body ground	Always	1 MΩ or Higher
O4-10 (SIG4) - Body ground	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the occupant classification sensor rear RH.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1783 is not output.

HINT:

Codes other than code B1783 may be output at this time, but they are not related to this check.

NG 

Go to step 8

OK 

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT 

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG 

Go to step 12

OK 

10 | **PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11 | **RECHECK DTC**

- (a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in memory (see page [05-1219](#)).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Using the hand-held tester, check the DTCs (see page [05-1219](#)).

OK:

DTC B1783 is not output.

HINT:

Codes other than code B1783 may be output at this time, but they are not related to this check.

NG → **Go to step 12**

OK

END

12 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace front RH seat assy (see page [72-20](#)).

NEXT**13 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****14 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1785	OCCUPANT CLASSIFICATION SENSOR FRONT LH COLLISION DETECTION
------------	--------------	--

CIRCUIT DESCRIPTION

DTC B1785 is output when the occupant classification ECU receives a collision detection signal sent by the occupant classification sensor front LH if an accident occurs.

DTC B1785 is also output when the front RH seat assy is subjected to a strong impact, even if an actual accident does not occur.

However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1785 can be cleared by "Zero point calibration" and "Sensitivity check".

Therefore, If DTC B1785 is output, first perform "Zero point calibration" and "Sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1785	<ul style="list-style-type: none"> • Front RH seat assy malfunction • Occupant classification ECU malfunction • Occupant classification sensor front LH senses a large load 	<ul style="list-style-type: none"> • Occupant classification ECU • Front RH seat assy (Occupant classification sensor front LH)

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1785 of the occupant classification system.

WIRING DIAGRAM

See page [05-1448](#).

INSPECTION PROCEDURE

1	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "**COMPLETED**" is displayed.

NG
Go to step 4

OK

2	PERFORM SENSITIVITY CHECK
----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG
Go to step 4

OK

3 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1785 is not output.

HINT:

Codes other than code B1785 may be output at this time, but they are not related to this check.

NG

Go to step 4

OK

END

4 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page 72-20).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

5 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG

Go to step 8

OK

6 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG

Go to step 8

OK

7 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1785 is not output.

HINT:

Codes other than code B1785 may be output at this time, but they are not related to this check.

NG

Go to step 8

OK

END

8 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

NEXT

9 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

SST 09843-18040

NEXT

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1786	OCCUPANT CLASSIFICATION SENSOR FRONT RH COLLISION DETECTION
------------	--------------	--

CIRCUIT DESCRIPTION

DTC B1786 is output when the occupant classification ECU receives a collision detection signal sent by the occupant classification sensor front RH if an accident occurs.

DTC B1786 is also output when the front RH seat assy is subjected to a strong impact, even if an actual accident does not occur.

However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1786 can be cleared by "Zero point calibration" and "Sensitivity check".

Therefore, if DTC B1786 is output, first perform "Zero point calibration" and "Sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1786	<ul style="list-style-type: none"> • Front RH seat assy malfunction • Occupant classification ECU malfunction • Occupant classification sensor front RH senses a large load 	<ul style="list-style-type: none"> • Occupant classification ECU • Front RH seat assy (Occupant classification sensor front RH)

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1786 of the occupant classification system.

WIRING DIAGRAM

See page [05-1455](#).

INSPECTION PROCEDURE

1	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "COMPLETED" is displayed.

NG

Go to step 4

OK

2	PERFORM SENSITIVITY CHECK
----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG

Go to step 4

OK

3 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1786 is not output.

HINT:

Codes other than code B1786 may be output at this time, but they are not related to this check.

NG

Go to step 4

OK

END

4 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page 72-20)

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

5 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG

Go to step 8

OK

6 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG

Go to step 8

OK

7 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1786 is not output.

HINT:

Codes other than code B1786 may be output at this time, but they are not related to this check.

NG

Go to step 8

OK

END

8 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

NEXT

9 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1787	OCCUPANT CLASSIFICATION SENSOR REAR LH COLLISION DETECTION
------------	--------------	---

CIRCUIT DESCRIPTION

DTC B1787 is output when the occupant classification ECU receives a collision detection signal sent by the occupant classification sensor rear LH if an accident occurs.

DTC B1787 is also output when the front RH seat assy is subjected to a strong impact, even if an actual accident does not occur.

However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1787 can be cleared by "Zero point calibration" and "Sensitivity check".

Therefore, if DTC B1787 is output, first perform "Zero point calibration" and "Sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1787	<ul style="list-style-type: none"> • Front RH seat assy malfunction • Occupant classification ECU malfunction • Occupant classification sensor rear LH senses a large load 	<ul style="list-style-type: none"> • Occupant classification ECU • Front RH seat assy (Occupant classification sensor rear LH)

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1787 of the occupant classification system.

WIRING DIAGRAM

See page [05-1462](#).

INSPECTION PROCEDURE

1	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "COMPLETED" is displayed.

NG
Go to step 4

OK

2	PERFORM SENSITIVITY CHECK
----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG
Go to step 4

OK

3 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1209).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1209).

OK:

DTC B1787 is not output.

HINT:

Codes other than code B1787 may be output at this time, but they are not related to this check.

NG Go to step 4

OK

END

4 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page 72-20).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

5 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG Go to step 8

OK

6 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG Go to step 8

OK

7 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1787 is not output.

HINT:

Codes other than code B1787 may be output at this time, but they are not related to this check.

NG

Go to step 8

OK

END

8 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

NEXT

9 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1788	OCCUPANT CLASSIFICATION SENSOR REAR RH COLLISION DETECTION
------------	--------------	---

CIRCUIT DESCRIPTION

DTC B1788 is output when the occupant classification ECU receives a collision detection signal sent by the occupant classification sensor rear RH if an accident occurs.

DTC B1788 is also output when the front RH seat assy is subjected to a strong impact, even if an actual accident does not occur.

However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1788 can be cleared by "Zero point calibration" and "Sensitivity check".

Therefore, if DTC B1788 is output, first perform "Zero point calibration" and "Sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1788	<ul style="list-style-type: none"> • Front RH seat assy malfunction • Occupant classification ECU malfunction • Occupant classification sensor rear RH senses a large load 	<ul style="list-style-type: none"> • Occupant classification ECU • Front RH seat assy (Occupant classification sensor rear RH)

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1788 of the occupant classification system.

WIRING DIAGRAM

See page [05-1469](#).

INSPECTION PROCEDURE

1	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "COMPLETED" is displayed.

NG
Go to step 4

OK

2	PERFORM SENSITIVITY CHECK
----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG
Go to step 4

OK

3 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page [05-1219](#)).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page [05-1219](#)).

OK:

DTC B1788 is not output.

HINT:

Codes other than code B1788 may be output at this time, but they are not related to this check.

NG

Go to step 4

OK

END

4 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page [72-20](#)).

HINT:

Perform the inspection using parts from a normal vehicle when possible.

NEXT

5 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "COMPLETED" is displayed.

NG

Go to step 8

OK

6 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
- Standard value: 27 to 33 kg (59.52 to 72.75 lb)**

NG

Go to step 8

OK

7 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1788 is not output.

HINT:

Codes other than code B1788 may be output at this time, but they are not related to this check.

NG

Go to step 8

OK

END

8 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

NEXT

9 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1790	AIRBAG SENSOR ASSY CENTER COMMUNICATION CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

The airbag sensor assy center communication circuit consists of the occupant classification ECU and the airbag sensor assy center.

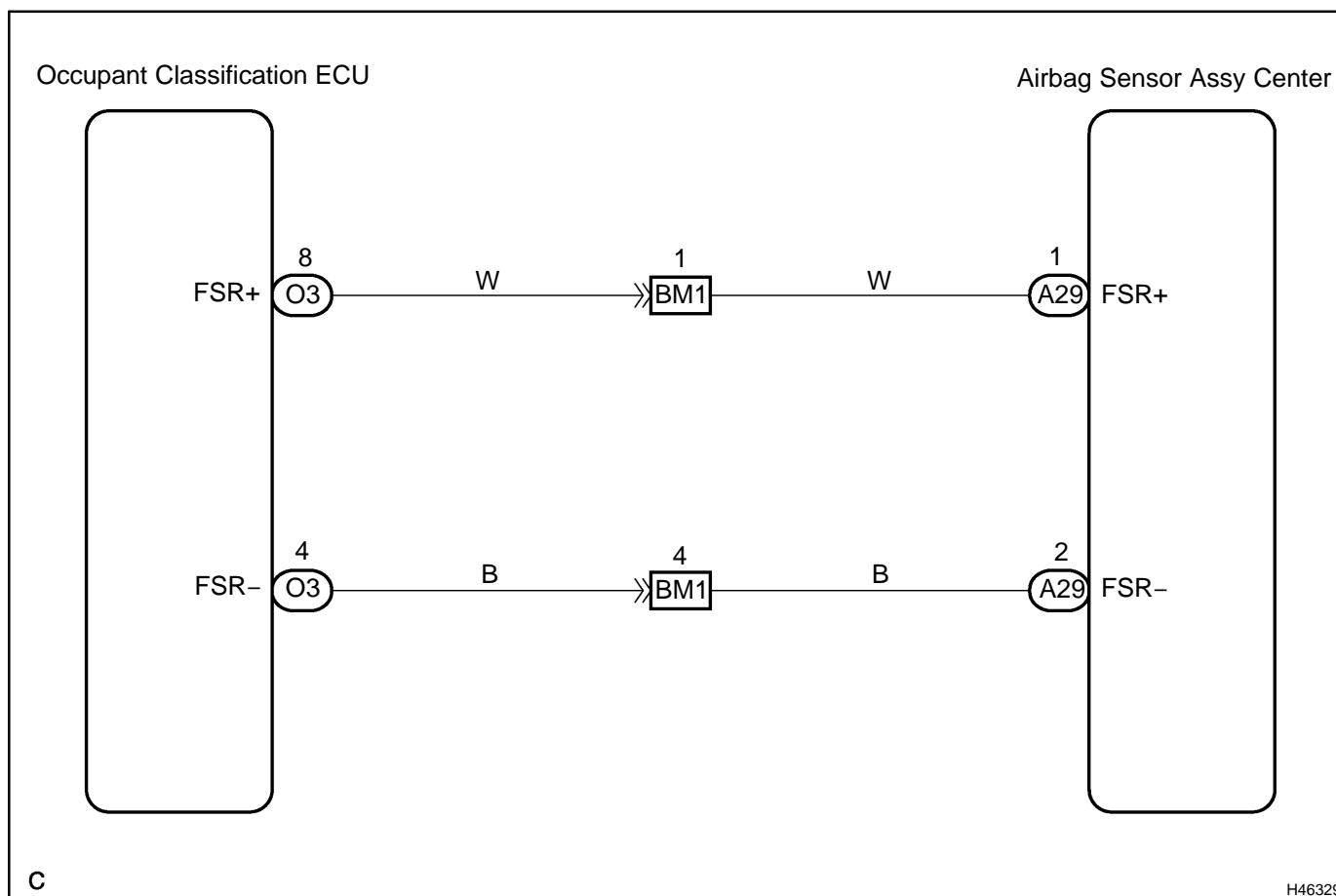
DTC B1790 is recorded when a malfunction is detected in the airbag sensor assy center communication circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1790	<ul style="list-style-type: none"> • The occupant classification ECU receives a line short signal, open signal, short to ground signal or B+ short signal in the airbag sensor assy center communication circuit for 2 seconds. • Airbag sensor assy center malfunction • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Occupant classification ECU • Airbag sensor assy center • Floor wire • Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1790 of the occupant classification system.

WIRING DIAGRAM



C

H46329

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- (a) Turn the ignition switch to the ON position.
 (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
 (d) Turn the ignition switch to the ON position.
 (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1790 is not output.

HINT:

Codes other than code B1790 may be output at this time, but they are not related to this check.

NG

Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Check that the connectors are properly connected to the occupant classification ECU and the airbag sensor assy center.

OK:

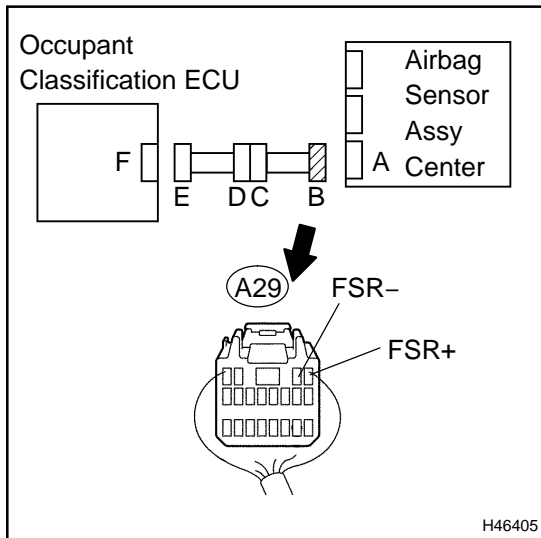
The connectors are connected.

NG

CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK WIRE HARNESS(TO B+)



- (a) Disconnect the connectors from the occupant classification ECU and the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

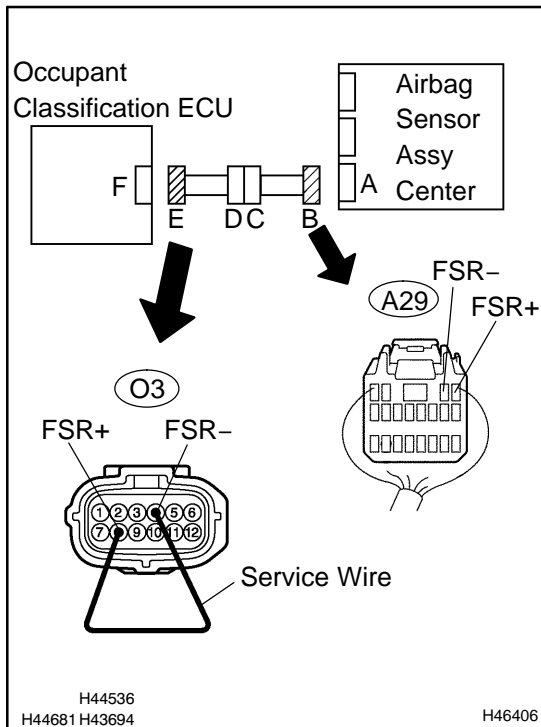
Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - Body ground	Ignition switch ON	Below 1 V
A29-2 (FSR-) - Body ground	Ignition switch ON	Below 1 V

NG Go to step 12

OK

4 CHECK WIRE HARNESS(OPEN)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Using a service wire, connect the O3-8 (FSR+) and O3-4 (FSR-) of connector "E".

NOTICE:

Do not forcibly insert a service wire into the terminals of the connector when connecting.

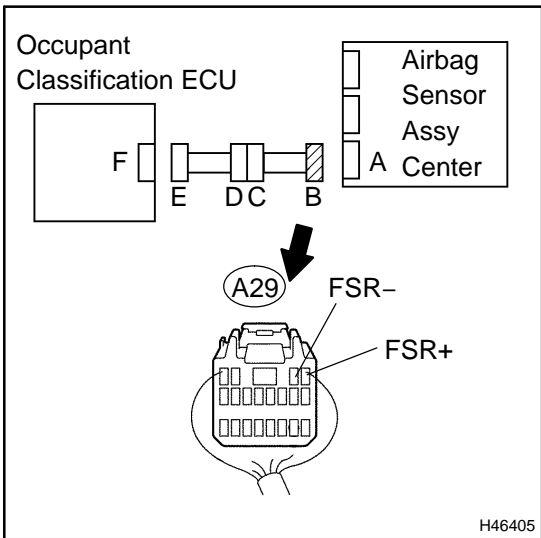
- (d) Measure the resistance according to the value(s) in the table below.

Tester connection	Condition	Specified condition
A29-1 (FSR+) - A29-2 (FSR-)	Always	Below 1 Ω

NG Go to step 13

OK

5 CHECK WIRE HARNESS(SHORT)



- (a) Disconnect the service wire from connector "E".
- (b) Measure the resistance according to the value(s) in the table below.

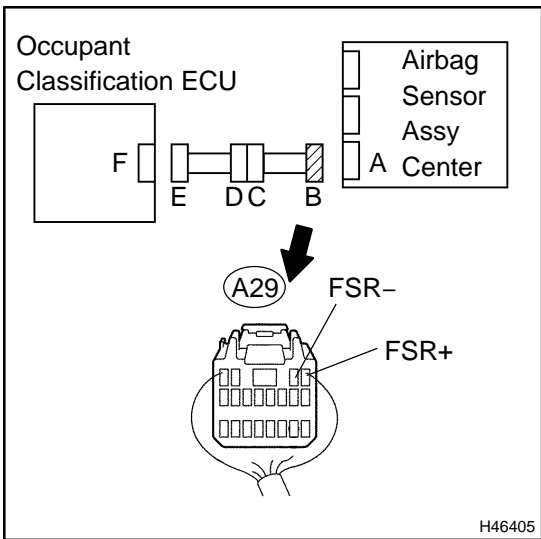
Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - A29-2 (FSR-)	Always	1 MΩ or Higher

NG Go to step 14

OK

6 CHECK WIRE HARNESS(TO GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A29-1 (FSR+) - Body ground	Always	1 MΩ or Higher
A29-2 (FSR-) - Body ground	Always	1 MΩ or Higher

NG Go to step 15

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the connectors to the occupant classification ECU and the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1790 is not output.

HINT:

Codes other than code B1790 may be output at this time, but they are not related to this check.

NG

Go to step 8

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK
-----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

11 RECHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1790 is not output.

HINT:

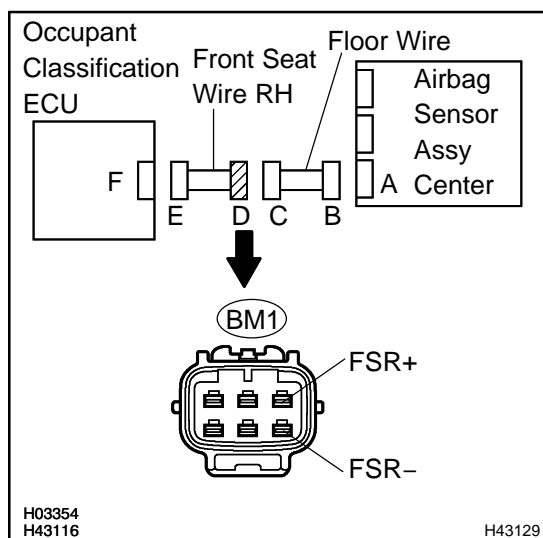
Codes other than code B1790 may be output at this time, but they are not related to this check.

NG

**REPLACE AIR BAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

END

12 CHECK FRONT SEAT WIRE RH(TO B+)

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from battery, and wait for at least 90 seconds.
- (c) Disconnect the front seat wire RH connector from the floor wire.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BM1-1 (FSR+) - Body ground	Ignition switch ON	Below 1 V
BM1-4 (FSR-) - Body ground	Ignition switch ON	Below 1 V

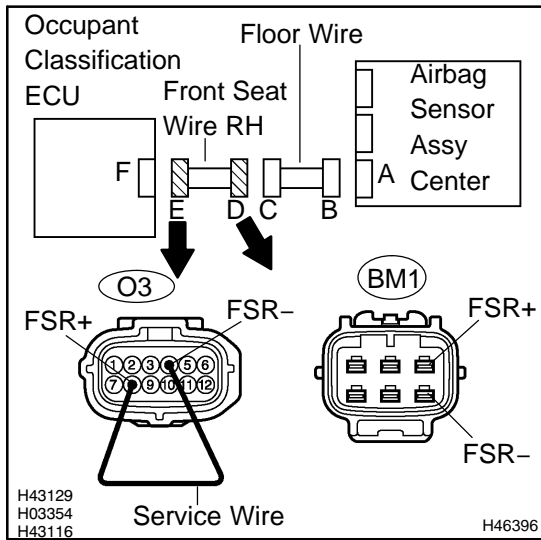
NG

REPLACE FRONT SEAT WIRE RH

OK

REPLACE FLOOR WIRE

13 CHECK FRONT SEAT WIRE RH(OPEN)



(a) Disconnect the front seat wire RH connector from the floor wire.

HINT:

The service wire has already been inserted into connector "E".

(b) Measure the resistance according to the value(s) in the table below.

Standard:

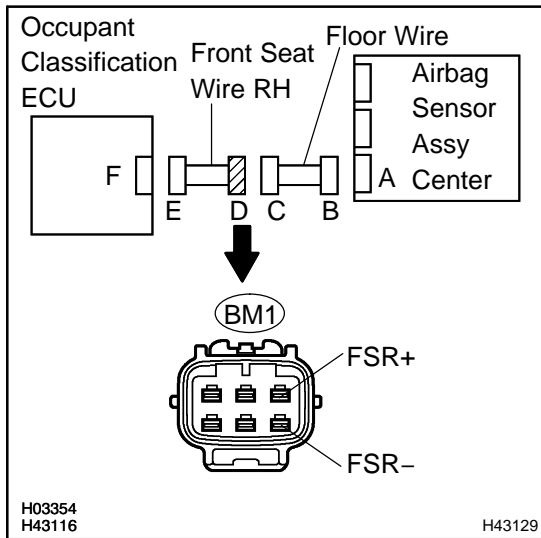
Tester connection	Condition	Specified condition
BM1-1 (FSR+) - BM1-4 (FSR-)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

REPLACE FLOOR WIRE

14 CHECK FRONT SEAT WIRE RH(SHORT)



(a) Disconnect the front seat wire RH connector from the floor wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

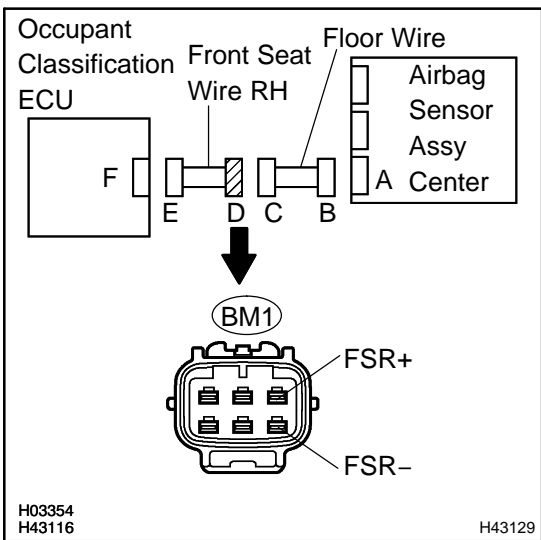
Tester connection	Condition	Specified condition
BM1-1 (FSR+) - BM1-4 (FSR-)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

REPLACE FLOOR WIRE

15 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Disconnect the front seat wire RH connector from the floor wire.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BM1-1 (FSR+) - Body ground	Always	1 MΩ or Higher
BM1-4 (FSR-) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE FRONT SEAT WIRE RH**

OK

REPLACE FLOOR WIRE

DTC	B1793	OCCUPANT CLASSIFICATION SENSOR POWER SUPPLY CIRCUIT MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

The occupant classification sensor power supply circuit consists of the occupant classification ECU and the occupant classification sensors.

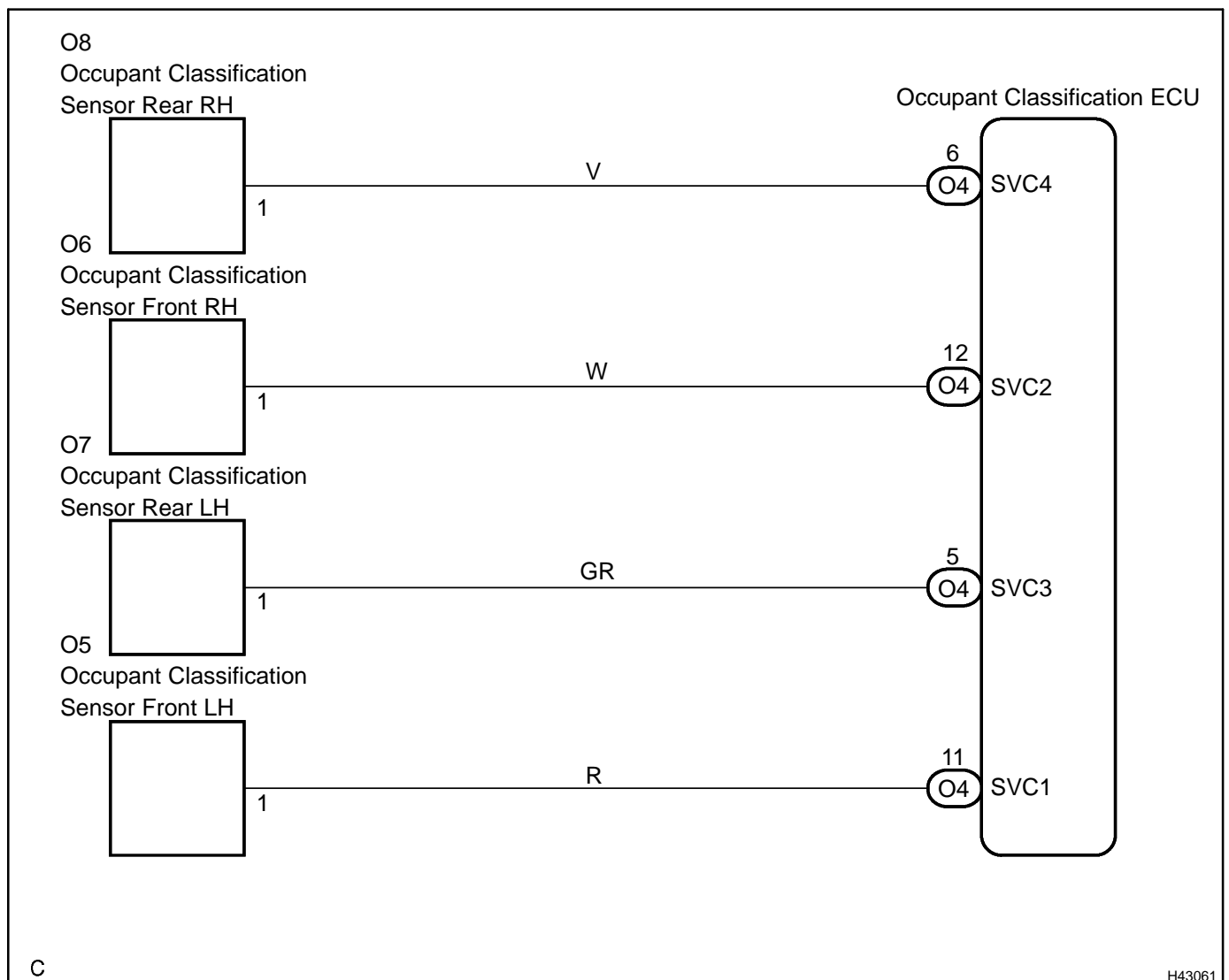
DTC B1793 is recorded when a malfunction is detected in the occupant classification sensor power supply circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1793	<ul style="list-style-type: none"> The occupant classification ECU receives a line short signal, an open signal, short to ground signal or B+ short signal in the occupant classification sensor power supply circuit for 2 seconds. Occupant classification ECU malfunction 	<ul style="list-style-type: none"> Front RH seat assy (Occupant classification sensors) Occupant classification ECU Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1793 of the occupant classification system.

WIRING DIAGRAM



C

H43061

INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front RH seat assy installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1 CHECK DTC

- (a) Turn the ignition switch to the ON position.
 (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
 (d) Turn the ignition switch to the ON position.
 (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1793 is not output.

HINT:

Codes other than code B1793 may be output at this time, but they are not related to this check.

NG → Go to step 2

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 CHECK CONNECTION OF CONNECTORS

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensors.

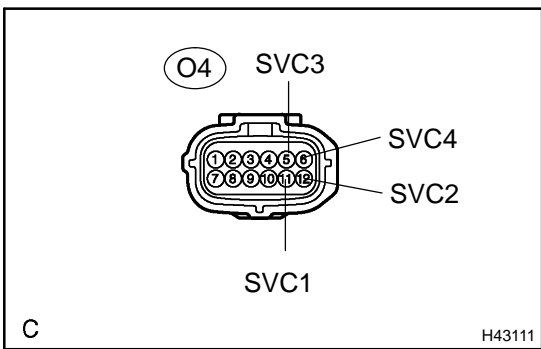
OK:

The connectors are connected.

NG → CONNECT CONNECTORS, THEN GO TO STEP 1

OK

3 CHECK FRONT SEAT WIRE RH(TO B+)



- (a) Disconnect the occupant classification ECU connector and the 4 occupant classification sensor connectors.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

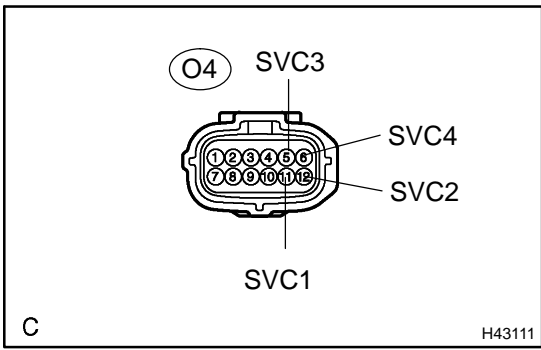
Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - Body ground	Ignition switch ON	Below 1 V
O4-6 (SVC4) - Body ground	Ignition switch ON	Below 1 V
O4-11 (SVC1) - Body ground	Ignition switch ON	Below 1 V
O4-12 (SVC2) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Measure the resistance according to the value(s) in the table below.

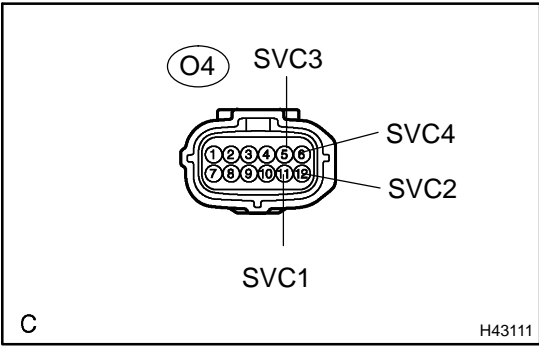
Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - Body ground	Always	1 MΩ or Higher
O4-6 (SVC4) - Body ground	Always	1 MΩ or Higher
O4-11 (SVC1) - Body ground	Always	1 MΩ or Higher
O4-12 (SVC2) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE FRONT SEAT WIRE RH**

OK

5 CHECK FRONT SEAT WIRE RH(OPEN)



(a) Measure the resistance according to the value(s) in the table below.

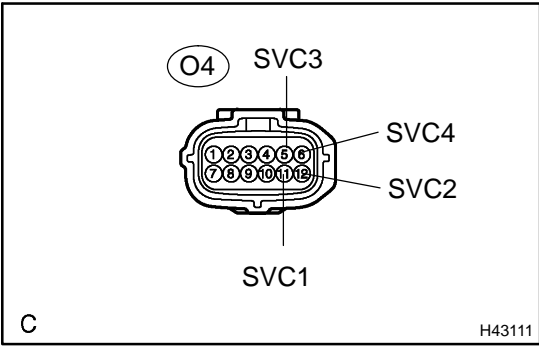
Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - O7-1 (SVC3)	Always	Below 1 Ω
O4-6 (SVC4) - O8-1 (SVC4)	Always	Below 1 Ω
O4-11 (SVC1) - O5-1 (SVC1)	Always	Below 1 Ω
O4-12 (SVC2) - O6-1 (SVC2)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH(SHORT)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O4-5 (SVC3) - O4-6 (SVC4)	Always	1 MΩ or Higher
O4-6 (SVC4) - O4-11 (SVC1)	Always	1 MΩ or Higher
O4-11 (SVC1) - O4-12 (SVC2)	Always	1 MΩ or Higher
O4-12 (SVC2) - O4-5 (SVC3)	Always	1 MΩ or Higher
O4-12 (SVC2) - O4-6 (SVC4)	Always	1 MΩ or Higher
O4-11 (SVC1) - O4-5 (SVC3)	Always	1 MΩ or Higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	RECHECK DTC
----------	--------------------

- (a) Connect the occupant classification ECU connector and the 4 occupant classification sensor connectors.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the LOCK position.
- (f) Turn the ignition switch to the ON position.
- (g) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1793 is not output.

HINT:

Codes other than code B1793 may be output at this time, but they are not related to this check.

NG	Go to step 8
-----------	---------------------

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)
--

8	REPLACE OCCUPANT CLASSIFICATION ECU
----------	--

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION
----------	---------------------------------------

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NG	Go to step 12
-----------	----------------------

OK

10 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG **Go to step 12**

OK

11 RECHECK DTC

- (a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1793 is not output.

HINT:

Codes other than code B1793 may be output at this time, but they are not related to this check.

NG **Go to step 12**

OK

END

12 REPLACE FRONT RH SEAT ASSY

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the front RH seat assy (see page [72-20](#)).

NEXT**13 CHECK PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****14 CHECK PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1794	OCCUPANT CLASSIFICATION ECU BATTERY POSITIVE LINE OPEN
------------	--------------	---

CIRCUIT DESCRIPTION

This circuit consists of the occupant classification ECU and the power source circuit (battery, fuse, wire harness).

DTC B1794 is recorded when a malfunction is detected in the occupant classification ECU or the power source circuit.

HINT:

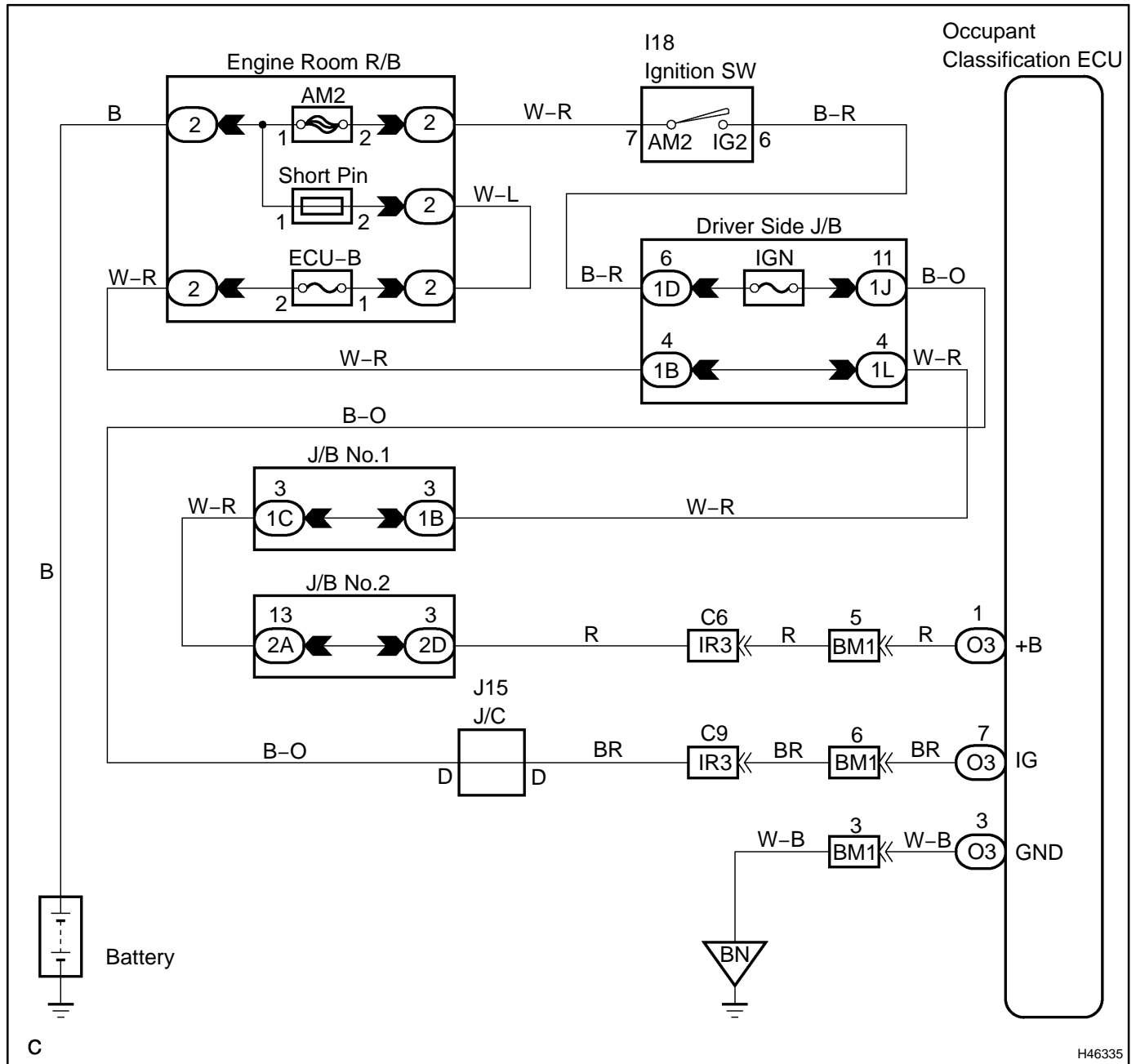
When DTC B1794 is output after switching the ignition switch LOCK-ON-LOCK 50 times in a row when a malfunction occurs in the power circuit for the occupant classification system, the DTC will be output again even after being cleared, unless the malfunction is repaired.

DTC No.	DTC Detecting Condition	Trouble Area
B1794	<ul style="list-style-type: none"> • The ignition switch is turned from LOCK to ON, hold for 10 seconds or more, and back to LOCK again 50 times in a row when a malfunction occurs in the power circuit for the occupant classification system. • Occupant classification ECU malfunction 	<ul style="list-style-type: none"> • Battery • ECU-B Fuse • Front seat wire RH • Occupant classification ECU

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1794 of the occupant classification system.

WIRING DIAGRAM



1 CHECK BATTERY

- (a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG → REPLACE BATTERY

OK

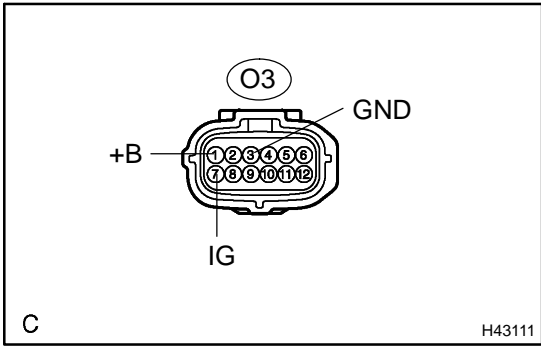
2 CHECK FUSE

- (a) Check the ECU-B fuse.
Standard: Below 1 Ω

NG → REPLACE FUSE

OK

3 CHECK WIRE HARNESS(SOURCE VOLTAGE)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connector from the occupant classification ECU.
- (d) Connect the negative (-) terminal cable to the battery.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage and resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O3-1 (+B) - Body ground	Always	10 to 14 V
O3-3 (GND) - Body ground	Always	Below 1 Ω
O3-7 (IG) - Body ground	Ignition switch ON	10 to 14 V

NG → REPLACE WIRE HARNESS

OK

4 CHECK DTC

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position.
- (d) Turn the ignition switch to the ON position, and wait for at least 10 seconds.
- (e) Using the hand-held tester, check the DTCs of the occupant classification ECU (see page 05-1219).

OK:

DTC B1794 is not output.

HINT:

Codes other than code B1794 may be output at this time, but they are not related to this check.

NG

Go to step 5

OK

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

5 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

6 PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform the "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT

7 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform the "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1795	OCCUPANT CLASSIFICATION ECU MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

DTC B1795 is recorded when a malfunction is detected in the occupant classification ECU. Troubleshoot DTC B1771 first when the DTCs B1771 and B1795 are output simultaneously.

DTC No.	DTC Detecting Condition	Trouble Area
B1795	<ul style="list-style-type: none"> • Occupant classification ECU circuit malfunction • Occupant classification ECU malfunction • The occupant classification ECU receives a short to ground signal in the passenger side buckle switch circuit for 2 seconds. 	<ul style="list-style-type: none"> • Front seat inner belt assy RH (Buckle switch RH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1795 of the occupant classification system.

INSPECTION PROCEDURE

1	CHECK DTC
----------	------------------

- Turn the ignition switch to the ON position, and wait for at least 10 seconds.
- Using the hand-held tester, check the DTCs (see page 05-1219).

Result:

A: DTCs B1771 and B1795 are output.

B: DTC B1795 is output.

HINT:

Codes other than codes B1771 or B1795 may be output at this time, but they are not related to this check.

A → **GO TO DTC B1771 (SEE PAGE 05-1442)**

B

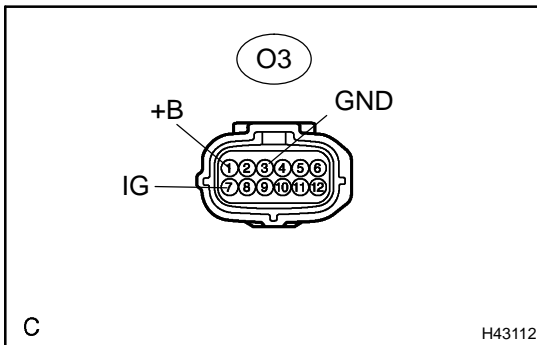
2	CHECK FUSE
----------	-------------------

- Check the ECU-B fuse.

Standard: Below 1 Ω

NG → **REPLACE FUSE**

OK

3 CHECK WIRE HARNESS(SOURCE VOLTAGE)

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the "O3" connector from the occupant classification ECU.
- (d) Connect the negative (-) terminal cable to the battery.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage and resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
O3-1 (+B) - Body ground	Always	10 to 14 V
O3-3 (GND) - Body ground	Always	Below 1 Ω
O3-7 (IG) - Body ground	Ignition switch ON	10 to 14 V

NG**REPLACE WIRE HARNESS OR BATTERY****OK****4 REPLACE OCCUPANT CLASSIFICATION ECU**

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page 60-67).

NEXT**5 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed.

NEXT**6 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

DTC	B1796	SLEEP OPERATION FAILURE OF OCCUPANT CLASSIFICATION ECU
------------	--------------	---

CIRCUIT DESCRIPTION

During sleep mode, the occupant classification ECU reads the condition of each sensor while the ignition switch is off. In this mode, if the occupant classification ECU detects an internal malfunction, DTC B1796 is output.

DTC No.	DTC Detecting Condition	Trouble Area
B1796	• Occupant classification ECU malfunction	• Occupant classification ECU

HINT:

When DTC B1150/23 is detected as a result of troubleshooting for the supplemental restraint system, perform troubleshooting for DTC B1796 of the occupant classification system.

INSPECTION PROCEDURE

1	CHECK DTC
----------	------------------

- (a) Turn the ignition switch to the ON position.
- (b) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (c) Turn the ignition switch to the LOCK position, and wait for at least 10 seconds.
- (d) Turn the ignition switch to the ON position.
- (e) Using the hand-held tester, check the DTCs (see page 05-1219).

OK:

DTC B1796 is not output.

HINT:

Codes other than code B1796 may be output at this time, but they are not related to this check.

NG 

Go to step 2

OK 

USE SIMULATION METHOD TO CHECK (SEE PAGE 05-1213)

2 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page [60-67](#)).

NEXT**3 PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Connect the negative (-) terminal cable to the battery.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:**The "COMPLETED" is displayed.****NEXT****4 PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).
Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT**END**

SOURCE VOLTAGE DROP

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag sensor assy center in case the source voltage drops.

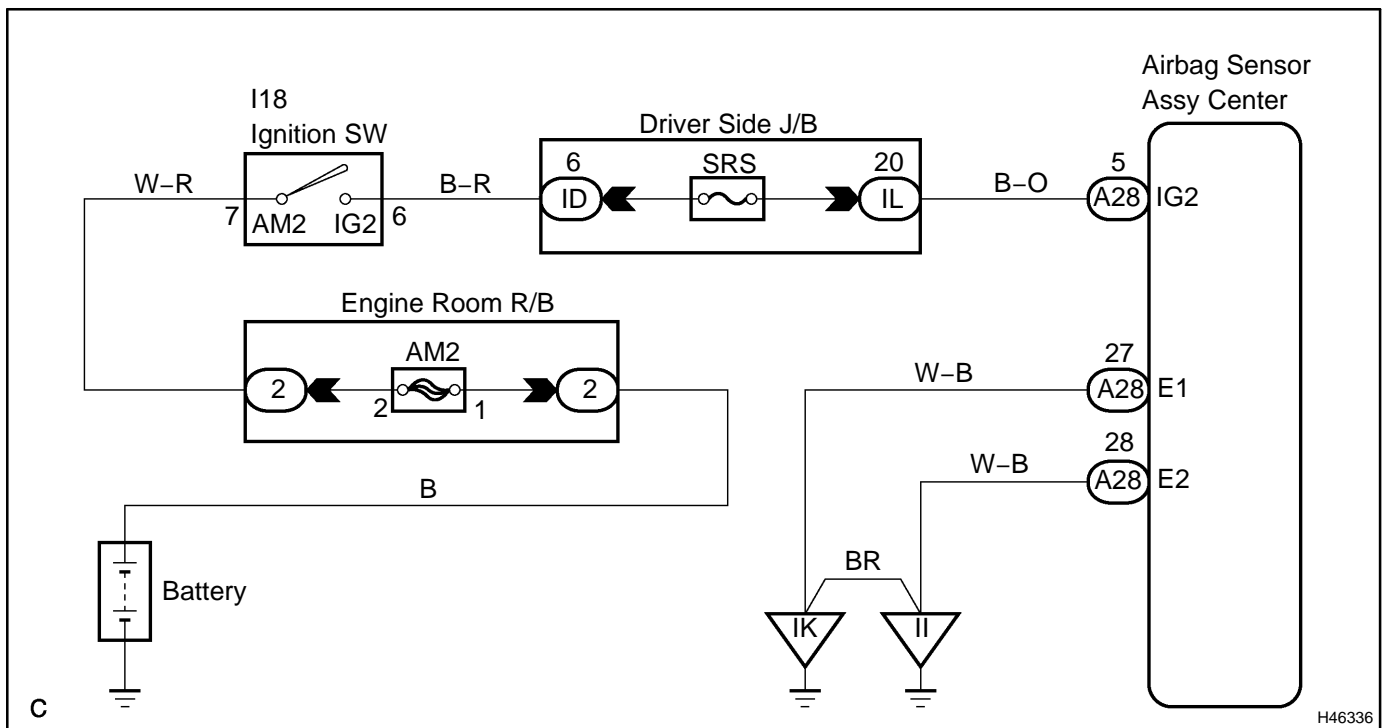
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

A malfunction in this circuit is displayed differently from other codes. The source voltage drop is indicated when the SRS warning light comes on while no DTC is detected.

A malfunction in this circuit is not recorded in the airbag sensor assy center. The SRS warning light automatically goes off when the source voltage returns to normal.

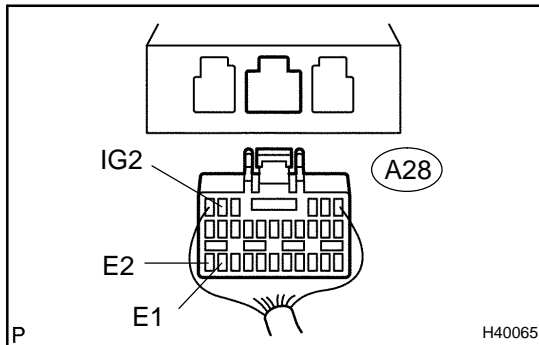
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK SOURCE VOLTAGE



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the connector from the airbag sensor assy center.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage and resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-5 (IG2) - Body ground	Ignition switch ON	10 to 14 V
A28-27 (E1) - Body ground	Always	Below 1 Ω
A28-28 (E2) - Body ground	Always	Below 1 Ω

NG

REPLACE WIRE HARNESS (BATTERY - AIRBAG SENSOR ASSY CENTER), CHARGING SYSTEM AND BATTERY

OK

2 CHECK SRS WARNING LIGHT

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the airbag sensor assy center connector.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Operate all components of the electrical system (defogger, wipers, headlight, heater blower, etc.) and check the SRS warning light operation.

OK:

The SRS warning light does not come on.

NG

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

OK

END

TROUBLE IN INDICATOR OF PASSENGER AIRBAG ON/OFF INDICATOR

CIRCUIT DESCRIPTION

The occupant classification system detects the front passenger seat condition. It then informs a passenger of the front passenger airbag assembly condition (activated/not activated) by the passenger airbag ON/OFF indicator.

The table below shows the normal indication condition of the passenger airbag ON/OFF indicator and the front passenger seat condition.

Front passenger seat condition	ON Indicator	OFF Indicator
Adult is seated.	ON	OFF
Child is seated.	OFF	ON
Vacant	OFF	OFF
Occupant classification system failure	OFF	ON

INSPECTION PROCEDURE

1 CHECK SRS WARNING LIGHT

(a) Turn the ignition switch to the ON position, and check the SRS warning light condition.

HINT:

If this trouble occurs, the SRS warning light is off. If it is on, a DTC is output. Troubleshoot for the output DTC.

OK:

The SRS warning light does not come on.

NG

CHECK DTC

OK

2 CHECK PASSENGER AIRBAG ON/OFF INDICATOR OPERATION

(a) Turn the ignition switch to the ON position.

(b) Check if the passenger airbag ON/OFF indicator correctly indicates the front passenger seat condition.

OK:

Front passenger seat condition	ON Indicator	OFF Indicator
Adult is seated.	ON	OFF
Child is seated.	OFF	ON
Vacant	OFF	OFF
Occupant classification system failure	OFF	ON

NG

Go to step 3

OK

END

3 | PERFORM ZERO POINT CALIBRATION

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed on the tester screen.

NG 

Go to step 5

OK **4 | PERFORM SENSITIVITY CHECK**

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).

OK:

Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG 

Go to step 5

OK **END****5 | RETIGHTEN FRONT SEAT ASSEMBLY RH BOLT**

- (a) Turn the ignition switch to the LOCK position.
- (b) Loosen the 4 installation bolts of the front RH seat assy.
- (c) Tighten the 4 installation bolts of the front RH seat assy to the specified torque.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)**NEXT** **6 | PERFORM ZERO POINT CALIBRATION**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch to the ON position.
- (c) Using the hand-held tester, perform "Zero point calibration" (see page 05-1209).

OK:

The "COMPLETED" is displayed on the tester screen.

NG 

Go to step 8

OK 

7	PERFORM SENSITIVITY CHECK
----------	----------------------------------

- (a) Using the hand-held tester, perform "Sensitivity check" (see page 05-1209).

OK:

Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NG

Go to step 8

OK

END

8	CHECK CONNECTORS
----------	-------------------------

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Check that the connectors are properly connected to the occupant classification ECU and the 4 occupant classification sensors.

OK:

The connectors are connected.

- (d) Disconnect the connectors from the occupant classification ECU and the 4 occupant classification sensors.
 (e) Check that the connectors are not damaged or deformed.

OK:

The connectors are normal.

NG

REPLACE CONNECTORS, THEN GO TO STEP 1

OK

9	CHECK DTC
----------	------------------

- (a) Connect the connectors to the occupant classification ECU and the 4 occupant classification sensors.
 (b) Connect the negative (-) terminal cable to the battery.
 (c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 (d) Clear the DTCs stored in memory (see page 05-1219).

HINT:

First clear DTCs stored in the occupant classification ECU and then in the airbag sensor assy center.

- (e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
 (f) Check the DTCs (see page 05-1219).

OK:

DTC is not output.

NG

**REPLACE AIRBAG SENSOR ASSY CENTER
(SEE PAGE 60-55)**

OK

10 REPLACE OCCUPANT CLASSIFICATION ECU

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Replace the occupant classification ECU (see page [60-67](#)).

HINT:

Perform the inspection using parts from a normal vehicle if possible.

NEXT

11 PERFORM ZERO POINT CALIBRATION

- (a) Connect the negative (-) terminal cable to the battery.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position.
- (d) Using the hand-held tester, perform "Zero point calibration" (see page [05-1209](#)).

OK:

The "**COMPLETED**" is displayed on the tester screen.

NEXT

12 PERFORM SENSITIVITY CHECK

- (a) Using the hand-held tester, perform "Sensitivity check" (see page [05-1209](#)).

OK:

Standard value: 27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

SRS WARNING LIGHT CIRCUIT MALFUNCTION (ALWAYS LIGHT UP, WHEN DTC IS NOT OUTPUT)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter assy.

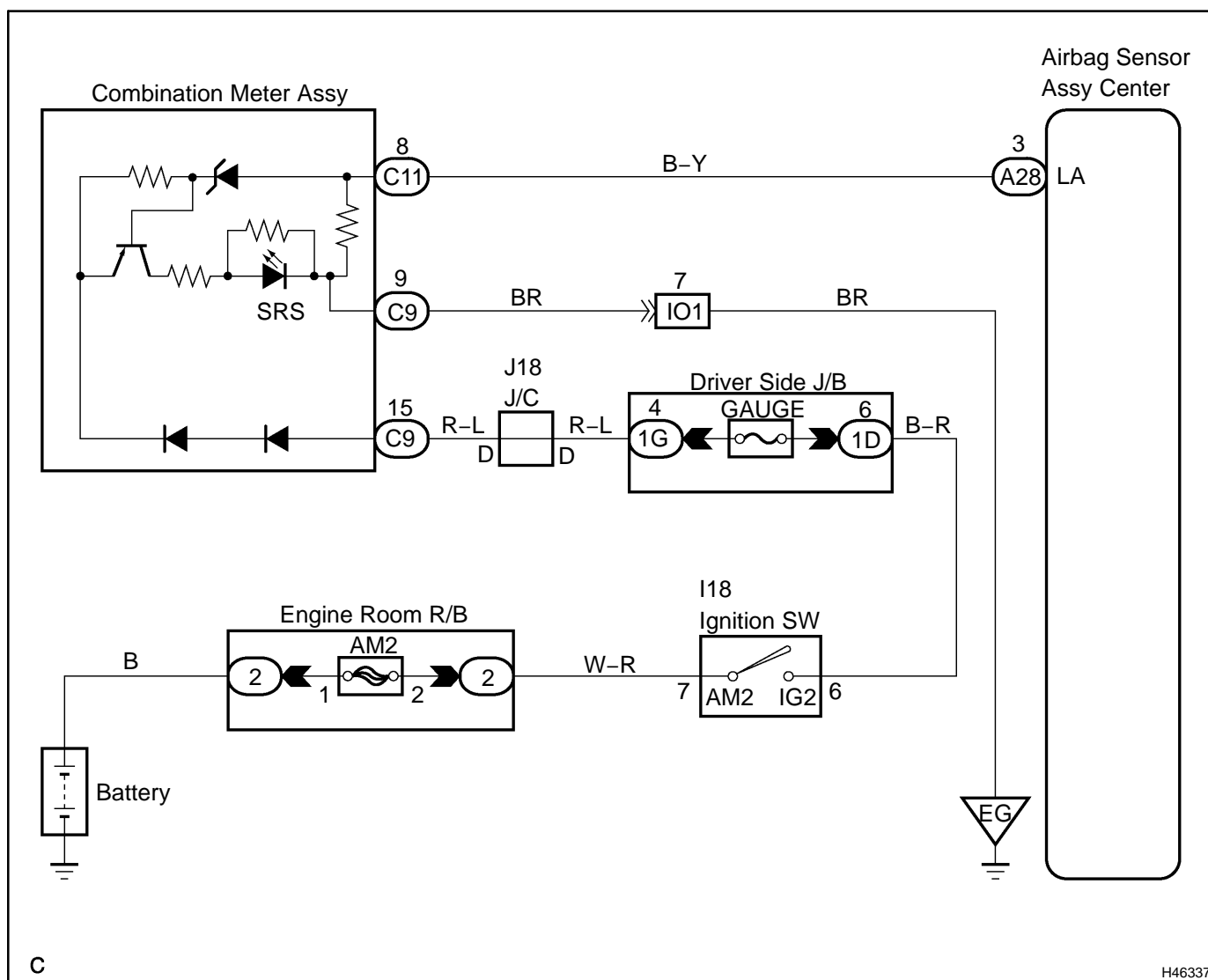
When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, and then goes off automatically.

If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of the abnormality. When terminals TC and CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

The airbag warning light on the combination meter assy stays on when;

- The connector of the airbag sensor assy center is not connected securely
- The wire harness between the airbag sensor assy center and the combination meter assy has a short to B+
- The combination meter assy malfunctions

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CONNECTOR

- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Check that the connectors are properly connected to the airbag sensor assy center and the combination meter assy.

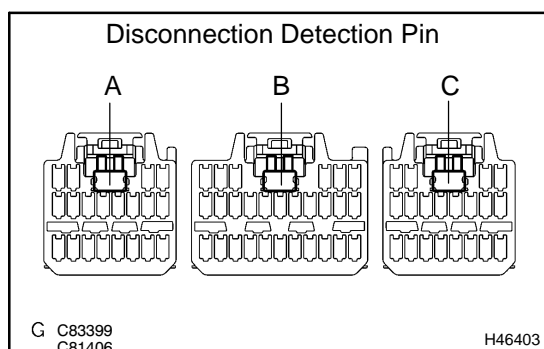
OK:

The connectors are connected.

NG → CONNECT CONNECTORS

OK

2 PERFORM A VISUAL CHECK OF THE DISCONNECTION DETECTION PIN



- (a) With the 3 connectors (A, B and C) connected to the airbag sensor assy center, place the tester leads onto any 2 or 3 disconnection detection pins and check for continuity.

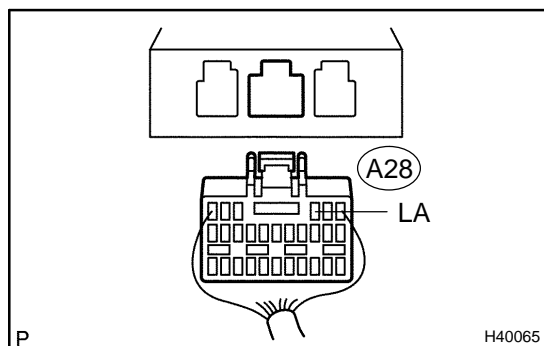
OK:

Continuity

NG → REPLACE AIRBAG SENSOR ASSY CENTER CONNECTOR

OK

3 CHECK SOURCE VOLTAGE



- (a) Disconnect the connector from the airbag sensor assy center.
- (b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (c) Turn the ignition switch to the ON position.
- (d) Measure the voltage according to the value(s) in the table below.

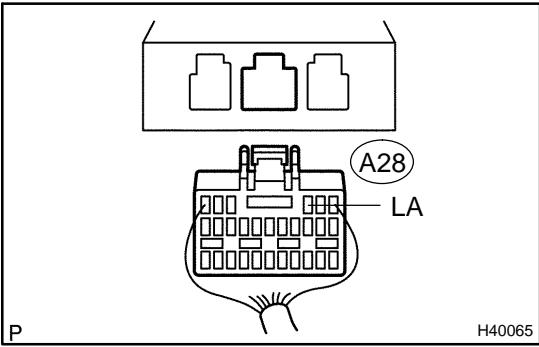
Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - Body ground	Ignition switch ON	8 to 14 V

NG → Go to step 6

OK

4 CHECK INSTRUMENT PANEL WIRE(TO GROUND)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Remove the combination meter assy (see page 71-13).
- (d) Measure the resistance according to the value(s) in the table below.

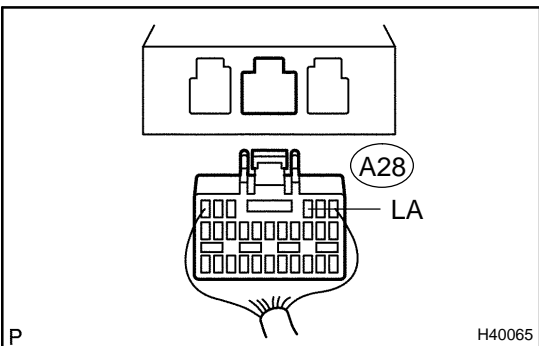
Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE INSTRUMENT PANEL WIRE (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)**

OK

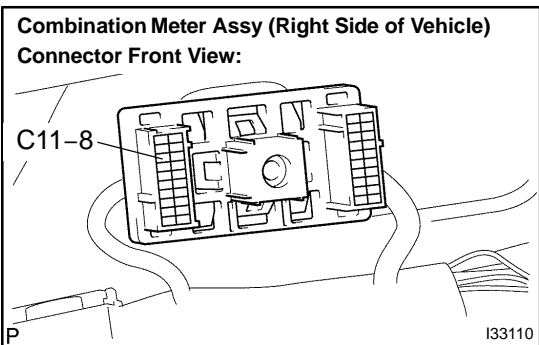
5 CHECK INSTRUMENT PANEL WIRE(OPEN)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - C11-8	Always	Below 1 Ω

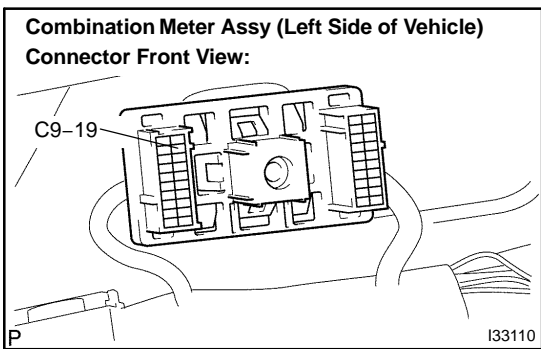


NG → **REPLACE INSTRUMENT PANEL WIRE (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)**

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

6 CHECK INSTRUMENT PANEL WIRE



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Remove the combination meter assy (see page 71-13).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

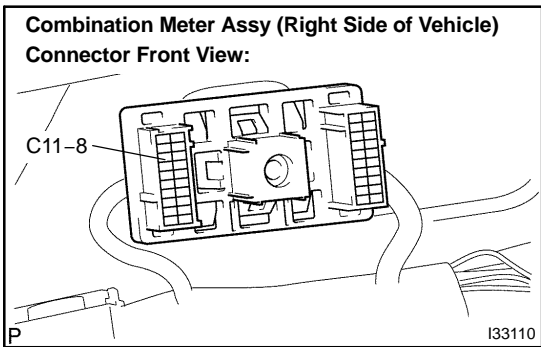
Standard:

Tester connection	Condition	Specified condition
C9-19 - Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE (BATTERY - COMBINATION METER ASSY), CHARGING SYSTEM OR BATTERY**

OK

7 CHECK SOURCE VOLTAGE



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Connect the connector to the airbag sensor assy center.
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

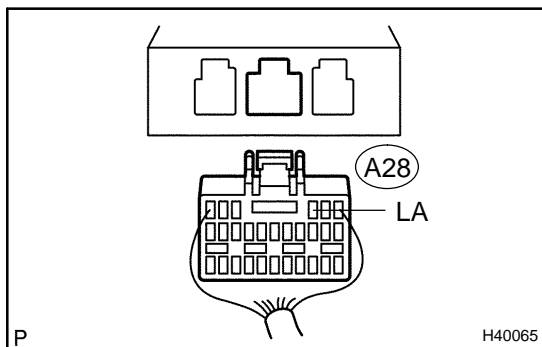
Standard:

Tester connection	Condition	Specified condition
C11-8 - Body ground	Ignition switch ON	8 to 14 V

NG → **Go to step 8**

OK

REPLACE COMBINATION METER ASSY (SEE PAGE 71-13)

8 CHECK INSTRUMENT PANEL WIRE(TO GROUND)

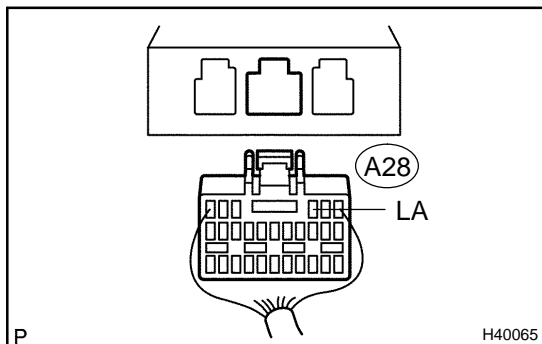
- Turn the ignition switch to the LOCK position
- Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- Disconnect the connector from the airbag sensor assy center.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - Body ground	Always	1 M Ω or Higher

NG

REPLACE INSTRUMENT PANEL WIRE (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)

OK**9 CHECK INSTRUMENT PANEL WIRE(OPEN)**

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - C11-8	Always	Below 1 Ω

NG

REPLACE INSTRUMENT PANEL WIRE (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

SRS WARNING LIGHT CIRCUIT MALFUNCTION (DOES NOT LIGHT UP, WHEN IGNITION SWITCH IS TURNED TO ON)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter assy.

When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, and then goes off automatically.

If there is a malfunction in the SRS, the SRS warning light comes on to inform the driver of the abnormality. When terminals TC and CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

See page [05-1517](#).

INSPECTION PROCEDURE

1 CHECK BATTERY

- (a) Measure the voltage of the battery.
Standard: 11 to 14 V

NG

REPLACE WIRE HARNESS (BATTERY - AIRBAG SENSOR ASSY CENTER), AND CHARGING SYSTEM

OK

2 CHECK AIR BAG SENSOR ASSY CENTER

- (a) Turn the ignition switch to the LOCK position.
 (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
 (c) Disconnect the connector from the airbag sensor assy center.
 (d) Connect the negative (-) terminal cable from the battery, and wait for at least 2 seconds.
 (e) Turn the ignition switch to the ON position.
 (f) Check the SRS warning light condition.

OK:

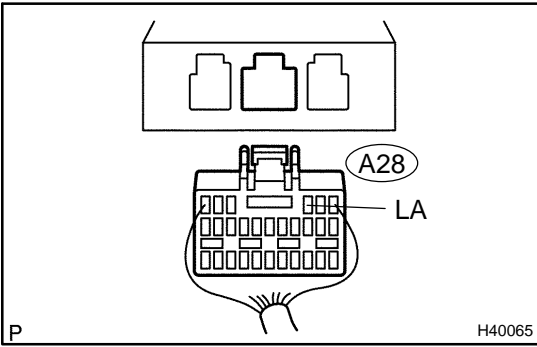
The SRS warning light comes on.

NG

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE [60-55](#))

OK

3 CHECK WIRE HARNESS



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Remove the combination meter assy (see page 71-13).
- (d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
- (e) Turn the ignition switch to the ON position.
- (f) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-3 (LA) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE WIRE HARNESS (AIRBAG SENSOR ASSY CENTER - COMBINATION METER ASSY)**

OK

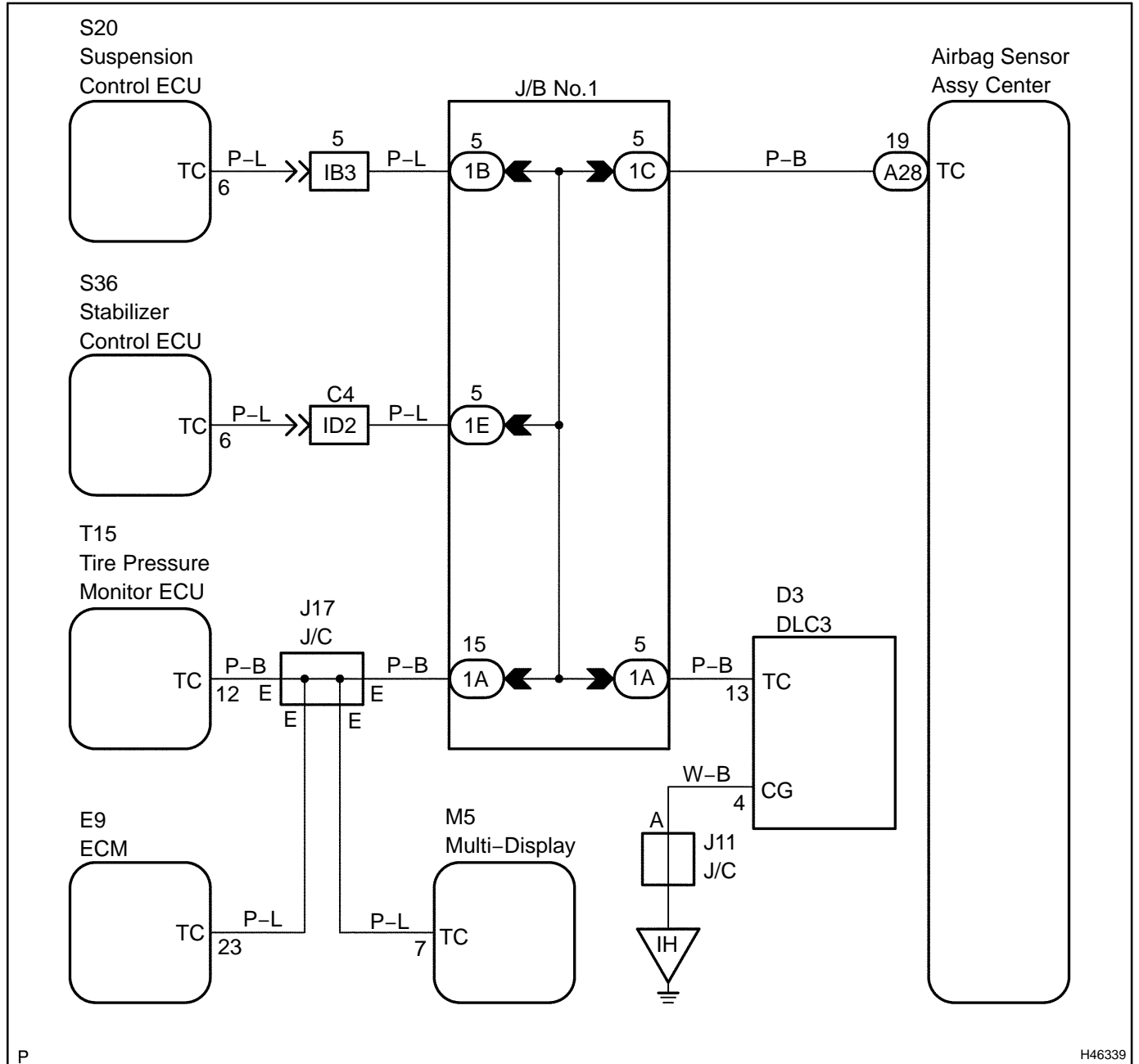
REPLACE COMBINATION METER ASSY (SEE PAGE 71-13)

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.
 The DTCs are displayed by blinking the SRS warning light.

WIRING DIAGRAM

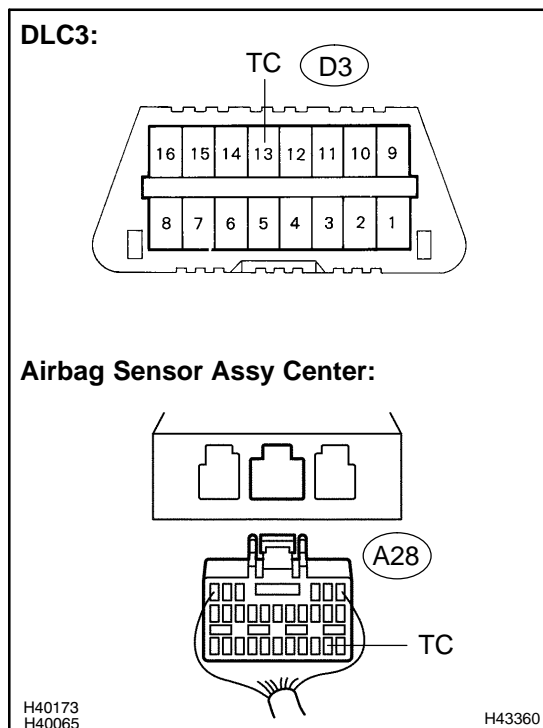


HINT:

When each warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (DLC3 - AIRBAG SENSOR ASSY CENTER)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
- (c) Disconnect the airbag sensor assy center connector.
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

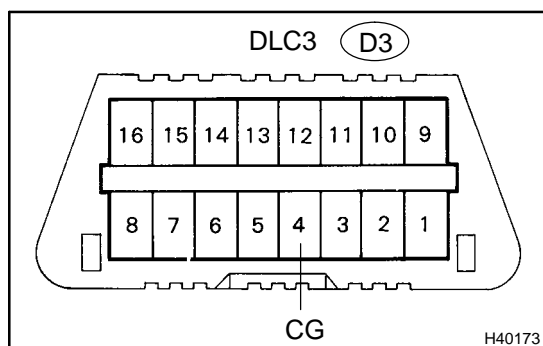
Tester connection	Condition	Specified condition
D3-13 (TC) - A28-19 (TC)	Always	Below 1 Ω

NG

REPLACE WIRE HARNESS (TC of DLC3 - TC of AIRBAG SENSOR ASSY CENTER)

OK

2 CHECK WIRE HARNESS (CG of DLC3 - BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

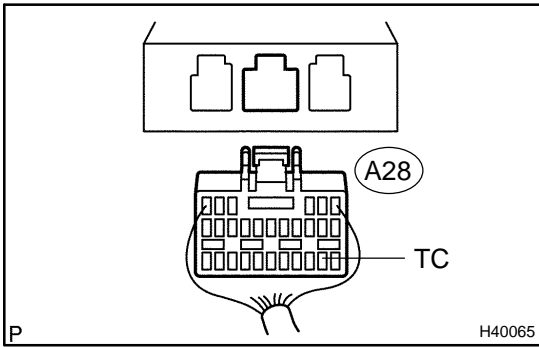
Tester connection	Condition	Specified condition
D3-4 (CG) - Body ground	Always	Below 1 Ω

NG

REPAIR OR REPLACE WIRE HARNESS (CG of DLC3 - BODY GROUND)

OK

3 CHECK WIRE HARNESS (TC of AIRBAG SENSOR ASSY CENTER - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A28-19 (TC) - Body ground	Always	1 MΩ or Higher

NG → **REPLACE WIRE HARNESS AND EACH ECU**

OK

REPLACE AIR BAG SENSOR ASSY CENTER (SEE PAGE 60-55)

LIGHTING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05B2A-01

1 VEHICLE BROUGHT TO WORK SHOP

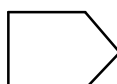


2 CUSTOMER PROBLEM ANALYSIS (See page 05-1528)

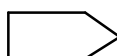


3 CHECK MULTIPLEX COMMUNICATION SYSTEM (See page 05-2254)

(a) Check that DTC is output.



DTC IS OUTPUT (PROCEED TO "MULTIPLEX COMMUNICATION SYSTEM")



DTC IS NOT OUTPUT (GO TO STEP 4)

4 PROBLEM SYMPTOMS TABLE (See page 05-1543)



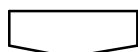
5 TERMINALS OF ECU (See page 05-1539)



6 CIRCUIT INSPECTION (See Page 05-1546 - 05-1599)



7 IDENTIFICATION OF PROBLEM



8 REPAIR OR REPLACE



9 CONFIRMATION TEST



END

CUSTOMER PROBLEM ANALYSIS CHECK

LIGHTING SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km Mile

Date Problem First Occurred	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather
	Outdoor Temperature

Fine Cloudy Rainy Snowy
 Various/ Others
 Hot Warm Cool
 Cold (Approx. °F (°C))

Malfunction System	<input type="checkbox"/> Fog light system
	<input type="checkbox"/> Turn signal and hazard warning system
	<input type="checkbox"/> Illumination light system
	<input type="checkbox"/> Interior light system
	<input type="checkbox"/> Headlight system
	<input type="checkbox"/> Taillight system
	<input type="checkbox"/> Stop light system
	<input type="checkbox"/> Others

N

I30682

PRE-CHECK

1. USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

Hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the hand-held tester operator's manual for further details.

2. DTC CLEAR

- (a) DTC and the freeze frame data can be erased by operating the hand-held tester.

3. DATA LIST

HINT:

By the DATA LIST displayed on the hand-held tester, you can read the value of the switches, sensors, actuators and so on without removing any part. Reading the DATA LIST as the first step of troubleshooting is one of the methods to shorten labor time.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON.
- (c) According to the display on the tester, read the "DATA LIST".

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
ACC SW	ACC SW signal/ ON or OFF	ON: Ignition key is in ACC, ON or START position OFF: Ignition key is in OFF position	-
IG SW	IG SW signal/ ON or OFF	ON: Ignition key is in ON or START position OFF: Ignition key is in OFF or ACC position	-
PARKING BRAKE SW	Parking brake switch signal/ON or OFF	ON: Parking brake switch is ON OFF: Parking brake is OFF	-
LUGG COURTSY SW	Back door courtesy SW signal/ON or OFF	ON: Back door is open OFF: Back door is closed	-
D DOR CTY SW	Driver's door courtesy SW signal/ON or OFF	ON: Driver's door is open OFF: Driver's door is closed	-
P DOR CTY SW	Passenger's door courtesy SW signal/ ON or OFF	ON: Front passenger's door is open OFF: Front passenger's door is closed	-
Rr DOR CTY SW	Rear door courtesy SW signal/ON or OFF	ON: Either right or left rear passenger's door is open OFF: Both the right and left passenger's doors are closed	-
P LOCK POS SW	Front passenger's door lock position SW signal/ON or OFF	ON: Door lock is in unlock position OFF: Door lock is in lock position	-
Rr. LOCK POS SW	Rear passenger's door lock position SW sig- nal/ON or OFF	ON: Door lock is in unlock position OFF: Door lock is in lock position	-
ALT L SIG	Alternator (Generator) signal/ON or OFF	ON: Engine is running OFF: Engine is stopping	-
HIGH FLASHER SW	Headlight dimmer SW signal/ON or OFF	ON: Headlight dimmer switch is in FLASH position OFF: Headlight dimmer switch is in except FLASH position	-
AUTO LIGHT SW	Head light control SW signal/ON or OFF	ON: Light control switch is in AUTO position OFF: Light control switch is in except AUTO position	-
HEAD LIGHT SW	Head light control SW signal/ON or OFF	ON: Light control switch is in HEAD position OFF: Light control switch is in except HEAD position	-
TAIL LIGHT SW	Taillight SW signal/ ON or OFF	ON: Light control switch is in TAIL or HEAD position OFF: Light control switch is in OFF position	-

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
ILLUMINATE RATE	Illumination rate information	0.8 ms – 22 ms (This is the time to be taken for the automatic light control sensor to generate one circle of frequency according to the brightness.)	-
TAIL CANCEL SW	Tail cancel SW signal/ ON or OFF	ON: Tail cancel switch of the light control rheostat is in ON position OFF: Tail cancel switch of the light control rheostat is in OFF position	-
LIGHTING TIME	Lighting time/7.5 s, 15 s or 30 s	-	-
ILLUMI SYSTEM	Operation of illumination system/ ON or OFF	-	-
LIGHT CONTROL	Light control condition of illumination system/ OFF or ON	ON: Illumination system is ON OFF: Illumination system is OFF	-
I/L ON/ACC OFF	Interior light ON when ACC OFF/ON or OFF	-	-
I/L ON/UNLOCK	Interior light ON w/unlock/ON or OFF	-	-
RESPONSE TIME	Response time/ 0.1 s or 1.0 s	-	-
SENSITIVITY	Turn on luminous intensity/ DARK2, DARK1, NORMAL, LIGHT1 or LIGHT2	-	-
LIGHT OFF DELAY	Light auto OFF delay/ OFF, 30 s., 60 s., or 90 s.	-	-
DISP EX ON SEN	Display extinction luminous intensity/ DARK2, DARK1, NORMAL, LIGHT1 or LIGHT2	-	-
DISP EX OFF SEN	Display extinction release luminous intensity/DARK2, DARK1, NORMAL, LIGHT1 or LIGHT2	-	-
DRL FUNCTION	Daytime Running Light function/ ON or OFF	-	-

Body No.2:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
IG SW	IG SW signal/ ON or OFF	ON: Ignition switch is in ON or START position OFF: Ignition switch is in OFF or ACC position	-

4. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without removing any part. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time. The DATA LIST can be displayed during the ACTIVE TEST.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON.
- (c) According to the display on the tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
HAZARD	Turn Hazard light flasher relay ON/OFF	-
HEAD LIGHT	Turn Headlight relay ON/OFF	-
TAIL LIGHT	Turn Tail light relay ON/OFF	-
DRL RLY	(Test Details) Turn DRL relay in the turn signal flasher ON/OFF (Vehicle Condition) IG switch is ON, engine is stopped and light control switch is in OFF position	-
DIMMER SIG	Turn auto dimmer ON/OFF	-
ILLUMI OUTPUT	(Test Details) Turn Interior light and Key illumination ON/OFF (Vehicle Condition) Interior light SW is in Door position and all doors are closed	-
DOME RLY CUT	Dome relay cut ON/OFF	-

Body No.2:

Item	Test Details	Diagnostic Note
CONSOLE LIGHT	Center console spot light ON/OFF	-
STEP LIGHT	Foot light and inside door handle illumination ON/OFF	-
SCUFF PLATE LEG	Side step light ON/OFF	-

5. ILLUMINATED ENTRY SYSTEM OPERATION CHECK

- (a) The light that is lit in the illuminated entry system is explained below:
 - (1) Turn the ignition switch to OFF, close all the doors, and set the driver's door in the lock condition.
 - (2) Unlock the door and open any other door, and check that the room light comes on. Close the door, and check that the room light goes off within 15 seconds.
 - (3) Turn the ignition switch to ON and open and close any other door. Check that the room light immediately goes off.
 - (4) Turn ignition switch to OFF.
 - (5) Open and close any door to turn the room light on. Before the room light goes off within 15 seconds, turn the ignition switch to ON, and check that the room light goes off immediately.
 - (6) Turn the ignition switch OFF.
 - (7) Open and close any door to light the room light. Before the light goes off within 15 seconds, lock the driver door. Check that the light goes off immediately.

6. DOME RELAY CUT OPERATION CHECK

- (a) Remove the ignition key and close all doors.
- (b) Open the driver door to turn the room light on, and leave it as opened. Check that the light goes off in about 30 min.
- (c) After the room light goes off, close the driver door.
- (d) Open any door except the driver's door to turn the room light on, and then open the driver's door. Check that room light goes off within 30 min. after opening the driver's door.

- (e) Close all the doors. With the ignition key inserted, open any door to turn the room light on, and then, remove the ignition key. Check that the room light goes off within 30 min.
- (f) Turn one of the room lamp switch on, and close all doors.
- (g) Lock all doors, and check that the room light goes off within 3 seconds.

7. SIDE STEP LAMP OPERATION CHECK

- (a) Turn the ignition switch to OFF, close all the doors, and set the all doors in the lock condition.
- (b) Unlock any of the doors and open one of the front or rear doors, and check that the side step lamp comes on. Close the door and check that the side step lamp goes off within 15 seconds.
- (c) Under the conditions that the ignition switch is ON, open one of the front or rear doors and put the shift in any positions except for P positions, and check that the side step lamp goes off when the vehicle speed exceeds 8 km/h (4.8 mph).
- (d) Then, check that the side step lamp comes on when the vehicle speed become 4 km/h (2.4 mph) or less.

8. LAMP AUTO CUT OPERATION CHECK

- (a) Turn the ignition switch to ON, and turn the headlamp switch to TAIL or HEAD.
- (b) Turn the ignition switch to OFF, and open and close the driver's door. Check the headlamp goes off within 30 seconds.

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTICE:

- **Be sure to record the current value before customizing.**
- **In case of performing the troubleshooting, pay attention as there is a possibility that the function is OFF by customizing. (Example: In case of the symptom in which "The wireless operation does not function", check that the wireless operation is not OFF by customizing, then perform the troubleshooting.)**

ILLUMINATED ENTRY

DISPLAY(ITEM)	DEFAULT	CONTENTS	SETTING
LIGHTING TIME (Lighting Time)	15 s	To change the lighting time after closing the door. (It will quickly fade out in case of turning the ignition ON.	7.5 s / 15 s / 30 s
ILLUMI SYSTEM (Operation of illumination)	ON	Function to light up the step light, center console light and door inside handle light when one of the following occurs; the ignition turned ON, door unlock or door open.	ON / OFF
LIGHT CONTROL (Light control)	ON	Function to light up the step light and door inside handle light when the ignition switch is ON and the shift position is not P.	ON / OFF
I/L ON / UNLOCK (Interior light ON w/ door key unlock)	ON	Function to light up the interior light*, ignition light and step light when unlocking with the door key cylinder. *: Interior light comes on when the interior light switch is at the DOOR position.	ON / OFF
I/L ON/ACC OFF (Illumination system with ACC OFF)	ON	Function to light the interior light* and door courtesy light when the ignition switch is operated from "ACC" to "LOCK". *: interior light comes on when the interior light switch is at the DOOR position.	ON / OFF

LIGHT CONTROL

HINT:

Sensitivity adjustment can hardly be confirmed. Please check by customer's actual driving.

DISPLAY(ITEM)	DEFAULT	CONTENTS	SETTING
LIGHT OFF DELAY (Light Auto OFF Delay)	30 s	Function to keep on lighting the headlight for a certain period of time after closing all the doors with the ignition switch turned OFF from ON under the condition that the light control switch is at HEAD or AUTO with the headlight ON.	OFF / 30 s / 60 s / 90 s
SENSITIVITY (Turn ON luminous intensity)	NORMAL	To adjust the sensitivity of the lighting illumination. Refer to the *3 illustration.	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2
DISP EX ON SEN (Display Extinction Luminous Intensity)	NORMAL	To change the brightness of lowering the lights such as the indicator light of the combination meter, A/C indicator light, clock. Refer to *1 illustration .	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2
DISP EX OFF SEN (Display Extinction Release Luminous Intensity)	NORMAL	To change the brightness of canceling the lowering the lights such as the indicator light of the combination meter, A/C indicator light, clock. Refer to *2 illustration.	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2
DRL FUNCTION (DRL function) (USA ONLY)	ON	ON / OFF of the DRL function.	ON / OFF

Illustration of *1

Brightness of lowering the lights	Dark ←————→ Bright
Setting	DARK2 ——— DARK1 ——— NORMAL ——— LIGHT1 ——— LIGHT2

Illustration of *2

Brightness when canceling the lowering of the lights	Dark ←————→ Bright
Setting	DARK2 ——— DARK1 ——— NORMAL ——— LIGHT1 ——— LIGHT2

Illustration of *3

Lighting brightness	Dark ←————→ Bright
Setting	DARK2 ——— DARK1 ——— NORMAL ——— LIGHT1 ——— LIGHT2

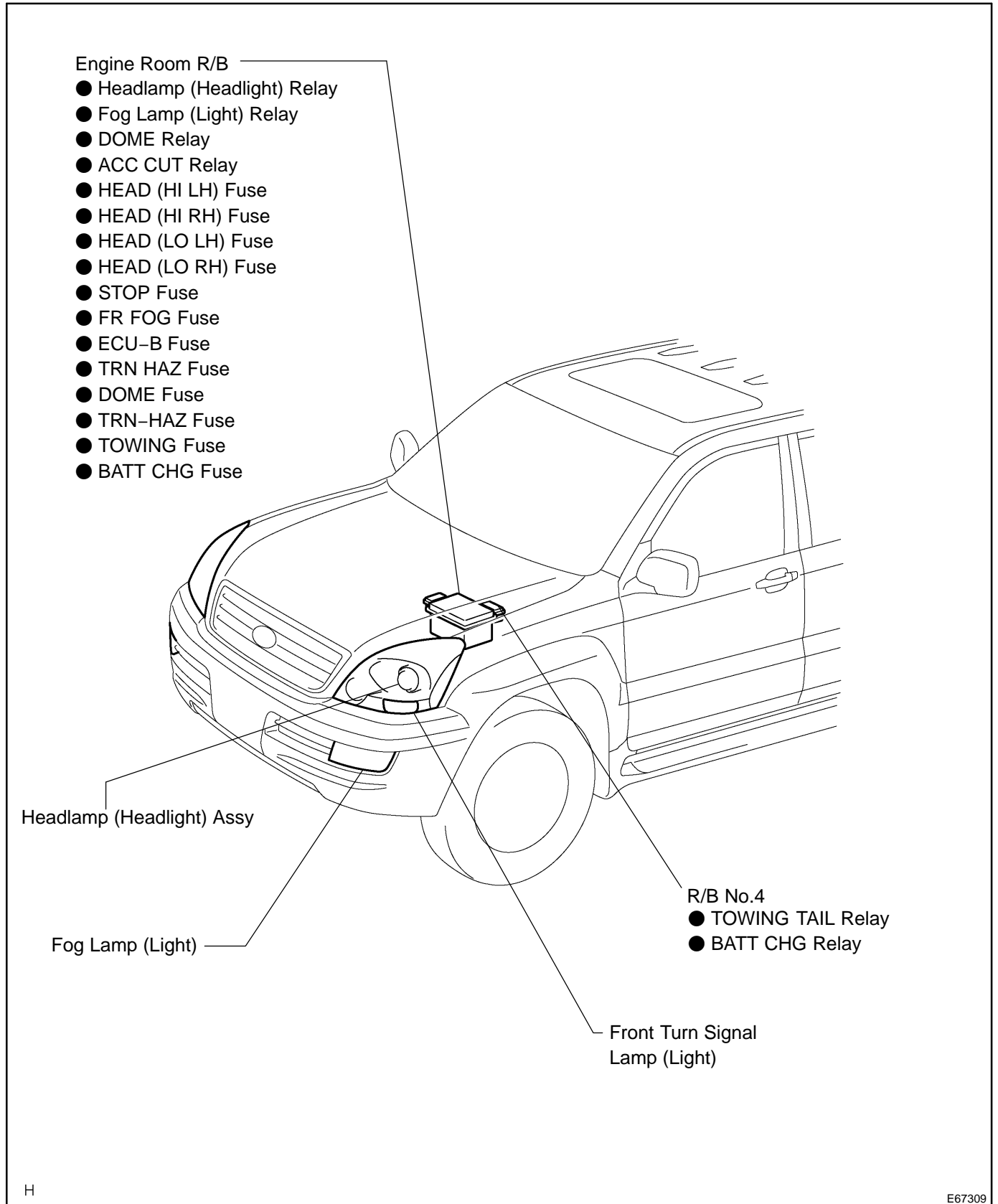
DIAGNOSTIC TROUBLE CODE CHART

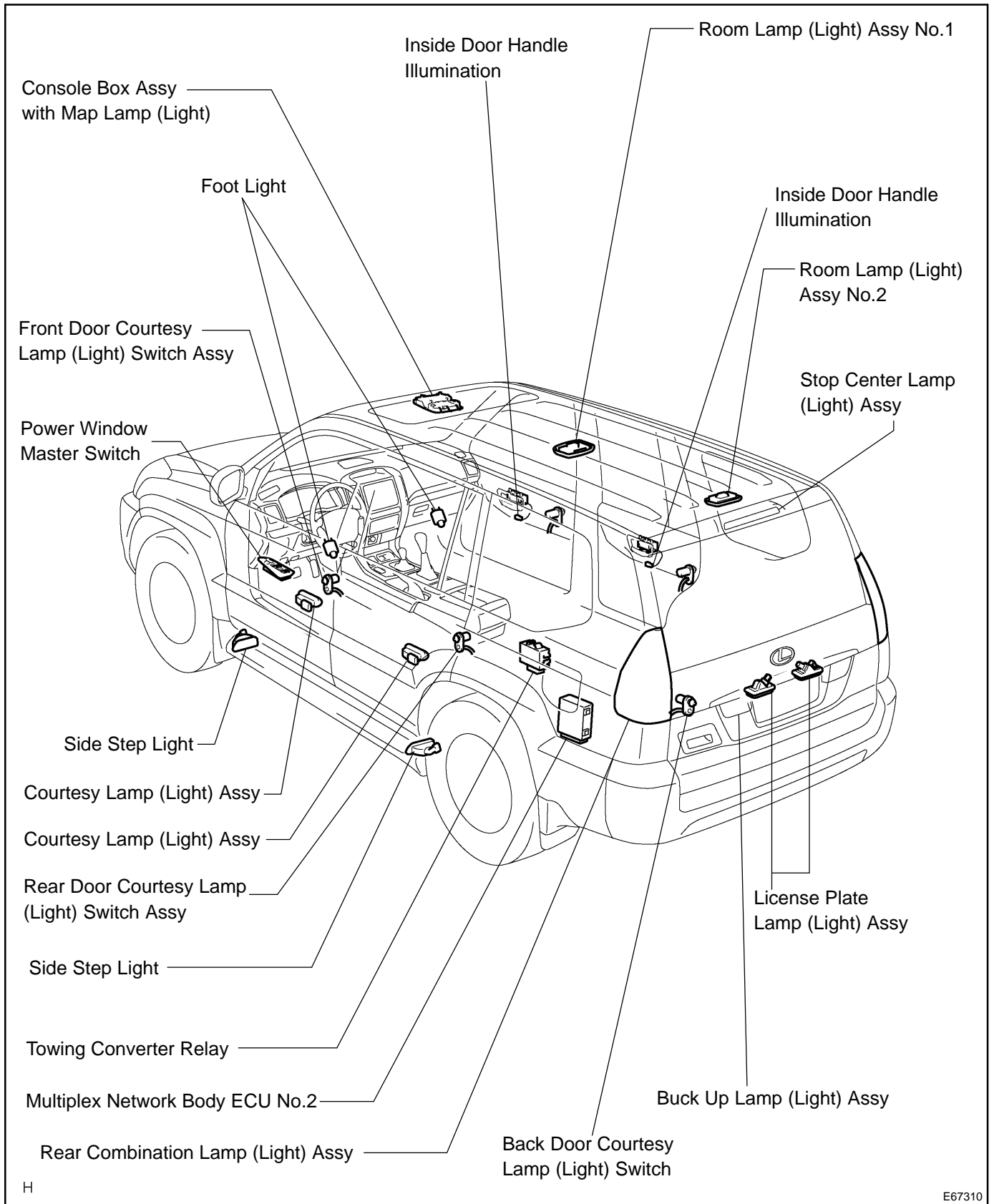
1. DTC CHECK

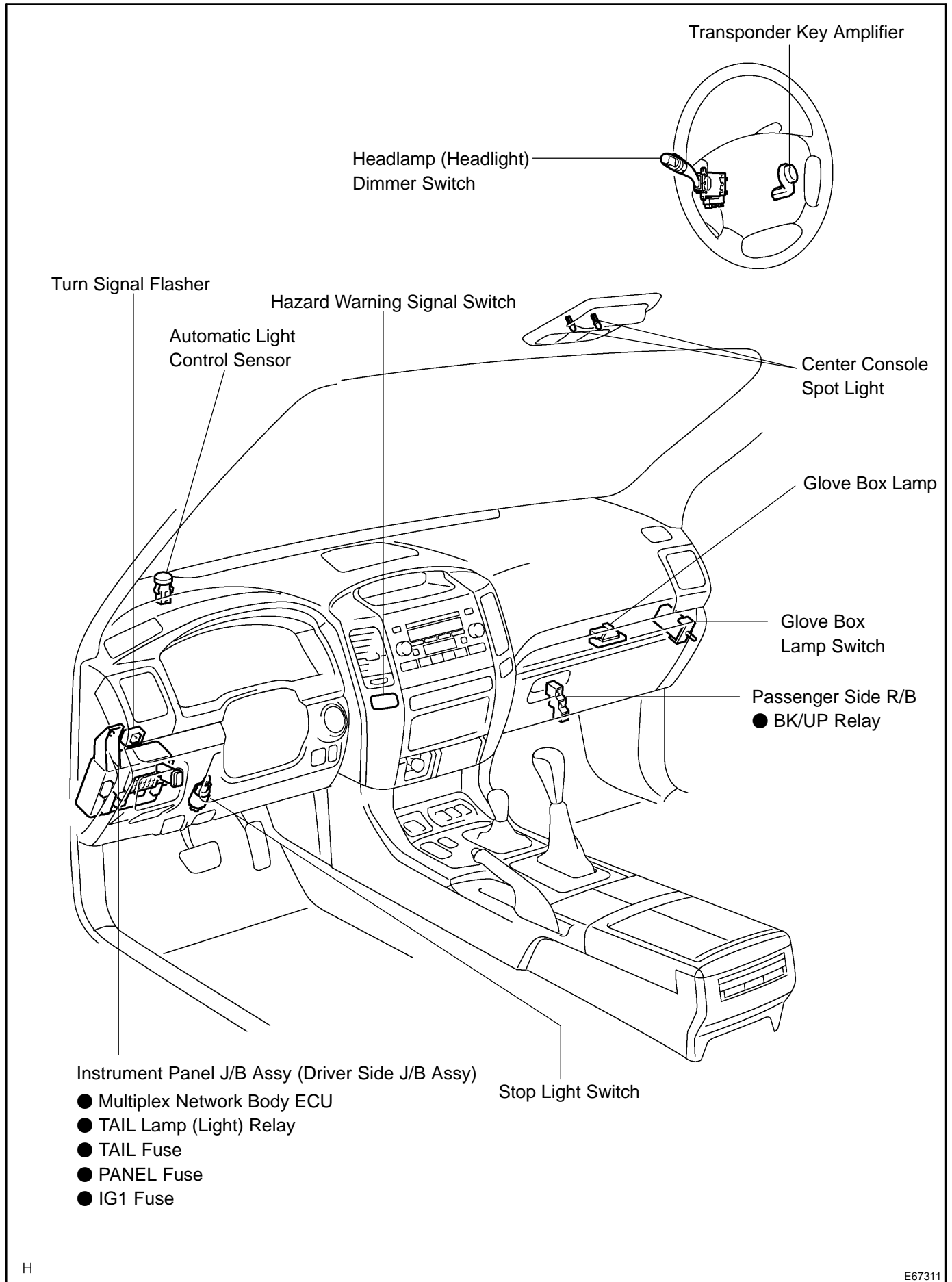
If a malfunction code is displayed during the DTC check, check the suspected area, and proceed to the appropriate page.

DTC No. (See Page)	Symptom	Suspected Area
B1244 (05-1546)	Light sensor fail	<ul style="list-style-type: none">• Automatic light control sensor• Wire harness or connector• Instrument panel junction block assy (Driver side J/B assy (Multiplex network body ECU))

LOCATION

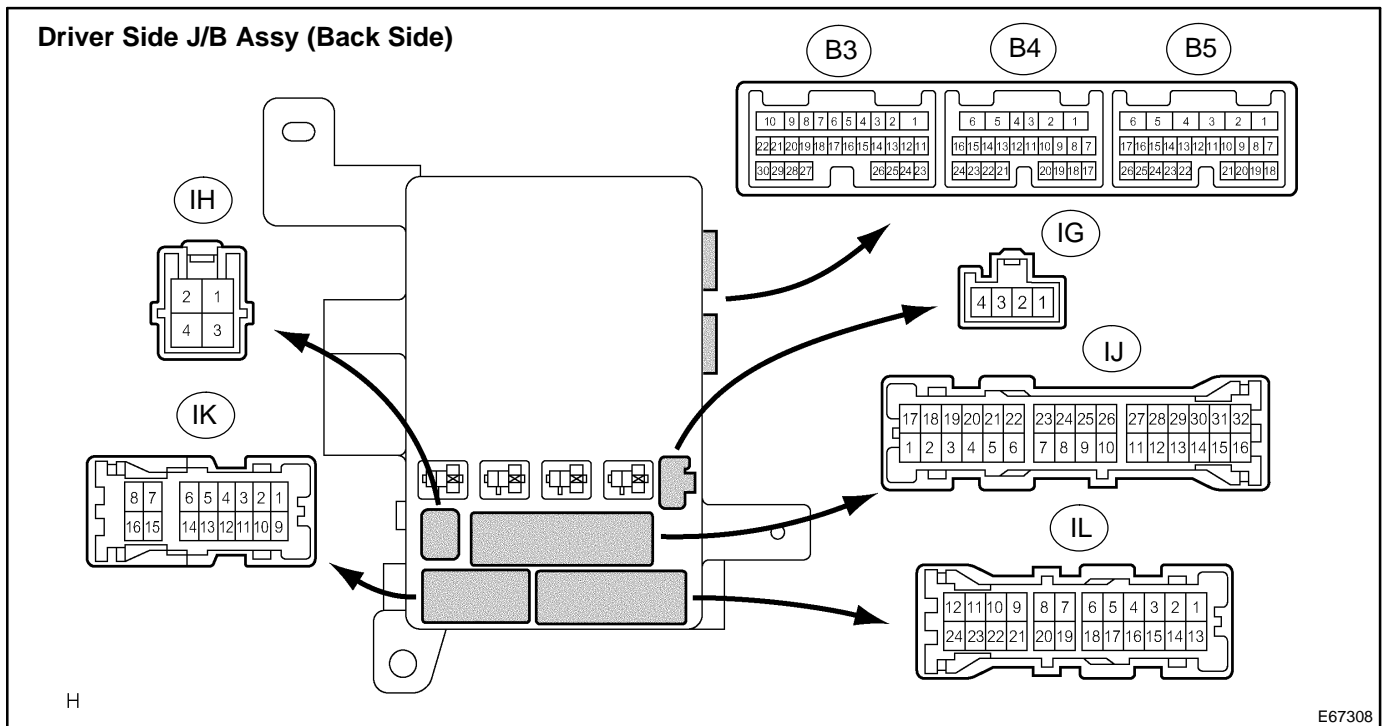
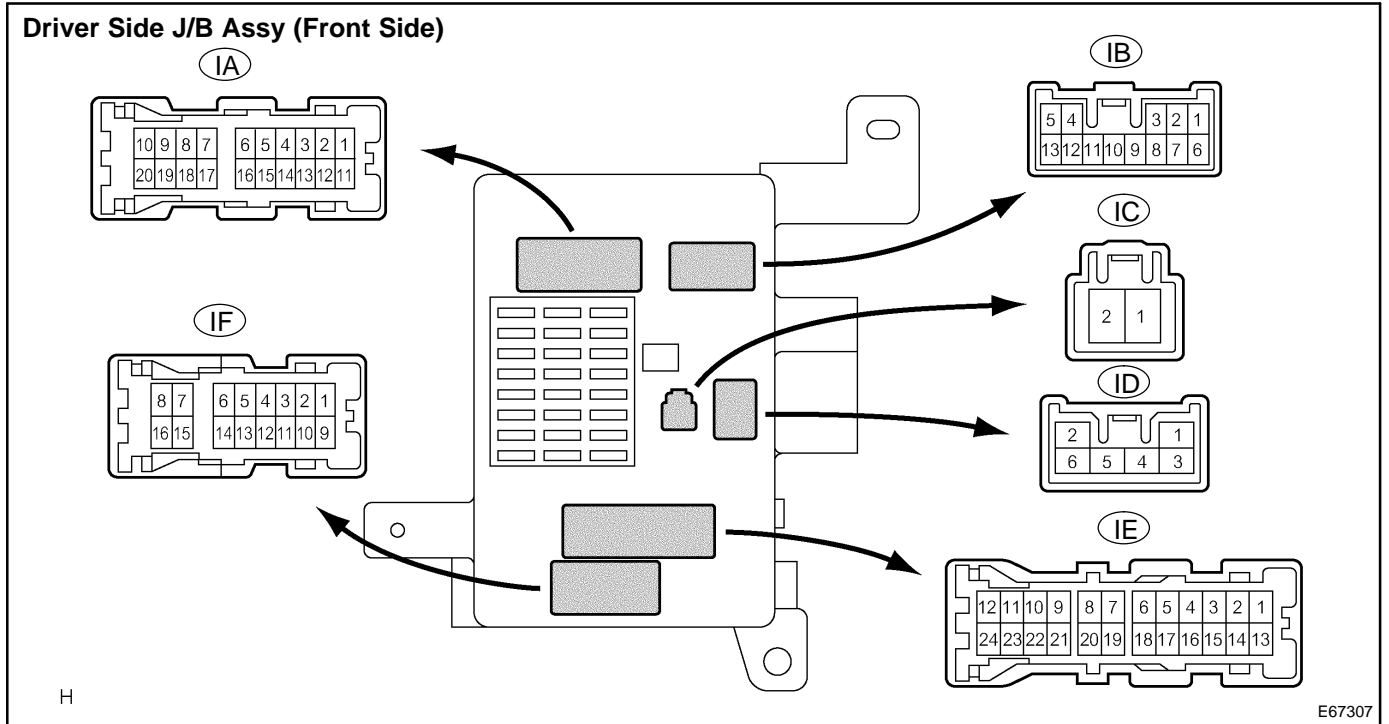






TERMINALS OF ECU

1. Instrument Panel J/B Assy (Driver Side J/B Assy (Multiplex Network Body ECU))

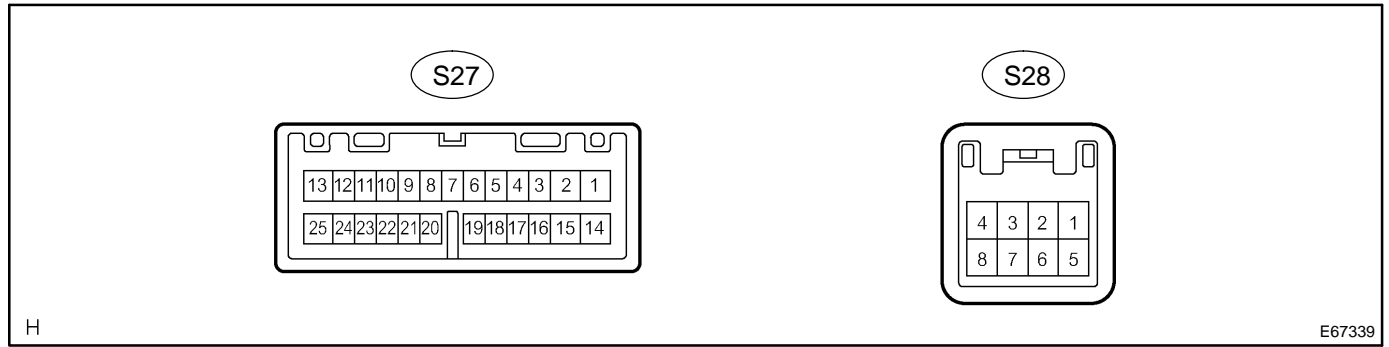


Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
IH-2 ⇔ Body ground (GND1 ⇔ Body ground)	W-B	Always	Below 1 V
IK-16 ⇔ IH-2 (LSR ⇔ GND1, 2)	W ⇔ W-B	Rear door lock switch is in unlock position	Below 1 V
		Rear door lock switch is in lock position	10 - 14 V
IL-16 ⇔ IH-2 (LSR ⇔ GND1, 2)	W ⇔ W-B	Rear door lock switch is in unlock position	Below 1 V
		Rear door lock switch is in lock position	10 - 14 V
IK-15 ⇔ IH-2 (LSR ⇔ GND1, 2)	W ⇔ W-B	Rear door lock switch is in unlock position	Below 1 V
		Rear door lock switch is in lock position	10 - 14 V
IC-2 ⇔ IH-2 (SIG ⇔ GND1,2)	L-Y ⇔ W-B	Ignition switch is OFF	Below 1 V
		Ignition switch is ON	10 - 14 V
IB-4 ⇔ IH-2 (BECU ⇔ GND1,2)	W-R ⇔ W-B	Always	10 - 14 V
IA-8 ⇔ IH-2 (ILE ⇔ GND1,2)	W ⇔ W-B	Key cylinder illumination, room lamp is OFF	Below 1 V
		Key cylinder illumination, room lamp is ON	10 - 14 V
IA-16 ⇔ IH-2 (ILE ⇔ GND1,2)	R-G ⇔ W-B	Key cylinder illumination, room lamp is OFF	Below 1 V
		Key cylinder illumination, room lamp is ON	10 - 14 V
IK-9 ⇔ IH-2 (ILE ⇔ GND1,2)	R-G ⇔ W-B	Key cylinder illumination, room lamp is OFF	Below 1 V
		Key cylinder illumination, room lamp is ON	10 - 14 V
IH-2 ⇔ Body ground (GND2 ⇔ Body ground)	W-B	Always	Below 1 V
IB-8 ⇔ IH-2 (HRLY ⇔ GND1, 2)	R ⇔ W-B	Always	10 - 14 V
IC-1 ⇔ IH-2 (TRLY ⇔ GND1, 2)	L-W ⇔ W-B	Always	10 - 14 V
IK-12 ⇔ IH-2 (TRLY ⇔ GND1, 2)	G ⇔ W-B	Always	10 - 14 V
IK-14 ⇔ IH-2 (TRLY ⇔ GND1, 2)	G-Y ⇔ W-B	Always	10 - 14 V
IK-10 ⇔ IH-2 (TRLY ⇔ GND1, 2)	L-R ⇔ W-B	Always	10 - 14 V
IE-16 ⇔ IH-2 (TRLY ⇔ GND1, 2)	L ⇔ W-B	Always	10 - 14 V
ID-5 ⇔ IH-2 (ACC ⇔ GND1, 2)	W-G ⇔ W-B	Ignition switch is OFF	Below 1 V
		Ignition switch is ON	10 - 14 V
IJ-14 ⇔ IH-2 (HAZ ⇔ GND1, 2)	W ⇔ W-B	Ignition switch is ON and hazard switch is ON	Below 1 V
		Ignition switch is ON and hazard switch is OFF	10 - 14 V
IJ-15 ⇔ IH-2 (HAZ ⇔ GND1, 2)	W ⇔ W-B	Ignition switch is ON and hazard switch is ON	Below 1 V
		Ignition switch is ON and hazard switch is OFF	10 - 14 V
IG-1 ⇔ IH-2 (SPD ⇔ GND1, 2)	V-R ⇔ W-B	Ignition switch is ON and wheel is turned slowly	Below 1 V ⇔ 10 - 14 V
B3-3 ⇔ IH-2 (LMRY ⇔ GND1, 2)	L-Y ⇔ W-B	Ignition switch is OFF	10 - 14 V
		Ignition switch is ON	Below 1 V
B3-7 ⇔ IH-2 (DRL ⇔ GND1, 2)	LG-B ⇔ W-B	Engine is OFF	Below 1 V
		Engine is ON	10 - 14 V
B3-14 ⇔ IH-2 (L ⇔ GND1, 2)	GR ⇔ W-B	Engine is OFF	Below 1 V
		Engine is ON	10 - 14 V

DIAGNOSTICS - LIGHTING SYSTEM

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
B3-25 ⇔ IH-2 (PCYL ⇔ GND1, 2)	Y ⇔ W-B	Front passenger courtesy lamp is OFF	10 - 14 V
		Front passenger courtesy lamp is ON	Below 1 V
B3-26 ⇔ IH-2 (DCYL ⇔ GND1, 2)	Y ⇔ W-B	Front LH courtesy lamp is OFF	10 - 14 V
		Front LH courtesy lamp is ON	Below 1 V
B3-28 ⇔ IH-2 (TAIL ⇔ GND1, 2)	G ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is TAIL	Below 1 V
B3-30 ⇔ IH-2 (LSWP ⇔ GND1, 2)	L-R ⇔ W-B	Front RH door lock switch is in unlock position	Below 1 V
		Front RH door lock switch is in lock position	10 - 14 V
B4-2 ⇔ IH-2 (PKB ⇔ GND1, 2)	G-R ⇔ W-B	Parking brake is ON	Below 1 V
		Parking brake is OFF	10 - 14 V
B4-7 ⇔ IH-2 (BCTY ⇔ GND1, 2)	R-L ⇔ W-B	Back door is closed	10 - 14 V
		Back LH door is open	Below 1 V
B4-11 ⇔ IH-2 (RLCY ⇔ GND1, 2)	P-B ⇔ W-B	Rear LH door is closed	10 - 14 V
		Rear LH door is open	Below 1 V
B4-12 ⇔ IH-2 (RRCY ⇔ GND1, 2)	P-L ⇔ W-B	Rear RH door is closed	10 - 14 V
		Rear RH door is open	Below 1 V
B4-17 ⇔ IH-2 (P ⇔ GND1, 2)	G-B ⇔ W-B	Ignition switch ON and PNP switch is P	10 - 14 V
		Ignition switch ON and PNP switch is except P	Below 1 V
B4-21 ⇔ IH-2 (LCYL ⇔ GND1, 2)	W-G ⇔ W-B	Rear LH courtesy lamp is OFF	10 - 14 V
		Rear LH courtesy lamp is ON	Below 1 V
B4-22 ⇔ IH-2 (RCYL ⇔ GND1, 2)	W-G ⇔ W-B	Rear RH courtesy lamp is OFF	10 - 14 V
		Rear RH courtesy lamp is ON	Below 1 V
B4-23 ⇔ IH-2 (DCTY ⇔ GND1, 2)	R-Y ⇔ W-B	Front LH door is closed	10 - 14 V
		Front LH door is open	Below 1 V
B4-24 ⇔ IH-2 (PCTY ⇔ GND1, 2)	R-Y ⇔ W-B	Front RH door is closed	10 - 14 V
		Front RH door is open	Below 1 V
B5-1 ⇔ IH-2 (HEAD ⇔ GND1, 2)	R ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is ON	Below 1 V
B5-3 ⇔ IH-2 (A ⇔ GND1, 2)	G-O ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is AUTO	Below 1 V
B5-4 ⇔ IH-2 (CLTS ⇔ GND1, 2)	Y ⇔ W-B	Ignition switch is ON	Signal waveform
B5-5 ⇔ IH-2 (ACAN ⇔ GND1, 2)	G-R ⇔ W-B	Ignition switch is ON, light control switch is OFF and automatic light control sensor is covered → not covered	Below 3 V → 10 - 14 V
B5-6 ⇔ IH-2 (CLTB ⇔ GND1, 2)	G-Y ⇔ W-B	Ignition switch is OFF	Below 1 V
		Ignition switch is ON	10 - 14 V
B5-7 ⇔ IH-2 (HF ⇔ GND1, 2)	R-Y ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is FLASH	Below 1 V
B5-8 ⇔ IH-2 (TAIL ⇔ GND1, 2)	G ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is TAIL	Below 1 V
B5-21 ⇔ IH-2 (CLTE ⇔ GND1, 2)	Y-G ⇔ W-B	Always	Below 1 V
B5-20 ⇔ IH-2 (HR ⇔ GND1, 2)	W ⇔ W-B	Ignition switch is ON and combination switch is OFF	10 - 14 V
		Ignition switch is ON and combination switch is HEAD	Below 1 V

2. Multiplex Network Body ECU No.2



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
SIG \leftrightarrow Body ground (S27-3 \leftrightarrow Body ground)	B-R	Ignition switch OFF \rightarrow ON	Below 1 V \rightarrow 10 - 14 V
BECU \leftrightarrow Body ground (S27-4 \leftrightarrow Body ground)	W-R	Always	10 - 14 V
RSPT \leftrightarrow Body ground (S27-16 \leftrightarrow Body ground)	G-W	Any door is opened \rightarrow all doors are closed	Below 1 V \rightarrow 10 - 14 V
LSPT \leftrightarrow Body ground (S27-17 \leftrightarrow Body ground)	R-W	Any door is opened \rightarrow all doors are closed	Below 1 V \rightarrow 10 - 14 V
CSPT \leftrightarrow Body ground (S27-18 \leftrightarrow Body ground)	W	Ignition switch OFF \rightarrow ON	10 - 14 V \rightarrow Below 1 V
ILEW \leftrightarrow Body ground (S27-23 \leftrightarrow Body ground)	W-G	Ignition switch ON, rheostat volume fully left side \rightarrow turned to right side	Below 1 V \rightarrow pulse generation
SG \leftrightarrow Body ground (S27-24 \leftrightarrow Body ground)	W-B	Always	Below 1 V
GND \leftrightarrow Body ground (S27-25 \leftrightarrow Body ground)	W-B	Always	Below 1 V
RBD1 \leftrightarrow Body ground (S28-1 \leftrightarrow Body ground)	R-L	PNP switch P position and any door is opened	Below 1 V
MPX+ (S28-2)	L	Multiplex communication circuit	-
RBD2 \leftrightarrow Body ground (S28-5 \leftrightarrow Body ground)	R-L	PNP switch P position and any door is opened	Below 1 V
MPX- (S28-6)	B	Multiplex communication circuit	-

PROBLEM SYMPTOMS TABLE

HINT:

Proceed to troubleshooting of each circuit in the table below.

1. HEADLAMP AND TAIL LAMP SYSTEM

Symptom	Suspected Area	See page
Only one headlamp comes on.	1. Bulb 2. HEAD (HI LH, HI RH, LO LH, LO RH) fuse 3. Harness or connector	- - -
Headlamp does not come on.	1. HEAD (HI LH, HI RH, LO LH, LO RH) fuse 2. Headlight relay circuit 3. Light control switch circuit 4. Ignition switch circuit 5. Door courtesy light and courtesy switch circuit 6. Headlight dimmer switch circuit 7. Instrument panel J/B Assy (Driver side J/B Assy (Multiplex network body ECU))	- 05-1566 05-1557 05-1548 05-1551 05-1561 01-26
"HI-Beam" does not come on (All). (w/o D.R.L. system)	1. Headlamp dimmer switch 2. Harness or connector	65-4 -
"HI-Beam" does not come on (All).	1. HEAD (HI LH, HI RH) fuse 2. Headlight dimmer switch circuit 3. Instrument panel J/B Assy (Driver side J/B Assy (Multiplex network body ECU))	- 65-4 01-26
"HI-Beam" does not come on (One side).	1. Bulb 2. HEAD (HI LH, HI RH) fuse 3. Harness or connector	- - -
"Flash" does not come on.	1. Headlamp Dimmer Switch 2. Harness or connector	65-4 -
Headlamp is dark.	1. Bulb 2. Harness or connector	- -
Only one tail lamp comes on.	1. Bulb 2. Harness or connector	- -
Tail lamp does not come on.	1. TAIL fuse 2. Bulb 3. TAIL relay circuit 4. Light control switch circuit 5. Ignition switch circuit 6. Door courtesy light and courtesy switch circuit 7. Headlight dimmer switch circuit 8. Instrument panel J/B Assy (Driver side J/B Assy (Multiplex network body ECU))	- - 05-1569 05-1557 05-1548 05-1551 05-1561 01-26
Daytime running light system does not operate.	1. DRL relay circuit 2. Headlight dimmer switch circuit 3. Light control switch circuit 4. Generator signal circuit 5. Ignition switch circuit 6. Parking brake switch circuit 7. Instrument panel J/B Assy (Driver side J/B Assy (Multiplex network body ECU))	05-1575 05-1561 05-1557 05-1586 05-1548 05-1599 01-26

2. LIGHT AUTO TURN OFF SYSTEM

Symptom	Suspected Area	See page
Light auto turn off system does not operate.	1. Light control switch circuit 2. Ignition switch circuit 3. Door courtesy light and courtesy switch circuit 4. Headlight dimmer switch circuit 5. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU))	05-1557 05-1586 05-1551 05-1561 01-26

3. FOG LAMP SYSTEM

Symptom	Suspected Area	See page
Front fog lamp does not come on with light control switch HEAD position.	1. FR FOG Fuse 2. FOG LAMP relay 3. Headlight dimmer switch (Fog lamp switch) 4. Harness or connector	- 65-4 65-4 -
Only one front fog lamp does not come on.	1. Bulb 2. Harness or connector	- -

4. TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspected Area	See page
"Hazard" and "Turn" do not come on.	1. TRN-HAZ fuse 2. IG1 fuse 3. Ignition switch 4. Turn signal flasher 5. Harness or connector	- - 05-1548 65-2 -
Hazard warning light does not come on. (Turn is normal)	1. Hazard warning switch 2. Harness or connector	65-4 -
Turn signal does not come on. (Hazard is normal)	1. Headlamp dimmer switch (turn signal switch) 2. Harness or connector	65-4 -
Turn signal does not come on in one direction.	1. Headlamp dimmer switch (turn signal switch) 2. Turn signal flasher 3. Harness or connector	65-4 65-2 -
Only one bulb does not come on.	1. Bulb 2. Harness or connector	- -

5. STOP LIGHT SYSTEM

Symptom	Suspected Area	See page
Stop light does not come on.	1. STOP fuse 2. Bulb 3. Stop light switch 4. DAC relay 5. Turn signal flasher 6. Harness or connector 7. Skid control ECU	- - 65-4 05-851 65-2 - 01-26

6. BACK UP LIGHT SYSTEM

Symptom	Suspected Area	See page
Back up light does not come on.	1. IG1 fuse 2. ACC fuse 3. Bulb 4. BK/UP relay 5. Park/neutral position switch 6. Harness or connector	- - - 65-4 05-958 -

7. ILLUMINATED ENTRY SYSTEM

Symptom	Suspected Area	See page
Illumination lamp of Multiplex body ECU control does not come on. (Terminal ILE of instrument panel J/B)	<ol style="list-style-type: none"> 1. Ignition switch circuit 2. Door courtesy light and courtesy switch circuit 3. Dome relay circuit 4. Illumination circuit 5. Door lock position circuit 6. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1586</p> <p>05-1551</p> <p>05-1579</p> <p>05-1582</p> <p>05-1555</p> <p>01-26</p>
Illumination lamp of Multiplex body ECU control does not go off. (Terminal ILE of instrument panel J/B)	<ol style="list-style-type: none"> 1. Ignition switch circuit 2. Door courtesy light and courtesy switch circuit 3. Dome relay circuit 4. Illumination circuit 5. Door lock position circuit 6. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1586</p> <p>05-1551</p> <p>05-1579</p> <p>05-1582</p> <p>05-1555</p> <p>01-26</p>
Illumination lamp of Multiplex body ECU No.2 control does not come on (center console spot light, foot light, inside door handle illumination).	<ol style="list-style-type: none"> 1. Illumination circuit (body ECU No.2 control) 2. Ignition switch circuit 3. Door courtesy light and courtesy switch circuit 4. Door lock position circuit 5. Body ECU No.2 ignition switch circuit 6. Multiplex network body ECU No.2 7. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1590</p> <p>05-1586</p> <p>05-1551</p> <p>05-1555</p> <p>05-1588</p> <p>01-26</p> <p>01-26</p>
Illumination lamp of Multiplex body ECU control does not go off (center console spot light, foot light, inside door handle illumination).	<ol style="list-style-type: none"> 1. Illumination circuit (body ECU No.2 control) 2. Ignition switch circuit 3. Door courtesy light and courtesy switch circuit 4. Door lock position circuit 5. Body ECU No.2 ignition switch circuit 6. Multiplex network body ECU No.2 7. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1590</p> <p>05-1586</p> <p>05-1551</p> <p>05-1555</p> <p>05-1588</p> <p>01-26</p> <p>01-26</p>
Courtesy lamp does not come on.	<ol style="list-style-type: none"> 1. Door courtesy light and courtesy switch circuit 2. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1551</p> <p>01-26</p>
Courtesy lamp does not go off.	<ol style="list-style-type: none"> 1. Door courtesy light and courtesy switch circuit 2. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1551</p> <p>01-26</p>
Step light does not come on.	<ol style="list-style-type: none"> 1. Bulb 2. Illumination circuit (body ECU No.2 control) 3. Ignition switch circuit 4. Door courtesy light and courtesy switch circuit 5. Door lock position circuit 6. Body ECU No.2 ignition switch circuit 7. Multiplex network body ECU No.2 8. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>-</p> <p>05-1590</p> <p>05-1586</p> <p>05-1551</p> <p>05-1555</p> <p>05-1588</p> <p>01-26</p> <p>01-26</p>
Auto dimmer function does not operate.	<ol style="list-style-type: none"> 1. Auto dimmer signal circuit 2. Ignition switch circuit 3. Light control switch circuit 4. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU)) 	<p>05-1596</p> <p>05-1586</p> <p>05-1557</p> <p>01-26</p>

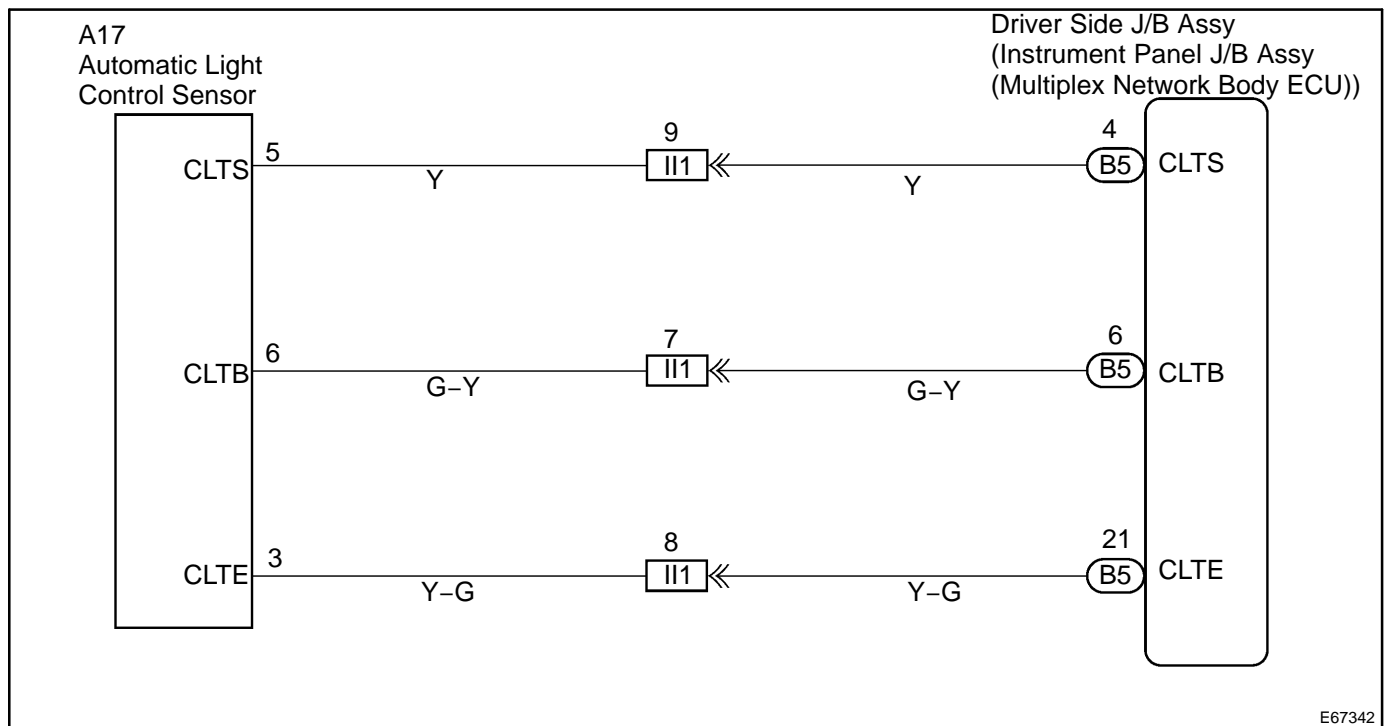
DTC	B1244	LIGHT SENSOR CIRCUIT MALFUNCTION
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CIRCUIT DESCRIPTION

This DTC is output when failure in the light sensor circuit is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1244	<ul style="list-style-type: none"> • Malfunction of light sensor (input signal of terminal CLTS is below 30 Hz) • Open or short of light sensor circuit 	<ul style="list-style-type: none"> • Automatic light control sensor • Harness or connector • Instrument panel junction block assy (Driver Side J/B Assy (Multiplex network body ECU))

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and the hand-held tester main switch ON.
- (c) The value of the illumination rate should change in the following range when the light sensor is put in the light or covered by a hand.

OK:

0.8 ms - 22.0 ms

HINT:

This is the time to be taken for the light sensor to generate one circle of frequency according to the brightness.

OK

CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (See Page 01-26)

NG

2 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal CLTB of the automatic light control sensor and the instrument panel J/B Assy (driver side J/B Assy).
- (b) Check for open and short circuit in the harness and the connector between terminal CLTS of the automatic light control sensor and the instrument panel J/B Assy (driver side J/B Assy).
- (c) Check for open and short circuit in the harness and the connector between terminal CLTE of the automatic light control sensor and the instrument panel J/B Assy (driver side J/B Assy).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

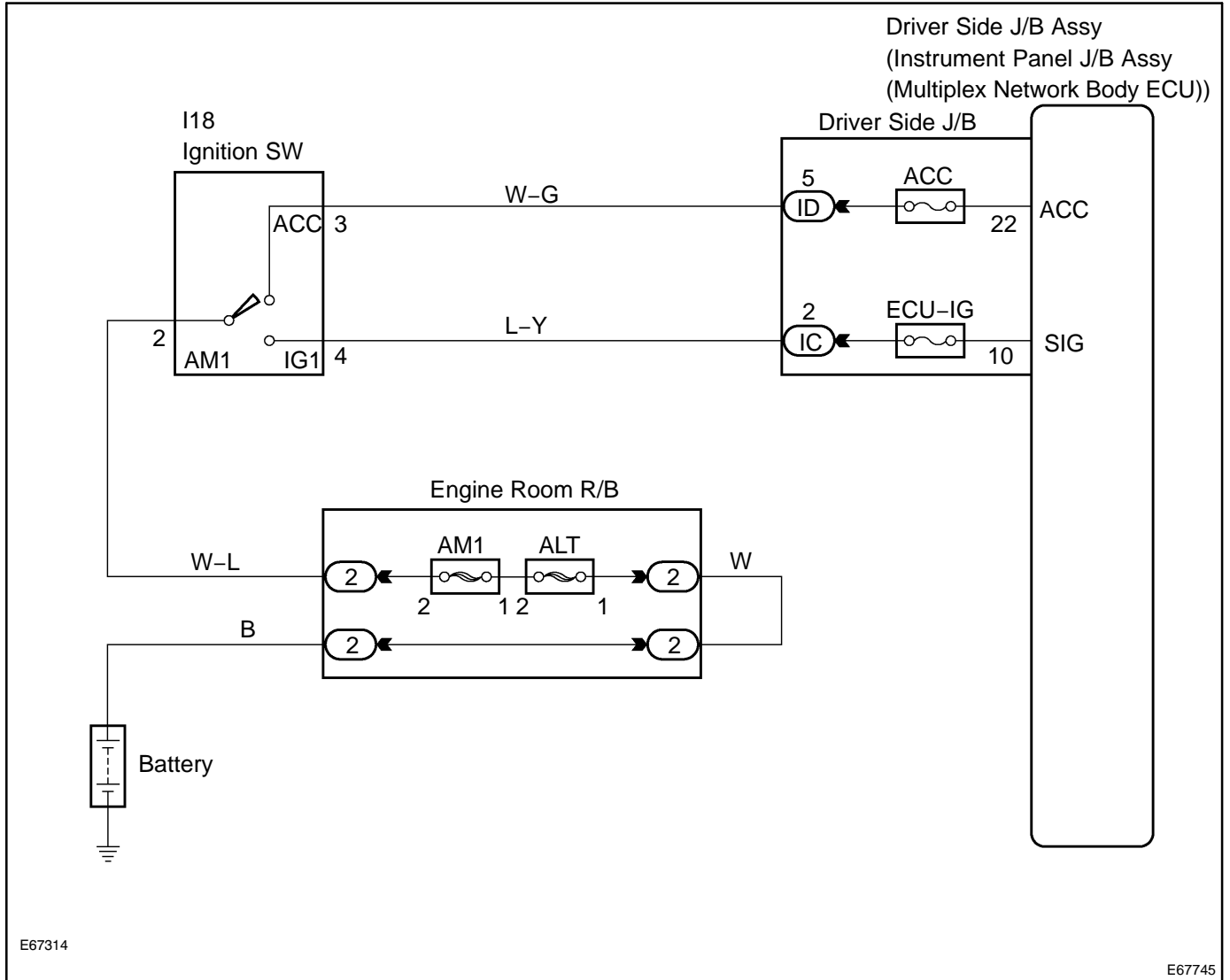
REPLACE AUTOMATIC LIGHT CONTROL SENSOR

IGNITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the ignition switch and sends it to the Multiplex Network Body ECU.

WIRING DIAGRAM



E67314

E67745

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the displays on the hand-held tester.

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
ACC SW	ACC SW signal/ ON or OFF	ON: Ignition key is in ACC, ON or START position OFF: Ignition key is in OFF position	-
IG SW	IG SW signal/ ON or OFF	ON: Ignition key is in ON or START position OFF: Ignition key is in OFF or ACC position	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

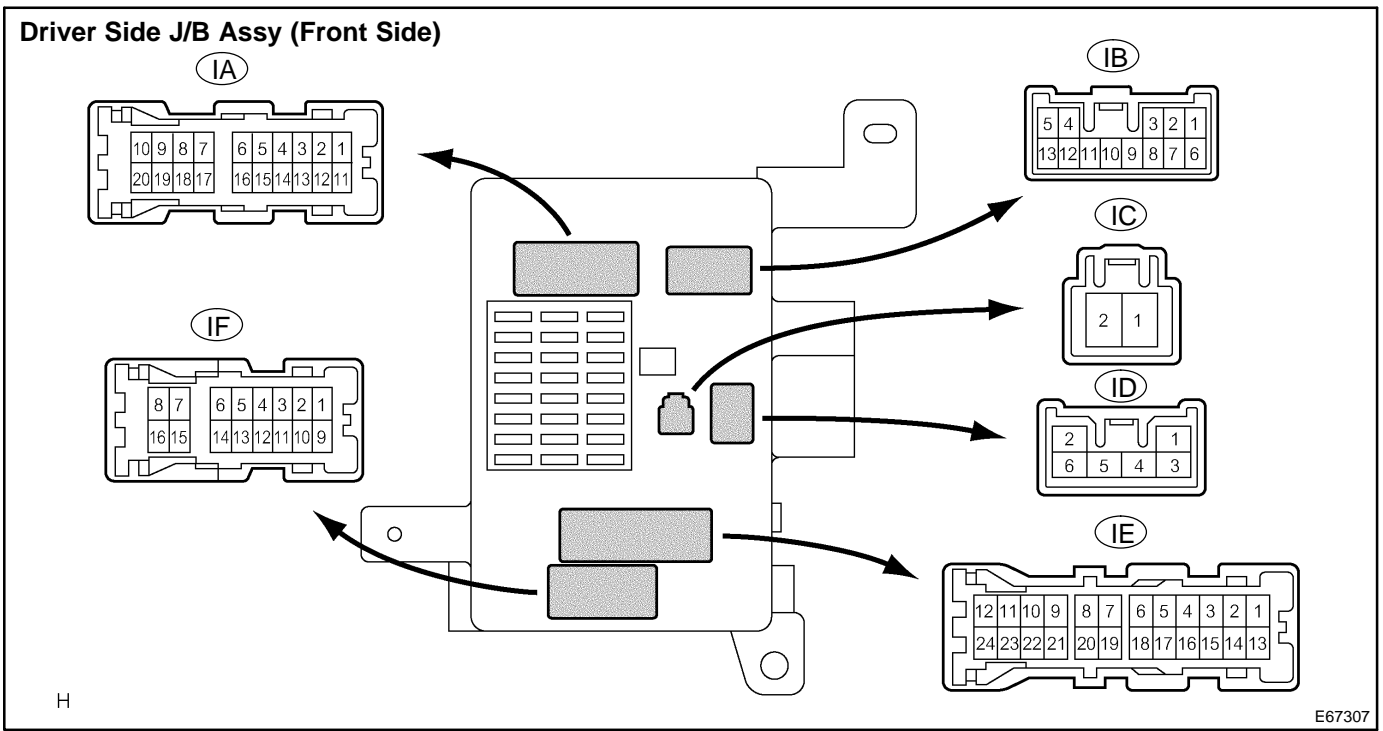
NG

2 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(ACC, SIG)

- (a) Disconnect the connector from the instrument panel J/B assy (driver side J/B assy).
- (b) Check continuity between terminal ACC, SIG of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
ID-5 ⇔ body ground (ACC ⇔ body ground)	Turn IG switch OFF → ACC	0 V → 10-14 V
IC-2 ⇔ body ground (SIG ⇔ body ground)	Turn IG switch OFF → ON	0 V → 10-14 V



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

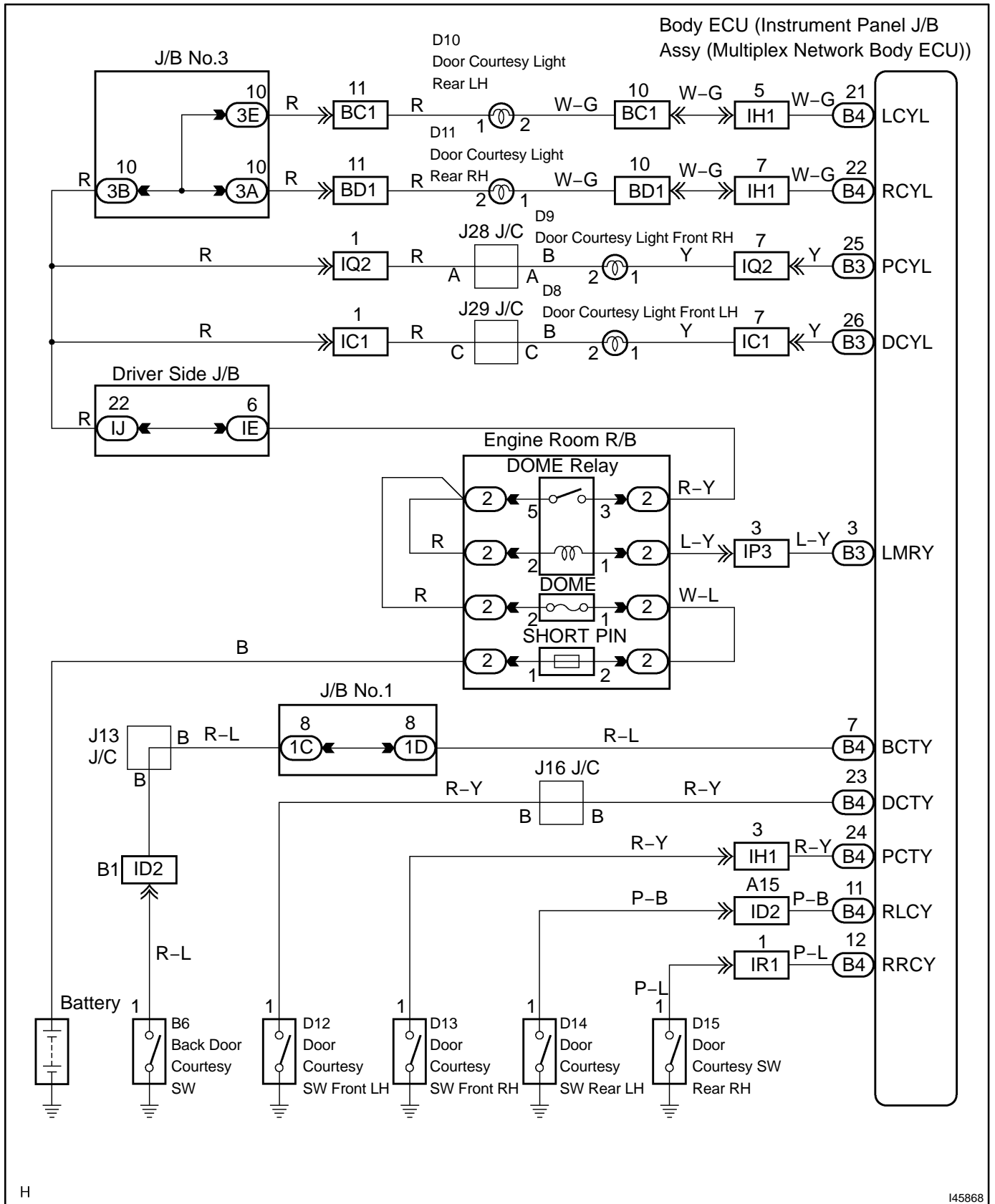
DOOR COURTESY LIGHT AND COURTESY SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The door courtesy light comes on when the door is opened and goes off when the door is closed.

The Multiplex Network Body ECU detects the condition of the door courtesy switch and controls the courtesy lights.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the displays on the hand-held tester.

BGW:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
LUGG COURTSY SW	Back door courtesy SW signal/ON or OFF	ON: Back door is open OFF: Back door is closed	-
D DOR CTY SW	Driver's door courtesy SW signal/ON or OFF	ON: Driver's door is open OFF: Driver's door is closed	-
P DOR CTY SW	Passenger's door courtesy SW signal/ ON or OFF	ON: Front passenger's door is open OFF: Front passenger's door is closed	-
Rr DOR CTY SW	Rear door courtesy SW signal/ON or OFF	ON: Either right or left rear passenger's door is open OFF: Both the right and left passenger's doors are closed	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

NG

2 INSPECT COURTESY LAMP

- (a) Inspect door courtesy lamp assy continuity
 - (1) Check continuity between terminals.

Standard: Continuity exists

NG

REPLACE COURTESY LAMP

OK

3 INSPECT COURTESY LAMP SWITCH

- (a) Inspect door courtesy switch continuity.
 - (1) Check continuity between terminal 1 and the switch body while operating the switch.

Standard:

ON (when shaft is pressed): No continuity

OFF (when shaft is not pressed): Continuity

NG

REPLACE COURTESY LAMP SWITCH

OK

4 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Inspect the harness and the connectors related to each light or switch by referring to the wiring diagram.

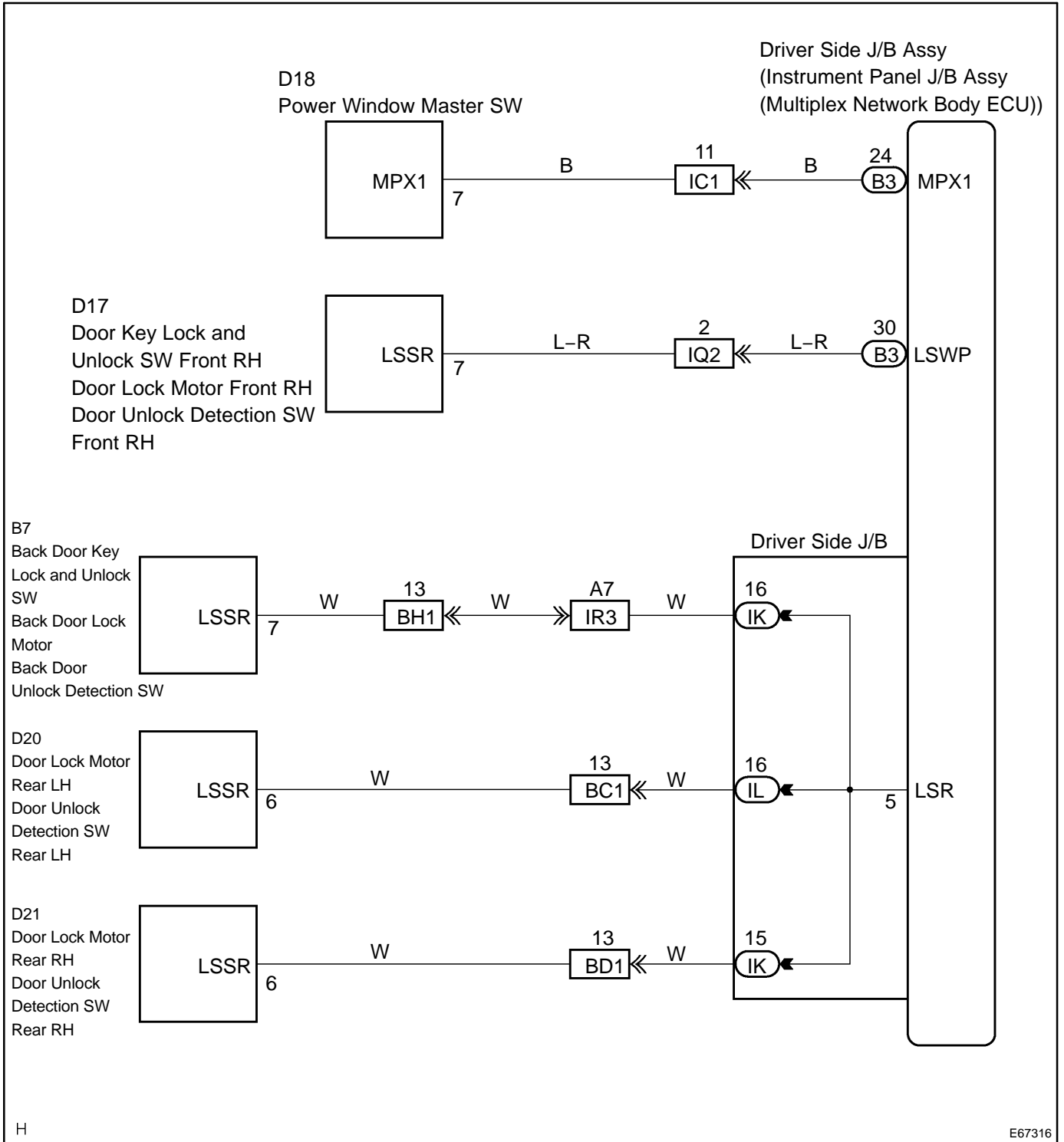
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

DOOR LOCK POSITION CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the door lock detection sensor and sends it to the Multiplex Network Body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and proceed to the next circuit inspection shown on the problem symptom table in the case of not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER
----------	---------------------------------------

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the displays on the hand-held tester.

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
P LOCK POS SW	Front passenger's door lock position SW signal/ON or OFF	ON: Door lock is in unlock position OFF: Door lock is in lock position	-
Rr. LOCK POS SW	Rear passenger's door lock position SW signal/ON or OFF	ON: Door lock is in unlock position OFF: Door lock is in lock position	-

NG

GO TO POWER DOOR LOCK CONTROL SYSTEM (See Page 05-2143)

OK

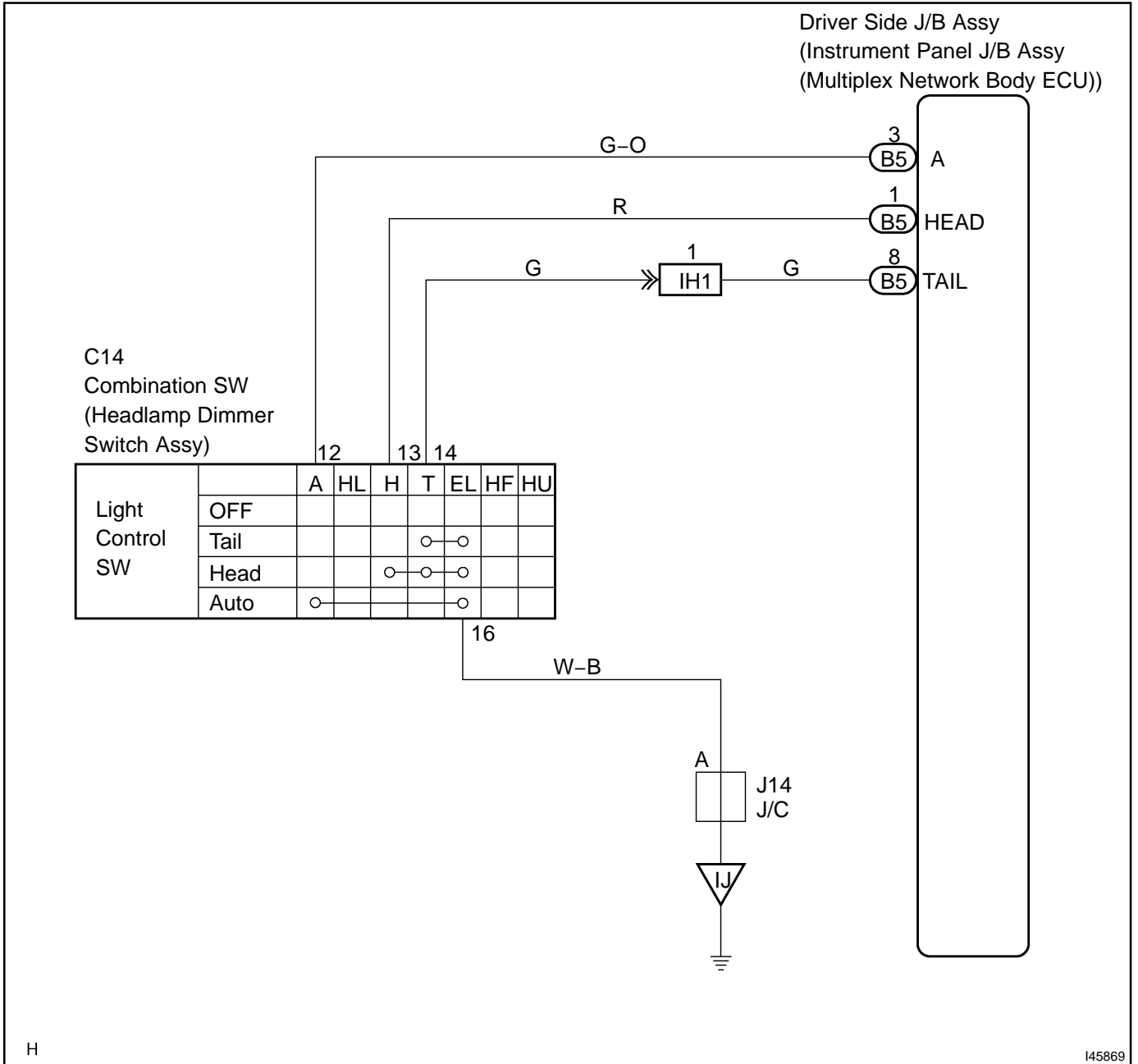
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

LIGHT CONTROL SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the light control switch and sends it to the Multiplex Network Body ECU.

WIRING DIAGRAM



H

145869

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER
----------	---------------------------------------

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the items in the DATA LIST, and read the displays on the hand-held tester.

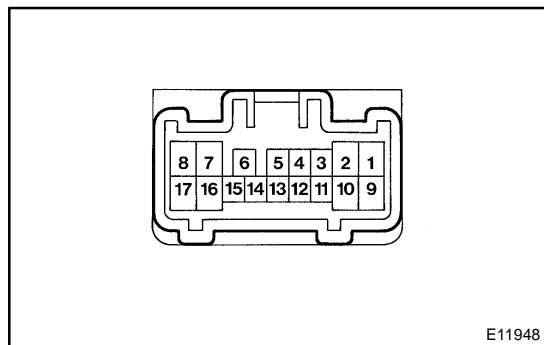
Multiplex body ECU:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
AUTO LIGHT SW	Head light control SW signal/ON or OFF	ON: Light control switch is in AUTO position OFF: Light control switch is in except AUTO position	-
HEAD LIGHT SW	Head light control SW signal/ON or OFF	ON: Light control switch is in HEAD position OFF: Light control switch is in except HEAD position	-
TAIL LIGHT SW	Taillight SW signal/ ON or OFF	ON: Light control switch is in TAIL or HEAD position OFF: Light control switch is in OFF position	-

OK	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)
-----------	--

NG

2	INSPECT HEADLAMP DIMMER SWITCH ASSY(HEAD, TAIL, A)
----------	---



- (a) Inspect the headlamp dimmer switch (light control switch) continuity.
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
TAIL	14 - 16	Continuity
HEAD	13 - 16 - 14	Continuity
AUTO	16 - 12	Continuity

NG	REPLACE HEADLAMP DIMMER SWITCH ASSY
-----------	--

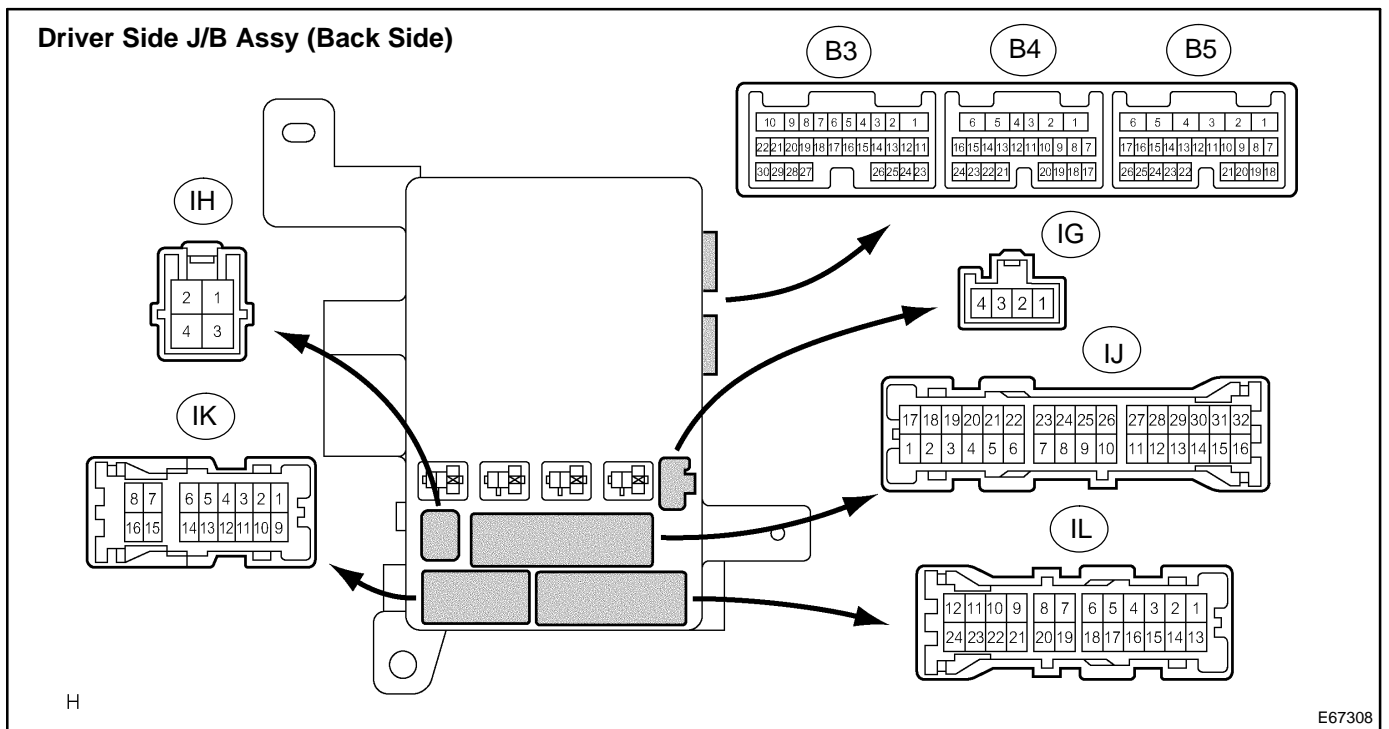
OK

3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(HEAD, TAIL, A)

- (a) Measure voltage between terminal HEAD, TAIL and A of the instrument panel J/B assy (driver side J/B assy) and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
B5-1 ⇔ body ground (HEAD ⇔ body ground)	Turn IG switch ON	10-14 V
B5-3 ⇔ body ground (A ⇔ body ground)	Turn IG switch ON	10-14 V
B5-8 ⇔ body ground (TAIL ⇔ body ground)	Turn IG switch ON	10-14 V



NG CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (See Page 01-26)

OK

4	INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(HEAD, TAIL, A)
----------	--

- (a) Disconnect the connector from the instrument panel J/B assy (driver side J/B assy).
- (b) Check continuity between terminal HEAD, TAIL and A of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
B5-1 ⇔ body ground (HEAD ⇔ body ground)	Turn headlight dimmer switch OFF → HEAD	No continuity → continuity
B5-3 ⇔ body ground (A ⇔ body ground)	Turn headlight dimmer switch OFF → AUTO	No continuity → continuity
B5-8 ⇔ body ground (TAIL ⇔ body ground)	Turn headlight dimmer switch OFF → TAIL or HEAD	No continuity → continuity

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

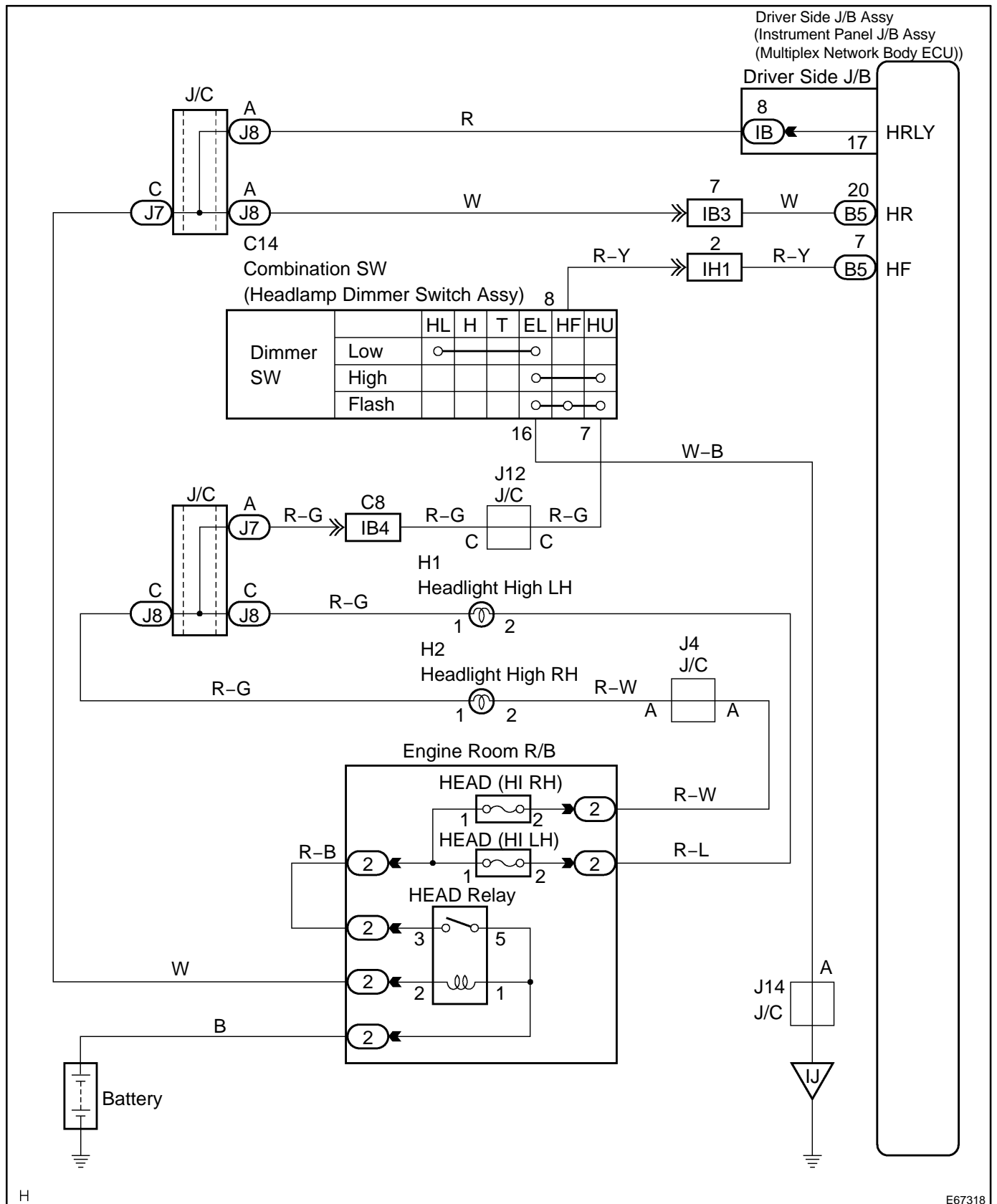
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)
--

HEADLIGHT DIMMER SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the headlight dimmer switch and sends it to the Multiplex Network Body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the items below in the DATA LIST, and read the displays on the hand-held tester.

BGW:

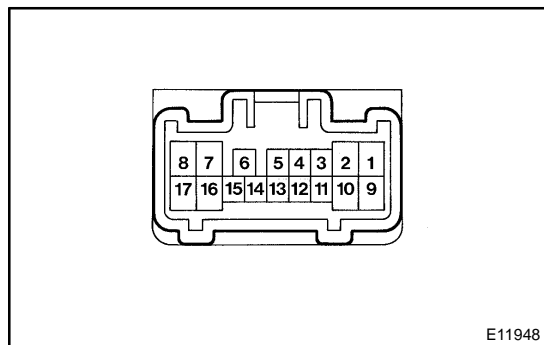
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
HIGH FLASHER SW	Headlight dimmer SW signal/ON or OFF	ON: Headlight dimmer switch is in FLASH position OFF: Headlight dimmer switch is in except FLASH position	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

NG

2 INSPECT HEADLAMP DIMMER SWITCH ASSY



- (a) Inspect headlight dimmer switch continuity.
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
FLASH	7 - 8 - 16	Continuity
LOW BEAM	16 - 17	Continuity
HI BEAM	7 - 16	Continuity

NG

REPLACE HEADLAMP DIMMER SWITCH ASSY

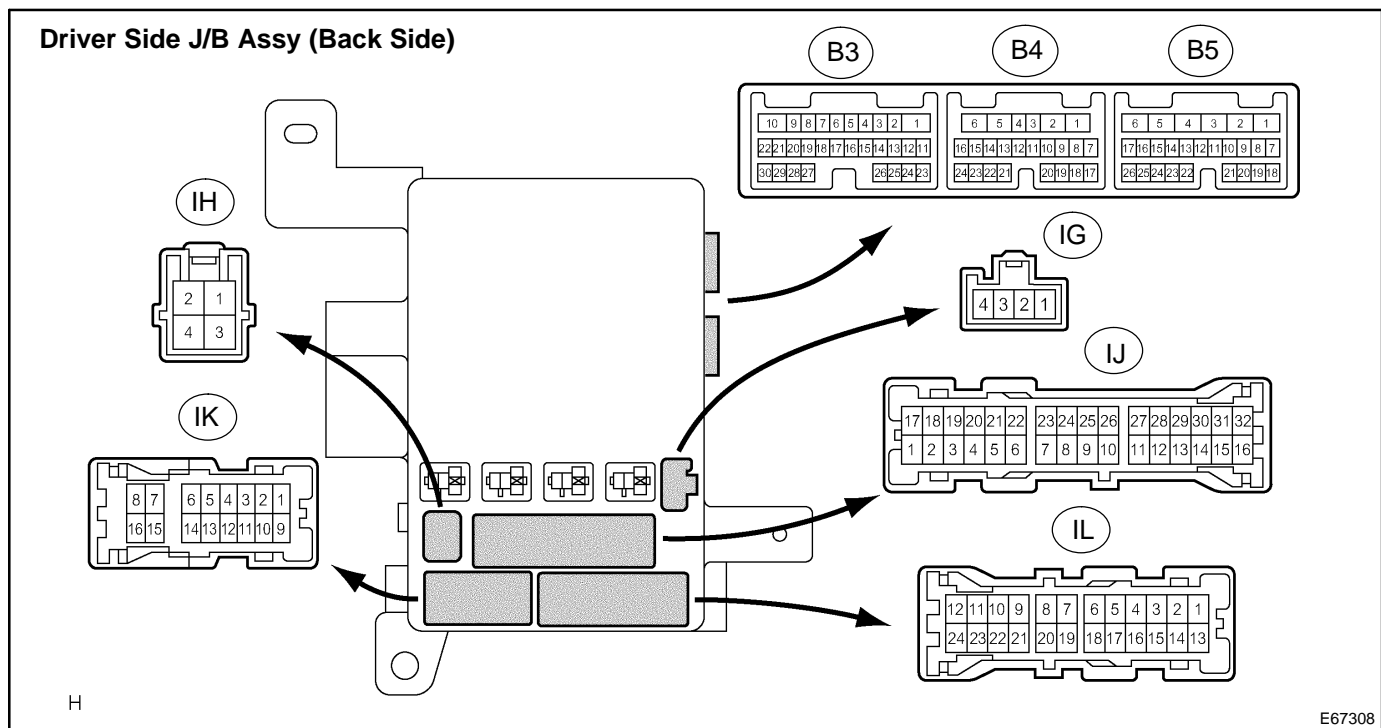
OK

3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(HF)

- (a) Measure voltage between terminal HF of the instrument panel J/B assy (driver side J/B assy) and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
B5-7 ↔ body ground (HF ↔ body ground)	Turn IG switch ON	10-14 V



NG CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (See Page 01-26)

OK

4 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(HF)

- (a) Disconnect the connector from the instrument panel J/B assy (driver side J/B assy).
- (b) Check continuity between terminal HF of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
B5-7 ⇔ body ground (HF ⇔ body ground)	Turn headlight dimmer switch LO → FLASH	No continuity → continuity

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

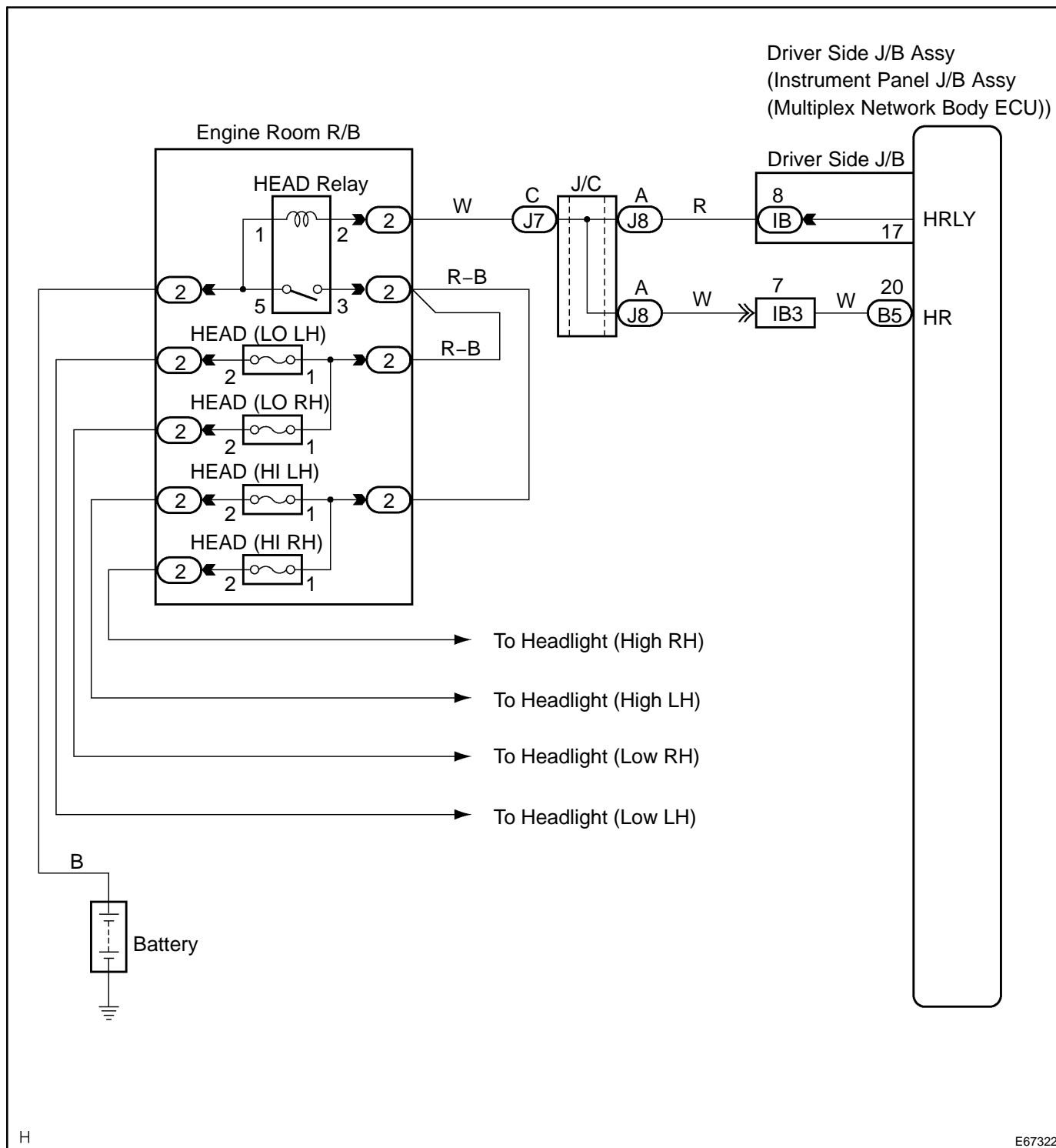
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

HEADLIGHT RELAY CIRCUIT

CIRCUIT DESCRIPTION

The Multiplex Network Body ECU controls the HEADLIGHT relay.

WIRING DIAGRAM



H

E67322

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 | PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

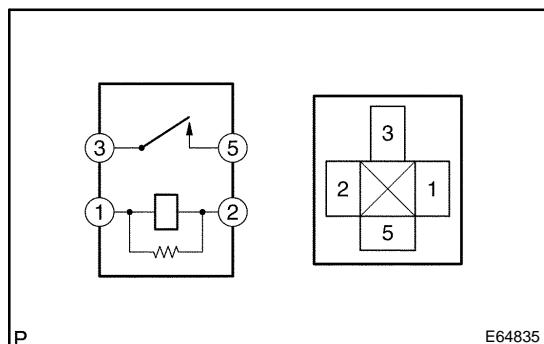
Body:

Item	Test Details	Diagnostic Note
HEAD LIGHT	Turns Headlight relay ON/OFF	-

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

2 | INSPECT HEADLAMP RELAY



- (a) Inspect relay continuity.

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

NG → **REPLACE HEADLAMP RELAY**

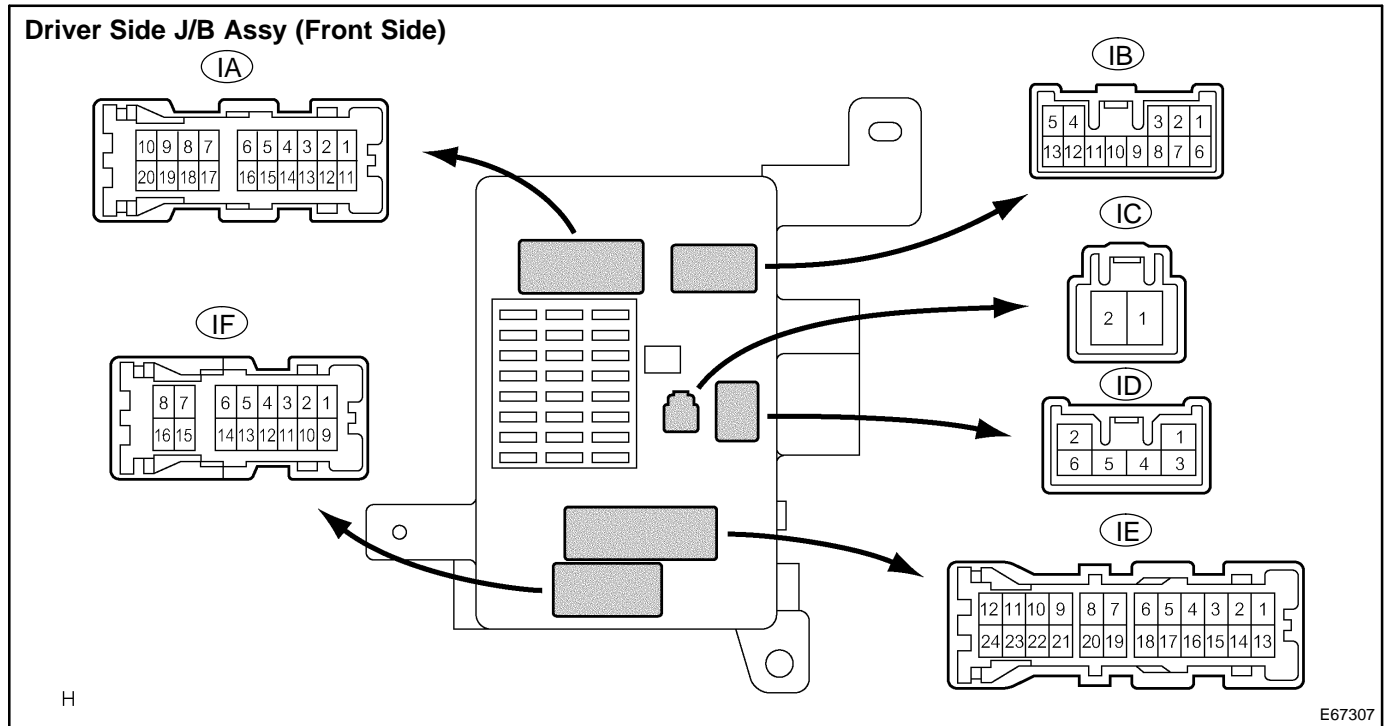
OK

3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(HRLY)

- (a) Disconnect the connector.
- (b) Measure voltage between terminal HRLY of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No.	Condition	Specified condition
IB-8 ↔ body ground (HRLY ↔ body ground)	Always	10-14 V



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

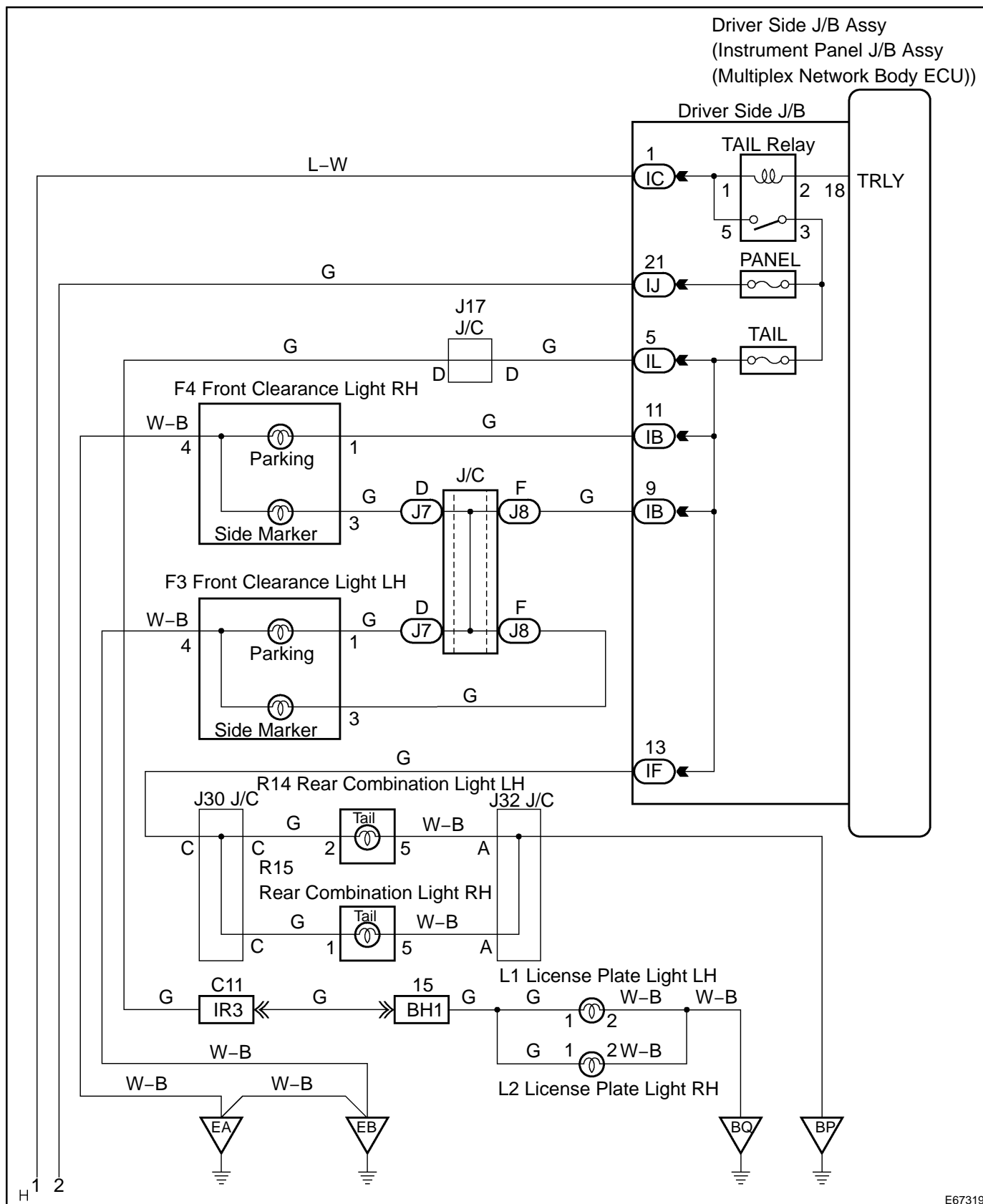
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

TAIL RELAY CIRCUIT

CIRCUIT DESCRIPTION

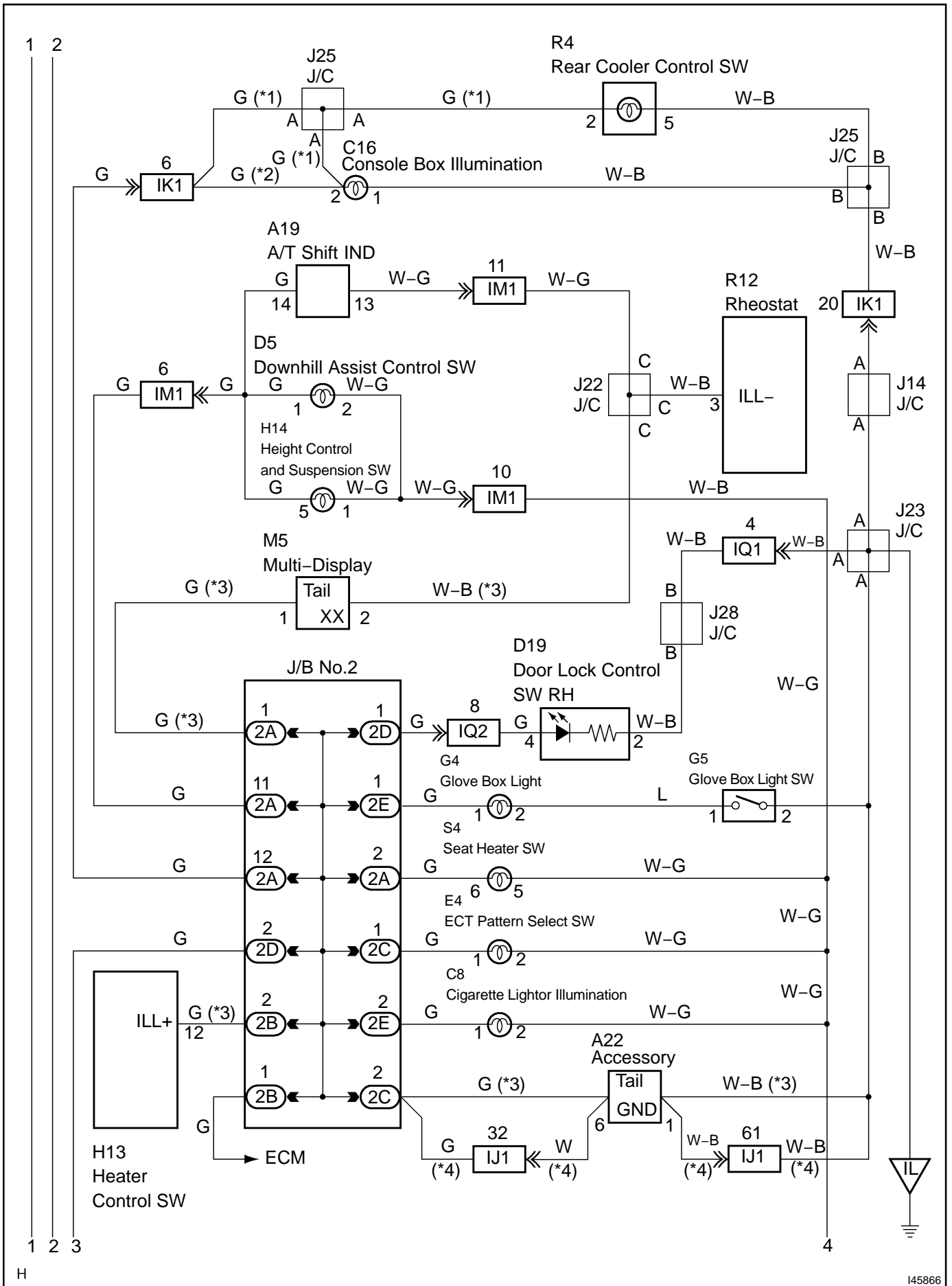
The Multiplex Network Body ECU controls TAIL relay.

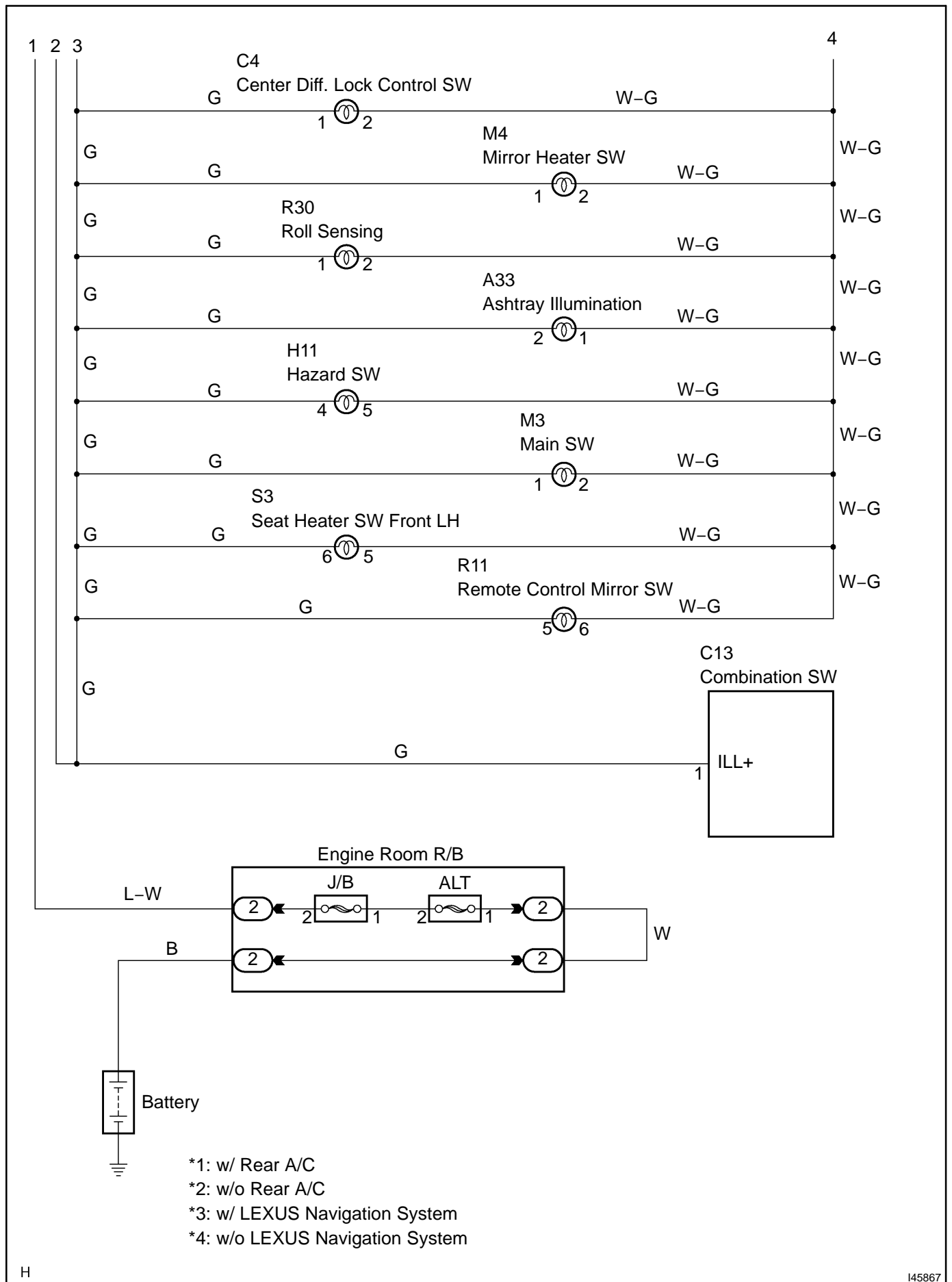
WIRING DIAGRAM



E67319

DIAGNOSTICS - LIGHTING SYSTEM





H

I45867

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

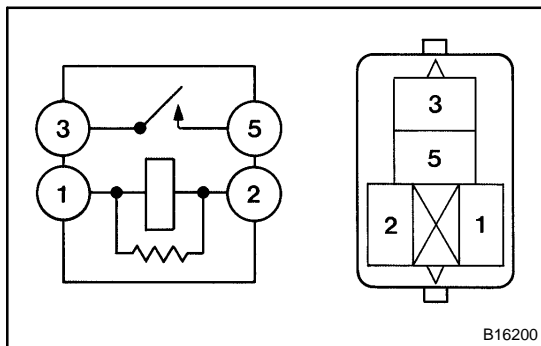
Body:

Item	Test Details	Diagnostic Note
TAIL LIGHT	Turns Tail light relay ON/OFF	-

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

2 INSPECT TAIL LAMP RELAY



(a) Inspect relay continuity.

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

NG → **REPLACE TAIL LAMP RELAY**

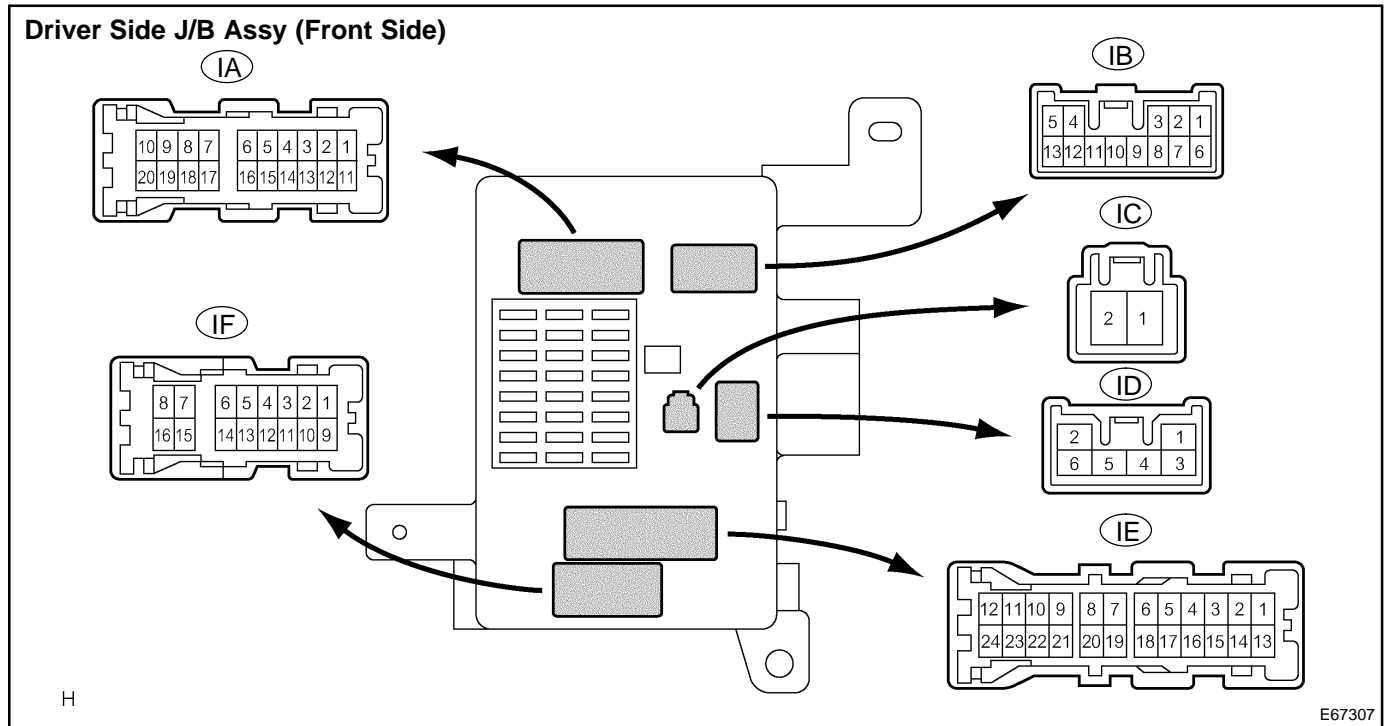
OK

3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(TRL)

- (a) Disconnect the connector.
- (b) Measure voltage between terminal TRLY of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No.	Condition	Specified condition
IC-1 ↔ body ground (TRL ↔ body ground)	Always	10-14 V



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

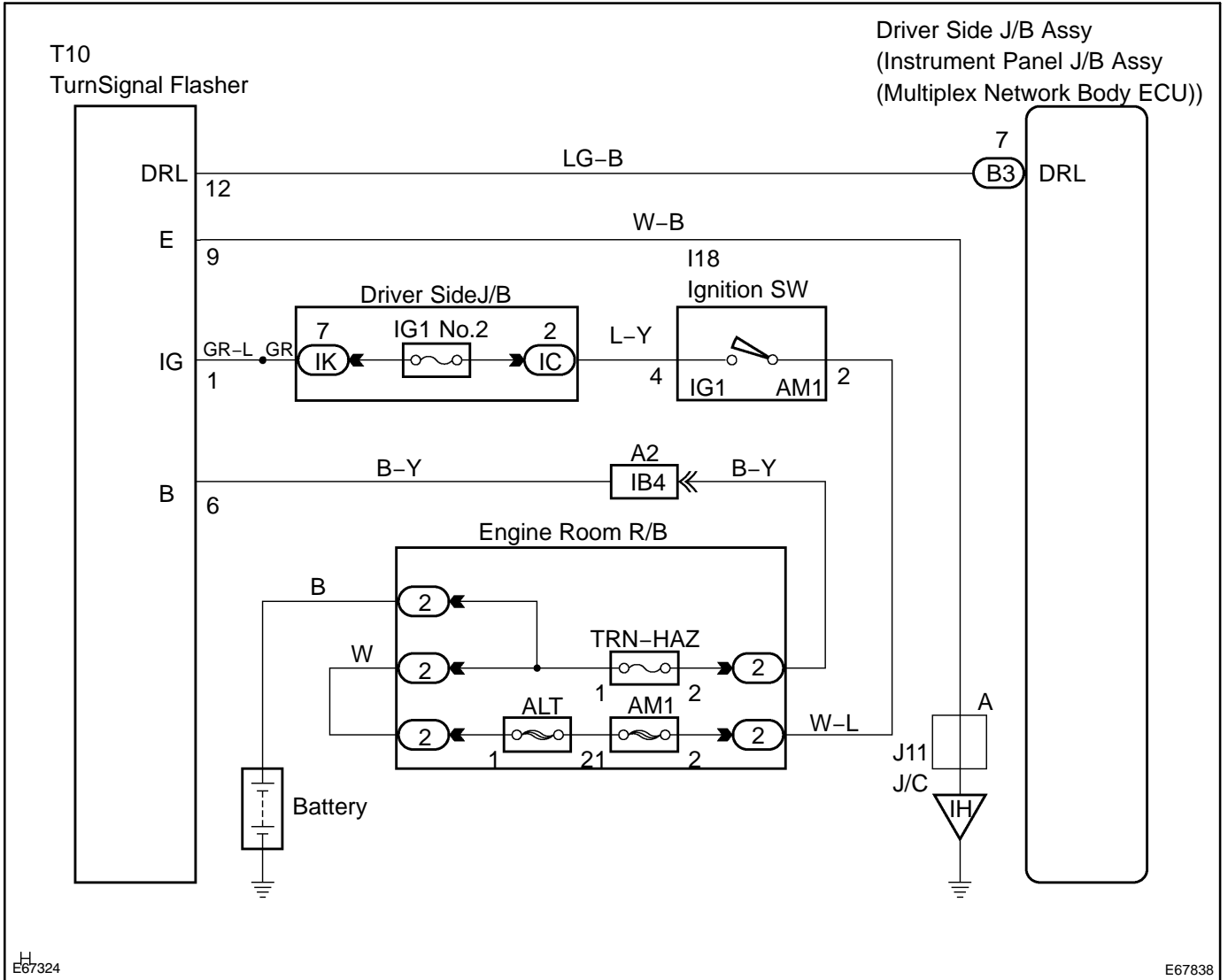
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

DRL RELAY CIRCUIT

CIRCUIT DESCRIPTION

The Multiplex Network Body ECU controls the D.R.L. control circuit in the turn signal flasher.

WIRING DIAGRAM



E67324

E67838

INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

Body:

Item	Test Details	Diagnostic Note
DRL RLY	(Test Details) Turns DRL relay in the turn signal flasher ON/OFF (Vehicle Condition) IG switch is ON, Engine is stopped and light control switch is in OFF position.	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

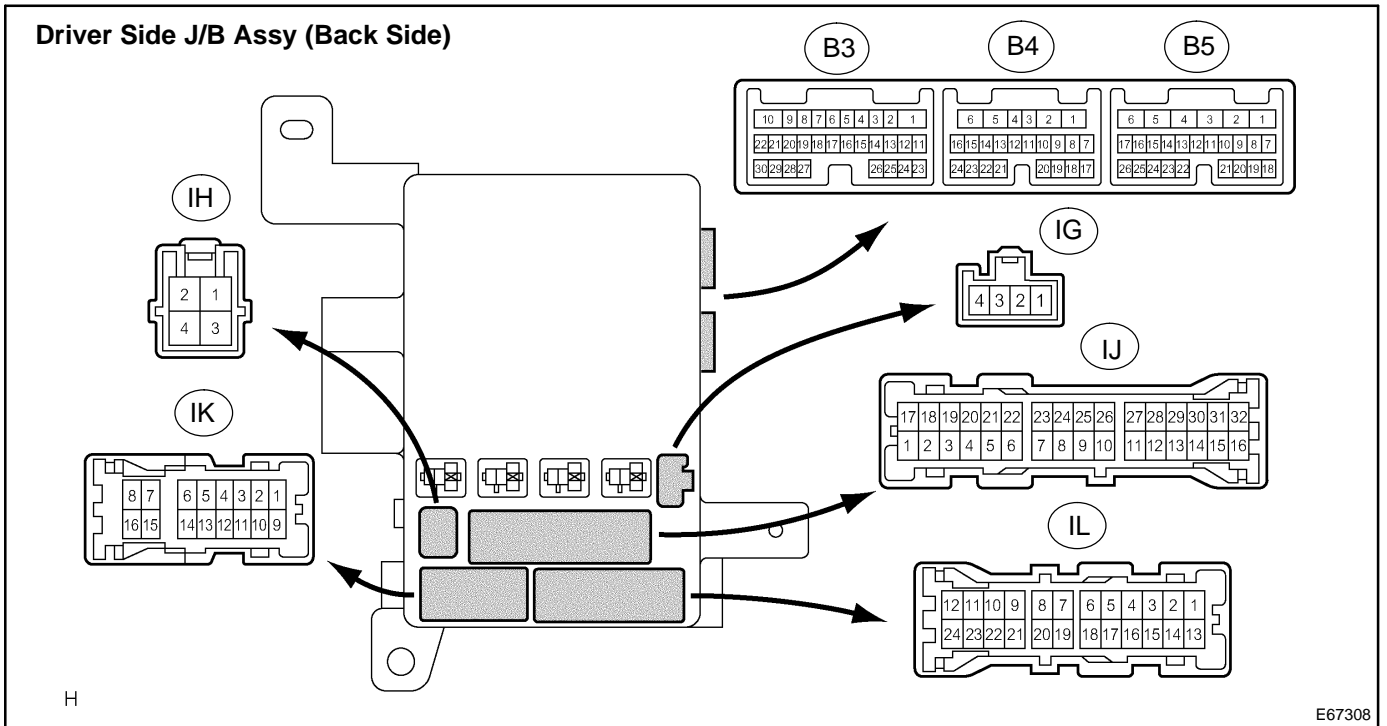
NG

2 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(DRL)

- (a) Disconnect the connector.
- (b) Measure voltage between terminal DRL of the instrument panel J/B assy (driver side J/B assy) and body ground on the wire harness side.

Standard:

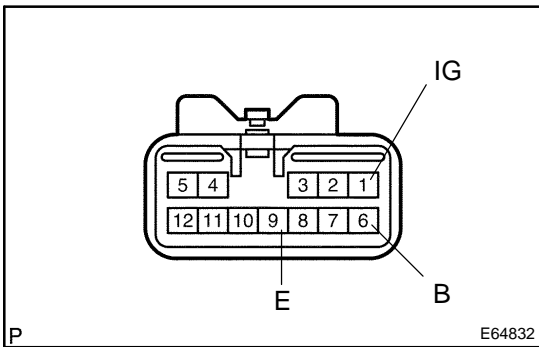
Terminal No.	Condition	Specified condition
B3-7 ↔ body ground (DRL ↔ body ground)	Engine is running	10-14 V



OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

3 INSPECT TURN SIGNAL FLASHER ASSY



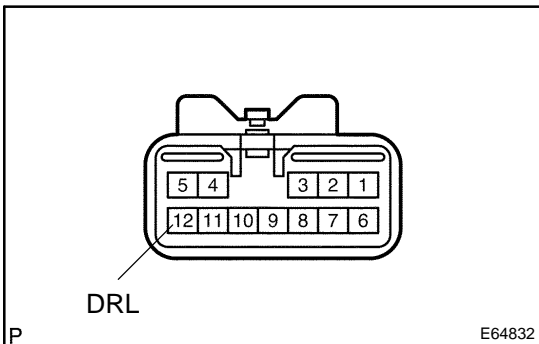
- (a) Disconnect the connector.
- (b) Measure voltage between terminals on the wire harness side as shown in the chart below.

Tester connection	Condition	Specified condition
9 (E) - Ground	Always	Continuity
1 (IG) - Ground	Turn ignition switch ON	Battery positive voltage
1 (IG) - Ground	Turn ignition switch OFF	No voltage
6 (B) - Ground	Always	Battery positive voltage

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT TURN SIGNAL FLASHER ASSY



- (a) Connect the connector to the turn signal flasher and turn the ignition switch to ON, and inspect the wire harness side connector on the back side as shown in the chart.

Tester connection	Condition	Specified condition
12 (DRL) - Ground	Turn ignition switch ON and engine OFF → ON	10 - 14 V → 0 V

NG → **REPLACE TURN SIGNAL FLASHER ASSY**

OK

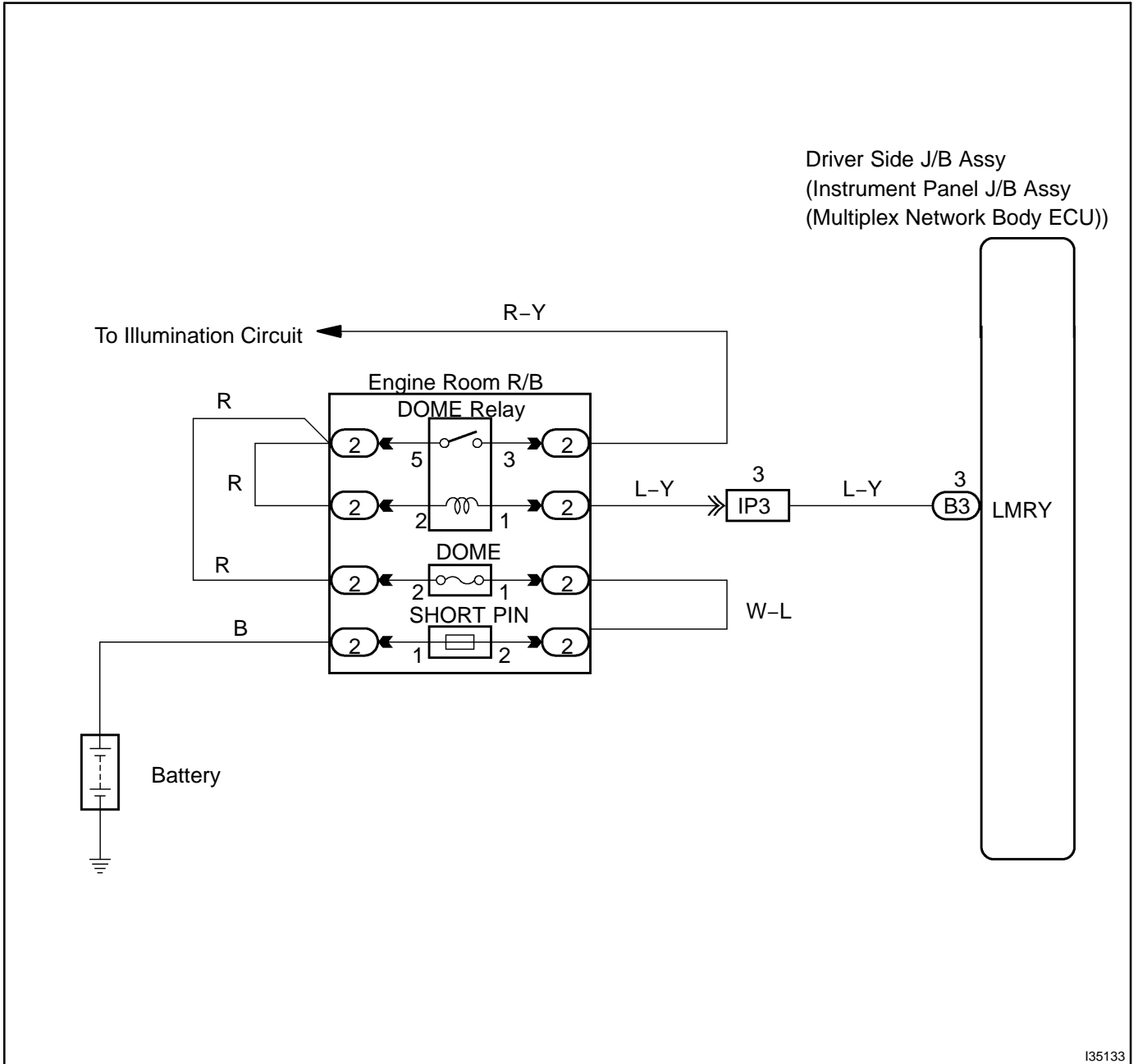
REPAIR OR REPLACE HARNESS OR CONNECTOR

DOME RELAY CIRCUIT

CIRCUIT DESCRIPTION

The Multiplex Network Body ECU controls the DOME relay.

WIRING DIAGRAM



I35133

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

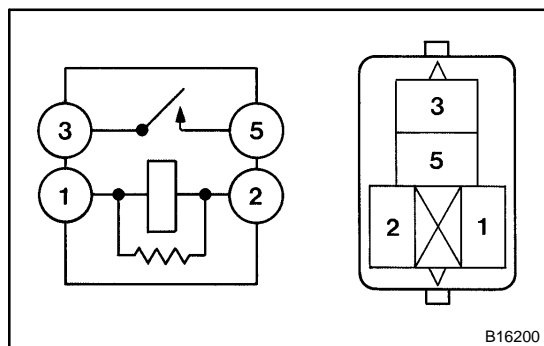
Body:

Item	Test Details	Diagnostic Note
DOME RLY CUT	Dome relay cut ON/OFF	-

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

2 INSPECT ROOM LAMP CONTROL RELAY(DOME RELAY)



- (a) Inspect relay continuity.

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

NG → **REPLACE ROOM LAMP CONTROL RELAY**

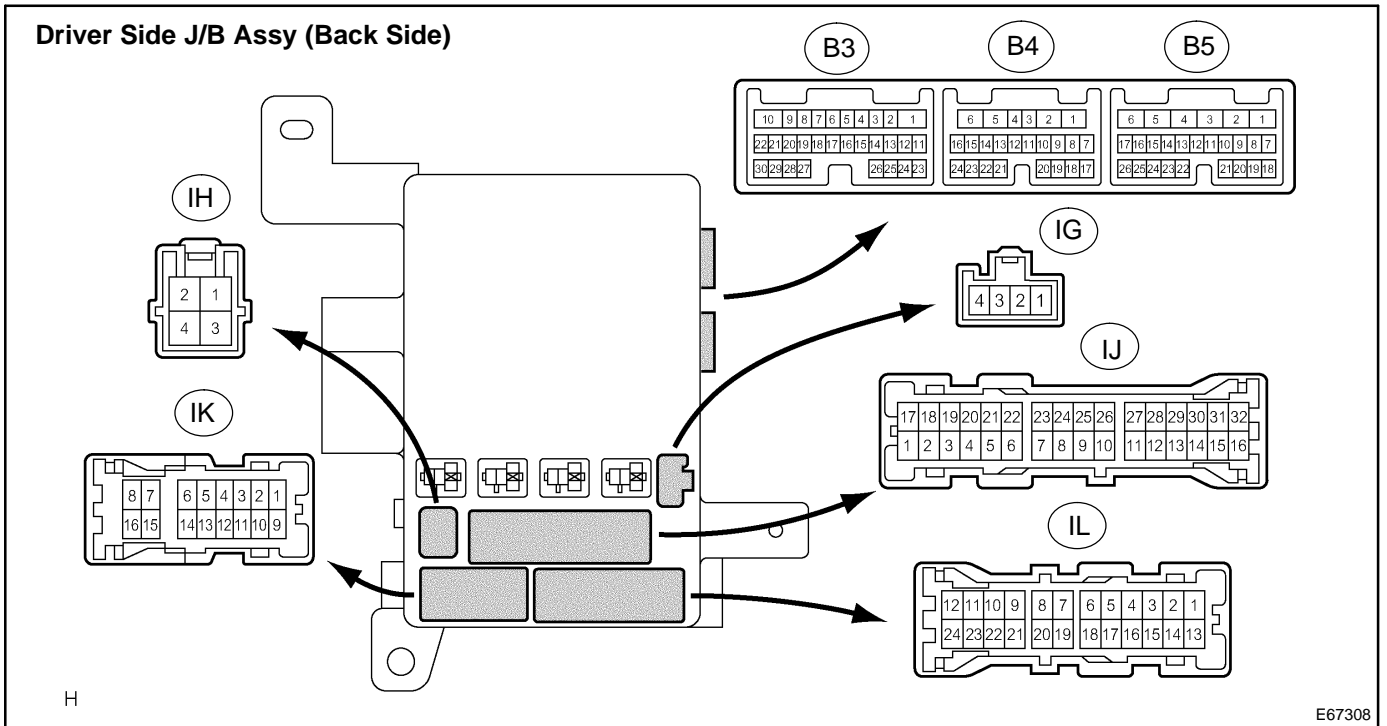
OK

3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY

- (a) Disconnect the connector.
- (b) Measure voltage between terminal LMRY of the instrument panel J/B assy (driver side J/B assy) on the wire harness side and body ground.

Standard:

Terminal No.	Condition	Specified condition
B3-3 ↔ body ground (LMRY ↔ body ground)	Always	10-14 V



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

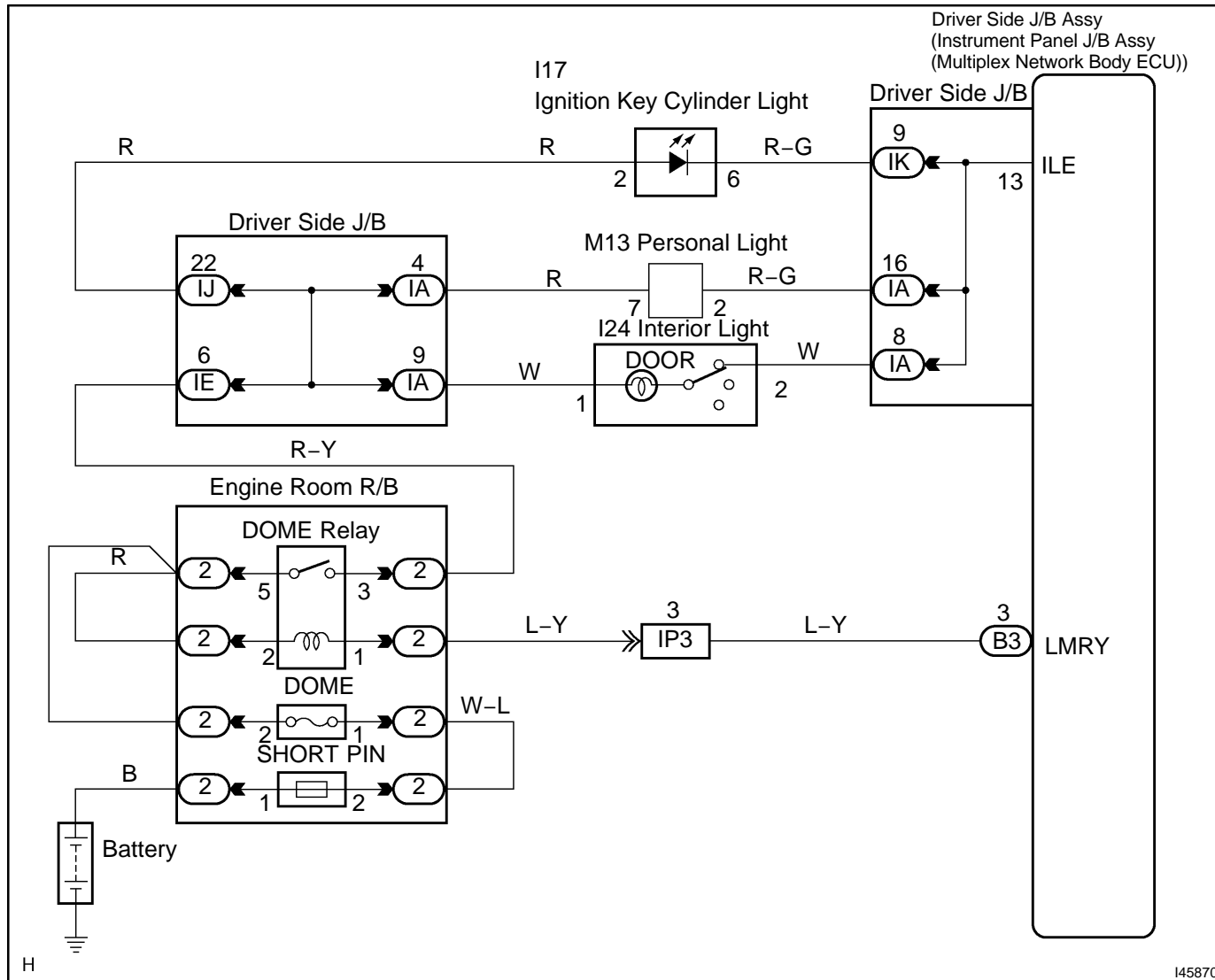
ILLUMINATION CIRCUIT

CIRCUIT DESCRIPTION

The Multiplex Network Body ECU controls the following illumination lamp.

- (1) Room lamp assy No.1 (Interior light) with DOOR position
- (2) Map lamp assy (Personal light)
- (3) Transponder key amplifier (Ignition key cylinder light)

WIRING DIAGRAM



145870

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

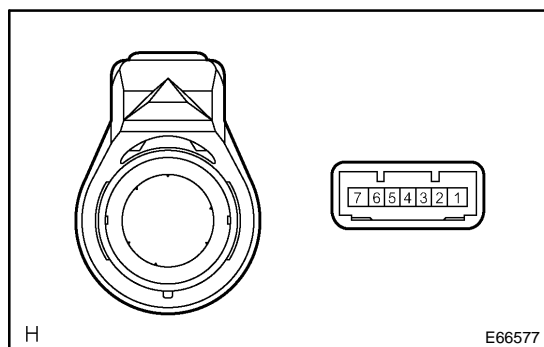
Body:

Item	Test Details	Diagnostic Note
ILLUMI OUTPUT	(Test Details) Turns Interior light and Key illumination ON/OFF (Vehicle Condition) Interior light SW is in Door position and all doors are closed	-

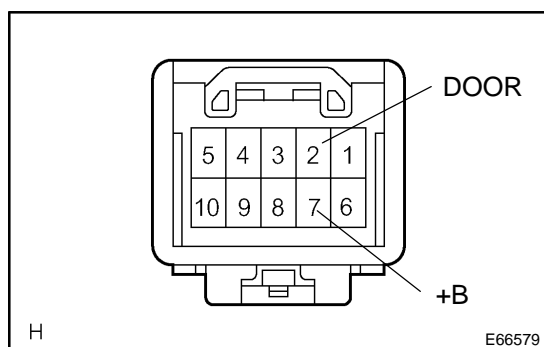
OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

2 INSPECT ILLUMINATION LIGHT

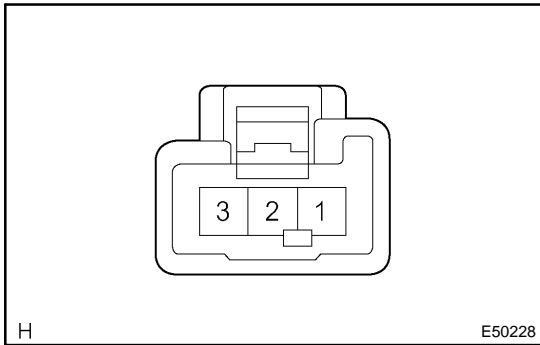


- (a) Inspect the transponder key amplifier (ignition key cylinder light)
 - (1) Connect the battery positive (+) lead to terminal 2 and the battery negative (-) lead to terminal 6, and check that the indicator light comes on.



- (b) Inspect the map lamp assy (personal light)
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
DOOR	7(+B) - 2(DOOR)	Continuity



- (c) Inspect the room lamp assy No.1 (interior light)
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
DOOR	1 - 2	Continuity

NG → REPLACE ILLUMINATION LIGHT

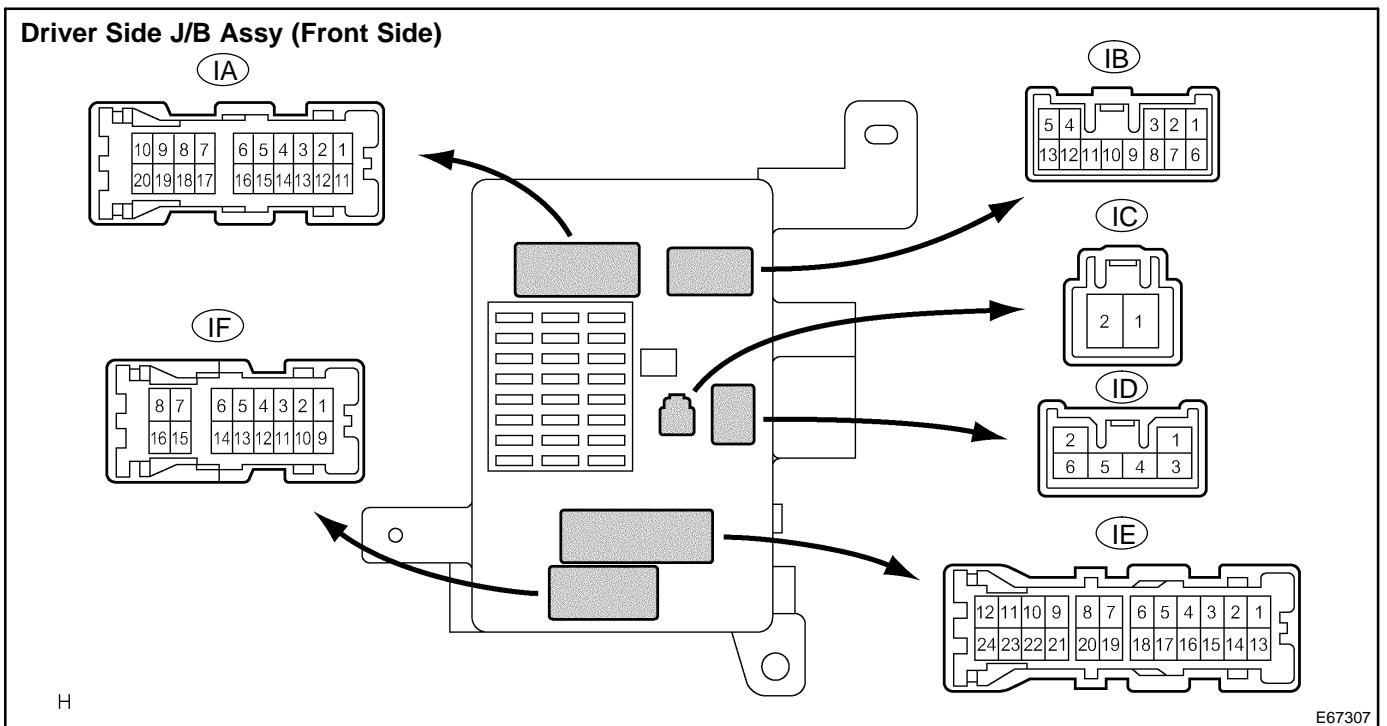
OK

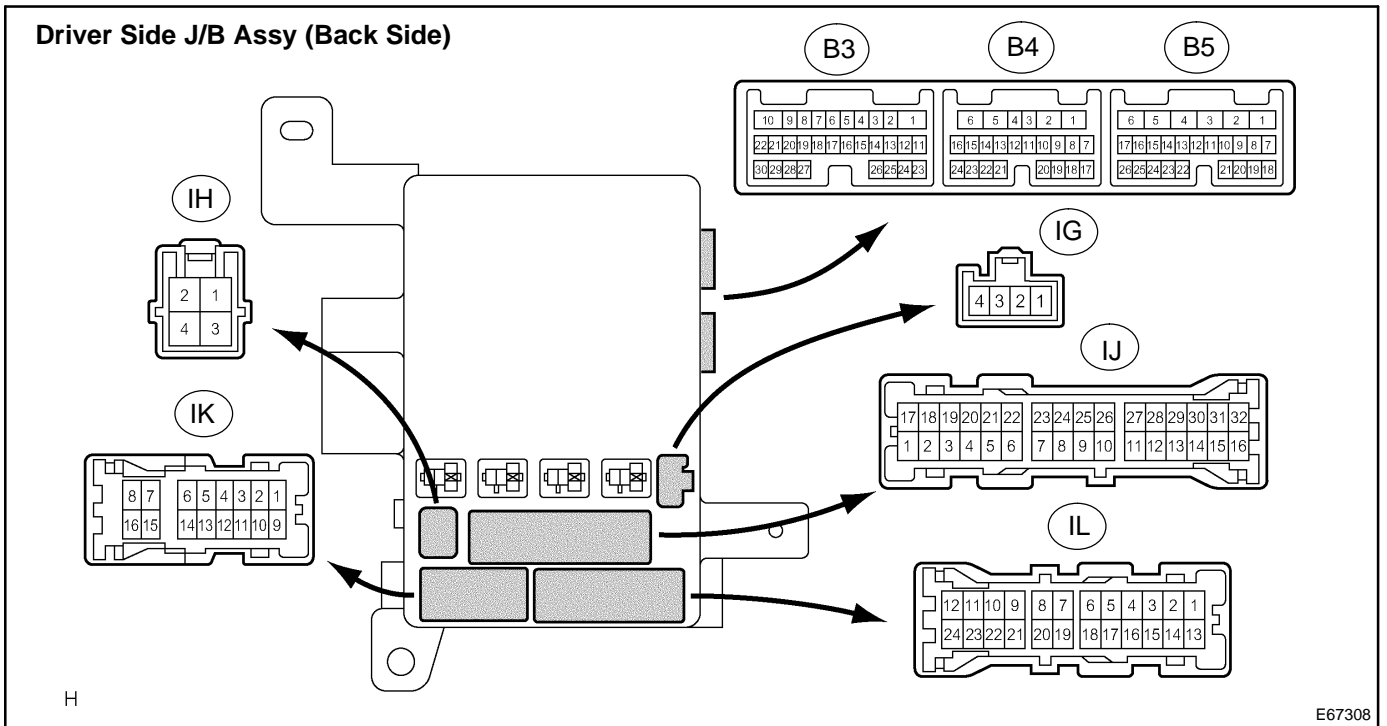
3 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(ILE)

- (a) Measure voltage between terminal ILE of the instrument panel J/B assy (driver side J/B assy) and body ground.

Standard:

Terminal No.	Condition	Specified condition
IA-8, IA-16, IK-9 ↔ body ground (ILE ↔ body ground)	Interior light SW is in Door position and doors all closed → One of the door opened	10-14 V → 0 V





OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

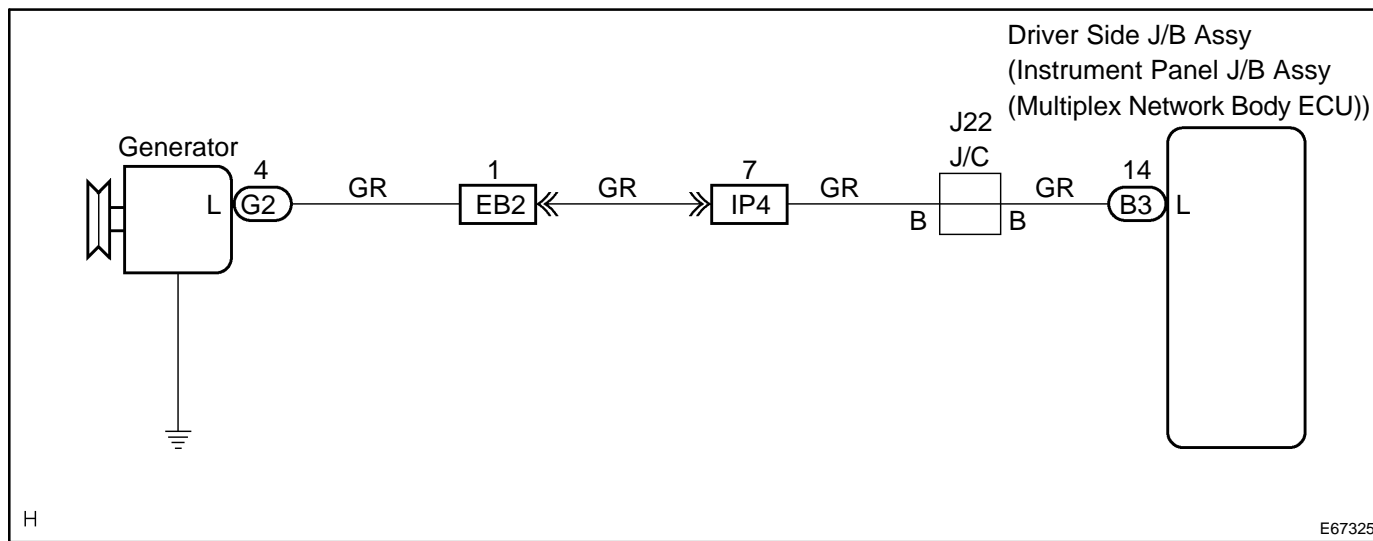
REPAIR OR REPLACE HARNESS OR CONNECTOR

GENERATOR SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

The Multiplex Network Body ECU receives engine condition (ON or OFF) from generator signal.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item below in the DATA LIST, and read the display on the hand-held tester.

BGW:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
ALT L SIG	Alternator (Generator) signal/ON or OFF	ON: Engine is running OFF: Engine is stopping	-

OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

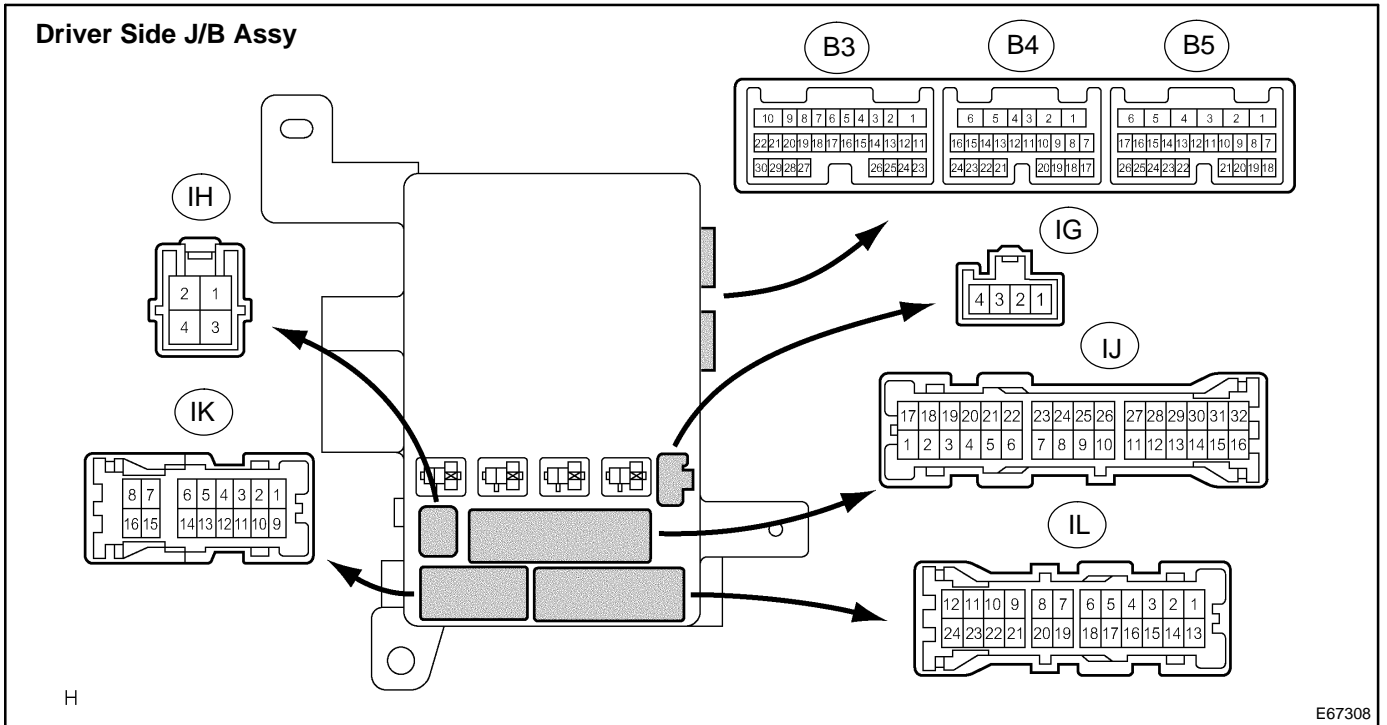
NG

2 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(L)

(a) Measure voltage between terminal L of the instrument panel J/B assy (driver side J/B assy) and body ground.

Standard:

Terminal No.	Condition	Specified condition
B3-14 ↔ body ground (L ↔ body ground)	Engine OFF → ON	0 V → 10-14 V



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

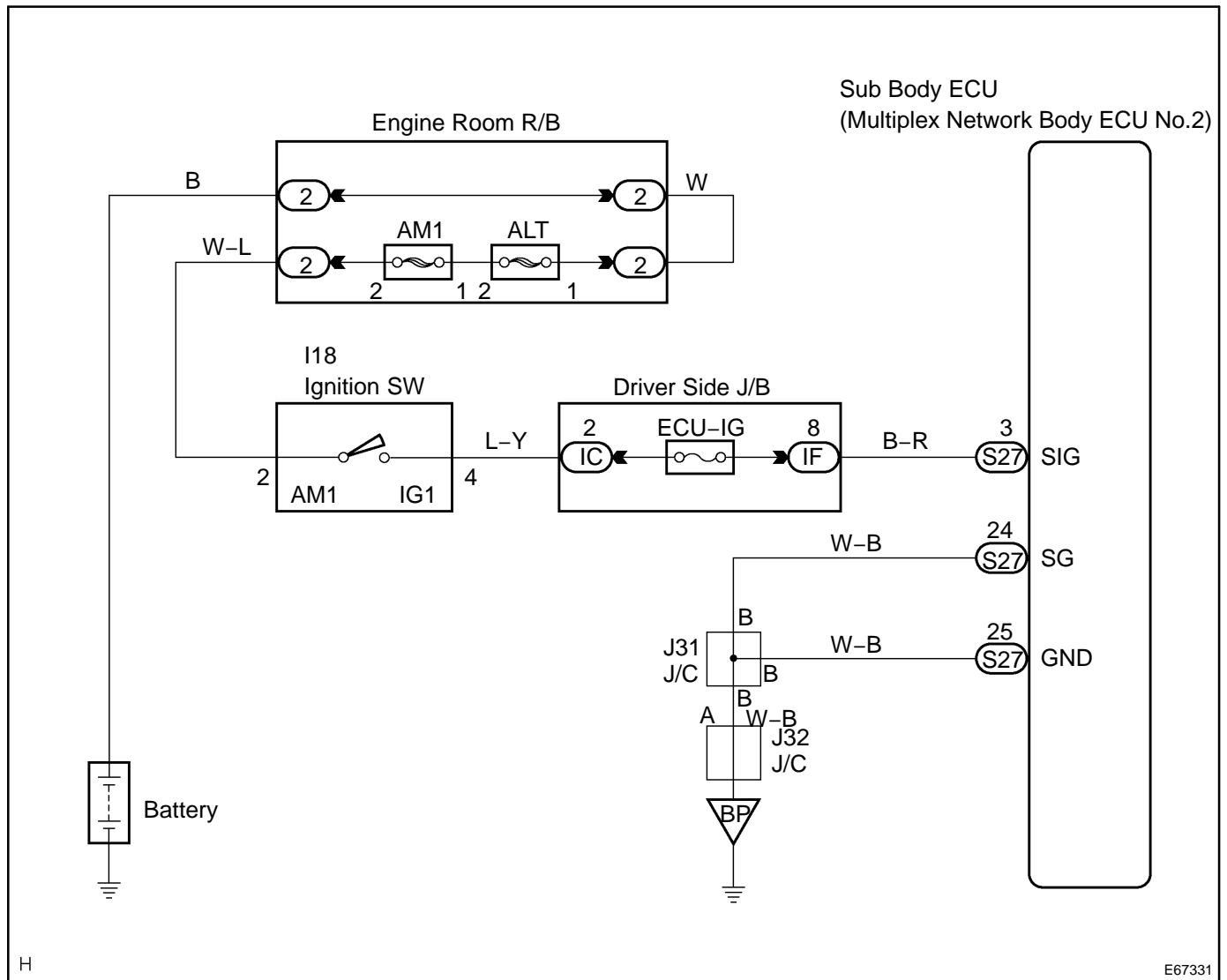
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

BODY ECU NO.2 IGNITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the ignition switch and sends it to Multiplex Network Body ECU No.2.

WIRING DIAGRAM



H

E67331

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the items below in the DATA LIST, and read the displays on the hand-held tester.

BGW:

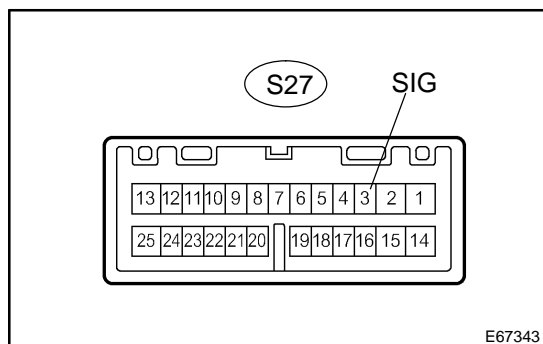
Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
IG SW	IG SW signal/ ON or OFF	ON: Ignition switch is in ON or START position OFF: Ignition switch is in OFF or ACC position	-

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

NG

2 INSPECT MULTIPLEX NETWORK BODY ECU NO.2 (SIG)



- Disconnect the connector from the multiplex network body ECU No.2.
- Check continuity between terminal SIG of the multiplex network body ECU No.2 on the wire harness side and body ground.

Standard:

Terminal No. (Symbols)	Condition	Specified condition
S27-3 ↔ body ground (SIG ↔ body ground)	Turn IG switch OFF → ACC	0 V → 10-14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

ILLUMINATION CIRCUIT (BODY ECU NO.2 CONTROL)

CIRCUIT DESCRIPTION

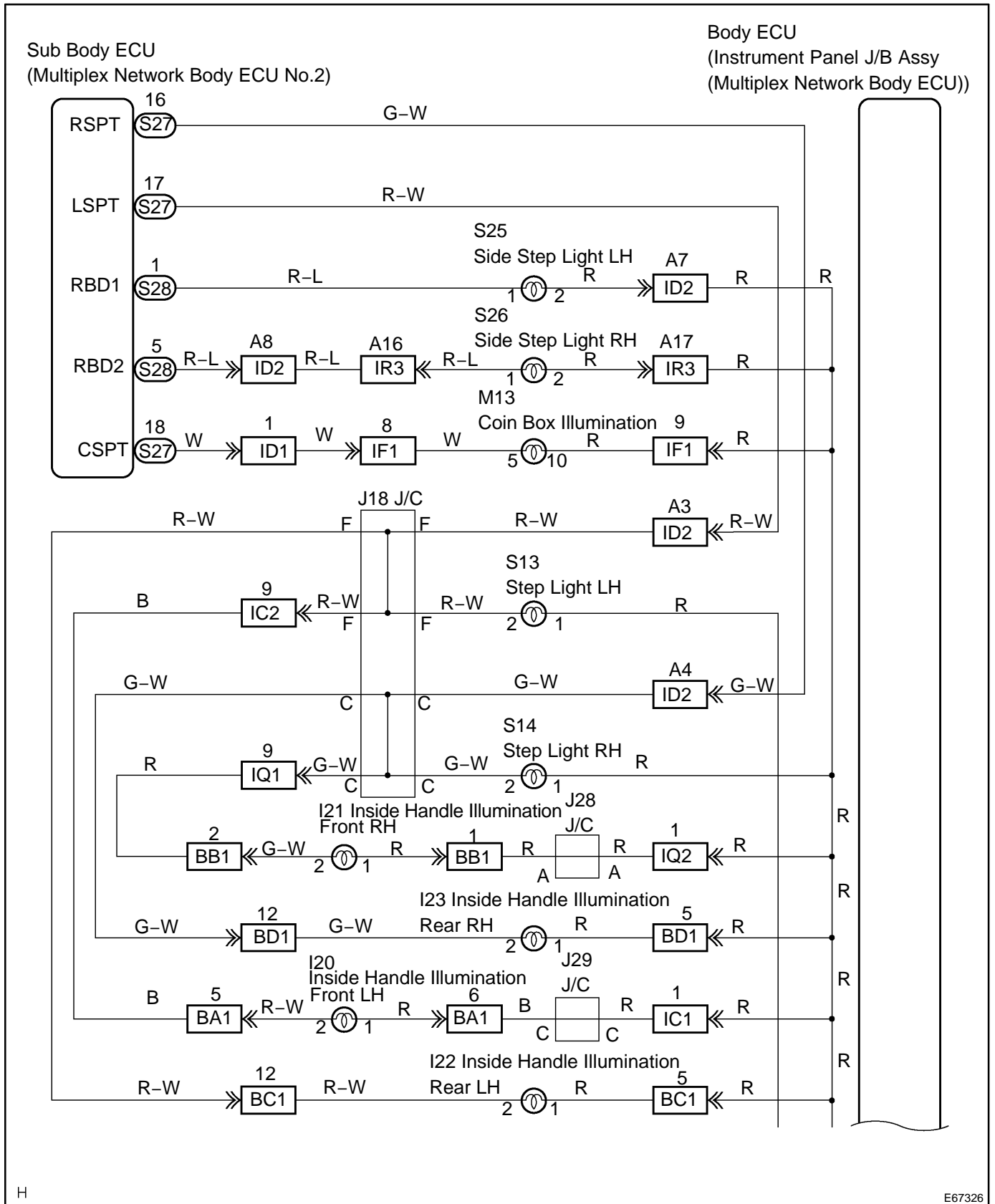
This circuit is used to turn the illumination on.

According to the control signal from the Multiplex Network Body ECU by the BEAN signal, the Multiplex Network Body ECU No.2 performs lighting, lights-out and adjustment of the foot light and the inside door handle illumination.

The Multiplex Network Body ECU controls lighting and lights-out of the center console spot light.

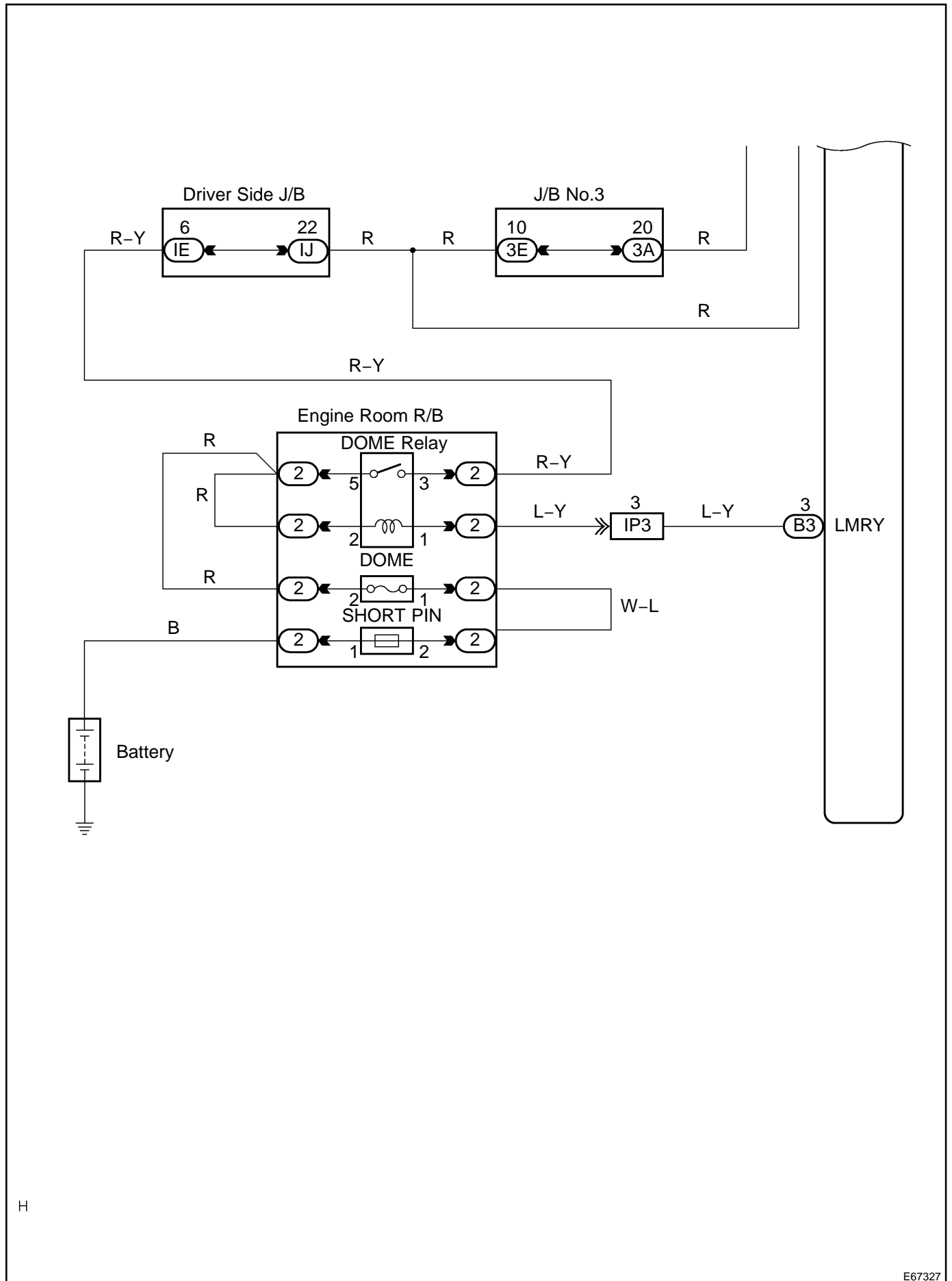
According to the control signal from the Multiplex Network Body ECU by the BEAN signal, the Body ECU No.2 performs lighting and lights-out of the side step light.

WIRING DIAGRAM



H

E67326



H

E67327

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item below in the ACTIVE TEST and then check that the relay operates.

Body No.2:

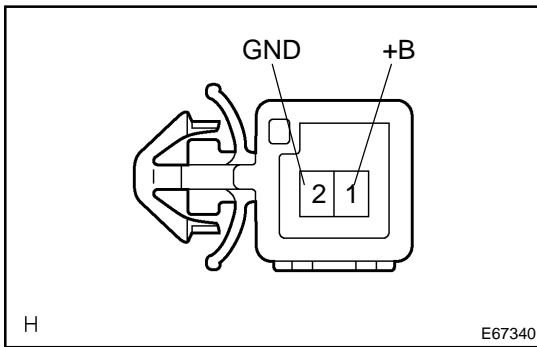
Item	Test Details	Diagnostic Note
CONSOLE LIGHT	Center console spot light ON/OFF	-
STEP LIGHT	Foot light and inside door handle illumination ON/OFF	-
SCUFF PLATE LEG	Side step light ON/OFF	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

NG

2 INSPECT ILLUMINATION LIGHT

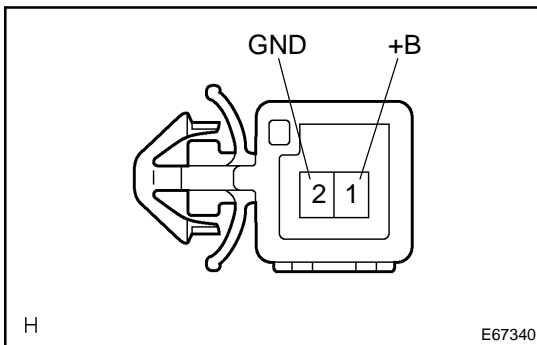


- (a) Inspect the interior illumination lamp assy No.1 (Inside handle illumination)
- (1) Check continuity between terminals 1 (+B) and 2 (GND).

Standard: Continuity

HINT:

Connect the positive (+) terminal of the tester to the terminal 1 (+B) of the connector, and the negative (-) terminal of the tester to the terminal 2 (GND) of the connector to check the continuity.



- (b) Inspect the interior illumination lamp assy No.2 (Foot light)
- (1) Check continuity between terminals 1 (+B) and 2 (GND).

Standard: Continuity

HINT:

Connect the positive (+) terminal of the tester to the terminal 1 (+B) of the connector, and the negative (-) terminal of the tester to the terminal 2 (GND) of the connector to check the continuity.

- (c) Inspect the side step lamp assy
- (1) Check continuity between terminals when the courtesy lamp switch is operated.

Standard:

ON: Continuity

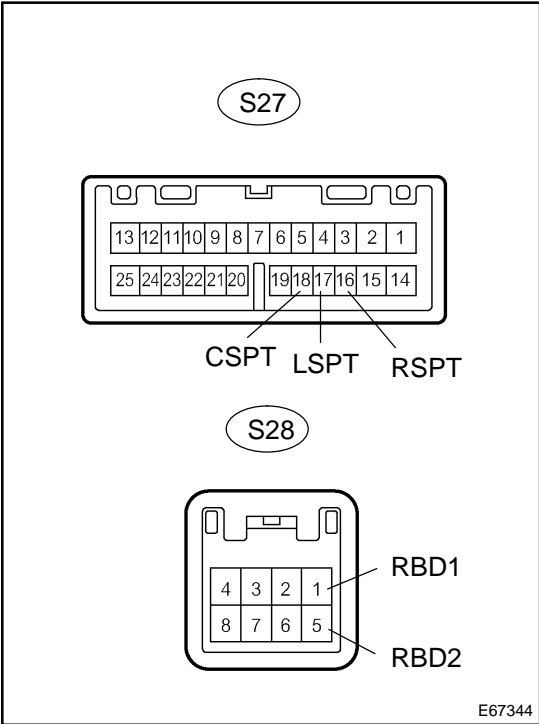
OFF: No continuity

NG

REPLACE ILLUMINATION LIGHT

OK

3 INSPECT MULTIPLEX NETWORK BODY ECU NO.2(CSPT, RBD1, RBD2, RSPT, LSPT)



(a) Measure voltage between terminals of the multiplex network body ECU No.2.

Standard:

Terminal No.	Condition	Specified condition
RSPT ↔ Body ground (S27-16 ↔ Body ground)	Each doors are opened → all doors are closed	Below 1 V → 10 - 14 V
LSPT ↔ Body ground (S27-17 ↔ Body ground)	Each doors are opened → all doors are closed	Below 1 V → 10 - 14 V
CSPT ↔ Body ground (S27-18 ↔ Body ground)	Ignition switch OFF → ON	10 - 14 V → Below 1 V
RBD1 ↔ Body ground (S28-1 ↔ Body ground)	PNP switch P position and each door are opened	Below 1 V
RBD2 ↔ Body ground (S28-5 ↔ Body ground)	PNP switch P position and each door are opened	Below 1 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)**

NG

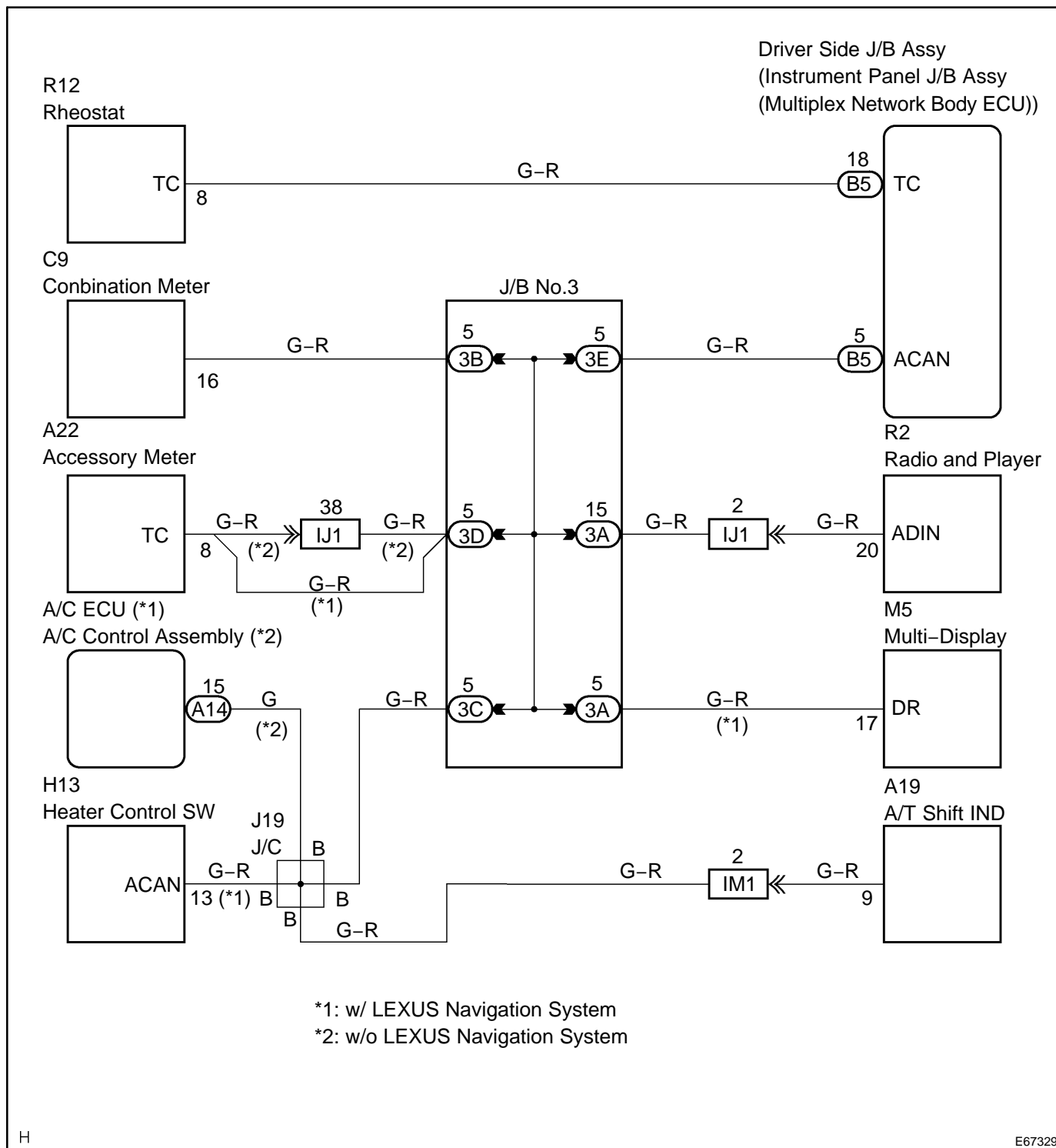
REPAIR OR REPLACE HARNESS OR CONNECTOR

AUTO DIMMER SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the tail cancel signal and sends auto dimmer signal to each ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 3 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the item below in the DATA LIST, and read the display on the hand-held tester.

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
TAIL CANCEL SW	Tail cancel SW signal/ ON or OFF	ON: Tail cancel switch of the light control rheostat is ON position OFF: Tail cancel switch of the light control rheostat is OFF position	-

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1543)

NG

2 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the item below in the ACTIVE TEST and then check that the relay operates.

Body:

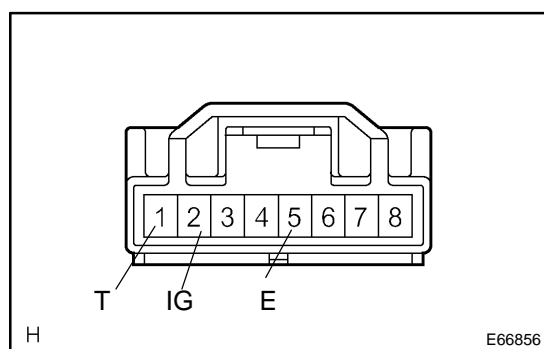
Item	Test Details	Diagnostic Note
DIMMER SIG	Turn auto dimmer ON/OFF	-

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT LIGHT CONTROL RHEOSTAT



- Check continuity of the light control rheostat when operating the light control rheostat as shown in the chart below.

Standard:

Terminal (Symbol)	Condition	Specified condition
1 (T) ⇔ Body ground	Ignition switch ON, Tail-light switch OFF → ON	Below 1V → 10 - 14V
2 (IG) ⇔ Body ground	Ignition switch OFF → ON	Below 1V → 10 - 14V
5 (E) ⇔ Body ground	Always	Continuity

NG

REPLACE LIGHT CONTROL RHEOSTAT

OK

4 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Inspect the harness and the connectors related to each ECU or meter by referring to the wiring diagram.

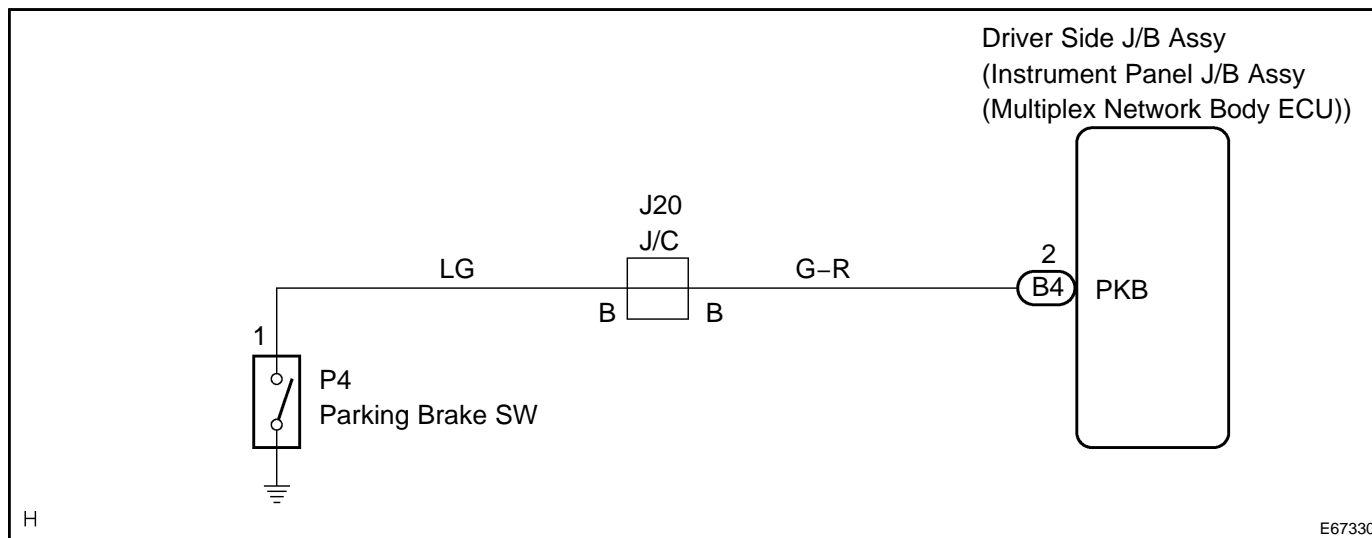
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

PARKING BRAKE SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the parking brake (ON/OFF) and sends it to each ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to DLC3.
- Turn the ignition switch to ON and push the hand-held tester main switch ON.
- Select the item below in the DATA LIST, and read the display on the hand-held tester.

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
PARKING BRAKE SW	Parking brake switch signal/ON or OFF	ON: Parking brake switch is ON OFF: Parking brake is OFF	-

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

NG

2 CHECK PARKING BRAKE WARNING INDICATOR

- (a) Pull-up the parking brake lever.
(b) Check that the parking brake warning indicator comes on.

Standard: indicator comes on.

NG

**GO TO COMBINATION METER SYSTEM
(See Page 05-2033)**

OK

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal PKB of the instrument panel J/B assy (driver side J/B assy) and the parking brake switch.

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1543)**

WIPER AND WASHER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

052AJ-05

1	VEHICLE BROUGHT TO WORK SHOP
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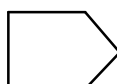


2	CUSTOMER PROBLEM ANALYSIS (See page 05-1603)
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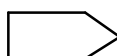


3	CHECK MULTIPLEX COMMUNICATION SYSTEM (See page 05-2254)
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(a) Check that DTC output.



DTC IS OUTPUT (PROCEED TO "MULTIPLEX COMMUNICATION SYSTEM")
--



DTC IS NOT OUTPUT (GO TO STEP 4)

4	SYMPTOM SIMULATION (See page 01-26)
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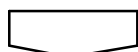
5	PROBLEM SYMPTOMS TABLE (See page 05-1611)
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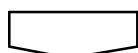
6	CIRCUIT INSPECTION (See page 05-1613 - 05-1645)
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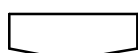
7	TERMINAL OF ECU (See page 05-1608)
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8	IDENTIFICATION OF PROBLEM
----------	----------------------------------



9	REPAIR OR REPLACE
----------	--------------------------



10	CONFIRMATION TEST
-----------	--------------------------



END

CUSTOMER PROBLEM ANALYSIS CHECK

WIPER AND WASHER SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km Mile

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times per day, month) <input type="checkbox"/> Once only
Weather Condition When Problem Occurred	Weather
	Outdoor Temperature
	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/ Others <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F (°C))

Malfunction System	<input type="checkbox"/> Front wiper and washer system
	<input type="checkbox"/> Rear wiper and washer system

N

I30683

PRE-CHECK

1. RAIN DROP SENSING WIPER OPERATION CHECK

- (a) Check that the wiper operates properly in INT, LO, HI mode depending on the amount of raindrop on the windshield glass when wiper switch is at AUTO.

2. FAIL SAFE FUNCTION

- (a) Wiper operates intermittently in accordance with the sensitivity control position even if the wiper switch is at "AUTO" in the following condition.
- (1) Rain sensor temperature is less than -30°C (-22°F).
 - (2) Rain sensor temperature is more than 90°C (194°F).
 - (3) Rain sensor malfunction.

3. USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to DLC3.
 (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

Hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the hand-held tester operator's manual for further details.

4. DTC CLEAR

- (a) DTC and the freeze frame data can be erased by operating the hand-held tester.

5. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switches, sensors, actuators and so on without removing any part. Reading the DATA LIST as a first step of troubleshooting is one of the methods to shorten labor time.

- (a) Connect the hand-held tester to DLC3.
 (b) Turn the ignition switch to ON.
 (c) According to the display on the tester, read the "DATA LIST".

Rain Sensor

Item	Condition	Specified Condition	Diagnostic Note
SEN COND INF	IG switch ON and front wiper switch AUTO	OK	This item diagnoses the conditions inside the rain sensor. If NG is displayed, replace the rain sensor because it has an internal problem.
SEN REACT CONDE	IG switch ON and front wiper switch AUTO	OK	This item diagnoses the rain sensor detection conditions. If NG is displayed, clean the outside of the windshield where the rain sensor is installed. Also confirm the following: <ul style="list-style-type: none"> • The sensor is correctly installed. • No air bubbles are trapped between the windshield and the sensor tape. • The sensor tape is properly placed between the windshield and the sensor. • The sensing portion of the sensor (contact surface with the windshield) is clean. If no defects are found, replace the rain sensor because it may have an internal problem.
SEN HI TEMP INF	IG switch ON and front wiper switch AUTO	OK	This item diagnoses the detection conditions of the temperature sensor in the rain sensor. If NG is displayed, check if the temperature around the rain sensor is more than 90°C (194°F). If the temperature is 90°C (194°F) or less, replace the rain sensor because it may have an internal problem.

DIAGNOSTICS - WIPER AND WASHER SYSTEM

Item	Condition	Specified Condition	Diagnostic Note
SEN LO TEMP INF	IG switch ON and front wiper switch AUTO	OK	This item diagnoses the detection conditions of the temperature sensor in the rain sensor. If NG is displayed, check if the temperature around the rain sensor is less than -30°C (-22°F). If the temperature is -30°C (-22°F) or more, replace the rain sensor because it may have an internal problem.
WIP SW LO SIG	IG switch ON and front wiper switch except LO \rightarrow LO	OFF/ON	-
WIP SW HI SIG	IG switch ON and front wiper switch except HI \rightarrow HI	OFF/ON	-
WIP SW AUTO SIG	IG switch ON and front wiper switch except AUTO \rightarrow AUTO	OFF/ON	-
WASH SW SIG	IG switch ON and front washer switch OFF \rightarrow ON	OFF/ON	-
KEY SW SIG	IG switch ON \rightarrow Without key	OFF/ON	-

Wiper

Item	Condition	Specified Condition
F WIPER SW	IG switch ON and front wiper switch OFF \rightarrow LO, HI, AUTO	OFF/ON
WIPER LO SW	IG switch ON and front wiper switch except LO \rightarrow LO	OFF/ON
WIPER HI SW	IG switch ON and front wiper switch except HI \rightarrow HI	OFF/ON
WIPER AUTO SW	IG switch ON and front wiper switch except AUTO \rightarrow AUTO	OFF/ON
WASHER SW	IG switch ON and front washer switch OFF \rightarrow ON	OFF/ON
BRAKE PEDAL SW	IG switch ON and brake pedal released \rightarrow depressed	OFF/ON
NSW SW	IG switch ON and PNP switch except N \rightarrow N	OFF/ON
TIME CTL SW	IG switch ON and front wiper INT switch fully clockwise \rightarrow fully counterclockwise	deg
AUTO WIPER	-	NOT AVL/AVIL
SPEED MODE	-	NOT AVL/AVIL
REWIPE CONTROL	-	OFF/3 s/ SPD MOD

Body

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
LUGG COURTESY SW	Back door courtesy SW signal/ON or OFF	ON: Back door is open OFF: Back door is closed	-
P/N POS SW	PNP SW signal/ON or OFF	ON: Park/neutral position switch is in P position OFF: Park/neutral position switch is in except P position	-

Body No.2

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
IG SW	IG SW signal	ON: IG switch is in ON or START position OFF: IG switch is in OFF or ACC position	-

6. ACTIVE TEST**HINT:**

Performing the ACTIVE TEST using the hand-held tester allows the relay, and so on to operate without removing any parts. Performing the ACTIVE TEST as a first step of troubleshooting is one of the methods to shorten labor time.

DATA LIST can be displayed during the ACTIVE TEST.

- (a) Turn the ignition switch to OFF.
- (b) Connect the hand-held tester to DLC3.
- (c) Turn the ignition switch to ON.
- (d) According to the display on tester, perform the "ACTIVE TEST".

Wiper

Item	Check Item	Operation
WIPER MOT (HI)	Front wiper motor HI operation	OFF/ON
WIPER MOT (LO)	Front wiper motor LO operation	OFF/ON

Body No.2

Item	Test Details	Diagnostic Note
R WIPER MOT	Rear wiper motor ON/OFF	-

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

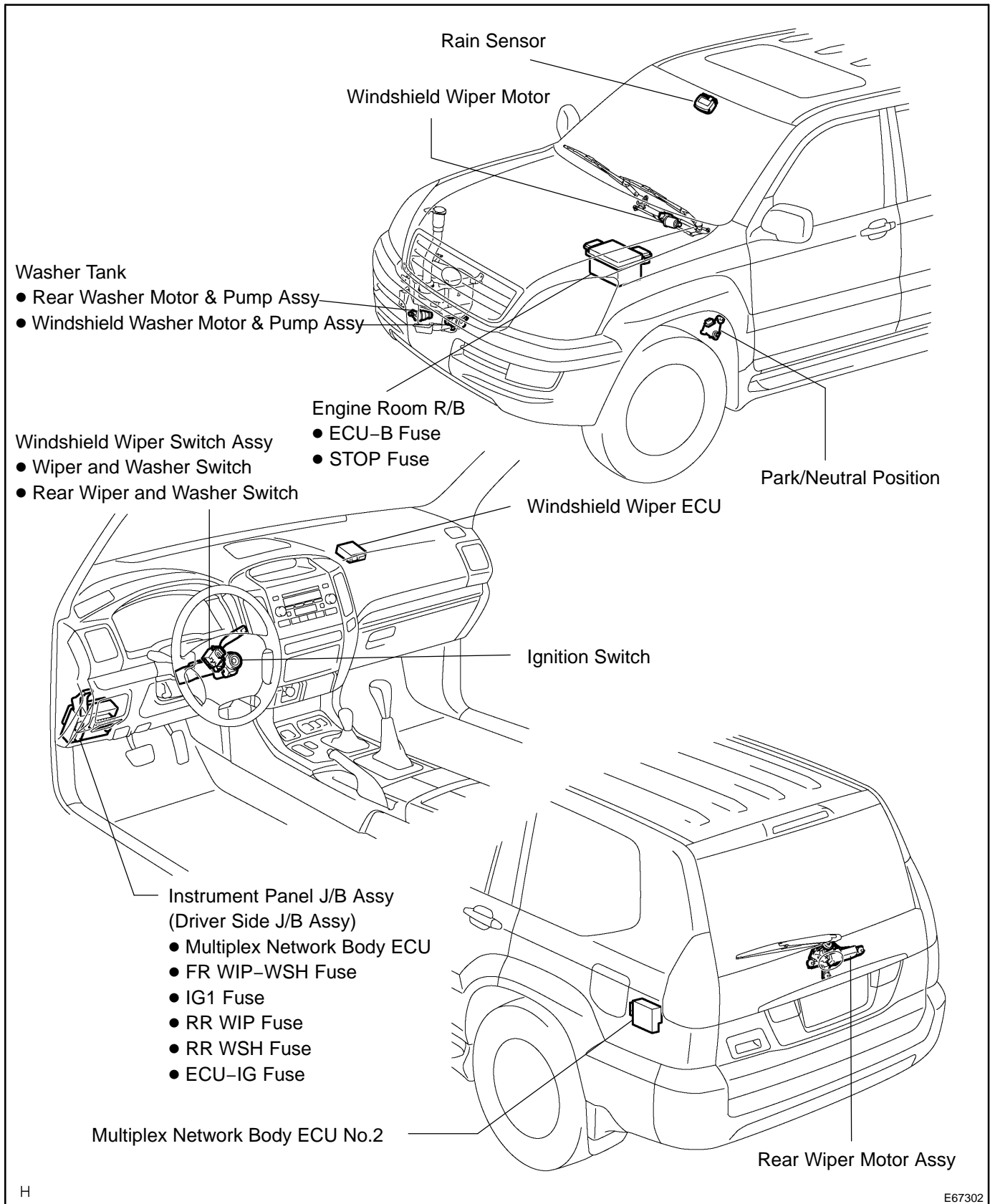
NOTICE:

- **Be sure to record the current value before customizing.**
- **In case of performing the troubleshooting, pay attention as there is a possibility that the function is OFF by customizing. (Example: In case of the symptom in which "The wireless operation does not function", check that the wireless operation is not OFF by customizing, then perform the troubleshooting.)**

WIPER

DISPLAY(ITEM)	DEFAULT	CONTENTS	SETTING
SPEED MODE (Speed Mode)	Avail	Function to change to the intermittent operation when the vehicle comes to a stop(0 vehicle speed) from running condition in case that the wiper switch is at the LO position.	Not Avail / Avail
AUTO WIPE (Auto wipe)	Avail	Function to operate the wiper automatically when it is raining.	Not Avail / Avail
REWIPE CONTROL (Rewipe Control)	SPD MOD	Function to change time until operating the wiper to prevent dropping after having used the washer.	OFF / 3s / SPD MOD

LOCATION

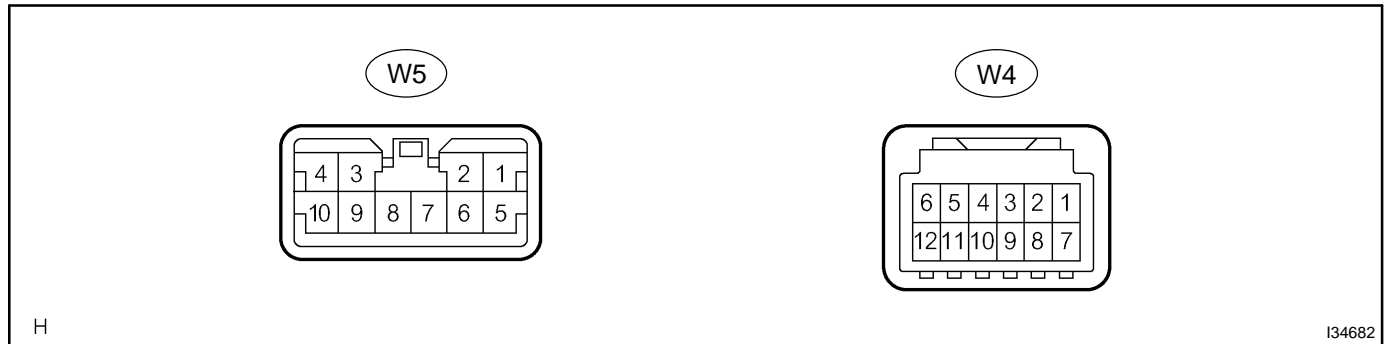


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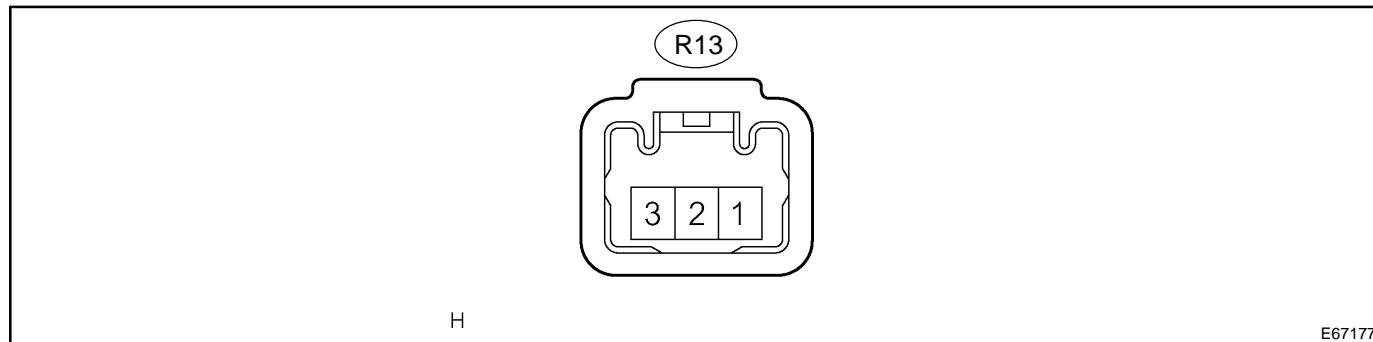
TERMINALS OF ECU

1. WINDSHIELD WIPER ECU



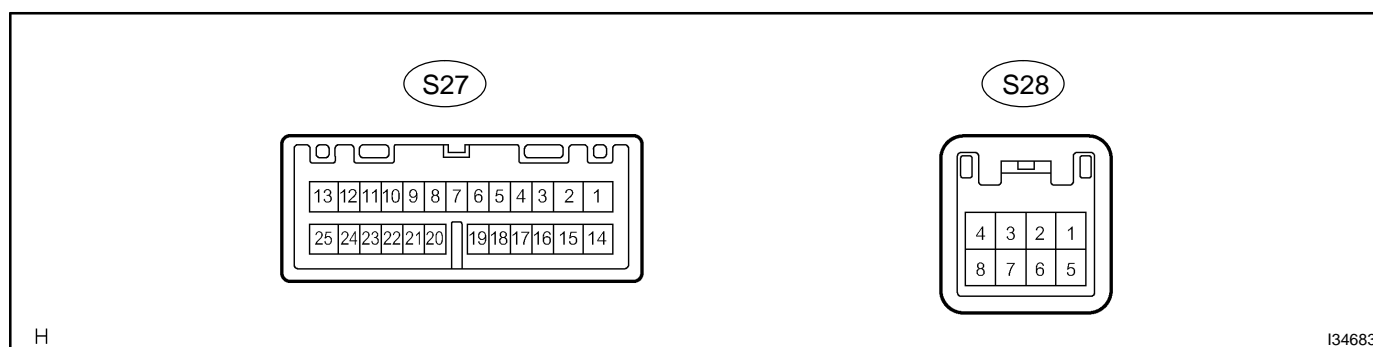
Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
SIS ⇔ Body ground (W5-1 ⇔ Body ground)	L-B ⇔ Body ground	Ignition switch ON and front wiper switch except LO → LO	Below 1 V → 10 - 14 V
+2 ⇔ Body ground (W5-2 ⇔ Body ground)	L-R ⇔ Body ground	Ignition switch ON and front wiper switch except HI → HI	Below 1 V → 10 - 14 V
SIM ⇔ Body ground (W5-5 ⇔ Body ground)	L-W ⇔ Body ground	Ignition switch ON and front wiper stop position → Except stop	Below 2 V → 10 - 14 V
WSHI ⇔ Body ground (W5-6 ⇔ Body ground)	L-R ⇔ Body ground	Ignition switch ON and front wiper switch except HI → HI	10 - 14 V → Below 1 V
WSLO ⇔ Body ground (W5-7 ⇔ Body ground)	L-W ⇔ Body ground	Ignition switch ON and front wiper switch except LO → LO	10 - 14 V → Below 1 V
WSE ⇔ Body ground (W5-8 ⇔ Body ground)	L ⇔ Body ground	Always	Below 1 V
WIG ⇔ Body ground (W5-10 ⇔ Body ground)	L ⇔ Body ground	Ignition switch OFF → ON	0 V → 10 - 14 V
MPX1 (W4-1)	R-Y	Multiplex communication circuit signals	-
MPX2 (W4-2)	B	Multiplex communication circuit signals	-
VR ⇔ Body ground (W4-3 ⇔ Body ground)	L-W ⇔ Body ground	Ignition switch ON and sensitivity volume "FAST" → "SLOW"	Below 1 V → 4.4 V
N ⇔ Body ground (W4-4 ⇔ Body ground)	G-W ⇔ Body ground	Ignition switch ON and PNP switch except N → N	Below 1 V → 10 - 14 V
WASH ⇔ Body ground (W4-6 ⇔ Body ground)	L-Y ⇔ Body ground	Ignition switch ON and front washer switch OFF → ON	10 - 14 V → Below 1 V
WSAU ⇔ Body ground (W4-7 ⇔ Body ground)	R-L ⇔ Body ground	Ignition switch ON and front wiper switch except AUTO → AUTO	10 - 14 V → Below 1 V
+B ⇔ Body ground (W4-8 ⇔ Body ground)	W-R ⇔ Body ground	Always	10 - 14 V
EVR ⇔ Body ground (W4-9 ⇔ Body ground)	R-W ⇔ Body ground	Always	Below 1 V
STP ⇔ Body ground (W4-10 ⇔ Body ground)	G-Y ⇔ Body ground	Ignition switch ON and stop light switch OFF → ON	Below 1 V → 10 - 14 V
GND ⇔ Body ground (W4-12 ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1 V

2. RAIN SENSOR



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
SIG ⇔ Body ground (R13-1 ⇔ Body ground)	B-W ⇔ Body ground	Ignition switch OFF or ACC → ON	Below 1 V → 10 - 14 V
MPX ⇔ Body ground (R13-2 ⇔ Body ground)	R-Y ⇔ Body ground	Multiplex communication circuit signals	-
ES ⇔ Body ground (R13-3 ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1 V

3. MULTIPLEX NETWORK BODY ECU No.2



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
RWLM ⇔ Body ground (S27-1 ⇔ Body ground)	L-R ⇔ Body ground	Ignition switch ON	10 - 14 V
W ⇔ Body ground (S27-2 ⇔ Body ground)	L-O ⇔ Body ground	Ignition switch OFF → ON	Below 1 V → 10 - 14 V
SIG ⇔ Body ground (S27-3 ⇔ Body ground)	B-R ⇔ Body ground	Ignition switch OFF → ON	Below 1 V → 10 - 14 V
BECU ⇔ Body ground (S27-4 ⇔ Body ground)	W-R ⇔ Body ground	Always	10 - 14 V
WRLO ⇔ Body ground (S27-5 ⇔ Body ground)	R-B ⇔ Body ground	Ignition switch ON and rear wiper switch LO	Below 1 V
RWSM ⇔ Body ground (S27-14 ⇔ Body ground)	L-B ⇔ Body ground	Ignition switch ON and front wiper stop position → Except stop position	Below 2 V → 6 - 14 V
WRIN ⇔ Body ground (S27-19 ⇔ Body ground)	R ⇔ Body ground	Ignition switch ON and rear wiper switch INT	Below 1 V
SG ⇔ Body ground (S27-24 ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1 V
GND ⇔ Body ground (S27-25 ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1 V
MPX+ (S28-2)	L	Multiplex communication circuit	-

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
WRSW ⇔ Body ground (S28-4 ⇔ Body ground)	P ⇔ Body ground	Ignition switch ON and rear washer switch ON	Below 1 V
MPX- (S28-6)	B	Multiplex communication circuit	-

PROBLEM SYMPTOMS TABLE

HINT:

Proceed to troubleshooting of each circuit in the table below.

WIPER AND WASHER SYSTEM

Symptom	Suspected Area	See page
Front wipers and washers do not operate. (w/o Rain Sensor)	1. FR WIP-WSH Fuse 2. Windshield wiper switch 3. Wire harness	- 66-3 -
Front wipers do not operate in LO or HI. (w/o Rain Sensor)	1. Windshield wiper switch 2. Windshield wiper motor 3. Wire harness	66-3 66-3 -
Front wipers do not operate in INT. (w/o Rain Sensor)	1. Windshield wiper switch 2. Windshield wiper motor 3. Wire harness	66-3 66-3 -
Front washer motor does not operate.	1. FR WIP-WSH Fuse 2. Windshield wiper switch 3. Windshield wiper motor (Front) 4. Wire harness	- 66-3 66-3 -
Front wipers do not operate when washer switch is in ON. (w/o Rain Sensor)	1. Windshield wiper switch 2. Windshield wiper motor 3. Wire harness	66-3 66-3 -
Auto wiper system does not operate (All functions). (w/ Rain Sensor)	1. ECU-B, WIP-WSH Fuse 2. Front wiper motor 3. Windshield wiper ECU power source circuit 4. Ignition switch circuit 5. Front wiper switch circuit 6. Front wiper motor circuit 7. Front wiper position circuit 8. Windshield wiper ECU	- 66-3 05-1615 05-1617 05-1626 05-1629 05-1619 01-26
Raindrop Sensing Function does not operate (When the position is in "Auto", the system becomes vehicle speed-sensing adjustable interval INT function). (w/ Rain Sensor)	1. IG1 Fuse 2. Rain sensor circuit 3. Rain sensor 4. Windshield wiper ECU	- 05-1613 01-26 01-26
Vehicle Speed Switching Function does not operate. (w/ Rain Sensor)	1. Park/Neutral position switch circuit 2. Stop light switch circuit 3. Speed signal circuit 4. Parking brake switch circuit 5. Windshield wiper ECU 6. Instrument panel J/B assy (Driver side J/B assy (Multiplex network body ECU))	05-1621 05-1624 05-1642 05-1645 01-26 01-26
Washer-Linked Wiper with Drip-Preventive Function does not operate. (w/ Rain Sensor)	1. Front washer switch circuit 2. Front wiper position circuit 3. Ignition switch circuit 4. Windshield wiper ECU	05-1626 05-1619 05-1617 01-26
Washer system does not operate.	1. Washer hose and nozzle	-
<ul style="list-style-type: none"> ● At wiper switch HI position, the wiper blade is in contact with the body. ● When the wiper switch is OFF, the wiper blade does not retract or the retract position wrong. 	1. *1 Windshield wiper motor 2. Wire harness	66-6 -

*1: Inspect wiper arm and blade set position

REAR WIPER AND WASHER SYSTEM

Symptom	Suspected Area	See page
Rear wiper system does not operate.	<ol style="list-style-type: none"> 1. ECU-B, RR WIP, ECU-IG Fuse 2. Door courtesy switch circuit (back door) 3. Body ECU No.2 power source circuit 4. Rear wiper switch circuit 5. Rear wiper motor and relay circuit 6. Multiplex network body ECU No.2 	<p>-</p> <p>05-1634</p> <p>05-1636</p> <p>05-1638</p> <p>05-1640</p> <p>01-26</p>
Rear washer linked function does not operate.	<ol style="list-style-type: none"> 1. Rear wiper switch circuit 2. Multiplex network body ECU No.2 	<p>05-1638</p> <p>01-26</p>
Vehicle speed switching function does not operate.	<ol style="list-style-type: none"> 1. Door courtesy switch circuit (back door) 2. Speed signal circuit 3. Multiplex network body ECU No.2 4. Instrument panel J/B Assy (Driver side J/B Assy (Multiplex network body ECU)) 	<p>05-1634</p> <p>05-1642</p> <p>01-26</p> <p>01-26</p>
Rear washer system does not operate.	<ol style="list-style-type: none"> 1. RR WSH Fuse 2. Windshield wiper switch 3. Front washer motor 4. Wire harness 	<p>-</p> <p>66-3</p> <p>66-2</p> <p>-</p>
<ul style="list-style-type: none"> • At wiper switch HI position, the wiper blade is in contact with the body. • When the wiper switch is OFF, the wiper blade does not retract or the retract position wrong. 	<ol style="list-style-type: none"> 1. *1 Rear wiper motor 2. Wire harness 	<p>66-10</p> <p>-</p>

*1: Inspect wiper arm and blade set position

WASHER LEVEL WARNING SYSTEM

Symptom	Suspected Area	See page
Washer level sensor does not come on.	<ol style="list-style-type: none"> 1. Washer level sensor 2. Wire harness 3. Combination meter 	<p>05-2033</p> <p>-</p> <p>05-2033</p>

RAIN SENSOR CIRCUIT

CIRCUIT DESCRIPTION

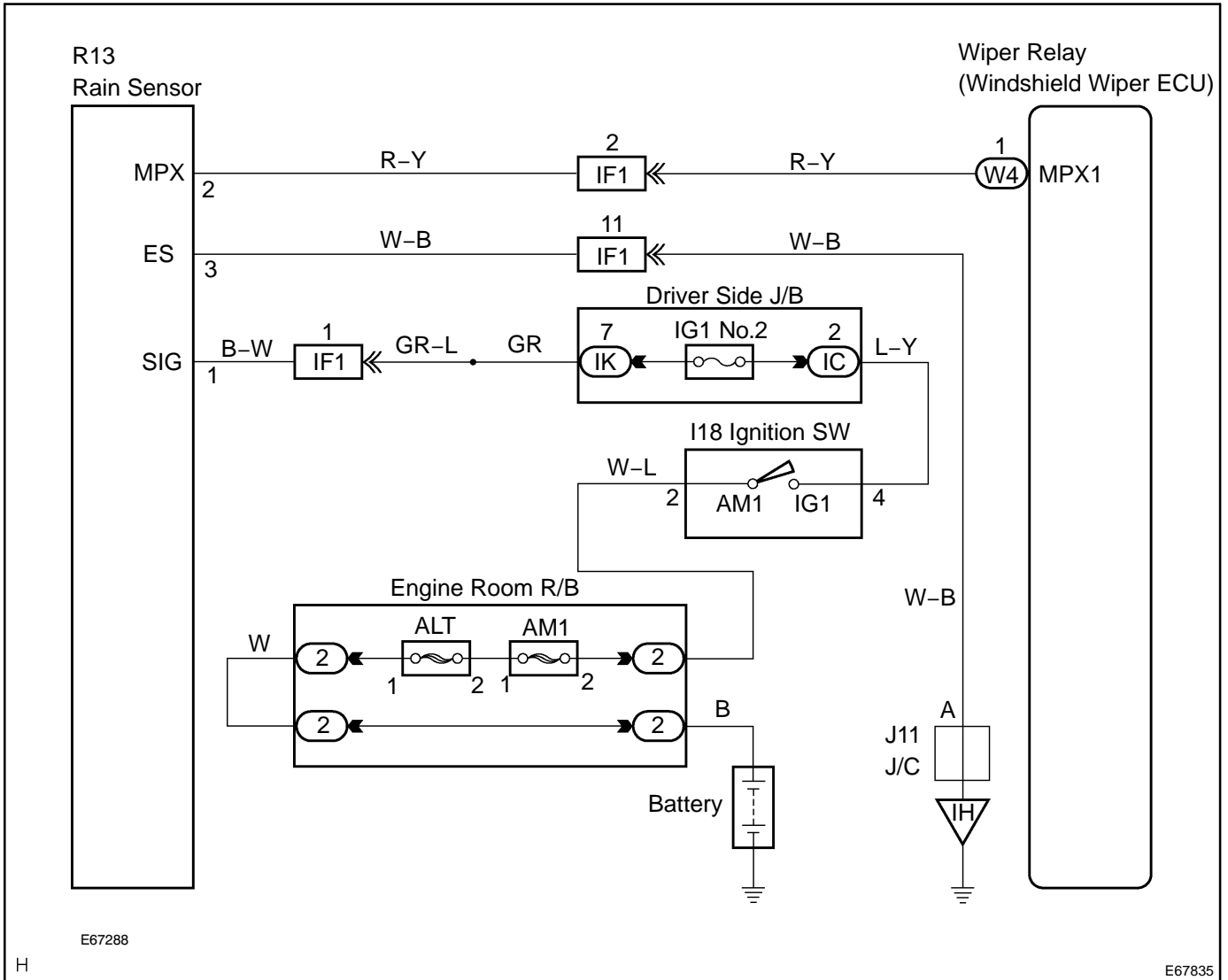
This circuit provides power to operate the rain sensor.

The auto wiper system operates when the wiper switch is in the AUTO position.

The rain sensor is connected to each ECU at the multiplex communication circuit.

When it detects raindrops that are stuck to the detection area on the windshield glass, it sends the wiper control signal according to the amount of raindrops to the Windshield Wiper ECU.

WIRING DIAGRAM



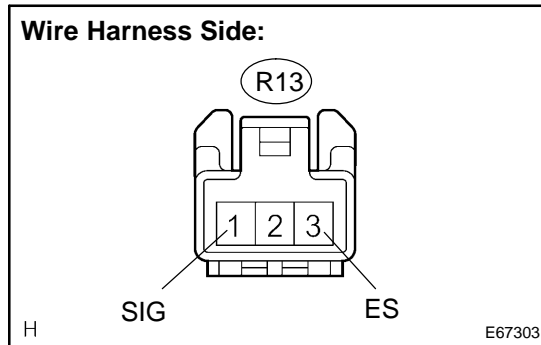
E67288

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E67835

INSPECTION PROCEDURE

1 INSPECT RAIN SENSOR(SIG, ES)



- (a) Disconnect the connector from the rain sensor.
- (b) Check that there is continuity between terminal ES on the wire harness side and body ground.
- (c) Turn the ignition switch to ON.
- (d) Measure the voltage between terminals SIG and ES on the wire harness side.

Standard: Continuity**Standard: 10 - 14 V**

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR(WINDSHILD WIPER ECU - RAIN SENSOR)
(See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal MPX1 of the wind-shield wiper ECU and the terminal MPX of the rain sensor.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

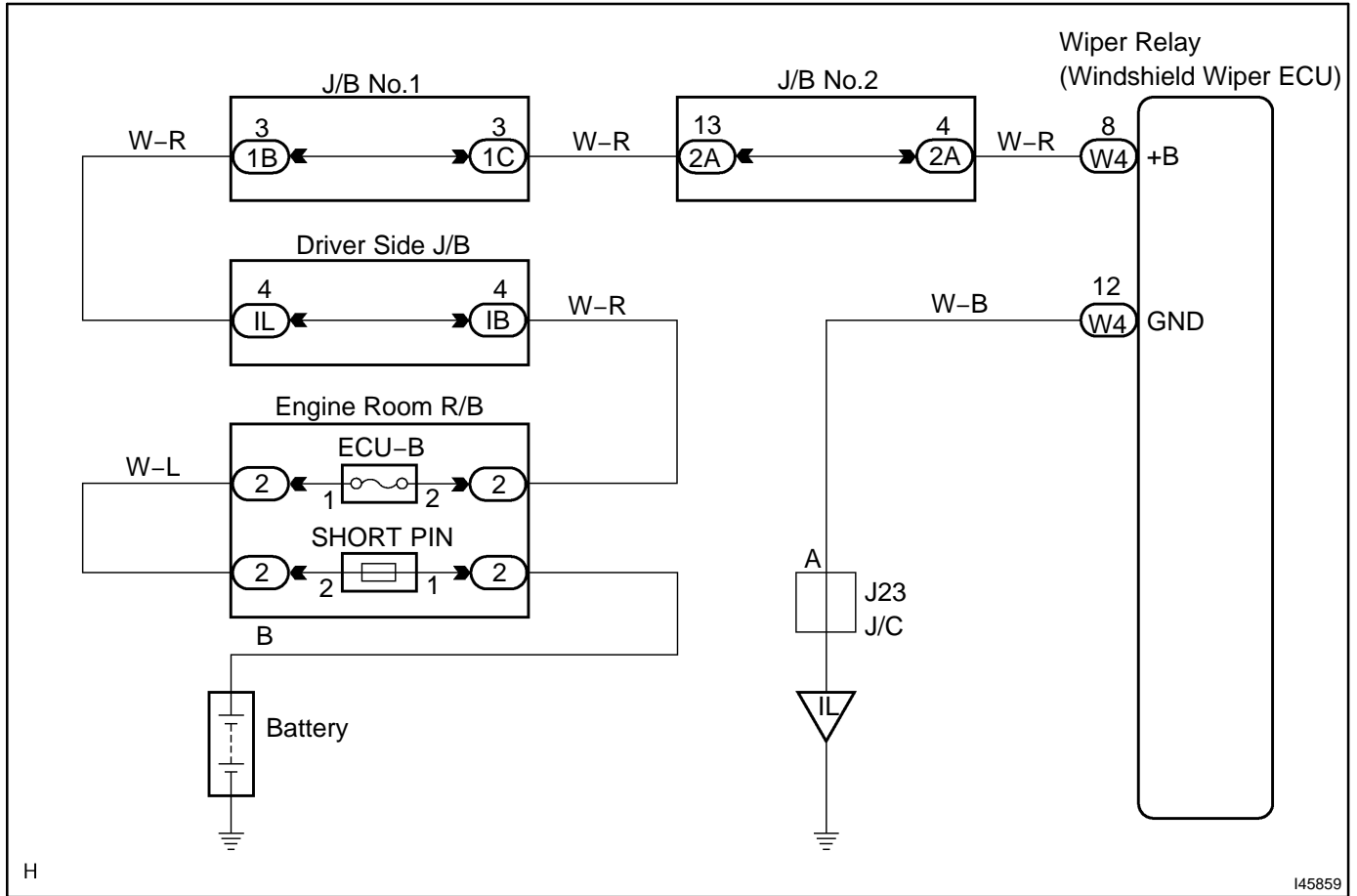
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)

WINDSHILD WIPER ECU POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This circuit provides power to operate the Windshield Wiper ECU.
 This circuit is the power source for the BEAN drive circuit.

WIRING DIAGRAM

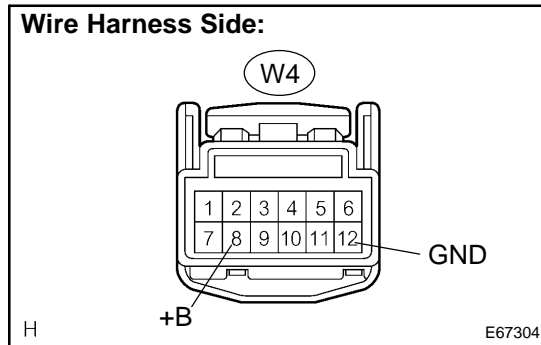


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I45859

INSPECTION PROCEDURE

1 INSPECT WINDSHILD WIPER ECU(+B, GND)



- (a) Disconnect the connector from the windshield wiper ECU.
 (b) Check that there is continuity between terminal GND on the wire harness side and body ground.

Standard: Continuity

- (c) Measure the voltage between terminal +B on the wire harness side and body ground.

Standard: 10 - 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

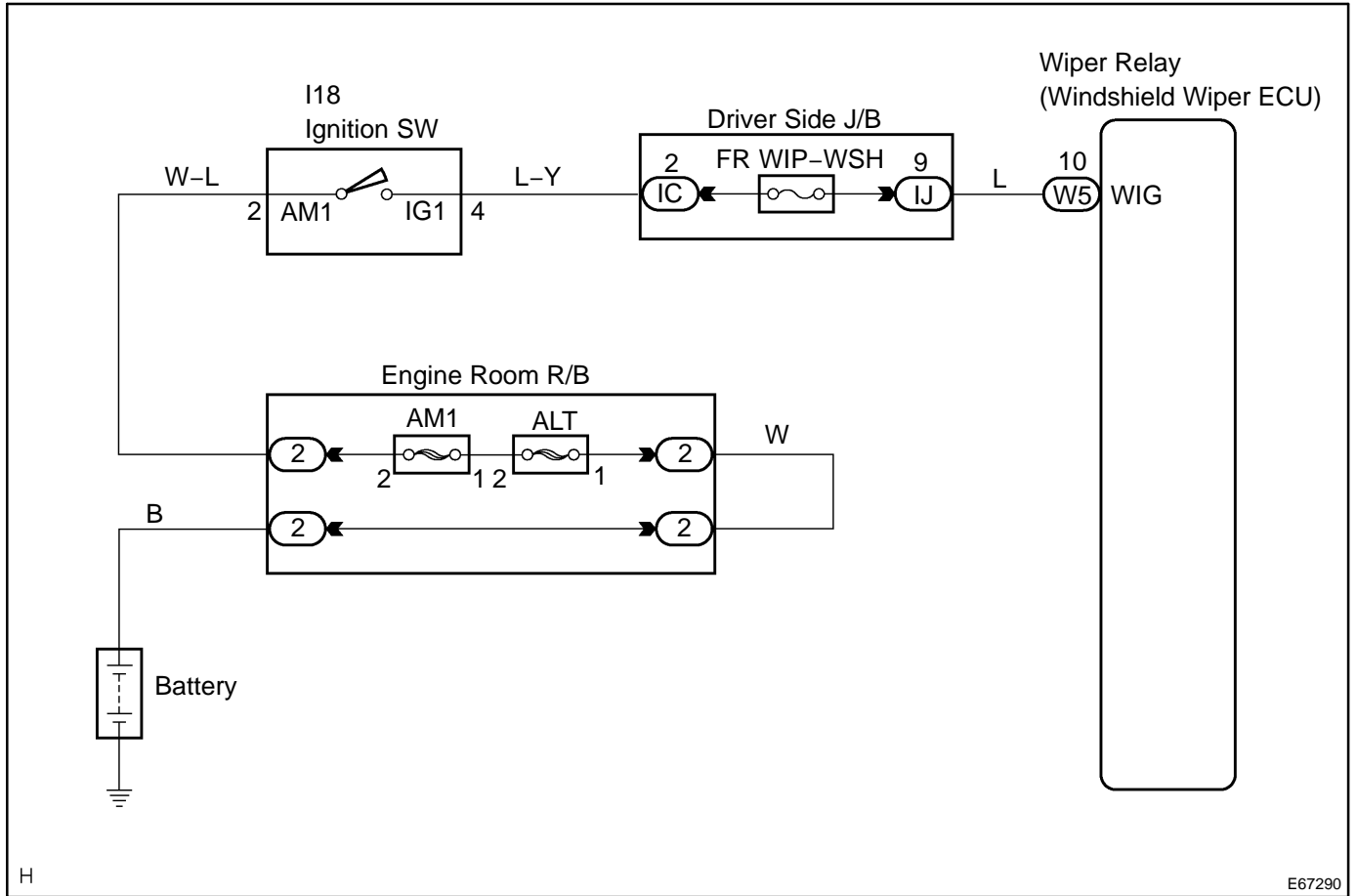
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
 (See Page 05-1611)**

IGNITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit is the power source for the wiper motor, the surrounding circuits and the CPU circuits. This circuit detects the state of the ignition switch.

WIRING DIAGRAM

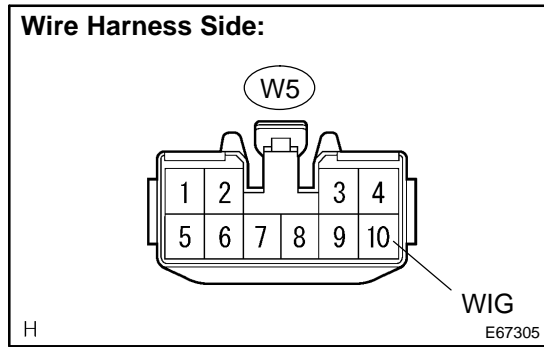


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E67290

INSPECTION PROCEDURE

1 INSPECT WINDSHILD WIPER ECU(WIG)



- (a) Disconnect the connector from the windshield wiper ECU.
- (b) Measure the voltage between terminal WIG on the wire harness side and body ground.

Standard:

Ignition switch	Voltage
ON	10 - 14 V
OFF	Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

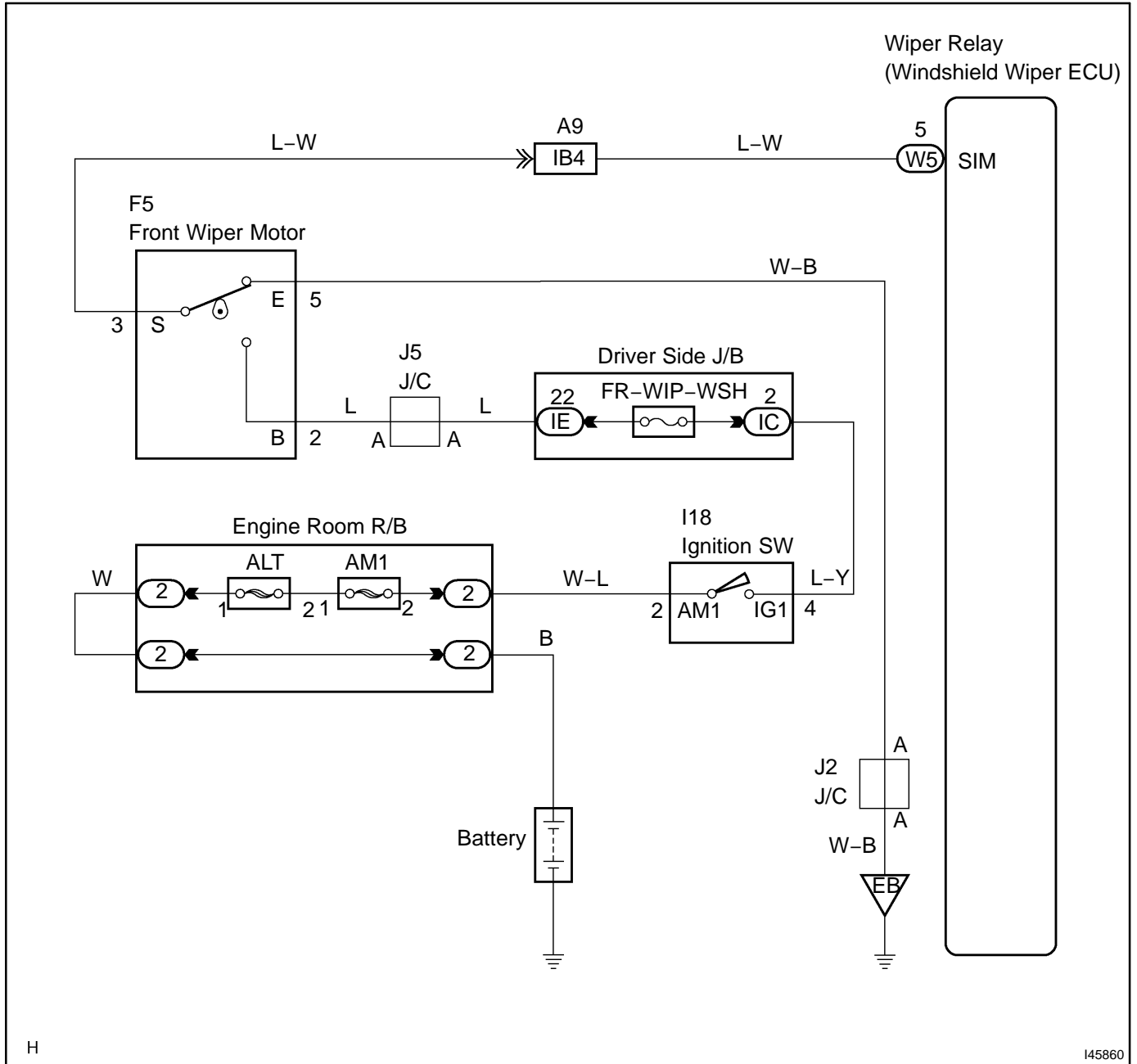
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

FRONT WIPER POSITION CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends a signal of the front wiper motor position to the windshield wiper ECU. This signal is taken into Multiplex Network Body ECU No.2.

WIRING DIAGRAM



H

145860

INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(WINDSHILD WIPER ECU - FRONT WIPER MOTOR) (See Page 01-26)
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- (a) Check for open and short circuit in the harness and the connector between terminal SIM of the windshield wiper ECU and the front wiper motor.

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
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OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)
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PARK/NEUTRAL POSITION SWITCH CIRCUIT

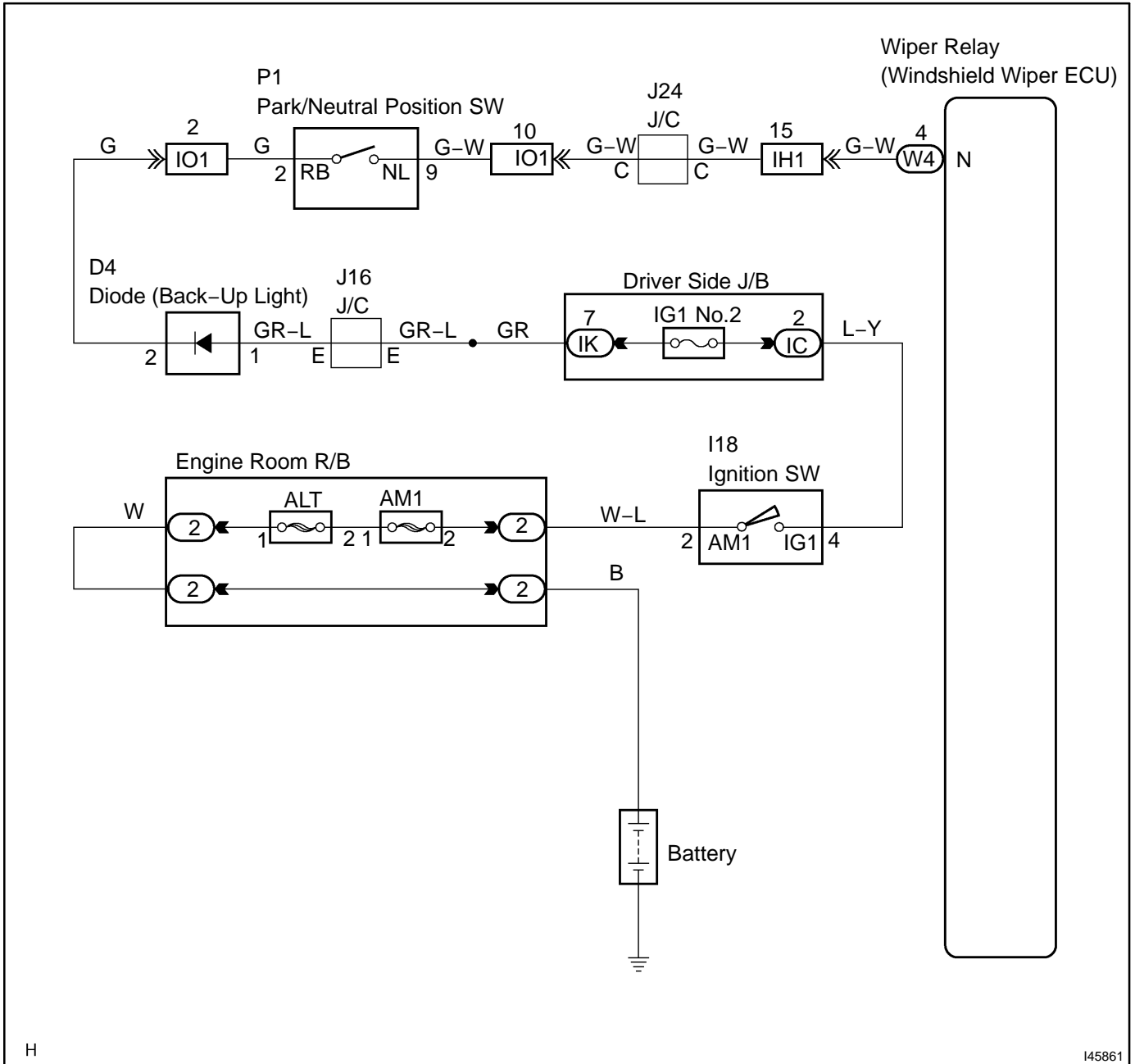
CIRCUIT DESCRIPTION

This circuit sends a signal of the Park/Neutral Position switch (Neutral or other) to the Windshield Wiper ECU, and the Park/Neutral Position switch (Park or other) to the Multiplex Network Body ECU.

HINT:

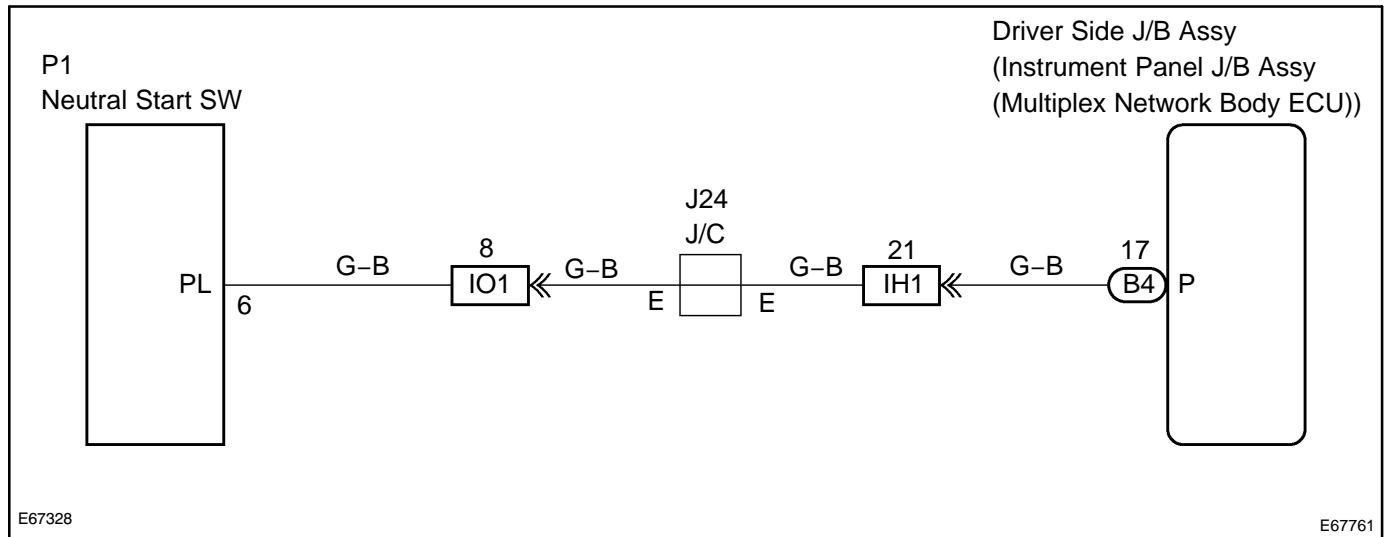
Refer to the Automatic Transmission section for the PNP switch check (See page 05-958).

WIRING DIAGRAM



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145861



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER
----------	---------------------------------------

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and the hand-held tester main switch to ON.
- (c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

Wiper:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
NSW SW	PNP SW signal/ON or OFF	ON: Park/neutral position switch is in N position OFF: Park/neutral position switch is in except N position	-

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
P/N POS SW	PNP SW signal/ON or OFF	ON: Park/neutral position switch is in P position OFF: Park/neutral position switch is in except P position	-

OK	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)
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NG

2 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal N of the windshield wiper ECU and the park/neutral position switch.
- (b) Check for open and short circuit in the harness and the connector between terminal P of the instrument panel J/B assy (driver side J/B assy) and the park/neutral position switch.

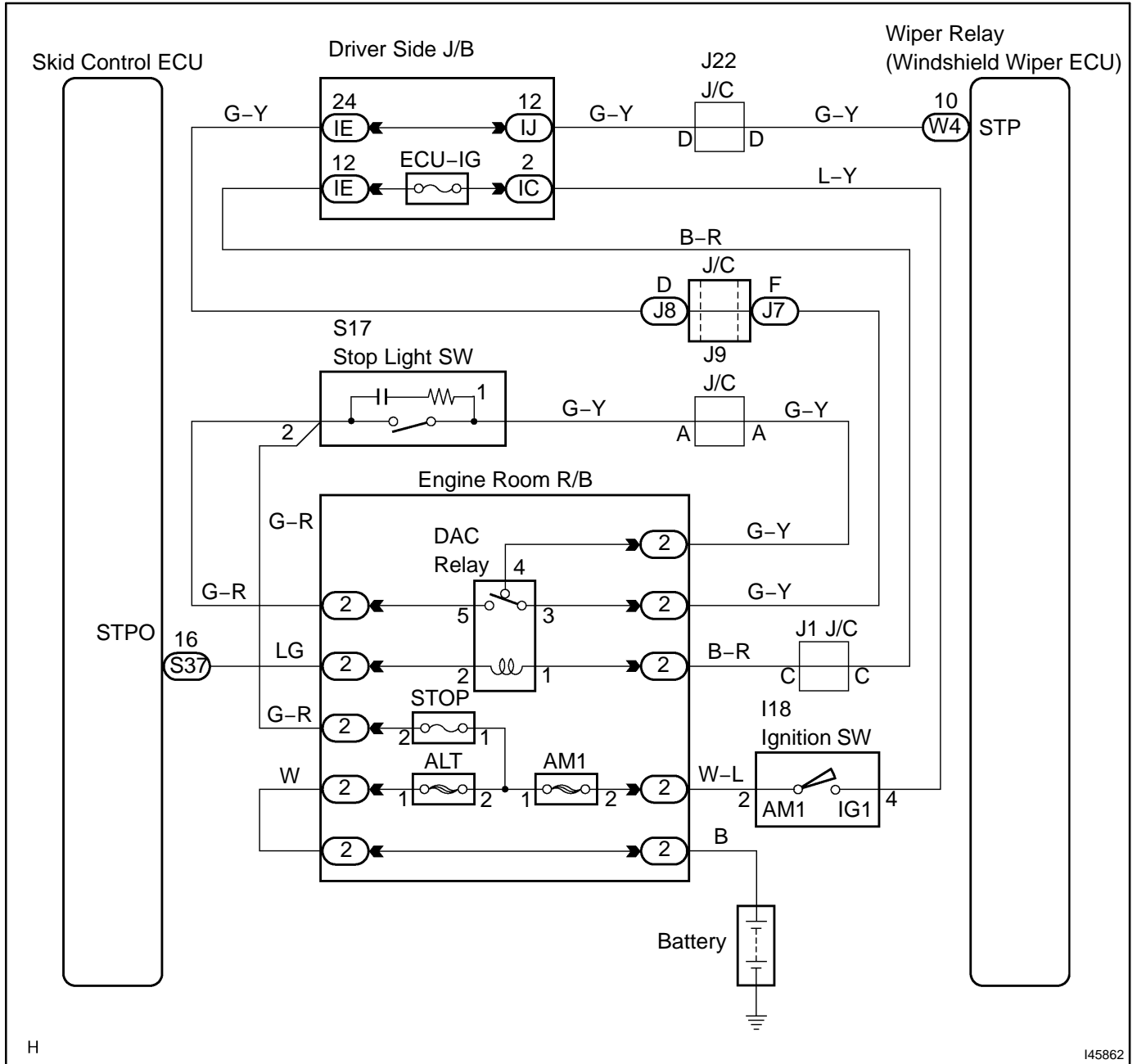
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

STOP LIGHT SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends a stop light switch ON/OFF signal to ECU. The skid control ECU controls the DAC relay.

WIRING DIAGRAM



H

I45862

INSPECTION PROCEDURE**1 CHECK STOP LAMP SWITCH OPERATION**

- (a) Depress the brake pedal.
(b) Check that the stop light comes on.

Standard: Stop light comes on.

NG

GO TO LIGHTING SYSTEM (See Page 05-1527)

OK

2 CHECK HARNESS AND CONNECTOR(WINDSHILD WIPER ECU - STOP LAMP SWITCH) (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal STP of the windshield wiper ECU and the stop light switch.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

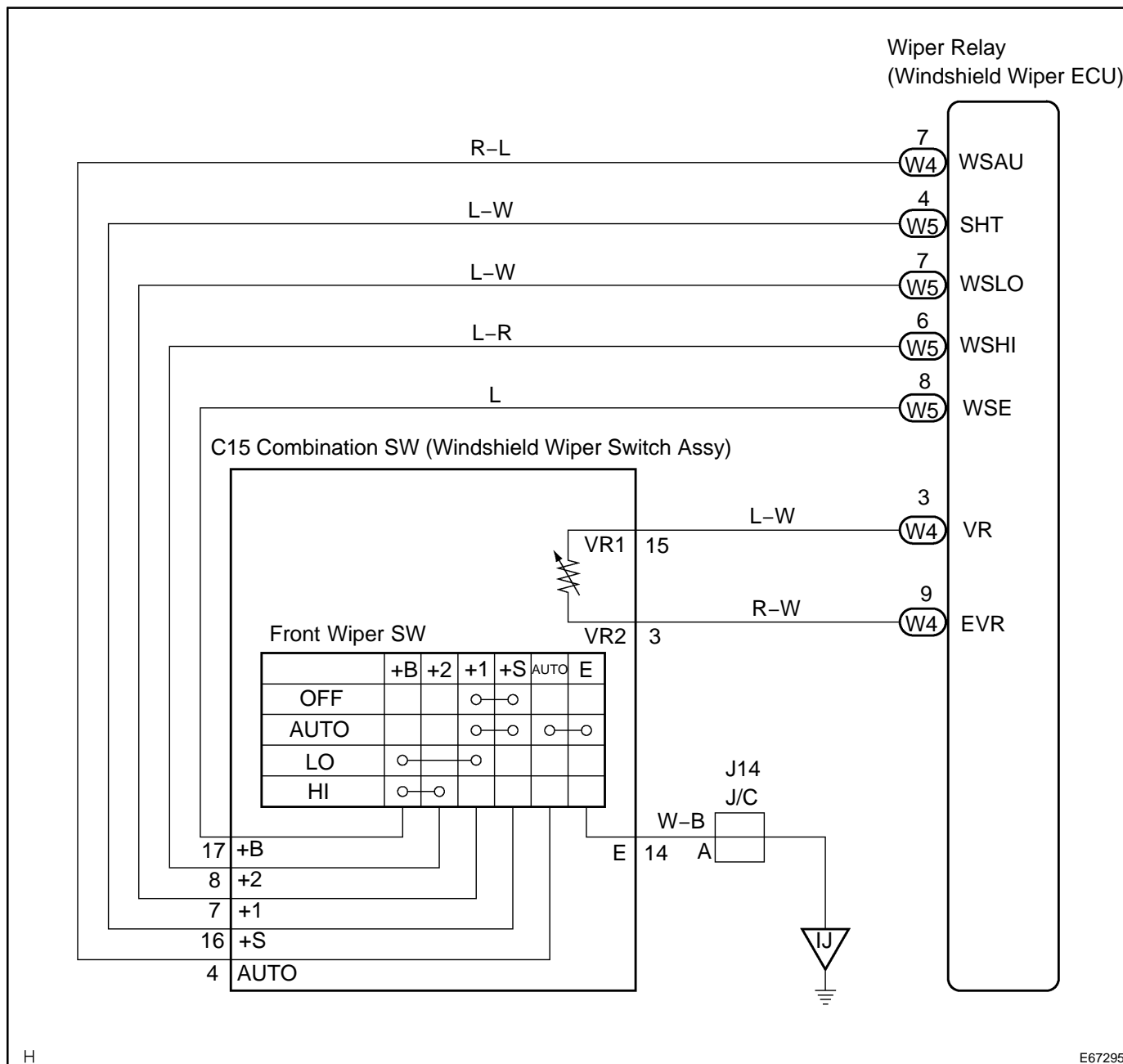
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

FRONT WIPER SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the wiper switch and sends it to the Windshield Wiper ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and the hand-held tester main switch to ON.
- (c) Select the items below in the DATA LIST and read the displays on the hand-held tester.

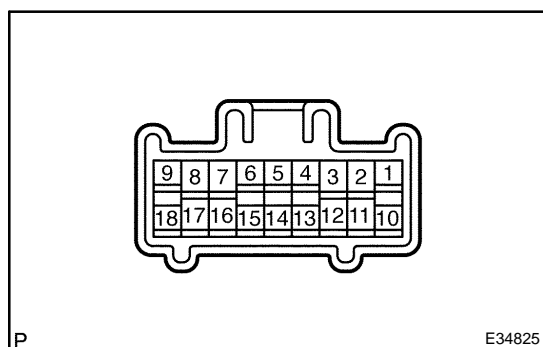
Item	Condition	Specified Condition
F WIPER SW	IG switch ON and front wiper switch OFF → LO, HI, AUTO	OFF/ON
WIPER LO SW	IG switch ON and front wiper switch except LO → LO	OFF/ON
WIPER HI SW	IG switch ON and front wiper switch except HI → HI	OFF/ON
WIPER AUTO SW	IG switch ON and front wiper switch except AUTO → AUTO	OFF/ON
TIME CTL SW	IG switch ON and front wiper switch fully clockwise → fully counterclockwise	deg

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

NG

2 INSPECT WINDSHIELD WIPER SWITCH ASSY



- (a) Continuity Check
 - (1) Check the continuity of each terminal of the windshield wiper switch.

Front Wiper Switch (w/ Rain Sensor)

Switch position	Tester connection	Specified condition
OFF	16 (+S) - 7 (+1)	Continuity
AUTO	16 (+S) - 7 (+1), 4 (AUTO) - 14 (E)	Continuity
LO	17 (+B) - 7 (+1)	Continuity
HI	17 (+B) - 8 (+2)	Continuity

NG

REPLACE WINDSHIELD WIPER SWITCH ASSY

OK

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the windshield wiper switch and body ground.
- (b) Check for open and short circuit in the harness and the connector between windshield wiper switch and body ground.

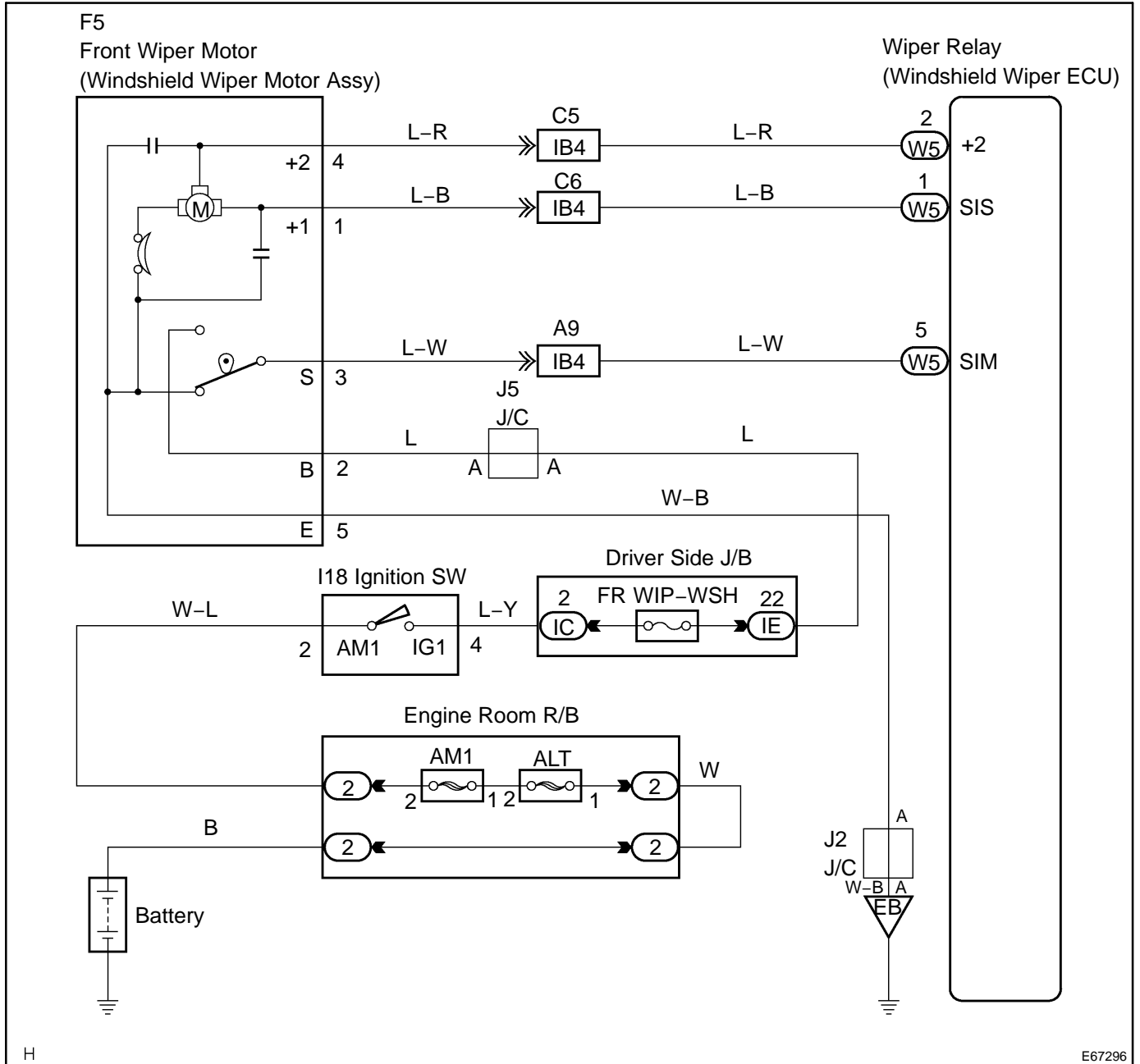
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

FRONT WIPER MOTOR CIRCUIT

CIRCUIT DESCRIPTION

The Windshield Wiper ECU controls the front wiper motor.

WIRING DIAGRAM



H

E67296

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Check that the wiper motor can be operated in the ACTIVE TEST.

Wiper:

Description	Tester display	Check condition
Wiper motor Hi operate	WIPER MOT (HI)	ON - OFF
Wiper motor Lo operate	WIPER MOT (LO)	ON - OFF

HINT:

LOW and HIGH can be checked with the active test separately. Therefore, check the HIGH side when HIGH does not operate properly and the LOW side when LOW does not operate properly.

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

NG

2 INSPECT WINDSHIELD WIPER MOTOR ASSY (See Page 66-3)

NG

REPLACE WINDSHIELD WIPER MOTOR ASSY

OK

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the front wiper motor and the windshield wiper ECU.
- (b) Check for open and short circuit in the harness and the connector between the front wiper motor and body ground.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

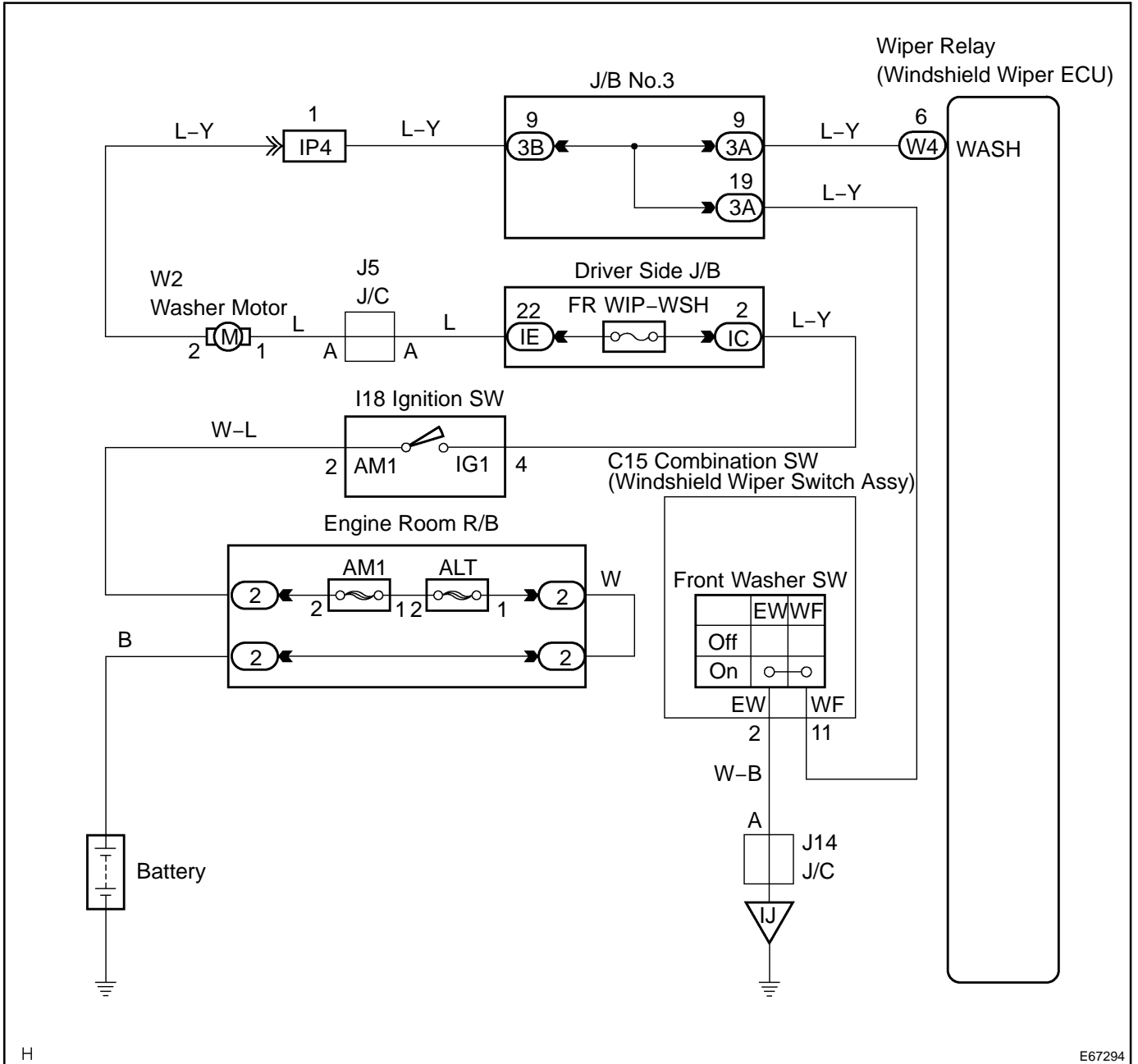
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

FRONT WASHER SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends a front washer switch ON/OFF signal to ECU.

WIRING DIAGRAM



H

E67294

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and the hand-held tester main switch to ON.
- (c) Select the item "WASHER SW" in the DATA LIST and read its value displayed on the hand-held tester.

Standard:

Ignition switch ON and front washer switch ON: ON

Ignition switch ON and front washer switch OFF: OFF

OK

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

NG

2 CHECK FRONT WASHER FUNCTION

- (a) Turn the ignition switch to ON.
- (b) Turn the front washer switch to ON.
- (c) Check that the front washer is ON.

Standard: Front washer function is normal.

NG

Go to step 4

OK

3 CHECK HARNESS AND CONNECTOR(WINDSHIELD WIPER ECU - WINDSHIELD WIPER SWITCH) (See Page 01-26)

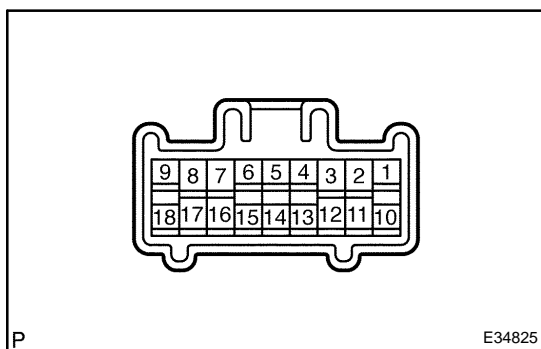
- (a) Check for open and short circuit in the harness and the connector between terminal WASH of the windshield wiper ECU and the windshield wiper switch.

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

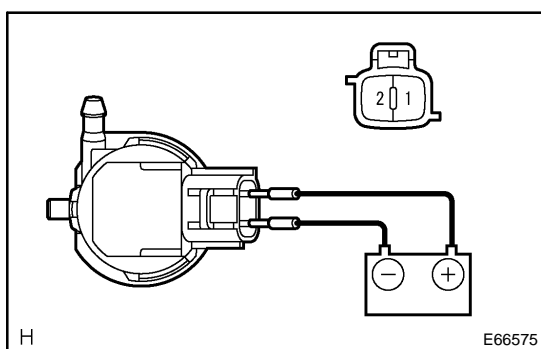
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

4 INSPECT WINDSHIELD WIPER SWITCH ASSY

- (a) Continuity Check
 (1) Check the continuity of each terminal of the windshield wiper switch.

Front Washer Switch

Switch position	Tester connection	Specified condition
OFF	11 (WF) - 2 (EW)	No continuity
ON	11 (WF) - 2 (EW)	Continuity

NG**REPLACE WINDSHIELD WIPER SWITCH ASSY****OK****5 INSPECT WINDSHIELD WASHER MOTOR AND PUMP ASSY**

- (a) Washer motor (front) operation Check
 (1) Pour the water into the washer jar with the washer motor and the pump installed to the washer jar assy.
 (2) Connect the battery (+) to terminal 1 of the washer motor and the pump and the battery (-) to terminal 2 of the washer motor and the pump. Check that the water comes out from the washer jar.

NG**REPLACE WINDSHIELD WASHER MOTOR AND PUMP ASSY****OK****6 CHECK HARNESS AND CONNECTOR (See Page 01-26)**

- (a) Check for open and short circuit in the harness and the connector between the fuse and the front washer motor.
 (b) Check for open and short circuit in the harness and the connector between the front washer motor and the windshield wiper switch.
 (c) Check for open and short circuit in the harness and the connector between the windshield wiper switch and body ground.

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

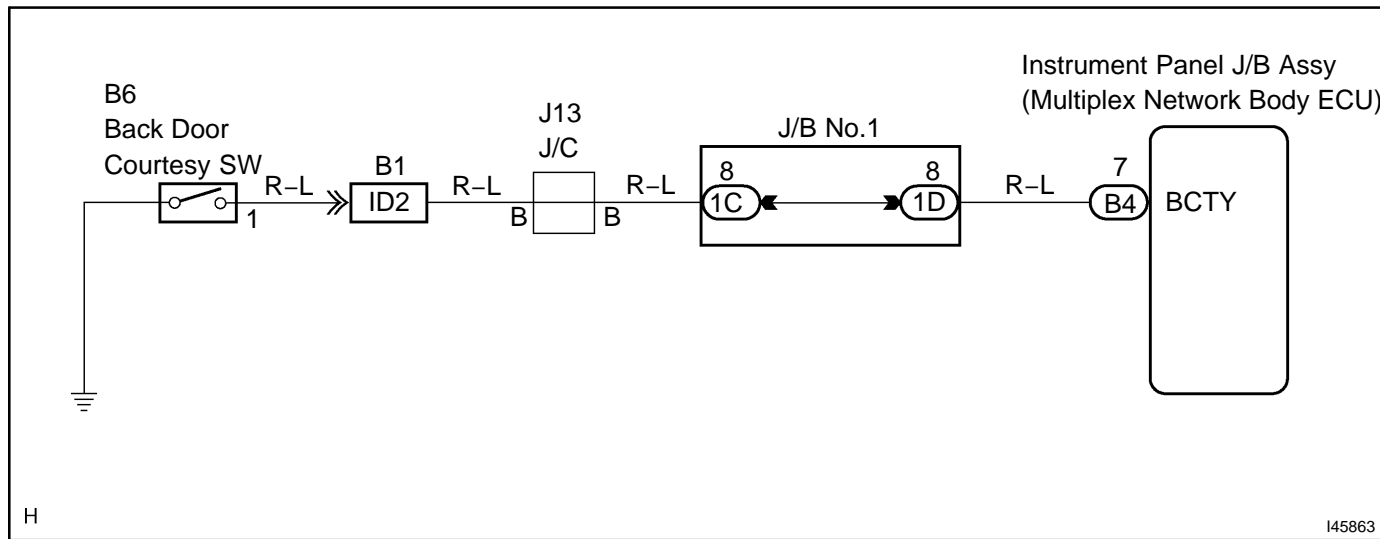
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
 (See Page 05-1611)

DOOR COURTESY SWITCH CIRCUIT

CIRCUIT DESCRIPTION

The door courtesy light comes on when the door is opened and goes off when the door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON and the hand-held tester main switch to ON.
- (c) Select the item below in the DATA LIST and read the display on the hand-held tester.

Body

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
LUGG COURTESY SW	Back door courtesy SW signal/ON or OFF	ON: Back door is open OFF: Back door is closed	-

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

NG

2 CHECK BACK DOOR COURTESY LAMP SWITCH FUNCTION

- (a) Switch the luggage compartment light to the DOOR position.
- (b) Close all the doors.
- (c) Check whether the luggage compartment light comes on when the back door is opened.

Standard: Function is normal.

NG**GO TO LIGHTING SYSTEM (See Page 05-1527)****OK**

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

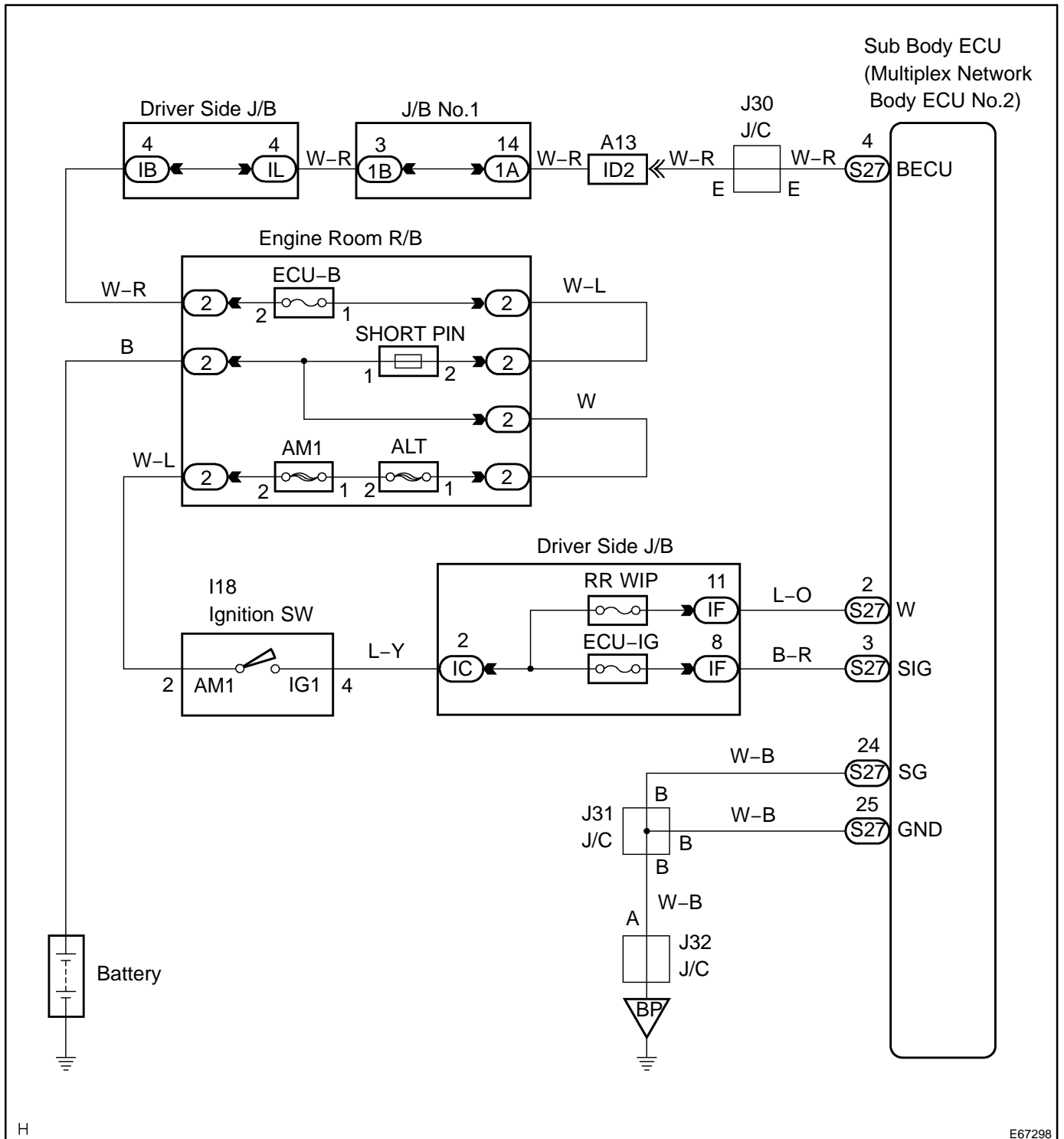
BODY ECU NO.2 POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This circuit supplies power to operate the Multiplex Network Body ECU No.2.

BECU	Power source of multiplex network body ECU No.2 CPU
SIG	Power source of multiplex network body ECU No.2 CPU
W	Power source of rear wiper system

WIRING DIAGRAM



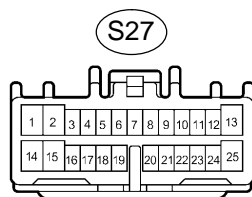
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E67298

INSPECTION PROCEDURE

1 INSPECT MULTIPLEX NETWORK BODY ECU NO.2(BECU, SIG, W, GND, SG)

Wire Harness Side:



H

E67306

- (a) Disconnect the connector from multiplex body ECU No.2.
- (b) Check that there is continuity between terminal GND, SG on the wire harness side and body ground.

Standard: Continuity

- (c) Measure the voltage terminal BECU on the wire harness side and body ground.

Standard: 10 - 14 V

- (d) Turn the ignition switch to ON.

- (e) Measure the voltage terminal SIG, W on the wire harness side and body ground.

Standard: 10 - 14 V

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

NG

2 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the multiplex network body ECU No.2 and body ground.
- (b) Check for open and short circuit in the harness and the connector between the multiplex network body ECU No.2 and battery.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

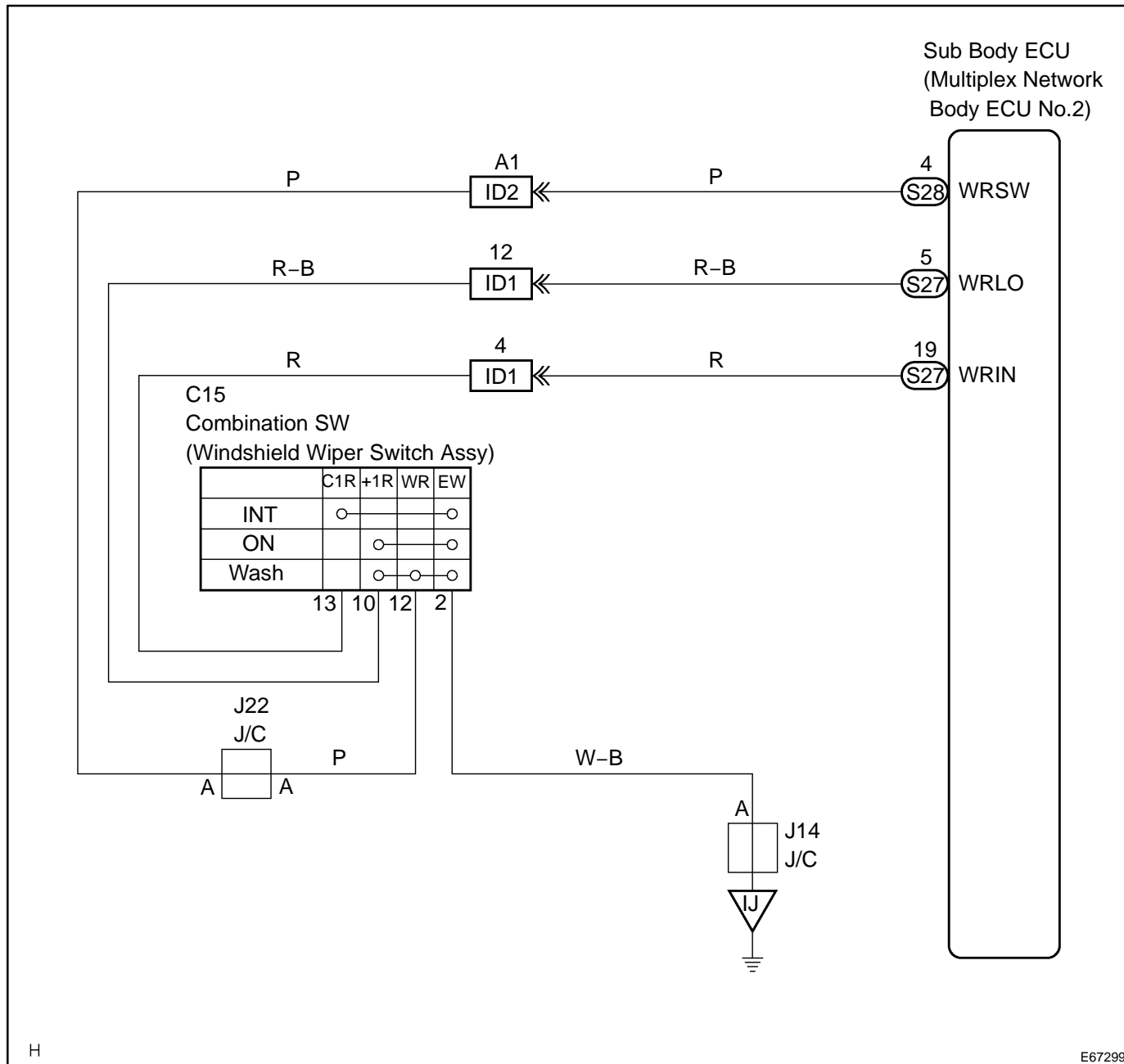
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

REAR WIPER SWITCH CIRCUIT

CIRCUIT DESCRIPTION

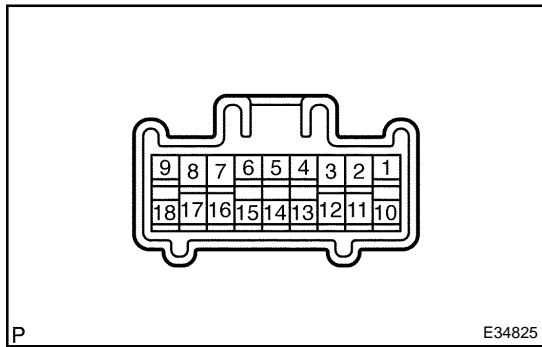
This circuit detects the state of the wiper and the washer switch and send it to the Multiplex Network Body ECU No.2.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT WINDSHIELD WIPER SWITCH ASSY



- (a) Continuity Check
 - (1) Check the continuity of each terminal of the windshield wiper switch.

Rear Wiper Switch

Switch position	Tester connection	Specified condition
OFF	-	No Continuity
INT	2 (EW) - 13 (C1R)	Continuity
ON	2 (EW) - 10 (+1R)	Continuity

NG → **REPLACE WINDSHIELD WIPER SWITCH ASSY**

OK

2 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the windshield wiper switch and body ground.
- (b) Check for open and short circuit in the harness and the connector between the windshield wiper switch and the multiplex network body ECU No.2.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

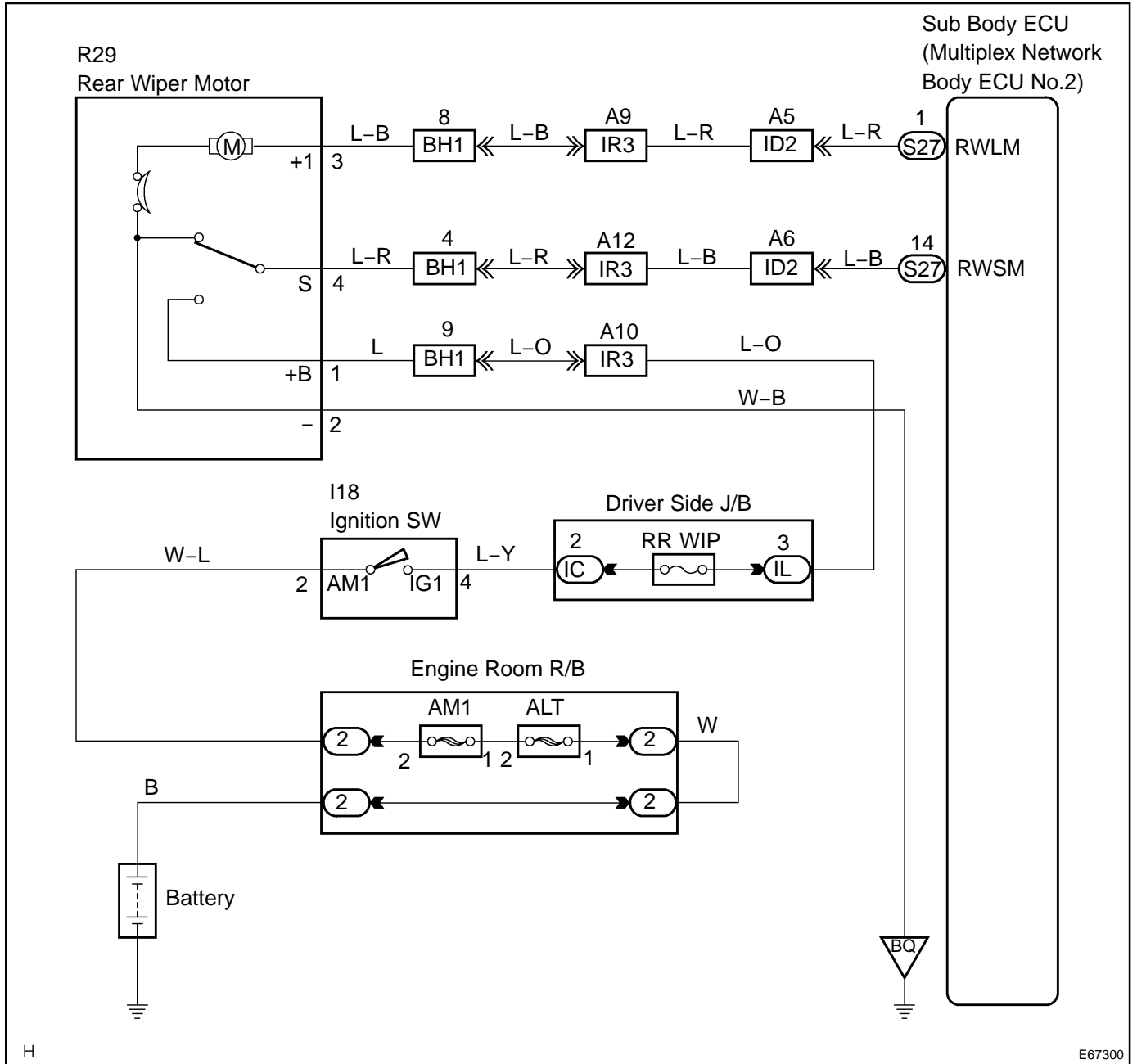
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

REAR WIPER MOTOR AND RELAY CIRCUIT

CIRCUIT DESCRIPTION

Wiper motor is controlled by the Multiplex Network Body ECU No.2. Even if CPU is in failure, its circuit structure enables the wiper to operate in "High" mode.

WIRING DIAGRAM



H

E67300

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Check that the wiper motor can be operated in the ACTIVE TEST.

Body No.2:

Description	Tester display	Check condition
Rear wiper motor operate	R WIPER MOT	ON - OFF

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

NG

2 INSPECT REAR WIPER MOTOR ASSY (See Page 66-3)

NG

REPLACE REAR WIPER MOTOR ASSY

OK

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the rear wiper motor and the multiplex network body ECU No.2.
- (b) Check for open and short circuit in the harness and the connector between the rear wiper motor and body ground.
- (c) Check for open and short circuit in the harness and the connector between the rear wiper motor and battery.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

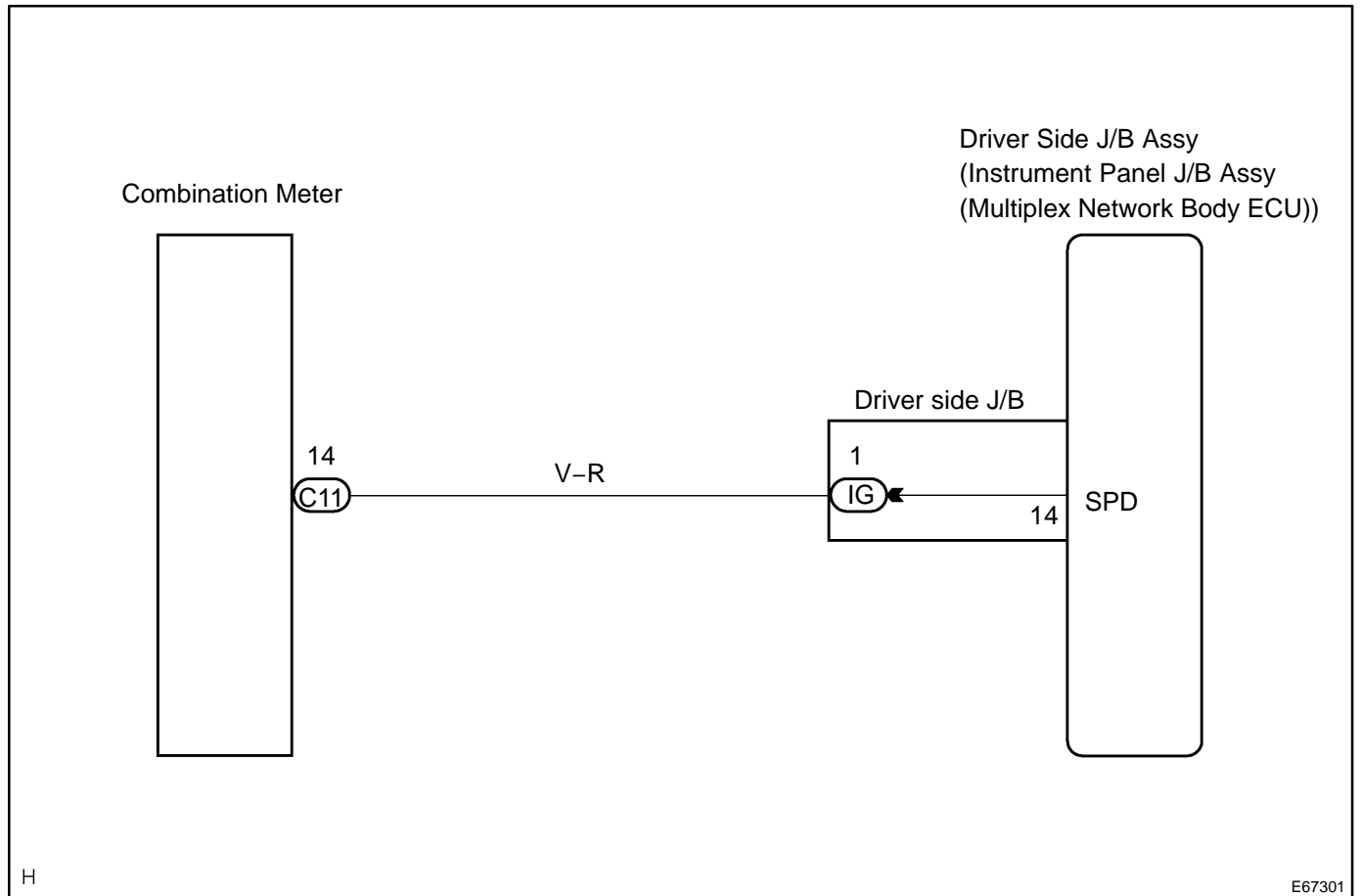
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

SPEED SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends a signal to the Multiplex Network Body ECU, and then the signal is converted into BEAN signal. Multiplex Network Body ECU sends this signal to each ECU in the multiplex communication circuit. If the Multiplex Network Body ECU No.2 cannot receive this signal, Multiplex Network Body ECU No.2 conducts the LO function instead of the vehicle switching function control (wiper system).

WIRING DIAGRAM



INSPECTION PROCEDURE

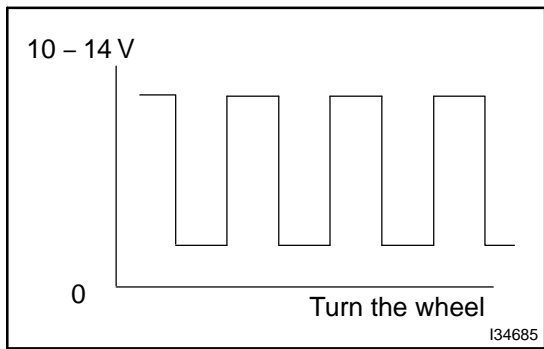
1 CHECK COMBINATION METER FUNCTION

- (a) Turn the ignition switch to ON.
- (b) Check that speedometer function is normal.
Standard: speedometer function is normal.

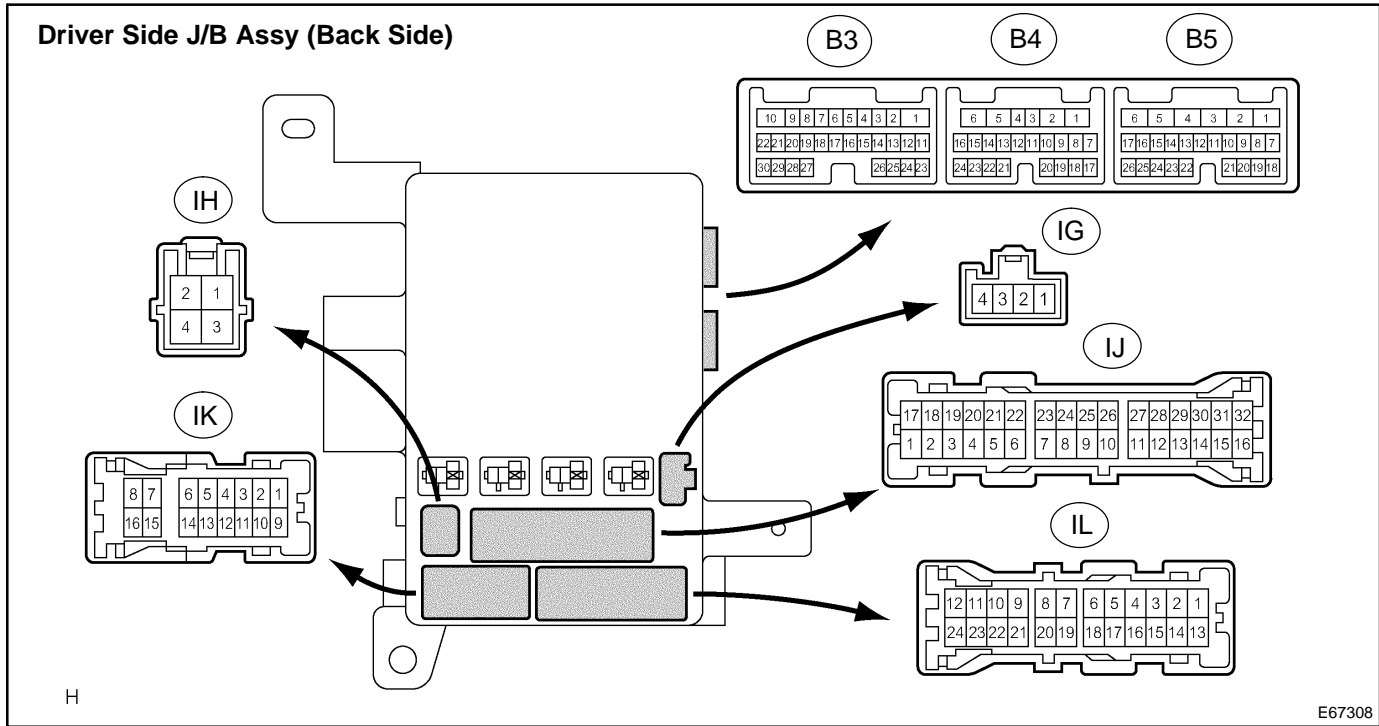
NG → GO TO COMBINATION METER SYSTEM (See Page 05-2033)

OK

2 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY(BODY ECU)



- (a) Disconnect the connector from the instrument panel J/B assy (driver side J/B assy).
- (b) Turn the ignition switch to ON.
- (c) Measure the voltage between terminal SPD and body ground.
Standard: Voltage is generated intermittently.



OK → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)

NG

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between the instrument panel J/B assy (driver side J/B assy) and the combination meter.

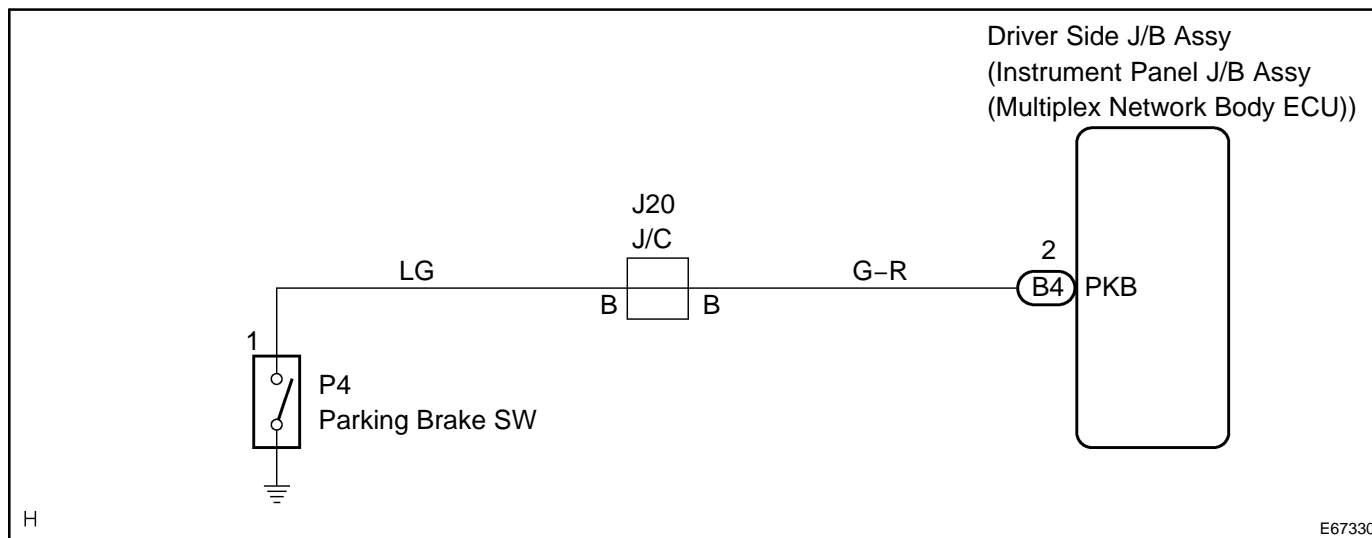
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****GO TO COMBINATION METER SYSTEM (See Page 05-2033)**

PARKING BRAKE SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit detects the state of the parking brake (ON/OFF) and sends it to each ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in the case of using the hand-held tester, and start from step 2 in the case of not using the hand-held tester.

1 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch to ON and push the hand-held tester main switch ON.
- (c) Select the item below in the DATA LIST, and read the display on the hand-held tester.

Body:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
PARKING BRAKE SW	Parking brake switch signal/On or OFF	ON: Parking brake switch is ON OFF: Parking brake is OFF	-

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See Page 05-1611)**

NG

2 CHECK PARKING BRAKE WARNING INDICATOR

- (a) Pull up the parking brake lever.
(b) Check that the parking brake warning indicator comes on.

Standard: indicator comes on.

NG

**GO TO COMBINATION METER SYSTEM
(See Page 05-2033)**

OK

3 CHECK HARNESS AND CONNECTOR (See Page 01-26)

- (a) Check for open and short circuit in the harness and the connector between terminal PKB of the instrument panel J/B assy (driver side J/B assy) and the parking brake switch.

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR**

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See Page 05-1611)**

AUDIO SYSTEM

DESCRIPTION

05ASA-04

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

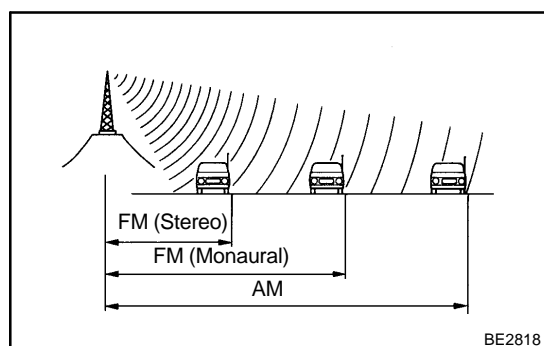
Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency

MF: Medium Frequency

HF: High Frequency

VHF: Very High Frequency



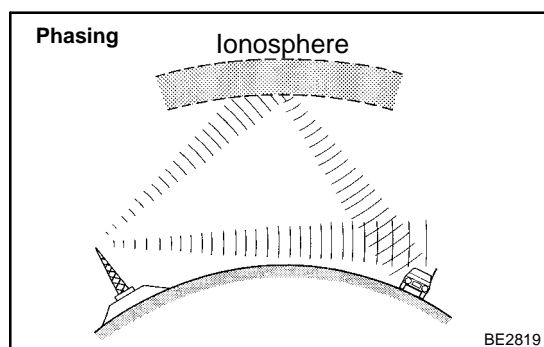
2. SERVICE AREA

- (a) There are great differences in the size of the service area for AM and FM broadcasting. Sometimes FM stereo broadcast cannot be received even though AM can be received very clearly. FM stereo has the smallest service area, and it also picks up static and other types of interference ("noise") easily.

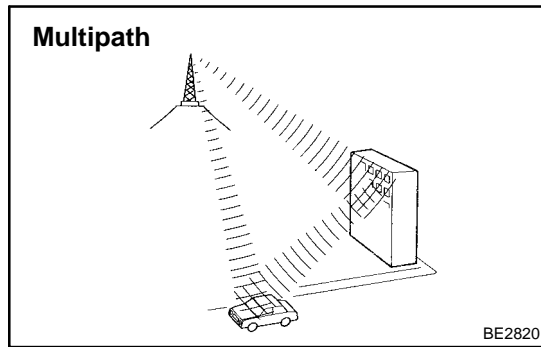
3. RECEPTION PROBLEMS

HINT:

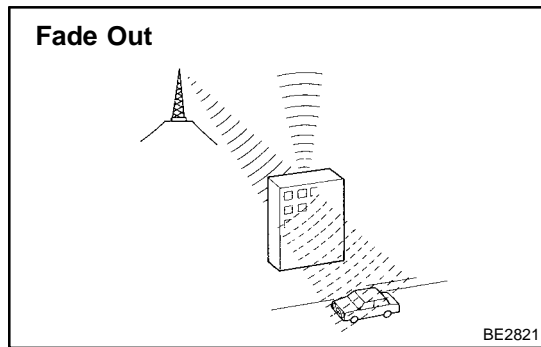
Besides the problem of static, there are other problems called "phasing", "multipath" and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.



- (a) Phasing
Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals that reach the vehicle's antenna directly from the same transmitter. This type of interference is called "phasing".



(b) **Multipath**
Interference caused by reflection of radio waves against obstructions is called "Multipath". Multipath occurs when radio signals emitted from the broadcast transmitter antenna are reflected against tall buildings or mountains and interferes with other signals which are to be received directly.



(c) **Fade Out**
FM radio wave tends to be reflected against obstructions such as tall buildings or mountains because FM frequency is higher than that of AM. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind those obstructions. This phenomenon is called "fade out".

4. NOISE PROBLEMS

(a) It is very important for technicians to understand a customer's claim about the noise clearly. Use the following table to diagnose the phenomena.

Radio wave	Condition in which noise occurs	Probable cause
AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	The same program may be broadcasted from some local stations. If the program is the same, one of those may be tuned in.
	Noise occurs only at night.	Strong possibility of beat from a distant broadcast.
FM	Noise occurs at a specific place during driving.	Strong possibility of multipath noise and phasing noise caused by changes of FM frequency.

HINT:

If the condition where the noise occurs does not meet any of the above, find out the cause based on "Reception Problems". Refer to the description about Multipath and Phasing mentioned previously.

5. COMPACT DISC PLAYER

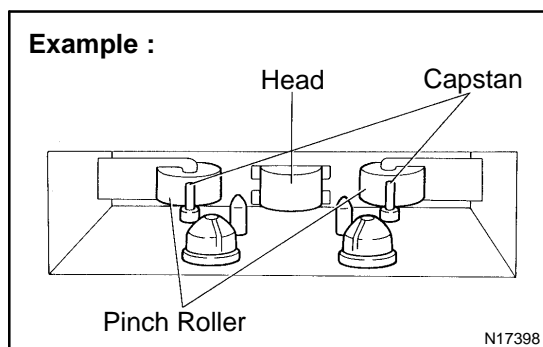
(a) Compact Disc (hereafter "CD" or "disc") Players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. 4.7 in. (12 cm) and 3.2 in. (8 cm) discs are available for the CD player.

HINT:

Never disassemble or apply oil to any part of the player unit. Do not insert any object other than a disc into the CD player.

NOTICE:

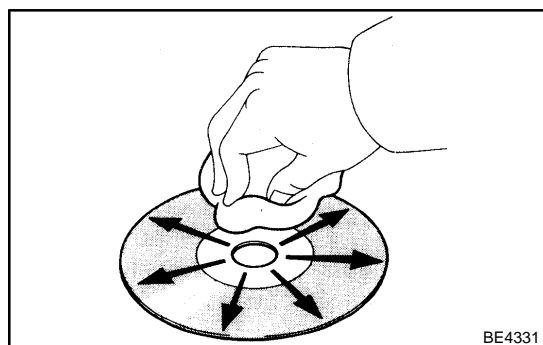
CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. MAINTENANCE

Tape Player / Head Cleaning:

- (a) Raise the cassette door with your finger. Using a pencil or similar object, push in the guide.
- (b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. MAINTENANCE

CD Player / Disc Cleaning:

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

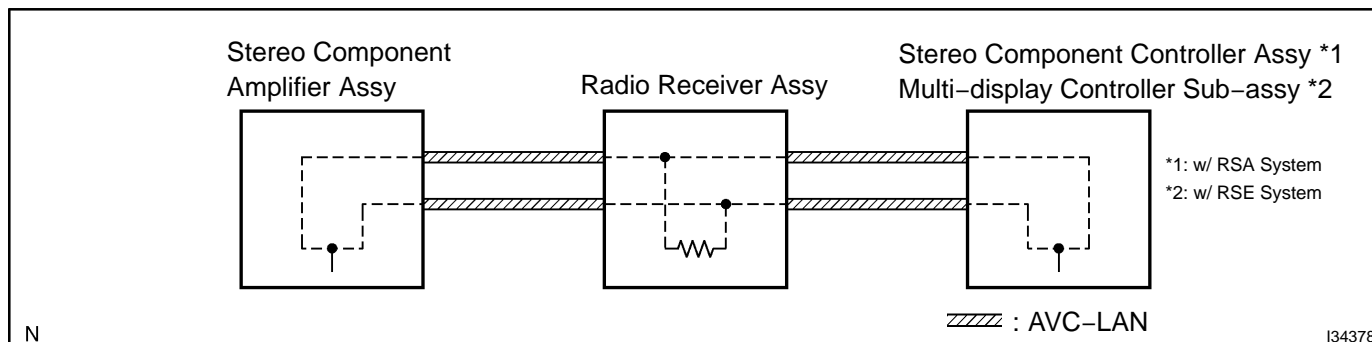
Do not use a conventional record cleaner or anti-static preservative.

8. COMMUNICATION SYSTEM

- (a) Components in the audio system communicate with each other through AVC-LAN. (Radio receiver with CD changer control function)
- (b) The master component of AVC-LAN is the radio receiver assy with a resistor (60 – 80 Ω), which is necessary for communication.
- (c) When a short circuit or circuit breakdown occurs in the AVC-LAN circuit, the audio system does not operate normally due to the communication cutoff.

9. DIAGNOSIS FUNCTION

- (a) The audio system has diagnosis function (The diagnosis result is displayed on the LCD of the radio receiver assy). (Radio receiver with CD changer control function)
- (b) The component code (physical address), or three-digit number (in hexadecimal) is set for each component comprising AVC-LAN.
- (c) The logical address, or two-digit number (in hexadecimal) is set for each function and component unit in each component.



HOW TO PROCEED WITH TROUBLESHOOTING

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE [05-1652](#))



3 CHECK AND CLEAR DTC (SEE PAGE [05-1653](#))



4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM OCCURS (GO TO STEP 6)



SYMPTOM DOES NOT OCCUR (GO TO STEP 5)

5 SYMPTOM SIMULATION (SEE PAGE [01-36](#))



6 DTC CHECK (SEE PAGE [05-1653](#))

HINT:

If the audio system is equipped with a multi-display, check DTCs in the LEXUS NAVIGATION SYSTEM section (see page [05-1722](#)).

MALFUNCTION CODE (GO TO STEP 7)

NORMAL CODE (GO TO STEP 8)

7 DTC CHART (SEE PAGE [05-1659](#))

GO TO STEP 9

8 PROBLEM SYMPTOMS TABLE (SEE PAGE [05-1671](#))



9 CIRCUIT INSPECTION (SEE PAGE [05-1672](#) - [05-1710](#))



10	CONFIRMATION TEST
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END

CUSTOMER PROBLEM ANALYSIS CHECK

AUDIO SYSTEM Check Sheet

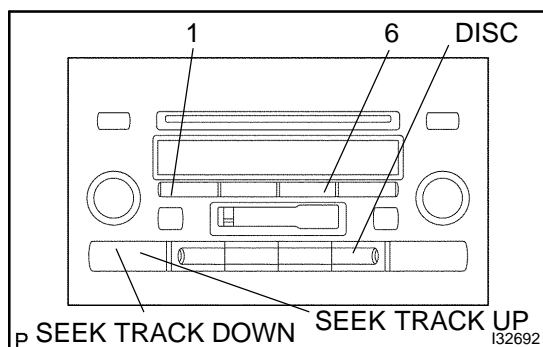
Inspector's name: _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Brought-in Date	/ /	Odometer Reading	km mile

Date of First Occurrence	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (Times a day)

Problem Symptom	<input type="checkbox"/> Switch
	<input type="checkbox"/> Radio
	<input type="checkbox"/> CD
	<input type="checkbox"/> Noise

DTC Check	Parts name	DTC (1st time)	DTC (2nd time)
	Radio receiver assy		
	Stereo component amplifier assy		
	Stereo component controller assy		
	Multi-display controller sub-assy		



PRE-CHECK

1. DIAGNOSIS CHECK

(a) Starting Diagnosis Mode (All elements are lighting in SW check mode).

(1) Turn off the audio system and turn the IG switch to ACC. While pressing the preset switches "1" and "6" at the same time, press "DISC" 3 times.

(2) Reference:

- When the system enters the Diagnosis Mode, a beep sound is emitted 3 times and all the elements come on in SW check mode.
- It may take about 40 sec. to complete the check.
- Turn all the elements in the LCD on.
- When pressing the switch, confirm a beep sound is emitted.
- Pressing the "SEEK TRACK UP" button switches the display to "Service Check Screen".

(b) Service Check Screen.

(1) Reference

- In the service check mode, the system check and the diagnosis memory check are performed, and the check results are displayed in ascending order of the device codes (physical address).

Terms	Meaning
Component code (Physical address)	Three-digit code (in hexadecimal) given to each device comprising AVC-LAN. Corresponding to its function, individual symbol is provided.
Logical address	Two-digit code (in hexadecimal) given to each function and device unit in each device comprising AVC-LAN.

Code No. (physical address) List

Code No. (physical address)	Equipment name
190	Radio receiver assy (Audio head unit)
440	Stereo component amplifier
1F6, 16C	Multi-display controller sub-assy
1F4	Stereo component controller assy

(c) Finishing Diagnosis Mode.

(1) Press "DISC" button for 2 sec. or more, or turn the IG switch OFF.

- (d) Service Check Mode Result Display (for checking the current and the past system conditions).
 - (1) Press the "SEEK TRACK" switch to see the check result of each device.

P---indicates physical address
 190---physical address

good---"The component is normal".

P---indicates physical address
 360---physical address

CHEC---"Check needed".

△ : SEEK TRACK UP
 ▽ : SEEK TRACK DOWN

The illustration shows the case that the system has 2 devices with codes 190 and 360, and the device (code 360) has a trouble.
 The check result is displayed in ascending order of device code. The device code is displayed first, and then the check result.

P I34696

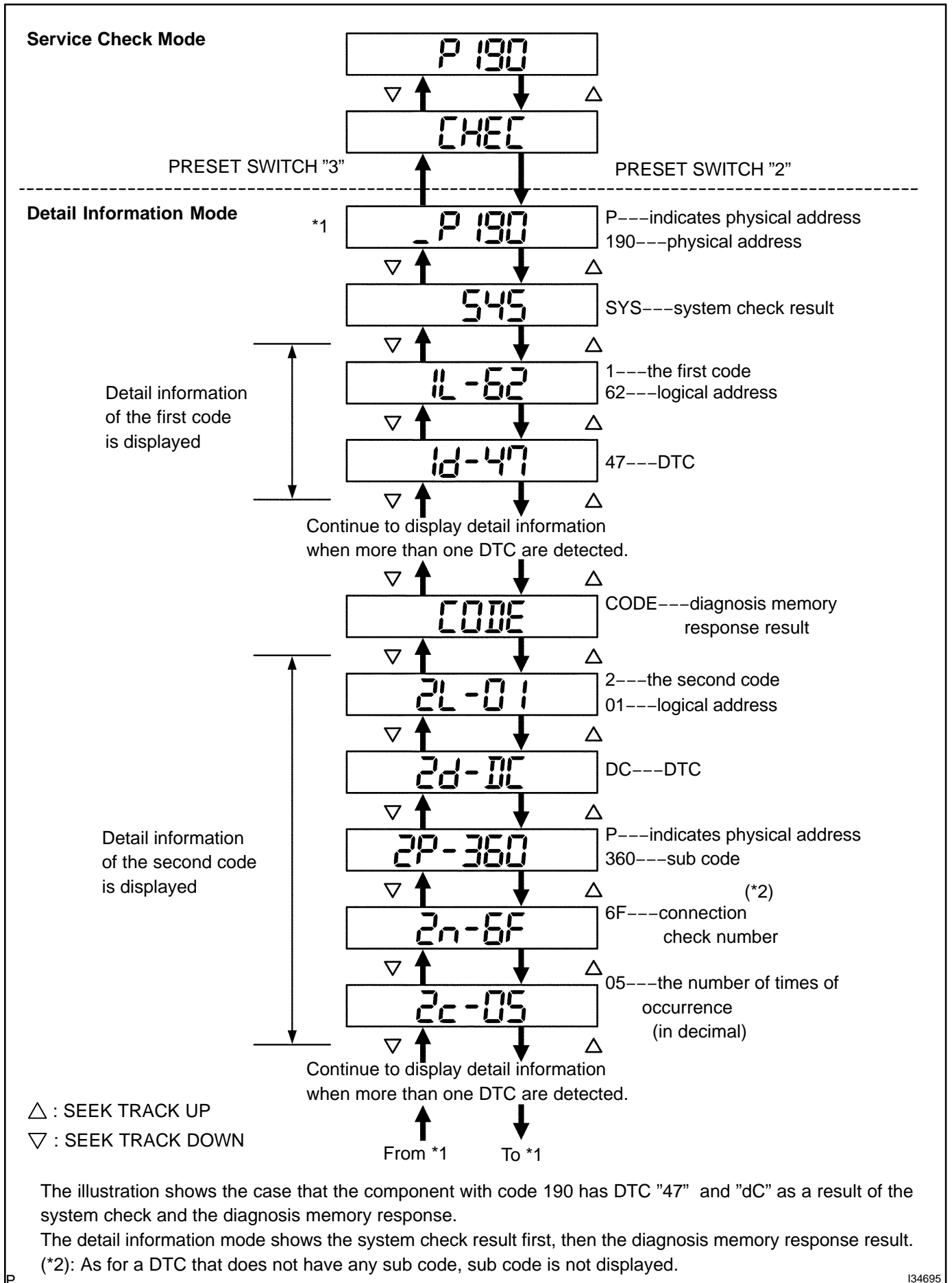
(2) Check Result Display.

Display	Original Language	Meaning	Action to be taken
good	Good (normal)	No DTC is detected in both "System Check Mode" and "Diagnosis Memory Mode".	-
NCON	No connection	The system recognized the component when it was registered, but the component gives no response to the "Diagnosis Mode ON Request".	Check the power source circuit and the communication circuit of the device indicated by the device code (physical address).
ECHN	Exchange	One or more DTCs for "Exchange" are detected in either "System Check Mode" or "Diagnosis Memory Mode".	Go to the detail information mode to check the trouble area referring to the DTC list.
CHEC	Check	When no DTC is detected for "Exchange", one or more DTCs for "Check" are detected in either "System Check Mode" or "Diagnosis Memory Mode".	Go to the detail information mode to check the trouble area referring to the DTC list.

DIAGNOSTICS - AUDIO SYSTEM

Display	Original Language	Meaning	Action to be taken
OLD	Old version	Old DTC application is identified and DTC is detected in either "System Check Mode" or "Diagnosis Memory Mode".	-
NRES	No response	The device gives no response to any one of "System Check Mode ON Request", "System Check Result Request" and "Diagnosis Memory Request".	Check the power source circuit and the communication circuit of the device indicated by the device code (physical code).

- (3) To perform the Service Check again, press the preset switch "1".
- (e) Detail information Mode (when displaying the troubled device's DTC)
 - (1) With "CHEC" or "ECHN" being display, press the preset switch "2" to go to the detail information mode.
 - (2) Press the "SEEK TRACK" switch to display "System Check Result (SYS)" and "Diagnosis Memory Response (CODE)".



(3) Displayed Items in Detail Information Mode

Division Code for DTC display	Meaning	The order of detailed information displayed when the "TUNE UP" switch is pressed. (The order is reversed when the "TUNE DOWN" switch is pressed.)
SYS	System check result is displayed.	Logical address → DTC
CODE	Diagnosis memory check result is displayed.	Logical address → DTC → Sub code → Connection confirmation number → The number of times of occurrence

(4) Check the trouble area referring to the DTC list.

(5) To return to the service check mode, press the preset switch "3".

(f) Clearing Individual DTC Memory (when clearing the memory of DTC detected in the past individually)

(1) Press the preset switch "5" for 2 sec. or more while the "ECHN" is displayed in the service check mode or during the detail information mode.

HINT:

- A beep sound is given once when the DTC memory is completely cleared.
- When DTC memory is cleared, only the component code (physical address) is displayed for the target component.
- To check DTC, press the preset switch "1" and perform the service check again.

(g) Clearance of all DTC memory (when clearing all the memory of DTC detected in the past)

(1) Start the diagnosis mode after repairing the trouble area.

(2) Press the preset switch "5" for 2 sec. or more. ("CLR" is displayed at this time.)

HINT:

- A beep sound is given once when the DTC memory is completely cleared.
 - When DTC memory for all the devices is cleared, only the component codes (physical address) are displayed.
- (3) Press the preset switch "1" to perform the service check again, and check that no DTC is displayed for all the component codes (physical address).

2. IDENTIFICATION OF NOISE SOURCE

- (a) Identify the conditions under which the noise occurs, and check the noise filter on the relevant part.

Condition under which noise occurs	Noise Source
Noise increases when the accelerator pedal is depressed, but stops when the engine is stopped.	Generator
Noise occurs during A/C or heater operation.	Blower motor
Noise occurs when the vehicle accelerates rapidly on an unpaved road or after the ignition switch is turned on.	Fuel pump
Noise occurs when the horn switch is pressed and released or when pressed and held.	Horn
Quiet noise occurs while the engine is running, but stops when the engine is stopped.	Ignition
Noise occurs synchronously with the blink of the turn signal.	Flasher
Noise occurs during window washer operation.	Washer
Noise occurs while the engine is running, and continues even after the engine is stopped.	Water temperature sensor
Noise occurs during wiper operation.	Wiper
Noise occurs when the brake pedal is depressed.	Stop light switch
Others	Static electricity stored on the vehicle

HINT:

- First ensure that the noise is not coming from the outside. Failure to do so makes noise source detection difficult and may lead to a misdiagnosis.
- Noise should be removed in descending order of loudness.
- Tuning the radio so that no station is received makes the noise more noticeable, making the recognition of the phenomenon easier.

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC-LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC-LAN.

1. RADIO RECEIVER ASSY (Physical address: 190)

HINT:

- *1: Even if no failure is detected, this trouble code may be stored depending on the battery condition or voltage for starting the engine.
- *2: It is stored when 180 sec. have passed after the power supply connector is pulled out after engine start.
- *3: It may be stored when the engine key is turned 1 min. after engine start.
- *4: It may be stored when the engine key is turned again after engine start.
- *5: When 210 sec. have passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected	Replace radio receiver assy.
22	RAM Error	Abnormal condition of RAM is detected	Replace radio receiver assy.
D6 *1	Absence of Master	Component in which this code is recorded was disconnected from system or master component with ignition switch in ACC or ON.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
D7 *5	Connection Check Error	Component in which this code is recorded was disconnected from system or master component with ignition switch in ACC or ON.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
D8 *2	No Response to Connection Check	Component shown by sub code is or was disconnected from system after engine start.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
D9 *1	Last Mode Error	Audio or visual component operated before engine stop is or was disconnected with ignition switch in ACC or ON.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Sound and picture do not change by button operation.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code. • If error occurs again, replace component shown by sub code.
DB *1	Mode Status Error	Dual alarm is detected.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
DC *3	Transmission Error	Transmission to component shown by auxiliary code has failed. (Detecting this DTC does not necessarily mean actual failure.)	If same sub code is recorded in other component, check harness for power supply and communication system of all components shown by code. (If not, delete DTC and recheck.)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
DD *4	Master Reset (Momentary Interruption)	After engine was started, master component was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • If this error occurs frequently, replace radio receiver assy.
DE *4	Slave Reset (Momentary Interruption)	After engine was started, component shown by sub code was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub code. • Check harness for communication system of component shown by sub code.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from master component.	Replace radio receiver assy
E3 *1	Registration Request Transmission	Registration Request command is output from component shown by sub code. Receiving Connection Check Instruction, Registration Request command is output from sub-master component.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

(b) Logical address: 21 (Switch)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
10	Panel Switch Error	Error in panel switch input part is detected. (Error in switch control part, or internal communication error with switch control part is detected.)	<ul style="list-style-type: none"> • Inspect all switches on panel switch test screen in display check mode. If any of them does not function, replace radio receiver assy. • If all switches function without any problems, observe them for a while.
11	Touch Switch Error	Error in touch switch sensor is detected. (Light level of LED is detected to be less than a fixed value.)	<ul style="list-style-type: none"> • Inspect all touch switches on touch switch test screen in display check mode. If any of lines does not react, replace radio receiver assy. • If all of vertical and horizontal lines react normally, observe them for a while.

(c) Logical address: 61 (Cassette switch)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
40	Mechanical Error of Media	Malfunction due to mechanical failure is identified. Either that, or cassette tape is cut or entangled.	<ul style="list-style-type: none"> • Inspect cassette tape. • Replace radio receiver assy.
41	EJECT Error	Malfunction due to mechanical failure.	Replace radio receiver assy.
42	Tape caught in the radio receiver assy	Hub lock etc.	Inspect cassette tape.

2. STEREO COMPONENT AMPLIFIER ASSY (Physical address: 440)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting the engine.
- *2: This code may be stored when the engine key is turned again 1 min. after the engine starts.
- *3: This code may be stored when the engine key is turned again after the engine starts.
- *4: When 210 sec. have passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition switch in ACC or ON. Either that, or when this code was recorded, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for power supply of stereo component amplifier assy. • Check harness for communication system of stereo component amplifier assy.
D7	Communication Check Error	Component in which this code is recorded is or was disconnected from system after engine start. Either that, or when this code was recorded, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for power supply of stereo component amplifier assy. • Check harness for communication system of stereo component amplifier assy.
DC *2	Transmission Error	Transmission to component shown by auxiliary code has failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in other components, check harness for power supply and communication system of all components shown by code.
DD *3	Master Reset (Momentary Interruption)	After engine was started, radio receiver assy was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for power supply of stereo component amplifier assy. • Check harness for communication system of stereo component amplifier assy. • If this error occurs frequently, replace radio receiver assy.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for communication system between radio receiver assy and sub-master component.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E1 *1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy.

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from radio receiver Assy.	Replace radio receiver Assy.
E3 *1	Registration Request Transmission	<ul style="list-style-type: none"> Registration Request command is output from slave component. Receiving Connection Check Instruction, Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

3. MULTI-DISPLAY CONTROLLER SUB-ASSY (Physical address: 1F6, 16C)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting the engine.
- *2: This code is stored when 180 sec. have passed after the power supply connector is pulled out after engine start.

(a) Main (1F6)

Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace multi-display controller sub-assy.
22	RAM Error	Abnormal condition of RAM is detected.	Replace multi-display controller sub-assy.
D1 *1	Registered component disconnected AVC-LAN transmitting abnormalities	Component shown by sub-code is or was disconnected from system with ignition switch in ACC or ON. Communication with component shown by sub-code is not ensured when engine is started.	<ul style="list-style-type: none"> Check harness for power supply of component shown by sub-code. Check harness for communication system of component shown by sub-code.
D7 *2	No response to connection check	Component shown by sub-code is or was disconnected from system after engine start.	<ul style="list-style-type: none"> Check harness for power supply of component shown by sub-code. Check harness for communication system of component shown by sub-code.
D7 *2	AVC-LAN Communication Check Error	Component in which this code is recorded is or was disconnected from system after engine start. Either that, or when recording this code, multi-display controller sub-assy was disconnected.	<ul style="list-style-type: none"> Check harness for power supply of radio receiver Assy. Check harness for communication system of radio receiver Assy. Check harness for power supply of multi-display controller sub-assy. Check harness for communication system of multi-display controller sub-assy.
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition switch in ACC or ON. Either that, or when this code was recorded, multi-display controller sub-assy was disconnected.	<ul style="list-style-type: none"> Check harness for power supply system of radio receiver Assy. Check harness for communication system of radio receiver Assy. Check harness for communication system between radio receiver Assy and multi-display controller sub-assy.
D7 *2	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Either that, or when this code was recorded, multi-display controller sub-assy was disconnected.	<ul style="list-style-type: none"> Check harness for power supply system of radio receiver Assy. Check harness for communication system of radio receiver Assy. Check harness for power supply of multi-display controller sub-assy. Check harness for communication system of multi-display controller sub-assy.

DIAGNOSTICS - AUDIO SYSTEM

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
DC *3	Transmission Error	Transmission to component shown by sub-code has failed. (This code does not necessarily mean actual failure.)	If same sub-code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.
DD *4	Master Reset (Momentary Interruption)	Component that is to be master has been disconnected after engine start.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for power supply of multi-display controller sub-assy. • Check harness for communication system of multi-display controller sub-assy. • If error occurs frequently, replace radio receiver assy.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E3 *1	Registration Request Transmission	<ul style="list-style-type: none"> • Registration Request command is output from slave component. • Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for communication system between multi-display controller sub-assy and radio receiver assy.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

(b) Sub (16C)-AVC-LAN L-1
Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
D8 *2	No Response To Connection Check	Component shown by sub-code is or was disconnected from system after engine start.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
D9 *1	Last Mode Error	Component operated (sound and/or image was provided) before engine stop is or was disconnected with ignition switch in ACC or ON.	<ul style="list-style-type: none"> • Check harness for power supply of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Sound and picture do not change by button operation.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code. • If error occurs again, replace component shown by auxiliary code
DB *1	Mode Status Error	Dual alarm is detected.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
DC *4	Transmission Error	Transmission to component shown by sub-code has failed. (This code does not necessarily mean actual failure.)	If same sub-code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.
DE *3	Slave Reset (Momentary Interruption)	After engine start, slave component has been disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

4. STEREO COMPONENT CONTROLLER ASSY (Physical address: 1F4)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting the engine.
- *2: When 210 sec. have passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.
- *3: This code may be stored when the engine key is turned 1 min. again after the engine starts.
- *4: This code may be stored when the engine key is turned again after the engine starts.

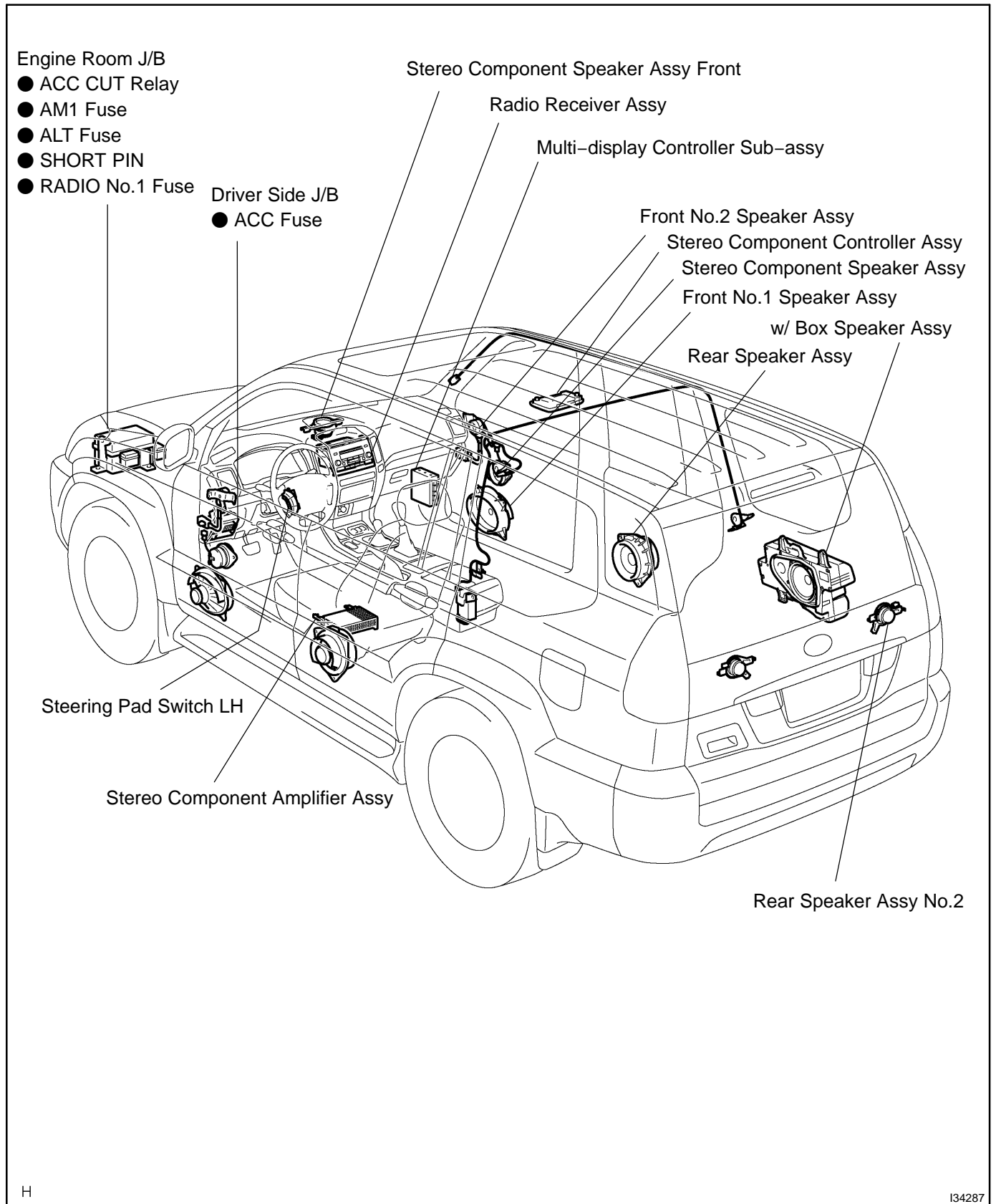
(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition switch in ACC or ON. Either that, or when this code was recorded, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for communication system between radio receiver assy and stereo component controller assy.
D7 *2	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Either that, or when this code was recorded, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy.
DC *3	Transmission Error	Transmission to component shown by sub-code has failed. (This code does not necessarily mean actual failure.)	If same sub-code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.
DD *4	Master Reset (Momentary Interruption)	Component that is to be master has been disconnected after engine start.	<ul style="list-style-type: none"> • Check harness for power supply system of radio receiver assy. • Check harness for communication system of radio receiver assy. • If error occurs frequently, replace stereo component controller assy.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
E3 *1	Registration Request Transmission	<ul style="list-style-type: none"> • Registration Request command is output from slave component. • Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.

DIAGNOSTICS - AUDIO SYSTEM

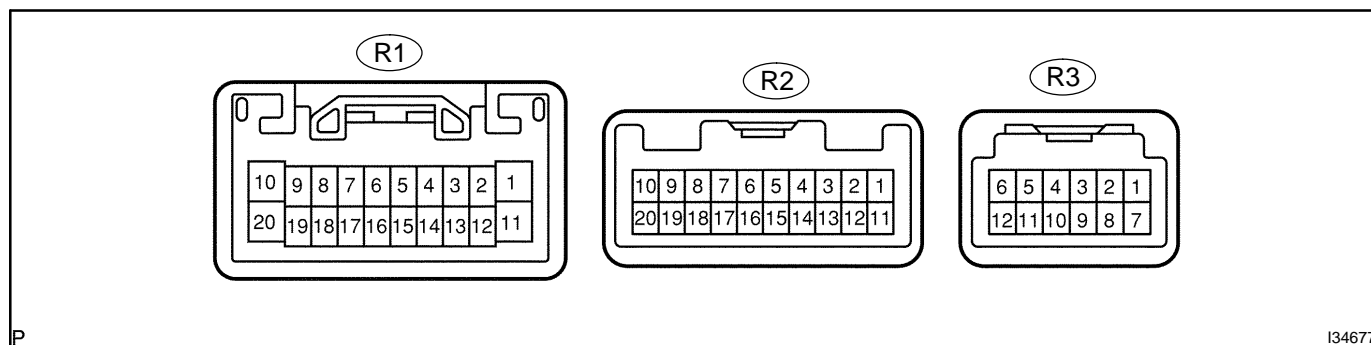
DTC	Diagnosis item	Condition	Countermeasure and inspected parts
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of radio receiver assy. • Check harness for communication system of radio receiver assy. • Check harness for communication system between stereo component controller assy and radio receiver assy.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purposes, it may be detected when no actual failure exists.
D8 *2	No Response To Connection Check	Component shown by sub-code is or was disconnected from system after engine start.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
D9 *1	Last Mode Error	Component operated (sound and/or image was provided) before engine stop is or was disconnected with ignition switch in ACC or ON.	<ul style="list-style-type: none"> • Check harness for power supply of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Sound and picture do not change by button operation.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code. • If error occurs again, replace component shown by auxiliary code
DB *1	Mode Status Error	Dual alarm is detected.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.
DC *4	Transmission Error	Transmission to component shown by sub-code has failed. (This code does not necessarily mean actual failure.)	If same sub-code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.
DE *3	Slave Reset (Momentary Interruption)	After engine start, slave component has been disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of component shown by sub-code. • Check harness for communication system of component shown by sub-code.

LOCATION



TERMINALS OF ECU

1. RADIO RECEIVER ASSY



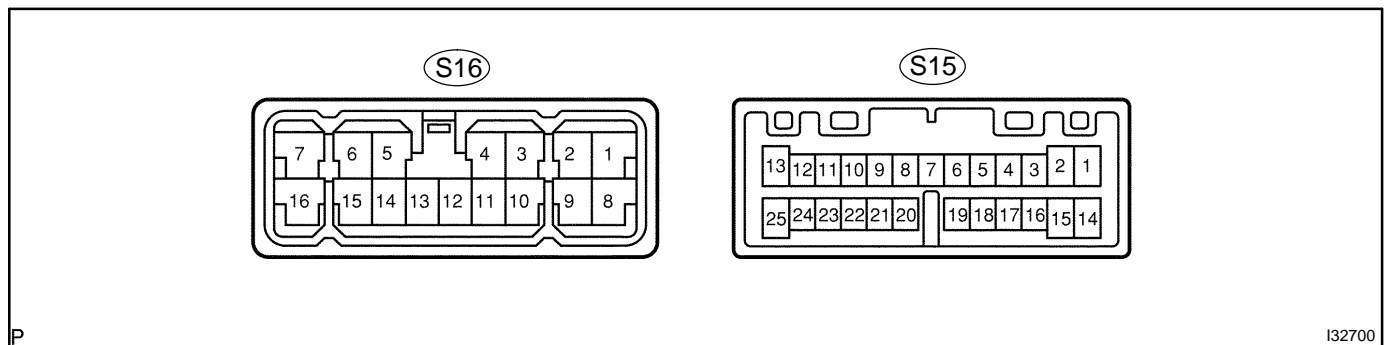
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Terminal No. (Symbols)	Wiring Color	Condition	STD Voltage (V)
R1-1 ⇔ R1-20 (BU ⇔ GND)	L-Y ⇔ BR	Always	10 - 14
R1-5 ⇔ R1-20 (TX+ ⇔ GND)	P ⇔ BR	Turn ignition switch to ACC	2 - 3
R1-7 ⇔ R1-20 (MUTE ⇔ GND)	B-W ⇔ BR	Audio system is playing → Changing mode	Above 3.5 → Below 1
R1-8 ⇔ R1-20 (R+ ⇔ GND)	R ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
R1-9 ⇔ R1-20 (L+ ⇔ GND)	B ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
R1-11 ⇔ R1-20 (ACC ⇔ GND)	GR ⇔ BR	Ignition switch to ACC	10 - 14
R1-13 ⇔ R1-20 (ANT ⇔ GND)	B ⇔ BR	Radio switch ON and AM or FM	10 - 14
R1-15 ⇔ R1-20 (TX- ⇔ GND)	V ⇔ BR	Turn ignition switch to ACC	2 - 3
R1-18 ⇔ R1-20 (R- ⇔ GND)	G ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
R1-19 ⇔ R1-20 (L- ⇔ GND)	W ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
R1-20 ⇔ Body ground (GND ⇔ Body ground)	BR ⇔ Body ground	Always	Continuity
R2-6 ⇔ R1-20 (SWGND ⇔ GND)	W ⇔ BR	Always	Below 1
R2-7 ⇔ R1-20 (STSW1 ⇔ GND)	LG-R ⇔ BR	Steering pad switch not operating. →SEEK+ switch push →SEEK- switch push →VOL+ switch push →VOL- switch push	4 or more →Approx. 0.5 →Approx. 0.9 →Approx. 2.0 →Approx. 3.4
R2-8 ⇔ R1-20 (STSW2 ⇔ GND)	P-B ⇔ BR	Steering pad switch not operating →MODE switch push	4 or more → Below 2.5
R2-9 ⇔ R1-20 (TX+ ⇔ GND)	B ⇔ BR	Turn ignition switch to ACC	2 - 3
R2-10 ⇔ R1-20 (TX- ⇔ GND)	W ⇔ BR	Turn ignition switch to ACC	2 - 3
R2-15 ⇔ R1-20 (RSA R+ ⇔ GND)	B ⇔ BR	RSA, RSE system is playing	A waveform synchronized with sounds is output

R2-16 ⇔ R1-20 (RSA R- ⇔ GND)	W ⇔ BR	RSA, RSE system is playing	A waveform synchronized with sounds is output
R2-17 ⇔ R1-20 (RSA L+ ⇔ GND)	R ⇔ BR	RSA, RSE system is playing	A waveform synchronized with sounds is output
R2-18 ⇔ R1-20 (RSA L- ⇔ GND)	G ⇔ BR	RSA, RSE system is playing	A waveform synchronized with sounds is output
R2-19 ⇔ R1-20 (RMUTE ⇔ GND)	L-B ⇔ BR	RSA, RSE system is playing → Changing	Above 3.5 → Below 1
R3-1 ⇔ Body ground (SGND ⇔ Body ground)	Shielded ⇔ Body ground	Always	Continuity
R3-2 ⇔ R1-20 (R+ ⇔ GND)	B ⇔ BR	Rear seat entertainment system is playing	A waveform synchronized with sounds is output
R3-3 ⇔ R1-20 (R- ⇔ GND)	W ⇔ BR	Rear seat entertainment system is playing	A waveform synchronized with sounds is output
R3-4 ⇔ R1-20 (L+ ⇔ GND)	R ⇔ BR	Rear seat entertainment system is playing	A waveform synchronized with sounds is output
R3-5 ⇔ R1-20 (L- ⇔ GND)	G ⇔ BR	Rear seat entertainment system is playing	A waveform synchronized with sounds is output
R3-6 ⇔ R1-20 (MUTE ⇔ GND)	P ⇔ BR	Rear seat entertainment system is playing → Changing	Above 3.5 → Below 1
R3-9 ⇔ R1-20 (TX+ ⇔ GND)	L ⇔ BR	Turn ignition switch to ACC	2 - 3
R3-10 ⇔ R1-20 (TX- ⇔ GND)	LG ⇔ BR	Turn ignition switch to ACC	2 - 3

2. STEREO COMPONENT AMPLIFIER



Terminal No. (Symbols)	Wiring Color	Condition	STD Voltage (V)
S15-1 ⇔ S16-13 (MR+ ⇔ GND)	Y ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-2 ⇔ S16-13 (ML+ ⇔ GND)	P ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-5 ⇔ S16-13 (TX+ ⇔ GND)	L ⇔ BR	Turn ignition switch to ACC	2 - 3
S15-9 ⇔ S16-13 (N-MU ⇔ GND)	(*1) P ⇔ BR	Audio system is playing → Navigation voice is sounding	Above 3.5 → Below 1
S15-11 ⇔ S16-13 (R+ ⇔ GND)	R ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output

DIAGNOSTICS - AUDIO SYSTEM

S15-12 ⇔ S16-13 (L+ ⇔ GND)	B ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-13 ⇔ S16-13 (SPD ⇔ GND)	V-R ⇔ BR	Vehicle is driving	Pulse generation
S15-14 ⇔ S16-13 (MR- ⇔ GND)	B ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-15 ⇔ S16-13 (ML- ⇔ GND)	V ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-18 ⇔ S16-13 (TX- ⇔ GND)	LG ⇔ BR	Turn ignition switch to ACC	2 - 3
S15-20 ⇔ S16-13 (ACC ⇔ GND)	GR ⇔ BR	Ignition switch to ACC	10 - 14
S15-21 ⇔ S16-13 (MUTE ⇔ GND)	B ⇔ BR	Audio system is playing → Changing mode	Above 3.5 → Below 1
S15-22 ⇔ Body ground (ASGD ⇔ Body ground)	Shielded ⇔ Body ground	Always	Continuity
S15-23 ⇔ S16-13 (R- ⇔ GND)	G ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S15-24 ⇔ S16-13 (L- ⇔ GND)	W ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-1 ⇔ S16-13 (FR+ ⇔ GND)	L ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-2 ⇔ S16-13 (FL+ ⇔ GND)	(*1) L ⇔ BR (*2) G ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-3 ⇔ S16-13 (RR+ ⇔ GND)	R ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-4 ⇔ S16-13 (RL+ ⇔ GND)	B ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-5 ⇔ S16-13 (WFR+ ⇔ GND)	(*3) G-B ⇔ BR (*4) G ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-6 ⇔ S16-13 (WFL+ ⇔ GND)	L-R ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-7 ⇔ S16-13 (+B ⇔ GND)	R-L ⇔ BR	Always	10 - 14
S16-8 ⇔ S16-13 (FR- ⇔ GND)	LG ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-9 ⇔ S16-13 (FL- ⇔ GND)	(*2) G-B ⇔ BR (*1) LG ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-10 ⇔ S16-13 (RR- ⇔ GND)	W ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output
S16-11 ⇔ S16-13 (RL- ⇔ GND)	Y ⇔ BR	Audio system is playing	A waveform synchronized with sounds is output

S16-12 ⇔ Body ground (E ⇔ Body ground)	BR ⇔ Body ground	Always	Continuity
S16-13 ⇔ Body ground (GND ⇔ Body ground)	BR ⇔ Body ground	Always	Continuity
S16-14 ⇔ S16-13 (WFR- ⇔ GND)	(*3) G ⇔ BR (*4) G-B ⇔ BR	Audio system is playing	A waveform synchro- nized with sounds is output
S16-15 ⇔ S16-13 (WFL- ⇔ GND)	L-B ⇔ BR	Audio system is playing	A waveform synchro- nized with sounds is output
S16-16 ⇔ S16-13 (+B2 ⇔ GND)	R-L ⇔ BR	Always	10 - 14

*1: w/ LEXUS Navigation System

*2: w/o LEXUS Navigation System

*3: 9 Speaker System

*4: 12 Speaker System

PROBLEM SYMPTOMS TABLE**RADIO RECEIVER ASSY**

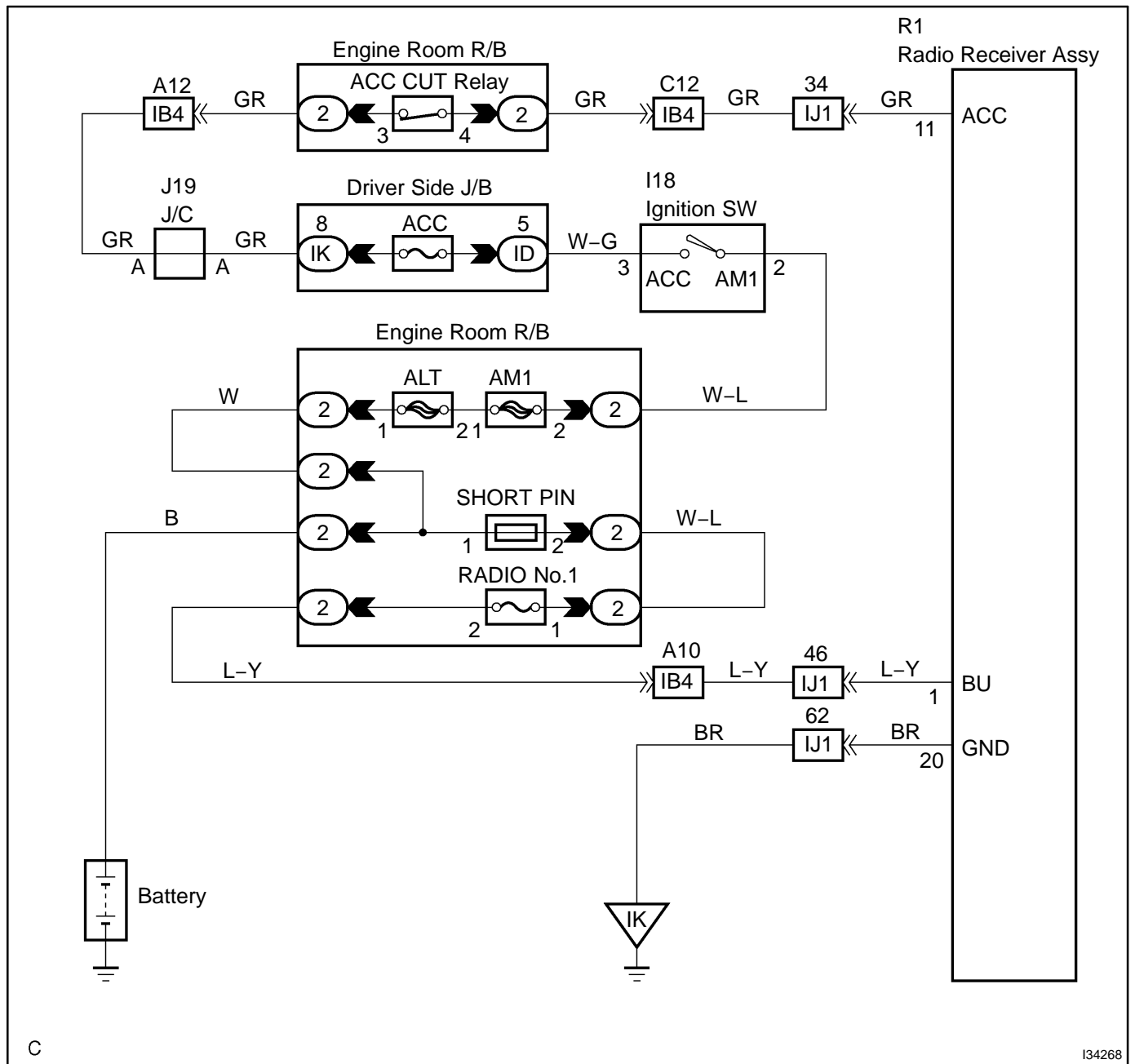
Symptom	Suspected Area	See page
Pressing power switch does not start system.	1. Power source circuit (radio receiver assy)	05-1672
Sound quality is bad in all modes. (volume is too low)	1. Power source circuit (radio receiver assy) 2. Power source circuit (stereo component amplifier assy) 3. Sound quality is bad in all modes (volume is too low)	05-1672 05-1674 05-1684
Sound quality is bad. (DVD, DISC player changer sound)	1. Power source circuit (radio receiver assy) 2. Power source circuit (multi-display controller sub-assy) 3. Sound quality is bad (DVD, disc player changer sound)	05-1672 05-1676 05-1692
Noise occurs.	-	05-1698
Radio broadcast cannot be received. (bad reception)	-	05-1699
CD cannot be inserted or is ejected right after insertion.	1. Power source circuit (radio receiver assy) 2. CD cannot be inserted or is ejected right after insertion	05-1672 05-1701
CD cannot be taken out.	1. Power source circuit (radio receiver assy) 2. CD cannot be taken out	05-1672 05-1703
Sound quality is bad only when CD is played.(volume is too low)	-	05-1704
CD sound skips.	-	05-1705
Cassette tape cannot be inserted or played.	1. Power source circuit (radio receiver assy) 2. Cassette tape cannot be inserted or played	05-1672 05-1707
Cassette tape cannot be ejected.	1. Power source circuit (radio receiver assy) 2. Cassette tape cannot be ejected	05-1672 05-1708
Sound quality is bad only when playing tape.	-	05-1709
Tape is tangled due to incorrect tape speed or auto-reverse mal-function.	-	05-1710

STEERING PAD SWITCH

Symptom	Suspected Area	See page
An audio system cannot be operated with steering pad switch	-	05-1694

POWER SOURCE CIRCUIT (RADIO RECEIVER ASSY)

WIRING DIAGRAM

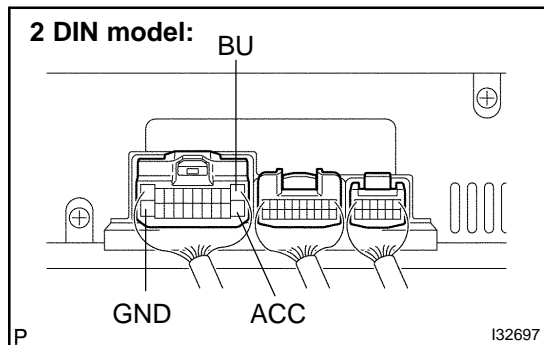


C

I34268

INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY(BU, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

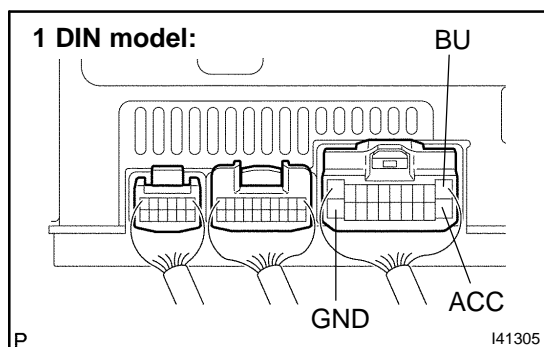
Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
BU ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Check of suspected areas is finished
B	Suspected areas still exist

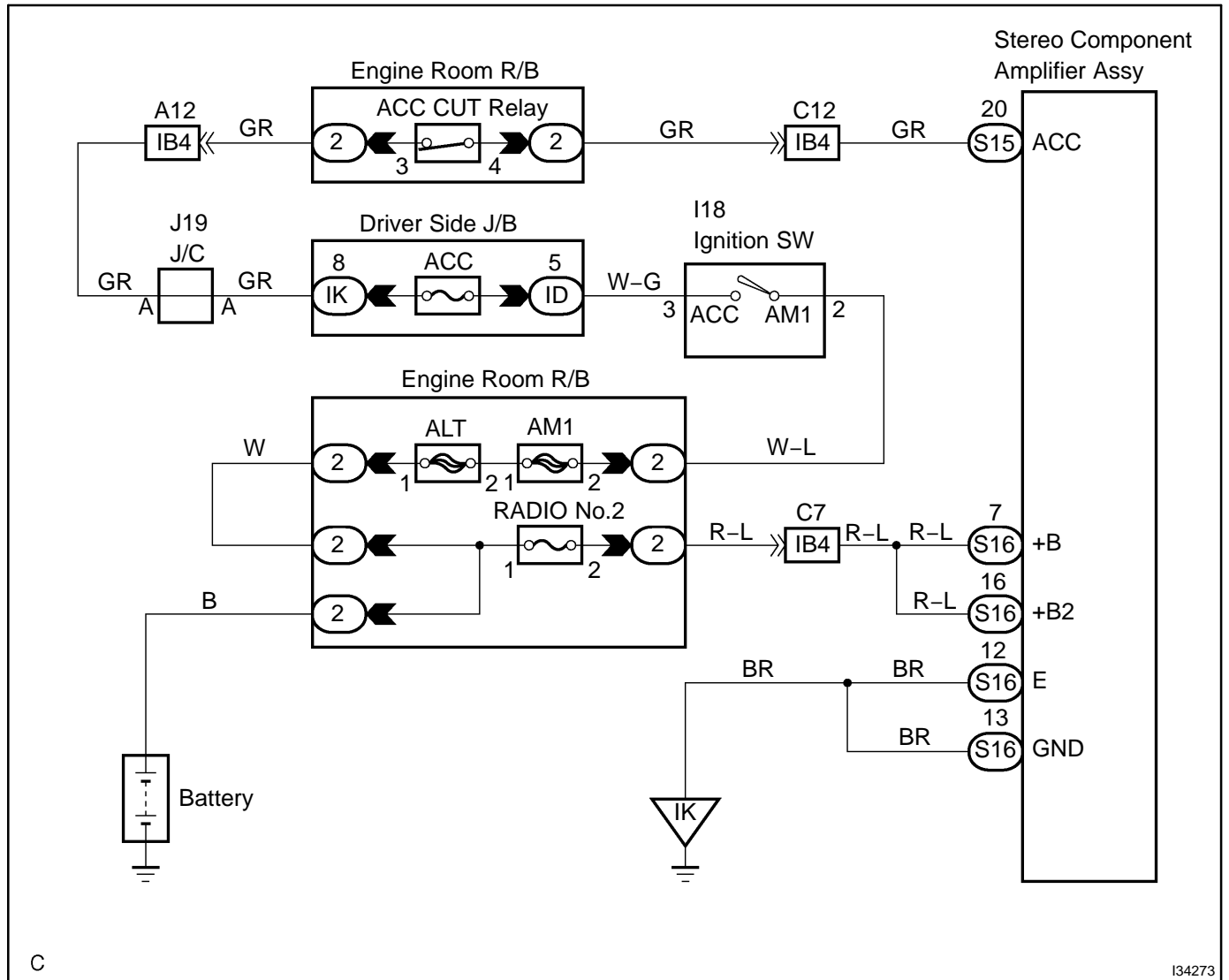
B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1671)

A

CHECK AND REPLACE RADIO RECEIVER ASSY

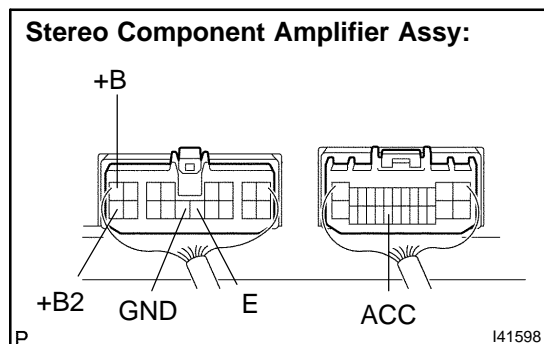
POWER SOURCE CIRCUIT (STEREO COMPONENT AMPLIFIER ASSY)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT STEREO COMPONENT AMPLIFIER ASSY(+B, +B2, ACC, E, GND)



- (a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
E ⇔ Body ground	Always	Continuity
GND ⇔ Body ground	Always	Continuity

- (b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
+B2 ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

2 CHECK FOR PROBLEM SYMPTOMS TABLE

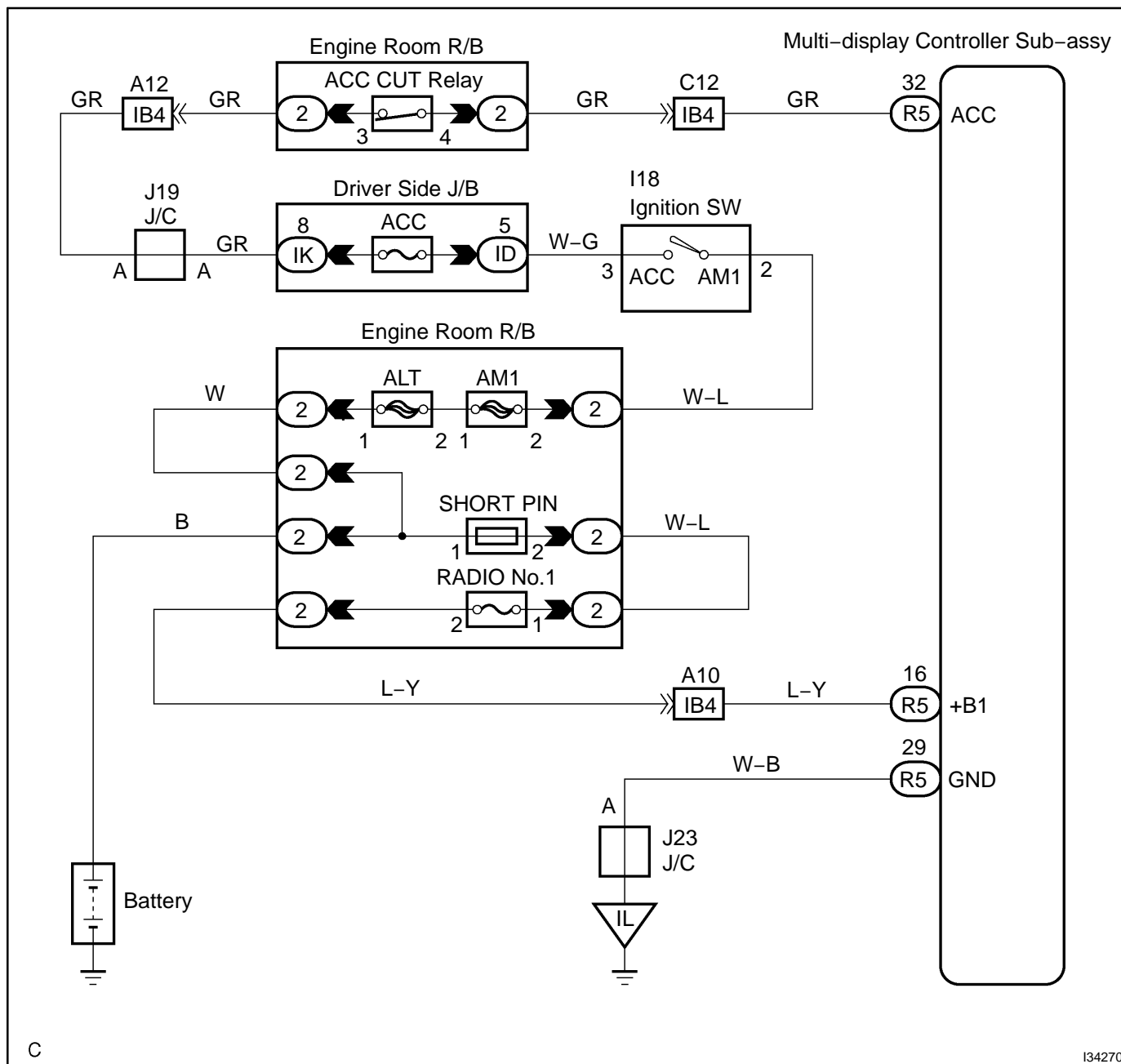
- (a) Check problem symptoms table.

A	Check of suspected areas is finished
B	Suspected areas still exist

B**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1671)****A****CHECK AND REPLACE STEREO COMPONENT AMPLIFIER ASSY**

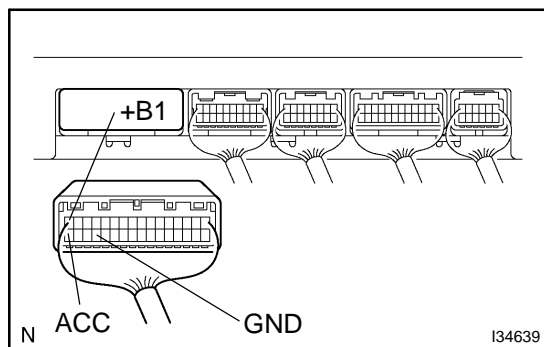
POWER SOURCE CIRCUIT(MULTI-DISPLAY CONTROLLER SUB-ASSY)

WIRING DIAGRAM



C 134270

INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY(+B1, ACC, GND)

- (a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

- (b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B1 ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****2 CHECK FOR PROBLEM SYMPTOMS TABLE**

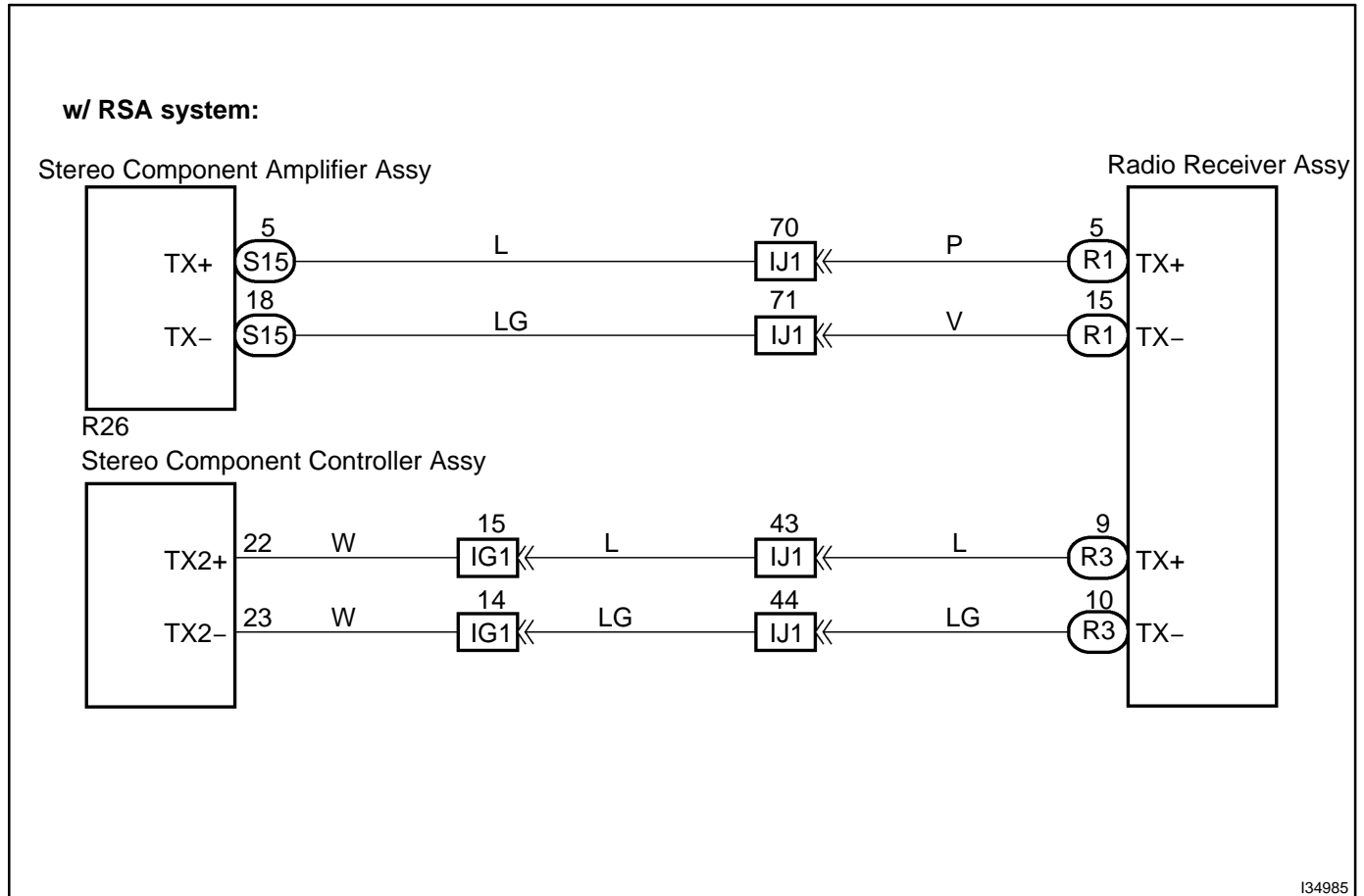
- (a) Check problem symptoms table.

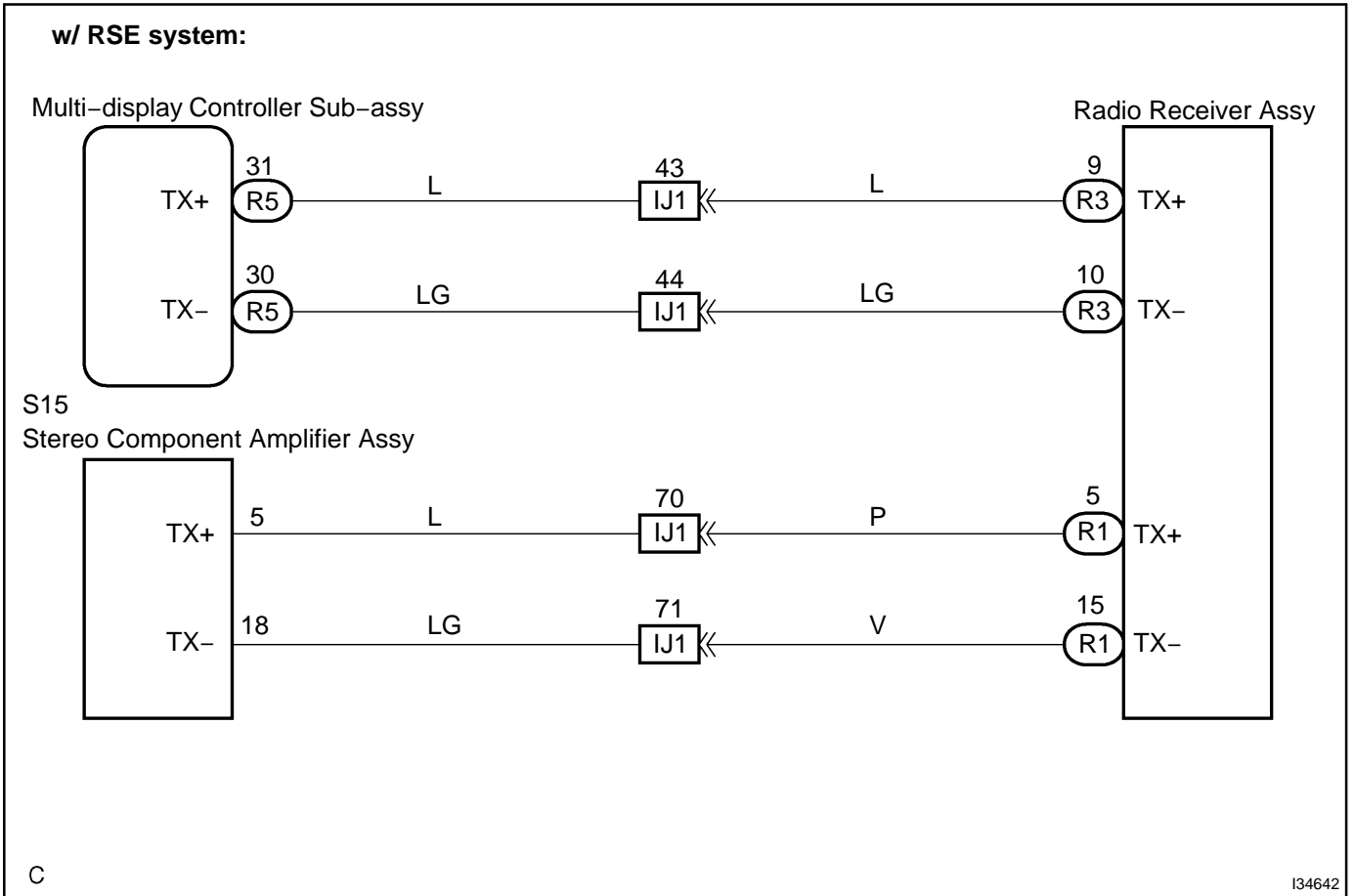
A	Check of suspected areas is finished
B	Suspected areas still exist

B**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1671)****A****CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY**

AVC-LAN CIRCUIT

WIRING DIAGRAM





INSPECTION PROCEDURE

1 INSPECT APPARATUS

(a) Choose the apparatus to be inspected.

A	Stereo component amplifier assy
B	Stereo component controller assy
C	Multi-display control sub-assy

B → Go to step 4

C → Go to step 6

A

2 SERVICE CHECK MODE(STEREO COMPONENT AMPLIFIER ASSY)

(a) Perform service check.

(1) Start the diagnosis system and read check result for stereo component amplifier assy.

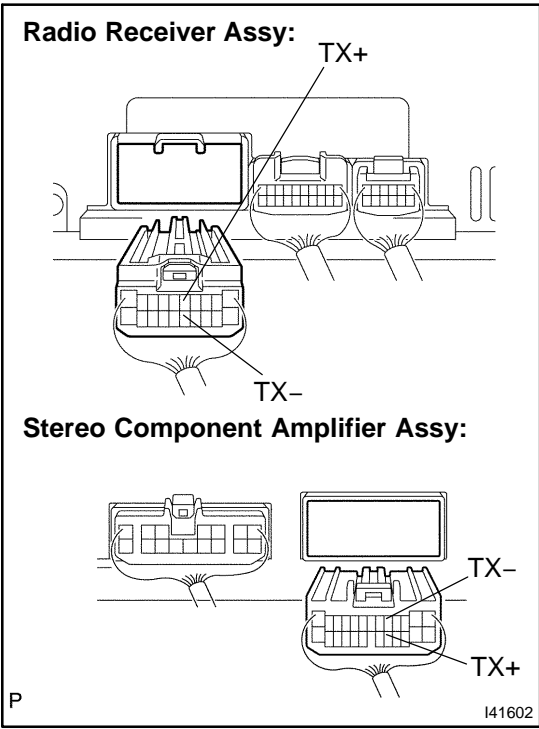
Standard:

A	"NCON" is displayed or nothing is displayed (DSP AMP)
B	"GOOD" is displayed

B → CHECK AND REPLACE RADIO RECEIVER ASSY

A

3 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - STEREO COMPONENT AMPLIFIER ASSY)



(a) Disconnect the radio receiver assy and stereo component amplifier assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TX+ ⇔ TX-	Continuity
TX- ⇔ TX-	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
TX+ ⇔ Body ground	No Continuity
TX- ⇔ Body ground	No Continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE STEREO COMPONENT AMPLIFIER ASSY

4 SERVICE CHECK MODE(STEREO COMPONENT CONTROLLER ASSY)

- (a) Perform service check.
 - (1) Start the diagnosis system and read check result for stereo component controller assy.

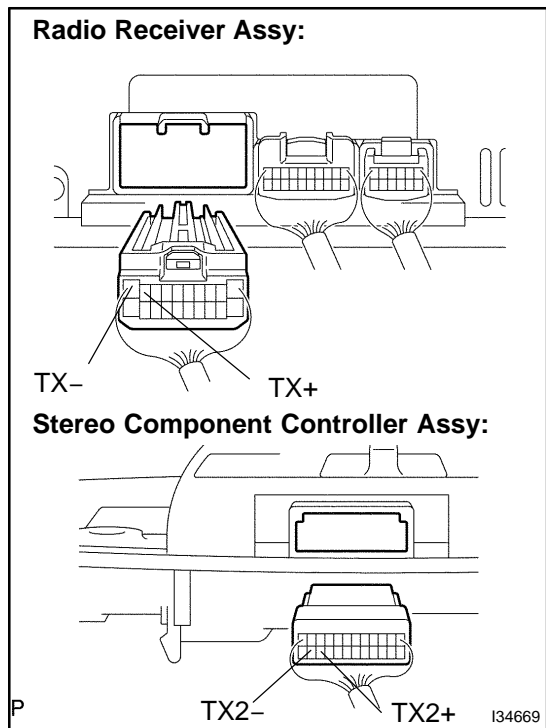
Standard:

A	"NCON" is displayed or nothing is displayed (RSA)
B	"GOOD" is displayed

B CHECK AND REPLACE RADIO RECEIVER ASSY

A

5 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - STEREO COMPONENT CONTROLLER ASSY)



- (a) Disconnect the radio receiver assy and stereo component controller assy.

- (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TX+ ↔ TX2+	Continuity
TX- ↔ TX2-	Continuity

- (2) Check short in harness.

Standard:

Tester connection	Specified condition
TX+ ↔ - Body ground	No Continuity
TX- ↔ Body ground	No Continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

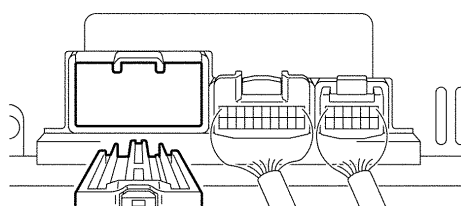
CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY

6 SERVICE CHECK MODE(MULTI-DISPLAY CONTROLLER SUB-ASSY)

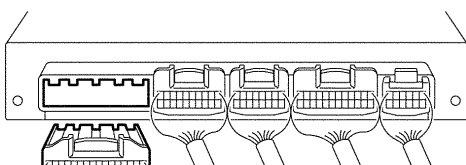
- (a) Perform service check.
 (1) Start the diagnosis system and read check result for multi-display controller sub-assy.

Standard:

A	"NCON" is displayed or nothing is displayed (RSE ECU)
B	"GOOD" is displayed

B**CHECK AND REPLACE RADIO RECEIVER ASSY****A****7 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)****Radio Receiver Assy:**

TX- TX+

Multi-display Controller Sub-assy:

P TX+ TX-

I34670

- (a) Disconnect the radio receiver assy and multi-display controller sub-assy.
 (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TX+ \leftrightarrow TX-	Continuity
TX- \leftrightarrow TX-	Continuity

- (2) Check short in harness.

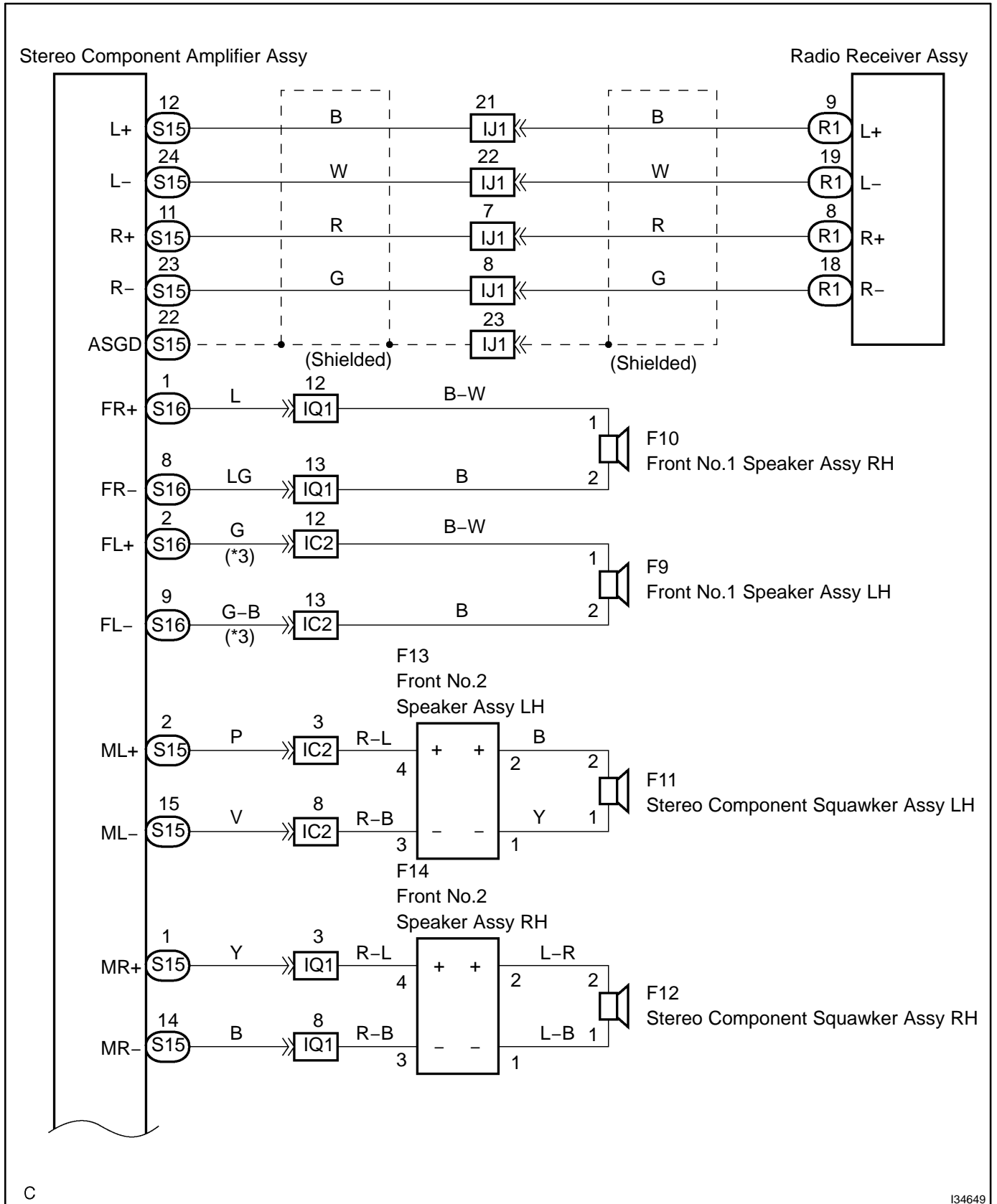
Standard:

Tester connection	Specified condition
TX+ \leftrightarrow Body ground	No Continuity
TX- \leftrightarrow Body ground	No Continuity

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY**

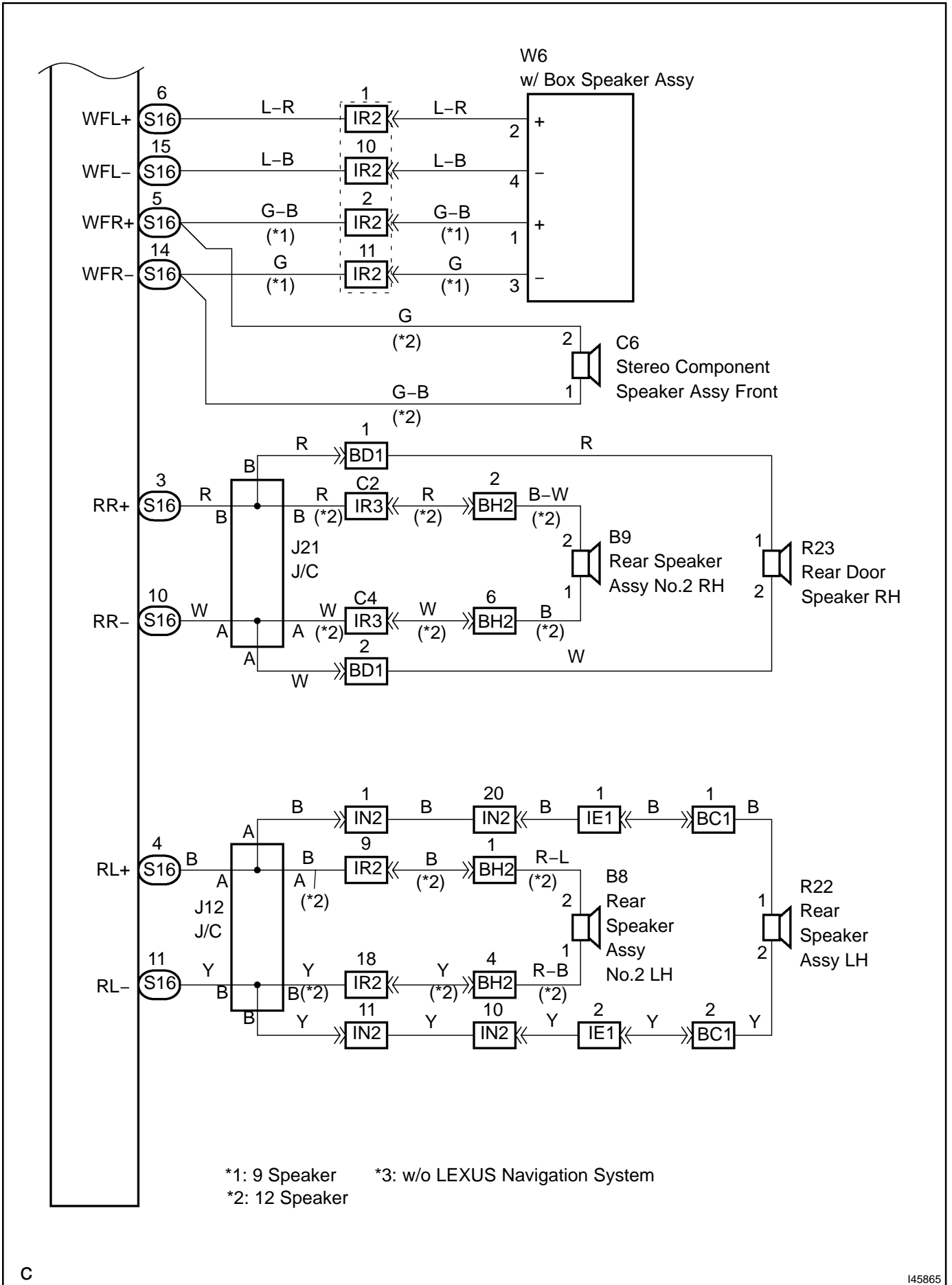
SOUND QUALITY IS BAD IN ALL MODES (VOLUME IS TOO LOW)

WIRING DIAGRAM



C

134649



C

I45865

INSPECTION PROCEDURE**1 ADJUST SOUND QUALITY**

- (a) Adjust the sound quality.
(1) Operate the radio receiver assy to adjust the sound quality.

Standard: Malfunction disappears.

OK

BAD SOUND QUALITY

NG

2 COMPARE IT WITH ANOTHER VEHICLE OF SAME MODEL

- (a) Compare it with another vehicle of the same model.
(1) Compare with the vehicle of the same type which does not have trouble to see if there is any difference in the condition of trouble occurrence.

Standard: No difference is found.

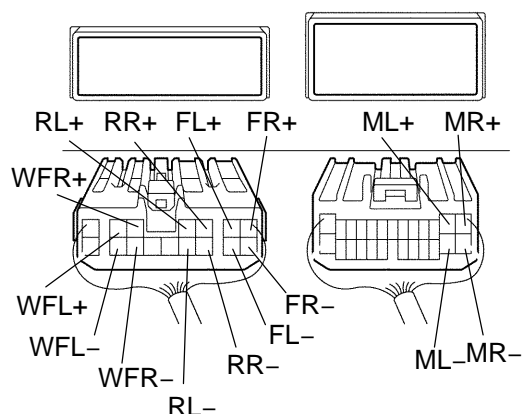
OK

SETTING

NG

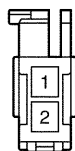
3 CHECK HARNESS AND CONNECTOR(STEREO COMPONENT AMPLIFIER ASSY - SPEAKER ASSY)

Stereo Component Amplifier Assy:

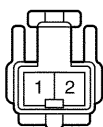


Front No.1 Speaker Assy:

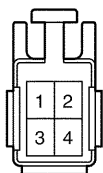
Rear Speaker Assy:



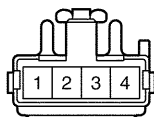
Stereo Component Speaker Assy: Stereo Component Speaker Assy Front: Rear Speaker Assy No. 2:



w/ Box Speaker Assy:



Front No.2 Speaker Assy:



P

I41600

(a) Disconnect the stereo component amplifier assy and speakers.

(1) Check continuity of harness.

Tester connection	Specified condition
FL+ ↔ 1 (Front No.1 speaker assy LH)	Continuity
FL- ↔ 2 (Front No.1 speaker assy LH)	Continuity
FR+ ↔ 1 (Front No.1 speaker assy RH)	Continuity
FR- ↔ 2 (Front No.1 speaker assy RH)	Continuity
ML+ ↔ 1 (Front No.2 speaker assy LH)	Continuity
ML- ↔ 2 (Front No.2 speaker assy LH)	Continuity
MR+ ↔ 1 (Front No.2 speaker assy RH)	Continuity
MR- ↔ 2 (Front No.2 speaker assy RH)	Continuity
ML+ ↔ 1 (Stereo component speaker assy LH)	Continuity
ML- ↔ 2 (Stereo component speaker assy LH)	Continuity
MR+ ↔ 1 (Stereo component speaker assy RH)	Continuity
MR- ↔ 2 (Stereo component speaker assy RH)	Continuity
RL+ ↔ 1 (Rear speaker assy LH)	Continuity
RL- ↔ 2 (Rear speaker assy LH)	Continuity
RR+ ↔ 1 (Rear speaker assy RH)	Continuity
RR- ↔ 2 (Rear speaker assy RH)	Continuity
RL+ ↔ 1 (Rear speaker assy No. 2 LH) (*2)	Continuity
RL- ↔ 2 (Rear speaker assy No. 2 LH) (*2)	Continuity
RR+ ↔ 1 (Rear speaker assy No. 2 RH) (*2)	Continuity
RR- ↔ 2 (Rear speaker assy No. 2 RH) (*2)	Continuity
WFL+ ↔ 1 (w/ box speaker assy LH)	Continuity
WFL- ↔ 3 (w/ box speaker assy LH)	Continuity
WFR+ ↔ 2 (w/ box speaker assy RH) (*1)	Continuity
WFR- ↔ 4 (w/ box speaker assy RH) (*1)	Continuity
WFR+ ↔ 1 (Stereo component speaker assy front) (*2)	Continuity
WFR- ↔ 2 (Stereo component speaker assy front) (*2)	Continuity

*1: 9 speaker models

*2: 12 speaker models

(1) Check short in harness.

Tester connection	Specified condition
FL+ ↔ Body ground	No Continuity
FL- ↔ Body ground	No Continuity
FR+ ↔ Body ground	No Continuity
FR- ↔ Body ground	No Continuity
ML+ ↔ Body ground	No Continuity
ML- ↔ Body ground	No Continuity
MR+ ↔ Body ground	No Continuity
MR- ↔ Body ground	No Continuity
RL+ ↔ Body ground	No Continuity
RL- ↔ Body ground	No Continuity
RR+ ↔ Body ground	No Continuity
RR- ↔ Body ground	No Continuity
WTL+ ↔ Body ground	No Continuity

Tester connection	Specified condition
WTL- ⇔ Body ground	No Continuity
WTR+ ⇔ Body ground	No Continuity
WTR- ⇔ Body ground	No Continuity

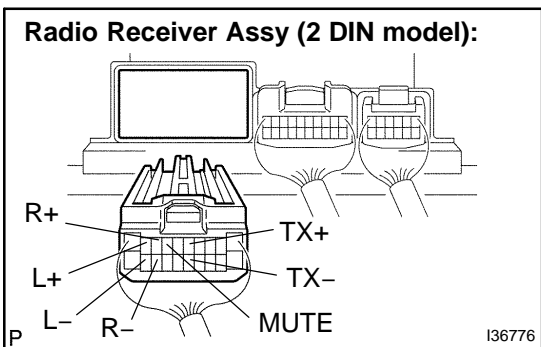
*1: 9 speaker models

*2: 12 speaker models

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - STEREO COMPONENT AMPLIFIER ASSY)

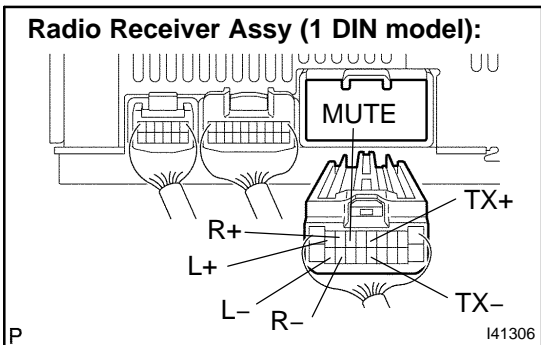


(a) Disconnect the radio receiver assy and stereo component amplifier assy.

(1) Check continuity of harness.

Standard:

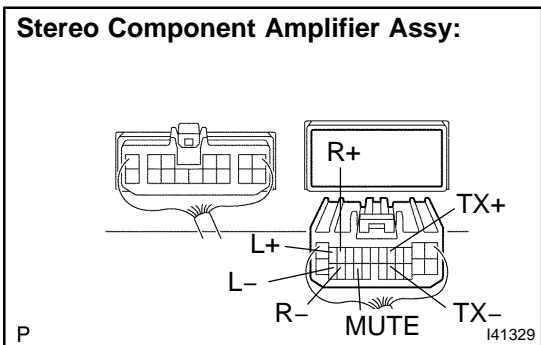
Tester connection	Specified condition
L+ ⇔ L+	Continuity
L- ⇔ L-	Continuity
R+ ⇔ R+	Continuity
R- ⇔ R-	Continuity
TX+ ⇔ TX+	Continuity
TX- ⇔ TX-	Continuity
MUTE ⇔ MUTE	Continuity



(2) Check short in harness.

Standard:

Tester connection	Specified condition
L+ ⇔ Body ground	No Continuity
L- ⇔ Body ground	No Continuity
R+ ⇔ Body ground	No Continuity
R- ⇔ Body ground	No Continuity
TX+ ⇔ Body ground	No Continuity
TX- ⇔ Body ground	No Continuity
MUTE ⇔ Body ground	No Continuity



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT FRONT NO.1 SPEAKER ASSY

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 7 - 9 Ω

NG**REPLACE FRONT NO.1 SPEAKER ASSY****OK****6 INSPECT FRONT NO.2 SPEAKER ASSY**

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 4 - 8 Ω

NG**REPLACE FRONT NO.2 SPEAKER ASSY****OK****7 INSPECT STEREO COMPONENT SPEAKER ASSY**

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 7 - 9 Ω

NG**REPLACE STEREO COMPONENT SPEAKER ASSY****OK**

8	INSPECT REAR SPEAKER ASSY
----------	----------------------------------

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

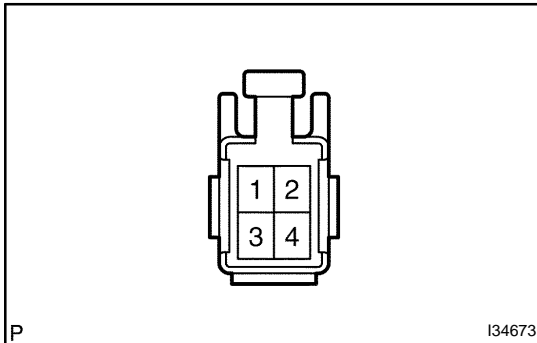
12 speaker models: 14 – 18 Ω

NG →

REPLACE REAR SPEAKER ASSY

OK

9	INSPECT W/BOX SPEAKER ASSY NO.1
----------	--



(a) Resistance check.

(1) Check the resistance between the terminals at each condition, as shown in the chart.

Tester connection	Condition
1 ↔ 3 (*1)	Constant
2 ↔ 4	Constant

*1: 9 speaker models

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 7 – 9 Ω

NG →

REPLACE W/BOX SPEAKER ASSY NO.1

OK

10	INSPECT STEREO COMPONENT SPEAKER ASSY FRONT(W/ 12 SPEAKER MODELS)
-----------	--

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 7 - 9 Ω

NG

REPLACE STEREO COMPONENT SPEAKER ASSY FRONT

OK

11	INSPECT REAR SPEAKER ASSY NO.2(W/ 12 SPEAKER MODELS)
-----------	---

(a) Resistance check.

(1) Check the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard value:

9 speaker models: 4 Ω

12 speaker models: 7 - 9 Ω

NG

REPLACE REAR SPEAKER ASSY NO.2

OK

12	CHECK AND REPLACE STEREO COMPONENT AMPLIFIER ASSY
-----------	--

OK

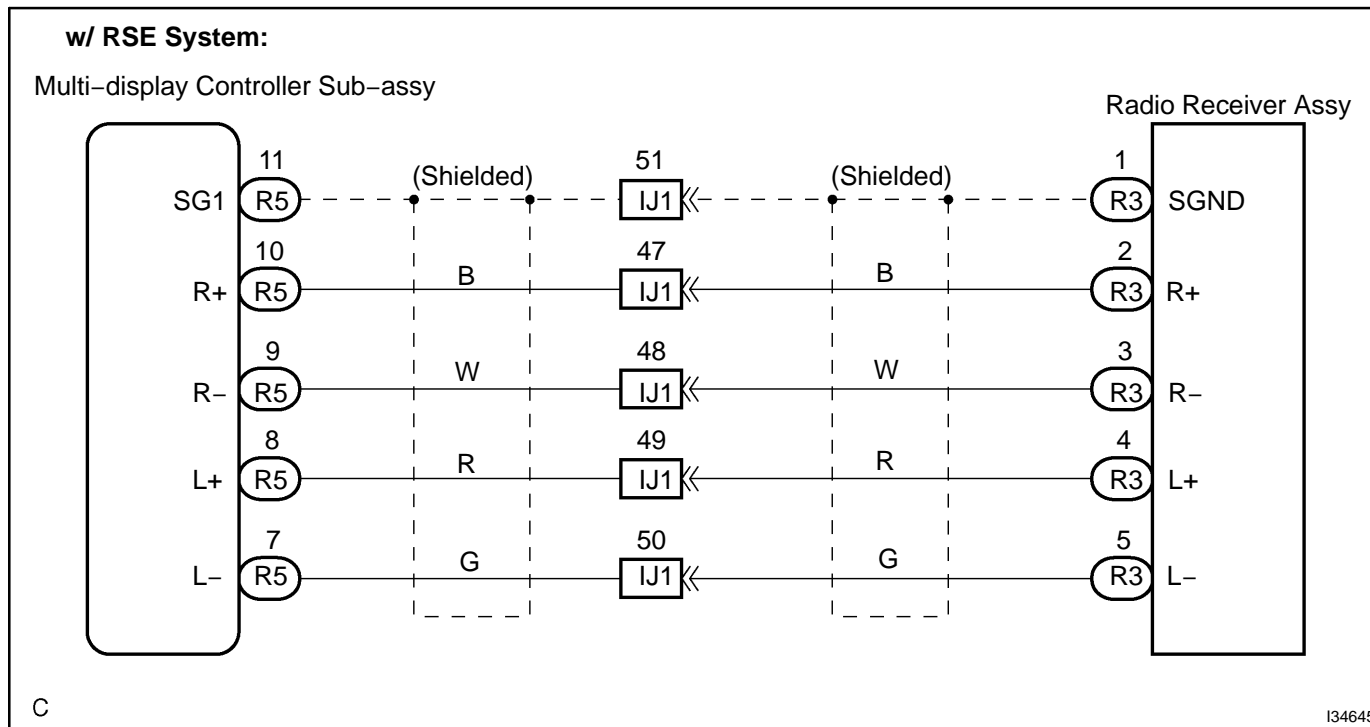
SYSTEM OK

NG

CHECK AND REPLACE RADIO RECEIVER ASSY
--

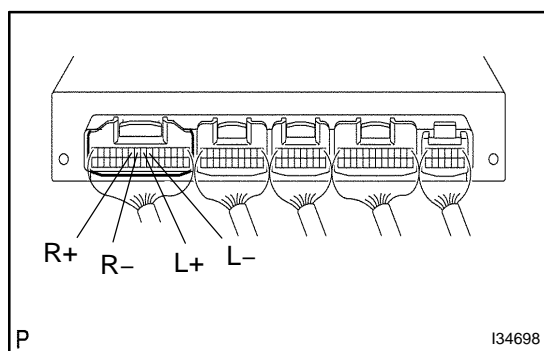
SOUND QUALITY IS BAD (DVD SOUND)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY(R+, R-, L+, L-, SG1)



- (a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SG1 ⇔ Body ground	Constant	Continuity

- (b) Check the voltage between terminals at each condition, as shown in the chart.

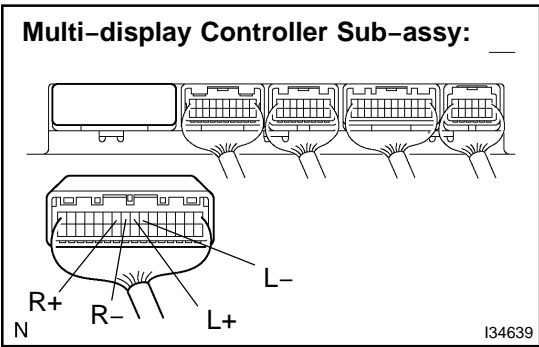
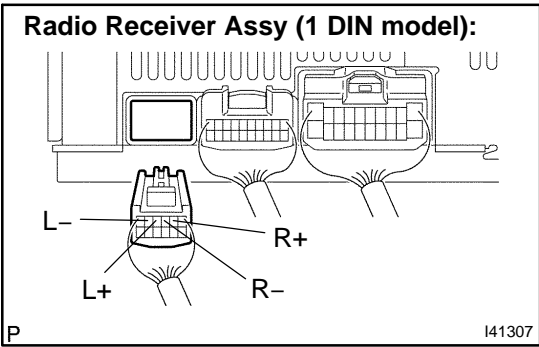
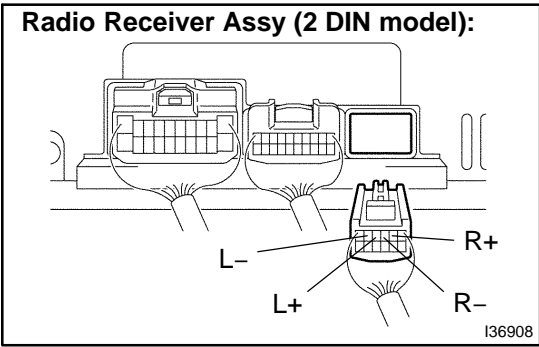
Standard:

Tester connection	Condition	Specified condition
R+ ⇔ SG1	While voice sound is being produced	A waveform synchronized with sound is output
R- ⇔ SG1	While voice sound is being produced	A waveform synchronized with sound is output
L+ ⇔ SG1	While voice sound is being produced	A waveform synchronized with sound is output
L- ⇔ SG1	While voice sound is being produced	A waveform synchronized with sound is output

NG → **CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY**

OK

2 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - RADIO RECEIVER ASSY)



(a) Disconnect the multi-display controller sub-assy and radio receiver assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
R+ ↔ R+	Continuity
R- ↔ R-	Continuity
L+ ↔ L+	Continuity
L- ↔ L-	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
R+ ↔ Body ground	No continuity
R- ↔ Body ground	No continuity
L+ ↔ Body ground	No continuity
L- ↔ Body ground	No continuity

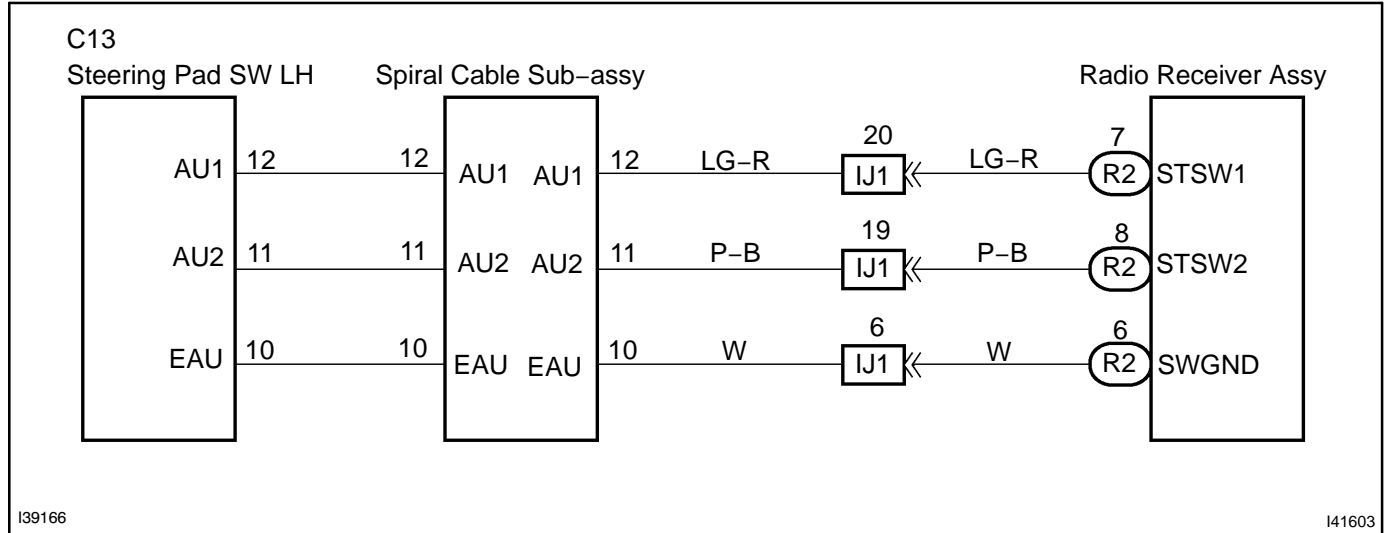
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE RADIO RECEIVER ASSY

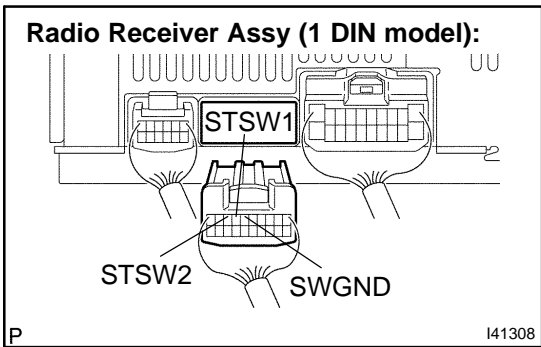
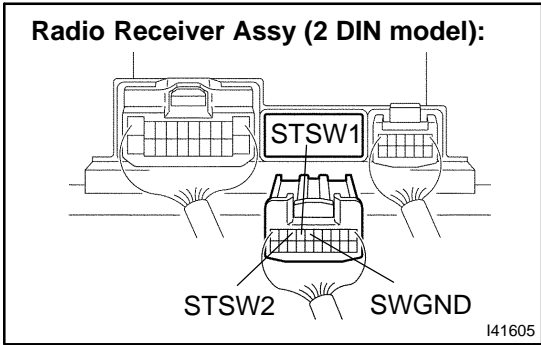
A AUDIO SYSTEM CANNOT BE OPERATED WITH STEERING PAD SWITCH

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



- (a) Disconnect the connector from the radio receiver assy.
- (b) Check continuity between terminals at each condition, as shown in the chart.

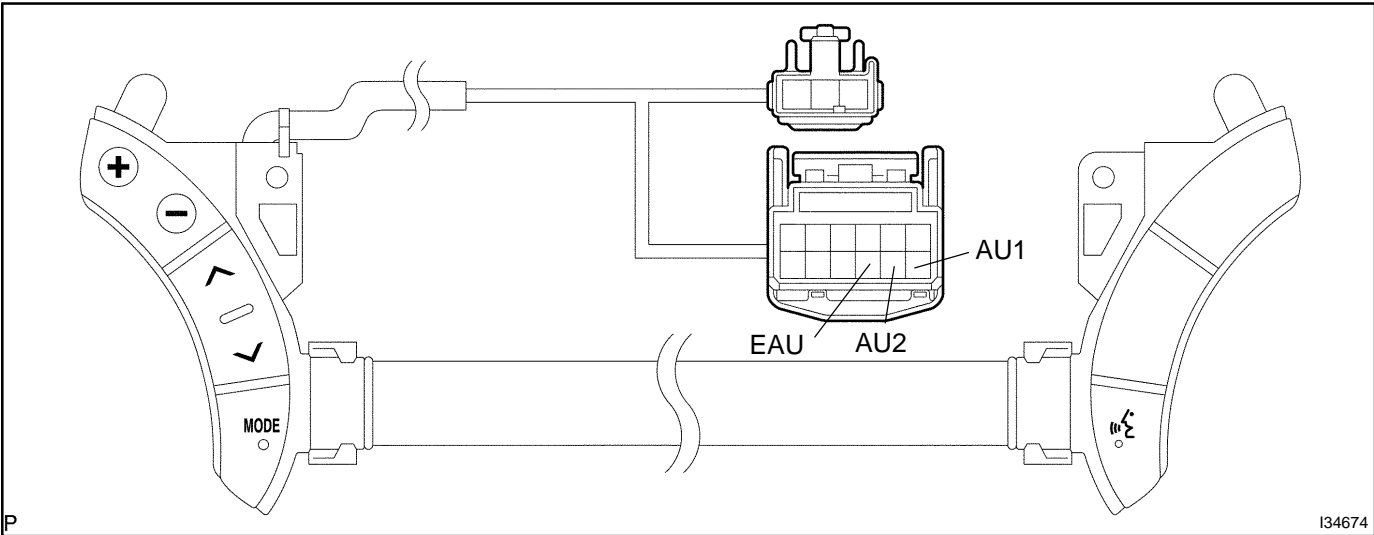
Standard:

Tester connection	Condition	Specified condition
STSW1 - SWGND	No switch is pushed	Approx. 100 kΩ
STSW1 - SWGND	SEEK+ switch: push	Approx. 0 Ω
STSW1 - SWGND	SEEK- switch: push	Approx. 0.3 kΩ
STSW1 - SWGND	VOL+ switch: push	Approx. 1 kΩ
STSW1 - SWGND	VOL- switch: push	Approx. 3.2 kΩ
STSW2 - SWGND	No switch is pushed	Approx. 100 kΩ
STSW2 - SWGND	MODE switch: push	Approx. 0 Ω

OK CHECK AND REPLACE RADIO RECEIVER ASSY

NG

2 INSPECT STEERING PAD SWITCH LH(AU1, AU2, EAU)



- (a) Check continuity between terminals at each condition, as shown in the chart.

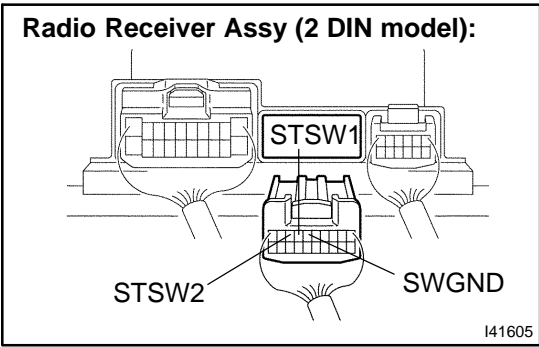
Standard:

Tester connection	Condition	Specified condition
AU1 ↔ EAU	No switch is pushed	Approx. 100 kΩ
AU1 ↔ EAU	SEEK+ switch: push	0 Ω
AU1 ↔ EAU	SEEK- switch: push	Approx. 0.3 kΩ
AU1 ↔ EAU	VOL+ switch: push	Approx. 1 kΩ
AU1 ↔ EAU	VOL- switch: push	Approx. 3.2 kΩ
AU2 ↔ EAU	No switch is pushed	Approx. 100 kΩ
AU2 ↔ EAU	MODE switch: push	0 Ω

NG CHECK AND REPLACE STEERING PAD SWITCH LH

OK

3 CHECK HARNESS AND CONNECTOR(STEERING PAD SWITCH LH - RADIO RECEIVER ASSY)



(a) Disconnect the spiral cable sub-assy and radio receiver assy.

(1) Check continuity of harness.

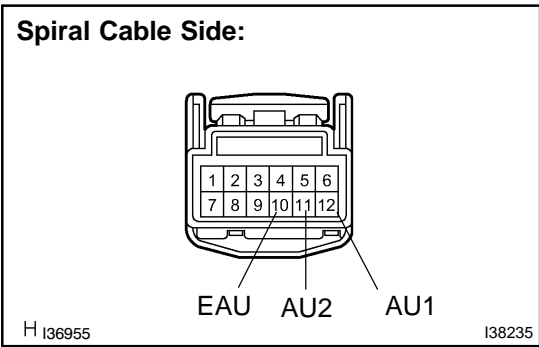
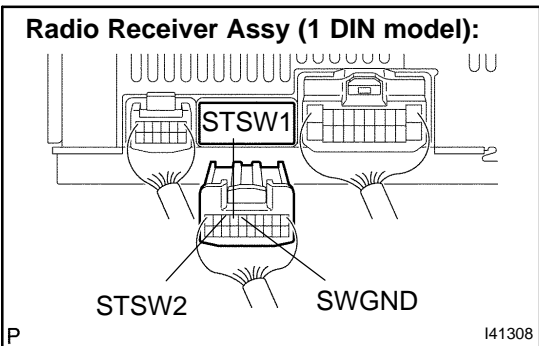
Standard:

Tester connection	Specified condition
STSW1- ↔ AU1	Continuity
STSW2 ↔ AU2	Continuity
SWGND ↔ EAU	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
STSW1 ↔ Body ground	No continuity
STSW2 ↔ Body ground	No continuity
SWGND ↔ Body ground	No continuity



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SPIRAL CABLE SUB-ASSY

NOISE OCCURS

INSPECTION PROCEDURE

1 CHECK OF SPEAKER INSTALLATION

- (a) Check the speaker installation condition.
 (1) Check that each speaker is securely installed.

Standard: Malfunction disappears.

HINT:

The radio is equipped with a noise prevention system that blocks excessively loud noise. If such noise occurs, check that all wiring is proper and that the antenna installation part ground and noise-prevention equipment are installed.

Conditions under which noise occurs	Noise type
Noise increases when the accelerator pedal is depressed, but stops when the engine is stopped.	Generator noise
Noise occurs during A/C or heater operation.	Blower motor noise
Noise occurs when the vehicle accelerates rapidly on an unpaved road or after the ignition switch is turned on.	Fuel pump noise
Noise occurs when the horn switch is pressed and released or when pressed and held.	Horn noise
Quiet noise occurs while the engine is running, but stops when the engine is stopped.	Ignition noise
Noise occurs synchronously with the blink of the turn signal.	Flasher noise
Noise occurs during window washer operation.	Washer noise
Noise occurs while the engine is running, and continues even after the engine is stopped.	Water temperature sensor noise
Noise occurs during wiper operation.	Wiper noise
Noise occurs when the brake pedal is depressed.	Stop light switch noise
Others	Static electricity on the vehicle

HINT:

- Identify the conditions under which the noise occurs, and check the noise filter on the relevant part.
- First ensure that the noise is not coming from the outside. Failure to do so makes noise source detection difficult and may lead to a misdiagnosis.
- Noise should be removed in descending order of loudness.

NG

INSTALL IT PROPERLY

OK

IDENTIFICATION OF NOISE SOURCE

RADIO BROADCAST CANNOT BE RECEIVED(BAD RECEPTION)

INSPECTION PROCEDURE

1 CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

- (a) Check if the radio auto-search functions properly.
 (1) Perform the auto-search of the radio and check that it functions normally.

Standard: The radio auto-search functions properly.

OK

CHECK AND REPLACE RADIO RECEIVER ASSY

NG

2 CHECK OPTIONAL COMPONENT

- (a) Check optional component (Sun shade film, telephone antenna, etc.).
 (1) Check whether or not any optional component is installed, such as the sunshade film and the telephone antenna.

Standard: Optional component is installed.

OK

EFFECT FROM OPTIONAL COMPONENT

NG

3 CHECK ANTENNA FOR NOISE PRODUCTION

- (a) Noise Check with Antenna
 (1) With the ignition switch in ACC, turn on the radio and choose the AM mode.
 (2) Place a tip of a screwdriver or the antenna of the antenna assembly w/ holder and check that the noise is heard from the speaker.

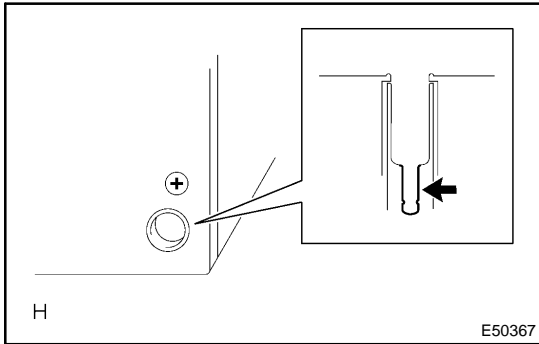
Standard: Noise occurs.

OK

CHECK AND REPLACE RADIO RECEIVER ASSY

NG

4	INSPECT RADIO RECEIVER ASSY(ANTENNA)
----------	---



- (a) Preparation for Check
- (1) Remove the antenna plug of the radio receiver assembly.
- (b) Noise Check
- (1) With the radio receiver assy connector connected, turn the ignition switch to ACC.
 - (2) Turn on the radio and choose the AM mode.
 - (3) Place a flat-head screwdriver or a metal such as a thin wire on the antenna jack of the radio receiver assy and check that the noise is heard from the speaker.

Standard: Noise occurs.

OK

CHECK AND REPLACE RADIO RECEIVER ASSY

NG

REPLACE ANTENNA CORD SUB-ASSY

CD CANNOT BE INSERTED OR IS EJECTED RIGHT AFTER INSERTION

INSPECTION PROCEDURE

1 CHECK IF A PROPER CD IS INSERTED

(a) Check if a proper CD is inserted.

- (1) Make sure that the CD is normal audio CD, and that there is no deformation, flaw, stain, burr and other defects on the CD.

Standard: Normal audio CD.

Reference:

- Translucent or different-shaped CD cannot be played.
- CD-ROM for the computers (with music recorded in) and recorded CD-R may not be played.
- Playing an 8-cm CD does not require an adapter.

NG → CD IS FAULTY

OK

2 CHECK THAT A PROPER CD IS INSERTED

(a) Check that a proper CD is inserted.

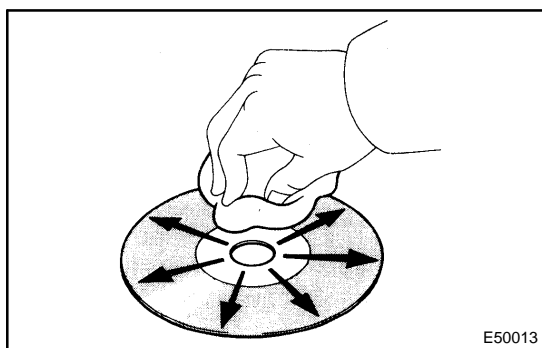
- (1) Check whether or not the CD is inserted upside down.

Standard: Not upside down.

NG → SET DISC CORRECTLY

OK

3 DISC CLEANING



(a) Disc cleaning

- (1) If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti-static preservative.

OK → DISC IS DIRTY

NG

4 REPLACE CD WITH ANOTHER AND RECHECK

- (a) Replace the CD with another and recheck.
(1) Replace the faulty CD with the normal one to see if the same trouble occurs again.
Standard: Malfunction disappears.

OK**CD IS FAULTY****NG****CHECK AND REPLACE RADIO RECEIVER ASSY**

CD CANNOT BE TAKEN OUT

INSPECTION PROCEDURE

1 CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

- (a) Check if the radio auto-search functions properly.
 (1) Perform the auto-research of the radio and check that the operation is normal.

Standard: Malfunction disappears.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 PRESS "EJECT" AND CHECK OPERATION

- (a) Press "EJECT" and check the operation.
 (1) Press the CD EJECT switch of the radio receiver assembly for 2 sec. or more and check that the CD is ejected.

Standard: CD is ejected.

Reference:

If the CD is not ejected, send the vehicle for repair.

Do not try to drag it out by force.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

3 CHECK IF A PROPER CD IS INSERTED

- (a) Check that a proper CD is inserted.
 (1) Check that in what conditions the sound skipping occurs.

Standard: While driving on the bad road.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

4 REPLACE CD WITH ANOTHER AND RECHECK

- (a) Replace the CD with another and recheck.
 (1) Check the installation condition of the radio receiver assembly.

Standard: Installed properly.

OK

CHECK AND REPLACE RADIO RECEIVER ASSY

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

SOUND QUALITY IS BAD ONLY WHEN CD IS PLAYED (VOLUME IS TOO LOW)**INSPECTION PROCEDURE****1 REPLACE CD WITH ANOTHER AND RECHECK**

- (a) Replace the CD with another and recheck.
(1) Check the installation condition of the radio receiver assembly.

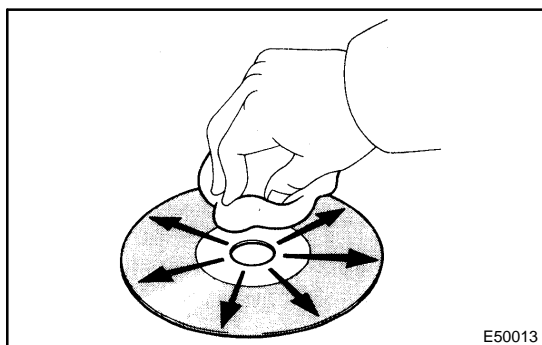
Standard: Malfunction disappears.

OK**CD IS FAULTY****NG****CHECK AND REPLACE RADIO RECEIVER ASSY**

CD SOUND SKIPS

INSPECTION PROCEDURE

1 DISC CLEANING



- (a) Disc cleaning
- (1) If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti-static preservative.

Standard: Malfunction disappears.

OK

DISC IS DIRTY

NG

2 REPLACE CD WITH ANOTHER AND RECHECK

- (a) Replace the CD with another and recheck.
- (1) Check the installation condition of the radio receiver assembly.
- Standard: Malfunction disappears.**

OK

CD IS FAULTY

NG

3 CHECK WHEN THIS HAPPENS

- (a) Check when this problem happens.
- (1) Check when noise occurs.
- Standard: While driving on the bumpy road.**

OK

Go to step 5

NG

4 COMPARE IT WITH ANOTHER VEHICLE OF SAME MODEL

- (a) Compare it with another vehicle of the same model.
- (1) Compare with the vehicle of the same type which does not have a trouble to see if there is any difference in the condition of trouble occurrence.
- Standard: No difference is found.**

OK

SETTING

NG

5 CHECK OF RADIO RECEIVER ASSEMBLY INSTALLATION

- (a) Check of radio receiver assembly installation.
(1) Check the installation condition of the radio receiver assembly.
Standard: Installed properly.

NG**INSTALL THE RADIO RECEIVER ASSEMBLY PROPERLY****OK****6 DID TEMPERATURE IN CABIN CHANGE RAPIDLY?**

- (a) Did the temperature in the cabin change rapidly?
(1) Check whether or not the rapid temperature change occurred in the cabin.
Standard: The rapid temperature change occurred.

Reference:

The rapid temperature change creates condensation inside the CD player, causing CD not to be played.

OK**CONDENSATION DUE TO TEMPERATURE CHANGE (LEAVE IT AS IT IS FOR A WHILE BEFORE USING)****NG****CHECK AND REPLACE RADIO RECEIVER ASSY**

CASSETTE TAPE CANNOT BE INSERTED OR PLAYED

INSPECTION PROCEDURE

1 CHECK FOR ANY FOREIGN OBJECT

(a) Check for any foreign object.

- (1) Check that no foreign object or defect is detected in the cassette tape player of radio receiver assembly.

Standard: No foreign object or defect is detected.

NG

REMOVE FOREIGN OBJECT

OK

2 CHECK CASSETTE TAPE

(a) Check the cassette tape.

- (1) Check that the cassette tape is a normal tape with music or voice recorded.

Standard: Proper cassette tape with music or voice recorded.

NG

CASSETTE TAPE IS FAULTY

OK

3 REPLACE CASSETTE TAPE WITH ANOTHER AND RECHECK

(a) Replace the cassette tape with another one and recheck.

- (1) Replace the faulty cassette tape with a normal one to see if the same trouble occurs again.

Standard: The function is recovered to normal.

OK

CASSETTE TAPE IS FAULTY

NG

4 CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

(a) Check if the radio auto-search functions properly.

- (1) Perform the auto-search of the radio and check that the operation is normal.

Standard: The operation returns to normal.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

NORMAL

CASSETTE TAPE CANNOT BE EJECTED

INSPECTION PROCEDURE

1 CHECK IF RADIO AUTO-SEARCH FUNCTIONS PROPERLY

- (a) Check if the radio auto-search functions properly.
 (1) Perform the auto-search of the radio and check that the operation is normal.
Standard: Malfunction disappears.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 PRESS "EJECT" AND CHECK OPERATION

- (a) Press "EJECT" and check the operation.
 (1) Press the cassette tape EJECT switch of the radio receiver assembly for 2 sec. or more and check that the cassette tape is ejected.
Standard: The cassette tape is ejected.

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

OK

3 CHECK CASSETTE TAPE

- (a) Check the cassette tape.
 (1) Check that the ejected cassette tape does not have the label peeled, cassette body deformation and other defects.
Standard: No fault on the cassette tape.

NG

CASSETTE TAPE IS FAULTY

OK

4 REPLACE CASSETTE TAPE WITH ANOTHER AND RECHECK

- (a) Replace the cassette tape with another and recheck.
 (1) Replace the faulty cassette tape with a normal one to see if the same trouble occurs again.
Standard: Malfunction disappears.

OK

CASSETTE TAPE IS FAULTY

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

SOUND QUALITY IS BAD ONLY WHEN PLAYING TAPE

INSPECTION PROCEDURE

1 REPLACE CASSETTE TAPE WITH ANOTHER AND RECHECK

- (a) Replace the cassette tape with another one and recheck.
- (1) Replace the faulty cassette tape with a normal one to see if the same trouble occurs again.
- Standard: Malfunction disappears.**

OK

CASSETTE TAPE IS FAULTY

NG

2 CHECK FOR ANY FOREIGN OBJECT

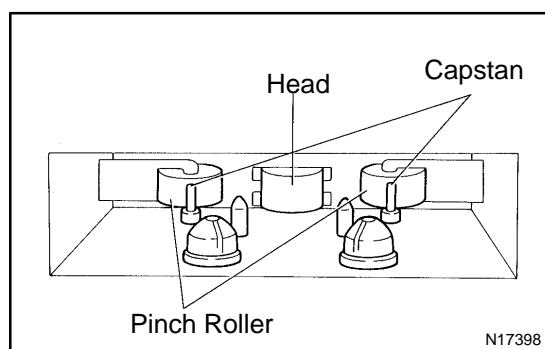
- (a) Check for foreign object.
- (1) Check that no foreign material and troubles are detected in the cassette tape player.

NG

REMOVE FOREIGN OBJECT

OK

3 CLEAN HEAD AND CHECK OPERATION



- (a) Head cleaning
- (1) Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.
- (2) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.
- (3) Check if the same trouble occurs again.

OK

HEAD IS DIRTY

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

TAPE IS TANGLED DUE TO INCORRECT TAPE SPEED OR AUTO-REVERSE MALFUNCTION

INSPECTION PROCEDURE

1 CHECK FOR ANY FOREIGN OBJECT

(a) Check for any foreign object.

- (1) Check that no foreign material or trouble is detected in the radio receiver assembly cassette tape player.

Standard: No foreign material or trouble is detected.

NG → REMOVE FOREIGN OBJECT

OK

2 REPLACE CASSETTE TAPE WITH ANOTHER AND RECHECK(BELOW 90 MIN.)

(a) Replace the cassette tape with another one and recheck.

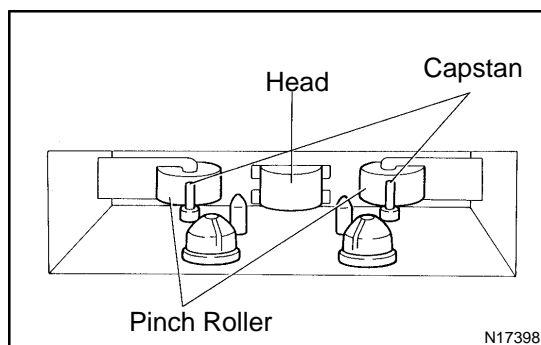
- (1) Replace the faulty cassette tape with a normal one (90 min or less) to see if the same trouble occurs again.

Standard: Malfunction disappears.

OK → CASSETTE TAPE IS FAULTY

NG

3 CLEAN HEAD AND CHECK OPERATION



(a) Head cleaning

- (1) Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.
- (2) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.
- (3) Check if the same trouble occurs again.

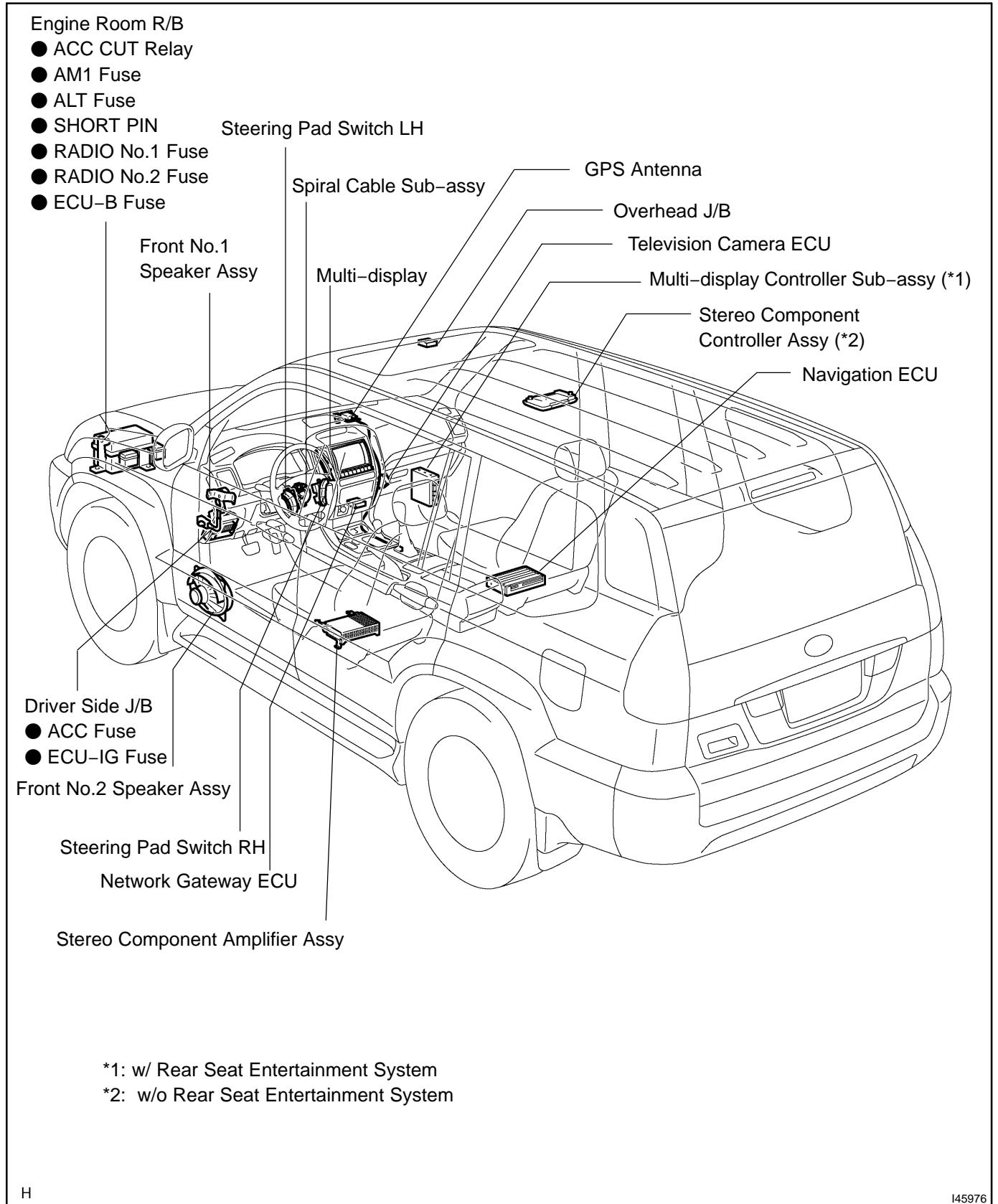
OK → HEAD IS DIRTY

NG

CHECK AND REPLACE RADIO RECEIVER ASSY

LEXUS NAVIGATION SYSTEM LOCATION

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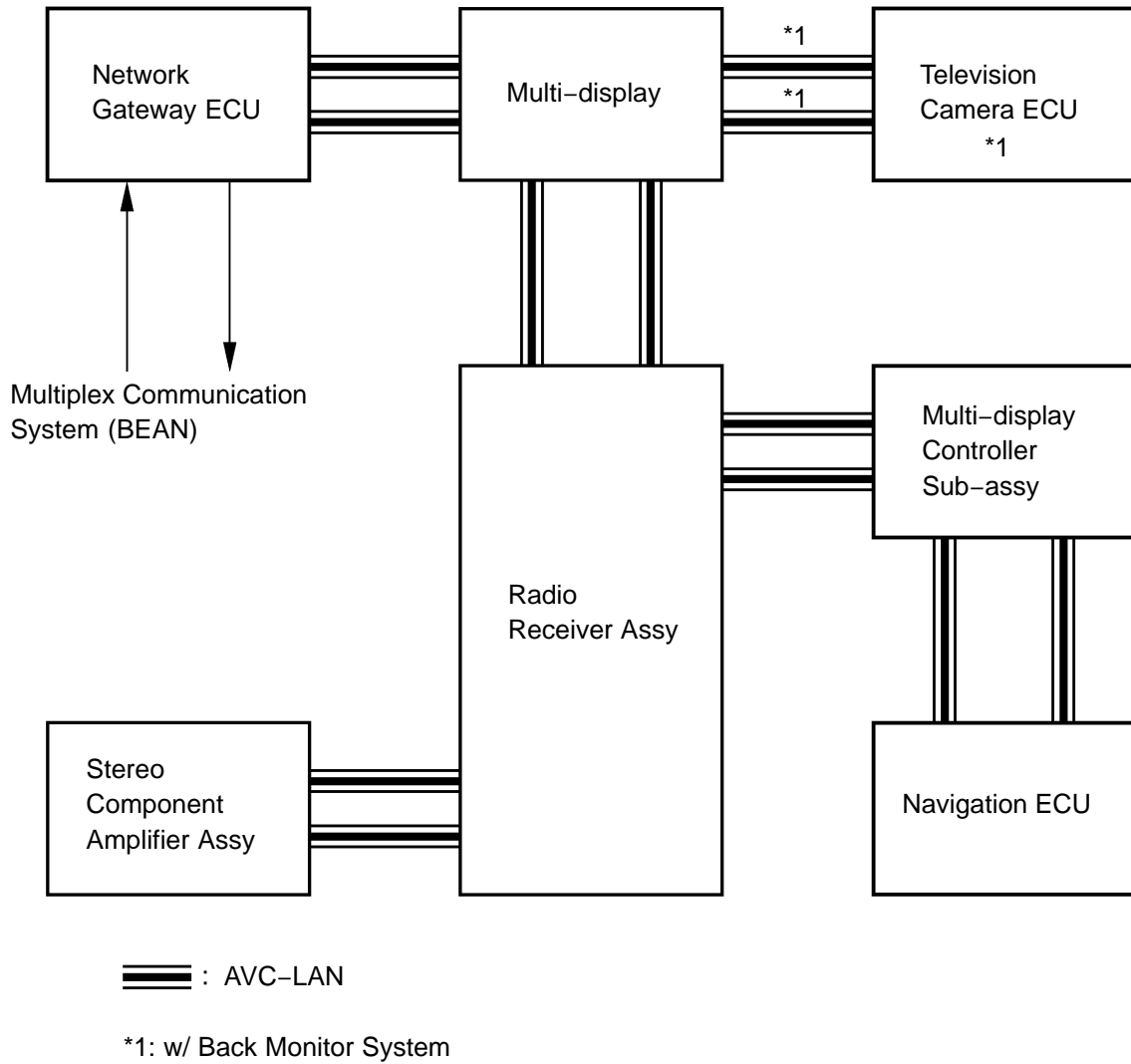


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SYSTEM DIAGRAM

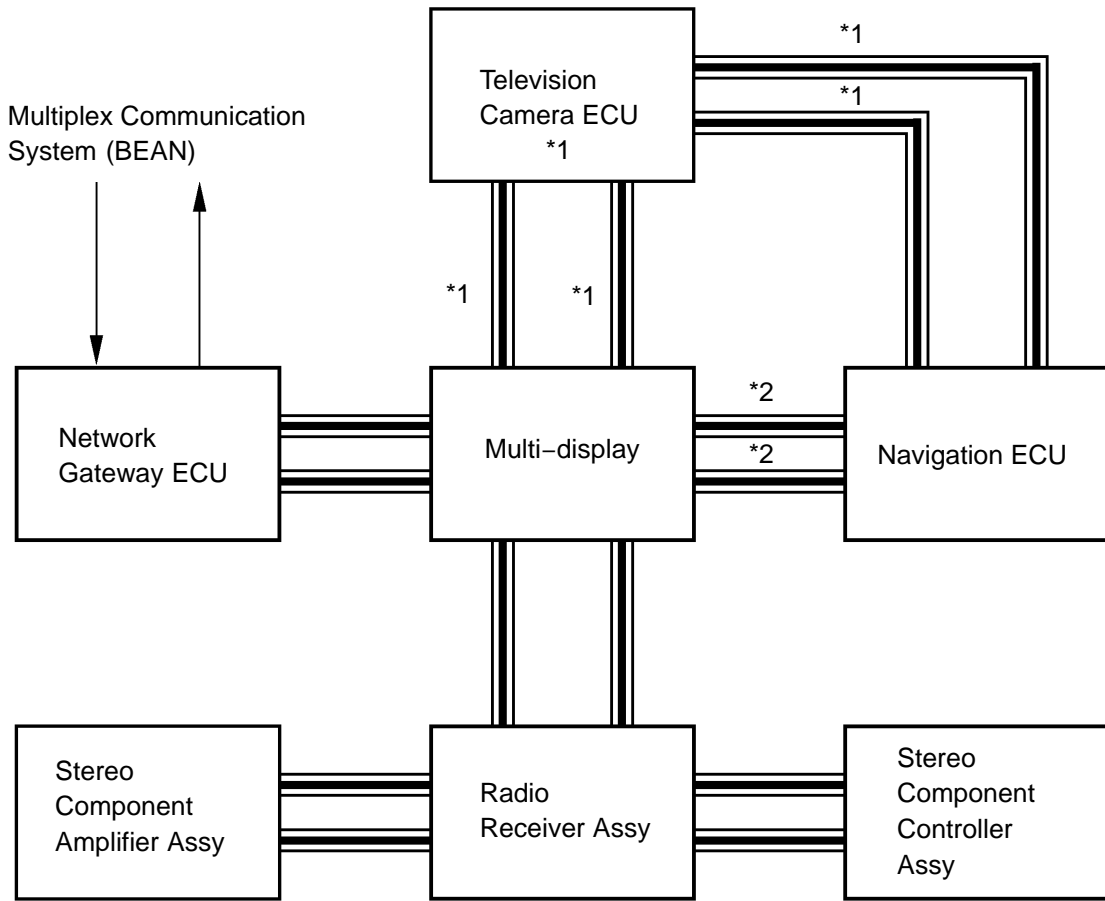
w/ Rear Seat Entertainment System:



N

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w/o Rear Seat Entertainment System:

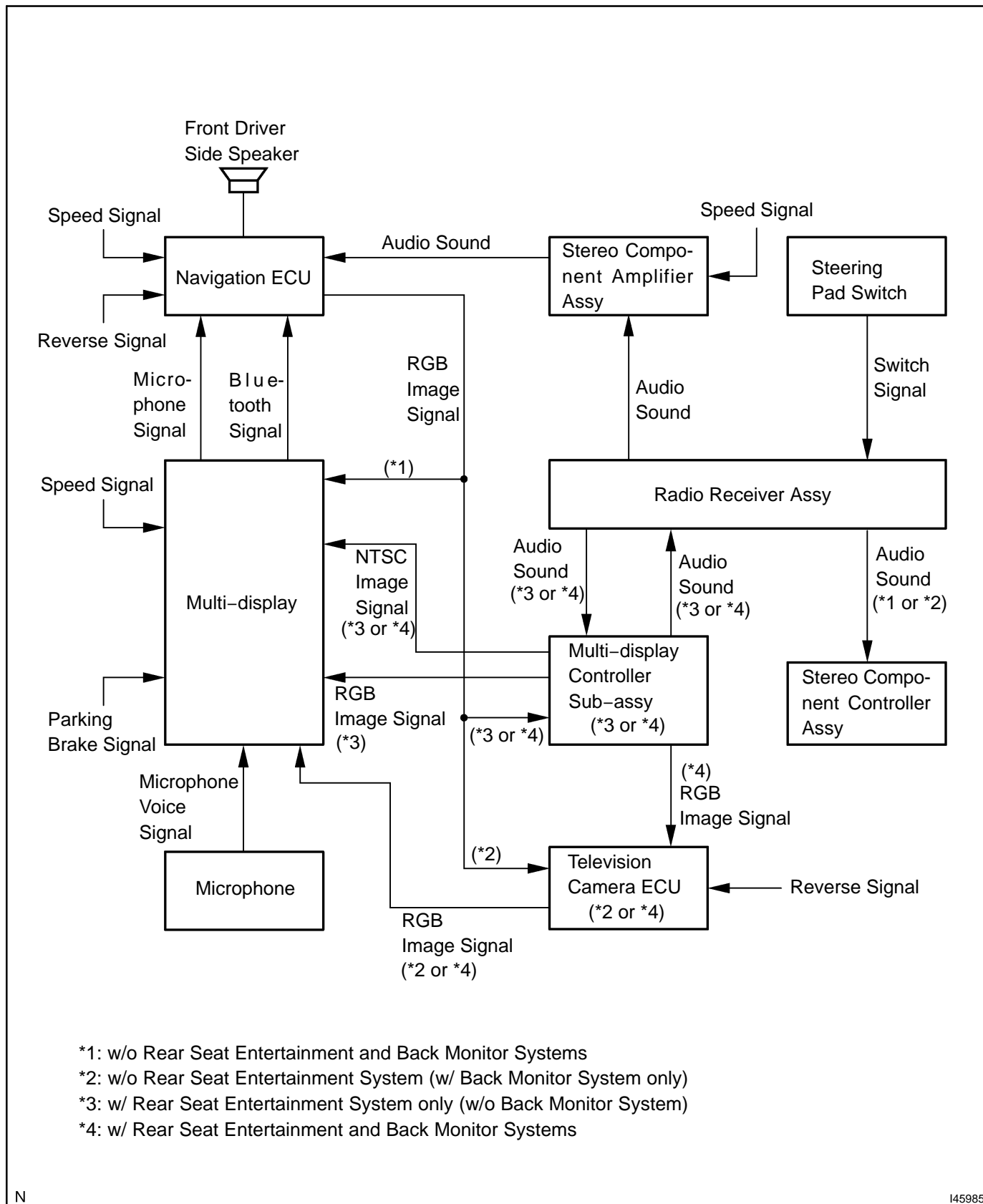


==== : AVC-LAN

*1: w/ Back Monitor System
*2: w/o Back Monitor System

N

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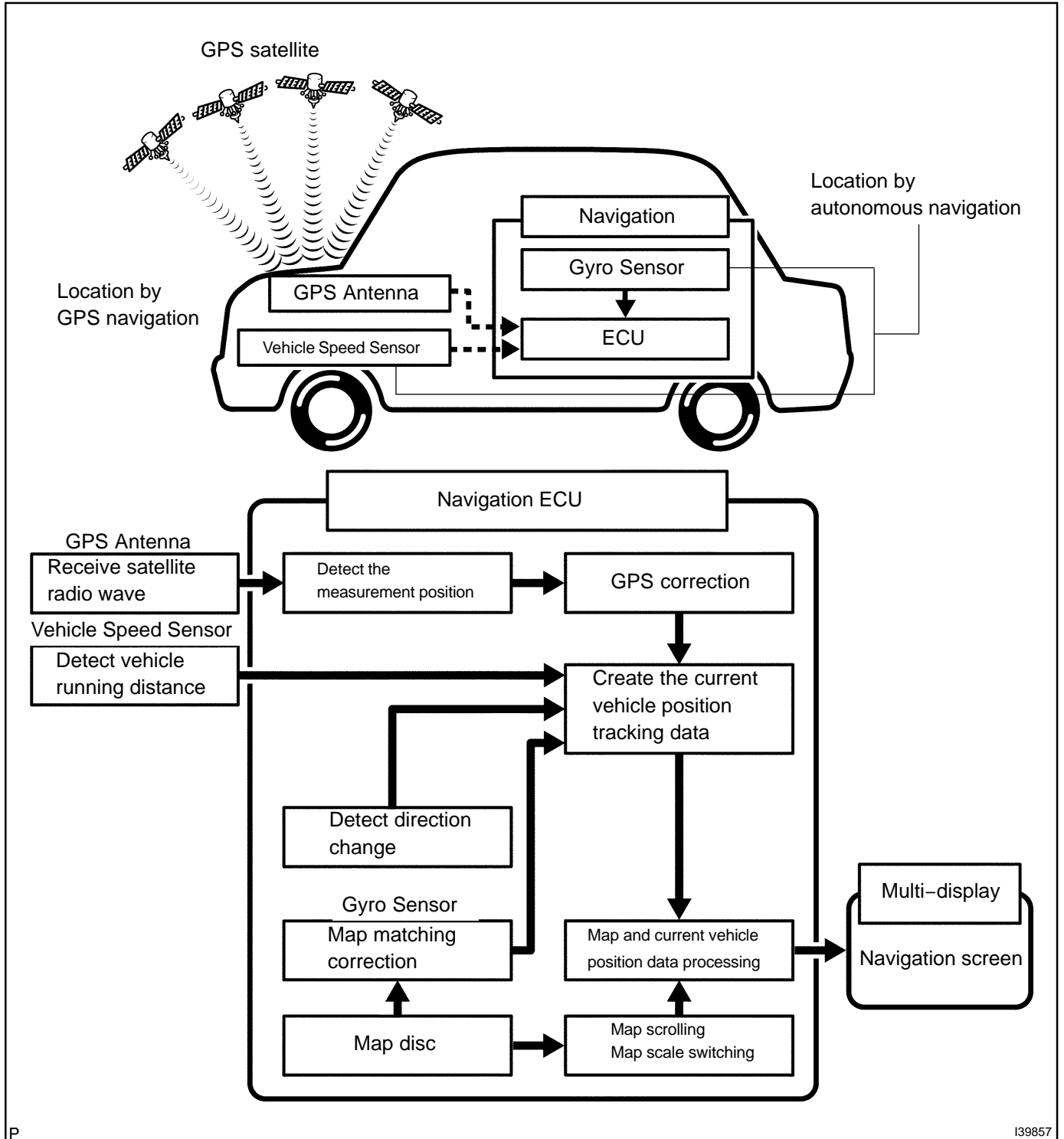
SYSTEM DESCRIPTION

1. Navigation system outline

(a) Vehicle position tracking methods

It is essential that the navigation system correctly tracks the current vehicle position and displays it on the map. There are 2 methods to track the current vehicle position: autonomous (dead reckoning) and GPS* (satellite) navigation. Both navigation methods are used in conjunction with each other.

*GPS (Global Positioning System)



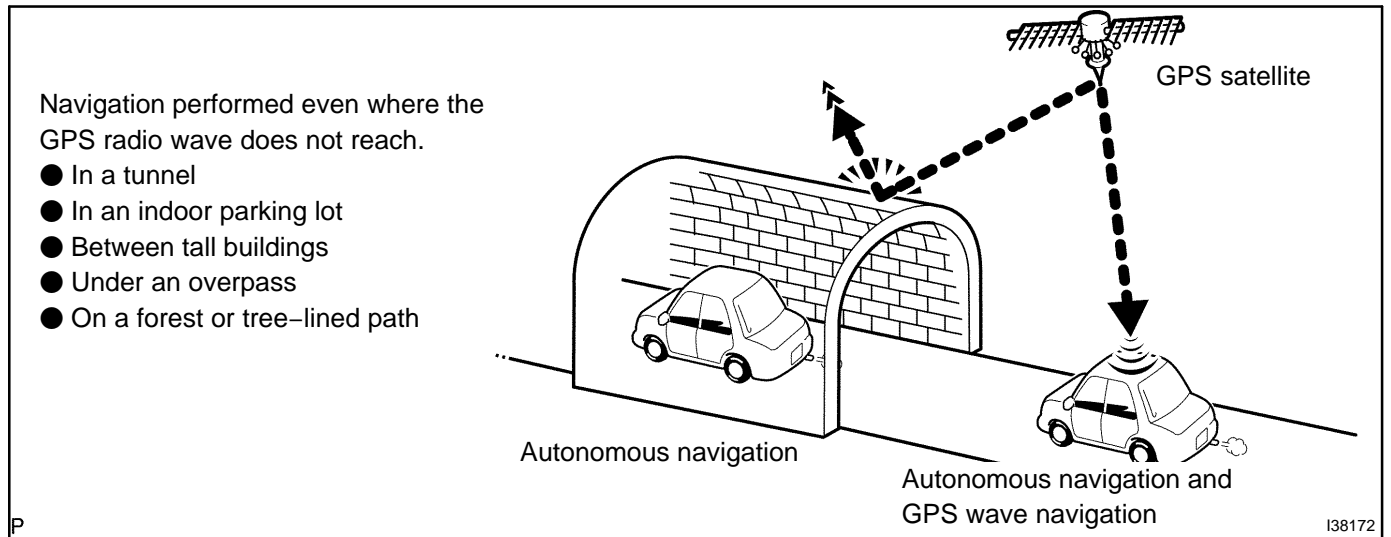
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Operation	Description
Vehicle Position Calculation	The navigation ECU calculates the current vehicle position (direction and current position) using the direction deviation signal from the gyro sensor and the running distance signal from the vehicle speed sensor and creates the driving route.
Map Display Processing	The navigation ECU displays the vehicle track on the map by processing the vehicle position data, vehicle running track, and map data from the map disc.
Map Matching	The map data from the map disc is compared to the vehicle position and running track data. Then, the vehicle position is matched with the nearest road.
GPS Correction	The vehicle position is matched to the position measured by GPS. Then, the measurement position data from the GPS unit is compared with the vehicle position and running track data. If the position is widely different, the GPS measurement position is used.
Distance Correction	The running distance signal from the vehicle speed sensor includes the error caused by tire wear and slippage between the tires and road surface. Distance correction is performed to account for this. The navigation ECU automatically offsets the running distance signal to make up for the difference between it and the distance data of the map. The offset is automatically updated.

HINT:

The combination of autonomous and GPS navigation makes it possible to display the vehicle position even when the vehicle is in places where the GPS radio wave cannot receive a signal. When only autonomous navigation is used, however, the mapping accuracy may slightly decline.



(b) Autonomous navigation

This method determines the relative vehicle position based on the running track determined by the gyro and vehicle speed sensors located in the navigation ECU.

(1) Gyro sensor

Calculates the direction by detecting angular velocity. It is located in the radio and navigation assy.

(2) Vehicle speed sensor

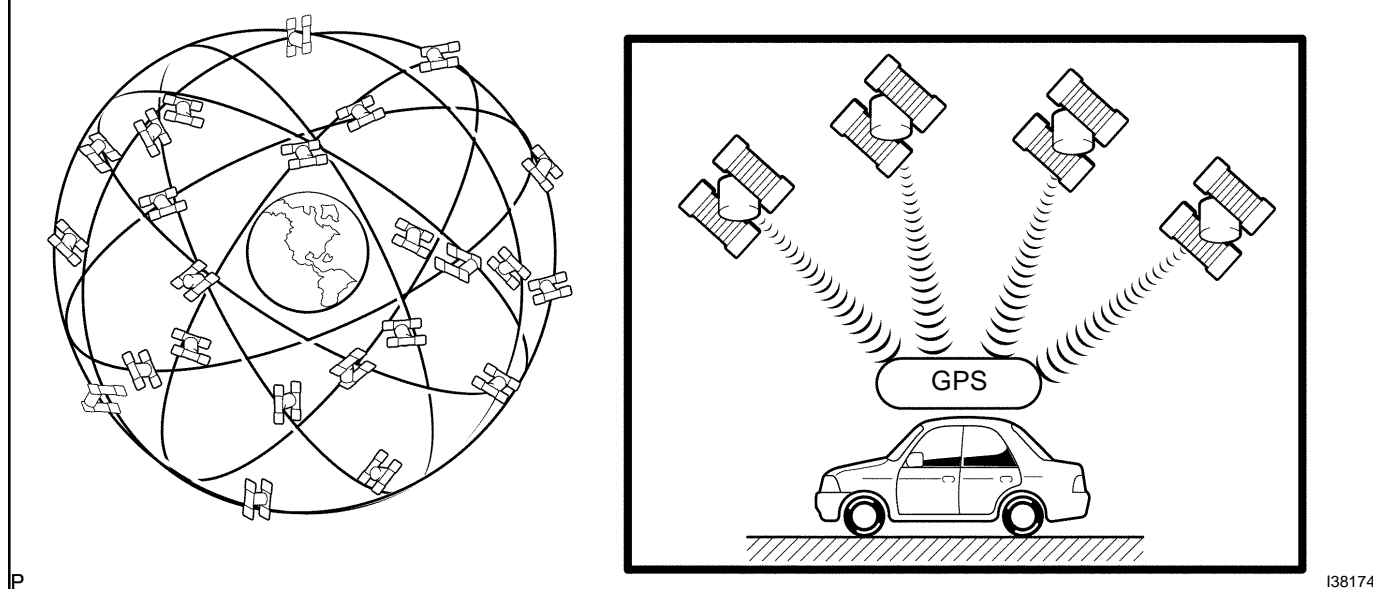
Used to calculate the vehicle running distance.

(c) GPS navigation (Satellite navigation)

This method detects the absolute vehicle position using radio wave from a GPS satellite.

* GPS satellites were launched by the U.S. Department of Defence for military purposes.

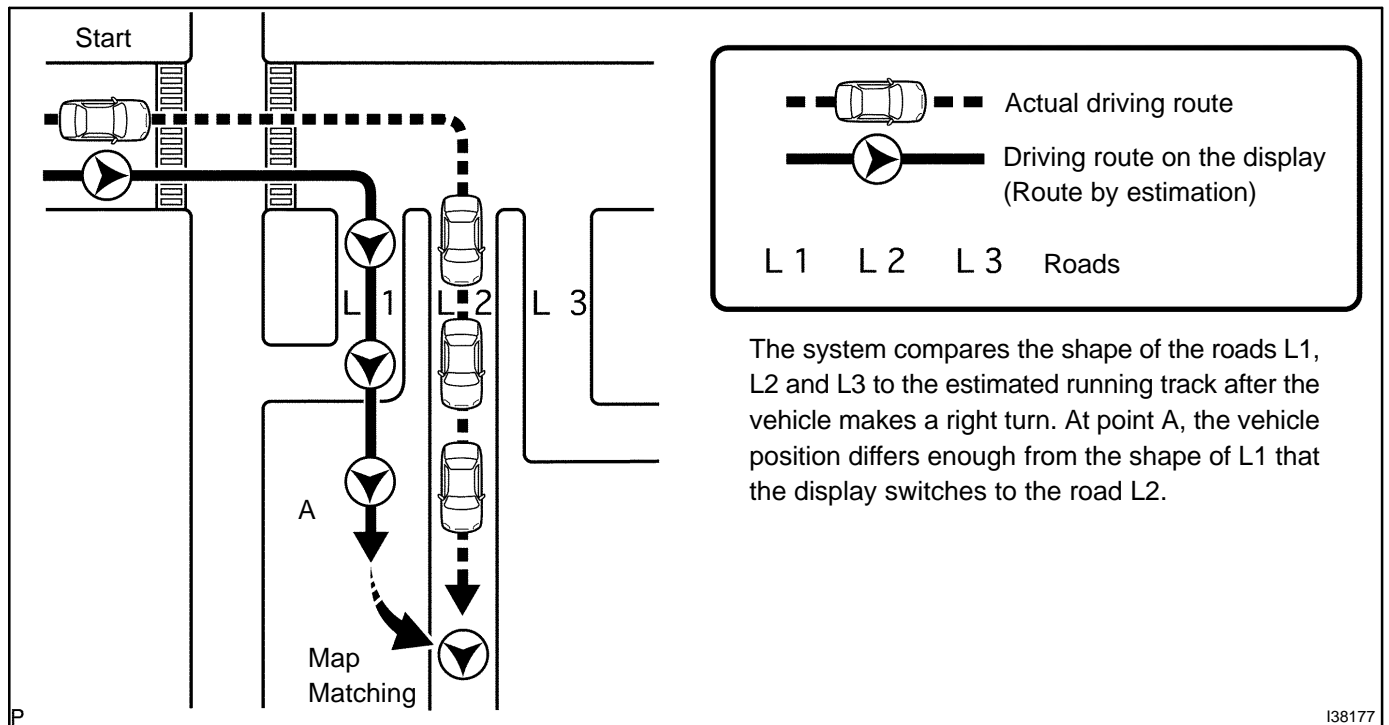
Current longitude/latitude/altitude is determined using the radio wave arrival time from four satellites.



Number of satellites	Measurement	Description
2 or less	Measurement impossible	Vehicle position cannot be obtained because the number of satellites is not enough.
3	2-dimensional measurement is possible	Vehicle position is obtained based on the current longitude and latitude. (This is less precise than 3-dimensional measurement.)
4	3-dimensional measurement is possible	Vehicle position is obtained based on the current longitude, latitude and altitude.

(d) Map matching

The current driving route is calculated by autonomous navigation (according to the gyro sensor and vehicle speed sensor) and GPS navigation. This information is then compared with possible road shapes from the map data in the map disc and the vehicle position is set onto the most appropriate road.



2. DVD (Digital Versatile Disc) player outline (for navigation map)

(a) The navigation ECU uses a laser pickup to read the digital signals recorded on a DVD.

HINT:

- Do not disassemble any part of the navigation ECU.
- Do not apply oil to the navigation ECU.
- Do not insert anything but a DVD into the navigation ECU.

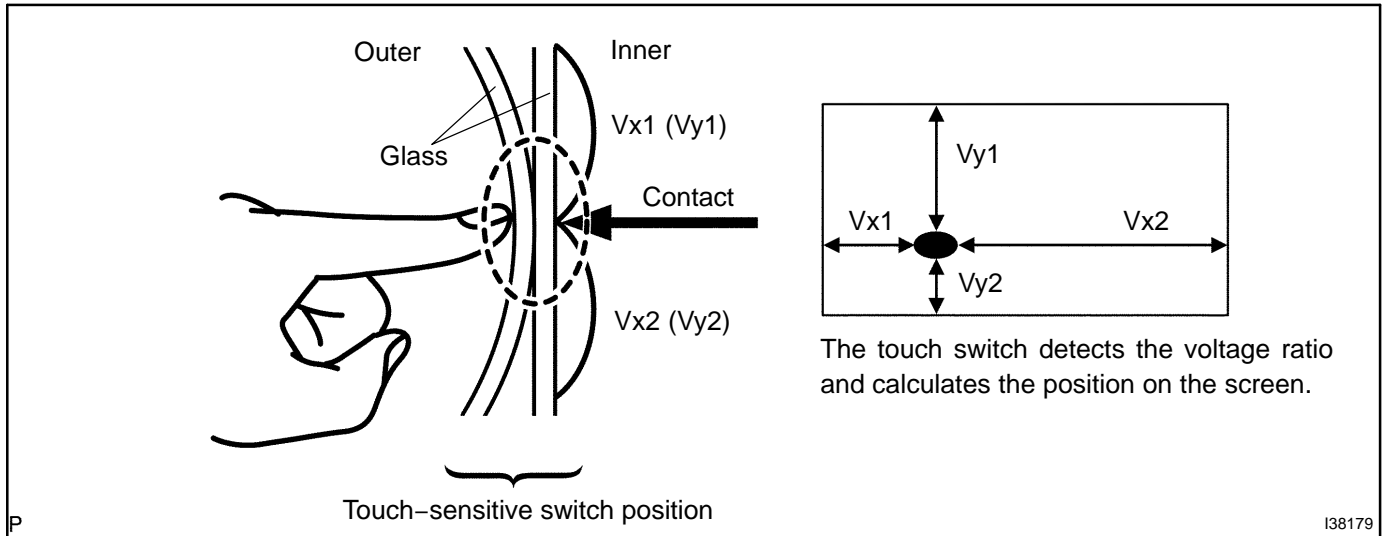
CAUTION:

Do not look directly at the laser pickup because the navigation system uses an invisible laser beam. Be sure to only operate the navigation system as instructed.

3. Multi-display outline

(a) Touch switch

Touch switches are touch-sensitive (interactive) switches operated by touching the screen. When a switch is pressed, the outer glass bends in to contact the inner glass at the pressed position. By doing this, the voltage ratio is measured and the pressed position is detected.

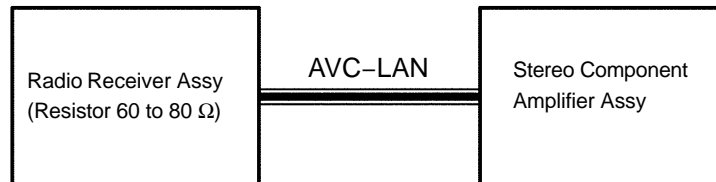


4. AVC-LAN Description

(a) What is AVC-LAN?

AVC-LAN, an abbreviation for "Audio Visual Communication Local Area Network", is a united standard developed by the manufacturers in affiliation with Toyota Motor Corporation. This standard pertains to audio and visual signals as well as switch and communication signals.

Example:



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(b) Purpose:

Recently, car audio systems have rapidly developed and the functions vastly changed. The conventional car audio system is being integrated with multi-media interfaces similar to those in navigation systems. At the same time, customers are demanding higher quality from their audio systems. This is merely an overview of the standardization background. The specific purposes are as follows.

- (1) To solve sound problems, etc. caused by using components of different manufacturers through signal standardization.
- (2) To allow each manufacturer to concentrate on developing products they do best. From this, reasonably priced products can be produced.

HINT:

- If a short to +B or short to ground is detected in the AVC-LAN circuit, communication is interrupted and the audio system will stop functioning.
- If an audio system is equipped with a navigation system, the multi-display unit acts as the master unit. If the navigation system is not equipped, the audio head unit acts as the master unit instead. If the radio and navigation assy is equipped, it is the master unit.
- The radio receiver assy provides resistance to make communication possible.
- The car audio system with an AVC-LAN circuit has a diagnostic function.
- Each component has a specified number (3-digit) called a physical address. Each function has a number (2-digit) called a logical address.

5. Communication system outline

- (a) Components of the navigation system communicate with each other via the AVC-LAN.
- (b) The radio receiver assy has enough resistance (60 to 80 Ω) necessary for communication.
- (c) If a short circuit or open circuit occurs in the AVC-LAN circuit, communication is interrupted and the navigation system will stop functioning.

6. Diagnostic function outline

- (a) The audio system has a diagnostic function (the result is indicated on the master unit).
- (b) A 3-digit hexadecimal component code (physical address) is allocated to each component on the AVC-LAN. Using this code, the component in the diagnostic function can be displayed.

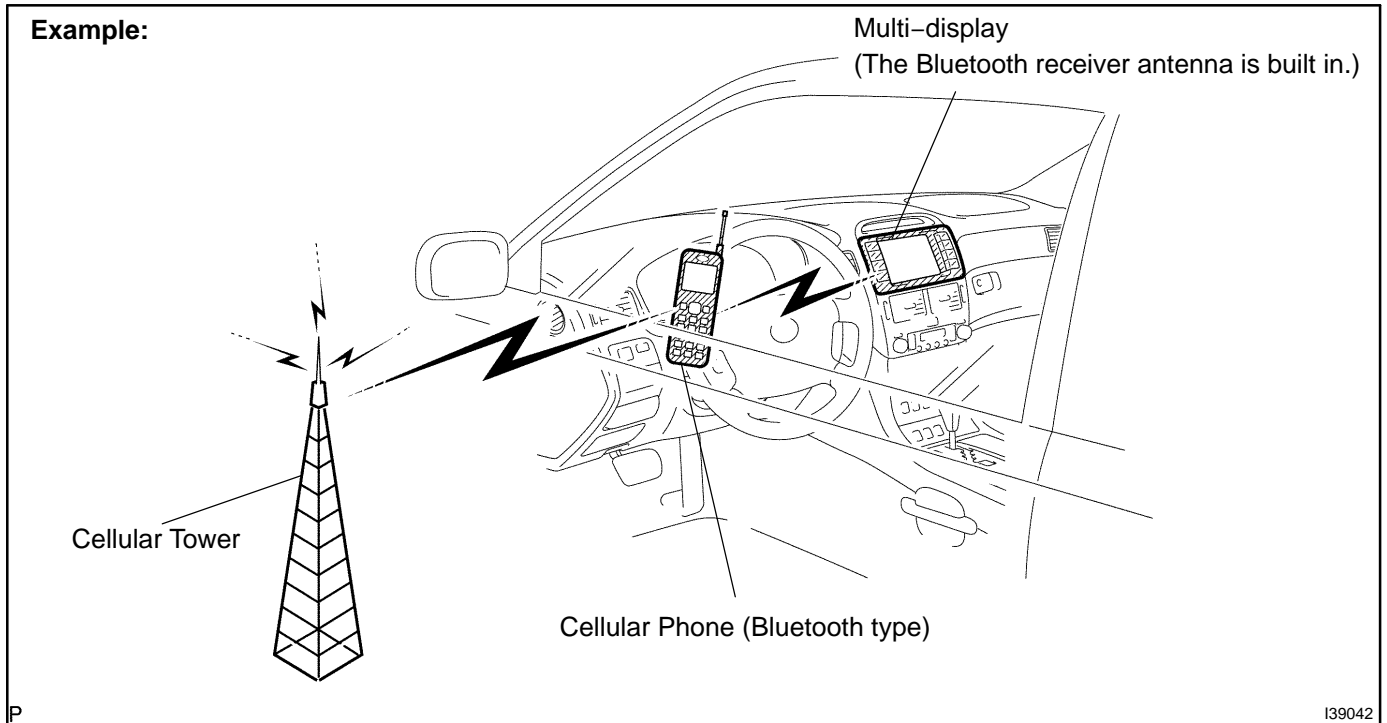
7. Bluetooth outline

- (a) Bluetooth is a new wireless connection technology that uses the 2.4 GHz frequency band. This makes it possible to connect a cellular phone (Bluetooth compatible phone^{*1}) to the multi-display (the Bluetooth system is built in), and use a hands-free function with the cellular phone either in a pocket or bag. As a result, it is not necessary to use a connector attached directly to the cellular phone.

*1: Some versions of Bluetooth compatible cellular phones may not function.

HINT:

The communication performance of Bluetooth may vary depending on obstructions or radio wave conditions between communication devices, electromagnetic radiation, communication device sensitivity, or antenna capacity.



HOW TO PROCEED WITH TROUBLESHOOTING

1 VEHICLE BROUGHT INTO A WORKSHOP

NEXT

2 DIAGNOSTIC QUESTIONING AND SYMPTOM CONFIRMATION (SEE PAGE [05-1724](#))

Ask the customer about symptoms and confirm malfunctions. Fill out the Customer Problem Analysis check sheet.

THE SCREEN DISPLAYS NOTHING (GO TO STEP 6, PROCEED TO "BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION/AUDIO SCREEN)")

OTHER SYMPTOMS (GO TO STEP 3)

3 CONFIRM THE SYSTEM NORMAL CONDITION (SEE PAGE [05-1741](#))

APPLICABLE (THIS IS NOT A MALFUNCTION.)

NOT APPLICABLE (GO TO STEP 4)

4 CHECK THE DIAGNOSTIC TROUBLE CODES (SEE PAGE [05-1753](#))

HINT:

- If the system cannot enter the diagnosis mode, inspect each AVC-LAN communication signal and repair or replace problem parts (see page [05-1882](#) to [05-1899](#)).
- Even if the malfunction symptom is not confirmed, check for diagnostic trouble codes. This is because the system stores past diagnostic trouble codes.
- Refer to the detailed description on the diagnostic screen, as necessary (see page [05-1734](#)).
- Check and clear the past diagnostic trouble codes. Check for diagnostic trouble codes and inspect the areas indicated by the codes.

A CODE IS OUTPUT (GO TO STEP 5)

A CODE IS NOT OUTPUT (GO TO STEP 6)

5 DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE [05-1758](#))

Find the output code in the diagnostic trouble code chart.

NEXT GO TO STEP 8

6	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)
----------	--

Find the applicable symptom code in the problem symptoms table.

HINT:

If the symptom does not recur and no code is output, perform the symptom reproduction method (see page 01-26).

	THERE IS AN APPLICABLE SYMPTOM CODE IN THE TABLE (GO TO STEP 8)
---	--

	THERE IS NO APPLICABLE SYMPTOM CODE IN THE TABLE (GO TO STEP 7)
---	--

7	CHECK THE ECU TERMINAL ARRANGEMENT BASED ON THE MALFUNCTION SYMPTOM (SEE PAGE 05-1747)
----------	---

NEXT

8	CHECK THE CIRCUIT
----------	--------------------------

Adjust, repair or replace as necessary.

NEXT

9	RECHECK THE DIAGNOSTIC TROUBLE CODE (SEE PAGE 05-1756)
----------	---

HINT:

After deleting the DTCs, recheck for diagnostic trouble codes.

NEXT

10	PERFORM CONFIRMATION TEST
-----------	----------------------------------

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

NAVIGATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Date Vehicle Brought in	/ /	Odometer Reading	km mile

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Always <input type="checkbox"/> Intermittently (Times a day)

DTC Check

1st time trouble code

Unit Check Mode		LAN Monitor	
Current	Memory	Code	Sub-Code

2nd time trouble code

Unit Check Mode		LAN Monitor	
Current	Memory	Code	Sub-Code

Problem Symptom

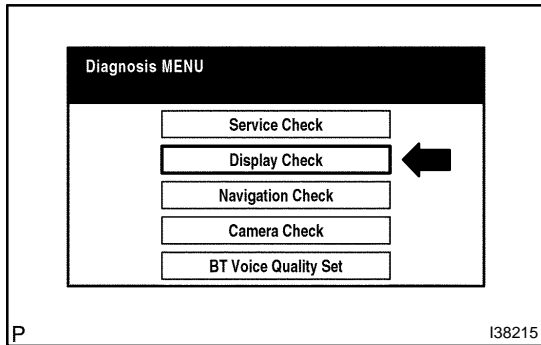
I38696

I39529

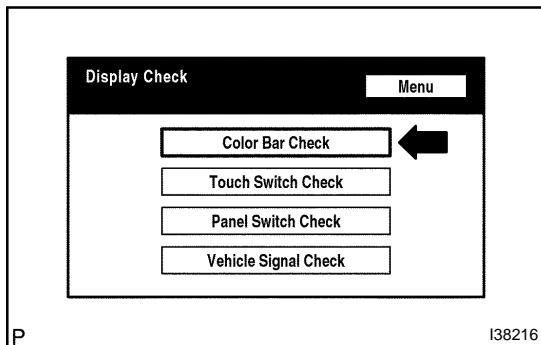
DISPLAY CHECK MODE (COLOR BAR CHECK)

HINT:

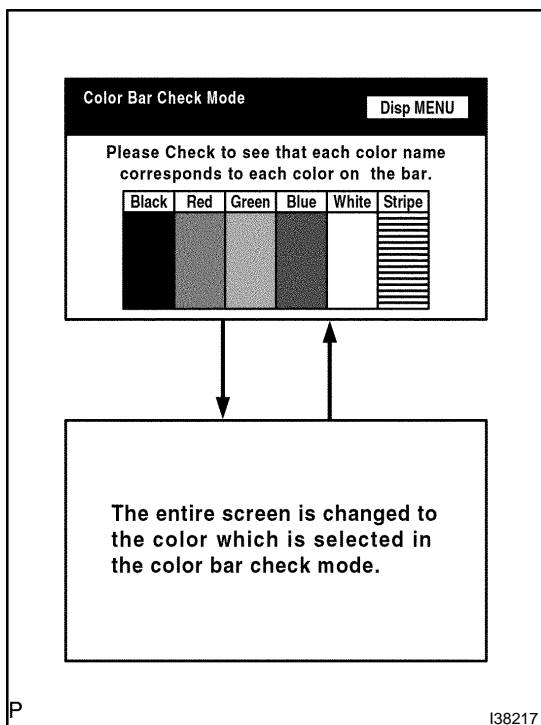
- This mode checks the color display on the multi-display.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
- 1. Enter diagnostic mode (see page 05-1751).**



- 2. Select "Display Check" from the "Diagnosis MENU" screen.**



- 3. Select "Color Bar Check" from the "Display Check" screen.**



- 4. Select a color bar from the "Color Bar Check Mode" screen.**

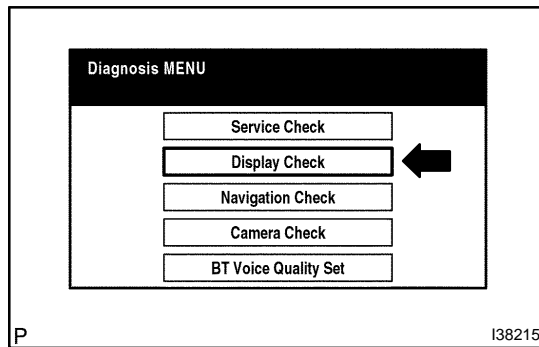
HINT:

- The entire screen turns to the color or stripe selected.
- Touching the display will return to the "Color Bar Check" screen.

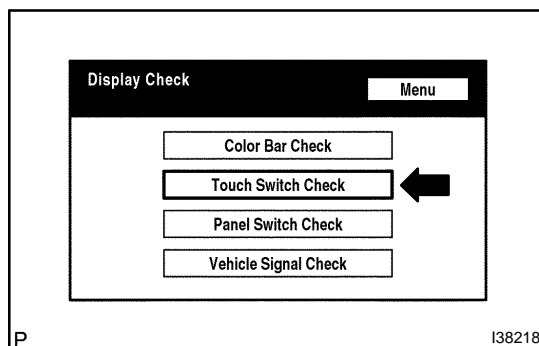
DISPLAY CHECK MODE (TOUCH SWITCH CHECK)

HINT:

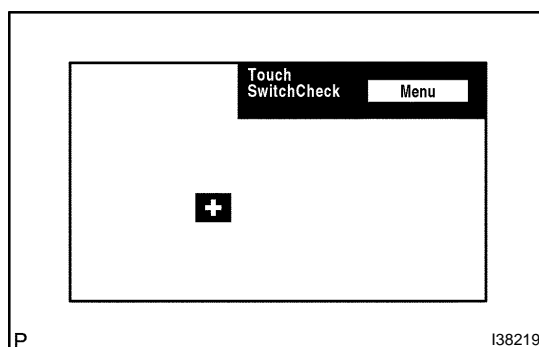
- This mode checks the touch switch operation condition on the multi-display.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page [05-1751](#)).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Touch Switch Check" from the "Display Check" screen.



4. Touch the display anywhere in the open area to perform the check when the "Touch Switch Check" screen is displayed.

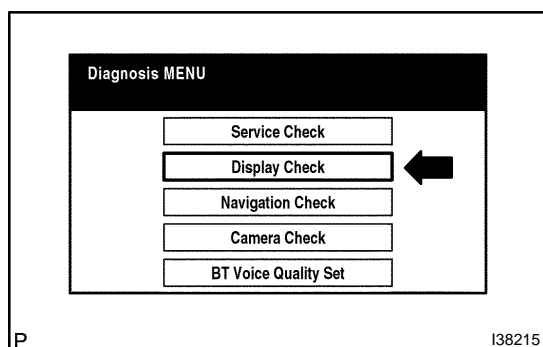
HINT:

- A "+" mark is displayed where the display is touched.
- The "+" mark remains on the display even after the finger is removed.

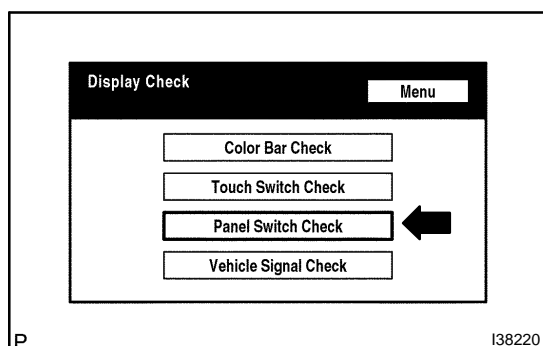
DISPLAY CHECK MODE (PANEL SWITCH CHECK)

HINT:

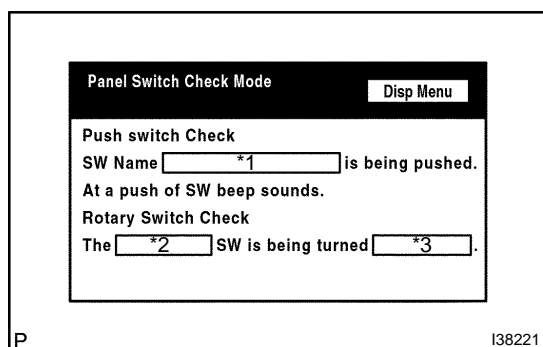
- This mode checks the panel switch operation response on the multi-display.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page [05-1751](#)).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Panel Switch Check" from the "Display Check" screen.



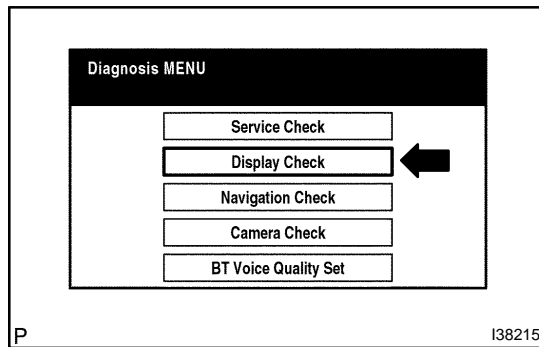
4. Operate each switch and check that the switch name and condition are correctly displayed.

Display	Contents
Push switch name/*1	<ul style="list-style-type: none"> • Name of the pressed switch is displayed. • If more than one switch is pressed, "MULTIPLE" is displayed.
Rotary switch name/*2	Name of the rotary switch is displayed.
Rotary switch direction/*3	Direction of the rotary switch is displayed.

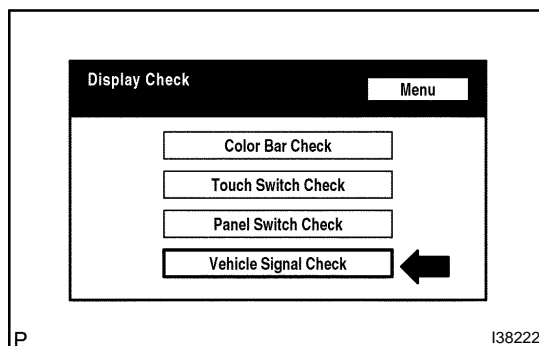
DISPLAY CHECK MODE (VEHICLE SIGNAL CHECK)

HINT:

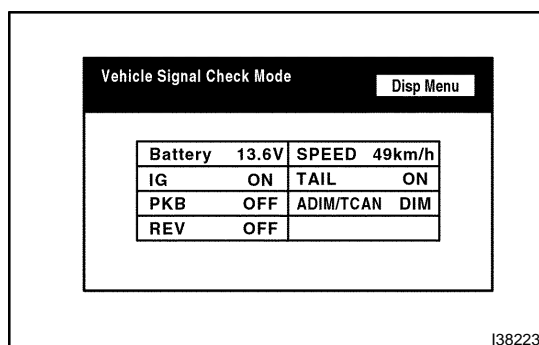
- This mode checks the vehicle signal status input to the multi-display.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page [05-1751](#)).



2. Select "Display Check" from the "Diagnosis MENU" screen.



3. Select "Vehicle Signal Check" from the "Display Check" screen.



4. When the "Vehicle Signal Check Mode" screen is displayed, check all the vehicle signal conditions.

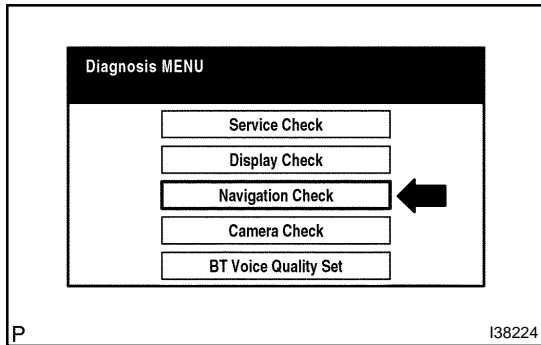
HINT:

- Only conditions having inputs are displayed.
- This screen is updated once per second when input signals to the vehicle are changed.

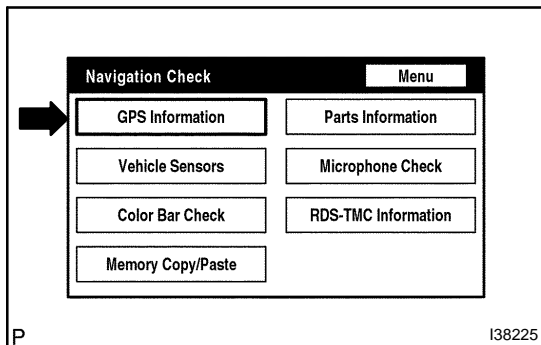
NAVIGATION CHECK MODE (GPS INFORMATION)

HINT:

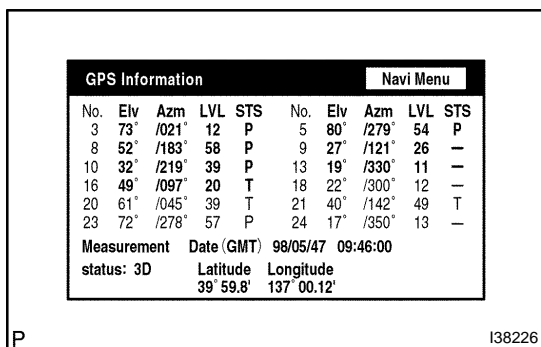
- This mode displays GPS satellite information.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page 05-1751).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "GPS Information" from the "Navigation Check" screen.



4. When GPS information is displayed, check the GPS conditions.

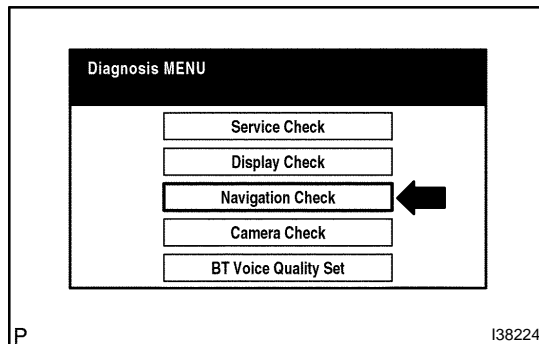
HINT:

This screen is updated once per second when input signals to the vehicle are changed.

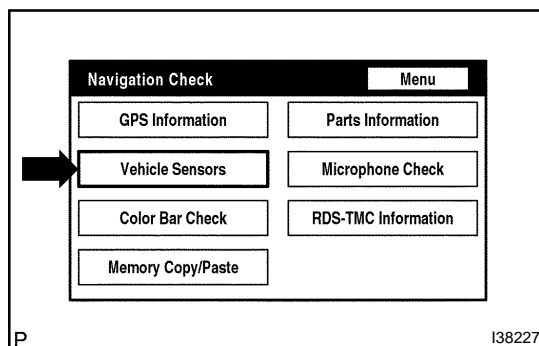
NAVIGATION CHECK MODE (VEHICLE SENSORS)

HINT:

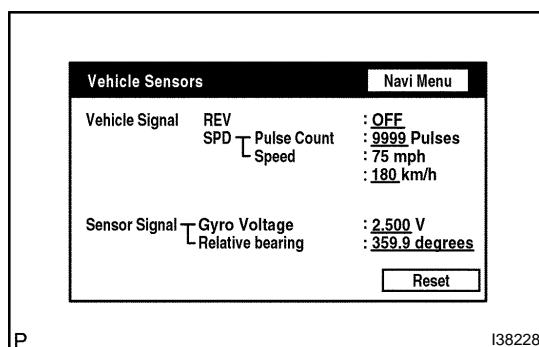
- This mode checks the vehicle signal status input to the navigation ECU.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page [05-1751](#)).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Vehicle Sensors" from the "Navigation Check" screen.



4. Check all the signals and sensors when vehicle signal information is displayed.

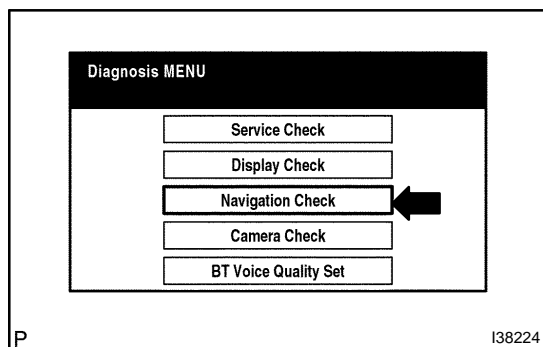
HINT:

This screen is updated once per second when input signals to the vehicle are changed.

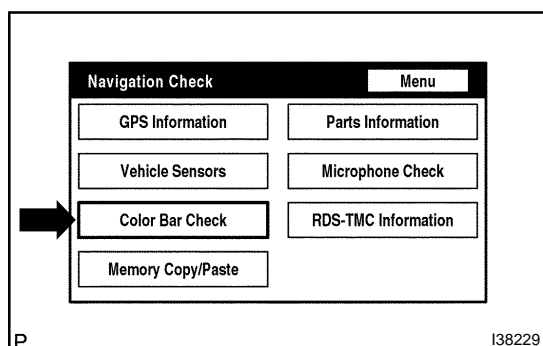
NAVIGATION CHECK MODE (NAVI COLOR BAR CHECK)

HINT:

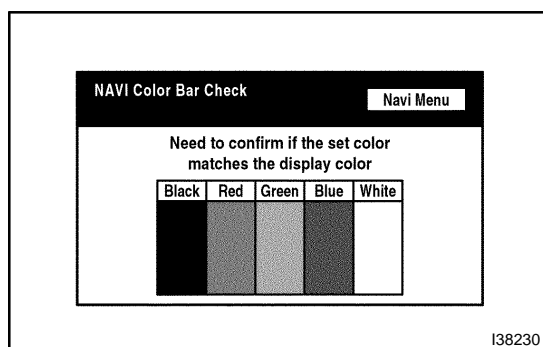
- This mode checks the color display on the navigation ECU.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
1. Enter diagnostic mode (see page [05-1751](#)).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Color Bar Check" from the "Navigation Check" screen.



4. Check each color of the color bar when the "NAVI Color Bar Check" screen is displayed.

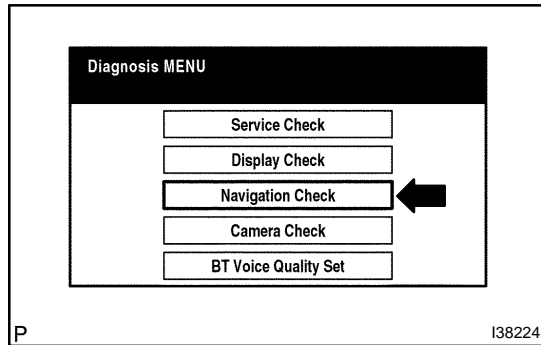
HINT:

Colors will not be displayed full-screen as in "Display Check Mode".

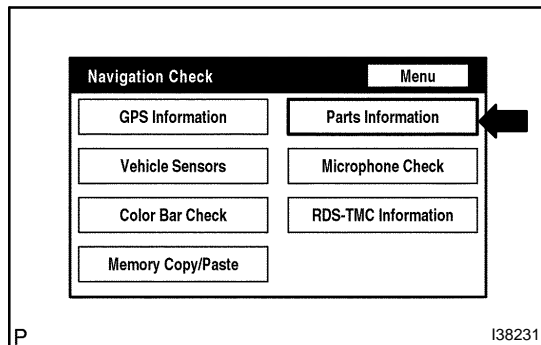
NAVIGATION CHECK MODE (PARTS INFORMATION)

HINT:

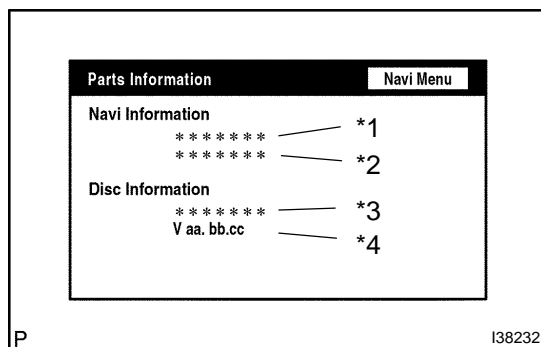
- This mode displays product information on the navigation systems and discs.
 - Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
- 1. Enter diagnostic mode (see page 05-1751).**



- 2. Select "Navigation Check" from the "Diagnosis MENU" screen.**



- 3. Select "Parts Information" from the "Navigation Check" screen.**



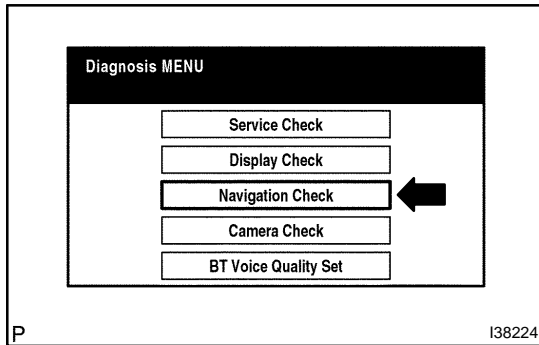
- 4. Check the navigation and disc information when the "Parts Information" screen is displayed.**

Display	Contents
Navigation Manufacturer/*1	Navigation ECU manufacturer name is displayed.
Navigation Version/*2	Navigation ECU version is displayed.
Disc Manufacturer/*3	Map disc manufacturer is displayed.
Disc Version/*4	Map disc version is displayed.

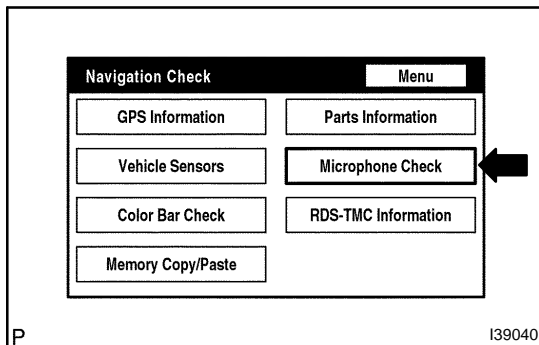
NAVIGATION CHECK MODE (MICROPHONE CHECK)

HINT:

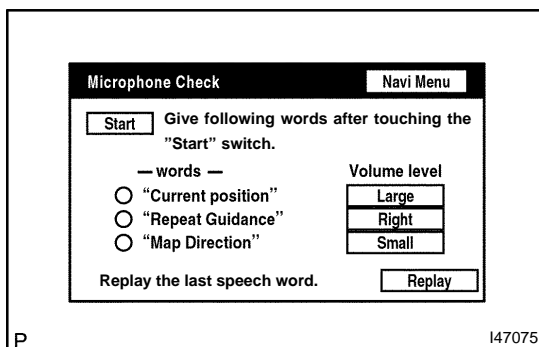
- The microphone is checked in the "Navigation Check (Microphone Check)" mode.
 - Illustrations may differ from the actual vehicle depending on vehicle specifications.
1. Enter diagnostic mode (see page 05-1751).



2. Select "Navigation Check" from the "Diagnosis MENU" screen.



3. Select "Microphone Check" from the "Navigation Check" screen.



4. Perform the microphone check by following the directions on the "Microphone Check" screen.

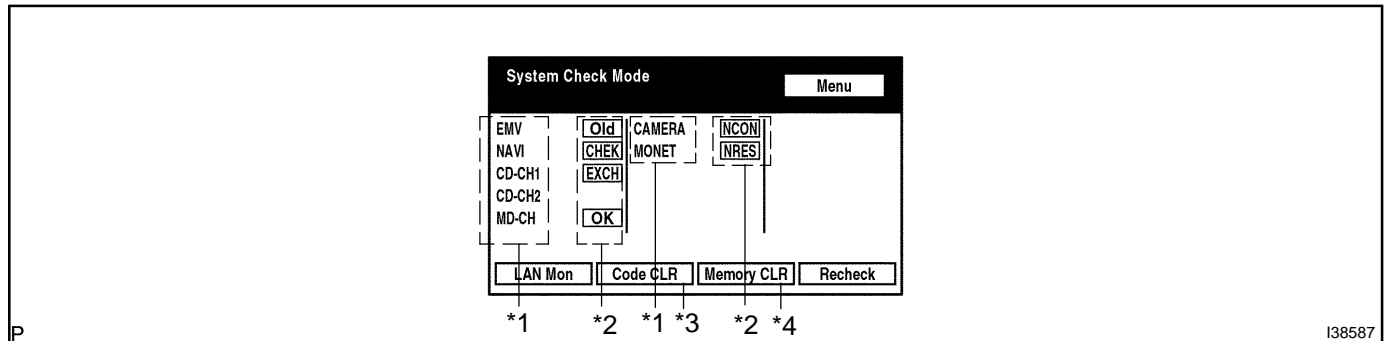
DIAGNOSIS DISPLAY DETAILED DESCRIPTION

HINT:

- This section contains a detailed description of displays within diagnostic mode.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. System Check

(a) System Check Mode Screen



Device Names and Hardware Address/*1

HINT:

- Registered device names are displayed.
- If a device name is unknown to the system, its physical address is shown instead.

Address No.	Name	Address No.	Name
110	EMV	120	AVX
128	1DIN TV	140	AVN
144	G-BOOK	178	NAVI
17C	MONET	190	AUDIO H/U
1AC	CAMERA-C	1B0	Rr-TV
1C0	Rr-CONT	1C2	TV-TUNER2
1C4	PANEL	1C6	G/W
1C8	FM-M-LCD	1D8	CONT-SW
1EC	Body	1F0	RADIO TUNER
1F1	XM	1F2	SIRIUS
230	TV-TUNER	240	CD-CH2
250	DVD-CH	280	CAMERA
360	CD-CH1	3A0	MD-CH
17D	TEL	440	DSP-AMP
530	ETC	5C8	MAYDAY
1A0	DVD-P	1D6	CLOCK
1F4	RSA	1F6	RSE
480	AMP	-	-

Check Result/*2

HINT:

Result codes for all devices are displayed.

Result	Meaning	Action
OK	The device did not respond with a DTC (excluding communication DTCs from the AVC-LAN).	-
EXCH	The device responds with a "replace"-type DTC.	Look up the DTC in "Unit Check Mode" and replace the device.
CHEK	The device responds with a "check"-type DTC.	Look up the DTC in "Unit Check Mode".
NCON	The device was previously present, but does not respond in diagnostic mode.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.
Old	The device responds with an "old"-type DTC.	Look up the DTC in "Unit Check Mode".
NRES	The device responds in diagnostic mode, but gives no DTC information.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.

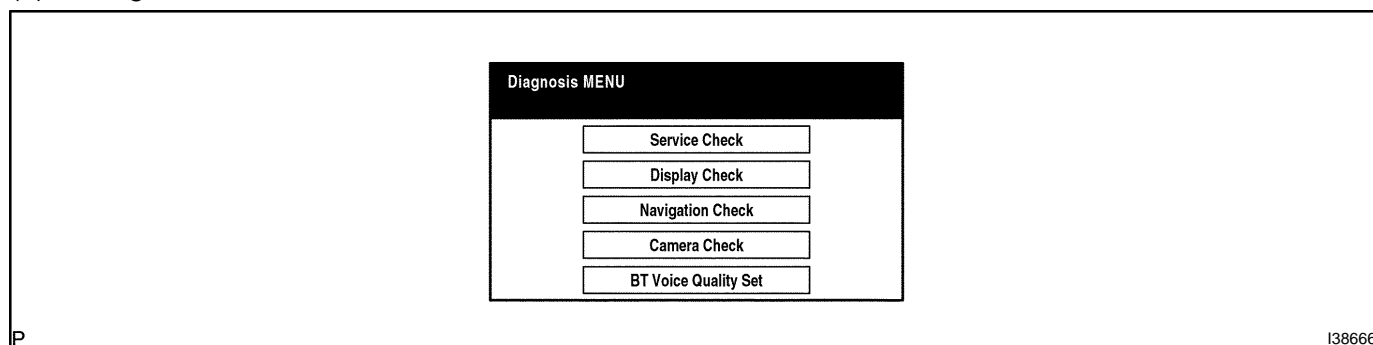
Code Clear/*3

Present DTCs are cleared.

Memory Clear/*4

Present and past DTCs and registered connected device names are cleared.

(b) Diagnosis MENU Screen



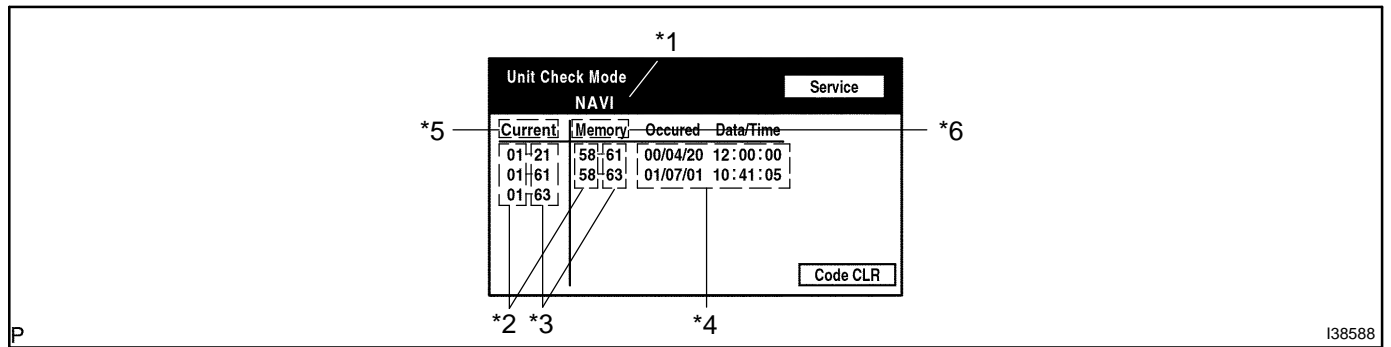
P

I38666

HINT:

Each item is grayed out or not displayed based on the device settings.

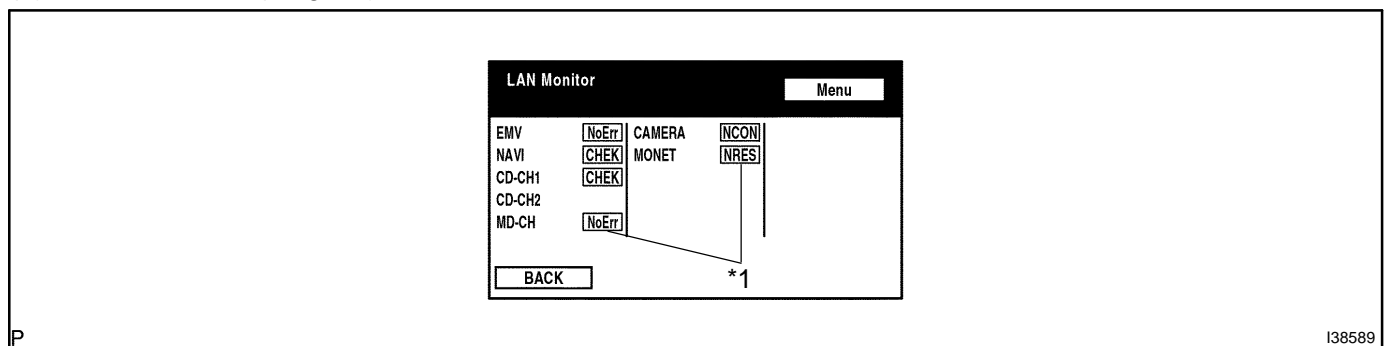
(c) Unit Check Mode Screen



Screen Description

Display	Contents
Device name/*1	Target device
Segment/*2	Target device logical address
DTC/*3	DTC (Diagnostic Trouble Code)
Timestamp/*4	The time and date of past DTCs are displayed. (The year is displayed in 2 digit format.)
Present Code/*5	The DTC output at the service check is displayed.
Past Code/*6	Diagnostic memory results and recorded DTCs are displayed.

(d) LAN Monitor (Original) Screen



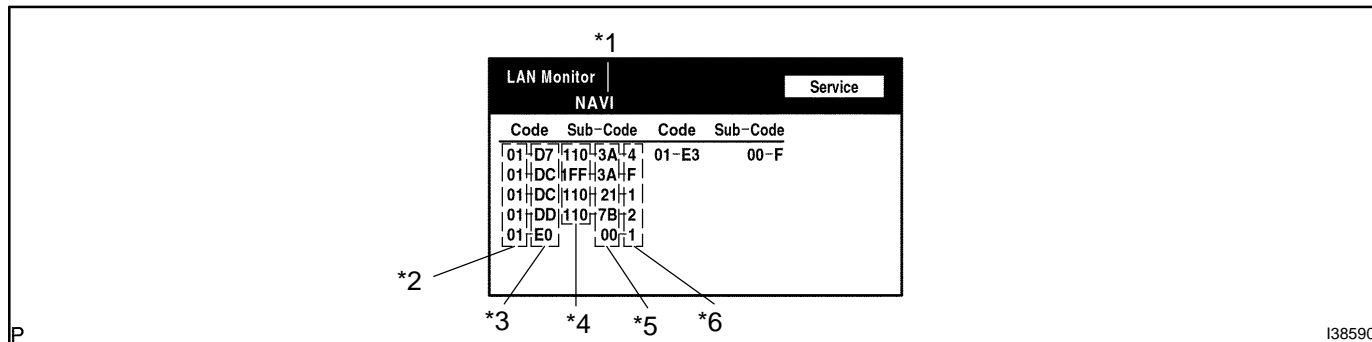
Check Result

HINT:

Check results of all the devices are displayed.

Result	Meaning	Action
No Err (OK)	There are no communication DTCs.	-
CHEK	The device responds with a "check"-type DTC.	Look up the DTC in "Unit Check Mode".
NCON	The device was previously present, but does not respond in diagnostic mode.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.
Old	The device responded with an "old"-type DTC.	Look up the DTC in "Unit Check Mode".
NRES	The device responds in diagnostic mode, but gives no DTC information.	1. Check power supply wire harness of the device. 2. Check the AVC-LAN of the device.

(e) LAN Monitor (Individual) Screen

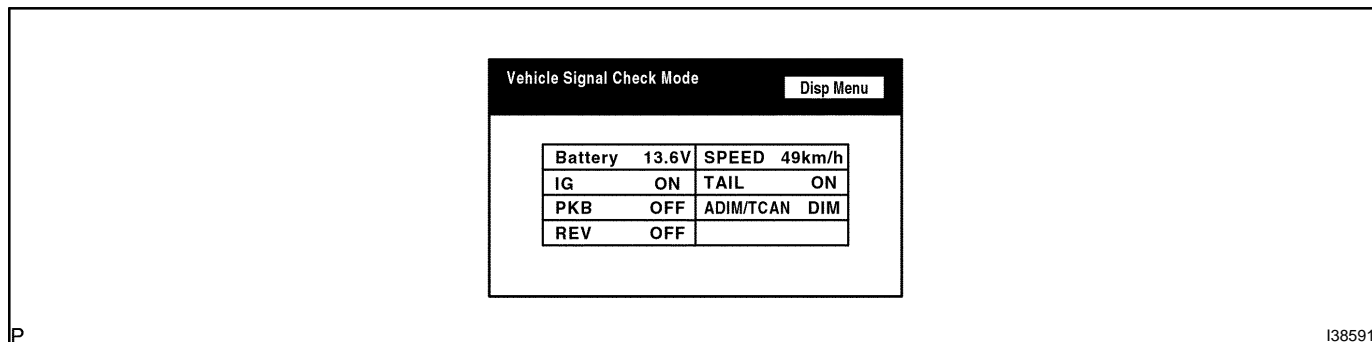


Screen Description

Display	Contents
Device name/*1	Target device
Segment/*2	Target logical address
DTC/*3	DTC (Diagnostic Trouble Code)
Sub-code (device address)/*4	Physical address stored with DTC (If there is no address, nothing is displayed.)
Connection check No./*5	Connection check number stored with DTC
DTC occurrence/*6	Number of times the same DTC has been recorded

2. DISPLAY CHECK

(a) Vehicle Signal Check Mode Screen



Screen Description

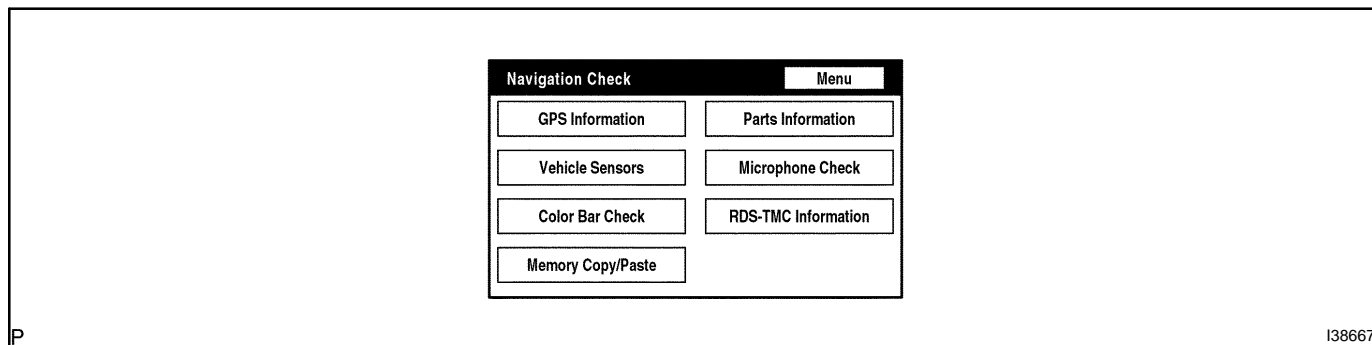
Name	Contents
Battery	Battery voltage is displayed.
PKB	Parking brake ON/OFF state is displayed.
REV	Reverse signal ON/OFF state is displayed.
IG	IG switch ON/OFF state is displayed.
ADIM/TCAN	Brightness state DIM (with)/BRIGHT (without) is displayed.
SPEED	Vehicle speed is displayed in km/h.
TAIL	TAIL signal (Head lamp dimmer switch) ON/OFF state is displayed.

HINT:

- Only items sending a vehicle signal will be displayed.
- This screen is updated once per second when input signals to the vehicle are changed.

3. NAVIGATION CHECK

(a) Navigation Check Screen

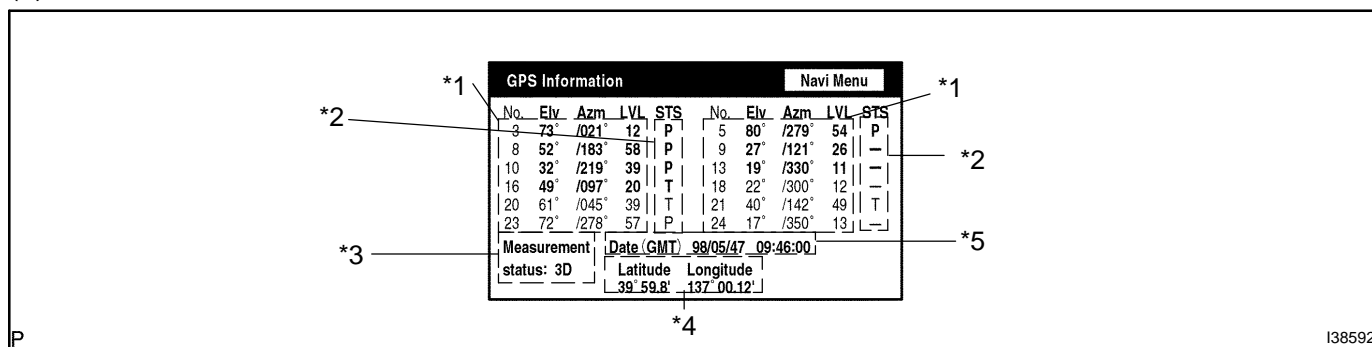


I38667

HINT:

Each item is grayed out or not displayed based on the device settings.

(b) GPS Information Screen



I38592

Satellite information/*1

Information from a maximum of 12 satellites is displayed on the screen. This information includes the target GPS satellite number, elevation angle, direction and signal level.

Receiving condition/*2

(DENSO model)

Display	Contents
T	The system is receiving a GPS signal, but is not using it for location.
P	The system is using the GPS signal for location.
-	The system cannot receive a GPS signal.

(AISIN AW model)

Display	Contents
01H	The system cannot receive a GPS signal.
02H	The system is tracing a satellite.
03H	The system is receiving a GPS signal, but is not using it for location.
04H	The system is using the GPS signal for location.

Measurement information/*3

Display	Contents
2D	2-dimensional location method is being used.
3D	3-dimensional location method is being used.
NG	Location data cannot be used.
Error	Reception error has occurred.
-	Any other state.

Position information/*4

Display	Contents
Position	Latitude and longitude information on the current position is displayed.

Date information/*5

Display	Contents
Date	The date/time information obtained from GPS signal is displayed in Greenwich mean time (GMT). The last 4 digits are displayed.

(c) Vehicle Sensors Screen

The screenshot shows the 'Vehicle Sensors' screen with a 'Navi Menu' button. It displays the following information:

- Vehicle Signal**: REV (OFF) - *1
- SPD**: Pulse Count (9999 Pulses) - *2
- Speed**: 75 mph / 180 km/h - *2
- Sensor Signal**: Gyro Voltage (2.500 V) - *3
- Relative bearing**: 359.9 degrees - *3

A 'Reset' button is located at the bottom of the screen. The letter 'P' is in the bottom left corner, and 'I38593' is in the bottom right corner.

Vehicle signal

Display	Contents
REV/*1	REV signal ON/OFF state is displayed.
SPD/*2	SPD signal condition is displayed.

Sensor signal

Display	Contents
Gyro sensor/*3	Gyro sensor output condition is displayed (when the vehicle runs straight or is stationary, the voltage is approximately 2.5 V).

HINT:

Signals are updated once per second only when vehicle sensor signals are changed.

(d) Parts Information Screen

The screenshot shows the 'Parts Information' screen with a 'Navi Menu' button. It displays the following information:

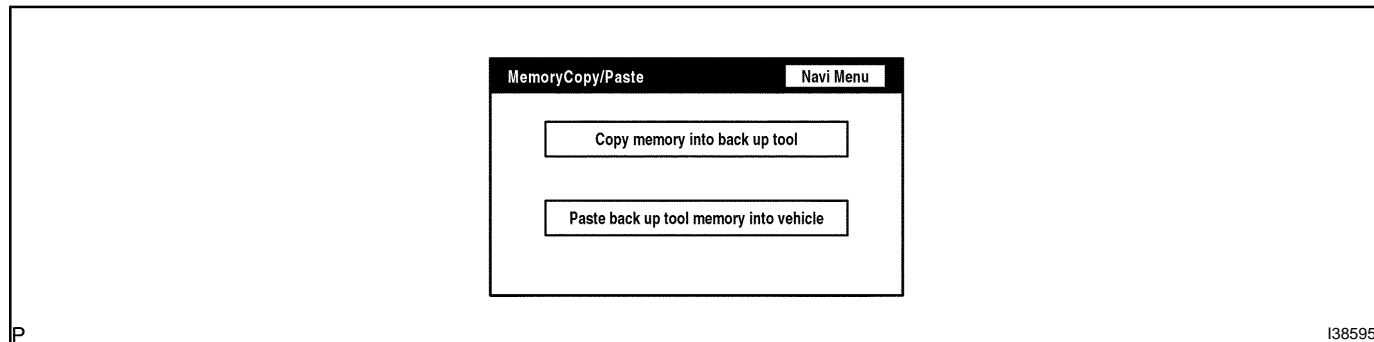
- Navi Information**: ***** - *1
- Navi Information**: ***** - *2
- Disc Information**: ***** - *3
- Disc Information**: V aa. bb.cc - *4

The letter 'P' is in the bottom left corner, and 'I38594' is in the bottom right corner.

Screen description

Display	Contents
Navigation Manufacturer/*1	Navigation ECU manufacturer is displayed.
Navigation Version No./*2	Navigation ECU version is displayed.
Disc Manufacturer/*3	Map disc manufacturer is displayed.
Disc Version No./*4	Map disc version is displayed.

(e) Memory Copy/Paste Screen



HINT:

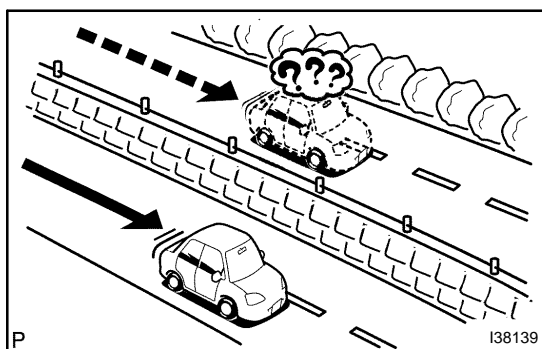
This function cannot be used.

SYSTEM NORMAL CONDITION CHECK

1. CHECK NORMAL CONDITION

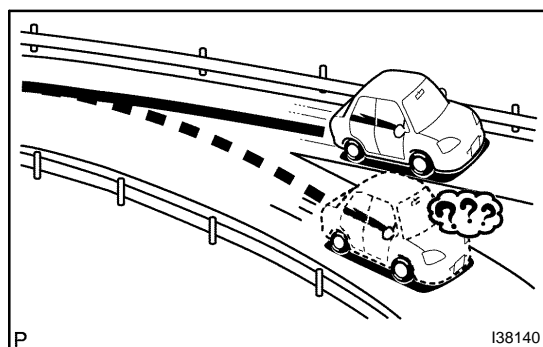
(a) If the symptom is applicable to any of the following, it is intended behavior, and not a malfunction.

Symptom	Answer
A longer route than expected is chosen.	Depending on the road conditions, the navigation ECU may determine that a longer route is quicker.
Even when distance priority is high, the shortest route is not shown.	Some paths may not be advised due to safety concerns.
When the vehicle is put into motion immediately after the engine starts, the navigation system deviates from the actual position.	If the vehicle starts before the navigation system activates, the system may not react.
When running on certain types of roads, especially new roads, the vehicle position deviates from the actual position.	When the vehicle is driving on new roads not available on the map disc, the system attempts to match it to another nearby road, causing the position mark to deviate.

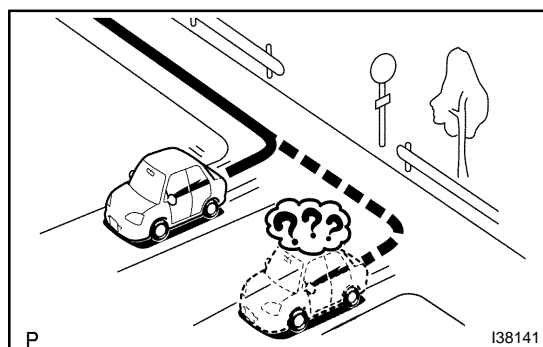


(b) The following symptoms are not a malfunction, but are caused by errors inherent in the GPS, gyro sensor, speed sensor, and navigation ECU.

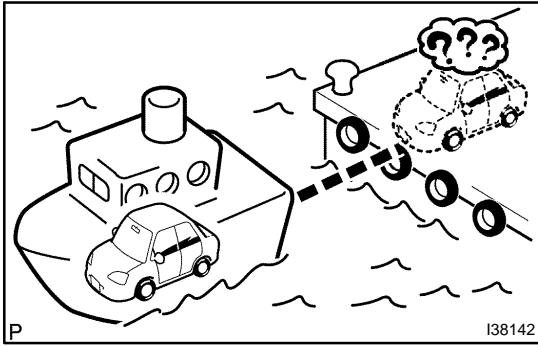
(1) The current position mark may be displayed on a nearby parallel road.



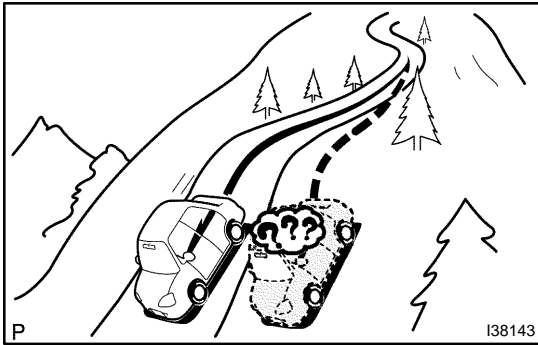
(2) Immediately after a fork in the road, the current vehicle position mark may be displayed on the wrong road.



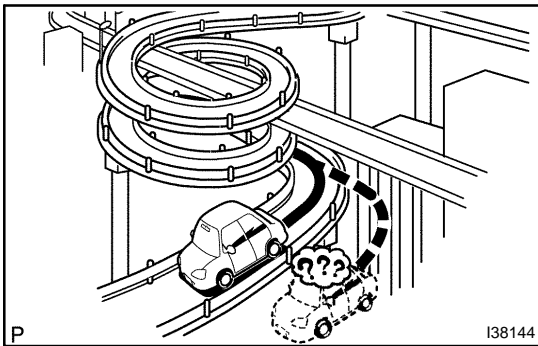
(3) When the vehicle turns right or left at an intersection, the current vehicle position mark may be displayed on a nearby parallel road.



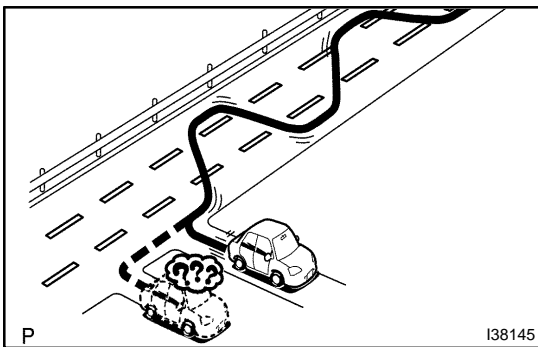
- (4) When the vehicle is carried, such as on a ferry, and the vehicle itself is not running, the current vehicle position mark may be displayed in the position where the vehicle was until a measurement can be performed by GPS.



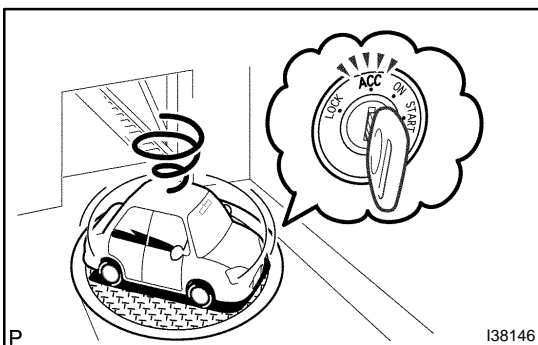
- (5) When the vehicle runs on a steep hill, the current vehicle position mark may deviate from the correct position.



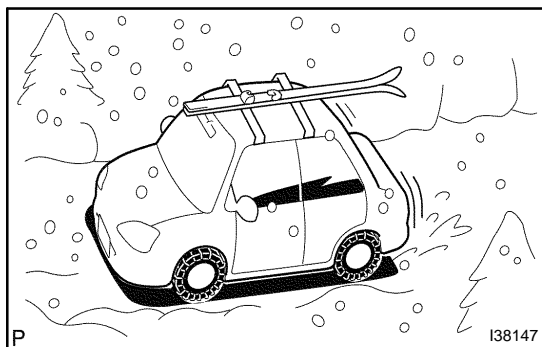
- (6) When the vehicle makes a continuous turn of 360, 720, 1,080, etc. degrees, the current vehicle position mark may deviate from the correct position.



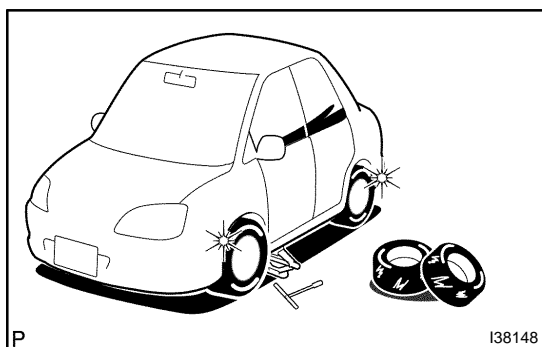
- (7) When the vehicle moves erratically, such as constant lane changes, the current vehicle position mark may deviate from the correct position.



- (8) When the ignition switch is turned to the ACC or ON position on a turntable before parking, the current vehicle position mark may not point in the correct direction. The same will occur when the vehicle comes out of parking.



- (9) When the vehicle runs on a snowy road or a mountain path with the chains installed or using a spare tire, the current vehicle position mark may deviate from the correct position.



- (10) When a tire is changed, the current vehicle position mark may deviate from the correct position.

HINT:

- Diameter of the tire may change, causing a speed sensor error.
- Performing the "tire change" in calibration mode will allow the system to correct the current vehicle position faster.

PROBLEM SYMPTOMS TABLE

HINT:

- Before performing verification listed in the table below, check the fuse and relay.
- Methods used to verify the cause of the problem are listed in order of probability in the verification column.

Display function

Symptom	Verification	See page
Black screen (No image appears on navigation/audio screen).	<ol style="list-style-type: none"> 1. "BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION AND AUDIO SCREEN)" 2. Dimmer signal circuit 3. Power source circuit (multi-display) 4. Replace multi-display 	05-1774 05-1827 05-1808 67-12
Illumination for panel switch does not come on with TAIL switch on.	<ol style="list-style-type: none"> 1. "ILLUMINATION FOR PANEL SWITCH DOES NOT COME ON WITH TAIL SWITCH ON" 2. Illumination circuit 3. Replace multi-display 	05-1775 05-1824 67-12
Display does not dim (Night Screen) with TAIL switch on.	<ol style="list-style-type: none"> 1. "DISPLAY DOES NOT DIM (NIGHT SCREEN) WITH TAIL SWITCH ON" 2. Dimmer signal circuit 3. Replace multi-display 	05-1776 05-1827 67-12
Power does not turn off (Screen remains on).	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. Replace multi-display 	05-1808 67-12
Panel switch does not function.	<ol style="list-style-type: none"> 1. "PANEL SWITCH DOES NOT FUNCTION" 2. Steering pad switch circuit 3. Power source circuit (multi-display) 4. Replace multi-display 	05-1777 05-1844 05-1808 67-12
Touch panel switch does not function.	<ol style="list-style-type: none"> 1. "TOUCH PANEL SWITCH DOES NOT FUNCTION" 2. Steering pad switch circuit 3. Power source circuit (multi-display) 4. Replace multi-display 	05-1778 05-1844 05-1808 67-12
Navigation screen is not displayed.	<ol style="list-style-type: none"> 1. Display signal circuit (navigation ECU - multi-display) (*1) 2. Display signal circuit (navigation ECU - multi-display controller sub-assy) (*3 or *4) 3. Display signal circuit (navigation ECU - television camera ECU) (*2) 4. Display signal circuit (multi-display controller sub-assy - television camera ECU) (*4) 5. Display signal circuit (television camera ECU - multi-display) (*2 or *4) 6. Display signal circuit (multi-display controller sub-assy - multi-display) (*3) 7. Replace multi-display 	05-1864 05-1867 05-1870 05-1873 05-1876 05-1879 67-12

Screen flicker or color distortion.	<ol style="list-style-type: none"> 1. "SCREEN FLICKER OR COLOR DISTORTION" 2. Display signal circuit (navigation ECU - multi-display) (*1) 3. Display signal circuit (navigation ECU - multi-display controller sub-assy) (*3 or *4) 4. Display signal circuit (navigation ECU - television camera ECU) (*2) 5. Display signal circuit (multi-display controller sub-assy - television camera ECU) (*4) 6. Display signal circuit (television camera ECU - multi-display) (*2 or *4) 7. Display signal circuit (multi-display controller sub-assy - multi-display) (*3) 8. Replace multi-display 9. Replace navigation ECU 	<p>05-1779 05-1864</p> <p>05-1867</p> <p>05-1870</p> <p>05-1873</p> <p>05-1876</p> <p>05-1879</p> <p>67-12 67-36</p>
Navigation function switches can be operated while vehicle is running.	<ol style="list-style-type: none"> 1. Speed signal circuit (multi-display - combination meter assy) 	05-1834
DVD image cannot be displayed on front screen. (Parking brake is on.) (*3 or *4)	<ol style="list-style-type: none"> 1. Display signal circuit (from multi-display controller sub-assy) 2. Parking brake switch circuit 3. Replace multi-display 	<p>05-1861</p> <p>05-1852 67-12</p>

*1: w/o Rear Seat Entertainment and Back Monitor Systems

*2: w/o Rear Seat Entertainment System (w/ Back Monitor System only)

*3: w/ Rear Seat Entertainment System only (w/o Back Monitor System)

*4: w/ Rear Seat Entertainment and Back Monitor Systems

Navigation function

Symptom	Verification	See page
Map disc cannot be inserted.	<ol style="list-style-type: none"> 1. "MAP DISC CANNOT BE INSERTED" 2. Power source circuit (navigation ECU) 3. Replace navigation ECU 	<p>05-1781</p> <p>05-1810 67-36</p>
Map disc cannot be ejected.	<ol style="list-style-type: none"> 1. Power source circuit (navigation ECU) 2. Replace navigation ECU 	<p>05-1810 67-36</p>
Vehicle position mark deviates greatly.	<ol style="list-style-type: none"> 1. "VEHICLE POSITION MARK DEVIATES GREATLY" 2. Replace GPS antenna assy 3. Replace navigation ECU 	<p>05-1782</p> <p>67-38 67-36</p>
Cursor or map rotates when vehicle is stopped.	<ol style="list-style-type: none"> 1. "CURSOR OR MAP ROTATES WHEN VEHICLE IS STOPPED" 2. Replace navigation ECU 	<p>05-1784</p> <p>67-36</p>
Vehicle position mark is not updated.	<ol style="list-style-type: none"> 1. "VEHICLE POSITION MARK IS NOT UPDATED" 2. Replace map disc 3. Replace navigation ECU 	<p>05-1785</p> <p>- 67-36</p>
Current position display does not appear.	<ol style="list-style-type: none"> 1. "CURRENT POSITION DISPLAY DOES NOT APPEAR" 2. Replace map disc 3. Replace navigation ECU 	<p>05-1786</p> <p>- 67-36</p>
GPS mark is not displayed.	<ol style="list-style-type: none"> 1. "GPS MARK IS NOT DISPLAYED" 2. Replace GPS antenna assy 3. Replace navigation ECU 	<p>05-1787</p> <p>67-38 67-36</p>
Voice guidance does not function.	<ol style="list-style-type: none"> 1. "VOICE GUIDANCE DOES NOT FUNCTION" 2. Speaker circuit (navigation voice) 3. Mute signal circuit (stereo component amplifier assy - navigation ECU) 4. Replace map disc 5. Replace navigation ECU 	<p>05-1789</p> <p>05-1850 05-1857</p> <p>- 67-36</p>

Map display incomplete	1. "MAP DISPLAY INCOMPLETE" 2. Replace map disc 3. Replace navigation ECU	05-1792 - 67-36
Route cannot be calculated.	1. "ROUTE CANNOT BE CALCULATED" 2. Replace map disc 3. Replace navigation ECU	05-1793 - 67-36
Voice recognition difficulty	1. "VOICE RECOGNITION DIFFICULTY" 2. Replace navigation ECU	05-1797 67-36
Voice is not recognized.	1. "VOICE IS NOT RECOGNIZED" 2. Microphone circuit (overhead J/B - multi-display) 3. Microphone circuit (multi-display - navigation ECU) 4. Steering pad switch circuit 5. Replace microphone 6. Replace overhead J/B 7. Replace navigation ECU 8. Replace multi-display 9. Replace radio receiver assy	05-1799 05-1838 05-1842 05-1844 67-33 67-33 67-36 67-12 67-9

Steering pad switch function

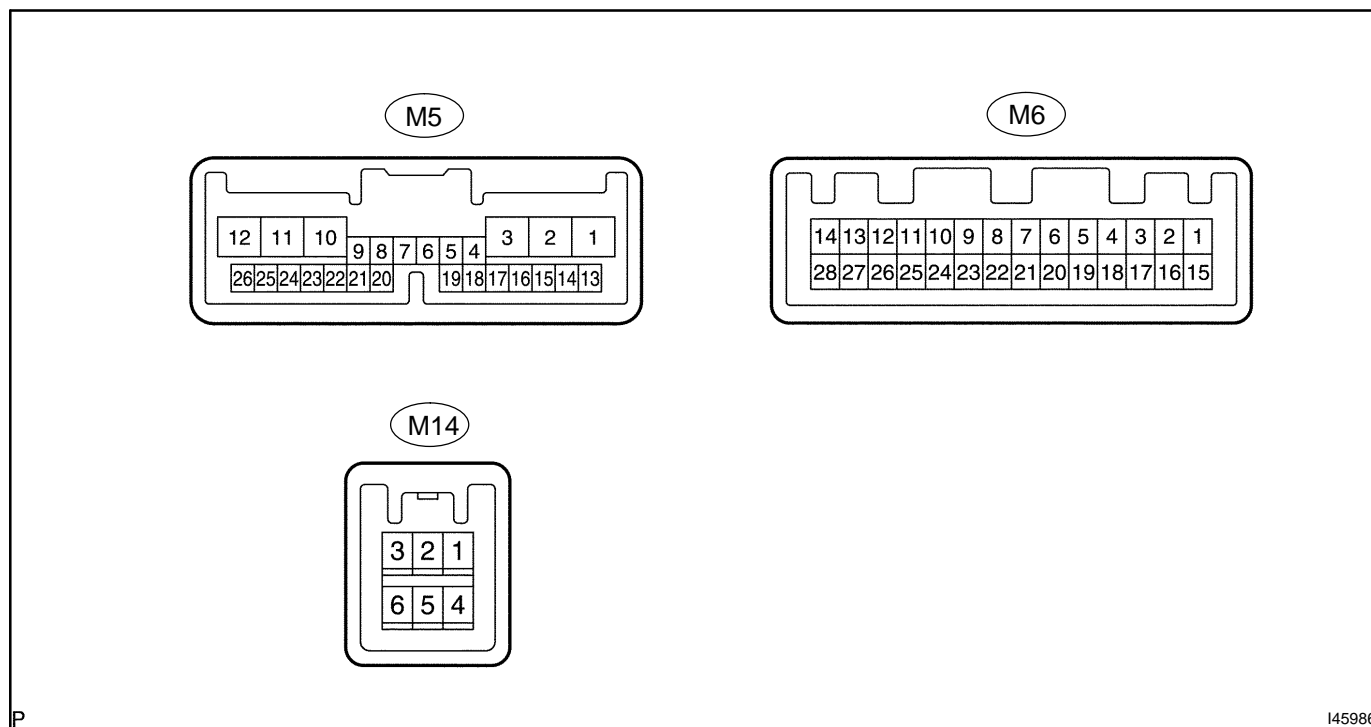
Symptom	Verification	See page
Voice navigation cannot be operated with steering pad switch.	1. Steering pad switch circuit 2. Replace radio receiver assy 3. Replace navigation ECU	05-1844 67-9 67-36

Bluetooth function

Symptom	Verification	See page
Cellular phone registration failure, phone directory transfer failure	1. "CELLULAR PHONE REGISTRATION FAILURE, PHONE DIRECTORY TRANSFER FAILURE"	05-1800
Cellular phone cannot send/receive.	1. "CELLULAR PHONE CANNOT SEND/RECEIVE" 2. "OWN VOICE CANNOT BE HEARD, IS TOO QUIET OR DISTORTED" 3. Cellular phone voice circuit (multi-display - navigation ECU) 4. Replace navigation ECU 5. Replace multi-display	05-1802 05-1807 05-1840 67-36 67-12
Unable to call in a certain place.	1. "UNABLE TO CALL IN A CERTAIN PLACE"	05-1804
Voice on phone cannot be heard, is too quiet, or distorted.	1. "VOICE ON PHONE CANNOT BE HEARD, TOO QUIET OR DISTORTED" 2. Cellular phone voice circuit (multi-display - navigation ECU) 3. Replace navigation ECU 4. Replace multi-display	05-1806 05-1840 67-36 67-12
Own voice cannot be heard, is too quiet or distorted.	1. "OWN VOICE CANNOT BE HEARD, IS TOO QUIET OR DISTORTED"	05-1807

TERMINALS OF ECU

1. MULTI-DISPLAY:



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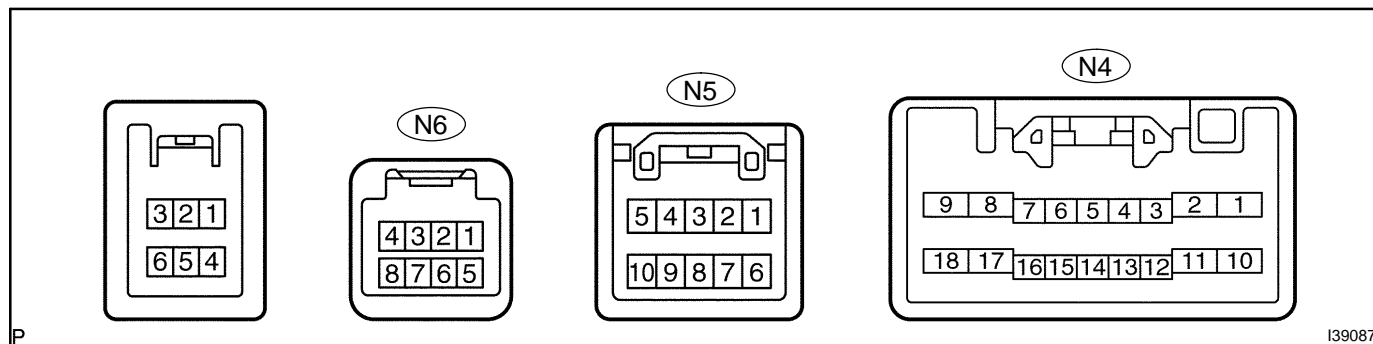
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
NTSC (M14-1) (*2) - GND1 (M5-3)	Y - BR	Display signal	DVD is played on multi-display	-
SG (M14-4) (*2) - Body ground	BR - Body ground	Ground	Always	Below 1 V
SGD1 (M14-5) (*2) - Body ground	Shielded - Body ground	Shielded ground	Always	Below 1 V
SGND (M6-3) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
MIN+ (M6-4) - GND1 (M5-3)	R - BR	Microphone voice signal	See "microphone check" (see page 05-1733)	-
MIN- (M6-5) - Body ground	G - Body ground	Microphone voice signal	See "microphone check" (see page 05-1733)	-
MACC (M6-6) - GND1 (M5-3)	Y-G - BR	Microphone AMP power supply	Turn ignition switch OFF → ON	Below 1 V → 5 V
TX3+ (M6-11) - GND1 (M5-3)	G - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
TX3- (M6-12) - GND1 (M5-3)	R - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
TX+ (M6-13) (*1) - GND1 (M5-3)	P - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
TX- (M6-14) (*1) - GND1 (M5-3)	L - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
SGND (M6-17) - Body ground	Shielded - Body ground	Shielded ground	Always	Below 1 V
MCO+ (M6-18) - GND1 (M5-3)	BR - BR	Microphone voice signal	See "microphone check" (see page 05-1733)	-

MCO- (M6-19) - GND1 (M5-3)	Y - BR	Microphone voice signal	See "microphone check" (see page 05-1733)	-
SLD (M6-20) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
IVO+ (M6-21) - GND1 (M5-3)	G - BR	Telephone voice signal (bluetooth)	See "microphone check" (see page 05-1733)	-
IVO- (M6-22) - GND1 (M5-3)	R - BR	Telephone voice signal (bluetooth)	See "microphone check" (see page 05-1733)	-
VR (M6-23) - GND1 (M5-3)	Y - BR	Video return signal	Turn ignition switch OFF	Below 1 V
R (M6-24) - GND1 (M5-3)	B - BR	Display signal (red)	Navigation display is on	-
G (M6-25) - GND1 (M5-3)	W - BR	Display signal (green)	Navigation display is on	-
B (M6-26) - GND1 (M5-3)	R - BR	Display signal (blue)	Navigation display is on	-
SYNC (M6-27) - GND1 (M5-3)	G - BR	Display signal (synchronize)	Navigation display is on	-
VG (M6-28) - Body ground	BR - Body ground	Shielded ground	Always	Below 1 V
ILL+ (M5-1) - GND1 (M5-3)	G - BR	Illumination signal	Light control switch OFF → TAIL or ON	Below 1 V → 10 to 14 V
ILL- (M5-2) - Body ground	W-B - Body ground	Illumination signal	Light control switch OFF → TAIL or ON (Light intensity is not max. or min.)	Below 1 V → Pulse generation
GND1 (M5-3) - Body ground	BR - Body ground	Ground	Always	Below 1 V
TC (M5-7) - GND1 (M5-3)	P-L - BR	Diagnosis ON signal	Turn ignition switch to ON	9 to 14 V
IG (M5-10) - GND1 (M5-3)	B-R - BR	Ignition (ON)	Turn ignition switch OFF → ON	Below 1 V → 10 to 14 V
ACC (M5-11) - GND1 (M5-3)	GR - BR	Accessory (ON)	Turn ignition switch OFF → ACC or ON	Below 1 V → 10 to 14 V
+B1 (M5-12) - GND1 (M5-3)	R-L - BR	Battery	Always	10 to 14 V
PKB (M5-16) - GND1 (M5-3)	LG - BR	Parking brake signal	Turn parking brake switch ON → OFF	Below 1 V → 10 to 14 V
DR (M5-17) - GND1 (M5-3)	G-R - BR	Illumination (auto dimmer) signal	Ignition switch ON, light control switch TAIL or ON and automatic light control sensor covered by hand	Above 9 V
TX1+ (M5-18) - GND1 (M5-3)	B - BR	AVC-LAN communication signal	Turn ignition switch to ON	2 to 3 V
TX1- (M5-19) - GND1 (M5-3)	W - BR	AVC-LAN communication signal	Turn ignition switch to ON	2 to 3 V
SPD (M5-25) - GND1 (M5-3)	V-R - BR	Speed signal from combination meter	See "Vehicle Signal Check Mode" (see page 05-1728)	-

*1: Any vehicle except those equipped with only the rear seat entertainment system (w/o Back Monitor System)

*2: w/ Rear Seat Entertainment System

2. NAVIGATION ECU:



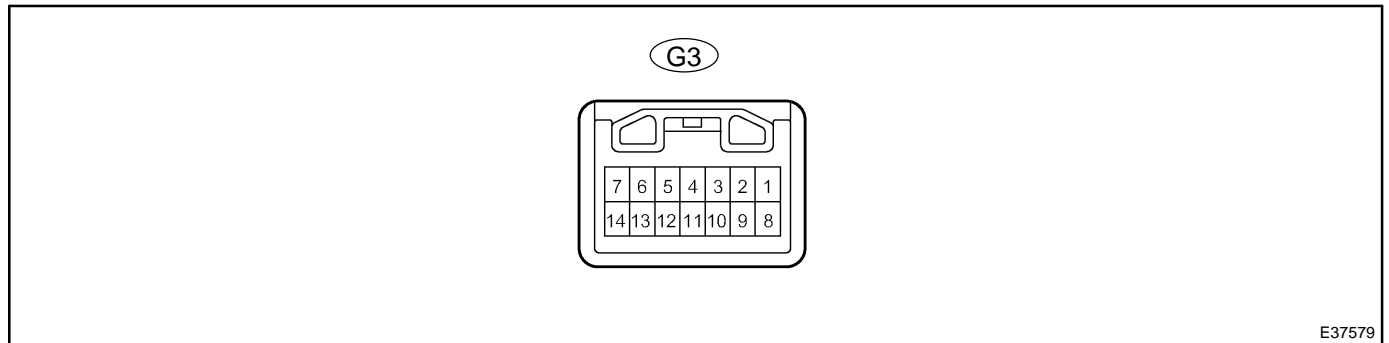
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Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
VR (N5-1) - GND (N4-17)	Y - BR	Video return signal	Turn ignition switch OFF	Below 1 V
R (N5-2) - GND (N4-17)	B - BR	Display signal (red)	Navigation display is on	-
B (N5-3) - GND (N4-17)	R - BR	Display signal (blue)	Navigation display is on	-
TX+ (N5-5) - GND (N4-17)	P - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
VG (N5-6) - Body ground	BR - Body ground	Shielded ground	Always	Below 1 V
G (N5-7) - GND (N4-17)	W - BR	Display signal (green)	Navigation display is on	-
SYNC (N5-8) - GND (N4-17)	G - BR	Display signal (synchronize)	Navigation display is on	-
TX- (N5-10) - GND (N4-17)	L - BR	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
AUI+ (N4-1) - GND (N4-17)	L - BR	Sound signal (input)	Audio system is playing	-
AUO+ (N4-2) - GND (N4-17)	LG - BR	Sound signal (output)	Audio system is playing	-
SLD1 (N4-3) - Body ground	Shielded - Body ground	Shielded ground	Always	Below 1 V
SPD (N4-5) - GND (N4-17)	V-R - BR	Speed signal from combination meter	See "Vehicle Signal Check Mode" (see page 05-1730)	-
+B (N4-9) - GND (N4-17)	L-Y - BR	Battery	Always	10 to 14 V
AUI- (N4-10) - GND (N4-17)	LG - BR	Sound signal (input)	Audio system is playing	-
AUO- (N4-11) - GND (N4-17)	L - BR	Sound signal (output)	Audio system is playing	-
VOI+ (N4-12) - GND (N4-17)	G - BR	Telephone voice signal (bluetooth)	See "microphone check" (see page 05-1733)	-
VOI- (N4-13) - GND (N4-17)	R - BR	Telephone voice signal (bluetooth)	See "microphone check" (see page 05-1733)	-
REV (N4-14) - GND (N4-17)	R-B - BR	Reverse signal from combination meter	See "Vehicle Signal Check Mode" (see page 05-1730)	-
MUTE (N4-15) - GND (N4-17)	P - BR	Mute signal	Audio system is playing → Changing mode	Above 3.5 V → Below 1 V
GND (N4-17) - Body ground	BR - Body ground	Ground	Always	Below 1 V
ACC (N4-18) - GND (N4-17)	GR - BR	Accessory (ON)	Turn ignition switch OFF → ACC or ON	Below 1 V → 10 to 14 V
MIC+ (N6-3) - GND (N4-17)	BR - BR	Microphone voice signal	See "microphone check" (see page 05-1733)	-

MIC- (N6-5) - GND (N4-17)	Y - BR	Microphone voice signal	See "microphone check" (see page 05-1733)	-
SNSE (N6-7) - Body ground	BR - Body ground	Microphone connection detection signal	Always	Below 1 V

3. NETWORK GATEWAY ECU:



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
IG (G3-2) - GND (G3-14)	B-R - W-B	Ignition (ON)	Turn ignition switch OFF → ON	Below 1 V → 10 to 14 V
MPD1 (G3-4)	W-G	BEAN signal	See "Diagnosis Check of Multiplex Communication System" (see page 05-2258)	-
GTX+ (G3-5) - GND (G3-14)	G - W-B	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
CG (G3-7) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
BATT (G3-8) - GND (G3-14)	W-R - W-B	Battery	Always	10 to 14 V
ACC (G3-9) - GND (G3-14)	GR - W-B	Accessory (ON)	Turn ignition switch OFF → ACC or ON	Below 1 V → 10 to 14 V
MPD2 (G3-11)	B	BEAN signal	See "Diagnosis Check of Multiplex Communication System" (see page 05-2258)	-
GTX- (G3-12) - GND (G3-14)	R - W-B	AVC-LAN communication signal	Turn ignition switch to ACC	2 to 3 V
GND (G3-14) - Body ground	W-B - Body ground	Ground	Always	Below 1 V

HINT:

When trouble occurs in the network gateway ECU, the following symptoms are also confirmed simultaneously.

- "Outside temperature" is not indicated on the multi-display.
- "Vehicle information" is not indicated on the multi-display.
- Unable to operate the air conditioner system.

4. RADIO RECEIVER ASSY (SEE PAGE [05-1667](#))

5. STEREO COMPONENT AMPLIFIER ASSY (SEE PAGE [05-1667](#))

6. TELEVISION CAMERA ECU (SEE PAGE [05-2011](#))

7. MULTI-DISPLAY CONTROLLER SUB-ASSY (SEE PAGE [05-1948](#))

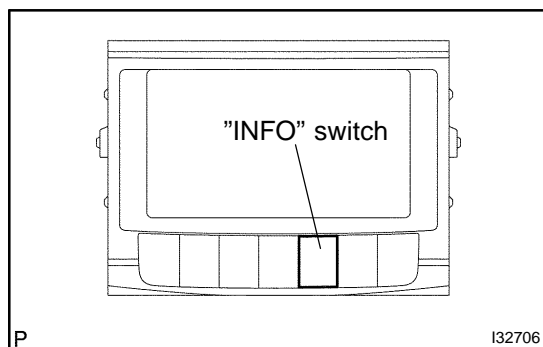
8. STEREO COMPONENT CONTROLLER ASSY (SEE PAGE [05-1913](#))

DIAGNOSTIC START-UP/FINISH

HINT:

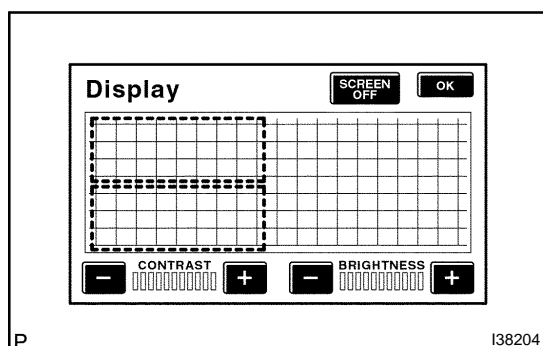
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.
- After the ignition switch is turned on, check that the map is displayed before starting the diagnostic mode. Otherwise, some items cannot be checked.

1. There are 2 methods to start diagnostic mode. Start the mode by using one of them.



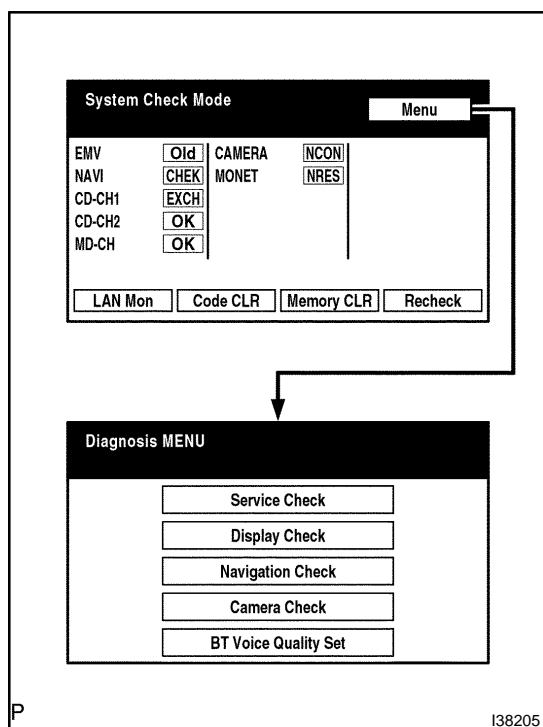
2. Method 1

- Start the engine.
- While pressing and holding the "INFO" switch, operate the light control switch: OFF → Turn ON → Turn OFF → Turn ON → Turn OFF → Turn ON → Turn OFF.
- The diagnostic mode starts and the service check screen ("System Check Mode") will be displayed. Service inspection starts automatically and the result will be displayed.



3. Method 2

- Start the engine.
- Switch to the "Display" screen.
- From the display quality adjustment screen, touch the corners of the screen in the following order: upper left → lower left → upper left → lower left → upper left → lower left.
- The diagnostic mode starts and the "Service Check" screen will be displayed. Service inspection starts automatically and the result will be displayed.



4. Diagnosis MENU

- The diagnostic screen will be displayed by pressing the menu switch on the service check screen.

5. Finish diagnostic mode.

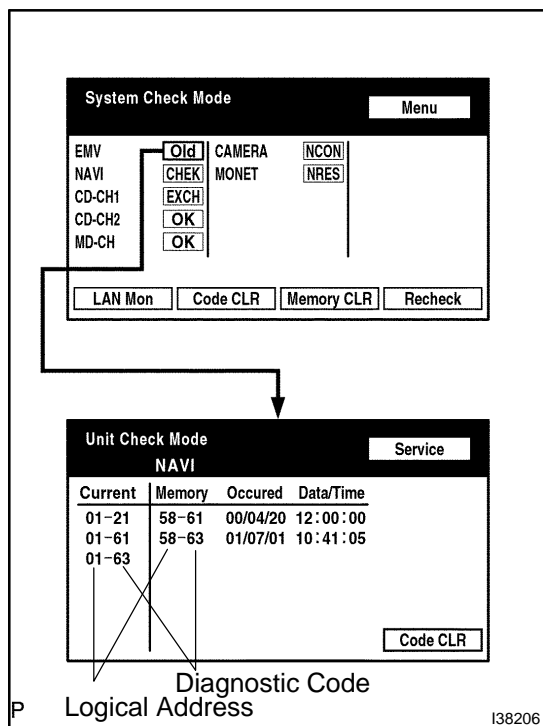
- (a) Turn the ignition switch off.

SYSTEM CHECK MODE (DTC CHECK)

HINT:

Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. Start the diagnostic mode (see page 05-1751).

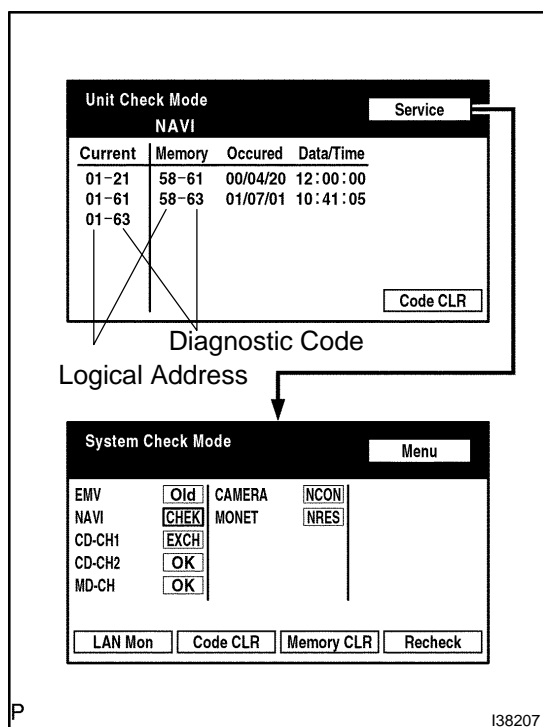


2. Read the system check result.

- (a) If the check result is "EXCH," "CHEK" or "Old," touch the displayed check result to view the results on the "Unit Check Mode" screen and record them on the customer problem analysis check sheet.

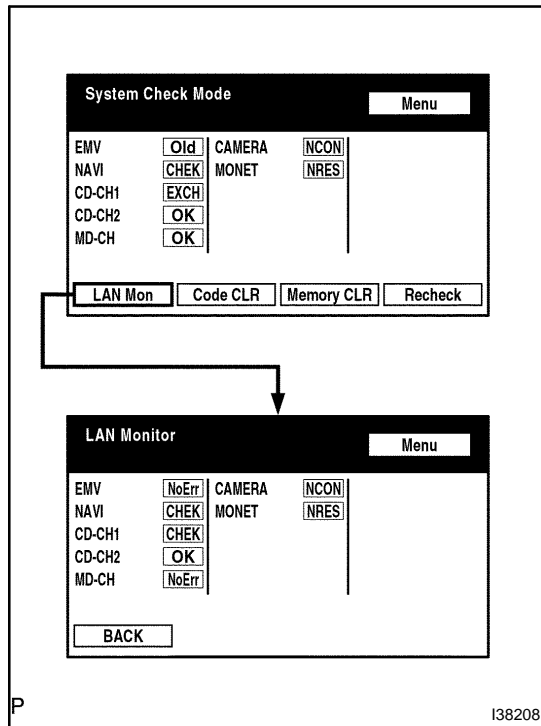
HINT:

- If all check results are "OK," go to communication DTC check (go to step 3).
- If a device name is not known, its physical address is displayed.

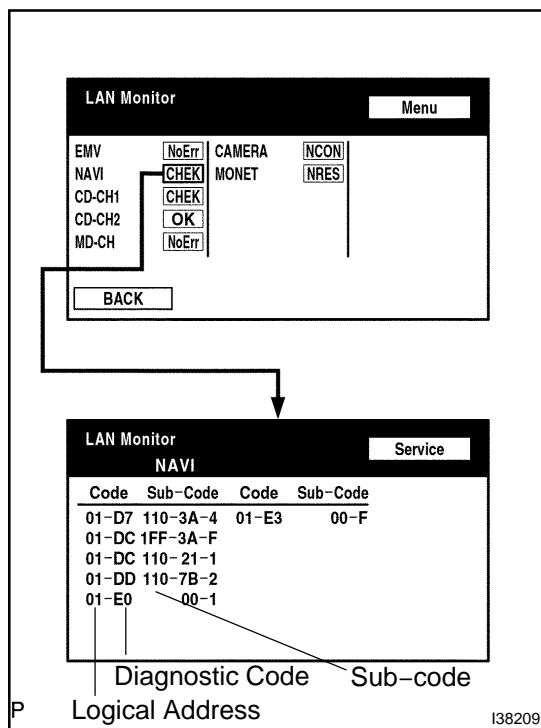


HINT:

When proceeding to view the results of another device, press the service switch to return to the "System Check Mode". Repeat step (a).



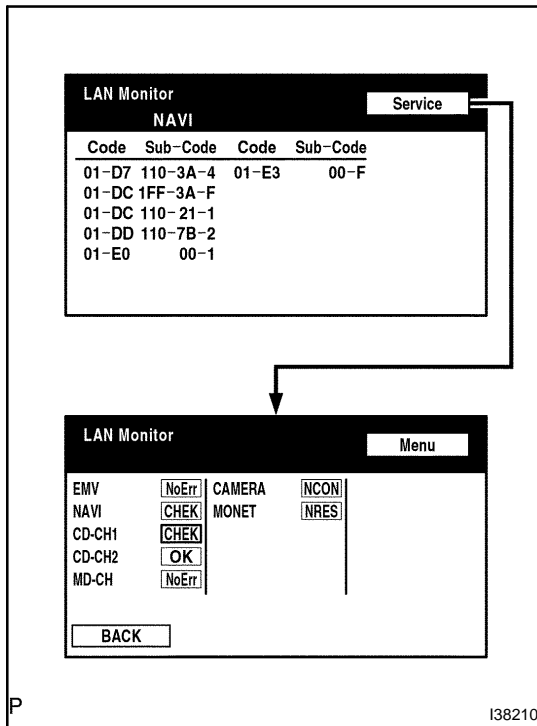
3. Read the communication diagnostic check result.
- (a) Return to the "System Check Mode", and press the "LAN Mon" switch to enter the LAN monitor screen.



- (b) If the check result is "CHEK" or "Old," touch the displayed check result to view the results on the individual communication diagnostic screen and record them on the customer problem analysis check sheet.

HINT:

- If all check results are "No Err," the system judges that no DTC exists.
- The sub-code (relevant device) will be indicated by its physical address.

**HINT:**

When proceeding to view the results of another device, press the "Service" switch to return to the original "LAN Monitor" screen. Repeat step (b).

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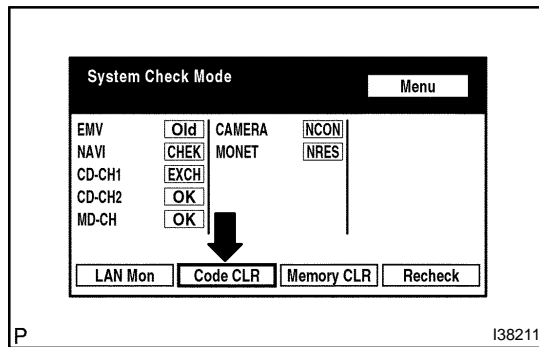
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SYSTEM CHECK MODE (DTC CLEAR/RECHECK)

HINT:

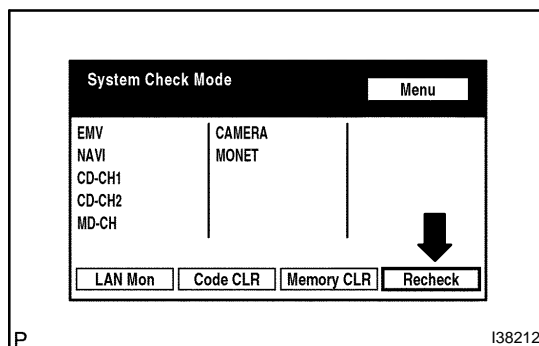
Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.

1. Enter the diagnostic mode (see page 05-1751).



2. Clear DTC

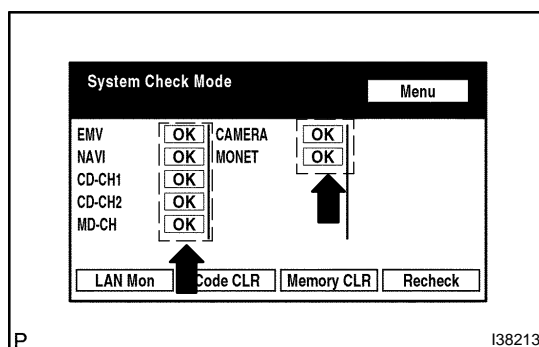
- (a) Press the "Code CLR" switch for 3 seconds.



- (b) The check results are cleared.

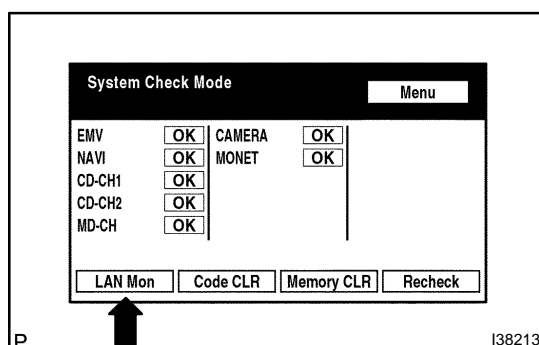
3. Recheck

- (a) Press the "Recheck" switch.

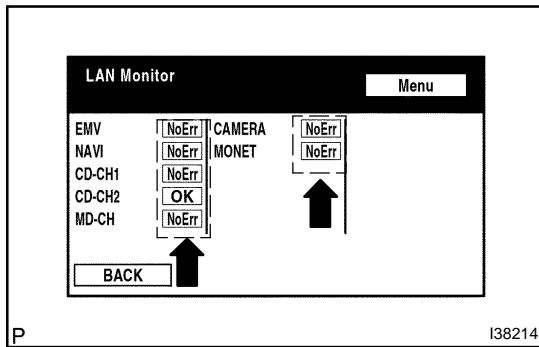


- (b) Confirm that all diagnostic codes are "OK" when the check results are displayed.

If a code other than "OK" is displayed, troubleshoot again.



- (c) Press the "LAN Mon" switch to change to "LAN Monitor" mode.



(d) Confirm that all diagnostic codes are "No Err".
If a code other than "No Err" is displayed, troubleshoot again.

DIAGNOSTIC TROUBLE CODE CHART

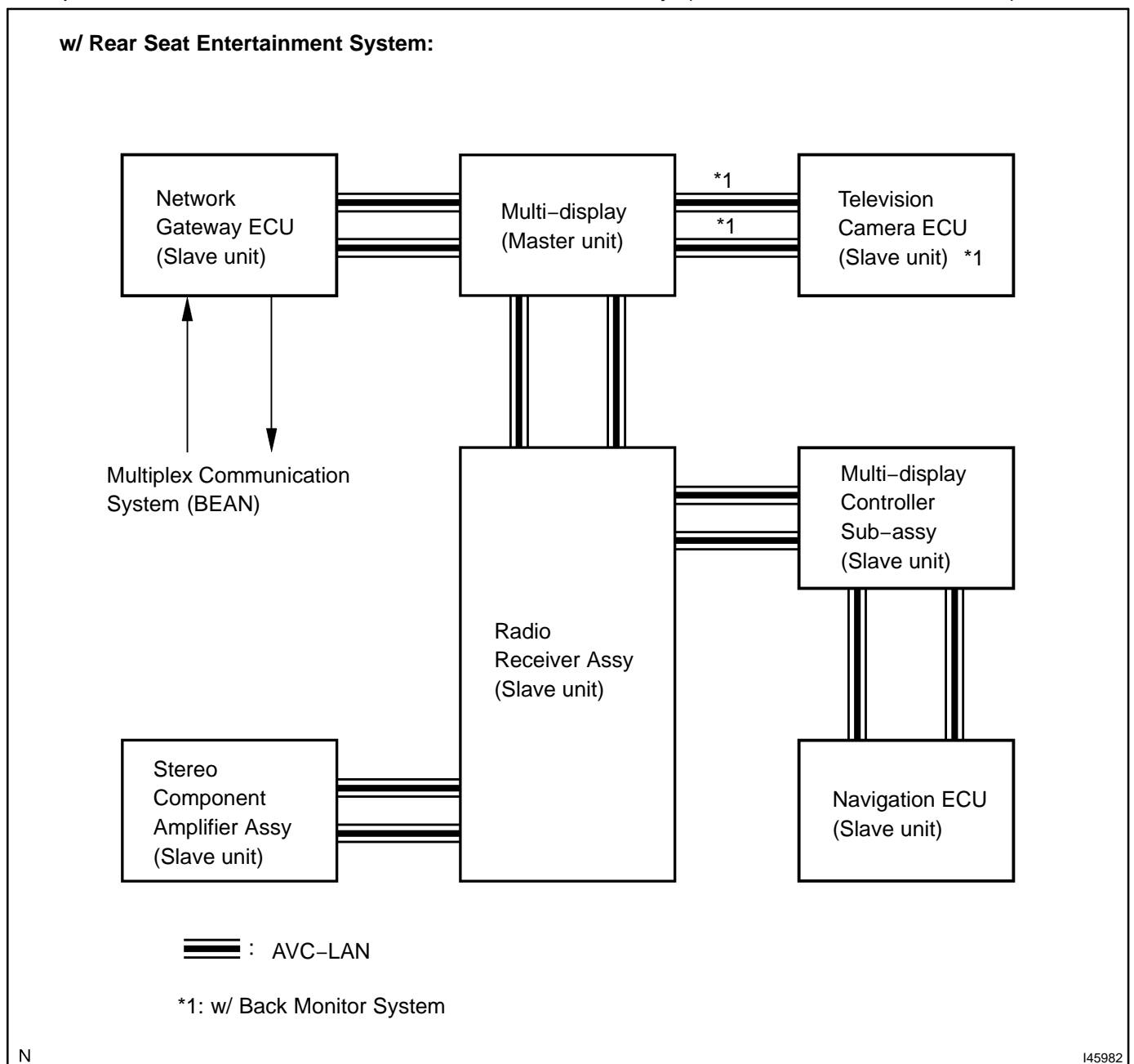
Terms	Description
Physical address	3-digit, hexadecimal code assigned to all components connected to the AVC-LAN. Individual symbols are specified based on function. Units whose names are unknown or relevant units are displayed with physical addresses.
Logical address	2-digit, hexadecimal code assigned to all the functions in the AVC-LAN system.

AVC-LAN WIRING DIAGRAM

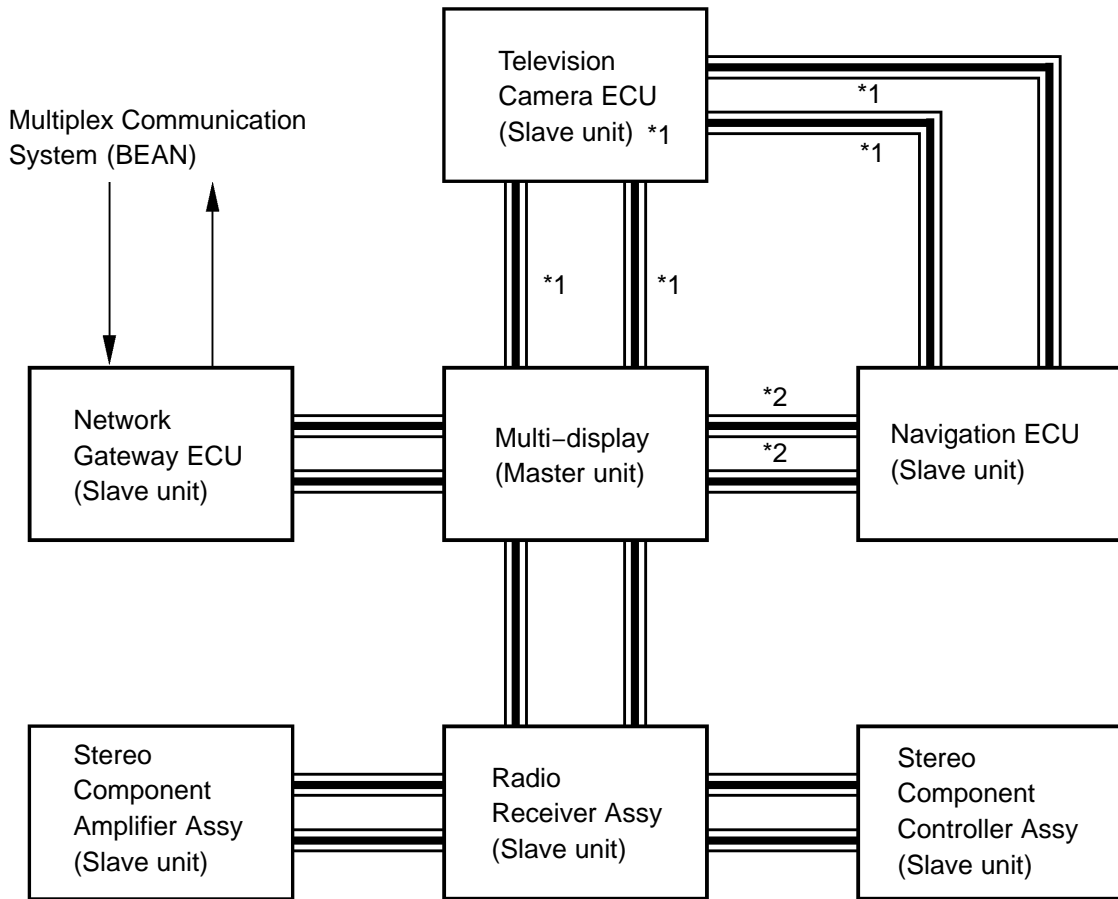
HINT:

If any DTCs are simultaneously output for 2 or more slave units that are connected in series, there may be a problem between the master unit and the slave unit which is closest to the master unit. Therefore, first proceed with troubleshooting of that slave unit.

For example, if DTCs are output for the radio receiver assy and stereo component amplifier assy, there may be a problem between the master unit and radio receiver assy. (Refer to the illustration below.)



w/o Rear Seat Entertainment System:



==== : AVC-LAN

- *1: w/ Back Monitor System
- *2: w/o Back Monitor System

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HINT:

Titles for each unit are stated in the following order: part name (physical address) [Name indicated by DTC]

1. MULTI-DISPLAY (physical address: 110) [EMV]**(a) Logical address: 01 (Communication control)**

DTC	Name	Diagnosis	Verification	See page
D5 *1 *5	Absence of registration unit	The device indicated by the sub code is (was) disconnected from the system when turning the ignition switch to the ACC or ON position. The communication condition with the device indicated by the code cannot be obtained when the engine starts.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
D8 *2 *5	No response to connection check	The device indicated by the sub code is (was) disconnected from the system after engine start.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
D9 *1 *5	Last mode error	The device (for audio visual system) that had functioned before the engine stopped is (was) disconnected from the system when the ignition switch is (was) in the ACC or ON position.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DA *5	No response to ON/OFF command	No response is identified when changing mode (audio and visual mode change). Sound and image do not change by switch operation.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DB *1 *5	Mode status error	A dual alarm is detected.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DC *3 *5	Failure in transmission	A transmission failure to the device indicated by the sub code is detected. NOTE: This DTC may have no direct relationship with the malfunction.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DE *4 *5	Slave reset	A slave device has been disconnected after engine start.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
21	ROM error	A malfunction exists in ROM.	Replace multi-display	67-12
22	RAM error	A malfunction exists in RAM.	Replace multi-display	67-12

HINT:

- *1: This code may be stored depending on the battery condition or engine start voltage even if no failure is detected.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again with the engine running.
- *4: This code may be stored if the ignition key is held in the START position for 1 minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

(b) Logical address: 21 (SW): 23 (SW with name): 24 (SW converting): 25 (command SW)

DTC	Name	Diagnosis	Verification	See page
10	Panel switch error	The panel SW detection circuit has a failure.	Replace multi-display	67-12
11	Touch switch error	Error in touch switch sensor is detected.	Replace multi-display	67-12

2. NAVIGATION ECU (Physical address: 178) [NAVI]

NOTICE:

Any vehicle except those not equipped with either the RSE or back monitor system:

The following inspection procedures of the navigation ECU are described on the assumption that the television camera ECU (w/o RSE) or multi-display controller sub-assy (w/ RSE) is normal.

If any television camera ECU (w/o RSE) DTC or multi-display controller sub-assy (w/ RSE) DTC is output, first proceed with troubleshooting of the television camera ECU (w/o RSE) or multi-display controller sub-assy (w/ RSE). (Refer to step 5 or 7.)

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in ACC or ON position. • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (navigation ECU) 2. AVC-LAN circuit (multi-display - navigation ECU) (*8) 3. AVC-LAN circuit (multi-display controller sub-assy - navigation ECU) (*6) 4. AVC-LAN circuit (television camera ECU - navigation ECU) (*7) 5. Replace navigation ECU 6. If error occurs again, replace multi-display controller sub-assy (*6) 7. If error occurs again, replace television camera ECU (*7) 8. If error occurs again, replace multi-display 	05-1810 05-1882 05-1895 05-1891 67-36 67-23 67-25 67-12
D7	Connection check error	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stored this code has (had) been disconnected after the engine starts (started). • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (navigation ECU) 2. AVC-LAN circuit (multi-display - navigation ECU) (*8) 3. AVC-LAN circuit (multi-display controller sub-assy - navigation ECU) (*6) 4. AVC-LAN circuit (television camera ECU - navigation ECU) (*7) 5. Replace navigation ECU 6. If error occurs again, replace multi-display controller sub-assy (*6) 7. If error occurs again, replace television camera ECU (*7) 8. If error occurs again, replace multi-display 	05-1810 05-1882 05-1895 05-1891 67-36 67-23 67-25 67-12
DC *2 *5	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9

DD *3	Master reset	The device that should be the master has been disconnected after engine start.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - navigation ECU) (*8) 3. AVC-LAN circuit (multi-display controller sub-assy - navigation ECU) (*6) 4. AVC-LAN circuit (television camera ECU - navigation ECU) (*7) 5. Replace multi-display 	<p>05-1808</p> <p>05-1882</p> <p>05-1895</p> <p>05-1891</p> <p>67-12</p>
DF *4	Master error	The device with a display fails and the master is switched to the audio device. Either that, or a communication error between the sub master (radio receiver assy) and master has occurred.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (television camera ECU - navigation ECU) (*7) 3. AVC-LAN circuit (multi-display - radio receiver assy) 4. AVC-LAN circuit (multi-display controller sub-assy - navigation ECU) (*6) 5. Replace multi-display 6. If error occurs again, replace multi-display controller sub-assy (*6) 7. If error occurs again, replace television camera ECU (*7) 8. If error occurs again, replace radio receiver assy 	<p>05-1808</p> <p>05-1891</p> <p>05-1889</p> <p>05-1895</p> <p>67-12</p> <p>67-23</p> <p>67-25</p> <p>67-9</p>
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code will be detected when signal receiving time is delayed.	-
E1 *1	Voice processing device ON error	The AMP device records that the AMP output does not function even while the source device operates.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - radio receiver assy) (*7) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy 	<p>05-1808</p> <p>05-1889</p> <p>67-12</p> <p>67-9</p>
E2	ON/OFF indication parameter error	A command for ON/OFF control from the master device has a problem.	Replace multi-display	67-12
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete.	-	-

*6: w/ Rear Seat Entertainment System

*7: w/o Rear Seat Entertainment System (w/ Back Monitor System only)

*8: w/o Rear Seat Entertainment and Back Monitor Systems

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or engine start voltage.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again after the engine starts.
- *4: This code may be stored if the ignition key is held in the START position for one minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

(b) Logical address: 58 (Navigation): 80 (GPS)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
10	Gyro error	Ground short, power supply short, open circuit in the gyro signal, or gyro failure.	1. Inspect gyro error 2. Replace GPS antenna 3. Replace navigation ECU	05-1794 67-38 67-36
11	GPS receiver error	RTC, ROM, and RAM of the GPS receiver and TCXO errors. GPS receiver is failed.	Replace navigation ECU	67-36
40	GPS antenna error	GPS antenna error	1. Replace GPS antenna 2. Replace navigation ECU	67-38 67-36
41	GPS antenna power source error	Error of the power source to the GPS antenna	1. Replace GPS antenna 2. Replace navigation ECU	67-38 67-36
42	Map disc read error	Player error. A scratch or dirt on the disc. Access to an invalid address due to software error.	1. Inspect map disc read error 2. Replace map disc 3. Replace navigation ECU	05-1795 - 67-36
43	SPD signal error	A difference between the GPS speed and SPD pulse is detected.	1. Inspect speed signal error 2. Speed signal circuit 3. Replace navigation ECU	05-1796 05-1830 67-36
44	Player error	Map player error is detected.	1. Check if the disc can be inserted and ejected. If a malfunction is found, replace the navigation ECU. 2. If the same code is detected again, replace the navigation ECU.	67-36 67-36
45	High temperature	High map player temperature is detected.	1. Park the vehicle in a cool place. Turn the engine off. After checking that the temperature of the navigation ECU becomes sufficiently low, turn the engine on to verify the malfunction symptom. 2. If the same code is detected, replace the navigation ECU.	- 67-36

3. RADIO RECEIVER ASSY (Physical address: 190) [AUDIO H/U]

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in the ACC or ON position. • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. Power source circuit (radio receiver assy) 3. AVC-LAN circuit (multi-display - radio receiver assy) 4. Replace multi-display 5. If error occurs again, replace radio receiver assy 	05-1808 05-1672 05-1889 67-12 67-9
D7	Connection check error	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stored this code has (had) been disconnected after the engine starts (started). • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. Power source circuit (radio receiver assy) 3. AVC-LAN circuit (multi-display - radio receiver assy) 4. Replace multi-display 5. If error occurs again, replace radio receiver assy 	05-1808 05-1672 05-1889 67-12 67-9
DC *2 *5	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DD *3	Master reset	The device that should be the master has been disconnected after engine start.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - radio receiver assy) 3. Replace multi-display 	05-1808 05-1889 67-12
DF *4	Master error	The device with a display fails and the master is switched to the audio device. Either that, or a communication error between the sub master (radio receiver assy) and master has occurred.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy 	05-1808 05-1889 67-12 67-9
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code will be detected when signal receiving time is delayed.	-
E1 *1	Voice processing device ON error	The AMP device records that the AMP output does not function even while the source device operates.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy 	05-1808 05-1889 67-12 67-9
E2	ON/OFF indication parameter error	A command for ON/OFF control from the master device has a problem.	Replace multi-display	67-12
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete.	-	-

(b) Logical address: 01 (Communication control)

DTC	Name	Diagnosis	Verification	See page
D5 *1 *5	Absence of registration unit	The device indicated by the sub code is (was) disconnected from the system when turning the ignition switch to the ACC or ON position. The communication condition with the device indicated by the code cannot be obtained when the engine starts.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
D8 *2 *5	No response to connection check	The device indicated by the sub code is (was) disconnected from the system after engine start	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
D9 *1 *5	Last mode error	The device (for audio visual system) that had functioned before the engine stopped is (was) disconnected from the system when the ignition switch is (was) in the ACC or ON position.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DA *5	No response to ON/OFF command	No response is identified when changing mode (audio and visual mode change). Sound and image do not change by switch operation.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DB *1 *5	Mode status error	A dual alarm is detected.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DC *3 *5	Failure in transmission	A transmission failure to the device indicated by the sub code. NOTE: This DTC may have no direct relationship with the malfunction.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DE *4 *5	Slave reset	A slave device has been disconnected after engine start.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
21	ROM error	A malfunction exists in ROM.	Replace radio receiver assy	67-9
22	RAM error	A malfunction exists in RAM.	Replace radio receiver assy	67-9

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or engine start voltage.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again after the engine starts.
- *4: This code may be stored if the ignition key is held in the START position for one minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

(c) Logical address: 62 (CD): 63 (In-dash CD changer)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
10	CD player mechanical error	A mechanical error in the CD player is detected while the CD is not being inserted or ejected.	Replace radio receiver assy	67-9
11	CD insertion & eject error	CD insertion or ejection is failed.	Replace radio receiver assy	67-9
12	CD reading abnormal	CD read problem occurs.	Replace radio receiver assy	67-9

40	No disc	No disc is inserted.	1. Check whether the CD is inserted or not. If the CD is inserted, check whether it can be ejected or not. If it cannot be ejected, replace radio receiver assy. 2. Inspect CD. 3. If the same code is detected, replace the radio receiver assy	67-9 - 67-9
41	Wrong disc	An unsuitable disc is inserted.	1. Inspect CD. 2. If the same code is detected, replace the radio receiver assy	- 67-9
42	Disc cannot be read	The disc cannot be read.	1. Inspect CD. 2. If the same code is detected, replace the radio receiver assy	- 67-9
43	CD-ROM abnormal	CD-ROM operation is abnormal.	Replace radio receiver assy	67-9
44	CD abnormal	Operation error in the CD mechanism (except for code 10).	1. After clearing the DTC, check the malfunction symptom. 2. If the same code is detected, replace the radio receiver assy	- 67-9
45	EJECT error	Magazine cannot be ejected.	Replace radio receiver assy	67-9
46	Scratched/Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	1. Inspect CD. 2. If the same code is detected, replace the radio receiver assy	- 67-9
47	CD temperature is high	The sensor detects that the CD unit temperature is high.	1. Park the vehicle in a cool place. Turn the engine off. After checking that the temperature of the radio receiver assy becomes sufficiently low, turn the engine on in order to verify the malfunction symptom. 2. If the same code is detected, replace the radio receiver assy	- 67-9
48	Excess current	Excess current is present in the disc player changer.	Replace radio receiver assy	67-9
50	Tray insertion/ejection error	Malfunction in insertion/ejection system	Replace radio receiver assy	67-9
51	Elevator error	Mechanical error occurred during elevator operation	Replace radio receiver assy	67-9
52	Clamp error	Error has occurred with CD changer clamp.	Replace radio receiver assy	67-9

(d) Logical address: 61 (Cassette)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
10	Belt cut	The inside belt is cut or came off.	Replace radio receiver assy	67-9
40	Mechanical error of media	A malfunction due to mechanical problem has occurred, cassette tape is cut or entangled.	1. Replace the cassette tape and recheck the symptom. 2. If the same code is detected, replace the radio receiver assy	- 67-9
41	EJECT error	A malfunction due to mechanical problem.	Replace radio receiver assy	67-9
42	Tape tangling	Cassette tape is tangled.	Replace radio receiver assy	67-9

43	Head dirt	Head is dirty.	1. Clean the head and recheck the symptom. 2. If the same code is detected, replace the radio receiver assy	- 67-9
44	Device power supply problem	A short or open in the power circuit.	1. Power source circuit (radio receiver assy) 2. Replace radio receiver assy	05-1672 67-9

4. GATEWAY ECU (Physical address: 1C6) [G/W]

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D4	Regular Communication Error	Component in which this code is recorded has been disconnected from system with ignition in the ACC or ON position. Either that, or the multi-display was disconnected when this code was recorded.	1. Power source circuit (gateway ECU) 2. AVC-LAN circuit (multi-display - gateway ECU) 3. Replace multi-display 4. Replace gateway ECU	05-1812 05-1884 67-12 67-49

HINT:

This code is stored 210 seconds after the power supply connector of the master component is disconnected with the ignition switch in the ACC or ON position.

5. TELEVISION CAMERA ECU (Physical address: 280) [CAMERA]

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: • The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in ACC or ON position. • The master device has (had) been disconnected when this code is (was) stored.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - television camera ECU) 3. Power source circuit (television camera ECU) 4. Replace multi-display 5. If error occurs again, replace television camera ECU	05-1808 05-1897 05-2015 67-12 67-25
D7	Connection check error	When either of the following conditions is met: • The device that stored this code has (had) been disconnected after the engine starts (started). • The master device has (had) been disconnected when this code is (was) stored.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - television camera ECU) 3. Power source circuit (television camera ECU) 4. Replace multi-display 5. If error occurs again, replace television camera ECU	05-1808 05-1897 05-2015 67-12 67-25
DC *2 *5	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DD *3	Master reset	The device that should be the master has been disconnected after engine start.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - television camera ECU) 3. Replace multi-display	05-1808 05-1897 67-12

DF *4	Master error	The device with a display fails and the master is switched to the audio device. Either that, or a communication error between the sub master (radio receiver assy) and master has occurred.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - radio receiver assy) 3. AVC-LAN circuit (multi-display - television camera ECU) 4. Replace multi-display 5. If error occurs again, replace television camera ECU	05-1808 05-1889 05-1897 67-12 67-25
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code will be detected when signal receiving time is delayed.	-
E1 *1	Voice processing device ON error	The AMP device records that the AMP output does not function even while the source device operates.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display - television camera ECU) 3. Replace multi-display 4. If error occurs again, replace television camera ECU	05-1808 05-1889 67-12 67-25
E2	ON/OFF indication parameter error	A command for ON/OFF control from the master device has a problem.	Replace multi-display	67-12
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete	-	-

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or engine start voltage.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again after the engine starts.
- *4: This code may be stored if the ignition key is held in the START position for one minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

(b) Logical address: 5C (Camera)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
40	Camera picture error	Synchronous signal from the camera cannot be transmitted.	1. Check the wire harness between television camera assy and television camera ECU 2. Replace television camera assy 3. Replace television camera ECU	05-2027 67-24 67-25

6. STEREO COMPONENT AMPLIFIER ASSY (Physical address: 440) [DSP AMP]

NOTICE:

The following inspection procedures of the stereo component amplifier assy are described on the assumption that the radio receiver assy is normal.

If any radio receiver assy DTC is output, first proceed with troubleshooting of the radio receiver assy. (Refer to step 3.)

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: <ul style="list-style-type: none"> •The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in the ACC or ON position. •The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (stereo component amplifier assy) 2. AVC-LAN circuit (stereo component amplifier assy – radio receiver assy) 3. Replace stereo component amplifier assy 4. If error occurs again, replace radio receiver assy 	05-1674 05-1886 67-13 67-9
D7	Connection check error	When either of the following conditions is met: <ul style="list-style-type: none"> •The device that stored this code has (had) been disconnected after the engine starts (started). •The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (stereo component amplifier assy) 2. AVC-LAN circuit (stereo component amplifier assy – radio receiver assy) 3. Replace stereo component amplifier assy 4. If error occurs again, replace radio receiver assy 	05-1674 05-1886 67-13 67-9
DC *2 *5	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DD *3	Master reset	The device that should be the master has been disconnected after engine start.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (stereo component amplifier assy – radio receiver assy) 3. Replace multi-display 	67-9 05-1886 67-12
DF *4	Master error	The device with a display fails and the master is switched to the audio device. Either that, or a communication error between the sub master (radio receiver assy) and master has occurred.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display – radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy 	05-1808 05-1889 67-12 67-9
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code will be detected when signal receiving time is delayed.	-
E1 *1	Voice processing device ON error	The AMP device records that the AMP output does not function even while the source device operates.	<ol style="list-style-type: none"> 1. Power source circuit (multi-display) 2. AVC-LAN circuit (stereo component amplifier assy – radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy 	05-1808 05-1886 67-12 67-9

E2	ON/OFF indication parameter error	The command for ON/OFF control from the master device has a problem.	Replace multi-display	67-12
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete.	-	-

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or engine start voltage.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again after the engine starts.
- *4: This code may be stored if the ignition key is held in the START position for one minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

7. MULTI-DISPLAY CONTROLLER SUB-ASSY (Physical address: 1F6) [RSE ECU]**NOTICE:**

The following inspection procedures of the multi-display controller sub-assy are described on the assumption that the radio receiver assy is normal.

If any radio receiver assy DTC is output, first proceed with troubleshooting of the radio receiver assy. (Refer to step 3.)

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in the ACC or ON position. • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (multi-display controller sub-assy) 2. AVC-LAN circuit (radio receiver assy - multi-display controller sub-assy) 3. Replace multi-display controller sub-assy 4. If error occurs again, replace radio receiver assy 	05-1959 05-1893 67-23 67-9
D7	Connection check error	When either of the following conditions is met: <ul style="list-style-type: none"> • The device that stored this code has (had) been disconnected after the engine starts (started). • The master device has (had) been disconnected when this code is (was) stored. 	<ol style="list-style-type: none"> 1. Power source circuit (multi-display controller sub-assy) 2. AVC-LAN circuit (radio receiver assy - multi-display controller sub-assy) 3. Replace multi-display controller sub-assy 4. If error occurs again, replace radio receiver assy 	05-1959 05-1893 67-23 67-9
DC *2 *4	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9

DD *3	Master reset	The device that should be the master has been disconnected after engine start.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (radio receiver assy - multi-display controller sub-assy) 3. Replace multi-display 4. If error occurs again, replace multi-display controller sub-assy	05-1808 05-1913 67-12 67-23
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code is detected when signal receiving time is delayed.	-
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete.	-	-
21	ROM error	A malfunction exists in ROM.	Replace multi-display controller sub-assy	67-23
22	RAM error	A malfunction exists in RAM.	Replace multi-display controller sub-assy	67-23

HINT:

- *1: This code may be stored depending on the battery condition or engine start voltage even if no failure is detected .
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again with the engine running.
- *4: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

8. STEREO COMPONENT CONTROLLER ASSY (Physical address: 1F4) [RSA]**NOTICE:**

The following inspection procedures of the stereo component controller assy are described on the assumption that the radio receiver assy is normal.

If any radio receiver assy DTC is output, first proceed with troubleshooting of the radio receiver assy. (Refer to step 3.)

(a) Logical address: 01 (Communication control)

HINT:

Methods used to verify the cause of the problem are listed in order of probability in the verification column.

DTC	Name	Diagnosis	Verification	See page
D6 *1	No master	When either of the following conditions is met: • The device that stores (stored) the code has (had) been disconnected when the ignition switch is (was) in the ACC or ON position. • The master device has (had) been disconnected when this code is (was) stored.	1. Power source circuit (stereo component controller assy) 2. AVC-LAN circuit (stereo component controller assy - radio receiver assy) 3. Replace stereo component controller assy 4. If error occurs again, replace radio receiver assy	05-1820 05-1899 67-28 67-9

D7	Connection check error	When either of the following conditions is met: • The device that stored this code has (had) been disconnected after the engine starts (started). • The master device has (had) been disconnected when this code is (was) stored.	1. Power source circuit (stereo component controller assy) 2. AVC-LAN circuit (stereo component controller assy – radio receiver assy) 3. Replace stereo component controller assy 4. If error occurs again, replace radio receiver assy	05-1820 05-1899 67-28 67-9
DC *2 *5	Transmission error	Transmission to the device indicated by the sub code has failed.	Inspection for the device indicated by the sub code. (Refer to the inspection list for the device indicated by the sub code.)	Refer to step 9
DD *3	Master reset	The device that should be the master has been disconnected after engine start.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (stereo component controller assy – radio receiver assy) 3. Replace multi-display	05-1808 05-1899 67-12
DF *4	Master error	The device with a display fails and the master is switched to the audio device. Either that, or a communication error between the sub master (radio receiver assy) and master has occurred.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (multi-display – radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy	05-1808 05-1889 67-12 67-9
E0 *1	Registration complete indication error	"Registration complete" command from the master device cannot be received.	This code will be detected when signal receiving time is delayed.	-
E1 *1	Voice processing device ON error	The AMP device records that the AMP output does not function even while the source device operates.	1. Power source circuit (multi-display) 2. AVC-LAN circuit (stereo component amplifier assy – radio receiver assy) 3. Replace multi-display 4. If error occurs again, replace radio receiver assy	05-1808 05-1886 67-12 67-9
E2	ON/OFF indication parameter error	The command for ON/OFF control from the master device has a problem.	Replace multi-display	67-12
E3 *1	Registration demand transmission	The registration demand command from the slave device is output, or the registration demand command is output by receiving connection confirmation command from the sub master device.	-	-
E4	Multiple frame incomplete	Multiple frame transmission ends incomplete.	-	-

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or engine start voltage.
- *2: If the power connector is disconnected after the engine starts, this code is stored after 180 seconds.
- *3: This code may be stored if the ignition key is turned to the START position again after the engine starts.
- *4: This code may be stored if the ignition key is held in the START position for one minute or more before returning to the ON position.
- *5: If the device is reported as not existing during verification, check the power source circuit and AVC-LAN circuit for the device.

9. THE INSPECTION LIST FOR THE DEVICE INDICATED BY THE SUB CODE**HINT:**

- If any DTCs are output for 2 or more slave units that are connected in series, there may be a problem between the master unit and the slave unit which is closest to the master unit. Therefore, first proceed with troubleshooting of that slave unit.
- Methods used to verify the cause of the problem are listed in order of probability in the verification column.

Sub code address (Device name)	Verification	See page
110 (Multi-display)	1. Power source circuit (multi-display) 2. Replace multi-display	05-1808 67-12
178 (Navigation ECU)	1. Power source circuit (navigation ECU) 2. AVC-LAN circuit (television camera ECU - navigation ECU) (*2) 3. AVC-LAN circuit (multi-display controller sub-assy - navigation ECU) (*1) 4. AVC-LAN circuit (multi-display - navigation ECU) (*3) 5. Replace navigation ECU	05-1810 05-1897 05-1895 05-1882 67-36
190 (Radio Receiver Assy)	1. Power source circuit (radio receiver assy) 2. AVC-LAN circuit (multi-display - radio receiver assy) (*2) 3. Replace radio receiver assy	05-1672 05-1889 67-9
1C6 (Gateway ECU)	1. Power source circuit (network gateway ECU) 2. AVC-LAN circuit (multi-display - network gateway ECU) 3. Replace network gateway ECU	05-1812 05-1884 67-49
280 (Television Camera ECU)	1. Power source circuit (television camera ECU) 2. AVC-LAN circuit (multi-display - television camera ECU) 3. Replace television camera ECU	05-2015 05-1897 67-25
440 (Stereo Component Amplifier Assy)	1. Power source circuit (stereo component amplifier assy) 2. AVC-LAN circuit (stereo component amplifier assy - radio receiver assy) 3. Replace stereo component amplifier assy	05-1674 05-1886 67-13
1F6 (Multi-display Controller Sub-assy) (*1)	1. Power source circuit (multi-display controller sub-assy) 2. AVC-LAN circuit (radio receiver assy - multi-display controller sub-assy) 3. Replace multi-display controller sub-assy	05-1959 05-1893 67-23
1F4 (Stereo Component Controller Assy) (*2)	1. Power source circuit (stereo component controller assy) 2. AVC-LAN circuit (radio receiver assy - stereo component controller assy) 3. Replace stereo component controller assy	05-1820 05-1899 67-28

*1: w/ Rear Seat Entertainment System

*2: w/o Rear Seat Entertainment System

*3: w/o Rear Seat Entertainment and Back Monitor Systems

BLACK SCREEN (NO IMAGE APPEARS ON NAVIGATION AND AUDIO SCREEN)

INSPECTION PROCEDURE

1 CHECK DISPLAY SETTING

- (a) Check that the display is not in "Screen OFF" mode.

OK: The display setting is not in "Screen OFF" mode.

NG

CHANGE SCREEN TO "SCREEN ON" MODE

OK

2 CHECK IMAGE QUALITY SETTING

- (a) Check if screen color quality can be set.

OK: Switching is possible.

OK

PRESS PANEL SWITCH "DISPLAY" AND SET SCREEN COLOR QUALITY TO NORMAL

NG

3 CHECK CABIN

- (a) Check if condensation is likely to occur, or the temperature is high or low (extremely cold) in the cabin.
HINT:

This problem occurs when the cabin is humid and the temperature rapidly changes. This condition may produce condensation, resulting in a short circuit.

OK: The above condition is not observed.

NG

SET CABIN TEMPERATURE TO APPROPRIATE DEGREES (20 TO 30°C) (68 TO 86°F)

OK

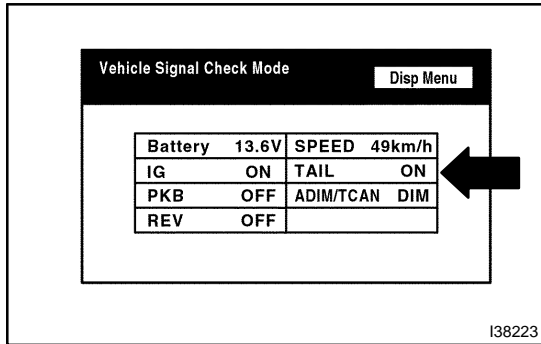
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

ILLUMINATION FOR PANEL SWITCH DOES NOT COME ON WITH TAIL SWITCH ON

INSPECTION PROCEDURE

1 | DISPLAY CHECK MODE(VEHICLE SIGNAL CHECK MODE)

(a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (see page 05-1728).



(b) Turn the light control switch to the TAIL, HEAD or OFF position.

Standard:

Light Control Switch	Display
TAIL or HEAD	ON
OFF	OFF

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

OK → **REPLACE MULTI-DISPLAY (SEE PAGE 67-12)**

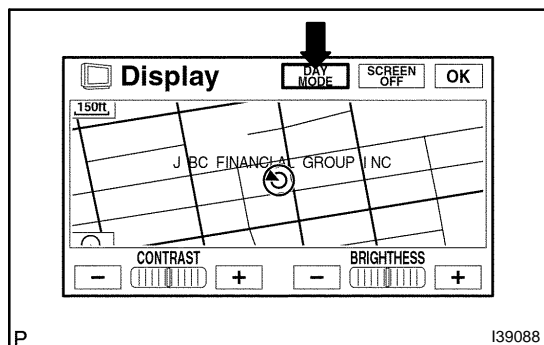
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

DISPLAY DOES NOT DIM (NIGHT SCREEN) WITH TAIL SWITCH ON

INSPECTION PROCEDURE

1 CHECK IMAGE QUALITY SETTING



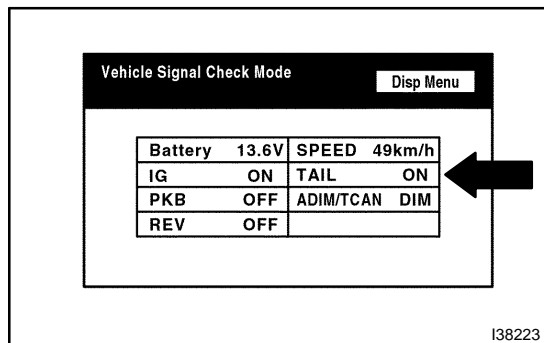
- (a) Enter the option screen by pressing the "OPTION" switch.
- (b) Enter the display adjustment screen by pressing the "DISPLAY" switch.
- (c) Turn the light control switch to the TAIL position.
- (d) Check if "DAY MODE" on the display adjustment is ON.
OK: "DAY MODE" is ON.

OK → **TURN FORCED "DAY MODE" SETTING OFF**

NG

2 DISPLAY CHECK MODE(VEHICLE SIGNAL CHECK MODE)

- (a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (see page 05-1728).



- (b) Turn the light control switch to the TAIL, HEAD or OFF position.

Standard:

Light Control switch	Display
TAIL or HEAD	ON
OFF	OFF

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

OK → **REPLACE MULTI-DISPLAY (SEE PAGE 67-12)**

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

PANEL SWITCH DOES NOT FUNCTION

INSPECTION PROCEDURE

1 CHECK PANEL SWITCH

- (a) Check for foreign matter around the switch that might prevent operation.

OK: No foreign matter is found.

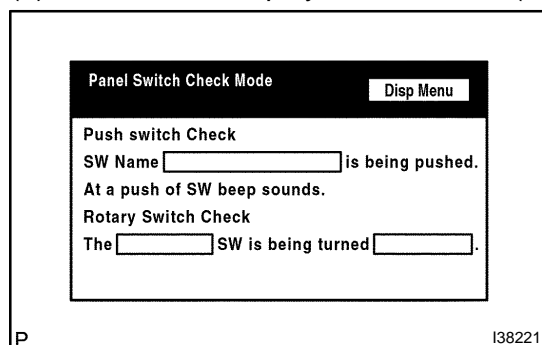
NG

REMOVE ANY FOREIGN MATTER FOUND

OK

2 DISPLAY CHECK MODE(PANEL SWITCH CHECK MODE)

- (a) Enter the "Display Check" mode (Panel Switch Check Mode) (see page [05-1727](#)).



- (b) Operate the abnormal switch and check if the switch name and status are correctly displayed.

OK: The switch name and status are correctly displayed as operated.

OK

**REPLACE MULTI-DISPLAY
(SEE PAGE [67-12](#))**

NG

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE [05-1744](#))**

TOUCH PANEL SWITCH DOES NOT FUNCTION

INSPECTION PROCEDURE

1 CHECK TOUCH PANEL

- (a) Check for dirt on the display surface.

OK: The display surface is clean.

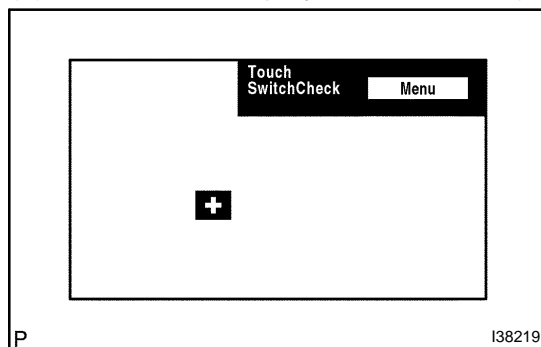
NG

REMOVE ANY DIRT FOUND AND RECHECK TOUCH PANEL

OK

2 DISPLAY CHECK MODE(TOUCH SWITCH CHECK)

- (a) Enter the "Display Check" mode (Touch Switch Check) (see page [05-1726](#)).



- (b) Touch the display in the area where the abnormal switch occurs.

OK: A "+" mark appears at the touched position.

OK

**REPLACE MULTI-DISPLAY
(SEE PAGE [67-12](#))**

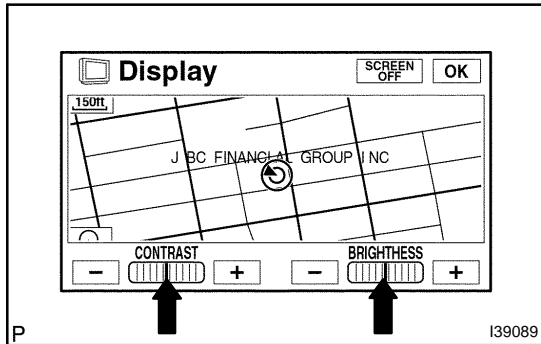
NG

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE [05-1744](#))**

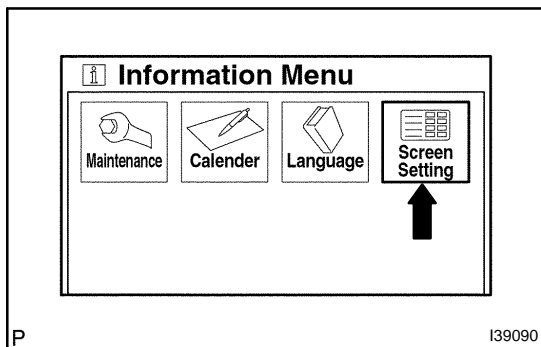
SCREEN FLICKER OR COLOR DISTORTION

INSPECTION PROCEDURE

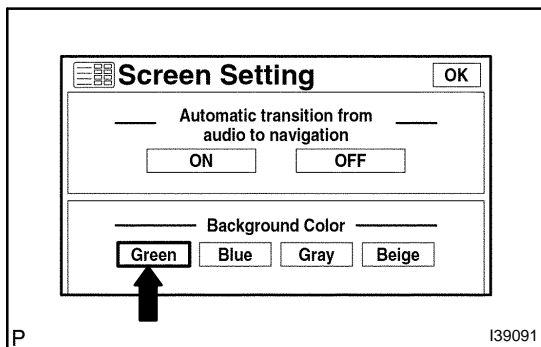
1 CHECK DISPLAY SETTING



- (a) Enter the option screen by pressing the "OPTION" switch.
- (b) Enter the display adjustment screen by pressing the "DISPLAY" switch.
- (c) Reset display settings (contrast, brightness) and check if the screen appears normal.



- (d) Press the "Information" switch and then the "Screen Setting" switch.



- (e) Set the "Background Color" to "Green" (initial setting) and check if it is normal.
OK: Returns to normal.

OK → END

NG

2 CHECK CABIN

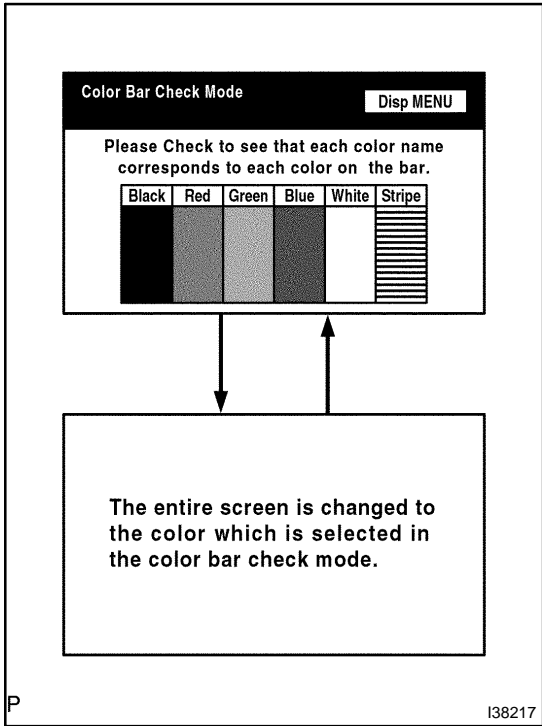
- (a) Check if the cabin temperature is -20°C (-4.0°F) or less.
OK: Cabin is warmer than -20°C (-4.0°F).

NG → HEAT CABIN AND RECHECK TEMPERATURE

OK

3 | DISPLAY CHECK MODE(COLOR BAR CHECK MODE)

(a) Enter the "Display Check" mode (Color Bar Check Mode) (see page 05-1725).



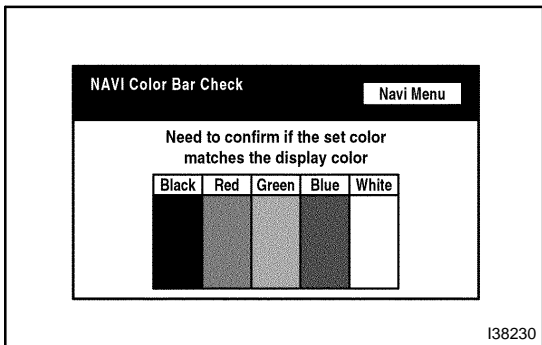
(b) Check that color bars match the displayed names.
OK: Color bars match the displayed names.

NG → REPLACE MULTI-DISPLAY (SEE PAGE 67-12)

OK

4 | NAVIGATION CHECK MODE(NAVI COLOR BAR CHECK)

(a) Enter the "Navigation Check" mode (NAVI Color Bar Check) (see page 05-1731).

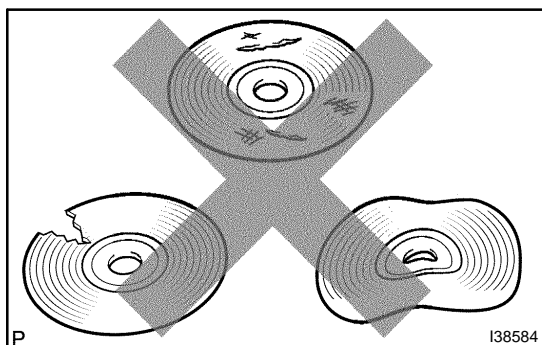


(b) Check that color bars match the displayed names.
OK: Color bars match the displayed names.

OK → REPLACE MULTI-DISPLAY (SEE PAGE 67-12)

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

MAP DISC CANNOT BE INSERTED**INSPECTION PROCEDURE****1 CHECK MAP DISC**

- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

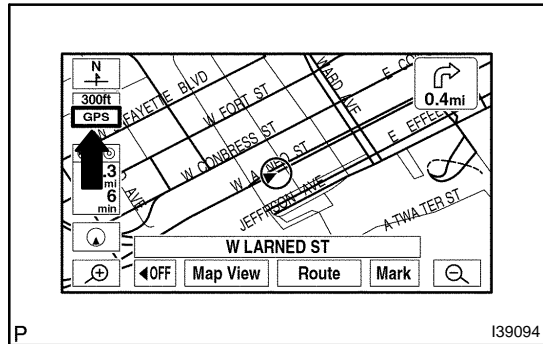
NG**REPLACE MAP DISC****OK**

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

VEHICLE POSITION MARK DEVIATES GREATLY

INSPECTION PROCEDURE

1 CHECK GPS MARK



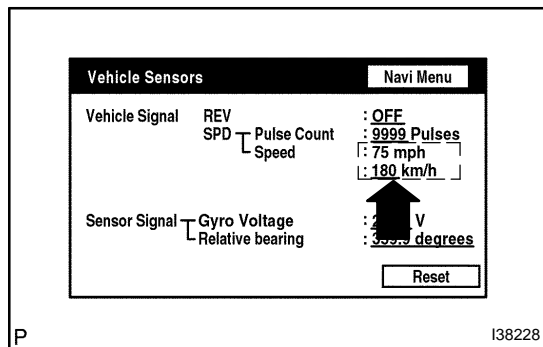
- (a) Check that the GPS mark is displayed.
OK: The GPS mark is displayed.

NG GO TO "GPS MARK IS NOT DISPLAYED" IN FLOW CHART (SEE PAGE 05-1787)

OK

2 NAVIGATION CHECK MODE(VEHICLE SENSORS)

- (a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1730).

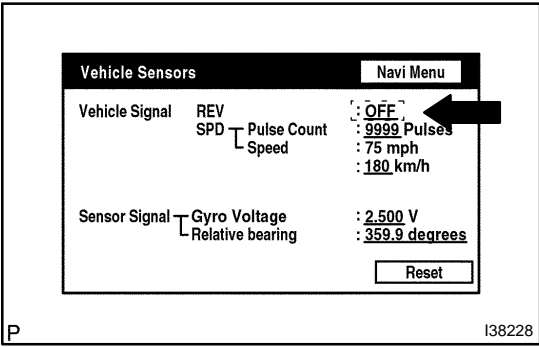


- (b) While driving, compare the "Speed" indicator to the reading on the speedometer. Check that these readings are almost the same.
OK: The readings are almost the same.

NG GO TO "SPEED SIGNAL CIRCUIT (NAVIGATION ECU - COMBINATION METER ASSY)" IN FLOW CHART (SEE PAGE 05-1830)

OK

3 NAVIGATION CHECK MODE(VEHICLE SENSORS)



(a) Move the shift lever to the R or P position.

Standard:

Shift lever	Display
P	OFF
R	ON

HINT:

The display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

NG → **GO TO "REVERSE SIGNAL CIRCUIT" IN FLOW CHART (SEE PAGE 05-1854)**

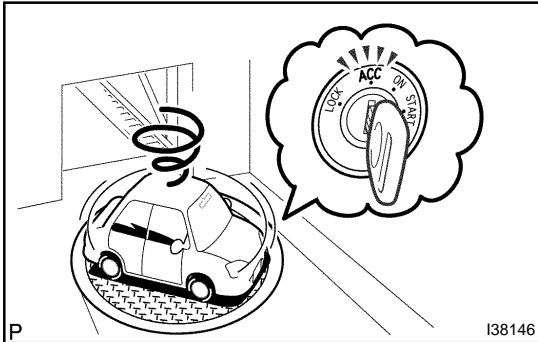
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

CURSOR OR MAP ROTATES WHEN VEHICLE IS STOPPED

INSPECTION PROCEDURE

1 CHECK CONDITION



- (a) Check with the customer if the vehicle has been turned by a turntable at parking.

OK: The vehicle has not been turned by a turntable.

HINT:

If the ignition switch is turned to the ACC or ON position while the vehicle is being turned by a turntable, the system may store the angular velocity at this time. For this reason, the vehicle position cursor could deviate.

NG

TURN IGNITION SWITCH TO ON POSITION WHEN VEHICLE IS COMPLETELY STOPPED

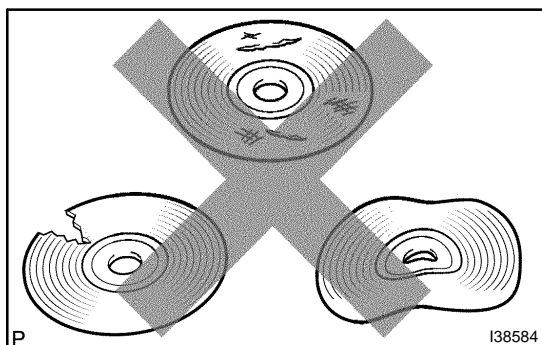
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

VEHICLE POSITION MARK IS NOT UPDATED

INSPECTION PROCEDURE

1 CHECK MAP DISC



- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → REPLACE MAP DISC

OK

2 CHECK MAP DISPLAY

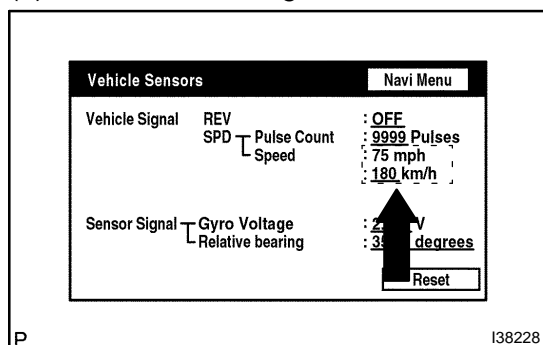
- (a) Check if a touch scroll can be performed on the map display.
OK: Touch scroll can be performed.

NG → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

OK

3 NAVIGATION CHECK MODE(VEHICLE SENSORS)

- (a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1728).

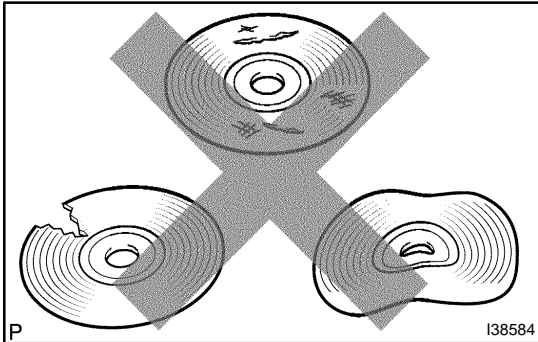


- (b) While driving, compare the "Speed" indicator to the reading on the speedometer. Check if these readings are almost the same.
OK: The readings are almost the same.

NG → GO TO "SPEED SIGNAL CIRCUIT (NAVIGATION ECU - COMBINATION METER ASSY)" IN FLOW CHART (SEE PAGE 05-1830)

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

CURRENT POSITION DISPLAY DOES NOT APPEAR**INSPECTION PROCEDURE****1 CHECK MAP DISC**

- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG**REPLACE MAP DISC****OK**

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

GPS MARK IS NOT DISPLAYED

INSPECTION PROCEDURE

1 CHECK CABIN

- (a) Check the cabin for any object that might interrupt radio reception on the instrument panel. If such an object exists, remove it and check if the GPS mark reappears.

HINT:

GPS works using extremely weak radio waves originating from satellites. If the signal is interrupted by obstructions or another radio wave, the GPS system may not be able to properly receive the signal.

OK: Mark appears.

OK

NORMAL OPERATION

NG

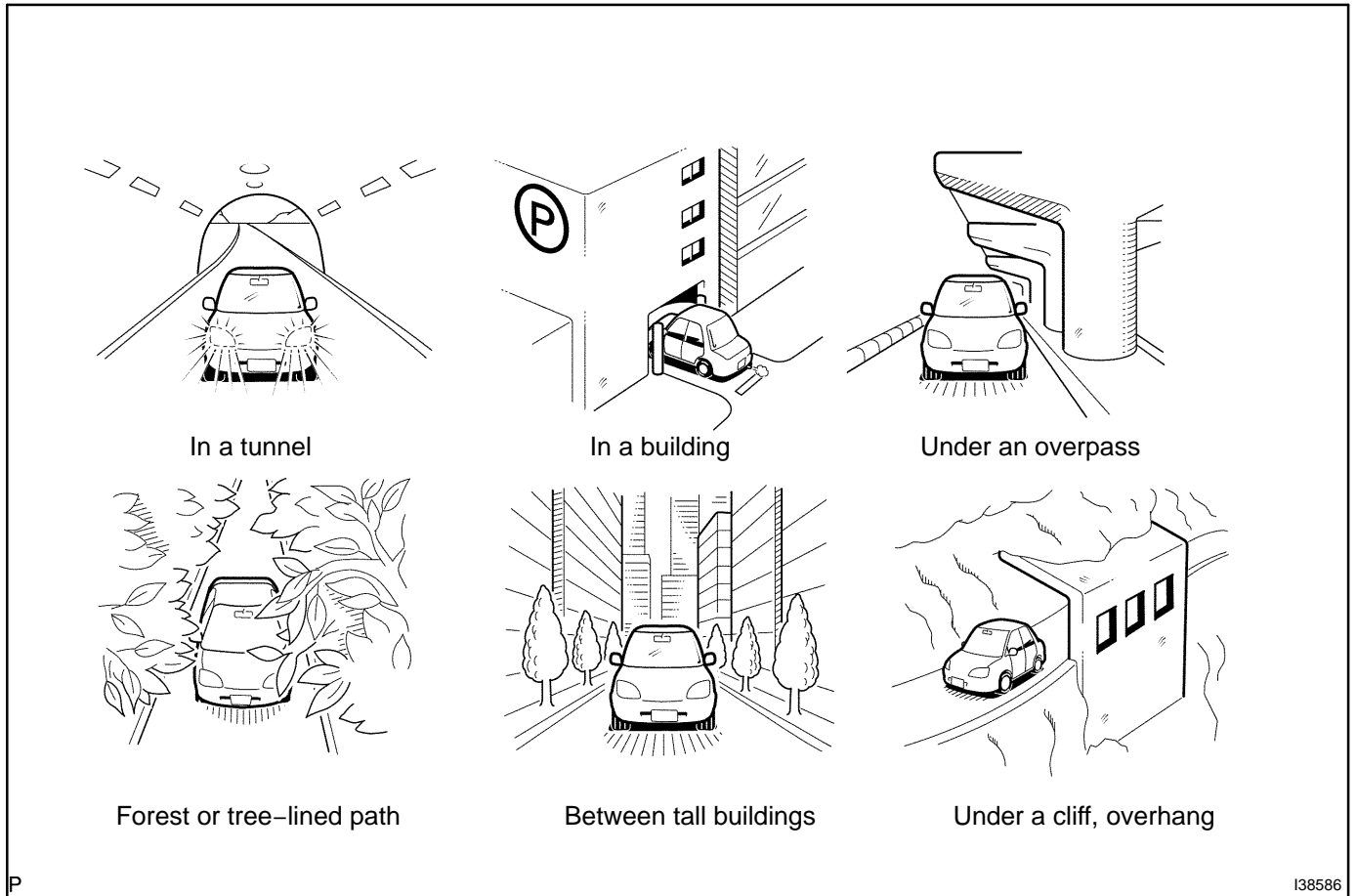
2 CHECK SURROUNDINGS

- (a) Check if the vehicle is in a location where GPS signal reception is bad. If the vehicle is in such a place, move it elsewhere and check if the GPS mark reappears.

HINT:

- GPS uses 24 satellites in 6 orbits so that at any time 4 satellites will be in line-of-sight of your vehicle.
- GPS signals may not be received, however, based on surroundings, vehicle direction, and time.

- The following illustrations show some conditions where it may be difficult to receive GPS signals.



OK: GPS mark is displayed.

OK RETURNS TO NORMAL

NG

3 NAVIGATION CHECK MODE(GPS INFORMATION)

(a) Enter the "Navigation Check" mode (GPS information) (see page 05-1729).

GPS Information					Navi Menu				
No.	Elv	Azm	LVL	STS	No.	Elv	Azm	LVL	STS
3	73°	/021°	12	P	5	80°	/279°	54	P
8	52°	/183°	58	P	9	27°	/121°	26	-
10	32°	/219°	39	P	13	19°	/330°	11	-
16	49°	/097°	20	T	18	22°	/300°	12	-
20	61°	/045°	39	T	21	40°	/142°	49	T
23	72°	/278°	57	P	24	17°	/350°	13	-
Measurement		Date	98/05/47 09:46:00						
status: 3D		Latitude	39° 59' 137° 00.12'						

I38226

(b) Check how many of the following codes occur in the "STS" column.

For DENSO Models: T, P
For AISIN AW Models: 04H, 08H
OK: At least 3 codes occur.

OK REPLACE NAVIGATION ECU (SEE PAGE 67-36)

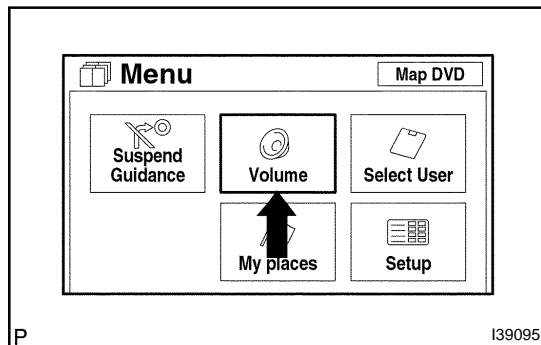
NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

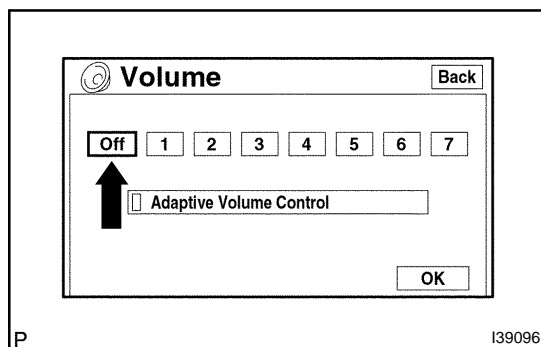
VOICE GUIDANCE DOES NOT FUNCTION

INSPECTION PROCEDURE

1 CHECK NAVIGATION SYSTEM SETTING



- (a) Enter the "Menu" screen by pressing the "MENU" switch.
 (b) Enter the volume adjustment screen by pressing the "Volume" switch.



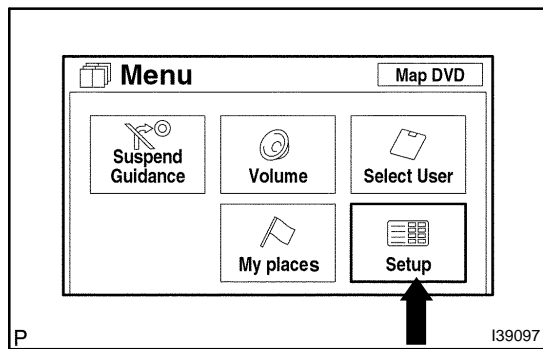
- (c) Check that "Off" is not selected.
OK: Off is not selected.

NG

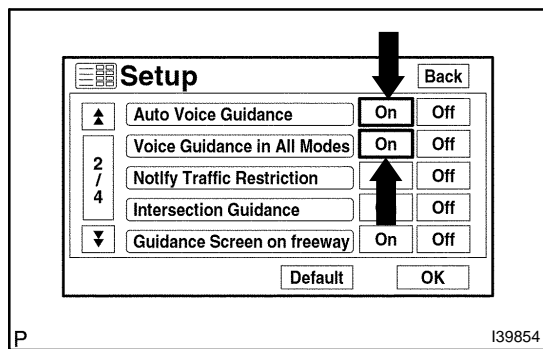
TURN VOICE GUIDANCE VOLUME UP TO 4 USING VOICE ADJUSTMENT SWITCHES

OK

2 CHECK NAVIGATION SETTING



- (a) Enter the "Menu" screen by pressing the "MENU" switch.
- (b) Enter the "Setup" screen by pressing the "Setup" switch.

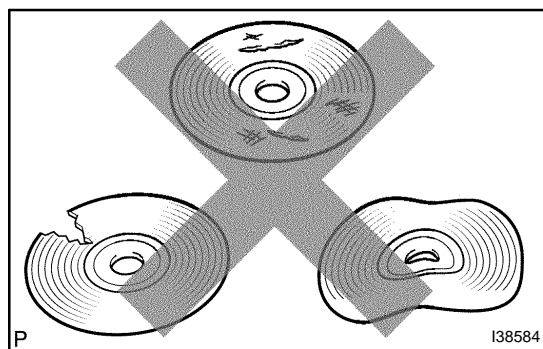


- (c) Check that "Auto Voice Guidance" is not OFF.
OK: Auto voice guidance is not OFF.
- (d) Check if "Voice Guidance in All Modes" is not OFF.
OK: Voice guidance in all modes is not OFF.

NG → **TURN AUTO VOICE GUIDANCE TO "ON"**

OK

3 CHECK MAP DISC



- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

4 CHECK RADIO RECEIVER ASSY

- (a) Check if audio sound can be heard from the driver's side speaker.

OK: Audio sound can be heard.

NG

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE [05-1744](#))**

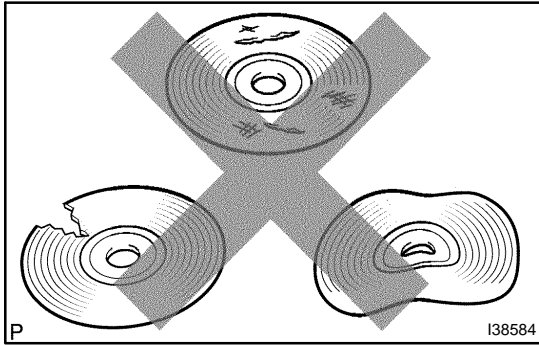
OK

REPLACE NAVIGATION ECU (SEE PAGE [67-36](#))

MAP DISPLAY INCOMPLETE

INSPECTION PROCEDURE

1 CHECK MAP DISC



- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG

REPLACE MAP DISC

OK

2 CHECK DISPLAY

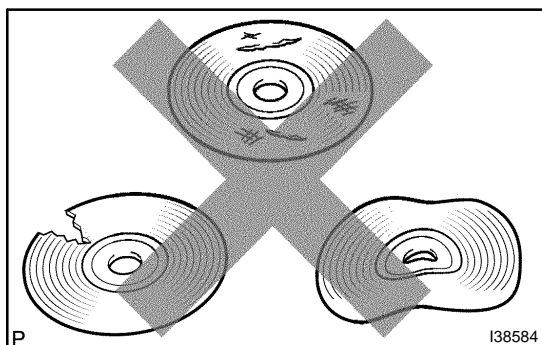
- (a) Check that displays other than the navigation display are complete.
OK: No other incomplete displays are found.

OK

REPLACE NAVIGATION ECU
 (SEE PAGE [67-36](#))

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
 (SEE PAGE [05-1744](#))

ROUTE CANNOT BE CALCULATED**INSPECTION PROCEDURE****1 CHECK MAP DISC**

- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

2 SET DESTINATION

- (a) Set another destination and check if the system can calculate the route correctly.
OK: Route can be correctly calculated.

OK → **NORMAL OPERATION**

NG

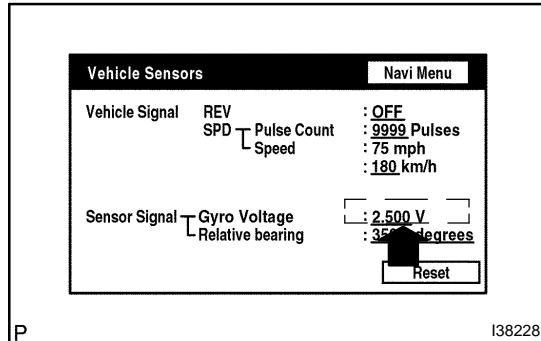
**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

GYRO ERROR

INSPECTION PROCEDURE

1 NAVIGATION CHECK MODE(VEHICLE SENSORS)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1730).



(b) Check the gyro voltage.

Standard: 0.1 to 4.5 V

NG

**REPLACE NAVIGATION ECU
(SEE PAGE 67-36)**

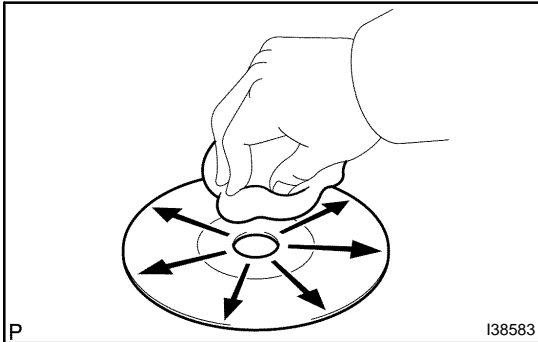
OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART
(SEE PAGE 05-1758)**

MAP DISC READ ERROR

INSPECTION PROCEDURE

1 CHECK MAP DISC



- (a) Check for dirt on the map disc surface.

OK: No dirt is on the map disc surface.

HINT:

If dirt is on the map disc surface, wipe it clean with a soft cloth from the inside to the outside in a radial direction.

NOTICE:

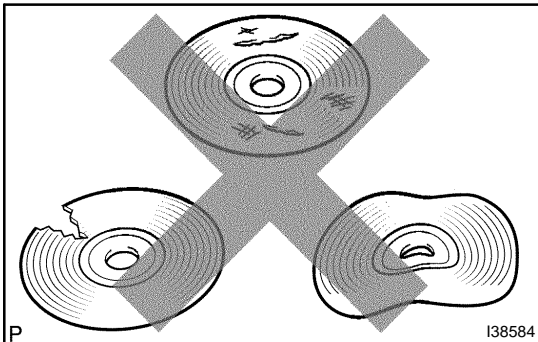
Do not use a conventional record cleaner or anti-static preservative.

NG →

CLEAN MAP DISC

OK

2 CHECK MAP DISC



- (a) Check that the map disc is not deformed or cracked.

OK: No deformations or cracks appear on the map disc.

NG →

REPLACE MAP DISC

OK

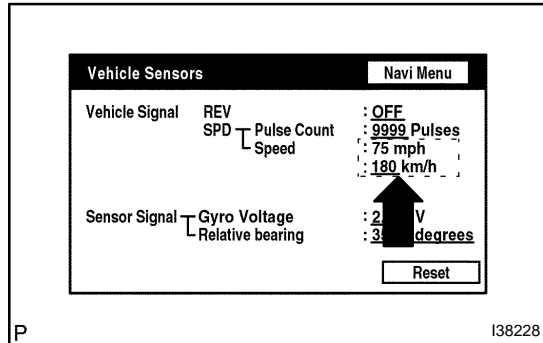
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

SPEED SIGNAL ERROR

INSPECTION PROCEDURE

1 NAVIGATION CHECK MODE(VEHICLE SENSORS)

(a) Enter the "Navigation Check" mode (Vehicle Sensors) (see page 05-1730).



(b) While driving, compare the "Speed" indicator to the reading on the speedometer. Check if these readings are almost the same.

OK: The readings are almost the same.

OK → **REPLACE NAVIGATION ECU (SEE PAGE 67-36)**

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

VOICE RECOGNITION DIFFICULTY

INSPECTION PROCEDURE

1 CHECK CONDITION

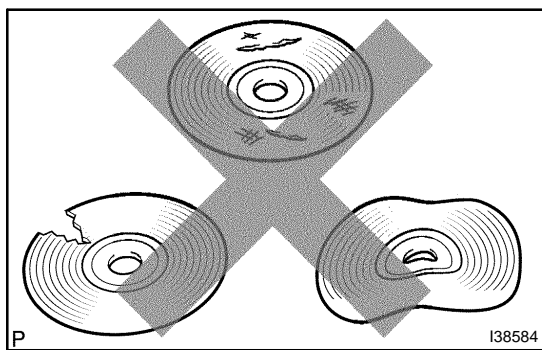
(a) Check if the system's voice recognition level is low by using only one particular voice.

OK: The system's voice recognition level is low with any voice.

NG SYSTEM'S VOICE RECOGNITION LEVEL VARIES DEPENDING ON VOICE AND PRONUNCIATION. THIS IS NOT A MALFUNCTION.

OK

2 CHECK MAP DISC

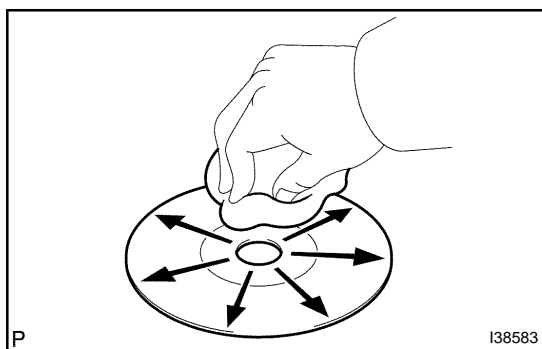


(a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG REPLACE MAP DISC

OK

3 CHECK MAP DISC



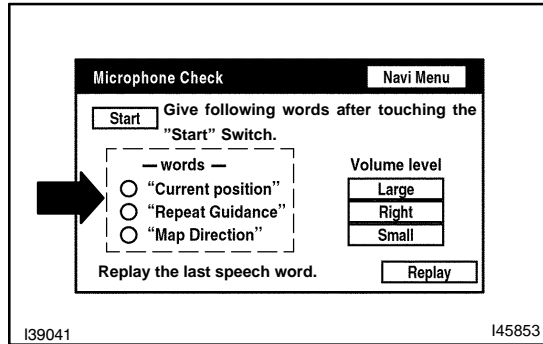
(a) Check for dirt on the map disc surface.
OK: No dirt is on the map disc surface.
HINT:
 If dirt is on the map disc surface, wipe it clean with a soft cloth from the inside to the outside in a radial direction.
NOTICE:
 Do not use a conventional record cleaner or anti-static preservative.

NG CLEAN MAP DISC

OK

4 NAVIGATION CHECK MODE (MICROPHONE CHECK)

(a) Enter the "Microphone Check" mode (see page 05-1733).



(b) Follow the directions on the screen. Check if the word recognition indicator lights up in green for each item.
OK: All check items are recognized.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)**

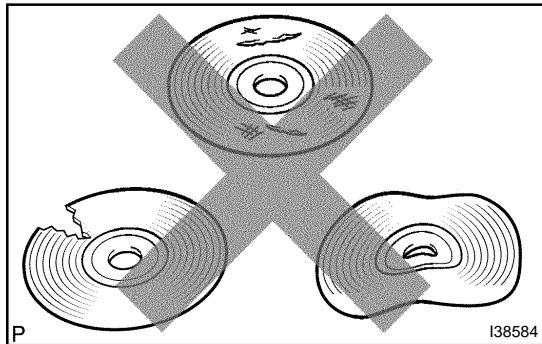
OK

NORMAL OPERATION

VOICE IS NOT RECOGNIZED

INSPECTION PROCEDURE

1 CHECK MAP DISC

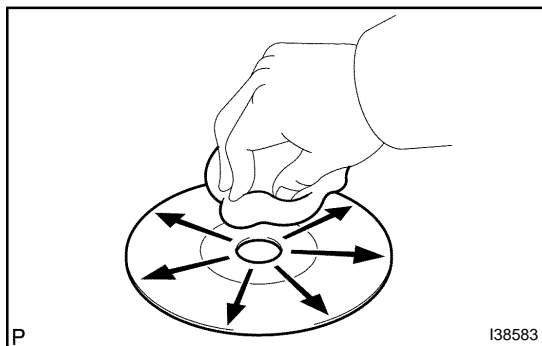


- (a) Check that the map disc is not deformed or cracked.
OK: No deformations or cracks appear on the map disc.

NG → **REPLACE MAP DISC**

OK

2 CHECK MAP DISC



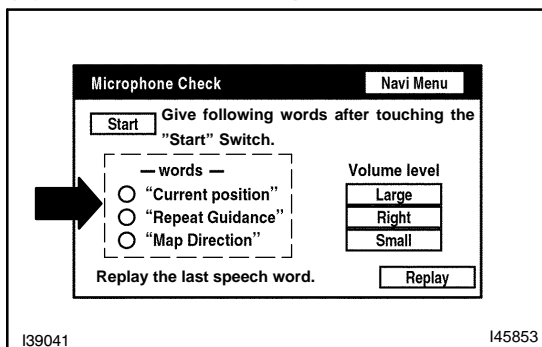
- (a) Check for dirt on the map disc surface.
OK: No dirt is on the map disc surface.
- HINT:
If dirt is on the map disc surface, wipe it clean with a soft cloth from the inside to the outside in a radial direction.
- NOTICE:**
Do not use a conventional record cleaner or anti-static preservative.

NG → **CLEAN MAP DISC**

OK

3 NAVIGATION CHECK MODE (MICROPHONE CHECK)

- (a) Enter the "Microphone Check" mode (see page 05-1733).



- (b) Follow the directions on the screen. Check if the word recognition indicator lights up in green for each item.
OK: All check items are recognized.

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)**

OK

REPLACE NAVIGATION ECU (SEE PAGE 67-36)

CELLULAR PHONE REGISTRATION FAILURE, PHONE DIRECTORY TRANSFER FAILURE

INSPECTION PROCEDURE

1 CHECK CELLULAR PHONE

(a) Proceed to the next step according to the table below.

Conditions	See page
Another Bluetooth compatible cellular phone is present.	A
Another Bluetooth compatible vehicle is present.	B
None of the above	C

B → GO TO STEP 3

C → GO TO STEP 4

A

2 CHECK USING ANOTHER CELLULAR PHONE

(a) Check if the system functions using another Bluetooth compatible cellular phone.

OK: The system functions.

NG → GO TO STEP 4

OK

USE A BLUETOOTH COMPATIBLE CELLULAR PHONE (DEPENDING ON THE VERSION, SOME BLUETOOTH COMPATIBLE CELLULAR PHONES CANNOT BE USED)

3 CHECK USING ANOTHER BLUETOOTH COMPATIBLE VEHICLE

(a) Check if the cellular phone is Bluetooth compatible.

OK: The system functions.

OK → REPLACE MULTI-DISPLAY
(SEE PAGE 67-12)

NG

4 CHECK CELLULAR PHONE

(a) Check if the cellular phone is Bluetooth compatible.

HINT:

Some version of Bluetooth compatible cellular phones may not function.

OK: The phone is Bluetooth compatible.

NG

USE A BLUETOOTH COMPATIBLE CELLULAR PHONE

OK

5 CHECK CELLULAR PHONE

(a) Check if a call can be made from the cellular phone.

HINT:

When the battery is low, registration or directory transfer cannot be done.

OK: A call can be made from the cellular phone.

NG

REPLACE CELLULAR PHONE

OK

REPLACE MULTI-DISPLAY (SEE PAGE [67-12](#))

CELLULAR PHONE CANNOT SEND/RECEIVE

INSPECTION PROCEDURE

1 CHECK BLUETOOTH SETTINGS

(a) Check if the Bluetooth settings are correct.

OK: Bluetooth settings are correct.

NG

SET CORRECTLY

OK

2 CHECK CELLULAR PHONE

(a) Check if the cellular phone is Bluetooth compatible.

HINT:

Some versions of Bluetooth compatible cellular phones may not function.

OK: The phone is Bluetooth compatible.

NG

END (ONLY A BLUETOOTH COMPATIBLE CELLULAR PHONE CAN BE USED)

OK

3 CHECK SETTINGS

(a) Check if the cellular phone functions.

HINT:

The cellular phone is unable to call under any of the following conditions:

- The cellular phone is locked.
- The directory is being transferred.
- The line is crossed.
- Transmission is regulated.
- The power is off.
- The cellular phone is not connected to Bluetooth ("BT" is displayed while a connection is established).

OK: None of the above conditions exist.

NG

SET CORRECTLY

OK

4 CHECK CELLULAR PHONE

(a) Check if a call can be made from the cellular phone.

HINT:

When the battery is low, calls cannot be made or received.

OK: A call can be made from the cellular phone.

NG

REPLACE CELLULAR PHONE

OK

5 CHECK RECEPTION

(a) Put a cellular phone into a receiving state.

(b) Place the cellular phone close to the multi-display.

(c) Check if the cellular phone has reception in accordance with the multi-display.

OK: The cellular phone has reception.

NG

**REPLACE MULTI-DISPLAY
(SEE PAGE 67-12)**

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

UNABLE TO CALL IN A CERTAIN PLACE

INSPECTION PROCEDURE

1 CHECK SURROUNDING CONDITIONS

- (a) Check if a call can be made from the cellular phone in a certain place.

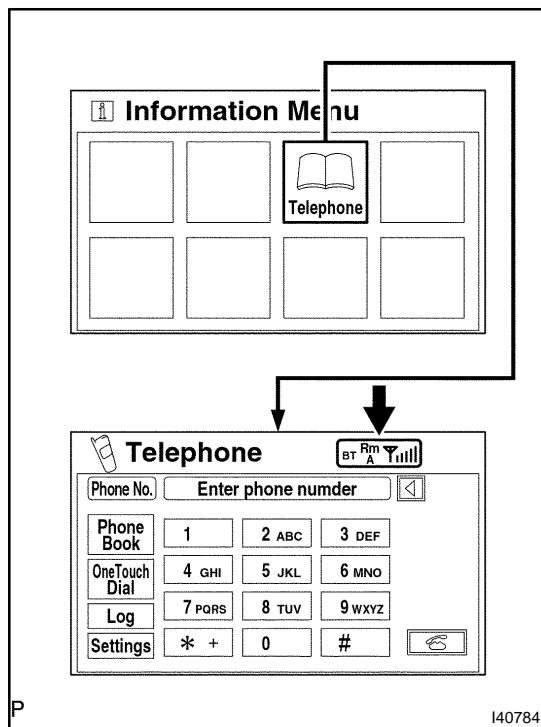
OK: A call can be made from the cellular phone.

NG

END(CELLULAR PHONES CAN ONLY FUNCTION IN CELLULAR SERVICE AREAS)

OK

2 CHECK SURROUNDING CONDITIONS



- (a) Check if the reception level is the same on the cellular phone and the multi-display.

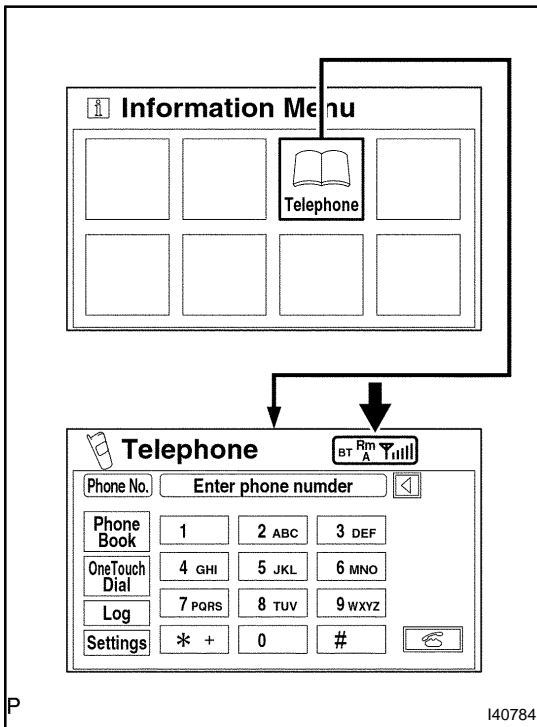
OK: The reception level is different.

NG

**REPLACE MULTI-DISPLAY
(SEE PAGE 67-12)**

OK

3 CHECK RECEPTION



- Place a cellular phone close to the multi-display.
- Check if the reception level becomes the same on the cellular phone and the multi-display.

OK: The reception level does not become the same.

NG

**REPLACE MULTI-DISPLAY
(SEE PAGE 67-12)**

OK

END (MULTI-DISPLAY RECEIVES RADIO WAVE OF DIFFERENT STRENGTH DEPENDING ON RADIO WAVE STRENGTH TRANSMITTED BY CELLULAR PHONE)

VOICE ON PHONE CANNOT BE HEARD, IS TOO QUIET, OR DISTORTED

INSPECTION PROCEDURE

1 CHECK CELLULAR PHONE

- (a) Check if the voice on the other side can be heard using a cellular phone.

OK: Voice can be heard.

NG → REPLACE CELLULAR PHONE

OK

2 CHECK SETTINGS

- (a) Check if the volume is set to the minimum or maximum level.

HINT:

When the volume is set to the minimum or maximum level, the sound may be distorted.

- (b) Check if the MUTE switch is set to ON.

OK: MUTE switch is not set to ON.

NG → TURN MUTE SWITCH OFF

OK

3 VOICE CHECK

- (a) Check if the navigation voice can be heard.

OK: The voice can be heard.

NG → GO TO "VOICE GUIDANCE DOES NOT FUNCTION" (SEE PAGE [05-1789](#))

OK

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE [05-1744](#))**

OWN VOICE CANNOT BE HEARD, IS TOO QUIET OR DISTORTED

INSPECTION PROCEDURE

1 CHECK CELLULAR PHONE

- (a) Check if the other side can hear your voice properly.

OK: Your voice can be heard correctly.

NG → REPLACE CELLULAR PHONE

OK

2 CHECK SETTINGS

- (a) Check if the mute switch is set to ON.

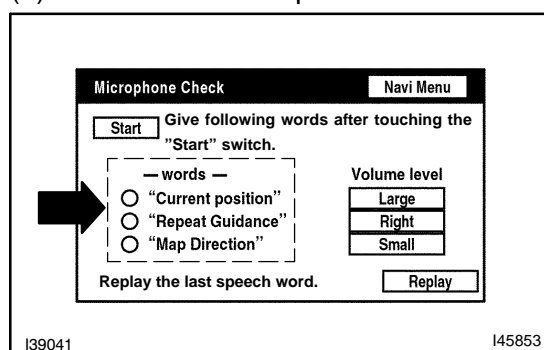
OK: MUTE switch is not set to ON.

NG → TURN MUTE SWITCH OFF

OK

3 NAVIGATION CHECK MODE (MICROPHONE CHECK)

- (a) Enter the "Microphone Check" mode (see page 05-1733).



- (b) Follow the directions on the screen. Check if the word recognition indicator lights up in green for each item.
OK: All check items are recognized.

NG → GO TO "VOICE IS NOT RECOGNIZED" (SEE PAGE 05-1799)

OK

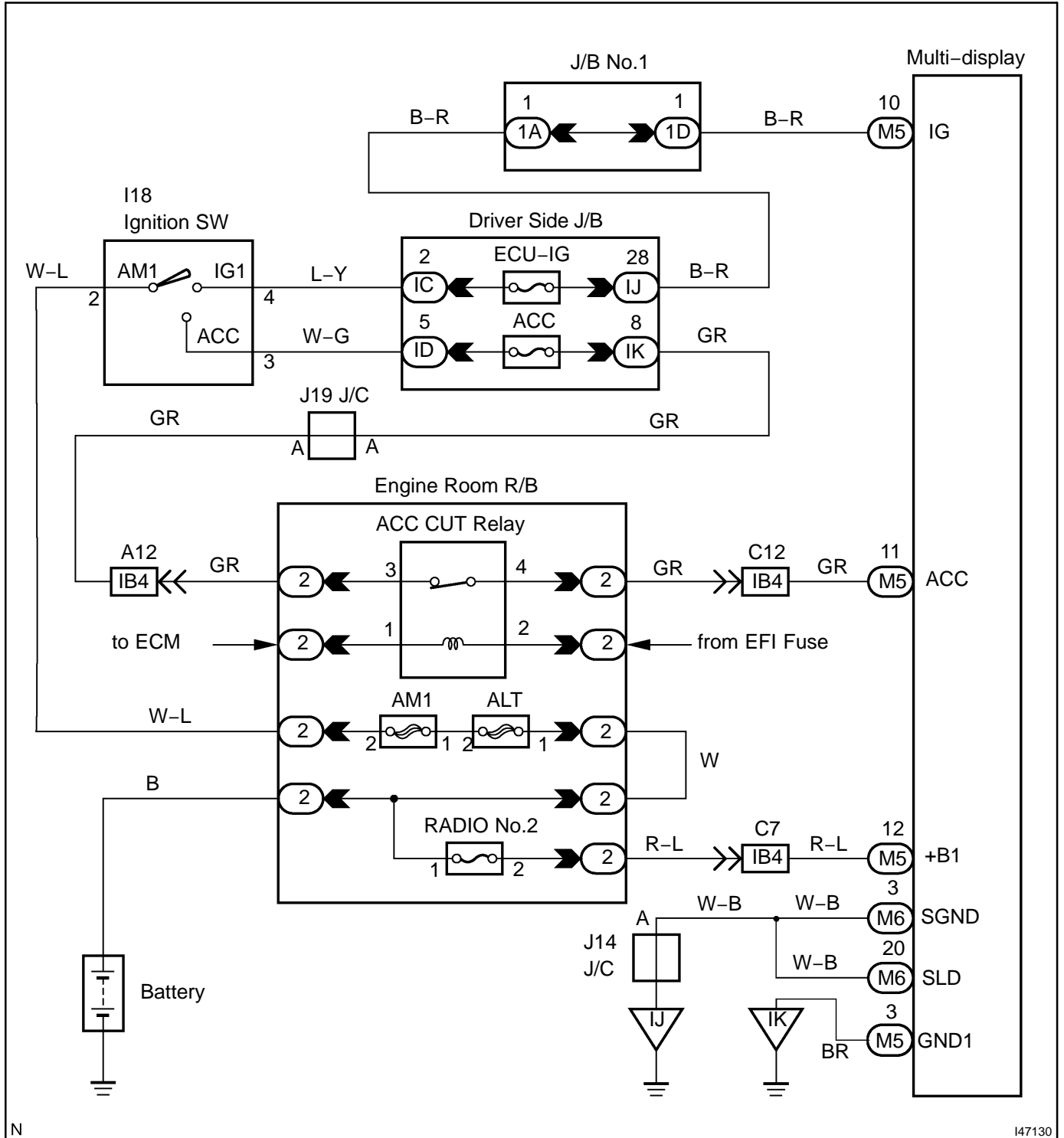
REPLACE MULTI-DISPLAY (SEE PAGE 67-12)

POWER SOURCE CIRCUIT (MULTI-DISPLAY)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the multi-display.

WIRING DIAGRAM

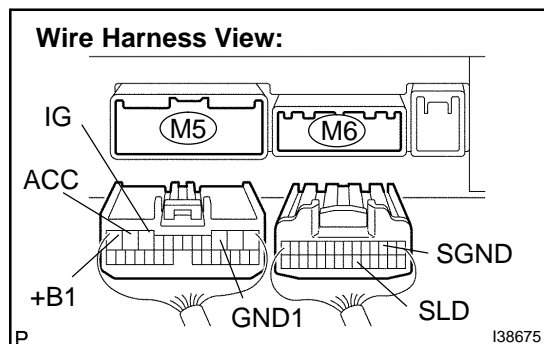


N

I47130

INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY



- (a) Disconnect the multi-display connectors M5 and M6.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND1 - Body ground	Always	Below 1 Ω
SLD - Body ground	Always	Below 1 Ω
SGND - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B1 - GND1	Always	10 to 14 V
ACC - GND1	Ignition SW ACC	10 to 14 V
IG - GND1	Ignition SW ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

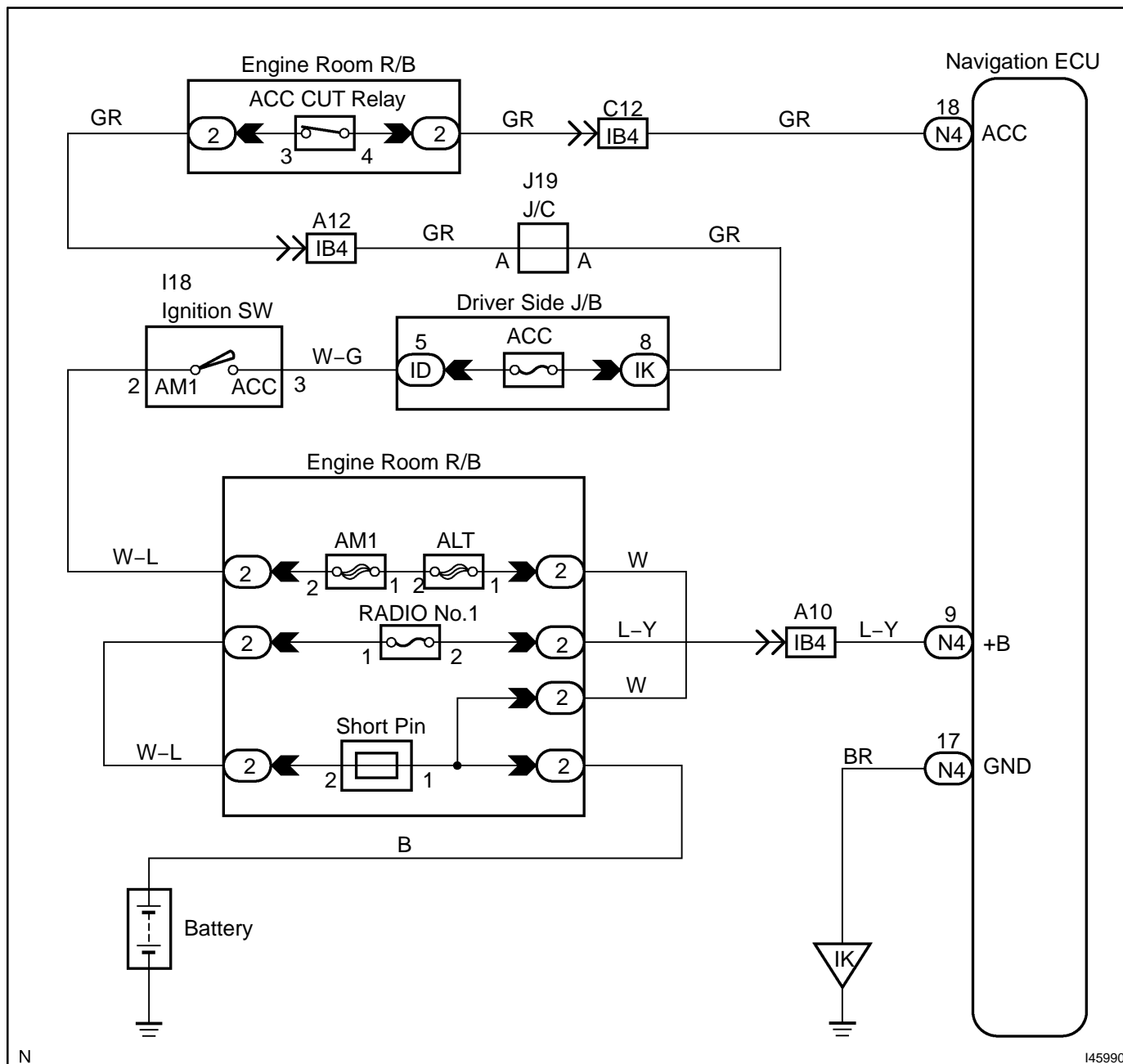
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE OR DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1744 or 05-1758)

POWER SOURCE CIRCUIT (NAVIGATION ECU)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the navigation ECU.

WIRING DIAGRAM

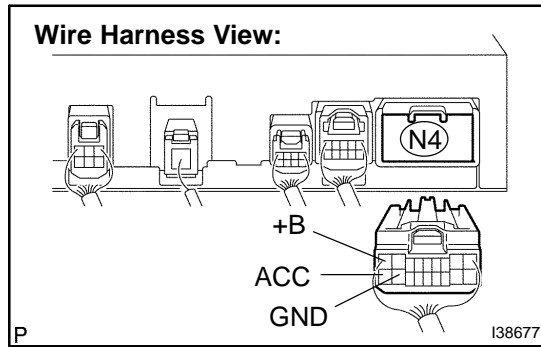


N

145990

INSPECTION PROCEDURE

1 INSPECT NAVIGATION ECU



- (a) Disconnect the navigation ECU connector N4.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B - Body ground	Always	10 to 14 V
ACC - Body ground	Ignition SW ACC	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

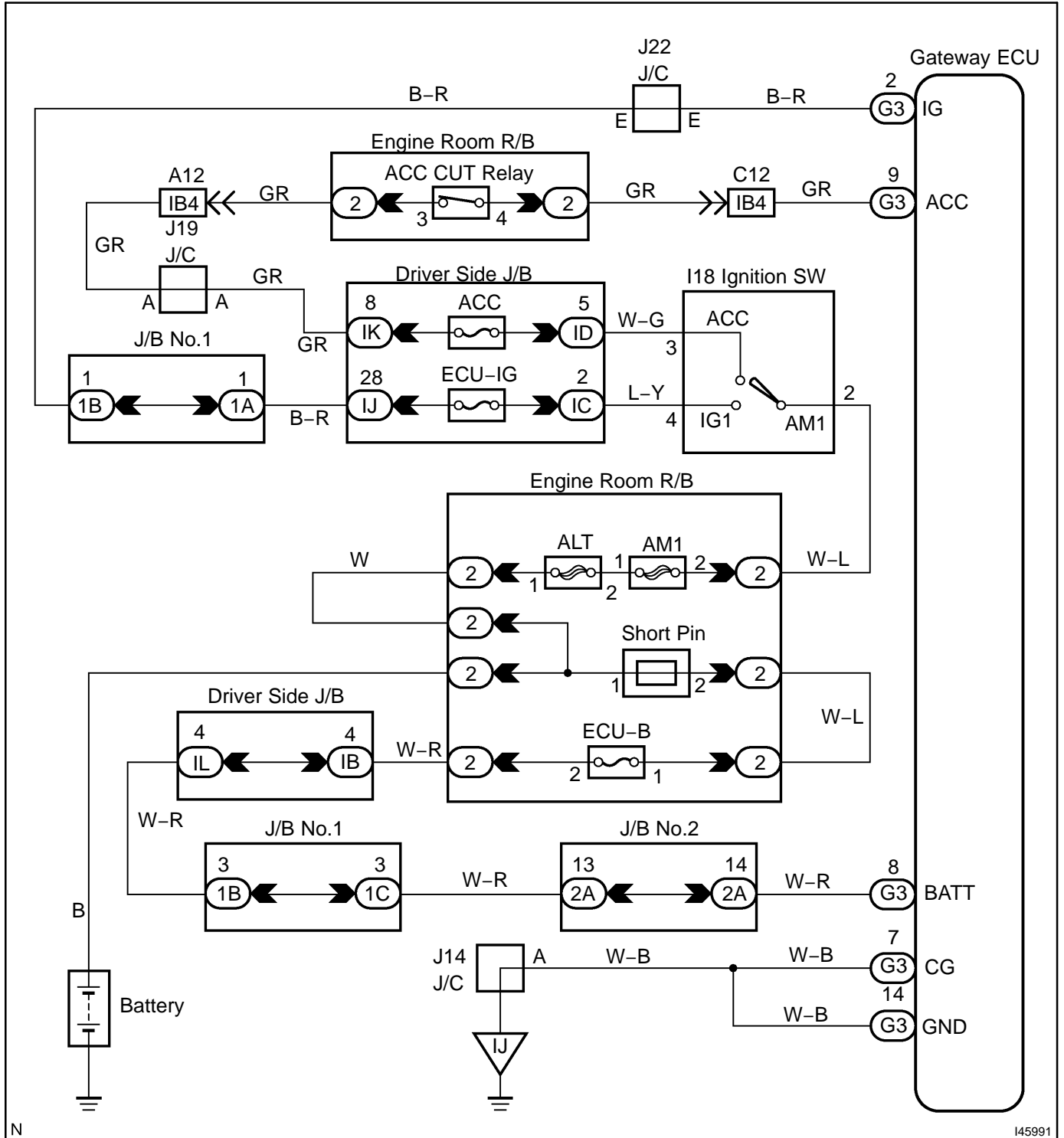
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE OR DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1744 or 05-1758)

POWER SOURCE CIRCUIT (NETWORK GATEWAY ECU)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the network gateway ECU.

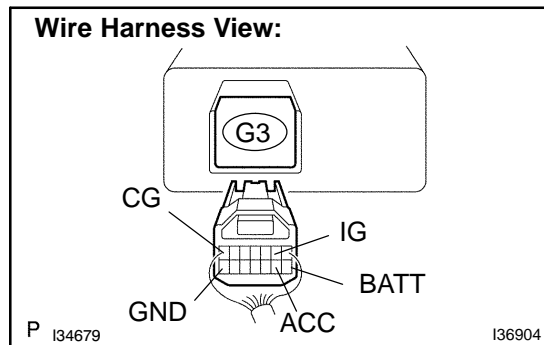
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT NETWORK GATEWAY ECU

Wire Harness View:



- (a) Disconnect the network gateway ECU connector G3.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω
CG - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BATT - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V
IG - GND	Ignition SW ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

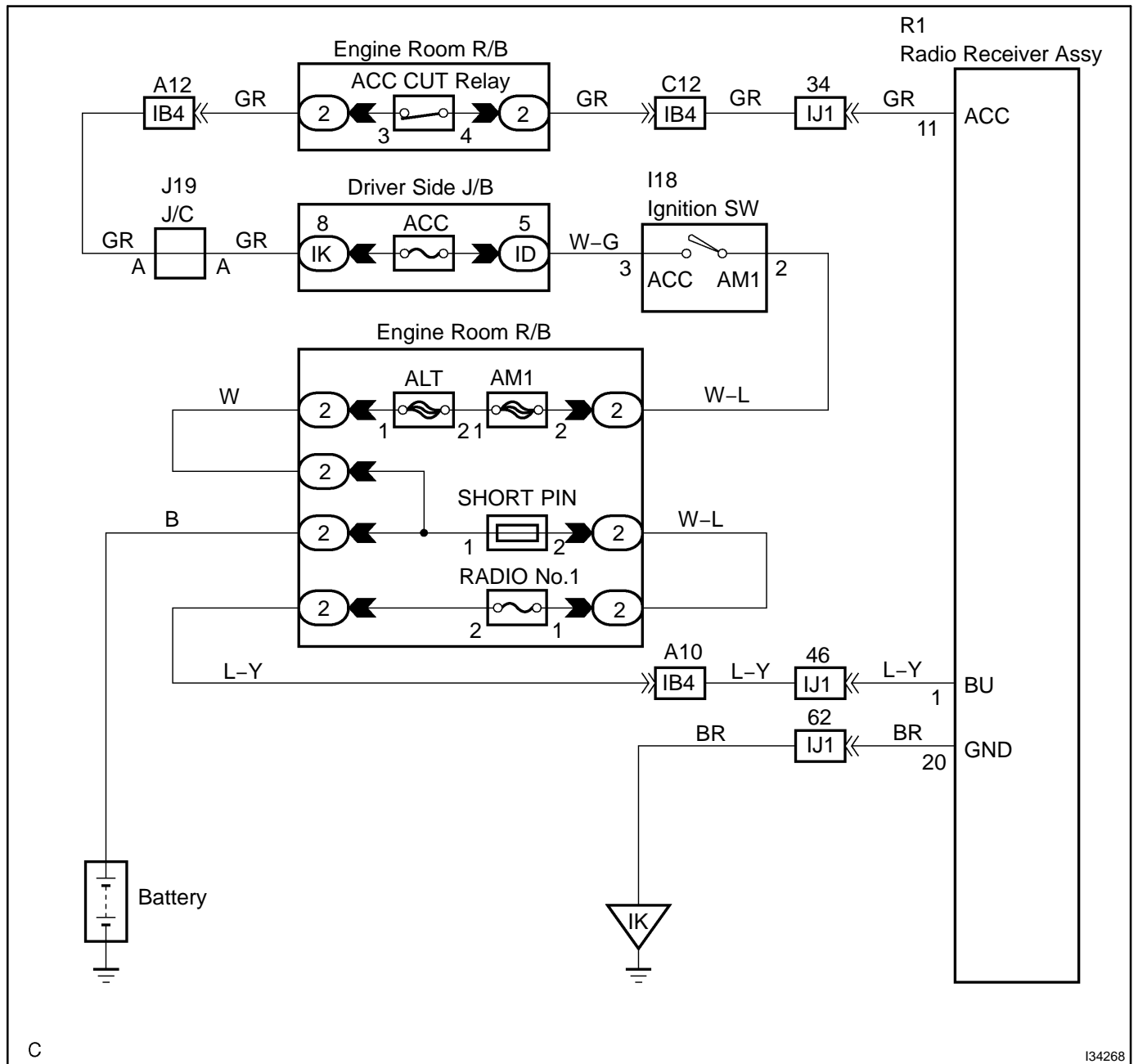
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART
 (SEE PAGE 05-1758)

POWER SOURCE CIRCUIT (RADIO RECEIVER ASSY)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the radio receiver assy.

WIRING DIAGRAM

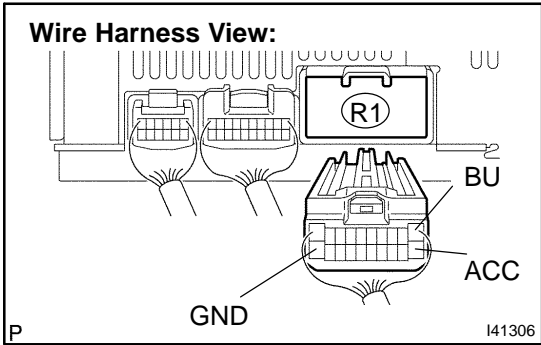


C

I34268

INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



- (a) Disconnect the radio receiver assy connector R1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
BU - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

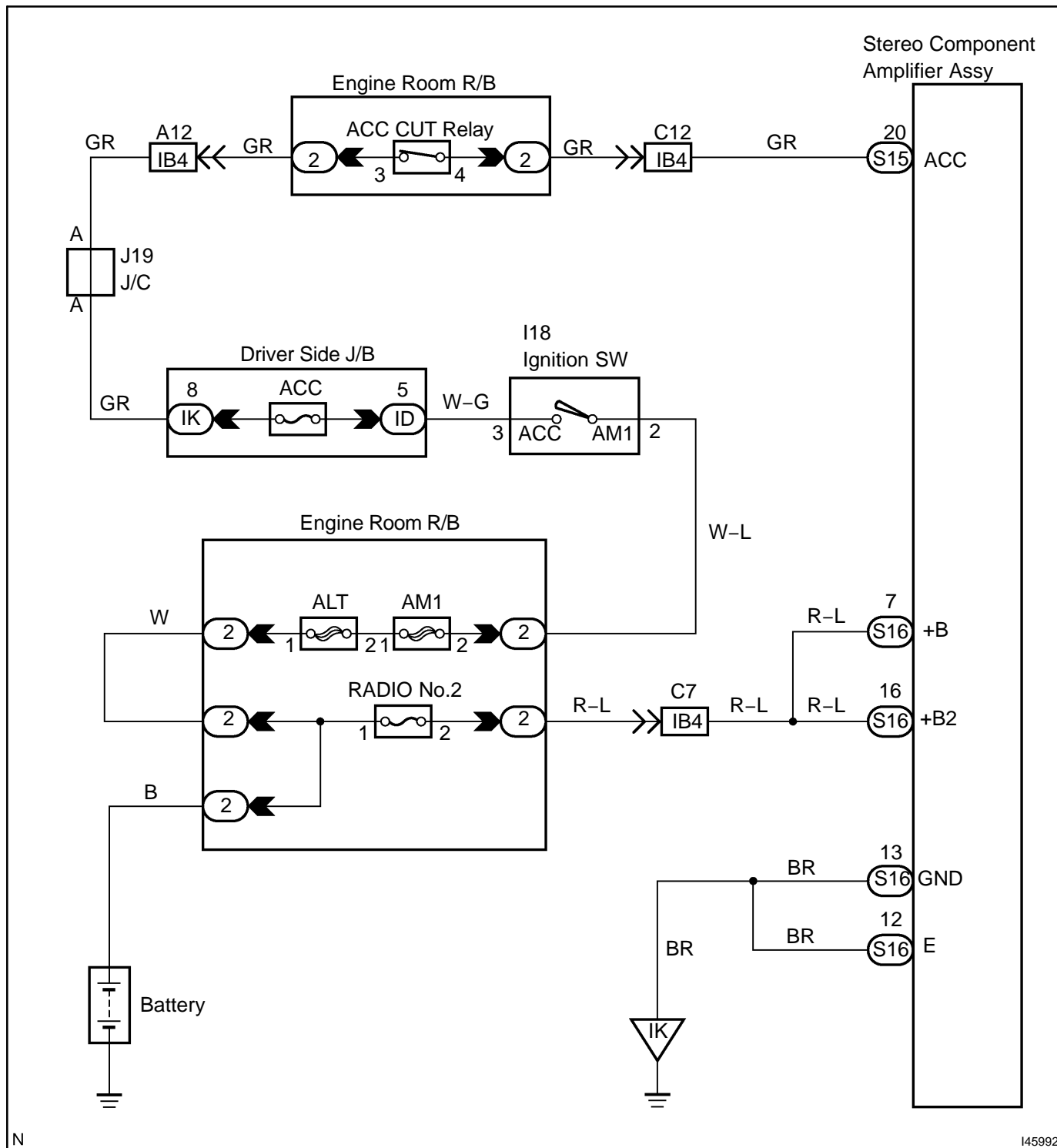
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

POWER SOURCE CIRCUIT (STEREO COMPONENT AMPLIFIER ASSY)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the stereo component amplifier assy.

WIRING DIAGRAM

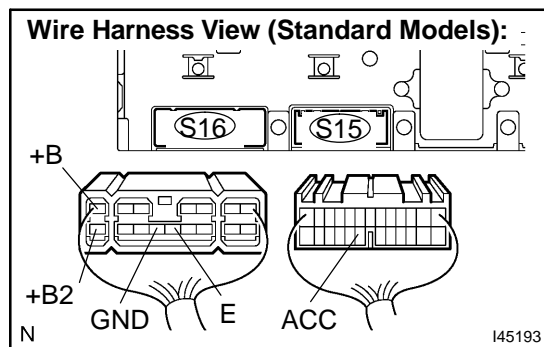


N

I45992

INSPECTION PROCEDURE

1 INSPECT STEREO COMPONENT AMPLIFIER ASSY



- (a) Disconnect the stereo component amplifier assy connectors S15 and S16.
- (b) Measure the resistance according to the value(s) in the table below.

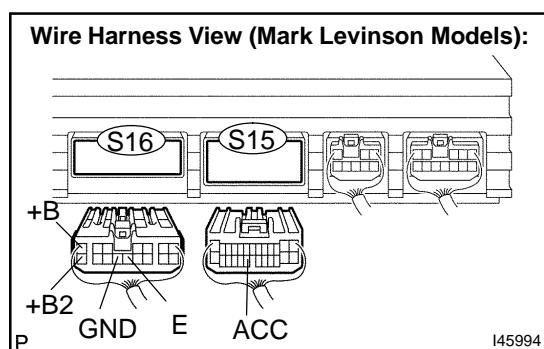
Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω
E - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B - GND	Always	10 to 14 V
+B2 - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

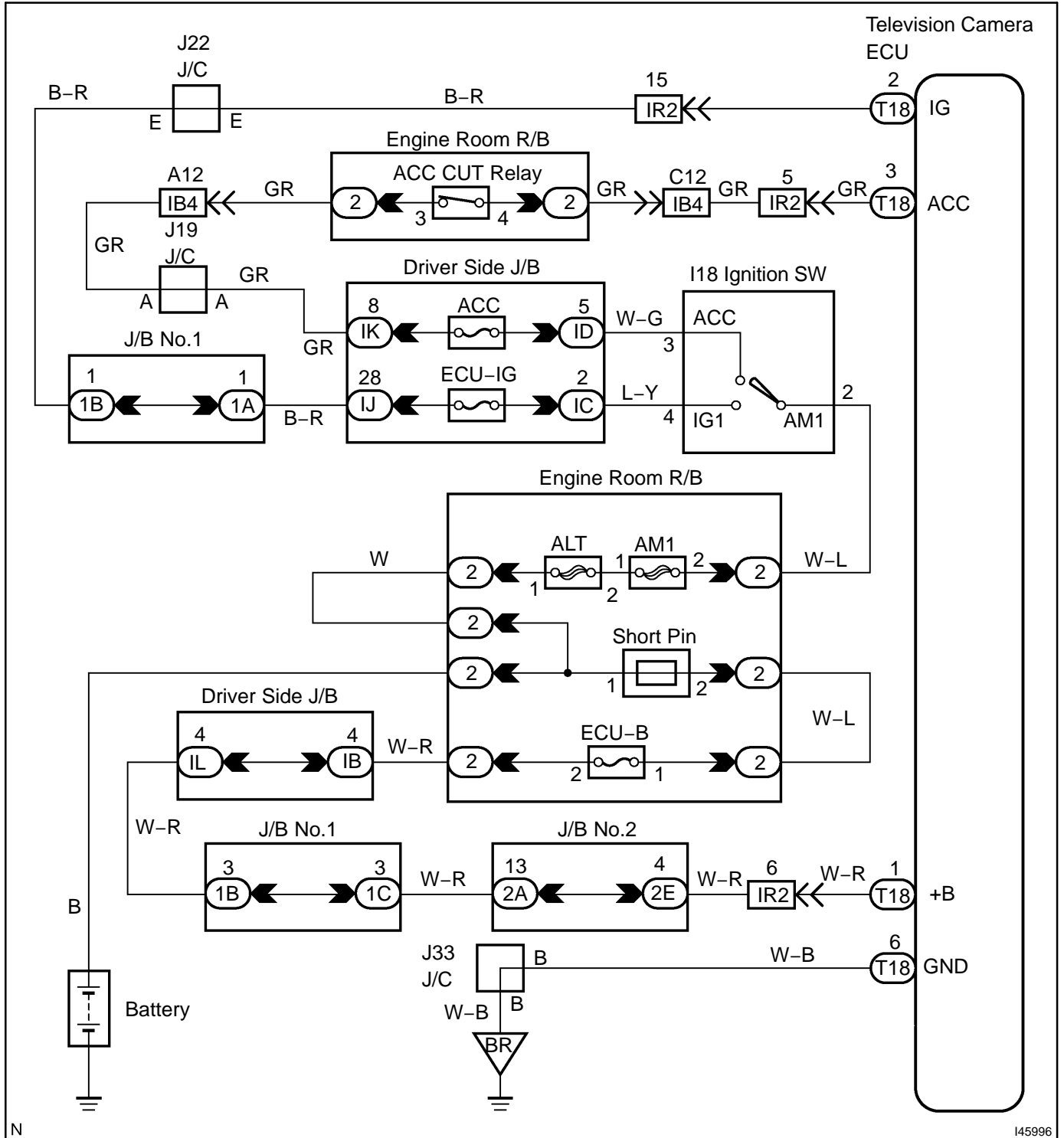
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

POWER SOURCE CIRCUIT (TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the television camera ECU.

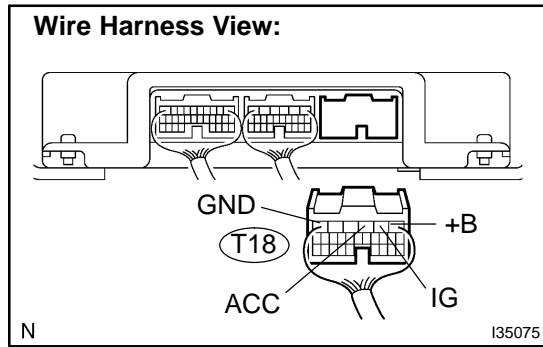
WIRING DIAGRAM



I45996

INSPECTION PROCEDURE

1 INSPECT TELEVISION CAMERA ECU



- (a) Disconnect the television camera ECU connector T18.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B - GND	Always	10 to 14 V
IG - GND	Ignition SW ON	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

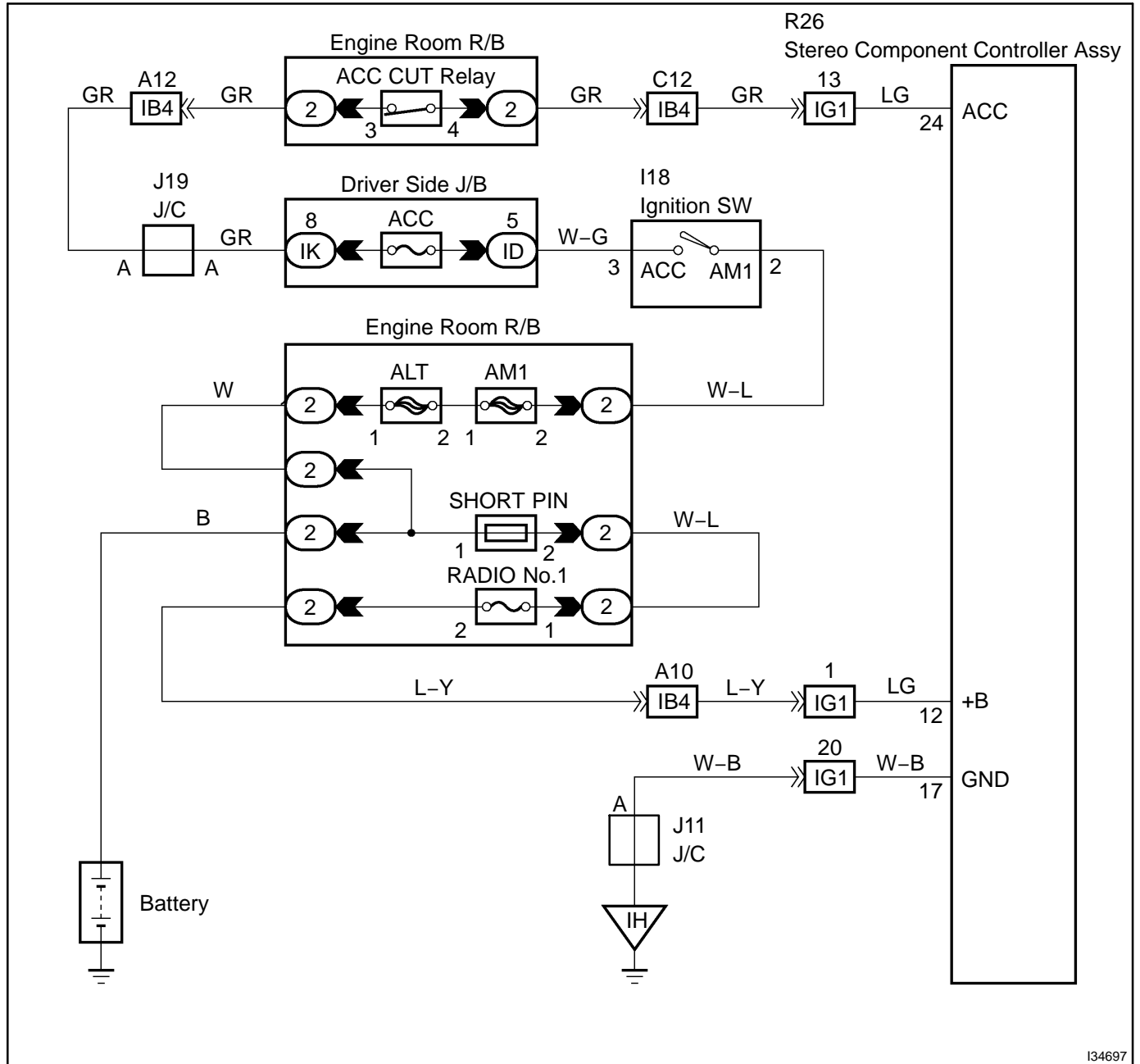
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

POWER SOURCE CIRCUIT (STEREO COMPONENT CONTROLLER ASSY)

CIRCUIT DESCRIPTION

This is the power source circuit to operate the stereo component controller assy.

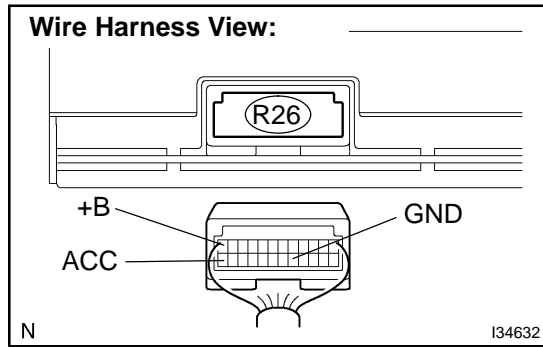
WIRING DIAGRAM



I34697

INSPECTION PROCEDURE

1 INSPECT STEREO COMPONENT CONTROLLER ASSY



- (a) Disconnect the stereo component controller assy connector R26.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

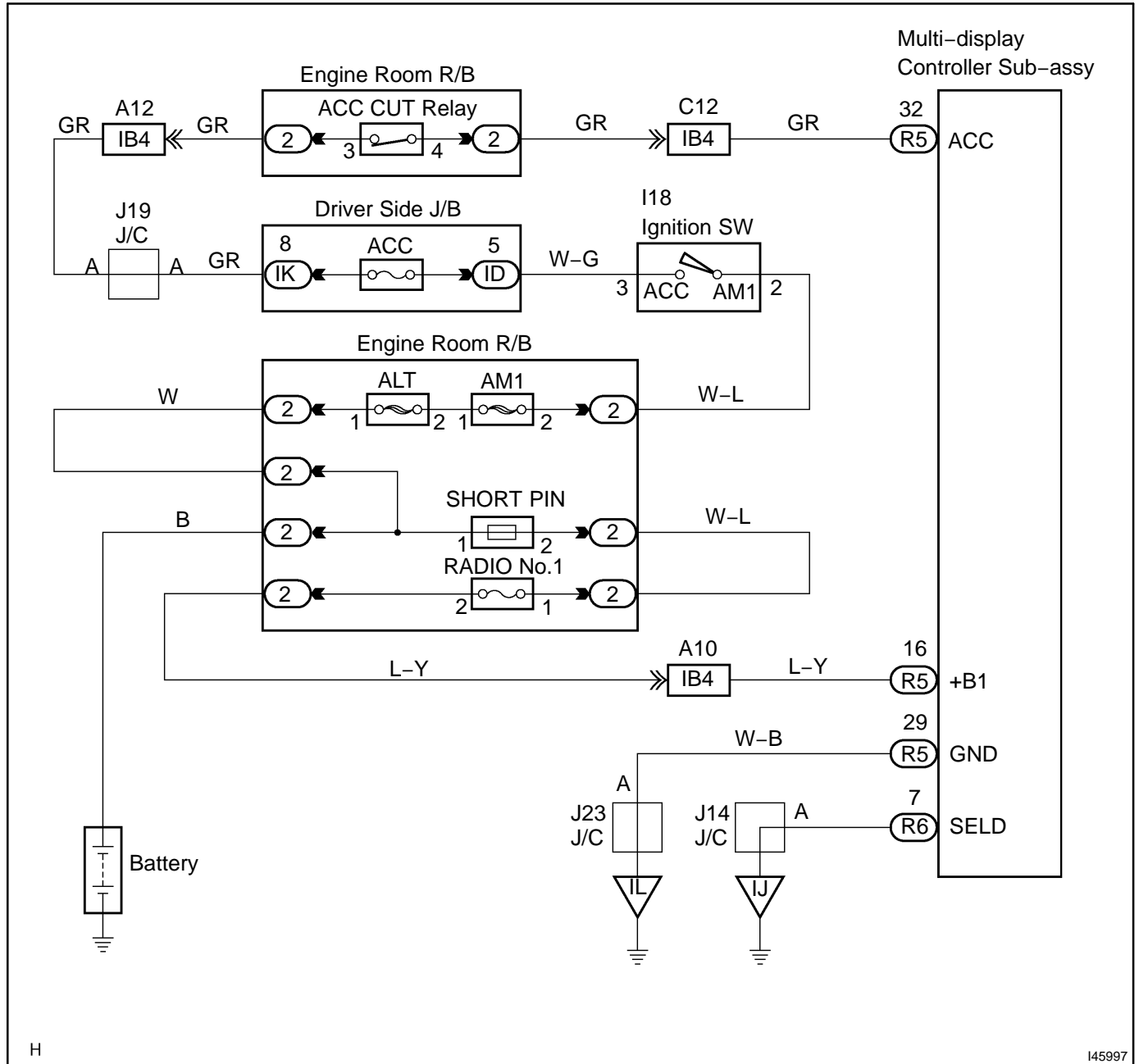
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

POWER SOURCE CIRCUIT (MULTI-DISPLAY CONTROLLER SUB-ASSY)

CIRCUIT DESCRIPTION

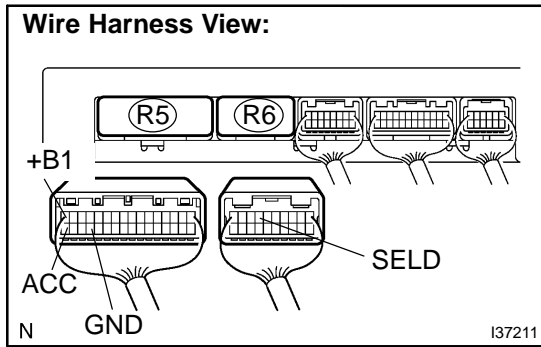
This is the power source circuit to operate the multi-display controller sub-assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY



- (a) Disconnect the multi-display controller sub-assy connectors R5 and R6.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GND - Body ground	Always	Below 1 Ω
SELD - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
+B1 - GND	Always	10 to 14 V
ACC - GND	Ignition SW ACC	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

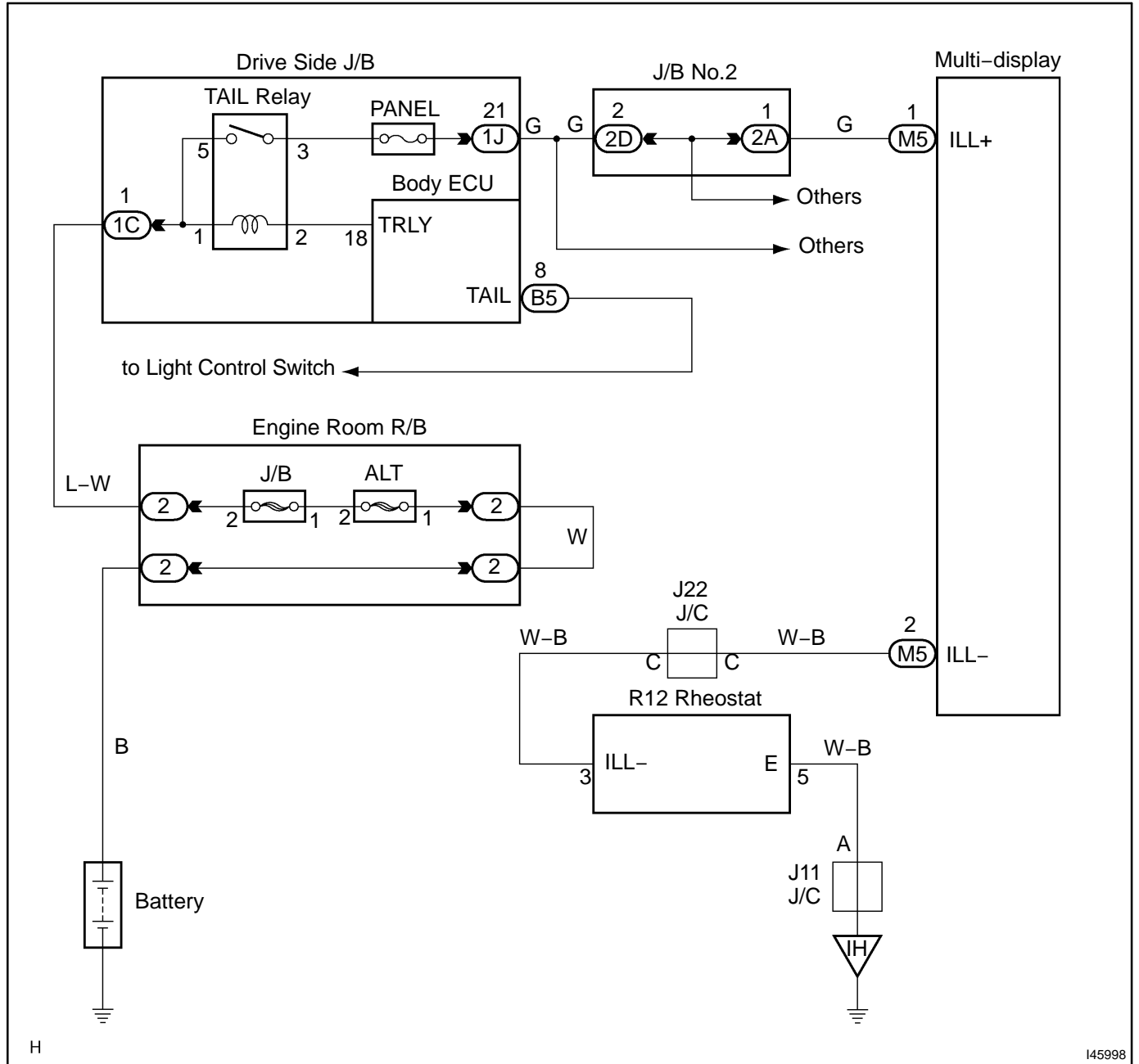
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

ILLUMINATION CIRCUIT

CIRCUIT DESCRIPTION

Power is supplied to the multi-display switch illumination when the light control switch is in the TAIL or HEAD position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK ILLUMINATION

- (a) Check if the illumination for the multi-display, radio receiver assy, glove box or others (seat heater switch, cigarette lighter, etc.) comes on when the light control switch is turned to the HEAD or TAIL position.

Result:

Result	Proceed to
Illumination comes on for components except multi-display.	A
Illumination comes on only for glove box, steering pad switch, accessory meter, door lock control switch RH, console box and rear cooler switch.	B
No illumination comes on (multi-display, glove box, cigarette lighter, etc.).	C

B

**GO TO COMBINATION METER SYSTEM
(SEE PAGE 05-2048)**

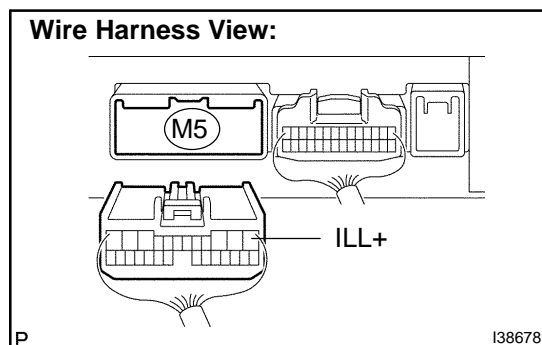
C

GO TO LIGHTING SYSTEM (SEE PAGE 05-1543)

A

2 INSPECT MULTI-DISPLAY

Wire Harness View:



- (a) Disconnect the multi-display connector M5.
 (b) Measure the voltage according to the value(s) in the table below.

Standard:

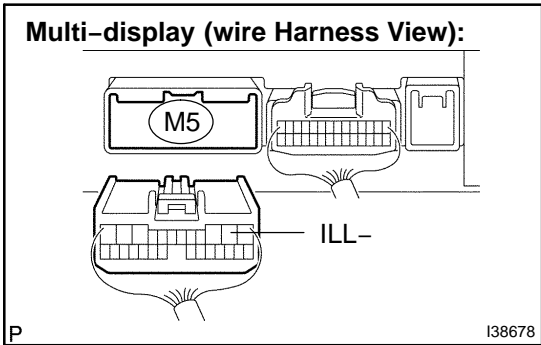
Tester connection	Condition	Specified condition
ILL+ - Body ground	Light control SW HEAD or TAIL	10 to 14 V

NG

**REPAIR OR REPLACE HARNESS OR
CONNECTOR (MULTI-DISPLAY - J/B No.2)**

OK

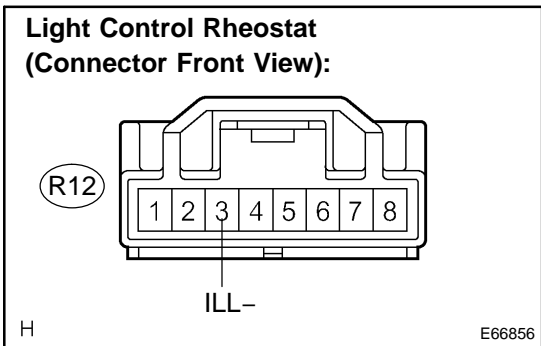
3 CHECK HARNESS AND CONNECTOR (MULTI-DISPLAY - LIGHT CONTROL RHEOSTAT)



- (a) Disconnect the multi-display connector M5 and light control rheostat connector R12.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
ILL- - ILL-	Always	Below 1 Ω
ILL- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

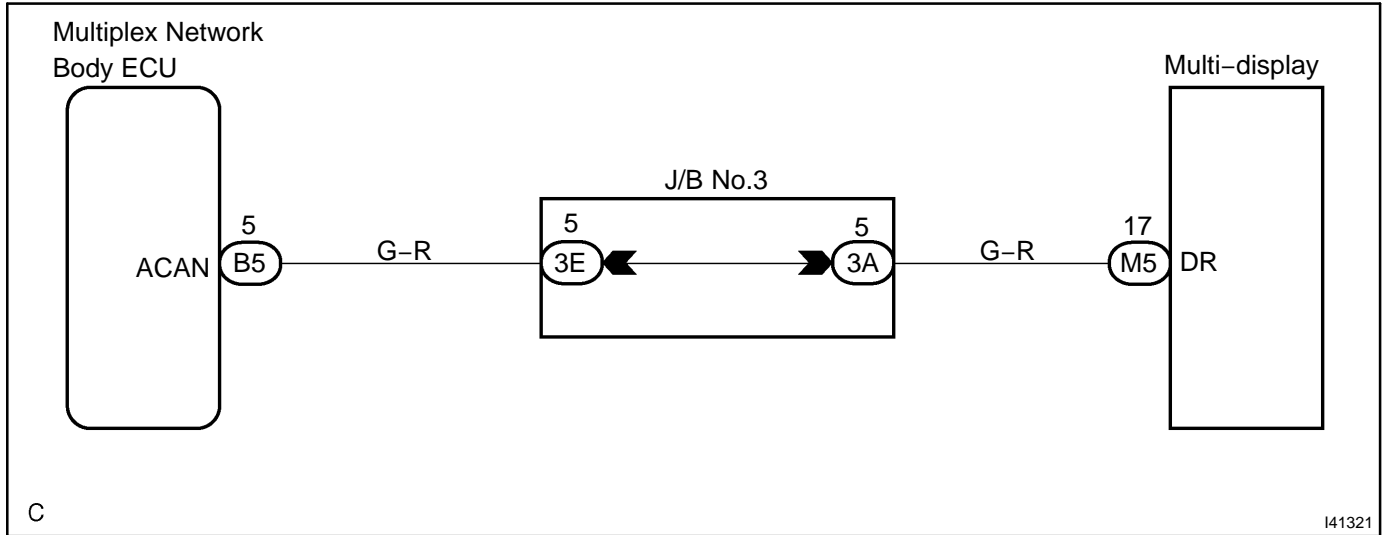
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

DIMMER SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

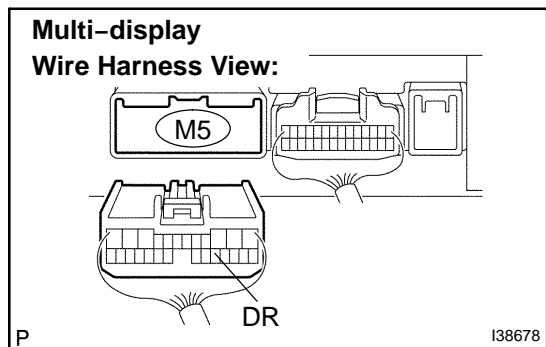
The multi-display dims the display by receiving a TAIL cancel signal from the body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

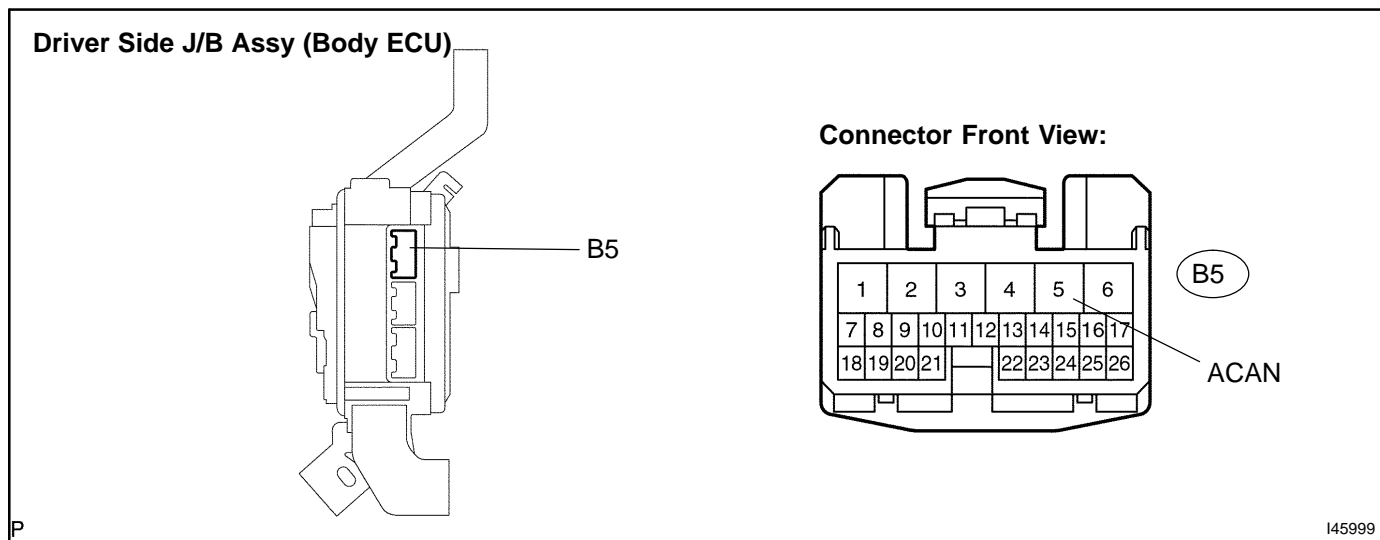
1 CHECK HARNESS AND CONNECTOR(MULTIPLEX NETWORK BODY ECU - MULTI-DISPLAY)



- (a) Disconnect the multiplex network body ECU connector B5 and multi-display connector M5.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

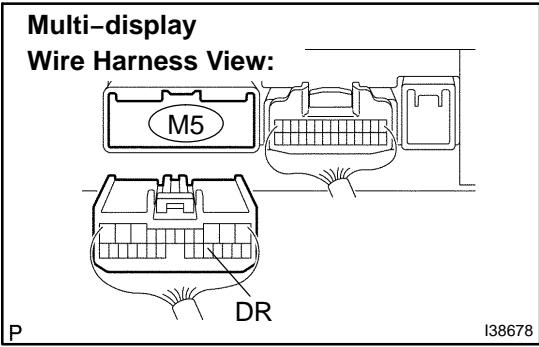
Tester connection	Condition	Specified condition
DR - ACAN	Always	Below 1 Ω
DR - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT MULTIPLEX NETWORK BODY ECU



- (a) Reconnect the multiplex network body ECU connector.
- (b) Turn the ignition switch to the ON position.
- (c) Turn the light control switch to the TAIL or HEAD position.
- (d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
DR - Body ground	Automatic light control sensor is covered.	Above 9 V

NG → **GO TO LIGHTING SYSTEM (SEE PAGE 05-1543)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

SPEED SIGNAL CIRCUIT (NAVIGATION ECU - COMBINATION METER ASSY)

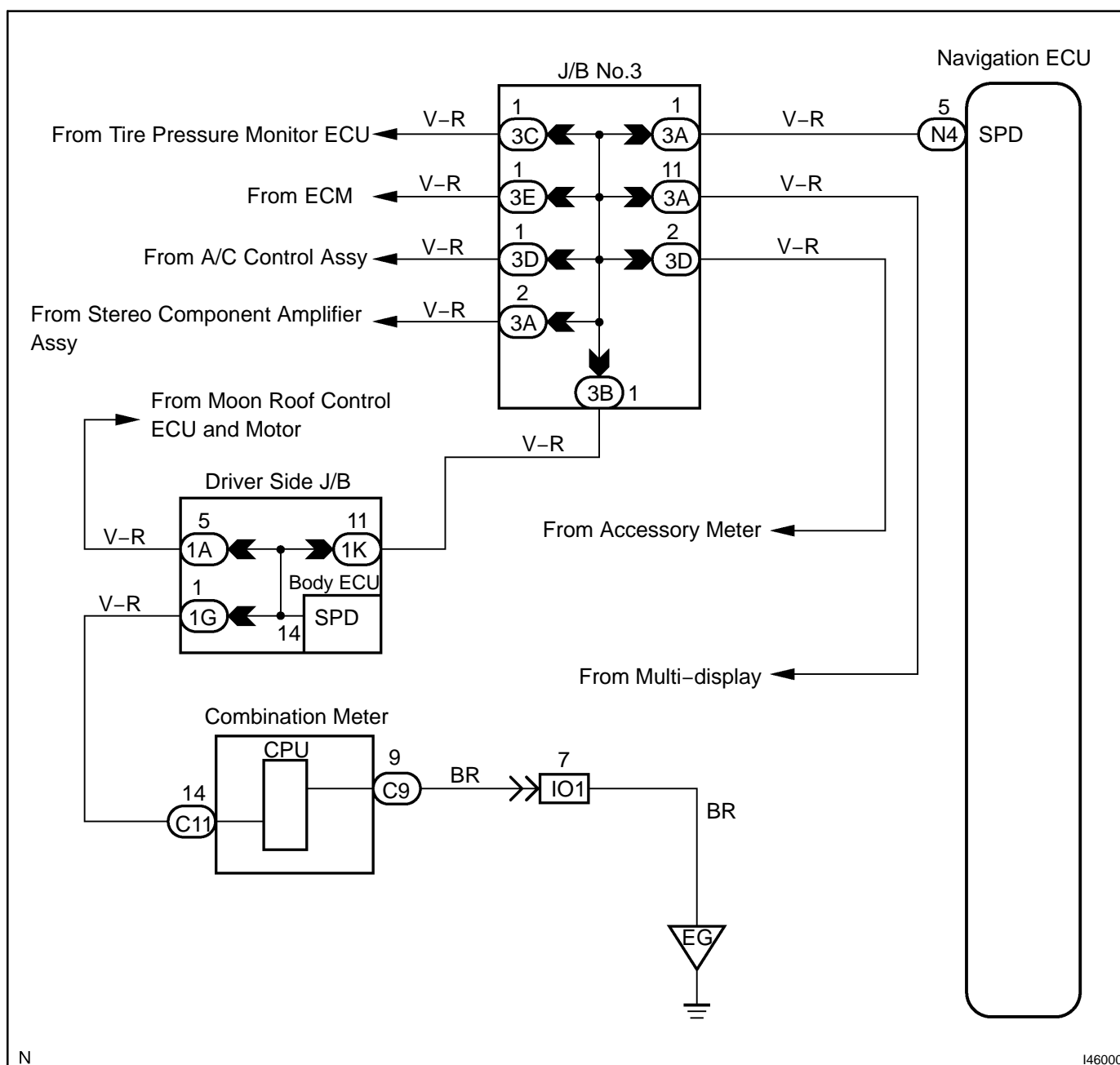
CIRCUIT DESCRIPTION

The navigation ECU receives a vehicle speed signal from the combination meter assy and information about the GPS antenna, and then adjusts vehicle position.

HINT:

- A voltage of 12 V or 5 V is output from each ECU and then input to the combination meter. The signal is changed to a pulse signal at the transistor in the combination meter. Each ECU controls the respective system based on the pulse signal.
- If a short occurs in an ECU, all systems in the diagram below will not operate normally.

WIRING DIAGRAM



N

146000

INSPECTION PROCEDURE

1 CHECK OPERATION OF SPEEDOMETER

(a) Drive the vehicle and check if the function of the speedometer in the combination meter is normal.

OK: Actual vehicle speed and the speed indicated on the speedometer are the same.

HINT:

The vehicle speed sensor is functioning normally when the indication on the speedometer is normal.

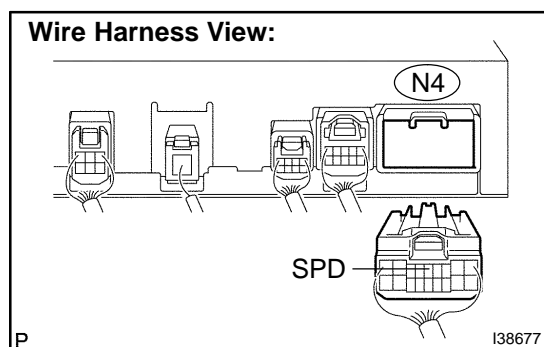
NG

**CHECK COMBINATION METER ASSY
(SEE PAGE 05-2048)**

OK

2 INSPECT NAVIGATION ECU

Wire Harness View:

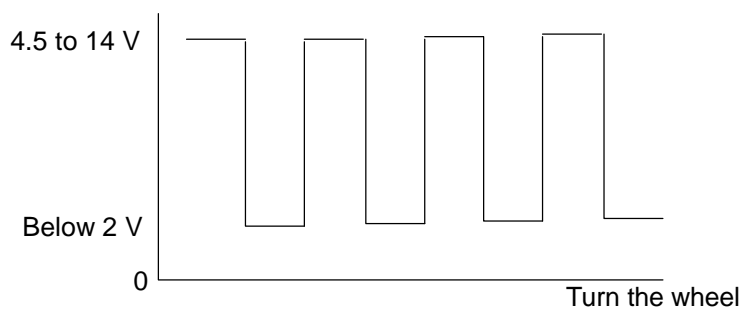


(a) Disconnect the navigation ECU connector N4.

(b) Measure voltage.

- (1) Jack up either one of the drive wheels.
- (2) Move the shift lever to the neutral position.
- (3) Turn the ignition switch to the ON position.
- (4) Measure the voltage between terminal SPD of the navigation ECU and body ground when the drive wheels are turned slowly.

OK: Voltage pulses as shown below.

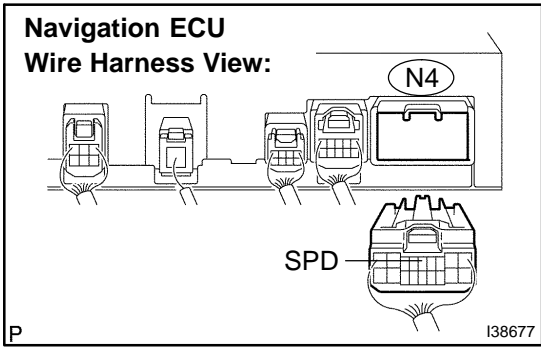


OK

**REPLACE NAVIGATION ECU
(SEE PAGE 67-36)**

NG

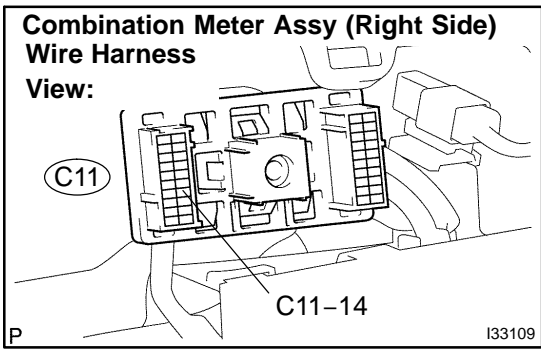
3 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - NAVIGATION ECU)



- (a) Disconnect the navigation ECU connector N4 and combination meter assy connector C11.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

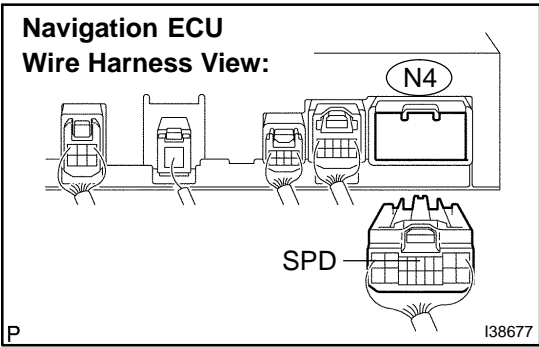
Tester connection	Condition	Specified condition
SPD - C11-14	Ignition switch OFF	Below 1 Ω



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - NAVIGATION ECU)



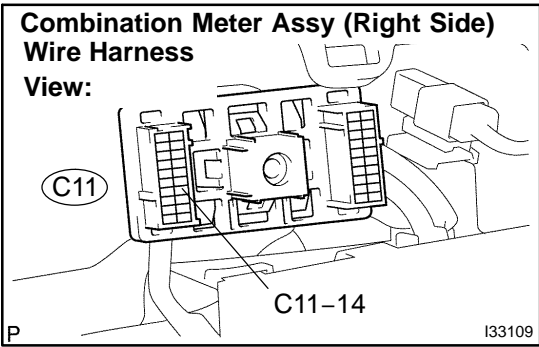
- (a) Disconnect the navigation ECU connector N4 and combination meter assy connector C11.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
SPD - Body ground	Ignition switch OFF	10 kΩ or higher

HINT:

If the resistance between terminal SPD and body ground is less than 10 kΩ, there may be a short in a wire harness, connector, or ECU.



NG REPAIR OR REPLACE HARNESS OR CONNECTOR OR CHECK EACH ECU

OK

REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

SPEED SIGNAL CIRCUIT (MULTI-DISPLAY - COMBINATION METER ASSY)

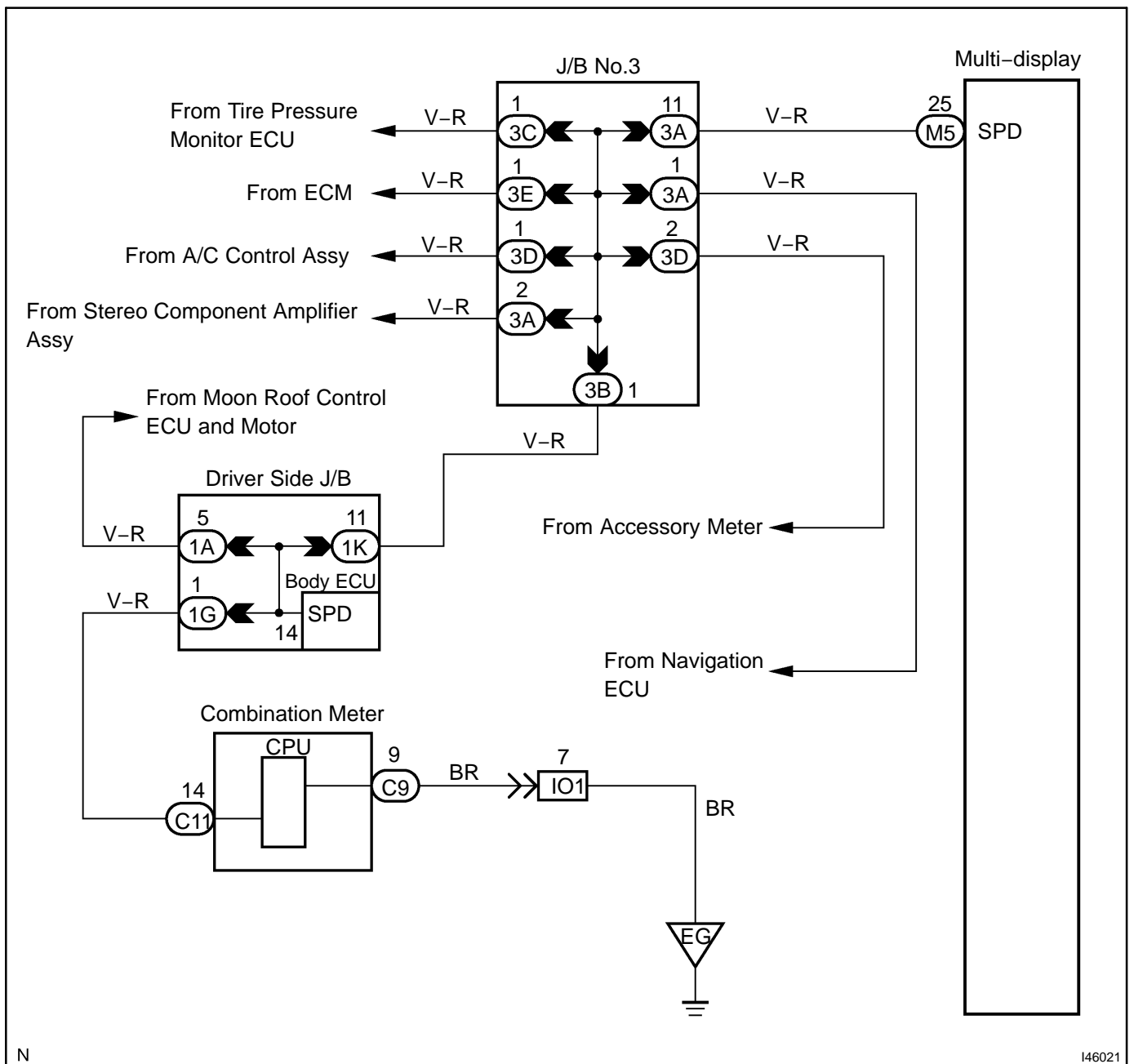
CIRCUIT DESCRIPTION

The multi-display performs switch operation control during driving by receiving a vehicle speed signal from the combination meter assy.

HINT:

- A voltage of 12 V or 5 V is output from each ECU and then input to the combination meter. The signal is changed to a pulse signal at the transistor in the combination meter. Each ECU controls the respective system based on the pulse signal.
- If a short occurs in an ECU, all systems in the diagram below will not operate normally.

WIRING DIAGRAM



N

146021

INSPECTION PROCEDURE

1 CHECK OPERATION OF SPEEDOMETER

- (a) Drive the vehicle and check if the function of the speedometer in the combination meter is normal.
OK: Actual vehicle speed and the speed indicated on the speedometer are the same.

HINT:

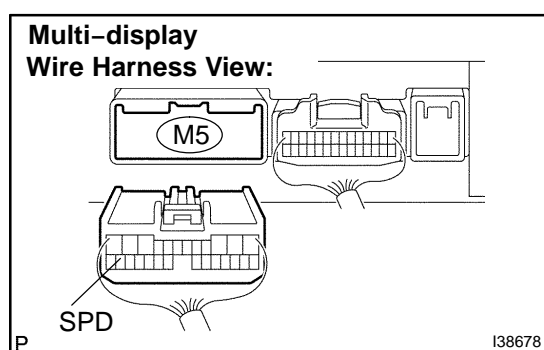
The vehicle speed sensor is functioning normally when the indication on the speedometer is normal.

NG

**CHECK COMBINATION METER ASSY
 (SEE PAGE 05-2048)**

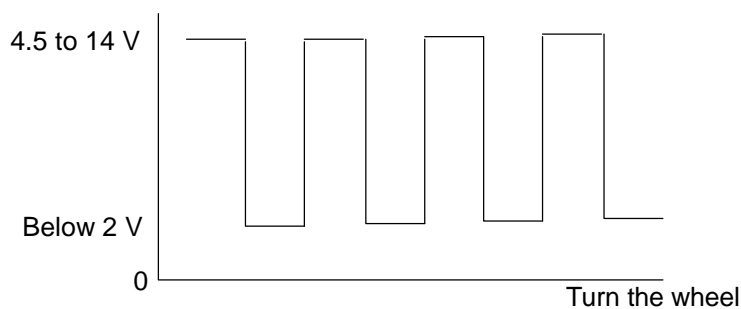
OK

2 INSPECT MULTI-DISPLAY



- (a) Disconnect the multi-display connector M5.
 (b) Measure voltage.
- (1) Jack up either one of the drive wheels.
 - (2) Move the shift lever to the neutral position.
 - (3) Turn the ignition switch to the ON position.
 - (4) Measure the voltage between terminal SPD of the multi-display and body ground when the drive wheels are turned slowly.

OK: Voltage pulses as shown below.

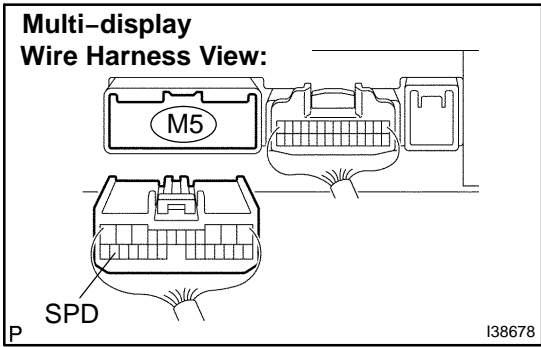


OK

**REPLACE MULTI-DISPLAY
 (SEE PAGE 67-12)**

NG

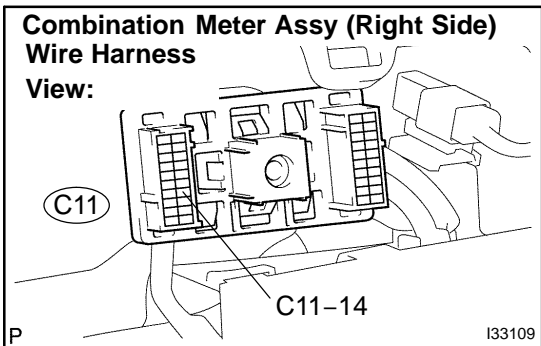
3 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - MULTI-DISPLAY)



- (a) Disconnect the multi-display connector M5 and combination meter assy connector C11.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

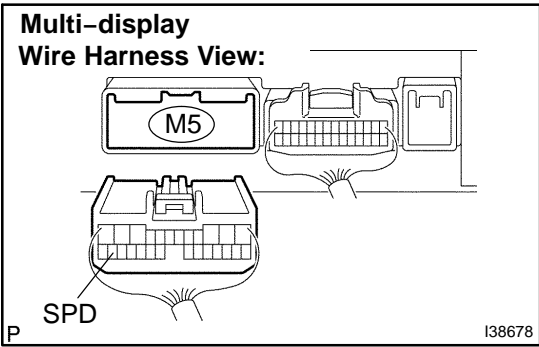
Tester connection	Condition	Specified condition
SPD - C11-14	Ignition switch OFF	Below 1 Ω



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(COMBINATION METER ASSY - MULTI-DISPLAY)



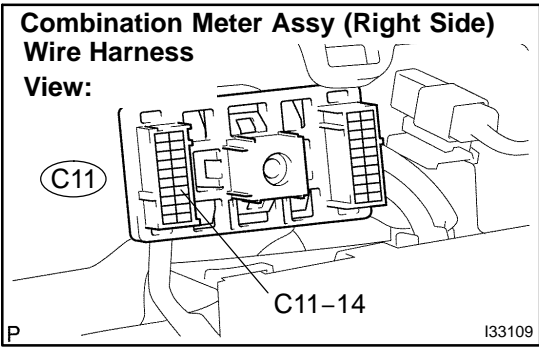
- (a) Disconnect the multi-display connector M5 and combination meter assy connector C11.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
SPD - Body ground	Ignition switch OFF	10 kΩ higher

HINT:

If the resistance between terminal SPD and body ground is less than 10 kΩ, there may be a short in a wire harness, connector, or ECU.



NG REPAIR OR REPLACE HARNESS OR CONNECTOR OR CHECK EACH ECU

OK

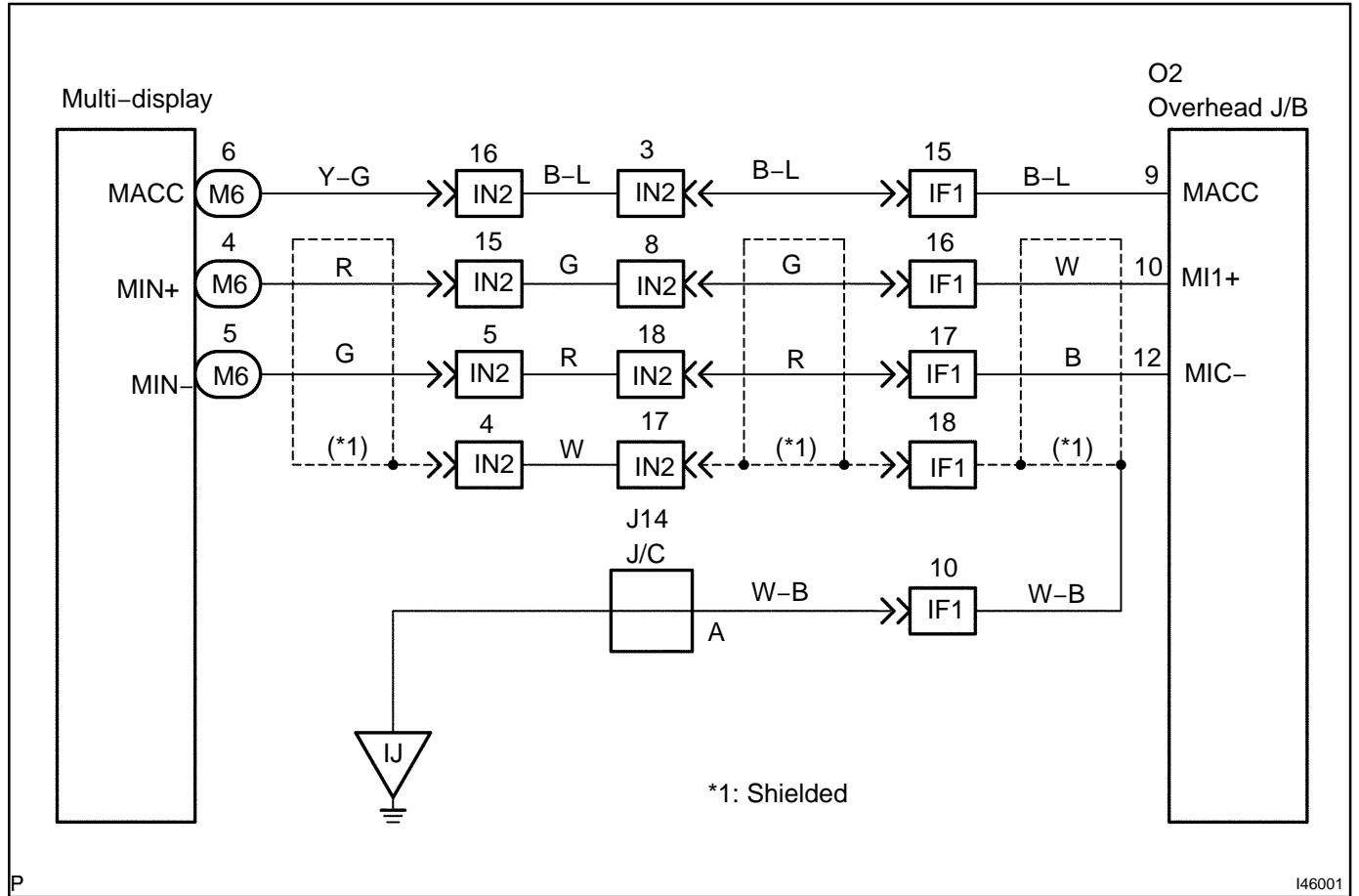
REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

MICROPHONE CIRCUIT (OVERHEAD J/B - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

This circuit sends a microphone signal from the overhead J/B to the multi-display. It also supplies power from the multi-display to the overhead J/B.

WIRING DIAGRAM

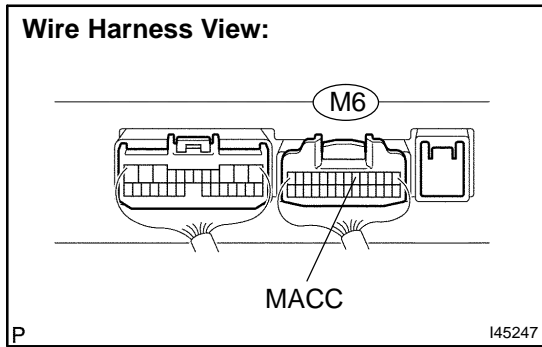


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INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY



- (a) Measure the voltage according to the value(s) in the table below.

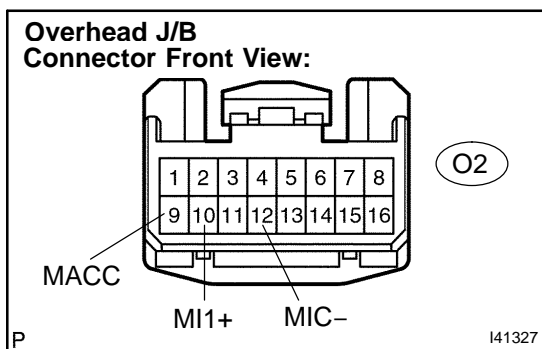
Standard:

Tester connection	Condition	Specified condition
MACC - Body ground	Ignition SW ACC	4 to 6 V

NG → REPLACE MULTI-DISPLAY (SEE PAGE 67-12)

OK

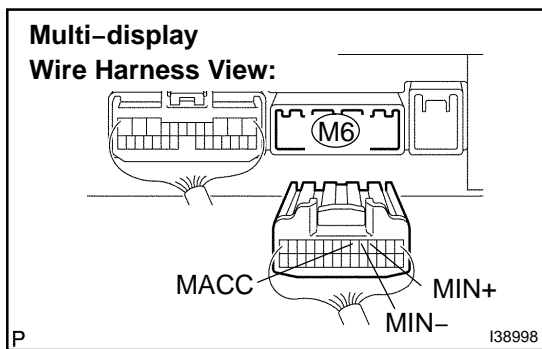
2 CHECK HARNESS AND CONNECTOR(OVERHEAD J/B - MULTI-DISPLAY)



- (a) Disconnect the overhead J/B connector O2 and multi-display connector M6.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified Condition
MACC - MACC	Always	Below 1 Ω
MI1+ - MIN+	Always	Below 1 Ω
MIC- - MIN-	Always	Below 1 Ω
MACC - Body ground	Always	10 kΩ or higher
MI1+ - Body ground	Always	10 kΩ or higher
MIC- - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

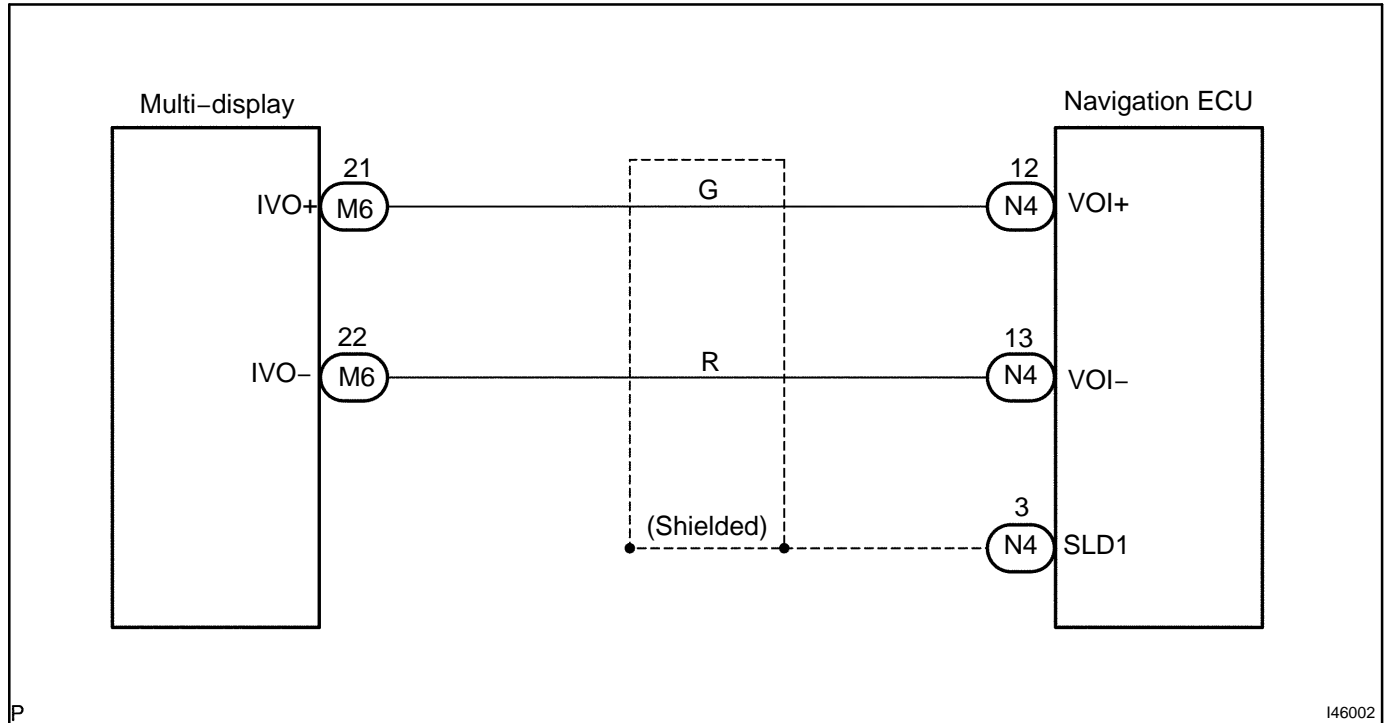
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

CELLULAR PHONE VOICE CIRCUIT (MULTI-DISPLAY - NAVIGATION ECU)

CIRCUIT DESCRIPTION

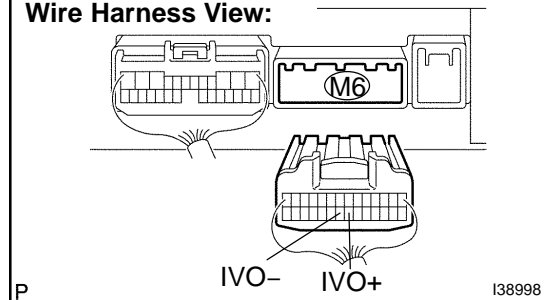
This circuit sends a cellular phone voice signal from the multi-display to the navigation ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

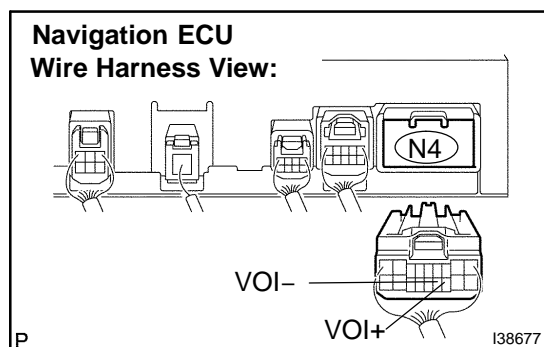
1 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - MULTI-DISPLAY)

Multi-display
Wire Harness View:

- Disconnect the navigation ECU connector N4 and multi-display connector M6.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
IVO+ - VOI+	Always	Below 1 Ω
IVO- - VOI-	Always	Below 1 Ω
IVO+ - Body ground	Always	10 k Ω or higher
IVO- - Body ground	Always	10 k Ω or higher

Navigation ECU
Wire Harness View:

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

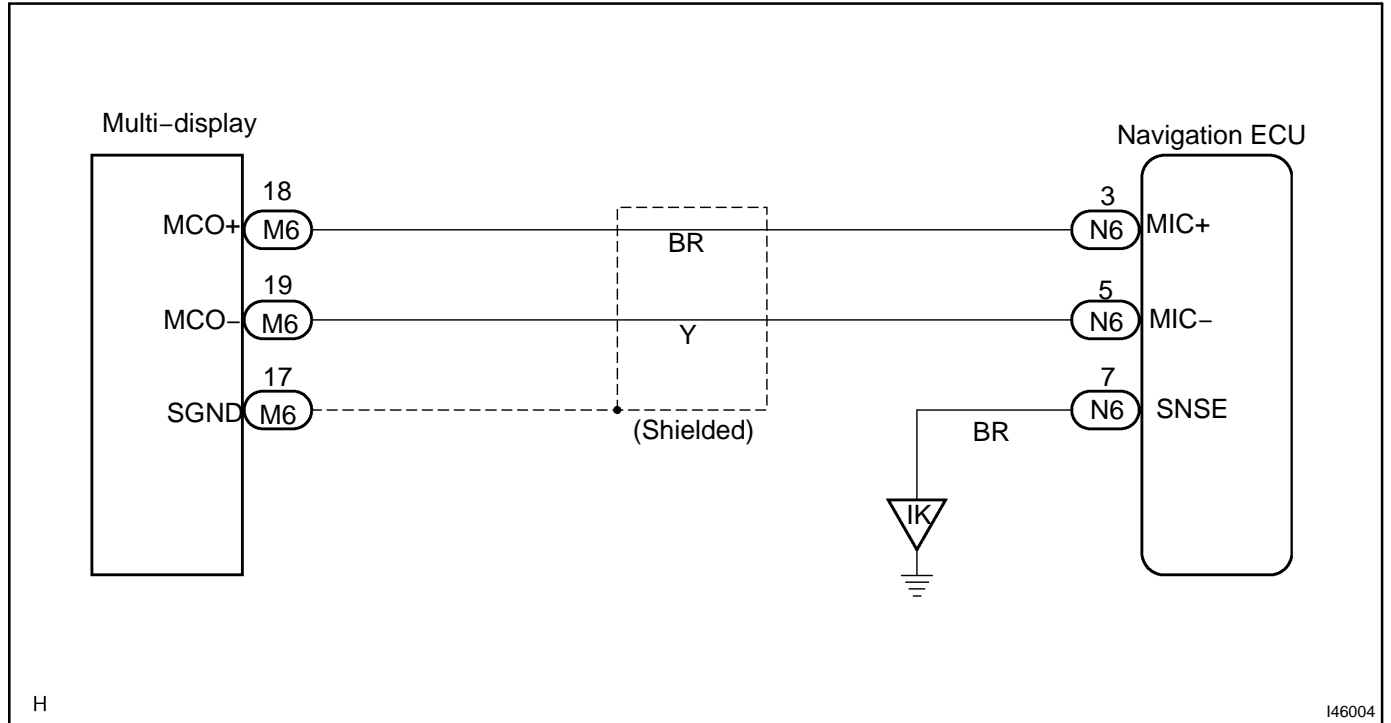
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)

MICROPHONE CIRCUIT (MULTI-DISPLAY - NAVIGATION ECU)

CIRCUIT DESCRIPTION

This circuit sends a microphone signal from the multi-display to the navigation ECU.

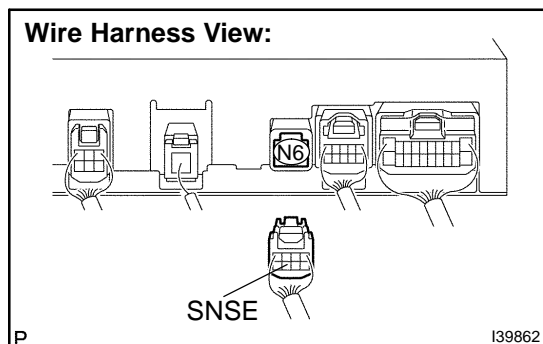
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT NAVIGATION ECU

Wire Harness View:



- Disconnect the navigation ECU connector N6.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
SNSE - Body ground	Always	Below 1 Ω

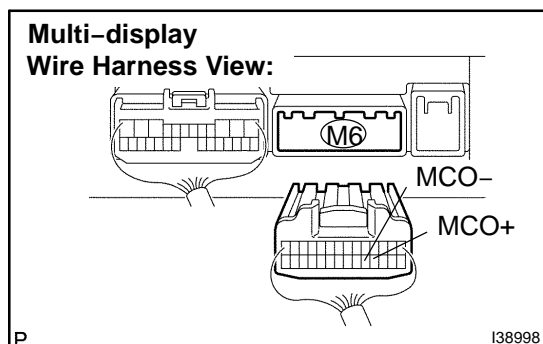
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY - NAVIGATION ECU)

Multi-display Wire Harness View:

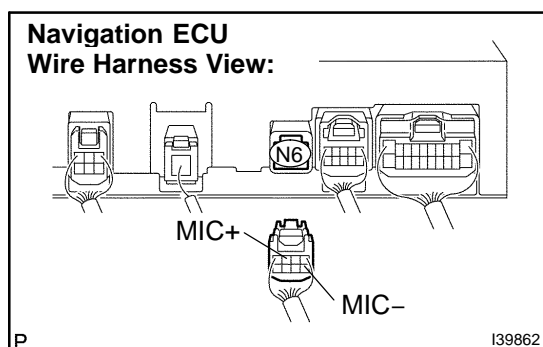


- Disconnect the multi-display connector M6 and navigation ECU connector N6.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
MCO+ - MIC+	Always	Below 1 Ω
MCO- - MIC-	Always	Below 1 Ω
MCO+ - Body ground	Always	10 k Ω or higher
MCO- - Body ground	Always	10 k Ω or higher

Navigation ECU Wire Harness View:



NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

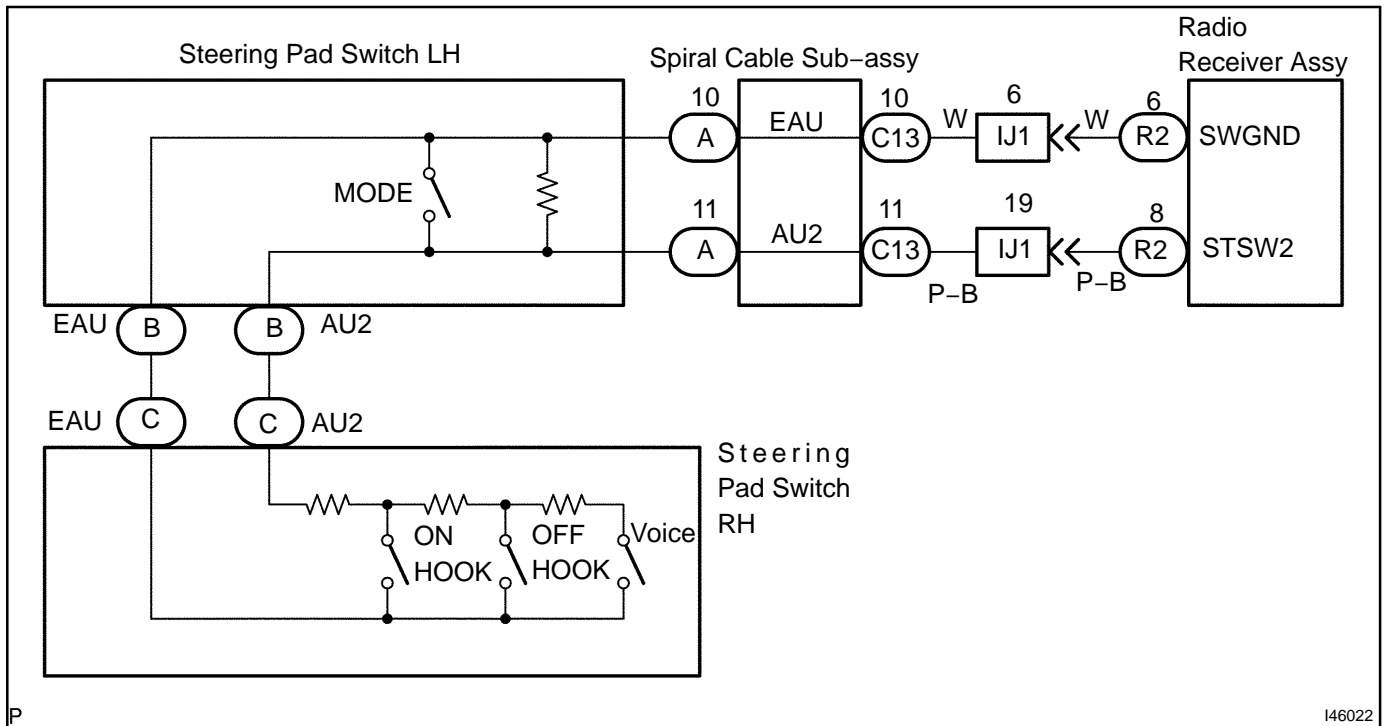
STEERING PAD SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit sends an operation signal from the steering pad switch assy to the radio receiver assy. If there is an open in the circuit, the LEXUS navigation system cannot be operated by the steering pad switch assy.

If there is a short in the circuit, the resulting condition is the same as if the switch were continuously depressed. Therefore, the LEXUS navigation system cannot be operated by the steering pad switch assy, and the radio receiver assy itself cannot function.

WIRING DIAGRAM



P

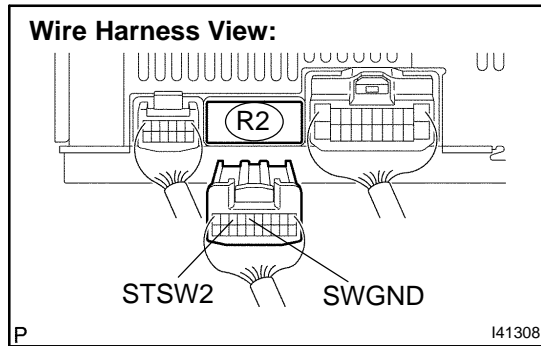
146022

INSPECTION PROCEDURE

NOTICE:

The vehicle is equipped with an SRS (Supplemental Restraint System) such as airbags. Before servicing (including removal or installation of parts), be sure to read the precautionary notice for the Supplemental Restraint System (see page 60-1).

1 INSPECT RADIO RECEIVER ASSY



- (a) Disconnect the radio receiver assy connector R2.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

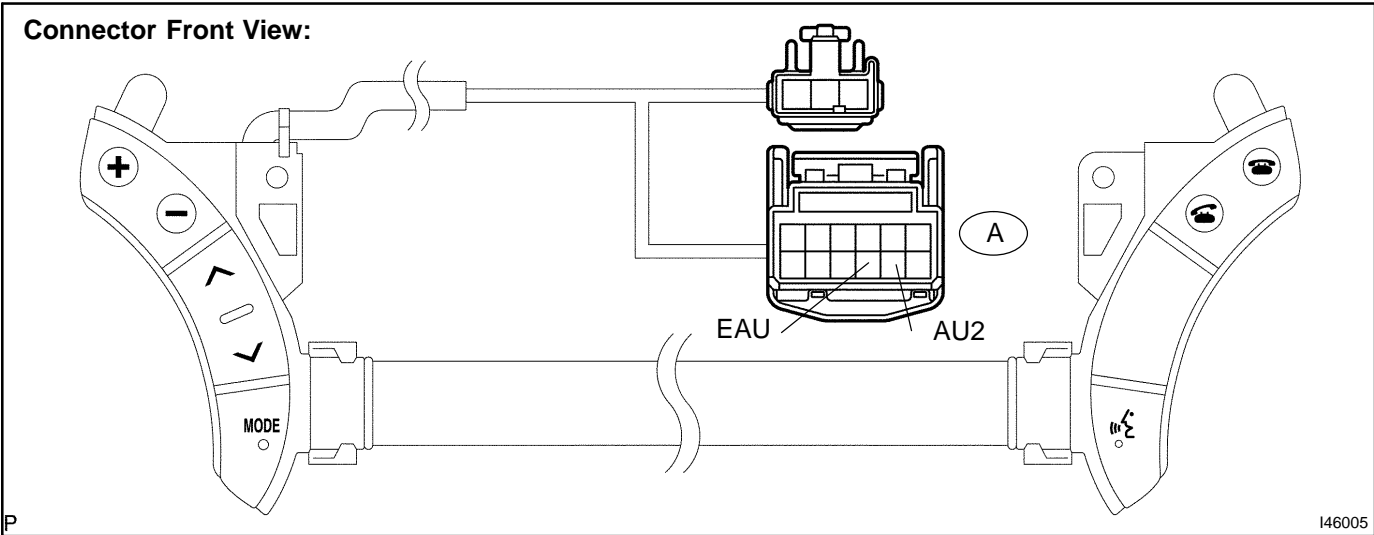
Tester connection	Condition	Specified condition
STSW2 - SWGND	No switch is pushed	Approx. 100 k Ω
STSW2 - SWGND	VOICE switch: push	Approx. 3.2 k Ω
STSW2 - SWGND	ON HOOK switch: push	Approx. 0.33 k Ω
STSW2 - SWGND	OFF HOOK switch: push	Approx. 1.0 k Ω

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

NG

2 INSPECT STEERING PAD SWITCH ASSY



- (a) Disconnect the steering pad switch assy connector A.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

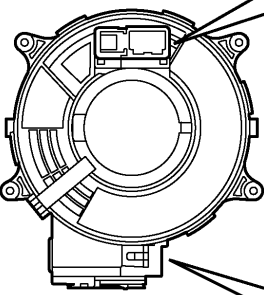
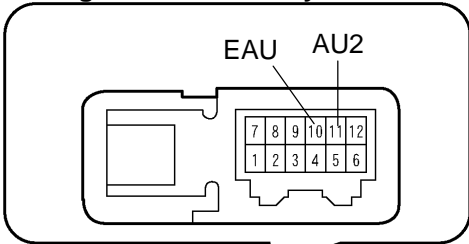
Tester connection	Condition	Specified condition
AU2 - EAU	No switch is pushed	Approx. 100 kΩ
AU2 - EAU	VOICE switch: push	Approx. 3.2 kΩ
AU2 - EAU	ON HOOK switch: push	Approx. 0.33 kΩ
AU2 - EAU	OFF HOOK switch: push	Approx. 1.0 kΩ

NG → Go to step 4

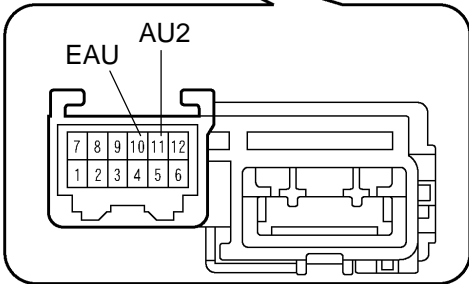
OK

3 INSPECT SPIRAL CABLE SUB-ASSY

Steering Pad Switch Assy Side:



Vehicle Side:



H

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- (a) Disconnect the steering pad switch assy and spiral cable sub-assy connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

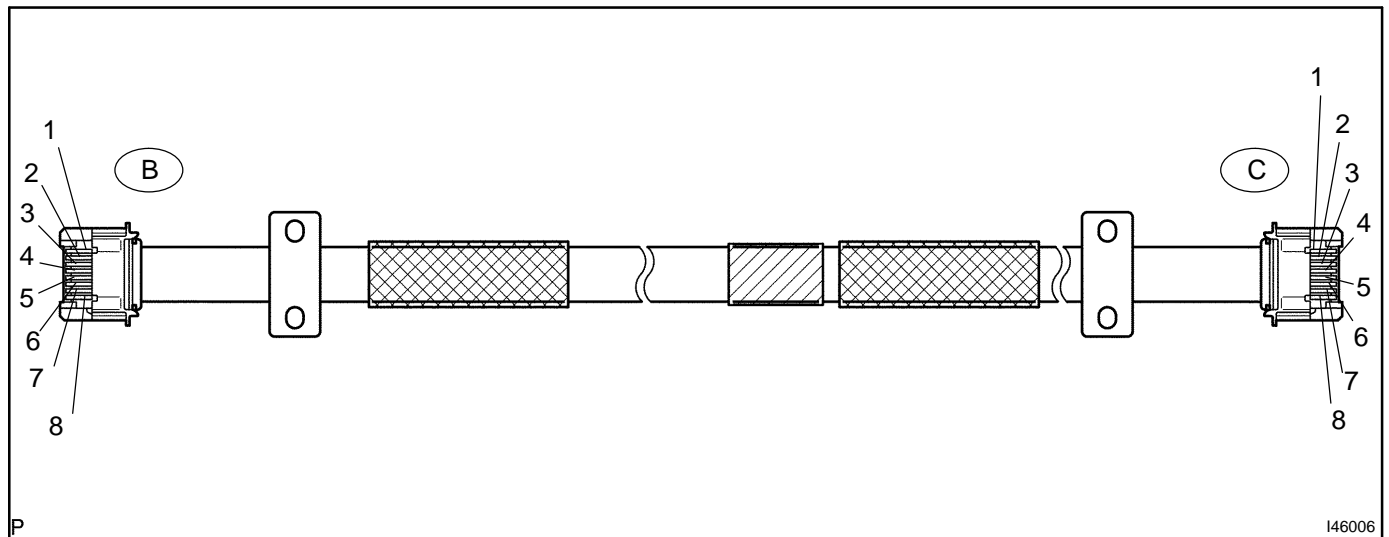
Tester connection	Specified condition
EAU - EAU	Below 1 Ω
AU2 - AU2	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (SPIRAL CABLE SUB-ASSY - RADIO RECEIVER ASSY)

4 INSPECT STEERING PAD SWITCH CABLE SUB-ASSY



- (a) Disconnect the steering pad switch LH and the steering pad switch RH.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

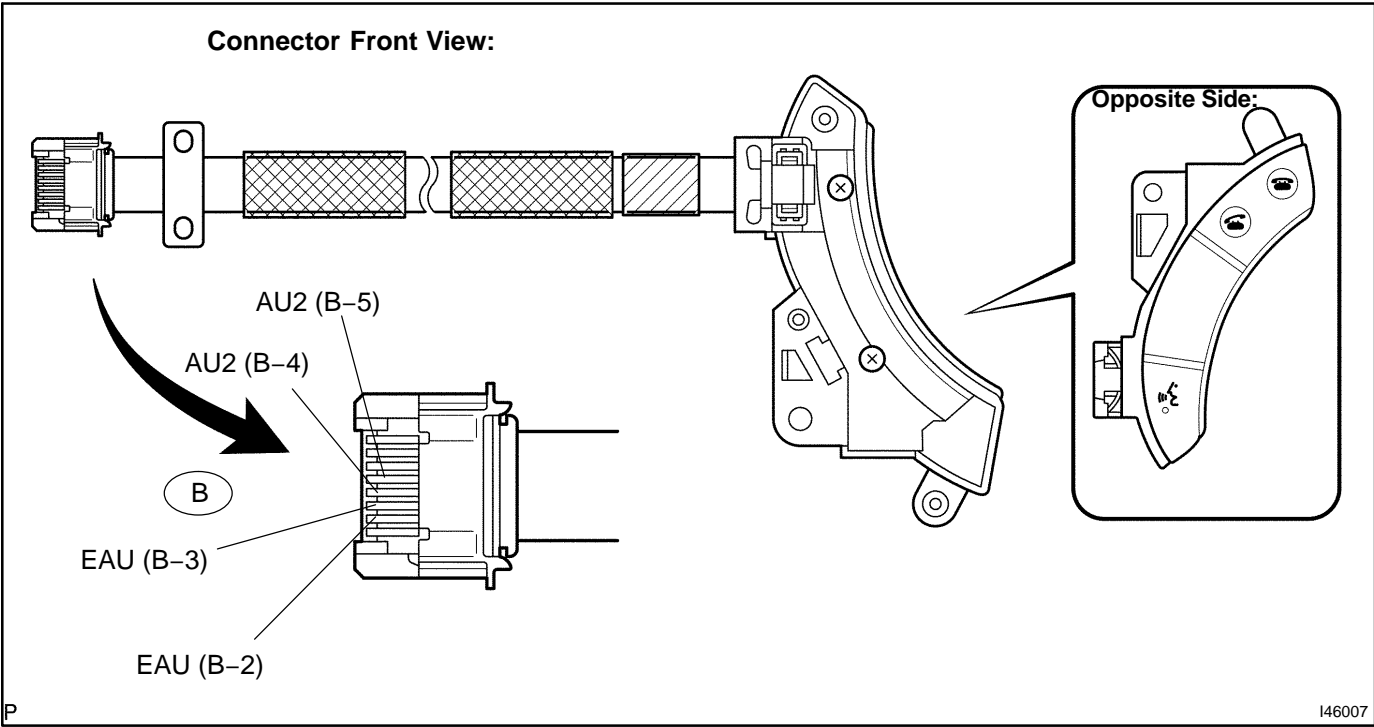
Tester connection	Condition	Specified condition
B-1 - C-1	Always	Below 1 Ω
B-2 - C-2	Always	Below 1 Ω
B-3 - C-3	Always	Below 1 Ω
B-4 - C-4	Always	Below 1 Ω
B-5 - C-5	Always	Below 1 Ω
B-6 - C-6	Always	Below 1 Ω
B-7 - C-7	Always	Below 1 Ω
B-8 - C-8	Always	Below 1 Ω
B-1 - Body ground	Always	10 k Ω or higher
B-2 - Body ground	Always	10 k Ω or higher
B-3 - Body ground	Always	10 k Ω or higher
B-4 - Body ground	Always	10 k Ω or higher
B-5 - Body ground	Always	10 k Ω or higher
B-6 - Body ground	Always	10 k Ω or higher
B-7 - Body ground	Always	10 k Ω or higher
B-8 - Body ground	Always	10 k Ω or higher

NG

REPLACE STEERING PAD SWITCH CABLE SUB-ASSY

OK

5 INSPECT STEERING PAD SWITCH RH



- (a) Reconnect the steering pad switch RH.
- (b) Measure the resistance according to the value(s) in the table below.

Tester connection	Condition	Specified condition
AU2 (B-4) - EAU (B-2)	No switch is pushed	10 kΩ or higher
AU2 (B-5) - EAU (B-3)		
AU2 (B-5) - EAU (B-2)		
AU2 (B-4) - EAU (B-3)		
AU2 (B-4) - EAU (B-2)	VOICE switch: push	Approx. 3.2 kΩ
AU2 (B-5) - EAU (B-3)		
AU2 (B-5) - EAU (B-2)		
AU2 (B-4) - EAU (B-3)		
AU2 (B-4) - EAU (B-2)	ON HOOK switch: push	Approx. 0.33 kΩ
AU2 (B-5) - EAU (B-3)		
AU2 (B-5) - EAU (B-2)		
AU2 (B-4) - EAU (B-3)		
AU2 (B-4) - EAU (B-2)	OFF HOOK switch: push	Approx. 1.0 kΩ
AU2 (B-5) - EAU (B-3)		
AU2 (B-5) - EAU (B-2)		
AU2 (B-4) - EAU (B-3)		

NG → **REPLACE STEERING PAD SWITCH RH (SEE PAGE 67-44)**

OK

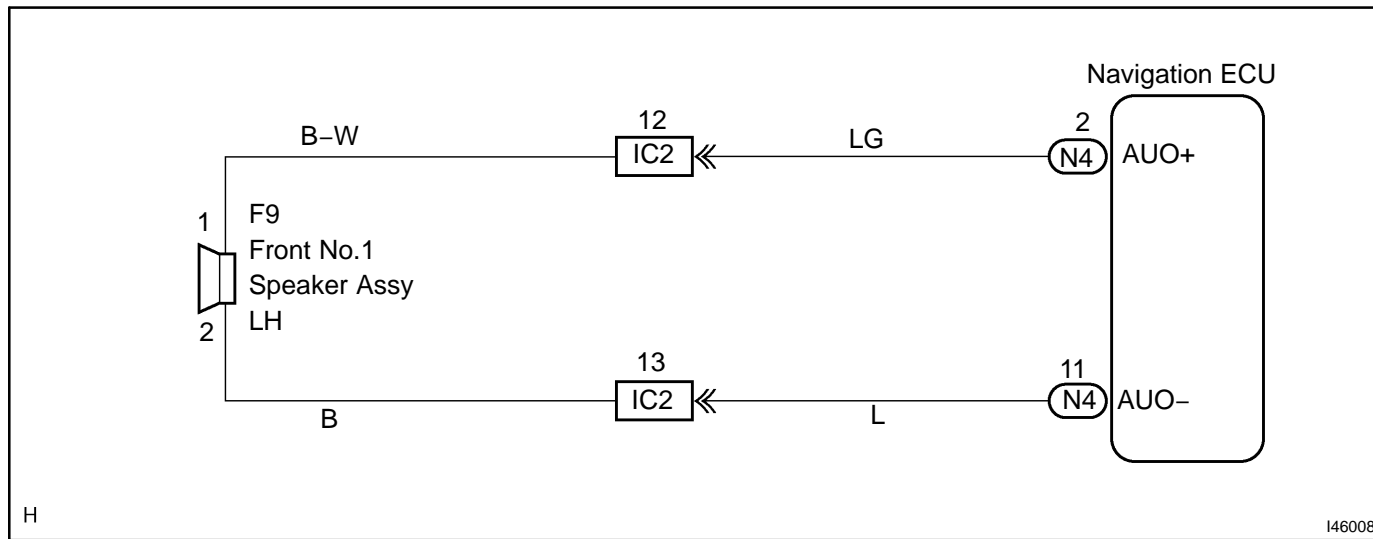
REPLACE STEERING PAD SWITCH LH (SEE PAGE 67-42)

SPEAKER CIRCUIT (NAVIGATION VOICE)

CIRCUIT DESCRIPTION

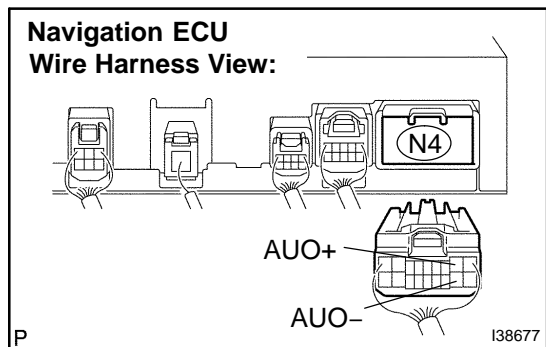
This circuit is used when the voice guidance in the navigation system is on.

WIRING DIAGRAM



INSPECTION PROCEDURE

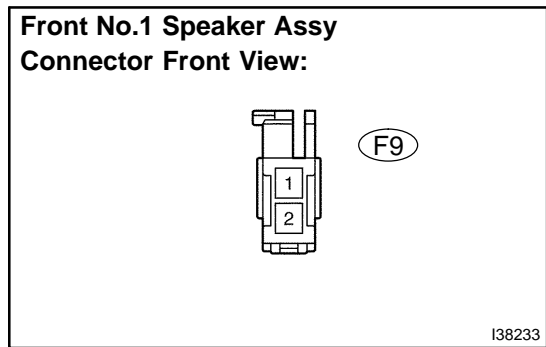
1 CHECK HARNESS AND CONNECTOR(FRONT NO.1 SPEAKER ASSY - NAVIGATION ECU)



- (a) Disconnect the navigation ECU connector N4 and front No.1 speaker assy connector F9.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
F9-1 - AUO+	Always	Below 1 Ω
F9-2 - AUO-	Always	Below 1 Ω
AUO+ - Body ground	Always	10 kΩ or higher
AUO- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT FRONT NO.1 SPEAKER ASSY

- (a) Resistance check.
(1) Measure the resistance between the terminals of the speaker.

NOTICE:

The speaker should not be removed for checking.

Standard:

Standard Models: Approximately 4 Ω

Mark Levinson Models: 7 to 9 Ω

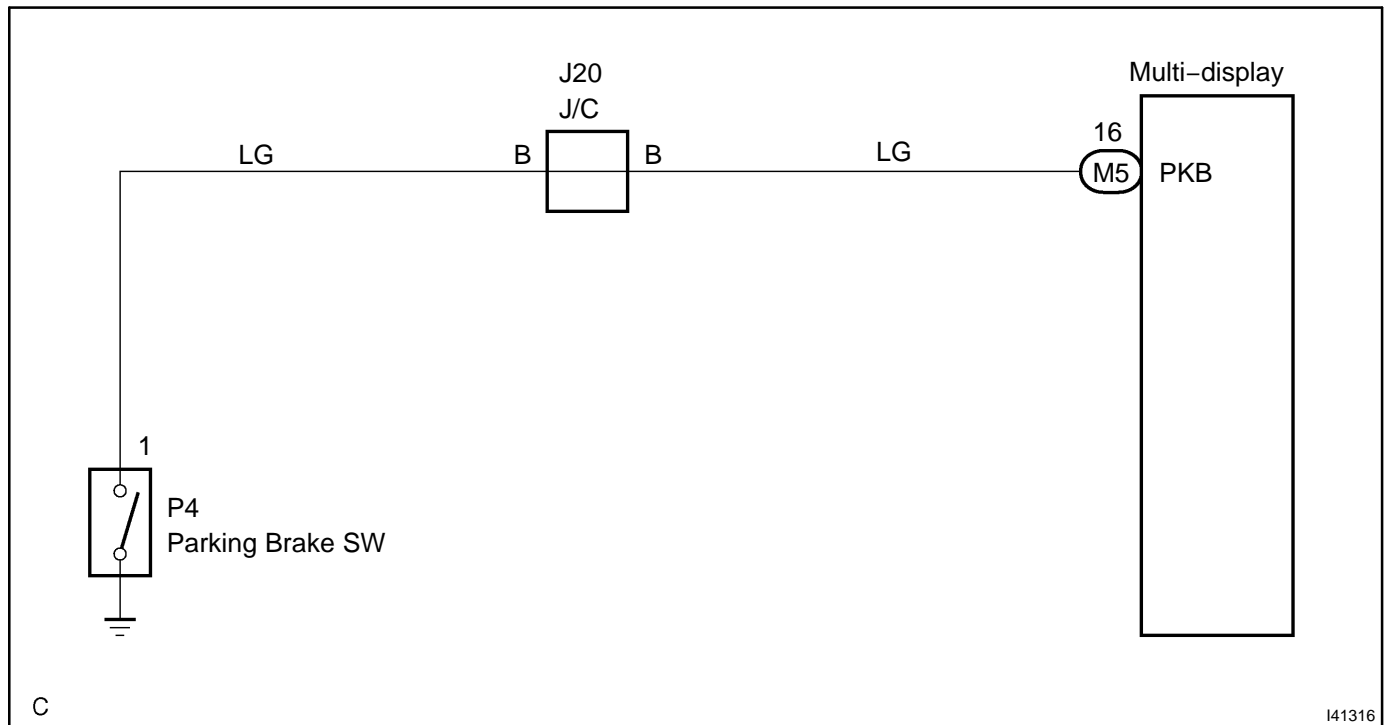
NG**REPLACE FRONT NO.1 SPEAKER ASSY
(SEE PAGE 67-15)****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-1744)**

PARKING BRAKE SWITCH CIRCUIT

CIRCUIT DESCRIPTION

This circuit is from the parking brake switch to the multi-display.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK BRAKE WARNING LIGHT

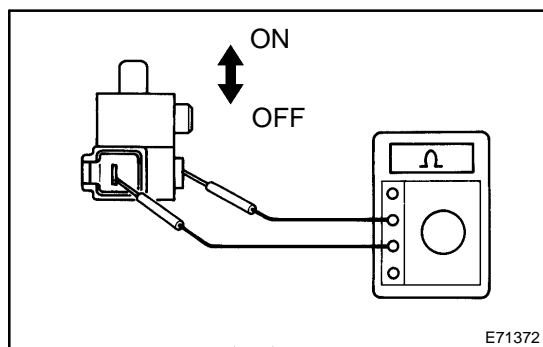
- (a) Check that the brake warning light comes on when the parking brake is applied and goes off when it is released.

OK: The brake warning light operates as specified above.

OK

Go to step 3

NG

2 INSPECT PARKING BRAKE SWITCH ASSY

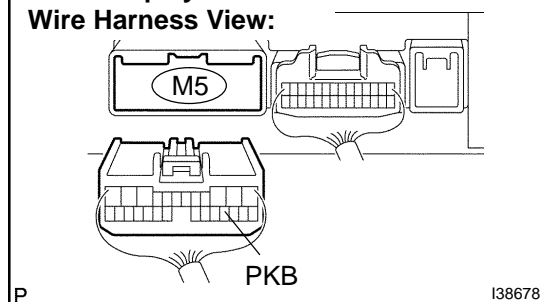
- (a) Disconnect the parking brake switch assy.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
Switch connector - Switch body	ON (When shaft is not pressed)	Below 1 Ω
Switch connector - Switch body	OFF (When shaft is pressed)	10 k Ω or higher

NG **REPLACE PARKING BRAKE SWITCH ASSY**

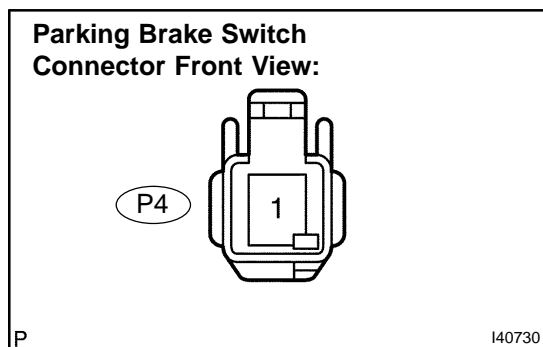
OK

3 CHECK HARNESS AND CONNECTOR(PARKING BRAKE SWITCH - MULTI-DISPLAY)**Multi-display Wire Harness View:**

- (a) Disconnect the multi-display connector M5 and parking brake switch connector P4.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
PKB - P4-1	Always	Below 1 Ω
PKB - Body ground	Always	10 k Ω or higher

Parking Brake Switch Connector Front View:

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

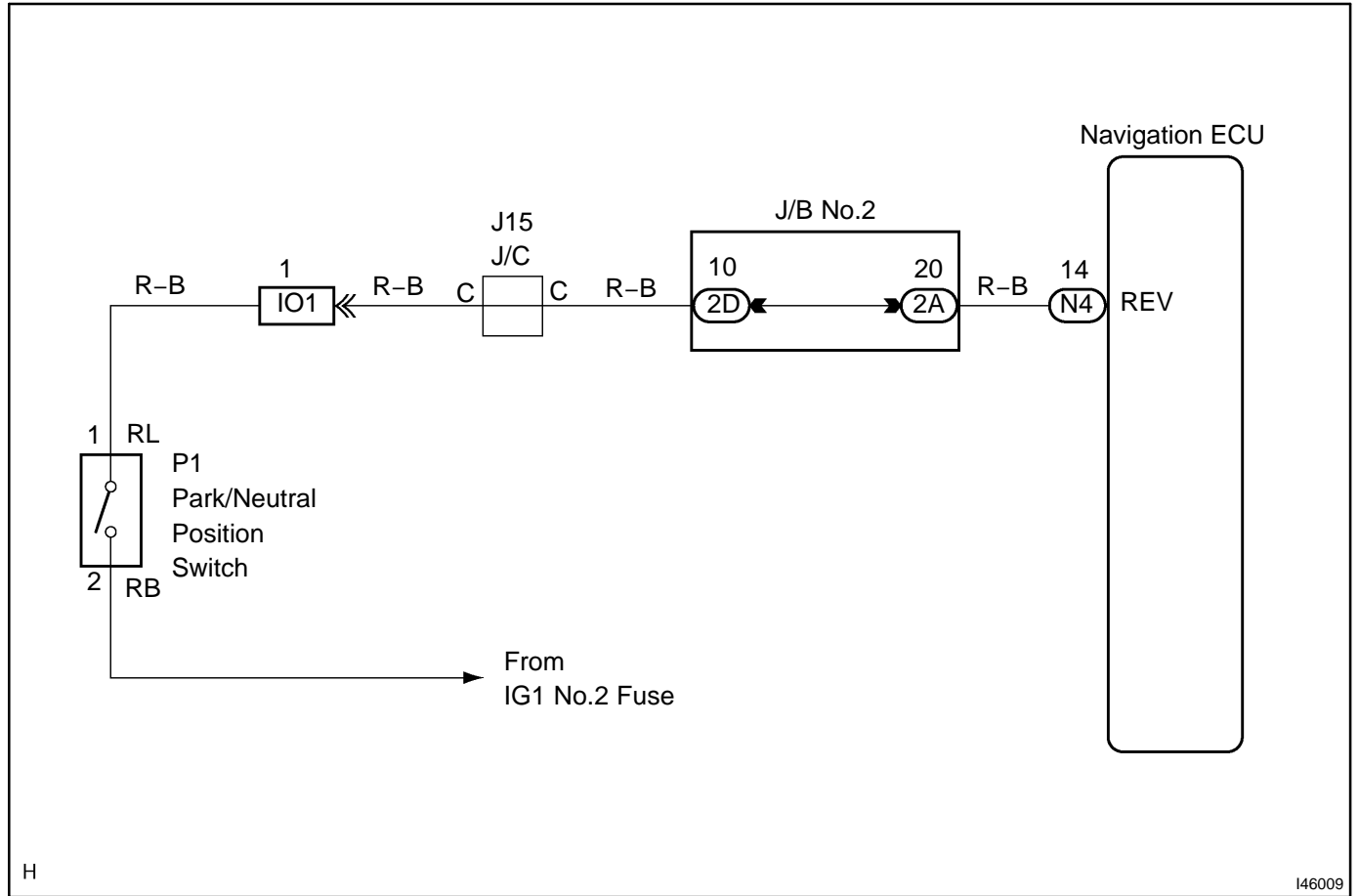
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

REVERSE SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

The navigation ECU receives a reverse signal from the park/neutral position switch and information about the GPS antenna, and then adjusts vehicle position.

WIRING DIAGRAM

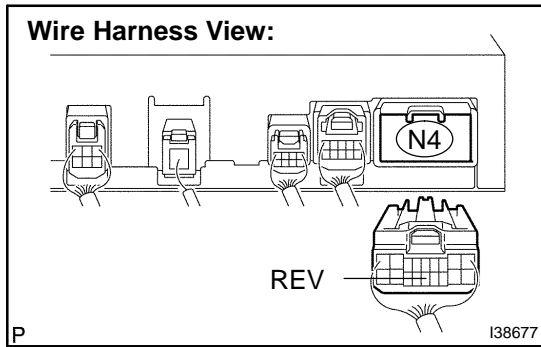


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INSPECTION PROCEDURE

1 INSPECT NAVIGATION ECU



- (a) Disconnect the navigation ECU connector N4.
- (b) Measure the resistance according to the value(s) in the table below.

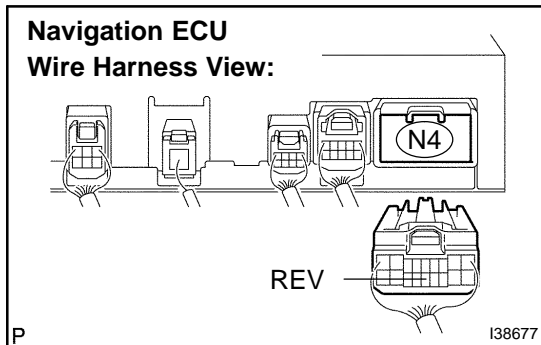
Standard:

Tester connection	Condition	Specified condition
REV - Body ground	Ignition switch is ON. Shift lever is moved to R position.	10 to 14 V
REV - Body ground	Ignition switch is ON. Shift lever is moved to any position except R.	Below 1 V

OK → REPLACE NAVIGATION ECU (SEE PAGE 67-36)

NG

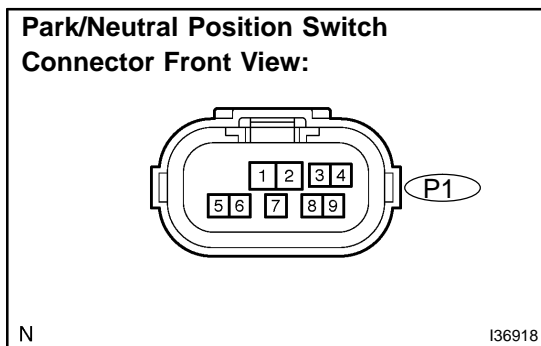
2 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - PARK/NEUTRAL POSITION SWITCH)



- (a) Disconnect the navigation ECU connector N4 and park/neutral position switch connector P1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

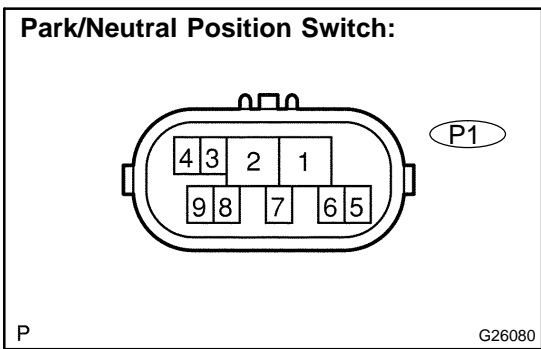
Tester connection	Condition	Specified condition
REV - P1-1	Always	Below 1 Ω
REV - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT PARK/NEUTRAL POSITION SWITCH



- (a) Disconnect the park/neutral position switch connector P1.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
P1-1 - P1-2	Shift lever is moved to R position.	Below 1 Ω
P1-1 - P1-2	Shift lever is moved to any position except R.	10 kΩ or higher

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

MUTE SIGNAL CIRCUIT (NAVIGATION ECU - STEREO COMPONENT AMPLIFIER ASSY)

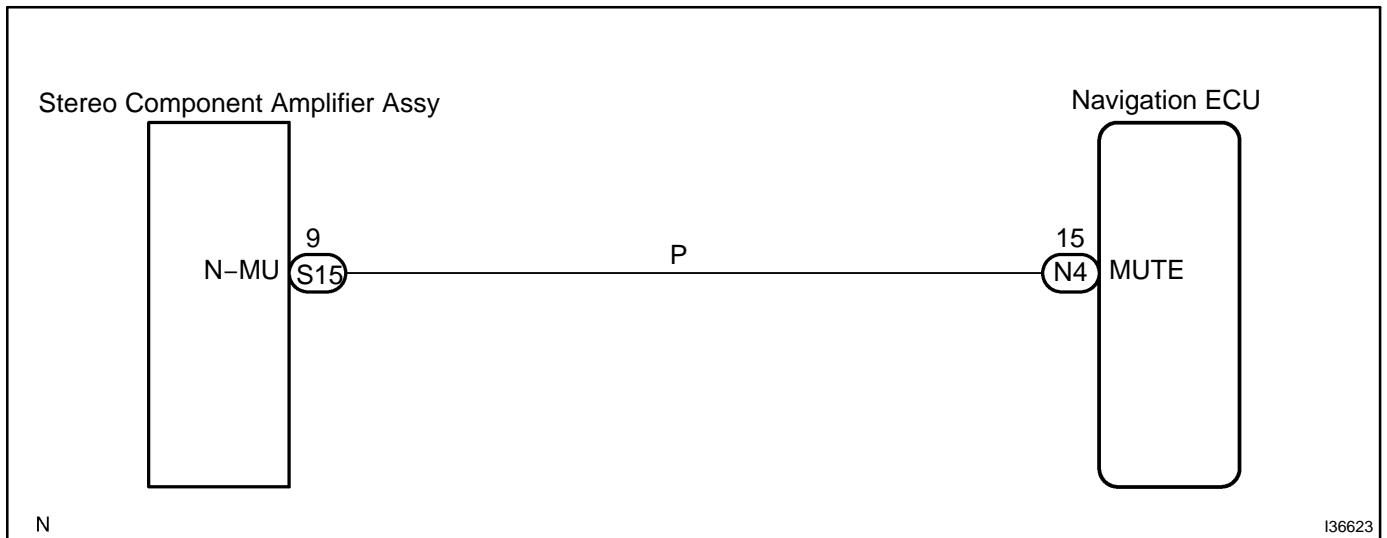
CIRCUIT DESCRIPTION

This circuit sends a mute signal to the stereo component amplifier assy to enable the voice on the phone to be heard clearly when the cellular phone is used.

If there is an open in the circuit, no sound can be produced from the speakers while the cellular phone is being used.

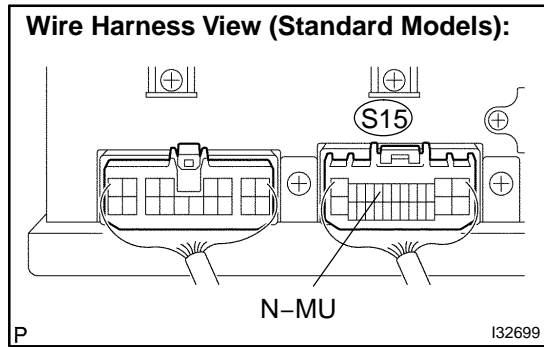
If there is a short in the circuit, even though the stereo component amplifier assy is normal, no sound or only an extremely small sound can be produced.

WIRING DIAGRAM



INSPECTION PROCEDURE

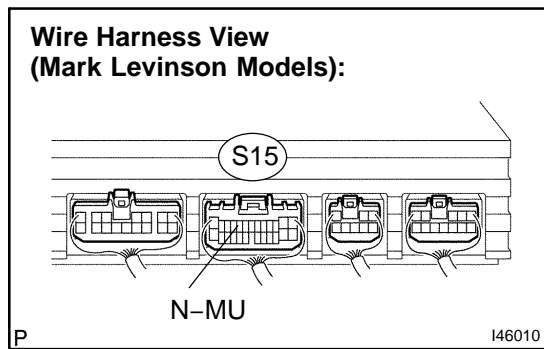
1 INSPECT STEREO COMPONENT AMPLIFIER ASSY



(a) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specification
N-MU - Body ground	Turn ignition switch to ACC, Audio system is playing → Cellular phone voice is produced	Above 3.5 V → Below 1 V

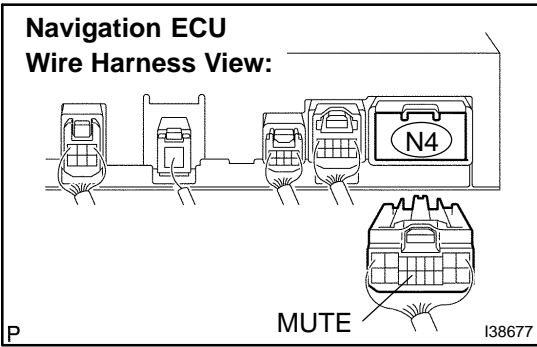


NG → Go to step 2

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

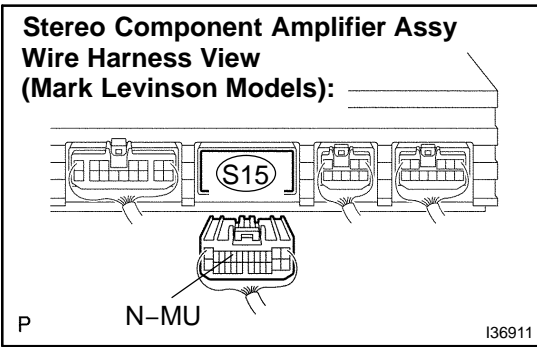
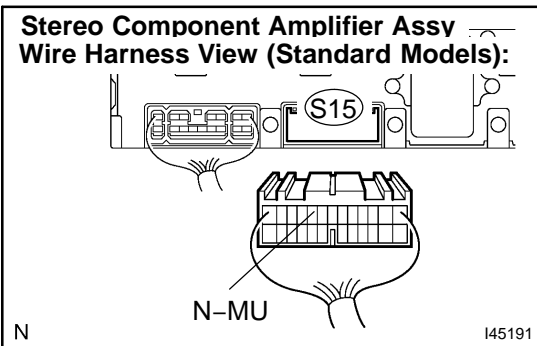
2 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - STEREO COMPONENT AMPLIFIER ASSY)



- (a) Disconnect the navigation ECU connector N4 and stereo component amplifier assy connector S15.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

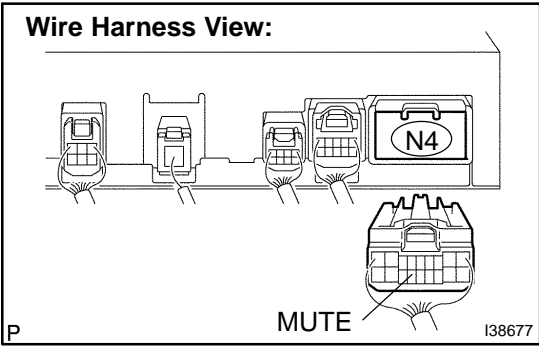
Tester connection	Condition	Specified condition
MUTE - N-MU	Always	Below 1 Ω
MUTE - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT NAVIGATION ECU



- (a) Reconnect the stereo component amplifier assy connector.
- (b) Disconnect the navigation ECU connector N4.
- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specification
MUTE - Body ground	Turn ignition switch to ACC	Above 3.5 V

NG → **REPLACE STEREO COMPONENT AMPLIFIER ASSY (SEE PAGE 67-13)**

OK

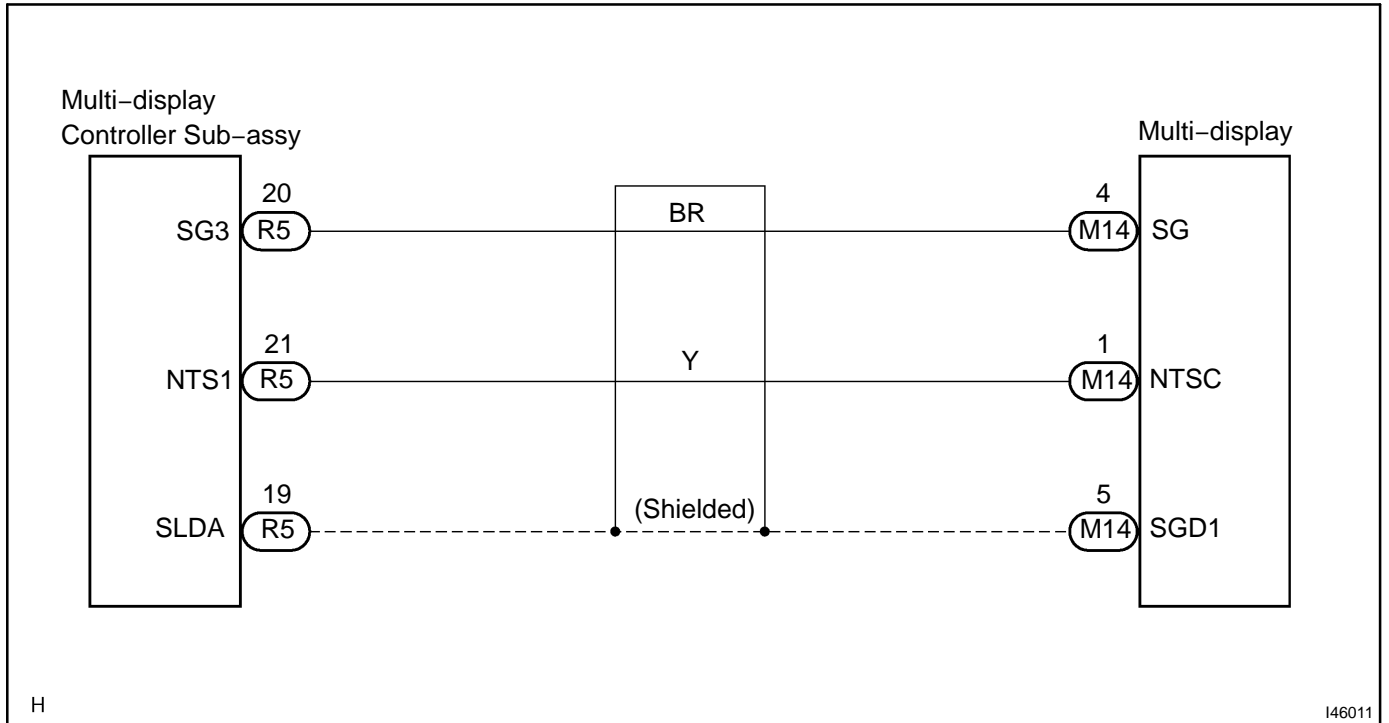
REPLACE NAVIGATION ECU (SEE PAGE 67-36)

DISPLAY SIGNAL CIRCUIT (FROM MULTI-DISPLAY CONTROLLER SUB-ASSY)

CIRCUIT DESCRIPTION

This is the DVD display signal circuit from the multi-display controller sub-assy to the multi-display.

WIRING DIAGRAM

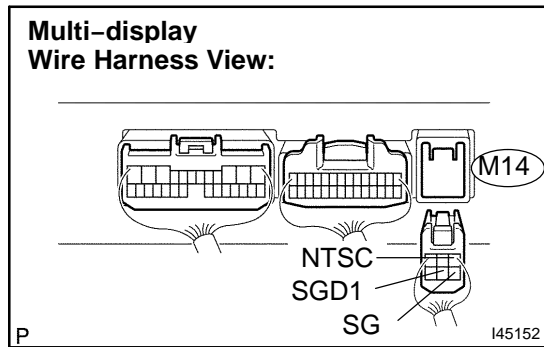


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INSPECTION PROCEDURE

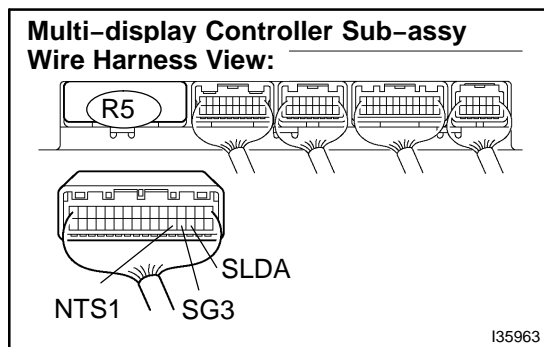
1	CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - MULTI-DISPLAY)
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- (a) Disconnect the multi-display connector M14 and multi-display controller sub-assy connector R5.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

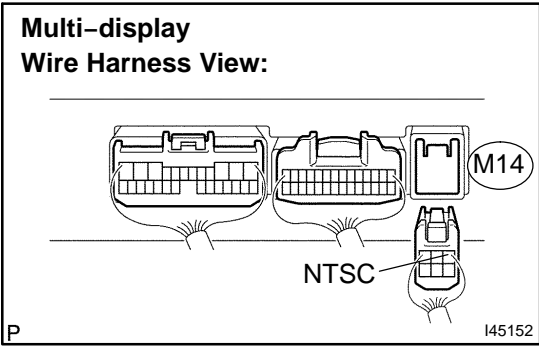
Tester connection	Condition	Specified condition
SGD1 - SLDA	Always	Below 1 Ω
NTSC - NTS1	Always	Below 1 Ω
SG - SG3	Always	Below 1 Ω
NTSC - Body ground	Always	10 kΩ or higher
SGD1 - Body ground	Always	10 kΩ or higher
SG - Body ground	Always	10 kΩ or higher



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

2 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY (OUTPUT SIGNAL)



- (a) Reconnect the multi-display controller sub-assy connector R5.
 - (b) Measure the waveform according to the table below.
- Standard:**

Tester connection	Condition	Specified condition
NTSC - Body ground	DVD display is ON	A waveform synchronized with display signals is output

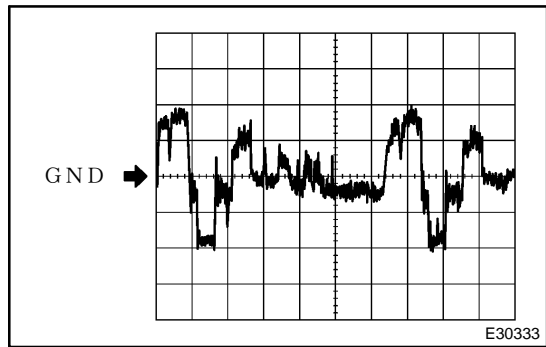
NG **REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY (SEE PAGE 67-23)**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from that shown in the illustration below due to differences in oscilloscope settings. A normal multi-display controller sub-assy operating condition can be determined if any waveform is output.



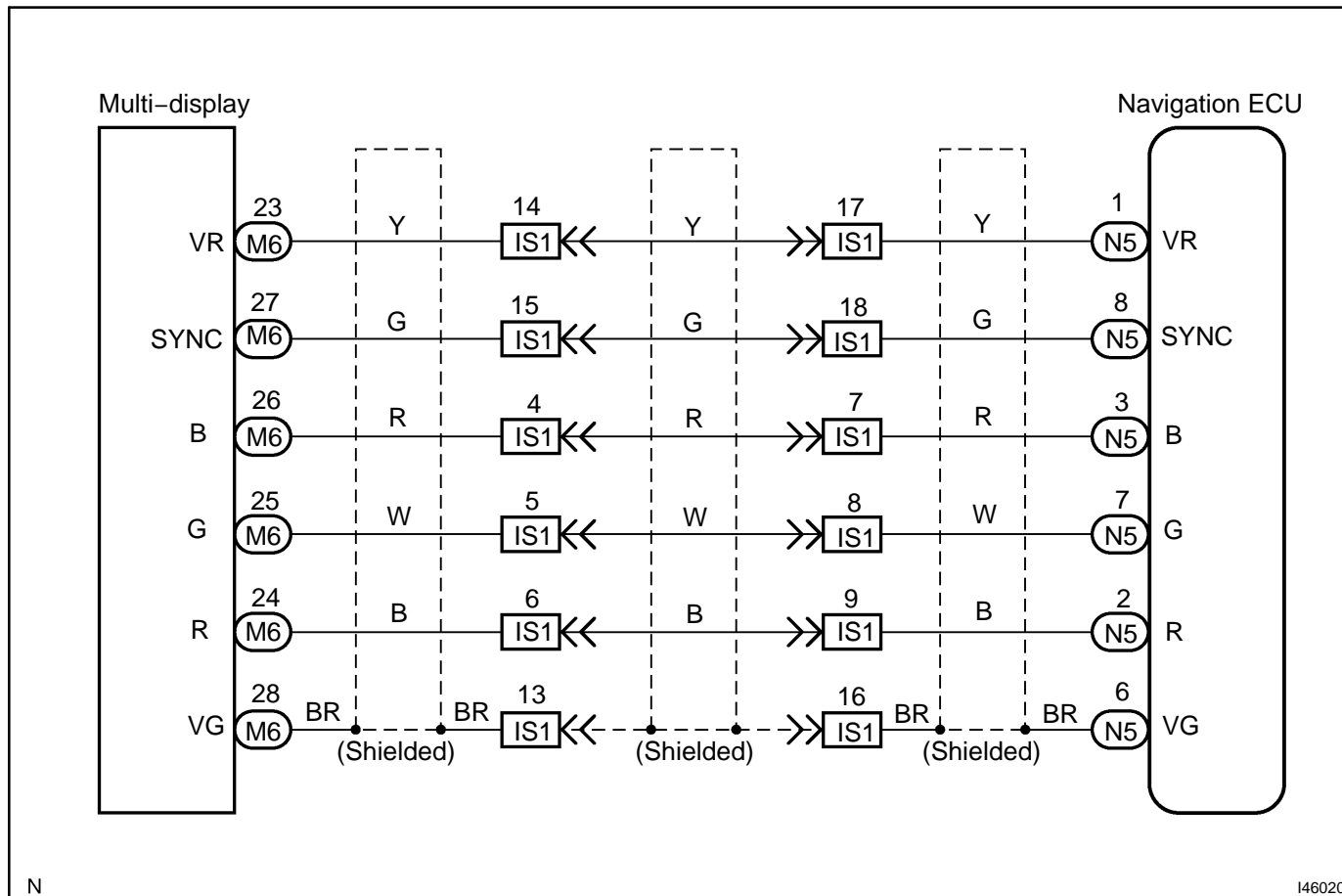
Oscilloscope wave
 Terminal: NTSC-Body ground
 Setting: 500 mV/DIV 10 μs/DIV
 Condition: DVD display is on.

DISPLAY SIGNAL CIRCUIT (NAVIGATION ECU - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

This is the display signal circuit from the navigation ECU to the multi-display.

WIRING DIAGRAM

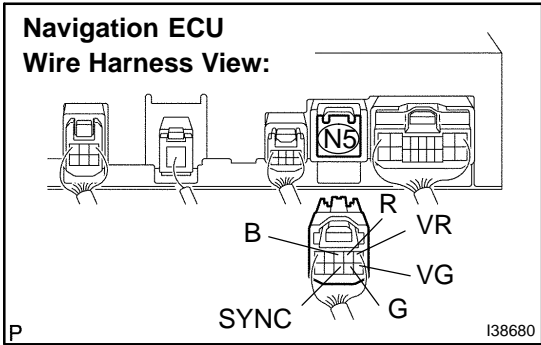


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INSPECTION PROCEDURE

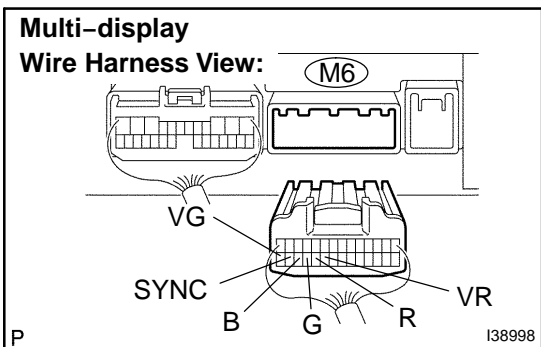
1 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - MULTI-DISPLAY)



- (a) Disconnect the navigation ECU connector N5 and multi-display connector M6.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

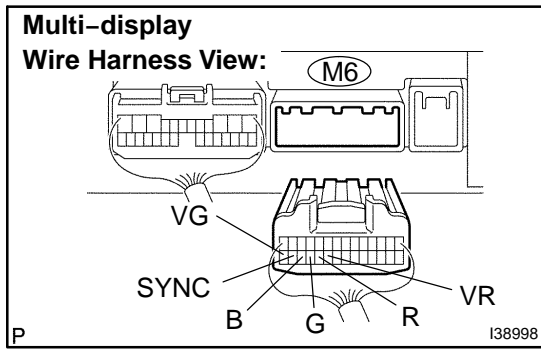
Tester connection	Condition	Specified condition
R - R	Always	Below 1 Ω
G - G	Always	Below 1 Ω
B - B	Always	Below 1 Ω
SYNC - SYNC	Always	Below 1 Ω
VR - VR	Always	Below 1 Ω
VG - VG	Always	Below 1 Ω
R - Body ground	Always	10 kΩ or higher
G - Body ground	Always	10 kΩ or higher
B - Body ground	Always	10 kΩ or higher
SYNC - Body ground	Always	10 kΩ or higher
VR - Body ground	Always	10 kΩ or higher
VG - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT NAVIGATION ECU (OUTPUT SIGNAL)



- (a) Reconnect the navigation ECU connector N5.
- (b) Measure the waveform according to the table below.

Standard:

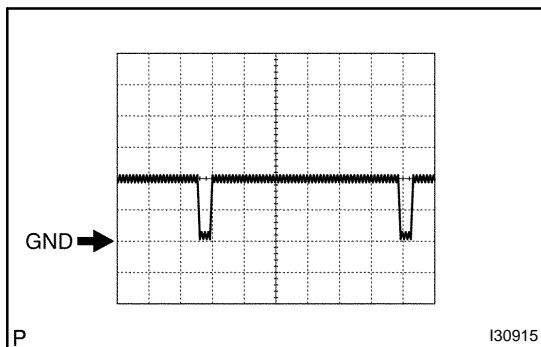
Tester connection	Condition	Specified condition
R - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYNC - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

NG **REPLACE NAVIGATION ECU (SEE PAGE 67-36)**

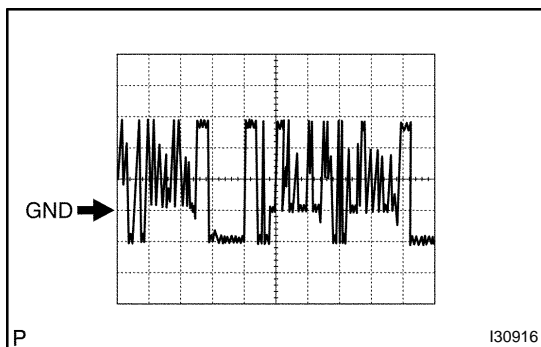
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT: The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal navigation ECU operating condition can be determined if any waveform is output.



Oscilloscope wave
Terminal: SYNC-Body ground
Setting: 500 mV/DIV 10 μs/DIV
Condition: Navigation display is on.



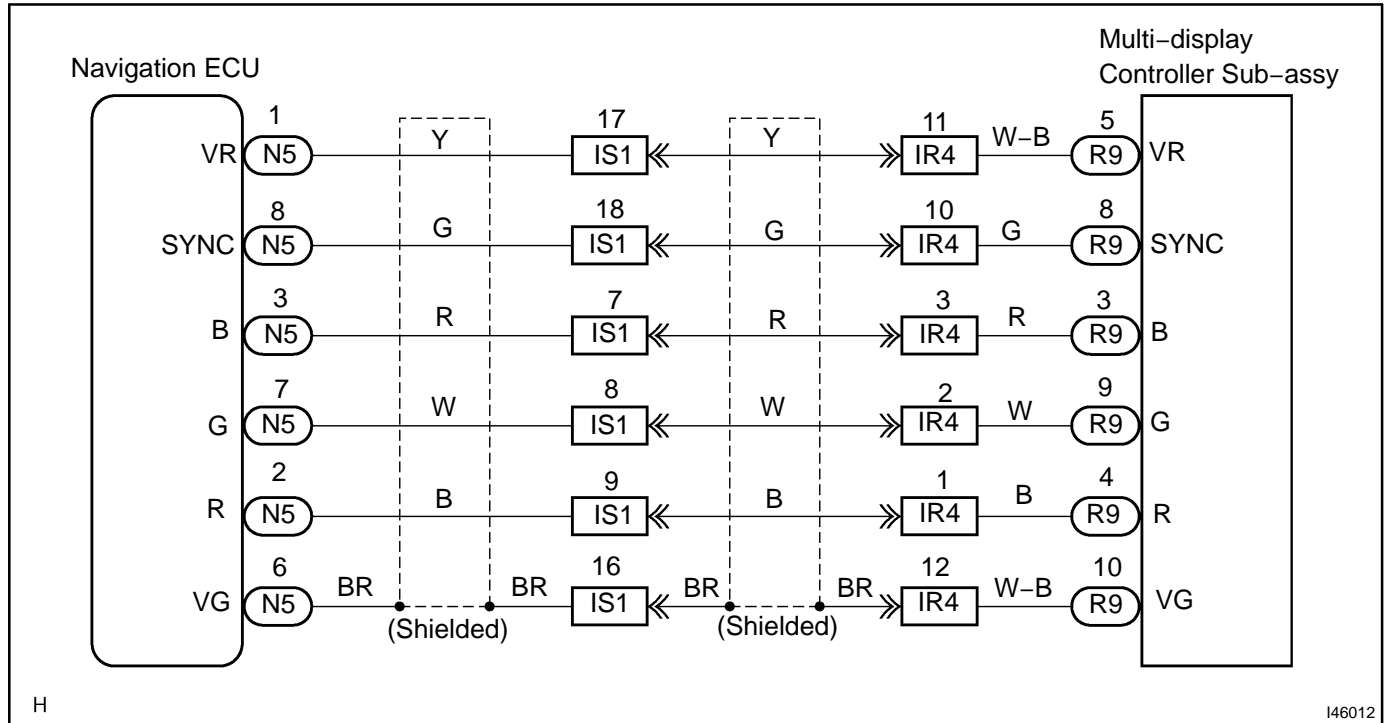
Oscilloscope wave
Terminal: R, G, B-Body ground
Setting: 200 mV/DIV 10 μs/DIV
Condition: Navigation display is on.

DISPLAY SIGNAL CIRCUIT (NAVIGATION ECU - MULTI-DISPLAY CONTROLLER SUB-ASSY)

CIRCUIT DESCRIPTION

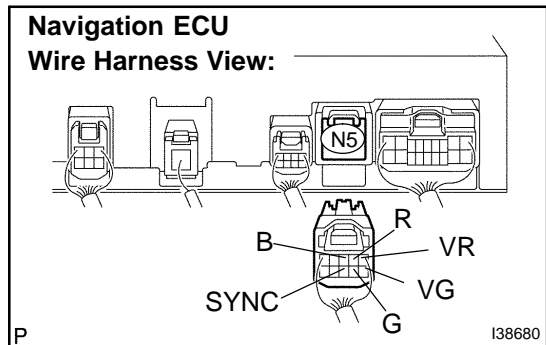
This is the display signal circuit from the navigation ECU to the multi-display controller sub-assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

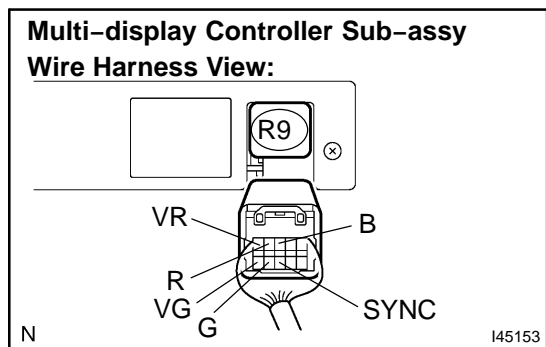
1 CHECK HARNESS AND CONNECTOR (NAVIGATION ECU - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the navigation ECU connector N5 and multi-display controller sub-assy connector R9.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

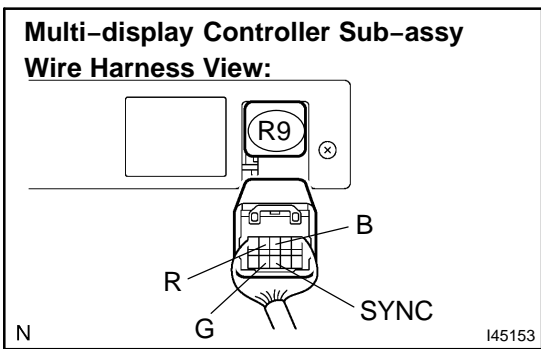
Tester connection	Condition	Specified condition
R - R	Always	Below 1 Ω
G - G	Always	Below 1 Ω
B - B	Always	Below 1 Ω
SYNC - SYNC	Always	Below 1 Ω
VR - VR	Always	Below 1 Ω
VG - VG	Always	Below 1 Ω
R - Body ground	Always	10 kΩ or higher
G - Body ground	Always	10 kΩ or higher
B - Body ground	Always	10 kΩ or higher
SYNC - Body ground	Always	10 kΩ or higher
VR - Body ground	Always	10 kΩ or higher
VG - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT NAVIGATION ECU (OUTPUT SIGNAL)



- (a) Reconnect the navigation ECU connector N5.
- (b) Measure the waveform according to the table below.

Standard:

Tester connection	Condition	Specified condition
R - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYNC - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

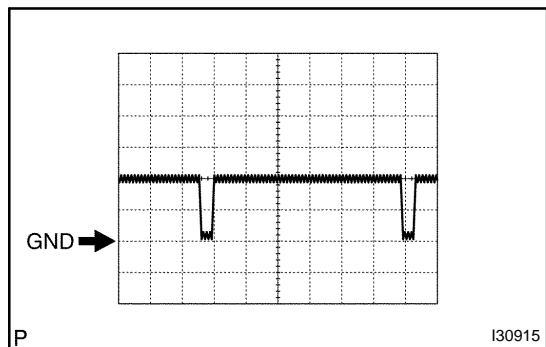
NG **REPLACE NAVIGATION ECU (SEE PAGE 67-36)**

OK

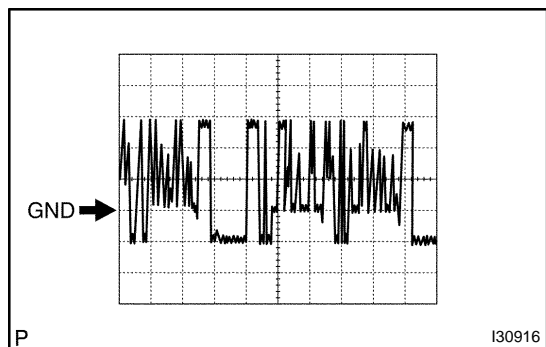
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal navigation ECU operating condition can be determined if any waveform is output.



Oscilloscope wave
Terminal: SYNC-Body ground
Setting: 500 mV/DIV 10 μs/DIV
Condition: Navigation display is on.



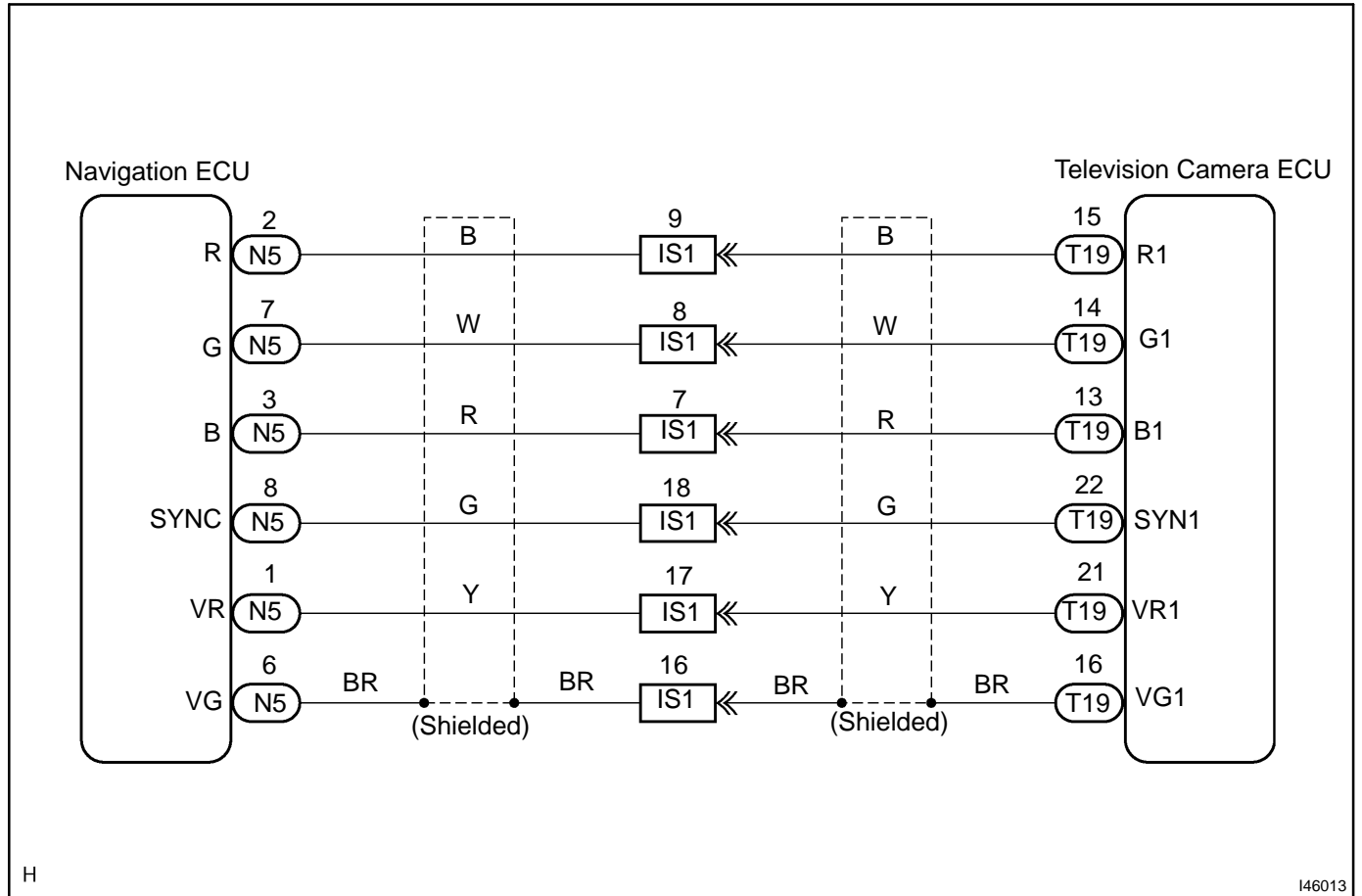
Oscilloscope wave
Terminal: R, G, B-Body ground
Setting: 200 mV/DIV 10 μs/DIV
Condition: Navigation display is on.

DISPLAY SIGNAL CIRCUIT (NAVIGATION ECU - TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

This is the display signal circuit from the navigation ECU to the television camera ECU.

WIRING DIAGRAM

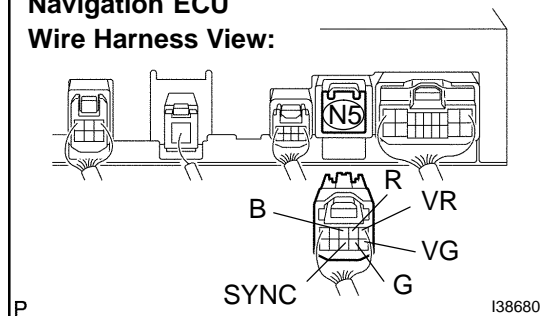


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INSPECTION PROCEDURE

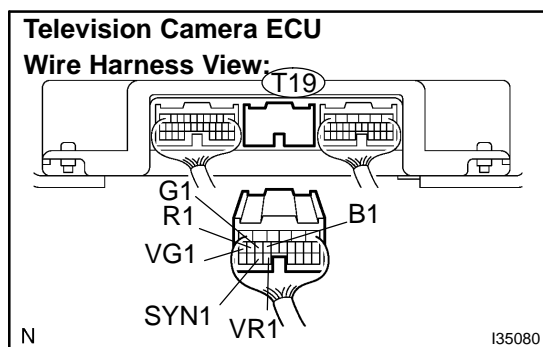
1	CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - TELEVISION CAMERA ECU)
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**Navigation ECU
Wire Harness View:**


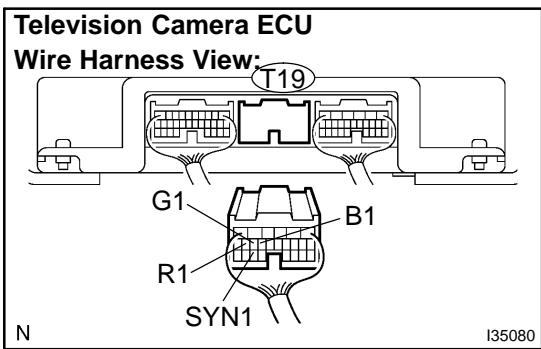
- (a) Disconnect the navigation ECU connector N5 and television camera ECU connector T19.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
R - R1	Always	Below 1 Ω
G - G1	Always	Below 1 Ω
B - B1	Always	Below 1 Ω
SYNC - SYN1	Always	Below 1 Ω
VR - VR1	Always	Below 1 Ω
VG - VG1	Always	Below 1 Ω
R - Body ground	Always	10 k Ω or higher
G - Body ground	Always	10 k Ω or higher
B - Body ground	Always	10 k Ω or higher
SYNC - Body ground	Always	10 k Ω or higher
VR - Body ground	Always	10 k Ω or higher
VG - Body ground	Always	10 k Ω or higher

**Television Camera ECU
Wire Harness View:**
**NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

2 INSPECT NAVIGATION ECU (OUTPUT SIGNAL)



- (a) Reconnect the navigation ECU connector N5.
- (b) Measure the waveform according to the table below.

Standard:

Tester connection	Condition	Specified condition
R1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYN1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

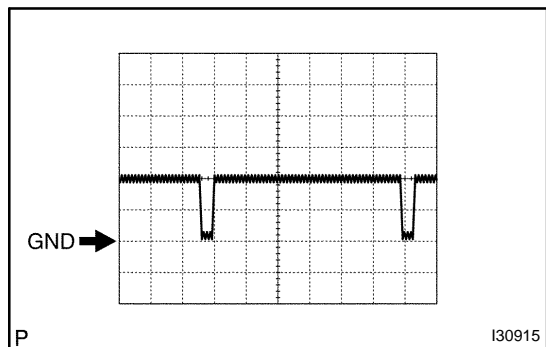
NG **REPLACE NAVIGATION ECU (SEE PAGE 67-36)**

OK

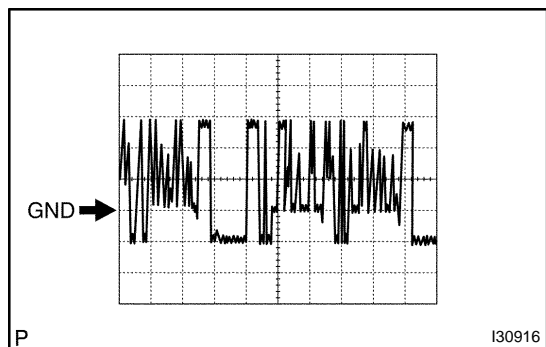
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal navigation ECU operating condition can be determined if any waveform is output.



Oscilloscope wave
 Terminal: SYNC-Body ground
 Setting: 500 mV/DIV 10 μs/DIV
 Condition: Navigation display is on.



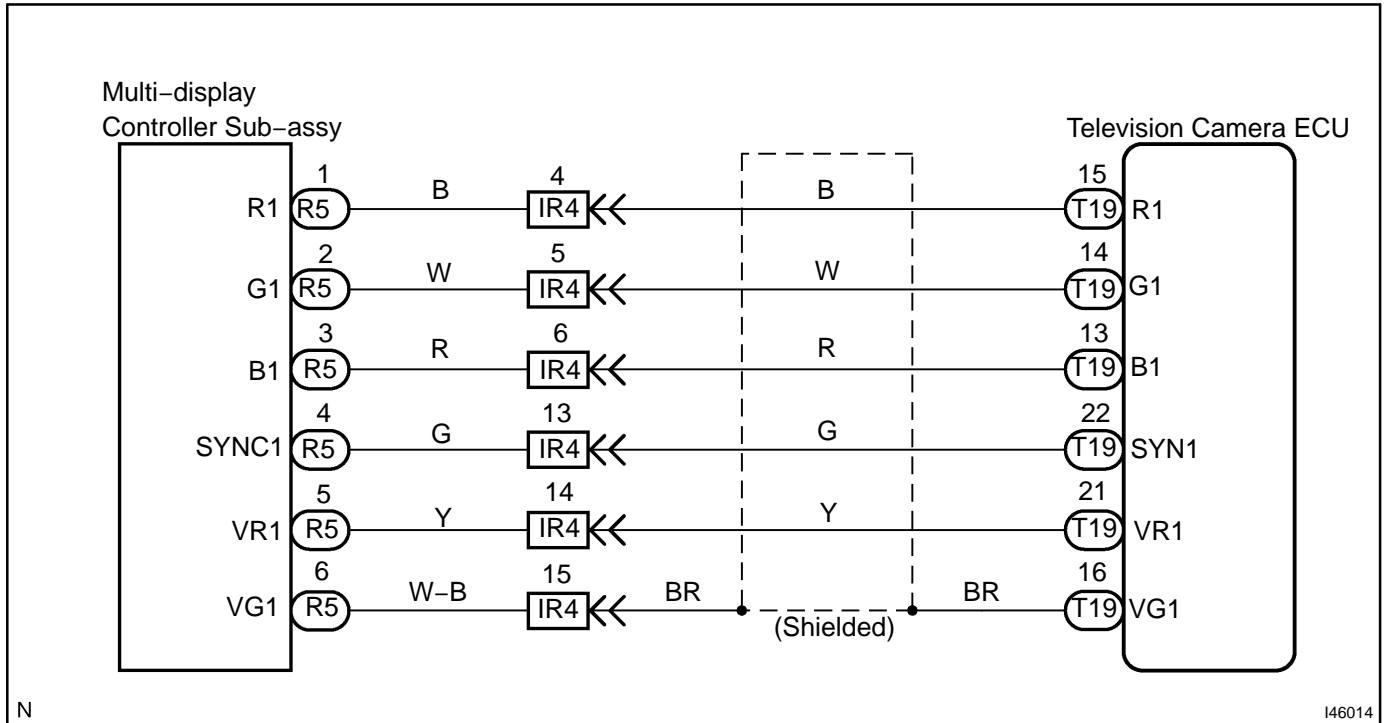
Oscilloscope wave
 Terminal: R, G, B-Body ground
 Setting: 200 mV/DIV 10 μs/DIV
 Condition: Navigation display is on.

DISPLAY SIGNAL CIRCUIT (MULTI-DISPLAY CONTROLLER SUB-ASSY - TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

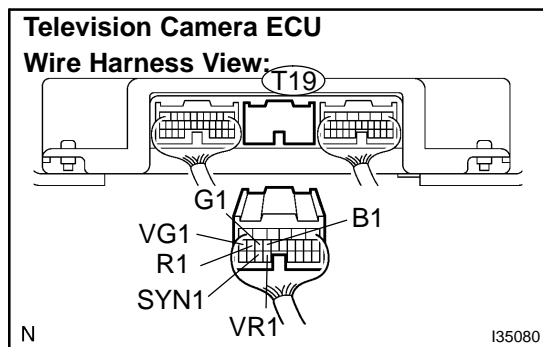
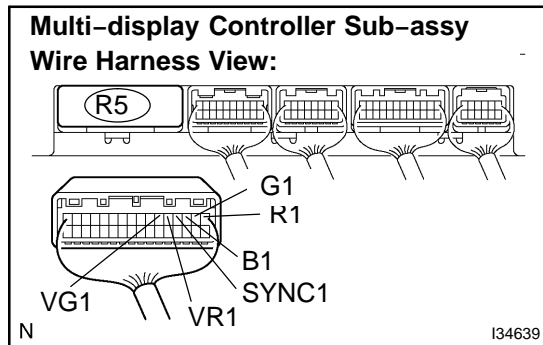
This is the display signal circuit from the multi-display controller sub-assy to the television camera ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - TELEVISION CAMERA ECU)



- (a) Disconnect the multi-display controller sub-assy connector R5 and television camera ECU connector T19.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
R1 - R1	Always	Below 1 Ω
G1 - G1	Always	Below 1 Ω
B1 - B1	Always	Below 1 Ω
SYNC1 - SYN1	Always	Below 1 Ω
VR1 - VR1	Always	Below 1 Ω
VG1 - VG1	Always	Below 1 Ω
R1 - Body ground	Always	10 kΩ or higher
G1 - Body ground	Always	10 kΩ or higher
B1 - Body ground	Always	10 kΩ or higher
SYNC1 - Body ground	Always	10 kΩ or higher
VR1 - Body ground	Always	10 kΩ or higher
VG1 - Body ground	Always	10 kΩ or higher

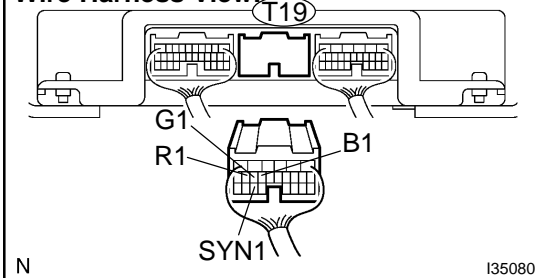
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY (OUTPUT SIGNAL)

Television Camera ECU

Wire Harness View:



(a) Reconnect the multi-display controller sub-assy connector R5.

(b) Measure the waveform according to the table below.

Standard:

Tester connection	Condition	Specified condition
R1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYN1 - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

NG

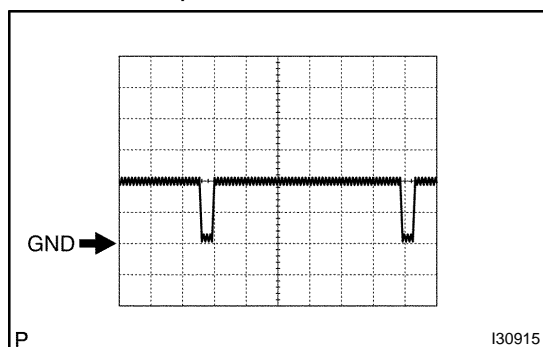
REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY (SEE PAGE 67-23)

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal multi-display controller sub-assy operating condition can be determined if any waveform is output.

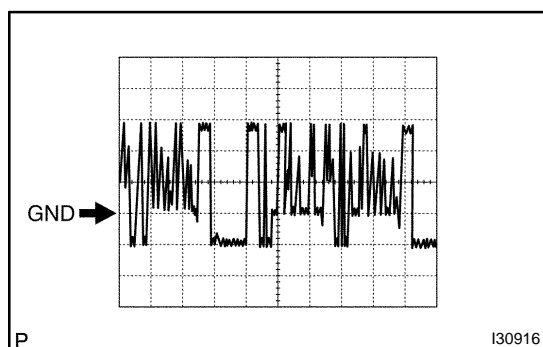


Oscilloscope wave

Terminal: SYNC-Body ground

Setting: 500 mV/DIV 10 μ s/DIV

Condition: Navigation display is on.



Oscilloscope wave

Terminal: R, G, B-Body ground

Setting: 200 mV/DIV 10 μ s/DIV

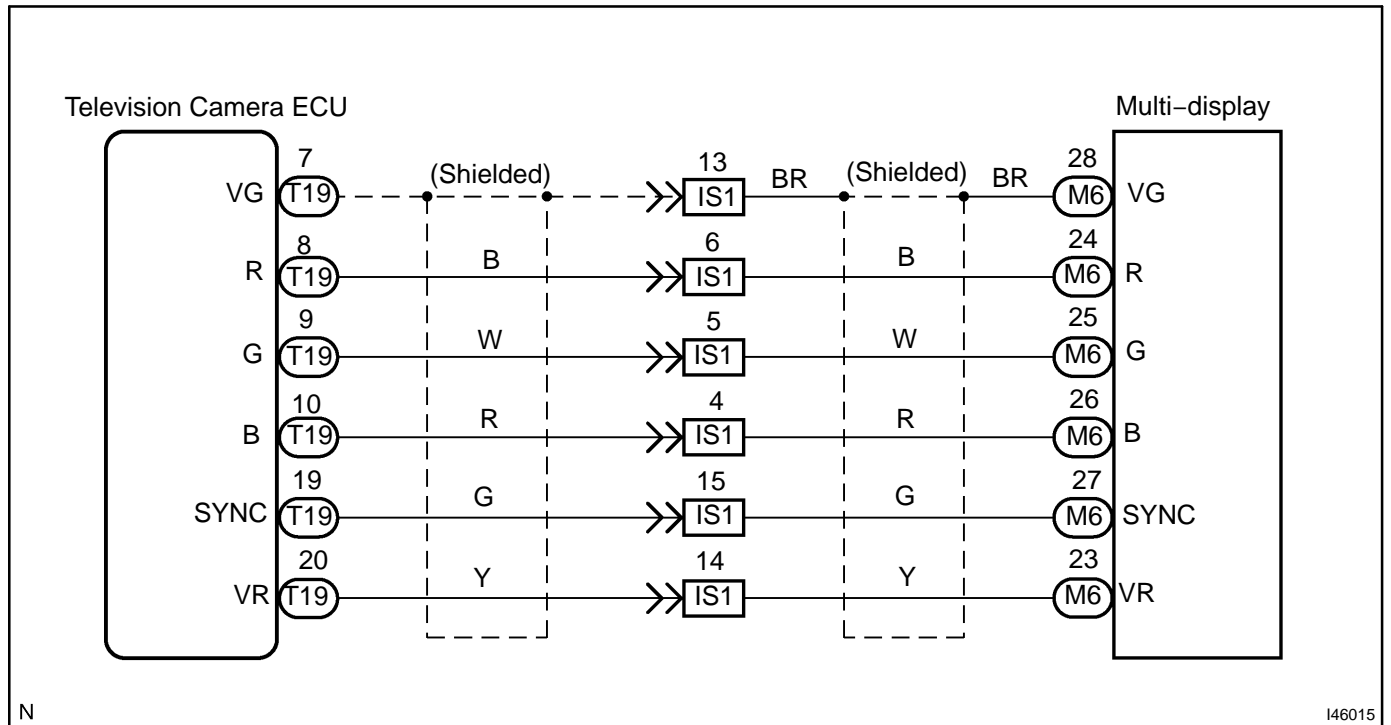
Condition: Navigation display is on.

DISPLAY SIGNAL CIRCUIT (TELEVISION CAMERA ECU - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

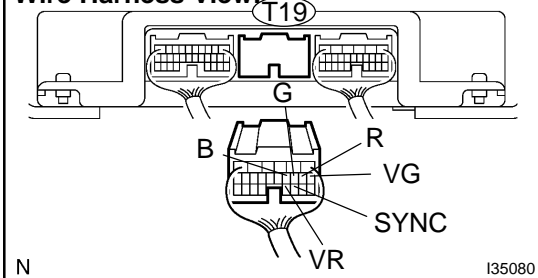
This is the display signal circuit from the television camera ECU to the multi-display.

WIRING DIAGRAM



INSPECTION PROCEDURE

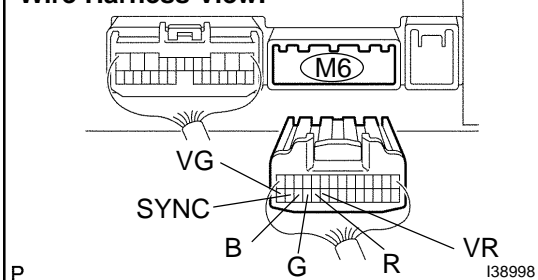
1	CHECK HARNESS AND CONNECTOR(TELEVISION CAMERA ECU - MULTI-DISPLAY)
----------	---

Television Camera ECU**Wire Harness View:**

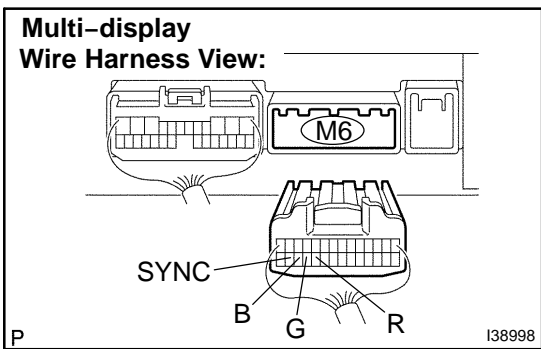
- (a) Disconnect the television camera ECU connector T19 and multi-display connector M6.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
R - R	Always	Below 1 Ω
G - G	Always	Below 1 Ω
B - B	Always	Below 1 Ω
SYNC - SYNC	Always	Below 1 Ω
VR - VR	Always	Below 1 Ω
VG - VG	Always	Below 1 Ω
R - Body ground	Always	10 k Ω or higher
G - Body ground	Always	10 k Ω or higher
B - Body ground	Always	10 k Ω or higher
SYNC - Body ground	Always	10 k Ω or higher
VR - Body ground	Always	10 k Ω or higher
VG - Body ground	Always	10 k Ω or higher

Multi-display**Wire Harness View:****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

2 INSPECT TELEVISION CAMERA ECU (OUTPUT SIGNAL)



- (a) Reconnect the television camera ECU connector T19.
- (b) Measure the waveform according to the table below.

Standard:

Tester connection	Condition	Specified condition
R - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYNC - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

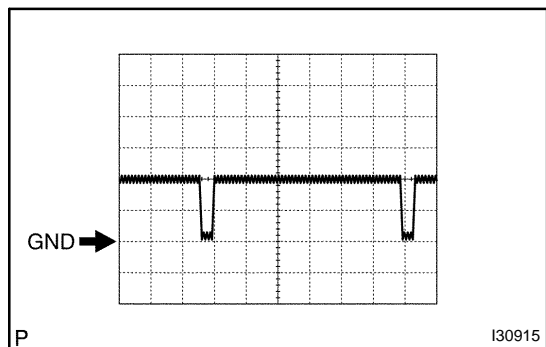
NG **REPLACE TELEVISION CAMERA ECU (SEE PAGE 67-25)**

OK

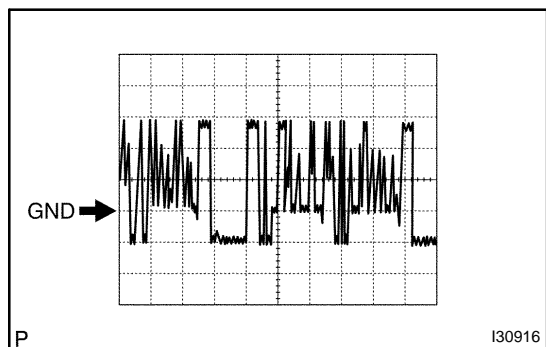
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal television camera ECU operating condition can be determined if any waveform is output.



Oscilloscope wave
Terminal: SYNC-Body ground
Setting: 500 mV/DIV 10 μs/DIV
Condition: Navigation display is on.



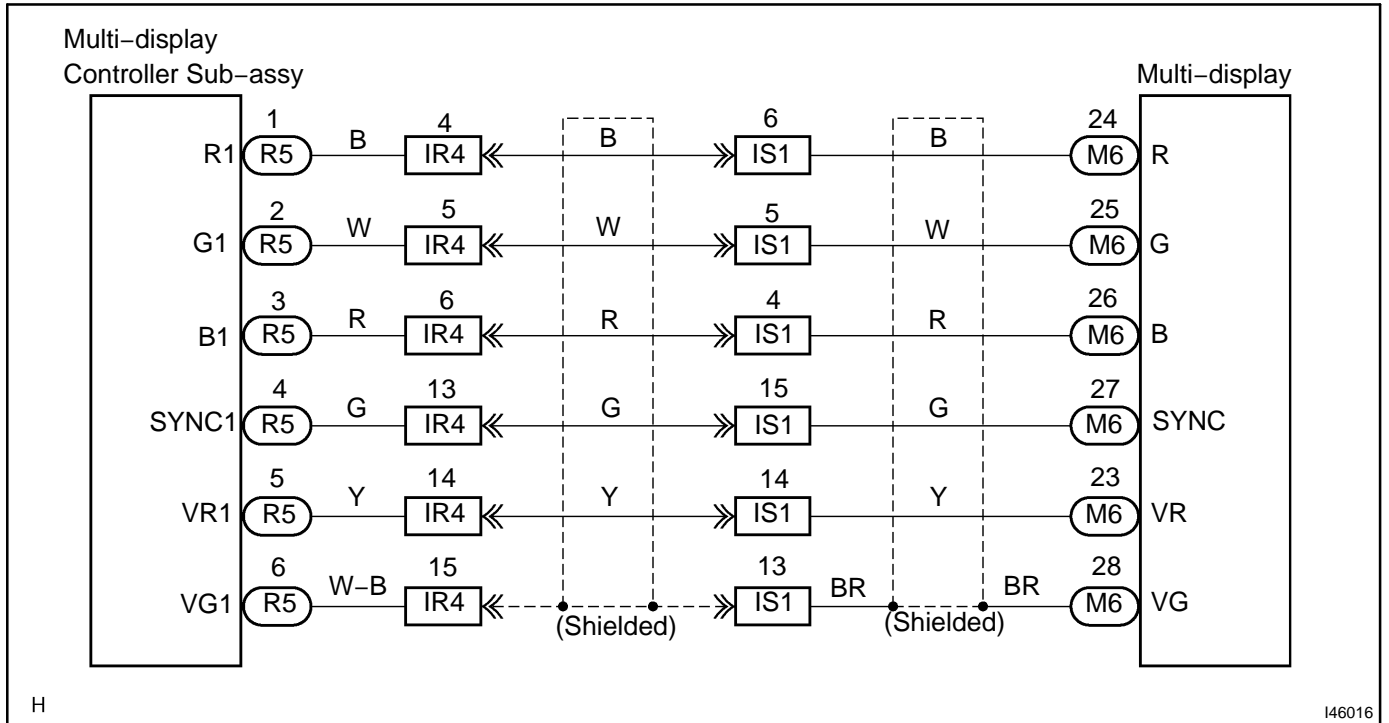
Oscilloscope wave
Terminal: R, G, B-Body ground
Setting: 200 mV/DIV 10 μs/DIV
Condition: Navigation display is on.

DISPLAY SIGNAL CIRCUIT (MULTI-DISPLAY CONTROLLER SUB-ASSY - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

This is the display signal circuit from the multi-display controller sub-assy to the multi-display.

WIRING DIAGRAM

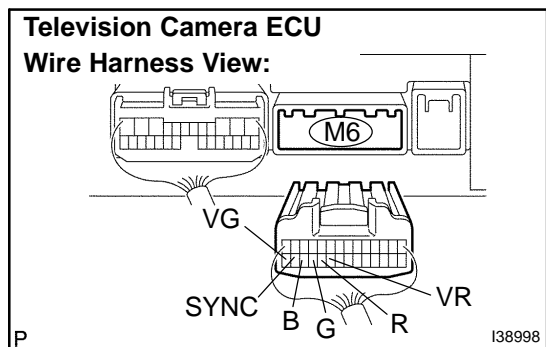
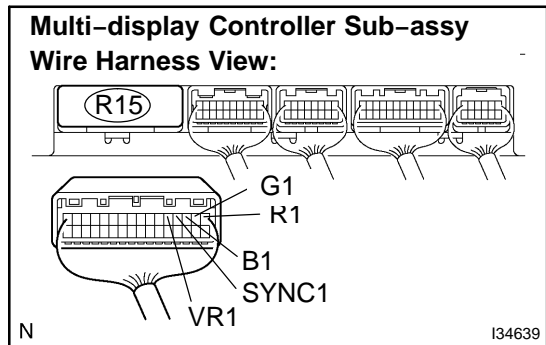


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INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - MULTI-DISPLAY)



- (a) Disconnect the multi-display controller sub-assy connector R5 and multi-display connector M6.
- (b) Measure the resistance according to the value(s) in the table below.

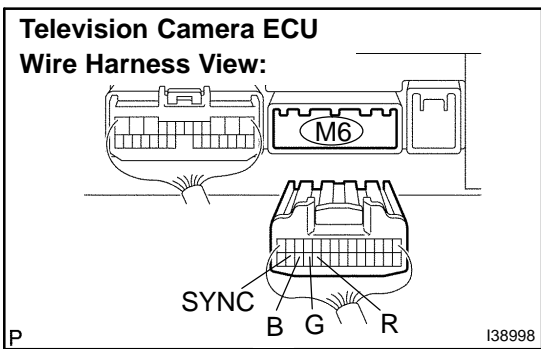
Standard:

Tester connection	Condition	Specified condition
R1 - R	Always	Below 1 Ω
G1 - G	Always	Below 1 Ω
B1 - B	Always	Below 1 Ω
SYNC1 - SYNC	Always	Below 1 Ω
VR1 - VR	Always	Below 1 Ω
VG1 - VG	Always	Below 1 Ω
R1 - Body ground	Always	10 kΩ or higher
G1 - Body ground	Always	10 kΩ or higher
B1 - Body ground	Always	10 kΩ or higher
SYNC1 - Body ground	Always	10 kΩ or higher
VR1 - Body ground	Always	10 kΩ or higher
VG1 - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY (OUTPUT SIGNAL)



- (a) Reconnect the multi-display controller sub-assy connector R5.
- (b) Measure the waveform according to the table below.
Standard:

Tester connection	Condition	Specified condition
R - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
G - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
B - Body ground	Navigation display is ON	A waveform synchronized with display signals is output
SYNC - Body ground	Navigation display is ON	A waveform synchronized with display signals is output

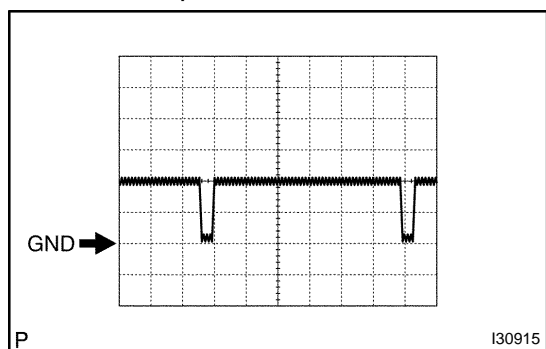
NG **REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY (SEE PAGE 67-23)**

OK

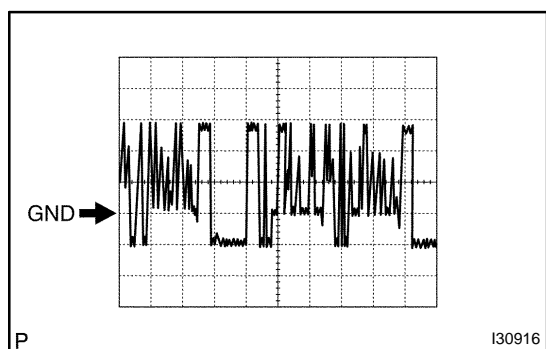
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05-1744)

HINT:

The waveform pattern may differ from those shown in the illustrations below due to differences in oscilloscope settings. A normal multi-display controller sub-assy operating condition can be determined if any waveform is output.



Oscilloscope wave
Terminal: SYNC-Body ground
Setting: 500 mV/DIV 10 μs/DIV
Condition: Navigation display is on.



Oscilloscope wave
Terminal: R, G, B-Body ground
Setting: 200 mV/DIV 10 μs/DIV
Condition: Navigation display is on.

AVC-LAN CIRCUIT (NAVIGATION ECU - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

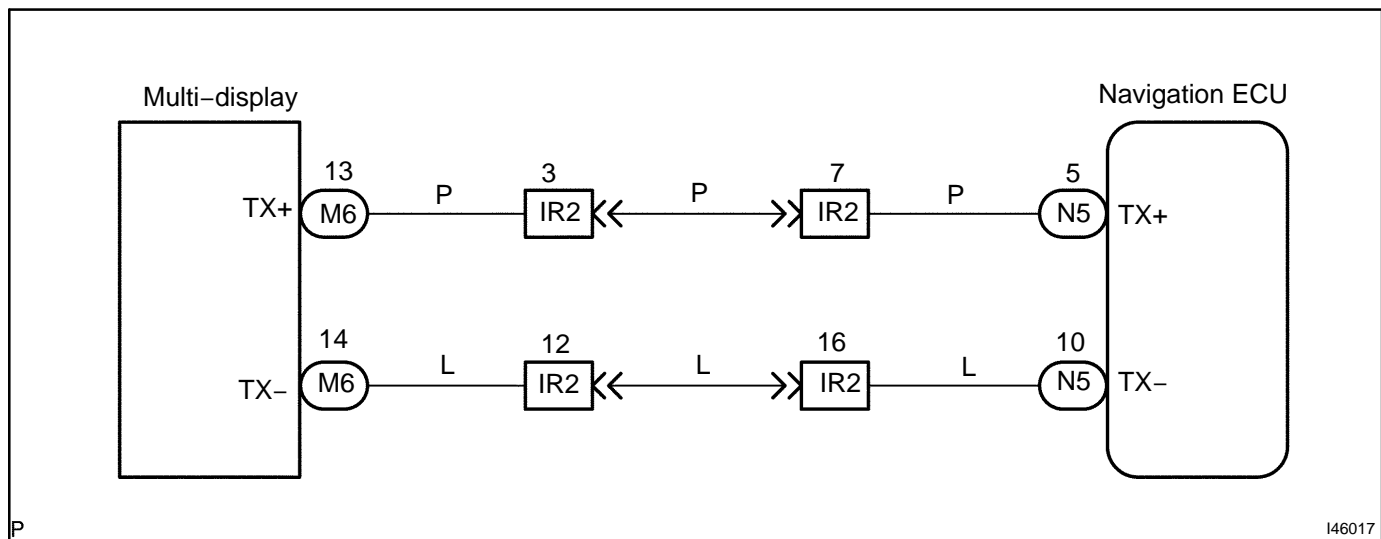
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

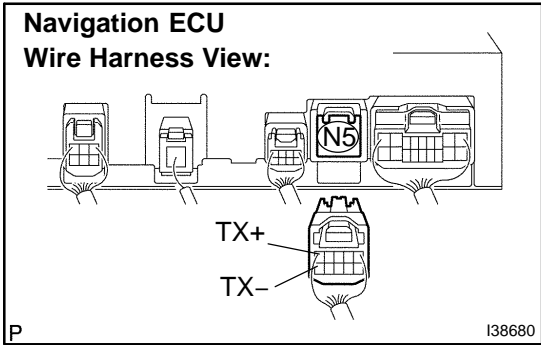
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

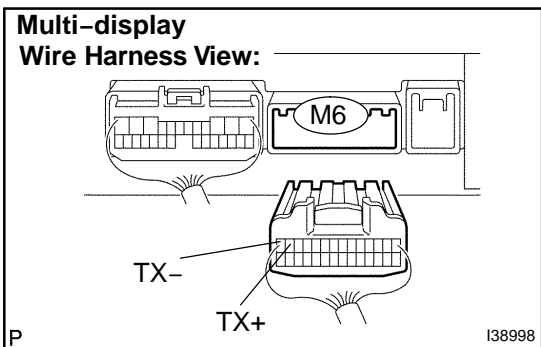
1 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - MULTI-DISPLAY)



- (a) Disconnect the navigation ECU connector N5 and multi-display connector M6.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (NETWORK GATEWAY ECU - MULTI-DISPLAY)

CIRCUIT DESCRIPTION

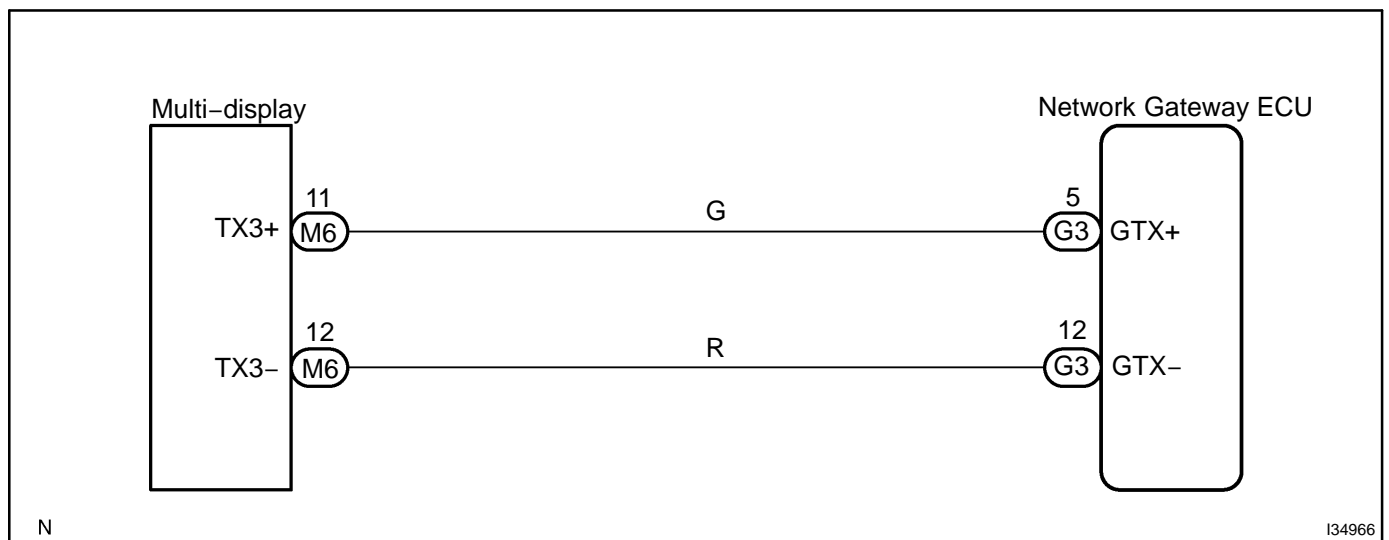
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

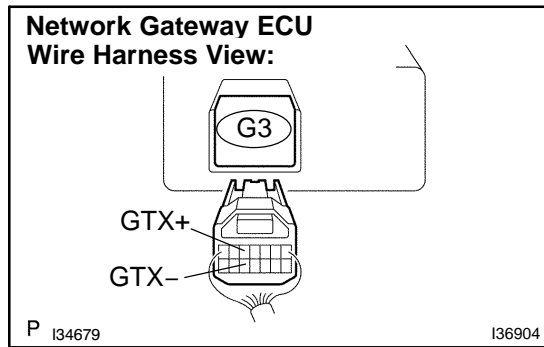
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

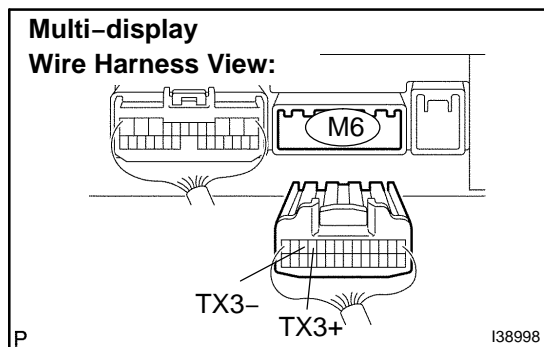
1 CHECK HARNESS AND CONNECTOR(NETWORK GATEWAY ECU - MULTI-DISPLAY)



- (a) Disconnect the network gateway ECU connector G3 and multi-display connector M6.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
GTX+ - TX3+	Always	Below 1 Ω
GTX- - TX3-	Always	Below 1 Ω
GTX+ - Body ground	Always	10 kΩ or higher
GTX- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (RADIO RECEIVER ASSY - STEREO COMPONENT AMPLIFIER ASSY)

CIRCUIT DESCRIPTION

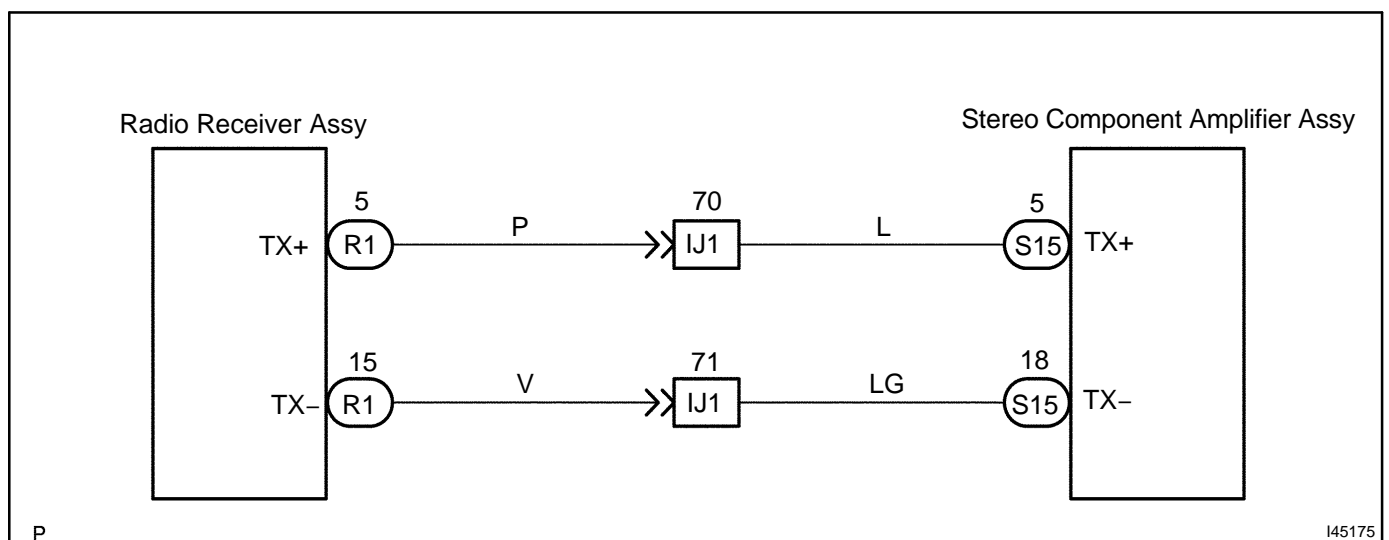
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM

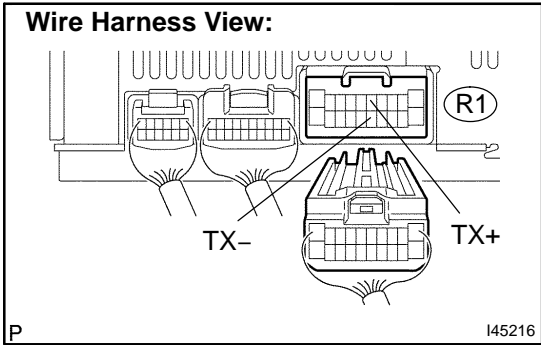


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INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



(a) Measure the resistance according to the value(s) in the table below.

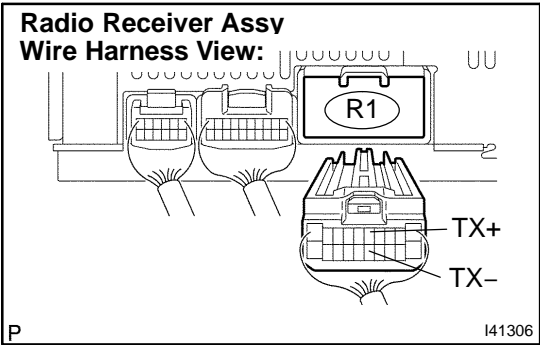
Standard:

Tester connection	Condition	Specified condition
TX+ - TX-	Always	60 to 80 Ω

NG → **REPLACE RADIO RECEIVER ASSY (SEE PAGE 67-9)**

OK

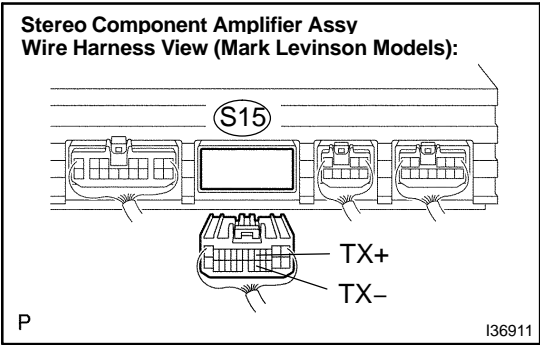
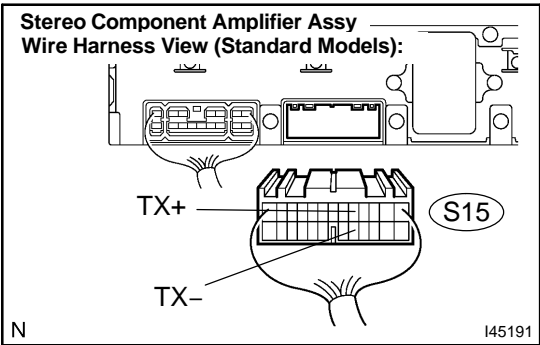
2 CHECK HARNESS AND CONNECTOR(STEREO COMPONENT AMPLIFIER ASSY - RADIO RECEIVER ASSY)



- (a) Disconnect the radio receiver assy connector R1 and stereo component amplifier assy connector S15.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (MULTI-DISPLAY - RADIO RECEIVER ASSY)

CIRCUIT DESCRIPTION

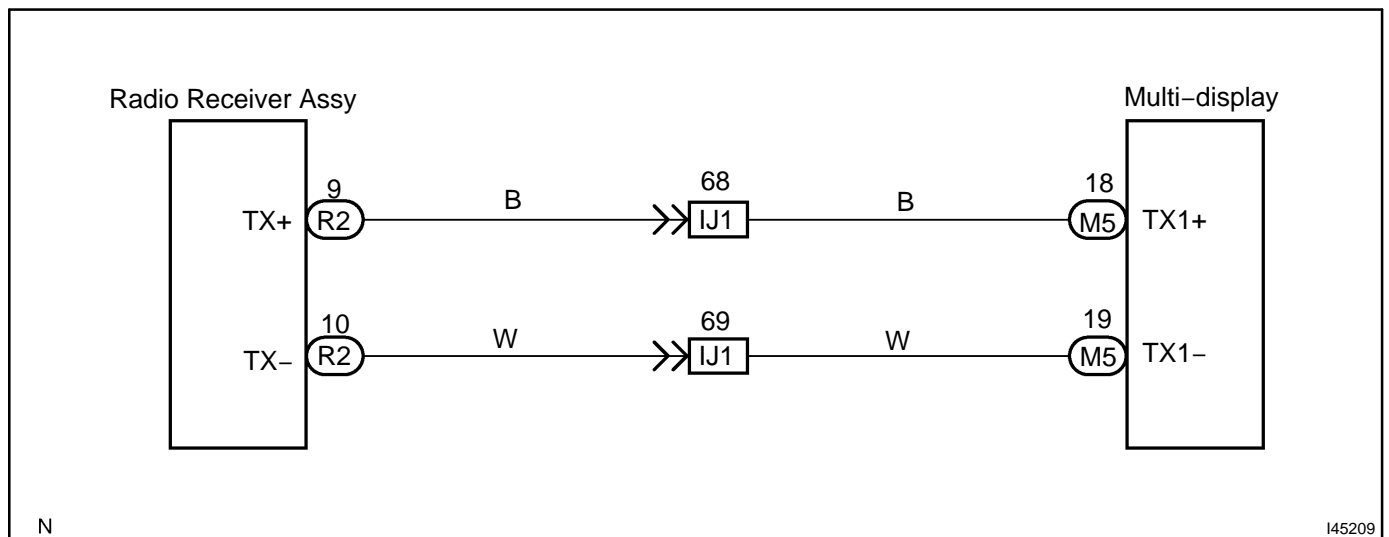
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

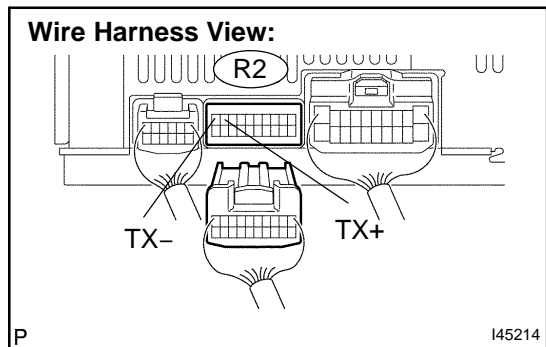
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



(a) Measure the resistance according to the value(s) in the table below.

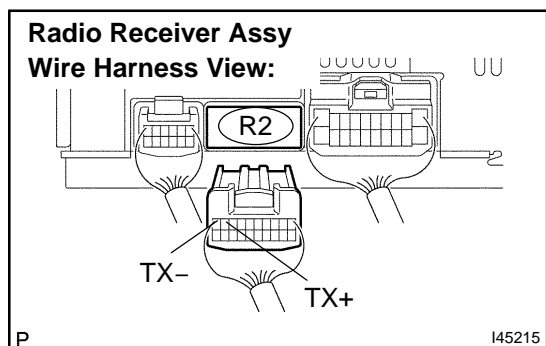
Standard:

Tester connection	Condition	Specified condition
TX+ - TX-	Always	60 to 80 Ω

NG → REPLACE RADIO RECEIVER ASSY (SEE PAGE 67-9)

OK

2 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY - RADIO RECEIVER ASSY)

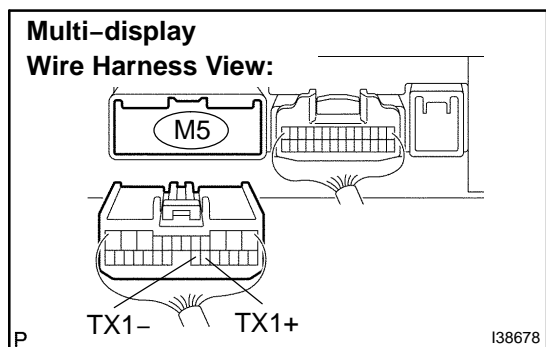


(a) Disconnect the radio receiver assy connector R2 and multi-display connector M5.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX1+	Always	Below 1 Ω
TX- - TX1-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (NAVIGATION ECU - TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

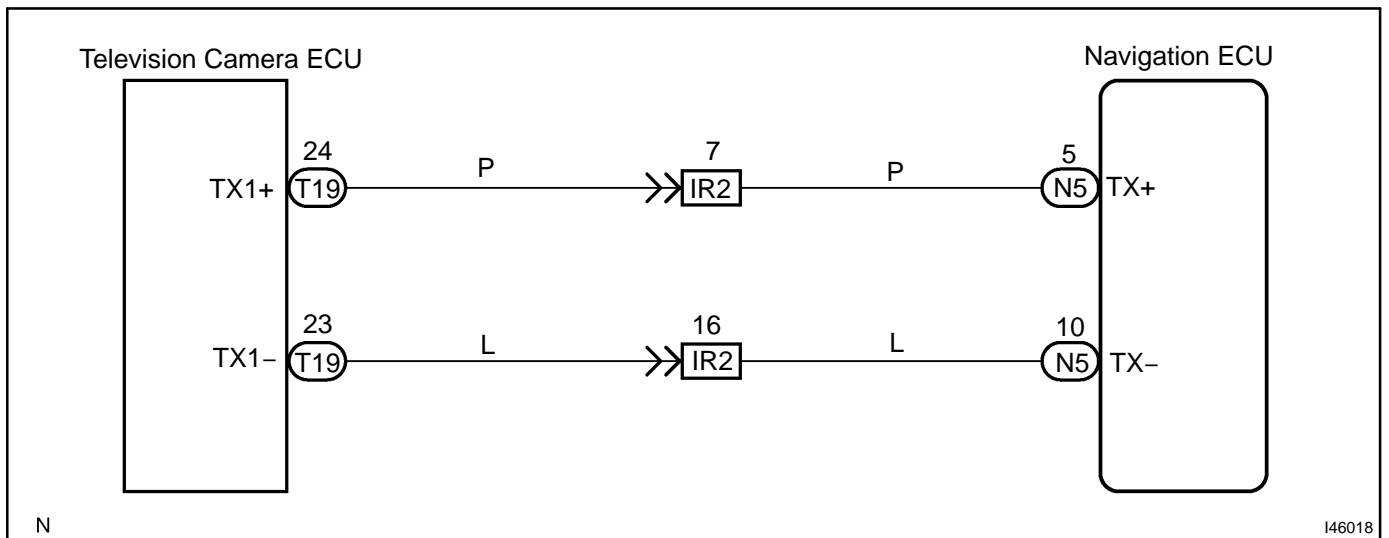
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

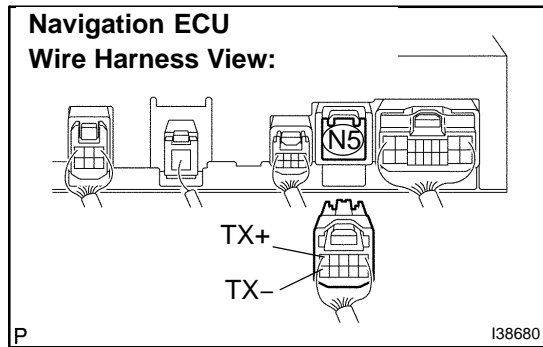
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

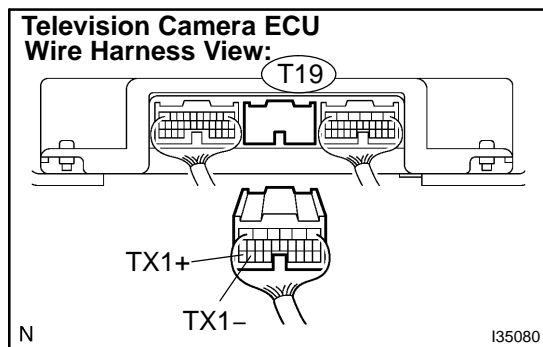
1 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - TELEVISION CAMERA ECU)



- (a) Disconnect the navigation ECU connector N5 and television camera ECU connector T19.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX1+	Always	Below 1 Ω
TX- - TX1-	Always	Below 1 Ω
TX+ - Body ground	Always	10 k Ω or higher
TX- - Body ground	Always	10 k Ω or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (MULTI-DISPLAY CONTROLLER SUB-ASSY - RADIO RECEIVER ASSY)

CIRCUIT DESCRIPTION

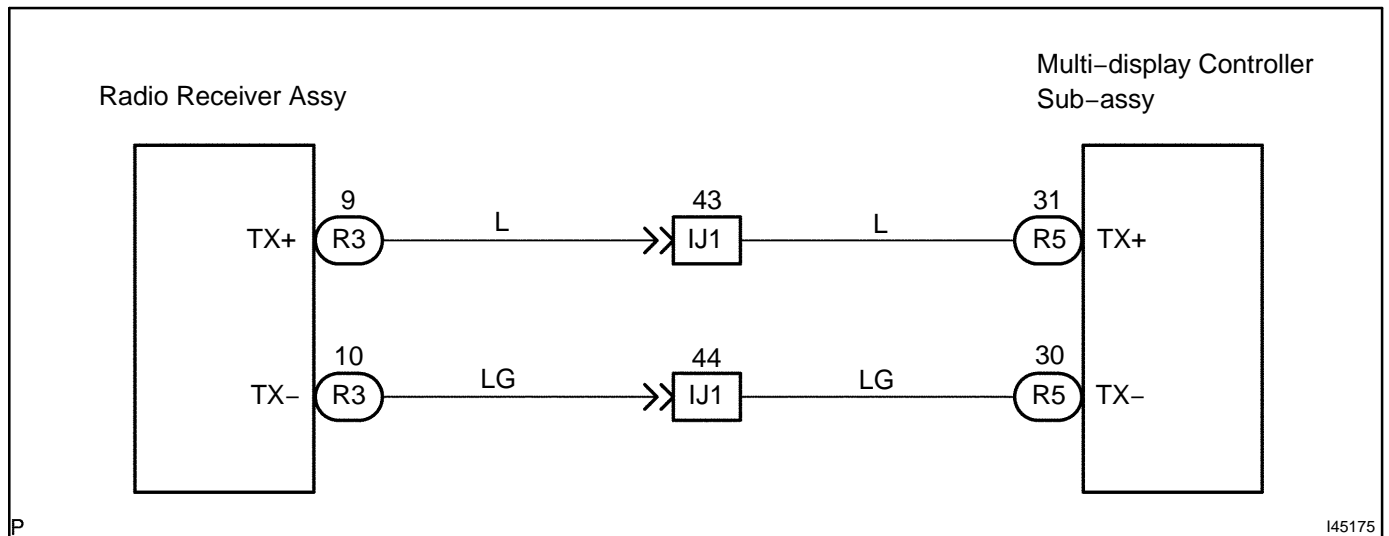
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

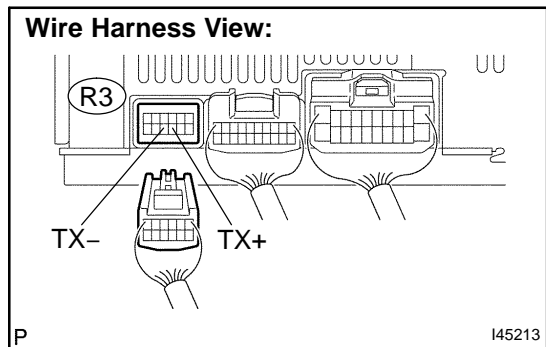
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



(a) Measure the resistance according to the value(s) in the table below.

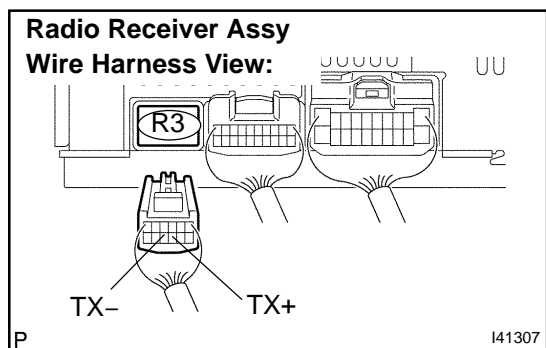
Standard:

Tester connection	Condition	Specified condition
TX+ - TX-	Always	60 to 80 Ω

NG → REPLACE RADIO RECEIVER ASSY (SEE PAGE 67-9)

OK

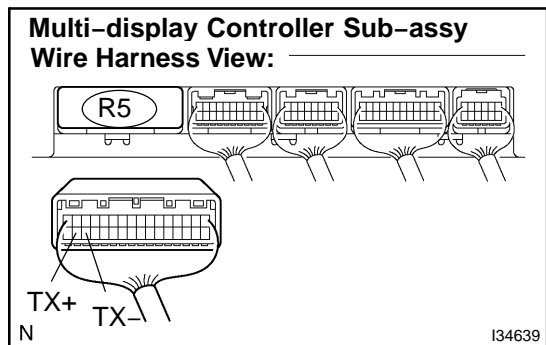
2 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - RADIO RECEIVER ASSY)



(a) Disconnect the multi-display controller sub-assy connector R5 and radio receiver assy connector R3.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (NAVIGATION ECU - MULTI-DISPLAY CONTROLLER SUB-ASSY)

CIRCUIT DESCRIPTION

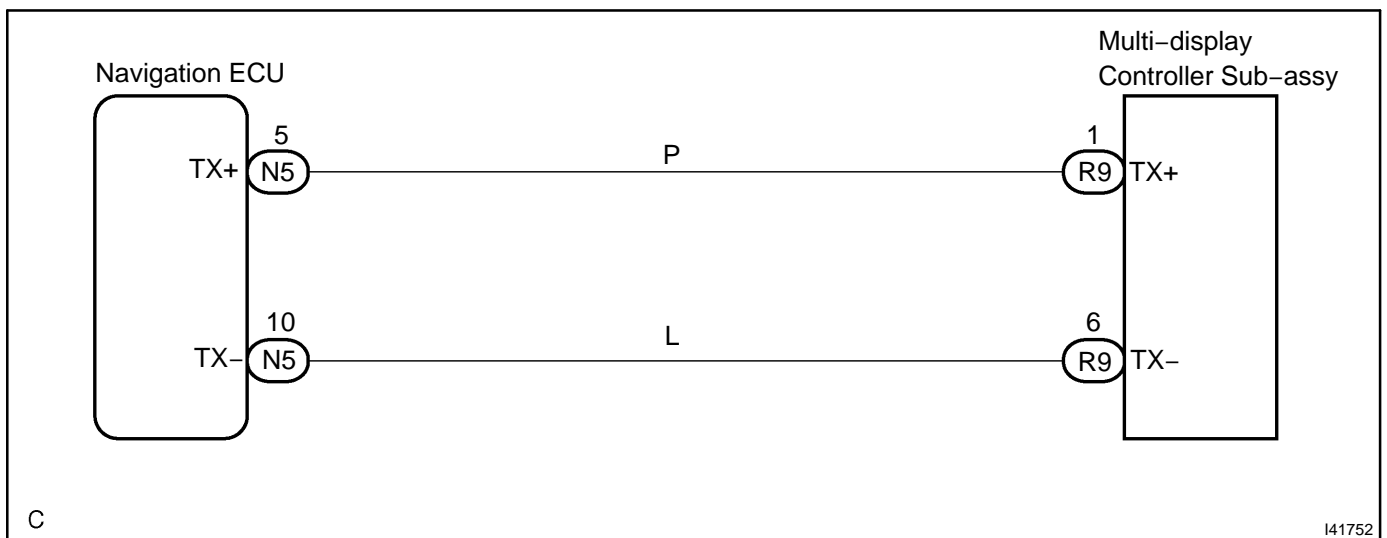
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

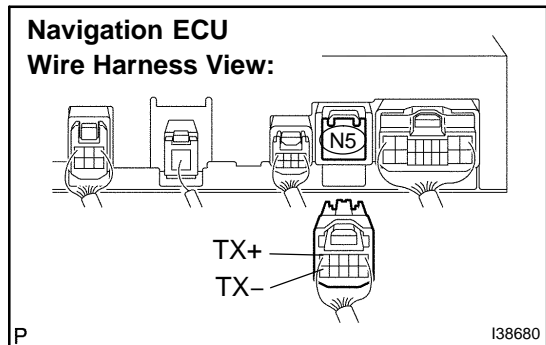
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

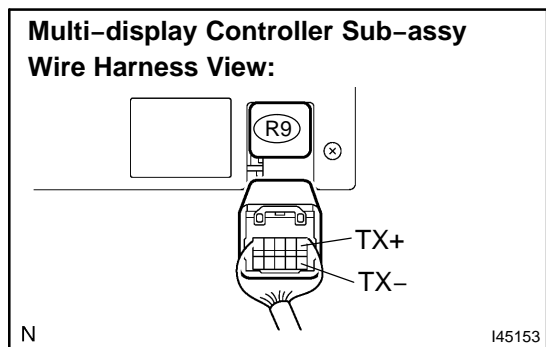
1 CHECK HARNESS AND CONNECTOR(NAVIGATION ECU - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the navigation ECU connector N5 and multi-display controller sub-assy connector R9.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (MULTI-DISPLAY - TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

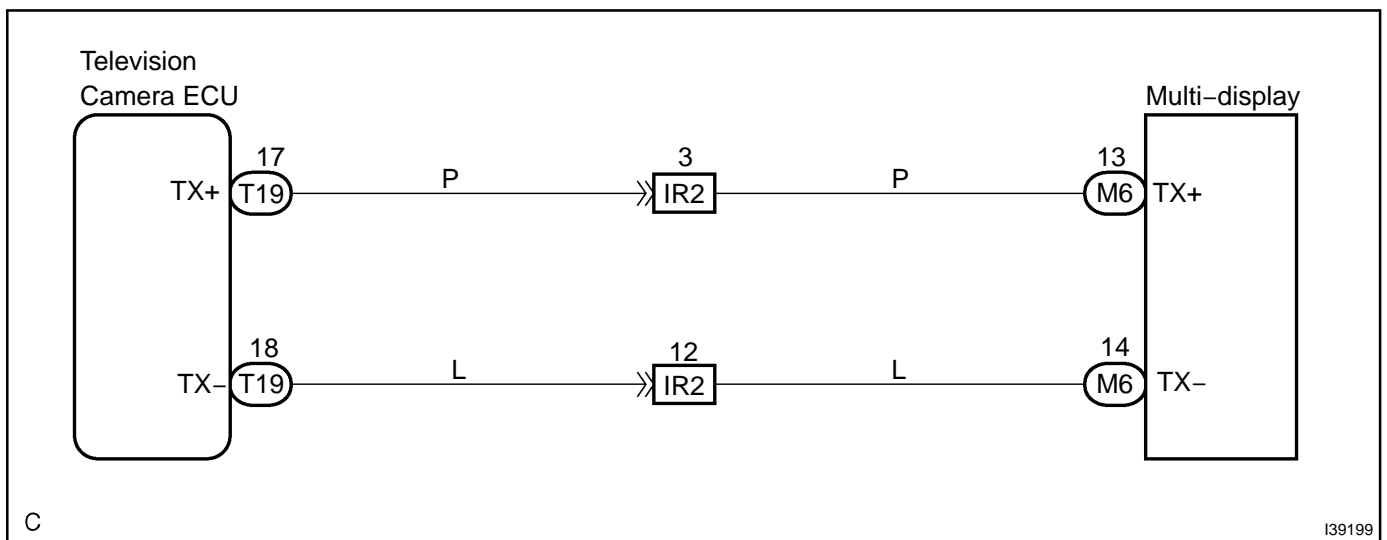
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

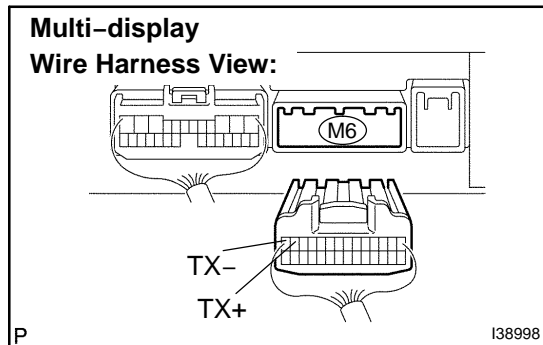
The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

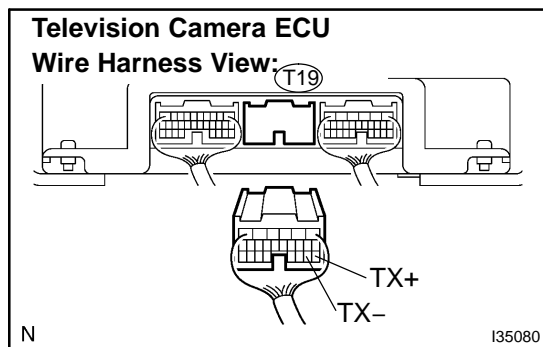
1 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY - TELEVISION CAMERA ECU)



- (a) Disconnect the multi-display connector M6 and television camera ECU connector T19.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 kΩ or higher
TX- - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

AVC-LAN CIRCUIT (STEREO COMPONENT CONTROLLER ASSY - RADIO RECEIVER ASSY)

CIRCUIT DESCRIPTION

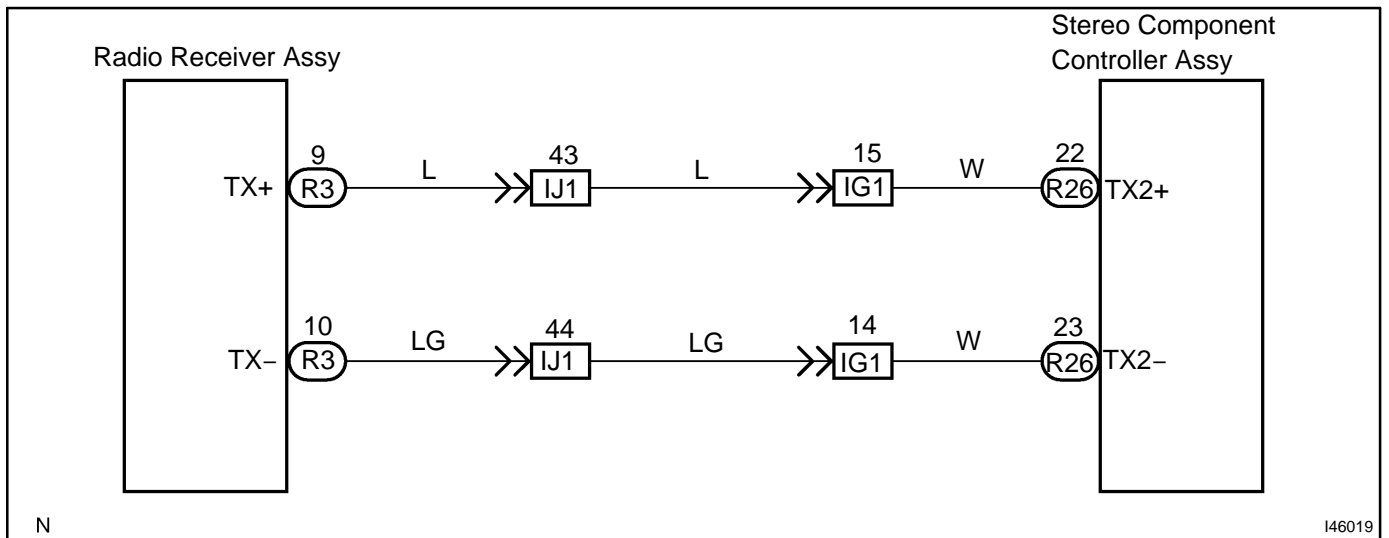
Each unit of the navigation system connected to the AVC-LAN (communication bus) communicates by transferring the signals from each switch.

When a short to +B or short to ground occurs in this AVC-LAN, the navigation system will not function normally as communication is discontinued.

In this AVC-LAN, the multi-display becomes the communication master, and the radio receiver assy has enough resistance necessary for transmitting the communication.

The navigation system has the structure that makes communication impossible without the navigation ECU, multi-display or radio receiver assy.

WIRING DIAGRAM

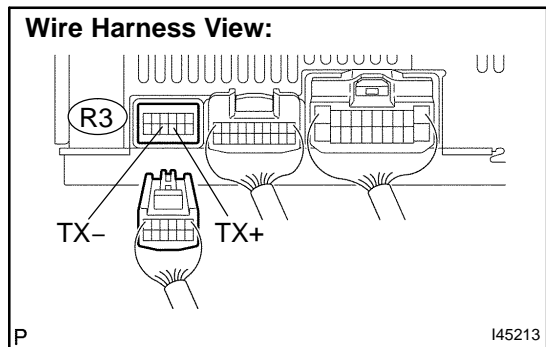


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INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY



(a) Measure the resistance according to the value(s) in the table below.

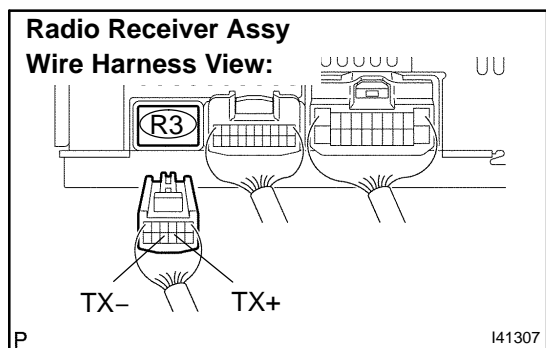
Standard:

Tester connection	Condition	Specified condition
TX+ - TX-	Always	60 to 80 Ω

NG REPLACE RADIO RECEIVER ASSY (SEE PAGE 67-9)

OK

2 CHECK HARNESS AND CONNECTOR(STEREO COMPONENT CONTROLLER ASSY - RADIO RECEIVER ASSY)

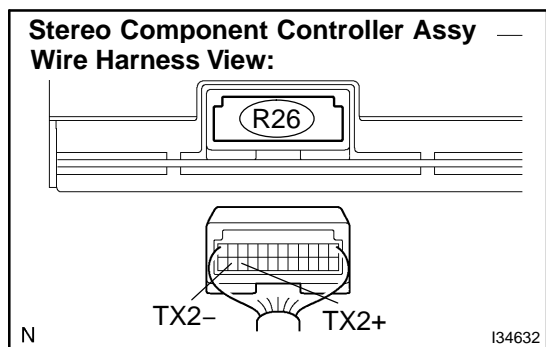


(a) Disconnect the stereo component controller assy connector R26 and radio receiver assy connector R3.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
TX+ - TX+	Always	Below 1 Ω
TX- - TX-	Always	Below 1 Ω
TX+ - Body ground	Always	10 k Ω or higher
TX- - Body ground	Always	10 k Ω or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN DIAGNOSTIC TROUBLE CODE CHART (SEE PAGE 05-1758)

REAR SEAT AUDIO SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05AT9-05

1 Vehicle Brought to Workshop



2 Customer Problem Analysis (See page [05-1903](#))



3 Problem Symptom Confirmation

➤ Symptom does not occur (Go to step 4)

➤ Symptom occurs (Go to step 5)

4 Symptom Simulation (See page [01-36](#))



5 DTC Check (See page [05-1904](#))

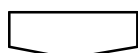
➤ Normal code (Go to step 7)

➤ Malfunction code (Go to step 6)

6 DTC Chart (See page [05-1910](#))

➤ Go to step 8

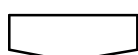
7 Problem Symptoms Table (See page [05-1915](#))



8 Circuit Inspection and Part Inspection



9 Identification of Problem



10	Repair or Replace
-----------	--------------------------



11	Confirmation Test
-----------	--------------------------



End

CUSTOMER PROBLEM ANALYSIS CHECK

RSA SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Brought-in Date	/ /	Odometer Reading	km Mile

Date of First Occurrence	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (Times a day)

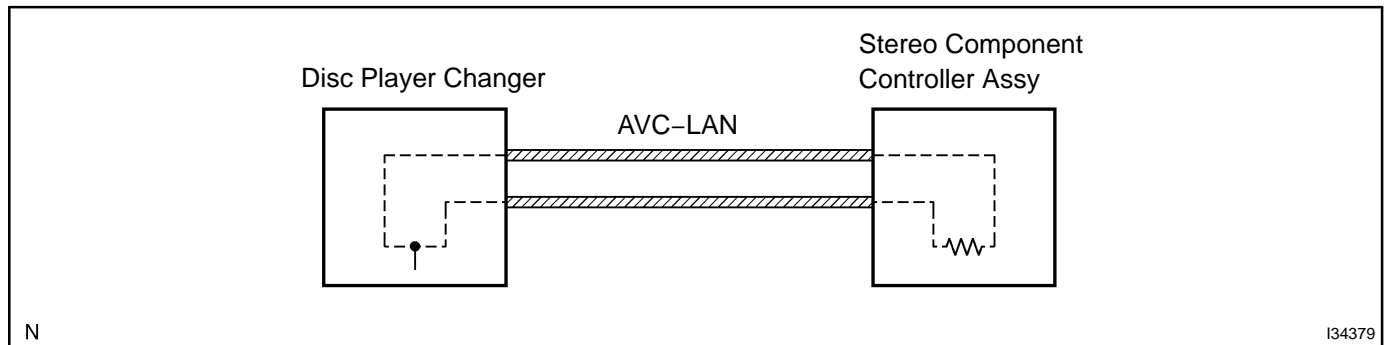
Problem Symptom	<input type="checkbox"/> Switch & Volume Assy
	<input type="checkbox"/> Headphone
	<input type="checkbox"/> Stereo Component Controller Assy
	<input type="checkbox"/> Headphone Terminal
	<input type="checkbox"/> Disc Player Changer

DTC Check	Parts name	DTC (1st time).	DTC (2nd time).
	Disc player changer		

PRE-CHECK

1. COMMUNICATION SYSTEM

- This system has 2 kinds of AVC-LAN, Main AVC-LAN and Sub AVC-LAN.
- Stereo component controller assy works as a master unit in the Sub AVC-LAN, but not in the Main AVC-LAN.



2. DIAGNOSIS CHECK

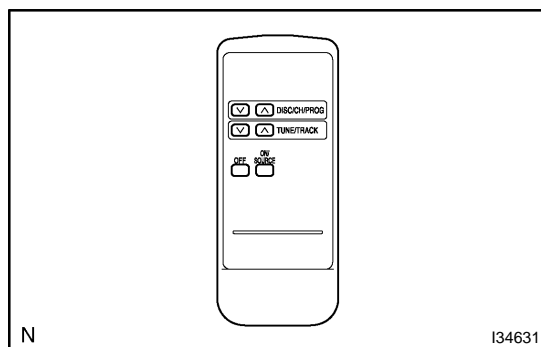
HINT:

RSA system inspects the devices consisting of Sub AVC-LAN on the stereo component controller assy.

- Starting Main AVC-LAN (See page [05-1653](#), [05-1751](#)).

HINT:

- As starting Main AVC-LAN to operate the diagnosis mode, Sub AVC-LAN is also automatically enter the diagnosis mode. Perform the diagnosis mode operation on the stereo component controller assy.
- Use a switch & volume assy to operate diagnosis mode.



(b) Service Check Screen.

(1) Reference

- In the service check mode, the system check and the diagnosis memory check are performed, and the check results are displayed in ascending order of the device codes (physical address).

Terms	Meaning
Component code (Physical address)	Three-digit code (In hexadecimal) given to each device comprising AVC-LAN. Corresponding to its function, individual symbol is provided.
Logical address	Two-digit code (In hexadecimal) given to each function and device unit in each device comprising AVC-LAN.

Code No. (physical address) List

Code No. (physical address)	Equipment name
240	Disc player changer

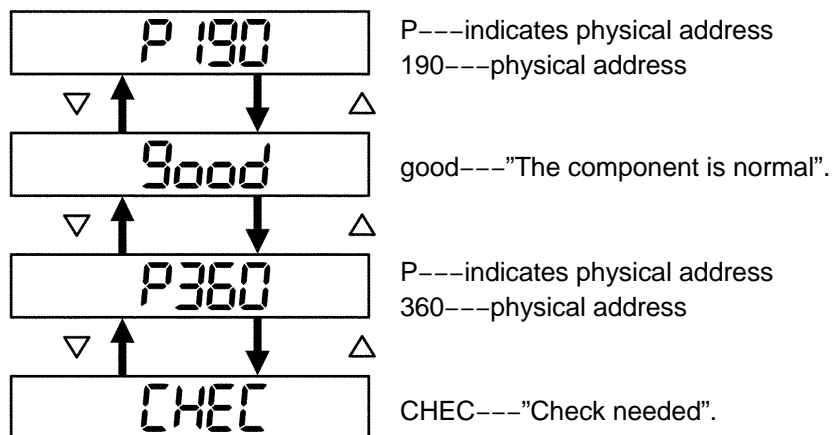
(c) Finishing Diagnosis Mode (See page [05-1653](#), [05-1751](#)).

(d) Element Check Mode.

- After the diagnosis start-up, the system enters the element check mode. Check that the all elements come on.

(e) Service Check Mode Result Display (for checking the current and the past system conditions).

(1) Press the "TUNE/TRACK UP" switch to see the check result of each device.



△ : TUNE/TRACK UP
▽ : TUNE/TRACK DOWN

The illustration shows the case that the system has 2 devices with codes 190 and 360, and the device (code 360) has a trouble.

The check result is displayed in ascending order of device code. The device code is displayed first, and then the check result.

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(2) Check Result Display.

Display	Original Language	Meaning	Action to be taken
good	Good (normal)	No DTC is detected in both "System Check Mode" and "Diagnosis Memory Mode".	-
NCON	No connection	The system recognized the component when it was registered, but the component gives no response to the "Diagnosis Mode ON Request".	Check the power source circuit and the communication circuit of the device indicated by the device code (physical address).
ECHN	Exchange	One or more DTC for "Exchange" is detected in either "System Check Mode" or "Diagnosis Memory Mode".	Go to the detail information mode to check the trouble area by referring to the DTC list.
CHEC	Check	When no DTC is detected for "Exchange", one or more DTC for "Check is detected in either "System Check Mode" or "Diagnosis Memory Mode".	Go to the detail information mode to check the trouble area referring to the DTC list.

DIAGNOSTICS - REAR SEAT AUDIO SYSTEM

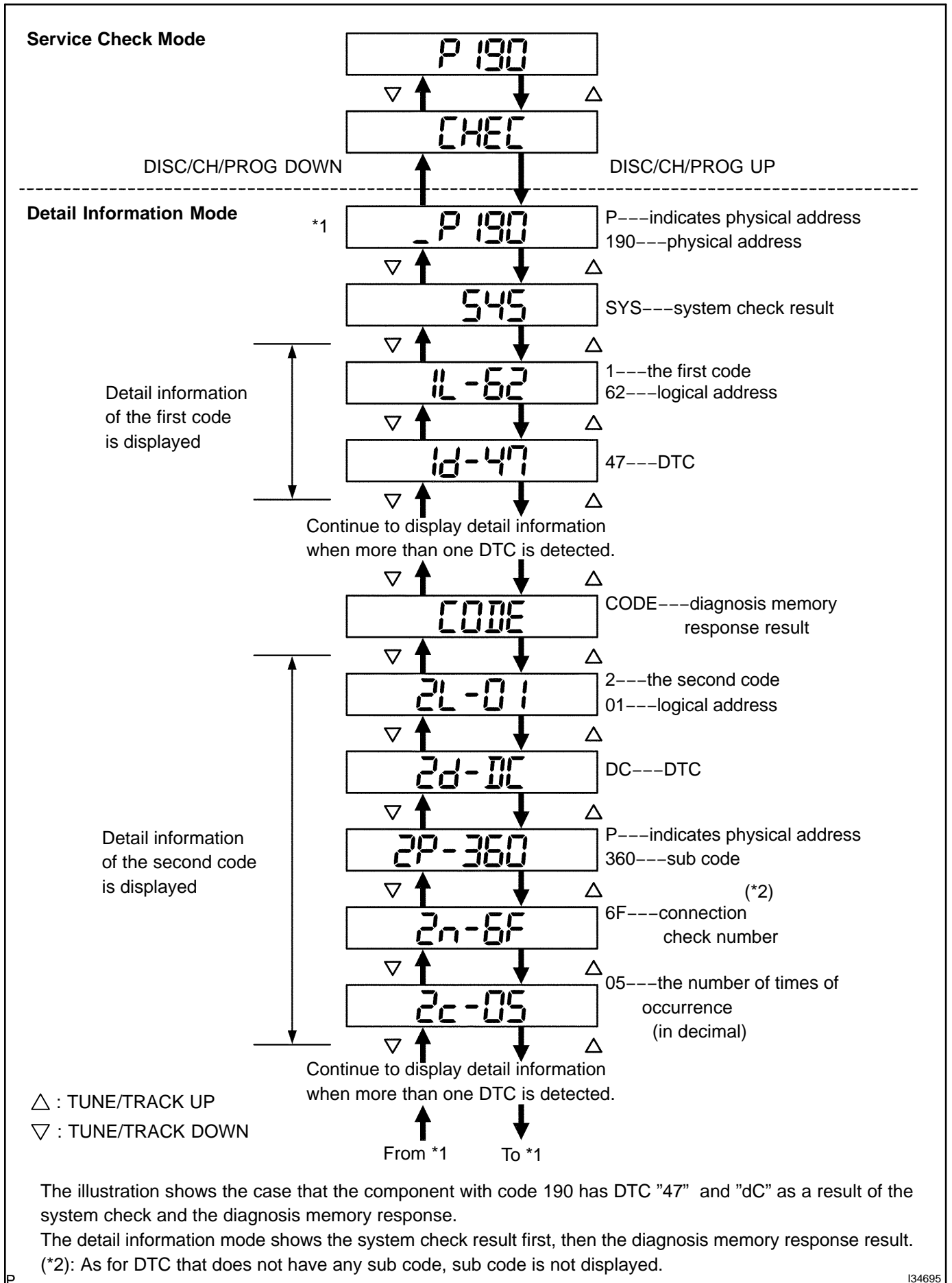
Display	Original Language	Meaning	Action to be taken
OLD	Old version	Old DTC application is identified and DTC is detected in either "System Check Mode" or "Diagnosis Memory Mode".	-
NRES	No response	The device gives no response to any one of "System Check Mode ON Request", "System Check Result Request" and "Diagnosis Memory Request".	Check the power source circuit and the communication circuit of the device indicated by the device code (physical code).

(3) To perform the Service Check again, press the preset switch "1".

(f) Detail information Mode (when displaying the troubled device's DTC)

(1) With "CHEC" or "ECHN" displayed, press the preset switch "2" to go to the detail information mode.

(2) Press the "TUNE/TRACK" switch to display "System Check Result (SYS)" and "Diagnosis Memory Response (CODE)".



(3) Displayed Items in Detail Information Mode

Division Code for DTC display	Meaning	Order of detailed information displayed when the "TUNE UP" switch is pressed. (The order is reversed when the "TUNE DOWN" switch is pressed.)
SYS	System check result is displayed.	Logical address → DTC
CODE	Diagnosis memory check result is displayed.	Logical address → DTC → Sub code → Connection confirmation number → The number of times of occurrence

(4) Check the trouble area referring to the DTC list.

(5) To return to the service check mode, press the pre-set switch "3".

(g) Clearing Individual DTC Memory (See page [05-1653](#), [05-1751](#)).

(h) Clearance of all DTC memory (See page [05-1653](#), [05-1751](#)).

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC-LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC-LAN.

1. DISC PLAYER CHANGER (Physical address: 240)

HINT:

- *1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.
- *2: It may be stored when the engine key is turned 1 min. after engine start.
- *3: It may be stored when the engine key is turned again after engine start.
- *4: It may be stored when the engine key is turned again after engine start.
- *5: When 210 sec. have passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace disc player changer.
22	RAM Error	Abnormal condition of ROM is detected.	Replace disc player changer.
D6 *2	Absence of Master	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of stereo component controller assy. • Check harness for communication system of stereo component controller assy. • Check harness for power supply system of disc player changer. • Check harness for communication system disc player changer.
D7 *5	Connection check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of stereo component controller assy. • Check harness for communication system of stereo component controller assy. • Check harness for power supply of disc player changer. • Check harness for communication system of disc player changer.
DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in other components, check harness for power supply and communication system of all components shown by code.
DD *3	Master Reset (Momentary Interruption)	After engine is started, stereo component controller assy was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply system of stereo component controller assy. • Check harness for communication system stereo component controller assy. • If this error occurs frequently, replace stereo component controller.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply system of stereo component controller assy. • Check harness for communication system of stereo component controller assy. • Check harness for communication system between stereo component controller assy and sub-master component.

DIAGNOSTICS - REAR SEAT AUDIO SYSTEM

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
E0*1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from stereo component controller assy.	Replace stereo component controller assy
E3*1	Registration Request Transmission	<ul style="list-style-type: none"> Registration Request command is output from slave component. Receiving Connection Check Instruction, Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
E4*1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

(b) Logical address: 43 (CD auto changer)

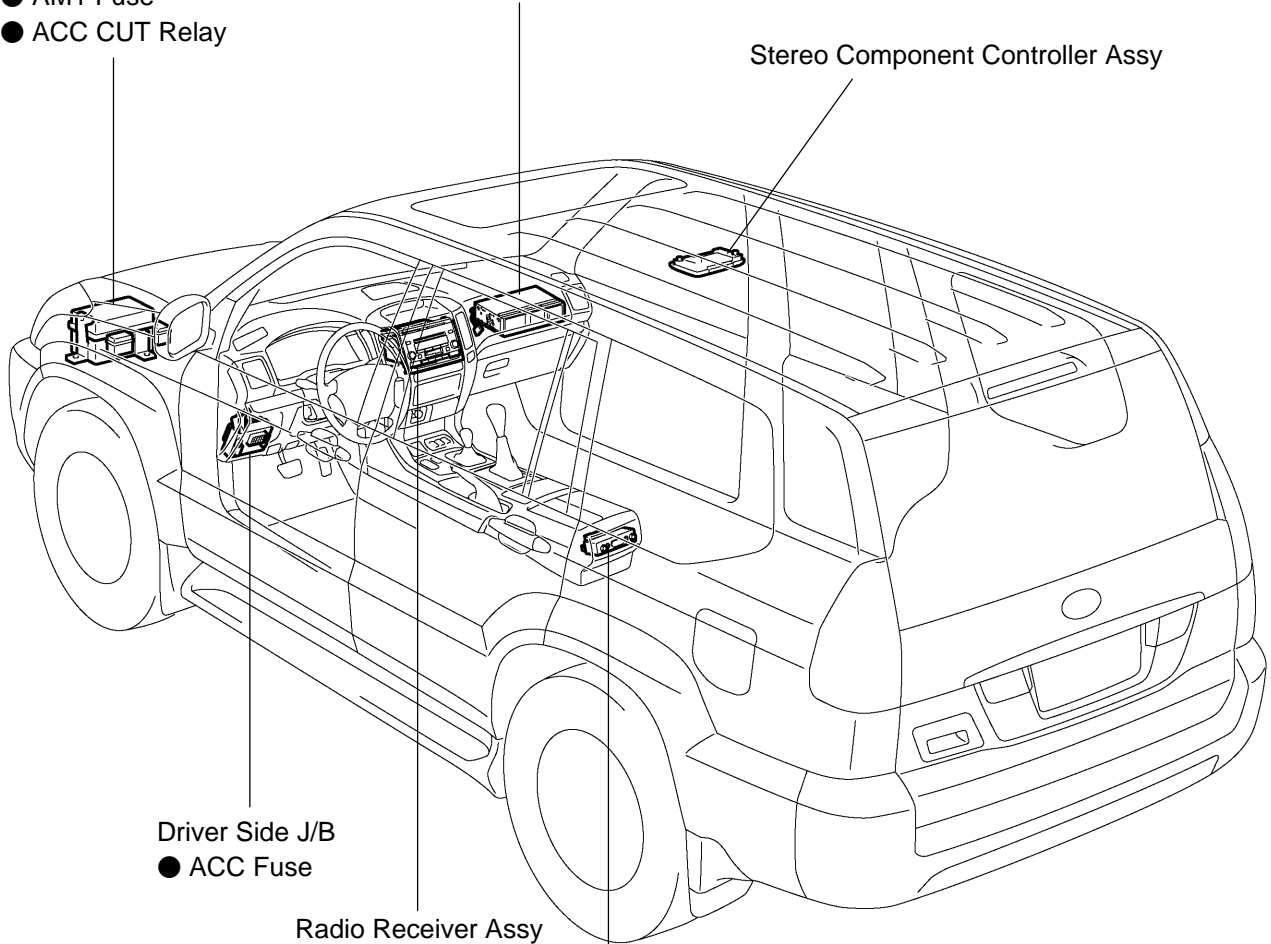
DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read.	Inspect CD
44	CD Error	Error is detected in disc player changer.	Replace disc player changer
45	EJECT Error	Magazine cannot be ejected	Replace disc player changer
46	Scratched/ Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD
47	CD Auto Changer Temp. Too High	Readout cannot be done because temperature around player's pick-up (reading part) is too high.	With IG switch OFF, leave vehicle in cool shaded place for a while and recheck. After deleting the DTC memory, if same code detected, replace disc player changer.
48	CD Auto Changer Excess Current	Excess current is applied disc player changer.	Replace disc player changer
50	Tray insertion/ejection error	Malfunction insertion/ejection system.	Replace disc player changer
51	CD changer elevator error	Mechanical error occurred during elevator operation.	Replace disc player changer

LOCATION

- Engine Room R/B
- RADIO No.1 Fuse
- SHORT PIN
- ALT Fuse
- AM1 Fuse
- ACC CUT Relay

Disc Player Changer

Stereo Component Controller Assy



Driver Side J/B
● ACC Fuse

Radio Receiver Assy

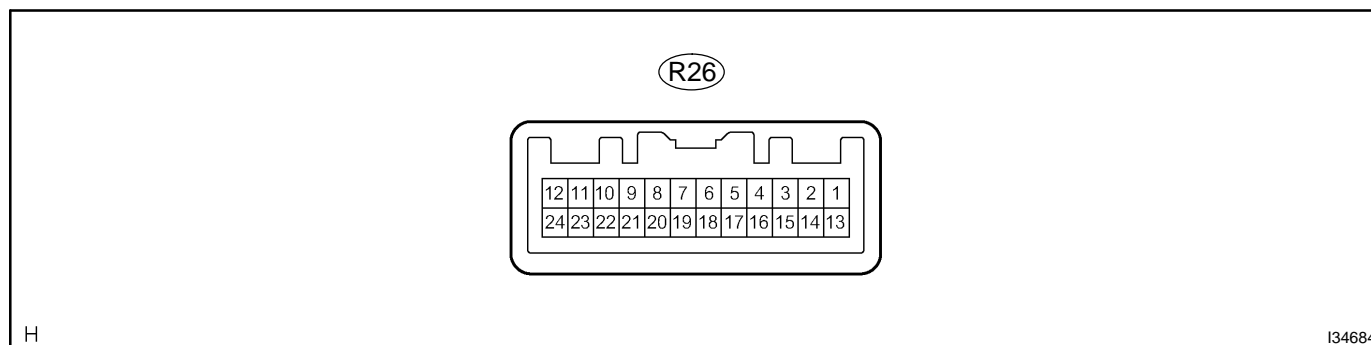
Headphone Terminal

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TERMINALS OF ECU

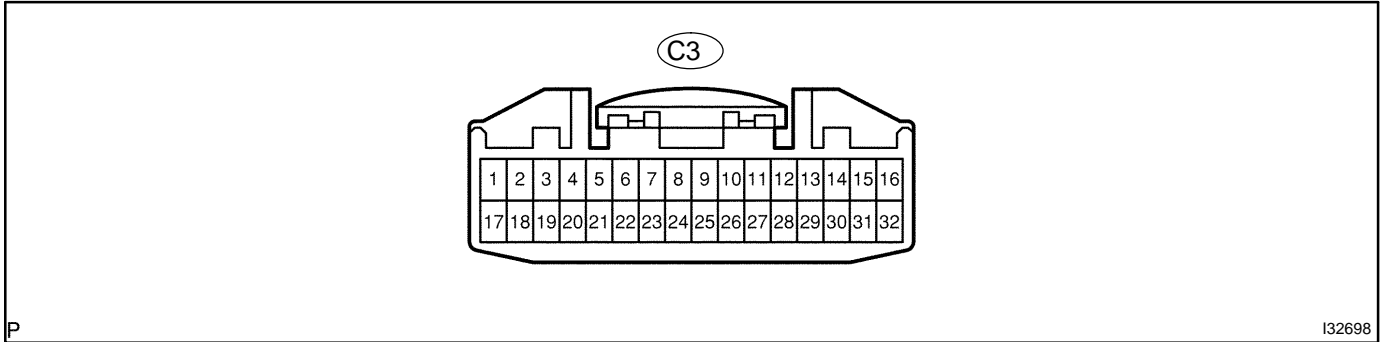
1. STEREO COMPONENT CONTROLLER ASSY



Terminals No. (Symbols)	Wiring Color	Condition	Specified value
R26-1 ⇔ Body ground (SG8 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R26-2 ⇔ R26-17 (HP1L ⇔ GND)	W ⇔ W-B	RSA system is sounding (Headphone)	A waveform synchro- nized with sounds is output
R26-3 ⇔ R26-17 (HP1R ⇔ GND)	W ⇔ W-B	RSA system is sounding (Headphone)	A waveform synchro- nized with sounds is output
R26-6 ⇔ R26-17 (R-L- ⇔ GND)	W ⇔ W-B	RSA system is sounding	A waveform synchro- nized with sounds is output
R26-7 ⇔ R26-17 (R-L+ ⇔ GND)	W ⇔ W-B	RSA system is sounding	A waveform synchro- nized with sounds is output
R26-8 ⇔ R26-17 (R-R- ⇔ GND)	W ⇔ W-B	RSA system is sounding	A waveform synchro- nized with sounds is output
R26-9 ⇔ R26-17 (R-R+ ⇔ GND)	W ⇔ W-B	RSA system is sounding	A waveform synchro- nized with sounds is output
R26-10 ⇔ Body ground (SG2 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R26-11 ⇔ R26-17 (RMUT ⇔ GND)	LG ⇔ W-B	Disc player changer is changing	Below 1
R26-12 ⇔ R26-17 (+B ⇔ GND)	LG ⇔ W-B	Always	10 - 14
R26-13 ⇔ Body ground (SG9 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R26-14 ⇔ R26-17 (HP2L ⇔ GND)	W ⇔ W-B	RSA system is sounding (Headphone)	A waveform synchro- nized with sounds is output
R26-15 ⇔ R26-17 (HP2R ⇔ GND)	W ⇔ W-B	RSA system is sounding (Headphone)	A waveform synchro- nized with sounds is output
R26-17 ⇔ Body ground (GND ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1
R26-18 ⇔ R26-17 (LMUT ⇔ GND)	LG ⇔ W-B	Disc player changer is changing	Below 1
R26-19 (TX+)	W	See "Service Check Mode"	-
R26-20 (TX-)	W	See "Service Check Mode"	-
R26-21 ⇔ R26-17 (TMUT ⇔ GND)	LG ⇔ W-B	Audio system is changing	Below 1

Terminals No. (Symbols)	Wiring Color	Condition	Specified value
R26-22 (TX2+)	W	See "Service Check Mode"	-
R26-23 (TX2-)	W	See "Service Check Mode"	-
R26-24 ⇔ R26-17 (ACC ⇔ GND)	LG ⇔ W-B	Ignition switch ON	10 - 14

2. DISC PLAYER CHANGER



Terminal No. (Symbols)	Wiring Color	Condition	Specified value
C3-1 ⇔ C3-21 (MUTE ⇔ GND)	B-R ⇔ BR	Disc player changer is changing	Above 3.5
C3-2 ⇔ C3-21 (CDL- ⇔ GND)	G ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-3 ⇔ C3-21 (CDL+ ⇔ GND)	R ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-4 ⇔ C3-21 (CDR- ⇔ GND)	W ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-5 ⇔ C3-21 (CDR+ ⇔ GND)	B ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-17 ⇔ C3-21 (+B ⇔ GND)	L-Y ⇔ BR	Always	10 - 14
C3-18 ⇔ C3-21 (ACC ⇔ GND)	GR ⇔ BR	Ignition switch to ACC	10 - 14
C3-19 (TXM-)	L	See "Service Check Mode"	-
C3-20 (TXM+)	P	See "Service Check Mode"	-
C3-21 ⇔ Body ground (GND ⇔ Body ground)	BR ⇔ Body ground	Always	Below 1

PROBLEM SYMPTOMS TABLE

RSA SYSTEM

Symptom	Suspected Areas	See page
RSA system cannot be powered.	1. Power source circuit (stereo component controller assy)	05-1916
Quality of sound from wireless headphone is poor or no sound can be heard.	1. Power source circuit (stereo component controller assy) 2. Quality of sound from wireless headphone is poor or no sound can be heard	05-1916 05-1922
Quality of sound from headphone connected to headphone terminal is poor or no sound can be heard.	1. Power source circuit (stereo component controller assy) 2. Quality of sound from headphone connected to headphone terminal is poor or no sound can be heard	05-1916 05-1925

DISC PLAYER CHANGER

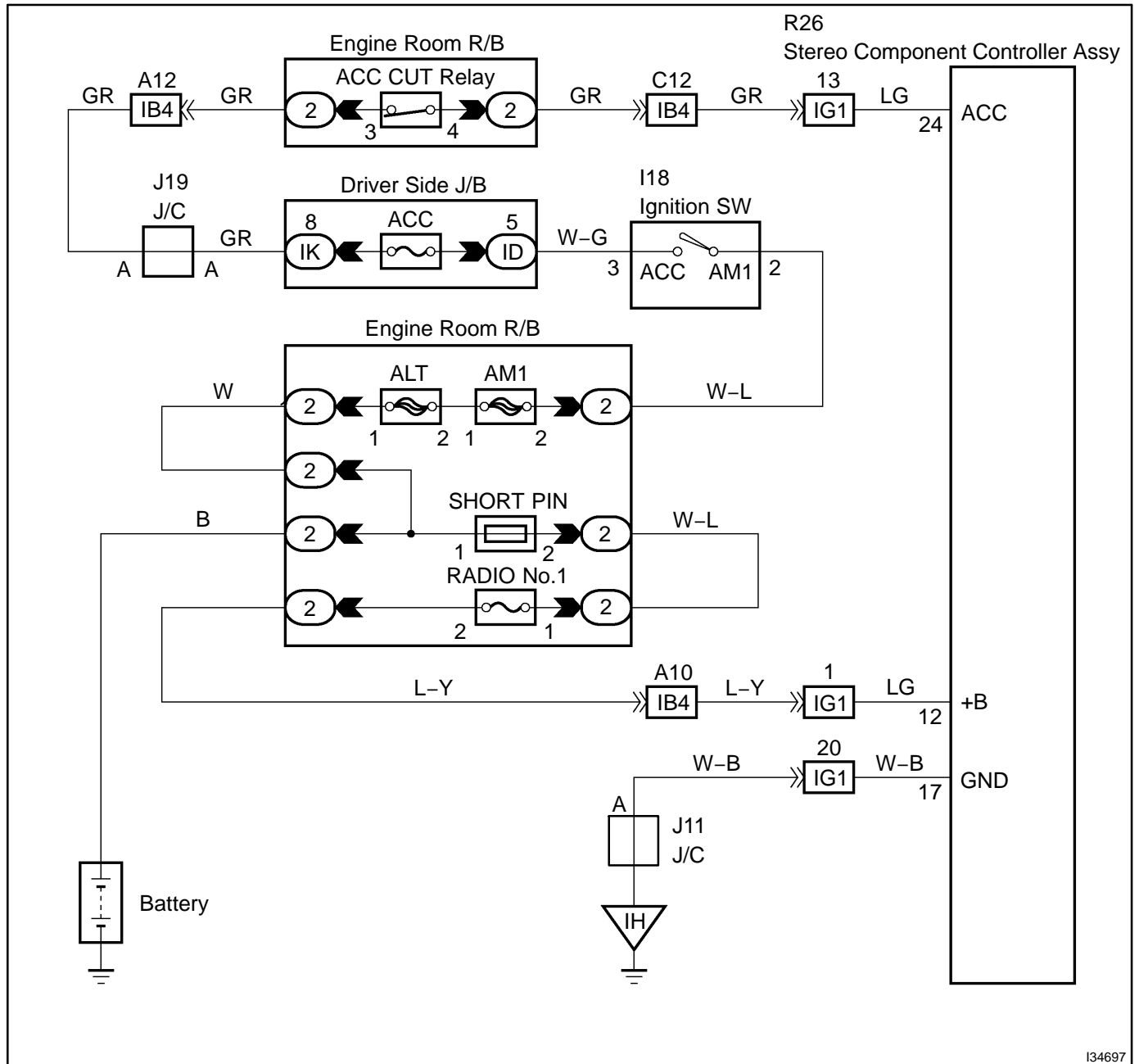
Symptom	Suspected Areas	See page
Disc player changer screen is not displayed.	1. Power source circuit (disc player changer) 2. AVC-LAN circuit	05-1918 05-1920

REMOTE CONTROL

Symptom	Suspected Areas	See page
A remote control system does not operate.	1. Power source circuit (stereo component controller assy) 2. A remote control system does not operate 3. AVC-LAN circuit	05-1918 05-1930 05-1920

POWER SOURCE CIRCUIT(STEREO COMPONENT CONTROLLER ASSY)

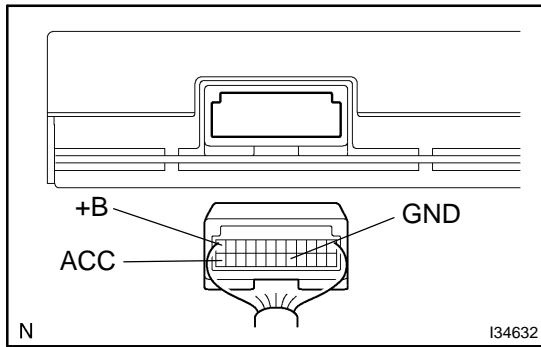
WIRING DIAGRAM



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INSPECTION PROCEDURE

1 INSPECT STEREO COMPONENT CONTROLLER ASSY(+B, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

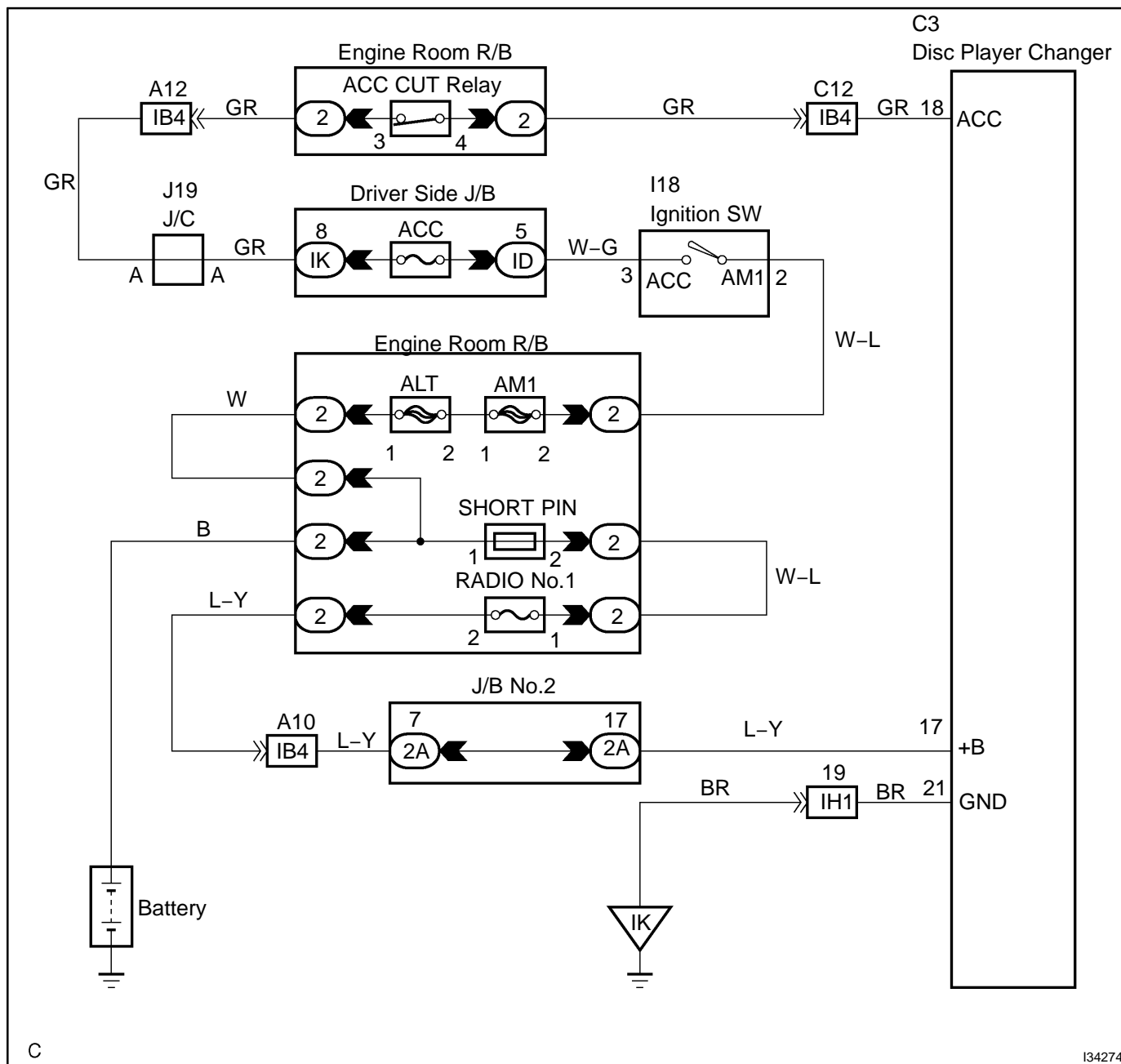
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

A

CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY

POWER SOURCE CIRCUIT (DISC PLAYER CHANGER)

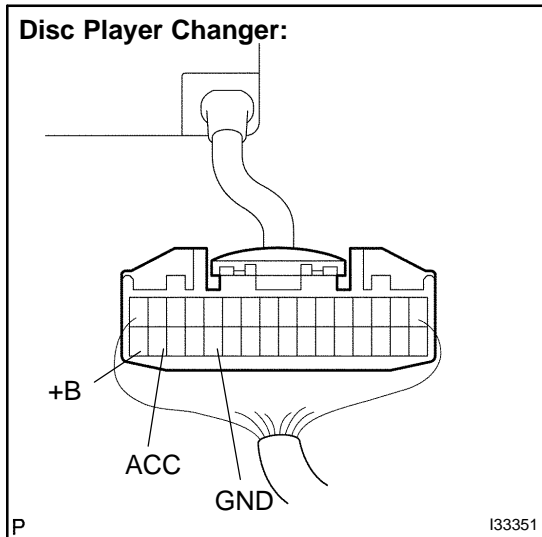
WIRING DIAGRAM



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INSPECTION PROCEDURE

1 INSPECT DISC PLAYER CHANGER(+B, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

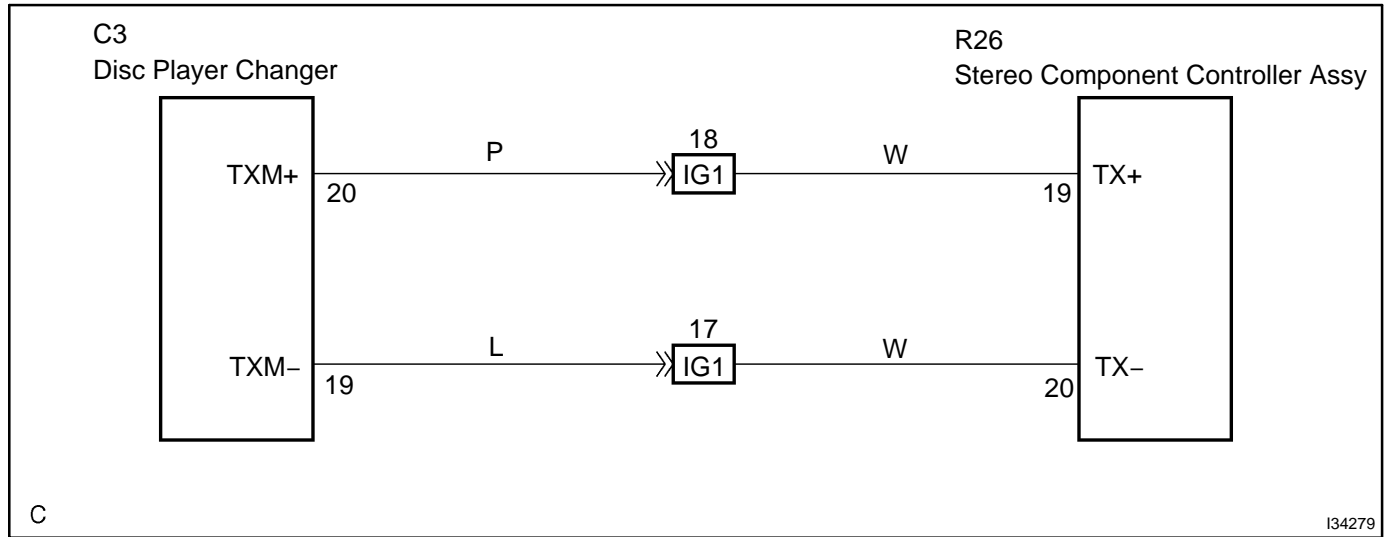
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

A

CHECK AND REPLACE DISC PLAYER CHANGER

AVC-LAN CIRCUIT

WIRING DIAGRAM



INSPECTION PROCEDURE

1 SERVICE CHECK MODE(DISC PLAYER CHANGER)

(a) Perform service check.

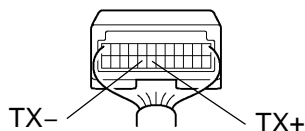
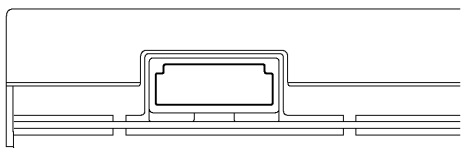
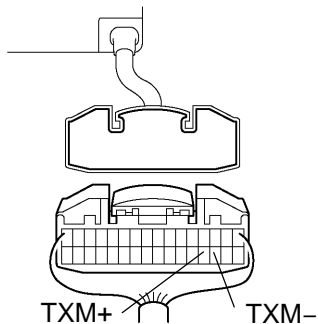
(1) Start the diagnosis system and read check result for disc player changer.

Standard:

A	"NCON" is displayed or nothing displayed (P240)
B	"GOOD" is displayed

B**CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY****A**

2 CHECK HARNESS AND CONNECTOR(DISC PLAYER CHANGER - STEREO COMPONENT CONTROLLER ASSY)

Stereo Component Controller Assy:**Disc Player Changer:**

N

I34633

(a) Disconnect the disc player changer and stereo component controller assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TXM- ↔ TX-	Continuity
TXM+ ↔ TX+	Continuity

(2) Check short in harness.

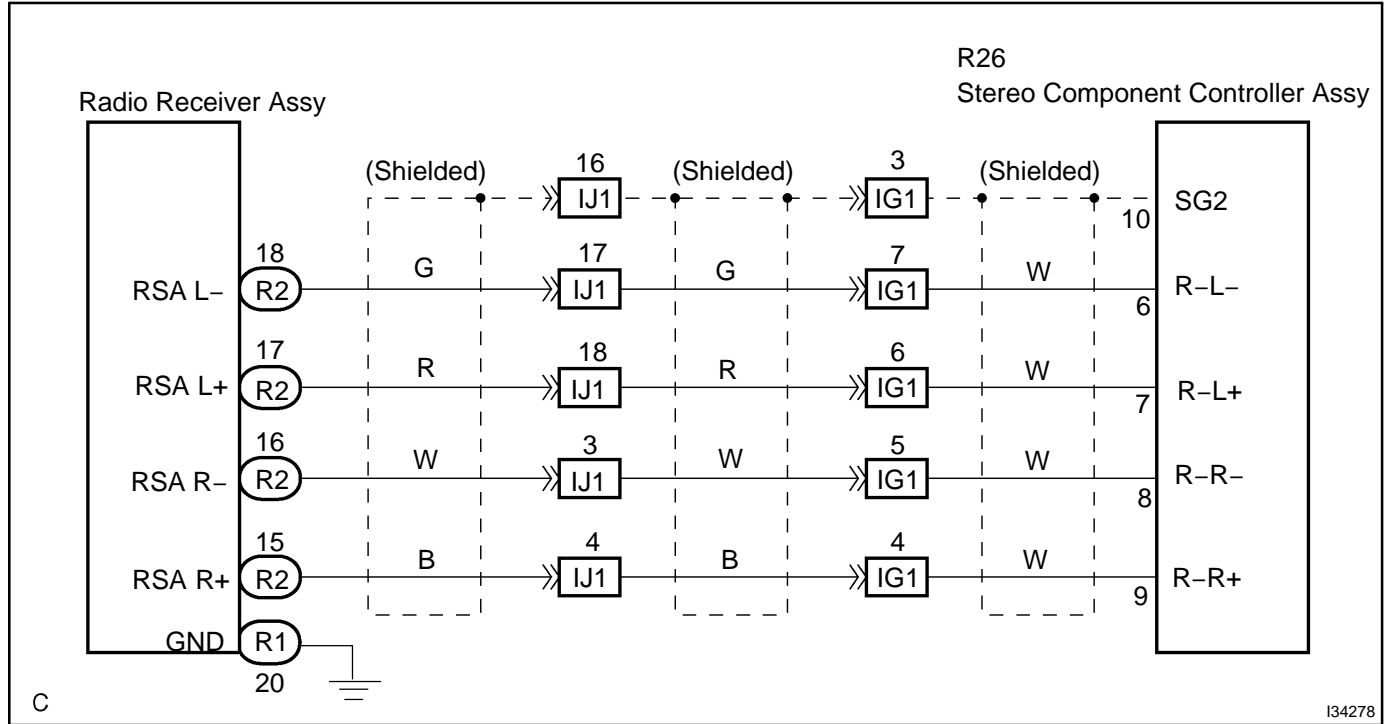
Standard:

Tester connection	Specified condition
TXM- ↔ Body ground	No continuity
TXM+ ↔ Body ground	No continuity

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****CHECK AND REPLACE DISC PLAYER CHANGER**

QUALITY OF SOUND FROM WIRELESS HEADPHONE IS POOR OR NO SOUND CAN BE HEARD

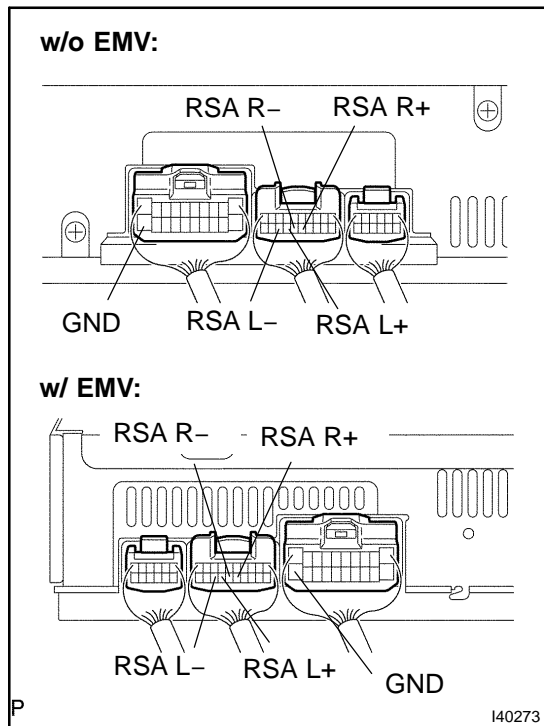
WIRING DIAGRAM



I34278

INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY(RSA R+, RSA R-, RSA L+, RSA L-, GND)



(a) Check that the continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Constant	Continuity

(b) Check that the voltage between terminals at each condition, as shown in the chart.

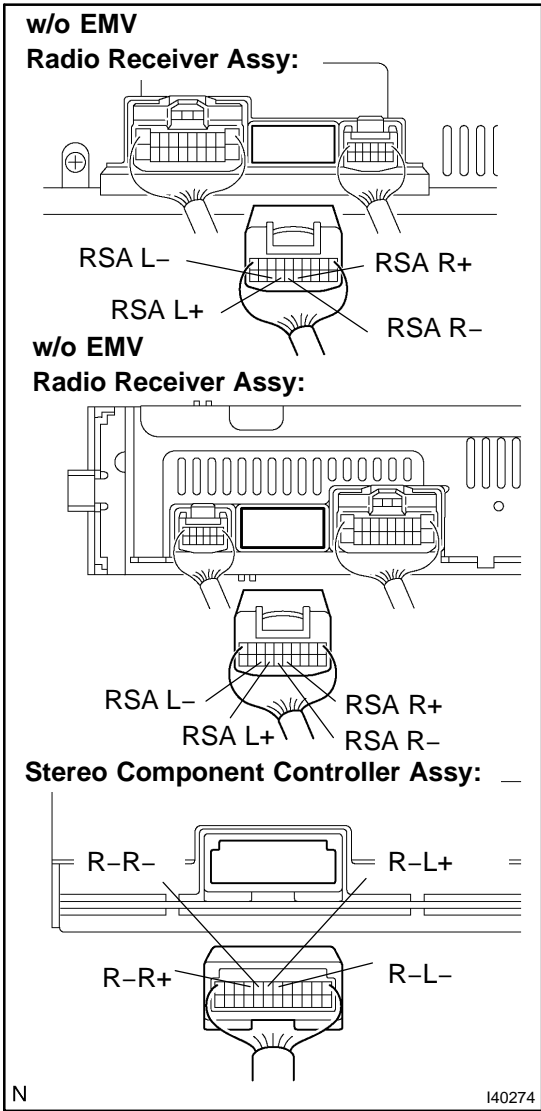
Standard:

Tester connection	Condition	Specified condition
RSA R+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA R- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - STEREO COMPONENT CONTROLLER ASSY)



(a) Disconnect the radio receiver assy and stereo component controller assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
RSA R+ ↔ R-R+	Continuity
RSA R- ↔ R-R-	Continuity
RSA L+ ↔ R-L+	Continuity
RSA L- ↔ R-L-	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
RSA R+ ↔ Body ground	No continuity
RSA R- ↔ Body ground	No continuity
RSA L+ ↔ Body ground	No continuity
RSA L- ↔ Body ground	No continuity

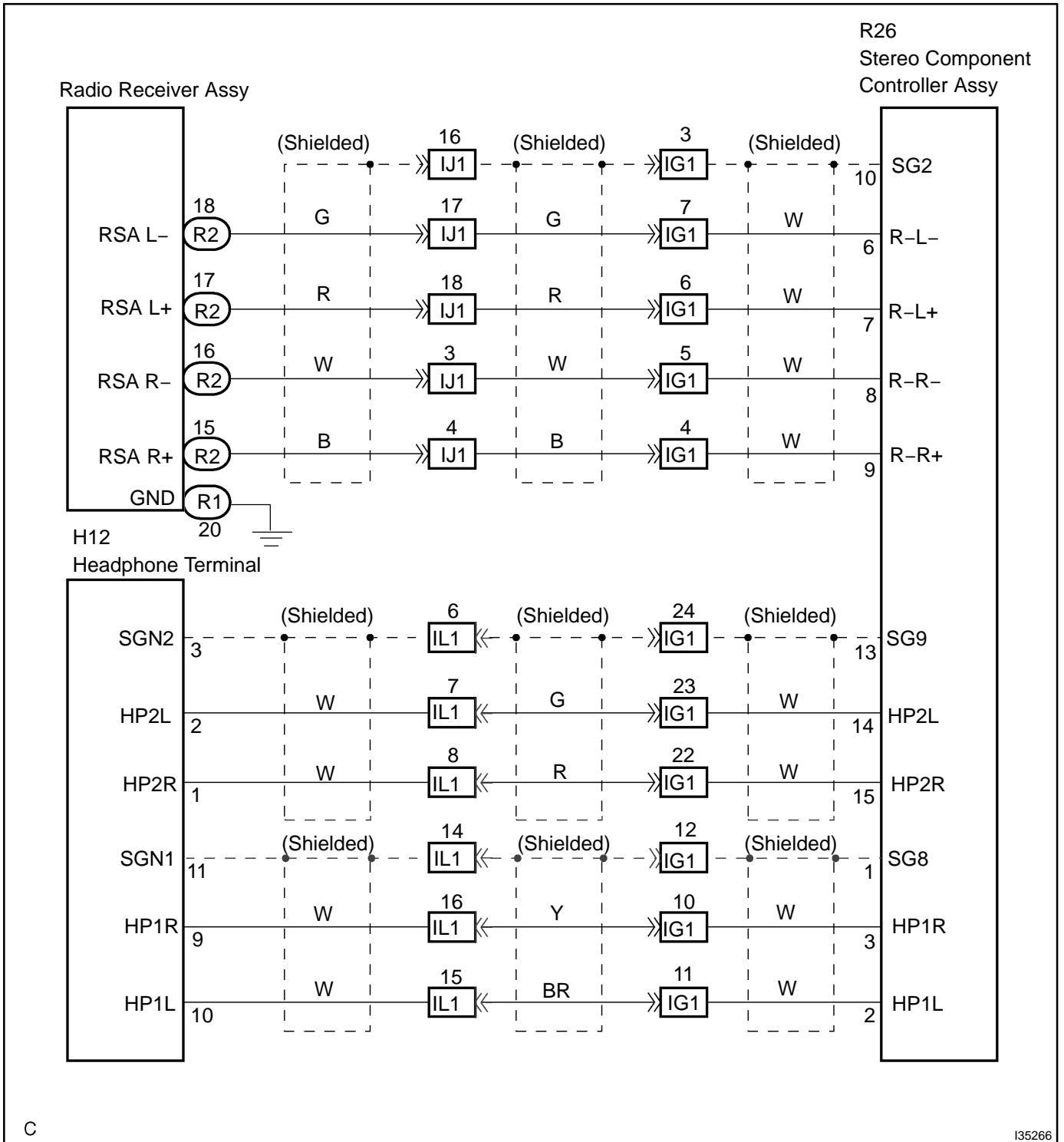
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY

QUALITY OF SOUND FROM HEADPHONE CONNECTED TO HEADPHONE TERMINAL IS POOR OR NO SOUND CAN BE HEARD

WIRING DIAGRAM

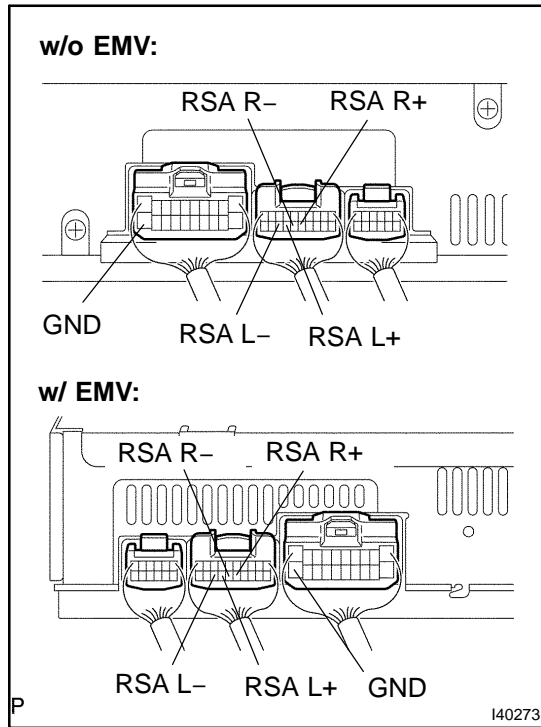


C

I35266

INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY(RSA R+, RSA R-, RSA L+, RSA L-, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

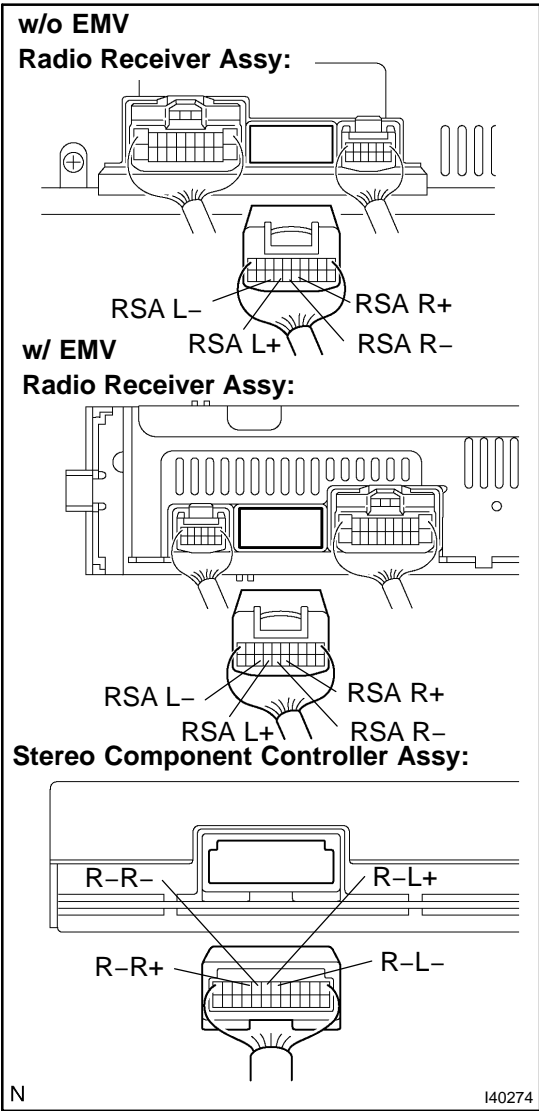
Standard:

Tester connection	Condition	Specified condition
RSA R+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA R- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - STEREO COMPONENT CONTROLLER ASSY)



(a) Disconnect the radio receiver assy and stereo component controller assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
RSA R+ ↔ R-R+	Continuity
RSA R- ↔ R-R-	Continuity
RSA L+ ↔ R-L+	Continuity
RSA L- ↔ R-L-	Continuity

(2) Check short in harness.

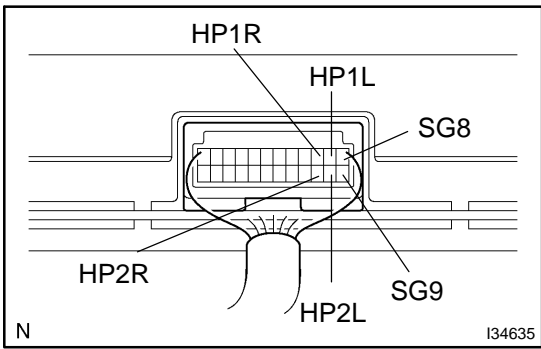
Standard:

Tester connection	Specified condition
RSA R+ ↔ Body ground	No continuity
RSA R- ↔ Body ground	No continuity
RSA L+ ↔ Body ground	No continuity
RSA L- ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT STEREO COMPONENT CONTROLLER ASSY(HP1R, HP1L, HP2R, HP2L, SG8, SG9)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SG8 ↔ Body ground	Always	Continuity
SG9 ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

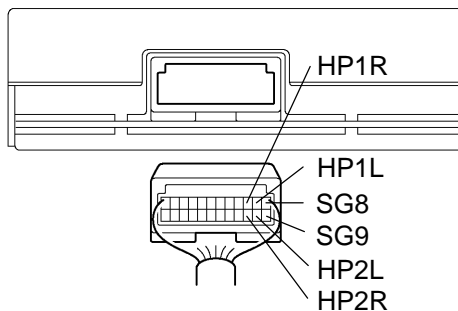
Tester connection	Condition	Specified condition
HP1L ↔ SG8	While voice sound is being produced	A waveform synchronized with sound is output
HP1R ↔ SG8	While voice sound is being produced	A waveform synchronized with sound is output
HP2L ↔ SG9	While voice sound is being produced	A waveform synchronized with sound is output
HP2R ↔ SG9	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY

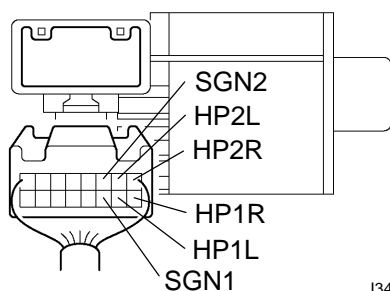
OK

4 CHECK HARNESS AND CONNECTOR(STEREO COMPONENT CONTROLLER ASSY - HEADPHONE TERMINAL)

Stereo Component Controller Assy:



Headphone Terminal:



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I34636

(a) Disconnect the stereo component controller assy and headphone terminal.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
HP1L ↔ HP1L	Continuity
HP1R ↔ HP1R	Continuity
HP2L ↔ HP2L	Continuity
HP2R ↔ HP2R	Continuity
SG8 ↔ SGN1	Continuity
SG9 ↔ SGN2	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
HP1L ↔ Body ground	No continuity
HP1R ↔ Body ground	No continuity
HP2L ↔ Body ground	No continuity
HP2R ↔ Body ground	No continuity
SG8 ↔ Body ground	No continuity
SG9 ↔ Body ground	No continuity

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE HEADPHONE TERMINAL

A REMOTE CONTROL SYSTEM DOES NOT OPERATE

INSPECTION PROCEDURE

1 CHECK MALFUNCTION SYMPTOMS

(a) Check obstruction.

- (1) Check that there are no obstructions between the switch & volume assy and the infrared ray light emitted portion of the stereo component controller assy.

Standard: Normally return.

OK

PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE

NG

2 CHECK BATTERY(SWITCH & VOLUME ASSY)

(a) Check battery.

- (1) Check that the dry-cell battery used for the switch & volume assy is not dead.

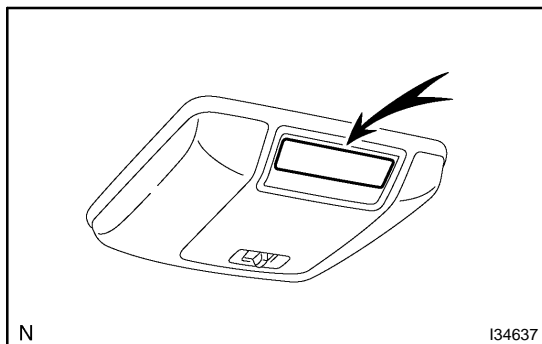
Standard: It is not dead.

NG

BATTERY IS DEAD

OK

3 CLEAN THE INFRARED RAY EMITTED PORTION



(a) Clean the infrared ray emitted portion.

- (1) Clean the infrared ray emitted portion on the stereo component controller assy.
(2) Check whether the same malfunction occurs.

Standard: The function returns to normal.

NG

DIRT AT THE INFRARED RAY EMITTED
PORTION

OK

4 CHECK AND REPLACE SWITCH & VOLUME ASSY

OK

NORMAL

NG

CHECK AND REPLACE STEREO COMPONENT CONTROLLER ASSY

REAR SEAT ENTERTAINMENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05ATM-07

1 Vehicle Brought to Workshop

NEXT

2 Customer Problem Analysis (See page [05-1933](#))

NEXT

3 Problem Symptom Confirmation

Symptom does not occur (Go to step 4)

Symptom occurs (Go to step 5)

4 Symptom Simulation (See page [01-36](#))

NEXT

5 DTC Check (See page [05-1934](#))

Normal code (Go to step 7)

Malfunction code (Go to step 6)

6 DTC Chart (See page [05-1943](#))

NEXT Go to step 8

7 Problem Symptoms Table (See page [05-1955](#))

NEXT

8 Circuit Inspection and Part Inspection

NEXT

9 Indemnification of Problem

NEXT

10	Repair or Replace
-----------	--------------------------

NEXT

11	Confirmation Test
-----------	--------------------------

NEXT

End

CUSTOMER PROBLEM ANALYSIS CHECK

RSE SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Brought-in Date	/ /	Odometer Reading	km Mile

Date of First Occurrence	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (Times a day)

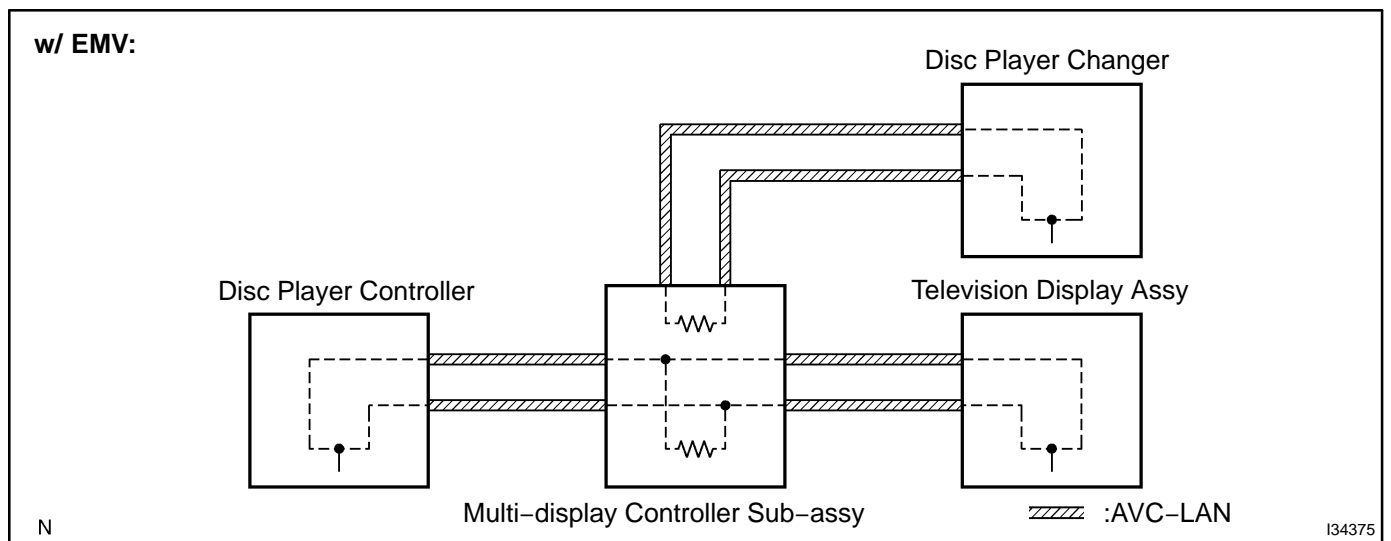
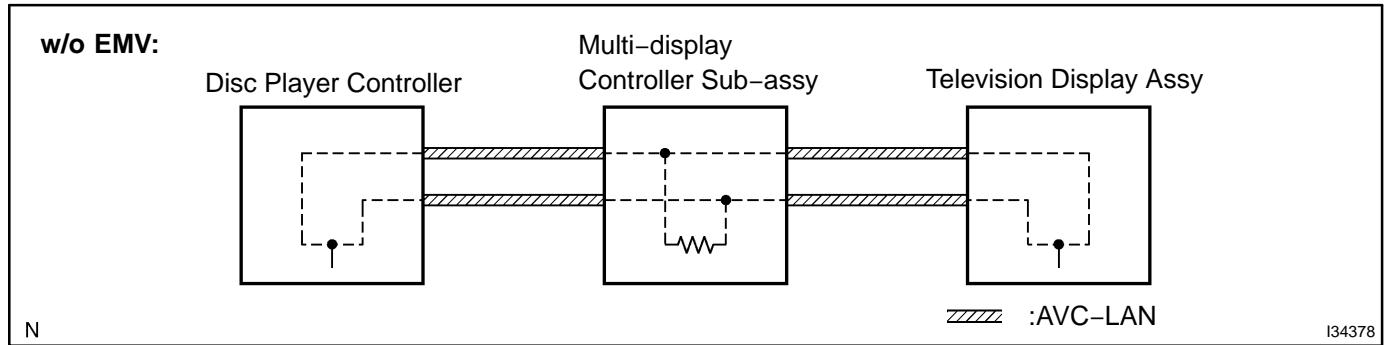
Problem Symptom	<input type="checkbox"/> Switch & Volume Assy
	<input type="checkbox"/> Headphone
	<input type="checkbox"/> Multi-display Controller Sub-assy
	<input type="checkbox"/> Disc Player Controller
	<input type="checkbox"/> Television Display Assy
	<input type="checkbox"/> Navigation ECU

DTC Check	Parts name	DTC (1st time).	DTC (2nd time).
	Disc Player Changer		
	Disc Player Controller		
	Television Display Assy		

PRE-CHECK

1. COMMUNICATION SYSTEM

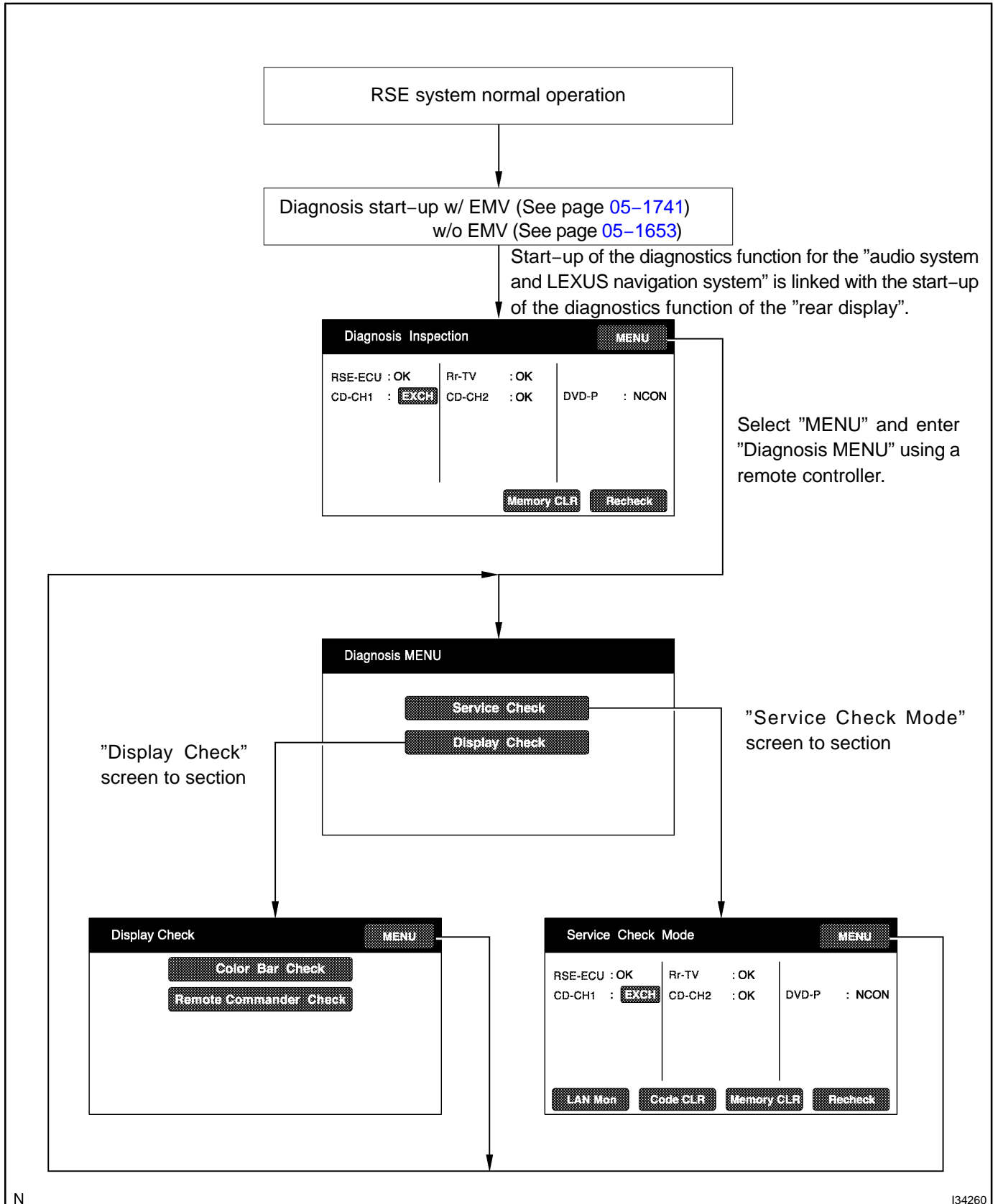
- (a) This system has 2 kinds of AVC-LAN, Main AVC-LAN and Sub AVC-LAN.
- (b) Multi-display controller sub-assy works as a master unit in the Sub AVC-LAN, but not in the Main AVC-LAN.



2. DIAGNOSIS CHECK

HINT:

- Diagnosis system mode is operated as follows.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.



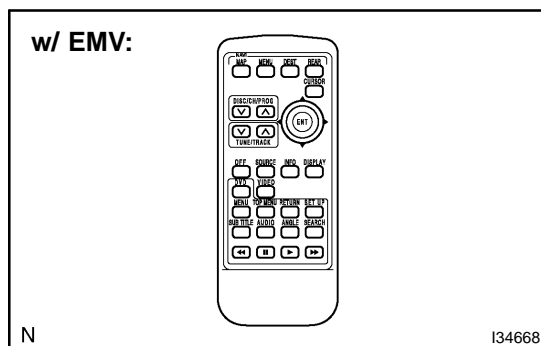
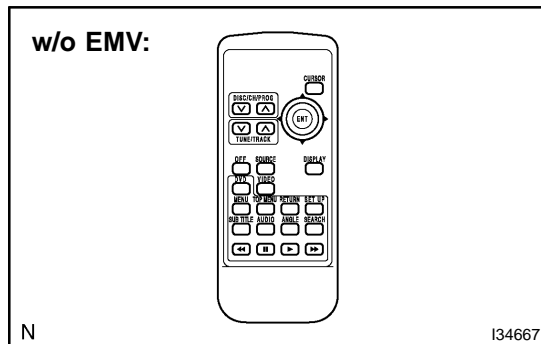
HINT:

RSE system inspects the devices consisting of Sub AVC-LAN multi-display controller sub-assy.

(a) Starting Main AVC-LAN (See page 05-1882, 05-1678).

HINT:

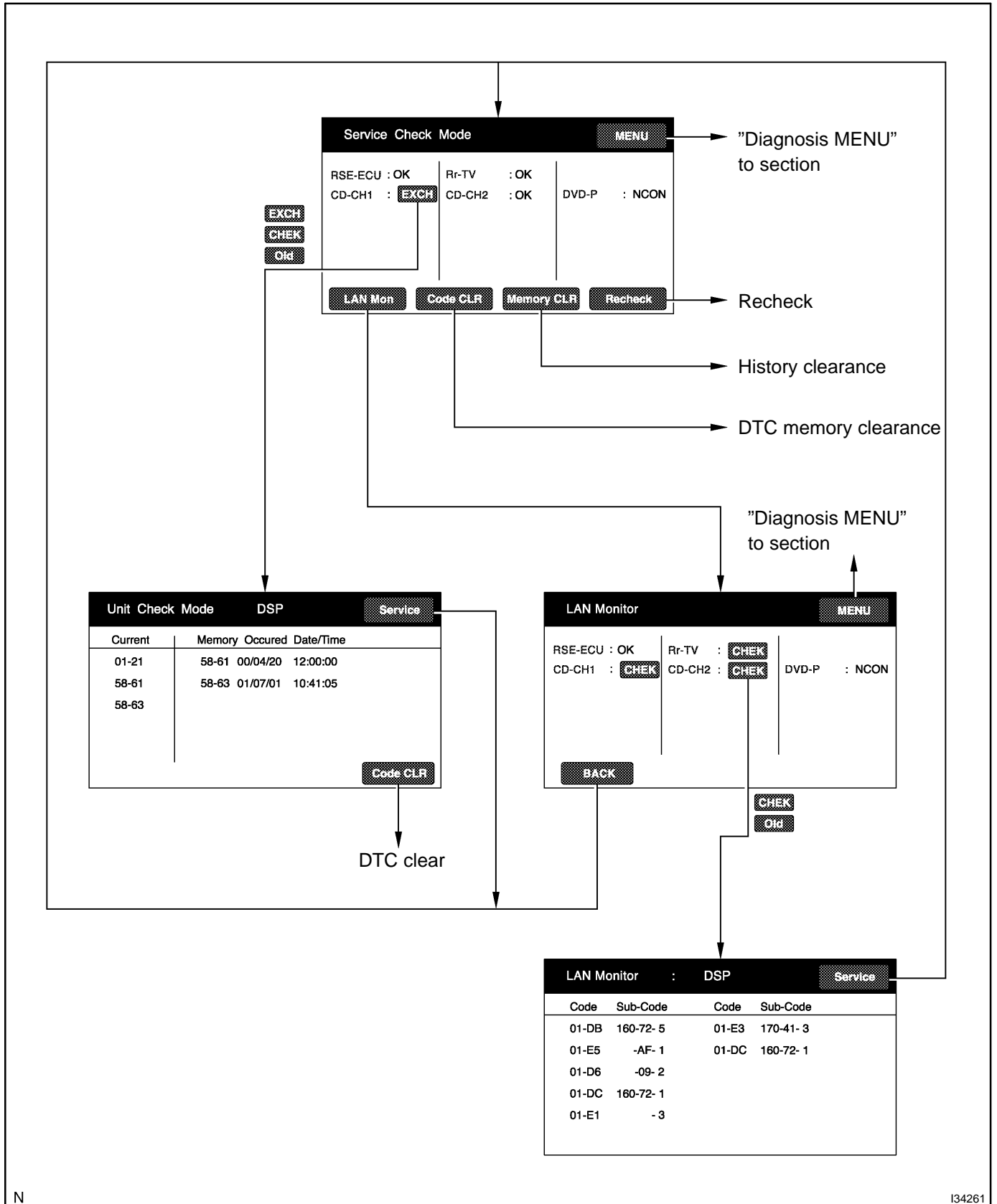
- Starting Main AVC-LAN operates the diagnosis mode and sub AVC-LAN is also automatically enter the diagnosis mode and performing the diagnosis mode operation on the multi-display controller sub-assy
- Use a switch & volume assy to operate diagnosis mode.



3. SERVICE CHECK MODE

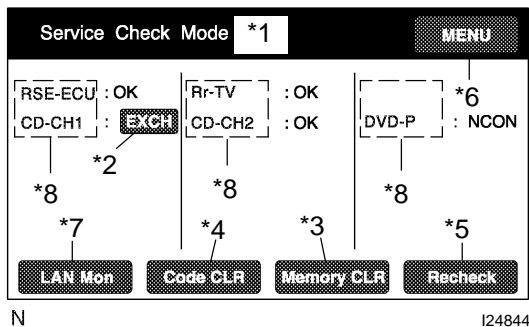
HINT:

- Service Check Mode is operated as follows.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.



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I34261



(a) Service Check Mode
(1) Start the Diagnosis System.

Display Item	Function
Components Name/*1	List of component names including optional components (15 components max.) are displayed. When the names are not identified, their physical addresses are displayed.
Check Result/*2	Check results are displayed.
Memory Clear switch/*3	Pressing this switch for 3 sec. deletes all the information about master component registration.
DTC Clear switch/*4	Pressing this switch for 3 sec. deletes diagnosis memory of all the components. It deletes Service Check results and the screen displaying the check results.
Recheck/*5	Pressing this switch performs Service Check again.
MENU/*6	Pressing this switch activates the Diagnosis Menu screen.
LAN Monitor screen switch/*7	Pressing this switch activates the LAN Monitor screen, which displays the logical address 01 with DTC D0 - FE.

Components:/*8

Display	Name
Rr-TV	Television Display Assy
CD-CH1	Disc Player Changer
DVD-P	Disc Player Controller

HINT:

Service Check displays the check results based on the information obtained from each component's response to "System Check Execution" and "Diagnosis Memory Request", and the information of "Current DTC Notification" (the Unit Check that will be displayed on the next screens.).

(2) Read Check Result

Check Result	Meaning
OK	No DTC is identified.
EXCH	One or more DTC requesting for exchange are detected.
CHEK	One or more DTC requesting for check are detected.
NCON	No connection response to Diagnosis System start-up, whereas it has the connection response to the AVC LAN system when the power switch is turned on (when IG is turned to ACC).
Old	One or more DTC are detected because of old version.
NRES	No response to the information about the Diagnosis System, whereas it responds to the Diagnosis System start-up.

HINT:

- After repair and check, press "Code CLR" for more than 3 sec. to delete diagnosis memory.
- After deleting diagnosis memory, press "Recheck" and make sure "OK" is displayed on the screen.

Unit Check Mode		DSP *1	Service
Current	Memory	Occured	Date/Time
01-21	58-61	00/04/20	12:00:00
58-61	58-63	01/07/01	10:41:05
58-63			
*5	*6	*4	

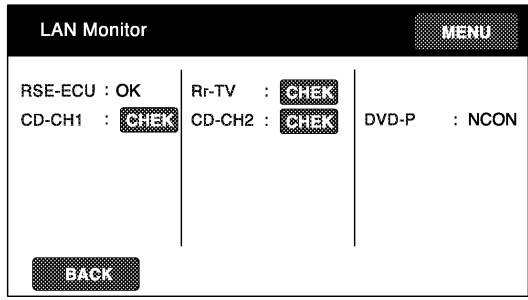
I24845

- (3) "EXCH", "CHEK" and "Old" can be used as switches to activate Unit Check Mode" for detail information. Check troubled parts of the components in these modes by referring to the DTC code list.

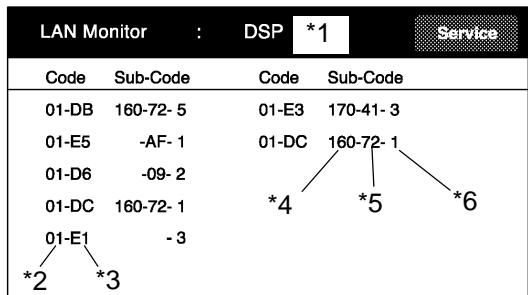
Display Item	Description
Components name/*1	Names of components to be checked are displayed.
DTC clear switch/*2	Pressing this switch for 3 sec. deletes DTC memory of the selected diagnosis component.
Service check mode screen switch/*3	Pressing this returns to the Service Check Mode screen.
Date/Time/*4	The date and time stamped at the time of DTC occurrence are displayed in the order of year-month-day-hour-minute-second. (If the date and time data is invalid, it is displayed as a blank.)
Current/*5	Up to 6 DTC codes detected during the System Check are displayed.
Memory/*6	DTC memories stored and current DTC Notification are displayed.

HINT:

- Detecting Unit DTC activates the Unit Check Mode on the screen.
- In the Unit Check Mode, DTC which is identified as "EHCK" in the Service Check is displayed as classified into Current DTC and Past DTC.



N I24860



N I24846

(4) "LAN Monitor" can be used as a switch to activate "LAN Monitor" for detail information. Check faulty parts of the components in these modes by referring to the DTC code list.

Display Item	Description
Components name/*1	Names of components to be checked are displayed.
Segment/*2	Logical address codes corresponding to DTC are displayed.
DTC/*3	DTC is displayed.
Sub-Code (address numbers of related components)/*4	Physical address codes memorized together with DTC are displayed.
Sub-code (Connection confirmation number)/*5	Connection confirmation numbers memorized together with DTC are displayed.
Sub-code (Number of occurrence)/*6	The number of occurrence of the same DTC is displayed.

HINT:

- Detecting no LAN DTC activates the LAN Monitor on the screen.
- The LAN Monitor chooses and displays the LAN DTC out of DTC of components identified as "CHEK" in the LAN Monitor.

(5) Read Check Result

Check Result	Meaning
OK	No DTC is identified.
CHEK	One or more DTC requesting for check are detected.
NCON	No connection response to Diagnosis System start-up, whereas it has the connection response to the AVC-LAN system when the power switch is turned on (when IG is turned to ACC).
NRES	No response to the information about the Diagnosis System, whereas it responds to the Diagnosis System start-up.
Old	One or more DTC are detected because of old version.

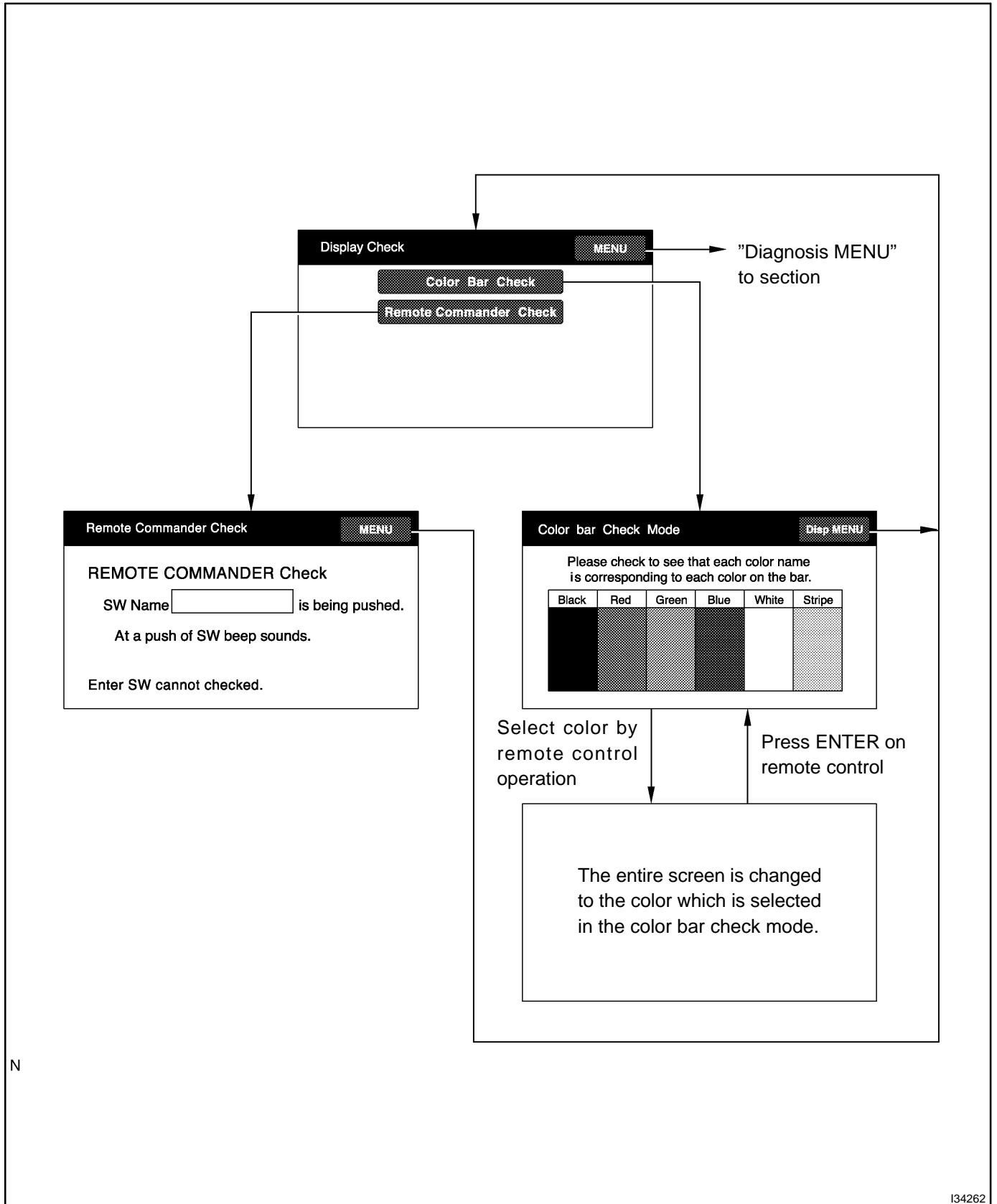
HINT:

- After repairing and checking, press "Code CLR" for more than 3 sec. to delete diagnosis memory.
- After deleting diagnosis memory, press "Recheck" and make sure "OK" is displayed on the screen.

4. DISPLAY CHECK MODE

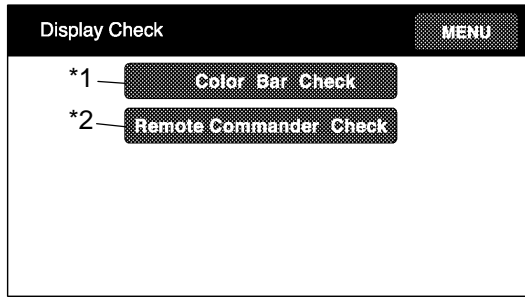
HINT:

- Display check mode is operated as follows.
- Illustrations may differ from the actual vehicle depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle.



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I34262



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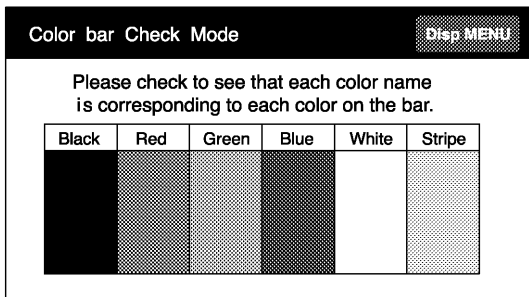
I24847

(a) Display Check Mode

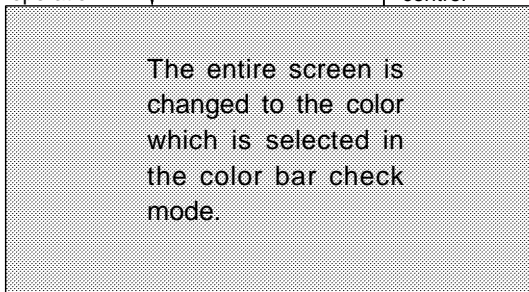
Display	Contents
Color Bar Check/*1	Color display is checked.
Remote Commander/*2	Operating condition of remote commander display is checked.

HINT:

In Display Check Mode, above checks can be performed.



Select color by remote control operation ↓ ↑ Press ENTER on remote control



N

I23620

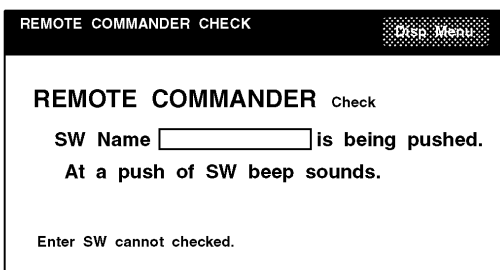
(b) Display Color Bar Check

- (1) Start the Diagnosis System.
- (2) Select "MENU".
- (3) Select "Display Check".
- (4) Select "Color Bar Check".
- (5) Make sure that each color name is corresponding to each color on the bar.

HINT:

Select Black, Red, Green, Blue, White and Stripe to display selected colors and stripe on the entire screen.

- (6) Compare the color with the Color Bar Check, and make sure that the color is the same.



C

I23501

(c) Display Remote Commander Check

- (1) Start the Diagnosis system.
- (2) Select "MENU".
- (3) Select "Display Check".
- (4) Select "Remote Commander".
- (5) Press each switch and make sure that it corresponds to the display on the screen.

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC-LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC-LAN.

HINT:

DTC of the device which is directly connected via AVC-LAN, is displayed on the "audio system or LEXUS navigation" and the "television display assy" respectively.

1. DISC PLAYER CHANGER (Physical address: 240)

HINT:

- *1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.
- *2: It may be stored when the engine key is turned 1 min. after engine start.
- *3: It may be stored when the engine key is turned again after engine start.
- *4: It may be stored when the engine key is turned again after engine start.
- *5: When 210 sec. have passed after the power supply connector of the master component is pulled out with the ignition switch in ACC or ON, this code is stored.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace disc player changer
22	RAM Error	Abnormal condition of ROM is detected.	Replace disc player changer
D6 *2	Absence of Master	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply system of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for power supply system of disc player changer • Check harness for communication system disc player changer
D7 *5	Connection check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, radio receiver assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for power supply of disc player changer • Check harness for communication system of disc player changer
DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in order component, check harness for power supply and communication system of all components shown by code
DD *3	Master Reset (Momentary Interruption)	After engine is started, multi-display controller sub-assy was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply system of multi-display controller sub-assy • Check harness for communication system multi-display controller sub-assy • If this error occurs frequently, replace multi-display controller sub-assy

DF*4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for communication system between radio receiver assy and sub-master component
E0*1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi-display controller sub-assy	Replace multi-display controller sub-assy
E3*1	Registration Request Transmission	<ul style="list-style-type: none"> • Registration Request command is output from slave component. • Receiving Connection Check Instruction, Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists
E4*1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists

(b) Logical address: 43 (CD auto changer)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read.	Inspect CD
44	CD Error	Error is detected in disc player changer.	Replace disc player changer
45	EJECT Error	Magazine cannot be ejected	Replace disc player changer
46	Scratched/ Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD
47	CD Auto Changer Temp. Too High	Readout cannot be done because temperature around player's pick-up (reading part) is too high.	With IG switch OFF, leave vehicle in cool shaded place for a while and recheck After deleting the DTC memory, if same code detected, replace disc player changer
48	CD Auto Changer Excess Current	Excess current is applied disc player changer.	Replace disc player changer
50	Tray insertion/ejection error	Malfunction insertion/ejection system.	Replace disc player changer
51	CD changer elevator error	Mechanical error occurred during elevator operation.	Replace disc player changer

2. TELEVISION DISPLAY ASSY (Physical address: 1B0)**HINT:**

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting an engine.
- *2: This code may be stored when the engine key is turned again 1 min. after engine start.
- *3: This code may be stored when the engine key is turned again after engine start.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
DC *3	Transmission Error	Transmission to component shown by sub-code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same sub-code is recorded in other components, check harness for power supply and communication system of all components shown by code
DD *2	Master Reset (Momentary Interruption)	After engine is started, multi-display controller sub-assy was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply system of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • If this error occurs frequently, replace multi-display controller sub-assy
E0 *1	Registration Completion Instruction Error	"Registration completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists
E3 *1	Registration Request Transmission	Registration request command is output from slave component. Receiving connection check Instruction, Registration request command is output from sub-master component.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists

3. DISC PLAYER CONTROLLER (Physical address :1A0)**HINT:**

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting an engine.
- *2: This code may be stored when the engine key is turned again 1 min. after the engine starts.
- *3: This code may be stored when the engine key is turned again after the engine starts.
- *4: When 210 sec. have passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
22	RAM Error	Abnormal condition of RAM is detected.	Replace disc player controller
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi-display controller sub-assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for power supply of disc player controller • Check harness for communication system of disc player controller
D7	Communication Check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, multi-display controller sub-assy was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for power supply of disc player controller • Check harness for communication system of disc player controller

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
DC*2	Transmission Error	Transmission to component shown by sub-code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same sub-code is recorded in other components, check harness for power supply and communication system of all components shown by code
DD*3	Master Reset (Momentary Interruption)	After engine start, radio and player assembly was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • If this error occurs frequently, replace multi-display controller sub-assy
DF*4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display controller sub-assy • Check harness for communication system of multi-display controller sub-assy • Check harness for communication system between multi-display controller sub-assy
E0*1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from disc player controller.	Replace disc player controller
E3*1	Registration Request Transmission	<ul style="list-style-type: none"> • Registration Request command is output from slave component. • Registration Connection Check Instruction, Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists
E4*1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists

(b) Logical address: 44 (DVD)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read.	Inspect disc
44	DVD Error	Error is detected in disc player controller.	Replace disc player controller
45	EJECT Error	Disc cannot be ejected.	Replace disc player controller
46	Disc Crack	A crack and dirt are in a disc.	Replace disc player controller
52	Player Error	Clamp unusually generating.	Replace disc player controller

LOCATION

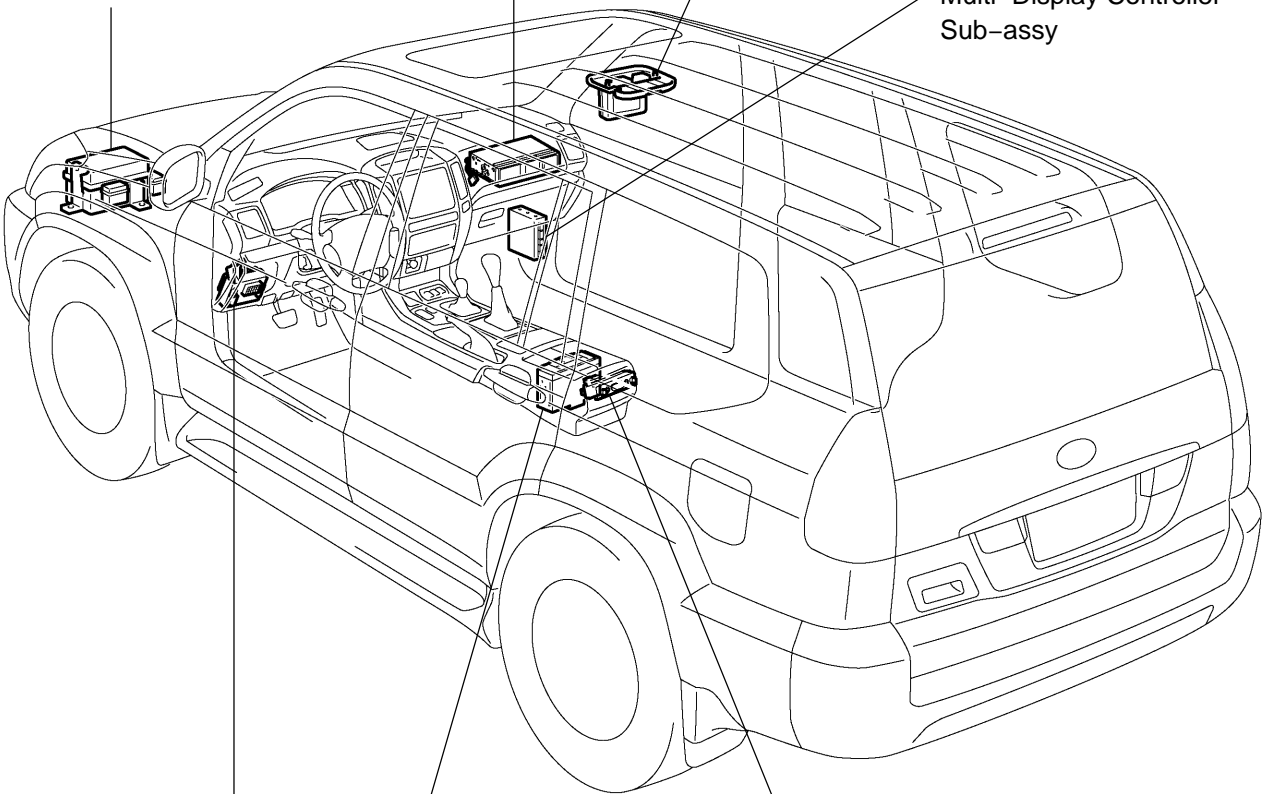
Engine Room J/B

- ACC CUT Relay
- AM1 Fuse
- ALT Fuse
- SHORT PIN
- RADIO No.1 Fuse

Television Display Assy

Disc Player Changer

Multi-Display Controller Sub-assy



Disc Player Controller

Headphone Terminal

Driver Side J/B

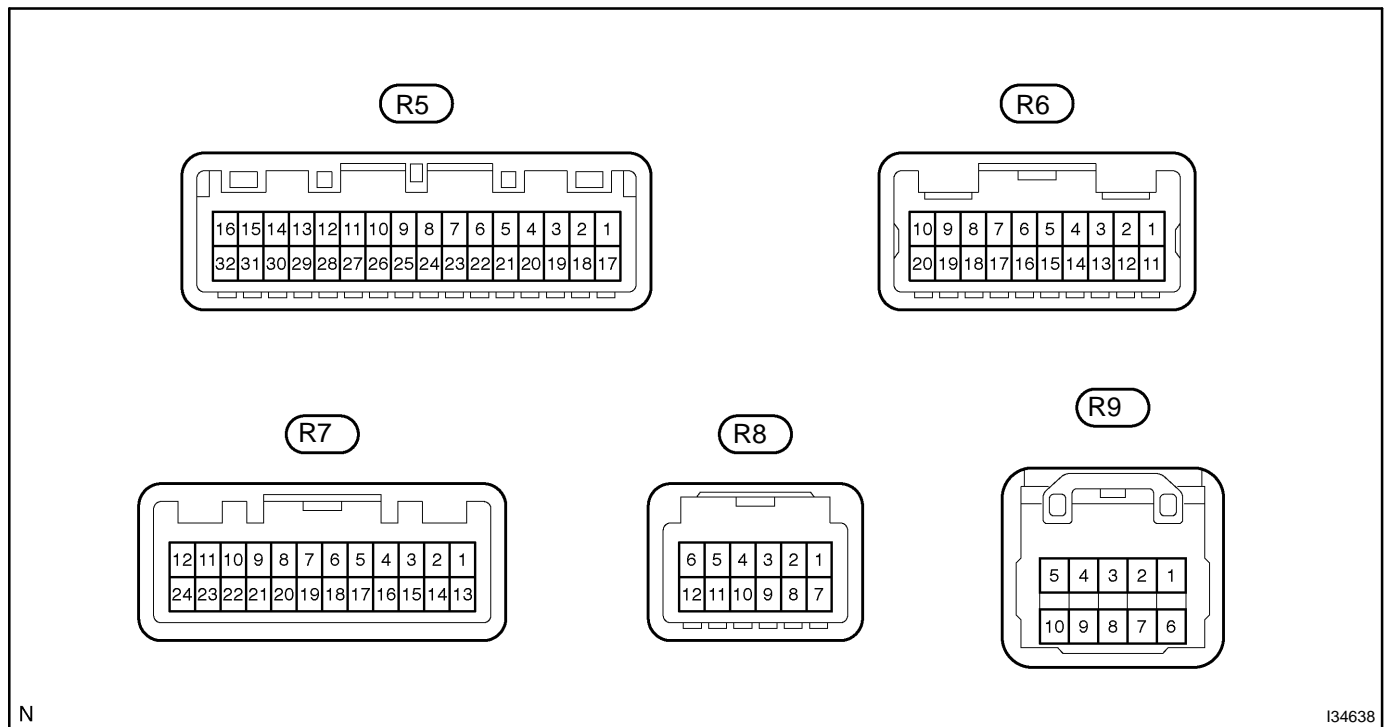
- ACC Fuse

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TERMINALS OF ECU

1. MULTI-DISPLAY CONTROLLER SUB-ASSY



N

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Terminals No. (Symbols)	Wiring Color	Condition	Specified value (V)
R5-1 ⇔ R5-29 (R1 ⇔ GND)	B ⇔ W-B	Navigation display is displayed (Multi-display (CRT display) display)	Pulse generation
R5-2 ⇔ R5-29 (G1 ⇔ GND)	W ⇔ W-B	Navigation display is displayed (Multi-display (CRT display) display)	Pulse generation
R5-3 ⇔ R5-29 (B1 ⇔ GND)	R ⇔ W-B	Navigation display is displayed (Multi-display (CRT display) display)	Pulse generation
R5-4 ⇔ R5-29 (SYNC1 ⇔ GND)	G ⇔ W-B	Navigation display is displayed (Multi-display (CRT display) display)	Pulse generation
R5-5 ⇔ R5-29 (VR1 ⇔ GND)	Y ⇔ W-B	Ignition switch OFF	Below 1
R5-6 ⇔ R5-29 (VG1 ⇔ GND)	W-B ⇔ W-B	Ignition switch OFF	Below 1
R5-7 ⇔ R5-29 (L- ⇔ GND)	G ⇔ W-B	DVD system is sounding	A waveform synchronized with sound is output
R5-8 ⇔ R5-29 (L+ ⇔ GND)	R ⇔ W-B	DVD system is sounding	A waveform synchronized with sound is output
R5-9 ⇔ R5-29 (R- ⇔ GND)	W ⇔ W-B	DVD system is sounding	A waveform synchronized with sound is output
R5-10 ⇔ R5-29 (R+ ⇔ GND)	B ⇔ W-B	DVD system is sounding	A waveform synchronized with sound is output
R5-11 ⇔ Body ground (SG1 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R5-12 ⇔ R5-29 (LMUT ⇔ GND)	P ⇔ W-B	Disc player changer or disc player controller is changing	Below 1
R5-16 ⇔ R5-29 (+B1 ⇔ GND)	L-Y ⇔ W-B	Always	10 - 14

DIAGNOSTICS - REAR SEAT ENTERTAINMENT SYSTEM

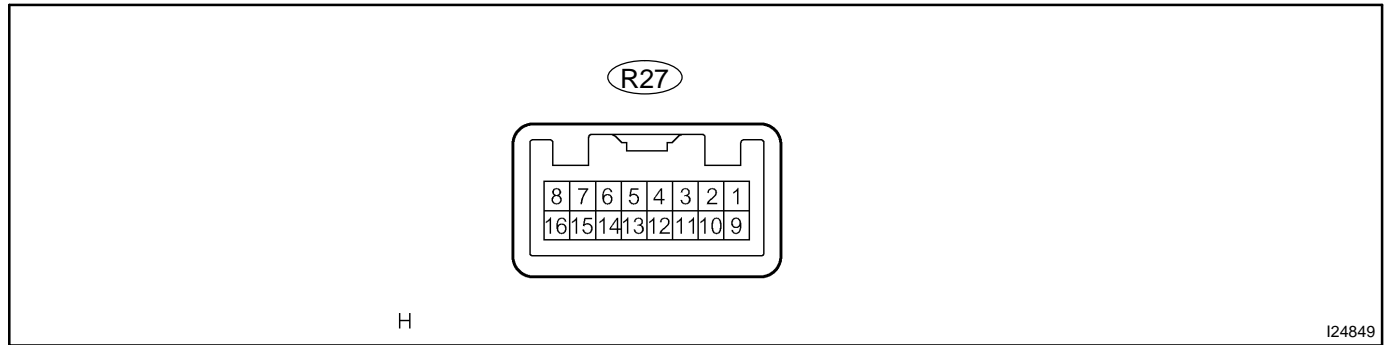
R5-19 ⇔ R5-29 (SLDA ⇔ GND)	Shielded ⇔ W-B	Always	Below 1
R5-20 ⇔ Body ground (SG3 ⇔ Body ground)	BR ⇔ Body ground	Always	Below 1
R5-21 ⇔ R5-29 (NTS1 ⇔ GND)	Y ⇔ W-B	DVD system is displayed	Pulse generation
R5-23 ⇔ R5-29 (R-L- ⇔ GND)	G ⇔ W-B	RSE system is sounding	A waveform synchro- nized with sound is out- put
R5-24 ⇔ R5-29 (R-L+ ⇔ GND)	R ⇔ W-B	RSE system is sounding	A waveform synchro- nized with sound is out- put
R5-25 ⇔ R5-29 (R-R- ⇔ GND)	W ⇔ W-B	RSE system is sounding	A waveform synchro- nized with sound is out- put
R5-26 ⇔ R5-29 (R-R+ ⇔ GND)	B ⇔ W-B	RSE system is sounding	A waveform synchro- nized with sound is out- put
R5-27 ⇔ Body ground (SG2 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R5-28 ⇔ R5-29 (RMUT ⇔ GND)	L-B ⇔ W-B	Audio system	Below 1
R5-29 ⇔ Body ground (GND ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1
R5-30 (TX-)	LG	See "Service Check Mode"	-
R5-31 (TX+)	L	See "Service Check Mode"	-
R5-32 ⇔ R5-29 (ACC ⇔ GND)	GR ⇔ W-B	Ignition switch to ACC	10 - 14
R6-1 ⇔ R5-29 (R-MU ⇔ GND)	P-B ⇔ W-B	Disc player controller	Below 1
R6-2 ⇔ R5-29 (L1- ⇔ GND)	G ⇔ W-B	DVD system is sounding	A waveform synchro- nized with sound is out- put
R6-3 ⇔ R5-29 (L1+ ⇔ GND)	R ⇔ W-B	DVD system is sounding	A waveform synchro- nized with sound is out- put
R6-4 ⇔ R5-29 (R1- ⇔ GND)	W ⇔ W-B	DVD system is sounding	A waveform synchro- nized with sound is out- put
R6-5 ⇔ R5-29 (R1+ ⇔ GND)	B ⇔ W-B	DVD system is sounding	A waveform synchro- nized with sound is out- put
R6-6 ⇔ Body ground (SLD2 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R6-7 ⇔ Body ground (SELD ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1
R6-8 ⇔ R5-29 (NTS2 ⇔ GND)	G ⇔ W-B	DVD system is displayed	Pulse generation
R6-9 ⇔ Body ground (SGN2 ⇔ Body ground)	R ⇔ Body ground	Always	Below 1
R6-10 ⇔ Body ground (SLD8 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R6-13 (TX2+)	R	See "Service Check Mode"	-
R6-14 (TX2-)	G	See "Service Check Mode"	-
R6-16 ⇔ R5-29 (HPL- ⇔ GND)	R ⇔ W-B	RSE system is sounding	A waveform synchro- nized with sound is out- put

R6-17 ⇔ R5-29 (HPL+ ⇔ GND)	G ⇔ W-B	RSE system is sounding	A waveform synchronized with sound is output
R6-18 ⇔ R5-29 (HPR- ⇔ GND)	B ⇔ W-B	RSE system is sounding	A waveform synchronized with sound is output
R6-19 ⇔ R5-29 (HPR+ ⇔ GND)	W ⇔ W-B	RSE system is sounding	A waveform synchronized with sound is output
R6-20 ⇔ Body ground (SLD5 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R7-1 ⇔ R5-29 (+B1 ⇔ GND)	G-B ⇔ W-B	Always	10 - 14
R7-2 ⇔ R5-29 (ACC1 ⇔ GND)	BR-B ⇔ W-B	Ignition switch ON	10 - 14
R7-3 ⇔ R5-29 (OPEN ⇔ GND)	R-L ⇔ W-B	External device system sounding (At that time of VTR jack use)	A waveform synchronized with sound is output
R7-4 (TX1+)	W	See "Service Check Mode"	-
R7-5 (TX1-)	B	See "Service Check Mode"	-
R7-6 ⇔ Body ground (GND4 ⇔ Body ground)	G-W ⇔ Body ground	Always	Below 1
R7-7 ⇔ Body ground (SLD6 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R7-8 ⇔ R5-29 (HP1L ⇔ GND)	BR ⇔ W-B	External device system sounding (At that time of VTR jack use)	A waveform synchronized with sound is output
R7-9 ⇔ R5-29 (HP1R ⇔ GND)	Y ⇔ W-B	External device system sounding (At that time of VTR jack use)	A waveform synchronized with sound is output
R7-10 ⇔ Body ground (SLDB ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R7-11 ⇔ R5-29 (AUXL ⇔ GND)	BR ⇔ W-B	External device system is sounding (At that time of VTR jack use)	A waveform synchronized with sound is output
R7-12 ⇔ R5-29 (AUXR ⇔ GND)	Y ⇔ W-B	External device system is sounding (At that time of VTR jack use)	A waveform synchronized with sound is output
R7-13 ⇔ R5-29 (R2 ⇔ GND)	G ⇔ W-B	Navigation display is displayed (Television display assy)	Pulse generation
R7-14 ⇔ R5-29 (G2 ⇔ GND)	R ⇔ W-B	Navigation display is displayed (Television display assy)	Pulse generation
R7-15 ⇔ R5-29 (B2 ⇔ GND)	W ⇔ W-B	Navigation display is displayed (Television display assy)	Pulse generation
R7-16 ⇔ R5-29 (SYN2 ⇔ GND)	B ⇔ W-B	Navigation display is displayed (Television display assy)	Pulse generation
R7-17 ⇔ Body ground (VR2 ⇔ Body ground)	Y ⇔ Body ground	Always	Below 1
R7-18 ⇔ Body ground (VG2 ⇔ Body ground)	W-B ⇔ Body ground	Always	Below 1
R7-19 ⇔ Body ground (SG6 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R7-20 ⇔ R5-29 (HP2L ⇔ GND)	G ⇔ W-B	Audio system is sounding (Headphone)	A waveform synchronized with sound is output

DIAGNOSTICS - REAR SEAT ENTERTAINMENT SYSTEM

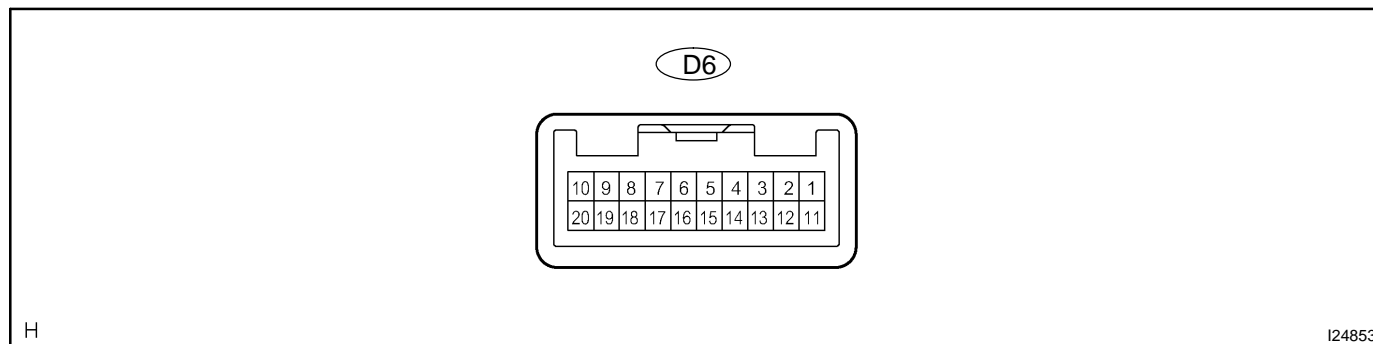
R7-21 ⇔ R5-29 (HP2R ⇔ GND)	R ⇔ W-B	Audio system is sounding (Headphone)	A waveform synchronized with sound is output
R7-22 ⇔ Body ground (SG6 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R7-23 ⇔ Body ground (SGN5 ⇔ Body ground)	Y ⇔ Body ground	Always	Below 1
R7-24 ⇔ R5-29 (NTS4 ⇔ GND)	BR ⇔ W-B	External device system displayed (At that time of VTR jack use)	Pulse generation
R8-1 ⇔ Body ground (SLD3 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R8-2 ⇔ R5-29 (AR+ ⇔ GND)	B ⇔ W-B	Disc player changer is sounding	A waveform synchronized with sound is output
R8-3 ⇔ R5-29 (AR- ⇔ GND)	W ⇔ W-B	Disc player changer is sounding	A waveform synchronized with sound is output
R8-4 ⇔ R5-29 (AL+ ⇔ GND)	R ⇔ W-B	Disc player changer is sounding	A waveform synchronized with sound is output
R8-5 ⇔ R5-29 (AL- ⇔ GND)	G ⇔ W-B	Disc player changer is sounding	A waveform synchronized with sound is output
R8-6 ⇔ R5-29 (TMUT ⇔ GND)	P ⇔ W-B	Disc player changer	Below 1
R8-9 (TX4+)	L	See "Service Check Mode"	-
R8-10 (TX4-)	LG	See "Service Check Mode"	-
R9-1 (TX+)	P	See "Service Check Mode"	-
R9-3 ⇔ R5-29 (B ⇔ GND)	R ⇔ W-B	Navigation display is displayed	Pulse generation
R9-4 ⇔ R5-29 (R ⇔ GND)	B ⇔ W-B	Navigation display is displayed	Pulse generation
R9-5 ⇔ R5-29 (VR ⇔ GND)	W-B ⇔ W-B	Ignition switch OFF	Below 1
R9-6 (TX-)	L	See "Service Check Mode"	-
R9-7 ⇔ R5-29 (NAVI ⇔ GND)	W-B ⇔ W-B	Always	Below 1
R9-8 ⇔ R5-29 (SYNC ⇔ GND)	G ⇔ W-B	Navigation display is displayed	Pulse generation
R9-9 ⇔ R5-29 (G ⇔ GND)	W ⇔ W-B	Navigation display is displayed	Pulse generation
R9-10 ⇔ R5-29 (VG ⇔ GND)	W-B ⇔ W-B	Ignition switch OFF	Below 1

2. TELEVISION DISPLAY ASSY



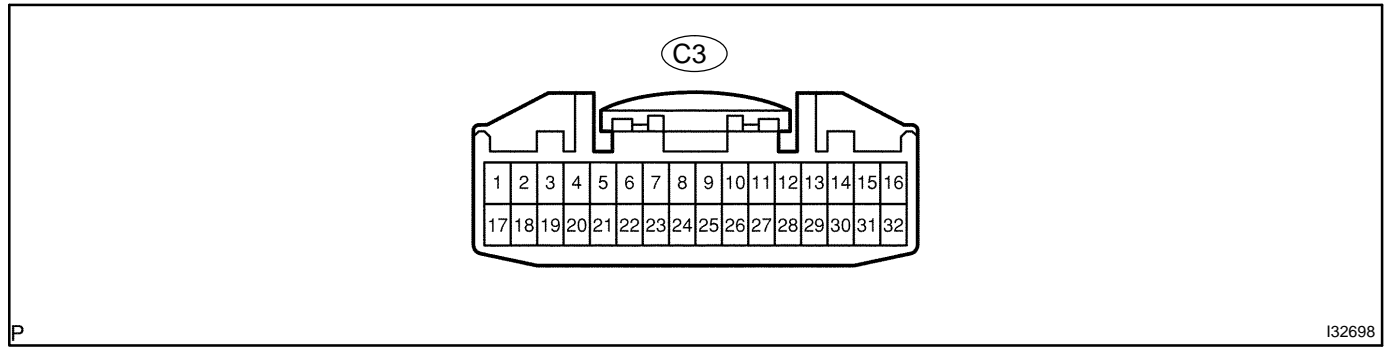
Terminals No. (Symbols)	Wiring Color	Condition	Specified value (V)
R27-1 ⇔ Body ground (GND ⇔ Body ground)	Y ⇔ Body ground	Always	Below 1
R27-2 ⇔ Body ground (SGN1 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R27-3 ⇔ R27-1 (HPR+ ⇔ GND)	W ⇔ Y	RSE system is sounding (Headphone)	A waveform synchronized with sound is output
R27-4 ⇔ R27-1 (HPR- ⇔ GND)	W ⇔ Y	RSE system is sounding (Headphone)	A waveform synchronized with sound is output
R27-5 ⇔ R27-1 (HPL+ ⇔ GND)	W ⇔ Y	RSE system is sounding (Headphone)	A waveform synchronized with sound is output
R27-6 ⇔ R27-1 (HPL- ⇔ GND)	W ⇔ Y	RSE system is sounding (Headphone)	A waveform synchronized with sound is output
R27-7 ⇔ R27-1 (ACC ⇔ GND)	LG ⇔ Y	Ignition switch ON	10 - 14
R27-8 ⇔ R27-1 (BU+B ⇔ GND)	Y ⇔ Y	Always	10 - 14
R27-9 (TX+)	W	See "Service Check Mode"	-
R27-10 (TX-)	W	See "Service Check Mode"	-
R27-11 ⇔ Body ground (VG ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
R27-12 ⇔ Body ground (VR ⇔ Body ground)	W ⇔ Body ground	Always	Below 1
R27-13 ⇔ R27-12 (SYNC ⇔ VR)	W ⇔ W	Rear display is displayed	Pulse generation
R27-14 ⇔ R27-12 (B ⇔ VR)	W ⇔ W	Rear display is displayed	Pulse generation
R27-15 ⇔ R27-12 (G ⇔ VR)	W ⇔ W	Rear display is displayed	Pulse generation
R27-16 ⇔ R27-12 (R ⇔ VR)	W ⇔ W	Rear display is displayed	Pulse generation

3. DISC PLAYER CONTROLLER



Terminals No. (Symbols)	Wiring Color	Condition	Specified value (V)
D6-1 ⇔ Body ground (SLD1 ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
D6-2 ⇔ Body ground (SGND ⇔ Body ground)	R ⇔ Body ground	Always	Below 1
D6-3 ⇔ D6-16 (NTSC ⇔ GND)	G ⇔ BR	Rear display is displayed (DVD)	Pulse generation
D6-5 ⇔ Body ground (SLD ⇔ Body ground)	Shielded ⇔ Body ground	Always	Below 1
D6-6 ⇔ D6-16 (R+ ⇔ GND)	B ⇔ BR	DVD system is sounding	A waveform synchronized with sound is output
D6-7 ⇔ D6-16 (R- ⇔ GND)	W ⇔ BR	DVD system is sounding	A waveform synchronized with sound is output
D6-8 ⇔ D6-16 (L+ ⇔ GND)	R ⇔ BR	DVD system is sounding	A waveform synchronized with sound is output
D6-9 ⇔ D6-16 (L- ⇔ GND)	G ⇔ BR	DVD system is sounding	A waveform synchronized with sound is output
D6-10 ⇔ D6-16 (MUTE ⇔ GND)	P-B ⇔ BR	DVD system is changing	Below 1
D6-16 ⇔ Body ground (GND ⇔ Body ground)	BR ⇔ Body ground	Disc player controller	Below 1
D6-17 (TX+)	G	See "Service Check Mode"	-
D6-18 (TX-)	R	See "Service Check Mode"	-
D6-19 ⇔ D6-16 (ACC ⇔ GND)	GR ⇔ BR	Ignition switch ON	10 - 14
D6-20 ⇔ D6-16 (+B ⇔ GND)	L-Y ⇔ BR	Always	10 - 14

4. DISC PLAYER CHANGER



Terminal No. (Symbols)	Wiring Color	Condition	Specified value (V)
C3-1 ⇔ C3-21 (MUTE ⇔ GND)	P ⇔ BR	Disc player changer is changing	Above 3.5
C3-2 ⇔ C3-21 (CDL- ⇔ GND)	G ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-3 ⇔ C3-21 (CDL+ ⇔ GND)	R ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-4 ⇔ C3-21 (CDR- ⇔ GND)	W ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-5 ⇔ C3-21 (CDR+ ⇔ GND)	B ⇔ BR	Disc player changer system is sounding	A waveform synchronized with sounds is output
C3-17 ⇔ C3-21 (+B ⇔ GND)	L-Y ⇔ BR	Always	10 - 14
C3-18 ⇔ C3-21 (ACC ⇔ GND)	GR ⇔ BR	Ignition switch to ACC	10 - 14
C3-19 (TXM-)	LG	See "Service Check Mode"	-
C3-20 (TXM+)	L	See "Service Check Mode"	-
C3-21 ⇔ Body ground (GND ⇔ Body ground)	BR ⇔ Body ground	Always	Below 1

PROBLEM SYMPTOMS TABLE**TELEVISION DISPLAY ASSY**

Symptom	Suspect Area	See page
Black screen.	4. Power source circuit (television display assy) 5. Power source circuit (multi-display controller sub-assy) 6. AVC-LAN circuit	05-1957 05-1959 05-1967
Display screen not stabilized (Synchronous error).	1. Power source circuit (television display assy) 2. Power source circuit (multi-display controller sub-assy) 3. Display screen not stabilized (Synchronous error)	05-1957 05-1959 05-1972
Display screen input from the external device not stabilized	1. Power source circuit (television display assy) 2. Power source circuit (multi-display controller sub-assy) 3. Display screen input from the external device not stabilized	05-1957 05-1959 05-1974
Color on display screen is unusual (RGB signal error).	-	05-1976

DISC PLAYER CONTROLLER

Symptom	Suspect Area	See page
DVD screen is not displayed.	1. Power source circuit (disc player controller) 2. DVD screen is not displayed 3. AVC-LAN circuit	05-1961 05-1978 05-1967
DVD is not heard or the sound quality is poor.	-	05-1980

RSE SYSTEM

Symptom	Suspect Area	See page
Quality of sound from wireless headphone is poor or no sound can be heard.	1. Power source circuit (television display assy) 2. Power source circuit (multi-display controller sub-assy) 3. Quality of sound from wireless headphone is poor or no sound can be heard	05-1957 05-1959 05-1983
Quality of sound from headphone connected to headphone terminal is poor or no sound can be heard.	1. Power source circuit (multi-display controller sub-assy) 2. Quality of sound from headphone connected to headphone terminal is poor or no sound can be heard	05-1959 05-1987
Sound quality input from the external device is poor or no sound.	1. Power source circuit (multi-display controller sub-assy) 2. Sound quality input from the external device is poor	05-1959 05-1991
The operation the external apparatus cannot be performed	1. Power source circuit (multi-display controller sub-assy) 2. The operation to the external apparatus cannot be performed	05-1959 05-1993

DISC PLAYER CHANGER

Symptom	Suspect Area	See page
Disc player changer screen is not displayed.	1. Power source circuit (disc player changer) 2. AVC-LAN circuit	05-1963 05-1967
Only disc player changer has bad sound.	1. Power source circuit (disc player changer) 2. Only disc player changer has bad sound (Sound is low)	05-1963 05-1995

REMOTE CONTROL

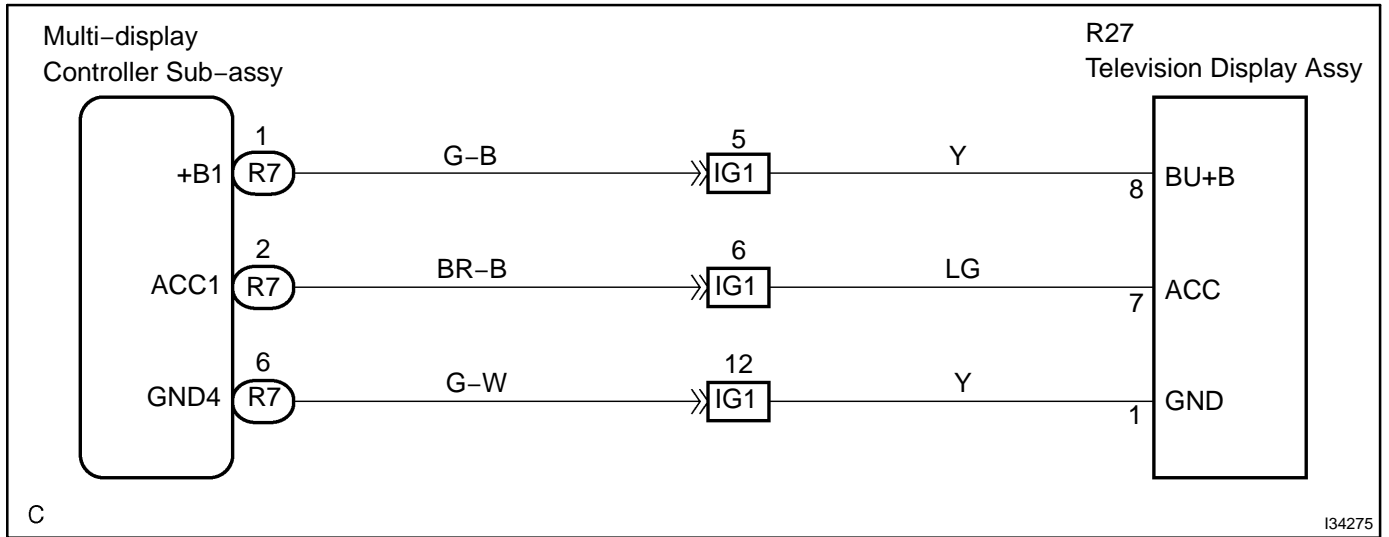
Symptom	Suspect Area	See page
A remote control system does not operate.	1. Power source circuit (television display assy) 2. A remote control system does not operate 3. AVC-LAN circuit	05-1957 05-1998 05-1967

NAVIGATION

Symptom	Suspect Area	See page
No navigation screen display	1. Power source circuit (navigation ECU) 2. AVC-LAN circuit	05-1965 05-1967
Navigation screen not stabilized (Synchronous error)	1. Power source circuit (navigation ECU) 2. Navigation screen not stabilized (Synchronous error)	05-1965 05-1999
Color on navigation screen is unusual (RGB signal error)	1. Power source circuit (navigation ECU) 2. Color on navigation screen is unusual (RGB signal error)	05-1965 05-2001

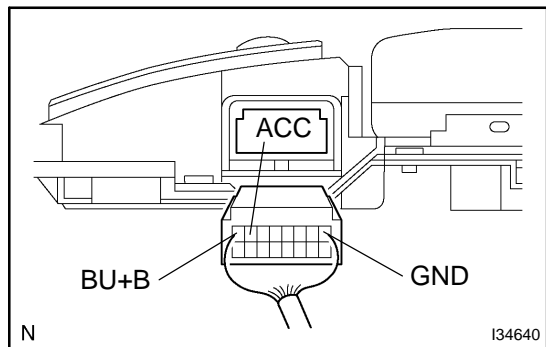
POWER SOURCE CIRCUIT(TELEVISION DISPLAY ASSY)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT TELEVISION DISPLAY ASSY(BU+B, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
BU+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

OK → CHECK AND REPLACE TELEVISION DISPLAY ASSY

NG

2 CHECK HARNESS AND CONNECTOR(TELEVISION DISPLAY ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

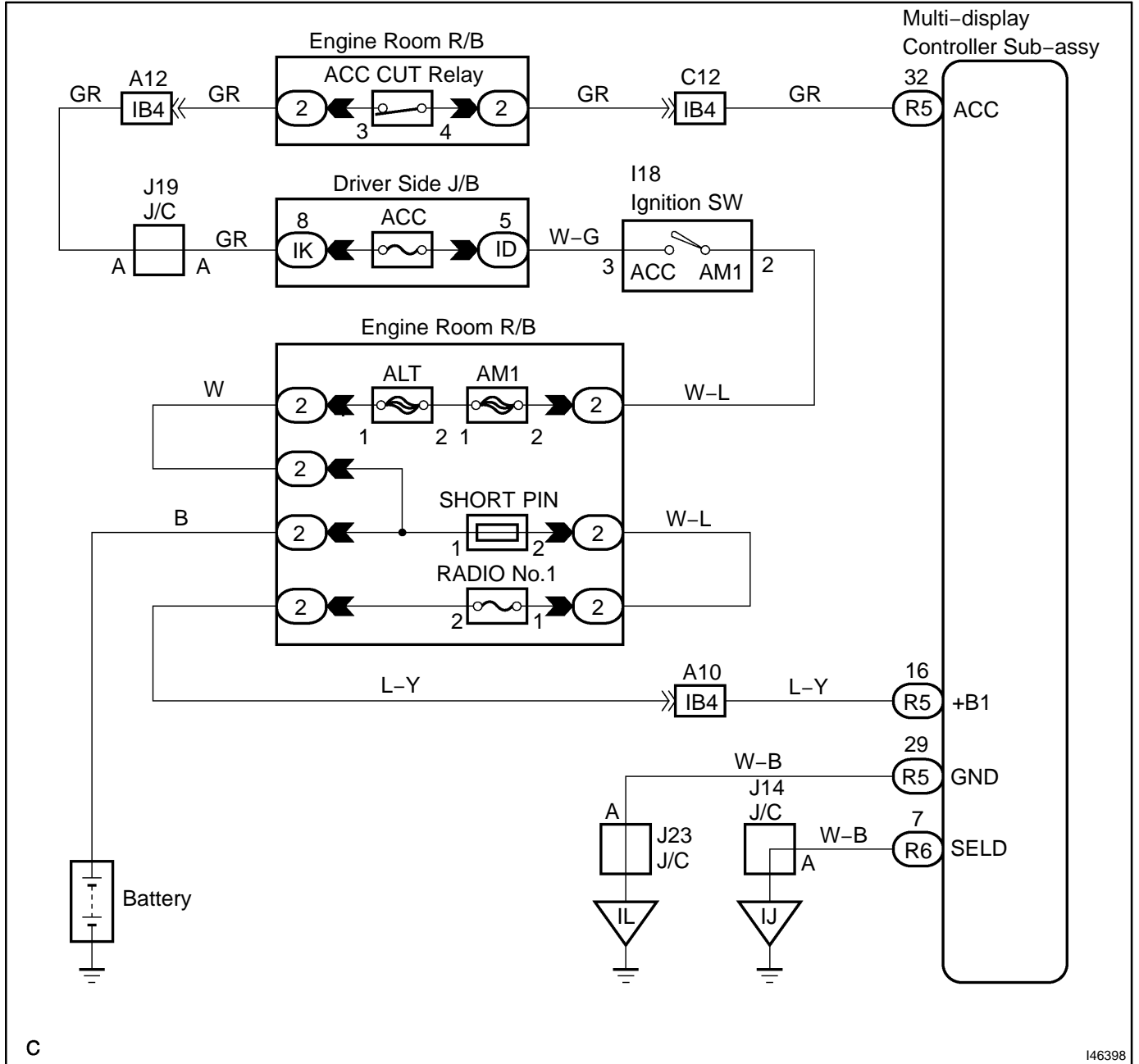
B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

A

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

POWER SOURCE CIRCUIT(MULTI-DISPLAY CONTROLLER SUB-ASSY)

WIRING DIAGRAM

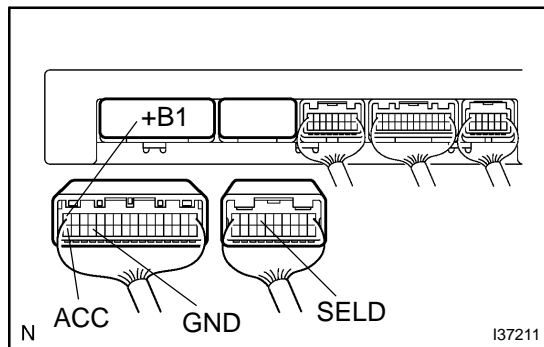


C

146398

INSPECTION PROCEDURE

1 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY(+B1, ACC, GND, SELD)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity
SELD ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B1 ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

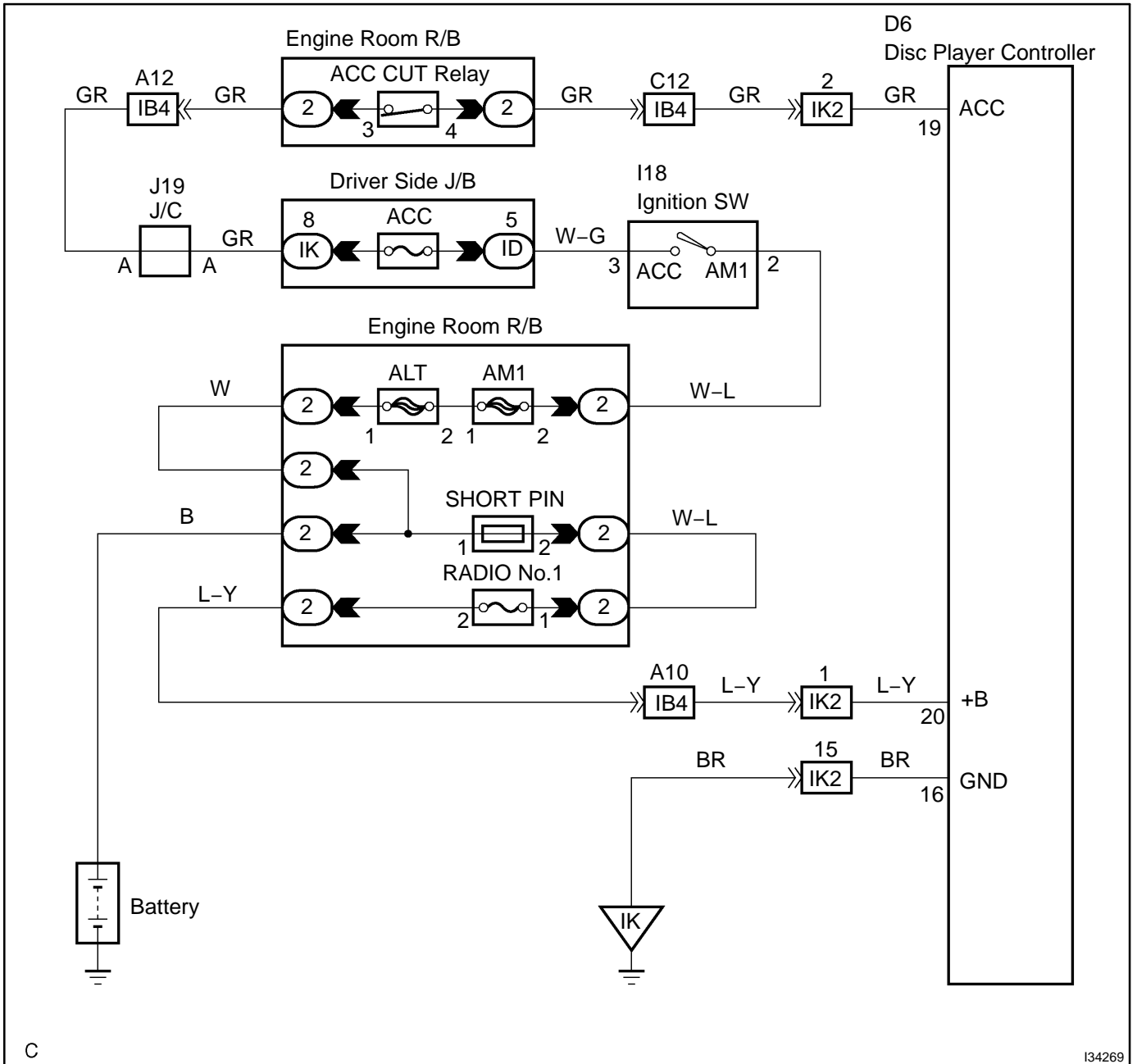
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE**

A

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

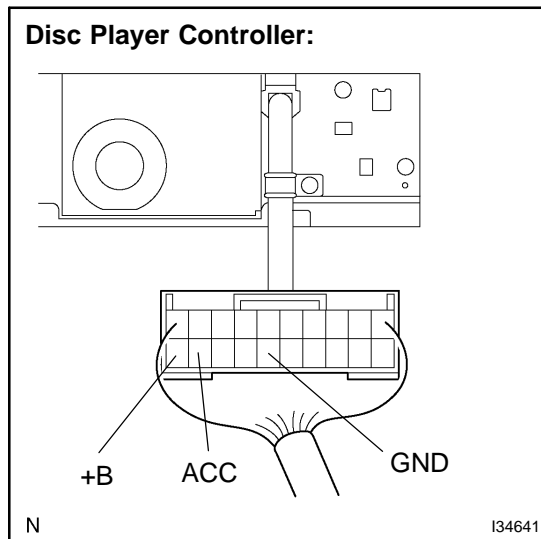
POWER SOURCE CIRCUIT(DISC PLAYER CONTROLLER)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DISC PLAYER CONTROLLER(+B, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

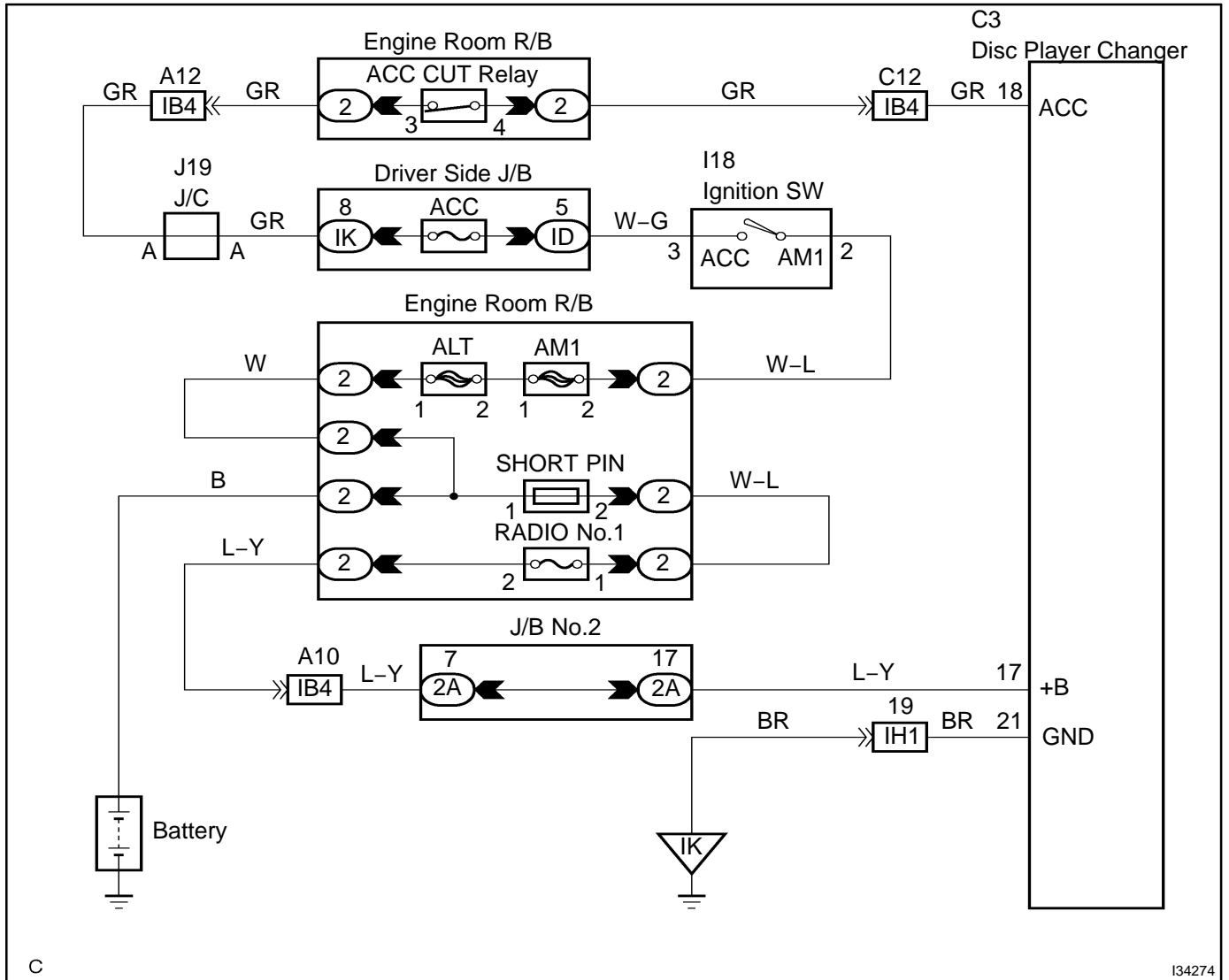
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE**

A

CHECK AND REPLACE DISC PLAYER CONTROLLER

POWER SOURCE CIRCUIT (DISC PLAYER CHANGER)

WIRING DIAGRAM

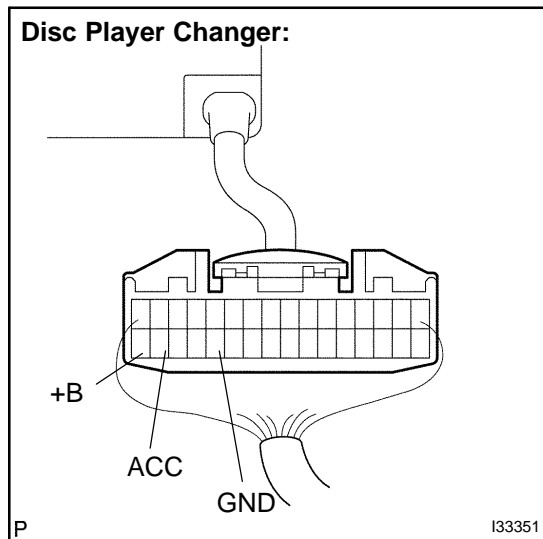


C

I34274

INSPECTION PROCEDURE

1 INSPECT DISC PLAYER CHANGER(+B, ACC, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK FOR PROBLEM SYMPTOMS TABLE

(a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

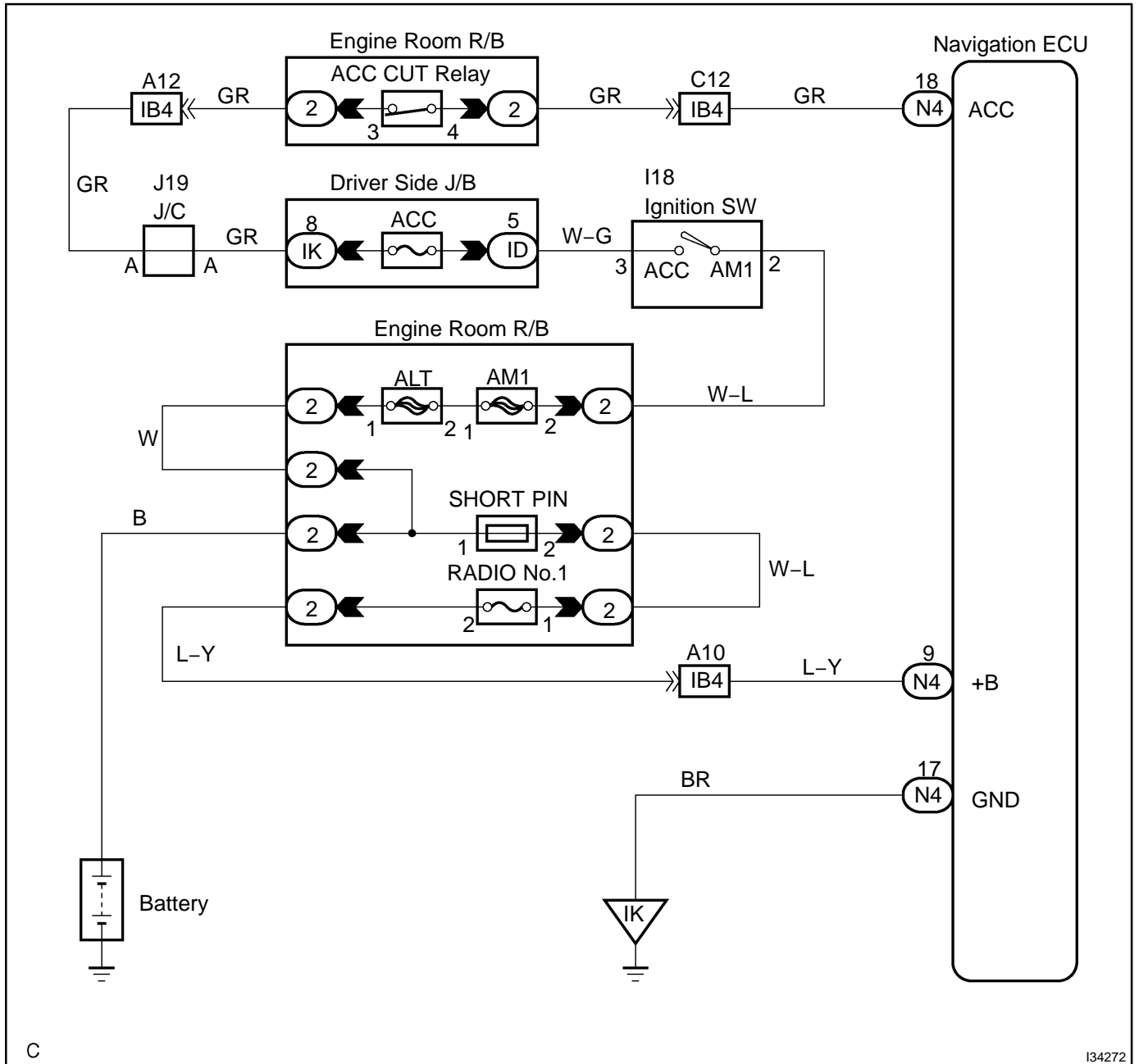
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE**

A

CHECK AND REPLACE DISC PLAYER CHANGER

POWER SOURCE CIRCUIT (NAVIGATION ECU)

WIRING DIAGRAM

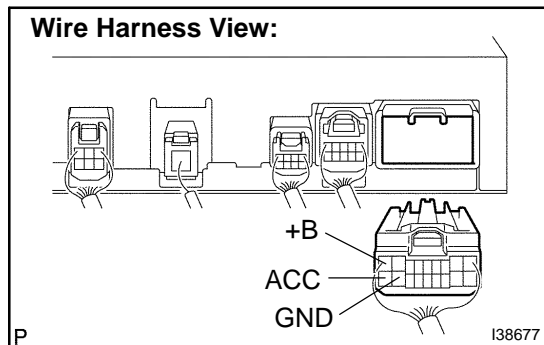


C

I34272

INSPECTION PROCEDURE

1 INSPECT NAVIGATION ECU(+B, ACC, GND)



- (a) Disconnect the connector from the navigation ECU.
- (b) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

- (c) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
+B ⇔ GND	Always	10 - 14 V
ACC ⇔ GND	Ignition SW ACC	10 - 14 V

NG → CHECK FOR PROBLEM SYMPTOMS TABLE

OK

2 CHECK AND REPLACE NAVIGATION ECU

- (a) Check problem symptoms table.

A	Suspected areas are completed
B	Suspected areas still continue

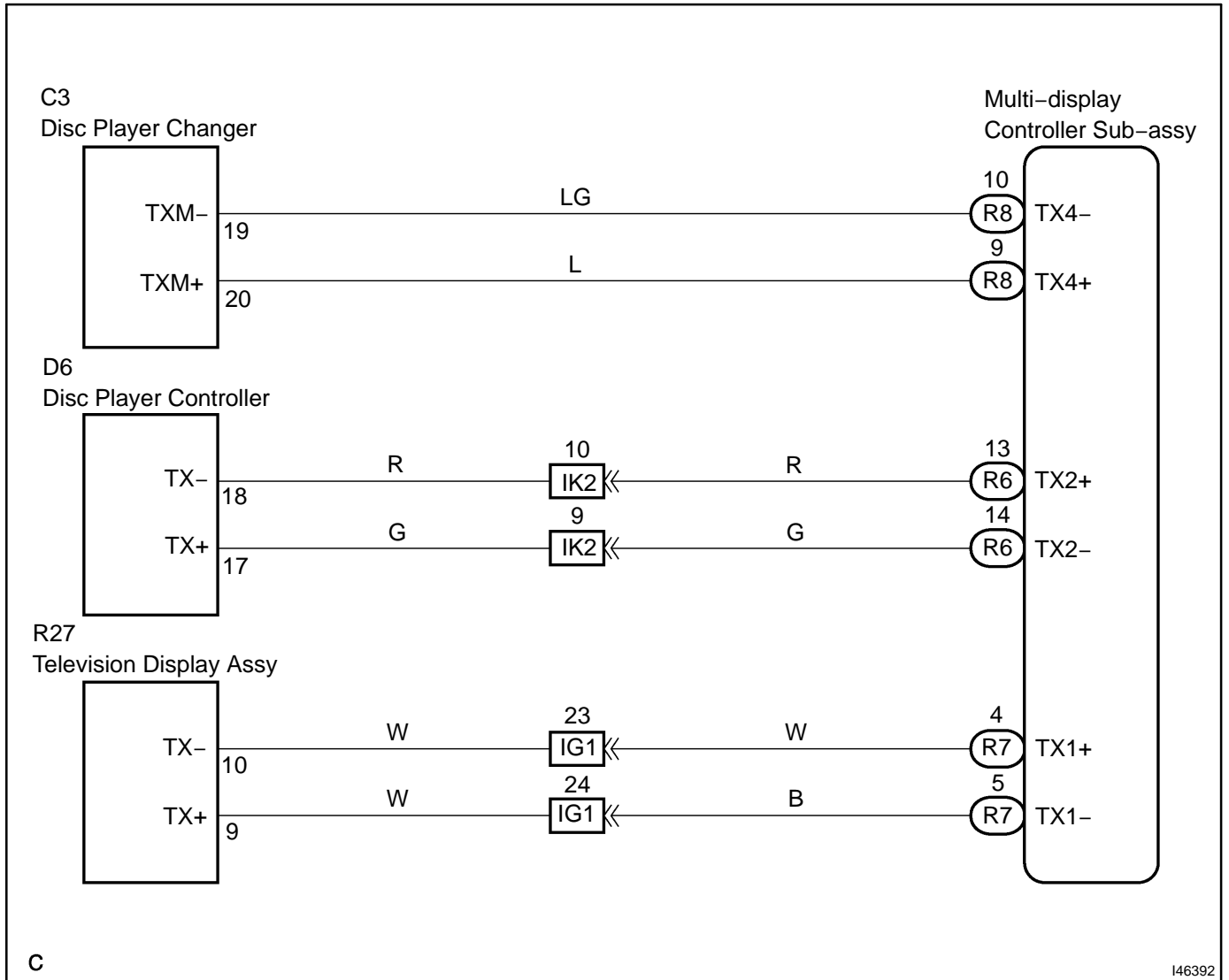
B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

AVC-LAN CIRCUIT

WIRING DIAGRAM



I46392

INSPECTION PROCEDURE**1 INSPECT APPARATUS**

(a) Choose the apparatus to be inspected.

A	Television display assy
B	Disc player changer
C	Disc player controller

B → **Go to step 4**

C → **Go to step 6**

A

2 SERVICE CHECK MODE(TELEVISION DISPLAY ASSY)

- (a) Perform service check.
 - (1) Start the diagnosis system and read check result for television display assy.

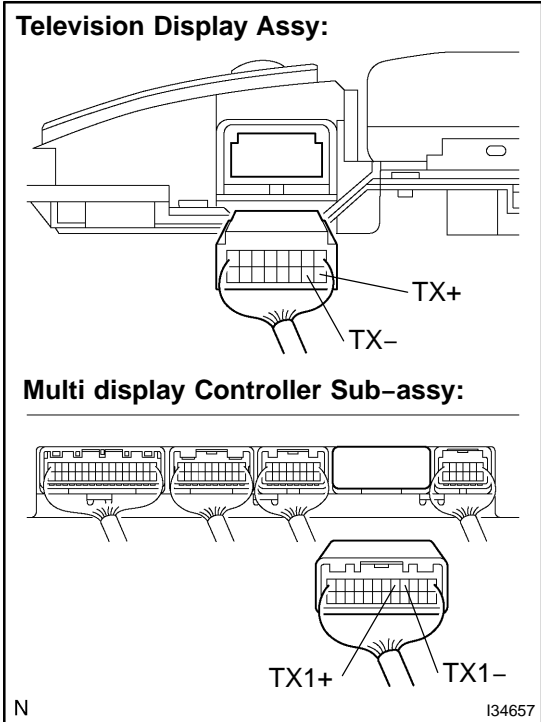
Standard:

A	"NCON" is displayed or nothing display (Rr-TV)
B	"GOOD" is display

B CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

A

3 CHECK HARNESS AND CONNECTOR(TELEVISION DISPLAY ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the television display assy and multi-display controller sub-assy.

- (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TX+ ↔ TX1+	Continuity
TX- ↔ TX1-	Continuity

- (2) Check short in harness.

Standard:

Tester connection	Specified condition
TX+ ↔ Body ground	No continuity
TX- ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE TELEVISION DISPLAY ASSY

4 SERVICE CHECK MODE(DISC PLAYER CHANGER)

- (a) Perform service check.
 - (1) Start the diagnosis system and read check result for disc player changer.

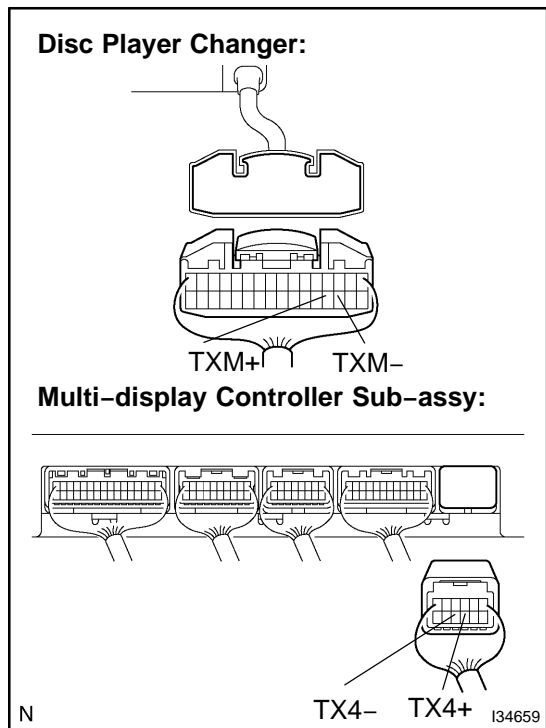
Standard:

A	"NCON" is displayed or nothing display (CD-CH)
B	"GOOD" is display

B CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

A

5 CHECK HARNESS AND CONNECTOR(DISC PLAYER CHANGER - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the disc player changer and multi-display controller sub-assy.
 - (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TXM+ ↔ TX4+	Continuity
TXM- ↔ TX4-	Continuity

- (2) Check short in harness.

Standard:

Tester connection	Specified condition
TXM+ ↔ Body ground	No continuity
TXM- ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE DISC PLAYER CHANGER

6 SERVICE CHECK MODE(DISC PLAYER CONTROLLER)

- (a) Perform service check.
 (1) Start the diagnosis system and read check result for disc player controller.

Standard:

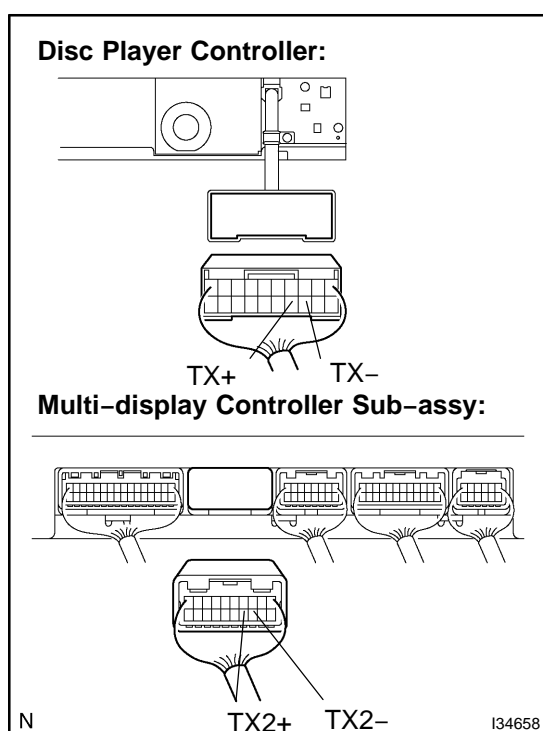
A	"NCON" is displayed or nothing display (DVD-P)
B	"GOOD" is display

B

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

A

7 CHECK HARNESS AND CONNECTOR(DISC PLAYER CONTROLLER - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the disc player controller and multi-display controller sub-assy.
 (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
TX+ \leftrightarrow TX2+	Continuity
TX- \leftrightarrow TX2-	Continuity

- (2) Check short in harness.

Standard:

Tester connection	Specified condition
TX+ \leftrightarrow Body ground	No continuity
TX- \leftrightarrow Body ground	No continuity

NG

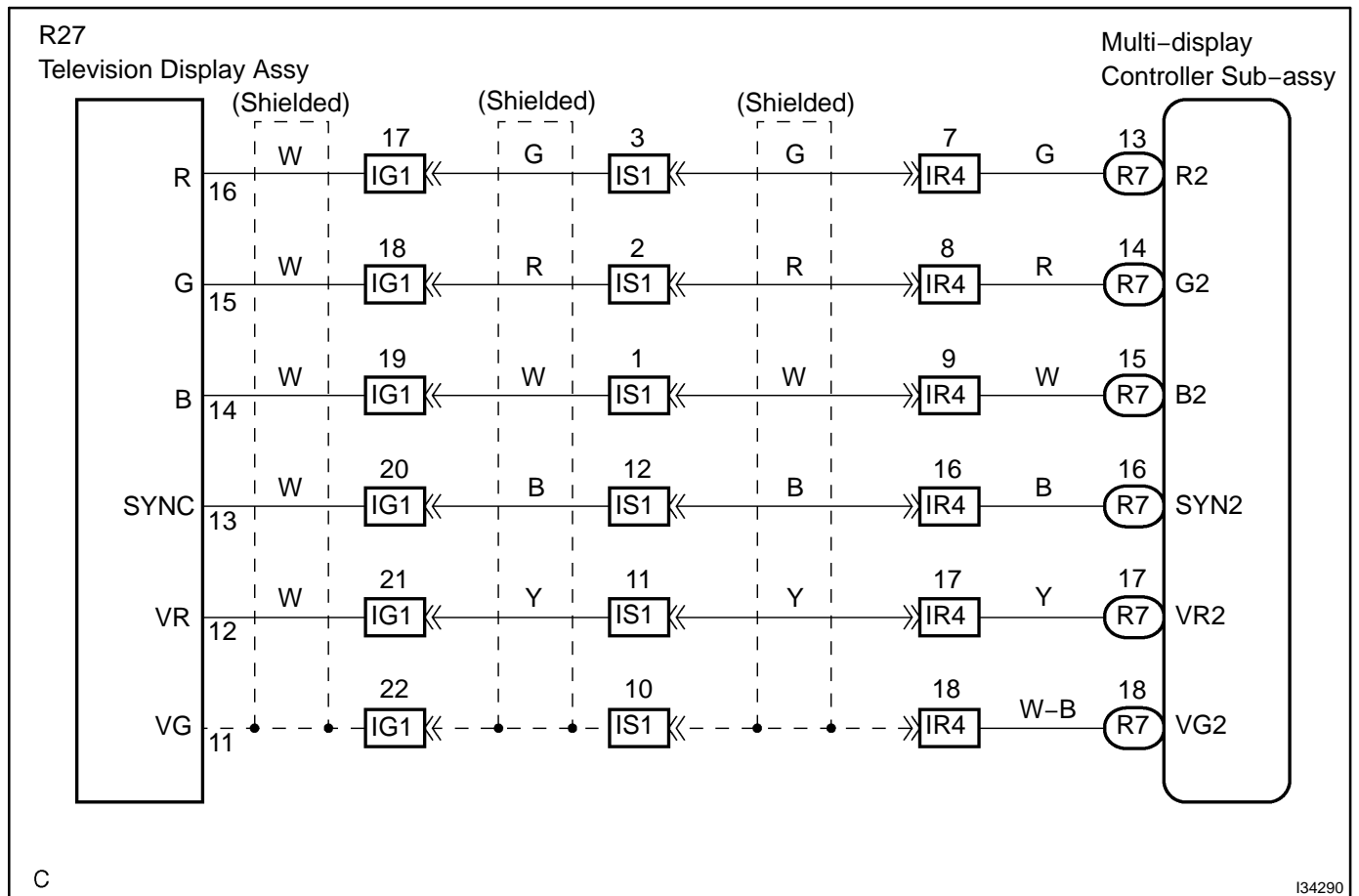
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE DISC PLAYER CONTROLLER

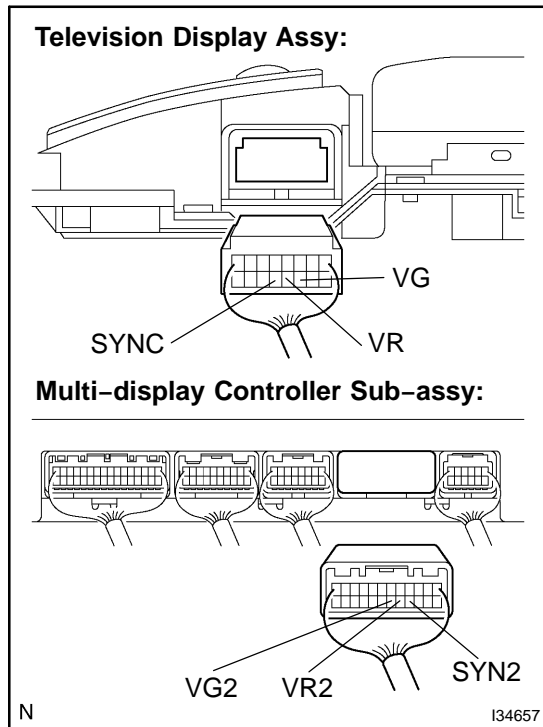
DISPLAY SCREEN NOT STABILIZED(SYNCHRONOUS ERROR)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - TELEVISION DISPLAY ASSY)



- (a) Disconnect the television display assy and multi-display controller sub-assy.
- (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
VG ⇔ VG2	Continuity
VR ⇔ VR2	Continuity
SYNC ⇔ SYN2	Continuity

- (2) Check short in harness.

Standard:

Tester connection	Specified condition
VG ⇔ Body ground	No continuity
VR ⇔ Body ground	No continuity
SYNC ⇔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK AND REPLACE TELEVISION DISPLAY ASSY

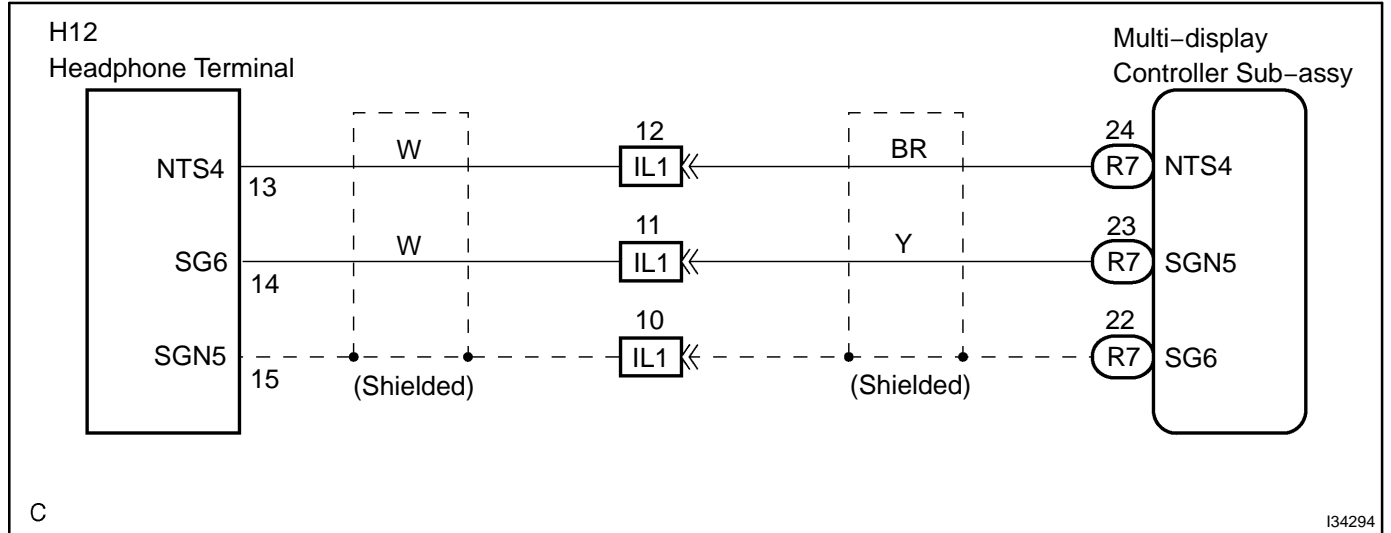
OK NORMAL

NG

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

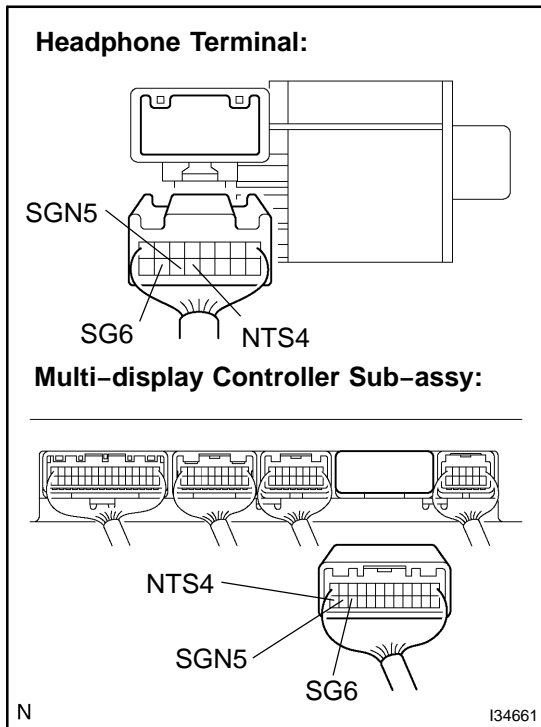
DISPLAY SCREEN INPUT FROM THE EXTERNAL DEVICE NOT STABILIZED

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(HEADPHONE TERMINAL - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the headphone terminal and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
NTS4 ↔ NTS4	Continuity
SGN5 ↔ SGN5	Continuity
SG6 ↔ SG6	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
NTS4 ↔ Body ground	No continuity
SGN5 ↔ Body ground	No continuity
SG6 ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK AND REPLACE HEADPHONE TERMINAL

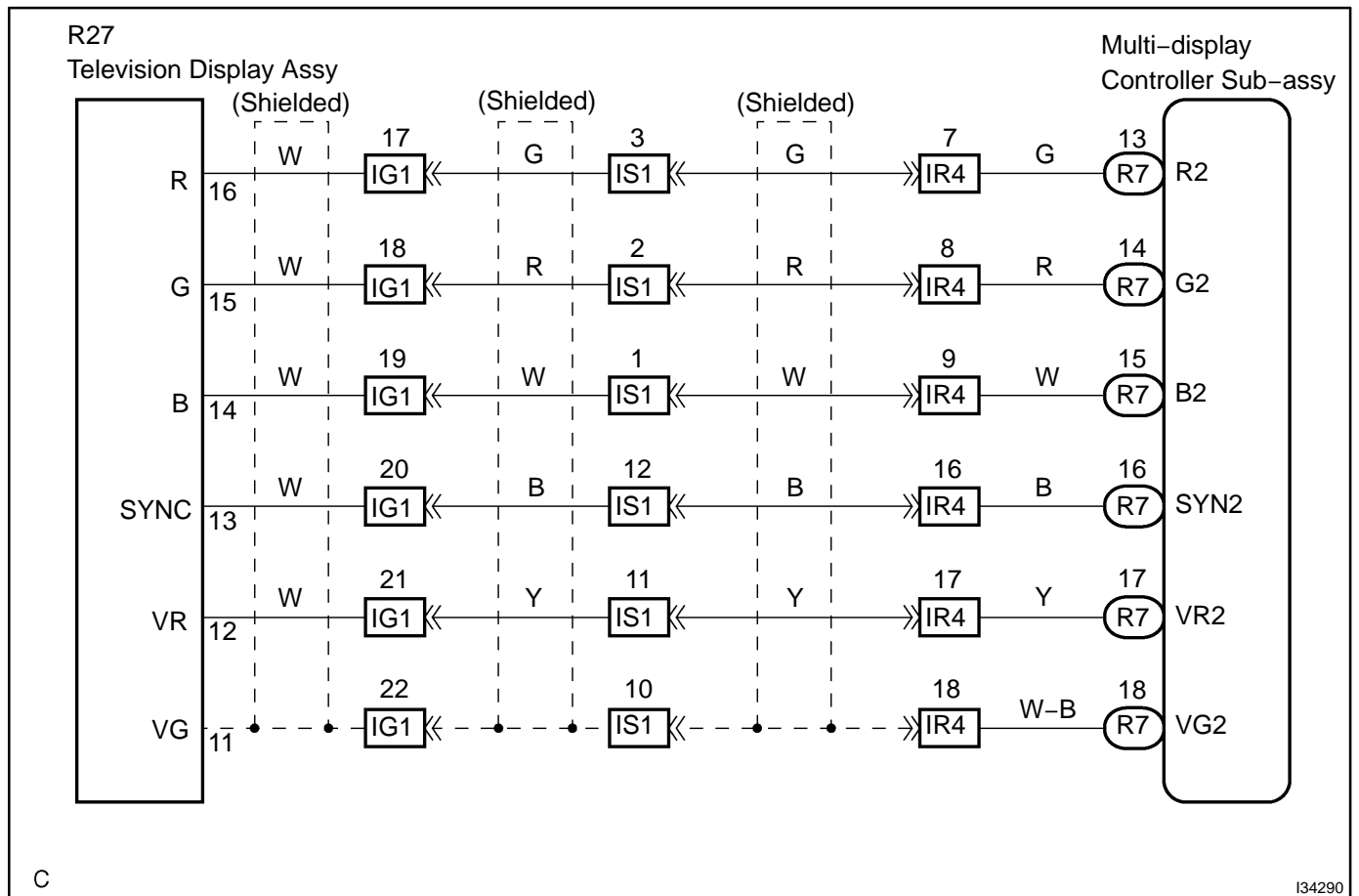
OK → **NORMAL**

NG

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

COLOR ON DISPLAY SCREEN IS UNUSUAL(RGB SIGNAL ERROR)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 DISPLAY CHECK MODE(COLOR BAR CHECK)

(a) Perform display check mode.

(1) Start the diagnosis system and perform display color bar check of display check mode.

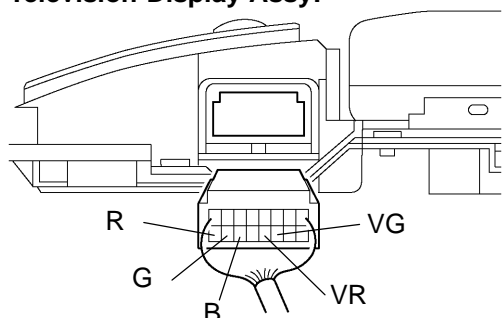
Standard: Color bar check is normally

OK NORMAL

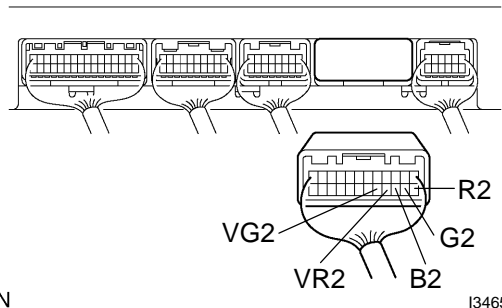
NG

2 CHECK HARNESS AND CONNECTOR(TELEVISION DISPLAY ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)

Television Display Assy:



Multi-display Controller Sub-assy:



(a) Disconnect the television display assy and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
VG ⇔ VG2	Continuity
VR ⇔ VR2	Continuity
R ⇔ R2	Continuity
G ⇔ G2	Continuity
B ⇔ B2	Continuity

(2) Check short in harness.

Tester connection	Specified condition
VG ⇔ Body ground	No continuity
VR ⇔ Body ground	No continuity
R ⇔ Body ground	No continuity
G ⇔ Body ground	No continuity
B ⇔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK AND REPLACE TELEVISION DISPLAY ASSY

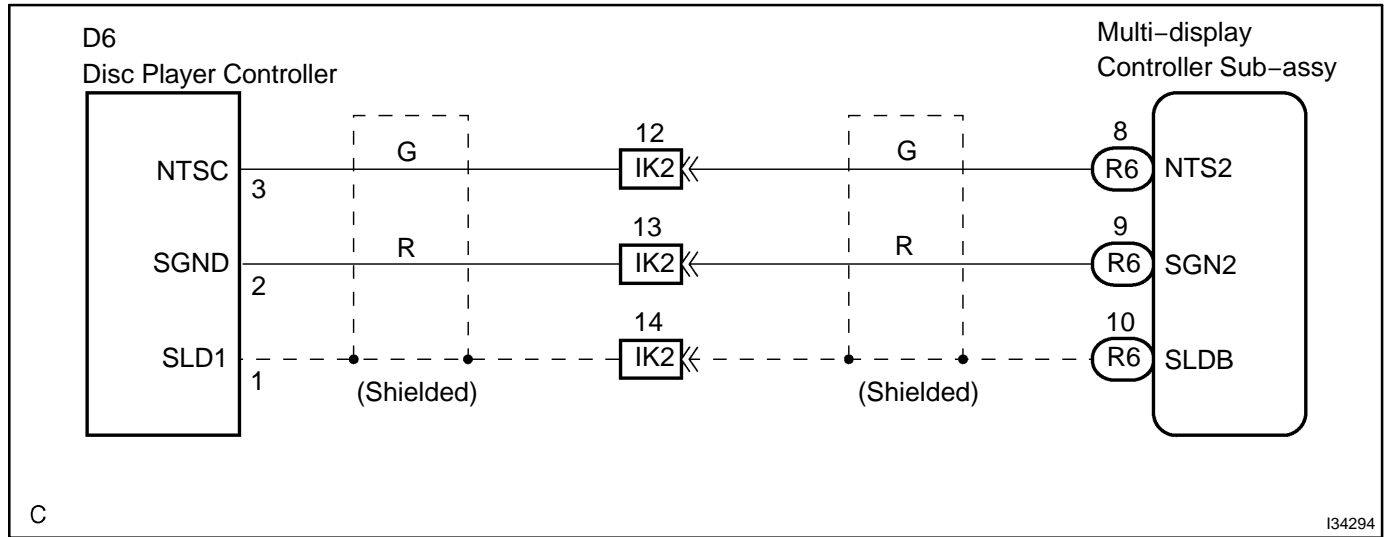
NG NORMAL

OK

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

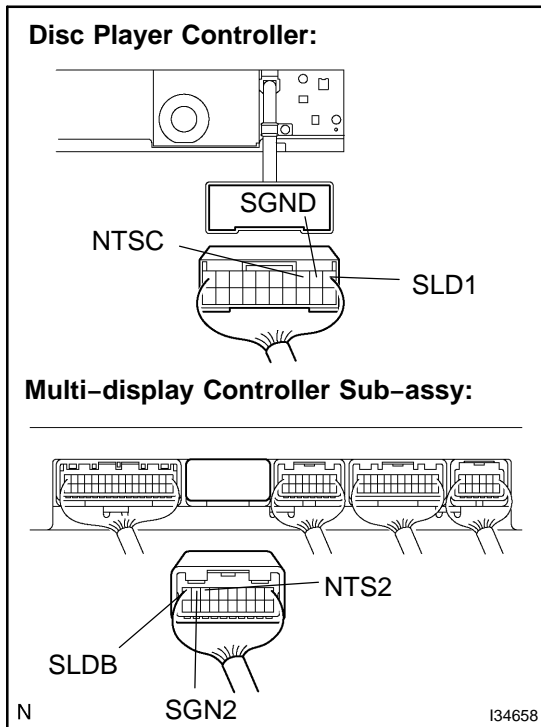
DVD SCREEN IS NOT DISPLAYED

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(DISC PLAYER CONTROLLER - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the disc player controller and multi display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
NTSC ⇔ NTS2	Continuity
SGND ⇔ SGN2	Continuity
SLD1 ⇔ SLDB	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
NTSC ⇔ Body ground	No continuity
SGND ⇔ Body ground	No continuity
SLD1 ⇔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK AND REPLACE DISC PLAYER CONTROLLER

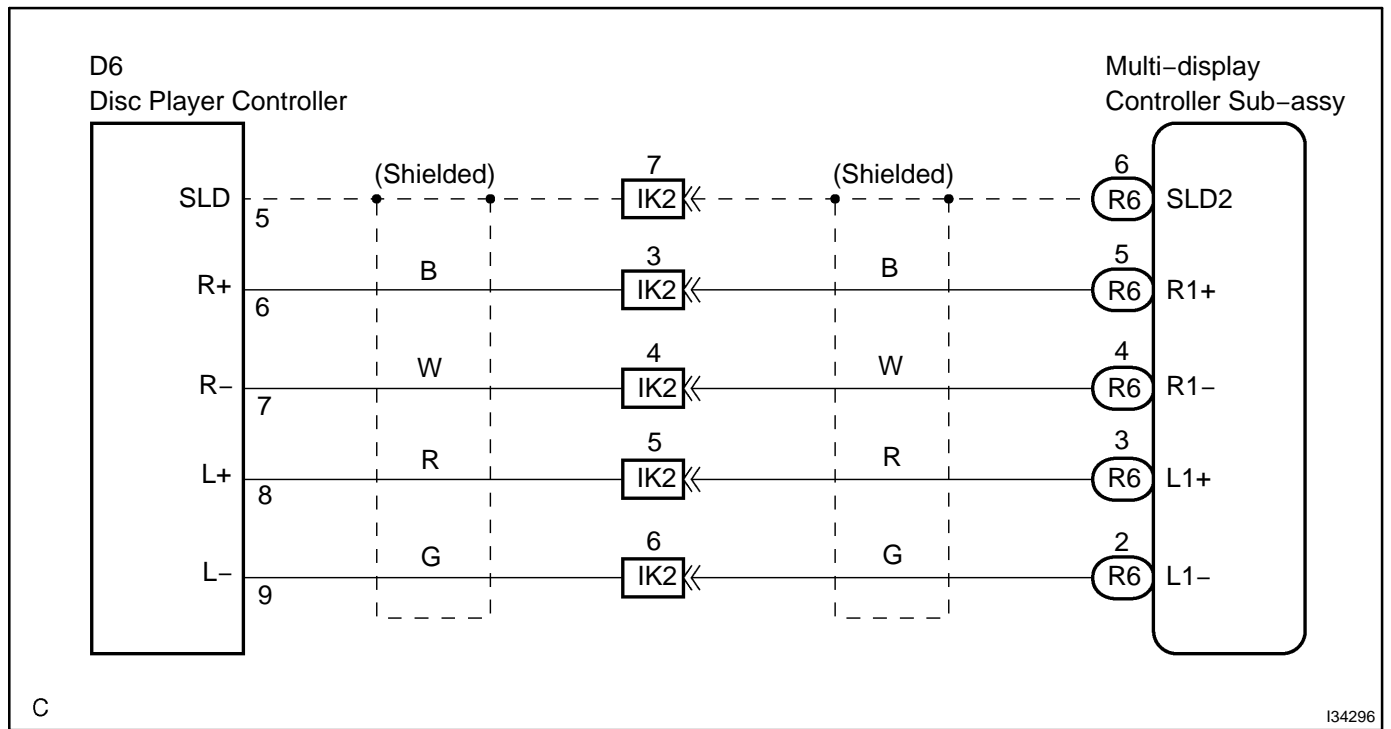
OK NORMAL

NG

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

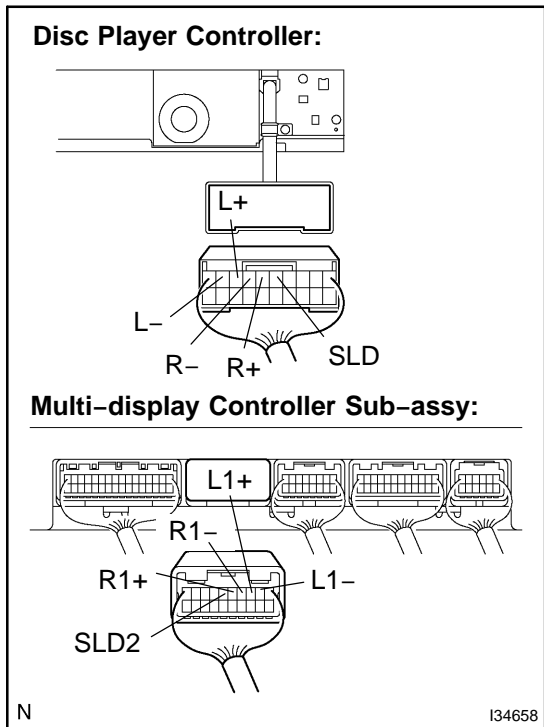
DVD IS NOT HEARD OR THE SOUND QUALITY IS POOR

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(DISC PLAYER CONTROLLER - MULTI-DISPLAY CONTROLLER SUB-ASSY)



- (a) Disconnect the disc player controller and multi-display controller sub-assy.
 (1) Check continuity of harness.

Standard:

Tester connection	Specified condition
L+ ⇔ L1+	Continuity
L- ⇔ L1-	Continuity
R+ ⇔ R1+	Continuity
R- ⇔ R1-	Continuity
SLD ⇔ SLD2	Continuity

- (2) Check short in harness.

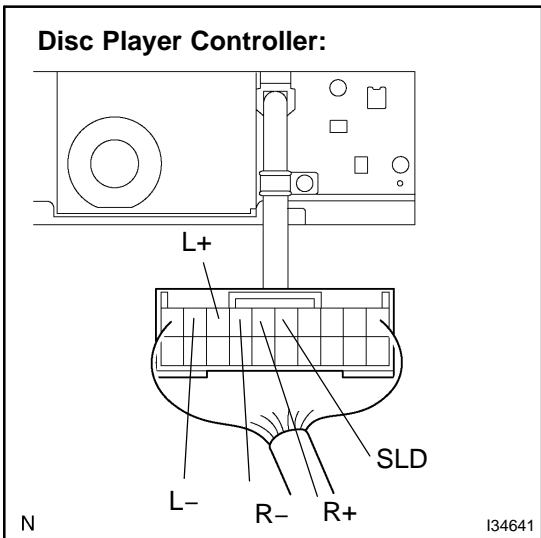
Standard:

Tester connection	Specified condition
L+ ⇔ Body ground	No continuity
L- ⇔ Body ground	No continuity
R+ ⇔ Body ground	No continuity
R- ⇔ Body ground	No continuity
SLD ⇔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT DISC PLAYER CONTROLLER(L+, L-, R+, R-, SLD)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SLD ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
L+ ↔ SLD	While voice sound is being produced	A waveform synchronized with sound is output
L- ↔ SLD	While voice sound is being produced	A waveform synchronized with sound is output
R+ ↔ SLD	While voice sound is being produced	A waveform synchronized with sound is output
R- ↔ SLD	While voice sound is being produced	A waveform synchronized with sound is output

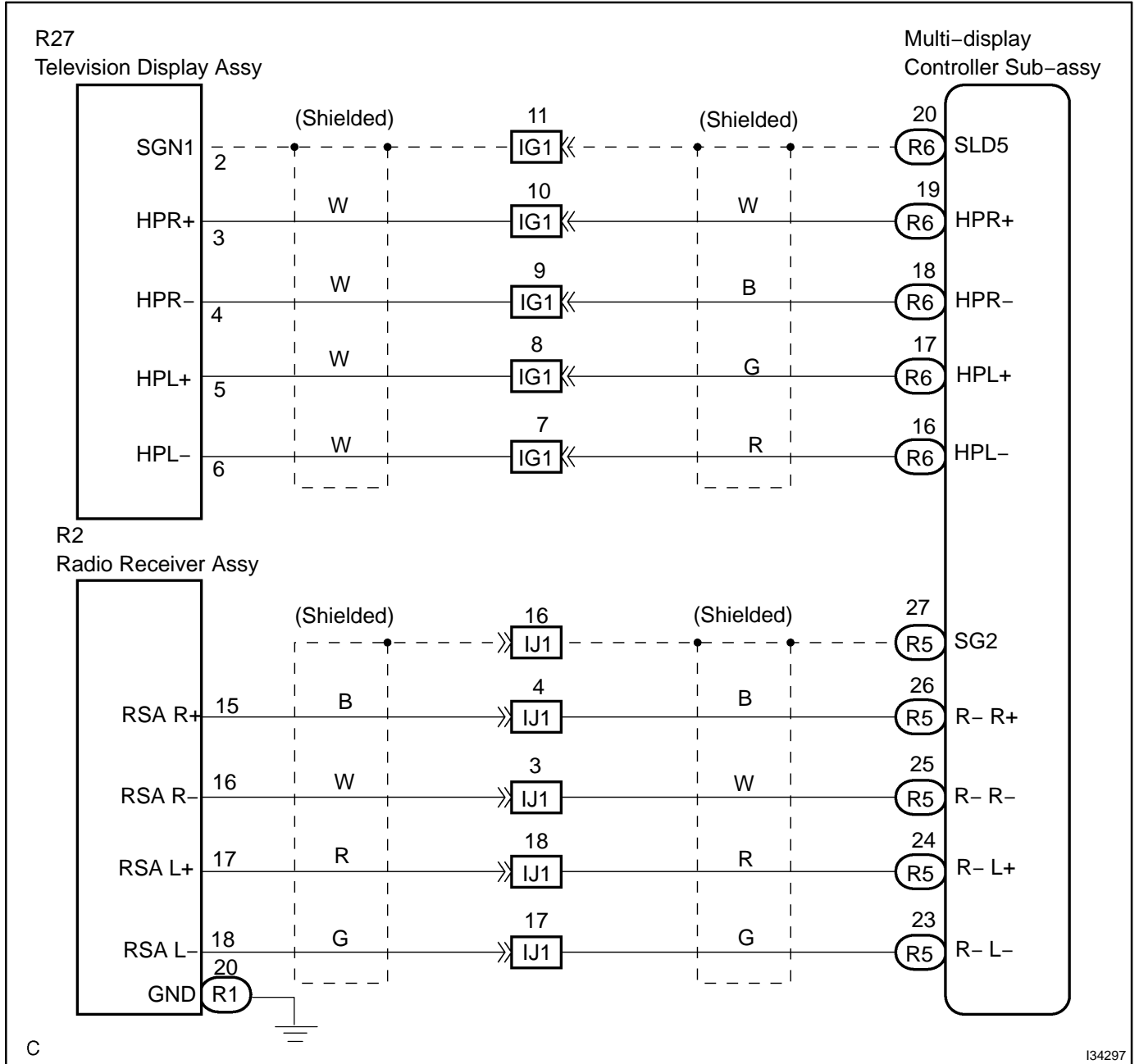
NG → **CHECK AND REPLACE DISC PLAYER CONTROLLER**

OK

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

QUALITY OF SOUND FROM WIRELESS HEADPHONE IS POOR OR NO SOUND CAN BE HEARD

WIRING DIAGRAM

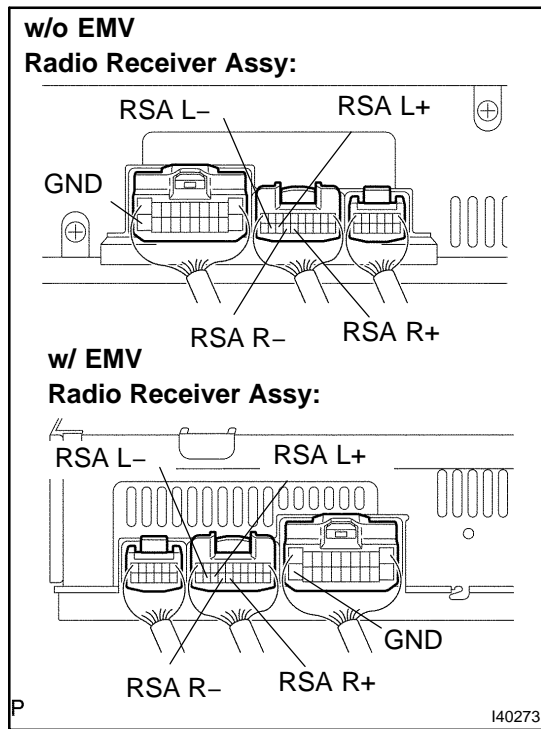


C

134297

INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY(RSA R+, RSA R-, RSA L+, RSA L-, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

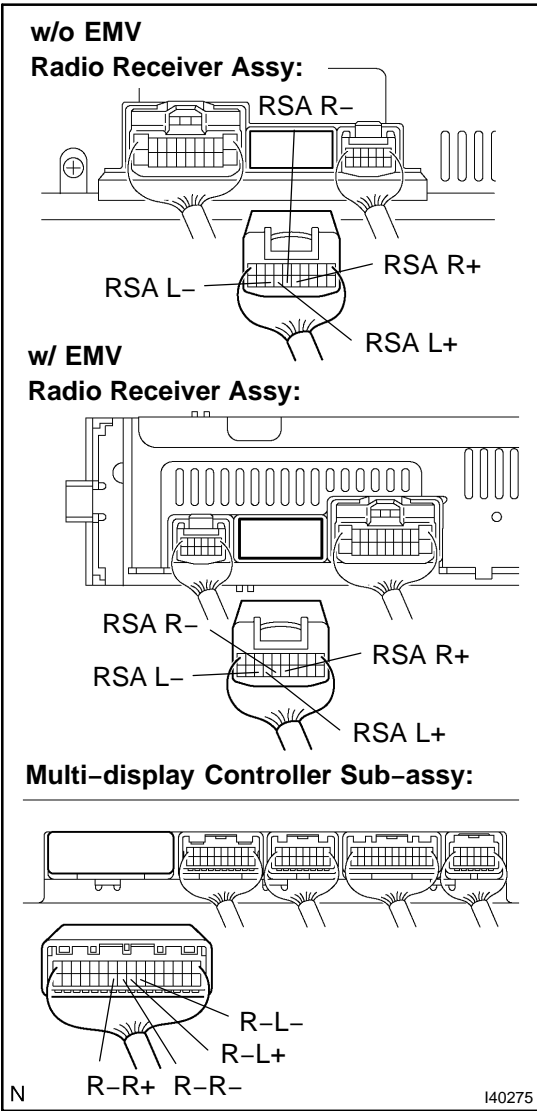
Standard:

Tester connection	Condition	Specified condition
RSA R+ ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA R- ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L+ ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L- ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the radio receiver assy and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
RSA R+ ↔ R-R+	Continuity
RSA R- ↔ R-R-	Continuity
RSA L+ ↔ R-L+	Continuity
RSA L- ↔ R-L-	Continuity

(2) Check short in harness.

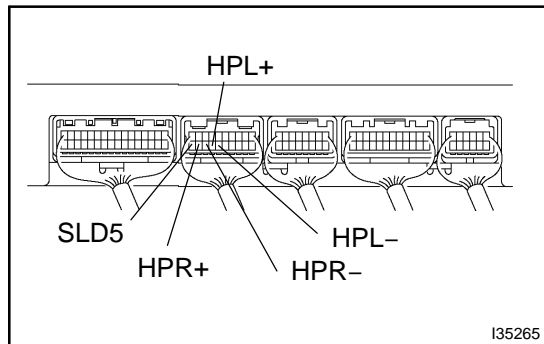
Standard:

Tester connection	Specified condition
RSA R+ ↔ Body ground	No continuity
RSA R- ↔ Body ground	No continuity
RSA L+ ↔ Body ground	No continuity
RSA L- ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY(HPR+, HPR-, HPL+, HPL-, SLD5)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SLD5 ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

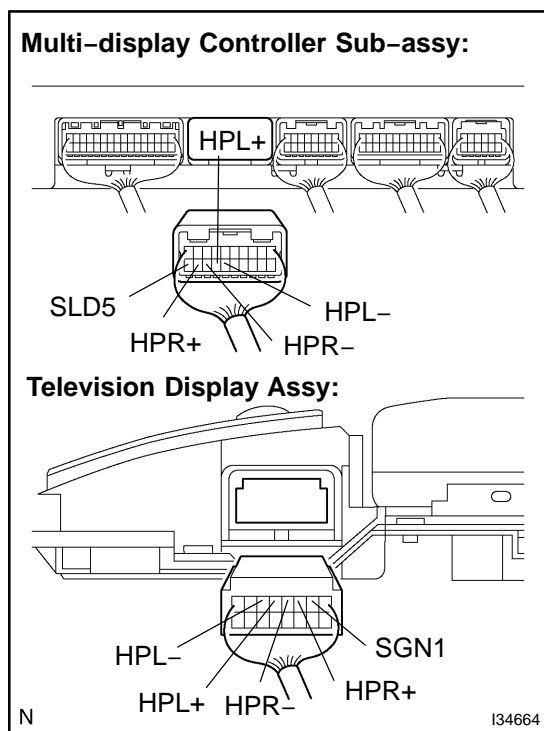
Standard:

Tester connection	Condition	Specified condition
HPR+ ↔ SLD5	While voice sound is being produced	A waveform synchronized with sound is output
HPR- ↔ SLD5	While voice sound is being produced	A waveform synchronized with sound is output
HPL+ ↔ SLD5	While voice sound is being produced	A waveform synchronized with sound is output
HPL- ↔ SLD5	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

OK

4 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - TELEVISION DISPLAY ASSY)



(a) Disconnect the multi-display controller sub-assy and television display assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
HPR+ ↔ HPR+	Continuity
HPR- ↔ HPR-	Continuity
HPL+ ↔ HPL+	Continuity
HPL- ↔ HPL-	Continuity
SLD5 ↔ SGN1	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
HPR+ ↔ Body ground	No continuity
HPR- ↔ Body ground	No continuity
HPL+ ↔ Body ground	No continuity
HPL- ↔ Body ground	No continuity
SLD5 ↔ Body ground	No continuity

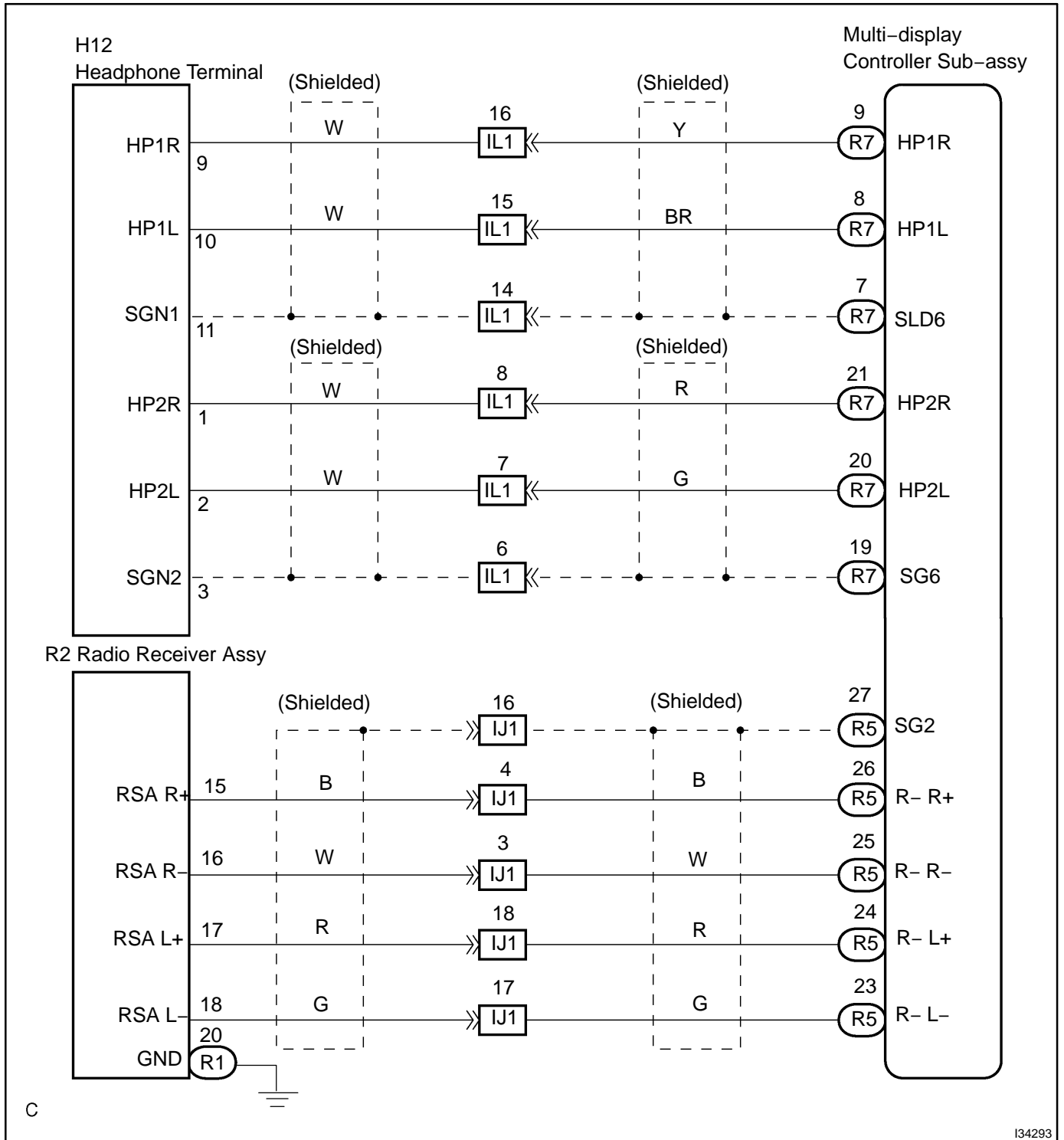
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE TELEVISION DISPLAY ASSY

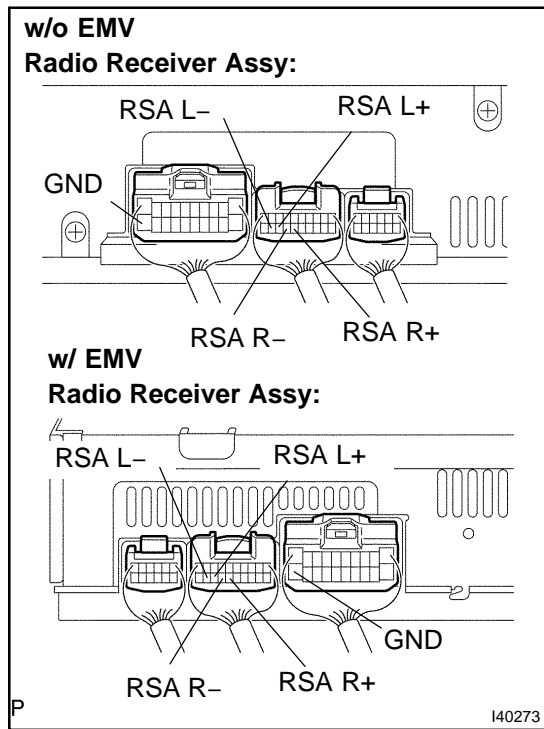
QUALITY OF SOUND FROM HEADPHONE CONNECTED TO HEADPHONE TERMINAL IS POOR OR NO SOUND CAN BE HEARD

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT RADIO RECEIVER ASSY(RSA R+, RSA R-, RSA L+, RSA L-, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

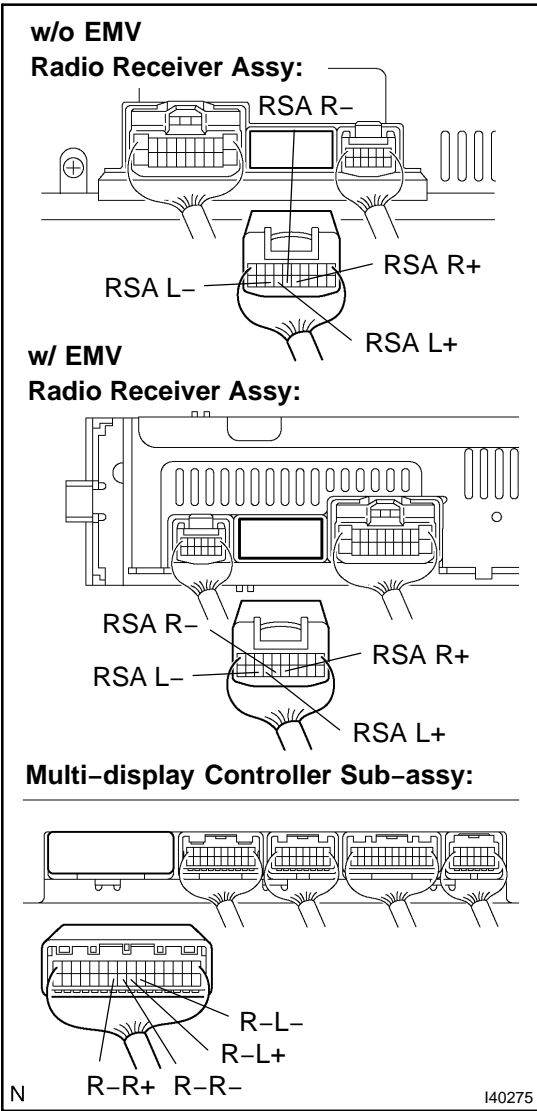
Standard:

Tester connection	Condition	Specified condition
RSA R+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA R- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L+ ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output
RSA L- ⇔ GND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE RADIO RECEIVER ASSY

OK

2 CHECK HARNESS AND CONNECTOR(RADIO RECEIVER ASSY - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the radio receiver assy and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
RSA R+ ↔ R-R+	Continuity
RSA R- ↔ R-R-	Continuity
RSA L+ ↔ R-L+	Continuity
RSA L- ↔ R-L-	Continuity

(2) Check short in Harness.

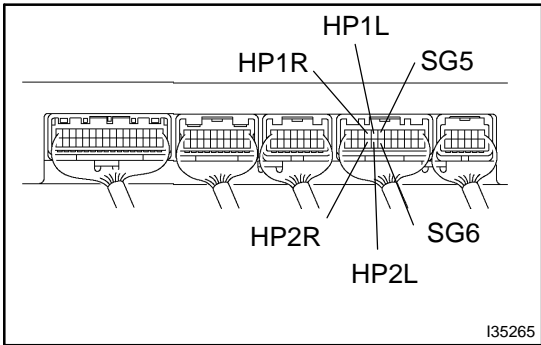
Standard:

Tester connection	Specified condition
RSA R+ ↔ Body ground	No continuity
RSA R- ↔ Body ground	No continuity
RSA L+ ↔ Body ground	No continuity
RSA L- ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT MULTI-DISPLAY CONTROLLER SUB-ASSY(HP1R, HP1L, HP2R, HP2L, SG5, SG6)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SG5 ↔ Body ground	Always	Continuity
SG6 ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

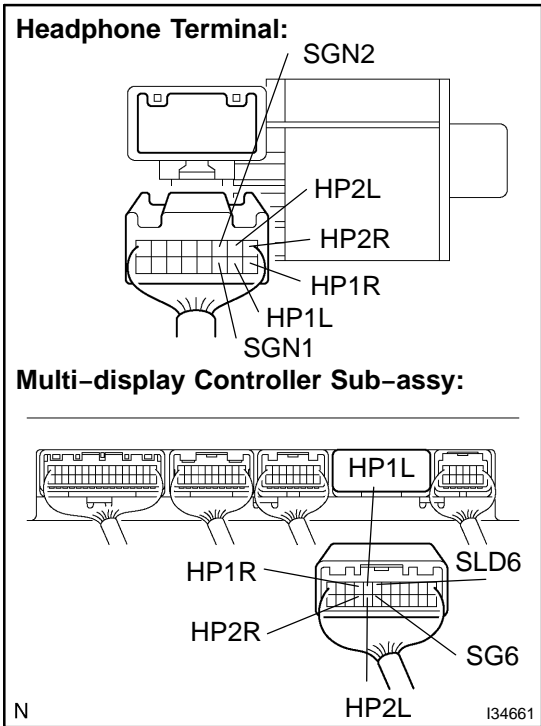
Standard:

Tester connection	Condition	Specified condition
HP1R ↔ SG5	While voice sound is being produced	A waveform synchronized with sound is output
HP1L ↔ SG5	While voice sound is being produced	A waveform synchronized with sound is output
HP2R ↔ SG6	While voice sound is being produced	A waveform synchronized with sound is output
HP2L ↔ SG6	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

OK

4 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - HEADPHONE TERMINAL)



(a) Disconnect the multi-display controller sub-assy and headphone terminal

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
HP1R ↔ HP1R	Continuity
HP1L ↔ HP1L	Continuity
HP2R ↔ HP2R	Continuity
HP2L ↔ HP2L	Continuity
SGN1 ↔ SLD6	Continuity
SGN2 ↔ SG6	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
HP1R ↔ Body ground	No continuity
HP1L ↔ Body ground	No continuity
HP2R ↔ Body ground	No continuity
HP2L ↔ Body ground	No continuity
SGND ↔ Body ground	No continuity

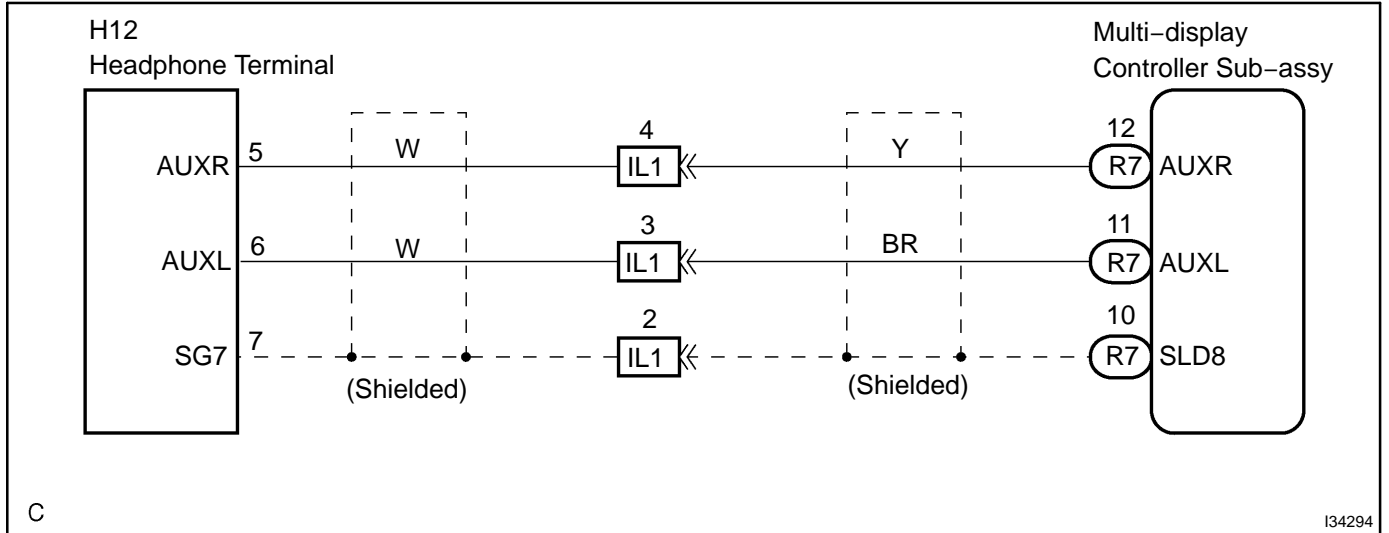
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE HEADPHONE TERMINAL

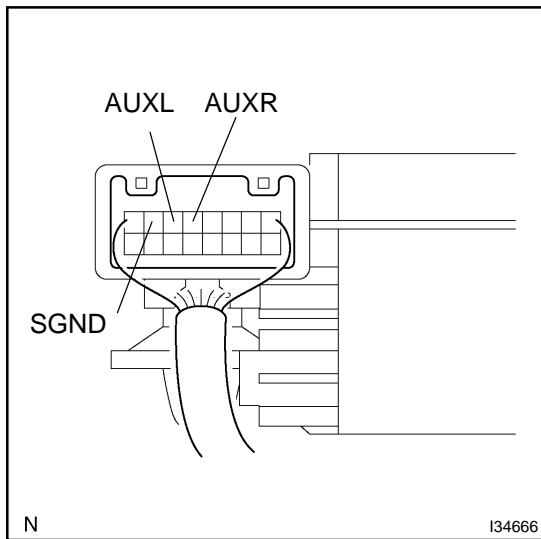
SOUND QUALITY INPUT FROM THE EXTERNAL DEVICE IS POOR OR NO SOUND

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT HEADPHONE TERMINAL(AUXL, AUXR, SGND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
SGND ⇔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

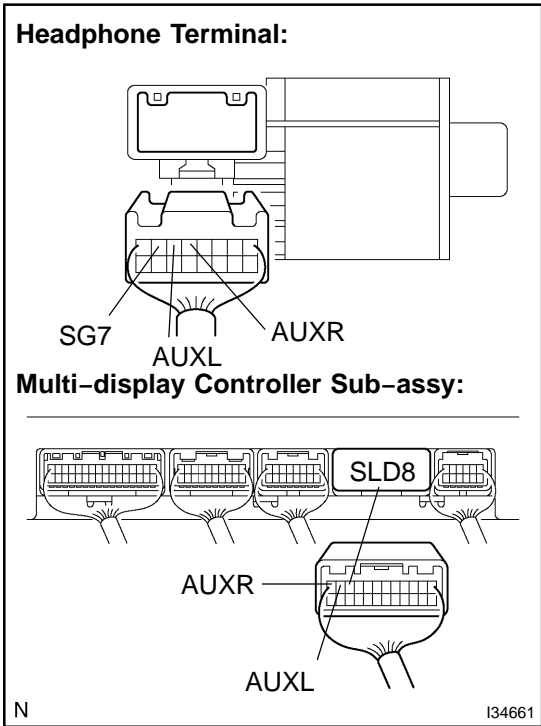
Standard:

Tester connection	Condition	Specified condition
AUXL ⇔ SGND	While voice sound is being produced	A waveform synchronized with sound is output
AUXR ⇔ SGND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE HEADPHONE TERMINAL

OK

2 CHECK HARNESS AND CONNECTOR(HEADPHONE TERMINAL - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the headphone terminal and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
AUXL ↔ AUXL	Continuity
AUXR ↔ AUXR	Continuity
SG7 ↔ SLD8	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
AUXL ↔ Body ground	No continuity
AUXR ↔ Body ground	No continuity
SG7 ↔ Body ground	No continuity

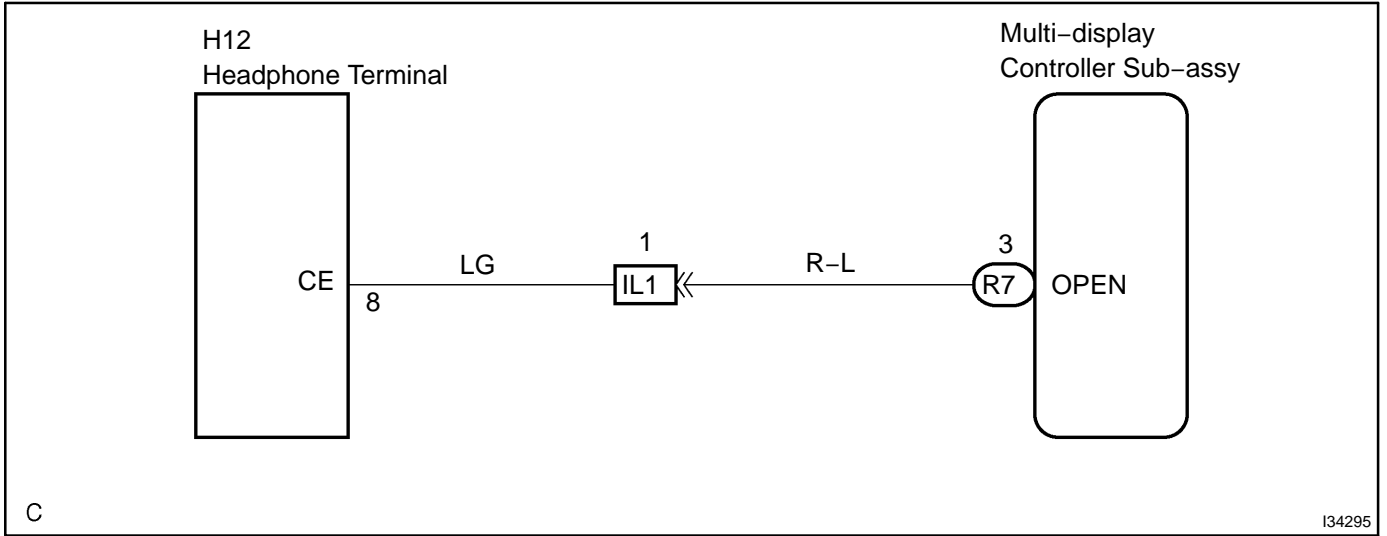
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

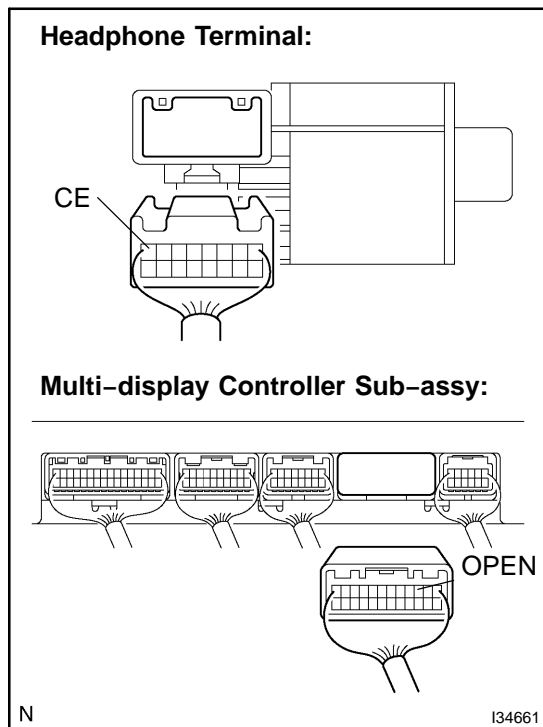
THE OPERATION TO THE EXTERNAL APPROTUS CANNOT BE PERFORMED

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(HEADPHONE TERMINAL - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the headphone terminal and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

tester connection	Specified condition
CE ↔ OPEN	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
CE ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK AND REPLACE TELEVISION DISPLAY ASSY

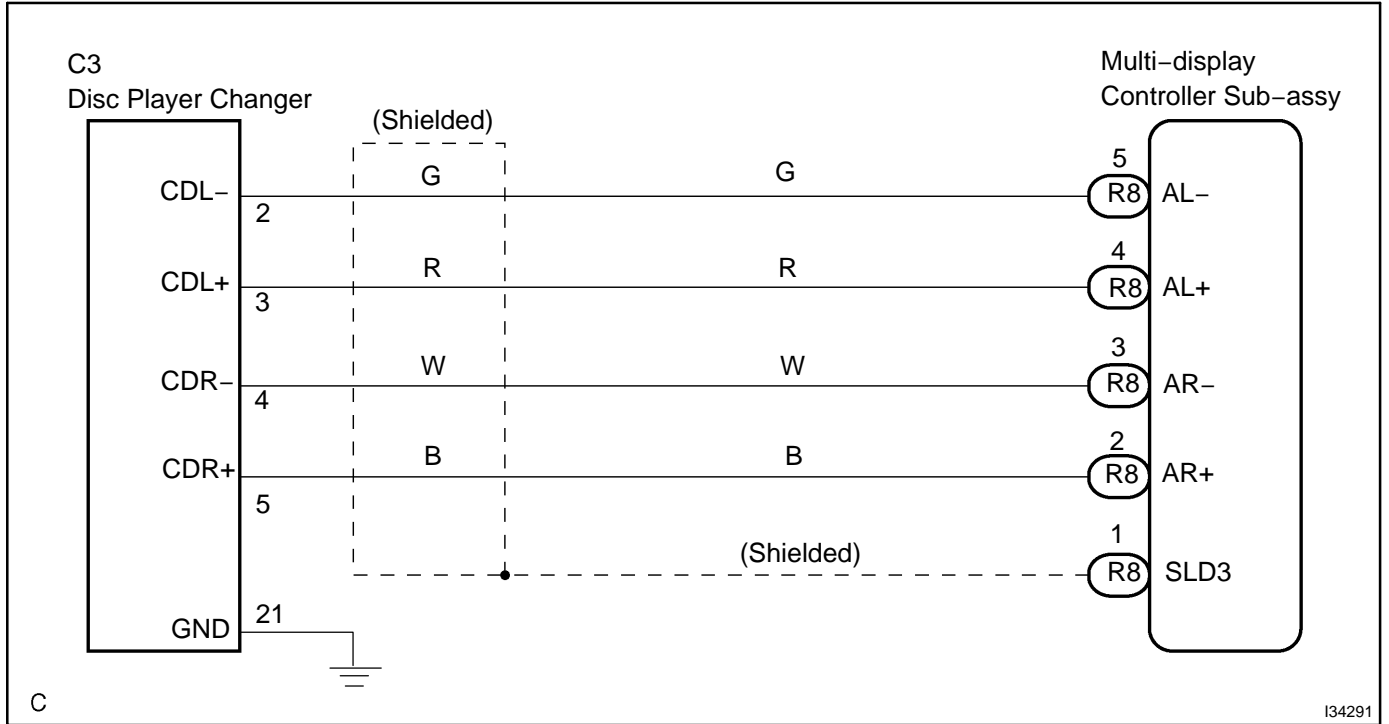
OK NORMAL

NG

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

ONLY DISC PLAYER CHANGER HAS BAD SOUND (SOUND IS LOW)

WIRING DIAGRAM

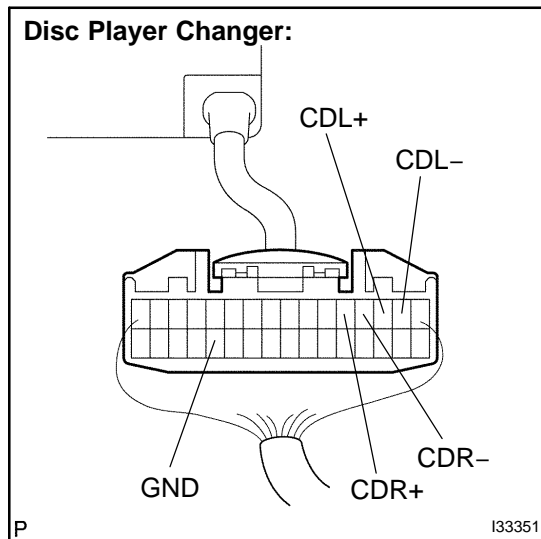


C

I34291

INSPECTION PROCEDURE

1 INSPECT DISC PLAYER CHANGER(CDR+, CDR-, CDL+, CDL-, GND)



(a) Check continuity between terminals at each condition, as shown in the chart.

Standard:

Tester connection	Condition	Specified condition
GND ↔ Body ground	Always	Continuity

(b) Check voltage between terminals at each condition, as shown in the chart.

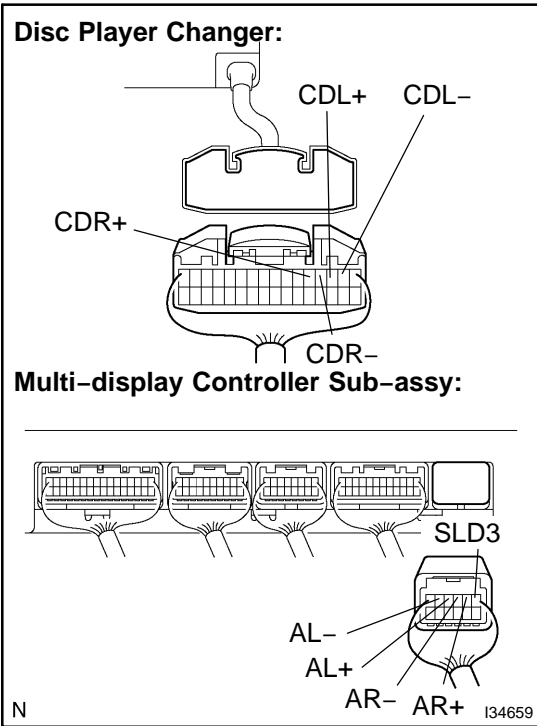
Standard:

Tester connection	Condition	Specified condition
CDR+ ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
CDR- ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
CDL+ ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output
CDL- ↔ GND	While voice sound is being produced	A waveform synchronized with sound is output

NG CHECK AND REPLACE DISC PLAYER CHANGER

OK

2 CHECK HARNESS AND CONNECTOR(DISC PLAYER CHANGER - MULTI-DISPLAY CONTROLLER SUB-ASSY)



(a) Disconnect the disc player changer and multi-display controller sub-assy.

(1) Check continuity of harness.

Standard:

Tester connection	Specified condition
CDR+ ↔ AR+	Continuity
CDR- ↔ AR-	Continuity
CDL+ ↔ AL-	Continuity
CDL- ↔ AL-	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
CDR+ ↔ Body ground	No continuity
CDR- ↔ Body ground	No continuity
CDL+ ↔ Body ground	No continuity
CDL- ↔ Body ground	No continuity
SLD3 ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

A REMOTE CONTROL SYSTEM DOES NOT OPERATE

INSPECTION PROCEDURE

1 CHECK MALFUNCTION SYMPTOMS

(a) Check obstruction.

- (1) Check that there are no obstructions between the switch & volume assy and the infrared ray light emission portion of the television display assy.

Standard: Normally return

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE

NG

2 CHECK BATTERY(SWITCH & VOLUME ASSY)

(a) Check battery.

- (1) Check that the dry-cell battery used for the switch & volume assy is not dead.

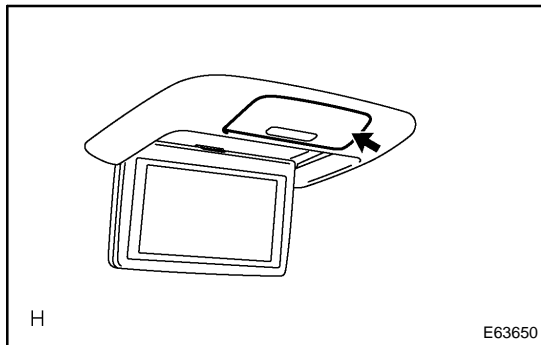
Standard: It is not dead

NG

BATTERY IS DEAD

OK

3 CLEAN THE INFRARED RAY EMITTED PORTION



(a) Clean the infrared ray emitted portion.

- (1) Clean the infrared ray emitted portion on the television display assy.

- (2) Check whether the same malfunction occurs.

STANDARD: The function returns to normal.

NG

DIRT AT THE INFRARED RAY EMITTED PORTION

OK

4 CHECK AND REPLACE SWITCH & VOLUME ASSY

OK

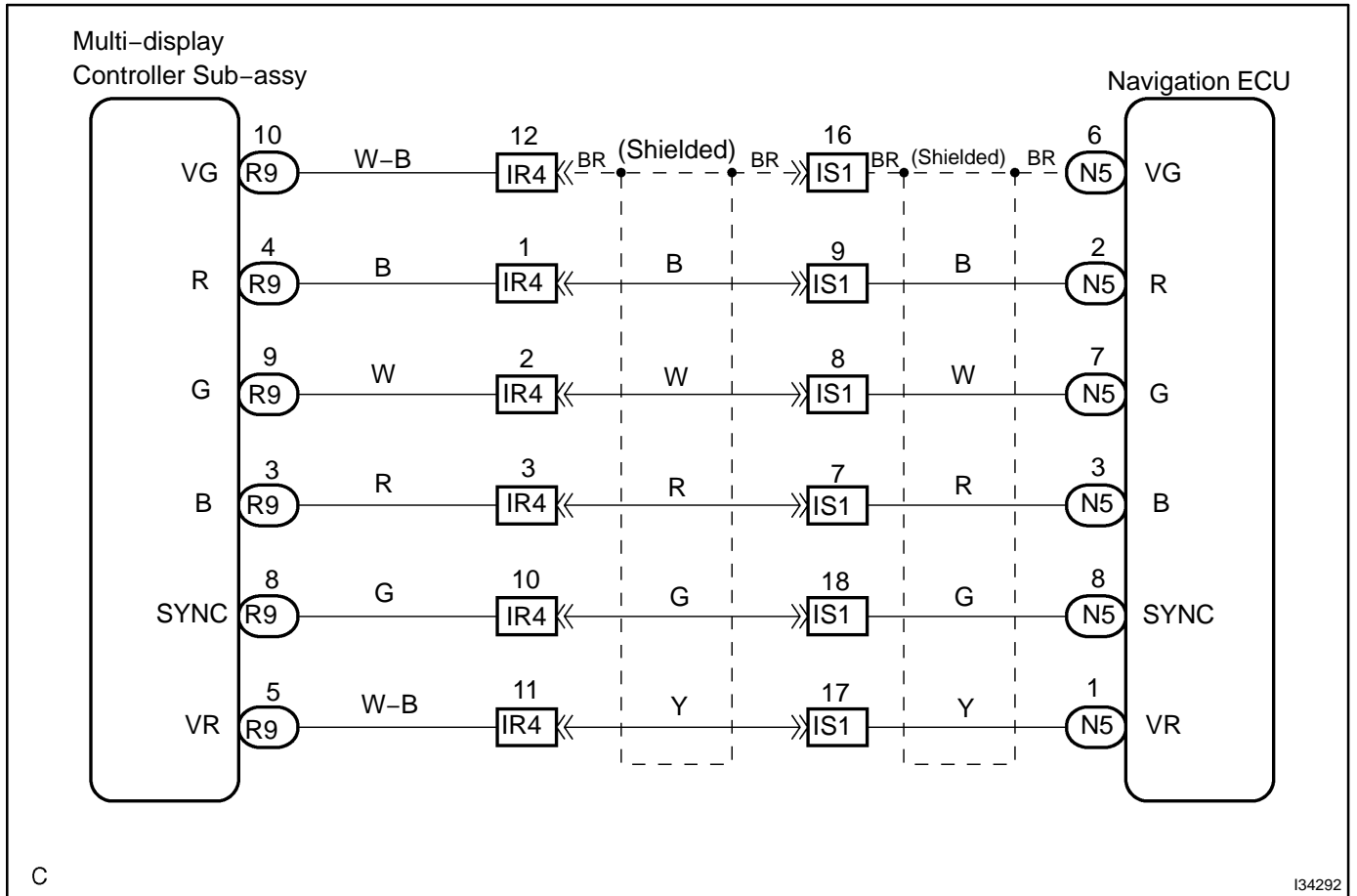
NORMAL

NG

CHECK AND REPLACE TELEVISION DISPLAY ASSY

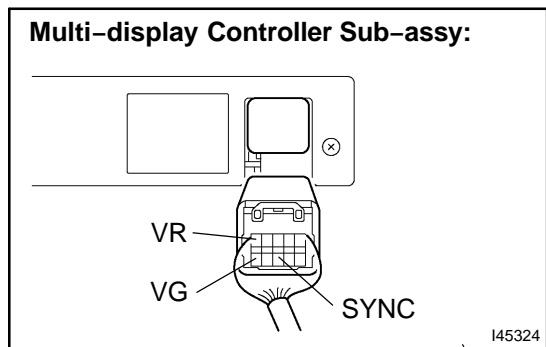
NAVIGATION SCREEN NOT STABILIZED(SYNCHRONOUS ERROR)

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - NAVIGATION ECU)



(a) Disconnect the multi-display controller sub-assy and navigation ECU.

(1) Check continuity of harness.

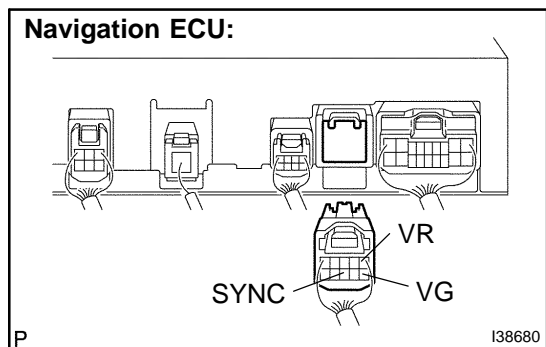
Standard:

Tester connection	Specified condition
VG ⇔ VG	Continuity
VR ⇔ VR	Continuity
SYNC ⇔ SYNC	Continuity

(2) Check short in harness.

Standard:

Tester connection	Specified condition
VG ⇔ Body ground	No continuity
VR ⇔ Body ground	No continuity
SYNC ⇔ Body ground	No continuity



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK AND REPLACE NAVIGATION ECU

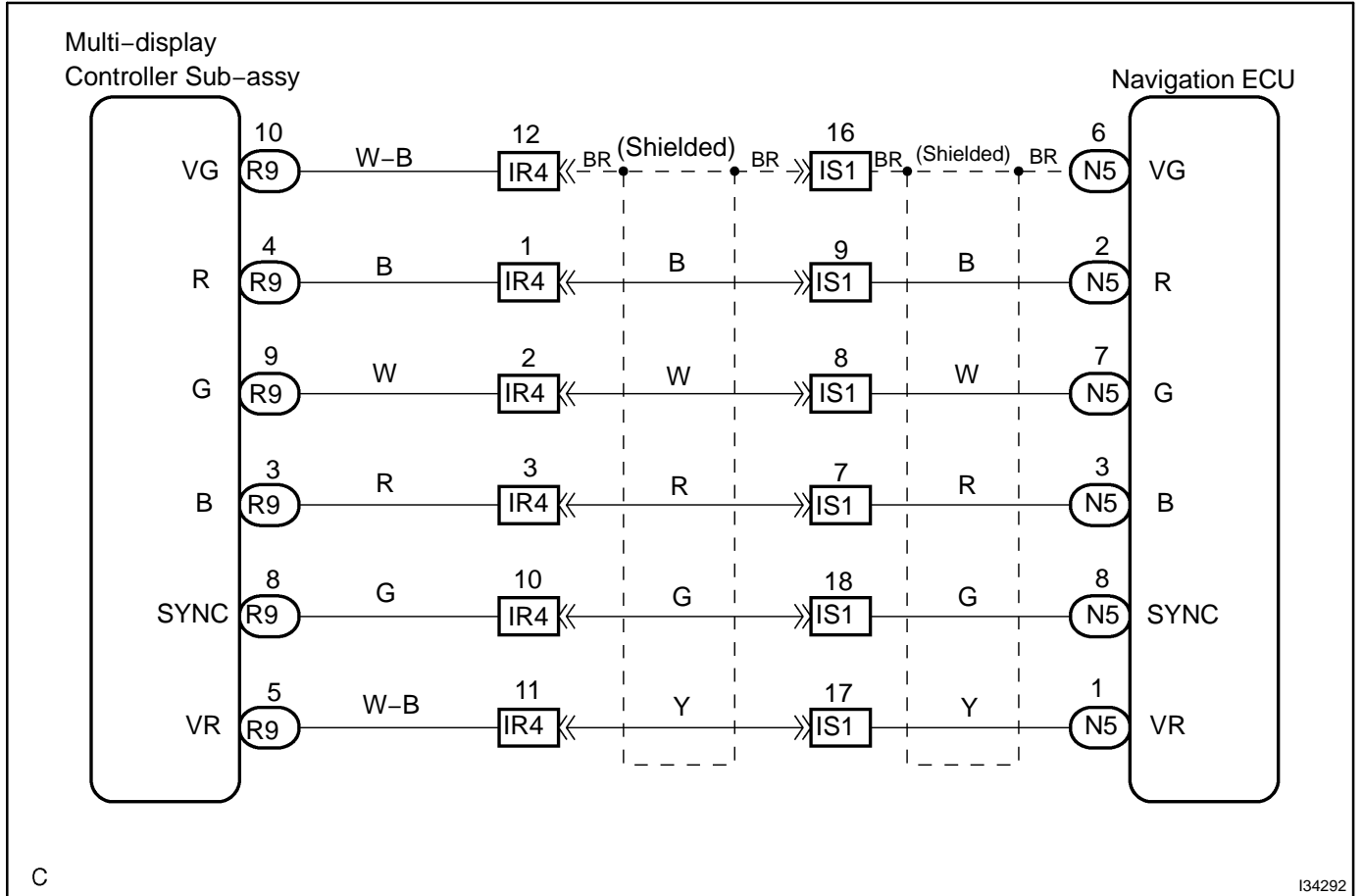
OK NORMAL

NG

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

COLOR ON NAVIGATION SCREEN IS UNUSUAL(RGB SIGNAL ERROR)

WIRING DIAGRAM



INSPECTION PROCEDURE

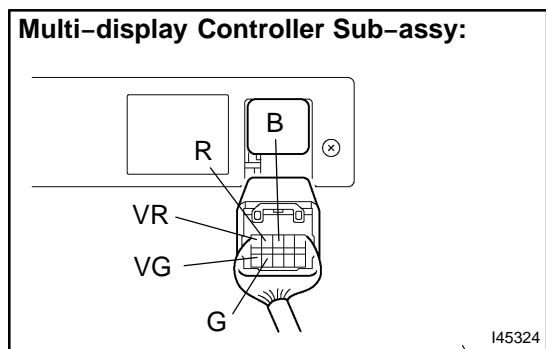
1 | DISPLAY CHECK MODE(COLOR BAR CHECK)

- (a) Preform display check mode.
 - (1) Start the diagnosis system and perform display color bar check of display check mode.
- Standard: Color bar check is normally**

OK → **NORMAL**

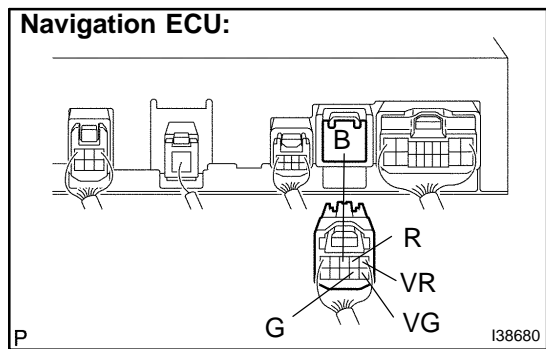
NG

2 | CHECK HARNESS AND CONNECTOR(MULTI-DISPLAY CONTROLLER SUB-ASSY - NAVIGATION ECU)



- (a) Disconnect the multi-display controller and navigation ECU.
 - (1) Check continuity of harness.
- Standard:**

Tester connection	Specified condition
VG ⇔ VG	Continuity
VR ⇔ VR	Continuity
R ⇔ R	Continuity
G ⇔ G	Continuity
B ⇔ B	Continuity



- (2) Check short in harness.
- Standard:**

Tester connection	Specified condition
VG ⇔ Body ground	No continuity
VR ⇔ Body ground	No continuity
R ⇔ Body ground	No continuity
G ⇔ Body ground	No continuity
B ⇔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 | CHECK AND REPLACE NAVIGATION ECU

OK → **NORMAL**

NG

CHECK AND REPLACE MULTI-DISPLAY CONTROLLER SUB-ASSY

BACK MONITOR SYSTEM

DESCRIPTION

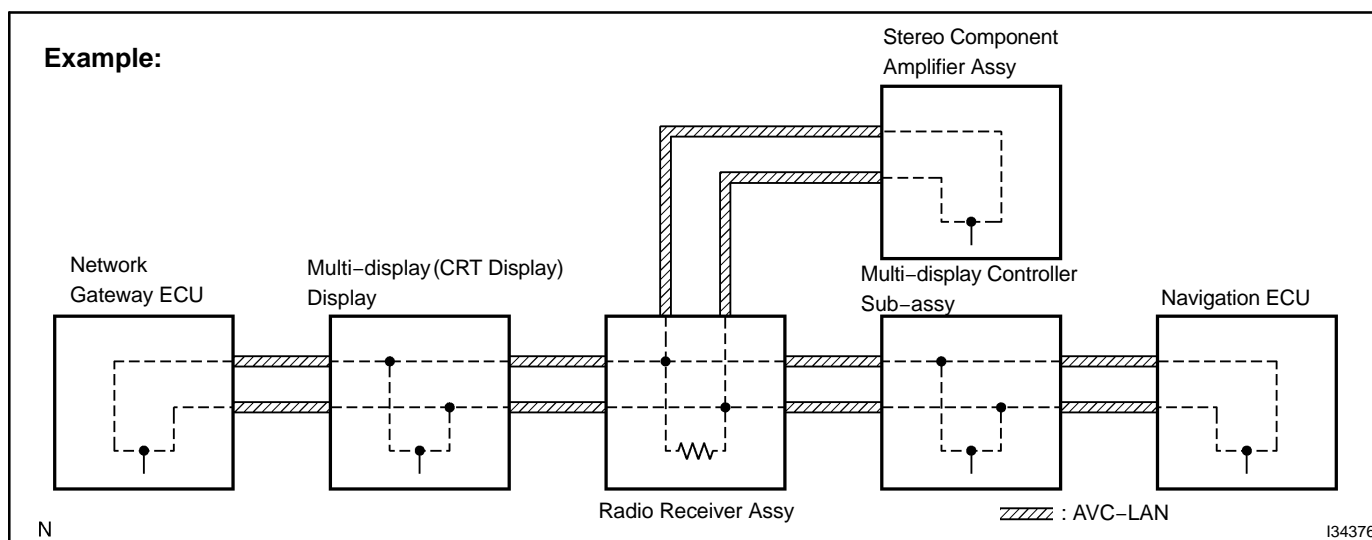
05KC4-02

1. OUTLINE OF AVC-LAN

(a) What is AVC-LAN?

AVC-LAN is the abbreviation for Audio Visual Communication-Local Area Network. This is a unified standard co-developed by 6 audio manufacturers associated with Toyota Motor Corporation.

The unified standard includes signals, such as audio, visual and signals for switch indication and communication.



(b) Objectives

Recently developments in car audio systems have been rapid and functions have been changed drastically. The conventional system has been switched to the multi-media type such as a navigation system. At the same time customers want to upgrade their audio systems. This is the factor that lies behind this standardization.

The concrete objectives are explained below.

- (1) When products by different manufacturers were combined together, malfunctions such as sound failure occurred. This problem can be solved by standardization of signals.
- (2) Various types of after market products are available.
- (3) Because of the above (2), each manufacturer has been able to concentrate on developing products in their strongest field. This has enabled the development of inexpensive products.
- (4) In general, a new product developed by one particular manufacturer could not be used due to a lack of compatibility with other manufacturers' products. By developing this new standard, users can enjoy a range of compatible products from different manufacturers anytime they want.

(c) The above stated are the reasons for the introduction of AVC-LAN. Under this standardization, development of new products no longer causes systematic errors.

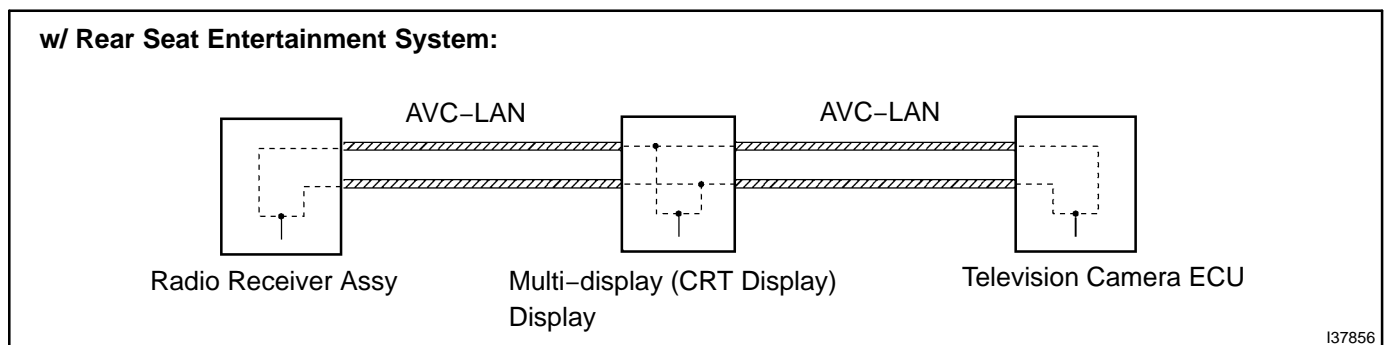
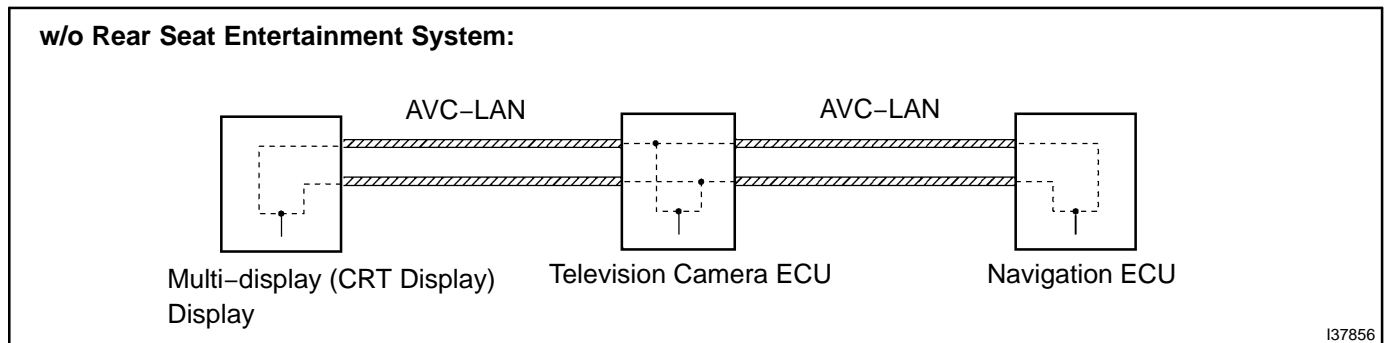
HINT:

- When +B short or GND short is detected in AVC-LAN circuit, communication stops, and the audio system does not function normally.
- When audio system is not equipped with a navigation system, the audio head unit is the master unit. When the audio system is equipped with a navigation system, the multi-display (CRT display) display is the master unit.
- The master unit is equipped with a resistor (60 to 80 Ω) for communication.
- The car audio system using AVC-LAN circuit has a diagnosis function.

- Each product has its own specified number called a physical address (three-digit number). Numbers are also allotted to each function within a product, which are called logical addresses (two-digit number).

2. COMMUNICATION SYSTEM

- (a) This system performs communication between the components through the AVC-LAN.



3. DIAGNOSIS FUNCTION

- (a) The Multi-display (CRT display) display functions as a master unit in the AVC-LAN circuit on this system. It identifies the trouble in this circuit, and the identified information is displayed on the Multi-display (CRT display) display.

HINT:

When performing the diagnosis check, refer to "LEXUS NAVIGATION SYSTEM" (See page 05-1722).

4. BACK MONITOR

- (a) Notes for back monitor.
- The back monitor may not function properly if subjected to a severe blow by any hard object.
 - Do not "scrub" the cover part of the camera (resin made). Scrubbing it may scratch the cover and affect the image. Prevent organic solvents, waxes, bond removing solvents, or glass coating from adhering to the cover. Clean off immediately, and wash with water.
 - Exposing the camera to sudden temperature change may affect proper function.
 - A clear image may not appear if the camera is dirty with snow, mud, etc. In that case, wash with water and wipe off. Use a detergent if necessary to remove dirt.
- (b) Images are difficult to discern even in normal conditions if:
- Camera screen is frosted over (the image immediately after turning the ignition switch ON may be blurred or darker than normal).
 - A strong beam of light, such as a sunbeam or headlight, hits the camera.
 - It is too dark around the camera (at night etc.).
 - The ambient temperature around the camera is either too high or too low.

HINT:

When a strong light, such as a sunbeam reflected off the vehicle's body, hits the camera, the image may be blurred. It is called the "SMEAR" phenomenon, peculiar to the CCD camera.

HOW TO PROCEED WITH TROUBLESHOOTING

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS (SEE PAGE [05-2007](#))

NEXT

3 CHECK AND CLEAR DTCs (SEE PAGE [05-1722](#))

NEXT

4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (Go to step 5)

SYMPTOM OCCURS (Go to step 6)

5 SYMPTOM SIMULATION (SEE PAGE [01-26](#))

NEXT

6 CHECK DTC (SEE PAGE [05-2008](#))

DTC IS OUTPUT (Go to step 7)

DTC IS NOT OUTPUT (Go to step 8)

7 DTC CHART (SEE PAGE [05-2008](#))

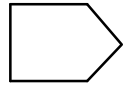
Go to step 11

8 CHECK IF THE SAME SYMPTOM APPEARS IN THE NAVIGATION SYSTEM
(SEE PAGE [05-1744](#))

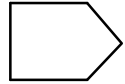
The symptom appears (Follow the navigation symptom chart to perform troubleshooting)

The symptom does not appear (Go to step 9)

9	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-2014)
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**The corresponding symptom exists
(Go to step 11)**



**The corresponding symptom does not exist
(Go to step 10)**

10	BASED ON THE MALFUNCTION SYMPTOM, PERFORM TROUBLESHOOTING BELOW
-----------	--

(a) Terminals of ECU (see page [05-2011](#)).

NEXT

11	ADJUST, REPAIR OR REPLACE
-----------	----------------------------------

NEXT

12	CONFIRMATION TEST
-----------	--------------------------

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

BACK MONITOR SYSTEM

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Brought-in Date	/ /	Odometer Reading	km mile

Date of First Occurrence	/ /
Frequency of Problem Occurrence	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (Times a day)

Problem Symptom	Condition on normal return	<input type="checkbox"/> ACC ON <input type="checkbox"/> E/G starts running <input type="checkbox"/> SW operating
	Condition when trouble occurs	<input type="checkbox"/> ACC OFF → ON <input type="checkbox"/> () SW operating <input type="checkbox"/> others

DTC Check	Parts name	DTC (1st time)	DTC (2nd time)
	Television camera ECU		

DIAGNOSTIC TROUBLE CODE CHART

HINT:

DTC is displayed on the multi-display (CRT display) display (See page 05-2008).

1. TELEVISION CAMERA ECU (Physical address: 1AC)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting the engine.
- *2: This code may be stored when the ignition switch is turned to the START position again in 1 minute after the engine start.
- *3: This code may be stored when the ignition switch is turned to the START position again after the engine start.
- *4: When 210 seconds have elapsed after pulling out the power supply connector of the master component with the ignition switch in the ACC or ON position, this code is stored.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded was disconnected from system with ignition switch in ACC or ON. Or, when this code was recorded, multi-display (CRT display) display was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display (CRT display) display. • Check harness for communication system of multi-display (CRT display) display. • Check harness for power supply of television camera ECU. • Check harness for communication system of television camera ECU.
D7 *4	Communication Check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, multi-display (CRT display) display was disconnected.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display (CRT display) display. • Check harness for communication system of multi-display (CRT display) display. • Check harness for power supply of television camera ECU. • Check harness for communication system of television camera ECU.
DC *2	Transmission Error	Transmission to component shown by sub-code failed. (Detecting this DTC does not always mean actual failure.)	If the same sub-code is recorded in other components, check harness for power supply and communication system of all components shown by code.
DD *3	Master Reset (Momentary Interruption)	After engine start, multi-display (CRT display) display was disconnected from system.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display (CRT display) display. • Check harness for communication system of multi-display (CRT display) display. • If this error occurs frequently, replace multi-display (CRT display) display.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> • Check harness for power supply of multi-display (CRT display) display. • Check harness for communication system between multi-display (CRT display) display and radio receiver assy.
E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

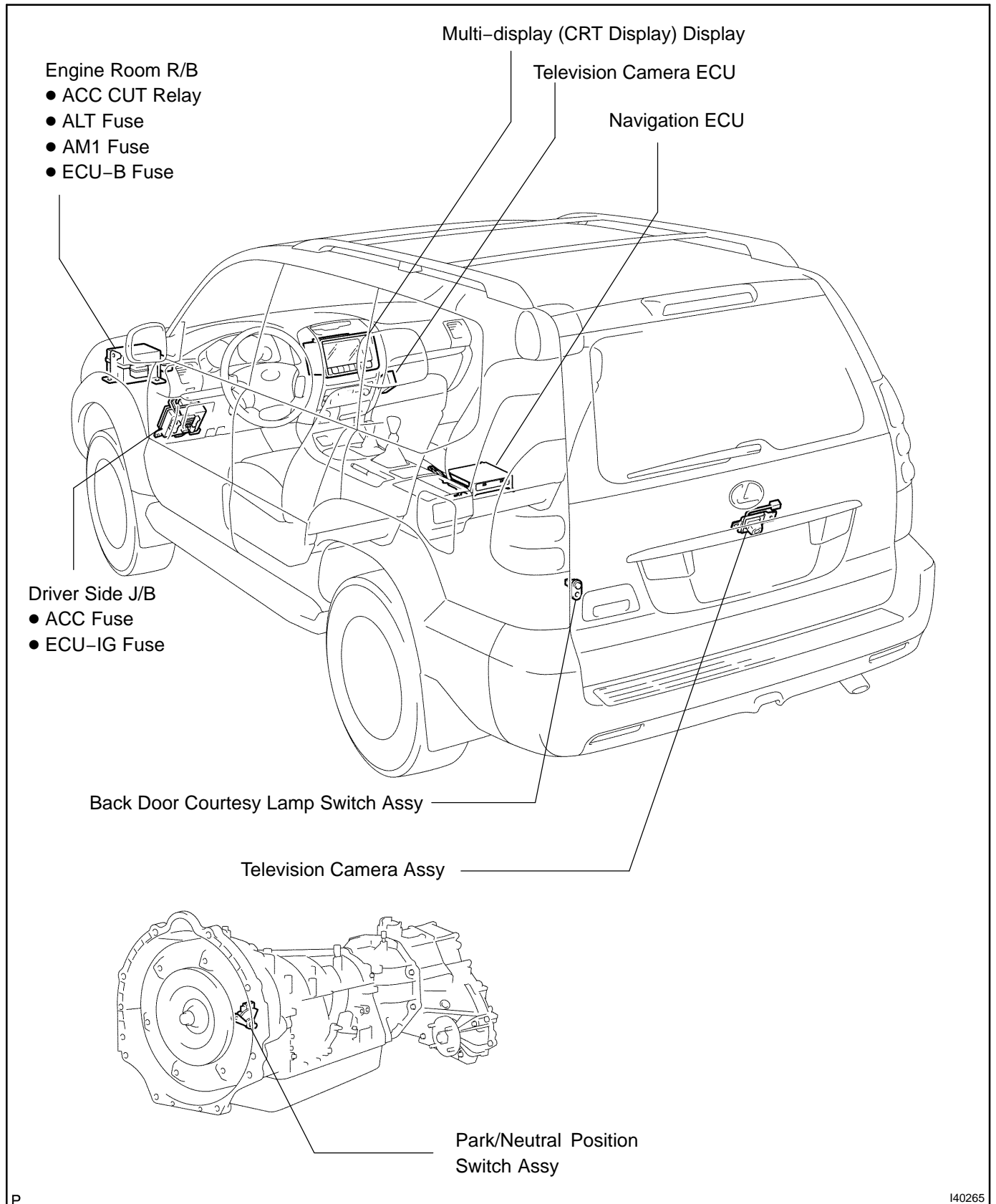
DIAGNOSTICS - BACK MONITOR SYSTEM

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi-display (CRT display) display.	Replace multi-display (CRT display) display.
E3 *1	Registration Request Transmission	<ul style="list-style-type: none"> • Registration Request command is output from slave component. • Registration Connection Check Instruction, Registration Request command is output from sub-master component. 	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

(b) Logical address: 5C (Camera unit)

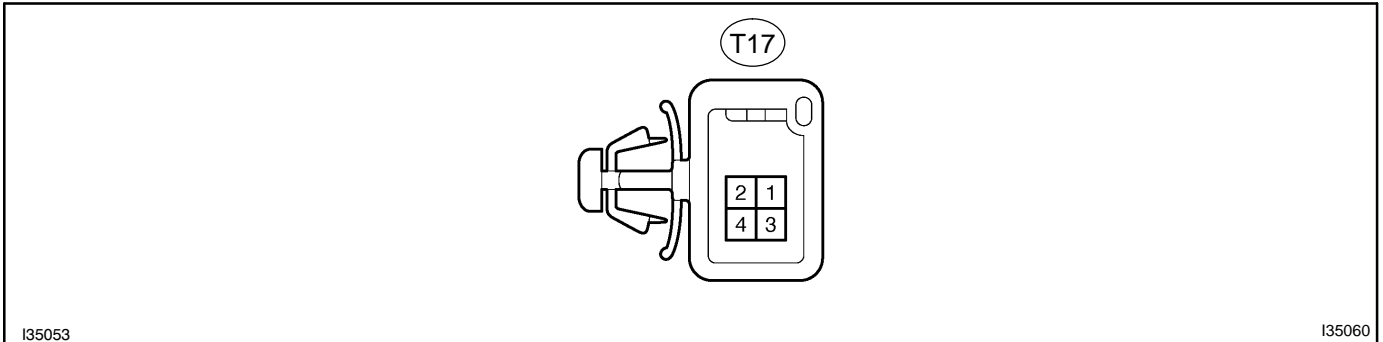
DTC	Diagnosis item	Condition	Countermeasure and inspected parts
40	Camera Picture Error	Synchronous signal from the camera cannot be transmitted.	Check the wire harness between television camera assy and television camera ECU.

LOCATION

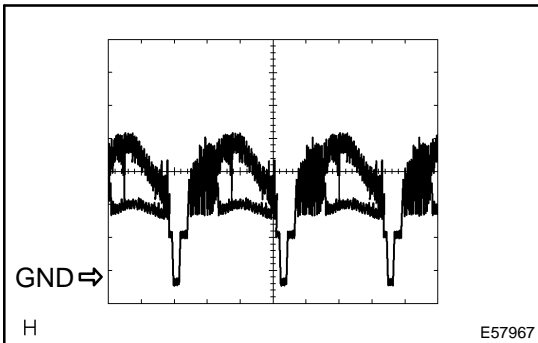


TERMINALS OF ECU

1. TELEVISION CAMERA ASSY:



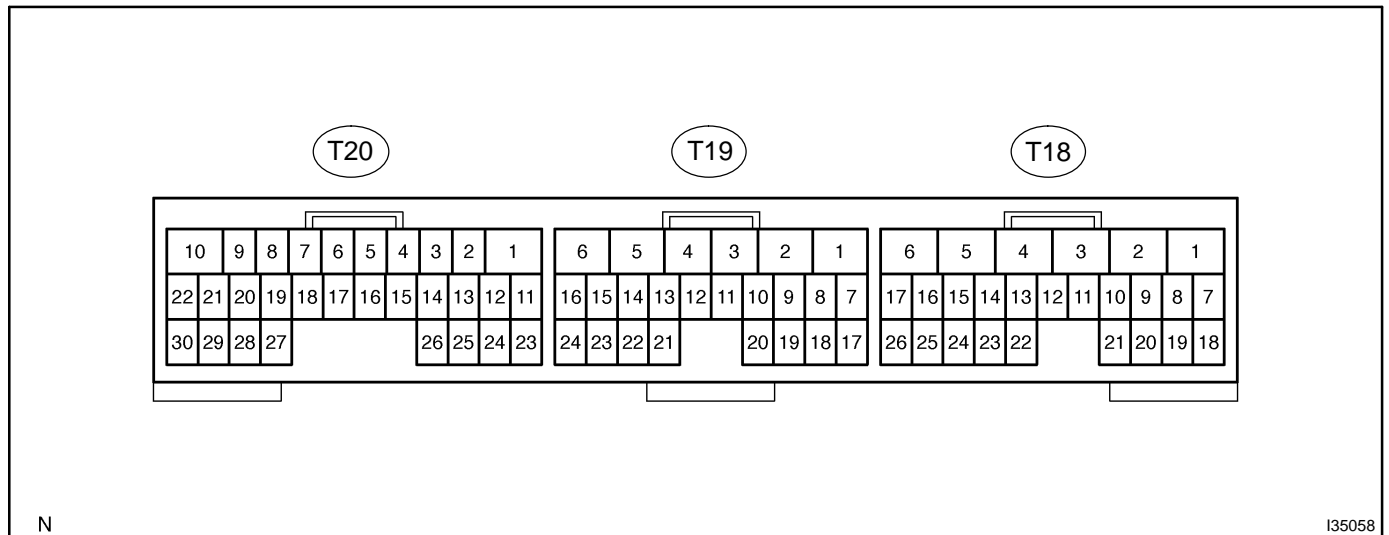
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified value
CV- (T17-1) - CGND (T17-3)	W - BR	Display signal (-)	Always	Below 1 Ω
CV+ (T17-2) - CGND (T17-3)	B - BR	Display signal (+)	IG switch ON, shift lever R position	Signal waveform 1
CGND (T17-3) - Body ground	BR - Body ground	Power ground	Always	Below 1 Ω
CB+ (T17-4) - CGND (T17-3)	W - BR	Power source	IG switch ON, shift lever R position	6 V



- (a) Reference:
Oscilloscope waveform
(1) Waveform 1

Item	Content
Measure terminal	CV+ - CV-
Measure set	0.2 V/DIV, 0.2 μS/DIV
Condition	Ignition switch: ON, Shift lever: R position

2. TELEVISION CAMERA ECU:



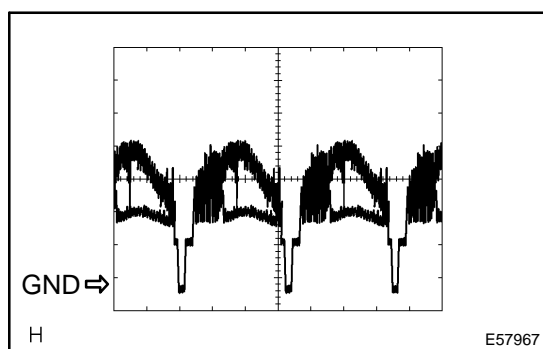
N

I35058

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified value
+B (T18-1) - GND (T18-6)	W-R - W-B	Battery supply	Always	10 to 14 V
IG (T18-2) - GND (T18-6)	B-R - W-B	IG signal input	IG switch ON	10 to 14 V
ACC (T18-3) - GND (T18-6)	GR - W-B	ACC signal input	IG switch ON or ACC	10 to 14 V
GND (T18-6) - Body ground	W-B - Body ground	Power ground	Always	Below 1 Ω
REV (T18-11) - GND (T18-6)	R-B - W-B	Reverse signal input	IG switch ON, shift lever R position	10 to 14 V
BCTY (T18-23) - Body ground	R-L - Body ground	Back door courtesy switch signal input	Back door is opened.	10 to 14 V
VG (T19-7) - GND (T18-6)	BR - W-B	Display signal output ground (Shielded)	Always	Below 1 Ω
R (T19-8) - GND (T18-6)	B - W-B	Display signal output (Red)	While displaying map or back monitor	Signal waveform 2
G (T19-9) - GND (T18-6)	W - W-B	Display signal output (Green)	While displaying map or back monitor	Signal waveform 2
B (T19-10) - GND (T18-6)	R - W-B	Display signal output (Blue)	While displaying map or back monitor	Signal waveform 2
B1 (T19-13) - GND (T18-6)	R - W-B	Display signal input (Blue)	While displaying map	Signal waveform 2
G1 (T19-14) - GND (T18-6)	W - W-B	Display signal input (Green)	While displaying map	Signal waveform 2
R1 (T19-15) - GND (T18-6)	B - W-B	Display signal input (Red)	While displaying map	Signal waveform 2
VG1(T19-16) - GND (T18-6)	BR - W-B	Display signal input ground (Shielded)	Always	Below 1 Ω
TX+ (T19-17)	P	AVC-LAN control bus	See "Service check mode"	-
TX- (T19-18)	L	AVC-LAN control bus	See "Service check mode"	-
SYNC (T19-19) - GND (T18-6)	G - W-B	Synchronized signal output	While displaying map or back monitor	Signal waveform 3
VR (T19-20) - GND (T18-6)	Y - W-B	Display signal output ground	Always	Below 1 Ω
VR1 (T19-21) - GND (T18-6)	Y - W-B	Display signal input ground	Always	Below 1 Ω

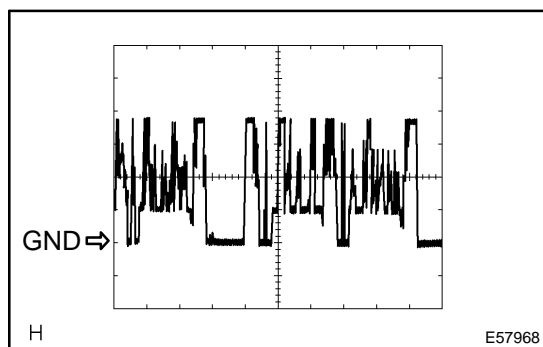
DIAGNOSTICS - BACK MONITOR SYSTEM

SYN1 (T19-22) - GND (T18-6)	G - W-B	Synchronized signal input	While displaying map	Signal waveform 3
TX1- (T19-23)	L	AVC-LAN control bus	See "Service check mode"	-
TX1+ (T19-24)	P	AVC-LAN control bus	See "Service check mode"	-
CGND (T20-21) - GND (T18-6)	BR - W-B	Back camera ground	Always	Below 1 Ω
CB+ (T20-22) - GND (T18-6)	R - W-B	Power source to back camera	IG switch ON, shift lever R position	6 V
CV- (T20-29) - GND (T18-6)	W - W-B	Back camera ground (Shielded)	Always	Below 1 Ω
CV+ (T20-30) - GND (T18-6)	B - W-B	Display signal of back camera input	IG switch ON, shift lever R position	Signal waveform 1



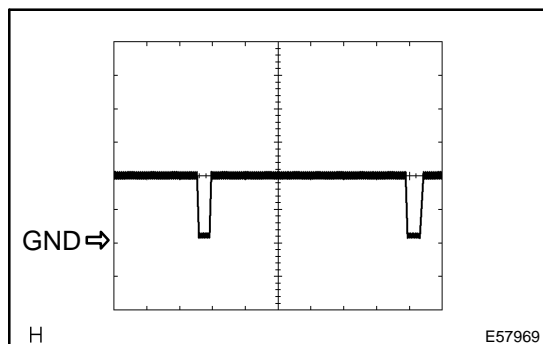
- (a) Reference:
Oscilloscope waveform
(1) Waveform 1

Item	Content
Measure terminal	CV+ - GND
Measure set	0.2 V/DIV, 0.2 μ S/DIV
Condition	Ignition switch: ON, Shift lever: R position



- (2) Waveform 2

Item	Content
Terminal	R, G, B, R1, G1, B1, - GND
Measure set	200 mV/DIV, 10 μ S/DIV
Condition	Image is being displayed (Parking assist system or navigation system).



- (3) Waveform 3

Item	Content
Terminal	SYNC, SYN1 - GND
Measure set	500 mV/DIV, 10 μ S/DIV
Condition	Image is being displayed (Parking assist system or navigation system).

PROBLEM SYMPTOMS TABLE

HINT:

CAUTION is displayed on the multi-display (CRT display) display and the back monitor system cannot be used if the back door is open with the shift lever in the R position.

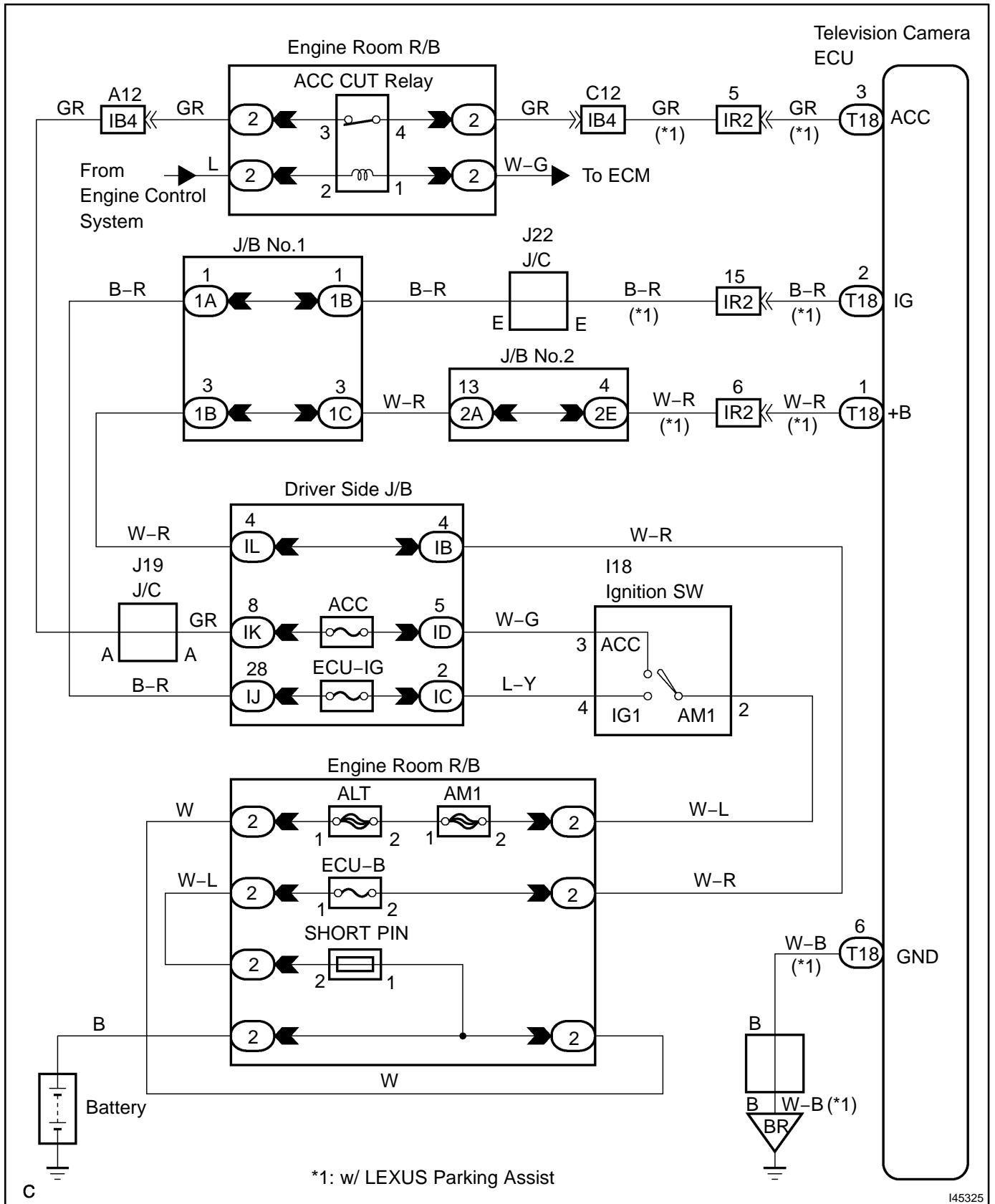
Symptom	Suspected Area	See page
When shift lever is in R position, back monitor image is not displayed (Screen is not black).	3. Power source circuit (Television camera ECU) 4. Reverse signal circuit 5. AVC-LAN circuit 6. Television camera ECU	05-2015 05-2022 05-2018 67-25
When shift lever is in R position, back monitor image is not displayed (Screen is black).	1. Display signal circuit (To multi-display (CRT display) display) 2. Display signal circuit (From television camera assy) 3. Television camera ECU	05-2031 05-2027 67-25
When shift lever is not in R position, back monitor image is displayed.	1. Reverse signal circuit 2. Television camera ECU	05-2022 67-25
The back monitor image is displayed even when the back door is open.	1. Courtesy switch signal circuit 2. Television camera ECU	05-2025 67-25
Back monitor image (color, or picture) is something wrong.	1. Display signal circuit (From television camera assy) 2. Display signal circuit (To multi-display (CRT display) display) 3. Television camera ECU	05-2027 05-2031 67-25

POWER SOURCE CIRCUIT (TELEVISION CAMERA ECU)

CIRCUIT DESCRIPTION

This circuit is the power source circuit to operate the television camera ECU.

WIRING DIAGRAM

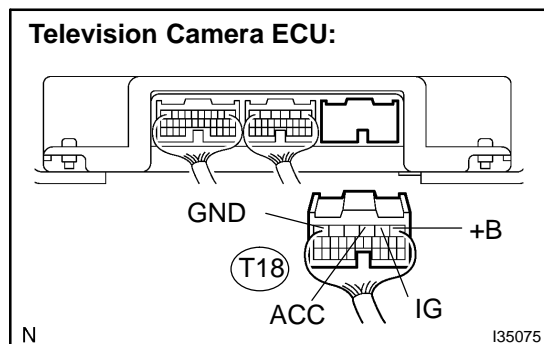


C

I45325

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (BATTERY - TELEVISION CAMERA ECU)



- (a) Disconnect the T18 connector from the television camera ECU.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
GND (T18-6) - Body ground	Always	Below 1 Ω

- (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
+B (T18-1) - GND (T18-6)	Always	10 to 14 V
IG (T18-2) - GND (T18-6)	IG SW ON	10 to 14 V
ACC (T18-3) - GND (T18-6)	IG SW ACC	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(See page 05-2014)

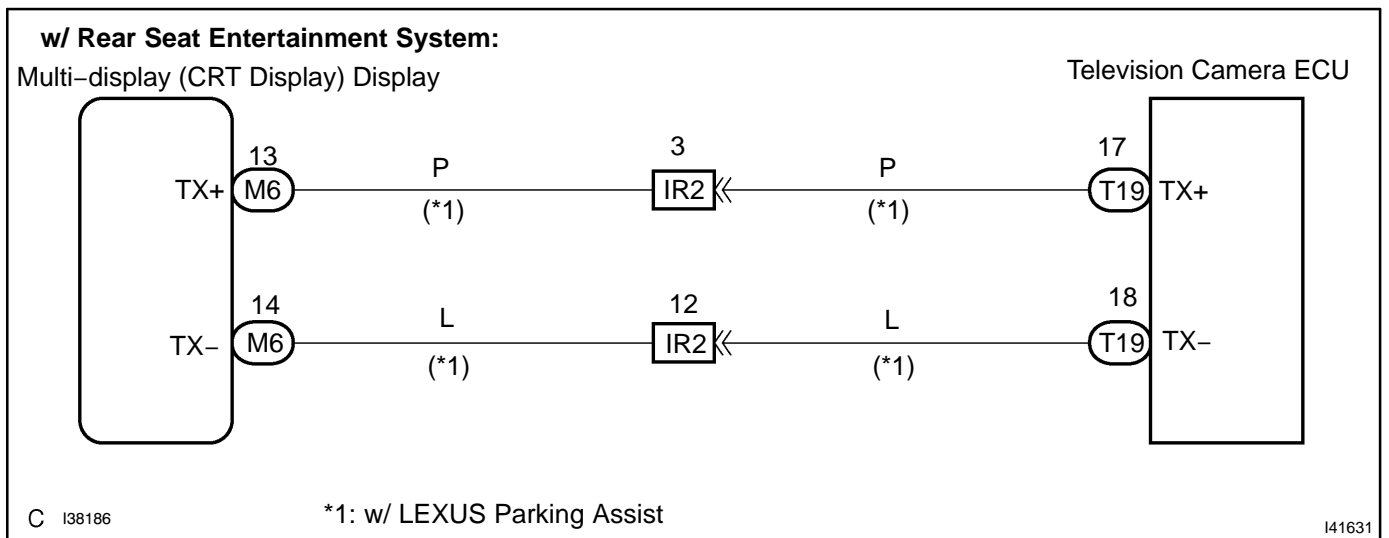
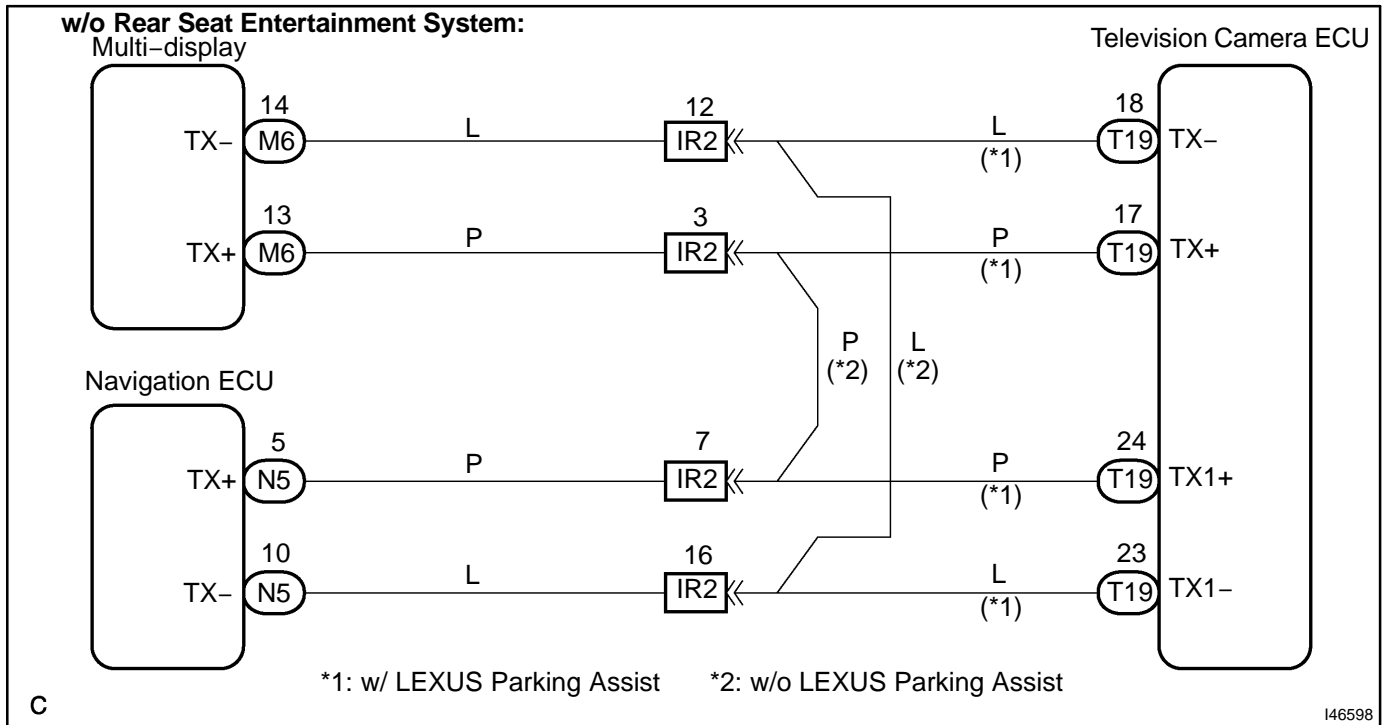
AVC-LAN CIRCUIT

CIRCUIT DESCRIPTION

Each unit of the "BACK MONITOR SYSTEM" connected with AVC-LAN (communication bus) transfers the signal of each switch by communication.

When short to +B or short to ground occurs in this AVC-LAN, the "BACK MONITOR SYSTEM" will not function normally as the communication is cut off.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT APPARATUS

(a) Choose the apparatus to be inspected.

(1) Start the diagnosis system and read check result for television display assy.

Standard:

A	w/o Rear seat entertainment system
B	w/ Rear seat entertainment system

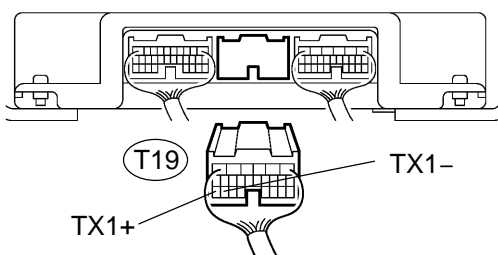
B

Go to step 4

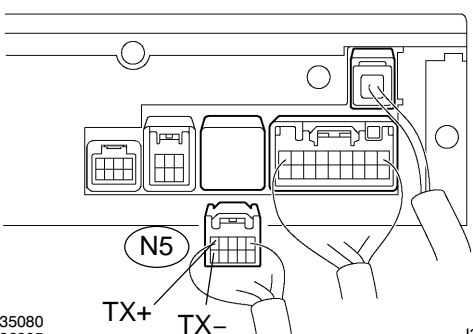
A

2 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - NAVIGATION ECU)

Television Camera ECU:



Navigation ECU:



I35080
I36905

I35093

- Disconnect the T19 connector from the television camera ECU.
- Disconnect the M5 connector from the navigation ECU.
- Measure the resistance according to the value(s) in the table below.

Standard:

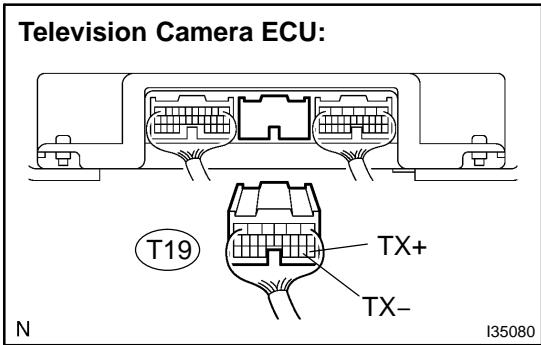
Tester connection (Terminal No.)	Condition	Specified condition
TX1+ (T19-24) - TX+ (N5-5)	Always	Below 1 Ω
TX1- (T19-23) - TX- (N5-10)	Always	Below 1 Ω
TX1+ (T19-24) - Body ground	Always	10 kΩ or higher
TX1- (T19-23) - Body ground	Always	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

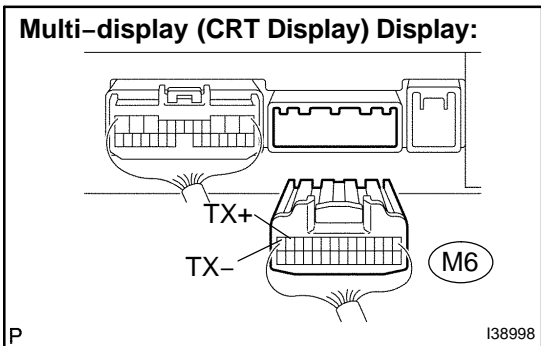
3 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - MULTI-DISPLAY (CRT DISPLAY) DISPLAY)



- (a) Disconnect the M6 connector from the multi-display (CRT display) display.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
TX+ (T19-17) - TX+ (M6-13)	Always	Below 1 Ω
TX- (T19-18) - TX- (M6-14)	Always	Below 1 Ω
TX+ (T19-17) - Body ground	Always	10 kΩ or higher
TX- (T19-18) - Body ground	Always	10 kΩ or higher

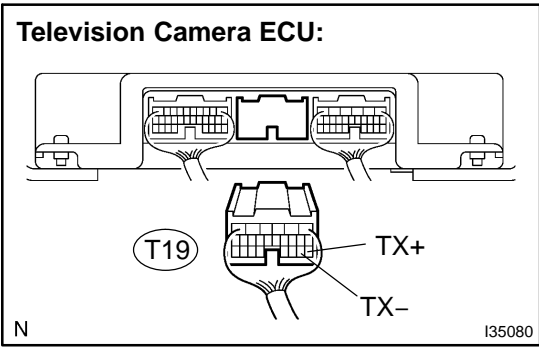


NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-2014)

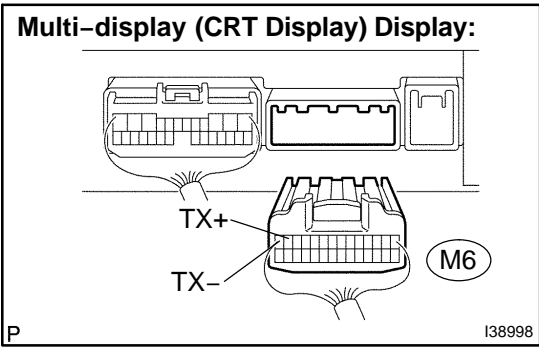
4 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - MULTI-DISPLAY (CRT DISPLAY) DISPLAY)



- (a) Disconnect the M6 connector from the multi-display (CRT display) display.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
TX+ (T19-17) - TX+ (M6-13)	Always	Below 1 Ω
TX- (T19-18) - TX- (M6-14)	Always	Below 1 Ω
TX+ (T19-17) - Body ground	Always	10 kΩ or higher
TX- (T19-18) - Body ground	Always	10 kΩ or higher



NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

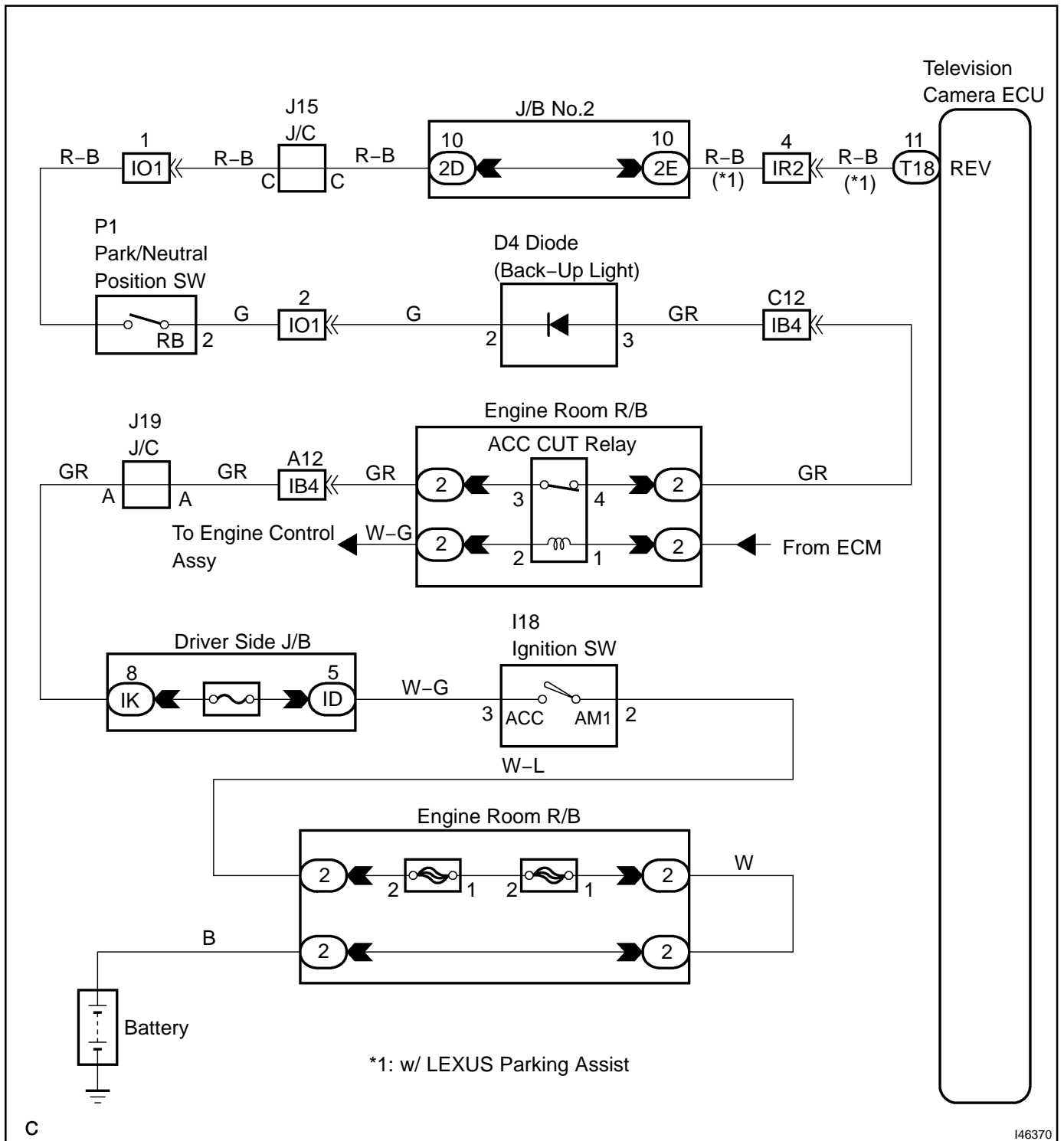
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-2014)

REVERSE SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

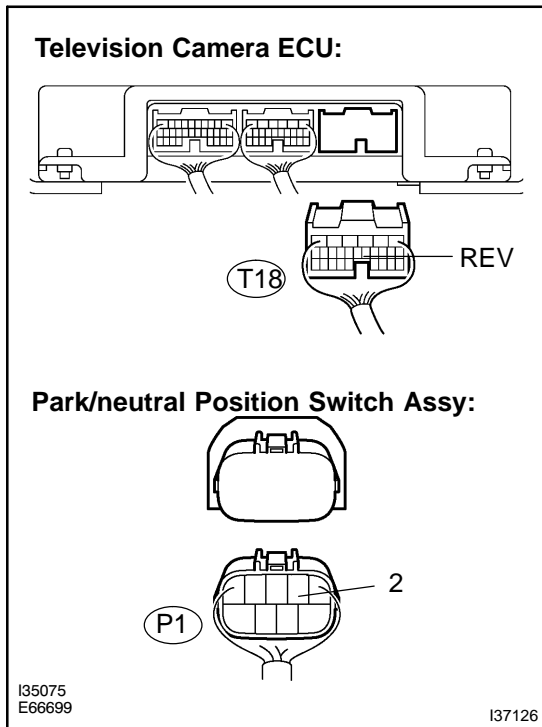
The television camera ECU receives the reverse signal from the park/neutral position switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - PARK/NEUTRAL POSITIIN SWITCH ASSY)



- (a) Disconnect the T18 connector from the television camera ECU.
- (b) Disconnect the P1 connector from the park/neutral position switch assy.
- (c) Measure the resistance according to the value(s) in the table below.

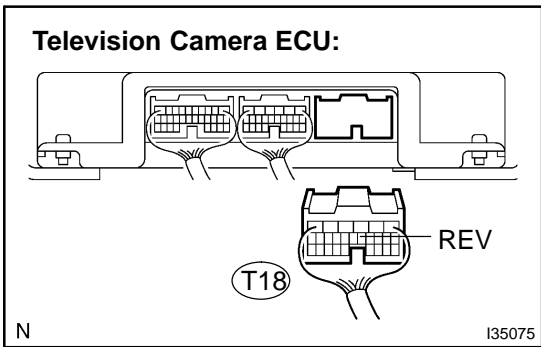
Standard:

Tester connection (Terminal No.)	Condition	Specified condition
REV (T18-11) - 2 (P1-2)	Always	Below 1 Ω
REV (T18-11) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT TELEVISION CAMERA ECU (REVERSE SIGNAL INPUT)



- (a) Reconnect the P1 connector to the park/neutral position switch assy.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
REV (T18-11) – Body ground	IG SW ON, shift lever R position	10 to 14 V

NG INSPECT PARK/NEUTRAL POSITION SWITCH ASSY (See page 40-10)

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-2014)

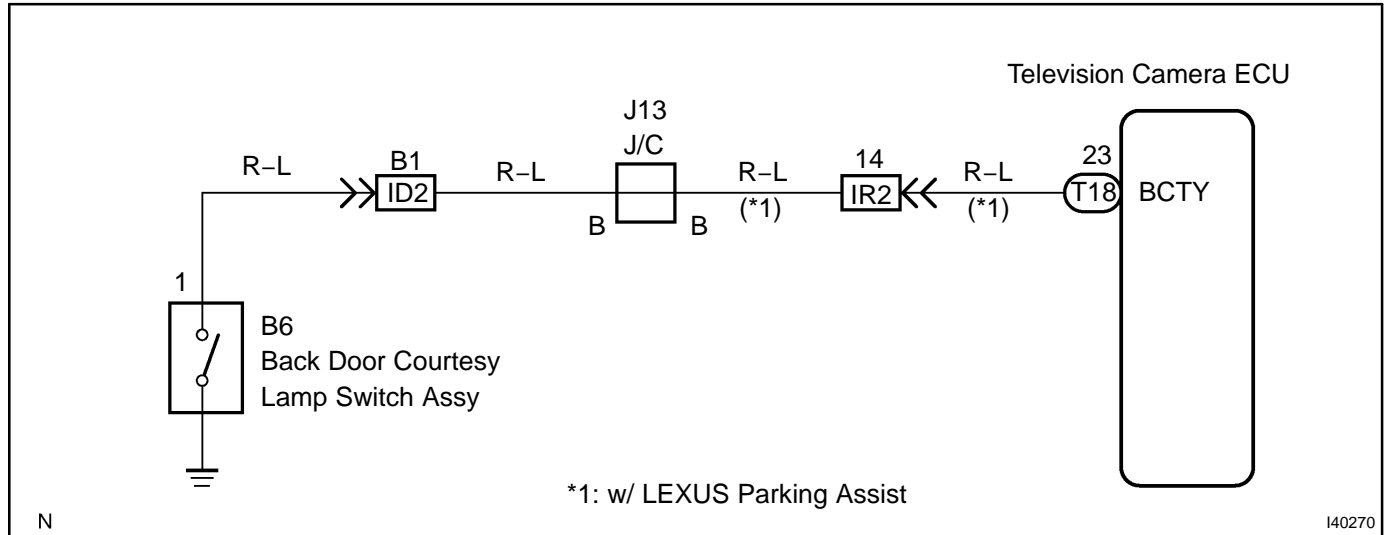
COURTESY SWITCH SIGNAL CIRCUIT

CIRCUIT DESCRIPTION

The television camera ECU receives a back door open/close signal from the back door courtesy lamp switch assy.

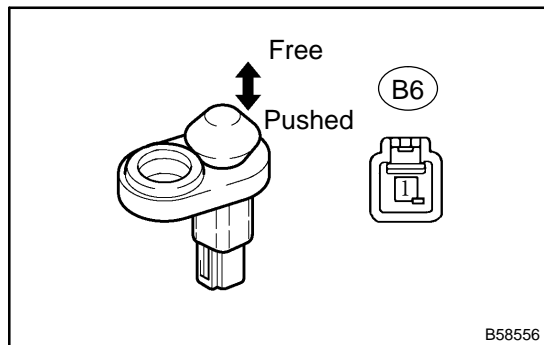
If the back door is open when the back monitor image can be displayed (the shift lever is in the R position), CAUTION is displayed on the display to inform the driver.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT BACK DOOR COURTESY LAMP SWITCH ASSY



- (a) Disconnect the B6 connector from the television camera ECU.
- (b) Remove the back door courtesy lamp switch assy.
- (c) Measure the resistance according to the value(s) in the table below.

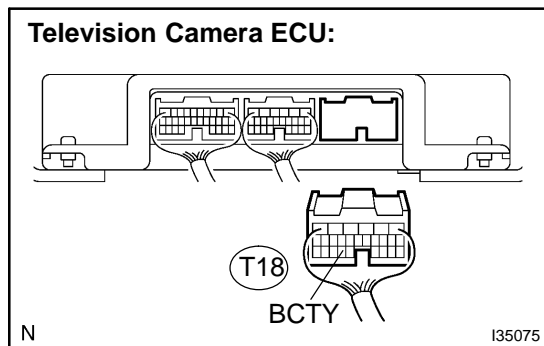
Standard:

Tester connection	Condition	Specified condition
B6-1 - Switch body	Back door courtesy lamp switch is free → pushed	Below 1 Ω → 10 kΩ or higher

NG → **REPLACE BACK DOOR COURTESY LAMP SWITCH ASSY**

OK

2 CHECK HARNESS AND CONNECTOR (BACK DOOR COURTESY LAMP SWITCH ASSY - TELEVISION CAMERA ECU)



- (a) Reconnect the B6 connector.
- (b) Install the back door courtesy lamp switch assy.
- (c) Disconnect the T18 connector from the television camera ECU.
- (d) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
BCTY (T18-23) - Body ground	Back door courtesy lamp switch is free → pushed	Below 1 Ω → 10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

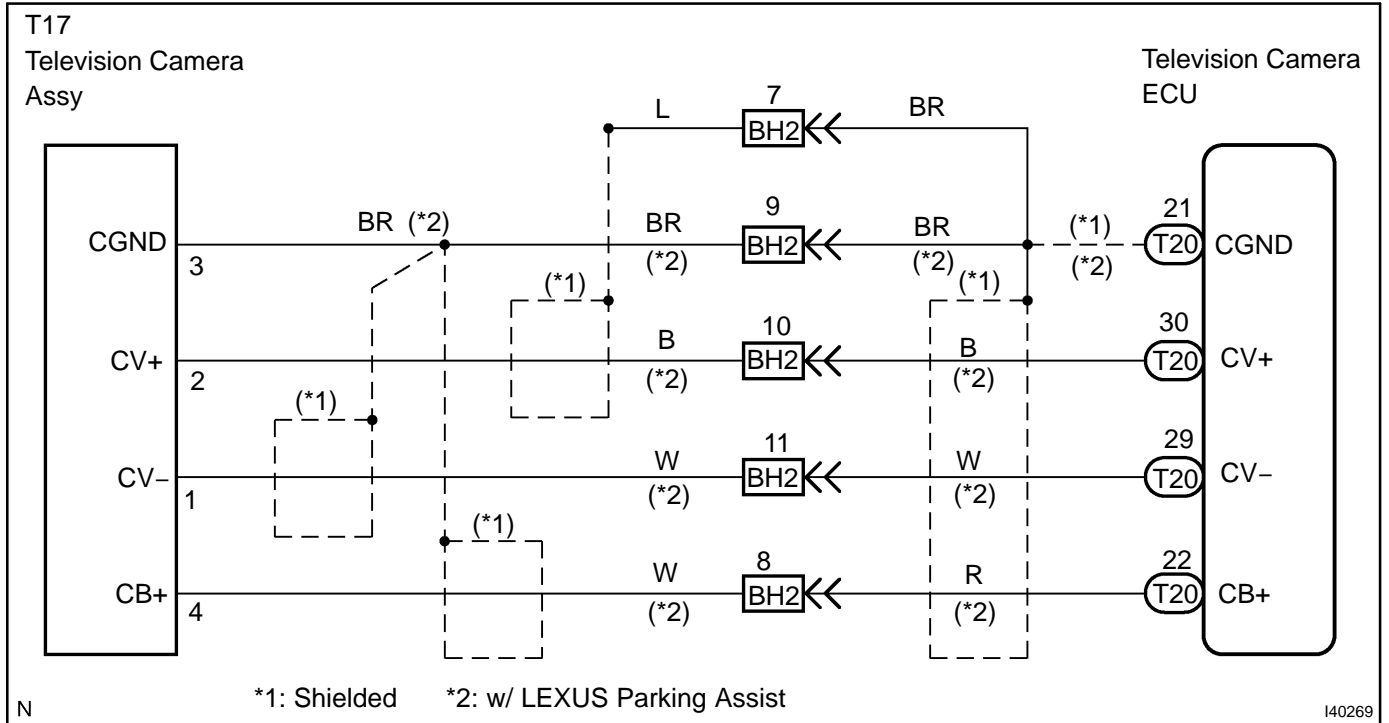
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-2014)

DISPLAY SIGNAL CIRCUIT (FROM TELEVISION CAMERA ASSY)

CIRCUIT DESCRIPTION

This is the display signal circuit of the television camera assy.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK NAVIGATION DISPLAY
----------	---------------------------------

(a) Check whether navigation display appears properly or not.

Standard: The navigation display properly appears.

HINT:

- When the navigation display has trouble, inspect the circuit between the television camera ECU and multi-display (CRT display) display (See page [05-1722](#)).
- When the navigation display is normal, inspect the circuit between the television camera ECU and television camera assy by following the steps below.

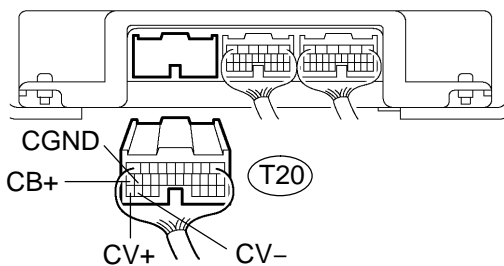
NG

INSPECT DISPLAY SIGNAL CIRCUIT
(See page [05-1876](#))

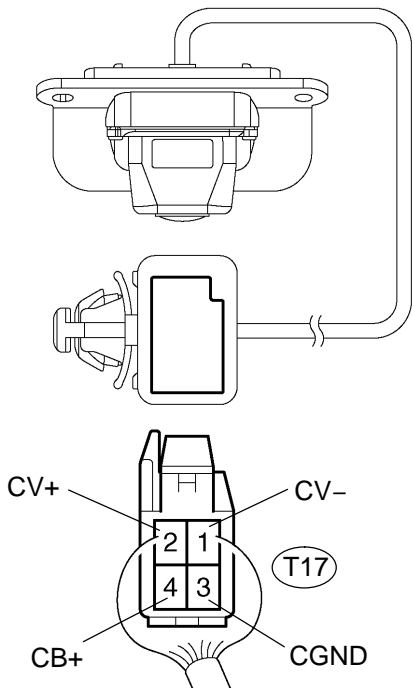
OK

2 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - TELEVISION CAMERA ASSY)

Television Camera ECU:



Television Camera Assy:



N 140286

- (a) Disconnect the T20 connector from the television camera ECU.
- (b) Disconnect the T17 connector from the television camera assy.
- (c) Measure the resistance according to the value(s) in the table below.

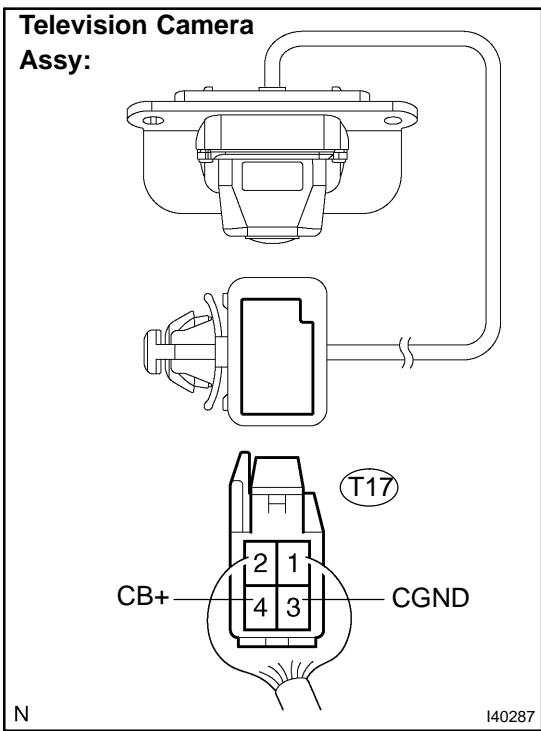
Standard:

Tester connection (Terminal No.)	Condition	Specified condition
CB+ (T20-22) - CB+ (T17-4)	Always	Below 1 Ω
CGND (T20-21) - CGND (T17-3)	Always	Below 1 Ω
CV+ (T20-30) - CV+ (T17-2)	Always	Below 1 Ω
CV- (T20-29) - CV- (T17-1)	Always	Below 1 Ω
CB+ (T20-22) - Body ground	Always	10 kΩ or higher
CV+ (T20-30) - Body ground	Always	10 kΩ or higher
CV- (T20-29) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT TELEVISION CAMERA ECU



- (a) Reconnect the T20 connector to the television camera ECU.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
CB+ (T17-4) - CGND (T17-3)	IG SW ON, shift lever R position	Approx. 6 V

NG → **REPLACE TELEVISION CAMERA ECU**
(See page 67-25)

OK

4 REPLACE TELEVISION CAMERA ASSY

Standard: Malfunction disappears

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**
(See page 05-2014)

OK

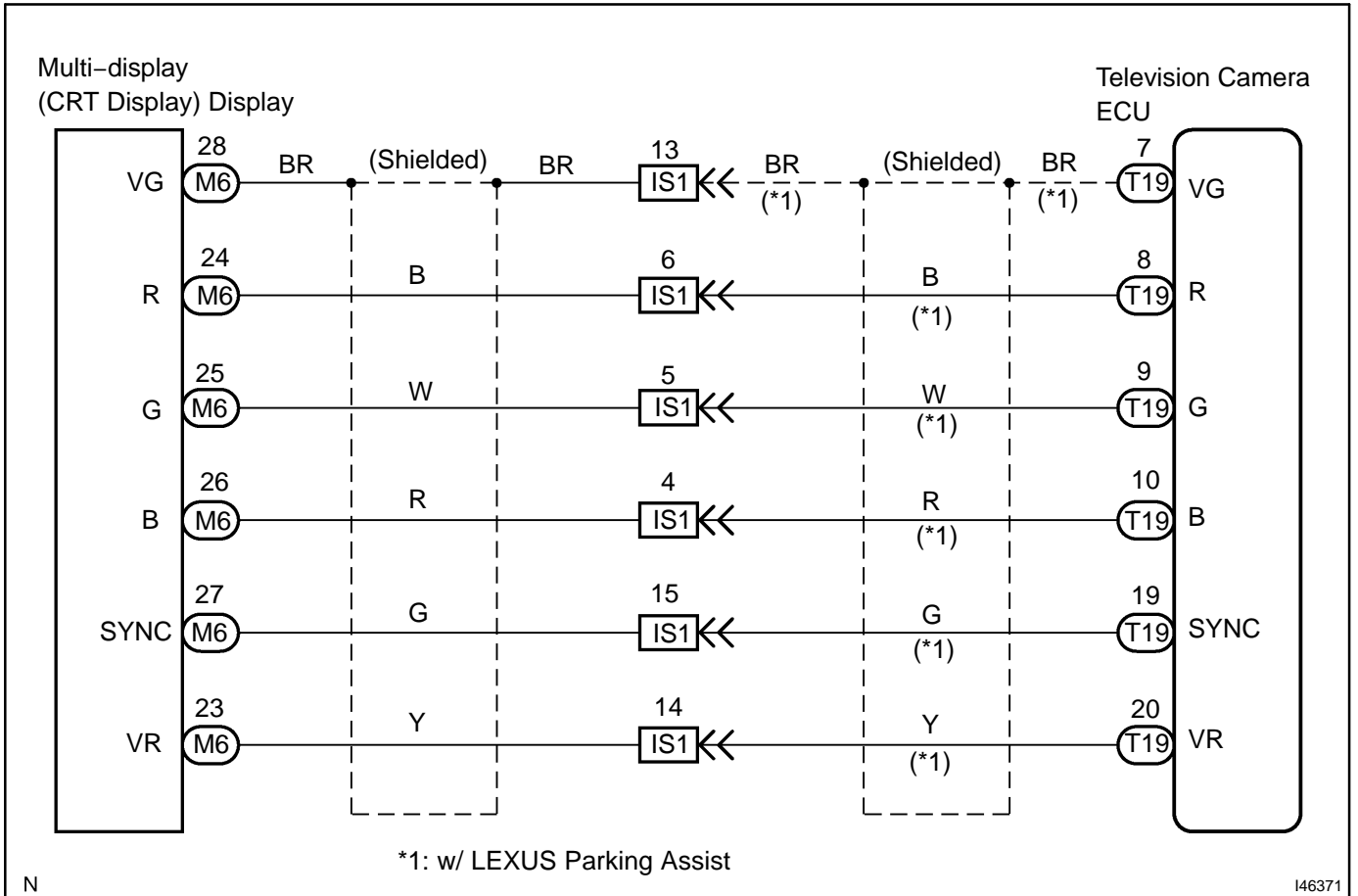
NORMAL

DISPLAY SIGNAL CIRCUIT (TO MULTI-DISPLAY (CRT DISPLAY) DISPLAY)

CIRCUIT DESCRIPTION

This is the display signal circuit of the multi-display (CRT display) display.

WIRING DIAGRAM

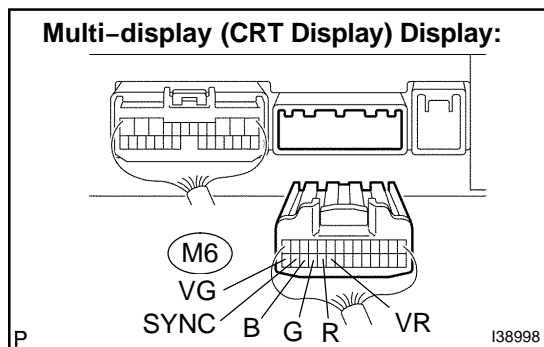
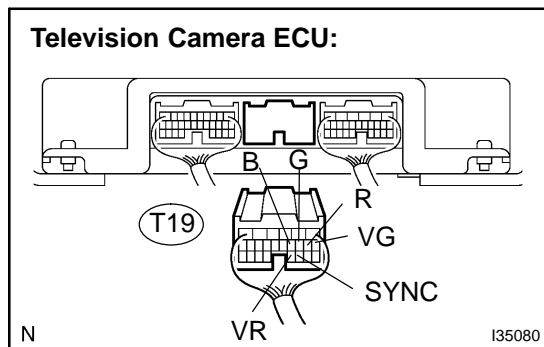


N

I46371

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (TELEVISION CAMERA ECU - MULTI-DISPLAY (CRT DISPLAY) DISPLAY)



- (a) Disconnect the T19 connector from the television camera ECU.
- (b) Disconnect the M6 connector from the multi-display (CRT display) display.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection (Terminal No.)	Condition	Specified condition
VG (M6-28) - VG (T19-7)	Always	Below 1 Ω
R (M6-24) - R (T19-8)	Always	Below 1 Ω
G (M6-25) - G (T19-9)	Always	Below 1 Ω
B (M6-26) - B (T19-10)	Always	Below 1 Ω
SYNC (M6-27) - SYNC (T19-19)	Always	Below 1 Ω
VR (M6-23) - VR (T19-20)	Always	Below 1 Ω
R (M6-24) - Body ground	Always	10 kΩ or higher
G (M6-25) - Body ground	Always	10 kΩ or higher
B (M6-26) - Body ground	Always	10 kΩ or higher
SYNC (M6-27) - Body ground	Always	10 kΩ or higher
VR (M6-23) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page 05-2014)

COMBINATION METER

HOW TO PROCEED WITH TROUBLESHOOTING

056E6-09

1	VEHICLE BROUGHT TO WORKSHOP
---	-----------------------------

NEXT

2	CUSTOMER PROBLEM ANALYSIS (SEE PAGE 05-2034)
---	---

NEXT

3	PROBLEM SYMPTOM CONFIRMATION (SEE PAGE 05-2048)
---	--

NEXT

4	PROBLEM SYMPTOMS TABLE (SEE PAGE 05-2048)
---	--

NEXT

5	CIRCUIT INSPECTION (SEE PAGE 05-2049 - 05-2073)
---	--

NEXT

6	REPAIR OR REPLACE
---	-------------------

NEXT

7	CONFIRMATION TEST
---	-------------------

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

COMBINATION METER SYSTEM Check Sheet

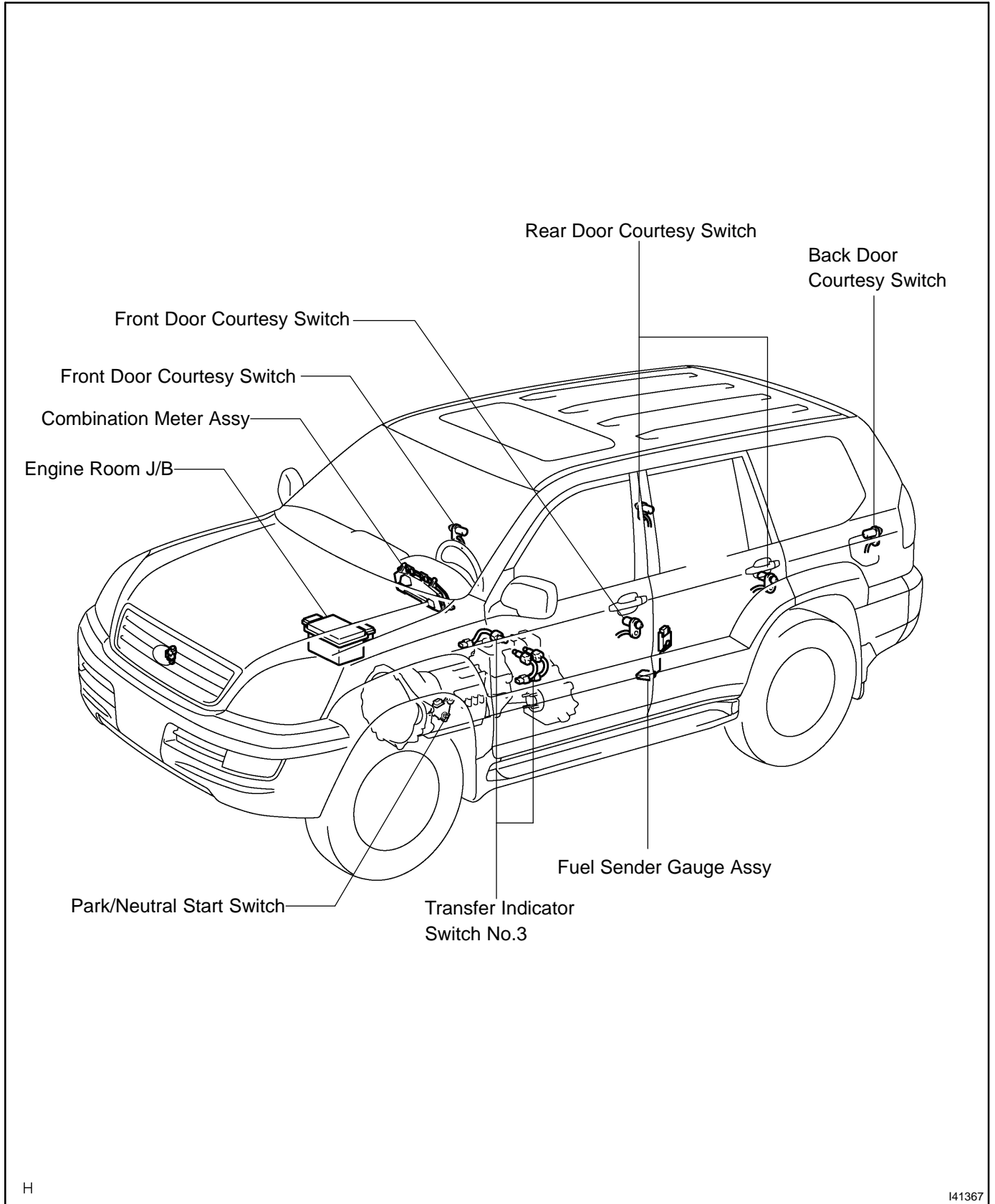
Inspector's name: _____

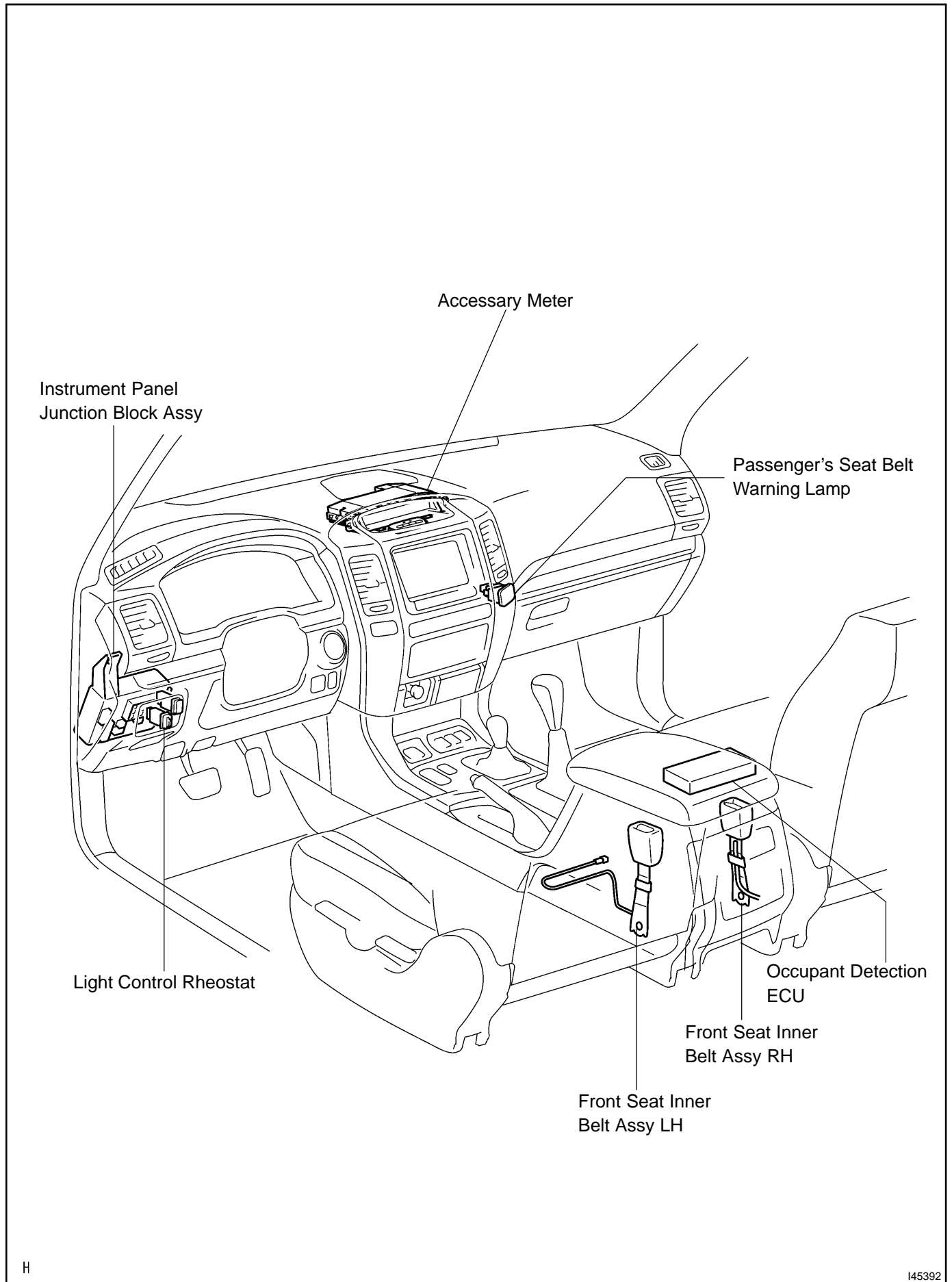
Customer's Name		VIN	
		Production Date	
		License No.	
Date of Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (Times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outside temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F (°C))

Problem Symptom	Gauge	<input type="checkbox"/> Malfunction in speedometer
		<input type="checkbox"/> Malfunction in tachometer
		<input type="checkbox"/> Malfunction in water temperature receiver gauge
		<input type="checkbox"/> Malfunction in fuel receiver gauge
	Others	<input type="checkbox"/> Entire combination meter does not operate
		<input type="checkbox"/> Operating light control rheostat does not charge light brightness
		<input type="checkbox"/> Buzzer does not sound (Key reminder warning, Seat belt warning)
		<input type="checkbox"/> Seat belt warning lamp for driver's seat does not operate
		<input type="checkbox"/> Seat belt warning lamp for front passenger's seat does not operate
		<input type="checkbox"/> Malfunction in clock display
		<input type="checkbox"/> Multi-information display screen does not change when steering pad switch is operated
		<input type="checkbox"/> Malfunction in average fuel consumption/instantaneous fuel consumption/possible running distance display
		<input type="checkbox"/> The ambient temperature does not display

LOCATION

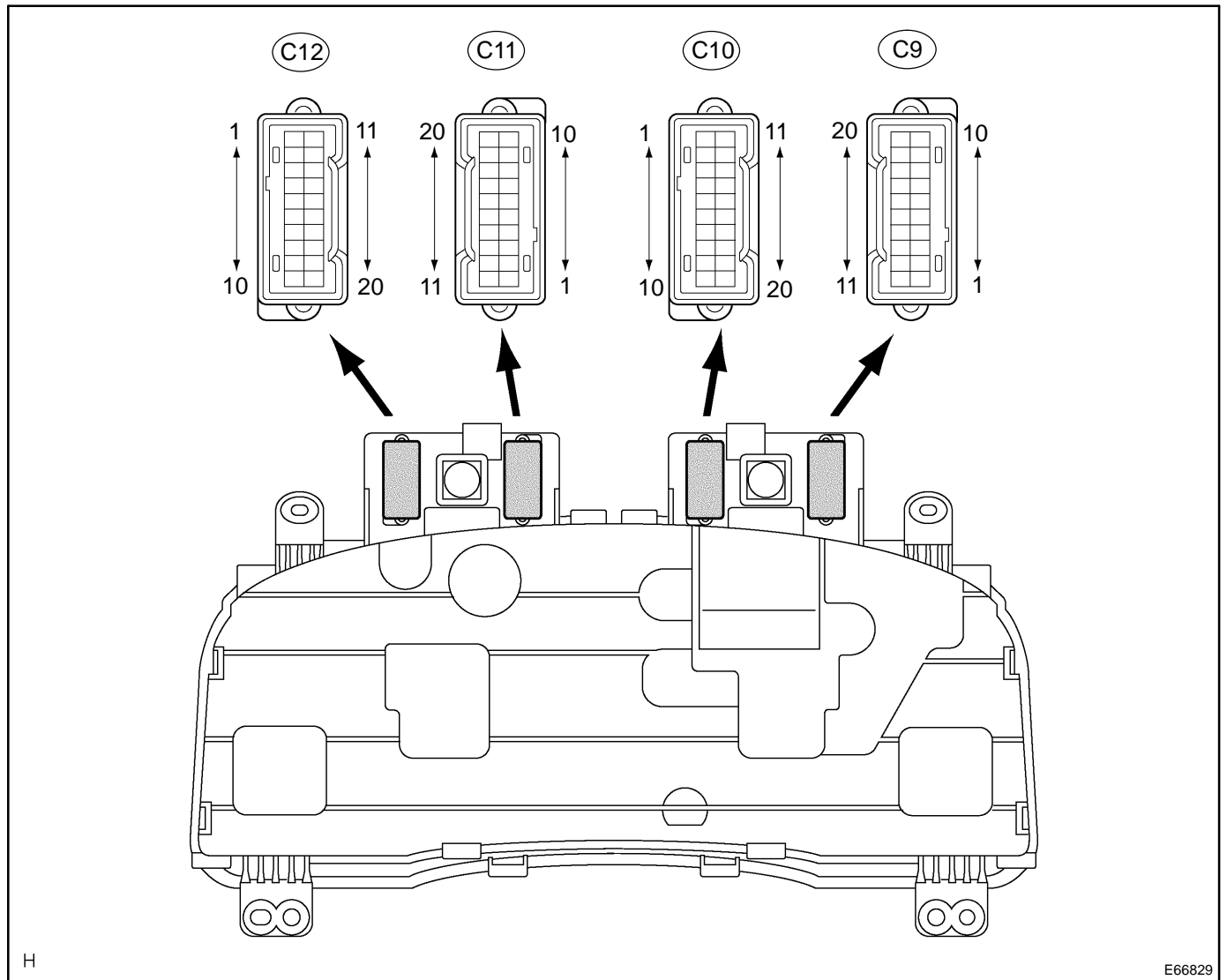


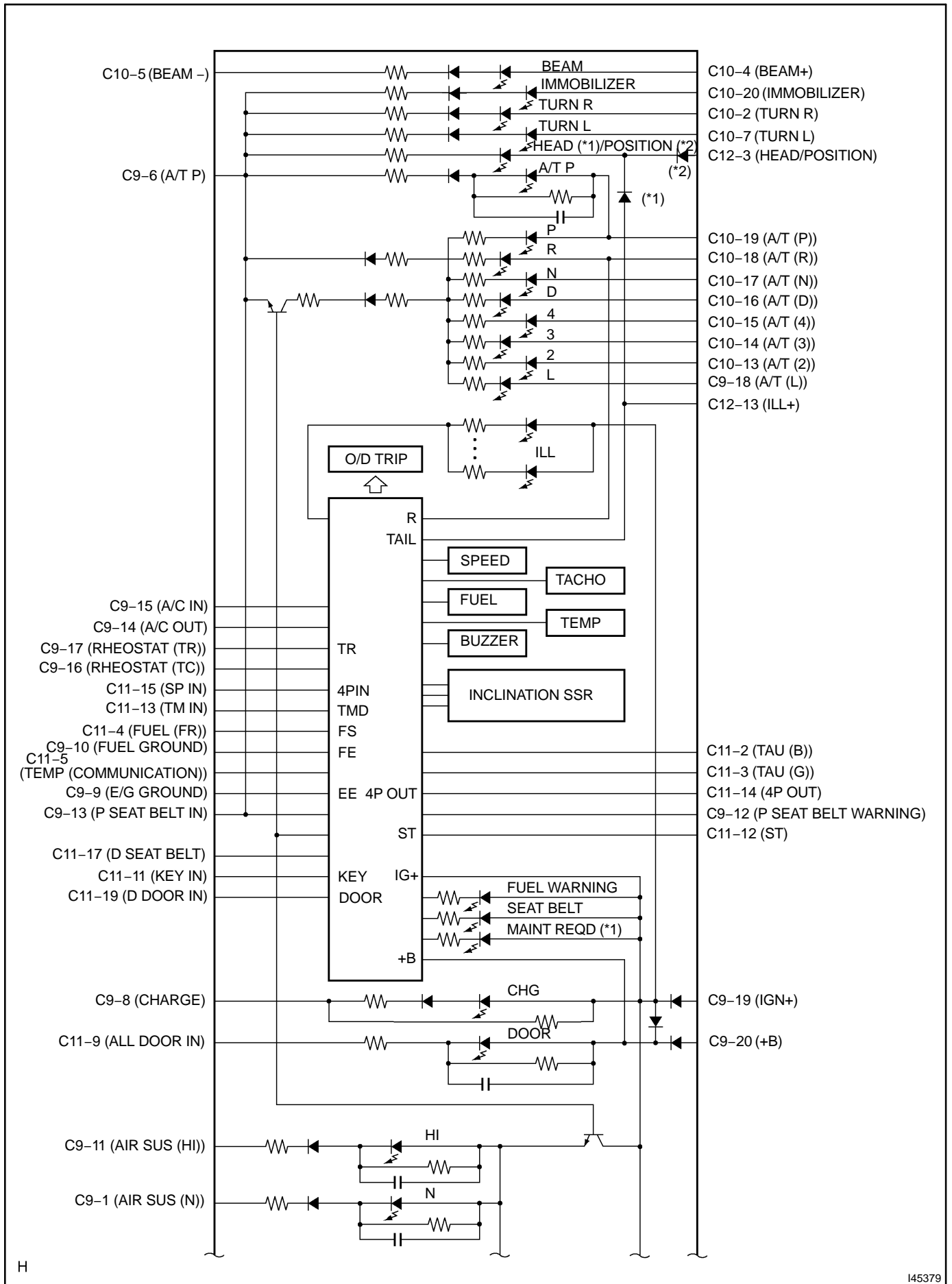


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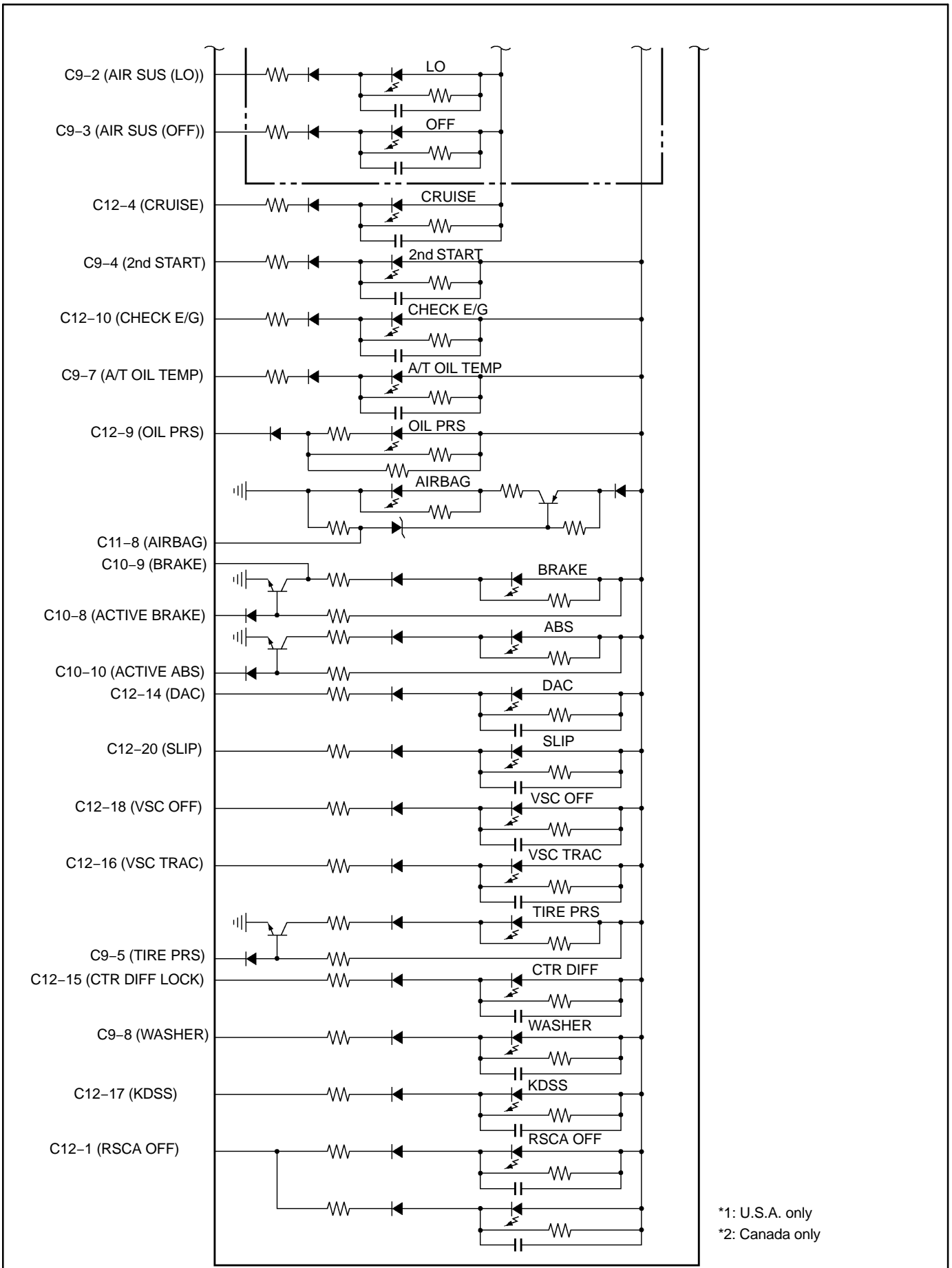
I45392

SYSTEM DIAGRAM





DIAGNOSTICS - COMBINATION METER



*1: U.S.A. only
*2: Canada only

H

I41344

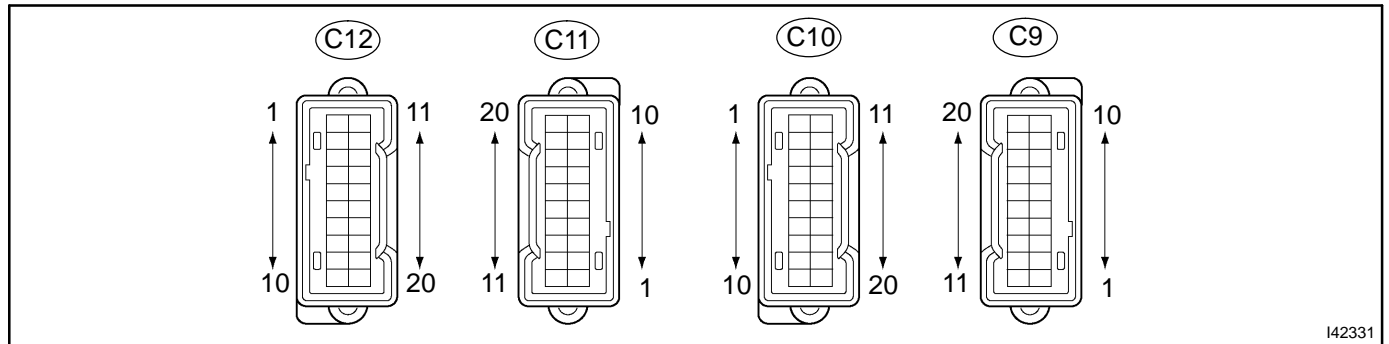
Terminal No.		Wire harness side
C9	1	Air Suspension ECU
	2	Air Suspension ECU
	3	Air Suspension ECU
	4	ECM
	5	Tire Pressure Warning Switch
	6	Transfer Neutral Position Detection Switch
	7	ECM
	8	Washer Level Switch
	9	Ground (E/G)
	10	Ground (Fuel Ground)
	11	Air Suspension ECU
	12	Passenger Seat Belt Warning Light
	13	Front Seat Inner Belt Assy (Driver Side)
	14	Accessory Meter
	15	Accessory Meter
	16	Light Control Rheostat (TC)
	17	Light Control Rheostat (TR)
	18	Park/Neutral Position Switch (L)
	19	GAUGE Fuse
	20	DOME Fuse
C10	1	-
	2	Turn Signal Flasher (R)
	3	Rear Fog Light Switch
	4	HEAD(HI RH) Fuse
	5	Combination Switch
	6	-
	7	Turn Signal Flasher (L)
	8	Skid Control ECU
	9	Oil Level Gauge
	10	Skid Control ECU
	11	-
	12	-
	13	Park/Neutral Position Switch (2)
	14	Park/Neutral Position Switch (3)
	15	Park/Neutral Position Switch (4)
	16	Park/Neutral Position Switch (D)
	17	Park/Neutral Position Switch (N)
	18	Park/Neutral Position Switch (R)
	19	Park/Neutral Position Switch (P)
	20	Theft Deterrent ECU

Terminal No.	Wire harness side	
C11	1	-
	2	AM2 Fuse
	3	ECM
	4	Fuel Sender Gauge Assy
	5	ECM
	6	-
	7	-
	8	Airbag Sensor Assy Center
	9	Body ECU
	10	-
	11	Body ECU
	12	Park/Neutral Position Switch
	13	ECM
	14	All parts that use speed signal (ECM, Navigation ECU, Multi-display, Body ECU, Stereo Component Amplifier, Moon Roof Control ECU & Motor, TPMS ECU, A/C ECU (*1), A/C Control Assy (*2))
	15	Skid Control ECU
	16	-
	17	Front Seat Inner Belt Assy (Passenger Side)
	18	-
	19	Body ECU
	20	-
C12	1	Airbag Sensor Assy Center
	2	Ground (Body Ground)
	3	HEAD (LO LH) Fuse (*3)
	4	ECM (CRUISE)
	5	-
	6	-
	7	-
	8	Alternator L Terminal
	9	Oil Pressure Switch
	10	ECM
	11	-
	12	-
	13	PANEL Fuse
	14	Skid Control ECU
	15	4WD Control ECU
	16	Skid Control ECU
	17	Rear Diff Lock ECU
	18	Skid Control ECU
	19	-
	20	Skid Control ECU

*1: w/ Lexus Navigation System *2: w/o Lexus Navigation System *3: U.S.A. only

TERMINALS OF ECU

1. COMBINATION METER ASSY



I42331

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AIR SUS (N) (C9-1) – Body ground	Y-B – Body ground	Auto height control signal (N)	Ignition switch ON and AIR SUS (N) indicator light OFF → ON	10 to 14 V → Below 2 V
AIR SUS (LO) (C9-2) – Body ground	BR-B – Body ground	Auto height control signal (LO)	Ignition switch ON and AIR SUS (LO) indicator light OFF → ON	10 to 14 V → Below 2 V
AIR SUS (OFF) (C9-3) – Body ground	Y-G – Body ground	Auto height control signal (OFF)	Ignition switch ON and AIR SUS (OFF) indicator light OFF → ON	10 to 14 V → Below 2 V
2nd START (C9-4) – Body ground	GR-R – Body ground	2nd START signal	Ignition switch ON and 2nd START indicator light OFF → ON	10 to 14 V → Below 2 V
TIRE PRESS (C9-5) (*1) – Body ground	L – Body ground	Tire Pressure signal	Ignition switch ON and TIRE PRS indicator light OFF → ON	10 to 14 V → Below 2 V
A/T P (C9-6) – Body ground	G – Body ground	A/T shift condition signal	Ignition switch ON and A/T P indicator light OFF → ON	10 to 14 V → Below 2 V
A/T OIL TEMP (C9-7) – Body ground	P – Body ground	A/T oil temperature signal	Ignition switch ON and A/T OIL TEMP indicator light OFF → ON	10 to 14 V → Below 2 V
WASHER (C9-8) – Body ground	Y-R – Body ground	Washer level signal	Ignition switch ON and WASHER indicator light OFF → ON	10 to 14 V → Below 2 V
ENGINE GROUND (C9-9) – Body ground	BR – Body ground	Ground	Always	Below 1 Ω
FUEL GROUND (C9-10) – Body ground	BR – Body ground	Ground	Always	Below 1 Ω
AIR SUS (HI) (C9-11) – Body ground	Y – Body ground	Auto height control signal (HI)	Ignition switch ON and AIR SUS (HI) indicator light OFF → ON	10 to 14 V → Below 2 V
P SEAT BELT WARNING (C9-12) – Body ground	G-O – Body ground	Seat belt condition signal (Passenger side)	Ignition switch ON and Passenger side seat belt warning light OFF → ON	10 to 14 V → Below 2 V
P SEAT BELT INPUT (C9-13) – Body ground	W-L – Body ground	Seat belt condition signal (Passenger side)	Ignition switch ON and Passenger side seat belt unfastened → fastened	Below 2 V → 10 to 14 V
A/C OUT (C9-14) – Body ground	B – Body ground	Accessory meter signal	Communication circuit	–
A/C IN (C9-15) – Body ground	P – Body ground	Accessory meter signal	Communication circuit	–
RHEOSTAT (TC) (C9-16) – Body ground	G-R – Body ground	Rheostat signal (Light control)	Tail switch ON and rheostat switch Max. position (TC position)	Below 1 Ω
RHEOSTAT (TR) (C9-17) – Body ground	W-G – Body ground	Rheostat signal (Light control)	Rheostat switch Min. (left side position) → Max. (right side position)	10 to 14 V → Below 2 V
A/T (L) (C9-18) – Body ground	G-R – Body ground	A/T shift condition signal (L)	Ignition switch ON and A/T (L) indicator light OFF → ON	Below 2 V → 10 to 14 V

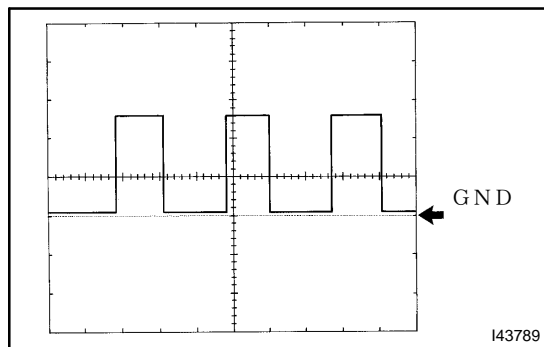
DIAGNOSTICS - COMBINATION METER

IGN+ (C9-19) - Body ground	R-L - Body ground	Ignition switch signal	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
+B (C9-20) - Body ground	R - Body ground	Battery	Always	10 to 14 V
TURN R (C10-2) - Body ground	L-Y - Body ground	Turn signal flasher (R)	Turn signal RH indicator light OFF → ON	Below 2 V → 10 to 14 V
BEAM+ (C10-4) - Body ground	R-W - Body ground	Hi-beam signal	BEAM indicator light OFF → ON	Below 2 V → 10 to 14 V
BEAM- (C10-5) - Body ground	R-G - Body ground	Hi-beam signal	Always	Below 1 Ω
TURN L (C10-7) - Body ground	L-B - Body ground	Turn signal flasher (L)	Turn signal LH indicator light OFF → ON	Below 2 V → 10 to 14 V
ACTIVE BRAKE (C10-8) - Body ground	B-L - Body ground	BRAKE signal	Ignition switch ON and BRAKE indi- cator light OFF → ON	Below 2 V → 10 to 14 V
BRAKE (C10-9) - Body ground	LG - Body ground	BRAKE signal	Ignition switch ON and BRAKE indi- cator light OFF → ON	10 to 14 V → Below 2 V
ABS (C10-10) - Body ground	LG-R - Body ground	ABS signal	Ignition switch ON and ABS indica- tor light OFF → ON	Below 2 V → 10 to 14 V
A/T (2) (C10-13) - Body ground	L - Body ground	A/T shift condition signal (2)	Ignition switch ON and A/T (2) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (3) (C10-14) - Body ground	G-O - Body ground	A/T shift condition signal (3)	Ignition switch ON and A/T (3) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (4) (C10-15) - Body ground	P-L - Body ground	A/T shift condition signal (4)	Ignition switch ON and A/T (4) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (D) (C10-16) - Body ground	B-R - Body ground	A/T shift condition signal (D)	Ignition switch ON and A/T (D) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (N) (C10-17) - Body ground	G-W - Body ground	A/T shift condition signal (N)	Ignition switch ON and A/T (N) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (R) (C10-18) - Body ground	R-B - Body ground	A/T shift condition signal (R)	Ignition switch ON and A/T (R) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
A/T (P) (C10-19) - Body ground	G-B - Body ground	A/T shift condition signal (P)	Ignition switch ON and A/T (P) indi- cator light OFF → ON	Below 2 V → 10 to 14 V
IMMOBILIZER (C10-20) - Body ground	V-W - Body ground	IMMOBILIZER signal	IMMOBILIZER indicator light OFF → ON	Below 2 V → 10 to 14 V
TAU (B) (C11-2) - Body ground	B-R - Body ground	Fuel signal	Ignition switch ON and Engine idle speed	Pulse generation (See wave form 3)
TAU (G) (C11-3) - Body ground	R-L - Body ground	Fuel signal	Ignition switch ON and Engine idle speed	Pulse generation (See wave form 2)
FUEL (FR) (C11-4) - Body ground	BR-R - Body ground	Fuel signal	Ignition switch ON and Fuel level is full → empty	Below 2 V → 6 V
TEMP (COMMUNICATION) (C11-5) - Body ground	P-B - Body ground	Water temperature communication signal	Ignition switch ON, engine coolant temp. 50°C (122.0°F) to 120°C (248°F)	Pulse generation (See wave form 4)
AIR BAG (C11-8) - Body ground	B-Y - Body ground	AIRBAG signal	Ignition switch ON and AIRBAG indi- cator light OFF → ON	10 to 14 V → Below 2 V
ALL DOOR INPUT (C11-9) - Body ground	V-Y - Body ground	Door condition signal (Except D door)	Any of the doors except driver door closed → open	10 to 14 V → Below 2 V
KEY IN (C11-11) - Body ground	LG-B - Body ground	KEY switch signal	Ignition switch OFF and ignition key inserted → no ignition key inserted	Below 2 V → 10 to 14 V
ST (C11-12) - Body ground	B-Y - Body ground	Starting signal	Ignition ON → START	Below 2 V → 10 to 14 V

TM IN (C11-13) - Body ground	B-W - Body ground	Tachometer signal (Input)	Ignition switch ON and engine idle speed	Pulse generation (See wave form 2)
4P OUT (C11-14) - Body ground	V-R - Body ground	Speed signal (Output)	Ignition switch ON and turn the wheel slowly	Pulse generation (See wave form 1)
SP IN (C11-15) - Body ground	P-L - Body ground	Speed signal (Input)	Ignition switch ON and turn the wheel slowly	Pulse generation (See wave form 1)
D SEAT BELT (C11-17) - Body ground	GR-B - Body ground	Seat belt condition signal (Driver side)	Driver seat belt warning light Blinks → OFF	Below 2 V → 10 to 14 V
D DOOR IN (C11-19) - Body ground	L-B - Body ground	Driver door condition signal	Driver side door is closed → open	10 to 14 V → Below 2 V
RSCA OFF (C12-1) (*1) - Body ground	Y-R - Body ground	RSCA OFF signal	Ignition switch ON and RSCA OFF indicator light OFF → ON	10 to 14 V → Below 2 V
HEAD/POSITION (C12-3) - Body ground	R-Y - Body ground	HEAD/POSITION signal	Ignition switch ON and HEAD (*1)/ POSITION (*2) indicator light OFF → ON	Below 2 V → 10 to 14 V
CRUISE (C12-4)- Body ground	LG - Body ground	CRUISE signal	Ignition switch ON and CRUISE indicator light OFF → ON	10 to 14 V → Below 2 V
CHARGE (C12-8) - Body ground	GR - Body ground	CHARGE signal	Ignition switch ON and CHARGE indicator light OFF → ON	10 to 14 V → Below 2 V
OIL PRS (C12-9) - Body ground	LG-B - Body ground	Oil pressure signal	Ignition switch ON and OIL PRS indicator light OFF → ON	10 to 14 V → Below 2 V
CHECK E/G (C12-10) - Body ground	R-B - Body ground	CHECK E/G signal	Ignition switch ON and CHECK E/G warning light OFF → ON	10 to 14 V → Below 2 V
ILL+ (C12-13) - Body ground	G - Body ground	Taillight signal (Light control)	Combination switch OFF → Tail	Below 2 V → 10 to 14 V
DAC (C12-14) - Body ground	BR-Y - Body ground	Downhill assist control signal	Ignition switch ON and DAC indicator light OFF → ON	10 to 14 V → Below 2 V
CTR DIFF LOCK (C12-15) - Body ground	G-W - Body ground	Center differential lock signal	Ignition switch ON and CTR DIFF LOCK or 4WD indicator light OFF → ON	10 to 14 V → Below 2 V
VSC TRAC (C12-16) - Body ground	Y-R - Body ground	VSC TRAC signal	Ignition switch ON and VSC TRAC indicator light OFF → ON	10 to 14 V → Below 2 V
KDSS (12-17) - Body ground	L - Body ground	KDSS signal	Ignition switch ON and KDSS indicator light OFF → ON	10 to 14 V → Below 2 V
VSC OFF (12-18) - Body ground	L-O - Body ground	VSC OFF signal	Ignition switch ON and VSC OFF indicator light OFF → ON	10 to 14 V → Below 2 V
SLIP (C12-20) - Body ground	R - Body ground	SLIP signal	Ignition switch ON and SLIP indicator light OFF → ON	10 to 14 V → Below 2 V

*1: U.S.A. only

*2: Canada only

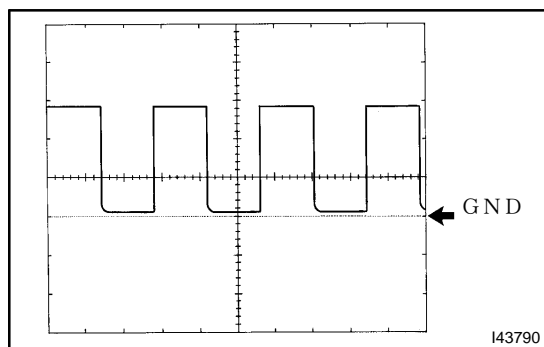


Wave Form 1 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/ DIV., 200 ms/ DIV.
Vehicle condition	Driving at approx. 20 km/h (12.4 mph)

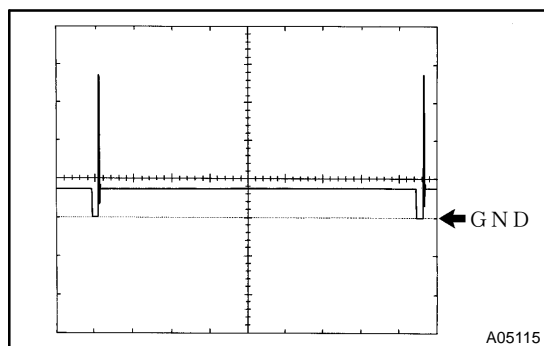
HINT:

As vehicle speed increases, the cycle of the signal wave form narrows.



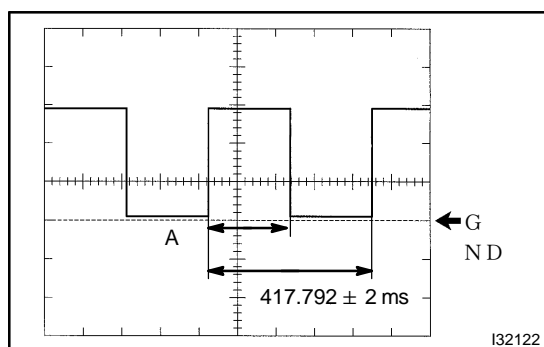
Wave Form 2 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	10 V/ DIV., 20 ms/ DIV.
Vehicle condition	Engine idle speed



Wave Form 3 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	10 V/ DIV., 20 ms/ DIV.
Vehicle condition	Engine idle speed



Wave Form 4 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 100 ms/DIV.
Vehicle condition	Ignition switch ON, engine coolant temp. 50°C (122.0°F) to 120°C (248°F)

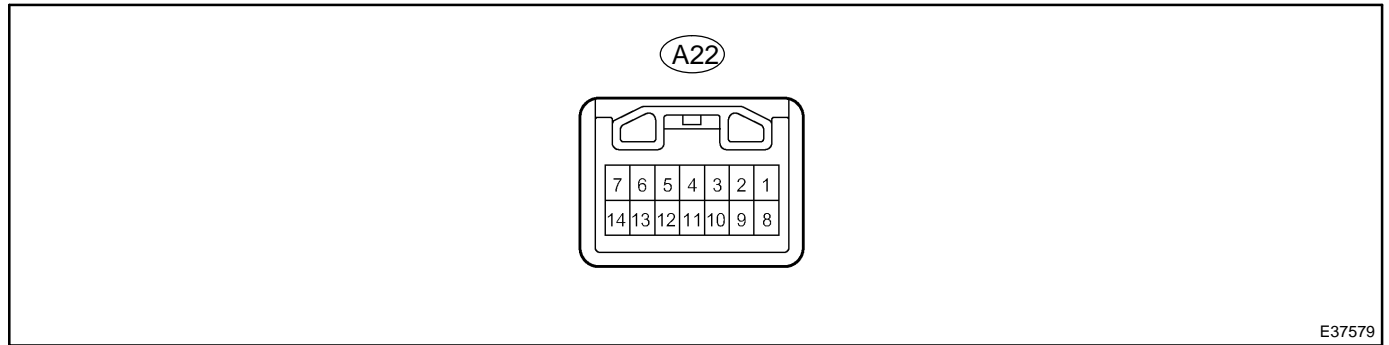
HINT:

As water temperature rises, period "A" shown in the illustration becomes longer.

Standard:

Water temperature	A
less than 50°C (122.0°F)	98.304 ± 2 ms
83°C (181.4°F)	233.472 ± 2 ms
120°C (248.0°F)	385.024 ± 2 ms

2. ACCESSORY METER



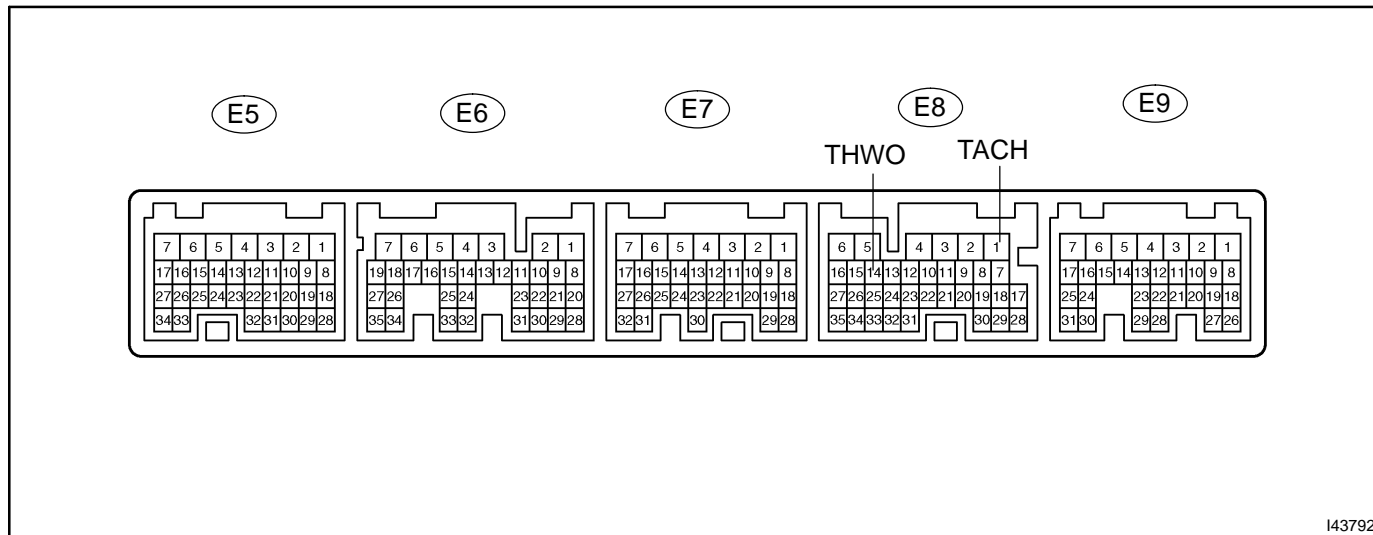
E37579

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (A22-1) – Body ground	W-B – Body ground	Ground	Always	Below 1 Ω
SG (A22-2) – Body ground	Y-G – Body ground	Outside temperature sensor signal	Always	Below 1 Ω
TH+ (A22-3) – Body ground	Y-R(*1)/GR(*2) – Body ground	Outside temperature sensor signal	Ignition switch ON and outside temperature is –9 °C (15.8 °F)	3.24 V
			Ignition switch ON and outside temperature is 43 °C (109.4 °F)	0.73 V
DMIN (A22-4) – Body ground	B – Body ground	Drive monitor signal	Communication circuit	–
SWOT (A22-5) – Body ground	P – Body ground	Reset switch signal	Communication circuit	–
TAIL (A22-6) – Body ground	G(*1) / W(*2) – Body ground	Illumination signal	Combination switch OFF → TAIL	Below 1 V → 10 to 14 V
TC (A22-8) – Body ground	GR – Body ground	Tail cancel signal (Light control)	Tail cancel switch OFF → ON	Below 1 V → 10 to 14 V
DATA (A22-9) – Body ground	G-O(*1) / GR(*2) – Body ground	Outside temperature data signal	Ignition switch ON	Pulse generation
IG (A22-12) – Body ground	B-R – Body ground	Ignition switch signal	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
ACC (A22-13) – Body ground	GR – Body ground	ACC switch signal	Ignition switch OFF → ON	Below 1 V → 10 to 14 V
+B (A22-14) – Body ground	W-R(*1)/R(*2) – Body ground	Battery	Always	10 to 14 V

*1: w/ LEXUS Navigation System

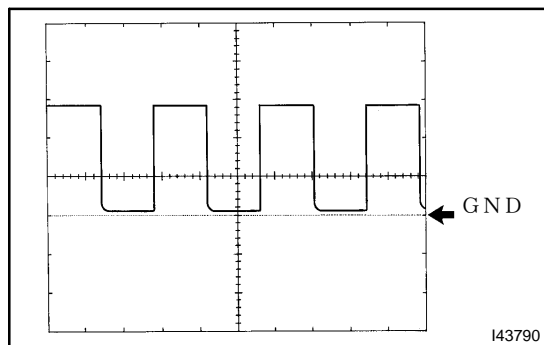
*2: w/o LEXUS Navigation System

3. ECM



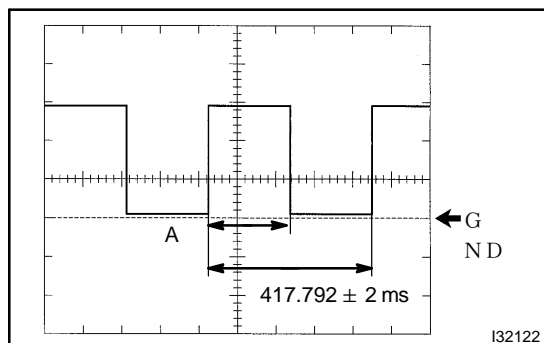
I43792

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
TACH (E8-1) - Body ground	B-W - Body ground	Tachometer signal	Ignition switch OFF → ON, engine idle speed	Pulse generation (See wave form 1)
THWO (E8-14) - Body ground	P-B - Body ground	Water temperature signal	Ignition switch ON, engine coolant temp. 50°C (122.0°F) to 120°C (248°F)	Pulse generation (See wave form 2)



Wave Form 1 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	10 V/DIV., 20 ms/DIV.
Vehicle condition	Engine idle speed



Wave Form 2 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 100 ms/DIV.
Vehicle condition	Ignition switch ON, engine coolant temp. 50°C (122.0°F) to 120°C (248°F)

HINT:

As water temperature rises, period "A" shown in the illustration becomes longer.

Standard:

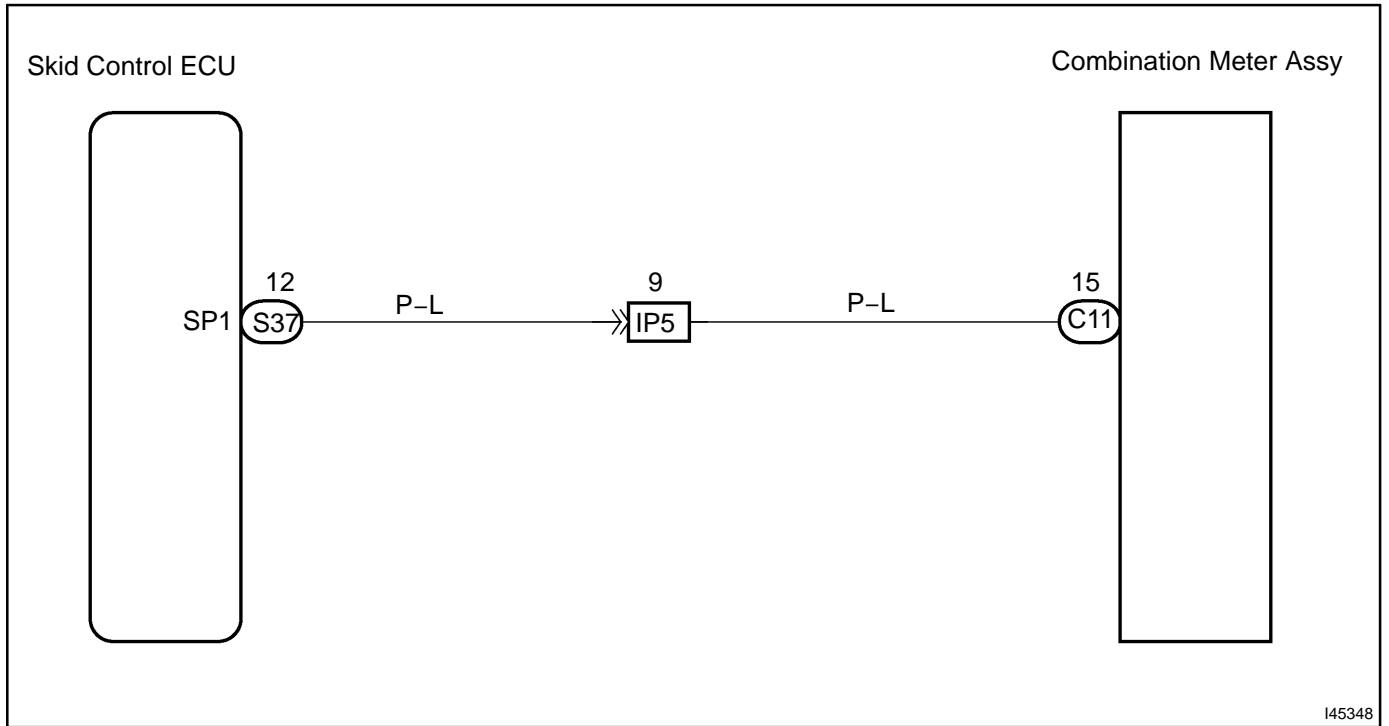
Water temperature	A
less than 50°C (122.0°F)	98.304 ± 2 ms
83°C (181.4°F)	233.472 ± 2 ms
120°C (248.0°F)	385.024 ± 2 ms

PROBLEM SYMPTOMS TABLE

Chart No.	Symptom	See page
1	Malfunction in speedometer	05-2049
2	Malfunction in tachometer	05-2052
3	Malfunction in water temperature receiver gauge	05-2055
4	Malfunction in fuel receiver gauge	05-2058
5	Operating light control rheostat does not change light brightness	05-2060
6	Entire combination meter does not operate	05-2063
7	Seat belt warning lamp for driver's seat does not operate	05-2065
8	Seat belt warning lamp for front passenger's seat does not operate	05-2067
9	Malfunction in average fuel consumption/instantaneous fuel consumption/possible running distance display	05-2071
10	The ambient temperature does not display	05-2073

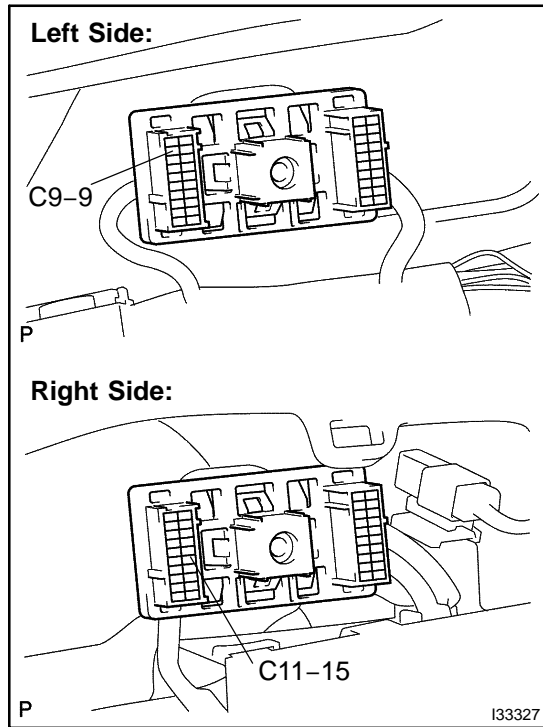
MALFUNCTION IN SPEEDOMETER

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT COMBINATION METER ASSY



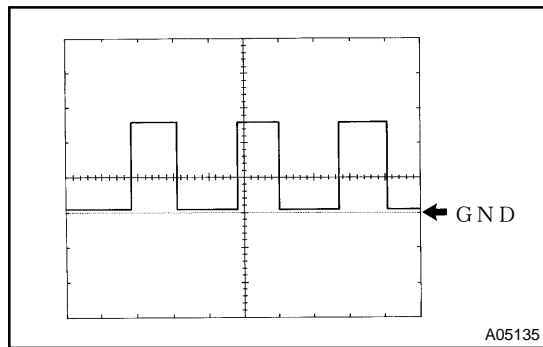
(REFERENCE) INSPECTION USING OSCILLOSCOPE

- (a) Check the input signal waveform.
 - (1) Remove the combination meter assy.
 - (2) Connect the oscilloscope to the terminal C11-15 and C9-9 of combination meter assy.
 - (3) Start the engine.
 - (4) Check the signal waveform.

Item	Condition
Tool setting	5 V/ DIV., 200 ms/ DIV.
Vehicle condition	Driving at approx. 20Km/h

HINT:

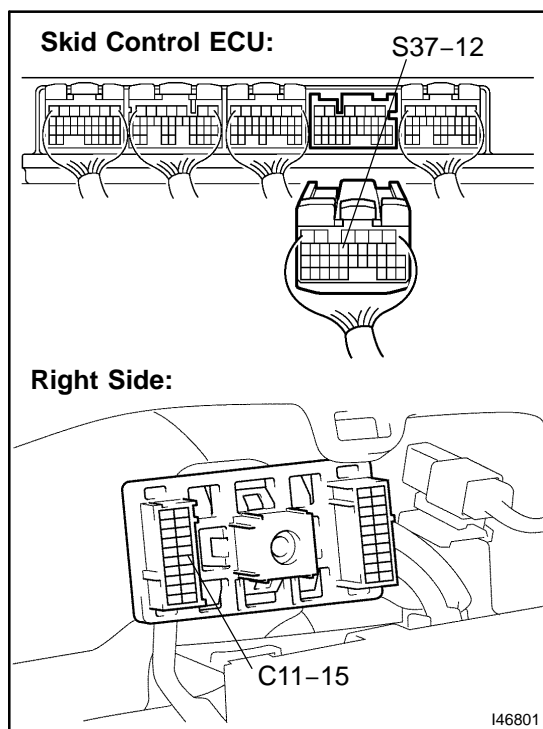
As the vehicle speed becomes higher, the cycle becomes shorter.



OK REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

NG

2 CHECK HARNESS AND CONNECTOR(BETWEEN SKID CONTROL ECU AND COMBINATION METER ASSY)



- (a) Remove the combination meter.
- (b) Disconnect the connector from skid control ECU.
- (c) Check the continuity between terminal S37-12 (SP1) of skid control ECU and C11-15 of combination meter connector.

Standard: There is continuity.

OK

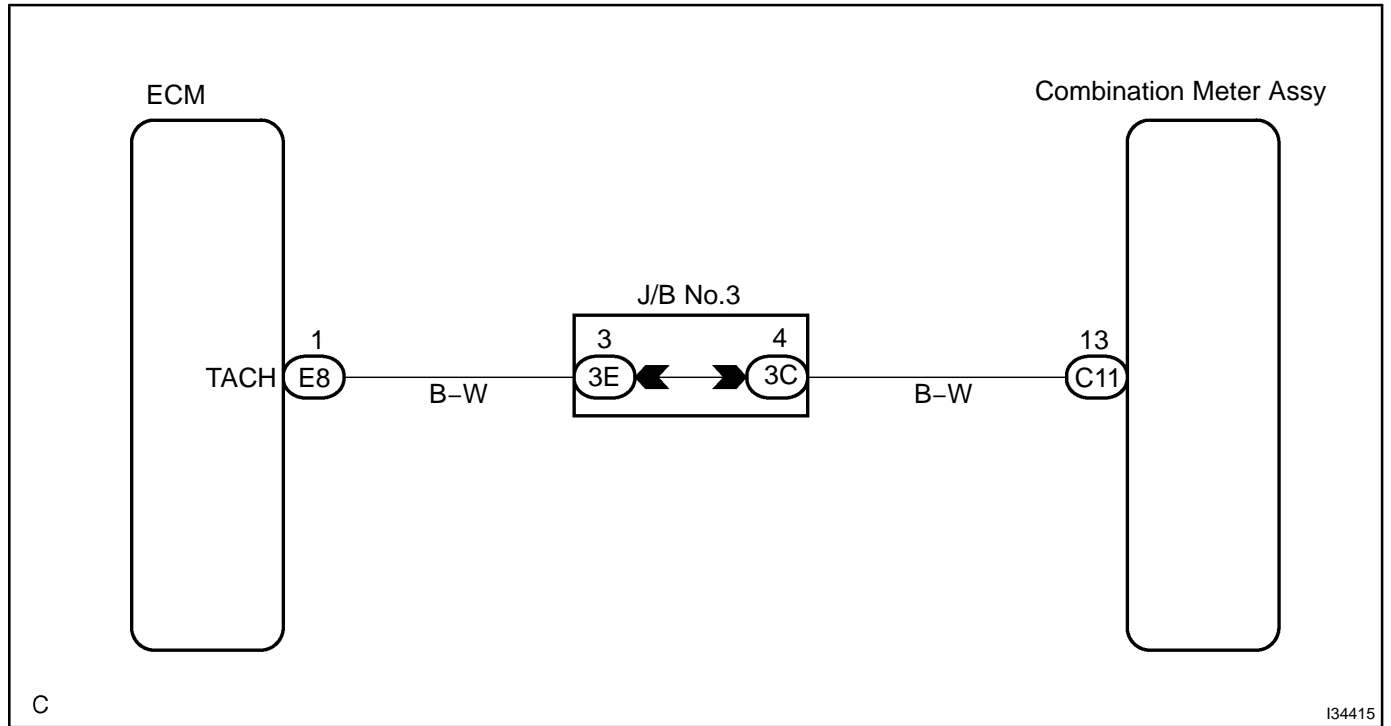
**REPLACE SKID CONTROL ECU ASSY
(SEE PAGE 05-750)**

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

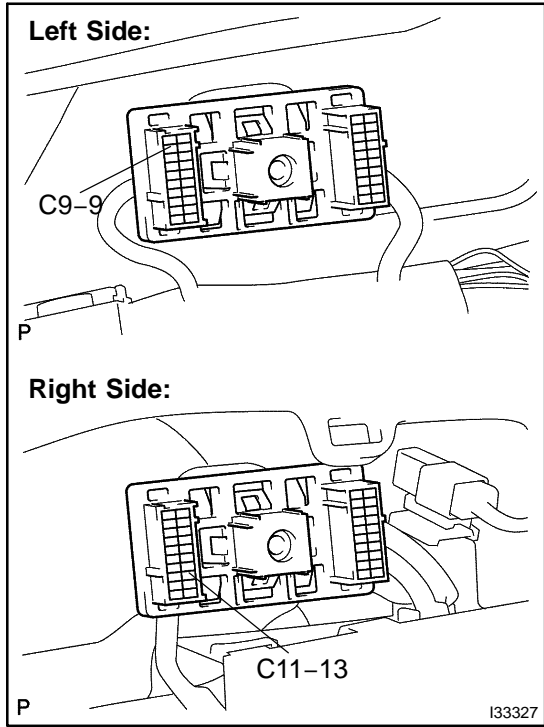
MALFUNCTION IN TACHOMETER

WIRING DIAGRAM



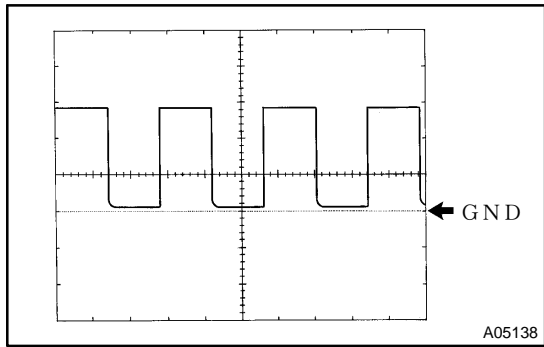
INSPECTION PROCEDURE

1 INSPECT COMBINATION METER ASSY



(REFERENCE) INSPECTION USING OSCILLOSCOPE

- (a) Check the input signal wave form.
 - (1) Remove the combination meter assy.
 - (2) Connect the oscilloscope to the terminals C9-9 and C11-13 of combination meter connector.
 - (3) Start engine.



- (4) Check the signal wave form.

Item	Condition
Tool setting	5 V/ DIV., 20 ms/ DIV.
Vehicle condition	Engine idle speed

OK REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

NG

2	CHECK HARNESS AND CONNECTOR(BETWEEN ECM AND COMBINATION METER ASSY)
----------	--

- (a) Remove the combination meter assy.
- (b) Disconnect the connector from ECM.
- (c) Check the continuity between terminals 1 (TACH) of ECM and C11-13 of combination meter connector (See Page [05-2042](#)).

Standard: There is continuity.

OK

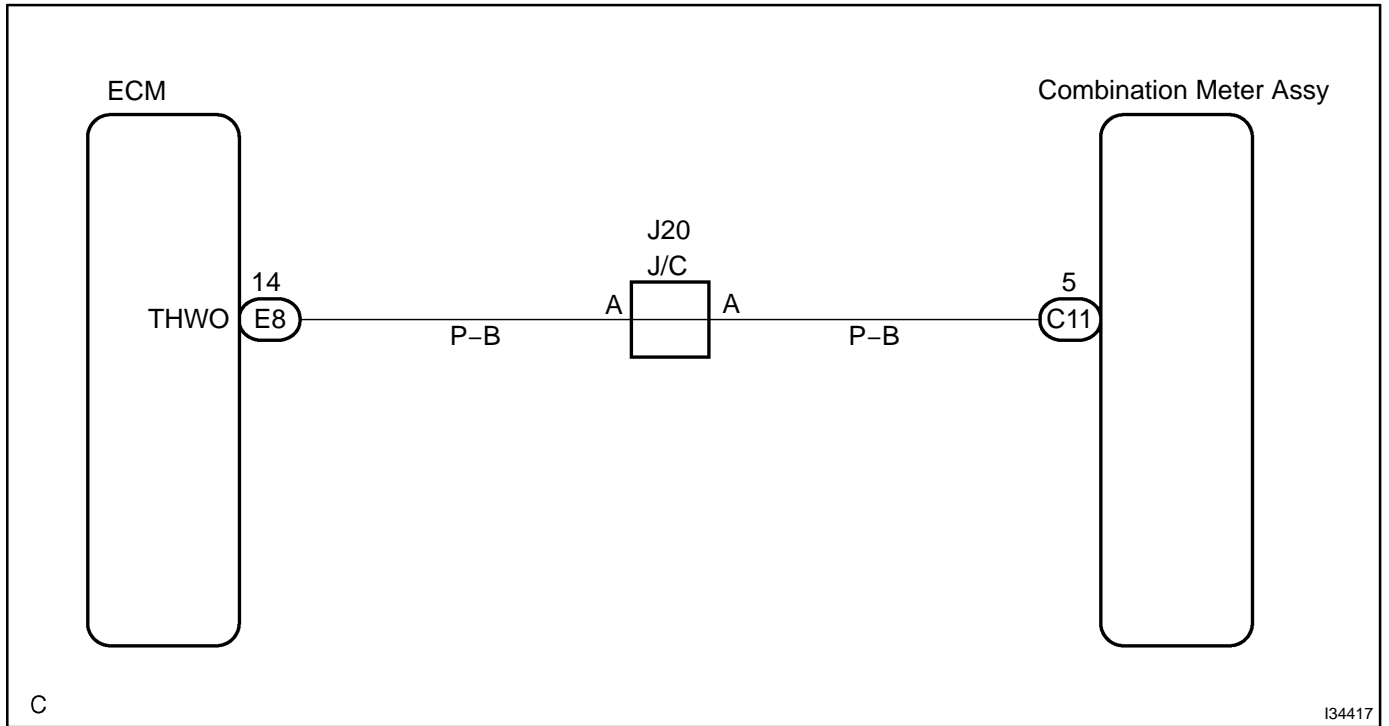
REPLACE ECM

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

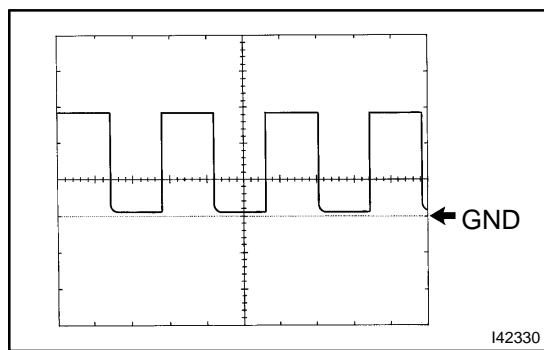
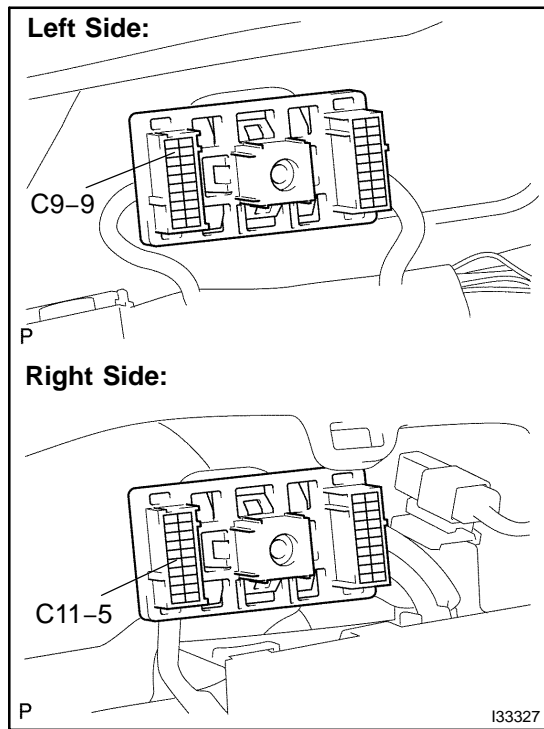
MALFUNCTION IN WATER TEMPERATURE RECEIVER GAUGE

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT COMBINATION METER ASSY



(REFERENCE) INSPECTION USING AN OSCILLOSCOPE

- (a) Check the input signal waveform.
 - (1) Remove the combination meter assy.
 - (2) Connect the oscilloscope to the terminals C11-5 and C9-9 of combination meter connector.
 - (3) Start engine.

- (4) Check the signal waveform.

Item	Condition
Tool setting	5 V/DIV., 10 ms/DIV.
Vehicle condition	Ignition switch ON, engine coolant temp. 50°C (122.0°F) to 120°C (248°F)

HINT:

As water temperature rises, period "A" shown in the illustration becomes longer.

Standard:

Water temperature	A
less than 50°C (122.0°F)	98.304 ± 2 ms
83°C (181.4°F)	233.472 ± 2 ms
120°C (248.0°F)	385.024 ± 2 ms

Result:

NG	A
OK	B

B REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

A

2	CHECK HARNESS AND CONNECTOR(BETWEEN ECM AND COMBINATION METER)
----------	---

- (a) Remove the combination meter.
(b) Check the continuity between terminals 14 (THWO) of ECM and C11-5 of combination meter connector(See Page [05-2042](#)).

Standard: There is continuity.

NG

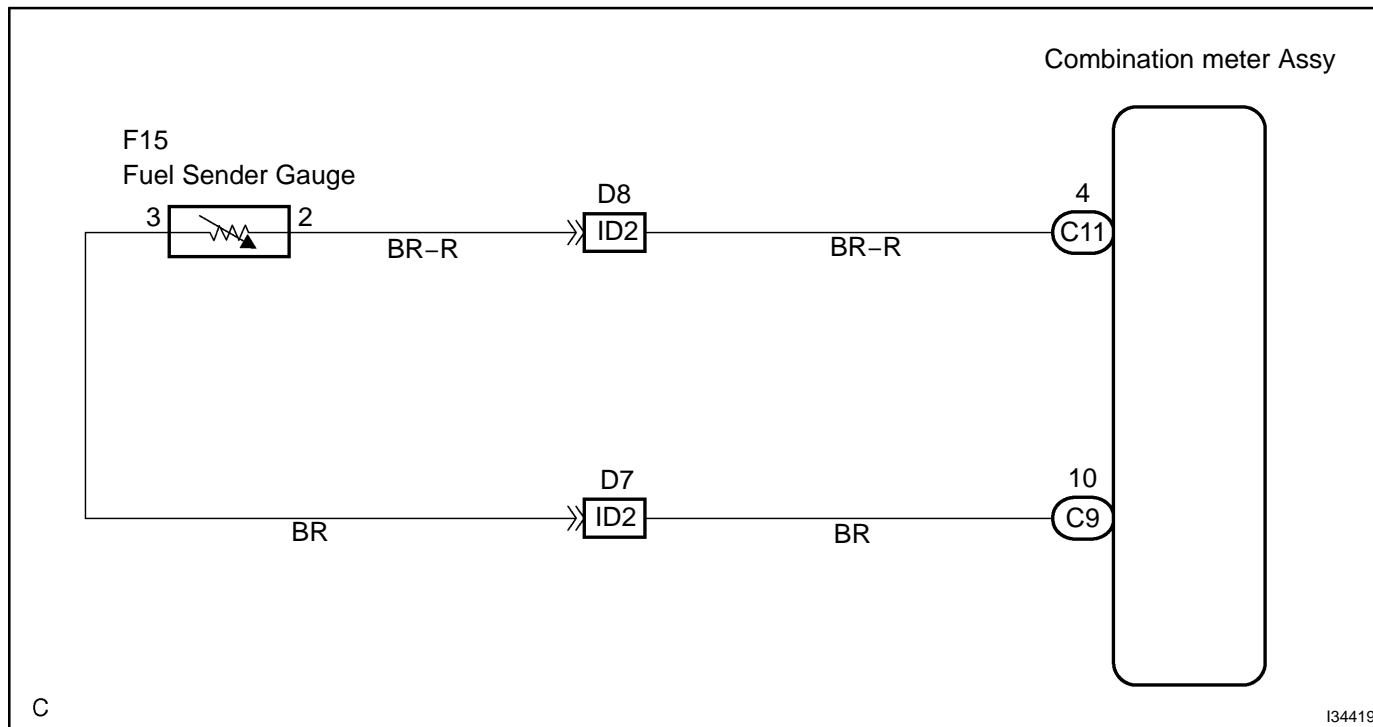
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM

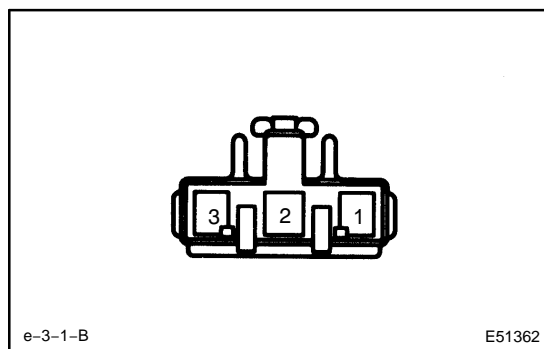
MALFUNCTION IN FUEL RECEIVER GAUGE

WIRING DIAGRAM



INSPECTION PROCEDURE

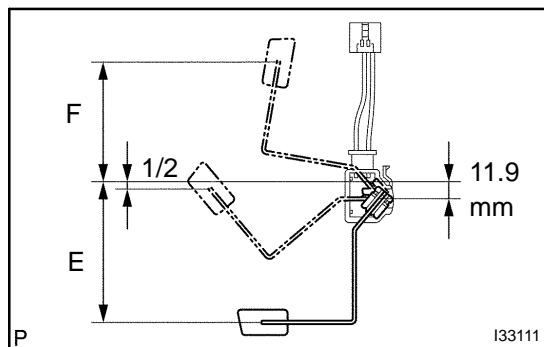
1 INSPECT FUEL SENDER GAUGE ASSY



- (a) Remove the fuel sender gauge assy.
- (b) Check the float position is between E and F and measure the resistance between terminals 2 and 3 of the connector. Check that the resistance value changes continuously.

Standard voltage:

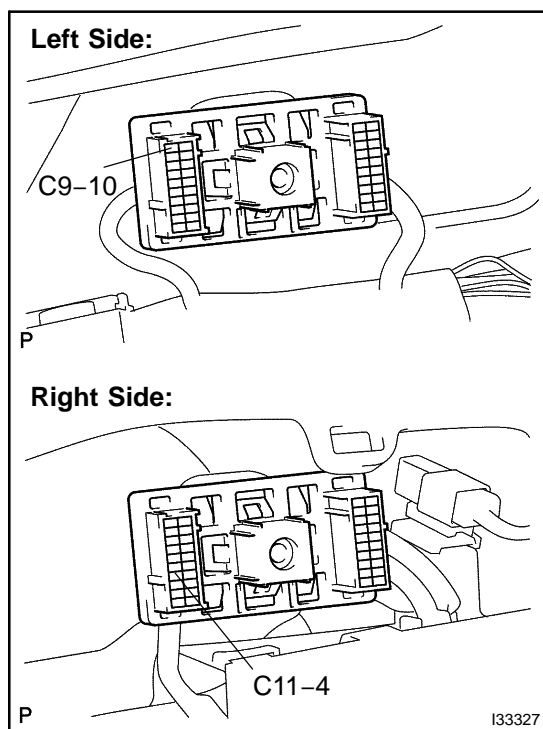
Float level	Float position mm (in.)	Resistance (Ω)
F	88.6 (3.49) ± 3 (0.12)	4.0 ± 1
1/2	6.4 (0.25)	59
E	102.9 (4.05) ± 3 (0.12)	110.0 ± 2.5



NG → REPLACE FUEL SENDER GAUGE ASSY

OK

2 CHECK HARNESS AND CONNECTOR(BETWEEN FUEL SENDER GAUGE ASSY AND COMBINATION METER)



- (a) Remove the combination assy and fuel sender gauge.
- (b) Check the continuity between terminal 3 of fuel sender gauge and C9-10 of combination meter assy.
Standard: There is continuity.
- (c) Check the continuity between terminal 2 of fuel sender gauge and C11-4 of combination meter assy.
Standard: There is continuity.

NG

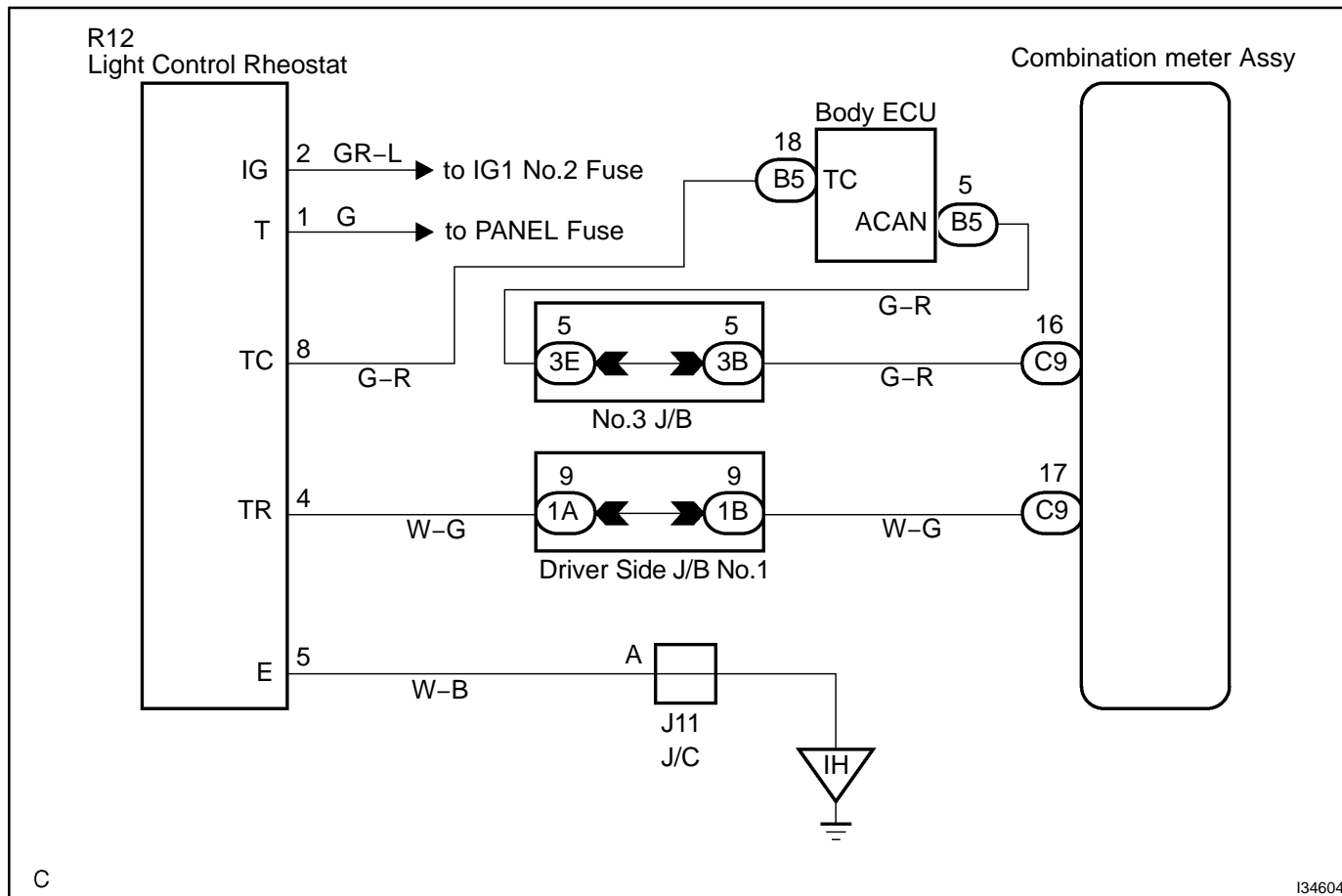
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

OPERATING LIGHT CONTROL RHEOSTAT DOES NOT CHANGE LIGHT BRIGHTNESS

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK ILLUMINATION

- (a) Operate the rheostat and check that the quantity of light for the combination meter assy, audio system and A/C control panel etc. are normally changed.

Result:

Combination meter does not change.	A
All light do not change.	B

B → Go to step 5

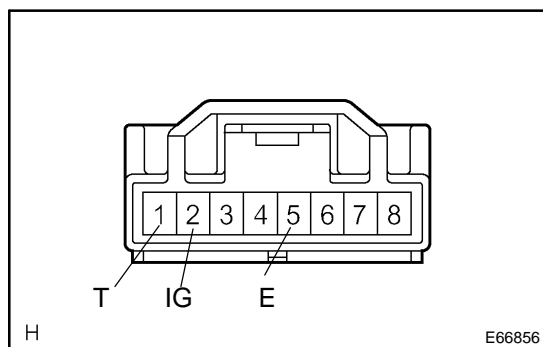
A

2 READ VALUE OF HAND-HELD TESTER

- (a) Check the date list of body ECU.

OK → NORMAL

NG

3 INSPECT LIGHT CONTROL RHEOSTAT

- (a) Check the continuity of light control rheostat when light control rheostat operation as shown in chart below.

Standard:

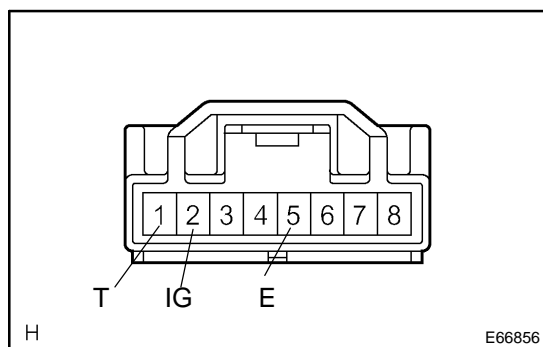
Terminal (Symbol)	Condition	Specified condition
1 (T) ↔ Body ground	Ignition switch ON, Tail-light switch OFF → ON	Below 1V → 10 - 14V
2 (IG) ↔ Body ground	Ignition switch OFF → ON	Below 1V → 10 - 14V
5 (E) ↔ Body ground	Constant	Continuity

NG**REPLACE LIGHT CONTROL RHEOSTAT****OK****4 CHECK HARNESS AND CONNECTOR**

- (a) Check the continuity between terminals 8 (TC) of light control rheostat and B5-18 of combination meter connector.

Standard: There is continuity.

- (b) Check the continuity between terminals C9-16 of combination meter assy and B5-5 of body ECU.

Standard: There is continuity.**OK****REPLACE COMBINATION METER ASSY
(SEE PAGE 71-24)****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****5 INSPECT LIGHT CONTROL RHEOSTAT**

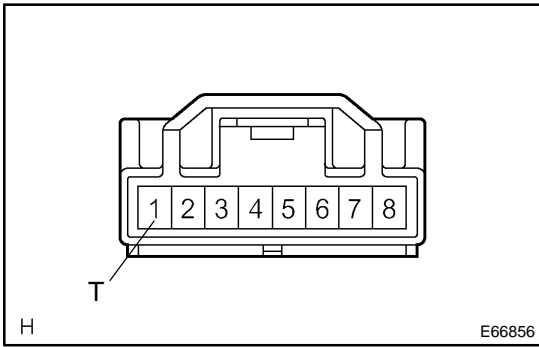
- (a) Check the continuity of light control rheostat when light control rheostat operation as shown in chart below.

Standard:

Terminal (Symbol)	Condition	Specified condition
1 (T) ↔ Body ground	Ignition switch ON, Tail-light switch OFF → ON	Below 1V → 10 - 14V
2 (IG) ↔ Body ground	Ignition switch OFF → ON	Below 1V → 10 - 14V
5 (E) ↔ Body ground	Constant	Continuity

NG**REPLACE LIGHT CONTROL RHEOSTAT****OK**

6 CHECK HARNESS AND CONNECTOR(BETWEEN LIGHT CONTROL RHEOSTST AND INSTRUMENT PANEL JUNCTION)



- (a) Check the continuity between 1 (T) of light control rheostat and R12-21 of instrument panel junction block assy.
Standard: There is continuity.

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7 INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY

- (a) Measure voltage between terminal R12-21 of instrument panel junction block assy and body ground.
Standard:

Combination switch	Specified condition
OFF	Below 1 V
TAIL	10 to 14 V

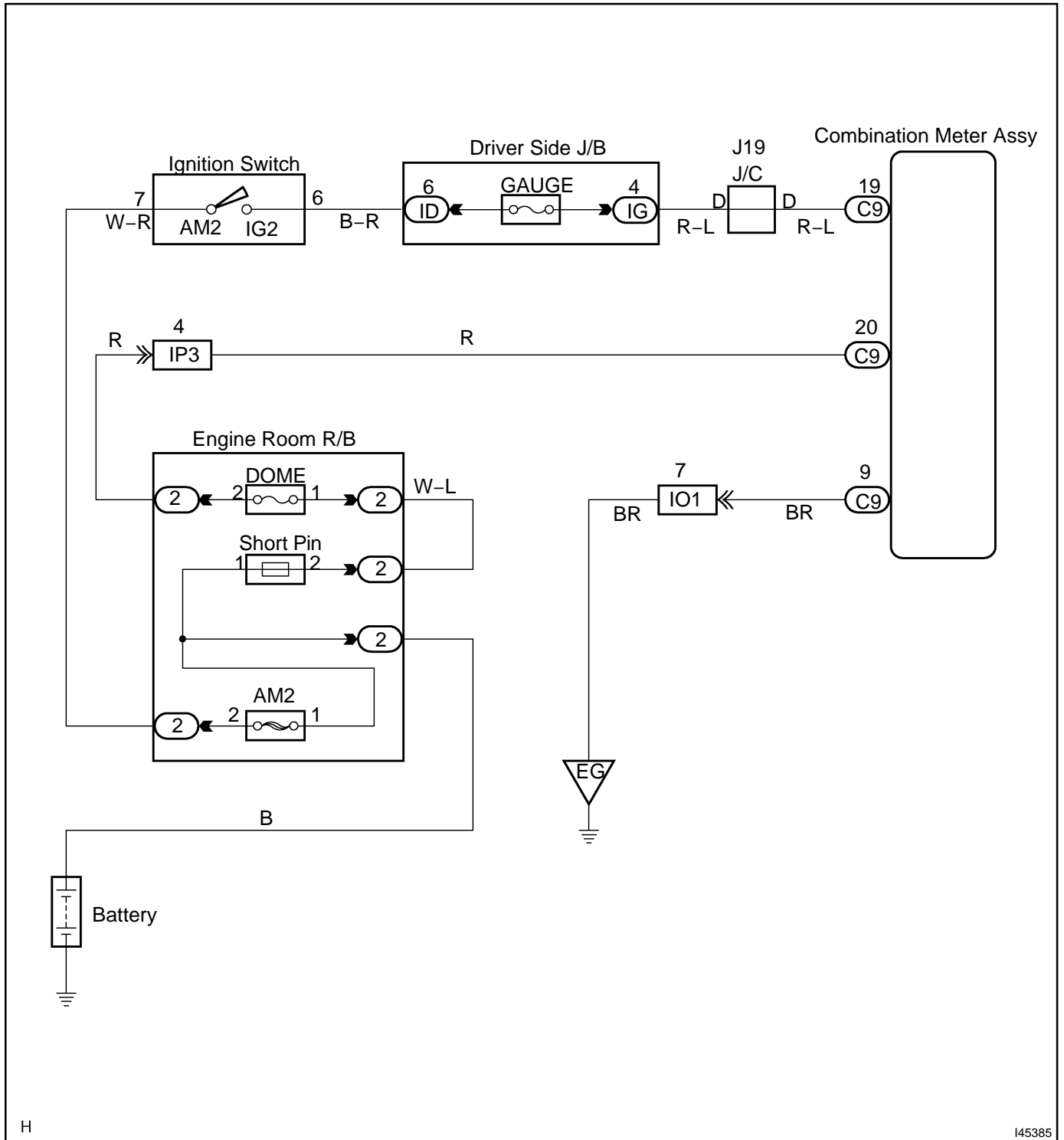
OK REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

NG

REPAIR OR REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

ENTIRE COMBINATION METER DOES NOT OPERATE

WIRING DIAGRAM



H

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INSPECTION PROCEDURE

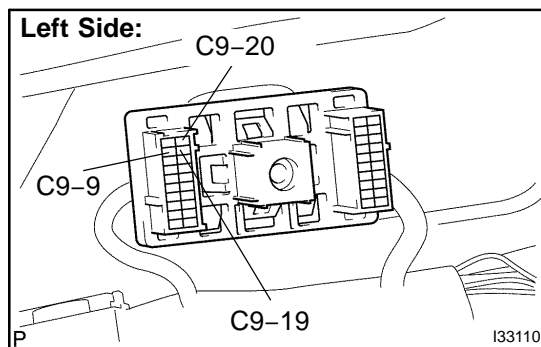
1 INSPECT FUSE(GAUGE, DOME)

- (a) Check the continuity in GAUGE fuse.
- (b) Check the continuity in DOME fuse.

NG → REPLACE FUSE

OK

2 INSPECT COMBINATION METER ASSY(POWER SOURCE AND GROUND CIRCUIT)



- (a) Remove combination meter assy.
- (b) Check continuity.
 - (1) Check the continuity between terminals C9-9 of combination meter connector and body ground.

Standard: There is continuity.

- (c) Check voltage.
 - (1) Measure voltage between terminal C9-20 of combination meter connector and body ground.
 - (2) Turn the ignition switch to ON.
 - (3) Measure voltage between terminal C9-19 of combination meter connector and body ground.

Standard voltage: 10 to 14 V

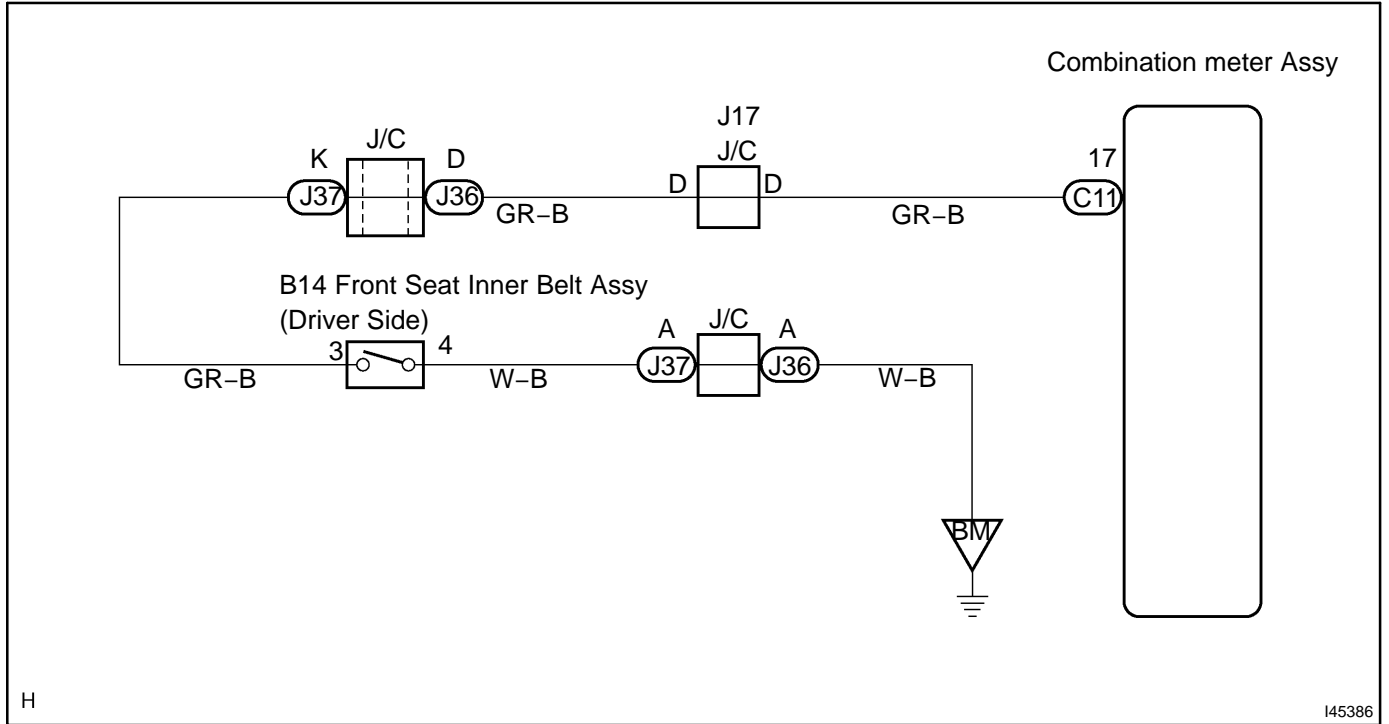
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

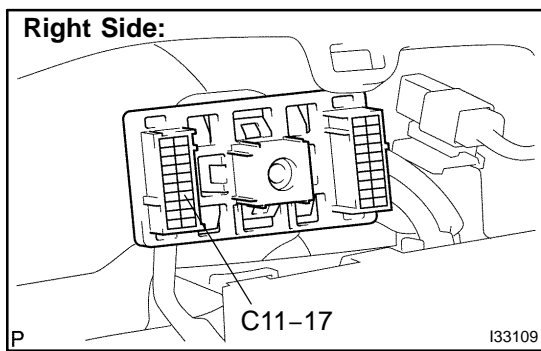
SEAT BELT WARNING LAMP FOR DRIVER'S SEAT DOES NOT OPERATE

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT COMBINATION METER ASSY



- (a) Remove the combination meter assy.
- (b) Driver sits on the seat.
- (c) Check the continuity between the terminal C11-17 of combination meter connector and body ground.

Standard:

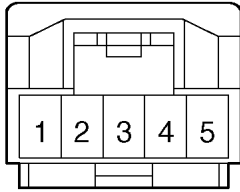
Condition	Continuity
Seat belt is fastened	Continuity
Seat belt is unfastened	No continuity

OK → **REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)**

NG

2 INSPECT FRONT SEAT INNER BELT ASSY (DRIVER SIDE)

Front Seat Inner Belt Assy (Driver Side) Connector Front View:



I45351

- (a) Check resistance.
- (1) Driver sits on the seat.
 - (2) Check resistance between terminals 3 and 4 of front seat inner belt assy.

Standard:

Condition	Resistance (Ω)
Seat belt is fastened	1,330
Seat belt is unfastened	330

NG →

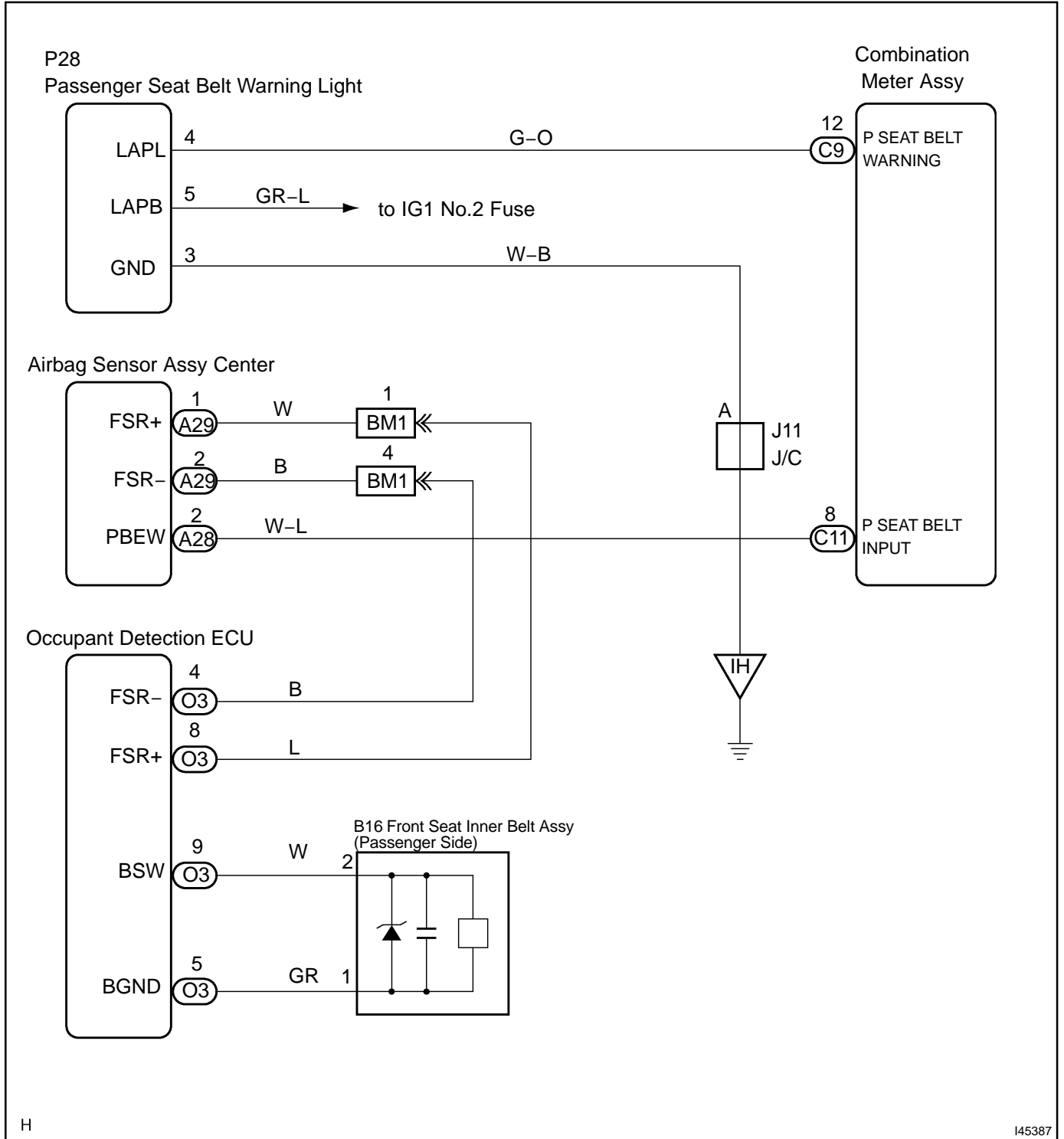
REPLACE FRONT SEAT INNER BELT ASSY (DRIVER SIDE)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

SEAT BELT WARNING LAMP FOR PASSENGER'S SEAT DOES NOT OPERATE

WIRING DIAGRAM

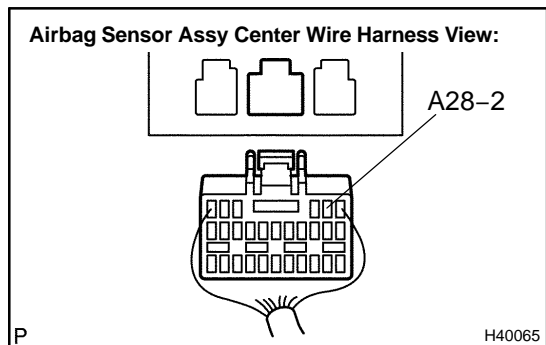


INSPECTION PROCEDURE

HINT:

If there is an open in the ground circuit (Airbag sensor assy center), the airbag sensor assy center outputs DTCs. Perform troubleshooting with the "Supplemental Restraint System" (See page 05-1206).

1 SYSTEM CHECK(INDICATOR CHECK)



- (a) Disconnect the A28 connector.
- (b) Check the operation of the warning light according to the table below.

Standard:

Tester Connection	Condition	Specified condition
No connection	Ignition switch ON	Warning light OFF
A28-2 - Body ground	Ignition switch ON	Warning light Blinks

NG → **Go to step 3**

OK

2 SYSTEM CHECK(INDICATOR CHECK)

- (a) Connect the A28 connector.
- (b) Check the operation of the warning light according to the table below.

Standard:

Condition	Bulb condition	Result
Ignition switch ON (Passenger does not sit on)	OFF	OK
Ignition switch ON (Passenger sits on)	Blinks	OK
Ignition switch ON (Passenger sits on and seat belt is fastened)	OFF	OK
Ignition switch ON (Passenger sits on and seat belt is unfastened)	Blinks	OK

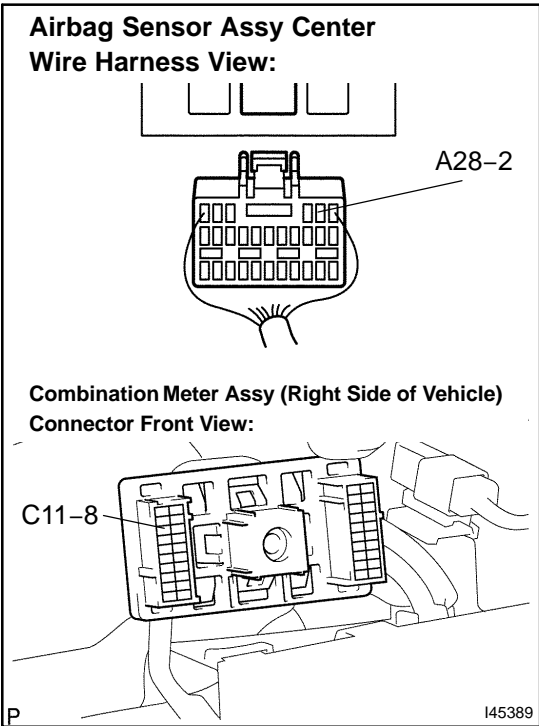
Check with the auto cut off switch in the AUTO position (w/ air-bag cut off switch).

NG → **GO TO AIRBAG SYSTEM (SEE PAGE 05-1229)**

OK

PERFORM ZERO POINT CALIBRATION (SEE PAGE 05-1206)

3 CHECK HARNESS AND CONNECTOR(BETWEEN AIRBAG SENSOR ASSY CENTER AND COMBINATION METER ASSY)



- (a) Disconnect the A28 and C11 connectors.
- (b) Measure the resistance according to the value(s) in the table below.

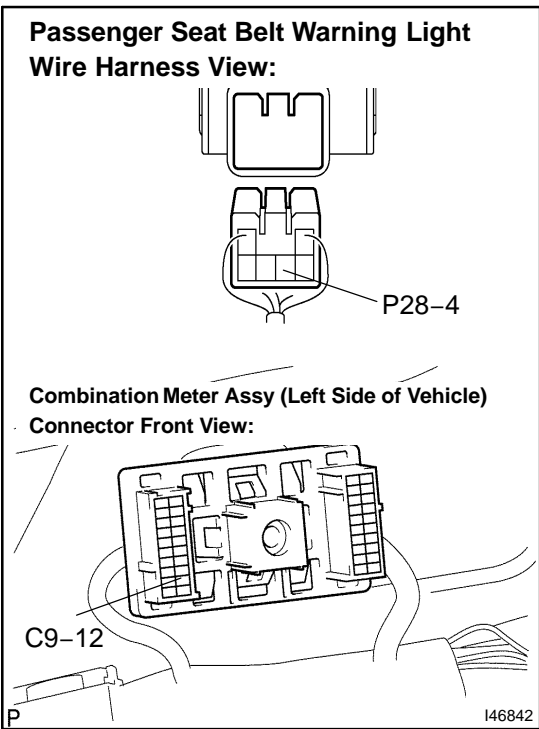
Standard:

Tester Connection	Condition	Specified Condition
A28-2 - C11-8	Always	Below 1 Ω
C11-8 - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(BETWEEN PASSENGER SEAT BELT WARNING LIGHT AND COMBINATION METER ASSY)



- (a) Disconnect the P28 and C9 connectors.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

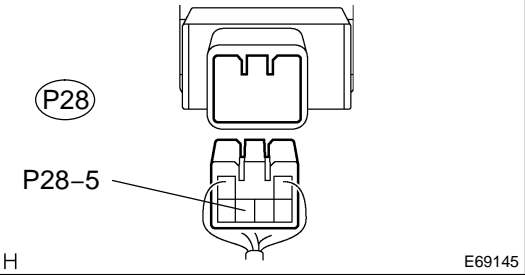
Tester Connection	Condition	Specified Condition
P28-4 - C9-12	Always	Below 1 Ω
P28-4 - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT PASSENGER SEAT BELT WARNING LIGHT

Passenger Seat Belt Warning Light Wire Harness View:



- (a) Disconnect the P28 connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
P28-5 - Body ground	Ignition switch ON	10 to 14 V

NG → **REPLACE PASSENGER SEAT BELT WARNING LIGHT**

OK

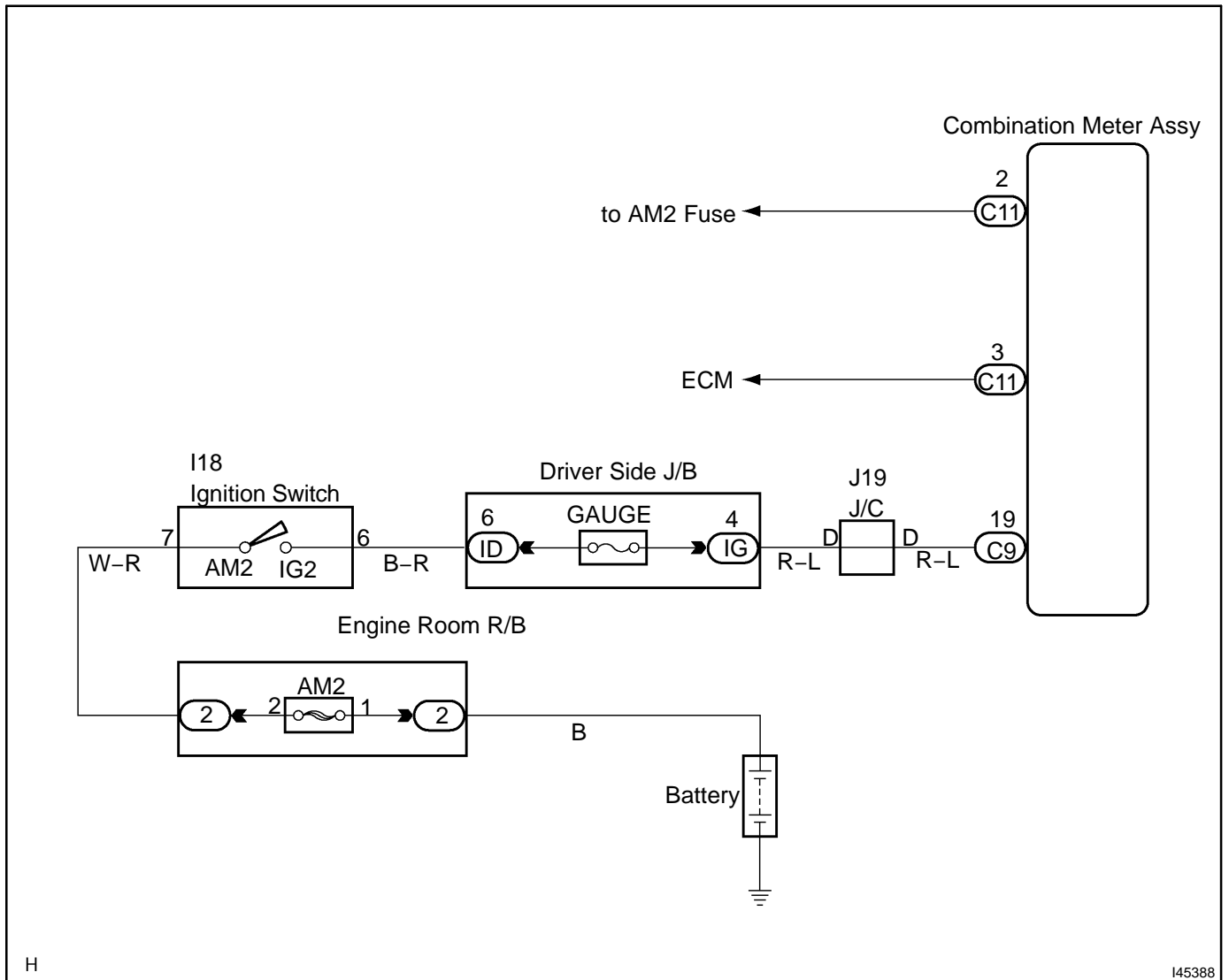
REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

MALFUNCTION IN AVERAGE FUEL CONSUMPTION/INSTANTANEOUS FUEL CONSUMPTION/POSSIBLE RUNNING DISTANCE DISPLAY

CIRCUIT DESCRIPTION

Confirm that the speedometer, tachometer, fuel receiver gauge is normal, then check this circuit.

WIRING DIAGRAM

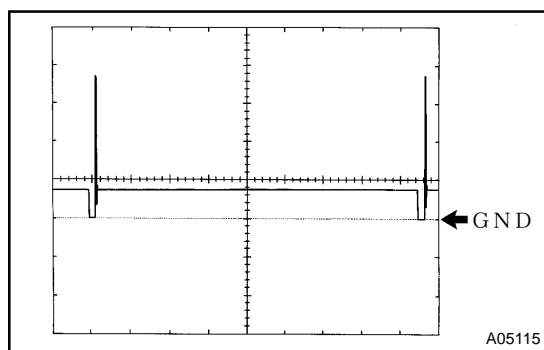
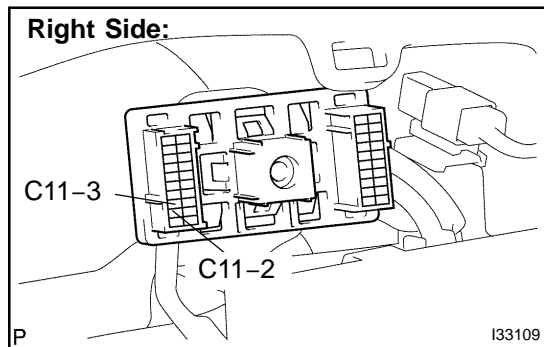


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INSPECTION PROCEDURE

1 INSPECT COMBINATION METER ASSY(TAU, TAUB, DISL)



- (a) Remove the combination meter assy.
- (b) Check voltage (TAUB signal).
 - (1) Turn the ignition switch to ON.
 - (2) Measure the voltage between terminal C11-2 of combination meter connector and body ground.

Standard voltage: 10 to 14 V
- (c) Check voltage (TAU signal).
 - (1) Turn the ignition switch to ON.
 - (2) Measure the voltage between terminal C11-3 of combination meter connector and body ground.

Standard voltage: 10 to 14 V
- (d) Check signal waveform (TAU signal).
 - (1) Connect the oscilloscope to the terminals C11-3 of combination meter connector and body ground.
 - (2) Start engine.
 - (3) Check the signal wave form.

Item	Condition
Tool setting	10 V/ DIV., 20 ms/ DIV.
Vehicle condition	Engine idle speed

Result:

A	NG (TAUB signal)
B	NG (TAU signal)
C	OK

B → GO TO ENGINE CONTROL SYSTEM (SEE PAGE 05-9)

C → REPLACE COMBINATION METER ASSY (SEE PAGE 71-24)

A

2 INSPECT FUSE(GAUGE)

- (a) Check the continuity in AM2 fuse.

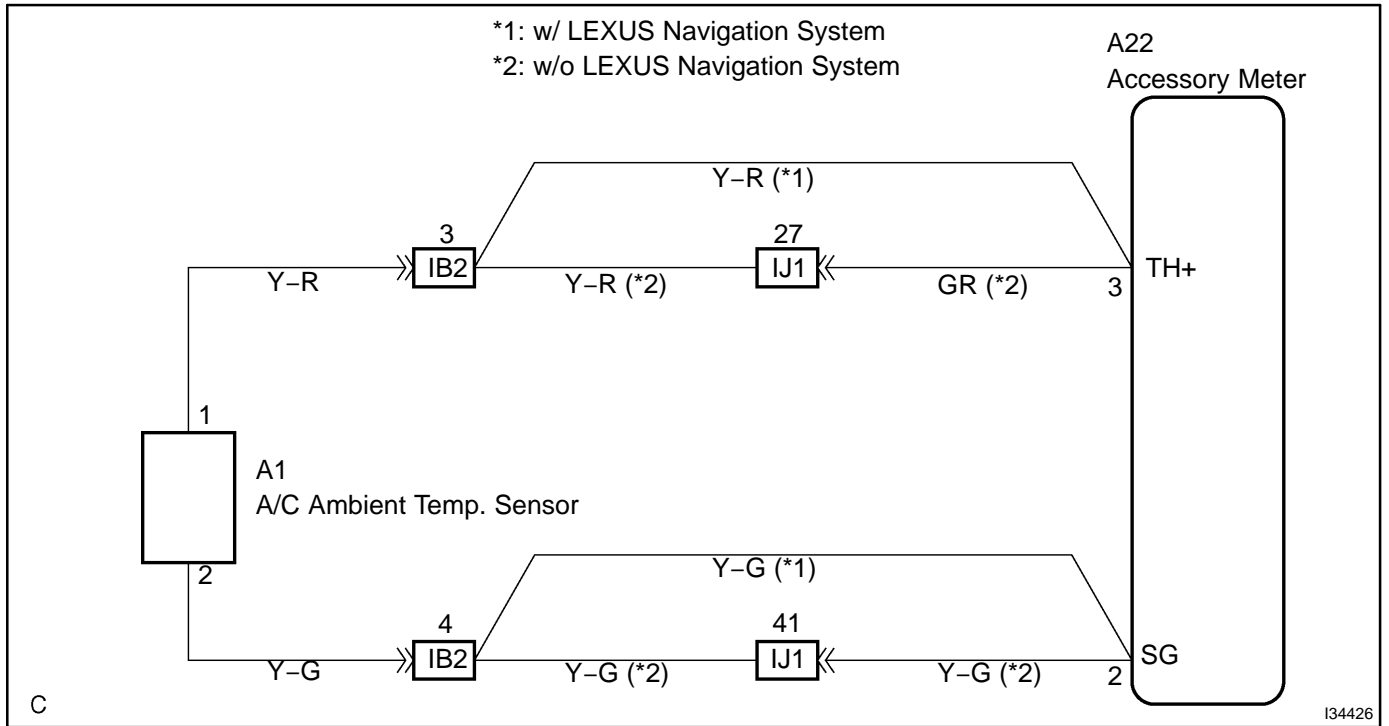
NG → REPLACE FUSE

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

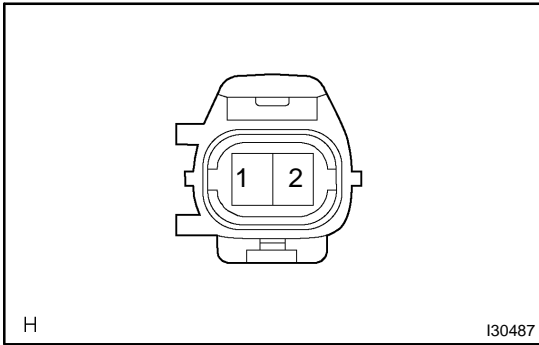
THE AMBIENT TEMPERATURE DOES NOT DISPLAY

WIRING DIAGRAM



INSPECTION PROCEDURE

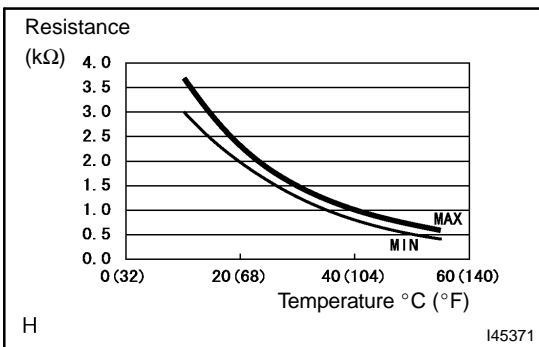
1 INSPECT THERMISTOR ASSY



- (a) Remove cooler (ambient temp. sensor) thermistor.
- (b) Measure resistance between terminals 1 and 2 of cooler (ambient temp. sensor) thermistor connector at each temperature.

HINT:

As the temperature increases, the resistance decreases.



Standard:

Temperature °C (°F)	Specification kΩ
10 (50)	3.00 to 3.73
15 (59)	2.45 to 2.88
20 (68)	1.95 to 2.30
25 (77)	1.60 to 1.80
30 (86)	1.28 to 1.47
35 (95)	1.00 to 1.22
40 (104)	0.80 to 1.00
45 (113)	0.65 to 0.85
50 (122)	0.50 to 0.70
55 (131)	0.44 to 0.60
60 (140)	0.36 to 0.50

NG → **REPLACE THERMISTOR ASSY**

OK

2 CHECK HARNESS OR CONNECTOR

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ACCESSORY METER ASSY (SEE PAGE 71-28)

POWER WINDOW CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05ARR-03

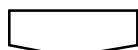
HINT:

Troubleshoot in accordance with the procedures on the following pages.

1	VEHICLE BROUGHT TO WORKSHOP
----------	------------------------------------



2	CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-2077)
----------	---



3	DTC CHECK (See page 05-2083)
----------	---

- (a) Check for DTCs and make a note of the code that is output.
- (b) Delete the DTC.
- (c) Check if the DTC is output once again when the problem symptom is simulated based on the noted code.
 - (1) With an output of the code, proceed to A.
 - (2) Without an output of the code, proceed to B.

A	Go to step 6
----------	---------------------

B

4	PROBLEM SYMPTOMS TABLE (See page 05-2085)
----------	--

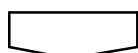


5	PERFORM TROUBLESHOOTING
----------	--------------------------------

- (a) Pre-check (See page [05-2078](#))
- (b) Circuit inspection (See page [05-2086](#) - [05-2112](#))



6	ADJUST, REPAIR OR REPLACE
----------	----------------------------------



7	RESET POWER WINDOW MOTOR
----------	---------------------------------

- (a) If any of the power window switch illuminations is blinking, reset the power window for the switch with the blinking illumination.
- (1) Turn the ignition switch ON.
 - (2) Open the door glass.
 - (3) Fully pull up the power window switch until the door glass is fully closed.
 - (4) Continue to hold the switch 1 second or more even after the door glass is fully closed.
 - (5) Check that the AUTO UP/DOWN function operates completely.



END

CUSTOMER PROBLEM ANALYSIS CHECK

POWER WINDOW CONTROL SYSTEM Check Sheet

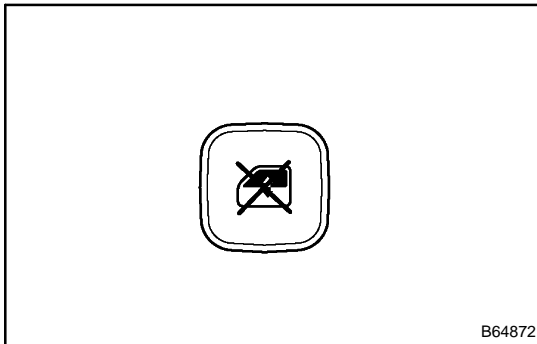
Inspector's name; _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (°C [°F])

Malfunction Symptoms	<input type="checkbox"/> AUTO UP/DOWN function does not operate
	<input type="checkbox"/> Manual UP/DOWN function does not operate
	<input type="checkbox"/> All <input type="checkbox"/> Driver side <input type="checkbox"/> Passenger side <input type="checkbox"/> Rear LH <input type="checkbox"/> Rear RH
	<input type="checkbox"/> Remote UP/DOWN function does not operate
	<input type="checkbox"/> All <input type="checkbox"/> Passenger side <input type="checkbox"/> Rear LH <input type="checkbox"/> Rear RH
DTC No.	<input type="checkbox"/> B1211 <input type="checkbox"/> B1221 <input type="checkbox"/> B1231 <input type="checkbox"/> B1232
Condition When Recovered Normal	<input type="checkbox"/> IG ON <input type="checkbox"/> Engine started <input type="checkbox"/> () Switch operated
Condition When Problem Occurred	Yes · No <input type="checkbox"/> IG OFF·ON <input type="checkbox"/> () Switch operated <input type="checkbox"/> Others ()

PRE-CHECK



1. CHECK WINDOW LOCK SWITCH

- (a) Check that operation of the door glasses except the driver side door glass and the roof glass is disabled when the window lock switch of the power window master switch is pressed.
- (b) Check that the door glasses and the roof glass can be operated when the window lock switch is pressed again.

2. CHECK MANUAL UP/DOWN FUNCTION

- (a) Check that the driver side power window operates as follows.

Standard:

Condition	Master Switch	Switch Operation	Door Glass
Ignition switch ON	Driver side	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)

- (b) Check that the power windows except the driver side power window operate as follows.

Standard:

Condition	Switch	Switch Operation	Door Glass
<ul style="list-style-type: none"> • Ignition switch ON • Window lock switch OFF 	Passenger side	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)
	Rear LH	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)
	Rear RH	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)

3. CHECK AUTO UP/DOWN FUNCTION

- (a) Check that the driver side power window operates as follows.

Standard:

Condition	Master Switch	Switch Operation	Door Glass
Ignition switch ON	Driver side	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)

- (b) Check that the power windows except the driver side power window operate as follows.

Standard:

Condition	Switch	Switch Operation	Door Glass
<ul style="list-style-type: none"> • Ignition switch ON • Window lock switch OFF 	Passenger side	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)
	Rear LH	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)
	Rear RH	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)

4. CHECK REMOTE MANUAL UP/DOWN FUNCTION

- (a) Check that the power windows except the driver side power window operate as follows.

Standard:

Condition	Master Switch	Switch Operation	Door Glass
<ul style="list-style-type: none"> • Ignition switch ON • Window lock switch OFF 	Passenger side	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)
	Rear LH	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)
	Rear RH	Halfway pushed DOWN	DOWN (Open)
		Halfway pulled UP	UP (Closed)

5. CHECK REMOTE AUTO UP/DOWN FUNCTION

- (a) Check that the power windows except the driver side power window operate as follows.

Standard:

Condition	Master Switch	Switch Operation	Door Glass
<ul style="list-style-type: none"> • Ignition switch ON • Window lock switch OFF 	Passenger side	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)
	Rear LH	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)
	Rear RH	Fully pushed DOWN	AUTO DOWN (Fully open)
		Fully pulled UP	AUTO UP (Fully closed)

6. CHECK MANUAL UP/DOWN FUNCTION VIA DRIVER SIDE DOOR LOCK KEY CYLINDER

- (a) Check that all door glasses and sliding roof operate as follows, when the key is inserted into the key cylinder.

Standard:

Condition	Key	Position/Operation
Ignition switch OFF	Turned right (LOCK) for more than 1.5 sec.	Driver and passenger side door glasses/UP
	Turned left (UNLOCK) for more than 1.5 sec.	Driver and passenger side door glasses/DOWN
	Turned right (LOCK) for more than 2.0 sec.	Rear LH and RH door glasses/UP
	Turned left (UNLOCK) for more than 2.0 sec.	Rear LH and RH door glasses/DOWN
	Turned right (LOCK) for more than 2.5 sec.	Sliding roof/Closed
	Turned left (UNLOCK) for more than 2.5 sec.	Sliding roof/Open

7. CHECK MANUAL DOWN FUNCTION VIA TRANSMITTER

- (a) Check that all door glasses and sliding roof operate as follows, when operating the transmitter.

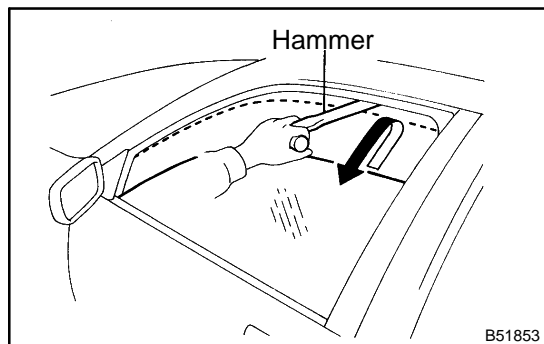
Standard:

Condition	Transmitter	Position/Operation
Ignition switch OFF	Press UNLOCK for more than 1.5 sec.	Driver and passenger side door glass/DOWN
	Press UNLOCK for more than 2.0 sec.	Rear LH and RH door glass/DOWN
	Press UNLOCK for more than 2.5 sec.	Sliding roof/Open

8. CHECK POWER WINDOW OPERATION FUNCTION AFTER IGNITION OFF

- (a) When both of the following conditions are fulfilled, check that the door glasses, the back door glass and the sliding roof can be operated even after the ignition switch is turned OFF:

- (1) Within 45 seconds after the ignition switch is turned OFF.
- (2) All the doors are closed.



9. CHECK JAM PROTECTION

HINT:

The jam protection function prevents any part of your body from getting caught by accident between the door frame and the door glass during power window operation.

- (a) Check that the door glass goes down by approximately 50 mm (2.0 in.) right when something gets caught between the door frame and the door glass during power window operation. However, when the opening between the door frame and the door glass is less than 200 mm (7.9 in.), the door glass keeps going down until the opening reaches 200 mm (7.9 in.) and stops there.

Operative condition:

- AUTO UP
- AUTO UP function after the ignition switch is turned OFF
- MANUAL UP function after the ignition switch is turned OFF
- MANUAL UP function via the driver side door lock key cylinder

10. CHECK POWER WINDOW FAIL-SAFE FUNCTION

HINT:

If there is a malfunction in the power window system, some of the power window functions will be disabled.

Driver side power window:

Malfunctioning Part	Disabled Function	Operative Function
Pulse sensor circuit in power window motor	<ul style="list-style-type: none"> • AUTO UP/DOWN function • Power window operation function after ignition OFF 	<ul style="list-style-type: none"> • Manual UP (fully pulled UP position) • Manual DOWN • Remote (AUTO and manual) • Remote function after ignition OFF (AUTO and manual) • MANUAL UP/DOWN function via driver side door lock key cylinder • MANUAL DOWN function via transmitter
CPU in power window master switch	<ul style="list-style-type: none"> • AUTO UP/DOWN function • Remote function (AUTO and manual) • MANUAL UP/DOWN function via driver side door lock key cylinder • MANUAL DOWN function via transmitter 	<ul style="list-style-type: none"> • Manual UP (fully pulled UP position) • Manual DOWN

Power windows except driver side power window:

Malfunctioning Part	Disabled Function	Operative Function
<ul style="list-style-type: none"> • Pulse sensor circuit in power window motor • CPU in power window master switch • Communication between master switch and each power window switch 	<ul style="list-style-type: none"> • AUTO UP/DOWN function • Power window operation function after ignition OFF • MANUAL UP/DOWN function via driver side door lock key cylinder • MANUAL DOWN function via transmitter 	<ul style="list-style-type: none"> • Manual UP function (fully pulled UP position) • Manual DOWN function

11. CHECK SWITCH CONDITION WITH HAND-HELD TESTER

HINT:

DTC B1221 is output when switches of the power window master switch are on. When these switches are off, DTC B1221 is not output. Using this DTC, you can check whether these switches are normal or not.

12. CHECK DATA LIST WITH HAND-HELD TESTER**HINT:**

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten labor time.

DATA LIST in D-DOOR ECU:

Measurement Item	Label	Parameter
Driver switch on master switch	P/W AUTO SW	ON/OFF
Passenger switch on master switch	P P/W AUTO SW	ON/OFF
Rear RH switch on master switch	RR P/W AUTO SW	ON/OFF
Rear LH switch on master switch	RL P/W AUTO SW	ON/OFF
Door glass position (Fully closed - 1/4 open)	GLASS POS-1/4	CAUTION/OK*
Door glass position (1/4 open - 2/4 open)	GLASS POS-2/4	CAUTION/OK*
Door glass position (2/4 open - 3/4 open)	GLASS POS-3/4	CAUTION/OK*
Door glass position (3/4 open - Fully opened)	GLASS POS-OPEN	CAUTION/OK*

HINT:

* CAUTION is displayed even when no resistance is applied in each position. In this case there must be something caught somewhere in that position.

13. CHECK ACTIVE TEST WITH HAND-HELD TESTER**HINT:**

Performing the ACTIVE TEST using the hand-held tester allows you to operate the relay, VSV, actuator, etc. without parts removal. Performing the ACTIVE TEST as the first step of trouble shooting is one way to shorten labor time. It is possible to display the DATA LIST during the ACTIVE TEST.

ACTIVE TEST in D-DOOR ECU:

Operation Item	Label	Operation
Driver side power window UP/DOWN	P/W UP/DOWN	UP/DOWN

ACTIVE TEST in BODY ECU:

Operation Item	Label	Operation
Passenger side power window UP/DOWN	P P/W UP/DOWN	UP/DOWN
Rear LH power window UP/DOWN	RL P/W UP/DOWN	UP/DOWN
Rear RH power window UP/DOWN	RR P/W UP/DOWN	UP/DOWN

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTICE:

- After confirming whether the items requested by the customer are applicable or not for customization, perform the customize operation.
- Be sure to record the current settings before customizing.
- When troubleshooting, make sure that the item in question is not set to "OFF" as a result of customization. (Example: For the symptom, "the wireless function does not operate", first check that the wireless function is not set to "OFF", then perform troubleshooting.)

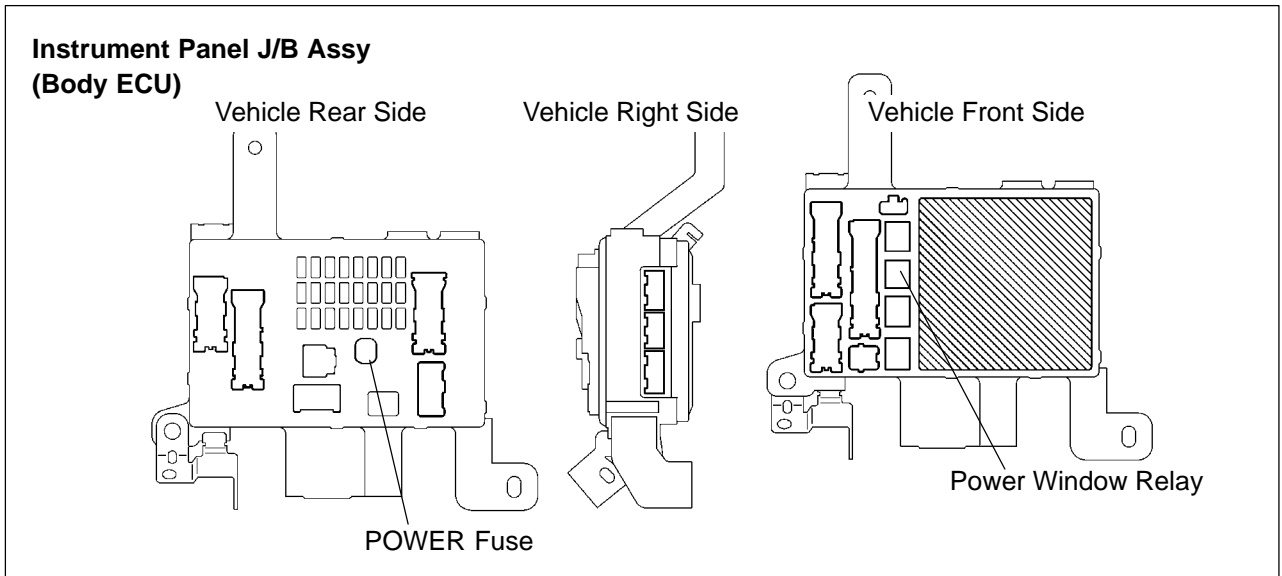
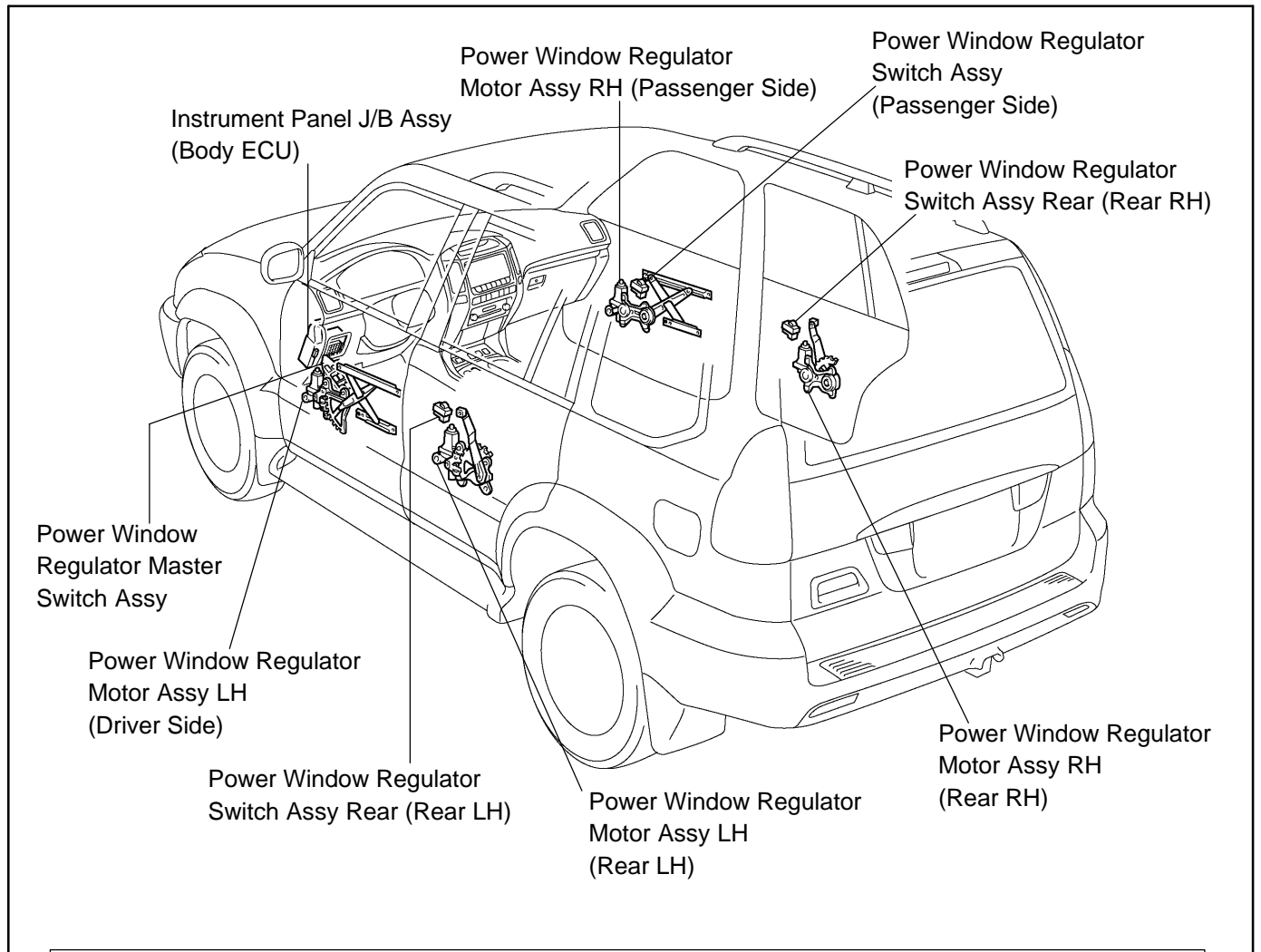
POWER WINDOW:

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
UP / DOOR KEY (Door key linked P/W UP)	ON	Function that makes all the door glasses go up manually when the driver side door key cylinder is held in the lock position for 1.5 seconds when the ignition switch is OFF.	ON / OFF
DOWN / DOOR KEY (Door key linked P/W DOWN)	ON	Function that makes all the door glasses go down manually when the driver side door key cylinder is held in the unlock position for 1.5 seconds when the ignition switch is OFF.	ON / OFF
DOWN / WIRELESS (P/W DOWN w/ transmitter)	ON	Function that makes all the door glasses go down manually when the unlock switch on the transmitter is held for 1.5 seconds when the ignition switch is OFF.	ON / OFF

DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See Page)	Detection Item	Trouble Area
B1221 (05-2086)	Power Window Switch Circuit on Driver Door	<ul style="list-style-type: none"> • Power window regulator master switch assy (D-door ECU)
B1231 (05-2087)	Jam Protection Limit Switch Circuit on Driver Door	<ul style="list-style-type: none"> • Power window regulator motor assy LH (Driver side) • Wire harness • Power window regulator master switch assy (D-door ECU)
B1232 (05-2087)	Jam Protection Pulse Switch Circuit on Driver Door	

LOCATION



B64901

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
AUTO UP/DOWN function does not operate at driver side	<ol style="list-style-type: none"> 1. Power window regulator motor assy LH (Driver side) 2. Wire harness 3. Power window regulator master switch assy 	05-2088
AUTO UP/DOWN function does not operate at passenger side	<ol style="list-style-type: none"> 1. Power window regulator motor assy RH (Passenger side) 2. Wire harness 3. Power window regulator switch assy RH 	05-2091
AUTO UP/DOWN function does not operate at rear LH	<ol style="list-style-type: none"> 1. Power window regulator motor assy LH (Rear LH) 2. Wire harness 3. Power window regulator switch assy rear (Rear LH) 	05-2094
AUTO UP/DOWN function does not operate at rear RH	<ol style="list-style-type: none"> 1. Power window regulator motor assy RH (Rear RH) 2. Wire harness 3. Power window regulator switch assy rear (Rear RH) 	05-2097
Manual UP/DOWN function does not operate at driver side	<ol style="list-style-type: none"> 1. Power window regulator master switch assy 2. Power window regulator motor assy LH (Driver side) 3. Wire harness 	05-2100
Manual UP/DOWN function does not operate at passenger side	<ol style="list-style-type: none"> 1. Power window regulator switch assy (Passenger side) 2. Power window regulator motor assy RH (Passenger side) 3. Wire harness 	05-2103
Manual UP/DOWN function does not operate at rear LH	<ol style="list-style-type: none"> 1. Power window regulator switch assy rear (Rear LH) 2. Power window regulator motor assy LH (Rear LH) 3. Wire harness 	05-2106
Manual UP/DOWN function does not operate at rear RH	<ol style="list-style-type: none"> 1. Power window regulator switch assy rear (Rear RH) 2. Power window regulator motor assy RH (Rear RH) 3. Wire harness 	05-2109
Remote UP/DOWN function does not operate	<ol style="list-style-type: none"> 1. Power window regulator master switch assy 2. Power window regulator switch assy (Passenger side) 3. Power window regulator switch assy rear (Rear LH) 4. Power window regulator switch assy rear (Rear RH) 5. Wire harness 6. Instrument panel J/B assy (Body ECU) 	05-2112

DTC	B1221	POWER WINDOW SWITCH CIRCUIT ON DRIVER DOOR
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CIRCUIT DESCRIPTION

DTC B1221 is output when switches of the power window master switch are on. When these switches are off, DTC B1221 is not output. Using DTC B1221, you can check whether these switches are normal or not.

DTC No.	DTC Detection Condition	Trouble Area
B1221	Any power window switch or door lock switch on master switch is operating	Power window regulator master switch assy (D-door ECU)

INSPECTION PROCEDURE

1	REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY
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DTC	B1231	JAM PROTECTION LIMIT SWITCH CIRCUIT ON DRIVER DOOR
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DTC	B1232	JAM PROTECTION PULSE SWITCH CIRCUIT ON DRIVER DOOR
------------	--------------	---

CIRCUIT DESCRIPTION

The power window master switch monitors the condition of the power window motor to detect the position of the door glass by using pulse signals output from the 2 pulse sensors in the power window motor.

DTC No.	DTC Detection Condition	Trouble Area
B1231 B1232	Pulse sensor circuit in power window motor malfunctions	<ul style="list-style-type: none"> • Power window regulator motor assy LH (Driver side) • Wire harness • Power window regulator master switch assy (D-door ECU)

WIRING DIAGRAM

Refer to page [05-2088](#).

INSPECTION PROCEDURE

Refer to page [05-2088](#).

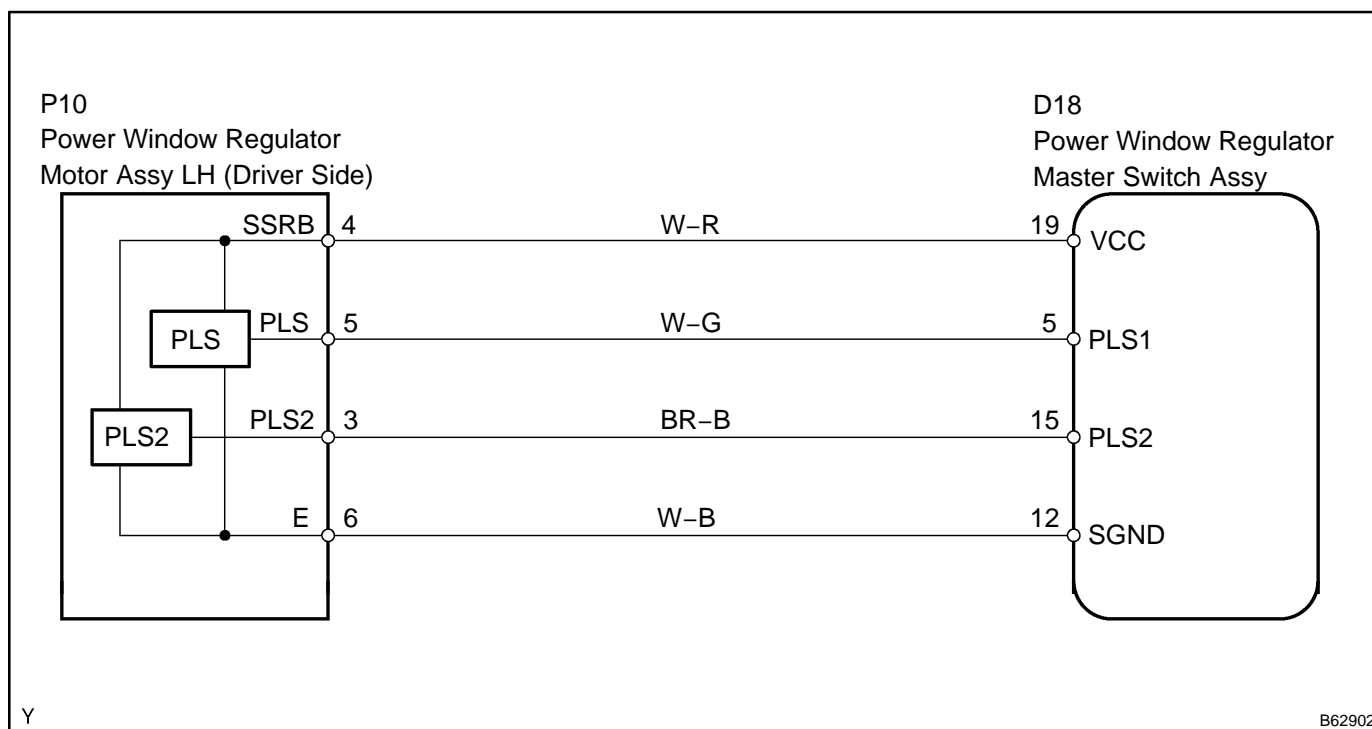
AUTO UP/DOWN FUNCTION DOES NOT OPERATE AT DRIVER SIDE

CIRCUIT DESCRIPTION

If the AUTO UP/DOWN function does not operate, any of the following troubles may be the cause:

- When the battery terminal and the connectors of the power window switches are disconnected, the power window memory of the fully closed position which is recorded in the power window switch in each door is erased.
- The pulse sensor in the power window motor has a malfunction.
- There is an open or short circuit in the wiring between the power window switch and the corresponding power window motor.
- The power window switch has a malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL UP/DOWN FUNCTION (DRIVER SIDE)

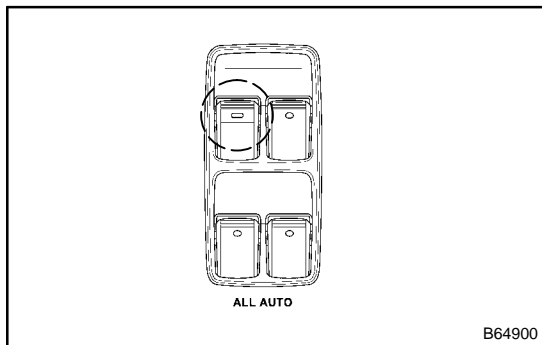
(a) Check that the door glass can be operated manually.

NG

OTHER PROBLEM (See page 05-2100)

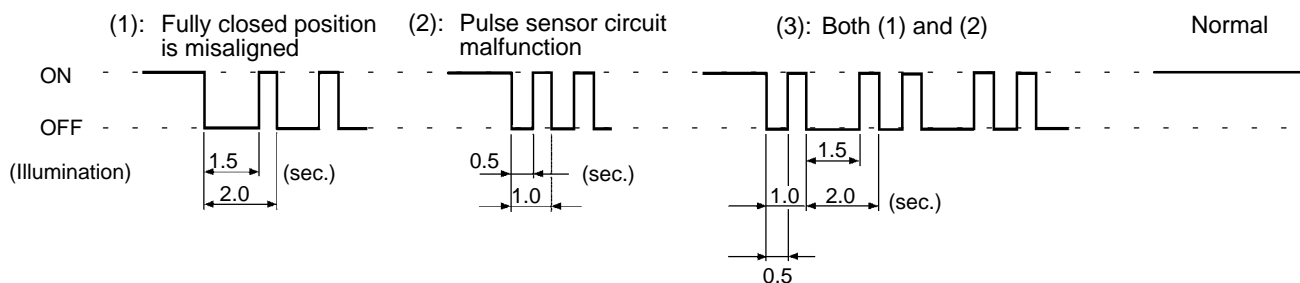
OK

2 CHECK ILLUMINATION OF POWER WINDOW MASTER SWITCH



- Turn the ignition switch ON.
- Operate the driver switch of the master switch.
- Check the blinking pattern of the illumination as shown in the illustration.
 - If pattern (1) is displayed, proceed to A.
 - If pattern (2) or (3) is displayed, proceed to B.
 - If the normal pattern is displayed, proceed to C.

Blinking Pattern of Illumination



B

Go to step 4

C

REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

A

3 RESET POWER WINDOW REGULATOR MOTOR (DRIVER SIDE)

- Turn the ignition switch ON.
- Open the door glass.
- Fully pull up the power window switch until the door glass is fully closed.
- Continue to hold the switch 1 second or more even after the door glass is fully closed.
- Check that the AUTO UP/DOWN function operates completely.

OK

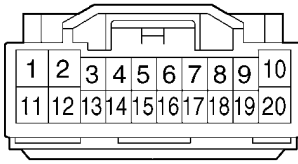
END

NG

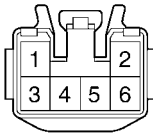
4 CHECK WIRE HARNESS (MASTER SWITCH ↔ MOTOR)

Wire Harness Side:

D18
Power Window Master Switch



P10
Power Window Motor (Driver Side)



B52055

- (a) Remove the driver side door trim board (See page 75-13).
- (b) Disconnect the D18 master switch connector.
- (c) Disconnect the P10 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
D18-19 ↔ P10-4	Continuity
D18-5 ↔ P10-5	Continuity
D18-15 ↔ P10-3	Continuity
D18-12 ↔ P10-6	Continuity
D18-5 ↔ Body ground	No continuity
D18-12 ↔ Body ground	No continuity
D18-15 ↔ Body ground	No continuity
D18-19 ↔ Body ground	No continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSY LH (DRIVER SIDE)

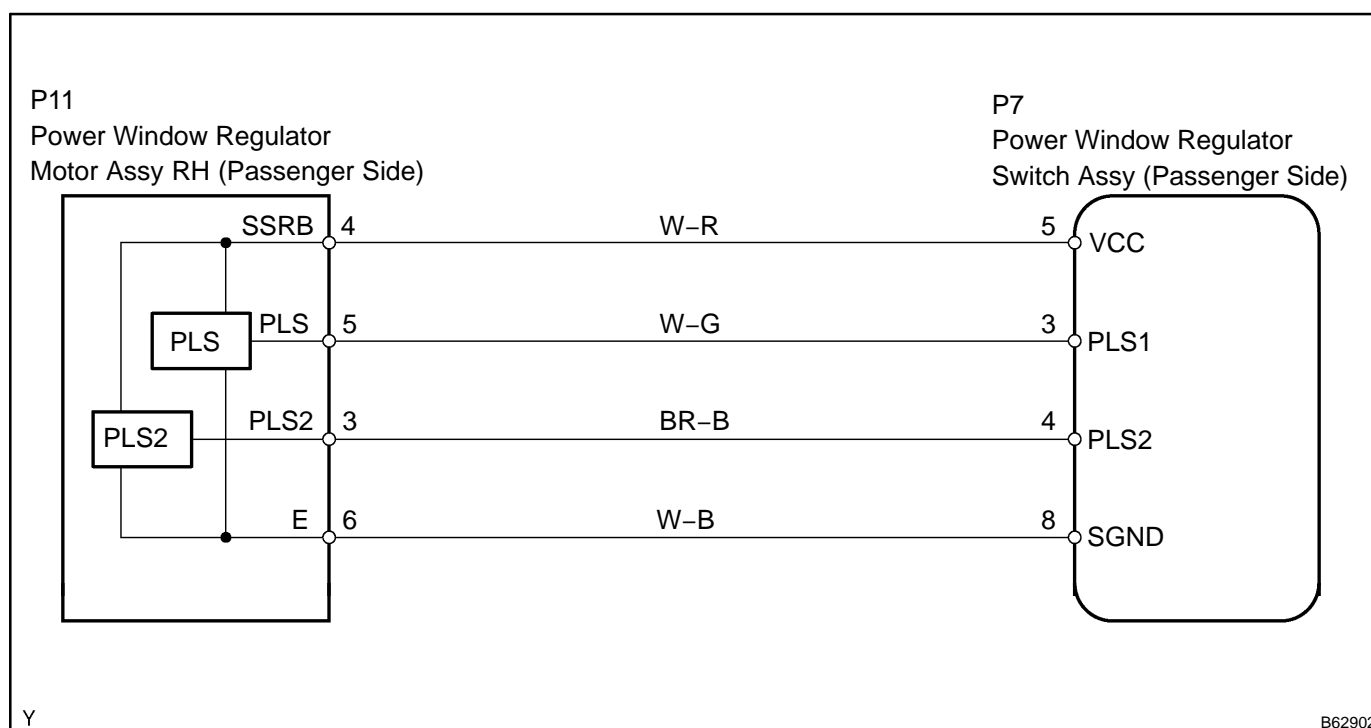
AUTO UP/DOWN FUNCTION DOES NOT OPERATE AT PASSENGER SIDE

CIRCUIT DESCRIPTION

If the AUTO UP/DOWN function does not operate, any of the following troubles may be the cause:

- When the battery terminal and the connectors of the power window switches are disconnected, the power window memory of the fully closed position which is recorded in the power window switch in each door is erased.
- The pulse sensor in the power window motor has a malfunction.
- There is an open or short circuit in the wiring between the power window switch and the corresponding power window motor.
- The power window switch has a malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL UP/DOWN FUNCTION (PASSENGER SIDE)

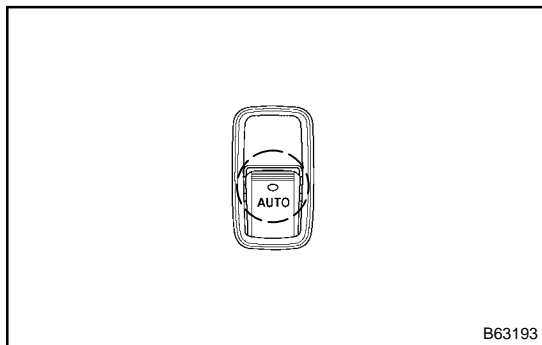
(a) Check that the door glass can be operated manually.

NG

OTHER PROBLEM (See page 05-2103)

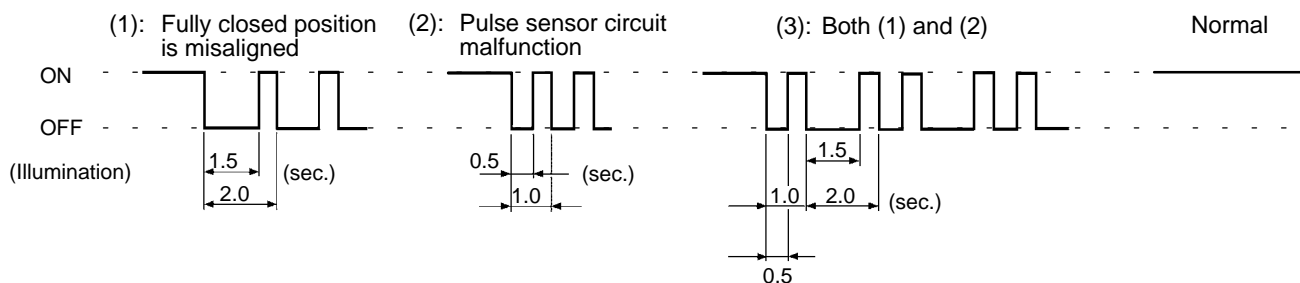
OK

2 CHECK ILLUMINATION OF POWER WINDOW SWITCH (PASSENGER SIDE)



- Turn the ignition switch ON.
- Operate the power window switch.
- Check the blinking pattern of the illumination as shown in the illustration.
 - If pattern (1) is displayed, proceed to A.
 - If pattern (2) or (3) is displayed, proceed to B.
 - If the normal pattern is displayed, proceed to C.

Blinking Pattern of Illumination



B

Go to step 4

C

REPLACE POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE)

A

3 RESET POWER WINDOW REGULATOR MOTOR (PASSENGER SIDE)

- Turn the ignition switch ON.
- Open the door glass.
- Fully pull up the power window switch until the door glass is fully closed.
- Continue to hold the switch 1 second or more even after the door glass is fully closed.
- Check that the AUTO UP/DOWN function operates completely.

OK

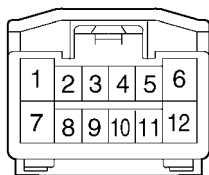
END

NG

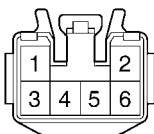
4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)

Wire Harness Side:

P7
Power Window Regulator Switch Assy
(Passenger Side)



P11
Power Window Regulator Motor
Assy RH (Passenger Side)



B52056

- Remove the passenger side door trim board (See page 75-13).
- Disconnect the P7 power window switch connector.
- Disconnect the P11 power window motor connector.
- Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P7-5 ↔ P11-4	Continuity
P7-3 ↔ P11-5	Continuity
P7-4 ↔ P11-3	Continuity
P7-8 ↔ P11-6	Continuity
P7-3 ↔ Body ground	No continuity
P7-4 ↔ Body ground	No continuity
P7-5 ↔ Body ground	No continuity
P7-8 ↔ Body ground	No continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSY RH (PASSENGER SIDE)

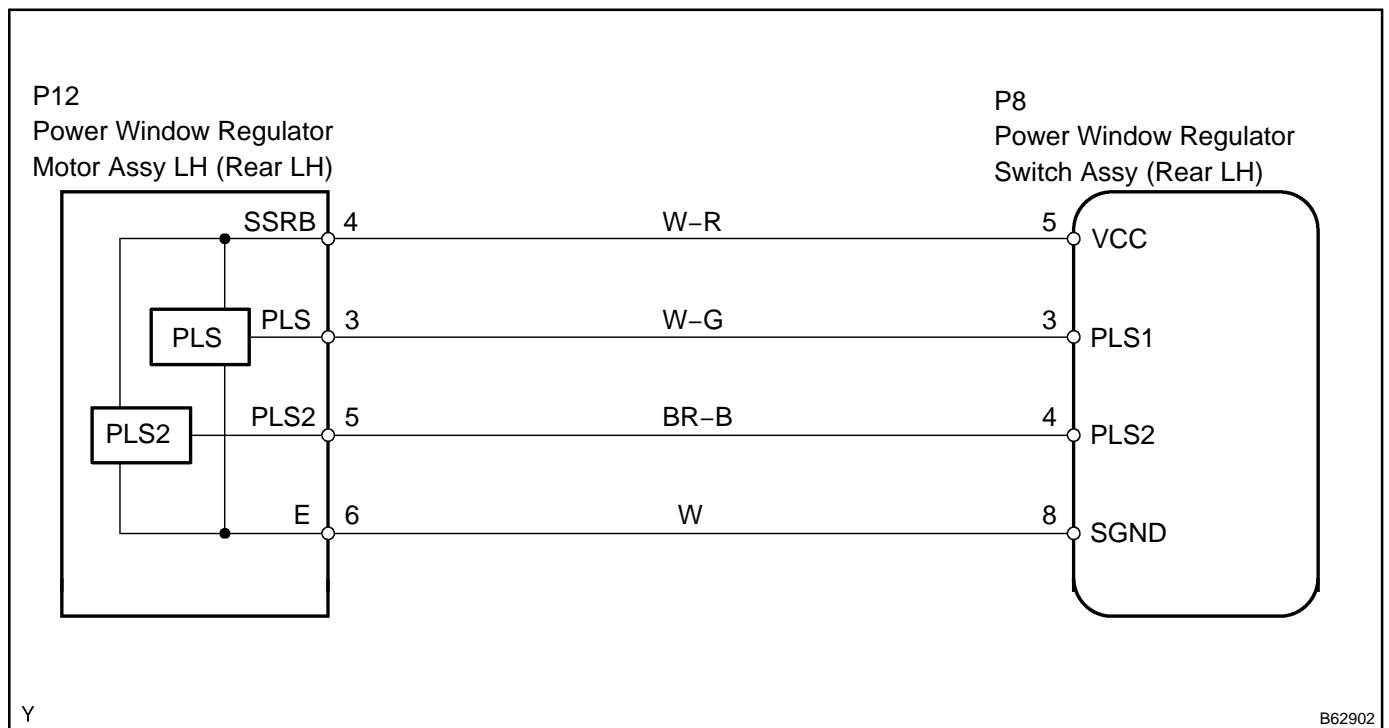
AUTO UP/DOWN FUNCTION DOES NOT OPERATE AT REAR LH

CIRCUIT DESCRIPTION

If the AUTO UP/DOWN function does not operate, any of the following troubles may be the cause:

- When the battery terminal and the connectors of the power window switches are disconnected, the power window memory of the fully closed position which is recorded in the power window switch in each door is erased.
- The pulse sensor in the power window motor has a malfunction.
- There is an open or short circuit in the wiring between the power window switch and the corresponding power window motor.
- The power window switch has a malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK MANUAL UP/DOWN FUNCTION (REAR LH)

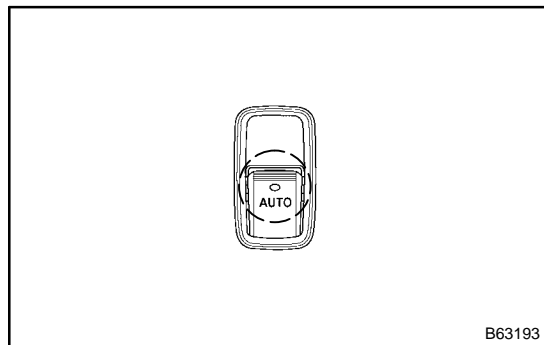
(a) Check that the door glass can be operated manually.

NG

OTHER PROBLEM (See page 05-2106)

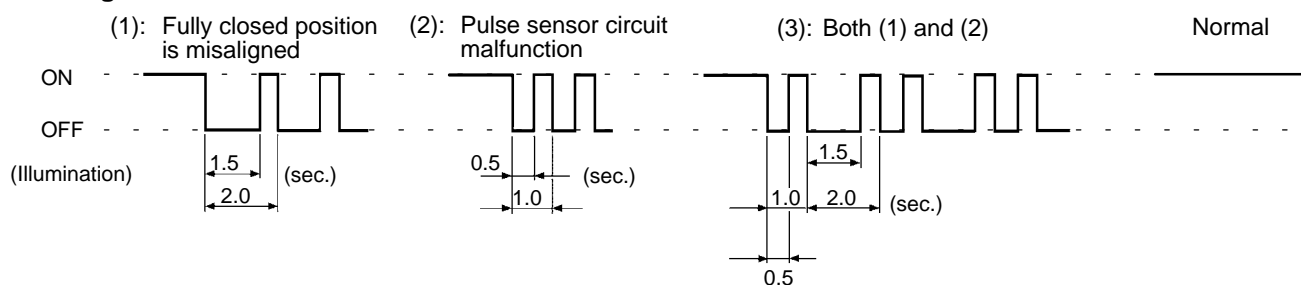
OK

2 CHECK ILLUMINATION OF POWER WINDOW SWITCH (REAR LH)



- Turn the ignition switch ON.
- Operate the power window switch.
- Check the blinking pattern of the illumination as shown in the illustration.
 - If pattern (1) is displayed, proceed to A.
 - If pattern (2) or (3) is displayed, proceed to B.
 - If the normal pattern is displayed, proceed to C.

Blinking Pattern of Illumination



B

Go to step 4

C

REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR LH)

A

3 RESET POWER WINDOW REGULATOR MOTOR (REAR LH)

- Turn the ignition switch ON.
- Open the door glass.
- Fully pull up the power window switch until the door glass is fully closed.
- Continue to hold the switch 1 second or more even after the door glass is fully closed.
- Check that the AUTO UP/DOWN function operates completely.

OK

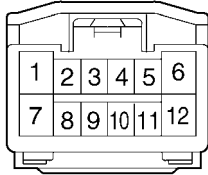
END

NG

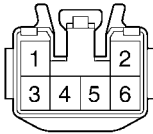
4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)

Wire Harness Side:

P8
Power Window Regulator Switch Assy
(Rear LH)



P12
Power Window Regulator Motor
Assy LH (Rear LH)



B52056

- (a) Remove the rear LH side door trim board (See page 75-26).
- (b) Disconnect the P8 power window switch connector.
- (c) Disconnect the P12 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P8-5 ↔ P12-4	Continuity
P8-3 ↔ P12-3	Continuity
P8-4 ↔ P12-5	Continuity
P8-8 ↔ P12-6	Continuity
P8-3 ↔ Body ground	No continuity
P8-4 ↔ Body ground	No continuity
P8-5 ↔ Body ground	No continuity
P8-8 ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSY LH (REAR LH SIDE)

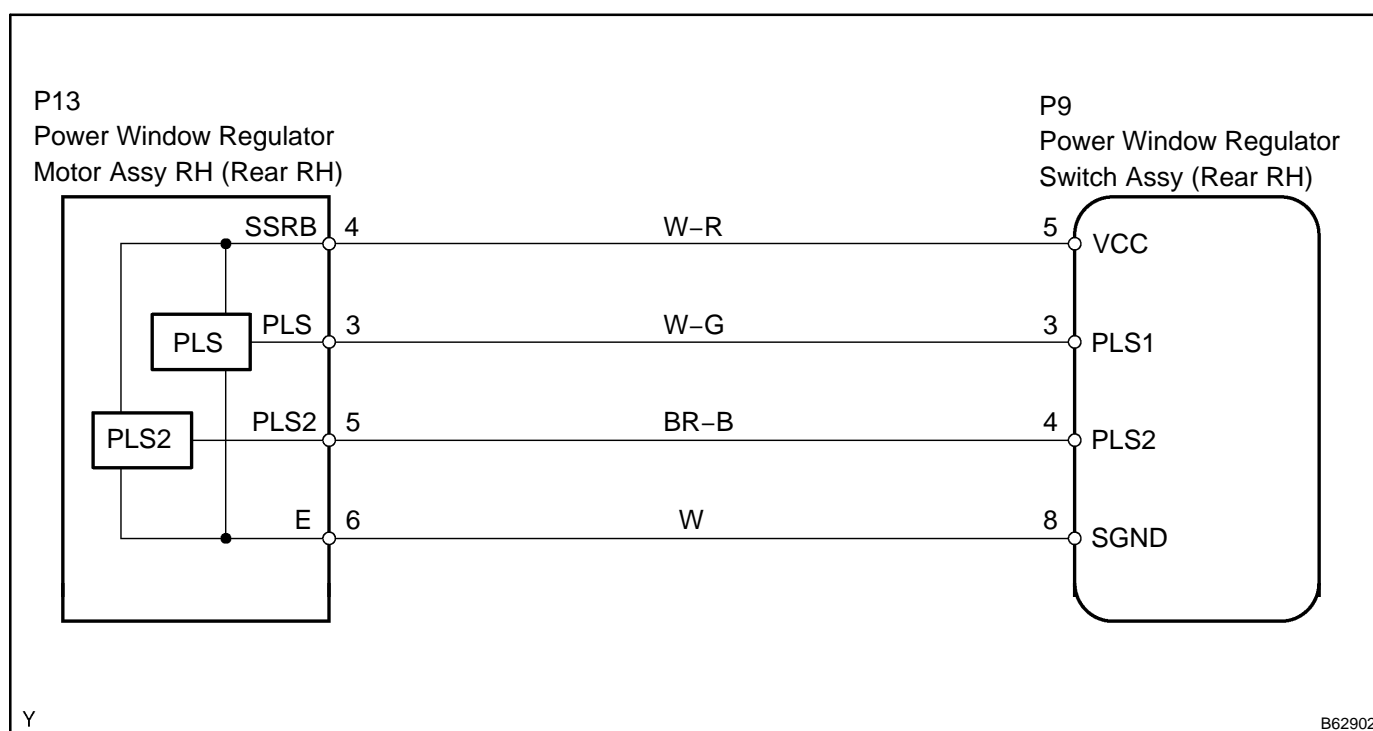
AUTO UP/DOWN FUNCTION DOES NOT OPERATE AT REAR RH

CIRCUIT DESCRIPTION

If the AUTO UP/DOWN function does not operate, any of the following troubles may be the cause:

- When the battery terminal and the connectors of the power window switches are disconnected, the power window memory of the fully closed position which is recorded in the power window switch in each door is erased.
- The pulse sensor in the power window motor has a malfunction.
- There is an open or short circuit in the wiring between the power window switch and the corresponding power window motor.
- The power window switch has a malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK POWER WINDOW OPERATION (REAR RH)

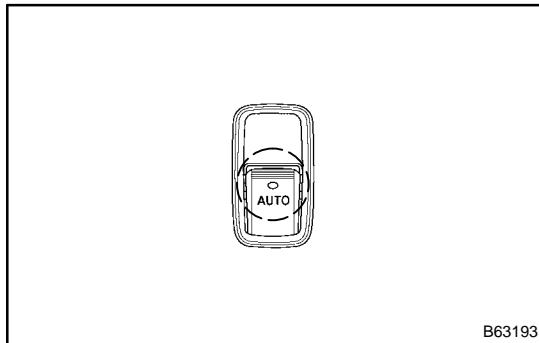
(a) Check that the door glass can be operated manually.

NG

OTHER PROBLEM (See page 05-2109)

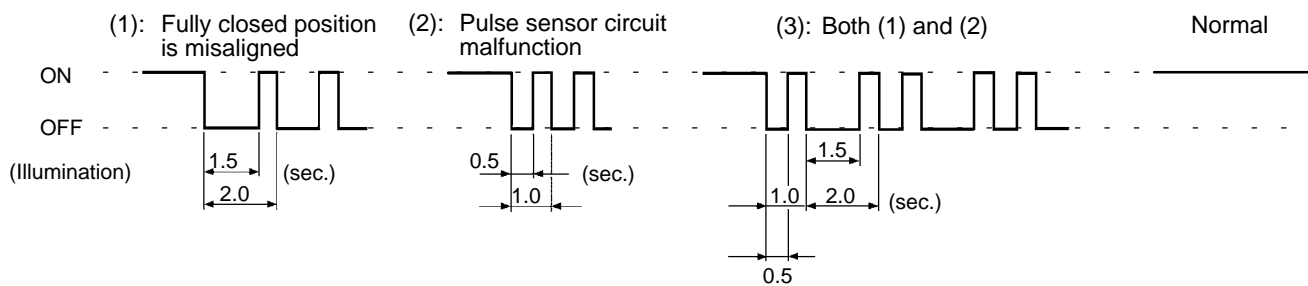
OK

2 CHECK MANUAL UP/DOWN FUNCTION (REAR RH)



- Turn the ignition switch ON.
- Operate the power window switch.
- Check the blinking pattern of the illumination as shown in the illustration.
 - If pattern (1) is displayed, proceed to A.
 - If pattern (2) or (3) is displayed, proceed to B.
 - If the normal pattern is displayed, proceed to C.

Blinking Pattern of Illumination



B

Go to step 4

C

REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR RH)

A

3 RESET POWER WINDOW REGULATOR MOTOR (REAR RH)

- Turn the ignition switch ON.
- Open the door glass.
- Fully pull up the power window switch until the door glass is fully closed.
- Continue to hold the switch 1 second or more even after the door glass is fully closed.
- Check that the AUTO UP/DOWN function operates completely.

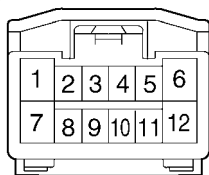
OK

END

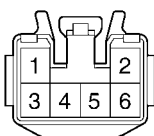
NG

4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)**Wire Harness Side:**

P9
Power Window Regulator Switch Assy
(Rear RH)



P13
Power Window Regulator Motor
Assy RH (Rear RH)



B52056

- (a) Remove the rear RH side door trim board (See page 75-26).
- (b) Disconnect the P9 power window switch connector.
- (c) Disconnect the P13 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P9-5 ↔ P13-4	Continuity
P9-3 ↔ P13-3	Continuity
P9-4 ↔ P13-5	Continuity
P9-8 ↔ P13-6	Continuity
P9-3 ↔ Body ground	No continuity
P9-4 ↔ Body ground	No continuity
P9-5 ↔ Body ground	No continuity
P9-8 ↔ Body ground	No continuity

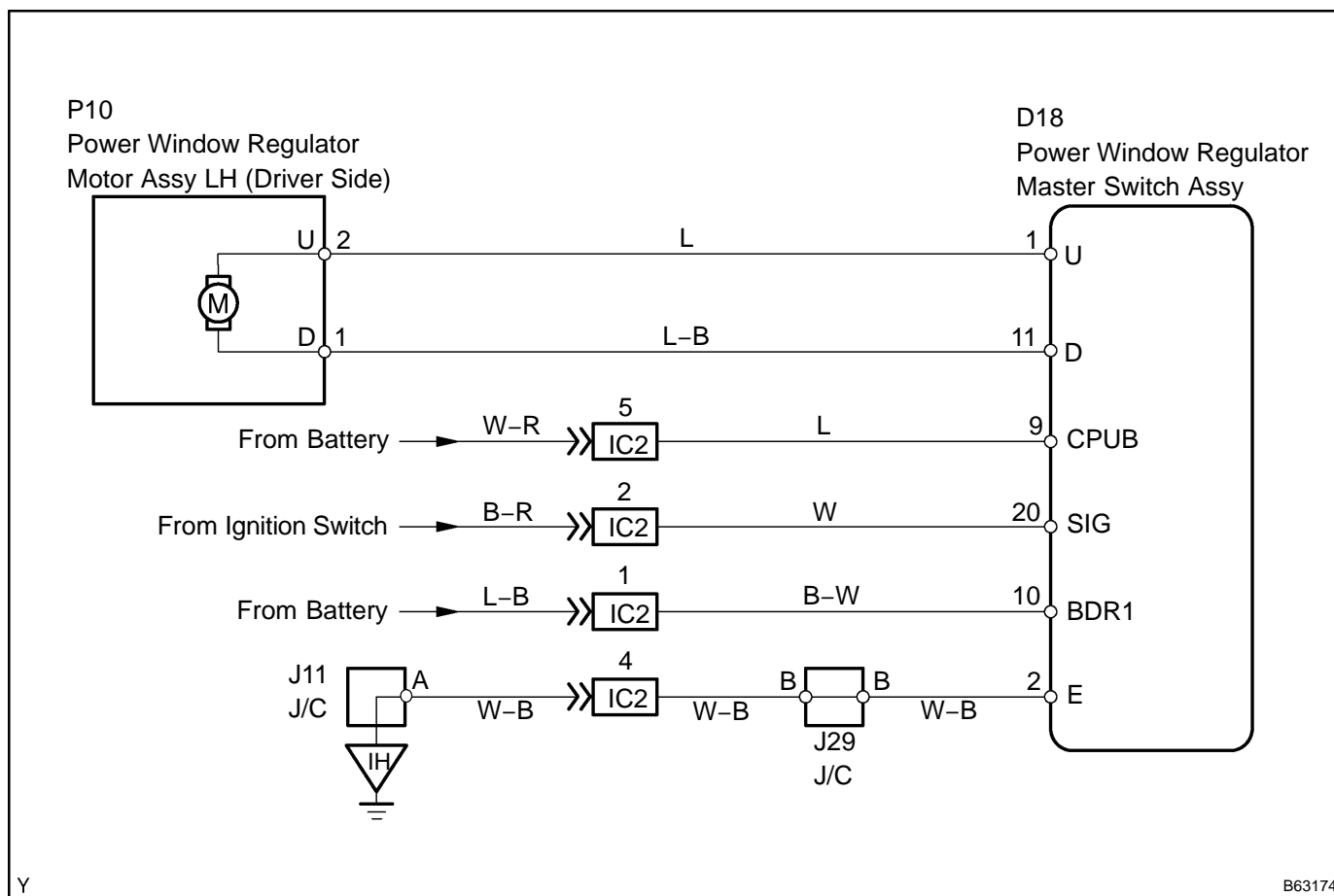
NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPLACE POWER WINDOW REGULATOR MOTOR ASSY RH (REAR RH)**

MANUAL UP/DOWN FUNCTION DOES NOT OPERATE AT DRIVER SIDE

CIRCUIT DESCRIPTION

If the manual UP/DOWN function does not operate, the power window motor, the power window master switch or the wire harness may be abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSY

(a) Using the hand-held tester, check operation of the master switch using the DATA LIST.

Standard:

DATA LIST in D-DOOR ECU

Measurement Item	Label	Parameter
Driver switch on master switch	P/W AUTO SW	ON/OFF

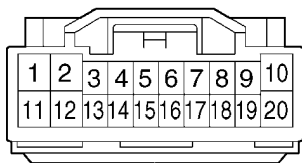
NG → Go to step 3

OK

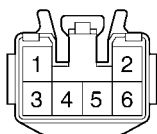
2 CHECK WIRE HARNESS (MASTER SWITCH ↔ MOTOR)

Wire Harness Side:

D18
Power Window Master Switch



P10
Power Window Motor (Driver Side)

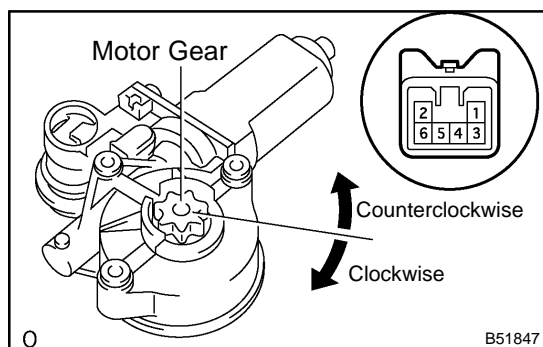


B52055

- (a) Disconnect the D18 master switch connector.
- (b) Remove the front door trim LH.
- (c) Disconnect the P10 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
D18-11 ↔ P10-1	Continuity
D18-1 ↔ P10-2	Continuity
D18-1 ↔ Body ground	No continuity
D18-11 ↔ Body ground	No continuity



B51847

- (e) Reference:
Check operation of the power window motor (driver side).
 - (1) Remove the motor (See page 75-13).
 - (2) Apply battery voltage to the connector between terminals 1 and 2.
 - (3) Check that the motor rotates smoothly.

NOTICE:

Do not apply battery voltage to the terminals except 1 and 2.

Standard:

Terminal No.	Motor Gear Rotation
Battery positive voltage → 2 Battery negative voltage → 1	Clockwise
Battery positive voltage → 1 Battery negative voltage → 2	Counterclockwise

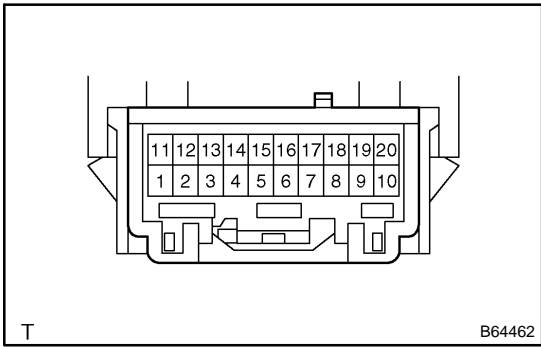
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSY LH (DRIVER SIDE)

3 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY (FOR GROUND)



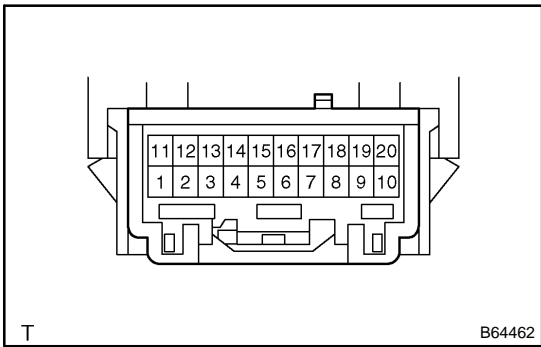
- (a) Remove the master switch (the connector is connected).
- (b) Check the continuity between terminal 2 and the body ground.

Standard: Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY (FOR POWER SOURCE)



- (a) Check the voltage between the terminals.

Standard:

Terminal No.	Condition	Specified Condition
9 ↔ 2	Constant	10 - 14 V
20 ↔ 2	Ignition ON	10 - 14 V
10 ↔ 2	Constant	10 - 14 V

NG REPAIR OR REPLACE HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)

OK

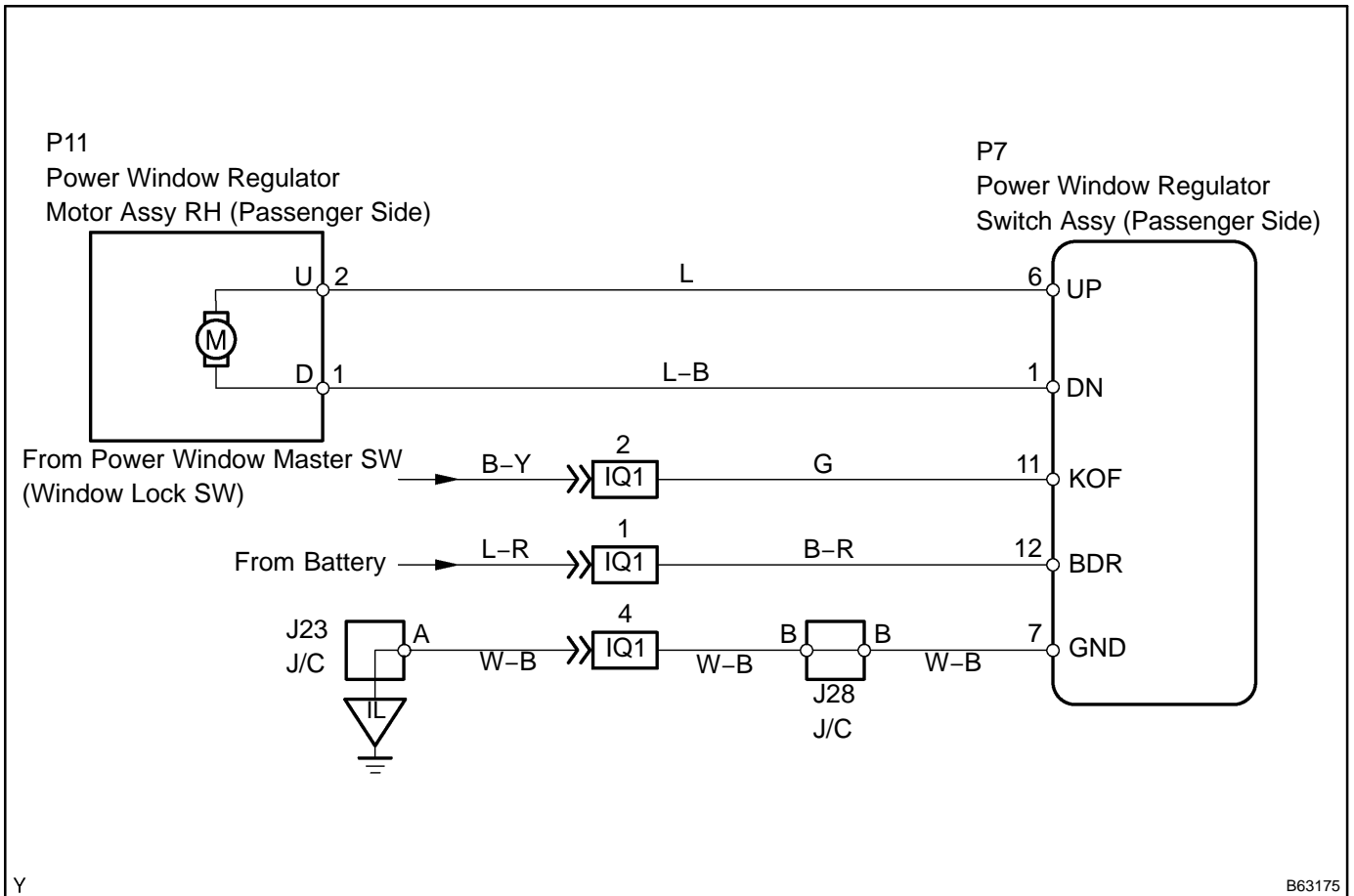
REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

MANUAL UP/DOWN FUNCTION DOES NOT OPERATE AT PASSENGER SIDE

CIRCUIT DESCRIPTION

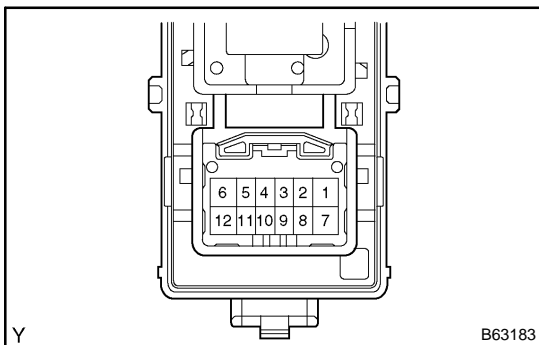
If the manual UP/DOWN function does not operate, the power window motor, the power window switch or the wire harness may be abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE) (FOR GROUND)

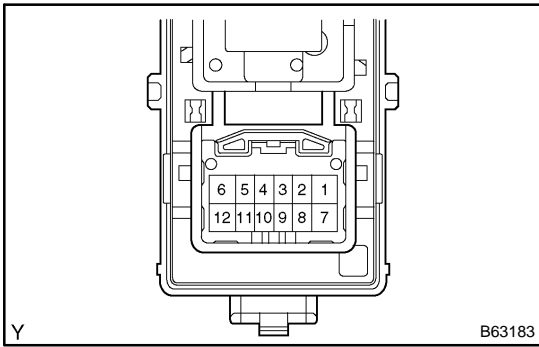


- (a) Remove the power window switch (the connector is connected).
 - (b) Check the continuity between terminal 7 and the body ground.
- Standard: Continuity**

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 INSPECT POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE) (FOR POWER SOURCE)

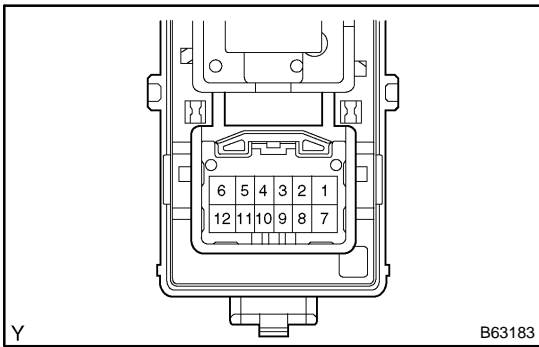


- (a) Check the voltage between terminals 12 and 7.
Standard: 10 - 14 V (Constant)

NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ POWER SOURCE)

OK

3 INSPECT POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE) (FOR WINDOW LOCK SWITCH)



- (a) Turn the ignition switch ON.
- (b) Check the voltage between terminals 11 and 7 when operating the window lock switch on the master switch.

Standard:

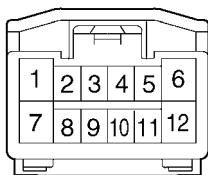
Terminal No.	Window Lock Switch	Specified Condition
11 ↔ 7	ON	5 V
	OFF	Less than 1 V

NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ MASTER SWITCH)

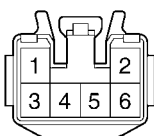
OK

4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)**Wire Harness Side:**

P7
Power Window Regulator
Switch Assy (Passenger Side)



P11
Power Window Regulator
Motor Assy RH (Passenger Side)

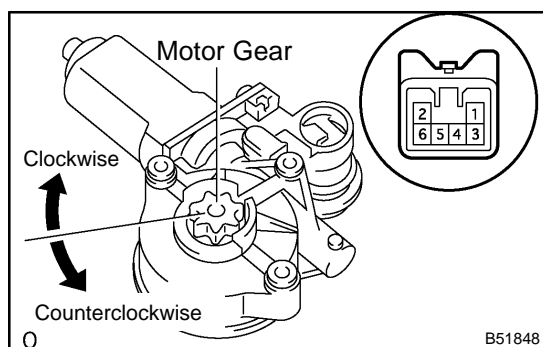


B52056

- Disconnect the P7 power window switch connector.
- Remove the front door trim RH.
- Disconnect the P11 power window motor connector.
- Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P7-1 ↔ P11-1	Continuity
P7-6 ↔ P11-2	Continuity
P7-1 ↔ Body ground	No continuity
P7-6 ↔ Body ground	No continuity

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****5 INSPECT POWER WINDOW REGULATOR MOTOR ASSY RH (PASSENGER SIDE)**

B51848

- Remove the motor (See page 75-13).
- Apply battery voltage to the connector between terminals 1 and 2.
- Check that the motor rotates smoothly.

NOTICE:

Do not apply battery voltage to the terminals except 1 and 2.

Standard:

Terminal No.	Motor Gear Rotation
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

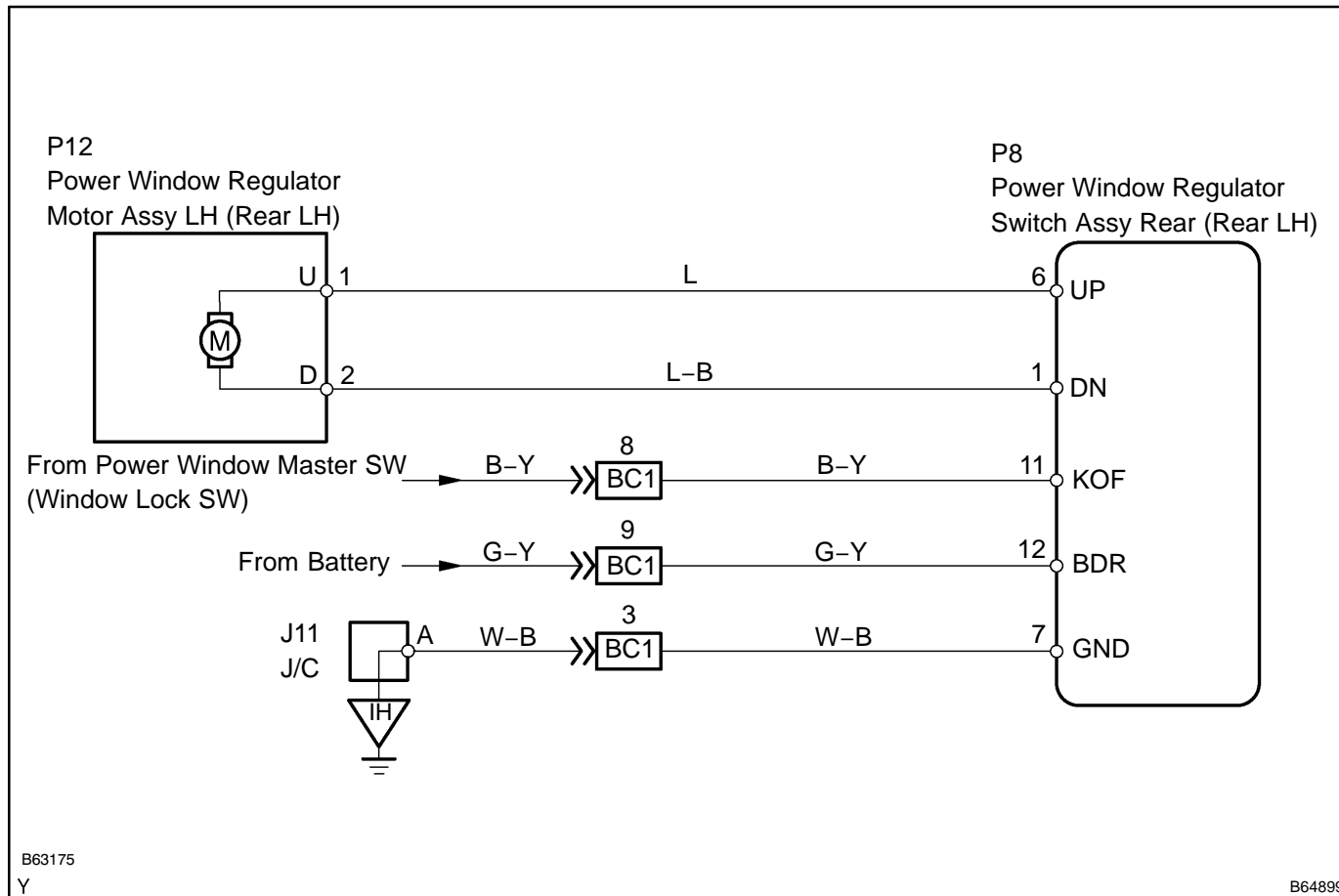
NG**REPLACE POWER WINDOW REGULATOR MOTOR ASSY RH (PASSENGER SIDE)****OK****REPLACE POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE)**

MANUAL UP/DOWN FUNCTION DOES NOT OPERATE AT REAR LH

CIRCUIT DESCRIPTION

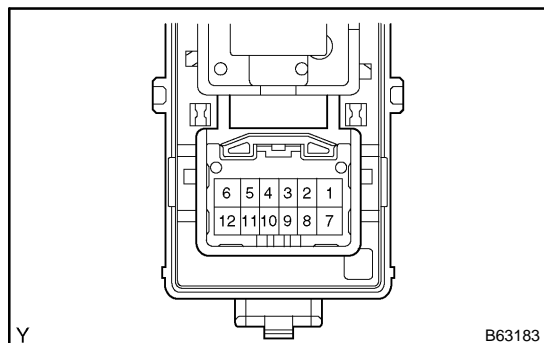
If the manual UP/DOWN function does not operate, the power window motor, the power window switch or the wire harness may be abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (PASSENGER SIDE) (FOR GROUND)



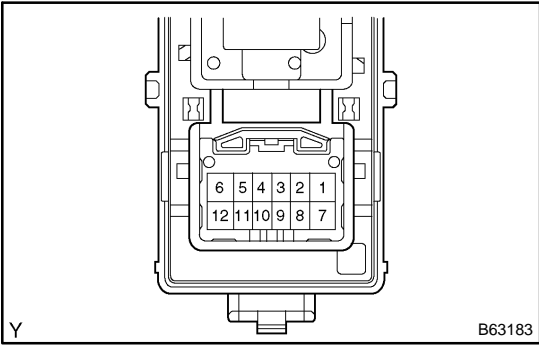
- (a) Remove the power window switch (the connector is connected).
- (b) Check the continuity between terminal 7 and the body ground.

Standard: Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR LH SIDE) (FOR POWER SOURCE)

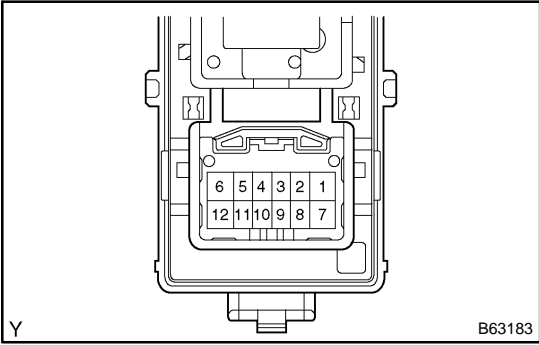


- (a) Check the voltage between terminals 12 and 7.
Standard: 10 - 14 V (Constant)

NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ POWER SOURCE)

OK

3 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR LH SIDE) (FOR WINDOW LOCK SWITCH)



- (a) Turn the ignition switch ON.
- (b) Check the voltage between terminals 11 and 7 when operating the window lock switch on the master switch.
Standard:

Terminal No.	Window Lock Switch	Specified Condition
11 ↔ 7	ON	5 V
	OFF	Less than 1 V

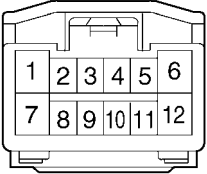
NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ MASTER SWITCH)

OK

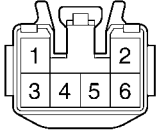
4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)

Wire Harness Side:

P8
Power Window Regulator
Switch Assy Rear (Rear LH)



P12
Power Window Regulator
Motor Assy LH (Rear LH)



B52056

- (a) Disconnect the P8 power window switch connector.
- (b) Remove the rear door trim LH.
- (c) Disconnect the P12 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

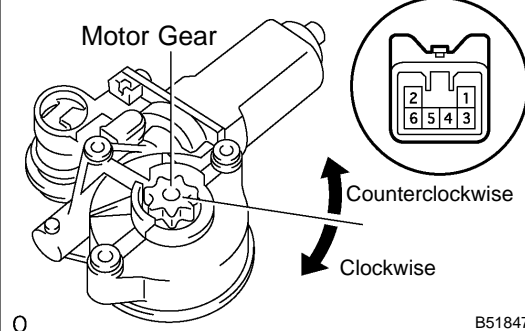
Standard:

Terminal No.	Specified Condition
P8-1 ↔ P12-2	Continuity
P8-6 ↔ P12-1	Continuity
P8-1 ↔ Body ground	No continuity
P8-6 ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5 INSPECT POWER WINDOW REGULATOR MOTOR ASSY LH (REAR LH)



Motor Gear

Counterclockwise

Clockwise

0

B51847

- (a) Remove the motor (See page 75-26).
- (b) Apply battery voltage to the connector between terminals 1 and 2.
- (c) Check that the motor rotates smoothly.

NOTICE:

Do not apply battery voltage to the terminals except 1 and 2.

Standard:

Terminal No.	Motor Gear Rotation
Battery positive voltage → 2 Battery negative voltage → 1	Clockwise
Battery positive voltage → 1 Battery negative voltage → 2	Counterclockwise

NG → **REPLACE POWER WINDOW REGULATOR MOTOR ASSY LH (REAR LH)**

OK

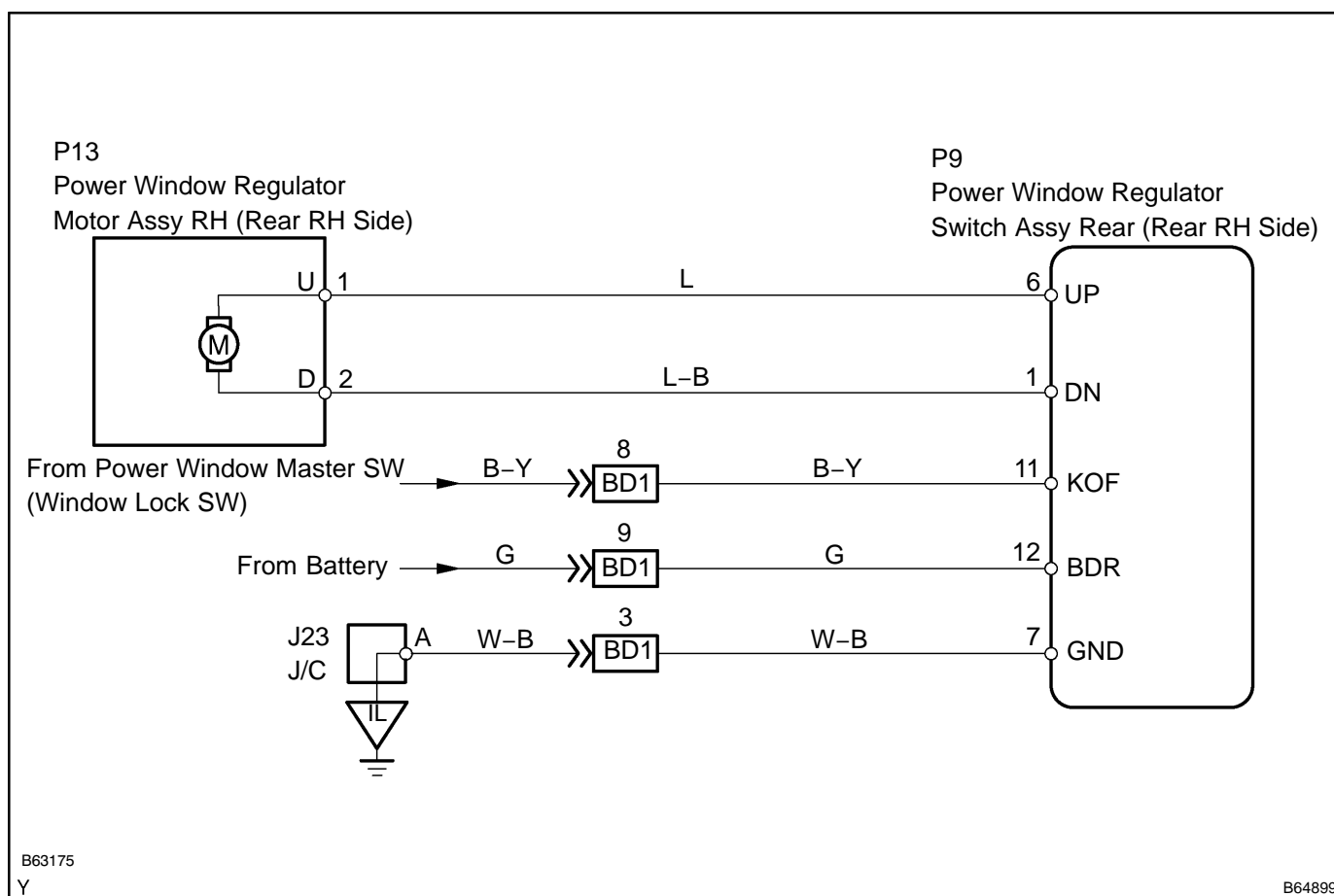
REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR LH)

MANUAL UP/DOWN FUNCTION DOES NOT OPERATE AT REAR RH

CIRCUIT DESCRIPTION

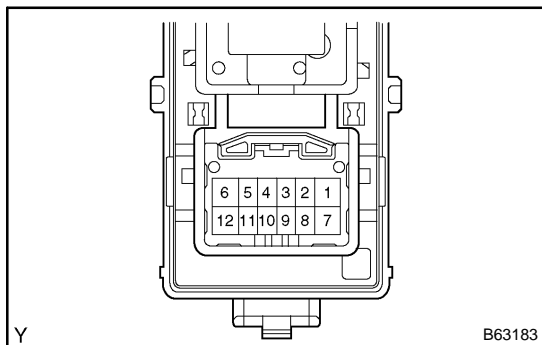
If the manual UP/DOWN function does not operate, the power window motor, the power window switch or the wire harness may be abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (PASSENGER SIDE) (FOR GROUND)



- Remove the power window switch (the connector is connected).
- Check the continuity between terminal 7 and the body ground.

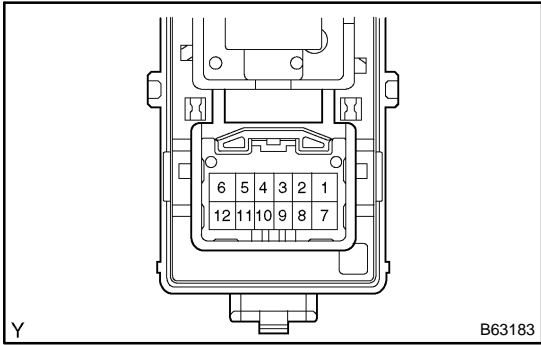
Standard: Continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR RH SIDE) (FOR POWER SOURCE)

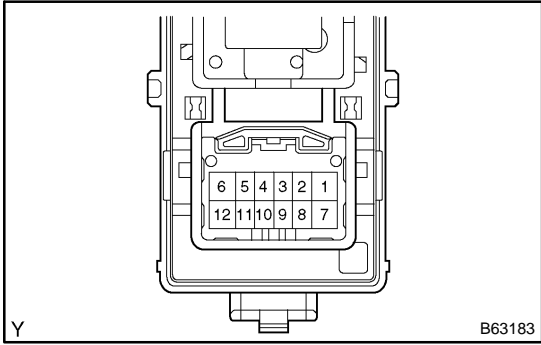


- (a) Check the voltage between terminals 12 and 7.
Standard: 10 - 14 V (Constant)

NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ POWER SOURCE)

OK

3 INSPECT POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR RH SIDE) (FOR WINDOW LOCK SWITCH)



- (a) Turn the ignition switch ON.
- (b) Check the voltage between terminals 11 and 7 when operating the window lock switch on the master switch.
Standard:

Terminal No.	Window Lock Switch	Specified Condition
11 ↔ 7	ON	5 V
	OFF	Less than 1 V

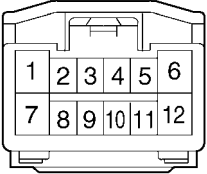
NG REPAIR OR REPLACE HARNESS AND CONNECTOR (SWITCH ↔ MASTER SWITCH)

OK

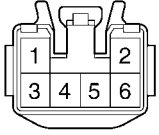
4 CHECK WIRE HARNESS (SWITCH ↔ MOTOR)

Wire Harness Side:

P9
Power Window Regulator
Switch Assy Rear (Rear RH)



P13
Power Window Regulator Motor
Assy RH (Rear RH)



B52056

- (a) Disconnect the P9 power window switch connector.
- (b) Remove the rear door trim RH.
- (c) Disconnect the P13 power window motor connector.
- (d) Check the continuity between the wire harness side connectors.

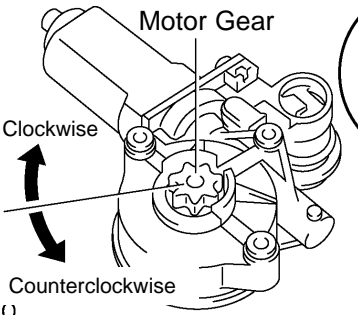
Standard:

Terminal No.	Specified Condition
P9-1 ↔ P13-2	Continuity
P9-6 ↔ P13-1	Continuity
P9-1 ↔ Body ground	No continuity
P9-6 ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5 INSPECT POWER WINDOW REGULATOR MOTOR ASSY RH (REAR RH)



B51848

- (a) Remove the motor (See page 75-26).
- (b) Apply battery voltage to the connector between terminals 1 and 2.
- (c) Check that the motor rotates smoothly.

NOTICE:

Do not apply battery voltage to the terminals except 1 and 2.

Standard:

Terminal No.	Motor Gear Rotation
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

NG → **REPLACE POWER WINDOW REGULATOR MOTOR ASSY RH (REAR RH)**

OK

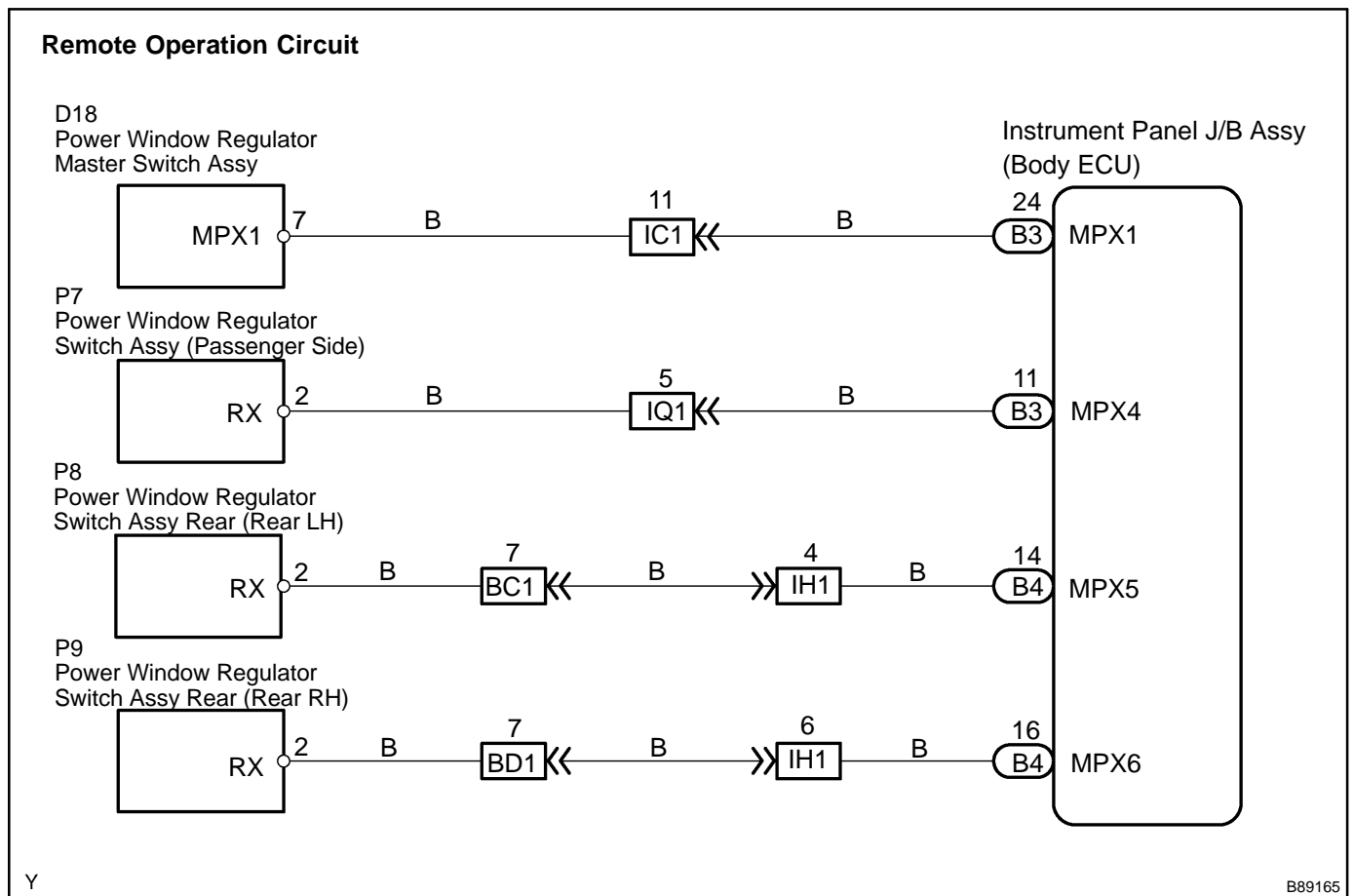
REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR RH)

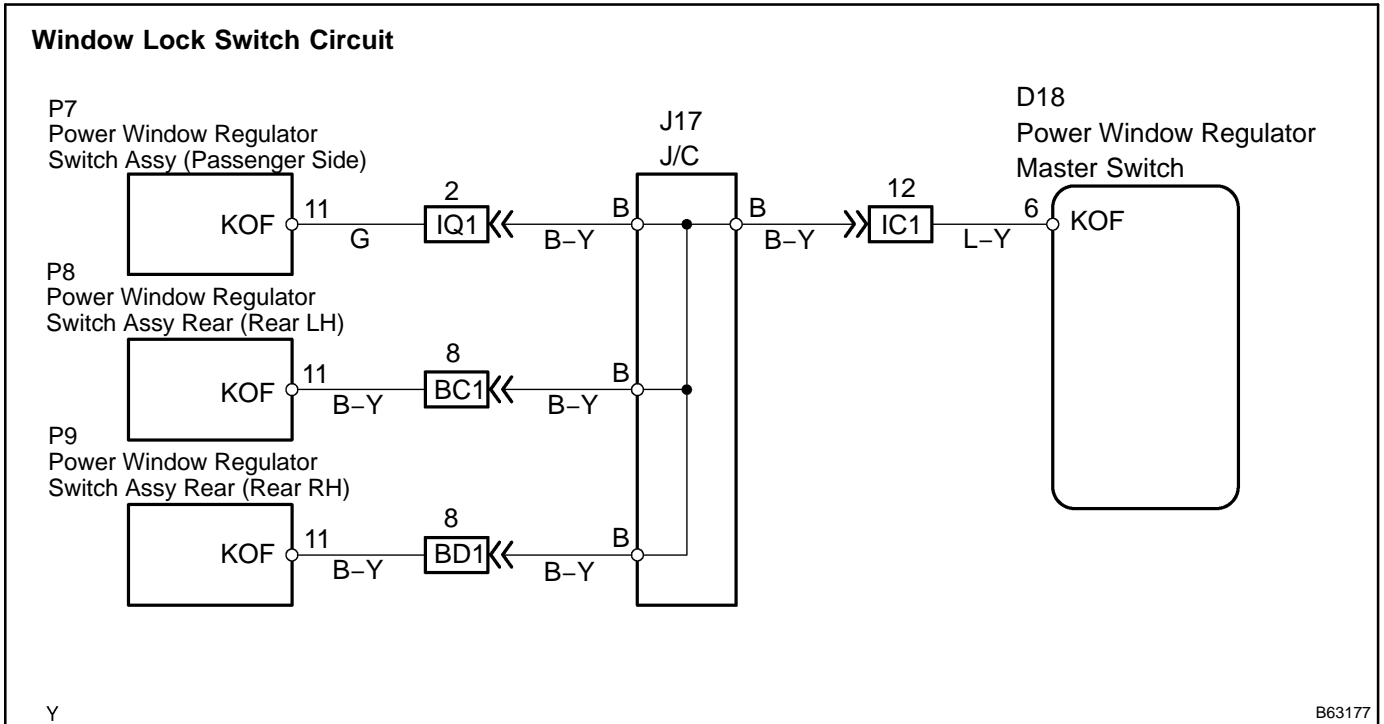
REMOTE UP/DOWN FUNCTION DOES NOT OPERATE

CIRCUIT DESCRIPTION

If the remote control does not operate, the remote function may have been disabled by a malfunction that was detected in the power window circuit. Also, when any power window switch or the wire harness has a malfunction, the remote control for the applicable power window does not function.

WIRING DIAGRAM





INSPECTION PROCEDURE

HINT:

Check which power window cannot be operated, and then proceed with the troubleshooting for the applicable power window as shown in the table below.

Position	Go To Step
Passenger side	1
Rear LH	5
Rear RH	9
All	13

1 CHECK MANUAL UP/DOWN FUNCTION (PASSENGER SIDE)

(a) Check that the door glass can be operated by the power window switch.

NG OTHER PROBLEM (See page 05-2103)

OK

2 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY

(a) Using the hand-held tester, check operation of the master switch using the DATA LIST.

Standard:

DATA LIST in D-DOOR ECU

Measurement Item	Label	Parameter
Passenger switch on master switch	P P/W AUTO SW	ON/OFF

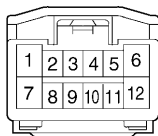
NG REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

OK

3 CHECK WIRE HARNESS (FOR POWER WINDOW SWITCH)

Wire Harness Side:

P7
Power Window Regulator Switch Assy
(Passenger Side)

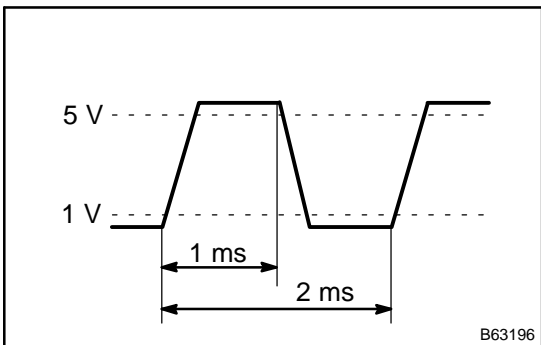


B52051

- (a) Disconnect the P7 power window switch connector.
- (b) Turn the ignition switch ON.
- (c) Using an oscilloscope, check the waveform of terminal 2 of the wire harness side connector when operating the passenger side switch of the power window master switch.

Standard:

The waveform is as shown in the illustration.



B63196

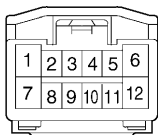
OK → **REPLACE POWER WINDOW REGULATOR SWITCH ASSY (PASSENGER SIDE)**

NG

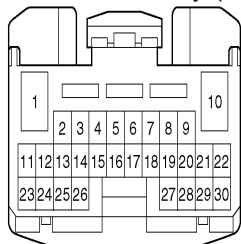
4 CHECK WIRE HARNESS (POWER WINDOW SWITCH ↔ BODY ECU)

Wire Harness Side:

P7
Power Window Regulator Switch Assy
(Passenger Side)



B3
Instrument Panel J/B Assy (Body ECU)



B52051
B63184

B63197

- (a) Disconnect the B3 body ECU connector from the instrument panel J/B Assy.
- (b) Check the continuity between the terminals of the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P7-2 ↔ B3-11	Continuity
P7-2 ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)

5 CHECK MANUAL UP/DOWN FUNCTION (REAR LH)

(a) Check that the power window can be operated by the power window switch.

NG OTHER PROBLEM (See page 05-2106)

OK

6 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY

(a) Using the hand-held tester, check operation of the master switch using the data list.

Standard:

Data list in D-DOOR ECU

Measurement Item	Label	Parameter
Rear LH switch on master switch	RL P/W AUTO SW	ON/OFF

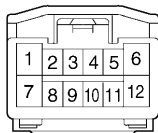
NG REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

OK

7 CHECK WIRE HARNESS (FOR POWER WINDOW SWITCH)

Wire Harness Side:

P8
Power Window Regulator Switch Assy
(Rear LH)

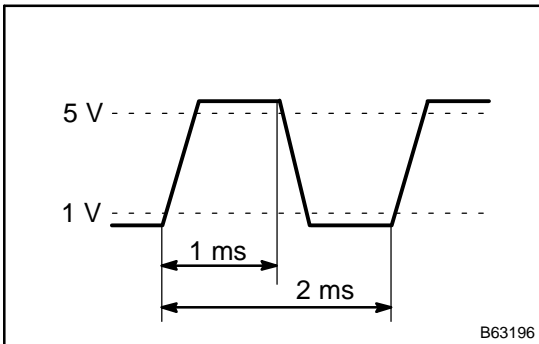


B52051

- (a) Disconnect the P8 power window switch connector.
- (b) Turn the ignition switch ON.
- (c) Using an oscilloscope, check the waveform of terminal 2 of the wire harness side connector when operating the rear LH switch of the master switch.

Standard:

The waveform is as shown in the illustration.



B63196

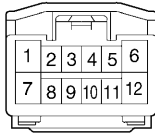
OK REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR LH)

NG

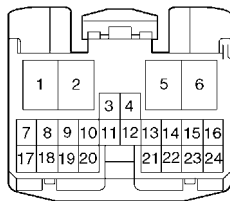
8 CHECK WIRE HARNESS (POWER WINDOW SWITCH ↔ BODY ECU)

Wire Harness Side:

P8
Power Window Regulator Switch Assy
(Rear LH)



B4
Instrument Panel J/B Assy (Body ECU)



B63198

- (a) Disconnect the B4 body ECU connector from the instrument panel J/B Assy.
- (b) Check the continuity between the terminals of the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P8-2 ↔ B4-14	Continuity
P8-2 ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)

9 CHECK MANUAL UP/DOWN FUNCTION (REAR LH)

- (a) Check that the power window can be operated by the power window switch.

NG OTHER PROBLEM (See page 05-2109)

OK

10 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY

- (a) Using the hand-held tester, check operation of the master switch using the data list.

Standard:

Data list in D-DOOR ECU

Measurement Item	Label	Parameter
Rear RH switch on master switch	RR P/W AUTO SW	ON/OFF

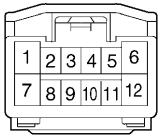
NG REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

OK

11 CHECK WIRE HARNESS (FOR POWER WINDOW SWITCH)

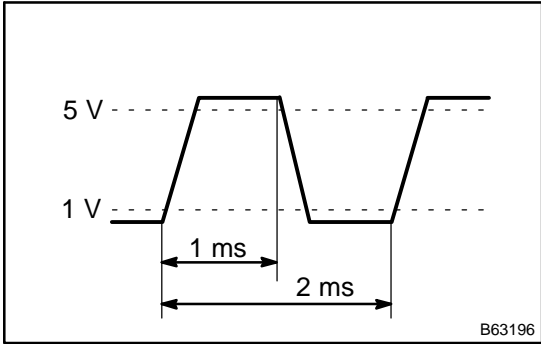
Wire Harness Side:

P9
Power Window Regulator Switch Assy
(Rear RH)



B52051

- (a) Disconnect the P9 power window switch connector.
- (b) Turn the ignition switch ON.
- (c) Using an oscilloscope, check the waveform of terminal 2 of the wire harness side connector when operating the rear RH switch of the master switch.



Standard:
The waveform is as shown in the illustration.

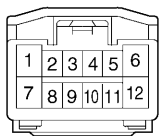
OK → **REPLACE POWER WINDOW REGULATOR SWITCH ASSY REAR (REAR RH)**

NG

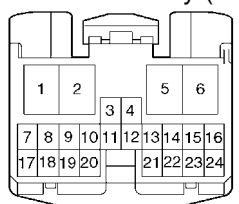
12 CHECK WIRE HARNESS (POWER WINDOW SWITCH ↔ BODY ECU)

Wire Harness Side:

P9
Power Window Regulator Switch Assy
(Rear RH)



B4
Instrument Panel J/B Assy (Body ECU)



B63198

- (a) Disconnect the B4 body ECU connector from the instrument panel J/B Assy.
- (b) Check the continuity between the terminals of the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
P9-2 ↔ B4-16	Continuity
P9-2 ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)

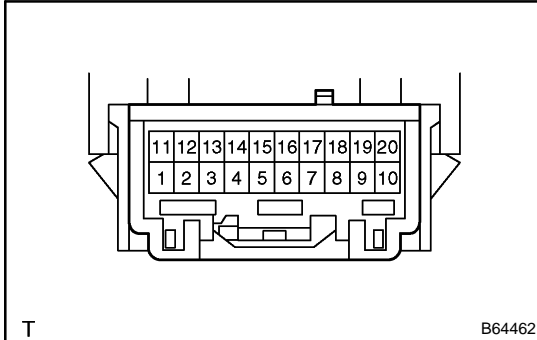
13	CHECK POWER WINDOW LOCK SWITCH
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- (a) Turn the window lock switch OFF and check that the remote function operates.

OK	END
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NG

14	INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY (FOR WINDOW LOCK SWITCH)
-----------	---



- (a) Remove the master switch (the connector is connected).
 (b) Turn the ignition switch ON.
 (c) Check the voltage between terminal 6 and the body ground when operating the window lock switch on the master switch.

Standard:

Terminal No.	Window Lock Switch	Specified Condition
6 ↔ body ground	ON	5 V
	OFF	Less than 1 V

NG	REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY
-----------	--

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (MASTER SWITCH ↔ EACH SWITCH)
--

POWER MIRROR CONTROL SYSTEM (W/ MEMORY)

HOW TO PROCEED WITH TROUBLESHOOTING

05AVP-01

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1	VEHICLE BROUGHT TO WORKSHOP
----------	------------------------------------



2	CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK
----------	--



3	SYMPTOMS SIMULATION
----------	----------------------------



4	PROBLEM SYMPTOMS TABLE (See page 05-2124)
----------	--

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

B	Go to step 6
----------	---------------------

A

5	PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM
----------	---

- (a) Terminals of ECU (See page 05-2122)
- (b) On-vehicle inspection (See page 70-27)
- (c) Inspection (See page 70-30)



6	ADJUST, REPAIR OR REPLACE
----------	----------------------------------



7	CONFIRMATION TEST
----------	--------------------------



END

CUSTOMER PROBLEM ANALYSIS CHECK

POWER MIRROR CONTROL SYSTEM Check Sheet

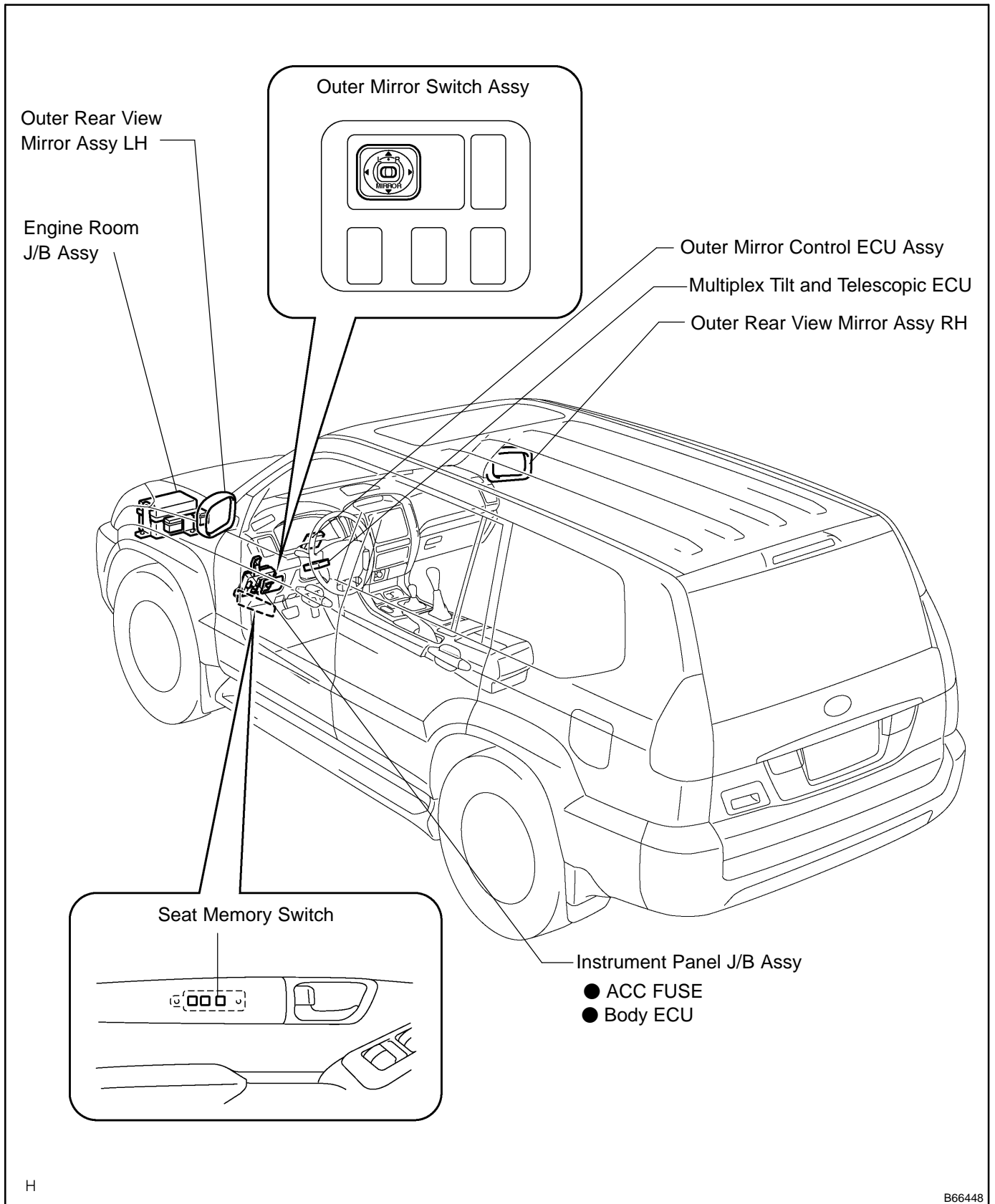
Inspector's Name _____

Customer's Name		Registration No.	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

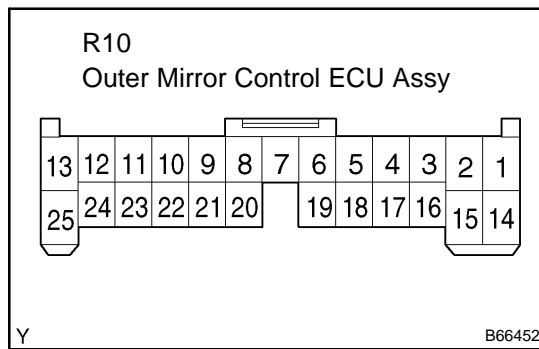
Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (times a day) <input type="checkbox"/> Only once
Weather Conditions When Problem Occurred	Weather
	Outdoor Temperature
	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))

Problem Symptoms	<input type="checkbox"/> Both driver and passenger power mirrors cannot be adjusted manually.
	<input type="checkbox"/> Either driver or passenger power mirror cannot be adjusted manually.
	<input type="checkbox"/> Mirror position cannot be recorded in memory.
	<input type="checkbox"/> Power mirrors do not turn to recorded position.

LOCATION



TERMINALS OF ECU



1. **CHECK OUTER MIRROR CONTROL ECU ASSY**
 - (a) Disconnect the R10 mirror ECU connector.
 - (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (R10-14) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
+B (R10-1) ⇔ Body ground	W-R ⇔ -	Constant	10 - 14 V
ACC (R10-2) ⇔ Body ground	GR ⇔ -	Ignition switch OFF → ACC	0 V → 10 - 14 V
REV (R10-15) ⇔ Body ground	R-B ⇔ -	Ignition switch OFF → ACC	0 V → 10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

- (1) Reconnect the R10 mirror ECU connector, and check the voltage of terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
M+L (R10-10) ⇔ GND (R10-14)	Y-B ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → RIGHT or DOWN	0 - 8 V or more
MHL (R10-11) ⇔ GND (R10-14)	P-B ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → LEFT	0 - 8 V or more
MVL (R10-12) ⇔ GND (R10-14)	P-G ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → UP	0 - 8 V or more
M+R (R10-22) ⇔ GND (R10-14)	Y-B ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → RIGHT or DOWN	0 - 8 V or more
MHR (R10-23) ⇔ GND (R10-14)	LG-B ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → LEFT	0 - 8 V or more
MVR (R10-24) ⇔ GND (R10-14)	LG-R ⇔ W-B	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch OFF → UP	0 - 8 V or more

If the result is not as specified, the ECU may be malfunctioning.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
VSRL (R10-8) ⇔ Body ground	B-L ⇔ -	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch innermost position → outermost position	Approx. 4 V → 0.23 V
HSRL (R10-9) ⇔ Body ground	B-R ⇔ -	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch uppermost position → lowermost position	Approx. 3.7 V → 0.27 V
VSSR (R10-20) ⇔ Body ground	B-L ⇔ -	Ignition switch ACC, Left/Right adjustment switch L side, Mirror switch innermost position → outermost position	Approx. 4 V → 0.23 V
HSRR (R10-21) ⇔ Body ground	B-R ⇔ -	Ignition switch ACC, Left/Right adjustment switch R side, Mirror switch uppermost position → lowermost position	Approx. 3.7 V → 0.27 V

DIAGNOSTICS - POWER MIRROR CONTROL SYSTEM (W/ MEMORY)

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
MHR (R10-23) ↔ Body ground	LG-B ↔ -	Ignition switch OFF, All lights OFF. All doors closed and left untouched for 30 sec. or more → Any door open	No Hz output (0 HZ) → Hz output
MVR (R10-24) ↔ Body ground	LG-R ↔ -	Ignition switch OFF, All lights OFF All doors closed and left untouched for 30 sec. or more → Any door open	No Hz output (0 HZ) → Hz output

If the result is not as specified, replace the mirror assy, or the multiplex control system may be malfunctioning.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
VC (R10-7) ↔ Body ground	B-Y ↔ -	Ignition switch OFF → ACC	0 V → 5 V

If the result is not as specified, the ECU may be malfunctioning.

PROBLEM SYMPTOMS TABLE

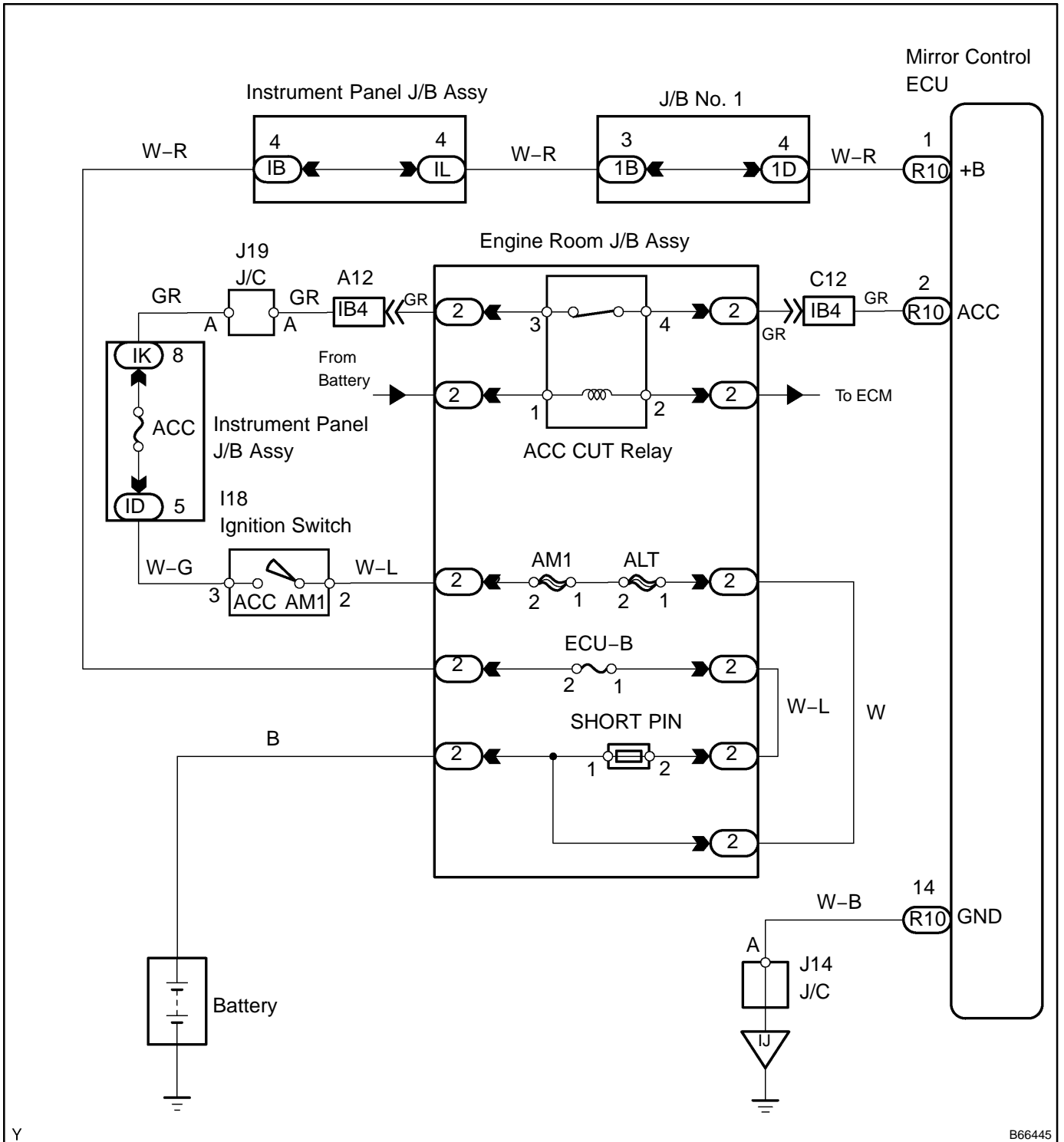
Symptom	Suspected Area	See Page
Power mirror cannot be adjusted manually.	<ol style="list-style-type: none"> 1. ECU power source circuit 2. Outer mirror switch assy 3. Outer mirror control ECU assy 4. Outer rear view mirror assy 5. Wire harness 	05-2125 70-30 05-2122 70-30 —
Power mirror does not turn to recorded position.	<ol style="list-style-type: none"> 1. Seat memory switch 2. Position control ECU & switch assy 3. Outer mirror control ECU assy 4. Outer rear view mirror assy 5. Wire harness 	05-2140 — 05-2122 70-30 —
Reverse shift-linked function of power mirror does not operate.	<ol style="list-style-type: none"> 1. Outer mirror switch assy 2. Outer rear view mirror assy 3. Outer mirror control ECU assy 4. Park/neutral position switch circuit 5. Ignition switch 	05-2127 70-30 05-2122 05-958 —

ECU POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This is the power source circuit for the outer mirror control ECU assy.

WIRING DIAGRAM



Y

B66445

1 CHECK FUSE (ACC, ECU-B)

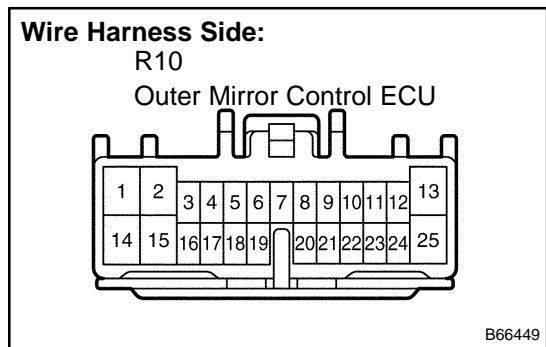
- (a) Remove the fuses from the instrument panel J/B Assy and engine room J/B Assy.
- (b) Check the continuity.

Standard: Continuity

NG → **REPLACE FUSE**

OK

2 CHECK OUTER MIRROR CONTROL ECU ASSY (POWER SOURCE)



- (a) Disconnect the R10 ECU connector.
- (b) Check the voltage between the R10 ECU and the body ground.

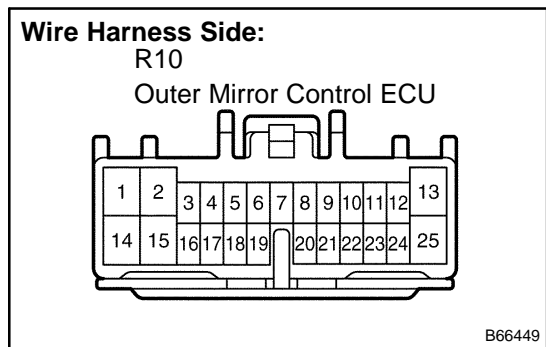
Standard:

Symbols (Terminal No.)	Condition	Specified Condition
+B (R10-1) ↔ Body ground	Constant	10 - 14 V
ACC (R10-2) ↔ Body ground	Ignition switch OFF → ACC	0 V → 10 - 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3 CHECK OUTER MIRROR CONTROL ECU ASSY (GROUND)



- (a) Disconnect the R10 ECU connector.
- (b) Check the continuity between the R10 mirror ECU connector and the body ground.

Symbols (Terminal No.)	Condition	Specified Condition
GND (R10-14) ↔ Body ground	Constant	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

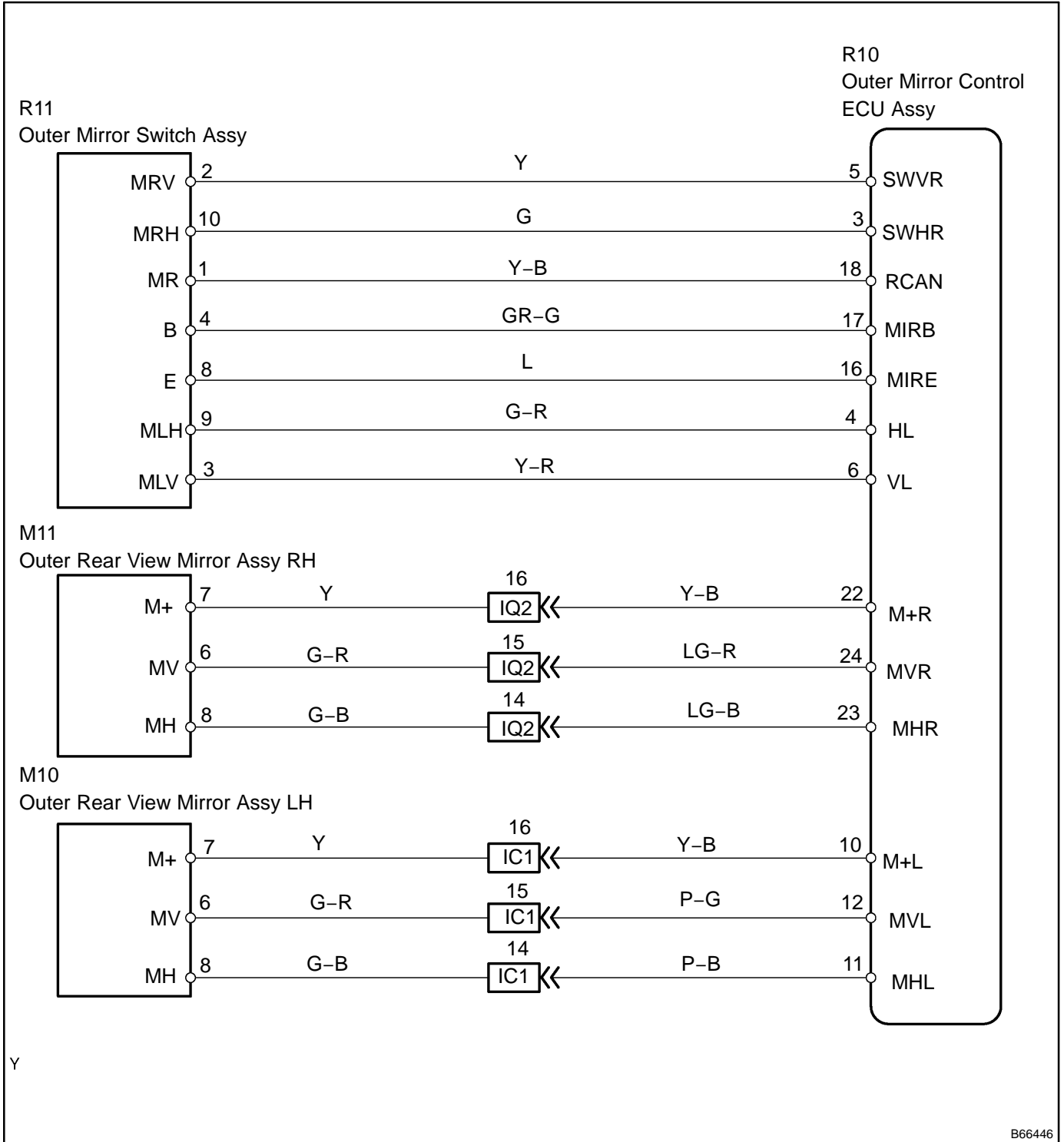
CHECK AND REPLACE OUTER MIRROR CONTROL ECU ASSY (See page 01-36)

POWER MIRRORS CANNOT BE ADJUSTED MANUALLY

CIRCUIT DESCRIPTION

When the mirror switch is pressed, a signal is transmitted to the outer mirror control ECU Assy. At this time, the mirror Assy faces upward, downward, right or left.

WIRING DIAGRAM



Y

B66446

1 CHECK OUTER MIRROR SWITCH ASSY (See page 70-30)

NG → **REPLACE OUTER MIRROR SWITCH ASSY**

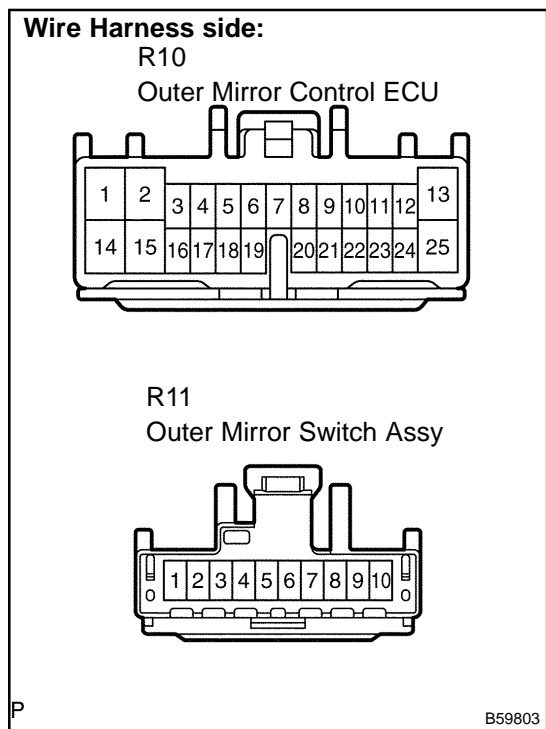
OK

2 CHECK OUTER REAR VIEW MIRROR (See page 70-30)

NG → **REPLACE OUTER REAR VIEW MIRROR**

OK

3 CHECK WIRE HARNESS (OUTER MIRROR SWITCH ASSY ↔ MIRROR CONTROL ECU ASSY)



- (a) Disconnect the R11 switch and R10 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
RCAN (R10-18) ↔ MR (R11-1)	Continuity
MIRB (R10-17) ↔ B (R11-4)	Continuity
MIRE (R10-16) ↔ E (R11-8)	Continuity
VL (R10-6) ↔ MVL (R11-3)	Continuity
SWVR (R10-5) ↔ MRV (R11-2)	Continuity
HL (R10-4) ↔ MLH (R11-9)	Continuity
SWHR (R10-3) ↔ MRH (R11-10)	Continuity

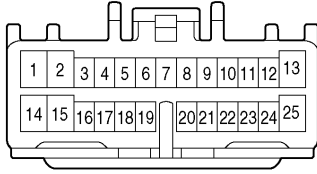
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

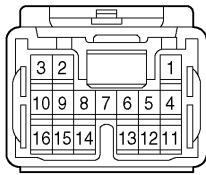
4 CHECK WIRE HARNESS (OUTER REAR VIEW MIRROR ASSY ↔ OUTER MIRROR CONTROL ECU ASSY)

Wire Harness Side:

R10
Outer Mirror Control ECU



M10*1
M11*2
Outer Rear View Mirror Assy



*1: LH Side
*2: RH Side

Y

B66444

- (a) Disconnect the R10 ECU connector.
- (b) Disconnect the M11 and M10 mirror assy connectors.
- (c) Check the continuity between the wire harness side connectors.

Standard: (RH side)

Symbols (Terminal No.)	Specified Condition
M+R (R10-22) ↔ M+ (M11-7)	Continuity
MVR (R10-24) ↔ MV (M11-6)	Continuity
MHR (R10-23) ↔ MH (M11-8)	Continuity

Standard: (LH side)

Symbols (Terminal No.)	Specified Condition
M+L (R10-10) ↔ M+ (M10-7)	Continuity
MVL (R10-12) ↔ MV (M10-6)	Continuity
MHL (R10-11) ↔ MH (M10-8)	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

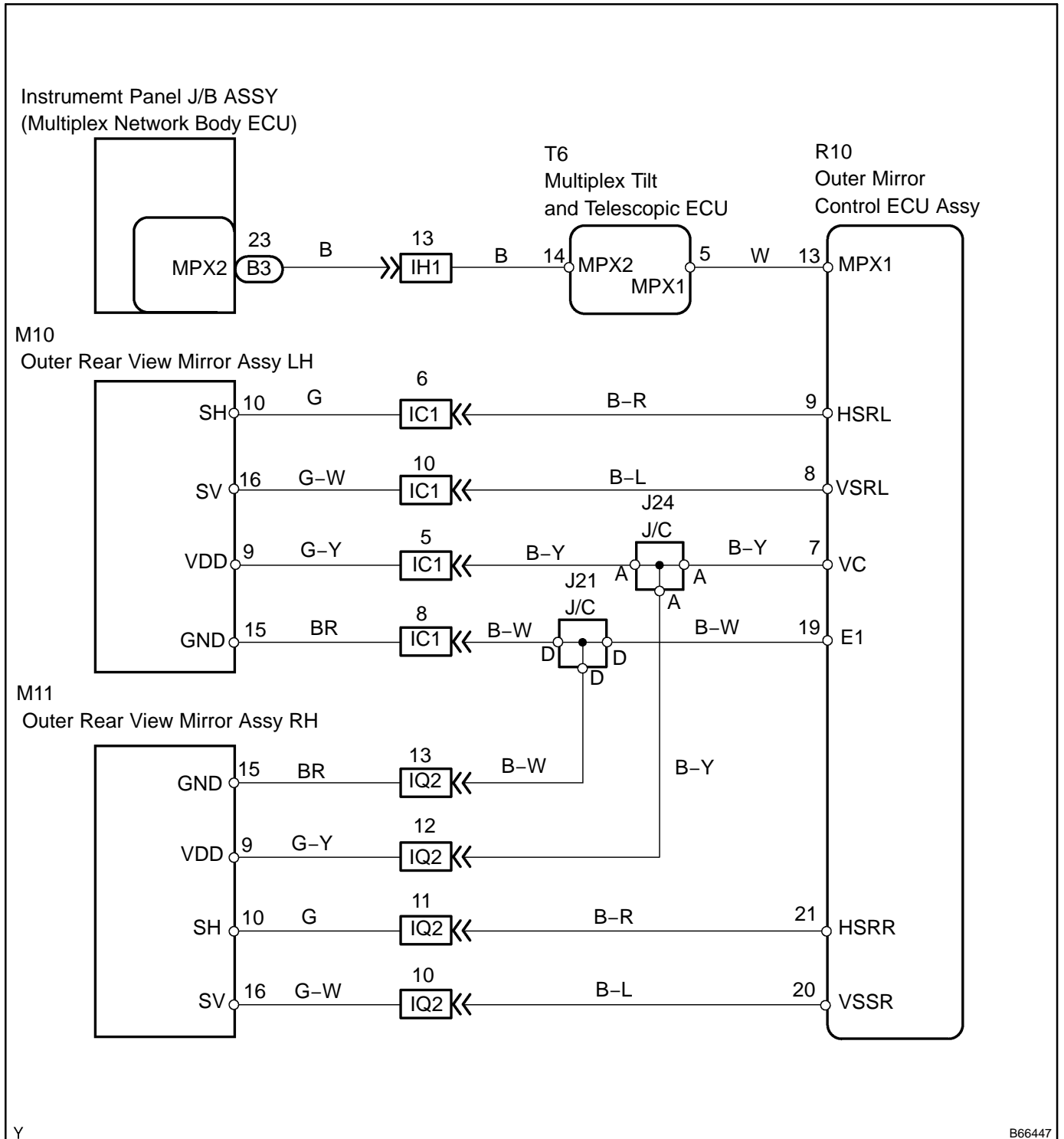
CHECK AND REPLACE OUTER MIRROR CONTROL ECU ASSY (See page 01-36)

POWER MIRROR DOES NOT TURN TO RECORDED POSITION

CIRCUIT DESCRIPTION

When either SW1 or SW2 of the seat memory switch is pressed, the body ECU transmits a signal of the recorded mirror position to the mirror ECU by way of the body ECU and multiplex tilt and telescopic ECU, then the mirror ECU drives the mirror motor.

WIRING DIAGRAM



Y

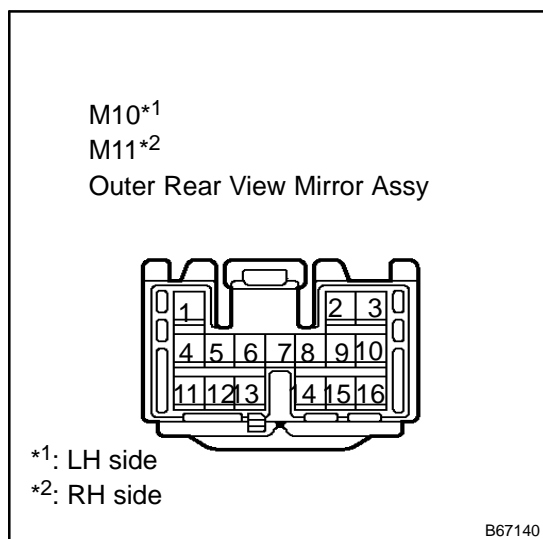
B66447

1 CHECK OUTER MIRROR SWITCH ASSY (FUNCTION CHECK)

- (a) Check that the door mirror operates normally, when the mirror switch is pressed.

NG → **GO TO PROBLEM SYMPTOMS TABLE**

OK

2 CHECK OUTER REAR VIEW MIRROR

- (a) Check that the voltage gradually changes while the mirror is moving.

Standard:

Symbols (Terminal No.)	Mirror Position	Standard Voltage
SV (M10-16) ⇔ GND (M10-15)	Lowermost	0 - 1.0 V
	Lower → Upper	Changes gradually
	Uppermost	3.0 - 4.0 V
SH (M11-10) ⇔ GND (M11-15)	Leftmost	0 - 1.0 V
	Left → Right	Changes gradually
	Rightmost	3.0 - 4.0 V

NG → **REPLACE OUTER REAR VIEW MIRROR**

OK

3 CHECK WIRE HARNESS (MULTIPLEX TILT AND TELESCOPIC ECU ⇔ OUTER MIRROR CONTROL ECU) (See page 05-2309)

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) ⇔ MULTIPLEX TILT AND TELESCOPIC ECU) (See page 05-2269)

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5 CHECK OUTER REAR VIEW MIRROR (FUNCTION CHECK)

- (a) Check that the power seat can be operated by the operating the seat memory switch.

NG → **GO TO PROBLEM SYMPTOMS TABLE**

OK

CHECK AND REPLACE OUTER MIRROR CONTROL ECU ASSY (See page [01-36](#))

FRONT POWER SEAT CONTROL SYSTEM (W/ MEMORY)

HOW TO PROCEED WITH TROUBLESHOOTING

0569V-02

HINT:

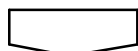
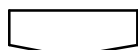
Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP**2 CUSTOMER PROBLEM ANALYSIS CHECK AND PROBLEM SYMPTOM CONFIRMATION (See page 05-2134)****3 PROBLEM SYMPTOMS TABLE (See page 05-2137)**

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

B**Go to step 5****A****4 PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM**

- (a) Terminals of ECU (See page 05-2136)
- (b) On-vehicle inspection (See page 72-3)
- (c) Inspection (See page 72-6)

5 ADJUST, REPAIR OR REPLACE**6 CONFIRMATION TEST****END**

CUSTOMER PROBLEM ANALYSIS CHECK

POWER SEAT CONTROL SYSTEM Check Sheet

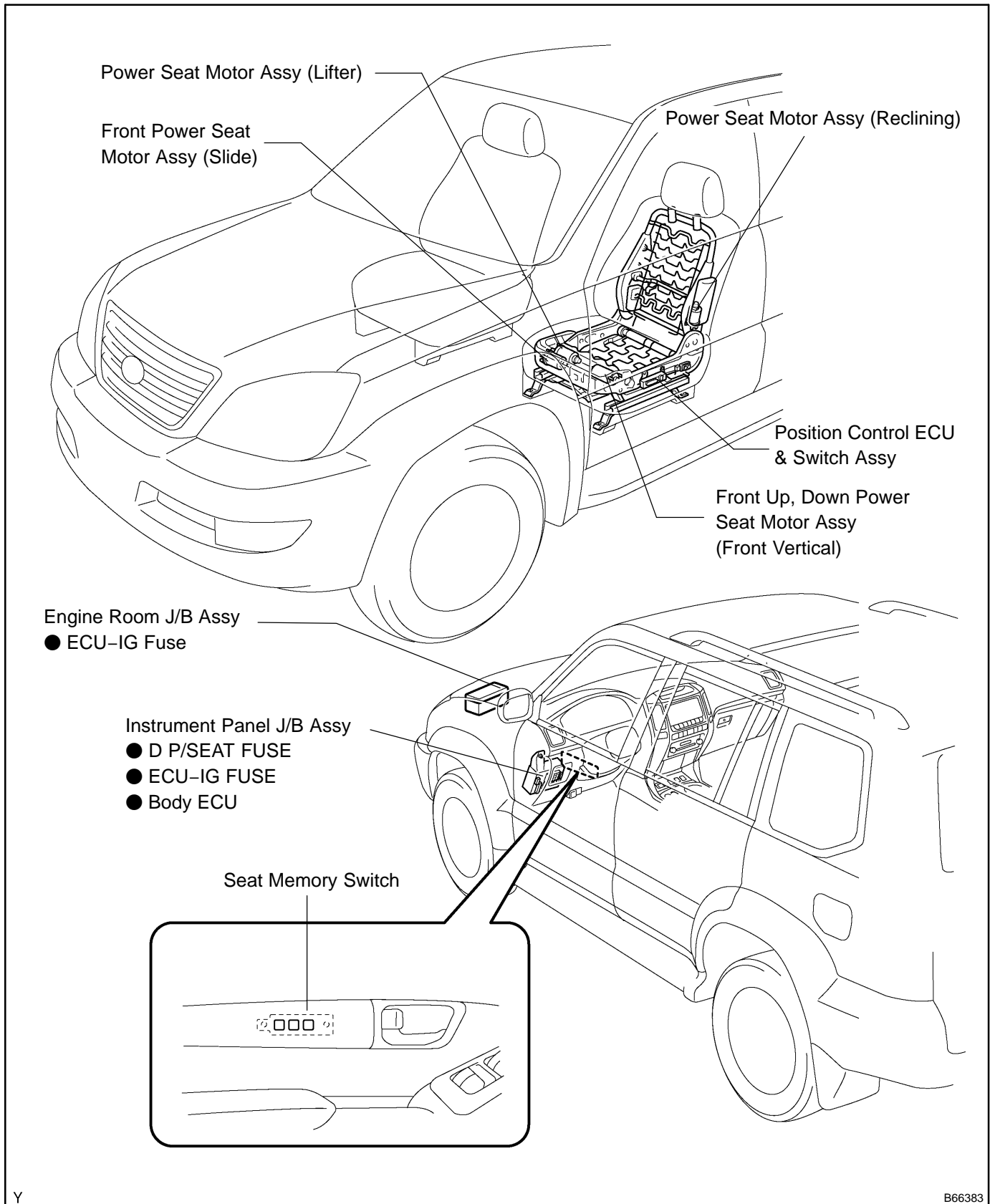
Inspector's Name: _____

Customer's Name	_____	Registration No.	_____
		Registration Date	/ /
		Frame No.	_____
Date Vehicle Brought In	/ /	Odometer Reading	_____ km miles

Date Problem First Occurred	_____ / _____ / _____
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (times a day) <input type="checkbox"/> Only once
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (°C [°F])

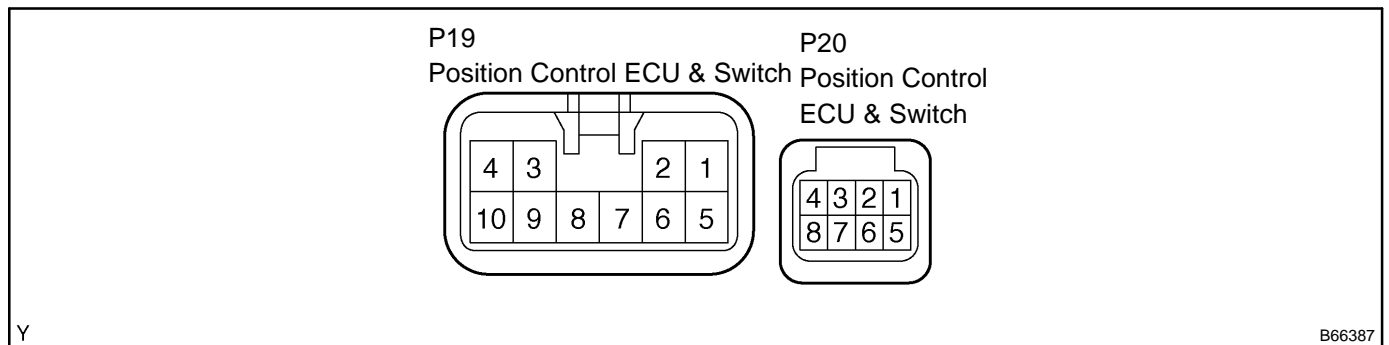
Problem Symptoms	<input type="checkbox"/> All functions do not operate
	<input type="checkbox"/> Slide function does not operate
	<input type="checkbox"/> Reclining function does not operate
	<input type="checkbox"/> Front vertical function does not operate
	<input type="checkbox"/> Lifter function does not operate
	<input type="checkbox"/> Seat position memory function does not operate
	<input type="checkbox"/> Others

LOCATION



TERMINALS OF ECU

1. CHECK POSITION CONTROL ECU & SWITCH ASSY



- (a) Disconnect the P19 and P20 position control ECU & switch connectors, and check the voltage of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (P19-1) ⇔ Body ground	W-B ⇔ -	Constant	Below 1 V
+B (P19-5) ⇔ GND (P19-1)	LG ⇔ W-B	Constant	10 - 14 V
SYSB (P20-8) ⇔ GND (P19-1)	GR ⇔ W-B	Constant	10 - 14 V
IG (P20-4) ⇔ GND (P19-1)	Y ⇔ W-B	Ignition switch OFF → ON	0 V → 10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the P19 and P20 position control ECU & switch connectors, and check the voltage of each terminal of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
SLD- (P19-3) ⇔ GND (P19-1)	Y ⇔ W-B	Seat is moved rearward using slide switch.	10 - 14 V
		Others	Below 1 V
FRV- (P19-4) ⇔ GND (P19-1)	B ⇔ W-B	Seat is lowered using front vertical switch.	10 - 14 V
		Others	Below 1 V
LFT- (P19-9) ⇔ GND (P19-1)	V ⇔ W-B	Seat is lowered using lifter switch.	10 - 14 V
		Others	Below 1 V
FRV+ (P19-6) ⇔ GND (P19-1)	G ⇔ W-B	Seat is raised using front vertical switch.	10 - 14 V
		Others	Below 1 V
SLD+ (P19-2) ⇔ GND (P19-1)	L ⇔ W-B	Seat is moved forward using slide switch.	10 - 14 V
		Others	Below 1 V
LFT+ (P19-7) ⇔ GND (P19-1)	W ⇔ W-B	Seat is raised using lifter switch.	10 - 14 V
		Others	Below 1 V
RCL- (P19-10) ⇔ GND (P19-1)	BR ⇔ W-B	Seat back is moved rearward using reclining switch.	10 - 14 V
		Others	Below 1 V
RCL+ (P19-8) ⇔ GND (P19-1)	P ⇔ W-B	Seat back is moved forward using reclining switch.	10 - 14 V
		Others	Below 1 V

If the result is not as specified, the position control ECU & switch may be malfunctioning.

PROBLEM SYMPTOMS TABLE

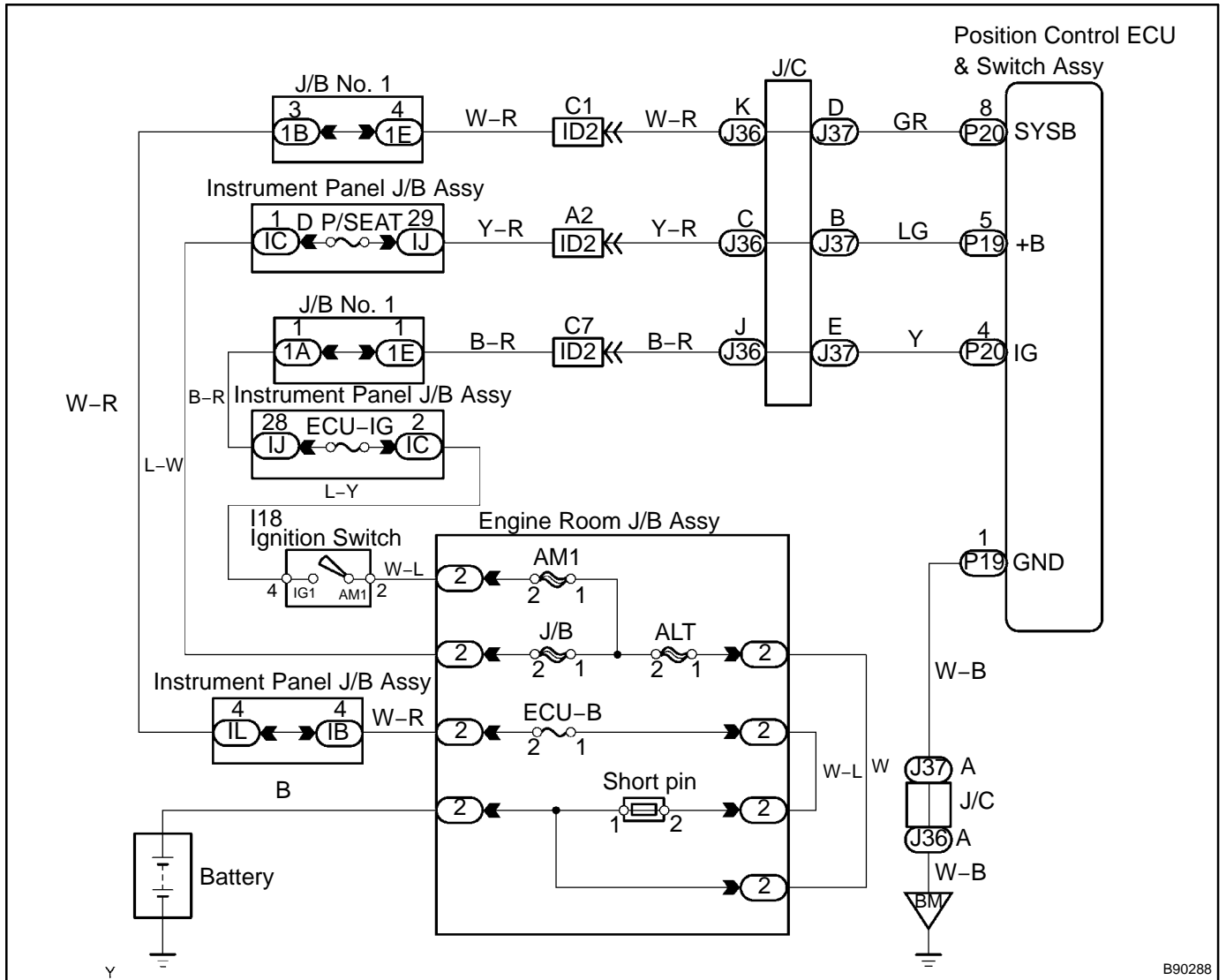
Symptom	Suspected Area	See Page
All manual and return functions do not operate.	<ol style="list-style-type: none"> 1. Power source circuit 2. Position control ECU & switch assy 3. Wire harness 	<p>05-2138</p> <p>—</p> <p>—</p>
One function for both manual and return operation do not operate.	<ol style="list-style-type: none"> 1. Power seat motor circuit 2. Position control ECU & switch assy 3. Wire harness 	<p>05-2142</p> <p>—</p> <p>—</p>
One or all functions do not operate for manual operation only.	<ol style="list-style-type: none"> 1. Position control ECU & switch assy 	<p>—</p>
Memory function does not operate.	<ol style="list-style-type: none"> 1. Power seat memory switch circuit 2. Ignition switch circuit 3. Park/neutral position switch circuit 4. Position control ECU & switch assy 5. Wire harness 	<p>05-2140</p> <p>—</p> <p>05-958</p> <p>—</p> <p>—</p>
All return operation do not operate or operates partially, then stop.	<ol style="list-style-type: none"> 1. Position control ECU & switch assy 	<p>—</p>
Only one return operation does not operate or operates partially, then stops.	<ol style="list-style-type: none"> 1. Position control ECU & switch assy 2. Power seat motor 	<p>—</p> <p>72-6</p>

POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This is the power source circuit for the slide motor, reclining motor, front vertical motor and lifter motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK FUSE (D P/SEAT, ECU-IG, ECU-B)

- (a) Remove the fuses from the instrument panel J/B assy and engine room J/B assy.
- (b) Check the continuity.

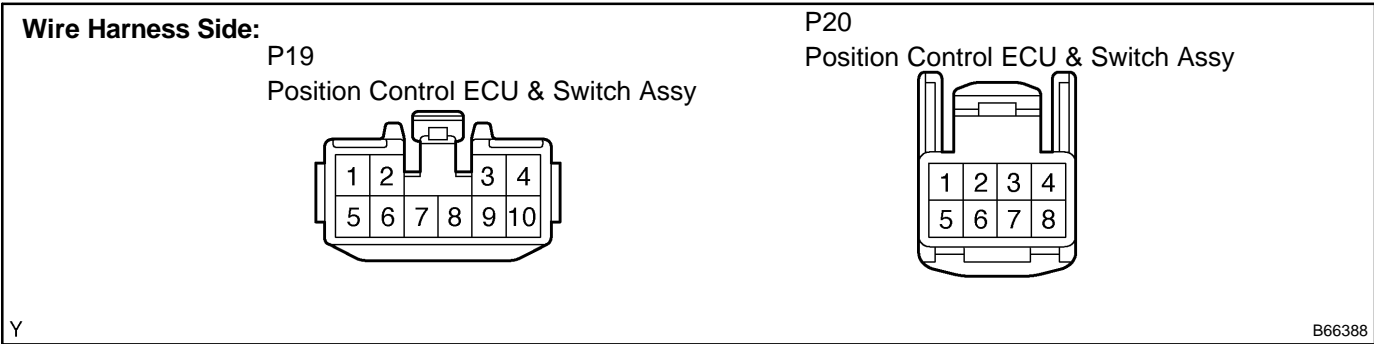
Standard: Continuity

NG → **REPLACE FUSE**

OK

2 | CHECK POSITION CONTROL ECU & SWITCH ASSY

- (a) Disconnect the P19 and P20 position control ECU & switch assy connectors.
- (b) Check the voltage between the terminal of the P19 or P20 connector and the body ground.



Standard:

Symbols (Terminal No.)	Condition	Specified Condition
+B (P19-5) ⇔ Body ground	Constant	10 - 14 V
SYSB (P20-8) ⇔ Body ground	Constant	10 - 14 V
IG (P20-4) ⇔ Body ground	Ignition switch OFF → ON	0 V → 10 - 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

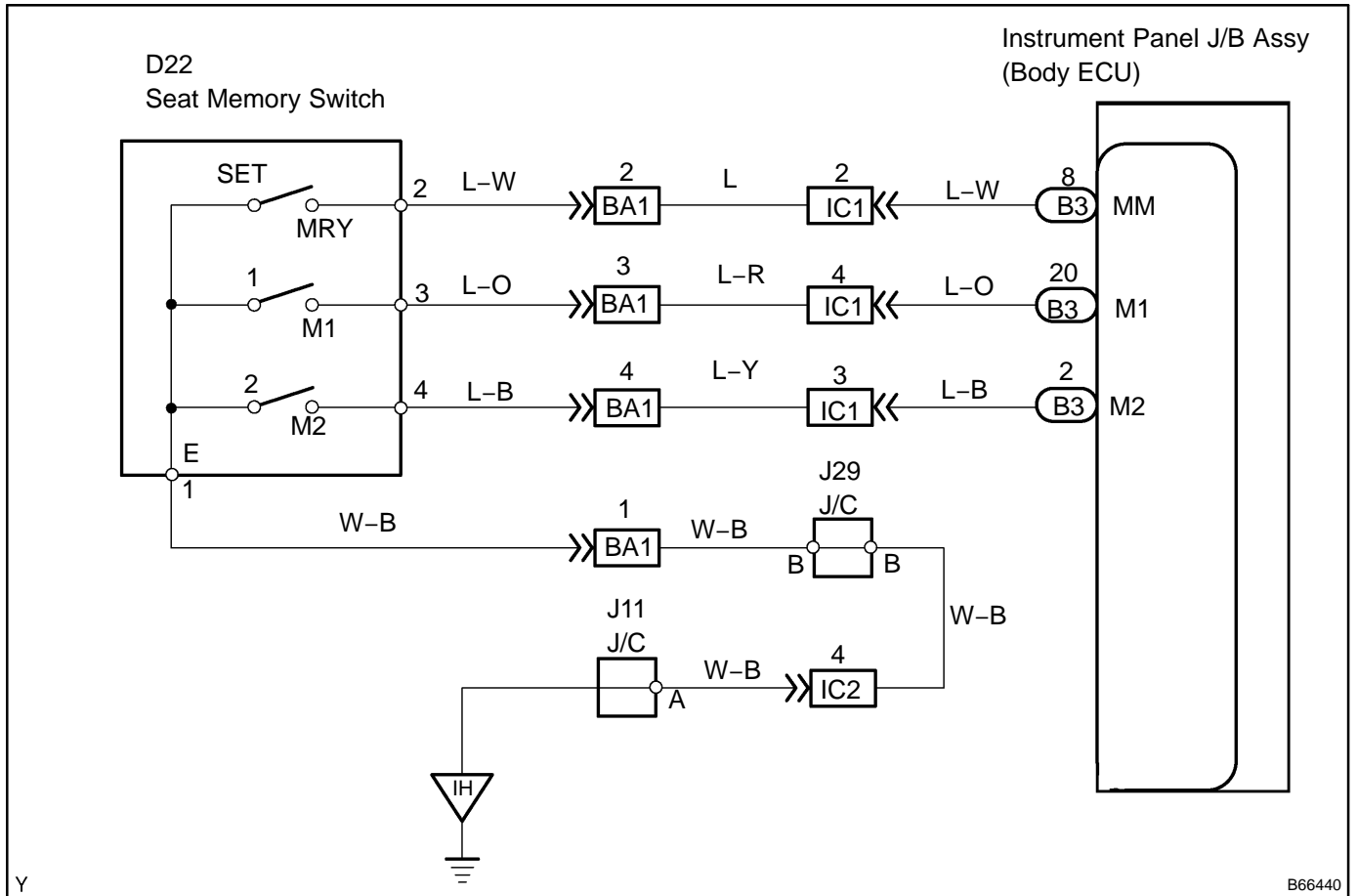
REPLACE POSITION CONTROL ECU & SWITCH ASSY

MEMORY SWITCH CIRCUIT

CIRCUIT DESCRIPTION

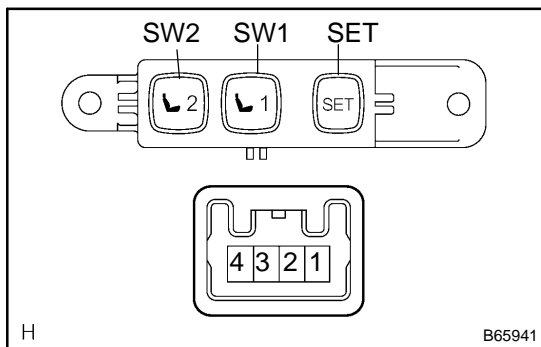
The seat memory switch sends memory and return signals to the body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT SEAT MEMORY SWITCH



- (a) Disconnect the seat memory switch connector.
- (b) Check the continuity of each terminal when each switch is operated.

Standard:

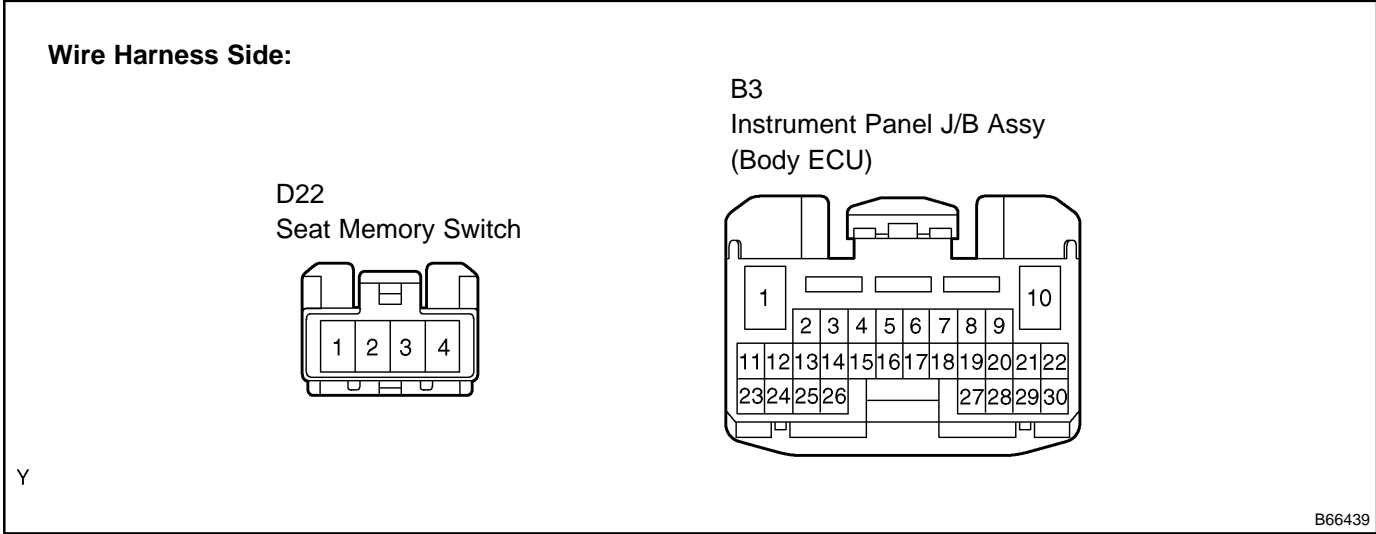
Terminal No.	Switch Position	Specified Condition
1 ↔ 2	SET switch ON	Continuity
2 ↔ 3	SW1 switch ON	Continuity
2 ↔ 4	SW2 switch ON	Continuity

NG → REPLACE SEAT MEMORY SWITCH

OK

2 CHECK WIRE HARNESS (SEAT MEMORY SWITCH ↔ INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU))

- (a) Disconnect the D22 switch and B3 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.



Standard:

Symbols (Terminal No.)	Condition	Specified Condition
M1 (D22-3) ↔ M1 (B3-20)	Constant	Continuity
M2 (D22-4) ↔ M2 (B3-2)	Constant	Continuity
MR Y (D22-2) ↔ MM (B3-8)	Constant	Continuity
E (D22-1) ↔ Body ground	Constant	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

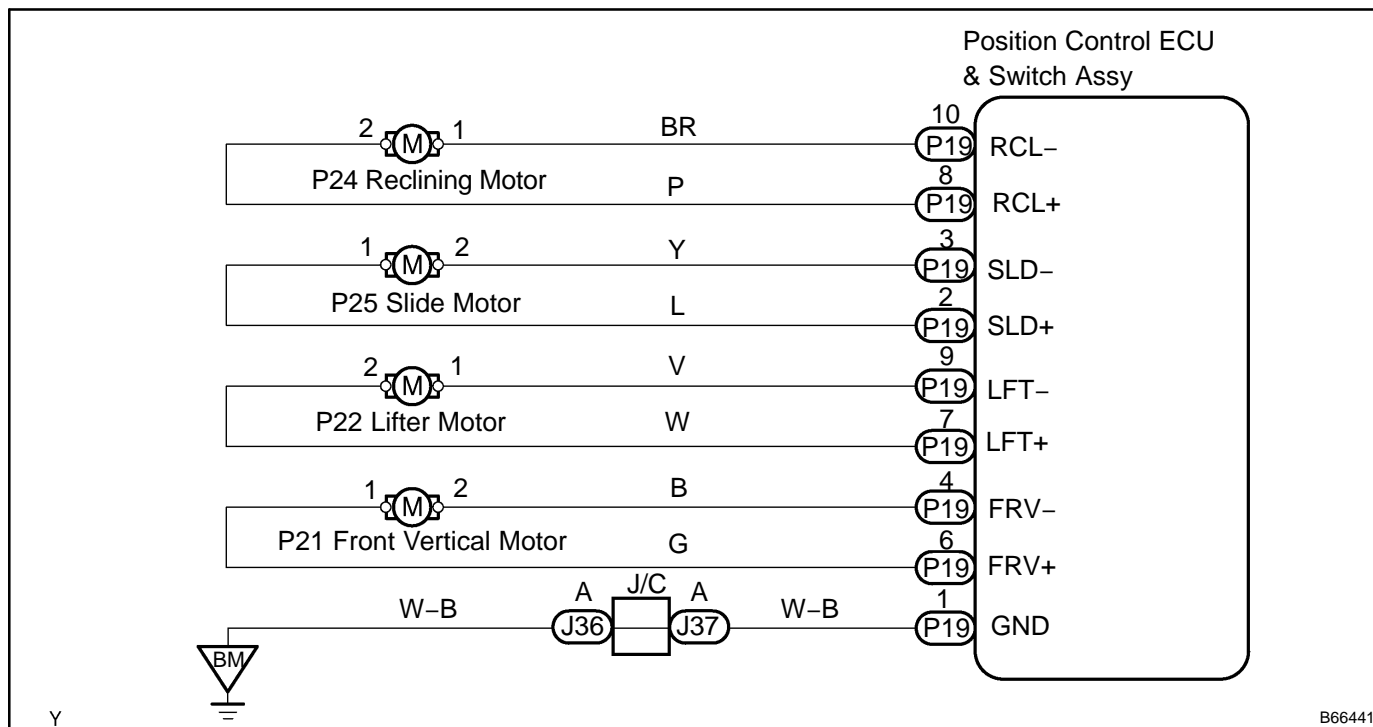
CHECK AND REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) (See page 01-36)

POWER SEAT MOTOR CIRCUIT

CIRCUIT DESCRIPTION

The seat position is detected by a pulse which occurs while the motor is operating. If no pulse is output or an abnormal pulse is output from the motor, the motor will stop operating. However, the motor can operate by operating the power seat switch for 10 seconds or more.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT POWER SEAT MOTOR ASSY (See page 72-6)

OK → REPLACE POSITION CONTROL ECU & SWITCH ASSY

NG

REPLACE FRONT SEAT ADJUSTER SUB-ASSY LH (See page 72-20)

POWER DOOR LOCK CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05AWS-01

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND PROBLEM SYMPTOM



3 INSPECT COMMUNICATION FUNCTION OF LARGE-SCALE MULTIPLEX COMMUNICATION SYSTEM (BEAN)

- (a) Check that there is no abnormality in the communication system by inspecting the communication function of the multiplex communication system with the hand-held tester.
- (1) (ECU unconnected, communication line abnormal) Without code outputs, proceed to A.
 - (2) (ECU unconnected, communication line abnormal) With code outputs, proceed to B.

B

GO TO MULTIPLEX COMMUNICATION SECTION (See page 05-2254)

A

4 DTC CHECK (See page 05-2149)

- (a) Check for a diagnostic trouble code.
- (1) Without code outputs, proceed to A.
 - (2) With code outputs, proceed to B.

B

Go to step 6

A

5 PROBLEM SYMPTOMS TABLE (See page 05-2154)

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

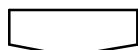
B

Go to step 7

A

6 | PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM

- (a) Pre-check (See page [05-2146](#)).
- (1) Inspection with the hand-held tester (ECU DATA LIST).
 - (2) Inspection with the hand-held tester (ACTIVE TEST).
- (b) On-vehicle inspection (See page [73-1](#)).
- (c) Inspection (See page [73-3](#)).
- (d) Terminals of ECU (See page [05-2151](#)).

**7 | ADJUST, REPAIR OR REPLACE****END**

CUSTOMER PROBLEM ANALYSIS CHECK

POWER DOOR LOCK CONTROL SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (Times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))

Problem Symptoms	<input type="checkbox"/> DTC (<input type="checkbox"/> B1222 <input type="checkbox"/> Others)		
	<input type="checkbox"/> Malfunction in Door Lock/Unlock Operation Using Door Lock Control Switch	<input type="checkbox"/> Driver side door lock control switch (Master switch) <input type="checkbox"/> Passenger side door lock control switch	<input type="checkbox"/> Driver side door <input type="checkbox"/> Passenger side door <input type="checkbox"/> Rear left door <input type="checkbox"/> Rear right door
	<input type="checkbox"/> Malfunction in Door Lock/Unlock Operation Using Key	<input type="checkbox"/> Driver side door key lock and unlock control switch	<input type="checkbox"/> Driver side door <input type="checkbox"/> Passenger side door <input type="checkbox"/> Rear left door <input type="checkbox"/> Rear right door
	<input type="checkbox"/> Malfunction in Key Lock-In Prevention Function		
	<input type="checkbox"/> Others		

PRE-CHECK

1. USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to the DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

The hand-held tester has a Snapshot function which records the monitored data. Refer to the hand-held tester operator's manual for further details.

2. DTC CLEAR

- (a) The DTCs and freeze frame data will be erased by the hand-held tester.

3. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, read the DATA LIST.

Standard (Body ECU):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
KEY UNLK WRN SW	Un-lock warning switch signal/ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-
LUGG COURTSY SW	Luggage courtesy switch signal/ON or OFF	ON: Luggage door is open OFF: Luggage door is closed	-
D DOR CTY SW	Driver side door courtesy switch signal/ON or OFF	ON: Driver side door is open OFF: Driver side door is closed	-
P DOR CTY SW	Passenger side door courtesy switch signal/ON or OFF	ON: Passenger side door is open OFF: Passenger side door is closed	-
Rr DOR CTY SW	Rear door courtesy switch signal/ON or OFF	ON: Either right or left rear door is open OFF: Both right and left doors are closed	-
P LOCK POS SW	Passenger side door lock position switch signal/ON or OFF	ON: Passenger side door lock is in unlock position OFF: Passenger side door lock is in lock position	-
D/L SW-LOCK	Manual door lock switch LOCK signal/ON or OFF	ON: Manual door lock switch is in lock position OFF: Manual door lock switch is in original position	-
D/L SW-UNLOCK	Manual door lock switch UNLOCK signal/ON or OFF	ON: Manual door lock switch is in unlock position OFF: Manual door lock switch is in original position	-
DOR KEY SW-LOCK	Key operation driver side door lock switch signal/ON or OFF	ON: Driver key operation door lock switch is in lock position OFF: Driver key operation door lock switch is in original position	-
D DOR KEY SW-UL	Key operation driver side door unlock switch signal/ON or OFF	ON: Driver key operation door lock switch is in unlock position OFF: Driver key operation door lock switch is in original position	-
OPEN DOOR WARN	Door courtesy switch signal/ON or OFF	ON: Either door is open OFF: All doors are closed	-

Standard (Door ECU):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
LOCK POS SW	Driver door lock position SW signal/ON or OFF	ON: Driver side door lock is in unlock position OFF: Driver side door lock is in lock position	-

4. ACTIVE TEST**HINT:**

Performing the ACTIVE TEST using the hand-held tester allows you to operate the relay, VSV, actuator, etc. without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one way to shorten labor time. It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, perform the ACTIVE TEST.

Standard (Body ECU):

Item	Test Details	Diagnostic Note
OPN DOR WRN LGT	Turn open door warning light ON/OFF (All doors are closed)	-
DOOR LOCK	Operate the door lock motor for all doors OFF/LOCK/UNLOCK	-

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTICE:

- After confirming whether the items requested by the customer are applicable or not for customization, perform the customize operation.
- Be sure to record the current settings before customizing.
- When troubleshooting, make sure that the item in question is not set to "OFF" as a result of customization.

DOOR LOCK

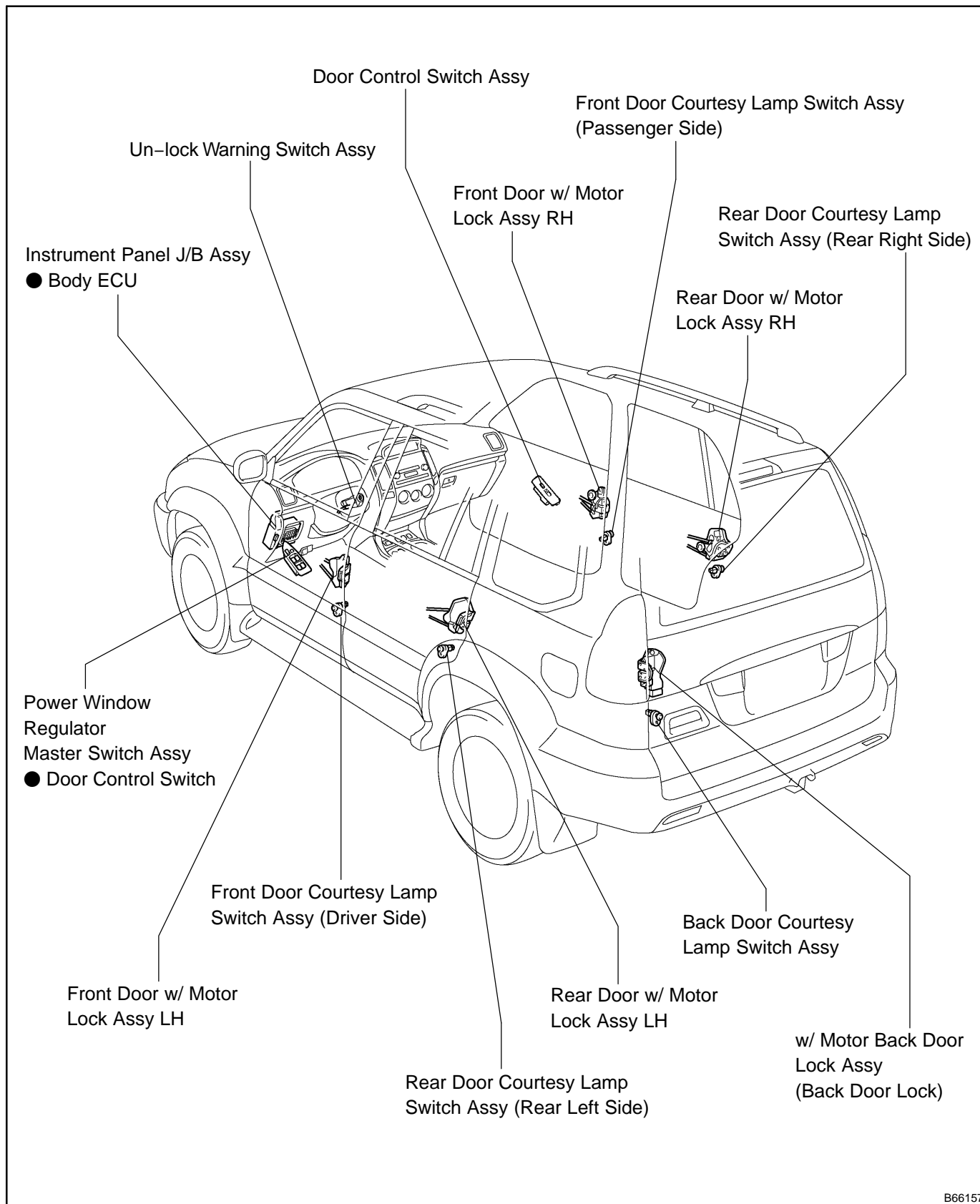
DISPLAY(ITEM)	DEFAULT	CONTENTS	SETTING
UNLOCK/PARK (Unlock w/ IG ON, shift P, speed 0)	OFF	Function that unlocks the doors when the lever is shifted to P range from any range other than P while the ignition switch is ON.	ON / OFF
ALL UNLK/OPN-CL (All unlock w/ D door open-close)	OFF	Function that unlocks all the other doors when opening the driver side door within 10 seconds after turning the ignition switch to OFF from ON.	ON / OFF
UNLK/KEY TWICE (Unlock w/ 2 times D key operation)	ON	Function that unlocks only the driver side door when the driver side door key cylinder is turned to unlock once and unlocks all the doors when it is turned to unlock twice. In the OFF setting, turning it once makes all the doors unlocked.	ON / OFF
AUTO LOCK (Auto Lock)	OFF	Function that locks the doors when the vehicle reaches a certain speed.	ON / OFF
AUTO LOCK/SHIFT (Auto Lock/shift not P)	ON	Function that locks the doors when the lever is shifted from P range to any range other than P.	ON / OFF

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.).

DTC No. (See Page)	Detection Item	Trouble Area
B1222 (05-2155)	Door lock switch circuit on driver door	<ul style="list-style-type: none">• Power window regulator master switch assy• Instrument panel junction block assy (body ECU)• Wire harness

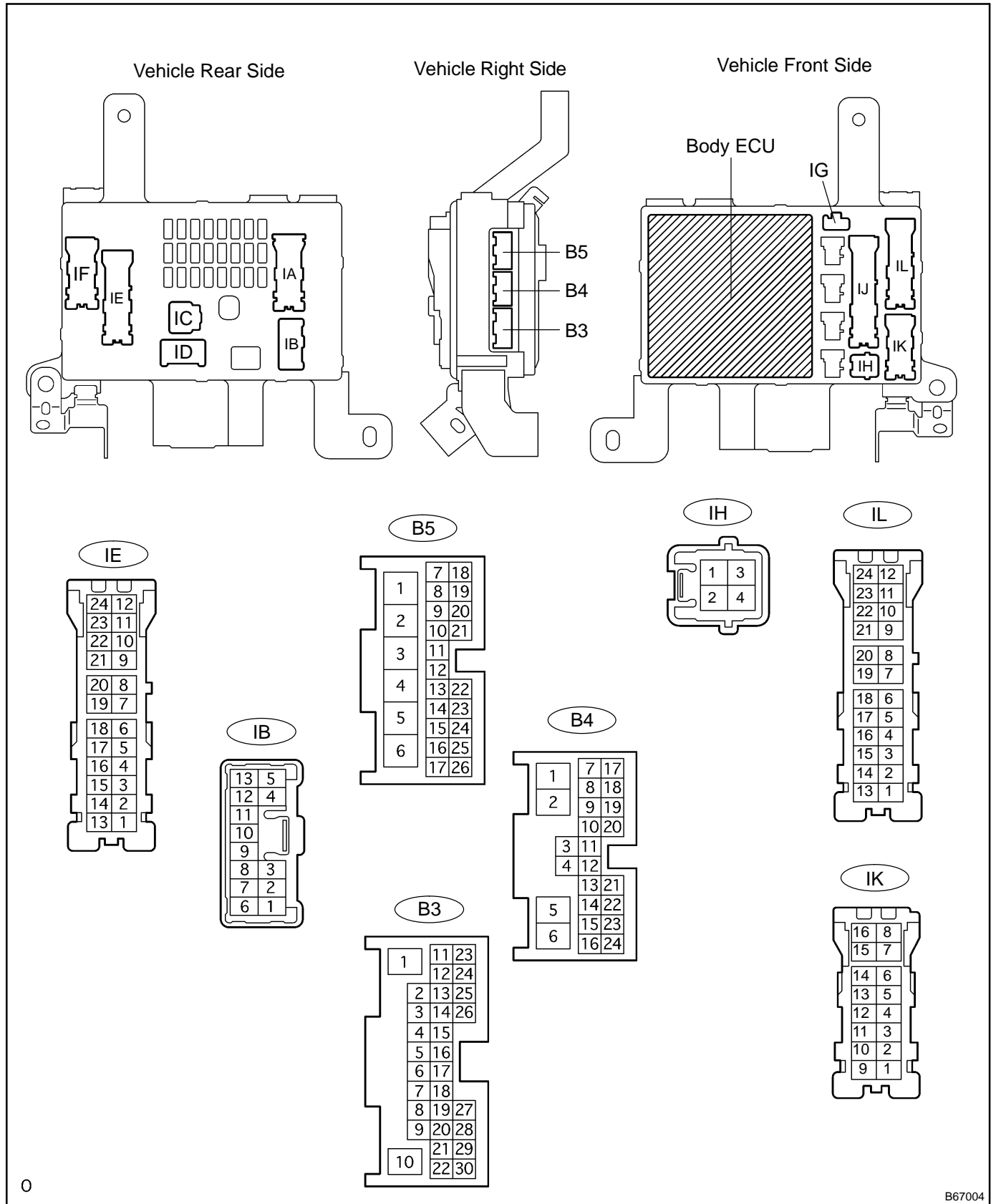
LOCATION



B66157

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)



0

B67004

- (a) Disconnect the IB, IE, IH, IK, IL, B3 and B5 J/B connectors, and check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
BDR1 (IE-9) ↔ Body Ground	G-W ↔ -	Constant	10 - 14 V
BECU (IB-4) ↔ Body Ground	W-R ↔ -	Constant	10 - 14 V
BECU (IL-4) ↔ Body Ground	W-R ↔ -		
GND1, 2 (IH-2) ↔ Body Ground	W-B ↔ -	Constant	Continuity
KSW (B5-14) ↔ Body Ground	G-Y ↔ -	No key inserted in ignition key cylinder → With Key inserted	No continuity → Continuity
L1 (IK-5) ↔ Body Ground	L-W ↔ -	Door control switch (Passenger side) OFF → LOCK	No continuity → Continuity
UL1 (IK-1) ↔ Body Ground	L-O ↔ -	Door control switch (Passenger side) OFF → UNLOCK	No continuity → Continuity
L2 (IK-3) ↔ Body Ground	B-O ↔ -	Driver side door key cylinder OFF → LOCK	No continuity → Continuity
UL2 (B3-22) ↔ Body Ground	G ↔ -	Driver side door key cylinder OFF → UNLOCK	No continuity → Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

(b) Reconnect the connectors, and check the voltage of each terminal of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
DCTY (B4-23) ⇔ Body Ground	R-Y ⇔ -	Driver side door CLOSED → OPEN	10 - 14 V → Below 1 V
PCTY (B4-24) ⇔ Body Ground	R-Y ⇔ -	Passenger side door CLOSED → OPEN	10 - 14 V → Below 1 V
RLCY (B4-11) ⇔ Body Ground	P-B ⇔ -	Rear left door CLOSED → OPEN	10 - 14 V → Below 1 V
RRCY (B4-12) ⇔ Body Ground	P-L ⇔ -	Rear right door CLOSED → OPEN	10 - 14 V → Below 1 V
BCTY (B4-7) ⇔ Body Ground	R-L ⇔ -	Back door CLOSED → OPEN	10 - 14 V → Below 1 V
ACT+ (IL-9) ⇔ Body Ground	L-R ⇔ -	Door control switch (master switch or passenger side switch) or door key cylinder (driver side) OFF → LOCK	Below 1 V → 10 - 14 V → Below 1 V
ACT+ (IL-6) ⇔ Body Ground	L-Y ⇔ -		
ACT+ (IL-11) ⇔ Body Ground	L-R ⇔ -		
ACT+ (IL-10) ⇔ Body Ground	L-R ⇔ -		
ACT+ (IL-12) ⇔ Body Ground	L-R ⇔ -		
ACT- (IL-18) ⇔ Body Ground	L-B ⇔ -	Door control switch (master switch or passenger side switch) or door key cylinder (driver side) OFF → LOCK	Below 1 V → 10 - 14 V → Below 1 V
ACT- (IL-23) ⇔ Body Ground	L-B ⇔ -		
ACT- (IL-22) ⇔ Body Ground	L-B ⇔ -		
ACT- (IL-24) ⇔ Body Ground	L-B ⇔ -		
ACTD (B3-10) ⇔ Body Ground	L-O ⇔ -	Driver side door UNLOCK → LOCK	Below 1 V → 10 - 14 V
LSWP (B3-30) ⇔ Body Ground	L-R ⇔ -	Passenger side door UNLOCK → LOCK	Below 1 V → 10 - 14 V
LSR (IL-16) ⇔ Body Ground	W ⇔ -	Rear left door UNLOCK → LOCK	Below 1 V → 10 - 14 V
LSR (IK-15) ⇔ Body Ground	W ⇔ -	Rear right door UNLOCK → LOCK	Below 1 V → 10 - 14 V
LSR (IK-16) ⇔ Body Ground	W ⇔ -	Back door UNLOCK → LOCK	Below 1 V → 10 - 14 V

If the result is not as specified, there may be a malfunction. In this case, check the harness, connector and fuse between the instrument panel junction block assy and battery. Then repair or replace it if necessary.

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
No doors lock/unlock functions operate via master switch, door control switch or driver side door key cylinder	<ul style="list-style-type: none"> 3. DR/LCK fuse 4. ECU-B fuse 5. Power window regulator master switch assy 6. Door control switch (Passenger side) 7. Front door lock assy LH (Driver side) 8. Instrument panel junction block assy (Body ECU) 9. Wire harness 	05-2157
Key lock-in prevention function does not work properly (Manual operation and operation interlocked with key are active)	<ul style="list-style-type: none"> 1. Un-lock warning switch assy 2. Front door courtesy lamp switch assy (Driver side) 3. Instrument panel junction block assy (Body ECU) 4. Wire harness 	05-2164

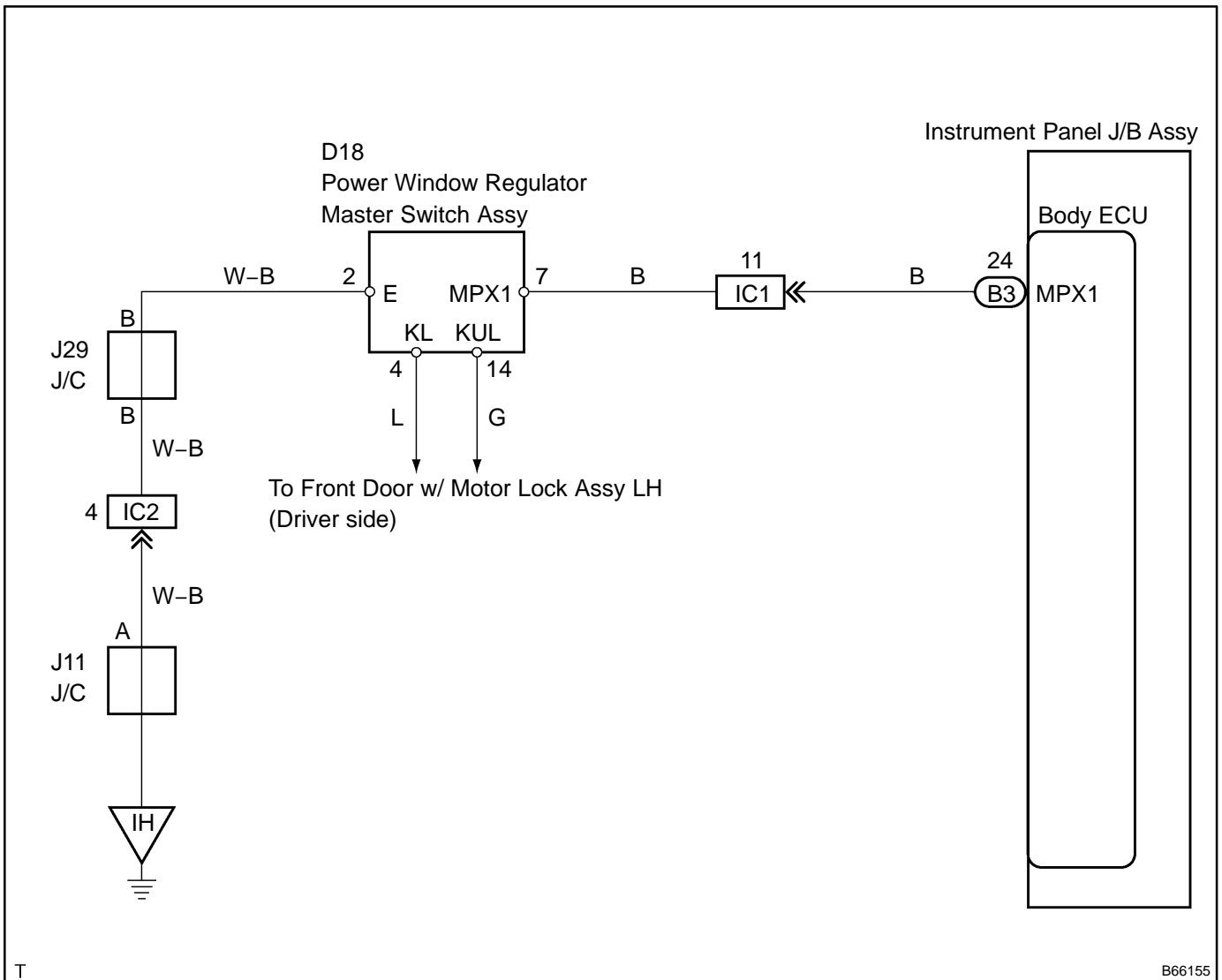
DTC	B1222	DOOR LOCK SWITCH CIRCUIT ON DRIVER DOOR
------------	--------------	--

CIRCUIT DESCRIPTION

This DTC is output when the driver door unlock switch (for manual operation) of the power window regulator master switch assy is ON.

DTC No	DTC Detection Condition	Trouble Area
B1222	Key lock and unlock switch is stuck	<ul style="list-style-type: none"> • Power window regulator master switch assy (door ECU) • Instrument panel junction block assy (body ECU) • Wire harness

WIRING DIAGRAM



T

B66155

INSPECTION PROCEDURE**1 CHECK DTC**

- (a) Check that there is no abnormality in the communication system by inspecting the communication function of the multiplex communication system with the hand-held tester.
- (1) (ECU unconnected, communication line abnormal) Without code outputs, proceed to A.
 - (2) (ECU unconnected, communication line abnormal) With code outputs, proceed to B.

B**GO TO MULTIPLEX COMMUNICATION SYSTEM
(See page 05-2254)****A****REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY**

NO DOORS LOCK/UNLOCK FUNCTIONS OPERATE VIA MASTER SWITCH, DOOR CONTROL SWITCH OR DRIVER SIDE DOOR KEY CYLINDER

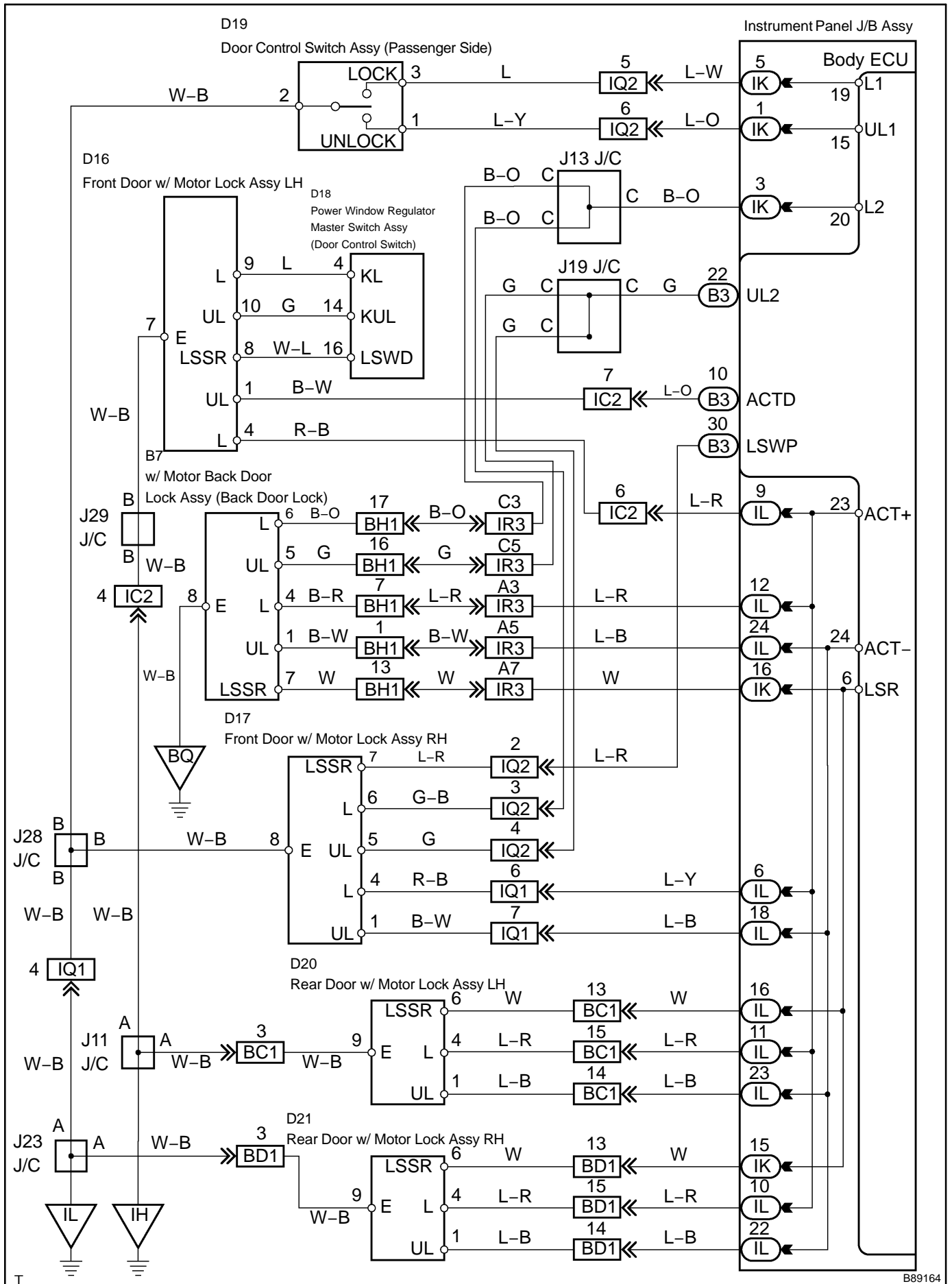
CIRCUIT DESCRIPTION

The body ECU receives a switch signal from the master switch, the door control switch and the driver door key and then drives the door lock motor.

WIRING DIAGRAM

HINT:

The wiring diagram for this title is shown on the next page.



B89164

INSPECTION PROCEDURE

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER

(a) Select the ACTIVE TEST, and then check that the power door lock operates.

HINT:

During the ACTIVE TEST, the hand-held tester sends a signal to the body ECU to drive all the power door lock motors. If the power door lock operates, the power door lock motor itself and the wire harness between the power door lock motor and body ECU are considered to be normal.

Standard (Body ECU):

Item	Test Details	Diagnostic Note
DOOR LOCK	Operate the door lock motor for all doors OFF/LOCK/UNLOCK	-

NG

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

OK

2 INSPECT MASTER SWITCH, DOOR CONTROL SWITCH OR DRIVER SIDE DOOR KEY CYLINDER OPERATION

- (a) When manual door lock/unlock operation via the master switch can not be performed, proceed to A.
 (b) When manual door lock/unlock operation via the door control switch (passenger side) can not be performed, proceed to B.
 (c) When manual door lock/unlock operation interlocked with the driver side door lock key cylinder can not be performed, proceed to C.

B

Go to step 5

C

Go to step 7

A

3 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSY

- (a) Check that all the power window switches on the master switch except the door lock control switch function normally.

OK

REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

NG

4	CHECK DTC
----------	------------------

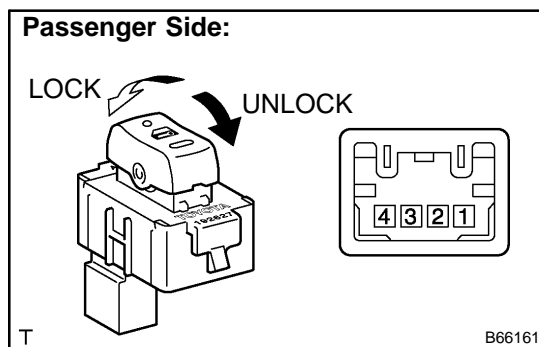
- (a) Check that there is no abnormality in the communication system by inspecting the communication function of the multiplex communication system with the hand-held tester.
- (1) (ECU unconnected, communication line abnormal) Without code outputs, proceed to A.
 - (2) (ECU unconnected, communication line abnormal) With code outputs, proceed to B.

B	GO TO MULTIPLEX COMMUNICATION SYSTEM (See page 05-2254)
----------	--

A

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

5	INSPECT DOOR CONTROL SWITCH ASSY (PASSENGER SIDE)
----------	--



- (a) Passenger side:
Inspect the door control switch continuity.

Standard:

Terminal No.	Switch Position	Specified Condition
2 ↔ 3	Lock	Continuity
-	OFF	No continuity
1 ↔ 2	Unlock	Continuity

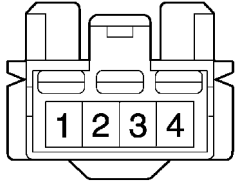
NG	REPLACE DOOR CONTROL SWITCH ASSY
-----------	---

OK

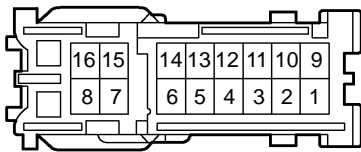
6 CHECK WIRE HARNESS (DOOR CONTROL SWITCH ASSY ↔ INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) AND BODY GROUND)

Wire Harness Side:

D19
Door Control Switch Assy
(Passenger Side)



IK
Instrument Panel Junction Block Assy
(Body ECU)



B66159

- (a) Disconnect the D19 door control switch and IK body ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard (Check for open):

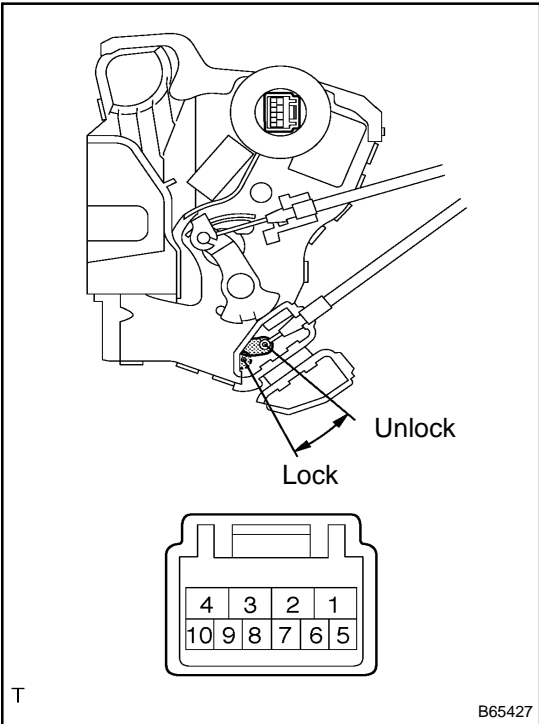
Symbols (Terminal No.)	Specified Condition
- (D19-3) ↔ L1 (IK-5)	Continuity
- (D19-1) ↔ UL1 (IK-1)	
- (D19-2) ↔ Body ground	

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

7 INSPECT FRONT DOOR W/MOTOR LOCK ASSY LH



(a) Apply battery voltage and inspect operation of the door lock motor.

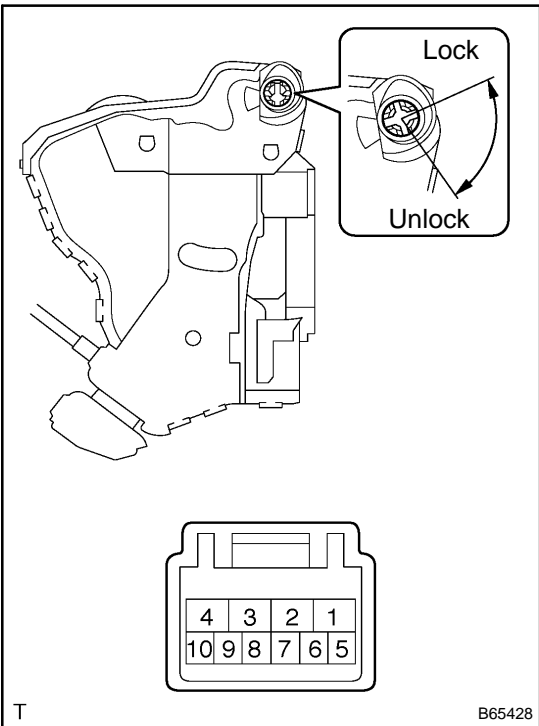
Standard:

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery negative (-) → Terminal 1	Lock
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 4	Unlock

(b) Inspect the position switch continuity.

Standard:

Terminal No.	Door Lock Position	Specified Condition
7 ↔ 8	Lock	No continuity
	Unlock	Continuity



(c) Inspect the door lock and unlock switch continuity.

Standard:

Terminal No.	Door Lock Position	Specified Condition
7 ↔ 9	Lock	Continuity
-	OFF	-
7 ↔ 10	Unlock	Continuity

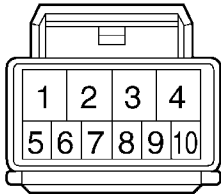
NG → REPLACE FRONT DOOR W/MOTOR LOCK ASSY LH

OK

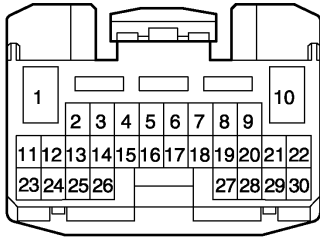
8 CHECK WIRE HARNESS (FRONT DOOR W/ MOTOR LOCK ASSY LH ↔ INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) AND BODY GROUND)

Wire Harness Side:

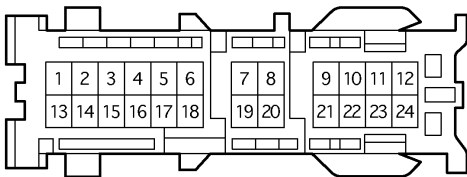
D16
Front Door w/ Motor Lock Assy LH



B3
Instrument Panel Junction Block Assy
(Body ECU)



IL
Instrument Panel Junction Block Assy
(Body ECU)



B66177

- (a) Disconnect the D16 door lock, B3 and IL body ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified Condition
UL (D16-1) ↔ ACTD (B3-10)	Continuity
L (D16-4) ↔ ACT+ (IL-9)	
E (D16-7) ↔ Body ground	

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

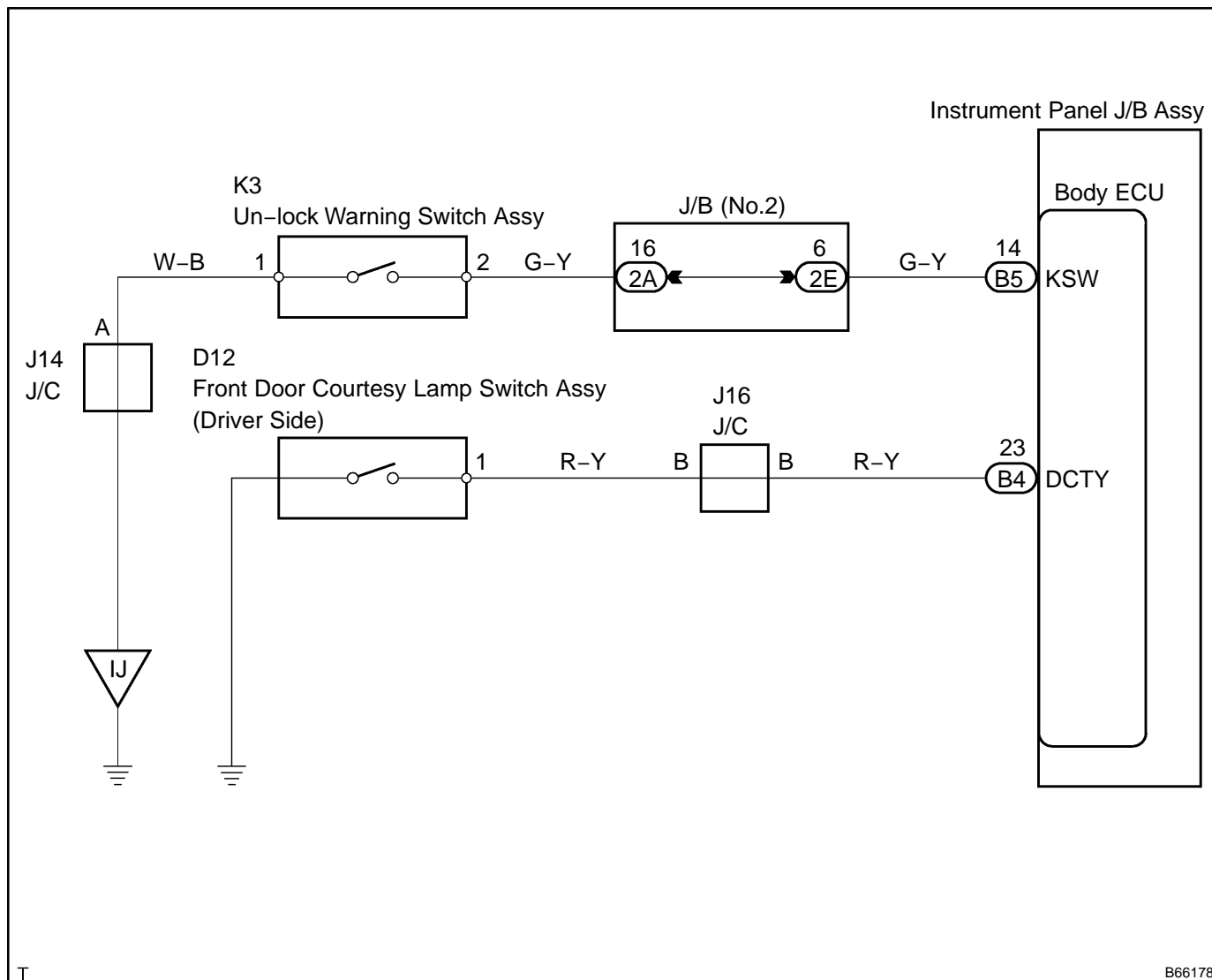
REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

KEY LOCK-IN PREVENTION FUNCTION DOES NOT WORK PROPERLY (MANUAL OPERATION AND OPERATION INTERLOCKED WITH KEY ARE ACTIVE)

CIRCUIT DESCRIPTION

The un-lock warning switch turns ON when the key is inserted in the ignition key cylinder. The courtesy lamp switch turns ON when the driver side door is opened. These 2 switches are monitored by the body ECU. In order to prevent the key from being locked in, the body ECU controls door locking operation according to the conditions of these switches so that the doors are not locked.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 READ VALUE OF HAND-HELD TESTER

- (a) Using the hand-held tester, check that un-lock warning switch signal is output when the switch is operated.

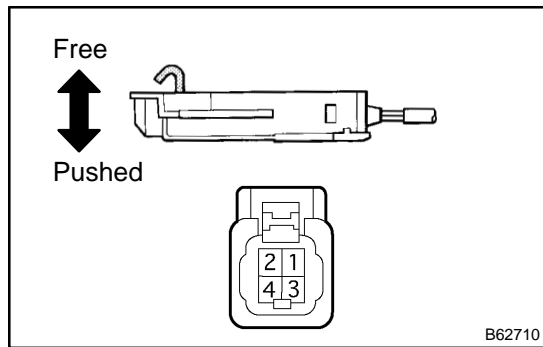
Standard (Body ECU (Switch condition)):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
KEY UNLK WRN SW	Un-lock warning switch signal/ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-

OK → Go to step 4

NG

2 INSPECT UN-LOCK WARNING SWITCH ASSY



- (a) Remove the un-lock warning switch.
(b) Inspect the un-lock warning switch continuity.

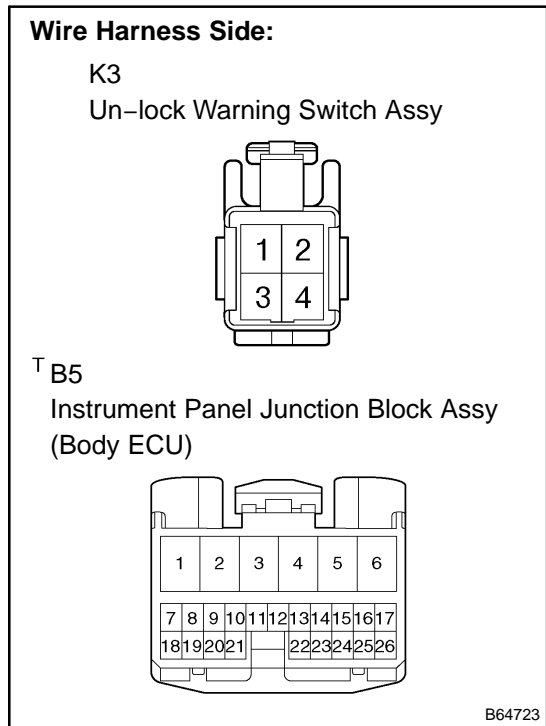
Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Switch free (Key removed)	No continuity
	Switch pushed (Key set)	Continuity

NG → REPLACE UN-LOCK WARNING SWITCH ASSY

OK

3 CHECK WIRE HARNESS (UN-LOCK WARNING SWITCH ASSY ↔ INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU))



- (a) Disconnect the K3 un-lock warning switch and B5 body ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified Condition
- (K3-2) ↔ KSW (B5-14)	Continuity
- (K3-1) ↔ Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

4 READ VALUE OF HAND-HELD TESTER

- (a) Using the hand-held tester, check that driver side door courtesy switch signal is output when the switch is operated.

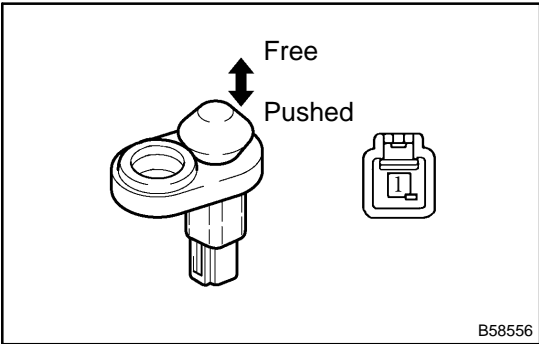
Standard (Body ECU (Switch condition)):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
D DOR CTY SW	Driver side door courtesy switch signal/ON or OFF	ON: Driver side door is open OFF: Driver side door is closed	-

OK → REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

NG

5 INSPECT FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE)



- (a) Remove the courtesy lamp switch.
- (b) Inspect the courtesy lamp switch continuity.

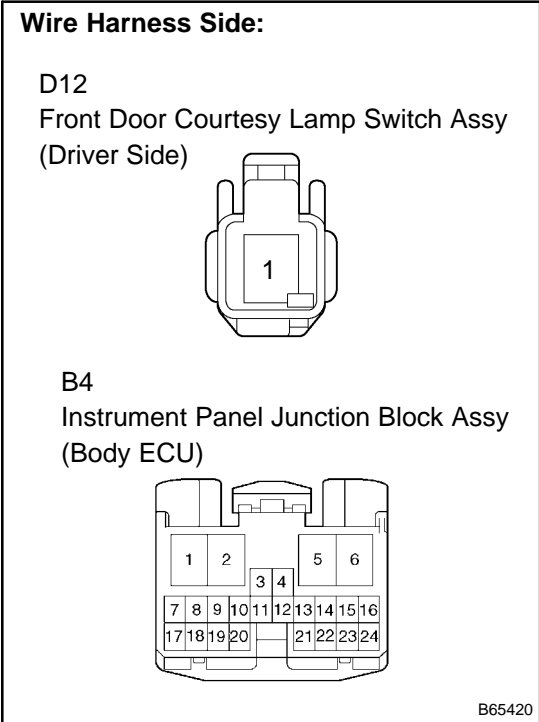
Standard:

Terminal No.	Condition	Specified Condition
1 ⇔ Body ground	Free	Continuity
	Pushed	No continuity

NG → **REPLACE FRONT DOOR COURTESY LAMP SWITCH ASSY**

OK

6 CHECK WIRE HARNESS (FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE) ⇔ INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU))



- (a) Disconnect the D12 courtesy lamp switch and B4 body ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified Condition
- (D12-1) ⇔ DCTY (B4-23)	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

WIRELESS DOOR LOCK CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

056B7-03

HINT:

Troubleshooting of the wireless door lock control system is based on the premise that the power door lock system, the power window control system and the sliding roof system are operating normally. Therefore, before troubleshooting the wireless door lock control system, first make certain that the power door lock system, the power window control system and the sliding roof system are operating normally.

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-2170)



3 DTC CHECK (See page 05-2173)

- (a) Check for DTC and make a note of the code that is output.
- (b) Delete the DTC.
- (c) Check if the DTC is output once again, when the problem symptom is simulated based on the noted code.
 - (1) Without code outputs, proceed to A.
 - (2) With code outputs, proceed to B.

Go to step 6

4 PROBLEM SYMPTOMS TABLE (See page 05-2178)

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

Go to step 6

5 PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM

- (a) Pre-check (See page 05-2171)
 - (1) Inspection with the hand-held tester (ECU DATA LIST)
 - (2) Inspection with the hand-held tester (ACTIVE TEST)
- (b) Terminals of ECU (See page 05-2176)
- (c) On-vehicle inspection (See page 73-8)

6	ADJUST, REPAIR OR REPLACE
----------	----------------------------------



7	CONFIRMATION TEST
----------	--------------------------



END

CUSTOMER PROBLEM ANALYSIS CHECK

WIRELESS DOOR LOCK CONTROL SYSTEM Check Sheet

Inspector's Name _____

Customer's Name		Registration No.	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred		/ /
Frequency Problem Occurs		<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (times/per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))
	Place	<input type="checkbox"/> Everywhere <input type="checkbox"/> Specific Locality ()
Date Transmitter Battery Last Replaced		/ /

Problem Symptoms	<input type="checkbox"/> Whole wireless door lock control system does not operate.
	<input type="checkbox"/> Only door unlock function does not operate.
	<input type="checkbox"/> Only door lock function does not operate.
	<input type="checkbox"/> Doors are locked by wireless door lock operation even when doors are opened.
	<input type="checkbox"/> Wireless door lock functions are abnormal.
	<input type="checkbox"/> Others

PRE-CHECK

1. USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

The hand-held tester has a "Snapshot" function which records the monitored data.

Refer to the hand-held tester operator's manual for further details.

2. DTC CLEAR

- (a) Using the hand-held tester, erase the DTCs and freeze frame data.

3. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Read the DATA LIST according to the display on the tester.

Standard (Body ECU):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
KEY UNLK WRN SW	Un-lock warning SW signal/ ON or OFF	ON: Key is in IG key cylinder OFF: No key is in IG key cylinder	-

4. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows you to operate the relay, VSV, actuator, etc. without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one way to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Perform the ACTIVE TEST according to the display on the tester.

Standard (Body ECU):

Item	Test Detail	Diagnostic Note
HAZARD	Turns turn signal flasher relay ON/OFF	-
BUZZ CONT SOUND	[Test Details] Turns wireless buzzer ON/OFF [Vehicle Condition] Sets wireless buzzer volume at MAX	-
BUZZ RESP SOUND	[Test Details] Turns wireless buzzer ON/OFF [Vehicle Condition] Sets wireless buzzer volume at MAX	-

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

NOTICE:

- After confirming whether the items requested by the customer are applicable or not for the customization, perform the customize operation.
- Be sure to record the current settings before customizing.
- When troubleshooting, make sure that the item in question is not set to "OFF" as a result of customization (Example: For the system, "the wireless function does not operate", first check that the wireless function is not set to "OFF", then perform troubleshooting).

WIRELESS DOOR LOCK

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
OPEN DOOR WARN (Open Door Warning)	ON	Function that makes the buzzer sound for 10 seconds if the door is not completely closed when locking with the wireless door lock function.	ON / OFF
WIRELS BUZZ VOL (Wireless Door Lock Buzzer Volume)	MIN	Function that adjusts the volume of the wireless buzzer.	OFF / MIN / MID1 / MID2 / MID3 / MAX
WIRELESS OPER (Wireless Door Lock Control Function)	ON	Function that turns the wireless door lock function ON/OFF.	ON / OFF
ALARM FUNCTION (Panic Function)	ON	Function that operates the theft deterrent system when the panic switch on the transmitter is held for 0.8 second.	ON / OFF
UNLOCK / 2OPER (2 times operation wireless unlock)	ON	Function that unlocks the driver side door when the unlock switch on the transmitter is pressed once and unlocks all the doors when pressed twice. In the OFF setting, pressing the unlock switch once makes all the doors unlocked.	ON / OFF
AUTO LOCK DELAY (Auto Lock Time)	30 s	Function that changes the time until automatic re-locking after unlocking with the wireless door lock function.	30 s / 60 s
HAZARD ANS BACK (Hazard answer back of the wireless)	ON	Function that lights up all the turn signal lights once when the lock switch on the transmitter is pressed and lights up twice when the unlock switch is pressed, with all the doors closed.	ON / OFF

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the chart below (Proceed to the page given for that circuit).

HINT:

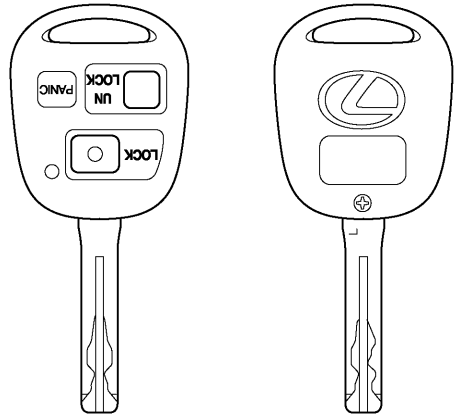
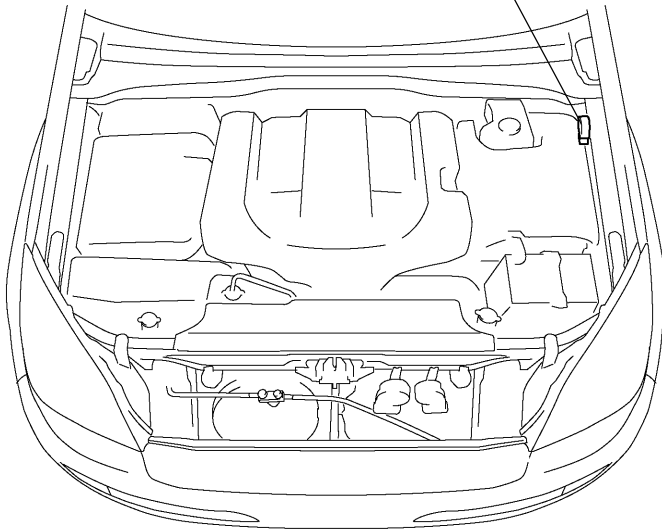
The DTC detection method (See page [05-2171](#)).

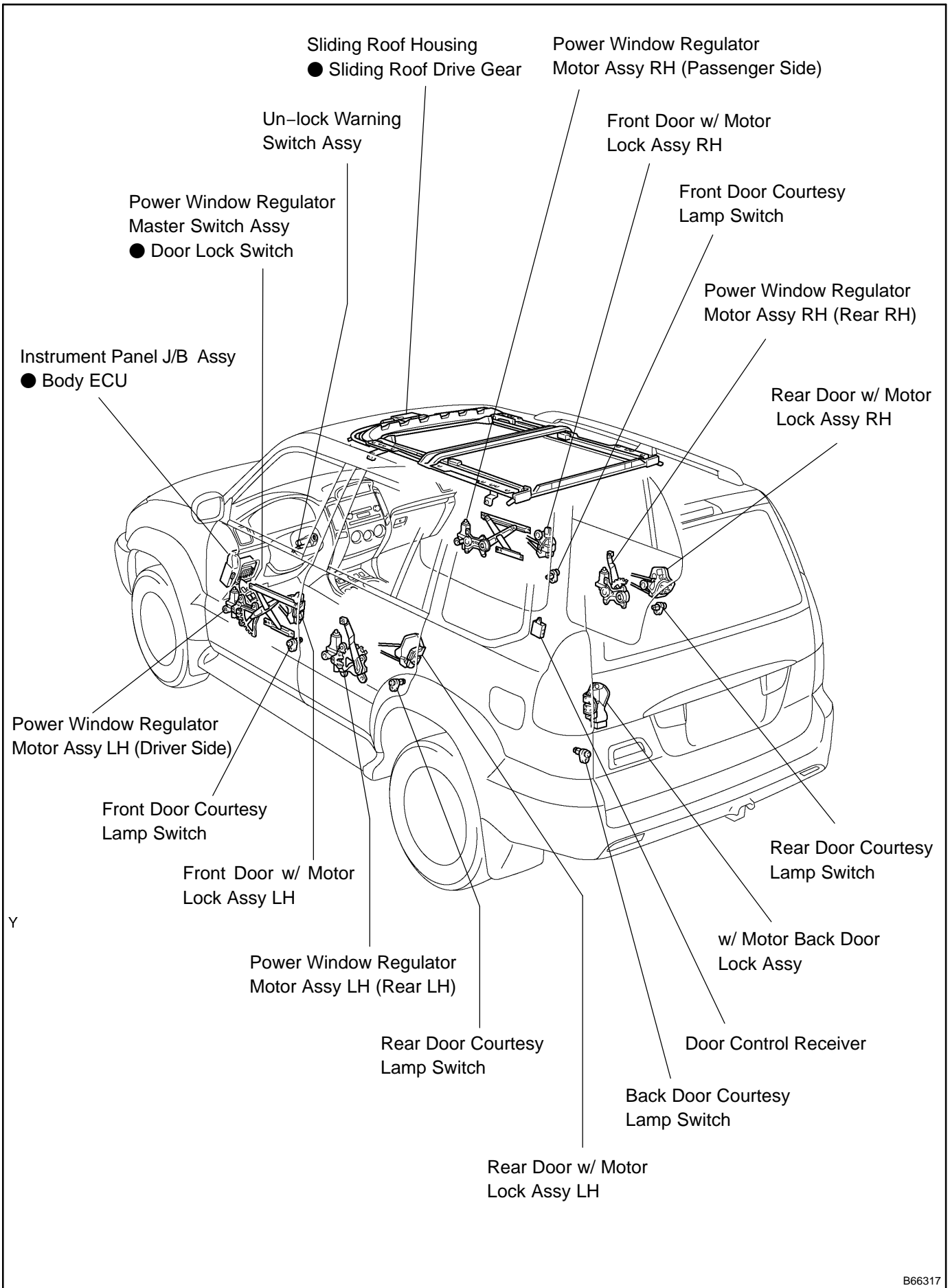
DTC No. (See Page)	Detection Item	Trouble Area
B1242 (05-2179)	Wireless Door Lock Tuner Circuit Malfunction	<ul style="list-style-type: none">• Door control receiver• Instrument panel J/B assy (Body ECU)• Wire harness

LOCATION

Wireless Door Lock Buzzer

Door Control Transmitter

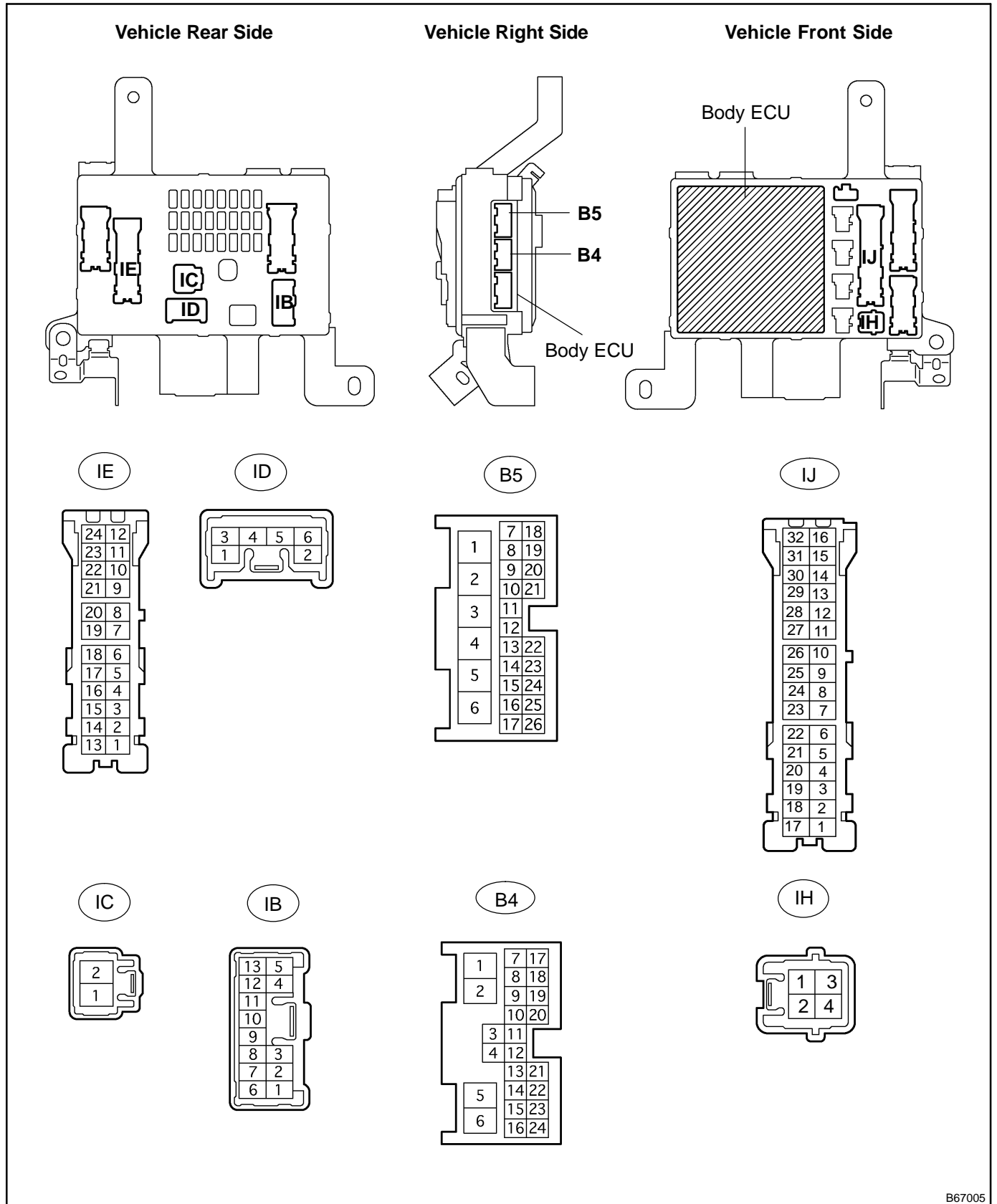




B66317

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)



B67005

- (a) Disconnect the B5 J/B connector.
- (b) Disconnect the IC, IB, ID, IE and IH J/B connectors.
- (c) Check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
KSW (B5-14) ⇔ Body ground	G-Y ⇔ -	No key in ignition key cylinder → Key inserted	No continuity → Continuity
BDR1 (IE-9) ⇔ Body ground	G-W ⇔ -	Constant	10 - 14 V
BECU (IB-4) ⇔ Body ground	W-R ⇔ -	Constant	10 - 14 V
SIG (IC-2) ⇔ Body ground	L-Y ⇔ -	Ignition switch ON	10 - 14 V
ACC (ID-5) ⇔ Body ground	W-G ⇔ -	Ignition switch ON	10 - 14 V
GND1 (IH-2) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
GND2 (IH-2) ⇔ Body ground	W-B ⇔ -	Constant	Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

- (d) Reconnect the B5 J/B connector.
- (e) Reconnect the IC, IB, ID, IE and IH J/B connectors.
- (f) Check the voltage of each terminal of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
RDA (B4-4) ⇔ Body ground	L-R ⇔ -	Ignition switch off, all doors closed and transmitter switch not pressed	10 - 14 V
		Ignition switch off, all doors closed and transmitter switch pressed	Pulse generation
DCTY (B4-23) ⇔ Body ground	R-Y ⇔ -	Driver side door CLOSED → OPEN	10 - 14 V → Below 1 V
PCTY (B4-24) ⇔ Body ground	R-Y ⇔ -	Passenger side door CLOSED → OPEN	10 - 14 V → Below 1 V
RLCY (B4-11) ⇔ Body ground	P-B ⇔ -	Rear door LH CLOSED → OPEN	10 - 14 V → Below 1 V
RRCY (B4-12) ⇔ Body ground	P-L ⇔ -	Rear door RH CLOSED → OPEN	10 - 14 V → Below 1 V
HAZ (IJ-14) ⇔ Body ground	W ⇔ -	Answer-back OFF → Answer-back ON	Pulse generation
BZR (IB-10) ⇔ BZR2 (IB-6)	L ⇔ W	Wireless buzzer OFF → ON	Pulse generation

If the result is not as specified, the J/B assy (body ECU) may have a malfunction.

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Only wireless control function does not operate (Prepare new or normal transmitter of the same type vehicle)	5. Transmitter battery 6. Door control transmitter 7. Door control receiver 8. Un-lock warning switch assy 9. Wire harness 10. Instrument panel J/B assy (Body ECU)	05-2181 73-12 05-2181 05-2181 - -
No answer-back (Hazard warning lamp and wireless door lock buzzer)	1. Wireless door lock buzzer 2. Lighting system 3. Wire harness	05-2189 05-1543 -

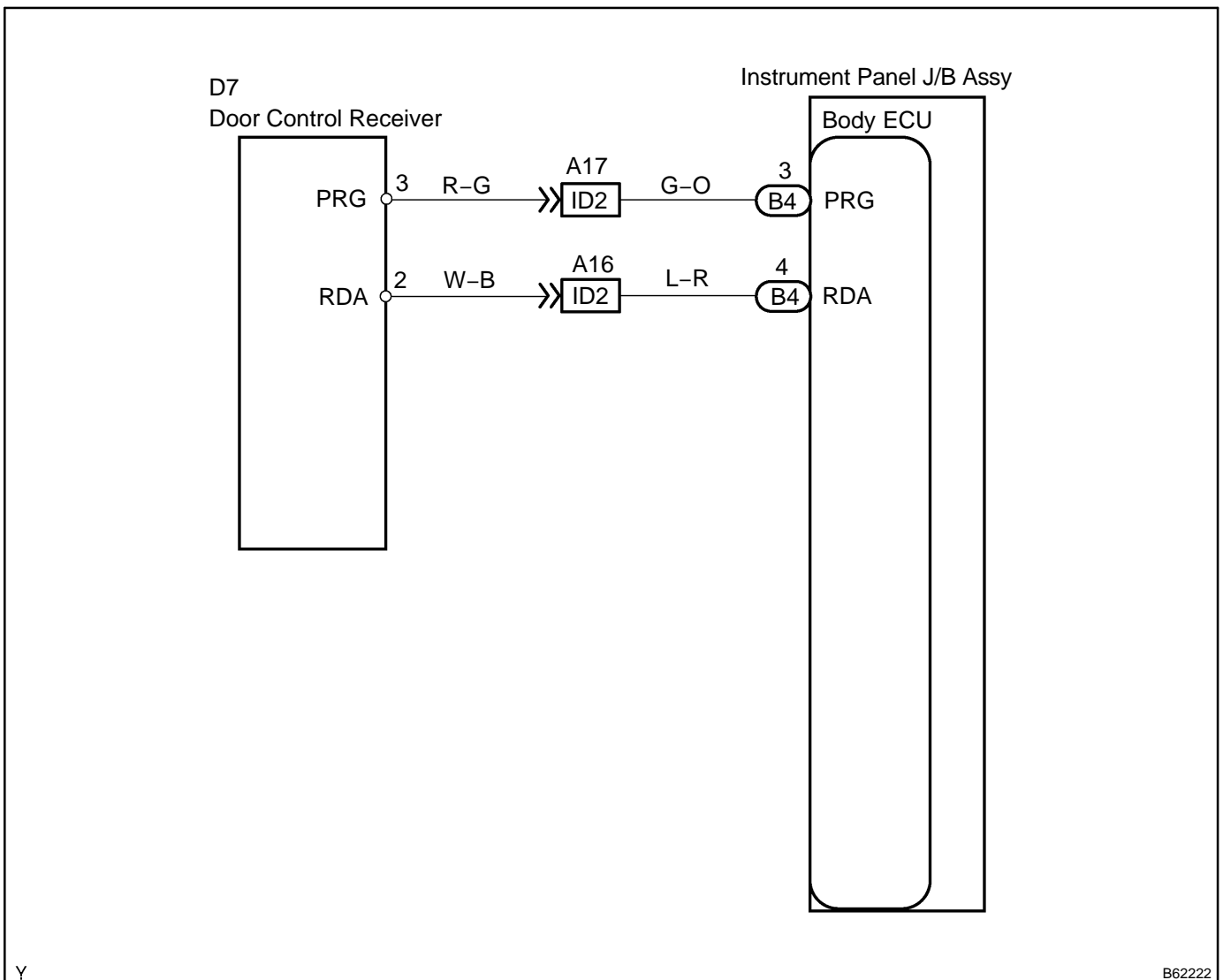
DTC	B1242	WIRELESS DOOR LOCK TUNER CIRCUIT MALFUNCTION
------------	--------------	---

CIRCUIT DESCRIPTION

This DTC is output when a ground short is detected in terminal RDA or PRG.

DTC No.	DTC Detection Condition	Trouble Area
B1242	Ground short in terminal RDA or PRG	<ul style="list-style-type: none"> • Door control receiver • Wire harness • Instrument panel J/B Assy (Body ECU)

WIRING DIAGRAM



Y

B62222

INSPECTION PROCEDURE

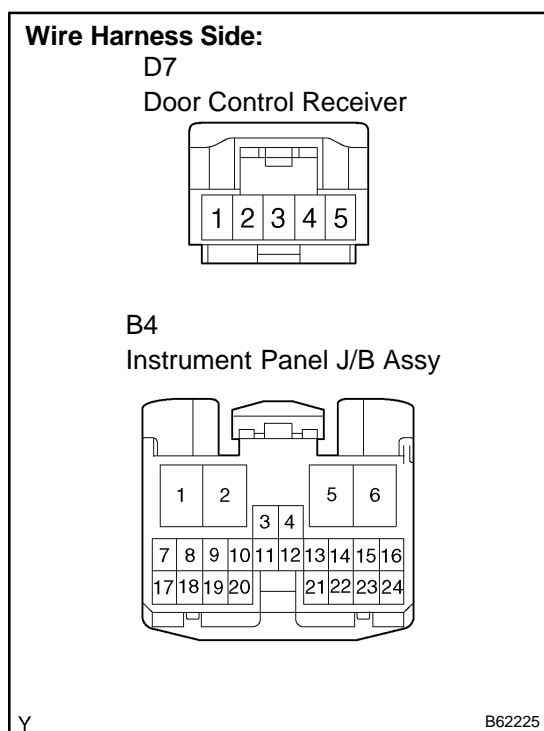
1 CHECK DOOR CONTROL RECEIVER

- (a) Check that the wireless system operates when a new or normal door control receiver is installed.
- (b) Check that no DTC is output.

OK → REPLACE DOOR CONTROL RECEIVER

NG

2 CHECK WIRE HARNESS (DOOR CONTROL RECEIVER ↔ INSTRUMENT PANEL JUNCTION BLOCK (BODY ECU)) (DOOR CONTROL RECEIVER OR INSTRUMENT PANEL JUNCTION BLOCK (BODY ECU) ↔ BODY GROUND)



- (a) Disconnect the D7 receiver connector.
- (b) Disconnect the B4 J/B connector.
- (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
RDA (D7-2) ↔ RDA (B4-4)	Continuity
PRG (D7-3) ↔ PRG (B4-3)	Continuity

- (d) Check the continuity between the D7 receiver connector or B4 J/B connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
RDA (D7-2) or RDA (B4-4) ↔ Body ground	No continuity
PRG (D7-3) or PRG (B4-3) ↔ Body ground	No continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

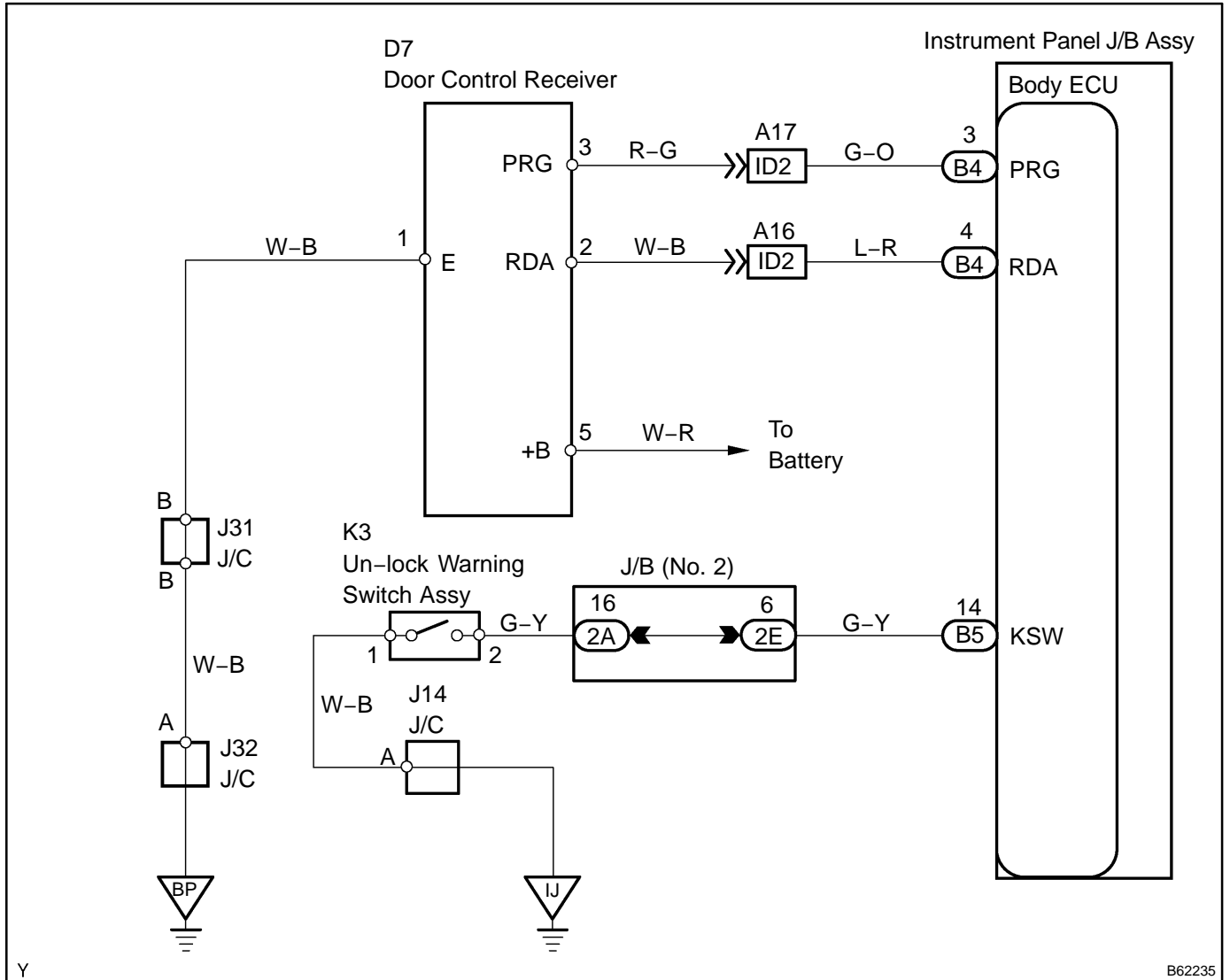
REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

ONLY WIRELESS CONTROL FUNCTION DOES NOT OPERATE (PREPARE NEW OR NORMAL TRANSMITTER OF THE SAME TYPE VEHICLE)

CIRCUIT DESCRIPTION

The door control receiver receives a signal from the transmitter and sends the signal to the body ECU. Then, the body ECU sends a door LOCK/UNLOCK signal to each door lock motor to control it.

WIRING DIAGRAM



Y

B62235

INSPECTION PROCEDURE

HINT:

The switch described in this text is a switch for transmitting signals, which is built in the door control transmitter.

1 PUT VEHICLE IN INITIAL CONDITION (See page 73-8)



2 CHECK THAT TRANSMITTER LED LIGHTS UP

- (a) Check that the transmitter LED lights up 3 times when the switch is pressed 3 times.

OK

Go to step 4

NG

3 SIMPLY CHECK TRANSMITTER BATTERY

- (a) After the transmitter battery is replaced with a new or normal one, check that the transmitter LED lights up 3 times when the switch is pressed 3 times.

NG

REPLACE TRANSMITTER SUB-ASSY MODULE
SET DOOR CONTROL

OK

REPLACE TRANSMITTER BATTERY

4 CHECK WIRELESS DOOR LOCK FUNCTIONS

- (a) Check if UNLOCK-LOCK operates in the standard operation.

NOTICE:

Standard operation, herein, means operation by pressing the transmission switch for 1 second, directing the transmitter to the vehicle in a location that is 100 cm (39.37 in.) away from the driver side door outside handle in the right direction.

OK

NORMAL

NG

5 CHECK WIRELESS DOOR LOCK BUZZER

- (a) Check that the wireless door lock buzzer sounds.

NG

GO TO FLOW CHART (See page 05-2189)

OK

6	SWITCH TO SELF-DIAGNOSTIC MODE
----------	---------------------------------------

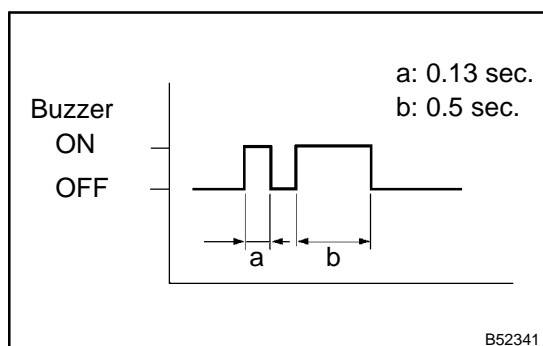
- (a) Switch to self-diagnostic mode by operating the hand-held tester.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON and hand-held tester main switch ON.
 - (3) Please refer to the hand-held tester operator's manual for further details.
- (b) Switch to self-diagnostic mode by operating the ignition key cylinder.
- (1) Insert the key into the ignition key cylinder and remove it under the initial vehicle condition (See page 73-8).
 - (2) Within 5 seconds after the above step, insert the key into the ignition key cylinder and turn the ignition switch ON → OFF once.
 - (3) Within 30 seconds after the above step, turn the ignition switch ON → OFF 9 times.

NOTICE:

If operation has failed, the system will return to the normal mode.

HINT:

- Operation of the ignition switch OFF → ON will end the self-diagnostic mode.
- Do not lock or unlock doors during the self-diagnostic mode.



- (c) Check that the system has switch to self-diagnostic mode by the answer-back of the wireless door lock buzzer sound.

NG

Go to step 11

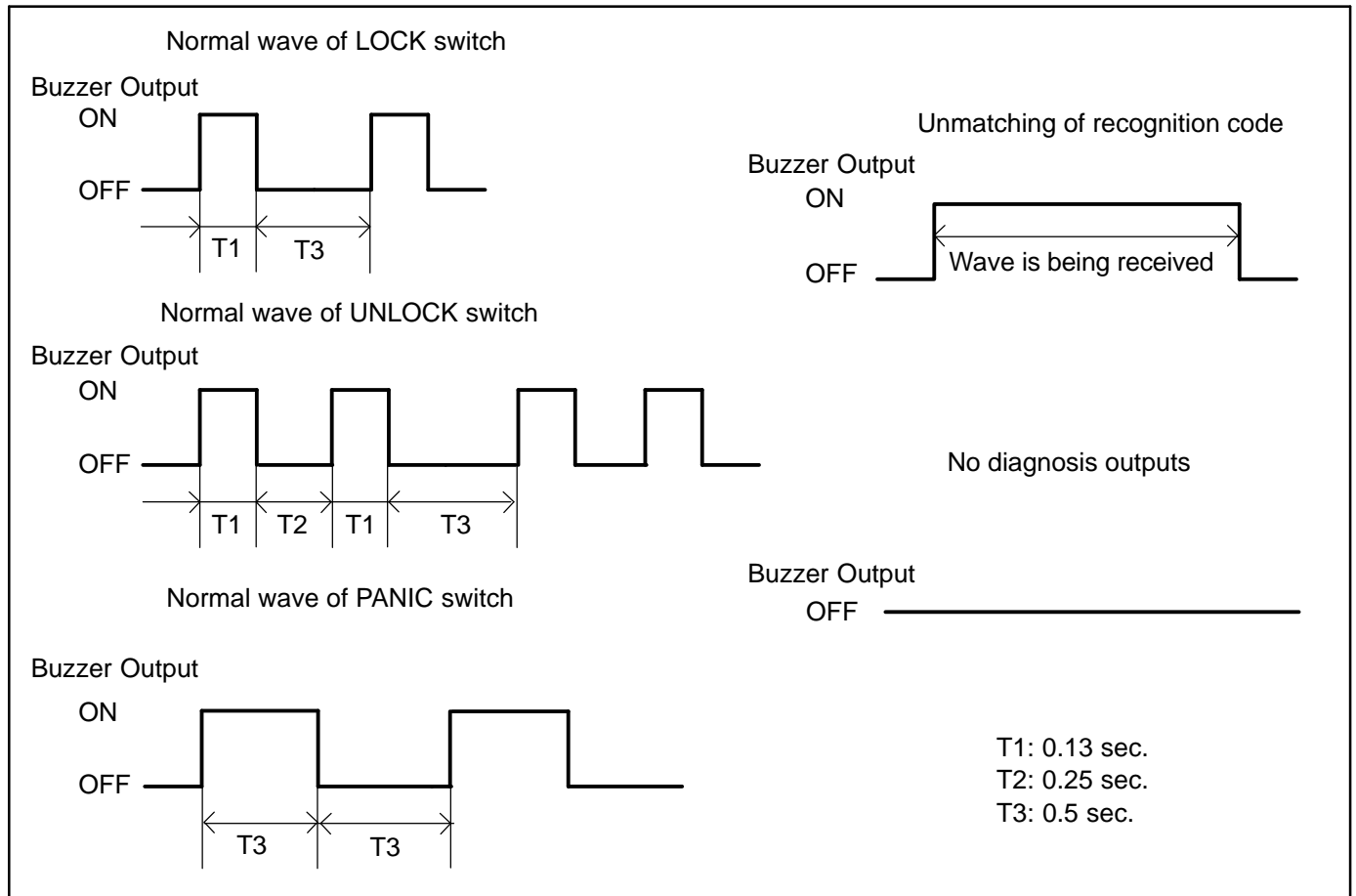
OK

7 | CHECK BY SELF-DIAGNOSTIC MODE

(a) Inspect the diagnosis outputs when the door control transmitter switch is held down (The diagnosis outputs can be checked with the sound of the wireless door lock buzzer).

HINT:

- In the case of a reception of the normal wave of the LOCK, UNLOCK or PANIC switch (wireless door lock buzzer sounds), go to step A.
- In the case of an unmatching of recognition code (wireless door lock buzzer ON), go to step B.
- In the case of no diagnosis outputs (wireless door lock buzzer OFF), go to step C.



A → REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

C → Go to step 9

B

8 REGISTER RECOGNITION CODE

- (a) Check that the system can switch to the rewrite mode or the add mode and also a recognition code can be registered.

NG Go to step 10

OK

NORMAL (CARRY OUT INSPECTION OF FUNCTIONS)**9 CHECK RESPONSE OF DOOR CONTROL RECEIVER**

- (a) When a new or normal door control transmitter switch for the same type vehicle is kept pressed, check that a diagnosis of unmatching recognition code is output.

NG Go to step 14

OK

REPLACE TRANSMITTER SUB-ASSY MODULE SET DOOR CONTROL**10 REPLACE DOOR CONTROL RECEIVER WITH NORMAL ONE**

NG REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

OK

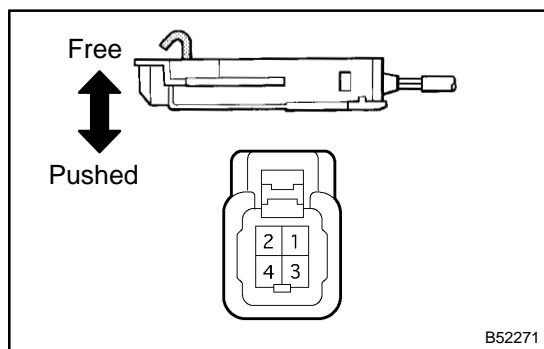
REPLACE DOOR CONTROL RECEIVER**11 CONFIRM INPUT METHOD OF SELF-DIAGNOSTIC MODE**

- (a) When the method for switching the system to self-diagnostic mode works, proceed to A.
 (b) When the method for switching the system to self-diagnostic mode does not work, proceed to B.

B Go to step 6

A

12 INSPECT UN-LOCK WARNING SWITCH ASSY



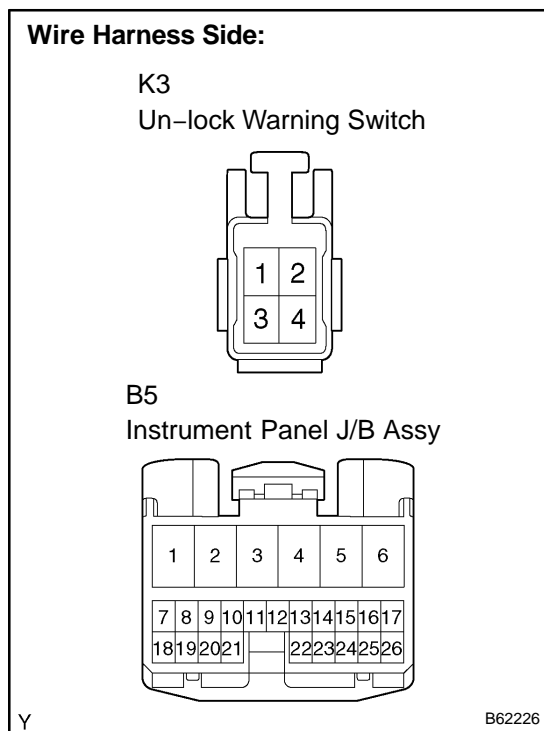
- (a) Inspect the continuity of the un-lock warning switch.
Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Switch free (Key removed)	No continuity
	Switch pushed (Key set)	Continuity

NG → **REPLACE UN-LOCK WARNING SWITCH ASSY**

OK

13 CHECK WIRE HARNESS (UN-LOCK WARNING SWITCH ↔ INSTRUMENT PANEL JUNCTION BLOCK (BODY ECU)) (UN-LOCK WARNING SWITCH ↔ BODY GROUND)



- (a) Disconnect the K3 warning switch connector.
- (b) Disconnect the B5 J/B connector.
- (c) Check the continuity between the wire harness side connectors.

Standard:

Terminal No.	Specified Condition
K3-2 ↔ B5-14	Continuity

- (d) Check the continuity between the K3 warning switch connector and body ground.

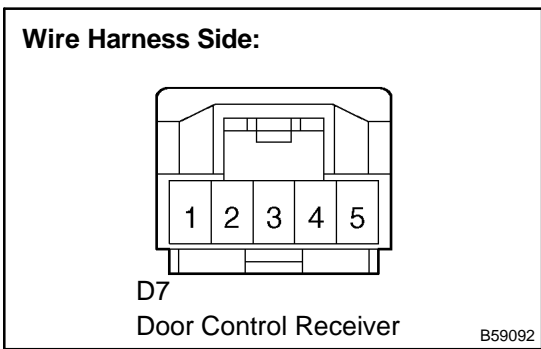
Standard:

Terminal No.	Specified Condition
K3-1 ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

14 CHECK DOOR CONTROL RECEIVER (POWER SOURCE AND GROUND)



- (a) Disconnect the D7 receiver connector.
- (b) Check the voltage or continuity between the D7 receiver wire harness side connector and body ground.

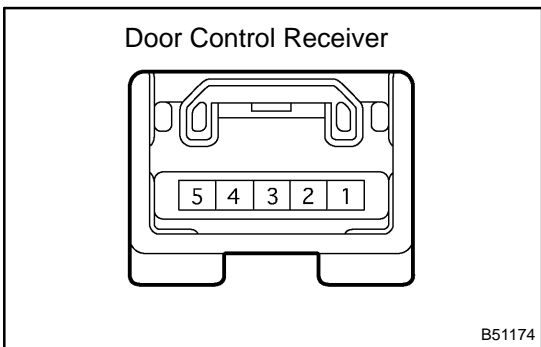
Standard:

Symbols (Terminal No.)	Specified Condition
+B (D7-5) ⇔ Body ground	10 - 14 V
E (D7-1) ⇔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

15 CHECK DOOR CONTROL RECEIVER



- (a) Reconnect the D7 receiver connector, and check the voltage between the terminal and body ground.

Standard:

Symbols (Terminal No.)	Condition	Specified Condition
RDA (D7-2) ⇔ Body ground	Ignition switch off, all doors closed and transmitter switch not pressed	10 - 14 V
	Ignition switch off, all doors closed and transmitter switch pressed	Pulse generation

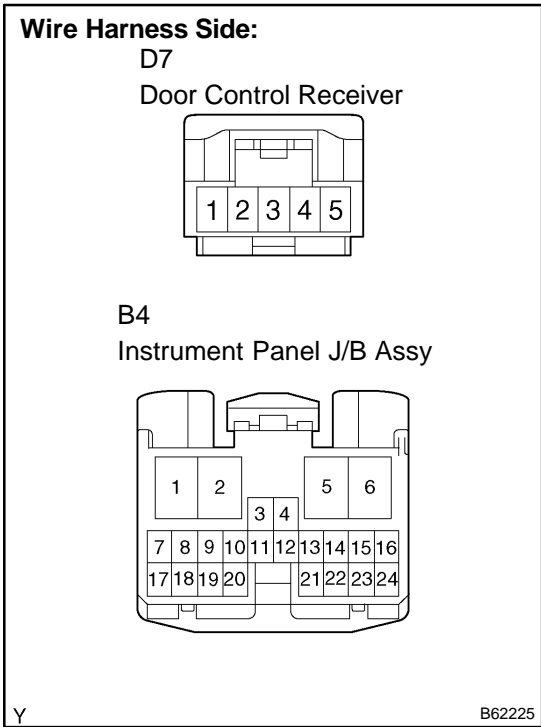
NOTICE:

Check the output voltage with the bar graph display.

OK → **Go to step 17**

NG

16 CHECK WIRE HARNESS (DOOR CONTROL RECEIVER ↔ INSTRUMENT PANEL JUNCTION BLOCK (BODY ECU)) (DOOR CONTROL RECEIVER OR INSTRUMENT PANEL JUNCTION BLOCK (BODY ECU) ↔ BODY GROUND)



- (a) Disconnect the D7 receiver connector.
- (b) Disconnect the B4 J/B connector.
- (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
RDA (D7-2) ↔ RDA (B4-4)	Continuity

- (d) Check the continuity between the D7 receiver connector or B5 J/B connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
RDA (D7-2) ↔ Body ground	No continuity
RDA (B4-4) ↔ Body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

17 REPLACE DOOR CONTROL RECEIVER WITH NORMAL ONE

OK → **REPLACE DOOR CONTROL RECEIVER**

NG

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

NO ANSWER-BACK (HAZARD WARNING LAMP AND WIRELESS DOOR LOCK BUZZER)

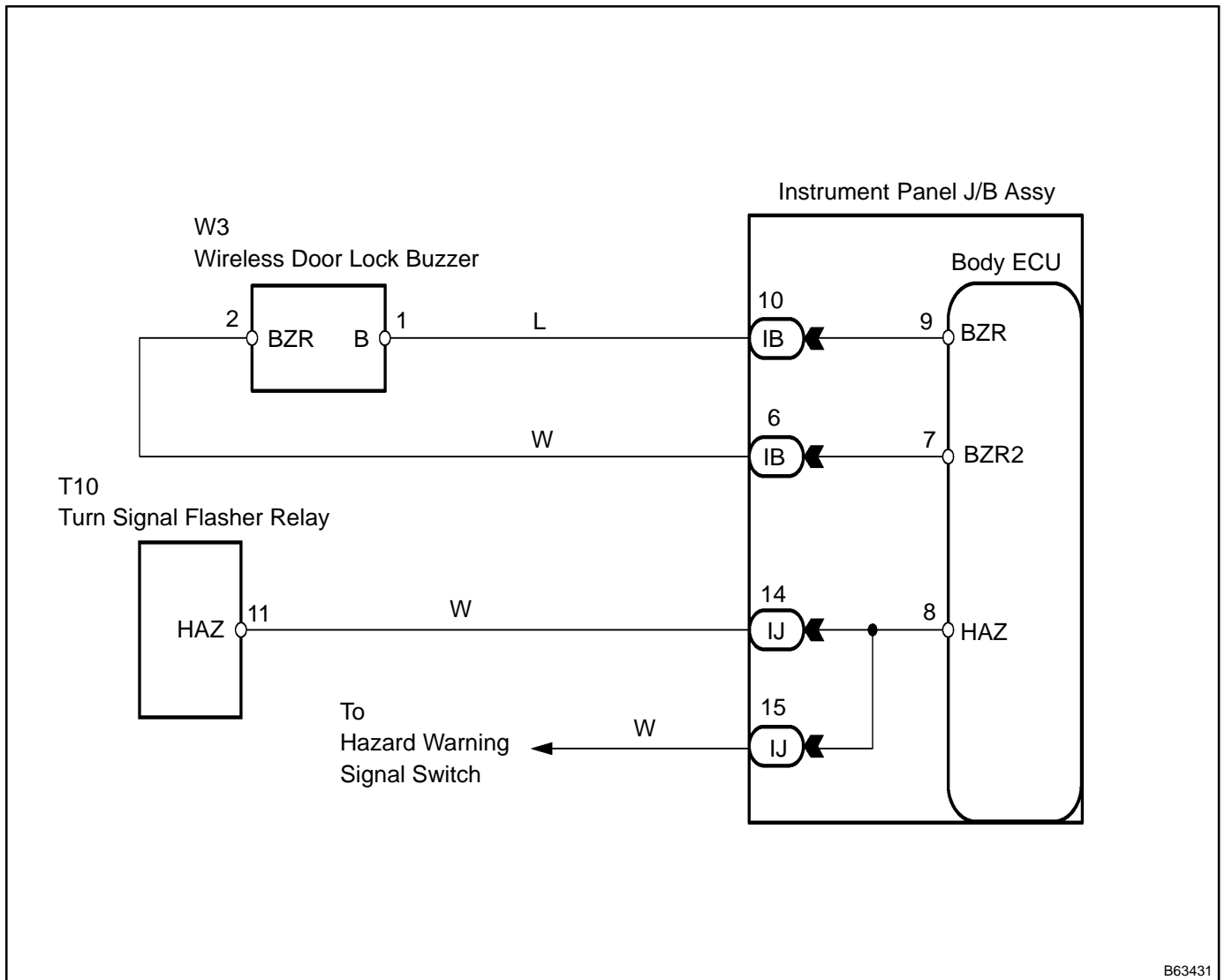
CIRCUIT DESCRIPTION

If there is no answer-back although the wireless door lock and unlock function is operating normally, there might be an abnormality in the hazard lamp signal and the wireless door lock buzzer signal which are output from the body ECU.

NOTICE:

Troubleshooting should be started after confirming that the hazard answer-back function has been switched ON through customization.

WIRING DIAGRAM



B63431

INSPECTION PROCEDURE

1 CHECK WIRELESS DOOR LOCK FUNCTIONS

(a) Check the wireless door lock functions by operating the transmitter switch.

HINT:

When the wireless door LOCK/UNLOCK operation can be performed, it means that the wireless signal from the transmitter is properly input to the body ECU.

NG → GO TO FLOW CHART (See page 05-2181)

OK

2 PERFORM ACTIVE TEST USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
 (c) Select the item "HAZARD" in the ACTIVE TEST and check the turn signal flasher relay ON/OFF.
 (d) Select the item "BUZZ CONT SOUND" or "BUZZ RESP SOUND" in the ACTIVE TEST and check the wireless buzzer ON/OFF.

HINT:

- In case of no wireless buzzer ON/OFF, go to step A.
- In case of no turn signal flasher assy ON/OFF, go to step B.
- In case of turn signal flasher assy ON/OFF and wireless buzzer ON/OFF, go to step C.

A → Go to step 4

C → REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

B

3 CHECK OUTPUTS OF HAZARD WARNING LAMPS

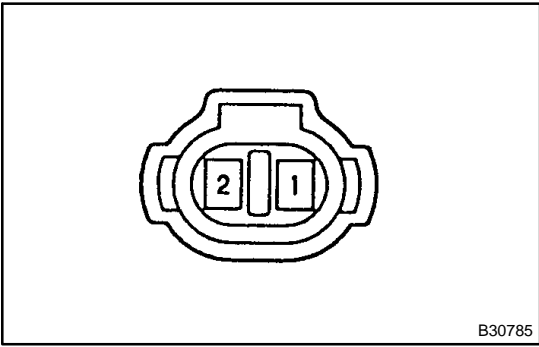
(a) Check that the hazard warning lamps blink when the hazard warning signal switch is pressed.

NG → GO TO LIGHTING SYSTEM (See page 05-1543)

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

4 INSPECT WIRELESS DOOR LOCK BUZZER



(a) Check the buzzer resistance.

NOTICE:

- The buzzer circuit is built into the body ECU, not in the buzzer itself.
- If battery voltage is directly applied to the buzzer, the buzzer will not sound.

(1) Check the resistance between terminals 1 and 2 of the buzzer.

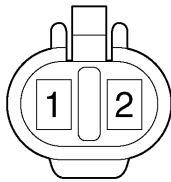
Standard: Approx. 1 kΩ

NG → **REPLACE WIRELESS DOOR LOCK BUZZER**

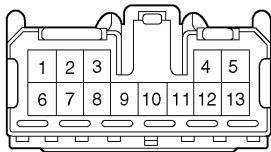
OK

5 CHECK WIRE HARNESS (BUZZER ↔ INSTRUMENT PANEL JUNCTION BLOCK ASSY)

Wire Harness Side:



W3
Wireless Door Lock Buzzer



IB
Instrument Panel J/B Assy

- (a) Disconnect the W3 wireless buzzer connector.
 (b) Disconnect the IB J/B connector.
 (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
B (W3-1) ↔ BZR (IB-10)	Continuity
BZR (W3-2) ↔ BZR2 (IB-6)	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

KEY REMINDER WARNING SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05AVS-01

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1	VEHICLE BROUGHT TO WORKSHOP
----------	------------------------------------



2	CUSTOMER PROBLEM ANALYSIS CHECK AND PROBLEM SYMPTOM
----------	--



3	PROBLEM SYMPTOMS TABLE (See page 05-2264)
----------	--

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

B	Go to step 5
----------	---------------------

A

4	PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM
----------	---

- (a) Pre-check (See page [05-2255](#))
 - (1) Inspection with the hand-held tester (ECU DATA MONITOR).
- (b) Terminals of ECU (See page [05-2258](#))
- (c) On-vehicle inspection (See page [73-20](#))



5	ADJUST, REPAIR OR REPLACE
----------	----------------------------------



6	CONFIRMATION TEST
----------	--------------------------



END

CUSTOMER PROBLEM ANALYSIS CHECK

KEY REMINDER WARNING SYSTEM Check Sheet

Inspector's
Name _____

Customer's Name		Registration No.	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (times a day) <input type="checkbox"/> Only once
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))

Problem Symptoms	<input type="checkbox"/> Key reminder buzzer does not sound
------------------	---

PRE-CHECK

1. USING HAND-HELD TESTER

- (a) Connect hand-held tester to the DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

The hand-held tester has a "Snapshot" function which records the monitored data.

Refer to the hand-held tester operator's manual for further details.

2. DATA LIST

HINT:

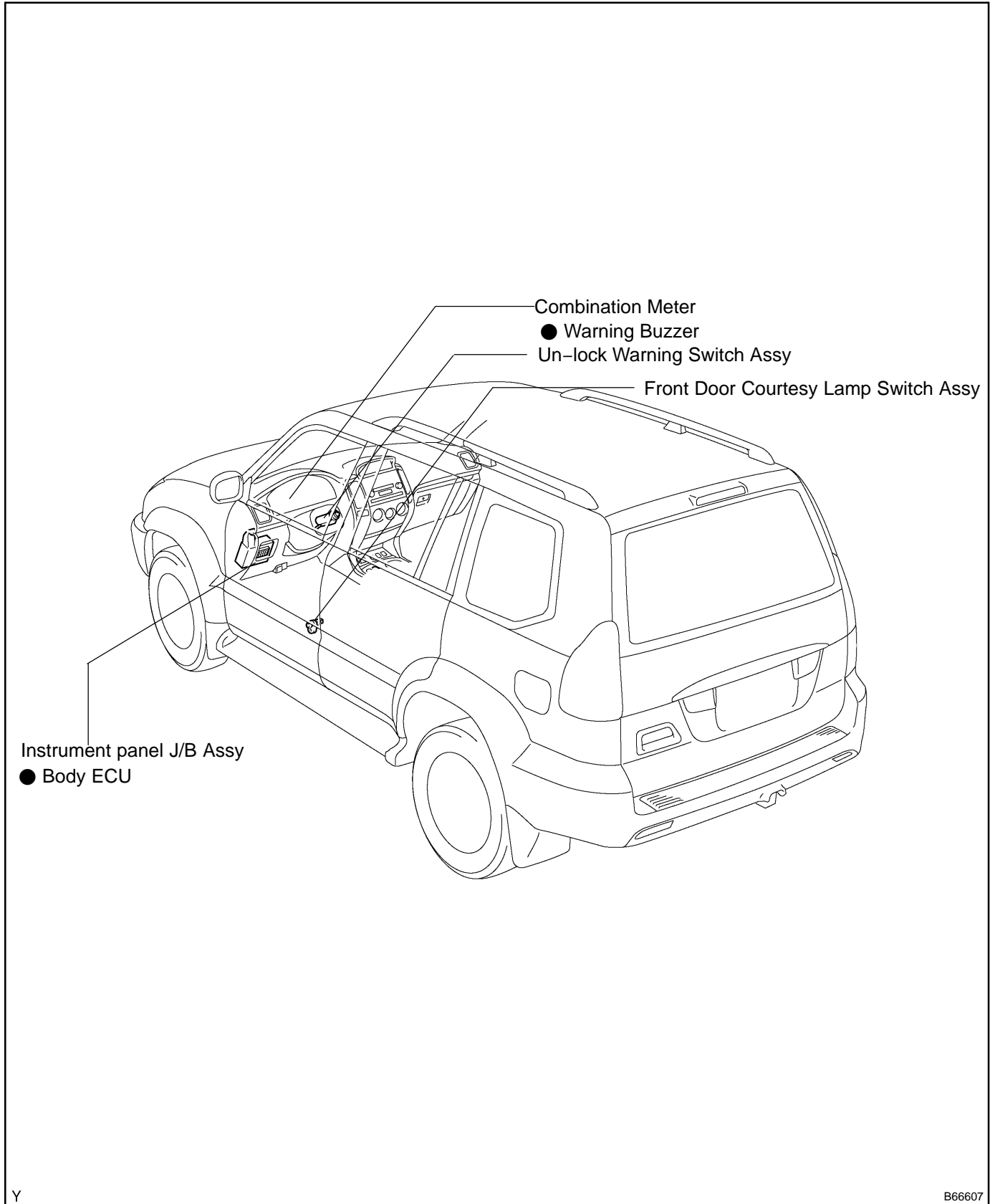
According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, read the DATA LIST.

Standard (Body ECU):

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
KEY UNLK WRN SW	Key unlock warning SW signal/ ON or OFF	ON: Key is in IG key cylinder OFF: No key is in IG key cylinder	-
D DOOR CTY SW	Driver's door courtesy SW signal/ ON or OFF	ON: Driver's door is open OFF: Driver's door is closed	-

LOCATION

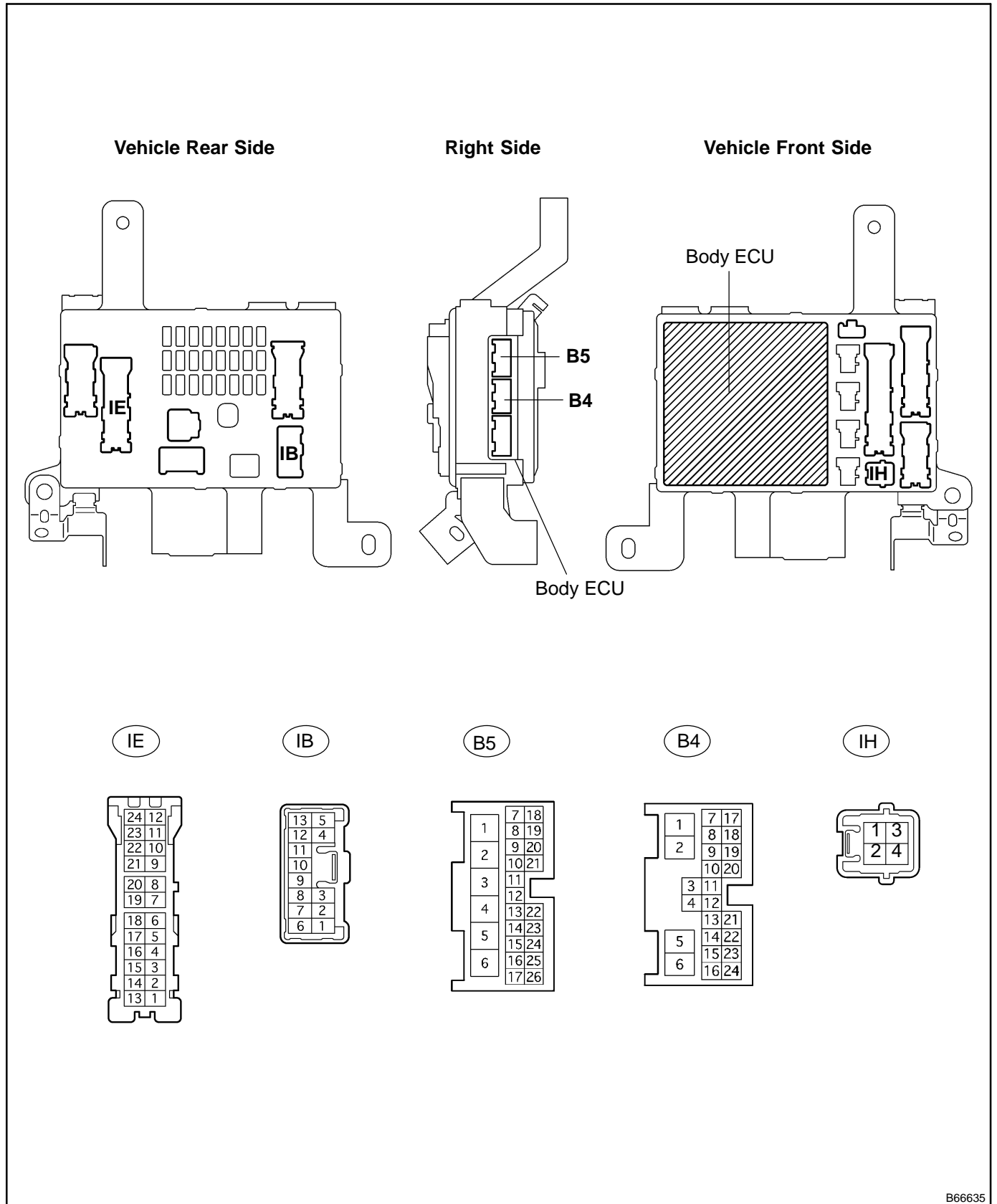


Y

B66607

TERMINALS OF ECU

1. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)



B66635

- (a) Disconnect the B5, IE, IB and IH J/B connectors.
 (b) Check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
BECU (IB-4) ↔ Body ground	W-R ↔ -	Constant	10 - 14 V
BDR1 (IE-9) ↔ Body ground	G-W ↔ -		
GND1, 2 (IH-2) ↔ Body ground	W-B ↔ -		Continuity
KSW (B5-14) ↔ Body ground	G-Y ↔ -	No key in ignition switch lock cylinder → Yes	No continuity → Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the B5, IE, IB and IH J/B connector.
 (d) Check the voltage of each terminal of the connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
DCTY (B4-23) ↔ Body ground	R-Y ↔ -	Driver's door CLOSED → OPEN	10 - 14 → 0 V

If the result is not as specified, the J/B may have a malfunction.

PROBLEM SYMPTOMS TABLE

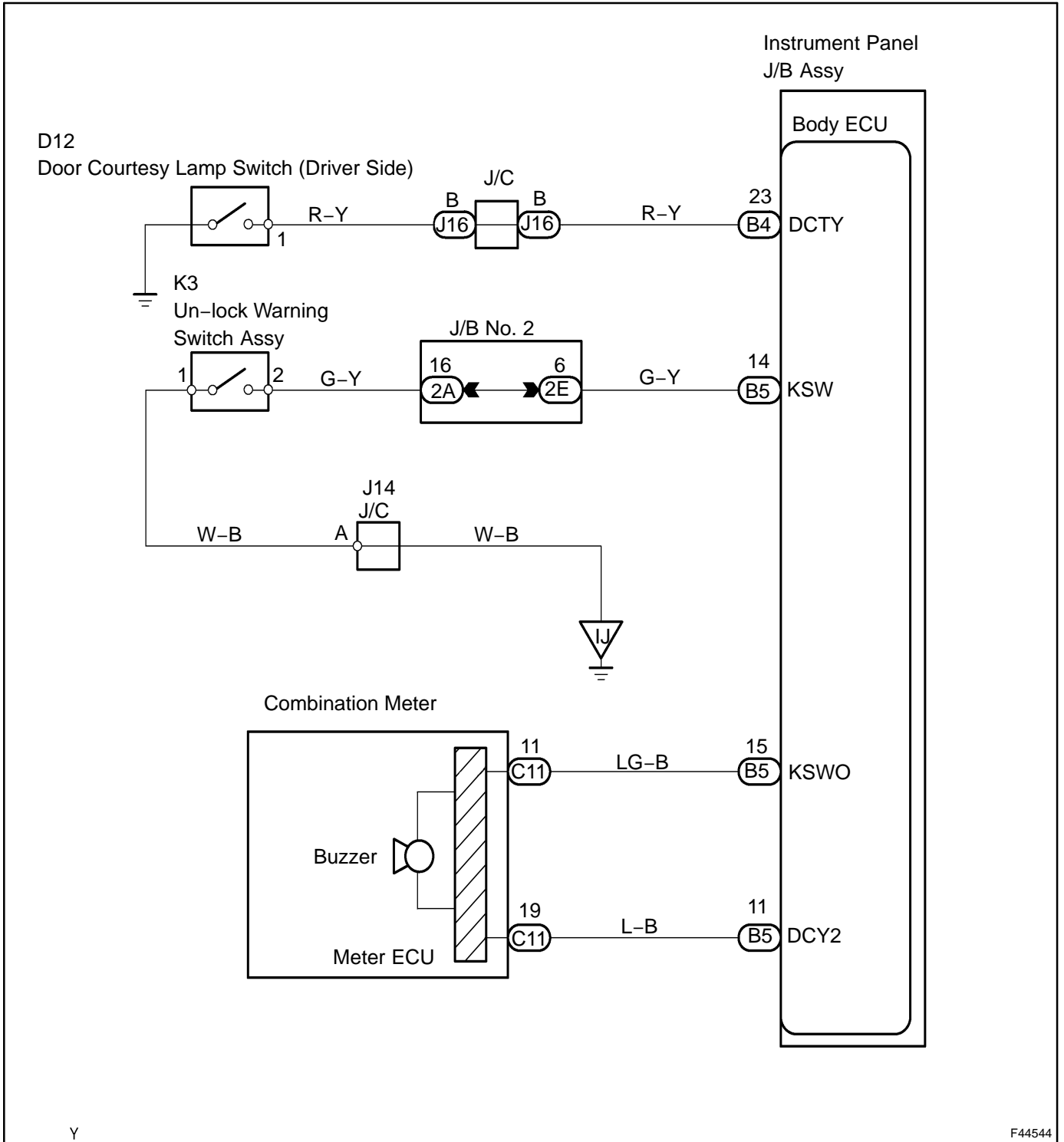
Symptom	Suspected Area	See Page
Key reminder buzzer does not sound	1. Un-lock warning switch assy	05-2199
	2. Front door courtesy lamp switch (Driver side)	05-2199
	3. Instrument panel J/B assy (Body ECU)	05-2196
	4. Combination meter	-
	5. Wire harness	-

KEY REMINDER BUZZER DOES NOT SOUND

CIRCUIT DESCRIPTION

When the ignition switch is OFF, the key is in the ignition key cylinder, and the driver side door is opened, the body ECU operates the combination meter to cause the buzzer to sound.

WIRING DIAGRAM



Y

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INSPECTION PROCEDURE

When using hand-held tester:

1 READ VALUE OF HAND-HELD TESTER (COURTESY LAMP SWITCH)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item "D DOR CTY SW" in the DATA LIST and read its value displayed on the hand-held tester.

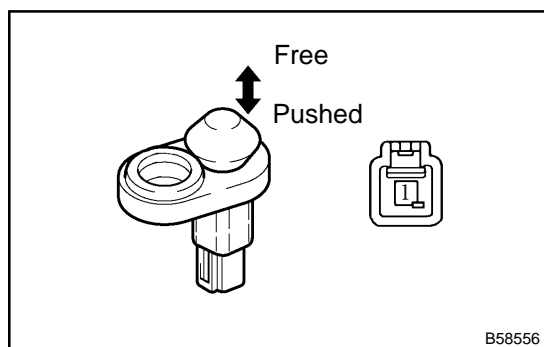
Standard:

- ON: Driver side door is open**
- OFF: Driver side door is closed**

OK → Go to step 4

NG

2 INSPECT FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE)



- (a) Remove the courtesy lamp switch.
- (b) Check the switch continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ Body ground	Switch Free	Continuity
	Switch Pushed	No continuity

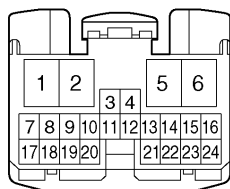
NG → REPLACE FRONT DOOR COURTESY LAMP SWITCH ASSY

OK

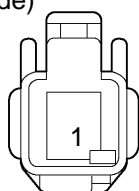
3 CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) ↔ COURTESY LAMP SWITCH)

Wire Harness Side:

B4
Instrument Panel J/B Assy



D12
Front Door Courtesy Lamp Switch
(Driver Side)



Y

B66620

- Disconnect the B4 J/B connector.
- Disconnect the D12 courtesy lamp switch connector.
- Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
DCTY (B4-23) ↔ + (D12-1)	Continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 CHECK BUZZER (COMBINATION METER) (See page 05-2048)

NG

GO TO COMBINATION METER SYSTEM
(See page 05-2048)

OK

5 READ VALUE OF HAND-HELD TESTER (KEY UN-LOCK WARNING SWITCH)

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the item "KEY UNLK WRN SW" in the DATA LIST and read its value displayed on the hand-held tester.

Standard:

ON: The key is in the ignition key cylinder

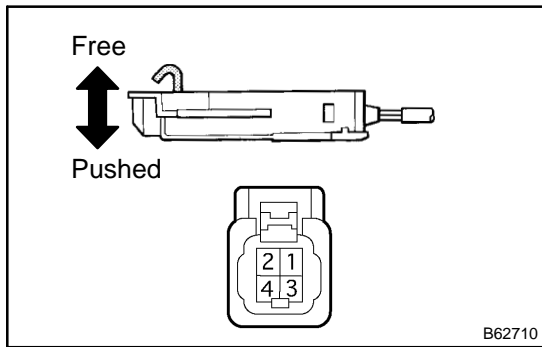
OFF: No key is in the ignition key cylinder

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

NG

6 INSPECT UN-LOCK WARNING SWITCH ASSY



- (a) Remove the un-lock warning switch assy.
- (b) Check the switch continuity.

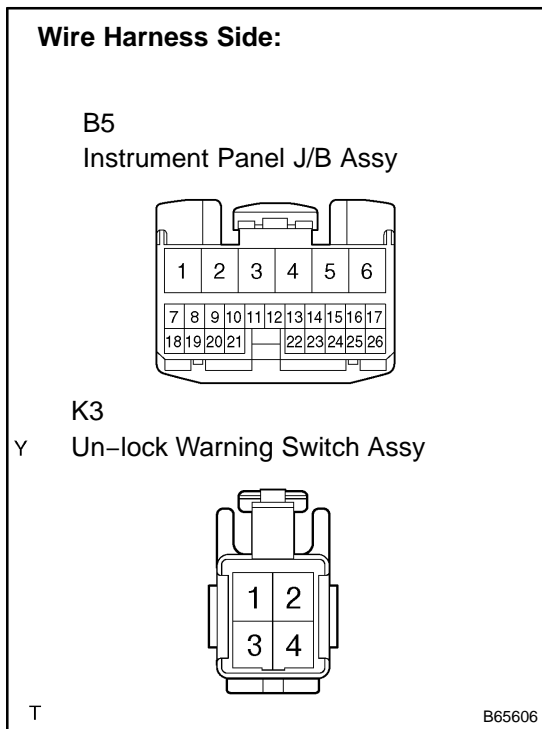
Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Free	No continuity
	Pushed	Continuity

NG → **REPLACE UN-LOCK WARNING SWITCH ASSY**

OK

**7 CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) ↔ UN-LOCK WARNING SWITCH ASSY)
(UN-LOCK WARNING SWITCH ↔ BODY GROUND)**



- (a) Disconnect the B5 J/B connector.
- (b) Disconnect the K3 warning switch connector.
- (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
KSW (B5-14) ↔ + (K3-2)	Continuity

- (d) Check the continuity between the K3 warning switch connector and body ground.

Standard:

Terminal No.	Specified Condition
K3-1 ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

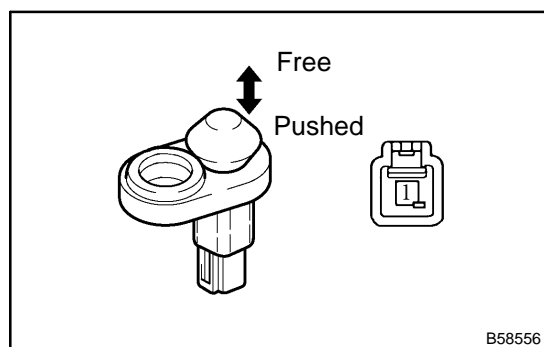
REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

When not using hand-held tester:**1 CHECK FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE)**

- (a) Put the dome lamp assy No. 2 switch in the door position and open the driver side door. Then check that the courtesy lamp switch comes on.

OK → Go to step 3

NG

2 INSPECT FRONT DOOR COURTESY LAMP SWITCH ASSY (DRIVER SIDE)

- (a) Remove the courtesy lamp switch.
 (b) Check the switch continuity.

Standard:

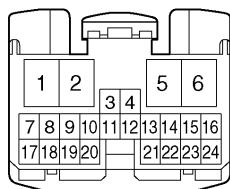
Terminal No.	Condition	Specified Condition
1 ↔ Body ground	Free	Continuity
	Pushed	No continuity

NG → REPLACE FRONT DOOR COURTESY LAMP SWITCH ASSY

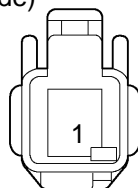
OK

3 CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) ↔ COURTESY LAMP SWITCH)**Wire Harness Side**

B4
Instrument Panel J/B Assy



D12
Front Door Courtesy Lamp Switch
(Driver Side)



- (a) Disconnect the B4 J/B connector.
 (b) Disconnect the D12 courtesy lamp switch connector.
 (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
DCTY (B4-23) ↔ - (D12-1)	Continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

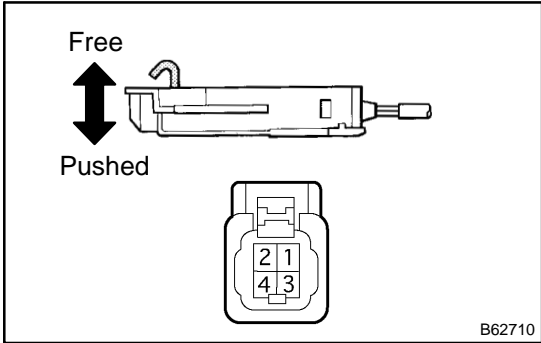
OK

4 CHECK BUZZER (COMBINATION METER) (See page 05-2048)

NG → **GO TO COMBINATION METER SYSTEM (See page 05-2048)**

OK

5 INSPECT UN-LOCK WARNING SWITCH ASSY



- (a) Remove the warning switch.
- (b) Check the switch continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Free	No continuity
	Pushed	Continuity

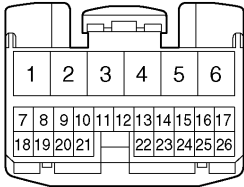
NG → **REPLACE UN-LOCK WARNING SWITCH ASSY**

OK

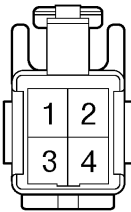
**6 CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU) ↔ UN-LOCK WARNING SWITCH ASSY)
(UN-LOCK WARNING SWITCH ↔ BODY GROUND)**

Wire Harness Side:

B5
Instrument Panel J/B Assy



K3
Y Un-lock Warning Switch Assy



T

B65606

- (a) Disconnect the B5 J/B connector.
- (b) Disconnect the K3 warning switch connector.
- (c) Check the continuity between the wire hareness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
KSW (B5-14) ↔ - (K3-2)	Continuity

- (d) Check the continuity between the K3 warning switch connector and body ground.

Standard:

Terminal No.	Specified Condition
K3-1 ↔ Body ground	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

0521A-36

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND PROBLEM SYMPTOM CONFIRMATION



3 CRANK ENGINE FOR MORE THAN 10 SECONDS



4 CHECK DTC

(a) Check for a DTC.

- (1) When any of codes B2780, B2784, B2793, B2794, B2795, B2796, B2797, B2798 or B2799 is output, proceed to A.
- (2) When a code except B2780, B2784, B2793, B2794, B2795, B2796, B2797, B2798 or B2799 is output, proceed to B.

B Go to SFI SYSTEM (See page 05-1)

A

5 READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the item "KEY SW" in the "DATA LIST" and read its value displayed on the hand-held tester.

Transponder key ECU assy:

Item	Measurement item/ Display (Range)	Normal condition	Diagnostic note
KEY SW	Un-lock warning switch signal /ON or OFF	OFF: Key is in IG key cylinder ON: No key is in IG key cylinder	-

NG Go to DTC B2780 (See page 05-2219)

OK

6 | PROBLEM SYMPTOMS TABLE (See page 05-2218)

- (a) When problem is not listed on problem symptoms table, proceed to A.
(b) When problem is listed on problem symptoms table, proceed to B.

B**Go to step 8****A****7 | PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM**

- (a) Pre-check (See page 05-2209)
(1) Inspect with the hand-held tester (ECU DATA MONITOR).
(2) Inspect with the hand-held tester (ACTIVE TEST).
(b) Terminals of ECU (See page 05-2214)

8 | ADJUST, REPAIR OR REPLACE**END**

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILISER SYSTEM Check Sheet

Inspector's :
Name _____

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Intermittent (times a day) <input type="checkbox"/> Only once
Weather Conditions When Problem Occurred	Weather
	Outdoor Temperature
	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))

Symptoms	<input type="checkbox"/> Immobiliser is not set. <input type="checkbox"/> (Engine starts with key codes other than the registered key code.)
	<input type="checkbox"/> Engine does not start.

DTC Check	1st Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (Code)
	2nd Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (Code)

PRE-CHECK

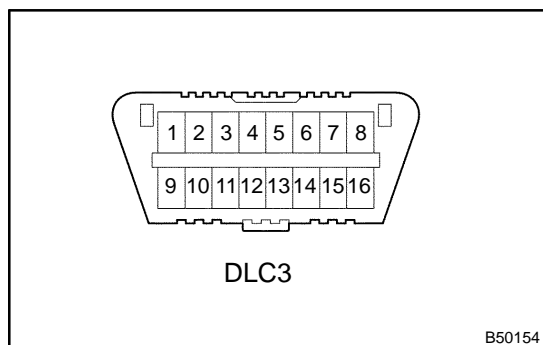
1. DIAGNOSIS SYSTEM

(a) Description

- (1) The ECM controls the function of the immobiliser system on this vehicle.

Data of the immobiliser system and the Diagnostic Trouble Code (DTC) can be read in the Data Link Connector 3 (DLC3) of the vehicle. When trouble occurs in the immobiliser system, even though the Malfunction Indicator Lamp (MIL) does not come on, DTCs can be checked.

Therefore, when there seems to be trouble with the immobiliser system, use the hand-held tester to check for trouble and troubleshoot it.



(b) Inspect the DLC3.

The vehicle's ECM uses the ISO 9141-2 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Standard:

Terminal No.	Condition	Specified Condition
7 (Bus + Line) ↔ 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) ↔ Body ground	Constant	1 Ω or less
5 (Signal Ground) ↔ Body ground	Constant	1 Ω or less
16 (B+) ↔ Body ground	Constant	9 - 14 V

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the hand-held tester to the DLC3, turned the ignition switch ON and operated the hand-held tester, the problem may be on the vehicle side or the tester side.

- If communication is normal when the tester is connected to other vehicle, inspect the DLC3 of the original vehicle.
- If communication is still impossible when the tester is connected to another vehicle, the problem may be in the tester itself, so consult the Service Department listed in the tester's instruction manual.

2. INSPECT DIAGNOSIS

- (a) Using the hand-held tester, check for DTC.

NOTICE:

Hand-held tester only:

When the diagnosis system is switched from the normal mode to the check mode, all the DTCs and freeze frame data recorded in the normal mode are erased. So before switching modes, always check the DTCs and freeze frame data, and make a note of them.

- (1) Prepare the hand-held tester.
- (2) Connect the hand-held tester to the DLC3 under the instrument panel lower pad.
- (3) Turn the ignition switch ON and push the hand-held tester switch ON.
- (4) Use the hand-held tester to check for DTCs and freeze frame data, and make a note of them (For operating instructions, see the hand-held tester instruction book).
- (5) Confirm the details of the DTCs.

- (b) Either of the following procedures will erase the DTCs and freeze frame data.
- (1) Operating the hand-held tester to erase the codes (See the hand-held tester instruction book for operating instructions).
 - (2) Disconnecting the battery terminals or ECU-B fuse.

3. DATA LIST

HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator, etc. without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, read the DATA LIST.

Transponder key ECU assy:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Un-lock warning SW signal/ ON or OFF	OFF: Key is in IG key cylinder ON: No key is in IG key cylinder	-
IG SW	IG SW signal/ ON or OFF	OFF: IG SW is ON or START position ON: IG SW is OFF or ON position	-
IMMOBILISER	Immobiliser system status/ SET or UNSET	UNSET: Without key SET: Ignition switch ON	-
RESPONSE	-	NG/OK	-
FRAME	-	NG/OK	-
SERIAL NUMBER	-	NG/OK	-
ENCRYPT CODE	-	NG/OK	-
STATUS	-	NG/OK	-
BCC	-	NG/OK	-
SUB KEY	-	NOMATCH/MATCH	-
MASTER KEY	-	NOMATCH/MATCH	-
REGIST SUB CODE	Number of registered master key/ min. 0, max. 15	Number of registered master key	-
REGIST MAS CODE	Number of registered sub-key/ min. 0, max. 15	Number of registered sub-key	-
REG CODE SPACE	-	NOT FUL/FULL	-
+B	-	NORMAL/BREAK	-
ANTENNA COIL	-	NORMAL/FAIL	-
G-CODE SUPPORT	-	NOT SUP/SUPPORT	-

4. ACTIVE TEST**HINT:**

Performing the ACTIVE TEST using the hand-held tester allows you to operate the relay, VSV, actuator, etc. without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time. It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, perform the ACTIVE TEST.

Transponder key ECU assy:

Item	Test Details	Diagnostic Note
SECURITY INDIC	Turn security indicator ON/OFF	Key reminder buzzer is installed in combination meter

DIAGNOSTIC TROUBLE CODE CHART

1. TRANSPONDER KEY ECU DTC CHART

DTC No. (See Page)	Detection Item	Trouble Area
B2780 (05-2219)	Push Switch/Key Unlock Warning Switch Malfunction	<ul style="list-style-type: none"> • Un-lock warning switch • Wire harness • Transponder key ECU assy
B2784 (05-2222)	Antenna Coil Open/Short	<ul style="list-style-type: none"> • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU assy
B2793 (05-2224)	Transponder Chip Malfunction	Key
B2794 (05-2225)	Unmatched Encryption Code	Key
B2795 (05-2226)	Unmatched Key Code	Key
B2796 (05-2227)	No Communication in Immobiliser System	<ul style="list-style-type: none"> • Key • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU assy
B2797 (05-2230)	Communication Malfunction No.1	<ul style="list-style-type: none"> • Key • Wire harness • Transponder key amplifier (Transponder key coil) • Transponder key ECU assy
B2798 (05-2227)	Communication Malfunction No.2	<ul style="list-style-type: none"> • Key • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU assy

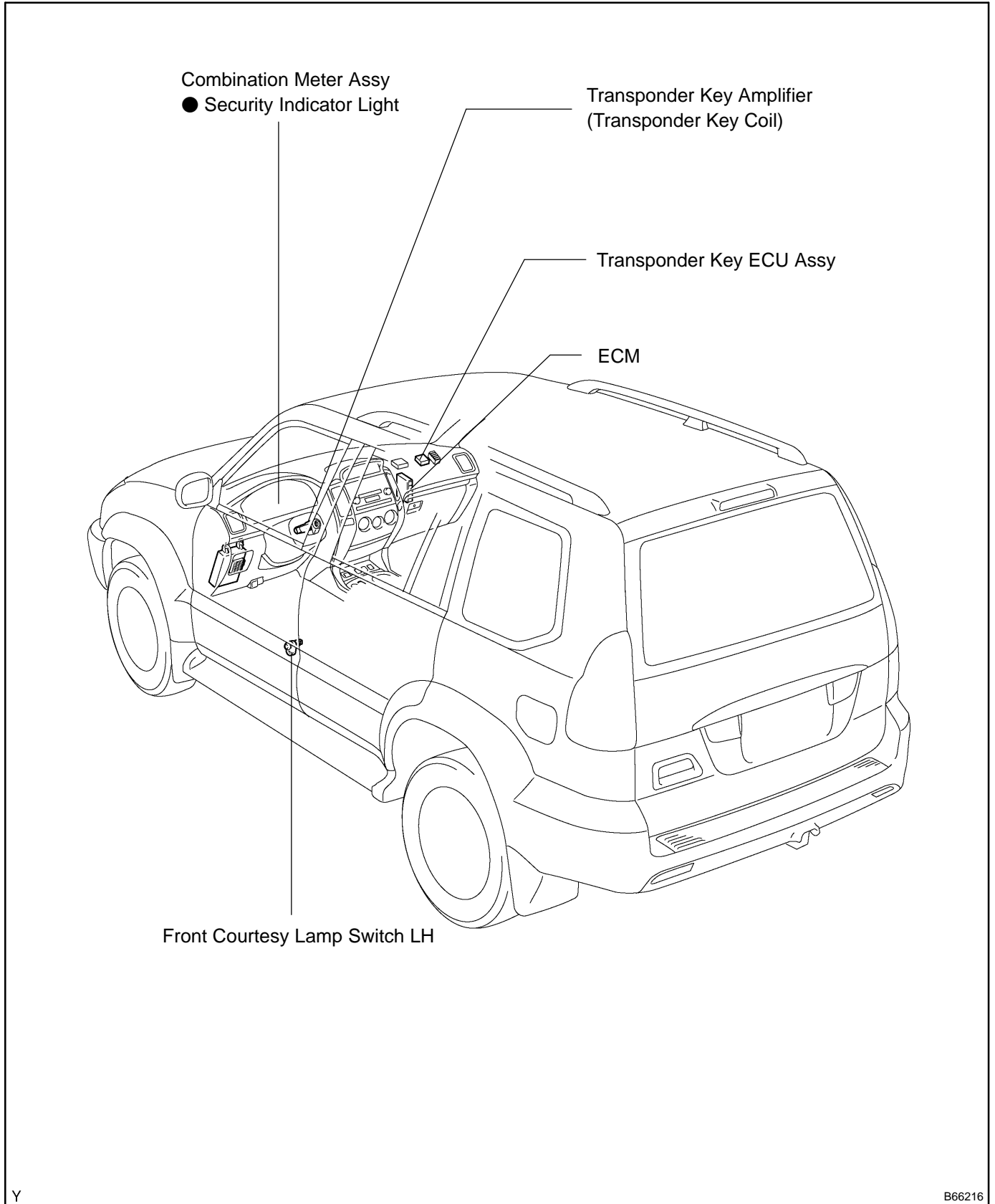
2. ECM DTC CHART

NOTICE:

The DTC for the immobiliser system is specified. If the other codes are output, check the DTC chart of the SFI system.

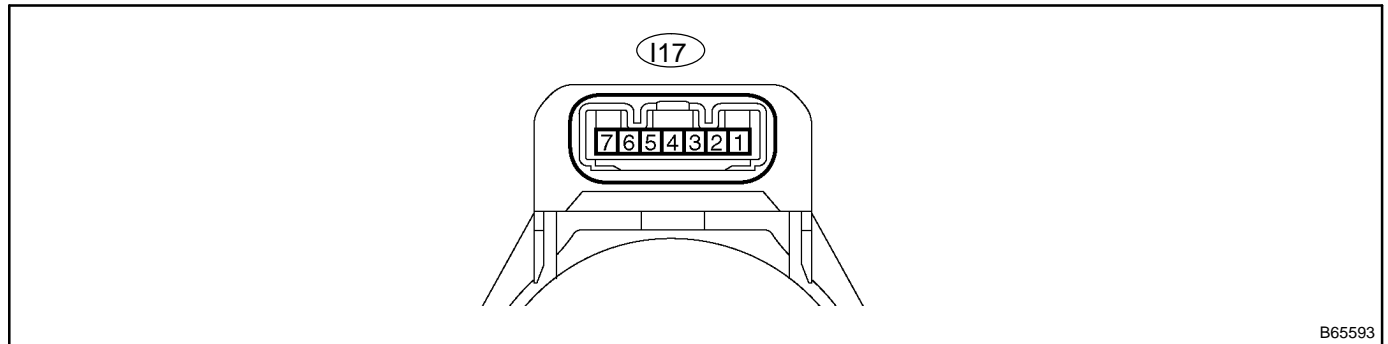
DTC No. (See Page)	Detection Item	Trouble Area
B2799 (05-2231)	Engine Immobiliser System Malfunction	<ul style="list-style-type: none"> • Wire harness • Transponder key ECU assy • Transponder key amplifier (Transponder key coil) • ECM

LOCATION



TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



(a) Disconnect the connector. Check the resistance of the wire harness side connector. If the result is not as specified, there may be a malfunction on the wire harness side.

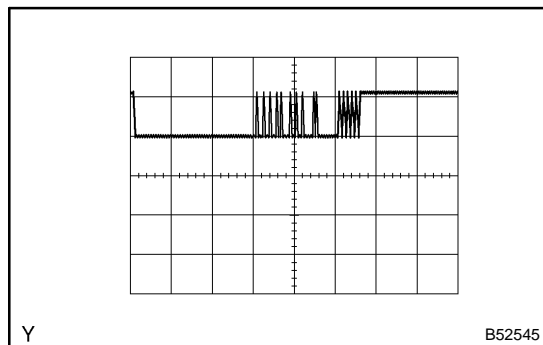
Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (I17-7) - Body ground	BR	-	Below 1 Ω

(b) Reconnect the connector. Check the resistance and voltage of the connector. If the result is not as specified, the amplifier may have a malfunction.

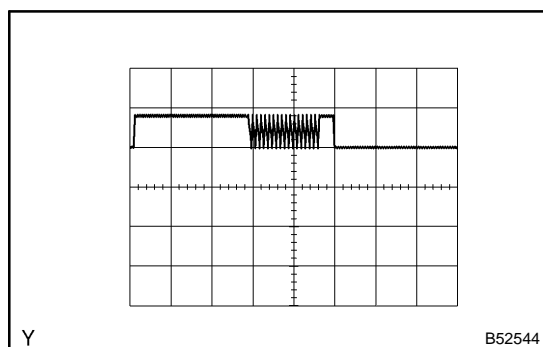
Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
VC5 (I17-1) - GND (I17-7)	R - BR	No key in ignition key cylinder → With key	0 V → 10 - 14 V
CODE(I17-4) - GND (I17-7)	Y - BR	No key in ignition key cylinder → With key	Waveform 1
TXCK (I17-5) - GND (I17-7)	Y-B - BR	No key in ignition key cylinder → With key	Waveform 2
GND (I17-7) - Body ground	BR	-	Below 1 Ω



Waveform 1 (Reference):

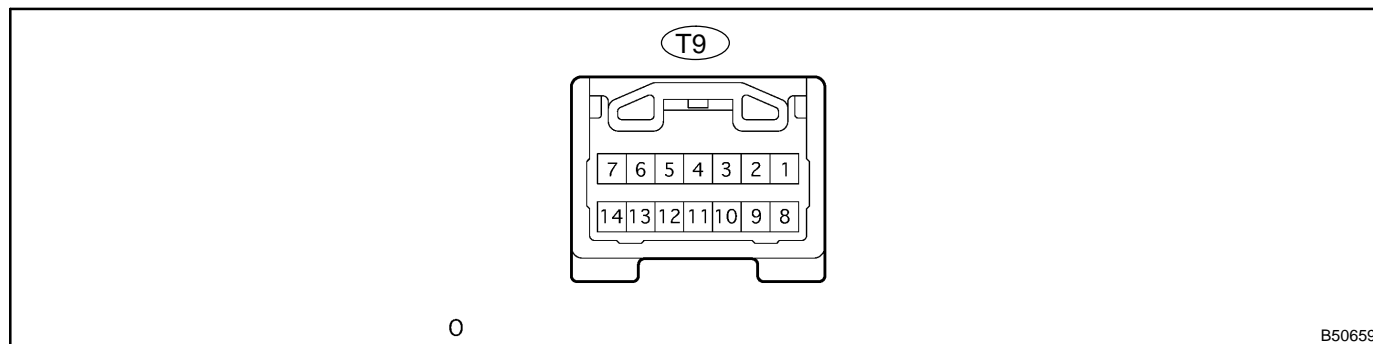
Terminal	CODE - GND
Tool setting	10 V/DIV, 20 ms/DIV
Condition	Ignition switch ON



Waveform 2 (Reference):

Terminal	TXCK - GND
Tool setting	5 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON

2. CHECK TRANSPONDER KEY ECU



(a) Disconnect the connector. Check the resistance and voltage of the wire harness side connector. If the result is not as specified, there may be a malfunction on the wire harness side.

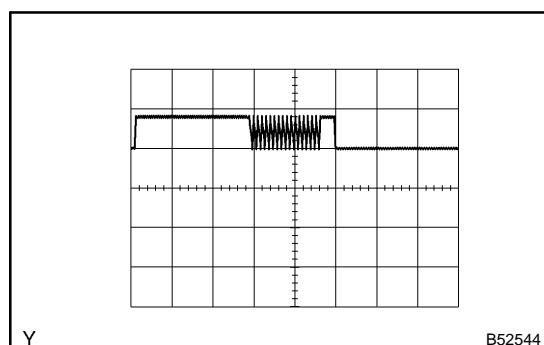
Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (T9-14) - Body ground	W-B	-	Continuity
+B (T9-1) - GND (T9-14)	W-R - W-B	-	10 - 14 V
IG (T9-2) - GND (T9-14)	B-R - W-B	Ignition switch OFF → ON	0 V → 10 - 14 V
KSW (T9-10) - GND (T9-14)	G-Y - W-B	No key in ignition key cylinder → With key	10 kΩ or more → Below 1 Ω
AGND (T9-13) - Body ground	BR	-	Below 1 Ω

(b) Reconnect the connector. Check the voltage of the connector. If the result is not as specified, the transponder key ECU may have a malfunction.

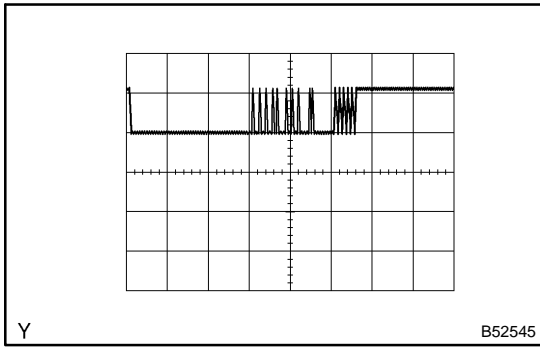
Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
KSW (T9-10) - GND (T9-14)	G-Y - W-B	No key in ignition key cylinder → With key	10 - 14 V → 0 V
VC5 (T9-8) - GND (T9-14)	R - W-B	Ignition switch OFF → ON	0 V → 10 - 14 V
TXCT (T9-12) - GND (T9-14)	Y-B - W-B	Ignition switch OFF → ON	Waveform 1
CODE (T9-11) - GND (T9-14)	Y - W-B	Ignition switch OFF → ON	Waveform 2
EFIO (T9-6) - GND (T9-14)	W-R - W-B	Ignition switch OFF → ON	Waveform 3
EFII (T9-7) - GND (T9-14)	L-R - W-B	Ignition switch OFF → ON	Waveform 4
CTY (T9-4) - GND (T9-14)	R-Y - W-B	Driver door closed → Open	10 - 14 V → 0 V
IND (T9-3) - GND (T9-14)	V-W - W-B	During set preparation	Switching between 12 V and 0 V



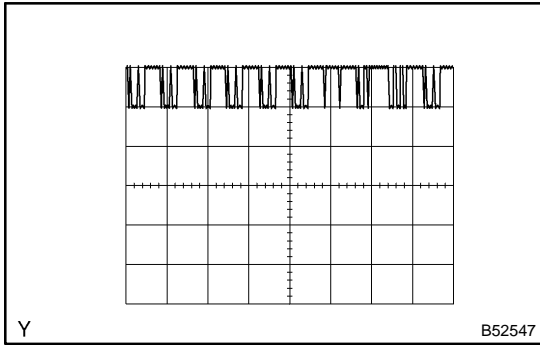
Waveform 1 (Reference):

Terminal	TXCT - GND
Tool setting	5 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



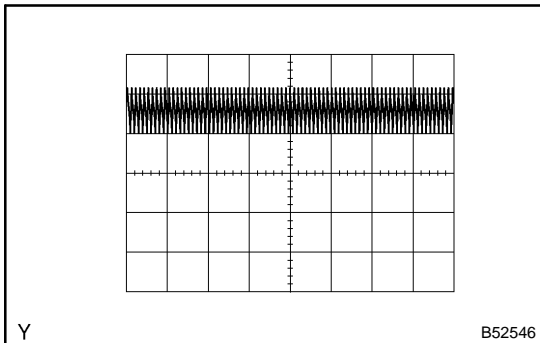
Waveform 2 (Reference):

Terminal	CODE - GND
Tool setting	10 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



Waveform 3 (Reference):

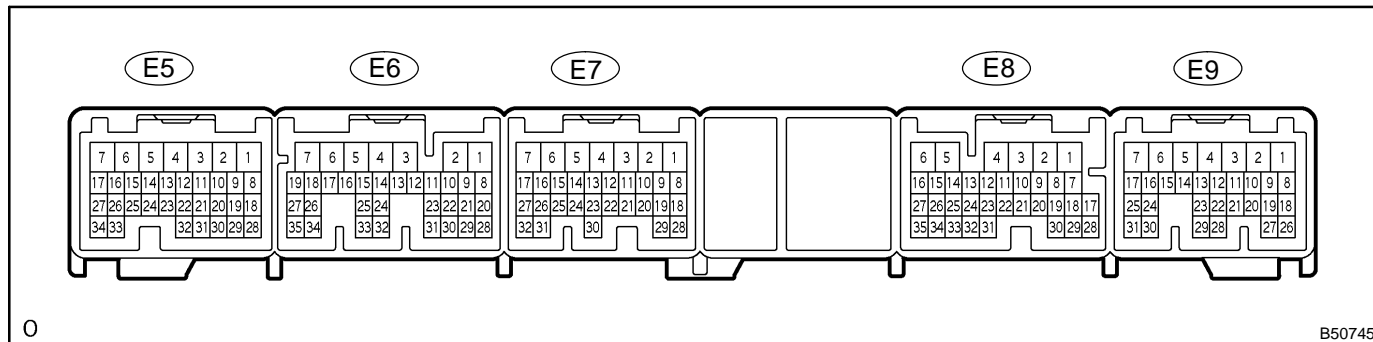
Terminal	EFIO - GND
Tool setting	10 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



Waveform 4 (Reference):

Terminal	EFII - GND
Tool setting	10 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON

3. CHECK ECM

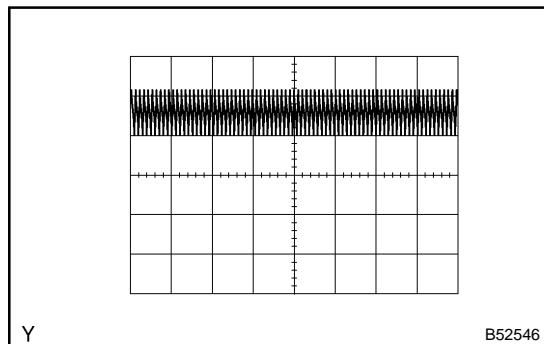


(a) Disconnect the E7 and E8 ECM connectors. Check the resistance and voltage of the wire harness side connectors.

If the result is not as specified, there may be a malfunction on the wire harness side.

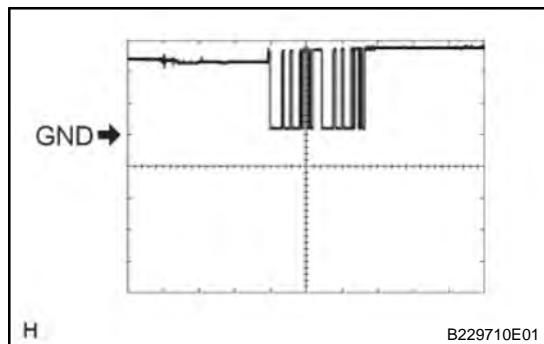
Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
IMI (E8-16) - E1 (E7-1)	W-R - BR	Ignition switch OFF	Below 1 V
		Ignition switch ON	Waveform 1
IMO (E8-15) - E1 (E7-1)	L-R - BR	Ignition switch OFF	10 - 14 V
		Within 3 sec after starter ON and initial combustion Or within 3 sec after ignition switch ON when battery is re-connected	Waveform 2
E1 (E7-1) - Body ground	BR	-	Below 1 Ω



Waveform 1 (Reference):

Terminal	IMI - GND
Tool setting	10 V/DIV., 20 ms/DIV.
Condition	Ignition switch ON



Waveform 2 (Reference):

Terminal	IMO - GND
Tool setting	5 V/DIV., 500 ms/DIV.
Condition	Within 3 sec after starter ON and initial combustion Or within 3 sec after ignition switch ON when battery is re-connected

PROBLEM SYMPTOMS TABLE

Problem Symptom	Suspected Area	See Page
Engine does not start	<ol style="list-style-type: none">1. Key2. Transponder key amplifier (Transponder key coil)3. Transponder key ECU assy4. Un-lock warning switch assy	05-2224 05-2225 05-2226 05-2227 05-2230 05-2227 05-2230 05-2231 05-2227 05-2230

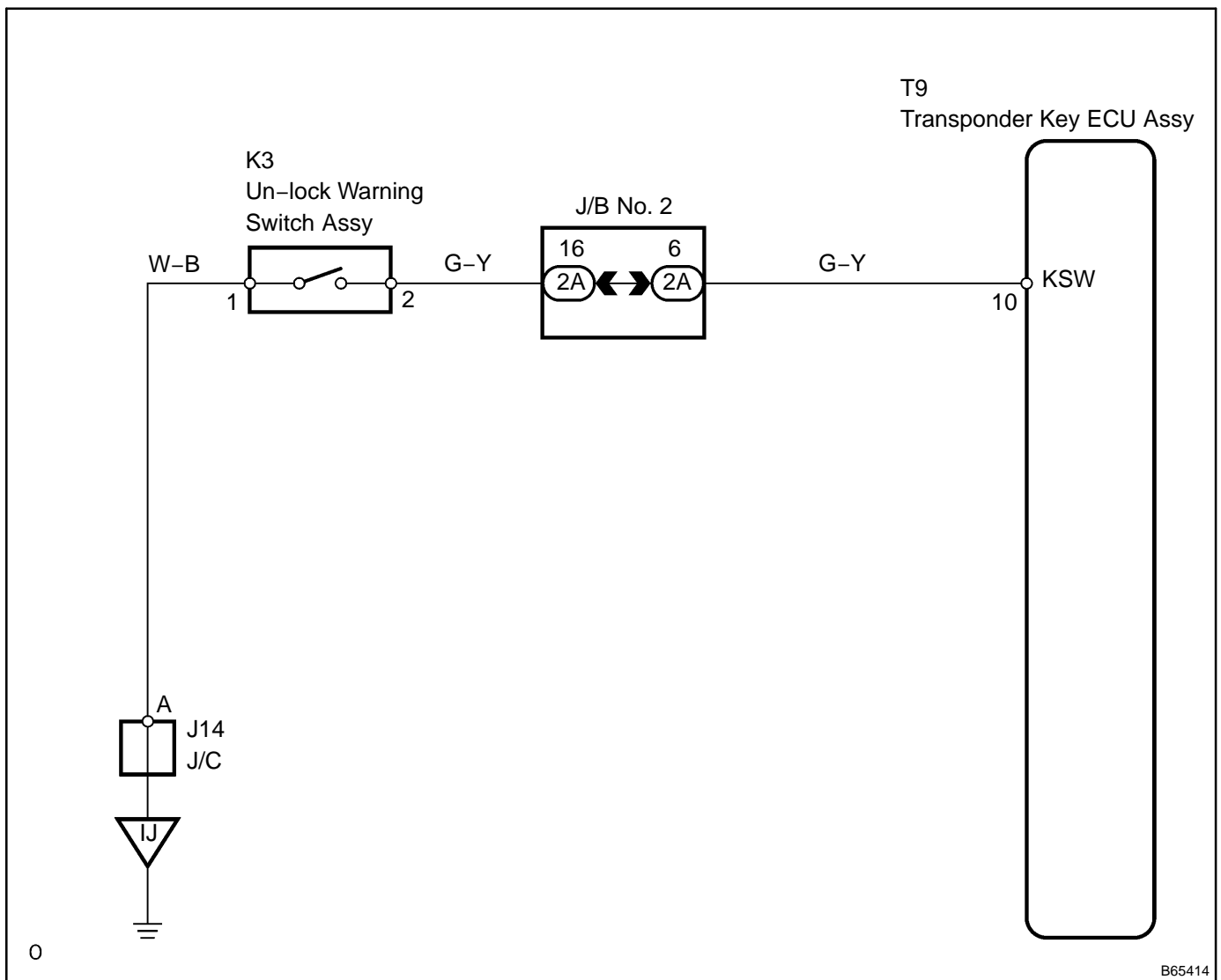
DTC	B2780	PUSH SWITCH/KEY UNLOCK WARNING SWITCH MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

This DTC will be output if the transponder key ECU does not detect that the un-lock warning switch is ON even when the ignition switch is ON (Under the normal condition, the un-lock warning switch is ON when the ignition switch is ON).

DTC No.	DTC Detection Condition	Trouble Area
B2780	Un-lock warning switch ON is not detected when the ignition switch is ON	<ul style="list-style-type: none"> • Un-lock warning switch • Wire harness • Transponder key ECU assy

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (TRANSPONDER KEY ECU (SWITCH CONDITION))
----------	--

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select the item "KEY SW" on the hand-held tester.

OK:

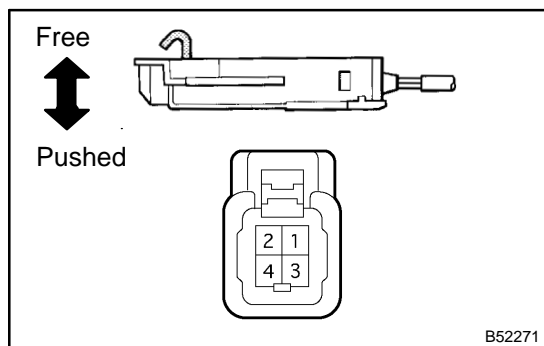
OFF → No key is in IG key cylinder

ON → Key is in IG key cylinder

OK	REPLACE TRANSPONDER KEY ECU ASSY
-----------	---

NG

2	INSPECT UN-LOCK WARNING SWITCH ASSY
----------	--



- (a) Remove the un-lock warning switch.
- (b) Inspect the un-lock warning switch continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Switch pushed (Key removed)	Continuity
	Switch free (Key set)	No continuity

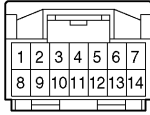
NG	REPLACE UN-LOCK WARNING SWITCH ASSY
-----------	--

OK

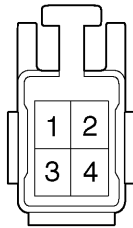
3 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY ↔ UN-LOCK WARNING SWITCH)

Wire Harness Side:

T9
Transponder Key ECU Assy



K3
Un-lock Warning Switch



B63404
B69245

B64973

- (a) Disconnect the T9 ECU and K3 un-lock warning switch connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
KSW (T9-10) ↔ - (K3-2)	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE TRANSPONDER KEY ECU ASSY

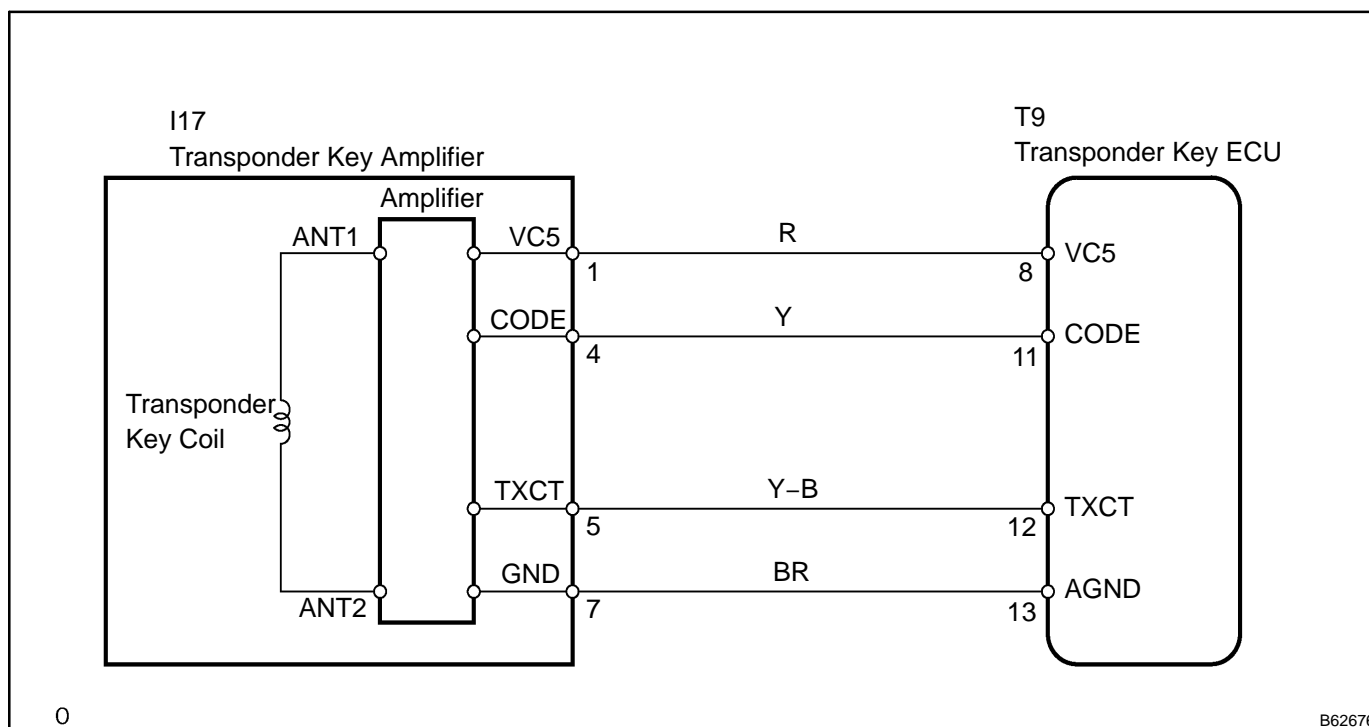
DTC	B2784	ANTENNA COIL OPEN/SHORT
------------	--------------	--------------------------------

CIRCUIT DESCRIPTION

The transponder key coil is built into the transponder key amplifier and receives a key code signal from the transponder chip in the key. This signal is amplified by the amplifier, then it is output to the transponder key ECU.

DTC No.	DTC Detection Condition	Trouble Area
B2784	Antenna coil is open/short	<ul style="list-style-type: none"> • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU assy

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key with which the engine does not start.
- (c) Select the item "ANTENNA COIL" on the hand-held tester.

OK: NORMAL

NG: FAIL

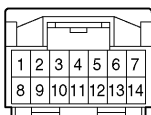
OK	CHECK AND REPLACE TRANSPONDER KEY ECU ASSY
-----------	---

NG

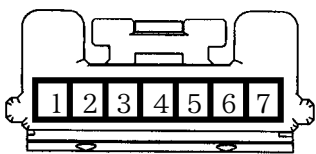
2 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY ↔ TRANSPONDER KEY AMPLIFIER) (TRANSPONDER KEY ECU ASSY OR TRANSPONDER KEY AMPLIFIER ↔ BODY GROUND)

Wire Harness Side:

T9
Transponder Key ECU Assy



I17
Transponder Key Amplifier



B63404
B55013

B64974

- (a) Disconnect the T9 ECU and I17 amplifier connectors.
(b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
VC5 (T9-8) ↔ VC5 (I17-1)	Continuity
CODE (T9-11) ↔ CODE (I17-4)	Continuity
TXCT (T9-12) ↔ TXCT (I17-5)	Continuity
AGND (T9-13) ↔ GND (I17-7)	Continuity

- (c) Check the continuity between the T9 ECU or I17 amplifier wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
VC5 (T9-8) or VC5 (I17-1) ↔ Body ground	No continuity
CODE (T9-11) or CODE (I17-4) ↔ Body ground	No continuity
TXCT (T9-12) or TXCT (I17-5) ↔ Body ground	No continuity
AGND (T9-13) or GND (I17-7) ↔ Body ground	No continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE TRANSPONDER KEY AMPLIFIER

DTC	B2793	TRANSPONDER CHIP MALFUNCTION
------------	--------------	-------------------------------------

CIRCUIT DESCRIPTION

This DTC is output when trouble is found in a key during the key code registration or the key code is not registered normally. Replace the key when the key code registration is not performed normally and this DTC is detected.

DTC No.	DTC Detection Condition	Trouble Area
B2793	Transponder chip malfunction	•Key

INSPECTION PROCEDURE

1	CHECK DTC
----------	------------------

- (a) Delete the DTC.
- (b) Insert the key into the ignition key cylinder.
- (c) Check that no code is output.

OK NO PROBLEM

NG

2	RE-REGISTER KEY
----------	------------------------

- (a) Delete the DTC.
- (b) Re-register the key, and check that the engine starts with the key.

OK NORMAL

NG

REPLACE KEY

DTC	B2794	UNMATCHED ENCRYPTION CODE
------------	--------------	----------------------------------

CIRCUIT DESCRIPTION

This DTC is output when a key with an incomplete key code is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2794	Key with incomplete key code is inserted	•Key

INSPECTION PROCEDURE

1	REPLACE KEY
----------	--------------------

DTC	B2795	UNMATCHED KEY CODE
------------	--------------	---------------------------

CIRCUIT DESCRIPTION

This DTC is output when a key with a key code that has not been registered in the ECU is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2795	Key with unregistered key code is inserted.	•Key

INSPECTION PROCEDURE

1	DELETE DTC AND INSERT ALL PRESENTLY AVAILABLE KEYS TO CHECK WHETHER ENGINE STARTS OR NOT
----------	---

OK	NO PROBLEM (BECAUSE OF KEY RE-REGISTRATION)
-----------	--

NG

REPLACE KEY WITH WHICH ENGINE DOES NOT START

DTC	B2796	NO COMMUNICATION IN IMMOBILISER SYSTEM
------------	--------------	---

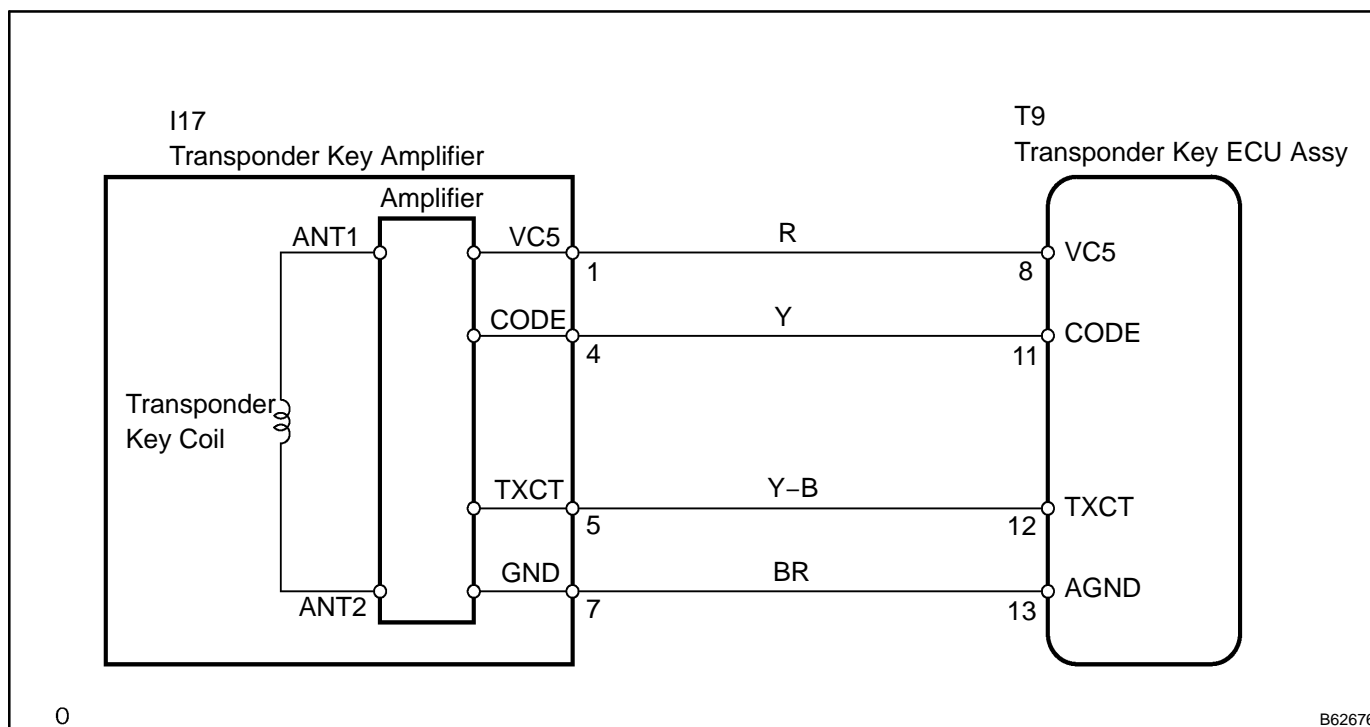
DTC	B2798	COMMUNICATION MALFUNCTION NO.2
------------	--------------	---------------------------------------

CIRCUIT DESCRIPTION

This DTC is stored in the memory when a key that does not have a transponder chip is inserted or if communication between the key and transponder key ECU is impossible.

DTC No.	DTC Detection Condition	Trouble Area
B2796	No communication	<ul style="list-style-type: none"> • Key • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU Assy
B2798	Communication error	<ul style="list-style-type: none"> • Key • Transponder key amplifier (Transponder key coil) • Wire harness • Transponder key ECU Assy

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester and start from step 2 when not using the hand-held tester.

1	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key that will not start the engine.
- (c) Select the item "IMMOBILISER" on the hand-held tester.

OK:

SET → Ignition switch ON

UNSET → Without key

OK	NORMAL
-----------	---------------

NG

2	CHECK WHETHER ENGINE STARTS WITH OTHER KEYS
----------	--

- (a) Check whether the engine starts with the other keys for the vehicle.

OK	RE-REGISTER OR REPLACE KEY WITH WHICH ENGINE DOES NOT START
-----------	--

NG

HINT:

Start the inspection from step 3 when using the hand-held tester and start from step 4 when not using the hand-held tester.

3	READ VALUE OF HAND-HELD TESTER (IMMOBILISER ECU (TRANSPONDER KEY ECU ASSY) (SWITCH CONDITION))
----------	---

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON with the key with which the engine does not start.
- (c) Select the item "ANTENNA COIL" on the hand-held tester.

OK: NORMAL

NG: FAIL

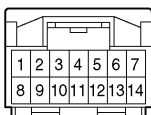
NG	CHECK AND REPLACE TRANSPONDER KEY ECU ASSY
-----------	---

OK

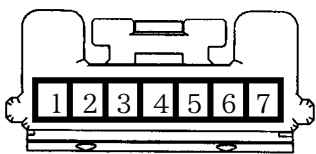
4 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY ↔ TRANSPONDER KEY AMPLIFIER) (TRANSPONDER KEY ECU ASSY OR TRANSPONDER KEY AMPLIFIER ↔ BODY GROUND)

Wire Harness Side:

T9
Transponder Key ECU Assy



I17
Transponder Key Amplifier



B63404
B55013

B64974

- (a) Disconnect the T9 ECU and I17 amplifier connectors.
(b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
VC5 (T9-8) ↔ VC5 (I17-1)	Continuity
CODE (T9-11) ↔ CODE (I17-4)	Continuity
TXCT (T9-12) ↔ TXCT (I17-5)	Continuity
AGND (T9-13) ↔ GND (I17-7)	Continuity

- (c) Check the continuity between the T9 ECU or I17 amplifier wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
VC5 (T9-8) or VC5 (I17-1) ↔ Body ground	No continuity
CODE (T9-11) or CODE (I17-4) ↔ Body ground	No continuity
TXCT (T9-12) or TXCT (I17-5) ↔ Body ground	No continuity
AGND (T9-13) or GND (I17-7) ↔ Body ground	No continuity

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

- (a) After replacing the transponder key amplifier, check that the engine starts.

NG

**NORMAL
(TRANSPONDER KEY AMPLIFIER DEFECTIVE)**

OK

REPLACE TRANSPONDER KEY ECU ASSY

DTC	B2797	COMMUNICATION MALFUNCTION NO.1
------------	--------------	---------------------------------------

CIRCUIT DESCRIPTION

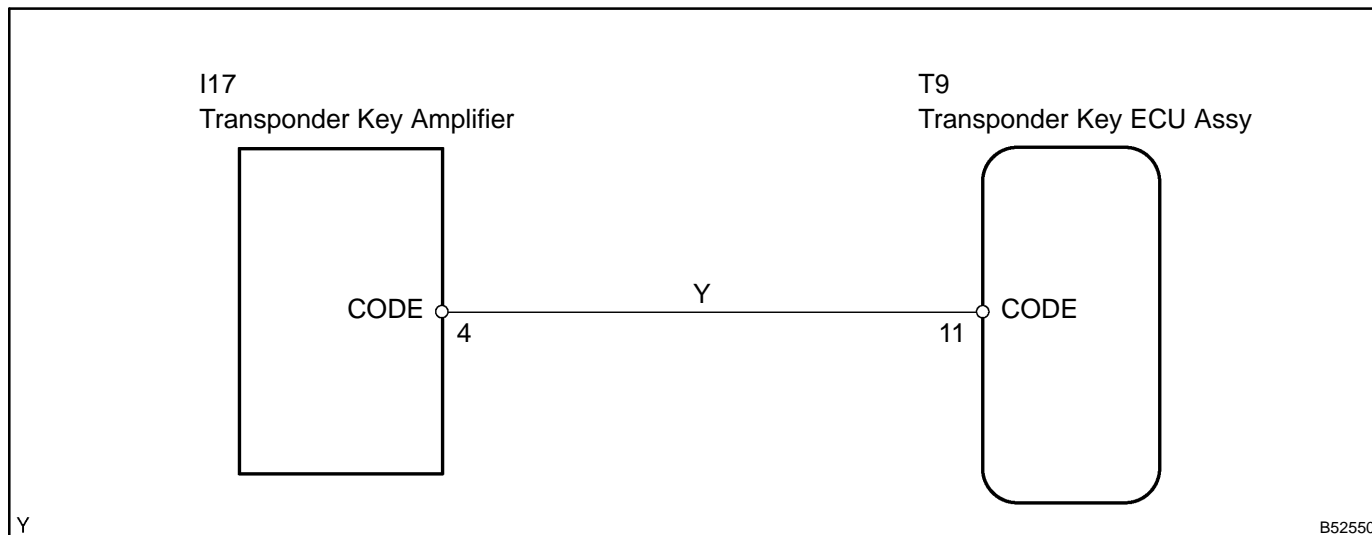
This DTC is output when an error occurs in the normal communication.

HINT:

Some noise exists in the communication line.

DTC No.	DTC Detection Condition	Trouble Area
B2797	Communication error	<ul style="list-style-type: none"> • Key • Wire harness • Transponder key amplifier (Transponder key coil) • Transponder key ECU Assy

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER
----------	---

(a) After replacing the transponder key amplifier, check that the engine starts.

OK	NORMAL (TRANSPONDER KEY AMPLIFIER DEFECTIVE)
-----------	---

NG

REPLACE TRANSPONDER KEY ECU ASSY

DTC	B2799	ENGINE IMMOBILISER SYSTEM MALFUNCTION
------------	--------------	--

CIRCUIT DESCRIPTION

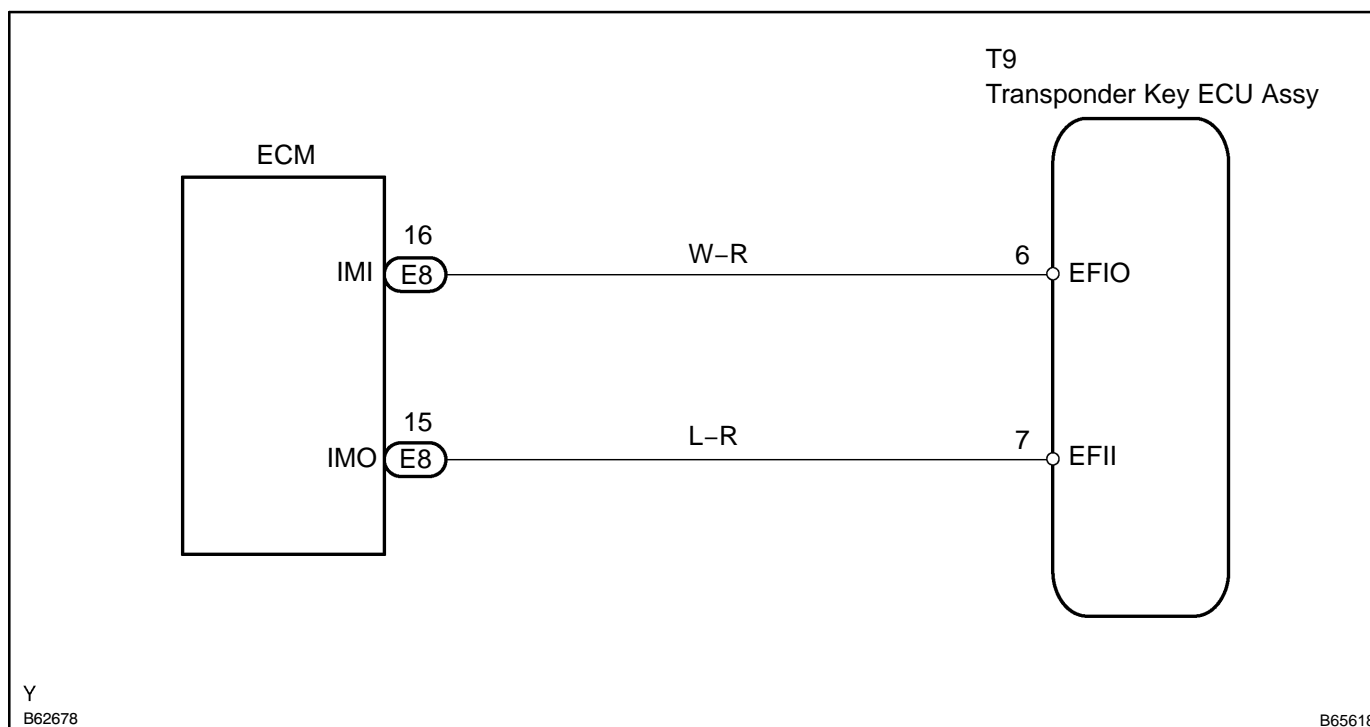
This DTC is output when the ECM detects errors in the communication between the transponder key ECU Assy and the ECM, or in the communication lines.

This DTC is also output when an engine start is attempted while the ECU communication ID between the transponder key ECU Assy and the ECM are different.

Before troubleshooting for this DTC, make sure that there is no DTC detected in the transponder key ECU. If there is key code-related DTC detected in the transponder key ECU Assy, repair it first.

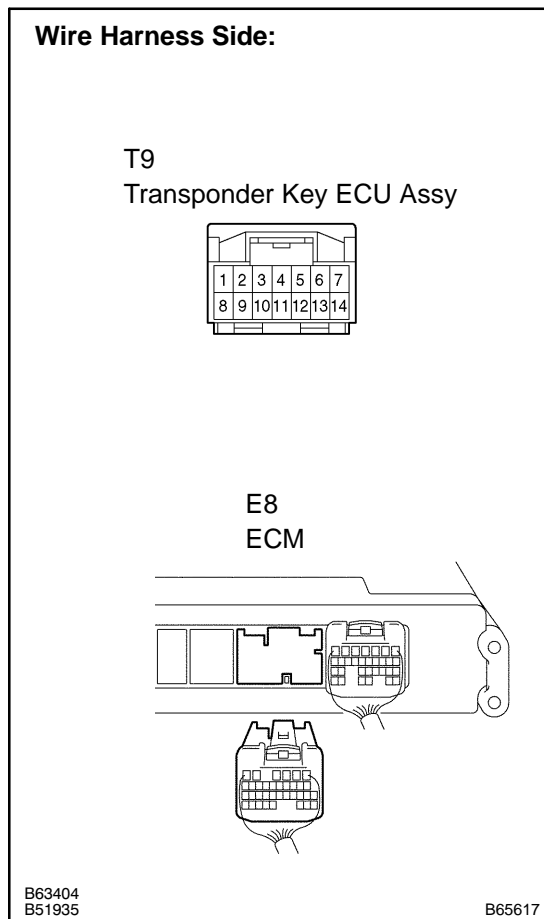
DTC No.	DTC Detection Condition	Trouble Area
B2799	<ul style="list-style-type: none"> • Error in communication between ECM and transponder key ECU Assy, and in communication line. • ECU communication ID is different during communication with transponder key ECU. 	<ul style="list-style-type: none"> • Wire harness • Transponder key ECU Assy • Transponder key amplifier (Transponder key coil) • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSY ↔ ECM) (TRANSPONDER KEY ECU ASSY OR ECM ↔ BODY GROUND)



- (a) Disconnect the T9 ECU and E8 ECM connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
EFIO (T9-6) ↔ IMI (E8-16)	Continuity
EFII (T9-7) ↔ IMO (E8-15)	Continuity

- (c) Check the continuity between the T9 or E8 wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
EFIO (T9-6) or IMI (E8-16) ↔ Body ground	No continuity
EFII (T9-7) or IMO (E8-15) ↔ Body ground	No continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

- (a) After replacing the transponder key amplifier, check that the engine starts.

NG NORMAL (TRANSPONDER KEY AMPLIFIER DEFECTIVE)

OK

REPLACE TRANSPONDER KEY ECU ASSY

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05AHM-04

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-2234)



3 INSPECT COMMUNICATION FUNCTION OF LARGE-SCALE MULTIPLEX COMMUNICATION SYSTEM (BEAN)

- (a) Check that there is no abnormality in the communication system by inspecting the communication function of the multiplex communication system with the hand-held tester.
- (1) (ECU unconnected, communication line abnormal) Without code outputs, proceed to A.
 - (2) (ECU unconnected, communication line abnormal) With code outputs, proceed to B.

B

Go to MULTIPLEX COMMUNICATION SECTION
(See page 05-2254)

A

4 PROBLEM SYMPTOMS TABLE (See page 05-2240)

- (a) When problem is not listed on problem symptoms table, proceed to A.
- (b) When problem is listed on problem symptoms table, proceed to B.

B

Go to step 6

A

5 PERFORM TROUBLESHOOTING ACCORDING TO MALFUNCTION SYMPTOM

- (a) Terminals of ECU (See page 05-2237)
- (b) On-vehicle inspection (See page 73-28)

6 ADJUST, REPAIR OR REPLACE



END

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (Times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	Weather <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	Outdoor Temperature <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °C (°F))

Problem Symptom

<input type="checkbox"/> Theft deterrent system cannot be set.	
<input type="checkbox"/> Security indicator light does not flash when theft deterrent system is set. (It stays ON or does not light up at all.)	
<input type="checkbox"/> Theft deterrent system does not operate.	<input type="checkbox"/> When door is opened. <input type="checkbox"/> When engine hood is opened.
Malfunction <input type="checkbox"/> Horns only <input type="checkbox"/> Theft deterrent horn only <input type="checkbox"/> Headlights only <input type="checkbox"/> Taillights only <input type="checkbox"/> Door lock operation only <input type="checkbox"/> Hazard warning light only <input type="checkbox"/> Room lamp only	
<input type="checkbox"/> Theft deterrent system cannot be canceled, once set.	<input type="checkbox"/> When door is unlocked using wireless door lock control system.
<input type="checkbox"/> Theft deterrent system cannot be canceled during warning operation.	<input type="checkbox"/> When door is unlocked using wireless door lock control system. <input type="checkbox"/> When key is inserted in ignition key cylinder and ignition switch is turned ON-OFF 10 times within 15 seconds.
<input type="checkbox"/> Warning operation does not start when theft deterrent system is set and door is opened with key.	
<input type="checkbox"/> Others.	

CUSTOMIZE PARAMETERS

HINT:

The following items can be customized.

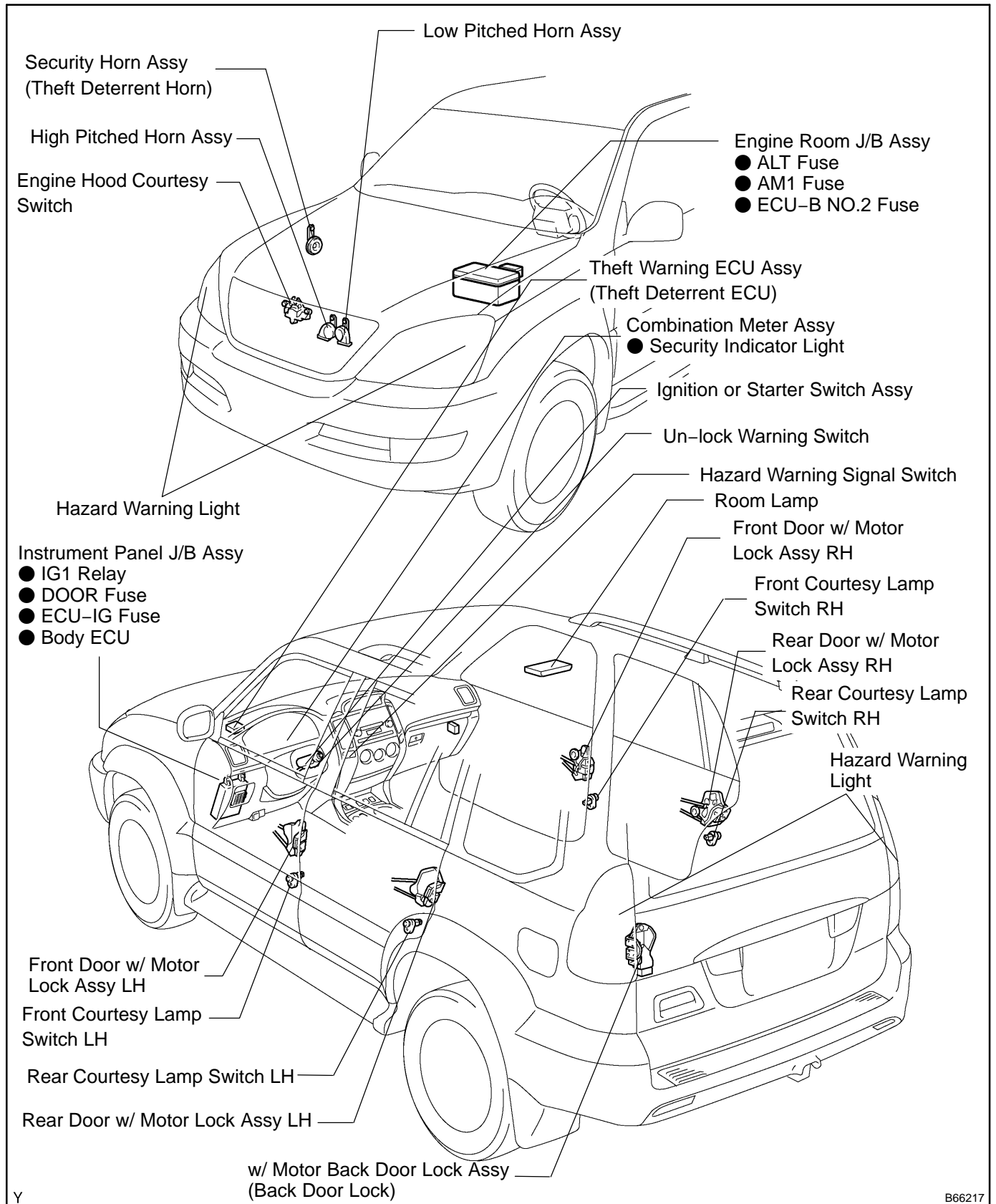
NOTICE:

- After confirming whether the items requested by the customer are applicable or not for customization, perform the customize operation.
- Be sure to record the current settings before customizing.
- When troubleshooting, make sure that the item in question is not set to "OFF" as a result of customization (Example: For the system, "the wireless function does not operate", first check that the wireless function is not set to "OFF", then perform troubleshooting).

THEFT DETERRENT SYSTEM

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
PASSIVE MODE (Passive Arming Mode)	OFF	<p>PASSIVE MODE is a function that switches theft deterrent system from arming preparation state to armed state 30 seconds after key is removed from ignition key cylinder and driver side door is closed, even if doors are not locked by wireless or door key lock operation</p> <p>In PASSIVE MODE if you do not perform following operations within 14 seconds after door is opened during armed state, theft deterrent system will judge that condition as a theft and switch to alarm sounding state</p> <ul style="list-style-type: none"> • Unlock any door by wireless operation • Reconnect battery • Insert key into ignition key cylinder and turn ignition switch from OFF to ON • Unlock any door by key operation 	ON/OFF
WARNING (HORN) (Warning (horn))	ON	Function that makes vehicle horn and theft deterrent horn able to be used as a warning device	ON/OFF
ENTRY DELAY (Entry delay time)	14 s	Function that changes entry delay time (time before warning starts) for PASSIVE MODE	0 s/14 s/30 s
WARN BY GLS SEN (Warning by glass broken sensor)	ON	Function that turns glass breakage sensor ON/OFF	ON/OFF

LOCATION

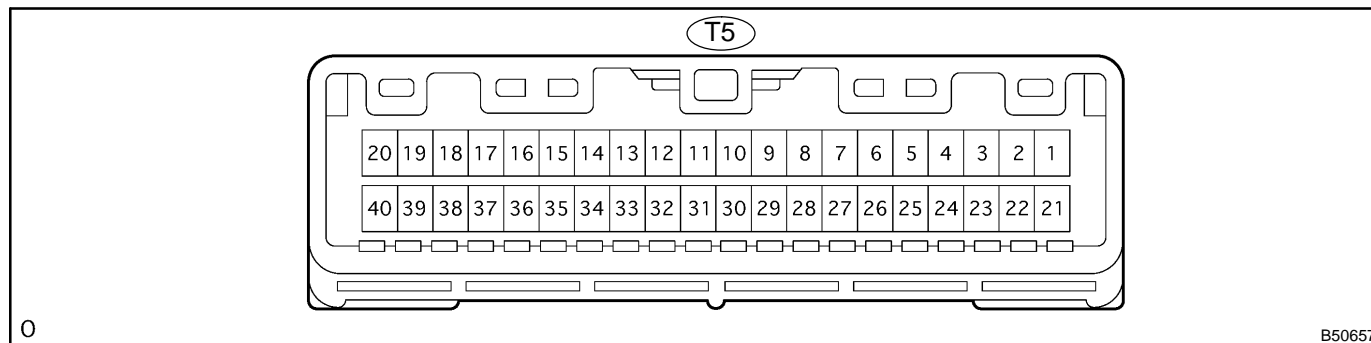


Y

B66217

TERMINALS OF ECU

1. CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU)



0

B50657

- (a) Disconnect the T5 ECU connector, and check the voltage or continuity between each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
E (T5-29) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
+B2 (T5-3) ⇔ E (T5-29)	P ⇔ W-B	Constant	10 - 14 V
IG (T5-10) ⇔ E (T5-29)	B-R ⇔ W-B	Ignition switch OFF → ON	0 V → 10 - 14 V
+B1 (T5-2) ⇔ E (T5-29)	W-R ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

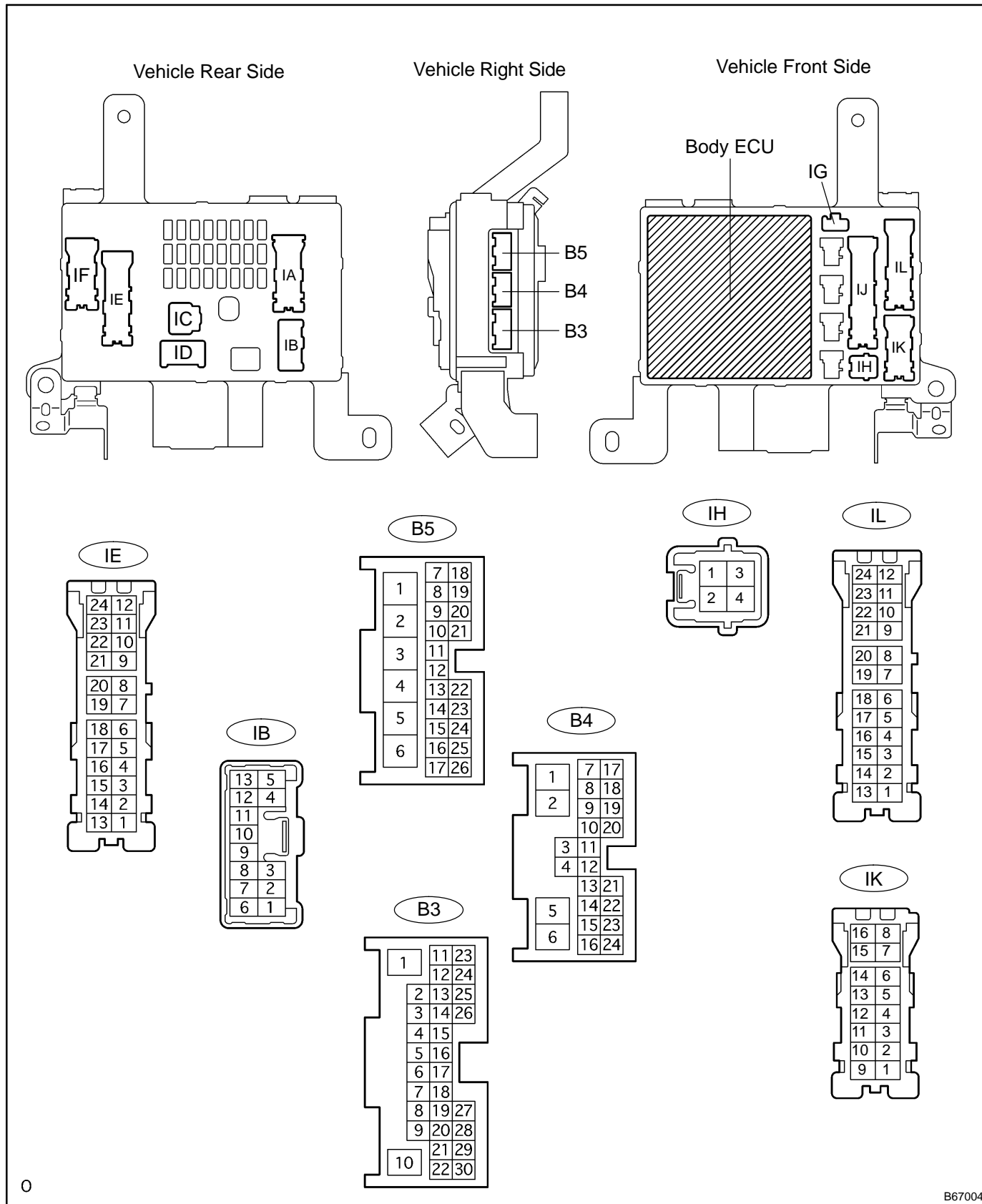
- (b) Reconnect the T5 ECU connector, and check the voltage between each terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
IND (T5-25) ⇔ E (T5-29)	V-W ⇔ W-B	Security indicator light lights up (It lights up only for 30 sec. in alarm sounding state. It flashes when immobiliser system is operating.)	3 - 6 V
SH- (T5-1) ⇔ E (T5-29)	W-R ⇔ W-B	Security horn is sounding (Theft deterrent system is in alarm sounding state)	10 - 14 V

If the result is not as specified, the ECU may have a malfunction.

2. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)



0

B67004

- (a) Disconnect the J/B connector, and check the voltage or continuity between each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
BDR1 (IE-9) ↔ Body ground	G-W ↔ -	Constant	10 - 14 V
GND1 (IH-2) ↔ Body ground	W-B ↔ -	Constant	Continuity
GND2 (IH-2) ↔ Body ground	W-B ↔ -	Constant	Continuity
KSW (B5-14) ↔ Body ground	G-Y ↔ -	No key in ignition key cylinder → Key inserted	No continuity → Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

- (b) Reconnect the J/B connector, and check the voltage between each terminal of the connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
DCTY (B4-23) ↔ Body ground	R-Y ↔ -	Driver side door CLOSED → OPEN	10 - 14 V → Below 0 V
PCTY (B4-24) ↔ Body ground	R-Y ↔ -	Passenger side door CLOSED → OPEN	10 - 14 V → Below 0 V
RLCY (B4-11) ↔ Body ground	P-B ↔ -	Rear door LH CLOSED → OPEN	10 - 14 V → Below 0 V
RRCY (B4-12) ↔ Body ground	P-L ↔ -	Rear door RH CLOSED → OPEN	10 - 14 V → Below 0 V

If the result is not as specified, the ECU may have a malfunction.

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the table below for each malfunction symptom and troubleshoot each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system and the wireless door lock control system are operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system and the wireless door lock control system are operating normally.

Symptom	Suspected Area	See Page
Theft deterrent system cannot be set	1. Security indicator light circuit 2. ECU power source circuit 3. Un-lock warning switch circuit 4. Door key lock and unlock switch 5. Back door key lock and unlock switch 6. Door courtesy switch circuit 7. Back door courtesy switch circuit 8. Engine hood courtesy switch circuit	05-2241 05-2244 05-2199 73-3 73-3 05-2237 05-2237 05-2248
Security indicator light does not blink when theft deterrent system is set	1. Security indicator light circuit	05-2241
Alarm sounding state cannot be canceled when ignition switch is turned ON-OFF 10 times within 15 seconds	1. Ignition switch circuit 2. Un-lock warning switch circuit	05-2246 05-2199
Theft deterrent system can be set even when a door is open	1. Door courtesy switch circuit	05-2237
Horns (low pitched, high pitched) do not sound while theft deterrent system is in warning operation	1. Horns (low pitched, high pitched) circuit	-
Headlights do not flash while theft deterrent system is in warning operation	1. Headlight circuit	05-1566
Taillights do not flash while theft deterrent system is in warning operation	1. Taillights circuit	05-1569
Hazard warning lights do not flash while theft deterrent system is in warning operation	1. Hazard warning switch	65-2
Room lamp does not blink while theft deterrent system is in warning operation	1. Room lamp circuit	05-1582
Theft deterrent horn does not sound while theft deterrent system is in warning operation	1. Theft deterrent horn circuit	05-2251
Headlights flash even when theft deterrent system is not set	1. Headlight circuit	05-1566
Taillights flash even when theft deterrent system is not set	1. Taillights circuit	05-1569
Hazard warning lights flash even when theft deterrent system is not set	1. Hazard warning switch circuit	65-2
Room lamp flashes even when theft deterrent system is not set	1. Room lamp circuit	05-1582

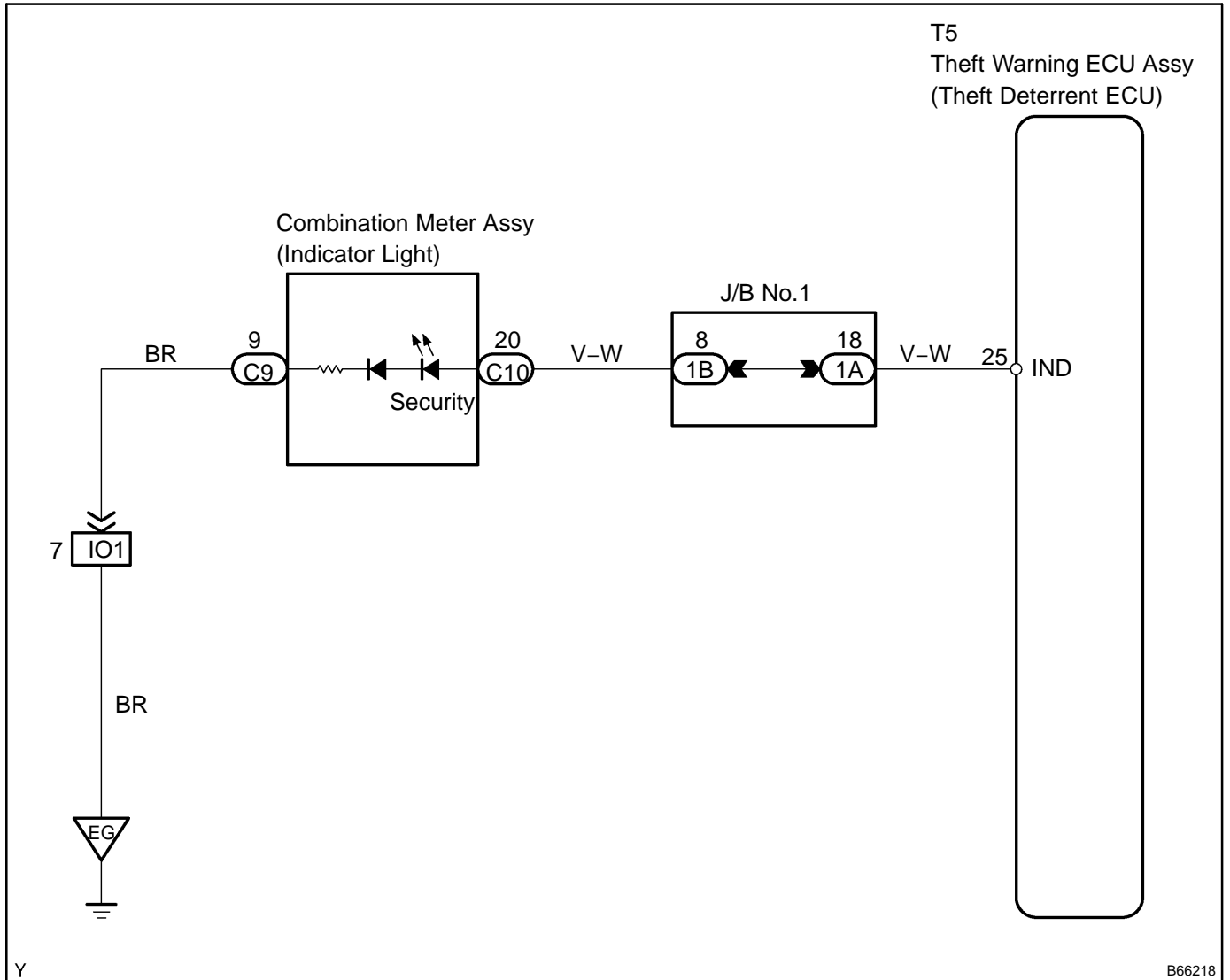
INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

Even when the theft deterrent system is in the disarmed state, the security indicator light flashes due to a signal output from the immobiliser system. The security indicator light flashes continuously by receiving a signal from the immobiliser system at all times while in the armed state.

The theft warning ECU Assy causes the security indicator light to light up or blink only during the customizing function mode or the add mode of the transmitter registration.

WIRING DIAGRAM

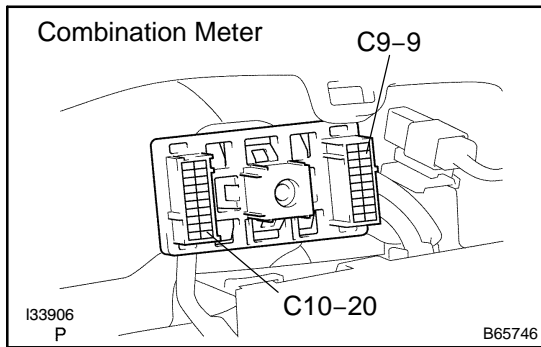


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B66218

INSPECTION PROCEDURE

1 CHECK COMBINATION METER ASSY (SECURITY INDICATOR LIGHT OPERATION)



- (a) Disconnect the combination meter connector.
- (b) Apply 12 V positive voltage between each terminal of the combination meter connector, and check the lighting condition of the security indicator light.

Standard:

Terminal No.	Specified Condition
C9-9 ↔ C10-20	Lights up

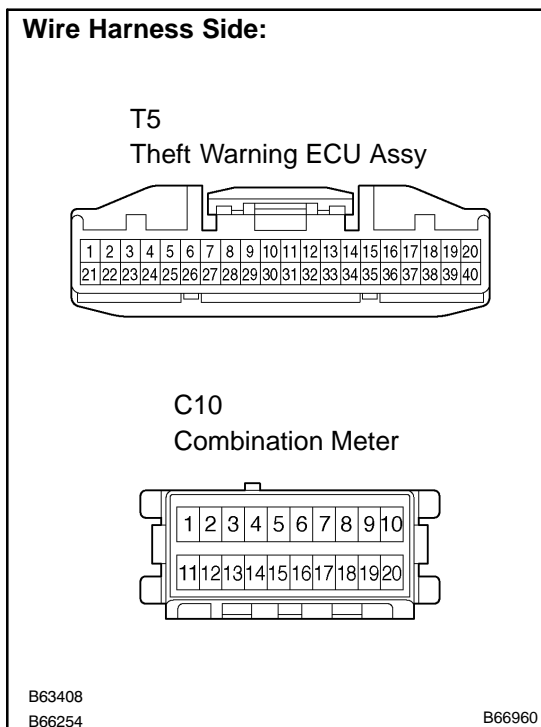
NOTICE:

- If the positive (+) lead and the negative (-) lead are incorrectly connected, the security indicator light does not light up.
- Voltage of more than 12 V will damage the security indicator light.
- If the voltage is too low, the security indicator light will not light up.

NG → REPLACE COMBINATION METER ASSY

OK

2 CHECK WIRE HARNESS (THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) ↔ SECURITY INDICATOR LIGHT)



- (a) Disconnect the T5 ECU and C10 combination meter connectors.
- (b) Check the continuity between the wire harness side connectors.

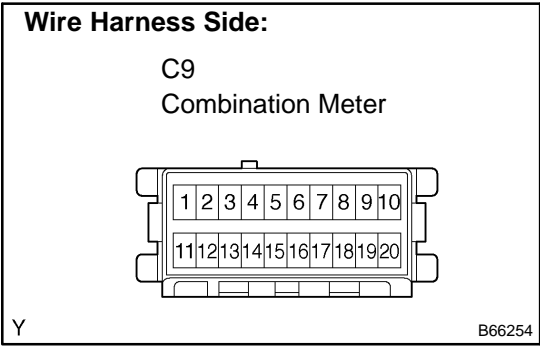
Standard:

Symbols (Terminal No.)	Specified Condition
IND (T5-25) ↔ - (C10-20)	Continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK WIRE HARNESS (SECURITY INDICATOR LIGHT ↔ BODY GROUND)



- (a) Disconnect the C9 combination meter connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Terminal No.	Specified Condition
C9-9 ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

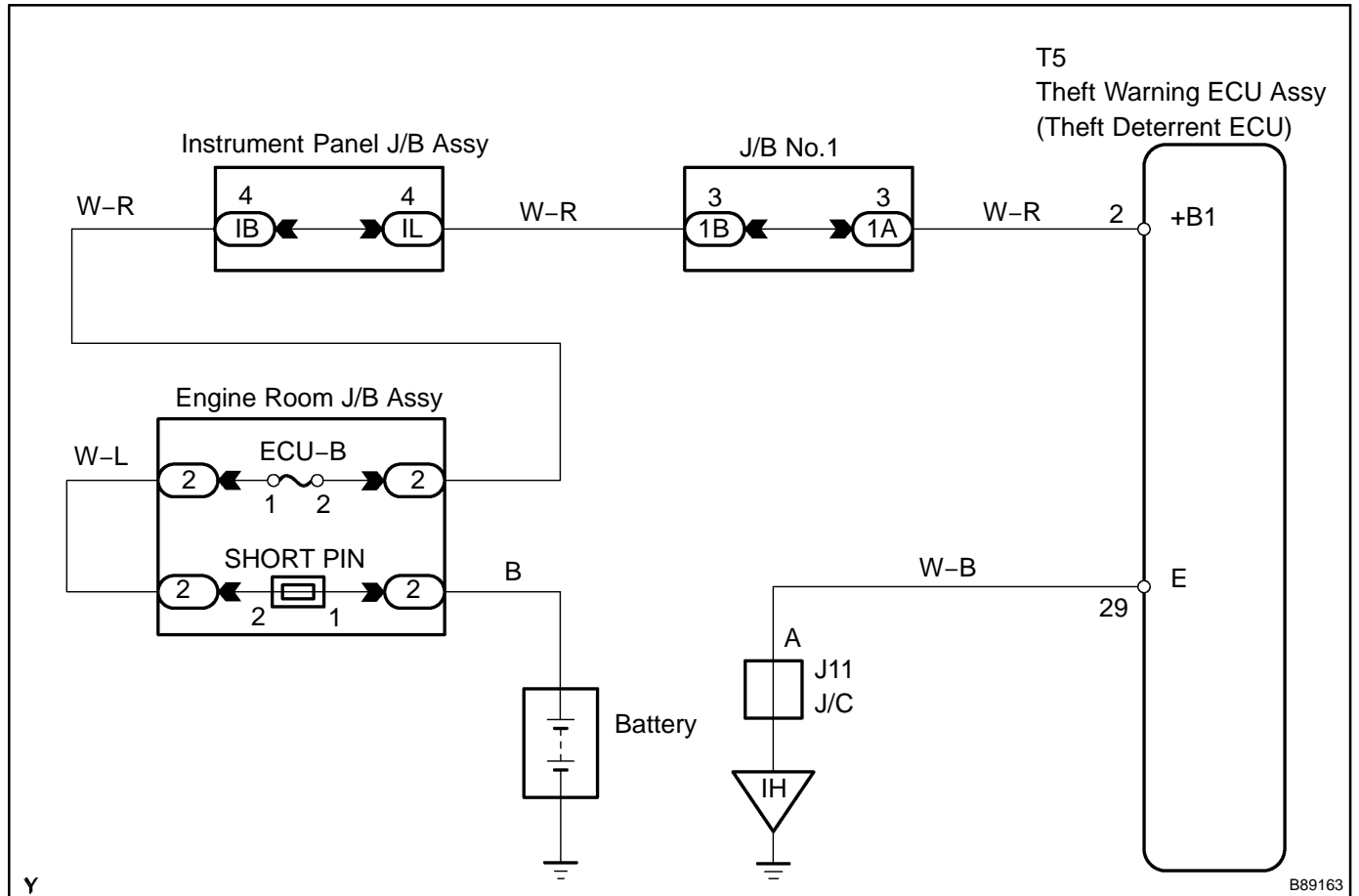
CHECK AND REPLACE THEFT WARNING ECU ASSY

ECU POWER SOURCE CIRCUIT

CIRCUIT DESCRIPTION

This circuit provides power to operate the theft warning ECU Assy.

WIRING DIAGRAM



Y

B89163

INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-B)

- (a) Remove the ECU-B fuse from the engine room J/B.
 (b) Check the continuity.

Standard: Continuity

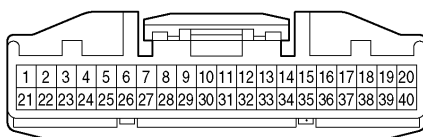
NG → REPLACE FUSE

OK

2 CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) (POWER SOURCE)

Wire Harness Side:

T5
Theft Warning ECU Assy



B63408

- (a) Disconnect the T5 ECU connector.
 (b) Check the voltage between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
+B1 (T5-2) ↔ Body ground	10 - 14 V

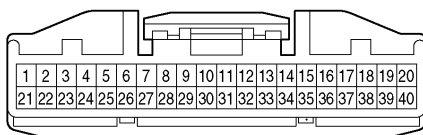
NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) (GROUND)

Wire Harness Side:

T5
Theft Warning ECU Assy



B63408

- (a) Disconnect the T5 ECU connector.
 (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
E (T5-29) ↔ Body ground	Continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

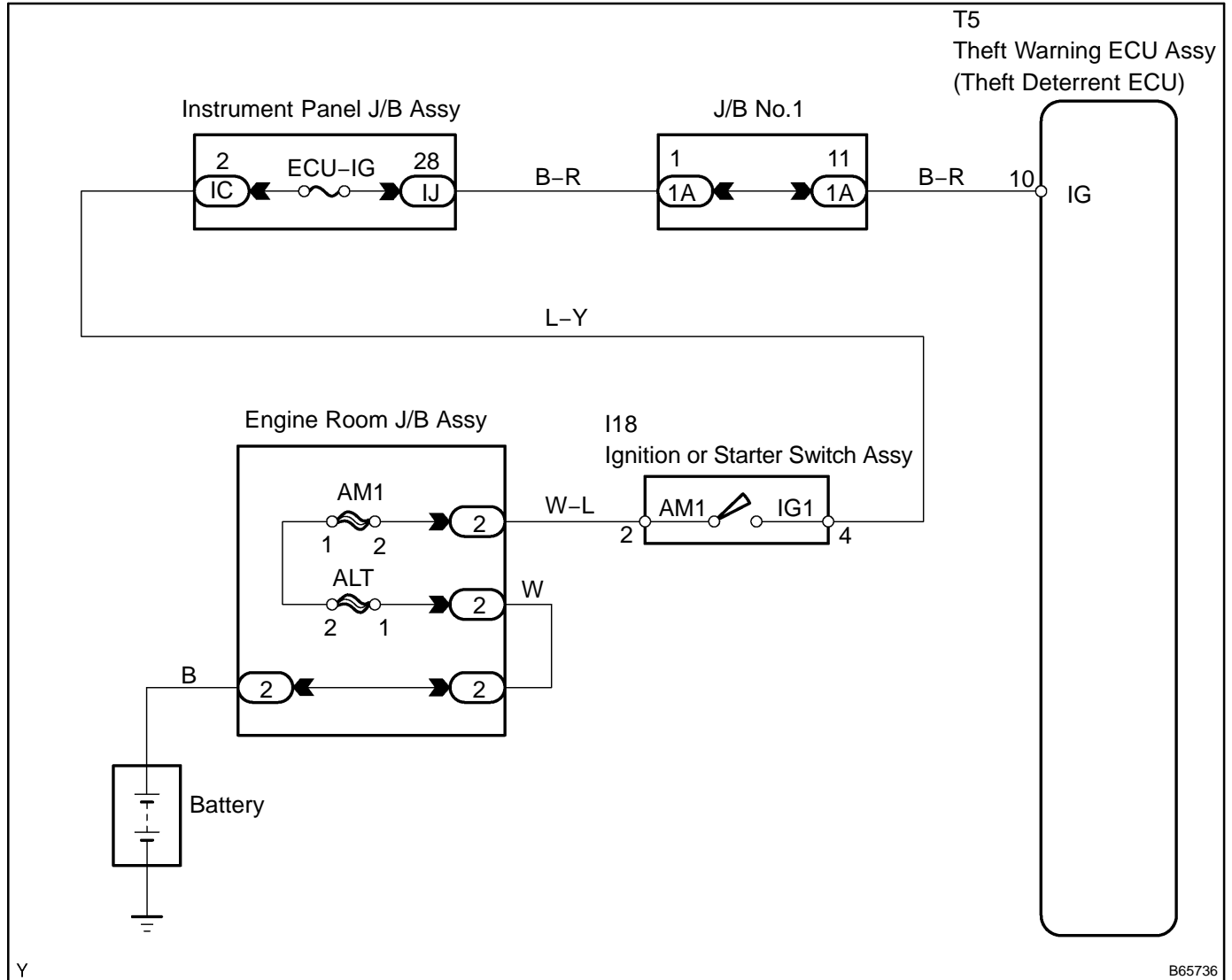
CHECK AND REPLACE THEFT WARNING ECU ASSY

IGNITION SWITCH CIRCUIT

CIRCUIT DESCRIPTION

When the ignition switch is turned to the ON position, battery positive voltage is applied to terminal IG of the theft warning ECU Assy.

WIRING DIAGRAM



Y

B65736

INSPECTION PROCEDURE

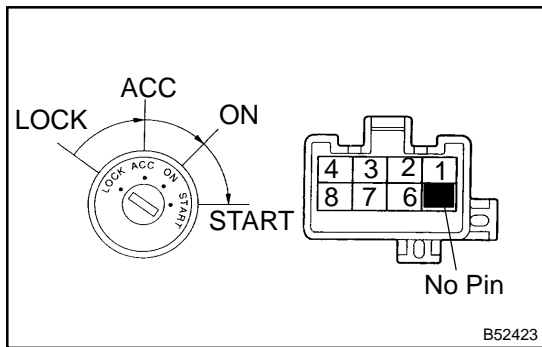
1 INSPECT FUSE (ECU-IG)

- (a) Remove the ECU-IG fuse from the instrument panel J/B.
 - (b) Check the continuity.
- Standard: Continuity**

NG → REPLACE FUSE

OK

2 INSPECT IGNITION OR STARTER SWITCH ASSY



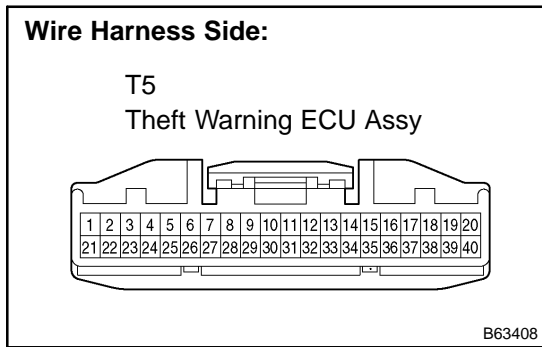
- (a) Check the switch continuity.
- Standard:**

Terminal No.	Switch Position	Specified Condition
-	LOCK	No continuity
2 ↔ 3	ACC	Continuity
2 ↔ 3 ↔ 4	ON	Continuity
6 ↔ 7		
1 ↔ 2 ↔ 4	START	Continuity
6 ↔ 7 ↔ 8		

NG → REPAIR OR REPLACE IGNITION OR STARTER SWITCH ASSY

OK

3 CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) (POWER SOURCE)



- (a) Disconnect the T5 ECU connector.
 - (b) Check the voltage between the wire harness side connector and body ground.
- Standard:**

Symbols (Terminal No.)	Condition	Specified Condition
IG (T5-10) ↔ Body ground	Ignition switch ON	10 - 14 V

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

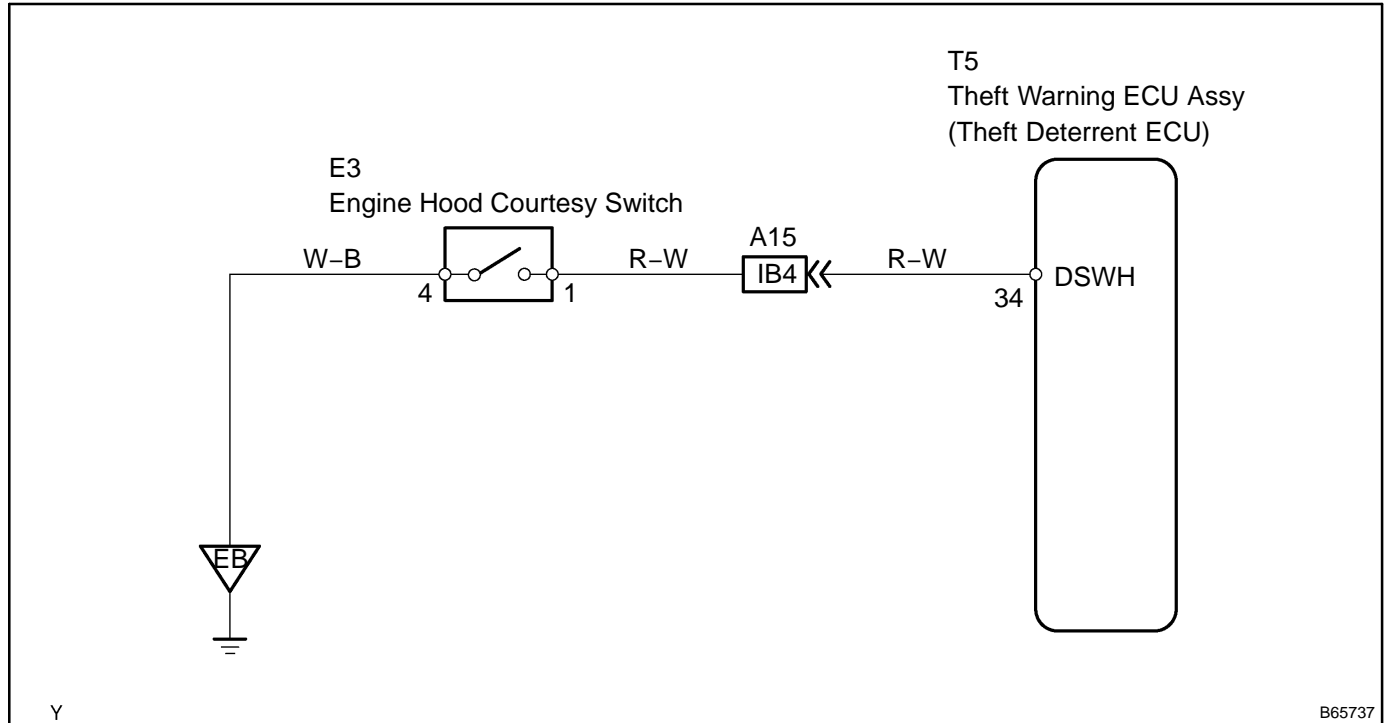
CHECK AND REPLACE THEFT WARNING ECU ASSY

ENGINE HOOD COURTESY SWITCH CIRCUIT

CIRCUIT DESCRIPTION

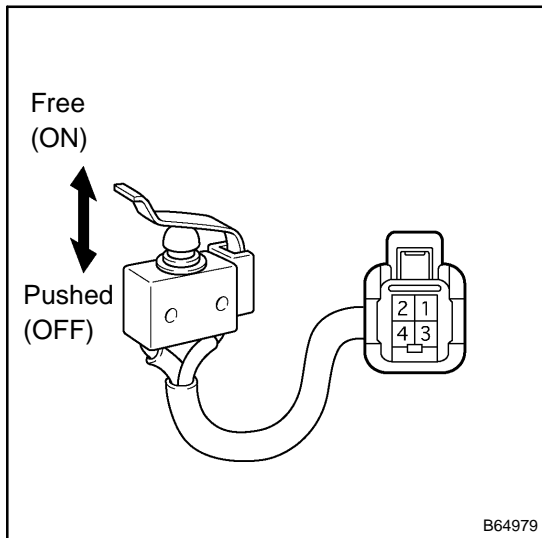
The engine hood courtesy switch is installed together with the hood lock assy. This switch comes on when the engine hood is opened and goes off when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT ENGINE HOOD COURTESY SWITCH (ENGINE HOOD COURTESY SWITCH)



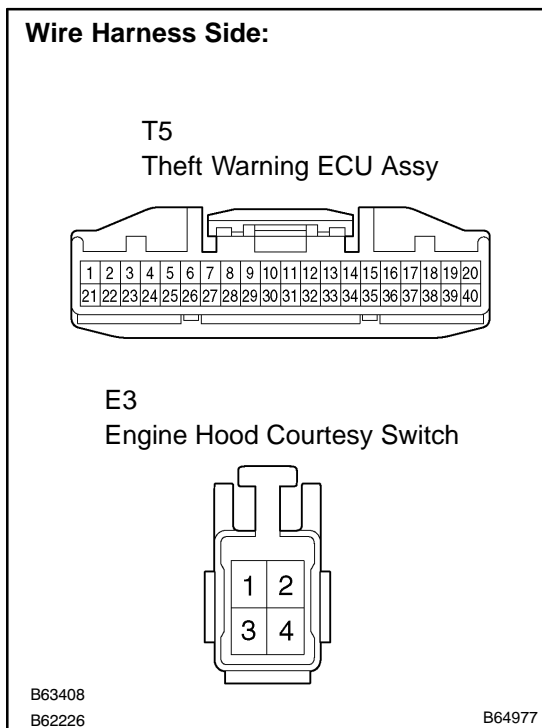
- (a) Remove the engine hood courtesy switch from the hood lock assy.
- (b) Check the continuity.

Terminal No.	Condition	Specified Condition
1 ↔ 4	Pushed (OFF)	No continuity
1 ↔ 4	Free (ON)	Continuity

NG REPAIR OR REPLACE ENGINE HOOD COURTESY SWITCH

OK

2 CHECK WIRE HARNESS (THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) ↔ ENGINE HOOD COURTESY SWITCH)



- (a) Disconnect the T5 ECU connector.
- (b) Disconnect the E3 switch connector.
- (c) Check the continuity between the wire harness side connectors.

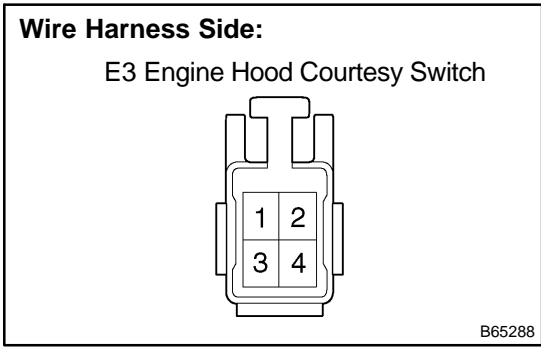
Standard:

Symbols (Terminal No.)	Specified Condition
DSWH (T5-34) ↔ - (E3-1)	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK WIRE HARNESS (ENGINE HOOD COURTESY SWITCH ↔ BODY GROUND)



- (a) Disconnect the E3 switch connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Terminal No.	Specified Condition
E3-4 ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

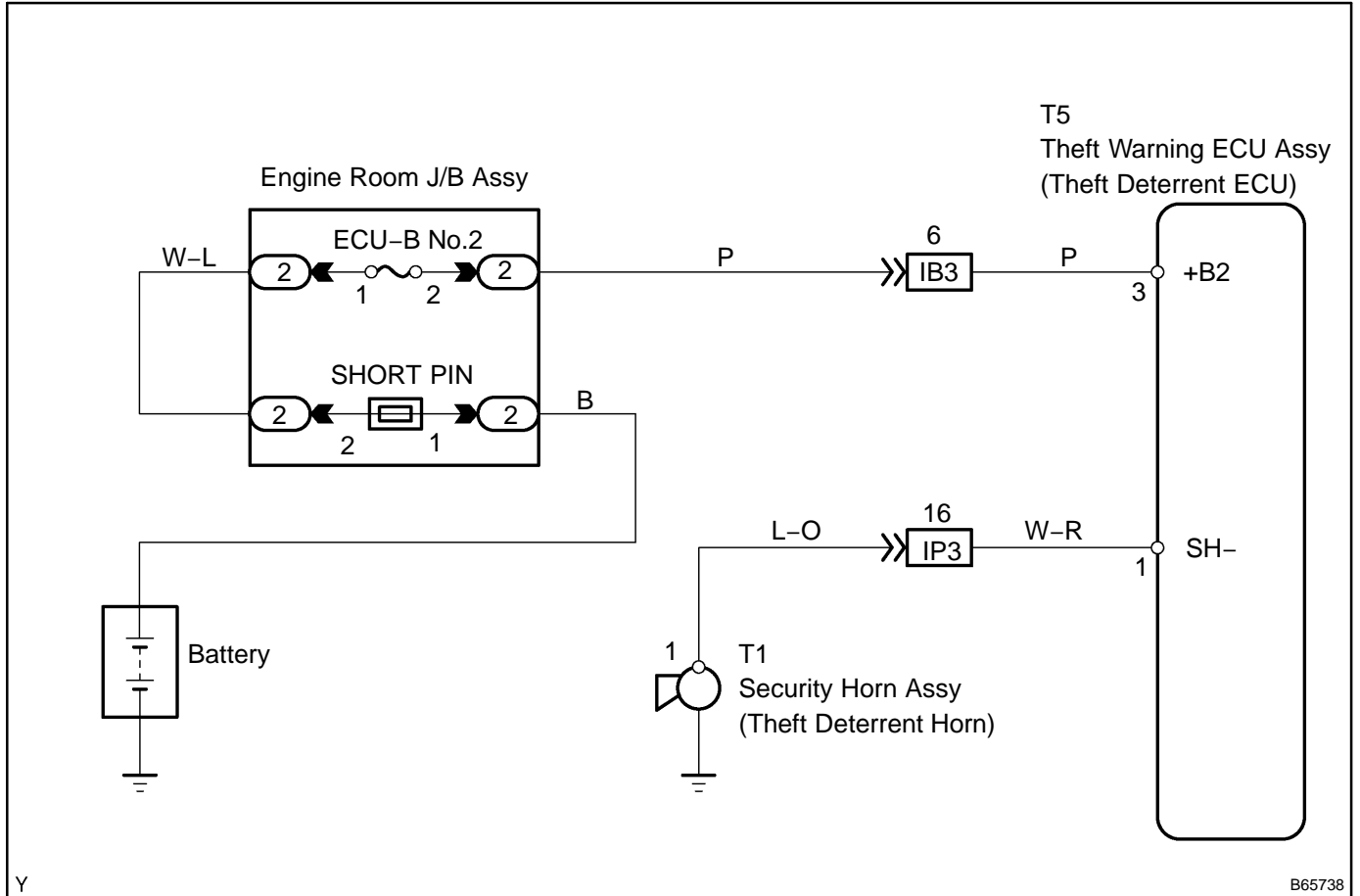
CHECK AND REPLACE THEFT WARNING ECU ASSY

THEFT DETERRENT HORN CIRCUIT

CIRCUIT DESCRIPTION

When the theft deterrent system is operating, the relay in the ECU turns ON and OFF in a cycle of approximately 0.2 seconds, causing the theft deterrent horn to blow.

WIRING DIAGRAM

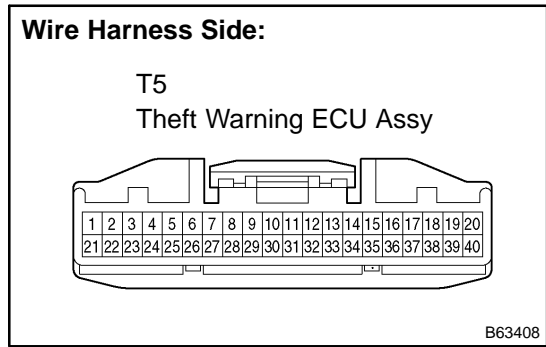


Y

B65738

INSPECTION PROCEDURE

1 INSPECT THEFT WARNING ECU ASSY (THEFT DETERRENT ECU)



- (a) Disconnect the T5 ECU connector.
- (b) Check the voltage between the T5 ECU connector and body ground.

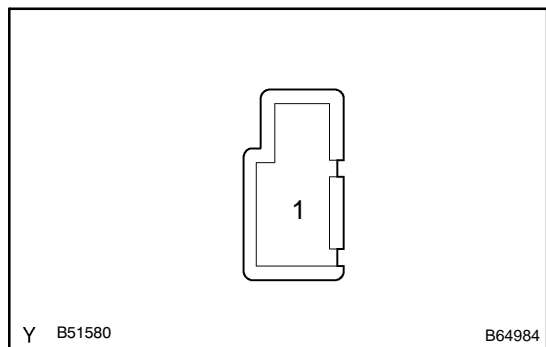
Standard:

Symbols (Terminal No.)	Specified Condition
SH- (T5-1) ↔ Body ground	10 - 14 V

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 INSPECT SECURITY HORN ASSY



- (a) Check operation of the security horn.

Standard:

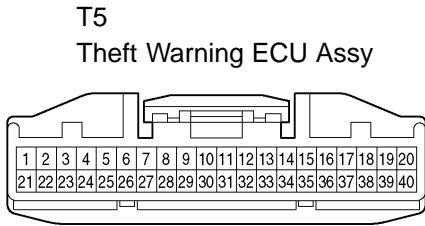
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 1	Security horn blows
Battery negative (-) → Body ground	

NG → REPLACE SECURITY HORN ASSY

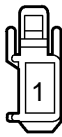
OK

3 CHECK WIRE HARNESS (THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) ↔ SECURITY HORN ASSY)

Wire Harness Side:



T1
Security Horn Assy



B63408
B58961

B64978

- (a) Disconnect the T5 ECU connector.
- (b) Disconnect the T1 security horn connector.
- (c) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified condition
SH- (T5-1) ↔ - (T1-1)	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE THEFT WARNING ECU ASSY

MULTIPLEX COMMUNICATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

0523R-04

HINT:

Troubleshoot in accordance with the procedures on the following pages.

1 VEHICLE BROUGHT TO WORKSHOP



2 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK (See page 05-2264)



3 DTC CHECK (See page 05-2256)

- (a) Check for DTCs and make a note of the code that is output.
- (b) Delete the DTC.
- (c) Check if the DTC will be output once again when the problem symptom is simulated based on the noted code.
 - (1) When no code is output (symptom check and simulation are possible), proceed to A.
 - (2) When a code is output, proceed to B.

B
Go to step 6
A

4 PROBLEM SYMPTOMS TABLE (See page 05-2264)

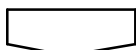
- (a) Without applicable symptoms, proceed to A.
- (b) With applicable symptoms, proceed to B.

B
Go to step 6
A

5 PERFORM TROUBLESHOOTING IN FOLLOWING METHOD, DEPENDING ON MALFUNCTION SYMPTOM

- (a) Pre-check (See page 05-2255)
- (b) Terminals of ECU (See page 05-2258)

6 ADJUST, REPAIR OR REPLACE


END

PRE-CHECK

1. MULTIPLEX COMMUNICATION SYSTEM (BEAN)

- (a) The BEAN communication line is used to control the power window regulator master switch assy (driver door ECU), the multiplex tilt & telescopic ECU (tilt and telescopic ECU), the multiplex network body ECU No. 2 (body No. 2 ECU), the windshield wiper ECU (wiper ECU), the theft warning ECU assy (theft deterrent ECU), the position control ECU & wiring assy (power seat ECU), the outer mirror control ECU assy (mirror ECU), and the rain sensor, which are connected to the instrument panel junction block assy (body ECU). If there is a short-circuit (bus-down) in the line, the communication to the system that has a short-circuit (bus-down) will be disabled and the DTC concerning the system will be output from the instrument panel junction block assy (body ECU).

2. CHECK COMMUNICATION FUNCTION

- (a) Check the battery voltage.

Standard: 10 – 14 V

- (b) Inspect the diagnosis trouble code output.

- (1) Check a diagnosis trouble code concerning the instrument panel junction block assy (body ECU) by connecting the hand-held tester to the DLC3 and turning the ignition switch ON.

HINT:

- When diagnostic trouble code check is impossible, check the next page items.
 - The display shows communication error (refer to new diagnosis system and the operations when an error occurred).
- (2) When the display shows diagnostic trouble codes concerning the ECU unconnected and the communication bus defective, perform the inspection depending on the troubleshooting procedures.

HINT:

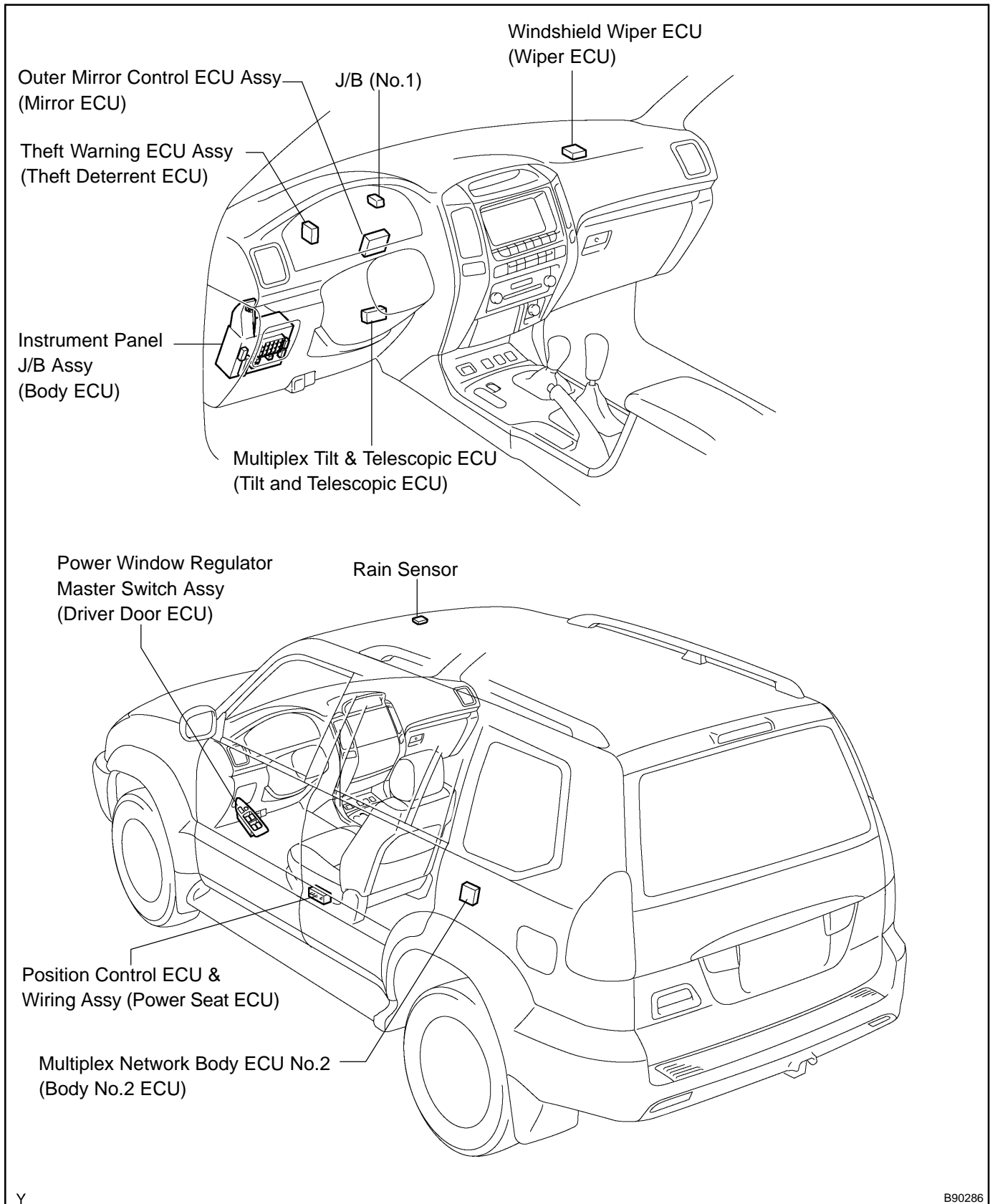
When another diagnostic trouble code is output, refer to the diagnostic trouble code table and check the applicable section.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the chart below (Proceed to the page given for that circuit).

DTC No. (See Page)	Detection Item	Trouble Area
B1211 (05-2265)	Driver Door ECU Communication Stop	<ul style="list-style-type: none"> • Power window regulator master switch Assy (Driver door ECU) • Wire harness
B1213 (05-2269)	Tilt and Telescopic ECU Communication Stop	<ul style="list-style-type: none"> • Multiplex tilt & telescopic ECU (Tilt and telescopic ECU) • Wire harness
B1214 (05-2273)	Door System Communication Bus Malfunction (+B Short)	<ul style="list-style-type: none"> • Power window regulator master switch Assy (Driver door ECU) • Multiplex tilt & telescopic ECU (Tilt and telescopic ECU) • Multiplex network body ECU No. 2 (Body No. 2 ECU) • Windshield wiper ECU (Wiper ECU) • Theft warning ECU Assy (Theft deterrent ECU) • Position control ECU & wiring Assy (Power seat ECU) • Outer mirror control ECU Assy (A/C & meter ECU (Mirror)) • Rain sensor • Junction Block • Instrument panel junction block Assy (Body ECU) • Wire harness
B1215 (05-2273)	Door System Communication Bus Malfunction (GND Short)	<ul style="list-style-type: none"> • Power window regulator master switch Assy (Driver door ECU) • Multiplex tilt & telescopic ECU (Tilt and telescopic ECU) • Multiplex network body ECU No. 2 (Body No. 2 ECU) • Windshield wiper ECU (Wiper ECU) • Theft warning ECU Assy (Theft deterrent ECU) • Position control ECU & wiring Assy (Power seat ECU) • Outer mirror control ECU Assy (Mirror ECU) • Rain sensor • Junction Block • Instrument panel junction block Assy (Body ECU) • Wire harness
B1218 (05-2293)	Body No. 2 ECU Communication Stop	<ul style="list-style-type: none"> • Multiplex network body ECU No. 2 (Body No. 2 ECU) • Wire harness
B1245 (05-2297)	Wiper ECU Communication Stop	<ul style="list-style-type: none"> • Windshield wiper ECU (Wiper ECU) • Wire harness
B1269 (05-2301)	Theft Deterrent ECU Communication Stop	<ul style="list-style-type: none"> • Theft warning ECU Assy (Theft deterrent ECU) • Wire harness
B1272 (05-2305)	Power Seat ECU Communication Stop	<ul style="list-style-type: none"> • Position control ECU & wiring Assy (Power Seat ECU) • Wire harness
B1276 (05-2309)	A/C & Meter ECU (Mirror) Communication Stop	<ul style="list-style-type: none"> • Outer mirror control ECU Assy (Mirror ECU) • Wire harness
B1279 (05-2312)	Rain Sensor Communication Stop	<ul style="list-style-type: none"> • Rain sensor • Wire harness

LOCATION

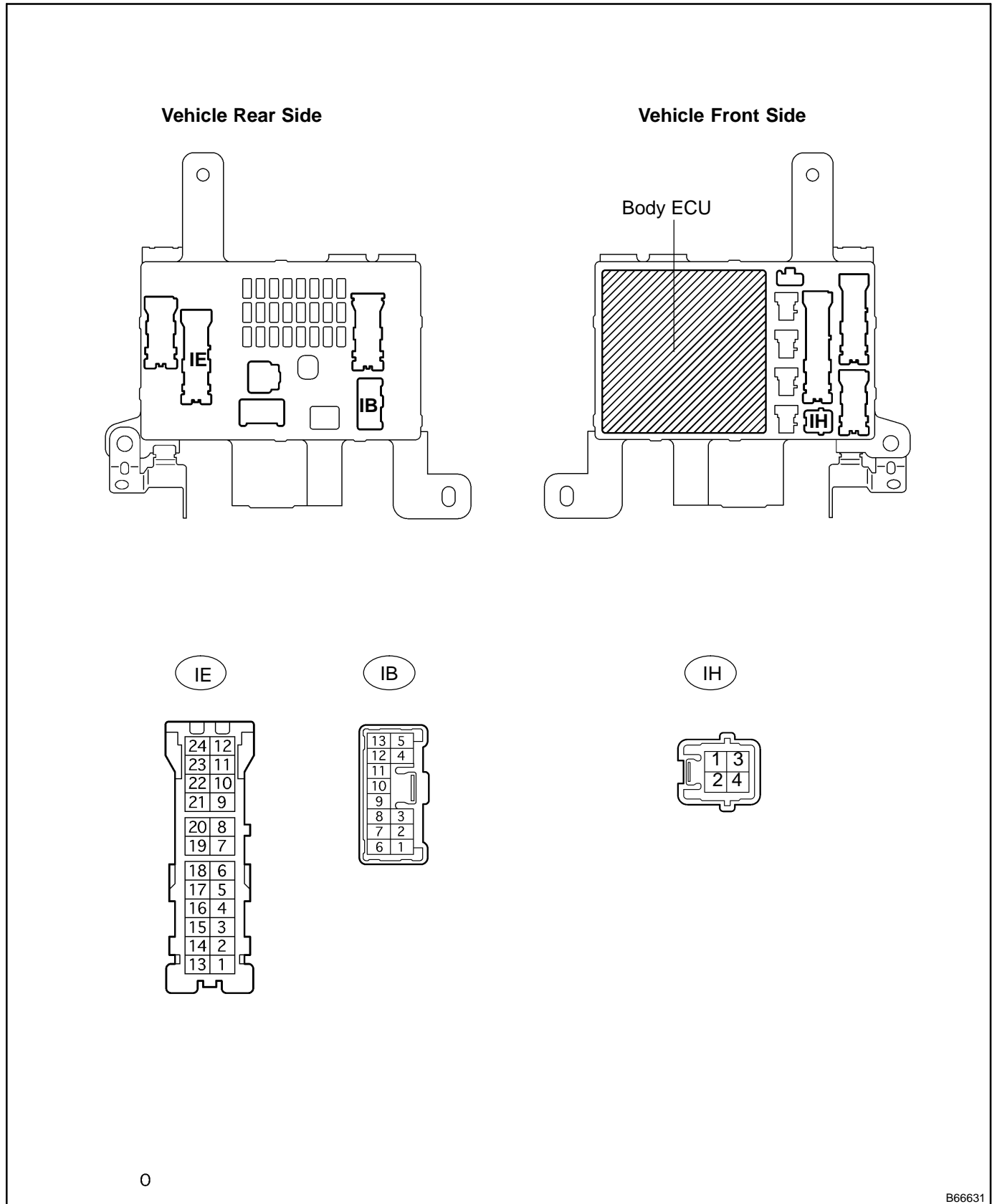


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B90286

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)

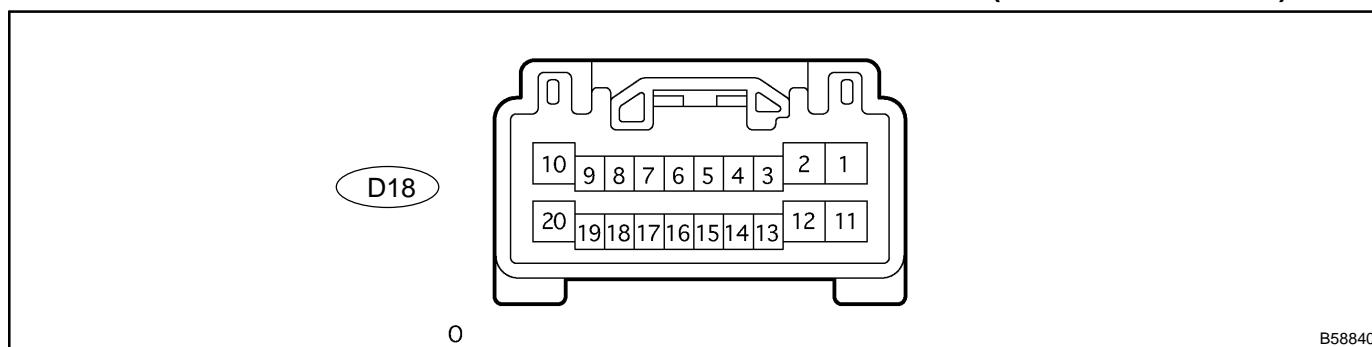


- (a) Disconnect the IB, IE and IH J/B connectors.
 (b) Check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
BECU (IB-4) ↔ Body ground	W-R ↔ -	Constant	10 - 14 V
BDR1 (IE-9) ↔ Body ground	G-W ↔ -		
GND1 (IH-2) ↔ Body ground	W-B ↔ -	Constant	Continuity
GND2 (IH-2) ↔ Body ground	W-B ↔ -	Constant	Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

2. CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSY (DRIVER DOOR ECU)

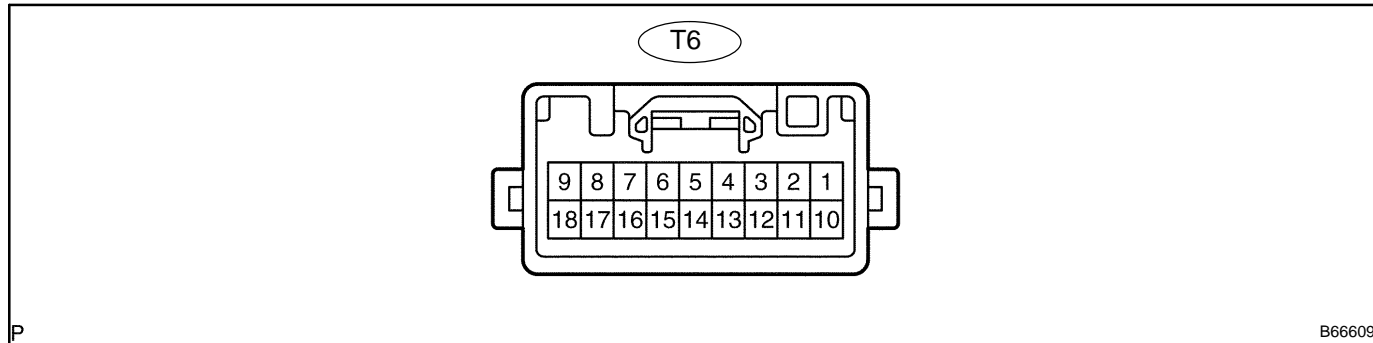
- (a) Disconnect the D18 switch connector.
 (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
E (D18-2) ↔ Body ground	W-B ↔ -	Constant	Continuity
CPUB (D18-9) ↔ E (D18-2)	L ↔ W-B	Constant	10 - 14 V
BDR1 (D18-10) ↔ E (D18-2)	B-W ↔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

3. CHECK MULTIPLEX TILT & TELESCOPIC ECU (TILT & TELESCOPIC ECU)



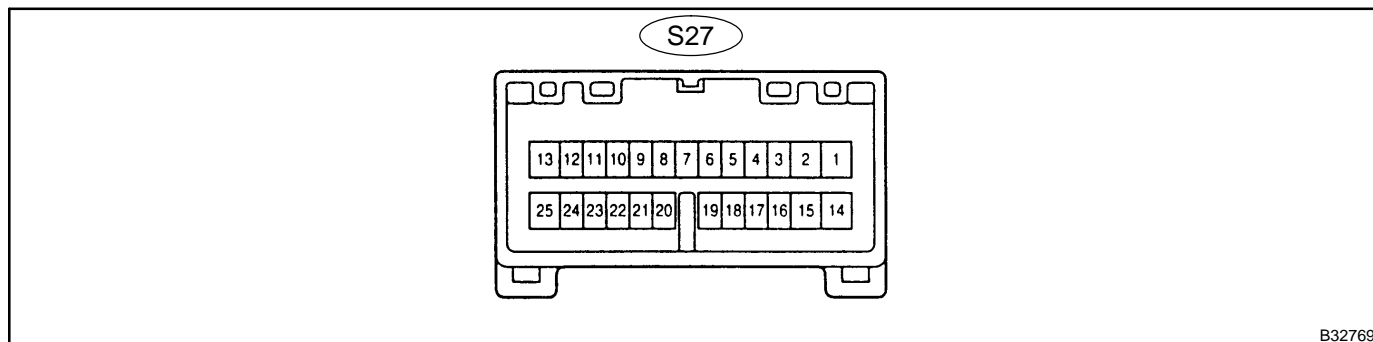
- (a) Disconnect the T6 ECU connector.
- (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (T6-11) ⇔ Body ground	W-G ⇔ -	Constant	Continuity
+B (T6-2) ⇔ GND (T6-11)	G-B ⇔ W-G	Constant	10 - 14 V
ECUB (T6-9) ⇔ GND (T6-11)	W-R ⇔ W-G	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

4. CHECK MULTIPLEX NETWORK BODY ECU NO. 2 (BODY NO. 2 ECU)



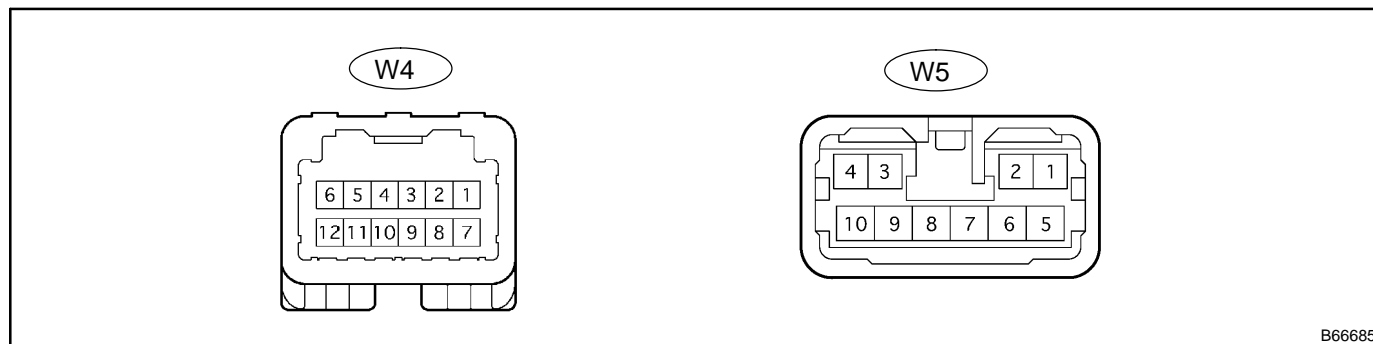
- (a) Disconnect the S27 ECU connector.
- (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (S27-25) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
SG (S27-24) ⇔ GND (S27-25)	W-B ⇔ W-B	Constant	Continuity
SIG (S27-3) ⇔ GND (S27-25)	B-R ⇔ W-B	Constant	Continuity
BEUC (S27-4) ⇔ GND (S27-25)	W-R ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

5. CHECK WINDSHIELD WIPER ECU (WIPER ECU)



B66685

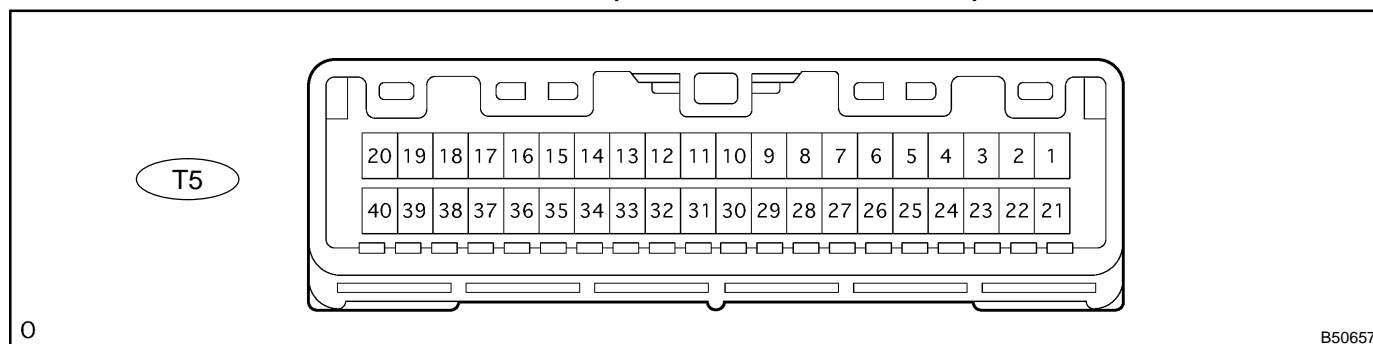
- Disconnect the W4 and W5 ECU connectors.
- Check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (W4-12) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
WIG (W5-10) ⇔ Body ground	L ⇔ -	Constant	Continuity
+B (W4-8) ⇔ GND (W4-12)	W-R ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

6. CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU)



0

B50657

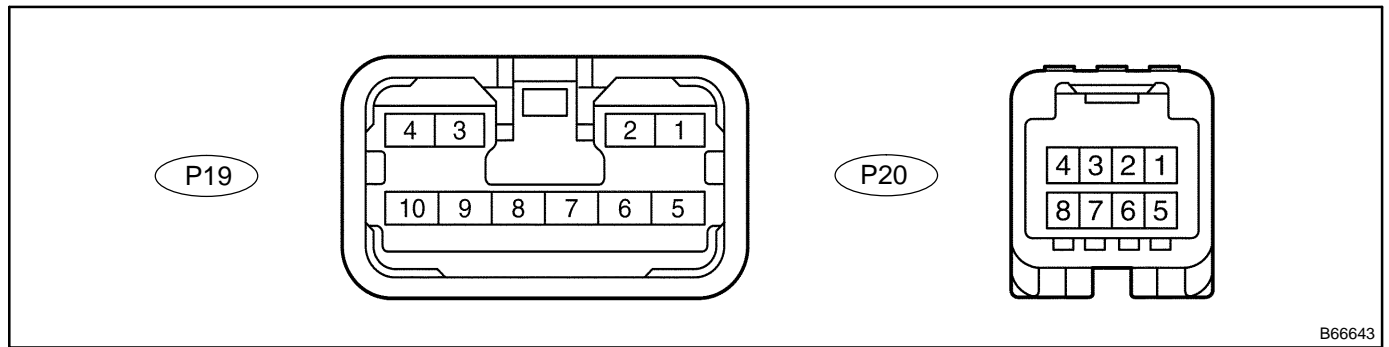
- Disconnect the T5 ECU connector.
- Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
E (T5-29) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
+B1 (T5-2) ⇔ E (T5-29)	W-R ⇔ W-B	Constant	10 - 14 V
+B2 (T5-3) ⇔ E (T5-29)	P ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

7. CHECK POSITION CONTROL ECU & WIRING ASSY (POWER SEAT ECU)



B66643

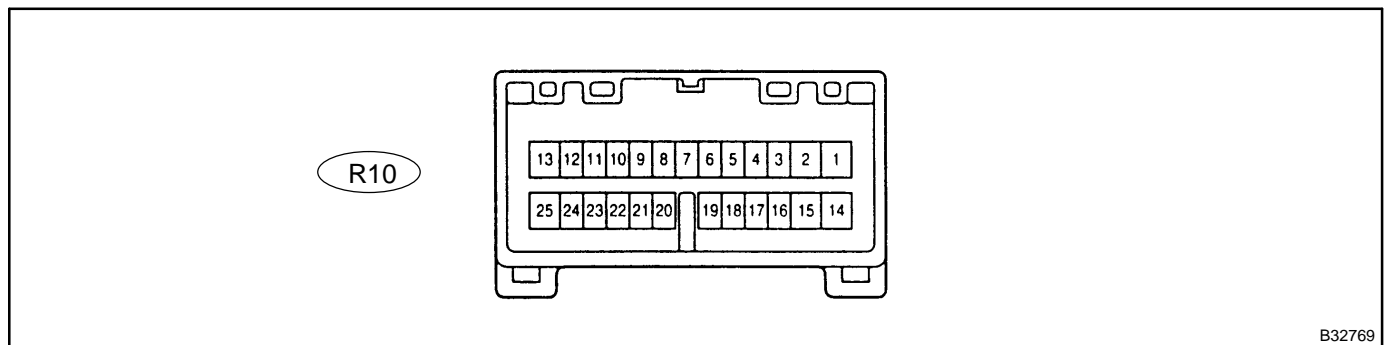
- Disconnect the P19 and P20 ECU connectors.
- Check the voltage or continuity of each terminal of the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (P19-1) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
+B (P19-5) ⇔ GND (P19-1)	LG ⇔ W-B	Constant	10 - 14 V
SYSB (P20-8) ⇔ GND (P19-1)	GR ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

8. CHECK OUTER MIRROR CONTROL ECU ASSY (MIRROR ECU)



B32769

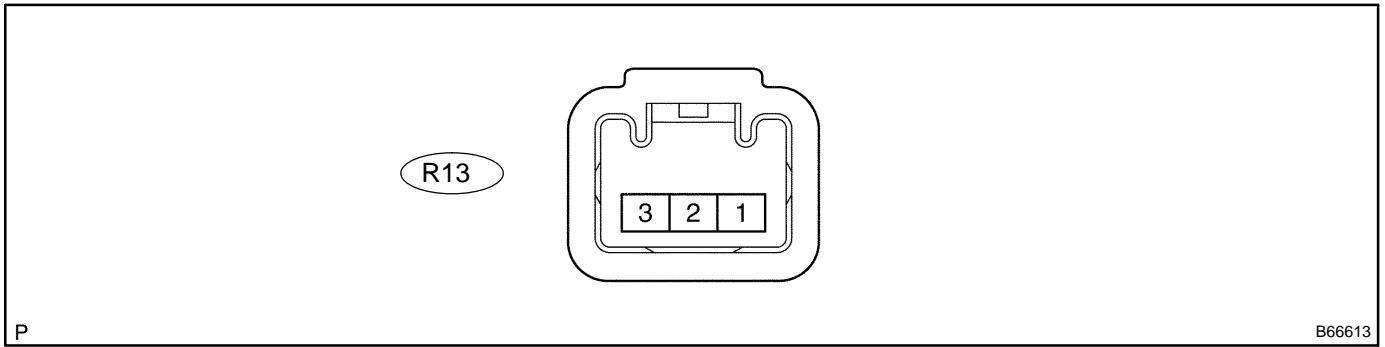
- Disconnect the R10 ECU connector.
- Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
GND (R10-14) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
+B (R10-1) ⇔ GND (R10-14)	W-R ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

9. CHECK RAIN SENSOR



- (a) Disconnect the R13 ECU connector.
 (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified Condition
ES (R13-3) ⇔ Body ground	W-B ⇔ -	Constant	Continuity
SIG (R13-1) ⇔ ES (R13-3)	B-W ⇔ W-B	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

PROBLEM SYMPTOMS TABLE

1. TROUBLESHOOTING FOR EACH PROBLEM SYMPTOM

NOTICE:

Confirm the problem symptom and make an inspection depending on the applicable flow chart.

Symptom	Suspected Area	See Page
B1211 (No communication from driver door ECU for more than 10 seconds)	1. Power window regulator master switch Assy (Driver door ECU) 2. Wire harness	05-2265 -
B1213 (No communication from tilt and telescopic ECU for more than 10 seconds)	1. Multiplex tilt & telescopic ECU (Tilt and telescopic ECU) 2. Wire harness	05-2269 -
B1214 (Short in communication circuit and +B power source system)	1. Power window regulator master switch Assy (Driver door ECU) 2. Multiplex tilt & telescopic ECU (Tilt & telescopic ECU) 3. Multiplex network body ECU No. 2 (Body No. 2 ECU) 4. Windshield wiper ECU (Wiper ECU) 5. Theft warning ECU Assy (Theft deterrent ECU) 6. Front power seat switch (Power Seat ECU) 7. Outer mirror control ECU Assy (Mirror ECU) 8. Rain sensor 9. Junction Block 10. Instrument panel J/B Assy (Body ECU) 11. Wire harness	05-2265 05-2269 05-2293 05-2297 05-2301 05-2305 05-2309 05-2312 - - -
B1215 (Short in communication circuit and body ground)	1. Power window regulator master switch Assy (Driver door ECU) 2. Multiplex tilt & telescopic ECU (Tilt & telescopic ECU) 3. Multiplex network body ECU No. 2 (Body No. 2 ECU) 4. Windshield wiper ECU (Wiper ECU) 5. Theft warning ECU Assy (Theft deterrent ECU) 6. Front power seat switch (Power Seat ECU) 7. Outer mirror control ECU Assy (Mirror ECU) 8. Rain sensor 9. Junction Block 10. Instrument panel J/B Assy (Body ECU) 11. Wire harness	05-2265 05-2269 05-2293 05-2297 05-2301 05-2305 05-2309 05-2312 - - -
B1218 (No communication from body No. 2 ECU for more than 10 seconds)	1. Multiplex network body ECU No. 2 (Body No. 2 ECU) 2. Wire harness	05-2293 -
B1245 (No communication from wiper ECU for more than 10 seconds)	1. Windshield wiper ECU (Wiper ECU) 2. Wire harness	05-2297 -
B1269 (No communication from theft deterrent ECU for more than 10 seconds)	1. Theft warning ECU Assy (Theft deterrent ECU) 2. Wire harness	05-2301 -
B1272 (No communication from power seat ECU for more than 10 seconds)	1. Front power seat switch (Power seat ECU) 2. Wire harness	05-2305 -
B1276 (No communication from Mirror ECU for more than 10 seconds)	1. Outer mirror control ECU Assy (Mirror ECU) 2. Wire harness	05-2309 -
B1279 (No communication from rain sensor for more than 10 seconds)	1. Rain sensor 2. Wire harness	05-2312 -

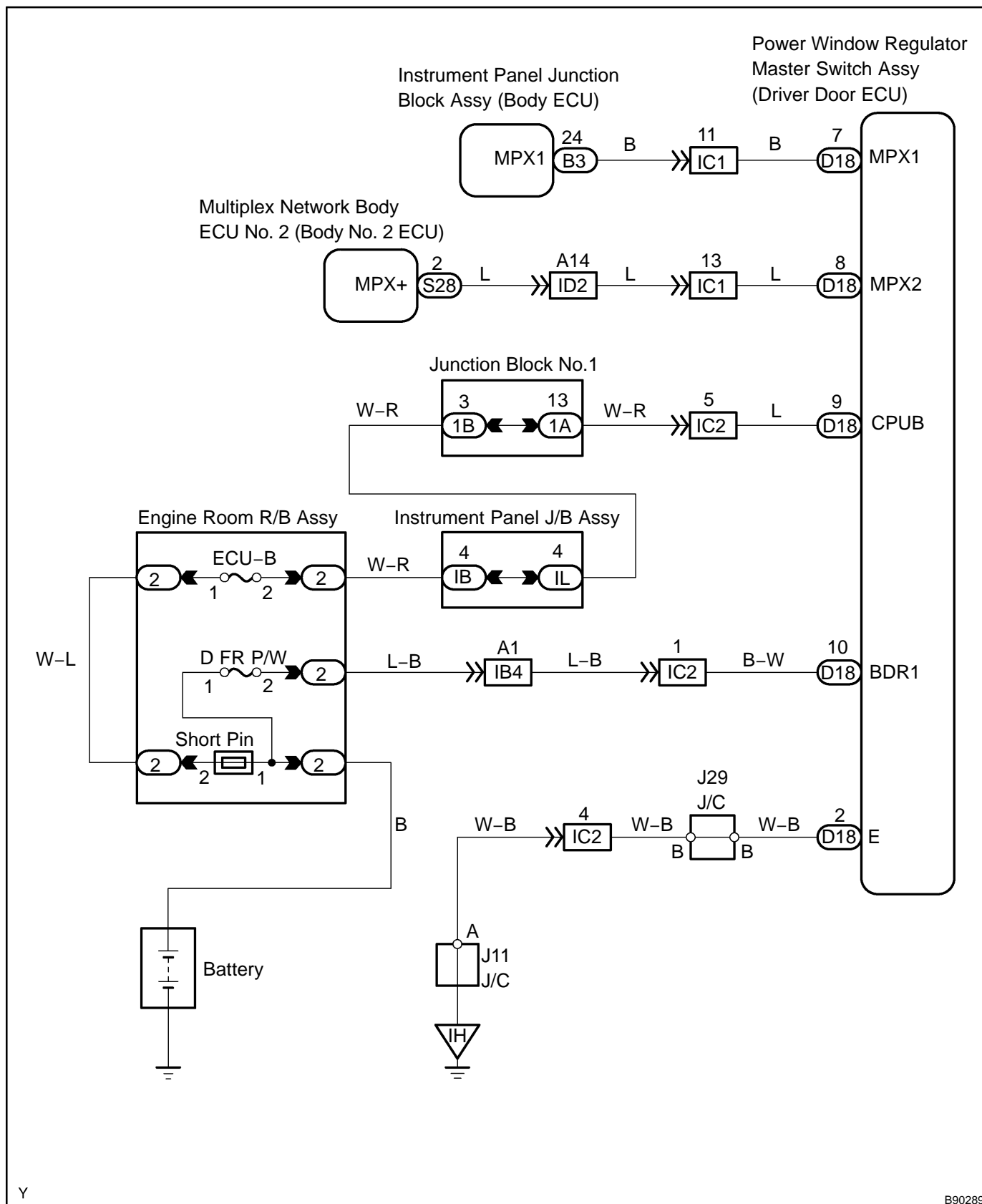
DTC	B1211	DRIVER DOOR ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1211 is output when the communication between the driver door ECU and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1211	Driver door ECU communication stops	<ul style="list-style-type: none">• Power window regulator master switch assy (Driver door ECU)• Wire harness

WIRING DIAGRAM



Y

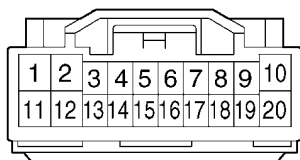
B90289

INSPECTION PROCEDURE

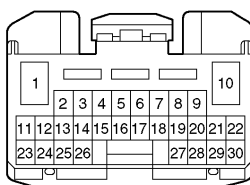
1 CHECK CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

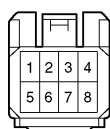
D18
Power Window Regulator Master
Switch Assy (Driver Door ECU)



B3
Instrument Panel J/B Assy
(Body ECU)



S28
Multiplex Network Body ECU No. 2
(Body No. 2 ECU)



- (a) Disconnect the D18 master switch, B3 J/B and S28 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX1 (D18-7) ⇔ MPX1 (B3-24)	Continuity
MPX2 (D18-8) ⇔ MPX+ (S28-2)	Continuity

NG

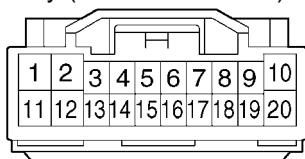
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSY (DRIVER DOOR ECU) (POWER SOURCE)

Wire Harness Side:

D18
Power Window Regulator Master
Switch Assy (Driver Door ECU)



- (a) Disconnect the D18 master switch connector.
- (b) Check the voltage between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
CPUB (D18-9) ⇔ Body ground	10 - 14 V
BDR1 (D18-10) ⇔ Body ground	10 - 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

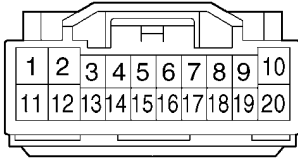
3 CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSY (DRIVER DOOR ECU) (GROUND)

Wire Harness Side:

D18

Power Window Regulator

Master Switch Assy (Driver Door ECU)



B65594

- (a) Disconnect the D18 master switch connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
E (D18-2) ⇔ Body ground	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY

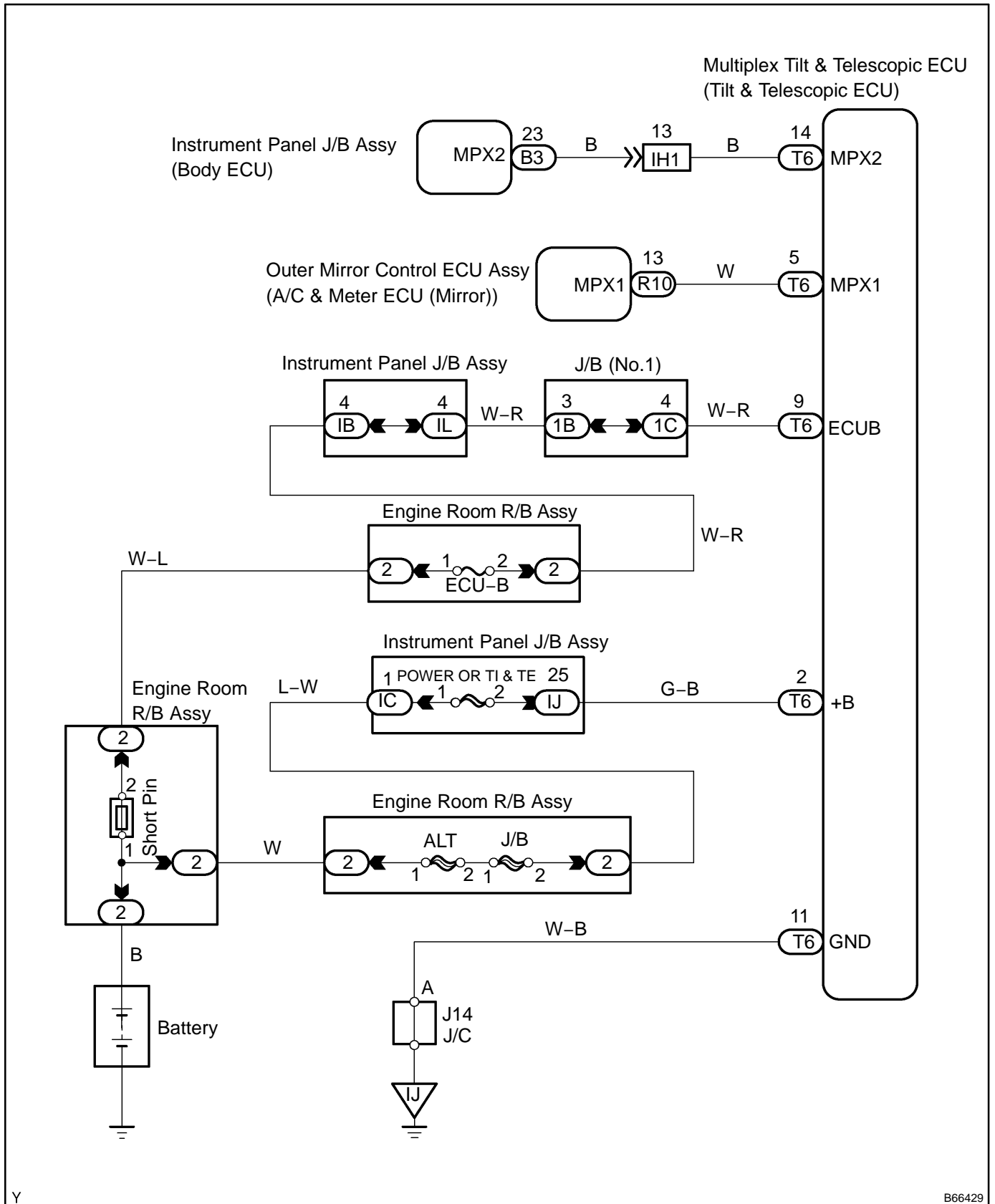
DTC	B1213	TILT AND TELESCOPIC ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1213 is output when communication between the multiplex tilt & telescopic ECU and the body ECU stops for more than 10 seconds.

DTC NO.	DTC Detection Condition	Trouble Area
B1213	Tilt & telescopic ECU communication stops	<ul style="list-style-type: none"> • Multiplex tilt & telescopic ECU (Tilt & telescopic ECU) • Wire harness

WIRING DIAGRAM

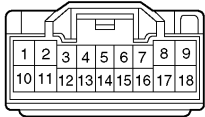


INSPECTION PROCEDURE

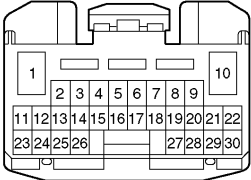
1 CHECK CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

T6
Multiplex Tilt & Telescopic ECU
(Tilt & Telescopic ECU)



B3
Instrument Panel J/B Assy
(Body ECU)



Y

B66645

- (a) Disconnect the T6 ECU and B3 J/B connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX2 (T6-14) ↔ MPX2 (B3-23)	Continuity

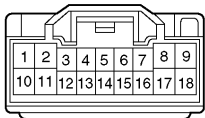
NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK MULTIPLEX TILT & TELESCOPIC ECU

Wire Harness Side:

T6
Multiplex Tilt & Telescopic ECU
(Tilt and Telescopic ECU)



B66644

- (a) Disconnect the T6 ECU connector.
- (b) Check the voltage between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
ECUB (T6-9) ↔ Body ground	10 - 14 V
+B (T6-2) ↔ Body ground	10 - 14 V

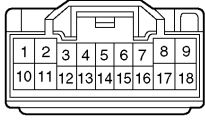
NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK MULTIPLEX TILT & TELESCOPIC ECU

Wire Harness Side:

T6
 Multiplex Tilt & Telescopic ECU
 (Tilt and Telescopic ECU)



B66424

- (a) Disconnect the T6 ECU connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
GND (T6-11) ⇔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE MULTIPLEX TILT & TELESCOPIC ECU

DTC	B1214	DOOR SYSTEM COMMUNICATION BUS MALFUNCTION (+B SHORT)
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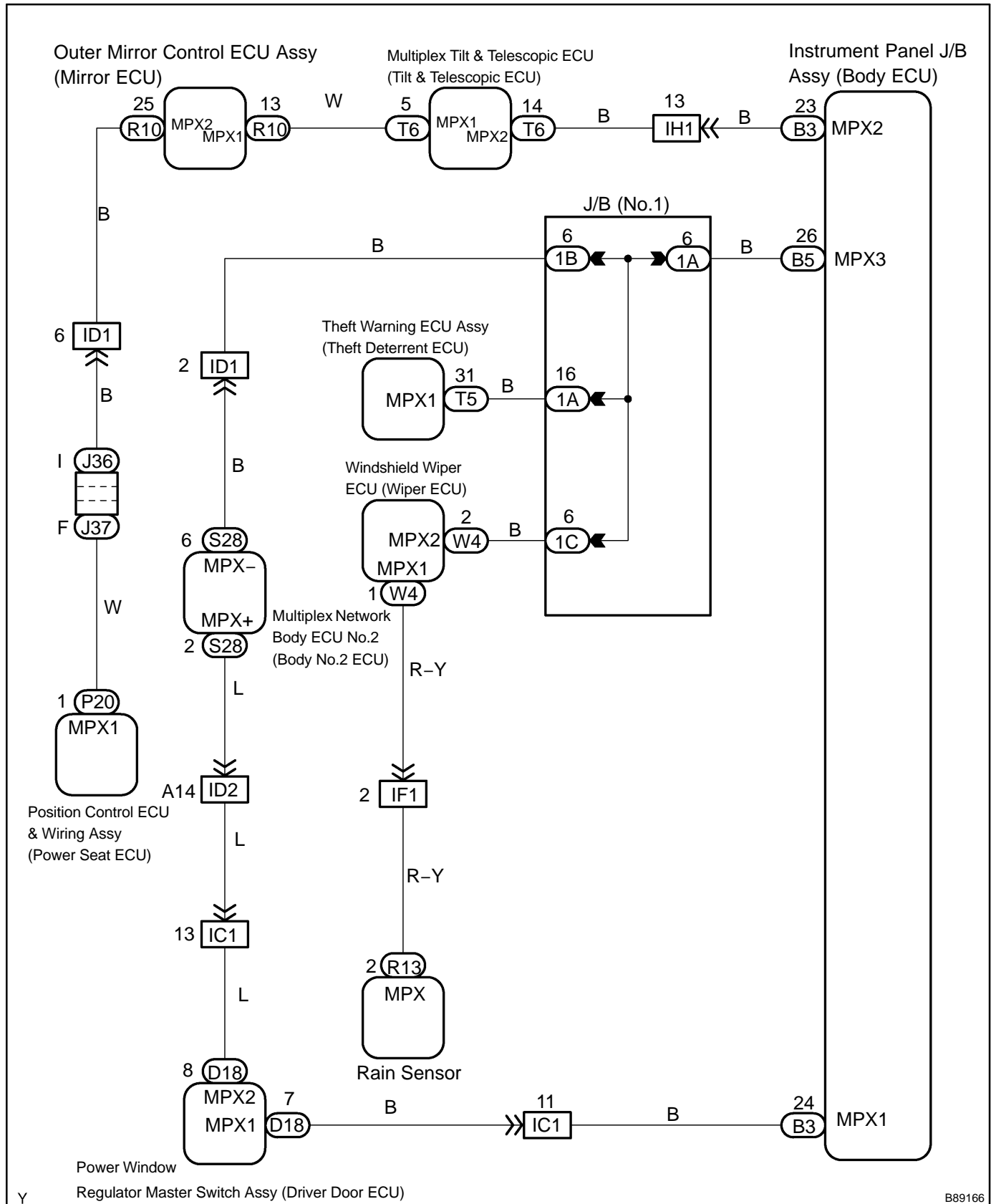
DTC	B1215	DOOR SYSTEM COMMUNICATION BUS MALFUNCTION (GND SHORT)
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CIRCUIT DESCRIPTION

B1214 and B1215 are output when +B and the body ground is short-circuited on the communication bus. Detecting this condition disables all the BEAN communication and outputs some DTCs.

DTC No.	DTC Detection Condition	Trouble Area
B1214	Communication circuit and +B battery system short	<ul style="list-style-type: none"> • Power window regulator master switch assy (Driver door ECU) • Multiplex tilt & telescopic ECU (Tilt & telescopic ECU) • Multiplex network body ECU No.2 (Body No.2 ECU) • Windshield wiper ECU (Wiper ECU) • Theft warning ECU assy (Theft deterrent ECU) • Position control ECU & wiring assy (Power seat ECU) • Outer mirror control ECU assy (Mirror ECU) • Rain sensor • Junction Block (No.1) • Instrument panel junction block assy (Body ECU) • Wire harness
B1215	Communication circuit and body ground short	<ul style="list-style-type: none"> • Power window regulator master switch assy (Driver door ECU) • Multiplex tilt & telescopic ECU (Tilt & telescopic ECU) • Multiplex network body ECU No.2 (Body No.2 ECU) • Windshield wiper ECU (Wiper ECU) • Theft warning ECU assy (Theft deterrent ECU) • Position control ECU & wiring assy (Power seat ECU) • Outer mirror control ECU assy (Mirror ECU) • Rain sensor • Junction Block (No.1) • Instrument panel junction block assy (Body ECU) • Wire harness

WIRING DIAGRAM

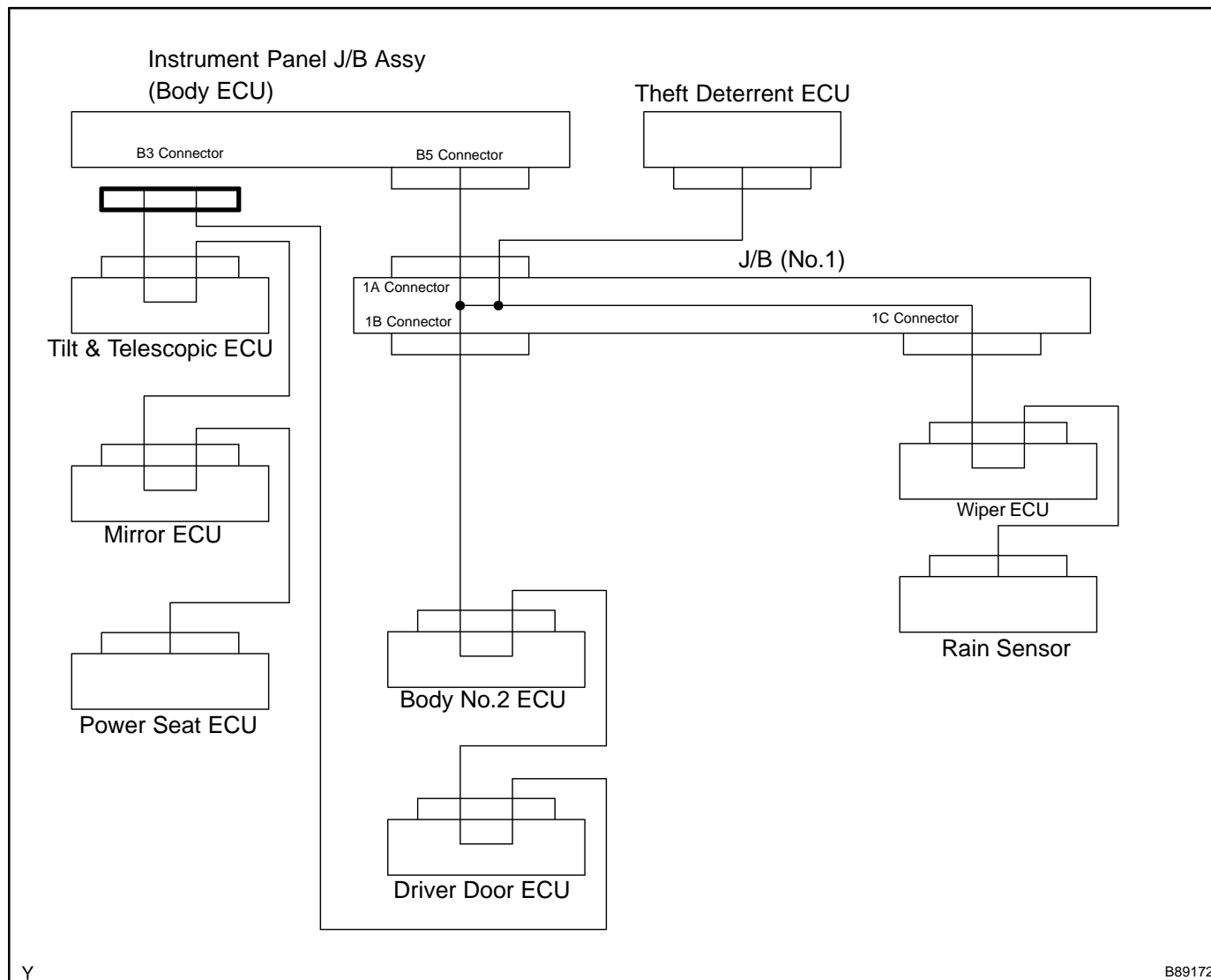


B89166

INSPECTION PROCEDURE

1	CHECK DTC (BODY ECU ↔ POWER SEAT ECU)
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(a) Check whether the output of the DTC stops when the B3 connector of the body ECU is disconnected.



Y

B89172

NOTICE:

Disconnect connector in operational sequence, and start the next operation after the connector is connected.

Standard:

When the output of the DTC stops, there is a malfunction between the B3 connector of the body ECU and the power seat ECU.

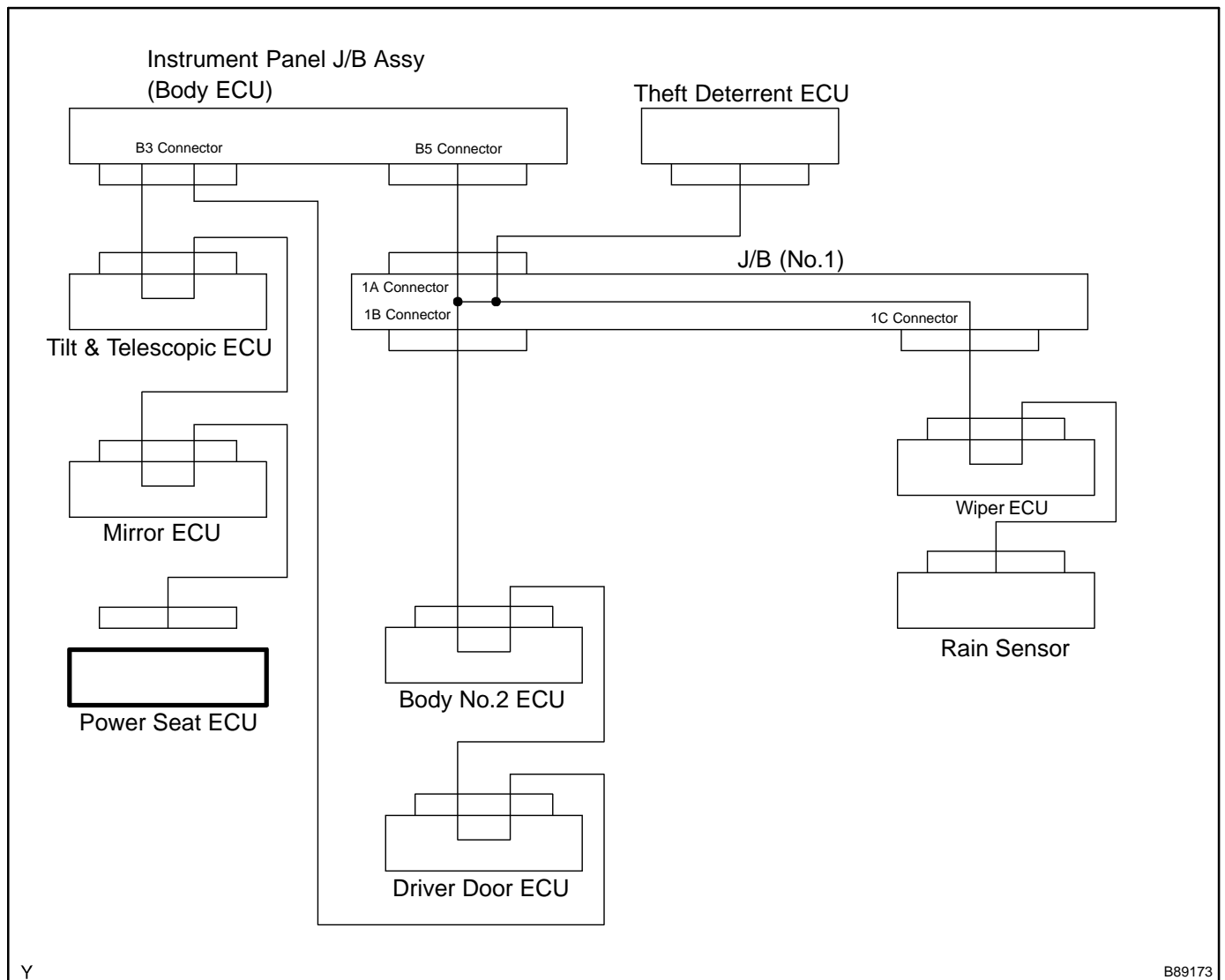
NO

Go to step 6

YES

2 CHECK DTC (POWER SEAT ECU)

(a) Check whether the output of the DTC stops when the power seat ECU connector is disconnected.



NOTICE:

Disconnect connector in operational sequence, and start the next operation after the connector is connected.

Standard:

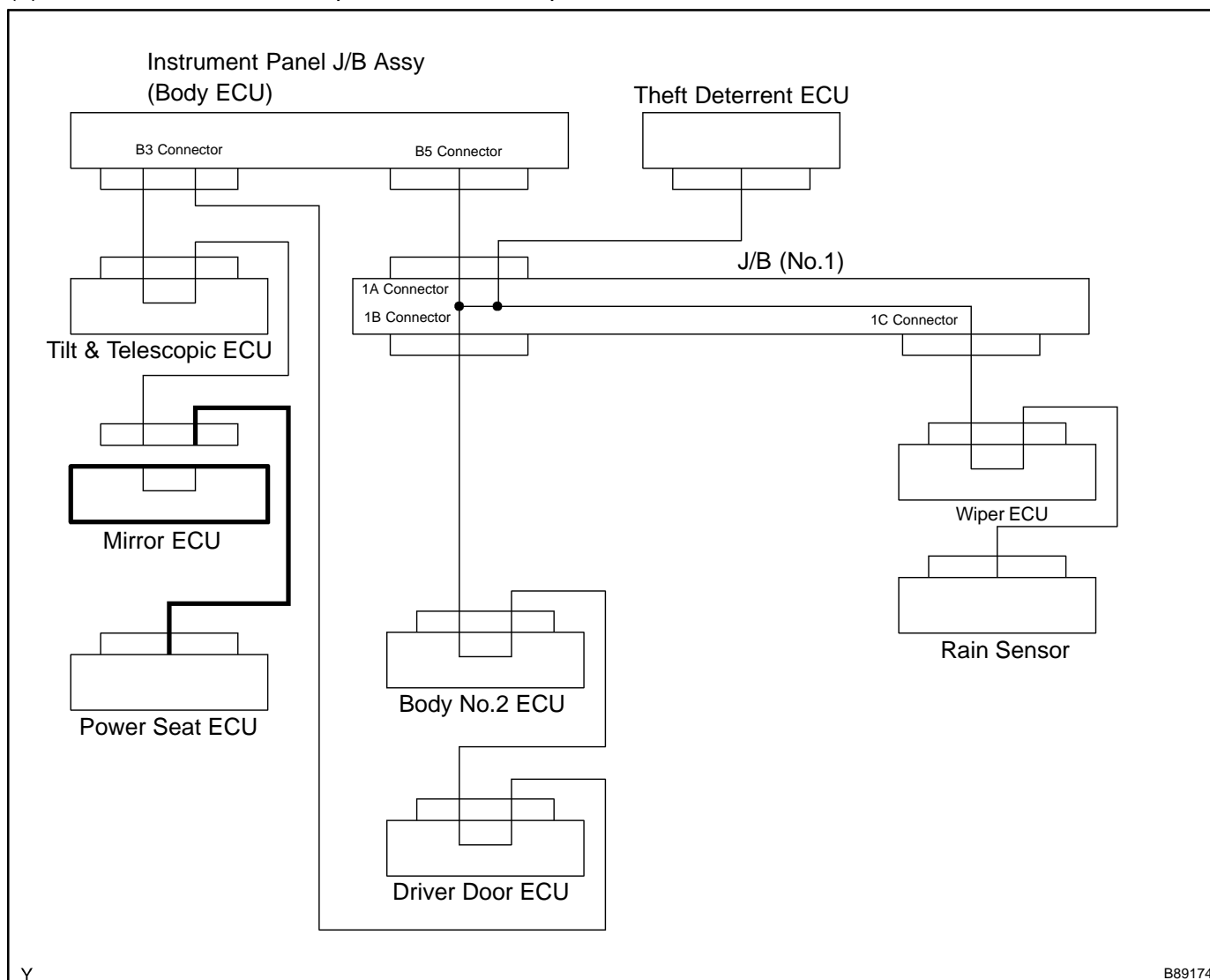
When the output of the DTC stops, the power seat ECU is abnormal.

YES → REPLACE POSITION CONTROL ECU & SWITCH ASSY (POWER SEAT ECU)

NO

3 CHECK DTC (MIRROR ECU AND WIRE HARNESS)

(a) Check whether the output of the DTC stops when the mirror ECU connector is disconnected.



Y

B89174

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

When the output of the DTC stops, the mirror ECU itself or the wire harness between the mirror ECU and the power seat ECU is abnormal.

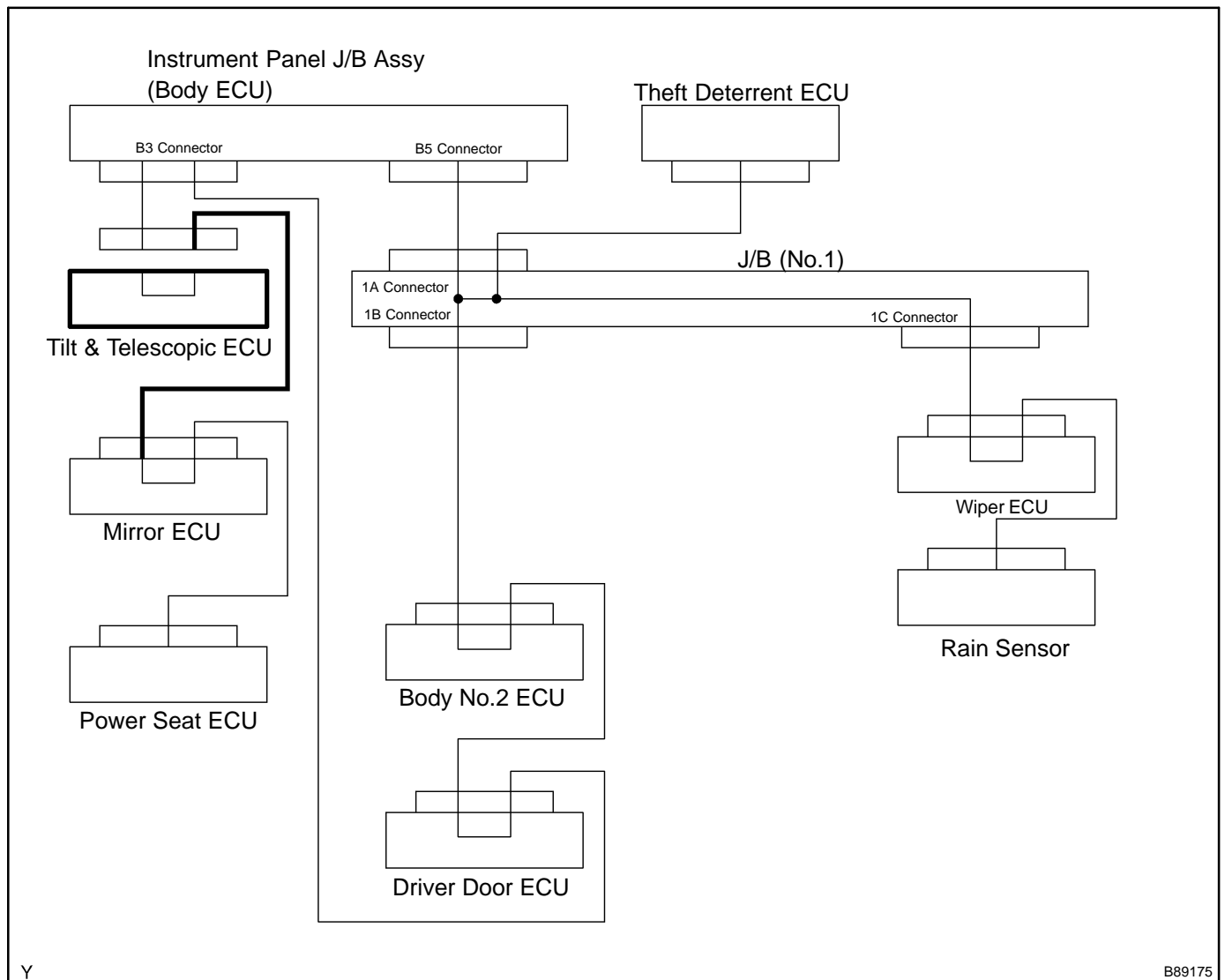
YES

REPAIR OR REPLACE OUTER MIRROR CONTROL ECU ASSY (MIRROR ECU) OR WIRE HARNESS

NO

4 CHECK DTC (TILT & TELESCOPIC ECU)

- (a) Check whether the output of the DTC stops when the tilt and telescopic ECU connector is disconnected.



Y

B89175

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector connected.

Standard:

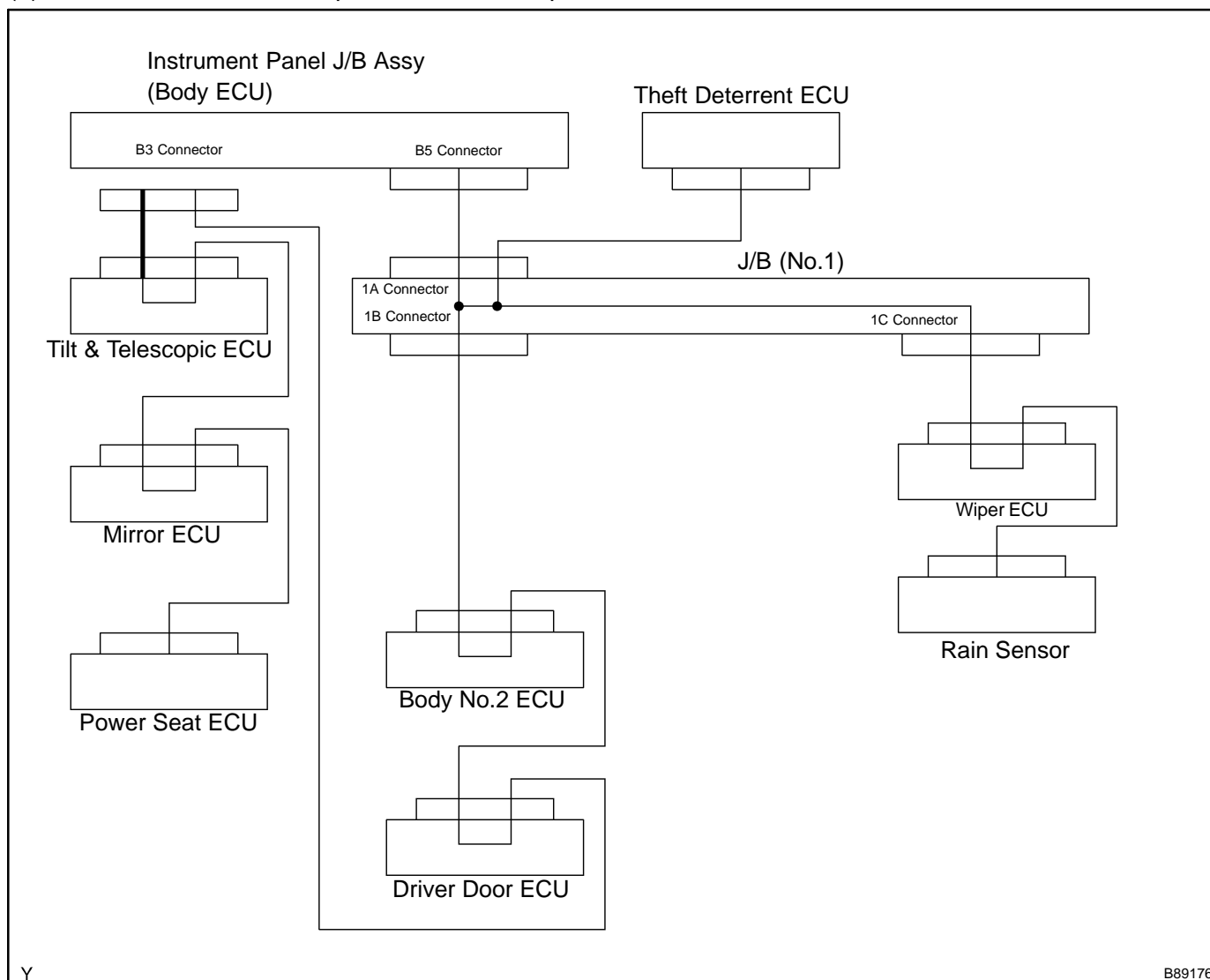
When the output of the DTC stops, the tilt & telescopic ECU itself or the wire harness between the tilt and telescopic ECU and the mirror ECU is abnormal.

YES → **REPAIR OR REPLACE MULTIPLEX TILT & TELESCOPIC ECU (TILT & TELESCOPIC ECU) OR WIRE HARNESS**

NO

5 CHECK WIRE HARNESS (BODY ECU ↔ TILT & TELESCOPIC ECU)

(a) Check whether the output of the DTC stops when the wire harness is disconnected.



Y

B89176

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

When the output of the DTC stops, the wire harness between the B3 connector of the body ECU and the tilt and telescopic ECU is abnormal.

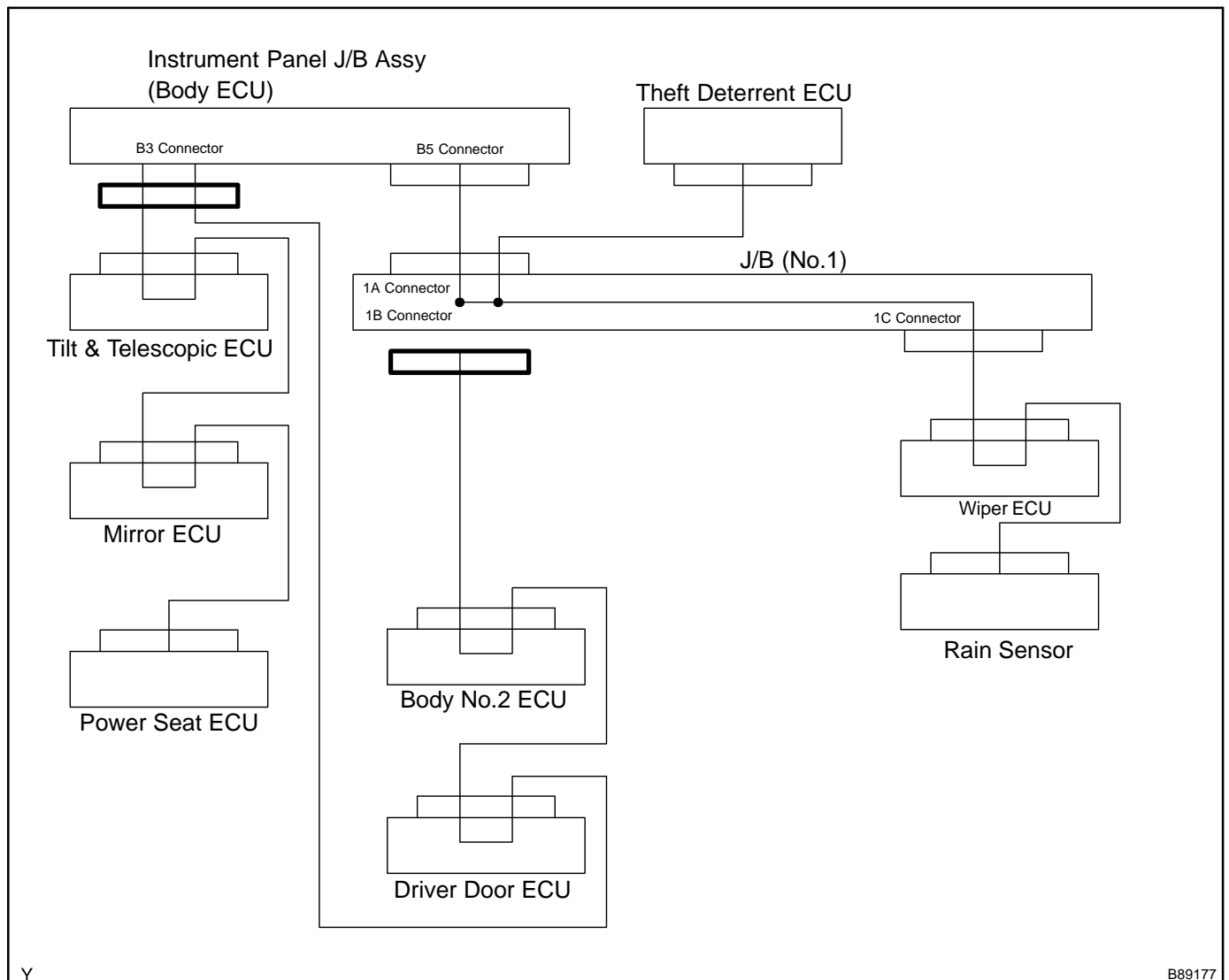
YES

REPAIR OR REPLACE HARNESS AND CONNECTOR

NO

6 CHECK DTC (BODY ECU ↔ J/B)

- (a) Check whether the output of the DTCs stops when the B3 connector of the body ECU and 1B connector of the junction block are disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

When the output of the DTC stops, there is a malfunction between the B3 connector of the body ECU and the 1B connector of the junction block.

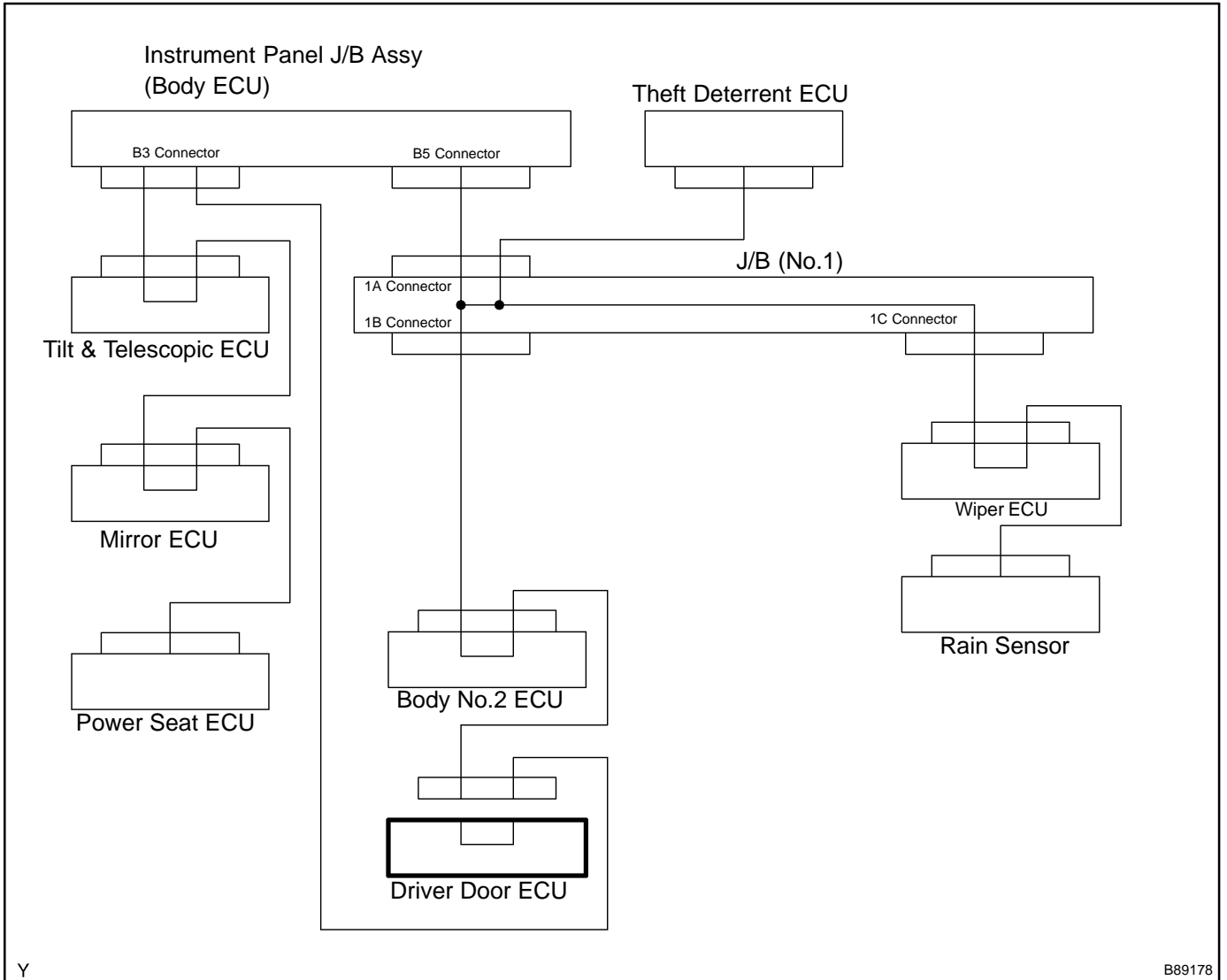
NO

Go to step 12

YES

7 CHECK DTC (DRIVER DOOR ECU)

(a) Check whether the output of the DTC stops when the driver door ECU connector is disconnected.



Y

B89178

NOTICE:

Disconnect connector in operational sequence, and start the next operation after the connector is connected.

Standard:

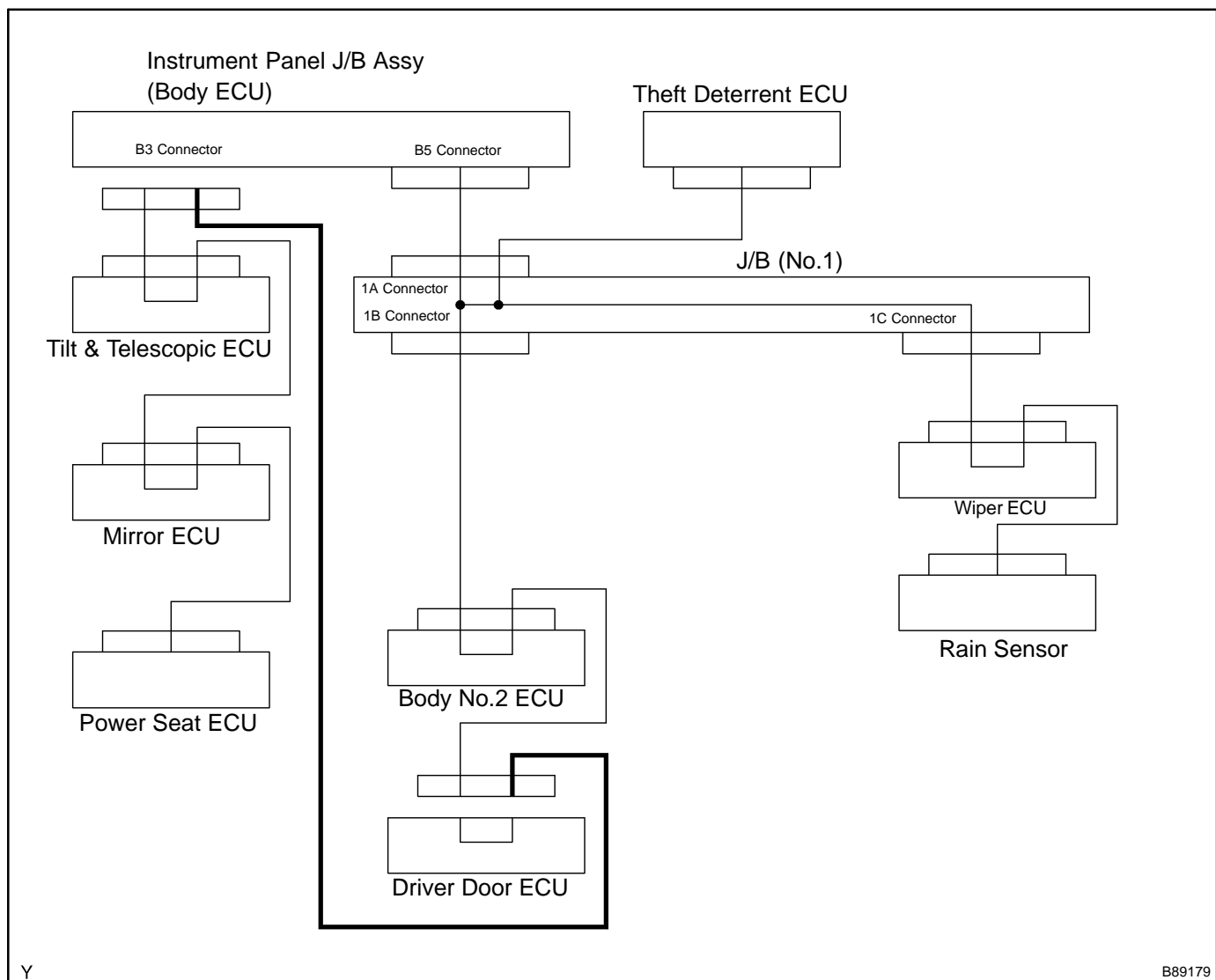
When the output of the DTC stops, the driver door ECU is abnormal.

YES → REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSY (DRIVER DOOR ECU)

NO

8 CHECK WIRE HARNESS (BODY ECU ↔ DRIVER DOOR ECU)

(a) Check whether the output of the DTC stops when the B3 connector of the body ECU and the driver door ECU connector are disconnected.



Y

B89179

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

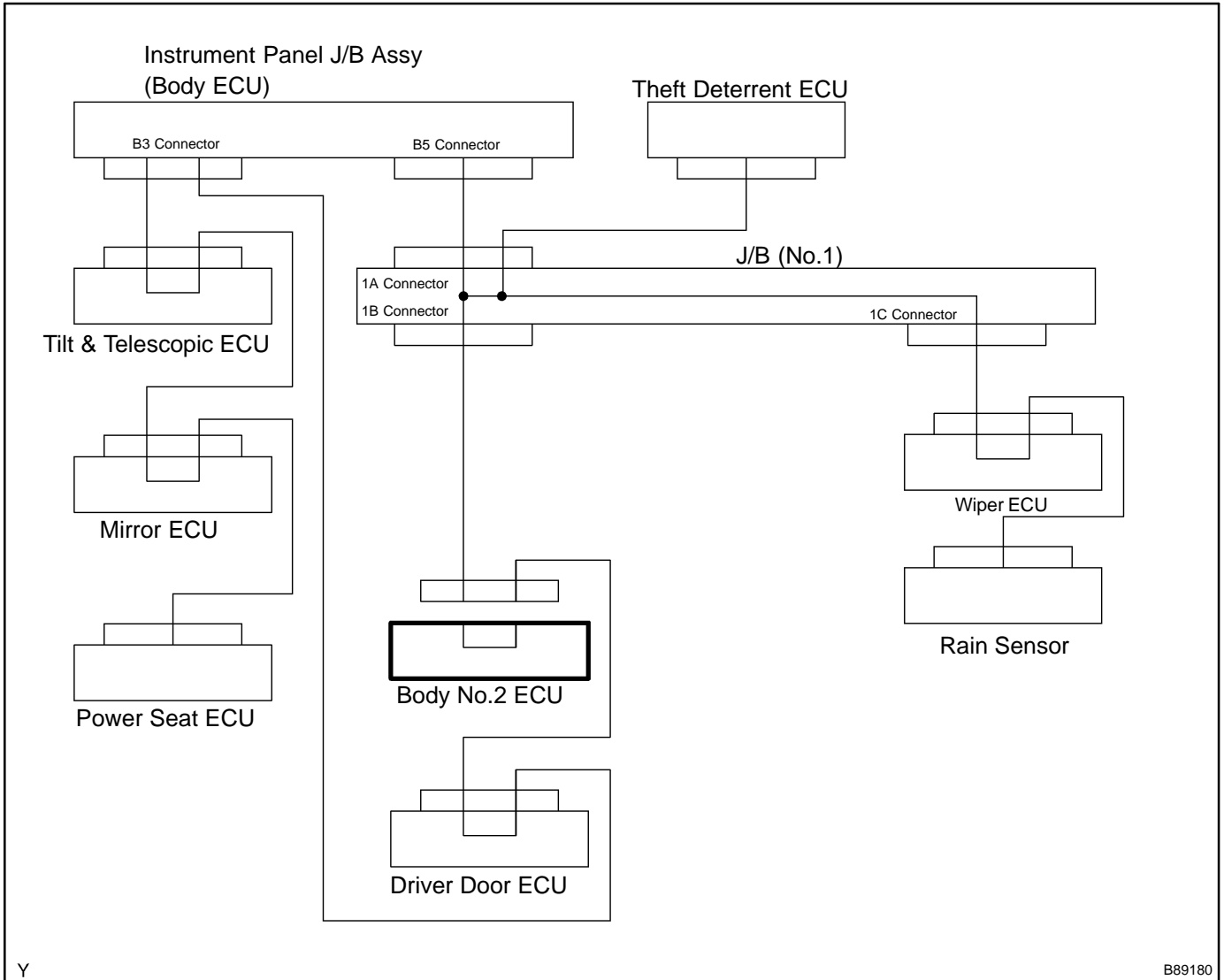
When the output of the DTC stops, the wire harness between the driver door ECU and B3 connector of the body ECU is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

9 CHECK DTC (BODY NO.2 ECU)

(a) Check whether the output of the DTC stops when the body No.2 ECU connector is disconnected.



Y

B89180

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

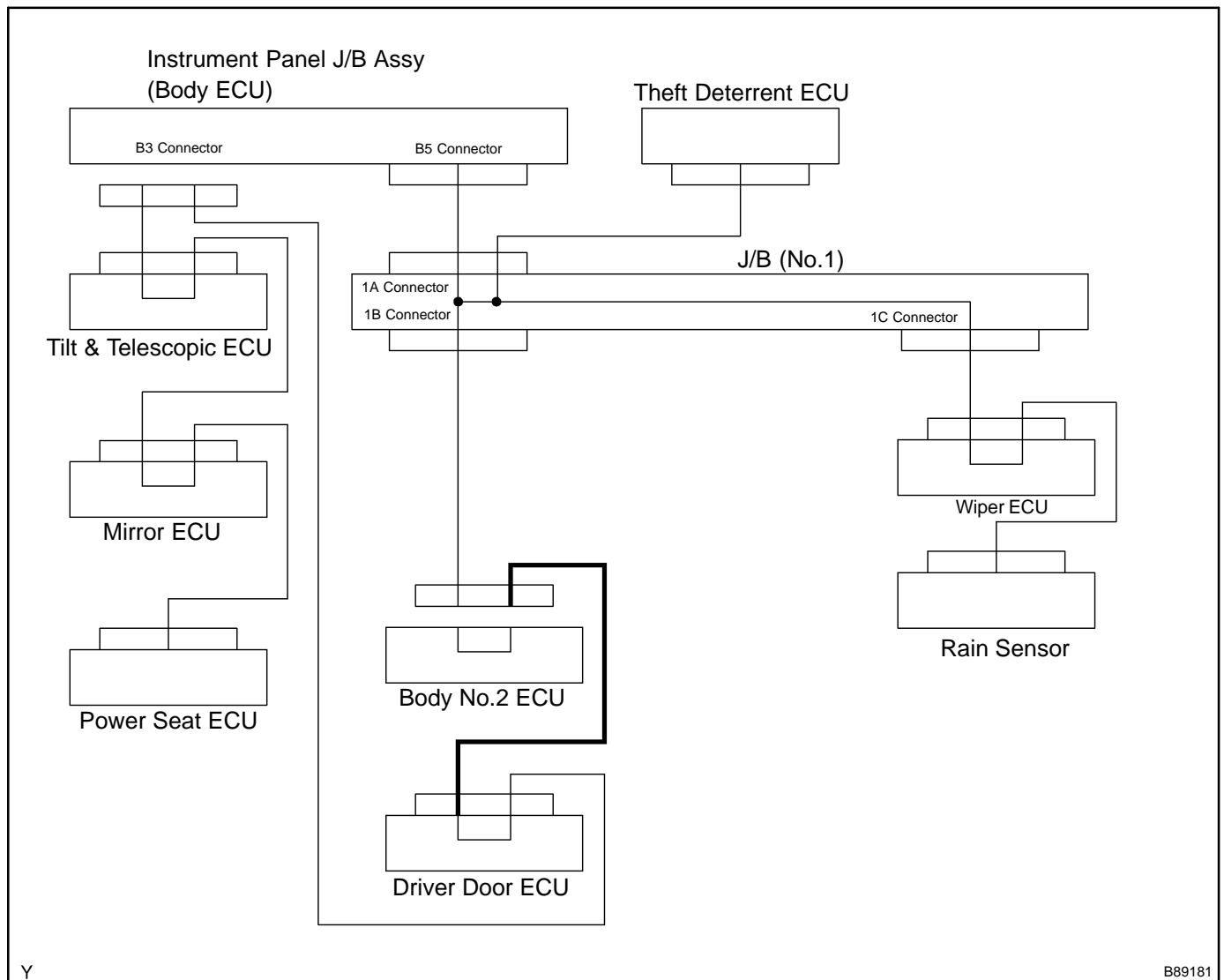
When the output of the DTC stops, the body No.2 ECU is abnormal.

YES → **REPLACE MULTIPLEX NETWORK BODY ECU NO.2 (BODY NO. 2 ECU)**

NO

10 CHECK WIRE HARNESS (BODY No.2 ECU ↔ DRIVER DOOR ECU)

- (a) Check whether the output of the DTC stops when the B3 connector of the body ECU and the body No.2 ECU connector are disconnected.



Y

B89181

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

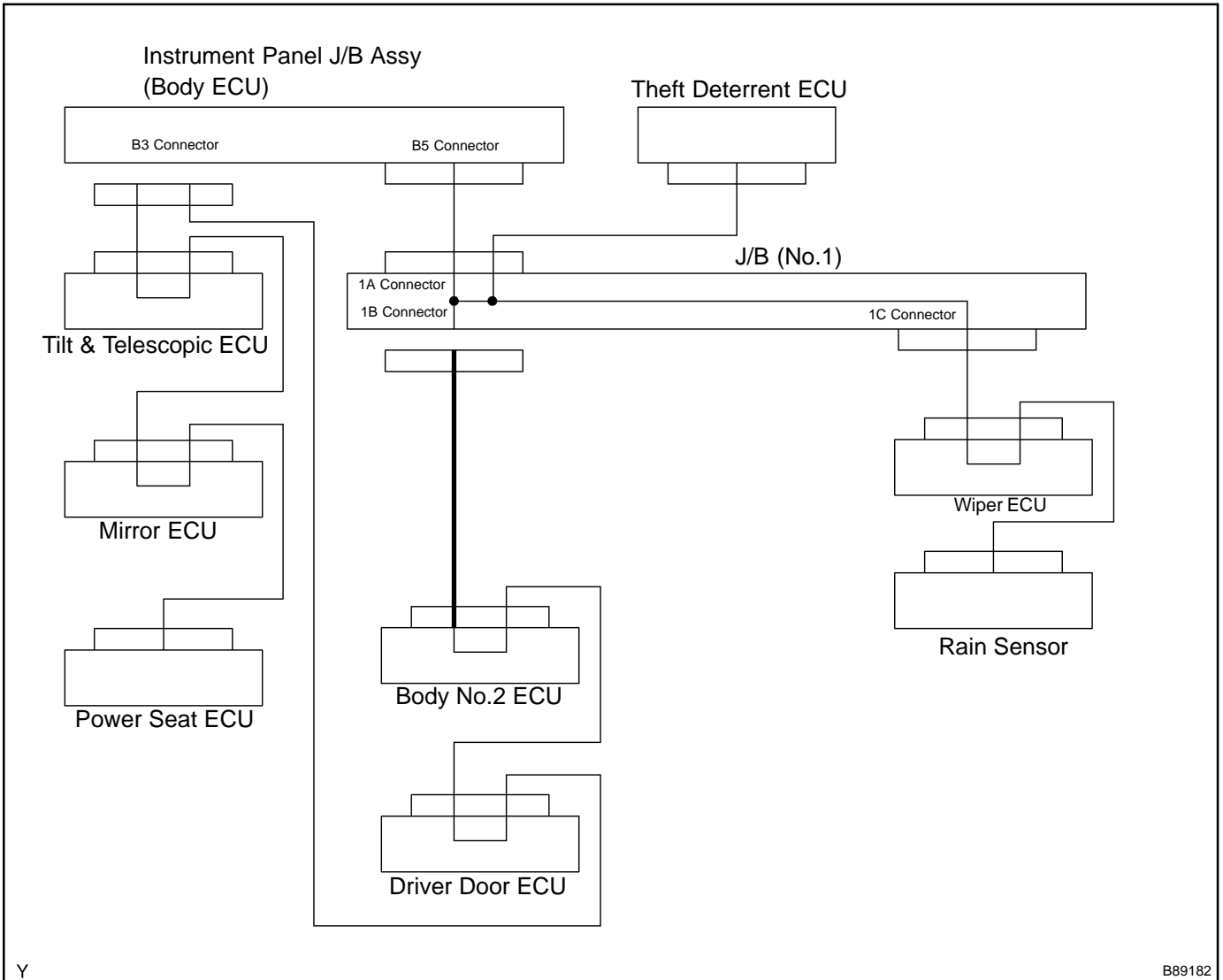
When the output of the DTC stops, the wire harness between the body No.2 ECU and the driver door ECU is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

11 CHECK WIRE HARNESS (J/B ↔ BODY No.2 ECU)

(a) Check whether the output of the DTC stops when the B3 connector of the body ECU and the 1B connector of the J/B No.1 are disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

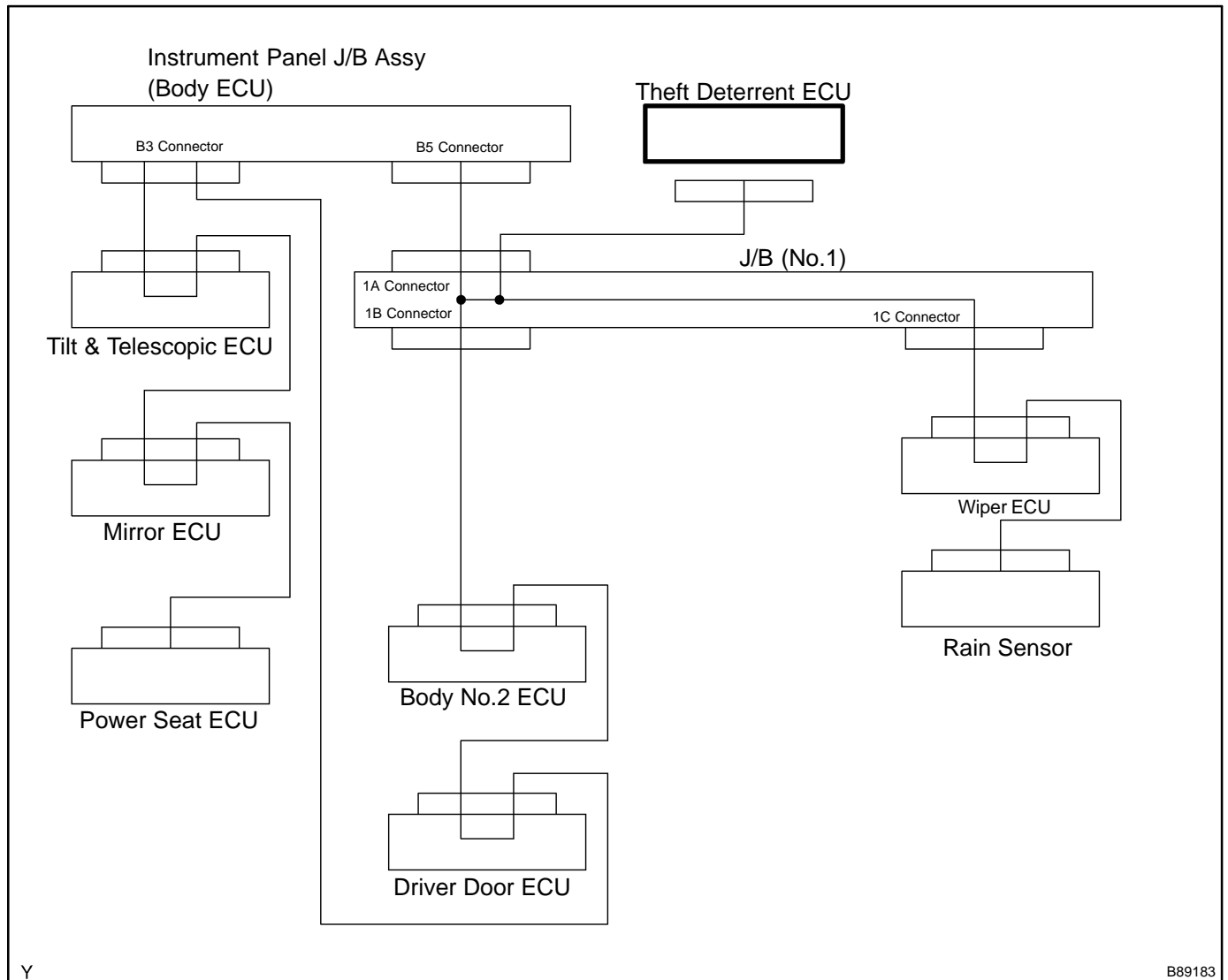
Standard: When the output of the DTC stops, the wire harness between the 1B connector of the J/ B (No.1) and the body No.2 ECU is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

12 CHECK DTC (THEFT DETERRENT ECU)

(a) Check whether the output of the DTC stops when the theft deterrent ECU connector is disconnected.



Y

B89183

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

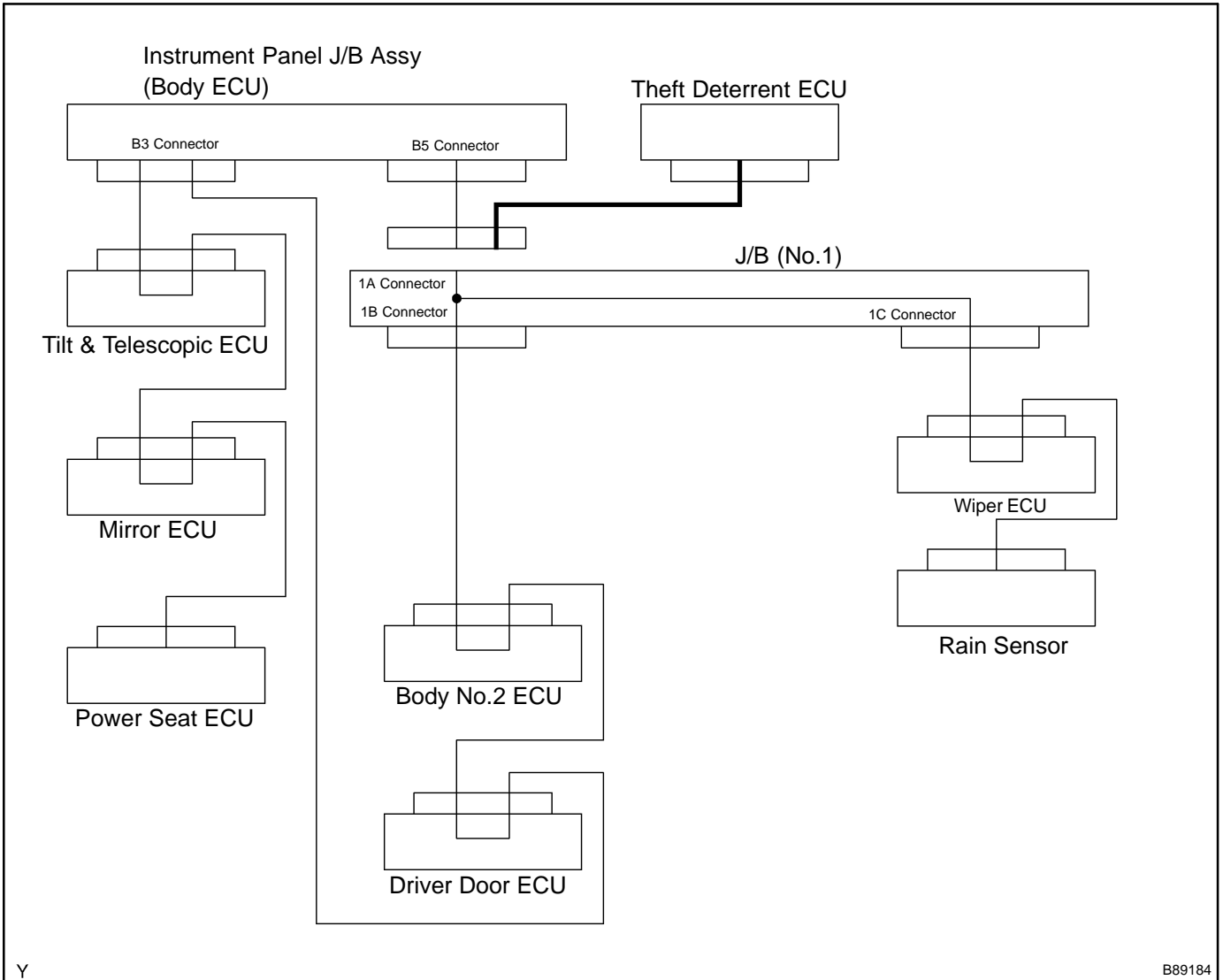
When the output of the DTC stops, the theft deterrent ECU is abnormal.

YES → **REPLACE THEFT WARNING ECU ASSY (THEFT DETERRENT ECU)**

NO

13 CHECK WIRE HARNESS (J/B ↔ THEFT DETERRENT ECU)

(a) Check whether the output of the DTC stops when the 1A connector of the J/B (No.1) is disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

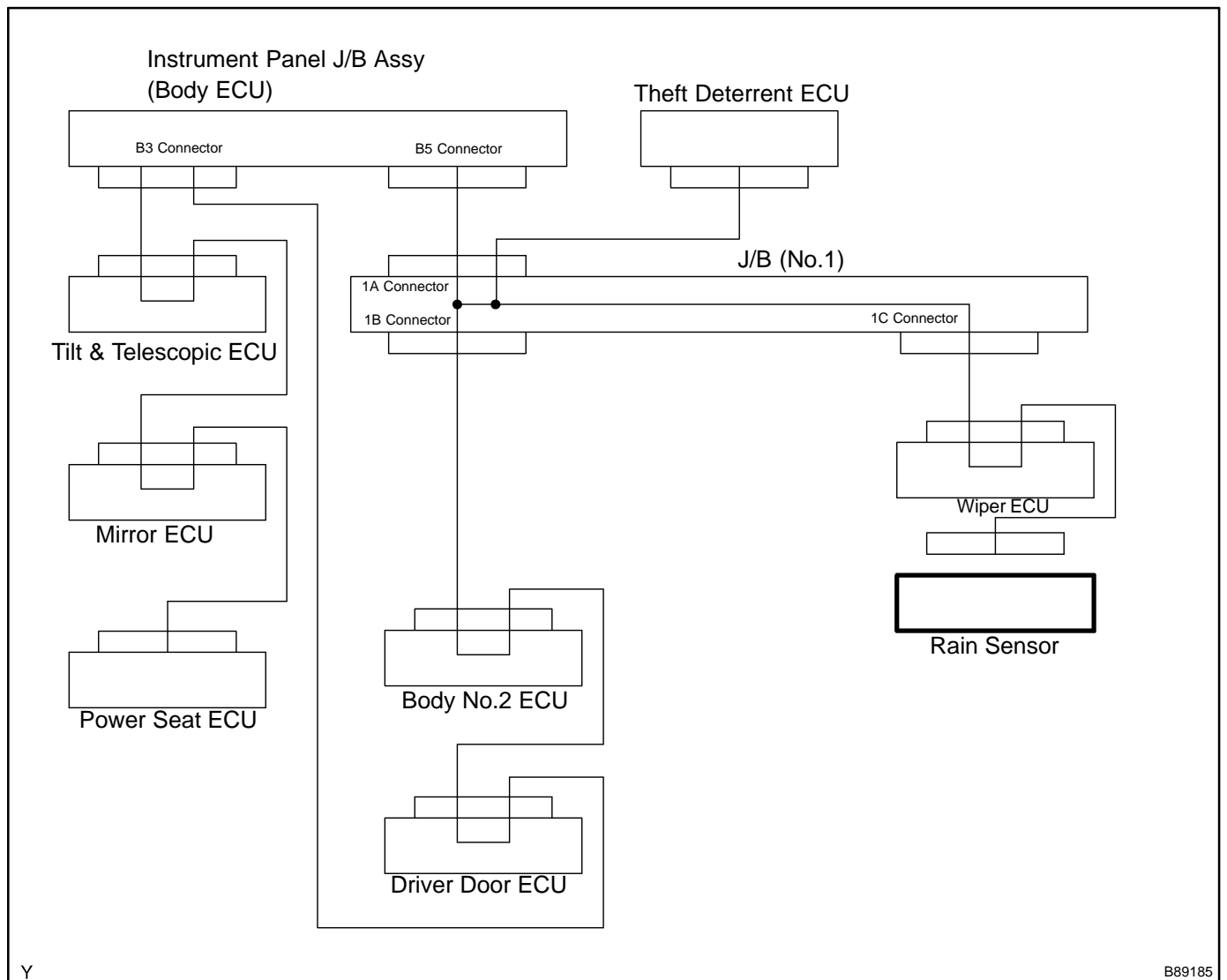
When the output of the DTC stops, the wire harness between the 1A connector of the J/B No.1 and the theft deterrent ECU is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

14 CHECK DTC (RAIN SENSOR)

(a) Check whether the output of the DTC stops when the rain sensor connector is disconnected.



Y

B89185

NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

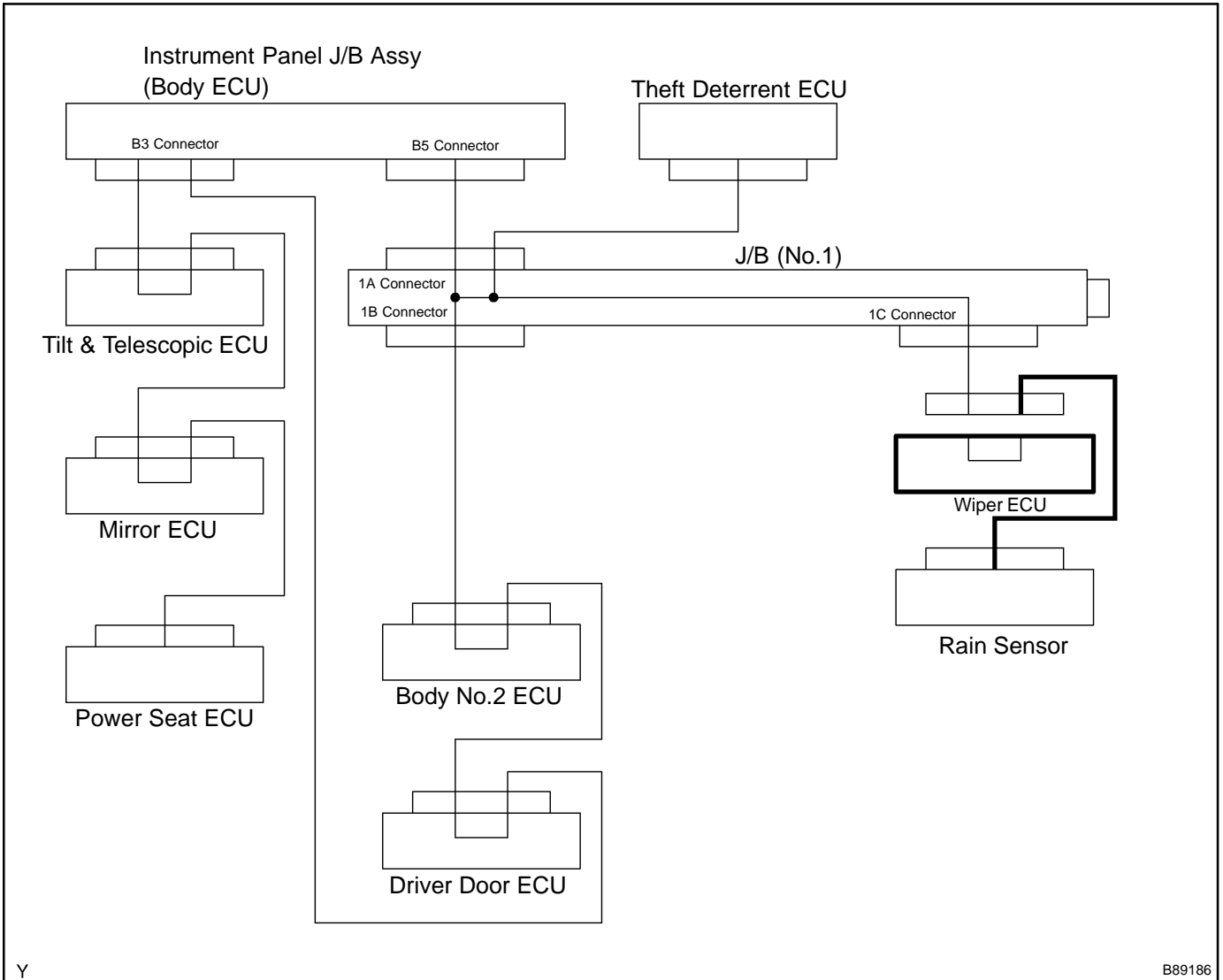
When the output of the DTC stops, the rain sensor is abnormal.

YES → **REPLACE RAIN SENSOR**

NO

15 CHECK DTC (WIPER ECU OR WIRE HARNESS (WIPER ECU ↔ RAIN SENSOR))

(a) Check whether the output of the DTC stops when the wiper ECU connector is disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

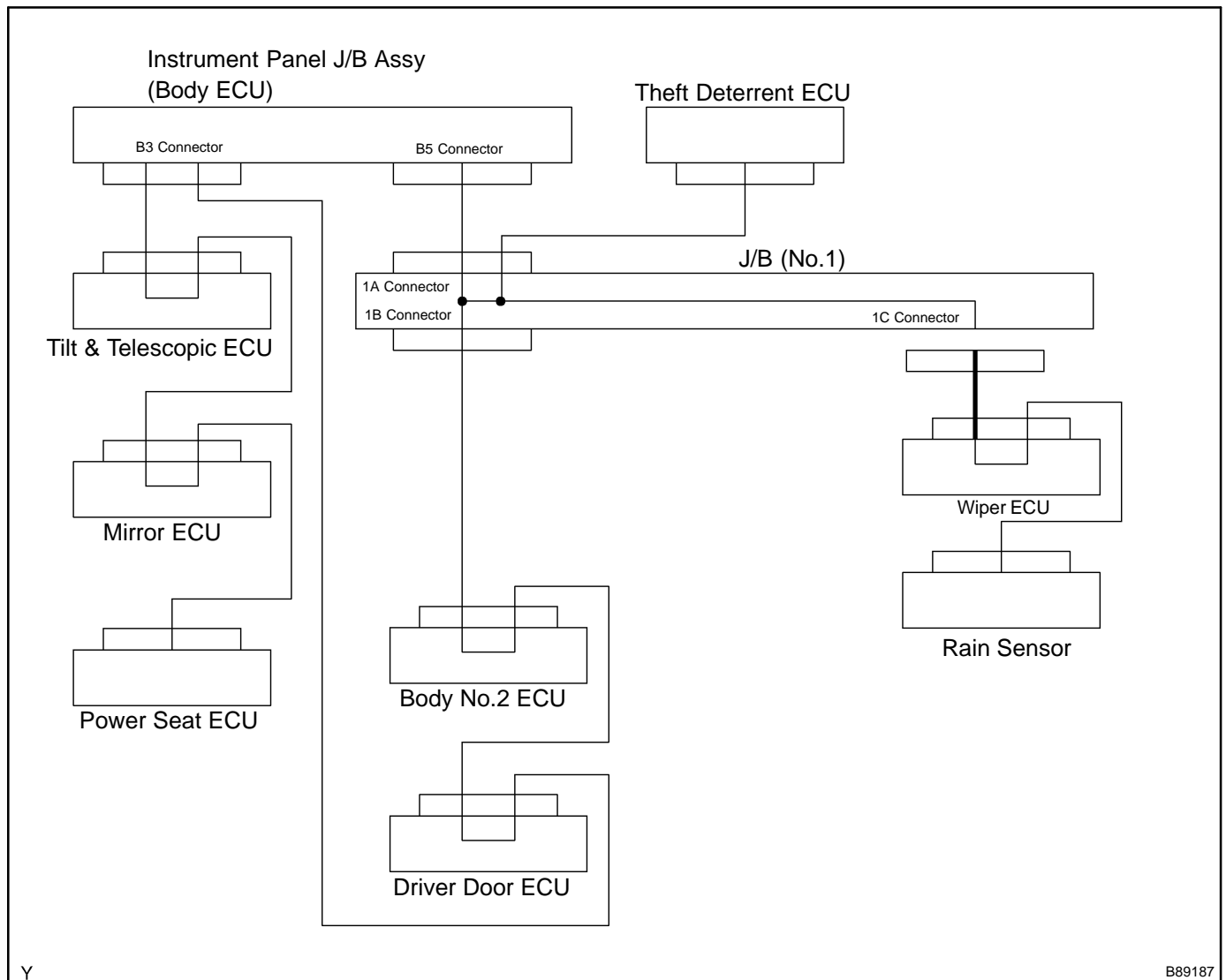
When the output of the DTC stops, the wiper ECU or the wire harness between the wiper ECU and the rain sensor is abnormal.

YES → REPAIR OR REPLACE WINDSHILED WIPER ECU (WIPER ECU) OR WIRE HARNESS

NO

16 CHECK WIRE HARNESS (J/B ↔ WIPER ECU)

(a) Check whether the output of the DTC stops when the 1C connector of the J/B is disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

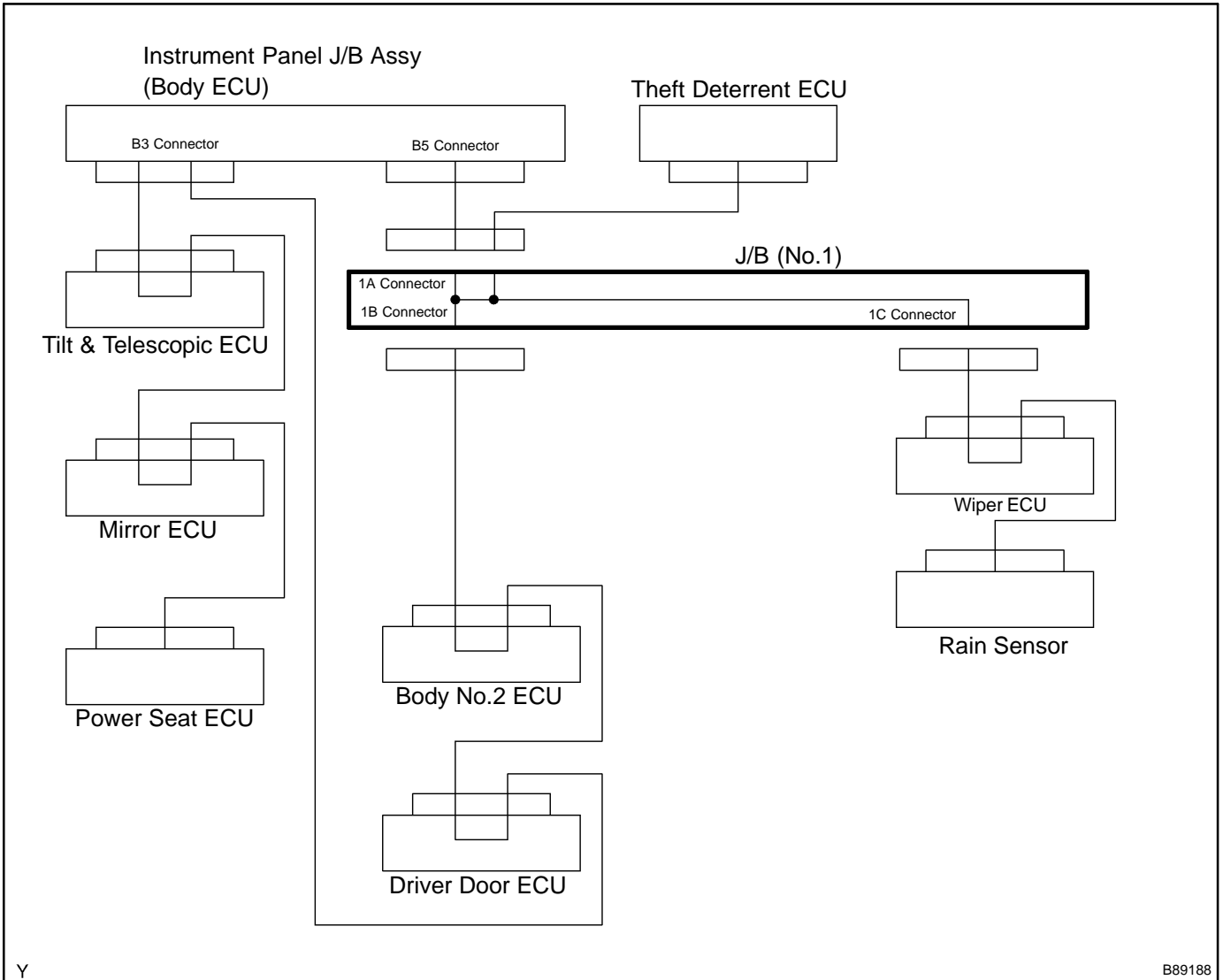
When the output of the DTC stops, the wire harness between the 1C connector of the J/B (No.1) and the wiper ECU is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

17 CHECK DTC (J/B)

(a) Check whether the output of the DTC stops when the J/B is disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

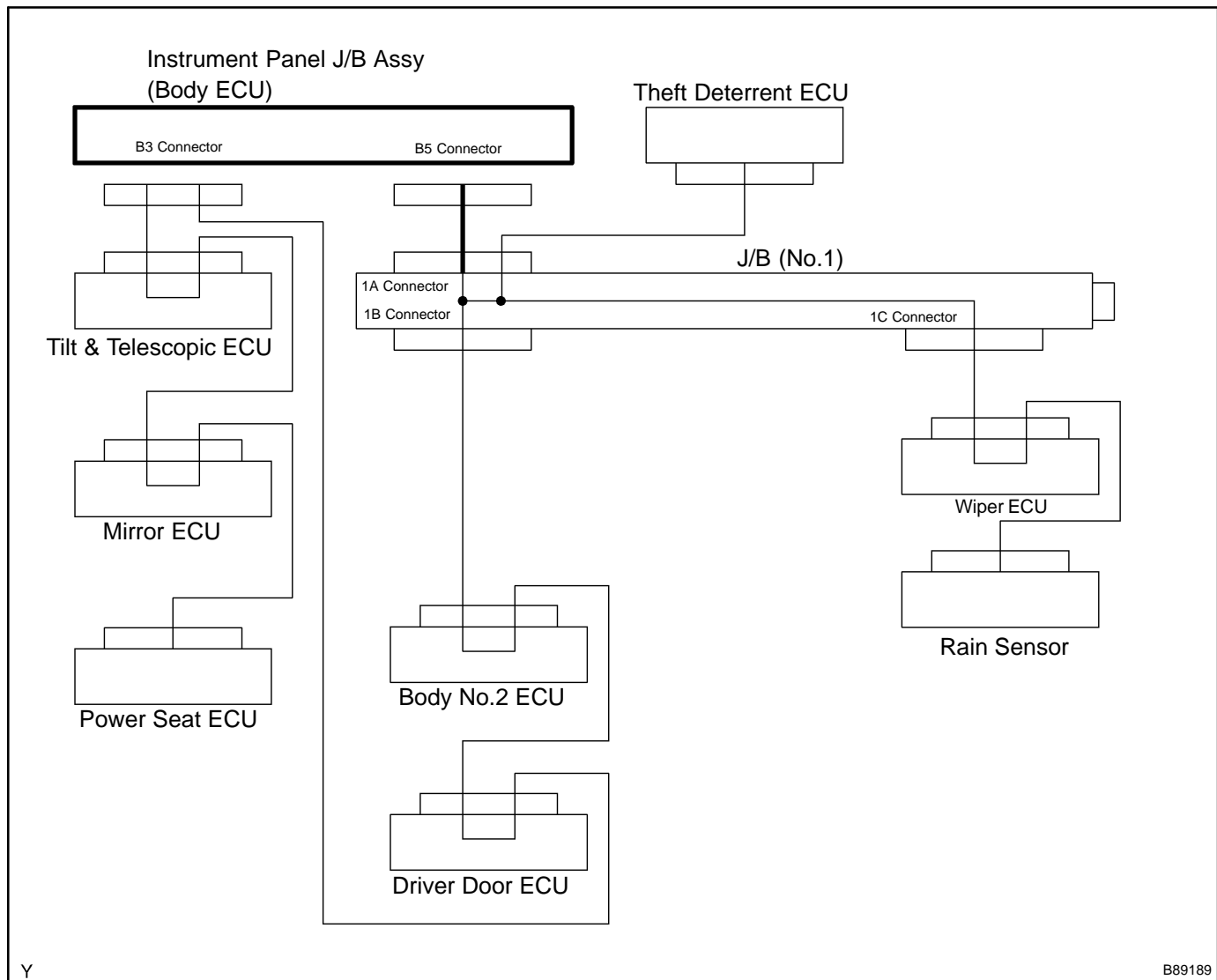
When the output of the DTC stops, the J/B (No.1) is abnormal.

YES → REPLACE JUNCTION BLOCK (No.1)

NO

18 CHECK DTC (BODY ECU OR WIRE HARNESS (BODY ECU ↔ J/B))

(a) Check whether the output of the DTC stops when the body ECU is disconnected.



NOTICE:

Disconnect connectors in operational sequence, and start the next operation after the connector is connected.

Standard:

When the output of the DTC stops, the body ECU or the wire harness between the B5 connector of the body ECU and the 1A connector of the J/B (No.1) is abnormal.

YES → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NO

REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSY (BODY ECU)

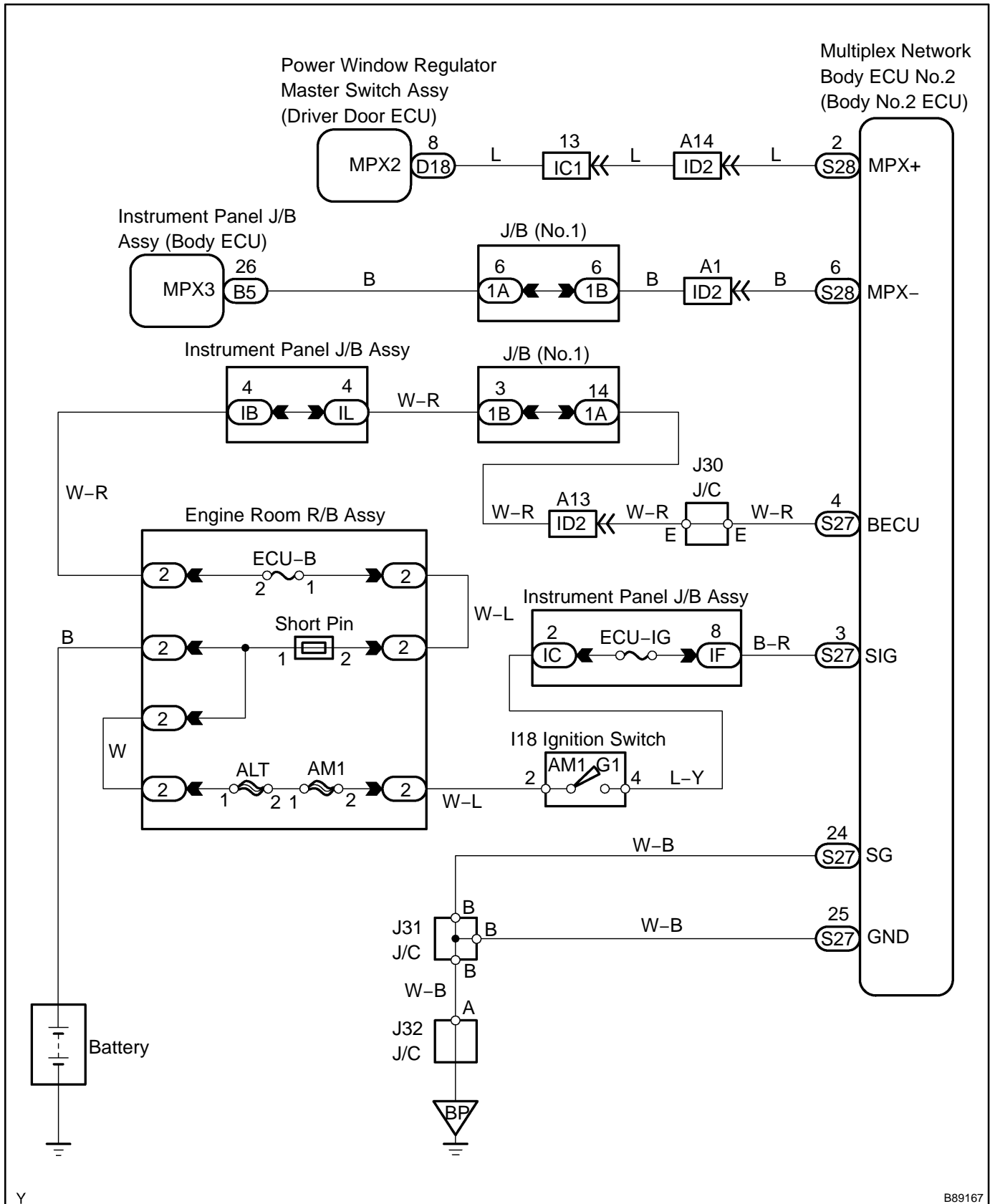
DTC	B1218	BODY NO.2 ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1218 is output when the communication between the body No.2 ECU and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1218	Body No.2 ECU communication stops	<ul style="list-style-type: none"> • Multiplex network body ECU No.2 (Body No.2 ECU) • Wire harness

WIRING DIAGRAM



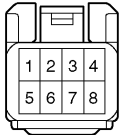
Y

B89167

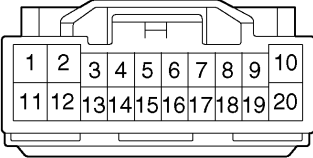
INSPECTION PROCEDURE

1 CHECK CONTINUITY OF COMMUNICATION LINE

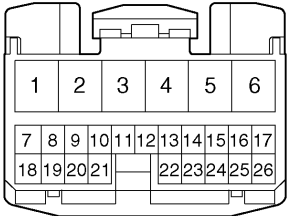
Wire Harness Side:
 S28
 Multiplex Network Body
 ECU No.2 (Body No.2 ECU)



D18
 Power Window Regulator
 Master Switch Assy
 (Driver Door ECU)



B5
 Instrument Panel J/B
 Assy (Body ECU)



Y B90287

- (a) Disconnect the S28 ECU and D18 master switch connectors.
 - (b) Check the continuity between the wire harness side connectors.
- Standard:**

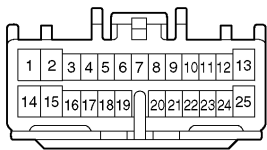
Symbols (Terminal No.)	Specified Condition
MPX+ (S28-2) ↔ MPX2 (D18-8)	Continuity
MPX- (S28-6) ↔ MPX3 (B5-26)	Continuity

OK

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

2 CHECK MULTIPLEX NETWORK BODY ECU NO.2 (BODY No.2 ECU) (POWER SOURCE)

Wire Harness Side:
 S27
 Multiplex Network Body
 ECU No.2 (Body No.2 ECU)



B66421

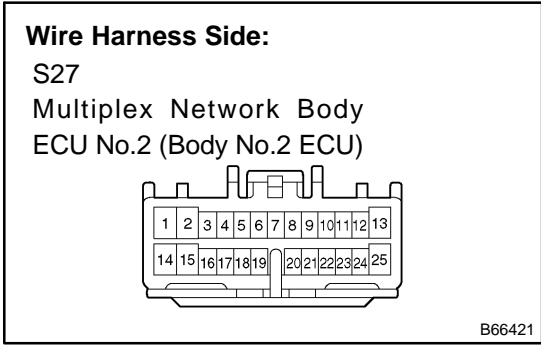
- (a) Disconnect the S27 ECU connector.
 - (b) Check the voltage between the wire harness side connector and body ground.
- Standard:**

Symbols (Terminal No.)	Specified Condition
BECU (S27-4) ↔ Body ground	10 - 14 V
SIG (S27-3) ↔ Body ground	10 - 14 V

OK

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

**3 CHECK MULTIPLEX NETWORK BODY ECU NO.2 (GROUND)
(BODY No.2 ECU)**



- (a) Disconnect the S27 ECU connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
SG (S27-24) ⇔ Body ground	Continuity
GND (S27-25) ⇔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE MULTIPLEX NETWORK BODY ECU NO.2

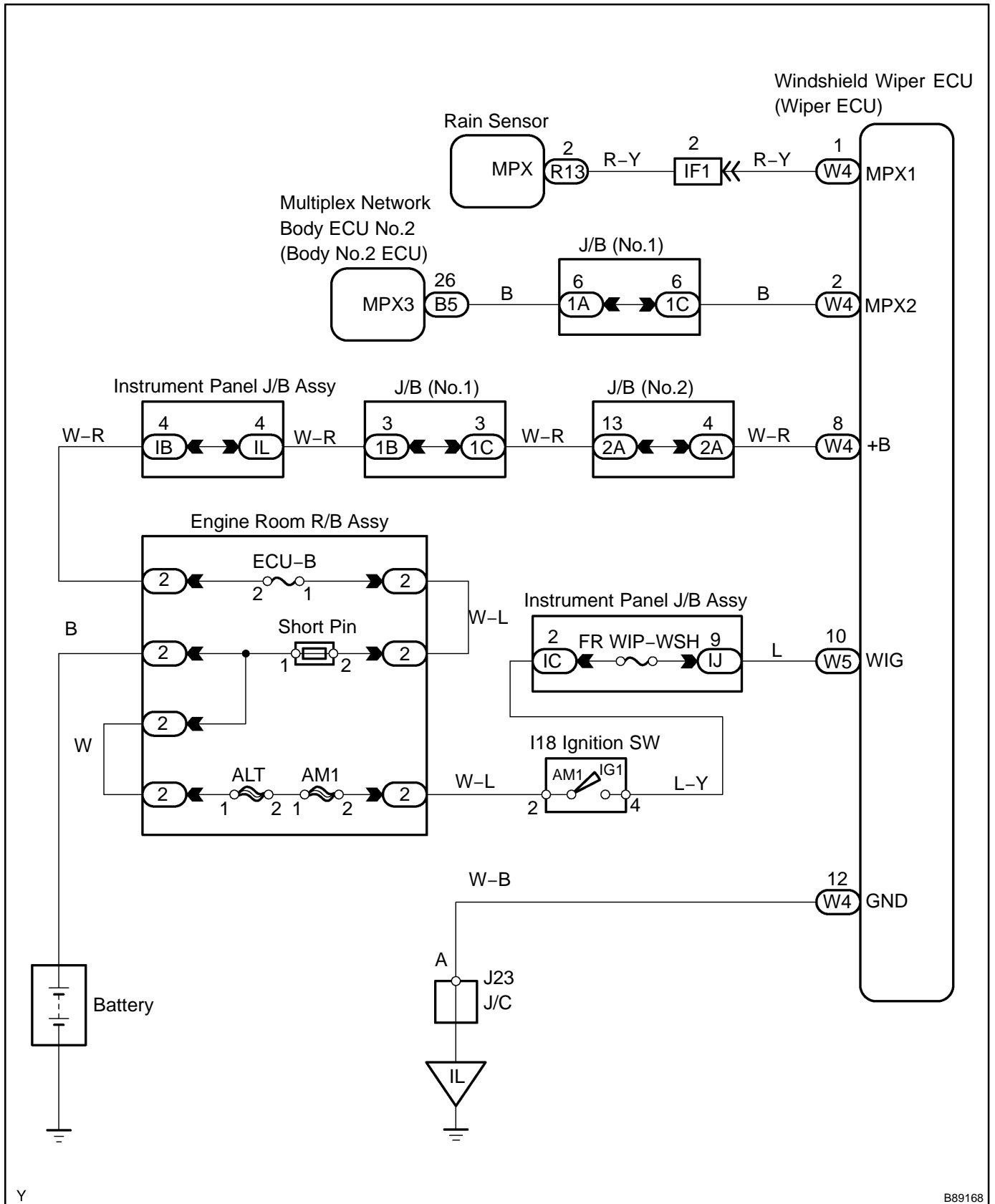
DTC	B1245	WIPER ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1245 is output when the communication between the wiper ECU and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1245	Wiper ECU communication stops	<ul style="list-style-type: none"> • Windshield wiper ECU (Wiper ECU) • Wire harness

WIRING DIAGRAM



Y

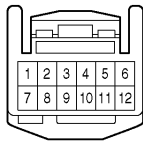
B89168

INSPECTION PROCEDURE

1 CHECK CONTINUITY OF COMMUNICATION LINE

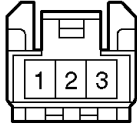
Wire Harness Side:

W4
Windshield Wiper ECU (Wiper ECU)

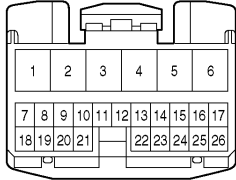


Y

R13
Rain Sensor



B5
Instrument Panel J/B Assy
(Body ECU)



Y

B66647

- (a) Disconnect the W4 ECU, R13 rain sensor and B5 J/B connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

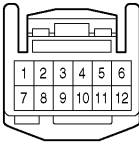
Symbols (Terminal No.)	Specified Condition
MPX2 (W4-2) ↔ MPX3 (B5-26)	Continuity
MPX1 (W4-1) ↔ MPX (R13-2)	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

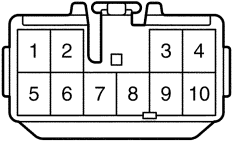
2 CHECK WINDSHILD WIPER ECU (WIPER ECU) (POWER SOURCE)

Wire Harness Side:
 W4
 Windshield Wiper ECU
 (Wiper ECU)



Y

W5
 Windshield Wiper ECU
 (Wiper ECU)



P

B66648

- (a) Disconnect the W4 and W5 ECU connectors.
- (b) Check the voltage between the wire harness side connector and body ground.

Standard:

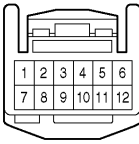
Symbols (Terminal No.)	Specified Condition
+B (W4-8) ⇔ Body ground	10 - 14 V
WIG (W5-10) ⇔ Body ground	10 - 14 V

NG REPAIR OR REPLACE FUSE OR HARNESS AND CONNECTOR

OK

3 CHECK WINDSHILD WIPER ECU (WIPER ECU) (GROUND)

Wire Harness Side:
 W4
 Windshield Wiper ECU
 (Wiper ECU)



B66308

- (a) Disconnect the W4 ECU connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
GND (W4-12) ⇔ Body ground	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE WINDSHILD WIPER ECU

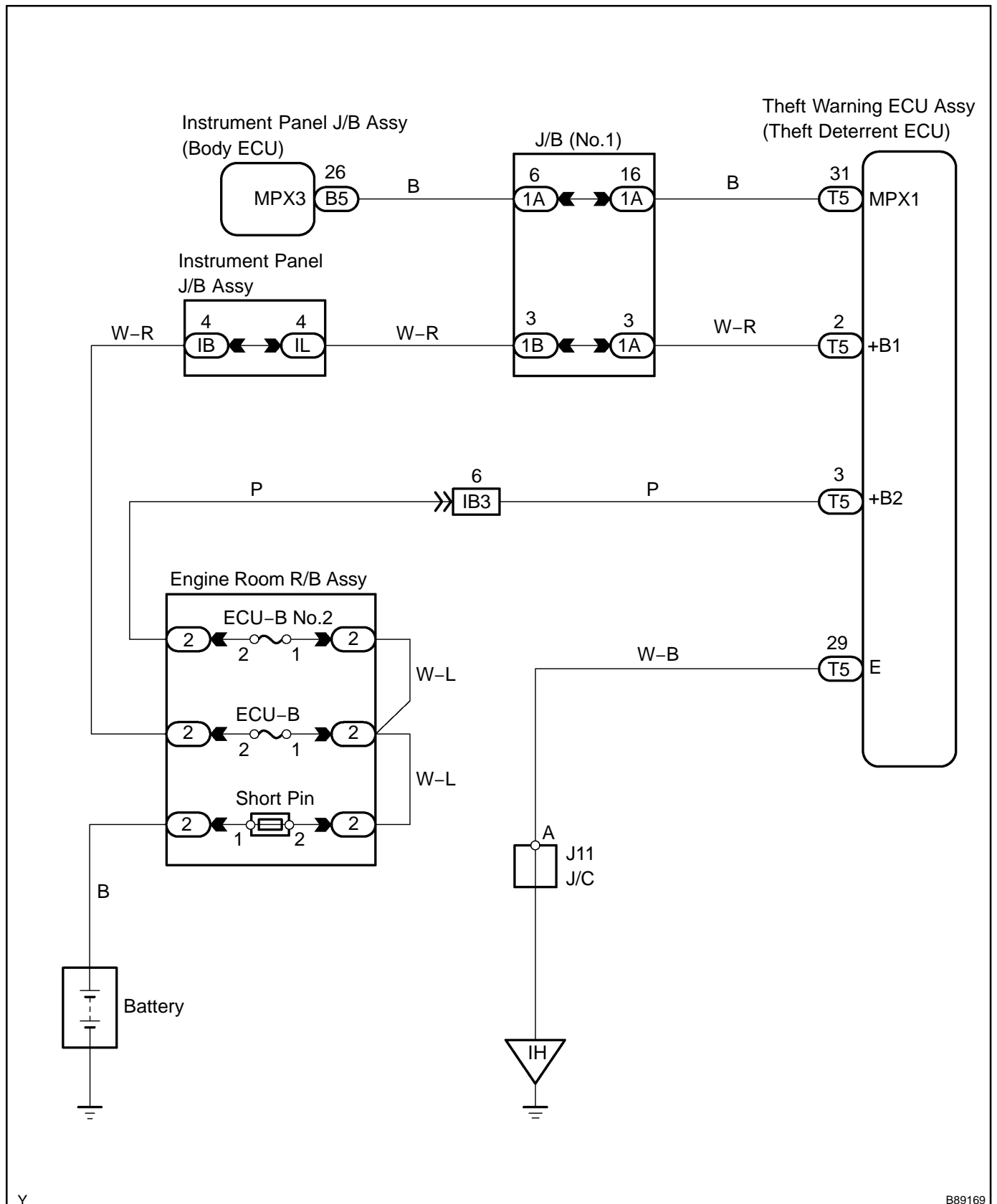
DTC	B1269	THEFT DETERRENT ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1269 is output when the communication between the theft deterrent ECU and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1269	No communication from theft deterrent ECU for more than 10 seconds	<ul style="list-style-type: none"> • Theft warning ECU assy (Theft deterrent ECU) • Wire harness

WIRING DIAGRAM



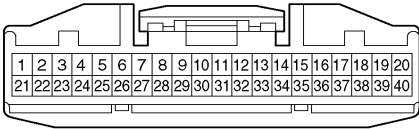
Y

B89169

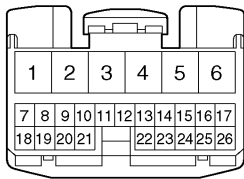
1 REPLACE CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

T5
Theft Warning ECU Assy
(Theft Deterrent ECU)



B5
Instrument Panel J/B Assy
(Body ECU)



B65848

- (a) Disconnect the T5 ECU and B5 J/B connectors.
- (b) Check the continuity between wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX1 (T5-31) ↔ MPX3 (B5-26)	Continuity

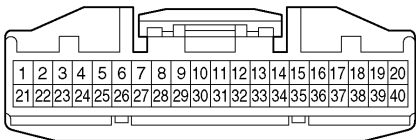
NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) (POWER SOURCE)

Wire Harness Side:

T5
Theft Warning ECU
(Theft Deterrent ECU)



B65849

- (a) Disconnect the T5 ECU connector.
- (b) Check the voltage between the wire harness side connector and body ground.

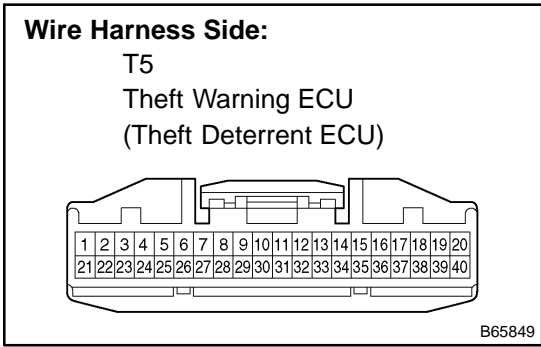
Standard:

Symbols (Terminal No.)	Specified Condition
+B1 (T5-2) ↔ Body ground	10 - 14 V
+B2 (T5-3) ↔ Body ground	10 - 14 V

NG REPAIR OR REPLACE FUSE OR HARNESS AND CONNECTOR

OK

3 CHECK THEFT WARNING ECU ASSY (THEFT DETERRENT ECU) (GROUND)



- (a) Disconnect the T5 ECU connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
E (T5-29) ⇔ Body ground	Continuity

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE THEFT WARNING ECU ASSY

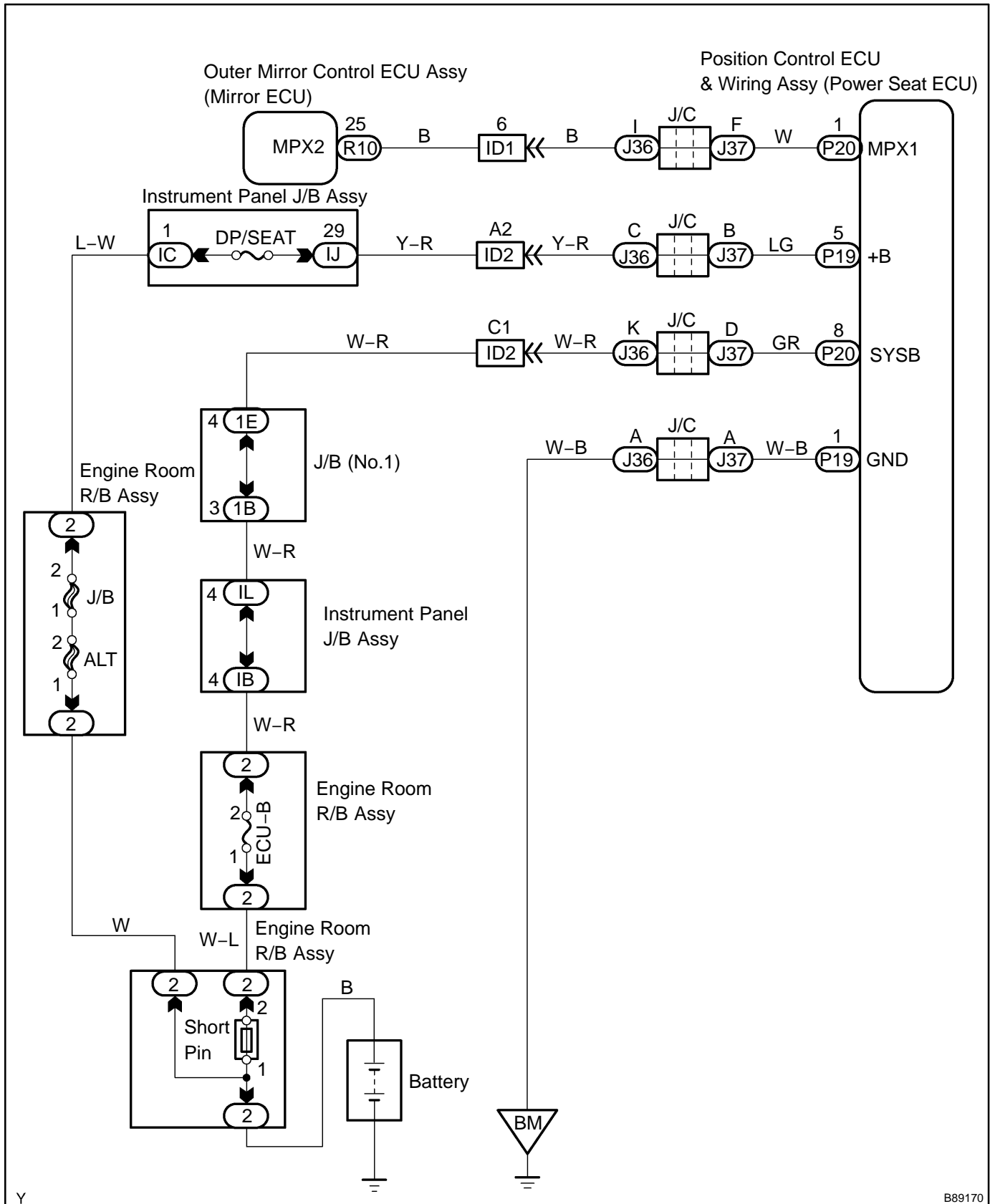
DTC	B1272	POWER SEAT ECU COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1272 is output when the communication between the power seat ECU and the body ECU stops for more than 10 seconds.

DTC NO.	DTC Detection Condition	Trouble Area
B1272	Power seat ECU communication stops	<ul style="list-style-type: none"> • Position control ECU & wiring assy (Power seat ECU) • Wire harness

WIRING DIAGRAM



Y

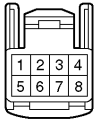
B89170

INSPECTION PROCEDURE

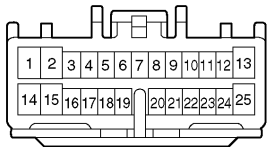
1 CHECK CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

P20
Front Power Seat Switch
(Power Seat ECU)



R10
Outer Mirror Control ECU Assy
(Mirror ECU)



Y

Y

B66649

- (a) Disconnect the P20 switch and R10 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX1 (P20-1) ↔ MPX2 (R10-25)	Continuity

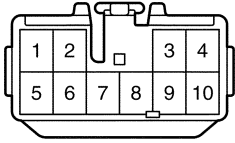
NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK FRONT POWER SEAT SWITCH (POWER SEAT ECU) (POWER SOURCE)

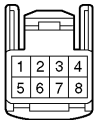
Wire Harness Side:

P19
Front Power Seat Switch
(Power Seat ECU)



P

P20
Front Power Seat Switch
(Power Seat ECU)



Y

B66680

- (a) Disconnect the P19 and P20 switch connectors.
- (b) Check the voltage between the wire harness side connector and body ground.

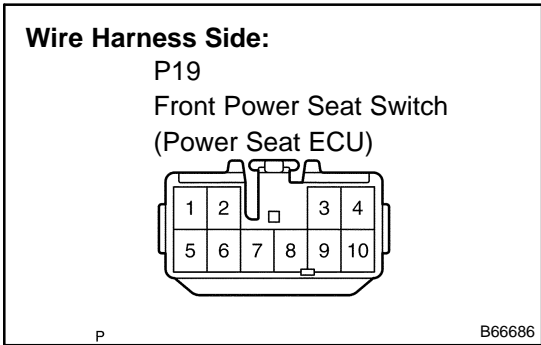
Standard:

Symbols (Terminal No.)	Specified Condition
+B (P19-5) ↔ Body ground	10 - 14 V
SYSB (P20-8) ↔ Body ground	10 - 14 V

NG REPAIR OR REPLACE FUSE OR HARNESS AND CONNECTOR

OK

3 CHECK FRONT POWER SEAT SWITCH (DRIVER DOOR ECU) (GROUND)



- (a) Disconnect the P19 switch connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
GND (P19-1) ⇔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE FRONT POWER SEAT SWITCH

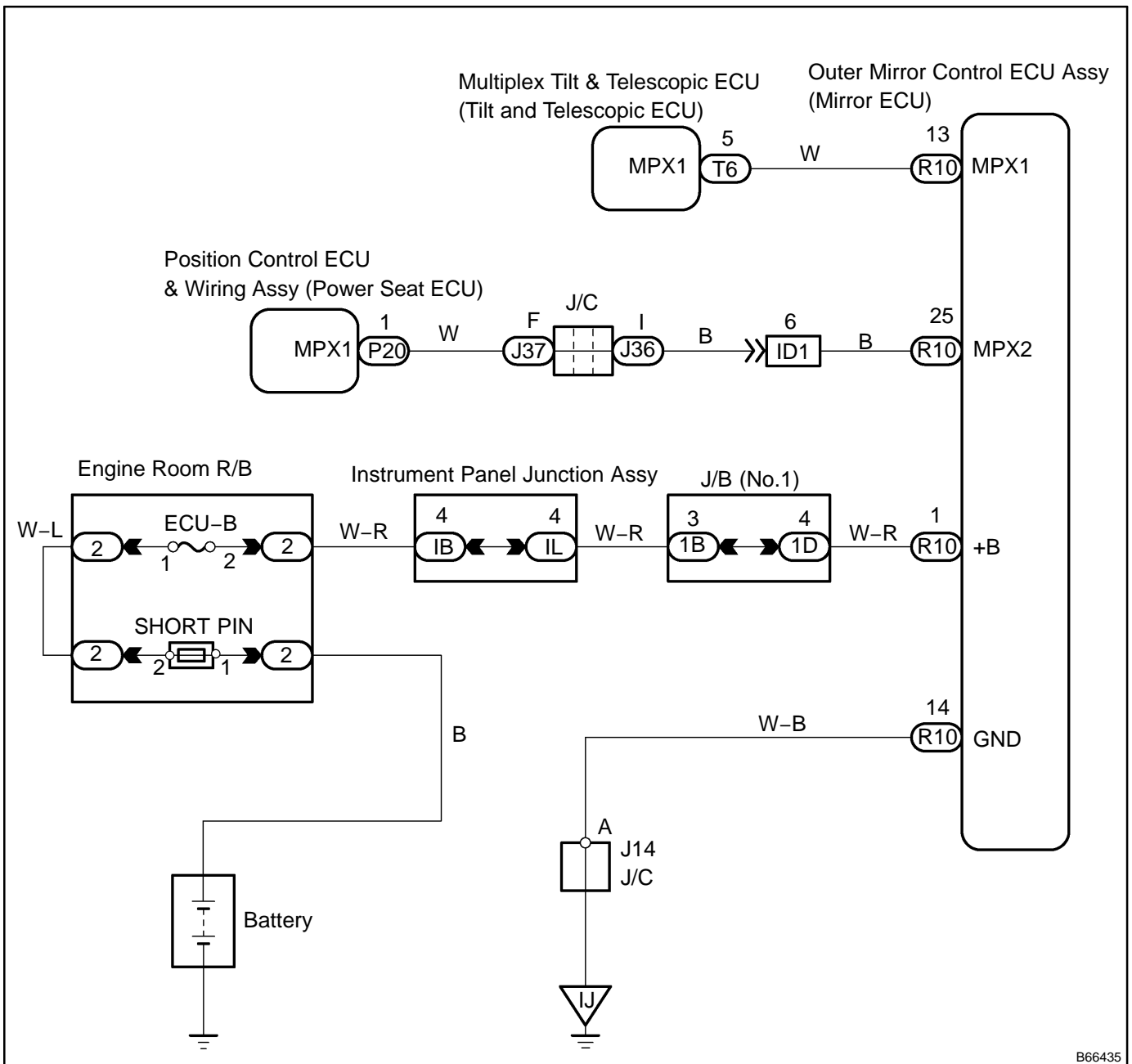
DTC	B1276	A/C AND METER ECU (MIRROR) COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1276 is output when the communication between the mirror ECU and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1276	A/C and meter ECU (mirror) communication stops	<ul style="list-style-type: none"> • Outer mirror control ECU Assy (Mirror ECU) • Wire harness

WIRING DIAGRAM

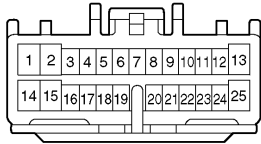


B66435

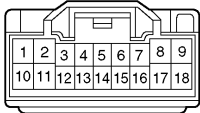
1 CHECK CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

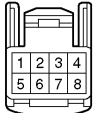
R10
Outer Mirror Control ECU Assy
(Mirror ECU)



T6
Multiplex Tilt & Telescopic ECU
(Tilt and Telescopic ECU)



P20
Position Control ECU & Wiring Assy
(Power Seat ECU)



B66682

- (a) Disconnect the R10, T6 and P20 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX1 (R10-13) ↔ MPX1 (T6-5)	Continuity
MPX2 (R10-25) ↔ MPX1 (P20-1)	Continuity

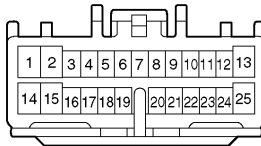
NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK OUTER MIRROR CONTROL ECU ASSY (MIRROR ECU) (POWER SOURCE)

Wire Harness Side:

R10
Outer Mirror Control ECU Assy
(Mirror ECU)



B66421

- (a) Disconnect the R10 ECU connector.
- (b) Check the voltage between the wire harness side connector and body ground.

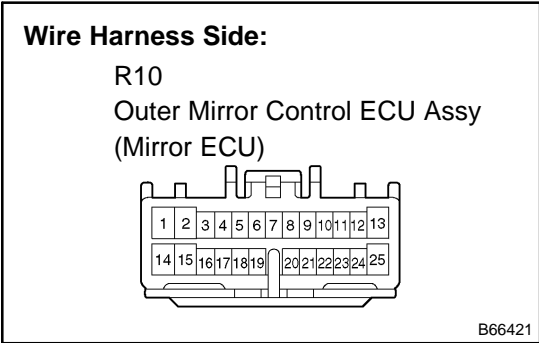
Standard:

Symbols (Terminal No.)	Specified Condition
+B (R10-1) ↔ Body ground	10 - 14 V

NG REPAIR OR REPLACE FUSE OR HARNESS AND CONNECTOR

OK

3 CHECK OUTER MIRROR CONTROL ECU ASSY (MIRROR ECU) (GROUND)



- (a) Disconnect the R10 ECU connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
GND (R10-14) ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE OUTER MIRROR CONTROL ECU ASSY

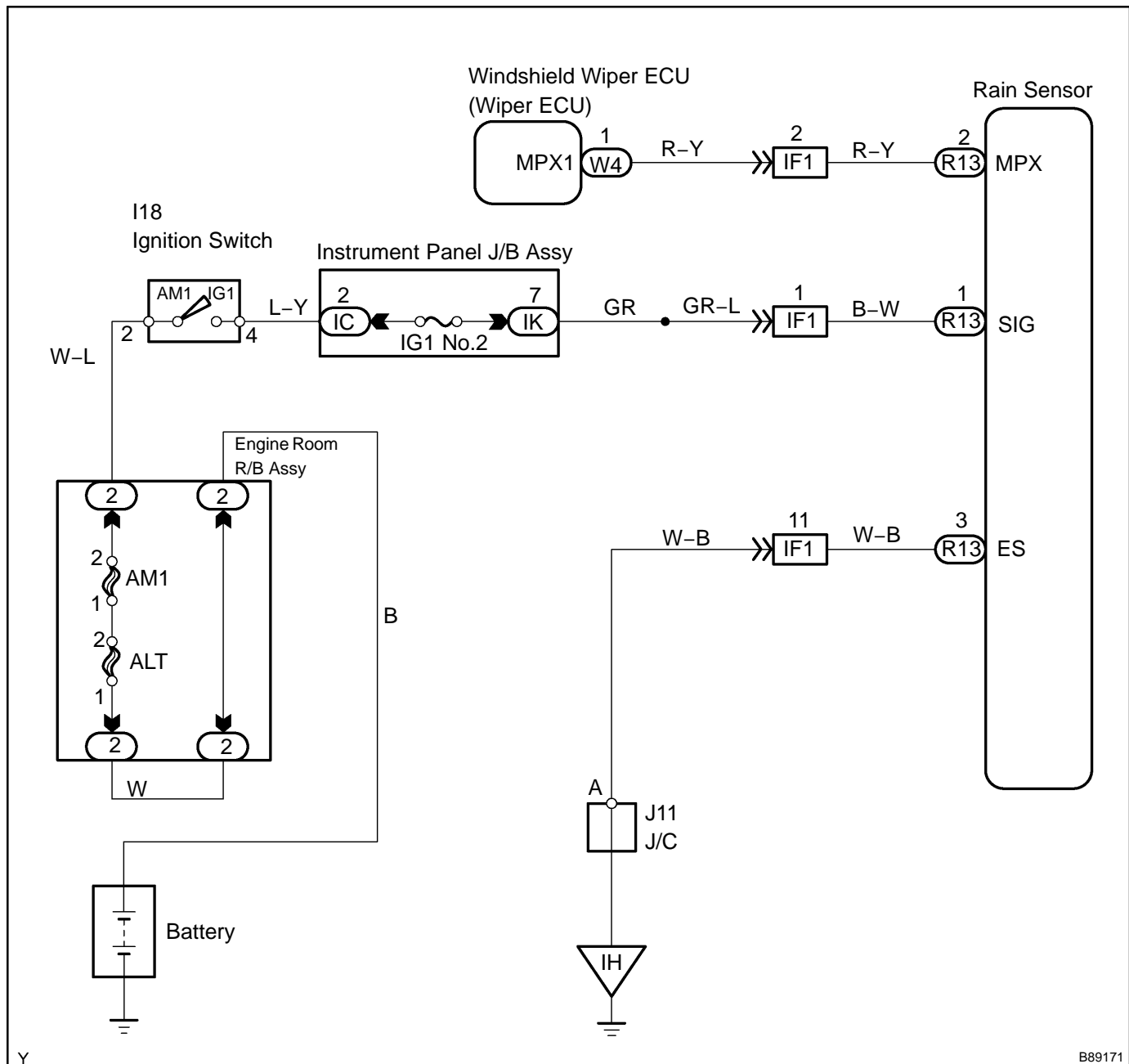
DTC	B1279	RAIN SENSOR COMMUNICATION STOP
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CIRCUIT DESCRIPTION

DTC B1279 is output when the communication between the rain sensor and the body ECU stops for more than 10 seconds.

DTC No.	DTC Detection Condition	Trouble Area
B1279	Rain sensor communication stops	<ul style="list-style-type: none"> • Rain sensor • Wire harness

WIRING DIAGRAM



Y

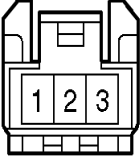
B89171

INSPECTION PROCEDURE

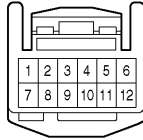
1 CHECK CONTINUITY OF COMMUNICATION LINE

Wire Harness Side:

R13
Rain Sensor



W4
Windshield Wiper ECU
(Wiper ECU)



Y B66683

- (a) Disconnect the R13 rain sensor W4 ECU connectors.
- (b) Check the continuity between the wire harness side connectors.

Standard:

Symbols (Terminal No.)	Specified Condition
MPX (R13-2) ↔ MPX1 (W4-1)	Continuity

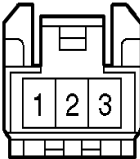
NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK RAIN SENSOR (POWER SOURCE)

Wire Harness Side:

R13
Rain Sensor



B66420

- (a) Disconnect the R13 rain sensor connector.
- (b) Check the voltage between the wire harness side connector and body ground.

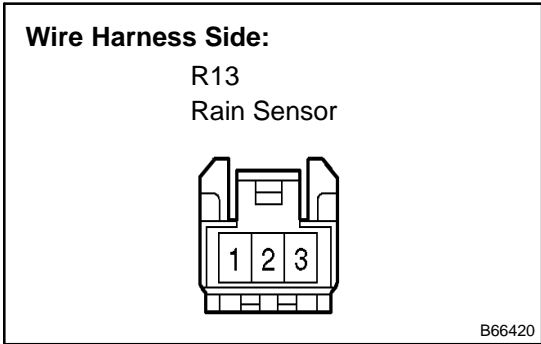
Standard:

Symbols (Terminal No.)	Specified Condition
SIG (R13-1) ↔ Body ground	10 - 14 V

NG → REPAIR OR REPLACE FUSE OR HARNESS AND CONNECTOR

OK

3 CHECK RAIN SENSOR (GROUND)



- (a) Disconnect the R13 rain sensor connector.
- (b) Check the continuity between the wire harness side connector and body ground.

Standard:

Symbols (Terminal No.)	Specified Condition
ES (R13-3) ↔ Body ground	Continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE RAIN SENSOR

CAN COMMUNICATION SYSTEM

05BYH-19

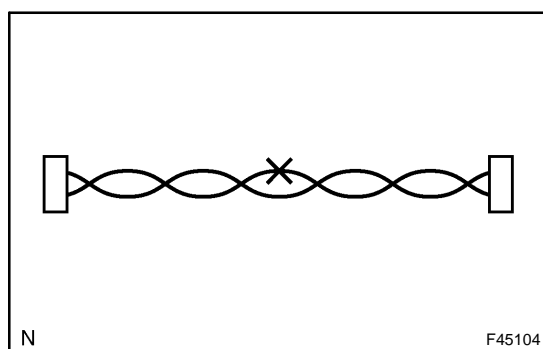
PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

- (a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in hazardous driving.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

- (a) This vehicle is equipped with an SRS (Supplemental Restraint System), such as the driver airbag and front passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS airbag to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the SRS (see page 60-1).

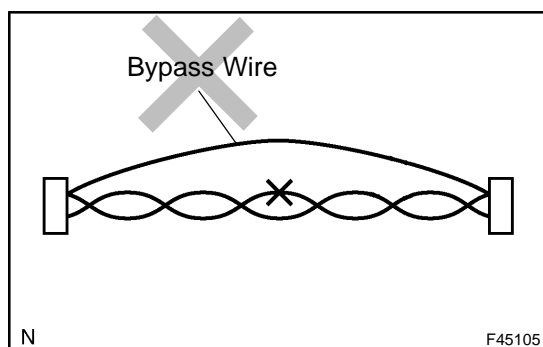


3. WIRE HARNESS REPAIR

- (a) After repairing the wire bus line with solder, wrap the repaired part with vinyl tape.

NOTICE:

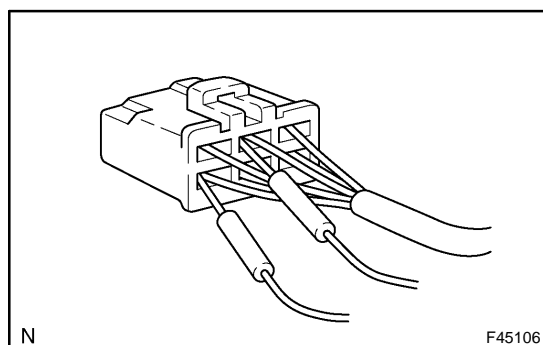
- The CANL bus line and CANH bus line must be installed together all the time. When installing, make sure to twist them.
- The difference in length of the CANL bus line and CANH bus line should be within 100 mm (3.93 in.).
- Untwisted parts around the connector should be within 80 mm (3.15 in.).



- (b) Do not use a bypass wire between the connectors.

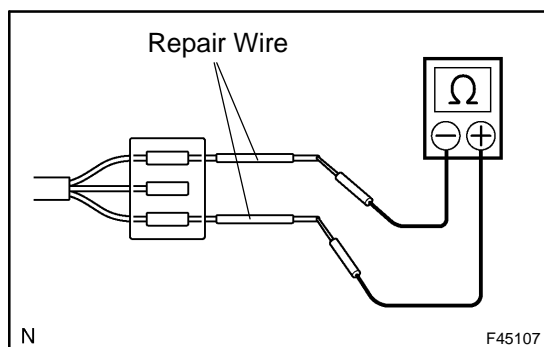
NOTICE:

If you use a bypass wire, the characteristic of the twisted wire harness will be lost.



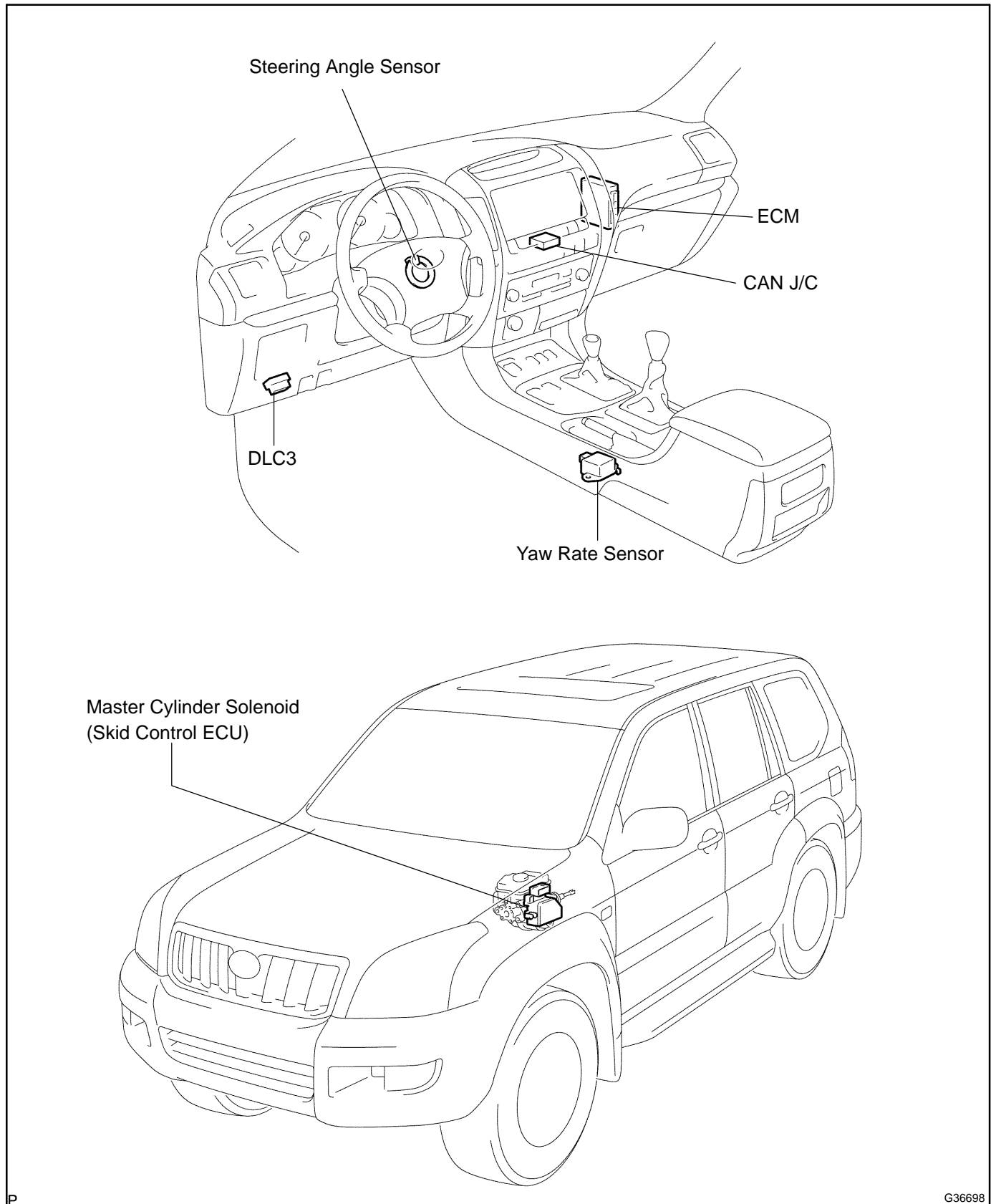
4. CONNECTOR HANDLING

- (a) When inserting tester probes into a connector, insert them from the back of the connector.



- (b) If it is impossible to check resistance from the back of the connector, use a repair wire to check it.

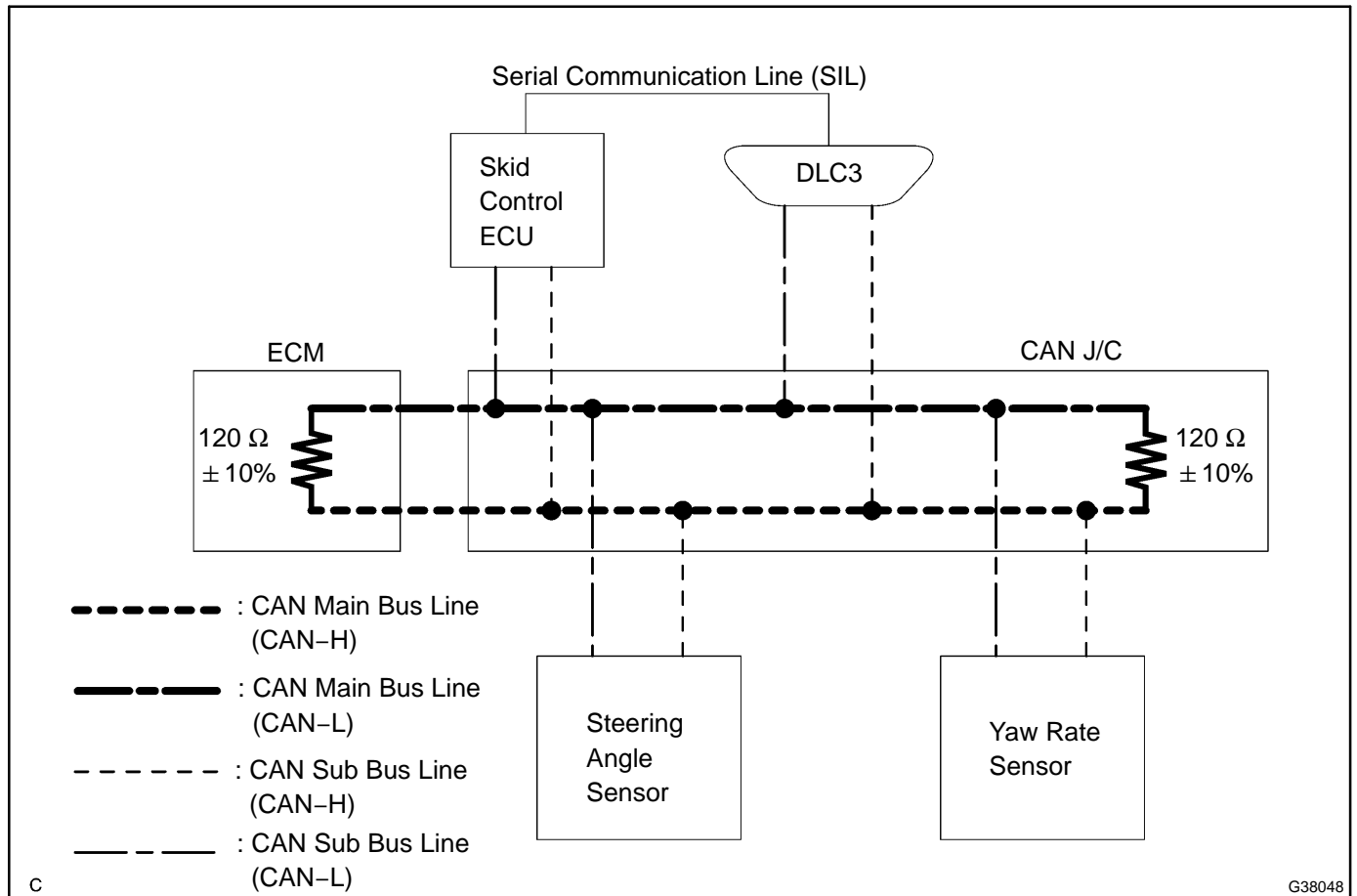
LOCATION



P

G36698

SYSTEM DIAGRAM



HINT:

- The skid control ECU stores DTCs and performs DTC communication by receiving information from the steering angle sensor and yaw rate sensor. These sensors cannot store DTCs or perform DTC communication.
- The ECM uses the CAN communication system to perform DTC communication instead of the conventional serial communication line (SIL).

SYSTEM DESCRIPTION

1. BRIEF DESCRIPTION

- (a) CAN (Controller Area Network) is a serial data communication system for real time application. It is an in-vehicle multiplex communication system which has a high communication speed (500 kbps) and a function to detect malfunctions.
- (b) The CAN performs communication based on differential voltage by pairing the CANH bus line and CANL bus line.
- (c) This vehicle uses the CAN communication system for communication between the components in the ABS with EBD & BA & TRC & VSC system.
- (d) The CAN has two resistors of 120 Ω that are necessary for communication with the main bus line.

2. DEFINITION OF TERMS

- (a) Main bus line
 - (1) The main bus line is a wire harness between the two terminus circuits on the bus (communication line). This is the main bus in the CAN communication system.
- (b) Sub bus line
 - (1) The sub bus line is a wire harness which diverges from the main bus line to an ECU or sensor.
- (c) Terminus circuit
 - (1) The terminus circuit is a circuit which is placed to convert communication current of the CAN communication into bus voltage. It consists of a resistor and condenser. Two terminus circuits are necessary for a bus.
- (d) CAN J/C
 - (1) The CAN J/C is a junction designed for CAN communication, which stores a terminus circuit.

3. COMPONENTS WHICH COMMUNICATE THROUGH THE CAN COMMUNICATION SYSTEM

- (a) Skid Control ECU
- (b) Steering Angle Sensor
- (c) Yaw Rate Sensor
- (d) ECM

4. DIAGNOSTIC CODES FOR THE CAN COMMUNICATION SYSTEM

- (a) DTCs for the CAN communication system are as follows:
U0073/94, U0123/62, U0124/95, U0126/63, U0100/65

5. REMARKS FOR TROUBLESHOOTING

- (a) Trouble in the CAN bus (communication line) can be checked from the DLC3 (except a wire break in lines other than the DLC3 sub bus line).
- (b) The CAN communication system cannot detect trouble in the DLC3 sub bus line even though the DLC3 is also connected to the CAN communication system.

6. HOW TO DISTINGUISH THE J/C CONNECTOR

- (a) In the CAN communication system, all connectors connected to the CAN J/C are the same shape. The connectors connected to the CAN J/C can be distinguished by the colors of the bus lines and the connecting side of the connector.

HINT:

See "TERMINALS OF ECU" (see page [05-2324](#)) for bus line colors or the type of connecting surface.

HOW TO PROCEED WITH TROUBLESHOOTING

NOTICE:

- DTCs for the CAN communication system are as follows:
U0073/94, U0123/62, U0124/95, U0126/63, U100/65.
- Refer to troubleshooting of each system if DTCs regarding the CAN communication system are not output.

1 CHECK AND CLEAR DTCs

NEXT

2 CHECK CAN BUS LINE (SEE PAGE 05-2332)

NEXT

3 CHECK USING HAND-HELD TESTER VIA CAN VIM

(a) Select "BUS CHECK" (see page 05-2329).

Result:

A	All ECUs and sensors connected to the CAN communication system are displayed.
B	An ECU or sensor not connected to the CAN communication system is displayed.
C	A few ECUs or sensors not connected to the CAN communication system are displayed.

B

**COMMUNICATION STOP MODE TABLE
(SEE PAGE 05-2323)**

C

**CHECK FOR AN OPEN IN ONE SIDE OF THE
CAN SUB BUS LINE (SEE PAGE 05-2368)**

A

4 DTC COMBINATION TABLE (SEE PAGE 05-2323)

(a) Confirm trouble according to the combination of output DTCs regarding the CAN communication system.

HINT:

Previous CAN communication system DTCs may be the cause if CAN communication system DTCs are output and all ECUs and sensors connected to the CAN communication system are displayed on the hand-held tester's "BUS CHECK" screen via the CAN VIM.

NEXT

5 CIRCUIT INSPECTION

NEXT

6 IDENTIFICATION OF PROBLEM

NEXT

7	REPAIR OR REPLACE
----------	--------------------------

NEXT

8	CONFIRMATION TEST
----------	--------------------------

NEXT

END

CUSTOMER PROBLEM ANALYSIS CHECK

CAN Communication System Check Sheet

Inspector's Name : _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuously <input type="checkbox"/> Intermittently (times a day)

DTC Check	1st Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code (Code)
	2nd Time	<input type="checkbox"/> Normal System Code <input type="checkbox"/> Trouble Code (Code)

PROBLEM SYMPTOMS TABLE

1. COMMUNICATION STOP MODE TABLE

- (a) Complete "CHECK CAN BUS LINE" (see page [05-2332](#)) to confirm that there is no malfunction in the CAN bus line. Select "BUS CHECK" on the hand-held tester via the CAN VIM (see page [05-2329](#)).
- (b) Check the communication stop mode of the ECUs or sensors is not displayed among the following: "ENGINE", "ABS/VSC/TRAC", "YAW /DECELERAT" or "STEERING SENSOR".

NOTICE:

If 2 or more ECUs or sensors are not displayed on the hand-held tester via the CAN VIM, perform troubleshooting for the communication stop mode of each undisplayed ECU or sensor. (Either side of the CAN sub bus lines may be open (see page [05-2368](#)).

Symptom	Inspection Item	Reference page or part to be replaced
"ENGINE" is not displayed on the hand-held tester via CAN VIM.	ECM COMMUNICATION STOP MODE	ECM (*1)
"ABS/VSC/TRAC" is not displayed on the hand-held tester via CAN VIM.	SKID CONTROL ECU COMMUNICATION STOP MODE	05-2335
"STEERING SENSOR" is not displayed on the hand-held tester via CAN VIM.	STEERING ANGLE SENSOR COMMUNICATION STOP MODE	05-2337
"YAW /DECELERAT" is not displayed on the hand-held tester via CAN VIM.	YAW RATE SENSOR COMMUNICATION STOP MODE	05-2339

HINT:

*1....."ENGINE" is not displayed on the hand-held tester via the CAN VIM if no power is supplied to the ECM.

2. DTC COMBINATION TABLE

- (a) Perform troubleshooting according to the combination of DTCs output.

Trouble Mode	U0100/65	U0073/94	U0123/62	U0124/95	U0126/63
SKID CONTROL ECU COMMUNICATION STOP MODE	○	○	○	○	○
YAW RATE SENSOR COMMUNICATION STOP MODE	-	-	○	○	-
STEERING ANGLE SENSOR COMMUNICATION STOP MODE	-	-	-	-	○
ECM COMMUNICATION STOP MODE (*2)	○	-	-	-	-

HINT:

- Previous CAN communication system DTCs may be the cause if CAN communication system DTCs are output and all ECUs and sensors connected to the CAN communication system are displayed on the hand-held tester's "BUS CHECK" screen via the CAN VIM.
- U0073/94, U0123/62, U0124/95, U0126/63 and U0100/65 are the DTCs in the CAN communication system.
- *2 U0100/65 is output if no power is supplied to the ECM.
- The above table shows combinations of these DTCs.
- ☑ DTCs that are being output.
- - DTCs that are not being output.
- SKID CONTROL ECU COMMUNICATION STOP MODE: see page [05-2335](#).
- STEERING ANGLE SENSOR COMMUNICATION STOP MODE: see page [05-2337](#).
- YAW RATE SENSOR COMMUNICATION STOP MODE: see page [05-2339](#).
- ECM COMMUNICATION STOP MODE: replace ECM.

TERMINALS OF ECU

HINT:

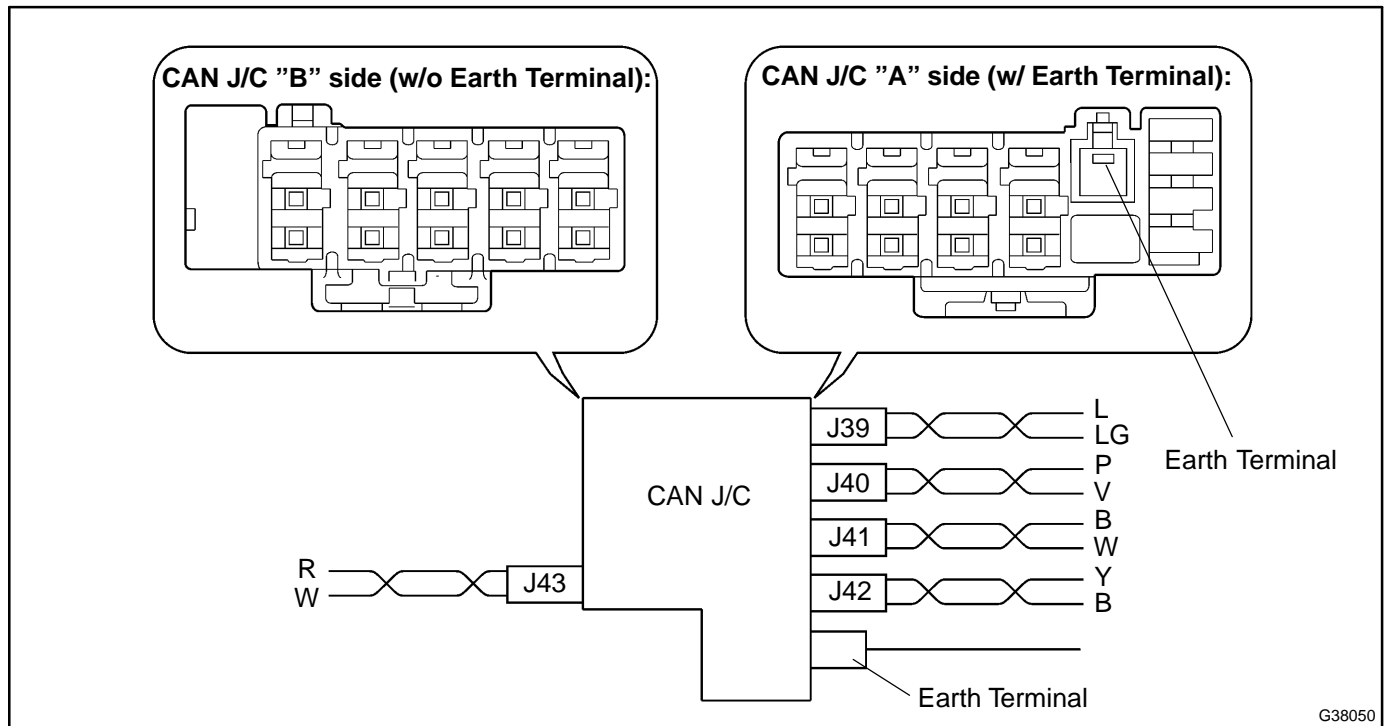
This section describes the standard CAN values for all CAN related components.

1. CAN J/C

(a) CAN J/C connectors.

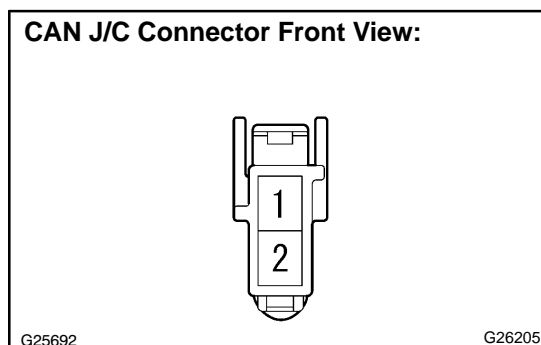
HINT:

- The connectors connected to the CAN J/C can be distinguished by the colors of the bus lines and the connecting side of the connector.
- J39, J40, J41 and J42 are interchangeable.



CAN J/C connectors ("A" side, w/ earth terminal)	Color (CAN-H Side)	Color (CAN-L Side)
ECM (J39)	L	LG
DLC3 (J40)	P	V
Skid Control ECU (J41)	B	W
Steering angle sensor (J42)	Y	B

CAN J/C connectors ("B" side, w/o earth terminal)	Color (CAN-H Side)	Color (CAN-L Side)
Yaw rate sensor (J43)	R	W



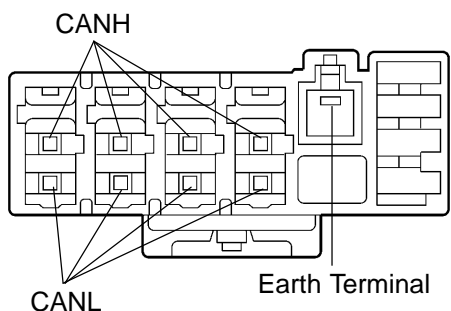
(b) The terminals of the CAN J/C connectors.

Terminal	Terminal symbol
1	CANH
2	CANL

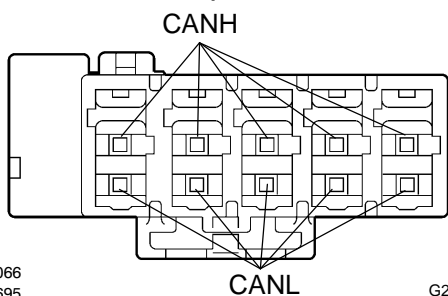
G25692

G26205

CAN J/C "A" Side (w/ Earth Terminal):



CAN J/C "B" Side (w/o Earth Terminal):



G26066
G25695

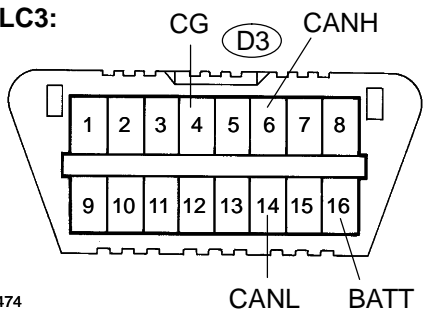
G26214

- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Specified value
CANH - CANL	108 to 132 Ω

DLC3:



G25474
C81825

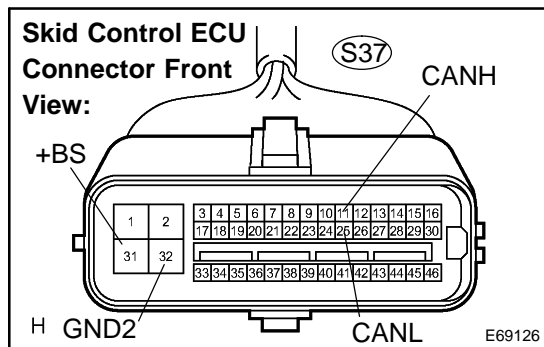
G26206

2. DLC3

- (a) Check the DLC3.
 (1) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Terminal Description	Condition	Specified Value
D3-6 (CANH) - D3-14 (CANL)	HIGH-level CAN bus line - LOW-level CAN bus line	• IG switch OFF • Stop light switch OFF	54 to 69 Ω
D3-6 (CANH) - D3-16 (BATT)	HIGH-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-14 (CANL) - D3-16 (BATT)	LOW-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-6 (CANH) - D3-4 (CG)	HIGH-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
D3-14 (CANL) - D3-4 (CG)	LOW-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher

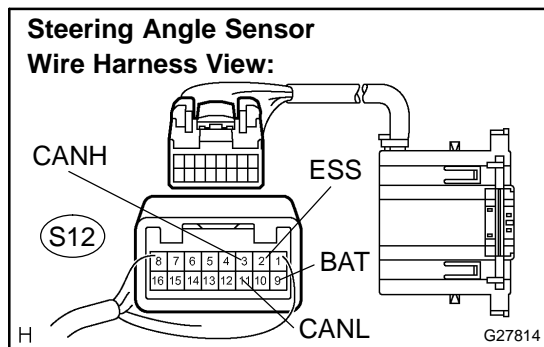


3. SKID CONTROL ECU

- (a) Check the skid control ECU harness side connector (S37).
 - (1) Disconnect the connector (S37) from the skid control ECU.
 - (2) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Wiring Color	Terminal Description	Condition	Specified Value
S37-11 (CANH) - S37-25 (CANL)	B - W	HIGH-level CAN bus line - LOW-level CAN bus line	• IG switch OFF • Stop light switch OFF	54 to 69 Ω
S37-11 (CANH) - S37-32 (GND2)	B - W-B	HIGH-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
S37-25 (CANL) - S37-32 (GND2)	W - W-B	LOW-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
S37-11 (CANH) - S37-31 (+BS)	B - Y	HIGH-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
S37-25 (CANL) - S37-31 (+BS)	W - Y	LOW-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher

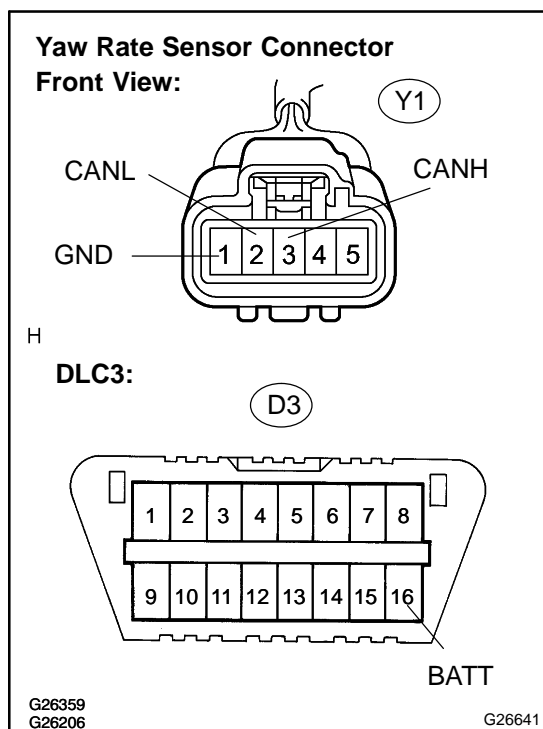


4. STEERING ANGLE SENSOR

- (a) Check the harness side connector (S12) of the steering angle sensor.
 - (1) Disconnect the connector (S12) from the steering angle sensor.
 - (2) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Wiring Color	Terminal Description	Condition	Specified Value
S12-3 (CANH) - S12-11 (CANL)	Y - B	HIGH-level CAN bus line - LOW-level CAN bus line	• IG switch OFF • Stop light switch OFF	54 to 69 Ω
S12-3 (CANH) - S12-2 (ESS)	Y - W-B	HIGH-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
S12-11 (CANL) - S12-2 (ESS)	B - W-B	LOW-level CAN bus line - Ground	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
S12-3 (CANH) - S12-9 (BAT)	Y - W-R	HIGH-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
S12-11 (CANL) - S12-9 (BAT)	B - W-R	LOW-level CAN bus line - Battery positive	• IG switch OFF • Stop light switch OFF	1 MΩ or higher



5. YAW RATE SENSOR

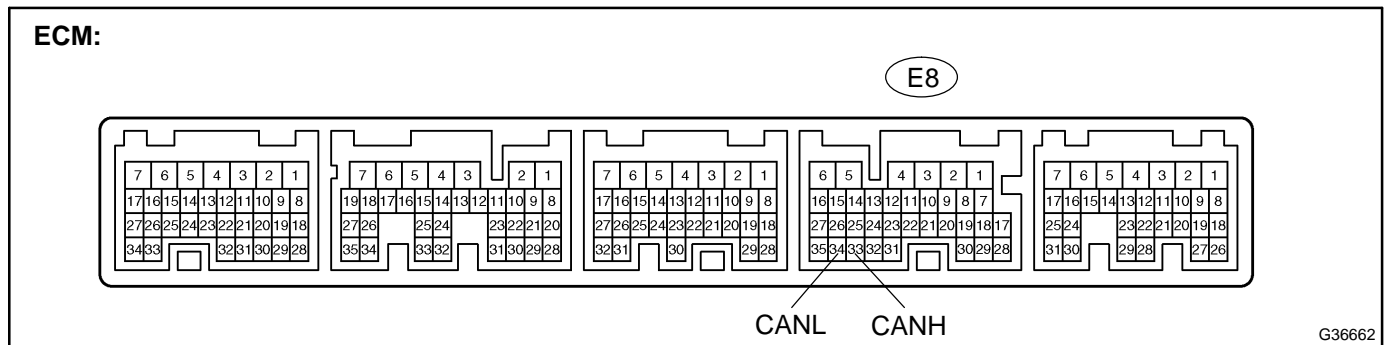
- (a) Check the yaw rate sensor harness side connector (Y1).
- (1) Disconnect the connector (Y1) from the yaw rate sensor.
 - (2) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Wiring Color	Terminal Description	Condition	Specified Value
Y1-3 (CANH) - Y1-2 (CANL)	R - W	HIGH-level CAN bus line - LOW-level CAN bus line	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω
Y1-3 (CANH) - Y1-1 (GND)	R - W-B	HIGH-level CAN bus line - Ground	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	3 k Ω or higher
Y1-2 (CANL) - Y1-1 (GND)	W - W-B	LOW-level CAN bus line - Ground	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	3 k Ω or higher
Y1-3 (CANH) - D3-16 (BATT)	R - O	HIGH-level CAN bus line - Battery positive	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	1 M Ω or higher
Y1-2 (CANL) - D3-16 (BATT)	W - O	LOW-level CAN bus line - Battery positive	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	1 M Ω or higher

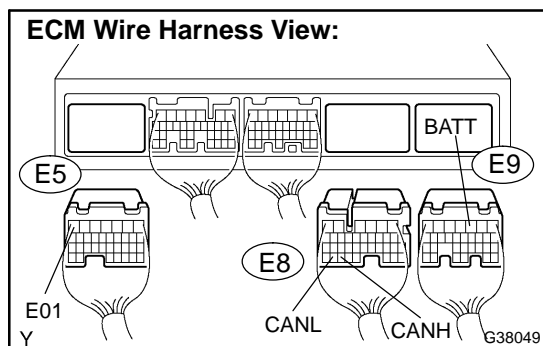
6. ECM

- (a) Measure the resistance according to the value(s) in the table below.



Standard:

Terminal	Condition	Specified Value
E8-33 (CANH) - E8-34 (CANL)	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	108 to 132 Ω

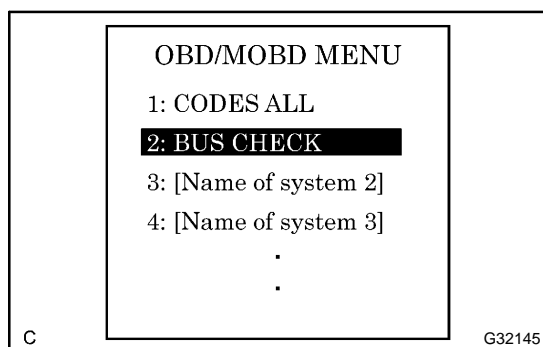


- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Terminals	Wiring Color	Condition	Specified Value
E8-33 (CANH) - E8-34 (CANL)	L - LG	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	108 to 132 Ω
E8-33 (CANH) - E5-7 (E01)	L - W-B	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	3 kΩ or higher
E8-34 (CANL) - E5-7 (E01)	LG - W-B	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	3 kΩ or higher
E8-33 (CANH) - E9-3 (BATT)	L - L	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	1 MΩ or higher
E8-34 (CANL) - E9-3 (BATT)	LG - L	<ul style="list-style-type: none"> •IG switch OFF • Stop light switch OFF 	1 MΩ or higher

DIAGNOSIS SYSTEM

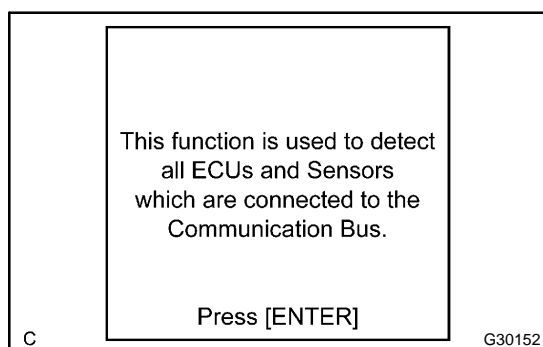


1. BUS CHECK

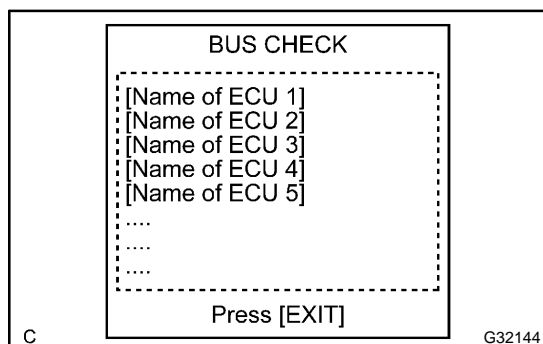
HINT:

The ECUs and sensors that are properly connected to the CAN communication system can be displayed using the hand-held tester via the CAN VIM.

- (a) Select "BUS CHECK" from the "OBD/MOBD MENU" screen.



- (b) Press "ENTER" on the hand-held tester via the CAN VIM.



- (c) The screen displays the ECUs and sensors that are properly connected to the CAN communication system.

HINT:

There is a communication stop in the system of any properly connected ECUs or sensors that are not displayed (see page [05-2323](#)).

FAIL-SAFE CHART

1. FAIL-SAFE FUNCTION

- (a) When communication fails in any of the CAN bus lines (communication lines) due to a short circuit or any other cause, the fail-safe function, which is specified for each system, operates to prevent the system from malfunctioning.
- (b) This function operates for each system when communication is impossible. (For further details, see the pages for each system.)

Function	ECM	Skid Control ECU	Steering Angle Sensor	Yaw Rate Sensor	Action when unable to communicate	DTC detection (Driver detectable)
VSC Control (Controls VSC/TRAC engine output)	-	Rx	Tx	Tx	VSC function stops	Detectable (Lamp comes on)
VSC Control (Controls VSC/TRAC engine output)	Rx or Tx	Tx or Rx	-	-	VSC function stops	Detectable (Lamp comes on)

HINT:

- Rx: Reception from each ECU (sensor).
- Tx: Transmission to each ECU (sensor).

DIAGNOSTIC TROUBLE CODE CHART

1. DTC TABLE BY ECU

HINT:

If CAN communication system DTCs are output, trouble cannot be determined only by the DTCs. Perform troubleshooting according to "HOW TO PROCEED WITH TROUBLESHOOTING" (see page [05-2320](#)).

(a) Skid Control ECU

HINT:

DTC communication uses the SIL line.

DTC No.	Detection Item
U0073/94	Control Module Communication Bus Off
U0100/65	Lost Communication With ECM/PCM "A"
U0123/62	Lost Communication With Yaw Rate Sensor Module
U0124/95	Lost Communication With Lateral Acceleration Sensor Module
U0126/63	Lost Communication With Steering Angle Sensor Module

(b) ECM

HINT:

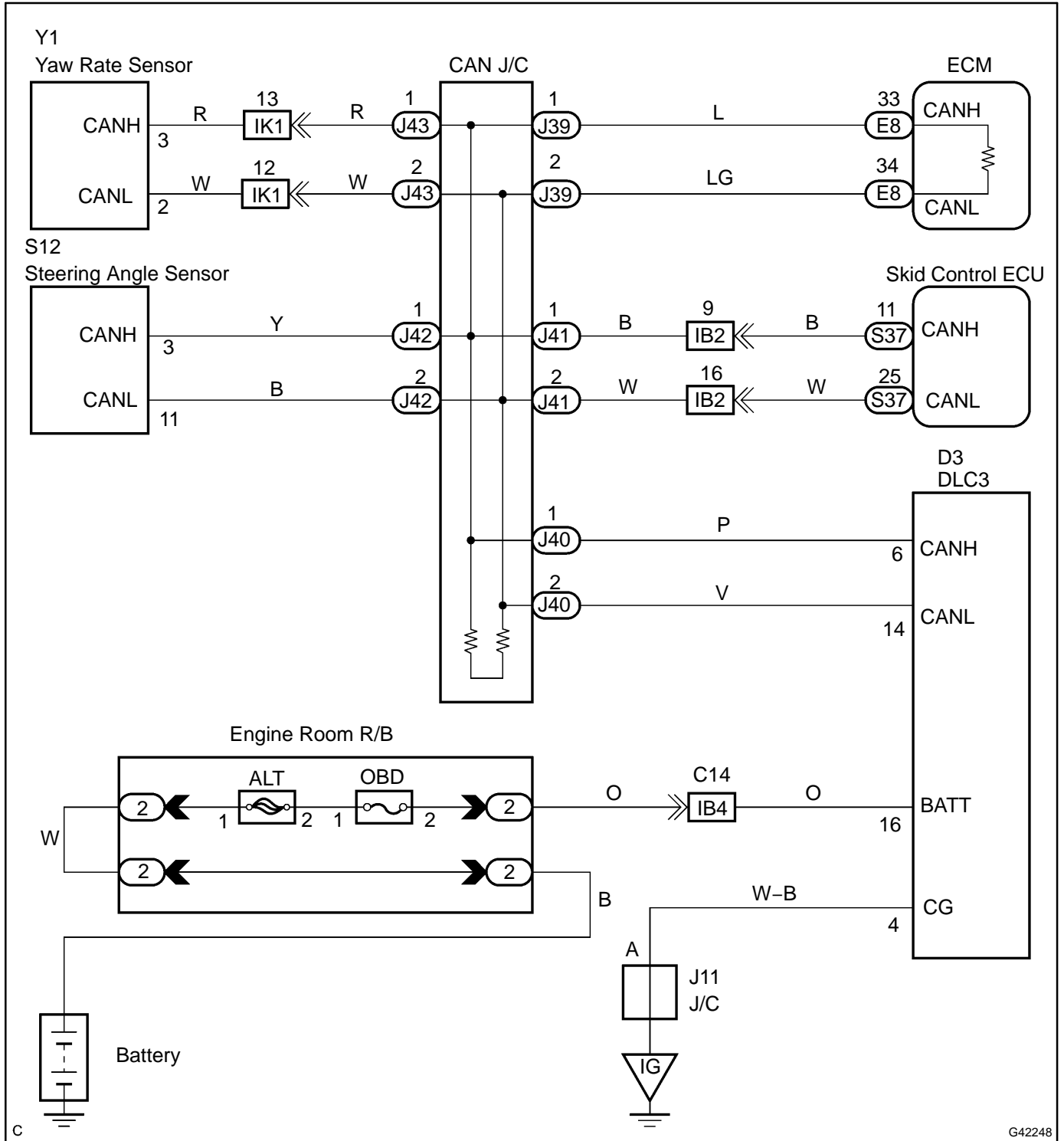
The ECM is connected to the CAN communication system, but CAN communication system DTCs are not output.

CHECK CAN BUS LINE

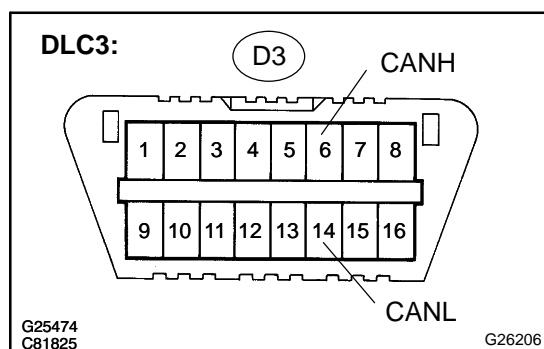
CIRCUIT DESCRIPTION

When any DTC of the CAN communication system is output, first measure the resistance between the terminals of the DLC3 and the yaw rate sensor connector to specify the trouble area.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CAN BUS LINE(MAIN BUS LINE FOR DISCONNECTION, BUS LINES FOR SHORT CIRCUIT)


(a) Measure the resistance according to the value(s) in the table below.

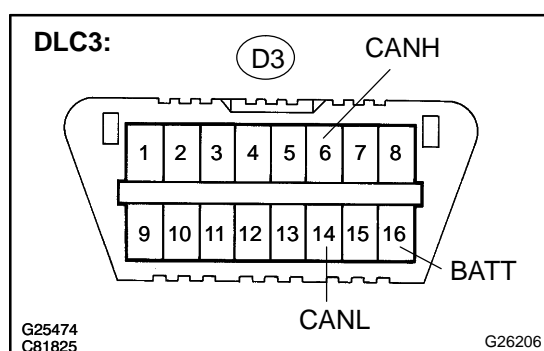
Standard:

Tester connection	Condition	Specified value	Result
D3-6 (CANH) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	54 to 69 Ω	OK
D3-6 (CANH) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	69 Ω or higher	NG-A
D3-6 (CANH) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	Below 54 Ω	NG-B

NG-A CHECK CAN MAIN BUS LINE FOR DISCONNECTION (SEE PAGE 05-2341)

NG-B CHECK CAN BUS LINES FOR SHORT CIRCUIT (SEE PAGE 05-2344)

OK

2 CHECK CAN BUS LINE FOR SHORT TO +B


(a) Measure the resistance according to the value(s) in the table below.

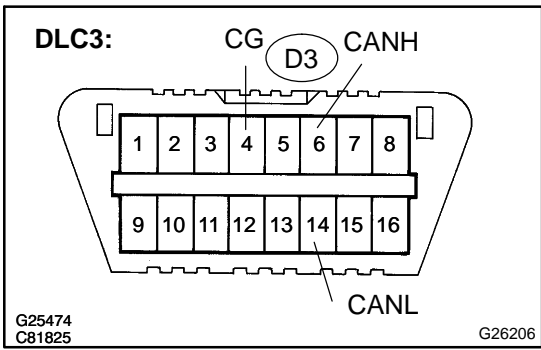
Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-16 (BATT)	• IG switch OFF • Stop light switch OFF	1 M Ω or higher
D3-14 (CANL) - D3-16 (BATT)	• IG switch OFF • Stop light switch OFF	1 M Ω or higher

NG CHECK CAN BUS LINE FOR SHORT TO +B (SEE PAGE 05-2352)

OK

3 CHECK CAN BUS LINE FOR SHORT TO GND



(a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	<ul style="list-style-type: none"> IG switch OFF Stop light switch OFF 	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	<ul style="list-style-type: none"> IG switch OFF Stop light switch OFF 	3 kΩ or higher

NG CHECK CAN BUS LINE FOR SHORT TO GND (SEE PAGE 05-2360)

OK

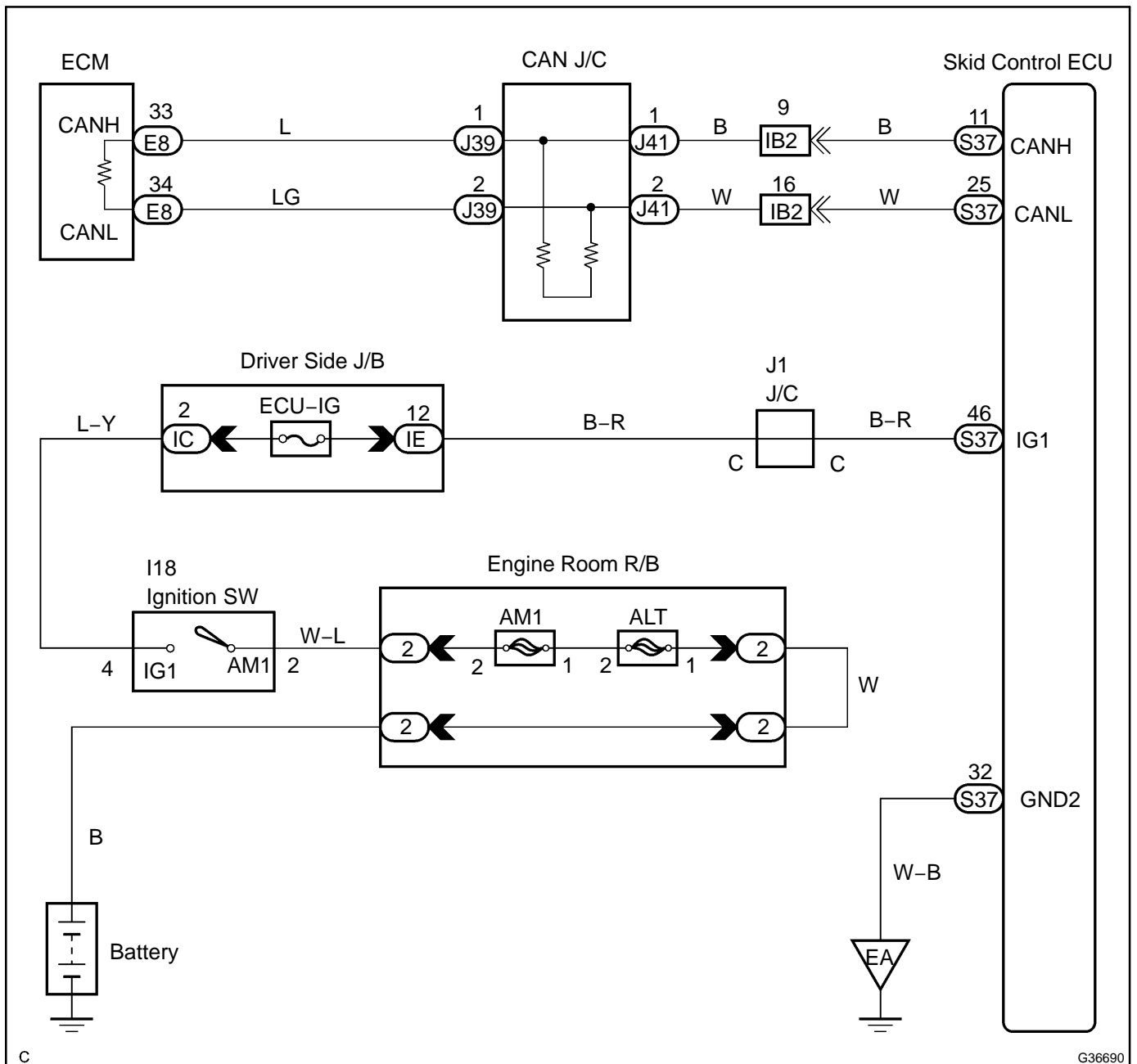
GO TO "HOW TO PROCEED WITH TROUBLESHOOTING" (SEE PAGE 05-2320)

SKID CONTROL ECU COMMUNICATION STOP MODE

MODE DESCRIPTION

Detection Item	Symptom	Trouble Area
SKID CONTROL ECU COMMUNICATION STOP MODE	<ul style="list-style-type: none"> • "ABS/VSC/TARC" is not displayed on the "BUS CHECK" screen of the hand-held tester via the CAN VIM. • DTCs are output from each ECU in skid control ECU communication stop mode as shown in the "DTC COMBINATION TABLE" (see page 05-2323). 	<ul style="list-style-type: none"> • Power source or inside the skid control ECU • Skid control ECU sub bus line or connector

WIRING DIAGRAM

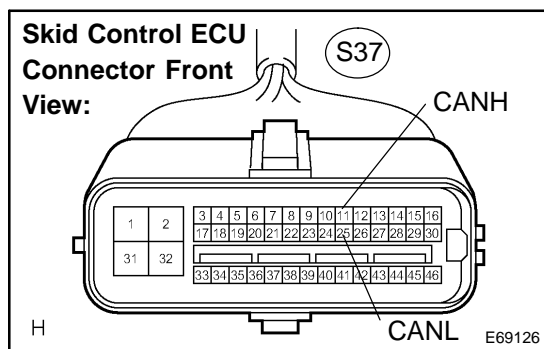


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G36690

INSPECTION PROCEDURE

1 CHECK CAN BUS LINE FOR DISCONNECTION(SKID CONTROL ECU SUB BUS LINE)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the skid control ECU connector (S37).
- (c) Measure the resistance according to the value(s) in the table below.

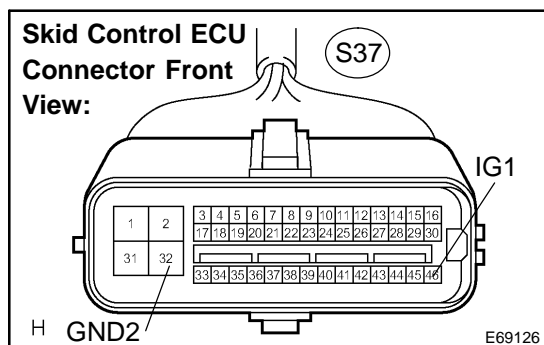
Standard:

Tester connection	Condition	Specified value
S37-11 (CANH) - S37-25 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

NG REPAIR OR REPLACE SKID CONTROL ECU SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

OK

2 CHECK WIRE HARNESS(IG, GND2)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
S37-32 (GND2) - Body ground	Always	Below 1 Ω

- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
S37-46 (IG1) - Body ground	IG switch ON	10 to 14 V

NG REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

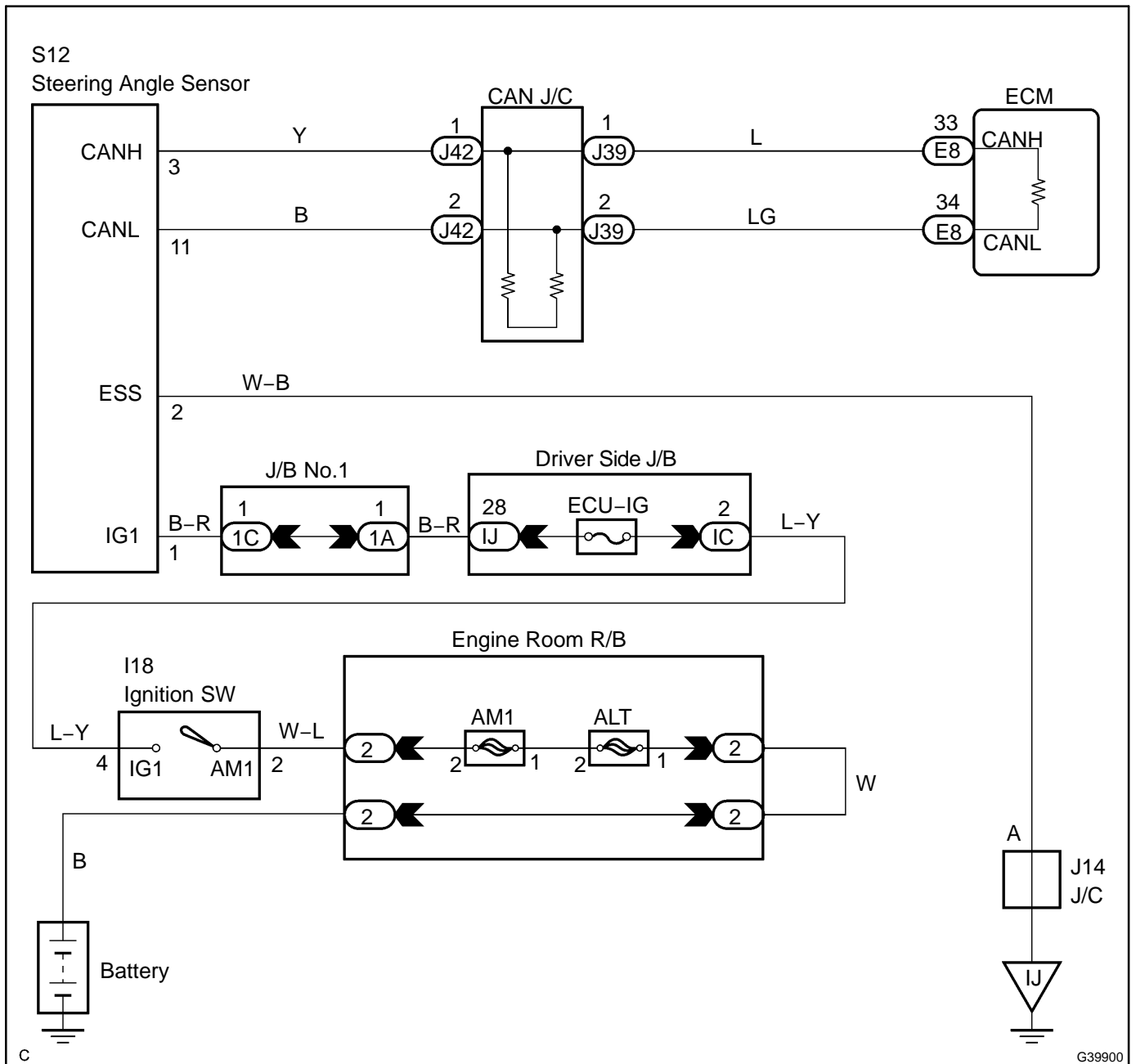
REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)

STEERING ANGLE SENSOR COMMUNICATION STOP MODE

MODE DESCRIPTION

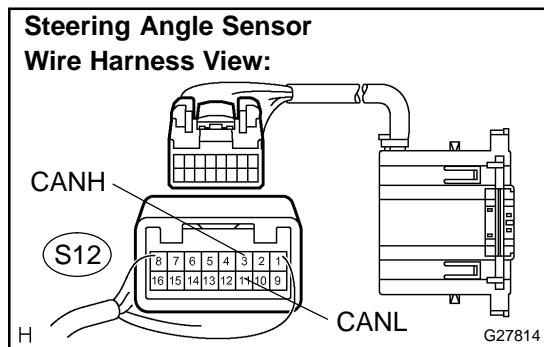
Detection Item	Symptom	Trouble Area
STEERING ANGLE SENSOR COMMUNICATION STOP MODE	<ul style="list-style-type: none"> • "STEERING SENSOR" is not displayed on the "BUS CHECK" screen of the hand-held tester via the CAN VIM. • DTCs are output from each ECU in steering angle sensor communication stop mode as shown in the "DTC COMBINATION TABLE" (see page 05-2323). 	<ul style="list-style-type: none"> • Power source or inside the steering angle sensor • Steering angle sensor sub bus line or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CAN BUS LINE FOR DISCONNECTION(STEERING ANGLE SENSOR SUB BUS LINE)



- Turn the ignition switch to the LOCK position.
- Disconnect the steering angle sensor connector (S12).
- Measure the resistance according to the value(s) in the table below.

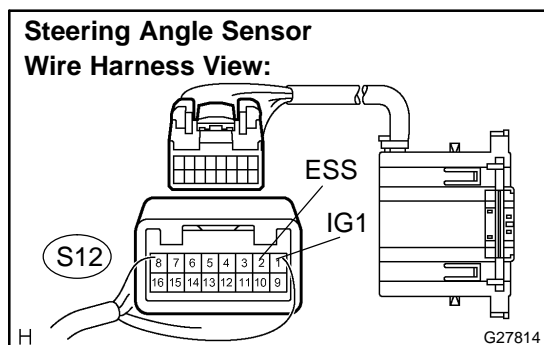
Standard:

Tester connection	Condition	Specified value
S12-3 (CANH) - S12-11 (CANL)	<ul style="list-style-type: none"> IG switch OFF Stop light switch OFF 	54 to 69 Ω

NG REPAIR OR REPLACE STEERING ANGLE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

OK

2 CHECK WIRE HARNESS(IG1, ESS)



- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
S12-2 (ESS) - Body ground	Always	Below 1 Ω

- Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
S12-1 (IG1) - Body ground	IG switch ON	10 to 14 V

NG REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

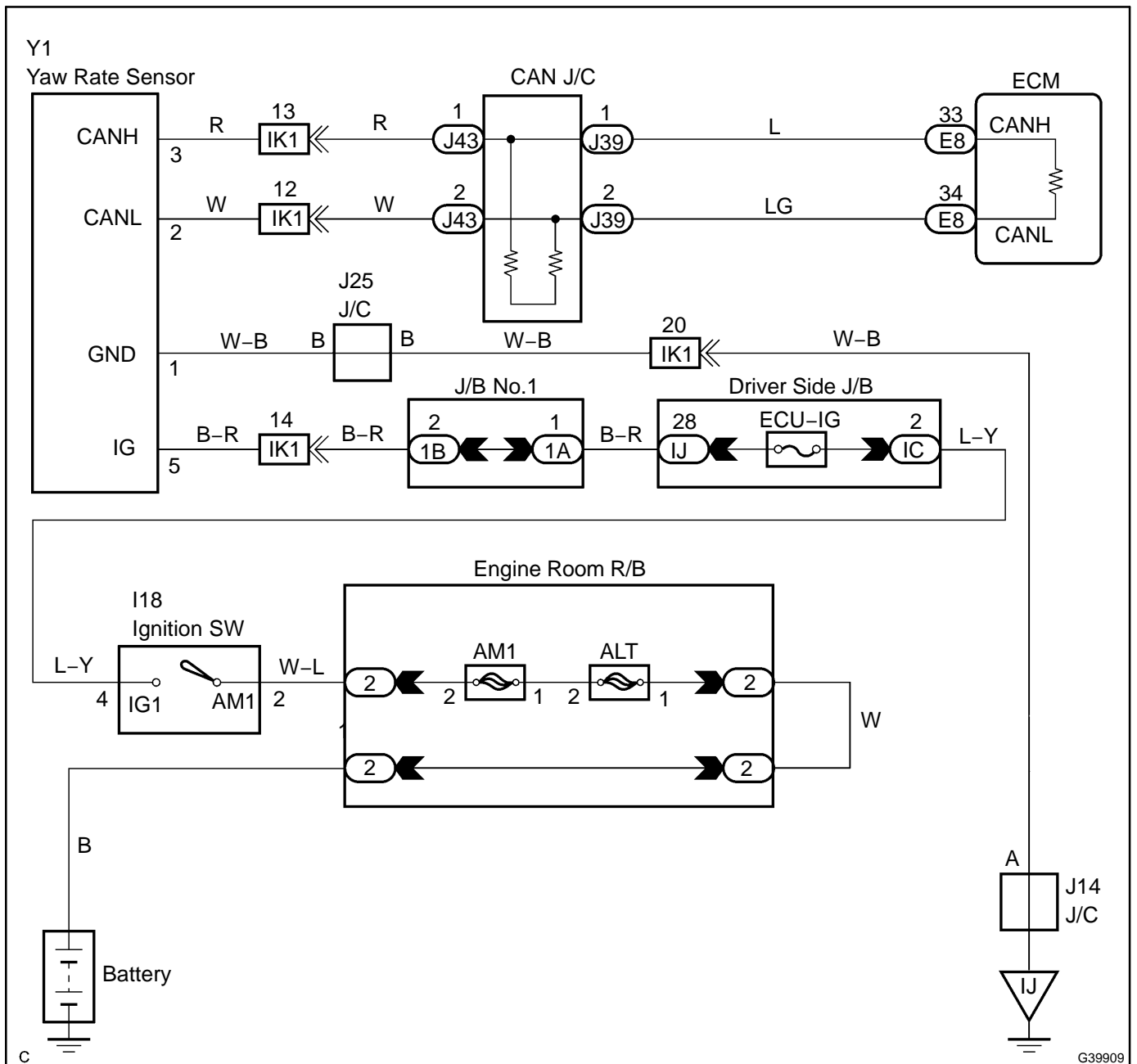
REPLACE STEERING ANGLE SENSOR (SEE PAGE 32-53)

YAW RATE SENSOR COMMUNICATION STOP MODE

MODE DESCRIPTION

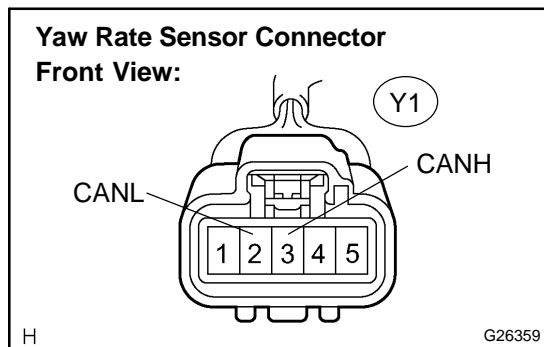
Detection Item	Symptom	Trouble Area
YAW RATE SENSOR COMMUNICATION STOP MODE	<ul style="list-style-type: none"> • "YAW /DECELERAT" is not displayed on the "BUS CHECK" screen of the hand-held tester via the CAN VIM. • DTCs are output from each ECU in yaw rate sensor communication stop mode as shown in the "DTC COMBINATION TABLE" (see page 05-2323). 	<ul style="list-style-type: none"> • Power source or inside the yaw rate sensor • Yaw rate sensor sub bus line or connector

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CAN BUS LINE FOR DISCONNECTION(YAW RATE SENSOR SUB BUS LINE)



- (a) Turn the ignition switch to the LOCK position.
- (b) Disconnect the yaw rate sensor connector (Y1).
- (c) Measure the resistance according to the value(s) in the table below.

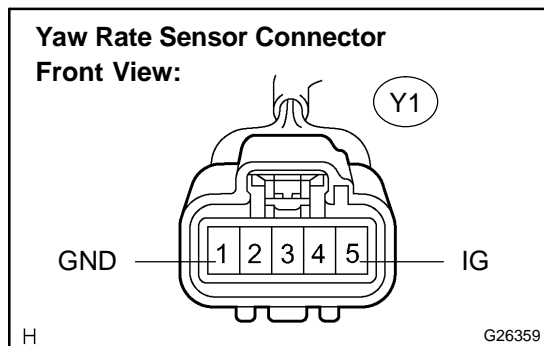
Standard:

Tester connection	Condition	Specified value
Y1-2 (CANL) - Y1-3 (CANH)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

NG REPAIR OR REPLACE YAW RATE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

OK

2 CHECK WIRE HARNESS(IG, GND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
Y1-1 (GND) - Body ground	Always	Below 1 Ω

- (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
Y1-5 (IG) - Body ground	IG switch ON	10 to 14 V

NG REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE YAW RATE SENSOR (SEE PAGE 32-52)

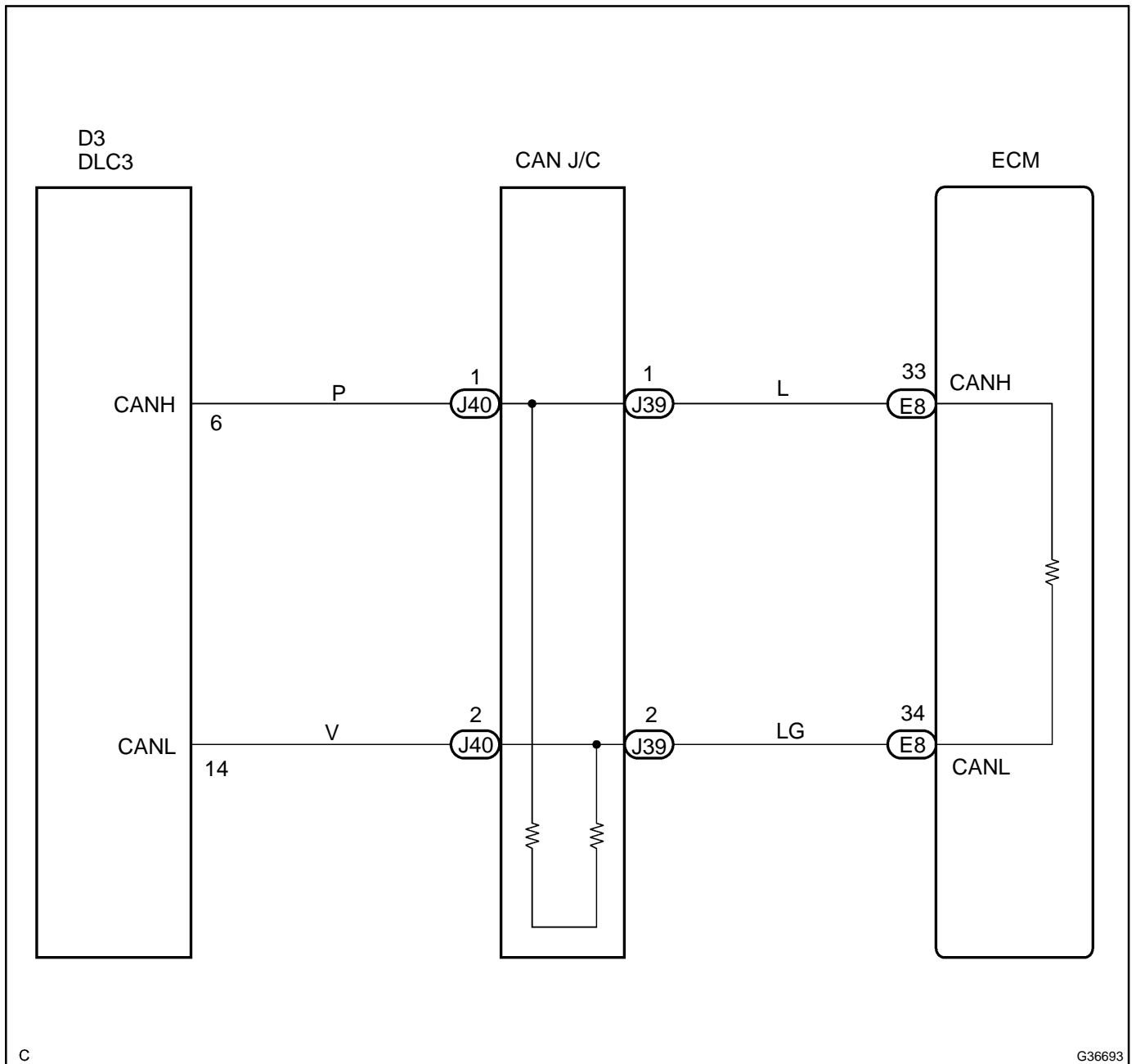
CHECK CAN MAIN BUS LINE FOR DISCONNECTION

CIRCUIT DESCRIPTION

The CAN main bus line and DLC3 sub bus line may have a disconnection when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is more than 69 Ω.

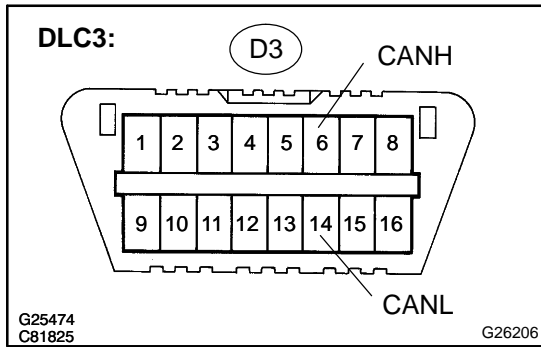
Symptom	Trouble Area
Resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is more than 69 Ω.	<ul style="list-style-type: none"> • CAN main bus line • ECM • CAN J/C

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DLC3



(a) Measure the resistance according to the value(s) in the table below.

Result:

Tester connection	Condition	Specified value	Result
D3-6 (CANH) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	108 to 132 Ω	A
D3-6 (CANH) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	132 Ω or higher	B

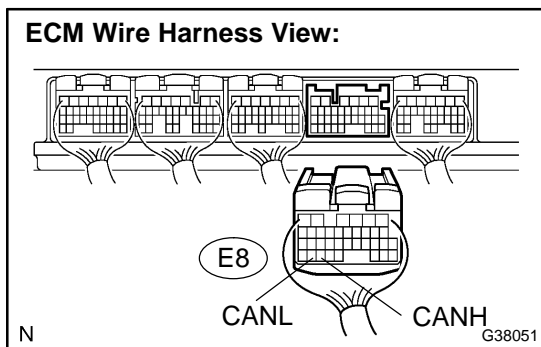
NOTICE:

When the measured value is 132 Ω or more and a CAN communication system diagnostic code is output, there may be a fault other than a disconnection of the DLC3 sub bus line. For that reason, troubleshooting should be performed again from the section "How to Proceed with Troubleshooting" after repairing the trouble area.

B REPAIR OR REPLACE DLC3 SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

A

2 CHECK CAN MAIN BUS LINE FOR DISCONNECTION(ECM - CAN J/C)



(a) Disconnect the connector (E8) from the ECM.
 (b) Measure the resistance according to the value(s) in the table below.

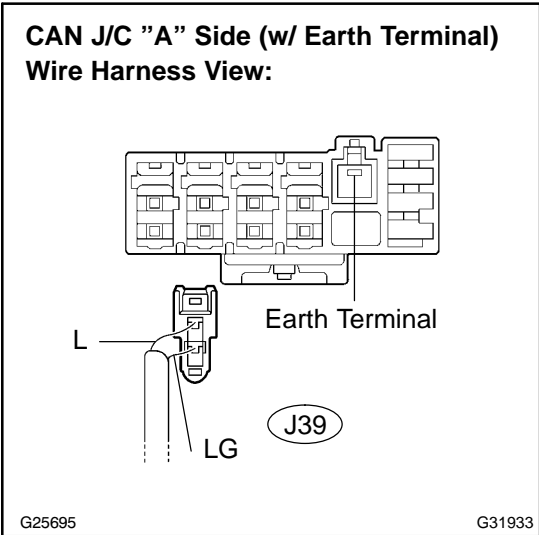
Standard:

Tester connection	Condition	Specified value
E8-33 (CANH) - E8-34 (CANL)	• IG switch OFF • Stop light switch OFF	108 to 132 Ω

OK REPLACE ECM (SEE PAGE 10-16)

NG

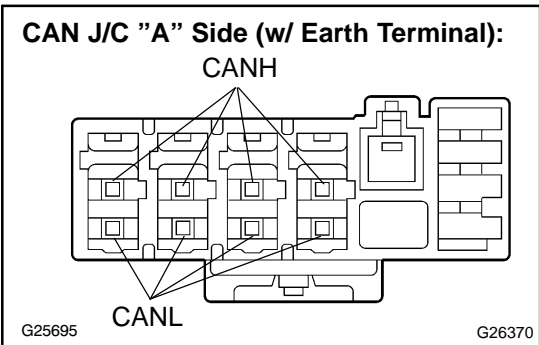
3 INSPECT CAN J/C



- (a) Disconnect the CAN main bus line connector (J39) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Between the terminals where the connector (J51) was connected	Condition	Specified value
CANH - CANL	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	108 to 132 Ω

NG → **REPLACE CAN J/C**

OK

REPAIR OR REPLACE CAN MAIN BUS LINE OR CONNECTOR (CAN J/C - ECM)

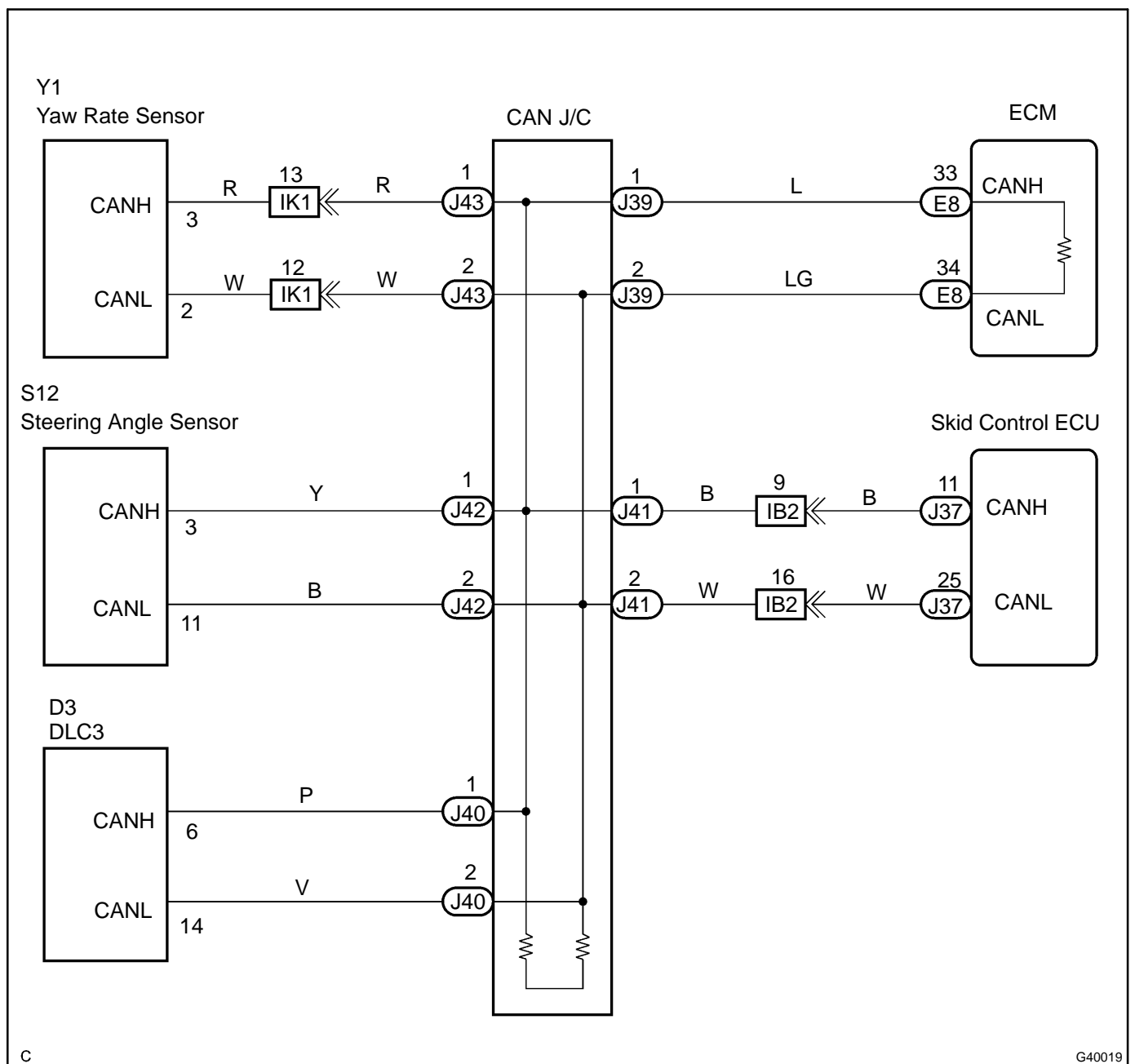
CHECK CAN BUS LINES FOR SHORT CIRCUIT

CIRCUIT DESCRIPTION

The CAN bus lines are considered to be shorted when the resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is below 54 Ω.

Symptom	Trouble Area
Resistance between terminals 6 (CANH) and 14 (CANL) of the DLC3 is below 54 Ω.	<ul style="list-style-type: none"> • Short in CAN bus lines • Skid control ECU • Steering angle sensor • Yaw rate sensor • ECM • CAN J/C

WIRING DIAGRAM

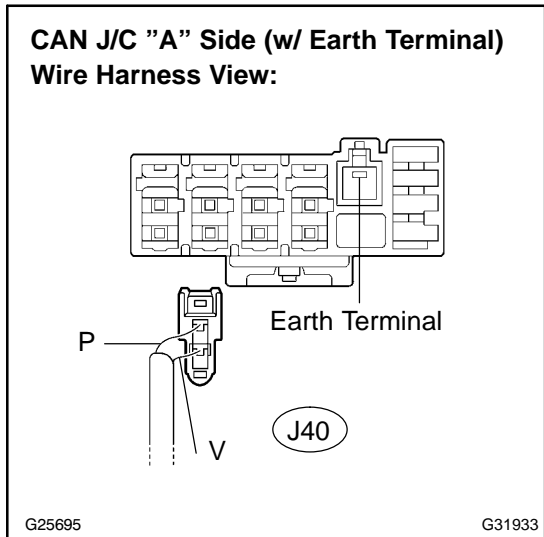


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INSPECTION PROCEDURE

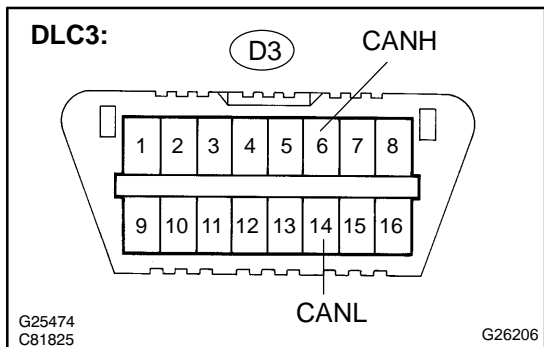
1 CHECK CAN BUS LINES FOR SHORT(DLC3 SUB BUS LINE)



(a) Disconnect the DLC3 sub bus line connector (J40) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	1 MΩ or more

NG → **REPAIR OR REPLACE DLC3 SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)**

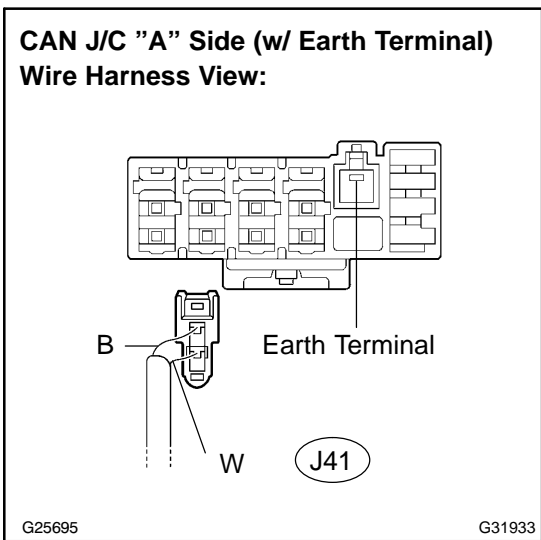
OK

2 CONNECT CONNECTOR

(a) Reconnect the DLC3 sub bus line connector (J40) to the CAN J/C.

NEXT

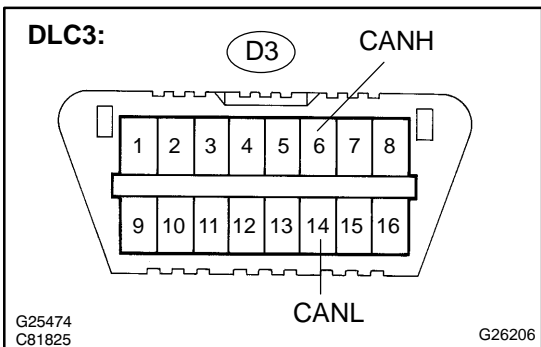
3 CHECK CAN BUS LINES FOR SHORT(SKID CONTROL ECU SUB BUS LINE)



(a) Disconnect the skid control ECU sub bus line connector (J41) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> •IG switch OFF •Stop light switch OFF 	54 to 69 Ω

OK → **Go to step 10**

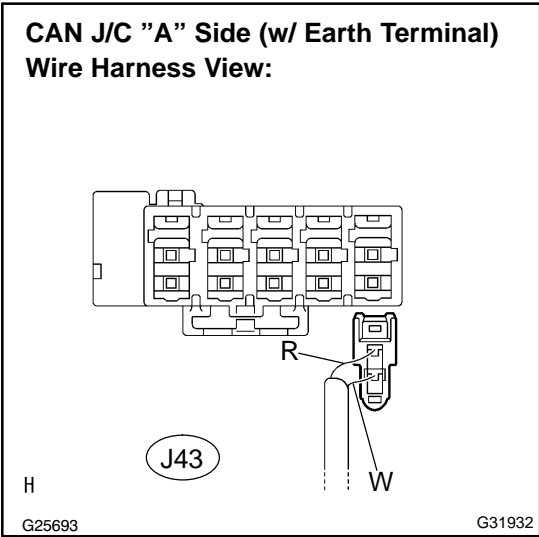
NG

4 CONNECT CONNECTOR

(a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

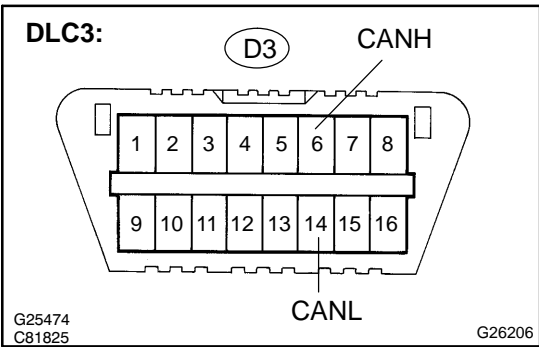
5 | CHECK CAN BUS LINES FOR SHORT(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor sub bus line connector (J43) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) – D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

OK → **Go to step 12**

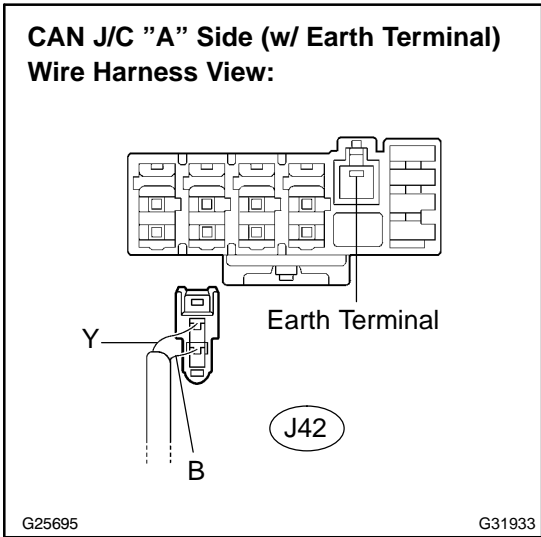
NG

6 | CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

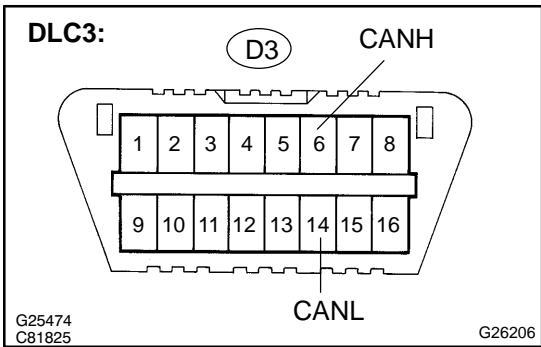
7 CHECK CAN BUS LINES FOR SHORT(STEERING ANGLE SENSOR SUB BUS LINE)



(a) Disconnect the steering angle sensor sub bus line connector (J42) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> •IG switch OFF •Stop light switch OFF 	54 to 69 Ω

OK → **Go to step 14**

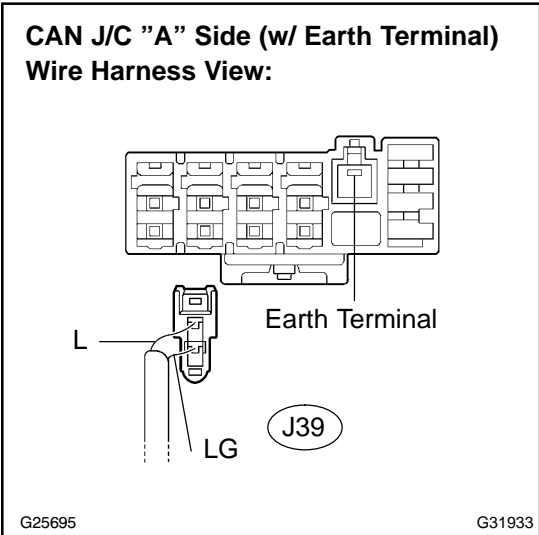
NG

8 CONNECT CONNECTOR

(a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT

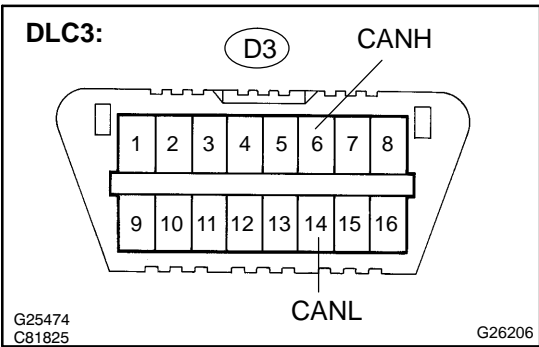
9 CHECK CAN BUS LINES FOR SHORT(ECM MAIN BUS LINE)



(a) Disconnect the ECM main bus line connector (J39) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> •IG switch OFF •Stop light switch OFF 	108 to 132 Ω

OK → **Go to step 16**

NG

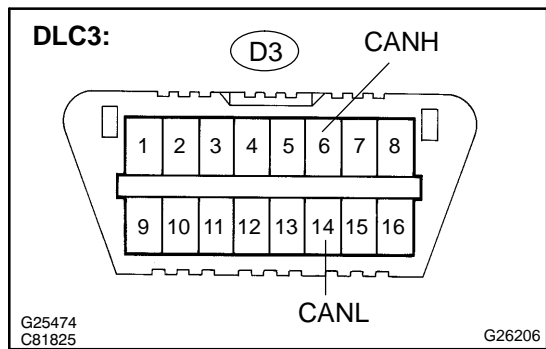
REPLACE CAN J/C

10 CONNECT CONNECTOR

(a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

11 CHECK CAN BUS LINES FOR SHORT(SKID CONTROL ECU SUB BUS LINE)



- (a) Disconnect the skid control ECU connector (S37).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

OK → **REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

NG

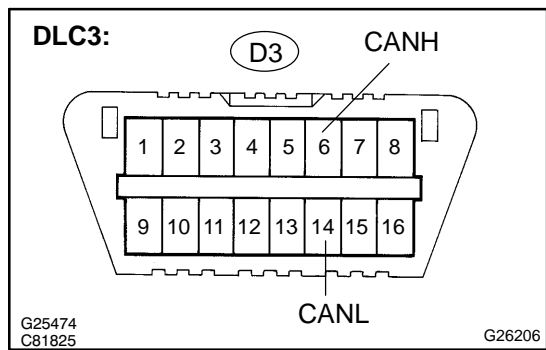
REPAIR OR REPLACE SKID CONTROL ECU SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

12 CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

13 CHECK CAN BUS LINES FOR SHORT(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor connector (Y1).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) - D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

OK → **REPLACE YAW RATE SENSOR (SEE PAGE 32-52)**

NG

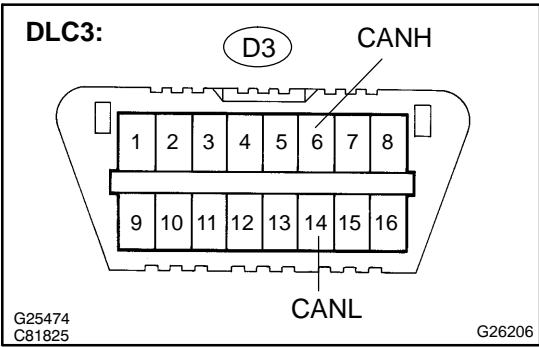
REPAIR OR REPLACE YAW RATE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

14 CONNECT CONNECTOR

- (a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT

15 CHECK CAN BUS LINES FOR SHORT(STEERING ANGLE SENSOR SUB BUS LINE)



- (a) Disconnect the steering angle sensor connector (S12).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) – D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

OK → **REPLACE STEERING ANGLE SENSOR (SEE PAGE 32-53)**

NG

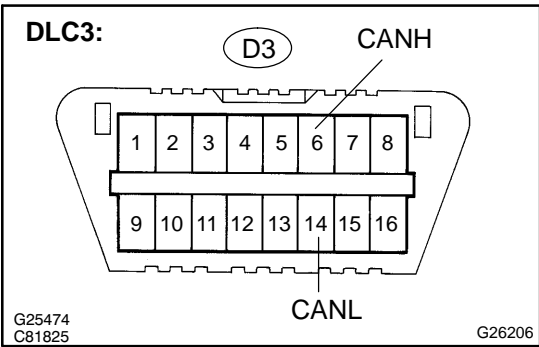
REPAIR OR REPLACE STEERING ANGLE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

16 CONNECT CONNECTOR

- (a) Reconnect the ECM main bus line connector (J39) to the CAN J/C.

NEXT

17 CHECK CAN BUS LINES FOR SHORT(ECM MAIN BUS LINE)



- (a) Disconnect the ECM connector (E8).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-6 (CANH) – D3-14 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	108 to 132 Ω

OK → **REPLACE ECM (SEE PAGE 10-16)**

NG

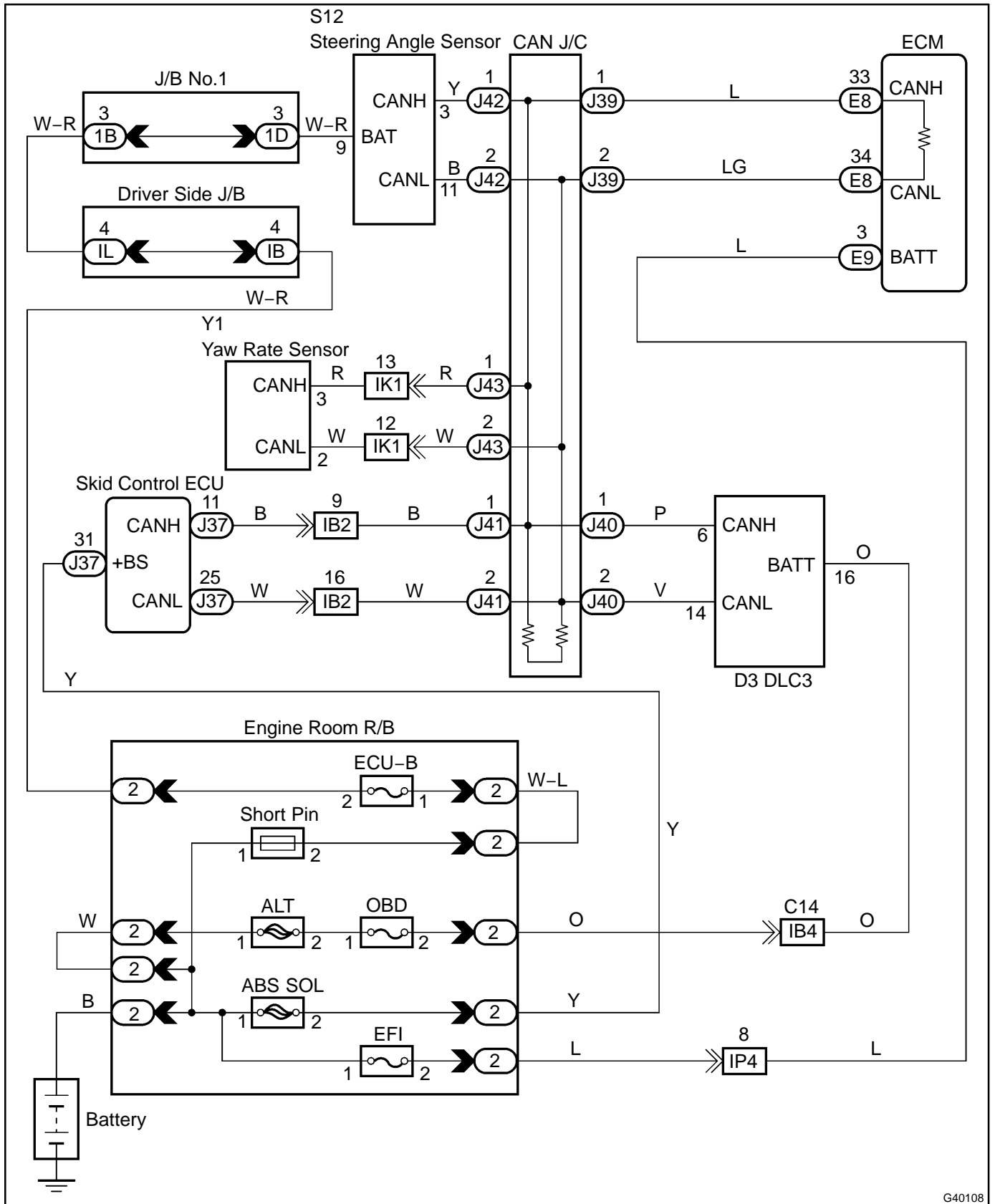
REPAIR OR REPLACE ECM MAIN BUS LINE OR CONNECTOR (CAN-H, CAN-L)

CHECK CAN BUS LINE FOR SHORT TO +B**CIRCUIT DESCRIPTION**

A short to +B is suspected in the CAN bus line when there is continuity between terminals 16 (BATT) and 6 (CANH) or terminals 16 (BATT) and 14 (CANL) of the DLC3.

Symptom	Trouble Area
There is continuity between terminals 16 (BAT) and 6 (CANH) or 16 (BATT) and 14 (CANL) of the DLC3.	<ul style="list-style-type: none">• Short to +B in CAN bus line• ECM• Skid control ECU• Steering angle sensor• Yaw rate sensor

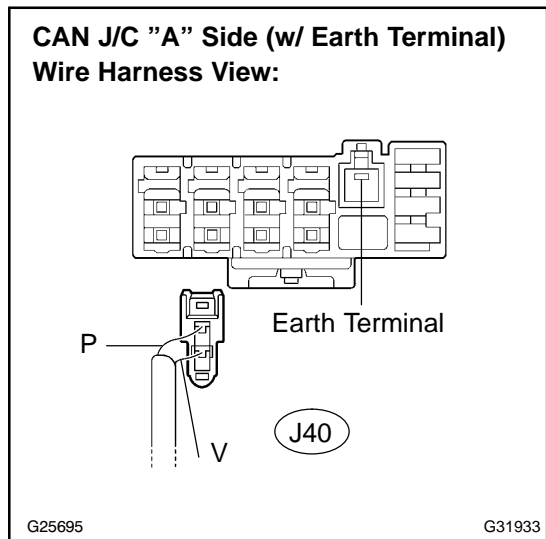
WIRING DIAGRAM



G40108

INSPECTION PROCEDURE

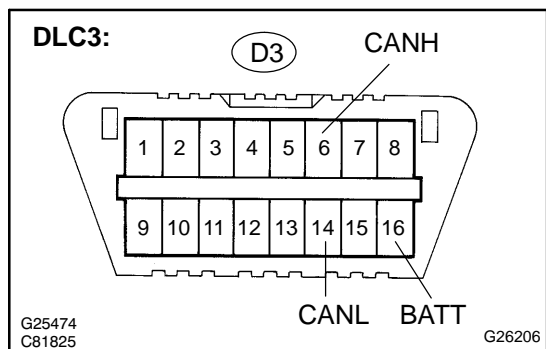
1 CHECK CAN BUS LINE FOR SHORT TO +B(DLC3 SUB BUS LINE)



(a) Disconnect the DLC3 sub bus line connector (J40) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher

NG REPAIR OR REPLACE DLC3 SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

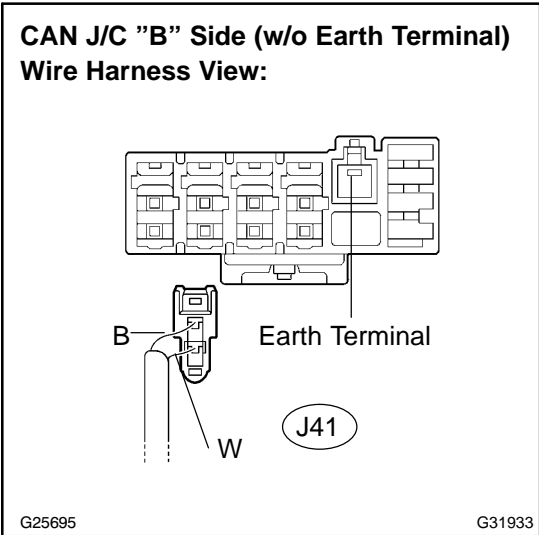
OK

2 CONNECT CONNECTOR

(a) Reconnect the DLC3 sub bus line connector (J40) to the CAN J/C.

NEXT

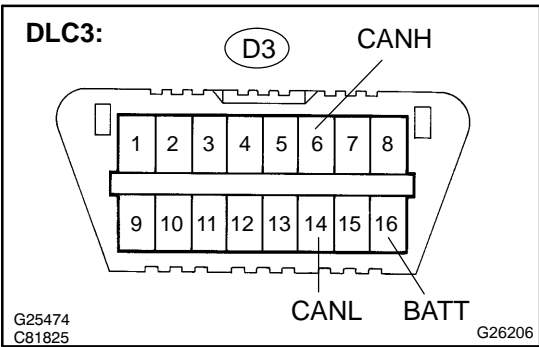
3 | CHECK CAN BUS LINE FOR SHORT TO +B(SKID CONTROL ECU SUB BUS LINE)



- (a) Disconnect the skid control ECU sub bus line connector (J41) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher

OK → **Go to step 10**

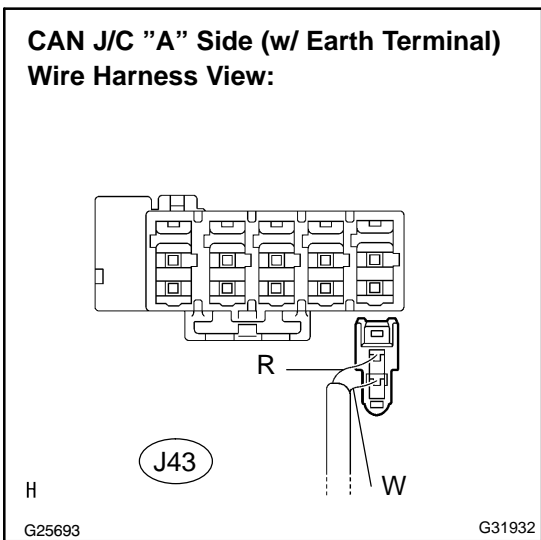
NG

4 | CONNECT CONNECTOR

- (a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

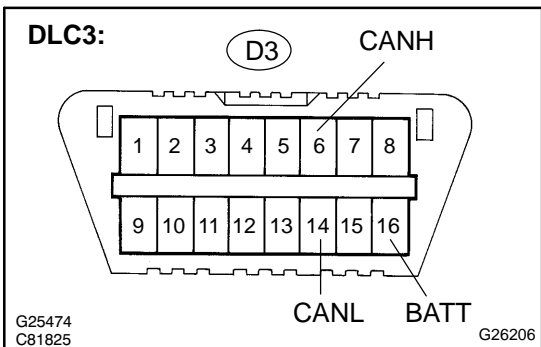
5 CHECK CAN BUS LINE FOR SHORT TO +B(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor sub bus line connector (J43) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	<ul style="list-style-type: none"> •IG switch OFF •Stop light switch OFF 	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	<ul style="list-style-type: none"> •IG switch OFF •Stop light switch OFF 	1 MΩ or higher

OK → **Go to step 12**

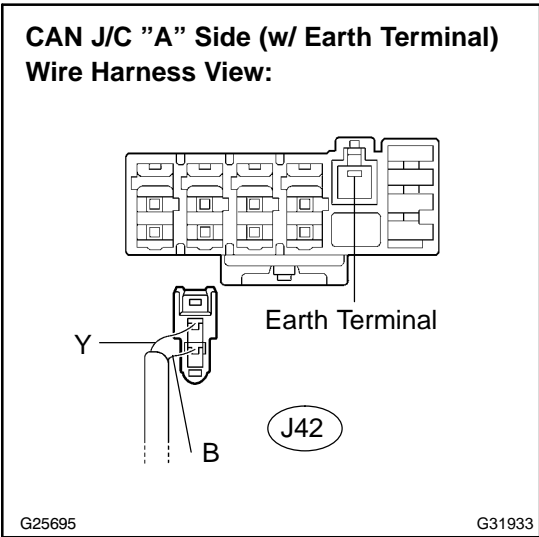
NG

6 CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

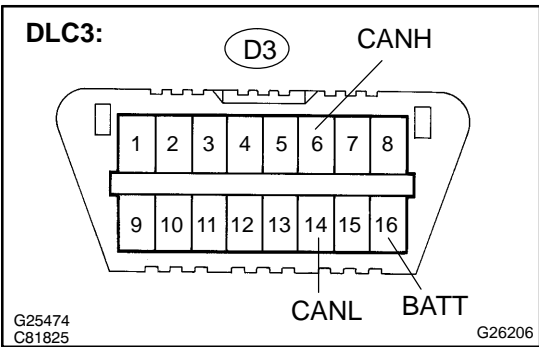
7 CHECK CAN BUS LINE FOR SHORT TO +B(STEERING ANGLE SENSOR SUB BUS LINE)



(a) Disconnect the steering angle sensor sub bus line connector (J42) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher

OK Go to step 14

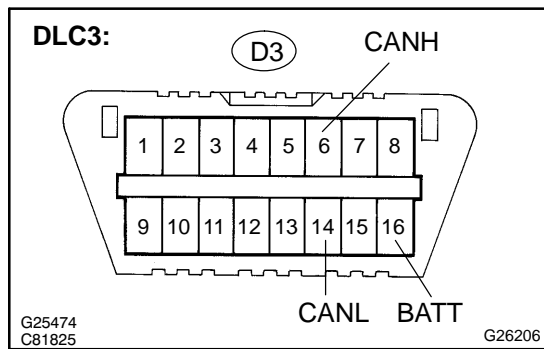
NG

8 CONNECT CONNECTOR

(a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT

9 CHECK CAN BUS LINE FOR SHORT TO +B(ECM MAIN BUS LINE)



- (a) Disconnect the ECM connector (E8).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher

OK → **REPLACE ECM (SEE PAGE 10-16)**

NG

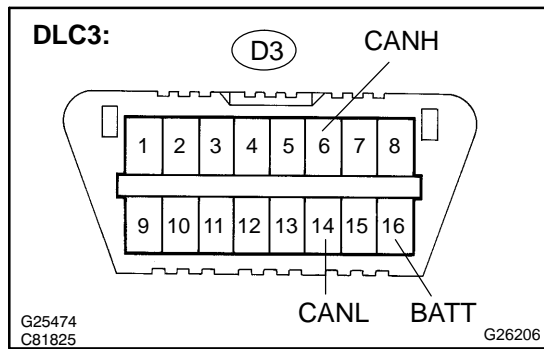
REPAIR OR REPLACE ECM MAIN BUS LINE OR CONNECTOR (CAN-H, CAN-L)

10 CONNECT CONNECTOR

- (a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

11 CHECK CAN BUS LINE FOR SHORT TO +B(SKID CONTROL ECU SUB BUS LINE)



- (a) Disconnect the skid control ECU connector (S37).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	1 MΩ or higher

OK → **REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

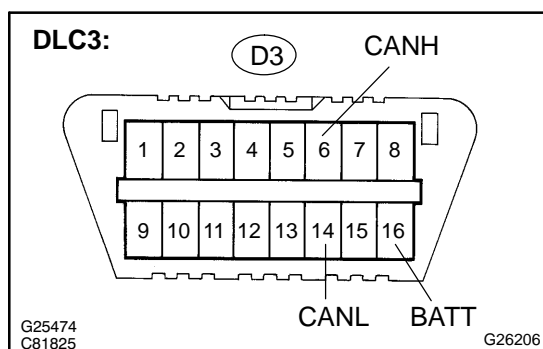
NG

REPAIR OR REPLACE SKID CONTROL ECU SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

12 CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

13 CHECK CAN BUS LINE FOR SHORT TO +B(YAW RATE SENSOR SUB BUS LINE)

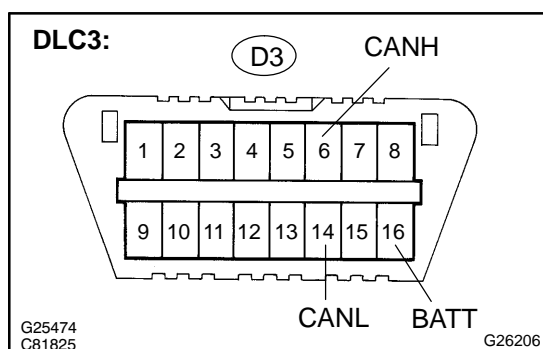
- Disconnect the yaw rate sensor connector (Y1).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher

OK**REPLACE YAW RATE SENSOR
(SEE PAGE 32-52)****NG****REPAIR OR REPLACE YAW RATE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)****14 CONNECT CONNECTOR**

- Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT**15 CHECK CAN BUS LINE FOR SHORT TO +B(STEERING ANGLE SENSOR SUB BUS LINE)**

- Disconnect the steering angle sensor connector (S12).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-16 (BATT) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-16 (BATT) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher

OK**REPLACE STEERING ANGLE SENSOR
(SEE PAGE 32-53)****NG****REPAIR OR REPLACE STEERING ANGLE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)**

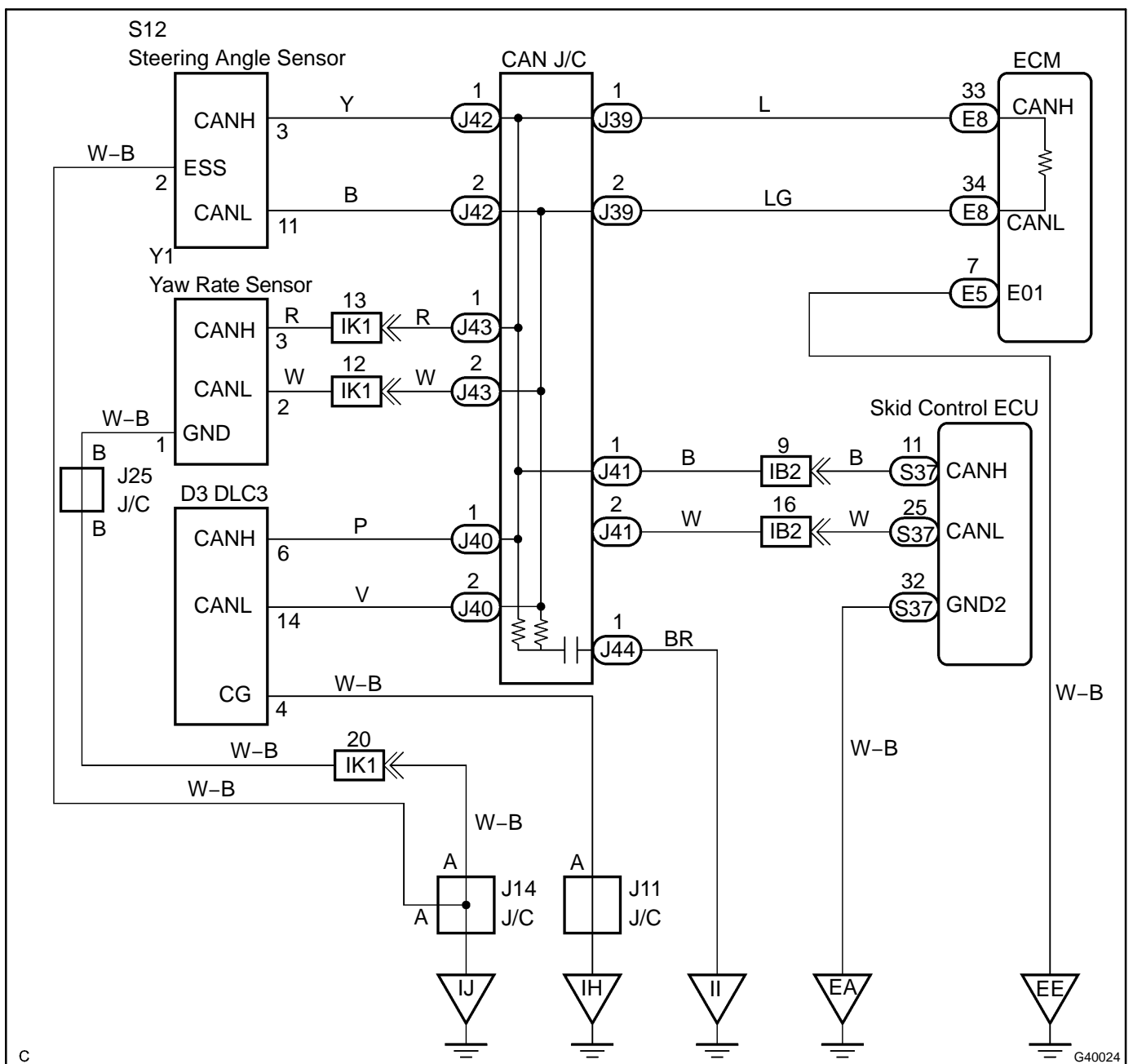
CHECK CAN BUS LINE FOR SHORT TO GND

CIRCUIT DESCRIPTION

A short to GND is suspected in the CAN bus line when there is continuity between terminals 4 (CG) and 6 (CANH) or terminals 4 (CG) and 14 (CANL) of the DLC3.

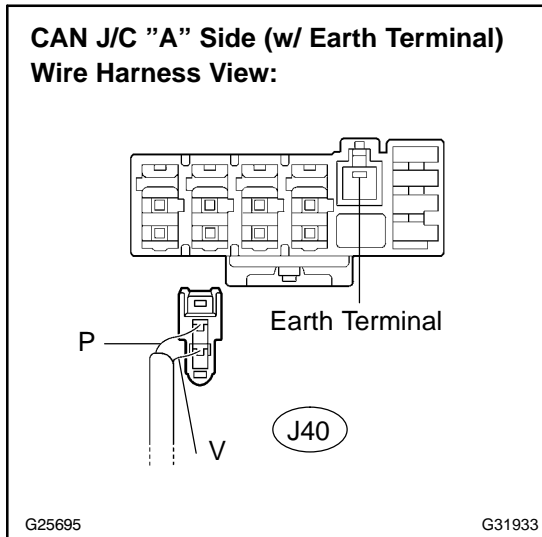
Symptom	Trouble Area
There is continuity between terminals 4 (CG) and 6 (CANH) or terminals 4 (CG) and 14 (CANL) of the DLC3.	<ul style="list-style-type: none"> • Short to GND in CAN bus line • ECM • Skid control ECU • Steering angle sensor • Yaw rate sensor • CAN J/C

WIRING DIAGRAM



INSPECTION PROCEDURE

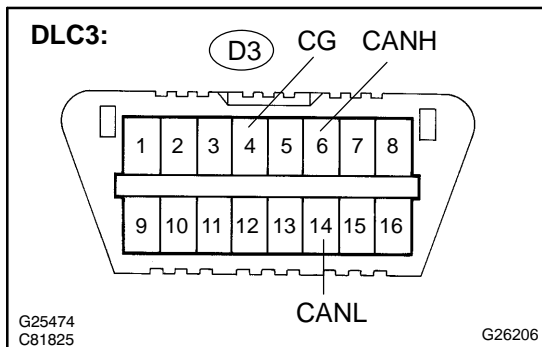
1 CHECK CAN BUS LINE FOR SHORT TO GND(DLC3 SUB BUS LINE)



- (a) Disconnect the DLC3 sub bus line connector (J40) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher
D3-4 (CG) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	1 MΩ or higher

NG REPAIR OR REPLACE DLC3 SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

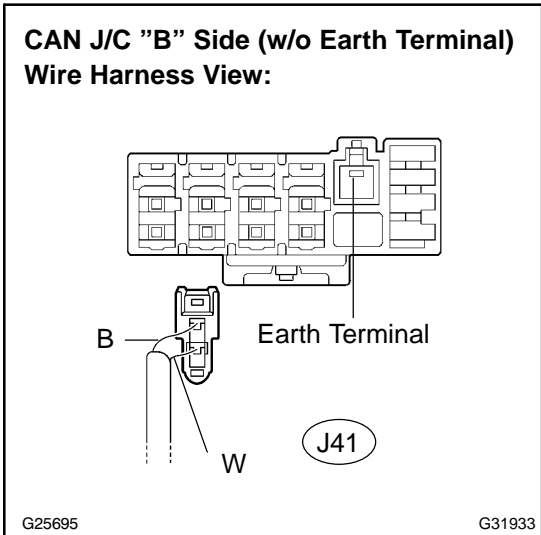
OK

2 CONNECT CONNECTOR

- (a) Reconnect the DLC3 sub bus line connector (J40) to the CAN J/C.

NEXT

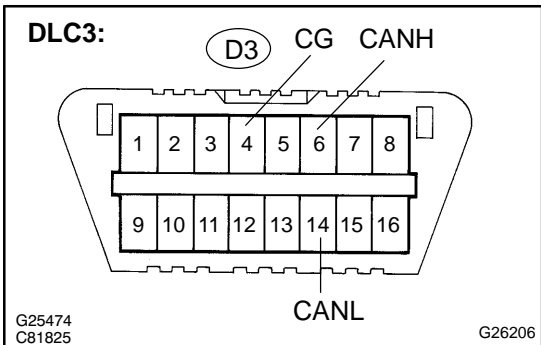
3 CHECK CAN BUS LINE FOR SHORT TO GND(SKID CONTROL ECU SUB BUS LINE)



(a) Disconnect the skid control ECU sub bus line connector (J41) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher

OK Go to step 10

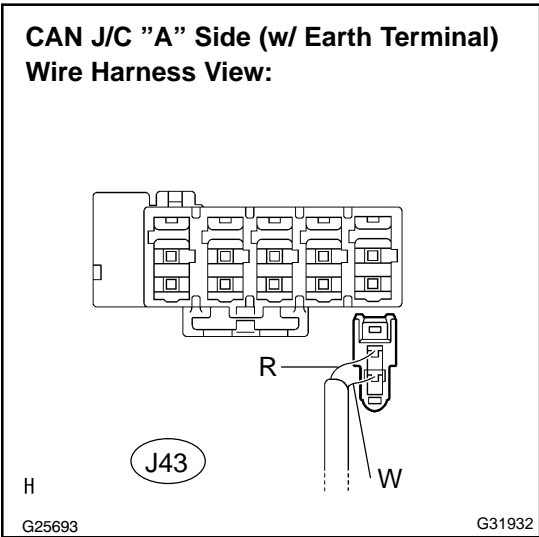
NG

4 CONNECT CONNECTOR

(a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

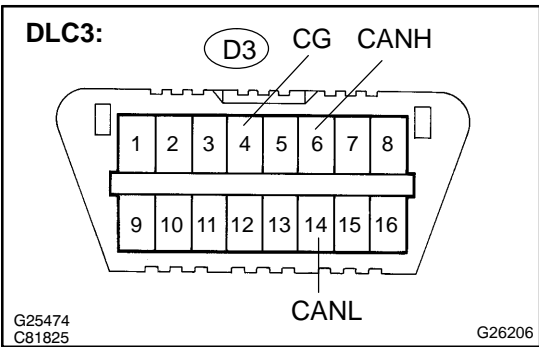
5 CHECK CAN BUS LINE FOR SHORT TO GND(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor sub bus line connector (J43) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher

OK → Go to step 12

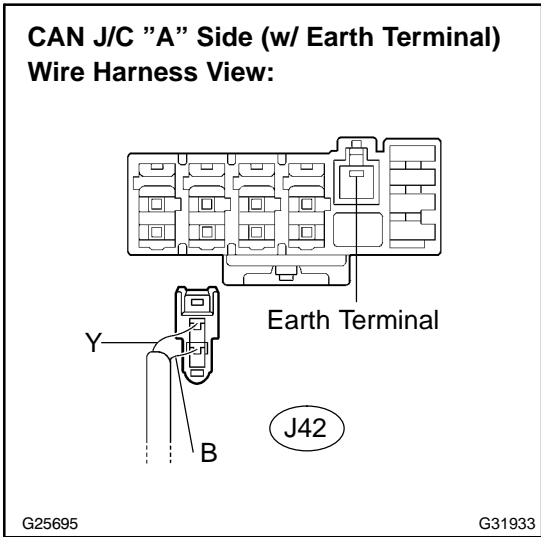
NG

6 CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

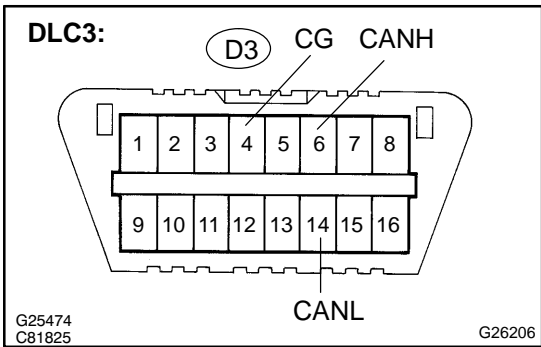
7 CHECK CAN BUS LINE FOR SHORT TO GND(STEERING ANGLE SENSOR SUB BUS LINE)



(a) Disconnect the steering angle sensor sub bus line connector (J42) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher

OK → **Go to step 14**

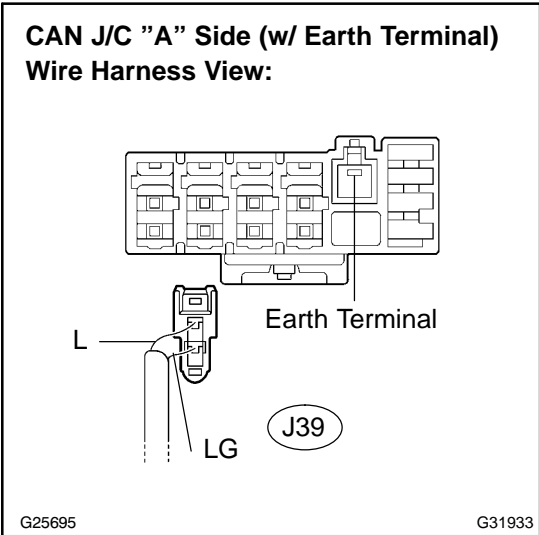
NG

8 CONNECT CONNECTOR

(a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT

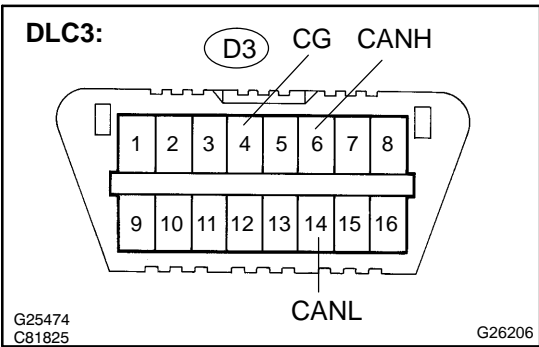
9 CHECK CAN BUS LINE FOR SHORT TO GND(ECM MAIN BUS LINE)



(a) Disconnect the ECM main bus line connector (J39) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
- Reconnect the connector to its original position.



(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	•IG switch OFF •Stop light switch OFF	3 kΩ or higher

OK → Go to step 16

NG

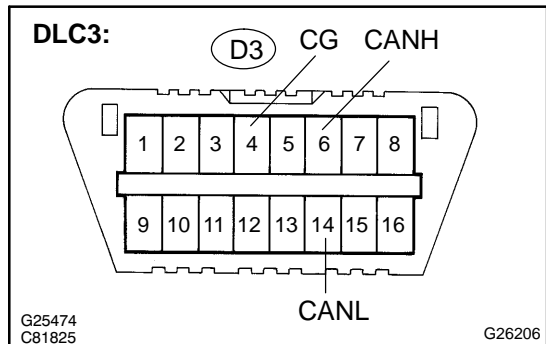
REPLACE CAN J/C

10 CONNECT CONNECTOR

(a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT

11 CHECK CAN BUS LINE FOR SHORT TO GND(SKID CONTROL ECU SUB BUS LINE)



- (a) Disconnect the skid control ECU connector (S37).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher

OK → **REPLACE MASTER CYLINDER SOLENOID (SEE PAGE 32-23)**

NG

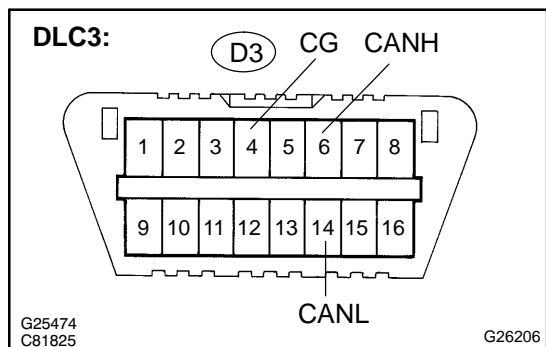
REPAIR OR REPLACE SKID CONTROL ECU SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

12 CONNECT CONNECTOR

- (a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

13 CHECK CAN BUS LINE FOR SHORT TO GND(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor connector (Y1).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher

OK → **REPLACE YAW RATE SENSOR (SEE PAGE 32-52)**

NG

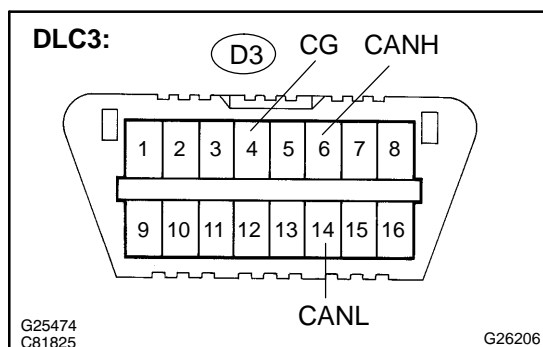
REPAIR OR REPLACE YAW RATE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

14 CONNECT CONNECTOR

- (a) Reconnect the steering angle sub bus line connector (J42) to the CAN J/C.

NEXT

15 CHECK CAN BUS LINE FOR SHORT TO GND(STEERING ANGLE SENSOR SUB BUS LINE)



- Disconnect the steering angle sensor connector (S12).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher

OK

**REPLACE STEERING ANGLE SENSOR
(SEE PAGE 32-53)**

NG

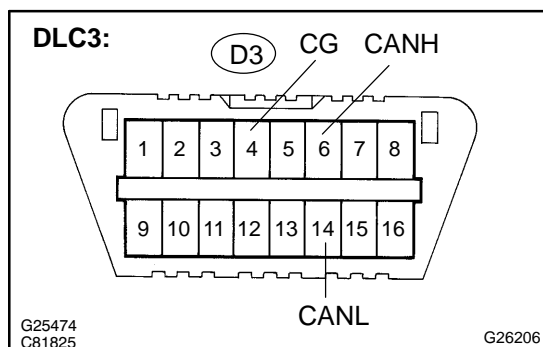
REPAIR OR REPLACE STEERING ANGLE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H, CAN-L)

16 CONNECT CONNECTOR

- Reconnect the ECM main bus line connector (J39) to the CAN J/C.

NEXT

17 CHECK CAN BUS LINE FOR SHORT TO GND(ECM MAIN BUS LINE)



- Disconnect the ECM connector (E8).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
D3-4 (CG) - D3-6 (CANH)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher
D3-4 (CG) - D3-14 (CANL)	• IG switch OFF • Stop light switch OFF	3 kΩ or higher

OK

REPLACE ECM (SEE PAGE 10-16)

NG

REPAIR OR REPLACE ECM MAIN BUS LINE OR CONNECTOR (CAN-H, CAN-L)

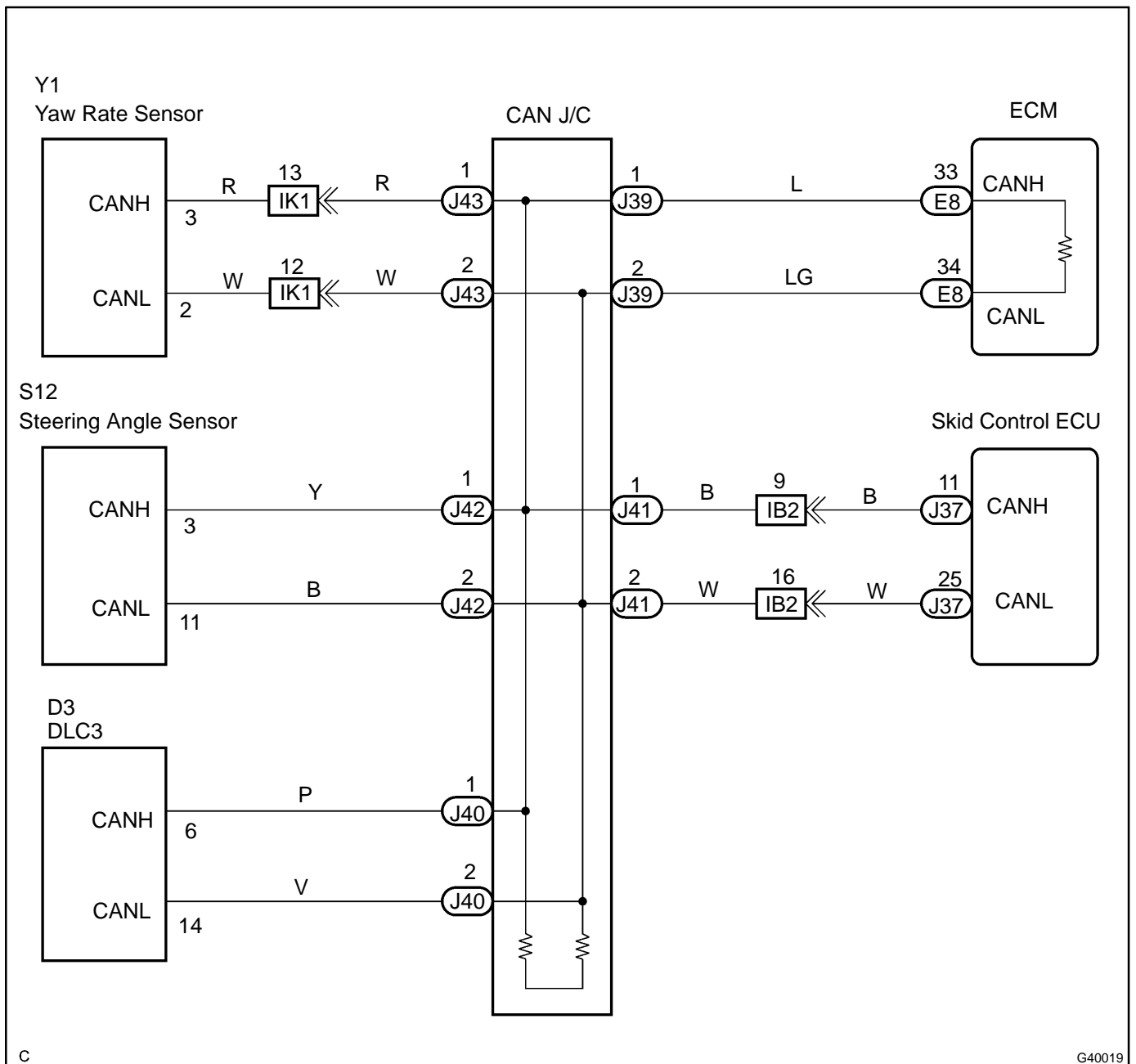
CHECK FOR AN OPEN IN ONE SIDE OF CAN SUB BUS LINE

CIRCUIT DESCRIPTION

If 2 or more ECUs and/or sensors do not appear on the hand-held tester's "BUS CHECK" screen via the CAN VIM, one side of the CAN sub-bus line may be open. (One side of the CAN-H [sub-bus line]/CAN-L [sub-bus line] of the ECU and/or sensor is open.)

Symptom	Trouble Area
2 or more ECUs and/or sensors do not appear on the hand-held tester's "BUS CHECK" screen via the CAN VIM.	<ul style="list-style-type: none"> • One side of the CAN sub-bus line is open • Skid control ECU • Steering angle sensor • Yaw rate sensor • ECM • CAN J/C

WIRING DIAGRAM

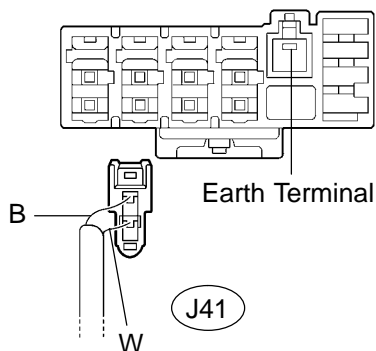


C

G40019

INSPECTION PROCEDURE

1	CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(SKID CONTROL ECU SUB BUS LINE)
----------	---

**CAN J/C "A" Side (w/ Earth Terminal)
Wire Harness View:**


G25695

G31933

- (a) Disconnect the skid control ECU sub bus line connector (J41) from the CAN J/C.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
 - **Reconnect the connector to its original position.**
- (b) Connect the hand-held tester via the CAN VIM to the DLC3.
- (c) Turn the ignition switch ON.
- (d) Select "BUS CHECK" on the hand-held tester display via the CAN VIM (see page 05-2329).

Result:

A	"ABS/VSC/TRAC" does not appear
B	2 or more ECUs and/or sensors do not appear

A	Go to step 8
----------	---------------------

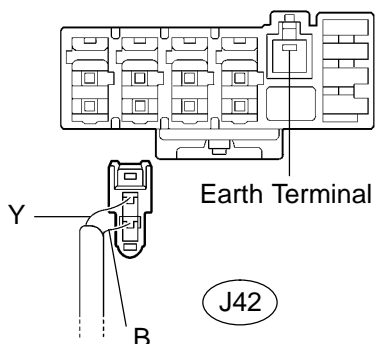
B

2	CONNECT CONNECTOR
----------	--------------------------

- (a) Reconnect the skid control ECU sub bus line DLC3. (J41) to the CAN J/C.

NEXT

3	CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(STEERING ANGLE SENSOR SUB BUS LINE)
----------	--

**CAN J/C "A" Side (w/ Earth Terminal)
Wire Harness View:**


G25695

G31933

- (a) Disconnect the steering angle sensor sub bus line connector (J42) from the CAN J/C.

NOTICE:

- **Before disconnecting the connector, make a note of where it is connected.**
 - **Reconnect the connector to its original position.**
- (b) Connect the hand-held tester via the CAN VIM to the DLC3.
- (c) Turn the ignition switch ON.
- (d) Select "BUS CHECK" on the hand-held tester display via the CAN VIM (see page 05-2329).

Result:

A	"STEERING SENSOR" does not appear
B	2 or more ECUs and/or sensors do not appear

A	Go to step 10
----------	----------------------

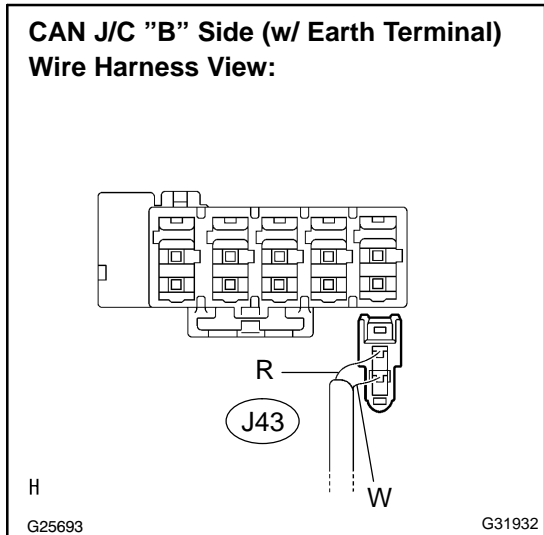
B

4 | CONNECT CONNECTOR

(a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT

5 | CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(YAW RATE SENSOR SUB BUS LINE)



(a) Disconnect the yaw rate sensor sub bus line connector (J43) from the CAN J/C.

NOTICE:

- Before disconnecting the connector, make a note of where it is connected.
 - Reconnect the connector to its original position.
- (b) Connect the hand-held tester via the CAN VIM to the DLC3.
- (c) Turn the ignition switch ON.
- (d) Select "BUS CHECK" on the hand-held tester display via the CAN VIM (see page 05-2329).

Result:

A	"YAW /DECELERAT" does not appear
B	2 or more ECUs and/or sensors do not appear

B → **Go to step 12**

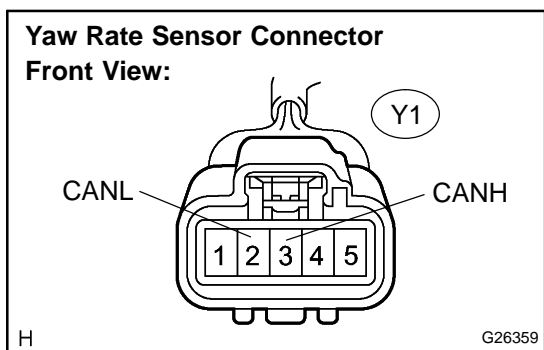
A

6 | CONNECT CONNECTOR

(a) Reconnect the yaw rate sensor sub bus line connector (J43) to the CAN J/C.

NEXT

7 | CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(YAW RATE SENSOR SUB BUS LINE)



- (a) Disconnect the yaw rate sensor connector (Y1).
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
Y1-2 (CANL) - Y1-3 (CANH)	• IG switch OFF • Stop light switch OFF	54 to 69 Ω

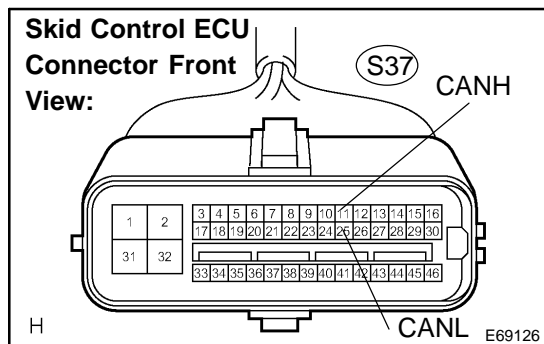
NG → **REPAIR OR REPLACE YAW RATE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H or CAN-L)**

OK

REPLACE YAW RATE SENSOR (SEE PAGE 32-52)

8 CONNECT CONNECTOR

- (a) Reconnect the skid control ECU sub bus line connector (J41) to the CAN J/C.

NEXT**9 CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(SKID CONTROL ECU SUB BUS LINE)**

- (a) Disconnect the skid control ECU connector (S37).
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

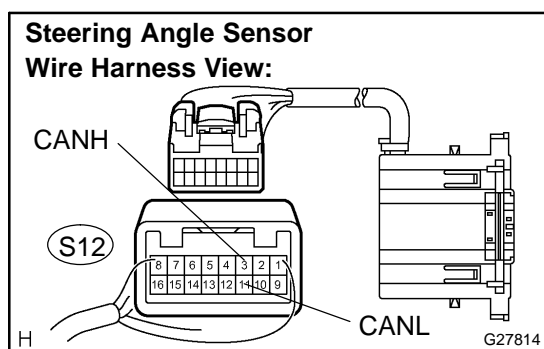
Tester connection	Condition	Specified value
S37-11 (CANH) - S37-25 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

NG

REPAIR OR REPLACE SKID CONTROL ECU SUB BUS LINE OR CONNECTOR (CAN-H or CAN-L)

OK**REPLACE MASTER CYLINDER SOLENOID****10 CONNECT CONNECTOR**

- (a) Reconnect the steering angle sensor sub bus line connector (J42) to the CAN J/C.

NEXT**11 CHECK FOR AN OPEN IN ONE SIDE OF THE CAN SUB BUS LINE(STEERING ANGLE SENSOR SUB BUS LINE)**

- (a) Disconnect the steering angle sensor connector (S12).
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
S12-3 (CANH) - S12-11 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	54 to 69 Ω

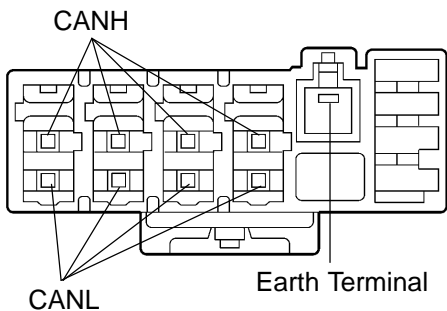
NG

REPAIR OR REPLACE STEERING ANGLE SENSOR SUB BUS LINE OR CONNECTOR (CAN-H or CAN-L)

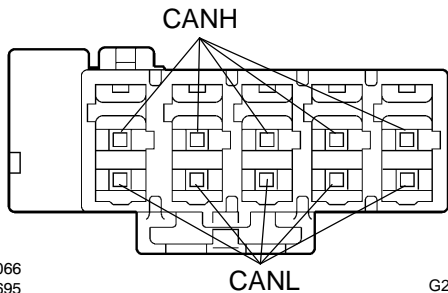
OK**REPLACE STEERING ANGLE SENSOR (SEE PAGE 32-53)**

12 INSPECT CAN J/C

CAN J/C "A" Side (w/ Earth Terminal):



CAN J/C "B" Side (w/o Earth Terminal):



G26066
G25695

G26214

- (a) Disconnect connectors (J39), (J40), (J41), (J42) and (J43) from the CAN J/C.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified value
1 (CANH) - 2 (CANL)	<ul style="list-style-type: none"> • IG switch OFF • Stop light switch OFF 	108 to 132 Ω

NG → **REPLACE CAN J/C**

OK

REPLACE ECM (SEE PAGE 10-16)

CRUISE CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

05B2Y-06

1 VEHICLE BROUGHT TO WORK SHOP



2 CUSTOMER PROBLEM ANALYSIS (See page [05-2375](#))



3 CHECK AND CLEAR DTCS (See page [05-2376](#))

4 PROBLEM SYMPTOM CONFIRMATION

SYMPTOM DOES NOT OCCUR (GO TO STEP 5)

SYMPTOM OCCURS (GO TO STEP 6)

5 SYMPTOM SIMULATION (See page [01-26](#))



6 DTC CHECK (See page [05-2376](#))

MALFUNCTION CODE (GO TO STEP 7)

NORMAL CODE (GO TO STEP 8)

7 DTC CHART (See page [05-2381](#))



GO TO STEP 9

8 PROBLEM SYMPTOMS TABLE (See page [05-2384](#))



9 CIRCUIT INSPECTION (See page [05-2385](#) to [05-2394](#))



10	TERMINAL OF ECM (See page 05-2383)
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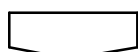
11	INDEMNIFICATION OF PROBLEM
-----------	-----------------------------------



12	REPAIR OR REPLACE
-----------	--------------------------



13	CONFIRMATION TEST
-----------	--------------------------



END

HINT:

Step 3, 6, 9, 13:

Diagnostic steps permitting the use of the hand-held tester.

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		VIN	
		Production Date	
		Licence Plate No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	Frequency Problem Occurs?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	<input type="checkbox"/> Auto cancel occurs	<ul style="list-style-type: none"> ● Driving condition <ul style="list-style-type: none"> <input type="checkbox"/> City driving <input type="checkbox"/> Freeway <input type="checkbox"/> Up hill <input type="checkbox"/> Down hill ● After cancel occurred, did the driver activate cruise control again? <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Cancel does not occur	<input type="checkbox"/> With brake ON <input type="checkbox"/> Except D range shift <input type="checkbox"/> When control SW turns to CANCEL position
	<input type="checkbox"/> Cruise control malfunction	<input type="checkbox"/> Slip to acceleration side <input type="checkbox"/> Slip to deceleration side <input type="checkbox"/> Hunting occurs <input type="checkbox"/> O/D cut off does not occur <input type="checkbox"/> O/D does not return
	<input type="checkbox"/> Switch malfunction	<input type="checkbox"/> SET <input type="checkbox"/> '+' <input type="checkbox"/> '-' <input type="checkbox"/> RES <input type="checkbox"/> CANCEL
	<input type="checkbox"/> CRUISE MAIN indicator light	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up <input type="checkbox"/> Blinks

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code)

PRE-CHECK

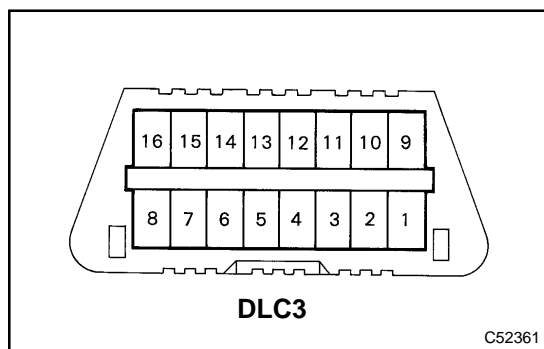
1. DIAGNOSIS SYSTEM

(a) Description

ECM controls the function of the cruise control on a vehicle.

Data on the cruise control and on the DTC can be read from the DLC3 on the vehicle. If CRUISE MAIN indicator light does not come on after the DTC check, there is a malfunction on the cruise control.

Use the hand-held tester or SST to check and solve the problem.



(b) Check the DLC3.

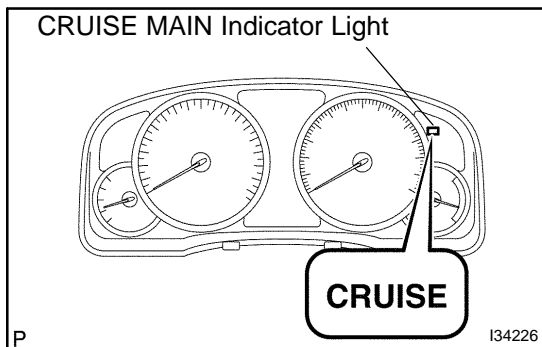
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Specified Condition	Condition
4	Chassis Ground ↔ Body Ground / 1 Ω or less	Always
7	Bus ⊕ Line / Pulse Generation	During Communication
16	Battery Positive ↔ Body Ground / 9 - 14 V	Always

HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" as connecting the hand-held tester to the DLC3 and turn the ignition ON, there is a problem either on the vehicle or on the tool.

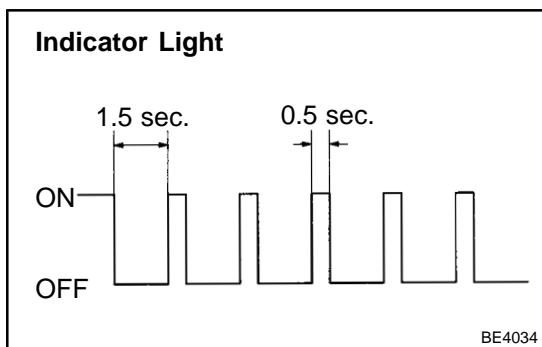
- If communication is normal when connecting the tool to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible when connecting the tool to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual in that case.



- (c) Check the indicator.
- (1) Turn the ignition switch ON.
 - (2) Check that the CRUISE MAIN indicator light comes on when the main switch button is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

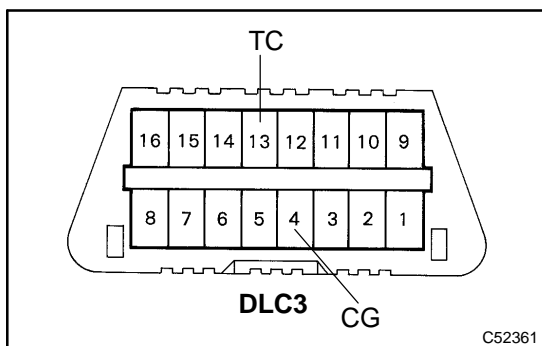
If the indicator check result is not normal, inspect the cruise main indicator light circuit (See page 05-2392).



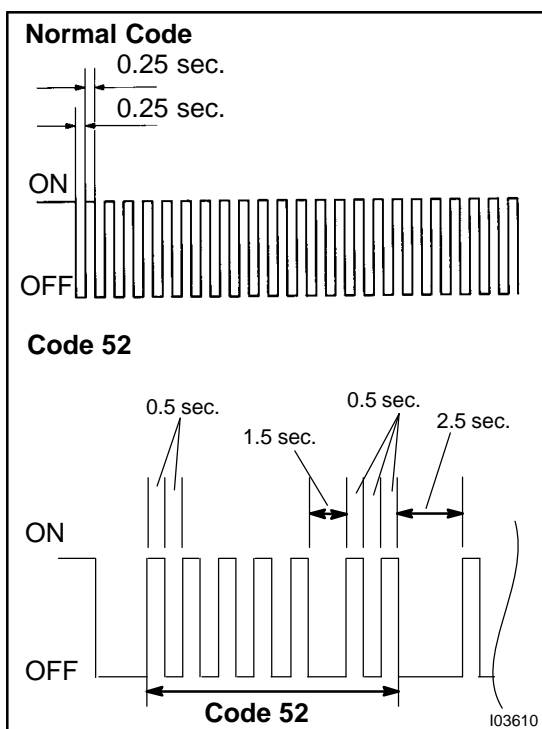
- (d) Check the DTC.

HINT:

If a malfunction occurs in the vehicle speed sensors or stop light switch assy, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns on and off the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



- (e) Output of DTC using diagnosis check wire.
- (1) Using SST, connect terminals TC and CG of DLC3.
SST 09843-18040
 - (2) Turn the ignition switch ON.
 - (3) Read the DTC on the CRUISE MAIN indicator light.



HINT:

If the DTC is not output, inspect the cruise main indicator light circuit (See page 05-2392) and diagnosis circuit (See page 05-2394).

As an example, the blinking pattern of normal code and code 52 are shown in the illustration.

2. USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

HINT:

Hand-held tester has a "Snapshot" function which records the monitored data. Please refer to the hand-held tester operator's manual for further details.

3. DATA LIST

HINT:

According to the DATA LIST displayed on the the hand-held tester, you can read the value of the switch, the sensor and so on without removing parts. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

- (a) Connect the hand-held tester to DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, read the "DATA LIST".

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed / min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
MEMORY SPD	Stored vehicle speed / min.: 36 km/h (22 mph), max.: 200 km/h (124 mph)	Actual stored vehicle speed	-
THROTTLE	Required throttle opening angle / min.: 0°, max.: 125°	Actual required throttle opening	-
CRUISE CONTROL	Cruise control system active condition / ON or OFF	ON : Cruise control activated OFF : Cruise control inactivated	-
MAIN SW (MAIN)	Main SW signal (Main CPU) / ON or OFF	ON : Main SW ON (Pressed in) OFF: Main SW OFF (Pressed out)	"3"
MAIN SW (SUB)	Main SW signal (Sub CPU) / ON or OFF	ON : Main SW ON (Pressed in) OFF: Main SW OFF (Pressed out)	"3"
CCS READY M	Cruise control system standby condition (Main CPU) / ON or OFF	ON ⇔ OFF : Change ON/OFF each time Main SW is pushed in.	"1"
CCS READY S	Cruise control system standby condition (Sub CPU) / ON or OFF	ON ⇔ OFF : Change ON/OFF each time Main SW is pushed in.	"1"
CCS INDICATOR M	Cruise indicator signal (Main CPU) / ON or OFF	ON : "CCS READY" ON OFF : "CCS READY" OFF	"2"
CCS INDICATOR S	Cruise indicator signal (Sub CPU) / ON or OFF	ON : "CCS READY" ON OFF : "CCS READY" OFF	"2"
CANCEL SW	CANCEL SW signal / ON or OFF	ON : CANCEL SW ON OFF : CANCEL SW OFF	-
SET/COAST SW	-/SET SW signal / ON or OFF	ON : -/SET SW ON OFF : -/SET SW OFF	-
RES/ACC SW	+/RES SW signal / ON or OFF	ON : +/RES SW ON OFF : +/RES SW OFF	-
STP LIGHT SW2 M	Stop light SW signal (Main CPU) / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	-
STP LIGHT SW2 S	Stop light SW signal (Sub CPU) / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	-

STP LIGHT SW1 S	Stop light SW signal (Sub CPU) / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	-
SHIFT D POS	PNP SW signal (D position) / ON or OFF	ON : Shift D position OFF : Except shift D position	-

HINT:

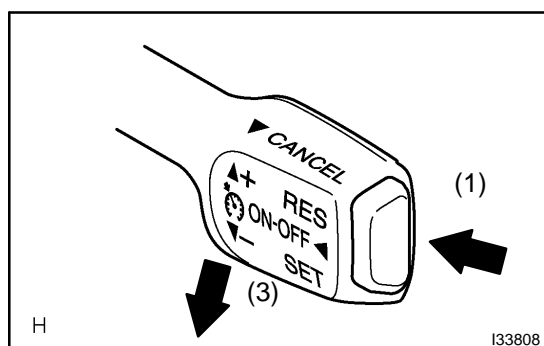
"3" is OK but "1" is NG → ECM failure

"1" is OK but "2" is NG → DTC output or ECM failure

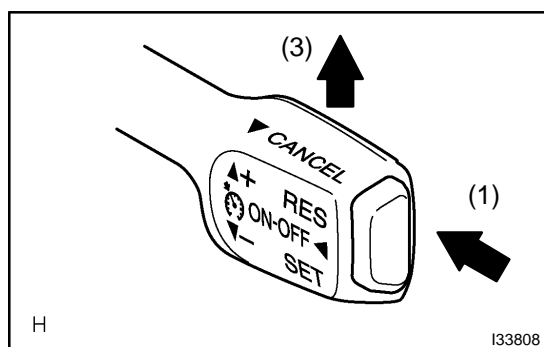
"3" is OK but cruise indicator not turn on → CRUISE MAIN indicator or wire harness or ECM failure

4. DTC CLEAR

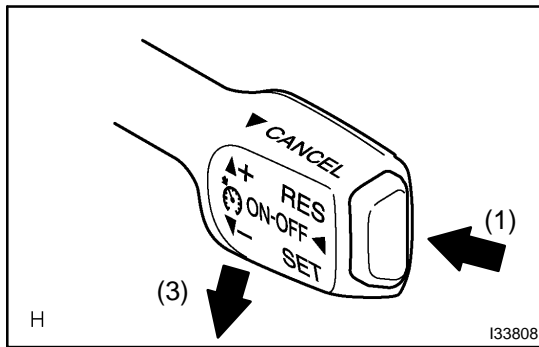
- (a) The following actions will erase the DTCs and freeze frame data.
- (1) Hand-Held Tester:
Operating the hand-held tester to erase the codes.
 - (2) Except Hand-Held Tester:
Disconnecting the battery terminals or EFI fuse.
- (b) After completing repairs, the DTC retained in memory can be cleared by removing the EFI fuse for 1 minutes or more with the ignition switch OFF.
- (c) Check that the normal code is displayed after connecting the fuse.

**5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)**

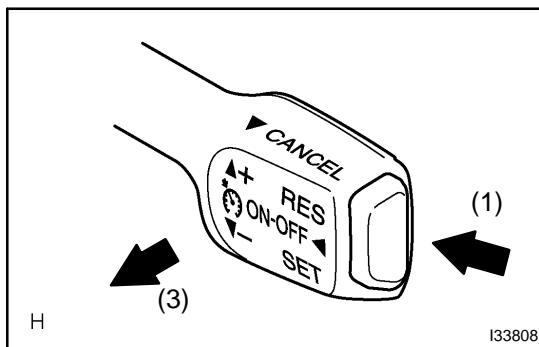
- (a) Inspect the SET switch.
- (1) Push the main switch button ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Push down the control switch to the -/SET.
 - (4) After releasing the switch, check that the vehicle cruises at the desired speed.



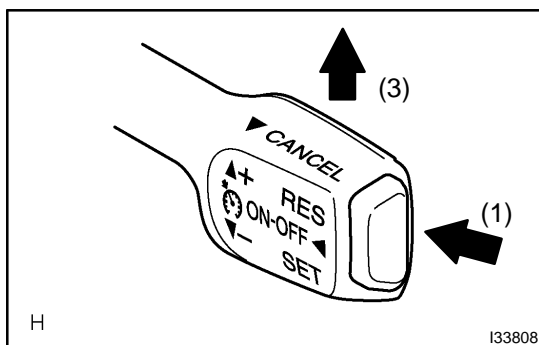
- (b) Inspect the '+' switch.
- (1) Push the main switch button ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed increases while the control switch is pull up to +/RES, and that the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily push the control switch upward to the +/RES, and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap-up function).



- (c) Inspect the '-' switch.
- (1) Push the main switch button ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) Check that the vehicle speed decreases while the control switch is push down to -/SET, and the vehicle cruises at the set speed when the switch is released.
 - (4) Momentarily push the control switch downward to -/SET, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).



- (d) Inspect the CANCEL switch.
- (1) Push the main switch button ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal.
 - Shift to except D position.
 - Push the main switch button OFF.
 - Pull the control switch CANCEL.



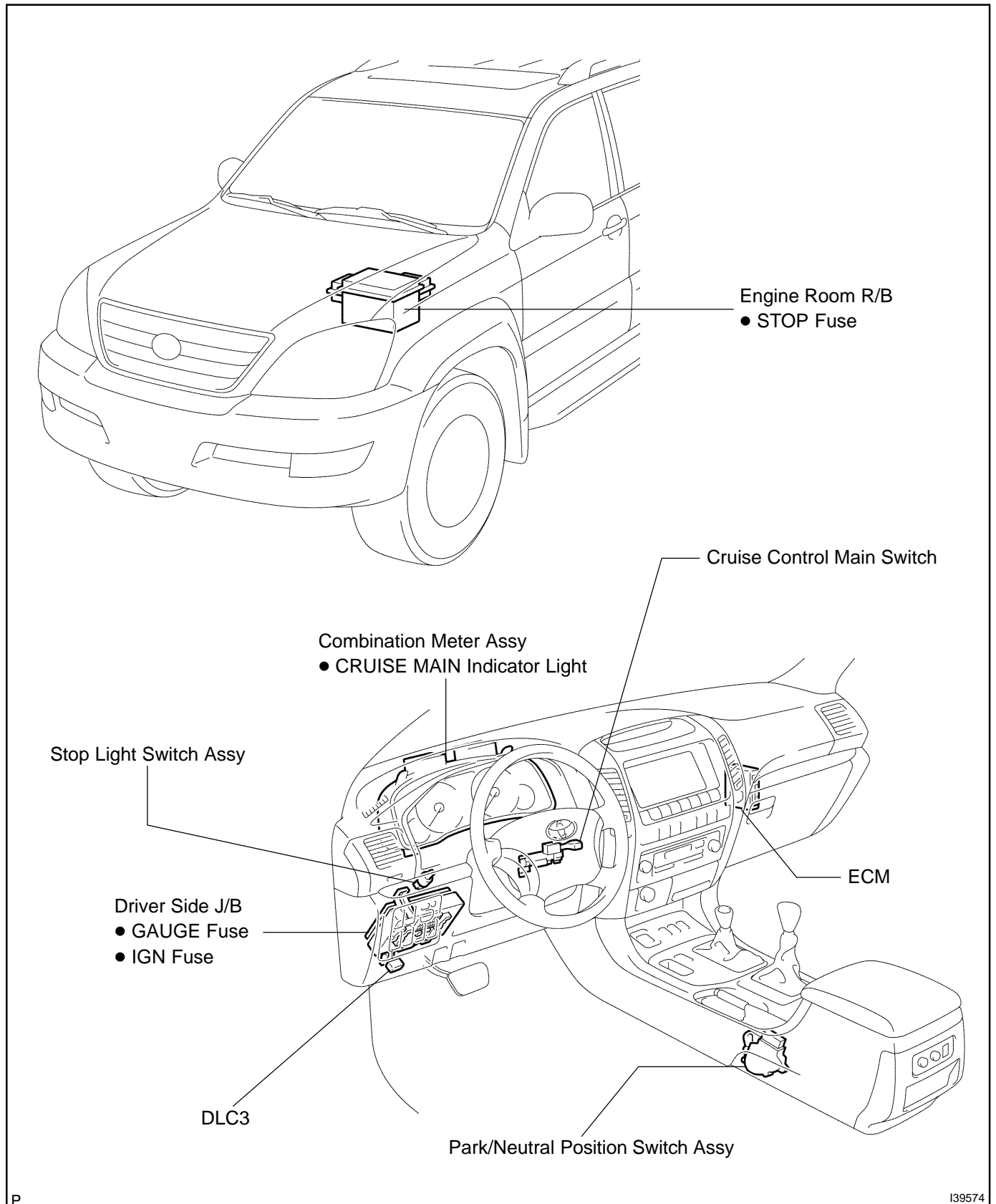
- (e) Inspect the RES switch.
- (1) Push the main switch button ON.
 - (2) Drive at a desired speed (40 km/h (25 mph) or higher).
 - (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
 - Depress the brake pedal.
 - Shift to except D position.
 - Pull the control switch CANCEL.
 - (4) After the control switch is pull up to +/RES at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed before the cancellation.

DIAGNOSTIC TROUBLE CODE CHART

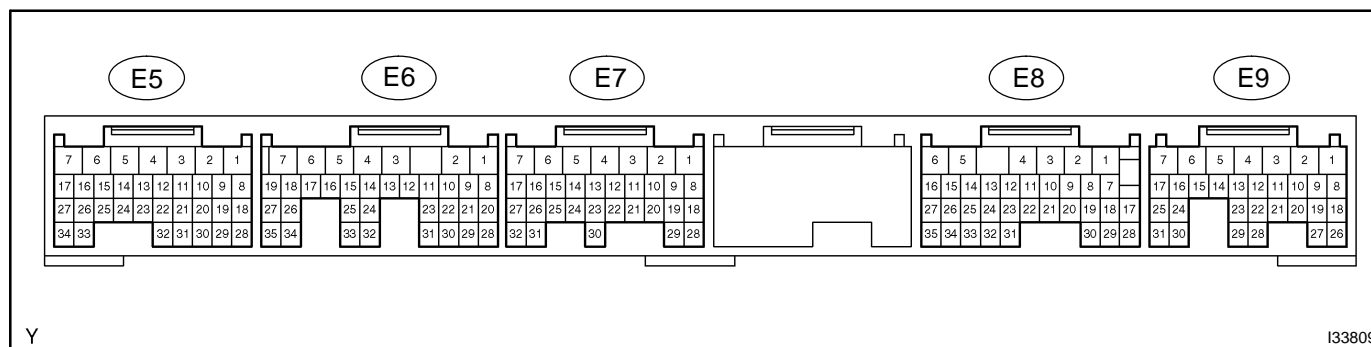
If a malfunction code is indicated during the DTC check, check the circuit listed for that code in the table below, and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
P0500/21 (05-2385)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> • Combination meter assy • Vehicle speed sensor
P0503/23 (05-2385)	Vehicle Speed Sensor "A" Intermittent/Erratic/High	<ul style="list-style-type: none"> • Vehicle speed sensor circuit • ECM
P0571/52 (05-2386)	Brake Switch "A" Circuit	<ul style="list-style-type: none"> • Stop light switch assy • Stop light switch assy circuit • ECM
P0607/54 (05-2389)	Control Module Performance	<ul style="list-style-type: none"> • ECM

LOCATION



TERMINALS OF ECM



Y

I33809

Symbols (Terminals No.)	Wiring Color	Condition	Specified Condition
TC - E1 (E9-23 - E7-1)	P-L - BR	Ignition switch ON	10 - 14 V
		Ignition switch ON Connect terminals TC and CG of DLC3	Below 2 V
ST1 - E1 (E9-16 - E7-1)	R-L - BR	Ignition switch ON Depress brake pedal	Below 1 V
		Ignition switch ON Release brake pedal	10 - 14 V
PI - E1 (E8-18 - E7-1)	LG - BR	Ignition switch ON Cruise control main switch ON	0 - 3 V
		Ignition switch ON Cruise control main switch OFF	9 - 14 V
STP - E1 (E9-15 - E7-1)	G-Y - BR	Ignition switch ON Depress brake pedal	10 - 14 V
		Ignition switch ON Release brake pedal	Below 1 V
CCS - E1 (E8-2 - E7-1)	L-B - BR	Ignition switch ON	9 - 14 V
		Ignition switch ON CANCEL switch hold ON	6 - 10.1 V
		Ignition switch ON -/SET switch hold ON	4 - 7.1 V
		Ignition switch ON +/RES switch hold ON	2.1 - 4 V
		Ignition switch ON MAIN switch hold ON	Below 1 V

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Suspect Area	See page
Main switch cannot be turned ON. (Cruise indicator light in combination meter is not lit.)	3. Cruise control switch circuit 4. CRUISE MAIN indicator light circuit 5. ECM	05-2390 05-2392 01-36
Vehicle speed setting cannot be done. (Although indicator light in combination meter is lit when the main switch is turned ON, they go off when vehicle speed is set.)	1. Cruise control switch circuit 2. ECM	05-2390 01-36
Setting cannot be done. (Indicator light in combination meter is lit when the main switch is turned ON and they remain ON while setting.)	1. Cruise control switch circuit 2. Stop light switch circuit 3. PNP switch circuit 4. Combination meter system 5. ECM	05-2390 05-2386 05-958 05-2033 01-36
While the vehicle is driving with cruise control, the set control is canceled. (Indicator light and CRUISE remain ON.)	1. Cruise control switch circuit 2. Vehicle speed sensor circuit 3. Stop light switch circuit 4. CRUISE MAIN indicator light circuit 5. PNP switch circuit 6. ECM	05-2390 05-2385 05-2386 05-2392 05-958 01-36
Hunting (Speed is not constant.)	1. Vehicle speed sensor circuit 2. ECM	05-2385 01-36
Setting cannot be cancelled. (When Coast, Acceleration, Resume, Set speed change and Control switch are operated.)	1. Cruise control switch circuit 2. ECM	05-2390 01-36
DTC is not output, or is output when should not be.	1. Diagnosis circuit 2. ECM	05-2394 01-36
CRUISE MAIN indicator light does not light up.	1. Cruise control switch circuit 2. CRUISE MAIN indicator light circuit 3. ECM	05-2390 05-2392 01-36

DTC	P0500/21	VEHICLE SPEED SENSOR "A"
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DTC	P0503/23	VEHICLE SPEED SENSOR "A" INTERMITTENT/ERRATIC/HIGH
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CIRCUIT DESCRIPTION

See page [05-261](#).

DTC No.	DTC Detection Condition	Trouble Area
P0500/21 P0503/23	No vehicle speed sensor signal to ECM under following conditions (a) and (b): (2 trip detection logic). (a) Park/neutral position switch is OFF (b) Vehicle is being driven	<ul style="list-style-type: none"> • Combination meter assy • Vehicle speed sensor • Vehicle speed sensor circuit • ECM

WIRING DIAGRAM

See page [05-261](#).

INSPECTION PROCEDURE

See page [05-261](#).

DTC	P0571/52	BRAKE SWITCH "A" CIRCUIT
------------	-----------------	---------------------------------

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch assy sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.

A fail-safe function is provided so that the functions normally, even if there is a malfunction in the stop light signal circuit.

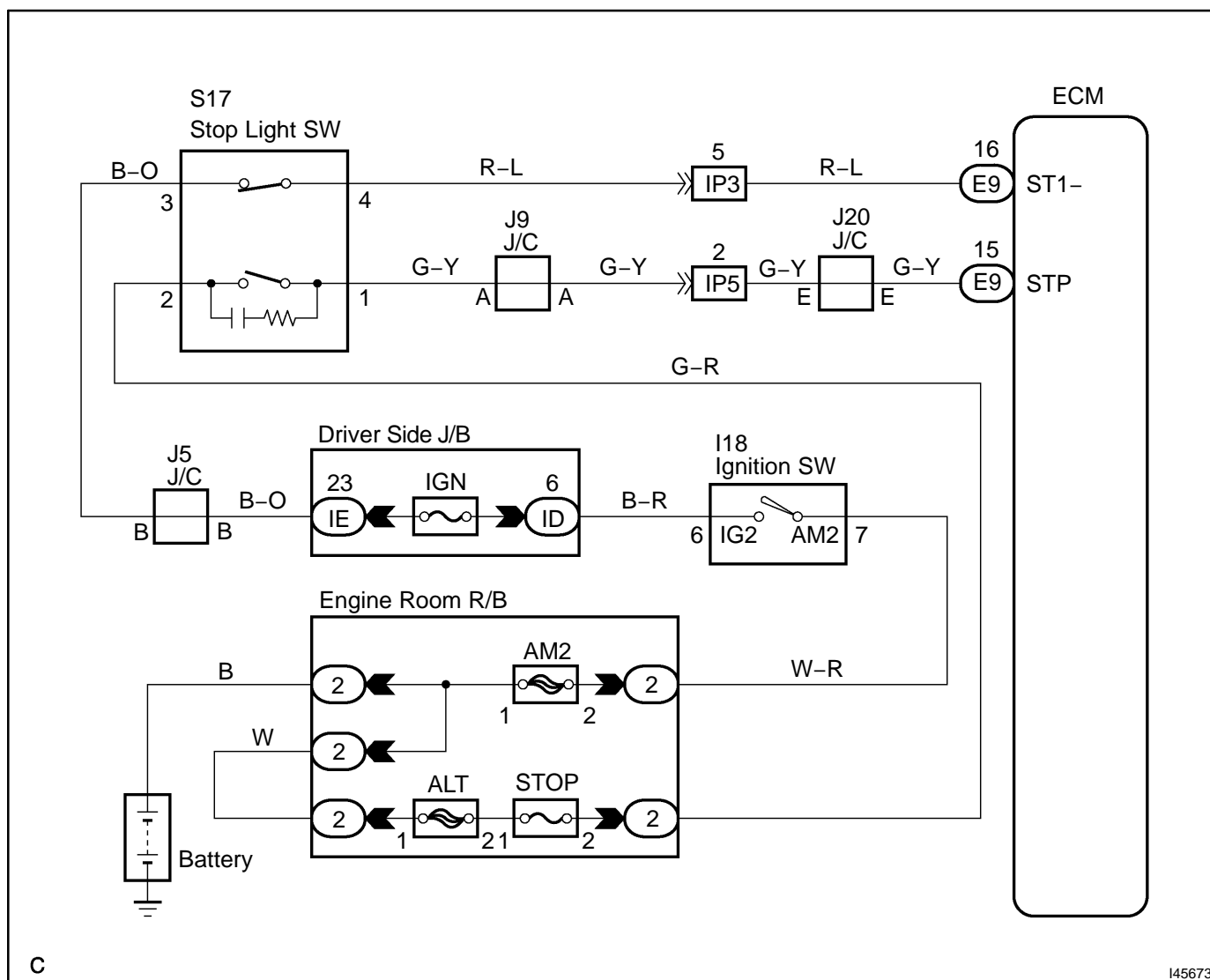
The cancel condition occurs as battery positive voltage is supplied to terminal STP.

When the brake is on, battery positive voltage is normally applied through the STOP fuse and the stop light switch assy to terminal STP of the ECM, and the ECM turns the cruise control OFF.

If the harness connected to terminal STP has an open circuit, terminal STP will have battery positive voltage and the cruise control will be turned OFF.

DTC No.	DTC Detection Condition	Trouble Area
P0571/52	Stop light switch assy does not turn off even once the vehicle is driven.	<ul style="list-style-type: none"> • Stop light switch assy • Stop light switch assy circuit • ECM

WIRING DIAGRAM



C

145673

INSPECTION PROCEDURE

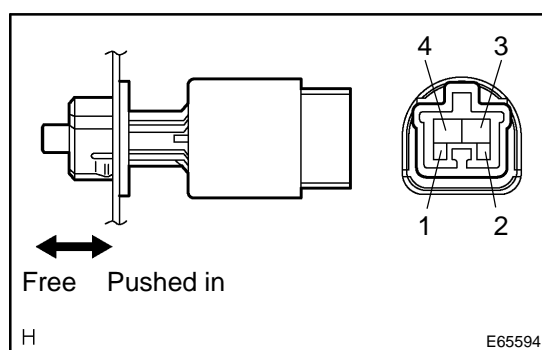
1 INSPECT STOP LIGHT SWITCH OPERATION

- (a) Check that the stop light lights up when brake pedal is depressed and turns OFF when the brake pedal is released.

NG INSPECT STOP LIGHT SWITCH CIRCUIT
(See page 05-821)

OK

2 INSPECT STOP LIGHT SWITCH ASSY



- (a) Disconnect the stop light switch assy connector.
(b) Measure the continuity between each terminal of the stop light switch assy.

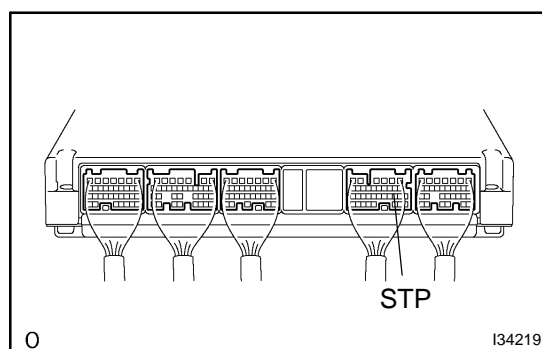
Standard:

Switch condition	Tester connection	Specification
Switch pin free	1 - 2	No continuity
Switch pin free	3 - 4	Continuity
Switch pin pushed in	1 - 2	Continuity
Switch pin pushed in	3 - 4	No continuity

NG REPLACE STOP LIGHT SWITCH ASSY

OK

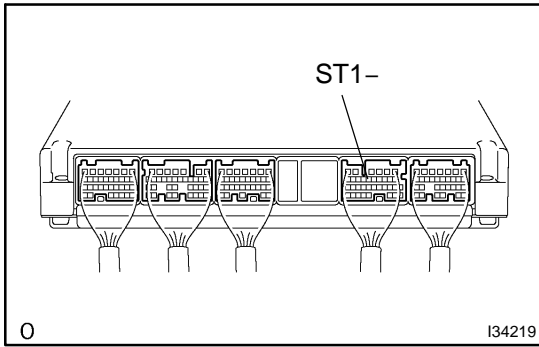
3 INSPECT ECM



- (a) Remove the ECM with connectors still connected.
(b) Turn the ignition switch to ON.
(c) Measure voltage between terminal STP of ECM connector and body ground when the brake pedal is depressed and released.

Standard:

Pedal condition	Voltage (V)
Depressed	10 - 14
Released	Below 1



- (d) Measure voltage between terminal ST1- of ECM connector and body ground when the brake pedal is depressed and released.

Standard:

Pedal condition	Voltage (V)
Depressed	Below 1
Released	10 - 14

NG

CHECK AND REPLACE ECM (See page 01-36)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC	P0607/54	CONTROL MODULE PERFORMANCE
------------	-----------------	-----------------------------------

CIRCUIT DESCRIPTION

This DTC expresses the internal abnormalities of ECM.

DTC No.	Detection Item	Trouble Area
P0607/54	<ul style="list-style-type: none"> • Cruise control input signal abnormal. • Stop light switch input signal abnormal. 	<ul style="list-style-type: none"> • ECM

INSPECTION PROCEDURE

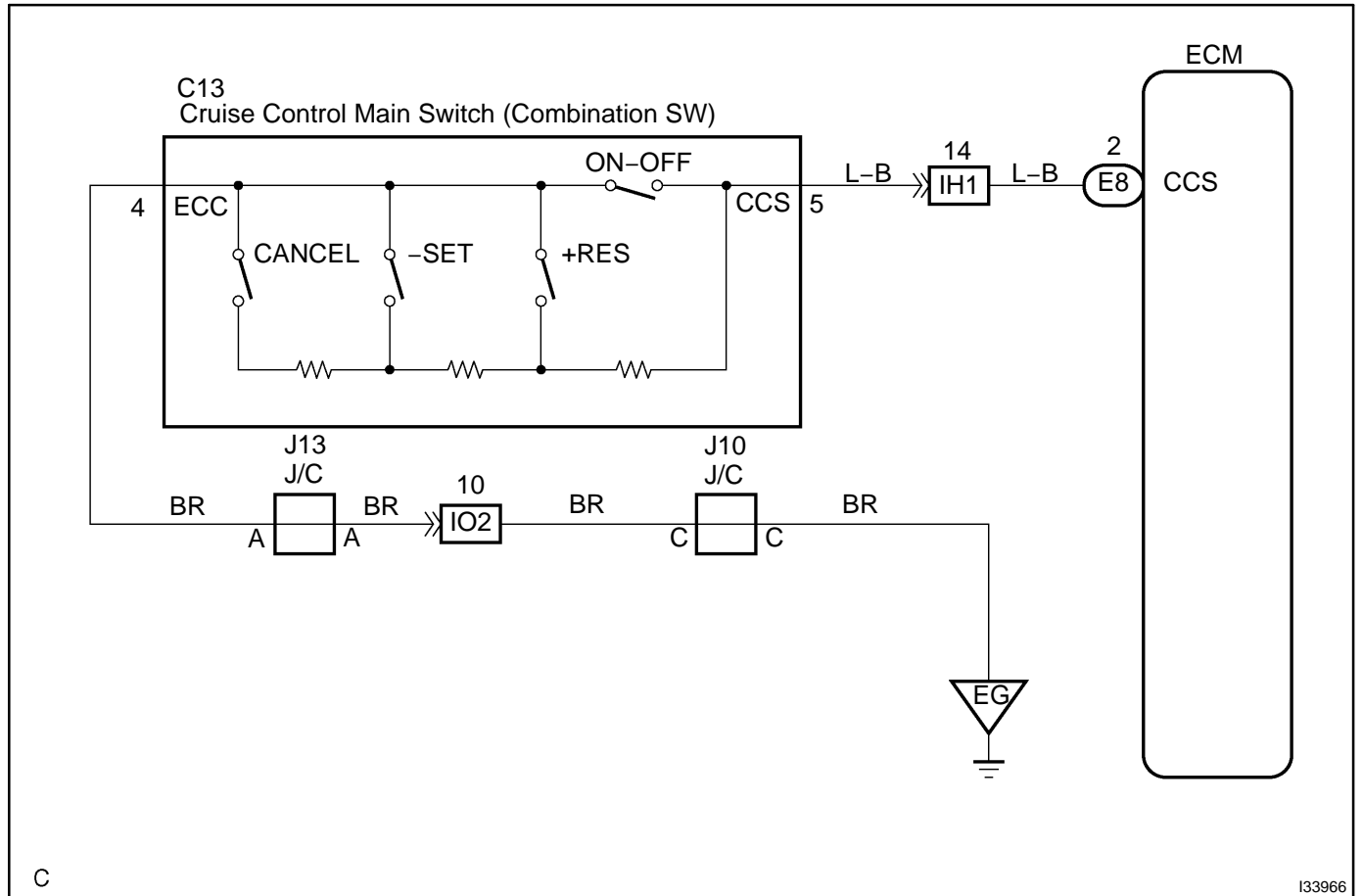
1	CHECK AND REPLACE ECM (See page 01-36)
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CRUISE CONTROL SWITCH CIRCUIT

CIRCUIT DESCRIPTION

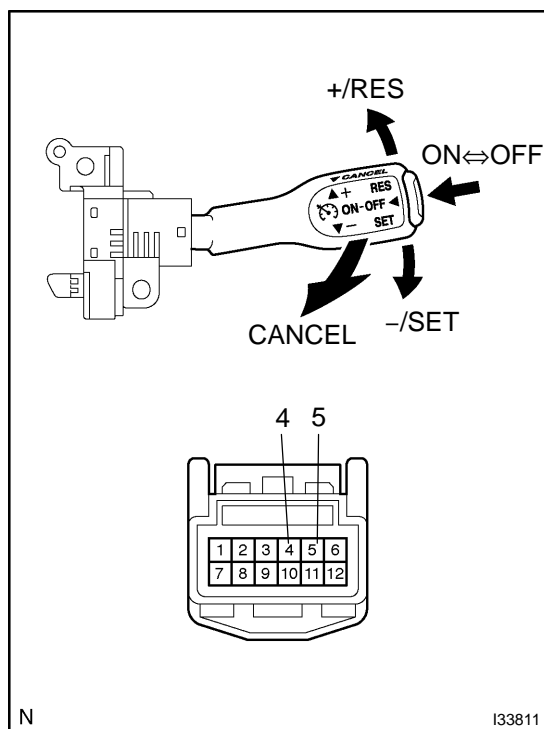
This circuit carries the -/SET, +/RES and CANCEL signals (each voltage) to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT CRUISE CONTROL MAIN SWITCH



- (a) Disconnect the cruise control main switch connector.
 (b) Measure resistance between terminal 4 and 5 of the cruise control switch connector when cruise control main switch is operated.

Standard:

Switch condition	Resistance (Ω)
Neutral	∞ (No continuity)
+ /RES	210 - 270
- /SET	560 - 700
CANCEL	1,380 - 1,700

- (c) Check continuity between terminals 4 and 5 of cruise control main switch connector when main switch button is held on and off.

Standard:

Switch condition	Tester connection	Specification
OFF	4 - 5	No continuity
ON	4 - 5	Continuity

NG**REPLACE CRUISE CONTROL MAIN SWITCH****OK**

2 CHECK HARNESS AND CONNECTOR(CRUISE CONTROL MAIN SWITCH, BODY GROUND - ECM)

- (a) Check for open and short circuit in harness and connector between cruise control main switch and ECM (See page 01-36).
 (b) Check for open and short circuit in harness and connector between cruise control main switch and body ground (See page 01-36).

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

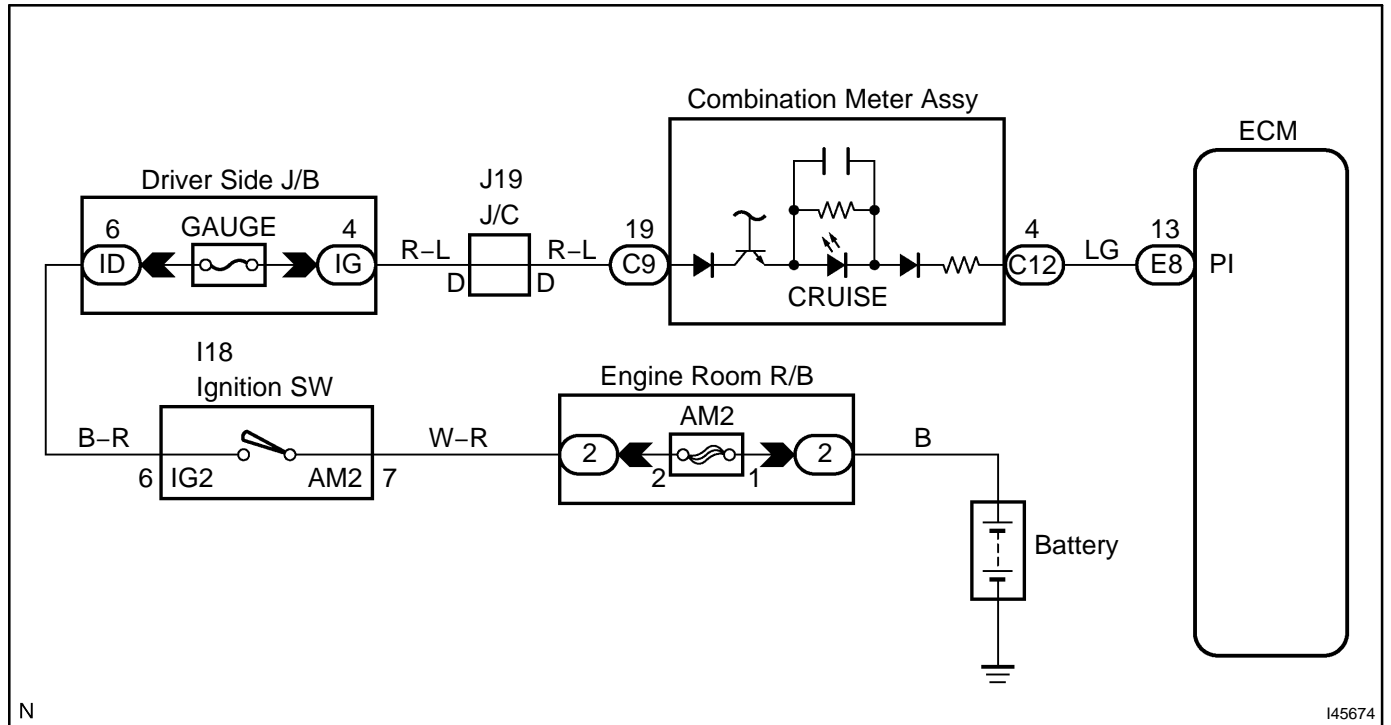
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page 05-2384)

CRUISE MAIN INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

When the cruise control main switch is turned off, the cruise control does not operate.

WIRING DIAGRAM



INSPECTION PROCEDURE**1 INSPECT COMBINATION METER ASSY**

- (a) See combination meter troubleshooting on page [05-2033](#).

NG**REPAIR OR REPLACE COMBINATION METER ASSY****OK****2 CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSY - ECM)**

- (a) Check for open and short circuit in harness and connector between combination meter assy and ECM (See page [01-36](#)).

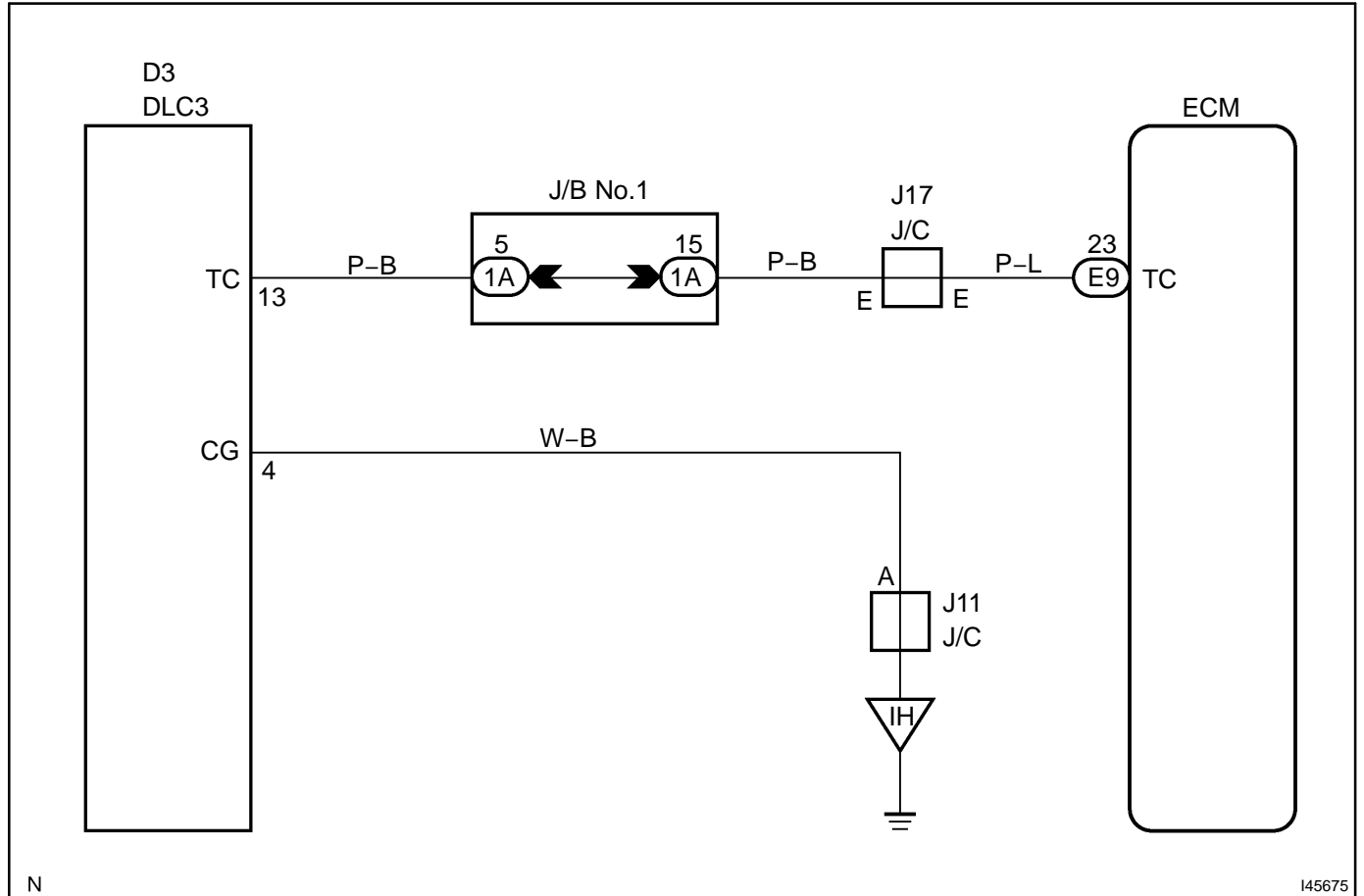
NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE (See page [05-2384](#))**

DIAGNOSIS CIRCUIT

CIRCUIT DESCRIPTION

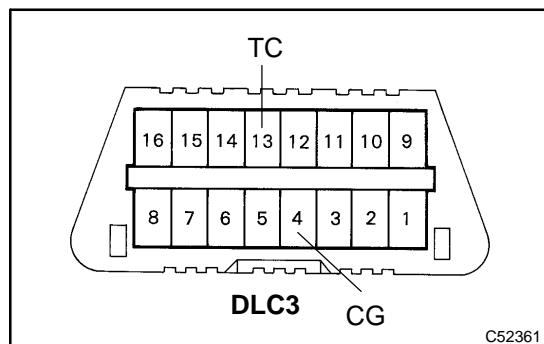
Making short circuit between terminal TC and CG of DLC3 will output DTC from the DLC3.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3(TC TERMINAL VOLTAGE)



- (a) Turn the ignition switch to ON.
 (b) Measure voltage between terminals TC and CG of DLC3.

Standard:
10 - 14 V

OK → Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(DLC3 - BODY GROUND)

- (a) Check for open and short circuit in harness and connector between terminal CG of DLC3 and body ground (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK HARNESS AND CONNECTOR(DLC3 - ECM)

- (a) Check for open and short circuit in harness and connector between terminal TC of DLC3 and ECM (See page 01-36).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

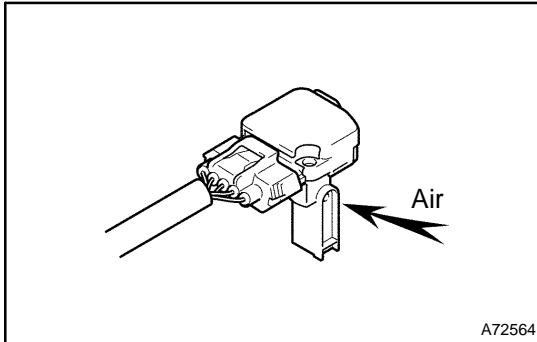
OK

CHECK AND REPLACE ECM (See page 01-36)

SFI SYSTEM (2UZ-FE)

ON-VEHICLE INSPECTION

100UC-01



1. INSPECT MASS AIR FLOW METER

(a) When using the hand-held tester:

Inspect operation.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Blow air into the MAF meter, and check that the air flow value of the CURRENT DATA changes.

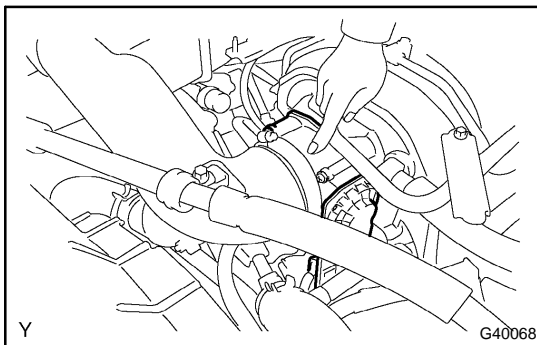
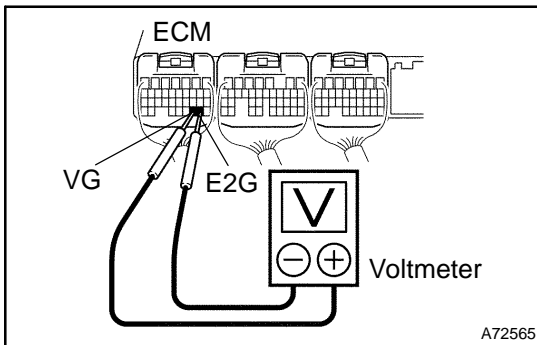
If operation is not as specified, check the MAF meter (See page 10-3), wiring and ECM.

(b) When not using the hand-held tester:

Inspect operation.

- (1) Turn the ignition switch ON.
- (2) Connect the positive tester probe of the voltmeter to terminal VG of the ECM, and the negative tester probe of the voltmeter to terminal E2G of the ECM.
- (3) Blow air into the air flow meter, and check if the voltage fluctuates.

If operation is not as specified, check the MAF meter (See page 10-3), wiring and ECM.



2. INSPECT THROTTLE BODY

(a) Check for an operating sound.

- (1) Turn the ignition switch ON.
- (2) When turning the accelerator pedal position sensor lever, listen to a running sound of the motor. Also, check that there is no friction sound.

If operation is not as specified, check the throttle control motor (See page 10-3), wiring and ECM.

(b) Inspect the throttle position sensor.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) When turning the accelerator pedal position sensor lever to the full-open position, check the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA.

Standard throttle valve opening percentage:

60% or more

If the result is not as specified, check the accelerator pedal position sensor (See page 05-336), wiring and ECM.

If the hand-held tester is not available, measure the voltage between the terminals (VTA1 - E2, VTA2 - E2) of the ECM connector (See page 05-35).

- (c) Inspect the air assist system.
 - (1) Start the engine and check that the MIL does not light up.
 - (2) Warm up the engine to the normal operating temperature.
 - (3) Switch the A/C compressor from ON to OFF, and check the idle speed.

Idle speed (Transmission in neutral): 700 ± 50 rpm

NOTICE:

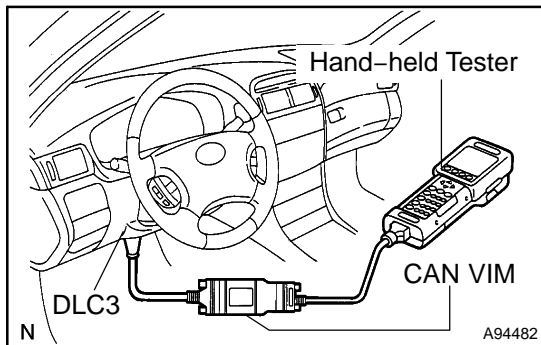
Perform this inspection while no electrical load is applied.

- (d) Perform the driving test.

3. INSPECT ACCELERATOR PEDAL POSITION SENSOR

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Check if the voltage (ACCEL POS) of the CURRENT DATA indicates the standard value.
 - Accelerator pedal released: 0.5 to 1.1 V**
 - Accelerator pedal depressed: 2.6 to 4.5 V**
- (d) Check if the voltage (ACCEL POS #2) of the CURRENT DATA indicates the standard value.
 - Accelerator pedal released: 1.2 to 2.0 V**
 - Accelerator pedal depressed: 3.4 to 5.3 V**

If the hand-held tester is not available, measure the voltage between the terminals (VPA - EPA, VPA2 - EPA2) of the ECM connector (See page 05-35).



4. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY

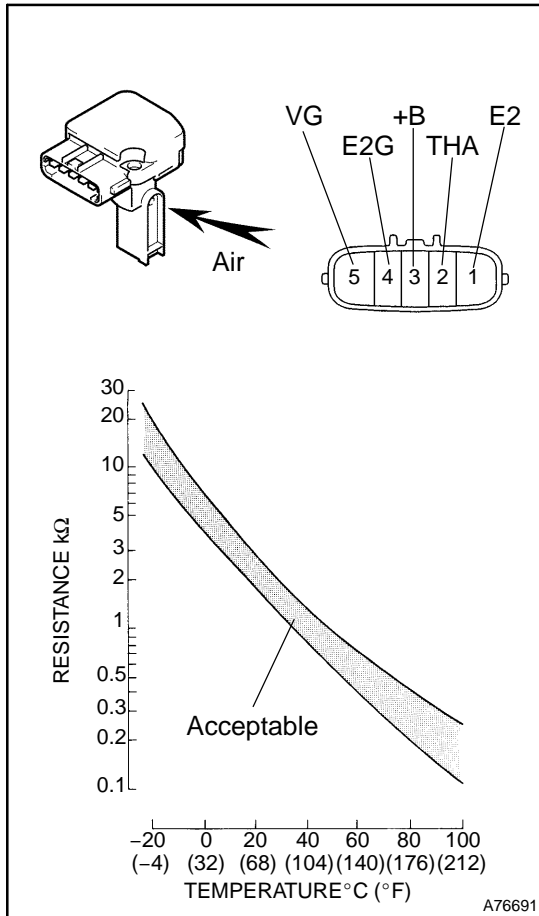
- (a) Connect the hand-held tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Start and warm up the engine.
- (d) Connect the hand-held tester and select VVT from the ACTIVE TEST menu.
- (e) Check the engine speed when the OCV is operated by the hand-held tester.

Idle speed: 650 to 750 rpm

OK:

Condition	Specified Condition
VVT system is OFF (OCV is OFF)	Normal engine speed
VVT system is ON (OCV is ON)	Rough idle or engine stalled

INSPECTION



1. INSPECT MASS AIR FLOW METER

- (a) Check the output voltage.
 - (1) Apply battery voltage across terminals 3 (+B) and 4 (E2G).
 - (2) Connect the positive (+) tester probe to terminal 5 (VG), and the negative (-) tester probe to terminal 4 (E2G).
 - (3) Blow air into the MAF meter, and check if the voltage fluctuates.
- (b) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between terminals 2 (THA) and 1 (E2).

Resistance:

- 12.5 to 16.9 kΩ at -20°C (-4°F)**
- 2.19 to 2.67 kΩ at 20°C (68°F)**
- 0.50 to 0.68 kΩ at 60°C (140°F)**

2. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (+B) - 2 (GND)	6.9 to 7.9 Ω at 20°C (68°F)

If the result is not as specified, replace the camshaft timing oil control valve.

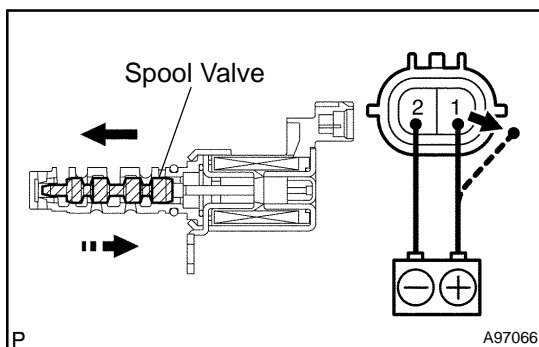
- (b) Check the operation.
 - (1) Apply battery voltage across the terminals, and check that the spool valve operates.

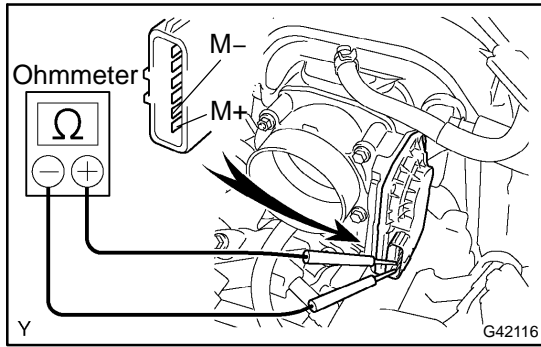
NOTICE:

Check that the spool valve is not stuck.

HINT:

The spool valve may not return if foreign objects are caught in it. This may cause subtle pressure leaks to the advance side, and a DTC may be set.

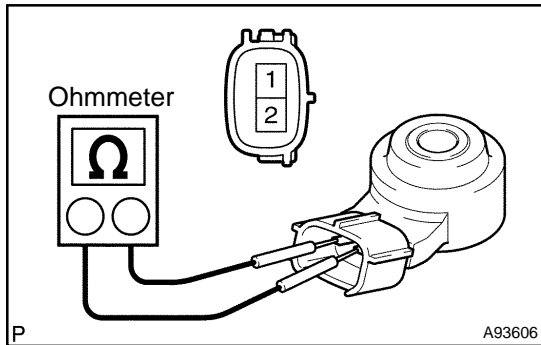




3. INSPECT THROTTLE W/MOTOR BODY ASSY

- (a) Disconnect the throttle control motor connector.
- (b) Using an ohmmeter, measure the motor resistance between terminals M+ and M-.

Motor resistance: 0.3 to 100 Ω at 20°C (68°F)



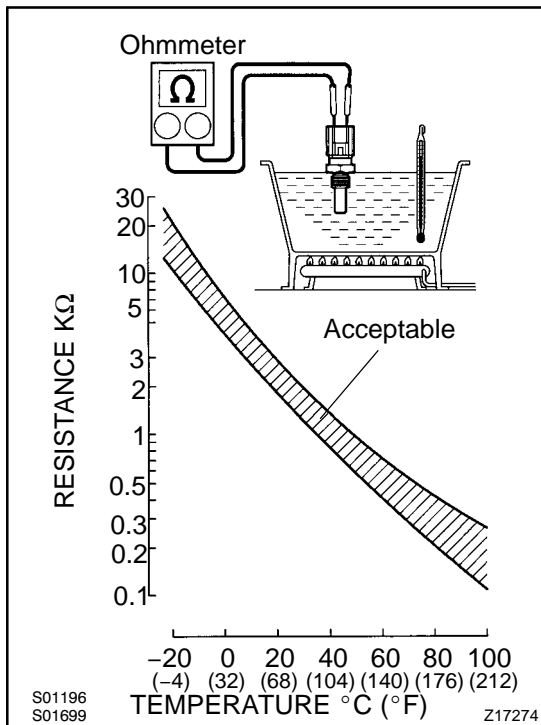
4. INSPECT KNOCK SENSOR

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 (Ground) - 2 (Output)	120 to 280 kΩ at 20°C (68°F)

If the result is not as specified, replace the knock sensor.



5. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

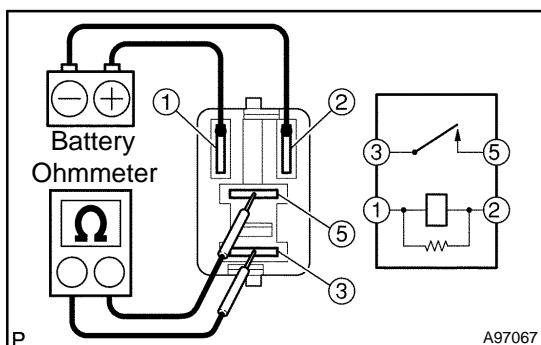
Resistance:

2.32 to 2.59 kΩ at 20°C (68°F)

0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:

If inspecting the water temperature sensor in water, prevent water from flowing into the terminals. After inspection, wipe the water off the sensor.



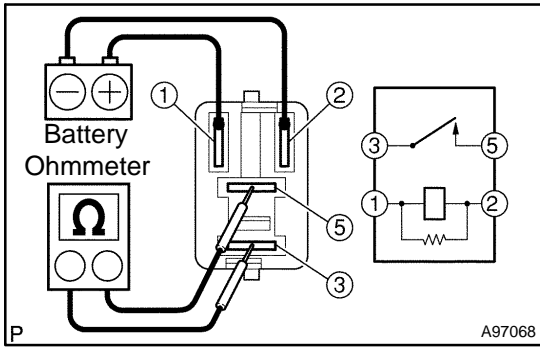
6. INSPECT CIRCUIT OPENING RELAY

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the result is not as specified, replace the circuit opening relay.



7. INSPECT EFI RELAY

(a) Check the resistance.

- (1) Using an ohmmeter, measure the resistance between the terminals.

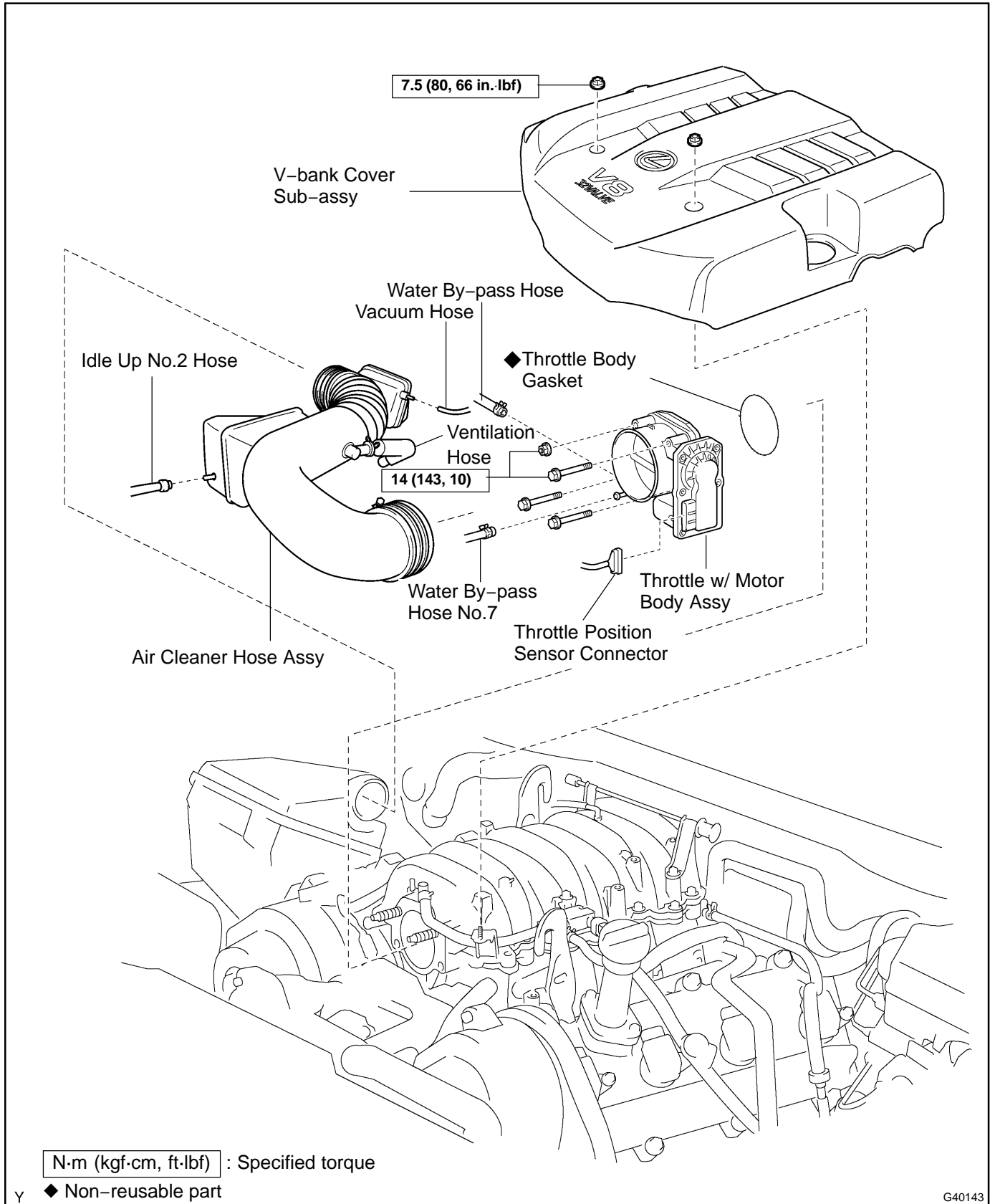
Standard:

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the result is not as specified, replace the E.F.I relay.

THROTTLE W/MOTOR BODY ASSY (2UZ-FE) COMPONENTS

10024-07



REPLACEMENT

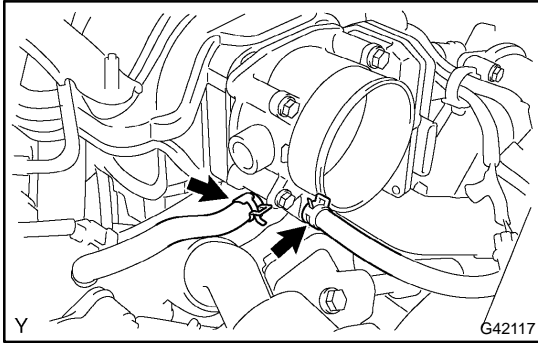
1. DRAIN ENGINE COOLANT (SEE PAGE 16-5)

2. REMOVE V-BANK COVER SUB-ASSY

- (a) Remove the 2 nuts and V-bank cover sub-assy.

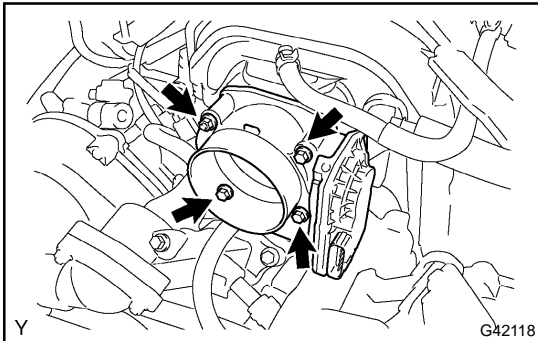
3. REMOVE AIR CLEANER HOSE ASSY

- (a) Disconnect the vacuum hoses (for the P/S idle-up and fuel pressure regulator) and ventilation hose.
 (b) Remove the air cleaner hose assy.



4. REMOVE THROTTLE W/MOTOR BODY ASSY

- (a) Disconnect the water by-pass hose, water by-pass hose No.7 and the throttle position sensor connector.



- (b) Remove the 3 bolts and nut.
 (c) Remove the throttle body and the throttle body gasket.

5. INSTALL THROTTLE W/MOTOR BODY ASSY

- (a) Install a new gasket and the throttle body with the 3 bolts and nut.

Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)

- (b) Connect the water by-pass hose, water by-pass hose No.7 and throttle position sensor connector.

6. INSTALL AIR CLEANER HOSE ASSY

7. ADD ENGINE COOLANT (SEE PAGE 16-5)

8. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)

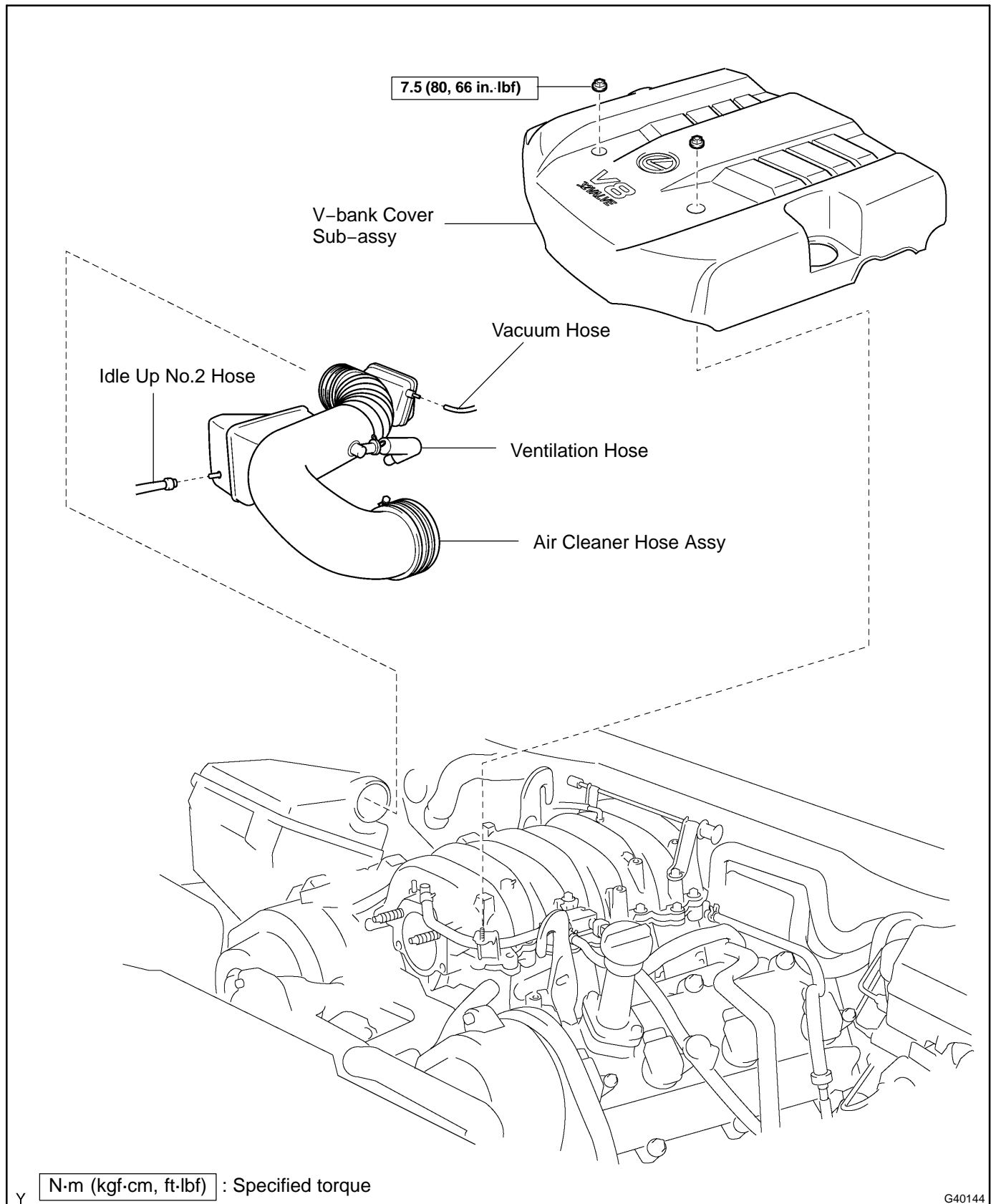
9. INSTALL V-BANK COVER SUB-ASSY

- (a) Install the V-bank cover sub-assy with the 2 nuts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

KNOCK SENSOR (2UZ-FE) COMPONENTS

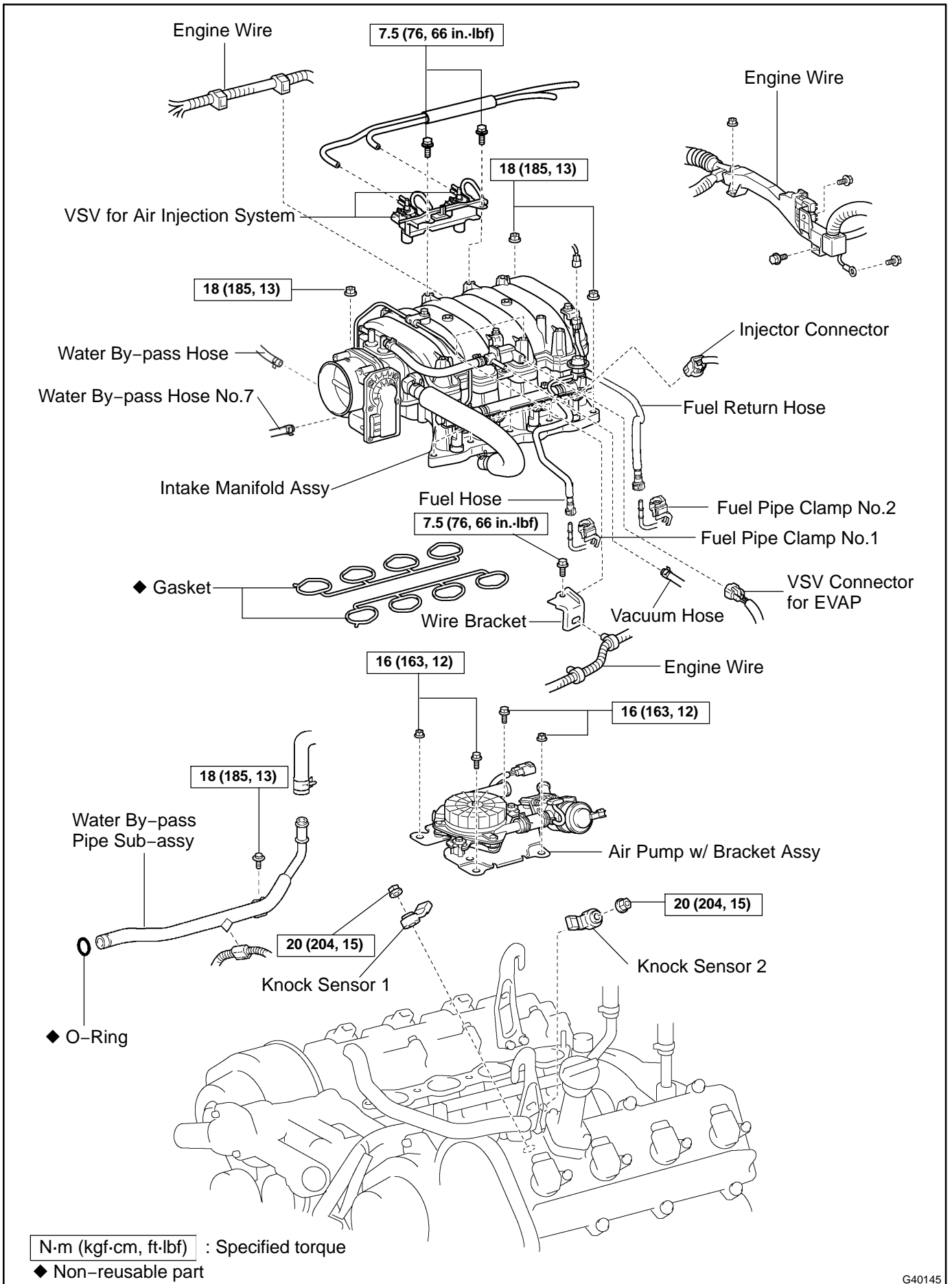
100KA-02



γ N·m (kgf·cm, ft·lbf) : Specified torque

G40144

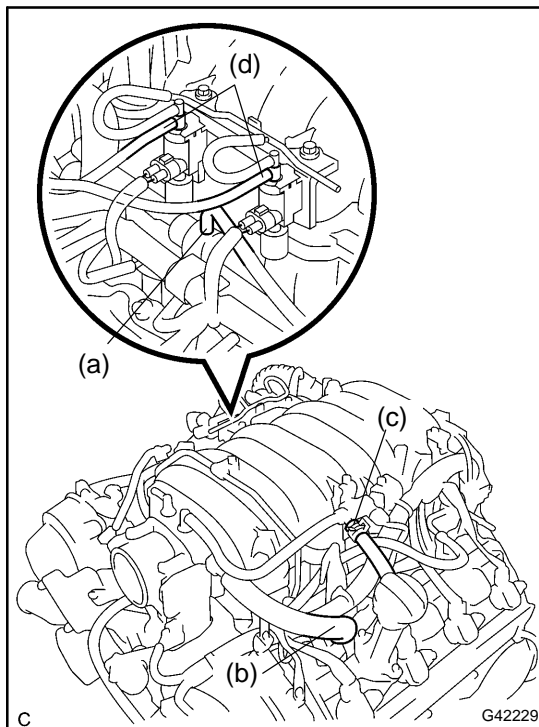
ENGINE CONTROL SYSTEM - KNOCK SENSOR (2UZ-FE)



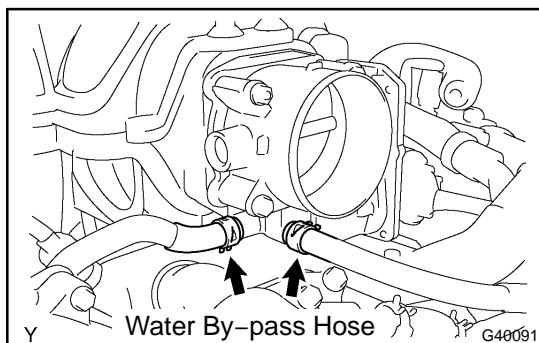
G40145

REPLACEMENT

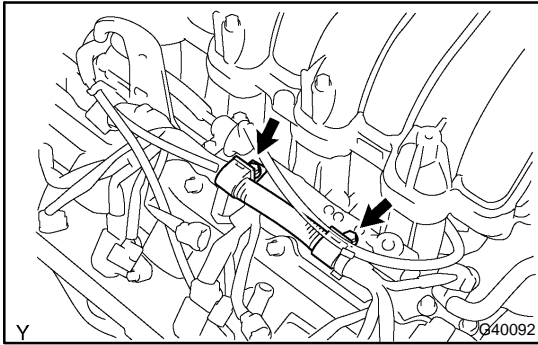
1. **PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **DRAIN ENGINE COOLANT (SEE PAGE 16-5)**
3. **REMOVE V-BANK COVER SUB-ASSY**
 - (a) Remove the 2 nuts and V-bank cover sub-assy.
4. **REMOVE AIR CLEANER HOSE ASSY**
 - (a) Disconnect the vacuum hoses (for the power steering idle-up and fuel pressure regulator) and ventilation hose.
 - (b) Remove the air cleaner hose assy.
5. **DISCONNECT FUEL HOSE (SEE PAGE 11-12)**
6. **DISCONNECT FUEL HOSE NO.2 (SEE PAGE 14-22)**
7. **DISCONNECT CONNECTORS FROM INTAKE MANIFOLD**
 - (a) Disconnect the throttle control connector.
 - (b) Disconnect the VSV connector for EVAP.
 - (c) Disconnect the 8 injector connectors.
 - (d) Disconnect the ECT sensor connector.
 - (e) Disconnect the 2 VSV connectors for the air injection system.
 - (f) Disconnect the 8 ignition coil connectors.
 - (g) Disconnect the 2 air fuel ratio sensor connectors.



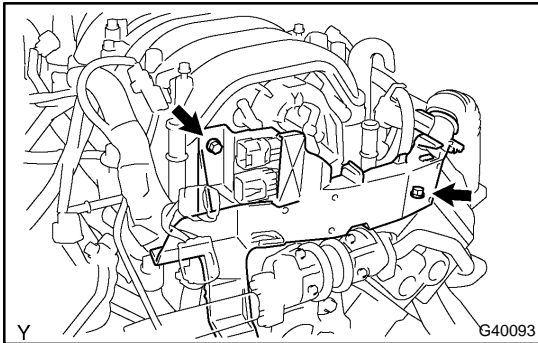
8. **DISCONNECT HOSES FROM INTAKE MANIFOLD**
 - (a) Disconnect the vacuum hose from the fuel pressure regulator.
 - (b) Disconnect the PCV hose from the PCV valve on the LH cylinder head.
 - (c) Disconnect the EVAP hose (from the charcoal canister) from the VSV for the EVAP.
 - (d) Disconnect the 2 vacuum hoses from the VSV for the air injection system.



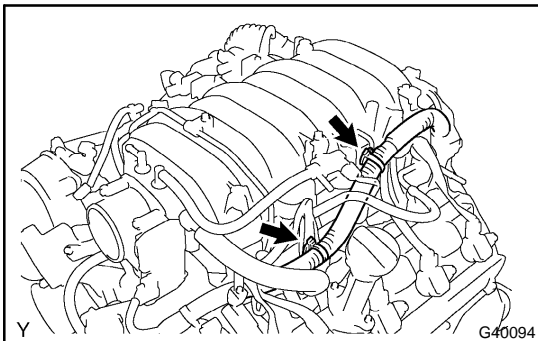
9. **REMOVE INTAKE MANIFOLD ASSY**
 - (a) Disconnect the 2 water by-pass hoses from the throttle body.



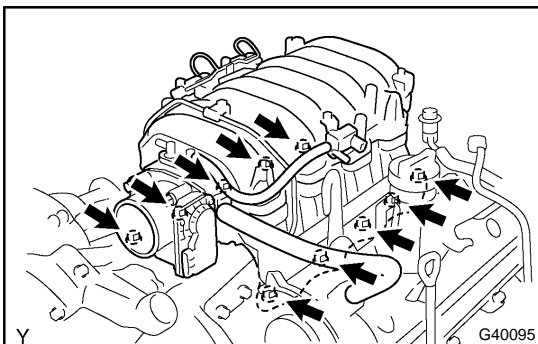
- (b) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.



- (c) Remove the bolt and nut holding the engine wire protector from the intake manifold and cylinder head.
- (d) Remove the 2 bolts and ground cables from the RH and LH cylinder heads.
- (e) Remove the bolt and V-bank cover bracket from the intake manifold.

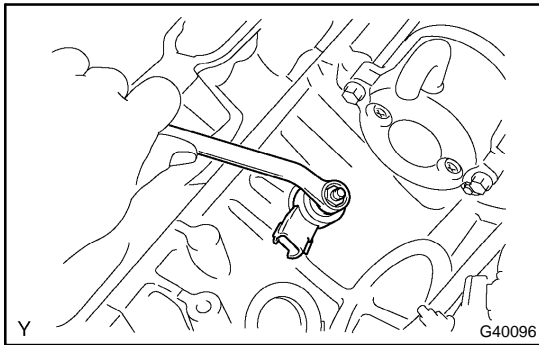


- (f) Disconnect the engine wire from the engine hanger and wire bracket.
- (g) Remove the bolt and wire bracket from the intake manifold.

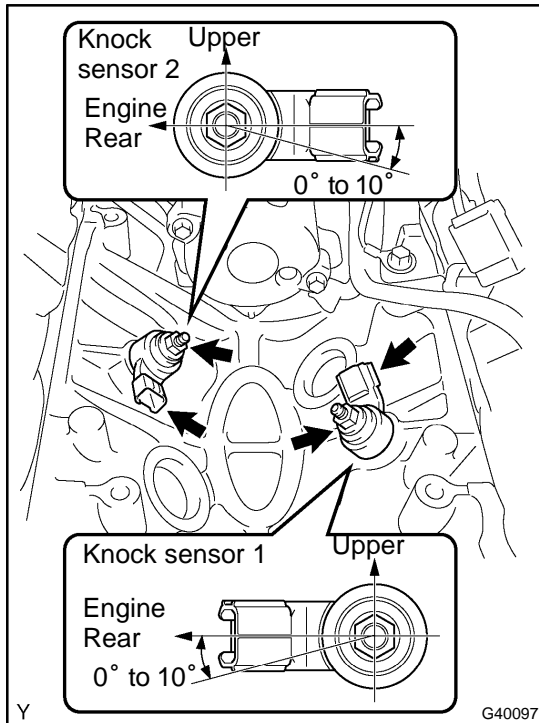


- (h) Remove the 6 bolts, 4 nuts, intake manifold assy and 2 gaskets.

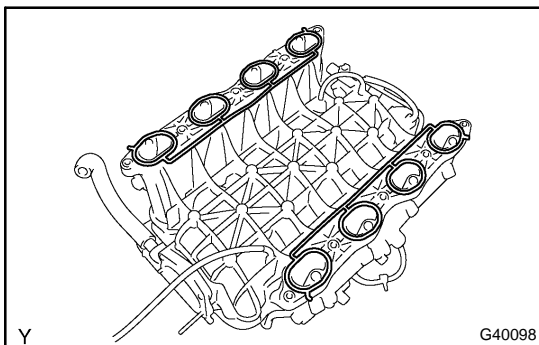
10. REMOVE AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)

**11. REMOVE KNOCK SENSOR**

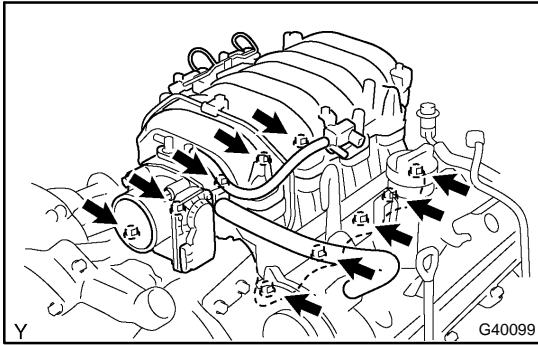
- (a) Disconnect the 2 knock sensor connectors.
- (b) Remove the 2 nuts and 2 knock sensors.

**12. INSTALL KNOCK SENSOR**

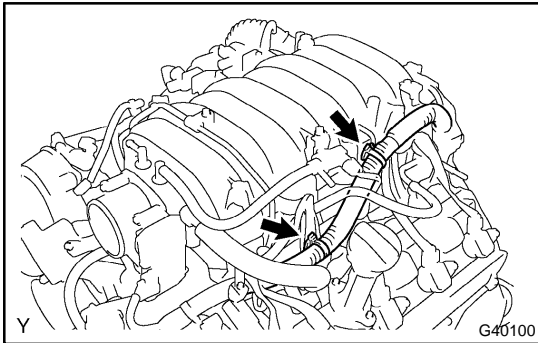
- (a) Install the 2 knock sensors with the 2 nuts as shown in the illustration.
20 N·m (204 kgf·cm, 15 ft·lbf)
- (b) Connect the 2 knock sensor connectors.

13. INSTALL AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)**14. INSTALL INTAKE MANIFOLD ASSY**

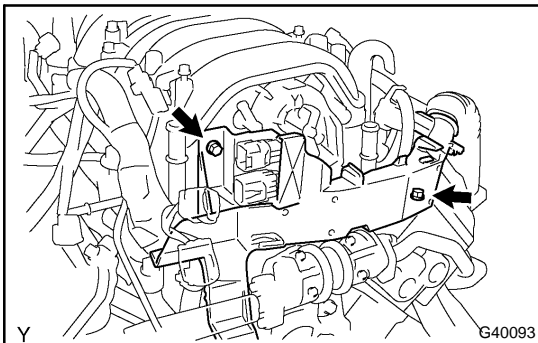
- (a) Place 2 new gaskets on the intake manifold.



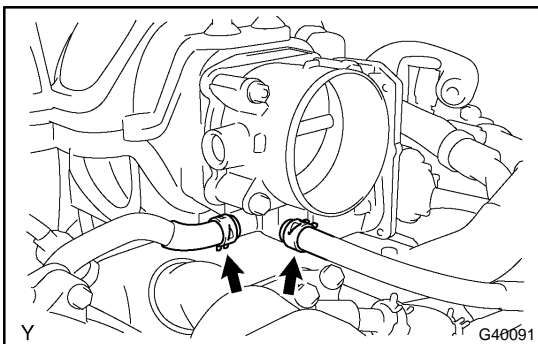
- (b) Place the intake manifold on the cylinder heads.
- (c) Install and uniformly tighten the 6 bolts and 4 nuts in several steps.
18 N·m (185 kgf-cm, 13 ft-lbf)



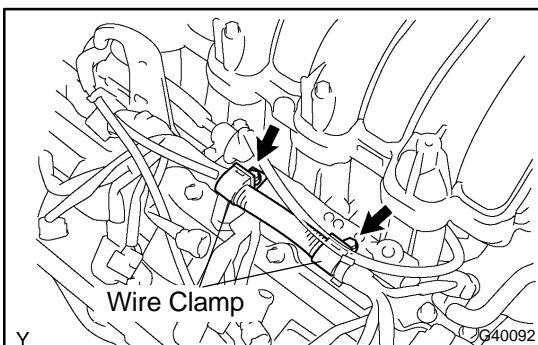
- (d) Install the V-bank cover bracket to the intake manifold.
7.5 N·m (76 kgf-cm, 66 in.-lbf)
- (e) Install the wire bracket to the intake manifold with the bolt.
7.5 N·m (76 kgf-cm, 66 in.-lbf)
- (f) Connect the engine wire to the engine hanger and wire bracket.



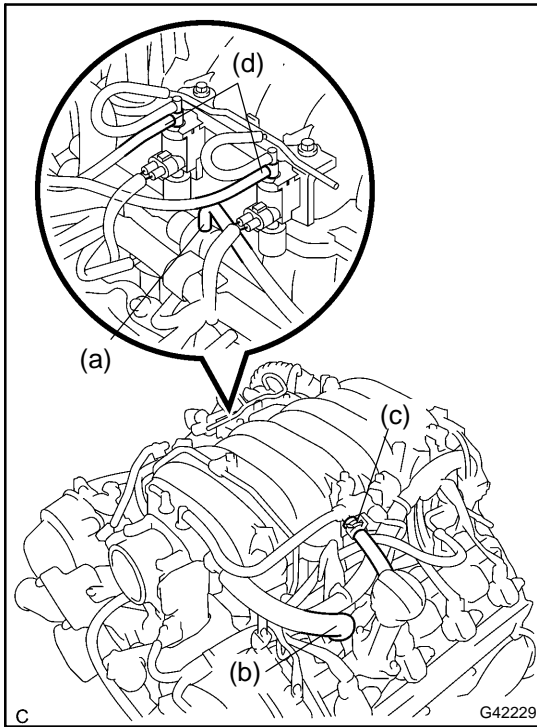
- (g) Connect the wire protector to the intake manifold and cylinder heads with the bolt and nut.
- (h) Install the 2 ground cables with the 2 bolts to the RH and LH cylinder heads.



- (i) Connect the 2 water by-pass hoses to the throttle body.



- (j) Connect the 2 wire clamps to the wire clamp bracket on the RH delivery pipe.

**15. CONNECT HOSES FROM INTAKE MANIFOLD**

- (a) Connect the vacuum hose to the fuel pressure regulator.
- (b) Connect the PCV hose to the PCV valve on the LH cylinder head.
- (c) Connect the EVAP hose (from the charcoal canister) to the VSV for EVAP.
- (d) Connect the 2 vacuum hoses to the VSV for the air injection system.

16. CONNECT CONNECTORS FROM INTAKE MANIFOLD

- (a) Connect the throttle control connector.
- (b) Connect the 2 VSV connectors for the air injection system.
- (c) Connect the VSV connector for the EVAP.
- (d) Connect the 8 injector connectors.
- (e) Connect the ECT sensor connector.
- (f) Connect the 8 ignition coil connectors.
- (g) Connect the 2 air fuel ratio sensor connectors.

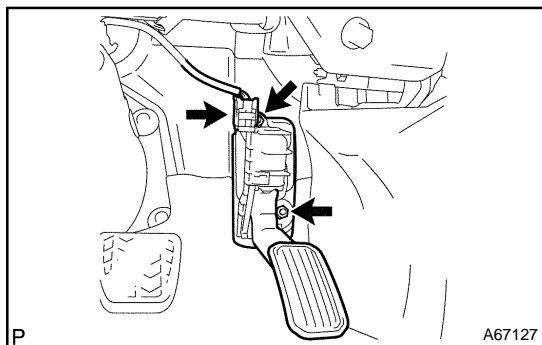
17. INSTALL FUEL HOSE NO.2 (SEE PAGE 14-22)**18. INSTALL FUEL HOSE (SEE PAGE 11-12)****19. INSTALL V-BANK COVER SUB-ASSY**

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

20. ADD ENGINE COOLANT (SEE PAGE 16-5)**21. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)****22. CHECK FOR FUEL LEAKS (SEE PAGE 11-6)**

ACCELERATOR PEDAL ROD ASSY (2UZ-FE) REPLACEMENT

100AI-05



1. **REMOVE ACCELERATOR PEDAL ROD ASSY**
 - (a) Disconnect the accelerator pedal connector.
 - (b) Remove the 2 nuts and the accelerator pedal assy.

2. INSTALL ACCELERATOR PEDAL ROD ASSY

NOTICE:

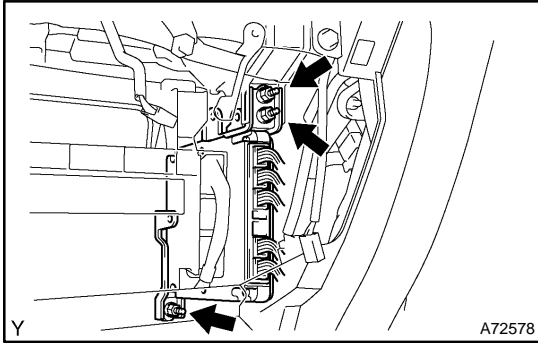
- **Avoid physical shock to the accelerator pedal assy.**
 - **Do not disassemble the accelerator pedal assy.**
- (a) Install the accelerator pedal assy with the 2 nuts.
Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)
 - (b) Connect the accelerator pedal connector.

ECM (2UZ-FE)

REPLACEMENT

100AH-05

1. REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (See page 71-13)
2. REMOVE INSTRUMENT PANEL ORNAMENT (See page 71-13)
3. REMOVE GLOVE COMPARTMENT DOOR ASSY (See page 71-13)



4. REMOVE ECM

- (a) Disconnect the 5 the ECM connectors from the ECM.
- (b) Remove the 3 nuts and the ECM.
- (c) Remove the 2 screws and the ECM bracket No. 1 from the ECM.
- (d) Remove the 2 screws and the ECM bracket No. 2 from the ECM.

5. INSTALL ECM

- (a) Install the ECM bracket No. 2 with the 2 screws to the ECM.
- (b) Install the ECM bracket No. 1 with the 2 screws to the ECM.
- (c) Install the ECM with the 3 nuts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)
- (d) Connect the 5 ECM connectors to the ECM.

FUEL SYSTEM (2UZ-FE)

PRECAUTION

111A0-01

1. **PRECAUTION**
 - (a) Before working on the fuel system, disconnect the negative (-) terminal cable from the battery.
 - (b) Do not smoke or work near fire when working on the fuel system.
 - (c) Keep gasoline away from rubber or leather parts.
2. **WORK FOR PREVENT GASOLINE FROM SPILLING OUT**

CAUTION:

- Do not disconnect any part of the fuel system until you have discharged the fuel system pressure.
- Even after discharging the fuel pressure, place a shop rag or piece of cloth over fittings to prevent fuel splashing on yourself or in the engine compartment when separating the fittings.

- (a) Remove the circuit opening relay from the engine room relay block.
- (b) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.

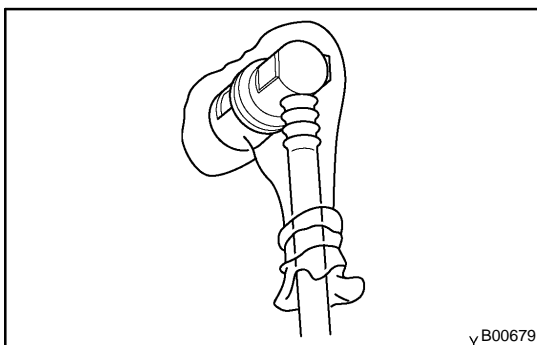
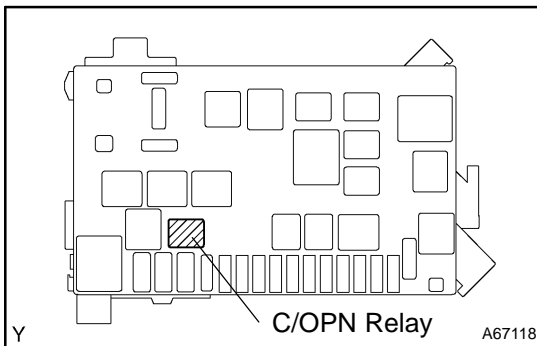
HINT:

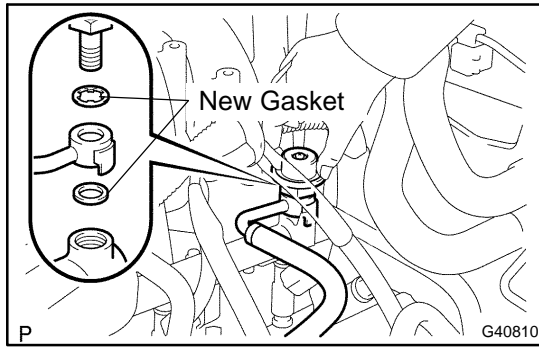
There is a case that DTC P0171 (system too lean) is output.

- (c) Check that the engine does not start.
- (d) Remove the fuel tank cap, and let the air out of the fuel tank.
- (e) Disconnect the negative (-) terminal cable from the battery.
- (f) Reinstall the circuit opening relay.

3. FUEL SYSTEM

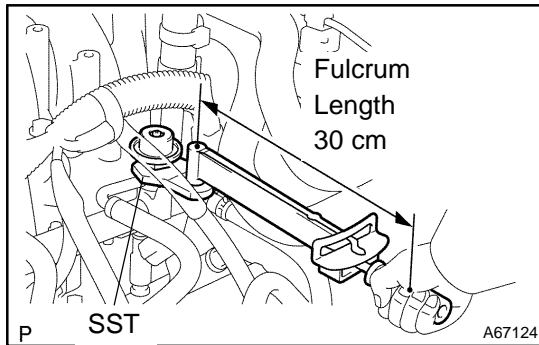
- (a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following procedures:
 - (1) Disconnect the fuel pump tube (See page 11-16).
 - (2) Drain the fuel remained inside the fuel pump tube.
 - (3) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.
 - (4) Place a container under the connection.





(b) When connecting the union bolt (fuel pressure pulsation damper) on the high pressure pipe union, observe the following procedures:

- (1) Always use new gaskets.
- (2) Tighten the union bolt by hand.



(3) Using SST, tighten the union bolt to the specified torque.

SST 09612-24014 (09617-24011)

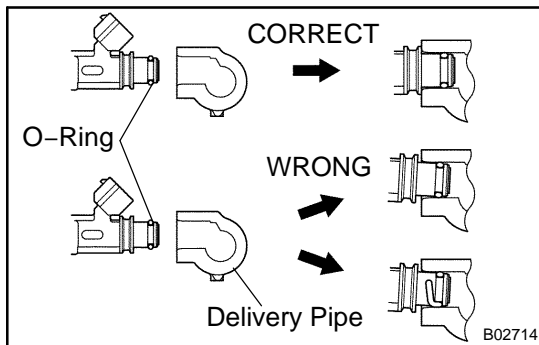
Torque:

33 N·m (340 kgf·cm, 24 ft·lbf) for use with SST

39 N·m (400 kgf·cm, 29 ft·lbf)

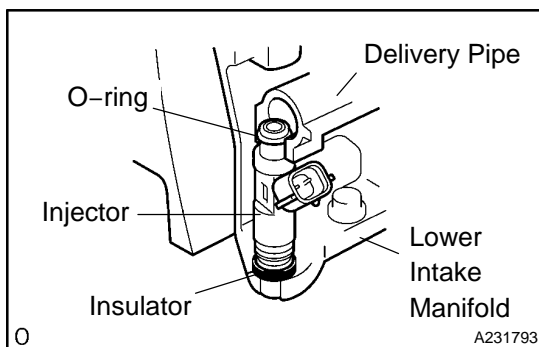
HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



(c) Observe the following precautions when removing and installing the injectors:

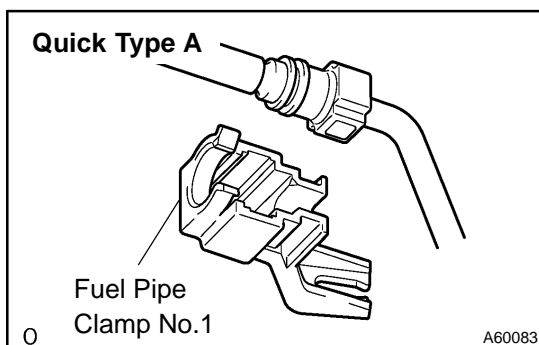
- (1) Never reuse the O-ring.
- (2) When placing a new O-ring on the injector, do not damage the O-ring.
- (3) Coat the new O-ring with spindle oil or gasoline before installing. Do not use engine oil, gear oil or brake fluid.



(d) Install the injector to the delivery pipe and lower intake manifold, as shown in the illustration.

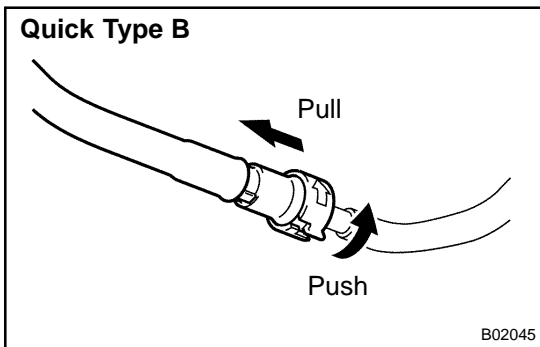
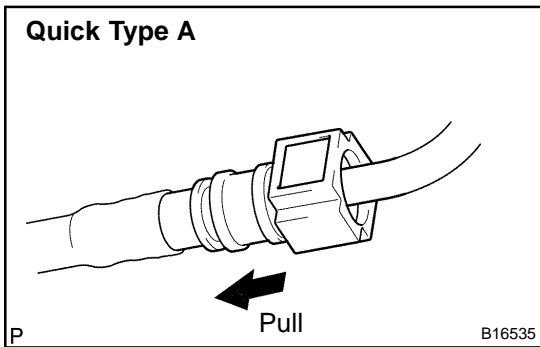
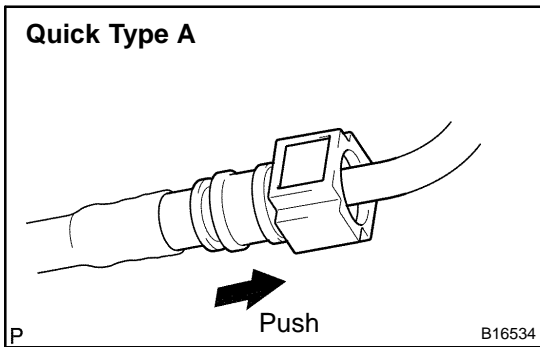
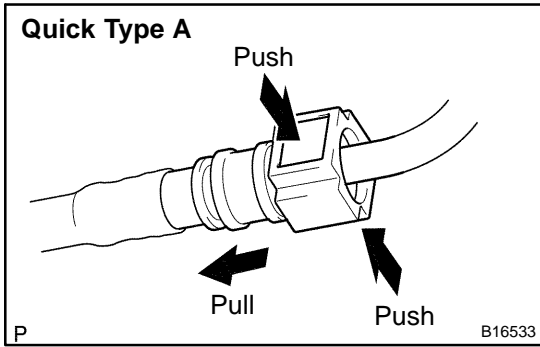
NOTICE:

Before installing the injector, apply spindle oil or gasoline where the delivery pipe or intake manifold contacts the O-ring of the injector.



(e) Observe the following precautions when disconnecting the fuel tube connector (Quick type A):

- (1) Remove the fuel pipe clamp No.1.



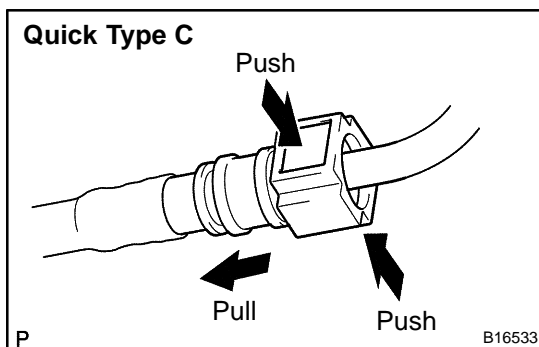
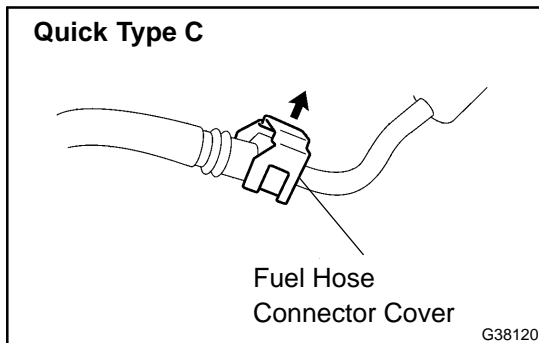
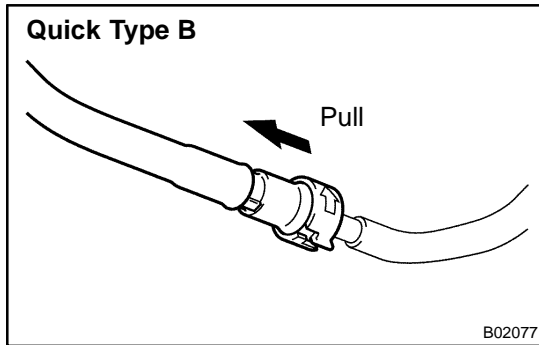
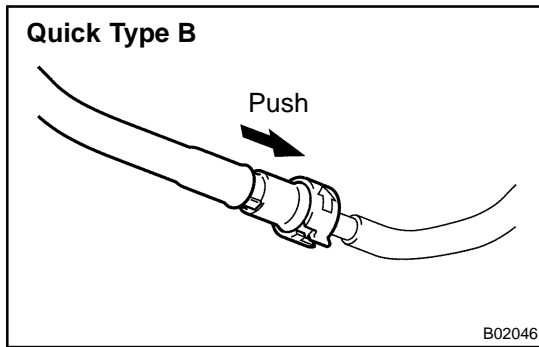
- (2) Check that there is no dirt on the pipe and around the connector before disconnecting them. Clean them if necessary.
- (3) Disconnect them by hand.
- (4) When the connector and the pipe are stuck, pinch the fuel pipe with your fingers and push the fuel tube connector to the fuel pipe by pressing the release buttons, then pull the connector out of the pipe.
- (5) Check that there is no dirt or other foreign objects on the seal surface of the disconnected pipe. Clean it away if necessary.
- (6) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.

(f) Observe the following precautions when connecting the fuel tube connector (Quick Type A):

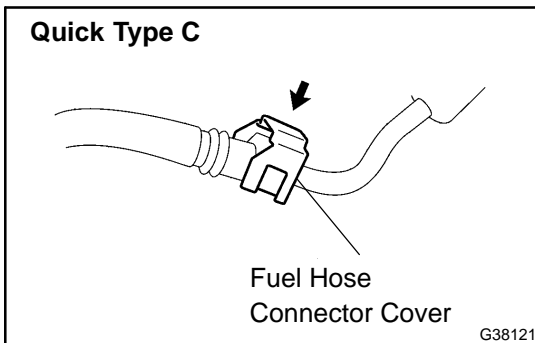
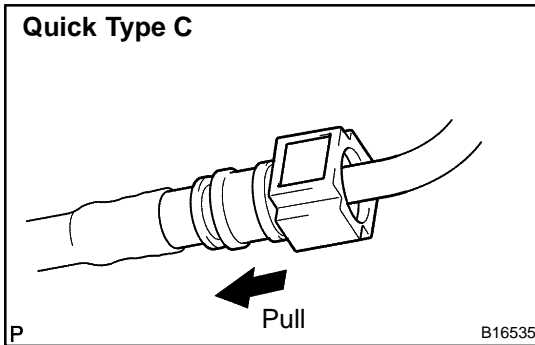
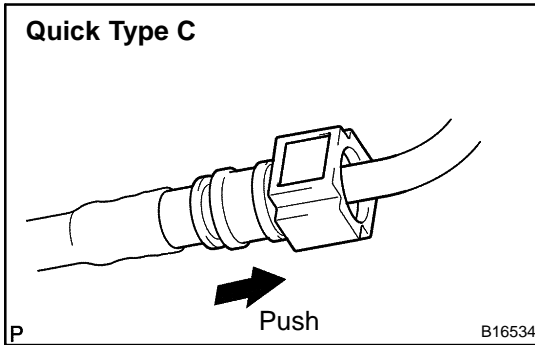
- (1) Check that there is no damage or foreign objects in the connected part of the pipe.
- (2) Match the axis of the connector with the axis of the pipe, and push into the connector until the connector makes a "click" sound. In case that the connection is tight, apply a small amount of fresh engine oil to the tip of the pipe.
- (3) After finishing the connection, check if the pipe and the connector are securely connected by pulling them.
- (4) Check for fuel leaks.

(g) Observe the following precautions when disconnecting the fuel tube connector (Quick type B):

- (1) Check if there is any dirt on the pipe and around the connector before disconnecting them. Clean the dirt away if necessary.
- (2) Disconnect them by hand.
- (3) When the connector and the pipe are stuck, push and pull the connector. Disconnect and pull it out. Do not use any tool at this time.
- (4) Check if there is any dirt or other foreign objects on the seal surface of the disconnected pipe. Clean it away if necessary.
- (5) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.



- (h) Observe the following precautions when connecting the fuel tube connector (Quick type B):
- (1) Match the axis of the connector with the axis of the pipe, and push in the connector until the connector makes a "click" sound. In case that the connection is tight, apply a small amount of new engine oil to the tip of the pipe.
 - (2) After finishing the connection, check if the pipe and the connector are securely connected by pulling them.
 - (3) Check for fuel leaks.
- (i) Observe the following precautions when disconnecting the fuel tube connector (Quick type C):
- (1) Pull the fuel hose connector cover up to release the lock.
 - (2) Check that there is no dirt in the pipe and around the connector before disconnecting them. Clean the dirt away if necessary.
 - (3) Be sure to disconnect them by hand.
 - (4) When the connector and the pipe are stuck, pinch the fuel pipe between the hands, and push and pull the connector. Disconnect and pull it out. Do not use any tool at this time.
 - (5) Check if there is any dirt or other foreign objects on the seal surface of the disconnected pipe. Clean it away if necessary.
 - (6) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.



- (j) Observe the following precautions when connecting the fuel tube connector (Quick Type C):
- (1) Check that there is no damage or foreign objects in the connected part of the pipe.
 - (2) Match the axis of the connector with the axis of the pipe, and push into the connector until the connector makes a "click" sound. In case that the connection is tight, apply a small amount of fresh engine oil to the tip of the pipe.
 - (3) After finishing the connection, check if the pipe and the connector are securely connected by pulling them.
 - (4) Lock the fuel hose connector cover.

HINT:

If the fuel tube is not completely connected, the half connection prevention connector prevents the fuel hose connector cover from being locked.

- (5) Check for fuel leaks.
- (k) Observe the following precautions when handling a nylon tube:

CAUTION:

- Do not twist the connection part of the nylon tube and the quick connector by force when connecting them.
- Do not twist the nylon tube.
- Do not remove the EPDM protector on the outside of the nylon tube.
- Do not close the piping with the nylon tube by bending it.

4. CHECK FUEL LEAK

Check that there are no fuel leaks anywhere on the fuel system after doing maintenance (See page 11-6).

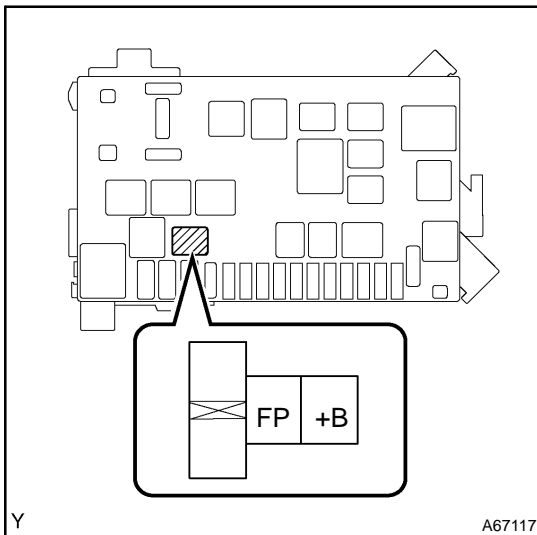
ON-VEHICLE INSPECTION

1. **CHECK FUEL PUMP OPERATION AND FUEL LEAK**
 - (a) When using the hand-held tester
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON and hand-held tester main switch ON.

NOTICE:

Do not start the engine.

- (3) Select the ACTIVE TEST mode on the hand-held tester.
- (4) Please refer to the hand-held tester operator's manual for further details.



- (b) When not using hand-held tester
 - (1) Remove the circuit opening relay.
 - (2) Using a service wire, connect terminals FP and +B of the relay block.

NOTICE:

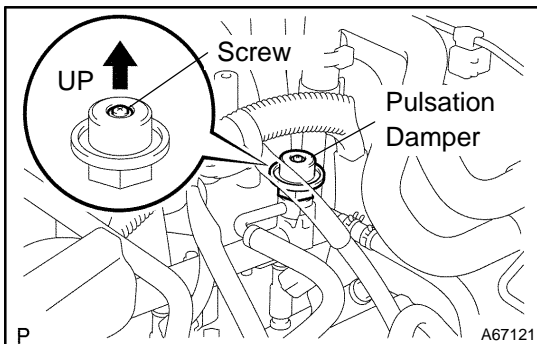
Pay due attention to the terminal connecting position to avoid a malfunction.

- (3) Turn the ignition switch ON, and check that the fuel pump operates.

NOTICE:

Do not start the engine.

- (c) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.



- (d) Check that the pulsation damper screw rises up when the fuel pump operates.

If operation is not as specified, check the following parts:

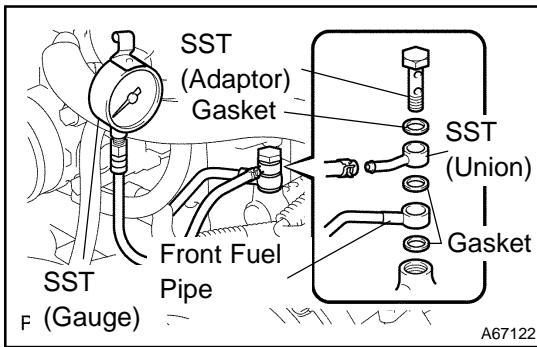
- Fusible link
- Fuses
- EFI main relay
- Fuel pump
- ECM
- Wiring connections

If no malfunction are found in the aforementioned components, replace the pulsation damper.

- (e) Turn the ignition switch OFF.
- (f) Disconnect the hand-held tester from the DLC3.

2. CHECK FUEL PRESSURE

- (a) Check the battery positive voltage is above 12 V.
- (b) Disconnect the negative (-) terminal cable from the battery.
- (c) Remove the front fuel pipe from the LH delivery pipe (See page 11-12).



- (d) Install the front fuel pipe and SST (pressure gauge) to the delivery pipe with the 3 gaskets and another SST (adaptor).

SST 09268-45014 (09268-41200, 09268-41190, 90405-06167, 09268-41210, 90467-11009)

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

- (e) Wipe off any splattered gasoline.
 (f) Reconnect the negative (-) terminal cable to the battery.
 (g) Connect the hand-held tester to the DLC3 (See step 1 in check fuel pump operation).
 (h) Measure the fuel pressure.

Fuel pressure:

265 to 304 kPa (2.7 to 3.1 kgf/cm², 38 to 44 psi)

If pressure is high, replace the fuel pressure regulator.

If pressure is low, check the following parts:

- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

- (i) Disconnect the hand-held tester from the DLC3.
 (j) Start the engine.
 (k) Measure the fuel pressure at idle.

Fuel pressure:

265 to 304 kPa (2.7 to 3.1 kgf/cm², 38 to 44 psi)

- (l) Stop the engine.
 (m) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

Fuel pressure: 147 kPa (1.5 kgf/cm², 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

- (n) After checking the fuel pressure, disconnect the negative (-) terminal cable from the battery and carefully remove the SST to prevent gasoline from splashing.

SST 09268-45014 (09268-41200, 09268-41190, 90405-06167, 09268-41210, 90467-11009)

- (o) Reinstall the front fuel pipe to the LH delivery pipe (See page 11-12).
 (p) Reconnect the negative (-) terminal cable to the battery.
 (q) Check for fuel leaks (See step 1 in check fuel pump operation).

INSPECTION

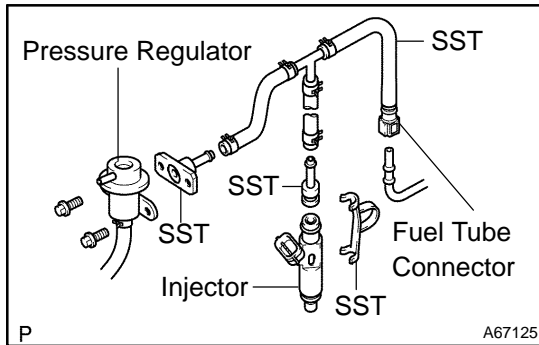
1. INSPECT FUEL INJECTOR ASSY

(a) Inspect injector resistance.

- (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 13.4 to 14.2 Ω at 20°C (68°F)

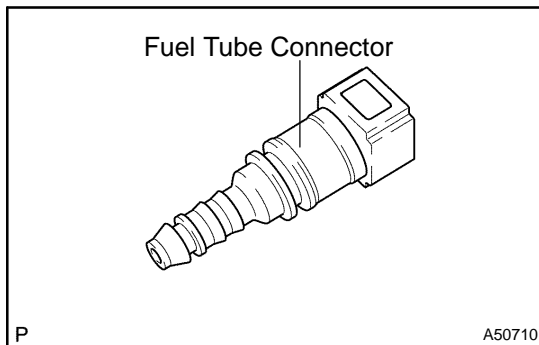
If the resistance is not as specified, replace the injector.



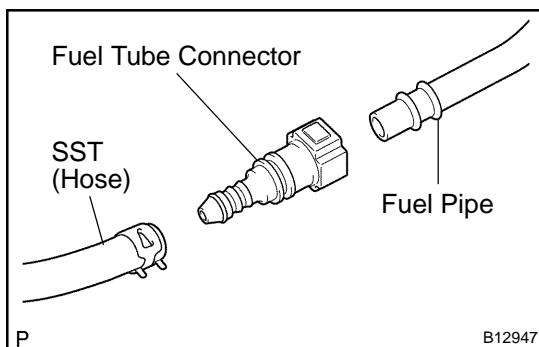
(b) Inspect injector.

CAUTION:

Avoid any sparks or flame during the test.



- (1) Obtain a new fuel main hose (part No. 23271-50190) and take the fuel tube connector out of the hose.



- (2) Install the fuel tube connector to SST (hose), then connect the tube connector and fuel pipe.

SST 09268-41047 (95336-08070)

CAUTION:

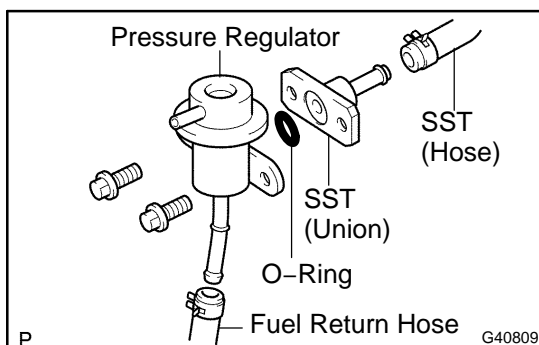
Observe the precautions when connecting the fuel tube connector (quick type).

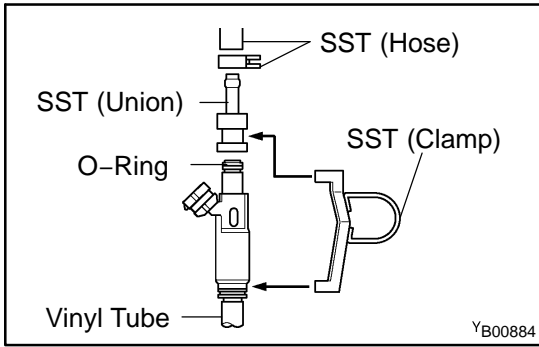
- (3) Remove the pressure regulator from the delivery pipe.
- (4) Install the O-ring to the fuel inlet of the pressure regulator.
- (5) Connect the SST (hose) to the fuel inlet of the pressure regulator with another SST (union) and the 2 bolts.

SST 09268-41047 (95336-08070, 09268-41091)

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

- (6) Connect the fuel return hose to the fuel outlet of the pressure regulator.



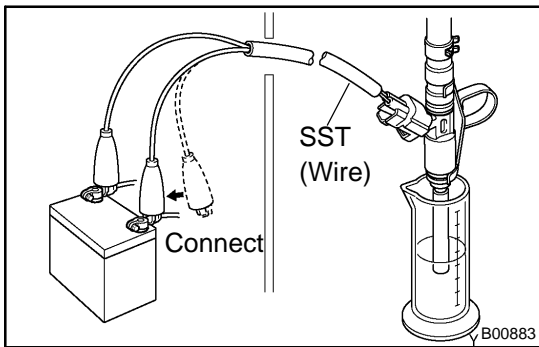


- (7) Install the O-ring to the injector.
 - (8) Connect SSTs (union and hose) to the injector, and hold the injector and union with another SST (clamp).
- SST 09268-41047 (09268-41110, 09268-41300, 95336-08070)
- (9) Put the injector into a graduated cylinder.

CAUTION:

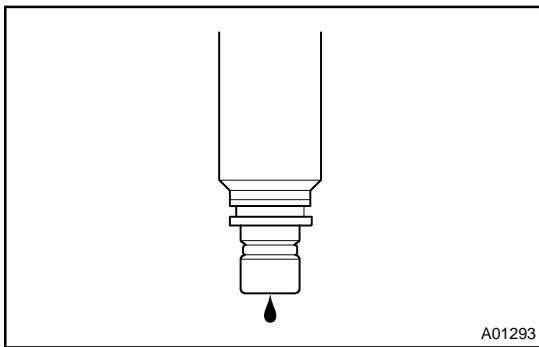
Install a suitable vinyl tube onto the injector to prevent gasoline from splashing out.

- (10) Operate the fuel pump (see page 11-6).



- (11) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with the graduated cylinder. Test each injector 2 or 3 times.
- SST 09842-30070
- Volume: 56 to 69 cm³ (3.4 to 4.2 cu in.) per 15 seconds**
- Difference between each injector: 13 cm³ (0.8 cu in.) or less**

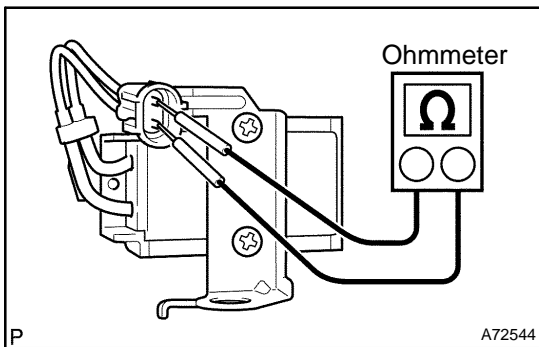
If the injection volume is not as specified, replace the injector.



- (c) Check for leakage.
 - (1) In the condition above, disconnect the tester probes of the SST (wire) from the battery and check for fuel leakage from the injector.

SST 09842-30070

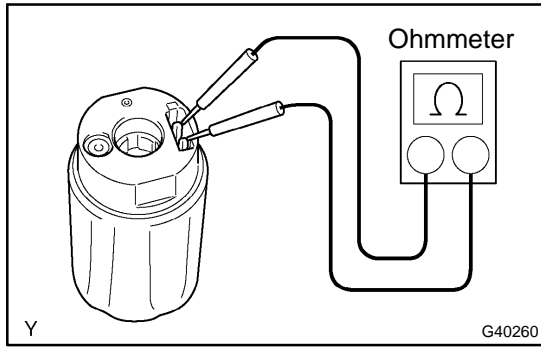
Fuel drop: 1 drop or less per 12 minutes



2. INSPECT FUEL PUMP RESISTER

- (a) Inspect fuel pump resistor resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 0.70 to 0.76 Ω at 20°C (68°F)



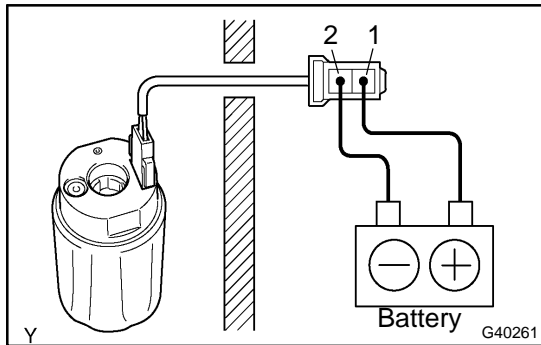
3. INSPECT FUEL PUMP

(a) Inspect fuel pump resistance.

- (1) Using an ohmmeter, measure the resistance between terminals 1 and 2.

Resistance: 0.2 to 3.0 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump.



(b) Inspect fuel pump operation.

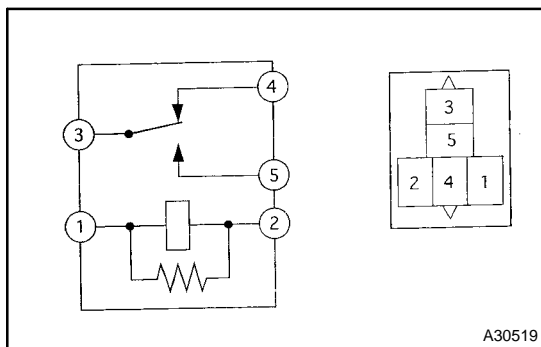
- (1) Connect the lead wire to the fuel pump.
- (2) Connect the positive (+) lead from the battery to terminal 1 of the connector, and the negative (-) lead to terminal 2. Check that the fuel pump operates.

NOTICE:

- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always switch on the battery side.**

If the fuel pump does not operate, replace the fuel pump and/or lead wire.

- (1) Disconnect the lead wire from the fuel pump.



4. INSPECT FUEL PUMP RELAY ASSY

(a) Check for continuity.

- (1) Using an ohmmeter, check if there is continuity between each terminal.

Specified condition:

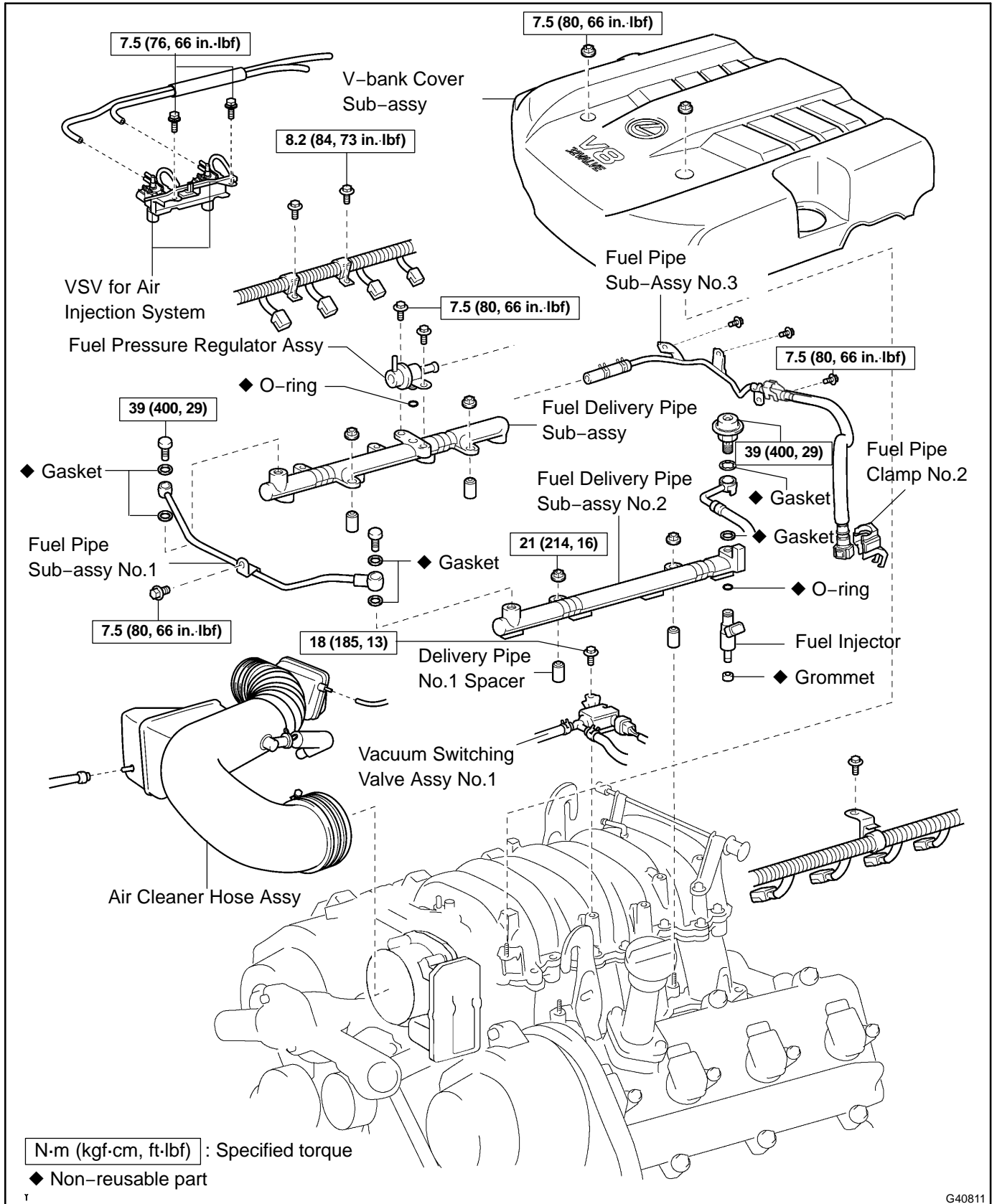
Between terminals	Specified condition
1 - 2	Continuity
3 - 4	
3 - 5	No continuity

- (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5 when battery voltage is applied across terminals 1 and 2.

Specified condition: Continuity

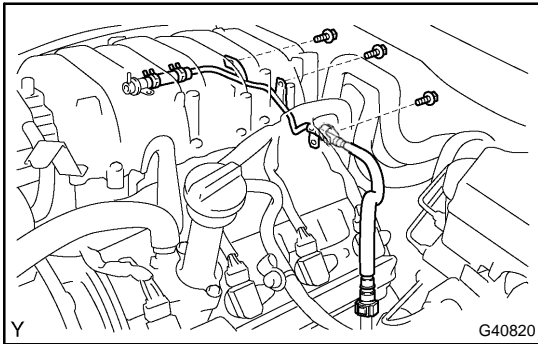
FUEL INJECTOR ASSY (2UZ-FE) COMPONENTS

110IG-05



REPLACEMENT

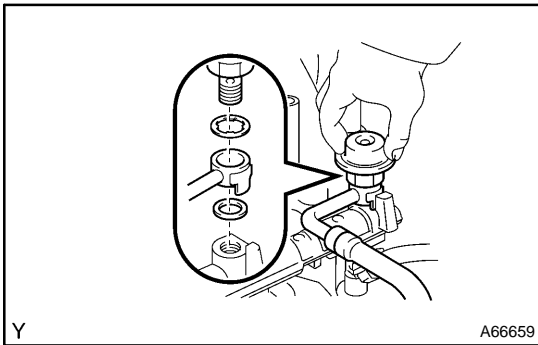
1. **WORK FOR PREVENTING GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **REMOVE V-BANK COVER SUB-ASSY**
 - (a) Remove the 2 cap nuts and V-bank cover sub-assy.
3. **REMOVE AIR CLEANER HOSE ASSY**
 - (a) Disconnect the vacuum hoses (for the P/S idle-up and fuel pressure regulator) and ventilation hose.
 - (b) Remove the air cleaner hose assy.
4. **REMOVE FUEL PIPE SUB-ASSY NO.1**
 - (a) Remove the 2 union bolts and 4 gaskets.
 - (b) Remove the bolts and fuel pipe sub-assy.



5. **SEPARATE FUEL PIPE SUB-ASSY NO.3**
 - (a) Remove the fuel pipe clamp No.2.
 - (b) Remove the 3 bolts and disconnect the fuel return pipe sub-assy from the fuel pressure regulator.

HINT:

Move it aside to secure more work space.



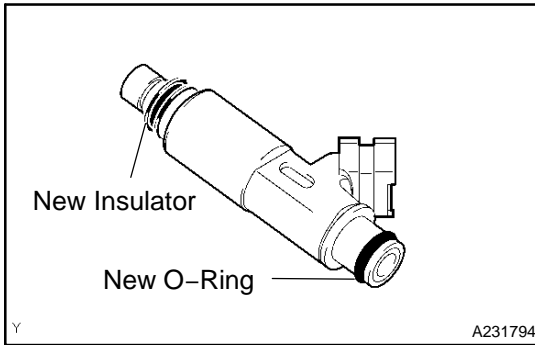
6. **DISCONNECT FUEL HOSE**
 - (a) Remove the pulsation damper and 2 gaskets.
 - (b) Disconnect the fuel hose No.1.

7. **SEPARATE VACUUM SWITCHING VALVE ASSY NO.1**
 - (a) Remove the bolts and separate the vacuum switching valve assy from the intake manifold.
8. **DISCONNECT ENGINE WIRE**
 - (a) Disconnect the 8 fuel injector connectors.
 - (b) Remove the 3 bolts and disconnect the engine wire.
9. **REMOVE FUEL DELIVERY PIPE SUB-ASSY**
 - (a) Remove the 2 nuts, and then the fuel delivery pipe by holding both ends and pulling it straight upward.
10. **REMOVE FUEL DELIVERY PIPE SUB-ASSY NO.2**
 - (a) Remove the 2 nuts, and then the fuel delivery pipe No.2 by holding both ends and pulling it straight upward.
11. **REMOVE FUEL INJECTOR ASSY**
 - (a) Remove the injector from the delivery pipe.

NOTICE:

Do not apply any force to the injector in the horizontal direction because the O-ring might be stuck.

- (b) Remove the O-ring and insulator from the injector.

**12. INSTALL FUEL INJECTOR ASSY**

- (a) Install a new insulator to the injector.
- (b) Check that there is no foreign object or damage to the groove of the O-ring of the injector. Apply gasoline to a new O-ring, and install it to the injector.
- (c) Install the injector to the delivery pipe while turning the injector in both ways.
- (d) Check that the injector can turn smoothly.

NOTICE:

When the injector cannot turn smoothly, the O-ring might be caught in something. In that case, replace the O-ring with a new one.

13. INSTALL FUEL DELIVERY PIPE SUB-ASSY NO.2

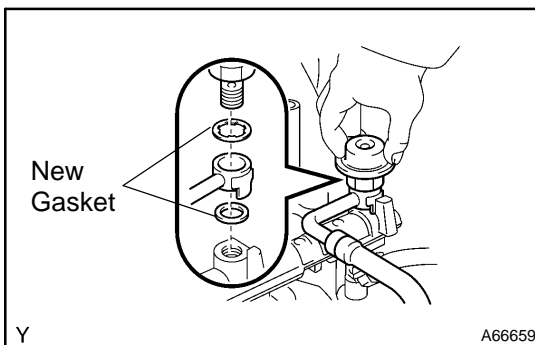
- (a) Install the injector with the delivery pipe to the intake manifold.
- (b) Turn the injector in both ways by approximately 45 degrees.
- (c) Inserting a spacer between the delivery pipe and the intake manifold, install the delivery pipe with the injector with the 2 nuts.

Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

14. INSTALL FUEL DELIVERY PIPE SUB-ASSY

- (a) Install the injector with the delivery pipe to the intake manifold.
- (b) Turn the injector in both ways by approximately 45 degrees.
- (c) Inserting a spacer between the delivery pipe and the intake manifold, install the delivery pipe with the injector with the 2 nuts.

Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

**15. INSTALL FUEL HOSE**

- (a) Using 2 new gaskets, install the fuel main hose with the fuel pressure pulsation damper.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

16. INSTALL VACUUM SWITCHING VALVE ASSY NO.1

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

17. INSTALL FUEL PIPE SUB-ASSY NO.3

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

18. INSTALL FUEL PIPE SUB-ASSY NO.1

- (a) Install the fuel pipe sub-assy with the bolts.
- (b) Using 4 new gaskets, install the fuel pipe sub-assy No.1 with the 2 union bolts.

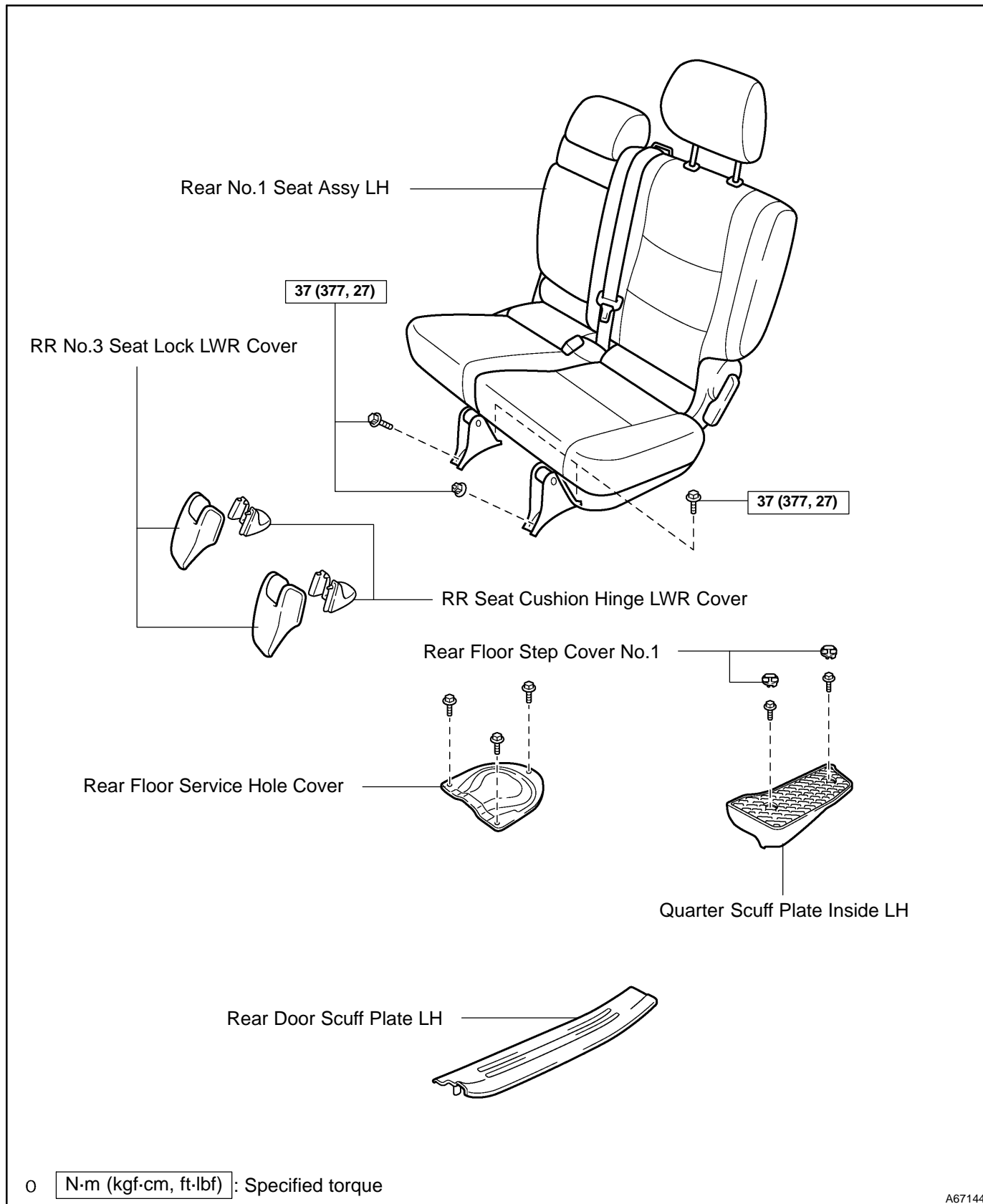
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

19. INSTALL AIR CLEANER HOSE ASSY**20. CHECK FUEL LEAK (SEE PAGE 11-6)****21. INSTALL V-BANK COVER SUB-ASSY**

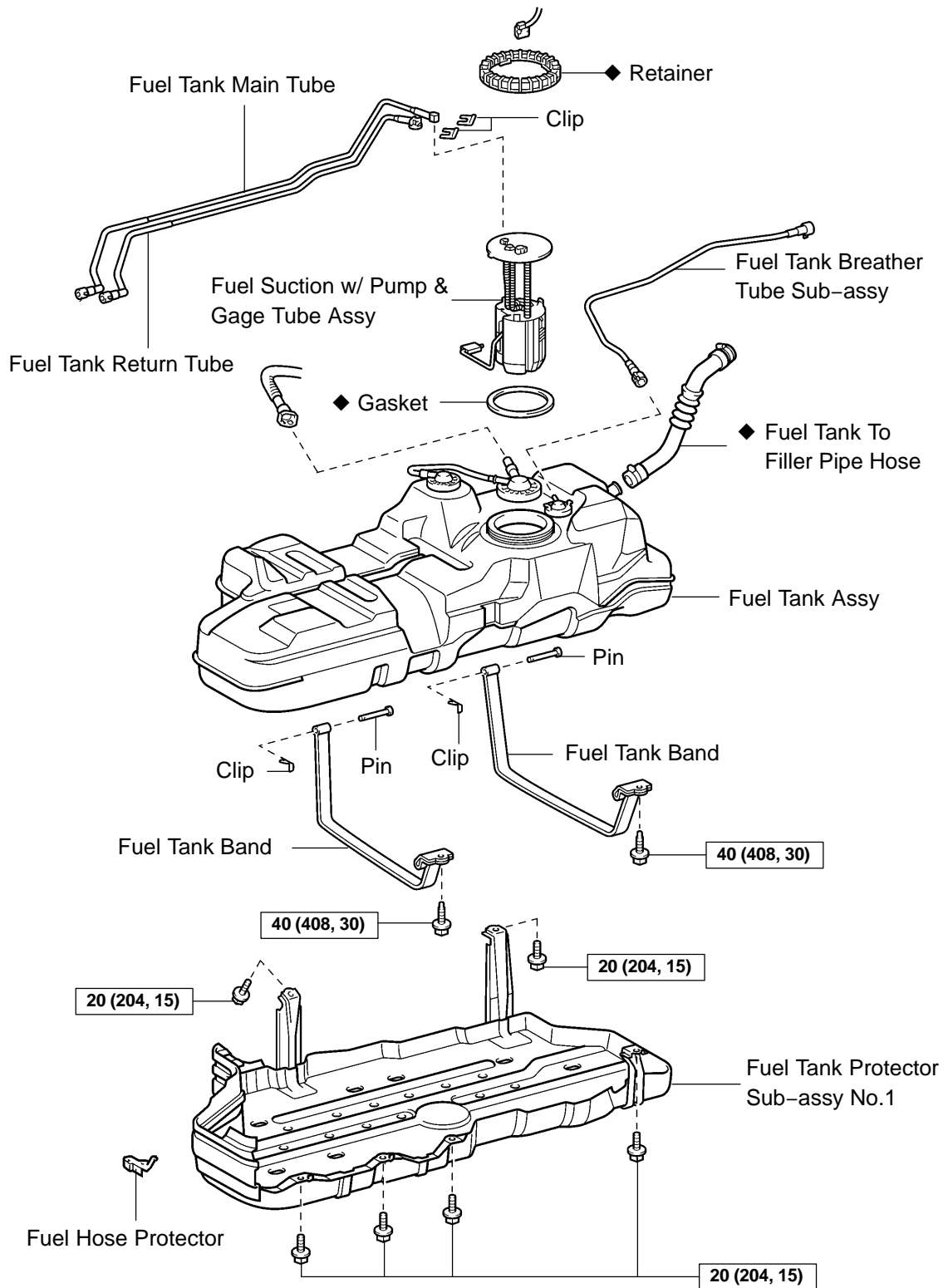
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

FUEL TANK ASSY (2UZ-FE) COMPONENTS

110MN-03



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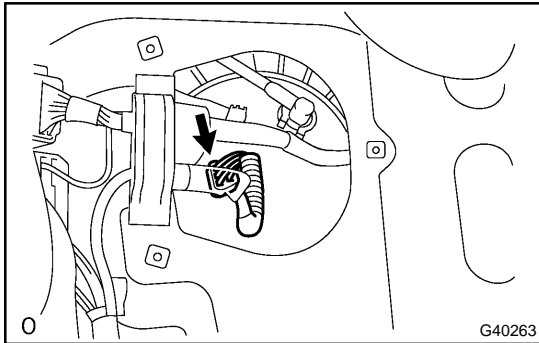
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

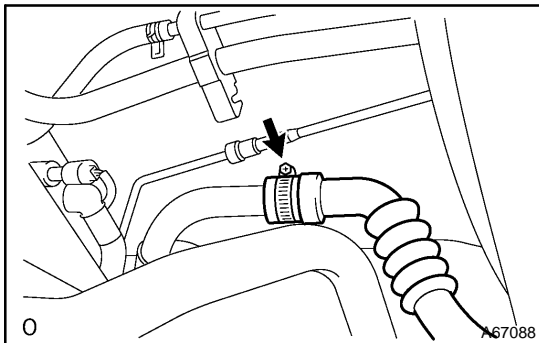
G42316

Removal & Installation and Disassembly & Reassembly

1. **WORK FOR PREVENTING GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **REMOVE REAR NO.1 SEAT ASSY LH (SEE PAGE 72-29)**
3. **REMOVE REAR FLOOR STEP COVER NO.1**
4. **REMOVE QUARTER SCUFF PLATE INSIDE LH**
 - (a) Remove the 2 bolts and quarter scuff plate inside LH.
5. **REMOVE REAR DOOR SCUFF PLATE LH**

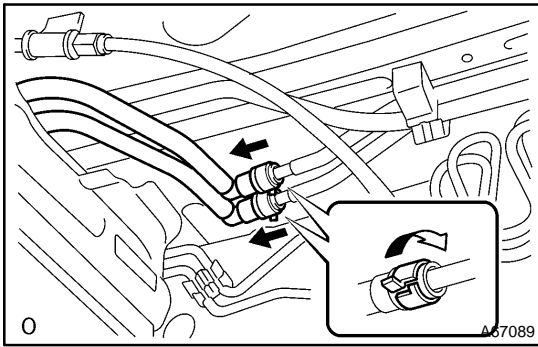


6. **REMOVE REAR FLOOR SERVICE HOLE COVER**
 - (a) Remove the rear floor carpet assy.
 - (b) Remove the 3 screws and rear floor service hole cover.
 - (c) Disconnect the connector.



7. **DISCONNECT FUEL TANK TO FILLER PIPE HOSE**
 - (a) Disconnect the fuel tank to filler pipe hose from the fuel filler pipe.

8. **DRAIN FUEL**
9. **REMOVE FUEL TANK PROTECTOR SUB-ASSY NO.1**
 - (a) Set a transmission jack to the fuel tank protector.
 - (b) Remove the 6 bolts and the fuel tank protector.

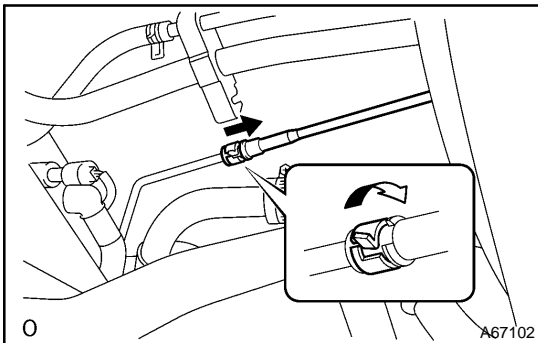
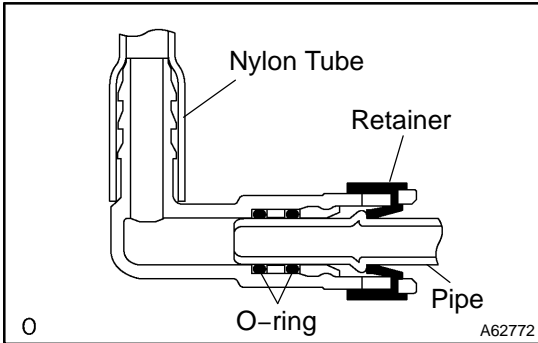


10. DISCONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE

- (a) Pinch and turn the projections of the retainers in the direction shown by the arrow to release the lock. Pull out the 2 fuel tank tubes.

NOTICE:

- Check that there is no dirt or mud around the quick connector before this work. Clean the connector if necessary.
- Do not use any tool in this work.
- Do not bend or twist the nylon tube by force.
- To protect the tube, cover it with a plastic bag after checking.
- When the connector and the pipe are stuck, turn the retainer carefully to release. Disconnect the fuel tank tube.

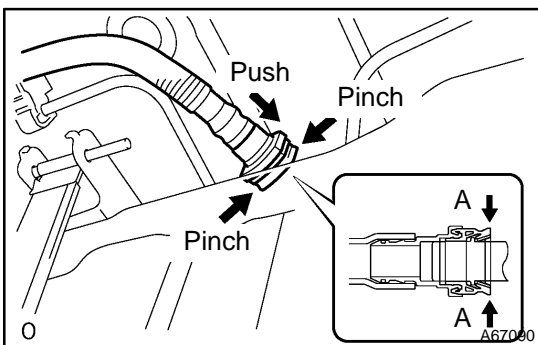
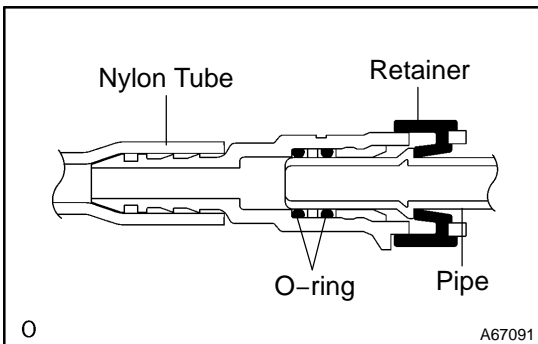


11. DISCONNECT FUEL TANK BREATHER TUBE SUB-ASSY

- (a) Pinch and turn the projection of the retainer in the direction shown by the arrow to release the lock. Pull out the fuel tank breather tube.

NOTICE:

- Check that there is no dirt or mud around the quick connector before this work. Clean the connector if necessary.
- Do not use any tool in this work.
- Do not bend or twist the nylon tube by force.
- To protect the tube, cover it with a plastic bag after checking.
- When the connector and the pipe are stuck, turn the retainer carefully to release. Disconnect the tube.

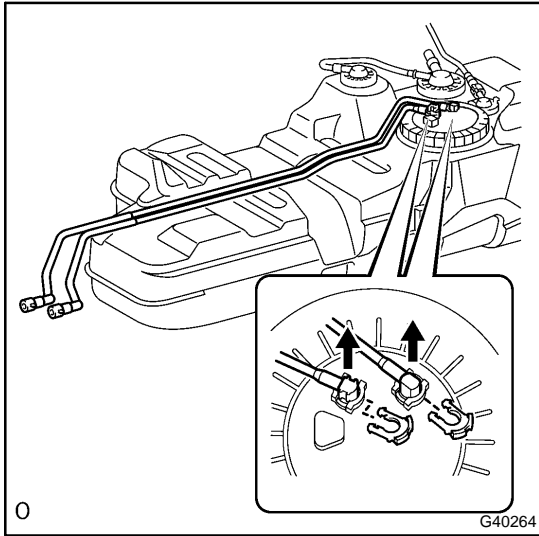


12. DISCONNECT FUEL TANK VENT HOSE

- (a) Disconnect the fuel tank breather tube from the fuel tank.
 - (1) Push the connector deep inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.

13. REMOVE FUEL TANK ASSY

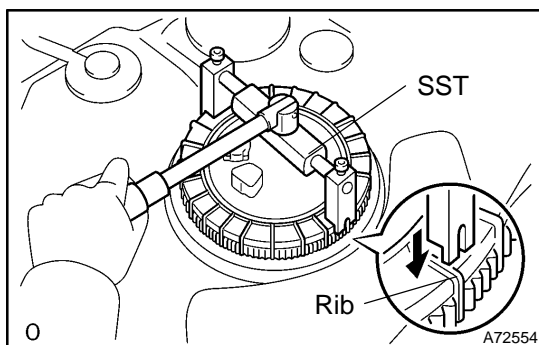
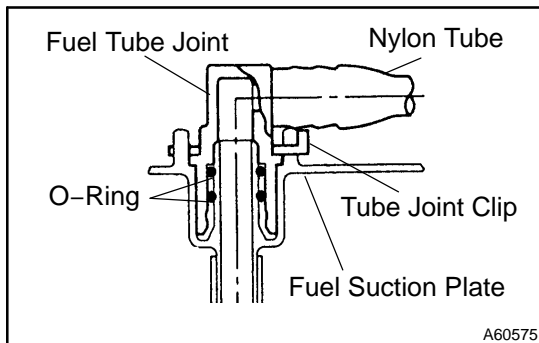
- (a) Set a transmission jack to the fuel tank.
- (b) Remove the 2 bolts, 2 fuel tank bands and fuel tank.

14. REMOVE FUEL TANK CUSHION**15. REMOVE FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE**

- (a) Remove the 2 clips, and pull out the 2 fuel tank tubes.

NOTICE:

- Check that there is no dirt or mud around the quick connector before this work. Clean the connector if necessary.
- Do not use any tool in this work.
- Do not bend or twist the nylon tube by force.
- After disconnecting, cover the fuel tube joint with a plastic bag.
- When the fuel tube joint and fuel suction plate are stuck, turn the fuel tank main tube carefully to release and disconnect it. Likewise, disconnect the fuel tank return tube.

**16. REMOVE FUEL SUCTION W/PUMP & GAGE TUBE ASSY****NOTICE:**

Protect a connector and tube joint with masking tape or something in order to prevent sticking foreign objects onto them, and clean dirt and foreign objects from the fuel suction tube assy before removing it.

- (a) Using SST, loosen the retainer.
SST 09808-14020 (09808-01410, 09808-01430)

HINT:

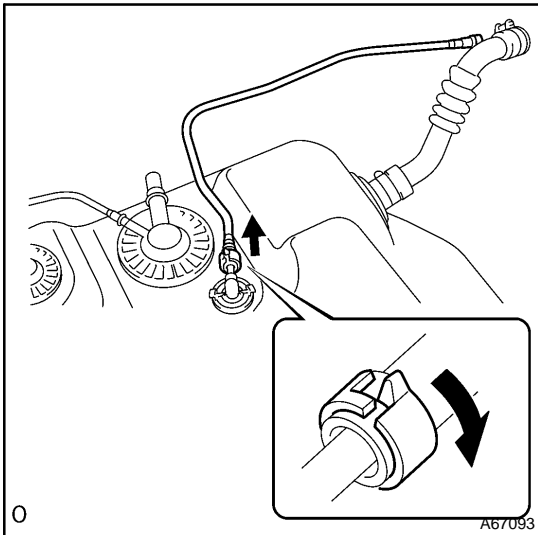
A rib on the retainer can be fitted into the tip of SST.

- (b) Remove the retainer.
- (c) Remove the fuel suction w/ pump & gage tube assy.

NOTICE:

Be careful not to bend the arm of the sender gage.

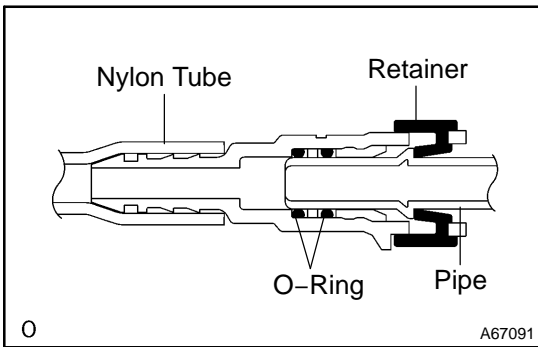
- (d) Remove the gasket from the fuel tank.



- 17. REMOVE FUEL TANK BREATHER TUBE SUB-ASSY**
 (a) Pinch and turn the projection of the retainer in the direction shown by the arrow to release the lock. Pull out the fuel tank breather tube.

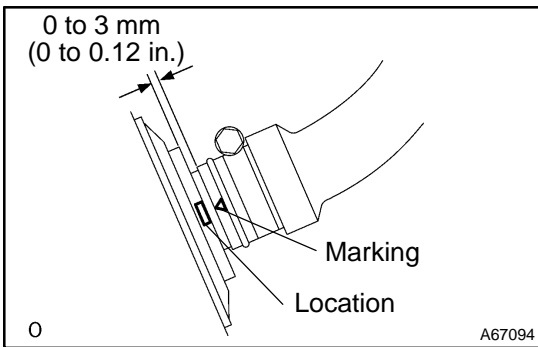
NOTICE:

- Check that there is no dirt or mud around the quick connector before this work. Clean the connector if necessary.
- Do not use any tool in this work.
- Do not bend or twist the nylon tube by force.
- To protect the tube, cover it with a plastic bag after checking.
- When the connector and the pipe are stuck, turn the fuel tank breather tube carefully to release. Disconnect the tube.



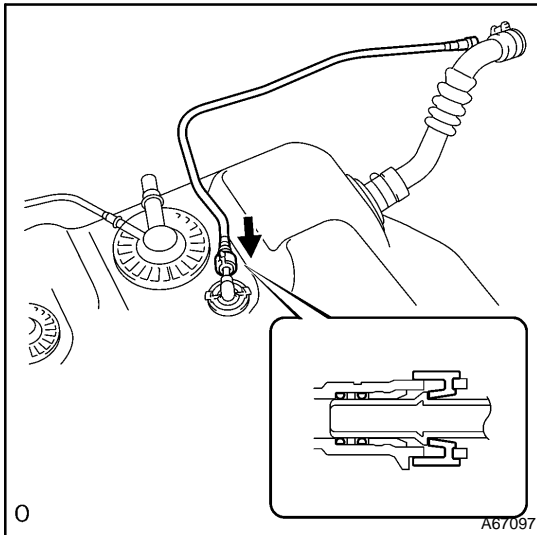
18. REMOVE FUEL TANK TO FILLER PIPE HOSE

- (a) Remove the fuel tank to filler pipe hose from the fuel tank.



19. CONNECT FUEL TANK TO FILLER PIPE HOSE

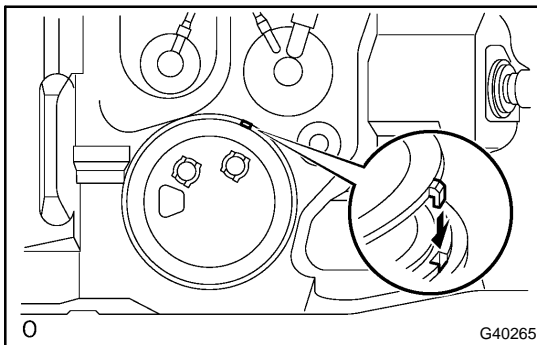
- (a) Connect a new fuel tank to filler pipe hose to the fuel tank.
HINT:
 Make sure that the hose and tank are connected as shown in the illustration.



- 20. INSTALL FUEL TANK BREATHER TUBE SUB-ASSY**
- (a) Push in the tube connector to the pipe until the connector makes a "click" sound.

NOTICE:

- Check if there is any damage or foreign objects on the connected part of the pipe.
- After connecting, check if the pipe and the connector are securely connected by pulling them.



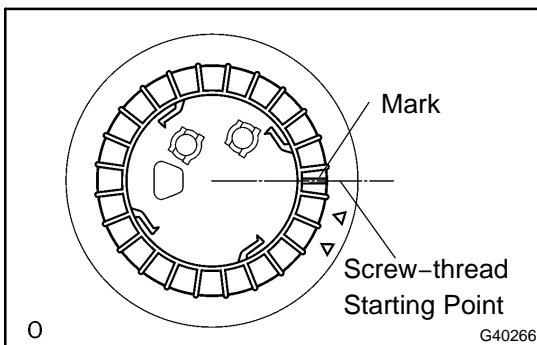
- 21. INSTALL FUEL SUCTION W/PUMP & GAGE TUBE ASSY**

- (a) Install a new gasket onto the fuel tank.
- (b) Set the fuel suction w/ pump & gage tube assy to the fuel tank.

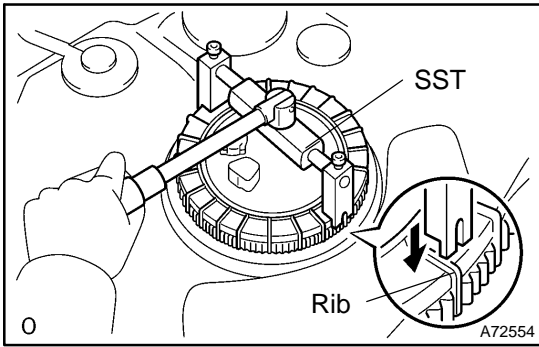
NOTICE:

Be careful not to bend the arm of the fuel sender gage.

- (c) Fit the spline of the fuel suction w/ pump & gage tube assy into the keyway of the fuel tank.



- (d) Install the retainer.
- (1) Using a new retainer, align the mark on the retainer with the screw-thread starting point of the fuel tank.
 - (2) While holding the fuel suction w/ pump & gage tube assy, tighten the retainer one complete turn by hand.

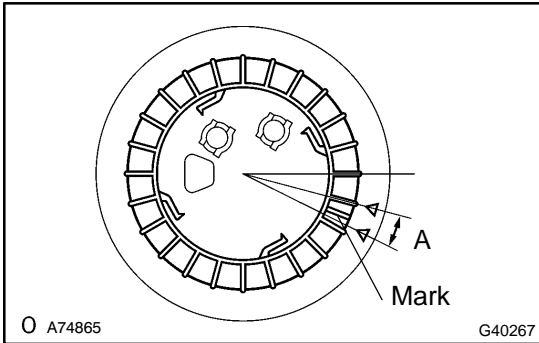


- (e) Using SST, tighten the retainer one more complete turn, and position the mark on the retainer into range A of the fuel tank.

SST 09808-14020 (09808-01410, 09808-01430)

HINT:

- Turn the retainer two complete turns and position the mark within range A to install the retainer.
- A rib on the retainer can be fitted into the tip of SST.

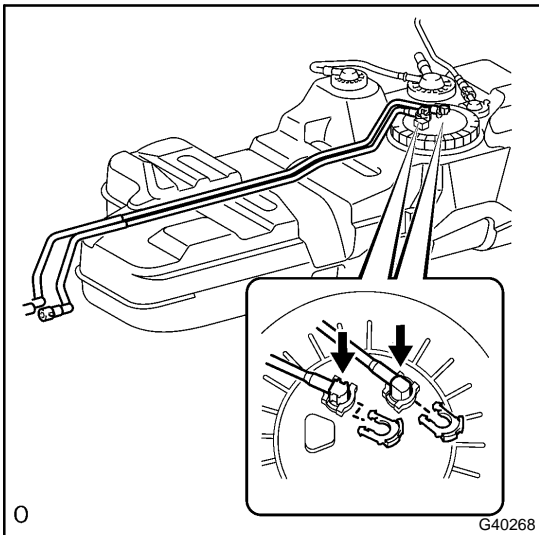


22. INSTALL FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE

- (a) Connect the 2 fuel tank tubes with the 2 clips.

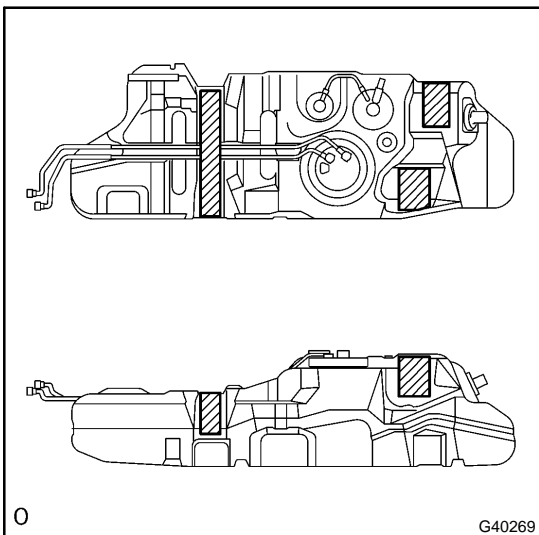
NOTICE:

- Check that there is no scratch or foreign objects on the connecting parts.
- Check that the connector is fully inserted.
- Check that the tube joint clip is on the collar of the connector.
- After installing the tube joint clip, check if the tubes are securely connected by pulling them.



23. INSTALL FUEL TANK CUSHION

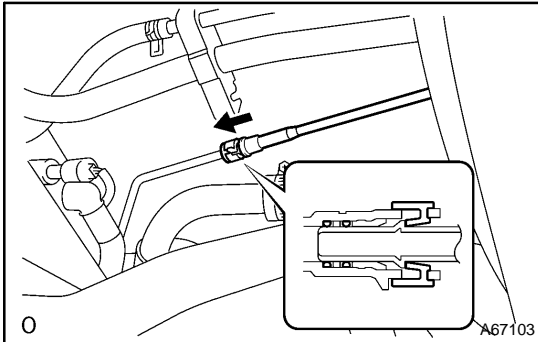
- (a) Install 3 new fuel tank cushions to the fuel tank.



24. INSTALL FUEL TANK ASSY

- (a) Set a transmission jack to the fuel tank.
- (b) Install the fuel tank and 2 fuel tank bands with the 2 bolts.

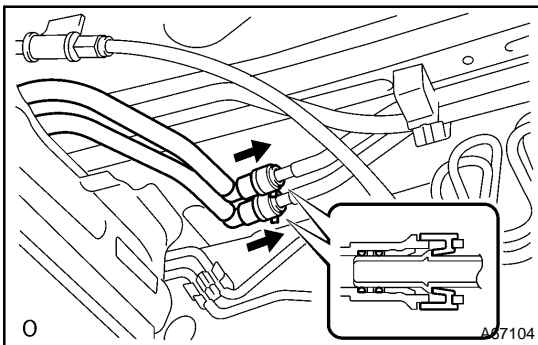
Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

**25. CONNECT FUEL TANK BREATHER TUBE SUB-ASSY**

- (a) Push in the tube connector to the pipe until the connector makes a "click" sound.

NOTICE:

- Check that there is no damage or foreign objects on the connected part of the pipe.
- After connecting, check if the pipe and the connector are securely connected by pulling them.

**26. CONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE**

- (a) Push in the tube connector to the pipe until the connector makes a "click" sound.

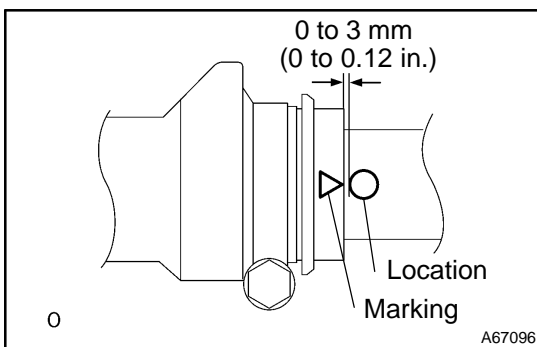
NOTICE:

- Check that there is no damage or foreign objects on the connected part of the pipe.
- After connecting, check if the pipe and the connector are securely connected by pulling them.

27. INSTALL FUEL TANK PROTECTOR SUB-ASSY NO.1

- (a) Set a transmission jack to the fuel tank protector.
- (b) Install the fuel tank protector with the 6 bolts.

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

**28. INSTALL FUEL TANK TO FILLER PIPE HOSE**

- (a) Install the fuel tank to filler pipe hose to the fuel filler pipe.

HINT:

Make sure that the hose and pipe are connected as shown in the illustration.

29. CHECK FUEL LEAK (SEE PAGE 11-6)**30. INSTALL REAR FLOOR SERVICE HOLE COVER**

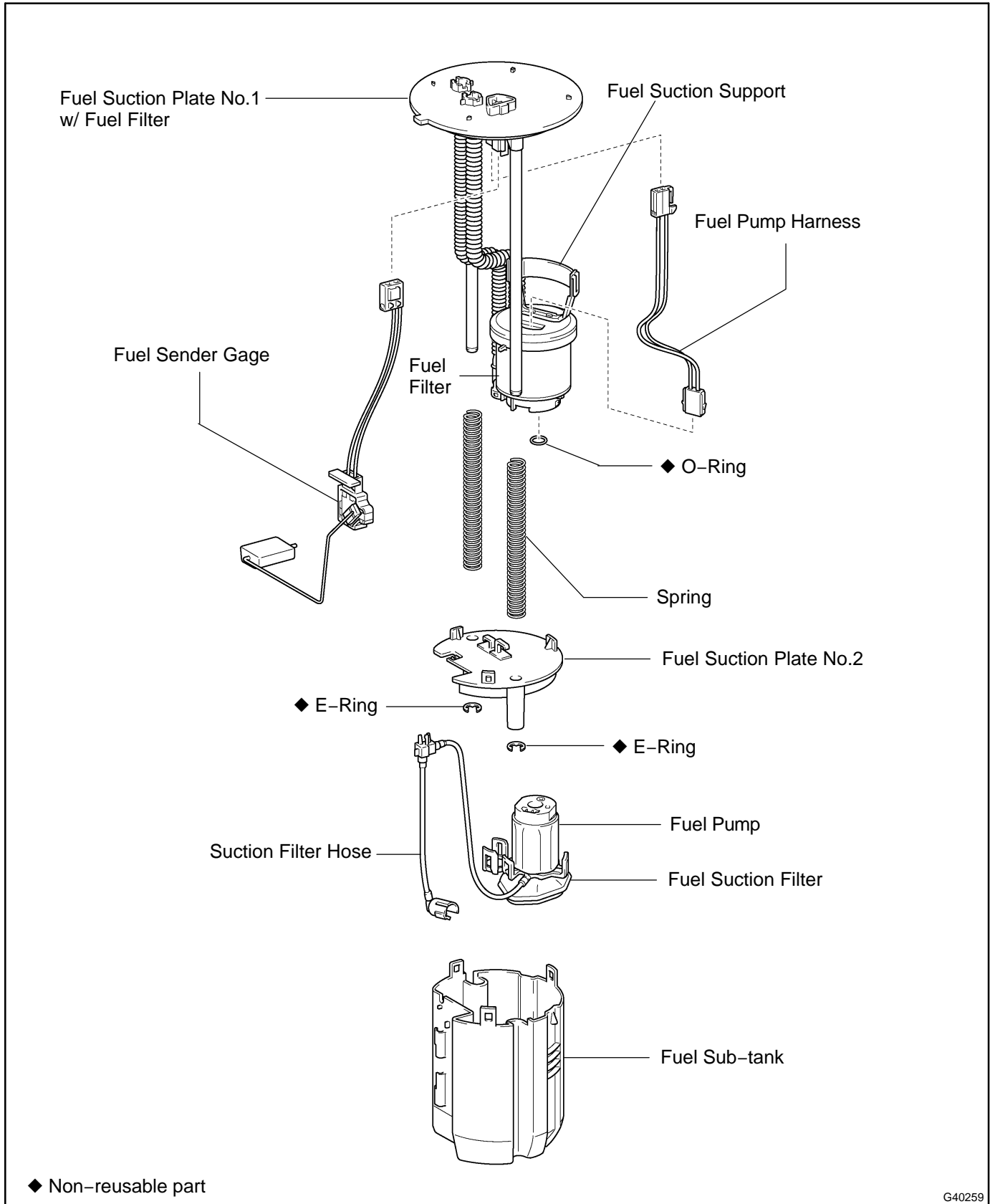
- (a) Connect the connector.
- (b) Install the 3 screws and rear floor service hole cover.
- (c) Install the rear floor carpet assy.

31. INSTALL REAR DOOR SCUFF PLATE LH**32. INSTALL QUARTER SCUFF PLATE INSIDE LH****33. INSTALL REAR FLOOR STEP COVER NO.1****34. INSTALL REAR NO.1 SEAT ASSY LH (SEE PAGE 72-29)**

FUEL PUMP ASSY (2UZ-FE)

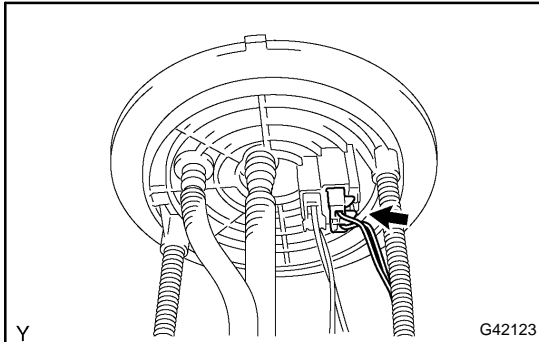
COMPONENTS

110OH-03



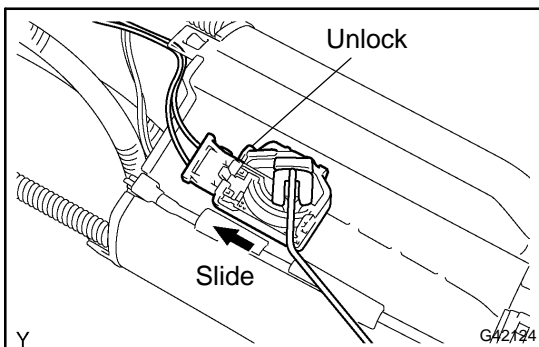
Removal & Installation and Disassembly & Reassembly

1. REMOVE FUEL SUCTION W/PUMP & GAGE TUBE ASSY (SEE PAGE 11-16)

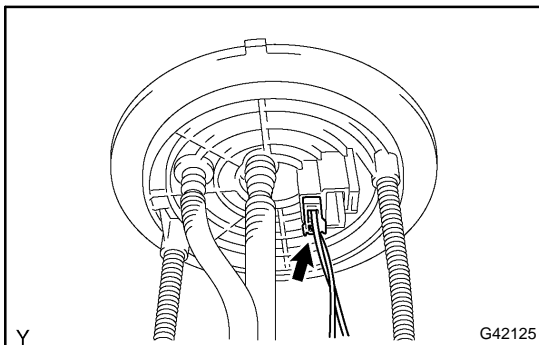


2. REMOVE FUEL SENDER GAGE ASSY

- (a) Disconnect the sender gage connector from the fuel suction plate No.1.

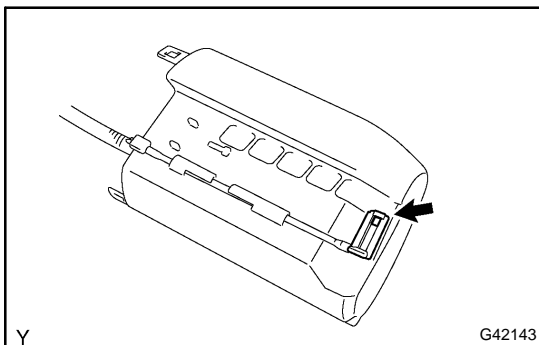


- (b) Unlock the fuel sender gage and remove it.

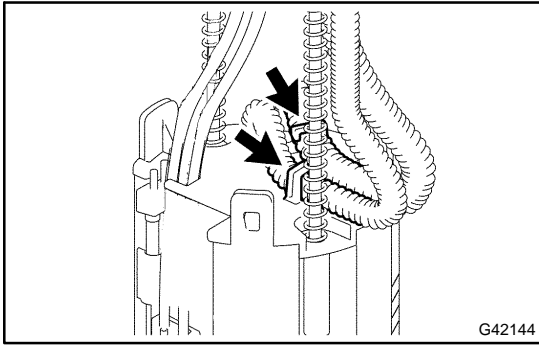


3. REMOVE FUEL SUB-TANK

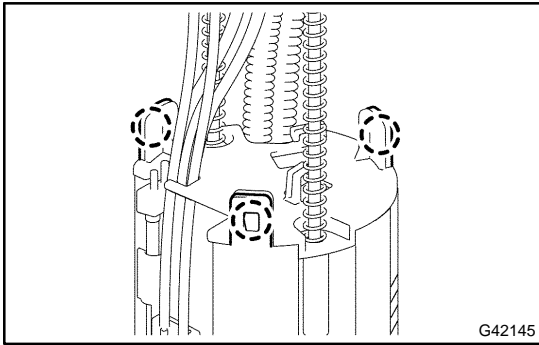
- (a) Disconnect the fuel pump harness connector from the fuel suction plate No.1.



- (b) Disconnect the suction filter hose from the fuel sub-tank.



(c) Disconnect the 2 tubes from the tube clamps.

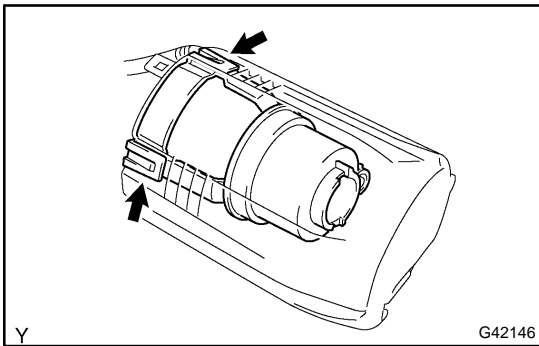


(d) Using a screwdriver with the tip wrapped in tape, disengage the 3 claws to separate the fuel suction plate No.2.

NOTICE:

Do not damage the fuel suction plate No.2 or fuel sub-tank.

(e) Disconnect the fuel suction plate No.1 with the fuel filter Assy from the fuel sub-tank.



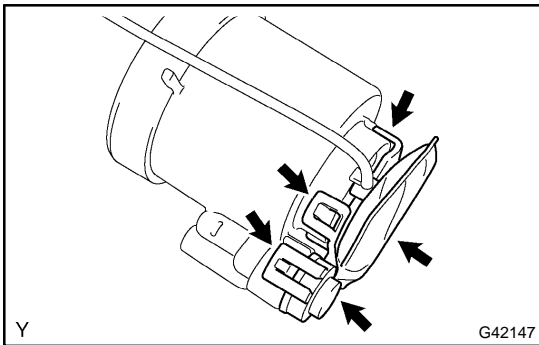
4. REMOVE FUEL PUMP ASSY W/FILTER

(a) Using a screwdriver with the tip wrapped in tape, disengage the 2 claws to separate the fuel suction support.

NOTICE:

Do not damage the fuel filter Assy or fuel suction support.

(b) Remove the fuel filter Assy with the fuel pump from the fuel suction support.



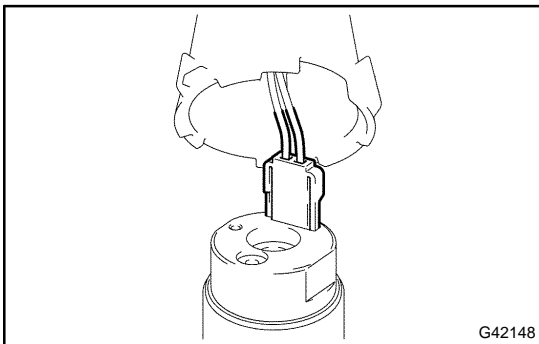
5. REMOVE FUEL PUMP

(a) Using a screwdriver with the tip wrapped in tape, disengage the 5 claws to separate the suction filter.

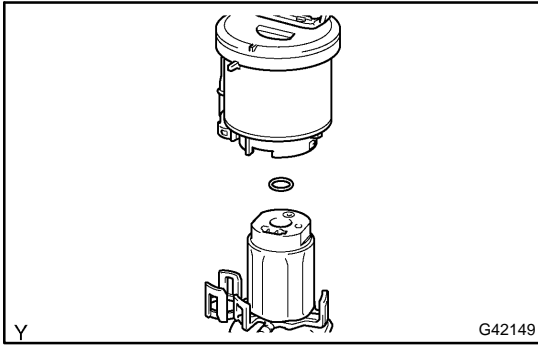
NOTICE:

Do not damage the fuel filter Assy or suction filter.

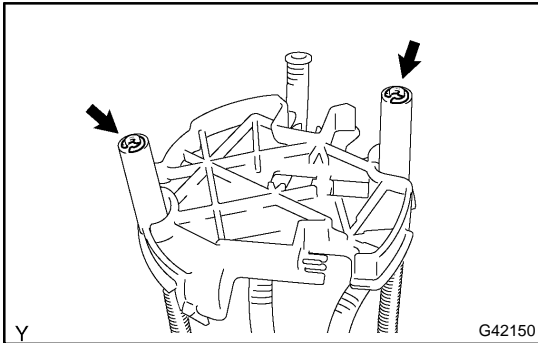
(b) Remove the fuel suction filter with the fuel pump from the fuel filter.



(c) Disconnect the fuel pump harness connector from the fuel pump.

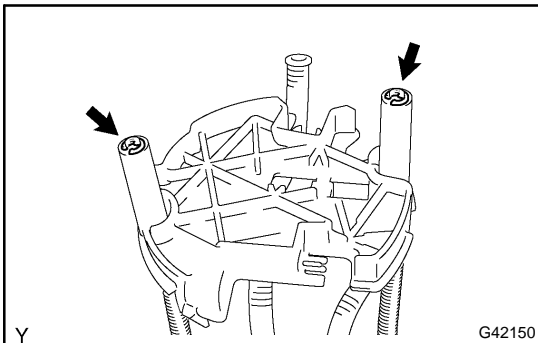


- (d) Remove the O-ring from the fuel pump.



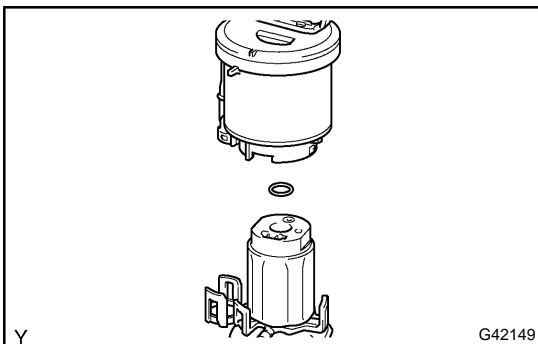
6. REMOVE FUEL SUCTION PLATE NO.2

- (a) Using a screwdriver, remove the 2 E-rings from the suction plate No.2.
 (b) Remove the suction plate No.2 and 2 springs from the fuel suction plate No.1.



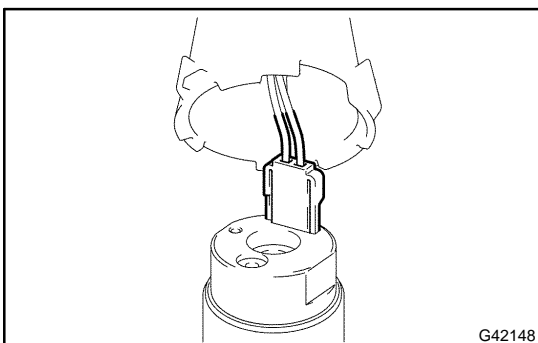
7. INSTALL FUEL SUCTION PLATE NO.2

- (a) Install the 2 springs and suction plate No.2 to the suction plate No.1.
 (b) Using needle-nose pliers, install 2 new E-rings to the suction plate No.2.

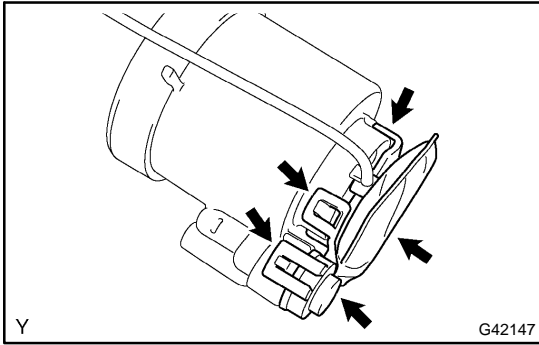


8. INSTALL FUEL PUMP

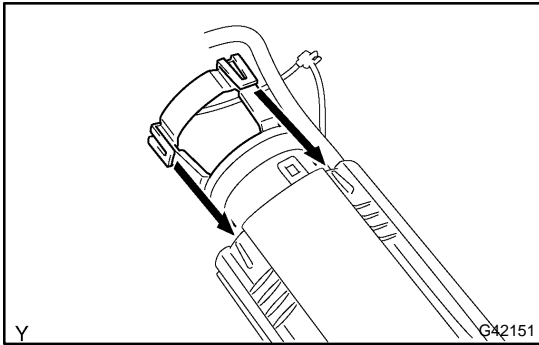
- (a) Apply a light coat of gasoline or spindle oil to a new O-ring, and install it to the fuel pump.



- (b) Connect the fuel pump harness connector to the fuel pump.

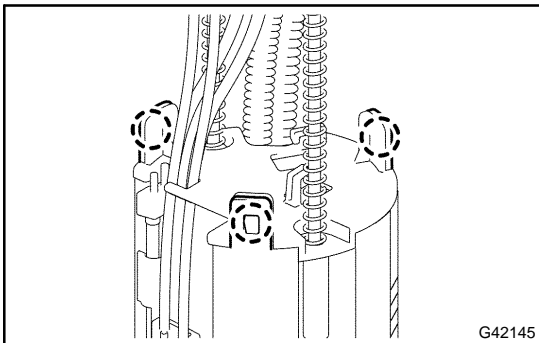


- (c) Install the suction filter to the fuel pump.
- (d) Install the fuel pump with the suction filter to the fuel filter.



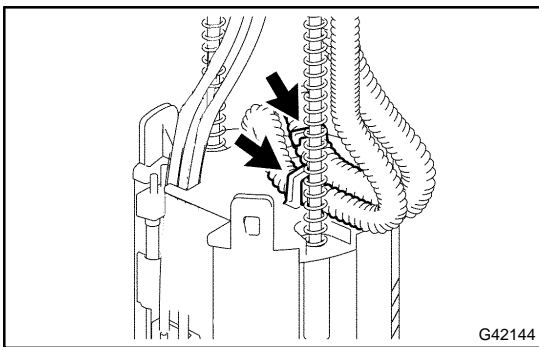
9. INSTALL FUEL PUMP ASSY W/FILTER

Install the fuel filter to the fuel sub-tank.

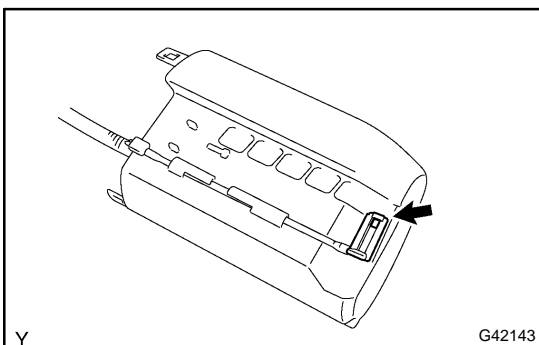


10. INSTALL FUEL SUB-TANK

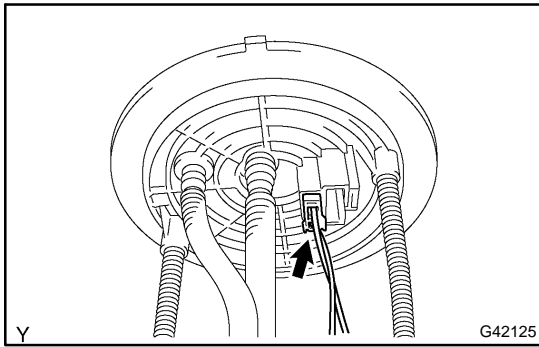
- (a) Engage the 3 claws to install the fuel suction plate No.2 to the fuel sub-tank.



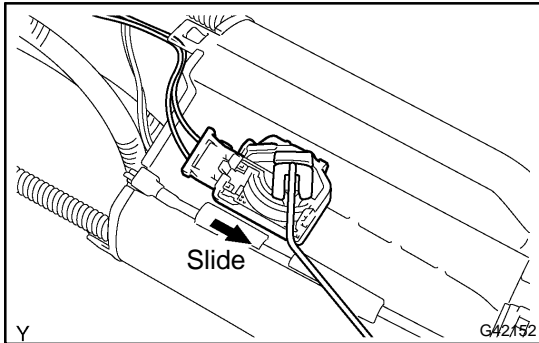
- (b) Connect the 2 tubes to the tube clamps.



- (c) Connect the suction filter hose to the fuel sub-tank.

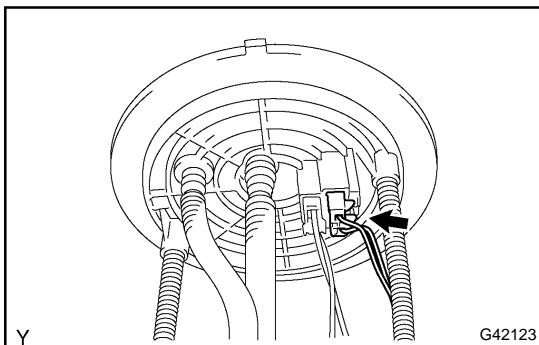


- (d) Connect the fuel pump harness connector to the fuel suction plate No.1.



11. INSTALL FUEL SENDER GAGE ASSY

- (a) Install the fuel sender gage to the fuel suction support.



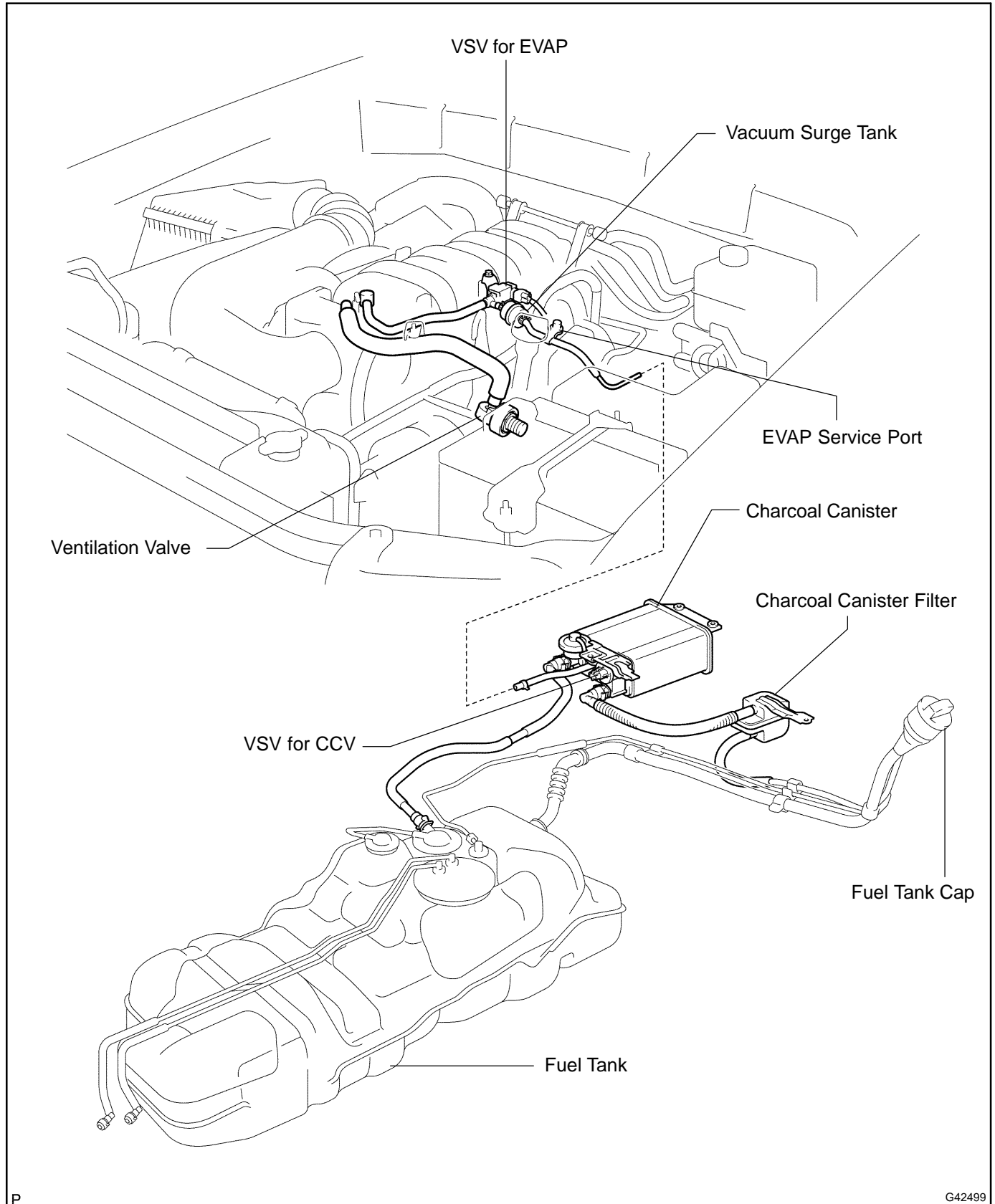
- (b) Connect the sender gage connector to the fuel suction plate No.1.

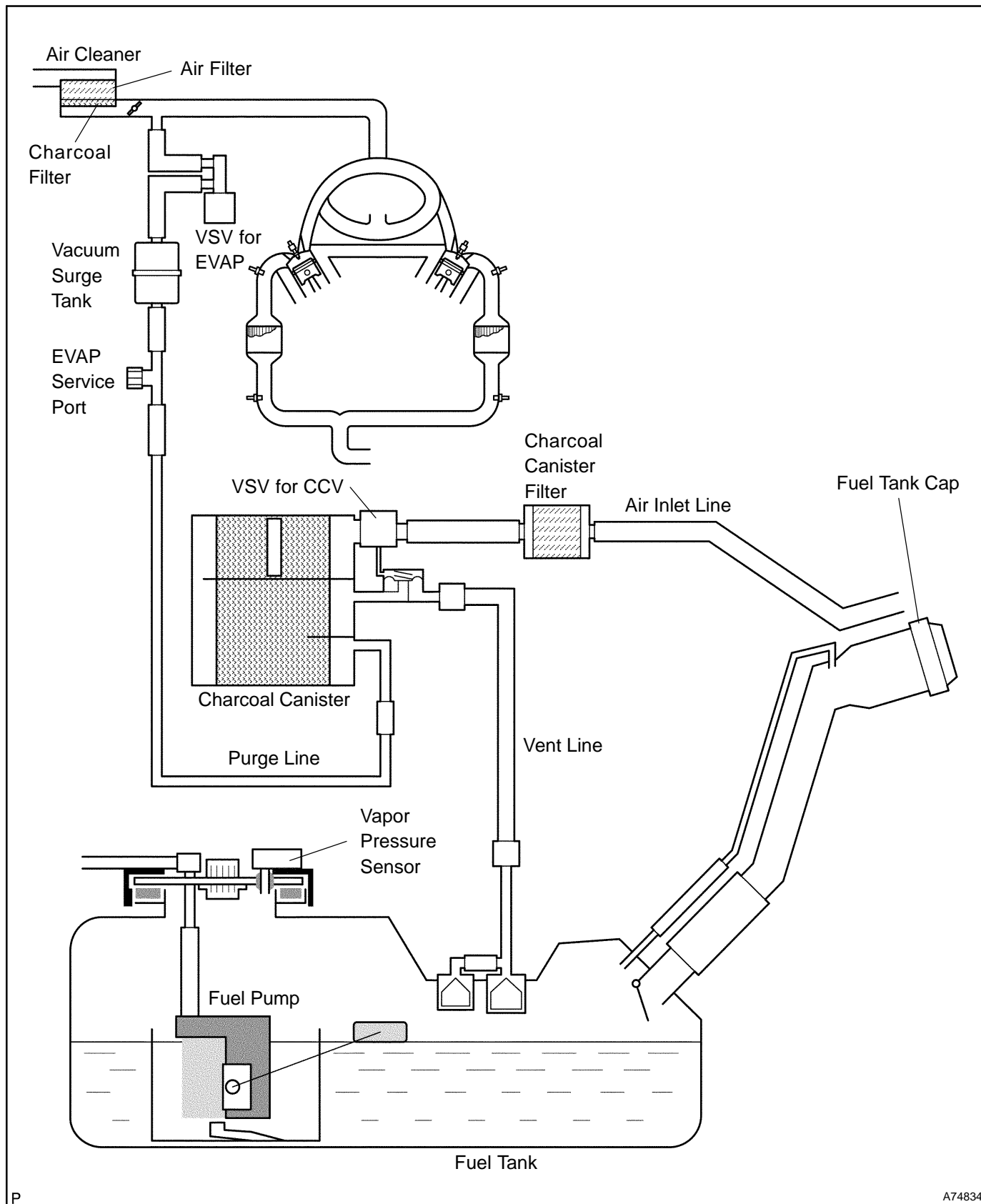
12. INSTALL FUEL SUCTION W/PUMP & GAGE TUBE ASSY (SEE PAGE 11-16)

EMISSION CONTROL SYSTEM (2UZ-FE)

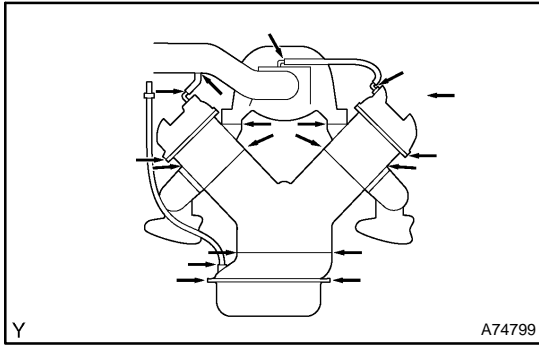
LOCATION

1205X-05





ON-VEHICLE INSPECTION

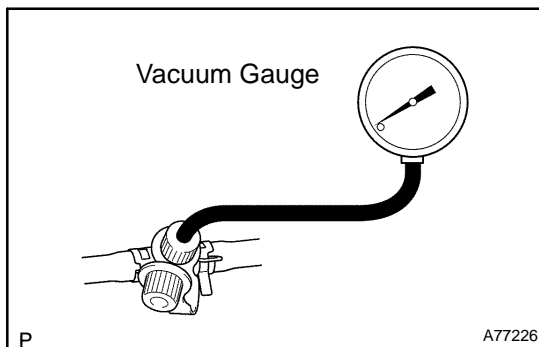


1. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- (a) Check for cracks, leaks or damage.

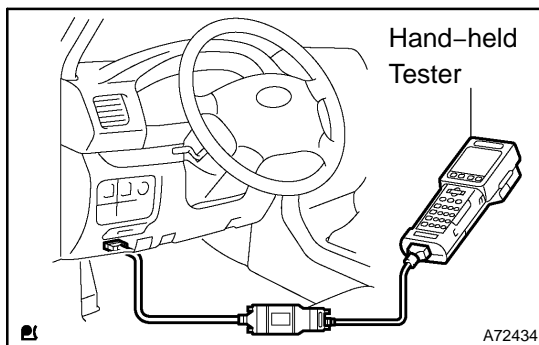
HINT:

Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause an engine failure or engine malfunctions. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause an engine failure or engine malfunctions.

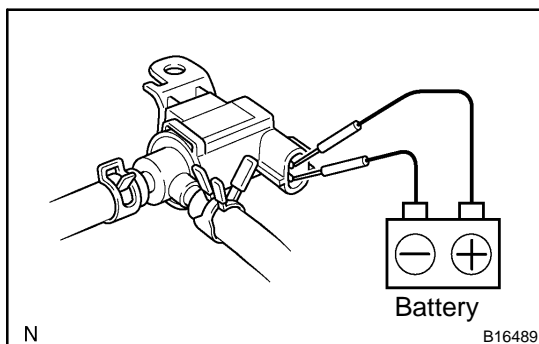


2. INSPECT EVAP SYSTEM LINE

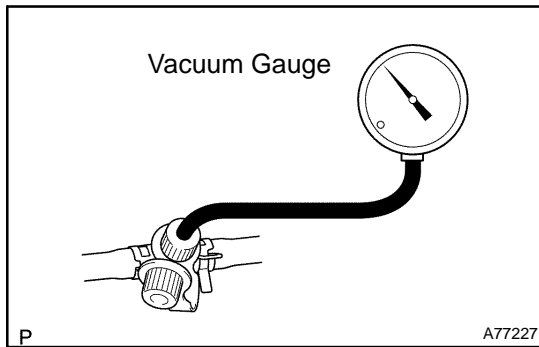
- (a) Warm up the engine to the normal operating temperature. After the warm-up, stop the engine.
- (b) Connect a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



- (c) Hand-held tester:
Forced driving of the VSV for the EVAP.
- (1) Connect a hand-held tester to the DLC3.
 - (2) Start the engine.
 - (3) Push the hand-held tester main switch ON.
 - (4) Use the ACTIVE TEST mode on the hand-held tester to operate the VSV for the EVAP.



- (d) If you do not have the hand-held tester:
Forced driving of the VSV for the EVAP.
- (1) Disconnect the VSV connector for the EVAP.
 - (2) Connect the positive (+) and negative (-) leads from the battery to the VSV terminals for the EVAP.
 - (3) Start the engine.



- (e) Check a vacuum at idle.

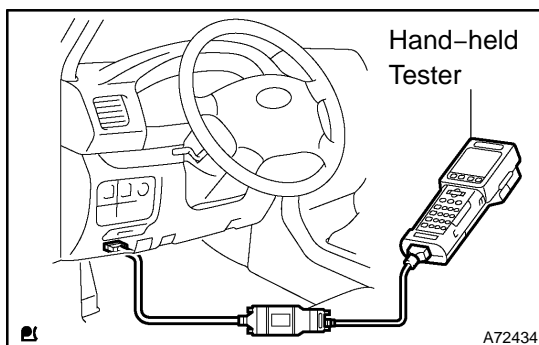
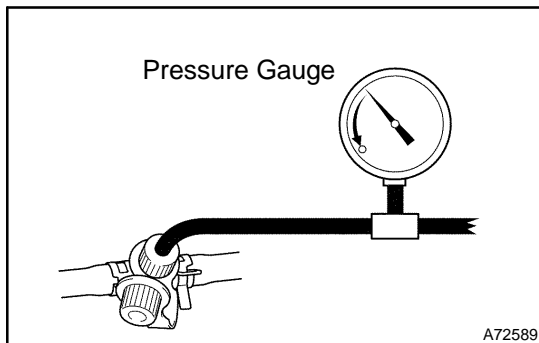
Vacuum:

Maintain at 0.368 – 19.713 in.Hg (5 – 268 in.Aq) for over 5 seconds

HINT:

If the vacuum does not change, the VSV service port connection has been loose or blocked or the VSV is malfunctioning.

- (f) If you have the hand-held tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the hand-held tester from the DLC3.
- (g) If you do not have the hand-held tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the positive (+) and negative (-) leads from the battery and from the VSV terminals for the EVAP.
 - (3) Connect the VSV connector for the EVAP.
- (h) Disconnect the vacuum gauge from the EVAP service port on the purge line.
- (i) Connect a pressure gauge to the EVAP service port on the purge line.



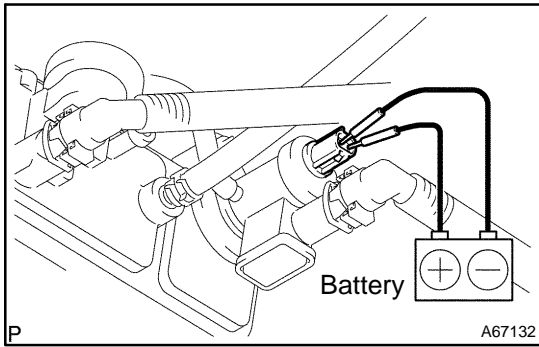
- (j) If you have hand-held tester:
Force driving of the VSV for CCV.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON.
 - (3) Push the hand-held tester main switch ON.
 - (4) Use the ACTIVE TEST mode on the hand-held tester to operate the VSV for CCV.

NOTICE:

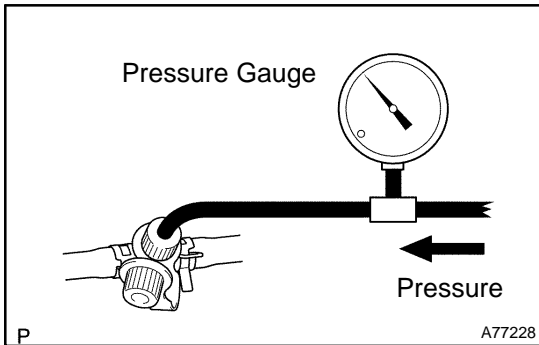
Do not start the engine.

HINT:

If the check is not completed within 10 minutes, the forced close of VSV for CCV will be reset.



- (k) If you do not have the hand-held tester:
Forced driving of the VSV for the CCV.
 - (1) Disconnect the VSV connector for the CCV.
 - (2) Connect the positive (+) and negative (-) leads from the battery to the VSV terminals for the CCV.

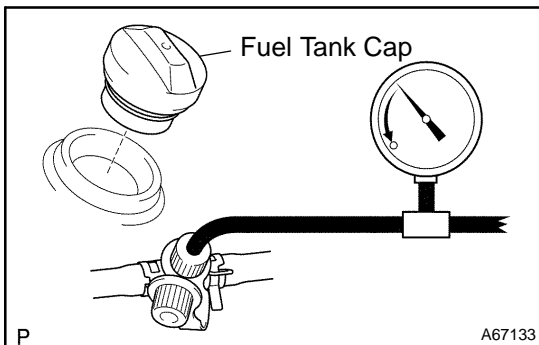


- (l) Check pressure.
 - (1) Apply the pressure (13.5 - 15.5 in.Aq) from the EVAP service port.

Pressure:
2 minutes after applying the pressure, the gauge indication should be over 7.7 - 8.8 in.Aq.

HINT:

If you are not able to apply the pressure, the VSV hose for the EVAP-canister-fuel-tank is disconnected or the VSV is open.

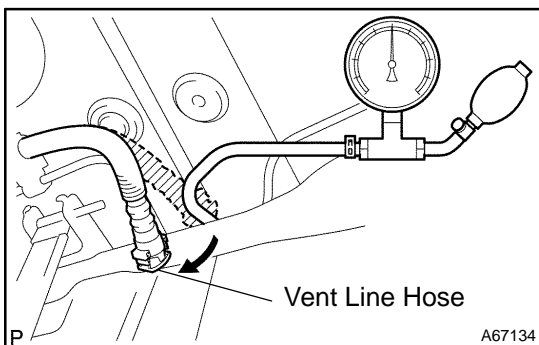


- (2) Check if the pressure decreases when the fuel tank cap is removed while applying the pressure.

HINT:

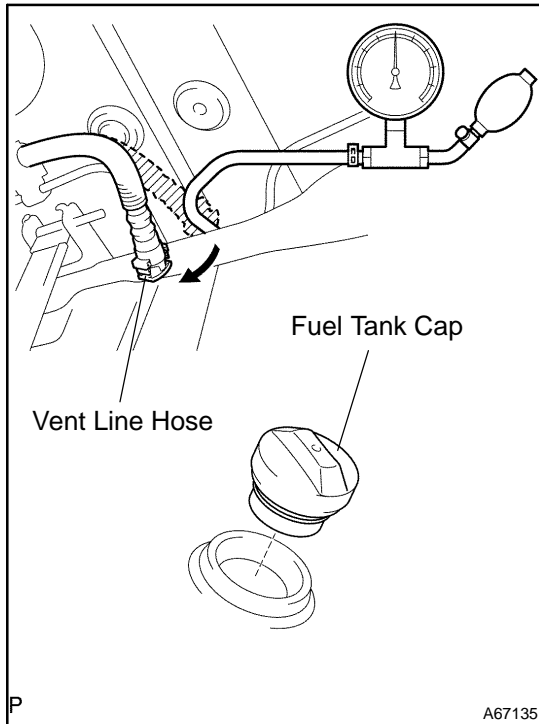
If the pressure does not decrease when the tank cap is removed, the hose between the service port and the fuel tank is blocked inside. etc.

- (m) If you have the hand-held tester:
Conclude forced driving of the VSV for the CCV.
 - (1) Turn ignition switch OFF.
 - (2) Disconnect the hand-held tester from the DLC3.
- (n) If you do not have the hand-held tester:
Conclude forced driving of the VSV for the CCV.
 - (1) Disconnect the positive (+) and negative (-) leads from the battery and from the VSV terminals for the CCV.
 - (2) Connect the VSV-connector-for-the-CCV.
- (o) Disconnect the pressure gauge from the EVAP service port on the purge line.



- 3. **CHECK AIR TIGHTNESS IN FUEL TANK AND FILLER PIPE**
 - (a) Disconnect the vent line hose from the fuel tank (See page 11-16).
 - (b) Apply pressure to the fuel tank and make the internal pressure of the air pressure 4 kPa (41 gf/cm², 0.58 psi).
 - (c) Check that the internal pressure of the fuel tank is maintained for 1 minute.
 - (d) Check the connections for each hose and pipe.

- (e) Check the installed parts on the fuel tank. If there is no abnormality, replace the fuel tank and filler pipe.
- (f) Reconnect the vent line hose to the fuel tank.



4. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE

- (a) Disconnect the vent line hose from the fuel tank (See page 11-16).
- (b) Apply 4 kPa (41 gf/cm², 0.58 psi) to the vent port of the fuel tank.

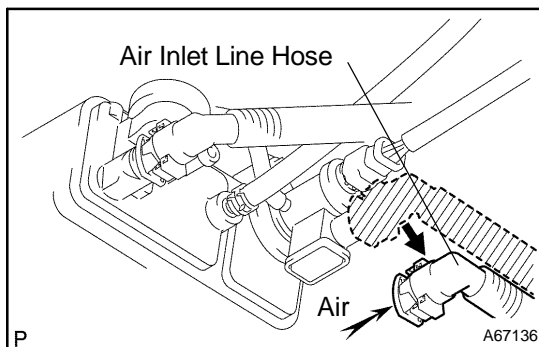
HINT:

In the condition that the fuel is full, as the float value of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

- (c) Remove the fuel tank cap, and check that the pressure inside the tank drops.

If pressure does not drop, replace the fuel tank assembly.

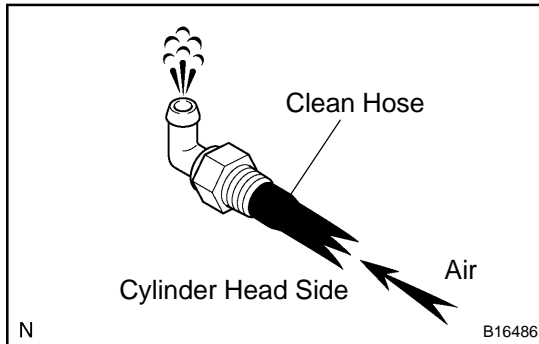
- (d) Reconnect the vent line hose to the fuel tank.



5. CHECK AIR INLET LINE

- (a) Disconnect the air inlet line hose from the charcoal canister (See page 12-12).
- (b) Check that there is ventilation in the air inlet line.
- (c) Reconnect the air inlet line hose to the charcoal canister.

INSPECTION

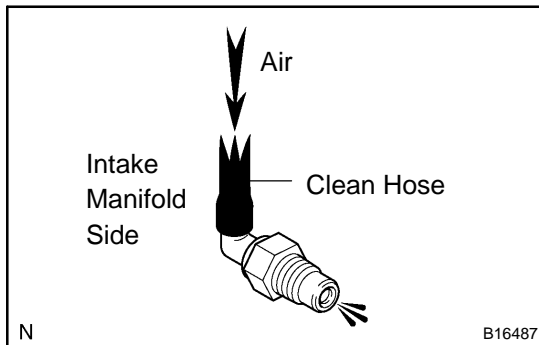


1. INSPECT VENTILATION VALVE SUB-ASSY

- (a) Install a clean hose to the ventilation valve.
- (b) Inspect the ventilation valve operation.
 - (1) Blow air into the cylinder head side, and check that air passes through smoothly.

CAUTION:

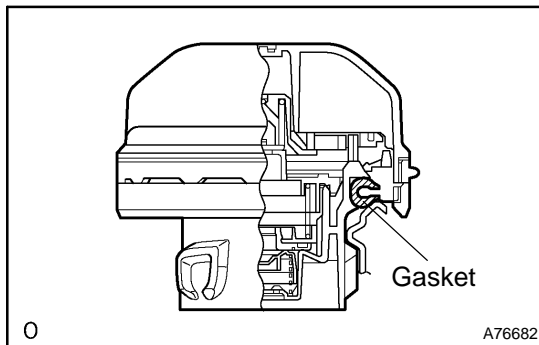
Do not suck air through the valve. Petroleum substances inside the valve are harmful.



- (2) Blow air into the intake manifold side, and check that air does not pass through smoothly.

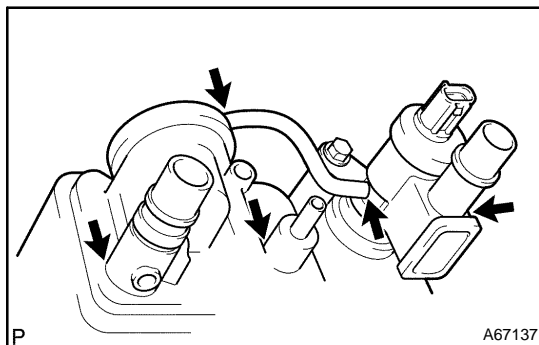
If operation is not as specified, replace the ventilation valve.

- (c) Remove the clean hose from the ventilation valve.



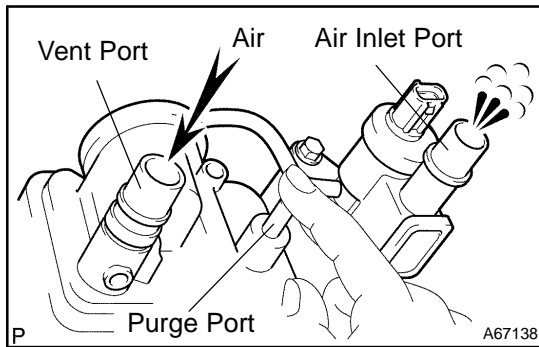
2. INSPECT FUEL TANK CAP ASSY

- (a) Visually check if the cap and/or gasket are deformed or damaged.

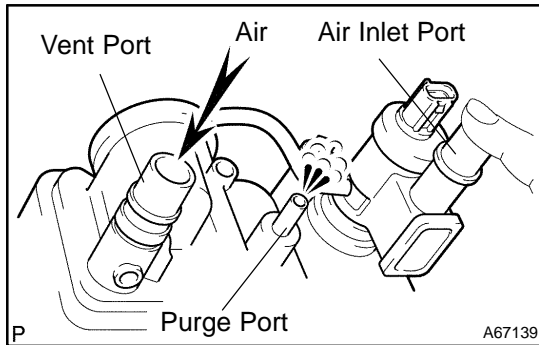


3. INSPECT CHARCOAL CANISTER ASSY

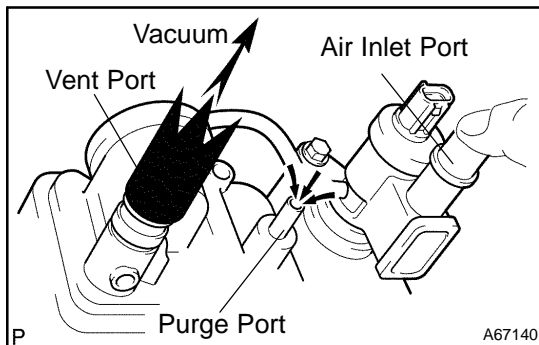
- (a) Visually check the charcoal canister for cracks or damage.



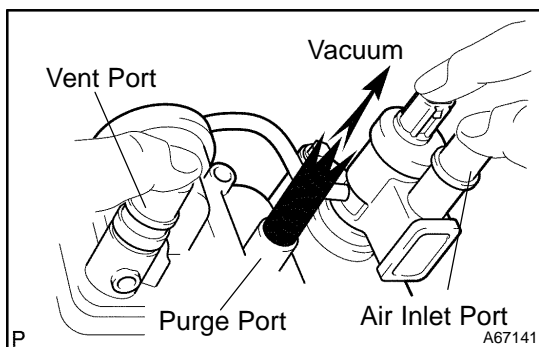
- (b) Inspect the charcoal canister operation.
- (1) Blow air (0.39 kPa, 4.0 gf/cm², 0.06 psi) into the vent port with the purge port closed, and check that the air flows from the air inlet port.



- (2) Blow air (0.39 kPa, 4.0 gf/cm², 0.06 psi) into the vent port with the air inlet port closed, and check that air flows from the purge port.



- (3) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the vent port with the air inlet port closed, and check that air is sucked in from the purge port.
- If operation is not as specified, replace the charcoal canister.

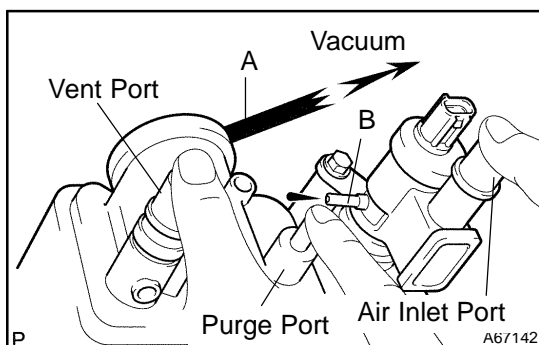


- (c) Inspect the air tightness.
- (1) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port with the vent and air inlet ports closed, and check that the vacuum is sustained for 1 minute.

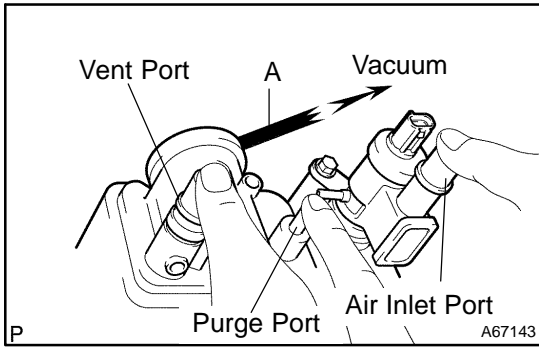
HINT:

In order to maintain air tightness, the checked should be performed with the CCV terminal port held closed by hand.

If operation is not as specified, replace the charcoal canister.



- (d) Inspect the diaphragm.
- (1) Remove the air hose between ports A and B.
 - (2) Apply vacuum (1.42 kPa, 11 mmHg, 0.42 in.Hg) into port A with the vent, purge and air inlet ports closed, and check that air is sucked in from port B.

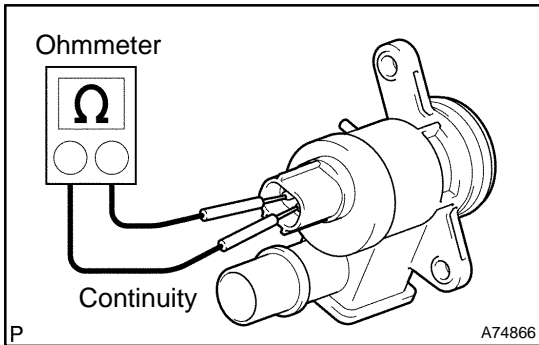


- (3) Apply vacuum (1.42 kPa, 11 mmHg, 0.42 in.Hg) into port A with the vent, purge and air inlet ports closed, and measure how long it takes for the vacuum to drop.

Vacuum drop time: 10 sec. or more

If operation is not as specified, replace the charcoal canister.

- (4) Reinstall the air hose between ports A and B.

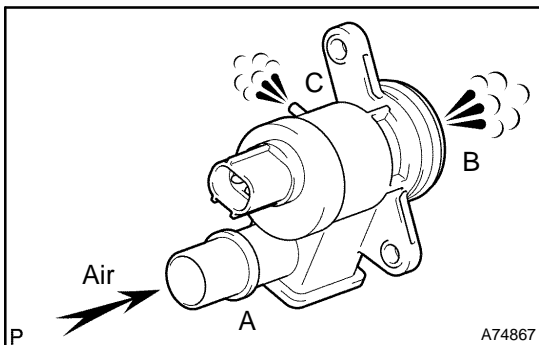


- (e) Inspect VSV for open circuit.
 - (1) Using an ohmmeter, check that there is continuity between the terminals.

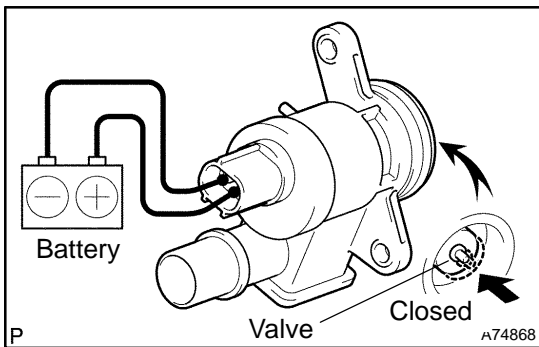
Resistance:

20 °C (68 °F)	25 - 30 Ω
100 °C (212 °F)	32 - 42 Ω

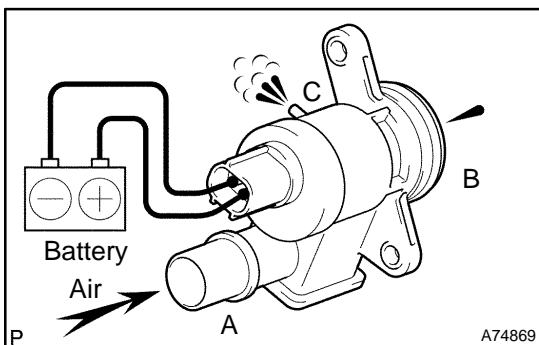
If there is no continuity, replace the charcoal canister.



- (f) Inspect VSV operation.
 - (1) Check that air flows from ports A to B and C.

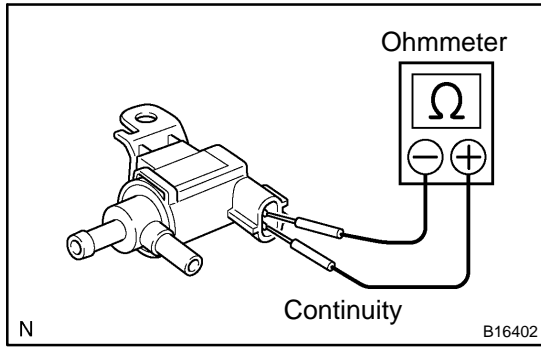


- (2) Apply battery positive voltage across the terminals.
- (3) Check that the valve is closed.



- (4) Check that air does not flow from ports A to B.
- (5) Check that air flows from ports A to C.

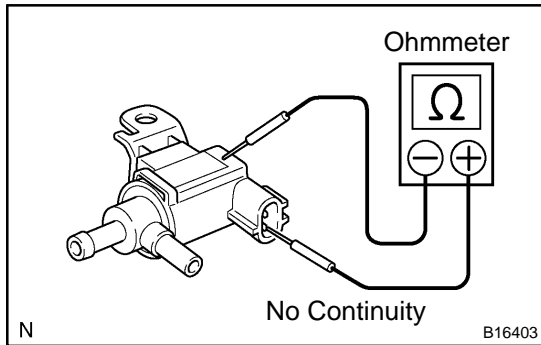
If the operation is not as specified, replace the charcoal canister.



- 4. INSPECT VACUUM SWITCHING VALVE ASSY NO.1**
- (a) Inspect the VSV for open circuit.
- (1) Using an ohmmeter, check resistance between the terminals.

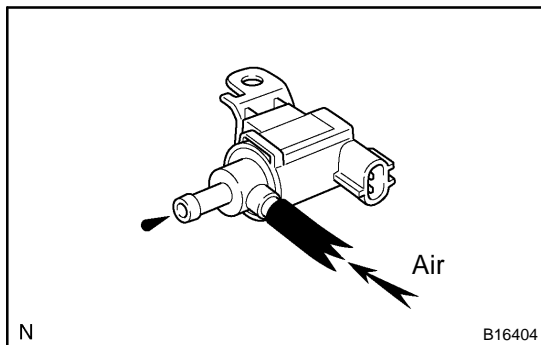
Resistance: 26 – 30 Ω at 20 °C (68 °F)

If the resistance is not as specified, replace the VSV.

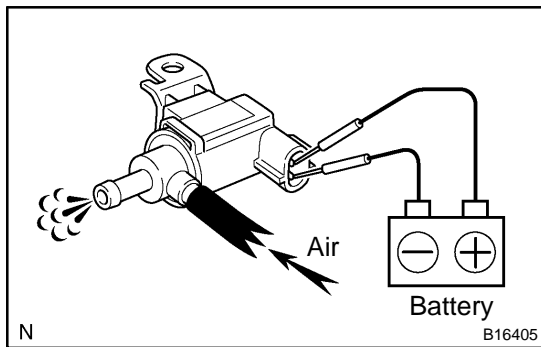


- (b) Inspect the VSV for ground.
- (1) Using an ohmmeter, check that there is no continuity between each terminal and the body.

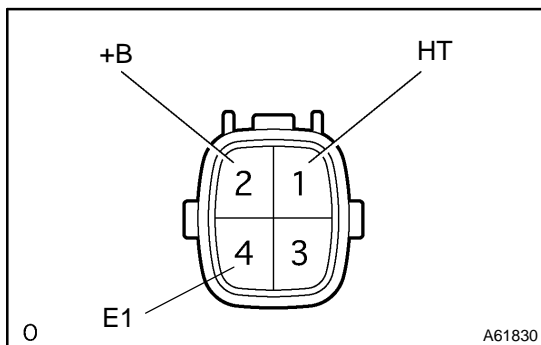
If there is continuity, replace the VSV.



- (c) Inspect the VSV operation.
- (1) Check that air does not flow from ports.



- (2) Apply battery positive voltage across the terminals.
- (3) Check that air flows from ports.
- If operation is not as specified, replace the VSV.



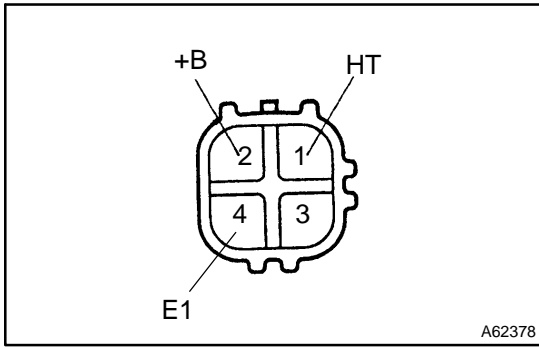
5. INSPECT HEATED OXYGEN SENSOR (BANK1, BANK2 OXYGEN SENSOR)

- (a) Using an ohmmeter, measure resistance between the terminals.

Resistance:

Terminal No.	Resistance
1 (HT) ↔ 2 (+B)	11 – 16 Ω at 20 °C (68 °F)
1 (HT) ↔ 4 (E1)	No Continuity

If the resistance is not as specified, replace the sensor.



6. INSPECT HEATED OXYGEN SENSOR (BANK1,BANK2 OXYGEN SENSOR NO.2)

- (a) Using an ohmmeter, measure resistance between the terminals.

Resistance:

Terminal No.	Resistance
1 (HT) ↔ 2 (+B)	11 – 16 Ω at 20 °C (68 °F)
1 (HT) ↔ 4 (E1)	No Continuity

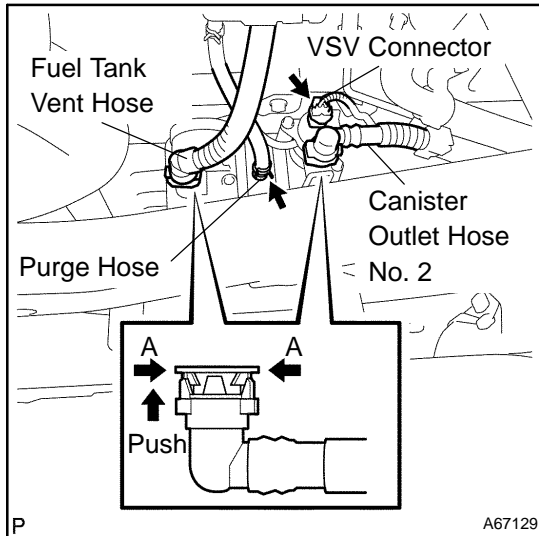
If the resistance is not as specified, replace the sensor.

CHARCOAL CANISTER ASSY (2UZ-FE)

REPLACEMENT

12060-05

1. REMOVE SPARE TIRE



2. REMOVE CHARCOAL CANISTER ASSY

- (a) Disconnect the fuel tank vent hose from the charcoal canister.
 - (1) Deeply push the connector inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.
- (b) Disconnect the canister outlet hose No. 2 from the charcoal canister.
 - (1) Deeply push the connector inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.
- (c) Disconnect the VSV connector from the CCV.
- (d) Disconnect the purge line hose from the charcoal canister.
- (e) Remove the 3 bolts and the charcoal canister from the body.

3. INSTALL CHARCOAL CANISTER ASSY

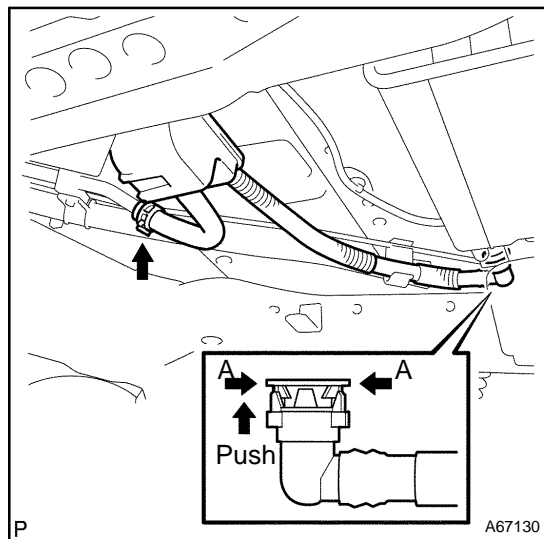
- (a) Install the charcoal canister with the 3 bolts.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
- (b) Connect the purge line hose to the charcoal canister.
- (c) Connect the VSV connector to the CCV.
- (d) Connect the canister outlet hose No. 2 to the charcoal canister.
- (e) Connect the fuel tank hose to the charcoal canister.

CHARCOAL CANISTER FILTER SUB-ASSY (2UZ-FE)

REPLACEMENT

12061-05

1. REMOVE SPARE TIRE



2. REMOVE CHARCOAL CANISTER FILTER SUB-ASSY

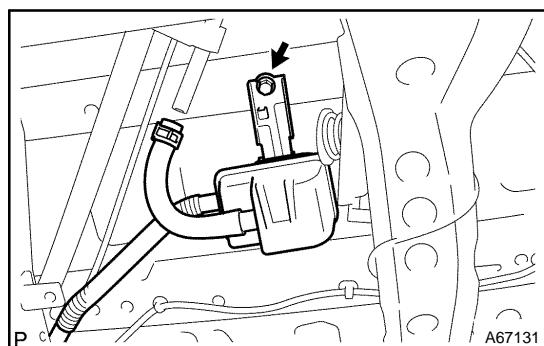
- (a) Disconnect the canister outlet hose No. 2 from the charcoal canister.

(1) Deeply push the connector inside.

(2) Pinch portion A.

(3) Pull out the connector.

- (b) Disconnect the canister outlet hose from the fuel tank filler pipe.



- (c) Remove a bolt and the charcoal canister filter.

3. INSTALL CHARCOAL CANISTER FILTER SUB-ASSY

- (a) Install the charcoal canister with a bolt.

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

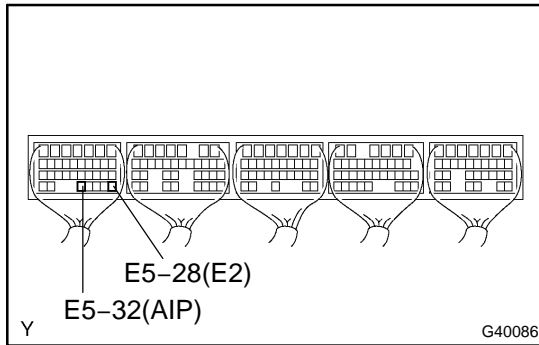
- (b) Connect the canister outlet hose to the fuel tank filler pipe.

- (c) Connect the canister outlet hose No. 2 to the charcoal canister.

SECONDARY AIR INJECTION SYSTEM (2UZ-FE)

ON-VEHICLE INSPECTION

120JB-01

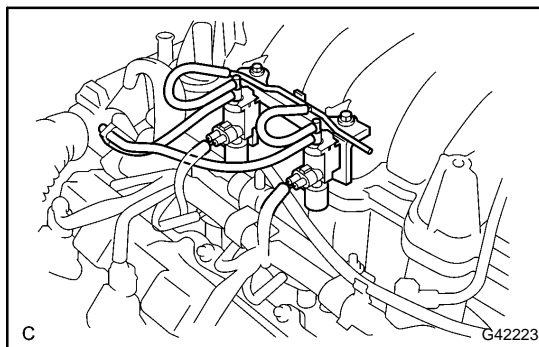


1. INSPECT PRESSURE SENSOR

- Turn the ignition switch to the ON position.
- Measure the voltage between terminals E5-32(AIP) and E5-28(E2) of the ECM connector.

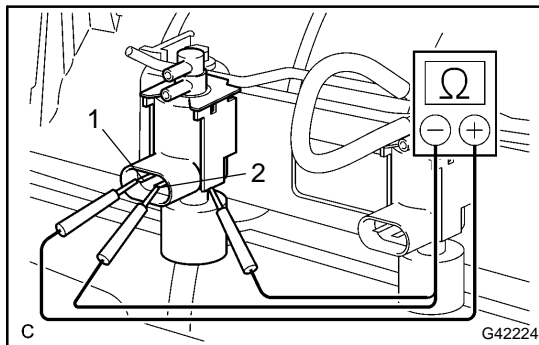
Voltage: 1.0 to 2.2 V

If the voltage is not as specified, replace the pressure sensor, wire harness or ECM.



2. INSPECT VSV FOR AIR INJECTION SYSTEM

- Disconnect the connector from the VSV.
- Disconnect the 2 vacuum hoses from the VSV.

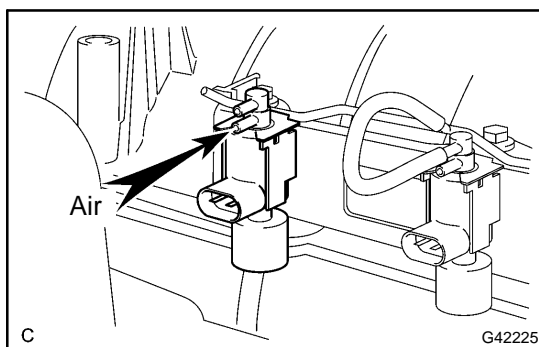


- Using an ohmmeter, measure the resistance between the terminals.

Standard:

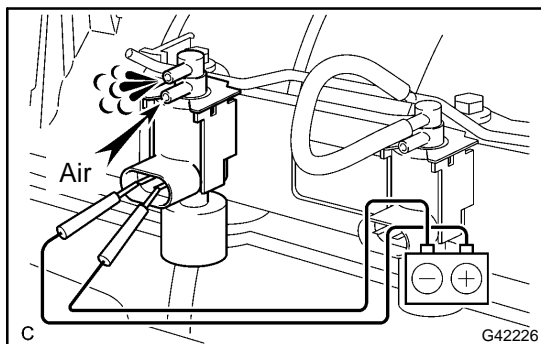
Tester Connection	Specified Condition
1 - 2	33 to 39 Ω at 20°C (68°F)
1 - Body ground	10 M Ω or higher
2 - Body ground	10 M Ω or higher

If the resistance is not as specified, replace the VSV.



- Check that air does not flow from the port as shown in the illustration.

If the result is not as specified, replace the VSV.



(e) Apply positive battery between the terminals, and check that air flows from the port.

If the result is not as specified, replace the VSV.

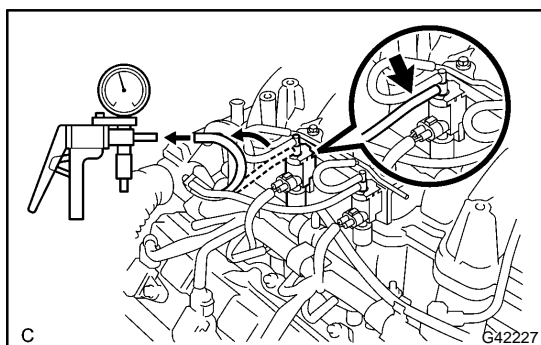
(f) Connect the 2 vacuum hoses to the VSV.

NOTICE:

Be sure to connect the vacuum hoses correctly.

(g) Connect the connector to the VSV.

(h) Perform procedures (a) to (g) for the other VSV.

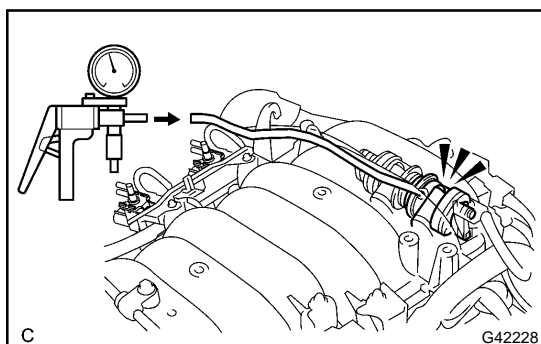


3. INSPECT NO.2 AIR SWITCHING VALVE

(a) Disconnect the vacuum hose from the VSV for the air injection system.

(b) Apply vacuum (30 kPa (306 gf/cm², 4.35 psi)) to the vacuum hose, and check that the vacuum does not decrease.

If operation is not as specified, replace the No.2 air switching valve.

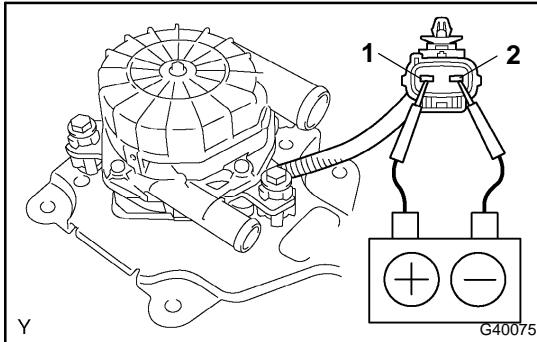


(c) Release the vacuum, and check that an operation sound is emitted from the No.2 air switching valve.

If operation is not as specified, replace the No.2 air switching valve.

(d) Perform procedures (a) to (c) for the other No.2 air switching valve.

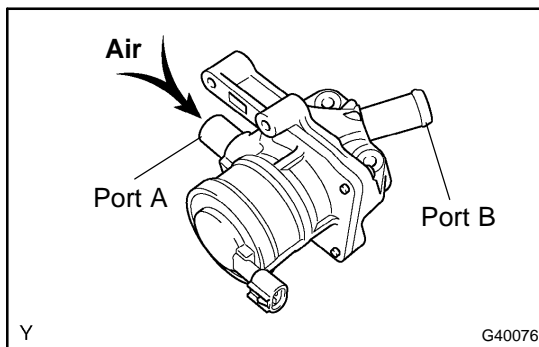
INSPECTION



1. AIR PUMP ASSY

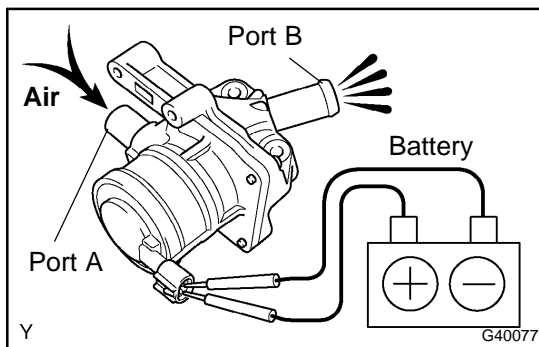
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that air flows.

If operation is not as specified, replace the air pump.



2. AIR SWITCHING VALVE

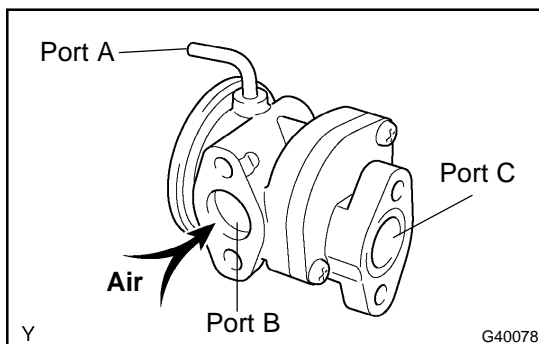
- (a) Blow air into port A and check that air is not discharged from port B.



- (b) Apply positive battery between the terminals.

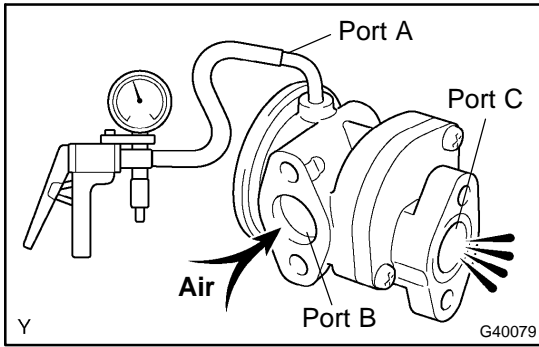
- (c) Blow air into port A and check that air is discharged from port B.

If operation is not as specified, replace the air switching valve.



3. AIR SWITCHING VALVE NO.2

- (a) Blow air into port B and check that air is not discharged from port C.

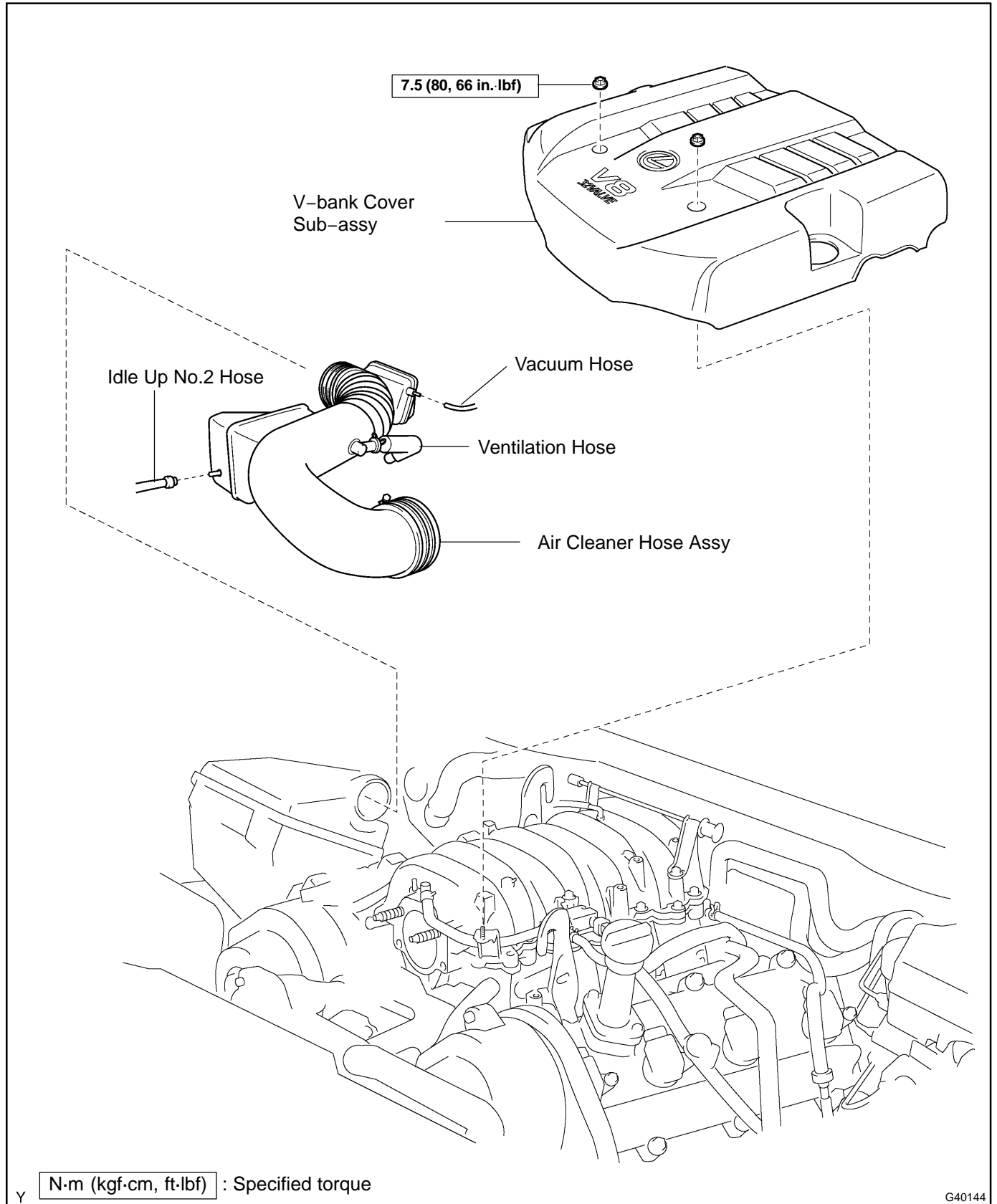


- (b) Apply vacuum (30 kPa (306 gf/cm², 4.35 psi)) to port A, blow air into port B and check that air is discharged from port C.

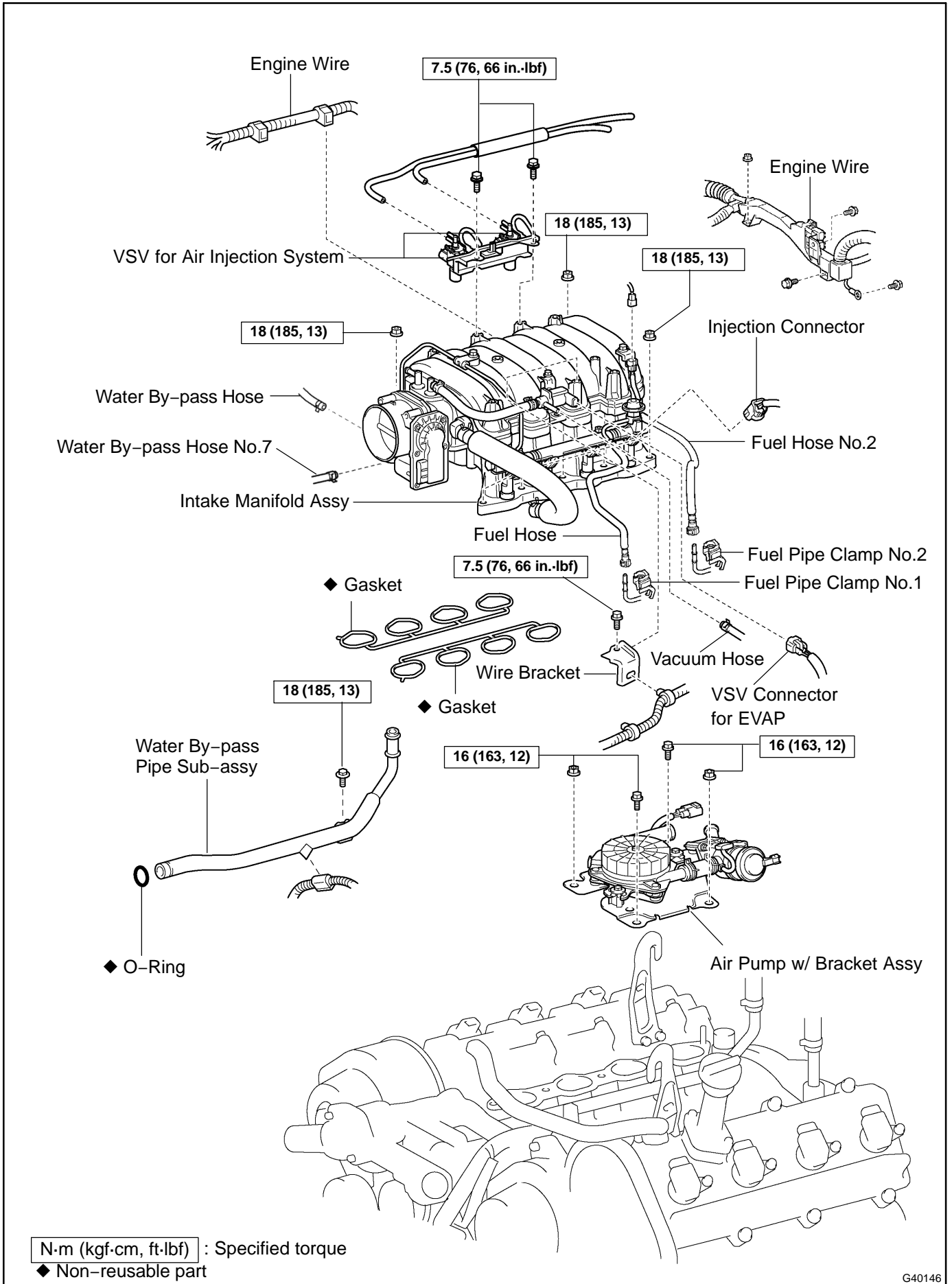
If operation is not as specified, replace the No.2 air switching valve.

AIR PUMP ASSY (2UZ-FE) COMPONENTS

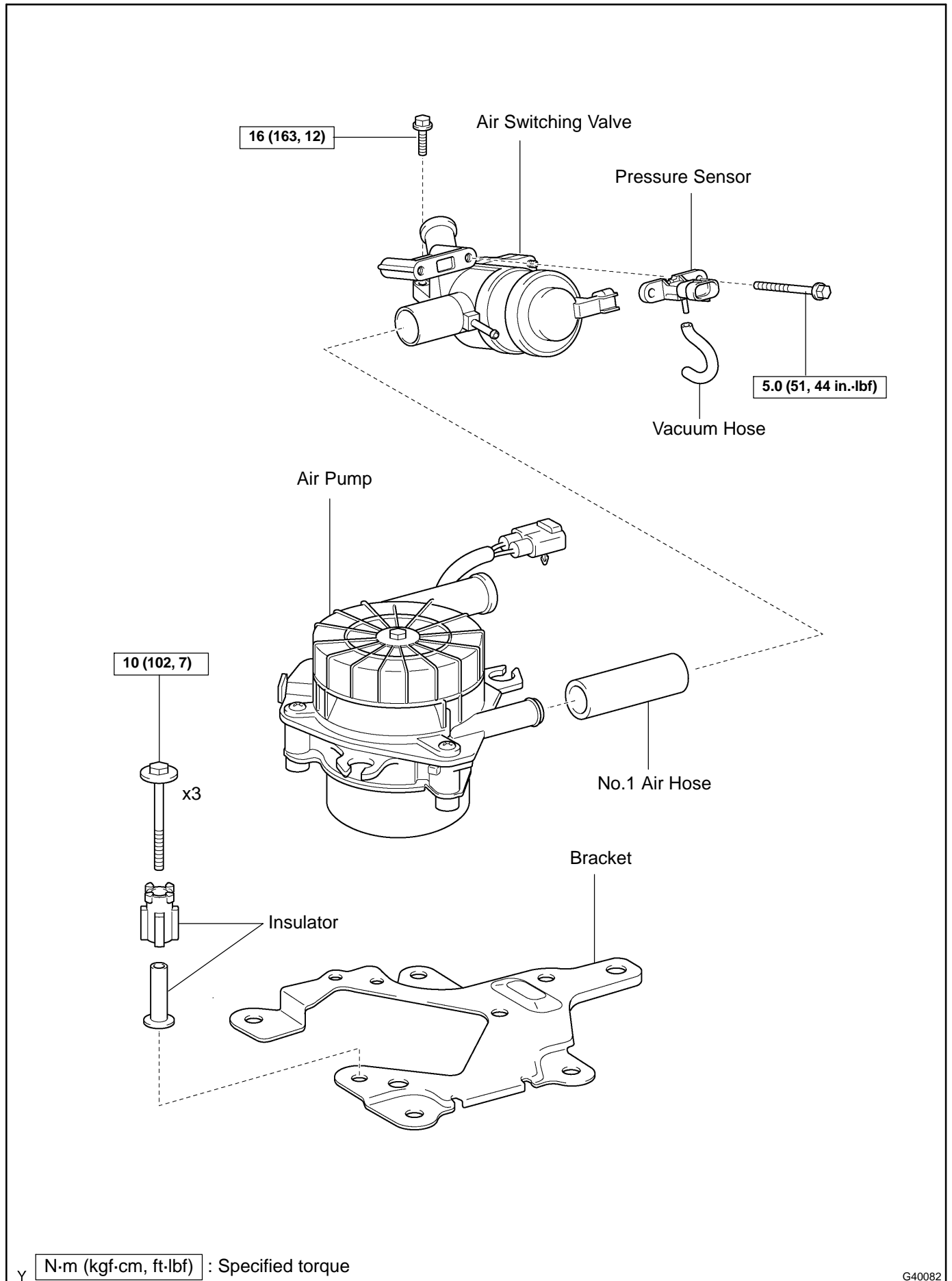
120JD-01



EMISSION CONTROL - AIR PUMP ASSY (2UZ-FE)



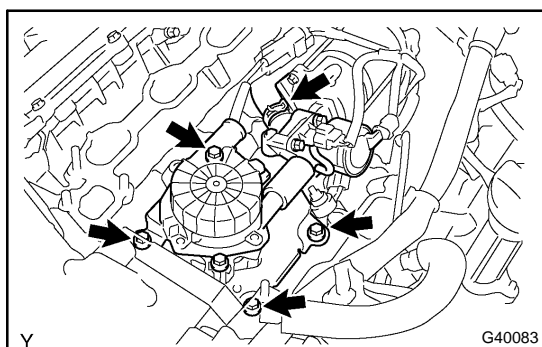
G40146



G40082

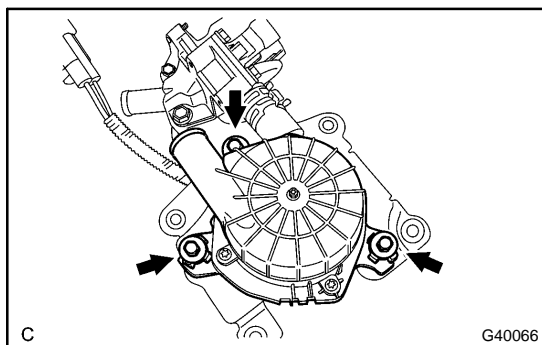
REPLACEMENT

1. PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)
2. DRAIN ENGINE COOLANT (SEE PAGE 11-6)
3. REMOVE V-BANK COVER SUB-ASSY (SEE PAGE 10-7)
4. REMOVE AIR CLEANER HOSE ASSY (SEE PAGE 10-7)
5. DISCONNECT FUEL HOSE (SEE PAGE 11-12)
6. DISCONNECT FUEL HOSE NO.2 (SEE PAGE 11-12)
7. DISCONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)
8. DISCONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)
9. REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)
10. REMOVE WATER BY-PASS PIPE SUB-ASSY (SEE PAGE 14-22)



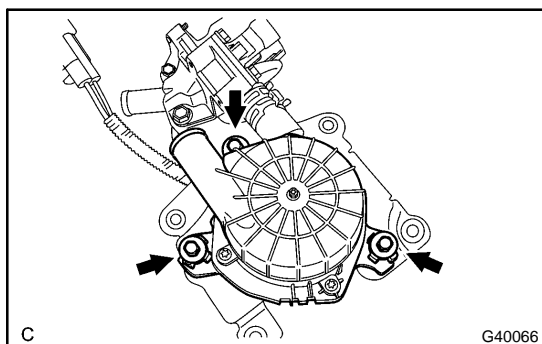
11. REMOVE AIR PUMP ASSY W/ BRACKET

- (a) Disconnect the air hose No.2 from the air switching valve.
- (b) Disconnect the air switching valve connector.
- (c) Disconnect the pressure sensor connector for the air injection system.
- (d) Remove the 4 bolts and air pump w/ bracket assy.



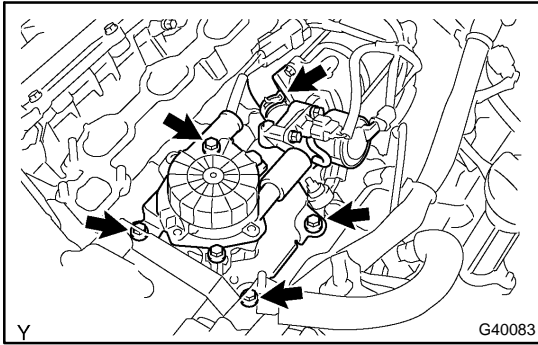
12. REMOVE AIR PUMP ASSY

- (a) Remove the 3 bolts and air pump assy.
- (b) Remove the 3 insulators from the air pump assy.



13. INSTALL AIR PUMP ASSY

- (a) Install the 3 insulators to the air pump assy.
- (b) Install the air pump assy with the 3 bolts.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

**14. INSTALL AIR PUMP ASSY W/ BRACKET**

- (a) Install the air pump assy with the 4 bolts.
Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)
- (b) Connect the pressure sensor connector for the air injection system.
- (c) Connect the air switching valve connector.
- (d) Connect the air hose No.2 to the air switching valve.

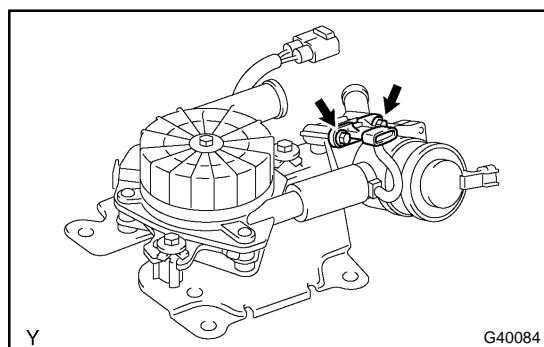
15. **INSTALL WATER BY-PASS PIPE SUB-ASSY (SEE PAGE 14-22)**
16. **INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
17. **CONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)**
18. **CONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)**
19. **INSTALL FUEL HOSE NO.2 (SEE PAGE 11-12)**
20. **INSTALL FUEL HOSE (SEE PAGE 11-12)**
21. **INSTALL AIR CLEANER HOSE ASSY (SEE PAGE 10-7)**
22. **INSTALL V-BANK COVER SUB-ASSY (SEE PAGE 10-7)**
23. **ADD ENGINE COOLANT (SEE PAGE 11-6)**
24. **CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)**
25. **CHECK FOR FUEL LEAKS (SEE PAGE 11-6)**

AIR SWITCHING VALVE (2UZ-FE)

120JF-01

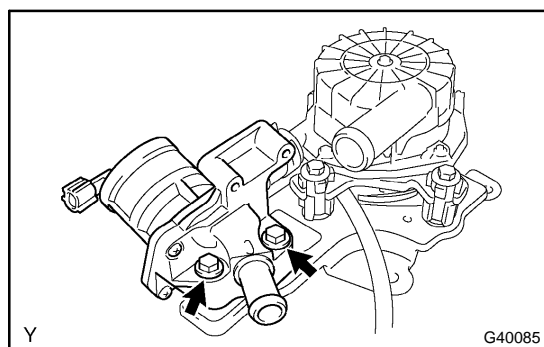
REPLACEMENT

1. PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)
2. DRAIN ENGINE COOLANT (SEE PAGE 11-6)
3. REMOVE V-BANK COVER SUB-ASSY (SEE PAGE 10-7)
4. REMOVE AIR CLEANER HOSE ASSY (SEE PAGE 10-7)
5. DISCONNECT FUEL HOSE (SEE PAGE 11-12)
6. DISCONNECT FUEL HOSE NO.2 (SEE PAGE 11-12)
7. DISCONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)
8. DISCONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)
9. REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)
10. REMOVE WATER BY-PASS PIPE SUB-ASSY (SEE PAGE 14-22)
11. REMOVE AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)



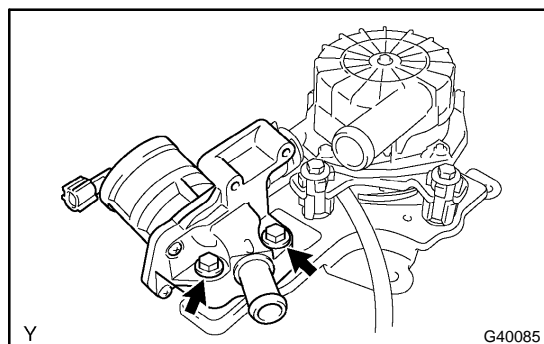
12. REMOVE PRESSURE SENSOR

- (a) Remove the vacuum hose from the pressure sensor and air switching valve.
- (b) Remove the 2 bolts and pressure sensor from the air switching valve.



13. REMOVE AIR SWITCHING VALVE

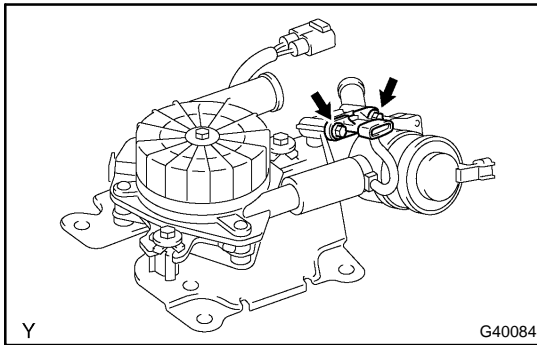
- (a) Remove the 2 bolts and air switching valve from the air pump bracket.
- (b) Remove the No.1 air hose from the air switching valve and air pump.



14. INSTALL AIR SWITCHING VALVE

- (a) Install the No.1 air hose to the air switching valve and air pump.
- (b) Install the air switching valve with the 2 bolts to the air pump bracket.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

**15. INSTALL PRESSURE SENSOR**

- (a) Install the pressure sensor with the 2 bolts to the air switching valve.

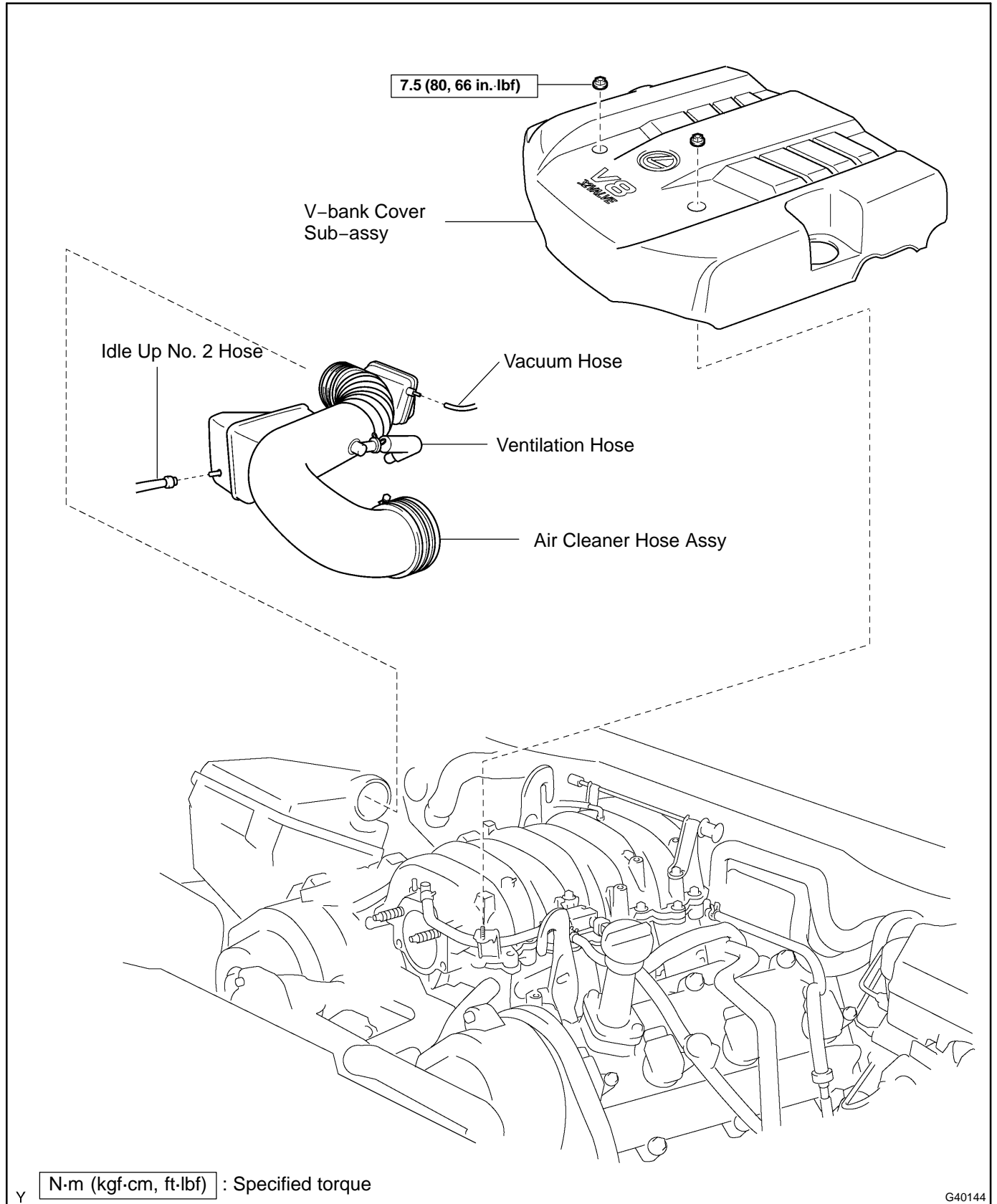
Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

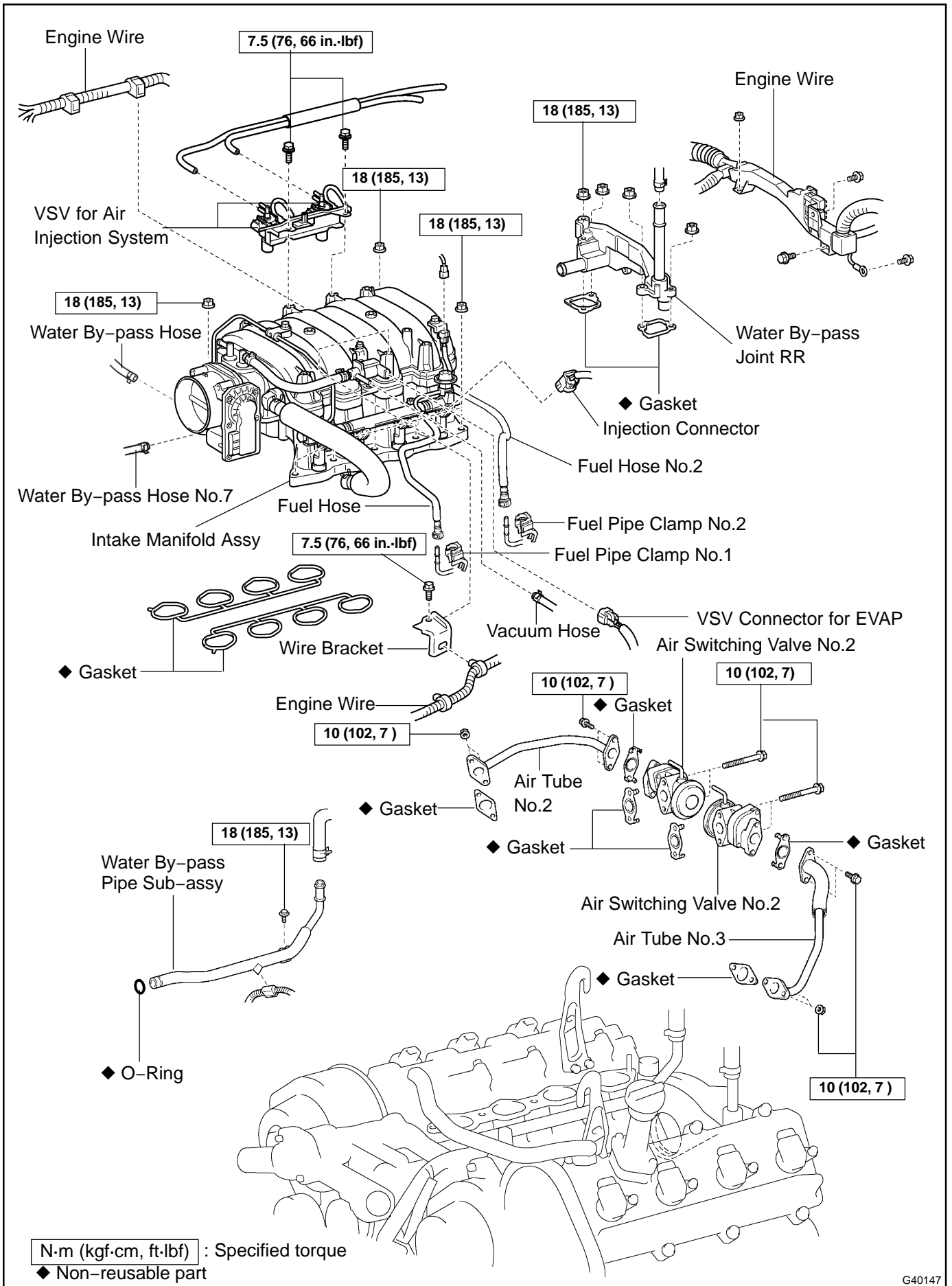
- (b) Install the vacuum hose to the pressure sensor and air switching valve.

16. **INSTALL AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)**
 17. **INSTALL WATER BY-PASS PIPE SUB-ASSY (SEE PAGE 14-22)**
 18. **INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
 19. **CONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)**
 20. **CONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)**
 21. **INSTALL FUEL HOSE NO.2 (SEE PAGE 11-12)**
 22. **INSTALL FUEL HOSE (SEE PAGE 11-12)**
 23. **INSTALL AIR CLEANER HOSE ASSY (SEE PAGE 10-7)**
 24. **INSTALL V-BANK COVER SUB-ASSY (SEE PAGE 10-7)**
 25. **ADD ENGINE COOLANT (SEE PAGE 11-6)**
 26. **CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)**
 27. **CHECK FOR FUEL LEAKS (SEE PAGE 11-6)**

AIR SWITCHING VALVE NO.2 (2UZ-FE) COMPONENTS

120JG-01

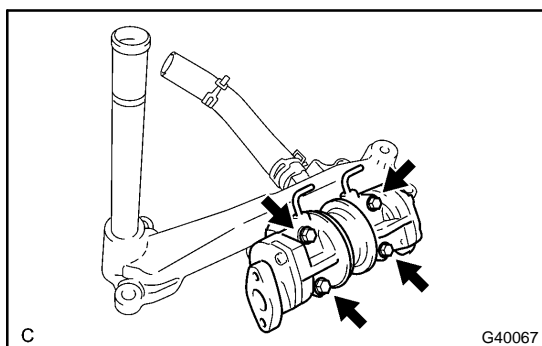




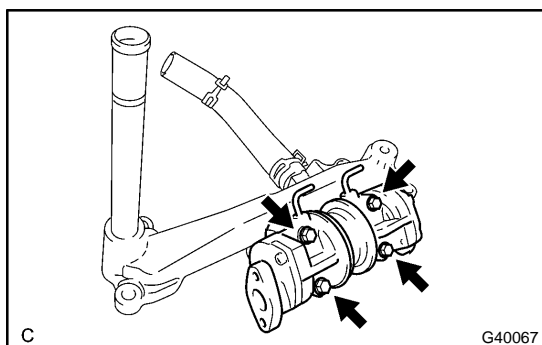
G40147

REPLACEMENT

1. PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)
2. DRAIN ENGINE COOLANT (SEE PAGE 11-6)
3. REMOVE V-BANK COVER SUB-ASSY (SEE PAGE 10-7)
4. REMOVE AIR CLEANER HOSE ASSY (SEE PAGE 10-7)
5. DISCONNECT FUEL HOSE (SEE PAGE 11-12)
6. DISCONNECT FUEL HOSE NO.2 (SEE PAGE 11-12)
7. DISCONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)
8. DISCONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)
9. REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)
10. REMOVE AIR TUBE NO.2
 - (a) Remove the 4 nuts and 2 gaskets, and disconnect the air tube No.2.
11. REMOVE AIR TUBE NO.3
 - (a) Remove the 4 nuts and 2 gaskets, and disconnect the air tube No.3.
12. REMOVE WATER BY-PASS JOINT RR (SEE PAGE 14-22)



13. REMOVE AIR SWITCHING VALVE NO.2
 - (a) Remove the 2 vacuum hoses from the No.2 air switching valves.
 - (b) Remove the 4 bolts, 2 gaskets and the 2 No.2 air switching valves from the water by-pass joint rear.



14. INSTALL AIR SWITCHING VALVE NO.2
 - (a) Install 2 new gaskets and the 2 No.2 air switching valves with the 4 bolts to the water by-pass joint rear.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)
 - (b) Connect the 2 vacuum hoses to the No.2 air switching valves.

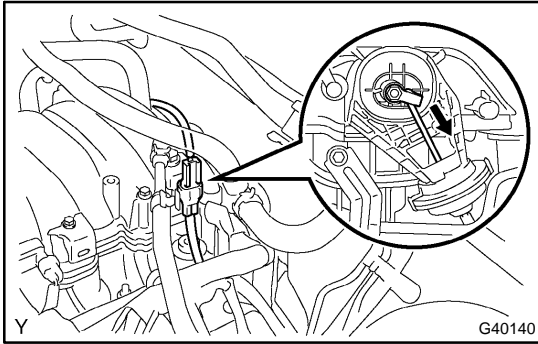
15. INSTALL WATER BY-PASS JOINT RR (SEE PAGE 14-22)
16. INSTALL AIR TUBE NO.3
 - (a) Install the 4 nuts and 2 new gaskets, and connect the air tube No.3.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)
17. INSTALL AIR TUBE NO.2
 - (a) Install the 4 nuts and 2 new gaskets, and connect the air tube No.2.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)
18. INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)
19. CONNECT HOSES FROM INTAKE MANIFOLD (SEE PAGE 10-10)
20. CONNECT CONNECTORS FROM INTAKE MANIFOLD (SEE PAGE 10-10)

21. INSTALL FUEL HOSE NO.2 (SEE PAGE 11-12)
22. INSTALL FUEL HOSE (SEE PAGE 11-12)
23. INSTALL AIR CLEANER HOSE ASSY (SEE PAGE 10-7)
24. INSTALL V-BANK COVER SUB-ASSY (SEE PAGE 10-7)
25. ADD ENGINE COOLANT (SEE PAGE 11-6)
26. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)
27. CHECK FOR FUEL LEAKS (SEE PAGE 11-6)

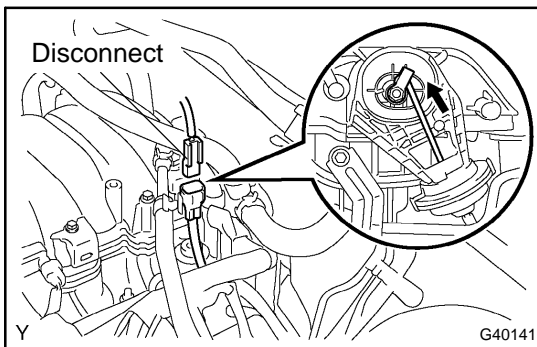
INTAKE AIR CONTROL SYSTEM (2UZ-FE)

ON-VEHICLE INSPECTION

130C0-01

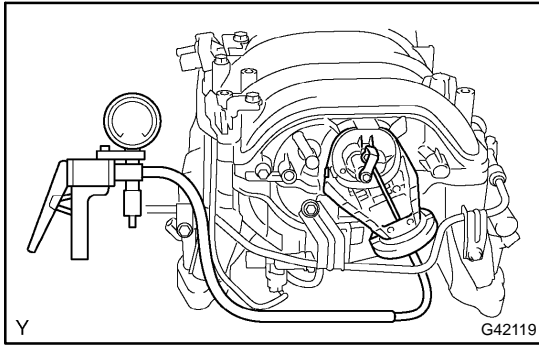


- (a) Start the engine.
- (b) While the engine is idling, check that the actuator rod moves.



- (c) Disconnect the VSV connector, and check that the actuator rod returns.
- If operation is not as specified, inspect the intake air control valve, VSV and ECM.

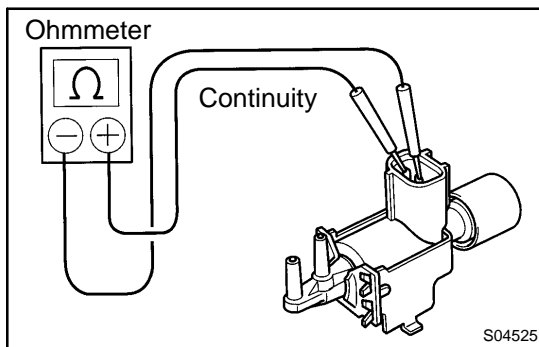
INSPECTION



1. INSPECT INTAKE AIR CONTROL VALVE

- (a) With 39.9 kPa (300 mmHg, 11.8 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.
- (b) One minute after applying the vacuum in step (a), check that the actuator rod does not return.

If operation is not as specified, replace the intake manifold.

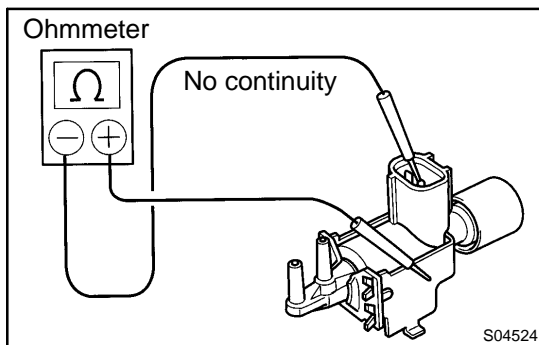


2. INSPECT VACUUM SWITCHING VALVE ASSY FOR IAC VALVE

- (a) Using an ohmmeter, check that there is continuity between each terminal.

Resistance: 33 to 39 Ω at 20°C (68°F)

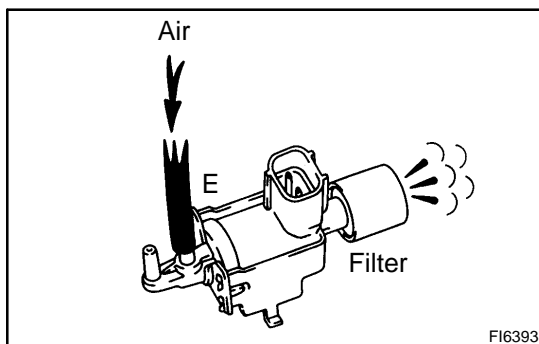
If there is no continuity, replace the VSV.



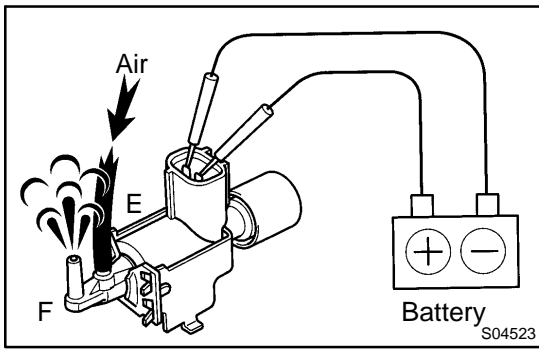
- (b) Using an ohmmeter, check that there is no continuity between each terminal and the body.

Resistance: 10 kΩ or higher

If there is continuity, replace the VSV.



- (c) Check that air flows from port E to the filter.



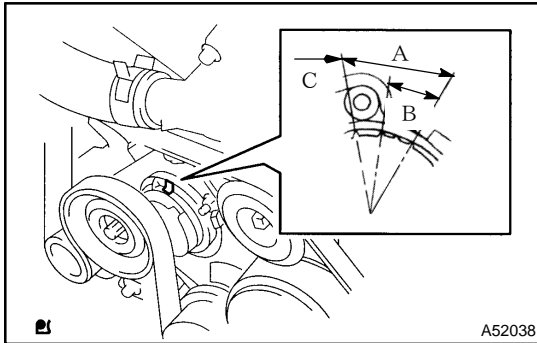
- (d) Apply battery voltage across the terminals.
(e) Check that air flows from port E to port F.
If operation is not as specified, replace the VSV.

ENGINE (2UZ-FE)

1414S-03

ADJUSTMENT

1. INSPECT COOLANT (SEE PAGE 16-1)
2. INSPECT ENGINE OIL (SEE PAGE 17-1)
3. INSPECT BATTERY SPECIFIC GRAVITY (SEE PAGE 19-13)
4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSY



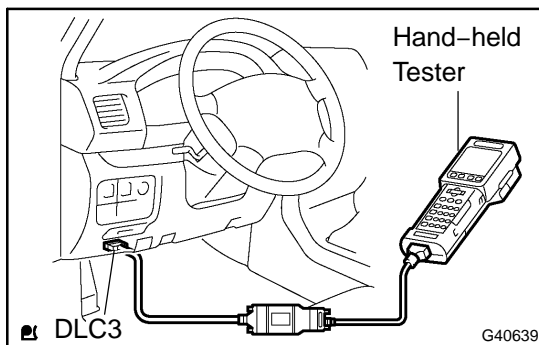
5. INSPECT FAN AND GENERATOR V BELT

HINT:

As the belt tensioner coordinates belt tension automatically by its mechanism, you do not need to adjust it by yourself.

- (a) Check that the indicator mark on the automatic tensioner is within the A range as shown in the illustration.
- (b) When the mark is out of the standard range, replace the V belt with a new one.

6. INSPECT V-RIBBED BELT TENSIONER ASSY (SEE PAGE 14-5)
7. WARM UP ENGINE



8. INSPECT IGNITION TIMING

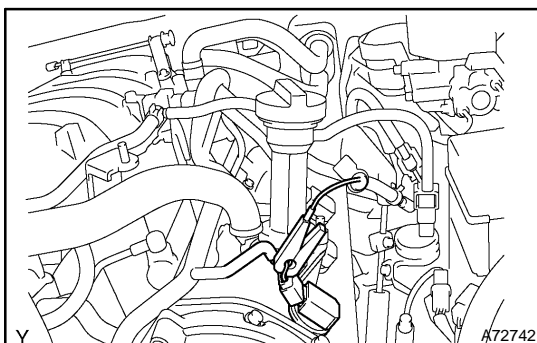
- (a) When using the hand-held tester or OBD II scan tool:
 - (1) Connect the hand-held tester or OBD II scan tool to the DLC3.

HINT:

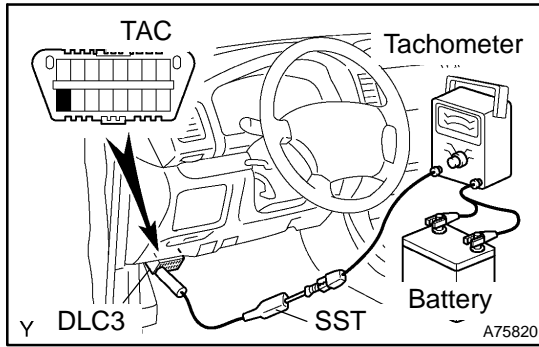
Refer to the hand-held tester or OBD II scan tool operator's manual for further details.

**Ignition timing: 5 to 15° BTDC at idle
(Transmission in neutral)**

- (2) Disconnect the hand-held tester or OBD II scan tool from the DLC3.

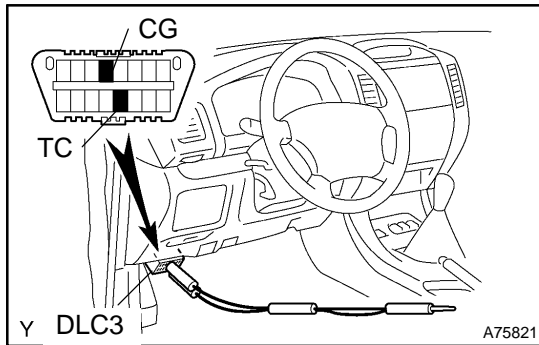


- (b) When not using the hand-held tester or OBD II scan tool:
 - (1) Remove the V-bank cover.
 - (2) Connect the tester probe of a timing light to the wire of the ignition coil connector for the No.1 cylinder.



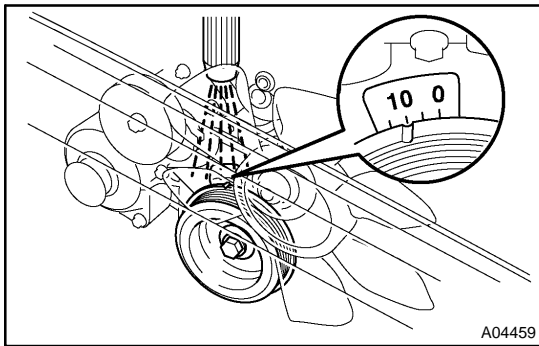
- (3) Using SST, connect the tachometer probe to terminal TAC of the DLC3.

SST 09843-18030



- (4) Using SST, connect terminals TC and CG of the DLC3.

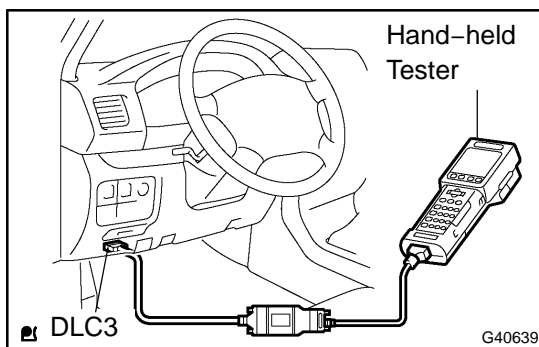
SST 09843-18040



- (5) Using the timing light, check the ignition timing.

**Ignition timing: 5 to 15° BTDC at idle
(Transmission in neutral)**

- (6) Remove the SST from the DLC3.
(7) Disconnect the timing light from the engine.
(8) Install the V-bank cover.



9. INSPECT ENGINE IDLE SPEED

- (a) When using the hand-held tester or OBD II scan tool:
(1) Connect the hand-held tester or OBD II scan tool to the DLC3.

HINT:

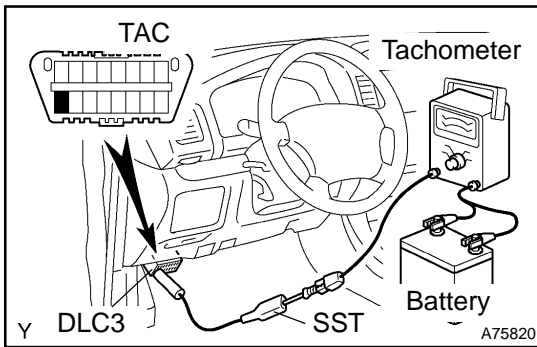
Refer to the hand-held tester or OBD II scan tool operator's manual for further details.

- (2) Run the engine at 2,500 rpm for approx. 90 seconds.
(3) Check the idle speed.

Idle speed: 700 ± 50 rpm

If the idle speed is not as specified, check the air intake system.

- (4) Disconnect the hand-held tester or OBD II scan tool from the DLC3.



- (b) When not using the hand-held tester or OBD II scan tool:
- (1) Using SST, connect the tachometer probe to terminal TAC of the DLC3.
- SST 09843-18030

HINT:

Refer to the hand-held tester operator's manual for further details.

- (2) Run the engine at 2,500 rpm for approx. 90 seconds.
 - (3) Check the idle speed.
- Idle speed: 700 ± 50 rpm**
- (4) Remove the SST from the DLC3.
 - (5) Disconnect the tachometer from the DLC3.

10. INSPECT COMPRESSION

- (a) Remove the V-bank cover sub-assy.
- (b) Remove the air cleaner hose assy.
- (c) Disconnect the throttle control motor connector.
- (d) Remove the 8 ignition coils.
- (e) Remove the 8 spark plugs.
- (f) Disconnect the 8 injector connectors.
- (g) Inspect the cylinder compression pressure.
 - (1) Insert a compression gauge into the spark plug hole.
 - (2) Fully open the throttle forcibly by hand.
 - (3) While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain an engine speed of 250 rpm or more.

- (4) Repeat steps (1) through (3) for each cylinder.

NOTICE:

This measurement must be done as quickly as possible.

Compression pressure:

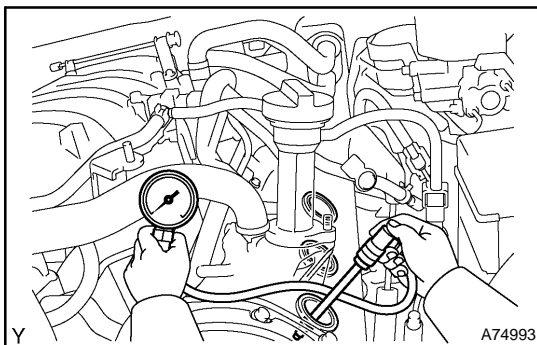
1,373 kPa (14.0 kgf/cm², 199 psi) or more

Minimum pressure: 1,030 kPa (10.5 kgf/cm², 149 psi)

Difference between each cylinder:

98 kPa (1.0 kgf/cm², 14 psi) or less

- (5) If the cylinder compression in one or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps through (1) to (3) for the cylinders with low compression.
 - If adding oil helps the compression, the piston rings and/or cylinder bore may be worn or damaged.
 - If pressure stays low, a valve may be sticking, seating is improper, or there may be leakage past the gasket.
- (h) Connect the 8 injector connectors.
- (i) Install the 8 spark plugs.
- (j) Install the 8 ignition coils.



- (k) Connect the throttle control motor connector.
- (l) Install the air cleaner hose assy.
- (m) Install the V-bank cover sub-assy.

11. INSPECT CO/HC

HINT:

This check is used only to determine whether or not the idle CO/HC complies with regulations.

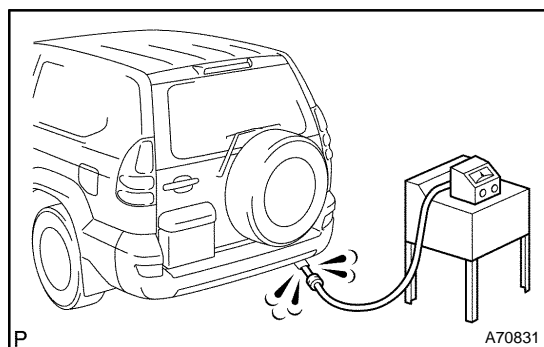
- (a) Start the engine.
- (b) Sustain the engine speed at 2,500 rpm for approx. 180 seconds.
- (c) Insert the CO/HC meter testing probe at least 40 cm (1.3 ft) into the tailpipe during idling.
- (d) Immediately check CO/HC concentration at idle and/or 2,500 rpm.

HINT:

When performing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

If the CO/HC concentration does not comply with the regulations, troubleshoot in the order given below.

- (1) Check the heated oxygen sensor operation (See page 05-138 and 05-347).
- (2) See the table below for possible causes, then inspect and correct the applicable causes if necessary.

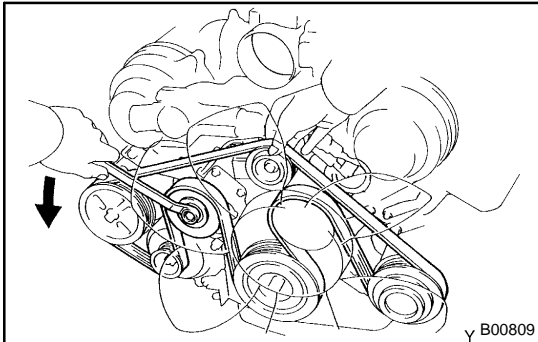


CO	HC	Symptom	Cause
Normal	High	Rough idle	1. Faulty ignitions: <ul style="list-style-type: none"> • Incorrect timing • Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinder
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: <ul style="list-style-type: none"> • PCV hose • Intake manifold • Throttle body 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty SFI system: <ul style="list-style-type: none"> • Faulty pressure regulator • Defective ECT sensor • Faulty ECM • Faulty injector • Faulty throttle position sensor • Faulty MAF sensor

FAN AND GENERATOR V BELT (2UZ-FE)

REPLACEMENT

14072-11



1. REMOVE FAN AND GENERATOR V BELT

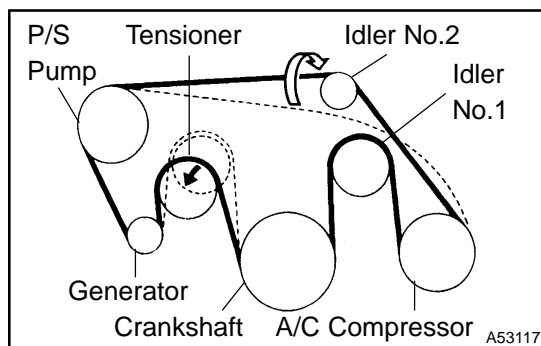
- (a) Loosen the belt tension by turning the belt tensioner counterclockwise, and then remove the drive belt.

HINT:

The pulley bolt for the belt tensioner has left-hand thread.

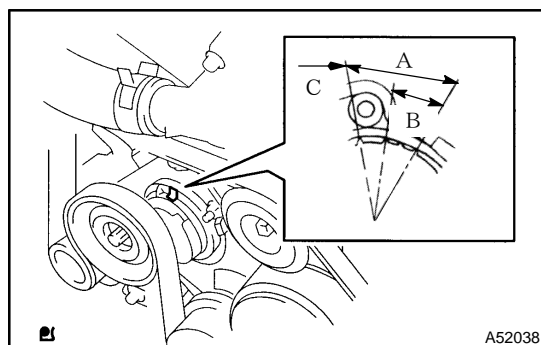
2. INSPECT V-RIBBED BELT TENSIONER ASSY

- (a) Remove the V belt from the tensioner pulley. Then check that nothing gets caught the tensioner by turning it clockwise and counterclockwise.
- (b) When a malfunction exists, replace the tensioner.



3. INSTALL FAN AND GENERATOR V BELT

- (a) Set the V belt onto every parts except the idler pulley No.2, as shown in the illustration.
- (b) Loosen the V belt by turning the belt tensioner counterclockwise.
- (c) Set the V belt to the idler pulley No.2.



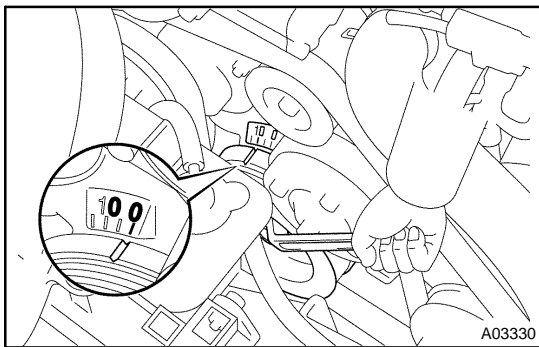
- (d) After installing a new belt, check that the mark is within the B range as shown in the illustration.

VALVE CLEARANCE (2UZ-FE)

14073-08

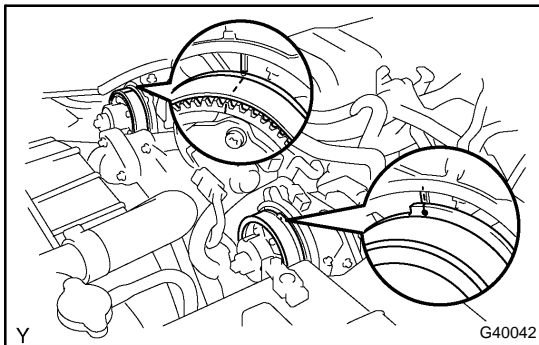
ADJUSTMENT

1. DRAIN ENGINE COOLANT (SEE PAGE 16-5)
2. SEPARATE BATTERY NEGATIVE TERMINAL
3. REMOVE V-BANK COVER SUB-ASSY
4. REMOVE ENGINE ROOM COVER SIDE
5. REMOVE ENGINE ROOM SIDE COVER LH
6. REMOVE AIR CLEANER HOSE ASSY
7. REMOVE RADIATOR SUPPORT SEAL UPPER
8. REMOVE FAN AND GENERATOR V BELT (SEE PAGE 14-5)
9. REMOVE OIL COOLER PIPE (SEE PAGE 14-115)
10. REMOVE IGNITION COIL ASSY
11. REMOVE TIMING BELT COVER SUB-ASSY NO.3 LH (SEE PAGE 14-115)
12. REMOVE TIMING CHAIN OR BELT COVER NO.2 (SEE PAGE 14-115)
13. REMOVE CYLINDER HEAD COVER SUB-ASSY
 - (a) Remove the 9 bolts, 9 seal washers and cylinder head cover.
14. REMOVE CYLINDER HEAD COVER SUB-ASSY LH
 - (a) Disconnect the PCV hose.
 - (b) Remove the 9 bolts, 9 seal washers and cylinder head cover.

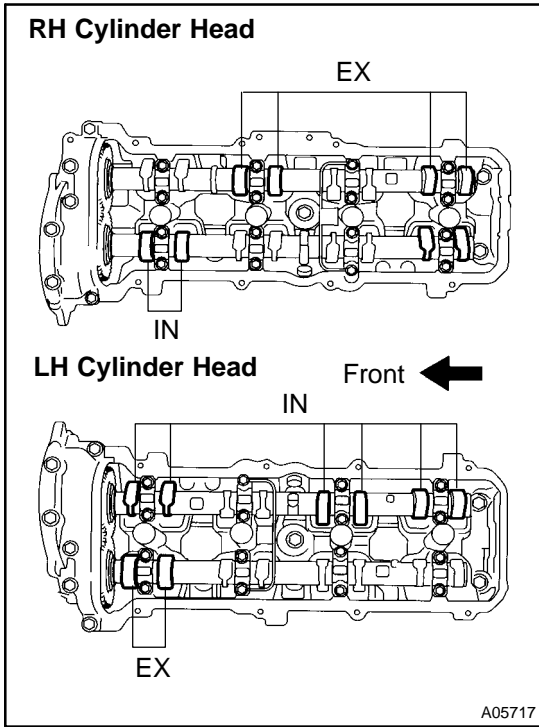


15. SET NO. 1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley to align its notch with timing mark "0" of the No.1 timing belt cover.



- (b) Check that the timing marks of the camshaft timing pulleys and timing belt rear plates are aligned. If not, turn the crankshaft 1 complete revolution (360°) and align the marks as above.



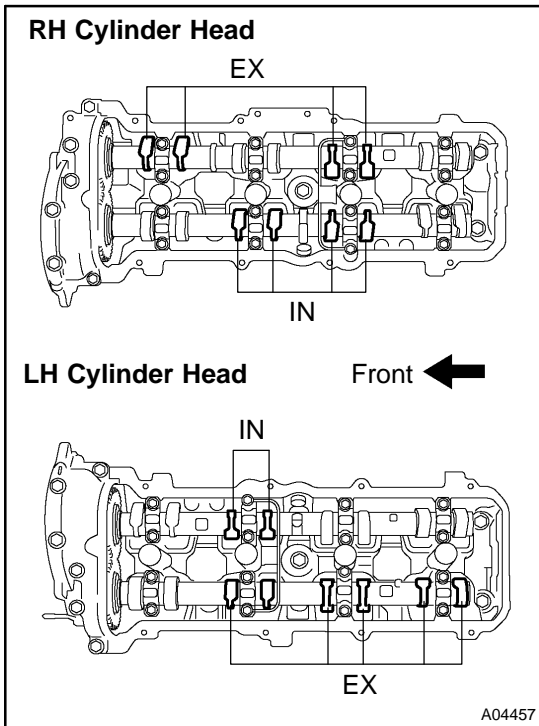
16. INSPECT VALVE CLEARANCE

- (a) Check only the valves indicated.
 - (1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - (2) Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

Intake: 0.15 to 0.25 mm (0.006 to 0.010 in.)

Exhaust: 0.25 to 0.35 mm (0.010 to 0.014 in.)



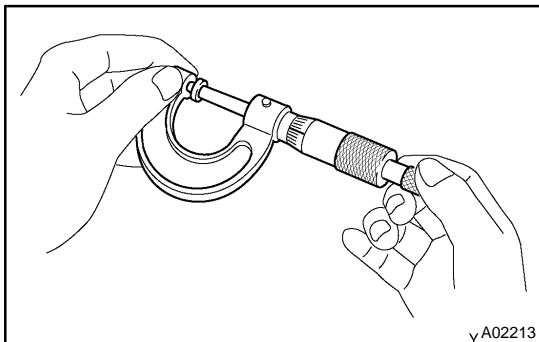
- (b) Turn the crankshaft 1 complete revolution (360°) and align the camshaft timing marks.
- (c) Check only the valves indicated as shown in the illustration. Measure the valve clearance.

17. ADJUST VALVE CLEARANCE

- (a) Remove the timing belt (See page 14-115).
- (b) Remove the camshafts (RH Bank) (See page 14-125).
- (c) Remove the camshafts (LH Bank) (See page 14-135).
- (d) Remove the valve lifter and adjusting shim.

NOTICE:

Be careful not to drop the adjusting shim into the cylinder head.



- (e) Determine the replacement adjusting shim size according to the formula or charts on the following pages.
 - (1) Using a micrometer, measure the thickness of the removed shim.
 - (2) Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

T: Thickness of removed shim

A: Measured valve clearance

N: Thickness of new shim

Intake:

$$N = T + (A - 0.20 \text{ mm (0.008 in.)})$$

Exhaust:

$$N = T + (A - 0.30 \text{ mm (0.012 in.)})$$

- (3) Select a new shim with a thickness as close as possible to the calculated value.

HINT:

Shims are available in 41 increments of 0.020 mm (0.0008 in.), from 2.00 mm (0.0787 in.) to 2.80 mm (0.1102 in.).

- (f) Place a new adjusting shim on the valve.
 - (g) Place the valve lifter.
 - (h) Reinstall the camshafts (LH Bank) (See page 14-135).
 - (i) Reinstall the camshafts (RH Bank) (See page 14-125).
 - (j) Reinstall the timing belt (See page 14-115).
 - (k) Recheck the valve clearance.
18. **INSTALL CYLINDER HEAD COVER SUB-ASSY LH (SEE PAGE 14-35)**
 19. **INSTALL CYLINDER HEAD COVER SUB-ASSY (SEE PAGE 14-35)**
 20. **INSTALL TIMING CHAIN OR BELT COVER NO.2 (SEE PAGE 14-115)**
 21. **INSTALL TIMING BELT COVER SUB-ASSY NO.3 LH (SEE PAGE 14-115)**
 22. **INSTALL IGNITION COIL ASSY**
 23. **INSTALL OIL COOLER PIPE (SEE PAGE 14-115)**
 24. **INSTALL FAN AND GENERATOR V BELT (SEE PAGE 14-5)**
 25. **INSTALL RADIATOR SUPPORT SEAL UPPER**
 26. **INSTALL AIR CLEANER HOSE ASSY**
 27. **INSTALL ENGINE ROOM SIDE COVER LH**
 28. **INSTALL ENGINE ROOM COVER SIDE**
 29. **INSTALL V-BANK COVER SUB-ASSY**
 30. **ADD ENGINE COOLANT (SEE PAGE 16-5)**

Adjusting Shim Selection Chart (Intake)

Table with 3 columns: Shim Selection Chart (Intake) values, Shim Selection Chart (Intake) values, and Shim Selection Chart (Intake) values. The chart is a large grid of numbers used for selecting the correct shim based on shim thickness and shim number.

2005 LEXUS GX

Table with 3 columns: Shim Selection Chart (Intake) values, Shim Selection Chart (Intake) values, and Shim Selection Chart (Intake) values. This table provides a secondary set of values for shim selection.

Intake valve clearance (Cold): 0.15 to 0.25 mm (0.006 to 0.010 in.)

EXAMPLE:

The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No.54 shim.

Author :

Date :

Adjusting Shim Selection Chart (Exhaust)

Table with 100 columns and 100 rows for shim selection. Columns represent shim thicknesses (e.g., 2.000-0.030) and rows represent shim numbers (e.g., 00, 02, 04, 06, 08, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 80).

2005 LEXUS GX

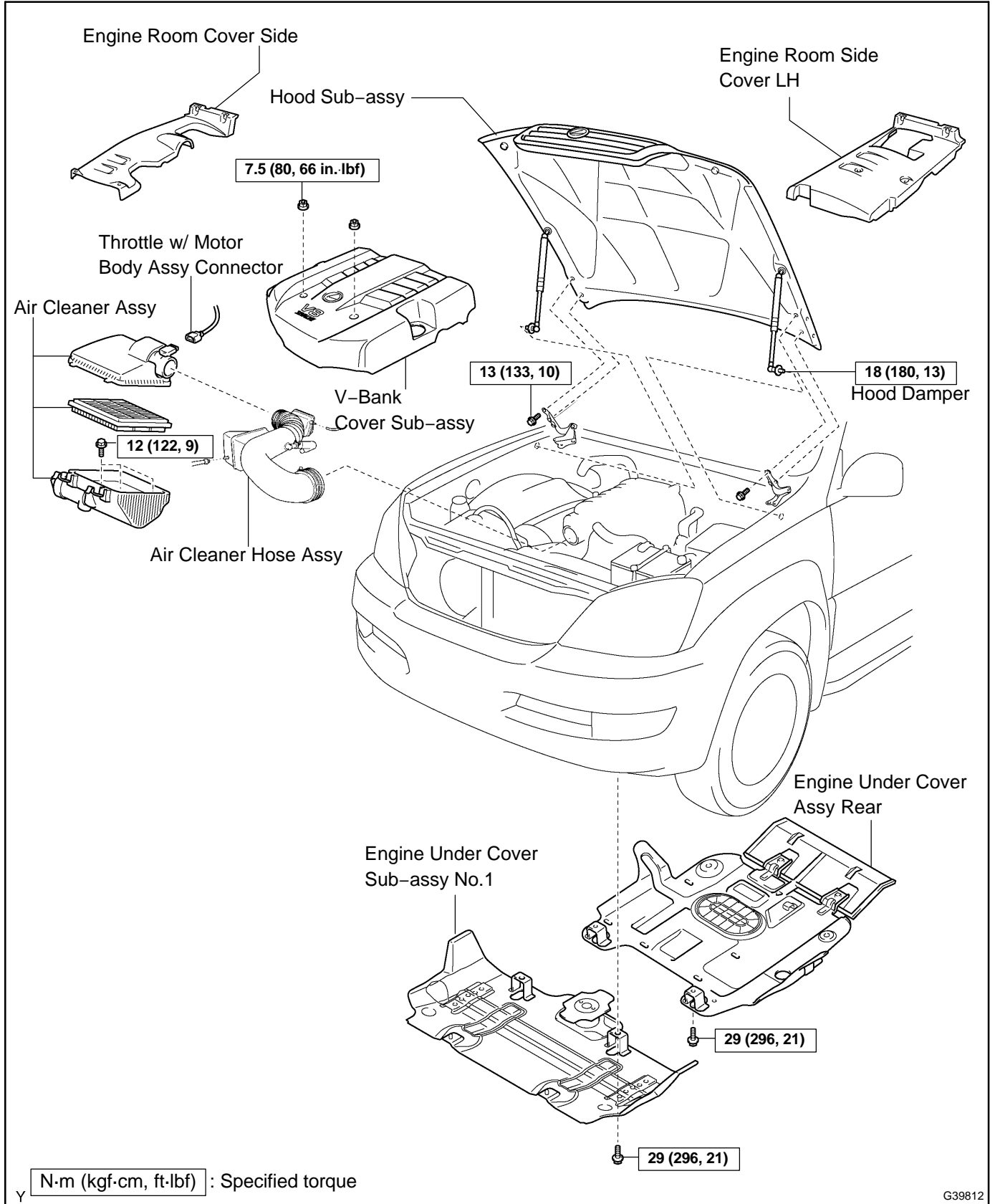
Exhaust valve clearance (Cold): 0.25 to 0.35 mm (0.010 to 0.014 in.)

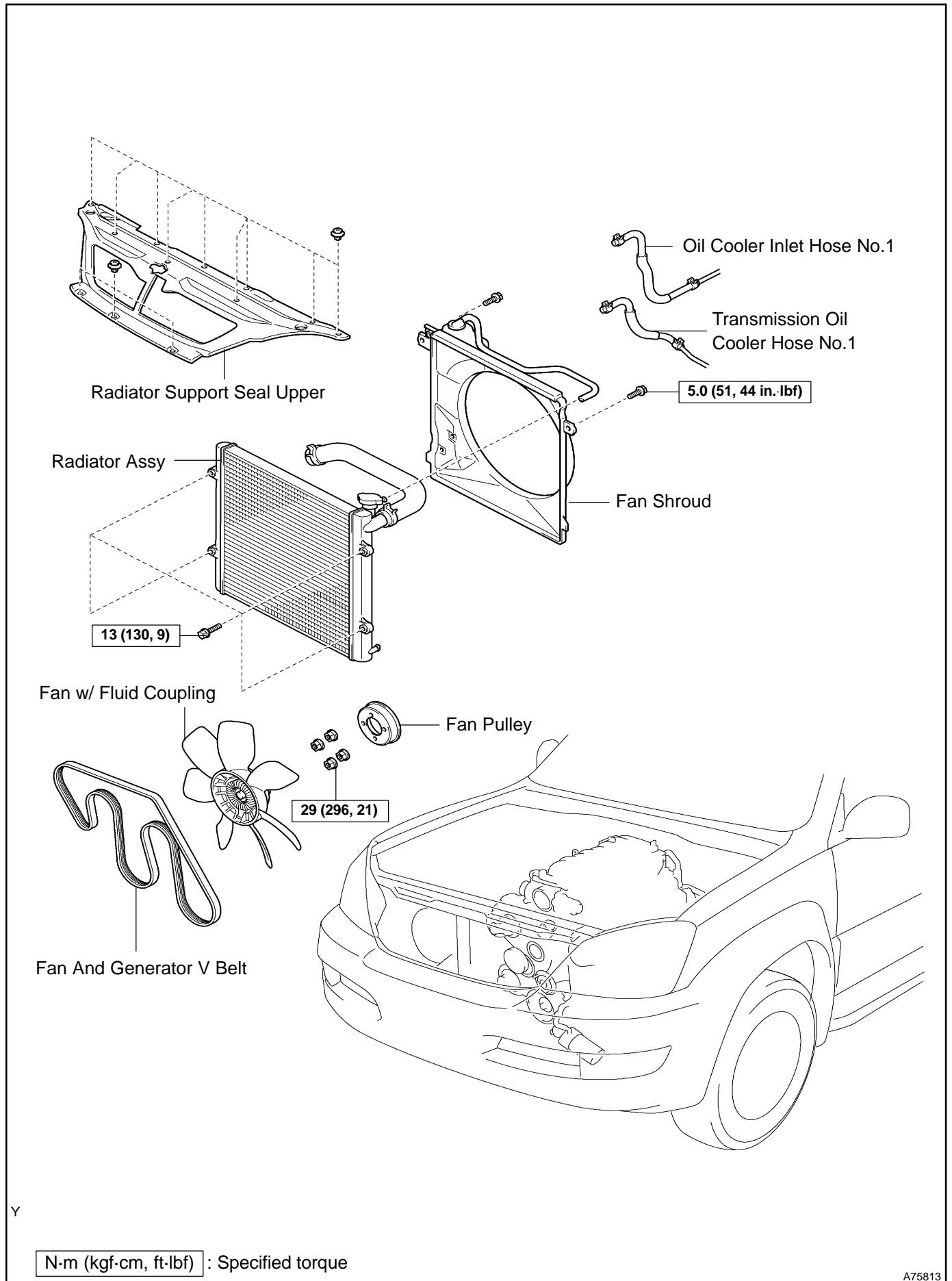
EXAMPLE: The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No.44 shim.

Summary table with 4 columns: Shim Number, Shim Thickness (mm), Shim Thickness (in.), and Adjusted Shim Number. It shows the mapping from the shim selected to the final shim number after adjustment.

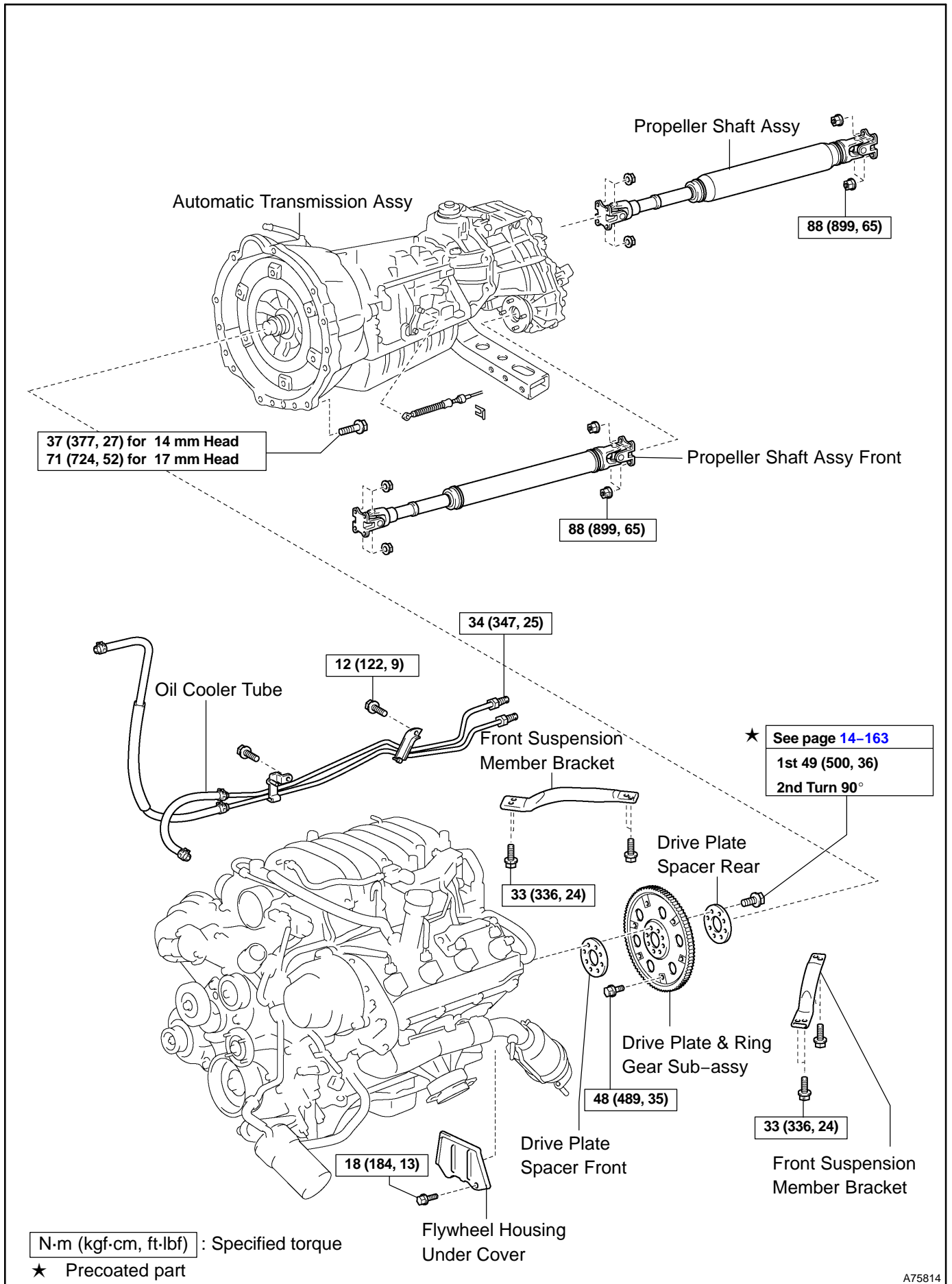
PARTIAL ENGINE ASSY (2UZ-FE) COMPONENTS

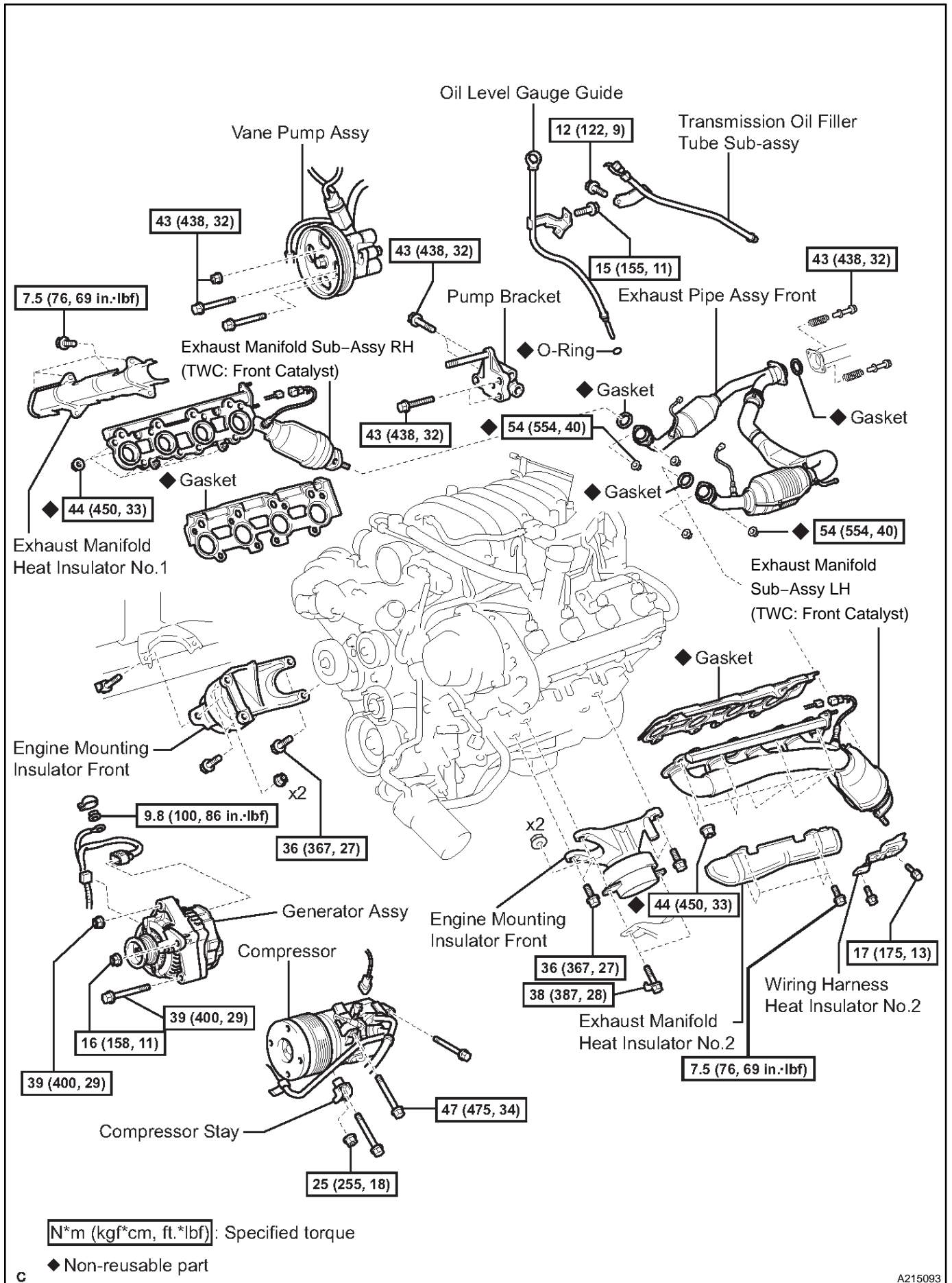
1423H-01



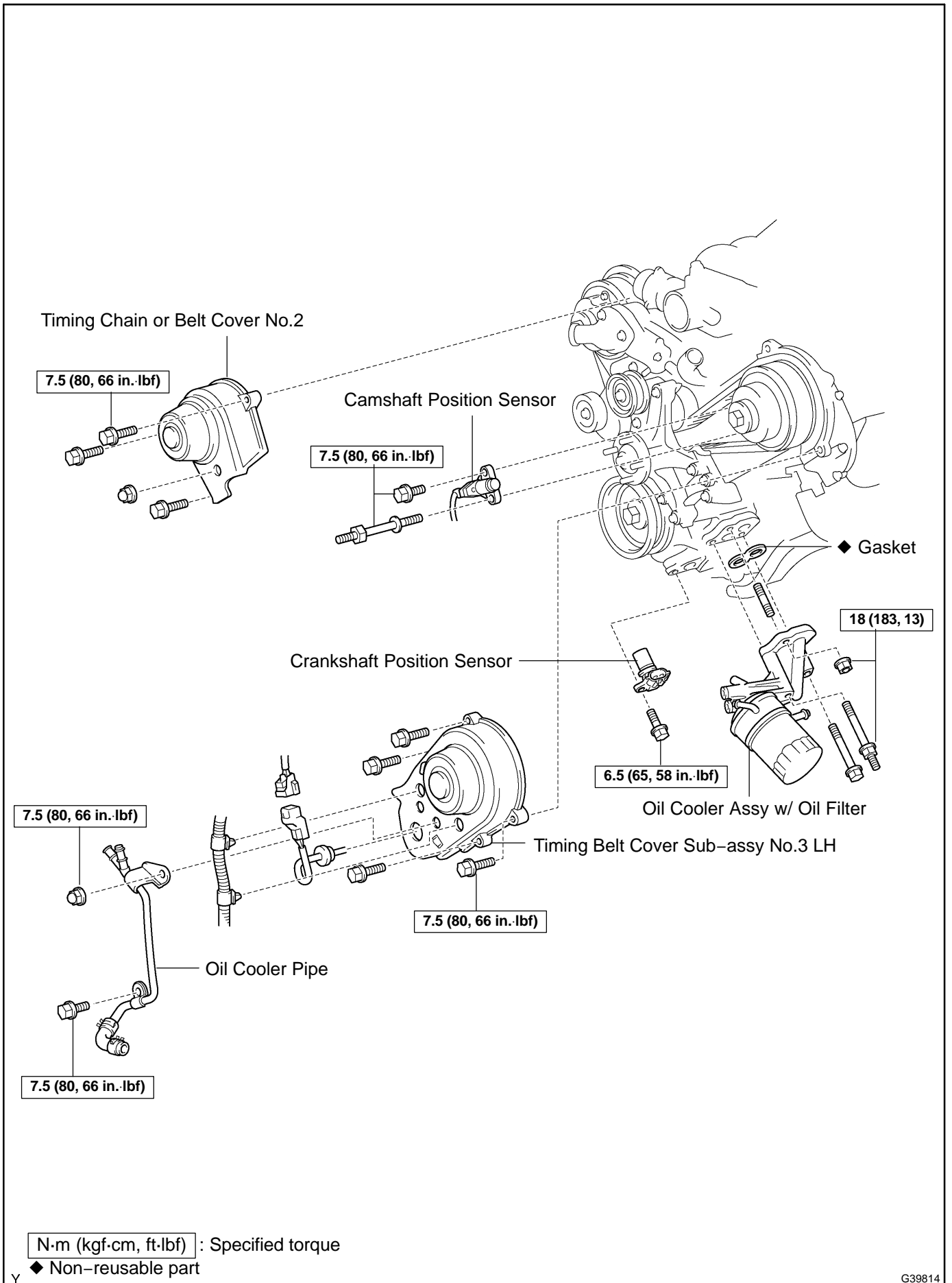


A75813

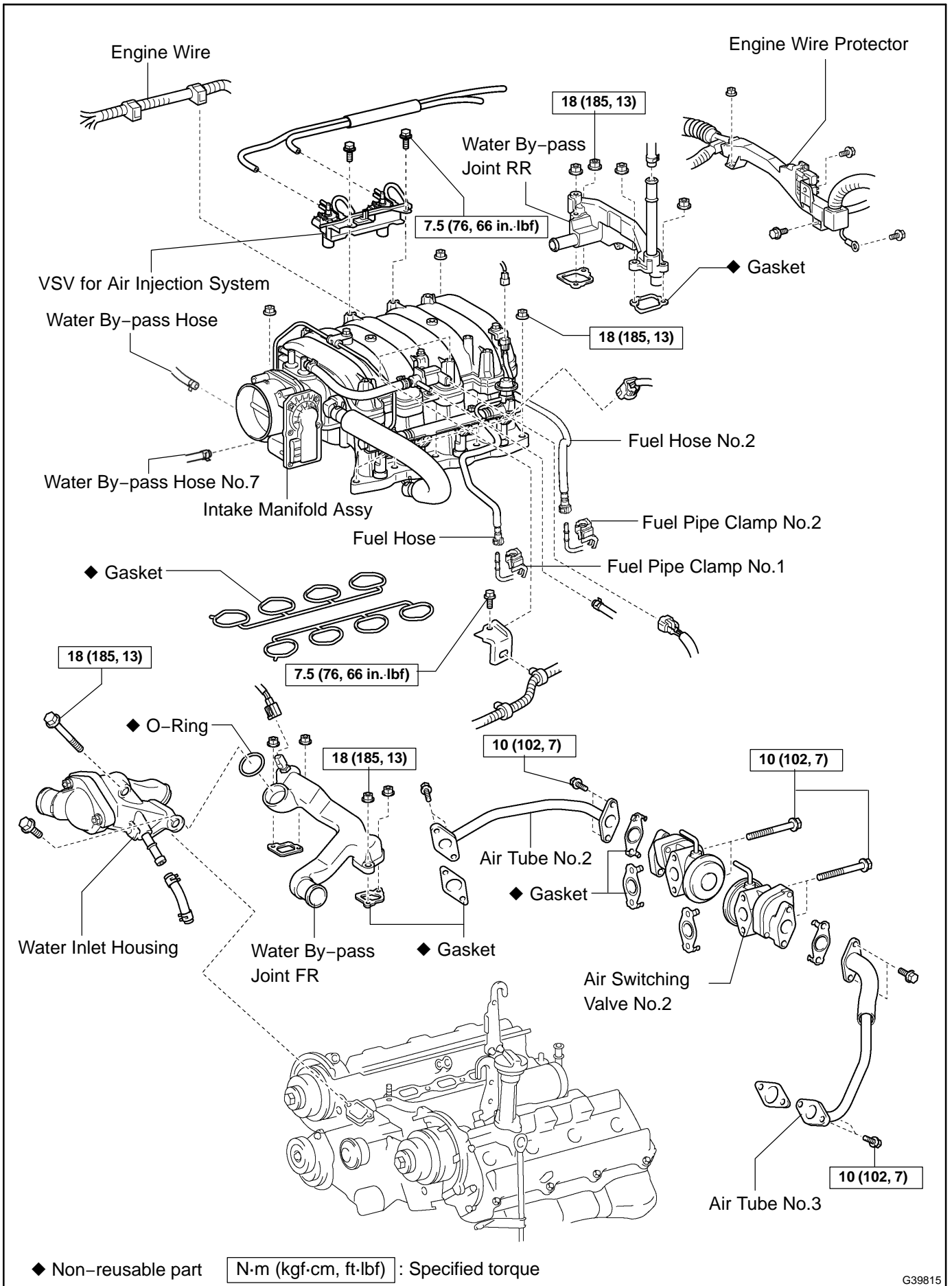




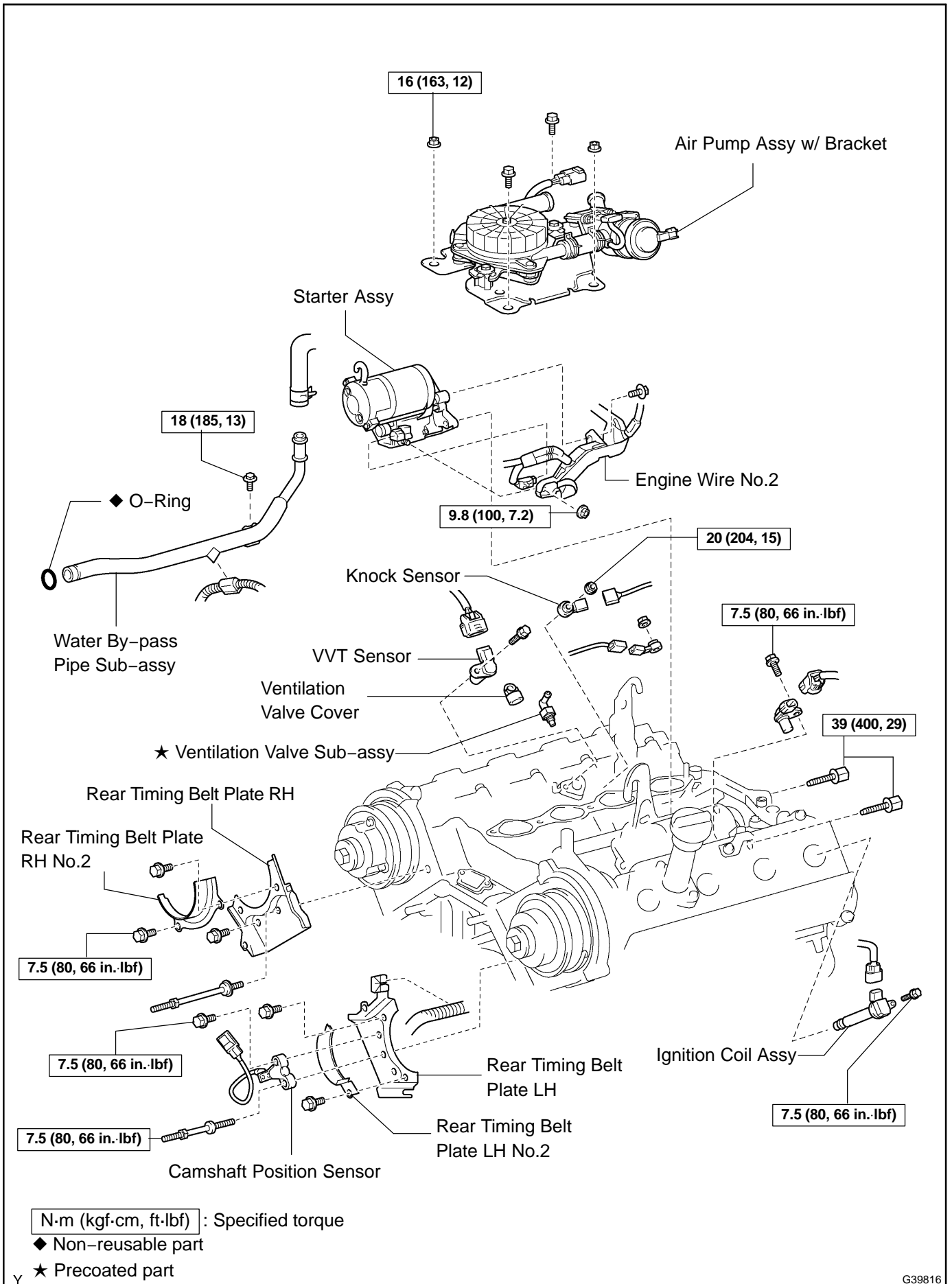
A215093



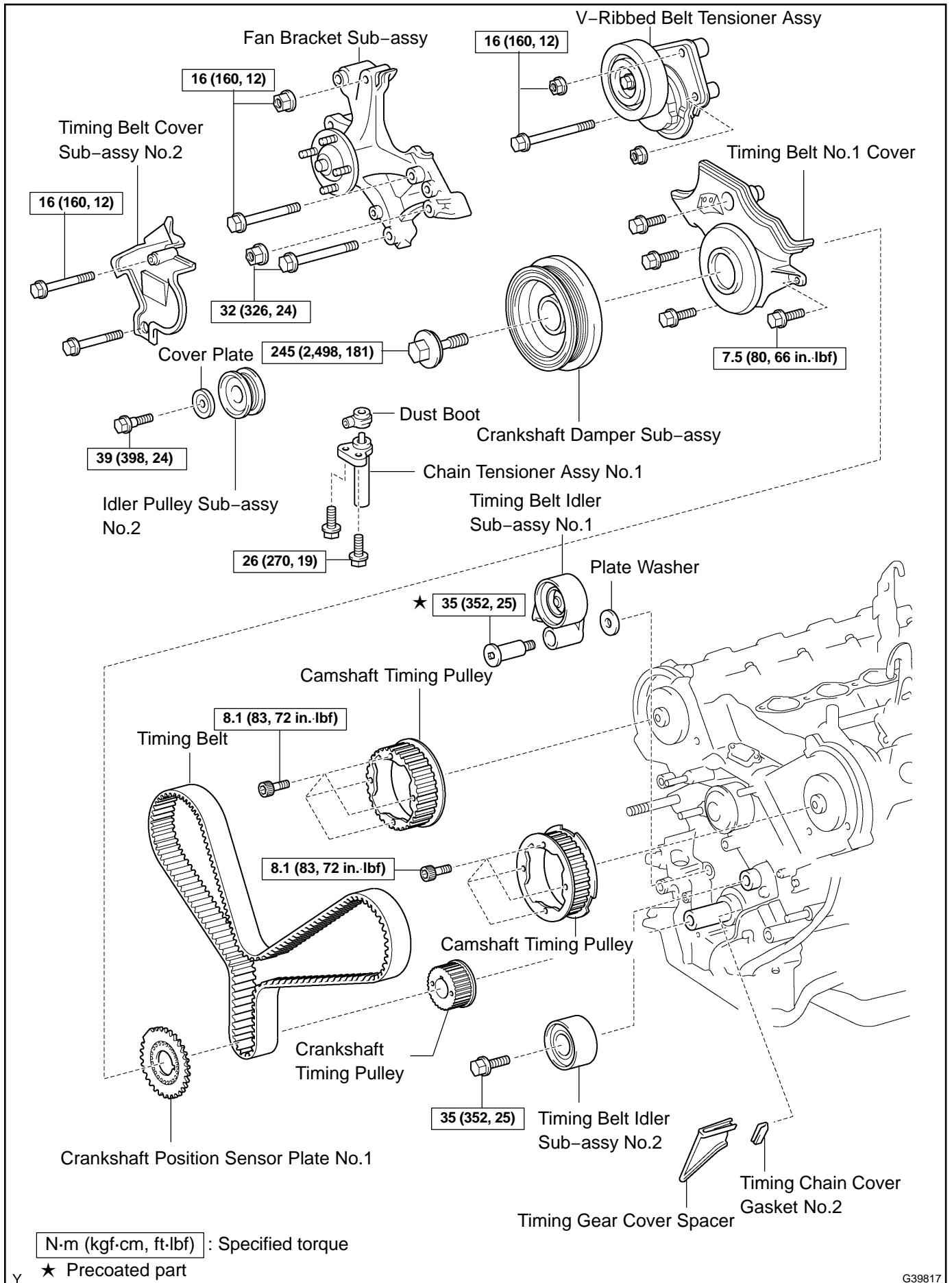
G39814



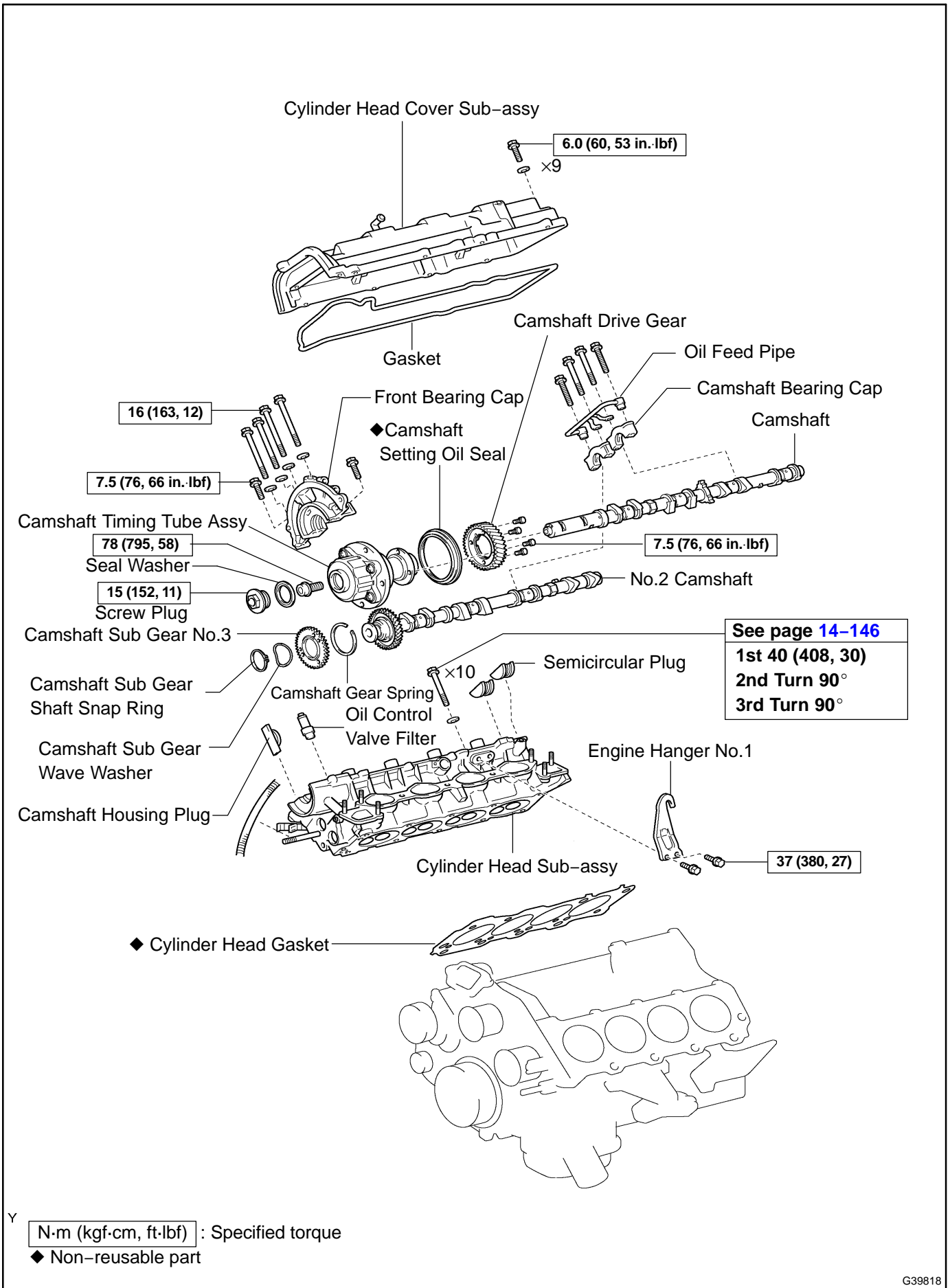
G39815



G39816

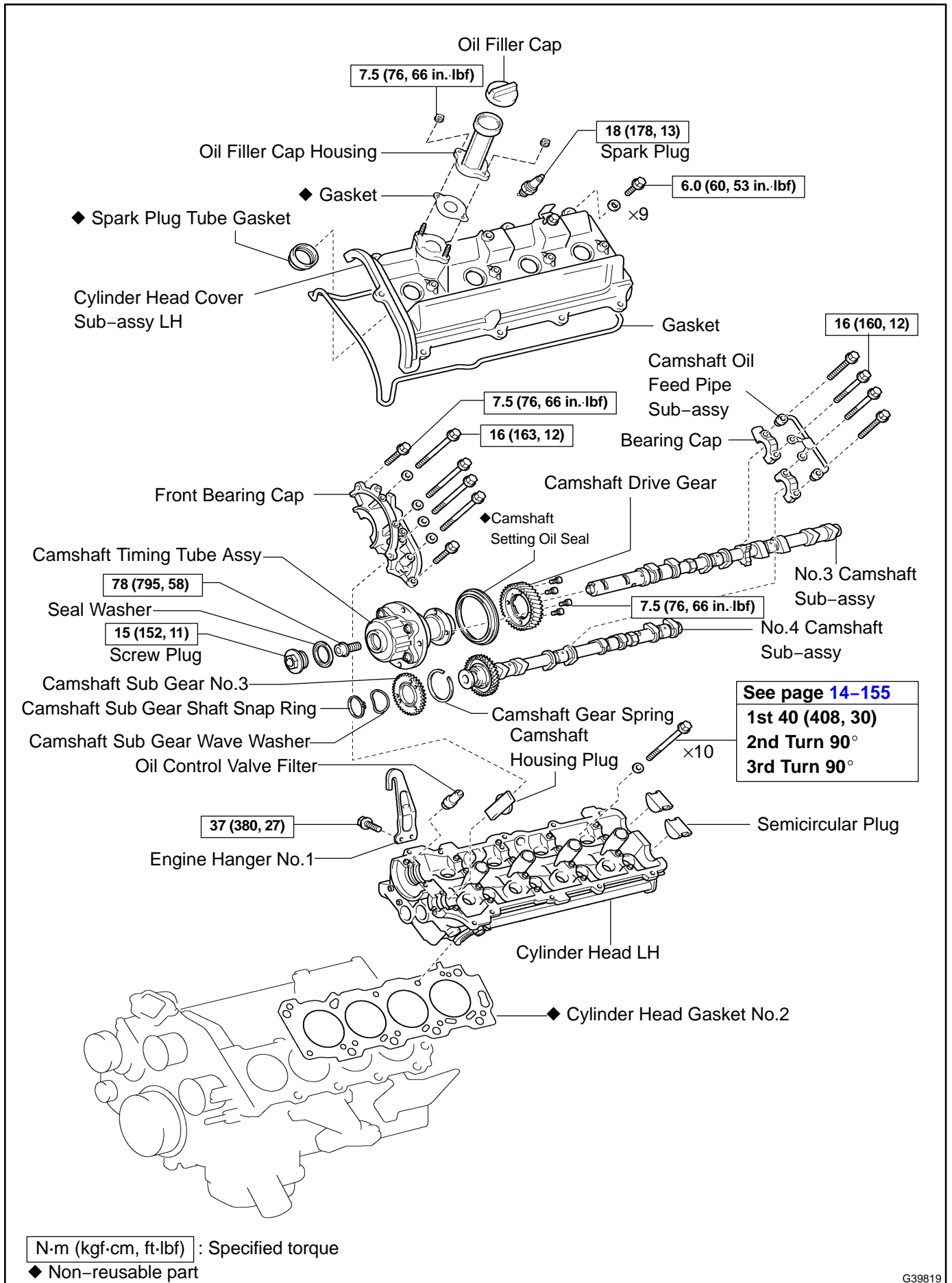


G39817

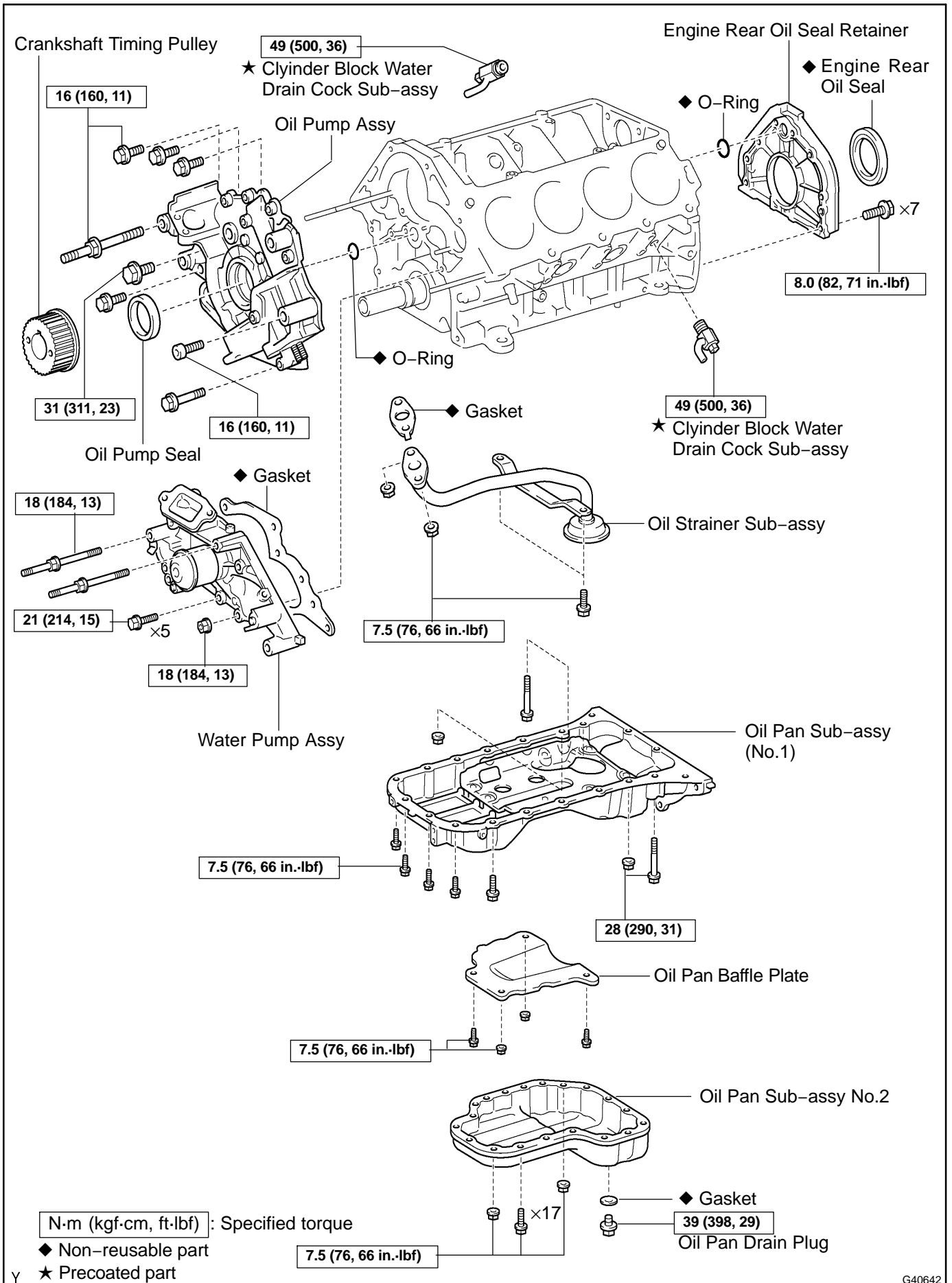


Y **N·m (kgf·cm, ft·lbf)** : Specified torque
 ◆ Non-reusable part

G39818



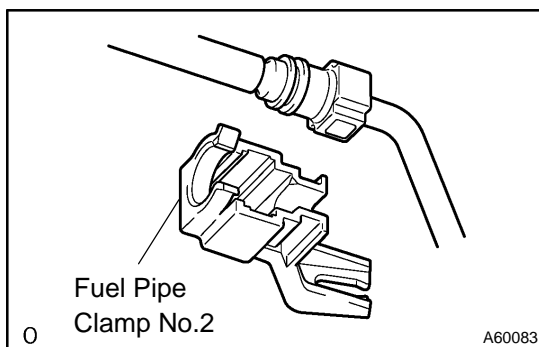
G39819



G40642

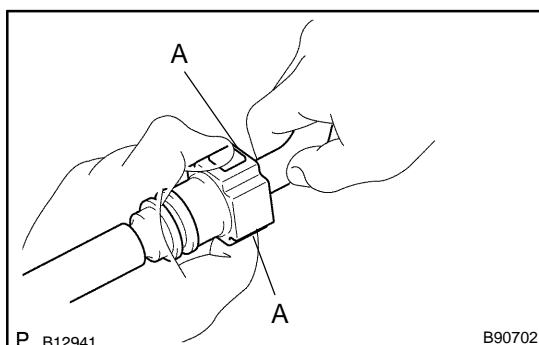
REPLACEMENT

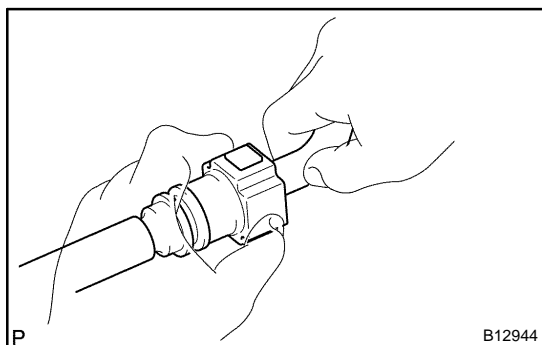
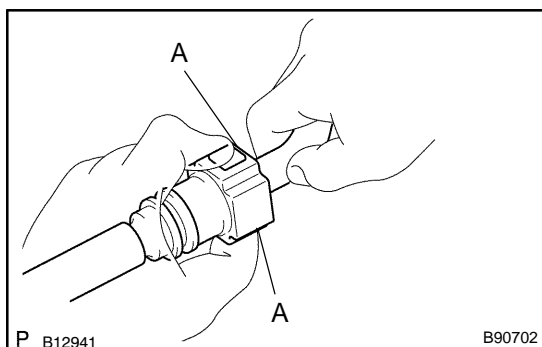
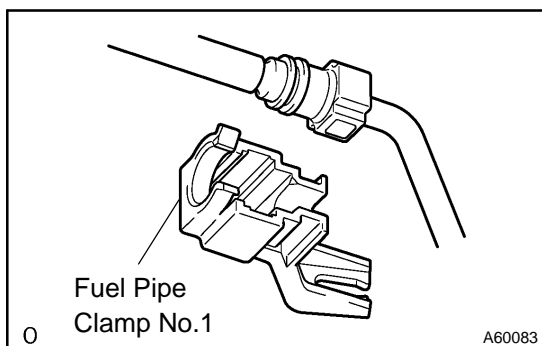
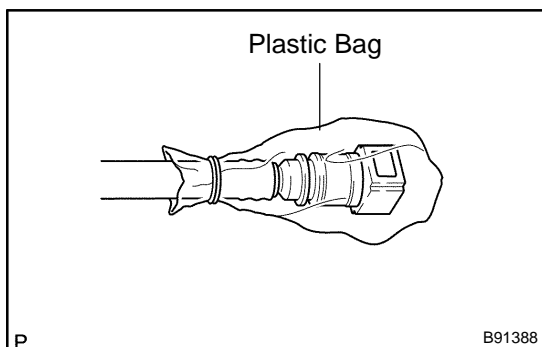
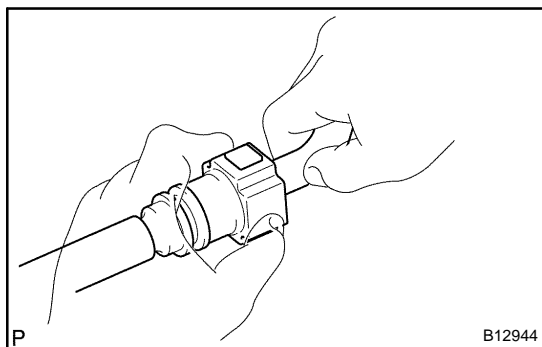
1. **PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **REMOVE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-14)**
3. **REMOVE HOOD SUB-ASSY**
 - (a) Disconnect the windshield washer hose.
 - (b) Disconnect the hood dampers.
 - (c) Remove the 4 bolts and hood sub-assy.
4. **REMOVE V-BANK COVER SUB-ASSY**
 - (a) Remove the 2 nuts and V-bank cover sub-assy.
5. **REMOVE ENGINE ROOM COVER SIDE**
6. **REMOVE ENGINE ROOM SIDE COVER LH**
7. **REMOVE AIR CLEANER HOSE ASSY**
 - (a) Disconnect the vacuum hoses (for P/S idle up and for fuel pressure regulator) and ventilation hose.
8. **REMOVE AIR CLEANER ASSY**
 - (a) Disconnect the intake air flow meter connector.
 - (b) Disconnect the ground cable from the body.
 - (c) Remove the air cleaner cap and air cleaner element.
 - (d) Remove the 3 bolts and air cleaner assy.
9. **REMOVE ENGINE UNDER COVER SUB-ASSY NO.1**
10. **REMOVE ENGINE UNDER COVER ASSY REAR**
11. **DRAIN ENGINE COOLANT (SEE PAGE 16-5)**
12. **DRAIN ENGINE OIL**
 - (a) Remove the oil pan drain plug and drain the engine oil.
 - (b) Clean the oil pan drain plug and install a new gasket and the drain plug.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)
13. **REMOVE RADIATOR ASSY (SEE PAGE 16-9)**
14. **REMOVE FAN SHROUD**
 - (a) Disconnect the fasteners of the clamp and oil cooler hoses from the fan shroud in sequence.
 - (b) Remove the fan shroud with fan.



15. DISCONNECT FUEL HOSE NO.2

- (a) Observe the following precautions when disconnecting the fuel tube connector:
 - (1) Remove the fuel pipe clamp No.2.
 - (2) Check if there is any dirt on the pipe and around the connector before disconnecting them. Clean the dirt away if necessary.
- (3) Disconnect the connector from the hose while pinching part A with fingers as shown in the illustration.

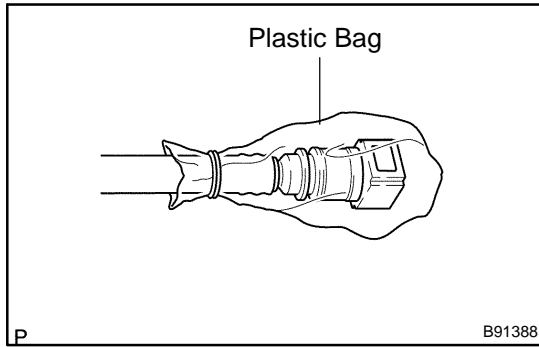




- (4) When the connector and the pipe are stuck, pinch the fuel pipe with fingers and push the fuel tube connector to the fuel pipe by pressing the release buttons, then pull the connector out from the pipe. Do not use any tool at this time.
- (5) Check if there is any dirt or other foreign objects on the seal surface of the disconnected pipe and clean it away.
- (6) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.

16. DISCONNECT FUEL HOSE

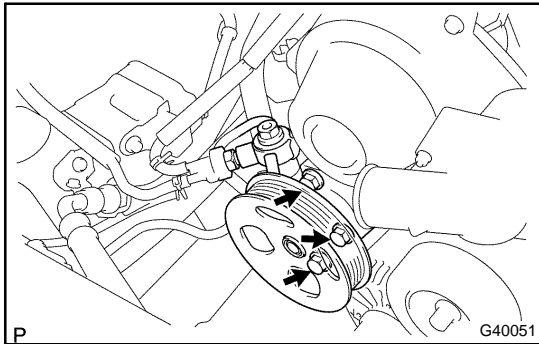
- (a) Observe the following precautions when disconnecting the fuel tube connector:
 - (1) Remove the fuel pipe clamp No.1.
 - (2) Check if there is any dirt on the pipe and around the connector before disconnecting them. Clean the dirt away if necessary.
 - (3) Disconnect the connector from the hose while pinching part A with fingers as shown in the illustration.
 - (4) When the connector and the pipe are stuck, pinch the fuel pipe with fingers and push the fuel tube connector to the fuel pipe by pressing the release buttons, then pull the connector out from the pipe. Do not use any tool at this time.
 - (5) Check if there is any dirt or other foreign objects on the seal surface of the disconnected pipe and clean it away.



- (6) Do not damage the disconnected pipe and connector, and prevent intrusion of foreign objects by covering them with a plastic bag.

17. DISCONNECT FUEL VAPOR FEED HOSE ASSY

18. REMOVE FAN AND GENERATOR V BELT (SEE PAGE 14-5)

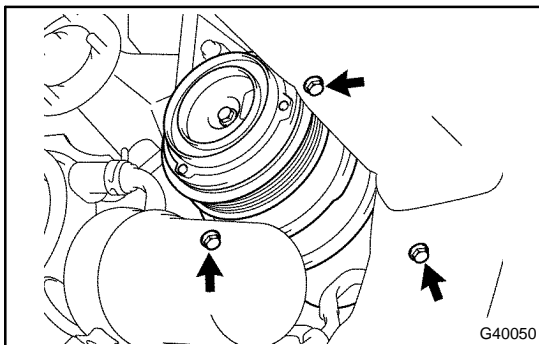


19. SEPARATE VANE PUMP ASSY

- (a) Disconnect the vacuum hose.
 (b) Remove the nut, 2 bolts and vane pump assy.

HINT:

Hang up the hose instead of detaching.

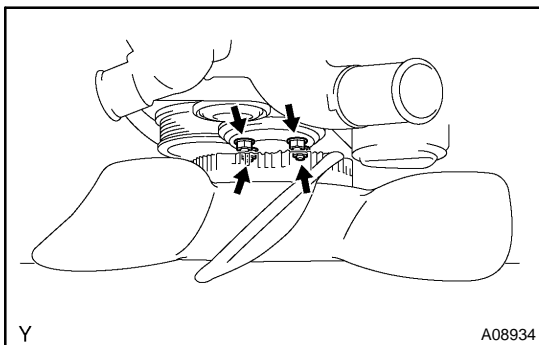


20. SEPARATE COMPRESSOR

- (a) Disconnect the compressor connector.
 (b) Remove the nut, 3 bolts, compressor stay and compressor.

HINT:

Hang up the hoses instead of detaching.



21. REMOVE FAN W/ FLUID COUPLING

- (a) Remove the 4 nuts and fan w/ fluid coupling.
 (b) Remove the fan pulley.

22. REMOVE TRANSMISSION OIL FILLER TUBE SUB-ASSY

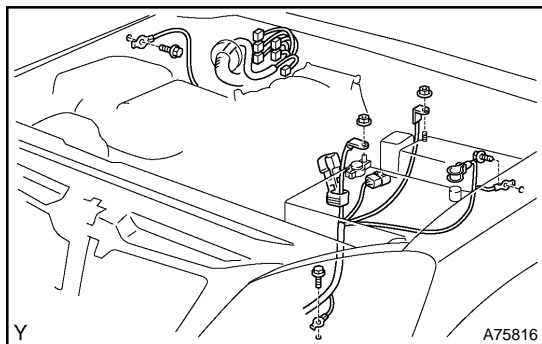
- (a) Remove the bolt and transmission oil filler tube.

23. REMOVE OIL LEVEL GAUGE GUIDE

- (a) Remove the bolt and oil level gauge guide.
 (b) Remove the O-ring.

24. DISCONNECT HEATER HOSE**25. SEPARATE ENGINE WIRE**

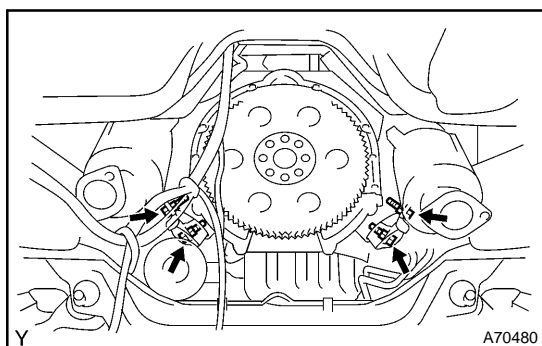
- (a) Remove the front door scuff plate RH.
(See page 71-13)
- (b) Remove the cowl side trim board RH.
(See page 71-13)
- (c) Remove the glove compartment door.
(See page 71-13)



- (d) Disconnect each connector for the ECM, four-wheel-drive-control ECU and instrument panel wire before pull out the engine wire into the engine room.
- (e) Disconnect the 3 ground cables from the body.
- (f) Disconnect the engine wire No.2 from the battery terminals (positive and negative) and engine room relay block.

26. REMOVE ENGINE ASSY

- (a) Attach the engine chain hoist to the engine hangers.



- (b) Remove the 4 nuts and 4 bolts.
- (c) Lift the engine out of the vehicle slowly and carefully.

HINT:

Make sure the engine is kept clear of all wiring hoses and cables.

27. REMOVE ENGINE WIRE

- (a) Disconnect the VSV connector.
- (b) Disconnect the solenoid connector.

28. REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**29. REMOVE WIRING HARNESS HEAT INSULATOR NO.2**

- (a) Remove the 2 bolts and wiring harness heat insulator No.2.

30. REMOVE ENGINE WIRE NO.2

- (a) Remove the bolt and separate the ground cable wire.
- (b) Remove the nut, 2 bolts and engine wire No.2.

31. REMOVE ENGINE MOUNTING BRACKET FRONT NO.1 RH

- (a) Remove the 4 bolts and the engine-mounting bracket together with the engine-mounting insulator front.

32. REMOVE ENGINE MOUNTING BRACKET FRONT NO.1 LH

- (a) Remove the 4 bolts and the engine-mounting bracket together with the engine-mounting insulator front.

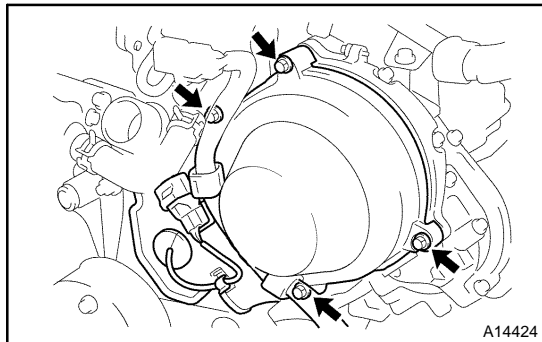
33. REMOVE GENERATOR ASSY (SEE PAGE 19-17)**34. REMOVE HEATER HOSE****35. REMOVE DRIVE PLATE & RING GEAR SUB-ASSY (SEE PAGE 14-163)**

36. REMOVE OIL COOLER PIPE

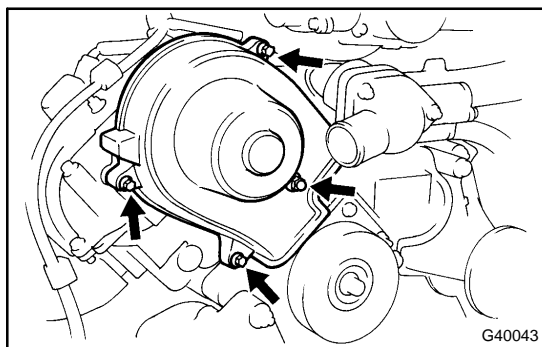
- (a) Disconnect the 3 hoses.
- (b) Remove the bolt, nut and oil cooler pipe.

37. REMOVE PUMP BRACKET

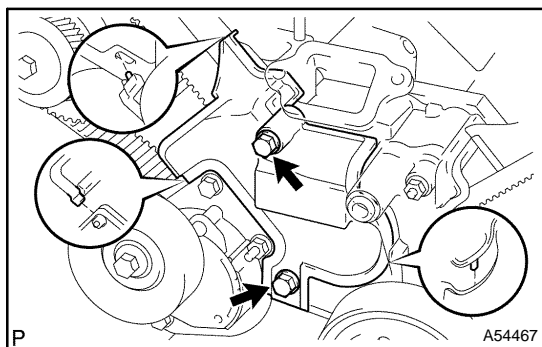
- (a) Remove the 4 bolts and pump bracket.

**38. REMOVE TIMING BELT COVER SUB-ASSY NO.3 LH**

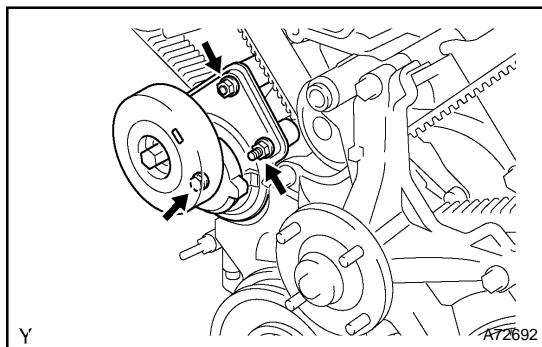
- (a) Remove the grommet and separate the cam position sensor connector from the timing belt cover sub-assy No.3 LH.
- (b) Remove the 4 bolts and timing belt cover sub-assy No.3 LH.

**39. REMOVE TIMING CHAIN OR BELT COVER NO.2**

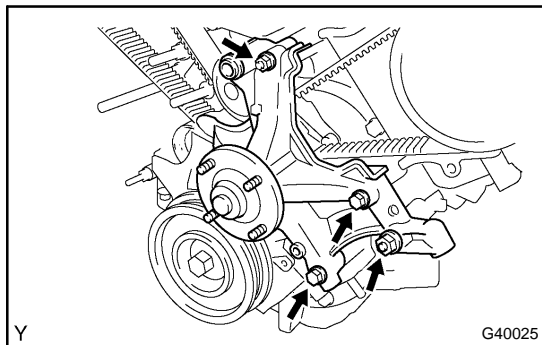
- (a) Remove the nut, 3 bolts and timing belt cover No.2.

**40. REMOVE TIMING BELT COVER SUB-ASSY NO.2**

- (a) Remove the 2 bolts and timing belt cover sub-assy No.2.

**41. REMOVE V-RIBBED BELT TENSIONER ASSY**

- (a) Remove the bolt, 2 nuts and V-ribbed belt tensioner.

**42. REMOVE FAN BRACKET SUB-ASSY**

- (a) Remove the 2 nuts, 2 bolts and fan bracket sub-assy.

43. REMOVE IGNITION COIL ASSY

- (a) Remove the 8 bolts and 8 ignition coils.

44. REMOVE CAMSHAFT POSITION SENSOR

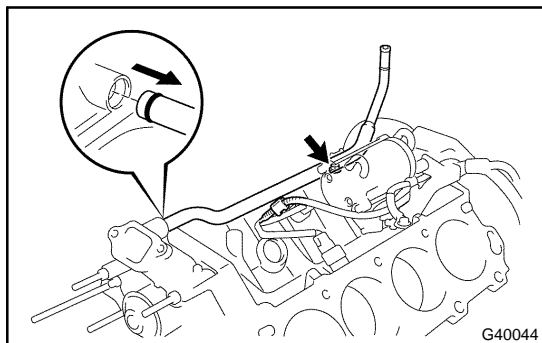
- (a) Remove the bolt, stud bolt and camshaft position sensor.

45. REMOVE CRANKSHAFT POSITION SENSOR

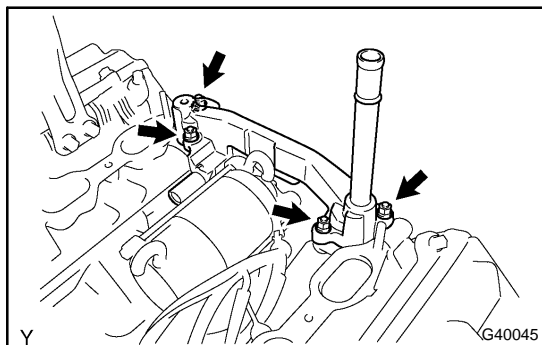
- (a) Remove the bolt and crankshaft position sensor.

46. REMOVE VVT SENSOR

- (a) Remove the 2 bolts and VVT sensors.

**47. REMOVE WATER BY-PASS PIPE SUB-ASSY**

- (a) Remove the wire clamp.
 (b) Remove the bolt and water by-pass.
 (c) Remove the O-ring from the water by-pass pipe sub-assy.

48. REMOVE AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**49. REMOVE WATER BY-PASS JOINT RR**

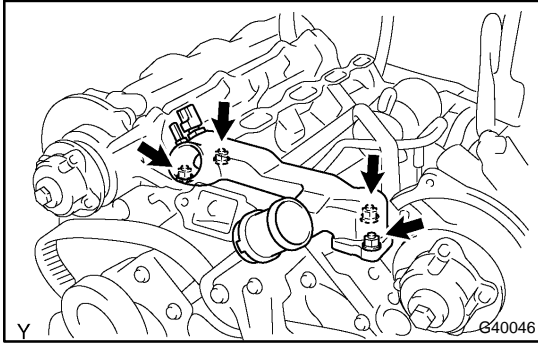
- (a) Remove the 4 nuts and water by-pass joint.
 (b) Remove the 2 gaskets from the water by-pass joint.

50. REMOVE AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)**51. REMOVE STARTER ASSY**

- (a) Disconnect the engine wire No.2.
 (b) Remove the 2 bolts and starter assy.

52. REMOVE KNOCK SENSOR (SEE PAGE 10-10)

SST 09816-30010

53. REMOVE WATER INLET HOUSING (SEE PAGE 16-6)**54. REMOVE WATER BY-PASS JOINT FR**

- (a) Remove the 4 nuts, water by-pass joint and 2 gaskets.

55. REMOVE EXHAUST MANIFOLD SUB-ASSY RH

- (a) Remove the 4 bolts and exhaust manifold heat insulator No.1.
 (b) Disconnect the oxygen sensor connector.
 (c) Remove the 8 nuts and exhaust manifold sub-assy.

56. REMOVE EXHAUST MANIFOLD SUB-ASSY LH

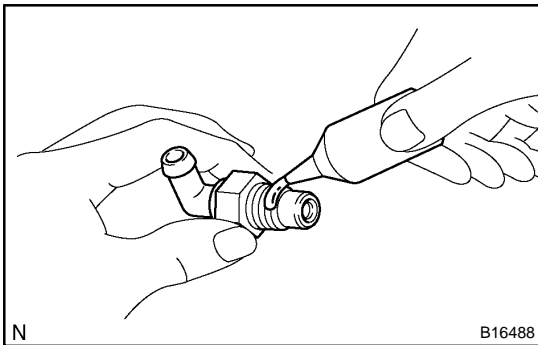
- (a) Remove the 4 bolts and exhaust manifold heat insulator No.2.
 (b) Disconnect the oxygen sensor connector.
 (c) Remove the 8 nuts and exhaust manifold sub-assy.

57. REMOVE OIL COOLER ASSY

- (a) Remove the 2 bolts and nut.
 (b) Remove the oil cooler assy w/ bracket and gasket.

58. REMOVE VENTILATION VALVE SUB-ASSY

- (a) Remove the ventilation valve cover.
 (b) Remove the ventilation valve sub-assy.

59. REPLACE PARTIAL ENGINE ASSY**60. INSTALL VENTILATION VALVE SUB-ASSY**

- (a) Apply adhesive to 2 or 3 threads.

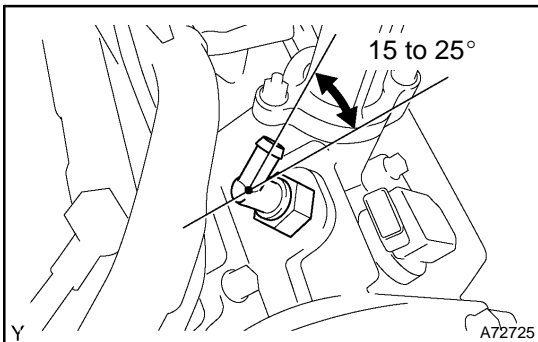
Adhesive:**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (b) Install the ventilation valve.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)**HINT:**

After tightening the valve to the specified torque, turn the ventilation valve clockwise with the port facing in the direction indicated in the illustration.

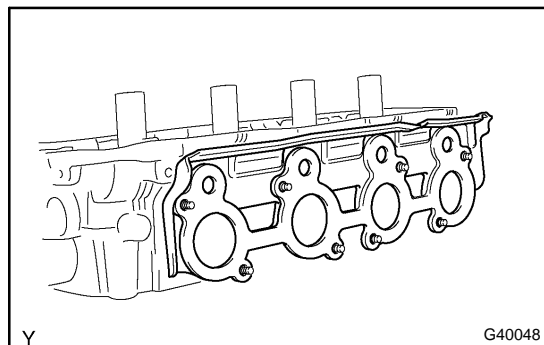
- (c) Install the ventilation valve cover to the ventilation valve.
 (d) Connect the ventilation hose to the ventilation valve.



61. INSTALL OIL COOLER ASSY

- (a) Place a new gasket into the groove of the oil cooler.
- (b) Apply a light coat of engine oil to the gasket.
- (c) Install the oil cooler assy with the 2 bolts and nut.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

**62. INSTALL EXHAUST MANIFOLD SUB-ASSY LH**

- (a) Place a new gasket on the cylinder head.

NOTICE:

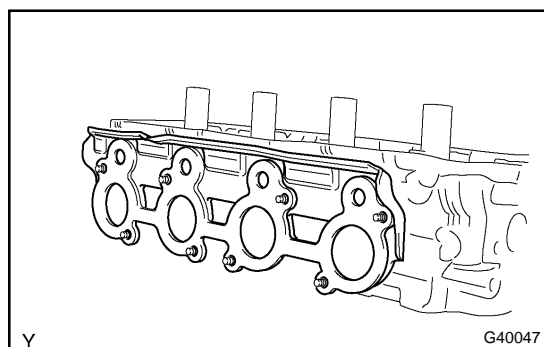
Be careful of the installation direction.

- (b) Install the exhaust manifold with 8 new nuts. Uniformly tighten the nuts in diagonally.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

- (c) Install the heat insulator with the 4 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

**63. INSTALL EXHAUST MANIFOLD SUB-ASSY RH**

- (a) Place a new gasket on the cylinder head.

NOTICE:

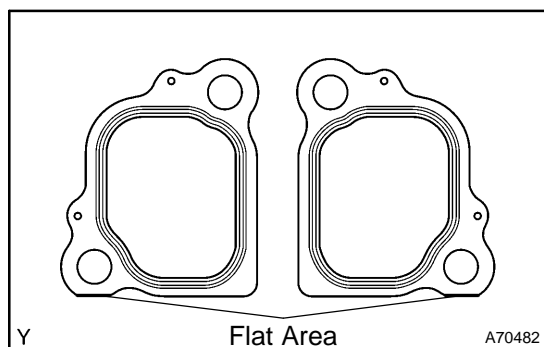
Be careful of the installation direction.

- (b) Install the exhaust manifold with 8 new nuts. Uniformly tighten the nuts diagonally.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

- (c) Install the heat insulator with the 4 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

**64. INSTALL WATER BY-PASS JOINT FR**

- (a) With the flat-bottom of each new gasket facing downward as shown in the illustration, install the 2 gaskets to the engine front side.

- (b) Install the water by-pass joint with the 4 nuts. Alternately tighten the nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

65. INSTALL WATER INLET HOUSING (SEE PAGE 16-6)**66. INSTALL KNOCK SENSOR (SEE PAGE 10-10)**

SST 09816-30010

67. INSTALL STARTER ASSY

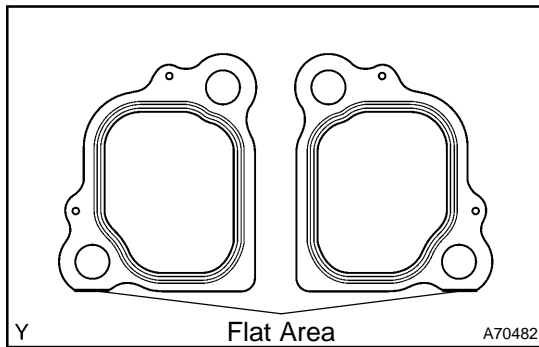
- (a) Install the starter assy with the 2 bolts.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

- (b) Connect the engine wire No.2.

Torque: 9.8 N·m (100 kgf·cm, 7.2 ft·lbf)

68. INSTALL AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)

**69. INSTALL WATER BY-PASS JOINT RR**

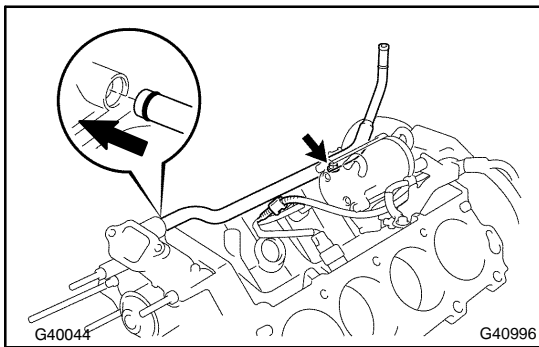
- (a) With the flat-bottom of each new gasket facing downward as shown in the illustration, install the 2 gaskets to the engine rear side.
- (b) Install the water by-pass joint with the 4 nuts. Alternately tighten the nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

70. INSTALL AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**71. INSTALL WATER BY-PASS PIPE SUB-ASSY**

- (a) Install a new O-ring to the water by-pass pipe.
- (b) Apply soapy water to the O-ring.
- (c) Push in the water by-pass pipe end into the pipe hole of the water pump.
- (d) Install the water by-pass pipe with the bolt.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

**72. INSTALL VVT SENSOR**

- (a) Install the VVT sensors with the 2 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

73. INSTALL CRANKSHAFT POSITION SENSOR

- (a) Install the crankshaft position sensor with the bolt.

Torque: 6.5 N·m (65 kgf·cm, 58 in·lbf)

74. INSTALL CAMSHAFT POSITION SENSOR

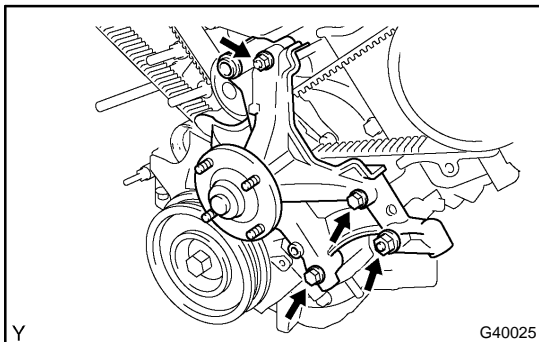
- (a) Install the camshaft position sensor with the bolt and the stud bolt.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

75. INSTALL IGNITION COIL ASSY

- (a) Install the 8 ignition coils with the 8 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

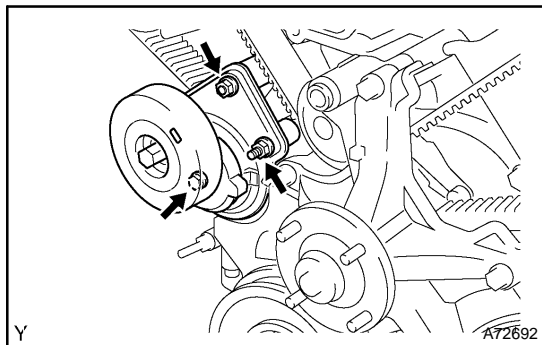
**76. INSTALL FAN BRACKET SUB-ASSY**

- (a) Install the fan bracket with the 2 bolts and 2 nuts.

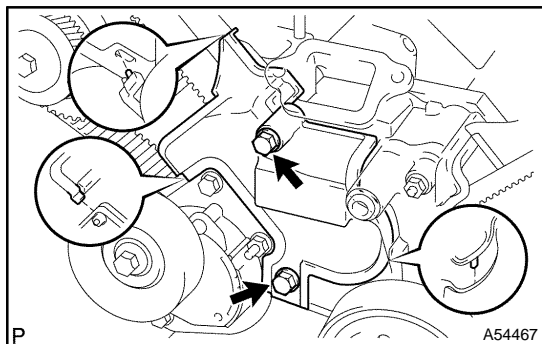
Torque:

12 mm head: 16 N·m (160 kgf·cm, 12 ft·lbf)

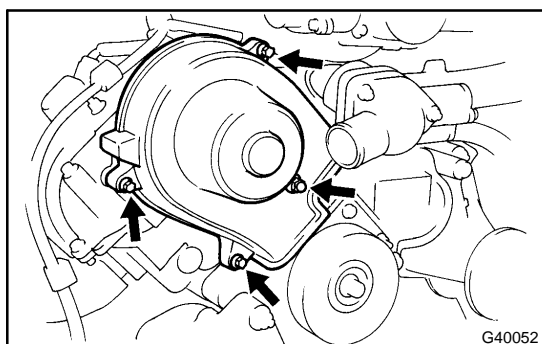
14 mm head: 32 N·m (326 kgf·cm, 24 ft·lbf)

**77. INSTALL V-RIBBED BELT TENSIONER ASSY**

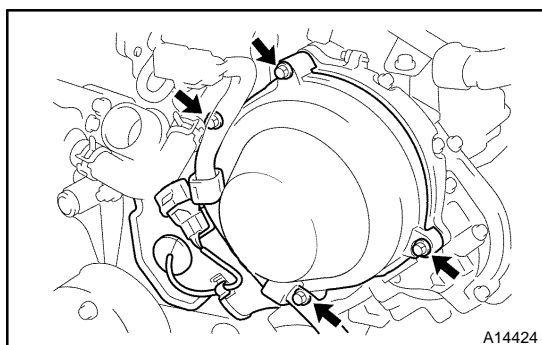
- (a) Install the v-ribbed belt tensioner with the bolt and 2 nuts.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

**78. INSTALL TIMING BELT COVER SUB-ASSY NO.2**

- (a) Install the timing belt cover sub-assy No.2 with the 2 bolts.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

**79. INSTALL TIMING CHAIN OR BELT COVER NO.2**

- (a) Install the timing chain or belt cover with the nut and 3 bolts.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

**80. INSTALL TIMING BELT COVER SUB-ASSY NO.3 LH**

- (a) Install the timing belt cover sub-assy with the 4 bolts.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)
 (b) Install the camshaft position sensor connector and grommet to the timing belt cover.

81. INSTALL PUMP BRACKET

- (a) Install the pump bracket with the 4 bolts.
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

82. INSTALL OIL COOLER PIPE

- (a) Install the oil cooler pipe with the bolt and nut.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)
 (b) Connect the 3 hoses.

83. INSTALL DRIVE PLATE & RING GEAR SUB-ASSY (SEE PAGE 14-163)

84. INSTALL HEATER HOSE**85. INSTALL GENERATOR ASSY (SEE PAGE 19-17)****86. INSTALL ENGINE MOUNTING BRACKET FRONT NO.1 LH**

- (a) Install the engine-mounting bracket and engine-mounting insulator with the 4 bolts.

Torque: 36 N·m (367 kgf·cm, 27 ft·lbf)

87. INSTALL ENGINE MOUNTING BRACKET FRONT NO.1 RH

- (a) Install the engine-mounting bracket and engine-mounting insulator with the 4 bolts.

Torque: 36 N·m (367 kgf·cm, 27 ft·lbf)

88. INSTALL ENGINE WIRE NO.2

- (a) Install the engine wire protector with the nut and 2 bolts.

- (b) Connect the ground cable wire clamp with the bolt.

89. INSTALL WIRING HARNESS HEAT INSULATOR NO.2

- (a) Install the wiring harness heat insulator with the 2 bolts.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

90. INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**91. INSTALL ENGINE WIRE****92. INSTALL ENGINE ASSY**

- (a) Attach the engine chain hoist to the engine hangers.

- (b) Slowly lower the engine assembly into the engine compartment.

- (c) Attach the engine mounting brackets to the frame brackets.

- (d) Install the engine mounting brackets with the 4 nuts and 4 bolts.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

- (e) Remove the engine chain hoist.

93. INSTALL ENGINE WIRE**94. CONNECT HEATER HOSE****95. INSTALL OIL LEVEL GAUGE GUIDE**

- (a) Install a new O-ring to the oil level gauge guide.

- (b) Install the oil level gauge guide with the bolt.

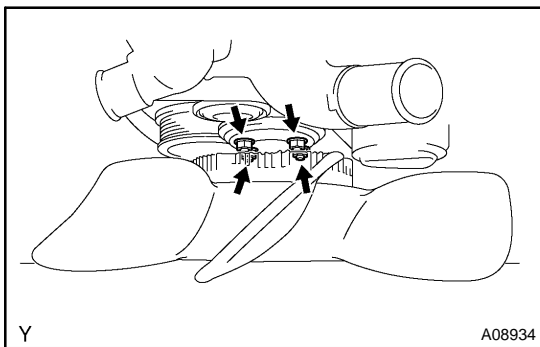
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

96. INSTALL TRANSMISSION OIL FILLER TUBE SUB-ASSY

- (a) Install a new O-ring to the oil filler tube sub-assy.

- (b) Install the transmission oil filler tube sub-assy with the bolt.

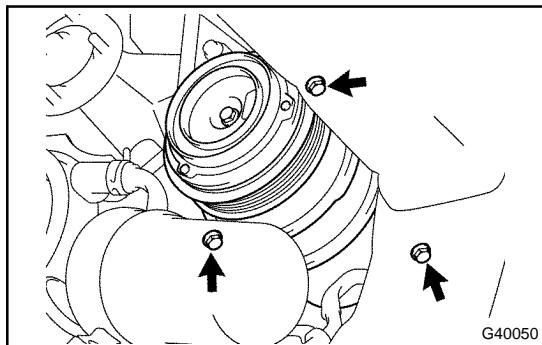
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

**97. INSTALL FAN W/ FLUID COUPLING**

- (a) Install the fan pulley to the engine.

- (b) Install the fan w/ fluid coupling with the 4 nuts.

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

**98. INSTALL COMPRESSOR**

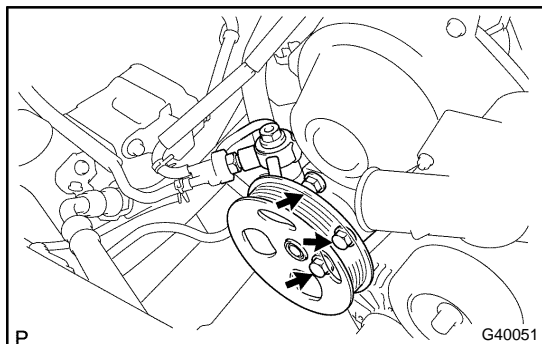
- (a) Install the compressor with the stay, nut and 3 bolts.

Torque:

Bolt: 47 N·m (475 kgf·cm, 34 ft·lbf)

Nut: 25 N·m (255 kgf·cm, 18 ft·lbf)

- (b) Connect the compressor connector.

**99. INSTALL VANE PUMP ASSY**

- (a) Install the vane pump assy with the nut and 2 bolts.

Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

100. INSTALL FAN AND GENERATOR V BELT (SEE PAGE 14-5)**101. CONNECT FUEL VAPOR FEED HOSE ASSY****102. CONNECT FUEL HOSE****103. CONNECT FUEL HOSE NO.2****104. INSTALL FAN SHROUD**

- (a) Install the fan shroud with the fan into the engine room.

Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

105. INSTALL RADIATOR ASSY (SEE PAGE 16-9)**106. ADD ENGINE COOLANT (SEE PAGE 16-5)****107. ADD ENGINE OIL****108. INSTALL ENGINE UNDER COVER ASSY REAR****109. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1****110. INSTALL AIR CLEANER ASSY**

- (a) Install the air cleaner assy with the 3 bolts.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

- (b) Connect the wire harness clamp and the ground cable.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

111. INSTALL AIR CLEANER HOSE ASSY**112. INSTALL ENGINE ROOM SIDE COVER LH****113. INSTALL ENGINE ROOM COVER SIDE****114. INSTALL V-BANK COVER SUB-ASSY**

- (a) Install the V-bank cover sub-assy with the 2 nuts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

115. INSTALL HOOD SUB-ASSY

- (a) Install the hood with the 4 bolts.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

- (b) Connect the hood damper.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

- (c) Connect the windshield washer hose.

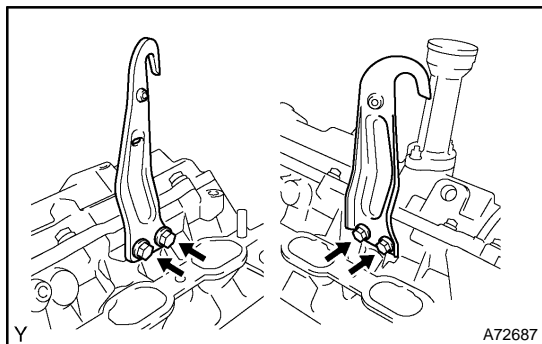
116. INSTALL AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-14)

- 117. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)
- 118. CHECK FOR EXHAUST GAS LEAKS
- 119. INSPECT CHECK FOR FUEL LEAKS (SEE PAGE 11-6)
- 120. INSPECT AUTOMATIC TRANSMISSION FLUID (SEE PAGE 40-2)
- 121. INSPECT CHECK FOR ENGINE OIL LEAKS

OVERHAUL

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new ones.



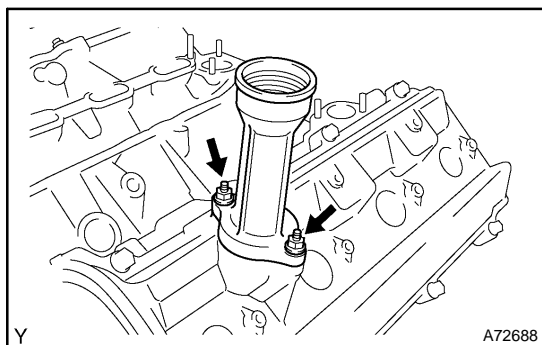
- 1. REMOVE ENGINE HANGER NO.1**
 - Remove the 4 bolts and engine hangers.

- 2. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB-ASSY**

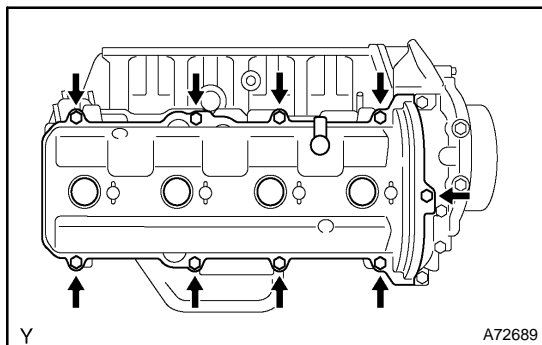
- Remove the 2 water drain cocks.

- 3. REMOVE SPARK PLUG**

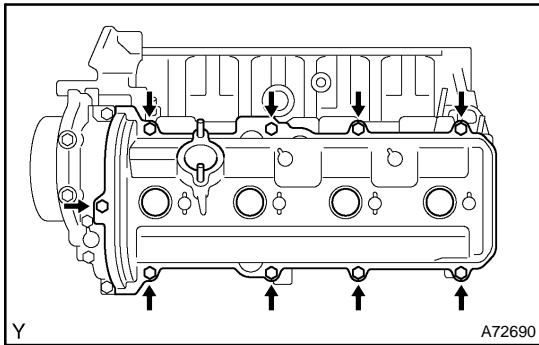
- 4. REMOVE OIL FILLER CAP SUB-ASSY**



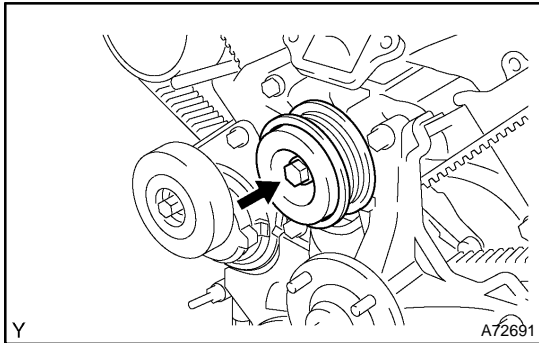
- 5. REMOVE OIL FILLER CAP HOUSING**
 - Remove the 2 nuts and oil filler cap housing.



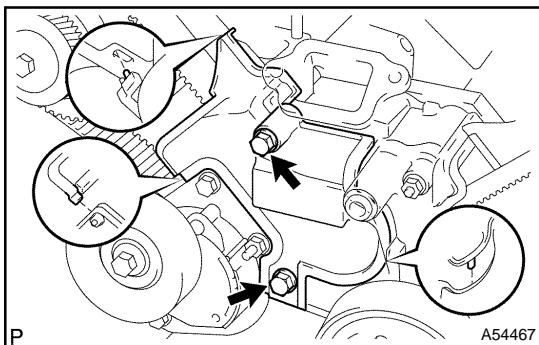
- 6. REMOVE CYLINDER HEAD COVER SUB-ASSY**
 - Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket.



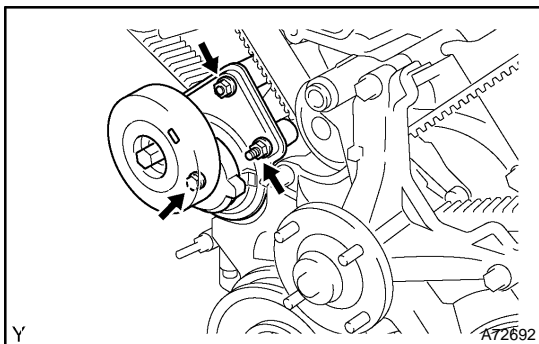
- 7. REMOVE CYLINDER HEAD COVER SUB-ASSY LH**
 (a) Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket.



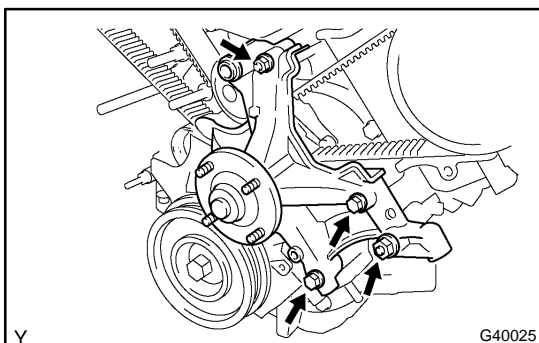
- 8. REMOVE IDLER PULLEY SUB-ASSY NO.2**
 (a) Remove the pulley bolt, cover plate and idler pulley.



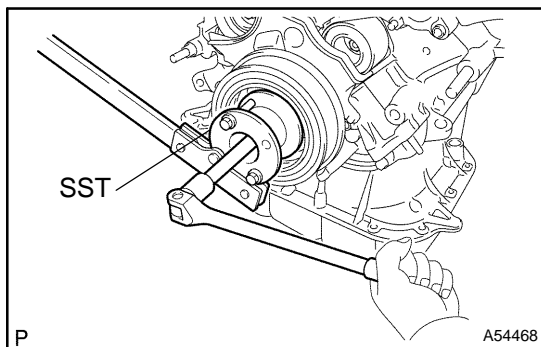
- 9. REMOVE TIMING BELT COVER SUB-ASSY NO.2**
 (a) Remove the 2 bolts and timing belt cover.



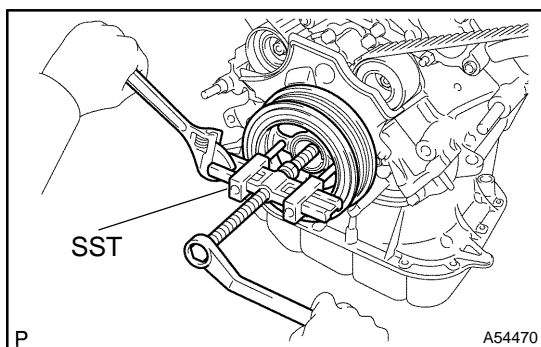
- 10. REMOVE V-RIBBED BELT TENSIONER ASSY**
 (a) Remove the bolt, 2 nuts and belt tensioner.



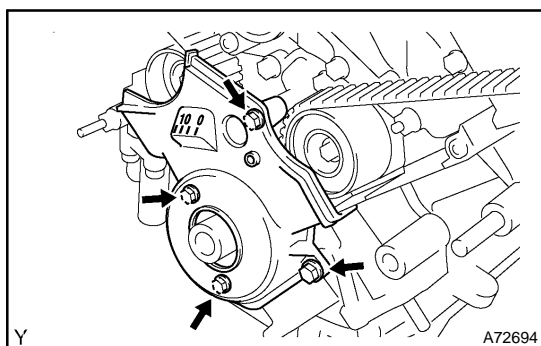
- 11. REMOVE FAN BRACKET SUB-ASSY**
 (a) Remove the 2 bolts, 2 nuts and fan bracket.

**12. REMOVE CRANKSHAFT DAMPER SUB-ASSY**

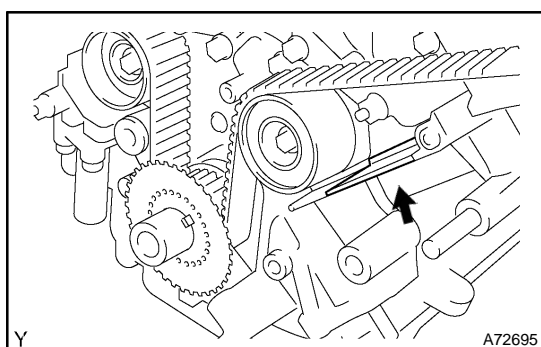
- (a) Using SST, remove the pulley bolt.
SST 09213-70011 (90105-08076), 09330-00021



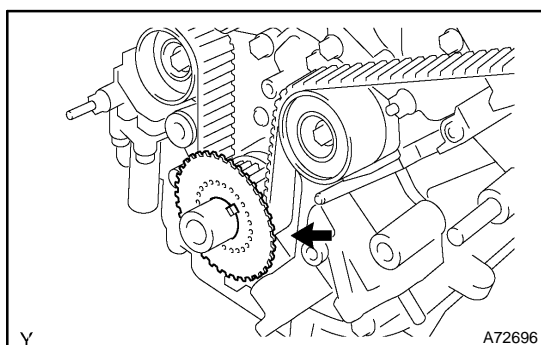
- (b) Using SST, remove the crankshaft pulley.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05021)

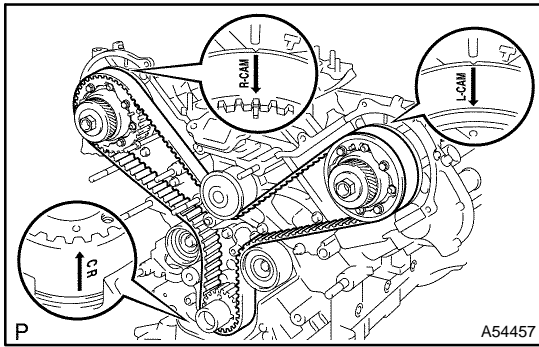
**13. REMOVE TIMING BELT NO.1 COVER**

- (a) Remove the 4 bolts and timing belt cover.

**14. REMOVE TIMING GEAR COVER SPACER**

- (a) Remove the cover spacer and gasket.

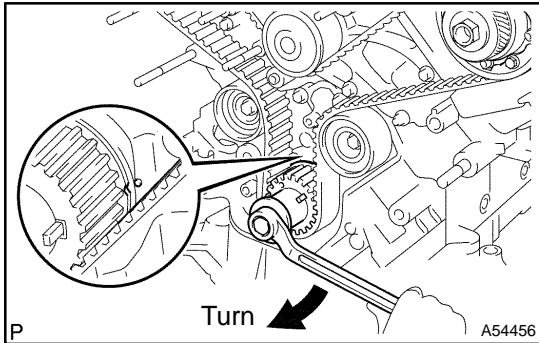
**15. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1**



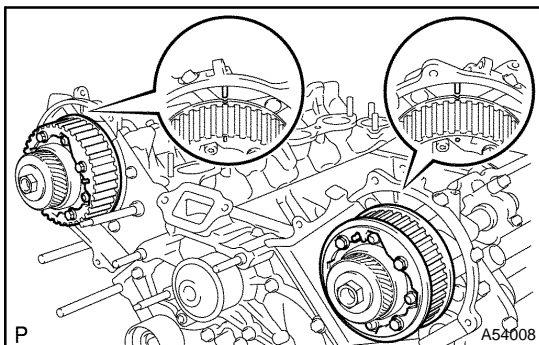
16. SET NO. 1 CYLINDER TO TDC/COMPRESSION

- (a) If reusing the timing belt, check the installation marks on the timing belt.
- (1) Check that there are 3 installation marks on the timing belt by turning the crankshaft as shown in the illustration.

If the installation marks have disappeared, put a new installation mark on the timing belt before removing each part.



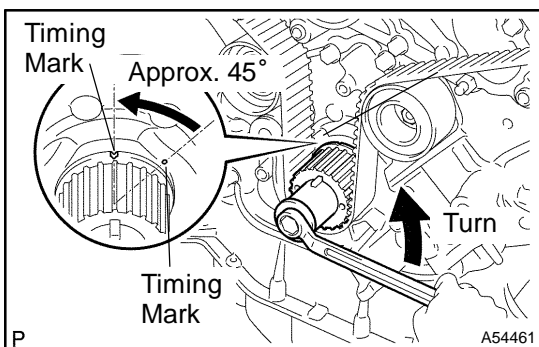
- (b) Using the crankshaft damper bolt, turn the crankshaft to align the timing marks of the crankshaft timing pulley and oil pump body.



- (c) Check that the timing marks of the camshaft timing pulleys and timing belt plates are aligned.
- If not, turn the crankshaft 1 complete revolution (360°).

17. REMOVE TIMING BELT

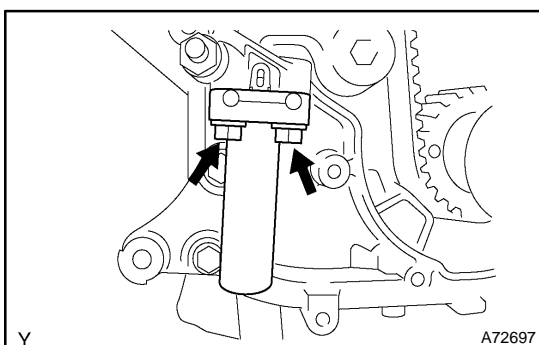
- (a) Set the No.1 cylinder to approx. 45° BTDC/compression.



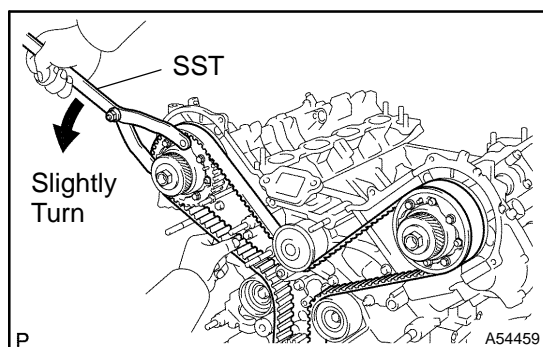
- (1) Using the crankshaft damper bolt, turn the crankshaft counterclockwise by approx. 45°.

NOTICE:

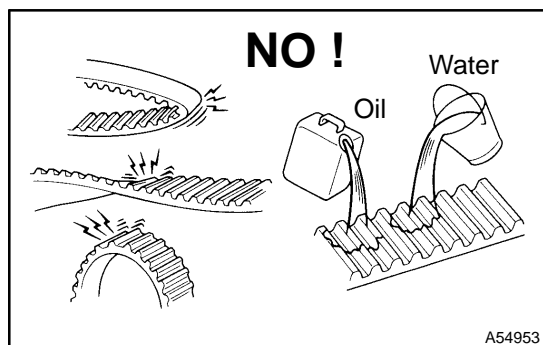
If the timing belt is disengaged, having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft timing pulley and camshaft, causing damage. So always set the crankshaft pulley at the correct angle.



- (b) Alternately loosen the 2 bolts, then remove the bolts, chain tensioner and dust boot.



- (c) Using SST, loosen the tension between the camshaft timing pulley (RH bank) and crankshaft timing pulley by slightly turning the camshaft timing pulley (RH bank) counterclockwise.
SST 09960-10010 (09962-01000, 09963-00350)
- (d) Disconnect the timing belt from the timing belt idler No.1 and remove the timing belt.



18. INSPECT TIMING BELT

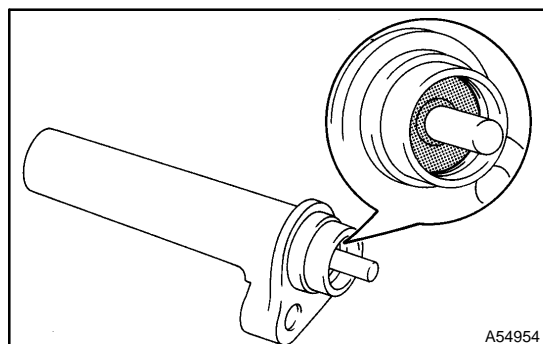
NOTICE:

- Do not bend, twist or turn the timing belt inside out.
- Do not allow the timing belt to come into contact with oil, water or steam.
- Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.

If there are any defects as shown in the illustration, check the following points:

- (a) If premature parting occurs, check the following:
- Check for proper installation.
 - Check the timing cover gasket for damage and proper installation.
- (b) If the belt teeth are cracked or damaged, inspect the camshaft.
- (c) If there is noticeable wear or cracks on the belt face, check if there are nicks on the side of the idler pulley lock and water pump.
- (d) If there is wear or damage on only one side of the belt, check the belt guide and alignment of each pulley.
- (e) If there is noticeable wear on the belt teeth, check for damage on the timing belt or foreign objects on the pulley teeth. Check if the gasket is installed correctly.

If necessary, replace the timing belt.



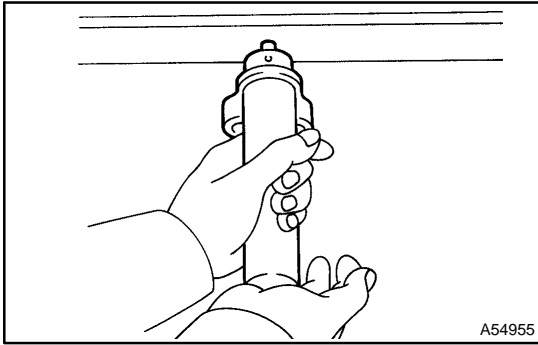
19. INSPECT CHAIN TENSIONER ASSY NO.1

- (a) Visually check the seal portion of the tensioner for oil leakage.

HINT:

If there is a faint trace of oil on the seal on the push rod side, the tensioner is all right.

If leakage is found, replace the tensioner.

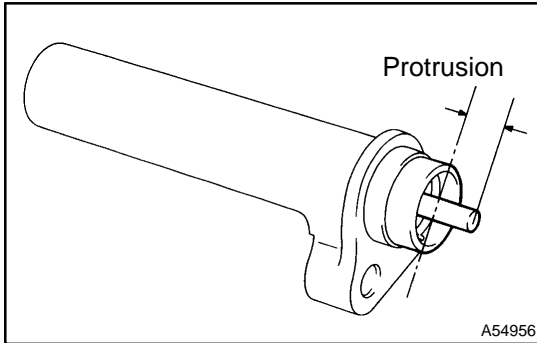


- (b) Hold the tensioner by hands and push the push rod strongly as shown in the illustration to check that it does not move.

If the push rod moves, replace the tensioner.

NOTICE:

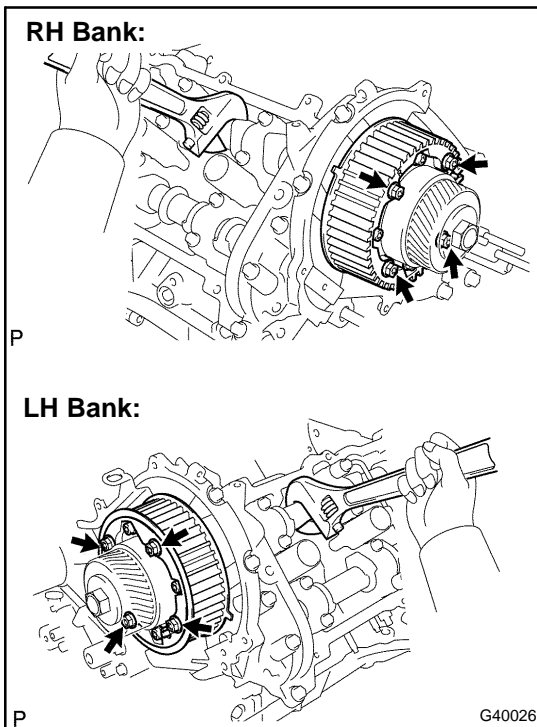
Do not face the tensioner push rod downward.



- (c) Measure the protrusion of the push rod from the housing end.

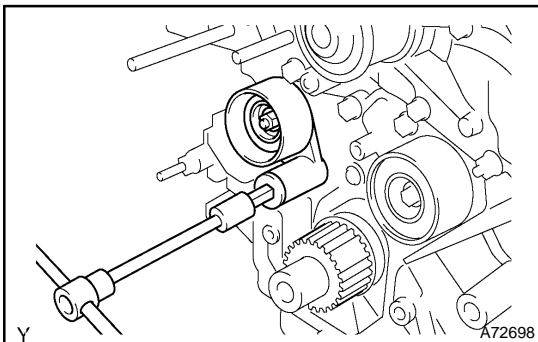
Protrusion: 11.2 to 12.2 mm (0.440 to 0.480 in.)

If the protrusion is not as specified, replace the tensioner.



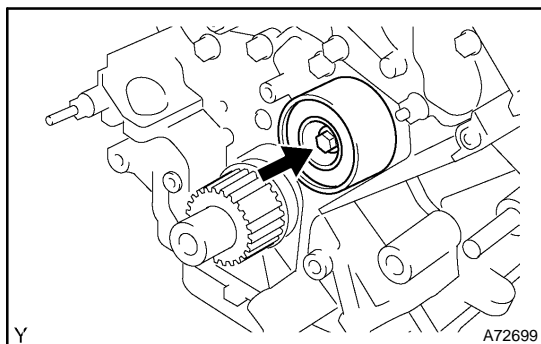
20. REMOVE CAMSHAFT TIMING PULLEYS

- (a) Hold the crankshaft with a wrench, and remove the 8 bolts and 2 timing pulleys.

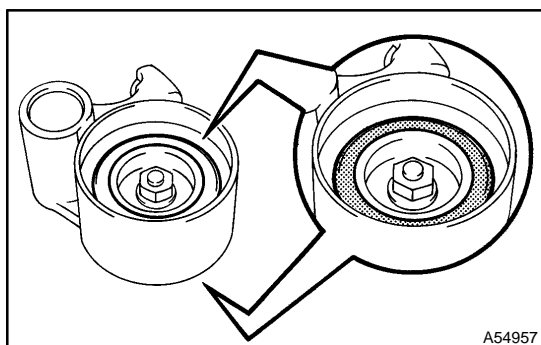


21. REMOVE TIMING BELT IDLER SUB-ASSY NO.1

- (a) Using a 10 mm hexagon wrench, remove the bolt, idler and plate washer.

**22. REMOVE TIMING BELT IDLER SUB-ASSY NO.2**

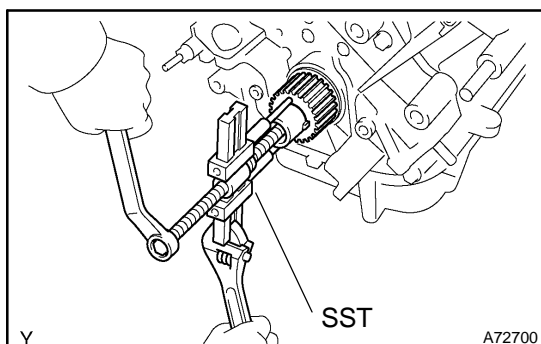
- (a) Remove the bolt and idler.

**23. INSPECT TIMING BELT IDLER**

- (a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.

- (b) Check that the idler pulley turns smoothly.
If necessary, replace the idler.

**24. REMOVE CRANKSHAFT TIMING PULLEY**

- (a) Using SST, remove the timing pulley.
SST 09950-50013 (09951-05010, 09952-05010,
09953-05010, 09953-05020, 09954-05010)

NOTICE:

Do not turn the timing pulley.

25. REMOVE REAR TIMING BELT PLATE RH NO. 2

- (a) Remove the 2 bolts and rear timing belt plate RH No.2.

26. REMOVE REAR TIMING BELT PLATE RH

- (a) Remove the bolt, stud bolt and rear timing belt plate RH.

27. REMOVE REAR TIMING BELT PLATE LH NO. 2

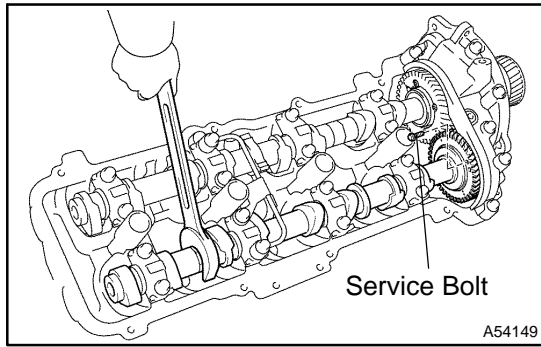
- (a) Remove the 2 bolts and rear timing belt plate LH No.2.

28. REMOVE REAR TIMING BELT PLATE LH

- (a) Remove the bolt and rear timing belt plate LH.

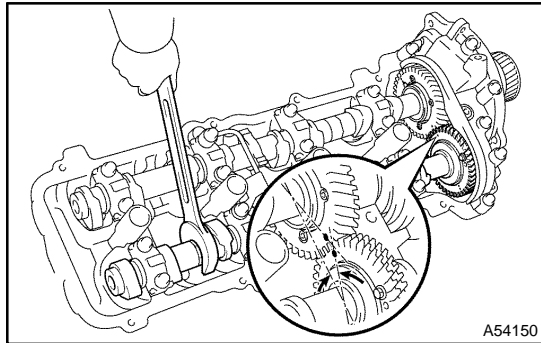
29. REMOVE CAMSHAFTS**NOTICE:**

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



- (a) Remove the camshafts of the RH bank.
- (1) In order to install a service bolt to the sub and main gears, turn the camshaft with a wrench. The hexagonal portion of the camshaft is used for turning the camshaft with the wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

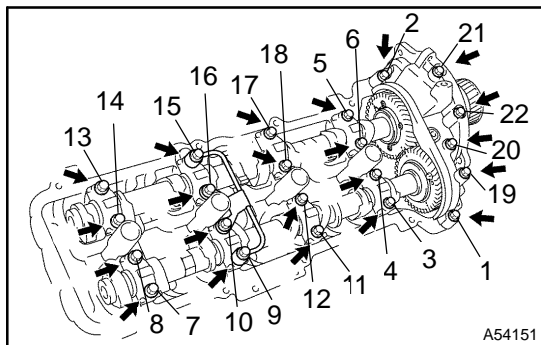
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)



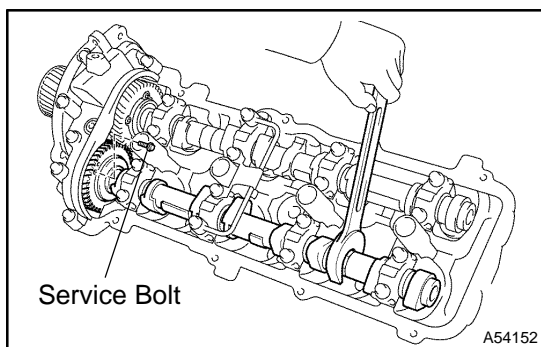
HINT:

When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.

- (3) Set the timing mark (1-dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagonal portion of the exhaust camshaft with a wrench.



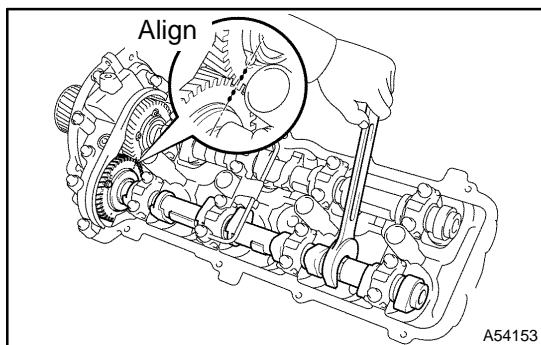
- (4) Uniformly loosen the 22 bearing cap bolts in the order shown in the illustration, then remove all the bolts.
- (5) Remove the oil feed pipe, 9 bearing caps, oil control valve filter, camshaft housing plug and 2 camshafts.



- (b) Remove the camshafts on the LH bank.
- (1) In order to install a service bolt to the sub and main gears, turn the camshaft with a wrench. The hexagonal portion of the camshaft is used for turning the camshaft with the wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

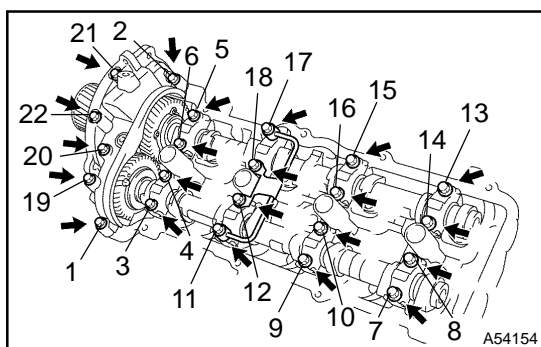
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)



HINT:

When removing the camshaft, make sure that the torsional spring force of the sub-gear has eliminated by the above operation.

- (3) Align the timing marks (2-dot marks) of the camshaft drive and driven gears by turning the hexagonal portion of the exhaust camshaft with a wrench.

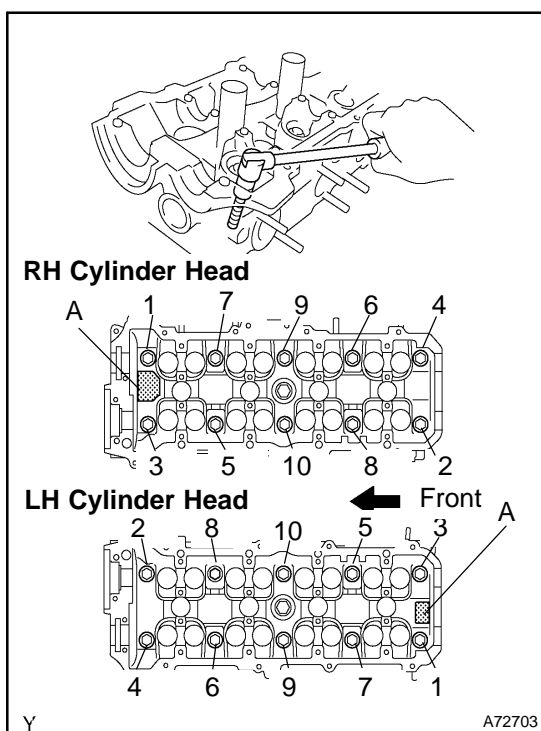


- (4) Uniformly loosen the 22 bearing cap bolts in the order shown in the illustration, then remove all the bolts.
- (5) Remove the oil feed pipe, 9 bearing caps, oil control valve filter, camshaft housing plug and 2 camshafts.

HINT:

Arrange the bearing caps in correct order.

30. REMOVE SEMICIRCULAR PLUG



31. REMOVE CYLINDER HEAD SUB-ASSY

- (a) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in several steps, in the order shown in the illustration. Likewise, loosen the 10 bolts on the other side. Remove the 20 cylinder head bolts and plate washers.

NOTICE:

- **Cylinder head warpage or cracking may result from removing bolts in incorrect order.**
- **Do not drop the plate washer for cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.**

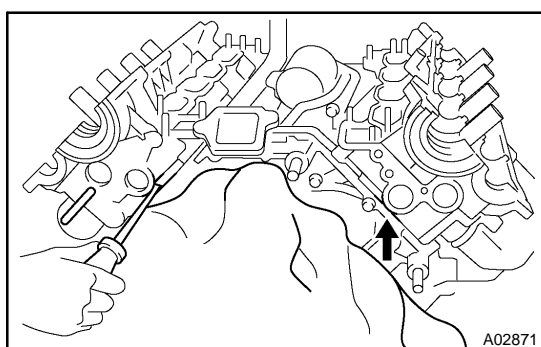
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks on a bench.

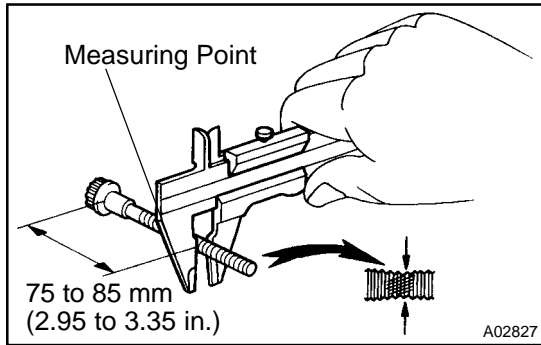
NOTICE:

- **Be careful not to damage the contact surfaces of the cylinder head and cylinder block.**
- **The cylinder head should not be tilted so as to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.**

HINT:

If the cylinder head cannot be lifted easily, pry between the cylinder head and cylinder block with a screwdriver.





32. INSPECT CYLINDER HEAD SET BOLT

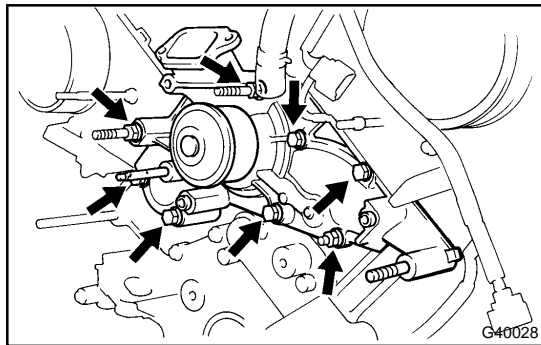
- (a) Using vernier calipers, measure the thread outside diameter of the bolt.

Standard outside diameter:

9.810 to 9.960 mm (0.3862 to 0.3921 in.)

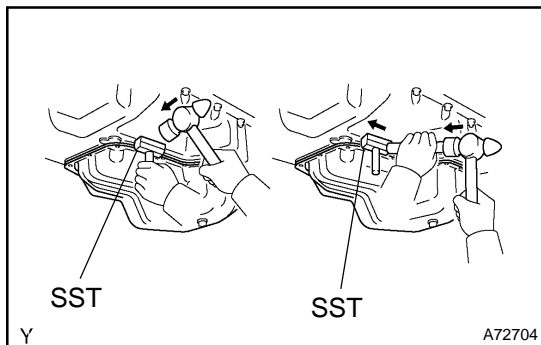
Minimum outside diameter:

9.700 mm (0.3819 in.)



33. REMOVE WATER PUMP ASSY

- (a) Remove the 5 bolts, 2 stud bolts, nut, water pump and gasket.

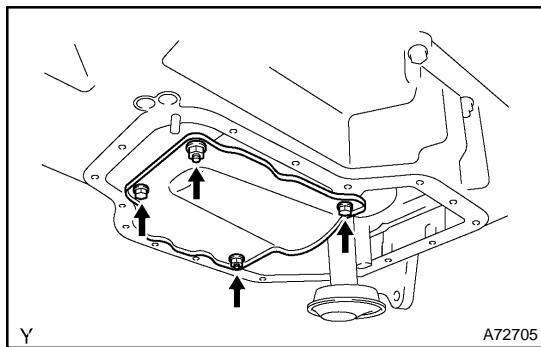


34. REMOVE OIL PAN SUB-ASSY NO.2

- (a) Remove the 17 bolts and 2 nuts.
 (b) Insert the blade of SST between the oil pan and No.2 oil pan, and cut off applied sealer. Remove the No.2 oil pan. SST 09032-00100

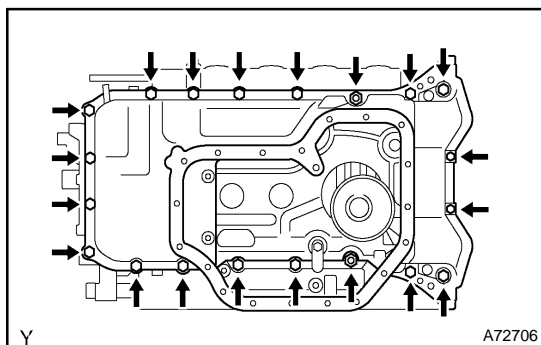
NOTICE:

- Be careful not to damage the contact surface of the oil pan and the No.2 oil pan.
- Be careful not to damage the No.2 oil pan flange.



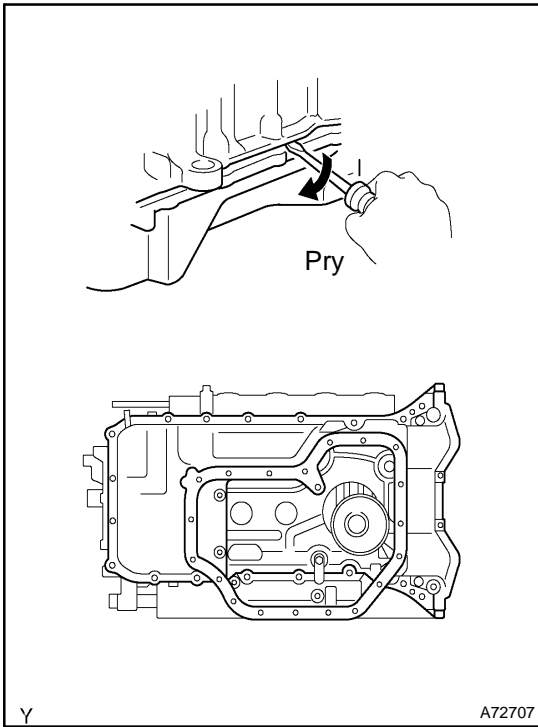
35. REMOVE OIL PAN Baffle PLATE

- (a) Remove the 2 bolts, 2 nuts and baffle plate.



36. REMOVE OIL PAN SUB-ASSY

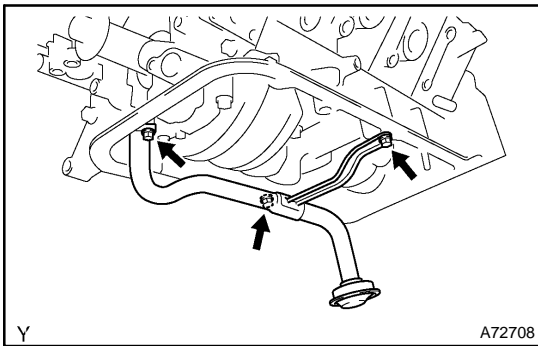
- (a) Remove the 18 bolts and 2 nuts.



- (b) Using a screwdriver, remove the oil pan by prying between the oil pan and cylinder block in the order shown in the illustration.

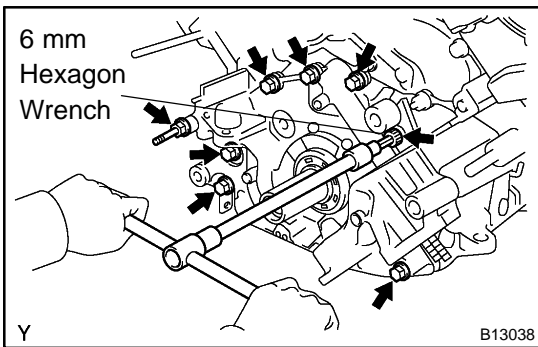
NOTICE:

Be careful not to damage the contact surfaces of the cylinder block or oil pan.



37. REMOVE OIL STRAINER SUB-ASSY

- (a) Remove the 2 bolts, 2 nuts, oil strainer and gasket.

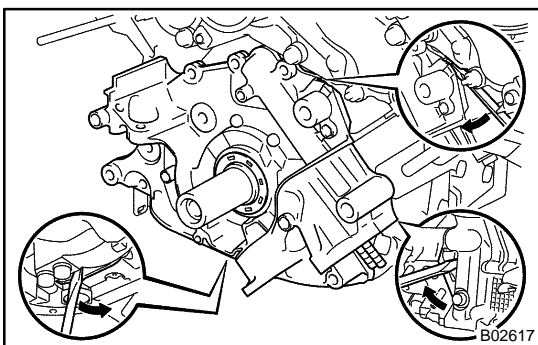


38. REMOVE OIL PUMP ASSY

- (a) Remove the 7 bolts and stud bolt.

HINT:

Use a 6 mm hexagon wrench to tighten the hexagon head bolt.

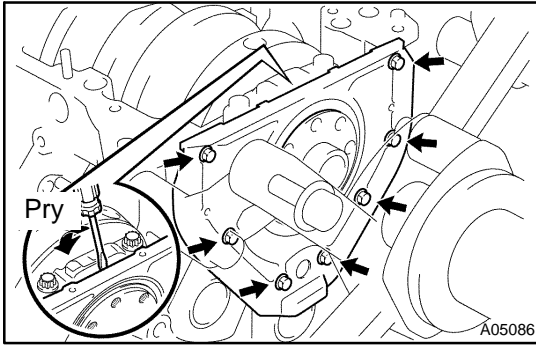


- (b) Using a screwdriver, remove the oil pump by prying the portions between the oil pump and cylinder block.

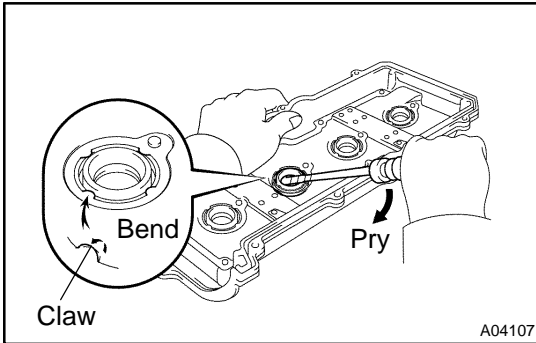
NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and oil pump.

- (c) Remove the O-ring from the cylinder block.

**39. REMOVE ENGINE REAR OIL SEAL RETAINER**

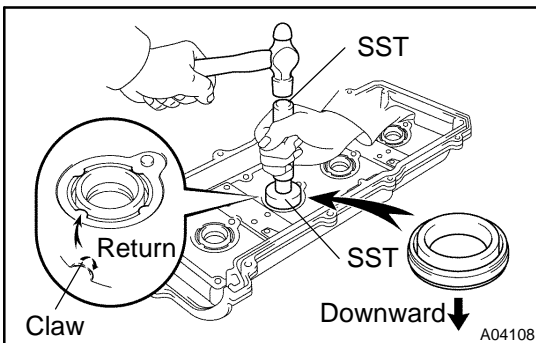
- (a) Remove the 7 bolts.
- (b) Using a screwdriver, remove the oil seal retainer by prying the portions between the oil seal retainer and crankshaft bearing cap.
- (c) Remove the O-ring.

**40. REMOVE SPARK PLUG TUBE GASKET**

- (a) Bend the 4 ventilation case claws installed on the cylinder head cover to an angle of 90° or more.
- (b) Using a screwdriver, pry out the gasket.

NOTICE:

Be careful not to damage the cylinder head cover. Tape the screwdriver tip.

**41. INSTALL SPARK PLUG TUBE GASKET**

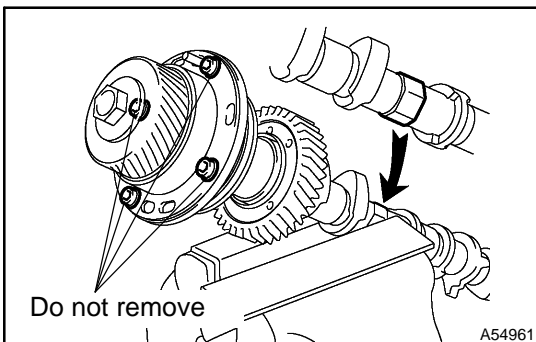
- (a) Using SST and a hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.

SST 09950-60010 (09951-00240, 09951-00440, 09952-06010), 09950-70010 (09951-07100)

NOTICE:

Be careful of the installation direction.

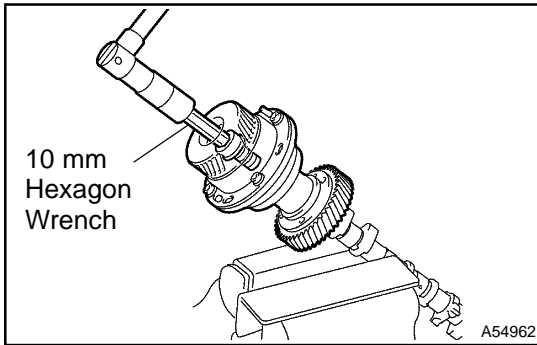
- (b) Apply a light coat of MP grease to the gasket lip.
- (c) Return the 4 ventilation case claws to the original positions.

**42. REMOVE CAMSHAFT TIMING TUBE ASSY**

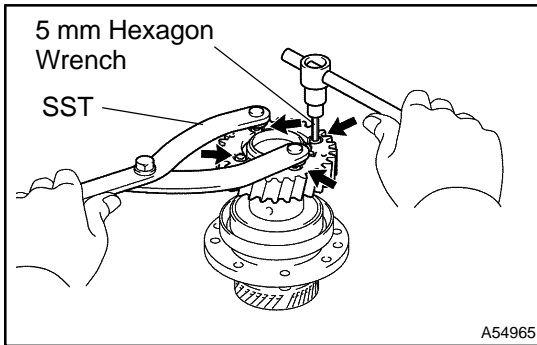
- (a) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

- **Be careful not to damage the camshaft.**
- **Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.**



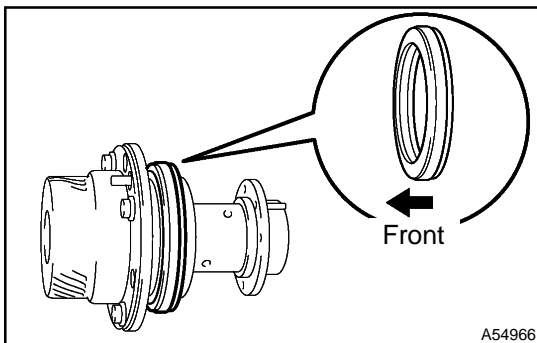
- (b) Remove the screw plug and seal washer.
- (c) Using a 10 mm hexagon wrench, and remove the bolt.
- (d) Pull out the timing tube and drive gear assembly from the camshaft.



- (e) Using SST and a 5 mm hexagon wrench, remove the 4 bolts, drive gear and oil seal.

NOTICE:

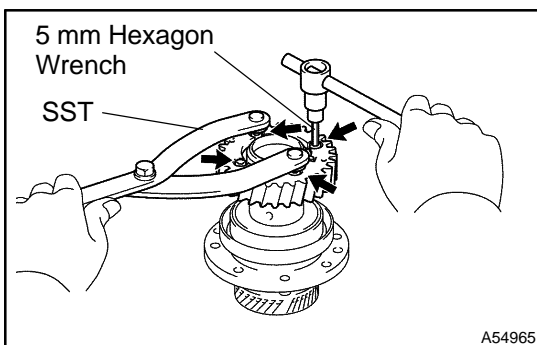
Be careful not to damage the timing tube.

**43. INSTALL CAMSHAFT SETTING OIL SEAL**

- (a) Insert a new oil seal into the camshaft timing tube until it reaches the stopper.

NOTICE:

- **Be careful of the installation direction.**
- **Do not turn over the oil seal lip.**

**44. INSTALL CAMSHAFT TIMING TUBE ASSY**

- (a) Align the timing tube knock pin with the knock pin groove of the drive gear, and temporarily install the drive gear with the 4 bolts.
- (b) Using SST and a 5 mm hexagon wrench, uniformly tighten the 4 bolts in several steps.

SST 09960-10010 (09962-01000, 09963-00500)

Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)

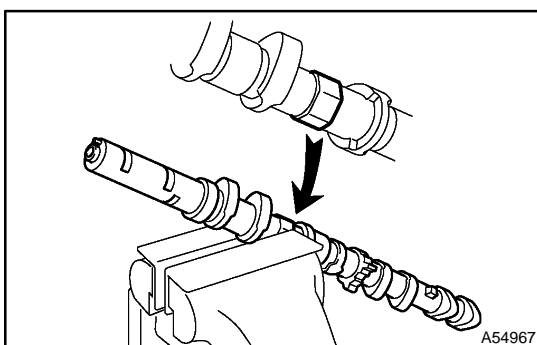
NOTICE:

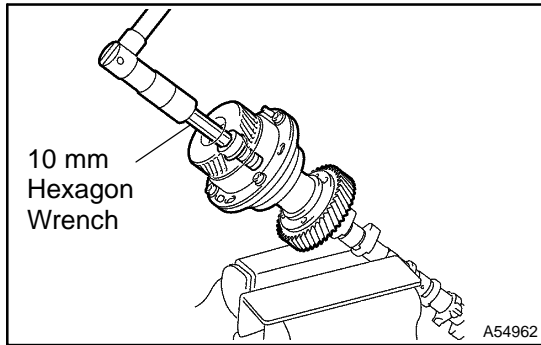
Be careful not to damage the timing tube.

- (c) Mount the hexagonal portion of the camshaft in a vise.

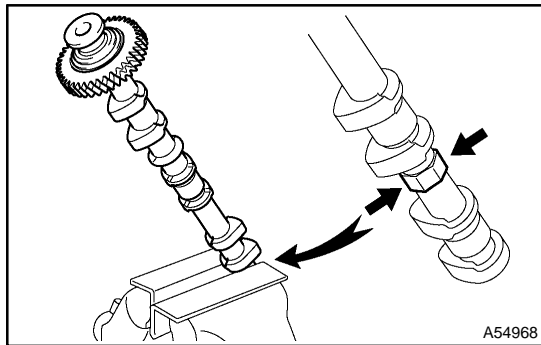
NOTICE:

Be careful not to damage the camshaft.





- (d) Align the camshaft knock pin with the knock pin groove of the timing tube, and push the timing tube by hand until it touches the bottom.
- (e) Using a 10 mm hexagon wrench, install the bolt.
Torque: 78 N·m (795 kgf-cm, 58 ft-lbf)
- (f) Install the seal washer and screw plug.
Torque: 15 N·m (152 kgf-cm, 11 ft-lbf)

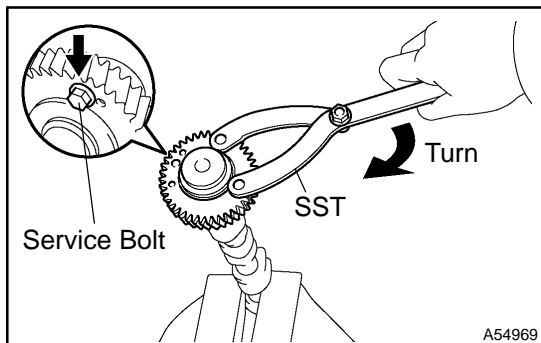


45. REMOVE CAMSHAFT SUB GEAR

- (a) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.

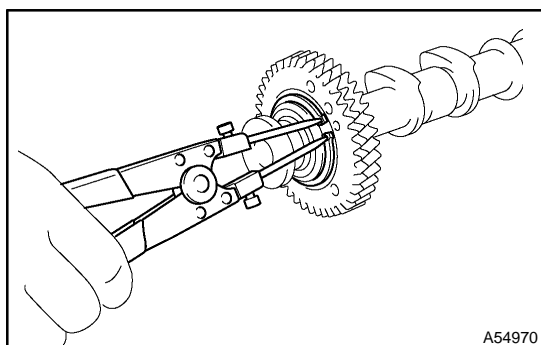


- (b) Using SST, turn the sub gear clockwise, and remove the service bolt.

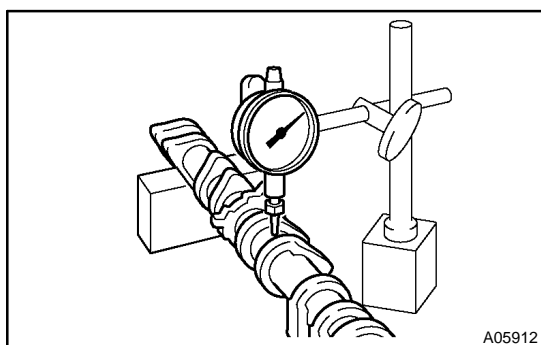
SST 09960-10010 (09962-01000, 09963-00500)

Recommended service bolt:

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)



- (c) Using snap ring pliers, remove the snap ring.
 - (d) Remove the wave washer, sub gear and gear spring.
- HINT:**
Arrange the camshaft sub gears and gear spring (RH and LH sides).

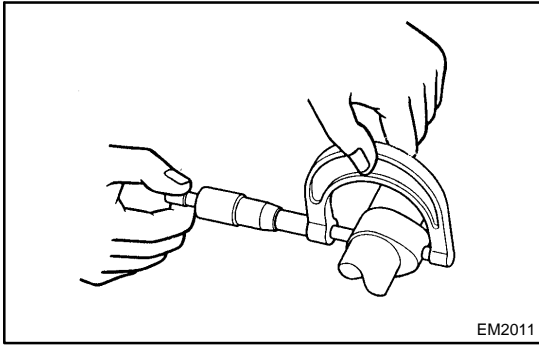


46. INSPECT CAMSHAFTS

- (a) Inspect the camshaft for runout.
 - (1) Place the camshaft on V-blocks.
 - (2) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

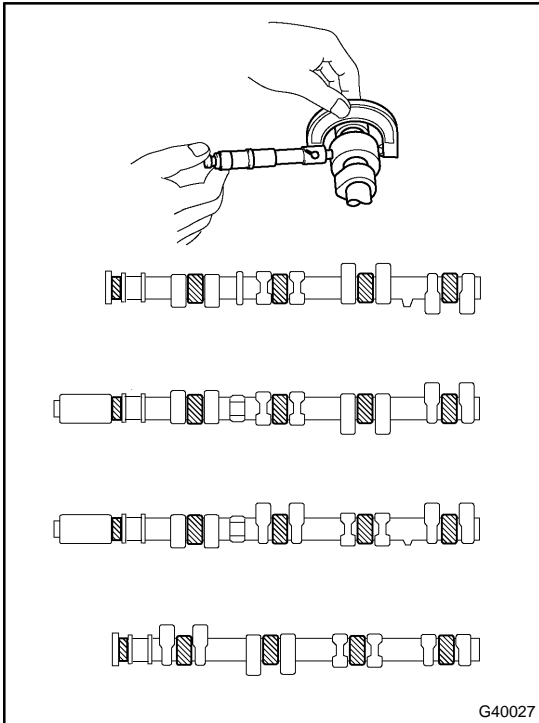
If the circle runout is greater than maximum, replace the camshaft.



EM2011

- (b) Inspect the cam lobes.
 - (1) Using a micrometer, measure the cam lobe height.
 - Standard cam lobe height:**
 - Intake: 41.94 to 42.04 mm (1.6512 to 1.6551 in.)**
 - Exhaust: 41.96 to 42.06 mm (1.6520 to 1.6559 in.)**
 - Minimum cam lobe height:**
 - Intake: 41.79 mm (1.6453 in.)**
 - Exhaust: 41.81 mm (1.6461 in.)**

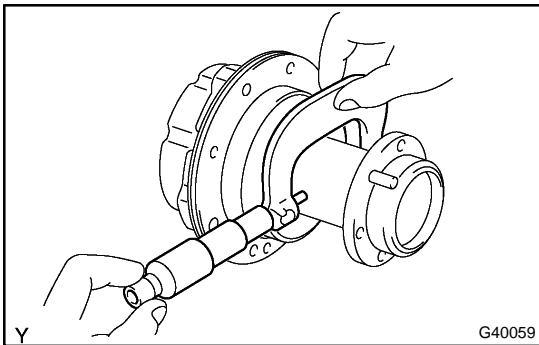
If the cam lobe height is less than the minimum, replace the camshaft.



G40027

- (c) Inspect the camshaft journals.
 - (1) Using a micrometer, measure the journal diameter.
 - Journal diameter:**
 - 26.954 to 26.970 mm (1.0612 to 1.0618 in.)**

If the journal diameter is not as specified, check the oil clearance.

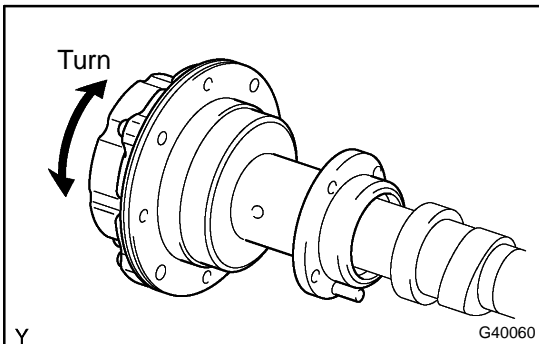


G40059

47. INSPECT CAMSHAFT TIMING TUBE ASSY

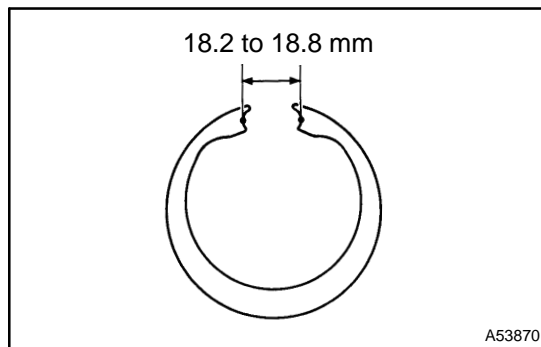
- (a) Using a micrometer, measure the journal diameter.
 - Journal diameter:**
 - 39.955 to 39.964 mm (1.5730 to 1.5734 in.)**

If the journal diameter is not as specified, check the oil clearance.



G40060

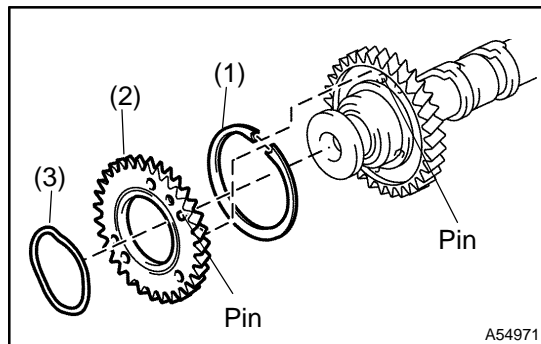
- (b) Install the timing tube to the intake camshaft, and check that the timing tube turns smoothly.
 - If necessary, replace the timing tube and intake camshaft.

**48. INSPECT CAMSHAFT GEAR SPRING**

- (a) Using vernier calipers, measure the gap distance of the gear spring.

Gap distance: 18.2 to 18.8 mm (0.717 to 0.740 in.)

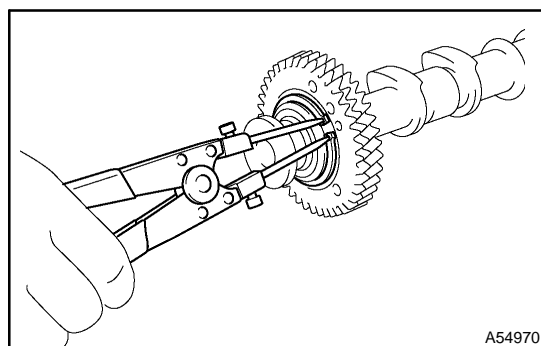
If the gap distance is not as specified, replace the gear spring.

**49. INSTALL CAMSHAFT SUB GEAR**

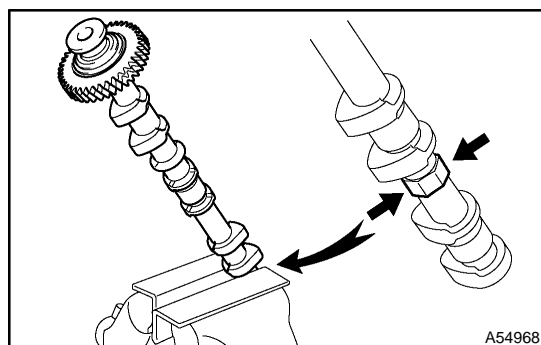
- (a) Install the gear spring (1), sub gear (2) and wave washer (3).

HINT:

Attach the pins on the gears to the gear spring ends.



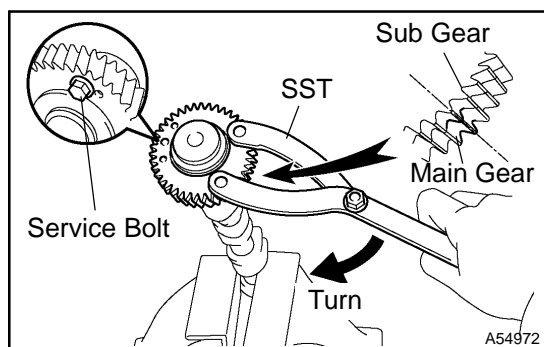
- (b) Using snap ring pliers, install the snap ring.



- (c) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

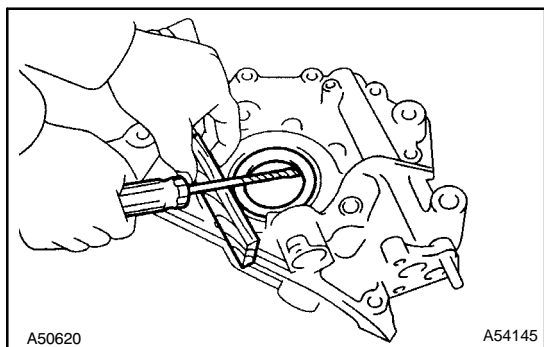
Be careful not to damage the camshaft.



- (d) Using SST, align the holes of the driven main gear and sub gear by turning the sub gear clockwise, and temporarily install a service bolt.
SST 09960-10010 (09962-01000, 09963-00500)
- (e) Align the gear teeth of the driven main gear and sub gear, and tighten the service bolt.

Recommended service bolt:

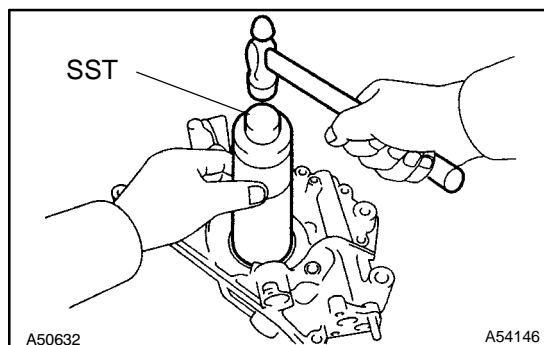
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)

**50. REMOVE OIL PUMP SEAL**

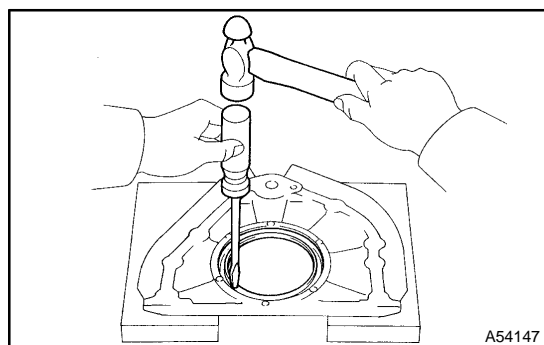
- (a) Using a screwdriver, pry out the oil seal.

NOTICE:

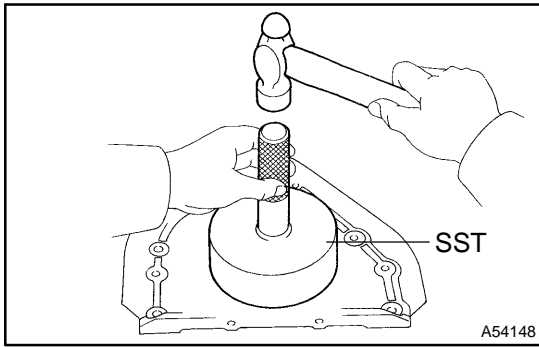
Be careful not to damage the oil pump body. Tape the screwdriver tip.

**51. INSTALL OIL PUMP SEAL**

- (a) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
SST 09316-60011 (09316-00011)
- (b) Apply MP grease to the oil seal lip.

**52. REMOVE ENGINE REAR OIL SEAL**

- (a) Using a screwdriver and hammer, tap out the oil seal.

**53. INSTALL ENGINE REAR OIL SEAL**

- (a) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223-56010

- (b) Apply MP grease to the oil seal lip.

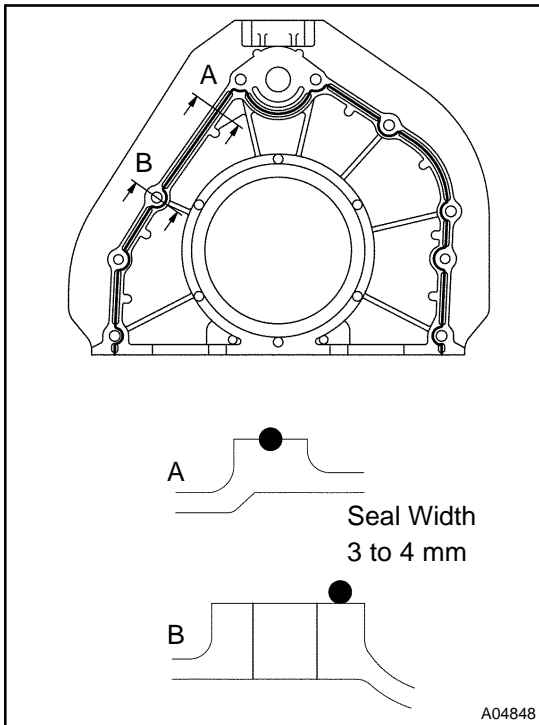
54. INSTALL ENGINE REAR OIL SEAL RETAINER

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil seal retainer and cylinder block.

(1) Using a razor blade and gasket scraper, remove all the oil packing (FIPG) material from the gasket surfaces and sealing grooves.

(2) Thoroughly clean all components to remove all the loose material.

(3) Using a non-residue solvent, clean both sealing surfaces.



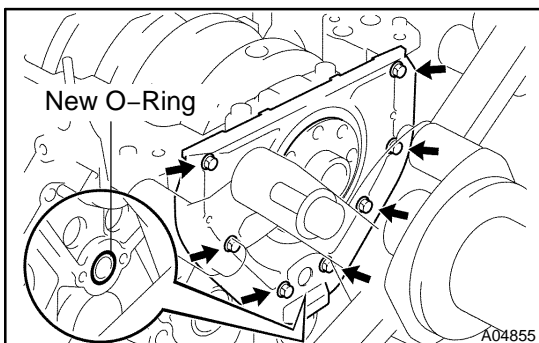
- (b) Apply seal packing to the oil seal retainer as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

(1) Use a nozzle that has been cut to a 3 to 4 mm (0.12 to 0.16 in.) opening.

(2) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

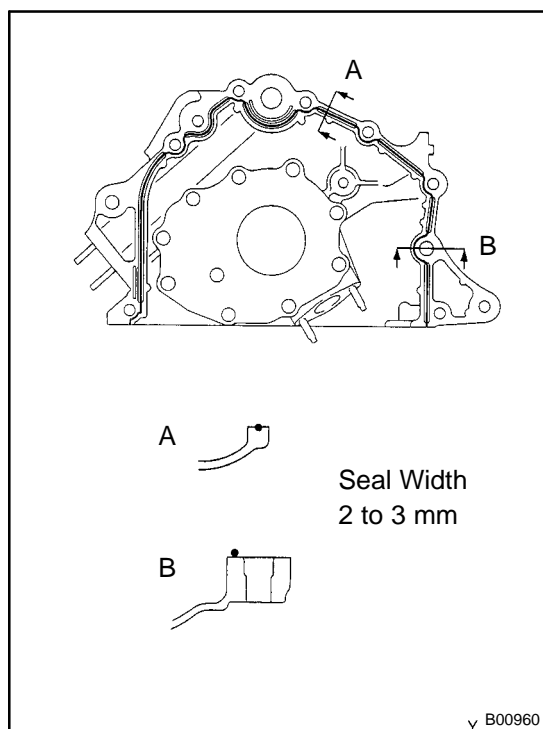
(3) Immediately remove the nozzle from the tube and reinstall the cap.



- (c) Install a new O-ring to the cylinder block.

- (d) Install the oil seal retainer with the 7 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)



55. INSTALL OIL PUMP ASSY

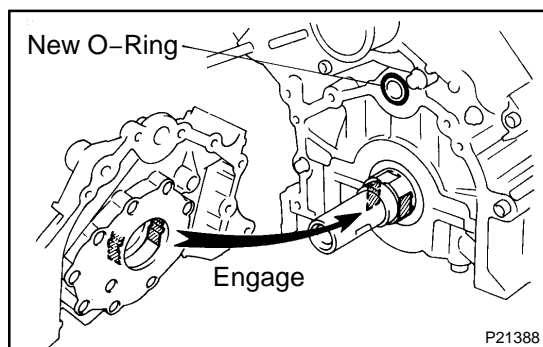
- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.
- (1) Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - (2) Thoroughly clean all components to remove all the loose material.
 - (3) Using a non-residue solvent, clean both sealing surfaces.
- (b) Apply seal packing to the oil pump as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

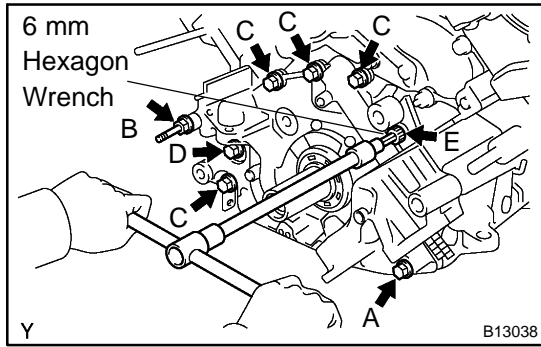
NOTICE:

Avoid applying an excessive amount to the surface, especially around the oil passage.

- (1) Use a nozzle that has been cut to a 2 to 3 mm (0.08 to 0.12 in.) opening.
- (2) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- (3) Immediately remove the nozzle from the tube and reinstall the cap.



- (c) Install a new O-ring to the cylinder block.
- (d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.



(e) Install the oil pump with a new stud bolt and the 7 bolts. Uniformly tighten the bolts diagonally.

HINT:

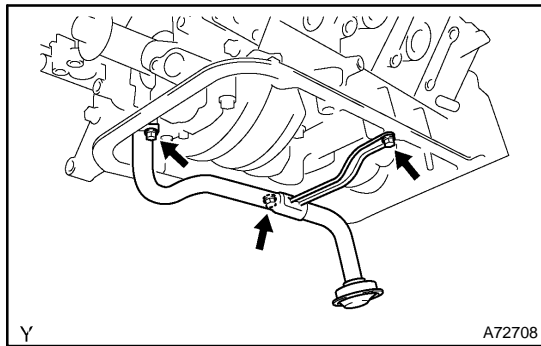
- Use a 6 mm hexagon wrench to tighten the hexagon head bolt.
- The following chart is the reference of the oil pump bolt length.

Bolt	Size of Bolt Head	Length
A	12 mm	50 mm (1.97 in.)
B	14 mm Stud Bolt	102.8 mm (4.047 in.)
C	12 mm	35 mm (1.38 in.)
D	14 mm	44 mm (1.73 in.)
E	6 mm Hexagon	28 mm (1.10 in.)

Torque:

16 N·m (160 kgf·cm, 11 ft·lbf) for bolts A, B, C and E

31 N·m (311 kgf·cm, 23 ft·lbf) for bolt D



56. INSTALL OIL STRAINER SUB-ASSY

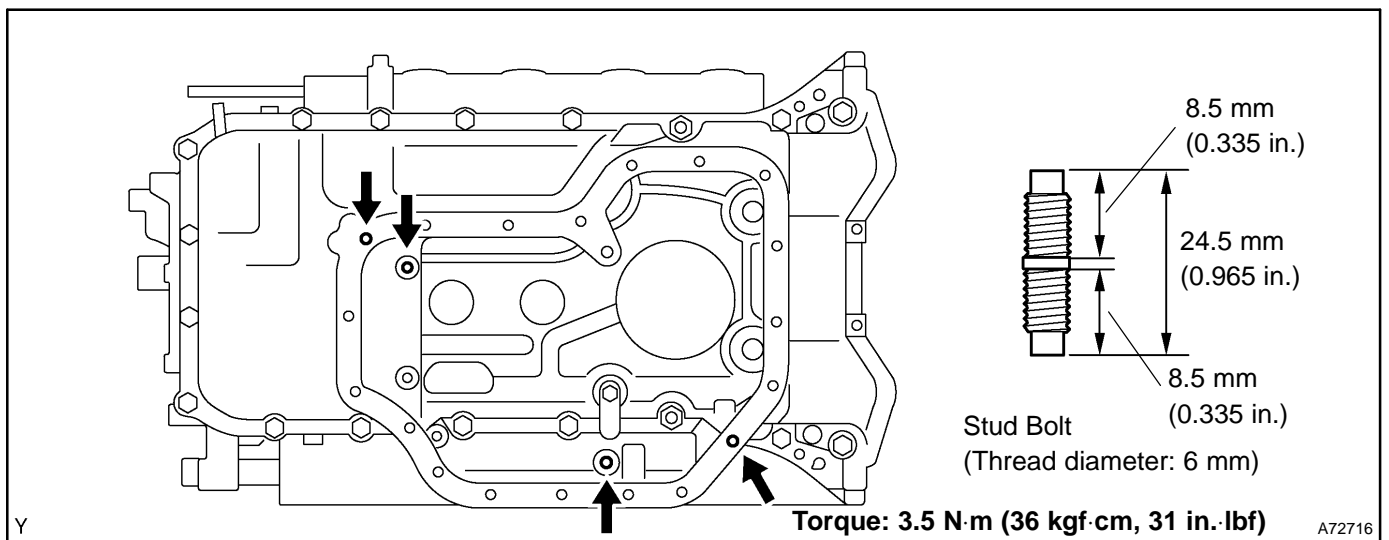
(a) Install a new gasket and the oil strainer with the 2 bolts and 2 nuts.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

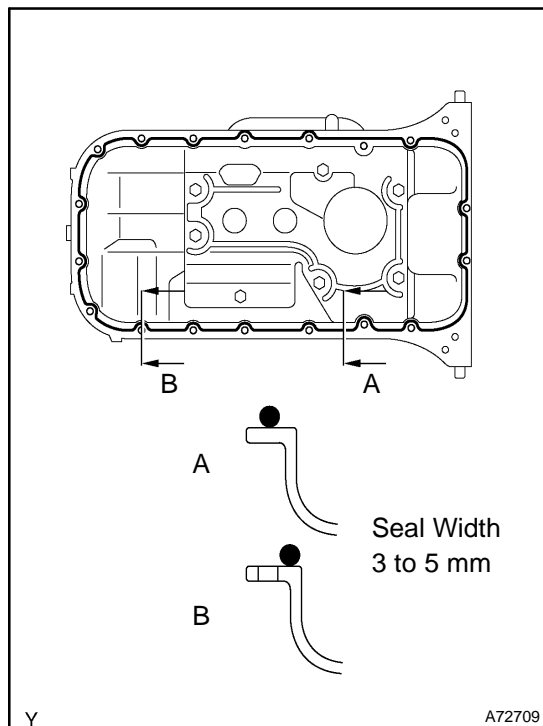
HINT:

Use bolts 12 mm (0.47 in.) in length.

57. INSTALL STUD BOLT



Torque: 3.5 N·m (36 kgf·cm, 31 in·lbf)



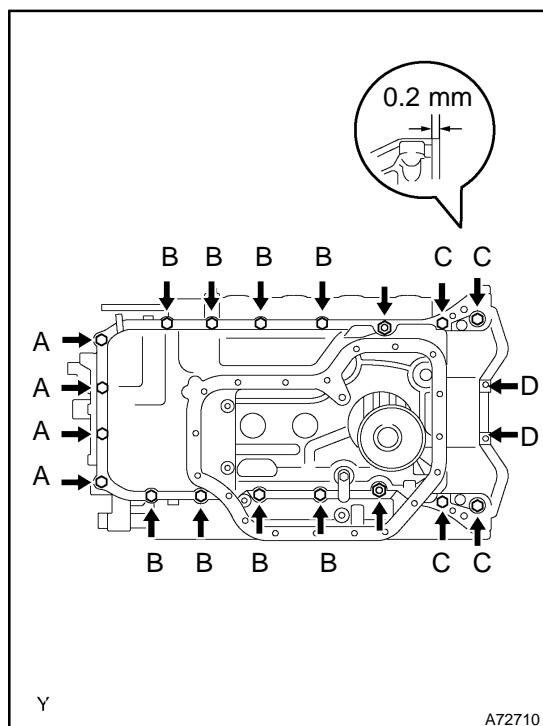
58. INSTALL OIL PAN SUB-ASSY

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan, cylinder block, oil pump and rear oil seal retainer.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.

- (b) Apply seal packing to the No.1 oil pan as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- Use a nozzle that has been cut to a 3 to 5 mm (0.12 to 0.20 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove the nozzle from the tube and reinstall the cap.



- (c) Temporarily install the oil pan with the 18 bolts and 2 nuts.
HINT:

The following chart is the reference for the oil pump bolt length.

Bolt	Size of Bolt Head	Length
A	10 mm	20 mm (0.79 in.)
B	12 mm	25 mm (0.98 in.)
C	12 mm	60 mm (2.36 in.)
D	10 mm	35 mm (1.38 in.)

- (d) Set the oil pan as shown in the illustration.

NOTICE:

Make sure the clearance between the rear end of the oil pan and cylinder block is 0.2 mm (0.008 in.) or less.

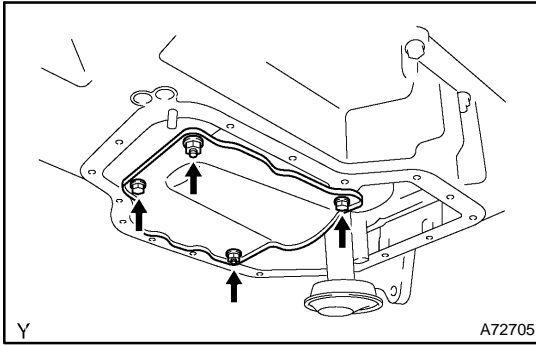
If the clearance is more than 0.2 mm (0.008 in.), the oil pan will be stretched.

- (e) Uniformly tighten the bolts and nuts diagonally.

Torque:

7.5 N·m (76 kgf·cm, 66 in·lbf) for bolts A and D

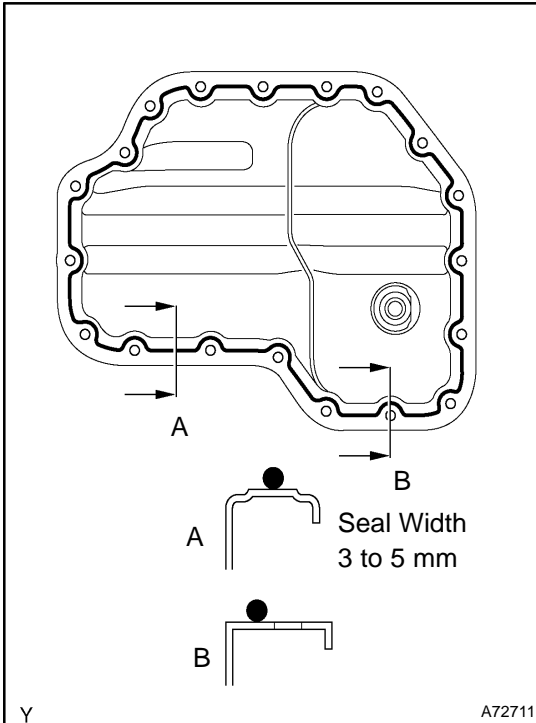
28 N·m (286 kgf·cm, 21 ft·lbf) for bolts B, C and nut

**59. INSTALL OIL PAN BAFFLE PLATE**

- (a) Install the baffle plate with the 2 bolts and 2 nuts.
Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)

HINT:

Use bolts 12 mm (0.47 in.) in length.

**60. INSTALL OIL PAN SUB-ASSY NO.2**

- (a) Remove any oil packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.

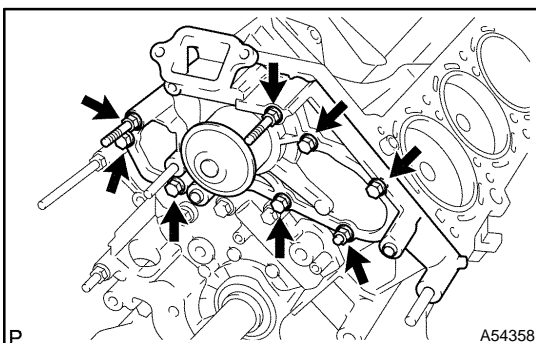
- (b) Apply seal packing to the No.2 oil pan as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- Use a nozzle that has been cut to a 3 to 5 mm (0.12 to 0.20 in.) opening.
 - Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 - Immediately remove the nozzle from the tube and reinstall the cap.
- (c) Install the No.2 oil pan with the 17 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several steps.
Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)

HINT:

Use bolts 14 mm (0.55 in.) in length.

**61. INSTALL WATER PUMP ASSY**

- (a) Install a new gasket and water pump with the 5 bolts, 2 stud bolts and nut. Uniformly tighten the bolts, stud bolts and nut in several steps.

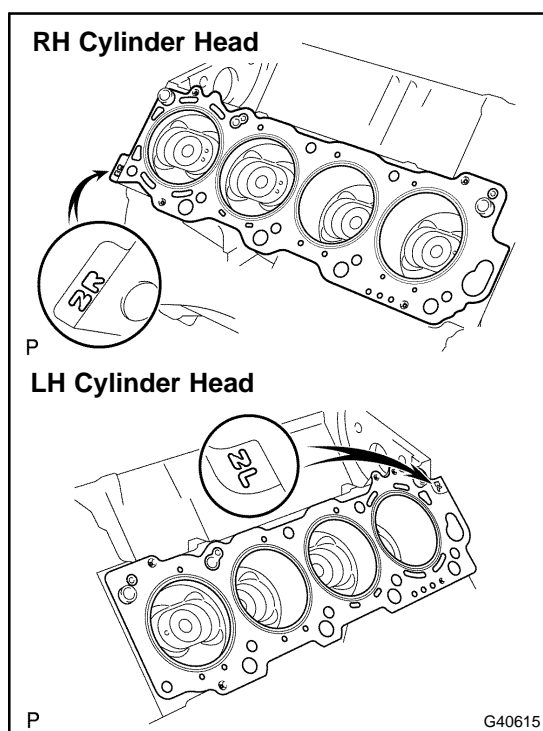
Torque:

Bolt: 21 N·m (214 kgf·cm, 15 ft.-lbf)

Stud bolt and nut: 18 N·m (184 kgf·cm, 13 ft.-lbf)

HINT:

Use bolts 35 mm (1.38 in.) in length.

**62. INSTALL CYLINDER HEAD SUB-ASSY**

- (a) Place 2 new cylinder head gaskets in position on the cylinder block.

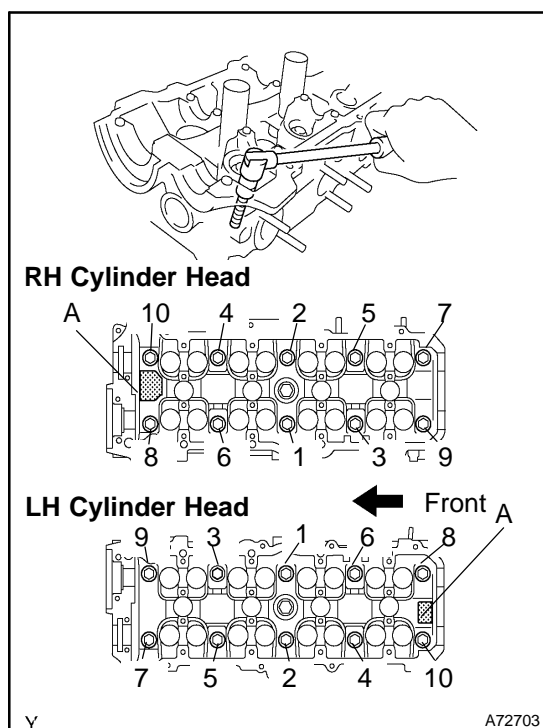
HINT:

A mark is placed on the rear side of the cylinder head gasket to distinguish the LH and RH banks, a "2R" mark for the RH bank and a "2L" mark for the LH bank.

NOTICE:

Be careful of the installation direction.

- (b) Place the 2 cylinder heads in position on the cylinder head gaskets.



- (c) Install the cylinder head bolts.

HINT:

- The cylinder head bolts are tightened in 3 progressive steps (steps (3), (5) and (6)).
- If any cylinder head bolt is broken or deformed, replace it.

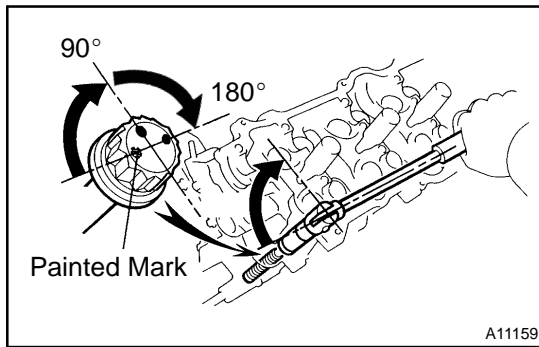
- (1) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- (2) Install the plate washer to the cylinder head bolt.
- (3) Install and uniformly tighten the 10 cylinder head bolts on one side of the cylinder head in several steps in the order shown in the illustration, then do the other side in the same way.

Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.

NOTICE:

Do not drop the plate washer for the cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.

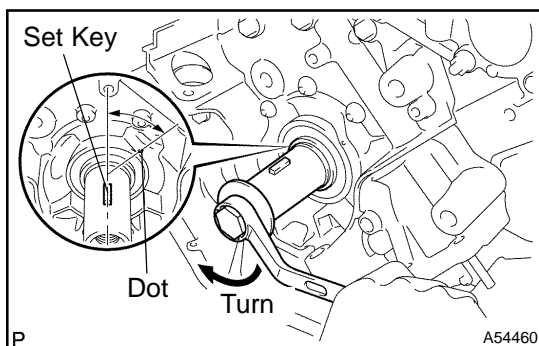


- (4) Mark the front of the cylinder head bolt head with paint.
- (5) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (6) Retighten the cylinder head bolts by an additional 90°.
- (7) Check that the painted mark is now at a 180° angle to front.

63. INSTALL CAMSHAFTS

NOTICE:

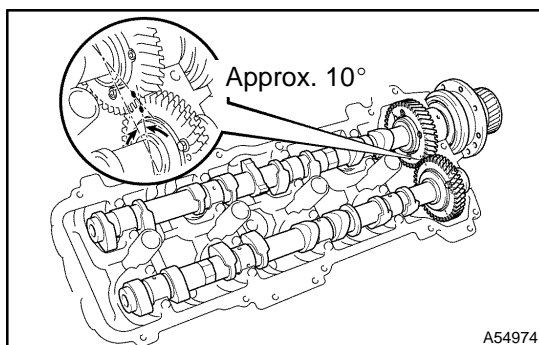
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



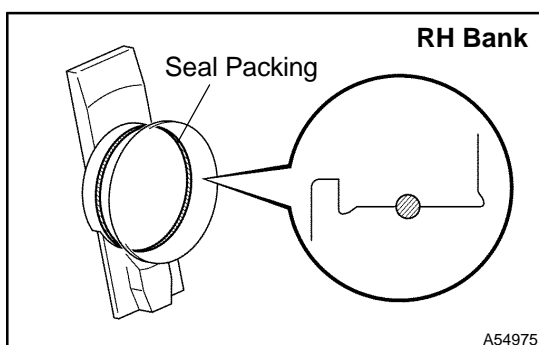
- (a) Set the crankshaft position.
 - (1) Using the crankshaft damper bolt, turn the crankshaft, and set the set key of the crankshaft at the position of 90° counterclockwise from the timing mark (dot) of the oil pump body.

NOTICE:

Having the crankshaft at a wrong angle can cause the piston head and valve head to come into contact with each other when installing the camshaft, causing damage. So always set the crankshaft at the correct angle.

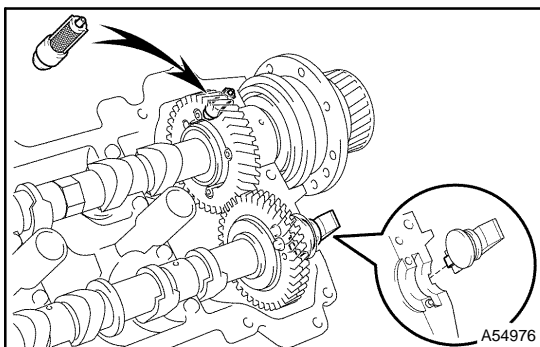


- (b) Install the camshafts of the RH bank.
 - (1) Apply engine oil to the thrust portions of the intake and exhaust camshafts.
 - (2) Align the timing marks (1-dot mark) of the camshaft drive and driven main gears, and place the 2 camshafts.
 - (3) Set the timing marks (1-dot mark) of the camshaft drive and driven main gears at approx. 10° angle.



- (4) Apply seal packing to the camshaft housing plug.
 - Remove the old packing (FIPG) material.
 - Apply seal packing to the housing plug.

Seal packing: Part No. 08826-00080 or equivalent



- (5) Install the camshaft housing plug and oil control valve filter to the cylinder head as shown in the illustration.

NOTICE:

Be careful of the installation direction.

- (6) Apply seal packing to the front bearing cap.
- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap and cylinder head.

Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and groove.

Thoroughly clean all components to remove all the loose material.

Using a non-residue solvent, clean both sealing surfaces.

- Apply seal packing to the bearing cap as shown in the illustration.

Use a nozzle that has been cut to 1.5 to 2.0 mm (0.059 to 0.079 in.) opening.

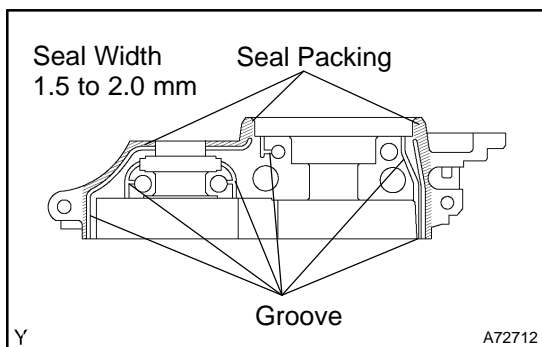
Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

Immediately remove the nozzle from the tube and reinstall the cap.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

Do not apply seal packing to the front bearing cap grooves.

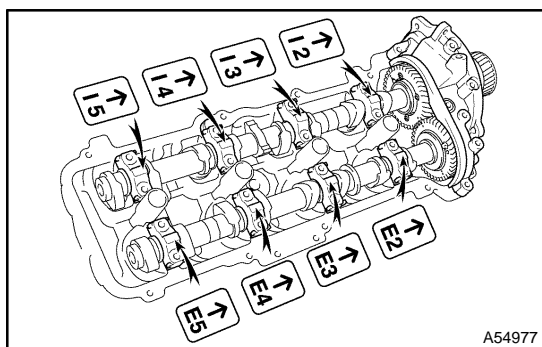


- (7) Install the front bearing cap.

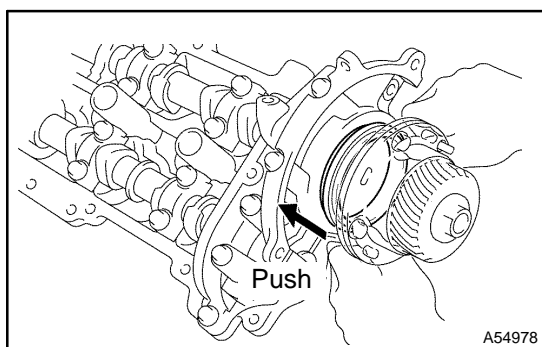
HINT:

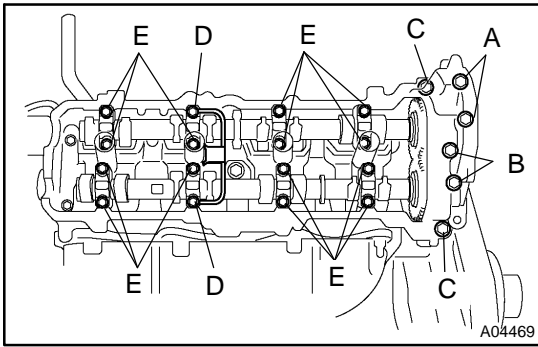
The thrust position of the camshaft will be determined after installing the front bearing cap.

- (8) Install the other bearing caps in the order shown with the arrow mark facing forward.



- (9) Push in the camshaft setting oil seal.





- (10) Install new seal washers to the bearing cap bolts (A and B).
- (11) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts (D and E).

NOTICE:

Do not apply engine oil under the heads of the bearing cap bolts (A), (B) and (C).

HINT:

Each bolt length is as follows:

94 mm (3.70 in.) for A with seal washer

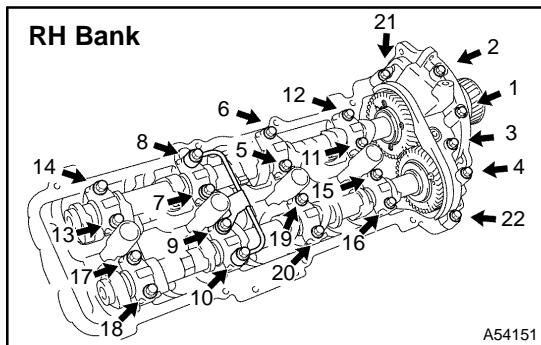
72 mm (2.83 in.) for B with seal washer

25 mm (0.98 in.) for C

55 mm (2.17 in.) for D

40 mm (1.57 in.) for E

- (12) Install the oil feed pipe and the 22 bearing cap bolts as shown in the illustration.

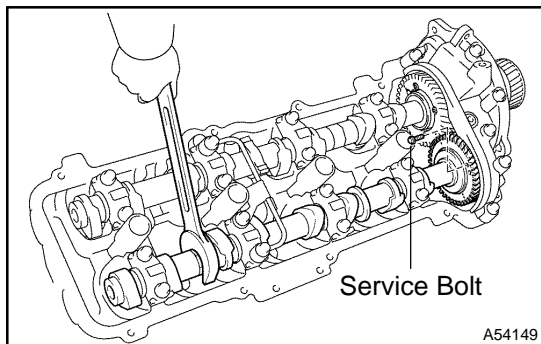


- (13) Uniformly tighten the 22 bearing cap bolts in several steps, in the order shown in the illustration.

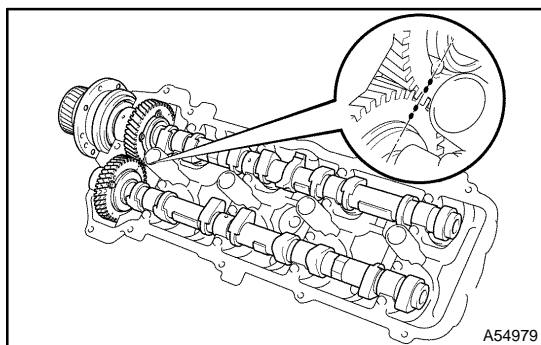
Torque:

7.5 N·m (76 kgf-cm, 66 in.-lbf) for bolt C

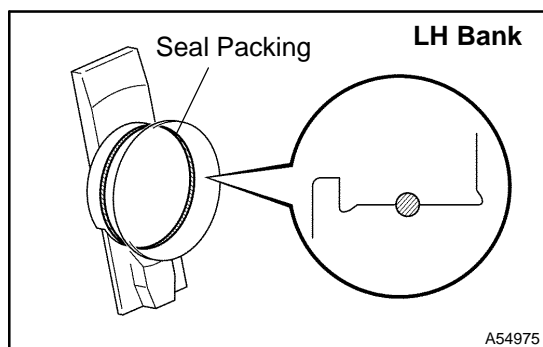
16 N·m (163 kgf-cm, 12 ft-lbf) for others



- (14) Bring the service bolt installed in the driven sub-gear upward by turning the hexagonal portion of the camshaft with a wrench.
- (15) Remove the service bolt.

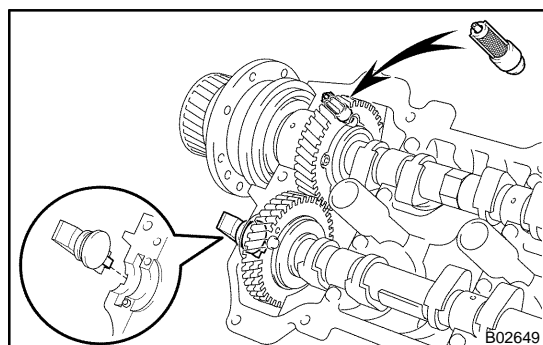


- (c) Install the camshafts of the LH bank.
 - (1) Apply MP grease to the thrust portion of the camshafts.
 - (2) Align the timing marks (2-dot marks) of the camshaft drive and driven main gears, and place the 2 camshafts.



- (3) Apply seal packing to the camshaft housing plug.
- Remove the old packing (FIPG) material.
 - Apply seal packing to the housing plug.

Seal packing: Part No. 08826-00080 or equivalent



- (4) Install the camshaft housing plug and oil control valve filter to the cylinder head as shown in the illustration.

NOTICE:

Be careful of the installation direction.

- (5) Apply seal packing to the front bearing cap.
- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap and cylinder head.

Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and groove.

Thoroughly clean all components to remove all the loose material.

Using a non-residue solvent, clean both sealing surfaces.

- Apply seal packing to the bearing cap as shown in the illustration.

Use a nozzle that has been cut to 1.5 to 2.0 mm (0.059 to 0.079 in.) opening.

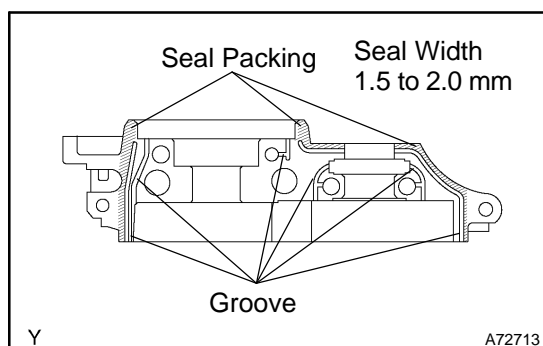
Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

Immediately remove the nozzle from the tube and reinstall the cap.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

Do not apply seal packing to the front bearing cap grooves.

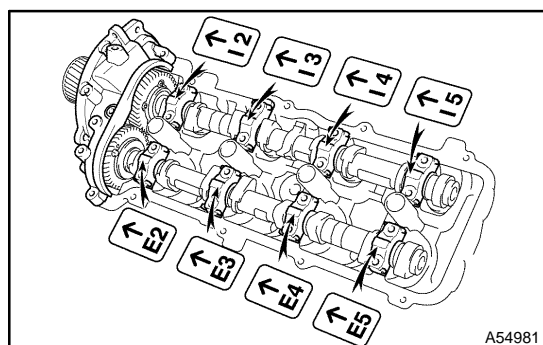


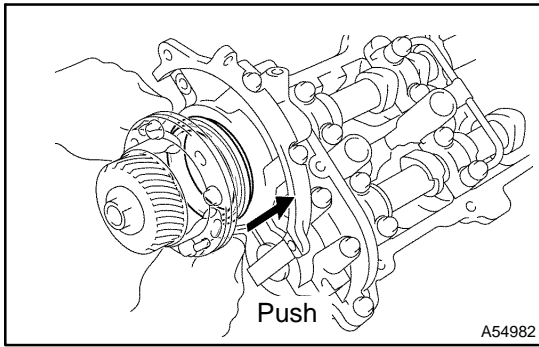
- (6) Install the front bearing cap.

HINT:

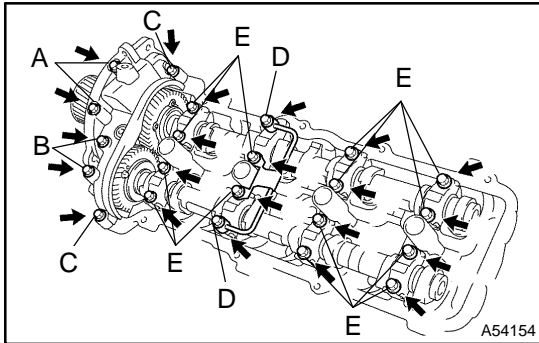
The thrust position of the camshaft will be determined after installing the front bearing cap.

- (7) Install the other bearing cap in the order shown with the arrow mark facing forward.





(8) Push in the camshaft setting oil seal.



(9) Install a new seal washer to the bearing cap bolt (A and B).

(10) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts (D and E).

NOTICE:

Do not apply engine oil under the heads of the bearing cap bolts (A), (B) and (C).

HINT:

Each bolt length is as follows:

94 mm (3.70 in.) for A with seal washer

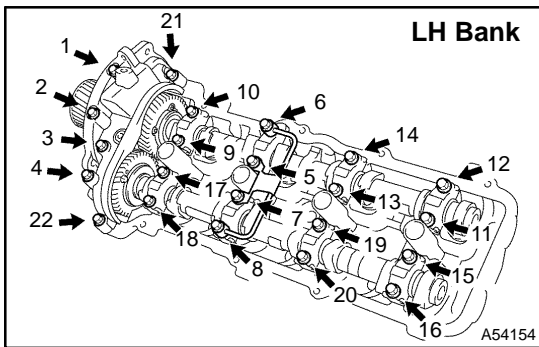
72 mm (2.83 in.) for B with seal washer

25 mm (0.98 in.) for C

55 mm (2.17 in.) for D

40 mm (1.57 in.) for E

(11) Install the oil feed pipe and the 22 bearing cap bolts as shown in the illustration.

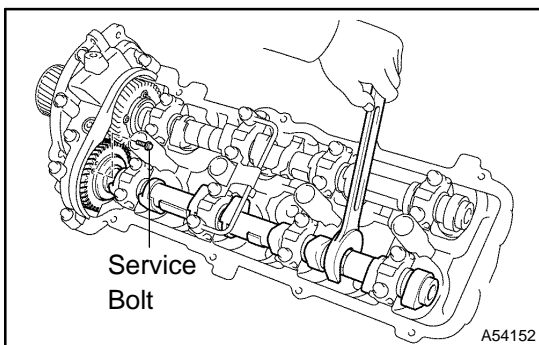


(12) Uniformly tighten the 22 bearing cap bolts in several steps, in the order shown in the illustration.

Torque:

7.5 N·m (76 kgf·cm, 66 in.-lbf) for bolt C

16 N·m (163 kgf·cm, 12 ft-lbf) for others



(13) Bring the service bolt installed in the driven sub-gear upward by turning the hexagonal portion of the camshaft with a wrench.

(14) Remove the service bolt.

64. INSTALL REAR TIMING BELT PLATE RH

- (a) Install the rear timing belt plate with the bolt and stud bolt.
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

65. INSTALL REAR TIMING BELT PLATE RH NO. 2

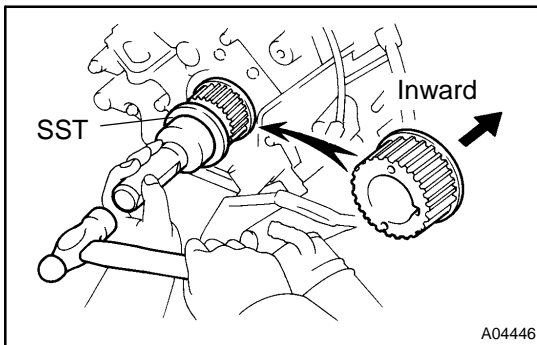
- (a) Install the rear timing belt plate with the 2 bolts.
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

66. INSTALL REAR TIMING BELT PLATE LH

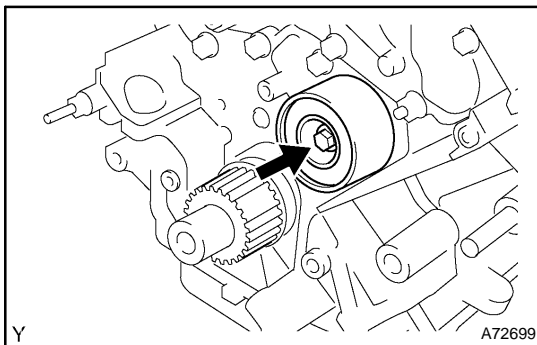
- (a) Install the rear timing belt plate with the bolt.
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

67. INSTALL REAR TIMING BELT PLATE LH NO. 2

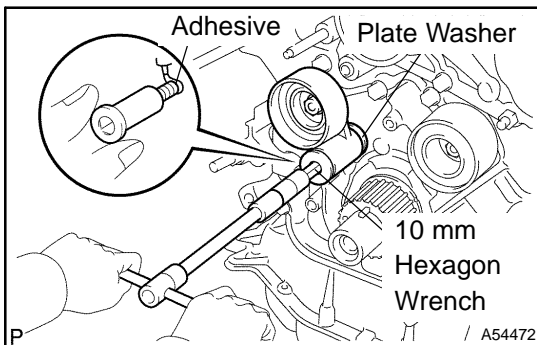
- (a) Install the rear timing belt plate with the 2 bolts.
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

**68. INSTALL CRANKSHAFT TIMING PULLEY**

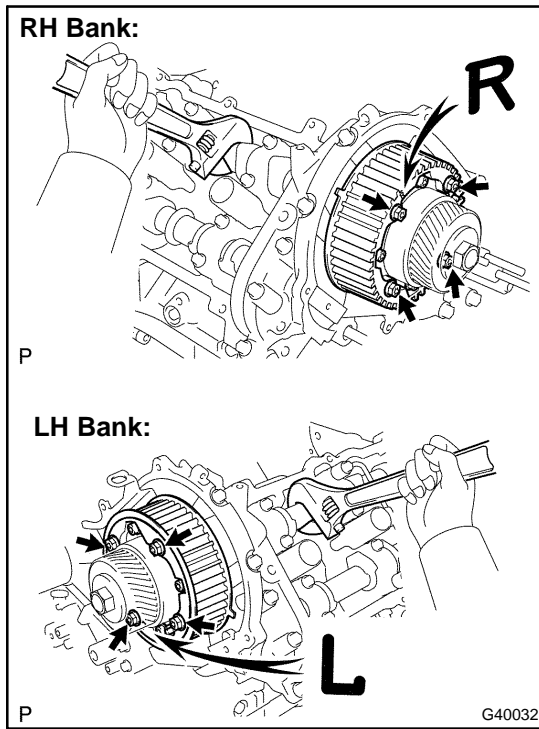
- (a) Fit the timing pulley set key to the key groove of the pulley.
 (b) Using SST and a hammer, tap in the timing pulley with the flange side facing inward.
SST 09223-46011

**69. INSTALL TIMING BELT IDLER SUB-ASSY NO.2**

- (a) Install the idler with the bolt.
Torque: 35 N·m (352 kgf·cm, 25 ft·lbf)
 (b) Check that the idler moves smoothly.

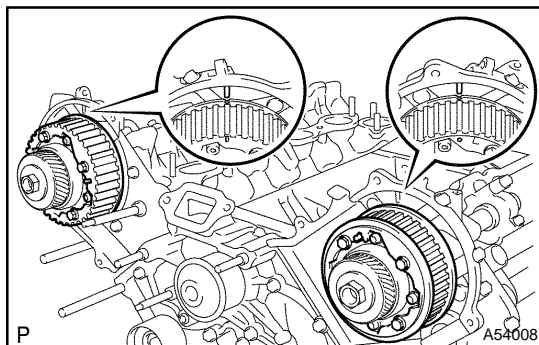
**70. INSTALL TIMING BELT IDLER SUB-ASSY NO.1**

- (a) Apply adhesive to 2 or 3 threads of the pivot bolt.
Adhesive:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
 (b) Using a 10 mm hexagon wrench, install the plate washer and idler with the pivot bolt.
Torque: 35 N·m (352 kgf·cm, 25 ft·lbf)
 (c) Check that the idler bracket moves smoothly.



71. INSTALL CAMSHAFT TIMING PULLEYS

- (a) Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
 - (b) Attach the timing pulley to the camshaft timing tube. Face the timing pulley's "R" and "L" marks forward.
 - (c) Hold the hexagonal portion of the camshaft.
 - (d) Using a 5 mm hexagon wrench, install the 8 bolts.
- Torque: 8.1 N·m (83 kgf·cm, 72 in.-lbf)**



72. INSTALL TIMING BELT

NOTICE:

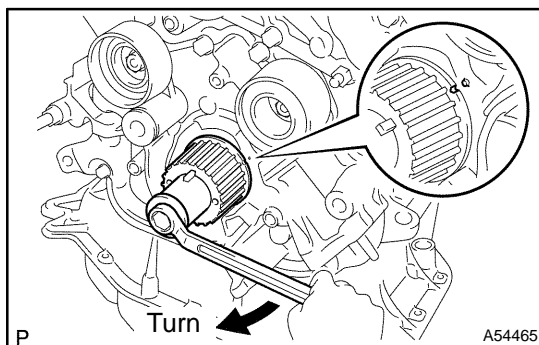
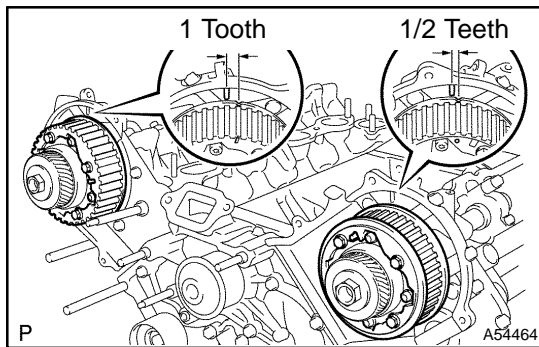
The engine should be cold.

- (a) Set the No.1 cylinder to TDC/compression.
 - (1) Turn the hexagonal portion of the camshaft to align the timing marks of the camshaft timing pulleys and timing belt plates.

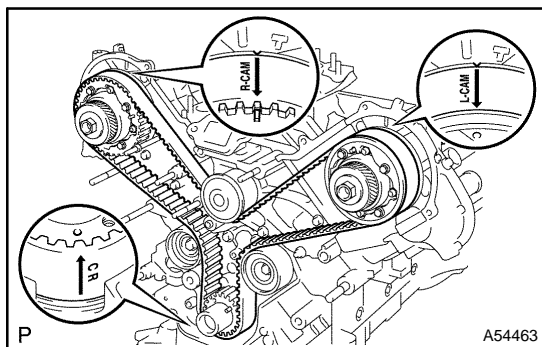
HINT:

By turning the camshaft timing pulleys clockwise as follows, installation of the timing pulleys will be easy:

- 1/2 teeth turn for the left bank camshaft timing pulley
- 1 tooth turn for the right bank camshaft timing pulley



- (2) Using the crankshaft damper bolt, turn the crankshaft to align the timing marks of the crankshaft timing pulley and oil pump body.



- (b) Install the timing belt.
- (1) Remove any oil or water on each pulley. Keep them clean after removal.

NOTICE:

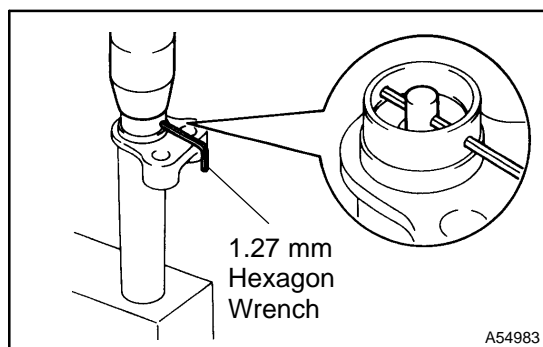
Only wipe the pulleys; do not use any cleansing agent.

- (2) Face the front mark (arrow) on the timing belt forward.
- (3) Connect the timing belt to the crankshaft timing pulley.
 - Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
- (4) Connect the timing belt to the idler No.2.
- (5) Connect the timing belt to the camshaft timing pulley LH.
 - Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.
- (6) Connect the timing belt to the water pump pulley.
- (7) Connect the timing belt to the camshaft timing pulley (RH bank).
 - Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.

- (8) Connect the timing belt to the idler No.1.

- (c) Set the belt tensioner.

- (1) Using a press, slowly press in the push rod using 981 to 9,807 N (100 to 1,000 kgf, 220 to 2,205 lbf) of pressure.
- (2) Align the holes of the push rod and housing, pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.
- (3) Release the press.
- (4) Install the dust boot to the belt tensioner.

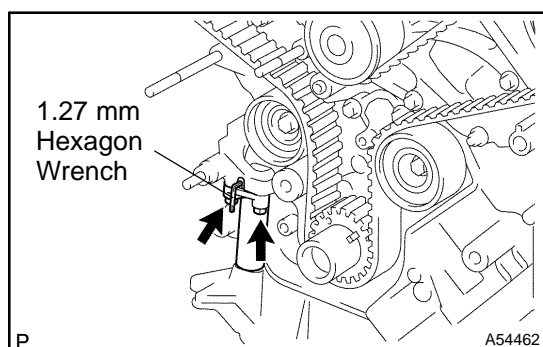


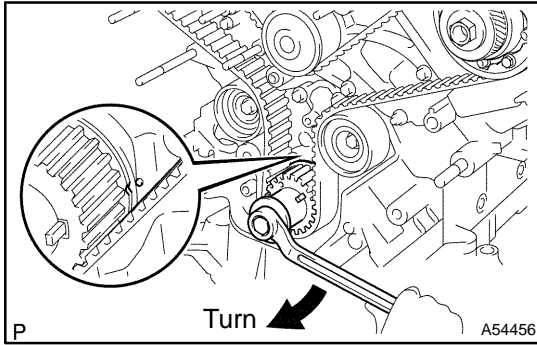
- (d) Install the belt tensioner.

- (1) Temporarily install the belt tensioner with the 2 bolts.
- (2) Alternately tighten the 2 bolts.

Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)

- (3) Using pliers, remove the 1.27 mm hexagon wrench from the belt tensioner.

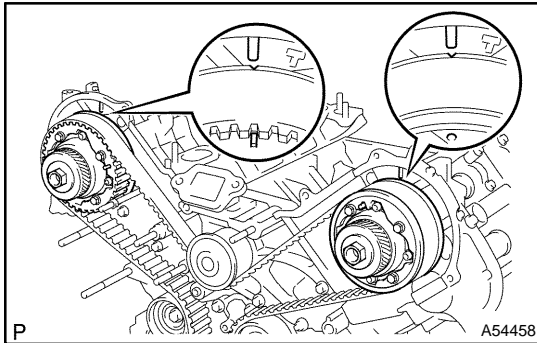




- (e) Check the valve timing.
- (1) Using the crankshaft damper bolt, slowly turn the crankshaft pulley 2 revolutions from the TDC to TDC.

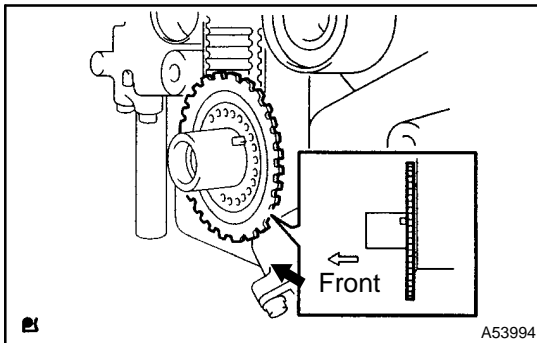
NOTICE:

Always turn the crankshaft pulley clockwise.



- (2) Check that each pulley aligns with the timing marks as shown in the illustration.

If the timing marks are not aligned, remove the timing belt and reinstall it.

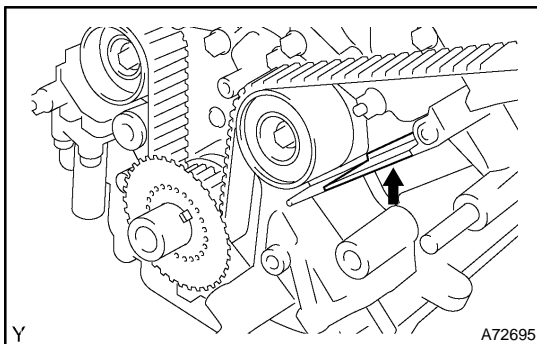


73. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1

- (a) Install the sensor plate as shown in the illustration.

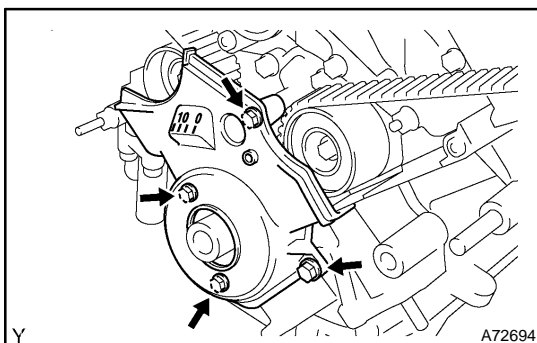
NOTICE:

Take care not to install it in a wrong direction.



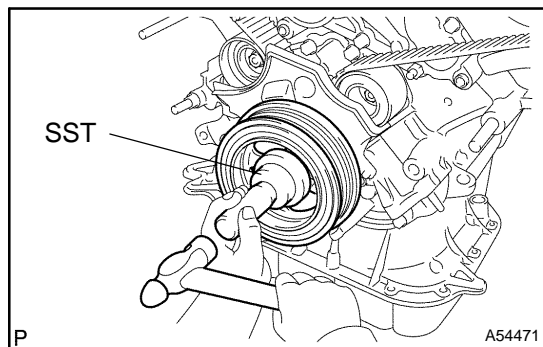
74. INSTALL TIMING GEAR COVER SPACER

- (a) Install the gasket to the cover spacer.
- (b) Install the cover spacer.

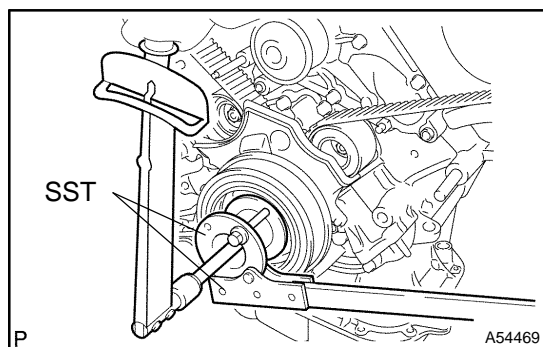


75. INSTALL TIMING BELT NO.1 COVER

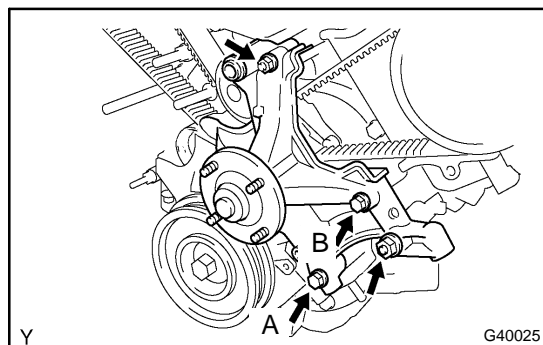
- (a) Install the timing belt cover with the 4 bolts.
- Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)**

**76. INSTALL CRANKSHAFT DAMPER SUB-ASSY**

- (a) Align the pulley set key with the key groove of the crankshaft damper.
- (b) Using SST and a hammer, tap in the crankshaft damper.
SST 09223-46011



- (c) Using SST, install the damper bolt.
SST 09213-70011 (90105-08076), 09330-00021
Torque: 245 N·m (2,498 kgf·cm, 181 ft·lbf)

77. INSPECT VALVE CLEARANCE (SEE PAGE 14-6)**78. ADJUST VALVE CLEARANCE (SEE PAGE 14-6)****79. INSTALL FAN BRACKET SUB-ASSY**

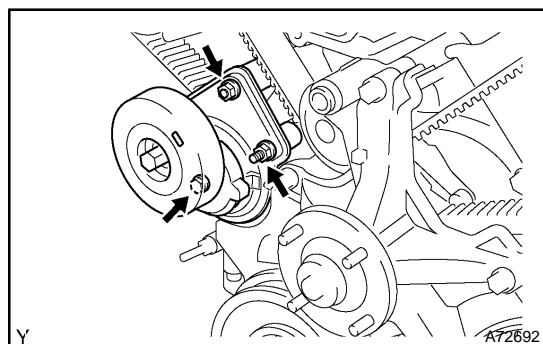
- (a) Install the idler pulley with the 2 bolts and 2 nuts.
Torque:
16 N·m (160 kgf·cm, 12 ft·lbf) for 12 mm head
32 N·m (326 kgf·cm, 24 ft·lbf) for 14 mm head

HINT:

Each bolt length is as follows:

106 mm (4.17 in.) for 12 mm head (A)

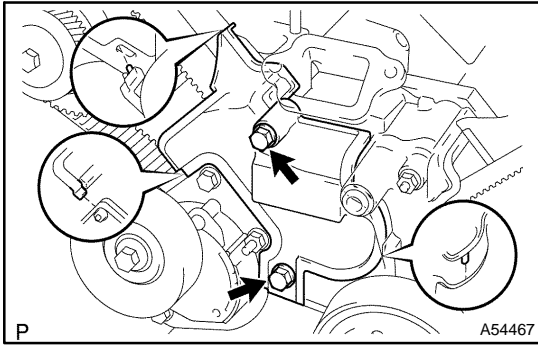
114 mm (4.49 in.) for 14 mm head (B)

**80. INSTALL V-RIBBED BELT TENSIONER ASSY**

- (a) Install the belt tensioner with the bolt and 2 nuts.
Torque: 16 N·m (160 kgf·cm, 11 ft·lbf)

HINT:

Use a bolt 106 mm (4.17 in.) in length.

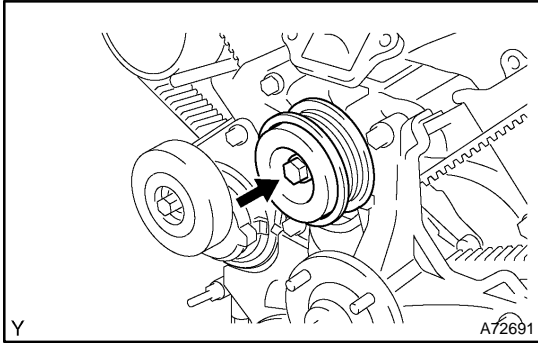
**81. INSTALL TIMING BELT COVER SUB-ASSY NO.2**

- (a) Install the timing belt cover and fit the claws and pins into each part.
- (b) Install the timing belt cover with the 2 bolts.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

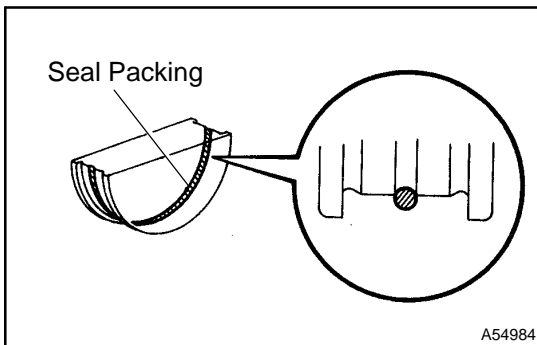
HINT:

Use bolts 106 mm (4.17 in.) in length.

**82. INSTALL IDLER PULLEY SUB-ASSY NO.2**

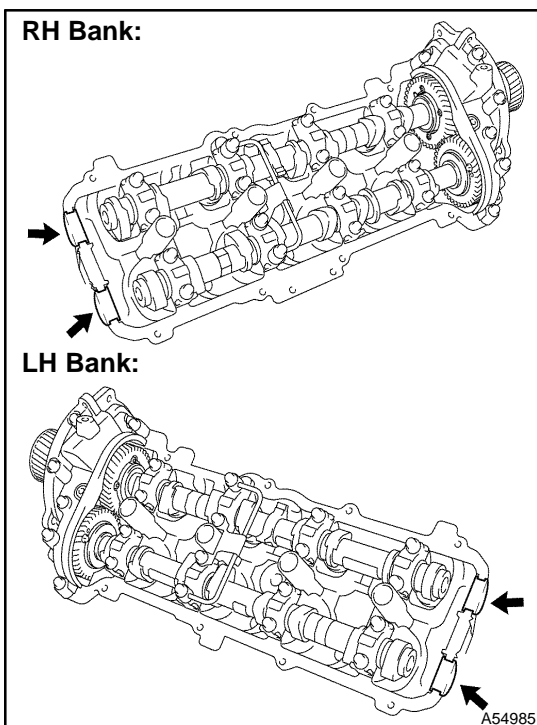
- (a) Install the idler pulley and cover plate with the bolt.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

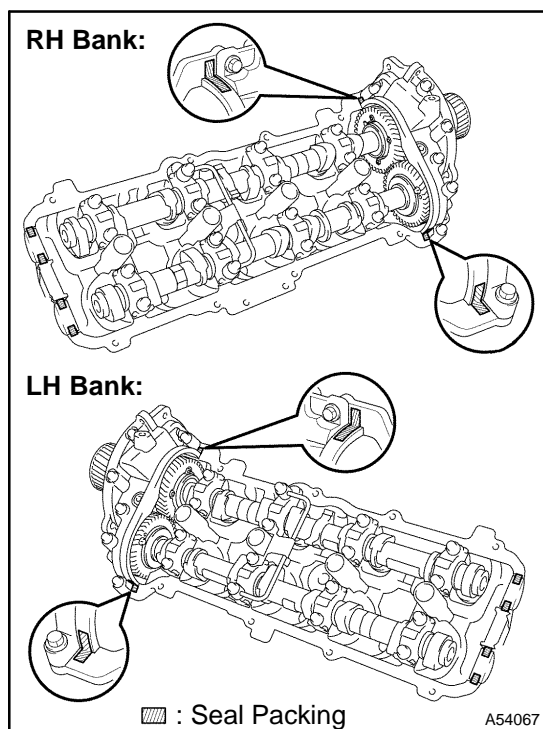
**83. INSTALL SEMICIRCULAR PLUG**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semicircular plug grooves.

Seal packing: Part No. 08826-00080 or equivalent



- (c) Install the 4 semicircular plugs to the cylinder heads as shown in the illustration.

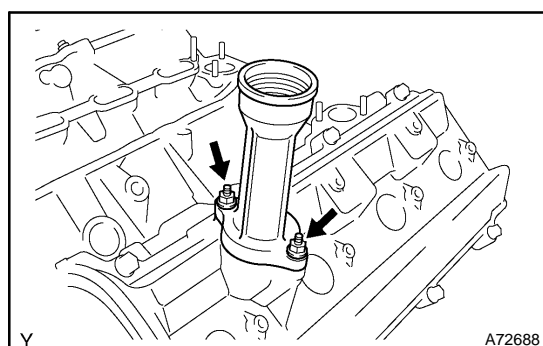
**84. INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- (c) Install the gasket to the cylinder head cover.
- (d) Install the seal washer to the bolt.
- (e) Install the cylinder head cover with the 9 bolts. Uniformly tighten the bolts in several steps.

Torque: 6.0 N·m (60 kgf·cm, 53 in.-lbf)

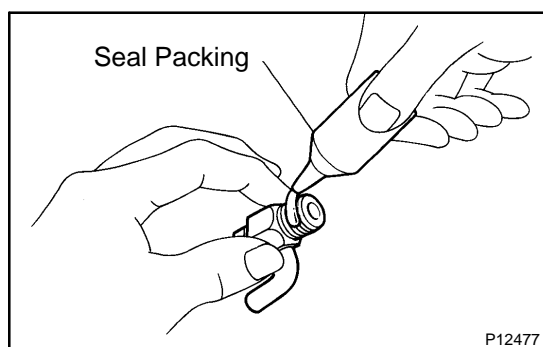
**85. INSTALL OIL FILLER CAP HOUSING**

- (a) Install a new gasket and the oil filler cap housing with the 2 nuts.

Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)

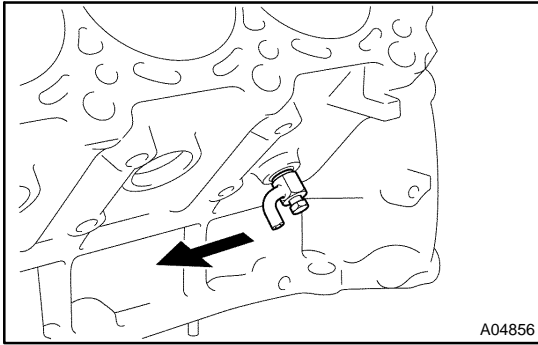
86. INSTALL OIL FILLER CAP SUB-ASSY**87. INSTALL SPARK PLUG**

Torque: 18 N·m (178 kgf·cm, 13 ft-lbf)

**88. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB-ASSY**

- (a) Apply seal packing to 2 or 3 threads.

Seal packing: Part No. 08826-00100 or equivalent

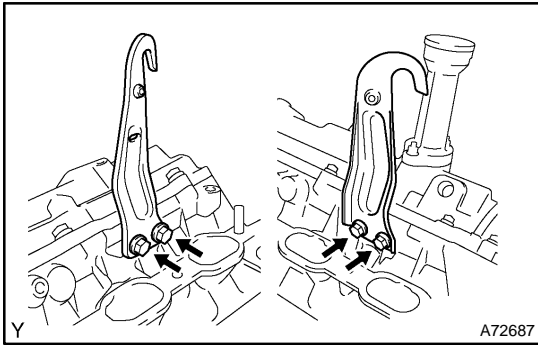


(b) Install the 2 drain cocks.

Torque: 49 N·m (500 kgf-cm, 36 ft.-lbf)

HINT:

After tightening to the specified torque, rotate the drain union clockwise until its drain port is facing forward.



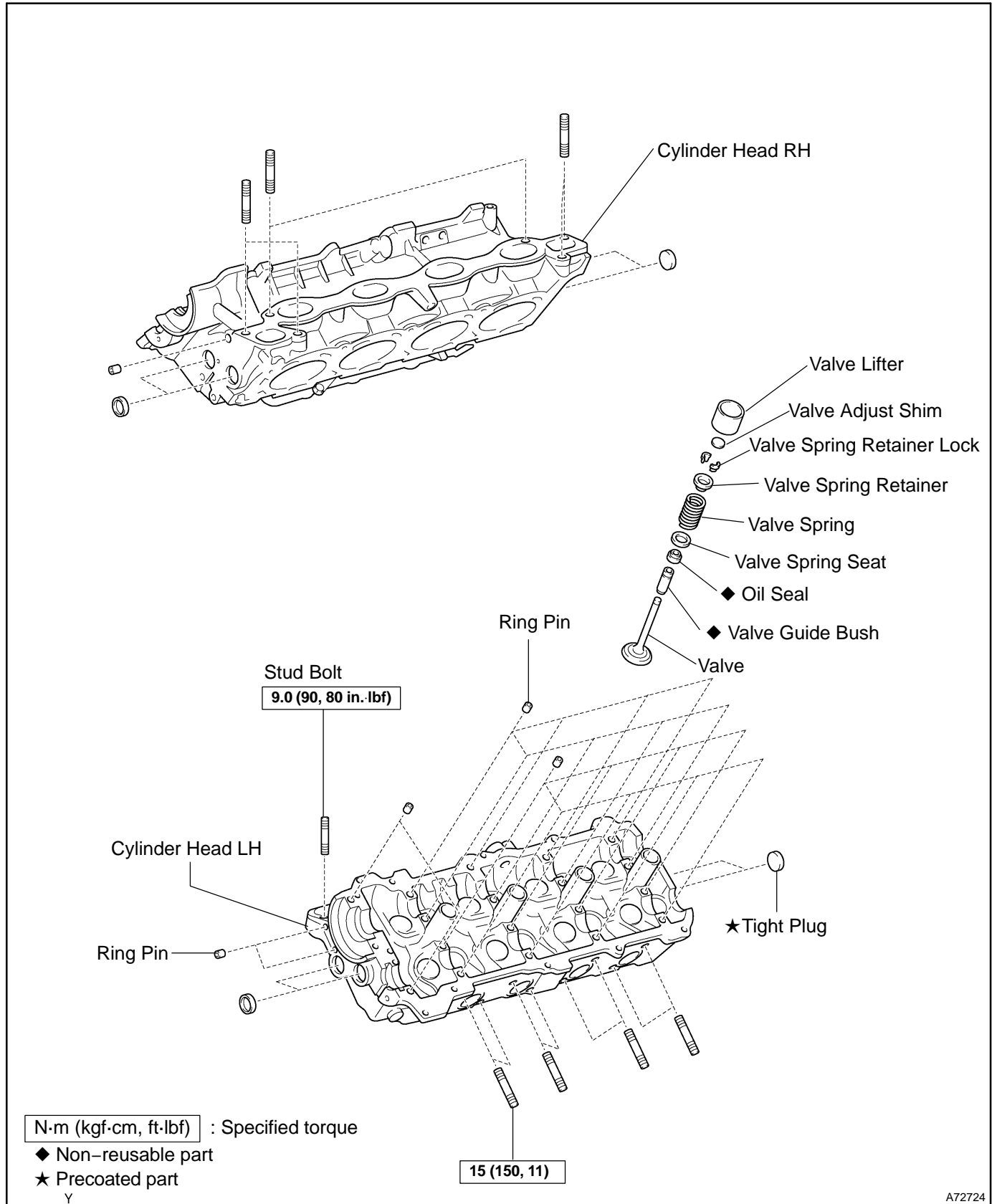
89. INSTALL ENGINE HANGER NO.1

(a) Install the 2 engine hangers with the 4 bolts.

Torque: 37 N·m (380 kgf-cm, 27 ft.-lbf)

CYLINDER HEAD ASSY (2UZ-FE) COMPONENTS

140ZL-06



A72724

OVERHAUL

HINT:

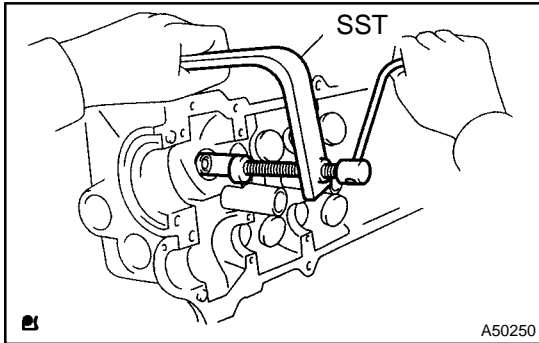
- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new ones.

1. REMOVE VALVE LIFTER

- (a) Remove the valve lifter and adjusting shim.

HINT:

Arrange the valve lifters and shims in correct order.

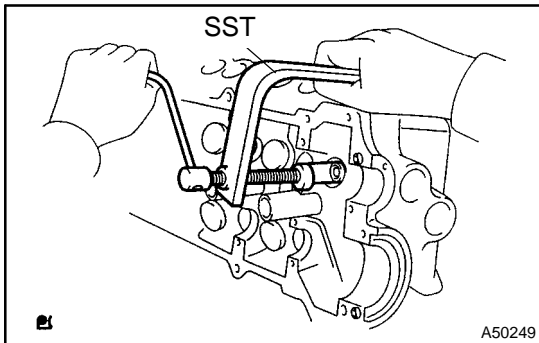


2. REMOVE INTAKE VALVE

- (a) Using SST, compress the valve spring and remove the 2 valve spring retainer locks.
SST 09202-70020 (09202-01010)
- (b) Remove the spring retainer, valve spring, valve and spring seat.

HINT:

Arrange the valves, valve springs, spring seats and spring retainers in correct order.

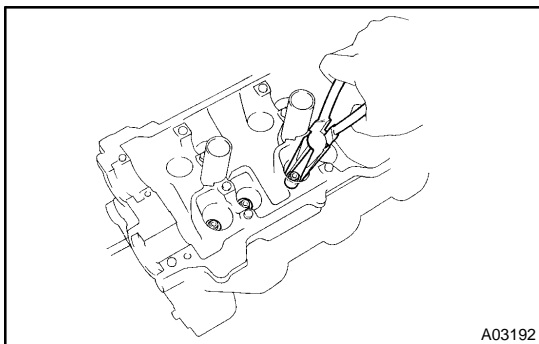


3. REMOVE EXHAUST VALVE

- (a) Using SST, compress the valve spring and remove the 2 valve spring retainer locks.
SST 09202-70020 (09202-00010)
- (b) Remove the spring retainer, valve spring, valve and spring seat.

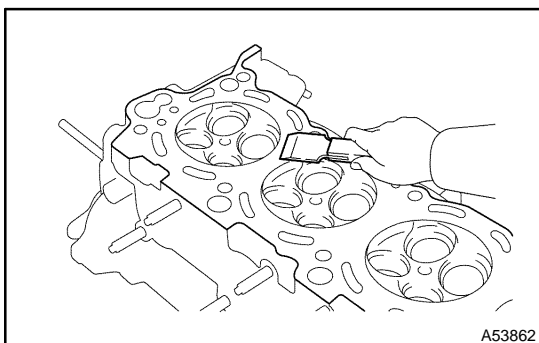
HINT:

Arrange the valves, valve springs, spring seats and spring retainers in correct order.



4. REMOVE VALVE STEM OIL SEAL

- (a) Using needle-nose pliers, remove the oil seal.

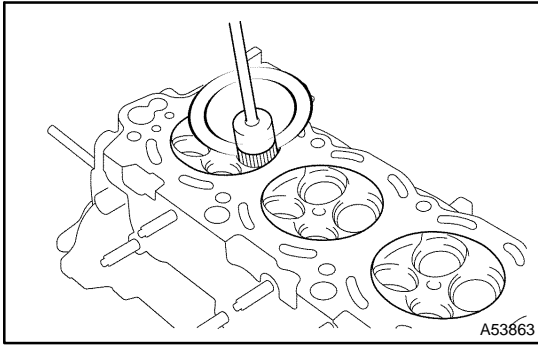


5. INSPECT CYLINDER HEAD SUB-ASSY

- (a) Clean the cylinder head.
- (1) Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

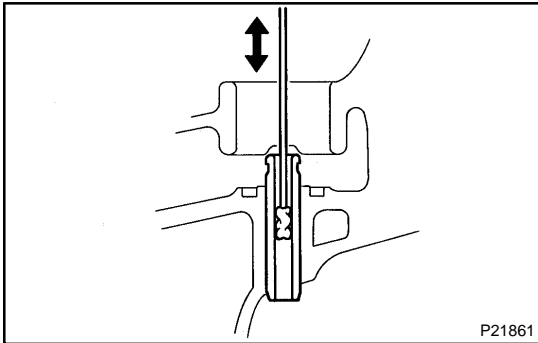
Be careful not to scratch the cylinder block contact surface.



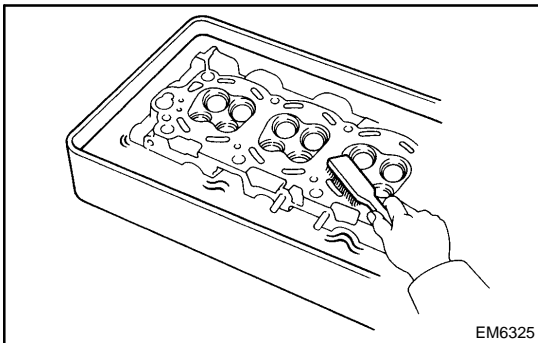
- (2) Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE:

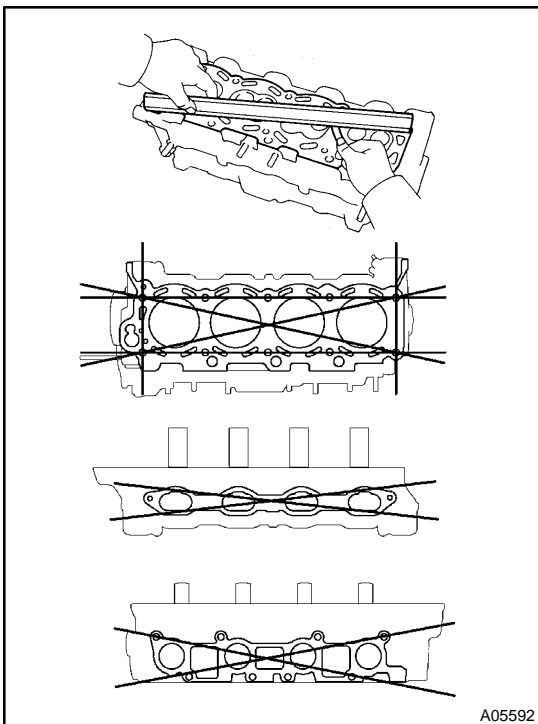
Be careful not to scratch the cylinder block contact surface.



- (3) Using a valve guide bushing brush and solvent, clean all the guide bushes.



- (4) Using a soft brush and solvent, thoroughly clean the cylinder head.

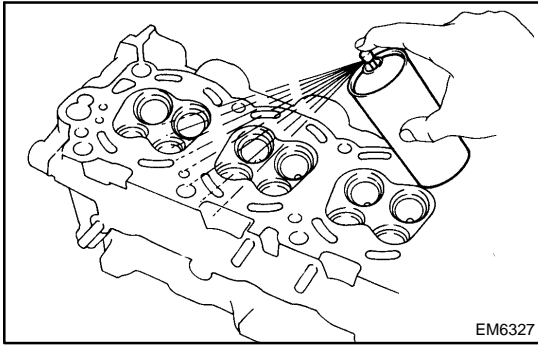


- (b) Inspect for warpage.

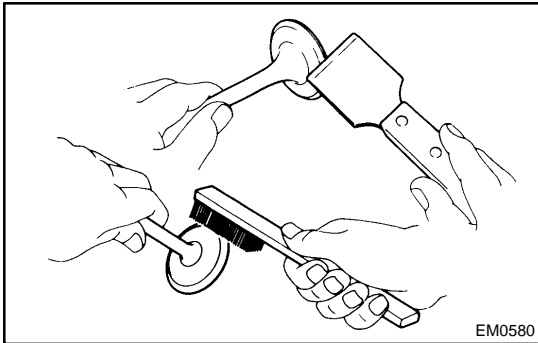
- (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder block and the manifolds.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than the maximum, replace the cylinder head.

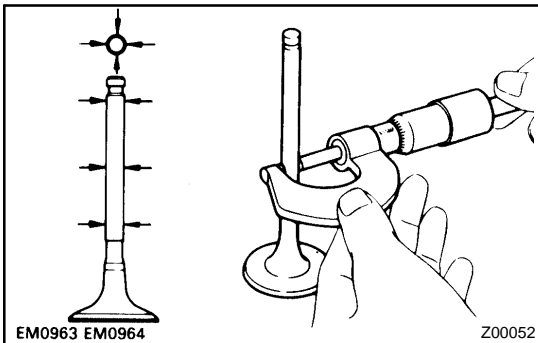


- (c) Inspect for cracks.
- (1) Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.
- If cracked, replace the cylinder head.



6. INSPECT VALVE

- (a) Clean the valves.
- (1) Using a gasket scraper, chip off any carbon from the valve head.
 - (2) Using a wire brush, thoroughly clean the valve.

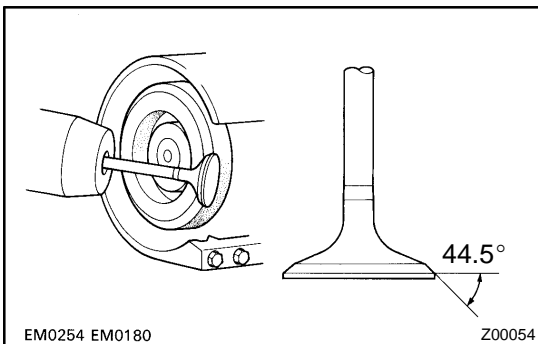


- (b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

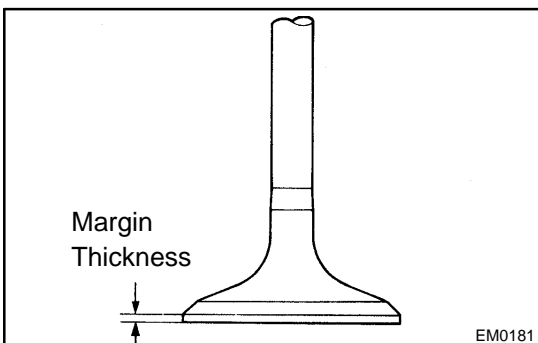
Intake: 5.470 to 5.485 mm (0.2154 to 0.2159 in.)

Exhaust: 5.465 to 5.480 mm (0.2152 to 0.2157 in.)



- (c) Check the valve face angle.
- (1) Grind the valve enough to remove pits and carbon.
 - (2) Check that the valve is ground to the correct valve face angle.

Valve face angle: 44.5°



- (d) Check the valve head margin thickness.

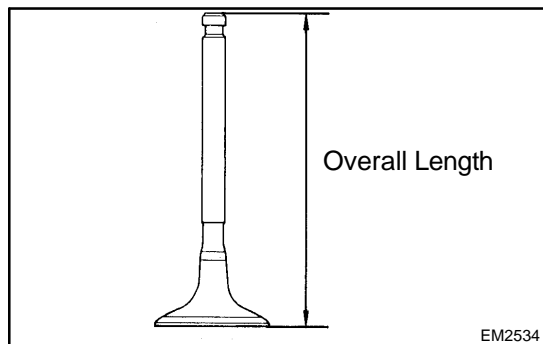
Standard margin thickness:

Intake: 1.25 mm (0.049 in.)

Exhaust: 1.4 mm (0.055 in.)

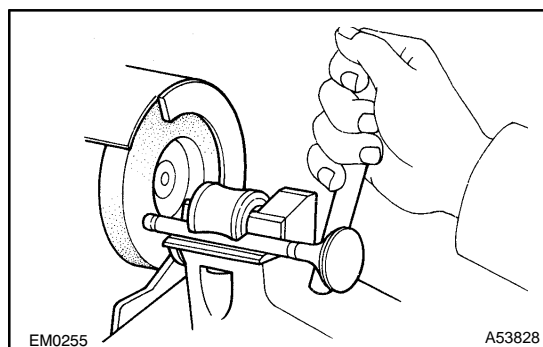
Minimum margin thickness: 0.5 mm (0.020 in.)

If the margin thickness is less than the minimum, replace the valve.



- (e) Check the valve overall length.
Standard overall length:
Intake: 95.05 mm (3.7421 in.)
Exhaust: 95.10 mm (3.7441 in.)
Minimum overall length:
Intake: 94.55 mm (3.7224 in.)
Exhaust: 94.60 mm (3.7244 in.)

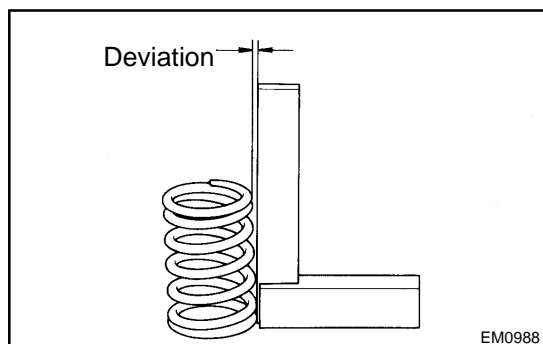
If the overall length is less than the minimum, replace the valve.



- (f) Check the surface of the valve stem tip for wear.
 If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

NOTICE:

Do not grind off more than the minimum.

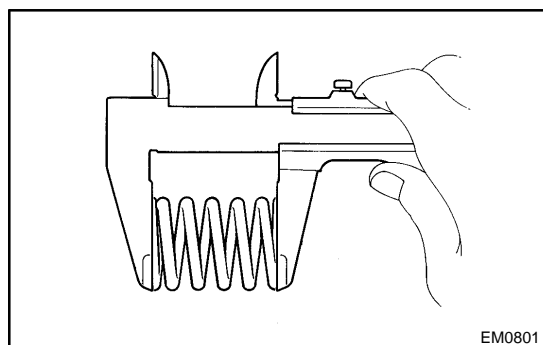


7. INSPECT VALVE SPRING

- (a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

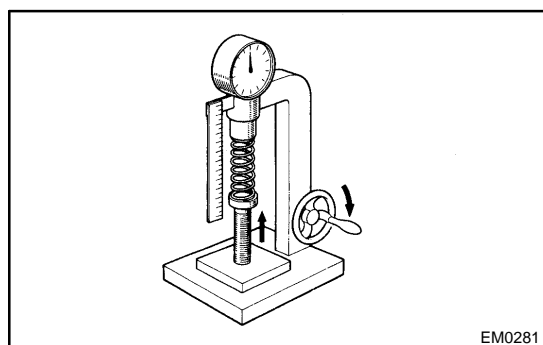
If the deviation is greater than the maximum, replace the valve spring.



- (b) Using vernier calipers, measure the free length of the valve spring.

Free length: 54.1 mm (2.130 in.)

If the free length is not as specified, replace the valve spring.

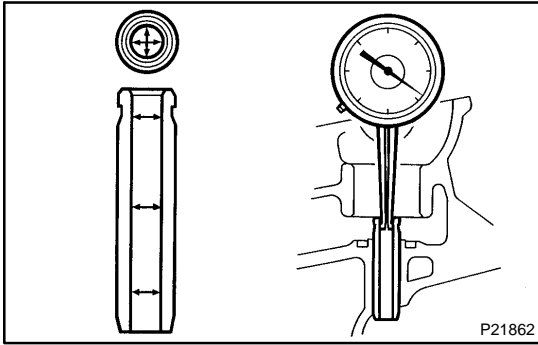


- (c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

210 to 226 N (21.4 to 23.0 kgf, 47.2 to 50.7 lbf)
at 35.0 mm (1.378 in.)

If the installed tension is not as specified, replace the valve spring.



8. INSPECT VALVE GUIDE BUSH

- (a) Using a caliper gauge, measure the inside diameter of the guide bush.

Bush inside diameter:

5.510 to 5.530 mm (0.2169 to 0.2177 in.)

- (b) Subtract the valve stem diameter measurement from the guide bush inside diameter measurement.

Standard oil clearance:

Intake: 0.025 to 0.060 mm (0.0010 to 0.0024 in.)

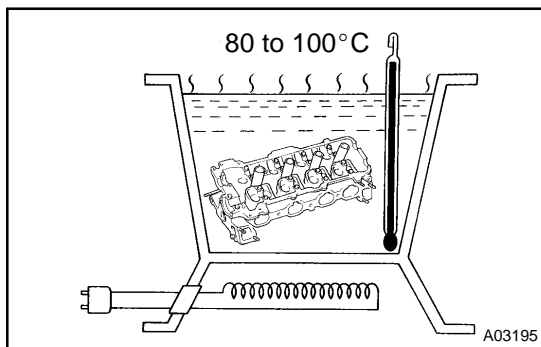
Exhaust: 0.030 to 0.065 mm (0.0012 to 0.0026 in.)

Maximum oil clearance:

Intake: 0.08 mm (0.0031 in.)

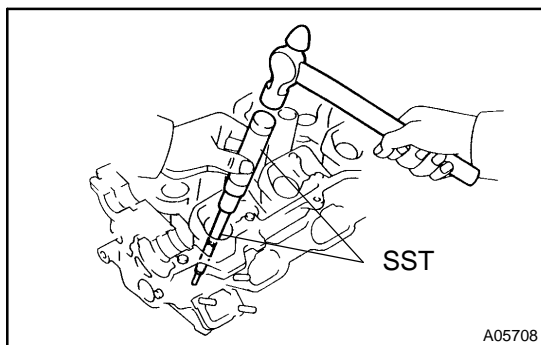
Exhaust: 0.10 mm (0.0039 in.)

If the clearance is greater than the maximum, replace the valve and guide bush.

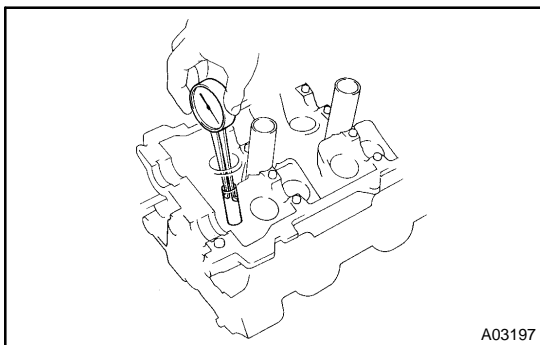


9. REMOVE VALVE GUIDE BUSH

- (a) Gradually heat the cylinder head to 80 to 100°C (176 to 212°F).

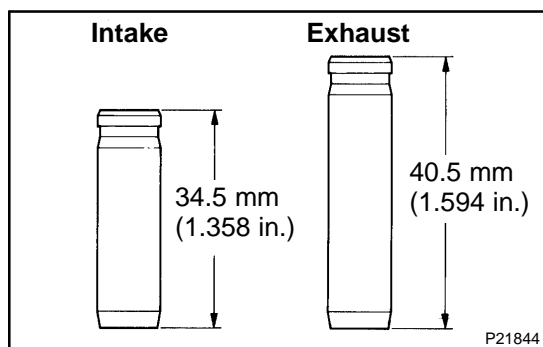


- (b) Using SST and a hammer, tap out the guide bush.
SST 09201-10000 (09201-01060), 09950-70010 (09951-07100)



10. INSTALL VALVE GUIDE BUSH

- (a) Using a caliper gauge, measure the bush bore diameter of the cylinder head.



- (b) Select a new guide bush (STD or O/S 0.05).

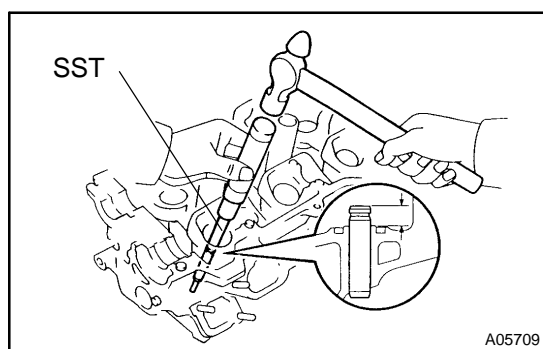
Bush bore diameter	Bush size
10.285 to 10.306 mm (0.4049 to 0.4057 in.)	Use STD
10.335 to 10.356 mm (0.4069 to 0.4077 in.)	Use O/S 0.05

If the bush bore diameter of the cylinder head is greater than 10.306 mm (0.4057 in.), machine the bush bore so that the dimension is between 10.335 and 10.356 mm (0.4069 and 0.4077 in.).

If the bush bore diameter of the cylinder head is greater than 10.356 mm (0.4077 in.), replace the cylinder head.

HINT:

Different bushes are used for the intake and exhaust.



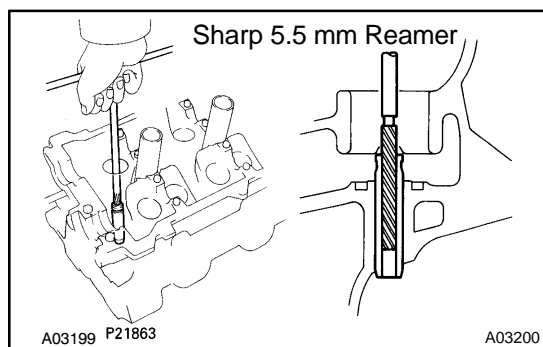
- (c) Gradually heat the cylinder head to 80 to 100°C (176 to 212°F).

- (d) Using SST and a hammer, tap in a new guide bush to the specified protrusion height.

Protrusion height :

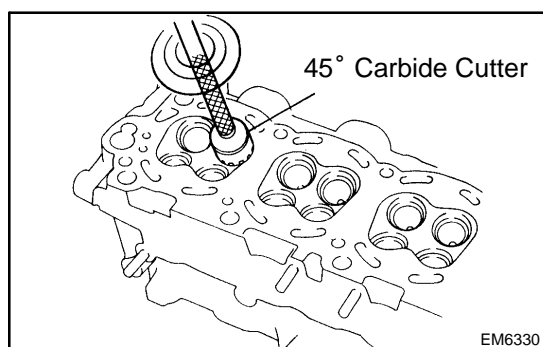
Intake: 9.2 to 9.8 mm (0.362 to 0.386 in.)

Exhaust: 8.2 to 8.8 mm (0.323 to 0.346 in.)



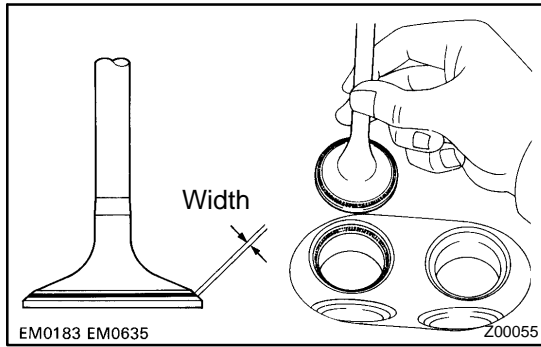
- (e) Using a sharp 5.5 mm reamer, ream the guide bush to obtain the specified clearance between the guide bush and valve stem.

SST 09201-10000 (09201-01060), 09950-70010
(09951-07100)



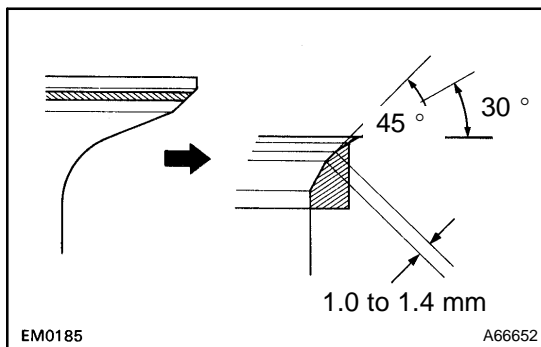
11. INSPECT VALVE SEAT

- (a) Using a 45° carbide cutter, resurface the valve seats. Clean metal filings from the valve seats.



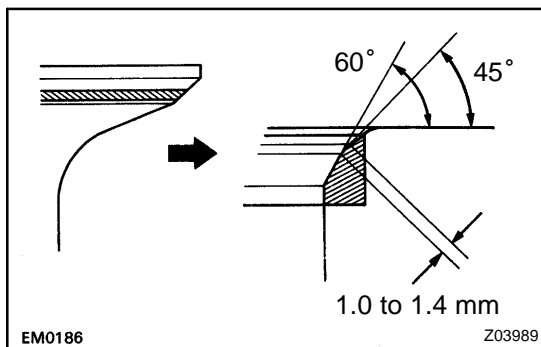
- (b) Check the valve seating position.
- (1) Apply a light coat of prussian blue (or white lead) to the valve face.
 - (2) Lightly press the valve against the seat. Do not rotate valve.
- (c) Check the valve face and seat for the following:
- (1) If prussian blue appears around the entire face, the valve is centered. If not, replace the valve.
 - (2) If prussian blue appears around the entire valve seat, the guide and face are centered. If not, resurface the seat.
 - (3) Check that the seat contacts in the middle of the valve face with the the following width:

Width: 1.0 to 1.4 mm (0.039 to 0.055 in.)

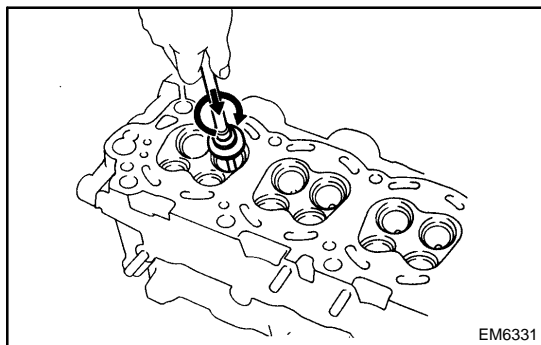


12. REPAIR VALVE SEAT

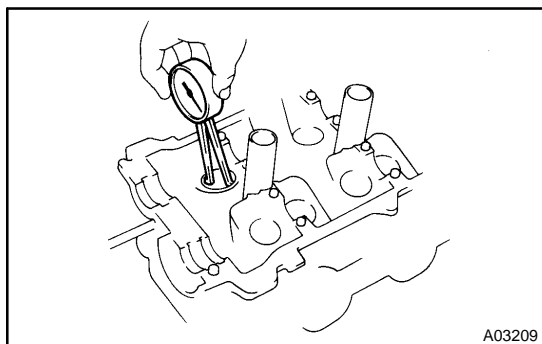
- (a) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.



- (b) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



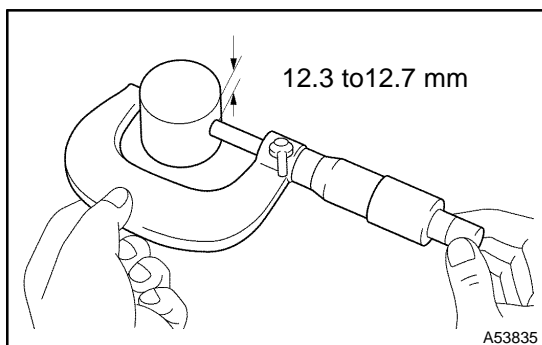
- (c) Handrub the valve and valve seat with an abrasive compound.
- (d) After handrubbing, clean the valve and valve seat.

**13. INSPECT VALVE LIFTER**

- (a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:

31.000 to 31.016 mm (1.2205 to 1.2211 in.)



- (b) Using a micrometer, measure the lifter diameter where the distance from the top surface is 12.3 to 12.7 mm (0.484 to 0.500 in.).

Lifter diameter:

30.968 to 30.976 mm (1.2192 to 1.2195 in.)

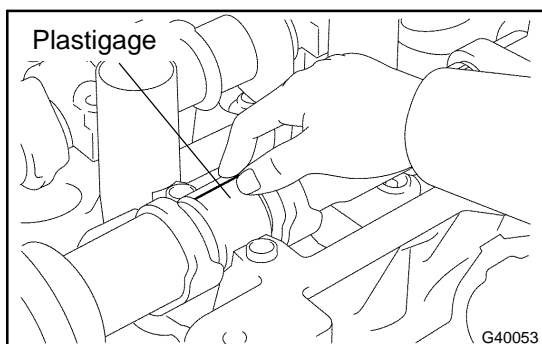
- (c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:

0.024 to 0.050 mm (0.0009 to 0.0020 in.)

Maximum oil clearance: 0.07 mm (0.0028 in.)

If the oil clearance is greater than the maximum, replace the lifter. If necessary, replace the cylinder head.

**14. INSPECT CAMSHAFT OIL CLEARANCE**

- (a) Install the camshaft timing tube to the camshaft (see page [14-35](#)).

- (b) Clean the bearing caps and camshaft journals.

- (c) Check the bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

- (d) Place the camshafts on the cylinder head.

- (e) Lay a strip of Plastigage across each of the camshaft journals.

- (f) Install the bearing caps (see page [14-35](#)).

Torque:

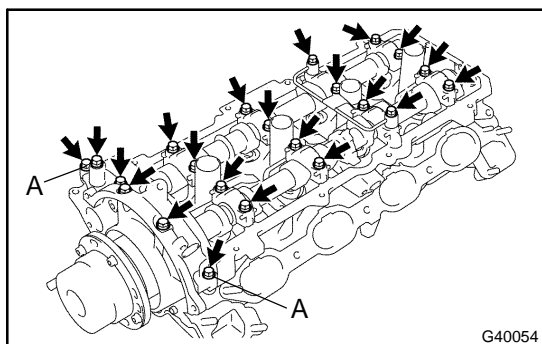
7.5 N·m (76 kgf·cm, 66 ft·lbf) for bolt A

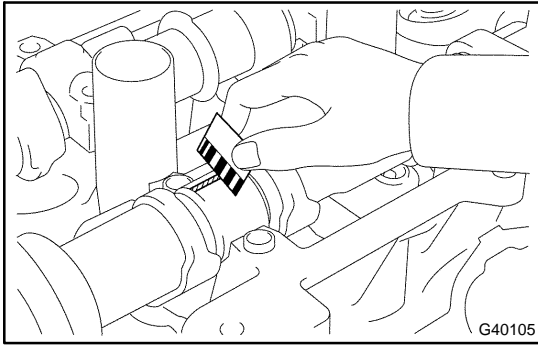
16 N·m (163 kgf·cm, 12 ft·lbf) for others

NOTICE:

Do not turn the camshaft.

- (g) Remove the bearing caps.





(h) Measure the Plastigage at its widest point.

Standard oil clearance:

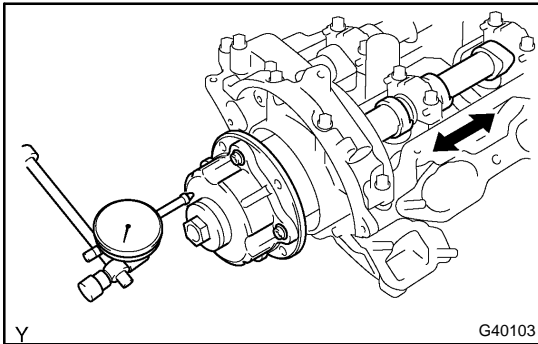
Camshaft journal	0.030 to 0.071 mm (0.0012 to 0.0028 in.)
Camshaft timing tube journal	0.036 to 0.057 mm (0.0014 to 0.0022 in.)

Maximum oil clearance:

Camshaft journal	0.100 mm (0.0039 in.)
Camshaft timing tube journal	0.075 mm (0.0030 in.)

If the oil clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (i) Remove the camshafts.
- (j) Completely remove the Plastigage.



15. INSPECT CAMSHAFT THRUST CLEARANCE

- (a) Install the camshaft (see page 14-35).
- (b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:

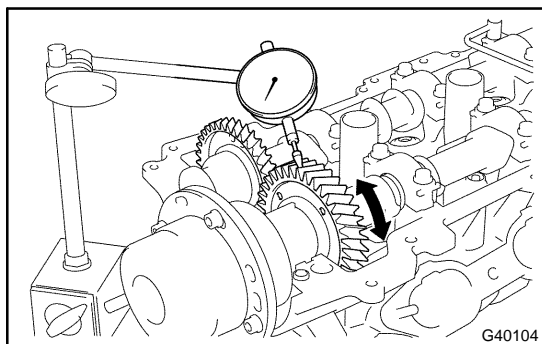
Intake	0 to 0.040 mm (0 to 0.0016 in.)
Exhaust	0.030 to 0.070 mm (0.0012 to 0.0028 in.)

Maximum thrust clearance:

Intake	0.12 mm (0.0047 in.)
Exhaust	0.10 mm (0.0039 in.)

If the thrust clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (c) Remove the camshafts.
- (d) Remove the camshaft timing tube from the intake camshaft.

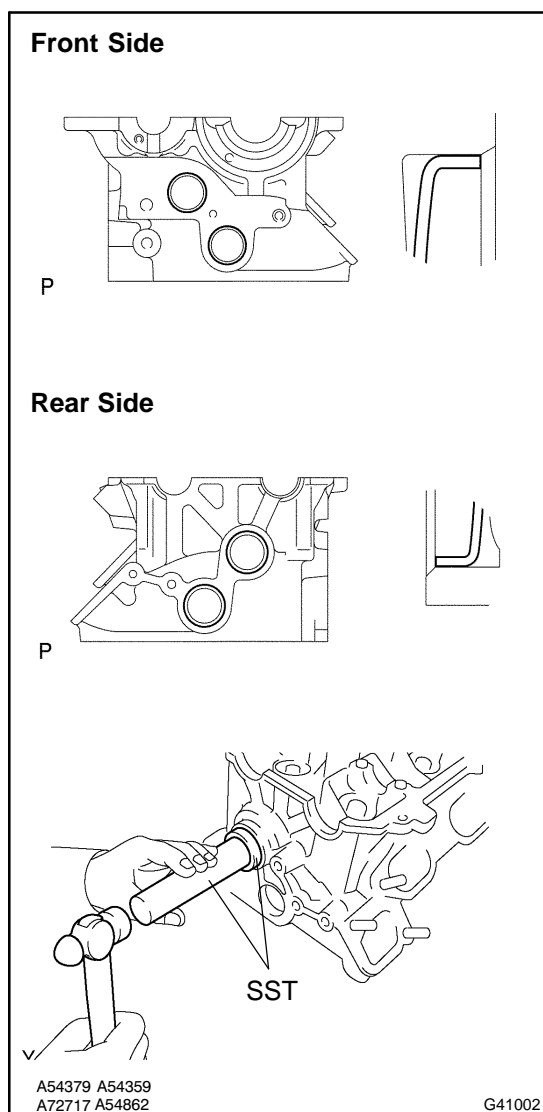
**16. INSPECT CAMSHAFT GEAR BACKLASH**

- (a) Install the drive gear to the camshaft timing tube (see page 14-35).
- (b) Install the camshaft timing tube to the intake camshaft (see page 14-35).
- (c) Install the camshafts without installing the exhaust camshaft sub-gear No.3 and front bearing cap (see page 14-35).
- (d) Using a dial indicator, measure the backlash.

Standard backlash:**0.020 to 0.200 mm (0.0008 to 0.0079 in.)****Maximum backlash: 0.30 mm (0.0118 in.)**

If the backlash is greater than the maximum, replace the intake camshaft drive gear and exhaust camshaft.

- (e) Remove the camshafts.
- (f) Remove the camshaft timing tube from the intake camshaft.
- (g) Remove the drive gear from the camshaft timing tube.

**17. INSTALL TIGHT PLUG NO.1**

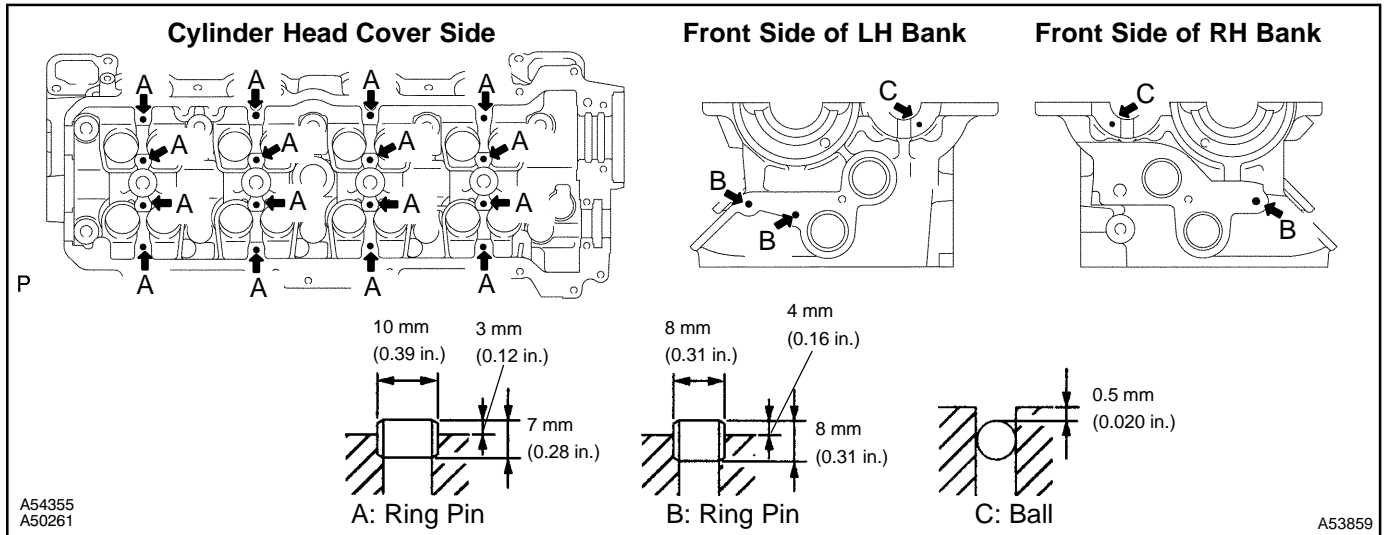
- (a) Apply adhesive to the tight plug.

Adhesive:**Part No. 08833-00070, THREE BOND 1324 or equivalent**

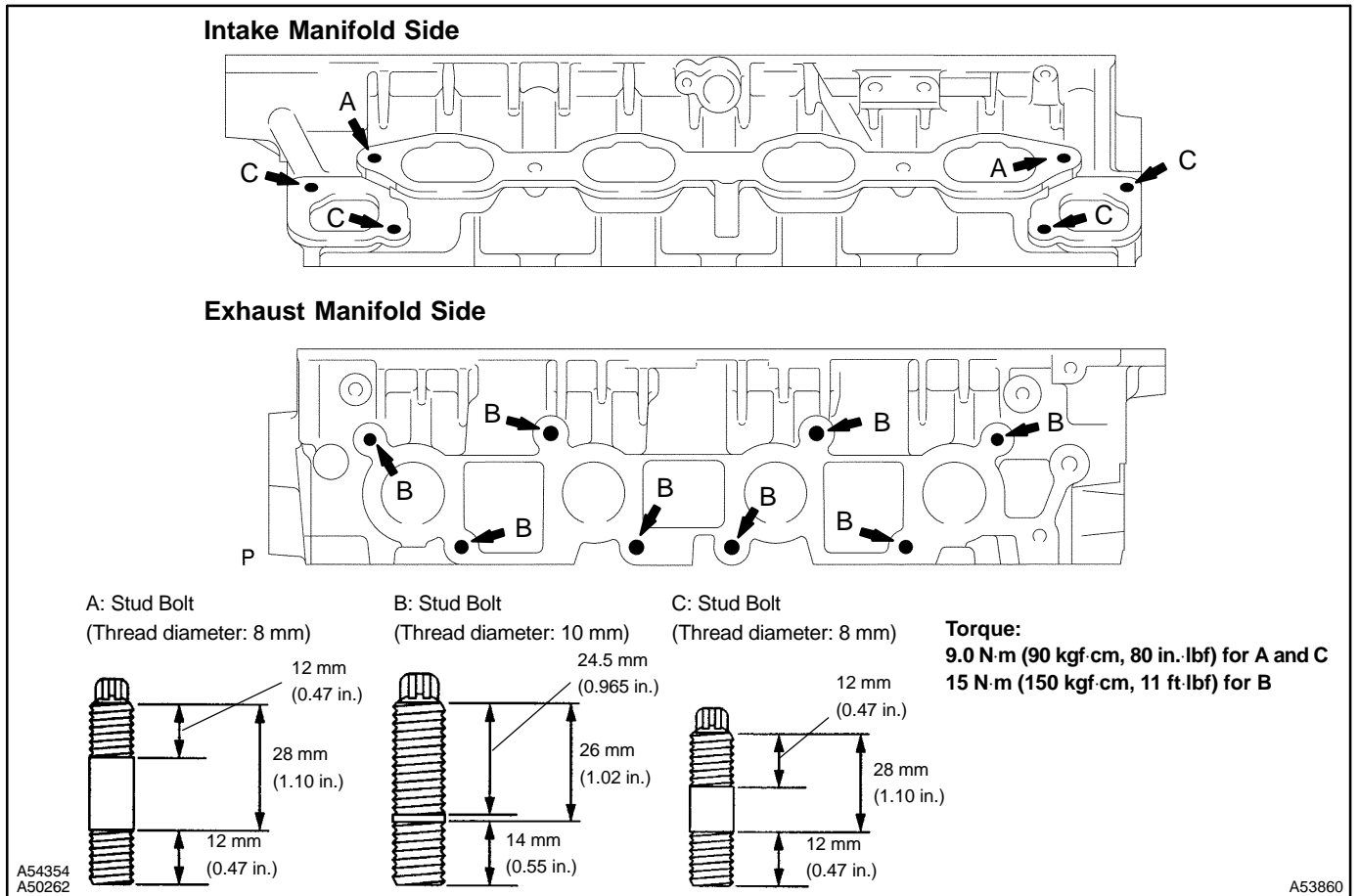
- (b) Using SST and a hammer, tap in a new tight plug as shown in the illustration.

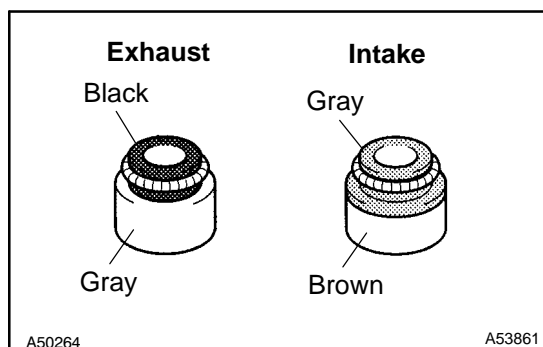
SST 09950-60010 (09951-00300), 09950-70010
(09951-07100)

18. INSTALL CAMSHAFT BEARING CAP SETTING RING PIN



19. INSTALL STUD BOLT





20. INSTALL VALVE STEM OIL SEAL

(a) Apply a light coat of engine oil to a new oil seal.

NOTICE:

Pay close attention when installing the intake and exhaust oil seals. For example, installing the intake oil seal into the exhaust or installing the exhaust oil seal to the intake can cause installation problems later.

HINT:

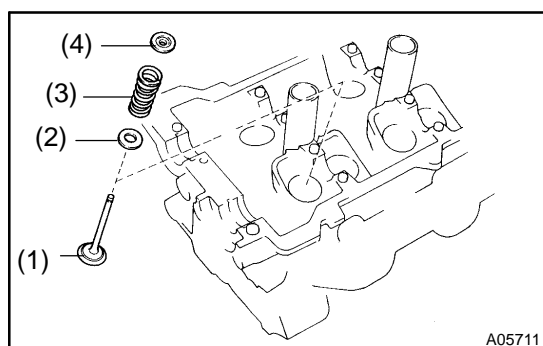
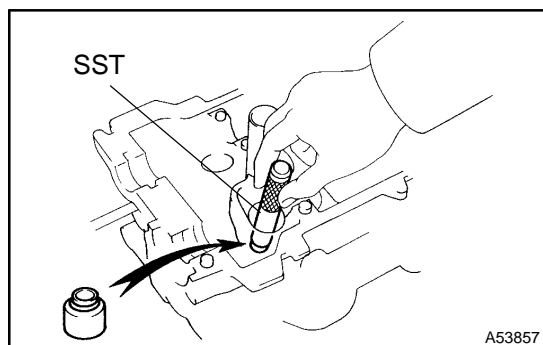
The intake valve oil seal is gray/brown and the exhaust valve oil seal is black/gray.

(b) Using SST, push in a new oil seal.

SST 09201-41020

NOTICE:

Failure to use SST will cause the seal to be damaged or improperly seated.



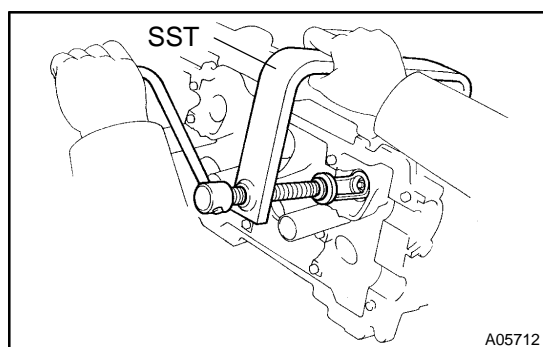
21. INSTALL VALVE

(a) Install the following parts:

- (1) Valve
- (2) Spring seat
- (3) Valve spring
- (4) Spring retainer

(b) Using SST, compress the valve spring and place the 2 spring retainer locks around the valve stem.

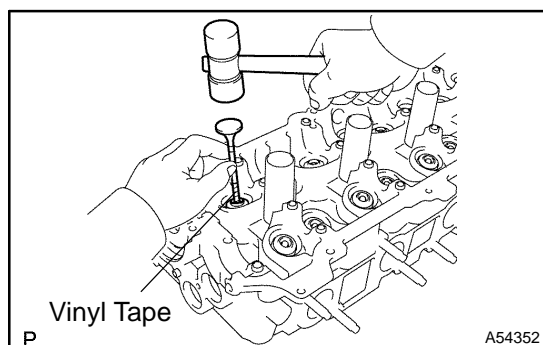
SST 09202-70020 (09202-00010)



(c) Using a plastic hammer and the valve stem (not in use) tip wrapped with vinyl tape, lightly tap the valve stem tip to assure proper fit.

NOTICE:

Be careful not to damage the valve stem tip.

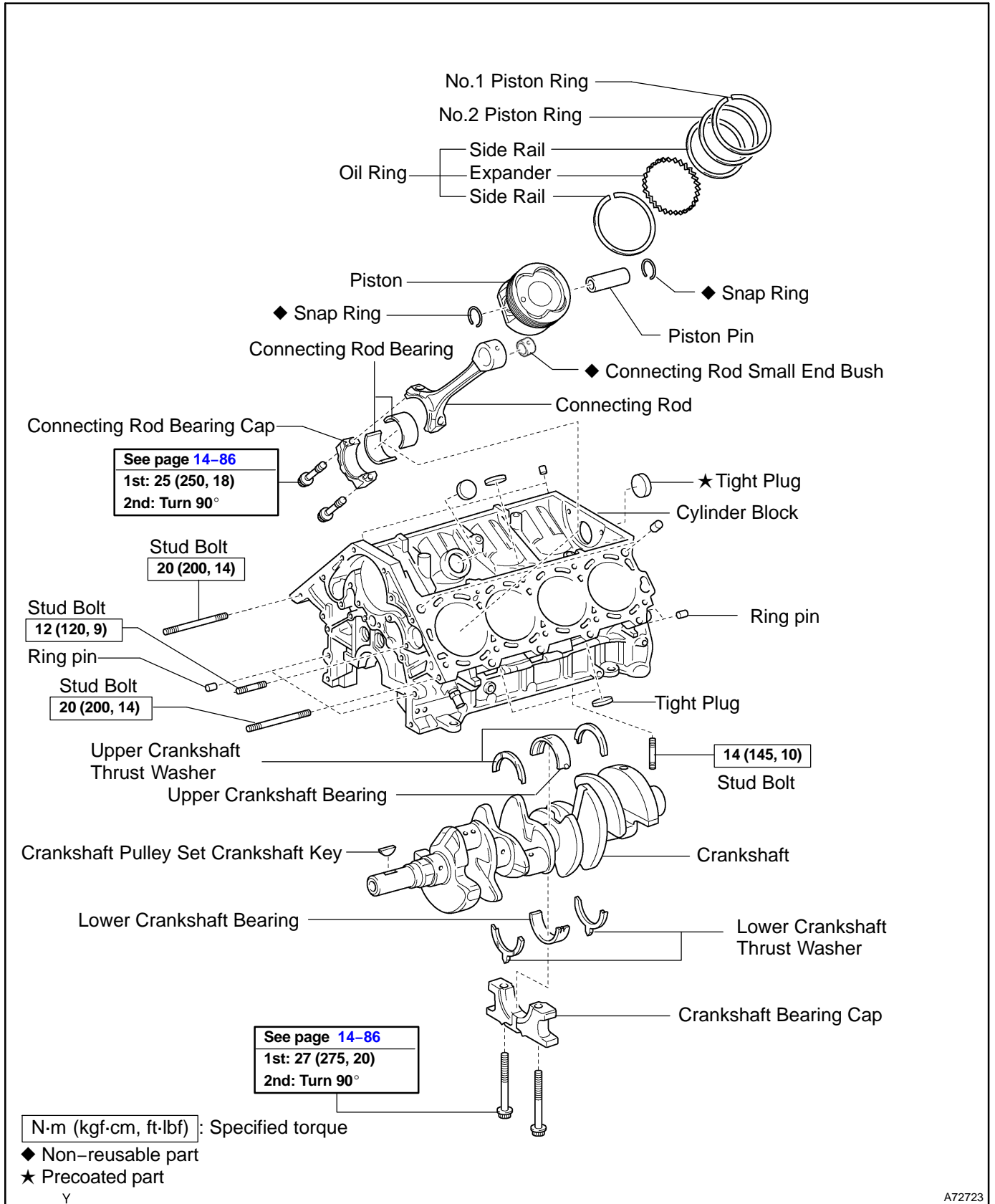


22. INSTALL VALVE LIFTER

- (a) Install the valve lifter and shim.
- (b) Check that the valve lifter rotates smoothly by hand.

CYLINDER BLOCK ASSY (2UZ-FE) COMPONENTS

140ZN-06

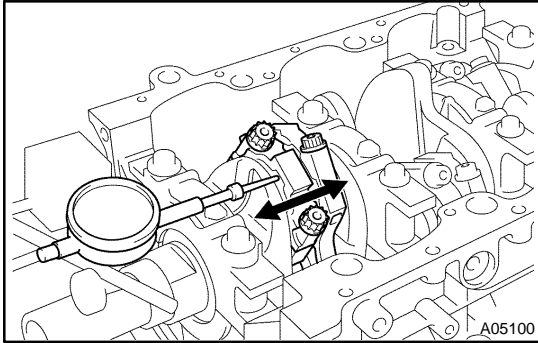


A72723

OVERHAUL

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new ones.



- 1. INSPECT CONNECTING ROD THRUST CLEARANCE**
 - (a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:

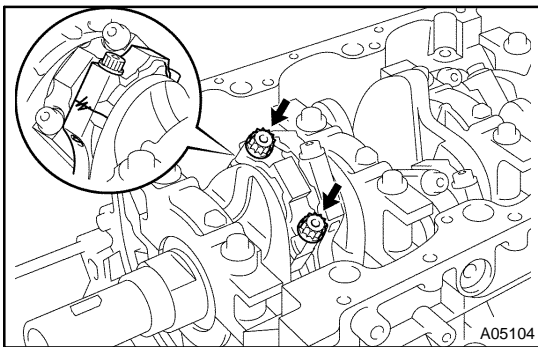
0.160 to 0.290 mm (0.0063 to 0.0114 in.)

Maximum thrust clearance: 0.35 mm (0.0138 in.)

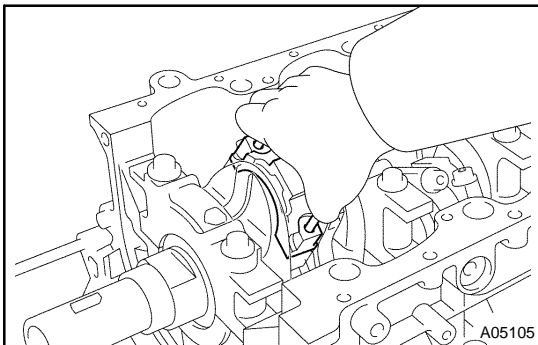
If the thrust clearance is greater than the maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.

Connecting rod thickness (Reference):

22.880 to 22.920 mm (0.9008 to 0.9024 in.)



- 2. INSPECT CONNECTING ROD OIL CLEARANCE**
 - (a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
 - (b) Remove the 2 connecting rod cap bolts.

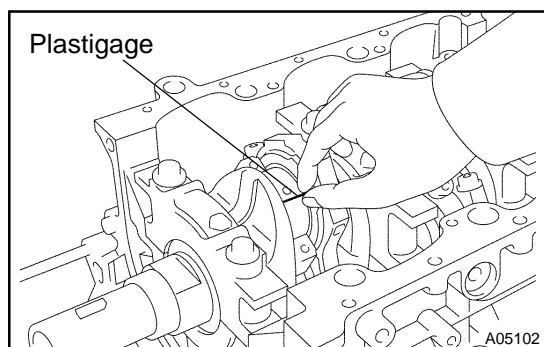


- (c) Using the removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

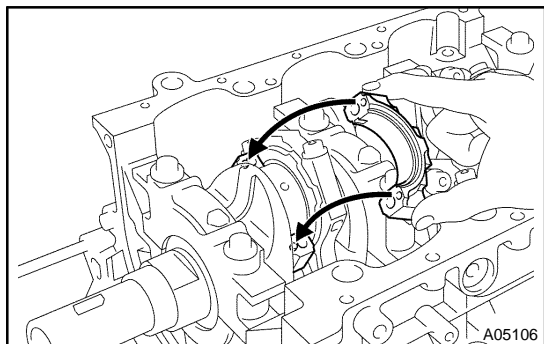
HINT:

Keep the lower bearing inserted with the connecting rod cap.

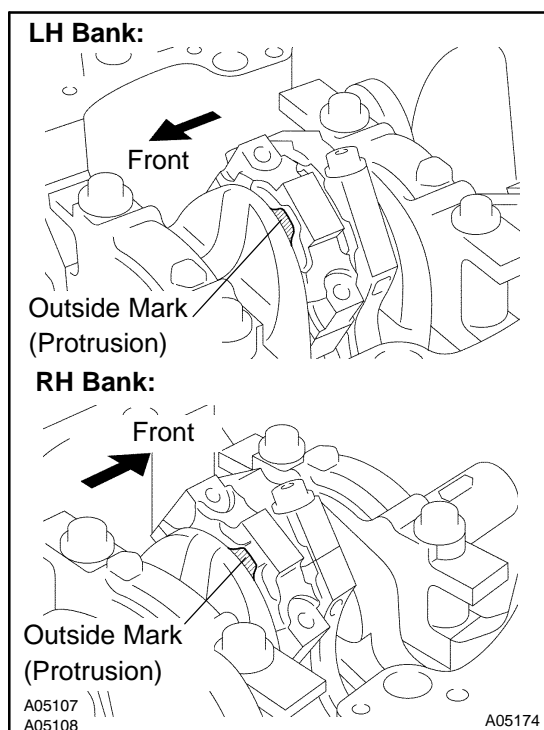
- (d) Clean the crank pin and bearing.
- (e) Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



- (f) Lay a strip of Plastigage across the crank pin.



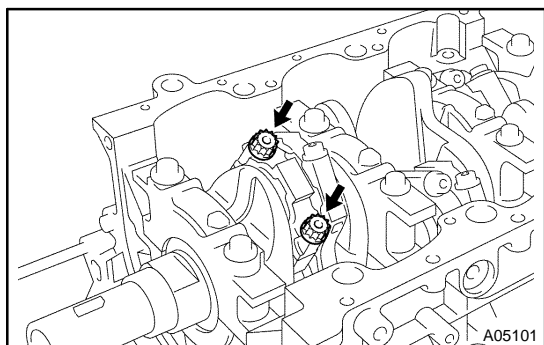
- (g) Match the numbered connecting rod cap with the connecting rod.
- (h) Align the pin groove of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.



- (i) Check that the outside mark of the connecting rod cap is facing in the correct direction.

HINT:

- The connecting rod cap bolts are tightened in 2 progressive steps.
- If any one of the connecting rod cap bolts is broken or deformed, replace it.



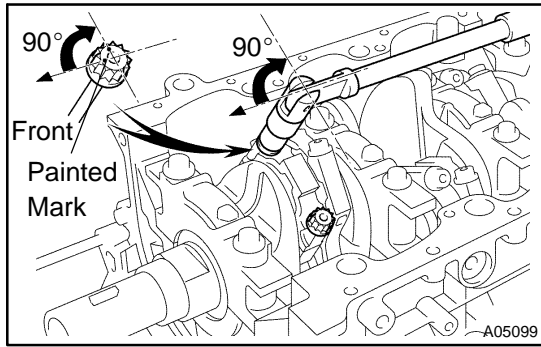
- (j) Apply a light coat of engine oil to the threads and under the heads of the connecting rod cap bolts.
- (k) Install and alternately tighten the 2 connecting rod cap bolts in several steps.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

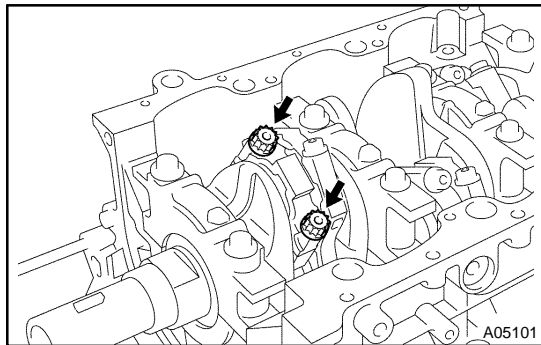
NOTICE:

Do not turn the crankshaft.

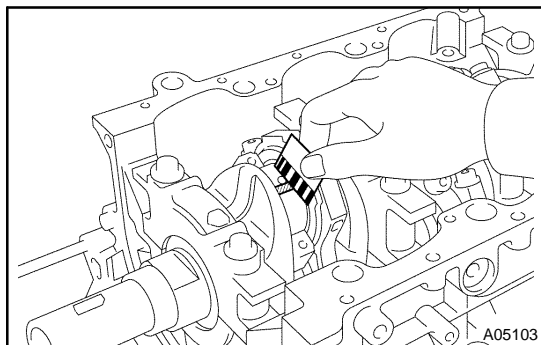
If any one of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



- (l) Mark the front of the connecting cap bolts with paint.
- (m) Retighten the cap bolts 90° as shown in the illustration.
- (n) Check that the painted mark is now at a 90° angle to the front.



- (o) Remove the 2 bolts, connecting rod cap and lower bearing.



- (p) Measure the Plastigage at its widest point.

Standard oil clearance:

0.021 to 0.047 mm (0.0008 to 0.0019 in.)

Maximum oil clearance: 0.065 mm (0.0026 in.)

If the oil clearance is greater than the maximum, replace the bearings. If necessary, replace the crankshaft.

HINT:

If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, add together the numbers imprinted on the connecting rod cap and crankshaft, then select the bearing with the same number as the total. There are 6 sizes of standard bearings, marked "2", "3", "4", "5", "6" and "7".

Item	Number Mark											
	1	1	2	1	2	3	2	3	4	3	4	4
Connecting rod cap	1	1	2	1	2	3	2	3	4	3	4	4
Crankshaft	1	2	1	3	2	1	3	2	1	3	2	3
Use bearing	2	3		4		5		6		7		

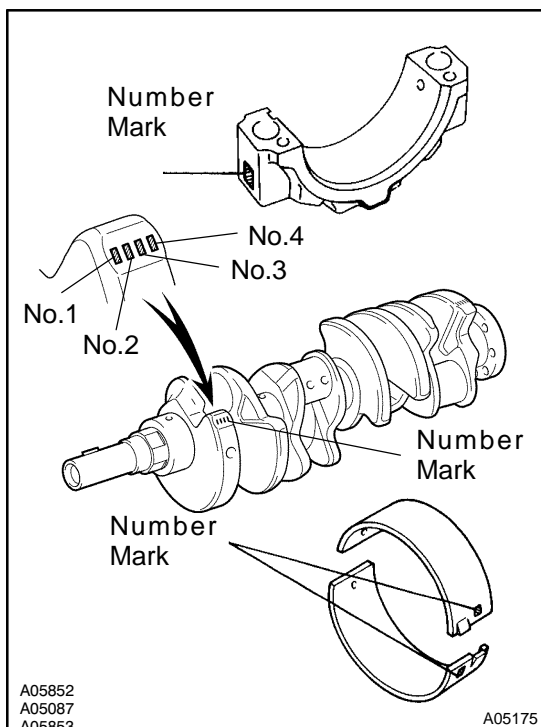
EXAMPLE:

Connecting rod cap "3" + Crankshaft "1"
= Total number 4 (Use bearing "4")

Reference

Connecting rod big end inside diameter:

Mark "1"	55.000 to 55.006 mm (2.1654 to 2.1656 in.)
Mark "2"	55.006 to 55.012 mm (2.1656 to 2.1658 in.)
Mark "3"	55.012 to 55.018 mm (2.1658 to 2.1661 in.)
Mark "4"	55.018 to 55.024 mm (2.1661 to 2.1663 in.)



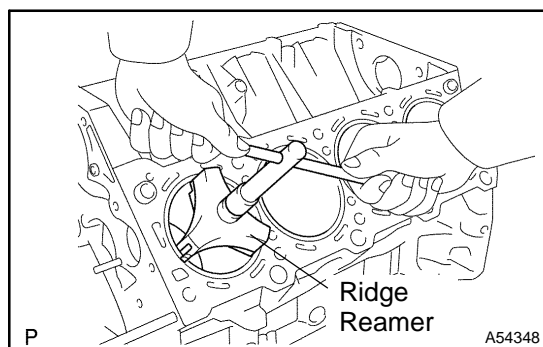
Crankshaft crank pin diameter:

Mark "1"	51.994 to 52.000 mm (2.0470 to 2.0472 in.)
Mark "2"	51.988 to 51.994 mm (2.0468 to 2.0470 in.)
Mark "3"	51.982 to 51.988 mm (2.0465 to 2.0468 in.)

Standard sized bearing center wall thickness:

Mark "2"	1.487 to 1.490 mm (0.0585 to 0.0587 in.)
Mark "3"	1.490 to 1.493 mm (0.0587 to 0.0588 in.)
Mark "4"	1.493 to 1.496 mm (0.0588 to 0.0589 in.)
Mark "5"	1.496 to 1.499 mm (0.0589 to 0.0590 in.)
Mark "6"	1.499 to 1.502 mm (0.0590 to 0.0591 in.)
Mark "7"	1.502 to 1.505 mm (0.0591 to 0.0593 in.)

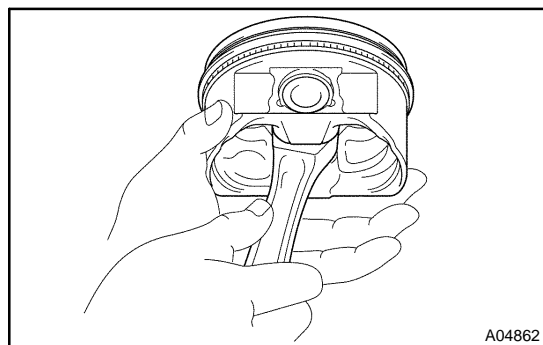
- (q) Completely remove the Plastigage.

**3. REMOVE PISTON AND CONNECTING ROD**

- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
- (b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

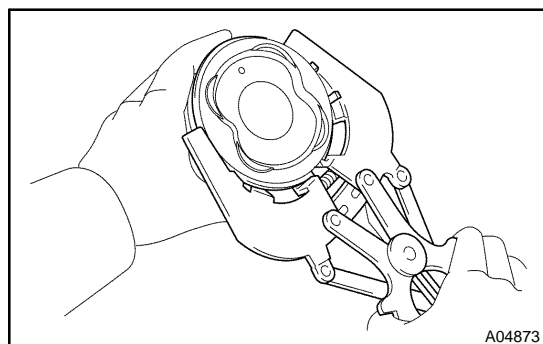
HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in correct order.

**4. REMOVE PISTON**

- (a) Check the fitting condition between the piston and piston pin.
- (1) Try to move the piston back and forth on the piston pin.

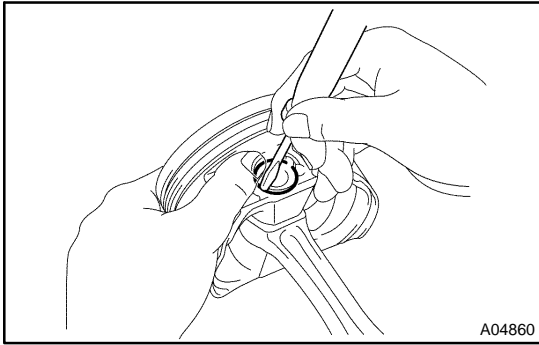
If any movement is felt, replace the piston and pin as a set.



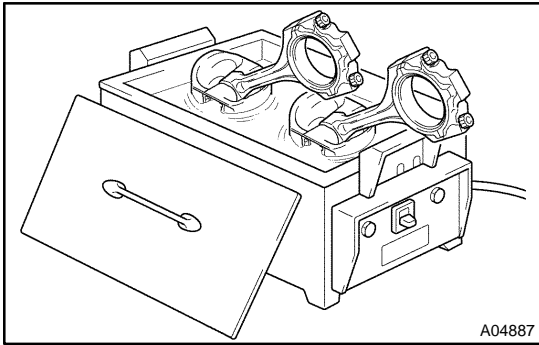
- (b) Using a piston ring expander, remove the 2 piston rings.
- (c) Remove the oil ring (2 side rails and expander) by hand.

HINT:

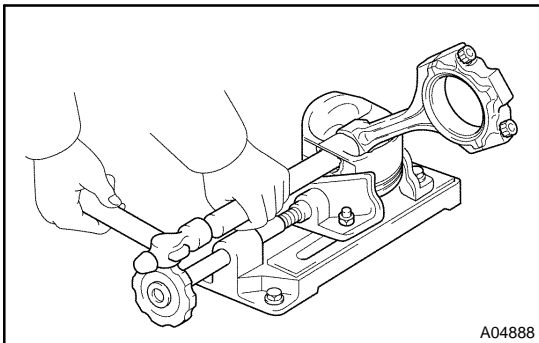
Arrange the piston rings in correct order.



(d) Using a screwdriver, pry out the 2 snap rings.



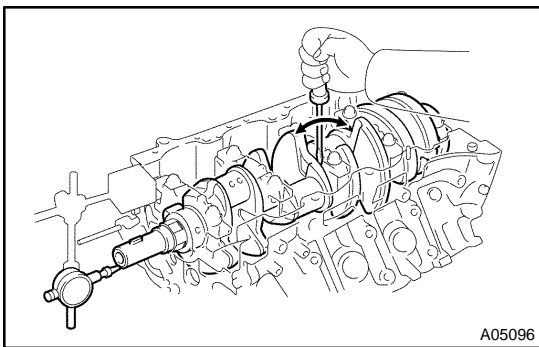
(e) Gradually heat the piston to approx. 60°C (140°F).



(f) Using a plastic hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in correct order.



5. INSPECT CRANKSHAFT THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:

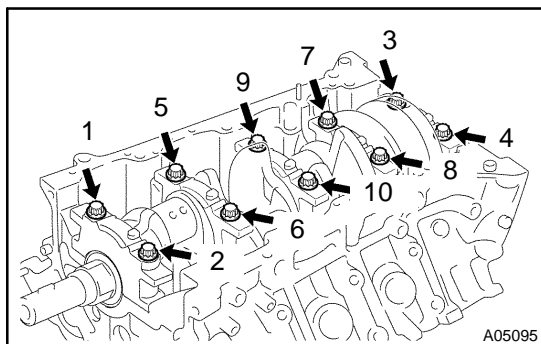
0.020 to 0.220 mm (0.0008 to 0.0087 in.)

Maximum thrust clearance: 0.30 mm (0.0118 in.)

If the thrust clearance is greater than the maximum, replace the thrust washers as a set.

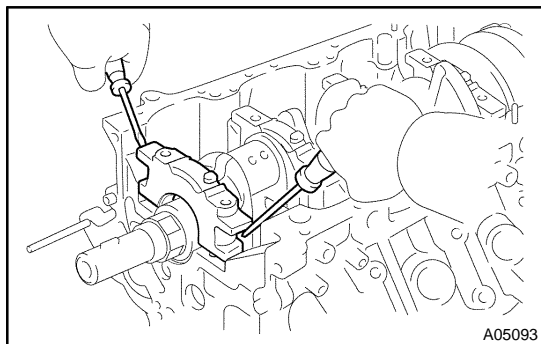
Thrust washer thickness:

STD	2.440 to 2.490 mm (0.0961 to 0.0980 in.)
O/S 0.125	2.503 to 2.553 mm (0.0985 to 0.1005 in.)



6. INSPECT CRANKSHAFT OIL CLEARANCE

- (a) Uniformly loosen and remove the 10 crankshaft bearing cap bolts in several steps, in the order shown in the illustration.



- (b) Using 2 screwdrivers, pry out the crankshaft bearing cap, and remove the 5 crankshaft bearing caps, 5 lower bearings and 2 lower thrust washers (No.3 crankshaft bearing cap only).

NOTICE:

Be careful not to damage the cylinder block.

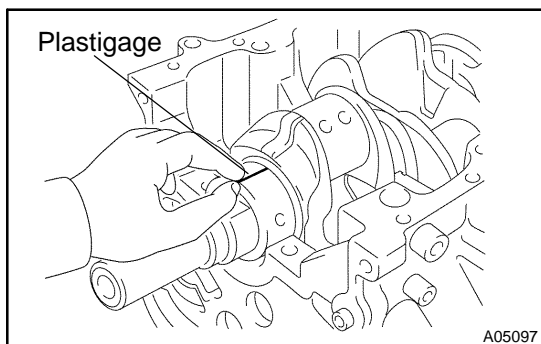
HINT:

- Keep the lower bearing and crankshaft bearing cap together.
 - Arrange the crankshaft bearing caps and lower thrust washers in correct order.
- (c) Lift out the crankshaft.
 (d) Remove the 2 upper thrust washers.

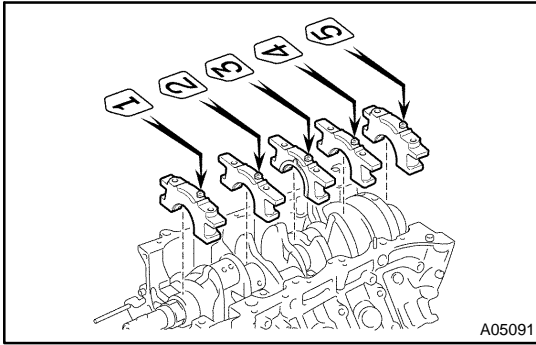
HINT:

- Arrange the upper thrust washers in correct order.
 - Keep the upper bearings together with the cylinder block.
- (e) Clean each crankshaft journal and bearing.
 (f) Check each crankshaft journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



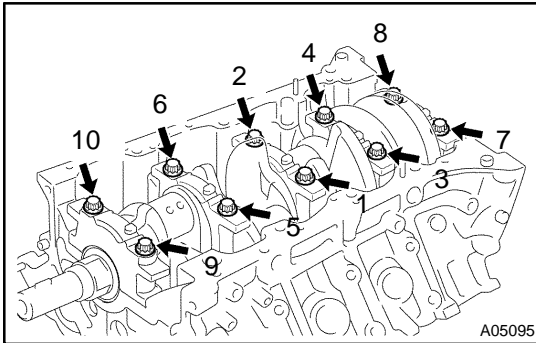
- (g) Place the crankshaft on the cylinder block.
 (h) Lay a strip of Plastigage across each journal.



- (i) Install the 5 crankshaft bearing caps in their proper locations.

HINT:

- The crankshaft bearing cap bolts are tightened in 2 progressive steps (steps (k) and (m)).
- If any one of the main bearing cap bolts is broken or deformed, replace it.



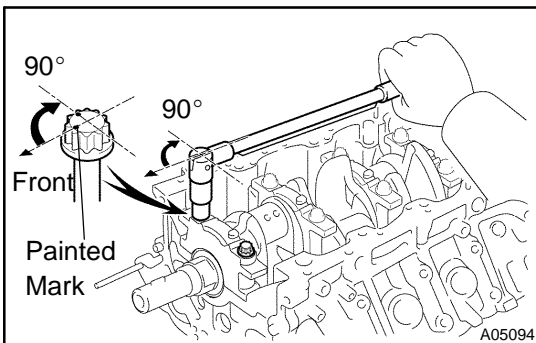
- (j) Apply a light coat of engine oil to the threads and under the heads of the crankshaft bearing cap bolts.
- (k) Install and uniformly tighten the 10 crankshaft bearing cap bolts in several steps, in the order shown in the illustration.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

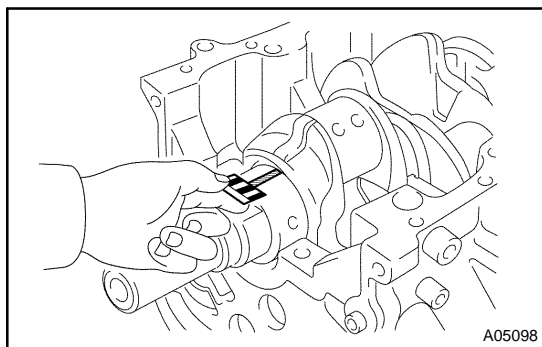
NOTICE:

Do not turn the crankshaft.

If any one of the crankshaft bearing cap bolts does not meet the torque specification, replace the crankshaft bearing cap bolt.



- (l) Mark the front of the crankshaft bearing cap bolts with paint.
- (m) Retighten the crankshaft bearing cap bolts by 90° in the order shown.
- (n) Check that the painted mark is now at a 90° angle to the front.
- (o) Remove the crankshaft bearing caps.



(p) Measure the Plastigage at its widest point.

Standard clearance:

No.1 and No.5	0.028 to 0.046 mm (0.0011 to 0.0018 in.)
Others	0.040 to 0.058 mm (0.0016 to 0.0023 in.)

Maximum clearance:

No.1 and No.5	0.065 mm (0.0026 in.)
Others	0.065 mm (0.0026 in.)

If the oil clearance is greater than the maximum, replace the bearings. If necessary, replace the crankshaft.

HINT:

If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, add together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. There are 5 sizes of the standard bearings. For No.1 and No.5 position bearings, use bearings marked "3", "4", "5", "6" and "7". For the other position bearings, use bearings marked "1", "2", "3", "4" and "5".

No.1 and No.5:

—		Use bearing
Cylinder block (A) + Crankshaft (B)	0 to 5	3
	6 to 11	4
	12 to 17	5
	18 to 23	6
	24 to 28	7

EXAMPLE:

Cylinder block "08" + Crankshaft "06" =
Total number 14 (Use bearing "5")

Others:

—		Use bearing
Cylinder block (A) + Crankshaft (B)	0 to 5	1
	6 to 11	2
	12 to 17	3
	18 to 23	4
	24 to 28	5

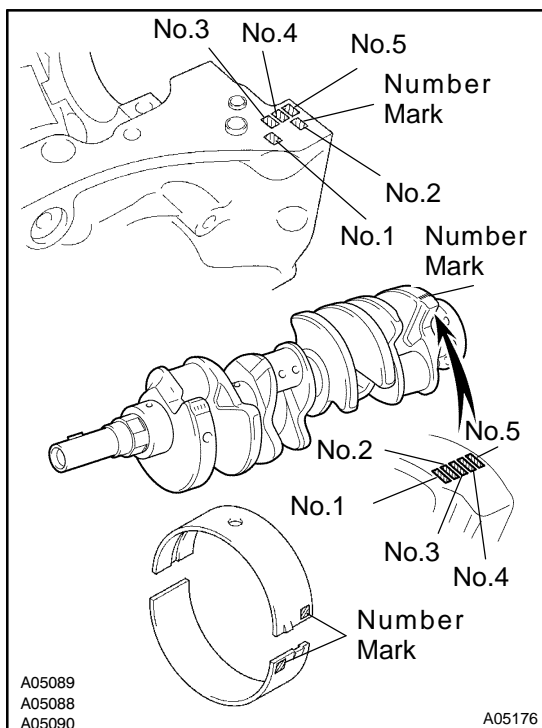
EXAMPLE:

Cylinder block "08" + Crankshaft "06" =
Total number 14 (Use bearing "3")

Reference

Cylinder block crankshaft journal bore diameter (A):

Mark "00"	72.000 mm (2.8347 in.)
Mark "01"	72.001 mm (2.8347 in.)
Mark "02"	72.002 mm (2.8347 in.)
Mark "03"	72.003 mm (2.8348 in.)
Mark "04"	72.004 mm (2.8348 in.)
Mark "05"	72.005 mm (2.8348 in.)
Mark "06"	72.006 mm (2.8349 in.)
Mark "07"	72.007 mm (2.8349 in.)



A05089
A05088
A05090

A05176

Mark "08"	72.008 mm (2.8350 in.)
Mark "09"	72.009 mm (2.8350 in.)
Mark "10"	72.010 mm (2.8350 in.)
Mark "11"	72.011 mm (2.8351 in.)
Mark "12"	72.012 mm (2.8351 in.)
Mark "13"	72.013 mm (2.8352 in.)
Mark "14"	72.014 mm (2.8352 in.)
Mark "15"	72.015 mm (2.8352 in.)
Mark "16"	72.016 mm (2.8353 in.)

Crankshaft journal diameter (B):

Mark "00"	67.000 mm (2.6378 in.)
Mark "01"	66.999 mm (2.6378 in.)
Mark "02"	66.998 mm (2.6377 in.)
Mark "03"	66.997 mm (2.6377 in.)
Mark "04"	66.996 mm (2.6376 in.)
Mark "05"	66.995 mm (2.6376 in.)
Mark "06"	66.994 mm (2.6376 in.)
Mark "07"	66.993 mm (2.6375 in.)
Mark "08"	66.992 mm (2.6375 in.)
Mark "09"	66.991 mm (2.6374 in.)
Mark "10"	66.990 mm (2.6374 in.)
Mark "11"	66.989 mm (2.6374 in.)
Mark "12"	66.988 mm (2.6373 in.)

Standard bearing center wall thickness:**No.1 and No.5:**

Mark "3"	2.487 to 2.490 mm (0.0979 to 0.0980 in.)
Mark "4"	2.490 to 2.493 mm (0.0980 to 0.0982 in.)
Mark "5"	2.493 to 2.496 mm (0.0982 to 0.0983 in.)
Mark "6"	2.496 to 2.499 mm (0.0983 to 0.0984 in.)
Mark "7"	2.499 to 2.502 mm (0.0984 to 0.0985 in.)

Others:

Mark "1"	2.481 to 2.484 mm (0.0977 to 0.0978 in.)
Mark "2"	2.484 to 2.487 mm (0.0978 to 0.0979 in.)
Mark "3"	2.487 to 2.490 mm (0.0979 to 0.0980 in.)
Mark "4"	2.490 to 2.493 mm (0.0980 to 0.0982 in.)
Mark "5"	2.493 to 2.496 mm (0.0982 to 0.0983 in.)

(q) Completely remove the Plastigage.

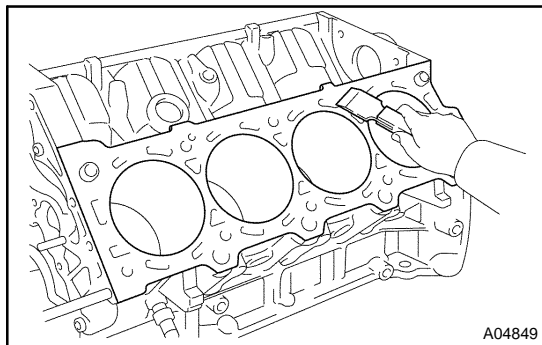
7. REMOVE CRANKSHAFT

- (a) Lift up the crankshaft.
- (b) Remove the 5 upper crankshaft bearings and 2 upper thrust washers from the cylinder block.

HINT:

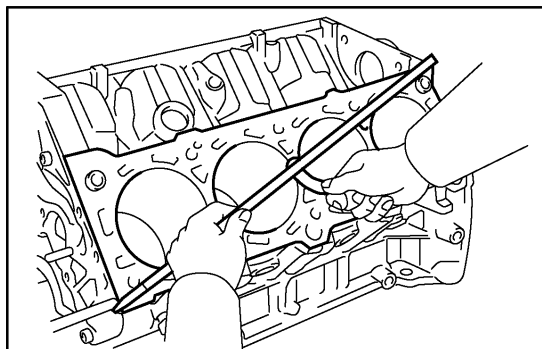
Arrange the crankshaft bearing caps, bearings and thrust washers in correct order.

8. REMOVE CRANKSHAFT PULLEY SET CRANKSHAFT KEY



9. CLEAN CYLINDER BLOCK SUB-ASSY

- (a) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.
- (b) Using a soft brush and solvent, thoroughly clean the cylinder block.



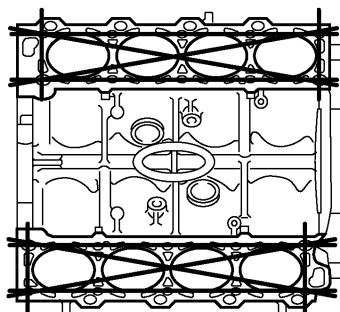
10. INSPECT CYLINDER BLOCK SUB-ASSY

- (a) Inspect for warpage.
 - (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder head and crankshaft bearing cap.

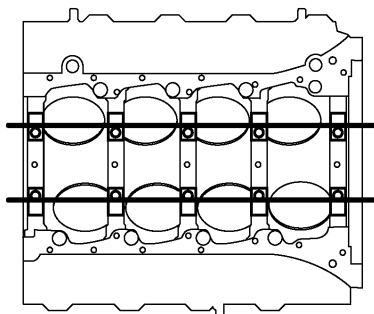
Maximum warpage: 0.07 mm (0.0028 in.)

If warpage is greater than the maximum, replace the cylinder block sub-assy.

Cylinder Head Side

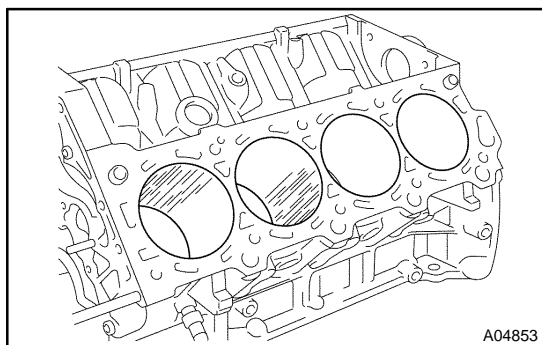


Crankshaft Bearing Cap Side

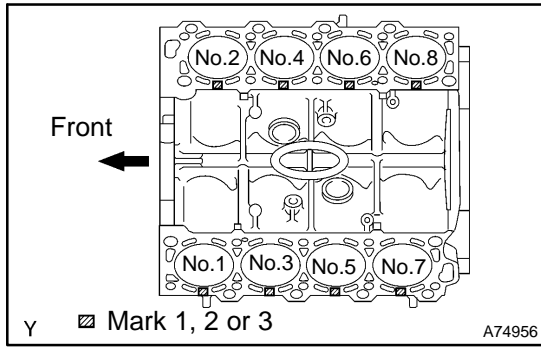


Y

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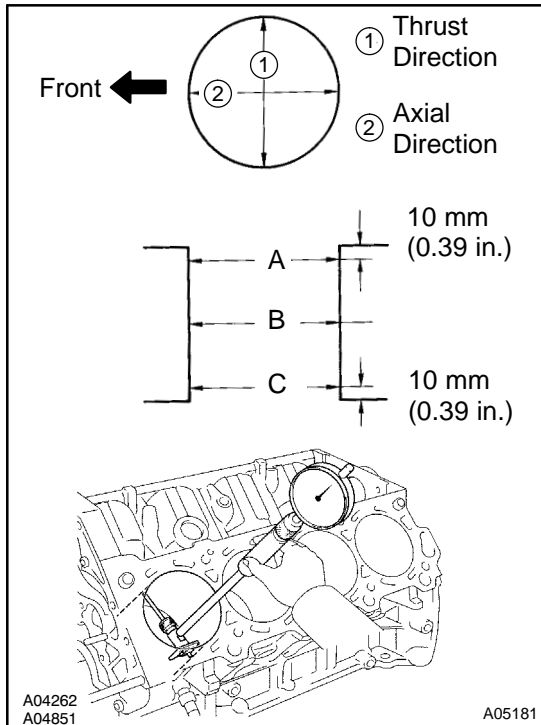
- (b) Visually check the cylinder for vertical scratches. If deep scratches are present, rebore all the 8 cylinders and replace all the 8 pistons. If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.

HINT:

There are 3 sizes of the standard cylinder bore diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the top of the cylinder block.



(1) Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

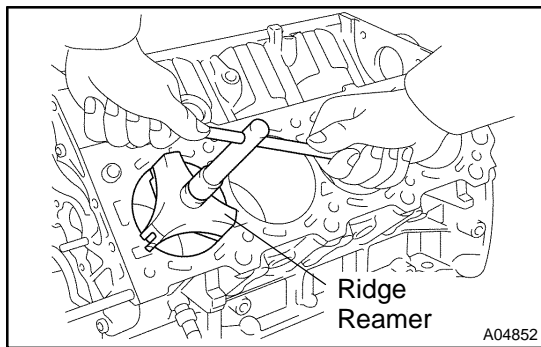
Standard diameter:

STD	Mark "1"	94.002 to 94.010 mm (3.7009 to 3.7012 in.)
	Mark "2"	94.010 to 94.023 mm (3.7012 to 3.7017 in.)
	Mark "3"	94.023 to 94.031 mm (3.7017 to 3.7020 in.)

Maximum diameter: 94.230 mm (3.7098 in.)

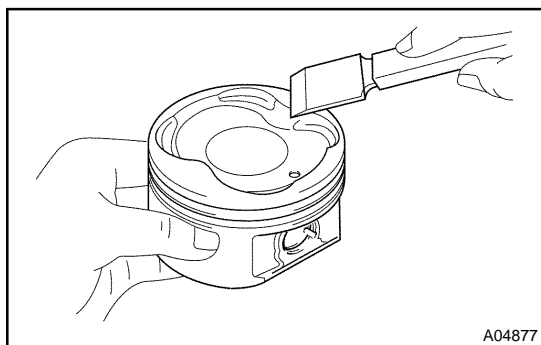
If the diameter is greater than the maximum, rebore all the 8 cylinders and replace all the 8 pistons. If necessary, replace the cylinder block.

STD	94.231 mm (3.7099 in.)
O/S 0.50	94.731 mm (3.7296 in.)



(d) Remove the cylinder ridge.

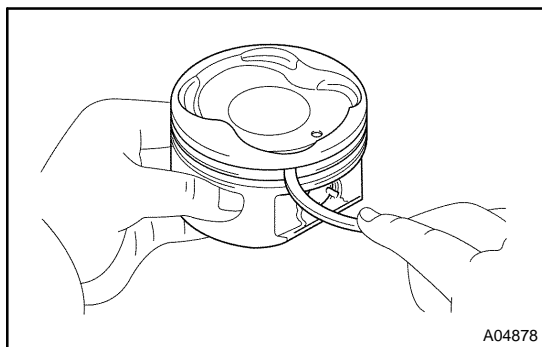
If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.



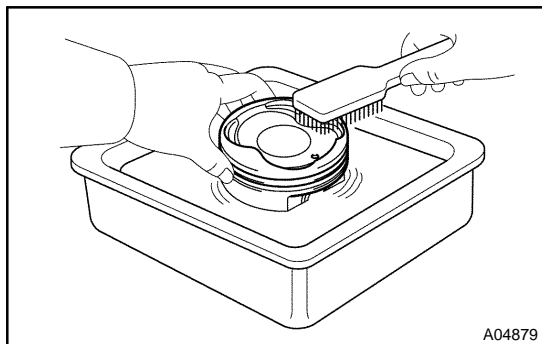
11. INSPECT PISTON

(a) Clean the piston.

(1) Using a gasket scraper, remove the carbon from the piston top.

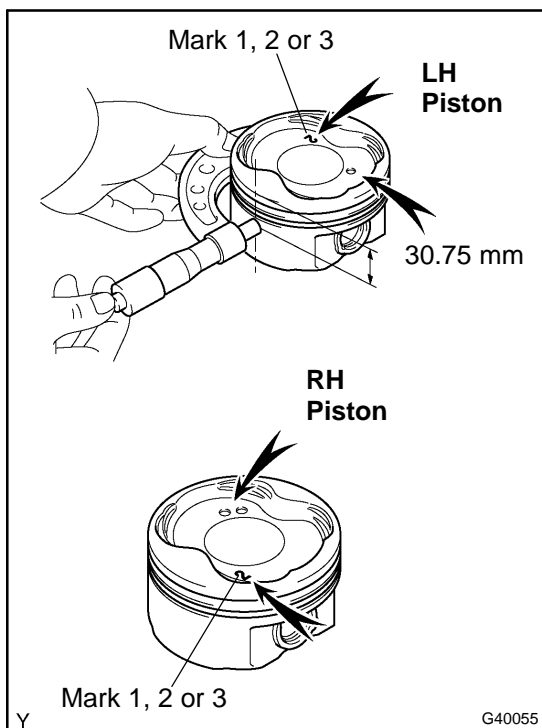


- (2) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



- (3) Using solvent and a brush, thoroughly clean the piston.

NOTICE:
Do not use a wire brush.



- (b) Inspect the piston oil clearance.

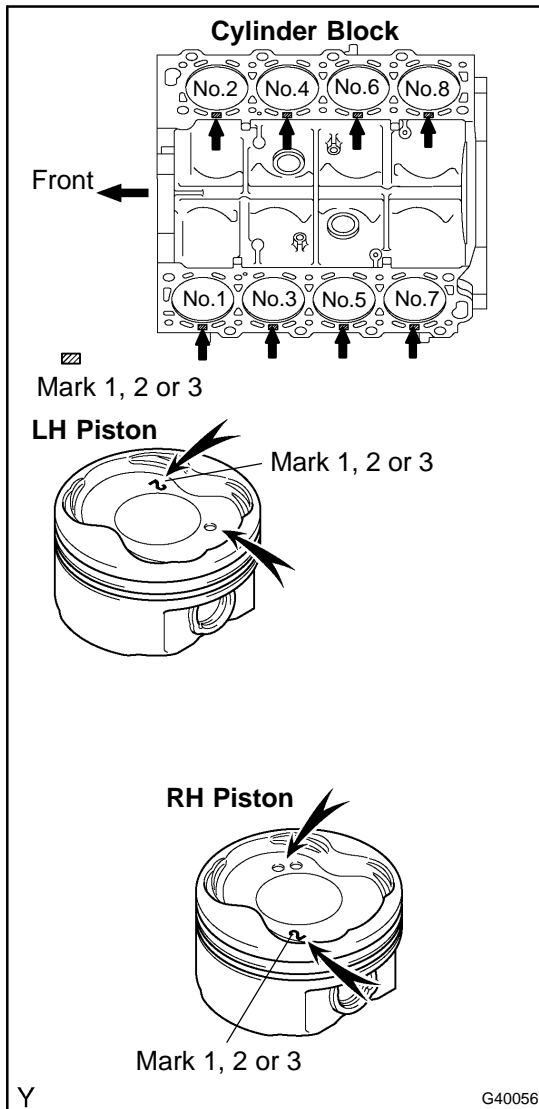
HINT:

There are 3 sizes of the standard piston diameter, marked "1", "2" or "3" accordingly. The mark is stamped on the piston top.

- (1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 30.75 mm (1.2106 in.) from the piston head.

Piston diameter:

STD	Mark "1"	93.902 to 93.912 mm (3.6969 to 3.6973 in.)
	Mark "2"	93.912 to 93.920 mm (3.6973 to 3.6976 in.)
	Mark "3"	93.920 to 93.930 mm (3.6976 to 3.6980 in.)
O/S 0.50		94.402 to 94.430 mm (3.7168 to 3.7177 in.)



- (2) Measure the cylinder bore diameter in the thrust directions.
- (3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

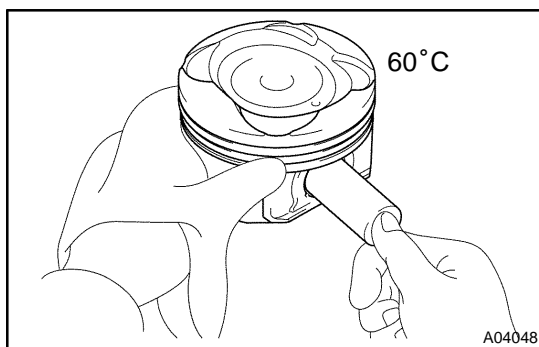
Standard oil clearance:**0.090 to 0.111 mm (0.0035 to 0.0044 in.)****Maximum oil clearance: 0.13 mm (0.0051 in.)**

If the oil clearance is greater than the maximum, replace all the 8 pistons and rebore all the 8 cylinders. If necessary, replace the cylinder block.

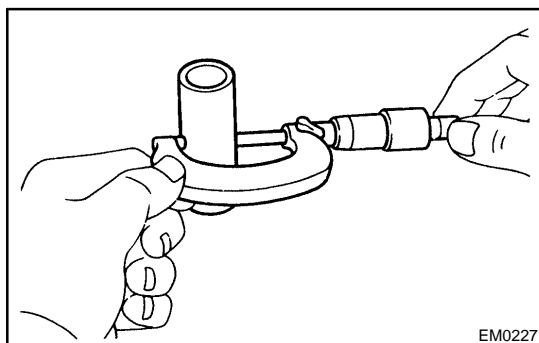
HINT:

Use a new cylinder block:

- Use a piston with the same number mark as the cylinder diameter marked on the cylinder block.
- The shape of the piston varies for the LH and RH banks. The LH piston is marked with 1 cavity and "2", the RH piston with 2 cavities and "2".

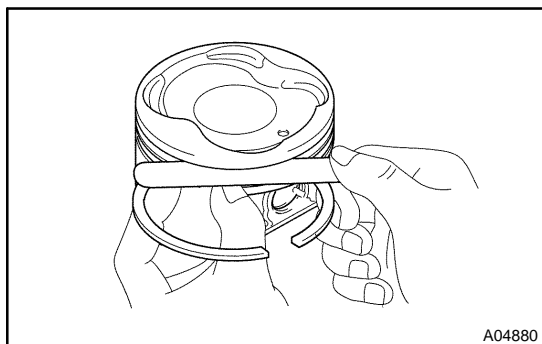


- (c) Inspect the piston pin fit.
 - (1) Heat the piston to approx. 60°C (140°F), and push the piston pin into the piston pin hole with your thumb.



- (d) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:
21.997 to 22.006 mm (0.8660 to 0.8664 in.)



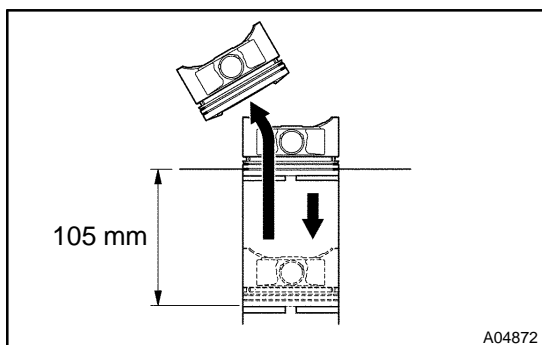
12. INSPECT PISTON RING SET

- (a) Inspect the piston ring groove clearance.
- (1) Using a feeler gauge, measure the clearance between the new piston ring and the wall of the ring groove.

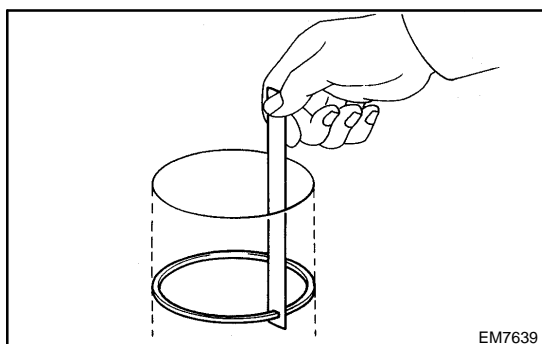
Ring groove clearance:

No.1	0.030 to 0.080 mm (0.0012 to 0.0032 in.)
No.2	0.020 to 0.060 mm (0.0008 to 0.0024 in.)

If the clearance is not as specified, replace the piston.



- (b) Inspect the piston ring end gap.
- (1) Insert the piston ring into the cylinder bore.
- (2) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



- (3) Using a feeler gauge, measure the end gap.

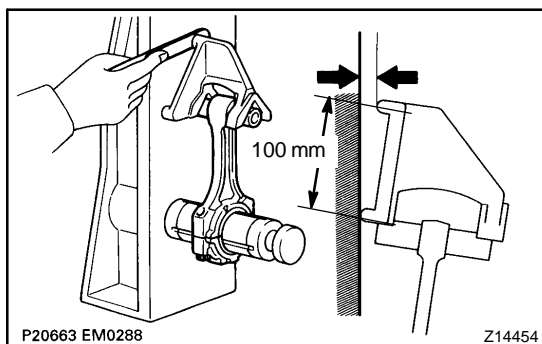
Standard end gap:

No.1	0.300 to 0.400 mm (0.0118 to 0.0158 in.)
No.2	0.400 to 0.550 mm (0.0158 to 0.0217 in.)
Oil (Side rail)	0.130 to 0.380 mm (0.0051 to 0.0150 in.)

Maximum end gap:

No.1	1.10 mm (0.0433 in.)
No.2	1.30 mm (0.0512 in.)
Oil (Side rail)	0.90 mm (0.0354 in.)

If the end gap is greater than the maximum, replace the piston ring. If the end gap is greater than the maximum, even with a new piston ring, rebore all the 8 cylinders or replace the cylinder block sub-assy.



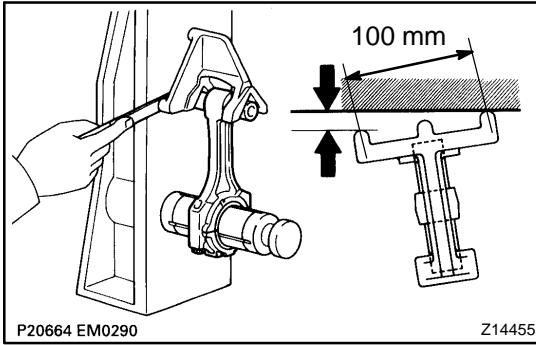
13. INSPECT CONNECTING ROD SUB-ASSY

- (a) Using a rod aligner and feeler gauge, check the connecting rod alignment.
- (1) Check for bend.

Maximum bend:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If bend is greater than the maximum, replace the connecting rod sub-assy.

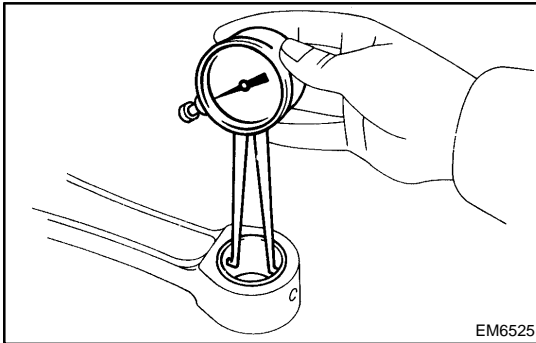


(2) Check for twist

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than the maximum, replace the connecting rod sub-assy.

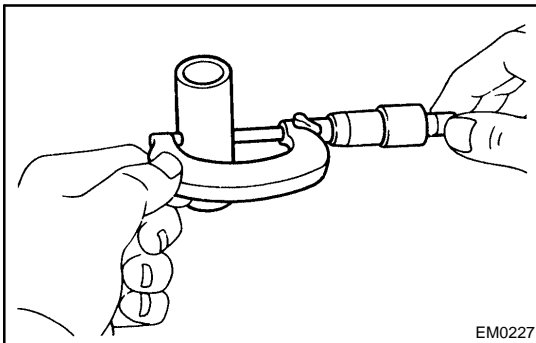


(b) Inspect the piston pin oil clearance.

(1) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

22.005 to 22.014 mm (0.8663 to 0.8667 in.)



(2) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

21.997 to 22.006 mm (0.8660 to 0.8664 in.)

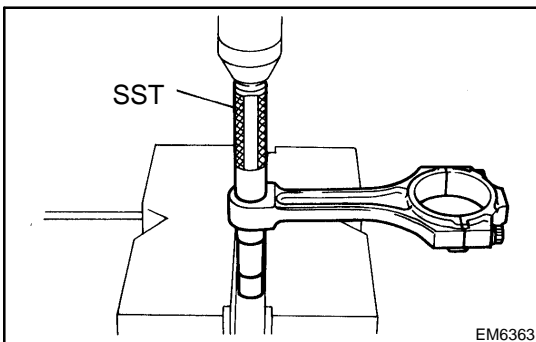
(3) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Standard oil clearance:

0.005 to 0.011 mm (0.0002 to 0.0004 in.)

Maximum oil clearance: 0.05 mm (0.0020 in.)

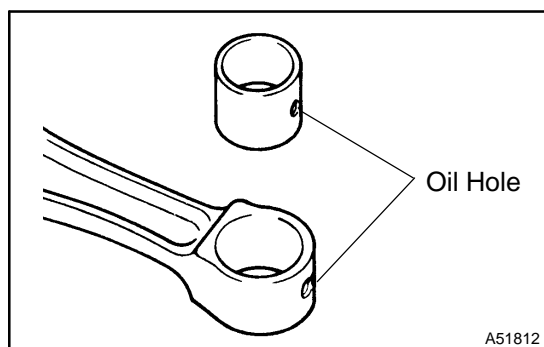
If the oil clearance is greater than the maximum, replace the connecting rod sub-assy. If necessary, replace the piston and piston pin as a set.



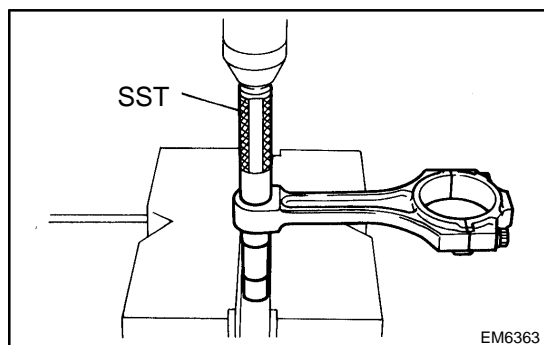
14. REMOVE CONNECTING ROD SMALL END BUSH

(a) Using SST and a press, press out the bushing.

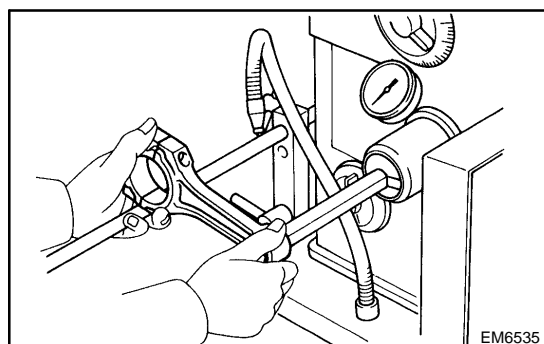
SST 09222-30010

**15. INSTALL CONNECTING ROD SMALL END BUSH**

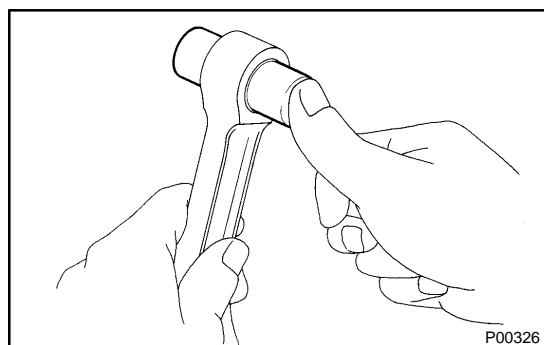
- (a) Align the oil holes of a new bushing and the connecting rod.



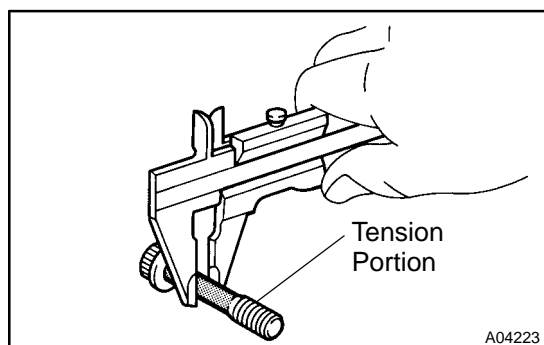
- (b) Using SST and a press, press in the bushing.
SST 09222-30010



- (c) Using a pin hole grinder, hone the bushing to obtain the specified clearance between the bushing and piston pin.



- (d) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

**16. INSPECT CONNECTING ROD BOLT**

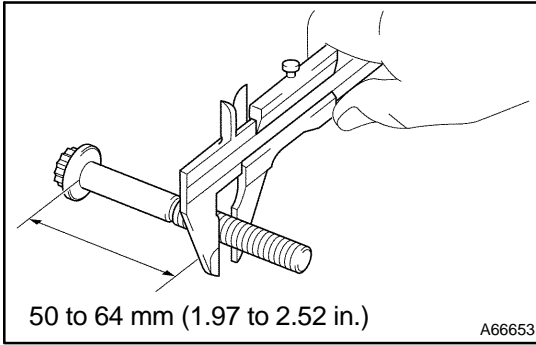
- (a) Using vernier calipers, measure the tension portion diameter of the connecting rod bolt.

Standard diameter:

7.200 to 7.300 mm (0.2835 to 0.2874 in.)

Minimum diameter: 7.00 mm (0.2756 in.)

If the diameter is less than the minimum, replace the bolt.

**17. INSPECT CRANKSHAFT BEARING CAP BOLT**

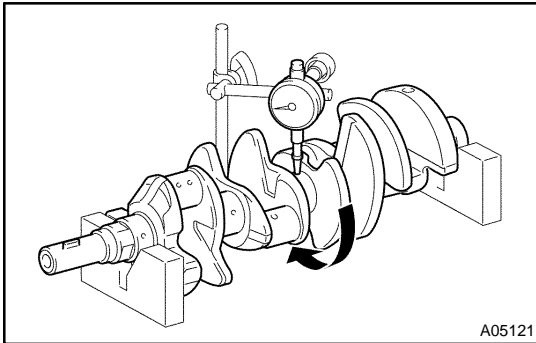
- (a) Using vernier calipers, measure the thread outside diameter of the crankshaft bearing cap bolt.

Standard diameter:

10.760 to 10.970 mm (0.4236 to 0.4319 in.)

Minimum diameter: 10.40 mm (0.4094 in.)

If the diameter is less than the minimum, replace the cap bolt.

**18. INSPECT CRANKSHAFT**

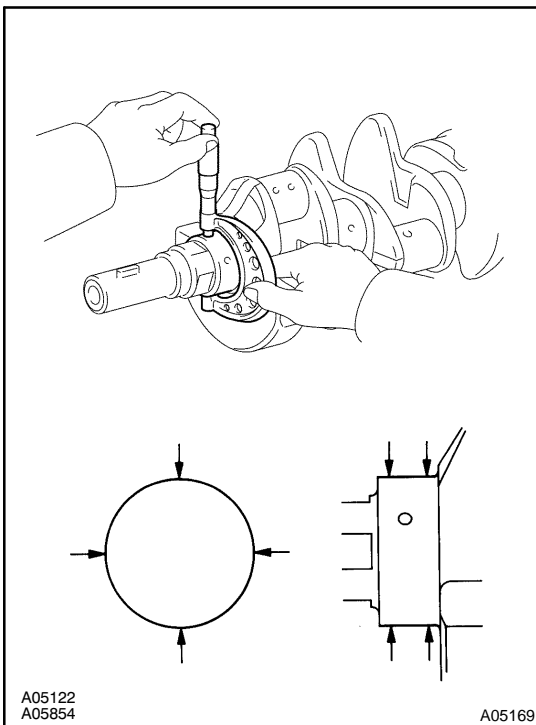
- (a) Inspect for circle runout.

(1) Place the crankshaft on V-blocks.

(2) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.04 mm (0.0016 in.)

If the circle runout is greater than the maximum, replace the crankshaft.



- (b) Inspect the crankshaft journals and crank pins.

(1) Using a micrometer, measure the diameter of each crankshaft journal and crank pin.

Crankshaft journal diameter:

66.988 to 67.000 mm (2.6373 to 2.6378 in.)

Crank pin diameter:

51.982 to 52.000 mm (2.0465 to 2.0472 in.)

If the diameter is not as specified, check the oil clearance. If necessary, replace the crankshaft.

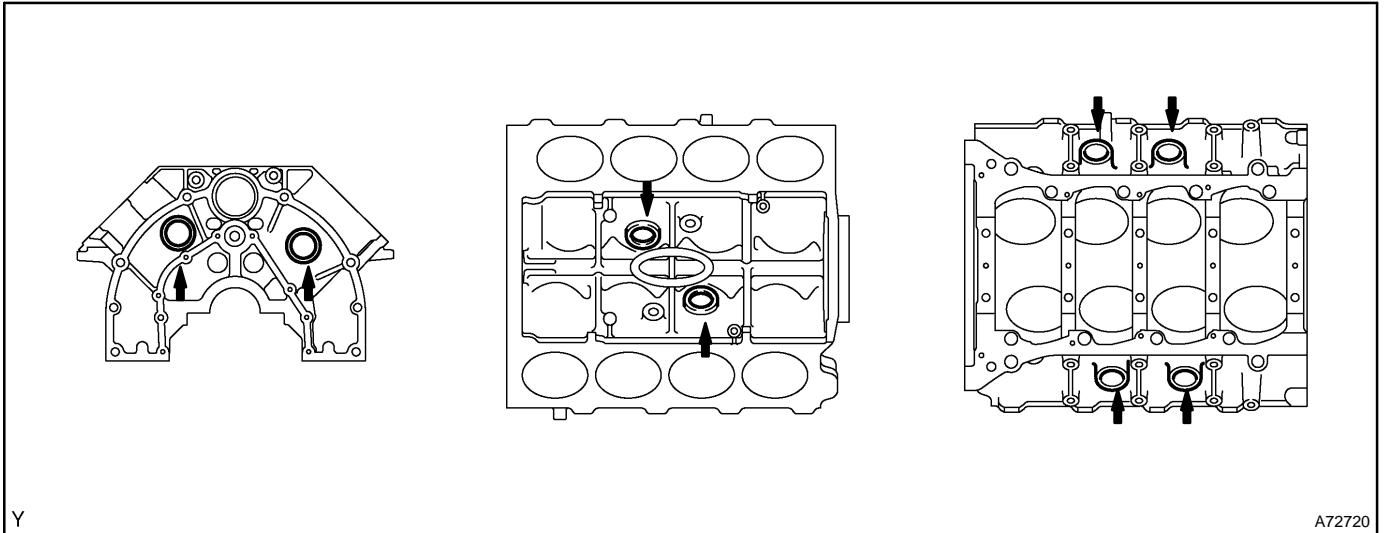
(2) Check each crankshaft journal and crank pin for taper and out-of-round as shown in the illustration.

Maximum taper and out-of-round:

0.02 mm (0.0008 in.)

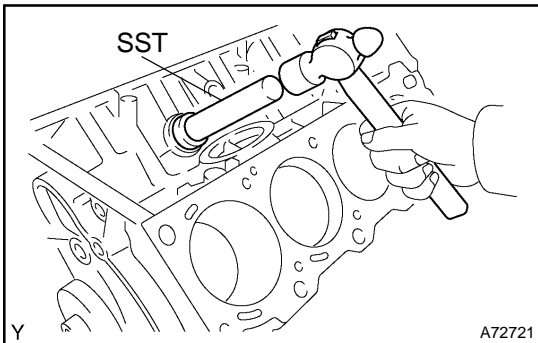
If the taper and out-of-round is greater than the maximum, replace the crankshaft.

19. INSTALL TIGHT PLUG



Y

A72720



Y

A72721

- (a) Apply adhesive to the tight plug.

Adhesive:

Part No. 08833-00070, THRE BOND 1324 or equivalent

- (b) Using SST and a hammer, tap in a new tight plug as shown in the illustration.

SST 09950-60010 (09951-00350), 09950-70010 (09951-07100)

20. INSTALL STUD BOLT

Torque:
8.0 N·m (80 kgf·cm, 71 in.-lbf) for A
20 N·m (200 kgf·cm, 14 ft.-lbf) for B
12 N·m (120 kgf·cm, 9 ft.-lbf) for C
14 N·m (145 kgf·cm, 10 ft.-lbf) for D
8.0 N·m (80 kgf·cm, 71 ft.-lbf) for E

Location	Thread Diameter	Length
A	8 mm	120 mm (4.72 in.)
B	10 mm	116 mm (4.57 in.)
C	8 mm	37 mm (1.46 in.)
D	8 mm	32 mm (1.26 in.)
E	8 mm	24 mm (0.94 in.)

21. INSTALL STRAIGHT PIN

Pin A Dimensions:
 Diameter: 6 mm (0.24 in.)
 Length: 14 mm (0.55 in.)

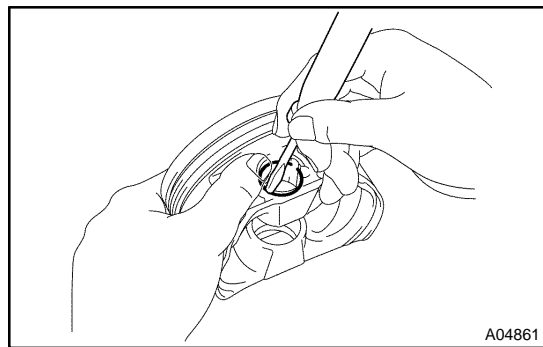
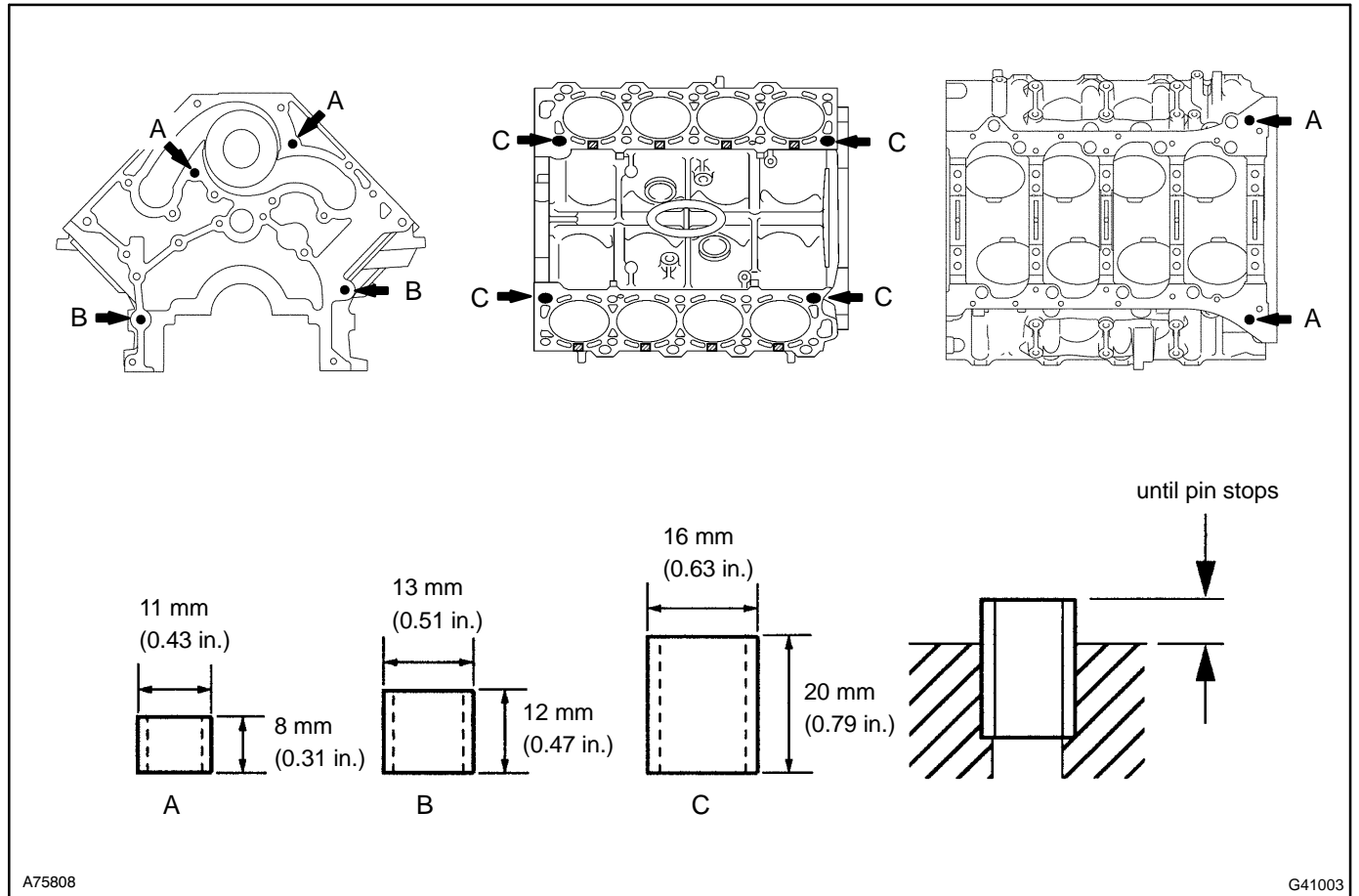
Pin B Dimensions:
 Diameter: 10 mm (0.39 in.)
 Length: 22 mm (0.87 in.)

Insert until pin stops.

A50243

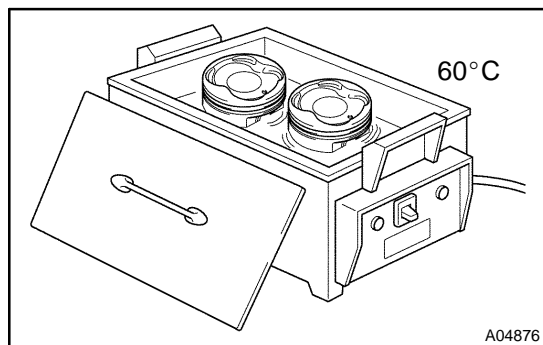
A53947

22. INSTALL RING PIN

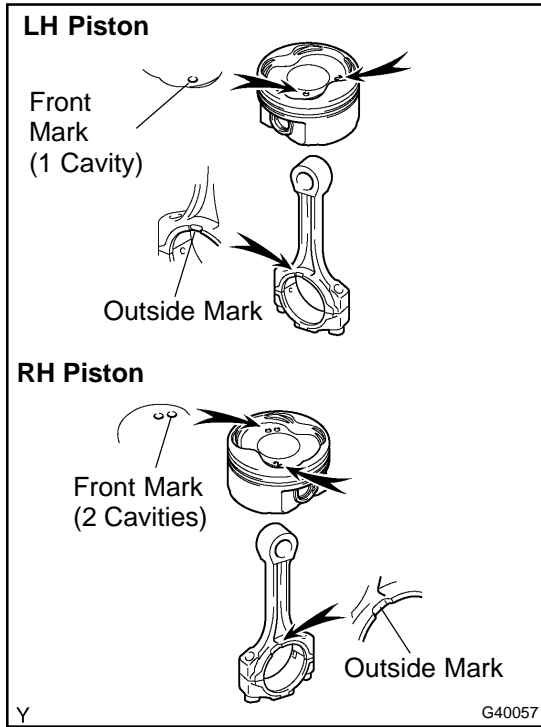


23. INSTALL PISTON

(a) Using a screwdriver, install a new snap ring on one side of the piston pin hole.



(b) Gradually heat the piston to about 60°C (140°F).

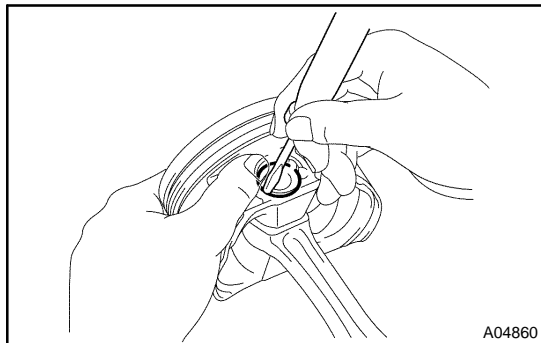


- (c) Coat the piston pin with engine oil.
- (d) Position the piston front mark with respect to the outside mark on the connecting rod as shown in the illustration.

NOTICE:

The installation directions of the piston and connecting rod are different for the LH and RH banks. The LH piston is marked with 1 cavity and "2", the RH piston with 2 cavities and "2".

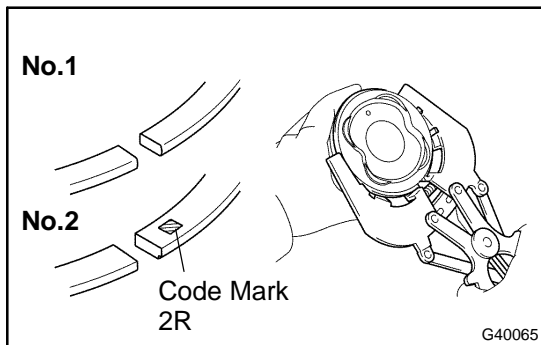
- (e) Align the piston pin holes of the piston and connecting rod, and push in the piston pin with your thumb.



- (f) Using a screwdriver, install a new snap ring on the other side of the piston pin hole.

24. INSTALL PISTON RING SET

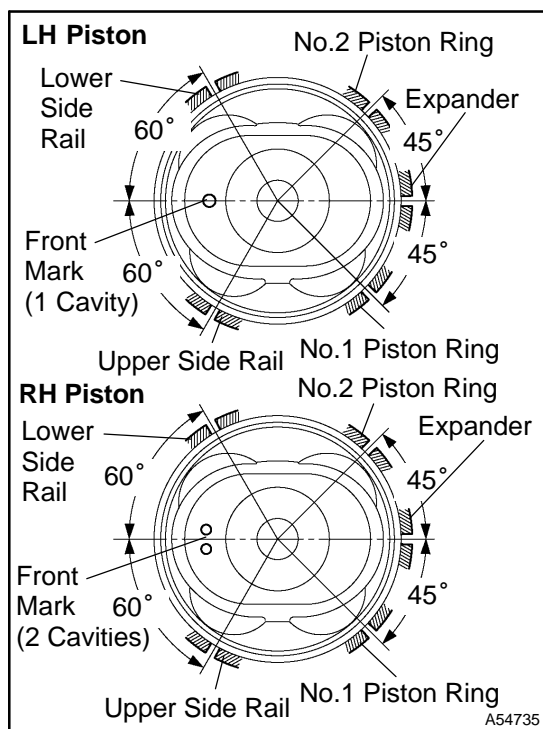
- (a) Install the oil ring expander and 2 side rails by hand.



- (b) Using a piston ring expander, install the 2 piston rings with the code mark facing upward.

Code mark:

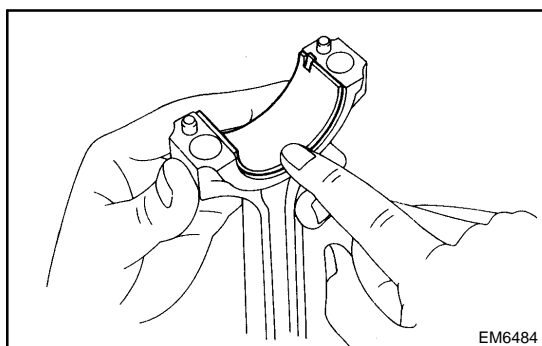
No.1	None
No.2	2R



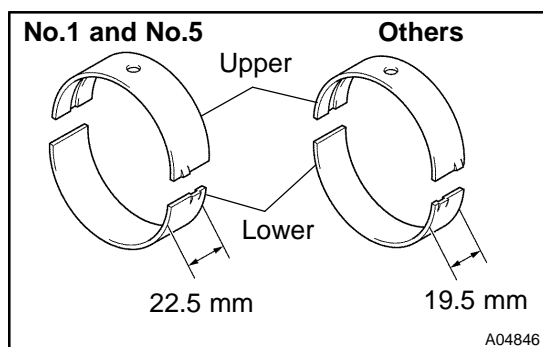
- (c) Position the piston rings so that the ring ends are as shown in the illustration.

NOTICE:

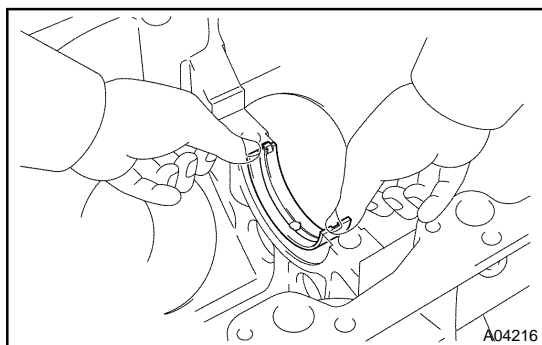
Do not align the ring ends.

**25. INSTALL CONNECTING ROD BEARING**

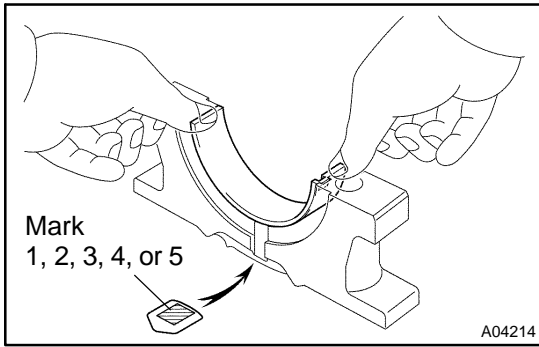
- (a) Align the bearing claw with the groove of the connecting rod or connecting cap.
 (b) Install the bearings in the connecting rod and connecting rod cap.

**26. INSTALL CRANKSHAFT BEARING****HINT:**

- Main bearings come in widths of 19.5 mm (0.768 in.) and 22.5 mm (0.886 in.). Install the 22.5 mm (0.886 in.) bearings in the No.1 and No.5 cylinder block journal positions with the crankshaft bearing cap. Install the 19.5 mm (0.768 in.) bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.



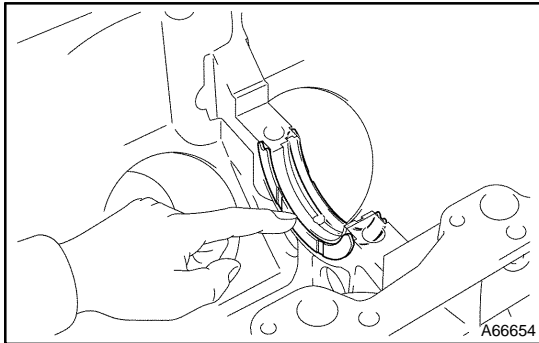
- (a) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.



- (b) Align the bearing claw with the claw groove of the crankshaft bearing cap, and push in the 5 lower bearings.

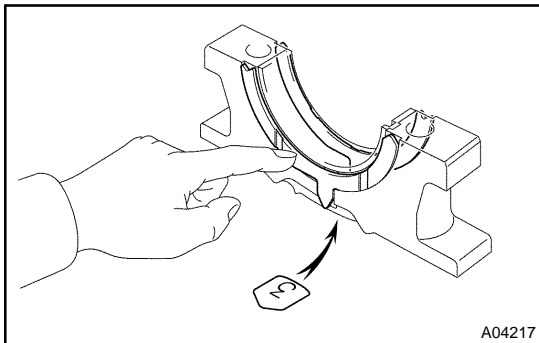
HINT:

A number is marked on each bearing cap to indicate the installation position.



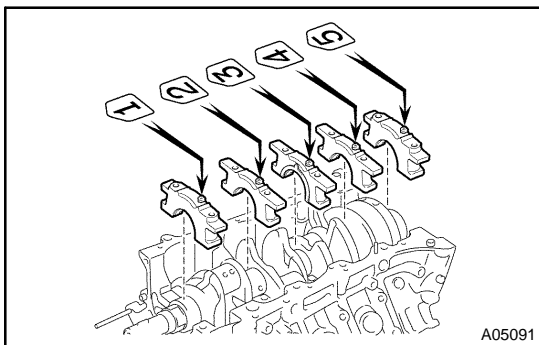
27. INSTALL CRANKSHAFT THRUST WASHER SET

- (a) Install the 2 thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.



- (b) Install the 2 thrust washers on the No.3 bearing cap with the grooves facing outward.

28. INSTALL CRANKSHAFT PULLEY SET CRANKSHAFT KEY



29. INSTALL CRANKSHAFT

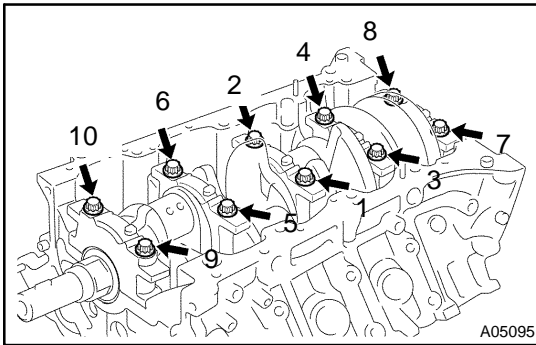
- (a) Place the crankshaft on the cylinder block.
- (b) Install the 5 crankshaft bearing caps in their proper locations.

HINT:

Place the bearing caps level and let them return to their original positions by their own weight.

NOTICE:

Do not install the bearing cap by tapping it.



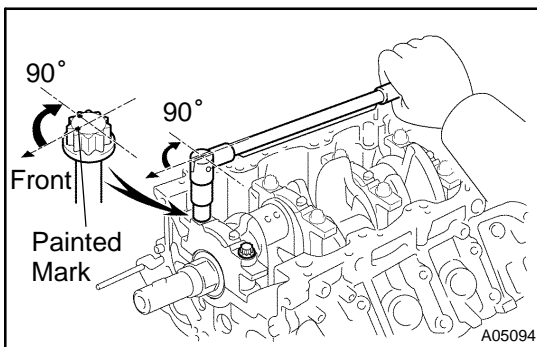
(c) Install the crankshaft bearing cap bolts.

HINT:

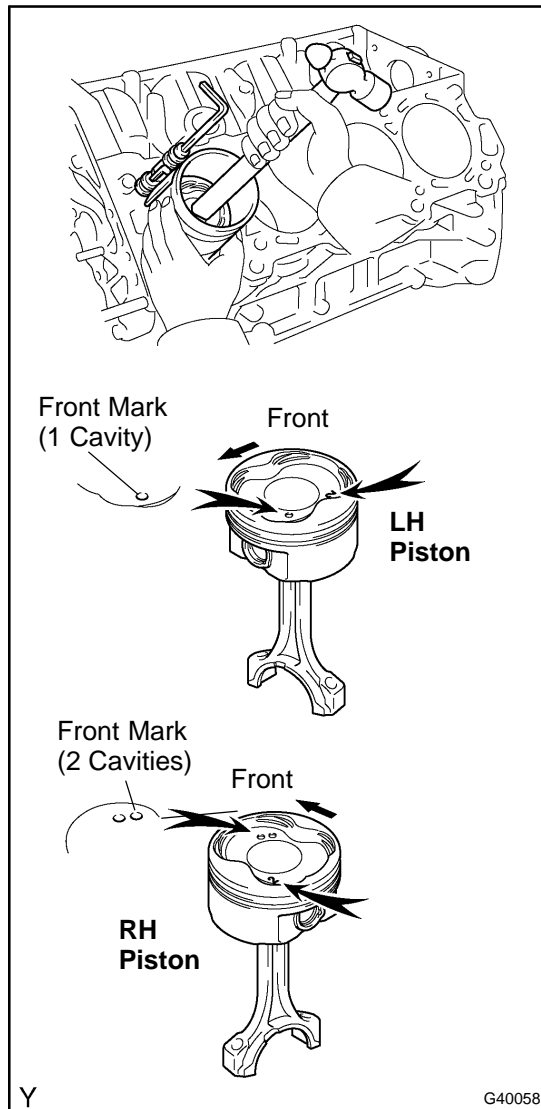
- The bearing cap bolts are tightened in 2 progressive steps.
 - If any one of the bearing cap bolts is broken or deformed, replace it.
- (1) Apply a light coat of engine oil to the threads and under the heads of the crankshaft bearing cap bolts.
 - (2) Install and uniformly tighten the 10 crankshaft bearing cap bolts in several steps, in the order shown in the illustration.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

If any one of the bearing cap bolts does not meet the torque specification, replace the bearing cap bolt.



- (3) Mark the front of the crankshaft bearing cap bolts with paint.
- (4) Retighten the crankshaft bearing cap bolts by 90° in the order shown.
- (5) Check that the painted mark is now at a 90° angle to the front.
- (6) Check that the crankshaft turns smoothly.

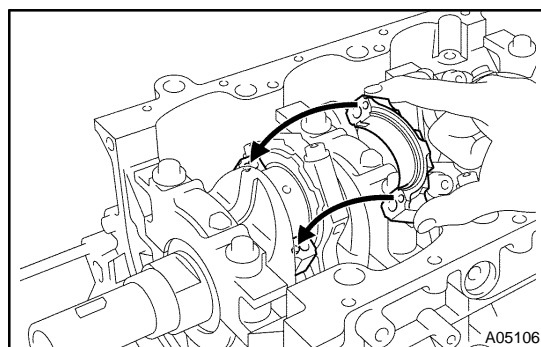


30. INSTALL PISTON AND CONNECTING ROD

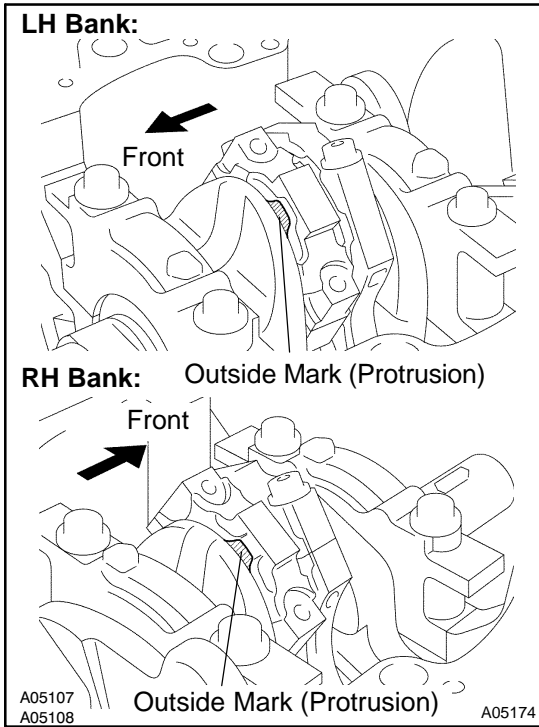
- (a) Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.

NOTICE:

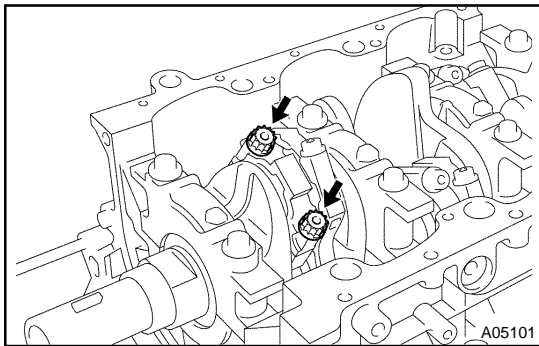
The shape of the piston varies for the LH and RH banks. The LH piston is marked with 1 cavity and "2", the RH piston with 2 cavities and "2".



- (b) Place the connecting rod cap on the connecting rod.
- (1) Match the numbered connecting rod cap with the connecting rod.
 - (2) Align the pin groove of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.



- (3) Check that the outside mark of the connecting rod cap is facing in the correct direction.



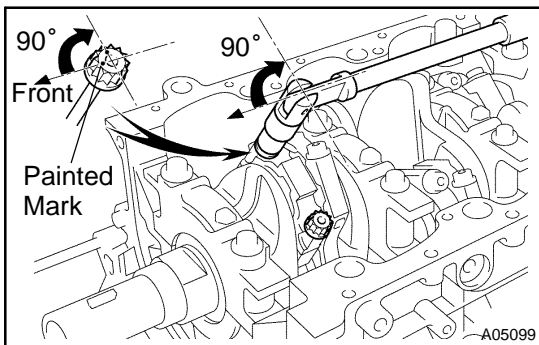
- (c) Install the connecting rod cap bolts.

HINT:

- The connecting rod cap bolts are tightened in 2 progressive steps.
- If any one of the connecting rod cap bolts is broken or deformed, replace it.
 - (1) Apply a light coat of engine oil to the threads and under the heads of the connecting rod cap bolts.
 - (2) Install and alternately tighten the 2 connecting rod cap bolts in several steps.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

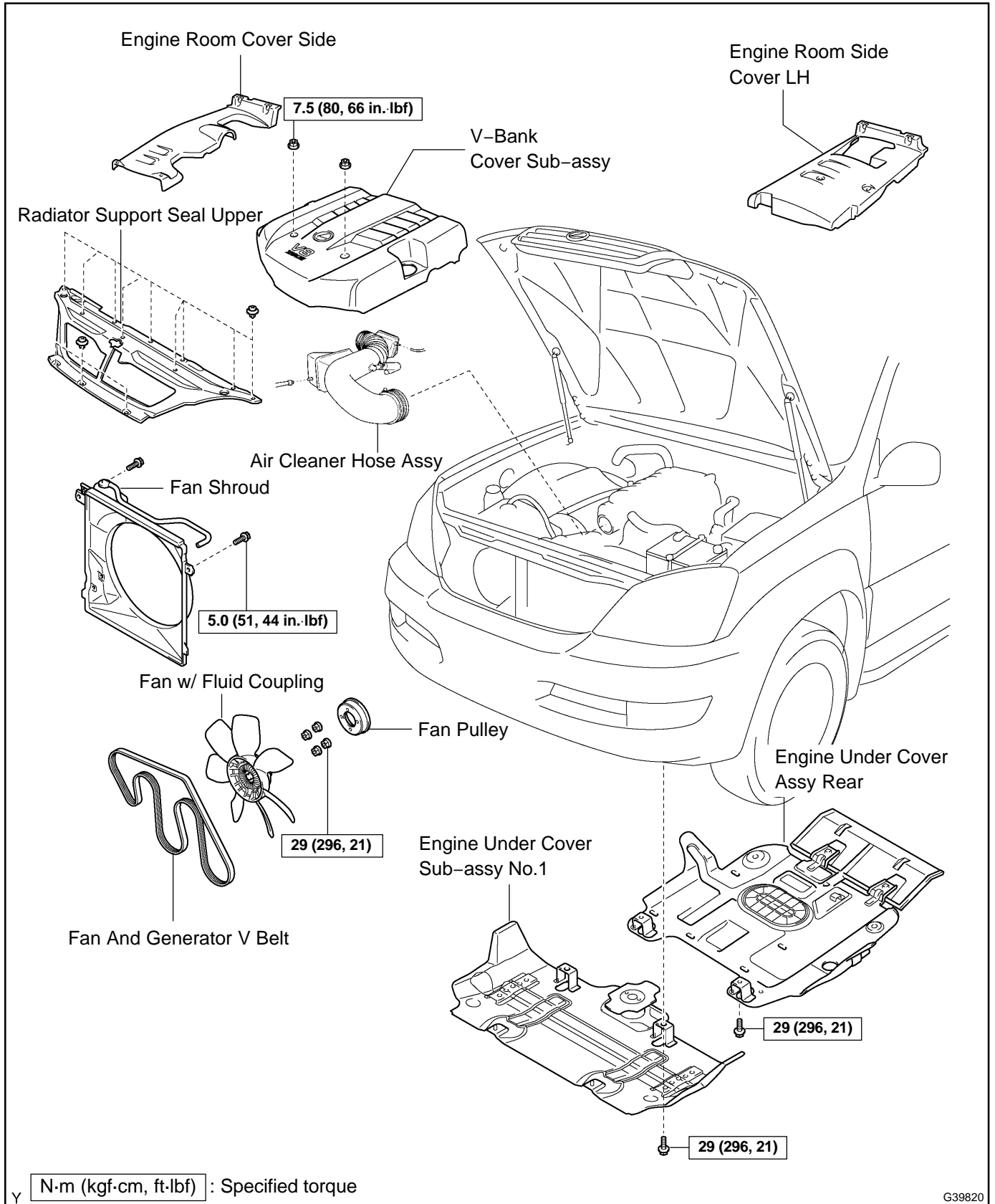
If any one of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



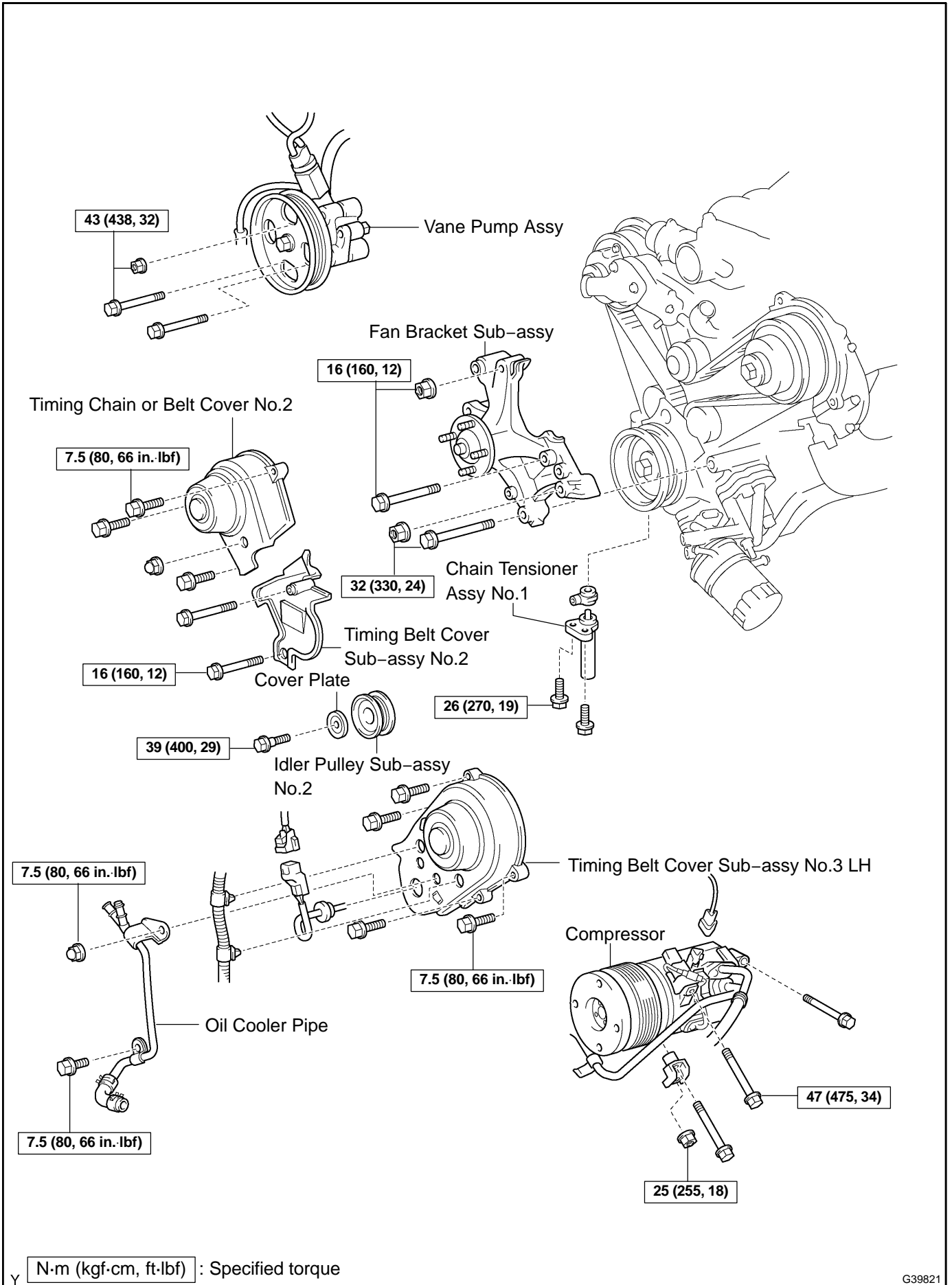
- (3) Mark the front of the connecting cap bolt with paint.
 - (4) Retighten the cap bolts 90° as shown in the illustration.
 - (5) Check that the painted mark is now at a 90° angle to the front.
- (d) Check that the crankshaft turns smoothly.

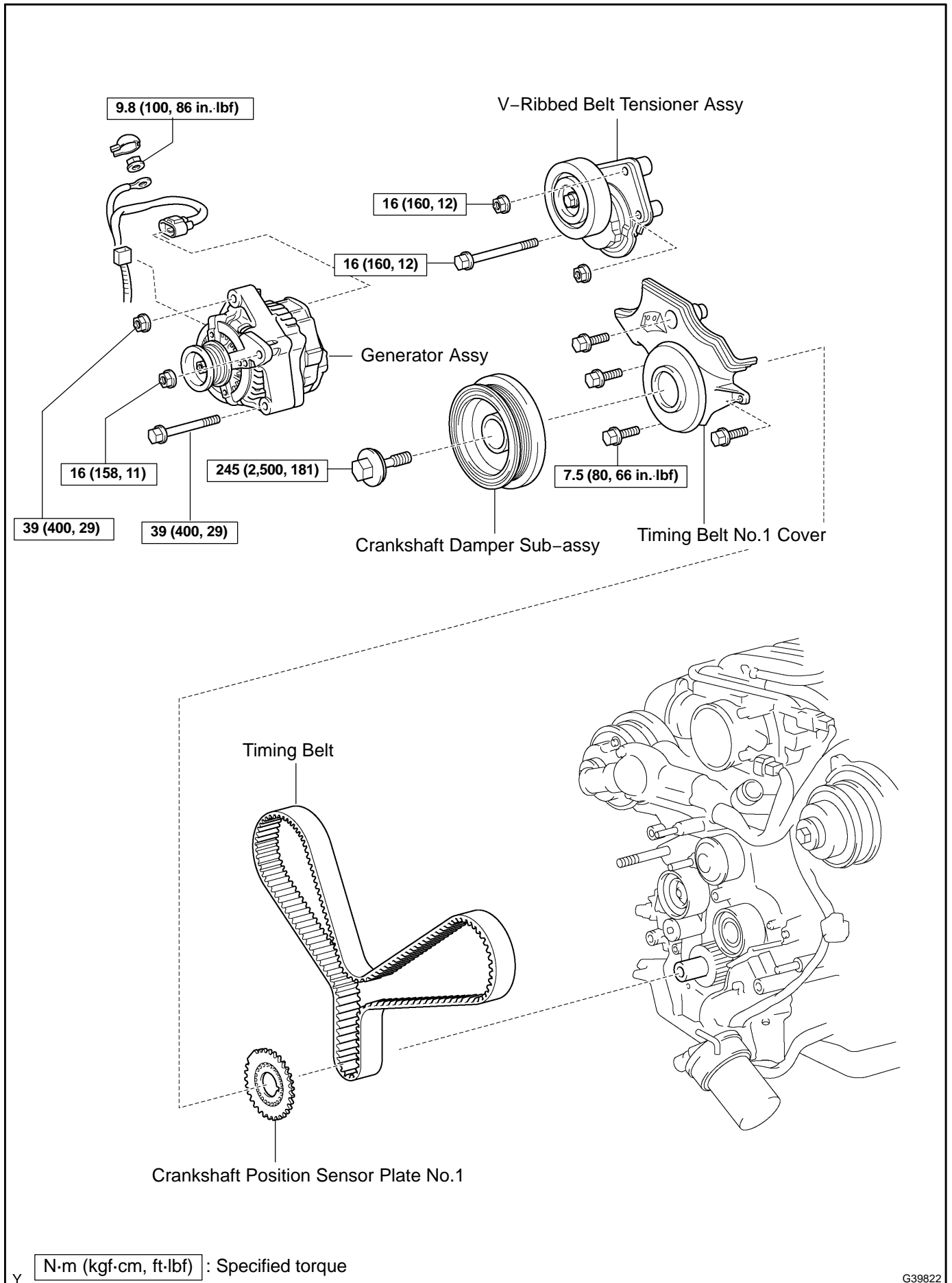
TIMING BELT (2UZ-FE) COMPONENTS

140ZJ-06



G39820

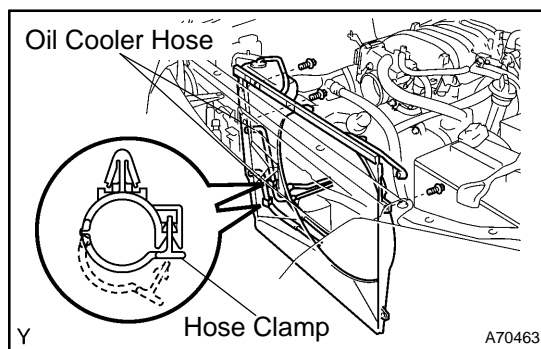




G39822

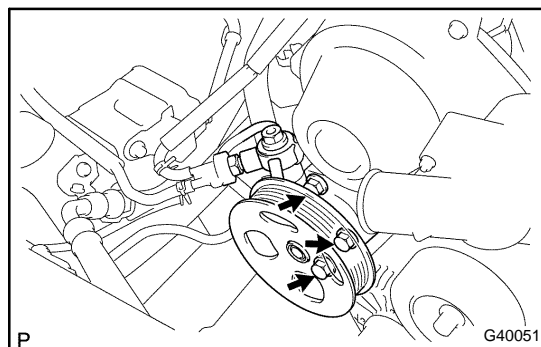
REPLACEMENT

1. DRAIN ENGINE COOLANT (SEE PAGE 16-5)
2. SEPARATE BATTERY NEGATIVE TERMINAL
3. REMOVE V-BANK COVER SUB-ASSY
 - (a) Remove the 2 nuts and V-bank cover sub-assy.
4. REMOVE ENGINE ROOM COVER SIDE
5. REMOVE ENGINE ROOM SIDE COVER LH
6. REMOVE AIR CLEANER HOSE ASSY
7. REMOVE RADIATOR SUPPORT SEAL UPPER
 - (a) Remove the 11 clips and radiator support seal upper.
8. REMOVE FAN AND GENERATOR V BELT (SEE PAGE 14-5)



9. REMOVE FAN W/ FLUID COUPLING

- (a) Unfasten each clip and the 2 hose clamps, and then separate the 2 oil cooler hoses from the fan shroud.
- (b) Remove the 3 bolts and separate the fan shroud from the radiator.
- (c) Remove the 4 nuts and separate the fan w/ fluid coupling from the engine.
- (d) Remove the fan shroud and fan w/ fluid coupling together from the vehicle.
- (e) Remove the fan pulley.



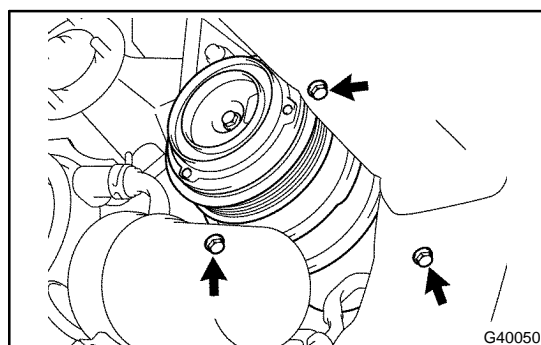
10. SEPARATE VANE PUMP ASSY

- (a) Disconnect the vacuum hose.
- (b) Remove the nut, 2 bolts and vane pump assy.

HINT:

Hang up the hoses instead of detaching.

11. REMOVE GENERATOR ASSY (SEE PAGE 19-17)

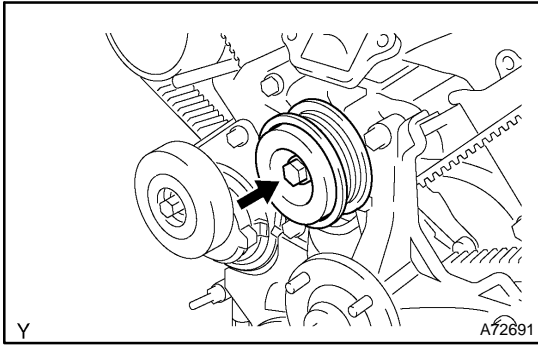


12. SEPARATE COMPRESSOR

- (a) Disconnect the compressor connector.
- (b) Remove the nut, 3 bolts, compressor stay and compressor.

HINT:

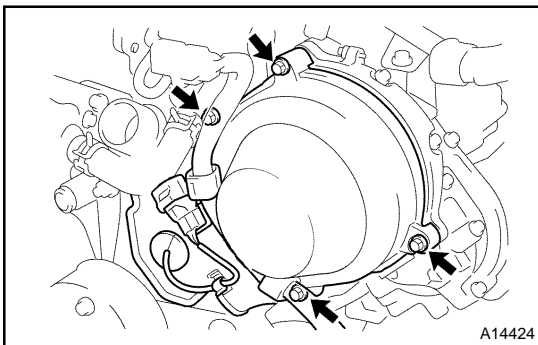
Hang up the hoses instead of detaching.

**13. REMOVE IDLER PULLEY SUB-ASSY NO.2**

- (a) Remove the pulley bolt, cover plate and idler pulley.

14. REMOVE OIL COOLER PIPE

- (a) Disconnect the 3 hoses.
 (b) Remove the bolt, nut and oil cooler pipe.

**15. REMOVE TIMING BELT COVER SUB-ASSY NO.3 LH**

- (a) Remove the grommet and separate the cam position sensor connector from the timing belt cover sub-assy No.3 LH.
 (b) Remove the 4 bolts and timing belt cover sub-assy No.3 LH.

16. REMOVE TIMING CHAIN OR BELT COVER NO.2

- (a) Remove the nut, 3 bolts and timing belt cover No.2.

17. REMOVE TIMING BELT COVER SUB-ASSY NO.2

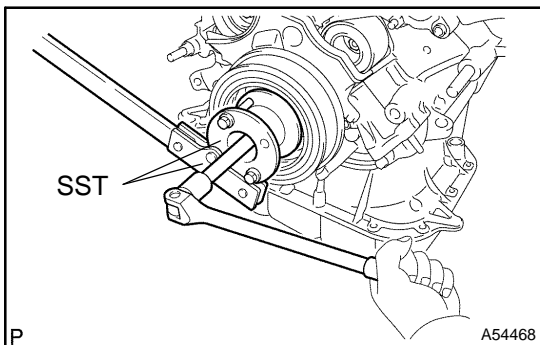
- (a) Remove the 2 bolts and timing belt cover sub-assy No.2.

18. REMOVE V-RIBBED BELT TENSIONER ASSY

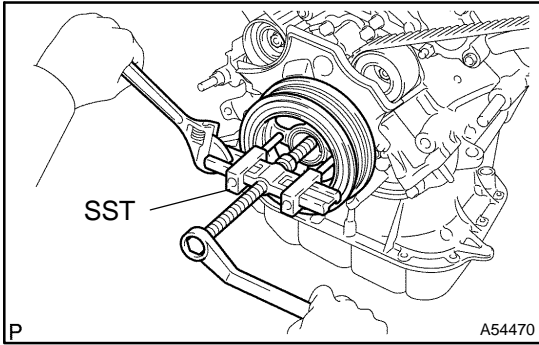
- (a) Remove the bolt, 2 nuts and V-ribbed belt tensioner.

19. REMOVE FAN BRACKET SUB-ASSY

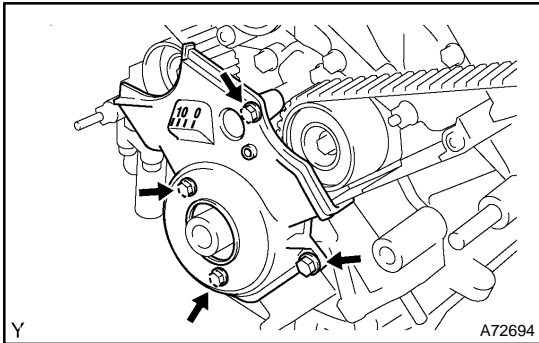
- (a) Remove the 2 nuts, 2 bolts and fan bracket sub-assy.

**20. REMOVE CRANKSHAFT DAMPER SUB-ASSY**

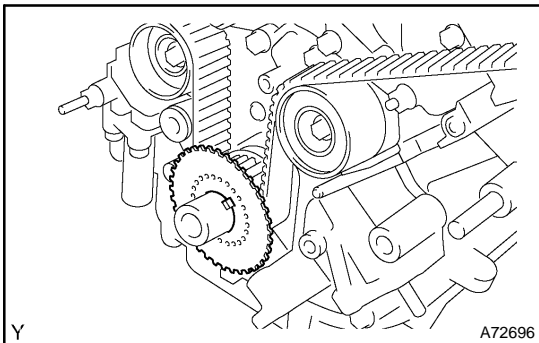
- (a) Using SST, remove the pulley bolt.
 SST 09213-70011 (09213-70020), 09330-00021



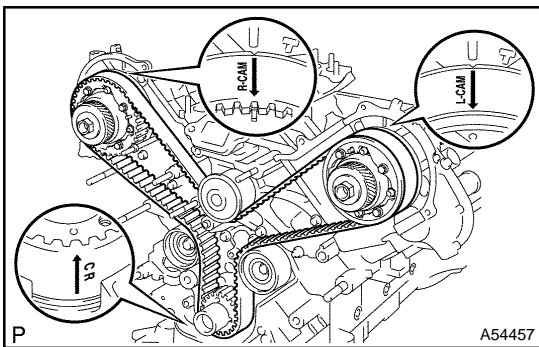
- (b) Using SST, remove the crankshaft pulley.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05021),



- 21. REMOVE TIMING BELT NO.1 COVER**
- (a) Remove the 4 bolts and timing belt cover.

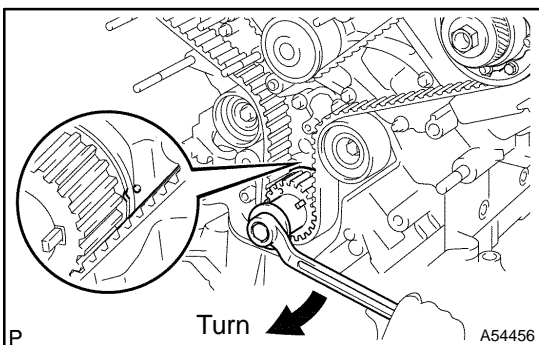


- 22. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1**

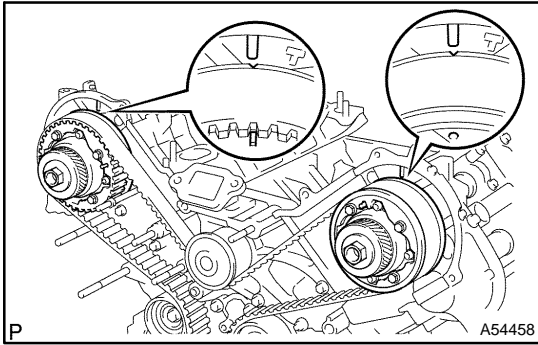


- 23. REMOVE TIMING BELT**
- (a) If reusing the timing belt, check the installation marks on the timing belt.
 - (1) Check that there are 3 installation marks on the timing belt by turning the crankshaft as shown in the illustration.

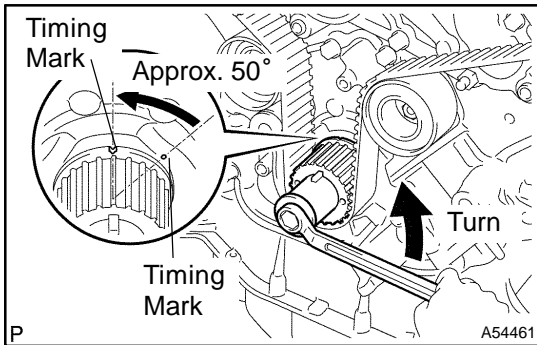
If the installation marks have disappeared, put a new installation mark on the timing belt before removing each part.



- (b) Set the No.1 cylinder to approx. 50° BTDC/compression.
 - (1) Using the crankshaft damper bolt, turn the crankshaft to align the timing marks of the crankshaft timing pulley and oil pump body.



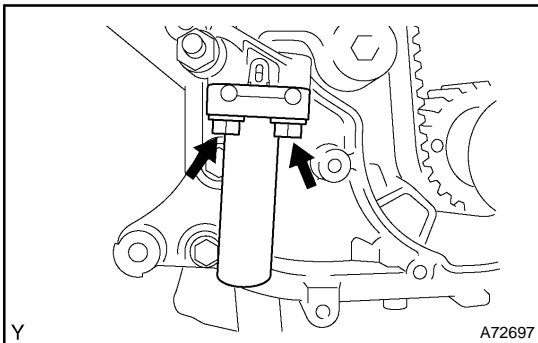
- (2) Check that the timing marks of the camshaft timing pulleys and timing belt plates are aligned.
If not, turn the crankshaft 1 complete revolution (360°).



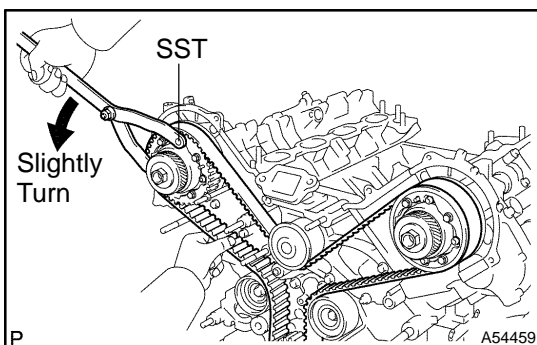
- (3) Using the crankshaft damper bolt, turn the crankshaft counterclockwise by approx. 50°.

NOTICE:

If the timing belt is disengaged, having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft timing pulley and camshaft, causing damage. So always set the crankshaft pulley at the correct angle.



- (c) Alternately loosen the 2 bolts, then remove the bolts, the chain tensioner and dust boot.



- (d) Using a SST, loosen the tension between the camshaft timing pulley (RH bank) and crankshaft timing pulley by turning the camshaft timing pulley (RH bank) counterclockwise slightly.

SST 09960-10010 (09962-01000, 09963-00350)

- (e) Disconnect the timing belt from the timing belt idler No.1 and remove the timing belt.

24. INSTALL TIMING BELT

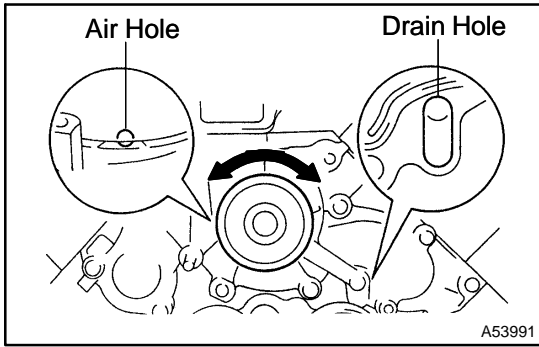
- (a) Check the timing belt idlers No.1 and No.2.

- (1) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler.

- (2) Check that the idler turns smoothly.

If necessary, replace the idler.



- (b) Check the water pump.
 - (1) Visually check the air hole and water hole for coolant leakage.

If leakage is found, replace the water pump and timing belt.

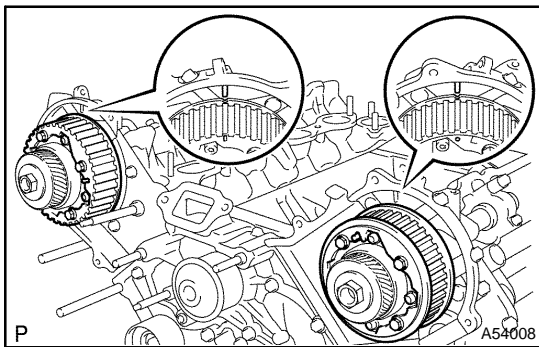
 - (2) Turn the pulley, and check that the water pump bearing moves smoothly .

If necessary, replace the water pump.

- (c) Remove any oil or water on the crankshaft pulley, oil pump pulley, water pump pulley, idler No.1 and idler No.2, and keep them clean.

NOTICE:

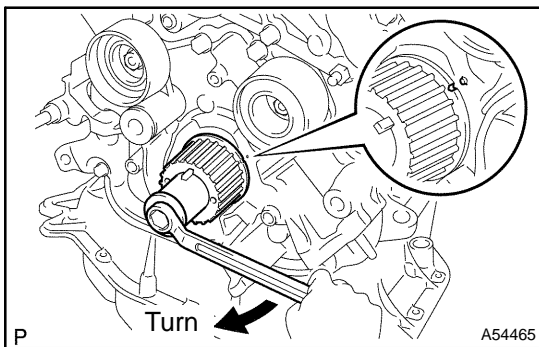
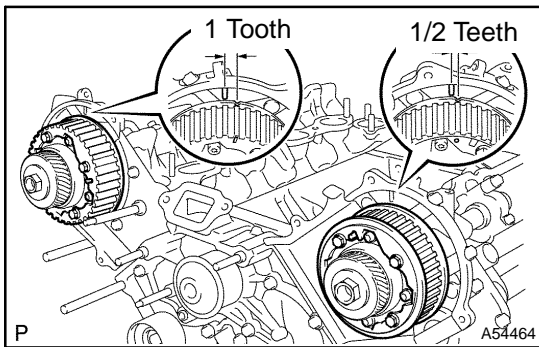
Only wipe the pulleys; do not use any cleansing agent.



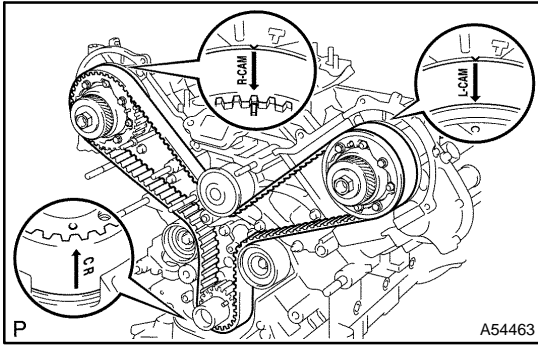
- (d) Set the No.1 cylinder to the TDC/compression.
 - (1) Turn the hexagonal portion of the camshaft to align the timing marks of the camshaft timing pulleys and timing belt plates.

HINT:

By turning the camshaft timing pulleys clockwise as follows, installation of the timing pulleys will be easy:
 1/2 teeth turn for the left bank camshaft timing pulley
 1 tooth turn for the right bank camshaft timing pulley



- (2) Using the crankshaft damper bolt, turn the crankshaft to align the timing marks of the crankshaft timing pulley and oil pump body.

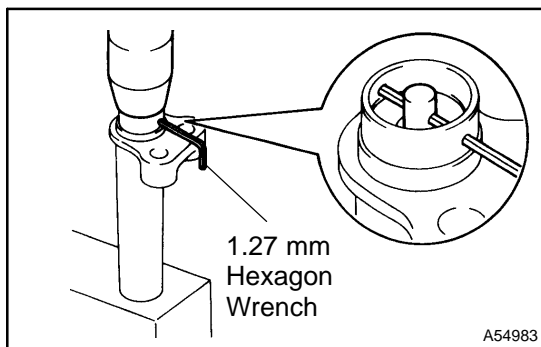


- (e) Install the timing belt.
- (1) Remove any oil or water on the each pulley, and keep them clean.

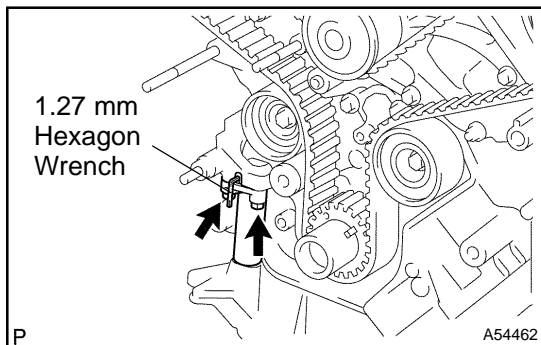
NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

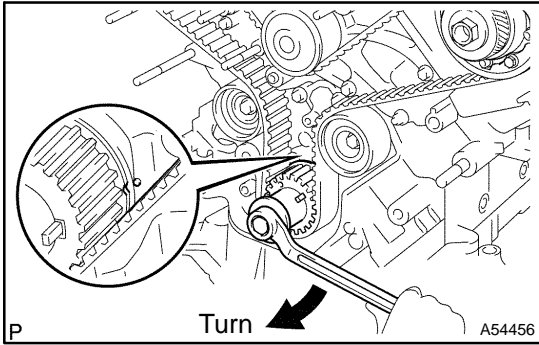
- (2) Face the front mark (arrow) on the timing belt forward.
- (3) Put the timing belt on the crankshaft timing pulley.
 - Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
- (4) Put the timing belt on the idler No.2.
- (5) Put the timing belt on the camshaft timing pulley (LH bank).
 - Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.
- (6) Put the timing belt on the water pump pulley.
- (7) Put the timing belt on the camshaft timing pulley (RH bank).
 - Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.
- (8) Put the timing belt on the idler No.1.



- (f) Set the belt tensioner.
- (1) Using a press, slowly press in the push rod using 981 to 9,807 N (100 to 1,000 kgf, 220 to 2,205 lbf) of pressure.
 - (2) Align the holes of the push rod and housing, and pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.
 - (3) Release the press.
 - (4) Install the dust boot to the belt tensioner.

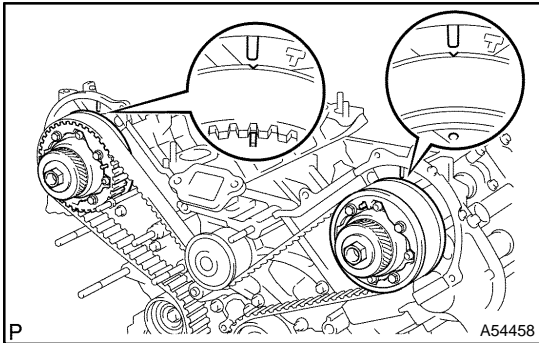


- (g) Install the belt tensioner.
- (1) Temporarily install the belt tensioner with the 2 bolts.
 - (2) Alternately tighten the 2 bolts.
Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)
 - (3) Using pliers, remove the 1.27 mm hexagon wrench from the chain tensioner.

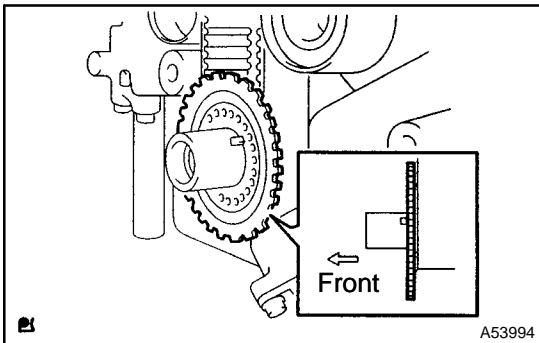


- (h) Check the valve timing.
 - (1) Using the crankshaft damper bolt, slowly turn the crankshaft pulley 2 revolutions from the TDC to TDC.

NOTICE:
Always turn the crankshaft pulley clockwise.



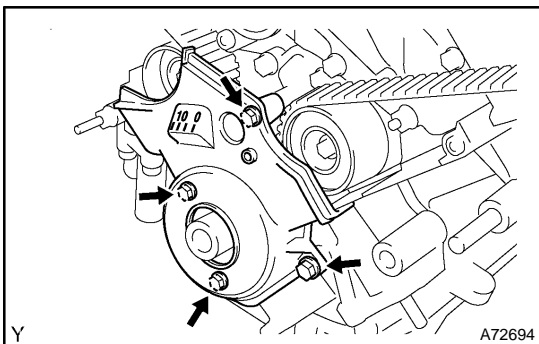
- (2) Check that each pulley is aligned with each timing mark as shown in the illustration. If the timing marks are not aligned, remove the timing belt and reinstall it.
- (3) Remove the crankshaft damper bolt.



25. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1

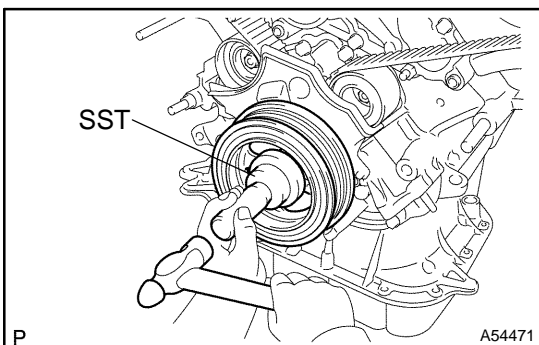
- (a) Install the sensor plate as shown in the illustration.

NOTICE:
Take care not to install it in a wrong direction.



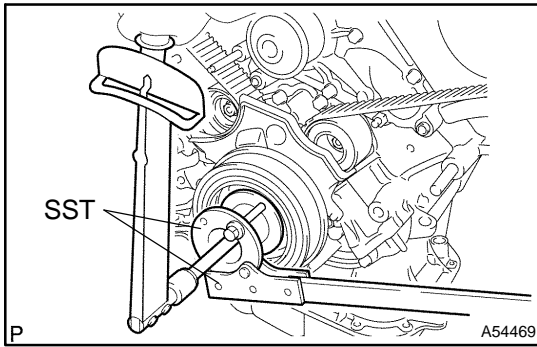
26. INSTALL TIMING BELT NO.1 COVER

- (a) Install the timing belt cover with the 4 bolts.
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

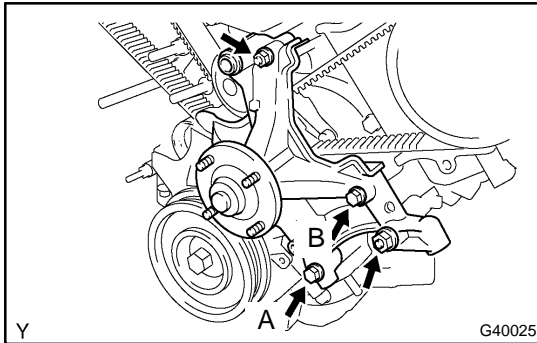


27. INSTALL CRANKSHAFT DAMPER SUB-ASSY

- (a) Align the pulley set key with the key groove of the crankshaft damper.
- (b) Using SST and a hammer, tap in the crankshaft damper.
SST 09223-46011



- (c) Using SST, install the damper bolt.
 SST 09213-70011 (09213-70020), 09330-00021
Torque: 245 N·m (2,498 kgf·cm, 181 ft·lbf)



28. INSTALL FAN BRACKET SUB-ASSY

- (a) Install the idler pulley with the 2 bolts and 2 nuts.

Torque:

16 N·m (160 kgf·cm, 12 ft·lbf) for 12 mm head

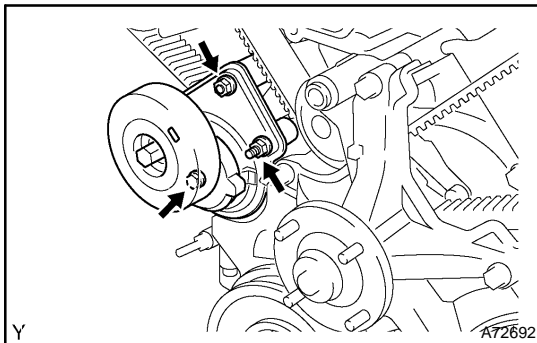
32 N·m (326 kgf·cm, 24 ft·lbf) for 14 mm head

HINT:

Each bolt length is as follows:

106 mm (4.17 in.) for 12 mm head (A)

114 mm (4.49 in.) for 14 mm head (B)



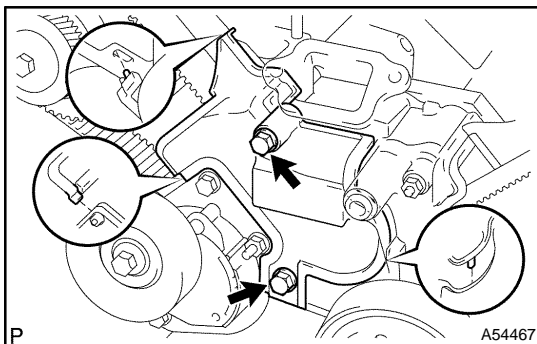
29. INSTALL V-RIBBED BELT TENSIONER ASSY

- (a) Install the belt tensioner with the bolt and 2 nuts.

Torque: 16 N·m (160 kgf·cm, 11 ft·lbf)

HINT:

Use a bolt 106 mm (4.17 in.) in length.



30. INSTALL TIMING BELT COVER SUB-ASSY NO.2

- (a) Install the timing belt cover and fit the claws and pins into each part.

- (b) Install the timing belt cover with the 2 bolts.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

HINT:

Use bolts 106 mm (4.17 in.) in length.

31. INSTALL TIMING BELT COVER SUB-ASSY NO.3 LH

- (a) Install the timing belt cover sub-assy with the 4 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

- (b) Install the camshaft position sensor connector and grommet to the timing belt cover.

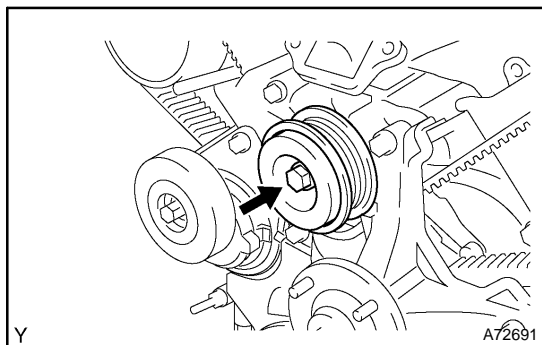
32. INSTALL TIMING CHAIN OR BELT COVER NO.2

- (a) Install the timing chain or belt cover with the nut and 3 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

33. INSTALL OIL COOLER PIPE

- (a) Install the oil cooler pipe with the bolt and nut.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)
- (b) Connect the 3 hoses.

**34. INSTALL IDLER PULLEY SUB-ASSY NO.2**

- (a) Install the idler pulley and cover plate with the bolt.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

35. INSTALL COMPRESSOR

- (a) Install the compressor with the stay, nut and 3 bolts.
Torque:
Bolt: 47 N·m (475 kgf·cm, 34 ft·lbf)
Nut: 25 N·m (255 kgf·cm, 18 ft·lbf)

36. INSTALL GENERATOR ASSY (SEE PAGE 19-17)**37. INSTALL VANE PUMP ASSY**

- (a) Install the vane pump assy with the nut and 2 bolts.
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

38. INSTALL FAN W/ FLUID COUPLING

- (a) Install the fan pulley to the engine.
 (b) Put the fan w/ fluid coupling and fan shroud together into the engine room.
 (c) Install the fan shroud with the 3 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)
 (d) Install the fan w/ fluid coupling with the 4 nuts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

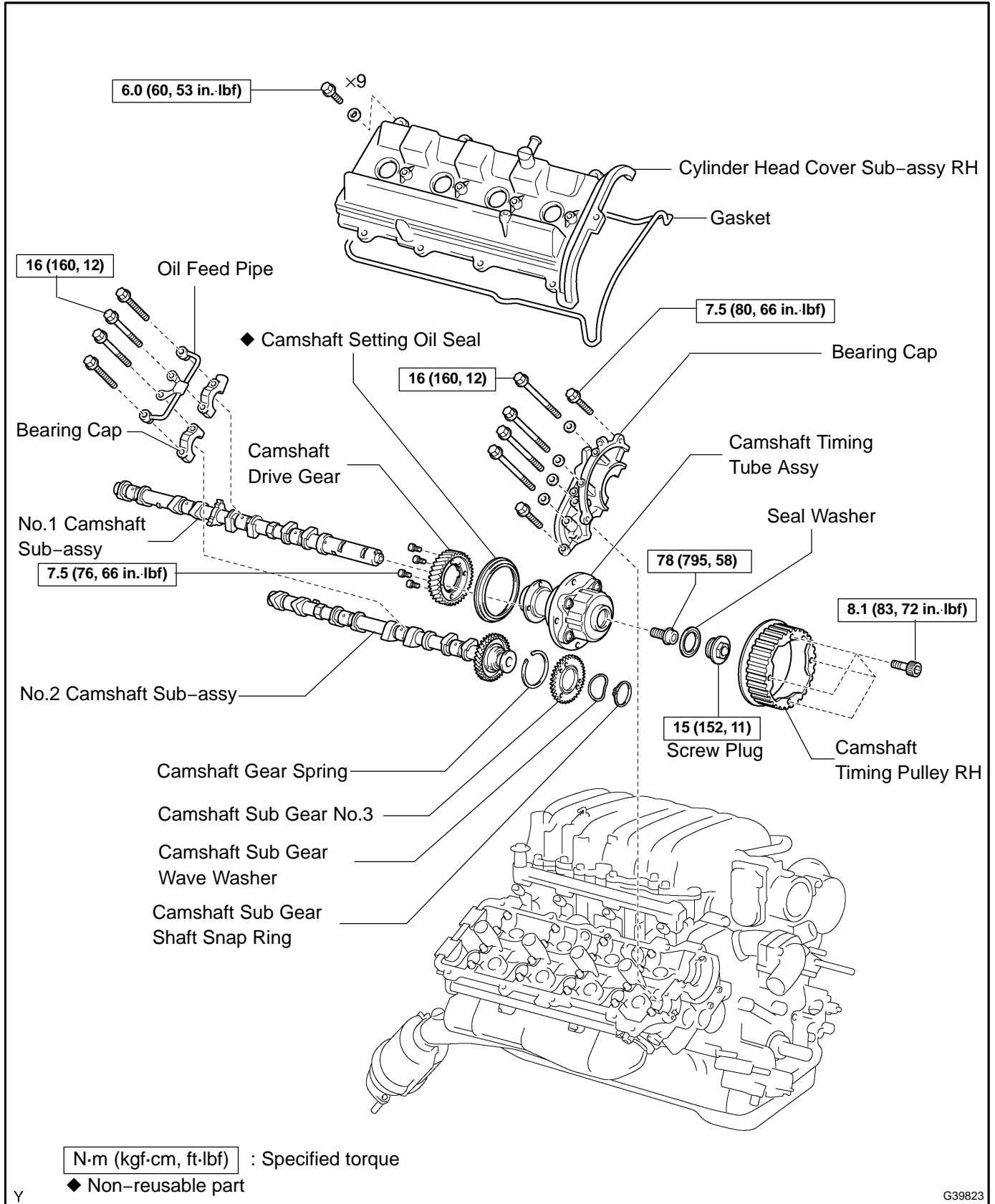
39. INSTALL FAN AND GENERATOR V BELT (SEE PAGE 14-5)**40. INSTALL RADIATOR SUPPORT SEAL UPPER****41. INSTALL AIR CLEANER HOSE ASSY****42. INSTALL ENGINE ROOM SIDE COVER LH****43. INSTALL ENGINE ROOM COVER SIDE****44. INSTALL V-BANK COVER SUB-ASSY**

- (a) Install the V-bank cover sub-assy with the 2 nuts.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

45. ADD ENGINE COOLANT (SEE PAGE 16-5)**46. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)**

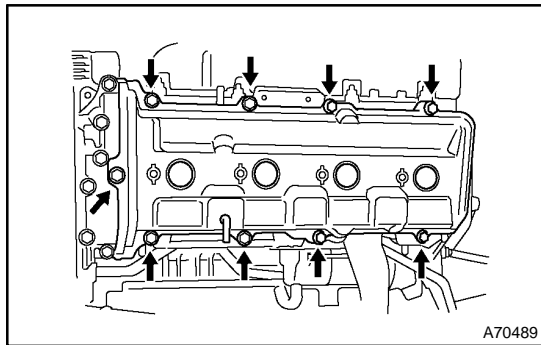
CAMSHAFT (RH BANK) (2UZ-FE) COMPONENTS

140ZU-06



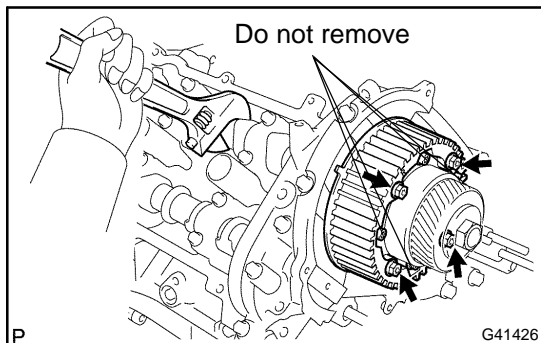
REPLACEMENT

1. REMOVE TIMING BELT (SEE PAGE 14-115)
2. REMOVE IGNITION COIL ASSY
 - (a) Disconnect the 4 ignition coil connectors.
 - (b) Remove the 4 bolts and 4 ignition coils.



3. REMOVE CYLINDER HEAD COVER

- (a) Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket.



4. REMOVE CAMSHAFT TIMING PULLEY SUB-ASSY RH

- (a) Hold the camshaft with a wrench, and remove the 4 bolts and timing pulley.

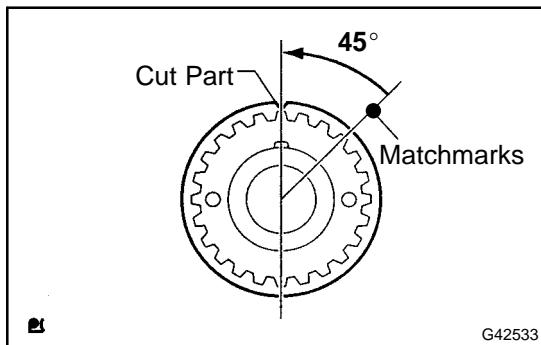
NOTICE:

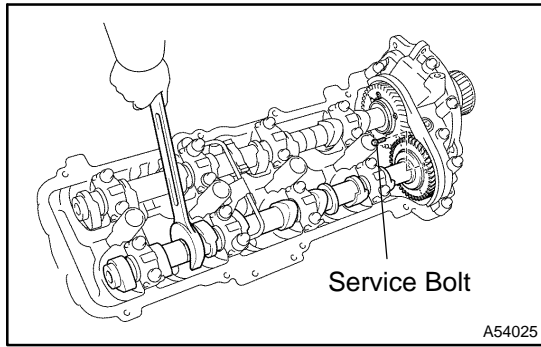
Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

5. REMOVE CAMSHAFT

NOTICE:

- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft. Always set the crankshaft pulley at the correct angle as shown in the illustration.





- (a) Bring the service bolt hole of the sub-gear upward by turning the hexagonal portion of the exhaust camshaft with a wrench.

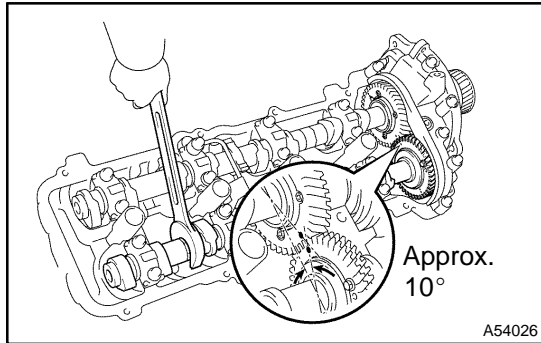
- (b) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

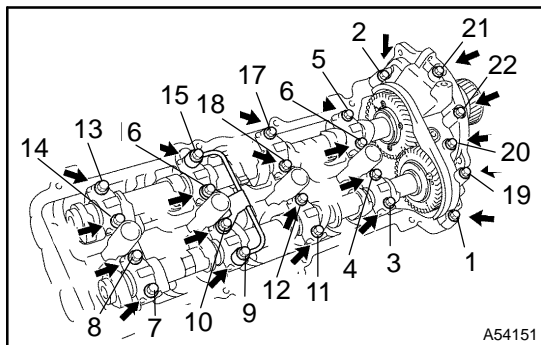
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



- (c) Set the timing mark (1-dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagonal portion of the exhaust camshaft with a wrench.

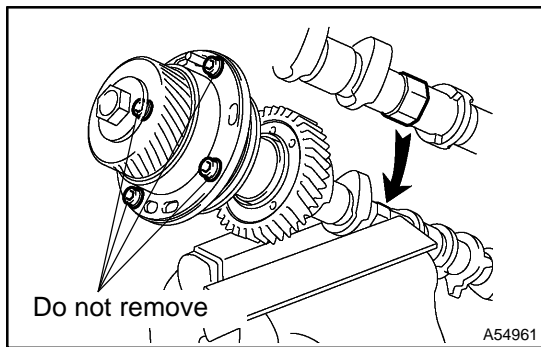


- (d) Uniformly loosen and remove the 22 bearing cap bolts in several steps, in the order shown in the illustration.

- (e) Remove the oil feed pipe, 9 bearing caps, camshaft housing plug, oil control valve filter, and camshafts.

HINT:

Arrange the bearing caps in correct order.

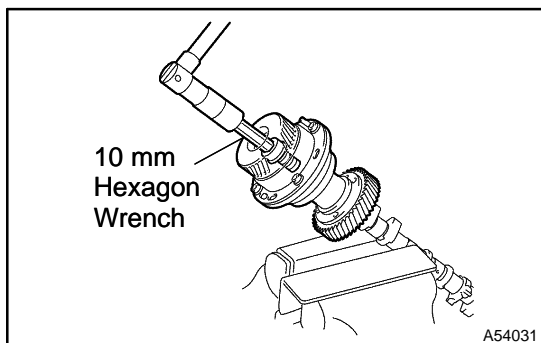


- (f) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

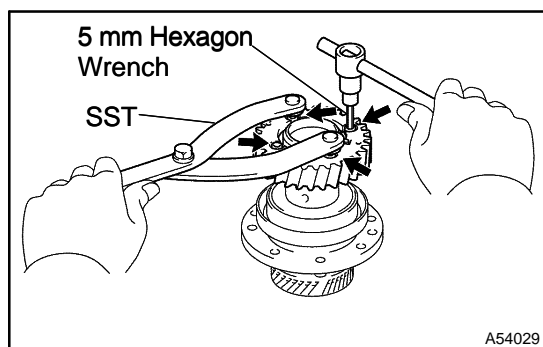
- Be careful not to damage the camshaft.
- Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

- (g) Remove the screw plug and seal washer.



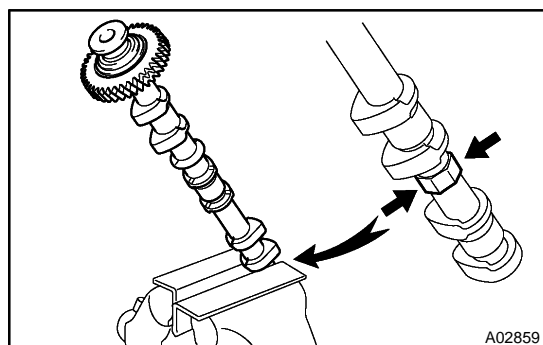
- (h) Using a 10 mm hexagon wrench, remove the bolt.

- (i) Pull out the timing tube and drive gear from the camshaft.



- (j) Using SST and a 5 mm hexagon wrench, remove the 4 bolts, drive gear and oil seal.
SST 09960-10010 (09962-01000, 09963-00500)

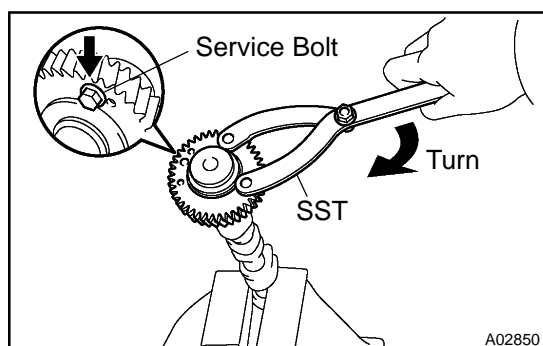
NOTICE:
Be careful not to damage the timing tube.



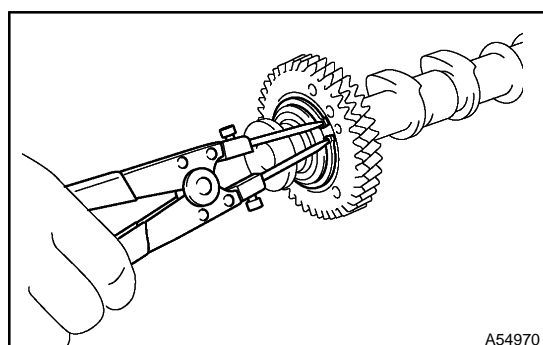
6. REMOVE CAMSHAFT SUB GEAR

- (a) Mount the hexagonal portion of the camshaft in a vise.

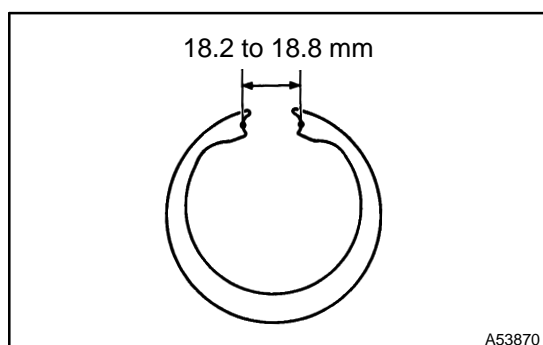
NOTICE:
Be careful not to damage the camshaft.



- (b) Using SST, turn the sub gear clockwise and remove the service bolt.

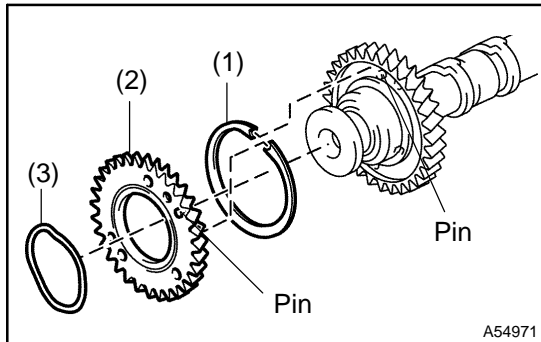


- (c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, sub gear and gear spring.
HINT:
Arrange the camshaft sub gears and gear spring (RH and LH sides).



- (e) Using a vernier caliper, measure the gap distance of the gear spring.
Gap distance: 18.2 to 18.8 mm (0.717 to 0.740 in.)
If the gap distance is not as specified, replace the gear spring.

7. REMOVE CAMSHAFT HOUSING PLUG

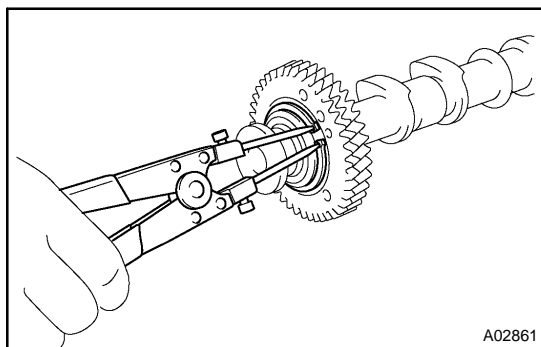


8. INSTALL CAMSHAFT SUB GEAR

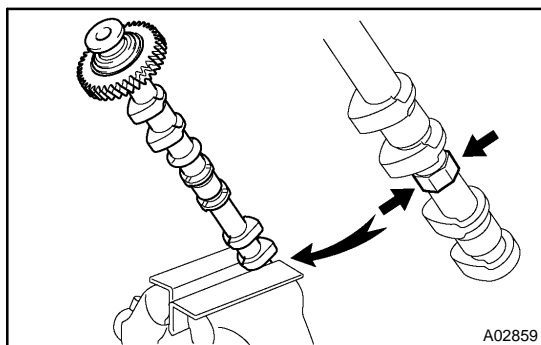
- (a) Install the gear spring (1), sub gear (2) and wave washer (3).

HINT:

Attach the pins on the gears to the gear spring ends.



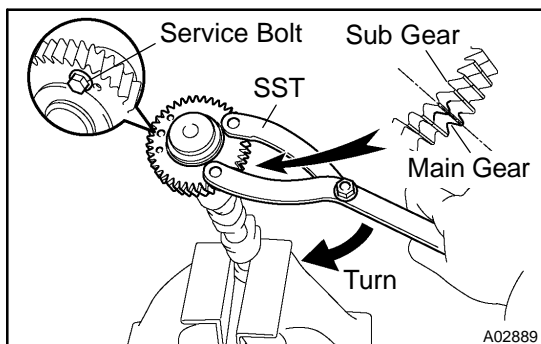
- (b) Using snap ring pliers, install the snap ring.



- (c) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

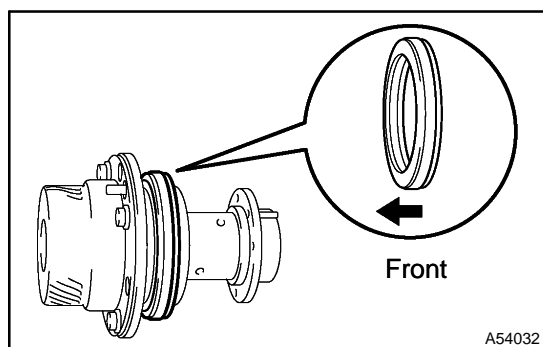
Be careful not to damage the camshaft.



- (d) Using SST, align the holes of the driven main gear and sub gear by turning the sub gear clockwise. Temporarily install a service bolt.

- (e) Align the gear teeth of the driven main gear and sub gear, and tighten the service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

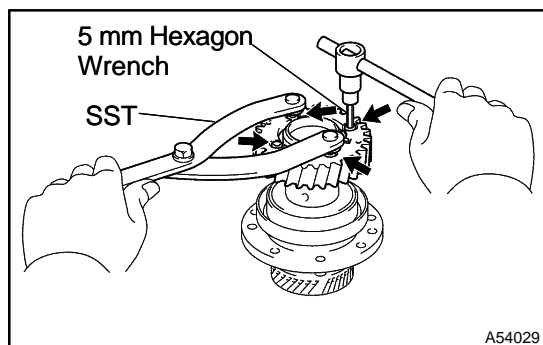


9. INSTALL CAMSHAFT TIMING TUBE ASSY

- (a) Insert a new oil seal into the camshaft timing tube until it reaches the stopper.

NOTICE:

- Be careful of the installation direction.
- Do not turn over the oil seal lip.



- (b) Align the timing tube knock pin with the knock pin groove of the drive gear, and temporarily install the drive gear with the 4 bolts.

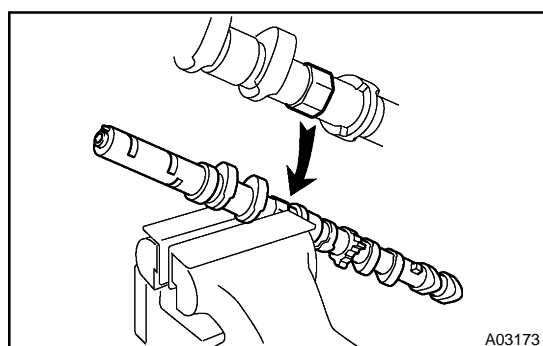
- (c) Using SST and a 5 mm hexagon wrench, uniformly tighten the 4 bolts in several steps.

SST 09960-10010 (09962-01000, 09963-00500)

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

NOTICE:

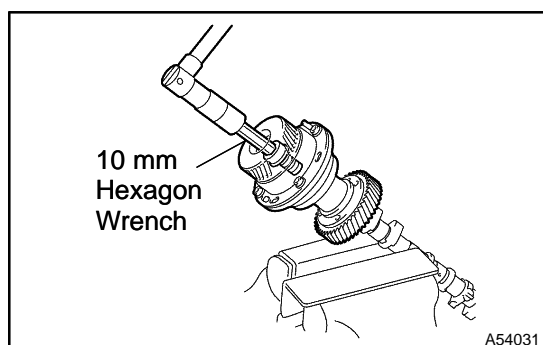
Be careful not to damage the timing tube.



- (d) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



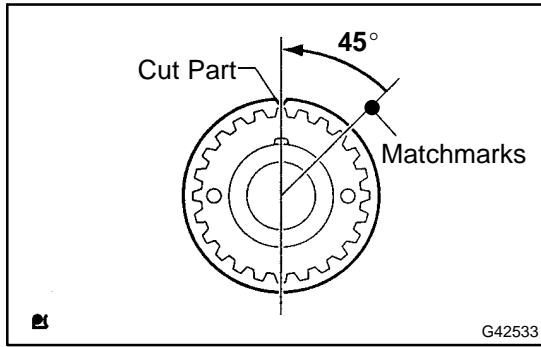
- (e) Align the camshaft knock pin with the knock pin groove of the timing tube, and push the timing tube by hand until it touches the bottom.

- (f) Using a 10 mm hexagon wrench, install the bolt.

Torque: 78 N·m (795 kgf·cm, 58 ft·lbf)

- (g) Install the seal washer and screw plug.

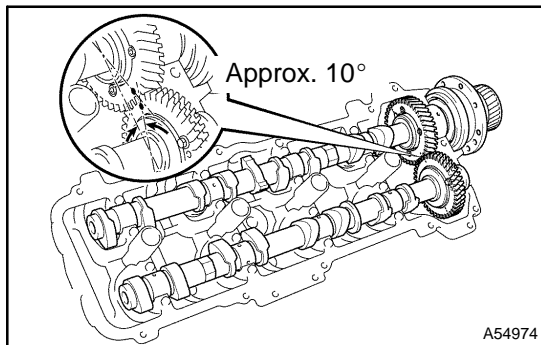
Torque: 15 N·m (152 kgf·cm, 11 ft·lbf)



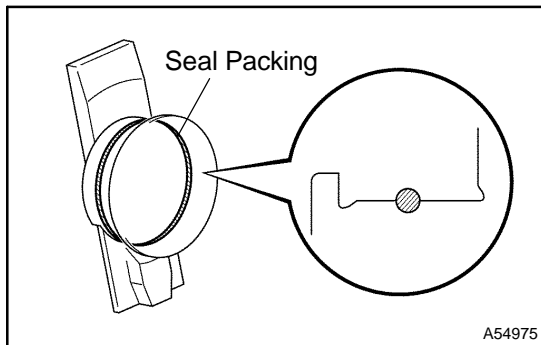
10. INSTALL CAMSHAFT

NOTICE:

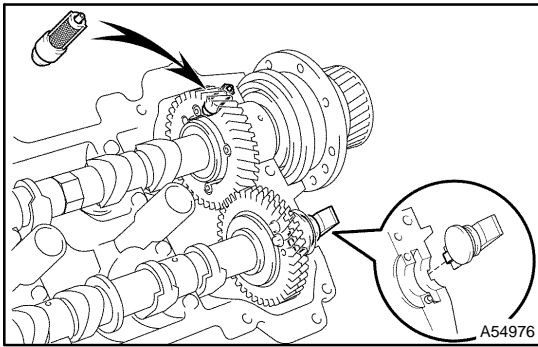
- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when installing the camshaft. Be sure to set the crankshaft pulley at the correct angle as shown in the illustration.



- Apply engine oil to the thrust portion of the intake and exhaust camshafts.
- Align the timing marks (1-dot mark) of the camshaft drive and driven main gears, and place the 2 camshafts.
- Set the timing marks (1-dot mark) of the camshaft drive and driven main gears at approx. 10° angle.



- Apply seal packing to the camshaft housing plug.
 - Remove the old packing (FIPG) material.
 - Apply seal packing to the housing plug.
- Seal packing: Part No. 08826-00080 or equivalent**

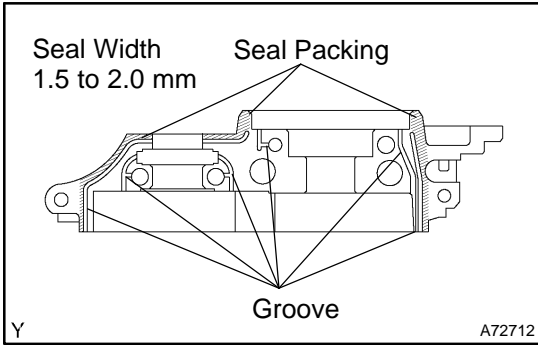


(e) Install the camshaft housing plug and oil control valve filter to the cylinder head as shown in the illustration.

NOTICE:

Be careful of the installation direction.

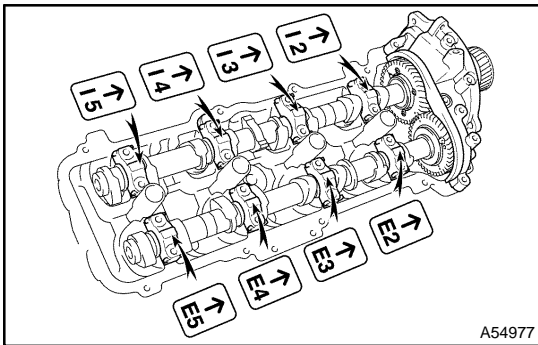
- (f) Apply seal packing to the front bearing cap.
- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap and cylinder head. Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and groove. Thoroughly clean all components to remove all the loose material. Using a non-residue solvent, clean both sealing surfaces.
 - Apply seal packing to the bearing cap as shown in the illustration. Use a nozzle that has been cut to 1.5 to 2.0 mm (0.059 to 0.079 in.) opening. Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied. Immediately remove the nozzle from the tube and reinstall the cap.



Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

Do not apply seal packing to the front bearing cap grooves.

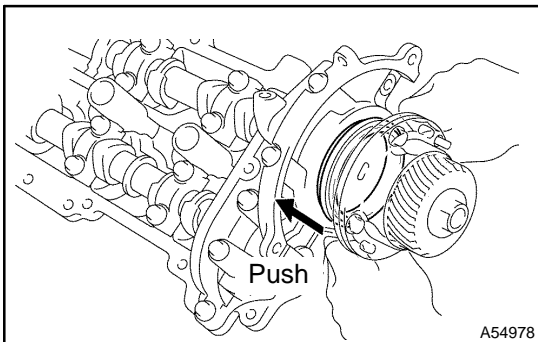


(g) Install the front bearing cap.

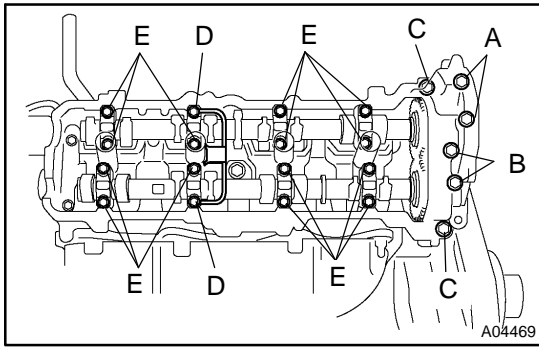
HINT:

The thrust position of the camshaft will be determined after installing the front bearing cap.

(h) Install the other bearing caps in the order shown with the arrow mark facing forward.



(i) Push in the camshaft setting oil seal.



- (j) Install new seal washers to the bearing cap bolts (A and B).
- (k) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts (D and E).

NOTICE:

Do not apply engine oil under the heads of the bearing cap bolts (A), (B) and (C).

HINT:

Each bolt length is as follows:

94 mm (3.70 in.) for A with seal washer

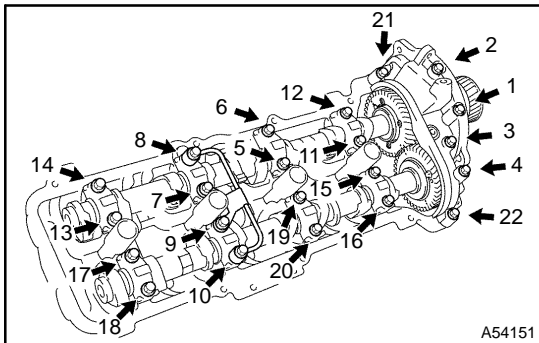
72 mm (2.83 in.) for B with seal washer

25 mm (0.98 in.) for C

55 mm (2.17 in.) for D

40 mm (1.57 in.) for E

- (l) Install the oil feed pipe and the 22 bearing cap bolts as shown in the illustration.

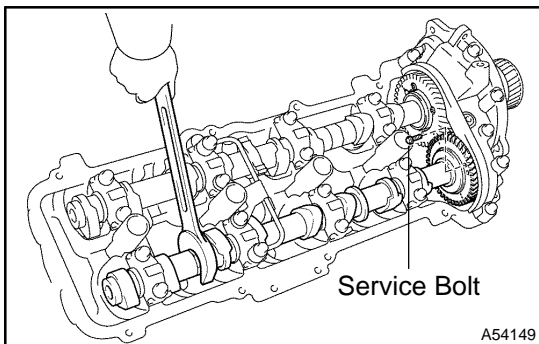


- (m) Uniformly tighten the 22 bearing cap bolts in several steps, in the order shown in the illustration.

Torque:

7.5 N·m (76 kgf·cm, 66 in.-lbf) for bolt C

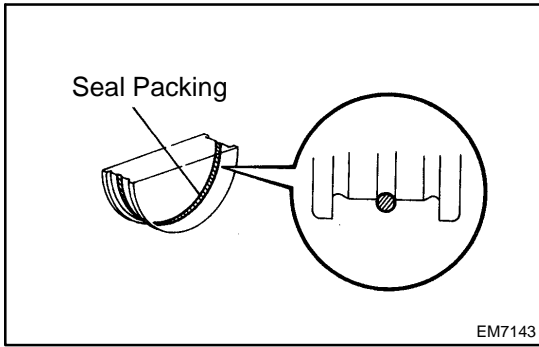
16 N·m (163 kgf·cm, 12 ft-lbf) for others



- (n) Bring the service bolt installed in the driven sub-gear upward by turning the hexagonal portion of the camshaft with a wrench.
- (o) Remove the service bolt.

11. INSPECT VALVE CLEARANCE (SEE PAGE 14-6)

- (a) Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

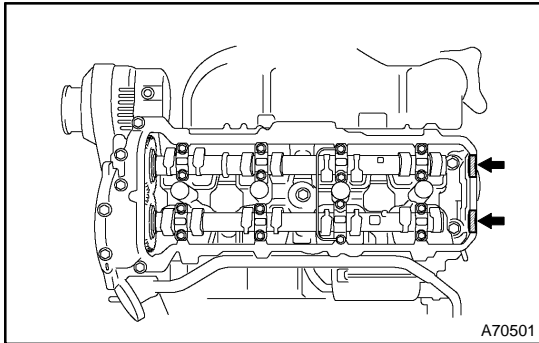


12. INSTALL SEMICIRCULAR PLUG

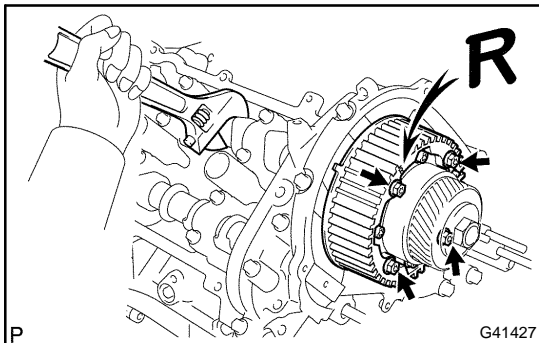
- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semicircular plug grooves.

Seal packing:

Part No. 08826-00080 or equivalent



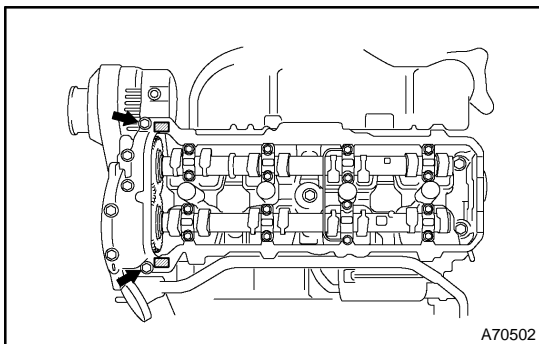
- (c) Install the 2 semicircular plugs to the cylinder heads.



13. INSTALL CAMSHAFT TIMING PULLEY SUB-ASSY RH

- (a) Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- (b) Attach the timing pulley to the camshaft timing tube. Face the timing pulley's "R" mark forward.
- (c) Hold the hexagonal portion of the camshaft.
- (d) Using a 5 mm hexagon wrench, install the 4 bolts.

Torque: 8.1 N·m (83 kgf·cm, 72 ft·lbf)



14. INSTALL CYLINDER HEAD COVER

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

- (c) Install the gasket to the cylinder head cover.
- (d) Install the seal washer to the bolt.
- (e) Install the cylinder head cover with the 18 bolts. Uniformly tighten the bolts in several steps. Install the 2 cylinder head covers.

Torque: 6.0 N·m (60 kgf·cm, 53 in·lbf)

15. INSTALL IGNITION COIL ASSY

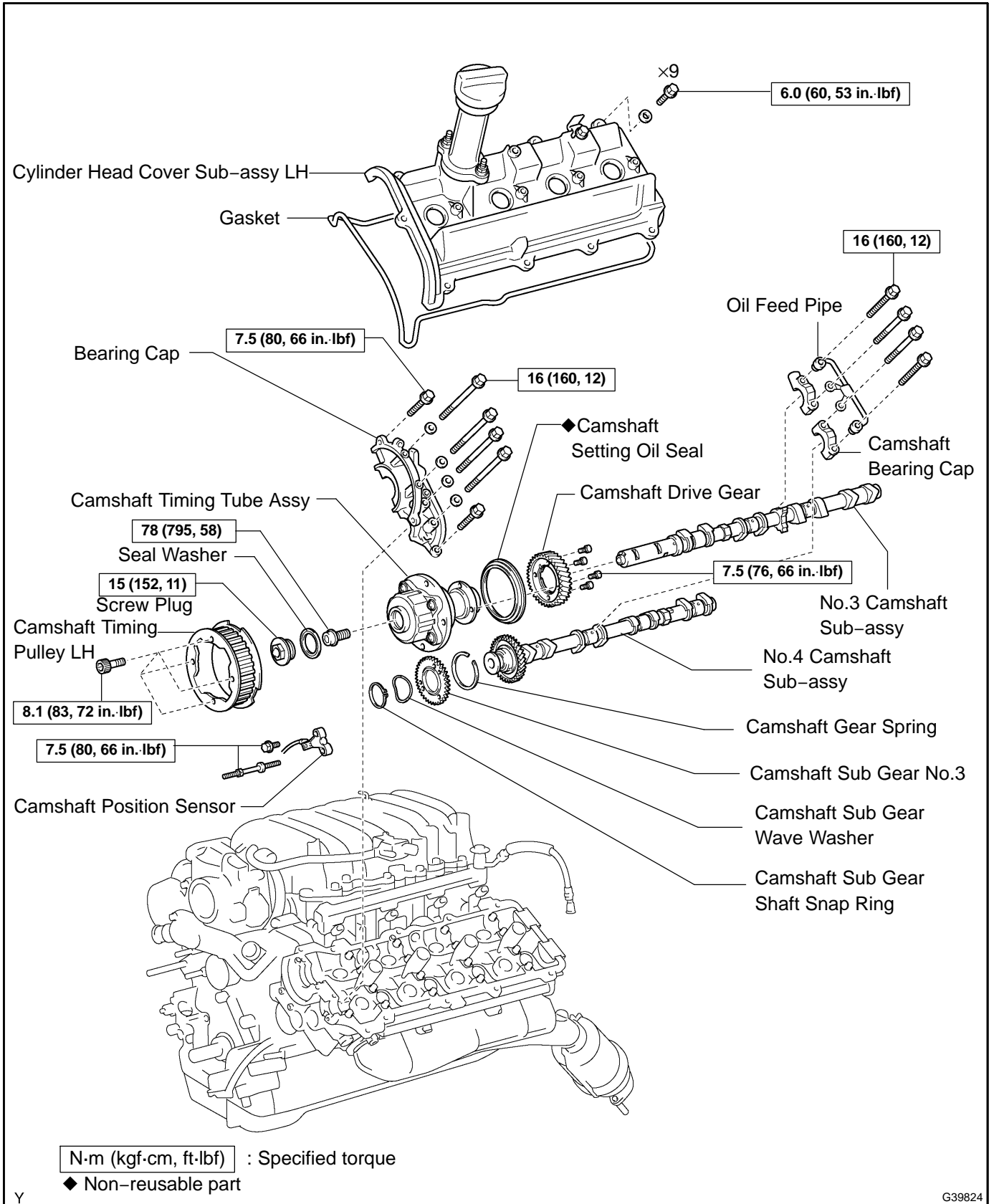
- (a) Install 4 bolts and ignition coil assy.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

16. INSTALL TIMING BELT (SEE PAGE 14-115)

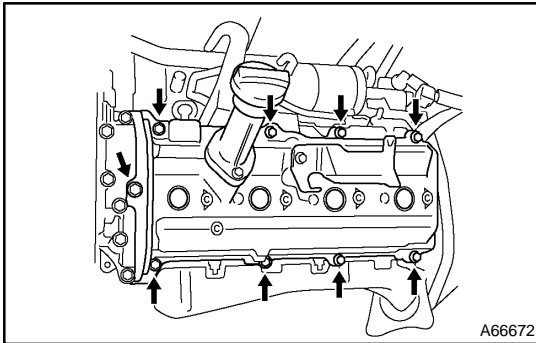
CAMSHAFT (LH BANK) (2UZ-FE) COMPONENTS

140ZX-06



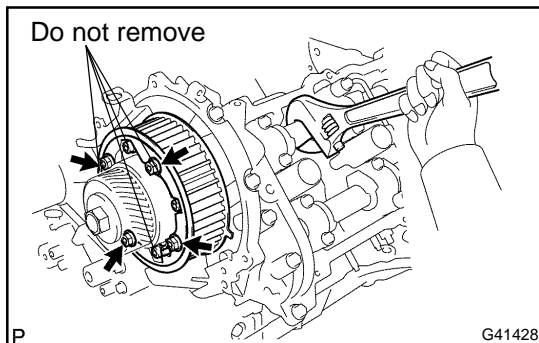
REPLACEMENT

1. REMOVE TIMING BELT (SEE PAGE 14-115)
2. REMOVE IGNITION COIL ASSY
 - (a) Disconnect the 4 ignition coil connectors.
 - (b) Remove the 4 bolts and 4 ignition coils.



3. REMOVE CYLINDER HEAD COVER

- (a) Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket. Remove the cylinder head cover.



4. REMOVE CAMSHAFT TIMING PULLEY SUB-ASSY LH

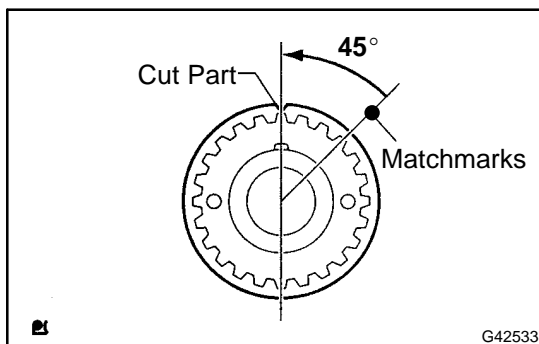
- (a) Hold the camshaft with a wrench, and remove the 4 bolts and timing pulley.

NOTICE:

Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

5. REMOVE CAMSHAFT POSITION SENSOR

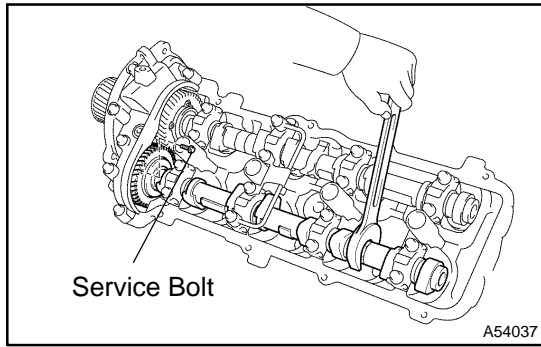
- (a) Remove the bolt, stud bolt and camshaft position sensor.



6. REMOVE CAMSHAFT

NOTICE:

- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft. Always set the crankshaft pulley at the correct angle as shown in the illustration.



- (a) Bring the service bolt hole of the sub-gear upward by turning the hexagonal portion of the exhaust camshaft with a wrench.
- (b) Secure the sub-gear to the main gear with a service bolt.

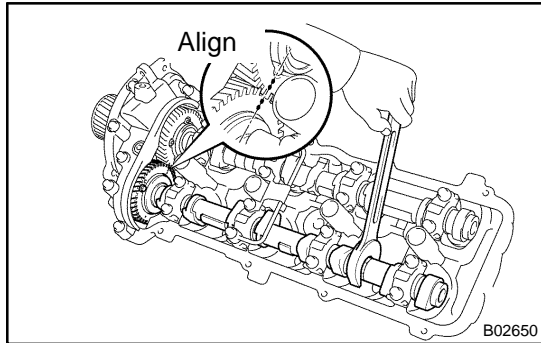
Recommended service bolt:

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm

HINT:

When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.

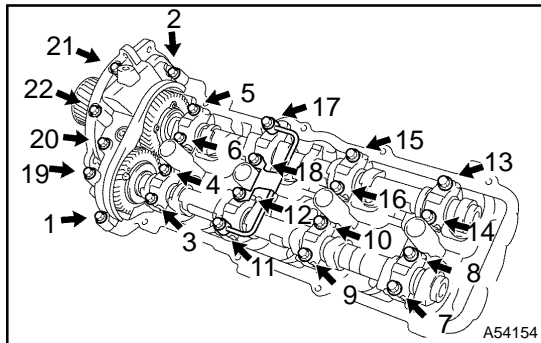
- (c) Align the timing marks (2-dot marks) of the camshaft drive and driven gears by turning the hexagonal portion of the exhaust camshaft with a wrench.



- (d) Uniformly loosen and remove the 22 bearing cap bolts in several steps, in the order shown in the illustration.
- (e) Remove the oil feed pipe, 9 bearing caps, camshaft housing plug, oil control valve filter, and camshafts.

HINT:

Arrange the bearing caps in correct order.

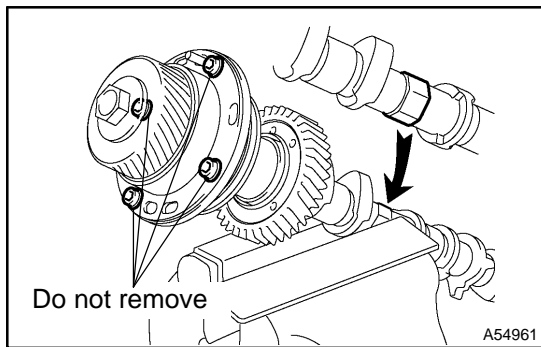


- (f) Mount the hexagonal portion of the camshaft in a vise.

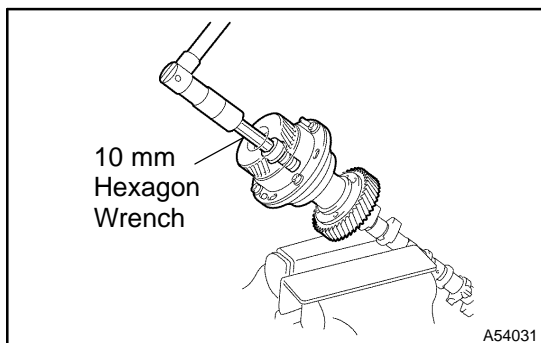
NOTICE:

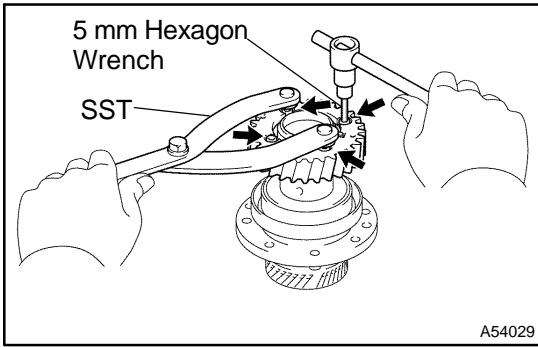
- Be careful not to damage the camshaft.
- Do not remove the 4 bolts shown in the illustration. If any of them are loosened or removed, the backlash of the gear in the timing tube will go out of adjustment. In this case, replace the timing tube assembly with a new one.

- (g) Remove the screw plug and seal washer.



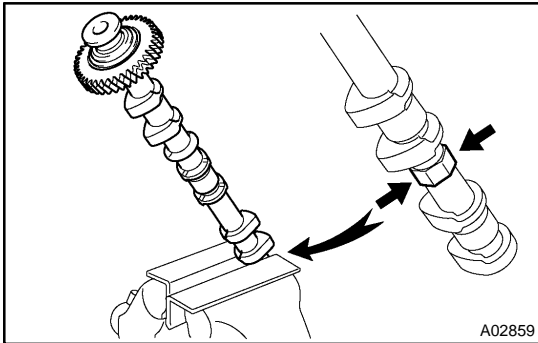
- (h) Using a 10 mm hexagon wrench, remove the bolt.
- (i) Pull out the timing tube and drive gear assembly from the camshaft.





- (j) Using SST and a 5 mm hexagon wrench, remove the 4 bolts, drive gear and oil seal.
SST 09960-10010 (09962-01000, 09963-00500)

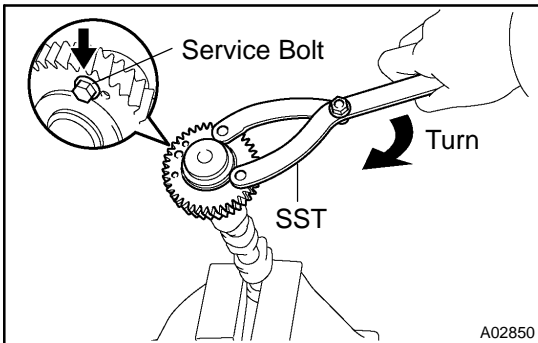
NOTICE:
Be careful not to damage the timing tube.



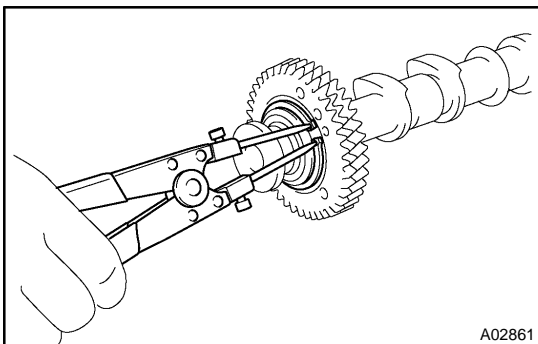
7. REMOVE CAMSHAFT SUB GEAR

- (a) Mount the hexagonal portion of the camshaft in a vise.

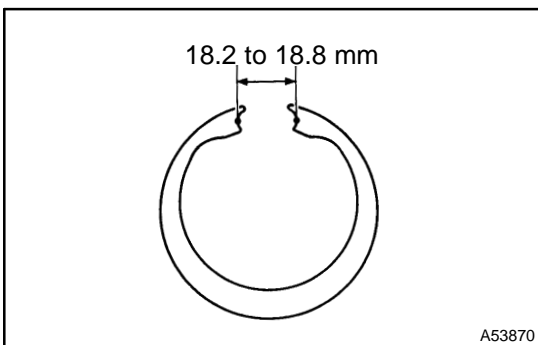
NOTICE:
Be careful not to damage the camshaft.



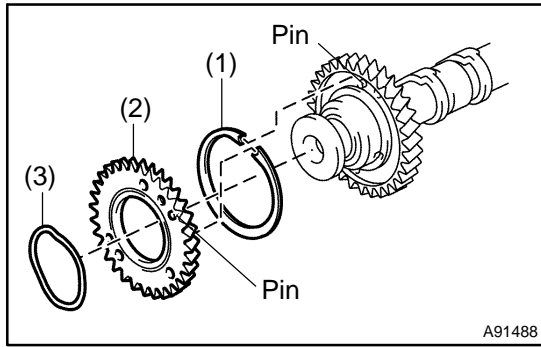
- (b) Using SST, turn the sub gear clockwise and remove the service bolt.



- (c) Using snap ring pliers, remove the snap ring.
 - (d) Remove the wave washer, sub gear and gear spring.
- HINT:**
Arrange the camshaft sub gears and gear spring (RH and LH sides).



- (e) Using vernier calipers, measure the gap distance of the gear spring.
Gap distance: 18.2 to 18.8 mm (0.717 to 0.740 in.)
If the gap distance is not as specified, replace the gear spring.

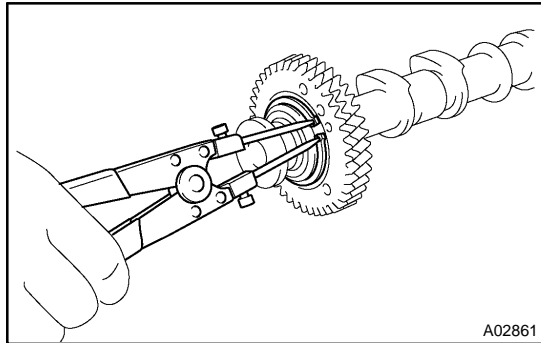


8. INSTALL CAMSHAFT SUB GEAR

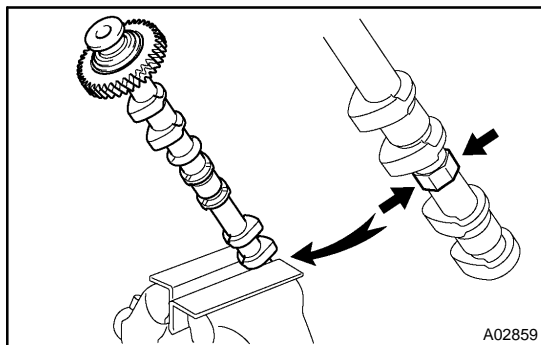
- (a) Install the gear spring (1), sub gear (2) and wave washer (3).

HINT:

Attach the pins on the gears to the gear spring ends.



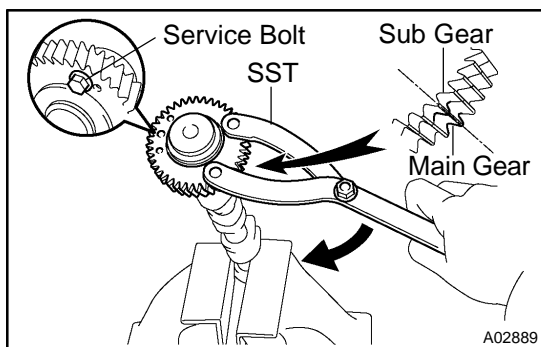
- (b) Using snap ring pliers, install the snap ring.



- (c) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

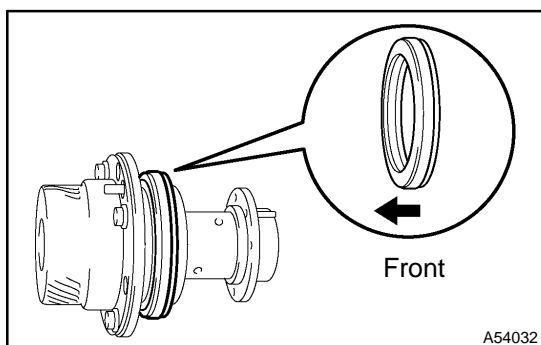
Be careful not to damage the camshaft.



- (d) Using SST, align the holes of the driven main gear and sub gear by turning the sub gear clockwise, and temporarily install a service bolt.

- (e) Align the gear teeth of the driven main gear and sub gear, and tighten the service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

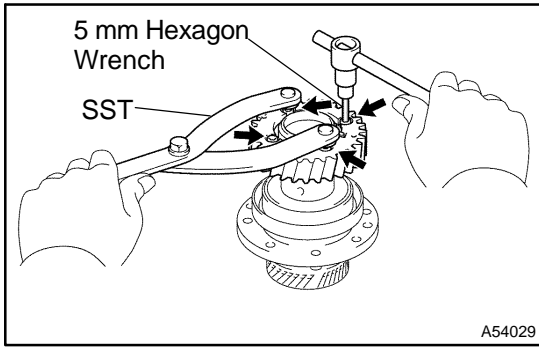


9. INSTALL CAMSHAFT TIMING TUBE ASSY

- (a) Insert a new oil seal into the camshaft timing tube until it reaches the stopper.

NOTICE:

- Be careful of the installation direction.
- Do not turn over the oil seal lip.



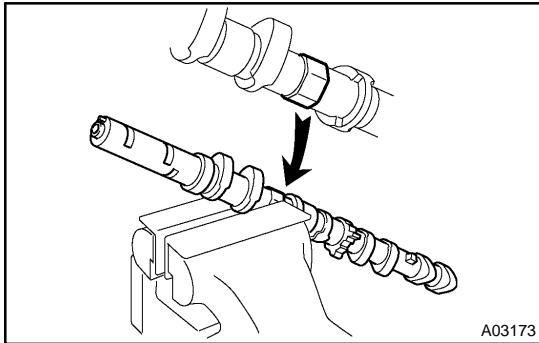
(b) Align the timing tube knock pin with the knock pin groove of the drive gear, and temporarily install the drive gear with the 4 bolts.

(c) Using SST and a 5 mm hexagon wrench, uniformly tighten the 4 bolts in several steps.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

NOTICE:

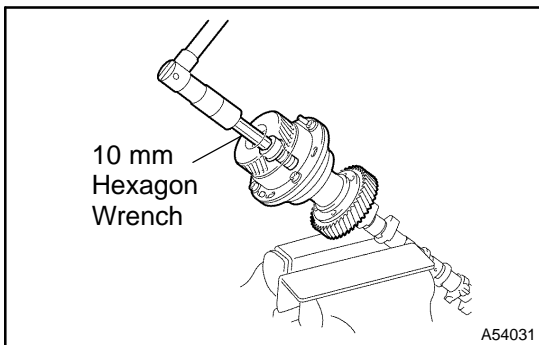
Be careful not to damage the timing tube.



(d) Mount the hexagonal portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



(e) Align the camshaft knock pin with the knock pin groove of the timing tube, and push the timing tube by hand until it touches the bottom.

(f) Using a 10 mm hexagon wrench, install the bolt.

Torque: 78 N·m (795 kgf·cm, 58 ft·lbf)

(g) Install the seal washer and screw plug.

Torque: 15 N·m (152 kgf·cm, 11 ft·lbf)

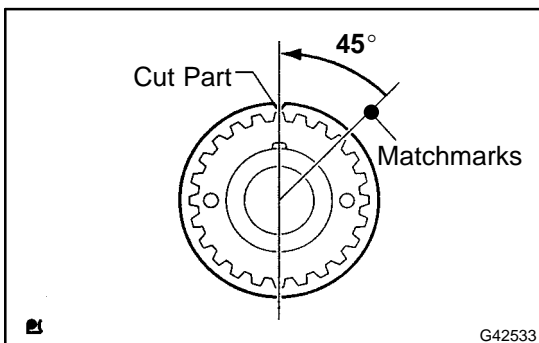
SST 09960-10010 (09962-01000, 09963-00500)

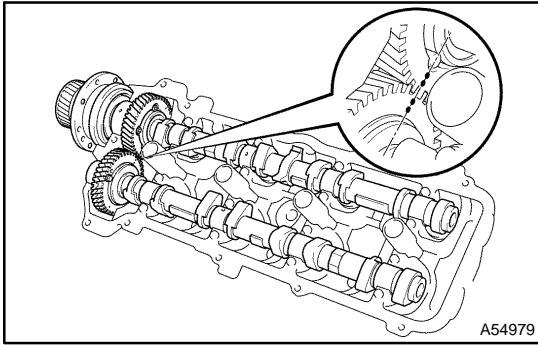
10. REMOVE SEMICIRCULAR PLUG

11. INSTALL CAMSHAFT

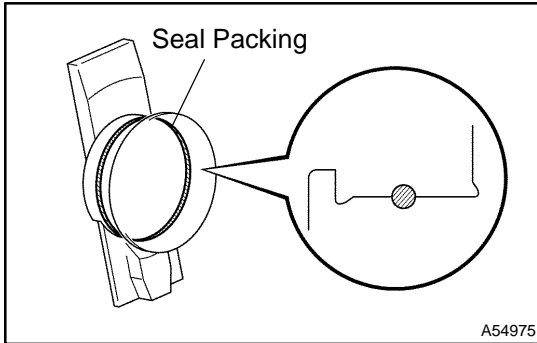
NOTICE:

- As the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head which receives the shaft thrust may crack or be damaged. To avoid this, the following steps should be carried out.
- Having the crankshaft pulley at a wrong angle can cause the piston head and valve head to come into contact with each other when removing the camshaft. Always set the crankshaft pulley at the correct angle as shown in the illustration.

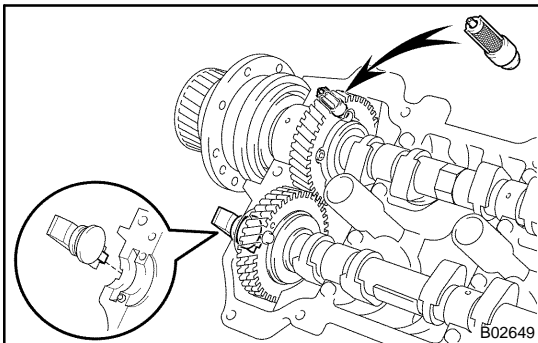




- (a) Apply MP grease to the thrust portions of the camshafts.
- (b) Align the timing marks (2-dot marks) of the camshaft drive and driven main gears, and place the 2 camshafts.



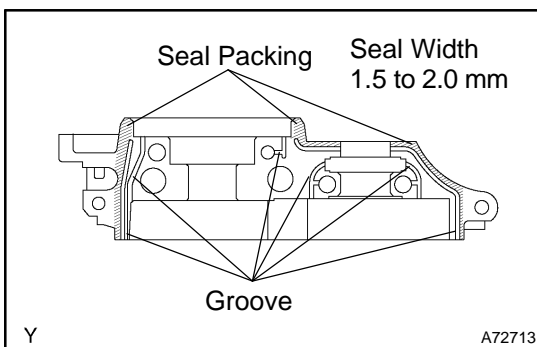
- (c) Apply seal packing to the camshaft housing plug.
 - Remove the old packing (FIPG) material.
 - Apply seal packing to the housing plug.**Seal packing: Part No. 08826-00080 or equivalent**

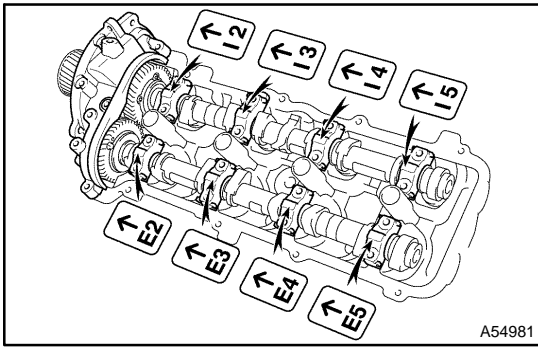


- (d) Install the camshaft housing plug and oil control valve filter to the cylinder head as shown in the illustration.

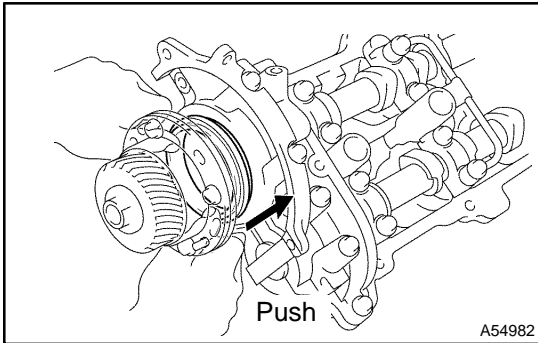
NOTICE:**Be careful of the installation direction.**

- (e) Apply seal packing to the front bearing cap.
 - Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bearing cap and cylinder head. Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and groove. Thoroughly clean all components to remove all the loose material. Using a non-residue solvent, clean both sealing surfaces.
 - Apply seal packing to the bearing cap as shown in the illustration. Use a nozzle that has been cut to 1.5 to 2.0 mm (0.059 to 0.079 in.) opening. Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied. Immediately remove the nozzle from the tube and reinstall the cap.

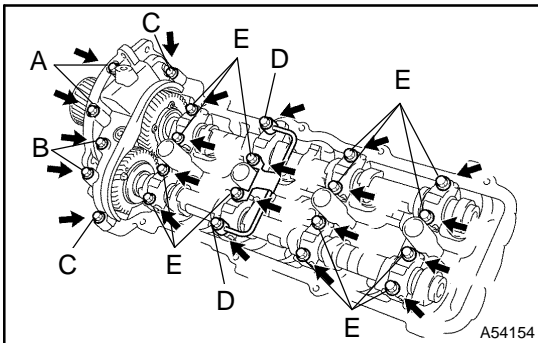
Seal packing: Part No. 08826-00080 or equivalent**NOTICE:****Do not apply seal packing to the front bearing cap grooves.**



- (f) Install the front bearing cap.
- HINT:
The thrust position of the camshaft will be determined after installing the front bearing cap.
- (g) Install the other bearing cap in the order shown with the arrow mark facing forward.



- (h) Push in the camshaft setting oil seal.



- (i) Install a new seal washer to the bearing cap bolt (A and B).
- (j) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts (D and E).
- (k) Install the camshafts of the LH bank.

NOTICE:

Do not apply engine oil under the heads of the bearing cap bolts (A), (B) and (C).

HINT:

Each bolt length is as follows:

94 mm (3.70 in.) for A with seal washer

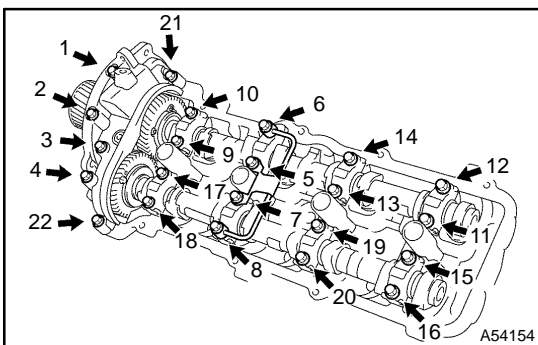
72 mm (2.83 in.) for B with seal washer

25 mm (0.98 in.) for C

55 mm (2.17 in.) for D

40 mm (1.57 in.) for E

- (l) Install the oil feed pipe and the 22 bearing cap bolts as shown in the illustration.

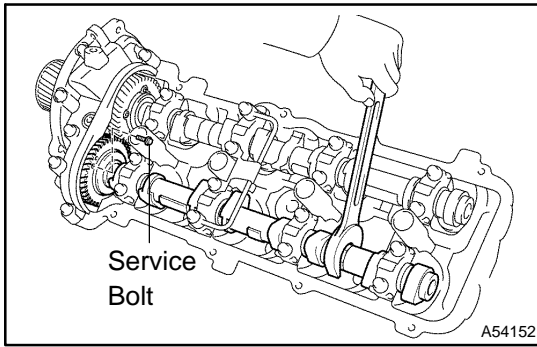


- (m) Uniformly tighten the 22 bearing cap bolts in several steps, in the order shown in the illustration.

Torque:

7.5 N·m (76 kgf·cm, 66 in.-lbf) for bolt C

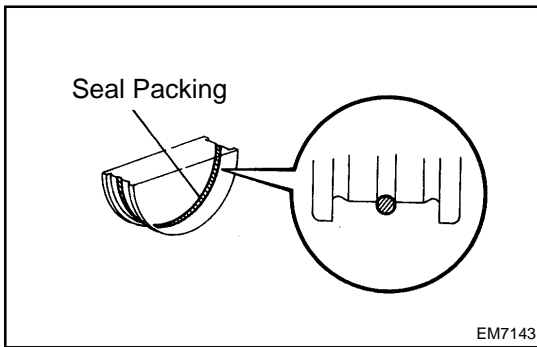
16 N·m (163 kgf·cm, 12 ft·lbf) for others



- (n) Bring the service bolt installed in the driven sub-gear upward by turning the hexagonal portion of the camshaft with a wrench.
- (o) Remove the service bolt.

12. INSPECT VALVE CLEARANCE (SEE PAGE 14-6)

- (a) Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

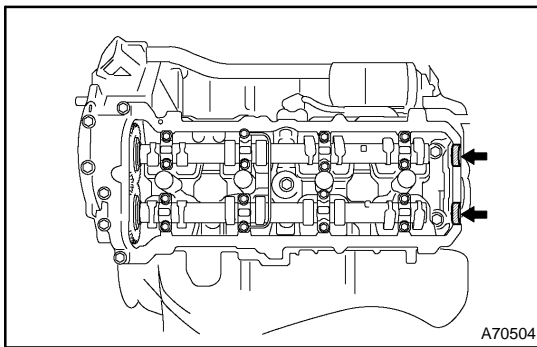


13. INSTALL SEMICIRCULAR PLUG

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semicircular plug grooves.

Seal packing:

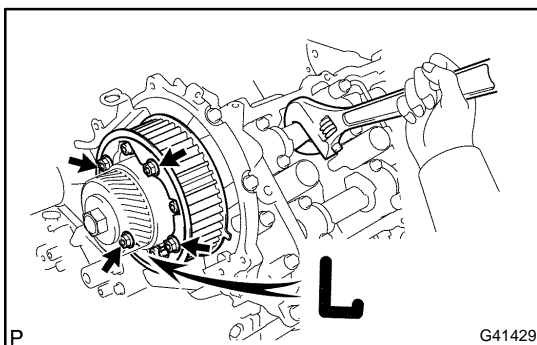
Part No. 08826-00080 or equivalent



- (c) Install the 4 semicircular plugs to the cylinder heads.

14. INSTALL CAMSHAFT POSITION SENSOR

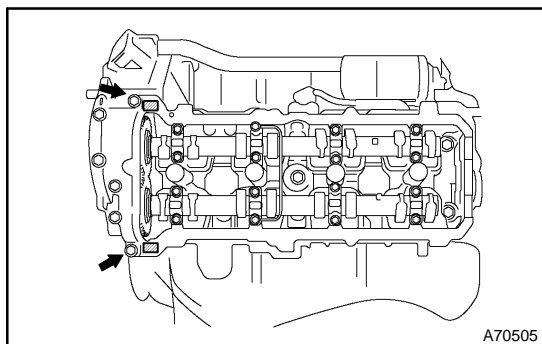
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



15. INSTALL CAMSHAFT TIMING PULLEY SUB-ASSY LH

- (a) Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- (b) Attach the timing pulley to the camshaft timing tube. Face the timing pulley's "L" mark forward.
- (c) Hold the hexagonal portion of the camshaft.
- (d) Using a 5 mm hexagon wrench, install the 4 bolts.

Torque: 8.1 N·m (83 kgf·cm, 72 in.·lbf)

**16. INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder heads as shown in the illustration.

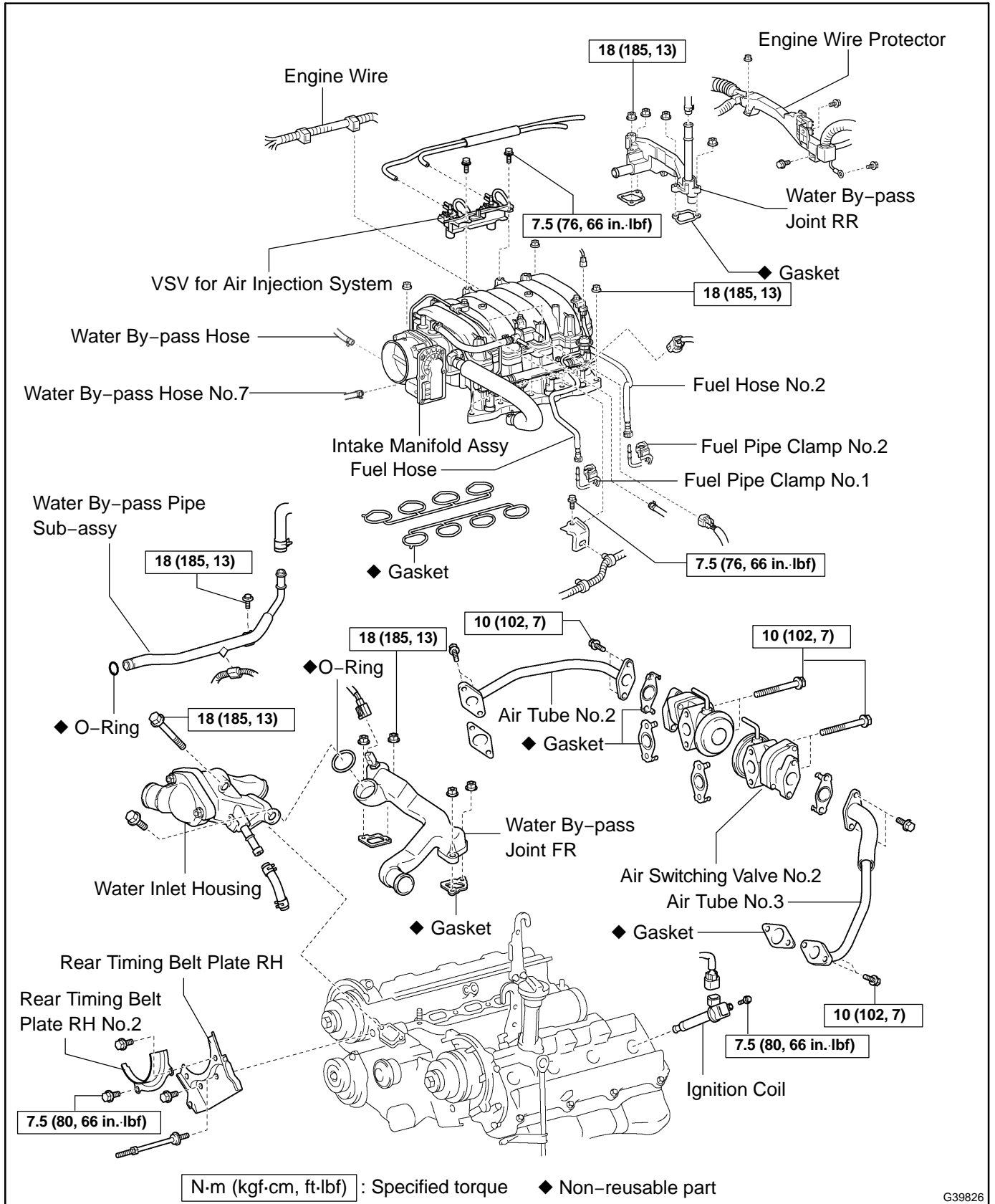
Seal packing:**Part No. 08826-00080 or equivalent**

- (c) Install the gasket to the cylinder head cover.
- (d) Install the seal washer to the bolt.
- (e) Install the cylinder head cover with the 18 bolts. Uniformly tighten the bolts in several steps. Install the 2 cylinder head covers.

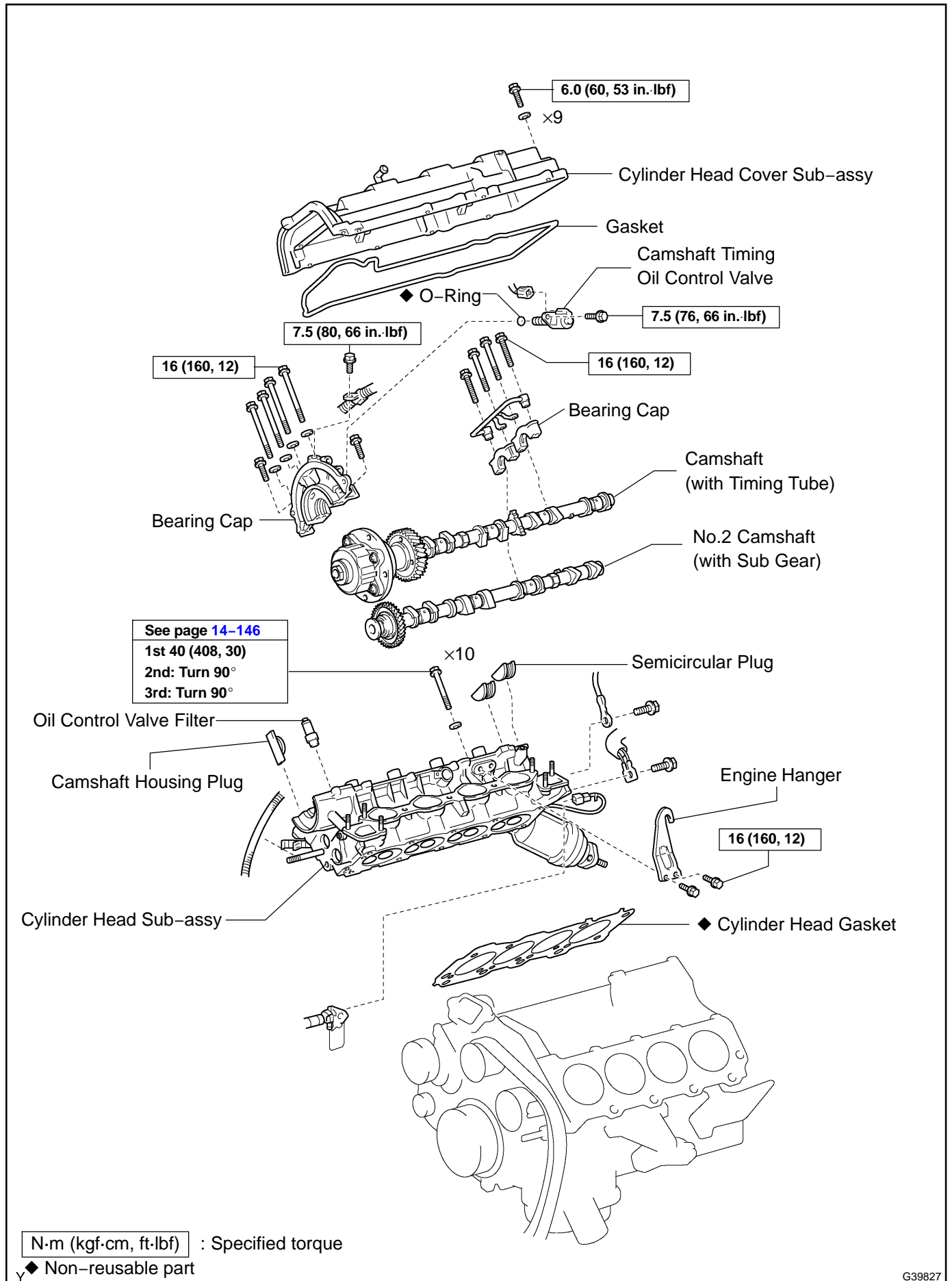
Torque: 6.0 N·m (60 kgf·cm, 53 in.-lbf)**17. INSTALL IGNITION COIL ASSY****Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)****18. INSTALL TIMING BELT (SEE PAGE [14-115](#))**

CYLINDER HEAD GASKET (2UZ-FE) COMPONENTS

140ZP-06



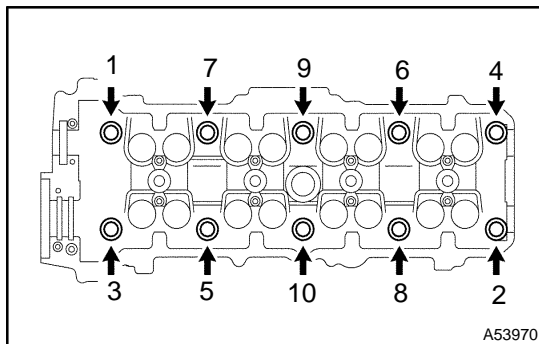
G39826



G39827

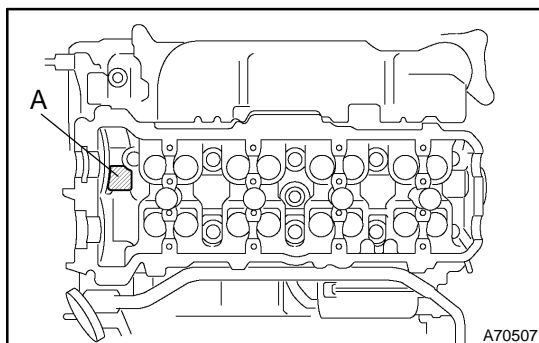
REPLACEMENT

1. **PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **REMOVE TIMING BELT (SEE PAGE 14-115)**
3. **REMOVE CAMSHAFT (RH BANK) (SEE PAGE 14-125)**
SST 09960-10010 (09962-01000, 09963-01000)
4. **REMOVE TRANSMISSION OIL FILLER TUBE SUB-ASSY**
 - (a) Remove the bolt and transmission oil filler tube.
5. **REMOVE OIL LEVEL GAUGE GUIDE**
 - (a) Remove the bolt and oil level gauge guide.
6. **REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
7. **REMOVE WATER INLET HOUSING**
 - (a) Remove the 2 bolts.
 - (b) Remove the water inlet housing and O-ring from the engine.
8. **REMOVE WATER BY-PASS JOINT FR**
 - (a) Remove the 4 nuts.
 - (b) Remove the water by-pass joint and 2 gaskets.
9. **REMOVE WATER BY-PASS PIPE SUB-ASSY**
 - (a) Remove the bolt and water by-pass pipe.
10. **REMOVE AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**
11. **REMOVE WATER BY-PASS JOINT RR**
 - (a) Remove the 4 nuts, water by-pass joint and 2 gaskets.
12. **INSTALL REAR TIMING BELT PLATE RH NO. 2**
 - (a) Remove the 2 bolts and rear timing belt plate RH No.2.
13. **INSTALL REAR TIMING BELT PLATE RH**
 - (a) Remove the bolt, stud bolt and rear timing plate RH.
14. **SEPARATE FRONT EXHAUST PIPE**
 - (a) Remove the 2 bolts and separate the front exhaust pipe.



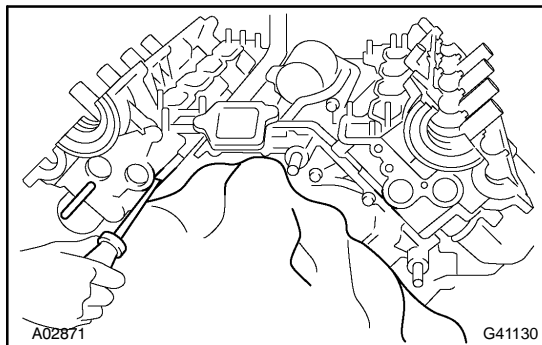
15. REMOVE CYLINDER HEAD SUB-ASSY

- (a) Uniformly loosen the 10 cylinder head bolts in the order shown in the illustration. Remove the bolts and plate washers.



NOTICE:

- Cylinder head warpage or cracking could result from removing bolts in incorrect order.
- Do not drop the plate washer for cylinder head bolt into portion A as shown in the illustration. If dropped into the portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.



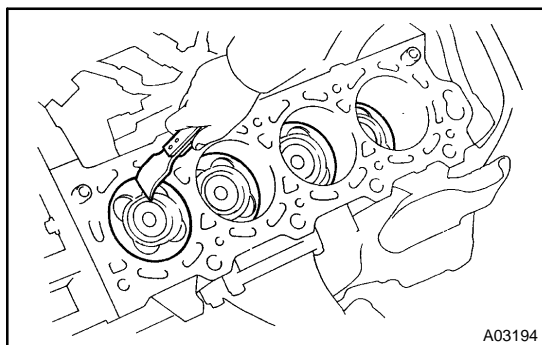
- (b) Remove the cylinder head from the dowels on the cylinder block, and place the cylinder head on wooden blocks on a bench.

HINT:

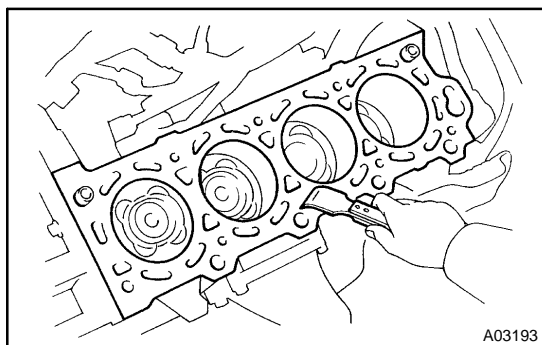
If the cylinder head is lifted off, pry off between the cylinder head and cylinder block with a screwdriver.

NOTICE:

- Be careful not to damage the contact surfaces of the cylinder head and cylinder block.
- The cylinder head should not be tilted so as to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.

16. REMOVE CYLINDER HEAD GASKET**17. CLEAN CYLINDER BLOCK SUB-ASSY**

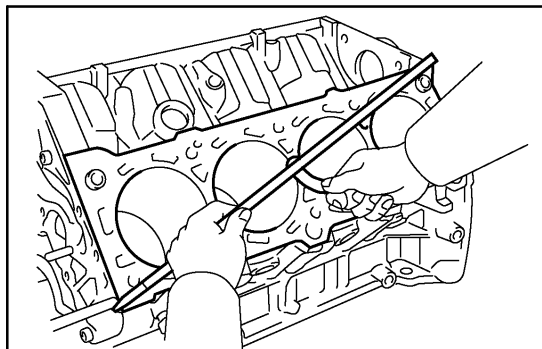
- (a) Turn the crankshaft, and bring each piston to the top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



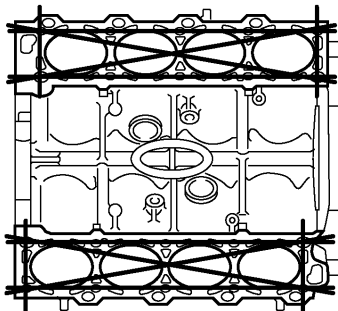
- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

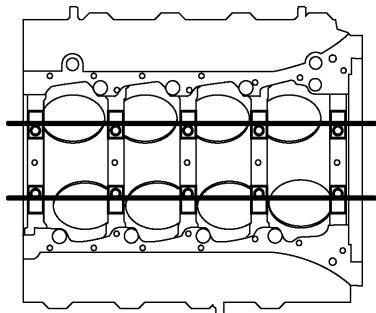
Protect your eyes when using compressed air.



Cylinder Head Side



Crankshaft Bearing Cap Side



Y

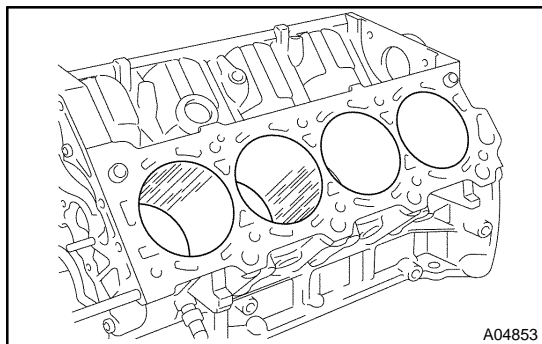
A74955

18. CHECK CYLINDER BLOCK FOR WARPAGE

- (a) Inspect for warpage.
- (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder head and crankshaft bearing cap.

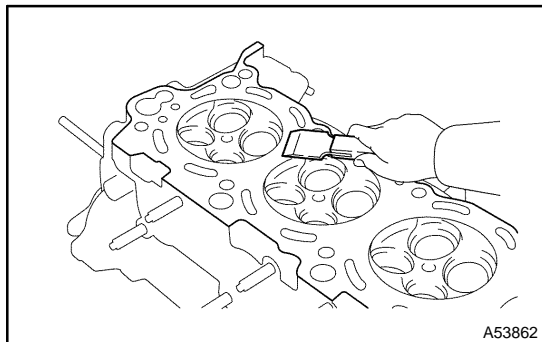
Maximum warpage: 0.07 mm (0.0028 in.)

If warpage is greater than the maximum, replace the cylinder block sub-assy.



A04853

- (b) Visually check the cylinder for vertical scratches.
- If deep scratches are present, rebore all the 8 cylinders and replace all the 8 pistons. If necessary, replace the cylinder block.



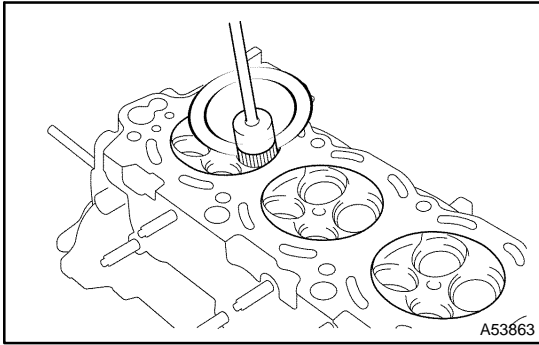
A53862

19. CLEAN CYLINDER HEAD SUB-ASSY

- (a) Clean the cylinder head.
- (1) Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

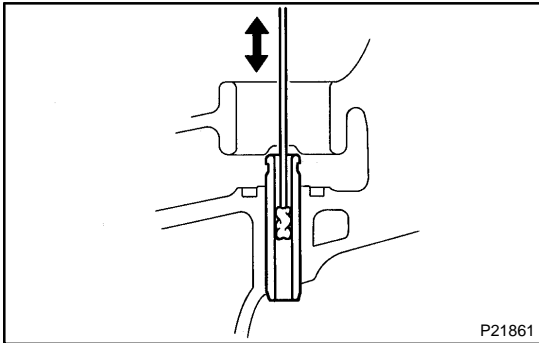
Be careful not to scratch the cylinder block contact surface.



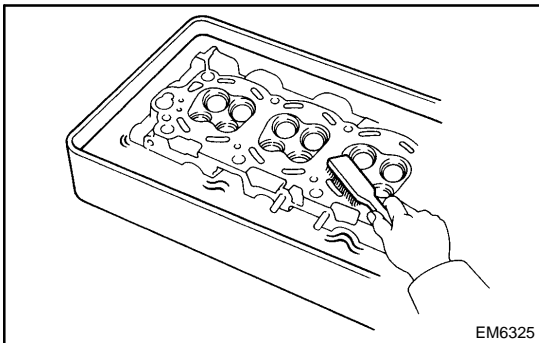
- (2) Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE:

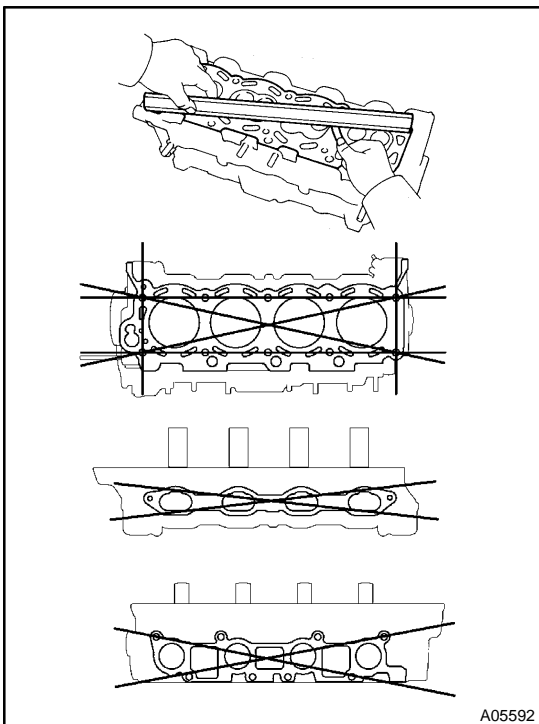
Be careful not to scratch the cylinder block contact surface.



- (3) Using a valve guide bushing brush and solvent, clean all the guide bushes.



- (4) Using a soft brush and solvent, thoroughly clean the cylinder head.



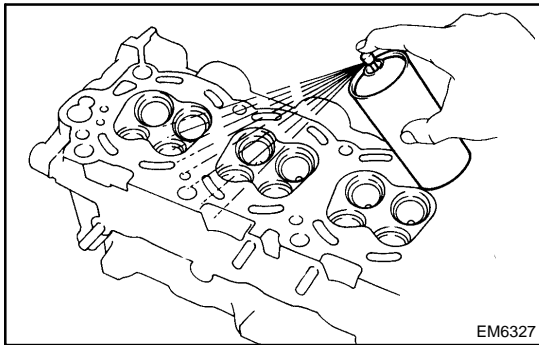
20. CHECK CYLINDER HEAD FOR WARPAGE

- (a) Inspect for warpage.

- (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder block and the manifolds.

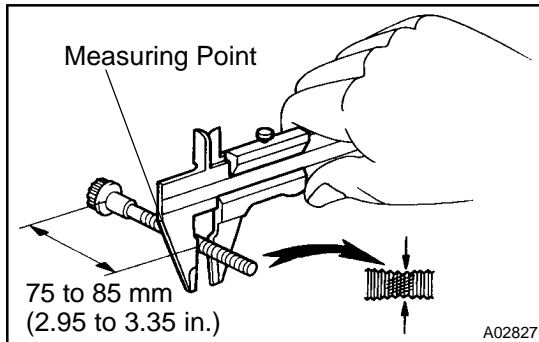
Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than the maximum, replace the cylinder head.



- (b) Inspect for cracks.
- (1) Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

If cracked, replace the cylinder head.



21. INSPECT CYLINDER HEAD SET BOLT

- (a) Using vernier calipers, measure the thread outside diameter of the bolt.

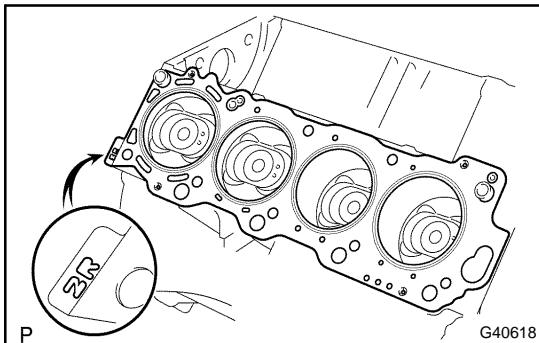
Standard outside diameter:

9.810 to 9.960 mm (0.3862 to 0.3921 in.)

Minimum outside diameter:

9.700 mm (0.3819 in.)

If the diameter is less than the minimum, replace the bolt.



22. INSTALL CYLINDER HEAD GASKET

- (a) Place a new cylinder head gasket in position on the cylinder block.

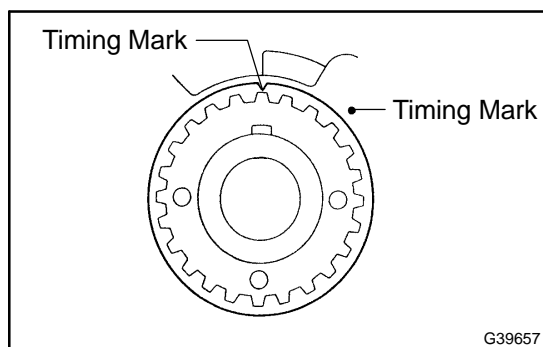
HINT:

A mark is placed on the rear side of the cylinder head gasket to distinguish the LH and RH banks, a "2R" mark for the RH bank and a "2L" mark for the LH bank.

NOTICE:

Be careful of the installation direction.

- (b) Place the cylinder head in position on the cylinder head gasket.



23. INSTALL CYLINDER HEAD SUB-ASSY

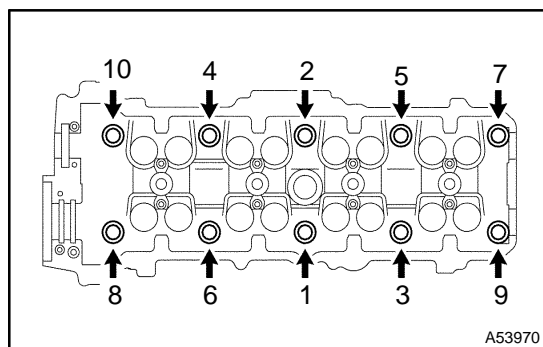
- Check that the timing mark of the crankshaft timing pulley is in the position shown in the illustration, and that the piston is below the TDC of compression.
- Install the cylinder head with the exhaust manifold to the cylinder block.

HINT:

- The cylinder head bolts are tightened in 3 progressive steps.
 - If any cylinder head bolt is broken or deformed, replace it.
- Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.
 - Install the plate washer to the cylinder head bolt.
 - Install and uniformly tighten the 10 cylinder head bolts, and plate washers, in the order shown in the illustration.

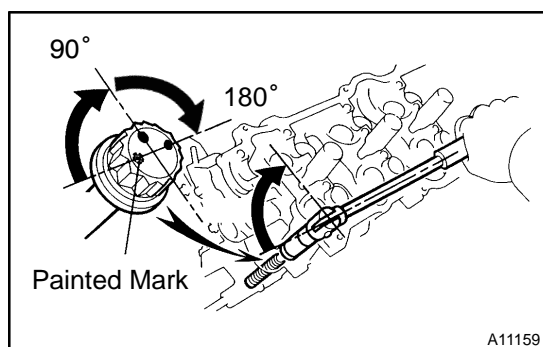
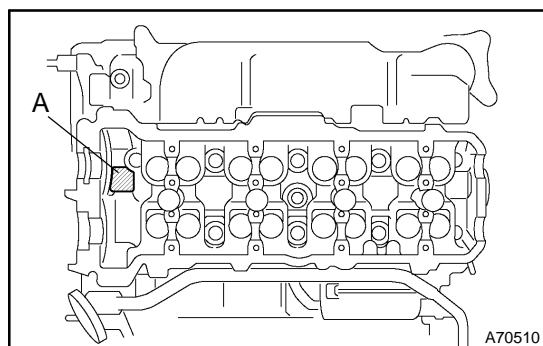
Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



NOTICE:

Do not drop the plate washer for the cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.



- Mark the front of the cylinder head bolt head with paint.
- Retighten the cylinder head bolts by 90° in the order shown.
- Retighten the cylinder head bolts by an additional 90°.
- Check that the painted mark is now at a 180° angle to front.

24. INSTALL FRONT EXHAUST PIPE

- Place a new gasket to the front exhaust pipe.
- Install the 2 nuts and front exhaust pipe.

Torque: 62 N·m (632 kgf·cm, 46 ft·lbf)

25. INSTALL REAR TIMING BELT PLATE RH

- Install the timing belt plate with the bolt and stud bolt.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

26. INSTALL REAR TIMING BELT PLATE RH NO. 2

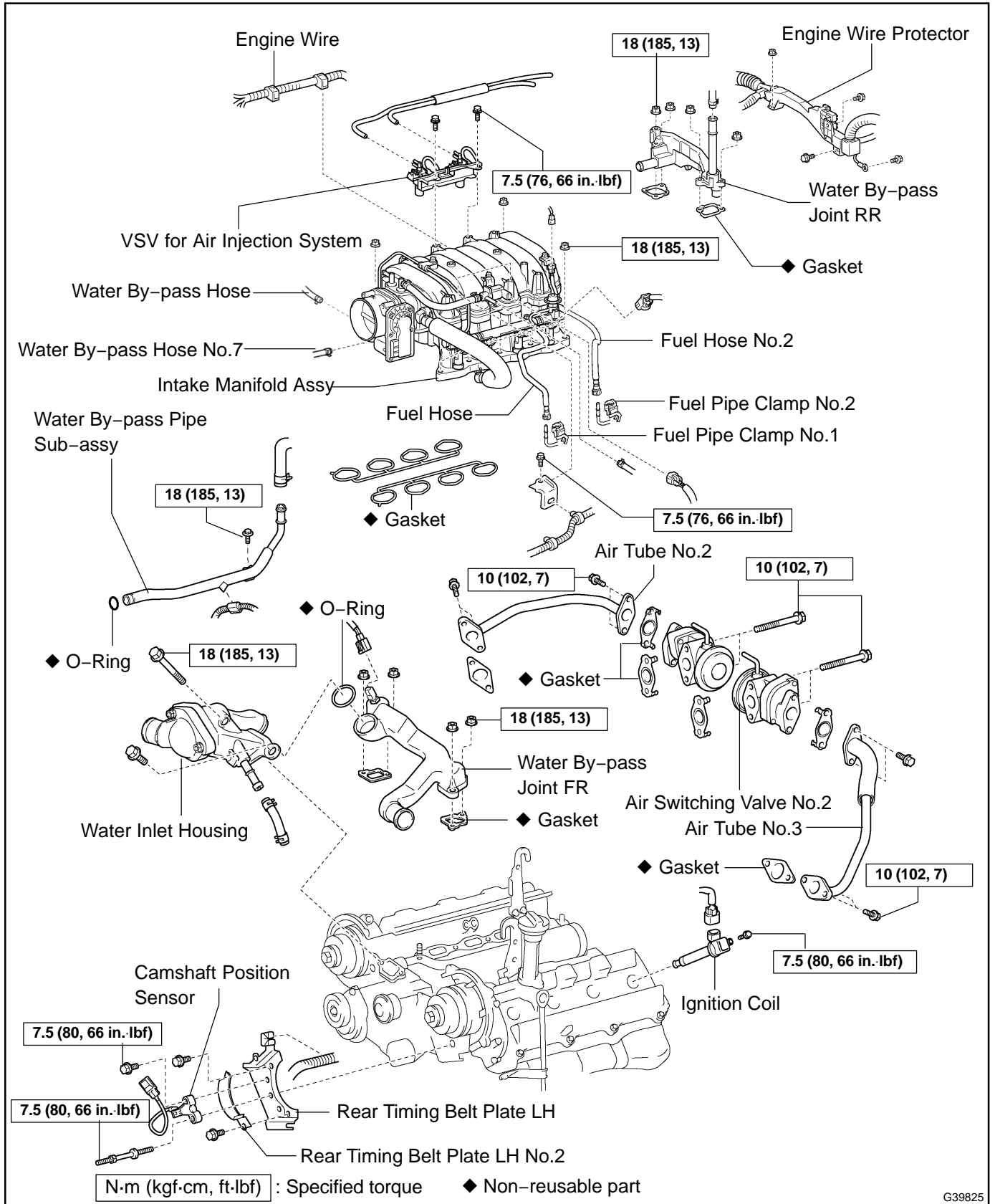
- Install the timing belt plate with the 2 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

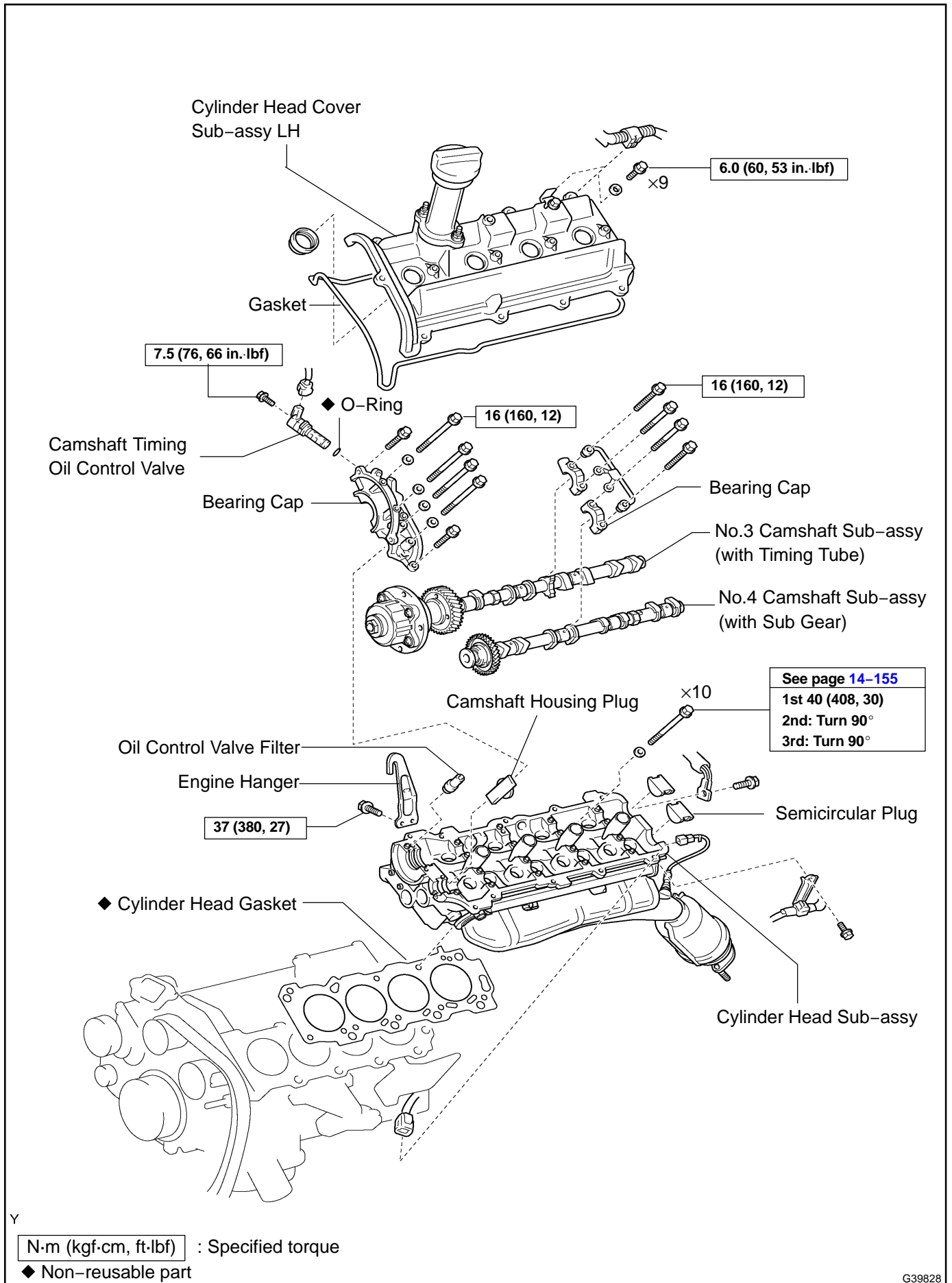
27. **INSTALL WATER BY-PASS JOINT RR (SEE PAGE 14-22)**
28. **INSTALL AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**
29. **INSTALL WATER BY-PASS JOINT FR (SEE PAGE 14-22)**
30. **INSTALL WATER INLET HOUSING (SEE PAGE 16-6)**
31. **INSTALL WATER BY-PASS PIPE SUB-ASSY**
 - (a) Install a new O-ring to the water by-pass pipe.
 - (b) Apply soapy water to the O-ring.
 - (c) Push in the water by-pass pipe end into the pipe hole of the water pump.
 - (d) Install the water by-pass pipe with the bolt.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
32. **INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
33. **INSTALL OIL LEVEL GAUGE GUIDE**
 - (a) Install a new O-ring to the oil level gauge guide.
 - (b) Install the oil level gauge guide with the bolt.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
34. **INSTALL TRANSMISSION OIL FILLER TUBE SUB-ASSY**
 - (a) Install the transmission oil filler tube sub-assy with the bolt.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)
35. **INSTALL CAMSHAFT (RH BANK) (SEE PAGE 14-125)**
36. **INSTALL TIMING BELT (SEE PAGE 14-115)**

CYLINDER HEAD GASKET NO.2 (2UZ-FE) COMPONENTS

140ZR-06



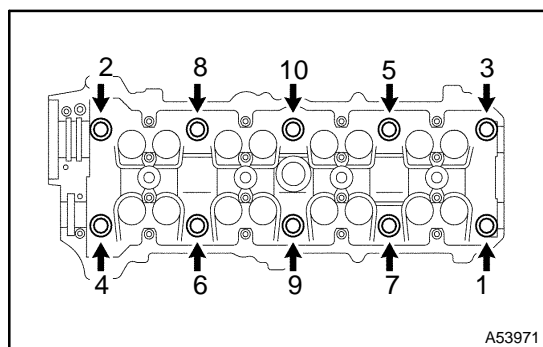
G39825



G39828

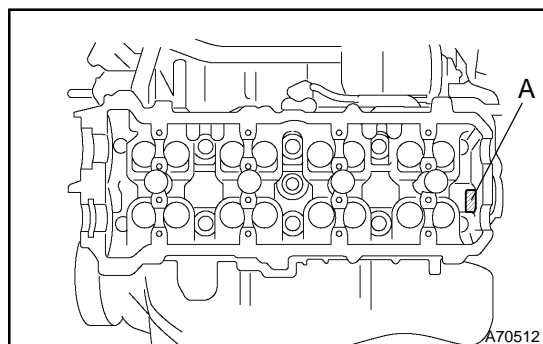
REPLACEMENT

1. **PREVENT GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **REMOVE TIMING BELT (SEE PAGE 14-115)**
3. **REMOVE CAMSHAFT (LH BANK) (SEE PAGE 14-135)**
4. **REMOVE INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
5. **REMOVE WATER INLET HOUSING**
 - (a) Remove the 2 bolts.
 - (b) Remove the water inlet housing and O-ring from the engine.
6. **REMOVE WATER BY-PASS JOINT FR**
 - (a) Remove the 4 nuts.
 - (b) Remove the water by-pass joint and 2 gaskets.
7. **REMOVE WATER BY-PASS PIPE SUB-ASSY**
 - (a) Remove the bolt and water by-pass pipe.
8. **REMOVE AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**
9. **REMOVE WATER BY-PASS JOINT RR**
 - (a) Remove the 4 nuts, water by-pass joint and 2 gaskets.
10. **DISCONNECT ENGINE WIRE**
11. **REMOVE REAR TIMING BELT PLATE LH NO. 2**
 - (a) Remove the 2 bolts and rear timing belt plate LH No.2.
12. **REMOVE REAR TIMING BELT PLATE LH**
 - (a) Remove the bolt and rear timing belt plate LH.
13. **SEPARATE FRONT EXHAUST PIPE**
 - (a) Remove the 2 bolts and separate the front exhaust pipe.



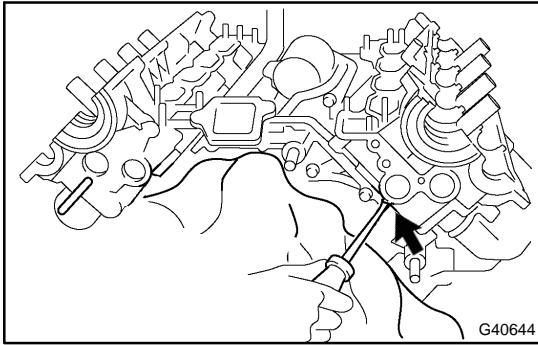
14. REMOVE CYLINDER HEAD LH

- (a) Uniformly loosen the 10 cylinder head bolts in the order shown in the illustration. Remove the bolts and plate washers.



NOTICE:

- **Cylinder head warpage or cracking could result from removing bolts in incorrect order.**
- **Do not drop the plate washer for the cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.**



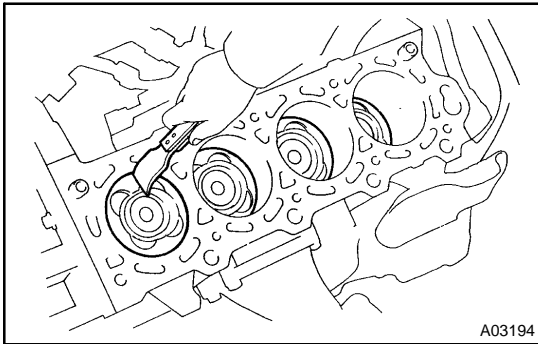
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the cylinder head on wooden blocks on a bench.

HINT:

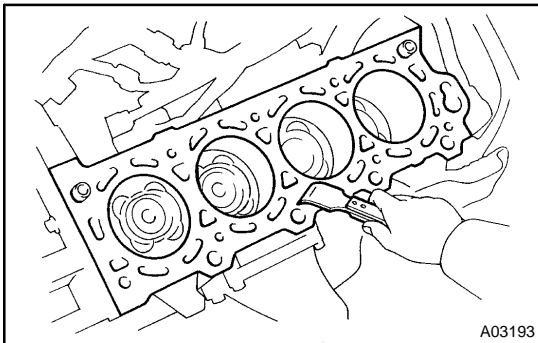
If the cylinder head cannot be lifted easily, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE:

- Be careful not to damage the contact surfaces of the cylinder head and cylinder block.
- The cylinder head should not be tilted so as to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.

15. REMOVE CYLINDER HEAD GASKET NO.2**16. CLEAN CYLINDER BLOCK SUB-ASSY**

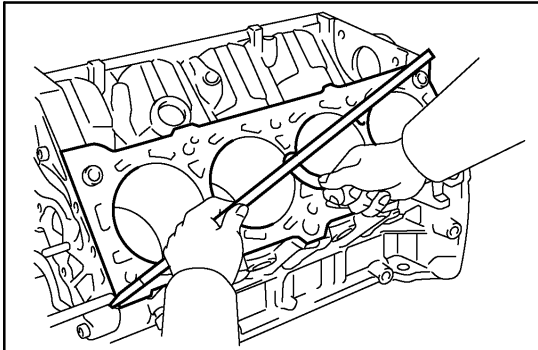
- (a) Turn the crankshaft, and bring each piston to the top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



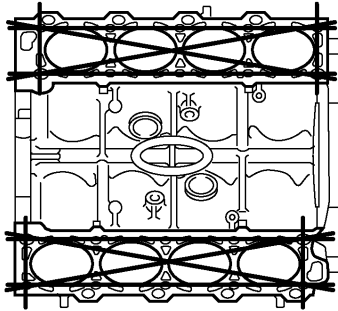
- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

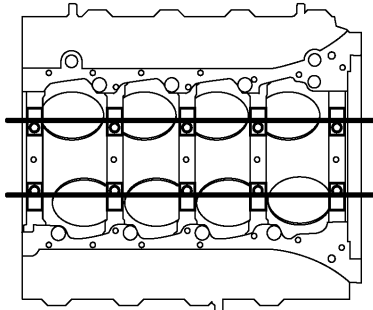
Protect your eyes when using compressed air.



Cylinder Head Side



Crankshaft Bearing Cap Side



Y

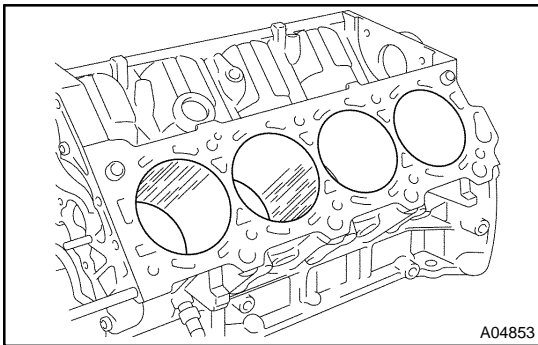
A74955

17. CHECK CYLINDER BLOCK FOR WARPAGE

- (a) Inspect for warpage.
 - (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder head and crankshaft bearing cap.

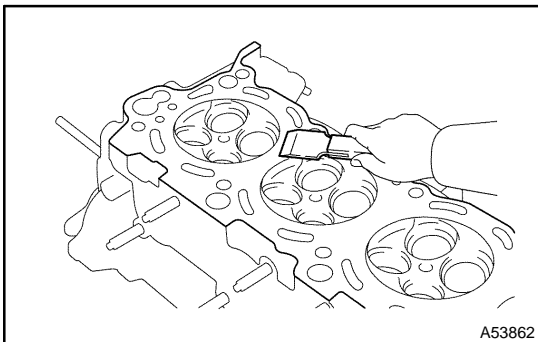
Maximum warpage: 0.07 mm (0.0028 in.)

If warpage is greater than the maximum, replace the cylinder block sub-assy.



A04853

- (b) Visually check the cylinder for vertical scratches. If deep scratches are present, rebore all the 8 cylinders and replace all the 8 pistons. If necessary, replace the cylinder block.



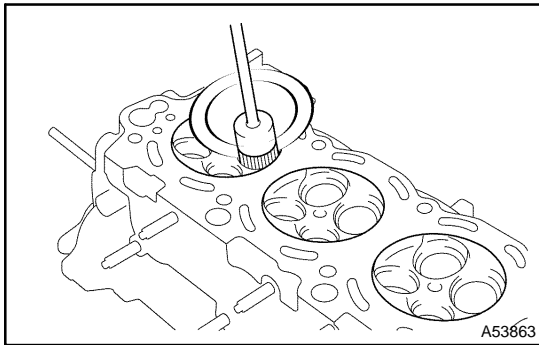
A53862

18. CLEAN CYLINDER HEAD LH

- (a) Clean the cylinder head.
 - (1) Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

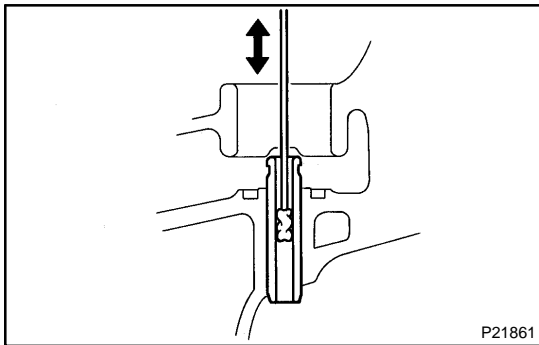
Be careful not to scratch the cylinder block contact surface.



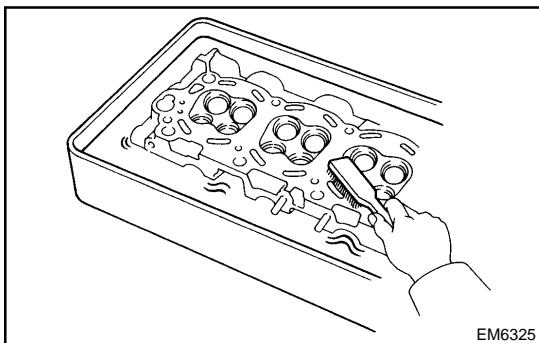
- (2) Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE:

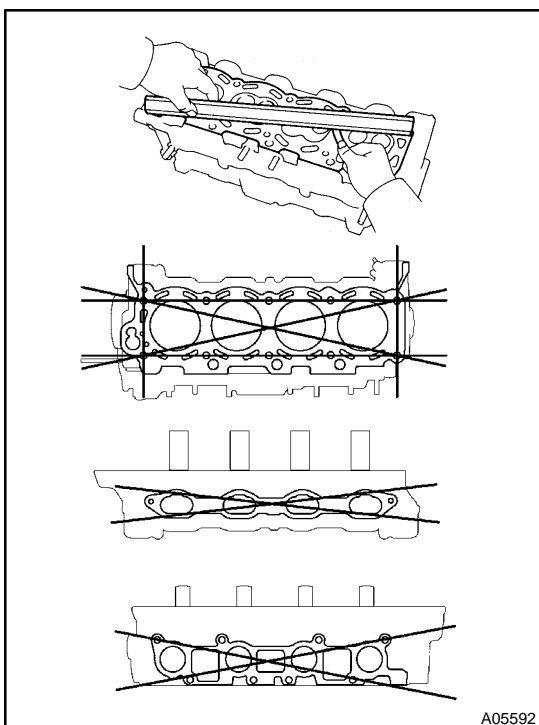
Be careful not to scratch the cylinder block contact surface.



- (3) Using a valve guide bushing brush and solvent, clean all the guide bushes.



- (4) Using a soft brush and solvent, thoroughly clean the cylinder head.

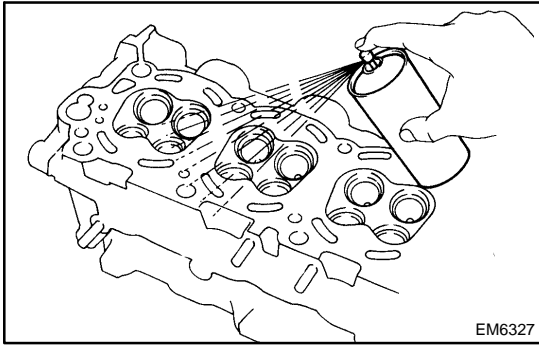
**19. INSPECT CHECK CYLINDER HEAD FOR WARPAGE**

- (a) Inspect for warpage.

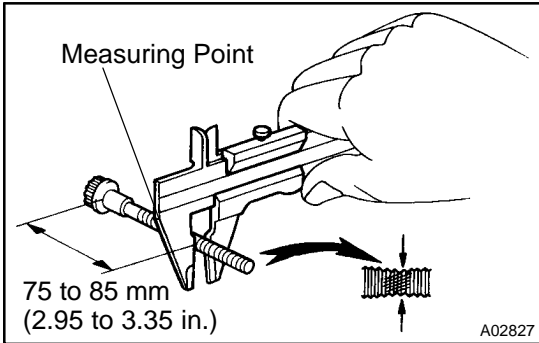
- (1) Using a precision straight edge and feeler gauge, measure the warpage of the contact surfaces of the cylinder block and the manifolds.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than the maximum, replace the cylinder head.



- (b) Inspect for cracks.
 - (1) Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.
- If cracked, replace the cylinder head.



20. INSPECT CYLINDER HEAD SET BOLT

- (a) Using vernier calipers, measure the thread outside diameter of the bolt.

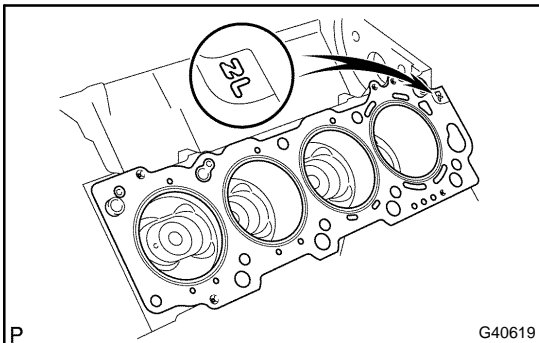
Standard outside diameter:

9.810 to 9.960 mm (0.3862 to 0.3921 in.)

Minimum outside diameter:

9.700 mm (0.3819 in.)

If the diameter is less than the minimum, replace the bolt.



21. INSTALL CYLINDER HEAD GASKET NO.2

- (a) Place a new cylinder head gasket in position on the cylinder block.

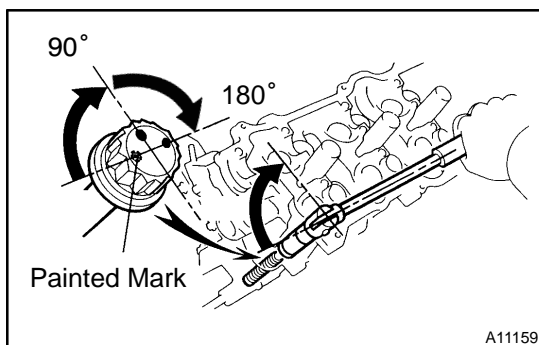
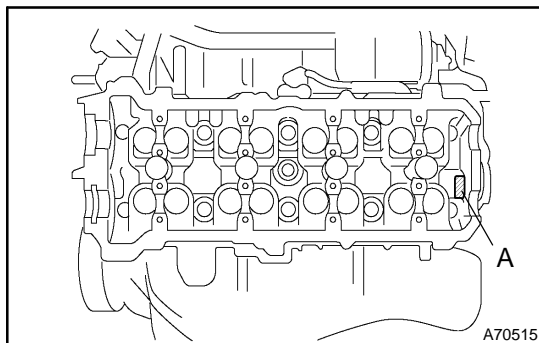
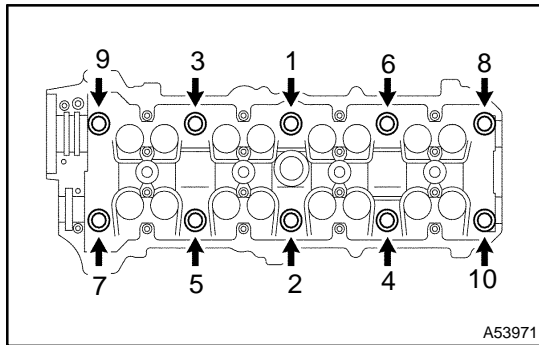
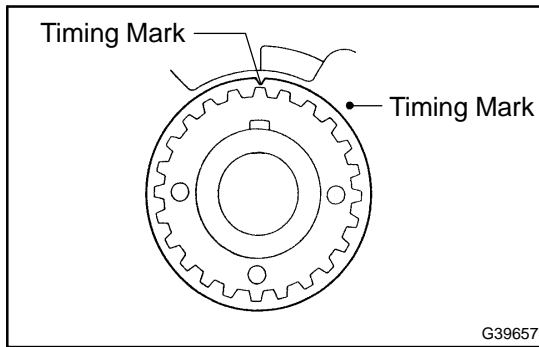
HINT:

A mark is placed on the rear side of the cylinder head gasket to distinguish the LH and RH banks, a "2R" mark for the RH bank and a "2L" mark for the LH bank.

NOTICE:

Be careful of the installation direction.

- (b) Place the cylinder head in position on the cylinder head gasket.



22. INSTALL CYLINDER HEAD LH

- Check that the timing mark of the crankshaft timing pulley is in the position shown in the illustration, and that the piston is below the TDC of compression.
- Install the cylinder head with the exhaust manifold to the cylinder block.

HINT:

- The cylinder head bolts are tightened in 3 progressive steps.
 - If any cylinder head bolt is broken or deformed, replace it.
- Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.
 - Install the plate washer to the cylinder head bolt.
 - Install and uniformly tighten the 10 cylinder head bolts, and plate washers, in the order shown in the illustration.

Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.

NOTICE:

Do not drop the plate washer for the cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.

- Mark the front of the cylinder head bolt head with paint.
- Retighten the cylinder head bolts by 90° in the order shown.
- Retighten the cylinder head bolts by an additional 90°.
- Check that the painted mark is now at a 180° angle to front.

23. INSTALL FRONT EXHAUST PIPE

- Place a new gasket to the front exhaust pipe.
 - Install the 2 nuts and front exhaust pipe.
- Torque: 62 N·m (632 kgf·cm, 46 ft·lbf)**

24. INSTALL REAR TIMING BELT PLATE LH

- Install the bolt and rear timing belt plate LH.
- Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)**

25. INSTALL REAR TIMING BELT PLATE LH NO. 2

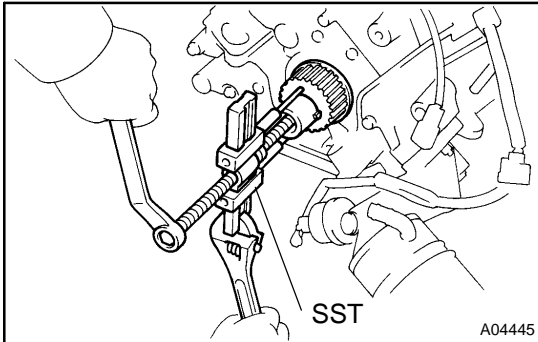
- Install the 2 bolts and rear timing belt plate LH No.2.
- Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)**

26. **INSTALL WATER BY-PASS JOINT RR (SEE PAGE 14-22)**
27. **INSTALL AIR SWITCHING VALVE NO.2 (SEE PAGE 12-27)**
28. **INSTALL WATER BY-PASS JOINT FR(SEE PAGE 14-22)**
29. **INSTALL WATER INLET HOUSING (SEE PAGE 16-6)**
30. **INSTALL WATER BY-PASS PIPE SUB-ASSY**
 - (a) Install a new O-ring to the water by-pass pipe.
 - (b) Apply soapy water to the O-ring.
 - (c) Push in the water by-pass pipe end into the pipe hole of the water pump.
 - (d) Install the water by-pass pipe with the bolt.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
31. **INSTALL INTAKE MANIFOLD ASSY (SEE PAGE 10-10)**
Nut 18 N·m (185 kgf·cm, 13 ft·lbf)
32. **INSTALL CAMSHAFT (LH BANK) (SEE PAGE 14-135)**
33. **INSTALL TIMING BELT (SEE PAGE 14-115)**

OIL PUMP SEAL (2UZ-FE)

REPLACEMENT

1. REMOVE TIMING BELT (SEE PAGE 14-115)

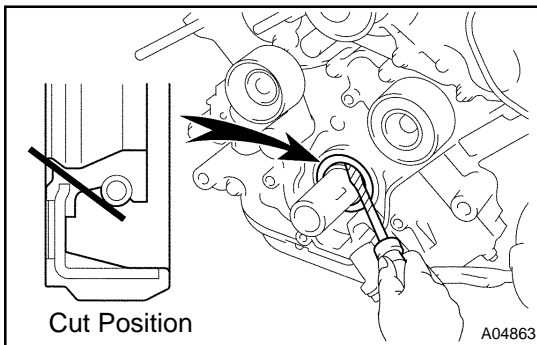


2. REMOVE CRANKSHAFT TIMING PULLEY

- (a) Using SST, remove the timing pulley.
 SST 09950-50013 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05010)

NOTICE:

Do not turn the timing pulley.



3. REMOVE OIL PUMP SEAL

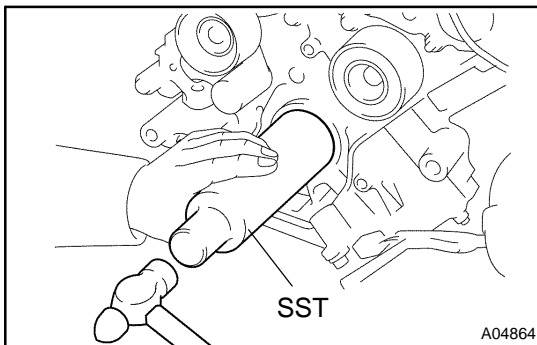
- (a) Using a knife, cut off the oil seal lip.
 (b) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft.

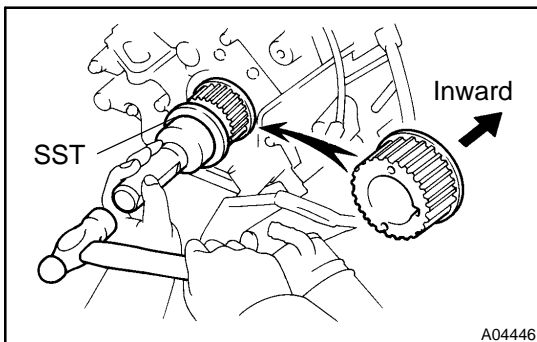
HINT:

Tap the screwdriver tip before use.



4. INSTALL OIL PUMP SEAL

- (a) Apply MP grease to a new oil seal lip.
 (b) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
 SST 09316-60011 (09316-00011)



5. INSTALL CRANKSHAFT TIMING PULLEY

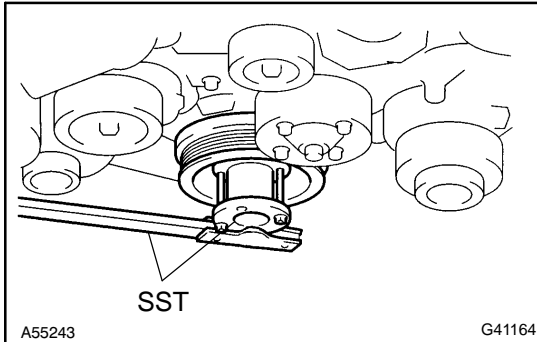
- (a) Align the timing pulley set key with the key groove of the pulley.
 (b) Using SST and a hammer, tap in the timing pulley with the flange side facing inward.
 SST 09223-46011

6. INSTALL TIMING BELT (SEE PAGE 14-115)

ENGINE REAR OIL SEAL (2UZ-FE) REPLACEMENT

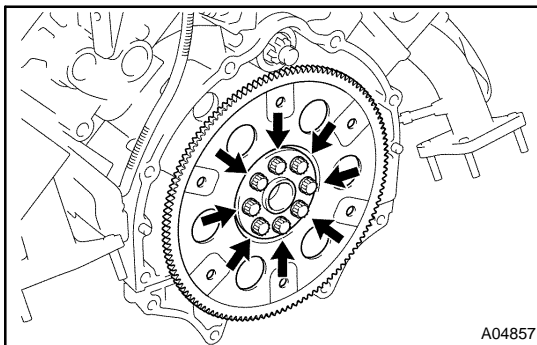
14103-06

1. REMOVE AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-14)

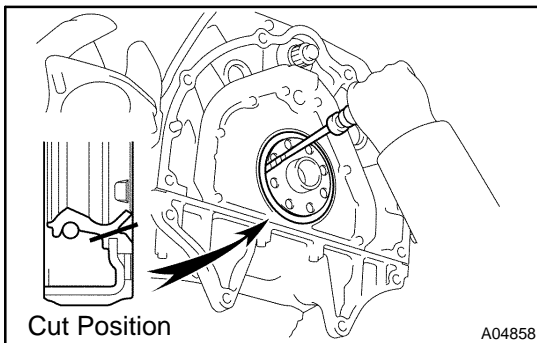


2. REMOVE DRIVE PLATE & RING GEAR SUB-ASSY

- (a) Using SST, hold the crankshaft.
SST 09213-70011, 09330-00021



- (b) Remove the 8 bolts, front spacer, drive plate and rear spacer.



3. REMOVE ENGINE REAR OIL SEAL

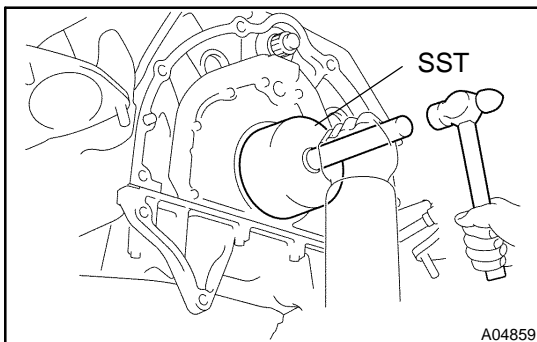
- (a) Using a knife, cut off the oil seal lip.
(b) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft.

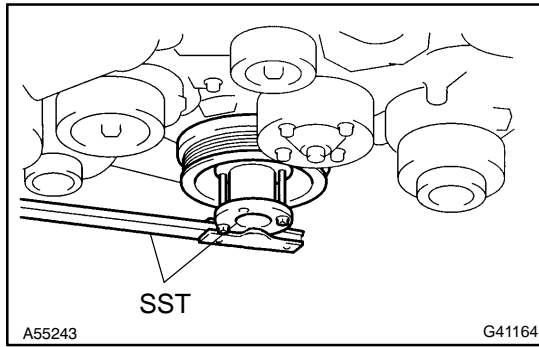
HINT:

Tap the screwdriver tip before use.



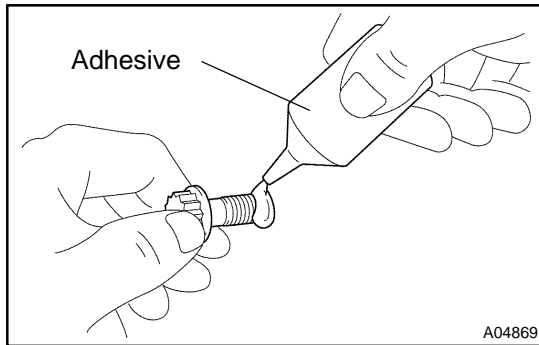
4. INSTALL ENGINE REAR OIL SEAL

- (a) Apply MP grease to a new oil seal lip.
(b) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-56010

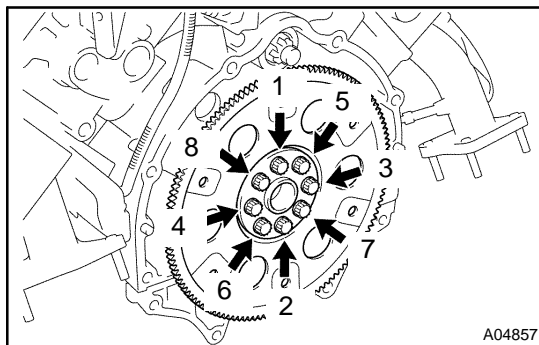


5. INSTALL DRIVE PLATE & RING GEAR SUB-ASSY

- (a) Using SST, hold the crankshaft.
SST 09213-70011, 09330-00021

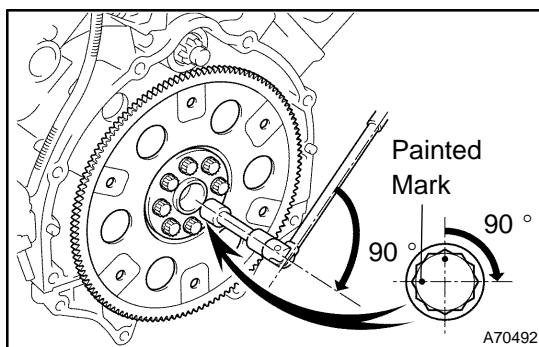


- (b) Apply adhesive to 2 or 3 threads of the mounting bolt end.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent



- (c) Install the front spacer, drive plate and rear spacer on the crankshaft.
(d) Install and uniformly tighten the 8 mounting bolts in several steps, in the order shown in the illustration.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

If any one of the mounting bolts does not meet the torque specification, replace the mounting bolt.

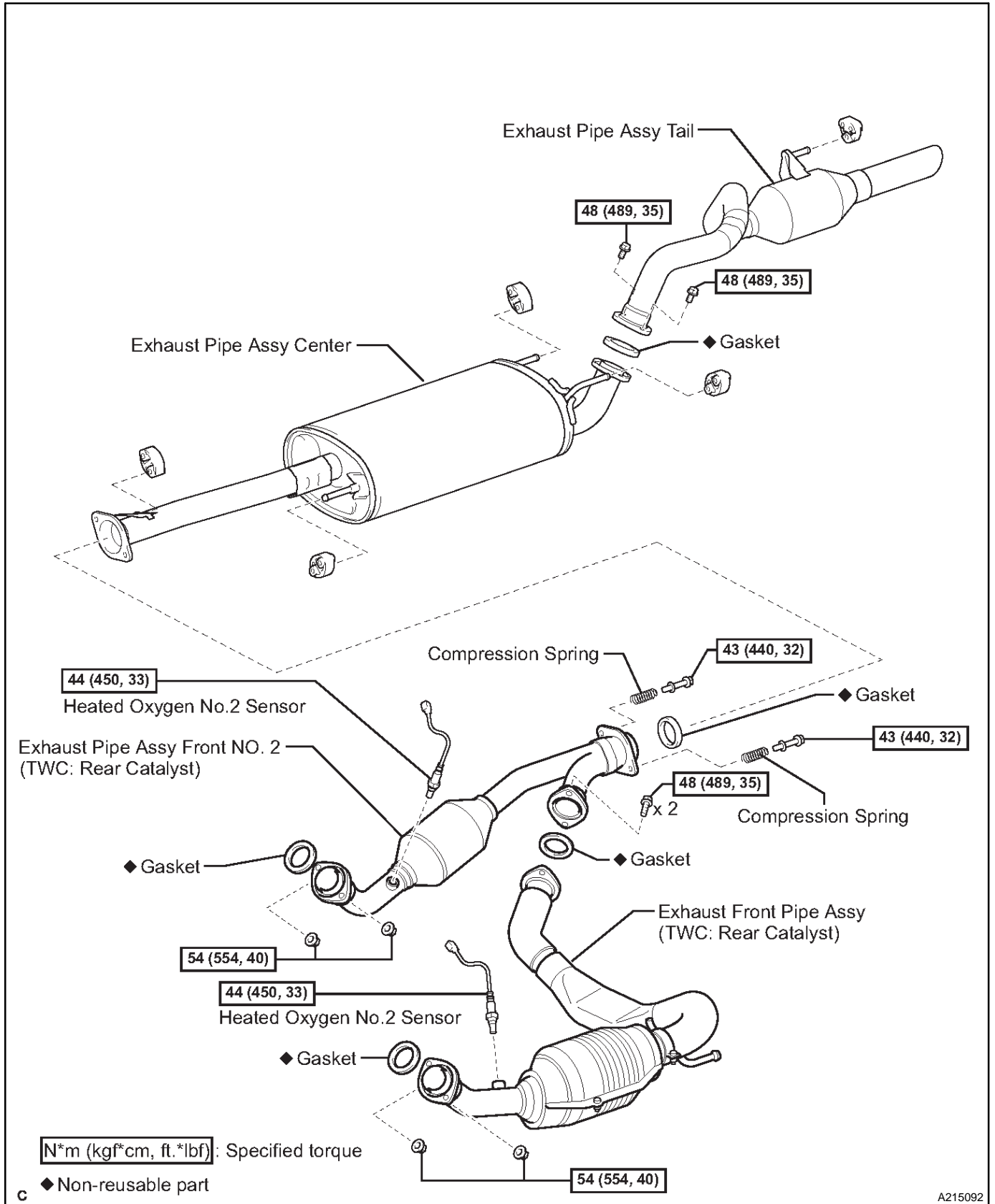


- (e) Mark the mounting bolt with paint.
(f) Retighten the mounting bolts by 90° in the order shown.
(g) Check that the painted mark is now at a 90° angle to the mark placed in step (e).

6. INSTALL AUTOMATIC TRANSMISSION ASSY (SEE PAGE 40-14)

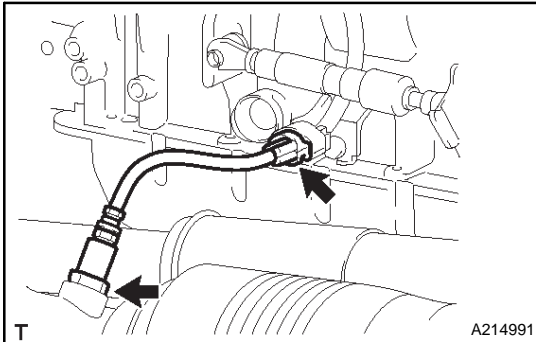
EXHAUST PIPE ASSY (2UZ-FE) COMPONENTS

1505H-05



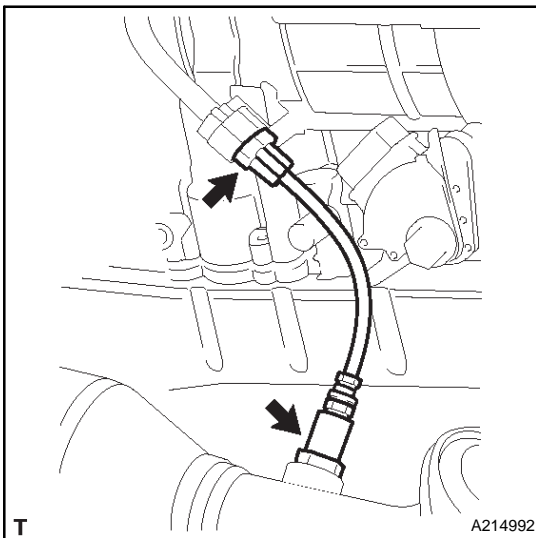
A215092

Removal & Installation and Disassembly & Reassembly



1. REMOVE HEATED OXYGEN SENSOR (BANK1 OXYGEN SENSOR NO.2)

- (a) Disconnect a heated oxygen sensor connector.
- (b) Remove the heated oxygen sensor.



2. REMOVE HEATED OXYGEN SENSOR (BANK2 OXYGEN SENSOR NO.2)

- (a) Disconnect a heated oxygen sensor connector.
- (b) Remove the heated oxygen sensor.

3. REMOVE EXHAUST PIPE ASSY TAIL

- (a) Remove the 2 bolts, exhaust pipe support and tail pipe.

4. REMOVE EXHAUST PIPE ASSY CENTER

- (a) Remove the 2 bolts and 2 compression springs.
- (b) Remove the 4 exhaust pipe supports and exhaust pipe center.

5. REMOVE EXHAUST FRONT PIPE ASSY NO.2

- (a) Remove the 2 bolts, 2 nuts and exhaust pipe assy front No. 2.

6. REMOVE EXHAUST PIPE ASSY FRONT

- (a) Remove the 2 nuts and exhaust pipe assy front.

7. INSTALL EXHAUST PIPE ASSY FRONT

- (a) Install a new gasket and front pipe to exhaust manifold.
- (b) Install the exhaust pipe front with new 2 nuts.

Torque: 54 N·m (554 kgf·cm, 40 ft·lbf)

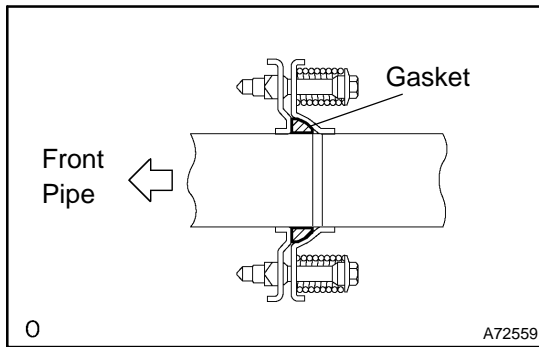
8. INSTALL EXHAUST FRONT PIPE ASSY NO.2

- (a) Install the 2 new gaskets and the front pipe to exhaust manifold.
- (b) Install the exhaust pipe front with 2 bolts and new 2 nuts.

Torque:

Nut 54 N·m (554 kgf·cm, 40 ft·lbf)

Bolt 48 N·m (490 kgf·cm, 35 ft·lbf)



9. INSTALL EXHAUST PIPE ASSY CENTER

- (a) Using vernier calipers, measure the free length to the compression spring.

Minimum length: 40.5 mm (1.5945 in.)

If the free length is less than minimum, replace the compression spring.

- (b) Install a new gasket on the exhaust pipe assy front.
 (c) Install the exhaust pipe assy center with 2 bolts and 2 springs.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

10. INSTALL EXHAUST PIPE ASSY TAIL

- (a) Install a new gasket on the exhaust pipe center.
 (b) Install the tail pipe with 2 bolts.

Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

11. INSTALL HEATED OXYGEN SENSOR (BANK1 OXYGEN SENSOR NO.2)

- (a) Install heated oxygen sensor to exhaust pipe front.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

- (b) Connect the heated oxygen sensor connector.

HINT:

After installing heated oxygen sensor, check that sensor wire is not twisted. If it is twisted, remove the heated oxygen sensor and reinstall it.

12. INSTALL HEATED OXYGEN SENSOR (BANK2 OXYGEN SENSOR NO.2)

- (a) Install heated oxygen sensor to exhaust pipe front.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

- (b) Connect the heated oxygen sensor connector.

HINT:

After installing heated oxygen sensor, check that sensor wire is not twisted. If it is twisted, remove the heated oxygen sensor and reinstall it.

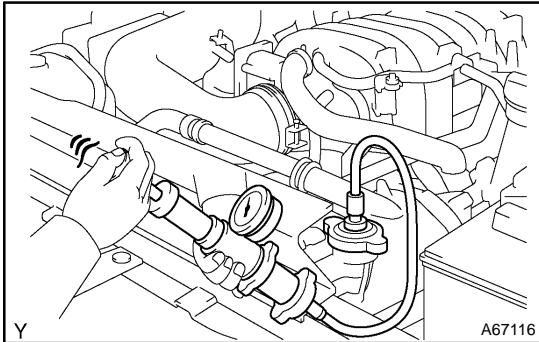
13. CHECK FOR EXHAUST GAS LEAKS

COOLING SYSTEM (2UZ-FE) ON-VEHICLE INSPECTION

160EP-04

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



1. INSPECT COOLING SYSTEM FOR LEAKS

- (a) Fill the radiator with coolant, then attach a radiator cap tester.
- (b) Warm up the engine.
- (c) Pump it to 118 kPa (1.2 kgf/cm², 17.1 psi), then check that the pressure does not drop.

HINT:

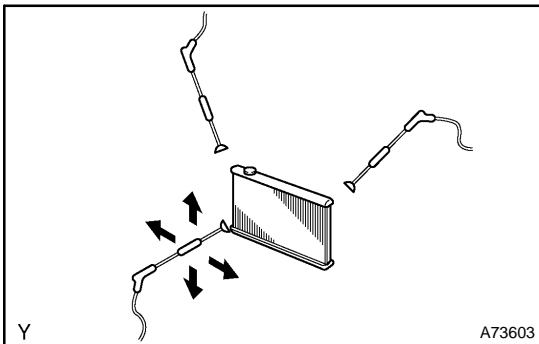
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

The engine coolant is between "LOW" and "FULL" lines of the reservoir when the engine is cold.

3. CHECK ENGINE COOLANT QUALITY

- (a) Check if there are any excessive deposits of rust or scale around the radiator cap and radiator filler hole; the coolant should be free from oil.



4. INSPECT RADIATOR BLOCKAGE

- (a) If the fins are clogged, wash them with water or a steam cleaner, then dry with compressed air.

NOTICE:

- If the distance between the steam cleaner and the core is too close, there is a possibility of damaging the fins, so keep the following injection distance.

Injection Pressure kPa (kgf/cm ² , psi)	Injection Distance mm (in.)
2,942 to 4,903 (30 to 50, 427 to 711)	300 (11.811)
4,903 to 7,845 (50 to 80, 711 to 1,138)	500 (19.685)

- If the fins are bent, straighten them with a screwdriver or pliers.
- Never apply water directly onto the electronic components.

-MEMO-

INSPECTION

1. INSPECT RADIATOR CAP SUB-ASSY

NOTICE:

- If the reservoir cap has contaminations, always rinse it with water.
- Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.

- (a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push / (3 seconds or more)

NOTICE:

Push the pump at a constant speed.

HINT:

- Pump speed: 1 push / (3 seconds or more)
- If air is not coming from the vacuum valve, replace the reservoir cap.

- (b) Pump the tester and measure the relief valve opening pressure.

Standard opening pressure:

93 – 123 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

NOTICE:

This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

HINT:

- Pump speed: 1 push within 1 second.
- Use the tester's maximum reading as the opening pressure.
- If the opening pressure is less than minimum, replace the reservoir cap.

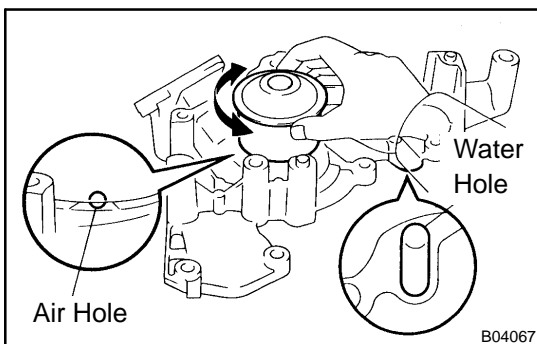
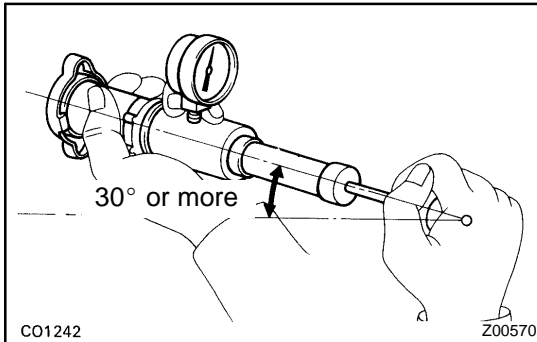
2. INSPECT WATER PUMP ASSY

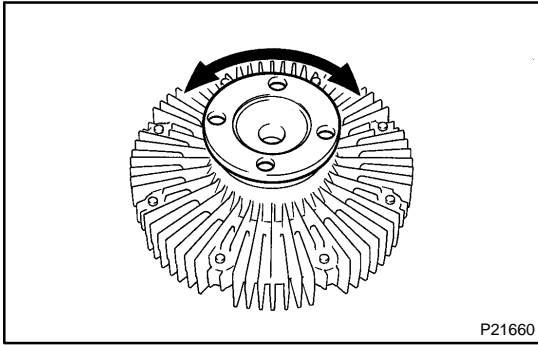
- (a) Visually check the air hole and water hole for coolant leakage.

If leakage is found, replace the water pump and timing belt.

- (b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

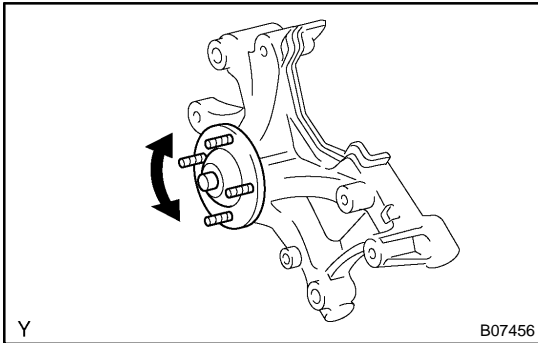




3. INSPECT FLUID COUPLING ASSY

- (a) Check that the fluid coupling is not damaged and that no silicon oil leaks.

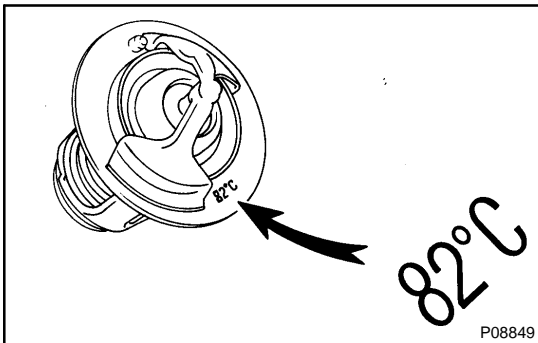
If necessary, replace the fluid coupling.



4. INSPECT FAN BRACKET SUB-ASSY

- (a) Check the turning smoothness of the fan pulley.

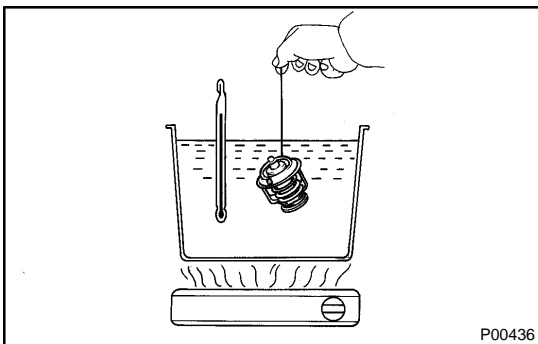
If necessary, replace the pulley bracket.



5. INSPECT THERMOSTAT

The thermostat is numbered with the valve opening temperature.

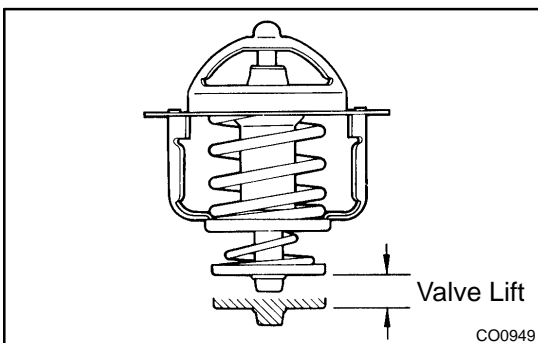
Valve opening temperature: 80 – 84°C (176 – 183°F)



- (a) Immerse the thermostat in water and gradually heat the water.

- (b) Check the valve opening temperature.

If the valve opening temperature is not as specified, replace the thermostat.



- (c) Check the valve lift.

Valve lift: 10 mm (0.39 in.) or more at 95°C (203°F)

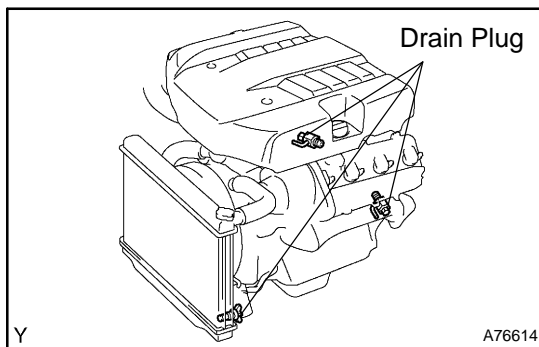
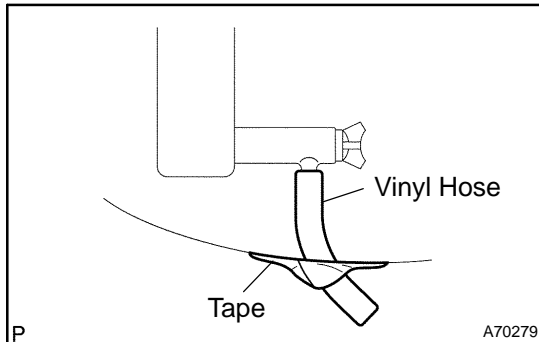
If the valve lift is not as specified, replace the thermostat.

- (d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40°C (104°F)).

If not closed, replace the thermostat.

COOLANT (2UZ-FE) REPLACEMENT

160F0-08



1. DRAIN ENGINE COOLANT

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. It is a probable result that heated fluid and steam are spewed by pressure inside the radiator.

- (a) Remove the radiator cap.
 - (b) Remove the service hole cover for the engine under cover No. 1.
 - (c) Install a vinyl hose to the drain at the radiator side.
 - (d) Loosen the radiator drain plug and engine drain plug, then drain the coolant from the radiator.
 - (e) Drain the coolant from the reservoir tank.
 - (f) Close the drain plugs.
- Torque: 13 N·m (130 kgf·cm, 9 ft·lbf) for engine**
- (g) Remove the vinyl hose from the radiator.

2. ADD ENGINE COOLANT

- (a) Slowly fill the cooling system with engine coolant.
Capacity: 12.9 liters (13.6 US qts, 11.4 Imp. qts)

HINT:

- Use of improper coolants may damage the engine cooling system.
- Only use "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology.
- New Toyota vehicles are filled with Toyota Super Long Life Coolant (color is pink, premixed ethylene-glycol concentration is approximately 50% and freezing temperature is -35°C (-31°F)). When replacing the coolant, Toyota Super Long Life Coolant is recommended.
- Observe the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add the coolant.

NOTICE:

Do not use plain water alone.

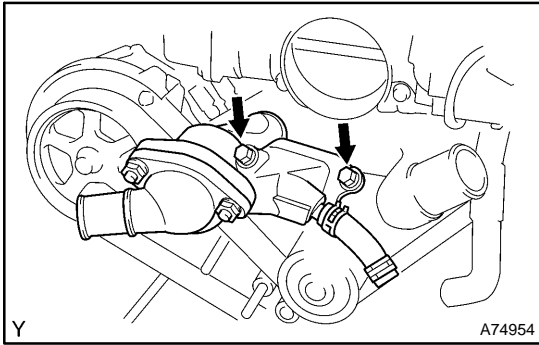
- (b) Install the radiator cap.
 - (c) Operate the cooling system.
 - (1) Start the engine, then open the heater water valve.
 - (2) Maintain the engine speed at 2,000 to 2,500 rpm, then warm up the engine.
 - (d) Stop the engine, then wait until the engine coolant cools down.
 - (e) Refill the reservoir with the coolant up to the "FULL" line.
- ## 3. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

WATER PUMP ASSY (2UZ-FE)

REPLACEMENT

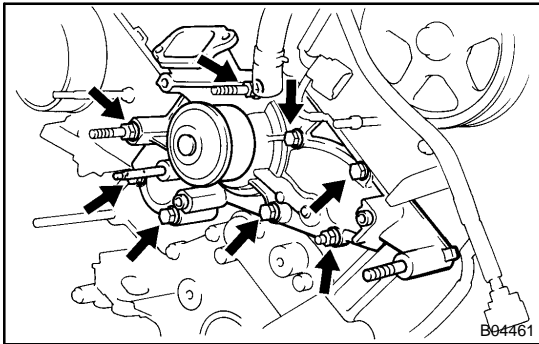
160F2-07

1. REMOVE TIMING BELT (See page 14-115)



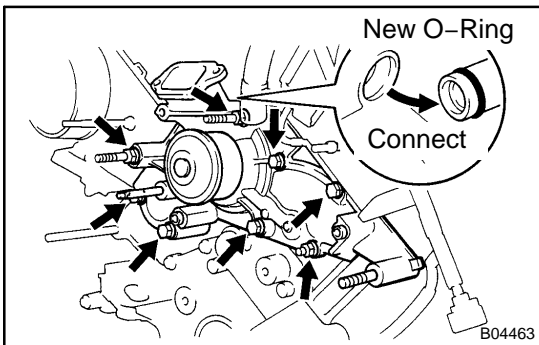
2. REMOVE WATER INLET HOUSING

- Disconnect the water by-pass hose from the water inlet housing.
- Remove the 2 bolts holding the water inlet housing to the water pump.
- Disconnect the water inlet housing from the front water by-pass joint, and remove the water inlet housing w/ water inlet.
- Remove the O-ring from the water inlet housing.



3. REMOVE WATER PUMP ASSY

- Remove the 5 bolts, 2 stud bolts, nut, water pump and gasket.
- Remove the O-ring from the water by-pass pipe.



4. INSTALL WATER PUMP ASSY

- Install a new O-ring to the water by-pass pipe end.
- Apply soapy water to the O-ring.
- Connect the water pump to the water by-pass pipe end.
- Install the water pump and new gasket with the 5 bolts, 2 stud bolts and nut. Uniformly tighten the bolts, stud bolts and nut in several passes.

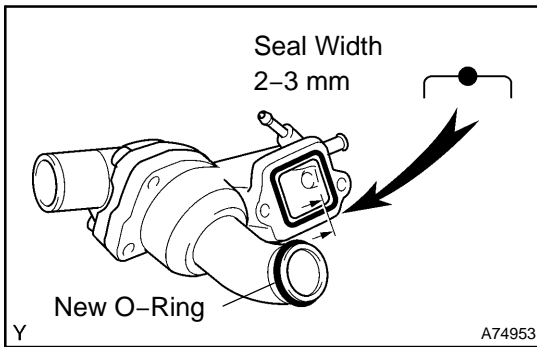
Torque:

Bolt 21 N·m (215 kgf·cm, 16 ft·lbf)

Stud bolt and nut 18 N·m (185 kgf·cm, 13 ft·lbf)

5. INSTALL WATER INLET HOUSING

- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water inlet housing and water pump.
 - Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.



- (b) Apply seal packing to the sealing groove of water inlet housing as shown in the illustration.

Seal packing: Part No. 08826-00100 or equivalent

- (1) Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.
 - (2) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 - (3) Immediately remove nozzle from the tube and reinstall cap.
- (c) Install a new O-ring to the water inlet housing.
- (d) Apply soapy water on the O-ring.
- (e) Attach the water inlet housing end to the front water bypass joint hole.
- (f) Install the water inlet and housing assembly with the 2 bolts. Alternately tighten the bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

6. INSTALL TIMING BELT (See page 14-115)

THERMOSTAT (2UZ-FE)

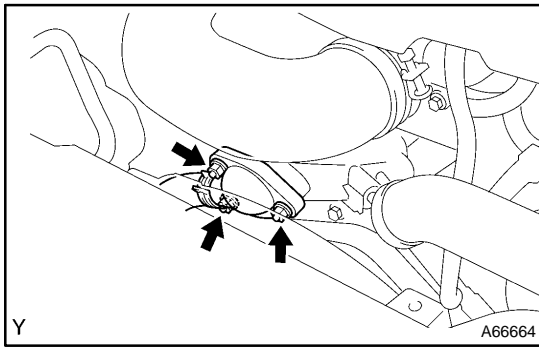
REPLACEMENT

160F1-04

HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **REMOVE V-BANK COVER SUB-ASSY**
2. **DRAIN ENGINE COOLANT (See page 16-5)**

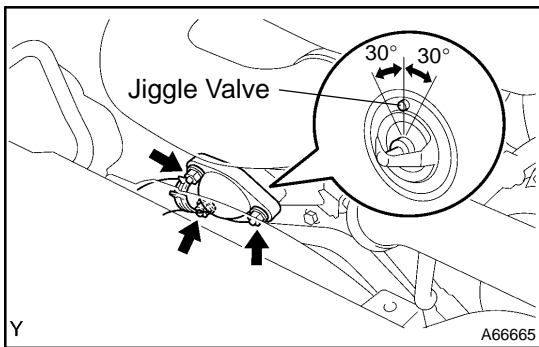


3. SEPARATE WATER INLET

- (a) Remove the 3 nuts, and separate the water inlet from the water inlet housing.

4. REMOVE THERMOSTAT

- (a) Remove the thermostat.
- (b) Remove the gasket from the thermostat.



5. INSTALL THERMOSTAT

- (a) Install a new gasket to the thermostat.
- (b) Insert the thermostat into the water inlet housing with the jiggle valve facing straight upward.

HINT:

The jiggle valve may be set within 30° of either side of the prescribed position.

6. INSTALL WATER INLET

- (a) Install the water inlet with the 3 nuts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

7. ADD ENGINE COOLANT (See page 16-5)

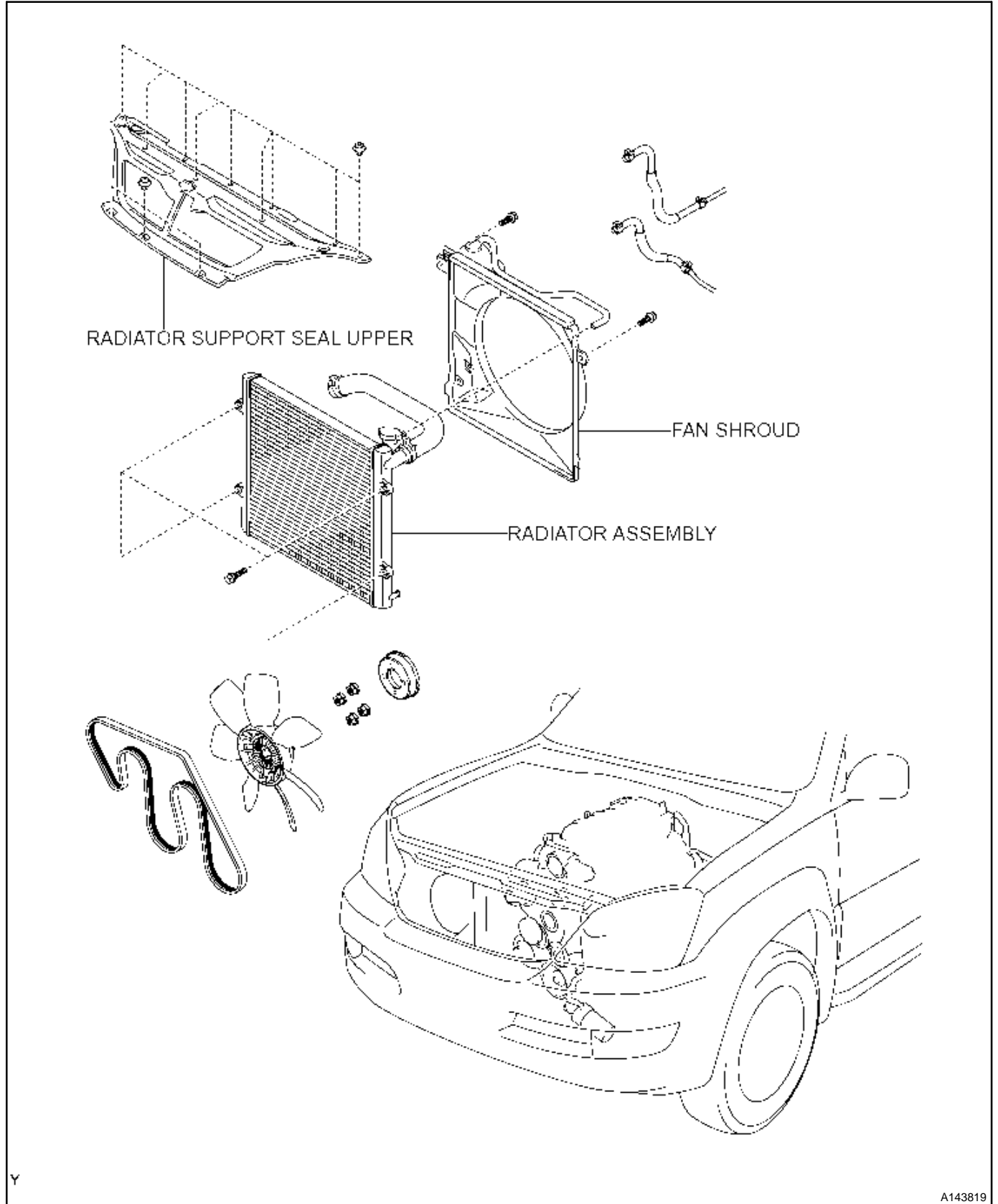
8. INSTALL V-BANK COVER SUB-ASSY

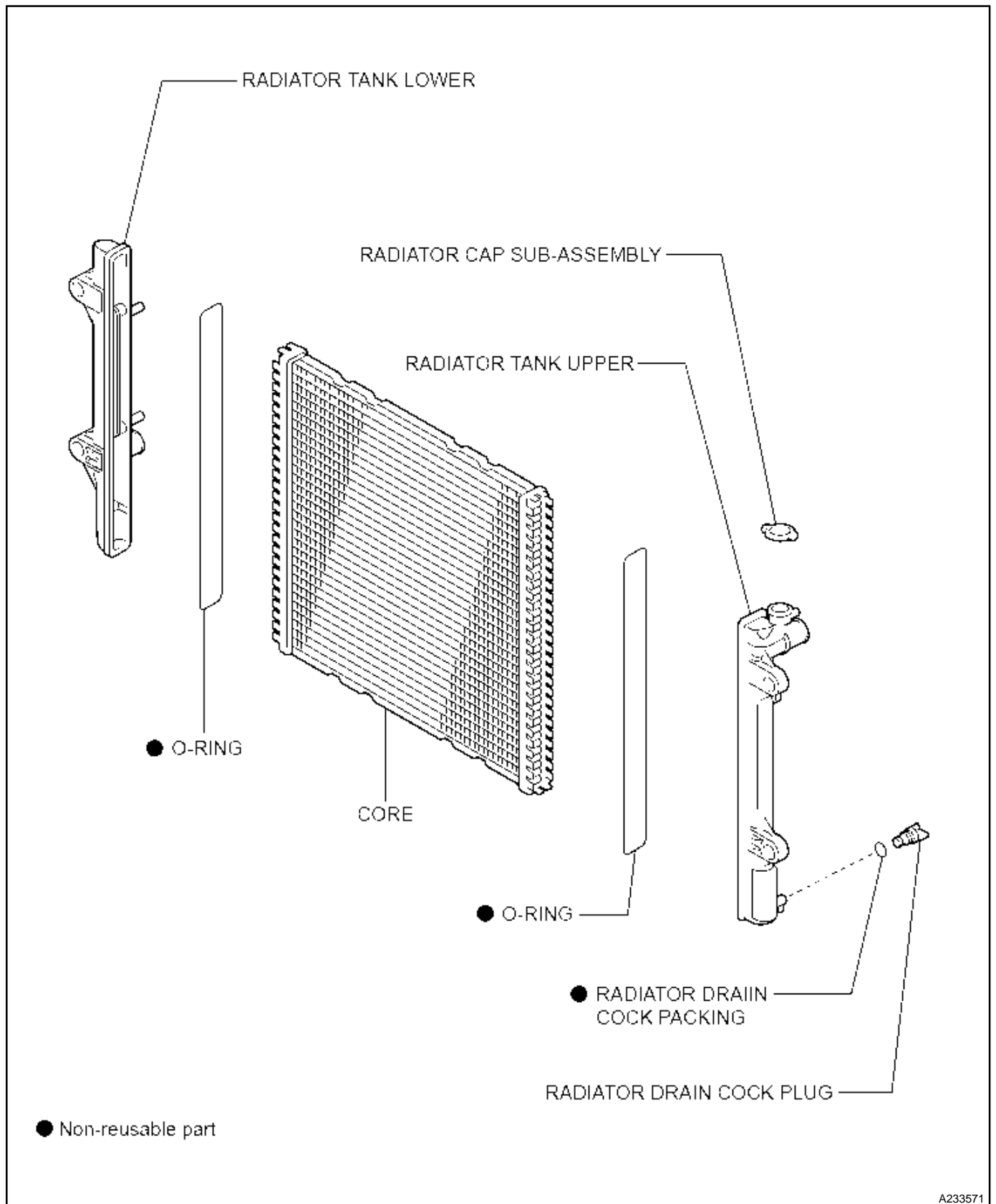
- (a) Install the V-bank cover sub-assy with 2 cap nuts.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

RADIATOR ASSY (2UZ-FE) COMPONENTS

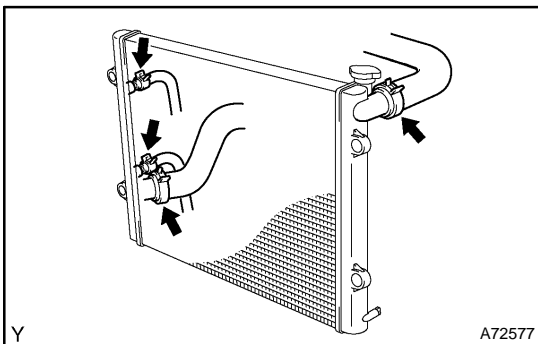
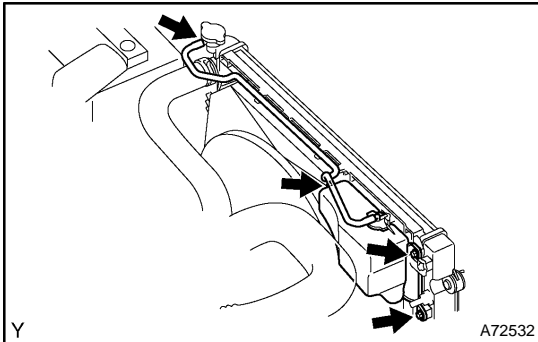
160ER-04



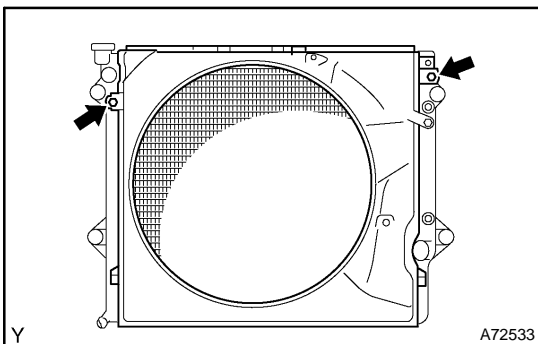


REMOVAL

1. **DRAIN ENGINE COOLANT** (See page 16-5)
2. **REMOVE ENGINE UNDER COVER SUB-ASSY NO.1**
 - (a) Remove the 4 bolts and engine under cover.
3. **REMOVE RADIATOR SUPPORT SEAL UPPER**
 - (a) Remove the 11 clips and radiator support upper.
4. **REMOVE RADIATOR RESERVE TANK ASSY**
 - (a) Disconnect the reserve tank hose from the radiator.
 - (b) Remove the 3 bolts and reserve tank.



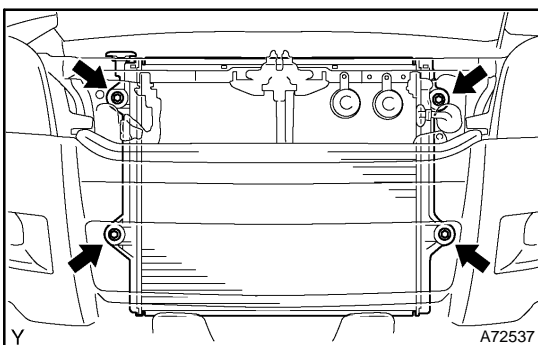
5. **SEPARATE FAN SHROUD**
 - (a) Disconnect the radiator hose No. 1 from the radiator.
 - (b) Disconnect the oil cooler inlet hose from the radiator (A/T TRANSMISSION).
 - (c) Disconnect the oil cooler outlet hose from the radiator (A/T TRANSMISSION).
 - (d) Disconnect the radiator hose No. 2 from the radiator.



- (e) Remove the 2 bolts, and separate the fan shroud.

HINT:

Temporarily put the separated fan shroud at an appropriate location in the engine room.

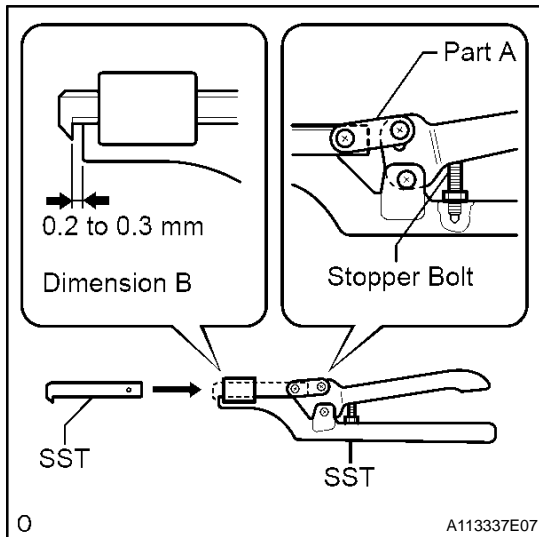


6. **REMOVE RADIATOR ASSY**
 - (a) Remove the 4 bolts and radiator.
7. **REMOVE RADIATOR SUPPORT NO.1**
 - (a) Remove the 1 radiator support No.1 from the radiator.
8. **REMOVE RADIATOR SUPPORT NO.2**
 - (a) Remove the 3 radiator support No.2 from the radiator.
9. **REMOVE RADIATOR SUPPORT NO.1 BUSH**
 - (a) Remove the 4 radiator support No.1 bush from the radiator.

DISASSEMBLY

1. REMOVE RADIATOR DRAIN COCK PLUG

- Remove the drain cock plug.
- Remove the radiator drain cock packing.



2. ASSEMBLE SST

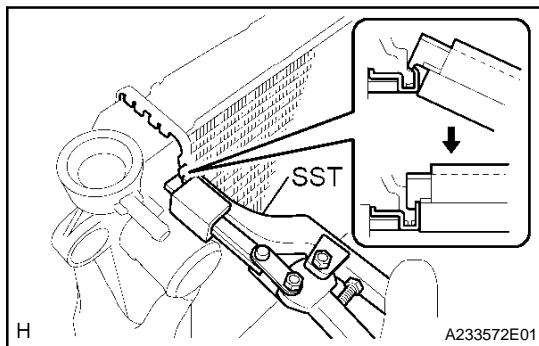
- Install the claw to part A of the overhaul handle as shown in the illustration.
SST 09230-01010 (09231-01010, 09231-01030)
- While squeezing the handle, adjust the stopper bolt so that dimension B is as specified below.
Dimension B: 0.2 to 0.3 mm (0.008 to 0.012 in.)

NOTICE:

If this adjustment is not performed, the claw will be damaged.

3. UNCAULK LOCK PLATE

- Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.
SST 09230-01010 (09231-01010, 09231-01030)



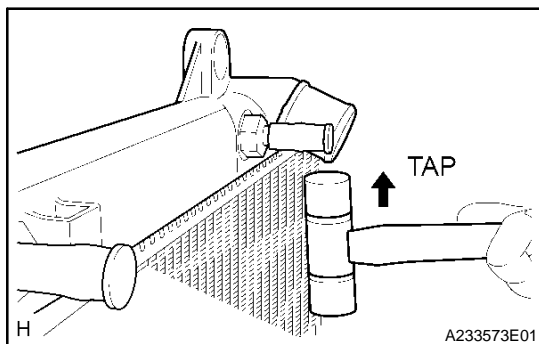
4. REMOVE RADIATOR TANK UPPER AND TANK LOWER

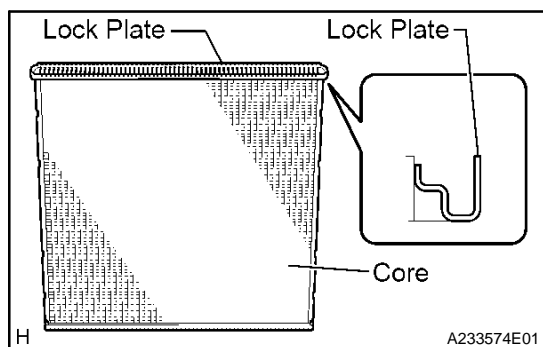
- Lightly tap the bracket of the radiator (or radiator hose inlet or outlet) with a plastic-faced hammer and remove the tanks.

NOTICE:

Do not tap automatic transmission oil cooler pipe.

- Remove the O-ring.





REASSEMBLY

1. INSPECT LOCK PLATE FOR DAMAGE

(a) Inspect the lock plate for damage.

If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible. Correct any deformations with pliers.

Water will leak if the bottom of the lock plate groove is damaged or dented. Repair or replace it as necessary.

NOTICE:

The radiator can only be recalced twice. After the second time, the radiator core must be replaced.

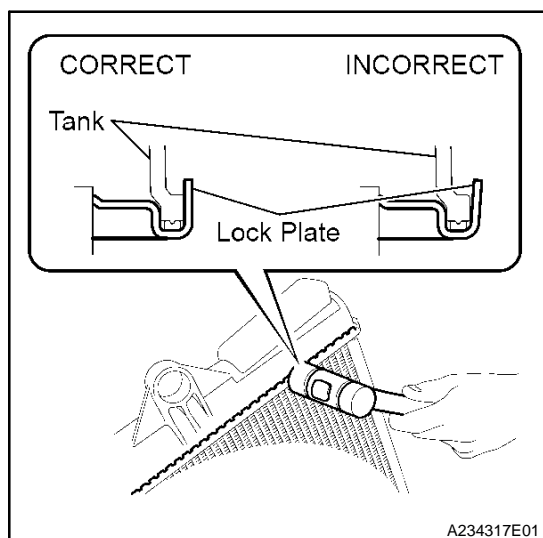
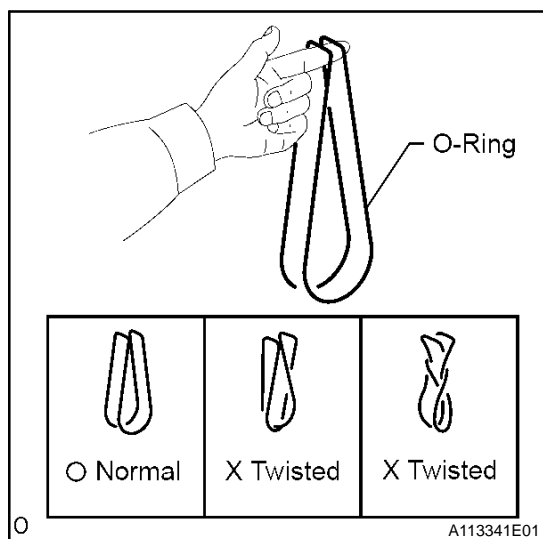
2. INSTALL RADIATOR TANK UPPER AND TANK LOWER

(a) Check that there are no foreign objects in the lock plate groove, and install a new O-ring. Make sure the O-ring is not twisted.

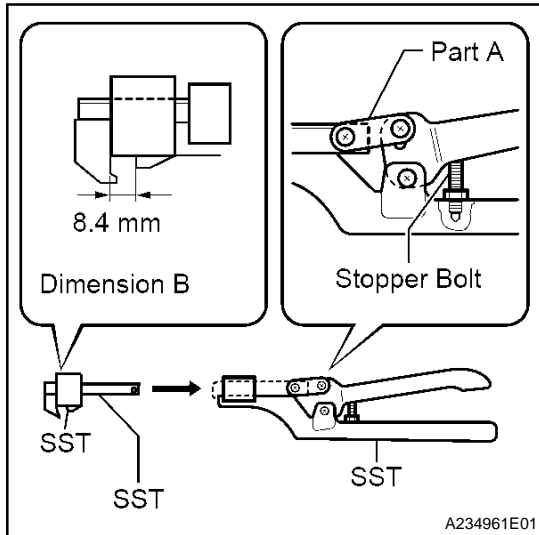
HINT:

When cleaning the lock plate groove, lightly rub it with sandpaper without scratching it.

(b) Install the tank without damaging the O-ring.

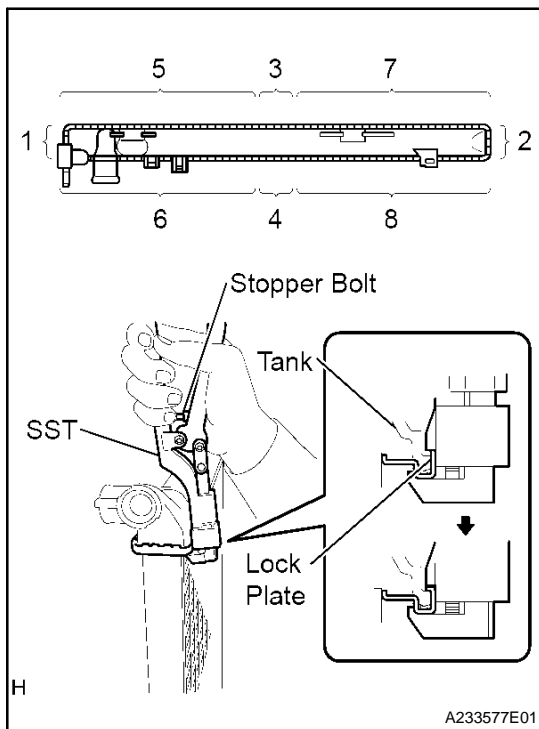


(c) Tap the lock plate with a plastic-faced hammer so that there is no gap between the lock plate and the tank.



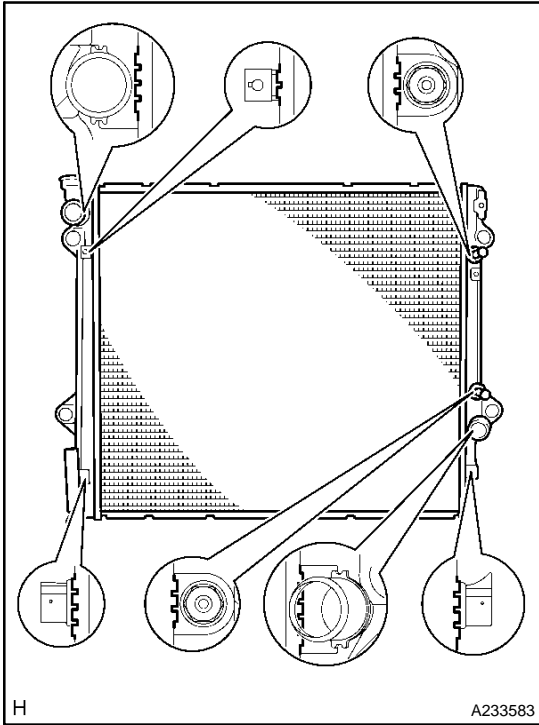
3. ASSEMBLE SST

- (a) Install the punch assembly to part A of the overhaul handle as shown in the illustration.
SST 09230-01010 (09231-01010, 09231-01020), 09231-14010
- (b) While squeezing the handle, adjust the stopper bolt so that dimension B is as specified below.
Dimension B: 8.4 mm (0.331 in.)



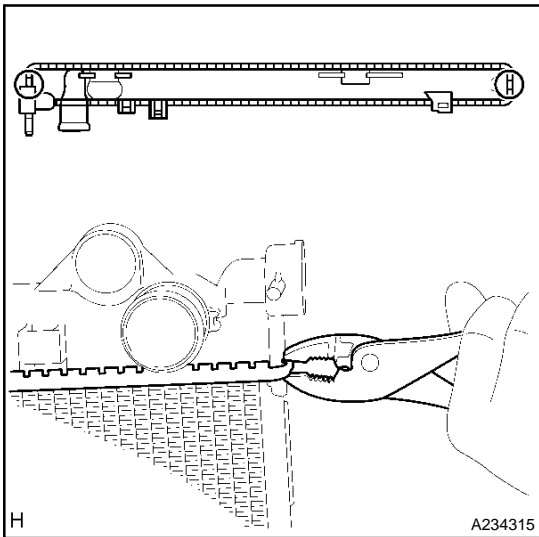
4. CAULK LOCK PLATE

- (a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper bolt.
SST 09230-01010 (09231-01010, 09231-01020), 09231-14010

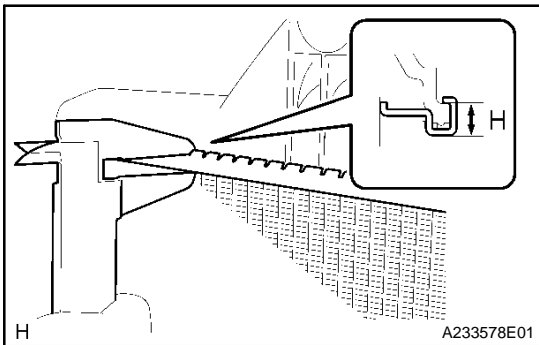


NOTICE:

- The lock plate is not required to caulked at the points shown in the illustration.



- Do not use SST to press the areas indicated by the circle marks in the illustration. Use pliers and be careful not to damage the core plates.



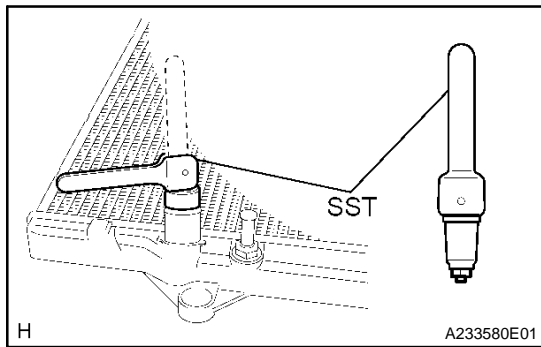
- (b) Check the lock plate height H after completing the caulking.

**Standard plate height H:
7.27 to 7.85 mm (0.286 to 0.309 in.)**

If the height is not as specified, readjust the stopper bolt of the handle and caulk the lock plate again.

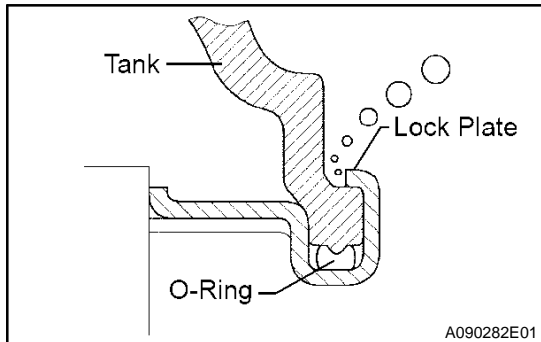
5. INSTALL RADIATOR DRAIN COCK PLUG

- (a) Install a new radiator drain cock packing to the drain cock plug.
- (b) Install the drain cock plug.



6. INSPECT FOR WATER LEAK

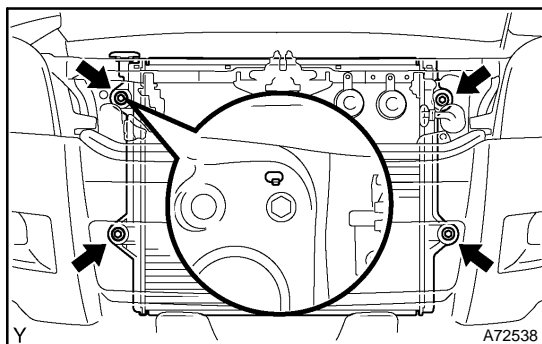
- (a) Plug the inlet and outlet pipes of the radiator with SST.
SST 09230-01010 (09231-00030, 09231-00060)
- (b) Using a radiator cap tester, apply pressure to the radiator.
Standard test pressure: 177 kPa (1.8 kgf/cm², 26 psi)
- (c) Submerge the radiator in water.



- (d) Inspect for leaks.

HINT:

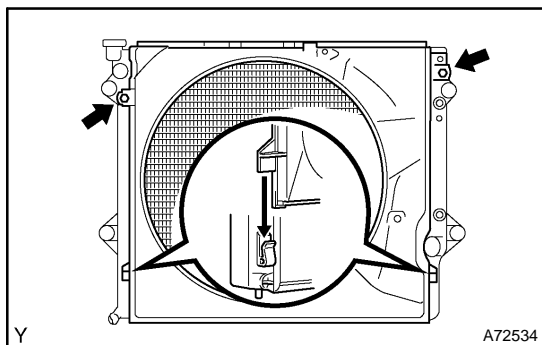
For radiators with resin tanks, there is clearance between the tank and lock plate where a small amount of air will remain. This air is released when the radiator is submerged in water, giving the appearance of an air leak. Before performing the water leak test, first shake the radiator in water until all air bubbles are released.



INSTALLATION

1. INSTALL RADIATOR ASSY

- (a) Insert the tabs of the radiator support through the radiator service holes.
- (b) Install the radiator assy with the 4 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



2. INSTALL FAN SHROUD

- (a) Insert tabs in the slots described in the illustration, attach the fan shroud with the 2 bolts.

Torque: 5 N·m (51 kgf·cm, 44 in·lbf)

3. INSTALL RADIATOR RESERVE TANK ASSY

- (a) Install the reserve tank with the 3 bolts.
Torque: 5 N·m (51 kgf·cm, 44 in·lbf)
- (b) Connect the reserve tank hose to the radiator.

4. ADD ENGINE COOLANT (See page 16-5)

5. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

LUBRICATION SYSTEM (2UZ-FE)

1709K-05

ON-VEHICLE INSPECTION

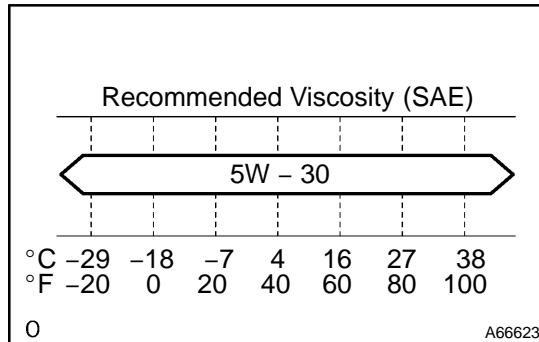
1. CHECK ENGINE OIL LEVEL

- (a) After warming up the engine and then 5 minutes after the engine stop, oil level should be between the low level and full level marks of the dipstick.

If low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not fill with engine oil above the full level mark.



2. CHECK ENGINE OIL QUALITY

- (a) Check the oil for deterioration, entry of water, discoloring or thinning.
 (b) If the quality is visibly poor, replace the oil.

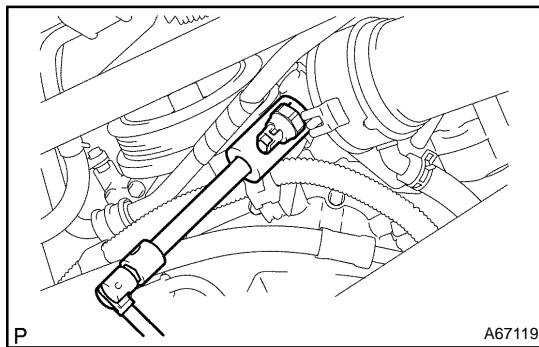
HINT:

Oil grade:

Use API grade SL "Energy-Conserving", or ILSAC multigrade engine oil.

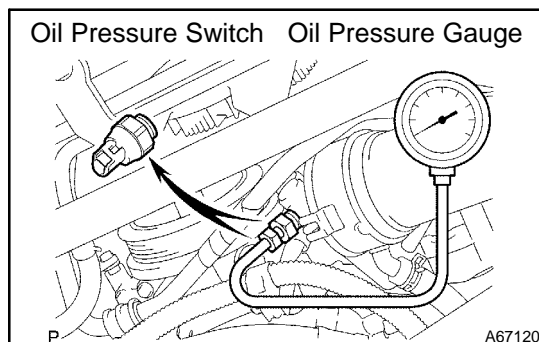
SAE 5W-30 is the best choice for good fuel economy, and good starting in cold weather.

If SAE 5W-30 is not available, SAE 10W-30 may be used. However, it should be replaced with SAE 5W-30 at the next oil change.



3. REMOVE OIL PRESSURE SWITCH ASSY

- (a) Remove the engine under cover.
 (b) Disconnect the oil pressure switch connector.
 (c) Using a 24 mm deep socket wrench, remove the oil pressure switch.



4. INSTALL OIL PRESSURE GAUGE

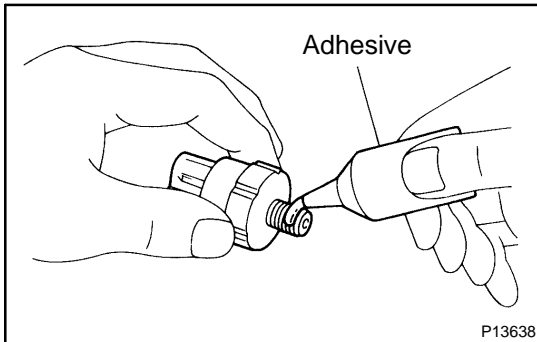
- (a) Install the oil pressure gauge.

5. WARM UP ENGINE

6. CHECK OIL PRESSURE

Oil pressure:

At idle	29 kPa (0.3 kgf·cm ² , 4.2 psi) or more
At 3,000 rpm	294 - 588 kPa (3.0 - 6.0 kgf·cm ² , 43 - 85 psi)

**7. INSTALL OIL PRESSURE SWITCH**

- (a) Remove the oil pressure gauge.
- (b) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

**Part No. 08833 - 00080, THREE BOND 1344,
LOCTITE 242 or equivalent**

- (c) Using a 24 mm deep socket wrench, install the oil pressure switch.

Torque: 15 N·m (152 kgf·cm, 11 ft·lbf)

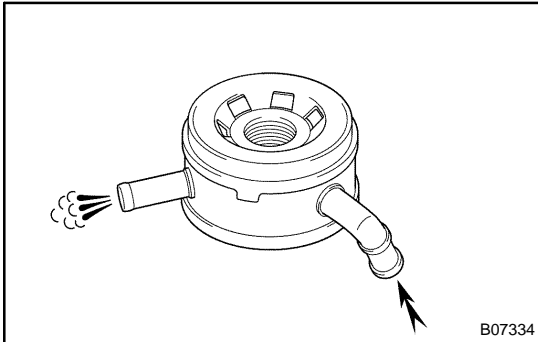
NOTICE:

Do not start the engine 1 hour after the installation.

- (d) Connect the oil pressure switch connector.

8. START ENGINE AND CHECK FOR LEAKS

INSPECTION



1. INSPECT OIL COOLER ASSY

- (a) Check the oil cooler for damage or clogging. If necessary, replace the oil cooler.

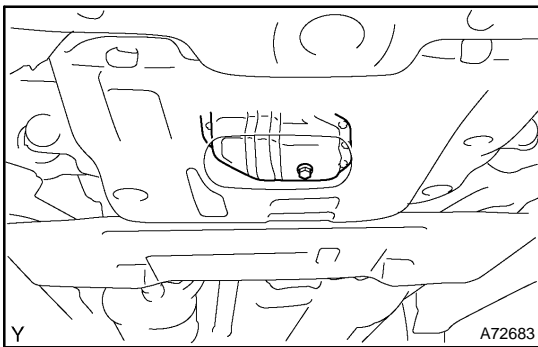
OIL FILTER ASSY (2UZ-FE)

1709W-05

REPLACEMENT

CAUTION:

- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.

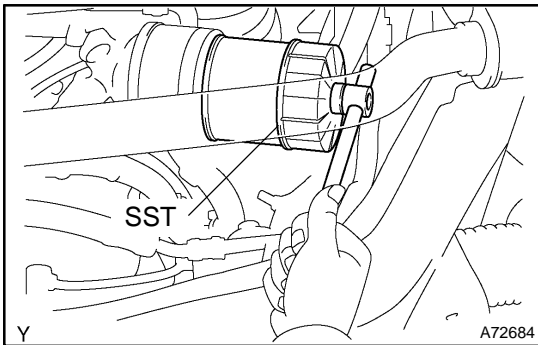


1. DRAIN ENGINE OIL

- Remove the engine under cover seal No. 3.
- Remove the oil pan drain plug and drain the engine oil.
- Clean the oil pan drain plug and install a new gasket and it.

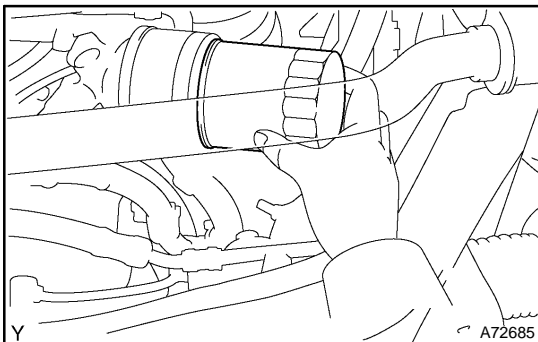
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

2. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1



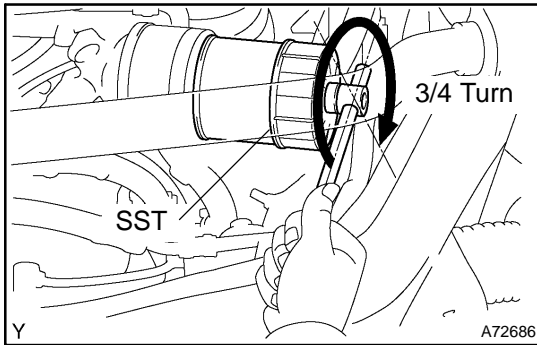
3. REMOVE OIL FILTER ASSY

- Using SST, remove the oil filter.
SST 09228-07501



4. INSTALL OIL FILTER ASSY

- Clean the oil filter contact surface on the oil filter mounting.
- Lubricate the filter gasket with clean engine oil.
- Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.



- (d) Using SST, give it an additional 3/4 turn to set the filter.
SST 09228-07501

5. ADD ENGINE OIL

- (a) Fill with new engine oil.

Capacity:

Drain and refill:

w/ Oil filter change: 6.2 liters (6.5 US qts, 5.5 Imp. qts)

w/o Oil filter change: 5.7 liters (6.0 US qts, 5.0 Imp. qts)

Dry fill: 7.1 liters (7.5 US qts, 6.2 Imp. qts)

- (b) Reinstall the oil filler cap.

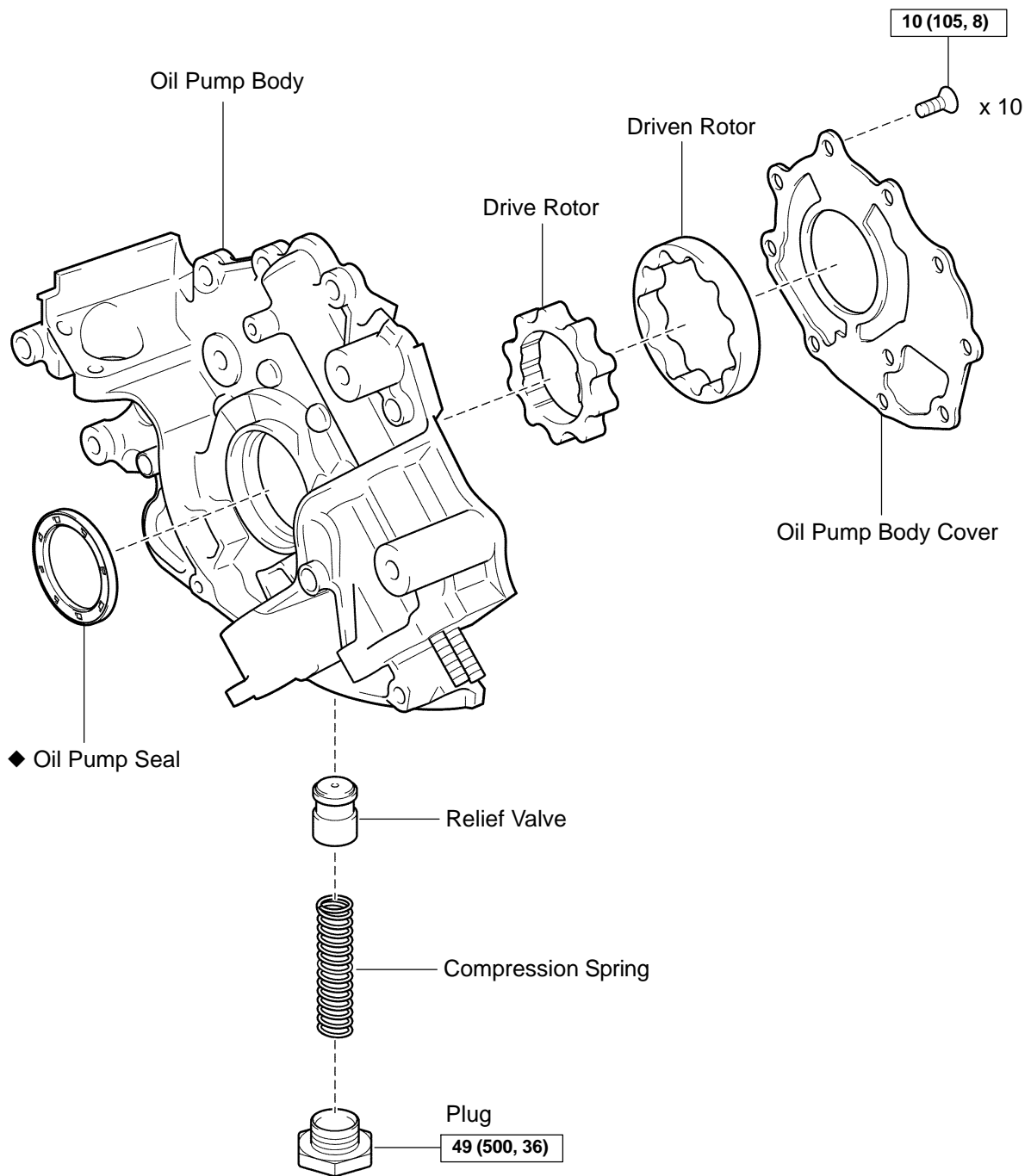
6. CHECK FOR ENGINE OIL LEAKS

7. CHECK ENGINE OIL LEVEL

8. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

OIL PUMP ASSY (2UZ-FE) COMPONENTS

1709X-05



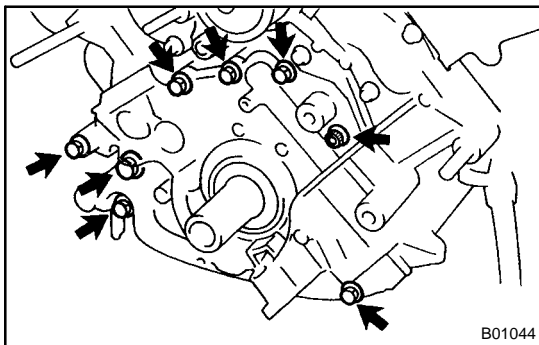
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

G40142

REPLACEMENT

1. REMOVE ENGINE ASSY (SEE PAGE 14-22)
2. REMOVE TIMING BELT (SEE PAGE 14-115)
3. REMOVE CRANKSHAFT TIMING PULLEY (SEE PAGE 14-162)
4. REMOVE CRANKSHAFT POSITION SENSOR (SEE PAGE 18-5)
5. REMOVE OIL COOLER ASSY (SEE PAGE 17-13)
6. REMOVE OIL PAN SUB-ASSY NO.2 (SEE PAGE 14-35)
7. REMOVE OIL STRAINER SUB-ASSY (SEE PAGE 14-35)
8. REMOVE OIL PAN BAFFLE PLATE (SEE PAGE 14-35)
9. REMOVE OIL PAN SUB-ASSY (SEE PAGE 14-35)

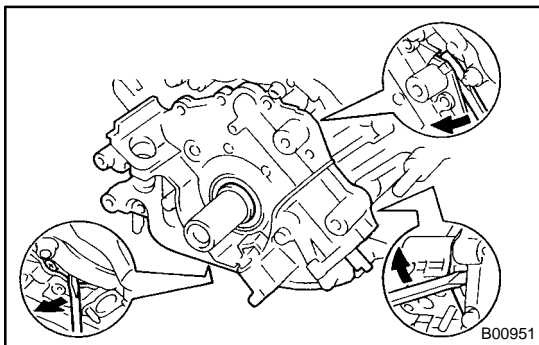


10. REMOVE OIL PUMP ASSY

- (a) Remove the 8 bolts.

HINT:

Use a 6 mm hexagon wrench for the hexagon head bolt.



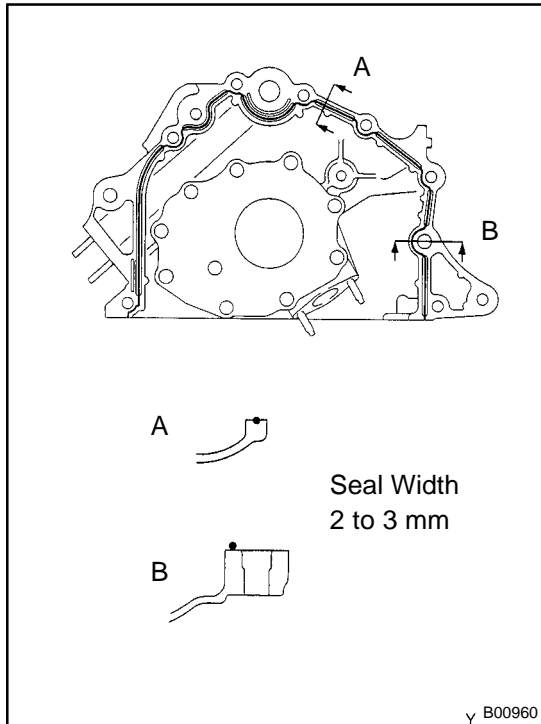
- (b) Using a screwdriver, remove the oil pump by prying the portions between the oil pump and cylinder block.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and oil pump.

- (c) Remove the O-ring from the cylinder block.

11. REMOVE OIL PUMP SEAL (SEE PAGE 14-162)



12. INSTALL OIL PUMP ASSY

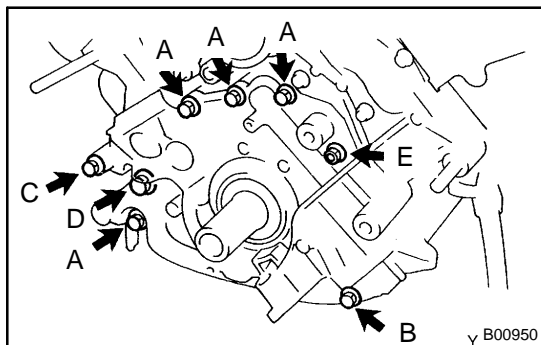
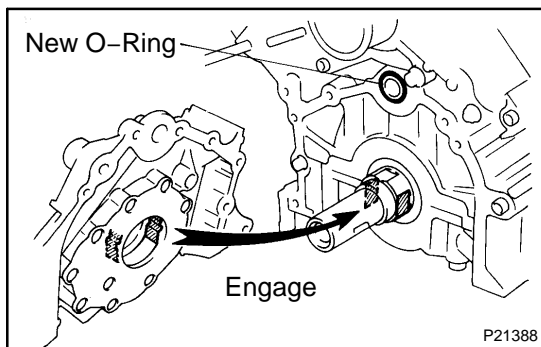
- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.
 - (1) Using a gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - (2) Thoroughly clean all components to remove all the loose material.
 - (3) Using a non-residue solvent, clean both sealing surfaces.
- (b) Install a new oil pump seal (See page 14-162).
- (c) Apply seal packing to the oil pump as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

NOTICE:

Avoid applying an excessive amount to the surface. Be particularly careful around the oil passages.

- (1) Use a nozzle that has been cut to a 2 to 3 mm (0.08 to 0.12 in.) opening.
- (2) Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- (3) Immediately remove the nozzle from the tube and reinstall the cap.
- (d) Install a new O-ring to the cylinder block.
- (e) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.



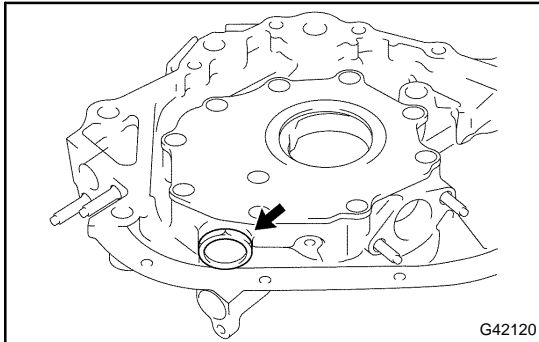
- (f) Install the oil pump with the 8 bolts. Uniformly tighten the bolts in several steps.

Torque:

31 N·m (311 kgf·cm, 23 ft·lbf) for 14 mm
16 N·m (160 kgf·cm, 11 ft·lbf) for others

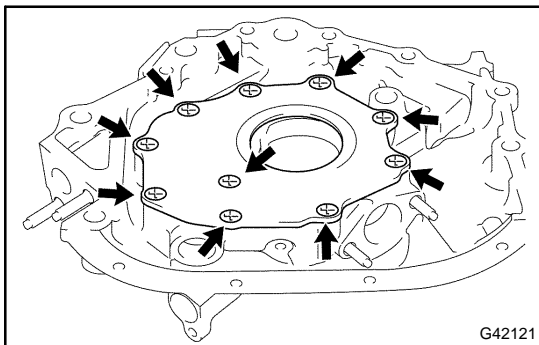
13. **INSTALL OIL PAN SUB-ASSY (SEE PAGE 14-35)**
14. **INSTALL OIL PAN BAFFLE PLATE (SEE PAGE 14-35)**
15. **INSTALL OIL STRAINER SUB-ASSY(SEE PAGE 14-35)**
16. **INSTALL OIL PAN SUB-ASSY NO.2 (SEE PAGE 14-35)**
17. **INSTALL OIL COOLER ASSY (SEE PAGE 17-13)**
18. **INSTALL CRANKSHAFT POSITION SENSOR (SEE PAGE 18-5)**
19. **INSTALL CRANKSHAFT TIMING PULLEY (SEE PAGE 14-162)**
20. **INSTALL TIMING BELT (SEE PAGE 14-115)**
21. **INSTALL ENGINE ASSY (SEE PAGE 14-22)**

OVERHAUL



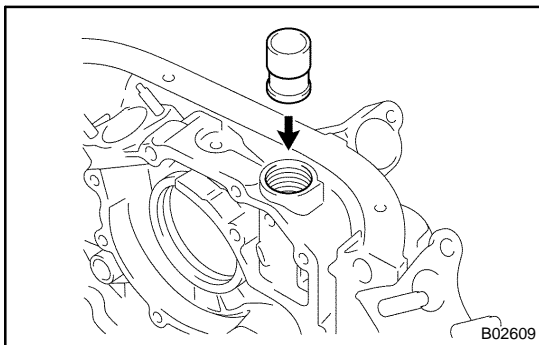
1. REMOVE OIL PUMP RELIEF VALVE

- (a) Remove the plug, compression spring and relief valve.



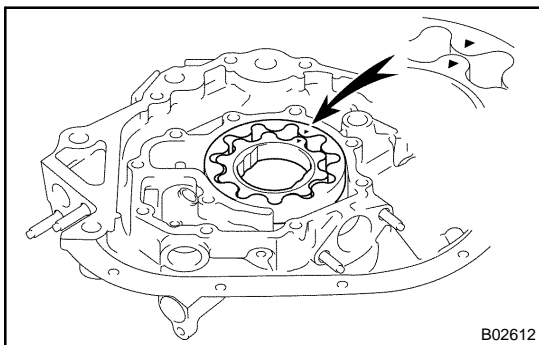
2. REMOVE OIL PUMP ROTOR SET

- (a) Remove the 10 screws, pump body cover and the drive and driven rotors.



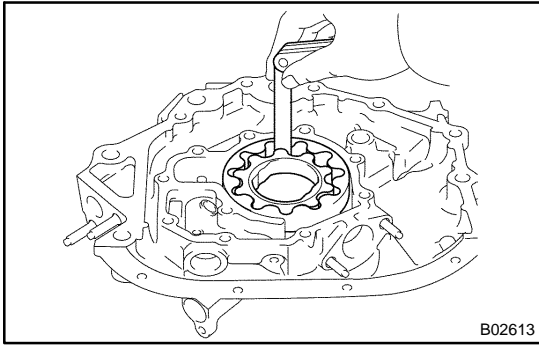
3. INSPECT OIL PUMP RELIEF VALVE

- (a) Coat the valve with engine oil and check that it falls smoothly into the valve hole under its own weight. If it does not, replace the relief valve. If necessary, replace the oil pump assembly.



4. INSPECT OIL PUMP ROTOR SET

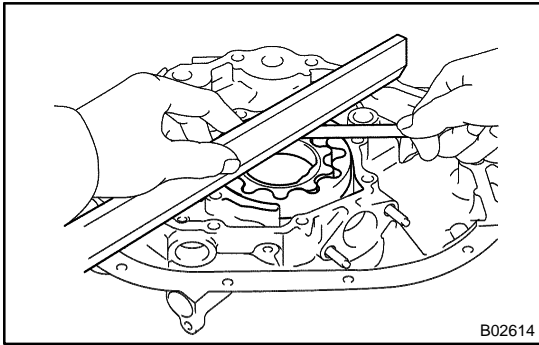
- (a) Place the drive and driven rotors into the pump body with the marks facing the pump body cover side.



- (b) Inspect the rotors for tip clearance.
 - (1) Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard tip clearance:
0.060 to 0.180 mm (0.0024 to 0.0071 in.)
Maximum tip clearance: 0.18 mm (0.0071 in.)

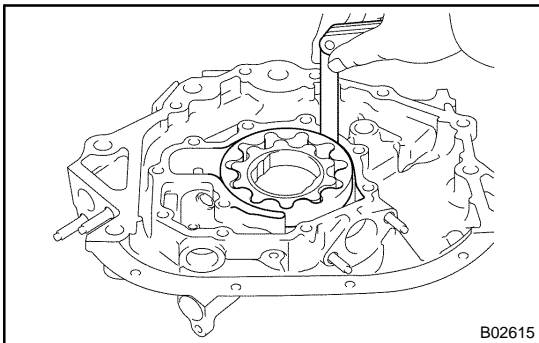
If the tip clearance is greater than the maximum, replace the rotors as a set.



- (c) Inspect the rotors for side clearance.
 - (1) Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:
0.030 to 0.090 mm (0.0012 to 0.0035 in.)
Maximum side clearance: 0.09 mm (0.0035 in.)

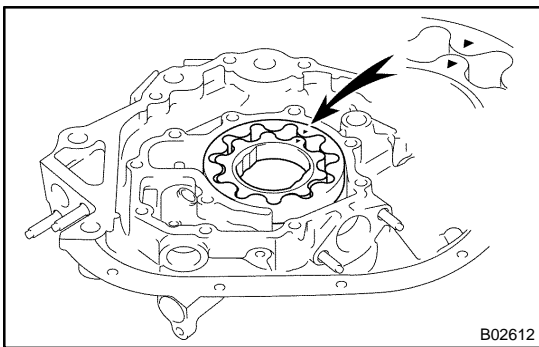
If the side clearance is greater than the maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



- (d) Inspect the rotor for body clearance.
 - (1) Using a feeler gauge, measure the clearance between the driven rotor and body.

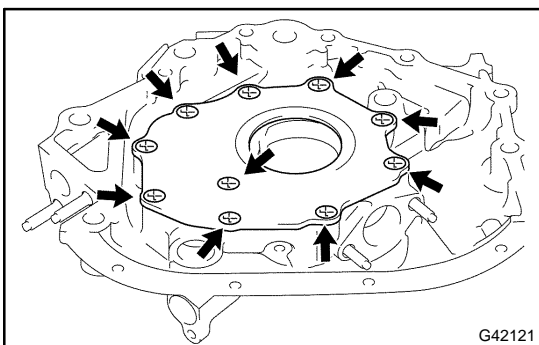
Standard body clearance:
0.250 to 0.325 mm (0.0098 to 0.0128 in.)
Maximum body clearance: 0.325 mm (0.0128 in.)

If the body clearance is greater than the maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

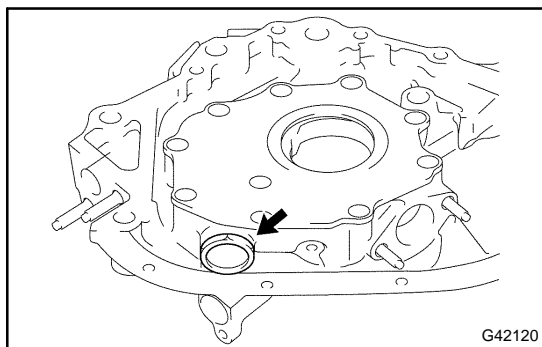


5. INSTALL OIL PUMP ROTOR SET

- (a) Place the drive and driven rotors into the pump body with the marks facing the pump body cover side.



- (b) Install the oil pump body cover with the 10 screws.
Torque: 10 N·m (105 kgf·cm, 7 ft·lbf)

**6. INSTALL OIL PUMP RELIEF VALVE**

- (a) Insert the relief valve and compression spring into the oil pump body hole.
- (b) Install the plug.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

OIL COOLER ASSY (2UZ-FE)

170A0-05

REPLACEMENT

1. REMOVE ENGINE UNDER COVER ASSY REAR
2. DRAIN ENGINE OIL
3. DRAIN ENGINE COOLANT (SEE PAGE 16-5)
4. REMOVE OIL FILTER ASSY (SEE PAGE 17-4)
5. REMOVE OIL COOLER ASSY
 - (a) Disconnect the 2 oil cooler hoses from oil cooler.
 - (b) Remove the union bolt, plate washer and the oil cooler.
 - (c) Remove the O-ring from the oil cooler.
6. INSTALL OIL COOLER ASSY
 - (a) Clean the oil cooler contact surface on the cooler mounting.
 - (b) Install a new O-ring to the oil cooler.
 - (c) Apply a light coat of engine oil on the threads and under the head of the union bolt.
 - (d) Install the plate washer and union bolt.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)
 - (e) Connect the 2 oil cooler hoses to the oil cooler.
7. INSTALL OIL FILTER ASSY (SEE PAGE 17-4)
8. ADD ENGINE OIL (SEE PAGE 17-4)
9. REFILL ENGINE COOLANT (SEE PAGE 16-5)
10. CHECK FOR ENGINE OIL LEAKS
11. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)
12. INSTALL ENGINE UNDER COVER ASSY REAR

IGNITION SYSTEM (2UZ-FE)

18057-05

ON-VEHICLE INSPECTION

1. INSPECT IGNITION COIL ASSY AND SPARK TEST

- (a) Confirm DTCs.(See page 05-44)

NOTICE:

If any DTCs are indicated, carry out troubleshooting in accordance with the procedures for those DTCs.

- (b) Check that a spark occurs.
- (1) Remove the V-bank cover.(See page 10-7)
 - (2) Remove the ignition coils.(See page 14-22)
 - (3) Using a 16 mm (0.63 in.) plug wrench, remove the spark plugs.
 - (4) Install the spark plugs to each ignition coil, and connect the ignition coil connectors.
 - (5) Disconnect the 8 injector connectors.
 - (6) Ground the spark plugs.
 - (7) Check if a spark occurs while the engine is being cranked.

NOTICE:

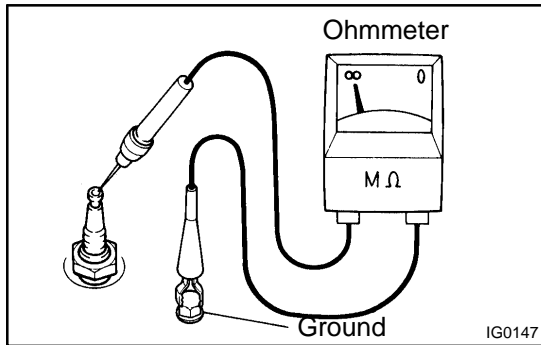
- **Be sure to ground the spark plugs when checking.**
 - **Replace the ignition coil if it is subjected to an impact.**
 - **Do not crank the engine for more than 2 seconds.**
- (c) Using a 16 mm (0.63 in.) plug wrench, install the spark plugs.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
- (d) Install the ignition coils.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)
- (e) Install the V-bank cover.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

INSPECTION

1. INSPECT SPARK PLUG

NOTICE:

- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on a used spark plug.**
- **The spark plug should be replaced every 200,000 km (120,000 miles).**



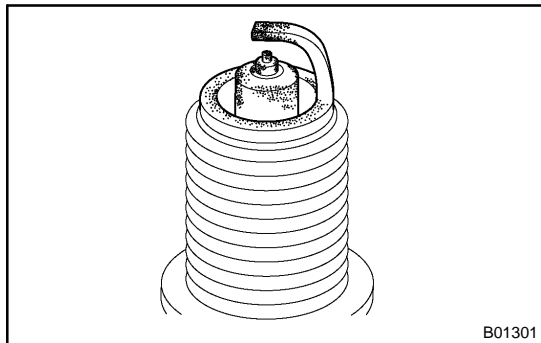
- (a) Check the electrode.
 (1) Using an ohmmeter, measure the insulation resistance.

Correct insulation resistance: 10 MΩ or more

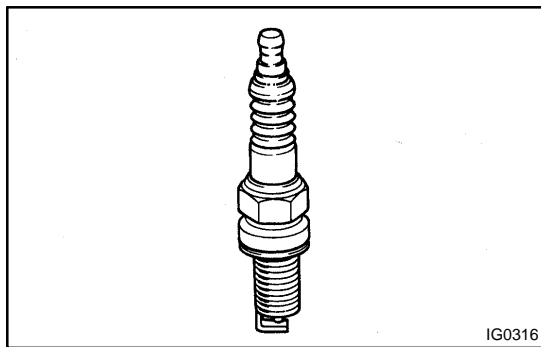
If the resistance is below the specified range, proceed to step (d).

HINT:

If an ohmmeter is not available, the following simple inspection provides fairly accurate results.



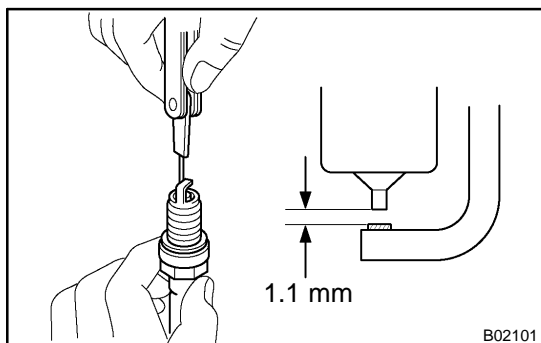
- (b) Simple Method:
 (1) Quickly race the engine to 4,000 rpm 5 times.
 (2) Remove the spark plug.
 (3) Visually check the spark plug.
 (4) If the electrode is dry...OK.
 (5) If the electrode is wet...Proceed to step (C).
 (6) Reinstall the spark plug.



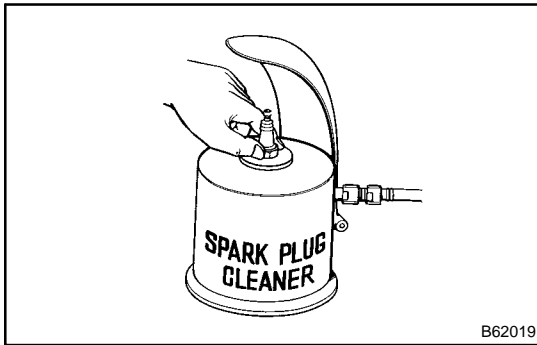
- (c) Check the spark plug for thread or insulator damage. If damaged, replace the spark plug.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11



- (d) Measure the spark plug electrode gap.
**Maximum electrode gap for used spark plug:
 1.3 mm (0.051 in.)**
 If the gap is greater than the maximum, replace the spark plug.
**Correct electrode gap for new spark plug:
 1.0 to 1.1 mm (0.039 to 0.043 in.)**



(e) Clean the spark plugs.

If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

Air pressure: Blow 588 kPa (6 kgf/cm², 85 psi)

Duration: 20 seconds or less

HINT:

If there are traces of oil, remove them with gasoline before using a spark plug cleaner.

2. VVT SENSOR

(a) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

at cold: 835 to 1,400 Ω

at hot: 1,060 to 1,645 Ω

NOTICE:

"Cold" and "Hot" above mean the temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

3. INSPECT CRANKSHAFT POSITION SENSOR

(a) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

at cold: 1,630 to 2,740 Ω

at hot: 2,065 to 3,225 Ω

NOTICE:

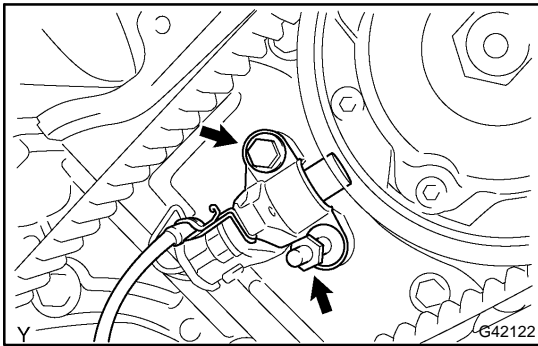
"Cold" and "Hot" above mean the temperature of the coils themselves. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

CAMSHAFT POSITION SENSOR (2UZ-FE)

1805F-05

REPLACEMENT

1. DRAIN ENGINE COOLANT (SEE PAGE 16-5)
2. REMOVE FAN AND GENERATOR V BELT (SEE PAGE 14-5)
3. REMOVE OIL COOLER PIPE (SEE PAGE 14-115)
4. REMOVE TIMING BELT COVER SUB-ASSY NO.3 LH (SEE PAGE 14-115)



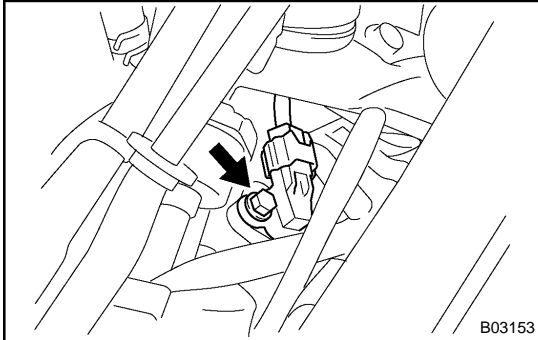
5. REMOVE CAMSHAFT POSITION SENSOR
 - (a) Disconnect the camshaft position sensor connector.
 - (b) Remove the bolt, stud bolt and camshaft position sensor.

6. INSTALL CAMSHAFT POSITION SENSOR
 - (a) Install the camshaft position sensor with the bolt and stud bolt.
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)
7. INSTALL TIMING BELT COVER SUB-ASSY NO.3 LH (SEE PAGE 14-115)
8. INSTALL OIL COOLER PIPE (SEE PAGE 14-115)
9. INSTALL FAN AND GENERATOR V BELT (SEE PAGE 14-5)
10. REFILL ENGINE COOLANT (SEE PAGE 16-5)
11. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)

CRANKSHAFT POSITION SENSOR REPLACEMENT

1805E-05

1. REMOVE ENGINE UNDER COVER ASSY REAR



2. REMOVE CRANKSHAFT POSITION SENSOR

- (a) Disconnect the crankshaft position sensor connector.
- (b) Remove the bolt and crankshaft position sensor.

3. INSTALL CRANKSHAFT POSITION SENSOR

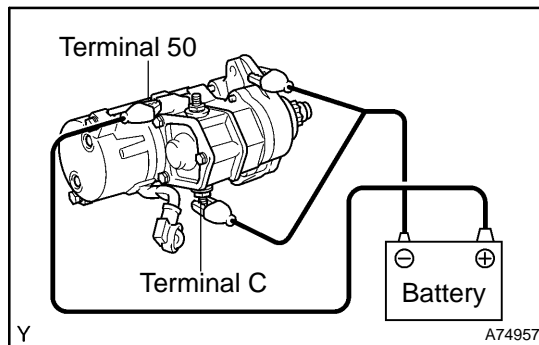
- (a) Install crankshaft position sensor with bolt.
Torque: 6.5 N·m (65 kgf·cm, 58 in.-lbf)

4. INSTALL ENGINE UNDER COVER ASSY REAR

STARTING SYSTEM (2UZ-FE)

INSPECTION

190F4-07

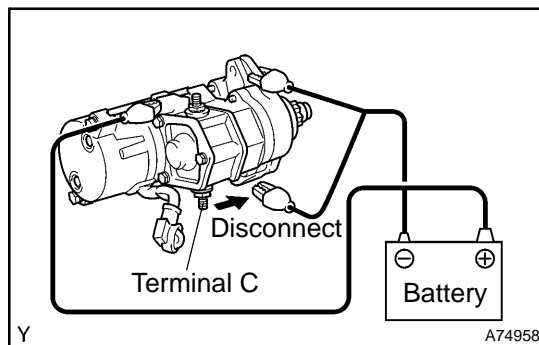


1. INSPECT STARTER ASSY

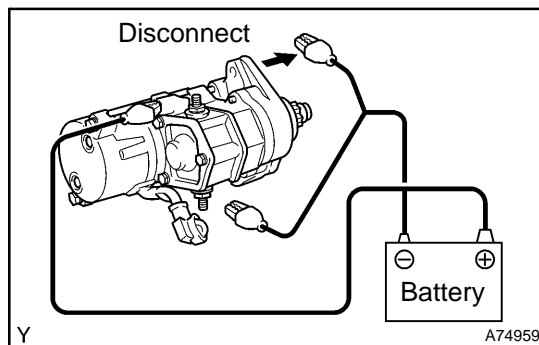
NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

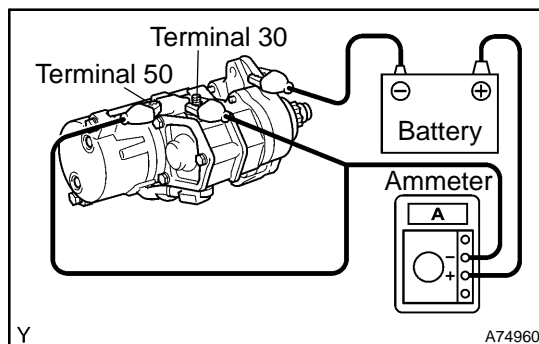
- (a) Do pull-in test.
- (1) Disconnect the field coil lead wire from terminal C.
 - (2) Connect the battery to the magnetic switch as shown. Check that the clutch pinion gear moves outward.



- (b) Do holding test.
- (1) With battery connected as above with the clutch pinion gear out, disconnect the negative (-) lead from terminal C. Check that the pinion gear remains out.

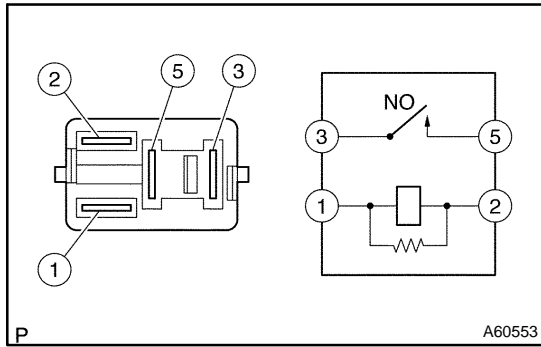


- (c) Inspect clutch pinion gear return.
- (1) Disconnect the negative (-) lead from the switch body. Check that the clutch pinion gear returns inward.



- (d) Perform the operation test without load.
- (1) Connect the field coil lead wire to terminal C.
 - (2) Grip the starter in a vise.
 - (3) Connect the battery and ammeter to the starter as shown.
 - (4) Check that the ammeter reads the specified current.

Specified current: 100 A or less at 11.5 V



2. INSPECT STARTER RELAY ASSY

(a) Continuity inspection.

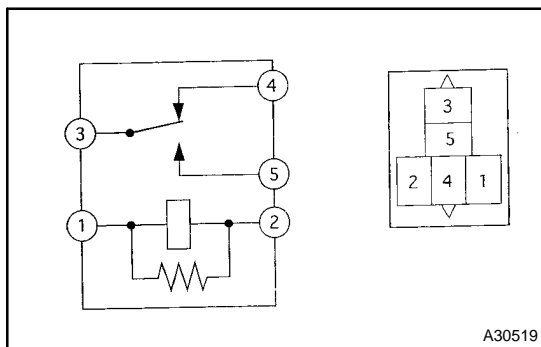
- (1) Using an ohmmeter, check that there is continuity between each terminal.

Specified condition:

Between terminals	Specified condition
1 - 2	Continuity
3 - 5	No continuity

- (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5 when the between voltage is applied across terminals 1 and 2.

Specified condition: Continuity



3. INSPECT ACC RELAY NO.2

(a) Continuity inspection.

- (1) Using an ohmmeter, check that there is continuity between each terminal.

Specified condition:

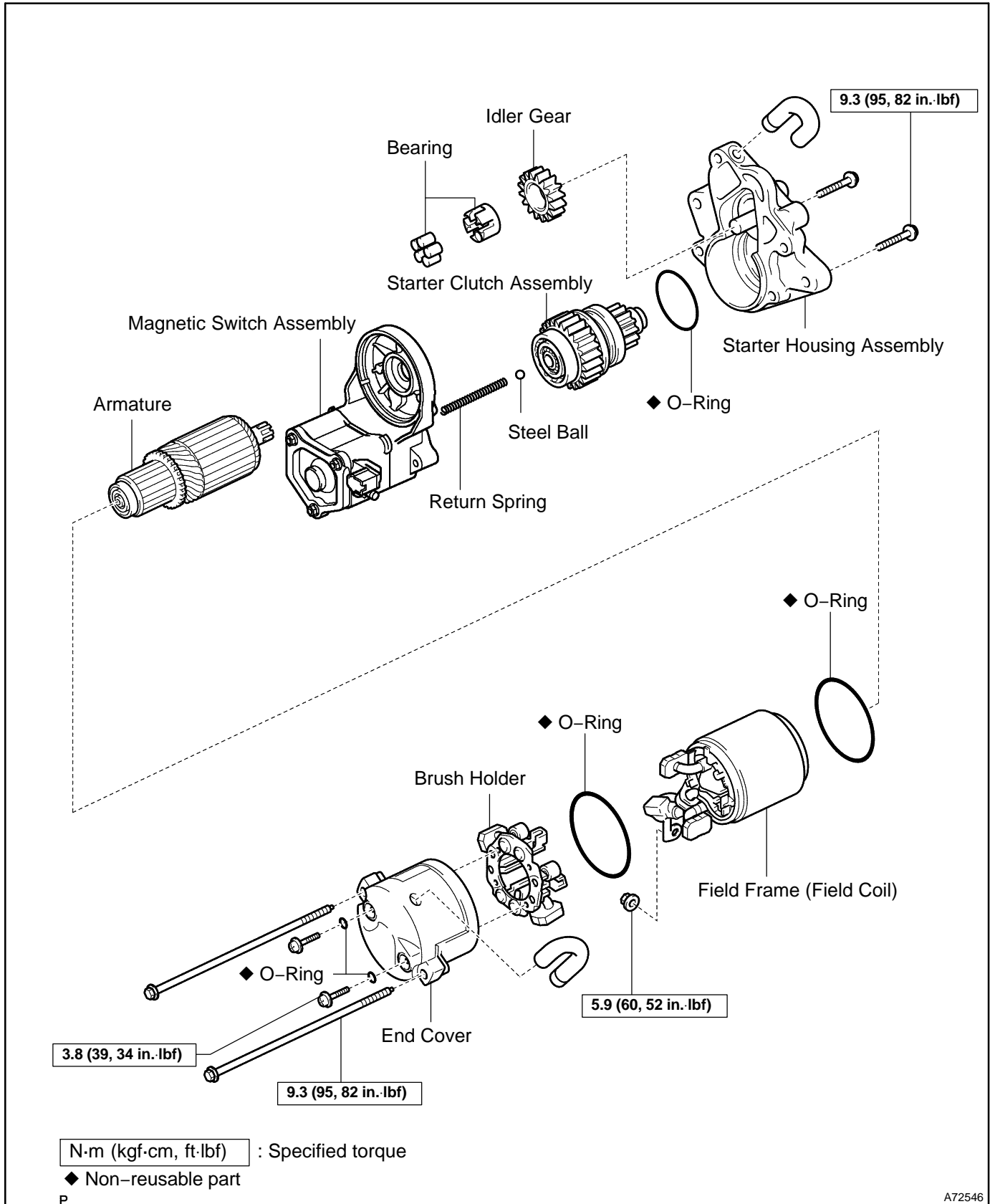
Between terminals	Specified condition
1 - 2	Continuity
3 - 4	
3 - 5	No continuity

- (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5 when the between voltage is applied across terminals 1 and 2.

Specified condition: Continuity

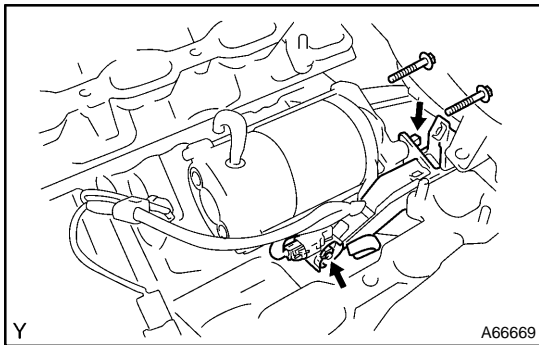
STARTER ASSY (2UZ-FE) COMPONENTS

190FJ-05



REPLACEMENT

1. **WORK FOR PREVENTING GASOLINE FROM SPILLING OUT (SEE PAGE 11-1)**
2. **DRAIN ENGINE COOLANT (SEE PAGE 16-5)**
3. **SEPARATE BATTERY NEGATIVE TERMINAL**
4. **REMOVE V-BANK COVER SUB-ASSY**
 - (a) Remove the 2 nuts and V-bank cover sub-assy.
5. **REMOVE AIR CLEANER HOSE ASSY**
6. **DISCONNECT FUEL HOSE**
7. **DISCONNECT FUEL HOSE NO.2**
8. **DISCONNECT FUEL VAPOR FEED HOSE ASSY**
9. **SEPARATE ENGINE WIRE**
 - (a) Disconnect the 8 fuel injector connectors.
 - (b) Disconnect the throttle position sensor connector.
 - (c) Disconnect the water temperature sensor connector.
 - (d) Remove the 3 bolts and separate the engine wire harness.
10. **DISCONNECT WATER BY-PASS HOSE NO.7**
11. **DISCONNECT WATER BY-PASS HOSE**
12. **REMOVE INTAKE MANIFOLD ASSY**
 - (a) Remove the 6 bolts and 4 nuts.
 - (b) Remove the intake manifold assy and 2 gaskets.
13. **REMOVE WATER BY-PASS PIPE SUB-ASSY**
 - (a) Separate the engine wire No.2.
 - (b) Remove the nut and water by-pass pipe sub-assy.
14. **REMOVE WATER BY-PASS JOINT RR**
 - (a) Remove the 4 nuts, water by-pass joint and 2 gaskets.
15. **REMOVE AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)**



16. **REMOVE STARTER ASSY**
 - (a) Disconnect the starter connector.
 - (b) Remove the nut and disconnect the starter cable.
 - (c) Remove the bolt and disconnect the engine wire protector.
 - (d) Remove the 2 bolts and starter.

17. **INSTALL STARTER ASSY**
 - (a) Install the starter assy with the 2 bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
 - (b) Connect the engine wire protector with the bolt.
 - (c) Connect the starter cable with the nut.
Torque: 9.8 N·m (100 kgf·cm, 86 in·lbf)
 - (d) Connect the starter connector.
18. **INSTALL AIR PUMP ASSY W/ BRACKET (SEE PAGE 12-21)**

19. INSTALL WATER BY-PASS JOINT RR

- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the 4 nuts holding the water by-pass joint to the cylinder heads. Alternately tighten the nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

20. INSTALL WATER BY-PASS PIPE SUB-ASSY

- (a) Install a new O-ring to the water by-pass pipe.
- (b) Apply soapy water to the O-ring.
- (c) Push the water by-pass pipe end into the pipe hole of the water pump.
- (d) Install the water by-pass pipe with the bolt.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

- (e) Install the wire clamp to the bracket of the water by-pass pipe.

21. INSTALL INTAKE MANIFOLD ASSY

- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the intake manifold assy with the 6 bolts and 2 nuts.

Torque:

Bolt 18 N·m (185 kgf·cm, 13 ft·lbf)

Nut 18 N·m (185 kgf·cm, 13 ft·lbf)

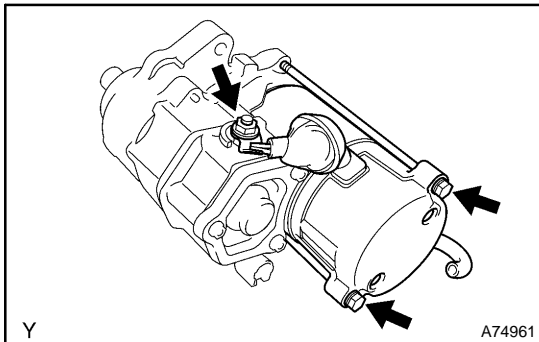
22. CONNECT WATER BY-PASS HOSE**23. CONNECT WATER BY-PASS HOSE NO.7****24. INSTALL ENGINE WIRE**

Torque: 8.2 N·m (83 kgf·cm, 72 in·lbf)

25. CONNECT FUEL VAPOR FEED HOSE ASSY**26. CONNECT FUEL HOSE NO.2****27. CONNECT FUEL HOSE****28. INSTALL AIR CLEANER HOSE ASSY****29. REFILL ENGINE COOLANT (SEE PAGE 16-5)****30. CHECK FOR ENGINE COOLANT LEAKS (SEE PAGE 16-1)****31. INSPECT FOR FUEL LEAKS (SEE PAGE 11-6)****32. INSTALL V-BANK COVER SUB-ASSY**

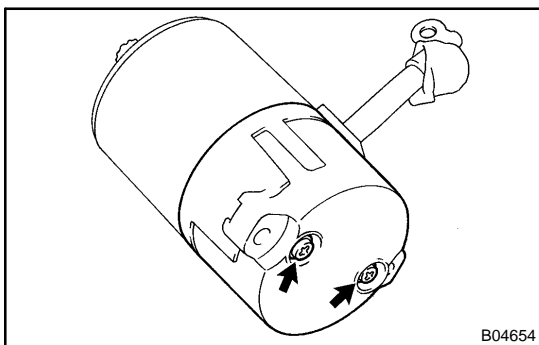
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

OVERHAUL



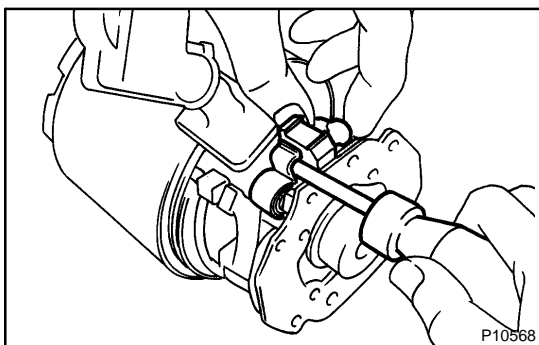
1. REMOVE STARTER YOKE ASSY

- (a) Remove the nut and disconnect the terminal C wire.
- (b) Remove the 2 through bolts.
- (c) Pull out the starter yoke assy with the armature assy.
- (d) Remove the O-ring from the starter yoke assy.



2. REMOVE STARTER BRUSH HOLDER ASSY

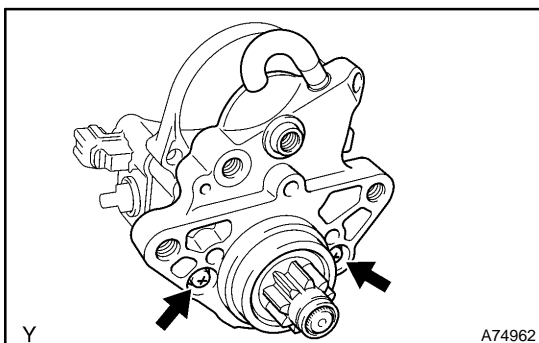
- (a) Remove the 2 screws w/ O-ring and end cover from the field frame.
- (b) Remove the O-ring from the field frame.



- (c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder.
- (d) Disconnect the 4 brushes, and remove the brush holder.

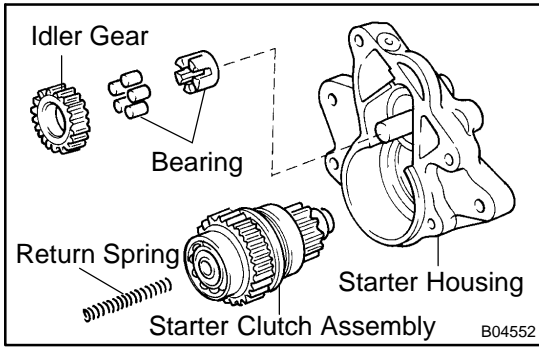
3. REMOVE STARTER ARMATURE ASSY

- (a) Remove the starter armature assy from starter yoke assy.

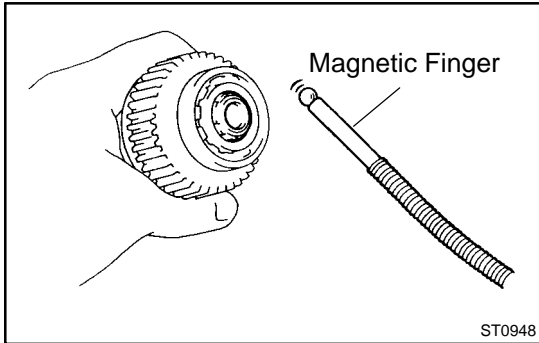


4. REMOVE STARTER CLUTCH

- (a) Remove the 2 screws and starter drive housing.



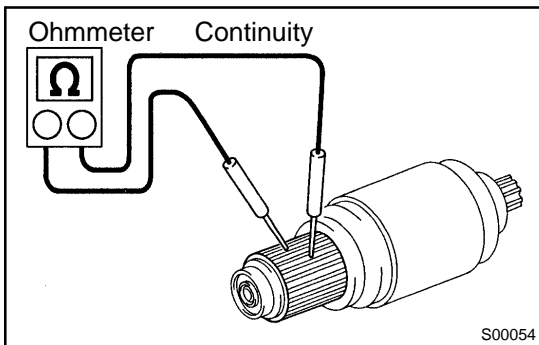
(b) Remove the return spring, idler gear, bearing and starter clutch assembly from the starter housing.



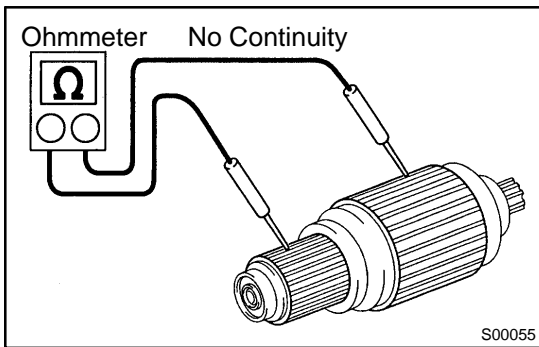
(c) Using a magnetic finger, remove the steel ball from the clutch shaft hole.

5. INSPECT STARTER ARMATURE ASSY

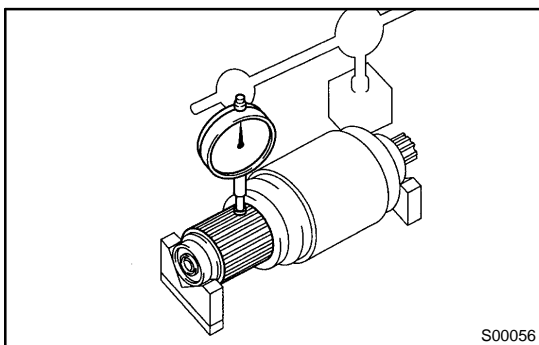
(a) Inspect commutator for dirty and burnt surface. If the surface of the commutator is dirty or burned, polish the part with sandpaper (#400) or replace the armature.



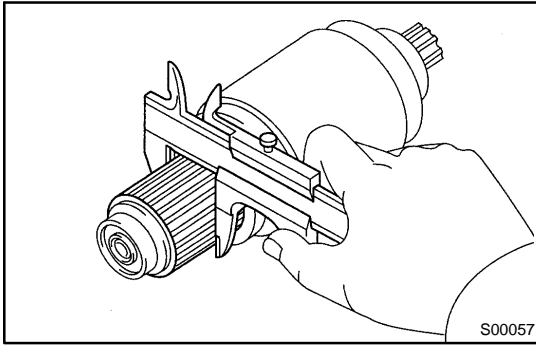
(b) Inspect commutator for open circuit.
 (1) Using an ohmmeter, check that there is continuity between the segments of the commutator. If there is no continuity between any segments, replace the armature.



(c) Inspect commutator for ground.
 (1) Using an ohmmeter, check that there is no continuity between the commutator and armature core. If there is continuity, replace the armature assy.



(d) Inspect commutator circle runout.
 (1) Place the armature on the V-blocks.
 (2) Using a dial gauge, measure the circle runout.
Maximum circle runout: 0.05 mm (0.0020 in.)
 If the circle runout is greater than maximum, correct it on a lathe.

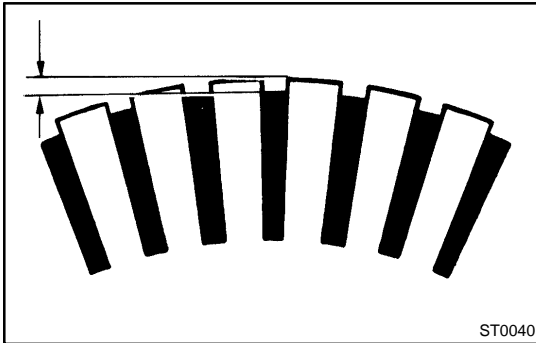


- (e) Using vernier calipers, measure the commutator diameter.

Standard diameter: 35.0 mm (1.378 in.)

Minimum diameter: 34.0 mm (1.339 in.)

If the diameter is less than minimum, replace the armature assy.



- (f) Measure the undercut depth of commutator.

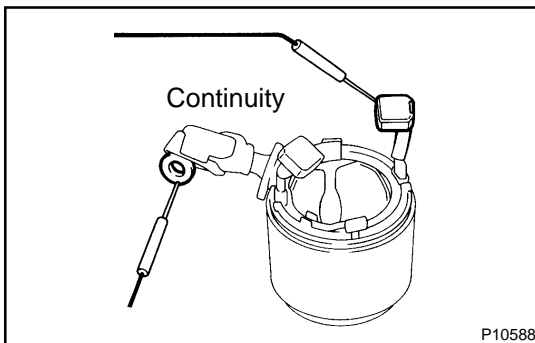
Standard undercut depth: 0.7 mm (0.028 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

If the undercut depth is less than the minimum, correct it with a hacksaw blade.

- (g) Inspect the bearings.

- (1) Check that the bearing rotates smoothly.

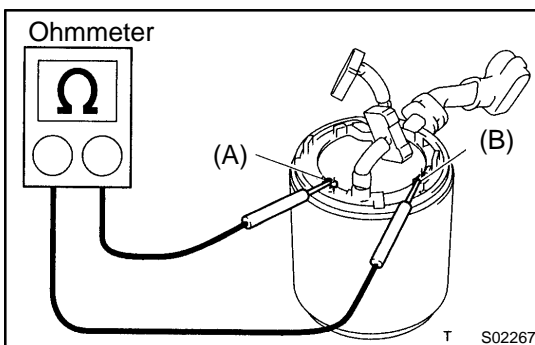


6. INSPECT STARTER YOKE ASSY

- (a) Inspect field coil for open circuit.

- (1) Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the starter yoke assy.



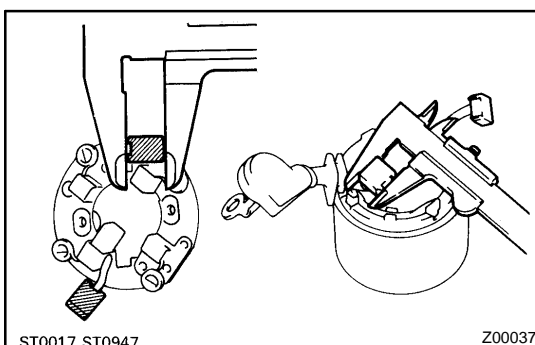
- (b) Inspect shunt coil for open circuit.

- (1) Using an ohmmeter, measure the resistance between shunt coil terminals (A) and (B).

Resistance:

1.5 - 1.9 Ω at 20°C (68°F)

If the resistance is not as specified, replace the starter yoke assy.



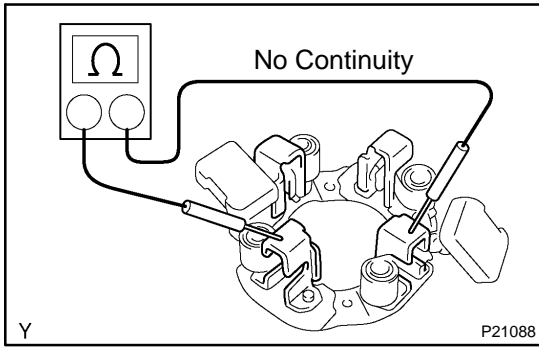
7. INSPECT BRUSH

- (a) Using vernier calipers, measure the brush length.

Standard length: 15.0 mm (0.591 in.)

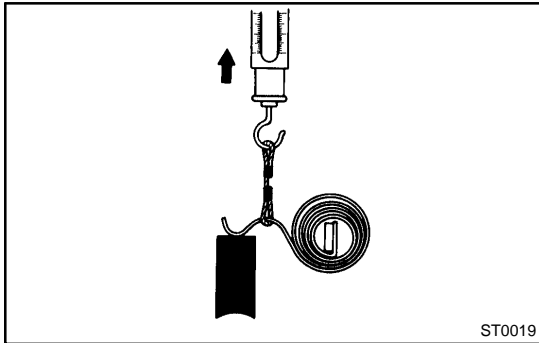
Minimum length: 9.0 mm (0.354 in.)

If the length is less than the minimum, replace the brush holder and starter yoke assy.



8. INSPECT STARTER BRUSH HOLDER ASSY

- (a) Using an ohmmeter, check that there is no continuity between the positive and negative brush holders. If there is continuity, replace the brush holder.



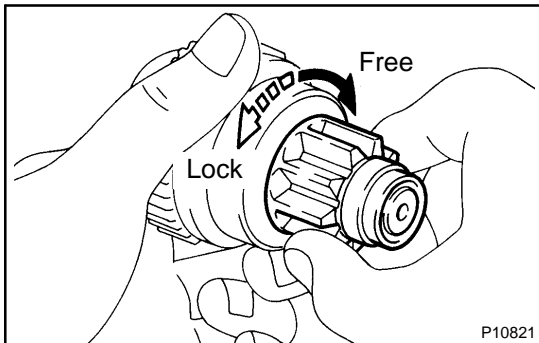
- (b) Take the pull scale reading the instant the brush spring separates from the brush.

Standard spring installed load:

21.5 – 27.5 N (2.2 – 2.8 kgf, 4.8 – 6.2 lbf)

Minimum spring installed load: 12.7 N (1.3 kgf, 2.9 lbf)

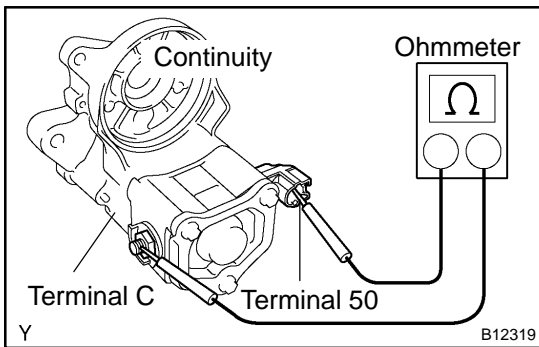
If the spring load is less than the minimum, replace the brush springs.



9. INSPECT STARTER CLUTCH

- (a) Rotate the pinion gear clockwise, and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

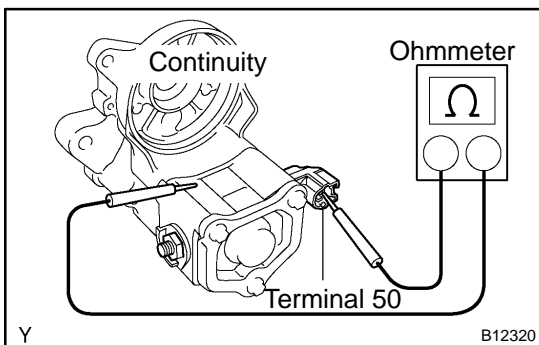
If necessary, replace the clutch assembly.



10. INSPECT STARTER MAGNETIC SWITCH ASSY

- (a) Check the pull-in coil continuity.
 - (1) Using an ohmmeter, check that there is continuity between terminals 50 and C.

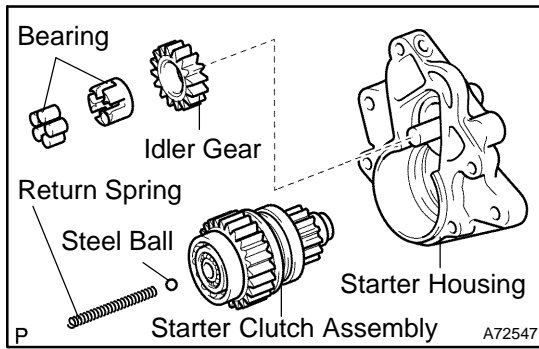
If there is no continuity, replace the magnet starter switch assy.



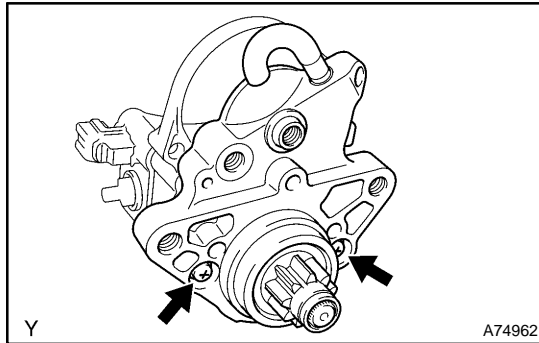
- (b) Check the holding coil continuity.

- (1) Using an ohmmeter, check that there is continuity between terminals 50 and switch body.

If there is no continuity, replace the magnet starter switch assy.

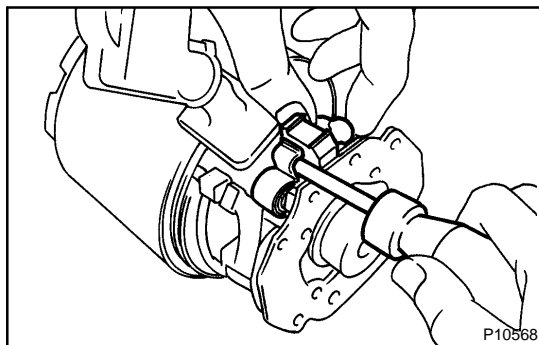
**11. INSTALL STARTER DRIVE HOUSING**

- (a) Apply grease to the steel ball, return spring, clutch rollers and starter idler pinions.
- (b) Install the steel ball.
- (c) Install a new O-ring to the starter housing.
- (d) Insert the return spring into the magnet starter switch hole.
- (e) Install the starter clutch assembly, idler gear and bearing.



- (f) Install the starter housing to the magnet switch assy with the 2 screws.

Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)

**12. INSTALL STARTER BRUSH HOLDER ASSY**

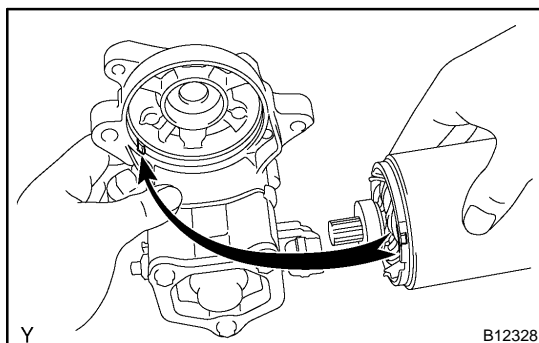
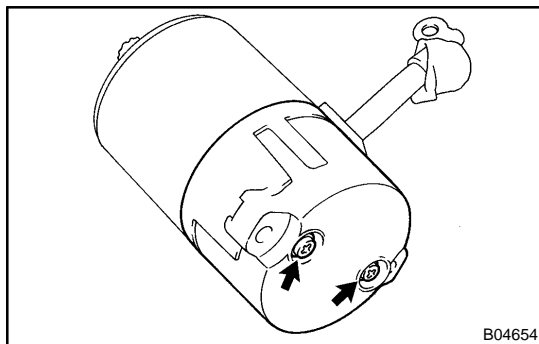
- (a) Align the claw of the brush holder with the claw groove of the starter yoke assy.
- (b) Place the brush holder on the starter yoke assy.
- (c) Using a screwdriver, hold the brush spring back.
- (d) Connect the brush into the brush holder.
- (e) Connect the 4 brushes.

NOTICE:

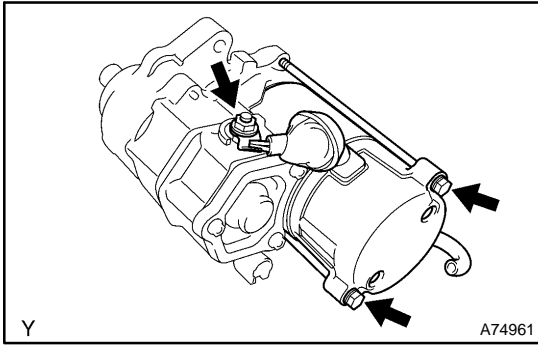
Check that the positive (+) lead wires are not grounded.

- (f) Install O-ring to the groove of the starter yoke.
- (g) Install 2 new O-rings and the end cover with the 2 screws.

Torque: 3.8 N·m (39 kgf·cm, 34 in.-lbf)

**13. INSTALL STARTER YOKE ASSY**

- (a) Install a new O-ring to the groove of the starter yoke assy.
- (b) Align the protrusion of the starter yoke assy with the groove of the magnetic switch.



- (c) Install the starter yoke assy with the 2 through bolts.
Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)
- (d) Connect the terminal C wire with the nut.
Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)

CHARGING SYSTEM (2UZ-FE)

190F5-07

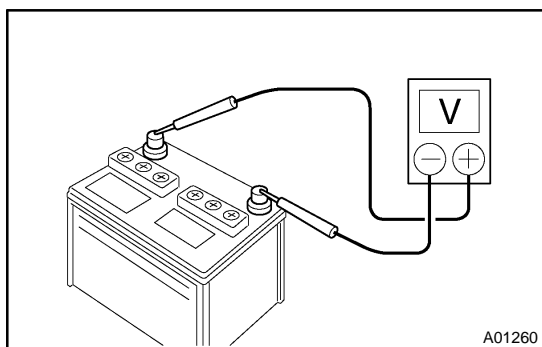
PRECAUTION

1. Check that the battery cables are connected to the correct terminals.
2. Disconnect the battery cables when the battery is given a quick charge.
3. Do not perform tests with a high voltage insulation resistance tester.
4. Never disconnect the battery while the engine is running.
5. Check that the charging cable is tightened on terminal B of the generator and the fuse box.
6. Do not check whether the generator or not with connecting terminal F to the other terminal.

ON-VEHICLE INSPECTION

1. CHECK BATTERY ELECTROLYTE LEVEL

- (a) Check the electrolyte quantity of each cell.
- (1) If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.



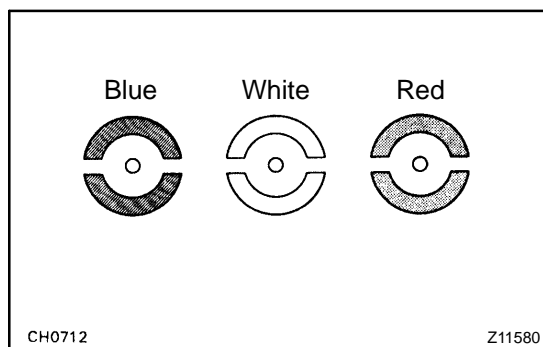
2. CHECK BATTERY VOLTAGE

- (a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.
- (b) Turn the ignition switch OFF and turn off the electrical systems.
- (c) Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage: 12.5 – 12.9 V at 20°C (68°F)

HINT:

If the voltage is less than specification, charge the battery.



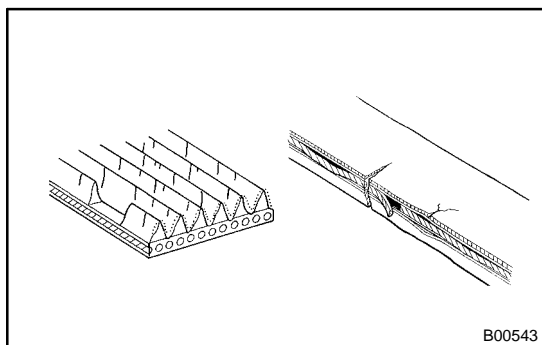
- (d) Check the indicator as shown in the illustration.

HINT:

- Blue: OK
- White: Charging Necessary
- Red: Insufficient Water

3. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fusible link, H-fuses and fuses for continuity.

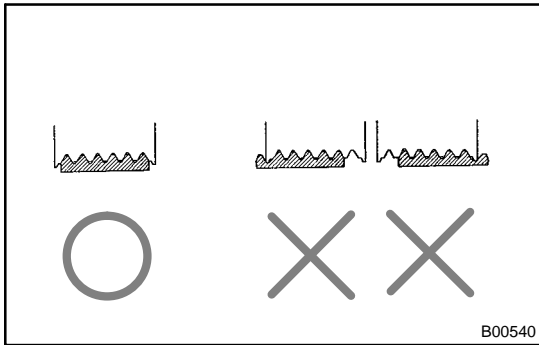


4. INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords etc.

HINT:

- If any defect has been found, replace the drive belt.
- Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Check that it fits properly in the ribbed grooves.

HINT:

Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

5. VISUALLY CHECK GENERATOR WIRING

(a) Check that the wiring is in good condition.

6. LISTEN FOR ABNORMAL NOISES FROM GENERATOR

(a) Check that there is no abnormal noise from the generator while the engine is running.

7. INSPECT CHARGE WARNING LIGHT CIRCUIT

(a) Turn the ignition switch ON. Check that the charge warning light comes on.

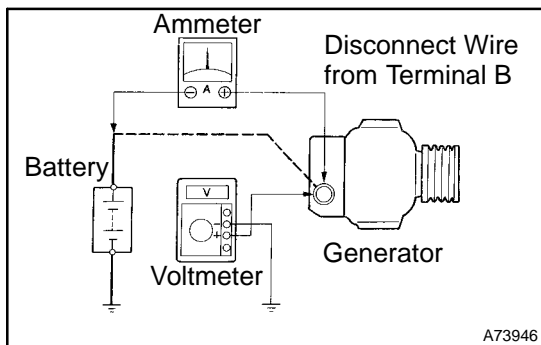
(b) Start the engine. Check that the light goes off.

HINT:

If the light does not operate as specified, troubleshoot the charge warning light circuit.

8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

(a) If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.



(b) If a tester is not available, connect a voltmeter to the charging circuit as follows:

- (1) Disconnect the wire from terminal B of the generator and connect it to the negative (-) lead of the ammeter.
- (2) Connect the positive (+) lead of the ammeter to terminal B of the generator.
- (3) Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- (4) Ground the negative (-) lead of the voltmeter.

(c) Check the charging circuit.

- (1) With the engine running from idle to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: 10 A or less

Standard voltage: 13.2 - 14.8 V

HINT:

- If the voltmeter reading is more than standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than the standard voltage, check the voltage regulator and generator as follows:

9. INSPECT CHARGING CIRCUIT WITH LOAD

- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".
- (b) Check the reading on the ammeter.

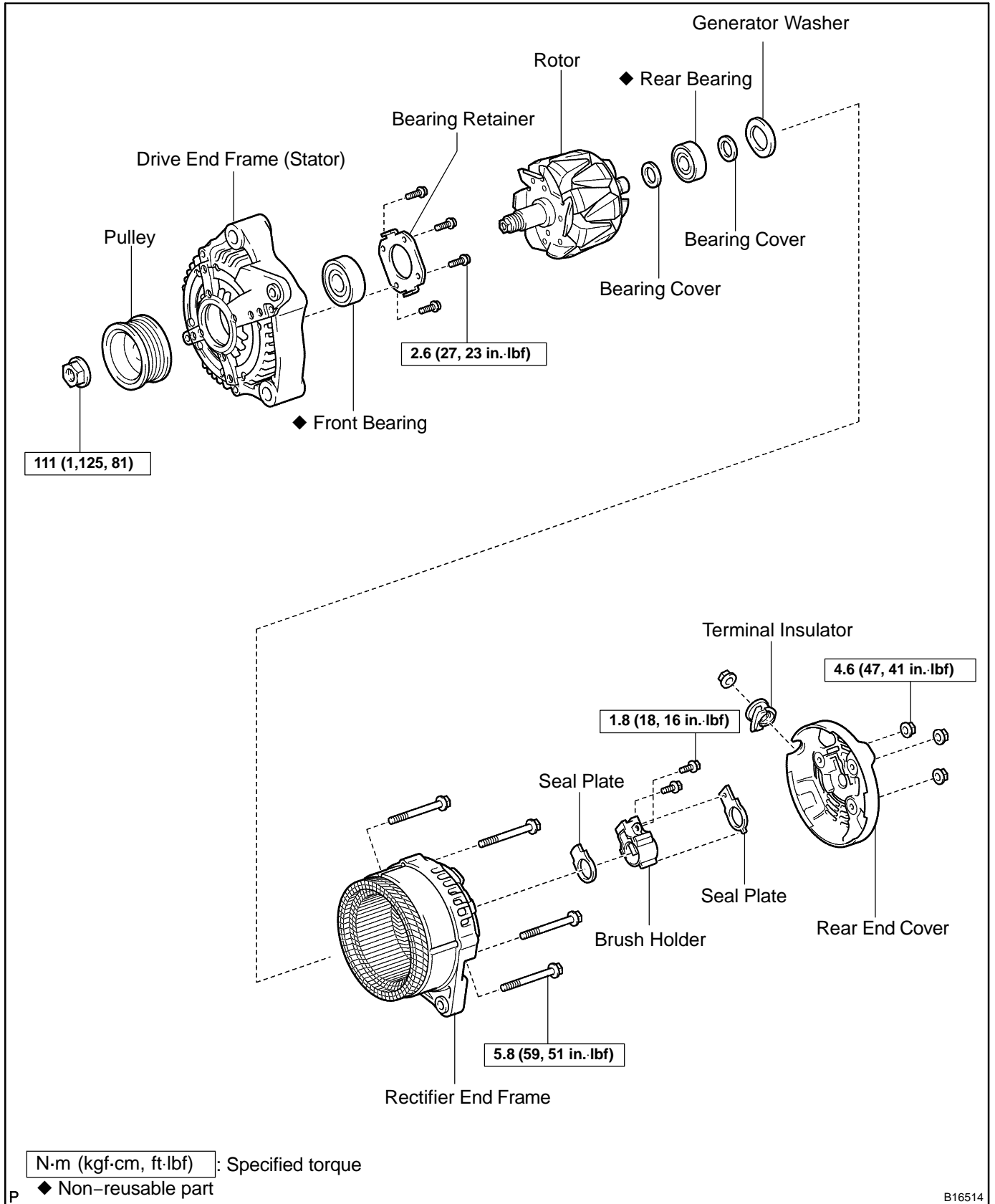
Standard amperage: 30 A or more

HINT:

- If the ammeter reading is less than standard amperage, repair the generator.
- If the battery is fully charged, the indication will sometimes be less than standard amperage.

GENERATOR ASSY (2UZ-FE) COMPONENTS

190FH-05



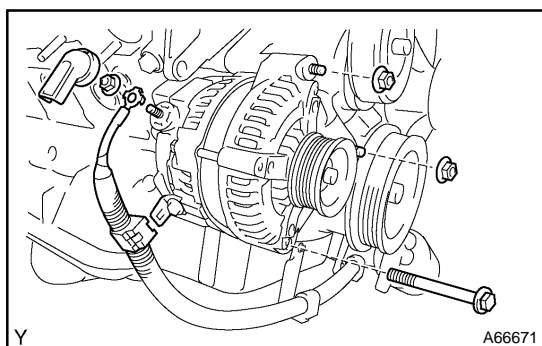
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REPLACEMENT

1. **SEPARATE BATTERY NEGATIVE TERMINAL**
2. **REMOVE RADIATOR SUPPORT SEAL UPPER**
 - (a) Remove the 11 clips and radiator support seal upper.
3. **REMOVE FAN AND GENERATOR V BELT (SEE PAGE 14-5)**
4. **REMOVE FAN W/ FLUID COUPLING**
 - (a) Separate the 2 oil cooler hoses from fan shroud.
 - (b) Remove the 3 bolts and separate the fan shroud from radiator.
 - (c) Remove the 4 nuts and separate the fan w/ fluid coupling from engine.
 - (d) Remove the fan shroud and fan w/fluid coupling from the vehicle at the same time.
5. **SEPARATE VANE PUMP ASSY**
 - (a) Disconnect the vacuum hose.
 - (b) Remove the nut, 2 bolts and vane pump assy.

HINT:

Hand up the hoses instead of detaching.



6. **REMOVE GENERATOR ASSY**
 - (a) Disconnect the generator connector.
 - (b) Remove the terminal cap and nut, and disconnect the generator wire.
 - (c) Disconnect the generator wire clamp from the cord clip on the generator.
 - (d) Remove the bolt, 2 nuts and generator.

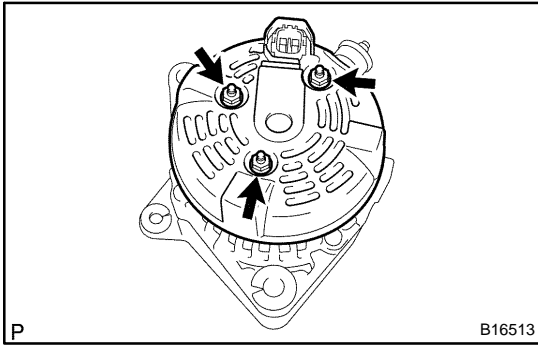
7. **INSTALL GENERATOR ASSY**
 - (a) Install the generator with the bolt and 2 nuts.
Torque:
Bolt 39 N·m (400 kgf·cm, 29 ft·lbf)
Nut (M10) 39 N·m (400 kgf·cm, 29 ft·lbf)
Nut (M8) 16 N·m (158 kgf·cm, 11 ft·lbf)
 - (b) Connect the generator connector.
 - (c) Connect the generator wire with the nut and rubber cap.
Torque: 9.8 N·m (100 kgf·cm, 86 in·lbf)
 - (d) Install the generator wire clamp to the cord clip on the generator.

8. **INSTALL VANE PUMP ASSY**
 - (a) Install the vane pump assy with the nut and 2 bolts.
Torque:
Nut 43 N·m (438 kgf·cm, 32 ft·lbf)
Bolt 43 N·m (438 kgf·cm, 32 ft·lbf)
 - (b) Connect the vacuum hose.

9. **INSTALL FAN W/ FLUID COUPLING**
 - (a) Put the fan w/ fluid coupling and fan shroud into the engine room at the same time.
 - (b) Install the fan shroud with 3 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

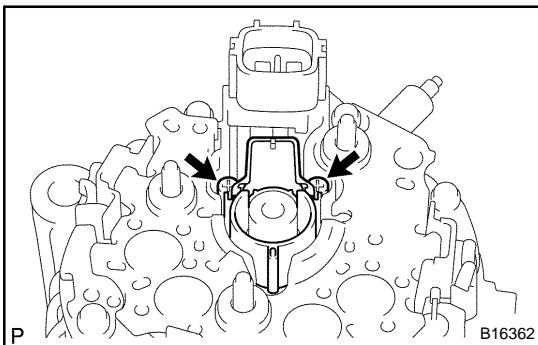
- (c) Install the fan w/ fluid coupling with 4 nuts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)
- 10. INSTALL FAN AND GENERATOR V BELT (SEE PAGE 14-5)**
- 11. INSTALL RADIATOR SUPPORT SEAL UPPER**

OVERHAUL



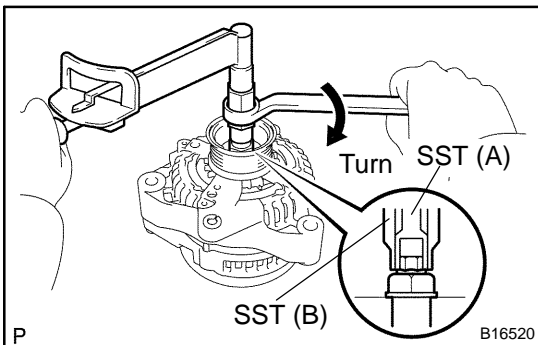
1. REMOVE GENERATOR REAR END COVER

- (a) Remove the 3 nuts and end cover.
- (b) Remove the terminal insulator.



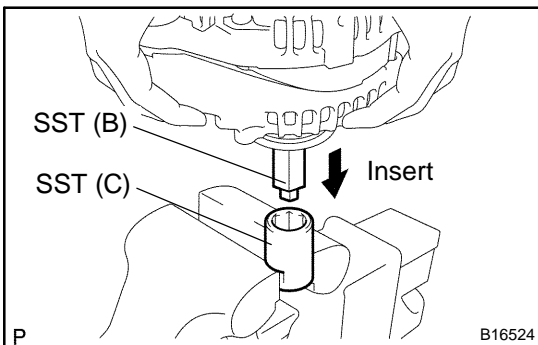
2. REMOVE GENERATOR BRUSH HOLDER ASSY

- (a) Remove the rear seal plate from the brush holder.
- (b) Remove the 2 screws and brush holder.
- (c) Remove the front seal plate from the coil assembly.

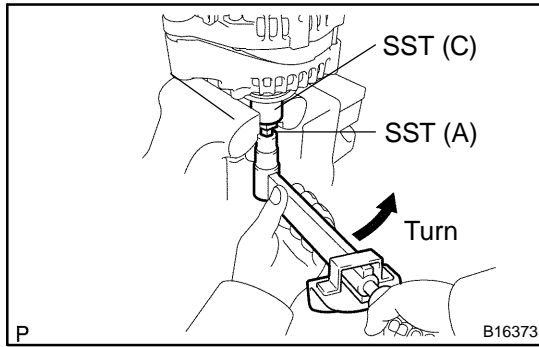


3. REMOVE GENERATOR PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-63011
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (b) Check that SST (A) is secured to the rotor shaft.



- (c) Mount SST (C) in a vise.
- (d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).

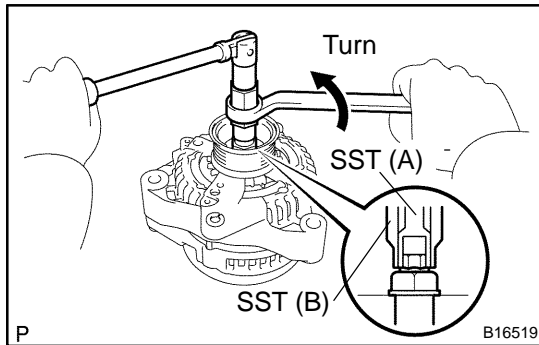


- (e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:

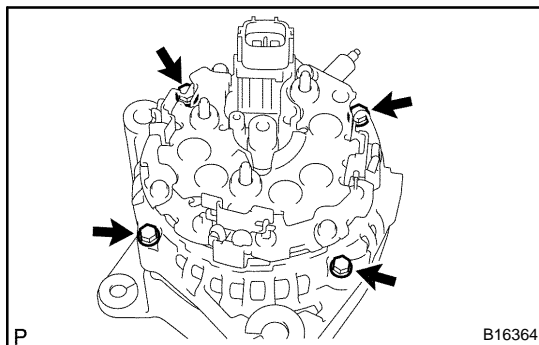
To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

- (f) Remove the generator from SST (C).

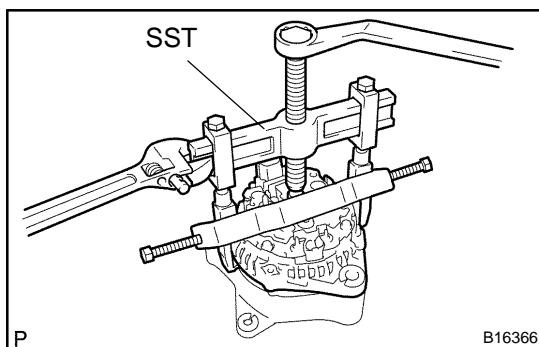


- (g) Turn SST (B), and remove SST (A and B).

- (h) Remove the pulley nut and pulley.

**4. REMOVE GENERATOR COIL ASSY**

- (a) Remove the 4 bolts.

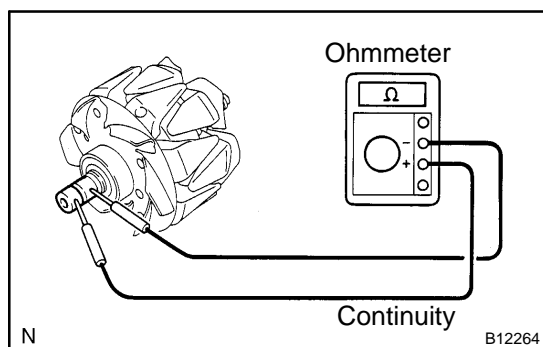


- (b) Using SST, remove the coil assembly.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04071, 09957-04010, 09958-04011)

- (c) Remove the generator washer.

5. REMOVE GENERATOR ROTOR ASSY

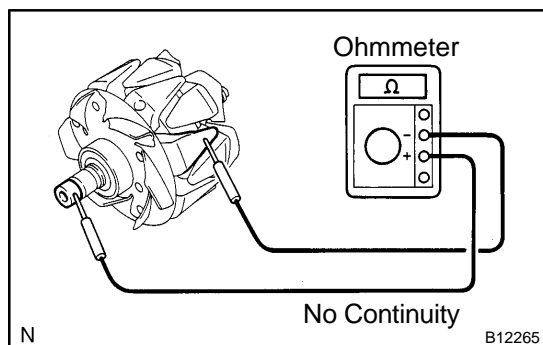


6. INSPECT GENERATOR ROTOR ASSY

- (a) Check the rotor for open circuit.
 (1) Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 2.3 – 2.7 Ω at 20°C (68°F)

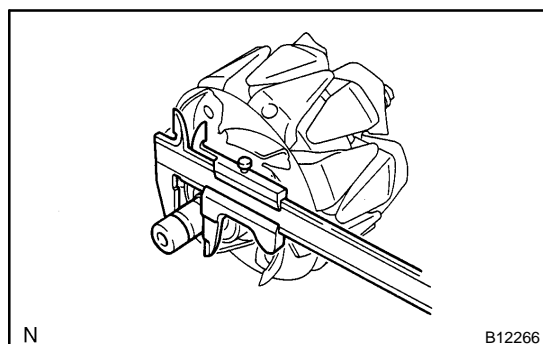
If there is no continuity, replace the rotor.



- (b) Check the rotor for ground.
 (1) Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

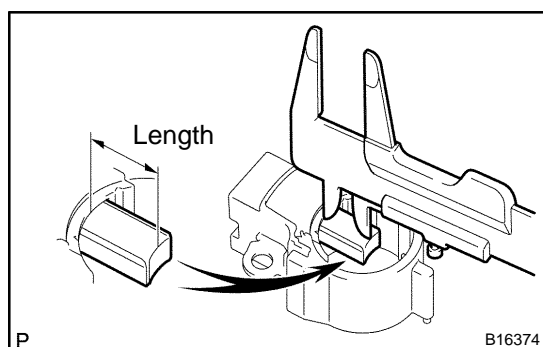
If there is continuity, replace the rotor.

- (c) Check that the slip rings are not rough or scored.
 If rough or scored, replace the rotor.



- (d) Using vernier calipers, measure the slip ring diameter.
Standard diameter: 14.2 – 14.4 mm (0.559 – 0.567 in.)
Minimum diameter: 14.0 mm (0.551 in.)

If the diameter is less than minimum, replace the rotor.



7. INSPECT GENERATOR BRUSH HOLDER ASSY

- (a) Using vernier caliper, measure the exposed brush length.
Standard exposed length: 10.5 mm (0.413 in.)
Minimum exposed length: 4.5 mm (0.177 in.)

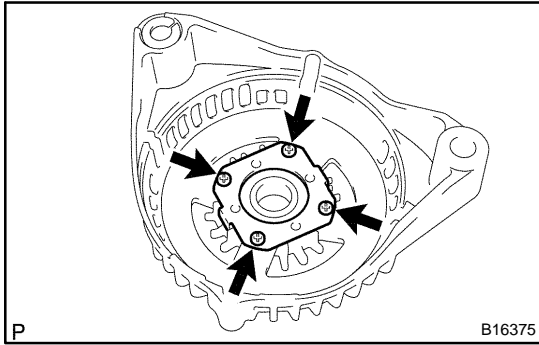
If the exposed length is less than minimum, replace the brushes and brush holder assembly.

8. INSPECT GENERATOR DRIVE END FRAME BEARING

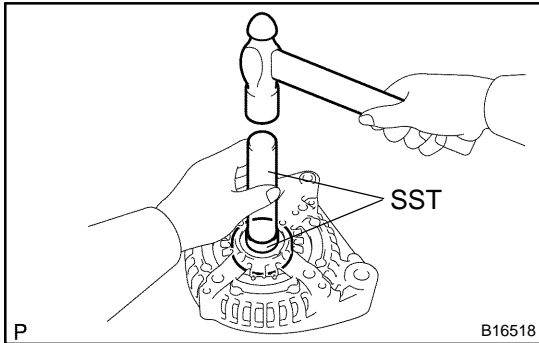
- (a) Check the bearing is not rough or worn.
 If necessary, replace the bearing.

9. INSPECT GENERATOR ROTOR BEARING

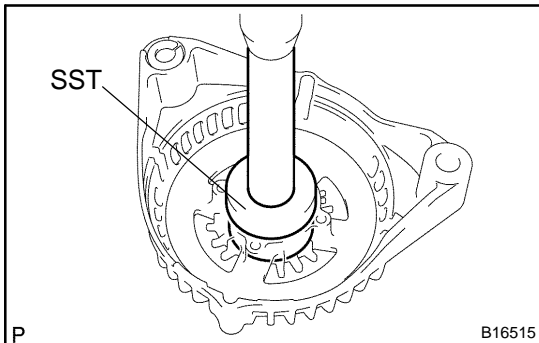
- (a) Check the bearing is not rough or worn.
 If necessary, replace the bearing.

**10. REMOVE GENERATOR DRIVE END FRAME BEARING**

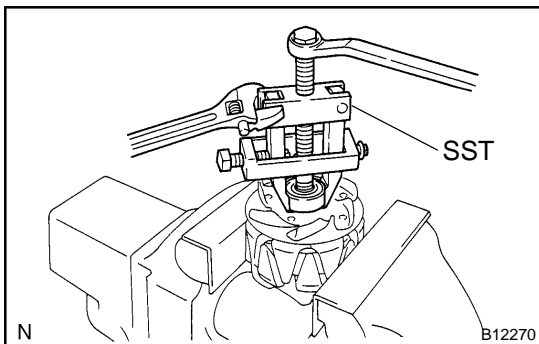
- (a) Remove the 4 screws, bearing retainer and bearing.



- (b) Using SST and a hammer, tap out the bearing.
 SST 09950-60010 (09951-00250), 09950-70010
 (09951-07100)

**11. INSTALL GENERATOR DRIVE END FRAME BEARING**

- (a) Using SST and a press, press in a new bearing.
 SST 09950-60010 (09951-00470), 09950-70010
 (09951-07100)
- (b) Install the bearing retainer with the 4 screws.
Torque: 2.6 N·m (27 kgf·cm, 23 in.-lbf)

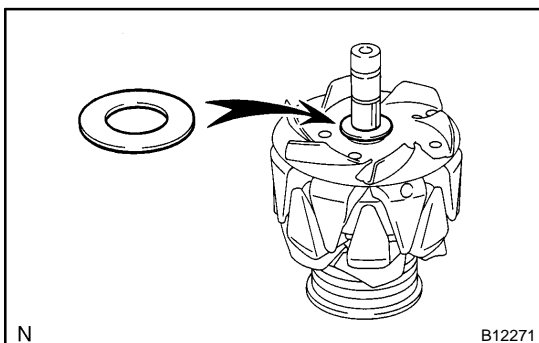
**12. REMOVE GENERATOR ROTOR BEARING**

- (a) Using SST, remove the bearing cover (outside) and bearing.
 SST 09820-00021

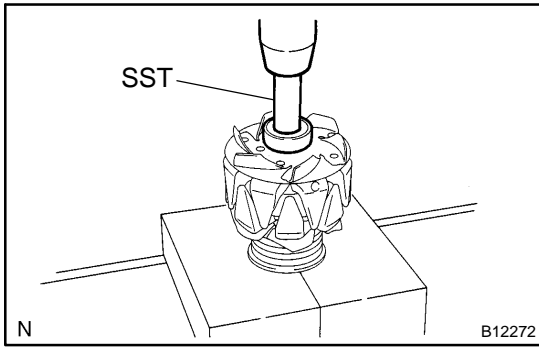
NOTICE:

Be careful not to damage the fan.

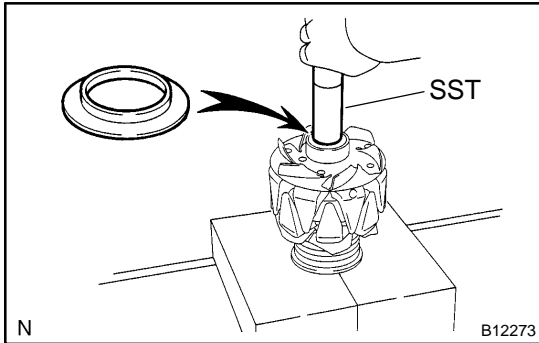
- (b) Remove the bearing cover (inside).



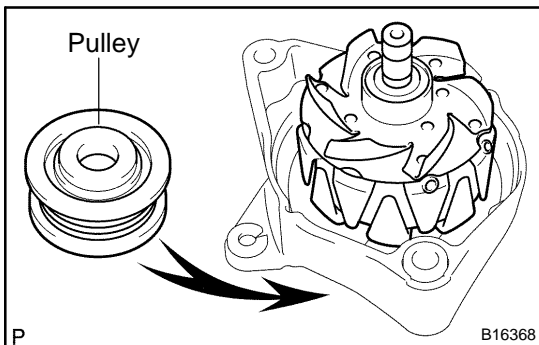
- (c) Place the bearing cover (inside) on the rotor.



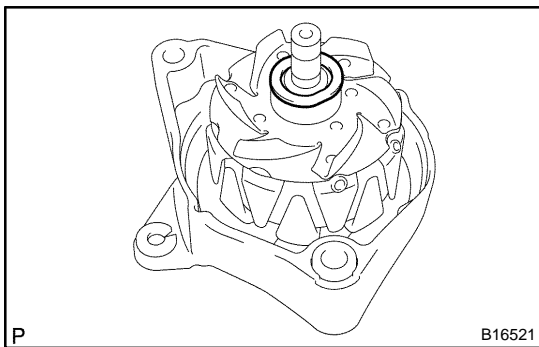
- 13. INSTALL GENERATOR ROTOR BEARING**
 (a) Using SST and a press, press in a new bearing.
 SST 09820-00031



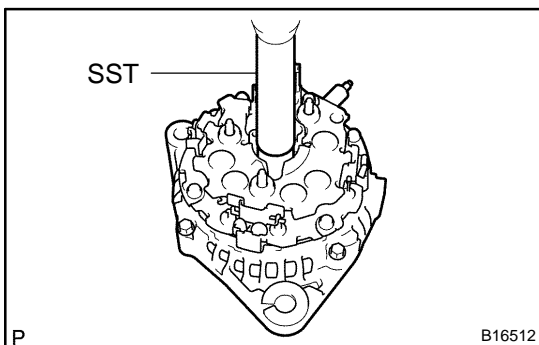
- (b) Using SST, push in the bearing cover (outside).
 SST 09285-76010



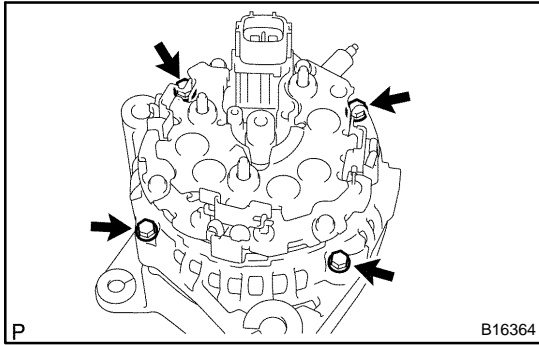
- 14. INSTALL GENERATOR ROTOR ASSY**
 (a) Place the drive end frame on the pulley.
 (b) Install the rotor to the drive end frame.



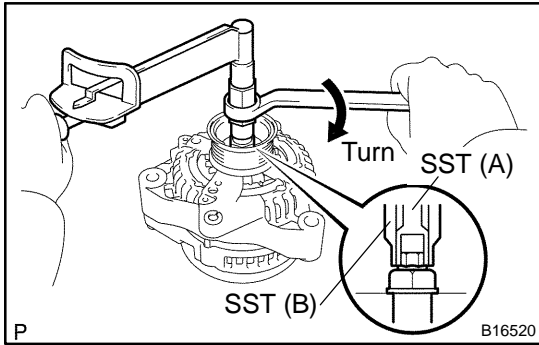
- 15. INSTALL GENERATOR COIL ASSY**
 (a) Place the generator washer on the rotor.



- (b) Using SST and a press, slowly press in the coil assembly.
 SST 09285-76010

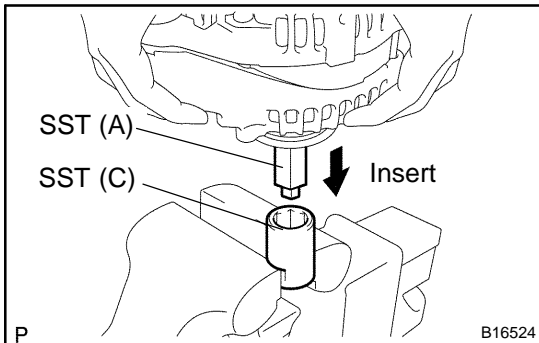


- (c) Install the coil assembly with the 4 bolts.
Torque: 5.8 N·m (59 kgf·cm, 51 in.·lbf)

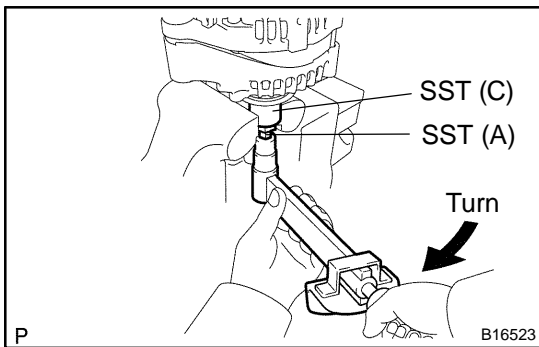


16. INSTALL GENERATOR PULLEY

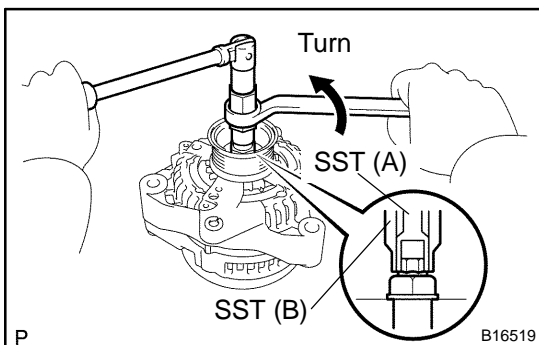
- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.
- (b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-63011
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (c) Check that SST (A) is secured to the pulley shaft.



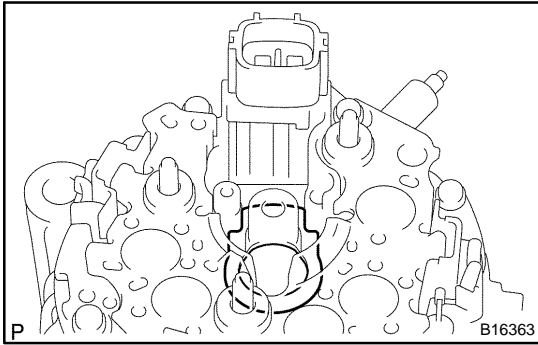
- (d) Mount SST (C) in a vise.
- (e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).



- (f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 111 N·m (1,125 kgf·cm, 81 ft·lbf)
- (g) Remove the generator from SST (C).

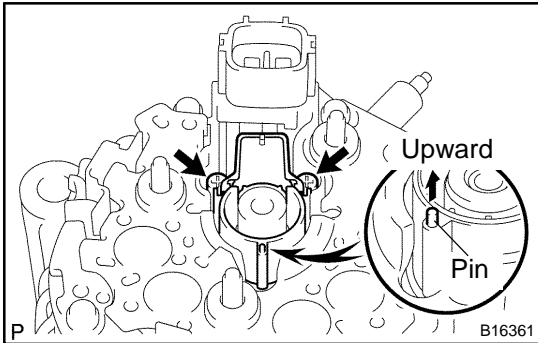


- (h) Turn SST (B), and remove SST (A and B).



17. INSTALL GENERATOR BRUSH HOLDER ASSY

- (a) Place the front seal plate on the coil assembly.



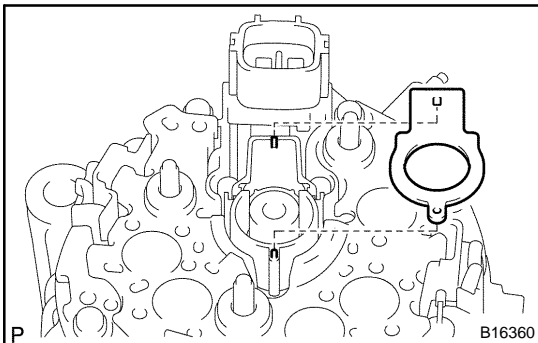
- (b) Place the brush holder on the coil assembly with the pin facing upward.

NOTICE:

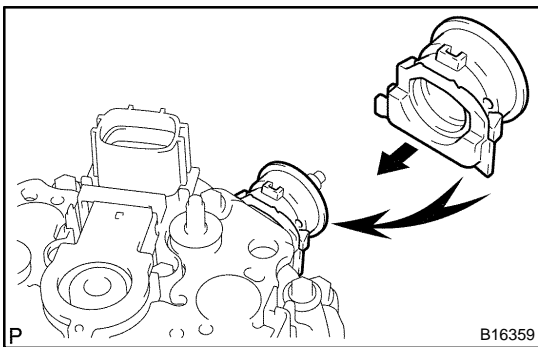
Be careful of the holder installation direction.

- (c) Install the 2 screws.

Torque: 1.8 N·m (18 kgf·cm, 16 in.-lbf)



- (d) Align the pins of the brush holder with the holes of the rear seal plate, and install the rear seal plate.

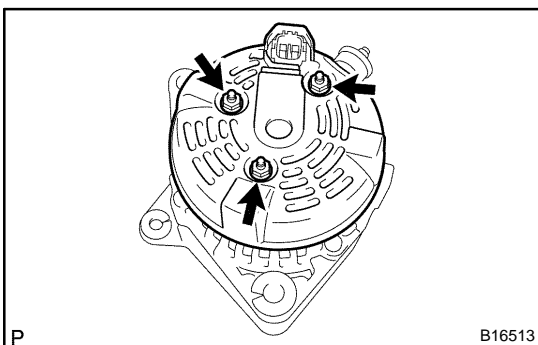


18. INSTALL GENERATOR REAR END COVER

- (a) Install the terminal insulator.

NOTICE:

Be careful of the terminal insulator installation direction.



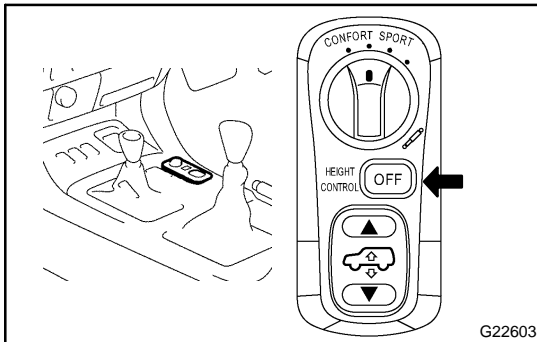
- (b) Install the end cover with the 3 nuts.

Torque: 4.6 N·m (47 kgf·cm, 41 in.-lbf)

SUSPENSION CONTROL SYSTEM

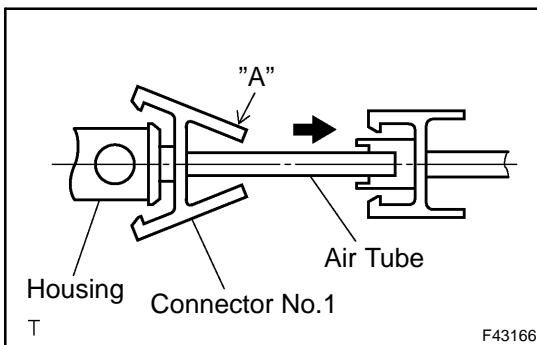
PRECAUTION

25018-06



1. JACK OR LIFT UP AND DOWN

- (a) When jacking up or lifting up, stop operating the air suspension control system by pressing the height control OFF switch.



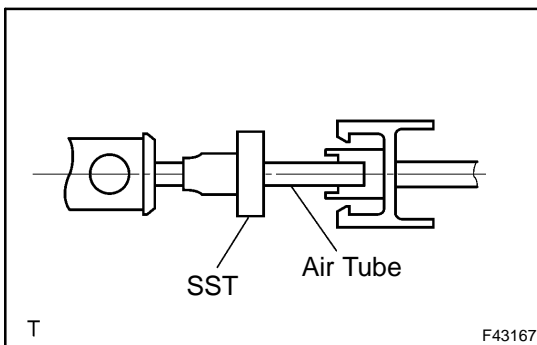
2. DISCONNECT AND CONNECT HEIGHT CONTROL TUBE

NOTICE:

- Disconnecting and connecting the height control tube should be performed by hand to prevent foreign objects from entering.
- Never damage the height control tube.

- (a) Disconnect the height control tube.

- (1) Pinch "A" of the connector No.1 and pull it out from the housing.
- (2) Set SST to the tube.
SST 09730-00010



- (3) Insert SST into the housing to expand the claw of plug or tube connector in the housing.
- (4) Pull out the tube with SST inserted.

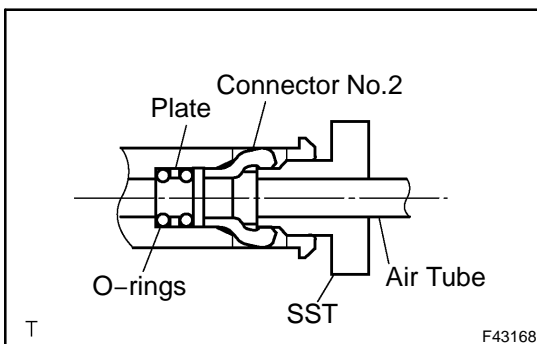
NOTICE:

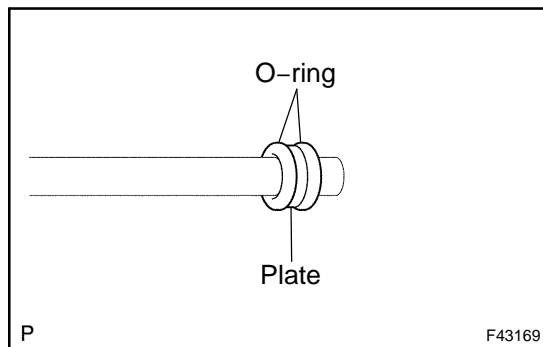
Never pull the tube forcibly.

- (5) Insert a flat-head thin-bladed screwdriver into the circular hole on the housing, and remove connector No.2, the 2 O-rings and the plate from the housing.

HINT:

O-ring, plate and connector No.2 are non-reusable parts.





(b) Installs 2 O-rings and the plate.

NOTICE:

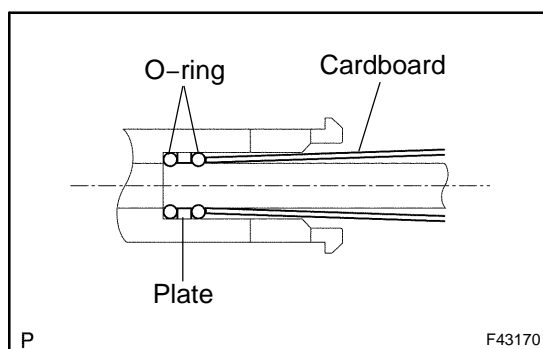
When replacing the parts on which the tube to be installed with a new one, it is not necessary to perform the procedure for installation.

- (1) Apply MP grease to 2 new O-rings and plate, and install them to the straight tube or equivalent.

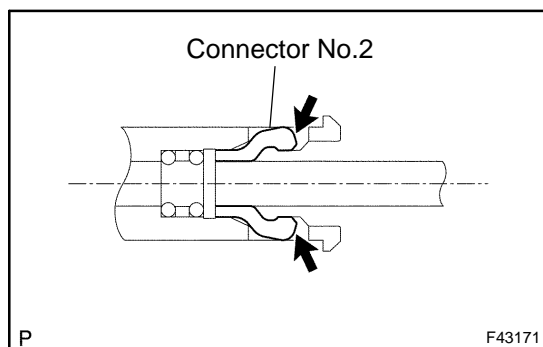
NOTICE:

Install the plate between the O-rings.

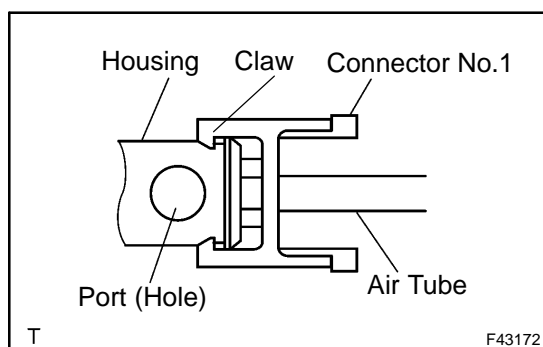
Never adhere foreign object to the O-rings and the height control tube to prevent air leaks.



- (2) Insert the tube on which 2 O-rings and a plate are installed into the housing, and then push it in lightly with rolled up cardboard.



- (3) Push the connector No.2 into the housing to the position where a clicking sound is heard.



(c) Install the height control tube.

- (1) Push the tube and connector No.1 into the housing to the position where a clicking sound is heard.

NOTICE:

- **Slide the phase of the housing port from that of the connector No.1 claw 90° to install.**
- **Pull the tube lightly to make sure that it is securely connected.**

ON-VEHICLE INSPECTION

1. ADJUST STANDARD VEHICLE HEIGHT

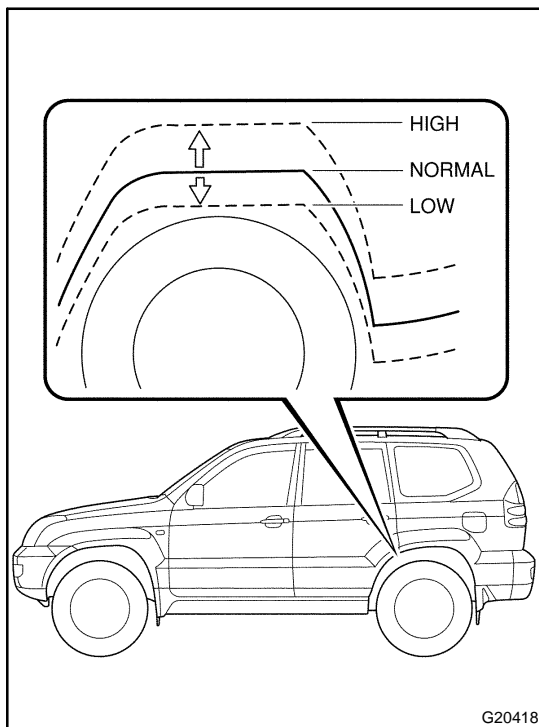
- (a) Release the parking brake and stabilize the suspensions by pushing up and down the corners of the vehicle.
- (b) Move the shift lever to the "N" position and settle the tires by moving the vehicle back and forth by hand.
- (c) Start the engine.
- (d) On the height control switch, first press "HIGH" to raise the vehicle height, and then change the switch to "LOW" to lower it. Perform this operation one more time.

NOTICE:

Make sure to release the parking brake and move the shift lever to the "N" position.

2. INSPECT TIRE (See page 28-1)

3. MEASURE VEHICLE HEIGHT (See page 26-7)



4. OPERATE HEIGHT CONTROL SWITCH AND CHECK CHANGE OF VEHICLE HEIGHT

- (a) Start the engine and change the height control switch from the NORMAL position to the HIGH and LOW position.

Check the time until the height adjustment is completed and the amount of change in the vehicle height.

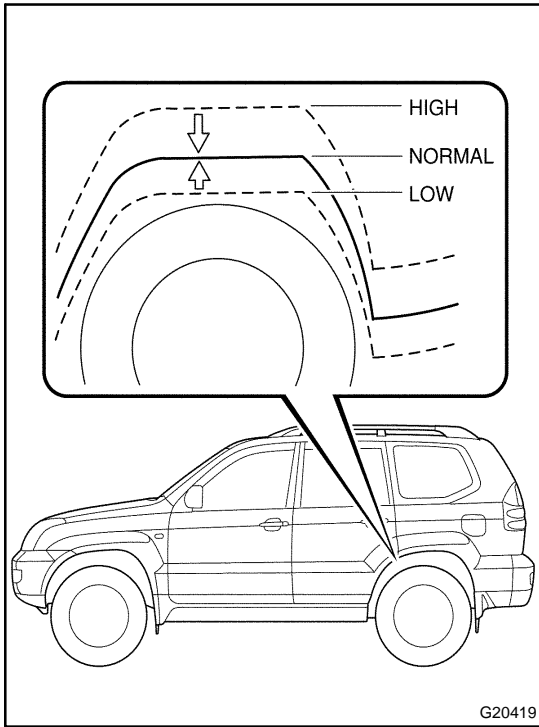
Adjustment time

From operation of height control switch to start of compressor.	Approx. 2 sec.
From start of compressor to completion of height adjustment.	15 - 20 sec. (HIGH position)

Amount of change in vehicle height

HIGH position: 40 mm (1.57 in.)

LOW position: -20 mm (-0.79 in.)



- (b) With the vehicle in the HIGH position height adjustment, start the engine and change the height control switch from the HIGH and LOW position to the NORMAL position. Check the time until the height adjustment is completed and the amount of change in the vehicle height.

Adjustment time

From operation of height control switch to open of exhaust valve.	Approx. 2 sec.
From open of exhaust valve to completion of height adjustment.	10 - 15 sec. (HIGH position)

Amount of change in vehicle height

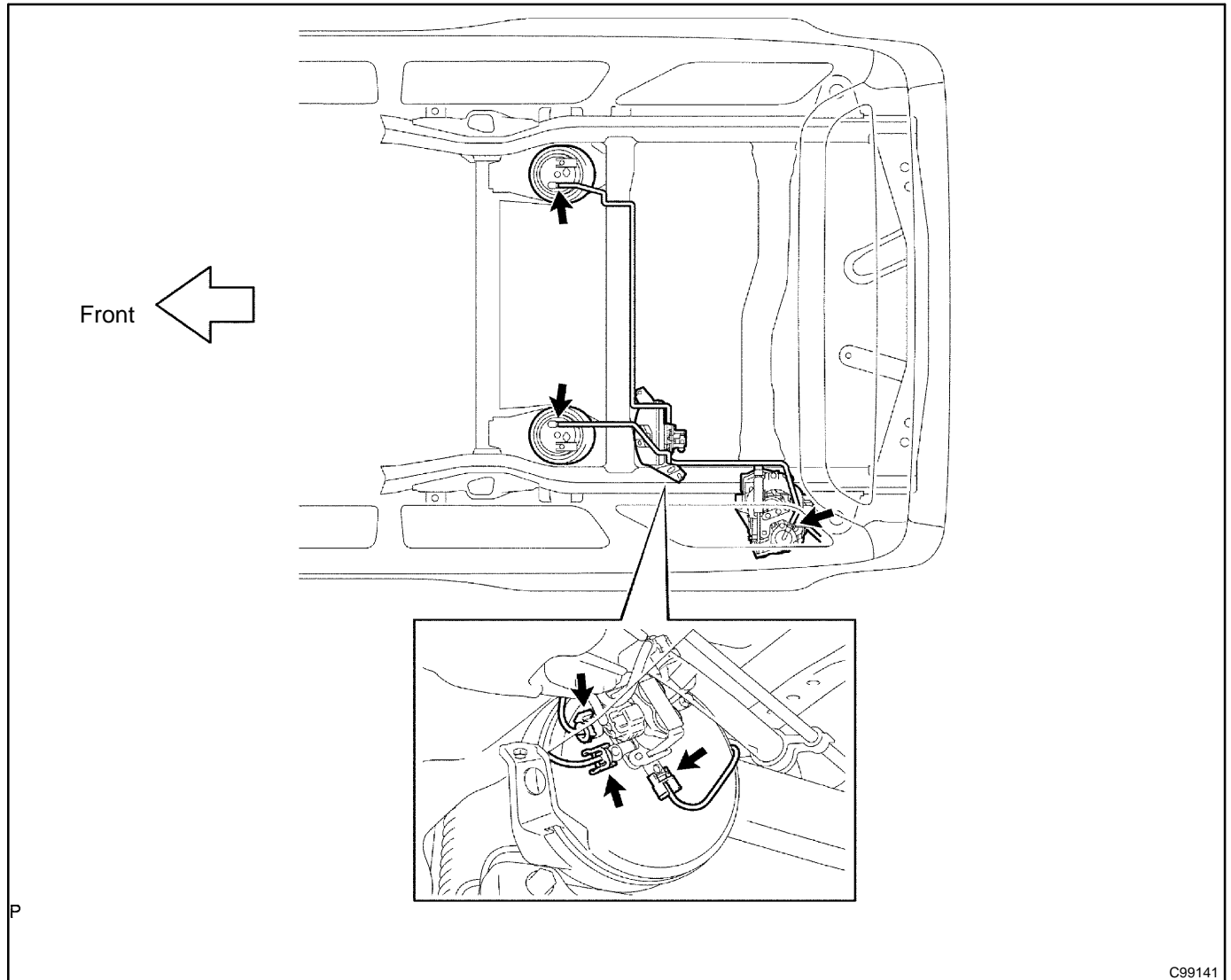
HIGH position: 40 mm (1.57 in.)

LOW position: -20 mm (-0.79 in.)

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5. CHECK CONNECTIONS OF TUBES FOR AIR LEAKAGE

- (a) Set the height control switch in the HIGH position and raise the vehicle height.
- (b) Stop the engine.
- (c) Apply soapy water to the connections of the tubes and check if there is any air leakage.

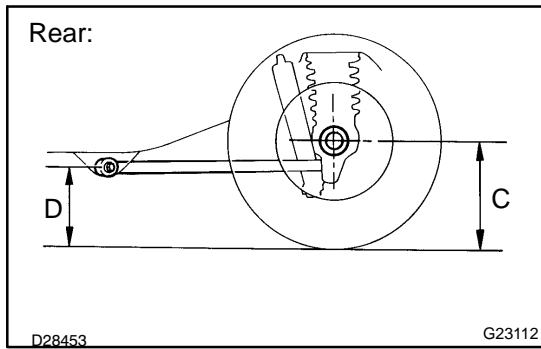


6. ADJUST VEHICLE HEIGHT

NOTICE:

While adjusting the vehicle height, never get on and off or load and unload the vehicle which causes the vehicle height to be changed.

- (a) Suspend the vehicle height control by pressing the height control OFF switch.
- (b) Put the vehicle in a level state.



(c) Measure again the vehicle height (C - D measurement) on the right side and left side.

Standard vehicle height value: See page 26-7

Difference between the right side and the left side: 10 mm (0.39 in.) or less

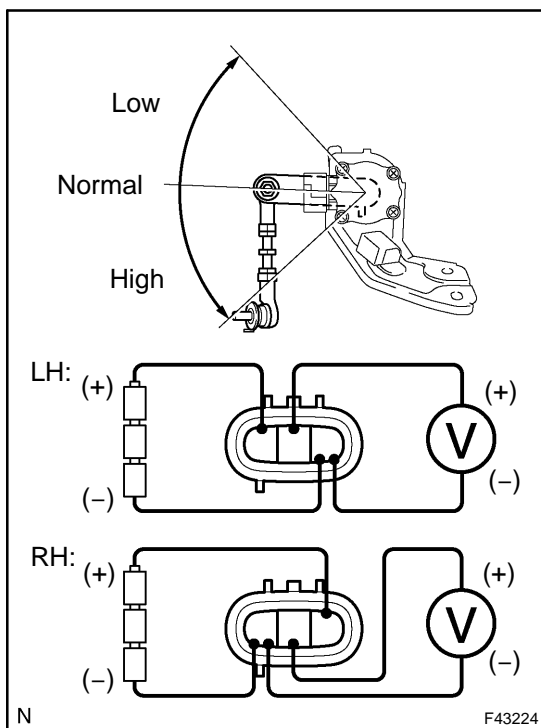
(d) If the actual vehicle height differs from the vehicle height (C - D measurement), adjust it by jacking up the frame, etc.

(e) When using the hand-held tester:

- (1) Turn the ignition switch to ON or ACC.
- (2) Using the hand-held tester, measure each vehicle height value of the right side and the left side sensors.

Difference between the tester value and vehicle height (C - D measurement) : 5 mm (0.20 in.) or less

Difference between the right side and the left side: 5 mm (0.20 in.) or less



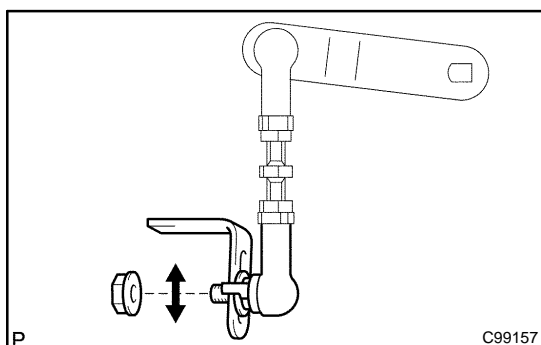
(f) When not using the hand-held tester:

- (1) Disconnect the connector of the height control sensor.
- (2) Connect three 1.5 V dry cell batteries in series.
- (3) Connect the battery positive (+) and negative (-) to the terminals as shown in the illustration.

Standard:

Position	Voltage
High	2.31 - 3.81 V
Normal	2.31 ± 0.04 V
Low	1.39 - 2.31 V

Difference between the right side and the left side: 0.06 V or less

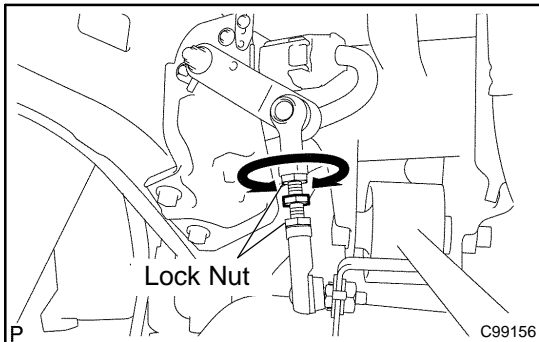


(g) If the value in (e) or (f) differs from the vehicle height (C - D measurement), adjust it by following the procedures below:

- (1) Loosen the nut.
- (2) Move the height control sensor link up and down along the slotted hole of the bracket.
- (3) Adjust the vehicle height to the vehicle height (C - D measurement) while checking the value on the hand-held tester or the voltmeter.

(4) Tighten the nut.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



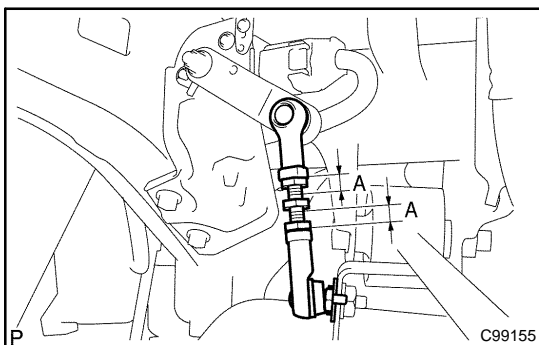
(h) If the vehicle height cannot be adjusted by performing (g), adjust it again by following the procedures below:

(1) Loosen the 2 lock nuts of the height control sensor link.

(2) Adjust the vehicle height to the vehicle height (C - D measurement) by turning the link while checking the value on the hand-held tester or the voltmeter.

(3) Tighten the 2 lock nuts.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



(i) Check that the lengths of the screw parts, "A" in the illustration, are within the standard value.

Standard length: 6.5 - 15.0 mm (0.26 - 0.59 in.)

(j) Operate the height control (From normal position to high position, and from high position to normal position).

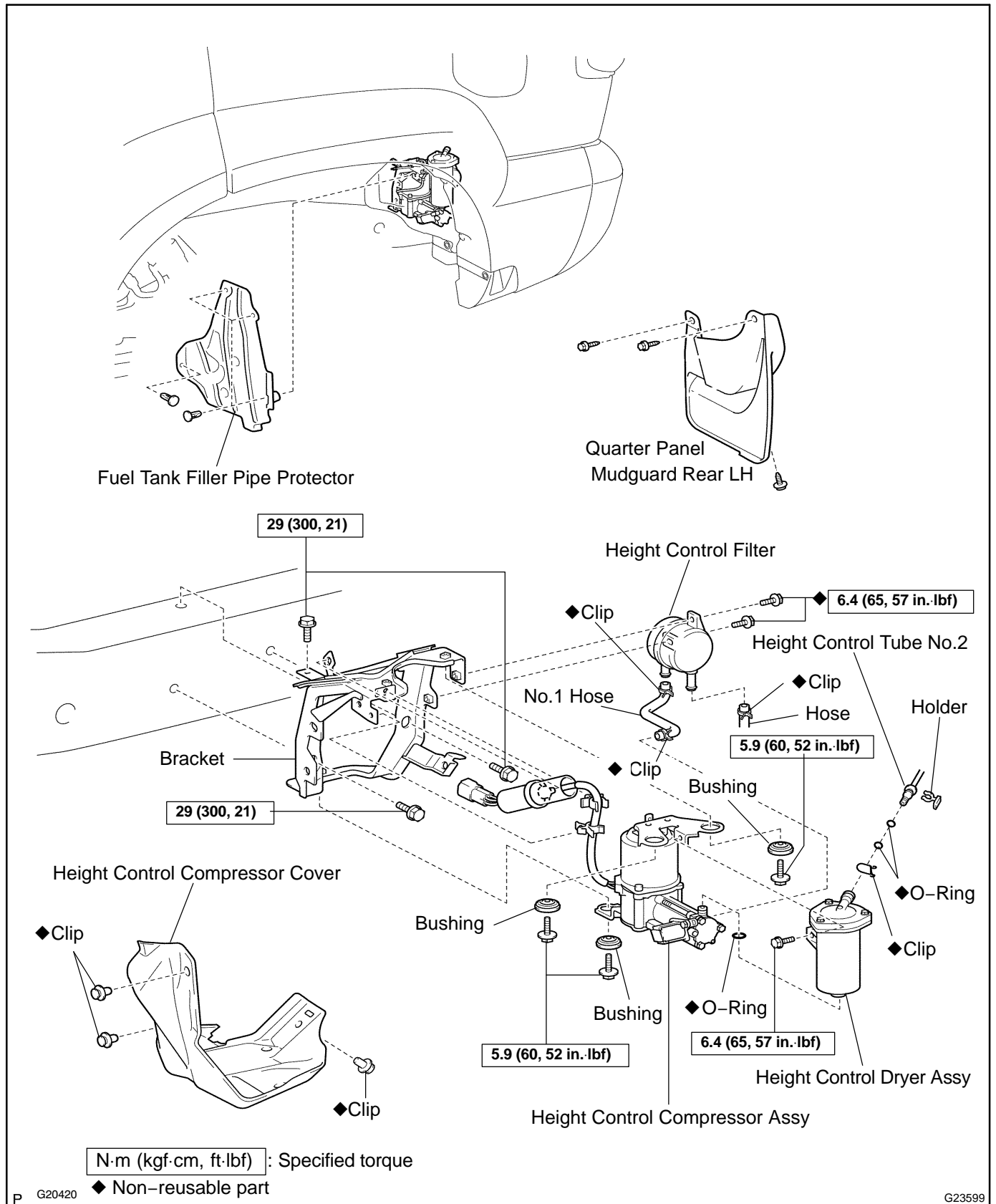
(k) Measure again the vehicle height (C - D measurement) on the right side and left side.

(l) Check that the vehicle height (C - D measurement) and the difference between the right side and the left side fall within the specification.

HINT:

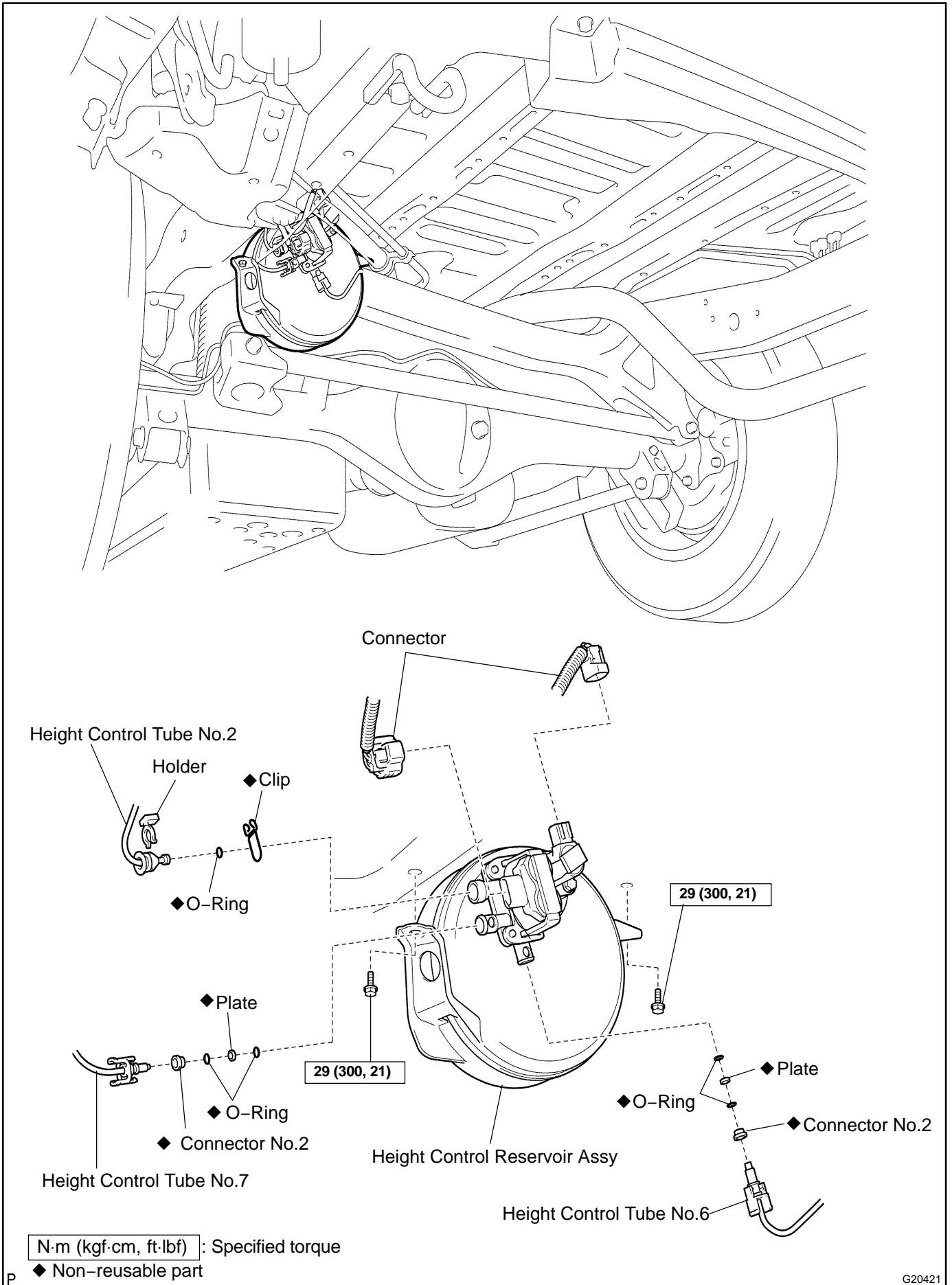
If the values are out of the standard, perform the procedure from (d) to (k) again.

COMPONENTS

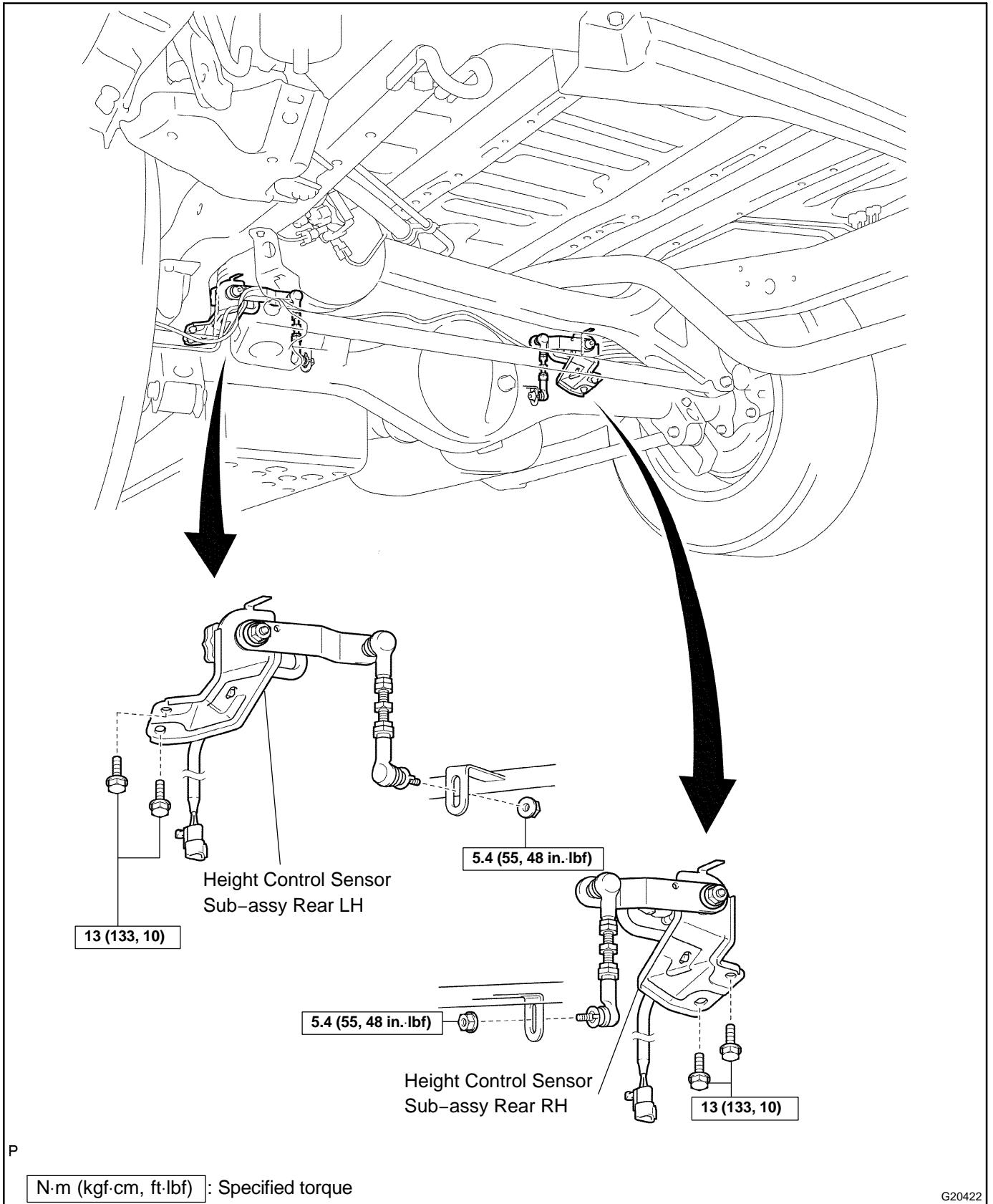


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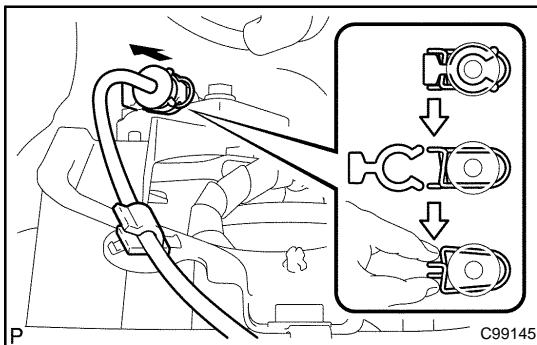
HEIGHT CONTROL COMPRESSOR ASSY REPLACEMENT

2501B-04

HINT:

COMPONENTS: See page 25-8

1. REMOVE REAR DISC WHEEL
2. REMOVE QUARTER PANEL MUDGUARD REAR LH
3. REMOVE FUEL TANK FILLER PIPE PROTECTOR
 - (a) Remove the 4 clips and the fuel tank filler pipe protector.
4. REMOVE HEIGHT CONTROL COMPRESSOR COVER
 - (a) Remove the 3 clips and the height control compressor cover.
5. REMOVE HEIGHT CONTROL FILTER
 - (a) Disconnect the 2 clips and the 2 hoses.
 - (b) Remove the 2 bolts and the height control filter.

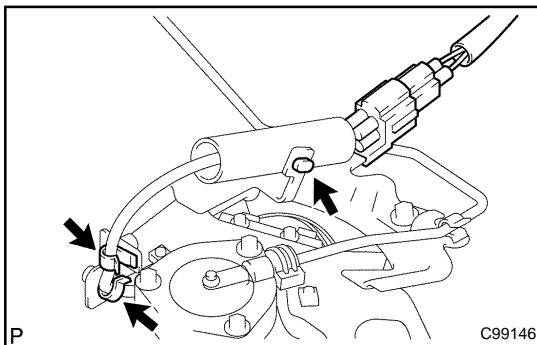


6. DISCONNECT HEIGHT CONTROL TUBE NO.2
 - (a) Remove the holder.
 - (b) Spread the clip and slowly pull the height control tube No.2 straight out.

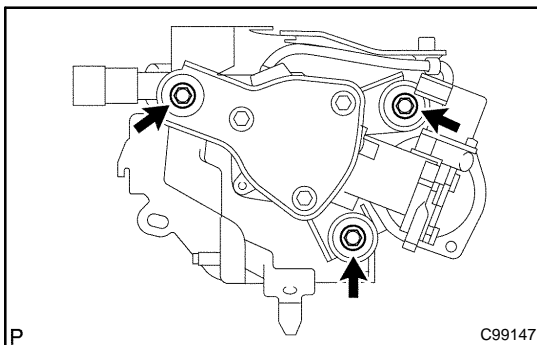
NOTICE:

Do not remove the clip from the union except when replacing it.

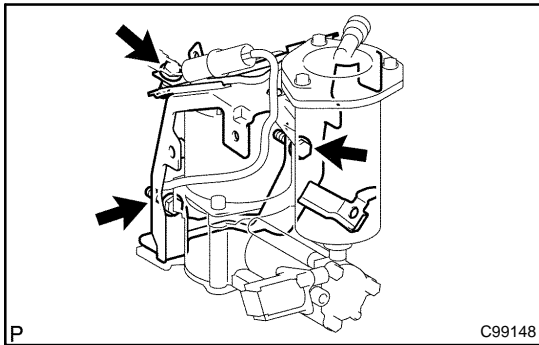
- (c) Remove the 2 O-rings.



7. REMOVE HEIGHT CONTROL COMPRESSOR ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 3 clamps.



- (c) Remove the 3 bolts.
- (d) Disconnect the clip and remove the No.1 hose.



- (e) Remove the 3 bolts, the height control compressor and the dryer with the bracket.
- (f) Remove the bolt, the dryer and the O-ring.
- (g) Remove the 3 bushings from the height control compressor assy.

8. INSTALL HEIGHT CONTROL COMPRESSOR ASSY

- (a) Install the 3 bushings to the height control compressor assy.
- (b) Install the bolt, the dryer and the new O-ring.
Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)
- (c) Assemble the height control compressor, the dryer and the bracket as a unit to the vehicle, and tighten the 3 bolts to fix the bracket to the frame.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)
- (d) Install the height control compressor assy to the bracket with the 3 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)
- (e) Install the 3 clamps.
- (f) Connect the connector.
- (g) Connect the No.1 hose with a new clip.

9. CONNECT HEIGHT CONTROL TUBE NO.2

- (a) Coat 2 new O-rings with MP grease.
- (b) Push the height control tube No.2 in straight to connect it until the clip makes "click" sound.

NOTICE:

Do not get scratches or foreign particle on the O-ring, the O-ring seal and the flare section.

- (c) Install the holder.

10. INSTALL HEIGHT CONTROL FILTER

- (a) Install the height control filter with the new 2 bolts.
Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)

- (b) Connect 2 new clips and 2 hoses.

11. INSTALL HEIGHT CONTROL COMPRESSOR COVER

- (a) Install the height control compressor cover with 3 new clips.

12. INSPECT AIR LEAK (See page 25-3)

13. INSTALL FUEL TANK FILLER PIPE PROTECTOR

- (a) Install the fuel tank filler pipe protector with the 4 clips.

14. INSTALL QUARTER PANEL MUDGUARD REAR LH

15. INSTALL REAR DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

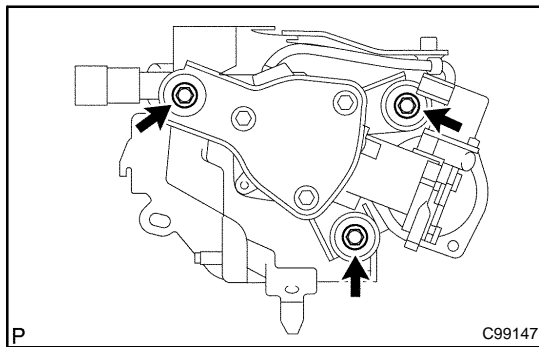
HEIGHT CONTROL DRYER ASSY REPLACEMENT

2501C-04

HINT:

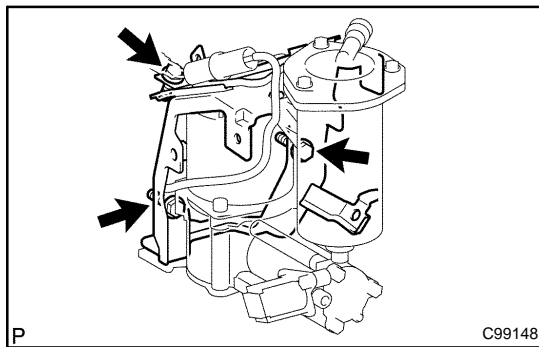
COMPONENTS: See page 25-8

1. REMOVE REAR DISC WHEEL
2. REMOVE QUARTER PANEL MUDGUARD REAR LH
3. REMOVE FUEL TANK FILLER PIPE PROTECTOR (See page 25-11)
4. REMOVE HEIGHT CONTROL COMPRESSOR COVER (See page 25-11)
5. REMOVE HEIGHT CONTROL FILTER (See page 25-11)
6. DISCONNECT HEIGHT CONTROL TUBE NO.2 (See page 25-11)



7. REMOVE HEIGHT CONTROL DRYER ASSY

- (a) Disconnect the connector.
- (b) Remove the 3 bolts.



- (c) Remove the 3 bolts, the height control compressor and the dryer with the bracket.
- (d) Remove the bolt and the dryer.
- (e) Remove the O-ring.

8. INSTALL HEIGHT CONTROL DRYER ASSY

- (a) Install the bolt, the dryer and a new O-ring.
Torque: 6.4 N·m (65 kgf·cm, 57 in·lbf)
 - (b) Assemble the height control compressor, the dryer and the bracket as a unit to the vehicle, and tighten the 3 bolts to fix the bracket to the frame.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)
 - (c) Install the height control compressor assy to the bracket with the 3 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in·lbf)
 - (d) Connect the connector.
9. CONNECT HEIGHT CONTROL TUBE NO.2 (See page 25-11)
 10. INSTALL HEIGHT CONTROL FILTER (See page 25-11)
 11. INSTALL HEIGHT CONTROL COMPRESSOR COVER (See page 25-11)
 12. INSPECT AIR LEAK (See page 25-3)
 13. INSTALL FUEL TANK FILLER PIPE PROTECTOR (See page 25-11)
 14. INSTALL QUARTER PANEL MUDGUARD REAR LH

15. INSTALL REAR DISC WHEEL**Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)**

HEIGHT CONTROL RESERVOIR ASSY REPLACEMENT

25029-02

HINT:

COMPONENTS: See page [25-8](#)

1. DISCONNECT HEIGHT CONTROL TUBE NO.2

- (a) Remove the holder.
- (b) Spread the clip and slowly pull the height control tube No.2 straight out.
- (c) Remove the 2 O-rings.

2. DISCONNECT HEIGHT CONTROL TUBE NO.6

- (a) Using SST, disconnect the height control tube No.6.
SST 09730-00010

NOTICE:

Refer to **PRECAUTION** of removal and installation of the height control tube (See page [25-1](#)).

- (b) Remove the 2 O-rings, the plate and the connector No.2.

3. DISCONNECT HEIGHT CONTROL TUBE NO.7

- (a) Using SST, disconnect the height control tube No.7.
SST 09730-00010

NOTICE:

Refer to **PRECAUTION** of removal and installation of the height control tube (See page [25-1](#)).

- (b) Remove the 2 O-rings, the plate and the connector No.2.

4. REMOVE HEIGHT CONTROL RESERVOIR ASSY

- (a) Remove the 2 bolts and the height control reservoir assy.

5. INSTALL HEIGHT CONTROL RESERVOIR ASSY

- (a) Install the height control reservoir assy with the 2 bolts.

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

6. CONNECT HEIGHT CONTROL TUBE NO.7

- (a) Install 2 new O-rings, a new plate, a new connector No.2, and connect the height control tube No.7.

NOTICE:

Refer to **PRECAUTION** of removal and installation of the height control tube (See page [25-1](#)).

7. CONNECT HEIGHT CONTROL TUBE NO.6

- (a) Install 2 new O-rings, a new plate, a new connector No.2, and connect the height control tube No.6.

NOTICE:

Refer to **PRECAUTION** of removal and installation of the height control tube (See page [25-1](#)).

8. CONNECT HEIGHT CONTROL TUBE NO.2

- (a) Coat 2 new O-rings with MP grease.
- (b) Push the height control tube No.2 in straight to connect it until the clip makes "click" sound.
- (c) Install the holder.

9. INSPECT AIR LEAK (See page [25-3](#))

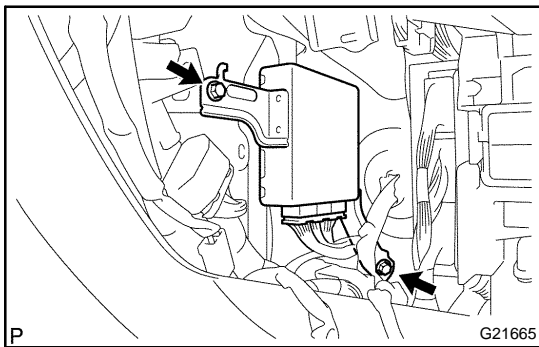
SUSPENSION CONTROL ECU REPLACEMENT

2502A-02

HINT:

LOCATION: See page 05-479

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (See page 76-38)
3. INSTALL COWL SIDE TRIM BOARD LH (See page 71-13)
4. REMOVE FRONT DOOR SCUFF PLATE LH (See page 71-13)
5. REMOVE COWL SIDE TRIM BOARD LH (See page 71-13)
6. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (See page 71-13)
7. REMOVE INSTRUMENT PANEL FINISH PLATE (See page 71-13)



8. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH
 - (a) Remove the 2 nuts and a bolt, disconnect the junction block.
 - (b) Disconnect the connector from the suspension control ECU.
 - (c) Remove the 2 bolts and the suspension control ECU.

9. REMOVE INSTRUMENT PANEL LOWER LH
 - (a) Install the suspension control ECU with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)
 - (b) Connect the connector to the suspension control ECU.
 - (c) Install the junction block with the 2 nuts and a bolt.
Torque: 8.4 N·m (86 kgf·cm, 74 in·lbf)
10. REMOVE SUSPENSION CONTROL ECU
11. INSTALL SUSPENSION CONTROL ECU
12. INSTALL INSTRUMENT PANEL LOWER LH
13. INSTALL INSTRUMENT PANEL FINISH LOWER PANEL RH
14. INSTALL COWL SIDE TRIM BOARD LH
15. INSTALL FRONT DOOR SCUFF PLATE LH

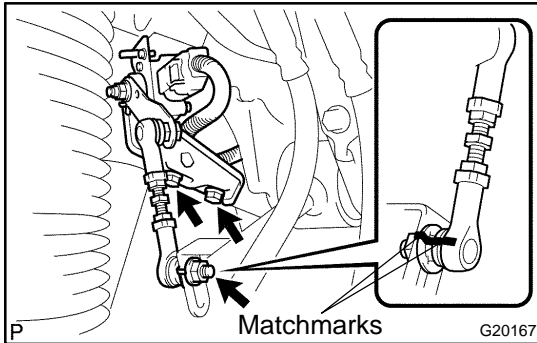
HEIGHT CONTROL SENSOR SUB-ASSY REAR LH REPLACEMENT

2501G-04

HINT:

COMPONENTS: See page 25-8

1. REMOVE REAR DISC WHEEL



2. REMOVE HEIGHT CONTROL SENSOR SUB-ASSY REAR LH

- Disconnect the connector from the height control sensor.
- Place matchmarks on the link and the bracket.
- Remove the nut and disconnect the sensor link.
- Remove the 2 bolts and height control sensor.

3. INSTALL HEIGHT CONTROL SENSOR SUB-ASSY REAR LH

- Install the height control sensor with the 2 bolts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)
- Align the matchmarks on the link and the bracket.
- Connect the sensor link with the nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)
- Connect the connector to the height control sensor.

4. INSTALL REAR DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

5. MEASURE VEHICLE HEIGHT (See page 26-7)

6. ADJUST VEHICLE HEIGHT (See page 25-3)

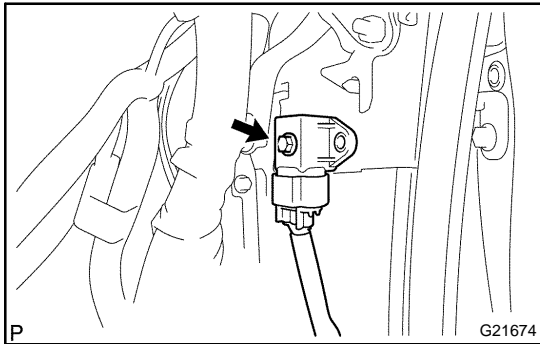
ACCELERATION SENSOR REPLACEMENT

2502B-03

HINT:

LOCATION: See page 05-479

1. REMOVE FRONT DOOR SCUFF PLATE RH (See page 76-38)
2. REMOVE COWL SIDE TRIM BOARD RH (See page 71-13)
3. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1 (See page 71-13)
4. REMOVE INSTRUMENT PANEL FINISH PLATE (See page 71-13)
5. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH (See page 71-13)
6. REMOVE INSTRUMENT PANEL LOWER LH (See page 71-13)



7. REMOVE ACCELERATION SENSOR

- (a) Disconnect the connector from the acceleration sensor.
- (b) Remove a bolt and the acceleration sensor.

8. INSTALL ACCELERATION SENSOR

- (a) Install the acceleration sensor with a bolt.
Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)
- (b) Connect the connector to the acceleration sensor.

9. INSTALL INSTRUMENT PANEL LOWER LH

10. INSTALL INSTRUMENT PANEL FINISH LOWER PANEL RH
11. INSTALL INSTRUMENT PANEL FINISH PLATE
12. INSTALL INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1
13. INSTALL COWL SIDE TRIM BOARD RH
14. INSTALL FRONT DOOR SCUFF PLATE RH

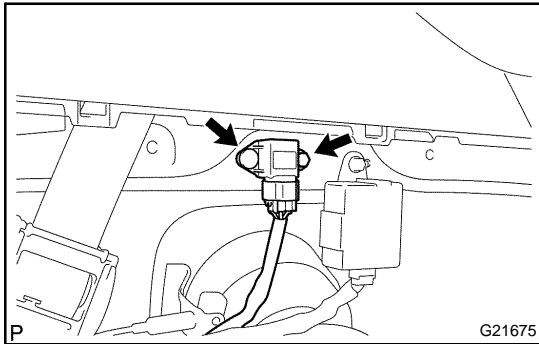
ACCELERATION SENSOR ASSY REPLACEMENT

2502C-02

HINT:

LOCATION: See page 05-479

1. REMOVE REAR NO. 2 SEAT ASSY LH (See page 72-42)
2. REMOVE QUARTER SCUFF PLATE INSIDE LH (See page 76-38)
3. REMOVE REAR DOOR SCUFF PLATE LH (See page 76-38)
4. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH (See page 76-38)
5. REMOVE BACK DOOR WEATHERSTRIP (See page 76-38)
6. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (See page 76-38)
7. REMOVE QUARTER INSIDE TRIM BOARD LH (See page 76-38)



8. REMOVE ACCELERATION SENSOR ASSY

- (a) Disconnect the connector.
- (b) Remove a clip, bolt and the acceleration sensor assy.

9. INSTALL ACCELERATION SENSOR ASSY

- (a) Install the acceleration sensor assy with a clip and a bolt.
Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)
- (b) Connect the connector.

10. INSTALL REAR NO. 2 SEAT ASSY LH (See page 72-42)

SUSPENSION CONTROL SYSTEM (KDSS)

2504N-01

PRECAUTION

1. To prevent dirt or mud on parts from entering the hydraulic circuits in the KDSS during removal and installation or disassembly, wash each part before starting operations.
2. Keep the removed or disassembled parts in order. Protect the parts to prevent foreign matter from entering the hydraulic circuits.
3. The fluid is sealed in the hydraulic circuits at high pressure. Start operations after reducing the pressure by draining the fluid from the bleeder plug on the accumulator. Be careful when removing and installing or disassembling the hydraulic circuit-related parts, such as bleeder plugs and tube flare nuts.
4. Wipe any residual fluid off each part before connecting the hydraulic circuits and checking for fluid leaks.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The following troubleshooting procedure relates to non-electrical system problem symptoms only.
- For malfunctions in electrical systems such as accumulator pressure sensor, stabilizer control ECU and wire harness, refer to page 05-563.

1. Vehicle conditions:

The right and left sides of the vehicle are not level.	Refer to step 3.
The vehicle rolls excessively during driving.	Refer to step 4.

2. Suspension fluid

HINT:

Check the suspension fluid pressure using the hand-held tester.

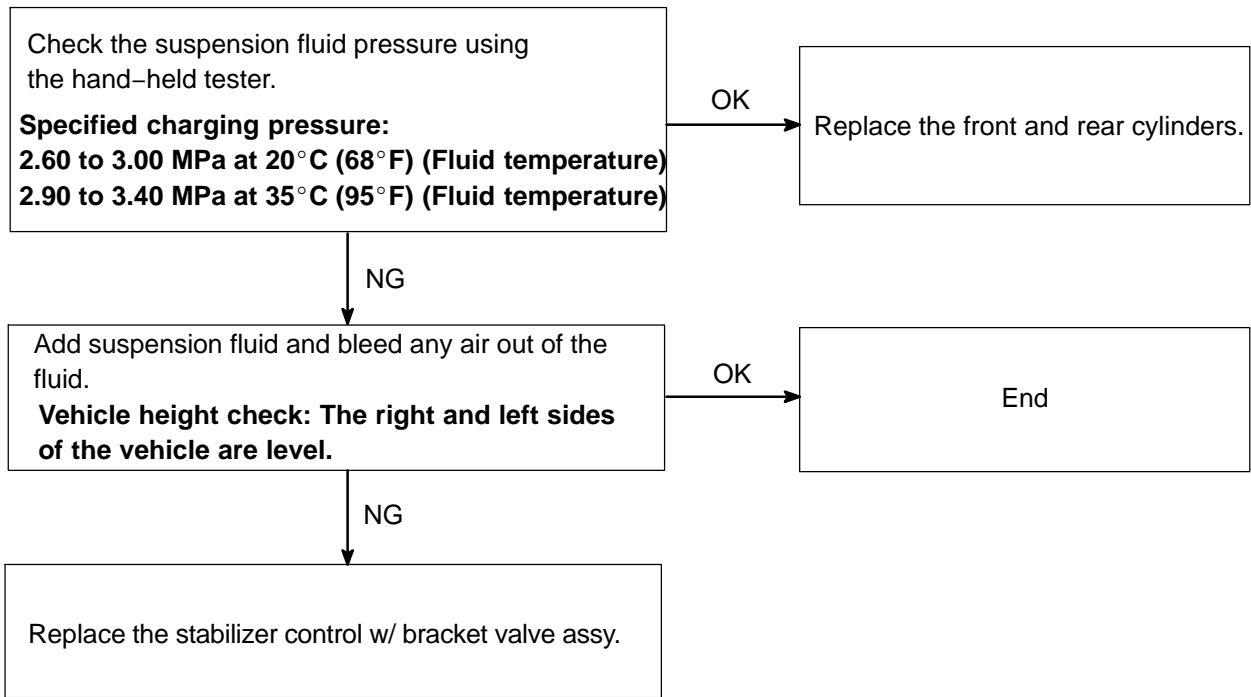
Standard:

2.60 to 3.00 MPa at 20°C (68°F) (Fluid temperature)

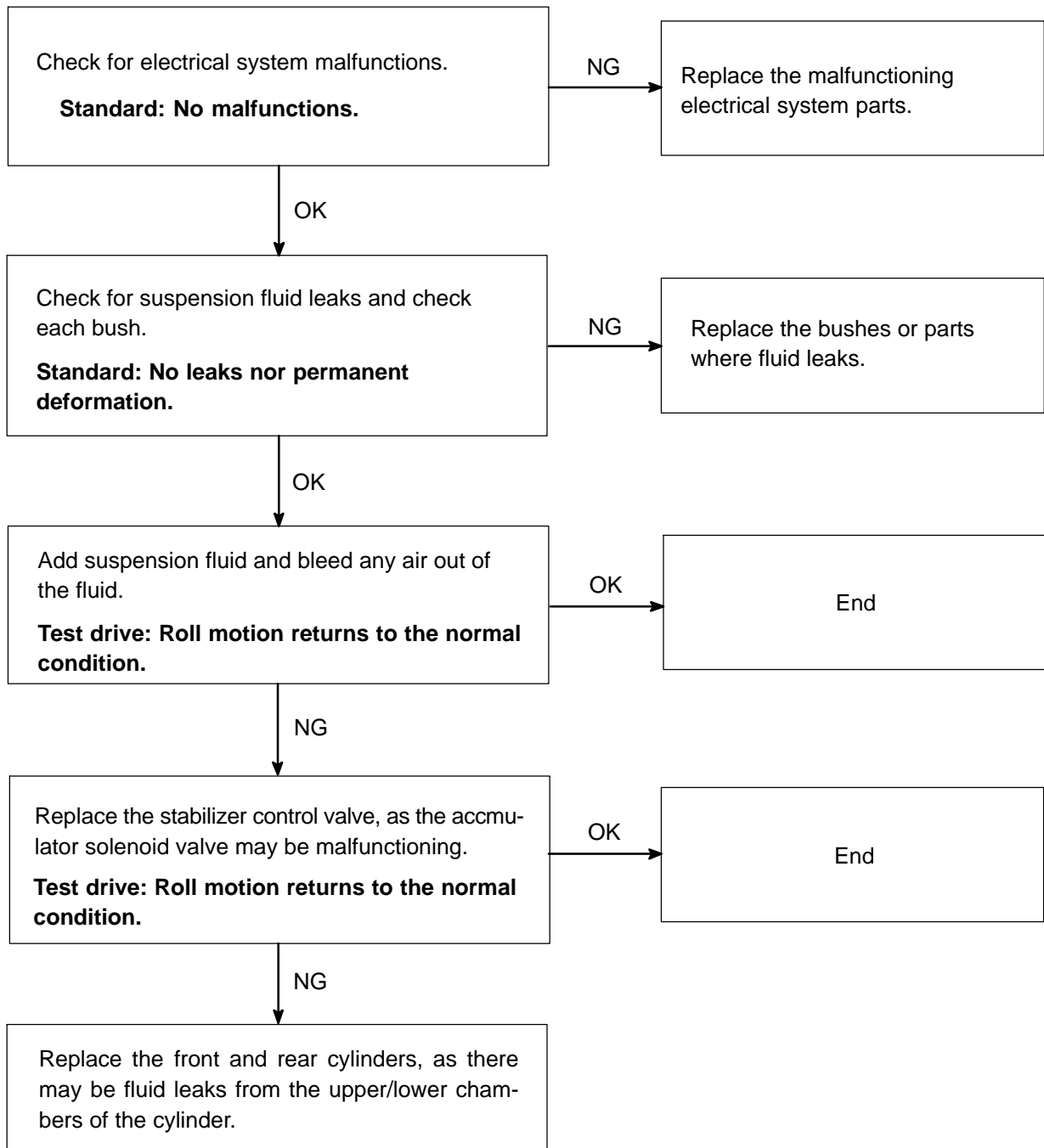
2.90 to 3.40 MPa at 35°C (95°F) (Fluid temperature)

Suspension fluid pressure is abnormally low.	Refer to step 5.
Suspension fluid pressure is abnormally high.	Refer to step 6.

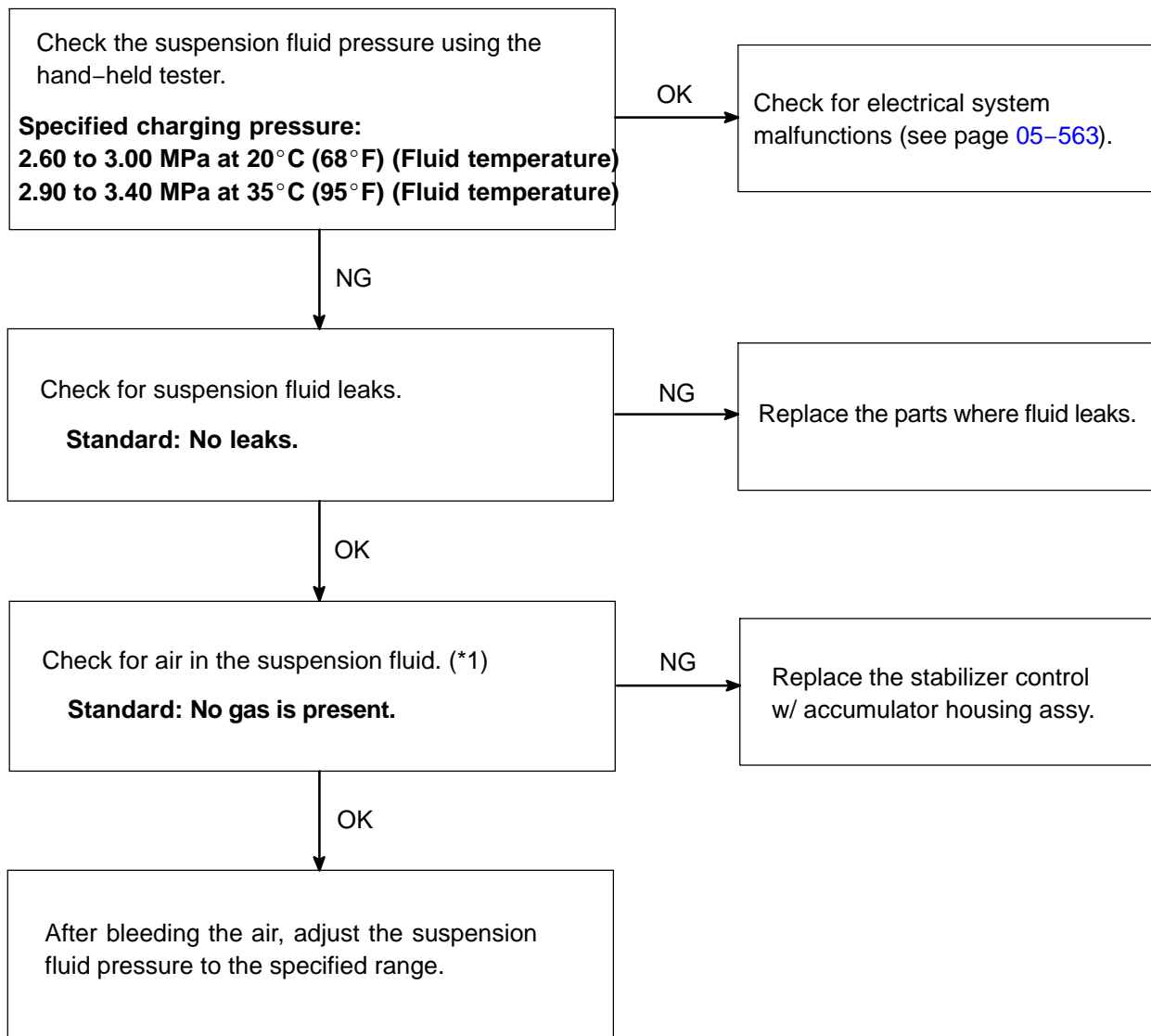
3. The right and left sides of the vehicle are not level.



4. The vehicle rolls excessively during driving.

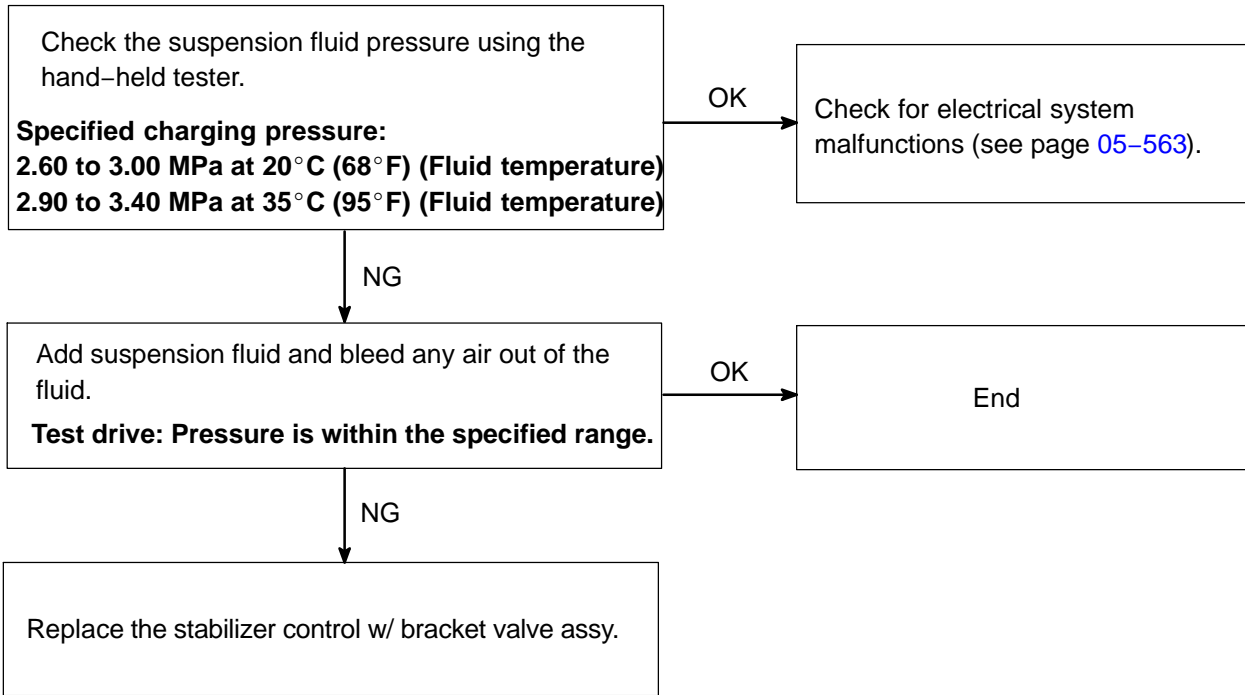


5. Suspension fluid pressure is abnormally low.

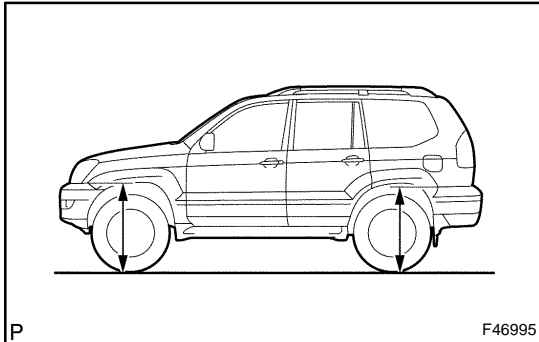


*1: This check is to confirm that the suspension fluid pressure is not low because of N² gas in the fluid. When the bellows in the stabilizer control w/ accumulator housing assy is malfunctioning, N² gas enters the suspension fluid, causing the fluid pressure to decrease.

6. Suspension fluid pressure is abnormally high.



ON-VEHICLE INSPECTION



1. MEASURE VEHICLE HEIGHT

- (a) Measure the distance from the ground to the top of the bumper and calculate the difference in the vehicle height between left and right. Perform this procedure for both the front and rear wheels.

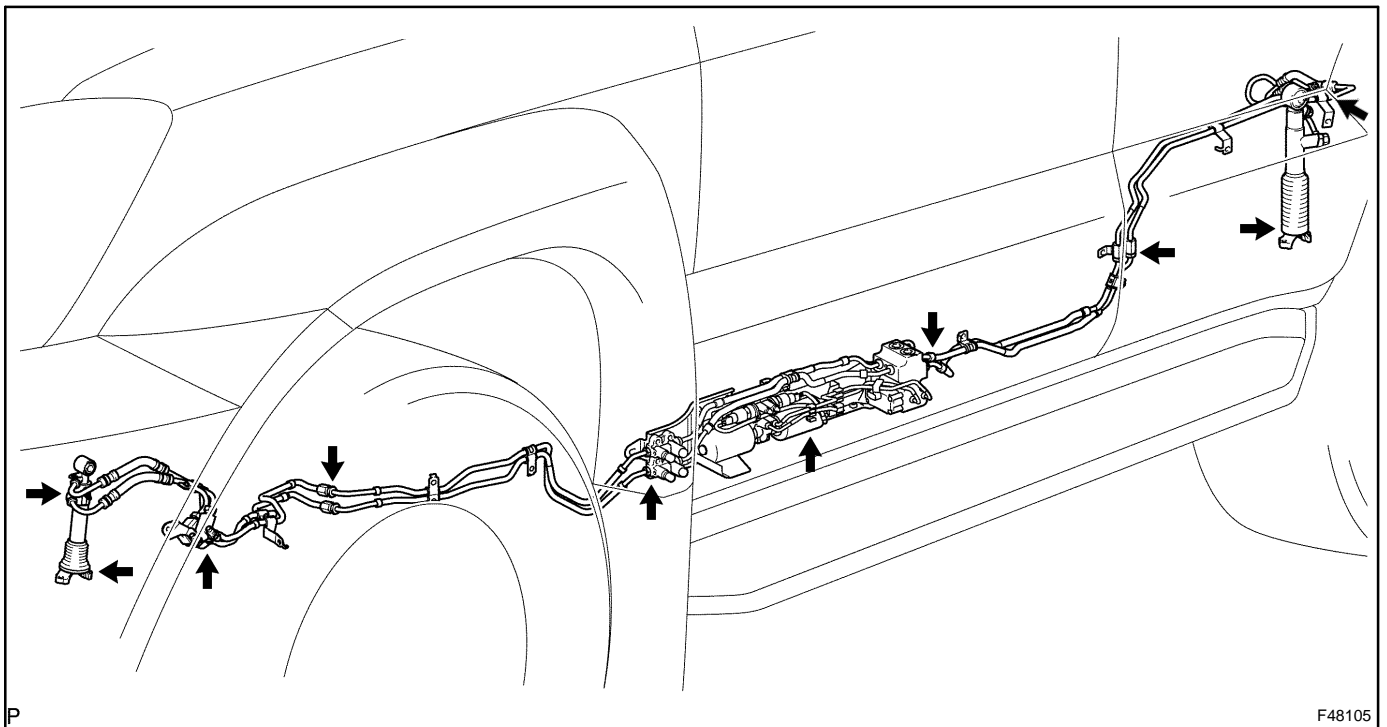
Height difference of left and right sides: 20 mm (0.79 in.) or less

NOTICE:

- Ensure that the wheels are on the ground and facing straight ahead.
- If the difference is not within the specified range, refer to "HOW TO PROCEED WITH TROUBLESHOOTING".

2. CHECK FOR FLUID LEAKS

- (a) Check the connection parts of the front stabilizer w/ tube cylinder assy, rear stabilizer control cylinder, stabilizer control w/ bracket valve assy and stabilizer control tube for suspension fluid leaks.



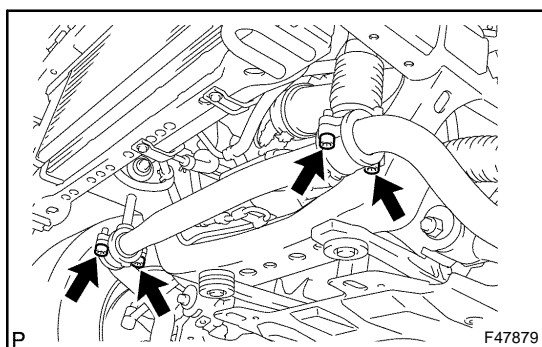
SUSPENSION FLUID (KDSS)

2504Q-02

BLEEDING

NOTICE:

- Ensure that the reservoir tank of the SST is sufficiently filled with suspension fluid. Keep the suspension fluid at a reasonable level to prevent air from entering the SST hose.
 - Do not reuse suspension fluid. Use only specified fluid: Suspension fluid AHC.
 - Do not push the pin on the oil nozzle valve sub-assy with a tool.
1. REMOVE RADIATOR SUPPORT SEAL UPPER (SEE PAGE 65-11)
 2. REMOVE BATTERY
 3. REMOVE STEP SUB-ASSY LH (SEE PAGE 76-33)
 4. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1



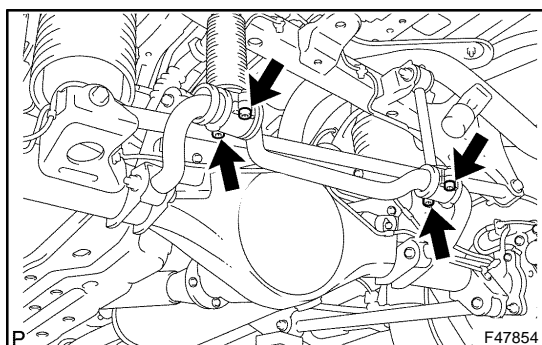
5. SEPARATE STABILIZER BAR FRONT

- (a) Using a socket hexagon wrench (10 mm), remove the 4 bolts and 2 front stabilizer lower brackets and separate the stabilizer bar front.

HINT:

Separate the stabilizer bar front so that the air in the front stabilizer w/ tube cylinder assy can be bled out easily when bleeding the hydraulic circuits.

6. REMOVE SPARE DISC WHEEL



7. SEPARATE STABILIZER BAR REAR

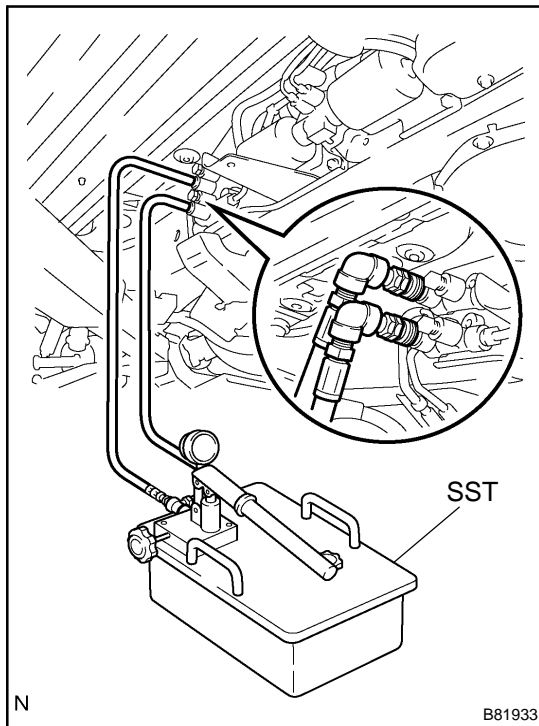
- (a) Using a socket hexagon wrench (8 mm), remove the 4 bolts and 2 rear stabilizer brackets lower and separate the stabilizer bar rear.

HINT:

Separate the stabilizer bar rear so that the air in the rear stabilizer control cylinder can be bled out easily when bleeding the hydraulic circuits.

8. BLEED SUSPENSION FLUID

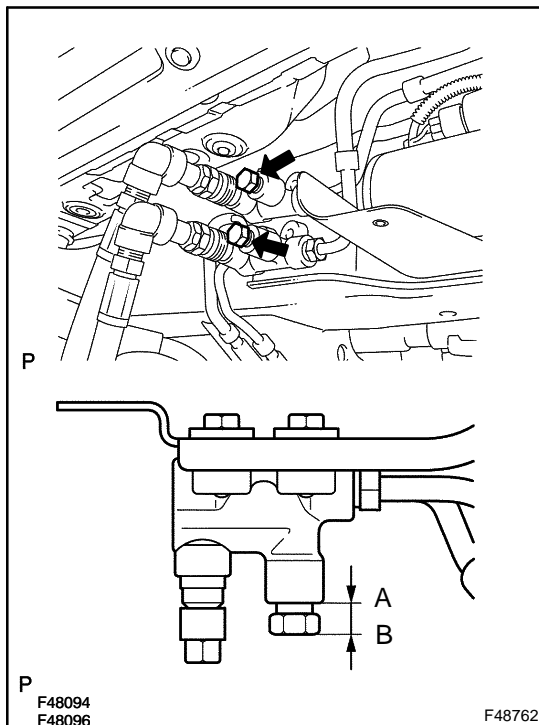
- (a) Fill the reservoir tank of the SST with suspension fluid.
Fluid: Suspension fluid AHC
 SST 09760-60010



(b) Connect the SST joints to the oil nozzle valves.

HINT:

The SST joints can be connected to either of the oil nozzle valves.

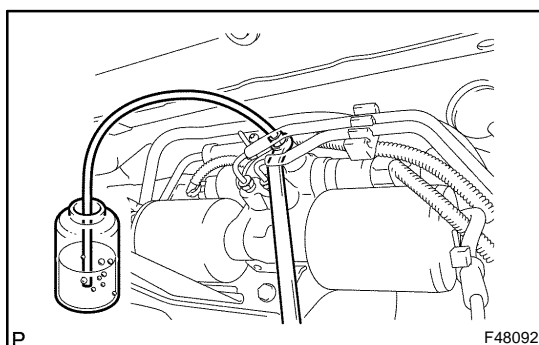


(c) Loosen the 2 stabilizer control adapter shutter valves.

Distance between A and B: 15 to 16.5 mm (0.60 to 0.65 in.) or less

NOTICE:

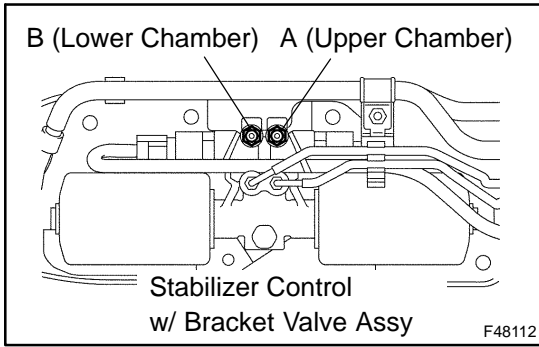
- Do not excessively loosen the valves.
- Ensure that all bleeder plugs are tightened.



(d) Set a wrench, vinyl tube and reservoir tank to the bleeder plug.

HINT:

Perform the following refill and air bleeding procedures in the same way for each bleeder plug.



- (e) Bleed any air out of the suspension fluid between the SST and stabilizer control w/ bracket valve assy.
 - (1) Boost the fluid pressure to 5 MPa, loosen the bleeder plug, bleed air and tighten the plug.

Torque: 9.5 N·m (97 kgf·cm, 84 in·lbf)
 - (2) Perform the procedure for A shown in the illustration first, then for B.

- (f) Add suspension fluid to each unit.
 - (1) Loosen the bleeder plug, add suspension fluid until air stops coming out and tighten the bleeder plug.

Torque: 9.5 N·m (97 kgf·cm, 84 in·lbf)

NOTICE:

Perform the operations in the following order: A, B, C, D, E and F. (Refer to the illustration below.)

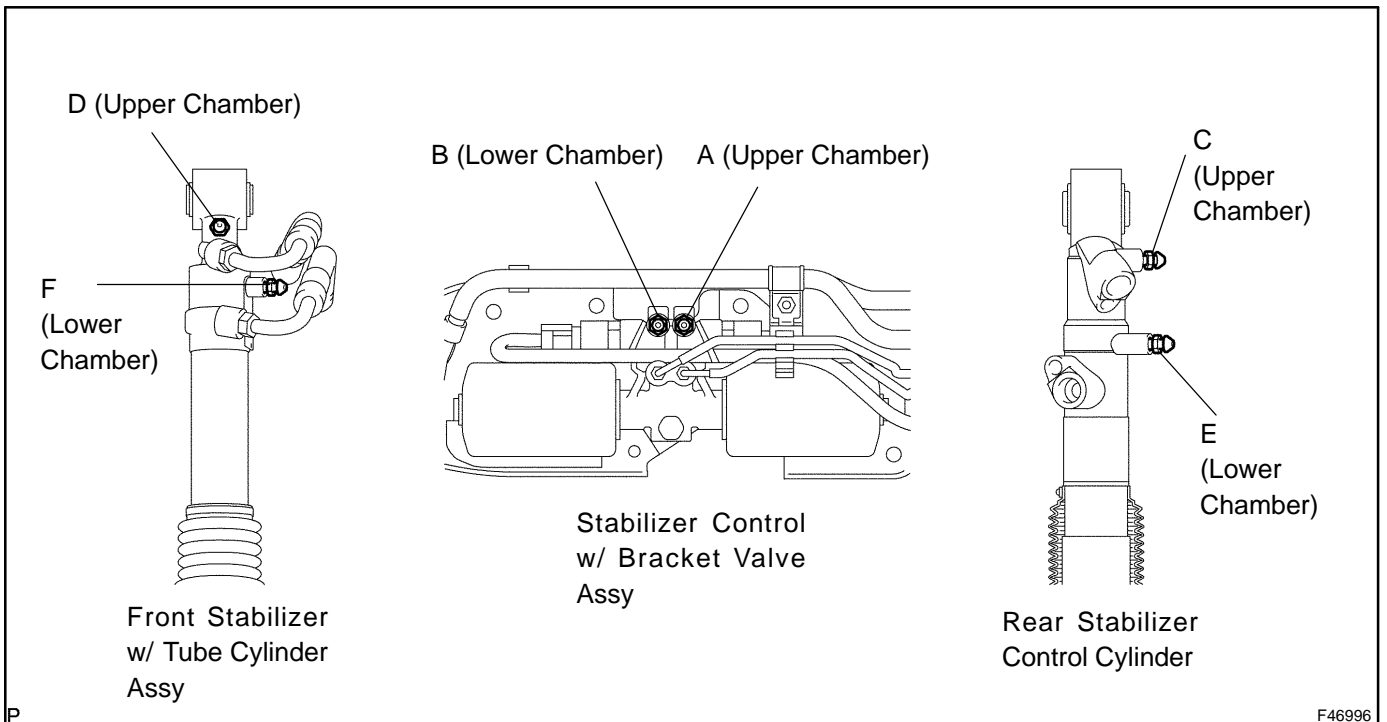
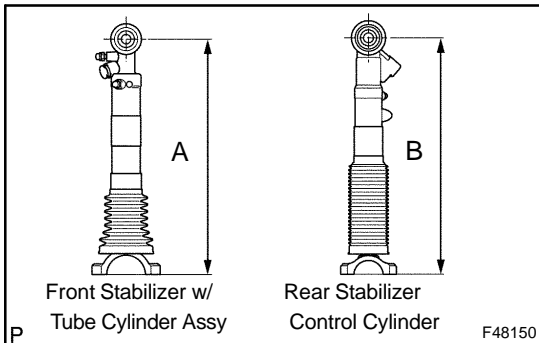
HINT:

- Ensure that only 1 bleeder plug is loose when adding suspension fluid.
- Perform the procedures with the front and rear cylinders fully stretched downward.

Length of cylinder:

A: 411.5 to 417.5 mm (16.20 to 16.44 in.)

B: 436.5 to 442.5 mm (17.19 to 17.42 in.)



- (g) Bleed any air out of the suspension fluid in each unit.
 (1) Boost the fluid pressure to 7 MPa, loosen the bleeder plug, bleed air and tighten the plug. Repeat the procedure until air stops coming out.

Torque: 9.5 N·m (97 kgf·cm, 84 in.-lbf)

NOTICE:

- Do not boost the fluid pressure to 8 MPa or more.
- Perform the operations in the following order: A, B, C, D, E and F. (Refer to the illustration above.)

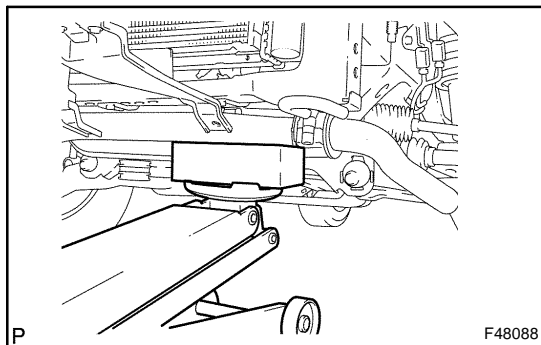
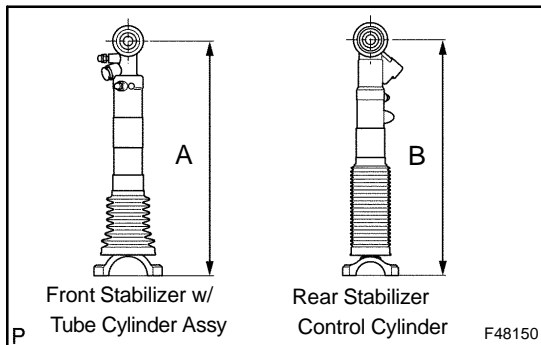
HINT:

- The procedure is complete when air does not come out twice in succession.
- Perform the procedures with the front and rear cylinders fully stretched downward.

Length of cylinder:

A: 411.5 to 417.5 mm (16.20 to 16.44 in.)

B: 436.5 to 442.5 mm (17.19 to 17.42 in.)

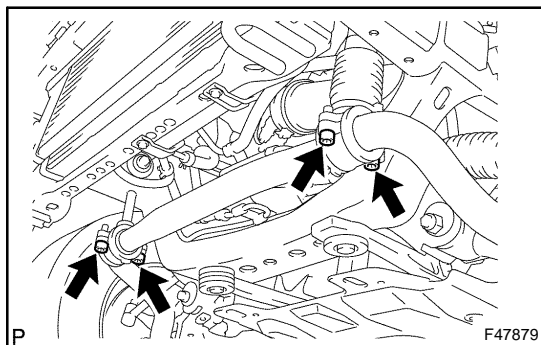


9. CONNECT STABILIZER BAR FRONT

- (a) Support the stabilizer bar front with a jack. Place a wooden block between the jack and the stabilizer bar front to prevent damage.

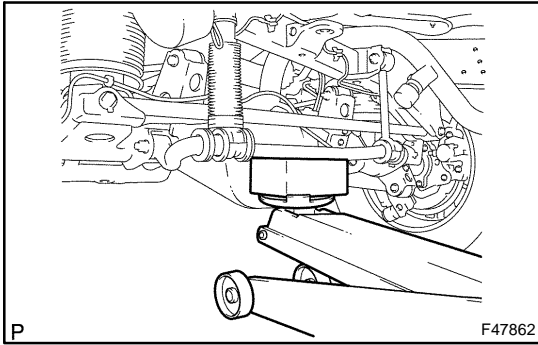
HINT:

Place the jack under the left side of the vehicle.



- (b) Using a socket hexagon wrench (10 mm), connect the stabilizer bar front with the 4 bolts and 2 front stabilizer lower brackets.

Torque: 59 N·m (602 kgf·cm, 44 ft.-lbf)

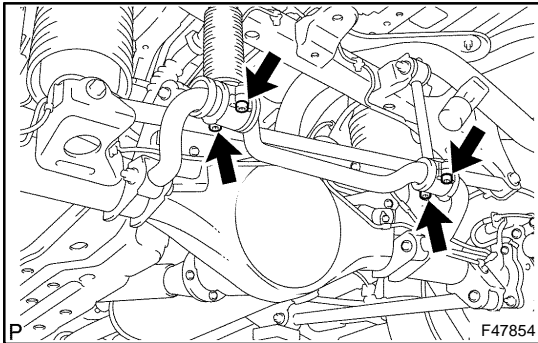


10. CONNECT STABILIZER BAR REAR

- (a) Support the stabilizer bar rear with a jack. Place a wooden block between the jack and the stabilizer bar rear to prevent damage.

HINT:

Place the jack under the left side of the vehicle.



- (b) Using a socket hexagon wrench (8 mm), connect the stabilizer bar rear with the 4 bolts and 2 rear stabilizer brackets lower.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

11. STABILIZE SUSPENSION (SEE PAGE 25-33)

12. CHECK SUSPENSION FLUID PRESSURE

- (a) Check the suspension fluid pressure.

13. MEASURE VEHICLE HEIGHT

- (a) Measure the difference in vehicle height between the left and right sides.

(1) For measurement procedures, refer to ON-VEHICLE INSPECTION on page 25-26.

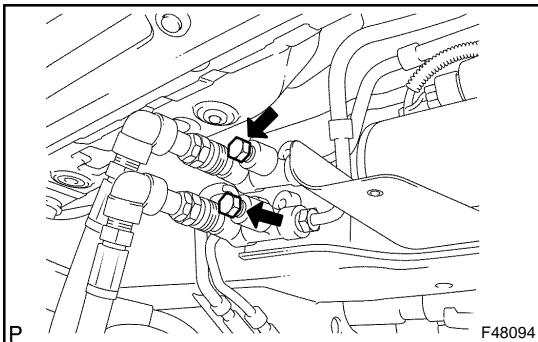
- (b) Tighten the stabilizer control adapter shutter valves.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

- (c) Disconnect the SST joints.

NOTICE:

- Ensure that the stabilizer control adapter shutter valves are completely closed before disconnecting the SST joints.
- Ensure that no pressure is applied to the SST hoses before disconnecting the SST joints.



14. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

15. INSTALL SPARE DISC WHEEL

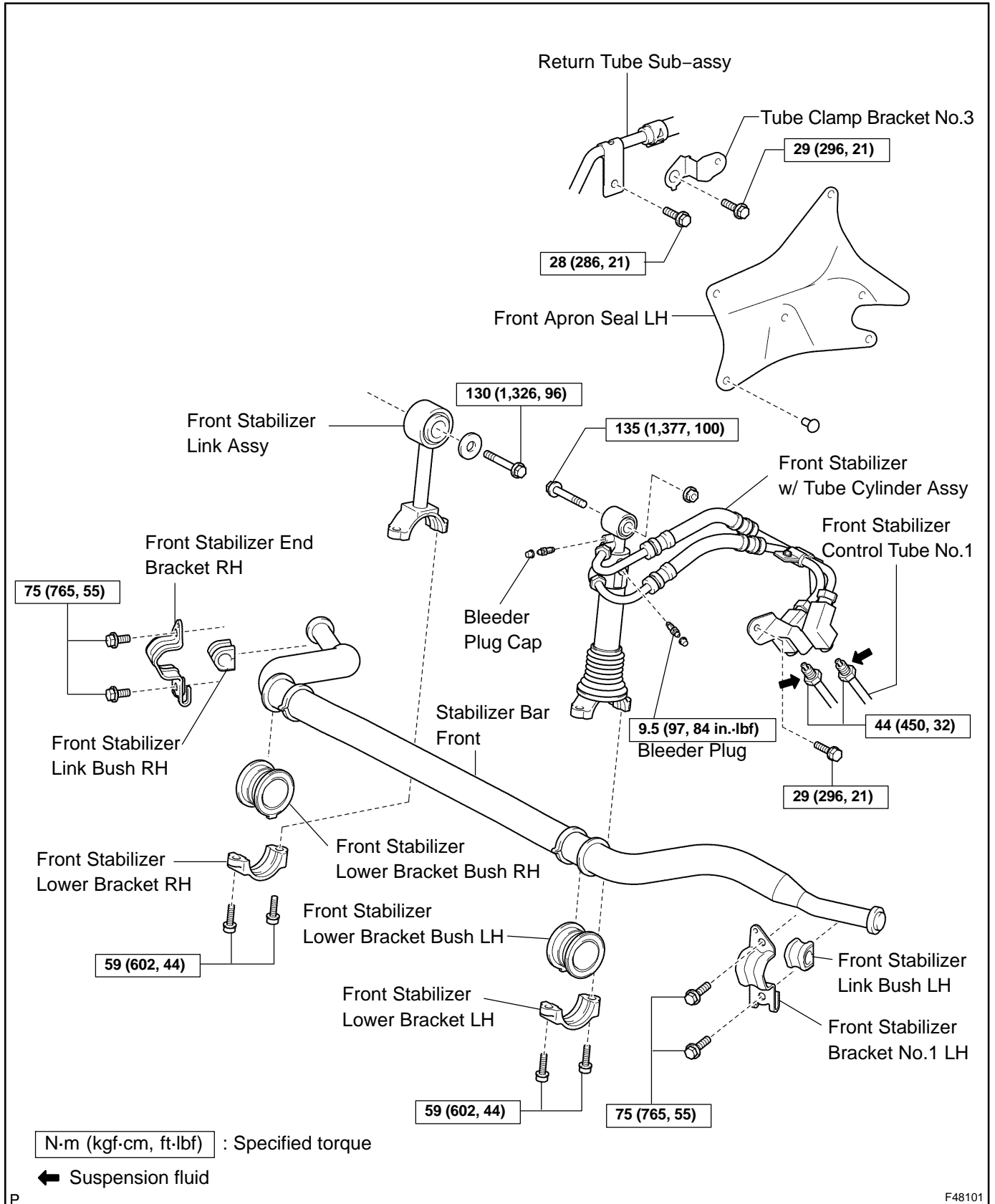
16. INSTALL STEP SUB-ASSY LH (SEE PAGE 76-33)

17. INSTALL BATTERY

18. INSTALL RADIATOR SUPPORT SEAL UPPER

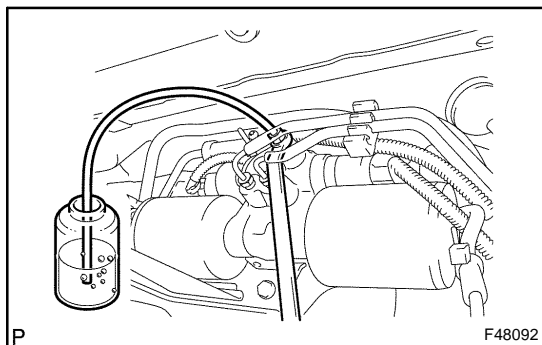
FRONT STABILIZER (KDSS) COMPONENTS

2504R-01



OVERHAUL

1. REMOVE RADIATOR SUPPORT SEAL UPPER (SEE PAGE 65-11)
2. REMOVE BATTERY
3. REMOVE STEP SUB-ASSY LH (SEE PAGE 76-33)



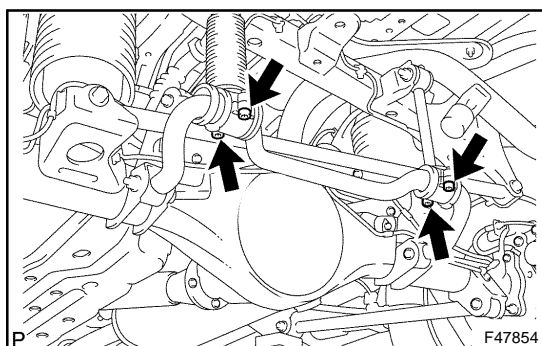
4. DRAIN SUSPENSION FLUID

- (a) Loosen the bleeder plug on the stabilizer control w/ accumulator housing assy and drain suspension fluid.

HINT:

- Drain suspension fluid when performing the operations related to the hydraulic circuits.
 - Draining suspension fluid decreases suspension fluid pressure.
- (b) Tighten the bleeder plug.
Torque: 9.5 N·m (97 kgf·cm, 84 in.-lbf)

5. REMOVE SPARE DISC WHEEL



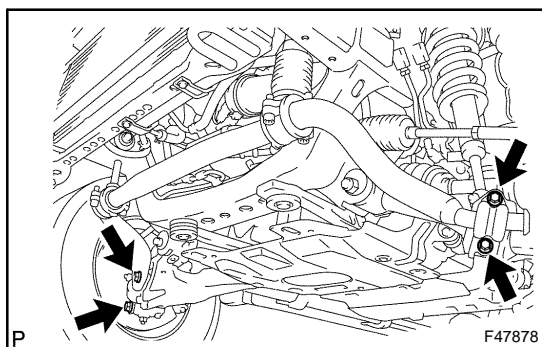
6. SEPARATE STABILIZER BAR REAR

- (a) Using a socket hexagon wrench (8 mm), remove the 4 bolts and 2 rear stabilizer brackets lower and separate the stabilizer bar rear.

HINT:

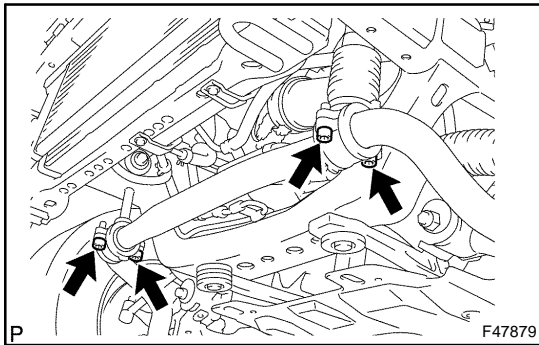
Separate the stabilizer bar rear so that the air in the rear stabilizer control cylinder can be bled out easily when bleeding the hydraulic circuits.

7. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1



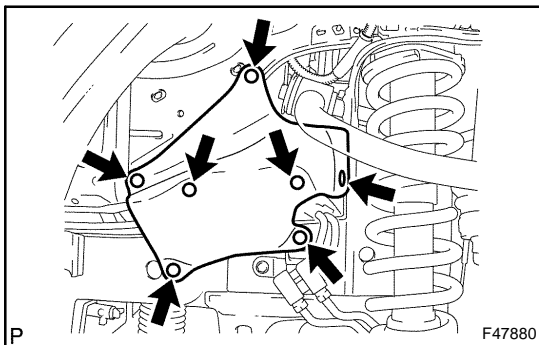
8. REMOVE STABILIZER BAR FRONT

- (a) Remove the 4 bolts and 2 front stabilizer brackets with the wheels on the ground.



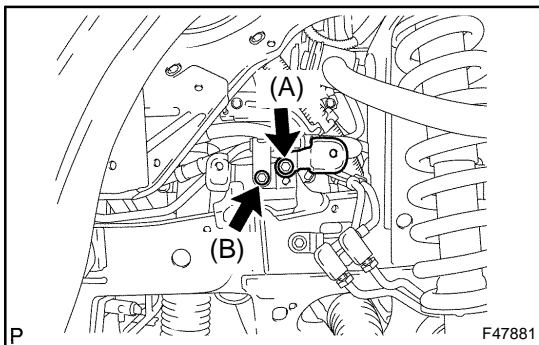
- (b) Using a socket hexagon wrench (10 mm), remove the 4 bolts, 2 front stabilizer lower brackets and stabilizer bar front.
- (c) Remove the 2 front stabilizer link bushes and front stabilizer lower bracket bushes from the stabilizer bar front.

9. REMOVE FRONT DISC WHEEL

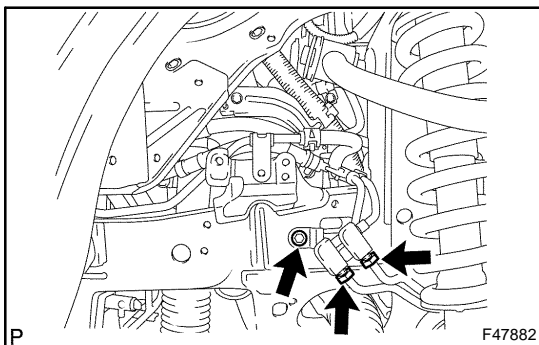


10. SEPARATE FRONT STABILIZER CONTROL TUBE NO.1

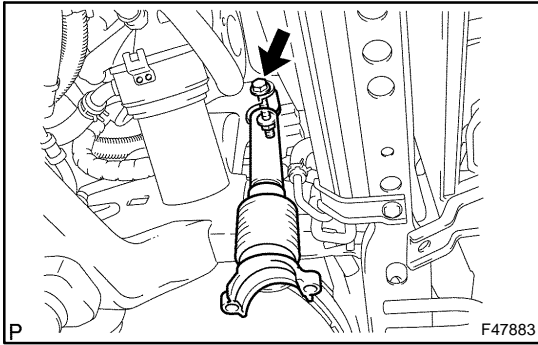
- (a) Remove the 7 clips and front apron seal LH.



- (b) Remove bolt (A) and tube clamp bracket No.3.
- (c) Remove bolt (B) and separate the return tube sub-assy.



- (d) Using SST, separate the front stabilizer control tube No.1 from the front stabilizer w/ tube cylinder assy.
SST 09023-12701
- (e) Remove the bolt.

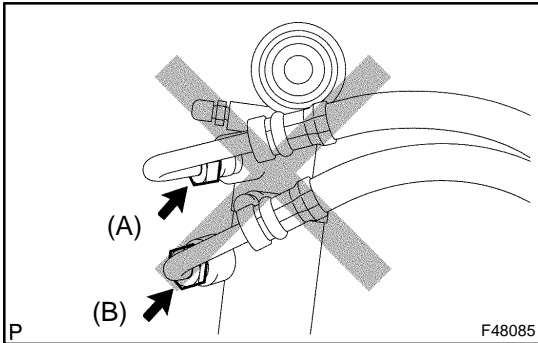


11. REMOVE FRONT STABILIZER W/TUBE CYLINDER ASSY

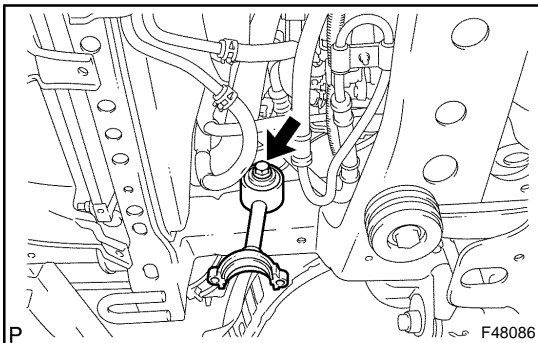
- (a) Remove the bolt, nut and front stabilizer w/ tube cylinder assy.

NOTICE:

- Turn the bolt while holding the nut.
- Do not loosen or remove flare nuts (A) and (B) shown in the illustration.
- Do not remove or hold the front stabilizer w/ tube cylinder assy by the cylinder boot.

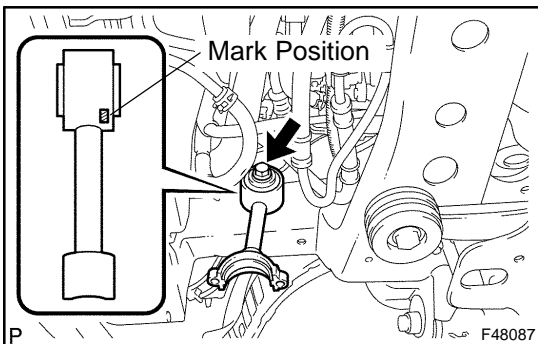


- (b) Remove the 2 bleeder plug caps and bleeder plugs from the front stabilizer w/ tube cylinder assy.



12. REMOVE FRONT STABILIZER LINK ASSY

- (a) Remove the bolt, spacer and front stabilizer link assy.



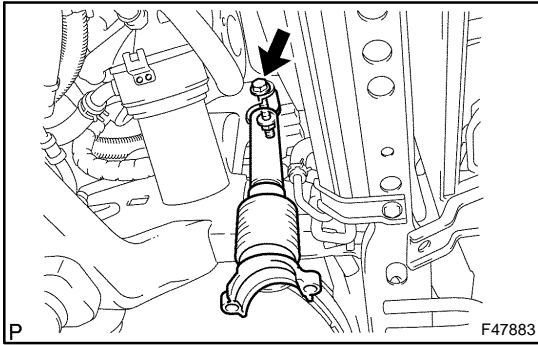
13. TEMPORARILY TIGHTEN FRONT STABILIZER LINK ASSY

- (a) Install the front stabilizer link assy with the spacer by temporarily tightening the bolt. Ensure that the identification mark on the front stabilizer link assy faces inward and to the front of the vehicle.

14. TEMPORARILY TIGHTEN FRONT STABILIZER W/TUBE CYLINDER ASSY

- (a) Install the 2 bleeder plugs and bleeder plug caps to the front stabilizer cylinder w/ tube cylinder assy.

Torque: 9.5 N·m (97 kgf·cm, 84 in·lbf)



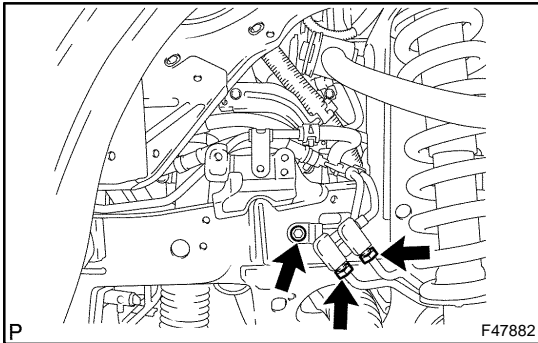
- (b) Install the front stabilizer w/ tube cylinder assy by temporarily tightening the nut and bolt.

NOTICE:

- Turn the bolt while holding the nut.
- Do not hold or install the front stabilizer w/ tube cylinder assy by the cylinder boot.

HINT:

Pass the tube side of the front stabilizer w/ tube cylinder assy under the return tube sub-assy before installing.

**15. CONNECT FRONT STABILIZER CONTROL TUBE NO.1**

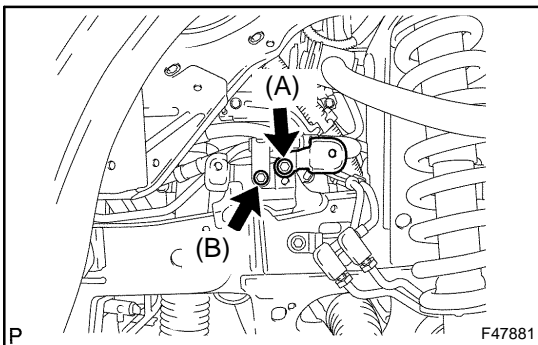
- (a) Install the bracket by temporarily tightening the bolt.
- (b) Connect the front stabilizer control tube No.1.
- (1) Apply suspension fluid to the threads of the flare nuts.
 - (2) Using SST, connect the front stabilizer control tube No.1 to the front stabilizer w/ tube cylinder assy and tighten the flare nuts.

SST 09023-12701

Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)

- (c) Fully tighten the bolt.

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

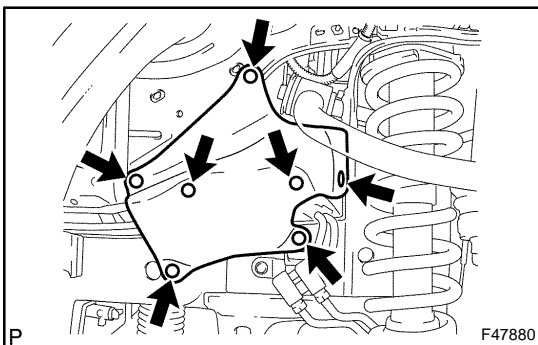


- (d) Install the tube clamp bracket No.3 with bolt (A).

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

- (e) Install the return tube sub-assy with bolt (B).

Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)



- (f) Install the front apron seal LH with the 7 clips.

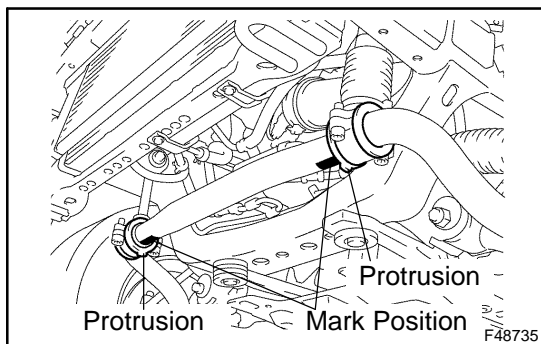
16. BLEED SUSPENSION FLUID (SEE PAGE 25-27)

SST 09760-60010

17. CHECK FOR FLUID LEAKS (SEE PAGE 25-26)**18. INSTALL FRONT DISC WHEEL**

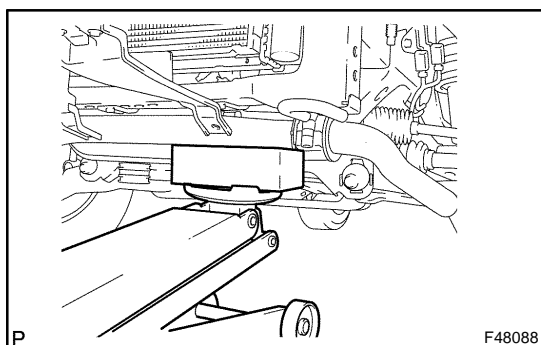
Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

2005 LEXUS GX470 REPAIR MANUAL (RM1164U)



19. INSTALL STABILIZER BAR FRONT

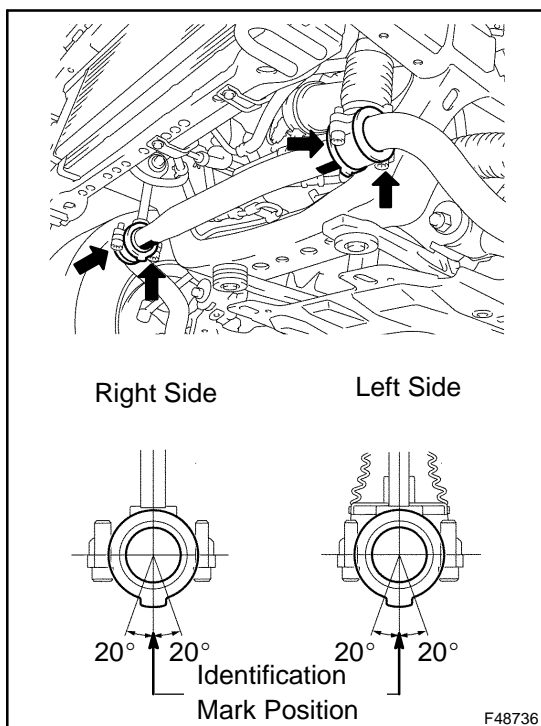
- (a) Install the 2 front stabilizer lower bracket bushes to the stabilizer bar front.
- (1) Align the protrusions on the bushes with the identification marks on the front stabilizer bar front with the protrusions facing inward.



- (b) Support the stabilizer bar front with the identification marks facing down with a jack. Place a wooden block between the jack and the stabilizer bar front to prevent damage.

HINT:

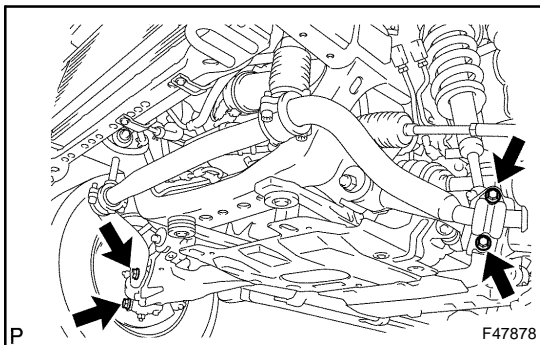
Place the jack under the left side of the vehicle.



- (c) Using a socket hexagon wrench (10 mm), install the stabilizer bar front with the 4 bolts and 2 front stabilizer lower brackets.

Torque: 59 N·m (602 kgf·cm, 44 ft·lbf)

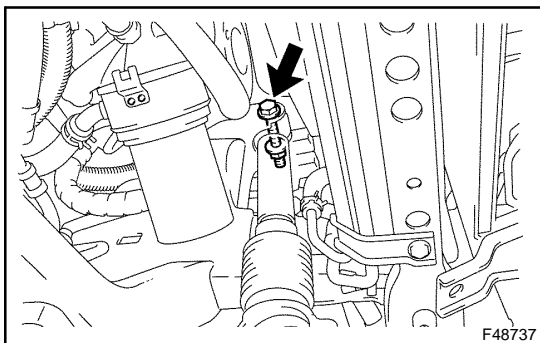
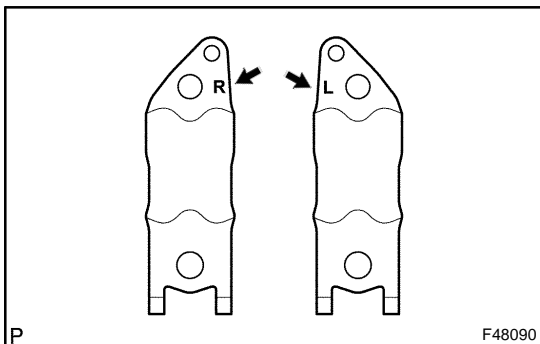
- (1) Check that the protrusions on the front stabilizer lower bracket bushes are positioned within 20° of the identification marks.



- (d) Install the 4 bolts, 2 front stabilizer brackets and 2 front stabilizer link bushes with the wheels on the ground.
Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

HINT:

There are stamps on the front stabilizer brackets to distinguish between right and left.



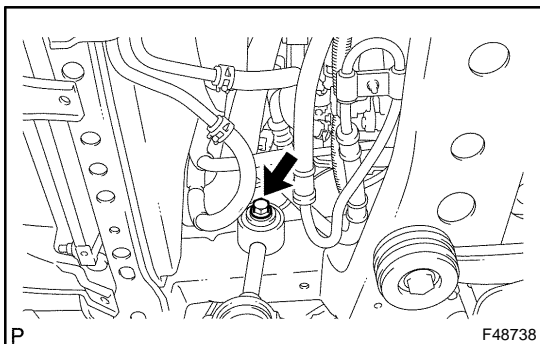
20. FULLY TIGHTEN FRONT STABILIZER W/TUBE CYLINDER ASSY

- (a) Fully tighten the bolt on the front stabilizer w/ tube cylinder assy.

Torque: 135 N·m (1,377 kgf·cm, 100 ft·lbf)

NOTICE:

Tighten the bolt with the wheels on the ground.



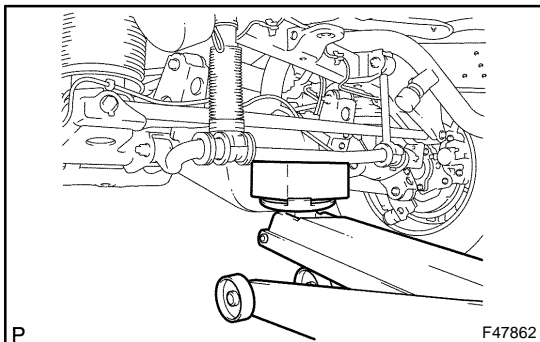
21. FULLY TIGHTEN FRONT STABILIZER LINK ASSY

- (a) Fully tighten the bolt on the front stabilizer link assy.

Torque: 130 N·m (1,326 kgf·cm, 96 ft·lbf)

NOTICE:

Tighten the bolt with the wheels on the ground.

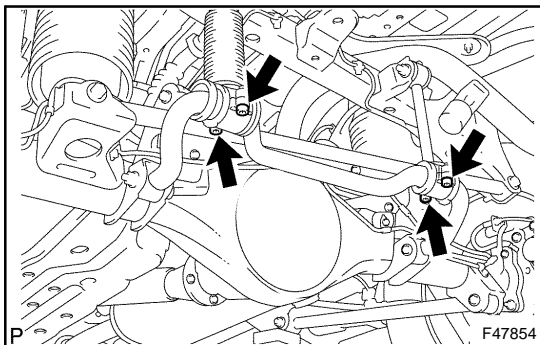


22. CONNECT STABILIZER BAR REAR

- (a) Support the stabilizer bar rear with a jack. Place a wooden block between the jack and the stabilizer bar rear to prevent damage.

HINT:

Place the jack under the left side of the vehicle.



- (b) Using a socket hexagon wrench (8 mm), connect the stabilizer bar rear with the 4 bolts and 2 rear stabilizer brackets lower.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

23. STABILIZE SUSPENSION

- (a) Lower the vehicle.
 (1) Place the 4 wheels on the ground with the SST connected.

NOTICE:

- Pay attention to the SST while lowering the vehicle.
- Ensure that the jack and lift are completely separated from the vehicle.

- (b) Set charging pressure to within the specified range.

- (1) Charge suspension fluid with the SST.

Specified charging pressure:

2.60 to 3.00 MPa at 20°C (68°F) (Fluid temperature)

2.90 to 3.40 MPa at 35°C (95°F) (Fluid temperature)

- (c) Stabilize the vehicle.

- (1) Do not perform any operations on the vehicle for 30 seconds or more after charging suspension fluid. The vehicle will stabilize during this time.

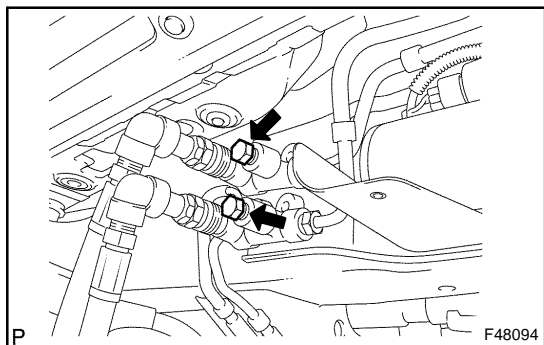
24. CHECK SUSPENSION FLUID PRESSURE

- (a) Check the suspension fluid pressure.

25. MEASURE VEHICLE HEIGHT

- (a) Measure the difference in vehicle height between the left and right sides.

- (1) For measurement procedures, refer to ON-VEHICLE INSPECTION on page 25-26.



- (b) Tighten the stabilizer control adapter shutter valves.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

- (c) Disconnect the SST joints.

NOTICE:

- Ensure that the stabilizer control adapter shutter valves are completely closed before disconnecting the SST joints.
- Ensure that no pressure is applied to the SST hoses before disconnecting the SST joints.

26. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

27. INSTALL SPARE DISC WHEEL

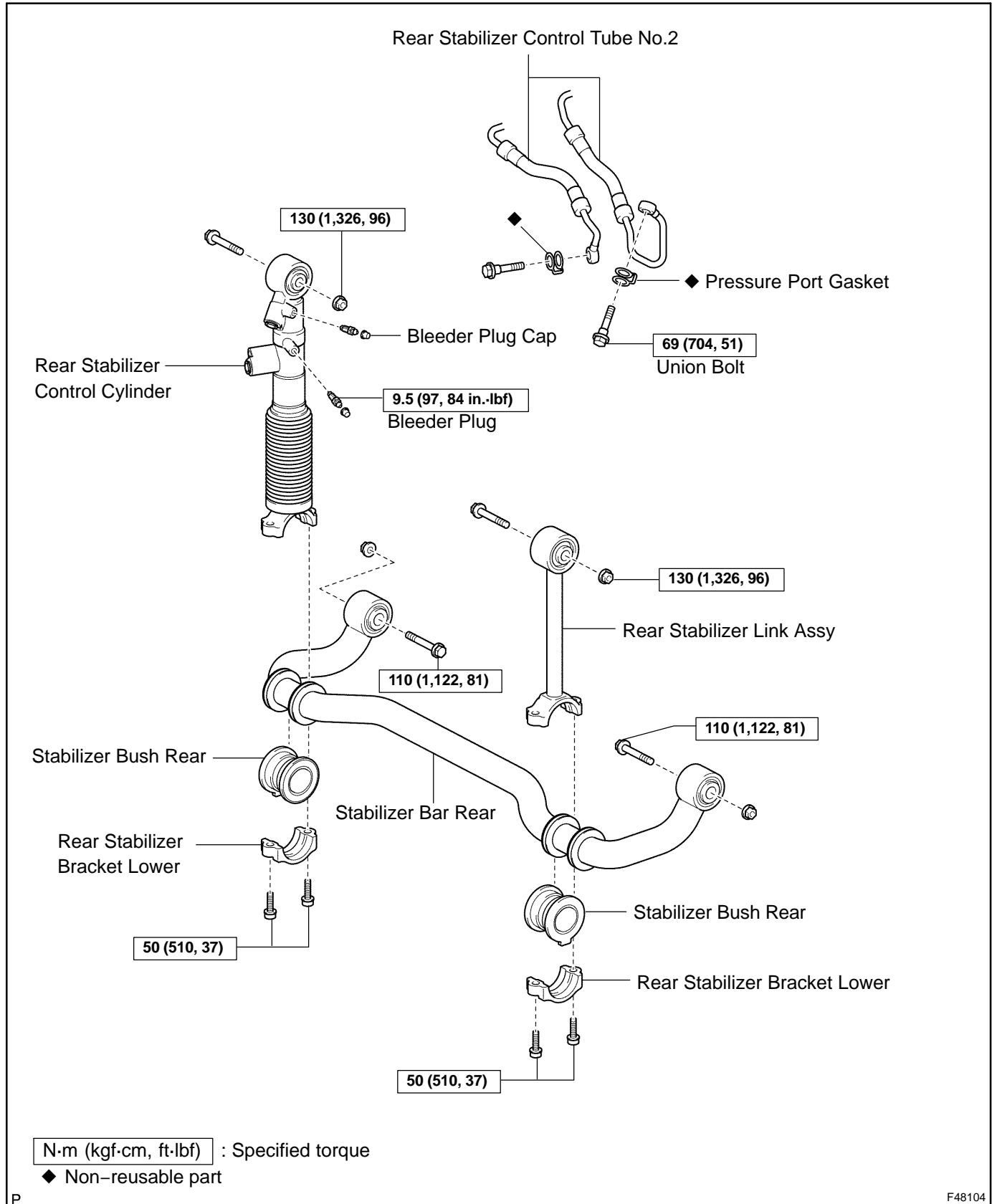
28. INSTALL STEP SUB-ASSY LH (SEE PAGE 76-33)

29. INSTALL BATTERY

30. INSTALL RADIATOR SUPPORT SEAL UPPER

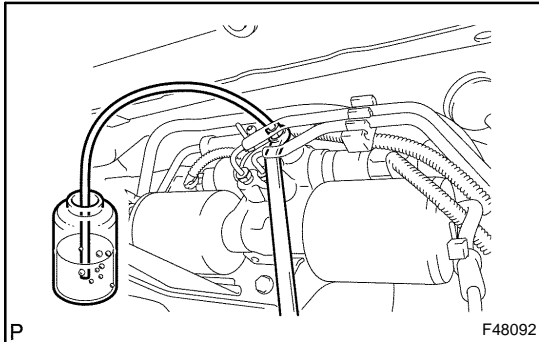
REAR STABILIZER (KDSS) COMPONENTS

2504T-01



OVERHAUL

1. REMOVE RADIATOR SUPPORT SEAL UPPER (SEE PAGE 65-11)
2. REMOVE BATTERY
3. REMOVE STEP SUB-ASSY LH (SEE PAGE 76-33)



4. DRAIN SUSPENSION FLUID

- (a) Loosen the bleeder plug on the stabilizer control w/ accumulator housing assy and drain suspension fluid.

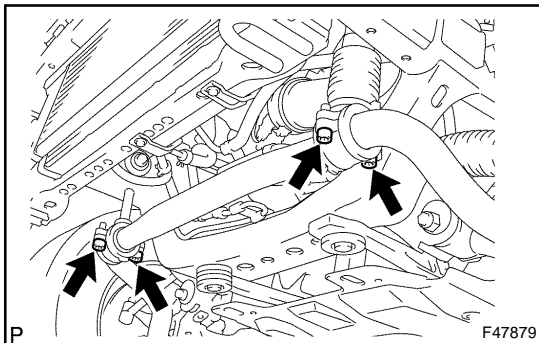
HINT:

- Drain suspension fluid when performing the operations related to the hydraulic circuits.
- Draining suspension fluid decreases suspension fluid pressure.

- (b) Tighten the bleeder plug.

Torque: 9.5 N·m (97 kgf·cm, 84 in.-lbf)

5. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1



6. SEPARATE STABILIZER BAR FRONT

- (a) Using a socket hexagon wrench (10 mm), remove the 4 bolts and 2 front stabilizer lower brackets and separate the stabilizer bar front.

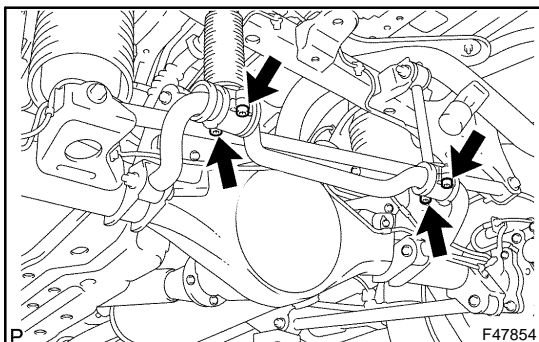
NOTICE:

Ensure that the bottom of the front stabilizer w/ tube cylinder assy is separated from the stabilizer bar front.

HINT:

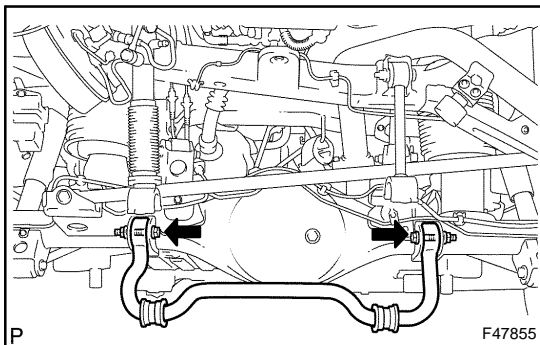
Separate the stabilizer bar front so that the air in the front stabilizer w/ tube cylinder assy can be bled out easily when bleeding the hydraulic circuits.

7. REMOVE SPARE DISC WHEEL



8. REMOVE STABILIZER BAR REAR

- (a) Using a socket hexagon wrench (8 mm), remove the 4 bolts and 2 rear stabilizer brackets lower.

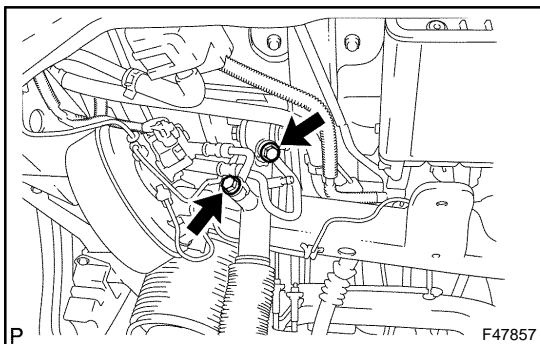


(b) Remove the 2 bolts, nuts and stabilizer bar rear.

NOTICE:

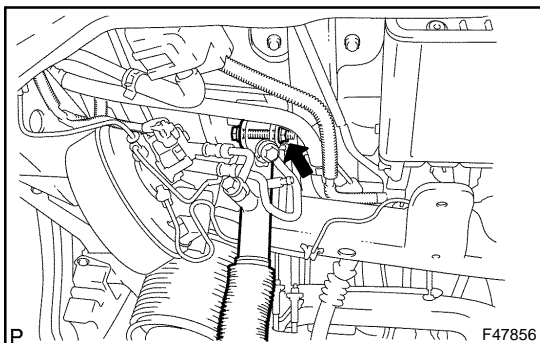
Turn the bolts while holding the nuts.

(c) Remove the 2 stabilizer bushes from the stabilizer bar rear.



9. SEPARATE REAR STABILIZER CONTROL TUBE NO.2

(a) Remove the 2 union bolts and pressure port gaskets and separate the rear stabilizer control tube No.2 from the rear stabilizer control cylinder.



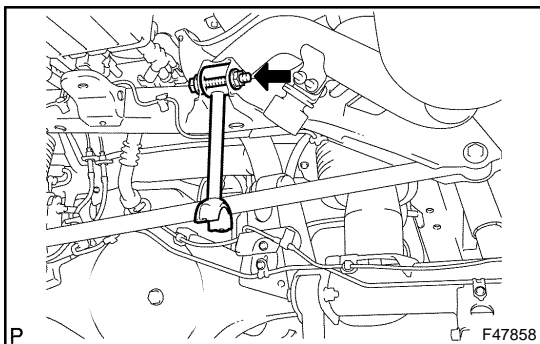
10. REMOVE REAR STABILIZER CONTROL CYLINDER

(a) Remove the bolt, nut and rear stabilizer control cylinder.

NOTICE:

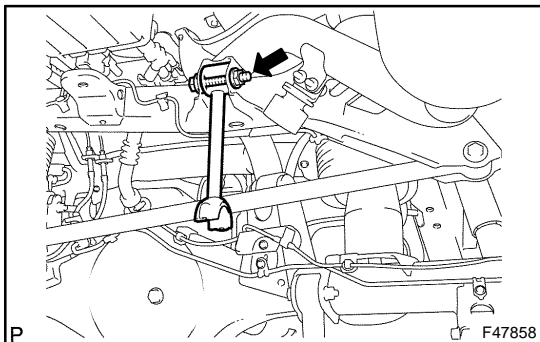
Do not remove or hold the rear stabilizer control cylinder by the cylinder boot.

(b) Remove the 2 bleeder plug caps and bleeder plugs from the rear stabilizer control cylinder.



11. REMOVE REAR STABILIZER LINK ASSY

(a) Remove the bolt, nut and rear stabilizer link assy.



12. INSTALL REAR STABILIZER LINK ASSY

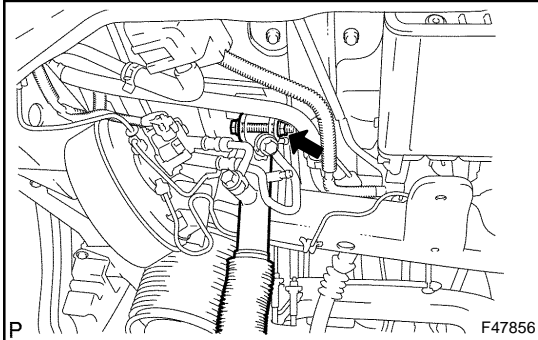
(a) Install the rear stabilizer link assy with the bolt and nut.

Torque: 130 N·m (1,326 kgf·cm, 96 ft·lbf)

13. INSTALL REAR STABILIZER CONTROL CYLINDER

- (a) Install the 2 bleeder plugs and bleeder plug caps to the rear stabilizer control cylinder.

Torque: 9.5 N·m (97 kgf·cm, 84 in·lbf)



- (b) Install the rear stabilizer control cylinder with the bolt and nut.

Torque: 130 N·m (1,326 kgf·cm, 96 ft·lbf)

NOTICE:

Do not hold or install the rear stabilizer control cylinder by the cylinder boot.

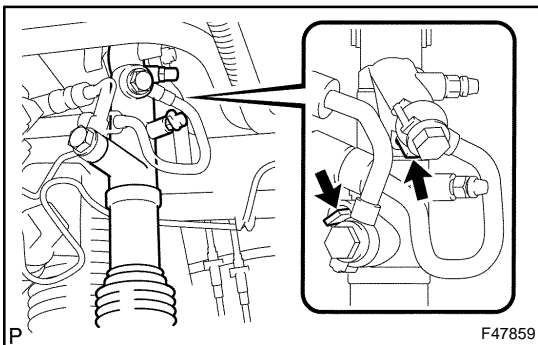
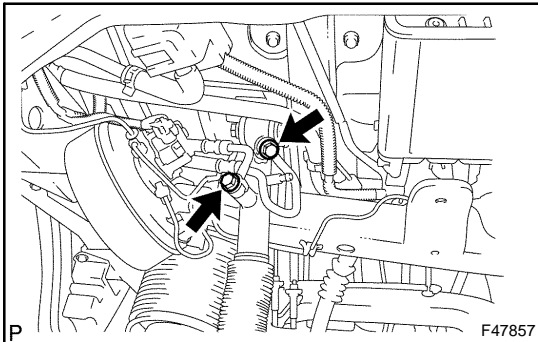
14. CONNECT REAR STABILIZER CONTROL TUBE NO.2

- (a) Install the rear stabilizer control tube No.2 to the rear stabilizer control cylinder with the 2 union bolts and 2 new pressure port gaskets.

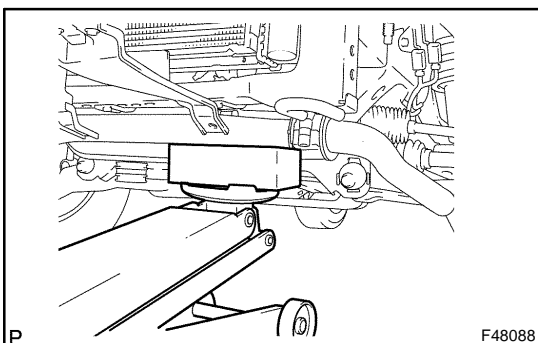
Torque: 69 N·m (704 kgf·cm, 51 ft·lbf)

NOTICE:

Insert the stopper of the rear stabilizer control tube No.2 into the rear stabilizer control cylinder.

**15. BLEED SUSPENSION FLUID (SEE PAGE 25-27)**

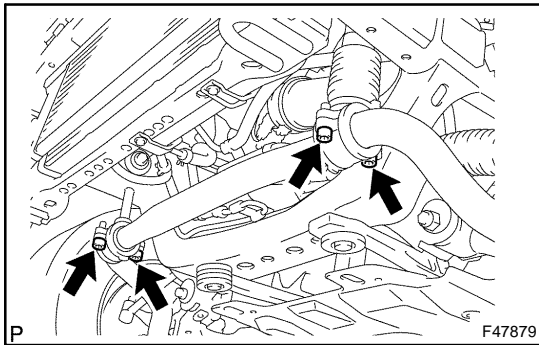
SST 09760-60010

16. CHECK FOR FLUID LEAKS (SEE PAGE 25-26)**17. CONNECT STABILIZER BAR FRONT**

- (a) Support the stabilizer bar front with a jack. Place a wooden block between the jack and the stabilizer bar front to prevent damage.

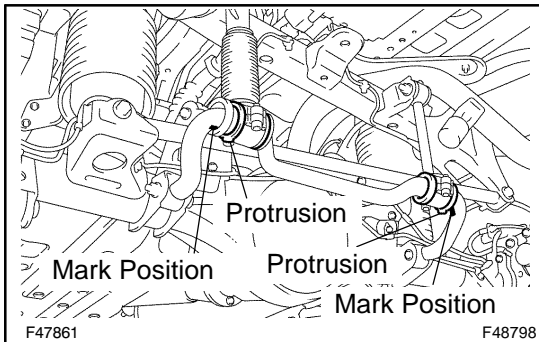
HINT:

Place the jack under the left side of the vehicle.



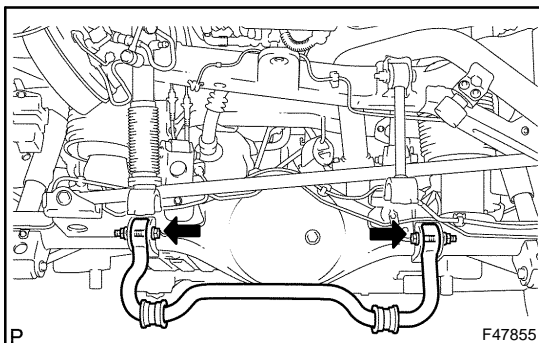
- (b) Using a socket hexagon wrench (10 mm), connect the stabilizer bar front with the 4 bolts and 2 front stabilizer lower brackets.

Torque: 59 N·m (602 kgf·cm, 44 ft·lbf)



18. INSTALL STABILIZER BAR REAR

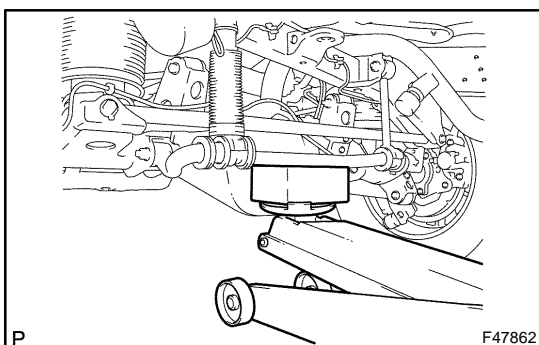
- (a) Install the 2 stabilizer bushes rear to the stabilizer bar rear.
- (1) Align the protrusions on the bushes with the identification marks on the stabilizer bar rear. Ensure that the protrusions face outward.



- (b) Install the stabilizer bar rear with the 2 bolts and nuts with the identification marks facing down.

NOTICE:

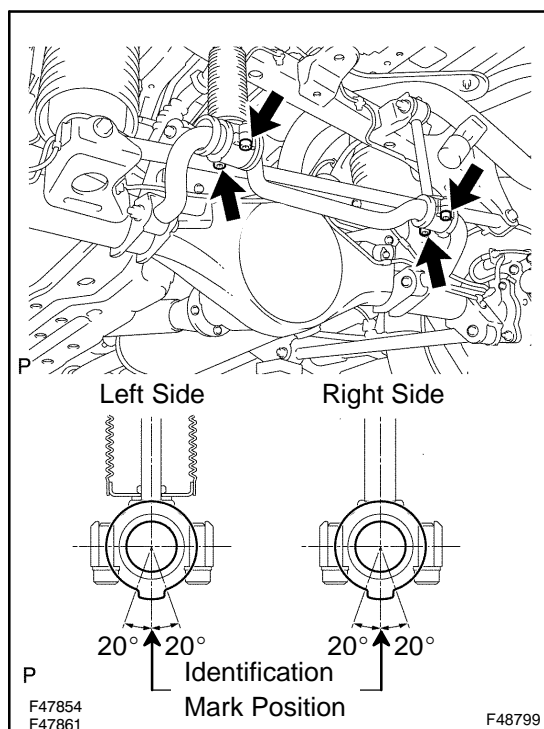
Turn the bolts while holding the nuts.



- (c) Support the stabilizer bar rear with a jack. Place a wooden block between the jack and the stabilizer bar rear to prevent damage.

HINT:

Set the jack under the left side of the vehicle.



- (d) Using a socket hexagon wrench (8 mm), install the stabilizer bar rear with the 4 bolts and 2 rear stabilizer brackets lower.

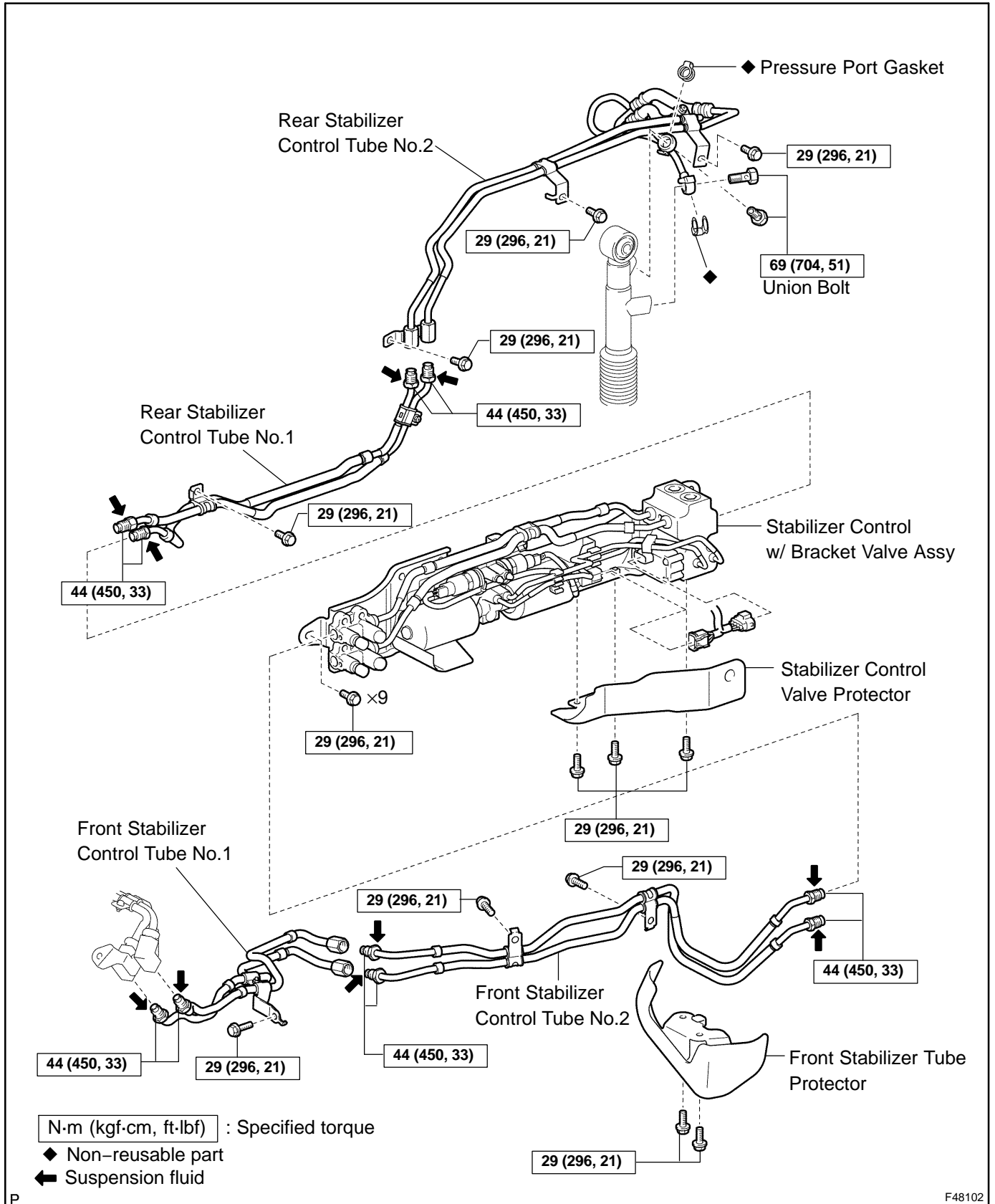
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

- (1) Check that the protrusions on the stabilizer bushes rear are positioned within 20° of the identification marks.

19. STABILIZE SUSPENSION (SEE PAGE 25-33)
20. CHECK SUSPENSION FLUID PRESSURE
 - (a) Check the suspension fluid pressure.
21. MEASURE VEHICLE HEIGHT (SEE PAGE 25-33)
22. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1
23. INSTALL SPARE DISC WHEEL
24. INSTALL STEP SUB-ASSY LH (SEE PAGE 76-33)
25. INSTALL BATTERY
26. INSTALL RADIATOR SUPPORT SEAL UPPER

STABILIZER CONTROL W/BRACKET VALVE ASSY (KDSS) COMPONENTS

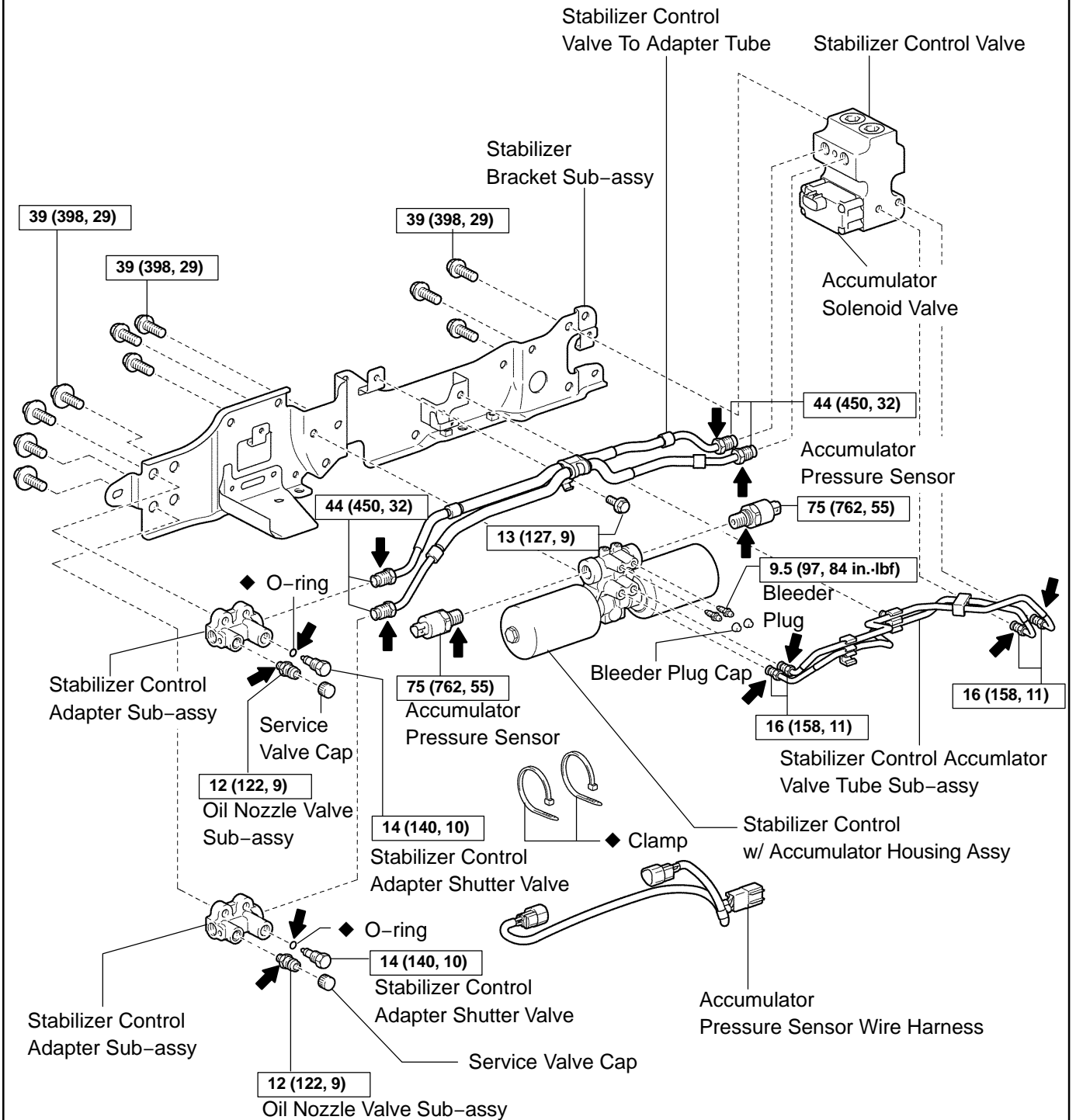
2504V-01



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Stabilizer Control w/ Bracket Valve Assy:



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

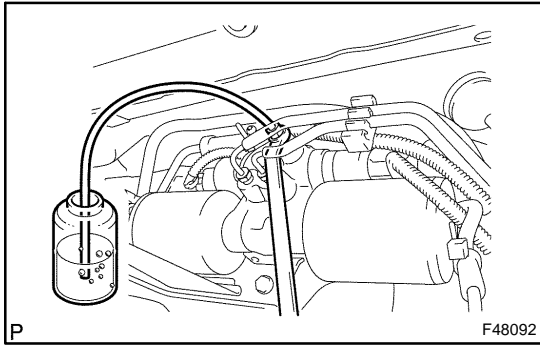
← Suspension fluid

P

F48103

OVERHAUL

1. REMOVE RADIATOR SUPPORT SEAL UPPER (SEE PAGE 65-11)
2. REMOVE BATTERY
3. REMOVE STEP SUB-ASSY LH (SEE PAGE 76-33)



4. DRAIN SUSPENSION FLUID

- (a) Loosen the bleeder plug on the stabilizer control w/ accumulator housing assy and drain suspension fluid.

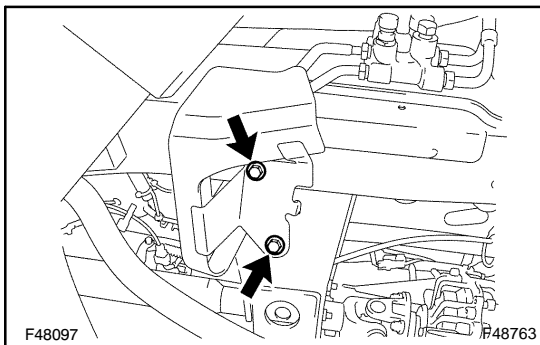
HINT:

- Drain suspension fluid when performing the operations related to the hydraulic circuits.
- Draining suspension fluid decreases suspension fluid pressure.

- (b) Tighten the bleeder plug.

Torque: 9.5 N·m (97 kgf·cm, 84 in.-lbf)

5. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
6. SEPARATE STABILIZER BAR FRONT (SEE PAGE 25-41)
7. REMOVE SPARE DISC WHEEL
8. SEPARATE STABILIZER BAR REAR (SEE PAGE 25-33)
9. REMOVE FRONT DISC WHEEL



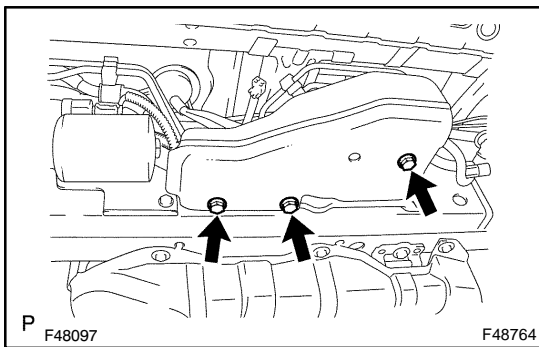
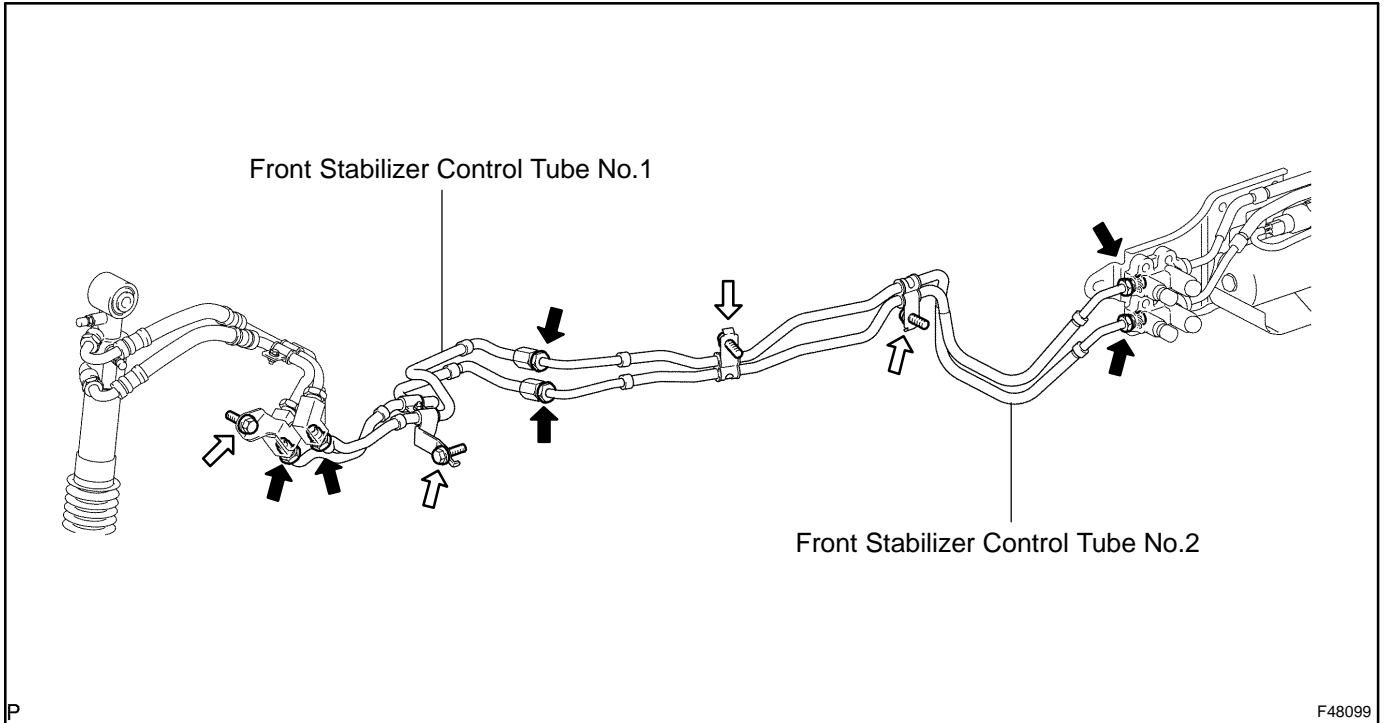
10. REMOVE FRONT STABILIZER CONTROL TUBE NO.1 AND NO.2

- (a) Remove the 2 bolts and front stabilizer tube protector.

- (b) Using SST, disconnect the front stabilizer control tube No.1 and No.2.
SST 09023-12701
- (c) Remove the 4 bolts and front stabilizer control tube No.1 and No.2.

NOTICE:

- Do not bend the control tubes.
- Do not damage the control tubes and flare nuts.



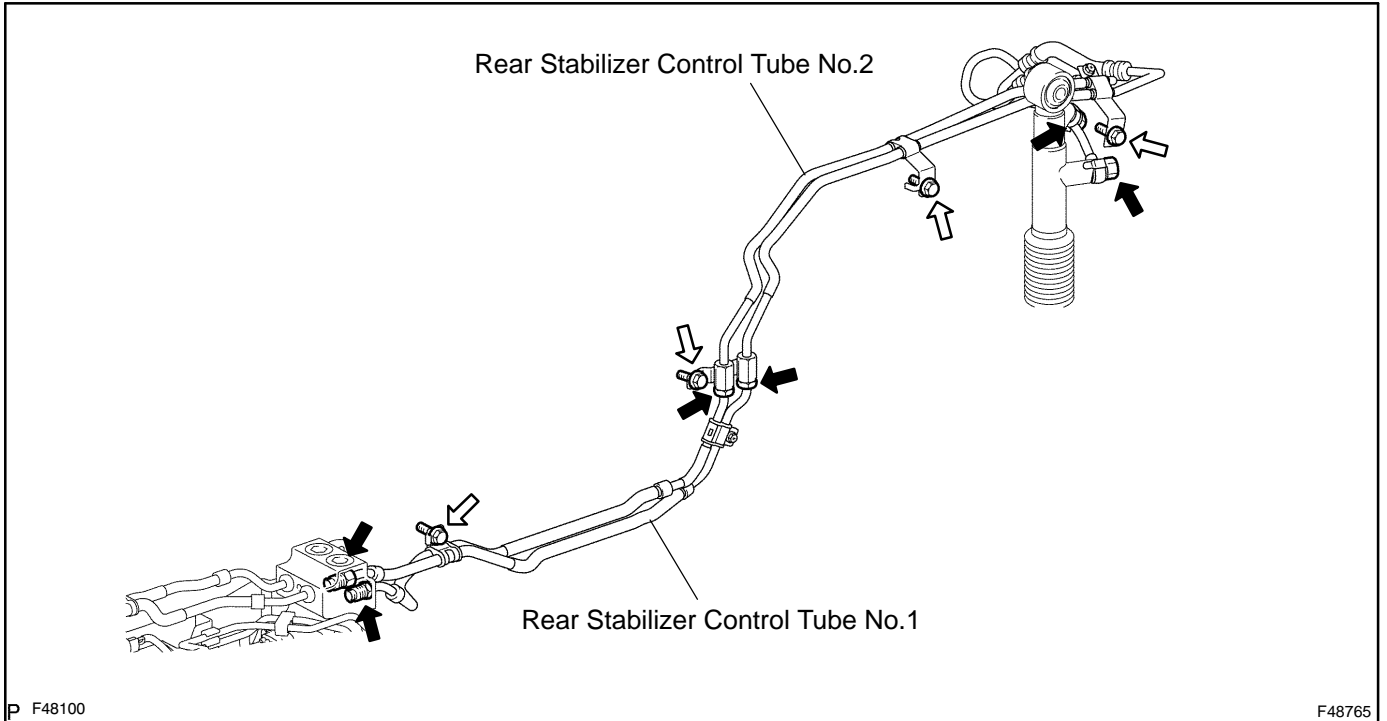
11. REMOVE REAR STABILIZER CONTROL TUBE NO.1 AND NO.2

- (a) Remove the 3 bolts and stabilizer control valve protector.

- (b) Using SST, disconnect the rear stabilizer control tube No.1.
SST 09023-12701
- (c) Remove the 2 union bolts of the rear stabilizer control cylinder and the 2 pressure port gaskets.
- (d) Remove the 4 bolts and rear stabilizer control tube No.1 and No.2.

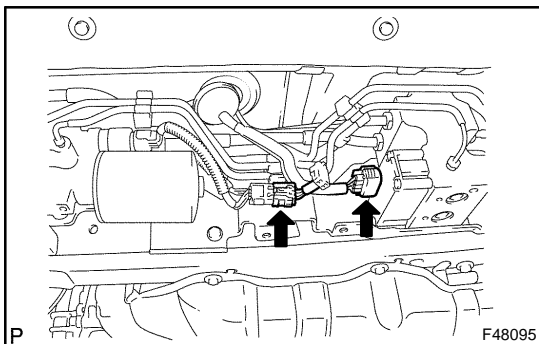
NOTICE:

- Do not bend the control tubes.
- Do not damage the control tubes and flare nuts.



P F48100

F48765

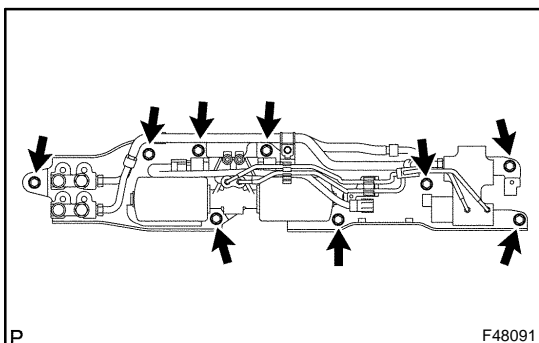


P

F48095

12. REMOVE STABILIZER CONTROL W/BRACKET VALVE ASSY

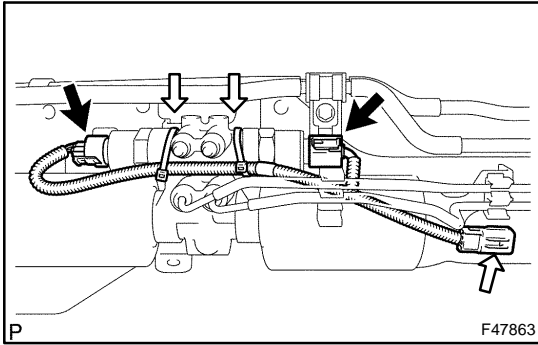
- (a) Disconnect the 2 connectors.



P

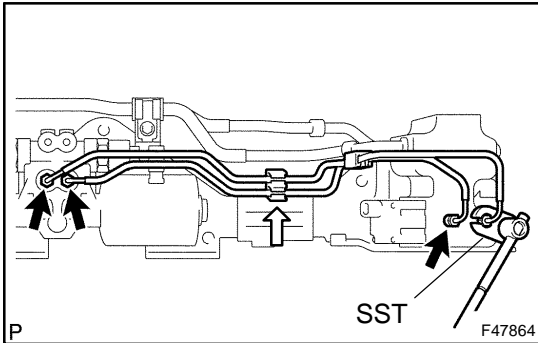
F48091

- (b) Remove the 9 bolts and stabilizer control w/ bracket valve assy.



13. REMOVE ACCUMULATOR PRESSURE SENSOR WIRE HARNESS

- (a) Remove the 2 clamps.
- (b) Disconnect the 2 connectors, disengage the clip and remove the accumulator pressure sensor wire harness.



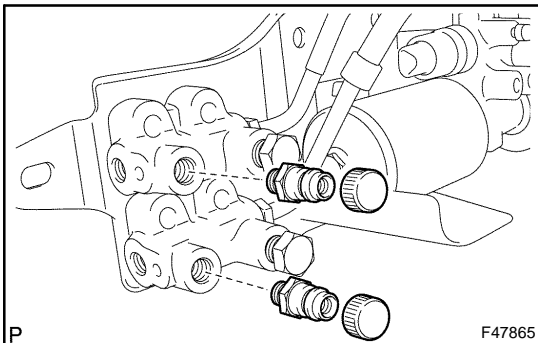
14. REMOVE STABILIZER CONTROL ACCUMULATOR VALVE TUBE SUB-ASSY

- (a) Using SST, disconnect the stabilizer control accumulator valve tube.
SST 09023-00101

NOTICE:

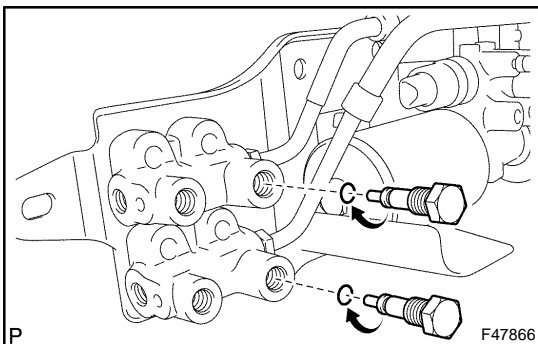
Do not damage the accumulator valve tube and flare nuts.

- (b) Disengage the clip and remove the stabilizer control accumulator valve tube.

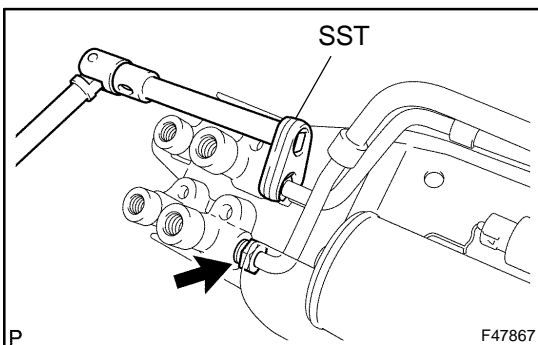


15. REMOVE STABILIZER CONTROL ADAPTER SUB-ASSY

- (a) Remove the 2 service valve caps and 2 oil nozzle valves.



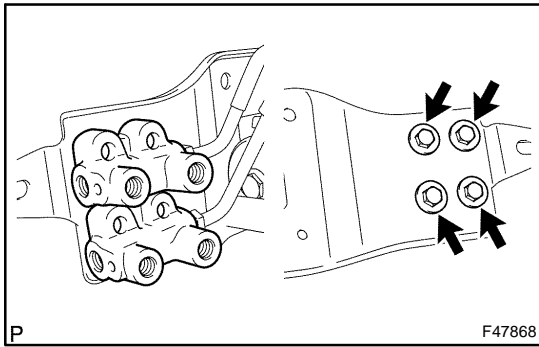
- (b) Remove the 2 stabilizer control adapter shutter valves.
- (c) Remove the O-rings from the stabilizer control adapter shutter valves.



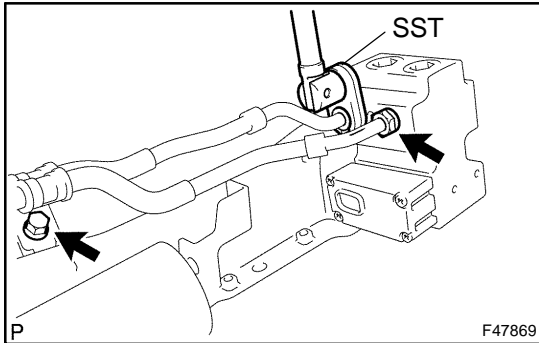
- (d) Using SST, disconnect the stabilizer control valve to adapter tube.
SST 09023-12700

NOTICE:

Do not damage the control valve adapter tube and flare nuts.



- (e) Remove the 4 bolts and 2 stabilizer control adapters.



16. REMOVE STABILIZER CONTROL VALVE TO ADAPTER TUBE

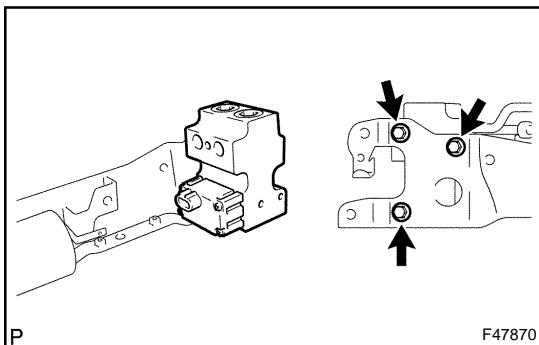
- (a) Using SST, disconnect the stabilizer control valve to adapter tube.

SST 09023-12701

NOTICE:

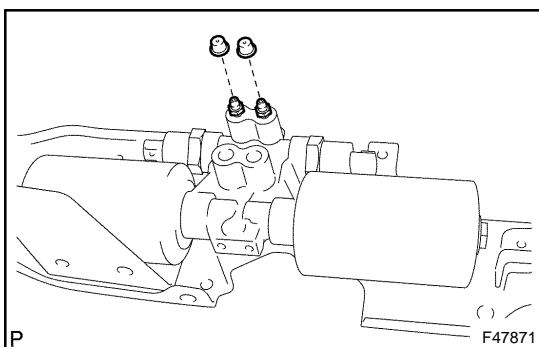
Do not damage the control valve adapter tube and flare nuts.

- (b) Remove the bolt and stabilizer control adapter tube.



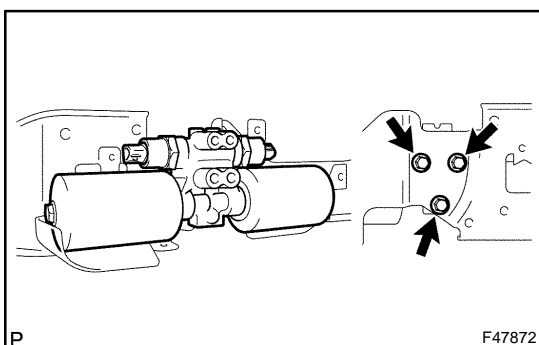
17. REMOVE STABILIZER CONTROL VALVE

- (a) Remove the 3 bolts and stabilizer control valve.

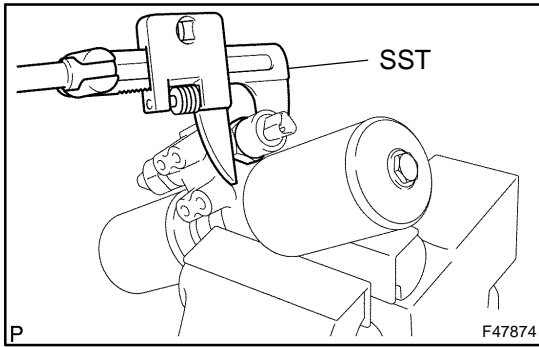


18. REMOVE STABILIZER CONTROL W/ACCUMULATOR HOUSING ASSY

- (a) Remove the 2 bleeder plug caps and 2 bleeder plugs.

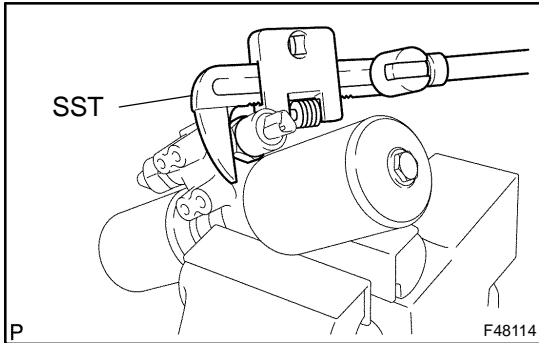


- (b) Remove the 3 bolts and stabilizer control w/ accumulator housing.



- 19. REMOVE ACCUMULATOR PRESSURE SENSOR**
- (a) Secure the stabilizer control w/ accumulator housing in a vise.
 - (b) Using SST, remove the 2 accumulator pressure sensors.
SST 09922-10010

NOTICE:
Do not damage the stabilizer control w/ accumulator housing with the SST.

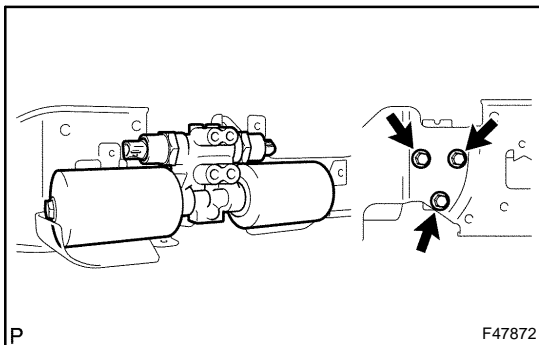


- 20. INSTALL ACCUMULATOR PRESSURE SENSOR**
- (a) Secure the stabilizer control w/ accumulator housing in a vise.
 - (b) Install the accumulator pressure sensors.
 - (1) Apply suspension fluid to the threads of the accumulator pressure sensors and O-rings.
 - (2) Using SST, install the 2 accumulator pressure sensors to the stabilizer control w/ accumulator housing.

SST 09922-10010

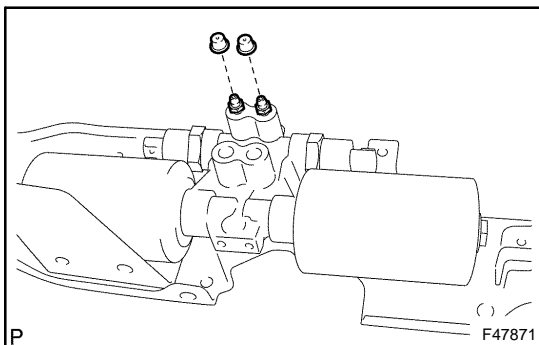
Torque: 75 N·m (762 kgf·cm, 55 ft·lbf)

NOTICE:
Do not damage the stabilizer control w/ accumulator housing with the SST.

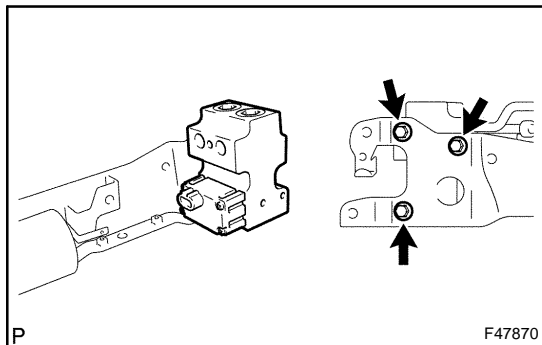


- 21. TEMPORARILY TIGHTEN STABILIZER CONTROL W/ACCUMULATOR HOUSING ASSY**

- (a) Install the stabilizer control w/ accumulator housing by temporarily tightening the 3 bolts.

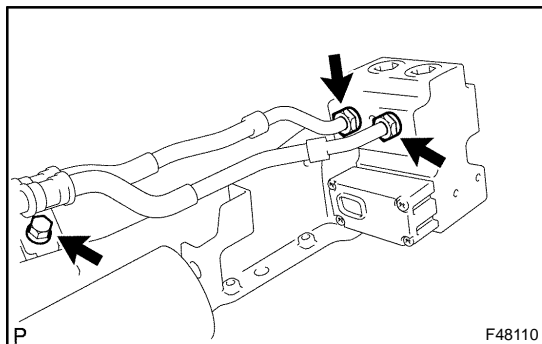


- (b) Install the 2 bleeder plugs and 2 bleeder plug caps.
Torque: 9.5 N·m (97 kgf·cm, 84 in·lbf)



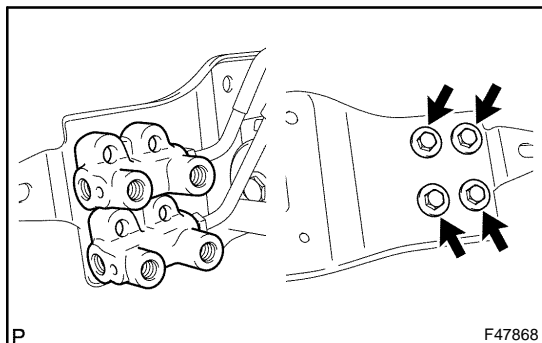
22. TEMPORARILY TIGHTEN STABILIZER CONTROL VALVE

- (a) Install the stabilizer control valve by temporarily tightening the 3 bolts.



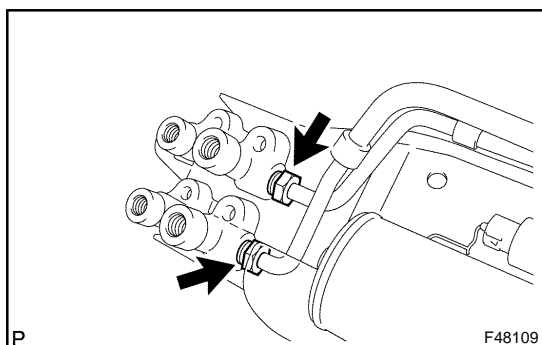
23. TEMPORARILY TIGHTEN STABILIZER CONTROL VALVE TO ADAPTER TUBE

- (a) Install the stabilizer control valve to adapter tube.
- (1) Apply suspension fluid to the threads of the flare nuts.
 - (2) Install the stabilizer control valve to adapter tube to the stabilizer control valve by temporarily tightening the 2 flare nuts.
- (b) Install the stabilizer control valve to adapter tube by temporarily tightening the bolt.

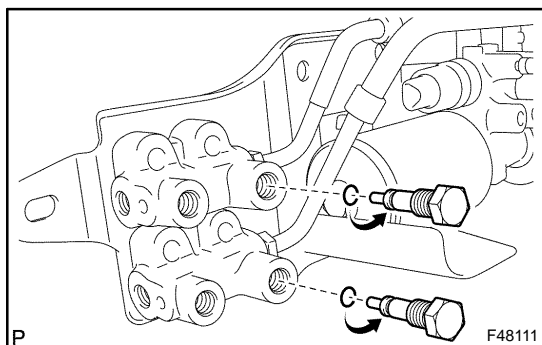


24. TEMPORARILY TIGHTEN STABILIZER CONTROL ADAPTER SUB-ASSY

- (a) Install the 2 stabilizer control adapters by temporarily tightening the 4 bolts.

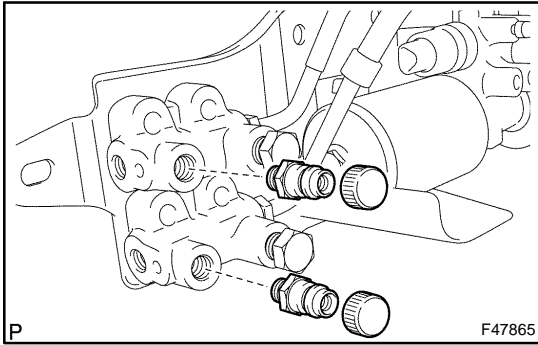


- (b) Install the stabilizer control valve to adapter tube.
- (1) Apply suspension fluid to the threads of the flare nuts.
 - (2) Install the stabilizer control valve to adapter tube to the stabilizer control adapter by temporarily tightening the 2 flare nuts.



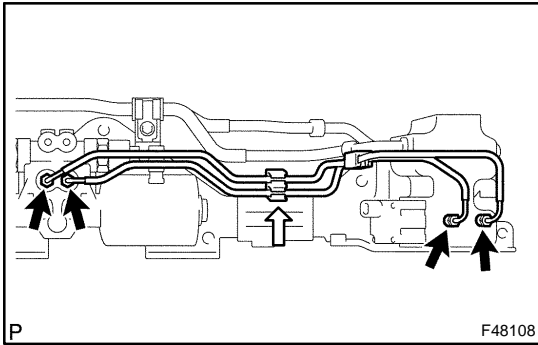
- (c) Install the stabilizer control adapter shutter valves.
- (1) Apply suspension fluid to 2 new O-rings and install them to the stabilizer control adapter shutter valves.
 - (2) Install the 2 stabilizer control adapter shutter valves to the stabilizer control adapter.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)



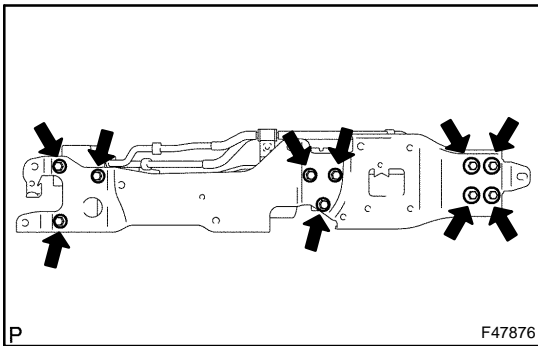
- (d) Install the oil nozzle valve sub-assy.
- (1) Apply suspension fluid to the 2 O-rings.
 - (2) Install the 2 oil nozzle valve sub-assy and 2 service valve caps to the stabilizer control adapter.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



25. TEMPORARILY TIGHTEN STABILIZER CONTROL ACCUMULATOR VALVE TUBE SUB-ASSY

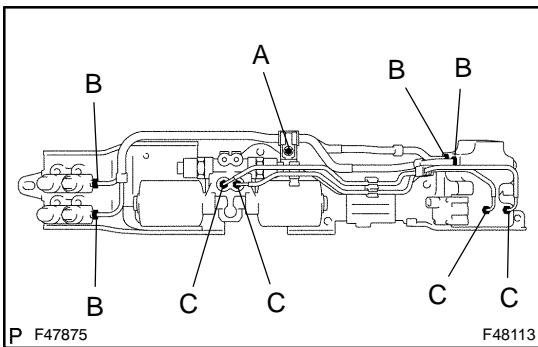
- (a) Apply suspension fluid to the threads of the flare nuts.
- (b) Temporarily tighten the 4 flare nuts on the stabilizer control accumulator valve tube sub-assy, and engage the clip.



26. FULLY TIGHTEN STABILIZER CONTROL W/BRACKET VALVE ASSY

- (a) Fully tighten the 10 bolts.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)



- (b) Fully tighten bolt (A).

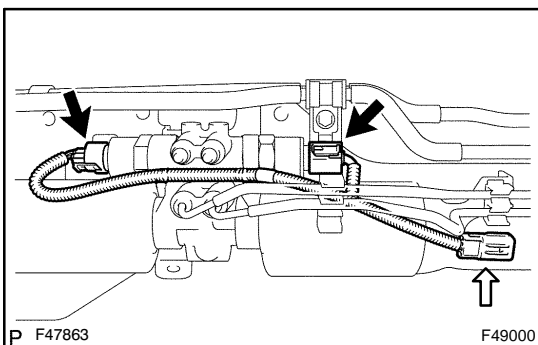
Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

- (c) Using SST, fully tighten flare nuts (B).
SST 09023-12701

Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)

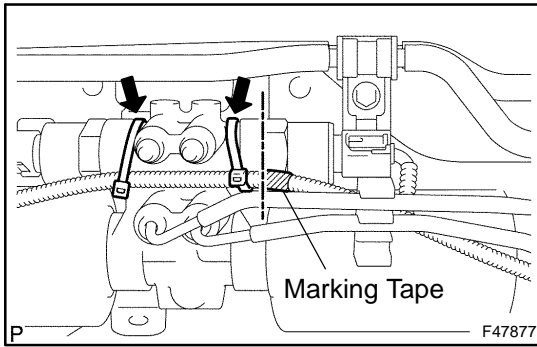
- (d) Using SST, fully tighten flare nuts (C).
SST 09023-00101

Torque: 16 N·m (158 kgf·cm, 11 ft·lbf)



27. INSTALL ACCUMULATOR PRESSURE SENSOR WIRE HARNESS

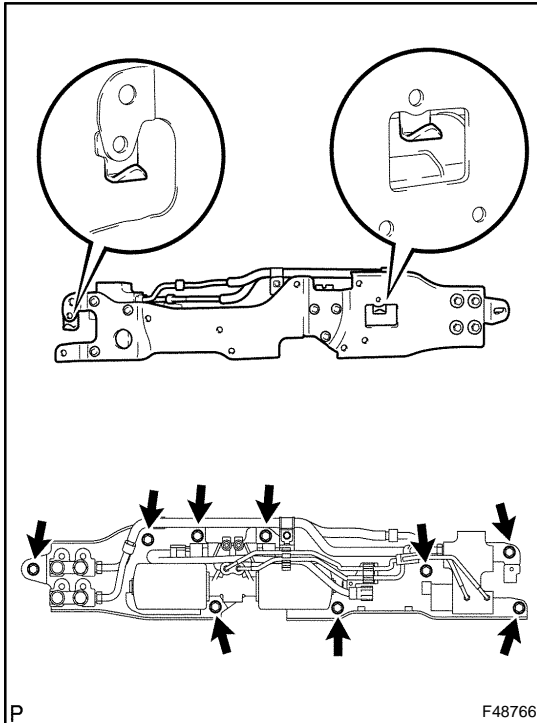
- (a) Connect the 2 connectors and engage the clip.



- (b) Align the left end of the marking tape and the connected part of the accumulator pressure sensor, and install 2 new clamps.

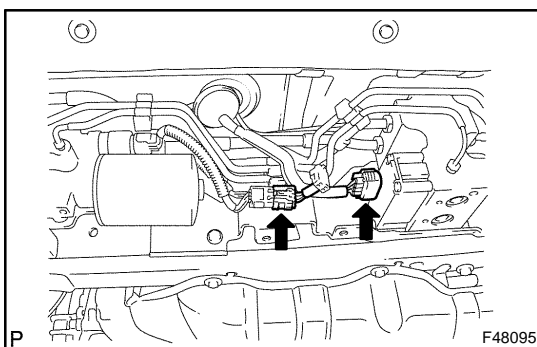
NOTICE:

The left end of the marking tape should be positioned within 5 mm (0.20 in.) from the connected part of the accumulator pressure sensor.

**28. INSTALL STABILIZER CONTROL W/BACKET VALVE ASSY**

- (a) Insert the protrusion on the stabilizer bracket into the frame, and install the stabilizer control w/ bracket valve assy with the 9 bolts.

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



- (b) Connect the 2 connectors.

29. INSTALL FRONT STABILIZER CONTROL TUBE NO.1 AND NO.2

- (a) Install the front stabilizer control tube No.1 and No.2.
 - (1) Apply suspension fluid to the threads of the flare nuts.
 - (2) Temporarily tighten the 6 flare nuts on the front stabilizer control tube No.1 and No.2.

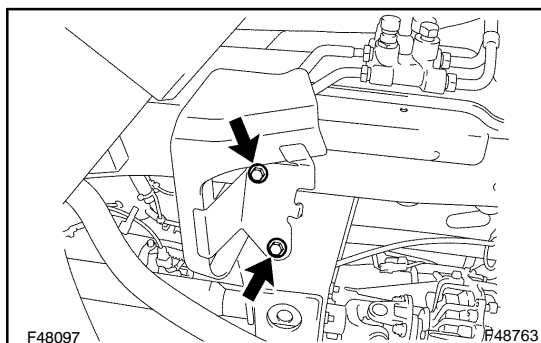
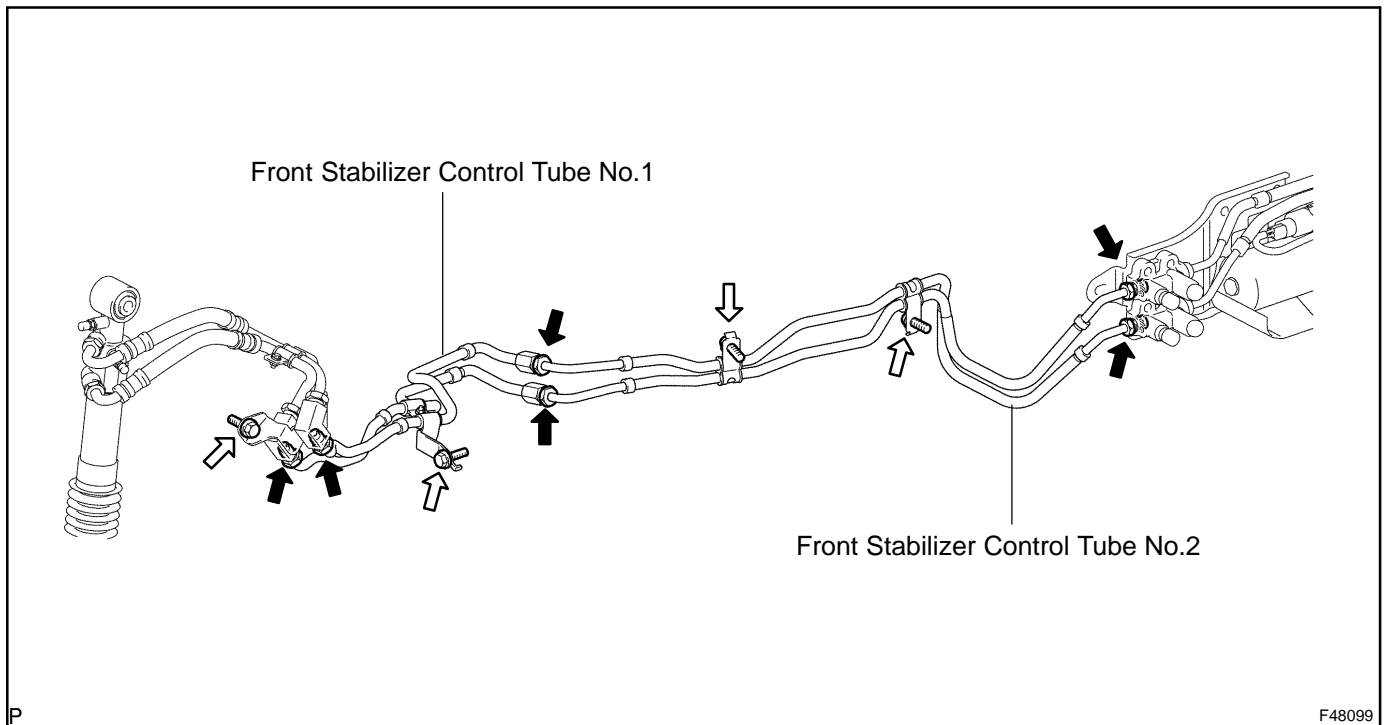
NOTICE:

- **Do not bend the control tubes.**
- **Ensure that the control tubes do not contact other parts.**
- **Do not damage the control tubes and flare nuts.**

- (b) Install the 4 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)
- (c) Using SST, fully tighten the 6 flare nuts on the front stabilizer control tube No.1 and No.2.

SST 09023-12701

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



- (d) Install the front stabilizer tube protector with the 2 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

30. INSTALL REAR STABILIZER CONTROL TUBE NO.1 AND NO.2

- (a) Install the rear stabilizer control tube No.1 and No.2.
- (1) Apply suspension fluid to the threads of the flare nuts.
 - (2) Temporarily tighten the 4 flare nuts on the rear stabilizer control tube No.1.

NOTICE:

- **Ensure that the control tubes do not contact other parts.**
- **Do not bend the control tubes.**
- **Do not damage the control tubes and flare nuts.**

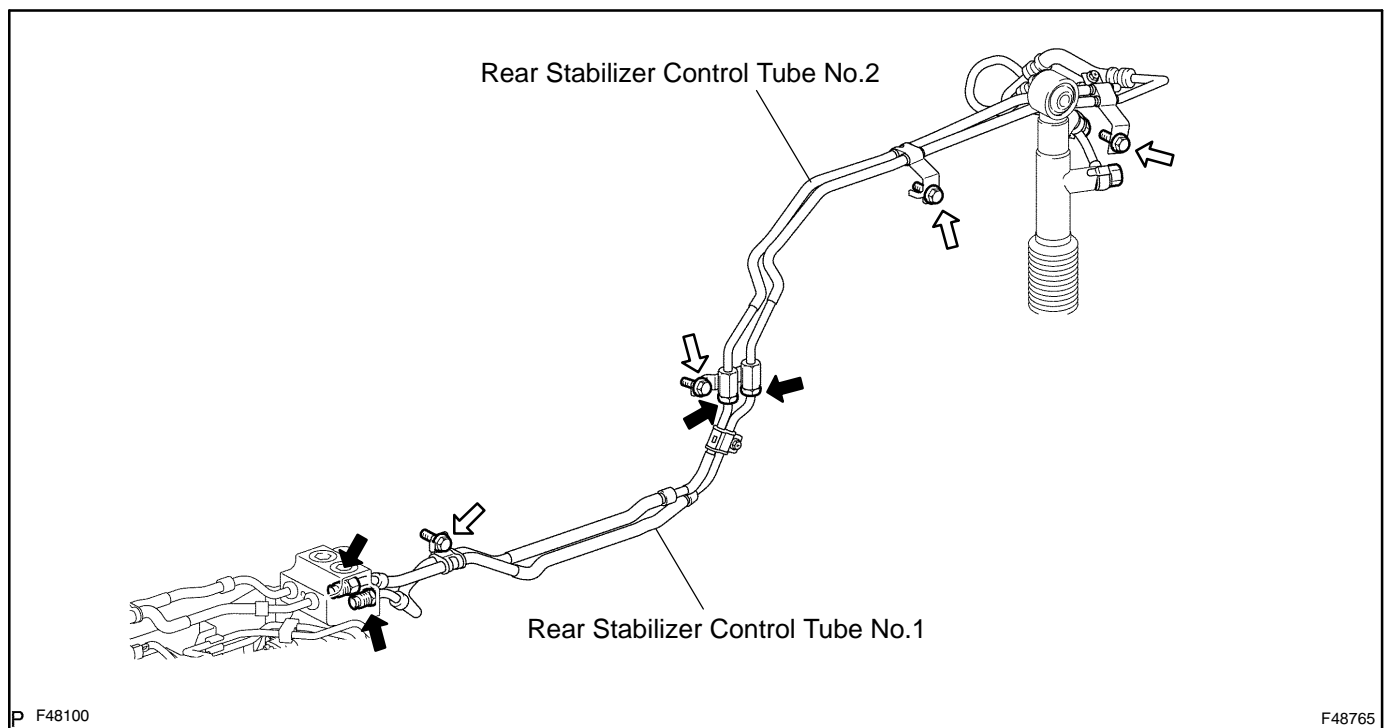
- (b) Install the 4 bolts.

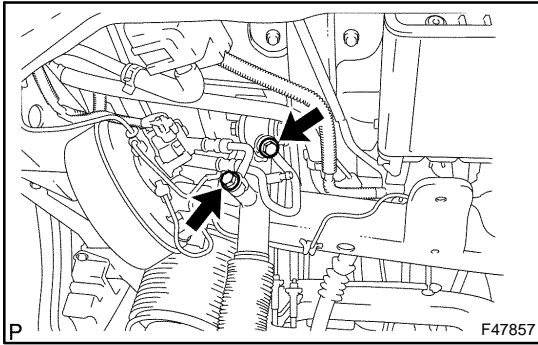
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

- (c) Using SST, fully tighten the 4 flare nuts on the rear stabilizer control tube No.1.

SST 09023-12701

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



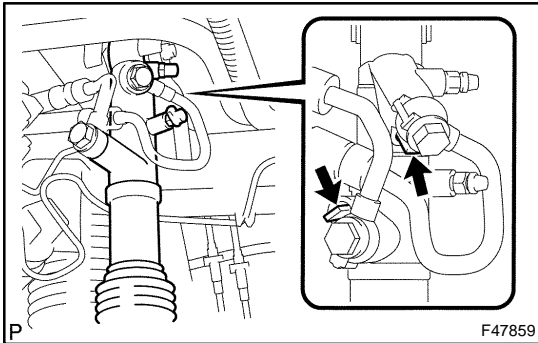


- (d) Install the rear stabilizer tube No.2 to the rear stabilizer control cylinder with the 2 union bolts and 2 new pressure port gaskets.

Torque: 69 N·m (704 kgf·cm, 51 ft·lbf)

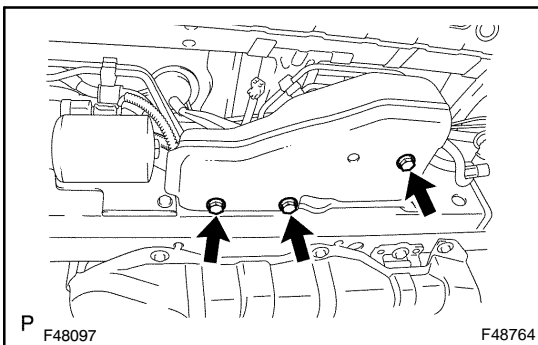
NOTICE:

Insert the stoppers of the rear stabilizer control tube No.2 into the rear stabilizer control cylinder.



- (e) Install the stabilizer control valve protector with the 3 bolts.

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



31. BLEED SUSPENSION FLUID (SEE PAGE 25-27)

SST 09760-60010

32. CHECK FOR FLUID LEAKS (SEE PAGE 25-26)

33. INSTALL FRONT DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

34. CONNECT STABILIZER BAR FRONT (SEE PAGE 25-41)

35. CONNECT STABILIZER BAR REAR (SEE PAGE 25-33)

36. STABILIZE SUSPENSION (SEE PAGE 25-33)

37. CHECK SUSPENSION FLUID PRESSURE

- (a) Check the suspension fluid pressure.

38. MEASURE VEHICLE HEIGHT (SEE PAGE 25-33)

39. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

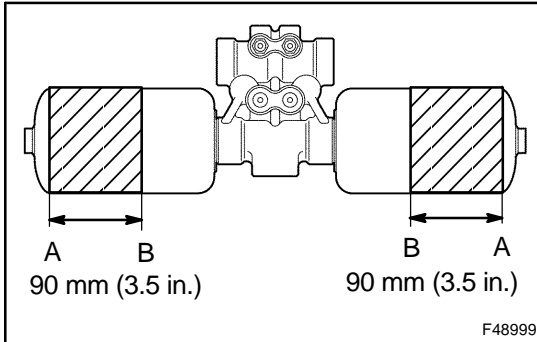
40. INSTALL SPARE DISC WHEEL

41. INSTALL STEP SUB-ASSY LH (SEE PAGE 76-33)

42. INSTALL BATTERY

43. INSTALL RADIATOR SUPPORT SEAL UPPER

DISPOSAL



1. DISPOSE OF STABILIZER CONTROL W/ACCUMULATOR HOUSING ASSY

- (a) Using a drill, make a hole in the areas between A and B of the accumulator housing indicated in the illustration to discharge the inside gas.

CAUTION:

- **Be careful when drilling because shards of metal may fly about, so always use the proper safety equipment.**
- **The gas is colorless, odorless and non-poisonous.**

ACCELERATION SENSOR ASSY (KDSS)

REPLACEMENT

2504Y-02

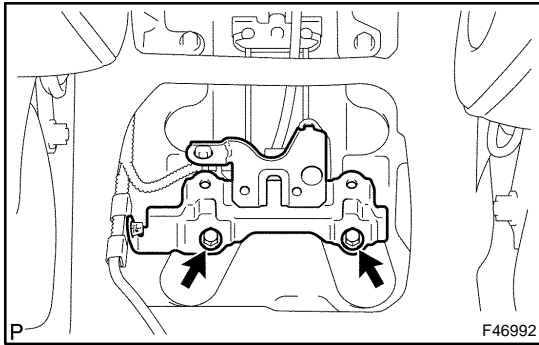
HINT:

LOCATION: See page 05-556.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **REMOVE RR CONSOLE BOX ASSY (SEE PAGE 71-13)**

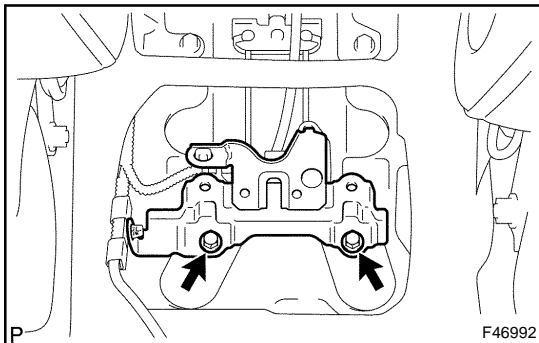
HINT:

Refer to the procedures up to "REMOVE RR CONSOLE BOX ASSY".



3. REMOVE ACCELERATION SENSOR ASSY

- (a) Disengage the 2 clamps.
- (b) Remove the 2 bolts and acceleration sensor assy.
- (c) Disconnect the connector from the acceleration sensor assy.



4. INSTALL ACCELERATION SENSOR ASSY

- (a) Connect the connector to the acceleration sensor assy.
- (b) Install the acceleration sensor assy with the 2 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)
- (c) Engage the 2 clamps.

5. INSTALL RR CONSOLE BOX ASSY

NOTICE:

When installing the rear console box assy, do not apply excessive force, as the bracket may become deformed.

6. **CONNECT BATTERY NEGATIVE TERMINAL**
7. **PERFORM ACCELERATION SENSOR ASSY ZERO POINT CALIBRATION (SEE PAGE 05-566)**

STABILIZER CONTROL ECU (KDSS)

REPLACEMENT

2504Z-02

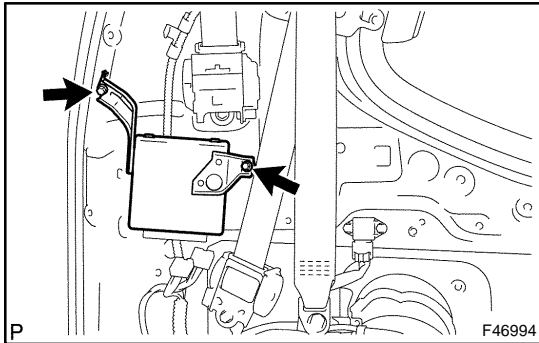
HINT:

LOCATION: See page 05-556.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **REMOVE ROOF SIDE GARNISH INNER LH (SEE PAGE 76-38)**

HINT:

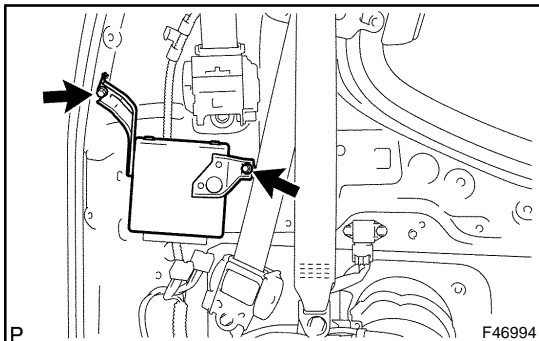
Refer to the procedures up to "REMOVE ROOF SIDE GARNISH INNER LH".



3. **REMOVE STABILIZER CONTROL ECU**
 - (a) Disconnect the connector.
 - (b) Remove the 2 bolts and stabilizer control ECU.

NOTICE:

- **Avoid any impact to the stabilizer control ECU.**
- **Replace the stabilizer control ECU with a new one if it is dropped.**



4. **INSTALL STABILIZER CONTROL ECU**
 - (a) Install the stabilizer control ECU with the 2 bolts. \square
 - Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)**
 - (b) Connect the connector.

5. **INSTALL ROOF SIDE GARNISH INNER LH (SEE PAGE 76-38)**

HINT:

Refer to the procedures from "INSTALL ROOF SIDE GARNISH INNER LH".

6. **CONNECT BATTERY NEGATIVE TERMINAL**
7. **PERFORM ACCELERATION SENSOR ASSY ZERO POINT CALIBRATION (SEE PAGE 05-566)**

FRONT SUSPENSION SYSTEM

2609H-05

PROBLEM SYMPTOMS TABLE

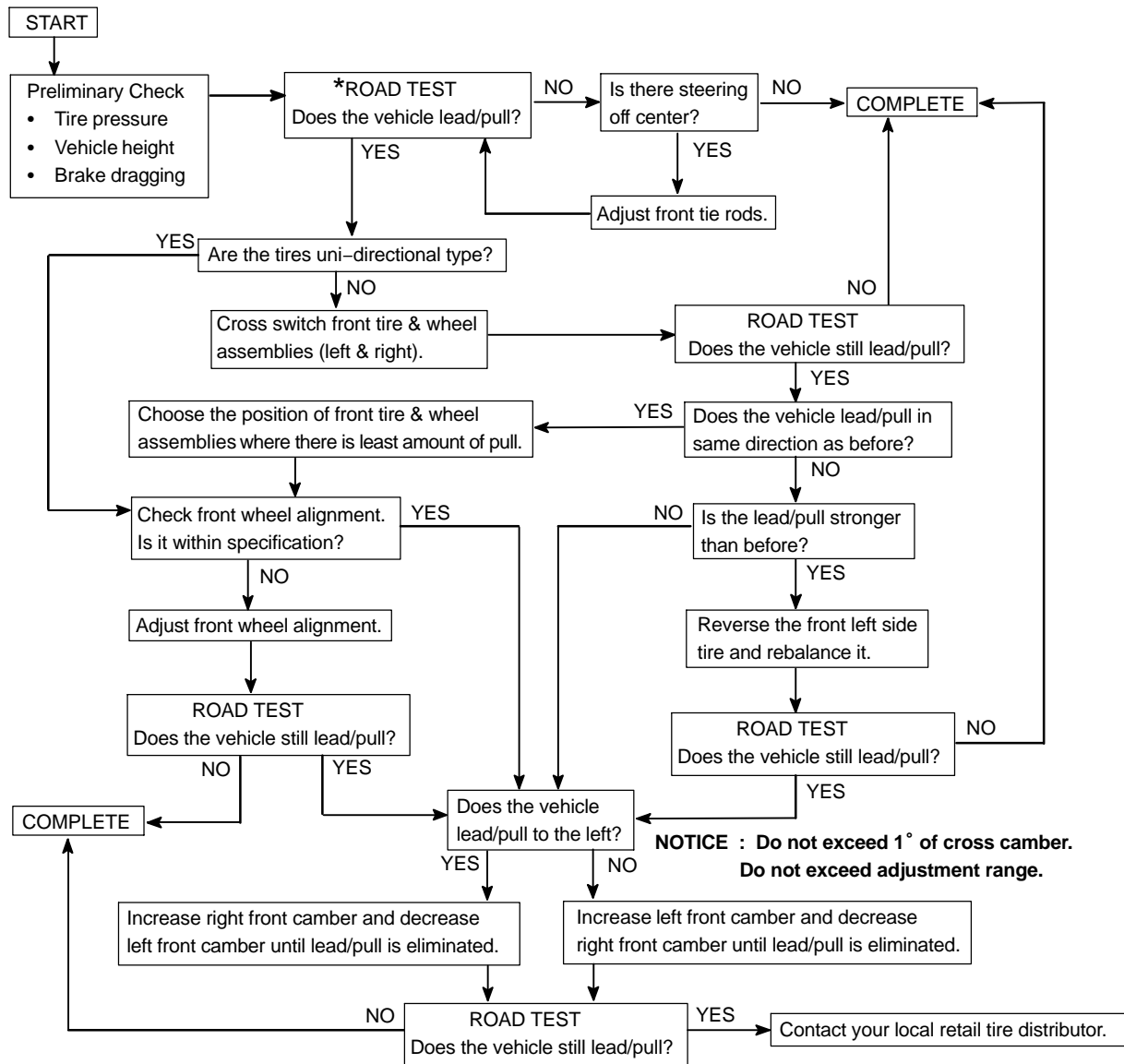
Use the table below to help find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Bottoming	<ol style="list-style-type: none"> 1. Vehicle (Overloaded) 2. Spring (Weak) 3. Shock absorber (Worn) 	<p style="text-align: center;">-</p> <p style="text-align: center;">26-11</p> <p style="text-align: center;">26-11</p>
Sways/pitches	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Stabilizer bar (Bent or broken) 3. Shock absorber (Worn) 	<p style="text-align: center;">28-1</p> <p style="text-align: center;">26-7</p> <p style="text-align: center;">26-11</p>
Front wheel shimmy	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Wheel (Out of balance) 3. Shock absorber (Worn) 4. Wheel alignment (Incorrect) 5. Ball joint (Worn) 6. Hub bearing (Worn) 7. Steering linkage (Loose or worn) 	<p style="text-align: center;">28-1</p> <p style="text-align: center;">28-1</p> <p style="text-align: center;">26-11</p> <p style="text-align: center;">26-7</p> <p style="text-align: center;">26-21</p> <p style="text-align: center;">30-2</p> <p style="text-align: center;">-</p>
Abnormal tire wear	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Wheel alignment (Incorrect) 3. Shock absorber (Worn) 4. Suspension parts (Worn) 	<p style="text-align: center;">28-1</p> <p style="text-align: center;">26-7</p> <p style="text-align: center;">26-11</p> <p style="text-align: center;">-</p>

REPAIR

HINT:

This is the repair procedure for vehicle pull.



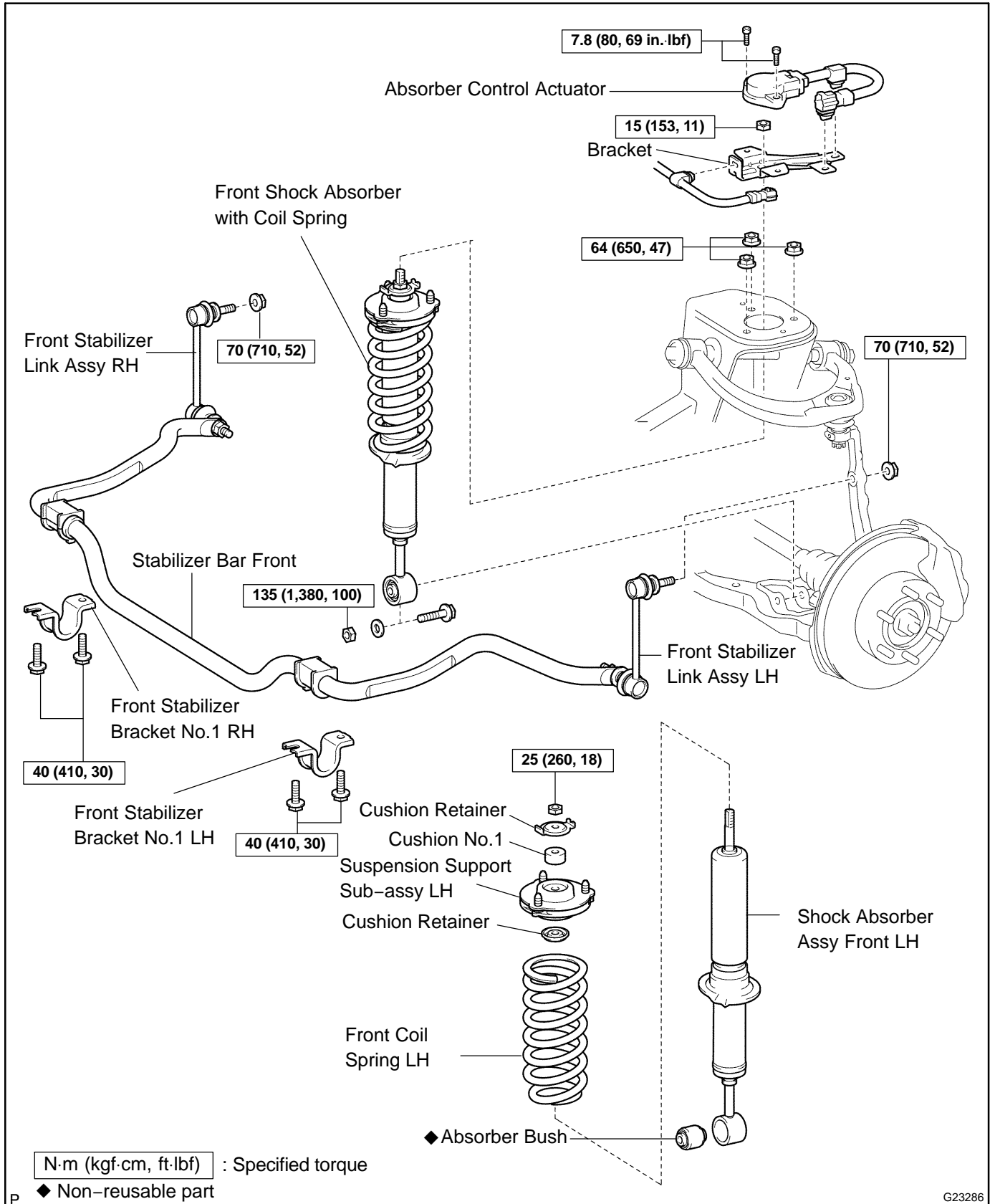
*Select a flat road where the vehicle can be driven in a straight line for 100 meters at a constant speed of 35mph. Please confirm safety and set the steering wheel to its straight position. Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph without holding the steering wheel.

(1) The vehicle can keep straight but the steering wheel has some angle. —>STEERING OFF CENTER (See page 50-4)

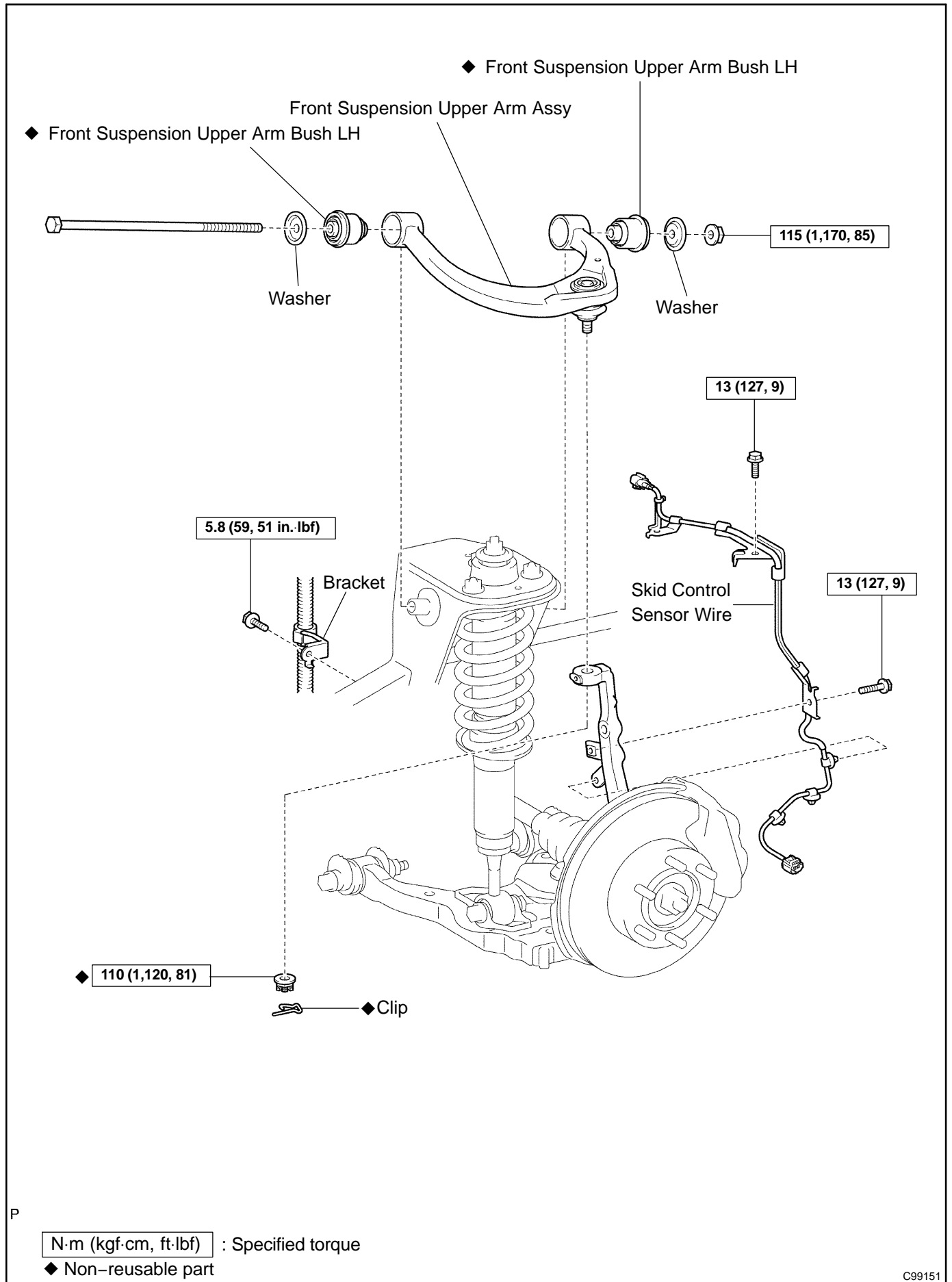
(2) The vehicle cannot keep straight. —>STEERING PULL

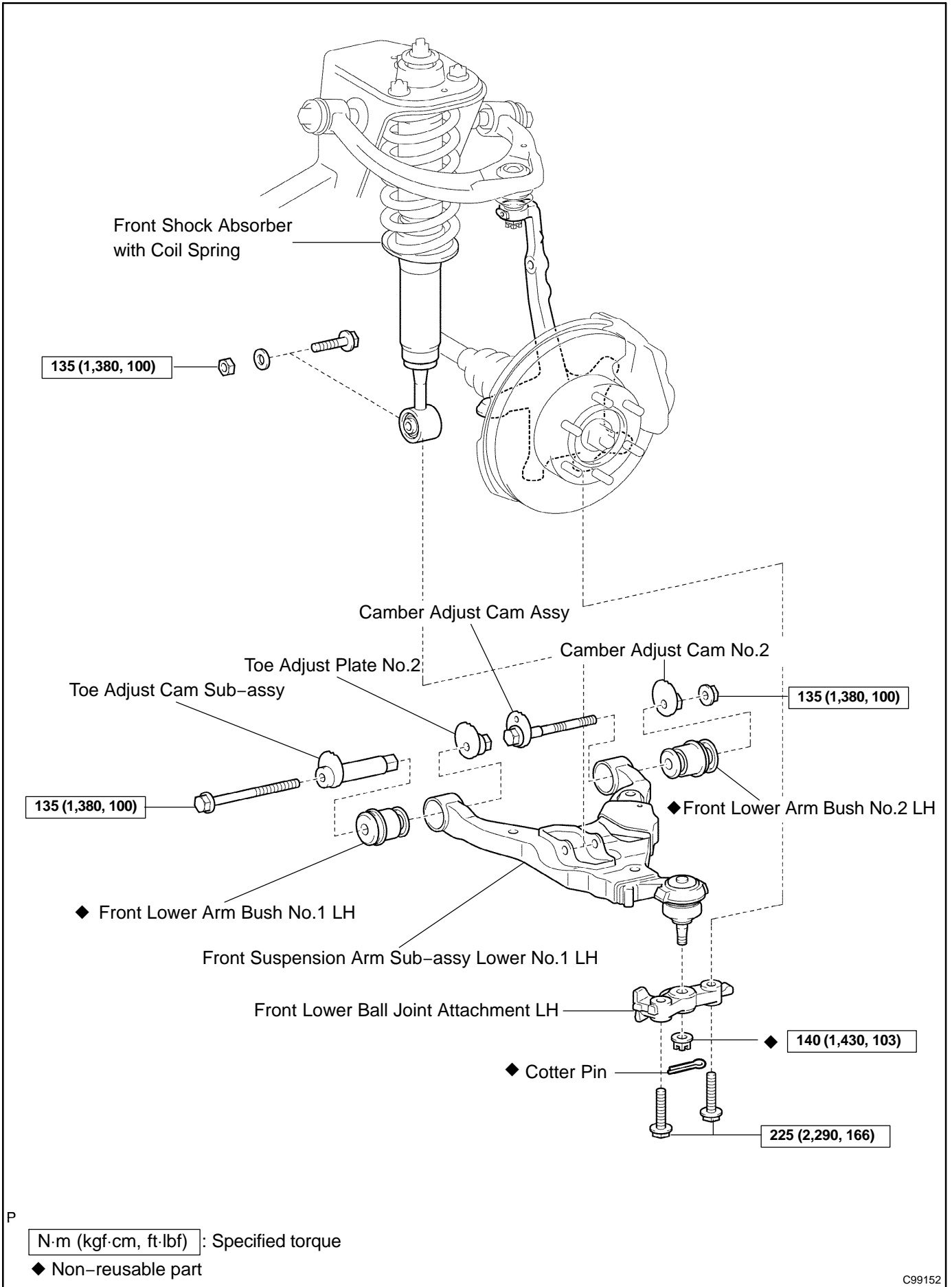
FRONT SUSPENSION COMPONENTS

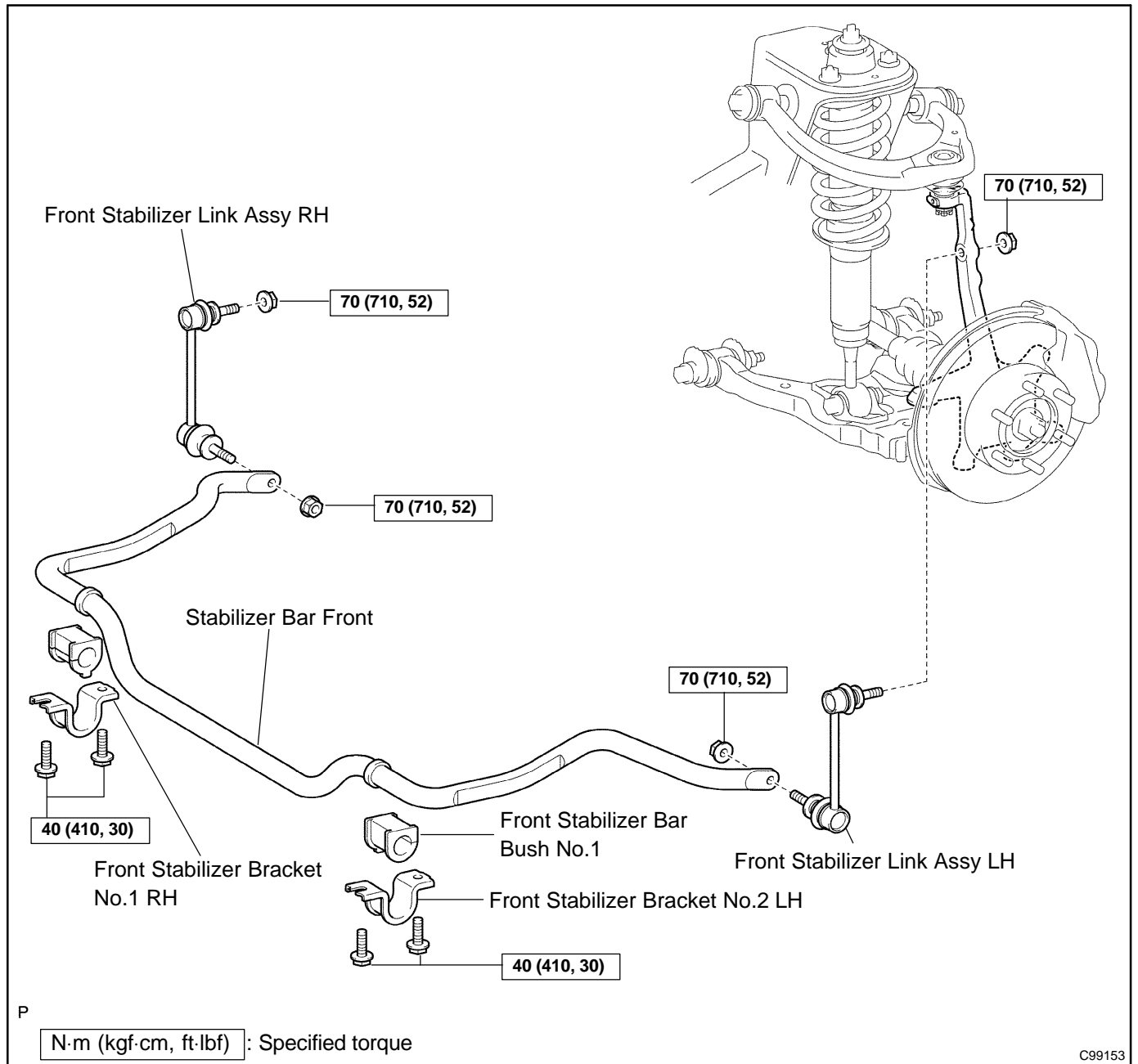
2609K-06



G23286



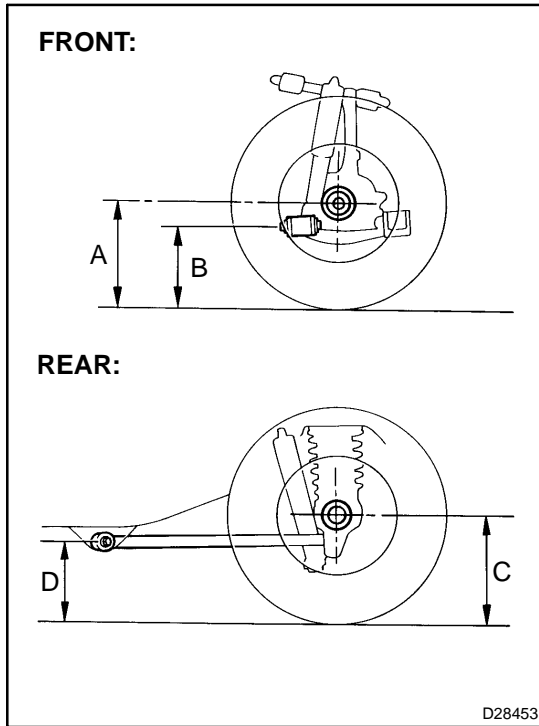




FRONT WHEEL ALIGNMENT ADJUSTMENT

2609J-02

1. INSPECT TIRE (See page 28-1)



2. MEASURE VEHICLE HEIGHT

Vehicle height:

	Front A - B	Rear C - D
UZJ120L - GKAZKA	91.9 mm (3.62 in.)	77.1 mm (3.04 in.)

Measuring points:

A: Ground clearance of front wheel center

B: Ground clearance of lower suspension arm No.2 set bolt center

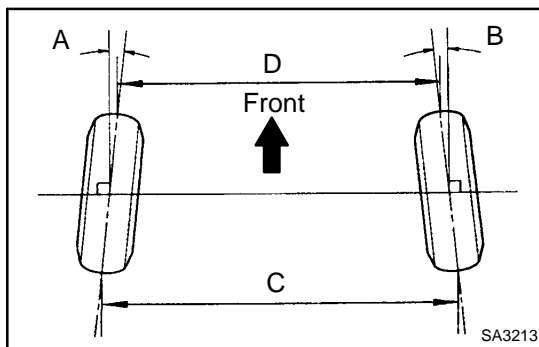
C: Ground clearance of rear wheel center

D: Ground clearance of strut rod set bolt center

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



3. INSPECT TOE-IN

Toe-in:

Toe-in (total)	A + B: $0^{\circ}05' \pm 0^{\circ}10'$ ($0.08^{\circ} \pm 0.16^{\circ}$) C - D: 1 ± 2 mm (0.04 ± 0.08 in.)
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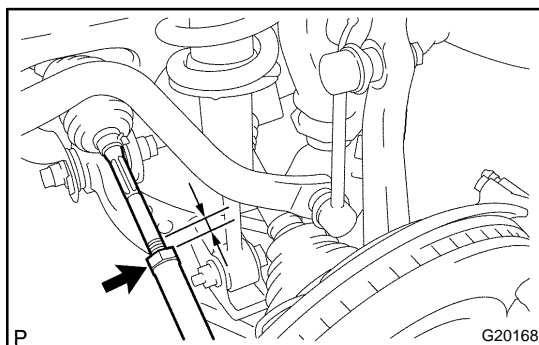
If the toe-in is not within the specified value, adjust it at the rack ends.

4. ADJUST TOE-IN

- Remove the rack boot set clips.
- Loosen the tie rod end lock nuts.
- Turn the right and left rack ends by an equal amount to adjust the toe-in.

HINT:

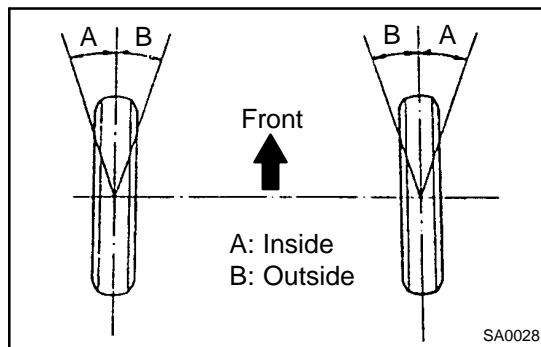
Try to adjust the toe-in to the center of the specified value.



- Make sure that the lengths of the right and left rack ends are the same.
- Torque the tie rod end lock nuts.
Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)
- Place the boots on the seats and install the clips.

HINT:

Make sure that the boots are not twisted.



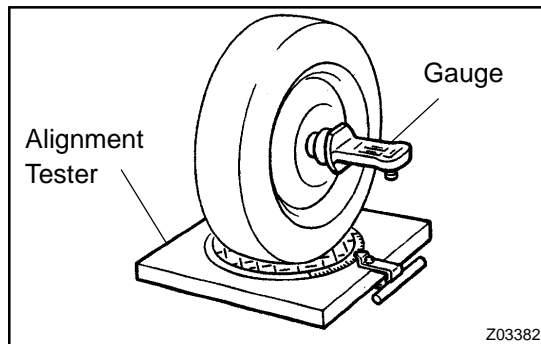
5. INSPECT WHEEL ANGLE

- (a) Turn the steering wheel fully, and measure the turning angle.

Wheel angle:

Inside wheel	Outside wheel (Reference)
36°36' (34°36' - 37°36')	32°58'
36.60° (34.60° - 37.60°)	32.97°

If the wheel angles differ from the standard of the specification, inspect the toe-in.



6. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

- (a) Install the camber-caster-kingpin gauge or position vehicle on a wheel alignment tester.
- (b) Inspect the camber, the caster and the steering axis inclination.

Camber, caster and steering axis inclination:

Camber	Right-left error	0°01' ± 45' (0.02° ± 0.75°) 45' (0.75°) or less
	Right-left error	3°17' ± 45' (3.28° ± 0.75°) 45' (0.75°) or less
Steering axis inclination	Right-left error	12°29' ± 45' (12.48° ± 0.75°) 45' (0.75°) or less

If the steering axis inclination is not as specified after adjusting the camber and the caster have been correctly adjusted, re-check the steering knuckle and the front wheel for distortion or looseness.

7. ADJUST CAMBER AND CASTER

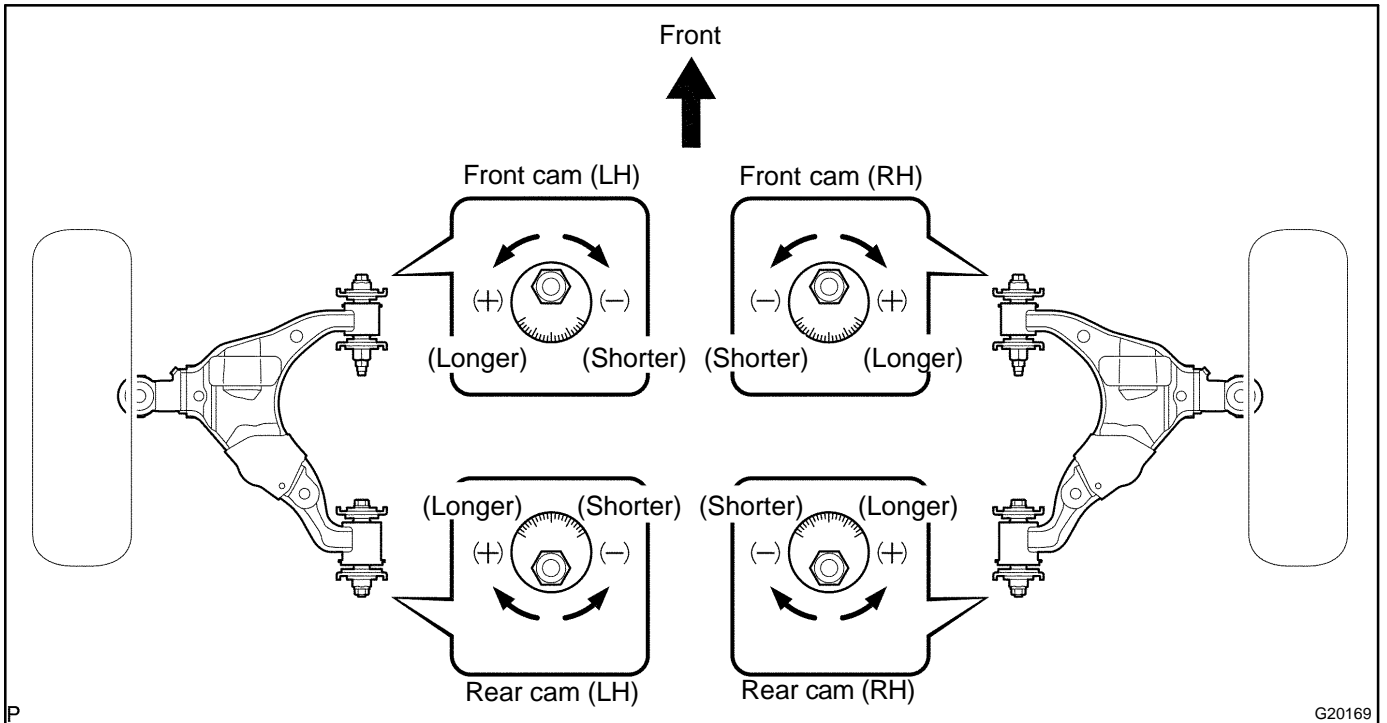
NOTICE:

After adjusting the camber, inspect the toe-in.

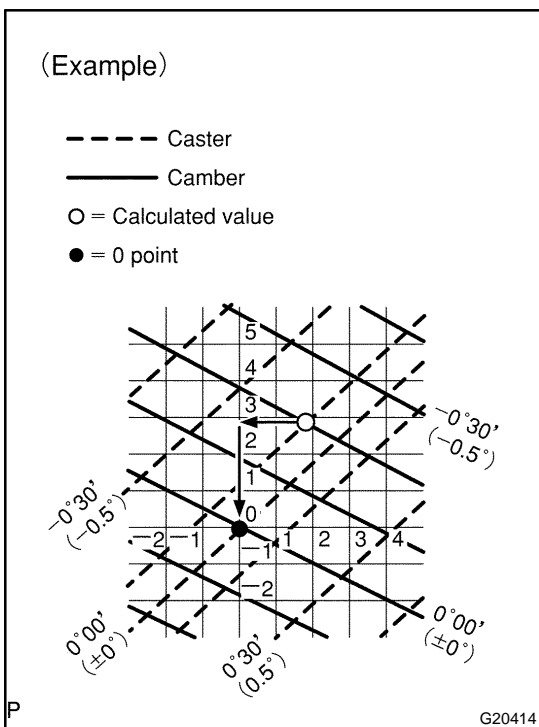
- (a) Loosen the nut and the bolt.
- (b) Turn the camber adjust cam No.2 and the toe adjust plate No.2 in the circumference direction, and adjust the camber and the caster.

HINT:

Try to adjust the camber and caster to the center value.



G20169



G20414

- (c) How to read adjustment chart (using examples).

(1) Measure the alignment.

Camber: 0°15' (0.25°)

Caster: 2°45' (2.75°)

(2) Make the difference between the standard value (A) and the measured value (B) on the adjustment chart.

Standard value:

Camber: 0°35' (0.58°)

Caster: 2°55' (2.92°)

Formula: B - A = C

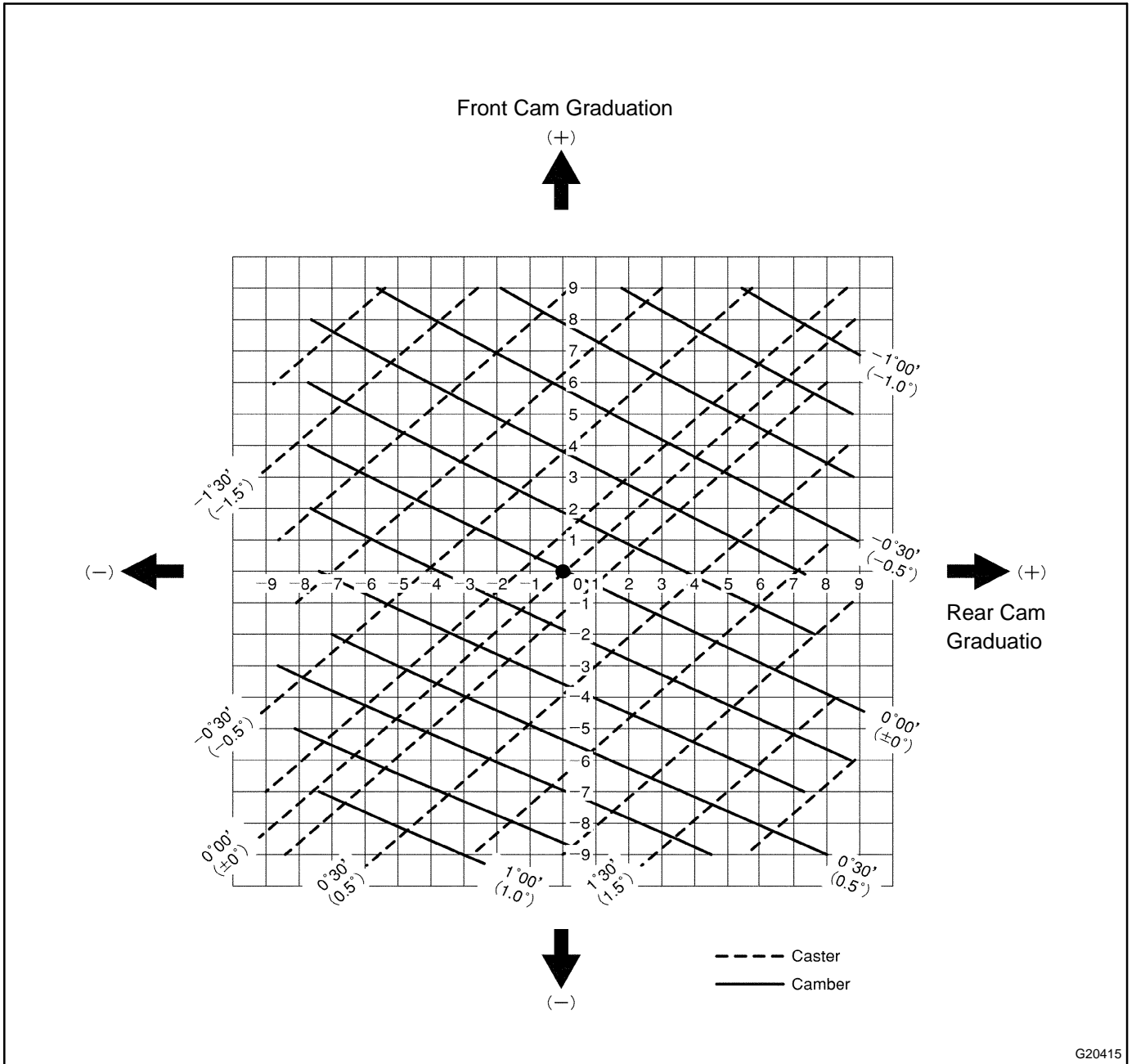
Camber: 0°15' - (0°35') = - 0°20'

Caster: 2°45' - (2°55') = - 0°10'

(3) As shown in the chart, read the distance from the marked point to 0 point, and adjust the front and/or rear adjusting cams accordingly.

Toe adjust cam: - (Shorter) 2.8

Camber adjust cam: - (Shorter) 1.8



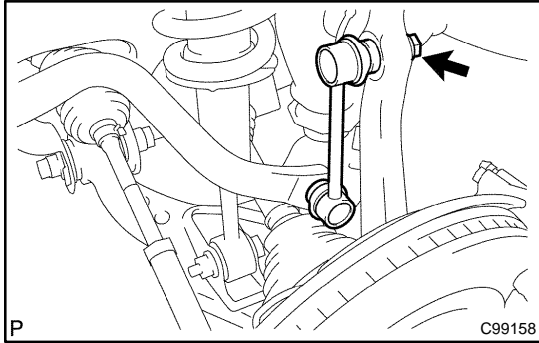
FRONT SHOCK ABSORBER WITH COIL SPRING OVERHAUL

260BS-02

HINT:

COMPONENTS: See page 26-3

1. REMOVE FRONT DISC WHEEL



2. SEPARATE FRONT STABILIZER LINK ASSY LH

- (a) Remove the nut and disconnect the stabilizer link from the steering knuckle.

HINT:

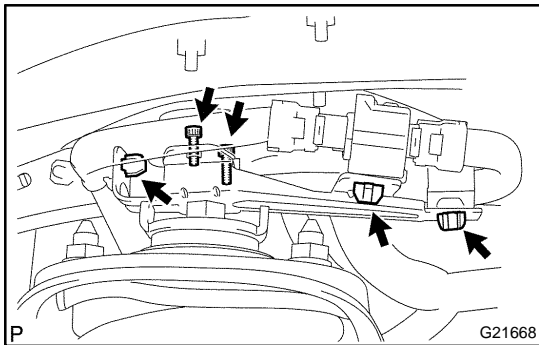
If the balljoint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

3. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:

Remove the RH side by following the same procedures with the LH side.

4. REMOVE FRONT STABILIZER BRACKET NO.1 LH (See page 26-26)
5. REMOVE FRONT STABILIZER BRACKET NO.1 RH (See page 26-26)
6. REMOVE STABILIZER BAR FRONT

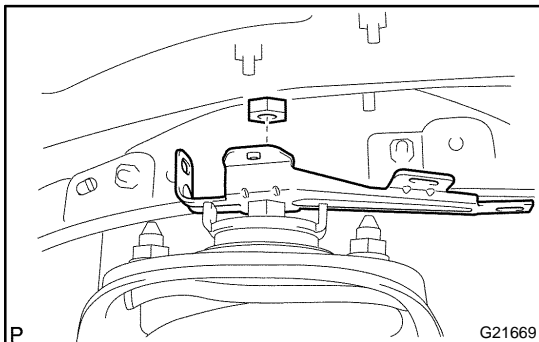


7. REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING

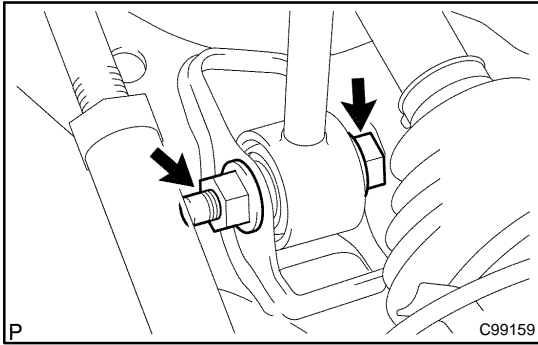
- (a) Disconnect the 3 clamps and a connector.
(b) Remove the 2 bolts and the absorber control actuator.

HINT:

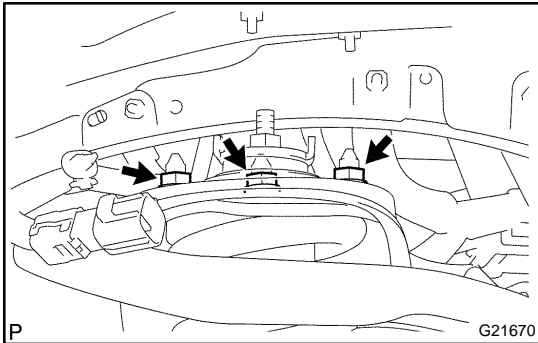
Using a hexagon wrench (4 mm), remove the 2 bolts.



- (c) Remove a nut and the bracket.

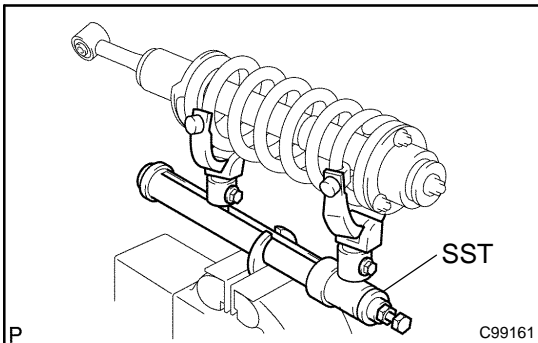


(d) Remove a bolt, the nut and the washer.



(e) Remove the 3 nuts on the upper side of the front shock absorber with coil spring.

(f) Remove the front shock absorber with coil spring.



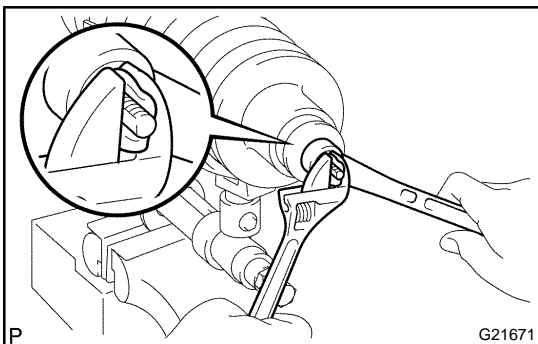
8. REMOVE FRONT SUPPORT TO FRONT SHOCK ABSORBER NUT

(a) Using SST, compress the coil spring.

SST 09727-30021 (09727-00010, 09727-00031),
09727-00060

NOTICE:

Do not use an impact wrench. It will damage the SST.

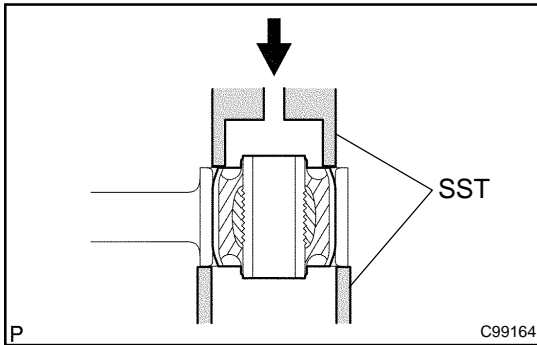


(b) Hold the shock absorber rod, and remove the nut.

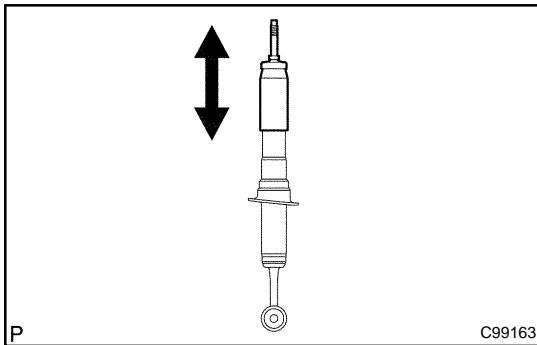
NOTICE:

Do not use an impact wrench. It will damage the shock absorber rod.

9. REMOVE FRONT SHOCK ABSORBER CUSHION RETAINER
10. REMOVE FRONT SHOCK ABSORBER CUSHION NO.1
11. REMOVE FRONT SUSPENSION SUPPORT SUB-ASSY LH
12. REMOVE FRONT SHOCK ABSORBER CUSHION RETAINER
13. REMOVE FRONT COIL SPRING LH

**14. REMOVE FRONT SHOCK ABSORBER BUSH**

- (a) Using SST and a press, remove the absorber bush.
SST 09710-22021 (09710-01071, 09710-01081)

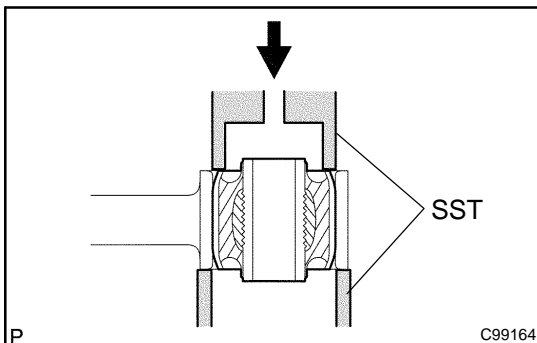
**15. INSPECT SHOCK ABSORBER ASSY FRONT LH**

- (a) Compress and extend the shock absorber rod, and check that there is no abnormal resistance or unusual sound during the operation.

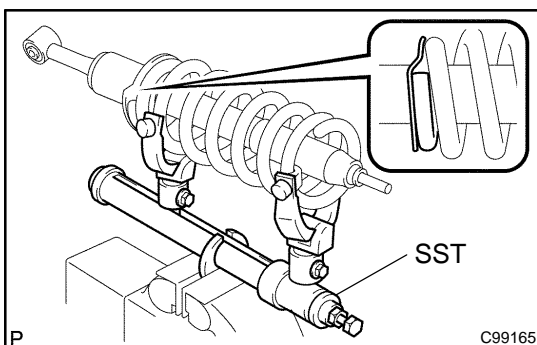
If there is any abnormality, replace the shock absorber assy front LH with a new one.

NOTICE:

When disposing of the shock absorber assy front LH, see DISPOSAL on page 26-17.

**16. INSTALL FRONT SHOCK ABSORBER BUSH**

- (a) Using SST and a press, install a new absorber bush.
SST 09710-22021 (09710-01071, 09710-01081)

**17. INSTALL FRONT COIL SPRING LH**

- (a) Using SST, compress the front coil spring LH.
SST 09727-30021 (09727-00010, 09727-00031),
09727-00060

NOTICE:

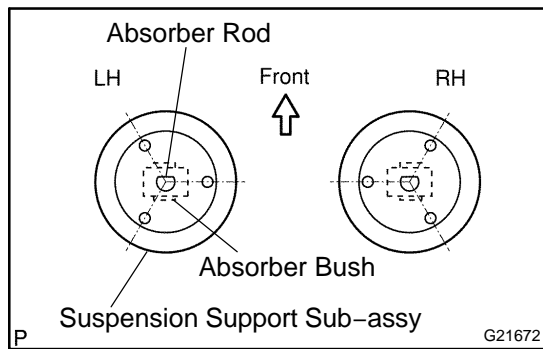
Do not use an impact wrench. It will damage the SST.

- (b) Install the front coil spring LH to the shock absorber assy front LH.

HINT:

Fit the lower end of the front coil spring LH into the gap of the spring lower seat.

18. INSTALL FRONT SHOCK ABSORBER CUSHION RETAINER**19. INSTALL FRONT SUSPENSION SUPPORT SUB-ASSY LH****20. INSTALL FRONT SHOCK ABSORBER CUSHION NO.1****21. INSTALL FRONT SHOCK ABSORBER CUSHION RETAINER**



22. INSTALL FRONT SUPPORT TO FRONT SHOCK ABSORBER NUT

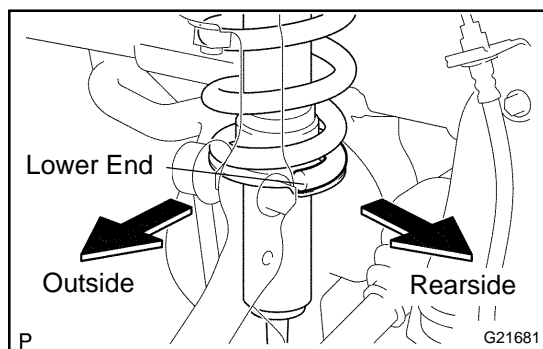
- (a) Align the front suspension support sub-assy, the absorber rod and the absorber bush as shown in the illustration.
- (b) Tighten the new lock nut.

Torque: 25 N·m (260 kgf·cm, 18 ft·lbf)

NOTICE:

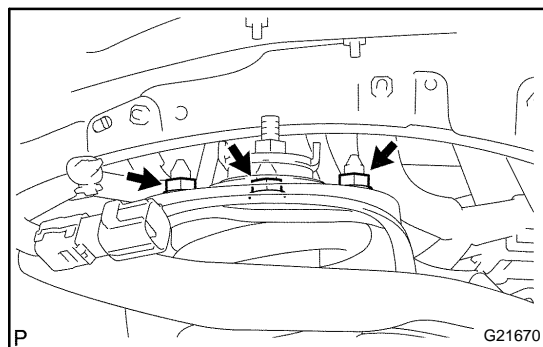
Do not use an impact wrench. It will damage the shock absorber rod.

- (c) Release the coil spring while checking the position of the suspension support.



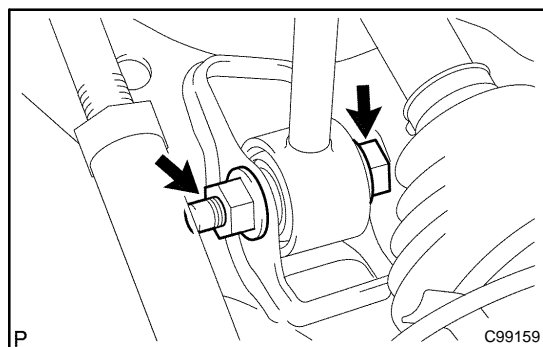
23. TEMPORARILY TIGHTEN FRONT SHOCK ABSORBER WITH COIL SPRING

- (a) Install the coil spring on the body as the lower end of the coil spring faces rear side of the vehicle.

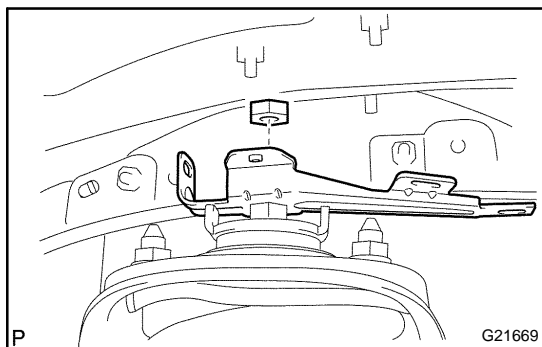


- (b) Install the 3 nuts on the upper side of the front shock absorber with coil spring.

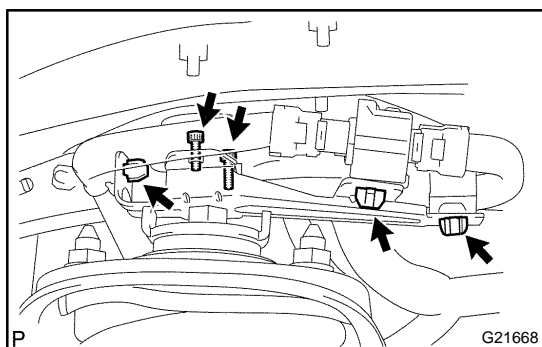
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



- (c) Temporarily tighten the bolt, the nut and the washer as shown in the illustration.



- (d) Install the bracket with a nut.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)



- (e) Install the absorber control actuator with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

HINT:

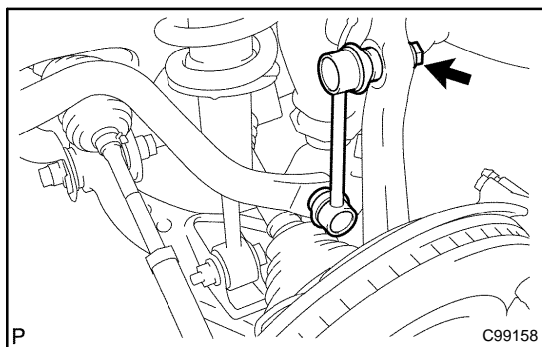
Using a hexagon wrench (4 mm), install the 2 bolts.

- (f) Connect the 3 clamps and a connector.

24. INSTALL STABILIZER BAR FRONT

25. INSTALL FRONT STABILIZER BRACKET NO.1 LH (See page 26-26)

26. INSTALL FRONT STABILIZER BRACKET NO.1 RH (See page 26-26)



27. INSTALL FRONT STABILIZER LINK ASSY LH

- (a) Connect the stabilizer link with the nut to the steering knuckle.

Torque: 70 N·m (710 kgf·cm, 52 ft·lbf)

HINT:

If the balljoint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

28. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

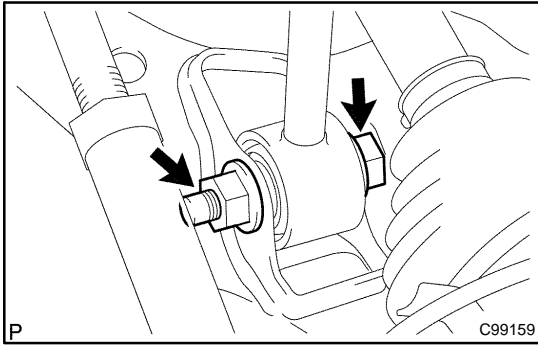
Install the RH side by following the same procedures with the LH side.

29. INSTALL FRONT DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

30. STABILIZE SUSPENSION

- (a) Jack down the vehicle.
 (b) Bounce the vehicle up and down several times to stabilize the suspension.



31. FULLY TIGHTEN FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Fully tighten the nut.

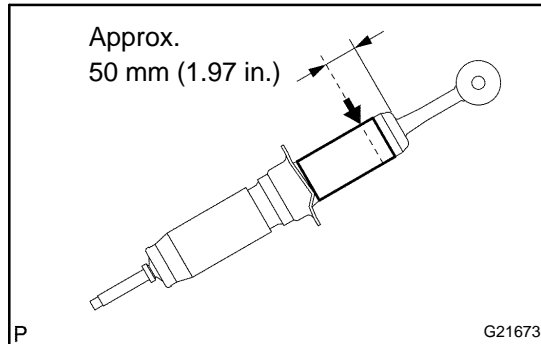
Torque: 135 N·m (1,380 kgf·cm, 100 ft·lb)

32. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page [26-7](#))

DISPOSAL

HINT:

Dispose of the RH side by the same procedures with the LH side.



1. **DISPOSE OF SHOCK ABSORBER ASSY FRONT LH**
 - (a) Fully extend the shock absorber piston rod, and fix it at a tilt in a vise or similar tool.
 - (b) Using a drill or similar tool, slowly make a hole at approx. 50 mm (1.97 in.) from the top end of the shock absorber, and discharge the gas inside of it.

CAUTION:

- **The gas is colorless, odorless and harmless.**
- **Since the discharged gas may cause chips to fly off, cover the drill with a shop rag when making a hole.**

FRONT SUSPENSION UPPER ARM ASSY LH

OVERHAUL

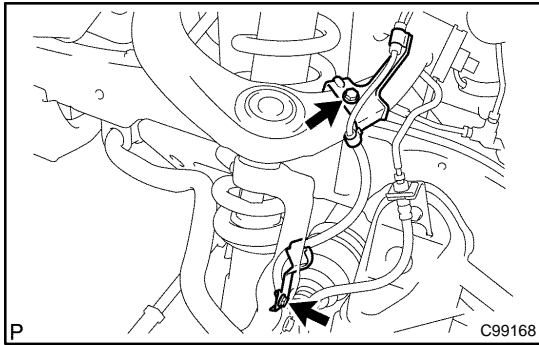
2609N-02

HINT:

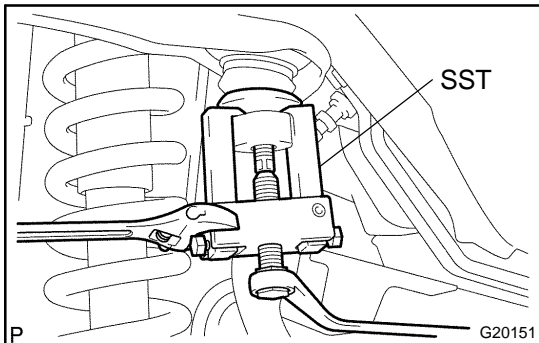
COMPONENTS: See page 26-3

1. REMOVE FRONT DISC WHEEL**2. INSPECT FRONT SUSPENSION UPPER ARM ASSY LH**

- (a) Check that there is no looseness on the ball joint by shaking the upper arm up and down by hand.

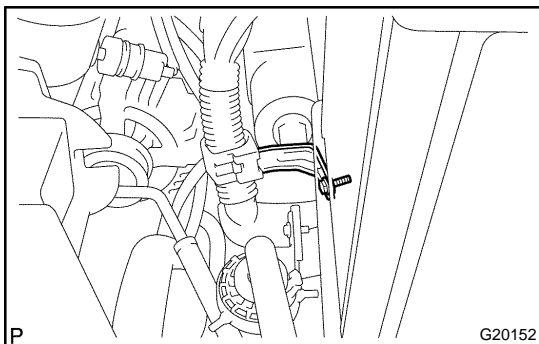
**3. DISCONNECT SKID CONTROL SENSOR WIRE**

- (a) Remove the 2 bolts, and disconnect the skid control sensor wire.

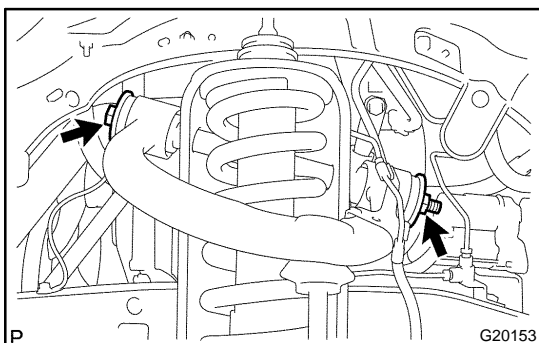
**4. REMOVE FRONT SUSPENSION UPPER ARM ASSY LH**

- (a) Support the front suspension lower arm LH with a jack.
 (b) Remove the clip and the nut.
 (c) Using SST, disconnect the upper ball joint from the steering knuckle.

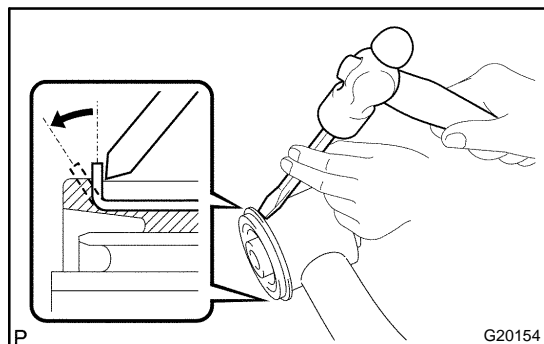
SST 09628-62011



- (d) Remove the bolt and the bracket.

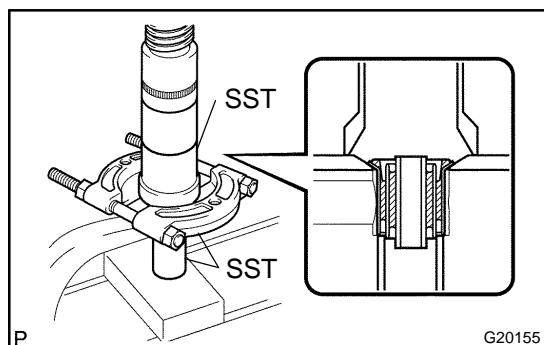


- (e) Remove the bolt, the 2 washers and the nut.
 (f) Remove the front suspension upper arm assy.



5. REMOVE FRONT SUSPENSION UPPER ARM BUSH LH

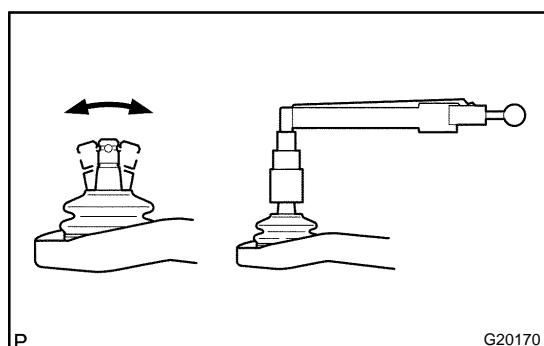
- (a) Using a hammer and a chisel, raise the flange of the bushing diagonally as shown in the illustration.



- (b) Using SST and a press, remove the front suspension upper arm bush LH (front side).

SST 09613-26010, 09710-22021 (09710-01031), 09950-00020

- (c) Replace the rear side by the same procedures with the front side.



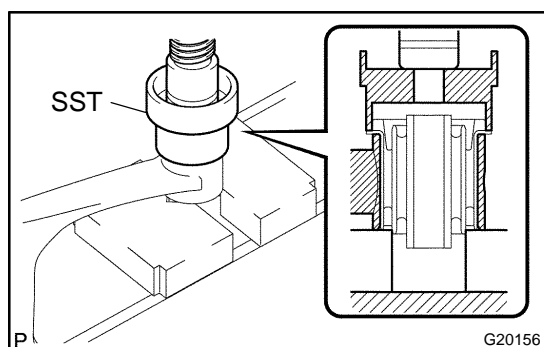
6. INSPECT FRONT SUSPENSION UPPER ARM ASSY LH

- (a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.

- (b) Using a torque wrench, turn the nut continuously at a rate of 3 - 5 seconds per 1 turn, and take the torque reading on the 5th turn.

Turning torque: 4.5 N·m (46 kgf·cm, 40 in.·lbf) or less

- (c) Check for any cracks and grease leaks on the ball joint dust cover.

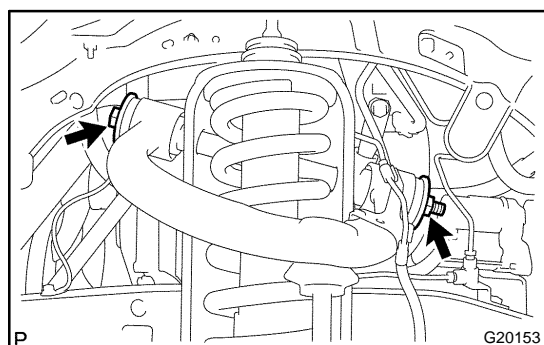


7. INSTALL FRONT SUSPENSION UPPER ARM BUSH LH

- (a) Using SST and a press, install a new front suspension upper arm bush LH (front side).

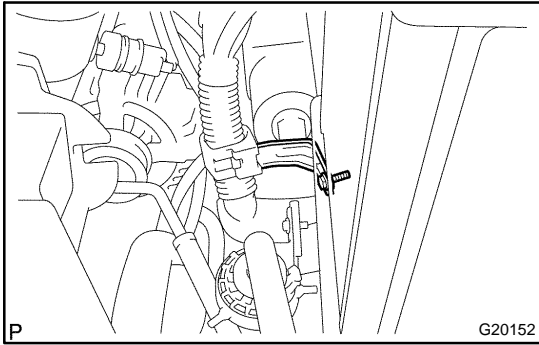
SST 09710-26010 (09710-05061)

- (b) Install the rear side by the same procedures with the front side.

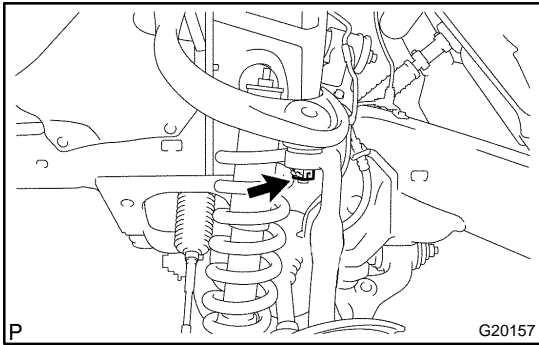


8. TEMPORARILY TIGHTEN FRONT SUSPENSION UPPER ARM ASSY LH

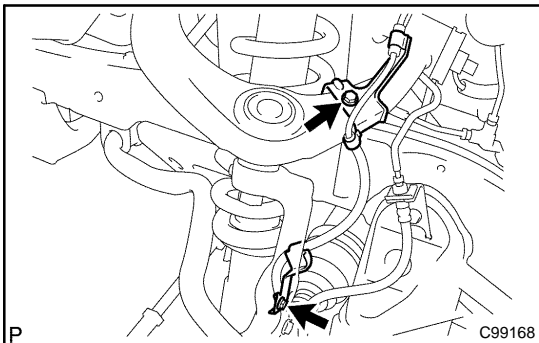
- (a) Install the front suspension upper arm assy, and temporarily tighten bolt, the 2 washers and the nut.



- (b) Install the bracket with the bolt.
Torque: 5.8 N·m (59 kgf·cm, 51 in·lbf)



- (c) Install a new nut and a new clip.
Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)



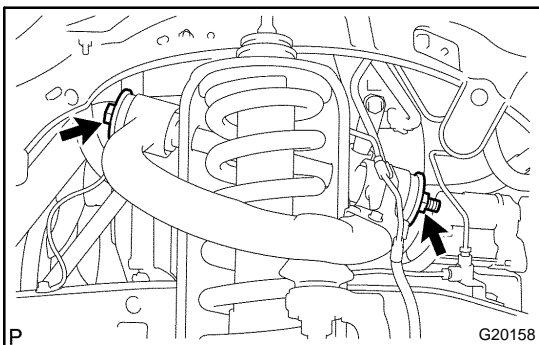
9. CONNECT SKID CONTROL SENSOR WIRE

- (a) Install the connect skid control sensor wire with the 2 bolts.
Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

10. INSTALL FRONT DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

11. STABILIZE SUSPENSION (See page [26-11](#))



12. FULLY TIGHTEN FRONT SUSPENSION UPPER ARM ASSY LH

- (a) Fully tighten the nut.
Torque: 115 N·m (1,170 kgf·cm, 85 ft·lbf)

13. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page [26-7](#))

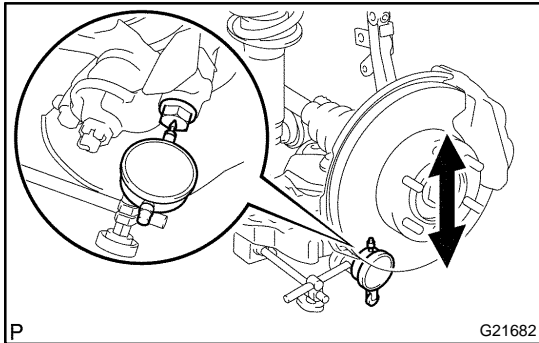
FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH OVERHAUL

26090-02

HINT:

COMPONENTS: See page 26-3

1. REMOVE FRONT DISC WHEEL



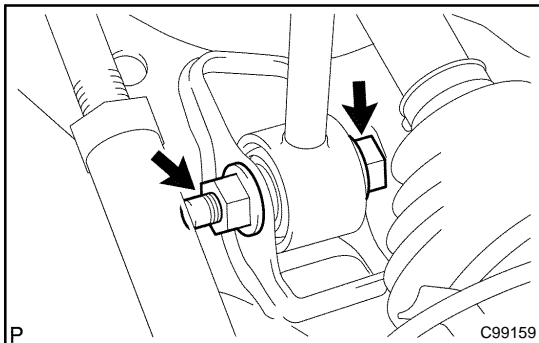
2. INSPECT FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

- Install the hub nuts to the disc.
- Using a dial indicator, check the lower ball joint for excessive play when you push the hub nuts up and down with a force of 294 N (30 kgf,66 lbf).

Maximum: 0.5 mm (0.020 in.)

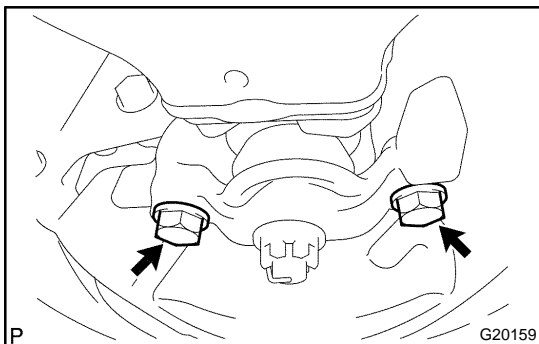
HINT:

If it is not within the specification, replace the lower arm.



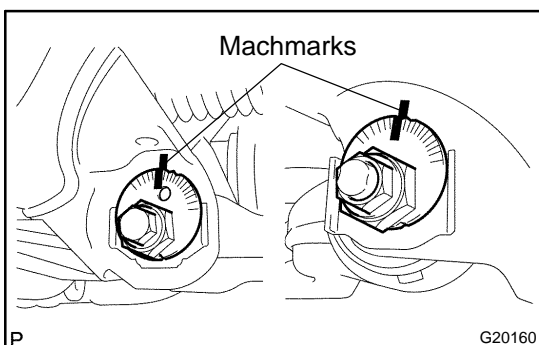
3. SEPARATE FRONT SHOCK ABSORBER WITH COIL SPRING

- Remove the bolt, nut and washer.
- Separate the front shock absorber with coil spring from the suspension lower arm.

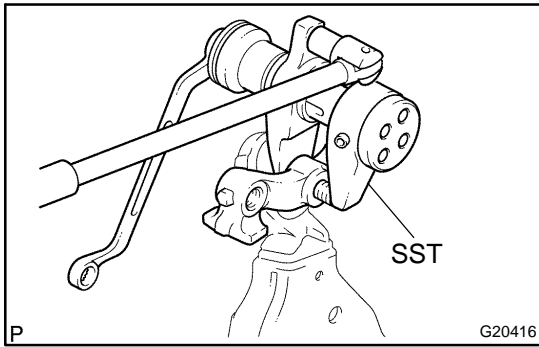


4. REMOVE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

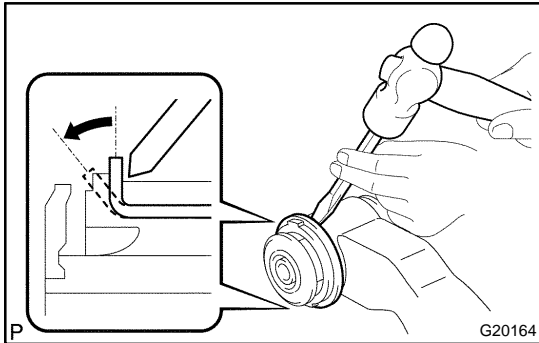
- Remove the 2 bolts, and separate the front lower ball joint attachment LH from the front axle.



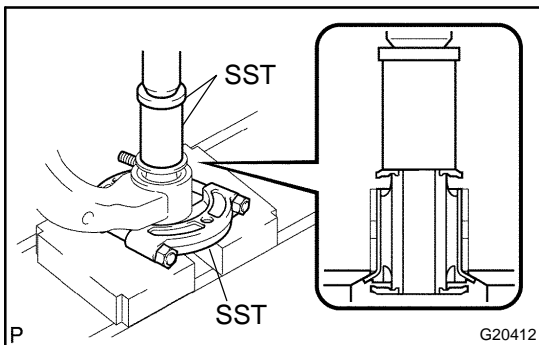
- Place matchmarks on the camber adjust cam No.2 and toe adjust cam sub-assy.
- Remove the nut, camber adjust cam No.2, camber adjust cam assy, bolt, toe adjust cam sub-assy, toe adjust plate No.2 and front suspension arm sub-assy lower No.1 LH.



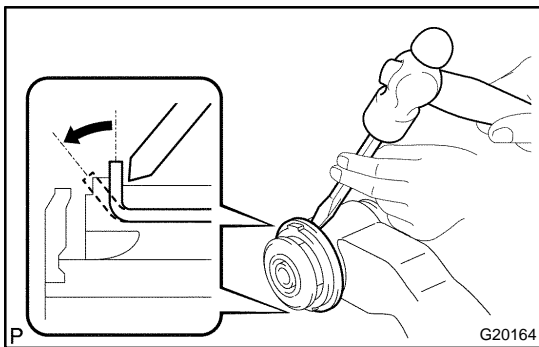
- (d) Remove the cotter pin and the nut.
 (e) Using SST, remove the front lower ball joint attachment LH.
 SST 09628-00011



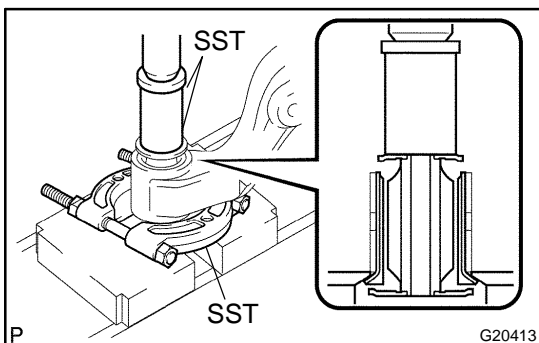
- 5. REMOVE FRONT LOWER ARM BUSH NO.1 LH**
 (a) Using a hammer and a chisel, raise the flange of the bushing diagonally as shown in the illustration.



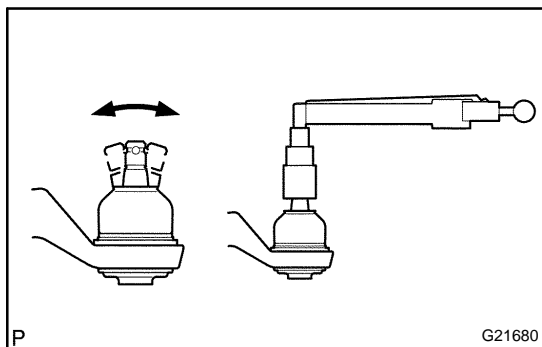
- (b) Using SST and a press, remove the lower arm bush No.1 LH.
 SST 09632-36010, 09950-00020, 09950-60010
 (09951-00400)



- 6. REMOVE FRONT LOWER ARM BUSH NO.2 LH**
 (a) Using a hammer and a chisel, raise the flange of the bushing diagonally as shown in the illustration.



- (b) Using SST and a press, remove the lower arm bush No.2 LH.
 SST 09632-36010, 09950-00020, 09950-60010
 (09951-00400)

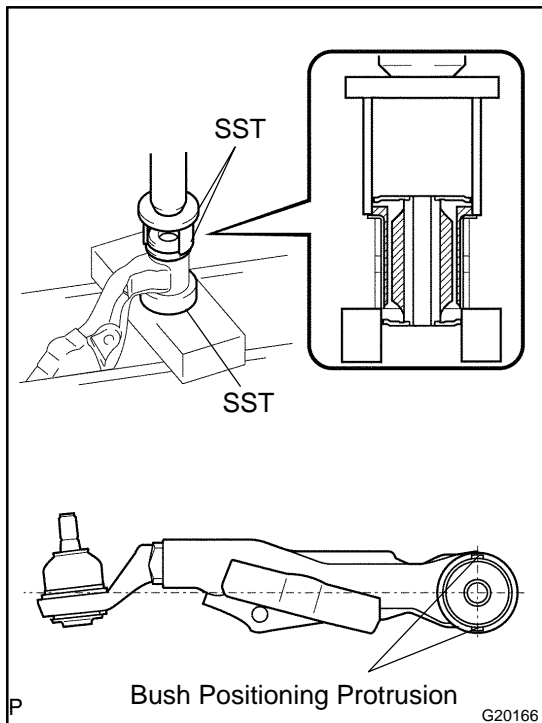


7. INSPECT FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

- (a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.
- (b) Using a torque wrench, turn the nut continuously at a rate of 3 – 5 seconds per 1 turn, and take the torque reading on the 5th turn.

Turning torque: 3.0 N·m (31 kgf·cm, 27 in·lbf) or less

- (c) Check for any cracks and grease leaks on the ball joint dust cover.



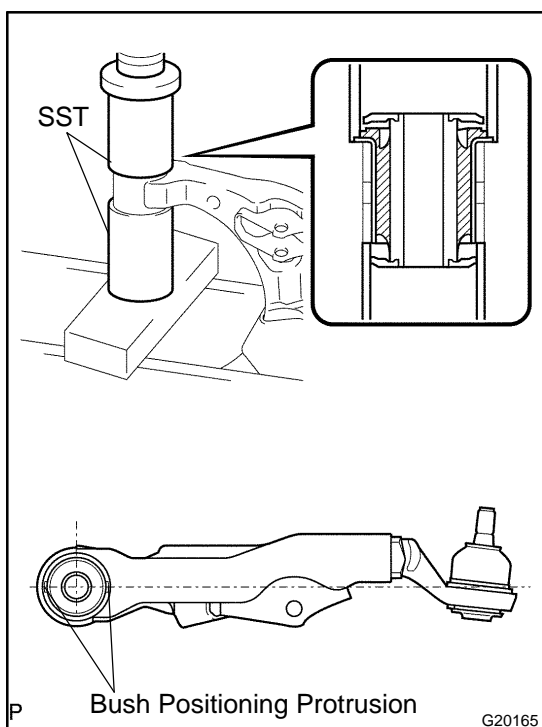
8. INSTALL FRONT LOWER ARM BUSH NO.2 LH

- (a) Using SST and a press, install a new lower arm bush No.2 LH.

SST 09710-26010 (09710-05081), 09950-60020 (09951-00890)

NOTICE:

Press the lower arm bush No.2 in the lower arm at the bush positioning protrusions become perpendicular to the lower arm as shown in the illustration.



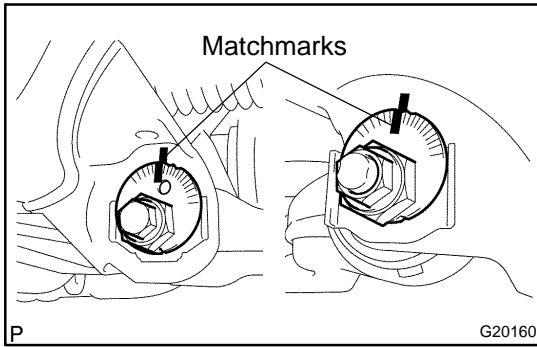
9. INSTALL FRONT LOWER ARM BUSH NO.1 LH

- (a) Using SST and a press, install a new lower arm bush No.1 LH.

SST 09223-00010, 09612-30012

NOTICE:

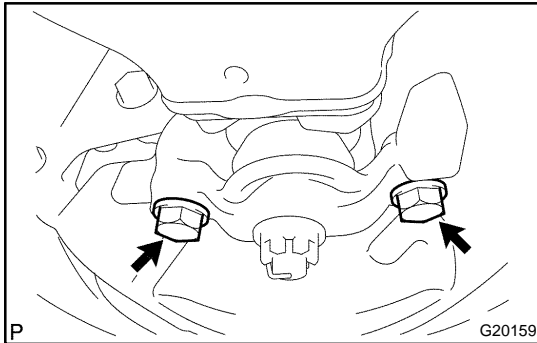
Press the lower arm bush No.1 in the lower arm at the bush positioning protrusions become parallel with the lower arm as shown in the illustration.



10. TEMPORARILY TIGHTEN FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

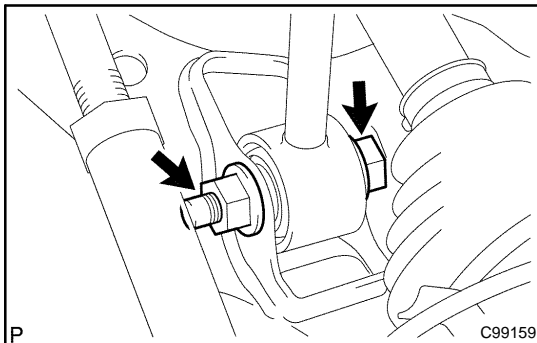
- (a) Align the matchmarks on the camber adjust cam No.2 and toe adjust cam sub-assy, temporarily tighten the bolt and the nut.
- (b) Install the front lower ball joint attachment LH, a new nut and a new cotter pin.

Torque: 140 N·m (1,430 kgf·cm, 103 ft·lbf)



- (c) Install the front lower ball joint attachment LH with the 2 bolts.

Torque: 225 N·m (2,290 kgf·cm, 166 ft·lbf)



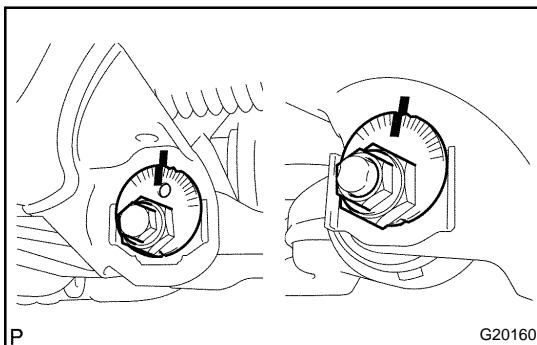
11. TEMPORARILY TIGHTEN FRONT SHOCK ABSORBER WITH COIL SPRING

- (a) Install the front shock absorber with coil spring, the bolt and the washer, and temporarily tighten the nut.

12. INSTALL FRONT DISC WHEEL

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

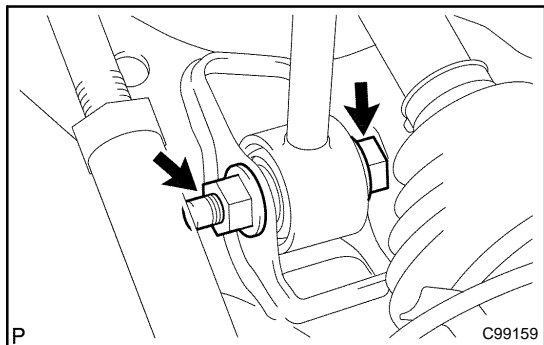
13. STABILIZE SUSPENSION (See page 26-11)



14. FULLY TIGHTEN FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

- (a) Fully tighten the bolt and the nut.

Torque: 135 N·m (1,380 kgf·cm, 100 ft·lbf)



15. FULLY TIGHTEN FRONT SHOCK ABSORBER WITH COIL SPRING

- (a) Fully tighten the nut.

Torque: 135 N·m (1,380 kgf·cm, 100 ft·lbf)

16. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-7)

STABILIZER BAR FRONT

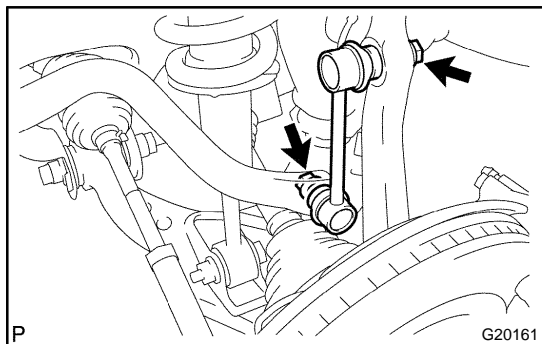
OVERHAUL

2609Q-02

HINT:

COMPONENTS: See page 26-3

1. REMOVE FRONT WHEELS



2. REMOVE FRONT STABILIZER LINK ASSY LH

(a) Remove the 2 nuts and the front stabilizer link assy LH.

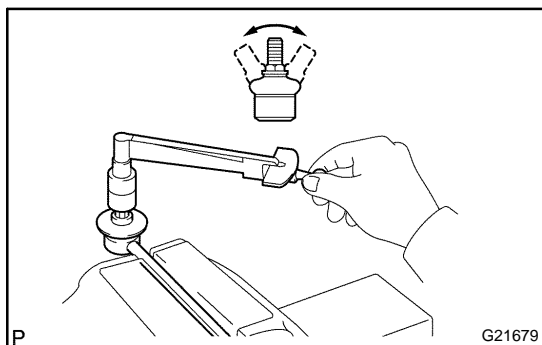
HINT:

If the balljoint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

3. REMOVE FRONT STABILIZER LINK ASSY RH

HINT:

Remove the RH side by following the same procedures with the LH side.



4. INSPECT FRONT STABILIZER LINK ASSY LH

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.

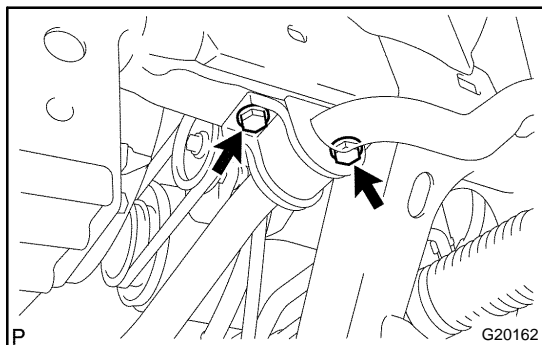
(b) Using a torque wrench, turn the nut continuously at a rate of 3 – 5 seconds per 1 turn, and take the torque reading on the 5th turn.

Turning torque:**2.0 N·m (20 kgf·cm, 18 in·lbf) or less**

(c) Check for any cracks and grease leaks on the ball joint dust cover.

5. REMOVE FRONT STABILIZER BRACKET NO.1 LH

(a) Remove the 2 bolts and the front stabilizer bracket No.1 LH.



6. REMOVE FRONT STABILIZER BRACKET NO.1 RH

HINT:

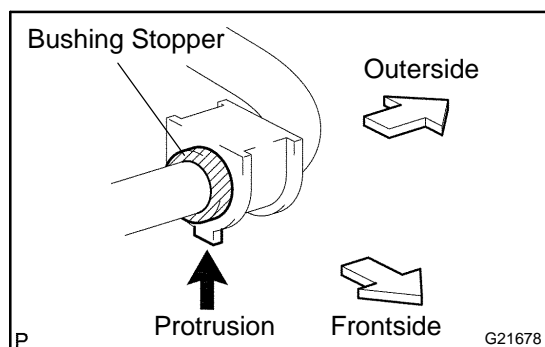
Remove the RH side by following the same procedures with the LH side.

7. REMOVE FRONT STABILIZER BAR BUSH NO.1

(a) Remove the 2 front stabilizer bar bush No.1.

2005 LEXUS GX470 REPAIR MANUAL (RM1164U)

8. REMOVE STABILIZER BAR FRONT
9. INSTALL STABILIZER BAR FRONT

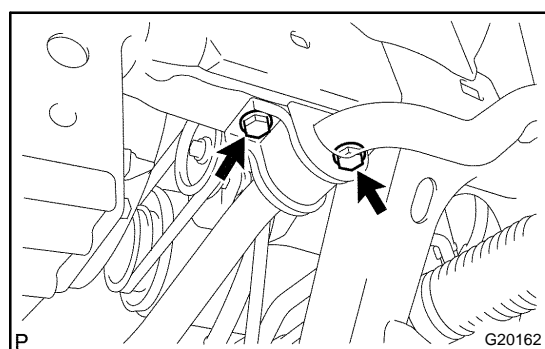


10. INSTALL FRONT STABILIZER BAR BUSH NO.1

- (a) Install the 2 front stabilizer bar bush No.1.

HINT:

- Install the bushing to the inner side of the bushing stopper on the stabilizer bar.
- Install the stabilizer bush No.1 as the protrusion to be on the inner side of the vehicle.



11. INSTALL FRONT STABILIZER BRACKET NO.1 LH

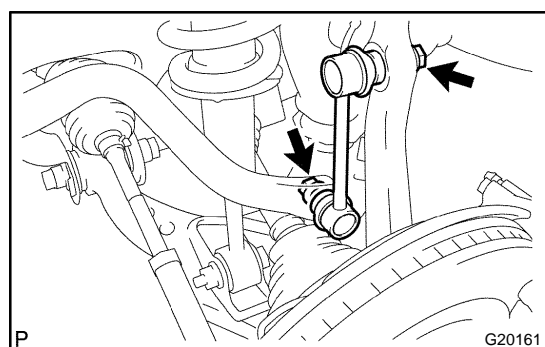
- (a) Install the front stabilizer bracket No.2 LH with the 2 bolts.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

12. INSTALL FRONT STABILIZER BRACKET NO.1 RH

HINT:

Install the RH side by following the same procedures with the LH side.



13. INSTALL FRONT STABILIZER LINK ASSY LH

- (a) Install the front stabilizer link assy LH with the 2 nuts.

Torque: 70 N·m (710 kgf·cm, 52 ft·lbf)

HINT:

If the balljoint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

14. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Install the RH side by following the same procedures with the LH side.

15. INSTALL FRONT WHEELS

Torque: 112 N·m (1,140 kgf·cm, 83 ft·lbf)

REAR SUSPENSION SYSTEM

270C4-03

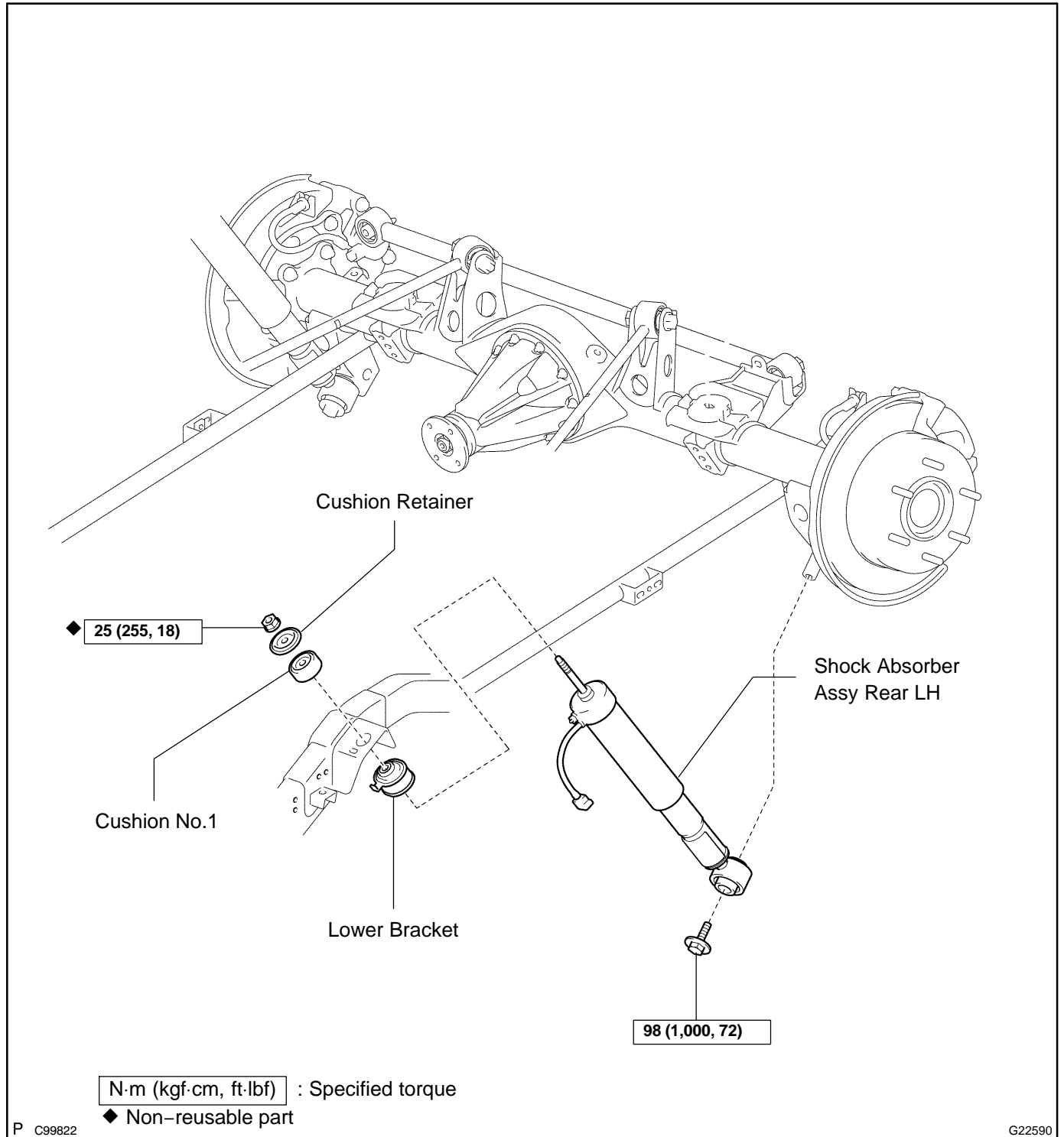
PROBLEM SYMPTOMS TABLE

Use the table below to help find the cause of the problem. The numbers indicate the probability of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Wander/pulls	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Wheel alignment (Incorrect) 3. Hub bearing (Worn) 4. Suspension parts (Worn) 	<p>28-1 26-7 30-38 -</p>
Bottoming	<ol style="list-style-type: none"> 1. Vehicle (Overloaded) 2. Pneumatic cylinder (Weak) 3. Shock absorber (Worn) 	<p>- 27-7 27-3</p>
Sways/pitches	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Stabilizer bar (Bent or broken) 3. Shock absorber (Worn) 	<p>28-1 27-19 27-3</p>
Rear wheel shimmy	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Wheel (Out of balance) 3. Shock absorber (Worn) 4. Wheel alignment (Incorrect) 5. Hub bearing (Worn) 	<p>28-1 28-1 27-3 26-7 30-38</p>
Abnormal tire wear	<ol style="list-style-type: none"> 1. Tire (Worn or improperly inflated) 2. Wheel alignment (Incorrect) 3. Shock absorber (Worn) 4. Suspension parts (Worn) 	<p>28-1 26-7 27-3 -</p>

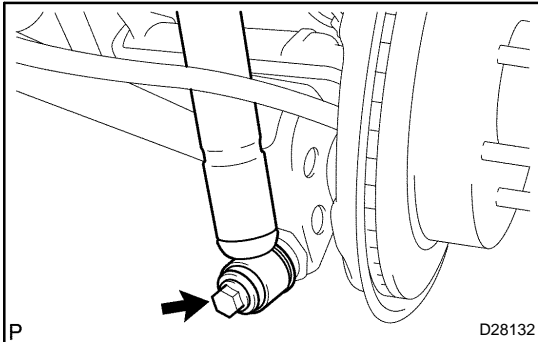
SHOCK ABSORBER ASSY REAR LH COMPONENTS

270C5-02



REPLACEMENT

1. REMOVE REAR WHEEL

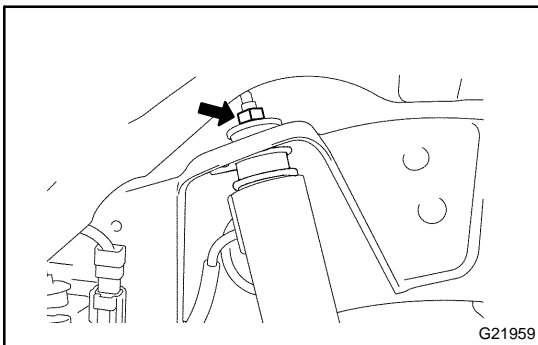


2. REMOVE SHOCK ABSORBER ASSY REAR LH

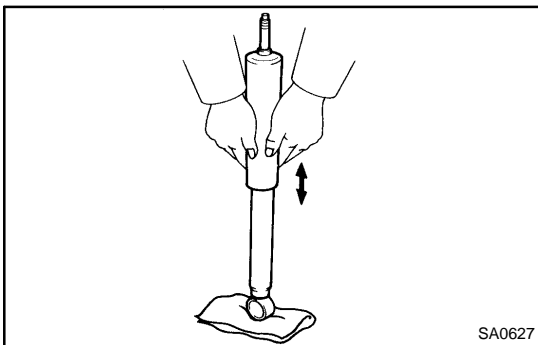
- (a) Disconnect the absorber control actuator connector.
- (b) Remove the bolt and separate the shock absorber assy rear LH from the rear axle housing.

NOTICE:

Do not lower the rear axle housing too much when disconnecting the shock absorber assy rear LH with the pneumatic cylinder being attached.



- (c) Remove the nut, cushion retainer, cushion No.1 and shock absorber assy rear LH.
- (d) Remove the lower bracket from the shock absorber assy rear LH.



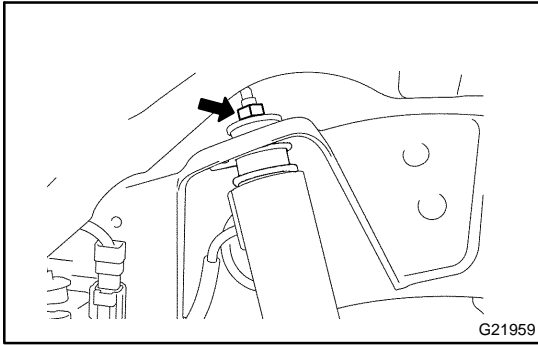
3. INSPECT SHOCK ABSORBER ASSY REAR LH

- (a) Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

NOTICE:

When disposing of the shock absorber, see DISPOSAL on page 27-5.



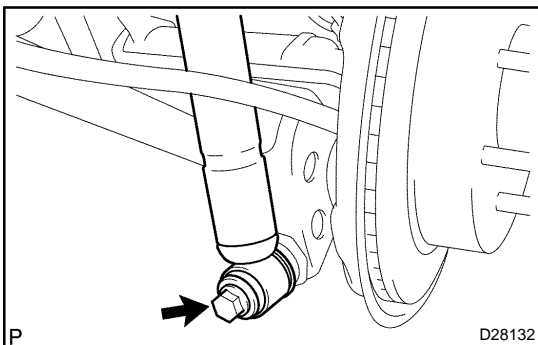
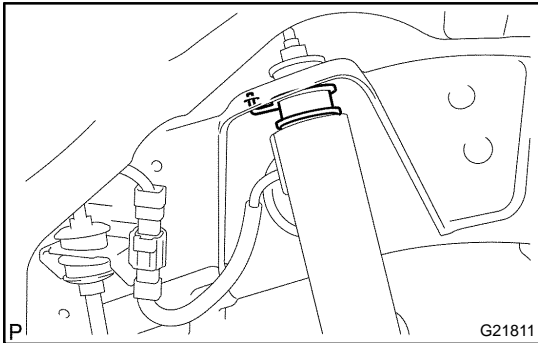
4. INSTALL SHOCK ABSORBER ASSY REAR LH

- (a) Install the lower bracket to the shock absorber assy rear LH.
- (b) Install the cushion retainer, cushion No.1 and shock absorber assy rear LH with the nut.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

NOTICE:

- Be sure to fit the positioning protrusion of the bracket to a hole on the frame.
- Install the connector as it comes in the front.



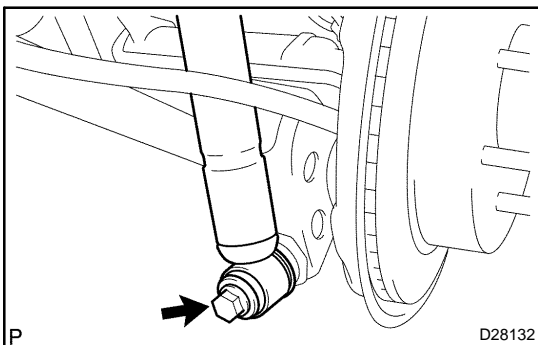
- (c) Install the shock absorber assy rear LH with the bolt.
- (d) Connect the absorber control actuator connector.

5. INSTALL REAR WHEEL

Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)

6. STABILIZE SUSPENSION

- (a) Jack down the vehicle.
- (b) Bounce the vehicle up and down several times to stabilize the suspension.

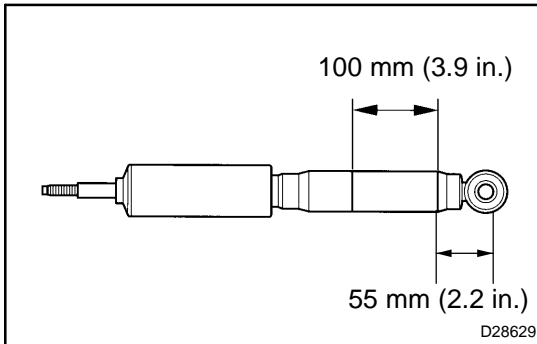


7. FULLY TIGHTEN SHOCK ABSORBER ASSY REAR LH

- (a) Fully tighten the bolt.

Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)

DISPOSAL



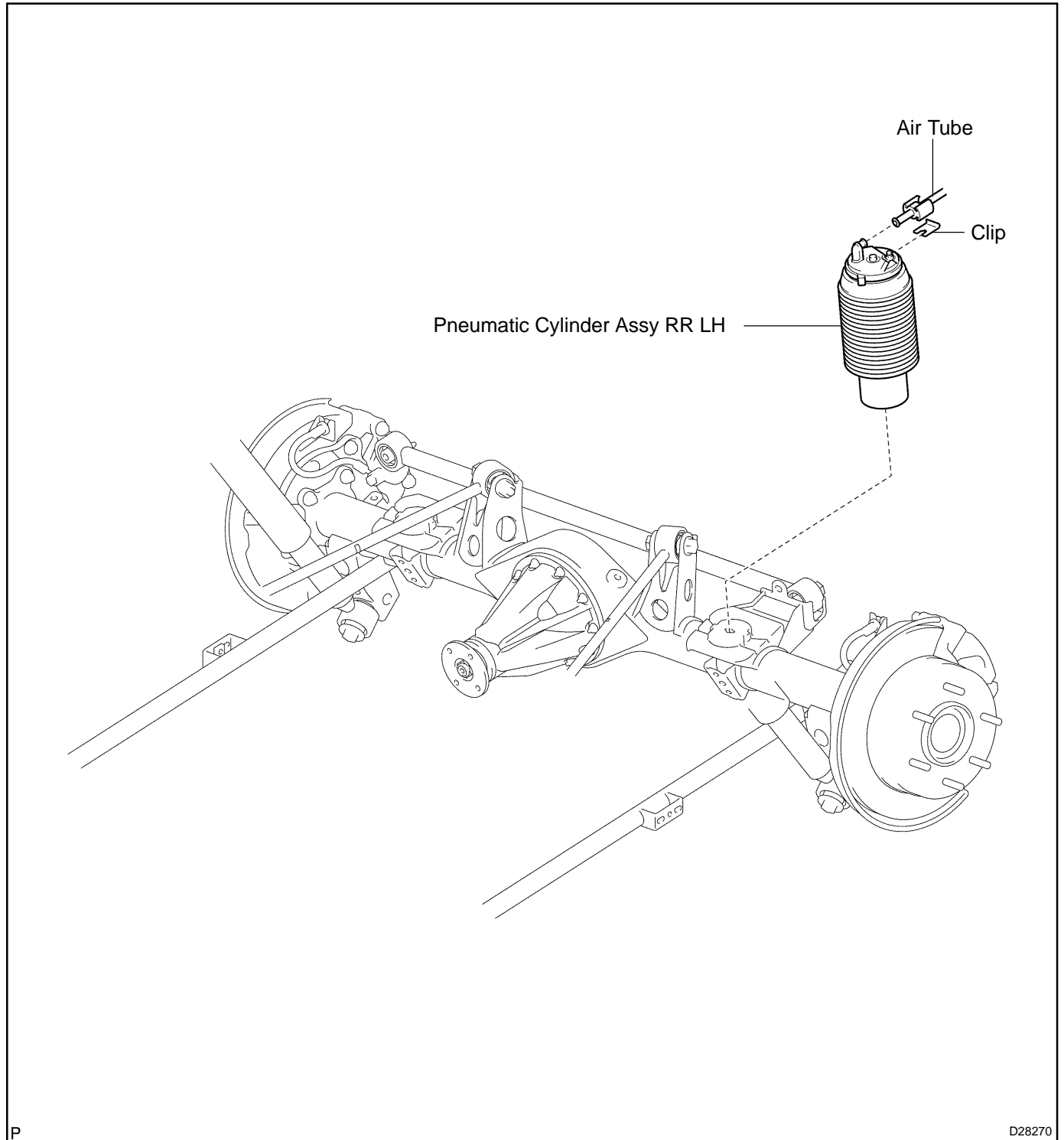
1. **DISPOSE OF SHOCK ABSORBER ASSY REAR LH**
 - (a) Fully extend the shock absorber rod.
 - (b) Using a drill, make a hole in the cylinder as shown in the illustration to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, so work carefully.**
- **The gas is colorless, odorless and non-poisonous.**

PNEUMATIC CYLINDER ASSY REAR LH COMPONENTS

270C8-02



REPLACEMENT

HINT:

For components of pneumatic cylinder assy RR LH, refer to page 27-6.

1. **REMOVE PNEUMATIC CYLINDER ASSY REAR LH**
 - (a) Jack up vehicle and support the frame with safety stands.

NOTICE:

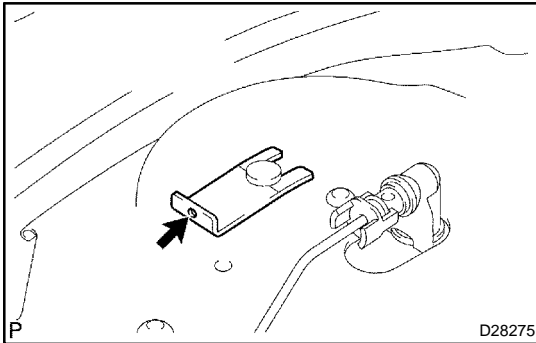
- Do the work with the rear axle assy lowered.
- Do the work with the shock absorber installed.

- (b) Disconnect the height control tube (See page 25-1).
- (c) Remove the clip on the upper side of the pneumatic cylinder (See page 25-1).

HINT:

If the clip cannot easily be removed, thread a wire through the hole to pull it.

- (d) Discharge air from the pneumatic cylinder assy to retract it.



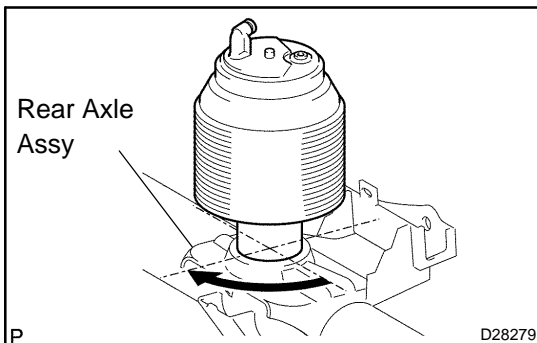
- (e) Turn the pneumatic cylinder assy 90 degrees and remove it from the rear axle assy.

NOTICE:

Do not extend the pneumatic cylinder assy.

HINT:

If the pneumatic cylinder assy is to be reused, 2 new o-rings as well as a new plate and height control plug must be used (See page 25-1).

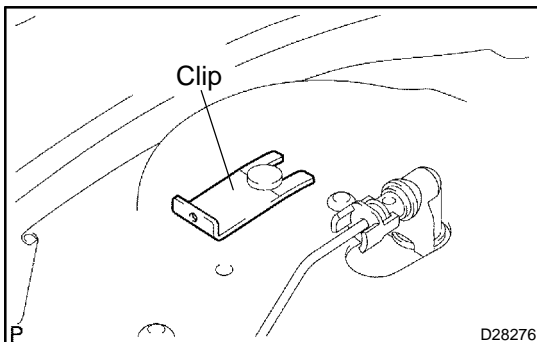


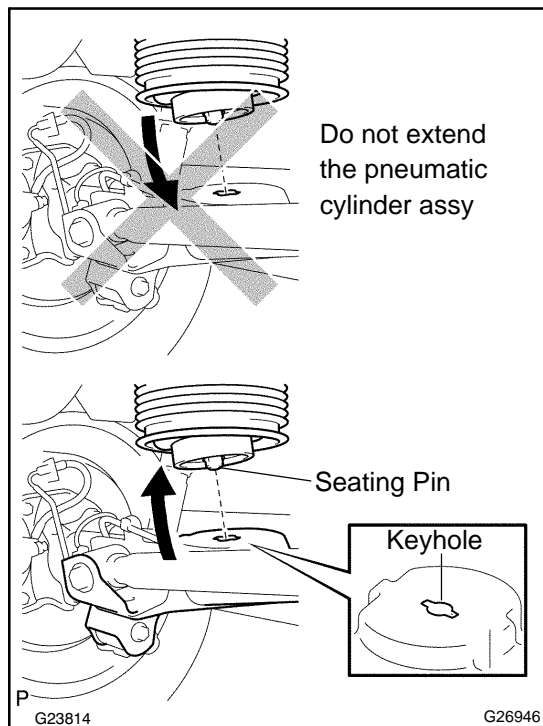
2. **INSTALL PNEUMATIC CYLINDER ASSY REAR LH**
 - (a) Install the pneumatic cylinder assy with the clip.

NOTICE:

Make sure that the clip is secured tightly onto the cylinder.

- (b) Connect the height control tube (See page 25-1).





- (c) When using safety stands and jack:
- (1) Jack up the rear axle assy until the bottom of the pneumatic cylinder assy touches the rear axle assy and install the seating pin at the lower side of the pneumatic cylinder assy into the keyhole in the rear axle assy.

NOTICE:

- **Do not extend the pneumatic cylinder assy for clip installation.**
 - **Make sure that the seating pin at the lower side of the pneumatic cylinder assy fits in the keyhole in the rear axle assy.**
- (2) Remove the safety stands with care not to extend the pneumatic cylinder assy when jacking down the vehicle till it sits on the ground.

NOTICE:

- **Do not extend the pneumatic cylinder assy by lowering the rear axle assy with safety stands installed.**
- **Make sure that the diaphragm of the pneumatic cylinder assy is not deformed.**

- (d) When using a swing arm type lift:
- (1) Lower the vehicle till the tires hit the ground, and continue lowering slowly until the bottom of the pneumatic cylinder assy touches the rear axle assy.
 - (2) Align the seating pin on the cylinder with the keyhole in the rear axle assy and install the pneumatic cylinder assy on the rear axle assy.
 - (3) Lower the lift carefully so as not to extend the pneumatic cylinder assy.

NOTICE:

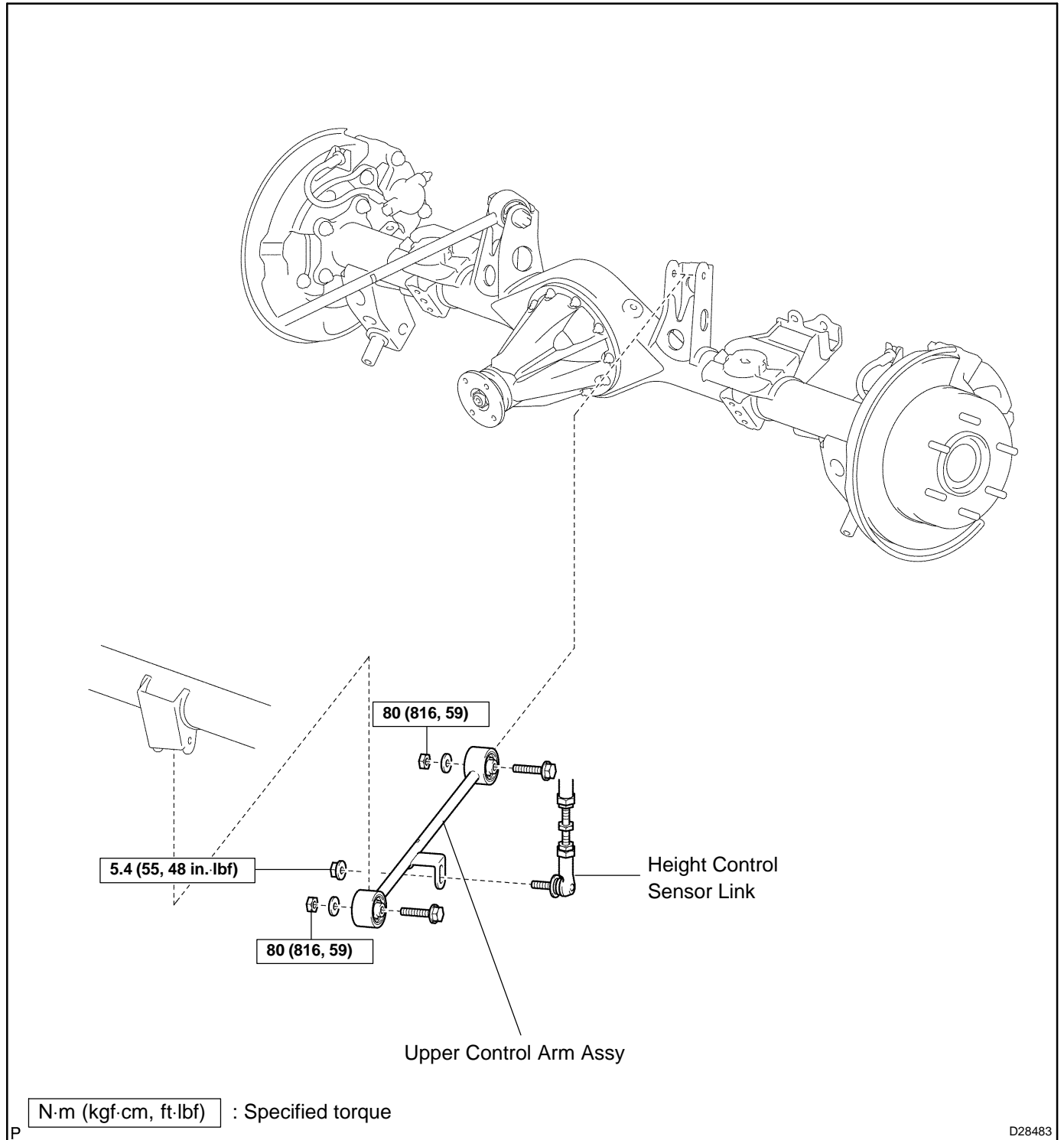
- **Do not extend the pneumatic cylinder assy by lifting up the rear axle housing after installing the seating pin.**
- **Make sure that the diaphragm of the pneumatic cylinder assy is not deformed.**

- (e) Start the engine and replenish the pneumatic cylinder assy with air.

3. **INSPECT AIR LEAK (See page 25-3)**
4. **INSPECT VEHICLE HEIGHT (See page 25-3)**

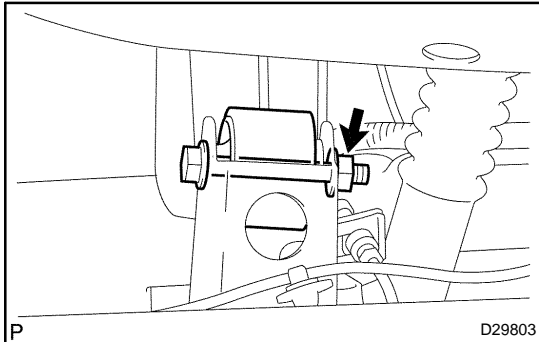
UPPER CONTROL ARM ASSY COMPONENTS

270CA-02



REPLACEMENT

1. REMOVE REAR WHEEL
2. DISCONNECT HEIGHT CONTROL SENSOR LINK SUB-ASSY REAR (See page 25-17)

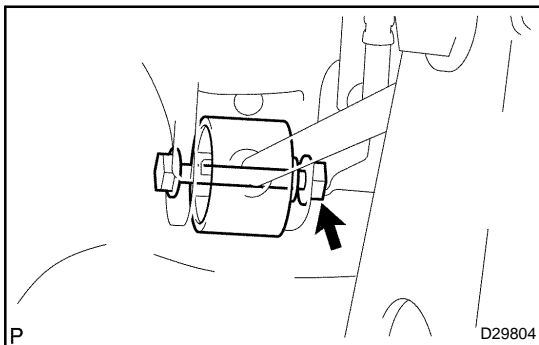


3. REMOVE UPPER CONTROL ARM ASSY

- (a) Remove the nut, washer and bolt from rear axle housing.

HINT:

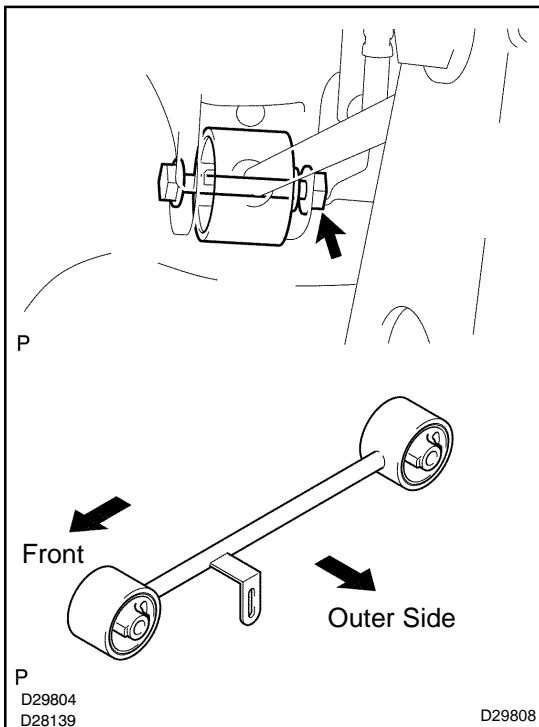
While holding the bolt, turn and remove the nut.



- (b) Remove the nut, washer and bolt with the upper control arm assembly.

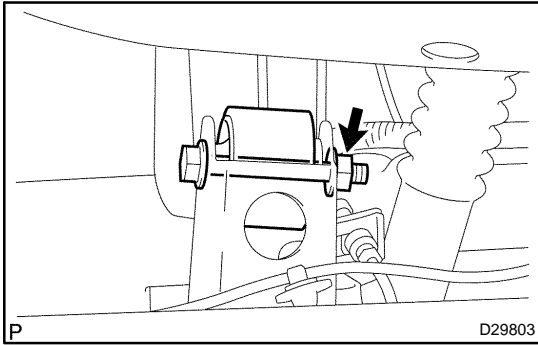
HINT:

While holding the bolt, turn and remove the nut.



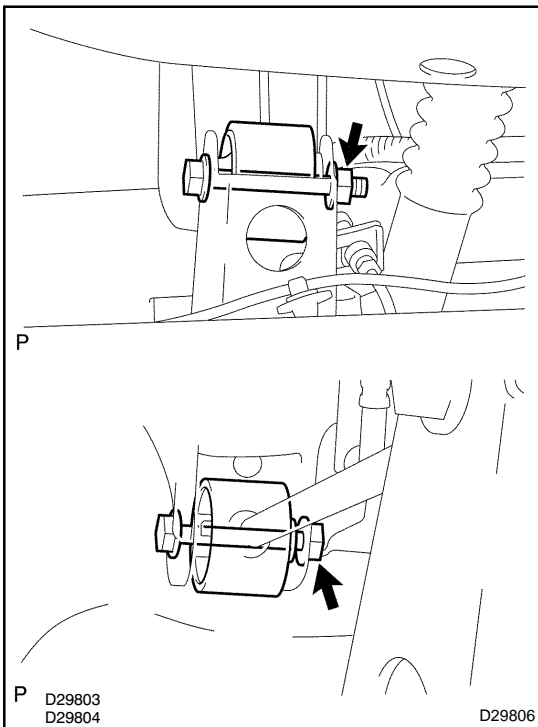
4. INSTALL UPPER CONTROL ARM ASSY

- (a) Install the upper control arm assembly, and temporarily tighten the nut, washer and bolt.



- (b) Install the rear axle housing, and temporarily tighten the nut, washer and bolt.

5. **CONNECT HEIGHT CONTROL SENSOR LINK SUB-ASSY REAR** (See page 25-17)
6. **INSTALL REAR WHEEL**
Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)
7. **STABILIZE SUSPENSION** (See page 27-3)



8. **FULLY TIGHTEN UPPER CONTROL ARM ASSY**

- (a) Fully tighten the 2 nuts.

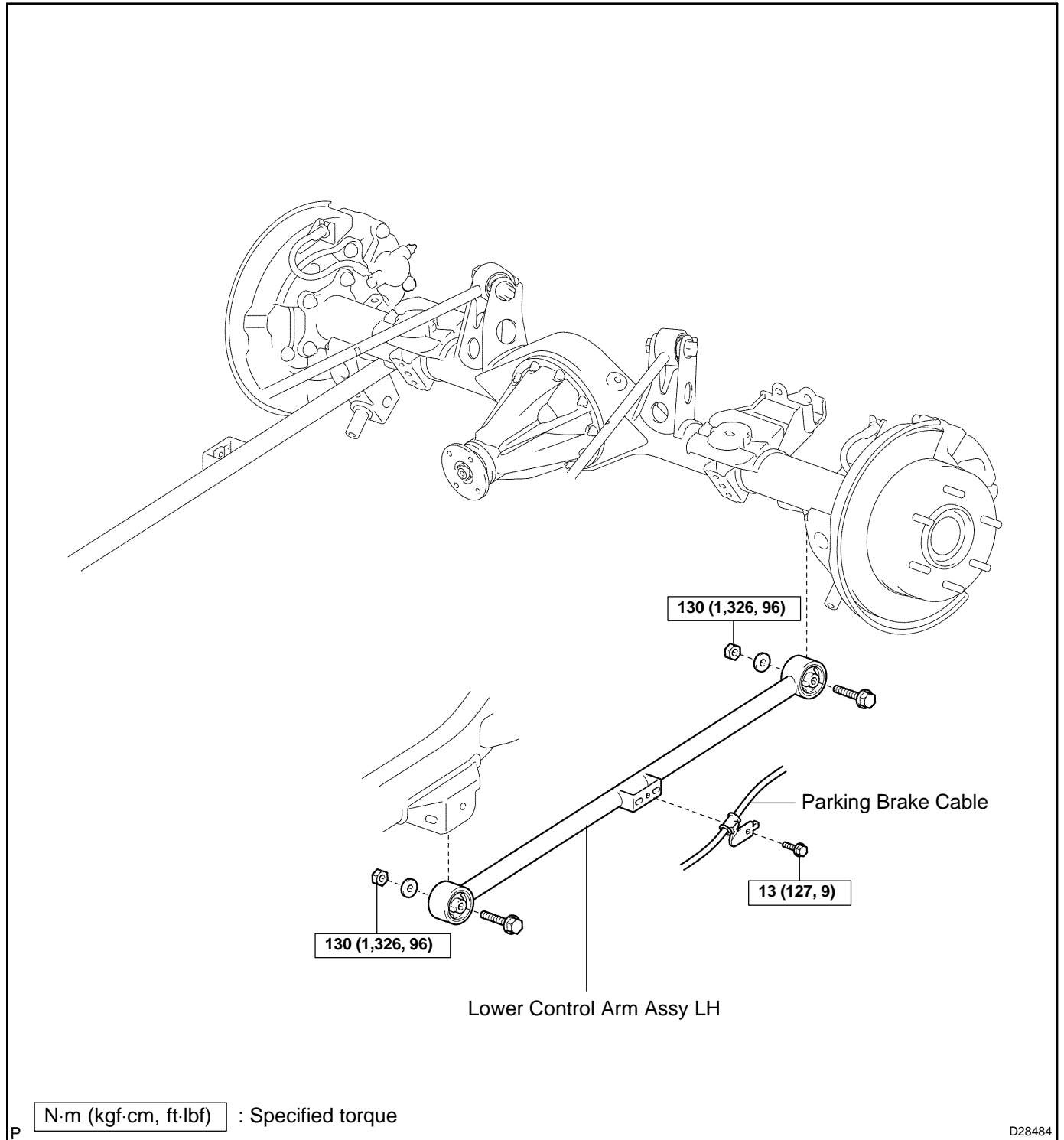
Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

HINT:

While holding the bolt, turn and install the nut.

LOWER CONTROL ARM ASSY LH COMPONENTS

270CC-02

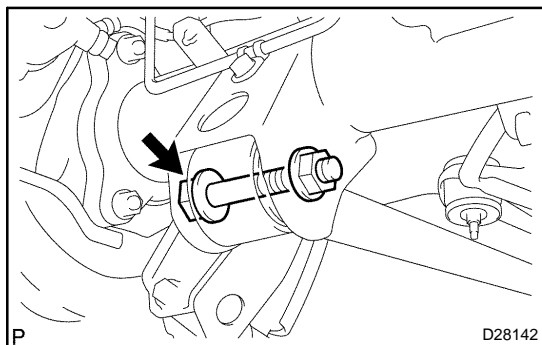


REPLACEMENT

1. REMOVE REAR WHEEL

2. SEPARATE PARKING BRAKE CABLE ASSY NO.3

- (a) Remove the bolt, and separate the parking brake cable assy No.3.

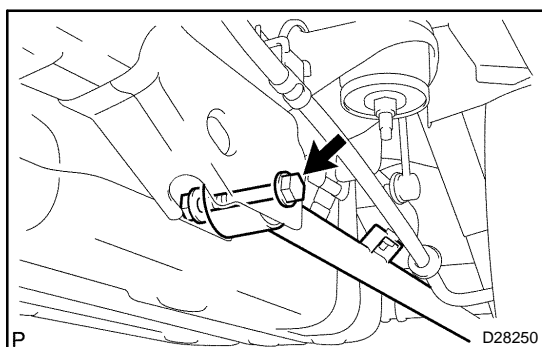


3. REMOVE LOWER CONTROL ARM ASSY LH

- (a) Remove the nut, washer and bolt from rear axle housing.

HINT:

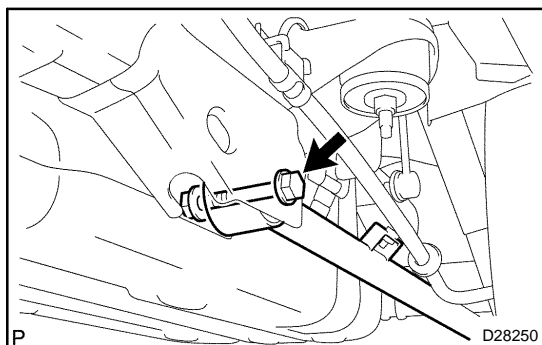
While holding the nut, turn and remove the bolt.



- (b) Remove the nut, washer, bolt and the lower control arm assy.

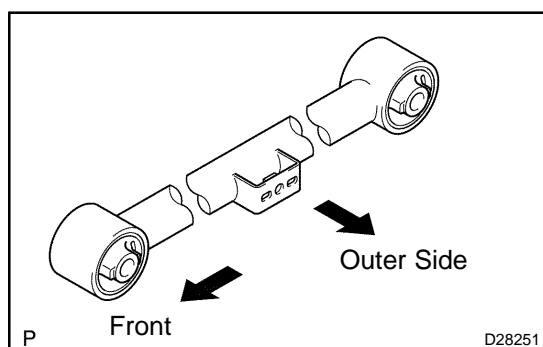
HINT:

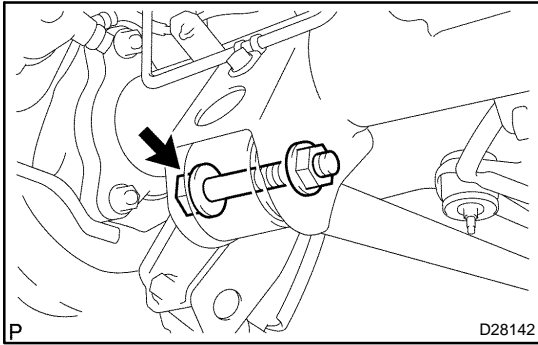
While holding the nut, turn and remove the bolt.



4. INSTALL LOWER CONTROL ARM ASSY LH

- (a) Install the lower control arm assy, and temporarily tighten the bolt, washer and nut.





- (b) Install the rear axle housing, and temporarily tighten the bolt, washer and nut.

5. CONNECT PARKING BRAKE CABLE ASSY NO.3

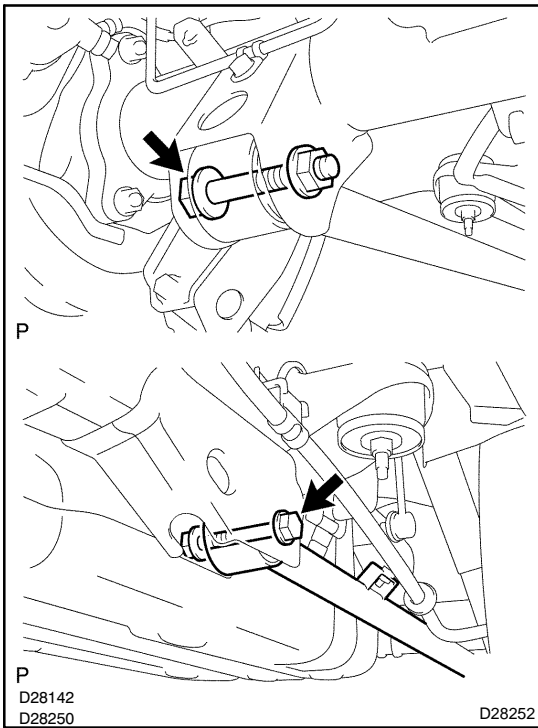
- (a) Connect the parking brake cable assy No.3 with the bolt.

Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

6. INSTALL REAR WHEEL

Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)

- 7. STABILIZE SUSPENSION (See page 27-3)**



8. FULLY TIGHTEN LOWER CONTROL ARM ASSY LH

- (a) Fully tighten the 2 bolts.

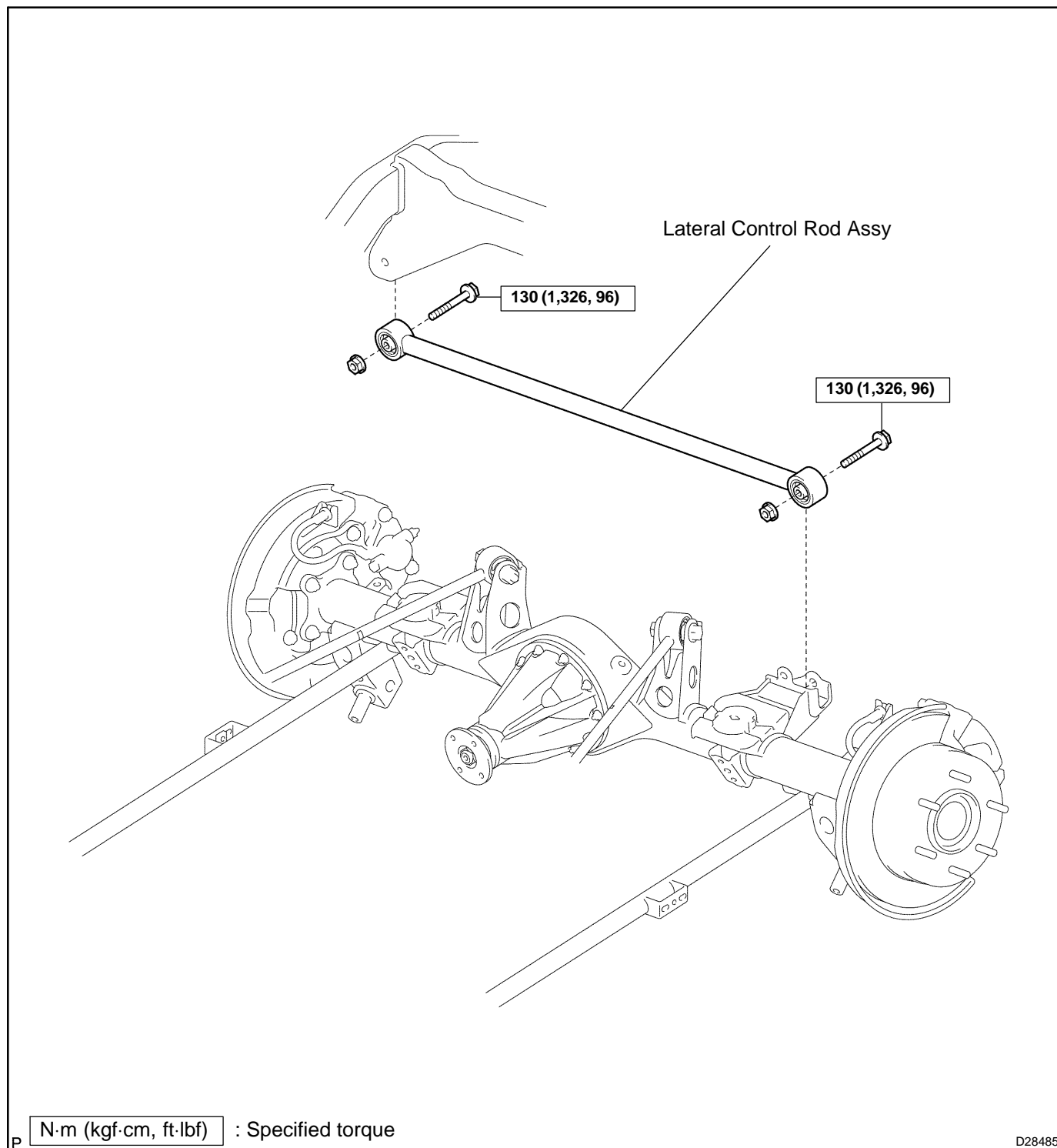
Torque: 130 N·m (1,326 kgf·cm, 96 ft·lbf)

HINT:

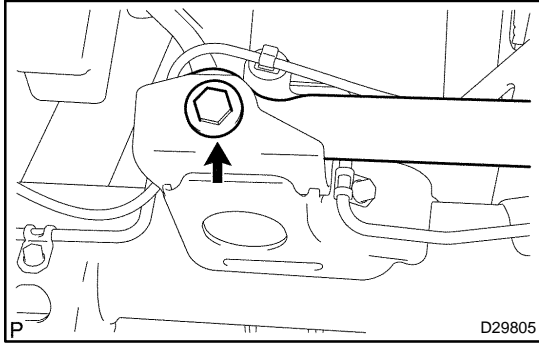
While holding the nut, turn and remove the bolt.

REAR LATERAL CONTROL ROD ASSY COMPONENTS

270CE-02

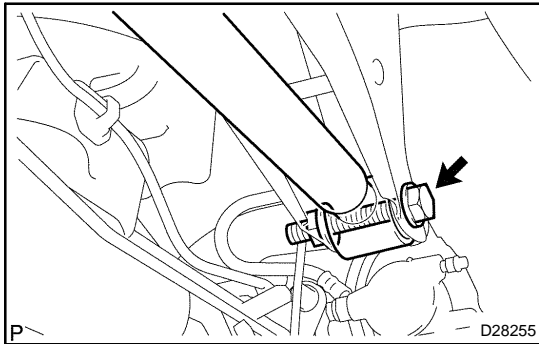


REPLACEMENT



1. REMOVE REAR LATERAL CONTROL ROD ASSY

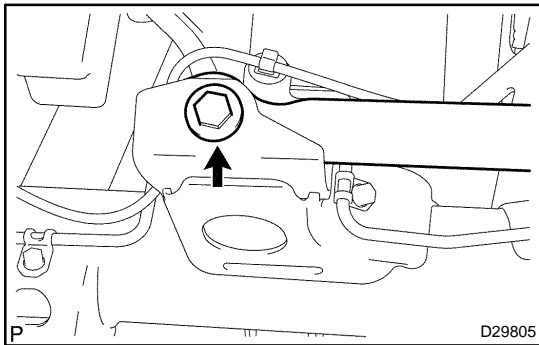
- (a) Remove the bolt.



- (b) Remove the bolt, nut and lateral control rod assy.

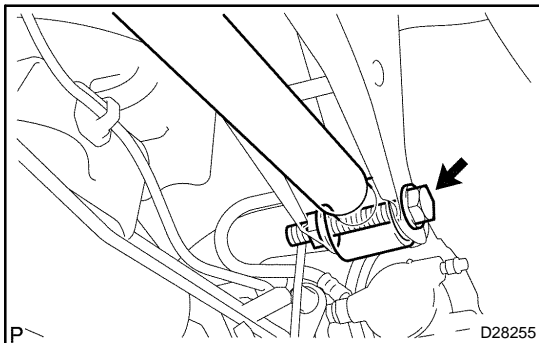
HINT:

While holding the nut, turn and remove the bolt.



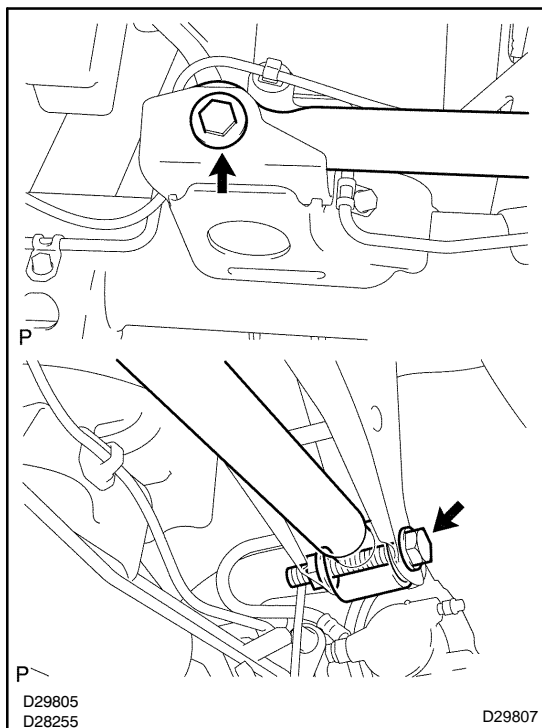
2. INSTALL REAR LATERAL CONTROL ROD ASSY

- (a) Install the lateral control rod assy with the bolt.



- (b) Install the bolt and the nut.

3. STABILIZE SUSPENSION (See page 27-3)



4. FULLY TIGHTEN REAR LATERAL CONTROL ROD ASSY

(a) Fully tighten the 2 bolts.

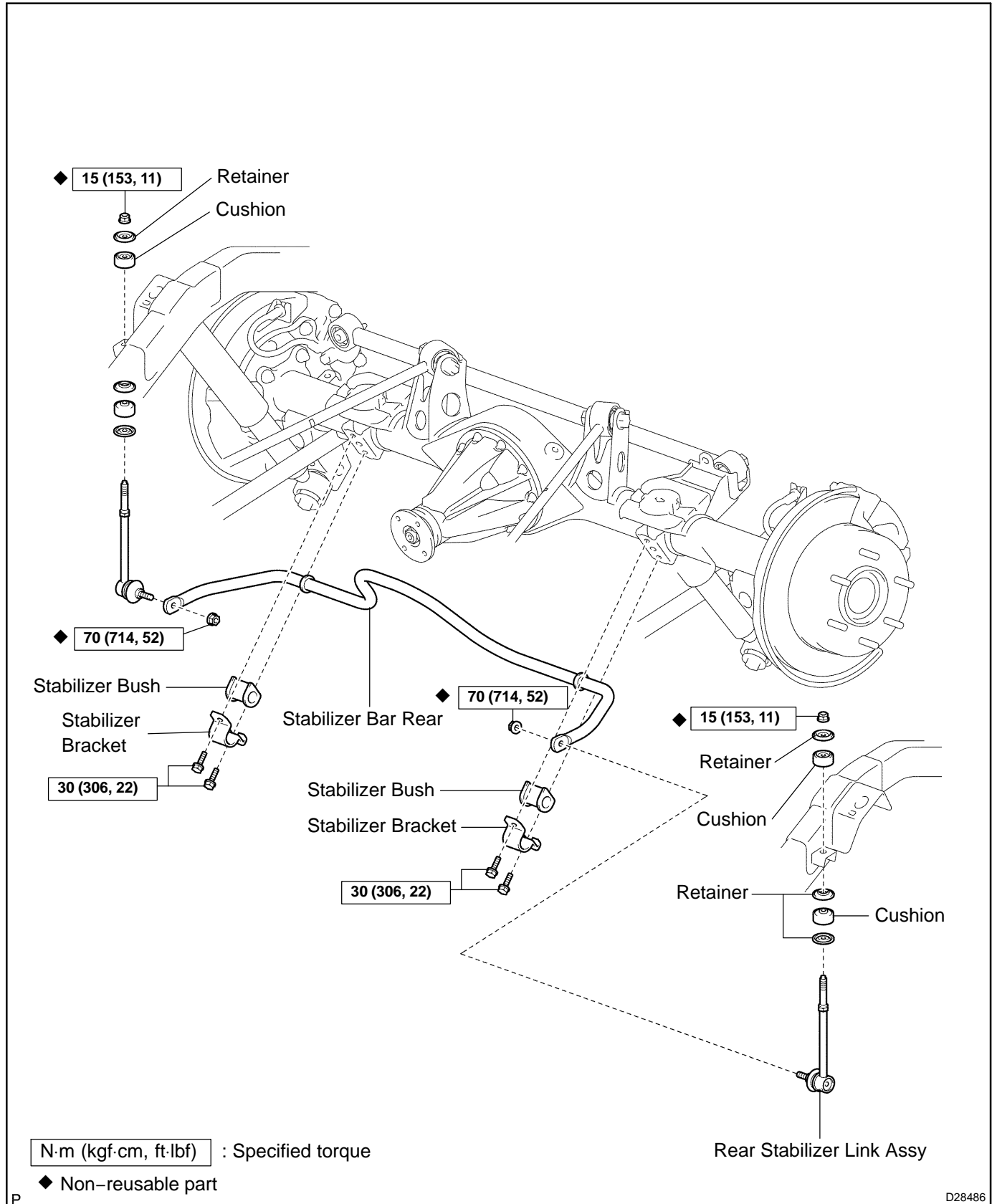
Torque: 130 N·m (1,326 kgf·cm, 96 ft·lbf)

HINT:

While holding the nut, turn and install the bolt.

STABILIZER BAR REAR COMPONENTS

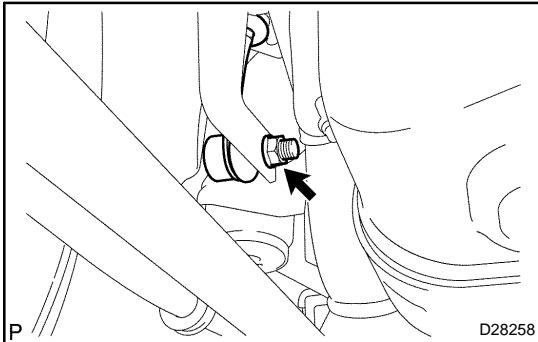
270CG-02



D28486

REPLACEMENT

1. REMOVE REAR WHEEL

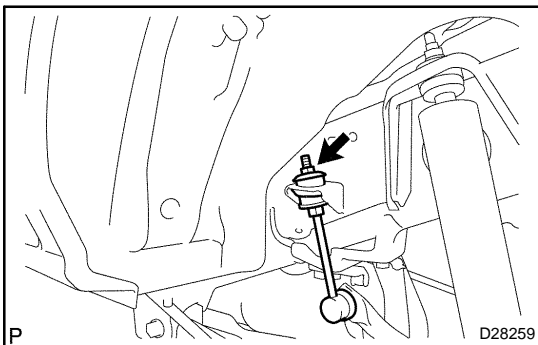


2. REMOVE REAR STABILIZER LINK ASSY LH

- (a) Remove the nut and disconnect the stabilizer bar from the stabilizer link (LH side).

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (6 mm) to hold the stud.

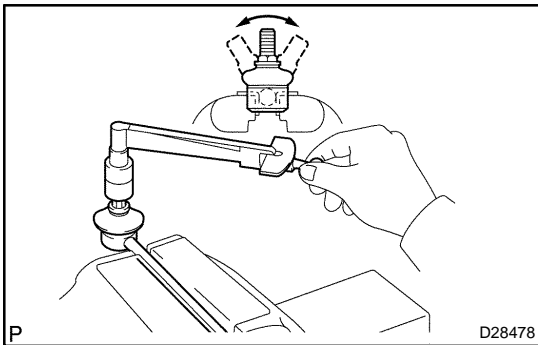


- (b) Hold the stabilizer bar link with a wrench and remove the nut, retainer, cushion and link.
 (c) Remove the 2 retainers and cushion from the stabilizer link.

3. REMOVE REAR STABILIZER LINK ASSY RH

HINT:

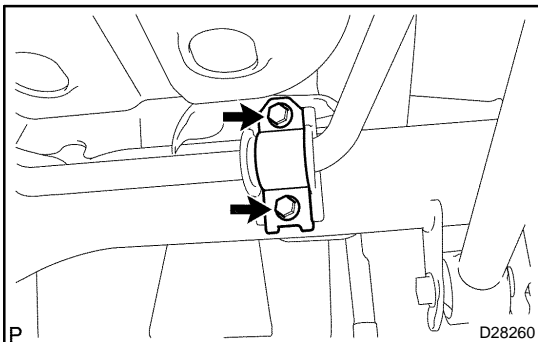
Remove the RH side by following the same procedures with the LH side.



4. INSPECT REAR STABILIZER LINK ASSY LH

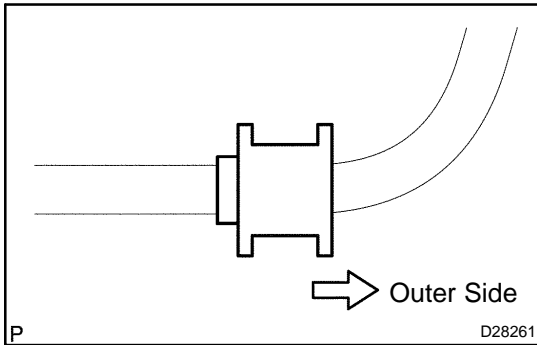
- (a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.
 (b) Using a torque wrench, turn the nut continuously at a rate of 3 - 5 seconds per 1 turn and take the torque reading on the 5th turn.

Turning torque: 2.0 N·m (20 kgf·cm, 17.7 in.-lbf) or less



5. REMOVE STABILIZER BAR REAR

- (a) Remove the 4 bolts, the 2 stabilizer brackets and the stabilizer bar.
 (b) Remove the 2 stabilizer bushes from the stabilizer bar.

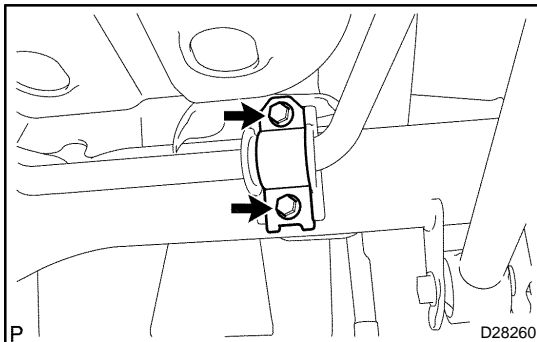


6. INSTALL STABILIZER BAR REAR

(a) Install the 2 stabilizer bushes to the stabilizer bar.

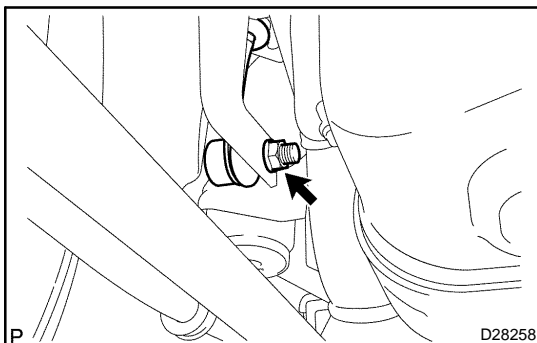
HINT:

Install the stabilizer bush to the inner side of the stabilizer bush stopper on the stabilizer bar.



(b) Install the stabilizer bar and the 2 stabilizer brackets with the 4 bolts.

Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



7. INSTALL REAR STABILIZER LINK ASSY LH

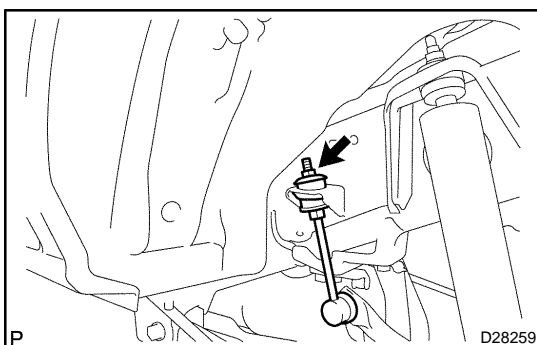
(a) Install the stabilizer link with the nut (LH side).

Torque: 70 N·m (714 kgf·cm, 52 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (6 mm) to hold the stud.

(b) Install the 2 retainers and the cushion to the stabilizer link.



(c) Hold the stabilizer bar link with a wrench, and install the nut, retainer, cushion and link.

Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

8. INSTALL REAR STABILIZER LINK ASSY RH

HINT:

Install the RH side by following the same procedures with the LH side.

9. INSTALL REAR WHEEL

Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)

WHEEL AND TIRE SYSTEM INSPECTION

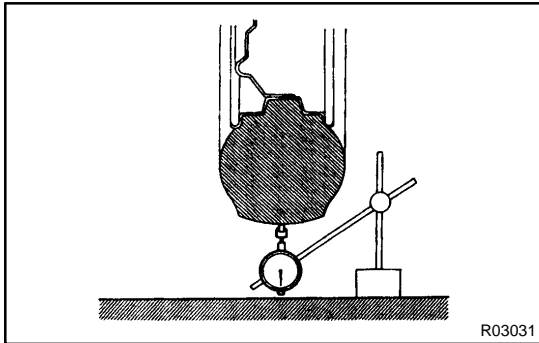
2802N-02

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

Cold tire inflation pressure:

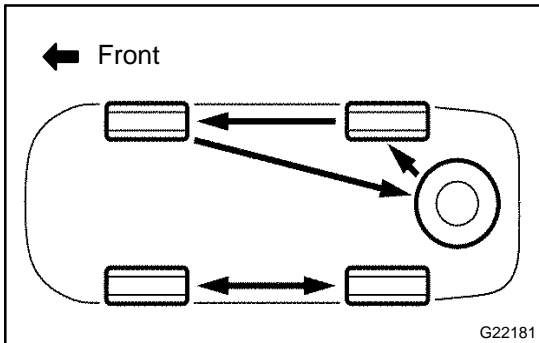
Tire size	Front, Rear Pressure kPa (kgf/cm ² , psi)
P265/65R17 110S	220 (2.2, 32)



R03031

(b) Using a dial indicator, check the tire runout.

Tire runout: 3.0 mm (0.118 in.) or less

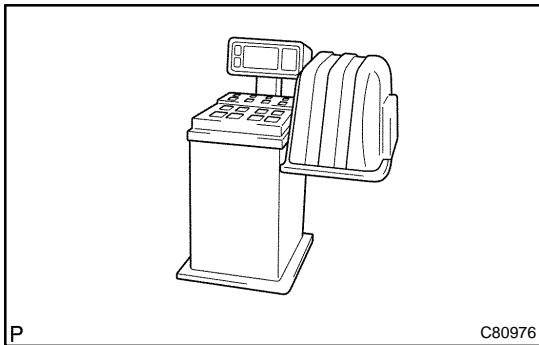


G22181

2. ROTATE TIRE

HINT:

See the illustration for where to rotate each tire when you include the spare tire in rotation.



P

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3. INSPECT WHEEL BALANCE

(a) Check and adjust the Off-the-car balance.

(b) If necessary, check and adjust the On-the-car balance.

Imbalance after adjustment: 7 g (0.015 lb) or less

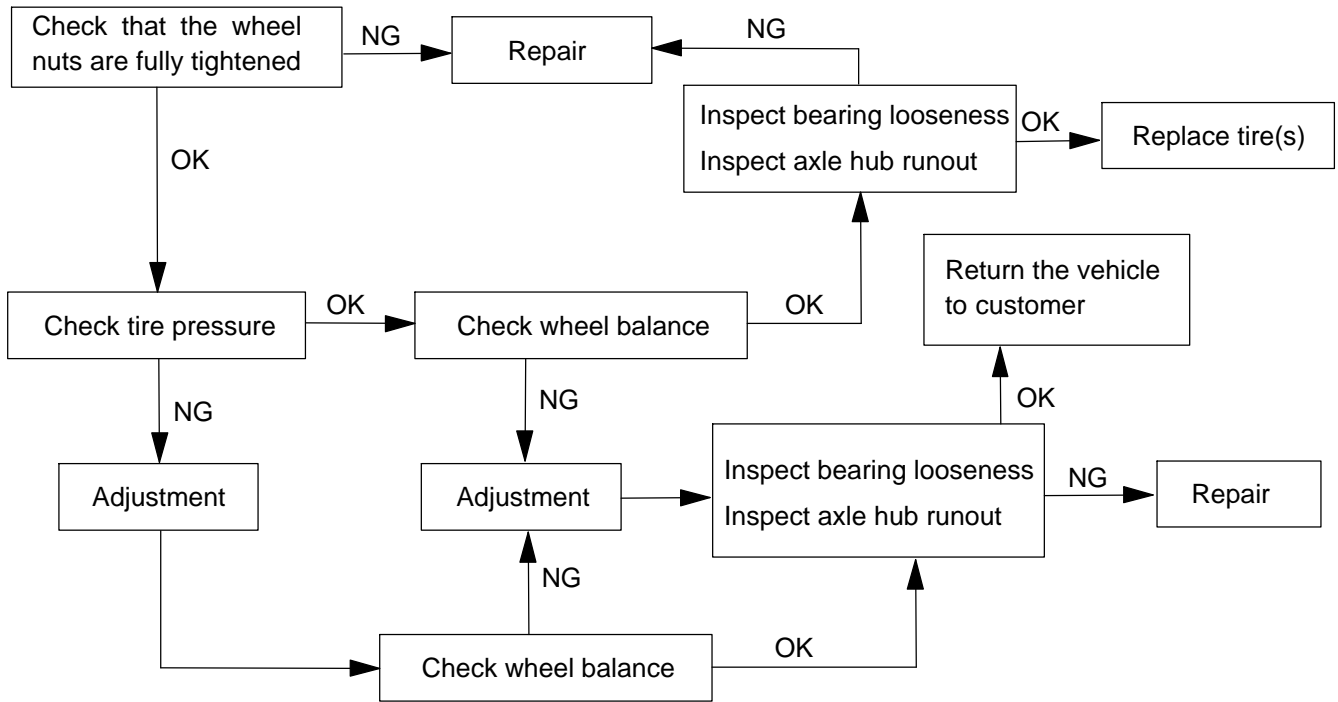
4. INSPECT BEARING BACKLASH (See page 30-2)
5. INSPECT BEARING BACKLASH (See page 30-2)
6. INSPECT AXLE HUB DEVIATION (See page 30-2)
7. INSPECT AXLE HUB DEVIATION (See page 30-2)

WHEEL AND TIRE SYSTEM

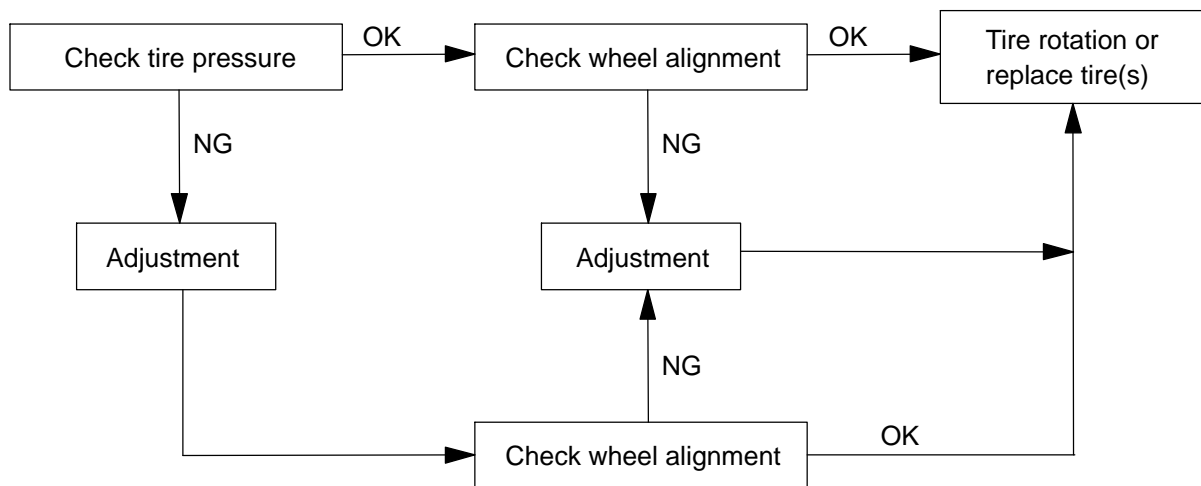
2804X-04

HOW TO PROCEED WITH TROUBLESHOOTING

1. VEHICLE PULLING DIAGNOSIS (SEE PAGE 26-2)
2. DIAGNOSIS OF TIRE VIBRATION



3. DIAGNOSIS OF PREMATURE OF IRREGULAR TIRE WEAR



PRECAUTION

1. IN CASE OF REMOVAL AND INSTALLATION OF TIRE PRESSURE MONITOR VALVE SUB-ASSY

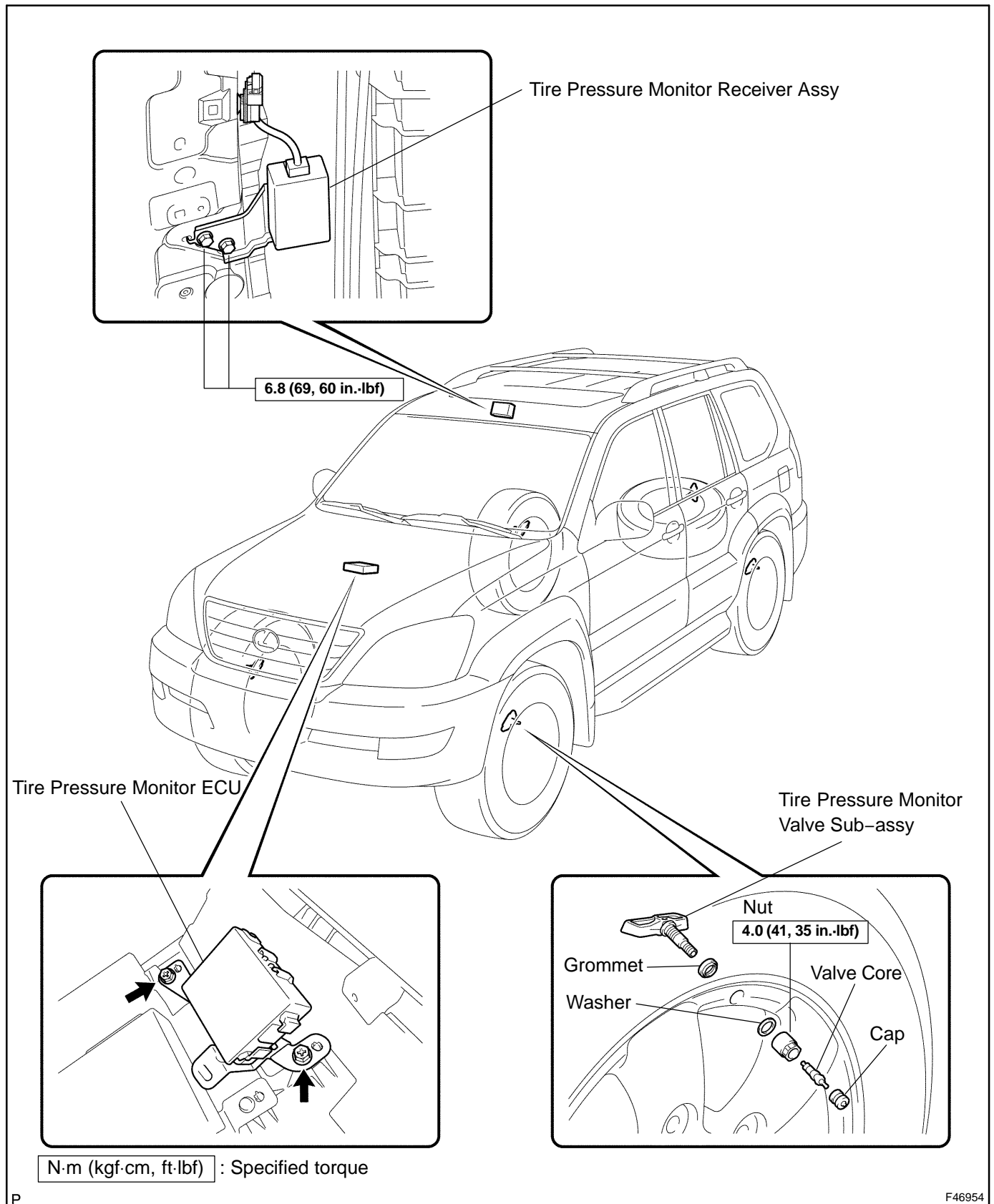
- (a) When installing a tire, make sure that the tire pressure monitor valve sub-assy does not interfere with the tire bead so that damage to the sensor is prevented.
- (b) After completing the operation, remove the valve core to rapidly release air and check that the warning light is lit. If not, the system may be defective.
- (c) If there is air leakage, tighten the nut with a force of 4.0 N·m (41 kgf·cm, 35 in.·lbf) and push the valve core 2 or 3 times to remove any dirt attached on the valve core.
If there is still air leakage, replace the grommet, the washer and the nut all together.
- (d) When installing the tire pressure monitor valve sub-assy, check whether the rim, grommet, washer and nut are clean. Use a manufacturer-specified cap.
- (e) When putting air into the tire, first install the tire pressure valve straight onto the stem of the tire pressure monitor valve sub-assy.

2. IN CASE OF TIRE AND WHEEL REPLACEMENT OR TIRE ROTATION

- (a) When replacing tires, be sure to check if the grommet of the tire valve is damaged or not. If so, replace the grommet together with the washer and nut.
- (b) When tires and wheels are replaced, register the transmitter ID without fail.

TIRE & WHEEL COMPONENTS

2804A-03



TIRE PRESSURE MONITOR RECEIVER ASSY REPLACEMENT

2800E-07

HINT:

COMPONENTS: See page 28-4 , 74-7.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **REMOVE REAR NO.2 SEAT ASSY LH (See page 72-42)**
3. **REMOVE REAR NO.2 SEAT ASSY RH**

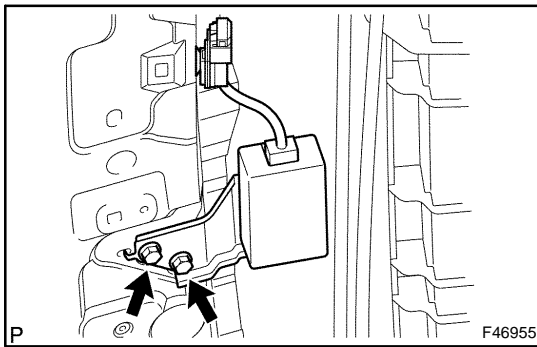
HINT:

Remove the RH side following the same procedures as with the LH side.

4. **REMOVE ROOF HEADLINING ASSY (See page 74-8)**

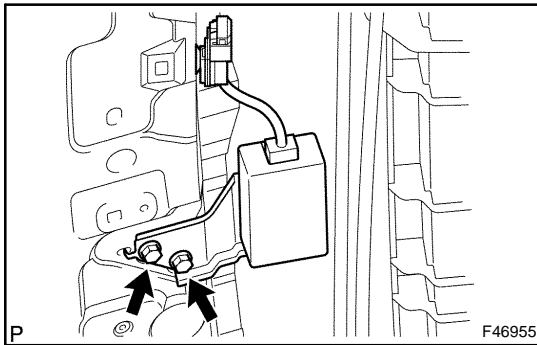
HINT:

Refer to the instructions for removal of the roof headlining assy.



5. **REMOVE TIRE PRESSURE MONITOR RECEIVER ASSY**

- (a) Disconnect the connector.
- (b) Remove the 2 bolts and receiver assy.



6. **INSTALL TIRE PRESSURE MONITOR RECEIVER ASSY**

- (a) Install the receiver assy with the 2 bolts.
Torque: 6.8 N·m (69 kgf·cm, 60 in·lbf)
- (b) Connect the connector.

7. **INSTALL ROOF HEADLINING ASSY**
8. **INSTALL REAR NO.2 SEAT ASSY LH (See page 72-42)**
9. **INSTALL REAR NO.2 SEAT ASSY RH**

HINT:

Install the RH side following the same procedures as with the LH side.

10. **CONNECT BATTERY NEGATIVE TERMINAL**
11. **INSPECT TIRE PRESSURE WARNING SYSTEM (See page 05-701)**

SST 09843-18040

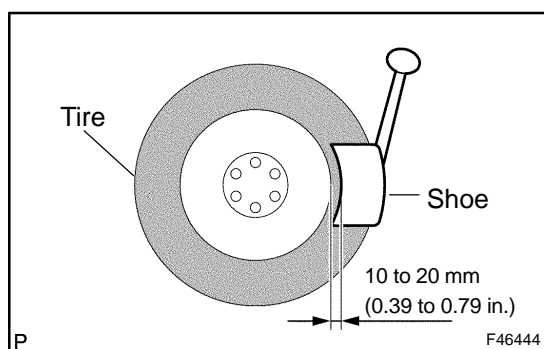
TIRE PRESSURE MONITOR VALVE SUB-ASSY REPLACEMENT

2800F-06

HINT:

COMPONENTS: See page 28-4.

1. REMOVE FRONT WHEEL
2. REMOVE REAR WHEEL



3. REMOVE TIRE PRESSURE MONITOR VALVE SUB-ASSY

- (a) Remove the valve core and cap, and release air from the tire.
- (b) After ensuring that air is sufficiently released, remove the nut and washer that is used to fix the tire pressure monitor valve sub-assy and drop the sensor inside the tire.
- (c) After dropping the tire pressure monitor valve sub-assy into the tire, disengage the bead using the shoe of the tire remover.

NOTICE:

Be careful not to damage the tire pressure monitor valve sub-assy due to interference between the sensor and tire bead.

- (d) Remove the bead on the upper side as in usual operation.
- (e) Take out the sensor from the tire and remove the bead on the lower side as in usual operation.
- (f) Remove the inner grommet from the tire pressure monitor valve sub-assy.

HINT:

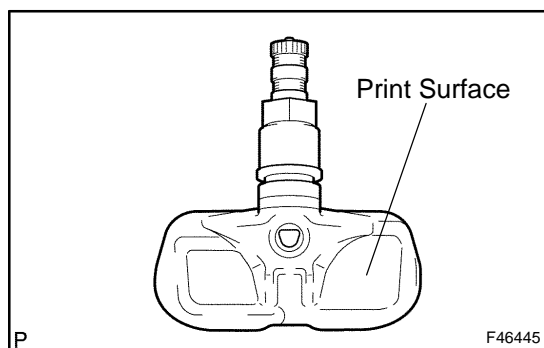
Check that no crack or damage is identified on the grommet. If so, replace the grommet together with the washer and nut.

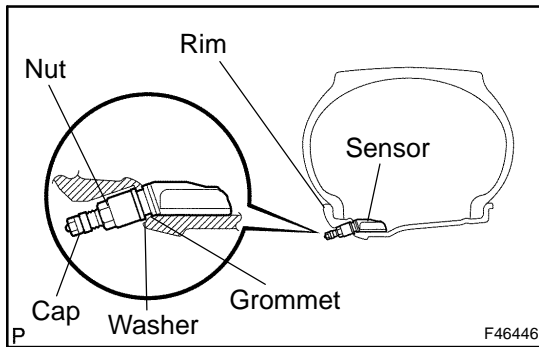
4. INSTALL TIRE PRESSURE MONITOR VALVE SUB-ASSY

- (a) Insert the tire pressure monitor valve into the valve installation hole. Insert from the inside of the rim so that the print surface can be seen.

NOTICE:

- Check that there is no visible deformation, damage or other abnormalities on the transmitter.
- Check that there is no foreign matter on the inner grommet and around the rim hole.
- If installed in the reverse direction, the tire pressure monitor valve may be damaged or fail to transmit signals when running at high speed.

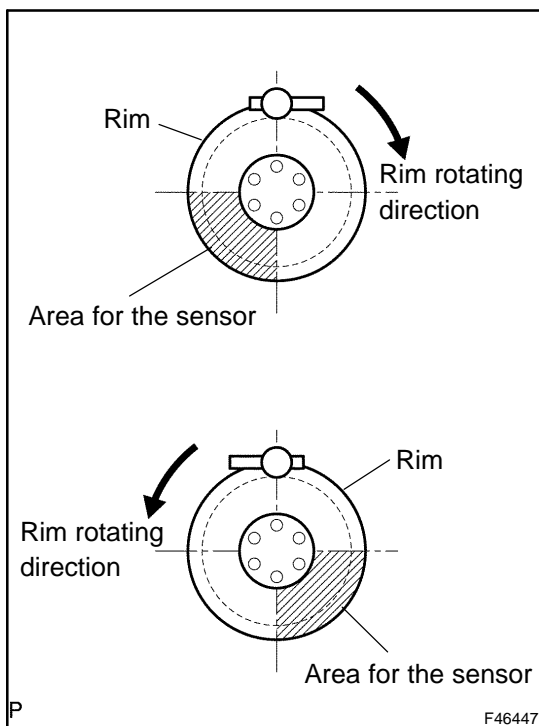




- (b) Install the washer on the tire pressure monitor valve from the rim side and tighten with a nut.
Torque: 4.0 N·m (41 kgf·cm, 35 in.-lbf)

NOTICE:

- Check that there is no foreign matter on the washer and nut.
- When removing the tire pressure monitor valve if the tire is removed for replacement, check that there is no damage or cuts, and no foreign matter such as mud, dirt or sand attached to the grommet. Replace the grommet with a new one if any of the defects mentioned above are found.
- Check that there is no oil, water or lubricant around the rim hole, tire pressure monitor valve, washer and nut. Failing to do so may result in improper installation.



- (c) Set the wheel disc to the mounting machine and install the lower tire bead. At the time, position the main body of the sensor to the shaded area shown in the illustration.

NOTICE:

If the sensor is positioned outside this area, it generates interference with the tire bead, causing possible damage to the sensor.

- (d) Install the upper bead.

NOTICE:

Make sure that the tire bead and tool do not interfere with the main body of the sensor and that the sensor is not clamped by the bead.

- (e) After the tire is inflated, the valve nut may be loose. Retighten the nut to the specified torque and then check for air leaks with soapy water.

Torque: 4.0 N·m (41 kgf·cm, 35 in.-lbf)

5. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

6. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

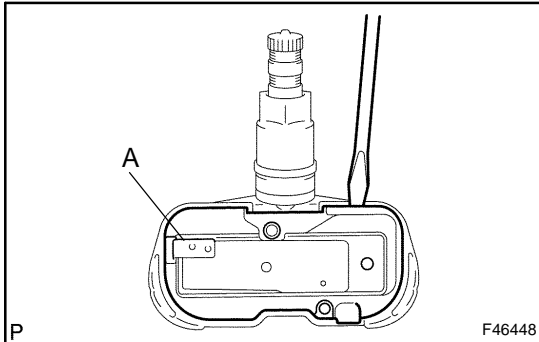
7. INSPECT TIRE (See page 28-1)**8. REGISTRATION OF TRANSMITTER ID (See page 05-642)****9. INSPECT TIRE PRESSURE WARNING SYSTEM (See page 05-701)**

SST 09843-18040

DISPOSAL

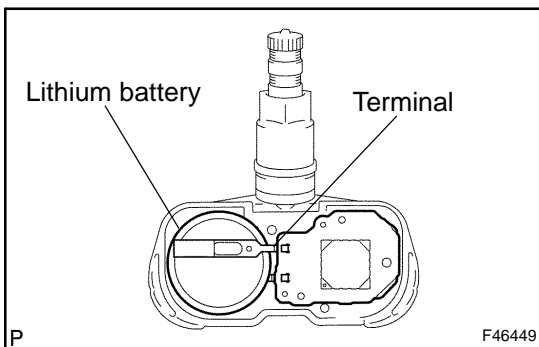
HINT:

The tire pressure monitor valve sub-assy is powered by a lithium battery. When disposing of the tire pressure monitor valve sub-assy, remove the battery and dispose of it correctly.



1. DISPOSE OF TIRE PRESSURE MONITOR VALVE SUB-ASSY

- (a) Disengage part "A" shown in the illustration.
- (b) Insert the tip of a screwdriver into the clearance and pry off the cover. Remove the back cover.



- (c) The battery and base board covered with silicone resin are exposed. While taking out the battery, cut off the 2 terminals which connects the battery and base board.

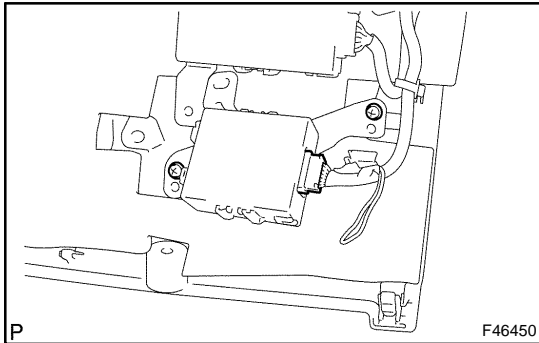
TIRE PRESSURE MONITOR ECU REPLACEMENT

28049-04

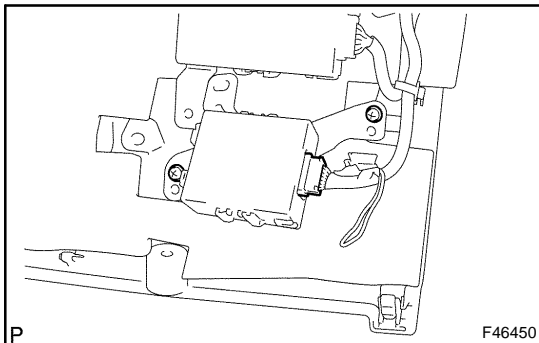
HINT:

COMPONENTS: See page 28-4.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
2. **REMOVE FRONT DOOR SCUFF PLATE RH (See page 71-13)**
3. **REMOVE COWL SIDE TRIM BOARD RH (See page 71-13)**
4. **REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (See page 71-13)**



5. **REMOVE TIRE PRESSURE MONITOR ECU**
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and tire pressure monitor ECU.



6. **INSTALL TIRE PRESSURE MONITOR ECU**
 - (a) Install the tire pressure monitor ECU with the 2 screws.
 - (b) Connect the connector.

7. **INSTALL INSTRUMENT PANEL UNDER COVER NO.2**
8. **INSTALL COWL SIDE TRIM BOARD RH**
9. **INSTALL FRONT DOOR SCUFF PLATE RH**
10. **CONNECT BATTERY NEGATIVE TERMINAL**
11. **REGISTRATION OF TRANSMITTER ID (See page 05-642)**
12. **INSPECT TIRE PRESSURE WARNING SYSTEM (See page 05-701)**

SST 09843-18040

DIFFERENTIAL SYSTEM

2906Y-01

PRECAUTION

1. Before disassembly, clean the outside of the rear differential assy and remove any sand or mud to prevent it from entering the inside of the assembly during disassembly and installation.
2. When removing a connected part made of light alloy such as a rear differential carrier cover, tap it off with a plastic hammer. Do not attempt to pry it off with a screwdriver.
3. Always arrange disassembled parts in order and protect them from dust.
4. Before installation, thoroughly clean and dry each part and then apply hypoid gear oil LSD to it. Do not use alkaline cleaner for aluminum or rubber parts and ring gear set bolts. Also, do not clean rubber parts such as O-rings or oil seals with white gasoline.
5. Coat any sliding surface and rotating part with hypoid gear oil LSD.
6. When holding a component part by vice, be sure to place an aluminum sheet under the part. Do not put it directly on the vice.
7. Be careful not to damage the contact surfaces of the case. Such damage may cause oil leakage.
8. Before applying sealant, remove deposited oil sealant and clean the part to be sealed using white gasoline.
9. Do not supply oil immediately after installing sealed parts. Leave it for at least an hour.
10. Damage on the surface being contact with an oil seal, O-ring or gasket may cause oil leakage. Special attention should be paid.
11. When press-fitting and oil seal, be careful not to damage the oil seal lip and outside periphery.
12. When replacing a bearing, replace the inner and outer races as a set.

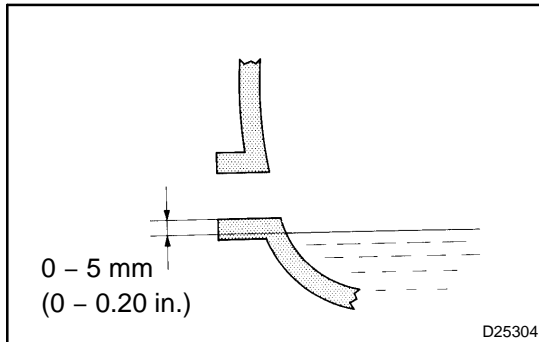
PROBLEM SYMPTOMS TABLE

Use the table below to help find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Oil leak from front differential	<ol style="list-style-type: none"> 1. Oil level (Too high or wrong grade) 2. Differential side gear shaft oil seal (Worn or damaged) 3. Differential rear oil seal (Worn or damaged) 4. Companion flange (Loose or damaged) 	29-3 29-4 29-7 29-13
Oil leak from rear differential	<ol style="list-style-type: none"> 1. Oil level (Too high or wrong grade) 2. Differential front oil seal (Worn or damaged) 3. Companion flange (Loose or damaged) 	29-3 29-31 29-37
Oil leak from front drive pinion shaft	<ol style="list-style-type: none"> 1. Oil level (Too high or wrong grade) 2. Differential side gear shaft oil seal (Worn or damaged) 3. Differential rear oil seal (Worn or damaged) 4. Companion flange (Loose or damaged) 	29-3 29-4 29-7 29-13
Oil leak from rear drive pinion shaft	<ol style="list-style-type: none"> 1. Oil level (Too high or wrong grade) 2. Differential front oil seal (Worn or damaged) 3. Companion flange (Loose or damaged) 	29-3 29-31 29-37

DIFFERENTIAL OIL ADJUSTMENT

29070-02



1. INSPECT AND ADJUST DIFFERENTIAL OIL

- (a) Stop the vehicle on the level place.
- (b) Remove the differential filler plug and gasket.
- (c) Check that the oil surface is within 5 mm (0.20 in.) from the lowest position of the inner surface of the differential filler plug opening.

NOTICE:

- **Excessively large or small amount of oil may cause troubles.**
- **After replacing oil, drive the vehicle and check the oil level.**

HINT:

If necessary, fill the differential carrier assy with hypoid gear oil.

Hypoid gear oil

Grade: API GL - 5

Viscosity:

Above - 18°C (0°F) SAE 90

Below - 18°C (0°F) SAE 80W or 80W-90

Capacity:

Fr Differential : 1.35 - 1.45 liters

Rr Differential : 3 - 3.1 liters

- (d) Check for oil leakage when the oil level is low.
- (e) Install the differential filler plug and a new gasket.

Fr Differential:

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

Re Differential:

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL REPLACEMENT

29071-02

HINT:

COMPONENTS : See page 29-11

1. REMOVE FRONT WHEELS
2. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
3. REMOVE ENGINE UNDER COVER ASSY REAR
4. DRAIN DIFFERENTIAL OIL
5. REMOVE SPEED SENSOR FRONT RH (See page 32-48)
6. REMOVE SPEED SENSOR FRONT LH

HINT:

Remove the RH side by the same procedures with the LH side.

7. REMOVE FRONT AXLE HUB GREASE CAP LH (See page 30-28)
8. REMOVE FRONT AXLE HUB GREASE CAP RH

HINT:

Remove the RH side by the same procedures with the LH side.

9. REMOVE FRONT AXLE HUB LH NUT (See page 30-28)
10. REMOVE FRONT AXLE HUB RH NUT

HINT:

Remove the RH side by the same procedures with the LH side.

11. SEPARATE FRONT STABILIZER LINK ASSY LH (See page 26-26)
12. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

13. SEPARATE TIE ROD END SUB-ASSY LH (See page 51-19)
SST 09628-62011

14. SEPARATE TIE ROD END SUB-ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

SST 09628-62011

15. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 26-21)
16. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:

Remove the RH side by the same procedures with the LH side.

17. SEPARATE FRONT AXLE ASSY LH (See page 30-28)
18. SEPARATE FRONT AXLE ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

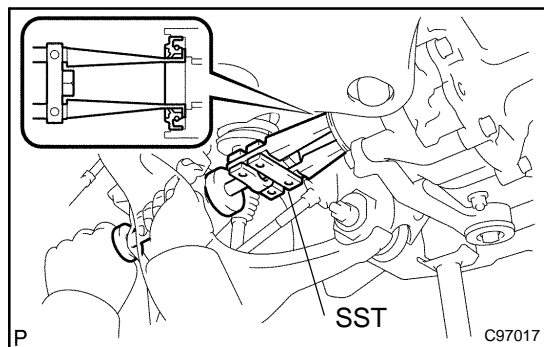
19. REMOVE FRONT DRIVE SHAFT ASSY LH (See page 30-19)
SST 09520-01010, 09520-24010 (09520-32040)

20. REMOVE FRONT DRIVE SHAFT ASSY RH

HINT:

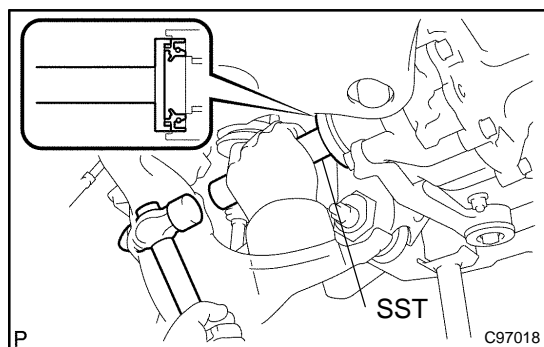
Remove the RH side by the same procedures with the LH side.

SST 09520-01010, 09520-24010 (09520-32040)



21. REMOVE DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST, remove the differential side gear shaft oil seal.
SST 09308-10010



22. INSTALL DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST, install the differential side gear shaft oil seal.
SST 09550-00032, 09950-70010 (09951-07100)

Oil seal drive in depth:

LH Side: 0 ± 0.45 mm (0 ± 0.018 in.)

RH Side: 5.3 ± 0.5 mm (0.209 ± 0.0197 in.)

23. INSTALL FRONT DRIVE SHAFT ASSY LH (See page 30-19)

24. INSTALL FRONT DRIVE SHAFT ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

25. INSTALL FRONT AXLE ASSY LH (See page 30-28)

26. INSTALL FRONT AXLE ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

27. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 26-21)

28. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:

Install the RH side by the same procedures with the LH side.

29. INSTALL TIE ROD END SUB-ASSY LH (See page 51-19)

30. INSTALL TIE ROD END SUB-ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

31. INSTALL FRONT STABILIZER LINK ASSY LH (See page 26-26)

32. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

33. INSTALL FRONT AXLE HUB LH NUT (See page 30-28)

34. INSTALL FRONT AXLE HUB RH NUT

HINT:

Install the RH side by the same procedures with the LH side.

35. INSPECT BEARING BACKLASH (See page 30-2)

36. INSPECT AXLE HUB DEVIATION (See page 30-2)

37. INSTALL FRONT AXLE HUB GREASE CAP LH (See page 30-28)

38. INSTALL FRONT AXLE HUB GREASE CAP RH

HINT:

Install the RH side by the same procedures with the LH side.

39. INSTALL SPEED SENSOR FRONT LH (See page 32-48)

40. INSTALL SPEED SENSOR FRONT RH

HINT:

Install the RH side by the same procedures with the LH side.

41. REFILL DIFFERENTIAL OIL (See page 29-3)

42. INSPECT AND ADJUST DIFFERENTIAL OIL (See page 29-3)

43. INSTALL ENGINE UNDER COVER ASSY REAR

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

44. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

45. INSTALL FRONT WHEELS

Torque: 112 N·m (1,140 kgf·cm, 82 ft·lbf)

46. CHECK ABS SPEED SENSOR SIGNAL (See page 05-738)

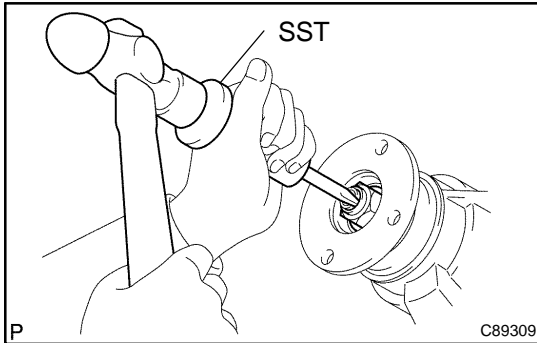
FRONT DIFFERENTIAL CARRIER OIL SEAL REPLACEMENT

29072-03

HINT:

COMPONENTS : See page 29-11

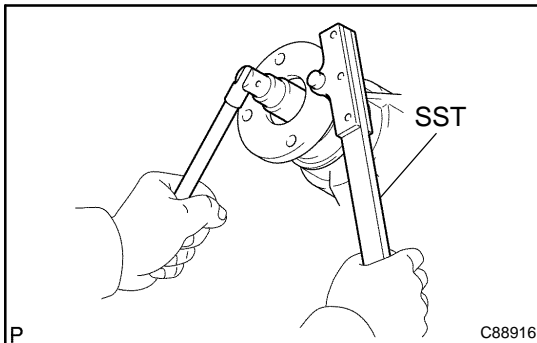
1. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
2. REMOVE ENGINE UNDER COVER ASSY REAR
3. REMOVE PROPELLER SHAFT ASSY FRONT (See page 30-19)



4. REMOVE FRONT DRIVE PINION COMPANION FLANGE FRONT NUT

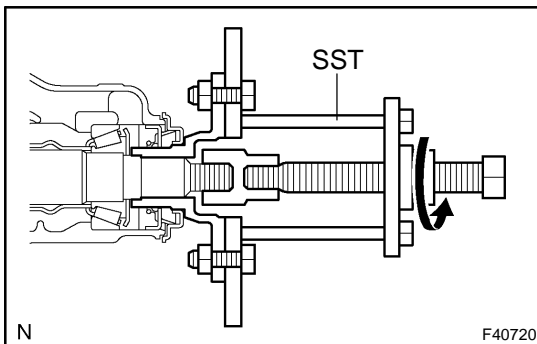
- (a) Using SST and a hammer, loosen the staked part of the nut.

SST 09930-00010



- (b) Using SST to hold the front drive pinion companion flange, remove the nut.

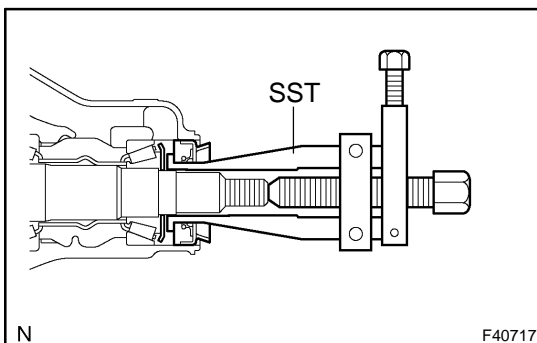
SST 09330-00021 (09330-00030)



5. REMOVE FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT

- (a) Using SST, remove the front drive pinion companion flange sub-assy.

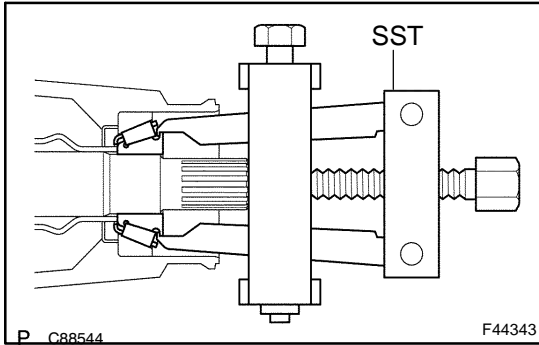
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



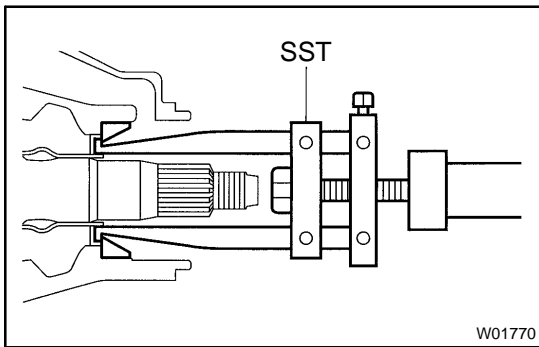
6. REMOVE FRONT DIFFERENTIAL CARRIER OIL SEAL

- (a) Using SST, remove the front differential carrier oil seal.

SST 09308-10010

7. REMOVE FRONT DIFFERENTIAL DRIVE PINION OIL SLINGER**8. REMOVE FRONT DRIVE PINION REAR TAPERED ROLLER BEARING**

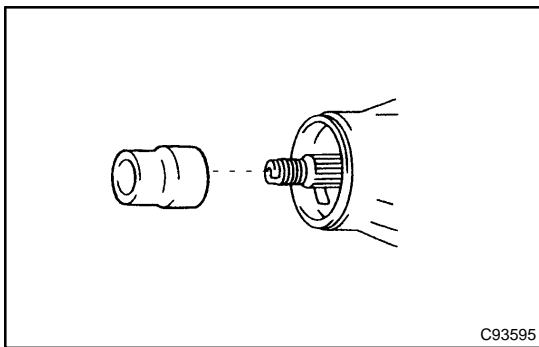
- (a) Using SST, remove front drive pinion rear tapered roller bearing (inner).
SST 09556-22010



- (b) Using SST, remove front drive pinion tapered roller bearing (outer).
SST 09308-00010

9. REMOVE FRONT DIFFERENTIAL OIL STORAGE RING

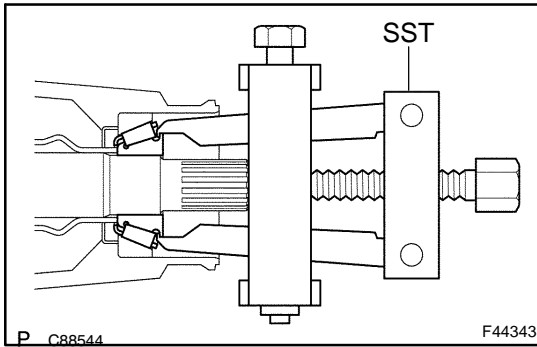
- (a) Using a screwdriver and a hammer, remove the oil storage ring.

10. REMOVE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER**11. INSTALL FRONT DIFFERENTIAL DRIVE PINION BEARING SPACER**

- (a) Install a new rear differential drive pinion bearing spacer.

12. INSTALL FRONT DIFFERENTIAL OIL STORAGE RING

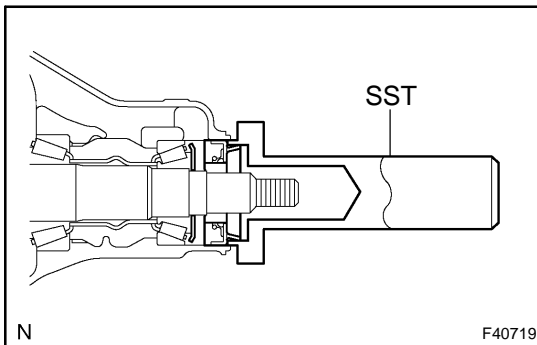
- (a) Using a brass bar and a hammer, install the oil storage ring.



13. INSTALL FRONT DRIVE PINION REAR TAPERED ROLLER BEARING

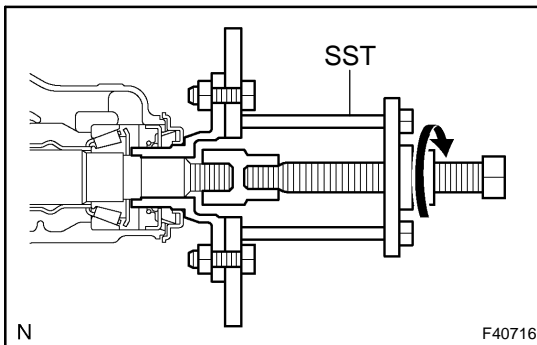
- (a) Using SST and a hammer, install the front drive pinion tapered roller bearing (outer).
SST 09316-60011 (09316-00011)
- (b) Install the front drive pinion tapered roller bearing (inner).

14. INSTALL FRONT DIFFERENTIAL DRIVE PINION OIL SLINGER



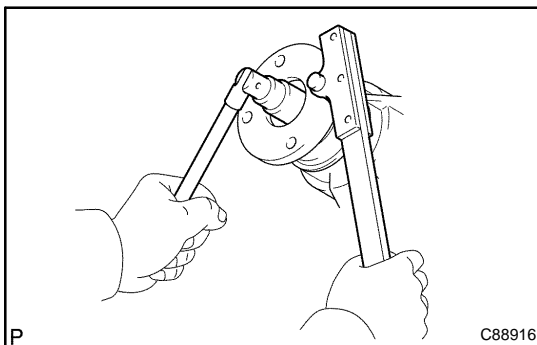
15. INSTALL FRONT DIFFERENTIAL CARRIER OIL SEAL

- (a) Using SST and a hammer, install a new differential carrier oil seal.
SST 09554-22010
Oil seal drive in depth:
4.35 ± 0.45 mm (0.17 ± 0.018 in.)
- (b) Coat MP grease to the oil seal lip.

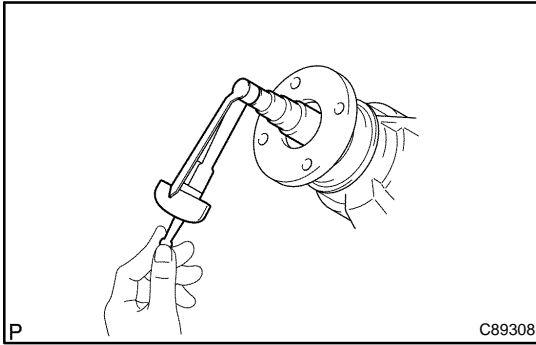


16. INSTALL FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT

- (a) Using SST, install the drive pinion companion flange sub-assy.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020),
- (b) Coat the threads of a new nut with hypoid gear oil LSD.



- (c) Using SST, to hold the drive pinion companion flange, torque the nut.
SST 09330-00021 (09330-00030)
Torque:
370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

**17. INSPECT DIFFERENTIAL DRIVE PINION PRELOAD**

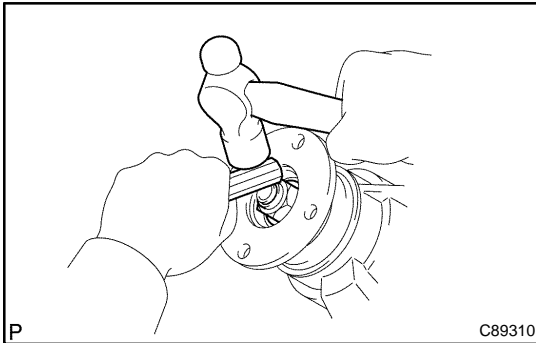
- (a) Using a torque wrench, measure the preload.

New bearing:

0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 14 in.·lbf)

Reused bearing:

0.49 – 0.78 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

**18. INSTALL FRONT DRIVE PINION COMPANION FLANGE FRONT NUT**

- (a) Using a chisel and hammer, stake the front drive pinion nut.

19. INSTALL PROPELLER SHAFT ASSY FRONT (See page 30-19)**20. REFILL DIFFERENTIAL OIL (See page 29-3)****21. INSPECT AND ADJUST DIFFERENTIAL OIL (See page 29-3)****22. INSTALL ENGINE UNDER COVER ASSY REAR**

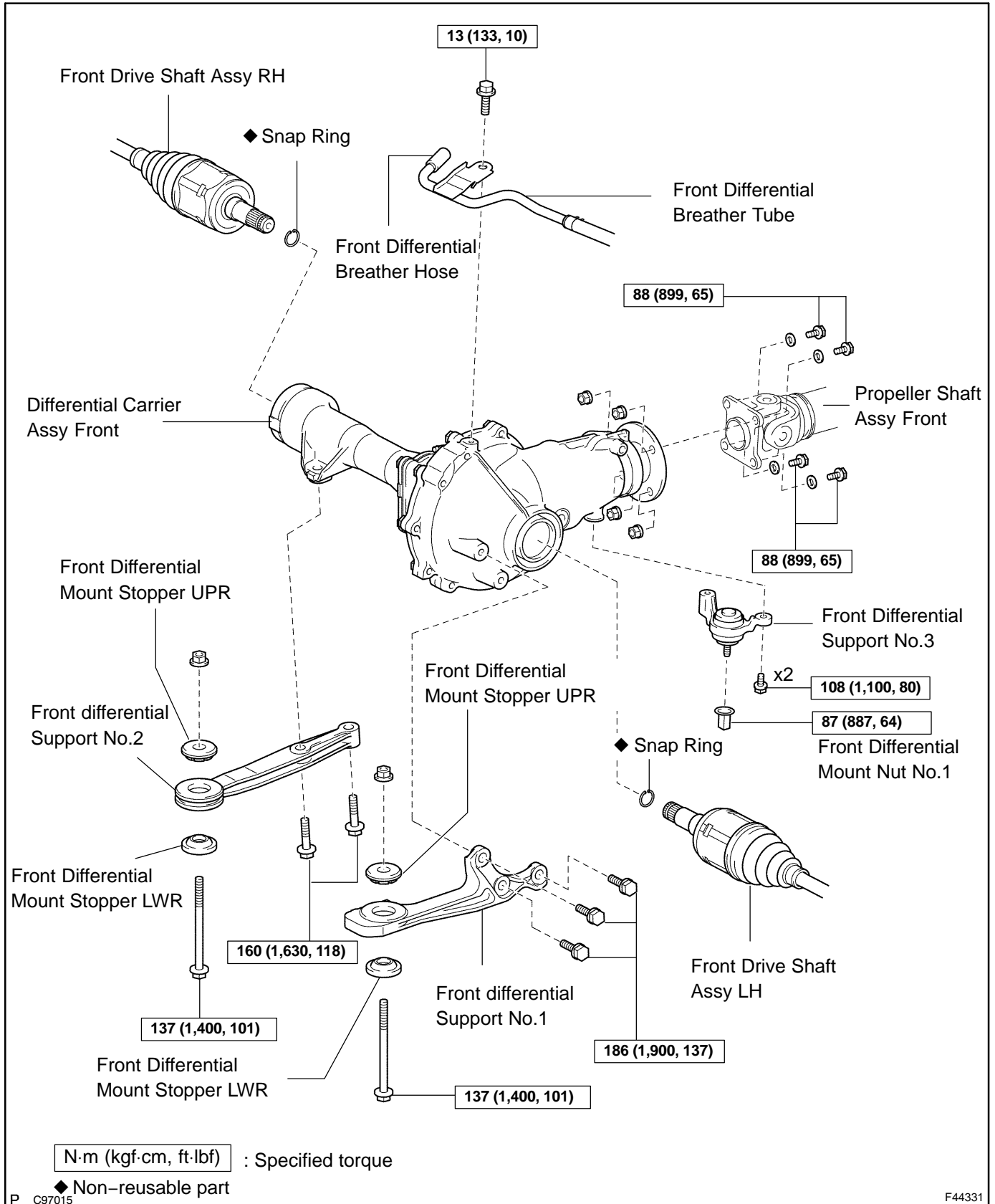
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

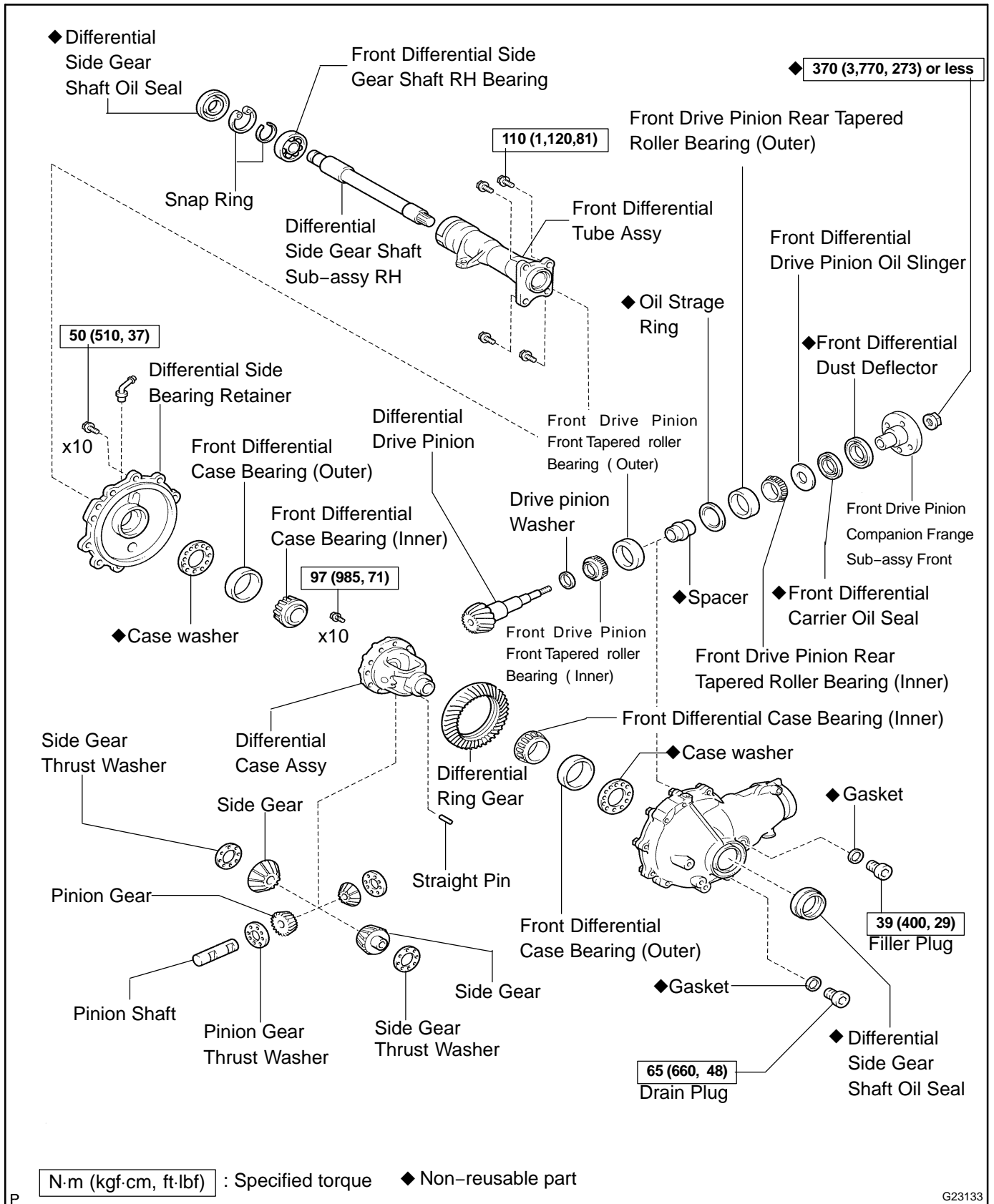
23. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

DIFFERENTIAL CARRIER ASSY FRONT COMPONENTS

29073-02





OVERHAUL

HINT:

COMPONENTS: See page 29-11

1. REMOVE FRONT WHEELS
2. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
3. REMOVE ENGINE UNDER COVER ASSY REAR
4. DRAIN DIFFERENTIAL OIL
5. REMOVE PROPELLER SHAFT ASSY FRONT (See page 30-19)
6. REMOVE SPEED SENSOR FRONT RH (See page 32-48)
7. REMOVE SPEED SENSOR FRONT LH

HINT:

Remove the RH side by the same procedures with the LH side.

8. REMOVE FRONT AXLE HUB GREASE CAP LH (See page 30-28)
9. REMOVE FRONT AXLE HUB GREASE CAP RH

HINT:

Remove the RH side by the same procedures with the LH side.

10. REMOVE FRONT AXLE HUB LH NUT (See page 30-28)
11. REMOVE FRONT AXLE HUB RH NUT

HINT:

Remove the RH side by the same procedures with the LH side.

12. SEPARATE FRONT STABILIZER LINK ASSY LH (See page 26-26)
13. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

14. SEPARATE TIE ROD END SUB-ASSY LH (See page 51-19)
SST 09628-62011
15. SEPARATE TIE ROD END SUB-ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

16. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 26-21)
17. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:

Remove the RH side by the same procedures with the LH side.

18. SEPARATE FRONT AXLE ASSY LH (See page 30-28)
19. SEPARATE FRONT AXLE ASSY RH

HINT:

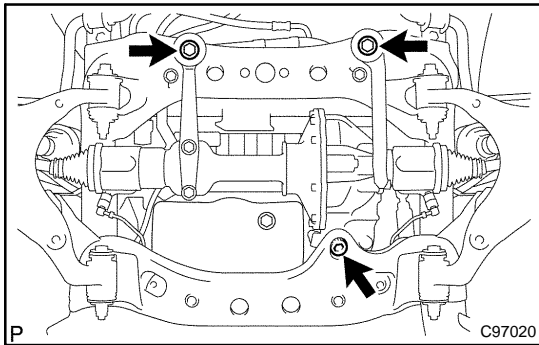
Remove the RH side by the same procedures with the LH side.

20. REMOVE FRONT DRIVE SHAFT ASSY LH (See page 30-19)
SST 09520-01010, 09520-24010 (09520-32040)
21. REMOVE FRONT DRIVE SHAFT ASSY RH

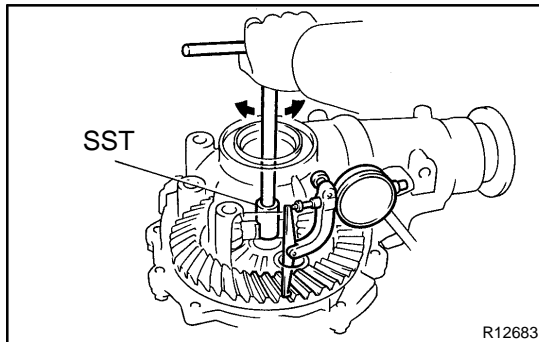
HINT:

Remove the RH side by the same procedures with the LH side.

- SST 09520-01010, 09520-24010 (09520-32040)

**22. REMOVE DIFFERENTIAL CARRIER ASSY FRONT**

- (a) Remove the bolt and separate the front differential breather tube bracket.
- (b) Support the front differential with a jack.
- (c) Remove the front differential mount nut No.1.
- (d) Remove the 2 front mounting bolts and 2 nuts.
- (e) Lower the jack and remove the front differential assembly.
- (f) Remove the 2 bolts and front differential support No.3.
- (g) Remove the 5 bolts and 2 front differential supports.

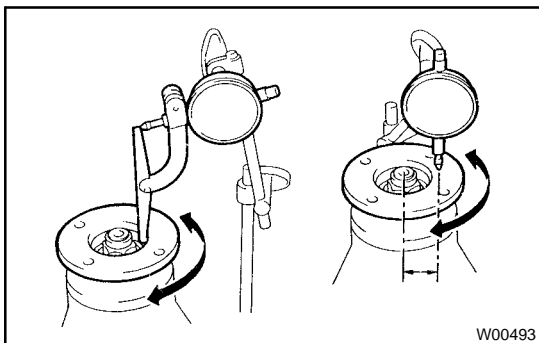
**23. INSPECT BACKLASH DIFFERENTIAL RING GEAR AND DIFFERENTIAL DRIVE PINION**

- (a) Using SST and a dial indicator, measure the ring gear backlash.

SST 09564-32011

Backlash: 0.11 - 0.18 mm (0.0043 - 0.0071 in.)

If the backlash is not within the specification, adjust the side bearing preload or repair as necessary.

**24. INSPECT FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT**

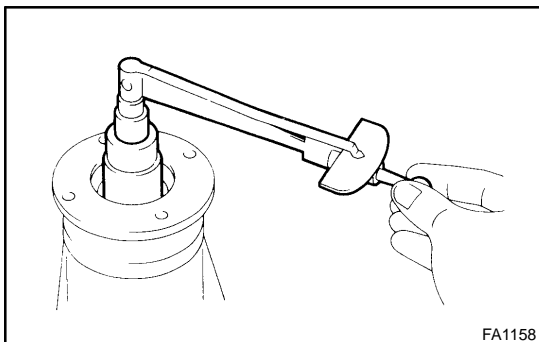
- (a) Using a dial indicator, measure the runout of the companion flange vertically and horizontally.

Maximum runout:

Vertical runout: 0.10 mm (0.0039 in.)

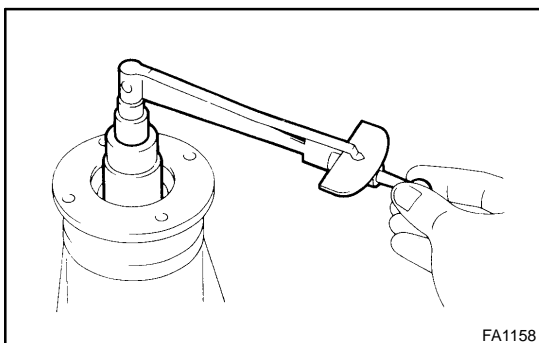
Lateral runout: 0.10 mm (0.0039 in.)

If the runout is greater than the maximum, replace the companion flange.

**25. INSPECT DRIVE PINION PRELOAD**

- (a) Using a torque wrench, measure the preload of backlash between the drive pinion and ring gear.

0.49 - 0.78 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in·lbf)

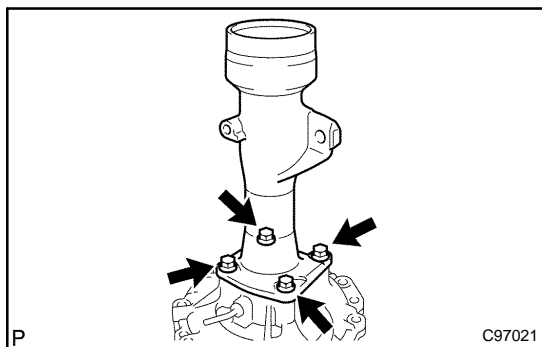
**26. INSPECT TOTAL PRELOAD**

- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

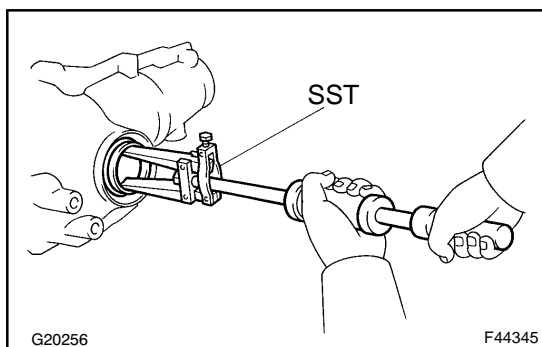
Total preload (at starting):

Drive pinion preload plus 0.20 - 0.63 N·m (2 - 6 kgf·cm, 1.8 - 5.6 in·lbf)

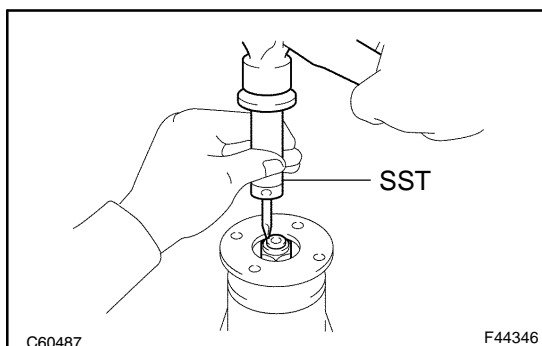
If necessary, disassemble and inspect the differential.

**27. REMOVE FRONT DIFFERENTIAL TUBE ASSY**

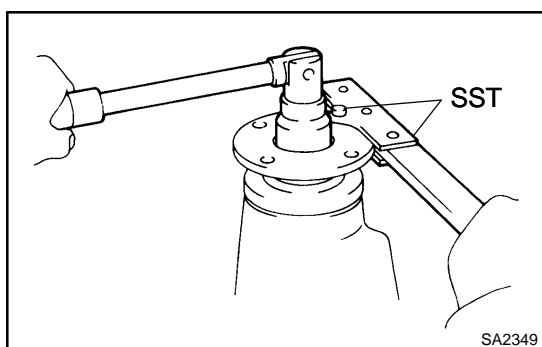
- (a) Remove the 4 bolts.
- (b) Using a plastic hammer, remove the differential tube.

**28. REMOVE DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL**

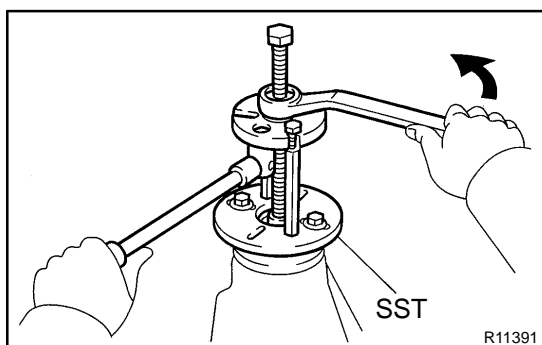
- (a) Using SST, remove the side oil seal.
SST 09308-00010

**29. REMOVE FRONT DRIVE PINION COMPANION FLANGE FRONT NUT**

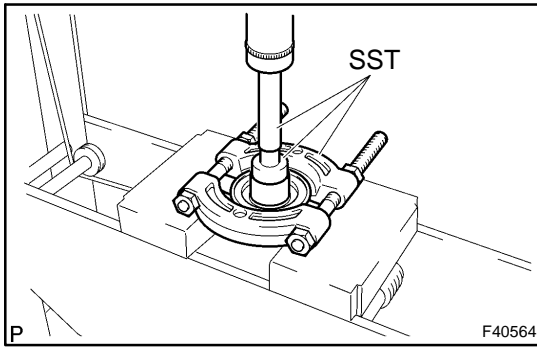
- (a) Using SST and a hammer, unseat the nut.
SST 09930-00010



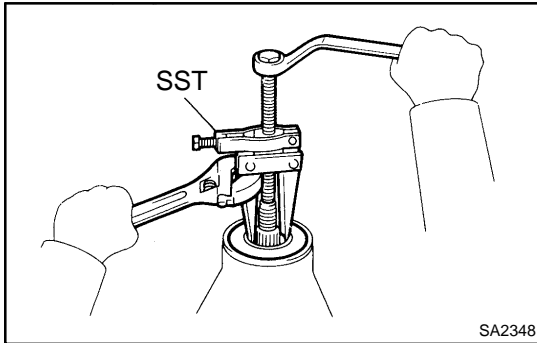
- (b) Using SST to hold the companion flange, remove the nut.
SST 09330-00021

**30. REMOVE FRONT DRIVE PINION COMPANION FLANGE SUB-ASSY FRONT**

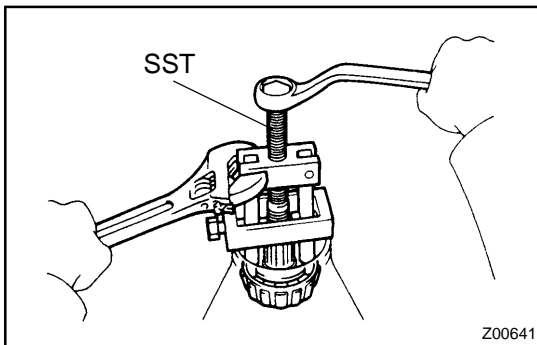
- (a) Using SST, remove the companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)

**31. REMOVE FRONT DIFFERENTIAL DUST DEFLECTOR**

- (a) Using SST and a press, remove the dust deflector
 SST 09950-00020, 09950-60010 (09951-00510),
 09950-70010 (09951-07150)

**32. REMOVE FRONT DIFFERENTIAL CARRIER OIL SEAL**

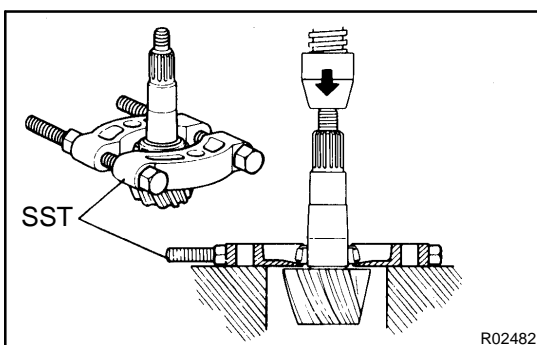
- (a) Using SST, remove the oil seal from the differential carrier.
 SST 09308-10010

33. REMOVE FRONT DIFFERENTIAL DRIVE PINION OIL SLINGER**34. REMOVE FRONT DRIVE PINION REAR TAPERED ROLLER BEARING**

- (a) Using SST, remove the tapered roller bearing (inner) the drive pinion.
 SST 09556-22010
- (b) Remove the bearing spacer.

35. REMOVE DIFFERENTIAL SIDE BEARING RETAINER

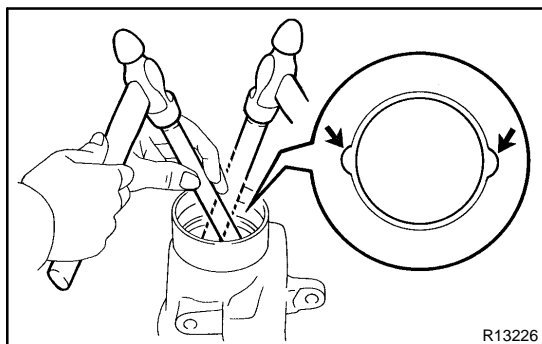
- (a) Remove the 10 bolts and tap out the retainer with a plastic hammer.

36. REMOVE DIFFERENTIAL CASE ASSY**37. REMOVE DIFFERENTIAL DRIVE PINION****38. REMOVE FRONT DRIVE PINION FRONT TAPERED ROLLER BEARING**

- (a) Using SST and a press, remove the tapered roller bearing (inner) and washer from the drive pinion.
 SST 09950-00020

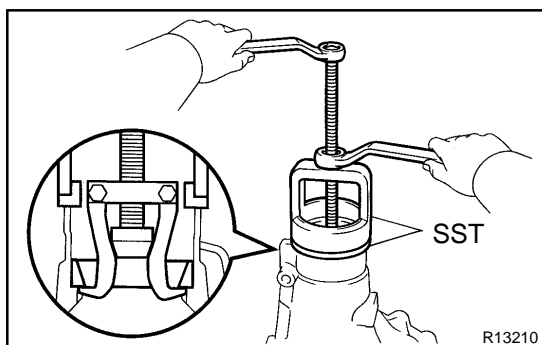
HINT:

If the drive or ring gear are damaged, replace them as a set.



39. REMOVE FRONT DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Using a brass bar and hammer, remove the tapered roller bearing (outer).

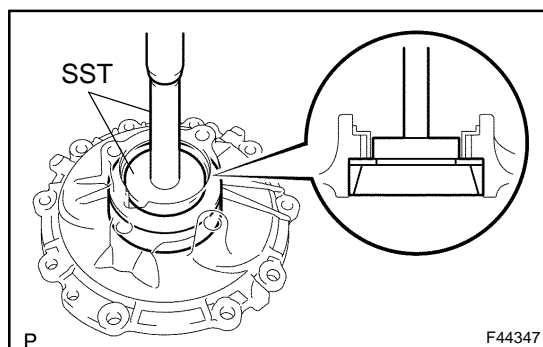


40. REMOVE FRONT DRIVE PINION REAR TAPERED ROLLER BEARING

- (a) Using SST, remove the rear tapered roller bearing (outer).
SST 09502-12010, 09612-65014 (09612-01020, 09612-01050)

41. REMOVE FRONT DIFFERENTIAL OIL STORAGE RING

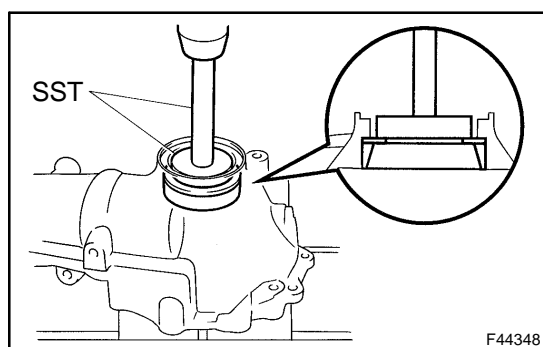
- (a) Using a brass bar and hammer, remove the oil storage ring.

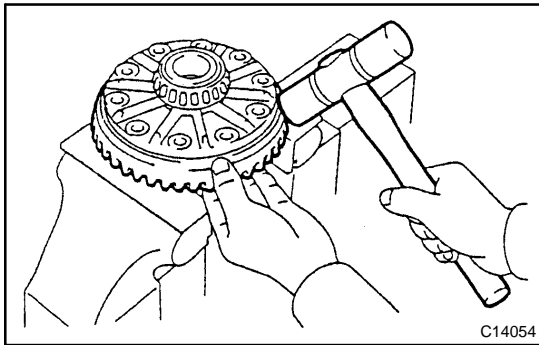


42. REMOVE FRONT DIFFERENTIAL CASE BEARING

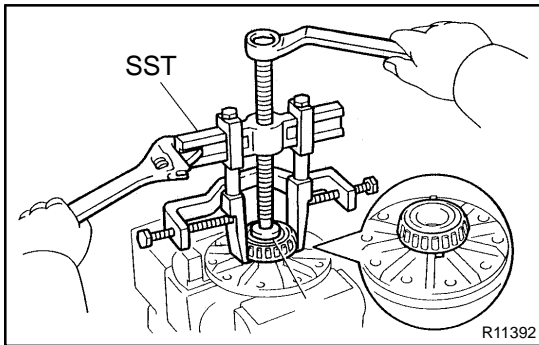
HINT:

- Measure the case washer and note the thickness.
 - Tag the bearing outer races to show the location for reassembly.
- (a) Using SST and a press, remove the case bearing (outer) and plate washer from the bearing retainer.
SST 09950-60020 (09951-00680), 09950-70010 (09951-07150)
- (b) Using SST and a press, remove the case bearing (outer) and plate washer from the differential carrier assy.
SST 09950-60020 (09951-00680), 09950-70010 (09951-07150)



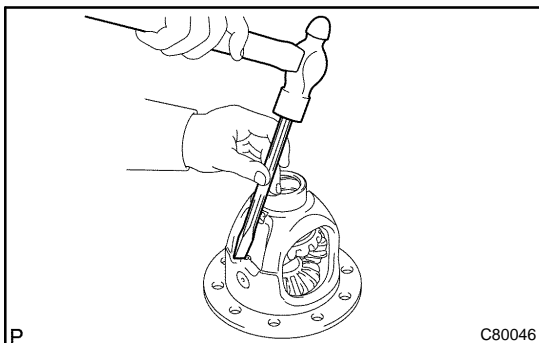
**43. REMOVE DIFFERENTIAL RING GEAR**

- (a) Place matchmarks on the ring gear and differential case.
- (b) Remove the 10 bolts.
- (c) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

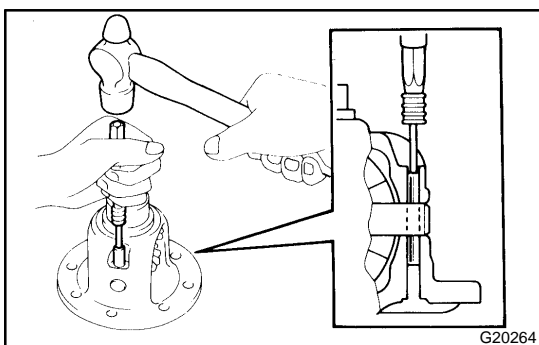
**44. REMOVE FRONT DIFFERENTIAL CASE BEARING**

- (a) Using SST, remove the 2 differential case bearing (inner) from the differential case assy.

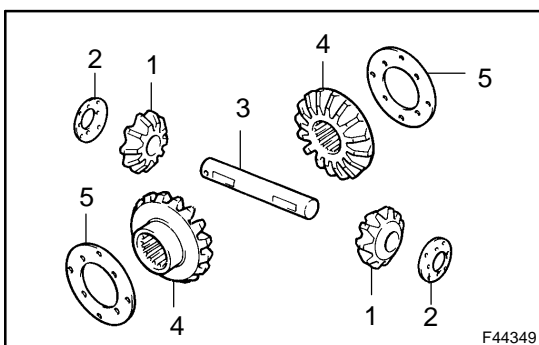
SST 09950-60010 (09951-00480), 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09953-04020, 09958-04011)

**45. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Using a chisel and hammer, unstick the differential case.



- (b) Using a pin punch and hammer, remove the straight pin.



- (c) Remove these parts from the differential case.

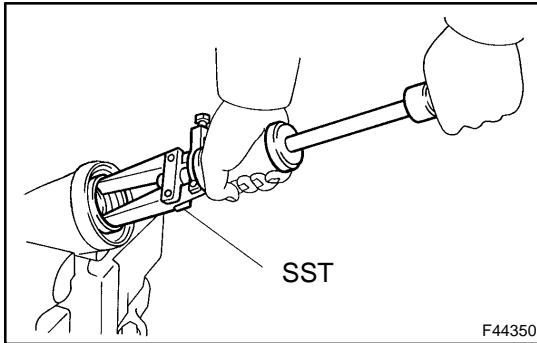
- (1) Differential pinion gear (2 pieces)
- (2) Differential pinion gear thrust washer (2 pieces)
- (3) Differential pinion shaft
- (4) Differential side gear (2 pieces)
- (5) Differential side gear thrust washer (2 pieces)

46. INSPECT DIFFERENTIAL GEAR KIT

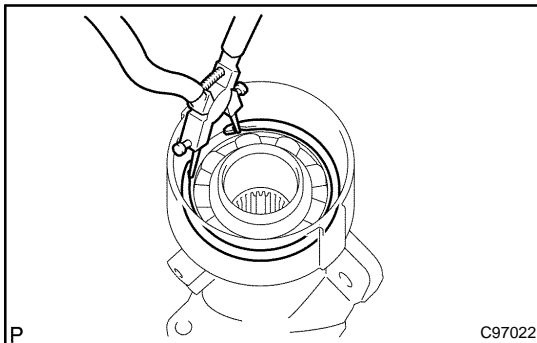
- (a) Check that no damage is identified on the differential pinion and differential side gear.
If the differential pinion and/or differential side gear is damaged, replace the differential gear kit.

47. INSPECT FRONT DIFFERENTIAL CASE

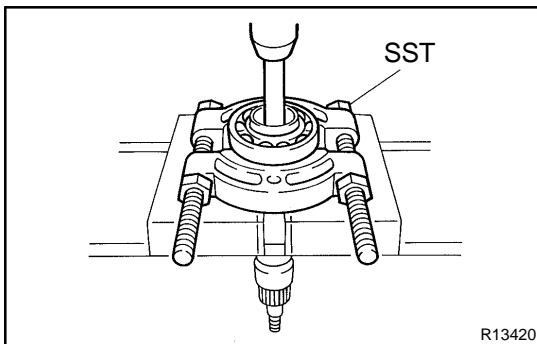
- (a) Check that no damage is identified on the differential case.
If the differential case is damaged, replace the differential case.

**48. REMOVE DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL**

- (a) Using SST, remove the oil seal from the differential tube.
SST 09308-00010

**49. REMOVE DIFFERENTIAL SIDE GEAR SHAFT SUB-ASSY RH**

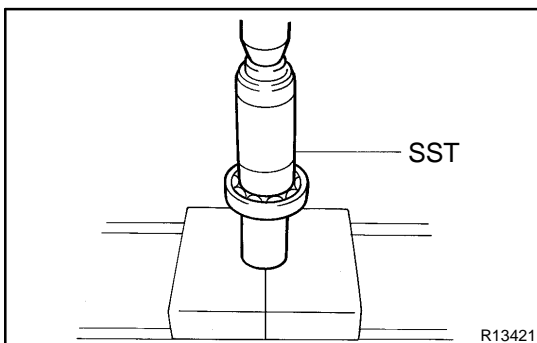
- (a) Using a snap ring expander, remove the snap ring.
(b) Remove the shaft from the differential tube.

**50. REMOVE FRONT DIFFERENTIAL SIDE GEAR SHAFT RH BEARING**

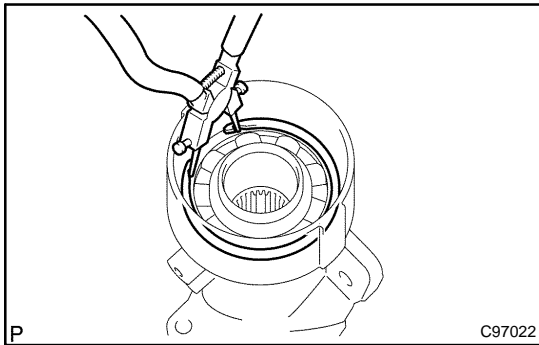
- (a) Using a snap ring expander, remove the snap ring.
(b) Using SST, a brass bar and press, remove the shaft RH bearing.
SST 09950-00020

NOTICE:

Do not damage the bearing.

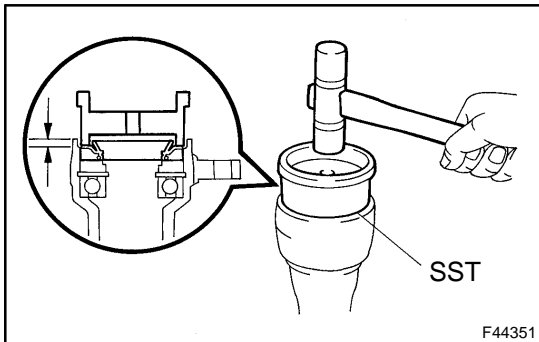
**51. INSTALL FRONT DIFFERENTIAL SIDE GEAR SHAFT RH BEARING**

- (a) Using SST and a press, install a new shaft RH bearing.
SST 09223-00010
(b) Using a snap ring expander, install the snap ring.



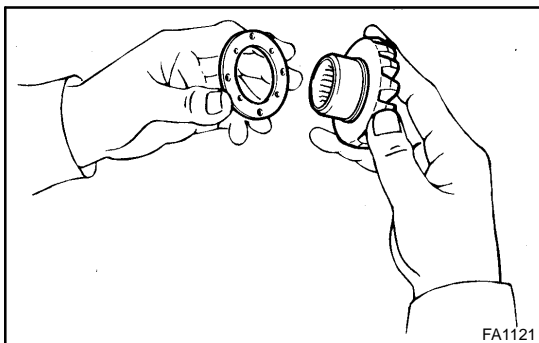
52. INSTALL DIFFERENTIAL SIDE GEAR SHAFT SUB-ASSY RH

- Install the shaft into the differential tube.
- Using needle nose pliers, install the snap ring.



53. INSTALL DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- Using SST and plastic hammer, install a new oil seal.
SST 09223-15020
Oil seal drive in depth:
5.3 ± 0.5 mm (0.209 ± 0.0197 in.)
- Coat the oil seal lip with MP grease.



54. INSTALL FRONT DIFFERENTIAL CASE

- Install the 2 proper thrust washers on the 2 side gears.

HINT:

Using the table below, select 2 thrust washers which will ensure that the backlash is within the specifications.

Washer thickness

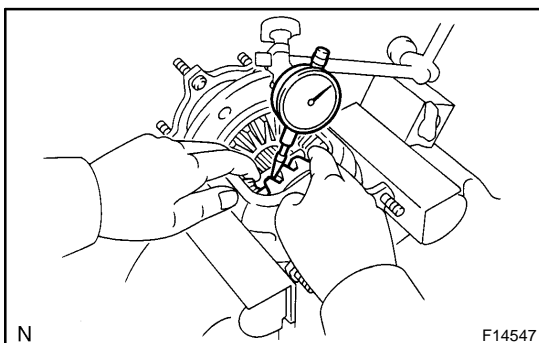
Thickness mm (in.)	Thickness mm (in.)
1.48 - 1.52 (0.0583 - 0.0598)	1.73 - 1.77 (0.0681 - 0.0697)
1.53 - 1.57 (0.0602 - 0.0618)	1.78 - 1.82 (0.0701 - 0.0717)
1.58 - 1.62 (0.0622 - 0.0638)	1.83 - 1.87 (0.0720 - 0.0736)
1.63 - 1.67 (0.0642 - 0.0657)	1.88 - 1.92 (0.0740 - 0.0756)
1.68 - 1.72 (0.0661 - 0.0677)	-

- Install the 2 side gears, 2 pinion gears, 2 side gear thrust washers, 2 pinion gears, 2 pinion thrust washers and pinion shaft in the differential case assy.

HINT:

Align the holes of the differential case and pinion shaft.

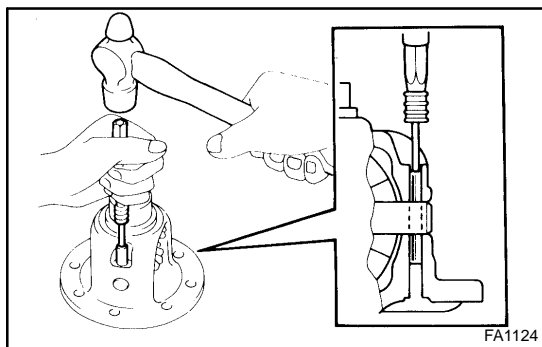
- Measure the side gear backlash.



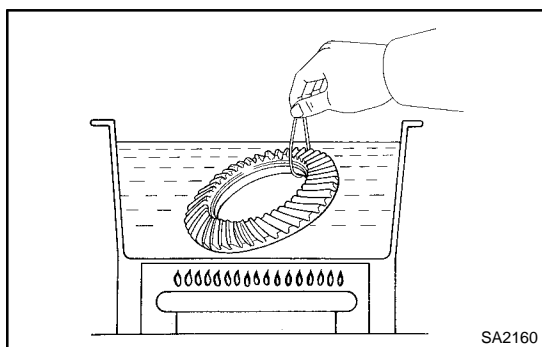
- Using a dial indicator, measure the side gear backlash with holding one pinion gear toward the differential case.

Backlash: 0 - 0.15 mm (0 - 0.00591 in.)

If the backlash is not within the specification, install 2 side gear thrust washers with different thicknesses.



- (d) Using a pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.
- (e) Stake the differential case.



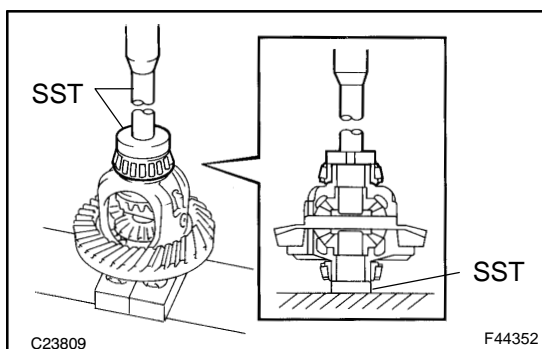
55. INSTALL DIFFERENTIAL RING GEAR

- (a) Clean the contact surfaces of the differential case and ring gear.
- (b) Heat the ring gear to about 100°C (212°F) in boiling water.
- (c) Carefully remove the ring gear from the boiling water.
- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.
- (e) Align the matchmarks on the ring gear and differential case.
- (f) After the ring gear cools down enough, torque the set bolts to which thread lock has been applied.

Thread lock:

Part No. 08833-00100, THREE BOND 1360k or equivalent.

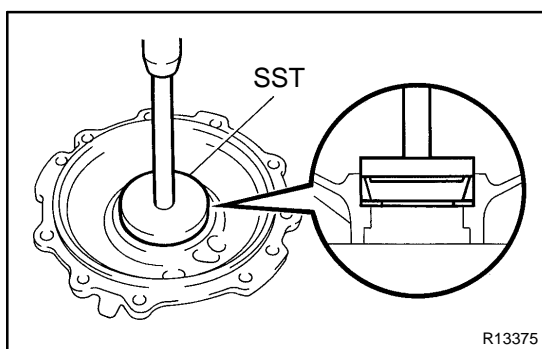
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



56. INSTALL FRONT DIFFERENTIAL CASE BEARING

- (a) Using SST and a press, install the 2 case bearings (inner) into the differential case.

SST 09950-60010 (09951-00520, 09951-00610),
09950-70010 (09951-07150)



57. INSTALL FRONT DIFFERENTIAL CASE BEARING

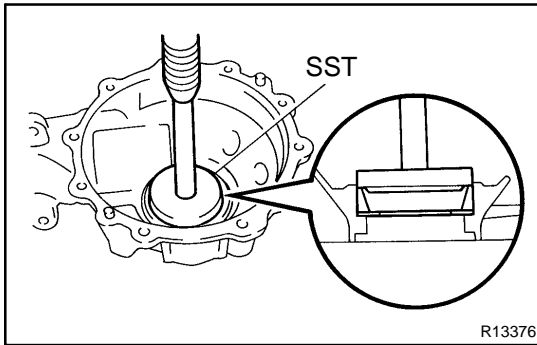
HINT:

When replacing the 2 differential case bearings, fit the 2 thinnest washers to each bearing and when reusing the bearings, fit the washers with the same thickness as removed.

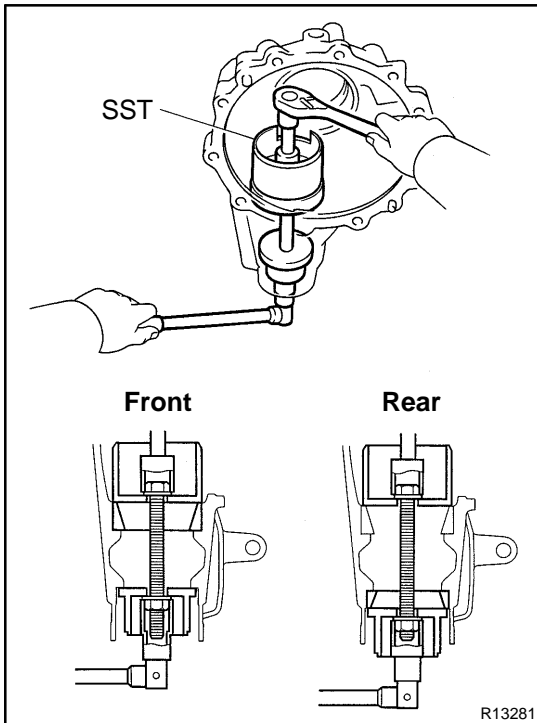
- (a) Using SST and a press, install the case bearing (outer) outer race to the differential case bearing retainer.

(RH side)

SST 09950-60020 (09951-00810), 09950-70010
(09951-07150)

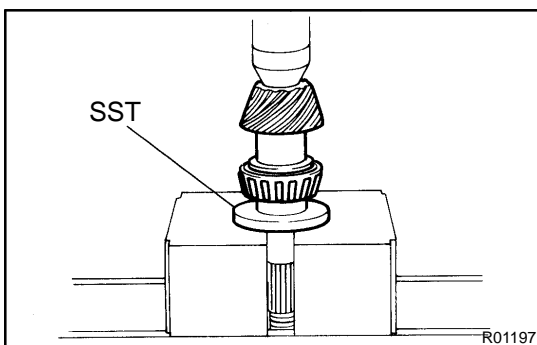


- (b) Install a new case washer to the side bearing retainer. (LH side)
 SST 09950-60020 (09951-00810), 09950-70010 (09951-07150)



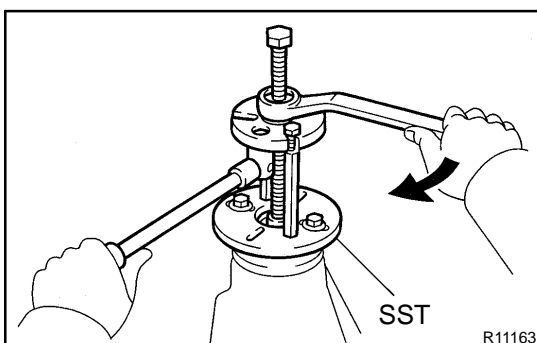
58. INSTALL BEARING OUTER RACE

- (a) Using SST, install the tapered roller bearings (outer) FR.
 SST 09950-00020 (09951-00890), (09951-00680)
 (b) Using a brass bar and a hammer, install the oil storage ring.
 (c) Using SST, install the tapered roller bearings (outer) RR.
 SST 09950-00020 (09951-00890), (09951-00680)



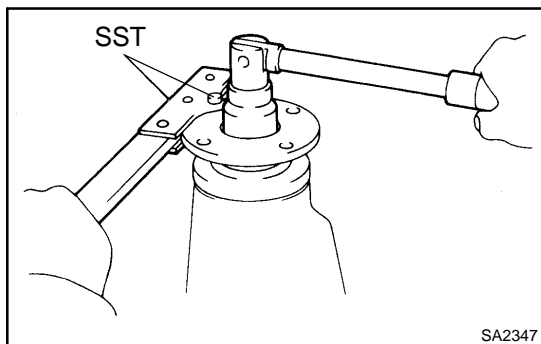
59. INSTALL FRONT DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Install the washer on the drive pinion.
 HINT:
 First fit a washer with the same thickness with the removed one, then after checking the tooth contact pattern, replace the washer with a different thickness if necessary.
 (b) Using SST and a press, install the front bearing onto the drive pinion.
 SST 09506-30012



60. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Install the drive pinion and oil slinger.
 HINT:
 Assemble the spacer and oil seal after adjusting the ring gear tooth contact pattern.
 (b) Using SST, install the rear bearing, oil slinger and companion flange.
 SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020),
 (c) Coat the threads of the nut with hypoid gear oil.



- (d) Adjust the drive pinion preload by tightening the companion flange nut.

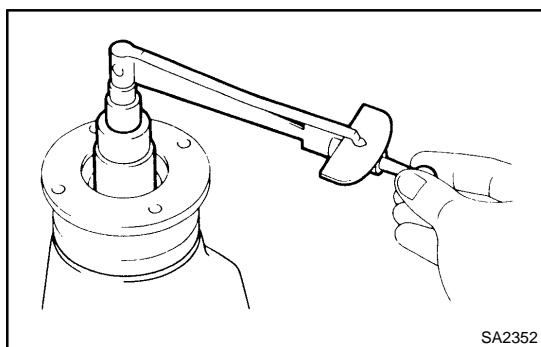
Using SST to hold the flange, tighten the nut.

SST 09330-00021 (09330-00030)

Torque: 370 N·m (3770 kgf·cm, 273 ft·lbf) or less

NOTICE:

As there is no spacer, tighten the nut a little at a time, being careful not to overtighten it.



- (e) Using a torque wrench, measure the preload.

Preroid (at starting)

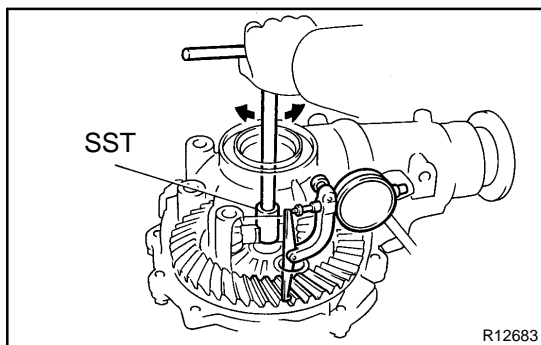
New bearing:

0.98 - 1.57 N·m (1 - 16 kgf·cm, 8.7 - 13.9 in·lbf)

Reused bearing:

0.49 - 0.78 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in·lbf)

61. INSTALL DIFFERENTIAL CASE ASSY



62. ADJUST BACKLASH DIFFERENTIAL RING GEAR AND DIFFERENTIAL DRIVE PINION

- (a) Install the side bearing retainer with the 10 bolts.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

- (b) Using SST and a dial indicator, measure the ring gear backlash.

SST 09564-32011

Backlash: 0.11 - 0.18 mm (0.0043 - 0.0071 in.)

- (c) If it is not within the specification, adjust it by either increasing or decreasing the washers on both sides by an equal amount.

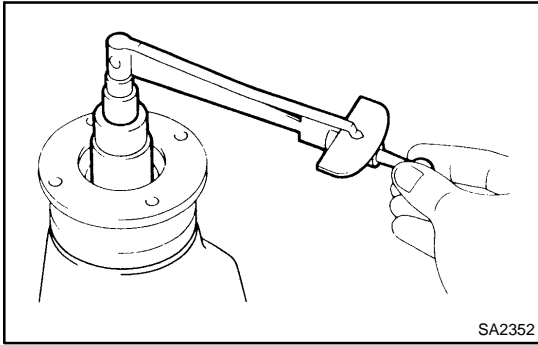
HINT:

There should be no clearance between the plate washer and case.

Make sure that there is ring gear backlash.

Washer thickness:

Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
1.59 - 1.61 (0.0626 - 0.0634)	1.89 - 1.91 (0.0744 - 0.0752)	2.19 - 2.21 (0.0862 - 0.0870)
1.62 - 1.64 (0.0638 - 0.0646)	1.92 - 1.94 (0.0756 - 0.0764)	2.22 - 2.24 (0.0874 - 0.0882)
1.65 - 1.67 (0.0650 - 0.0657)	1.95 - 1.97 (0.0768 - 0.0776)	2.25 - 2.27 (0.0886 - 0.0894)
1.68 - 1.70 (0.0661 - 0.0669)	1.98 - 2.00 (0.0780 - 0.0787)	2.28 - 2.30 (0.0898 - 0.0906)
1.71 - 1.73 (0.0673 - 0.0681)	2.01 - 2.03 (0.0791 - 0.0800)	2.31 - 2.33 (0.0909 - 0.0917)
1.74 - 1.76 (0.0685 - 0.0693)	2.04 - 2.06 (0.0803 - 0.0811)	2.34 - 2.36 (0.0921 - 0.0929)
1.77 - 1.79 (0.0697 - 0.0705)	2.07 - 2.09 (0.0815 - 0.0823)	2.37 - 2.39 (0.0933 - 0.0941)
1.80 - 1.82 (0.0709 - 0.0717)	2.10 - 2.12 (0.0827 - 0.0835)	2.40 - 2.42 (0.0945 - 0.0953)
1.83 - 1.85 (0.0720 - 0.0728)	2.13 - 2.15 (0.0839 - 0.0846)	2.43 - 2.45 (0.0957 - 0.0965)
1.86 - 1.88 (0.0732 - 0.0740)	2.16 - 2.18 (0.0850 - 0.0858)	2.46 - 2.48 (0.0969 - 0.0976)



63. INSPECT TOTAL PRELOAD

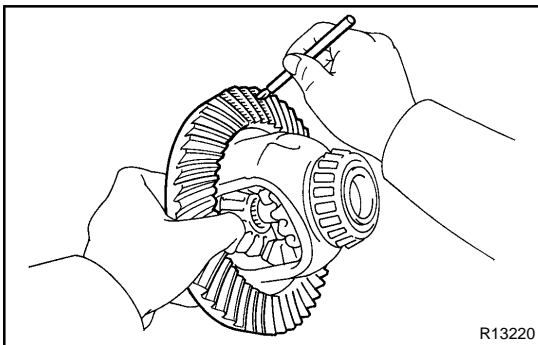
- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):

Drive pinion preload plus

0.20 - 0.63 N·m (2 - 6 kgf·cm, 1.8 - 5.6 in·lbf)

64. ADJUST TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION



- (a) Remove the differential case bearing retainer and differential case.

- (b) Coat 3 or 4 teeth at the 3 different positions on the ring gear with red lead.

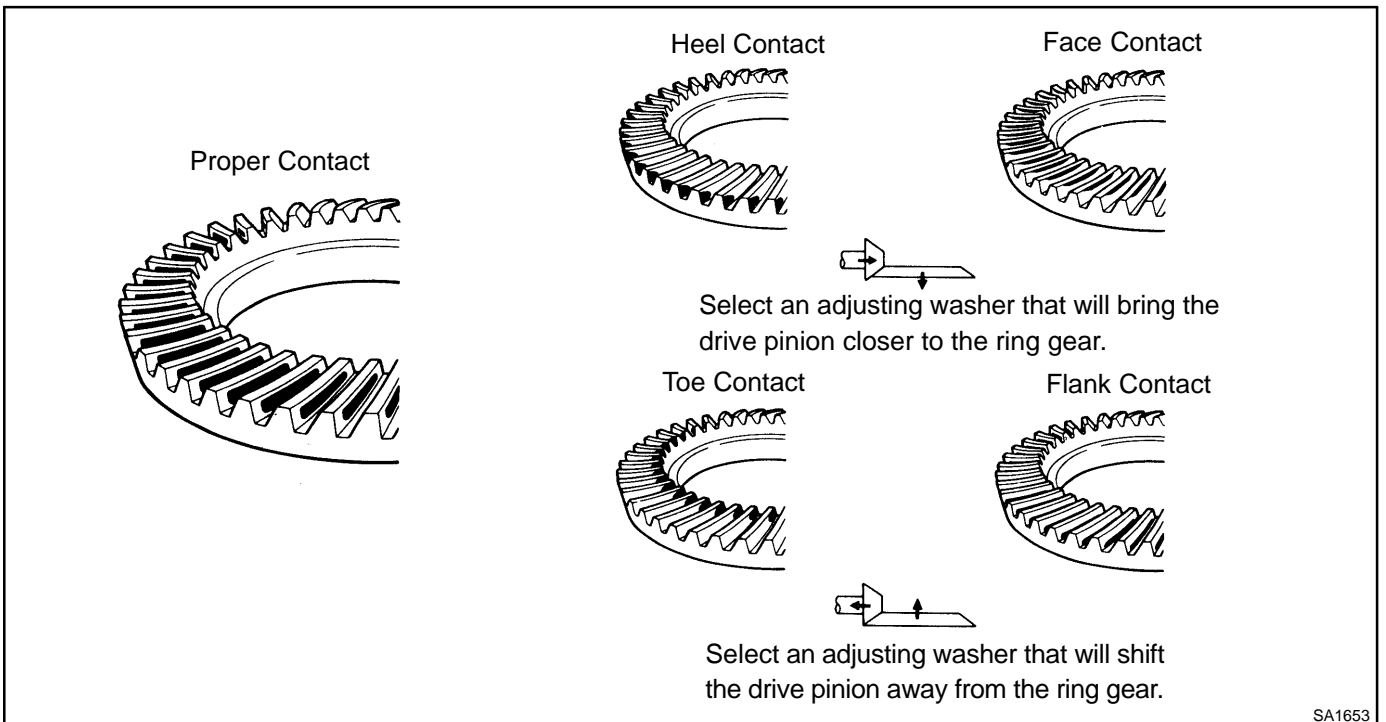
- (c) Install the differential case and differential case bearing retainer.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

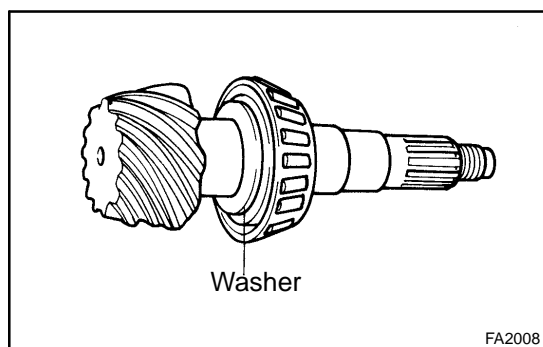
- (d) Hold the companion flange firmly and rotate the ring gear in both directions.

- (e) Remove the differential case bearing retainer and differential case.

- (f) Inspect the tooth contact pattern.



SA1653



If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness:

Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
1.69 - 1.71 (0.0665 - 0.0673)	1.93 - 1.95 (0.0760 - 0.0768)	2.17 - 2.19 (0.0854 - 0.0862)
1.72 - 1.74 (0.0677 - 0.0685)	1.96 - 1.98 (0.0772 - 0.0780)	2.20 - 2.22 (0.0866 - 0.0874)
1.75 - 1.77 (0.0689 - 0.0697)	1.99 - 2.01 (0.0783 - 0.0791)	2.23 - 2.25 (0.0878 - 0.0886)
1.78 - 1.80 (0.0701 - 0.0709)	2.02 - 2.04 (0.0795 - 0.0803)	2.26 - 2.28 (0.0890 - 0.0898)
1.81 - 1.83 (0.0713 - 0.0720)	2.05 - 2.07 (0.0807 - 0.0815)	2.29 - 2.31 (0.0902 - 0.0909)
1.84 - 1.86 (0.0724 - 0.0732)	2.08 - 2.10 (0.0819 - 0.0827)	2.32 - 2.34 (0.0913 - 0.0921)
1.87 - 1.89 (0.0736 - 0.0744)	2.11 - 2.13 (0.0831 - 0.0839)	-
1.90 - 1.92 (0.0748 - 0.0756)	2.14 - 2.16 (0.0843 - 0.0850)	-

65. REMOVE FRONT DRIVE PINION COMPANION FLANGE FRONT NUT

SST 09330-00021

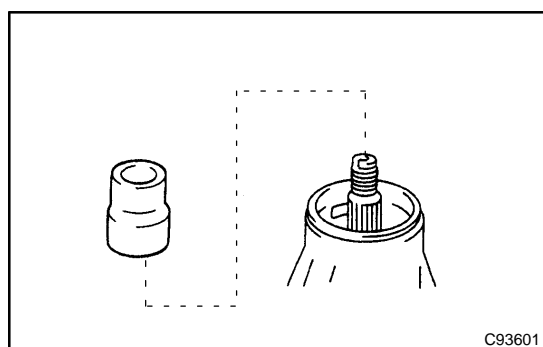
66. REMOVE FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)

67. REMOVE FRONT DIFFERENTIAL DRIVE PINION OIL SLINGER

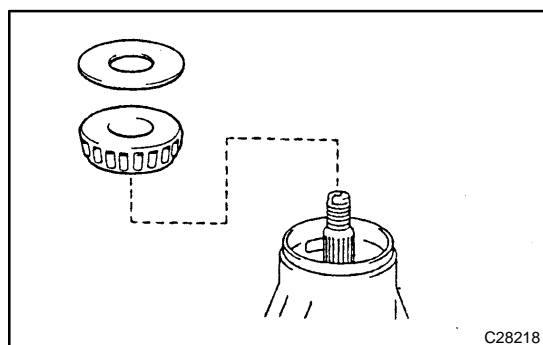
68. REMOVE FRONT DRIVE PINION REAR TAPERED ROLLER BEARING

SST 09556-22010



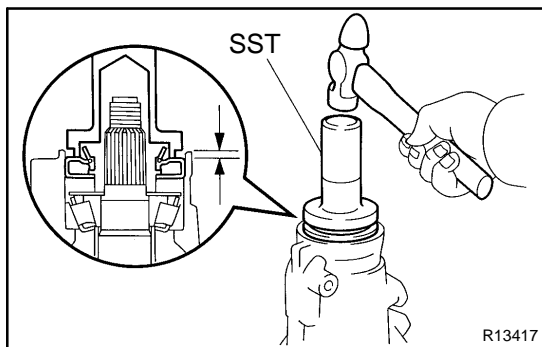
69. INSTALL FRONT DIFFERENTIAL DRIVE PINION BEARING SPACER

- (a) Install a new bearing spacer to the drive pinion.



70. INSTALL FRONT DRIVE PINION REAR TAPERED ROLLER BEARING

71. INSTALL FRONT DIFFERENTIAL DRIVE PINION OIL SLINGER

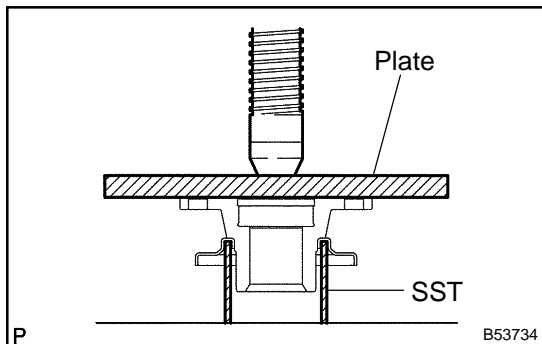
**72. INSTALL FRONT DIFFERENTIAL CARRIER OIL SEAL**

- (a) Using SST and a hammer, install the oil seal.

SST 09554-22010

Oil seal drive in depth:

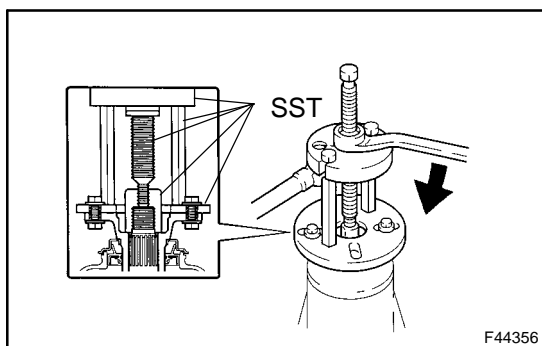
4.35 ± 0.45 mm (0.1713 ± 0.0177 in.)

**73. INSTALL FRONT DIFFERENTIAL DUST DEFLECTOR**

- (a) Using a steel plate and a press, install a new dust deflector.

NOTICE:

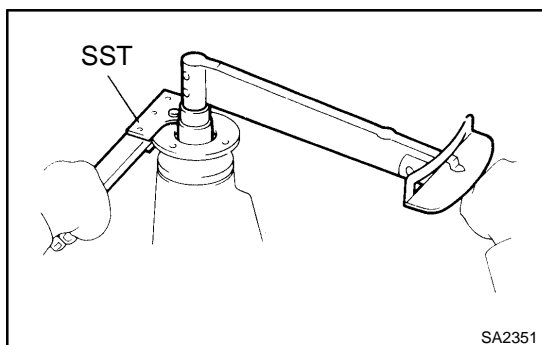
Do not damage the dust deflector.

**74. INSTALL FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT**

- (a) Place the companion drive pinion companion flange on the drive pinion.

- (b) Coat the threads of a new nut with hypoid gear oil.

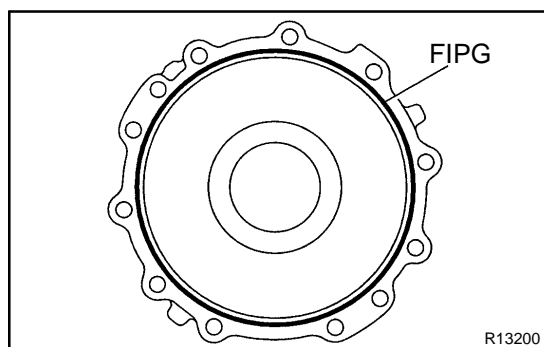
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020),



- (c) Using SST to hold the drive pinion companion flange, torque the nut.

SST 09330-00021 (09330-00030)

Torque: 370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

**75. INSTALL DIFFERENTIAL SIDE BEARING RETAINER**

- (a) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and side bearing retainer.
- (b) Clear contacting surfaces of any residual FIPG material using gasoline or alcohol.
- (c) Apply FIPG to the side bearing retainer, as shown.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:

Install the bearing retainer within 10 minutes after applying FIPG.

- (d) install the side bearing retainer with the 10 bolts.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

76. INSPECT DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

Preroid (at starting)**New bearing:**

0.98 - 1.57 N·m (10 - 16 kgf·cm, 8.7 - 13.9 in·lbf)

Reused bearing:

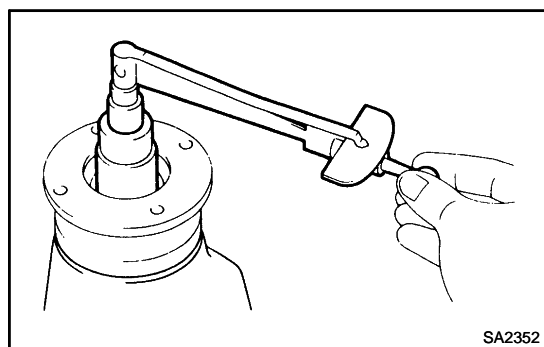
0.49 - 0.78 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in·lbf)

If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut to 13 N·m (130 kgf·cm, 9 ft·lbf) a little at a time until the specified preload is reached.

Torque: 370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the nut to reduce the preload.

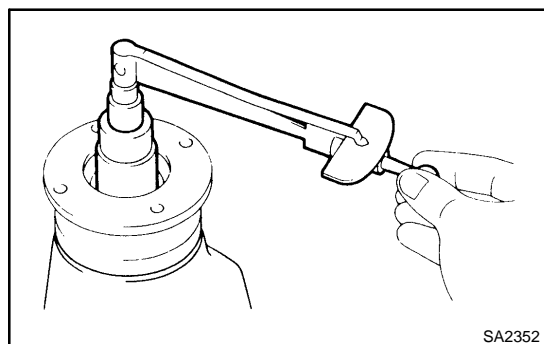
**77. INSPECT TOTAL PRELOAD**

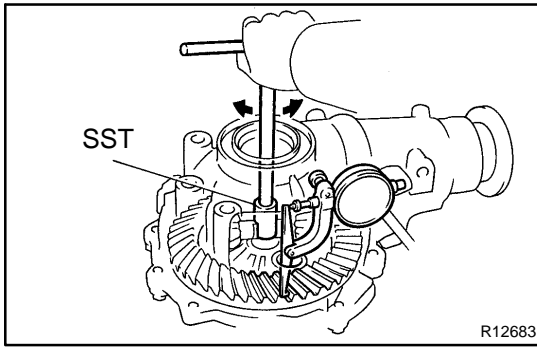
- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):

Drive pinion preload plus 0.20 - 0.63 N·m (2 - 6 kgf·cm, 1.8 - 5.6 in·lbf)

If necessary, disassemble and inspect the differential.



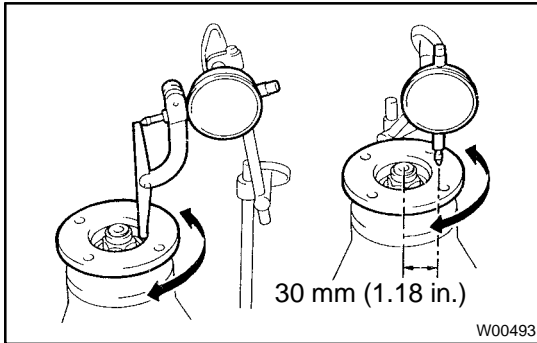


78. INSPECT BACKLASH DIFFERENTIAL RING GEAR AND DIFFERENTIAL DRIVE PINION

- (a) Using SST and a dial indicator, measure the ring gear backlash.

SST 09564-32011

Backlash: 0.11 – 0.18 mm (0.0043 – 0.0071 in.)



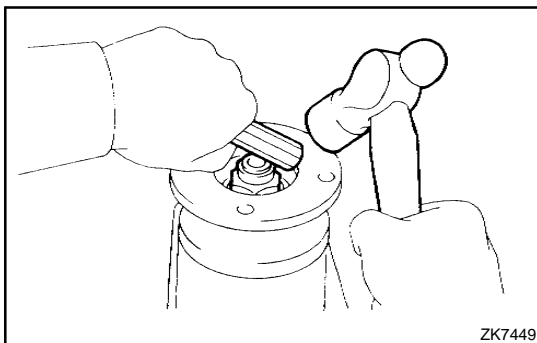
79. INSPECT FRONT DRIVE PINION COMPANION FLANGE SUB-ASSYFRONT

- (a) Using a dial indicator, measure the runout of the companion flange vertically and horizontally.

Maximum runout:

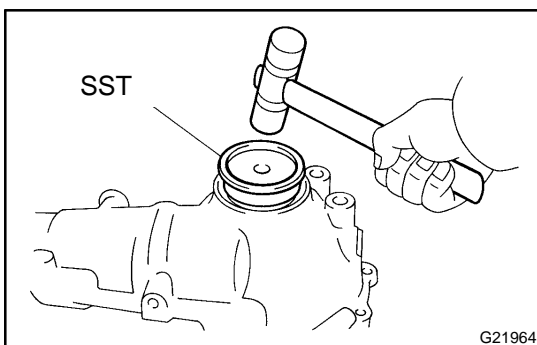
Vertical runout: 0.10 mm (0.0039 in.)

Lateral runout: 0.10mm (0.0039 in.)



80. INSTALL FRONT DRIVE PINION COMPANION FLANGE FRONT NUT

- (a) Using a chisel and hammer, stake the drive pinion nut.



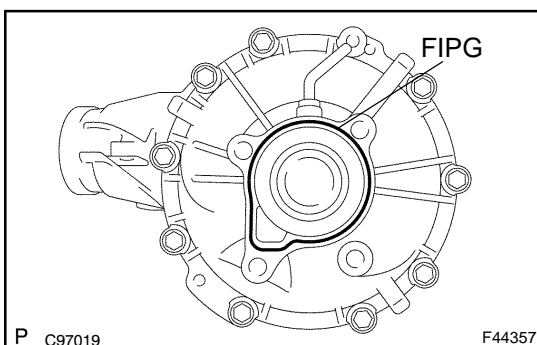
81. INSTALL DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST and a plastic hammer, install a new oil seal until its surface is flush with the differential carrier end.

SST 09608-32010

- (b) Coat the oil seal lip with MP grease.

Oil seal drive in depth: 0 ± 0.45 mm (0 ± 0.018 in.)



82. INSTALL FRONT DIFFERENTIAL TUBE ASSY

- (a) Remove the any oil FIPG material and be careful not to drop oil on the contact surfaces of the differential and clutch case.

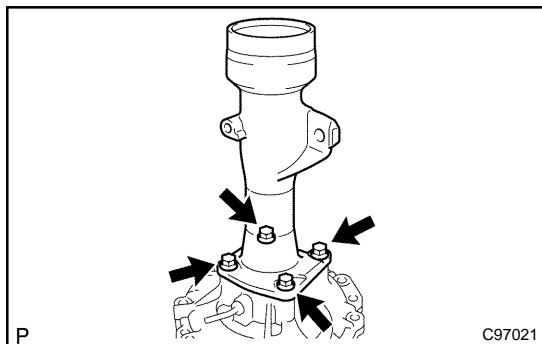
- (b) Clean the contact surfaces of any residual FIPG material using gasoline or alcohol.

- (c) Apply FIPG to the differential, as shown.
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

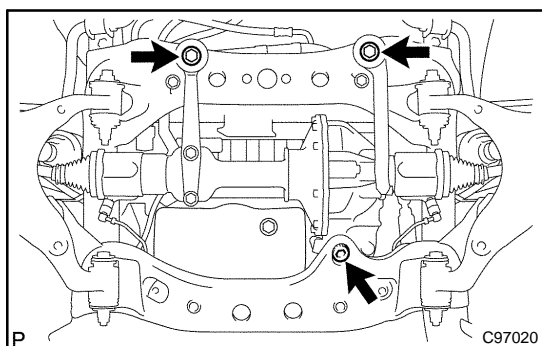
HINT:

Install the differential tube within 10 minutes after applying FIPG.

- (d) Install the differential tube to the differential.



- (e) Clean the threads of the 4 bolts and retainer bolt holes with toluene or trichloroethylene.
- (f) Apply adhesive to 2 to 3 threads of the bolts end.
Adhesive: Part No. 08833-00070, THREE BOND 1281 or equivalent
- (g) Install the 4 bolts.
Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)



83. INSTALL DIFFERENTIAL CARRIER ASSY FRONT

- (a) Install the No.1 mounting support with the 3 bolts.
Torque:186 N·m (1,900 kgf·cm, 137 ft·lbf)
- (b) Install the No.2 mounting support with the 2 bolts.
Torque:160 N·m (1,630 kgf·cm, 118 ft·lbf)
- (c) Install the front differential support No.3 with the 2 bolts.
Torque:108 N·m (1,100 kgf·cm, 80 ft·lbf)
- (d) Support the front differential with a jack.
- (e) Install the 2 front mounting bolts and nuts.
Torque:137 N·m (1,400 kgf·cm, 101 ft·lbf)
- (f) Install the front differential mount nuts No.1.
Torque:87 N·m (887 kgf·cm, 64 ft·lbf)
- (g) Install the front differential breather tube bracket with a bolt.
Torque:13 N·m (133 kgf·cm, 10 ft·lbf)
- (h) Lower the jack.

84. INSTALL FRONT DRIVE SHAFT ASSY LH (See page 30-19)

85. INSTALL FRONT DRIVE SHAFT ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

86. INSTALL FRONT AXLE ASSY LH (See page 30-28)

87. INSTALL FRONT AXLE ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

88. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH (See page 26-21)

89. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 RH

HINT:

Install the RH side by the same procedures with the LH side.

90. INSTALL TIE ROD END SUB-ASSY LH (See page 51-19)

91. INSTALL TIE ROD END SUB-ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

92. INSTALL FRONT STABILIZER LINK ASSY LH (See page 26-26)

93. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

94. INSTALL FRONT AXLE HUB LH NUT (See page 30-28)

95. INSTALL FRONT AXLE HUB RH NUT

HINT:

Install the RH side by the same procedures with the LH side.

96. INSPECT BEARING BACKLASH (See page 30-2)

97. INSPECT AXLE HUB DEVIATION (See page 30-2)

98. INSTALL FRONT AXLE HUB GREASE CAP LH (See page 30-28)

99. INSTALL FRONT AXLE HUB GREASE CAP RH

HINT:

Install the RH side by the same procedures with the LH side.

100. INSTALL SPEED SENSOR FRONT LH (See page 32-48)

101. INSTALL SPEED SENSOR FRONT RH

HINT:

Install the RH side by the same procedures with the LH side.

102. INSTALL PROPELLER SHAFT ASSY FRONT (See page 32-48)

103. REFILL DIFFERENTIAL OIL (See page 29-3)

104. INSPECT AND ADJUST DIFFERENTIAL OIL (See page 29-3)

105. INSTALL ENGINE UNDER COVER ASSY REAR

Torque:29 N·m (296 kgf·cm, 21 ft·lbf)

106. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

Torque:29 N·m (296 kgf·cm, 21 ft·lbf)

107. INSTALL FRONT WHEELS

Torque:112 N·m (1,140 kgf·cm, 83 ft·lbf)

108. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-7)

109. CHECK ABS SPEED SENSOR SIGNAL (See page 05-738)

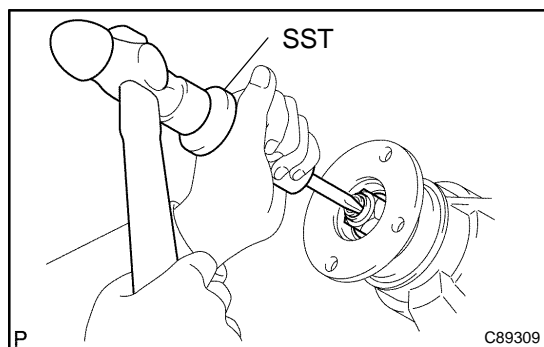
REAR DIFFERENTIAL CARRIER OIL SEAL REPLACEMENT

29075-01

HINT:

COMPONENTS: See page 29-35

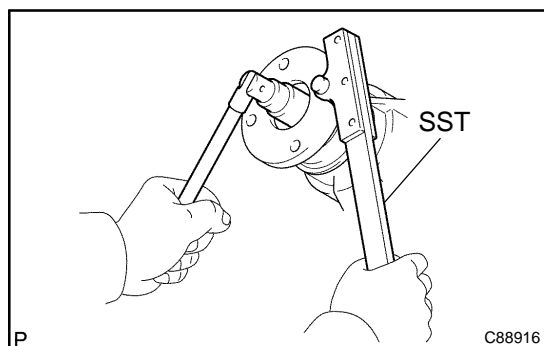
1. REMOVE PROPELLER SHAFT ASSY (See page 30-12)



2. REMOVE REAR DRIVE PINION NUT

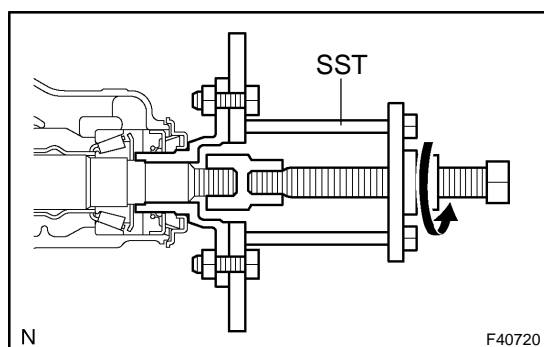
- (a) Using a chisel and a hammer, loosen the staked part of the nut.

SST 09930-00010



- (b) Using SST to hold the drive pinion companion flange, remove the nut.

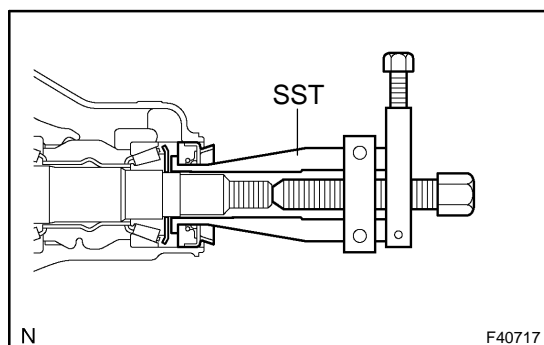
SST 09330-00021, (09330-00030)



3. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

- (a) Using SST, remove the drive pinion companion flange sub-assy.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)

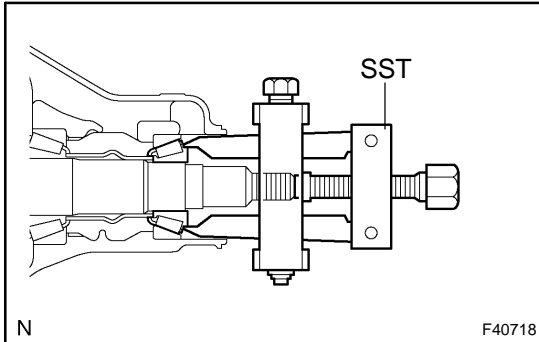


4. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL

- (a) Using SST, remove the differential carrier oil seal.

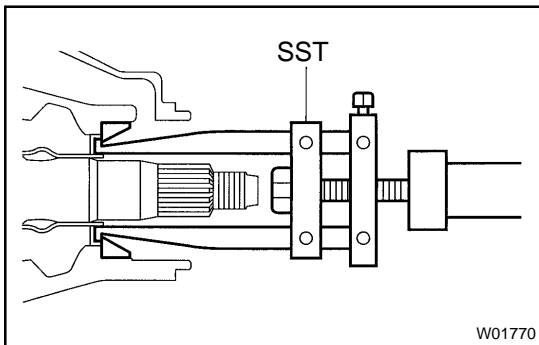
SST 09308-10010

5. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



6. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the tapered roller bearing (inner).
SST 09556-22010

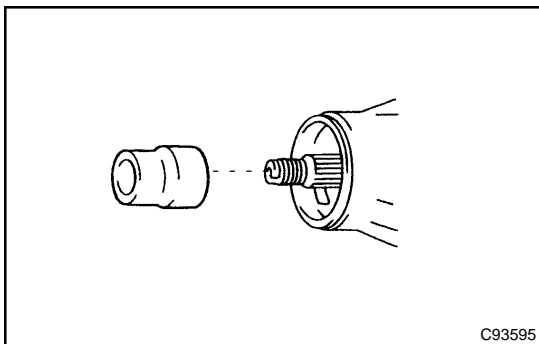


- (b) Using SST, remove tapered roller bearing (outer).
SST 09308-00010

7. REMOVE DIFFERENTIAL OIL STORAGE RING

- (a) Using a screwdriver and a hammer, remove the oil storage ring.

8. REMOVE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

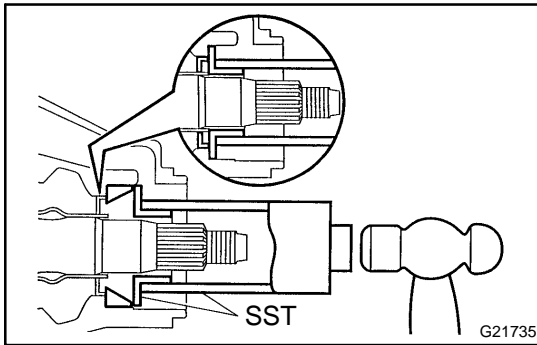


9. INSTALL REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

- (a) Install a new rear differential drive pinion bearing spacer.

10. INSTALL DIFFERENTIAL OIL STORAGE RING

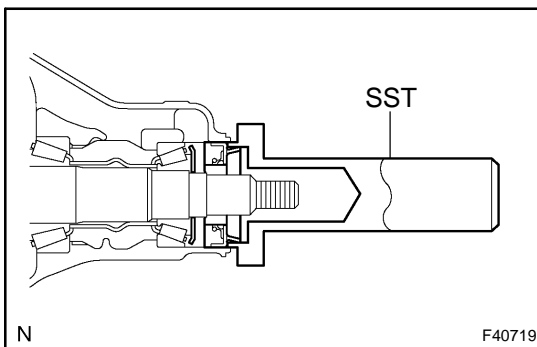
- (a) Using a brass bar and a hammer, install a new oil storage ring.



11. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

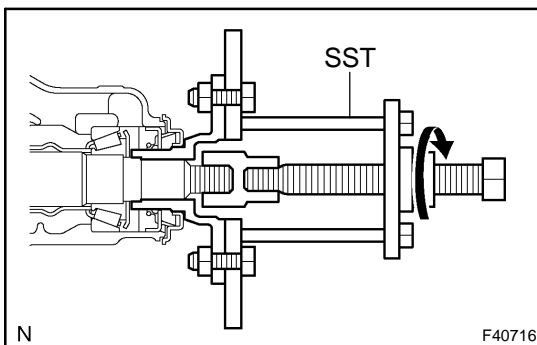
- (a) Using SST and a hammer, install a new tapered roller bearing (outer).
SST 09316-60011 (09316-00011, 09316-00021)
- (b) Install the tapered roller bearing (inner).

12. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



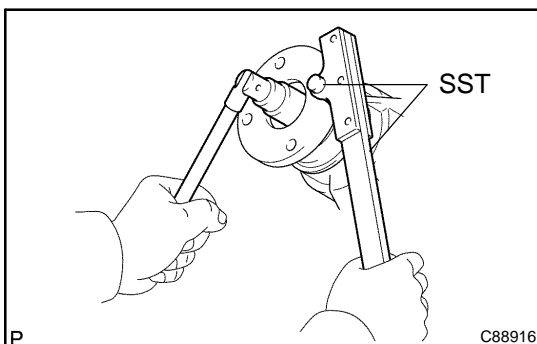
13. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL

- (a) Using SST and a hammer, install a new rear differential carrier oil seal.
SST 09554-30011
Oil seal drive in depth:
1.0 ± 0.45 mm (0.039 ± 0.018 in.)
- (b) Coat MP grease to the oil seal lip.

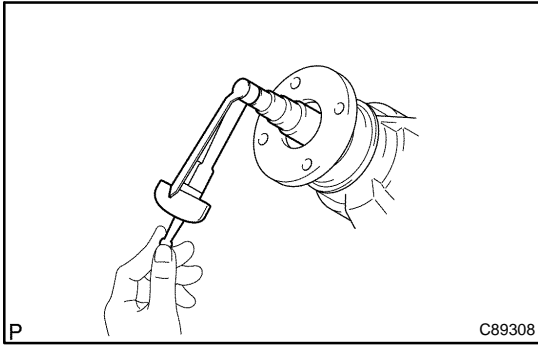


14. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

- (a) Using SST, install the rear drive pinion companion flange sub-assy.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)
- (b) Coat the threads of a new nut with hypoid gear oil LSD.



- (c) Using SST to hold the rear drive pinion companion flange, torque the nut.
SST 09330-00021 (09330-00030)
Torque:
370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

**15. INSPECT DIFFERENTIAL DRIVE PINION PRELOAD**

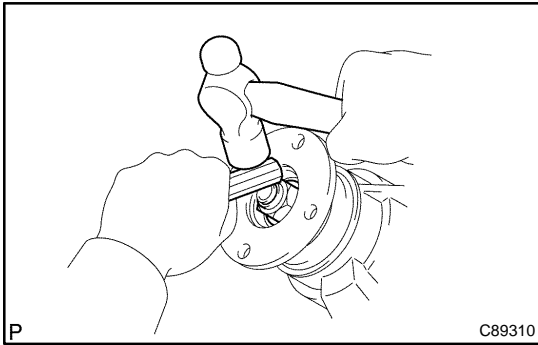
- (a) Using a torque wrench, measure the preload.

New bearing:

1.05 – 1.64 N·m (11 – 17 kgf·cm, 9.3 – 15 in·lbf)

Reused bearing:

0.56 – 0.85 N·m (6 – 9 kgf·cm, 4.9 – 7.5 in·lbf)

**16. INSTALL REAR DRIVE PINION NUT**

- (a) Using a chisel and hammer, stake the drive pinion companion flange nut.

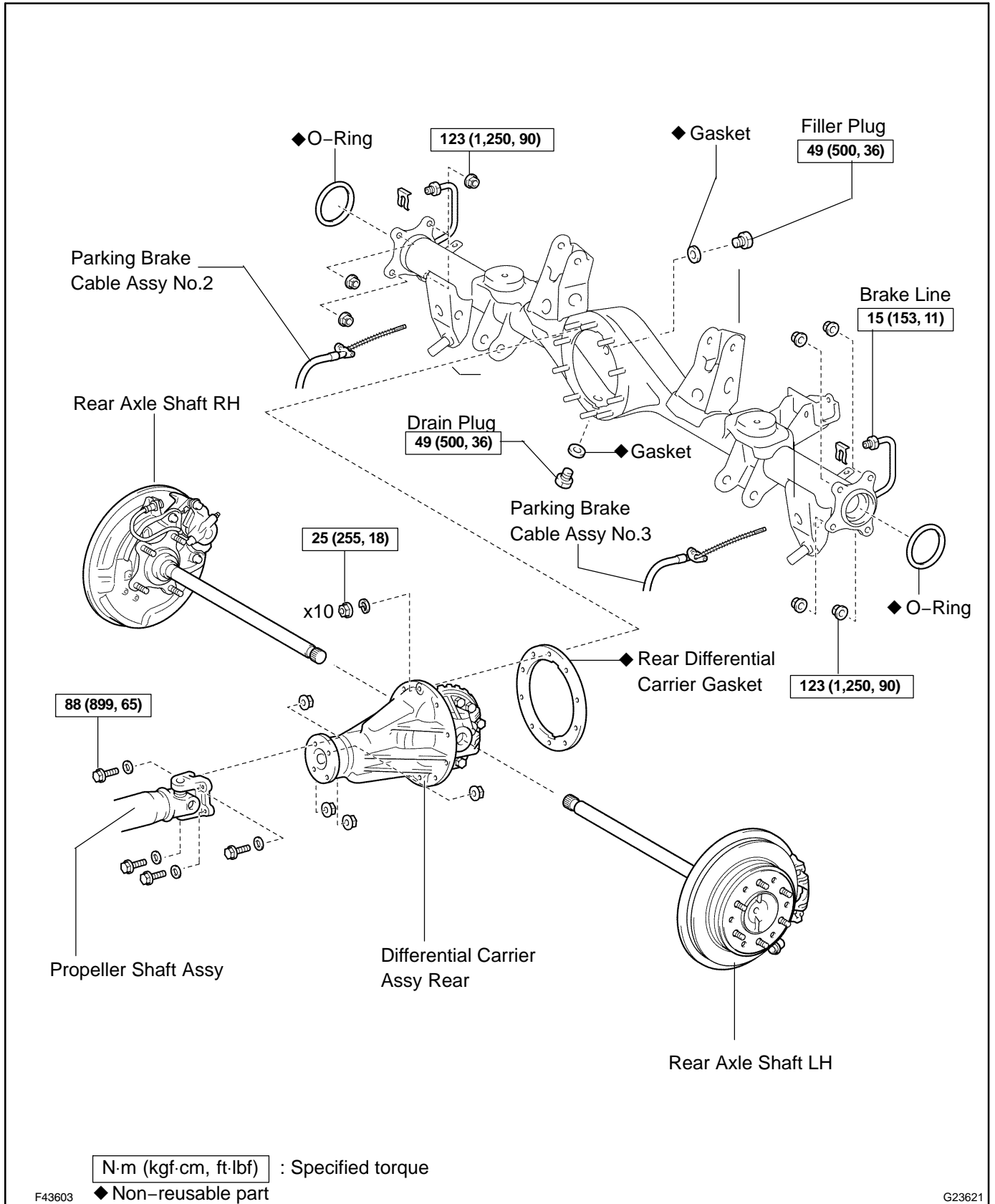
17. INSTALL PROPELLER SHAFT ASSY (See page 30-12)

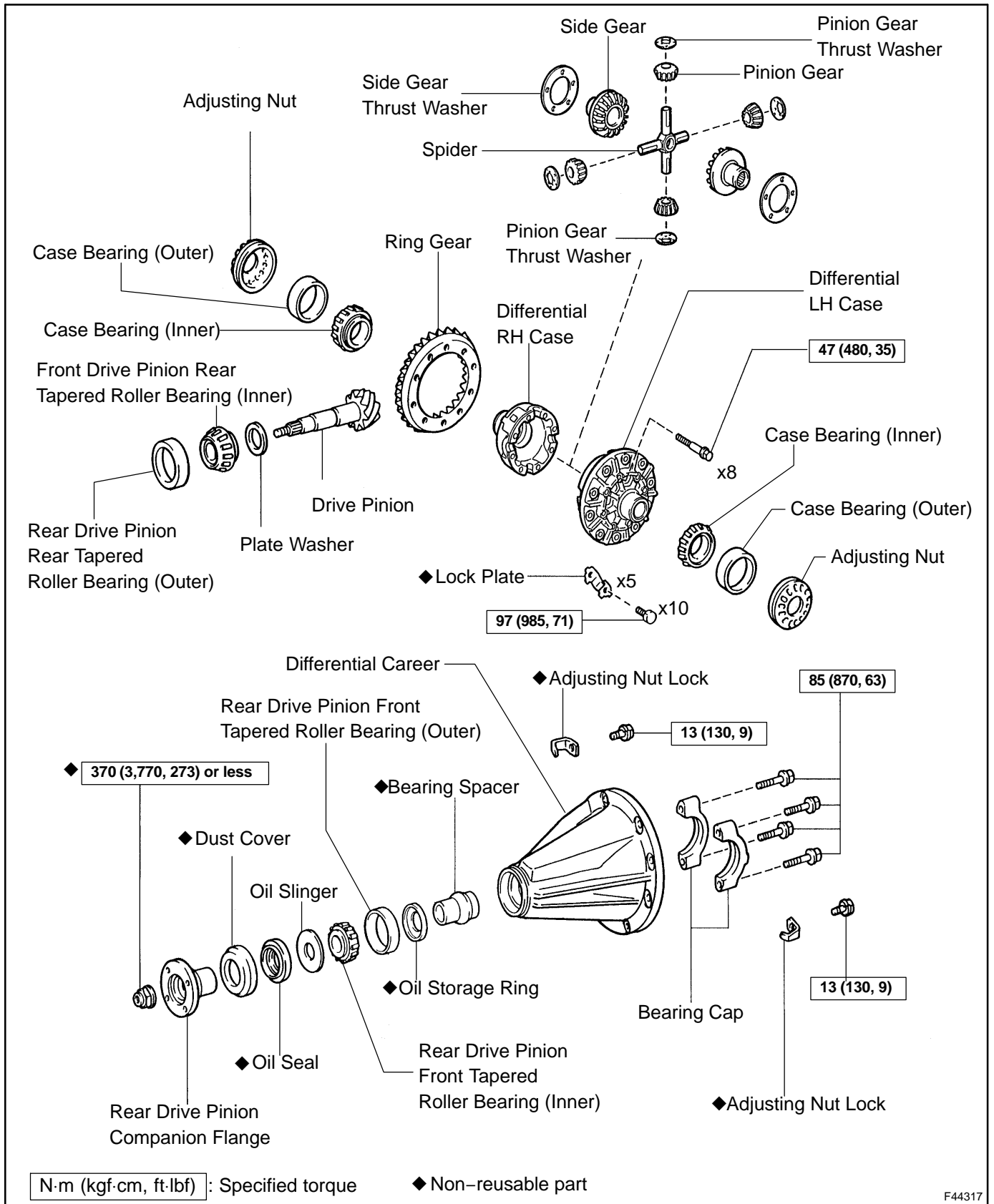
18. REFILL DIFFERENTIAL OIL (See page 29-3)

19. INSPECT AND ADJUST DIFFERENTIAL OIL (See page 29-3)

DIFFERENTIAL CARRIER ASSY REAR COMPONENTS

29076-01





OVERHAUL

HINT:

COMPONENTS: See page 29-35

1. REMOVE REAR WHEEL
2. REMOVE PROPELLER SHAFT ASSY (See page 30-12)
3. REMOVE REAR AXLE HOUSING FILLER PLUG
4. REMOVE REAR AXLE HOUSING DRAIN PLUG
5. REMOVE REAR DISC BRAKE CALIPER ASSY LH (See page 32-38)
SST 09023-00101
6. REMOVE REAR DISC BRAKE CALIPER ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.

SST 09023-00101

7. REMOVE REAR DISC (See page 32-44)
8. REMOVE REAR DISC

HINT:

Remove the RH side by the same procedures with the LH side.

9. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
10. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING

HINT:

Remove the RH side by the same procedures with the LH side.

11. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
12. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING

HINT:

Remove the RH side by the same procedures with the LH side.

13. REMOVE PARKING BRAKE SHOE STRUT LH (See page 33-12)
14. REMOVE PARKING BRAKE SHOE STRUT RH

HINT:

Remove the RH side by the same procedures with the LH side.

15. REMOVE PARKING BRAKE SHOE (See page 33-12)
16. REMOVE PARKING BRAKE SHOE

HINT:

Remove the RH side by the same procedures with the LH side.

17. SEPARATE SPEED SENSOR REAR LH (See page 32-50)
18. SEPARATE SPEED SENSOR REAR RH

HINT:

Remove the RH side by the same procedures with the LH side.

19. SEPARATE PARKING BRAKE CABLE ASSY NO.3 (See page 33-8)
20. SEPARATE PARKING BRAKE CABLE ASSY NO.2

HINT:

Remove the parking brake cable assy No.2 by the same procedures with the parking brake cable assy No.3.

21. REMOVE REAR AXLE SHAFT W/BACKING PLATE (See page 30-38)
22. REMOVE REAR AXLE SHAFT W/BACKING PLATE

HINT:

Remove the RH side by the same procedures with the LH side.

23. REMOVE REAR AXLE SHAFT LH OIL SEAL (See page 30-38)

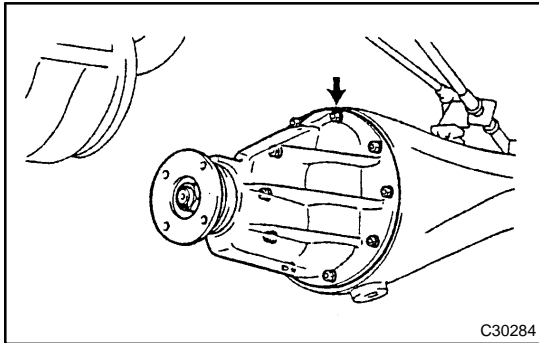
SST 09308-00010

24. REMOVE REAR AXLE SHAFT RH OIL SEAL (See page 30-38)

HINT:

Remove the RH side by the same procedures with the LH side.

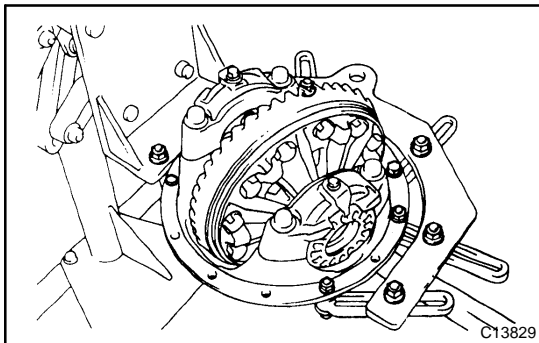
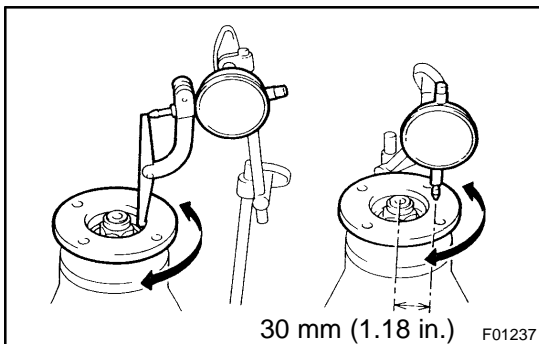
SST 09308-00010

**25. REMOVE DIFFERENTIAL CARRIER ASSY REAR**

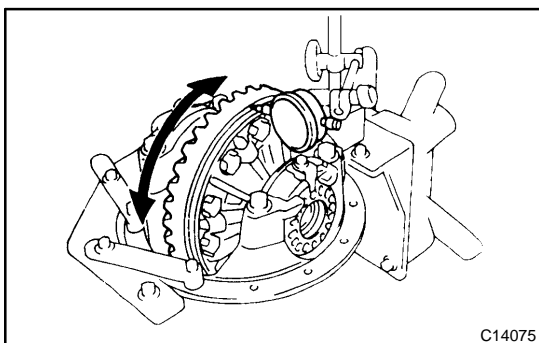
- (a) Remove the 10 nuts and differential carrier assy.

NOTICE:

Be careful not to damage the removal surface.

26. REMOVE REAR DIFFERENTIAL CARRIER GASKET**27. FIX DIFFERENTIAL CARRIER ASSY REAR****28. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR**

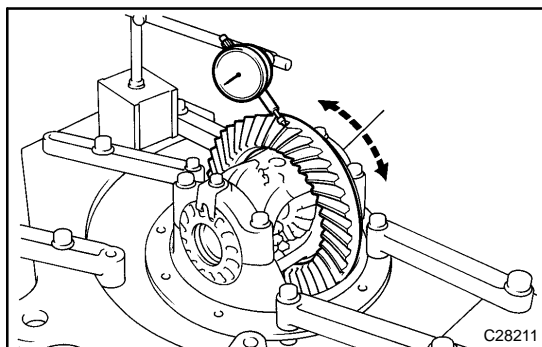
- (a) Using a dial indicator, measure the runout of the companion flange vertically and horizontally.

Maximum runout:**Vertical runout: 0.10 mm (0.0039 in.)****Lateral runout: 0.10 mm (0.0039 in.)****29. INSPECT RUNOUT OF DIFFERENTIAL RING GEAR**

- (a) Using a dial indicator, check the runout of the ring gear.

Maximum runout: 0.07 mm (0.0028 in.)

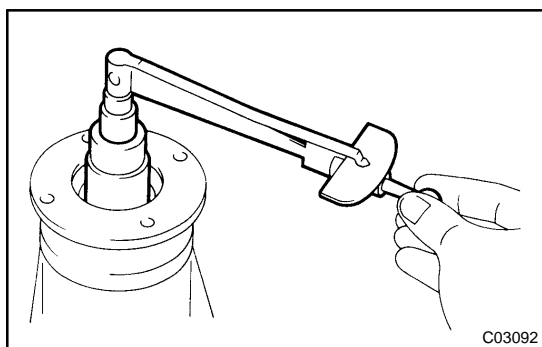
If the runout is greater than the maximum, replace the ring gear with new one.



30. INSPECT DIFFERENTIAL RING GEAR BACKLASH

- (a) Using a dial indicator, check the backlash of the ring gear.
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

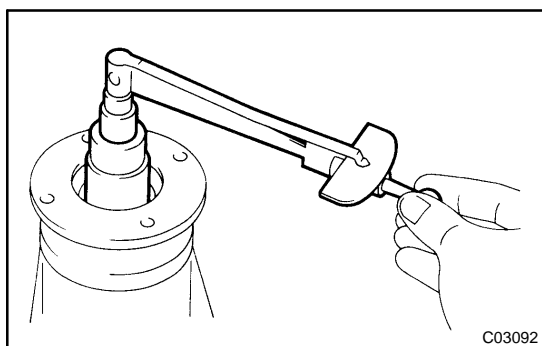
If the backlash is not within the specification, adjust the side bearing preload or repair as necessary.



31. INSPECT DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the preload of backlash between the drive pinion and ring gear.

Preload (at starting):
0.56 – 0.85 N·m (6 – 9 kgf·cm, 4.9 – 7.5 in.·lbf)

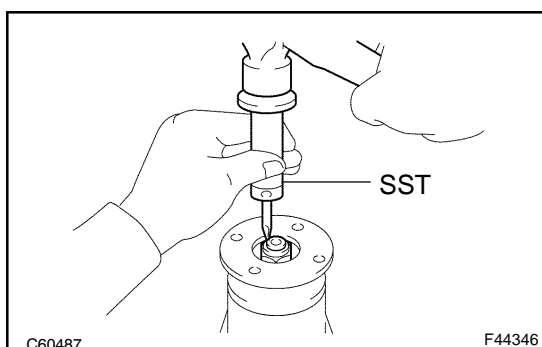


32. INSPECT TOTAL PRELOAD

- (a) Using a torque wrench, measure the preload with the teeth ring gear in contact.
 (b) Using a torque wrench, measure the total preload.

Total preload (at starting):
Drive pinion preload plus 0.39 – 0.59 N·m (4 – 6 kgf·cm, 3.4 – 5.2 in.·lbf)

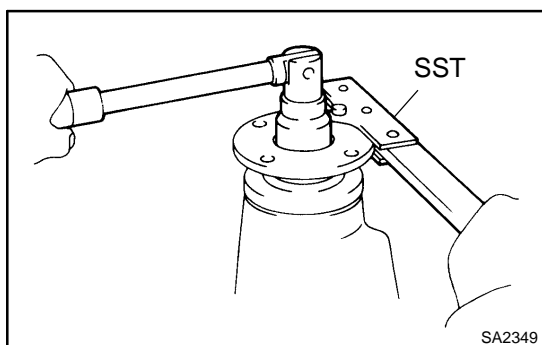
If necessary, disassemble and inspect the differential.



33. REMOVE REAR DRIVE PINION NUT

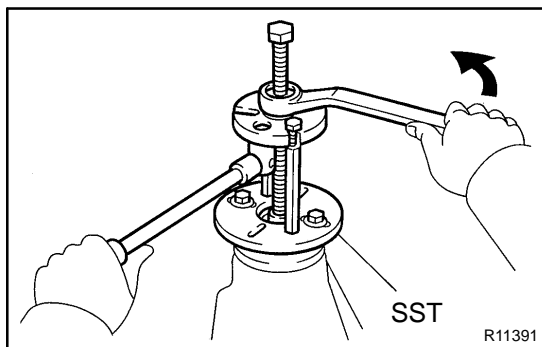
- (a) Using SST and a hammer, loosen the staked part of the nut.

SST 09930-00010



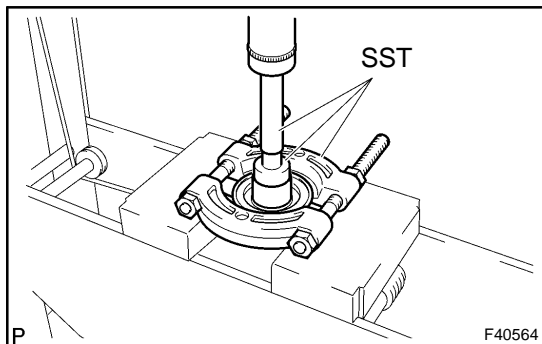
- (b) Using SST to hold the drive pinion companion flange, remove the nut.

SST 09330-00021



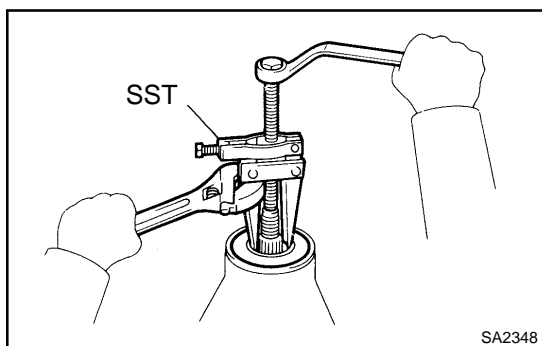
34. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

- (a) Using SST, remove the drive pinion companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)



35. REMOVE REAR DIFFERENTIAL DUST DEFLECTOR

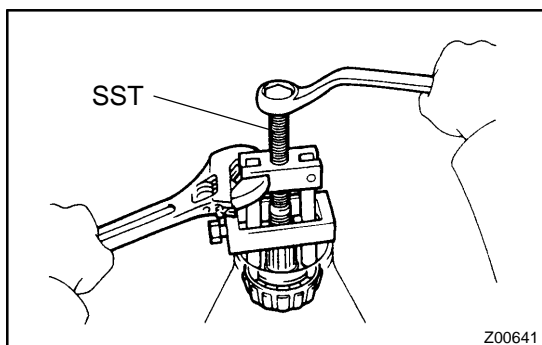
- (a) Using SST and a press, remove the dust deflector.
SST 09950-60010 (09951-00380), 09950-70010 (09951-07150), 09950-00020



36. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL

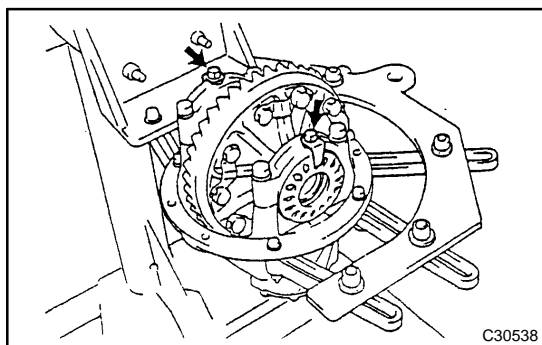
- (a) Using SST, remove the oil seal from the differential carrier.
SST 09308-10010

37. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



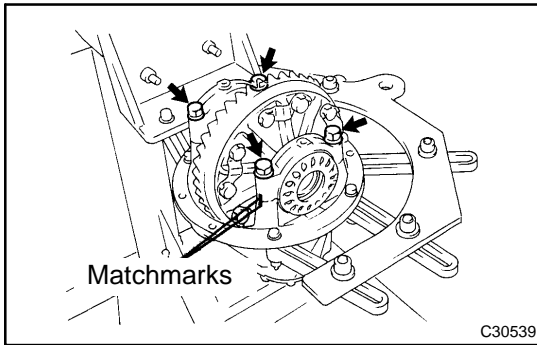
38. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the drive pinion tapered roller bearing (inner) from the drive pinion.
SST 09556-22010

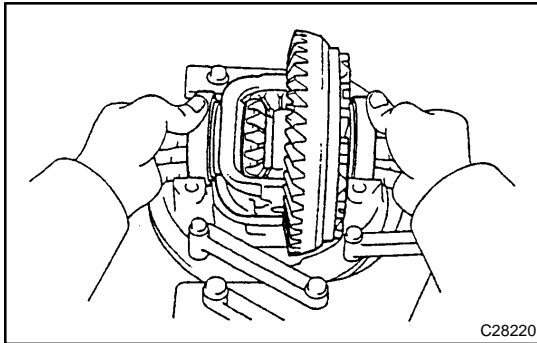


39. REMOVE REAR DIFFERENTIAL BEARING ADJUSTING NUT LOCK

- (a) Remove the 2 bolts and 2 rear differential bearing adjust locks.

**40. REMOVE DIFFERENTIAL CASE ASSY**

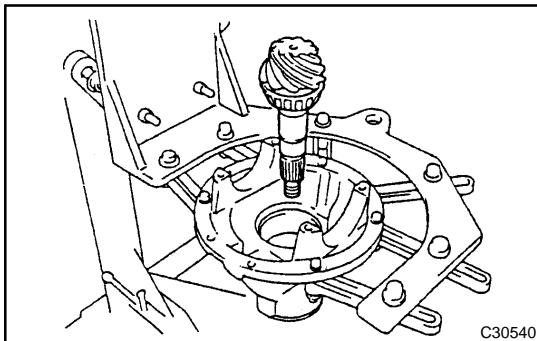
- (a) Place matchmarks on the bearing cap and differential carrier.
- (b) Remove the 4 bolts and 2 differential bearing caps.
- (c) Remove the 2 adjusting nuts.



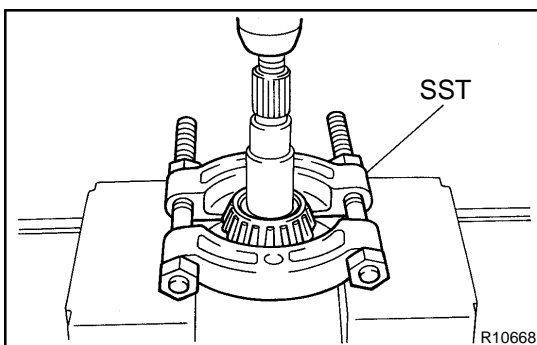
- (d) Remove the rear differential case sub-assy and 2 case bearings from the differential carrier.

HINT:

Tag the 2 case bearings outer races to show the location for reassembling.

**41. REMOVE DIFFERENTIAL DRIVE PINION**

- (a) Remove the differential drive pinion and bearing spacer from the differential carrier.

**42. REMOVE REAR DRIVE PINION REAR TAPERED ROLLER BEARING**

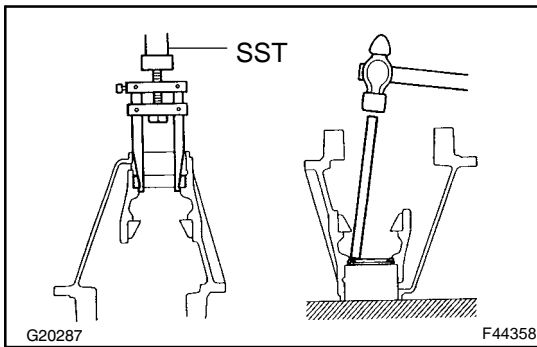
- (a) Using SST and a press, remove the drive pinion tapered roller bearing (inner) from the drive pinion.

SST 09950-00020

If the drive pinion or ring gear are damaged, replace them as a set.

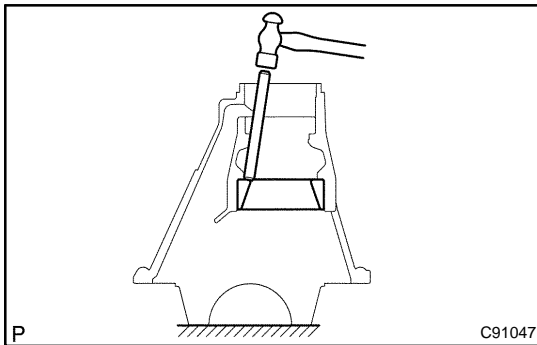
43. REMOVE REAR DIFFERENTIAL DRIVE PINION PLATE WASHER

- (a) Remove the drive pinion plate washer from the drive pinion.



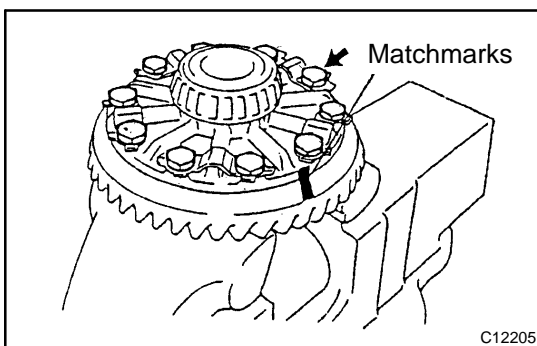
44. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the front tapered roller bearing (outer) from the carrier.
SST 09308-00010
- (b) Using a brass bar and a hammer, remove the oil storage ring from the carrier.



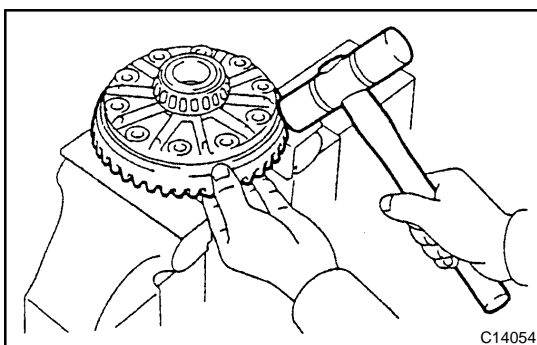
45. REMOVE REAR DRIVE PINION REAR TAPERED ROLLER BEARING

- (a) Using a brass bar and a hammer, remove the rear tapered roller bearing (outer) from the carrier.

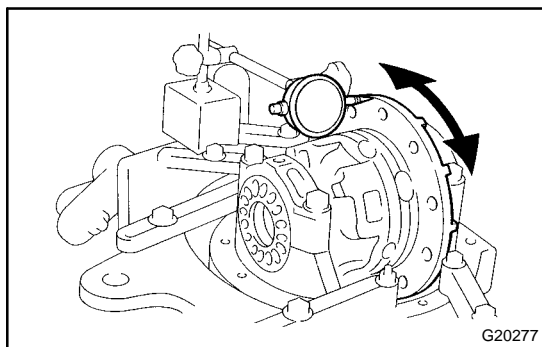


46. REMOVE DIFFERENTIAL RING GEAR

- (a) Place matchmarks on the ring gear and differential case.
- (b) Using a screwdriver and a hammer, unstake the lock plates.
- (c) Remove the 10 ring gear set bolts and 5 lock plates.



- (d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

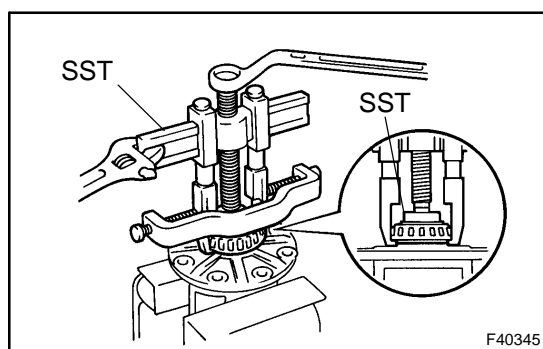
**47. INSPECT DIFFERENTIAL CASE ASSY RUNOUT****HINT:**

This step will be done only when runout exceeds the limit at the ring gear runout check.

- (a) Install the rear differential case bearing to the differential case.
- (b) Install the differential case to the differential carrier.
- (c) Install the 2 bearing caps and 4 bolts to the differential carrier.

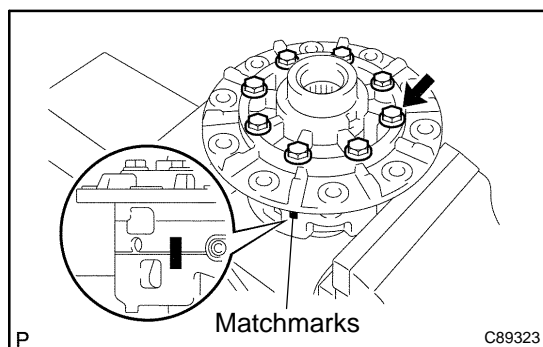
Torque: 85 N·m (867 ft·lbf, 63 ft·lbf)

- (d) Inspect the differential case runout.
Maximum runout: 0.07 mm (0.0028 in.)
- (e) Remove the differential case.
- (f) Remove the rear differential case bearing.

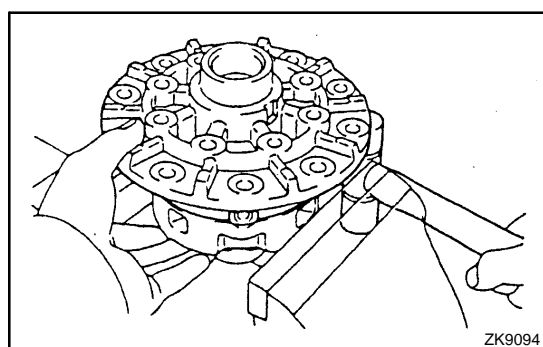
**48. REMOVE REAR DIFFERENTIAL CASE BEARING**

- (a) Using SST, remove the rear differential case 2 bearings from the differential case.

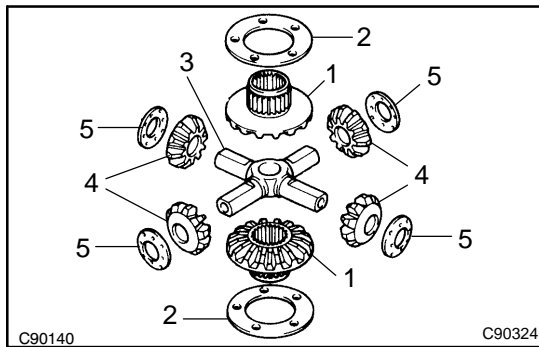
SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00360)

**49. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Place matchmarks on the LH and RH cases.
- (b) Remove the 8 bolts.



- (c) Using a plastic hammer, separate the LH and RH case.



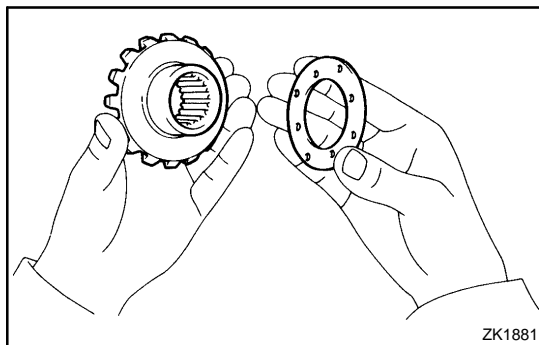
- (d) Remove the following parts from the differential case.
- (1) Side gear (2 pieces)
 - (2) Side gear thrust washer (2 pieces)
 - (3) Spider
 - (4) Pinion gear (4 pieces)
 - (5) Pinion gear thrust washer (4 pieces)

50. INSPECT DIFFERENTIAL PINION AND SIDE GEAR

- (a) Check that no damage is identified on the differential pinion and differential side gear. If the differential pinion and/or differential side gear is damaged, replace the differential.

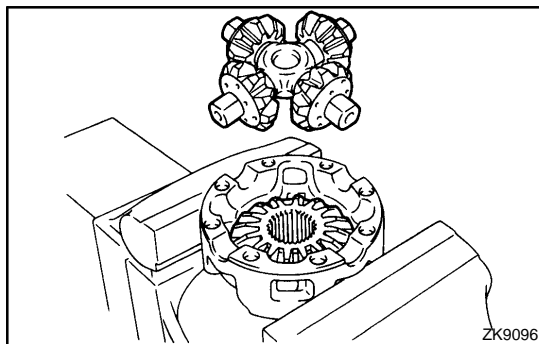
51. INSPECT DIFFERENTIAL CASE

- (a) Check that no damage is identified on the differential case. If the differential case is damaged, replace the differential case.

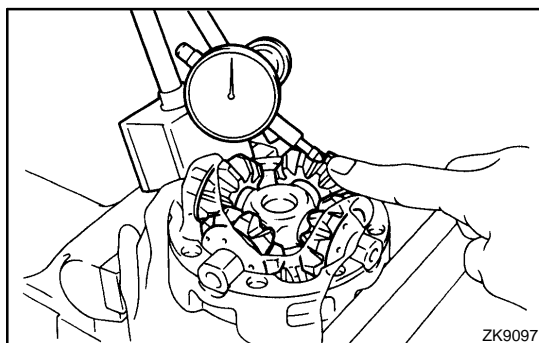


52. INSTALL DIFFERENTIAL CASE ASSY

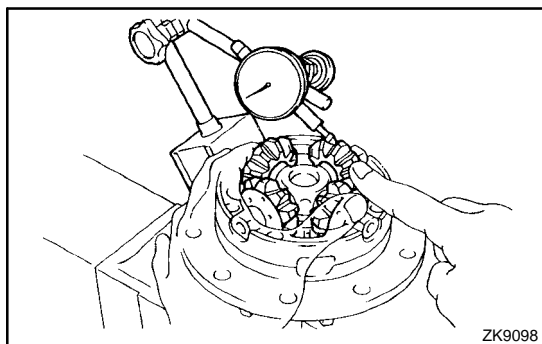
- (a) Install the rear differential side gear thrust washer to the rear differential side gear.
- (b) Install the rear differential pinion thrust washer and rear differential pinion to the rear differential spider.
- (c) Fix the differential case RH.



- (d) Install the rear differential side gear and rear differential spider to the differential case RH.



- (e) Using a dial indicator, measure the differential case RH side backlash while holding pinion toward the case.
Backlash: 0.05 – 0.20 mm (0.002 – 0.008 in.)
- (f) Remove the rear differential spider from the differential case RH.



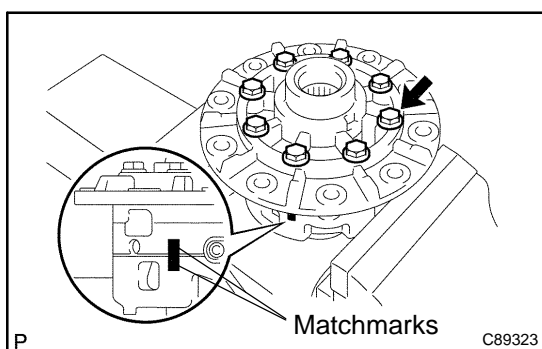
- (g) Install the rear differential side gear and rear differential spider to the differential case LH.
- (h) Using a dial indicator, measure the differential case LH side backlash while holding pinion toward the case.

Backlash: 0.05 – 0.20 mm (0.002 – 0.008 in.)

If the backlash is not within the specification, install the 2 side gear thrust washers with different thickness.

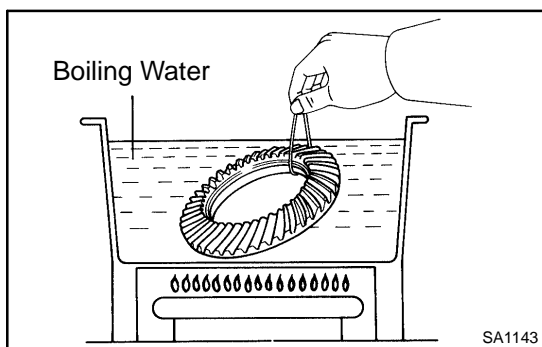
Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
0.9 (0.0354)	1.2 (0.0472)
1.0 (0.0394)	1.3 (0.0512)
1.1 (0.0433)	-



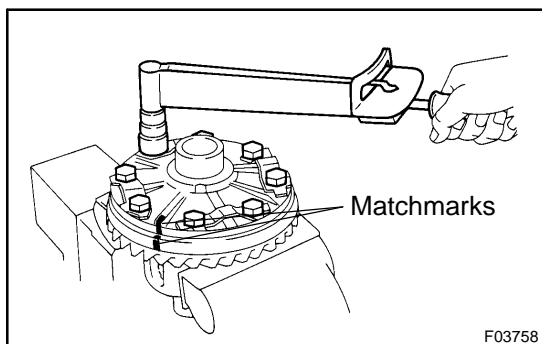
- (i) Align the matchmarks and assemble the RH and LH cases.
- (j) Using a plastic hammer, install the differential case.
- (k) Install the 8 bolts.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)



53. INSTALL DIFFERENTIAL RING GEAR

- (a) Clean the contact surfaces of the differential case and ring gear.
- (b) Heat the ring gear approx. 100°C (212°F) in the boiling water.
- (c) Carefully take the ring gear out of the boiling water.
- (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

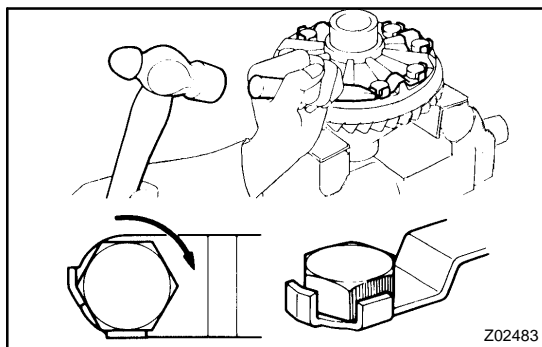


- (e) Align the matchmarks on the ring gear and differential case.
- (f) Temporarily install 5 new lock plates and 10 bolts.
- (g) After the ring gear cools down enough, torque the 8 bolts uniformly at a time.

Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)

HINT:

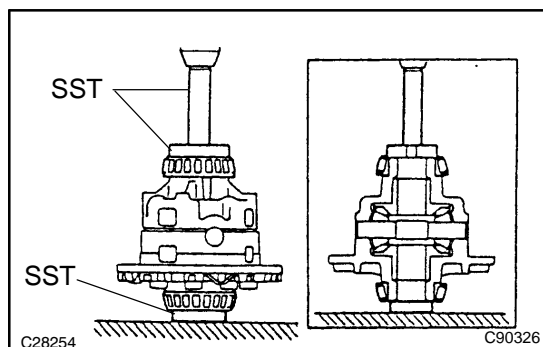
Tighten the bolts in diagonal order little by little over several times.



(h) Using a chisel and a hammer, stake the 5 lock plates.

HINT:

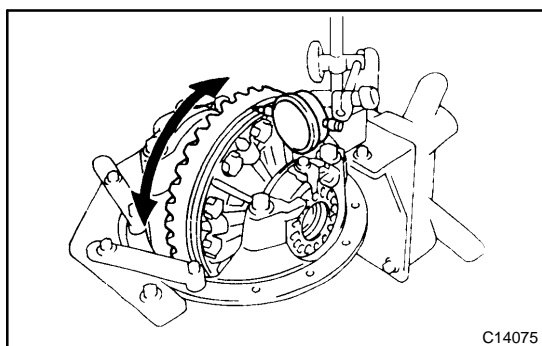
Stake one claw so that it is flush with the flat surface of the bolt. For the claw contacting the protruding portion of the bolt, stake only the half on the tightening side.



54. INSTALL REAR DIFFERENTIAL CASE BEARING

(a) Using SST and a press, install the bearing on the differential case.

SST 09950-60010 (09951-00430, 09951-00480, 09951-00470, 09951-00550), 09950-70010 (09951-07150)



55. INSPECT DIFFERENTIAL RING GEAR RUNOUT

(a) Install the differential case on the carrier, and install the 2 adjusting nut so that there is no play in the bearing.

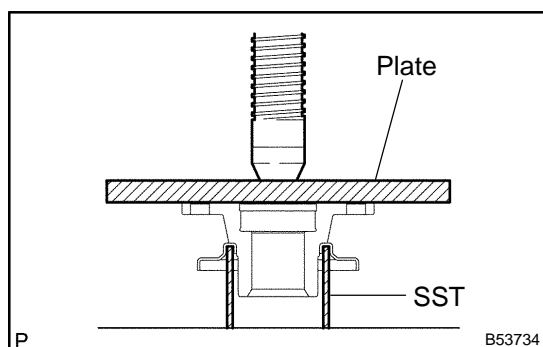
(b) Install the 2 bearing caps with the 4 bolts.

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)

(c) Using a dial indicator, measure the runout of the ring gear.

Maximum runout: 0.07 mm (0.0028 in.)

(d) Remove the 2 bearing caps, 2 adjusting nuts and differential case.



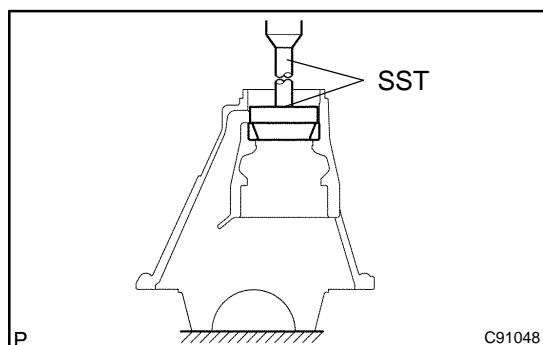
56. INSTALL REAR DIFFERENTIAL DUST DEFLECTOR

(a) Using a press, install the dust deflector.

NOTICE:

Be careful not to damage the dust deflector.

SST 09636-20010

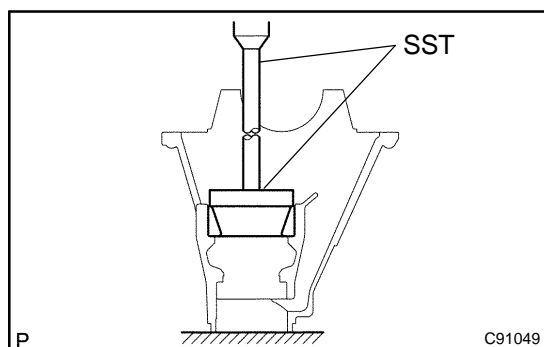


57. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

(a) Using a brass bar and a hammer, install the oil storage ring.

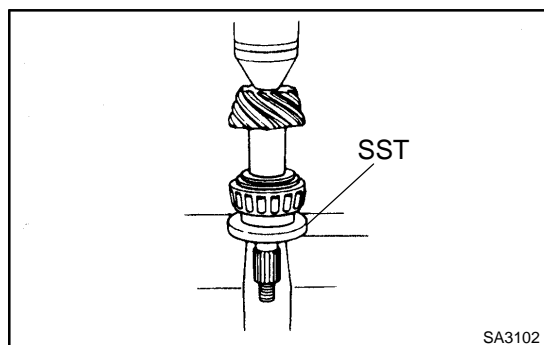
(b) Using SST and a press, install the tapered roller bearing (outer) to the carrier.

SST 09316-60011 (09316-00011, 09316-00021)



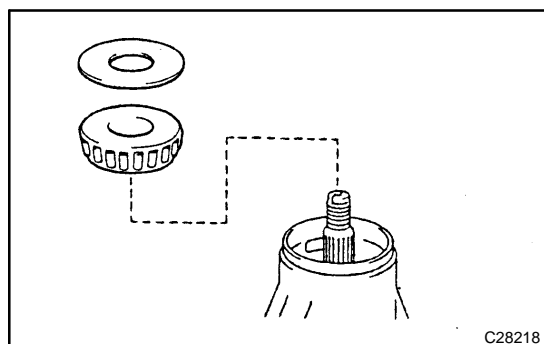
58. INSTALL REAR DRIVE PINION REAR TAPERED ROLLER BEARING

- (a) Using SST and a press, install the tapered roller bearing (outer) to the carrier.
SST 09316-60011 (09316-00041, 09316-00011)



59. INSTALL REAR DRIVE PINION REAR TAPERED ROLLER BEARING

- (a) Install the plate washer on the drive pinion.
(b) Using SST and a press, install the tapered roller bearing (inner) onto the drive pinion.
SST 09506-30012

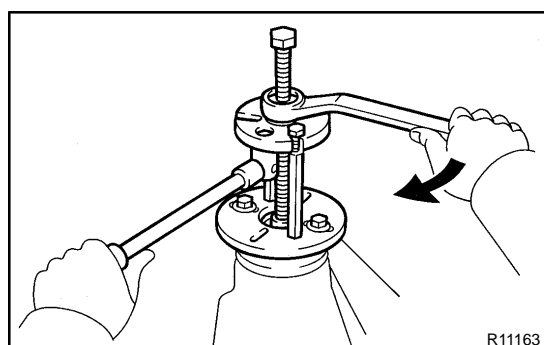


60. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

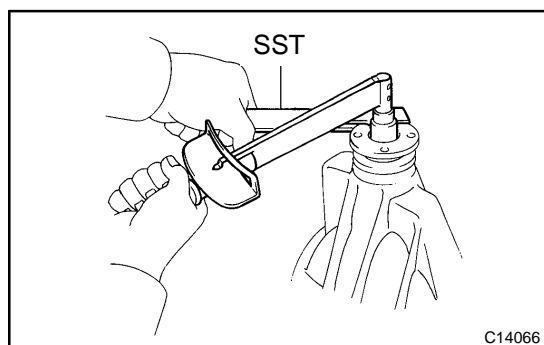
- (a) Install the drive pinion, rear drive pinion tapered roller bearing and rear differential drive oil slinger.

HINT:

Assemble the spacer and oil seal after adjusting the gear contact pattern.



- (b) Using SST, install the drive pinion companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030), 09330-00021 (09330-00030)
(c) Coat the threads of the nut with hypoid gear oil LSD.

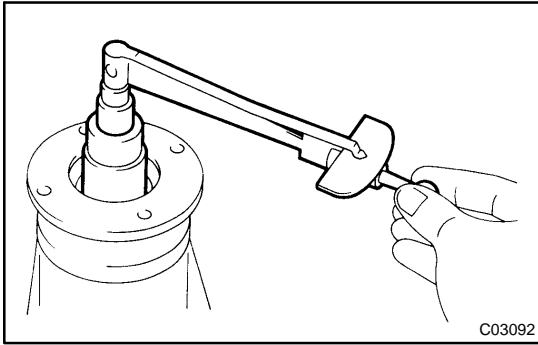


- (d) Using SST to hold the drive pinion companion flange, torque the nut.

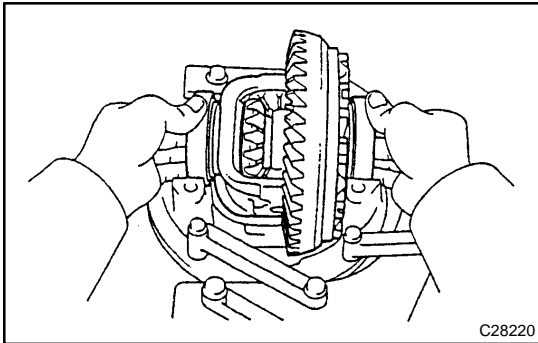
Torque: 370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

NOTICE:

- As there is no spacer, torque a little at a time, being careful not to overtighten it.
- Apply hypoid gear oil LSD to the nut.



- (e) Using a torque wrench, measure the preload.
- Preload (at starting):**
- New bearing:**
1.05 – 1.64 N·m (10.7 – 16.7 kgf·cm, 9.3 – 14.5 in.-lbf)
- Reused bearing:**
0.56 – 0.85 N·m (5.7 – 8.7 kgf·cm, 5.0 – 7.5 in.-lbf)

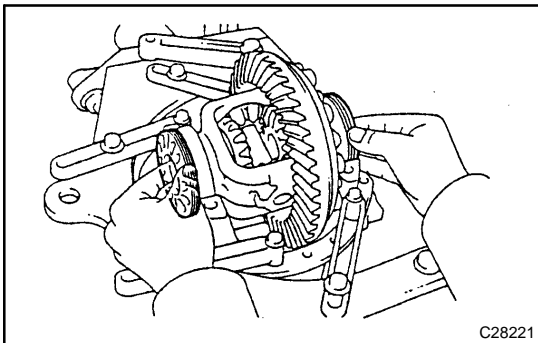


61. INSTALL DIFFERENTIAL CASE ASSY

- (a) Place the 2 bearing outer races on their respective bearings.

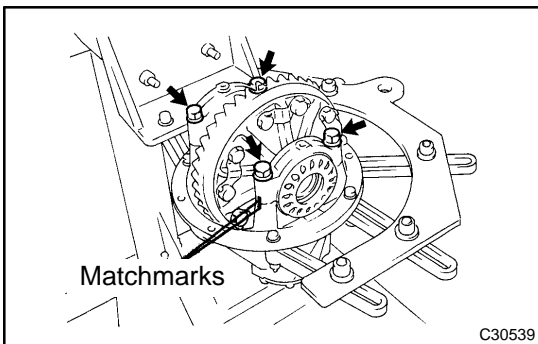
HINT:

Make sure the right and left races are not interchanged.



62. INSTALL REAR DIFFERENTIAL BEARING ADJUSTING NUT

- (a) Install the 2 adjusting nuts on the carrier, making sure the nuts are threaded properly.



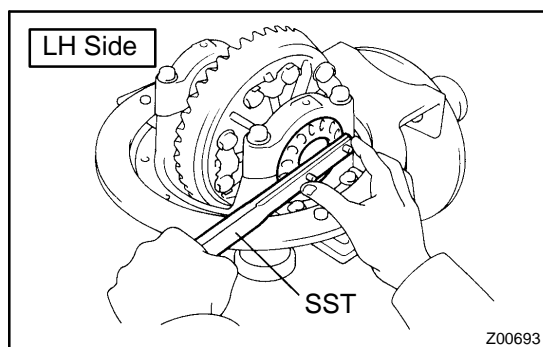
63. INSPECT AND ADJUST ADJUST BACKLASH DIFFERENTIAL RING GEAR AND DIFFERENTIAL DRIVE PINION

- (a) Align the matchmarks on the cap and carrier.
- (b) Install the right and left bearing caps with the 4 bolts.

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)

If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly.

Reinstall the adjusting nuts if necessary.

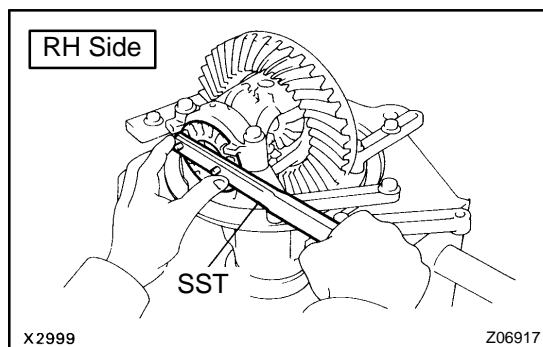


- (c) Torque the 4 bearing cap bolts to the specified torque, then loosen them to the point where the adjusting nuts can be turned by SST. (4 pinion, w/LSD)

SST 09504-00011

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)

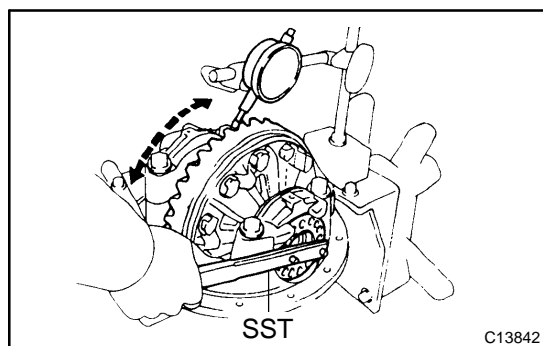
- (d) Using the SST, torque the adjusting nut on the ring gear side until the ring has a backlash of about 0.2 mm (0.008 in.).



- (e) While turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side.

After the bearings are settled, loosen the adjusting nut on the drive pinion side.

- (f) Using SST, torque the adjusting nut 1 – 1.5 notches from the 0 preload position.

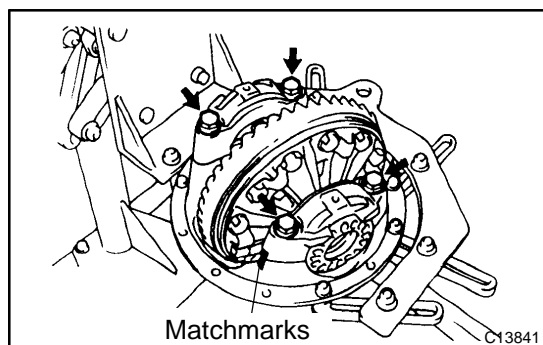


- (g) Using a dial indicator, adjust the ring gear backlash until it is within the specification.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

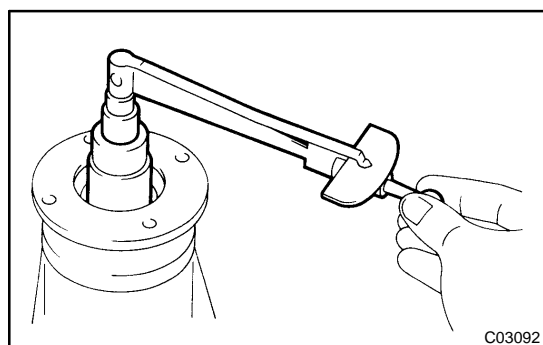
HINT:

The backlash is adjusted by turning the left and right adjusting nuts for an equal amounts. For example, loosen the nut on the right side one notch.



- (h) Torque the bearing cap bolts.

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)



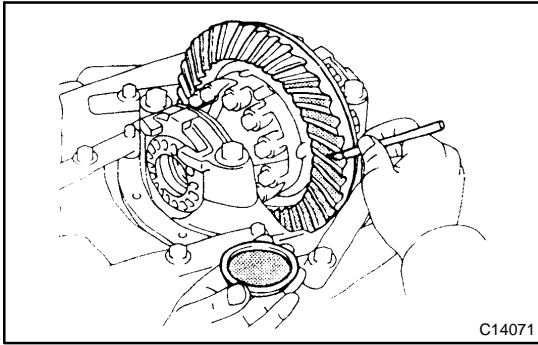
64. INSPECT TOTAL PRELOAD

- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):

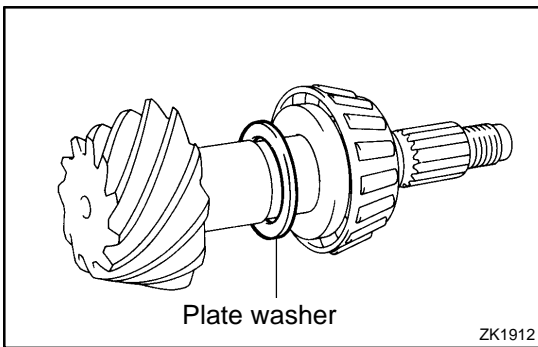
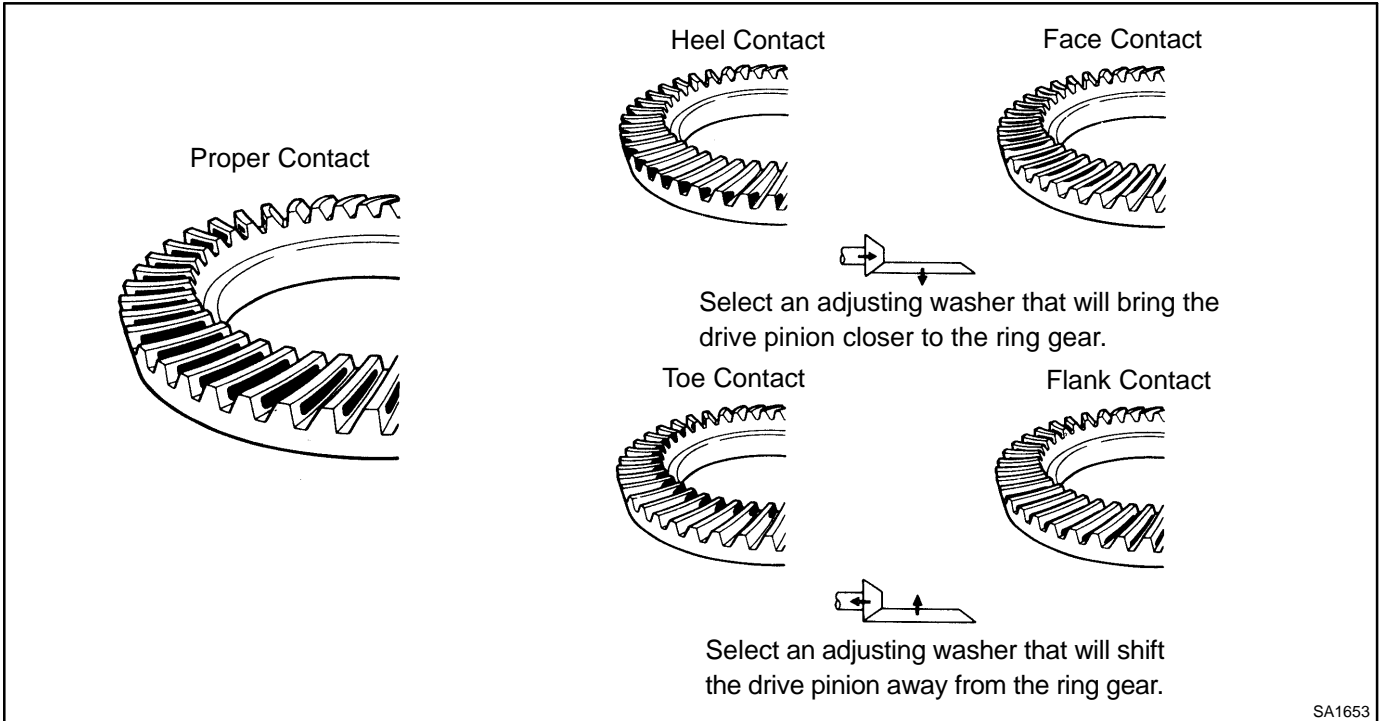
Drive pinion preload plus

0.39 – 0.59 N·m (4 – 7 kgf·cm, 3.5 – 5.8 in·lbf)



65. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.
- (b) Hold the companion flange firmly and rotate the ring gear in both directions.
- (c) Inspect the tooth contact pattern.



If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Plate Washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0823)
1.79 (0.0705)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0846)
1.85 (0.0728)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0917)

66. REMOVE REAR DRIVE PINION NUT

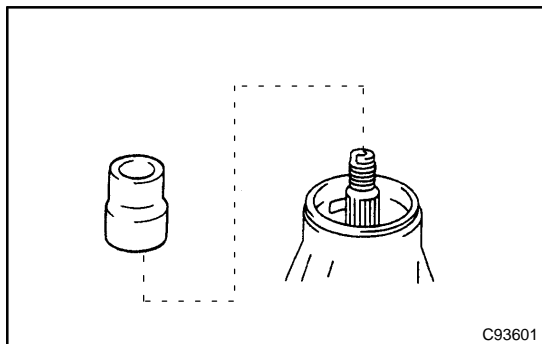
SST 09330-00021 (09330-00030)

67. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)

68. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER**69. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING**

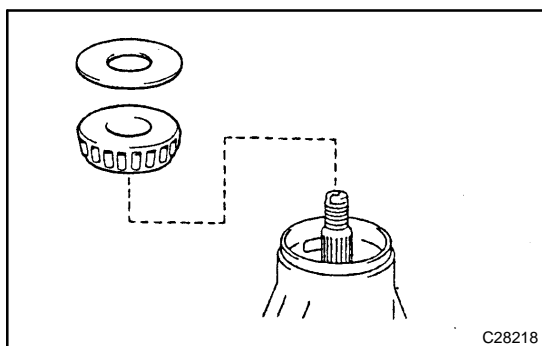
SST 09556-22010



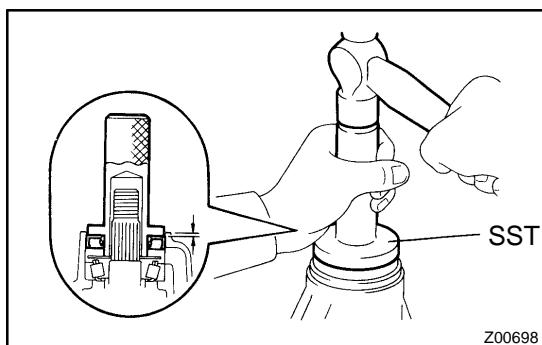
C93601

70. INSTALL REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

- (a) Instal a new bearing spacer to the drive pinion.



C28218

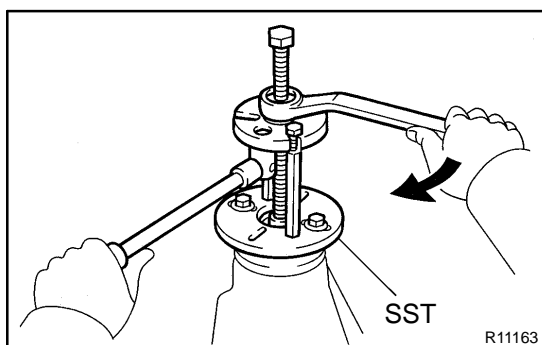
71. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING**72. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER**

Z00698

73. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL

- (a) Coat MP grease to the oil seal lip.
 (b) Using SST and a hammer, install a new carrier oil seal.

SST 09554-30011

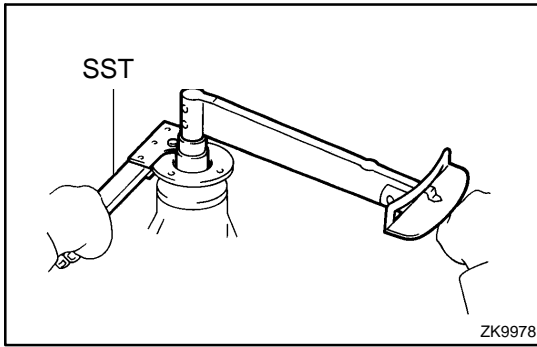
Oil seal drive in depth:**1.0 ± 0.45 mm (0.039 ± 0.018 in.)**

R11163

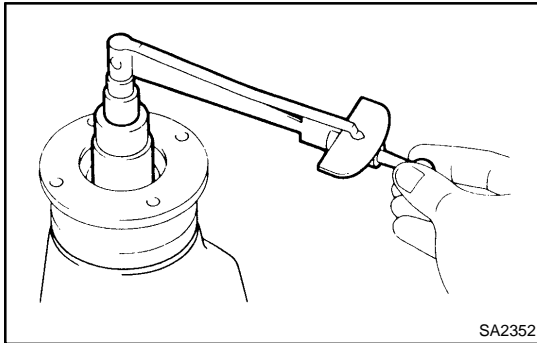
74. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

- (a) Using SST, install the drive pinion companion flange on the drive pinion.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030),



- (b) Coat the threads of a new nut with hypoid gear oil LSD.
 (c) Using SST to hold the flange, torque the nut.
 SST 09330-00021 (09330-00030)
Torque: 370 N·m (3,770 kgf·cm, 273 ft·lbf) or less



75. INSPECT DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

Preload (at starting):

New bearing:

1.05 - 1.64 N·m (11 - 17 kgf·cm, 9.3 - 14.5 in·lbf)

Reused bearing:

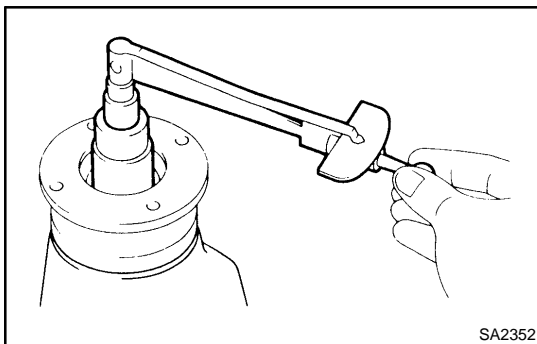
0.56 - 0.85 N·m (6 - 9 kgf·cm, 5.0 - 7.5 in·lbf)

If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retorque the nut with 13 N·m (130 kgf·cm, 9 ft·lbf) of torque at a time until the specified preload is reached.

Torque: 370 N·m (3,770 kgf·cm, 273 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload adjusting procedure. Do not loosen the pinion nut to reduce the preload.



76. INSPECT TOTAL PRELOAD

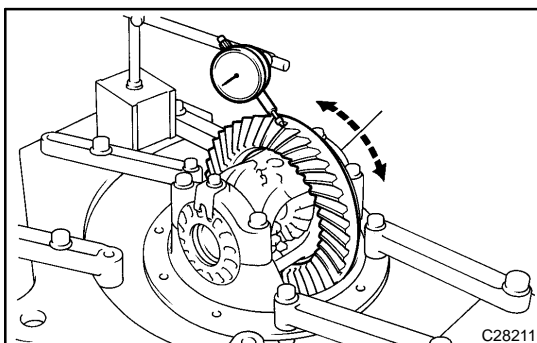
- (a) Using a torque wrench, measure the preload.

Total preload (at starting):

Drive pinion preload plus

0.39 - 0.59 N·m (4 - 6 kgf·cm, 4.0 - 5.2 in·lbf)

If the necessary, disassemble and inspect the differential.

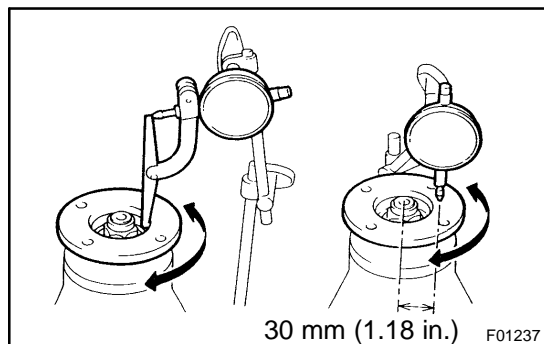


77. INSPECT DIFFERENTIAL RING GEAR BACKLASH

- (a) Using a dial indicator, check the backlash of the ring gear.

Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

If the backlash is not within the specification, adjust the side bearing preload or repair as necessary.



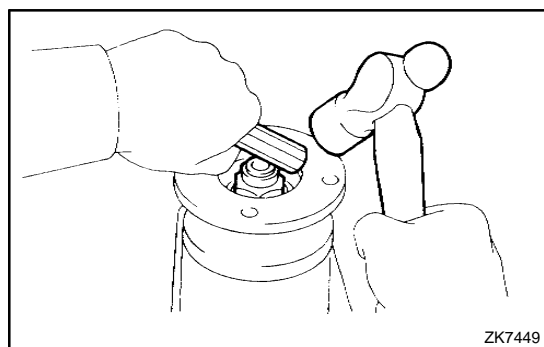
78. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSY REAR

- (a) Using a dial indicator, measure the runout of the drive pinion companion flange vertically and horizontally.

Maximum runout:

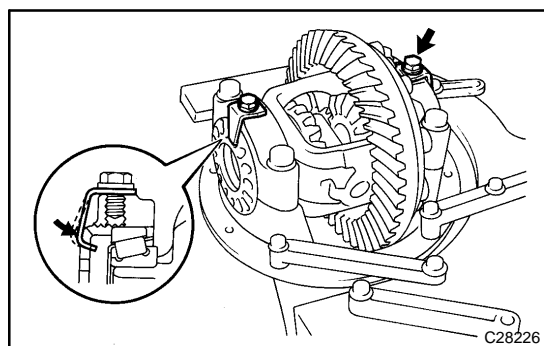
Vertical runout: 0.10 mm (0.0039 in.)

Lateral runout: 0.10 mm (0.0039 in.)



79. INSTALL REAR DRIVE PINION NUT

- (a) Using a chisel and hammer, stake the drive pinion nut.

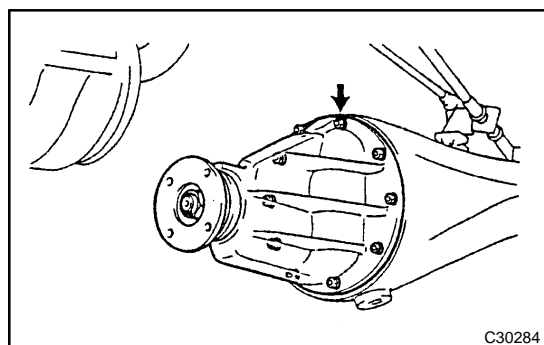


80. INSTALL REAR DIFFERENTIAL BEARING ADJUSTING NUT LOCK

- (a) Install 2 new adjust lock on the bearing caps.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- (b) After tightening belts, bend the nut locks.



81. INSTALL DIFFERENTIAL CARRIER ASSY REAR

- (a) Clean the contact surfaces of the rear differential carrier assy and rear axle housing assy.

- (b) Install the rear differential carrier assy and gasket with the 10 nuts and washers.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

82. INSTALL REAR AXLE SHAFT LH OIL SEAL (See page 30-38)

83. INSTALL REAR AXLE SHAFT RH OIL SEAL

HINT:

Install the RH side by the same procedures with the LH side.

84. INSTALL REAR AXLE SHAFT W/BACKING PLATE (See page 30-38)

85. INSTALL REAR AXLE SHAFT W/BACKING PLATE

HINT:

Install the RH side by the same procedures with the LH side.

86. INSTALL PARKING BRAKE CABLE ASSY NO.3 (See page 33-8)**87. INSTALL PARKING BRAKE CABLE ASSY NO.2**

HINT:

Install the parking brake cable assy No.2 by the same procedures with the parking brake cable assy No.3.

88. INSTALL SPEED SENSOR REAR LH (See page 32-50)**89. INSTALL SPEED SENSOR REAR RH**

HINT:

Install the RH side by the same procedures with the LH side.

90. INSTALL PARKING BRAKE SHOE (See page 33-12)**91. INSTALL PARKING BRAKE SHOE**

HINT:

Install the RH side by the same procedures with the LH side.

92. INSTALL PARKING BRAKE SHOE STRUT LH (See page 33-12)**93. INSTALL PARKING BRAKE SHOE STRUT RH**

HINT:

Install the RH side by the same procedures with the LH side.

94. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)**95. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING**

HINT:

Install the RH side by the same procedures with the LH side.

96. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)**97. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING**

HINT:

Install the RH side by the same procedures with the LH side.

98. CHECK PARKING BRAKE INSTALLATION (See page 33-12)**99. INSTALL REAR DISC (See page 32-44)****100. INSTALL REAR DISC**

HINT:

Install the RH side by the same procedures with the LH side.

101. INSTALL REAR DISC BRAKE CALIPER ASSY LH (See page 32-38)

SST 09023-00101

102. INSTALL REAR DISC BRAKE CALIPER ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

SST 09023-00101

103. BLEED BRAKE LINE (See page 32-4)**104. CHECK FLUID LEVEL IN RESERVOIR (See page 32-4)****105. CHECK BRAKE FLUID LEAKAGE (See page 32-4)****106. REFILL DIFFERENTIAL OIL(See page 29-3)****107. INSPECT AND ADJUST DIFFERENTIAL OIL (See page 29-3)****108. INSTALL PROPELLER SHAFT ASSY (See page 30-12)****109. INSTALL REAR WHEEL**

Torque:112 N·m (1,140 kgf·cm, 83 ft·lbf)

110. INSPECT PARKING BRAKE PEDAL TRAVEL (See page 33-2)**111. ADJUST PARKING BRAKE PEDAL TRAVEL (See page 33-2)****112. CHECK ABS SPEED SENSOR SIGNAL (See page 05-738)**

DRIVE SHAFT, PROPELLER SHAFT, AXLE

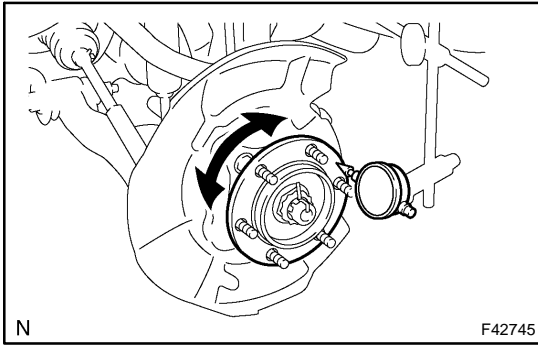
300H3-03

PROBLEM SYMPTOMS TABLE

Use the table below to help find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Wander/pulls	4. Tires (Worn or improperly inflated) 5. Wheel alignment (Incorrect) 6. Steering linkage (Loosen or worn) 7. Hub bearings (Loosen or worn) 8. Steering gear (Out of adjustment or broken) 9. Suspension parts (Worn out)	28-1 26-7 - 30-2 - -
Front wheel shimmy	1. Tires (Worn or improperly inflated) 2. Wheels (Out of balance) 3. Shock absorber (Worn out) 4. Wheel alignment (Incorrect) 5. Ball joints (Worn) 6. Hub bearings (Loosen or worn) 7. Steering linkage (Loosen or worn) 8. Steering gear (Out of adjustment or broken)	28-1 28-1 26-11 26-7 26-18 26-21 30-2 - -
Rear wheel shimmy	1. Tires (Worn or improperly inflated) 2. Wheels (Out of balance) 3. Shock absorber (Worn out) 4. Hub bearings (Loosen or worn)	28-1 28-1 27-3 27-7 30-2
Noise	1. Spider bearing (Worn or stuck)	30-4 30-12
Vibration	1. Propeller shaft (Runout) 2. Propeller shaft (Imbalance)	30-4 30-12 -

ON-VEHICLE INSPECTION

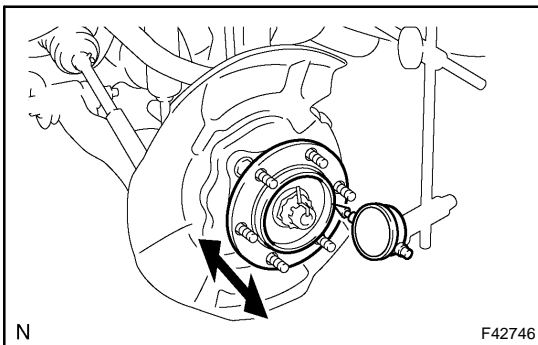


1. INSPECT FRONT AXLE HUB BEARING

- (a) Remove the front wheel.
- (b) Remove the front disc brake caliper (See page 32-38).
- (c) Remove the front disc.
- (d) Inspect the axle hub backlash.
 - (1) Using a dial indicator, check the backlash near the center of the axle hub.

Maximum: 0.05 mm (0.0020 in.)

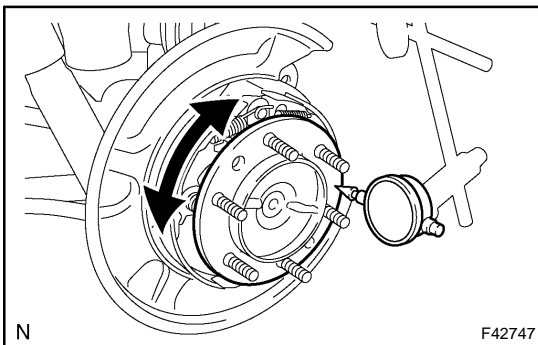
If the backlash exceeds the maximum, replace the bearing.



- (e) Inspect the axle hub deviation.
 - (1) Using a dial indicator, check the deviation at the surface of the axle hub.

Maximum: 0.05 mm (0.0020 in.)

If the deviation exceeds the maximum, replace the bearing.

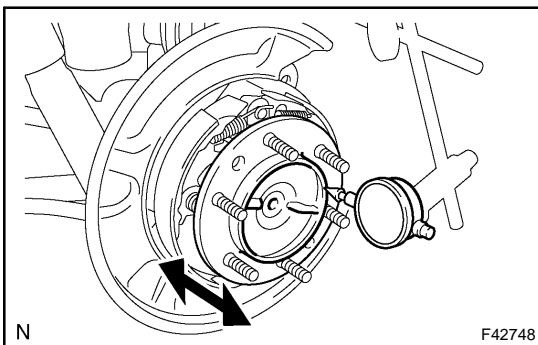


2. INSPECT REAR AXLE SHAFT BEARING

- (a) Remove the rear wheel.
- (b) Remove the rear disc brake caliper (See page 32-44).
- (c) Remove the rear disc.
- (d) Inspect the axle shaft backlash.
 - (1) Using a dial indicator, check the backlash near the center of the axle shaft.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.



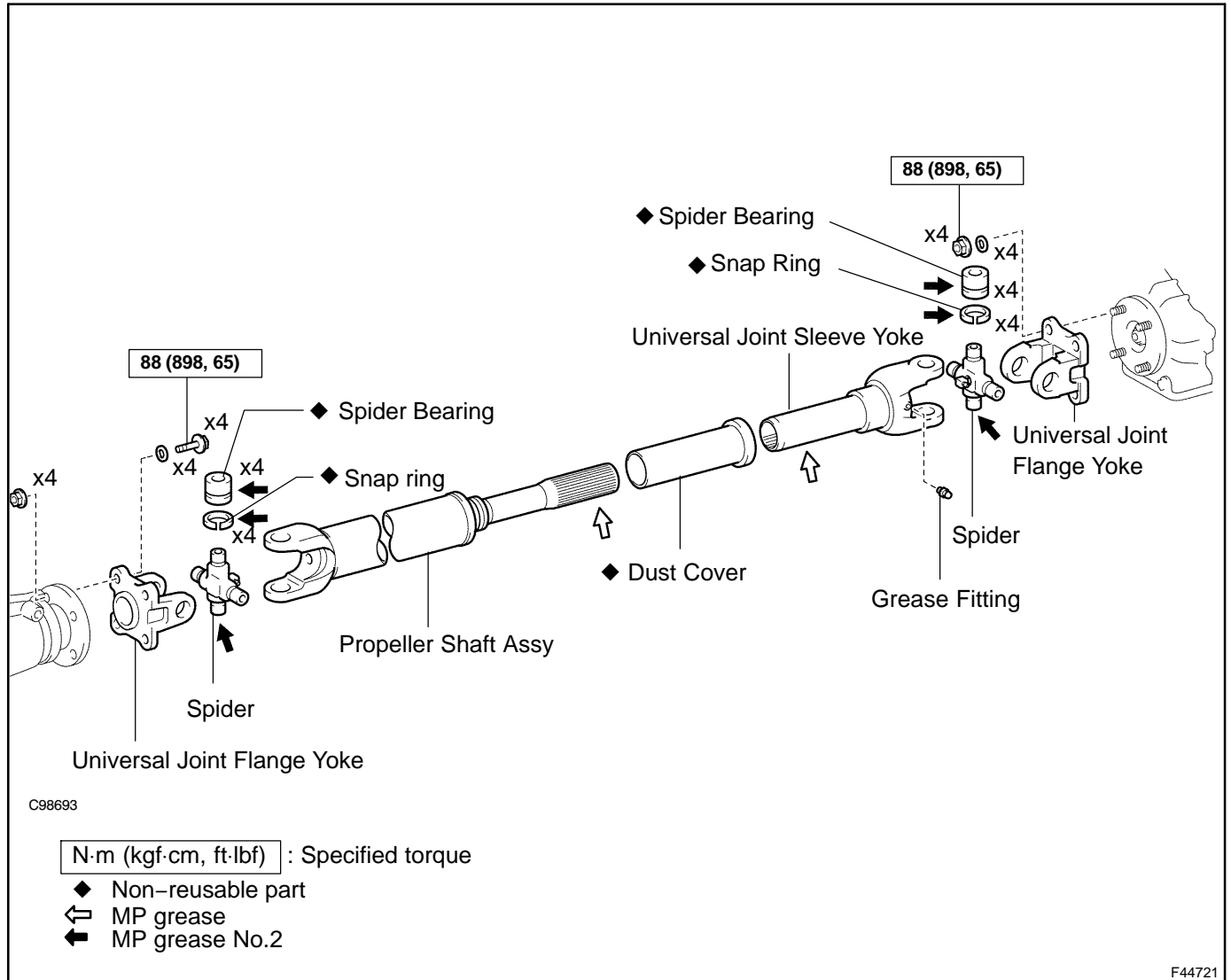
- (e) Inspect the axle shaft deviation.
 - (1) Using a dial indicator, check the deviation at the surface of the axle shaft.

Maximum: 0.05 mm (0.0020 in.)

If the deviation exceeds the maximum, replace the bearing.

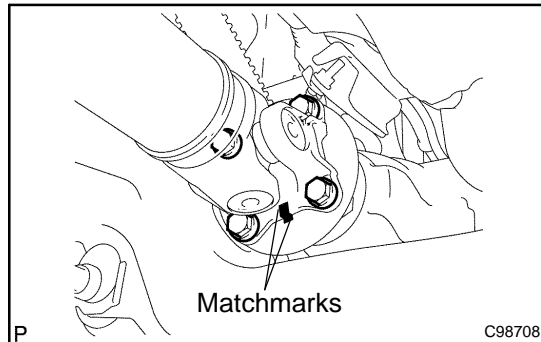
PROPELLER SHAFT ASSY FRONT COMPONENTS

300H5-01



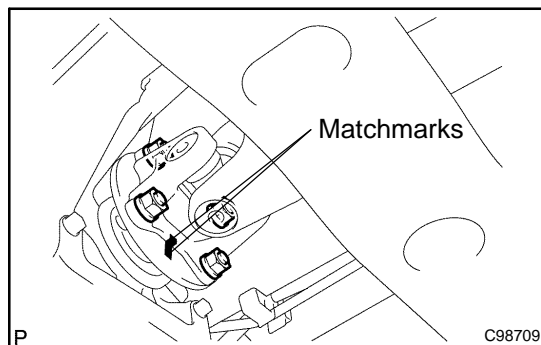
OVERHAUL

1. REMOVE TRANSMISSION UNDER COVER
2. REMOVE ENGINE UNDER COVER ASSY REAR

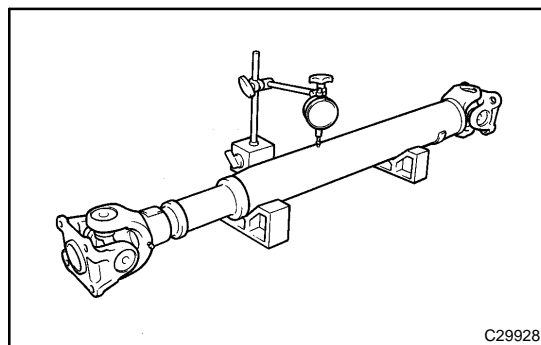


3. REMOVE PROPELLER SHAFT ASSY FRONT

- (a) Place matchmarks on the propeller shaft flange and differential flange.
- (b) Remove the 4 nuts, 4 bolts, 4 washers and front propeller shaft assy.



- (c) Place matchmarks on the propeller shaft flange and transfer flange.
- (d) Remove the 4 nuts, 4 washers and front propeller shaft assy.



4. INSPECT PROPELLER SHAFT ASSY FRONT

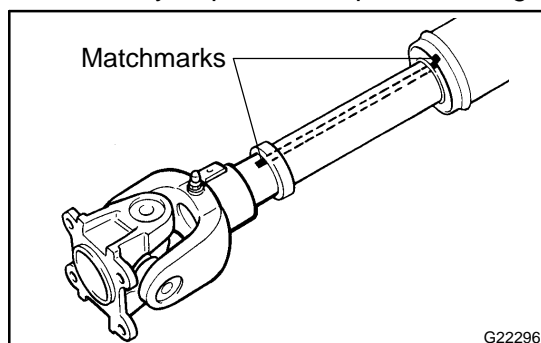
- (a) Using a dial indicator, check the propeller shaft runout.
Maximum runout: 0.3 mm (0.012 in.)

If the shaft runout is greater than maximum, replace the propeller shaft.

5. INSPECT FRONT PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

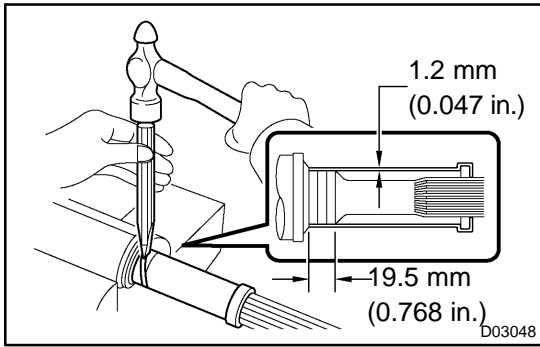
- (a) Check the spider bearings for wear or damage.
- (b) Check the spider bearing axial play by turning the yoke with holding the shaft tightly.
Maximum bearing axial play: 0 mm (0 in.)

If necessary, replace the spider bearing.



6. REMOVE FR PROPELLER SHAFT UNIVERSAL JOINT SLEEVE YOKE SUB-ASSY

- (a) Place matchmarks on the propeller shaft and sleeve yoke.
- (b) Remove the sleeve yoke from the propeller shaft.
- (c) Remove the grease fitting from the universal joint sleeve yoke.

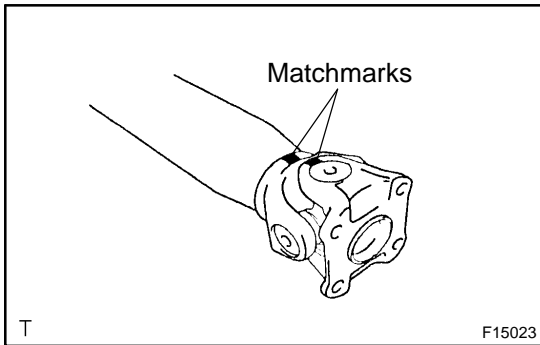


7. REMOVE FRONT PROPELLER SHAFT SLIDING SHAFT DUST COVER SUB-ASSY

- (a) Cut the dust cover spirally at the pressing-in part with a saw and pry it off with a chisel and a hammer.

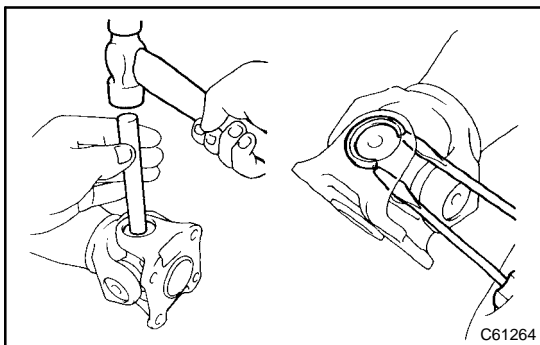
NOTICE:

Do not damage the propeller shaft. If damaged, replace the shaft with a new one.

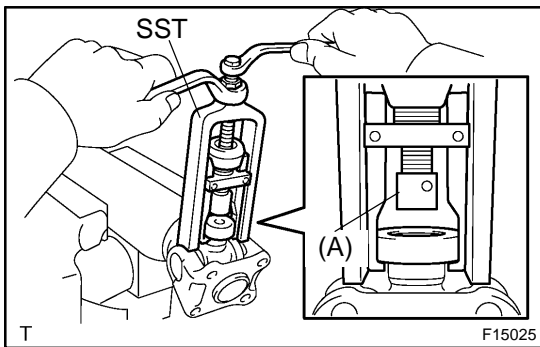


8. REMOVE FRONT PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

- (a) Place matchmarks on the flange yoke and sleeve yoke.



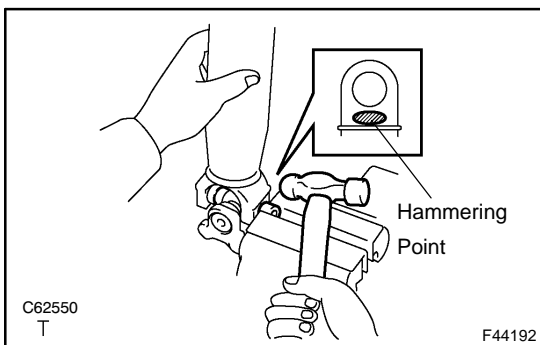
- (b) Using a brass bar and a hammer, slightly tap in the spider bearing outer races.
- (c) Using 2 screwdrivers, remove the 4 snap rings from the grooves.



- (d) Using SST, push out the spider bearing from the propeller shaft.
SST 09332-25010

HINT:

Sufficiently raise the part indicated by (A) so that it does not come into contact with the spider bearing.



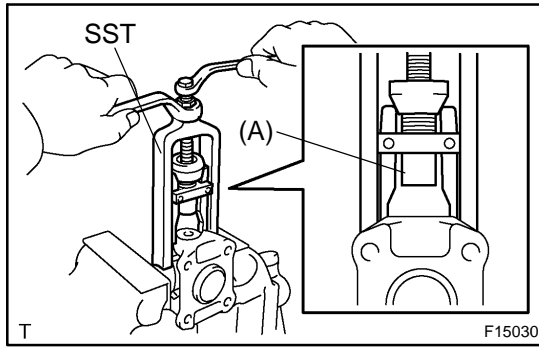
- (e) Clamp the spider bearing outer race in a vise and tap off the propeller shaft with a hammer.

HINT:

Remove the bearing on opposite side in the same procedure.

NOTICE:

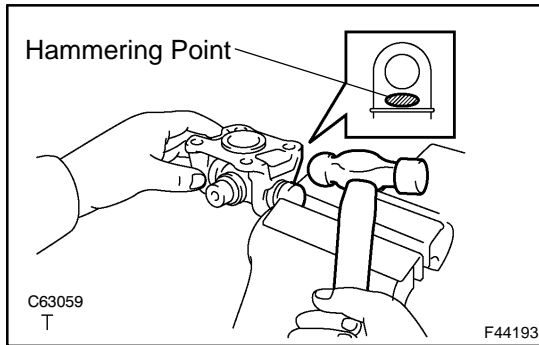
Do not tap the shaft.



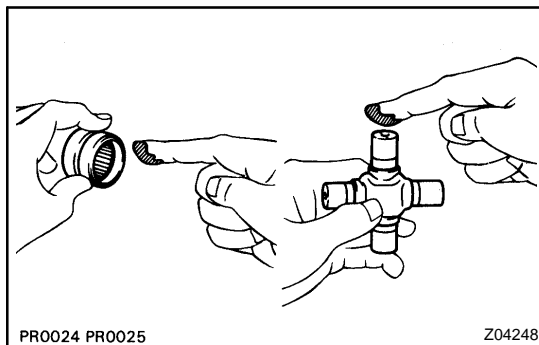
- (f) Install the 2 removed spider bearing outer races to the spider.
- (g) Using SST, push out the bearing from the yoke.
SST 09332-25010

HINT:

Sufficiently raise the part indicated by (A) so that it does not come into contact with the bearing.

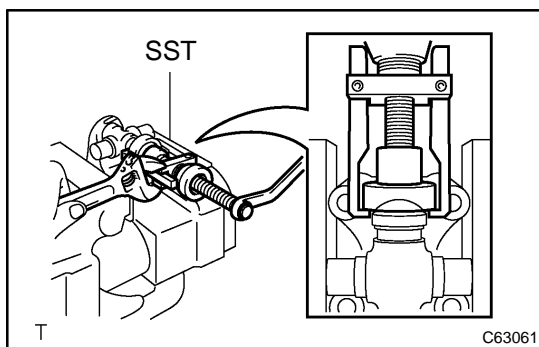


- (h) Clamp the outer bearing race in a vise and tap off the flange yoke with a hammer.
- (i) Remove the spider.

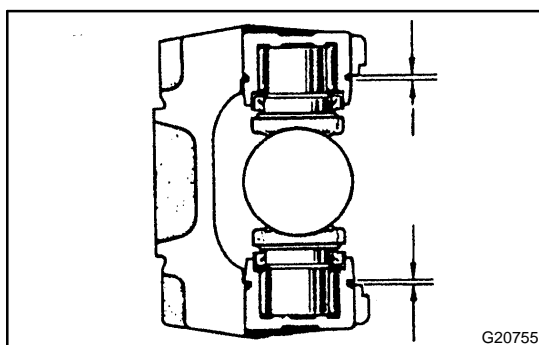


9. INSTALL FRONT PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

- (a) Apply MP grease No.2 to a new spider and spider bearing.
- (b) Fit the spider into the flange yoke.



- (c) Using SST, install the spider bearings on the spider.
SST 09332-25010
- (d) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal in width.
SST 09332-25010



- (e) Install the 4 new snap rings of equal thickness which will allow no axial play.

HINT:

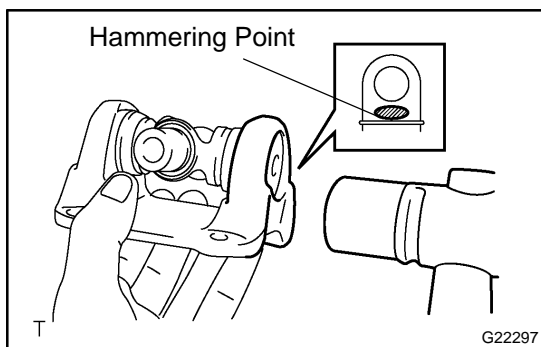
Do not reuse the snap rings.

Thickness of snap ring:

Parts No.	Thickness mm (in.)	Mark
90520-25039	2.28 - 2.30	1
90520-25040	2.30 - 2.32	2
90520-25041	2.32 - 2.34	-
90520-25042	2.34 - 2.36	Brown
90520-25043	2.36 - 2.38	Blue
90520-25044	2.38 - 2.40	6
90520-25045	2.40 - 2.42	7
90520-25046	2.42 - 2.44	8
90520-25047	2.44 - 2.46	九
90520-25048	2.46 - 2.48	10
90520-25049	2.48 - 2.50	A
90520-25050	2.50 - 2.52	B
90520-25051	2.52 - 2.54	C
90520-25052	2.54 - 2.56	D
90520-25053	2.56 - 2.58	E
90520-25054	2.18 - 2.20	J
90520-25055	2.20 - 2.22	K
90520-25056	2.22 - 2.24	F
90520-25057	2.24 - 2.26	G
90520-25058	2.26 - 2.28	H

NOTICE:

- **Must use a new retainer ring.**
- **Must use retainer rings of the same thickness as much as possible on both ends.**

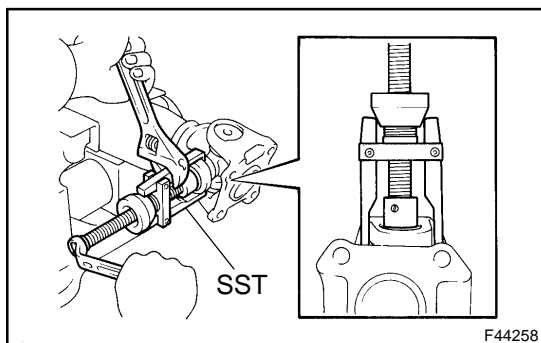


- (f) Using a hammer, tap the yoke until there is no clearance between the spider bearing outer race and snap ring.

HINT:

Install a new spider bearing on the sleeve side in the procedure described above.

- (g) Align the matchmark on the flange yoke with the one on the sleeve yoke.



- (h) Using SST, install the spider bearings on the spider.
SST 09332-25010
- (i) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal in width.
SST 09332-25010

- (j) Install the new 4 snap rings of equal thickness which will allow no axial play.

HINT:

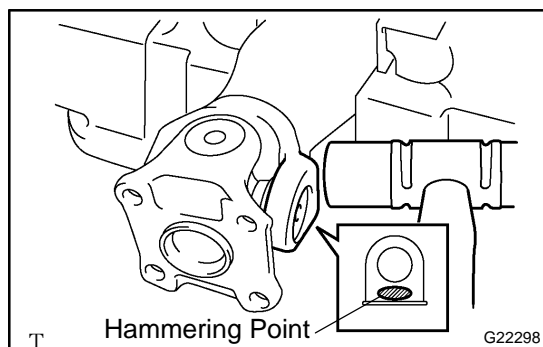
Do not reuse the snap rings.

Thickness of snap ring:

Parts No.	Thickness mm (in.)	Mark
90520-25039	2.28 - 2.30	1
90520-25040	2.30 - 2.32	2
90520-25041	2.32 - 2.34	-
90520-25042	2.34 - 2.36	Brown
90520-25043	2.36 - 2.38	Blue
90520-25044	2.38 - 2.40	6
90520-25045	2.40 - 2.42	7
90520-25046	2.42 - 2.44	8
90520-25047	2.44 - 2.46	九
90520-25048	2.46 - 2.48	10
90520-25049	2.48 - 2.50	A
90520-25050	2.50 - 2.52	B
90520-25051	2.52 - 2.54	C
90520-25052	2.54 - 2.56	D
90520-25053	2.56 - 2.58	E
90520-25054	2.18 - 2.20	J
90520-25055	2.20 - 2.22	K
90520-25056	2.22 - 2.24	F
90520-25057	2.24 - 2.26	G
90520-25058	2.26 - 2.28	H

NOTICE:

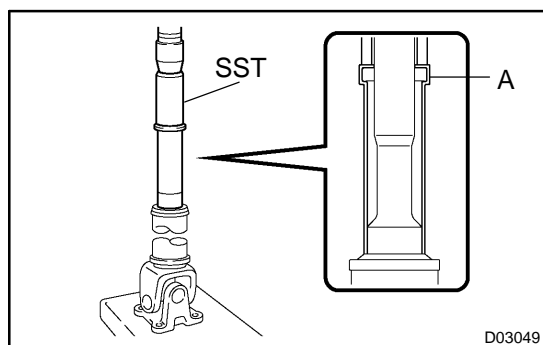
- **Must use a new retainer ring.**
- **Must use retainer rings of the same thickness as much as possible on both ends.**



- (k) Using a plastic hammer, tap the yoke until there is no clearance between the spider bearing outer race and snap ring.

HINT:

Install a new spider bearing on the sleeve side in the procedure described above.

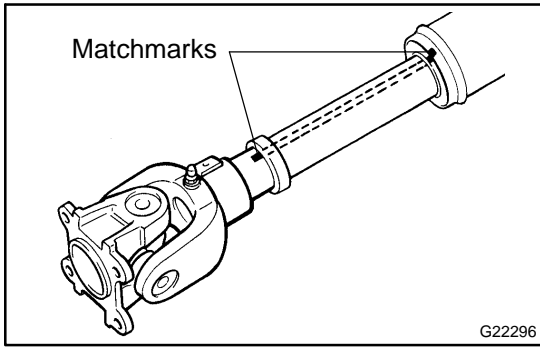


10. INSTALL FRONT PROPELLER SHAFT SLIDING SHAFT DUST COVER SUB-ASSY

- (a) Using SST and press, press in a new dust cover.

NOTICE:

Place the universal joint straight when pressing in the dust cover. Apply MP grease to the "A" part.



11. INSTALL FR PROPELLER SHAFT UNIVERSAL JOINT SLEEVE YOKE SUB-ASSY

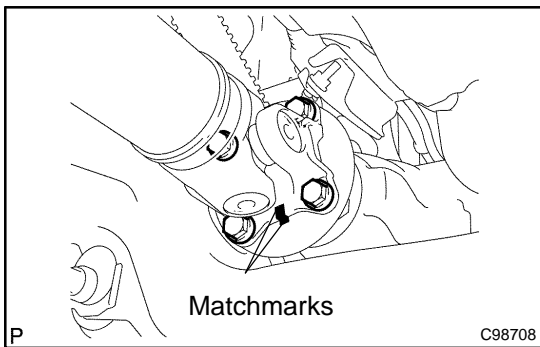
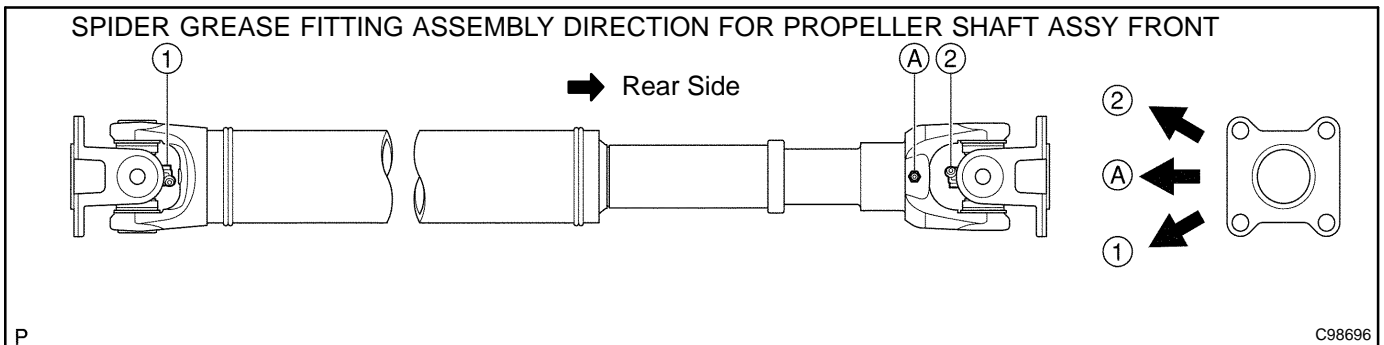
- (a) Install the grease fitting to the universal joint sleeve yoke.
- (b) Apply MP grease to the propeller shaft spline and sleeve yoke sliding surface.
- (c) Align the matchmarks on the sleeve yoke propeller shaft.
- (d) Install the propeller shaft into the sleeve yoke.

12. INSPECT FRONT PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

13. INSPECT PROPELLER SHAFT ASSY FRONT

HINT:

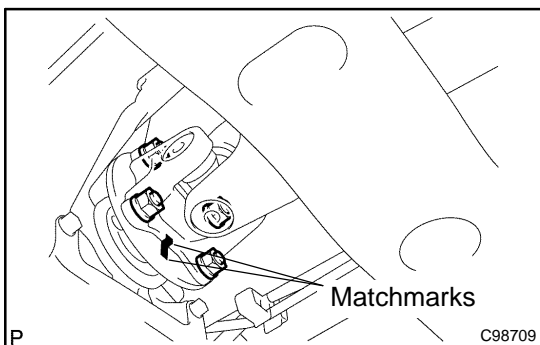
When replacing the spider bearing, be sure that the grease fitting assembly hole is facing to the direction shown in the illustration.



14. INSTALL PROPELLER SHAFT ASSY FRONT

- (a) Align the matchmarks on the yoke and differential flange.
- (b) Install the propeller shaft assy with the 4 bolts, 4 nuts and 4 washers.

Torque: 88 N·m (898 kgf·cm, 65 ft·lbf)



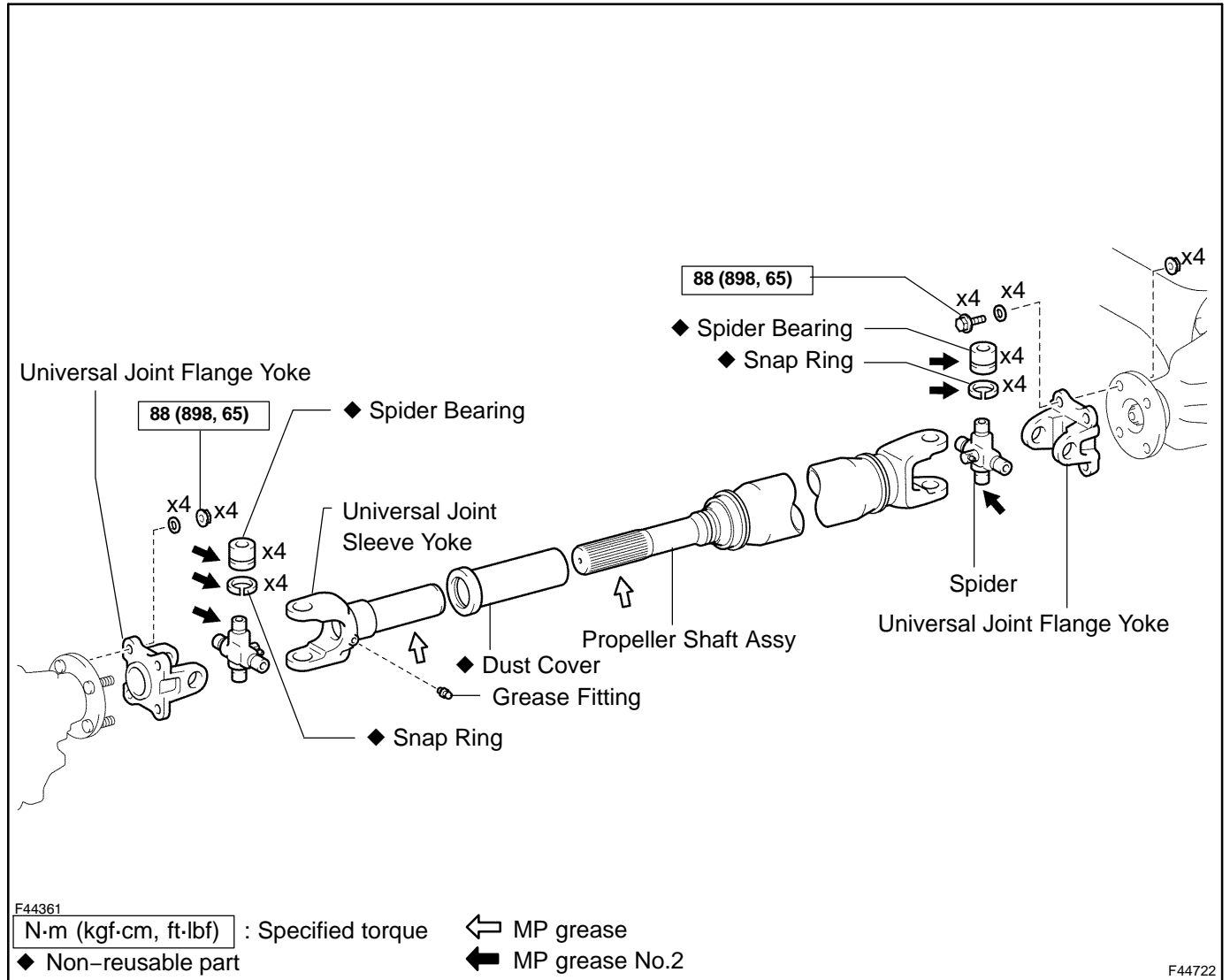
- (c) Align the matchmarks on the yoke and transfer flange.
- (d) Install the propeller shaft assy with the 4 nuts and 4 washers.

Torque: 88 N·m (898 kgf·cm, 65 ft·lbf)

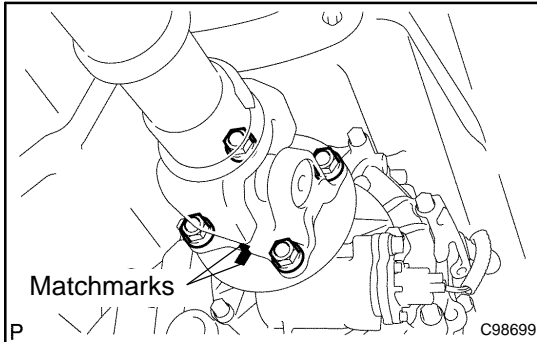
15. INSTALL ENGINE UNDER COVER ASSY REAR
16. INSTALL TRANSMISSION UNDER COVER

PROPELLER SHAFT ASSY COMPONENTS

300H7-01

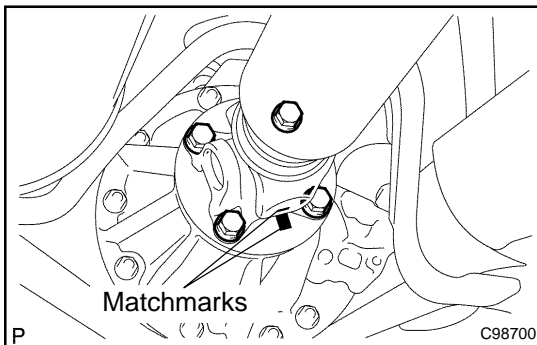


OVERHAUL

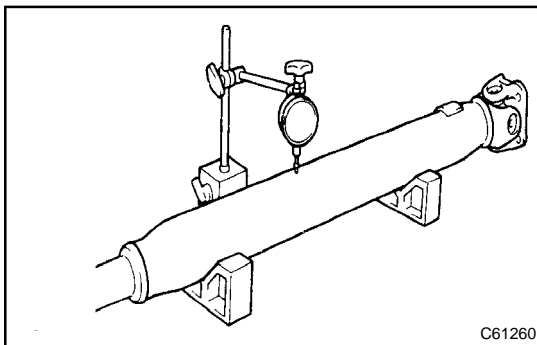


1. REMOVE PROPELLER SHAFT ASSY

- (a) Place matchmarks on the propeller shaft flange and transfer flange.
- (b) Remove the 4 nuts and 4 washers.



- (c) Place matchmarks on the propeller shaft flange and differential flange.
- (d) Remove the 4 nuts, 4 bolts and 4 washers and propeller shaft assy.



2. INSPECT PROPELLER SHAFT ASSY

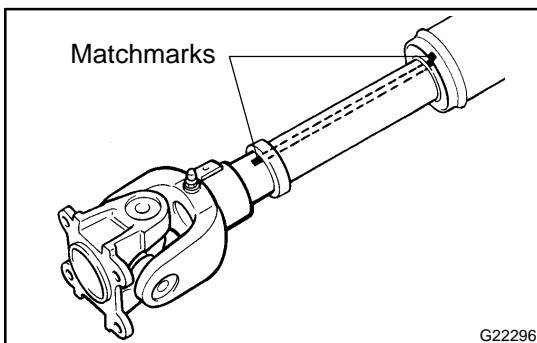
- (a) Using a dial indicator, check the propeller shaft runout.
Maximum runout: 0.3 mm (0.012 in.)

If the shaft runout is greater than maximum, replace the propeller shaft.

3. INSPECT REAR PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

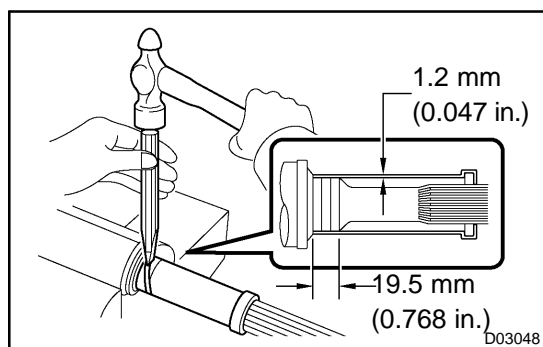
- (a) Check the spider bearings for wear or damage.
- (b) Check the spider bearing axial play by turning the yoke with holding the shaft tightly.
Maximum bearing axial play: 0 mm (0 in.)

If necessary, replace the spider bearing.



4. REMOVE RR PROPELLER SHAFT UNIVERSAL JOINT SLEEVE YOKE SUB-ASSY

- (a) Place matchmarks on the propeller shaft and sleeve yoke.
- (b) Remove the sleeve yoke from the propeller shaft.
- (c) Remove the grease fitting from the universal joint sleeve yoke.

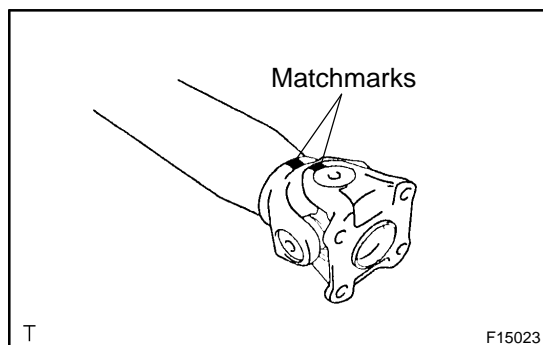


5. REMOVE REAR PROPELLER SHAFT SLIDING SHAFT DUST COVER SUB-ASSY

- (a) Cut the dust cover spirally at the pressing-in part with a saw and pry it off with a chisel and a hammer.

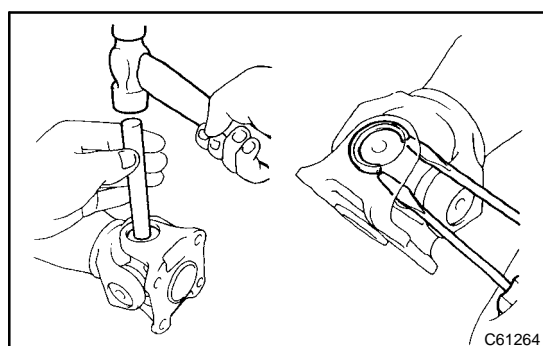
NOTICE:

Do not damage the propeller shaft. If damaged, replace the shaft with a new one.



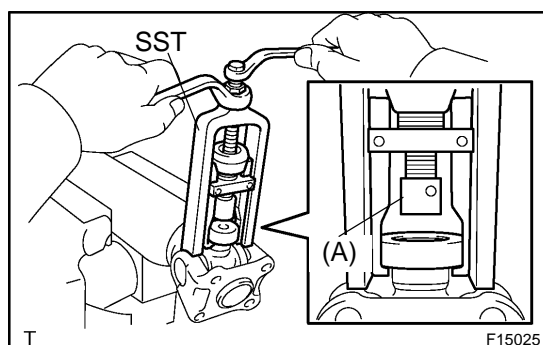
6. REMOVE REAR PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

- (a) Place matchmarks on the flange yoke and sleeve yoke.



- (b) Using a brass bar and a hammer, slightly tap in the bearing outer races.

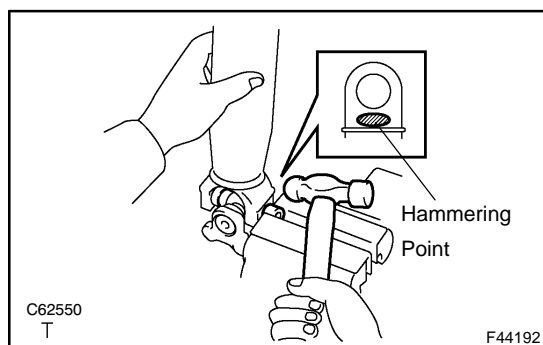
- (c) Using 2 screwdrivers, remove the 4 snap rings from the grooves.



- (d) Using SST, push out the bearing from the propeller shaft.
SST 09332-25010

HINT:

Sufficiently raise the part indicated by (A) so that it does not come into contact with the bearing.



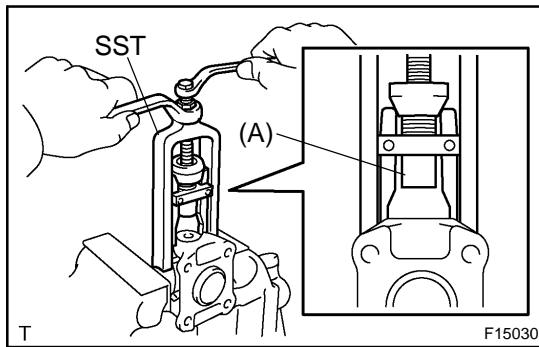
- (e) Clamp the bearing outer race in a vise and tap off the propeller shaft with a hammer.

HINT:

Remove the bearing on opposite side in the same procedure.

NOTICE:

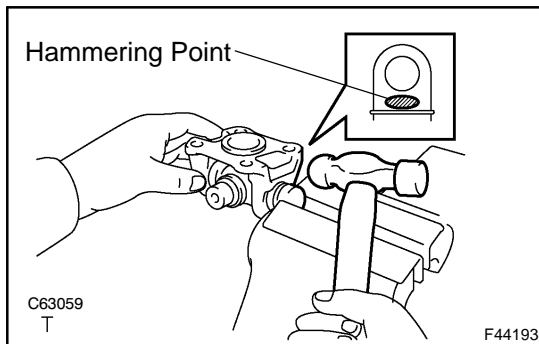
Do not tap the shaft.



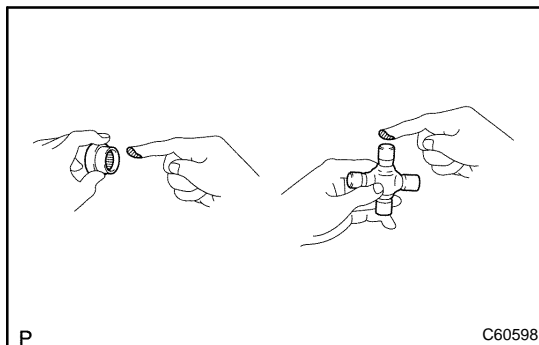
- (f) Install the 2 removed bearing outer races to the spider.
- (g) Using SST, push out the bearing from the yoke.
SST 09332-25010

HINT:

Sufficiently raise the part indicated by (A) so that it does not come into contact with the bearing.

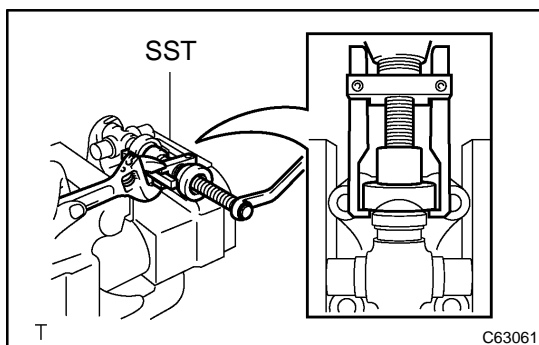


- (h) Clamp the bearing outer race in a vise and tap off the yoke with a hammer.
- (i) Remove the spider.

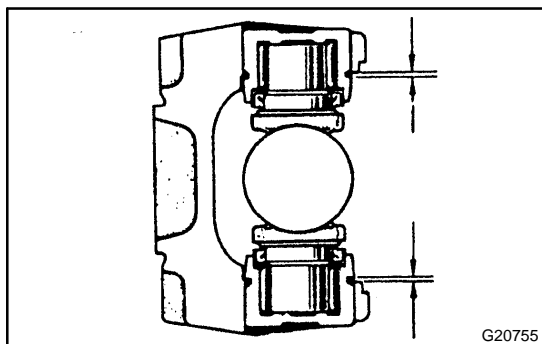


7. INSTALL REAR PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

- (a) Apply MP grease No.2 to a new spider and bearings.
- (b) Fit the spider into the flange yoke.



- (c) Using SST, install the bearings on the spider.
SST 09332-25010
- (d) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal in width.
SST 09332-25010



- (e) Install the 4 new snap rings of equal thickness which will allow no axial play.

HINT:

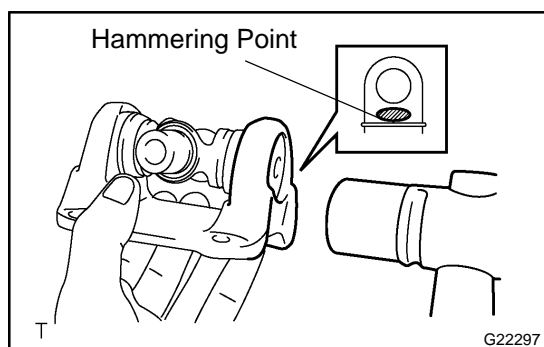
Do not reuse the snap rings.

Thickness of snap ring:

Parts No.	Thickness mm (in.)	Mark
90520-25039	2.28 - 2.30	1
90520-25040	2.30 - 2.32	2
90520-25041	2.32 - 2.34	-
90520-25042	2.34 - 2.36	Brown
90520-25043	2.36 - 2.38	Blue
90520-25044	2.38 - 2.40	6
90520-25045	2.40 - 2.42	7
90520-25046	2.42 - 2.44	8
90520-25047	2.44 - 2.46	九
90520-25048	2.46 - 2.48	10
90520-25049	2.48 - 2.50	A
90520-25050	2.50 - 2.52	B
90520-25051	2.52 - 2.54	C
90520-25052	2.54 - 2.56	D
90520-25053	2.56 - 2.58	E
90520-25054	2.18 - 2.20	J
90520-25055	2.20 - 2.22	K
90520-25056	2.22 - 2.24	F
90520-25057	2.24 - 2.26	G
90520-25058	2.26 - 2.28	H

NOTICE:

- **Must use a new retainer ring.**
- **Must use retainer rings of the same thickness as much as possible on both ends.**

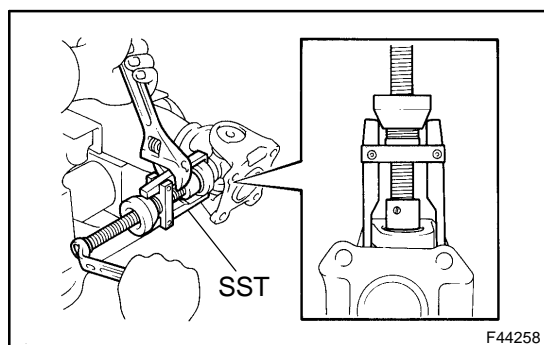


- (f) Using a hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.

HINT:

Install a new spider bearing on the sleeve side using the procedure described above.

- (g) Align the matchmark on the yoke with the one on the sleeve yoke.

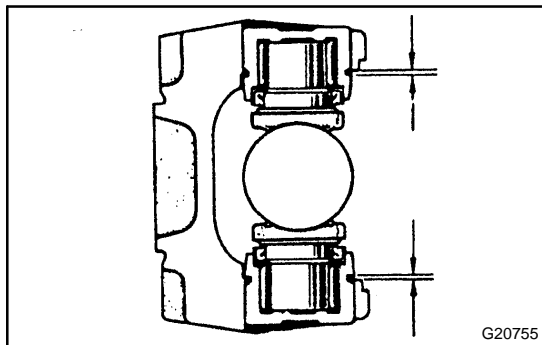


- (h) Using SST, install the bearings on the spider.

SST 09332-25010

- (i) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal in width.

SST 09332-25010



(j) Install the 4 new snap rings of equal thickness which will allow no axial play.

HINT:

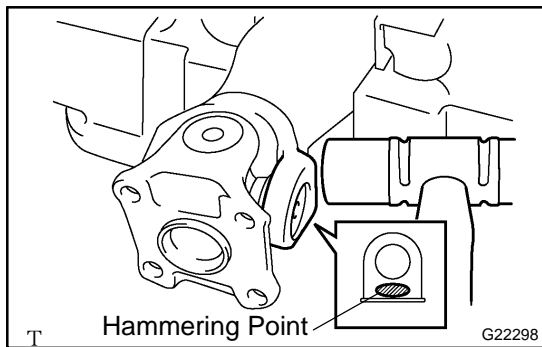
Do not reuse the snap rings.

Thickness of snap ring:

Parts No.	Thickness mm (in.)	Mark
90520-25039	2.28 - 2.30	1
90520-25040	2.30 - 2.32	2
90520-25041	2.32 - 2.34	-
90520-25042	2.34 - 2.36	Brown
90520-25043	2.36 - 2.38	Blue
90520-25044	2.38 - 2.40	6
90520-25045	2.40 - 2.42	7
90520-25046	2.42 - 2.44	8
90520-25047	2.44 - 2.46	九
90520-25048	2.46 - 2.48	10
90520-25049	2.48 - 2.50	A
90520-25050	2.50 - 2.52	B
90520-25051	2.52 - 2.54	C
90520-25052	2.54 - 2.56	D
90520-25053	2.56 - 2.58	E
90520-25054	2.18 - 2.20	J
90520-25055	2.20 - 2.22	K
90520-25056	2.22 - 2.24	F
90520-25057	2.24 - 2.26	G
90520-25058	2.26 - 2.28	H

NOTICE:

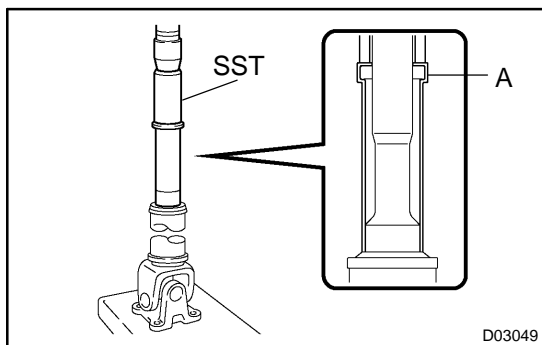
- Must use a new retainer ring.
- Must use retainer rings of the same thickness as much as possible on both ends.



(k) Using a plastic hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.

HINT:

Install a new spider bearing on the sleeve side using the procedure described above.

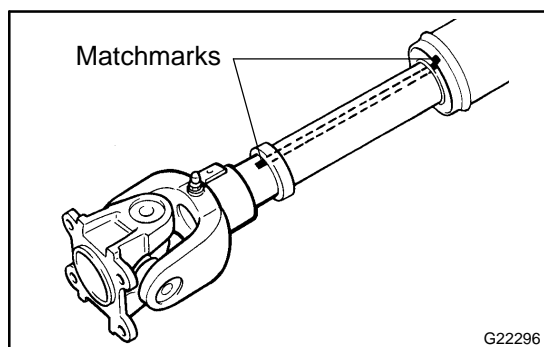


8. INSTALL REAR PROPELLER SHAFT SLIDING SHAFT DUST COVER SUB-ASSY

(a) Using SST and press, press in a new dust cover.
SST 09636-20010

NOTICE:

Place the universal joint straight when pressing in the dust cover. Apply MP grease to the "A" part.



9. INSTALL RR PROPELLER SHAFT UNIVERSAL JOINT SLEEVE YOKE SUB-ASSY

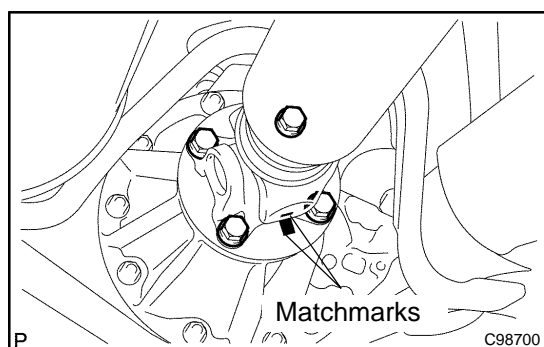
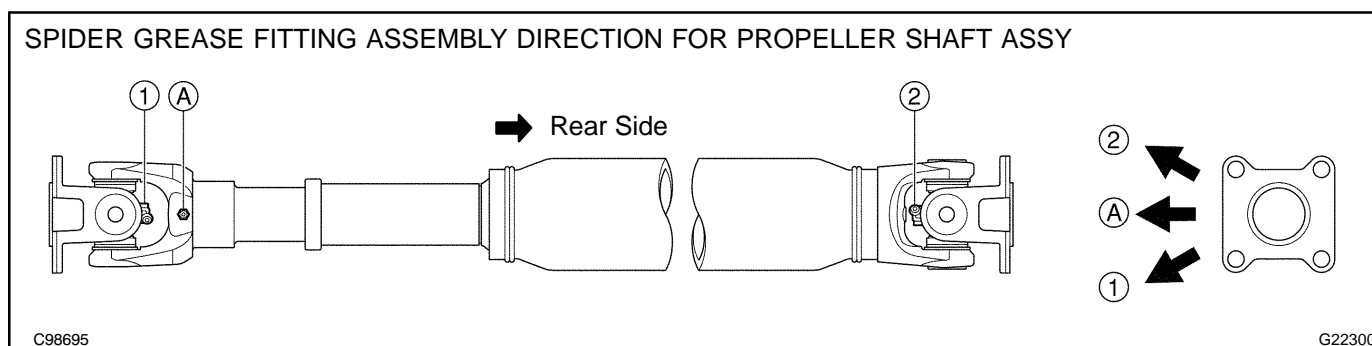
- Install the grease fitting to the universal joint sleeve yoke.
- Apply MP grease to the propeller shaft spline and sleeve yoke sliding surface.
- Align the matchmarks on the sleeve yoke propeller shaft.
- Install the propeller shaft into the sleeve yoke.

10. INSPECT REAR PROPELLER SHAFT UNIVERSAL JOINT SPIDER BEARING

11. INSPECT PROPELLER SHAFT ASSY

HINT:

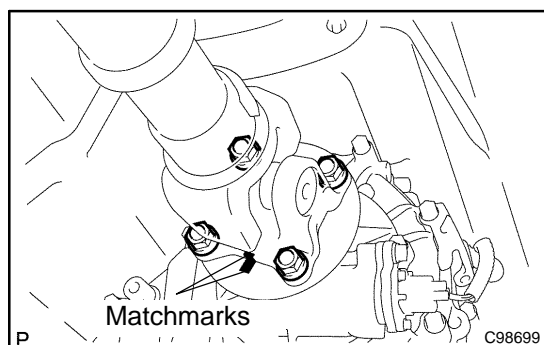
When replacing the spider bearing, be sure that the grease fitting assembly hole is facing the direction shown in the illustration.



12. INSTALL PROPELLER SHAFT ASSY

- Align the matchmarks on the yoke and differential flange.
- Install the propeller shaft assy with the 4 bolts, 4 nuts and 4 washers.

Torque: 88 N·m (898 kgf·cm, 65 ft·lbf)

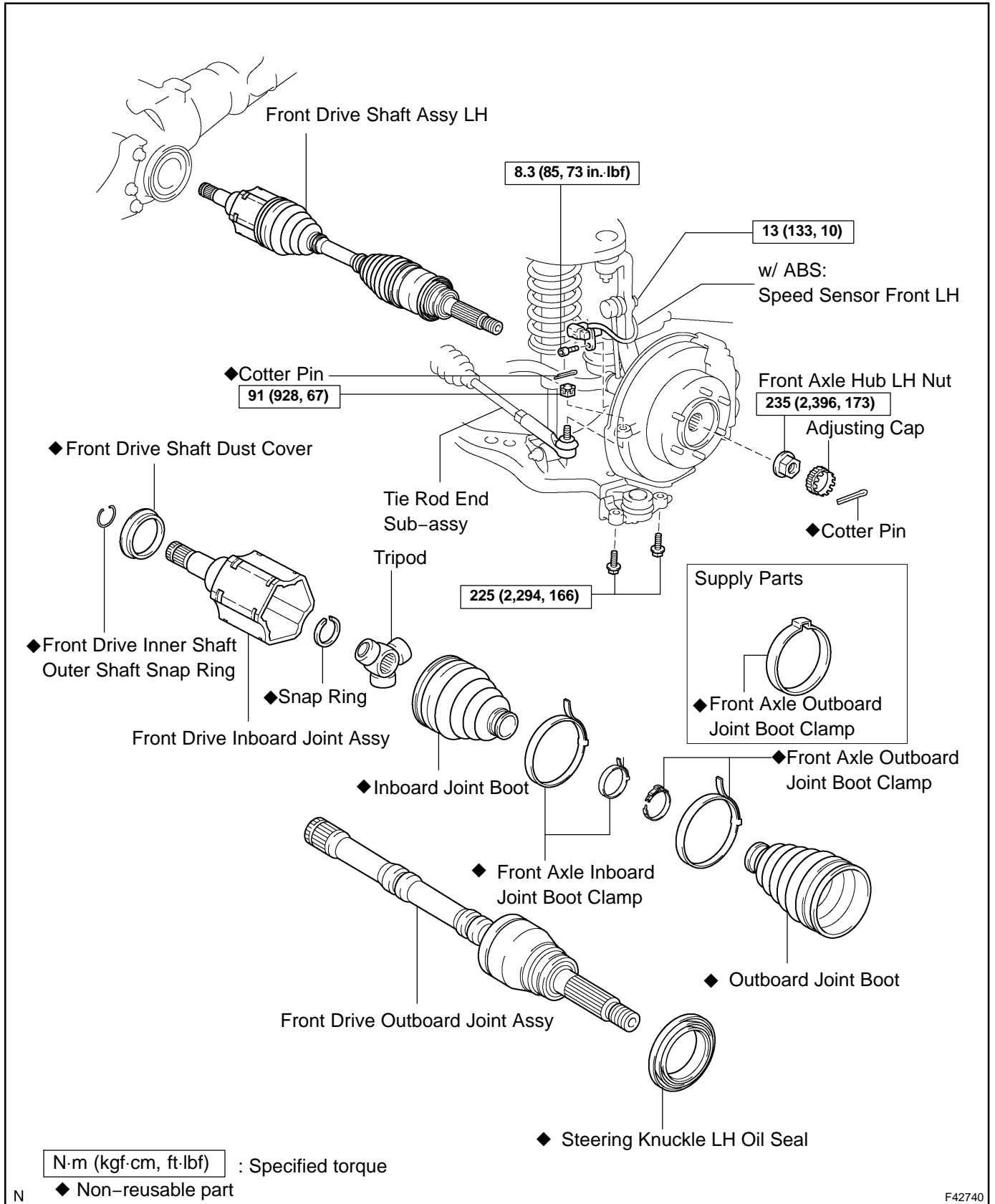


- Align the matchmarks on the yoke and transfer flange.
- Install the propeller shaft assy with the 4 nuts and 4 washers.

Torque: 88 N·m (898 kgf·cm, 65 ft·lbf)

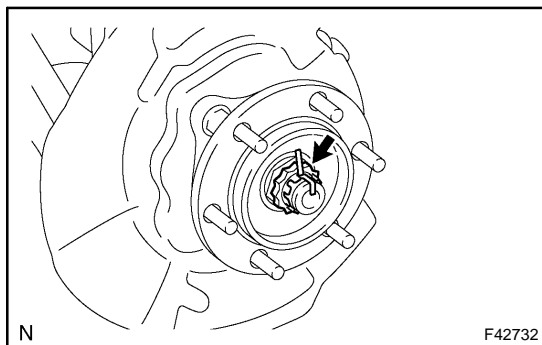
FRONT DRIVE SHAFT ASSY LH COMPONENTS

300H9-01

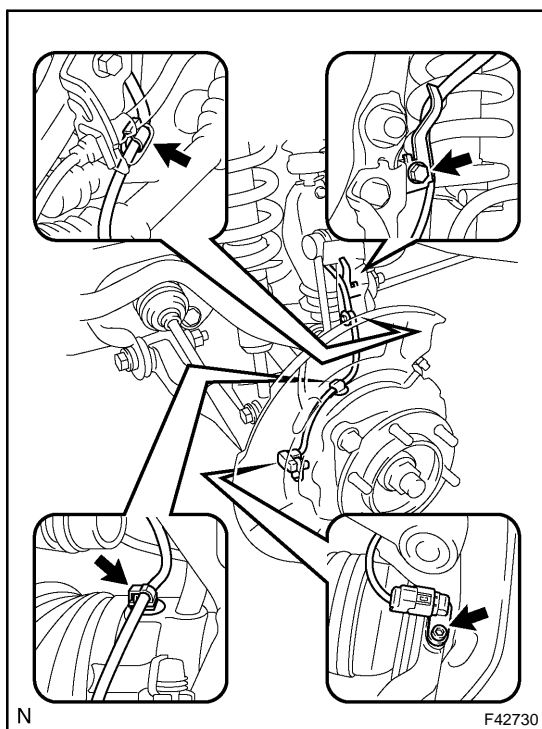


OVERHAUL

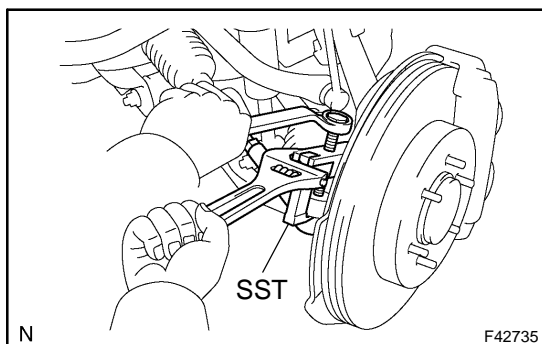
1. REMOVE FRONT WHEEL
2. DRAIN DIFFERENTIAL OIL (See page 29-3)



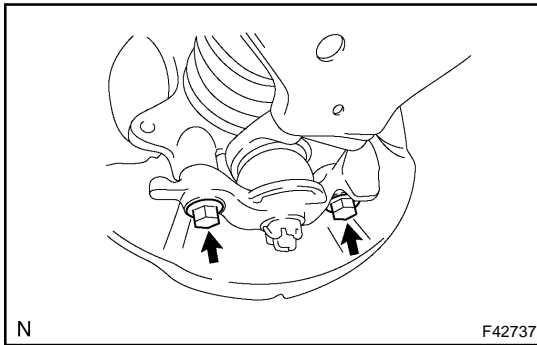
3. REMOVE FRONT AXLE HUB LH NUT
 - (a) Remove the cotter pin and a adjusting cap.
 - (b) Remove the front axle hub LH nut.



4. SEPARATE SPEED SENSOR FRONT LH (W/ ABS)
 - (a) Using a hexagon wrench, separate the speed sensor front LH.
 - (b) Disconnect the 2 clamp.
 - (c) Remove the bolt and separate the speed sensor wire harness from the steering knuckle.

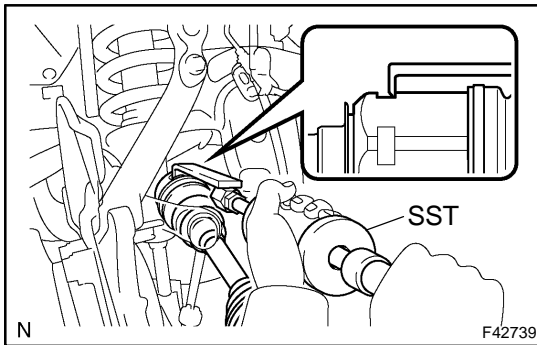


5. SEPARATE TIE ROD END SUB-ASSY LH
 - (a) Remove the cotter pin and nut.
 - (b) Using SST, separate the tie rod end from the steering knuckle.
SST 09628-62011



6. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

- (a) Remove the 2 bolts and separate the front suspension arm from the lower ball joint.



7. REMOVE FRONT DRIVE SHAFT ASSY LH

- (a) Using SST, remove the front drive shaft assy LH.
SST 09520-01010, 09520-24010 (09520-32040)

NOTICE:

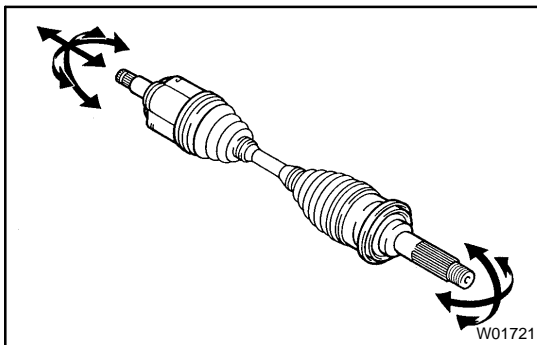
Be careful not to damage the oil seal.

8. REMOVE FRONT DRIVE SHAFT ASSY RH

HINT:

Remove the RH side by the same procedures with LH side.

SST 09520-01010, 09520-24010 (09520-32040)

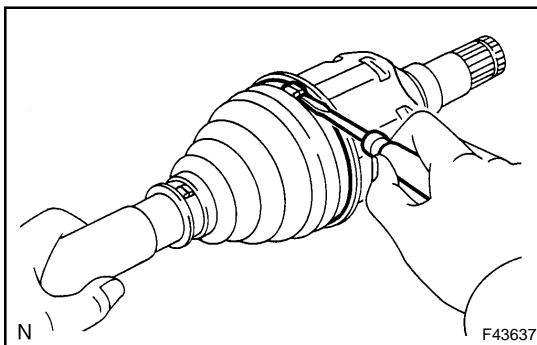


9. INSPECT FRONT DRIVE SHAFT ASSY LH

- (a) Check to see that there is no remarkable play in the outboard joint.
(b) Check to see that the inboard joint slides smoothly in the thrust direction.
(c) Check to see that there is no remarkable play in the radial direction of the inboard joint.
(d) Check the boots for damage.

NOTICE:

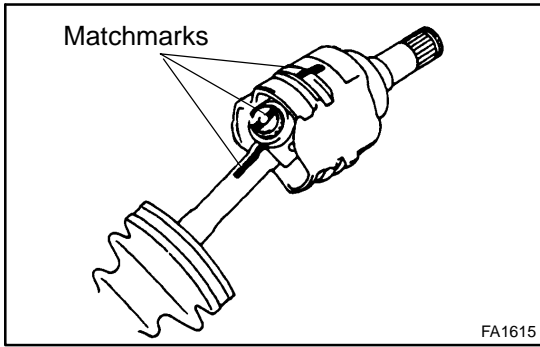
Move the drive shaft assy keeping it level.



10. SEPARATE FRONT AXLE INBOARD JOINT BOOT CLAMP

- (a) Using a screwdriver, disclamp the inboard joint boot clamp.
(b) Using the same manner to the inboard joint small boot clamp.

11. SEPARATE INBOARD JOINT BOOT

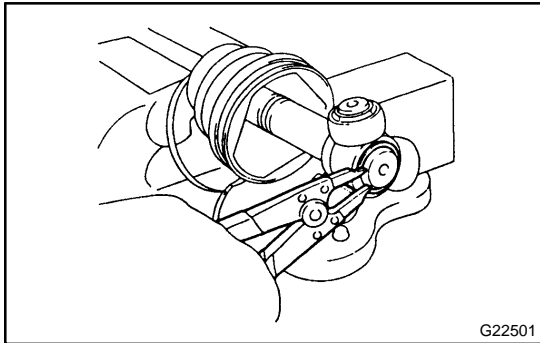


- 12. REMOVE FRONT DRIVE INBOARD JOINT ASSY LH**
 (a) Place matchmarks on the tripod, inboard and outboard joint shafts.

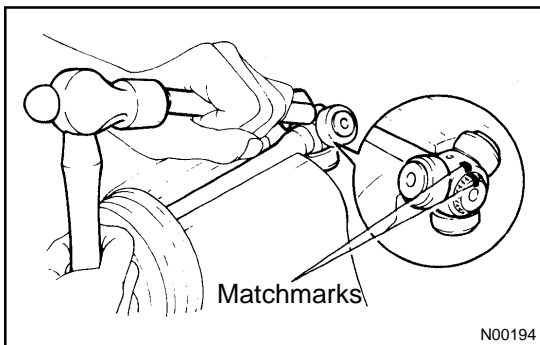
NOTICE:

Do not punch the marks.

- (b) Remove the inboard joint shaft from the outboard joint shaft.



- (c) Using a snap ring expander, remove the snap ring.



- (d) Place matchmarks on the outboard joint shaft and tripod.

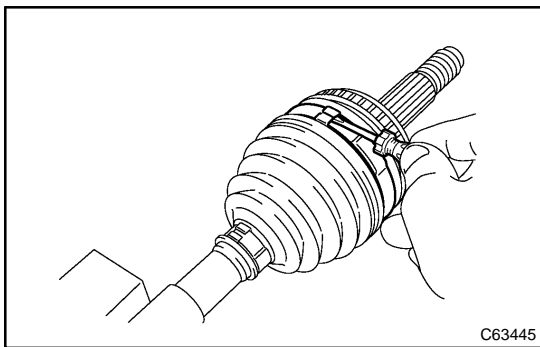
NOTICE:

Do not punch the marks.

- (e) Using a brass bar and hammer, remove the tripod from the drive shaft.

NOTICE:

Do not tap the roller.



13. REMOVE FRONT AXLE OUTBOARD JOINT BOOT CLAMP

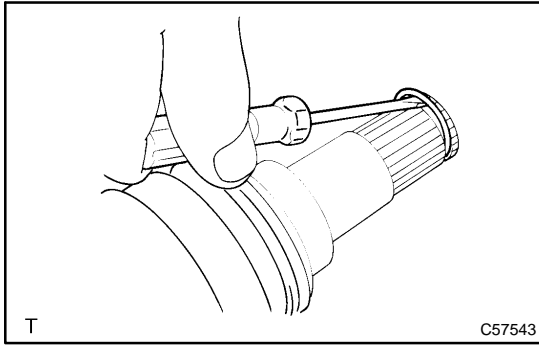
- (a) Using a screwdriver, disclamp the outboard joint large boot clamp.

HINT:

If the outboard joint boot clamps have been replaced, use a side cutter to remove them.

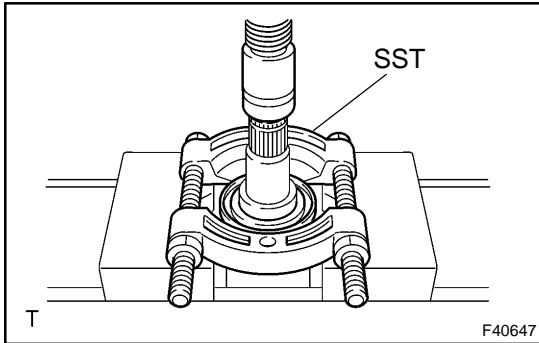
- (b) Use the same manner to the outboard joint small boot clamp.

14. REMOVE OUTBOARD JOINT BOOT



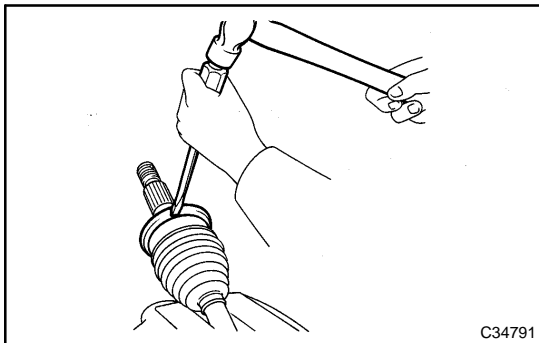
15. REMOVE FRONT DRIVE INNER SHAFT OUTER SHAFT SNAP RING

- (a) Using a screwdriver, remove the snap ring.



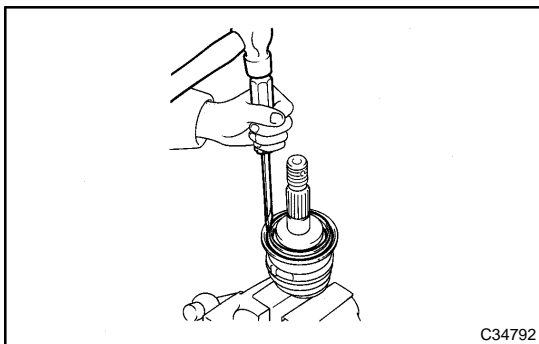
16. REMOVE FRONT DRIVE SHAFT DUST COVER

- (a) Using SST and a press, remove the dust cover.
SST 09950-00020



17. REMOVE STEERING KNUCKLE LH OIL SEAL

- (a) Using a screwdriver and a hammer, remove the oil seal.

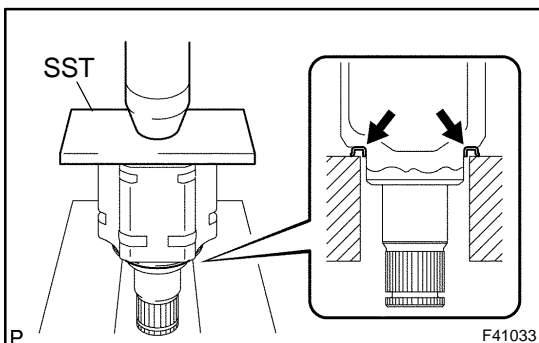


18. INSTALL STEERING KNUCKLE LH OIL SEAL

- (a) Using a screwdriver and a hammer, install a new oil seal.

NOTICE:

Do not damage the oil seal.

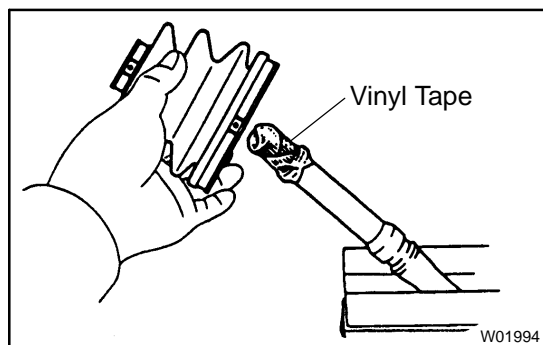


19. INSTALL FRONT DRIVE SHAFT DUST COVER

- (a) Using SST and a press, install a new dust cover.
SST 09527-10011

20. INSTALL FRONT DRIVE INNER SHAFT OUTER SHAFT SNAP RING

- (a) Install a new snap ring.

**21. INSTALL OUTBOARD JOINT BOOT****HINT:**

Before installing the boots, wrap the spline of the drive shaft with vinyl tape to prevent the boots from being damaged.

- (a) Temporarily install a new outboard joint boot with 2 clamps to the drive shaft.
 (b) Pack the outboard joint assy and boot with grease in the boot kit.

Grease capacity:

260 – 270 g (9.2 – 9.5 oz.)

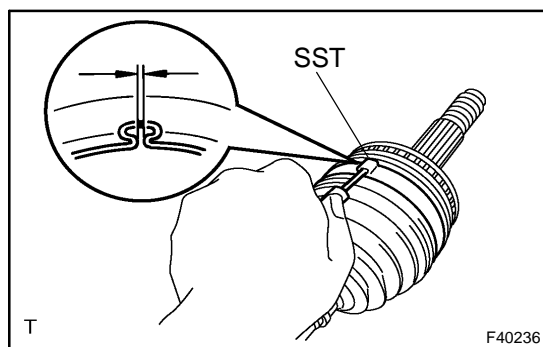
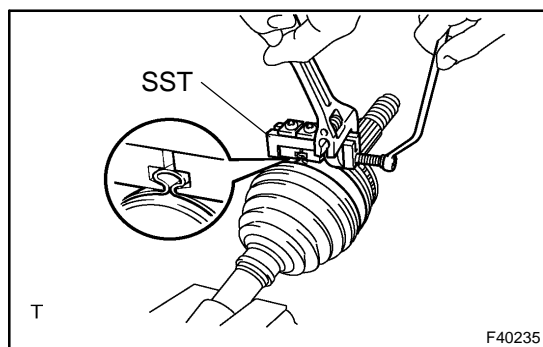
22. INSTALL FRONT AXLE OUTBOARD JOINT BOOT CLAMP

- (a) Mount drive shaft in a soft vise.
 (b) Secure the outboard joint boot clamps onto the boot.
 (c) Place SST onto the outboard joint large boot clamp.
 SST 09240-00020, 09521-24010
Clearance: 0.8 mm (0.031 in.) or less
 (d) Tighten the SST so that the large clamp is pinched.

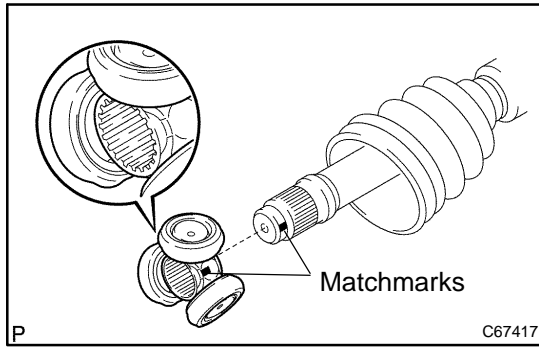
NOTICE:

Do not overtighten the SST.

- (e) Using SST, adjust the clearance of the large clamp.
 SST 09240-00020
Clearance: 0.8 mm (0.031 in.) or less
 (f) Employ the same manner to the outboard joint small boot clamp.

**23. INSTALL INBOARD JOINT BOOT**

- (a) Install a new inboard joint boot to the outboard joint shaft.

**24. INSTALL FRONT DRIVE INBOARD JOINT ASSY LH**

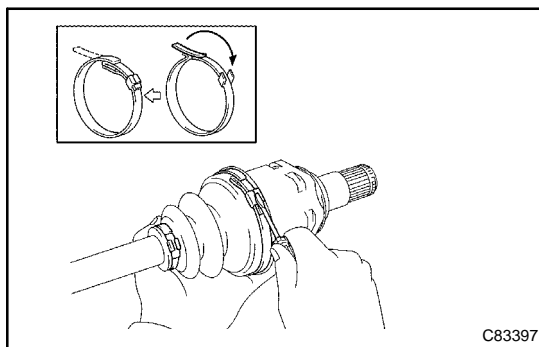
- (a) Place the beveled side of the tripod axial spline toward the outboard joint.
- (b) Align the matchmarks placed before removal.
- (c) Using a brass bar and hammer, tap in the tripod to the drive shaft.

NOTICE:**Do not tap the roller.**

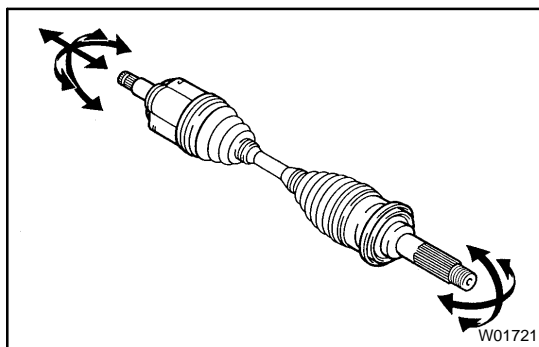
- (d) Pack the inboard joint assy and boot with grease in the boot kit.

Grease capacity:**231 – 241 g (8.1 – 8.5 oz.)**

- (e) Using a snap ring expander, install a new snap ring.

**25. INSTALL FRONT AXLE INBOARD JOINT BOOT CLAMP**

- (a) Bend the band and lock a new inboard joint large boot clamp with a screwdriver.
- (b) Using the same manner to the inboard joint small boot clamp.

**26. INSPECT FRONT DRIVE SHAFT ASSY LH**

- (a) Check to see that there is no remarkable play in the outboard joint.
- (b) Check to see that the inboard joint slides smoothly in the thrust direction.
- (c) Check to see that there is no remarkable play in the radial direction of the inboard joint.
- (d) Check the boots for damage.

NOTICE:**Move the drive shaft assy keeping it level.****27. INSTALL FRONT DRIVE SHAFT ASSY LH**

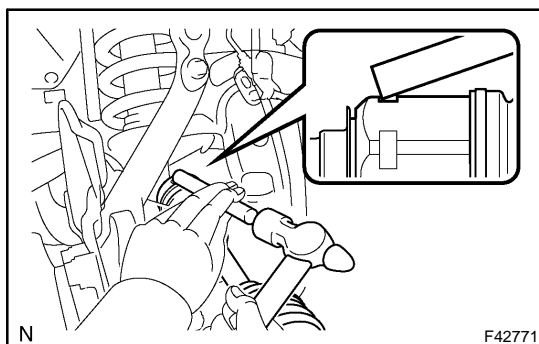
- (a) Coat the spline of the inboard joint shaft assy with ATF.
- (b) Align the shaft splines and install the drive shaft assy with brass bar and hammer.

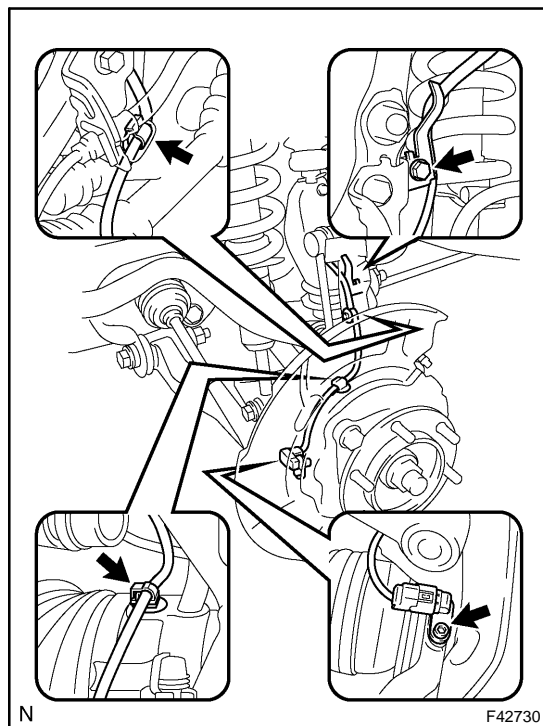
NOTICE:

- **Set the snap ring with opening side facing downward.**
- **Be careful not to damage the oil seal.**

HINT:

Whether the inboard joint shaft is in contact with the pinion shaft or not can be known from the sound or feeling when driving it.



**28. INSTALL SPEED SENSOR FRONT LH (W/ ABS)**

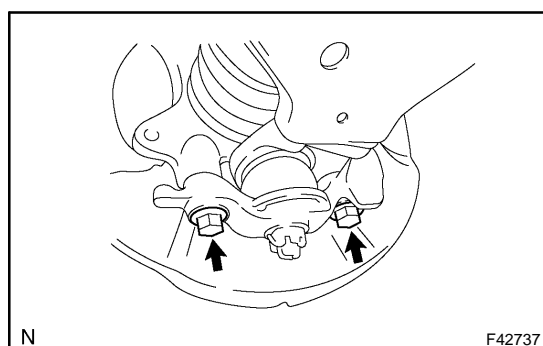
- (a) Install the speed sensor wire harness to the steering knuckle with the bolt.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

- (b) Connect the 2 clips.

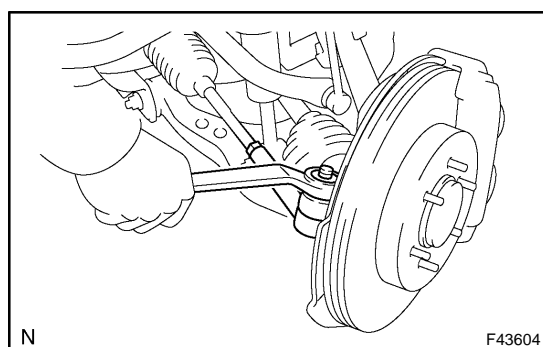
- (c) Using a hexagon wrench, install the speed sensor with the bolt.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

**29. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH**

- (a) Install the lower ball joint to the lower suspension arm with the bolt and nut.

Torque: 225 N·m (2,294 kgf·cm, 166 ft·lbf)

**30. INSTALL TIE ROD END SUB-ASSY LH**

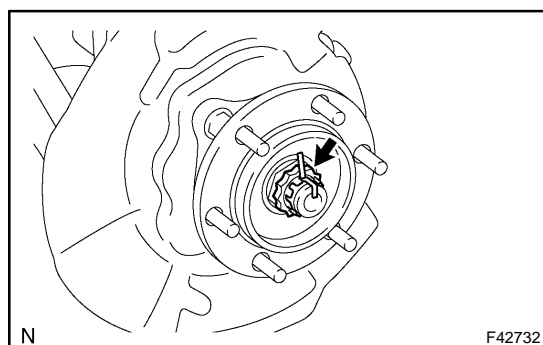
- (a) Install the tie rod end to the steering knuckle with the nut.

Torque: 91 N·m (928 kgf·cm, 67 ft·lbf)

- (b) Install a new cotter pin.

NOTICE:

If the holes for the cotter pin are not aligned, tighten the nut further to 60°.

**31. INSTALL FRONT AXLE HUB LH NUT**

- (a) Install the hub nut.

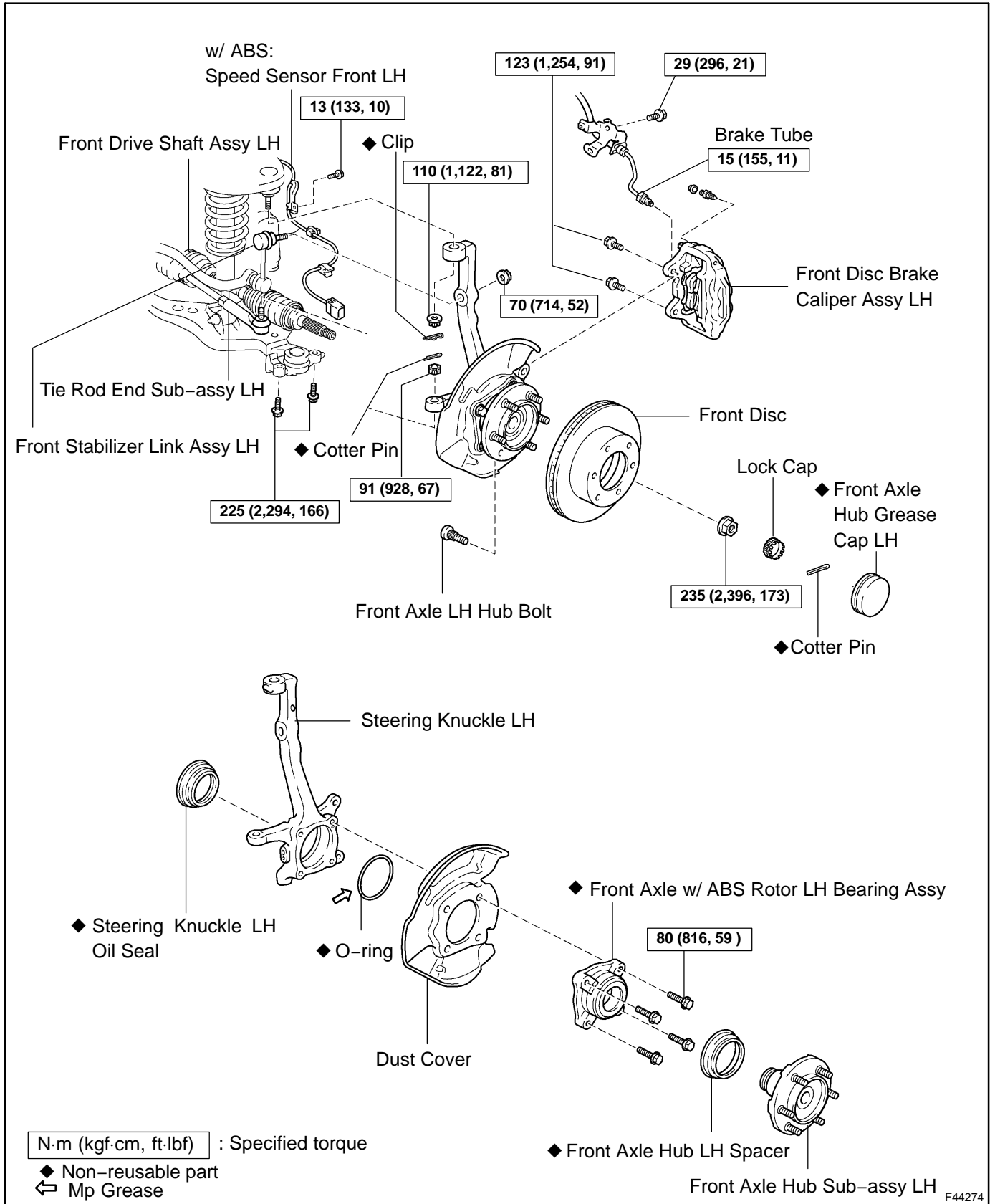
Torque: 235 N·m (2,396 kgf·cm, 173 ft·lbf)

- (b) Install a new cotter pin and adjusting cap.

32. FILL UP DIFFERENTIAL OIL (See page [29-3](#))
33. INSPECT DIFFERENTIAL OIL (See page [29-3](#))
34. INSTALL FRONT WHEEL
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
35. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page [26-7](#))
36. CHECK ABS SPEED SENSOR SIGNAL (W/ ABS) (See page [05-738](#))

FRONT AXLE HUB SUB-ASSY LH COMPONENTS

300HB-01



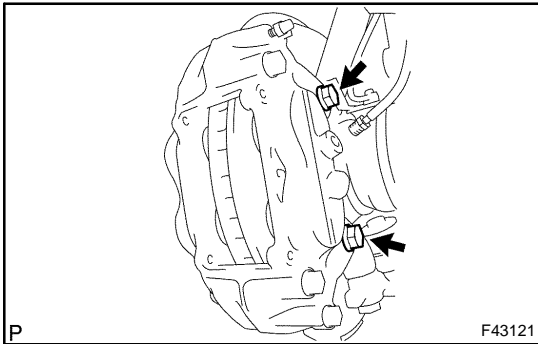
REPLACEMENT

1. REMOVE FRONT WHEEL



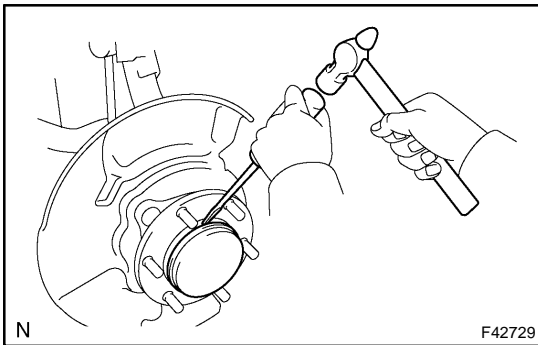
2. REMOVE FRONT DISC BRAKE CALIPER ASSY LH

- (a) Remove the bolt and separate the brake tube bracket from the steering knuckle.
- (b) Using SST, disconnect the brake tube from the front disc brake caliper assy LH.
SST 09023-00101



- (c) Remove the 2 bolts and front disc brake caliper assy LH.

3. REMOVE FRONT DISC

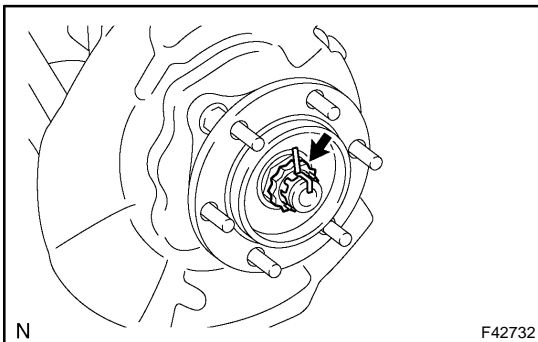


4. REMOVE FRONT AXLE HUB GREASE CAP LH

- (a) Using a screwdriver and a hammer, remove the front axle hub grease cap LH.

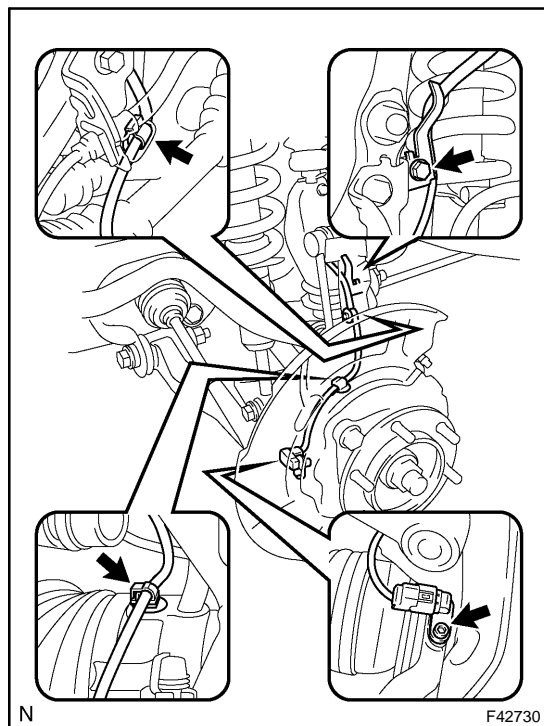
NOTICE:

Do not damage the axle hub.



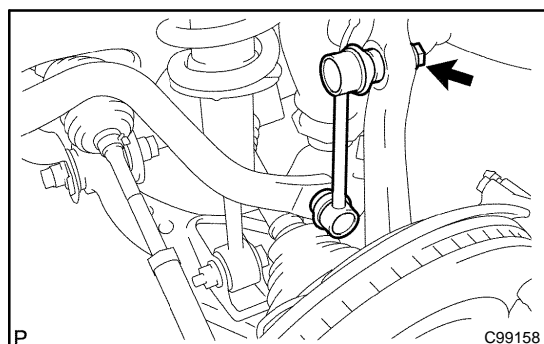
5. REMOVE FRONT AXLE HUB LH NUT

- (a) Remove the cotter pin and a lock cap.
- (b) Remove the front axle hub LH nut.



6. SEPARATE SPEED SENSOR FRONT LH (W/ ABS)

- (a) Using a hexagon wrench, separate the speed sensor front LH.
- (b) Disconnect the 2 clamp.
- (c) Remove the bolt and separate the speed sensor wire harness from the steering knuckle.

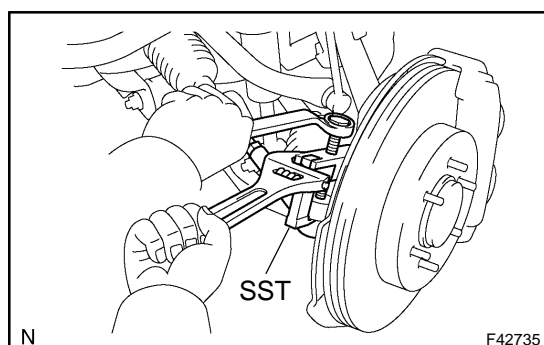


7. SEPARATE FRONT STABILIZER LINK ASSY LH

- (a) Remove the nut and separate the stabilizer link assy LH from the steering knuckle.

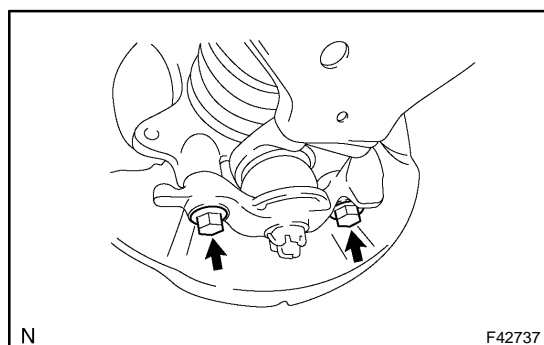
HINT:

If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.



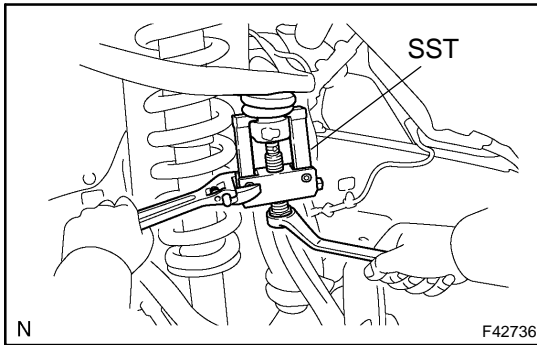
8. SEPARATE TIE ROD END SUB-ASSY LH

- (a) Remove the cotter pin and nut.
- (b) Using SST, separate the tie rod end sub-assy LH from the steering knuckle.
SST 09628-62011



9. SEPARATE FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH

- (a) Remove the 2 bolts and separate the front suspension arm sub-assy lower No.1 LH from the steering knuckle.

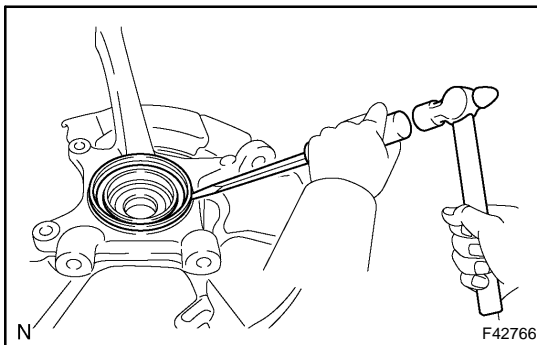


10. SEPARATE FRONT SUSPENSION UPPER ARM ASSY LH

- (a) Remove the cotter pin and nut.
- (b) Using SST, separate the steering knuckle from the front suspension upper arm assy LH.
SST 09628-62011

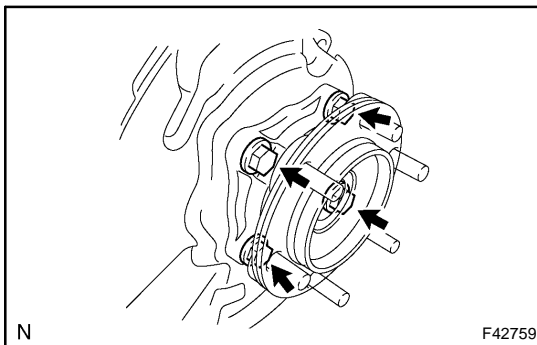
11. REMOVE FRONT AXLE HUB SUB-ASSY LH

- (a) Using a plastic hammer, separate the front axle hub from the front drive shaft.
- (b) Remove the front axle hub sub-assy LH.



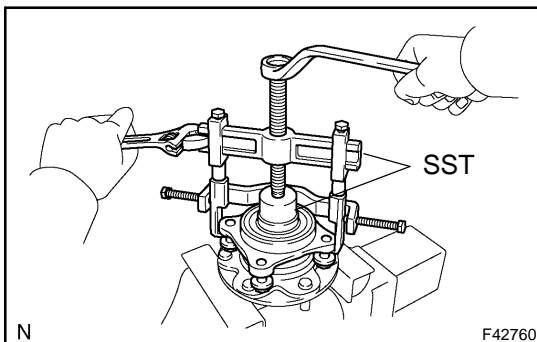
12. REMOVE STEERING KNUCKLE LH OIL SEAL

- (a) Using a screwdriver and hammer, remove the steering knuckle LH oil seal.

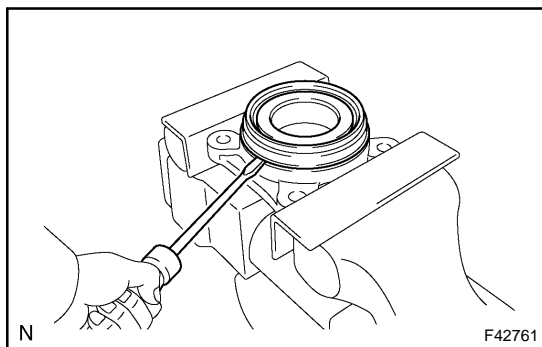


13. REMOVE FRONT AXLE HUB SUB-ASSY LH

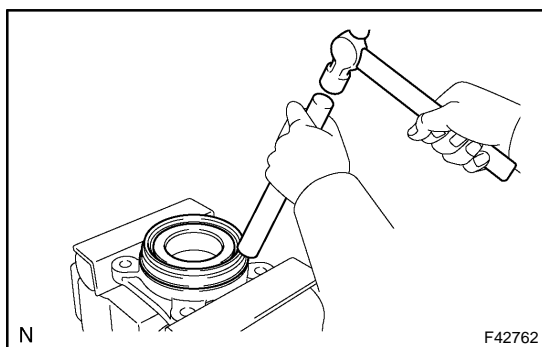
- (a) Remove the 4 bolts and axle hub from the steering knuckle.
- (b) Remove the O-ring from the axle hub.



- (c) Fix the front axle hub soft in vise.
- (d) Using SST, remove the bearing.
SST 09710-30021 (09710-03051), 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09957-04010, 09958-04011)

**14. REMOVE FRONT AXLE HUB LH OIL SEAL**

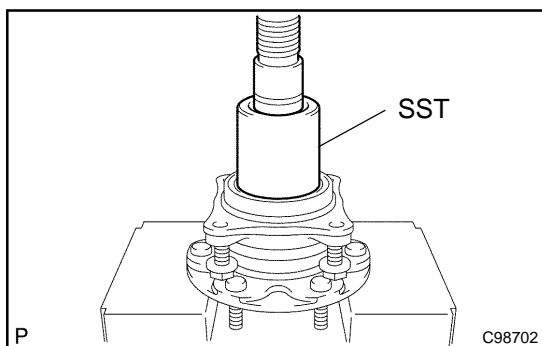
- (a) Using a screwdriver, remove the front axle hub LH oil seal.
SST 09308-00010

**15. INSTALL FRONT AXLE HUB LH OIL SEAL**

- (a) Using a brass bar and a hammer, install the new front axle hub LH oil seal.

NOTICE:

Do not damage the spacer.

**16. INSTALL FRONT AXLE HUB SUB-ASSY LH**

- (a) Using SST and a press, install the new bearing to the front axle hub.

SST 09649-17010

HINT:

Preset the 4 bolts to the new bearing before a press.

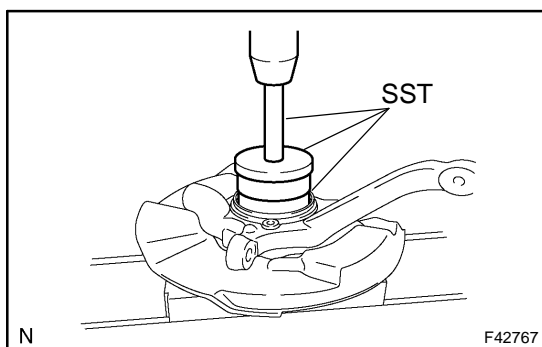
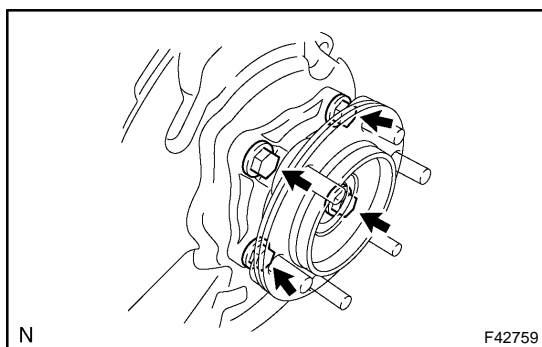
- (b) Apply the MP grease to a new O-ring.
(c) Install the O-ring to the axle hub.

NOTICE:

Do not damage the speed sensor rotor.

- (d) Install the dust cover, axle hub to the steering knuckle with the 4 bolts.

Torque: 80 N·m (816 kgf·cm, 59 ft·lbf)

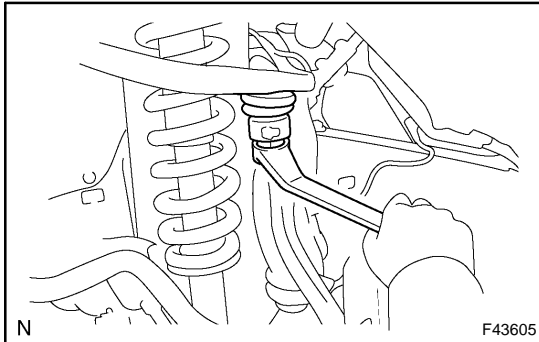
**17. INSTALL STEERING KNUCKLE LH OIL SEAL**

- (a) Using SST and a press, install a new steering knuckle LH oil seal.

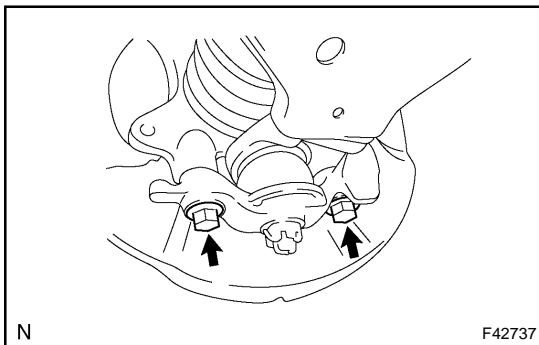
SST 09527-17011, 09950-70010 (09951-07100),
09951-01000

18. INSTALL FRONT AXLE HUB SUB-ASSY LH**NOTICE:**

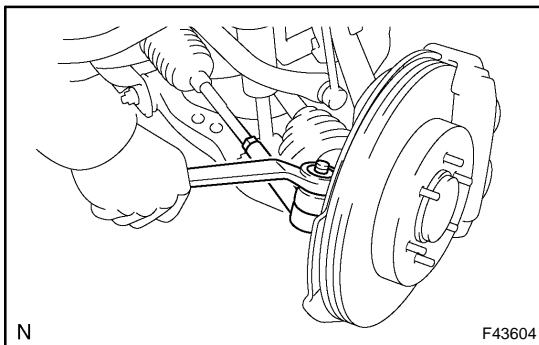
- Do not damage the speed sensor rotor.
- Inspect no damage and no foreign matter at the speed sensor rotor.

**19. INSTALL FRONT SUSPENSION UPPER ARM ASSY LH**

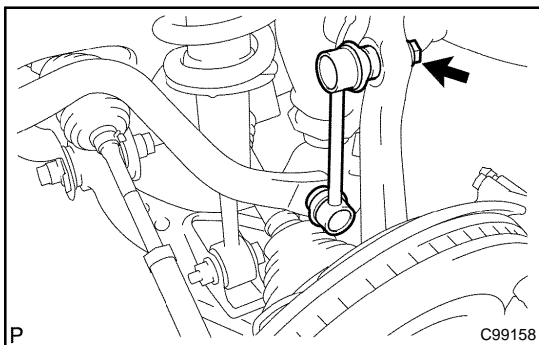
- Install the front suspension upper arm assy LH with a nut.
Torque: 110 N·m (1,122 kgf·cm, 81 ft·lbf)
- Install a new cotter pin.

**20. INSTALL FRONT SUSPENSION ARM SUB-ASSY LOWER NO.1 LH**

- Install the front suspension arm sub-assy lower No.1 LH with the 2 bolts.
Torque: 225 N·m (2,294 kgf·cm, 166 ft·lbf)

**21. INSTALL TIE ROD END SUB-ASSY LH**

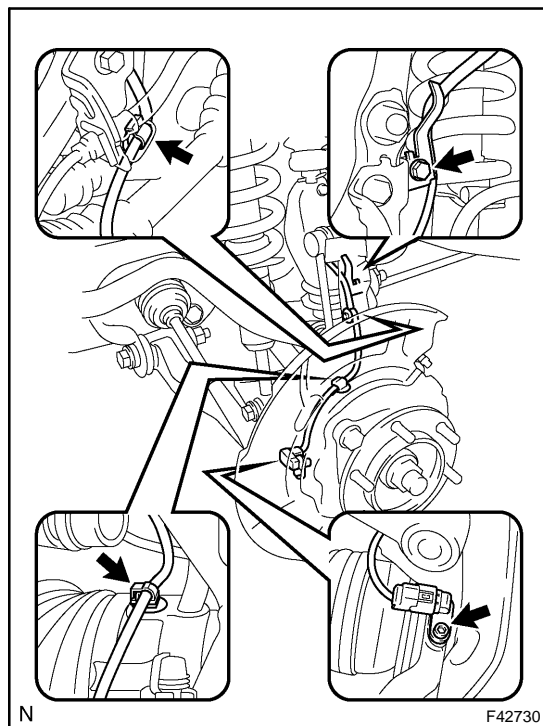
- Install the tie rod end sub-assy LH with a nut.
Torque: 91 N·m (928 kgf·cm, 67 ft·lbf)
- Install a new cotter pin.

**22. INSTALL FRONT STABILIZER LINK ASSY LH**

- Install the stabilizer link with a nut to the steering knuckle.
Torque: 70 N·m (714 kgf·cm, 52 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a hexagon (6 mm) wrench to hold the stud.

**23. INSTALL SPEED SENSOR FRONT LH (W/ ABS)**

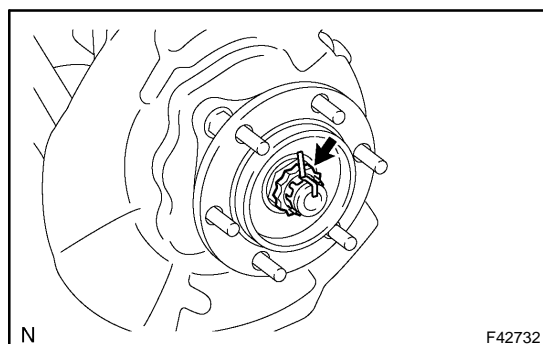
- (a) Install the speed sensor wire harness to the steering knuckle with a bolt.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

- (b) Connect the 2 clips.

- (c) Using a hexagon wrench, install the speed sensor with the bolt.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

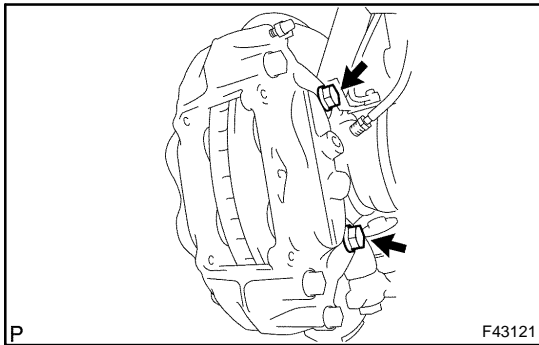
**24. INSTALL FRONT AXLE HUB LH NUT**

- (a) Install the hub nut.

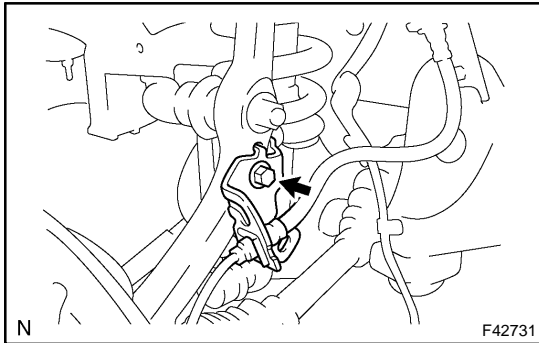
Torque: 235 N·m (2,396 kgf·cm, 173 ft·lbf)

- (b) Install the adjusting cap and a new cotter pin.

25. INSPECT BEARING BACKLASH (See page 30-2)**26. INSPECT AXLE HUB DEVIATION (See page 30-2)****27. INSTALL FRONT AXLE HUB GREASE CAP LH****28. INSTALL FRONT DISC**



- 29. INSTALL FRONT DISC BRAKE CALIPER ASSY LH**
 (a) Install the front disc brake caliper assy LH with the 2 bolts.
Torque: 123 N·m (1,254 kgf·cm, 91 ft·lbf)



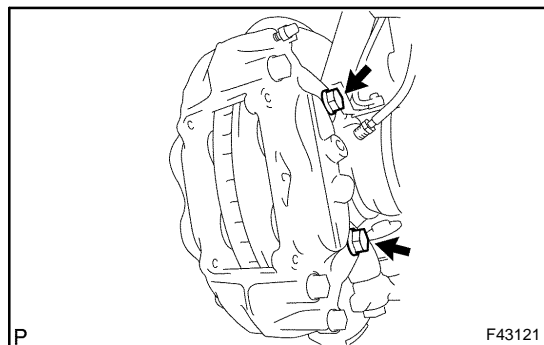
- (b) Install the brake tube bracket to the steering knuckle with a bolt.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)
 (c) Using SST, connect the brake tube to the disc brake caliper assy.
 SST 09023-00101
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

- 30. BLEED BRAKE LINE (See page 32-4)**
31. CHECK FLUID LEVEL IN RESERVOIR (See page 32-4)
32. CHECK BRAKE FLUID LEAKAGE (See page 32-4)
33. INSTALL FRONT WHEEL
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
34. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-7)
35. CHECK ABS SPEED SENSOR SIGNAL (W/ ABS) (See page 05-738)

FRONT AXLE LH HUB BOLT REPLACEMENT

300HD-03

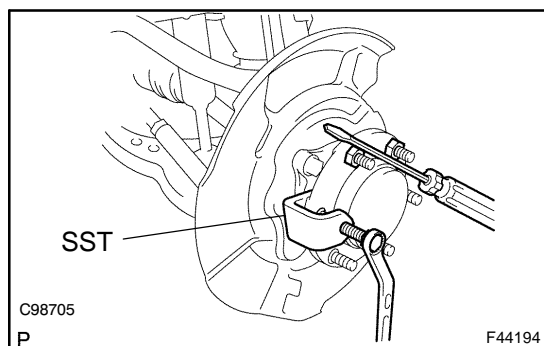
1. REMOVE FRONT WHEEL



2. REMOVE FRONT DISC BRAKE CALIPER ASSY LH

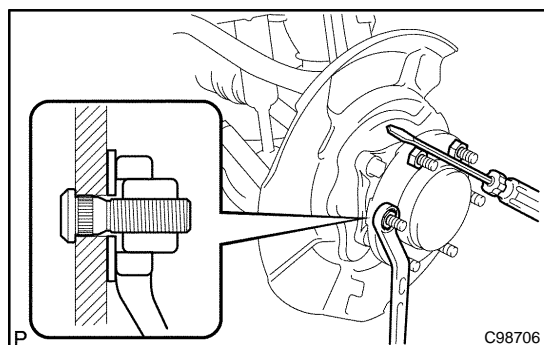
- (a) Using SST, disconnect the brake tube from the disc brake caliper assy.
SST 09023-00101
- (b) Remove the 2 bolts and disc brake caliper assy.

3. REMOVE FRONT DISC



4. REMOVE FRONT AXLE LH HUB BOLT

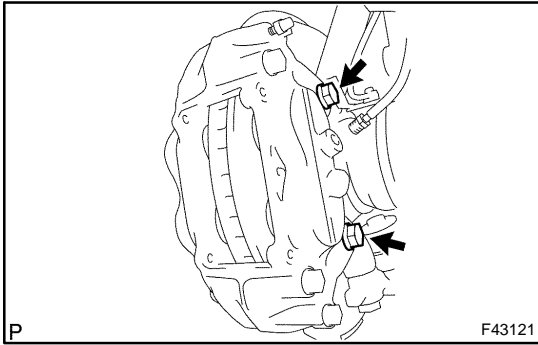
- (a) Using SST and a screwdriver, remove the hub bolt.
SST 09611-12010



5. INSTALL FRONT AXLE LH HUB BOLT

- (a) Pass a new hub bolt through the axle hub.
- (b) Pass a washer plate through the hub bolt as shown in the illustration, and install the hub bolt as tightening the hub nut.

6. INSTALL FRONT DISC

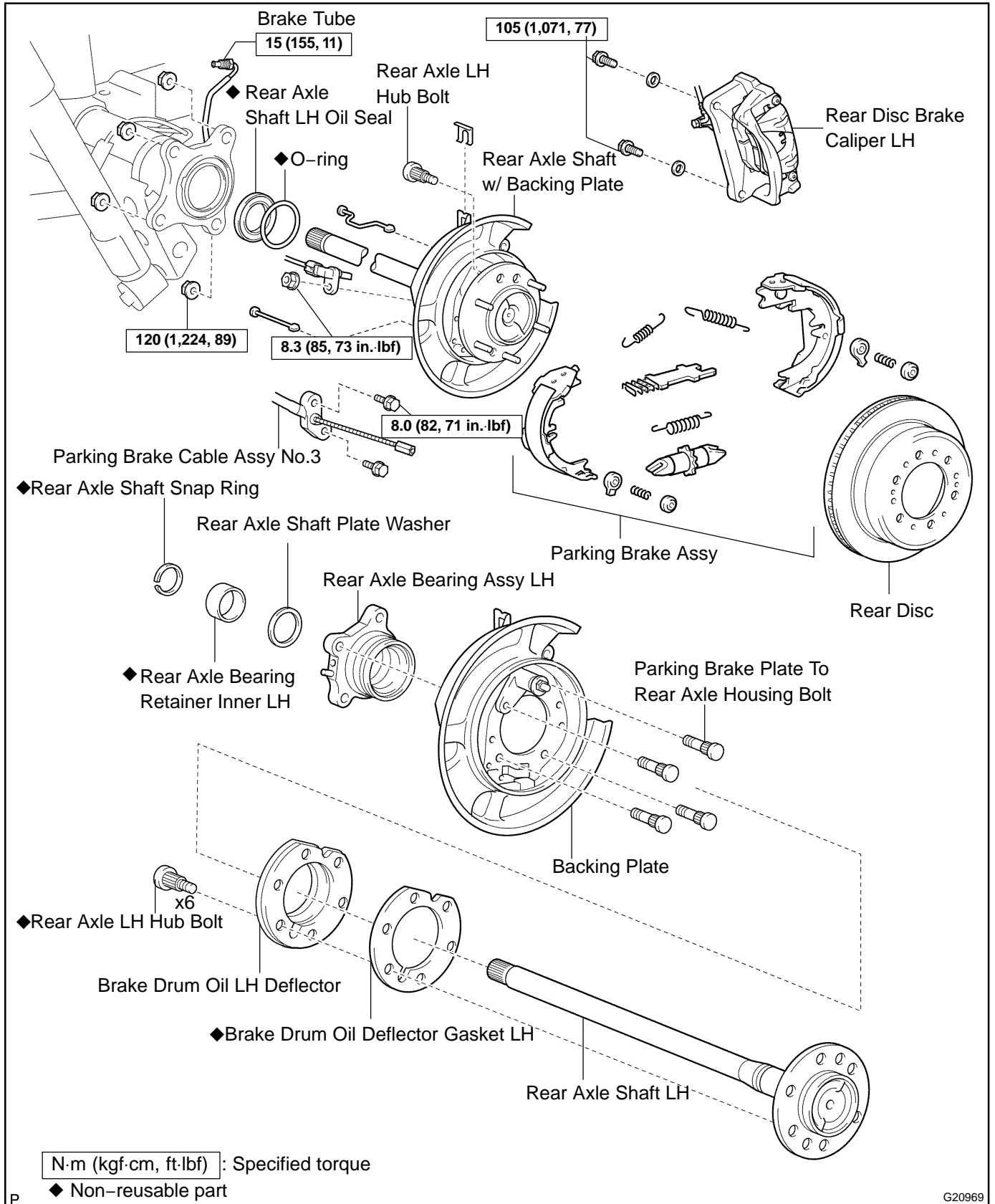


- 7. INSTALL FRONT DISC BRAKE CALIPER ASSY LH**
- (a) Install the disc brake caliper assy with the 2 bolts.
Torque: 123 N·m (1,254 kgf·cm, 91 ft·lbf)
 - (b) Using SST, connect the brake tube to the disc brake caliper assy.
SST 09023-00101
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

- 8. **BLEED BRAKE LINE (See page 32-4)**
- 9. **CHECK FLUID LEVEL IN RESERVOIR (See page 32-4)**
- 10. **CHECK BRAKE FLUID LEAKAGE (See page 32-4)**
- 11. **INSTALL FRONT WHEEL**
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)

REAR AXLE SHAFT LH COMPONENTS

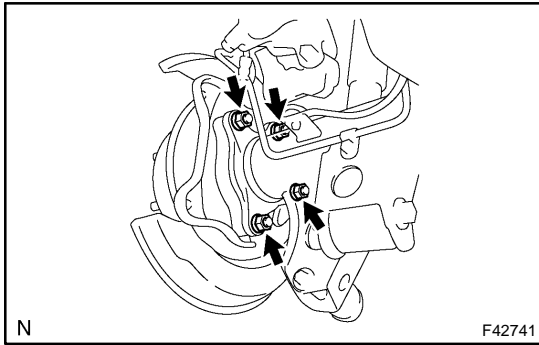
300HE-01



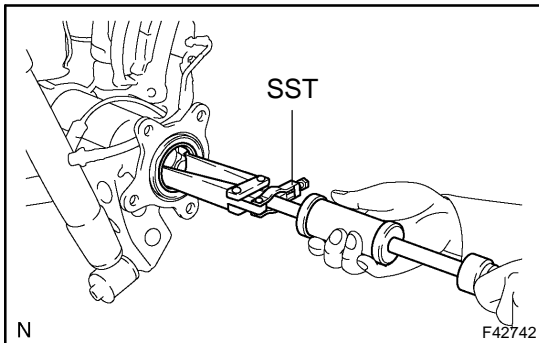
G20969

REPLACEMENT

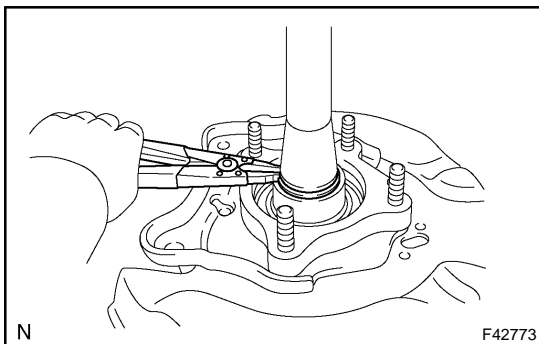
1. REMOVE REAR WHEEL
2. REMOVE SPEED SENSOR REAR LH (W/ ABS) (See page 32-50)
3. SEPARATE REAR DISC BRAKE CALIPER ASSY LH (See page 32-44)
4. REMOVE REAR DISC
5. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
6. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
7. REMOVE PARKING BRAKE SHOE STRUT LH (See page 33-12)
8. REMOVE PARKING BRAKE SHOE (See page 33-12)



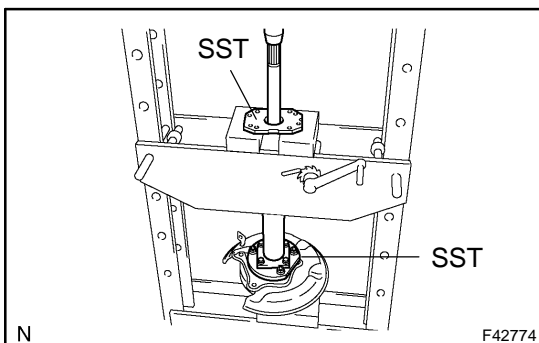
9. REMOVE REAR AXLE SHAFT W/BACKING PLATE
 - (a) Remove the 4 nuts and rear axle shaft w/backing plate.
 - (b) Remove a O-ring.



10. REMOVE REAR AXLE SHAFT LH OIL SEAL
 - (a) Using SST, remove the rear axle shaft oil seal.
SST 09308-00010



11. REMOVE REAR AXLE SHAFT LH SNAP RING
 - (a) Using a snap ring expander, remove the snap ring.



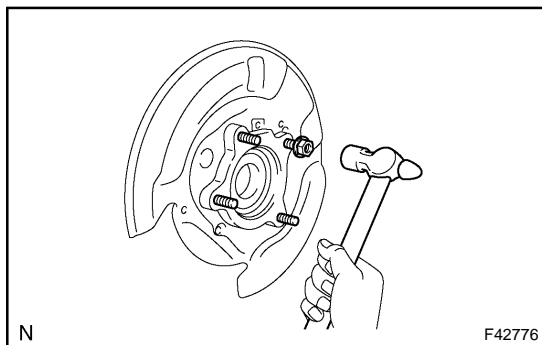
12. REMOVE REAR AXLE SHAFT LH
 - (a) Using SST and press, remove the rear axle shaft.
SST 09521-25011, 09521-25021

13. REMOVE REAR AXLE BEARING RETAINER INNER LH

- (a) Remove the rear axle bearing retainer inner LH from the rear axle bearing assy LH.

14. REMOVE REAR AXLE SHAFT LH WASHER

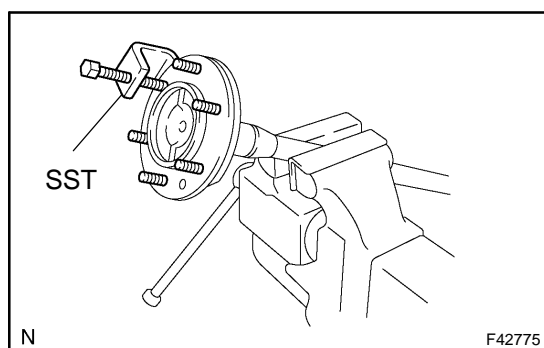
- (a) Remove the rear axle shaft plate washer from the rear axle bearing assy LH.

**15. REMOVE PARKING BRAKE PLATE TO REAR AXLE HOUSING BOLT**

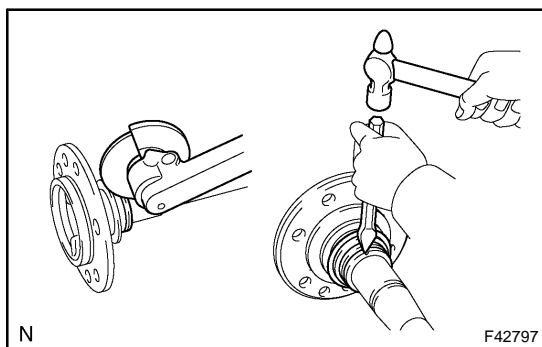
- (a) Attach 4 nuts to the parking brake plate to rear axle housing bolts.
 (b) Using a hammer, remove the 4 parking brake plate to rear axle housing bolts and rear axle bearing assy.

NOTICE:

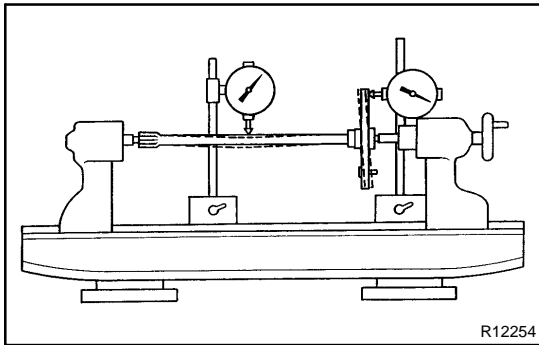
Do not reuse the nuts previously removed from the vehicle.

16. REMOVE REAR AXLE HUB & BEARING ASSY LH**17. REMOVE REAR AXLE LH HUB BOLT**

- (a) Using SST, remove the 6 hub bolts.
 SST 09650-17011

18. REMOVE BRAKE DRUM OIL LH DEFLECTOR**19. REMOVE BRAKE DRUM OIL DEFLECTOR GASKET LH****20. REMOVE REAR AXLE BEARING OIL SEAL**

- (a) Grind the rear axle bearing inner race surface using a grinder, then chisel them out with a chisel.
 (b) Remove the rear axle shaft oil seal from the rear axle shaft.

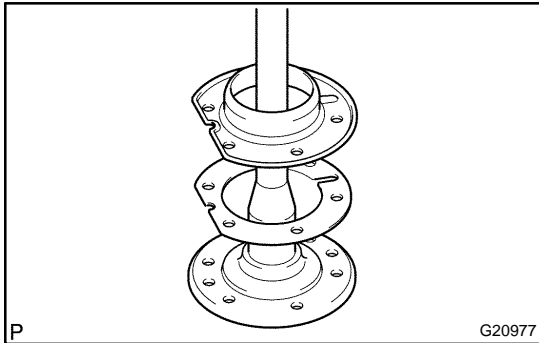
**21. INSPECT REAR AXLE SHAFT LH**

Maximum runout:

Shaft runout: 1.5 mm (0.0591 in.)

Flange runout: 0.05 mm (0.0020 in.)

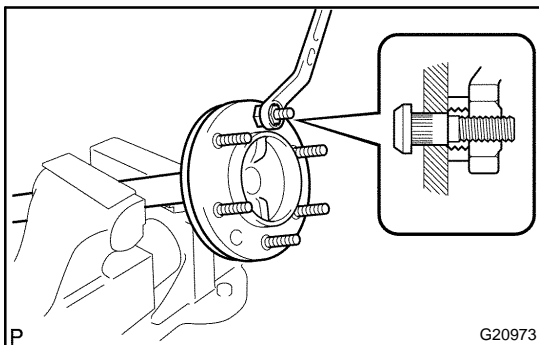
If the rear axle shaft or flange is damaged or worn, or runout is greater than the maximum, replace the rear axle shaft.

**22. INSTALL REAR AXLE LH HUB BOLT**

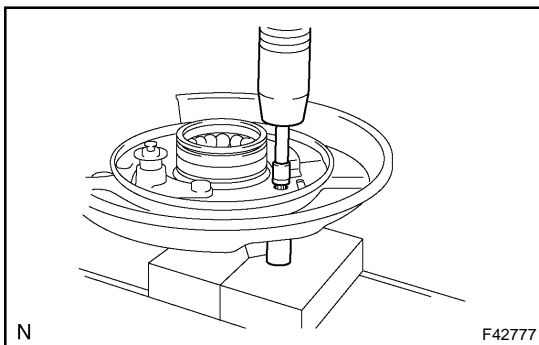
- (a) Install a new deflector gasket and deflector to the rear axle shaft.

HINT:

Align the 2 notches.



- (b) Pass the 6 bolts through the axle hub.
 (c) Pass a washer plate through the hub bolt as shown in the illustration, and install the hub bolt as tightening the hub nut.

23. INSTALL REAR AXLE HUB & BEARING ASSY LH**24. INSTALL PARKING BRAKE PLATE TO REAR AXLE HOUSING BOLT**

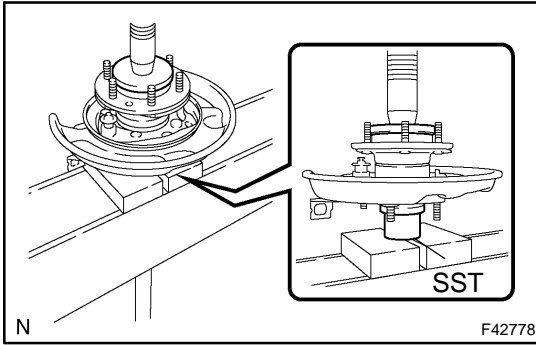
- (a) Position the backing plate on a rear axle bearing assy LH, and install the 4 parking brake plate to rear axle housing bolts using 2 socket wrenches and a press.

25. INSTALL REAR AXLE SHAFT LH WASHER

- (a) Install the rear axle shaft plate washer to the rear axle shaft LH.

26. INSTALL REAR AXLE BEARING RETAINER INNER LH

- (a) Install a new rear axle bearing retainer inner LH to the rear axle shaft LH.

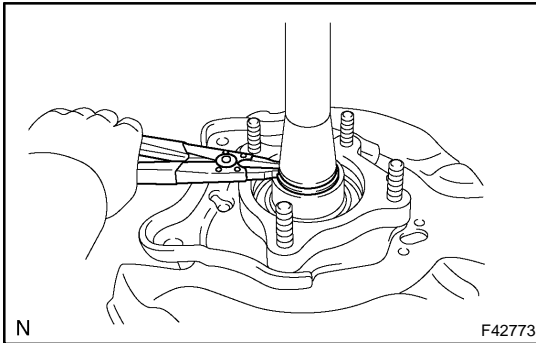
**27. INSTALL REAR AXLE SHAFT LH**

- (a) Using SST and a press, install the rear axle shaft LH to the rear axle bearing assy LH.

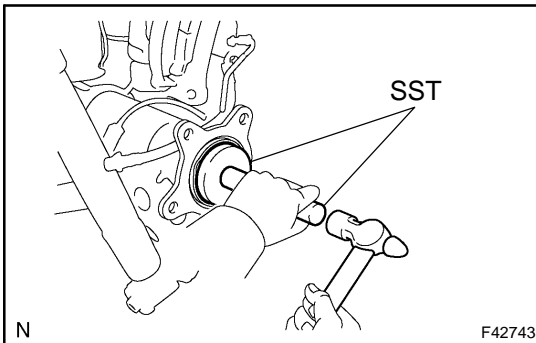
SST 09521-25011

NOTICE:

Do not damage the speed sensor rotor.

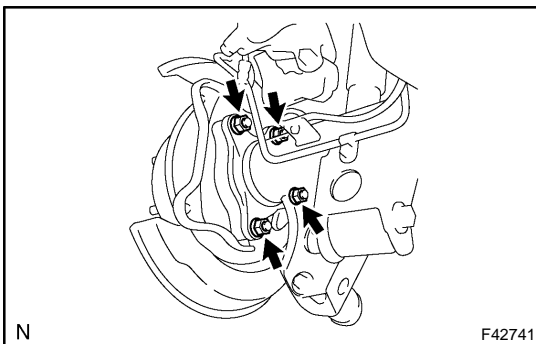
**28. INSTALL REAR AXLE SHAFT LH SNAP RING**

- (a) Using a snap ring expander, install a new rear axle shaft snap ring.

**29. INSTALL REAR AXLE SHAFT LH OIL SEAL**

- (a) Using SST and a hammer, install a new axle shaft oil seal.

SST 09950-60020 (09951-00770), 09950-70010
(09951-07150)

**30. INSTALL REAR AXLE SHAFT W/BACKING PLATE**

- (a) Install a new O-ring.
(b) Install the rear axle shaft w/backing plate with the 4 nuts.
Torque: 120 N·m (1,224 kgf·cm, 89 ft·lbf)

NOTICE:

- **Do not damage the speed sensor rotor.**
- **Inspect no damage and no foreign matter at the speed sensor rotor.**

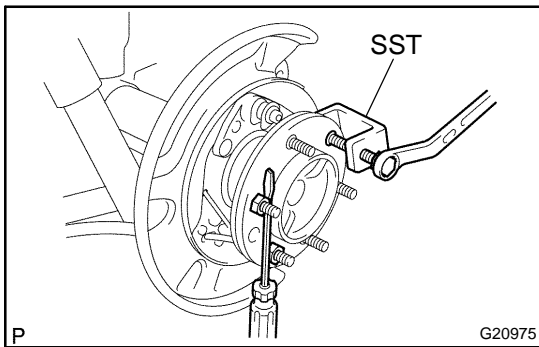
31. **INSTALL PARKING BRAKE SHOE (See page 33-12)**
 32. **INSTALL PARKING BRAKE SHOE STRUT LH (See page 33-12)**
 33. **INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)**
 34. **INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)**
 35. **INSTALL REAR DISC**
 36. **CONNECT REAR DISC BRAKE CALIPER ASSY LH (See page 32-44)**
 37. **INSTALL SPEED SENSOR REAR LH (W/ ABS) (See page 32-50)**
 38. **REFILL DIFFERENTIAL OIL (See page 29-3)**
 39. **INSPECT DIFFERENTIAL OIL (See page 29-3)**
 40. **FILL RESERVOIR WITH BRAKE FLUID (See page 32-4)**

41. BLEED MASTER CYLINDER (See page 32-4)
42. BLEED BRAKE LINE (See page 32-4)
43. INSPECT BRAKE FLUID LEVEL IN RESERVOIR (See page 32-4)
44. CHECK BRAKE FLUID LEAKAGE (See page 32-4)
45. INSTALL REAR WHEEL
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
46. INSPECT AND ADJUST PARKING BRAKE LEVER TRAVEL (See page 33-2)
47. CHECK ABS SPEED SENSOR SIGNAL (W/ ABS) (See page 05-738)

REAR AXLE LH HUB BOLT REPLACEMENT

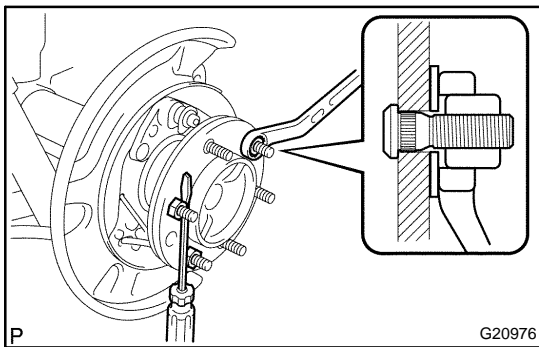
300HG-02

1. REMOVE REAR WHEEL
2. SEPARATE REAR DISC BRAKE CALIPER ASSY LH (See page 32-44)
3. REMOVE REAR DISC
4. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
5. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
6. REMOVE PARKING BRAKE SHOE STRUT LH (See page 33-12)
7. REMOVE PARKING BRAKE SHOE (See page 33-12)



8. REMOVE REAR AXLE LH HUB BOLT

- (a) Using SST, remove the hub bolt.
SST 09650-17011



9. INSTALL REAR AXLE LH HUB BOLT

- (a) Pass a new hub bolt through the axle hub.
- (b) Pass a washer plate through the hub bolt as shown in the illustration, and install the hub bolt as tightening the hub nut.

10. INSTALL PARKING BRAKE SHOE (See page 33-12)
11. INSTALL PARKING BRAKE SHOE STRUT LH (See page 33-12)
12. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
13. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
14. CHECK PARKING BRAKE INSTALLATION (See page 33-12)
15. INSTALL REAR DISC
16. INSTALL REAR DISC BRAKE CALIPER ASSY LH (See page 32-44)
17. ADJUST PARKING BRAKE SHOE CLEARANCE (See page 33-12)
18. INSTALL REAR WHEEL
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
19. INSPECT PARKING BRAKE LEVER TRAVEL (See page 33-2)
20. ADJUST PARKING BRAKE LEVER TRAVEL (See page 33-2)

TRANSFER SYSTEM

3102B-03

PRECAUTION

- Before disassembly, clean the transfer assy and remove any deposited sand or mud to prevent it from entering the inside of the transfer during disassembly and assembly.
- When removing any light alloy part such as a transfer cover, do not pry it off with a tool like a screwdriver but tap it out with a plastic hammer.
- Always organize the removed parts properly and protect them away from dust.
- After cleaning and drying completely before installation, apply hypoid gear oil to each part. Do not use alkaline chemicals when cleansing aluminum or rubber parts and ring gear set bolts. Also, do not use any cleansing oil (ex. white gasoline) to clean the rubber parts such as oil seals.
- Sufficiently apply hypoid gear oil to any sliding surface or rotating part.
- Do not directly hold a part by vise. Make sure to put an aluminum sheet between them.
- Replace any damaged or deformed snap ring with new one.
- If mating surface of the case is scratched, it may cause oil leakage. Therefore, carefully avoid such damage when handling.
- Using a razor blade and gasket scraper, remove old FIPG from seal surface.
- Clean all the components to remove the redundant FIPG completely.
- Clean sealing surface with solvent so that any residue does not remain on the seal surface.
- Apply FIPG in an approx. 1.2 mm (0.047 in.) diameter of bead state along the sealing surface.
- Be sure to assemble parts within 10 minutes of application. Otherwise, the FIPG must be removed and reapplied.
- Do not fill oil immediately after installing sealed parts. Leave it 1 hour or more.
- Scratches on the contact surface with an oil seal or gasket may result in oil leakage. Handle with care to prevent such damage.
- When press-fitting an oil seal, take care to prevent the oil seal lip and its periphery from being damaged.

TRANSFER SYSTEM

3102C-10

PROBLEM SYMPTOMS TABLE

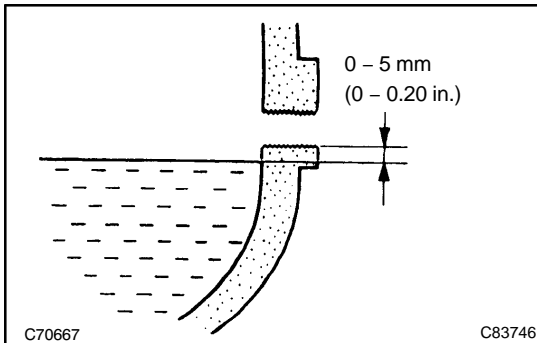
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order.

If necessary, replace these parts.

Symptom	Suspected Area	See page
Noise	3. Oil (Level low)	31-3
	4. Oil (Wrong)	31-3
	5. Transfer faulty	31-6
Oil leakage	1. Oil (Level too high)	31-3
	2. Gasket (Damaged)	31-12
	3. Oil seal (Worn or damaged)	31-12
	4. O-ring (Worn or damaged)	31-12
Shift from 4WD (H4) to 4WD (L4) impossible	1. Four wheel drive control switch	31-38
	2. Wire harness	-
	3. Four wheel drive control ECU	31-38
Shift from 4WD (L4) to 4WD (H4) impossible	1. Four wheel drive control switch	31-38
	2. Wire harness	-
	3. Four wheel drive control ECU	31-38

TRANSFER OIL ADJUSTMENT

3102D-04



1. INSPECT TRANSFER OIL

- (a) Remove the case plug No.1 (filler plug) and gasket.
- (b) Check the oil level is within 0 – 5 mm (0 – 0.20 in.) down from the lowest end of the hole for case plug No.1 (filler plug).

NOTICE:

- **When changing oil, recheck the oil level after driving.**
- **Excessively large or small quantity of oil may cause some trouble.**

- (c) When the oil level is too low, check for oil leakage.
- (d) Tighten the case plug No.1 (filler plug) with a new gasket.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

2. ADJUST TRANSFER OIL

- (a) Remove the case plug No.1 (filler plug) and gasket, and supply oil.

Oil Grade: GL-5

Viscosity: SAE 75W – 90

Capacity: 1.4 liters (1.5 US qts, 1.2 Imp. qts)

NOTICE:

- **When supplying oil, pour it slowly.**
- **Repeat supplying oil several times at several minutes interval.**

HINT:

Within 0 – 5 mm (0 – 0.20 in.) down from the lowest end of the hole for the case plug No.1 (filler plug).

- (b) After leaving it alone for 5 min., check the oil level again.
- (c) Tighten the case plug No.1 (filler plug) with a new gasket.

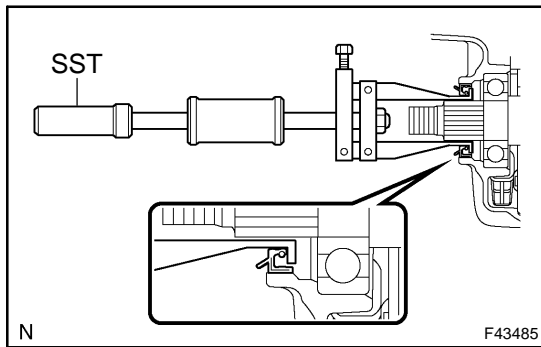
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

TRANSFER CASE OIL SEAL REPLACEMENT

HINT:

COMPONENTS : See page 31-6

1. DRAIN TRANSFER OIL
2. REMOVE TRANSFER CASE LOWER PROTECTOR
3. REMOVE AUTOMATIC TRANSMISSION ASSY
 - (a) 2UZ-FE : (See page 40-14)
4. REMOVE OUTPUT SHAFT COMPANION FLANGE SUB-ASSY (See page 31-6, 31-12)

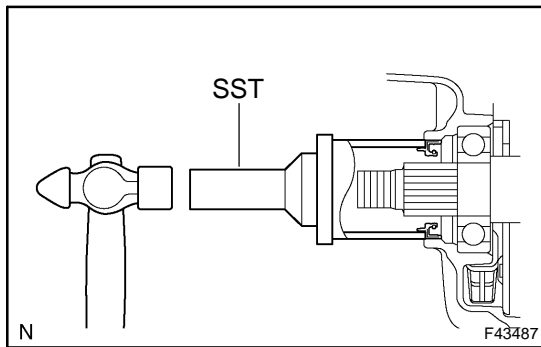


5. REMOVE TRANSFER CASE OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09308-00010

NOTICE:

Do not damage the oil-seal-fitted surface of the case.



6. INSTALL TRANSFER CASE OIL SEAL

- (a) Coat the lip of a new oil seal with MP grease.
- (b) Using SST and a hammer, drive in the oil seal until its surface is flush with the case upper surface.
SST 09316-60011 (09316-00011)

7. INSTALL OUTPUT SHAFT COMPANION FLANGE SUB-ASSY (See page 31-6, 31-12)
8. INSTALL AUTOMATIC TRANSMISSION ASSY
 - (a) 2UZ-FE : (See page 40-14)
9. INSTALL TRANSFER CASE LOWER PROTECTOR
 - (a) Install the 4 bolts and transfer case lower protector.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)
10. ADD TRANSFER OIL (See page 31-3)

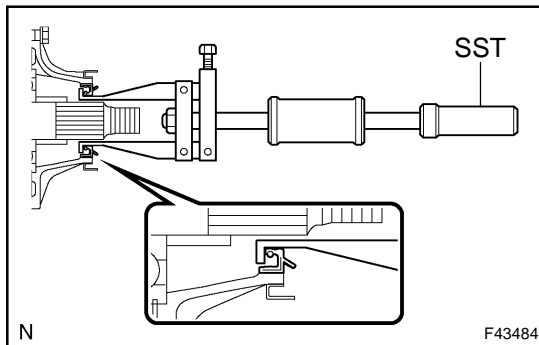
TRANSFER EXTENSION HOUSING TYPE T OIL SEAL REPLACEMENT

3102G-06

HINT:

COMPONENTS : See page 31-6

1. DRAIN TRANSFER OIL
2. REMOVE TRANSFER CASE LOWER PROTECTOR
3. REMOVE AUTOMATIC TRANSMISSION ASSY
 - (a) 2UZ-FE : (See page 40-14)
4. REMOVE OUTPUT SHAFT COMPANION FLANGE SUB-ASSY (See page 31-12)

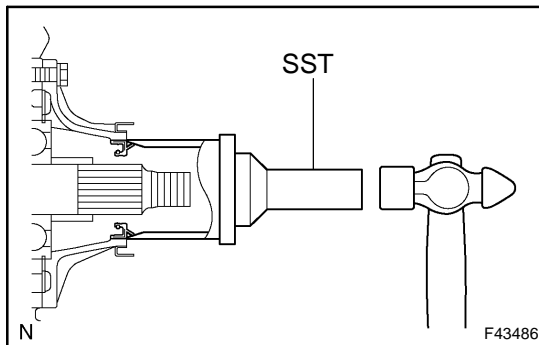


5. REMOVE TRANSFER EXTENSION HOUSING TYPE T OIL SEAL

- (a) Using SST, remove the oil seal.
SST 09308-00010

NOTICE:

Do not damage the oil-seal fitted surface of the extension housing sub-assy rear.

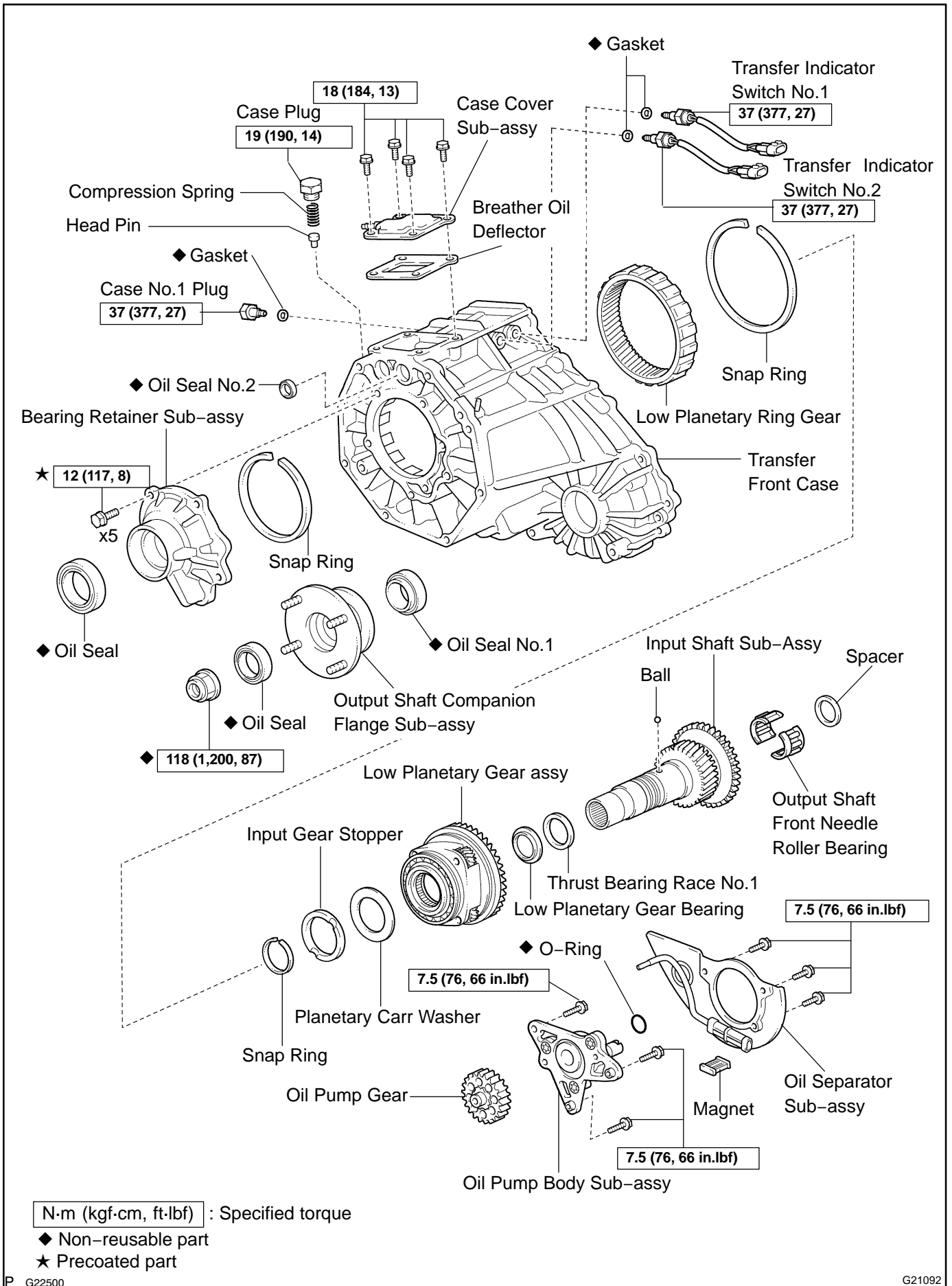


6. INSTALL TRANSFER EXTENSION HOUSING TYPE T OIL SEAL

- (a) Coat the lip of a new oil seal with the MP grease.
- (b) Using SST and a hammer, drive in the oil seal until its surface is flush with the housing upper surface.
SST 09223-46011, 09631-32020

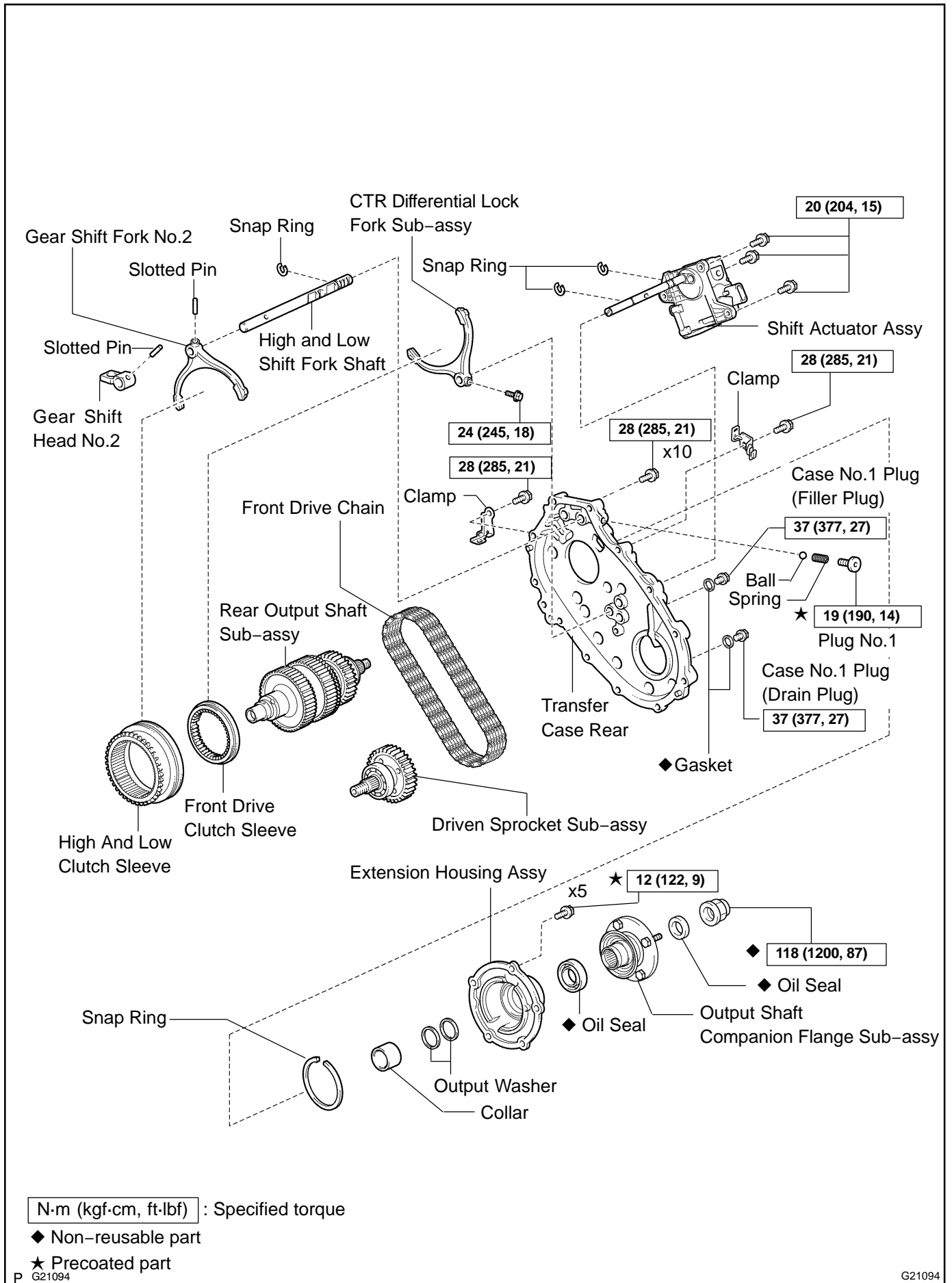
7. INSTALL OUTPUT SHAFT COMPANION FLANGE SUB-ASSY (See page 31-12)
8. INSTALL AUTOMATIC TRANSMISSION ASSY
 - (a) 2UZ-FE : (See page 40-14)
9. INSTALL TRANSFER CASE LOWER PROTECTOR
 - (a) Install the 4 bolts and transfer case lower protector.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)
10. ADD TRANSFER OIL (See page 31-3)

TRANSFER - TRANSFER ASSY

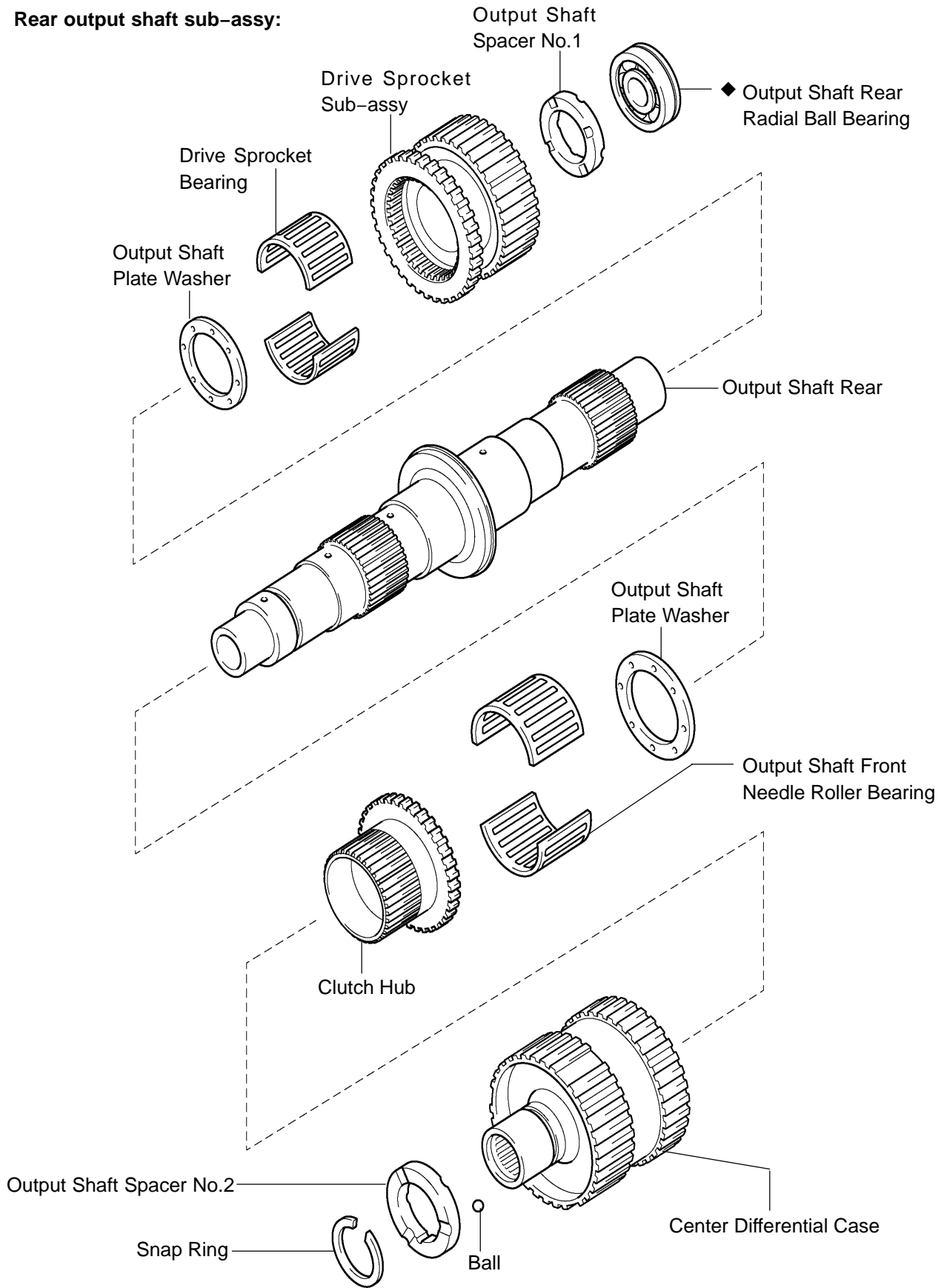


P G22500

G21092



Rear output shaft sub-assy:

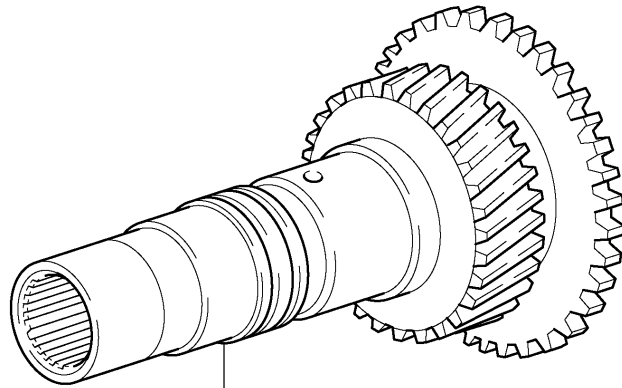
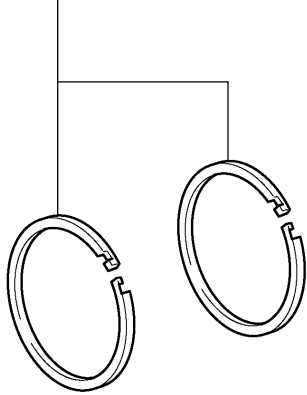


◆ Non-reusable part

G21093

Input shaft sub-assy:

◆ Seal Ring No.1



Input Shaft

◆ Non-reusable part

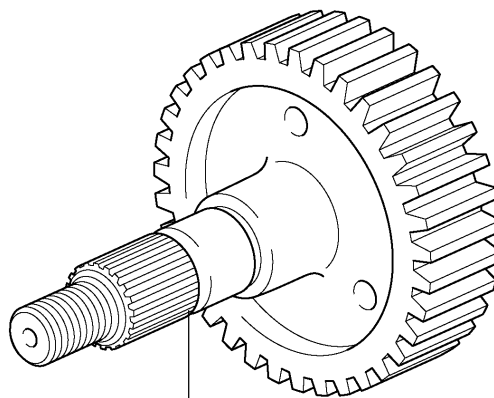
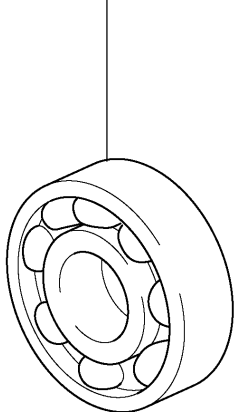
N

F43496

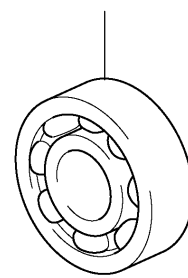
Driven sprocket sub-assy:

◆ Input Gear Radial Ball Bearing

◆ Driven Sprocket Bearing



Driven Sprocket

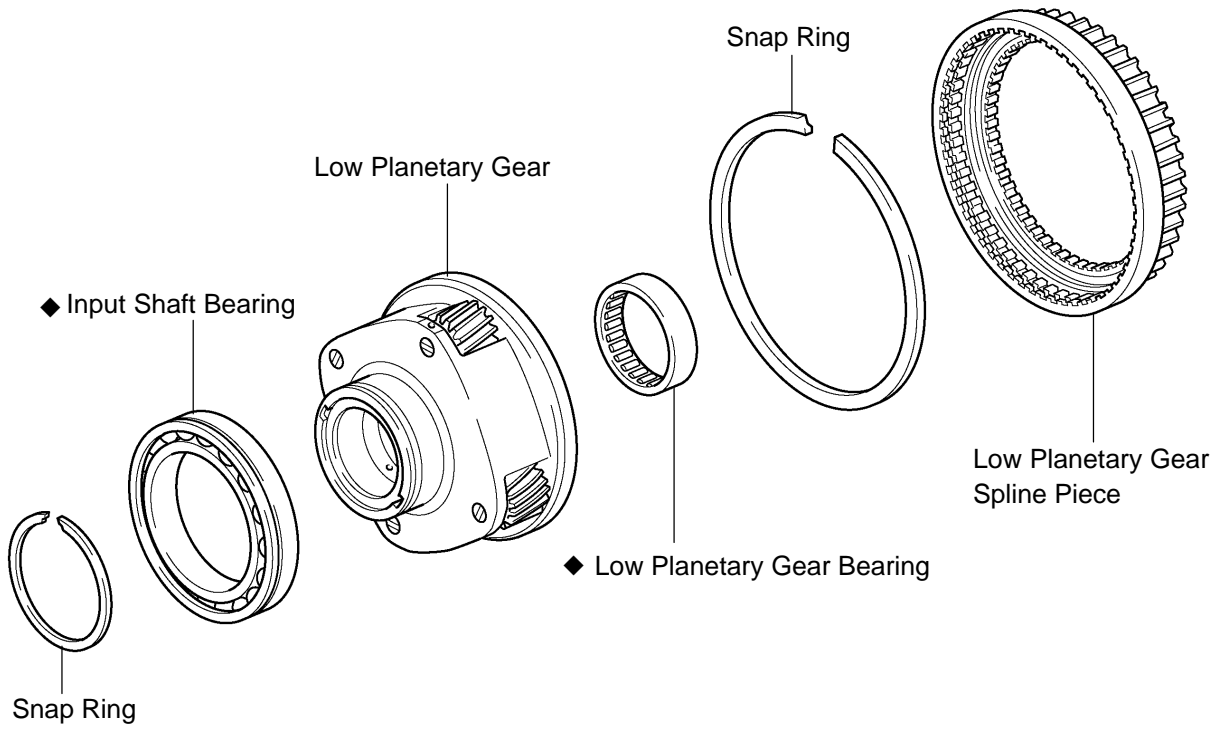


◆ Non-reusable part

N

F43494

Low planetary gear assy:



N ◆ Non-reusable part

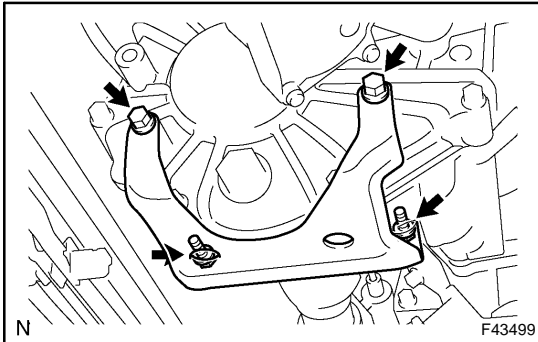
F43495

OVERHAUL

HINT:

COMPONENTS : See page 31-6

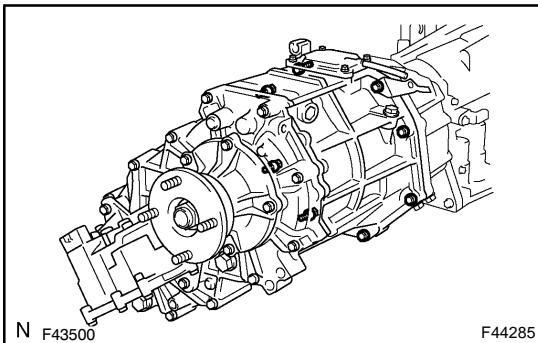
1. DRAIN TRANSFER OIL



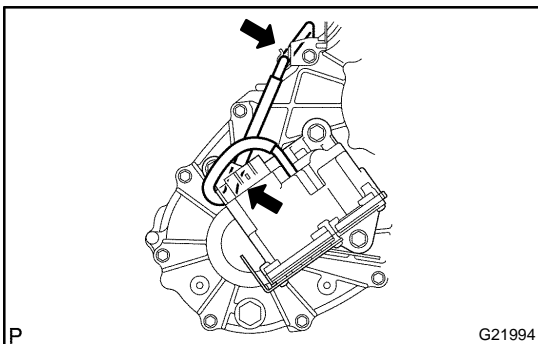
- 2. REMOVE TRANSFER CASE LOWER PROTECTOR**
 (a) Remove the 4 bolts and transfer case lower protector.

3. REMOVE AUTOMATIC TRANSMISSION ASSY

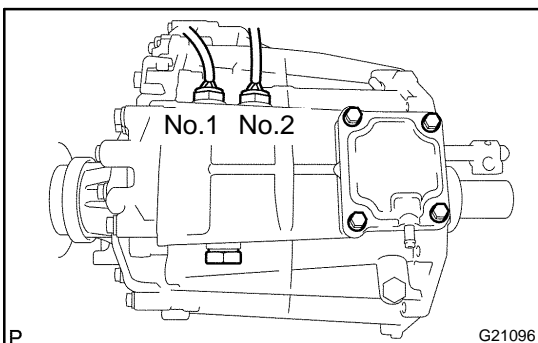
- (a) 2UZ-FE : (See page 40-14)



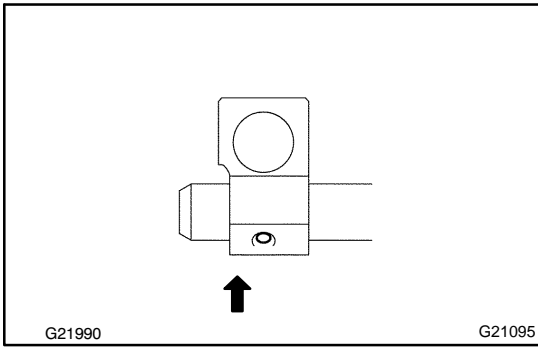
- 4. REMOVE TRANSFER ASSY**
 (a) Remove the 8 bolts and 2 clamps from the transmission.



- 5. REMOVE HOSES**
 (a) Remove an actuator motor breather hose.

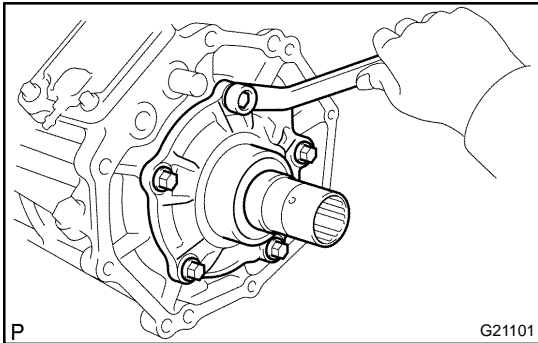


- 6. REMOVE SWITCH**
 (a) Remove the indicator No.1 and No.2 switches, case No.1 plug and gaskets.



7. REMOVE TRANSFER GEAR SHIFT HEAD NO.2

- (a) Using a pin punch and hammer, remove the slotted pin from the gear shift head No.2.

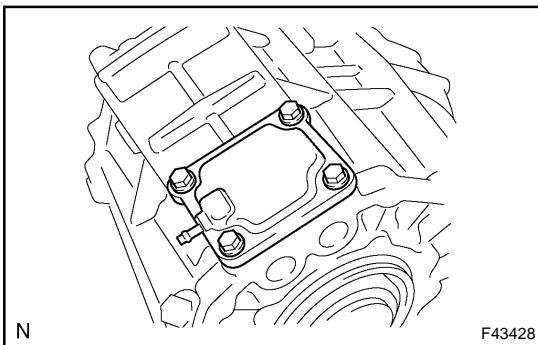


8. REMOVE TRANSFER RH BEARING RETAINER SUB-ASSY

- (a) Remove the 5 bolts and the bearing retainer sub-assy.
HINT:
If necessary, tap the extension housing with a plastic hammer to remove it.

9. REMOVE TRANSFER COVER TYPE T OIL SEAL

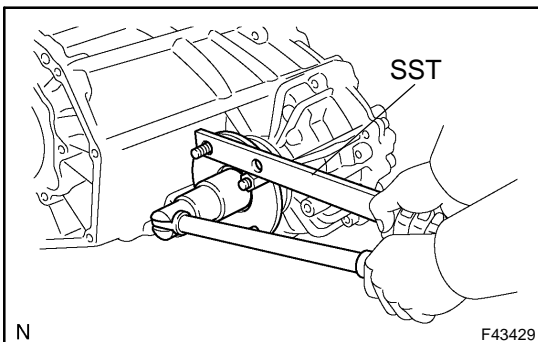
- (a) Using a screwdriver and hammer, remove the oil seal from the bearing retainer sub-assy.



10. REMOVE TRANSFER CASE COVER SUB-ASSY

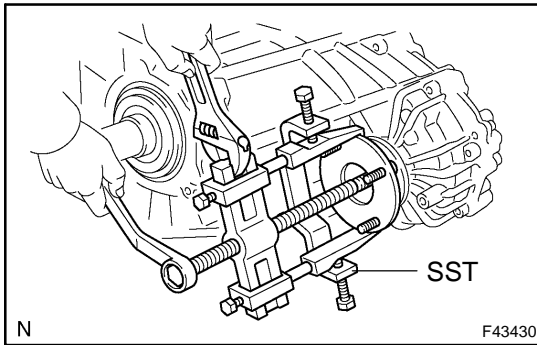
- (a) Remove the 4 bolts and case cover sub-assy.

11. REMOVE BREATHER OIL DEFLECTOR



12. REMOVE OUTPUT SHAFT COMPANION FLANGE SUB-ASSY

- (a) Using a chisel and hammer, loosen the staked part of the output shaft companion flange lock nut.(front)
(b) Using SST to hold the output shaft companion flange, remove the output shaft companion flange lock nut.(front)
SST 09330-0021



- (c) Using SST, remove the output shaft companion flange sub-assy (front).

SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04051, 09957-04010, 09958-04011)

13. REMOVE TRANSFER OUTPUT SHAFT COMPANION FLANGE OIL SEAL

- (a) Using a screwdriver and hammer, remove the oil seal from the output shaft companion flange sub-assy (front).

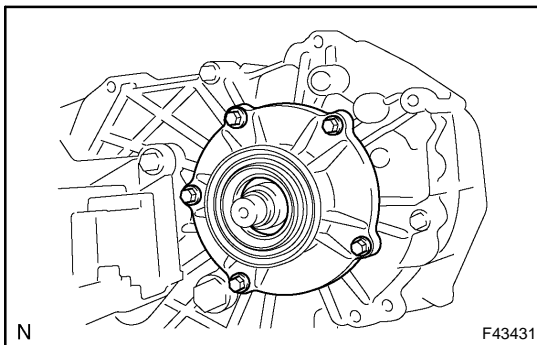
14. REMOVE OUTPUT SHAFT COMPANION FLANGE SUB-ASSY

- (a) Remove the rear output shaft companion flange sub-assy in the same way as the front output shaft companion flange sub-assy (rear).

SST 09330-00021, 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04051, 09957-04010, 09958-04011)

15. REMOVE TRANSFER OUTPUT SHAFT COMPANION FLANGE OIL SEAL

- (a) Using a screwdriver and hammer, remove the oil seal from the rear output shaft companion flange sub-assy (rear).



16. REMOVE EXTENSION HOUSING ASSY

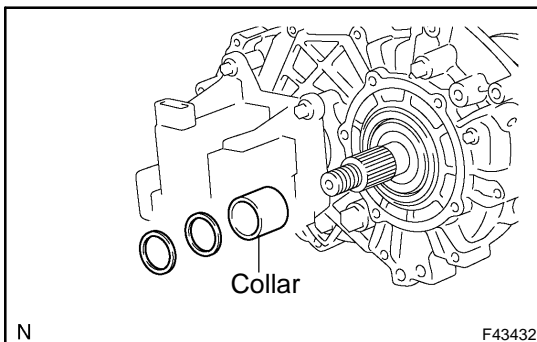
- (a) Remove the 5 bolts and extension housing assy.

HINT:

If necessary, tap the extension housing assy rear with a plastic hammer to remove it.

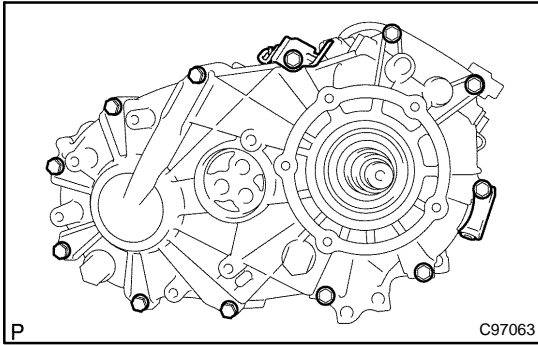
17. REMOVE TRANSFER EXTENSION HOUSING TYPE T OIL SEAL

- (a) Using a screwdriver and hammer, remove the oil seal.



18. REMOVE TRANSFER OUTPUT WASHER

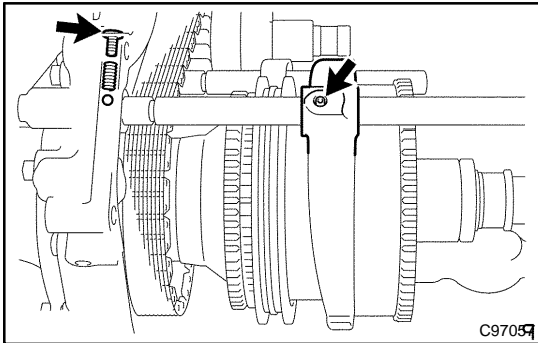
- (a) Remove the 2 output washers and collar.

**19. REMOVE TRANSFER CASE REAR**

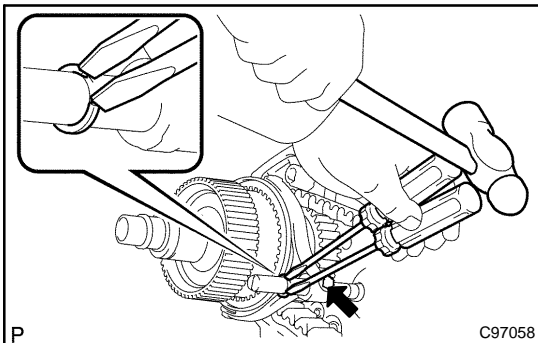
- (a) Remove the 12 bolts and 2 clamps.
- (b) Remove the transfer case rear.

HINT:

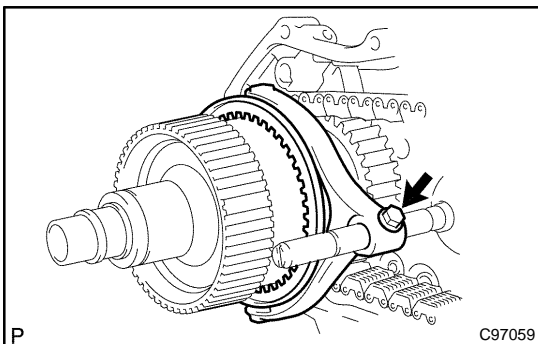
If necessary, tap the transfer case rear with a plastic hammer to remove it.

**20. REMOVE TRANSFER GEAR SHIFT FORK NO.2 W/TRANSFER HIGH AND LOW CLUTCH SLEEVE**

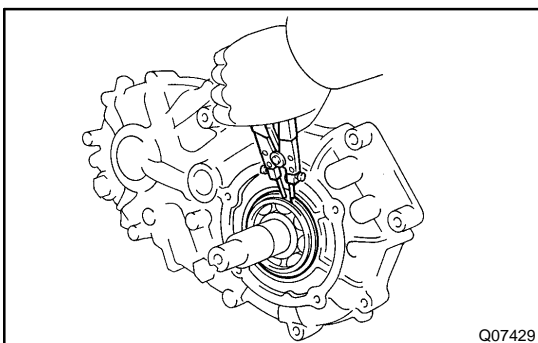
- (a) Using a hexagon wrench, remove the plug No.1.
- (b) Using a magnetic finger, remove the spring and ball from the hole.
- (c) Using a pin punch and hammer, drive out the slotted spring pin.
- (d) Remove the gear shift fork No.2 and high and low shift fork shaft.
- (e) Remove the high and low clutch sleeve.

**21. REMOVE CTR DIFFERENTIAL LOCK FORK SUB-ASSY W/FRONT DRIVE CLUTCH SLEEVE**

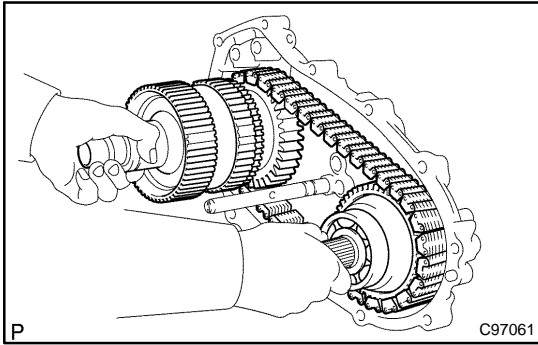
- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.



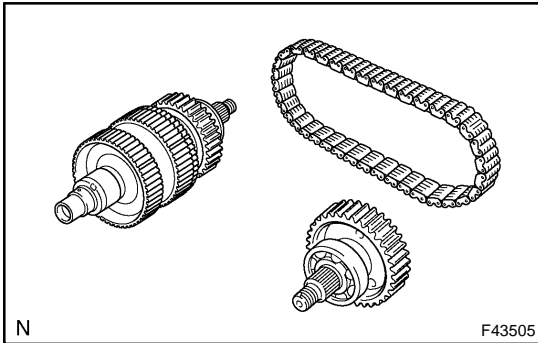
- (b) Remove the bolt, CTR differential lock fork sub-assy and front drive clutch sleeve.

**22. REMOVE REAR OUTPUT SHAFT SUB-ASSY, FRONT DRIVE CHAIN AND DRIVEN SPROCKET SUB-ASSY**

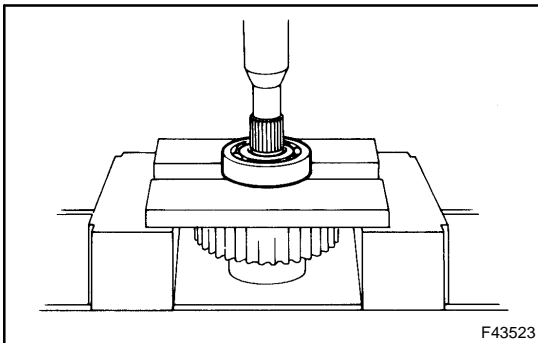
- (a) Using a snap ring expander, remove the snap ring.
- (b) Mount the transfer case rear in a vise.



- (c) Using a plastic hammer, carefully tap the transfer case rear, and remove the rear output shaft sub-assy together with front drive chain and driven sprocket sub-assy.

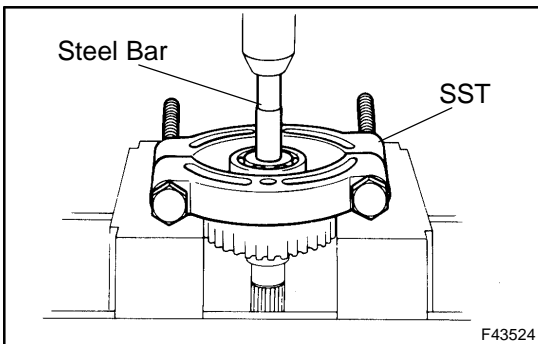


- (d) Remove the rear output shaft sub-assy, front drive chain and driven sprocket sub-assy.



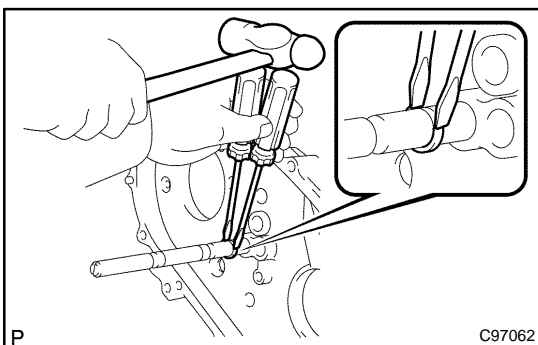
23. REMOVE TRANSFER DRIVEN SPROCKET BEARING

- (a) Using a press, remove the driven sprocket bearing.



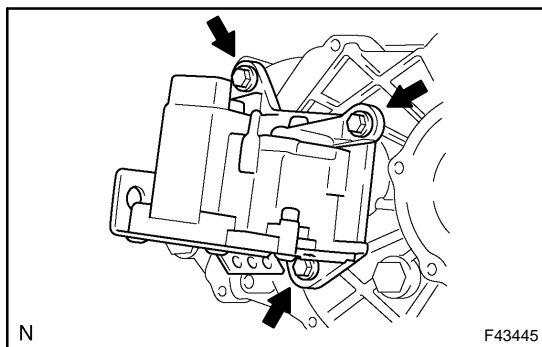
24. REMOVE TRANSFER INPUT GEAR RADIAL BALL BEARING

- (a) Using SST, a press and steel bar, remove the transfer input gear radial ball bearing.
SST 09555-55010



25. REMOVE TRANSFER SHIFT ACTUATOR ASSY

- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.



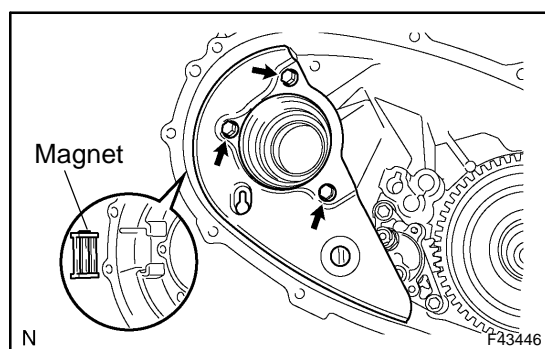
- (b) Remove the 3 bolts and transfer shift actuator assy.

26. REMOVE TRANSFER CASE NO.1 PLUG

- (a) Remove the transfer case plug No.1 (filler plug) and gasket.

27. REMOVE TRANSFER CASE NO.1 PLUG

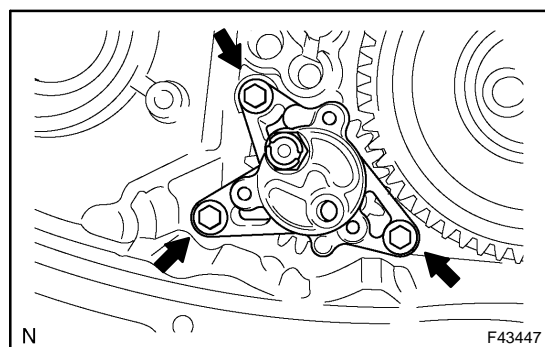
- (a) Remove the transfer case plug No.1 (drain plug) and gasket.



28. REMOVE TRANSFER OIL SEPARATOR SUB-ASSY

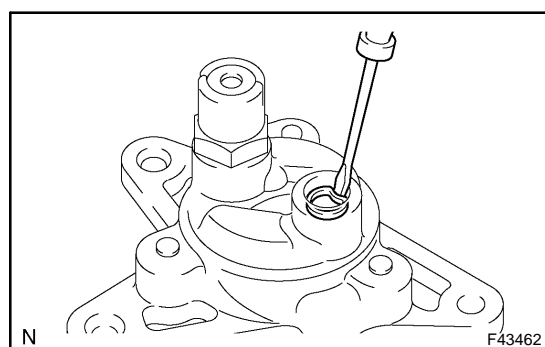
- (a) Remove the 3 bolts and oil separator sub-assy.

29. REMOVE TRANSFER CASE MAGNET



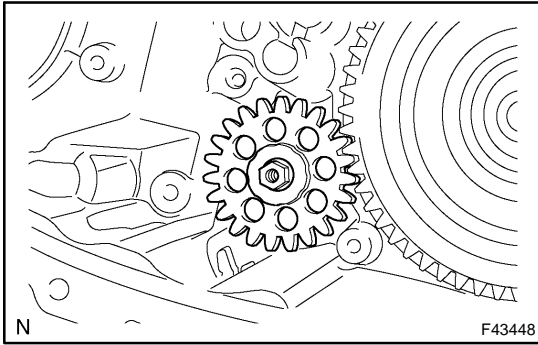
30. REMOVE TRANSFER OIL PUMP BODY SUB-ASSY

- (a) Remove the 3 bolts and oil pump body sub-assy.

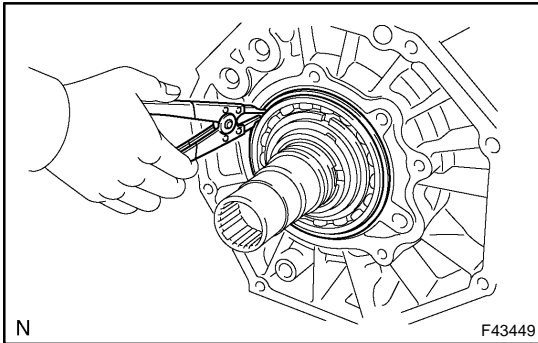


31. REMOVE TRANSFER OIL PUMP BODY O-RING

- (a) Using a screwdriver, remove the oil pump body O-ring.

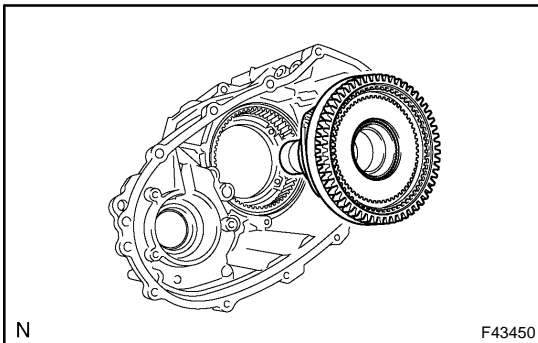


32. REMOVE TRANSFER OIL PUMP GEAR

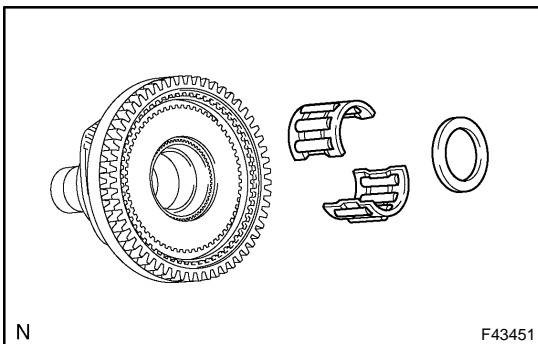


33. REMOVE LOW PLANETARY GEAR ASSY W/INPUT SHAFT SUB-ASSY

(a) Using a snap ring expander, remove the snap ring.



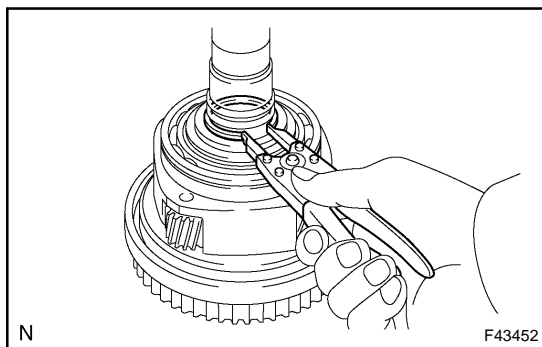
(b) Remove the low planetary gear assy and input shaft sub-assy.



34. REMOVE TRANSFER OUTPUT SHAFT SPACER 35. REMOVE TRANSFER OUTPUT SHAFT FRONT NEEDLE ROLLER BEARING

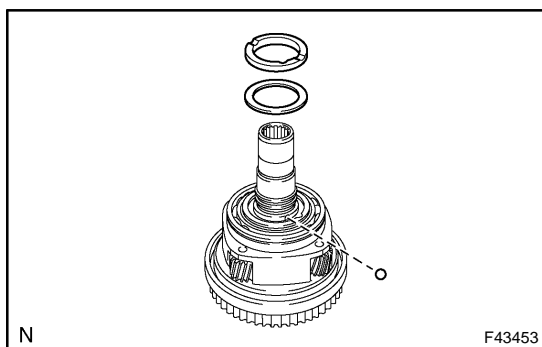
36. REMOVE TRANSFER CASE OIL SEAL

- (a) Using a screwdriver and hammer, remove the transfer case oil seal (No.1).
 (b) Using a screwdriver and hammer, remove the transfer case oil seal (No.2).

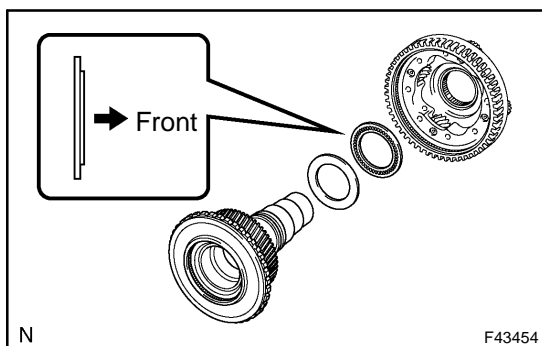


37. REMOVE TRANSFER INPUT GEAR STOPPER SHAFT SNAP RING

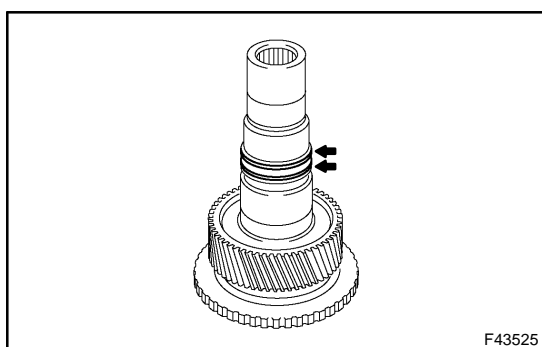
- (a) Using a snap ring expander, remove the input gear stopper shaft snap ring.



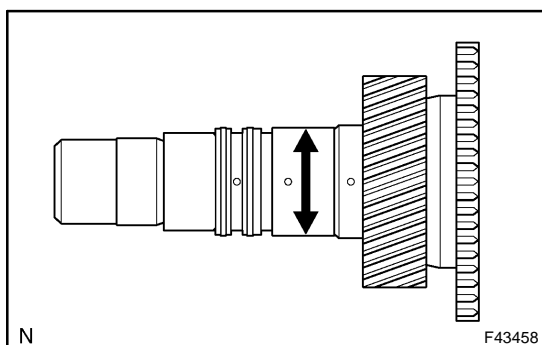
38. REMOVE TRANSFER INPUT GEAR STOPPER
39. REMOVE TRANSFER INPUT GEAR STOPPER BALL
40. REMOVE MANUAL TRANSFER PLANETARY CARR WASHER



41. REMOVE TRANSFER INPUT SHAFT
42. REMOVE TRANSFER THRUST BEARING RACE NO.1
43. REMOVE TRANSFER LOW PLANETARY GEAR BEARING



44. REMOVE TRANSFER INPUT SHAFT SEAL RING NO.1

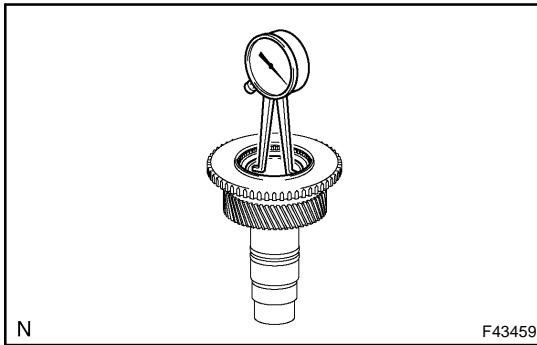


45. INSPECT TRANSFER INPUT SHAFT

- (a) Using a micrometer, measure the outer diameter of the input shaft journal surface.

Minimum diameter: 47.59 mm (1.8736 in.)

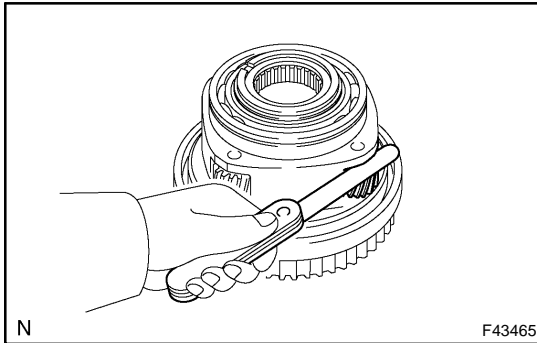
If the outer diameter is less than the minimum, replace the input shaft.



- (b) Using a dial indicator, measure the inside diameter of the input shaft bushing.

Maximum diameter: 48.14 mm (1.8953 in.)

If the inside diameter exceeds the maximum, replace the input shaft.



46. INSPECT PLANETARY PINION GEAR THRUST CLEARANCE

- (a) Using a feeler gauge, measure the thrust clearance of the planetary pinion gear.

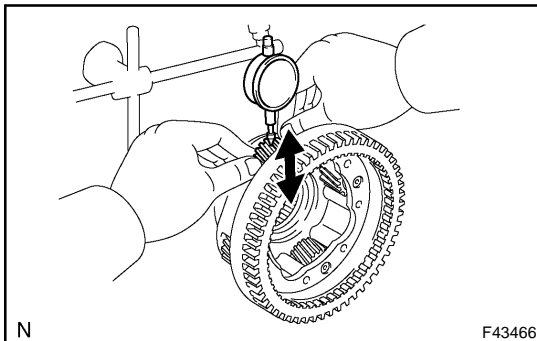
Standard clearance:

0.11 - 0.84 mm (0.0043 - 0.0331 in.)

Maximum clearance:

0.84 mm (0.0331 in.)

If the clearance exceeds the maximum, replace the planetary gear assy.



47. INSPECT PLANETARY PINION GEAR RADIAL CLEARANCE

- (a) Using a dial indicator, measure the radial clearance of the planetary pinion gear.

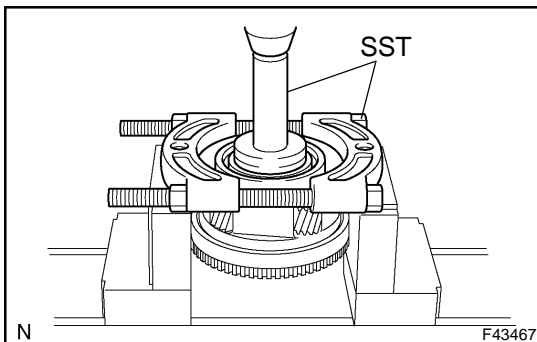
Standard clearance:

0.009 - 0.038 mm (0.0004 - 0.0015 in.)

Maximum clearance:

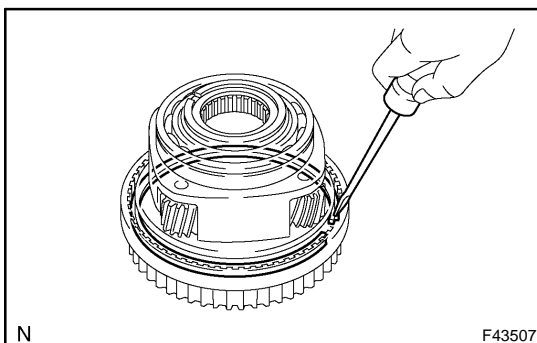
0.038 mm (0.0015 in.)

If the clearance exceeds the maximum, replace the planetary gear assy.



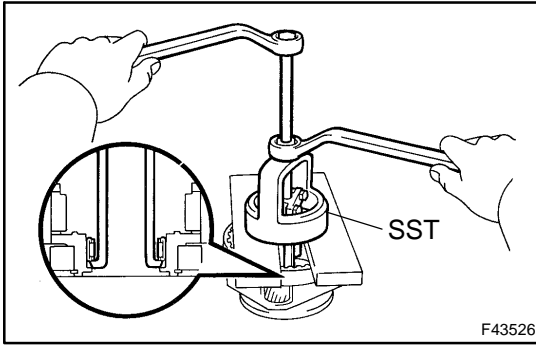
48. REMOVE TRANSFER INPUT SHAFT BEARING

- (a) Using a snap ring expander, remove the snap ring.
 (b) Using SST and a press, remove the input shaft bearing.
 SST 09554-30011, 09555-55010



49. REMOVE TRANSFER LOW PLANETARY GEAR SPLINE PIECE

- (a) Using a screwdriver, remove the snap ring.
 (b) Remove the low planetary gear spline piece.

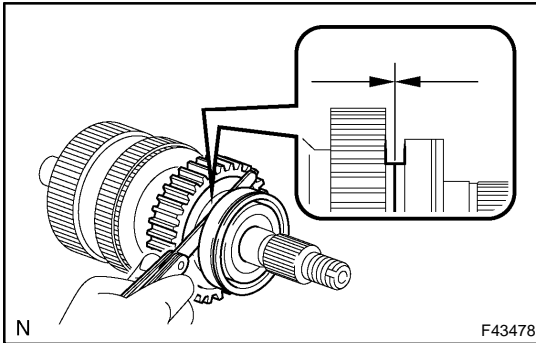


50. REMOVE TRANSFER LOW PLANETARY GEAR BEARING

- (a) Using SST, remove the low planetary gear bearing.
SST 09612-65014 (09612-01030, 09612-01050)

NOTICE:

Hang SST securely to the clearance between the bearing and low planetary gear.



51. INSPECT DRIVE SPROCKET THRUST CLEARANCE

- (a) Using a feeler gauge, measure the thrust clearance of the drive sprocket.

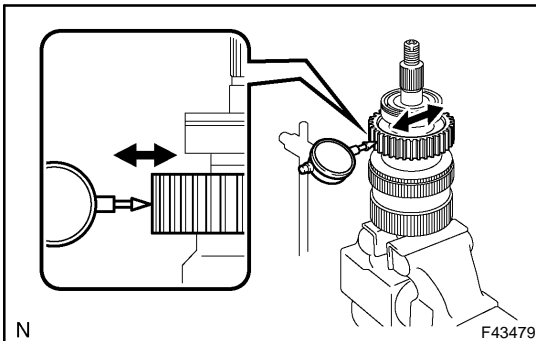
Standard clearance:

0.15 - 0.24 mm (0.0059 - 0.0094 in.)

Maximum clearance:

0.24 mm (0.0094 in.)

If the clearance exceeds the maximum, replace the drive sprocket.



52. INSPECT DRIVE SPROCKET RADIAL CLEARANCE

- (a) Using a dial indicator, measure the radial clearance of the drive sprocket.

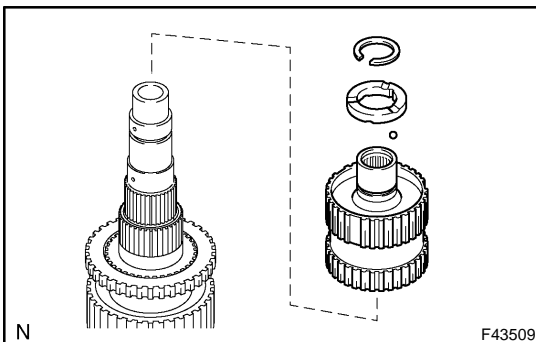
Standard clearance:

0.01 - 0.06 mm (0.0004 - 0.0024 in.)

Maximum clearance:

0.06 mm (0.0024 in.)

If the clearance exceeds the maximum, replace the drive sprocket, output shaft rear or needle roller bearing.



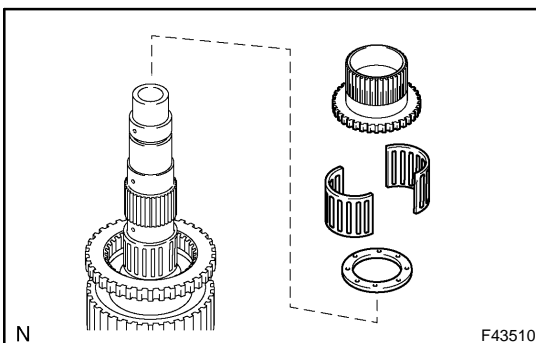
53. REMOVE TRANSFER LOW PLANETARY RING GEAR HOLE SNAP RING

- (a) Using a snap ring expander, remove the snap ring.

54. REMOVE TRANSFER OUTPUT SHAFT SPACER NO.2

55. REMOVE TRANSFER OUTPUT SHAFT SPACER BALL

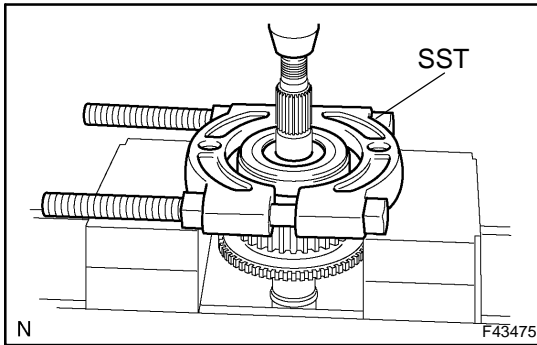
56. REMOVE CENTER DIFFERENTIAL CASE



57. REMOVE TRANSFER CLUTCH HUB

58. REMOVE TRANSFER OUTPUT SHAFT FRONT NEEDLE ROLLER BEARING

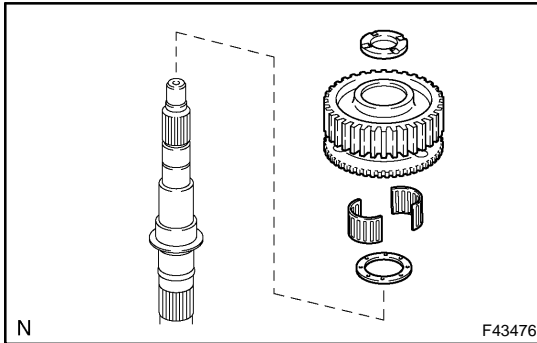
59. REMOVE TRANSFER OUTPUT SHAFT PLATE WASHER



60. REMOVE TRANSFER OUTPUT SHAFT REAR RADIAL BALL BEARING

- (a) Using SST and a press, remove the output shaft rear radial ball bearing.

SST 09555-55010

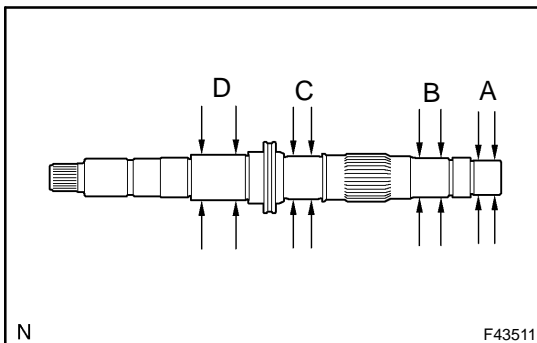


61. REMOVE TRANSFER OUTPUT SHAFT SPACER NO.1

62. REMOVE TRANSFER DRIVE SPROCKET SUB-ASSY

63. REMOVE TRANSFER DRIVE SPROCKET BEARING

64. REMOVE TRANSFER OUTPUT SHAFT PLATE WASHER



65. INSPECT TRANSFER OUTPUT SHAFT REAR

- (a) Using a micrometer, measure the outer diameter of the output shaft rear journal surface.

Standard diameter:

Part A: 27.98 – 27.99 mm (1.1016 – 1.1020 in.)

Part B: 31.98 – 32.00 mm (1.2591 – 1.2598 in.)

Part C: 34.98 – 35.00 mm (1.3772 – 1.3780 in.)

Part D: 36.98 – 37.00 mm (1.4559 – 1.4567 in.)

Minimum Diameter:

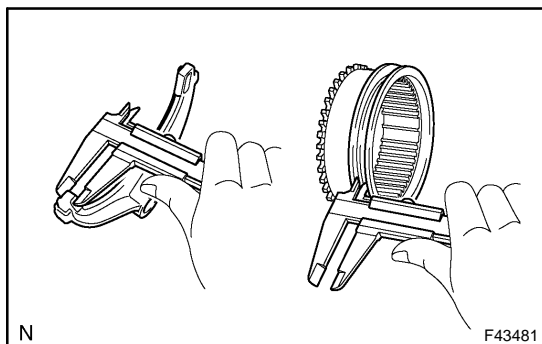
Part A: 27.98 mm (1.1016 in.)

Part B: 31.98 mm (1.2591 in.)

Part C: 34.98 mm (1.3772 in.)

Part D: 36.98 mm (1.4559 in.)

If the outer diameter is less than the minimum, replace the output shaft rear.



66. INSPECT HIGH AND LOW CLUTCH SLEEVE AND GEAR SHIFT FORK NO.2 CLEARANCE

- (a) Using vernier calipers, measure the thickness of the gear shift fork No.2 claw.

Thickness: 10 mm (0.3937 in.)

- (b) Using vernier calipers, measure the groove of the high and low clutch sleeve.

Distance: 10.5 mm (0.4134 in.)

- (c) Calculate a clearance between the high and low clutch sleeve and gear shift fork No.2 clearance.

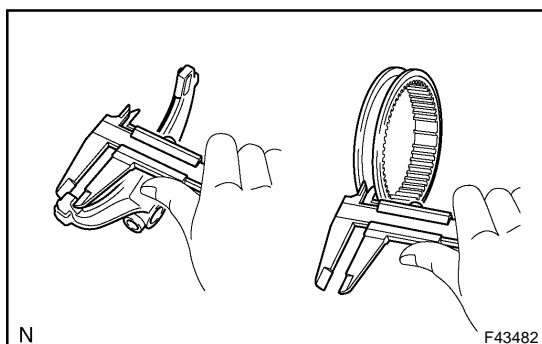
Standard clearance:

0.26 - 0.84 mm (0.0102 - 0.0331 in.)

Maximum clearance:

0.84 mm (0.0331 in.)

If the clearance exceeds the maximum, replace the high and low clutch sleeve or gear shift fork No.2.



67. INSPECT FRONT DRIVE CLUTCH SLEEVE AND CTR DIFFERENTIAL LOCK FORK SUB-ASSY CLEARANCE

- (a) Using vernier calipers, measure the thickness of the CTR differential lock fork claw.

Thickness: 10 mm (0.397 in.)

- (b) Using vernier calipers, measure the groove of the front drive clutch sleeve.

Distance: 10.5 mm (0.4134 in.)

- (c) Calculate a clearance between the front drive clutch sleeve and CTR differential lock fork.

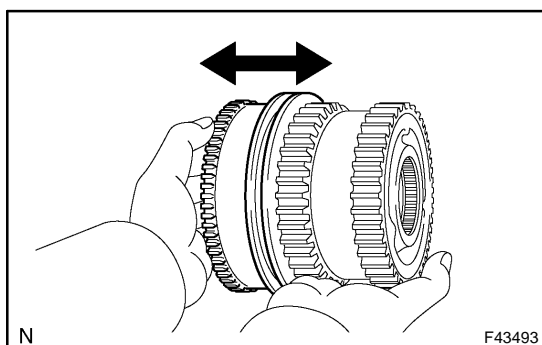
Standard clearance:

0.26 - 0.84 mm (0.0102 - 0.0331 in.)

Maximum clearance:

0.84 mm (0.0331 in.)

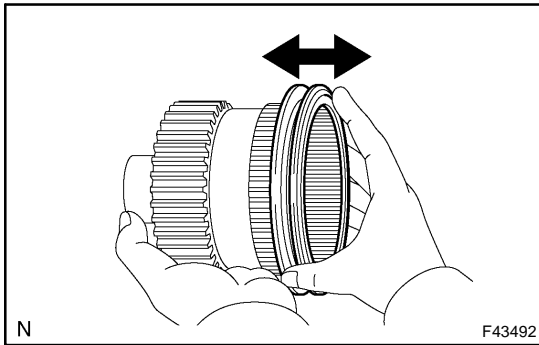
If the clearance exceeds the maximum, replace the front drive clutch sleeve or CTR differential lock fork.



68. INSPECT CENTER DIFFERENTIAL CASE AND HIGH AND LOW CLUTCH SLEEVE

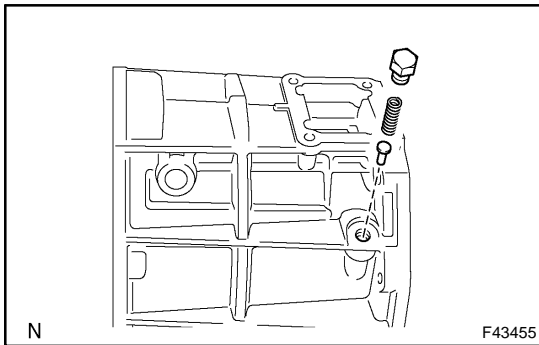
- (a) Check that the tip of the spline gear of the high and low clutch sleeve is not worn.

- (b) Install the high and low clutch sleeve to the center differential case and check that the high and low clutch sleeve moves smoothly.



69. INSPECT CENTER DIFFERENTIAL CASE AND FRONT DRIVE CLUTCH SLEEVE

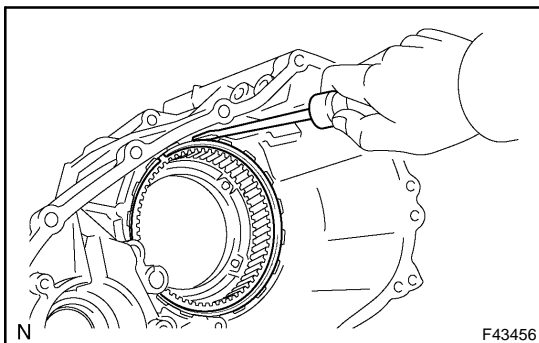
- (a) Check that the tip of the spline gear of the front drive clutch sleeve is not worn.
- (b) Install the front drive clutch sleeve to the center differential case and check that the front drive clutch sleeve moves smoothly.



70. REMOVE TRANSFER CASE PLUG

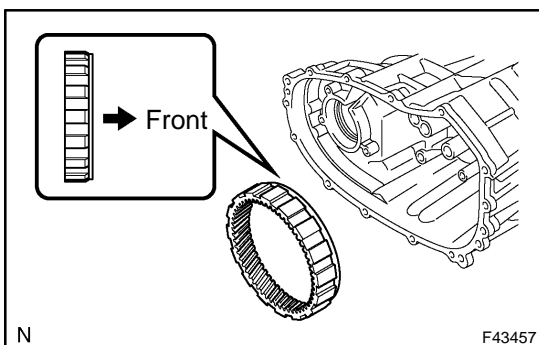
71. REMOVE COMPRESSION SPRING

72. REMOVE PIN



73. REMOVE TRANSFER LOW PLANETARY RING GEAR

- (a) Using a screwdriver, remove the snap ring.
- (b) Remove the low planetary ring gear from the front case.

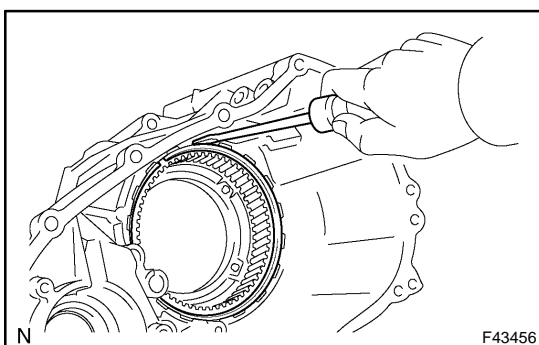


74. INSTALL TRANSFER LOW PLANETARY RING GEAR

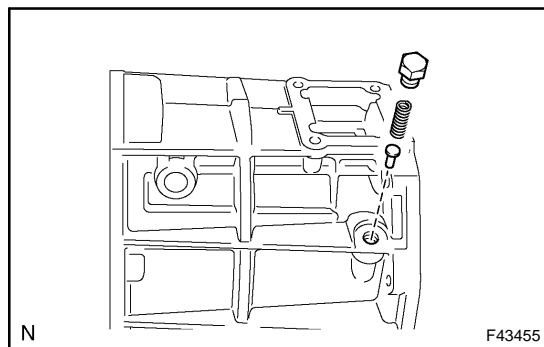
- (a) Install the low planetary ring gear to the front case.

NOTICE:

Make sure to install the low planetary ring gear in the correct direction.



- (b) Using a screwdriver, install the snap ring.

**75. INSTALL PIN****76. INSTALL COMPRESSION SPRING****77. INSTALL TRANSFER CASE PLUG**

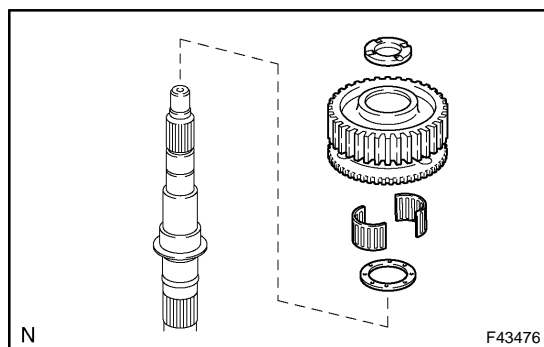
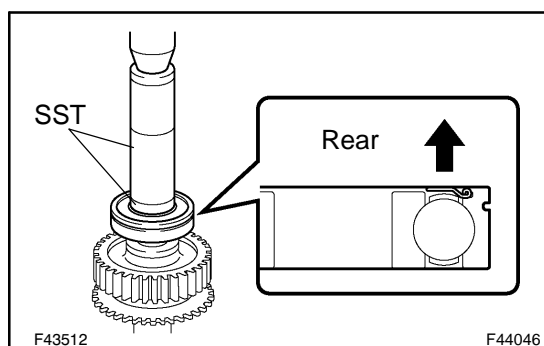
- (a) Apply sealant to the case plug threads.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Install the case plug.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

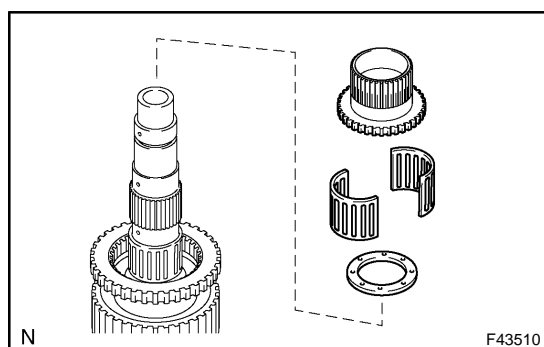
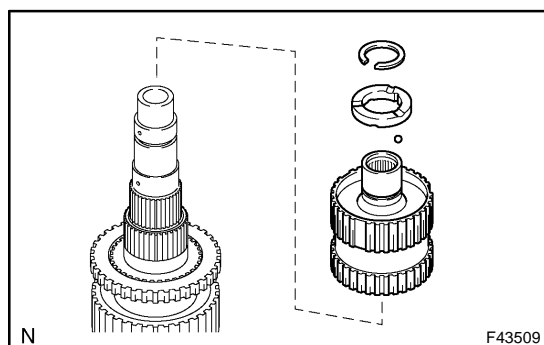
**78. INSTALL TRANSFER OUTPUT SHAFT PLATE WASHER****79. INSTALL TRANSFER DRIVE SPROCKET BEARING****80. INSTALL TRANSFER DRIVE SPROCKET SUB-ASSY****81. INSTALL TRANSFER OUTPUT SHAFT SPACER NO.1****82. INSTALL TRANSFER OUTPUT SHAFT REAR RADIAL BALL BEARING**

- (a) Using SST and a press, install a new output shaft rear radial ball bearing.

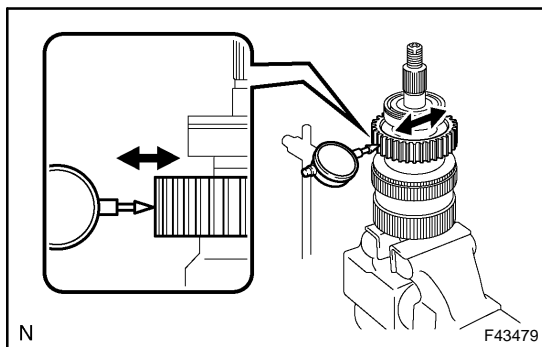
SST 09316-60011 (09316-00011, 09316-00071)

NOTICE:

Install the output shaft rear radial ball bearing so that the bearing snap ring groove faces to the rear.

**83. INSTALL TRANSFER OUTPUT SHAFT PLATE WASHER****84. INSTALL TRANSFER OUTPUT SHAFT FRONT NEEDLE ROLLER BEARING****85. INSTALL TRANSFER CLUTCH HUB****86. INSTALL CENTER DIFFERENTIAL CASE****87. INSTALL TRANSFER OUTPUT SHAFT SPACER BALL****88. INSTALL TRANSFER OUTPUT SHAFT SPACER NO.2****89. INSTALL TRANSFER LOW PLANETARY RING GEAR HOLE SNAP RING**

- (a) Using a snap ring expander, install the snap ring.

**90. INSPECT DRIVE SPROCKET RADIAL CLEARANCE**

- (a) Using a dial indicator, measure the radial clearance of the drive sprocket.

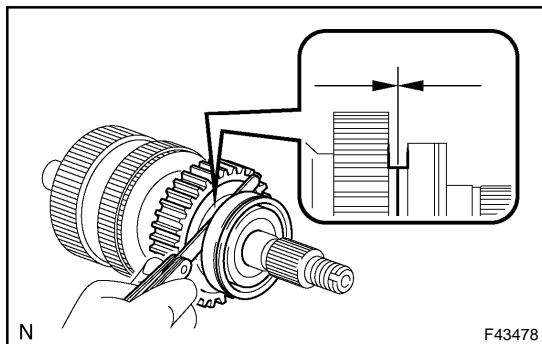
Standard clearance:

0.01 - 0.06 mm (0.0004 - 0.0024 in.)

Maximum clearance:

0.06 mm (0.0024 in.)

If the clearance exceeds the maximum, replace the drive sprocket, output shaft rear or needle roller bearing.

**91. INSPECT DRIVE SPROCKET THRUST CLEARANCE**

- (a) Using a feeler gauge, measure the thrust clearance of the drive sprocket.

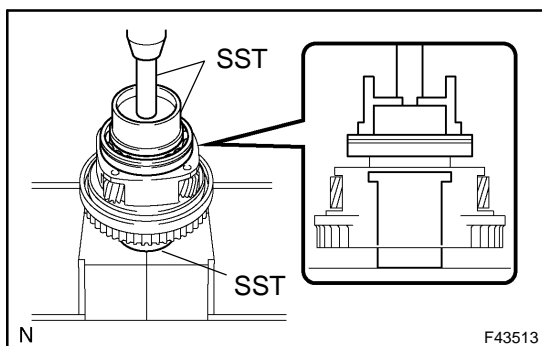
Standard clearance:

0.15 - 0.24 mm (0.0059 - 0.0094 in.)

Maximum clearance:

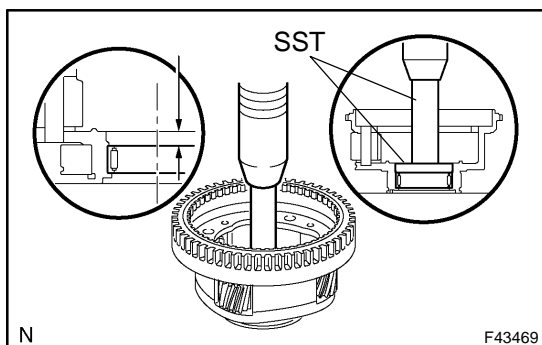
0.24 mm (0.0094 in.)

If the clearance exceeds the maximum, replace the drive sprocket.

**92. INSTALL TRANSFER INPUT SHAFT BEARING**

- (a) Using SST and a press, install a new bearing with the groove facing forward.

SST 09223-15020, 09515-30010, 09950-70010
(09951-07100)

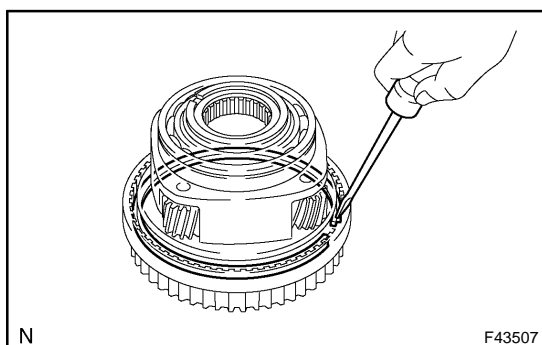
**93. INSTALL TRANSFER LOW PLANETARY GEAR BEARING**

- (a) Using SST and a press, drive in a new bearing.

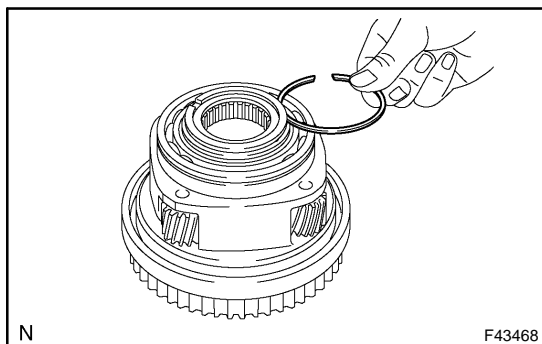
SST 09950-60010 (09951-00570), 09950-70010
(09951-07100)

Bearing press in depth:

7.7 - 8.3 mm (0.303 - 0.327 in.)

**94. INSTALL TRANSFER LOW PLANETARY GEAR SPLINE PIECE**

- (a) Using a screwdriver, install the spline piece with the snap ring.

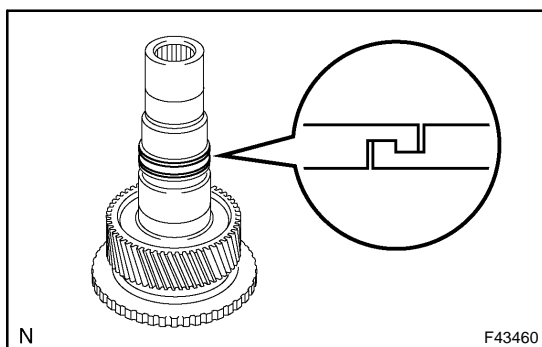


95. INSTALL TRANSFER INPUT BEARING SHAFT SNAP RING

- (a) Select a snap ring that allows 0.1 mm (0.0039 in.) or less axial play.

Mark	Thickness mm (in.)
1	1.45 - 1.50 (0.0571 - 0.0591)
2	1.50 - 1.55 (0.0591 - 0.0610)
3	1.55 - 1.60 (0.0610 - 0.0630)
4	1.60 - 1.65 (0.0630 - 0.0650)
5	1.65 - 1.70 (0.0650 - 0.0669)

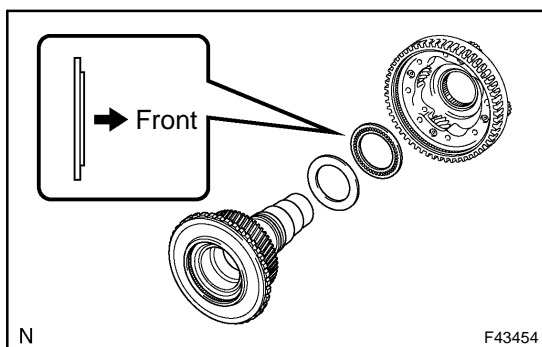
- (b) Using a snap ring expander, install a new snap ring.



96. INSTALL TRANSFER INPUT SHAFT SEAL RING NO.1

HINT:

- Apply gear oil to the 2 oil seal rings.
- Engage securely to eliminate clearance as shown in the illustration.



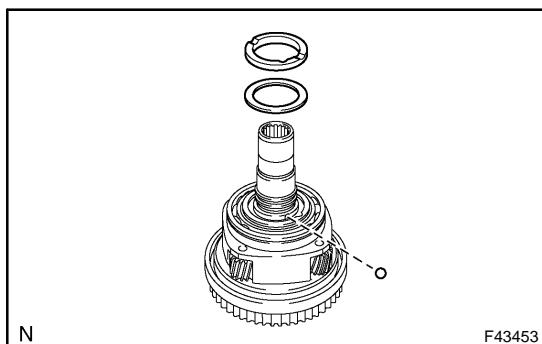
97. INSTALL TRANSFER LOW PLANETARY GEAR BEARING

NOTICE:

Make sure to install the transfer low planetary gear bearing in the correct direction.

98. INSTALL TRANSFER THRUST BEARING RACE NO.1

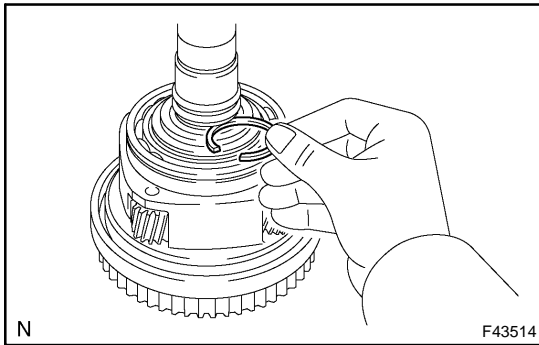
99. INSTALL TRANSFER INPUT SHAFT



100. INSTALL MANUAL TRANSFER PLANETARY CARR WASHER

101. INSTALL TRANSFER INPUT GEAR STOPPER BALL

102. INSTALL TRANSFER INPUT GEAR STOPPER

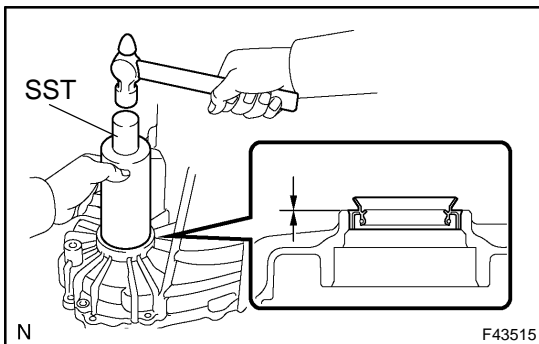


103. INSTALL TRANSFER INPUT GEAR STOPPER SHAFT SNAP RING

- (a) Select a input gear stopper snap ring that allows 0.05 – 0.15 mm (0.0020 – 0.0059 in.) axial play.

Mark	Thickness mm (in.)
A	2.10 – 2.15 (0.0827 – 0.0846)
B	2.15 – 2.20 (0.0846 – 0.0866)
C	2.20 – 2.25 (0.0866 – 0.0886)
D	2.25 – 2.30 (0.0886 – 0.0906)
E	2.30 – 2.35 (0.0906 – 0.0925)
F	2.35 – 2.40 (0.0925 – 0.0945)
G	2.40 – 2.45 (0.0945 – 0.0965)
H	2.45 – 2.50 (0.0965 – 0.0984)
J	2.50 – 2.55 (0.0984 – 0.1004)
K	2.55 – 2.60 (0.1004 – 0.1204)
L	2.60 – 2.65 (0.1024 – 0.1043)
M	2.65 – 2.70 (0.1043 – 0.1063)
N	2.70 – 2.75 (0.1063 – 0.1083)
P	2.75 – 2.80 (0.1083 – 0.1102)
Q	2.80 – 2.85 (0.1102 – 0.1122)
R	2.85 – 2.90 (0.1122 – 0.1142)
S	2.90 – 2.95 (0.1142 – 0.1161)
T	2.95 – 3.00 (0.1161 – 0.1181)
U	3.00 – 3.05 (0.1181 – 0.1201)

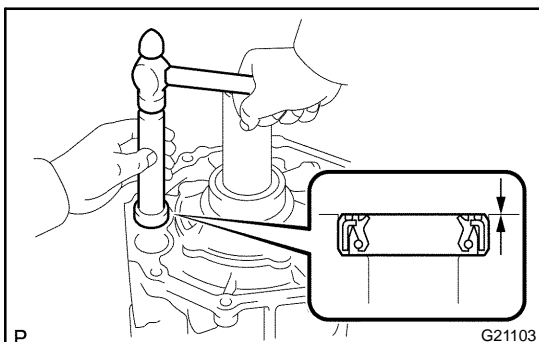
- (b) Using a snap ring expander, install a new input gear stopper snap ring.



104. INSTALL TRANSFER CASE OIL SEAL

- (a) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case upper surface. (No.1)
SST 09316-60011 (09316-00011)

- (b) Coat the lip of the oil seal with MP grease.

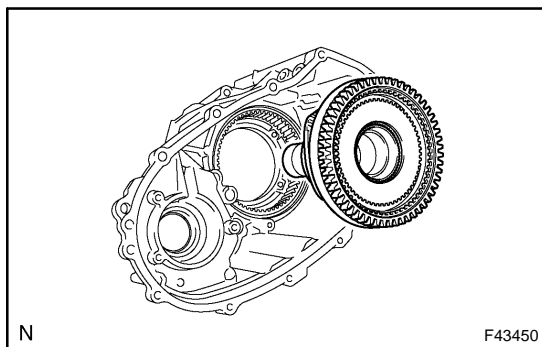


- (c) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case upper surface. (No.2)
SST 09304-12012

Oil seal drive in depth:

-0.5 – 0.5 mm (-0.020 – 0.020 in.)

- (d) Coat the lip of the oil seal with MP grease.

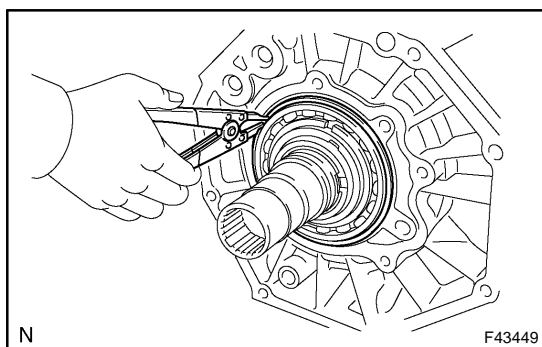


105. INSTALL LOW PLANETARY GEAR ASSY W/INPUT SHAFT SUB-ASSY

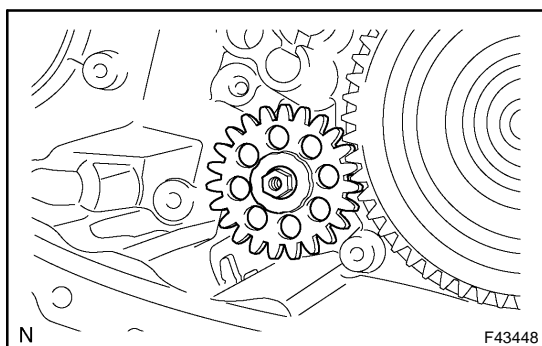
- (a) Install the low planetary gear assy with input shaft sub-assy.

HINT:

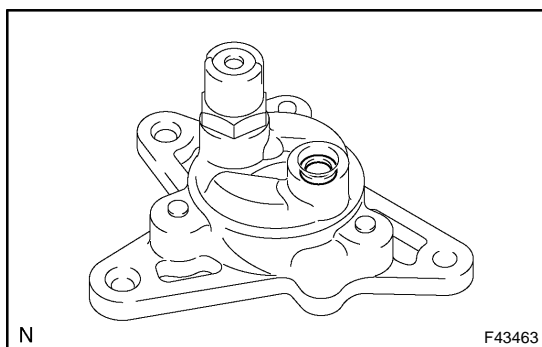
If necessary, heat the front case to about 50 - 80°C (122 - 176°F).



- (b) Using a snap ring expander, install the snap ring.

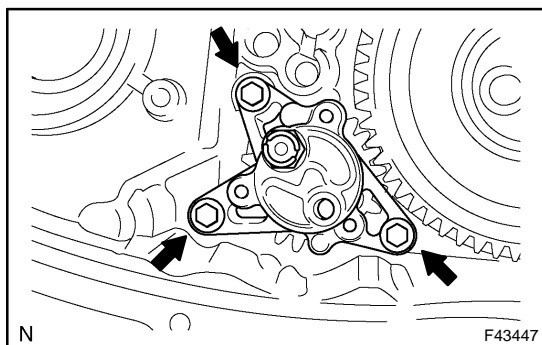


106. INSTALL TRANSFER OIL PUMP GEAR



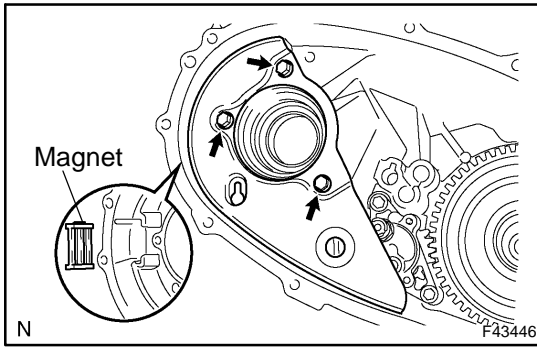
107. INSTALL TRANSFER OIL PUMP BODY O-RING

- (a) Coat a new O-ring with gear oil and install it to the oil pump body.



108. INSTALL TRANSFER OIL PUMP BODY SUB-ASSY

- (a) Install the oil pump body sub-assy with the 3 bolts.
Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)

**109. INSTALL TRANSFER CASE MAGNET****110. INSTALL TRANSFER OIL SEPARATOR SUB-ASSY**

- (a) Install the oil separator sub-assy with the 3 bolts.

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

111. INSTALL TRANSFER CASE NO.1 PLUG

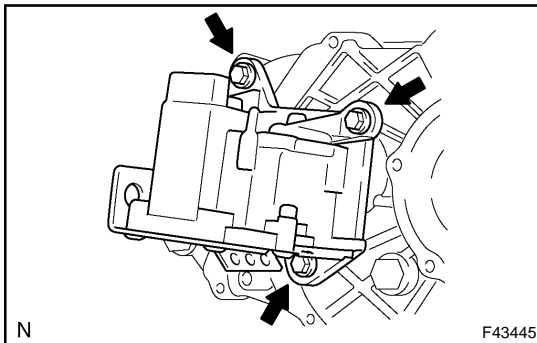
- (a) Install the case No.1 plug (filler plug) and a new gasket.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

112. INSTALL TRANSFER CASE NO.1 PLUG

- (a) Install the case No.1 plug (drain plug) and a new gasket.

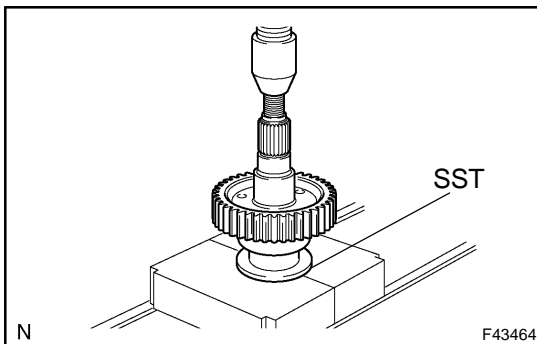
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

**113. INSTALL TRANSFER SHIFT ACTUATOR ASSY**

- (a) Install the actuator assy with the 3 bolts.

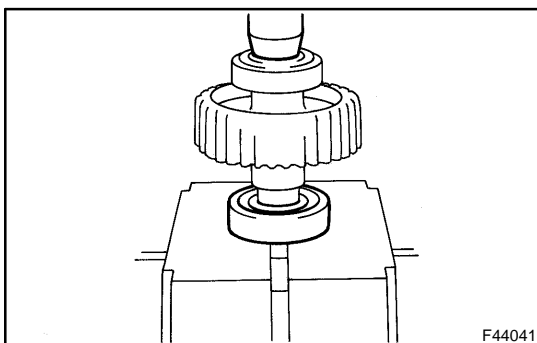
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

- (b) Using a screwdriver and hammer, drive in the 2 snap rings.

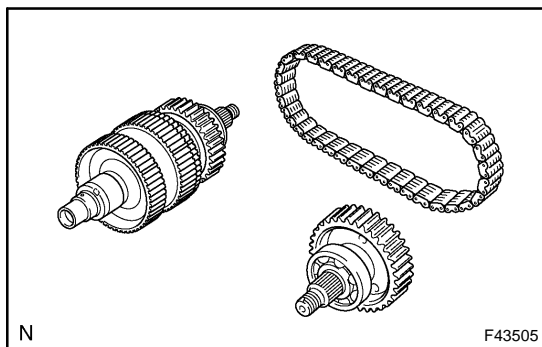
**114. INSTALL TRANSFER INPUT GEAR RADIAL BALL BEARING**

- (a) Using SST and a press, install a new input gear radial ball bearing.

SST 09316-60011 (09316-00031)

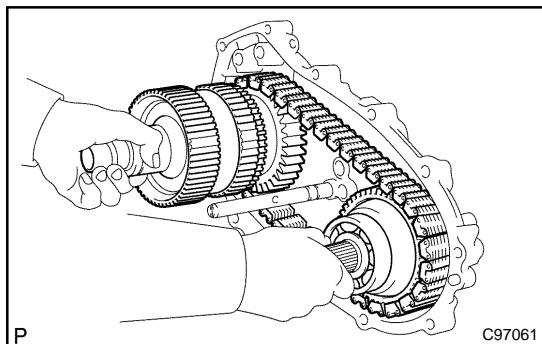
**115. INSTALL TRANSFER DRIVEN SPROCKET BEARING**

- (a) Using a press, install a new driven sprocket bearing.



116. INSTALL REAR OUTPUT SHAFT SUB-ASSY, FRONT DRIVE CHAIN AND DRIVEN SPROCKET SUB-ASSY

- (a) Install the rear output shaft sub-assy and drive sprocket to the front drive chain.

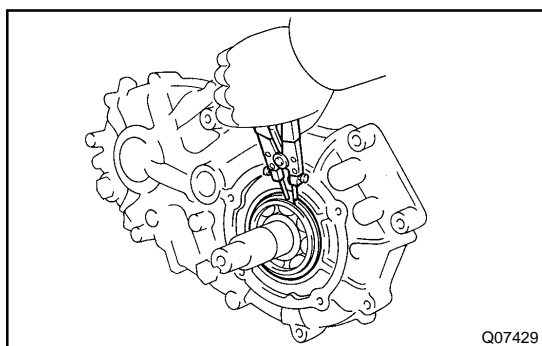


- (b) Install the rear output shaft sub-assy, front drive chain and driven sprocket sub-assy to the case rear.

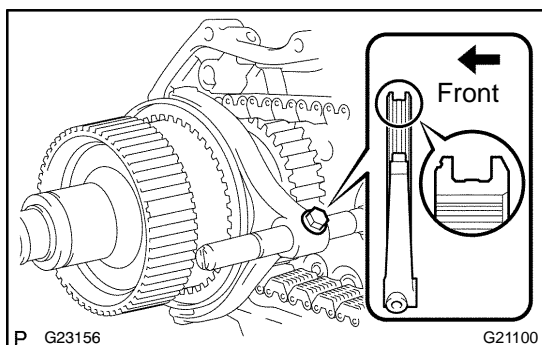
HINT:

Check that the rear output shaft sub-assy and driven sprocket sub-assy turn lightly.

If necessary, heat the rear case to about 50 - 80°C (122 - 176°F).



- (c) Using a snap ring expander, install the snap ring.



117. INSTALL CTR DIFFERENTIAL LOCK FORK SUB-ASSY W/FRONT DRIVE CLUTCH SLEEVE

- (a) Install the CTR differential lock fork sub-assy and front drive clutch sleeve.

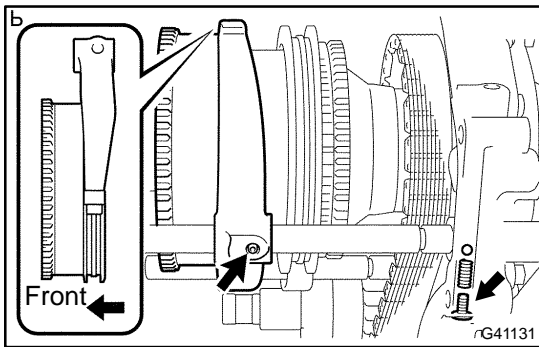
- (b) Install the bolt.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

- (c) Using a screwdriver and hammer, drive in the snap ring.

NOTICE:

Make sure to install the fork and clutch sleeve in the correct direction.



118. INSTALL TRANSFER GEAR SHIFT FORK NO.2 W/TRANSFER HIGH AND LOW CLUTCH SLEEVE

- (a) Install the gear shift fork No.2 and high and low shift fork shaft and high and low clutch sleeve.

NOTICE:

Make sure to install the fork in the correct direction.

- (b) Apply sealant to the plug No.1 threads.

Sealant:

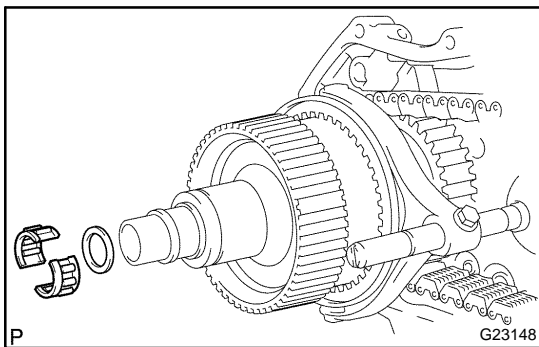
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (c) Install the spring and ball to the hole.

- (d) Install the plug No.1 to the hole.

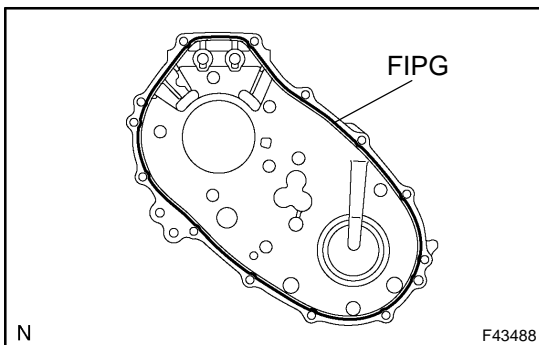
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

- (e) Using a pin punch and hammer, Install the slotted pin.



119. INSTALL TRANSFER OUTPUT SHAFT SPACER

120. INSTALL TRANSFER OUTPUT SHAFT FRONT NEEDLE ROLLER BEARING



121. INSTALL TRANSFER CASE REAR

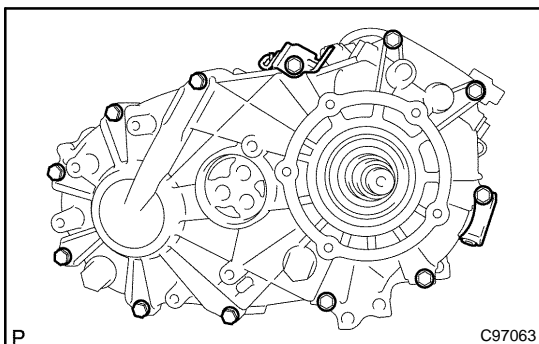
- (a) Apply FIPG to the case rear, as shown.

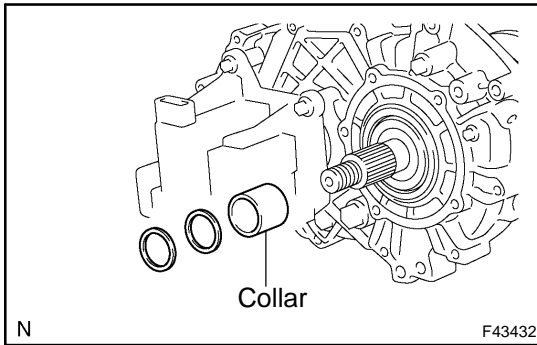
FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent

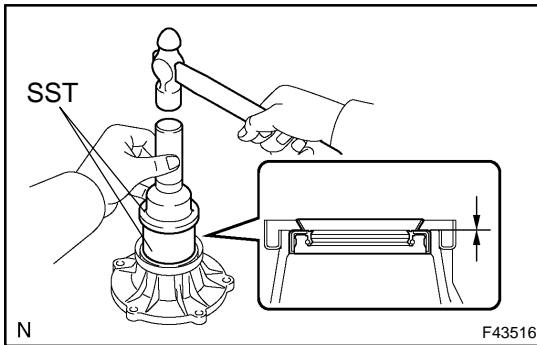
- (b) Install the 2 clamps and case rear with the 12 bolts.

Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

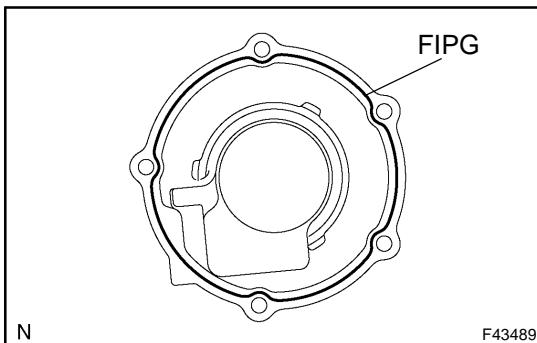


**122. INSTALL TRANSFER OUTPUT WASHER**

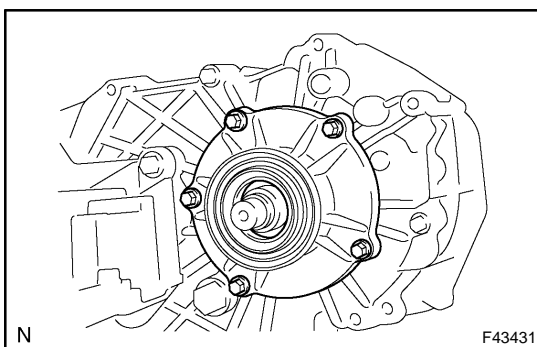
- (a) Install the collar and 2 output washers.

**123. INSTALL TRANSFER EXTENSION HOUSING TYPE T OIL SEAL**

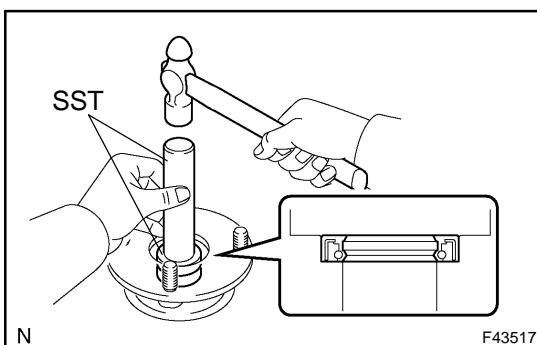
- (a) Using SST and a hammer, drive in a new oil seal until its surface is flush with the housing upper surface.
SST 09223-46011, 09631-32020
- (b) Coat the lip of the oil seal with MP grease.

**124. INSTALL EXTENSION HOUSING ASSY**

- (a) Apply FIPG to the extension housing assy rear, as shown.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent
- (b) Apply sealant to the bolt threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent



- (c) Install the extension housing assy with the 5 bolts.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

**125. INSTALL TRANSFER OUTPUT SHAFT COMPANION FLANGE OIL SEAL**

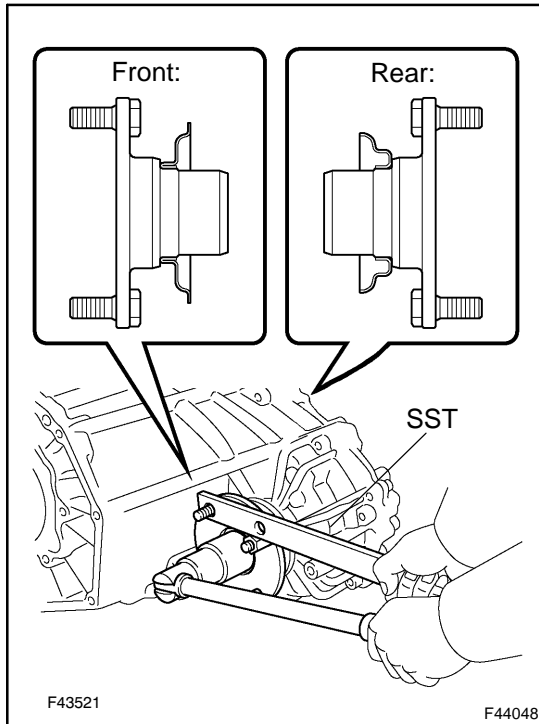
- (a) Using SST and a hammer, drive in a new oil seal (front).
SST 09950-60010 (09951-00320), 09950-70010 (09951-07100)
- (b) Coat the lip of the oil seal with MP grease.

126. INSTALL TRANSFER OUTPUT SHAFT COMPANION FLANGE OIL SEAL

- (a) Drive in a new oil seal (rear) in the same way as the oil seal (front).

SST 09950-60010 (09951-00320), 09950-70010 (09951-07100)

- (b) Coat the lip of the oil seal with MP grease.



127. INSTALL OUTPUT SHAFT COMPANION FLANGE SUB-ASSY

- (a) Install the companion flange sub-assy to the drive sprocket sub-assy (front).
 (b) Using SST to hold the companion flange, install a new companion flange lock nut.

SST 09330-00021

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

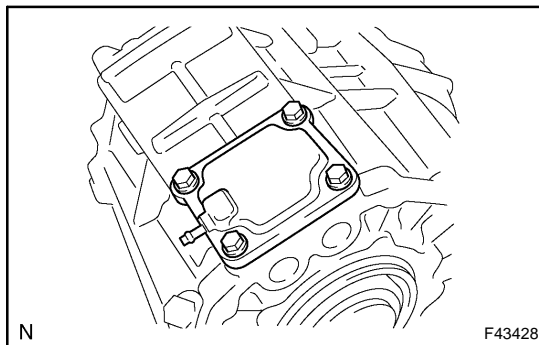
- (c) Using a chisel and hammer, stake the companion flange lock nut.

128. INSTALL OUTPUT SHAFT COMPANION FLANGE SUB-ASSY

- (a) Using SST, install the companion flange sub-assy (rear) in the same way as the companion flange sub-assy (front).

SST 09330-00021

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

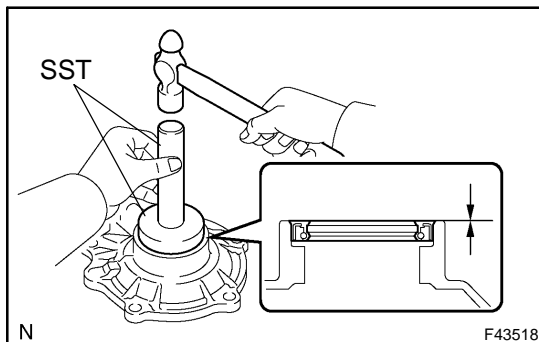


129. INSTALL BREATHER OIL DEFLECTOR

130. INSTALL TRANSFER CASE COVER SUB-ASSY

- (a) Install the case cover sub-assy with the 4 bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

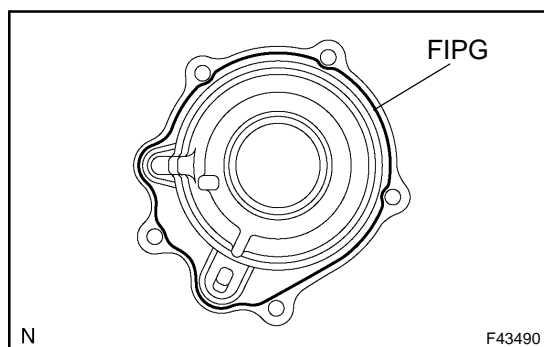


131. INSTALL TRANSFER COVER TYPE T OIL SEAL

- (a) Using SST and a hammer, drive in a new oil seal until its surface is flush with the retainer upper surface.

- (b) Coat the lip of the oil seal with MP grease.

SST 09950-60010 (09951-00590), 09950-70010 (09951-07100)



132. INSTALL TRANSFER RH BEARING RETAINER SUB-ASSY

- (a) Apply FIPG to the bearing retainer sub-assy, as shown.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent

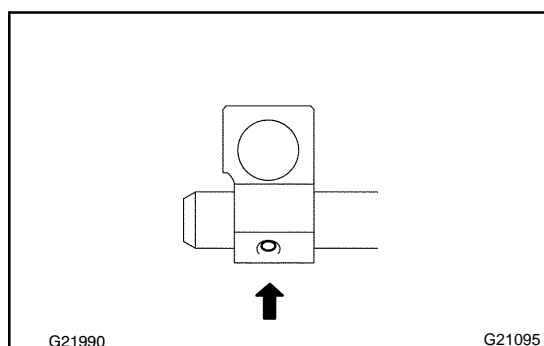
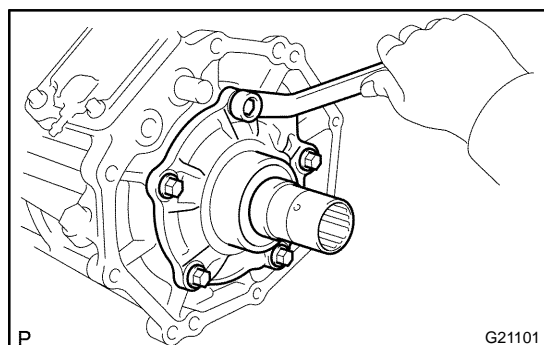
- (b) Apply sealant to the bolt thread.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

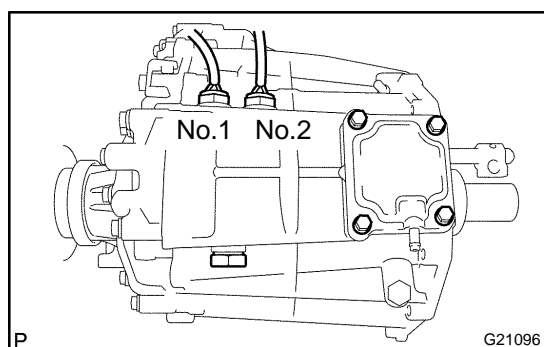
- (c) Install the bearing retainer sub-assy with the 5 bolts.

Torque: 12 N·m (117 kgf·cm, 8 ft·lbf)



133. INSTALL TRANSFER GEAR SHIFT HEAD NO.2

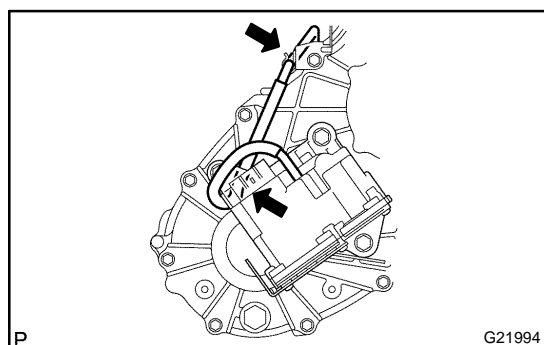
- (a) Using a pin punch and hammer, install the slotted pin to the gear shift head No.2.



134. INSTALL SWITCH

- (a) Install a new gasket, the indicator switches and the case No.1 plug.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



135. INSTALL HOSES

NOTICE:

- Place the hose that passes between the transfer rear case and the actuator motor.
- Adjust the clamp position to prevent the excessive bent or expansion/contraction of the hose.

136. INSTALL TRANSFER ASSY

- (a) Install the transfer to the automatic transmission.
- (b) Install the 2 clamps and 8 bolts.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

137. INSTALL AUTOMATIC TRANSMISSION ASSY

- (a) 2UZ-FE : (See page [40-14](#))

138. INSTALL TRANSFER CASE LOWER PROTECTOR

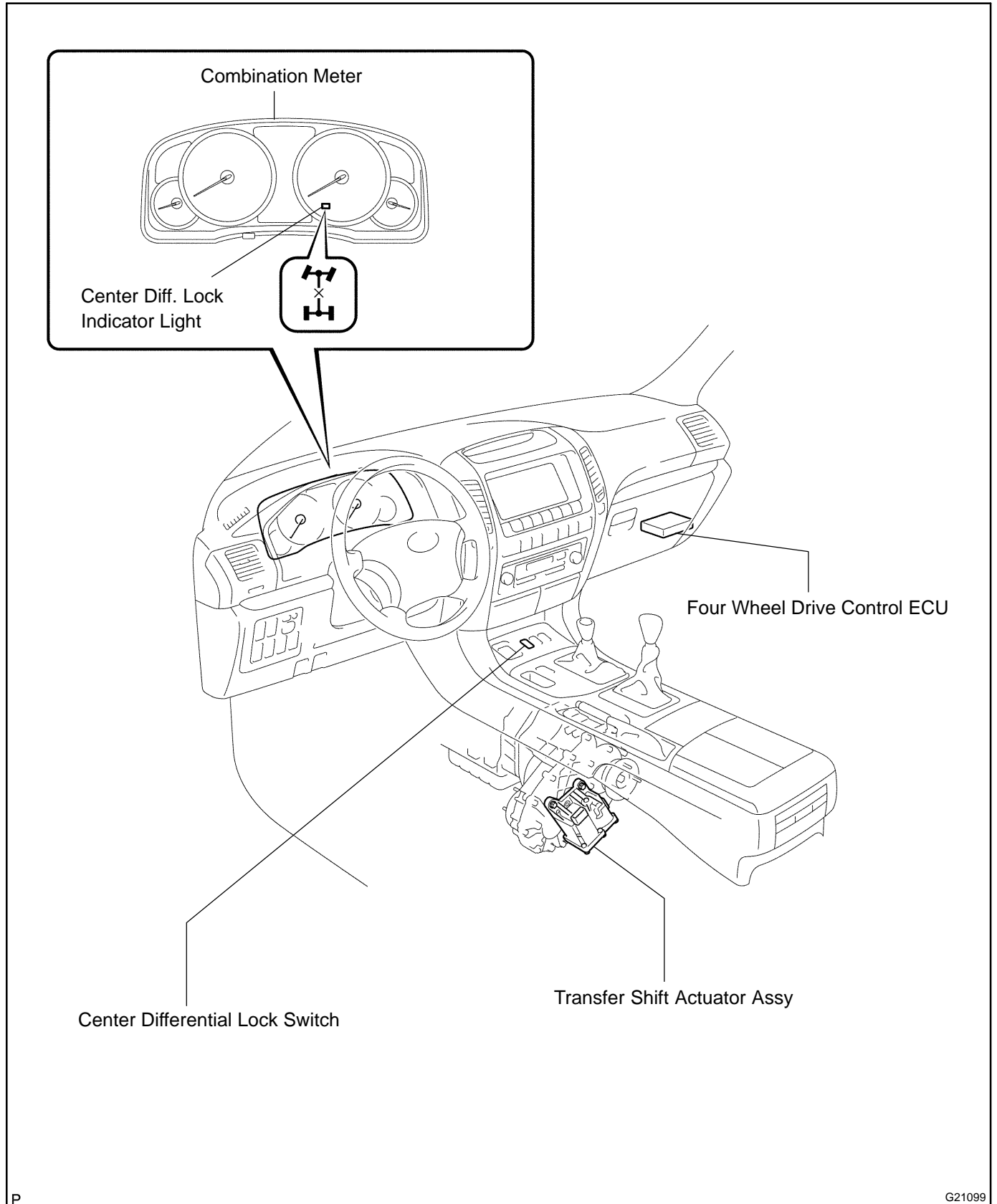
- (a) Install the 4 bolts with the transfer case lower protector.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

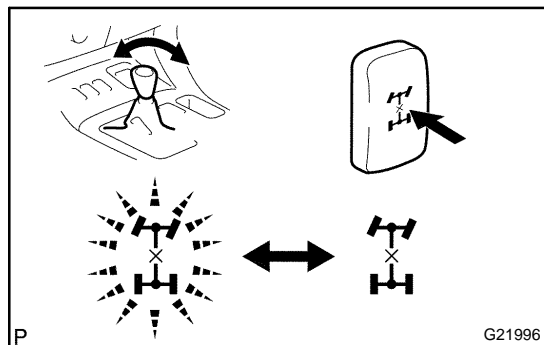
139. ADD TRANSFER OIL (See page [31-3](#))

CENTER DIFF. LOCK SYSTEM LOCATION

3103T-01

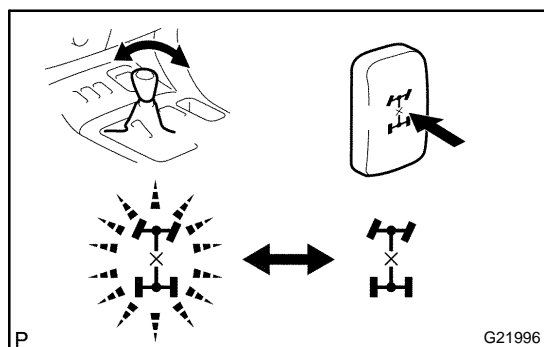


INSPECTION



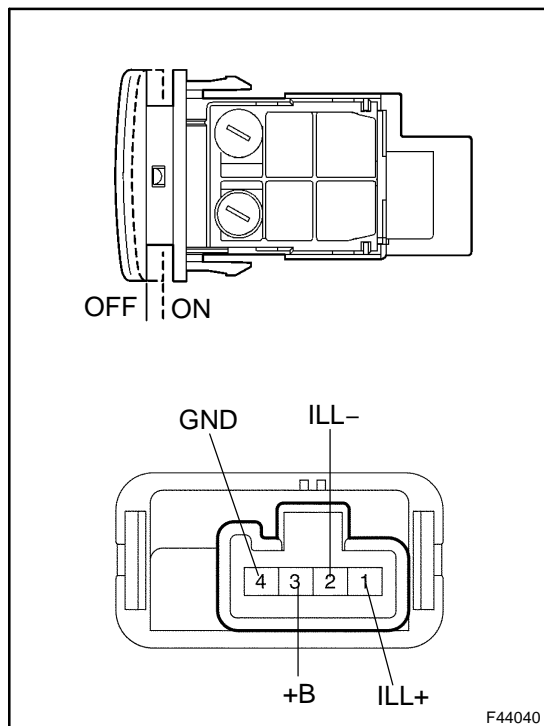
1. INSPECT H4 (Differential lock "FREE") ↔ H4 (Differential lock "LOCK") SHIFT

- (a) Start the engine, and make sure that the differential lock switch is in "OFF" position.
- (b) Operate the transfer shift lever to "H4" position.
- (c) Check that the center diff. lock indicator light comes on after pressing the differential lock switch for 2 seconds. Check that the center diff. lock indicator light goes off after pressing the differential lock switch for 2 seconds.



2. INSPECT L4 (Differential lock "FREE") ↔ L4 (Differential lock "LOCK") SHIFT

- (a) Start the engine, and make sure that the differential lock switch is in "OFF" position.
- (b) Operate the transfer shift lever to "L4" position.
- (c) Check that the center diff. lock indicator light comes on after pressing the differential lock switch for 2 seconds. Check that the center diff. lock indicator light goes off after pressing the differential lock switch for 2 seconds.



3. INSPECT CENTER DIFFERENTIAL LOCK SWITCH CONTINUITY

- (a) Remove the instrument panel finish lower panel sub-assy.
- (b) Remove the differential lock switch from the instrument panel finish lower sub-assy.
- (c) Inspect the continuity between the each terminal.

Switch position	Tester connection	Specified condition
OFF	+B (3) ↔ GND (4)	No continuity
Hold ON	+B (3) ↔ GND (4)	Continuity
Illumination	ILL+ (1) ↔ ILL- (2)	Continuity

If continuity is not as specified, replace the differential lock switch or bulb.

4. INSPECT ACTUATOR

NOTICE:

Inspect the actuator while overhauling the transfer or as a unit.

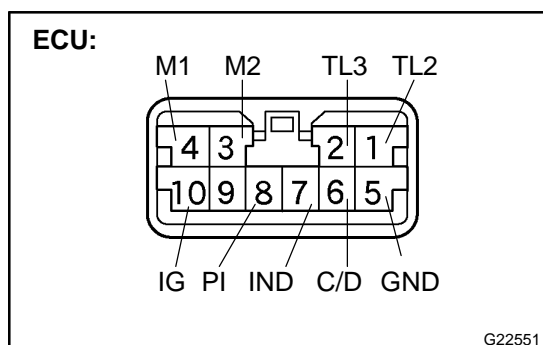
- (a) Turn the ignition switch OFF and set the parking brake.
- (b) Using a rigid rack, jack up the vehicle so that the 4 wheels do not touch on the ground.
- (c) Turn the ignition switch ON and check that the front propeller shaft free or lock when switching the center differential lock.

Center differential lock switch	Condition of front propeller shaft
Off (center def. free)	Possible to rotate
On (center def. lock)	Impossible to rotate

HINT:

- When the transfer gear is off the position, shift fork of the actuator could not operate.
 - When switching is impossible, jack down the vehicle to move it back and forth, and then check it again.
- (d) Turn the ignition switch to ON.
 - (e) Check the operating sound produced by center differential lock switch operation.

If the operating sound cannot be heard, check the four wheel drive control ECU and the wire harness in the next step. When the wire harness and four wheel drive control ECU is normal, replace the actuator.



5. INSPECT FOUR WHEEL DRIVE CONTROL ECU

- (a) Connect the wire harness side connector to the four wheel drive control ECU and inspect wire harness side connector from the back side, as shown.

STANDARD VALUE OF ECU TERMINAL

Terminals (Symbols)	Condition	STD Voltage (V)
1 (TL2) - 5 (GND)	<ul style="list-style-type: none"> Ignition switch ON While switching from center def. lock to free → Center def. Free operation is completed 	With continuity → Without continuity
2 (TL3) - 5 (GND)	<ul style="list-style-type: none"> Ignition switch ON While switching from center def. free to lock → Center def. Free operation is completed 	With continuity → Without continuity
3 (M2) - 4(M1)	<ul style="list-style-type: none"> Ignition switch ON Center def. lock → Switching motor to free is in operation 	0 ↔ 10 - 14
4 (M1) - 3 (M2)	<ul style="list-style-type: none"> Ignition switch ON Center def. lock → Switching motor to lock is in operation 	0 ↔ 10 - 14
5 (GND) - Body ground	Always	Continuity
6 (C/D) - 5 (GND)	<ul style="list-style-type: none"> Ignition switch ON Center differential lock switch OFF → ON 	10 - 14 → 1 or less
7 (IND) - 5 (GND)	<ul style="list-style-type: none"> Ignition switch ON Indicator lamp is OFF → ON 	10 - 14 → 1 or less
8 (P1) - 5 (GND)	<ul style="list-style-type: none"> Ignition switch ON Indicator lamp is OFF → ON 	10 - 14 → 1 or less
10 (IG) - 5 (GND)	Ignition switch ON	10 - 14

BRAKE SYSTEM

32038-15

PRECAUTION

- Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts having the same part number or equivalent.
- It is very important to keep the parts and the area clean when repairing the brake system.
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the INTRODUCTION section.

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the likelihood of the cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	<ol style="list-style-type: none"> 1. Fluid leaks for brake system 2. Air in brake system 3. Piston seals (Worn or damaged) 4. Brake master cylinder (Faulty) 	<p>–</p> <p>32-4</p> <p>32-38</p> <p>32-44</p> <p>32-23</p>
Brake drag	<ol style="list-style-type: none"> 1. Brake pedal free play (Minimum) 2. Parking brake lever travel (Out of adjustment) 3. Parking brake wire (Sticking) 4. Parking brake (Shoe clearance out of adjustment) 5. Pad (Cracked or distorted) 6. Piston (Stuck) 7. Piston (Frozen) 8. Tension or return spring (Faulty) 9. Brake master cylinder (Faulty) 	<p>32-6</p> <p>32-6</p> <p>32-38</p> <p>32-44</p> <p>33-12</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>33-12</p> <p>32-23</p>
Brake pull	<ol style="list-style-type: none"> 1. Piston (Stuck) 2. Pad (Cracked or distorted) 3. Piston (Frozen) 4. Disc (Scored) 5. Pad (Cracked or distorted) 6. Brake master cylinder (Faulty) 	<p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-23</p>
Hard pedal but brake inefficient	<ol style="list-style-type: none"> 1. Fluid leaks for brake system 2. Air in brake system 3. Pad (Worn) 4. Pad (Cracked or distorted) 5. Pad (Oily) 6. Pad (Glazed) 7. Disc (Scored) 8. Brake master cylinder (Faulty) 	<p>–</p> <p>32-4</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-38</p> <p>32-44</p> <p>32-23</p>

BRAKE - BRAKE SYSTEM

Noise from brakes	1. Pad (Cracked or distorted)	32-38 32-44
	2. Installation bolt (Loose)	32-44
	3. Disc (Scored)	32-38 32-44
	4. Pad support plate (Loose)	32-44
	5. Sliding pin (Worn)	32-44
	6. Pad (Dirty)	32-38 32-44
	7. Pad (Glazed)	32-38 32-44
	8. Tension or return spring (Faulty)	33-12
	9. Anti-squeal shim (Damaged)	32-38 32-44
	10. Shoe hold-down spring (Damaged)	33-12
Brake warning light lights up* ¹ (Parking brake lever released)	1. Brake fluid level 2. Brake master cylinder power supply system (Faulty)	32-14 -
Brake warning light lights up and skid control buzzer sounds* ²	Brake master cylinder power supply system (Faulty)	-
ABS warning light lights up* ³	1. Anti-lock brake system (Faulty) 2. Brake master cylinder power supply system (Faulty)	- -

*¹, *³: The light may stay on for about 60 seconds after the engine starts. It is normal if it goes off after a while.

*², *³: Depressing the brake pedal repeatedly may turn on the warning light and buzzer. It is normal if the light goes off and the buzzer stops sounding after a few seconds.

*³: While ABS warning light is ON, both VSC warning light and VSC OFF indicator light come on.

BRAKE FLUID BLEEDING

321HA-01

NOTICE:

- Wash off brake fluid immediately if it comes into contact with a painted surface.
- If the brake pedal is depressed with the reservoir cap removed, then brake fluid will spatter.

HINT:

- If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the brake system.
- When bleeding, keep the amount of the fluid between the Min. and Max. lines on the reservoir.

1. FILL RESERVOIR WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116 DOT3

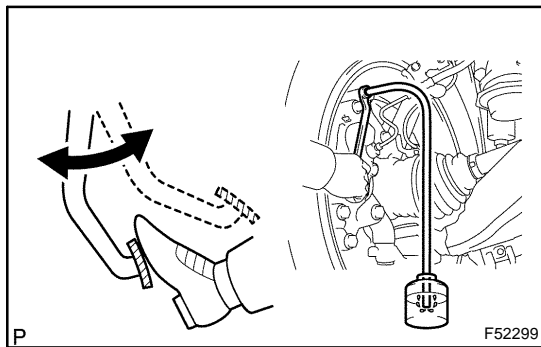
2. BLEED BRAKE BOOSTER W/ACCUMULATOR PUMP ASSY

HINT:

Perform this step only if the brake booster w/ accumulator pump assy is removed and/or installed.

- Turn the ignition switch off, depress the brake pedal 20 times or more to release the pressure from the accumulator.
- Fully depress the brake pedal 10 times.
- Turn the ignition switch to the ON position and start the brake booster pump.
- Make sure the pump operates for 8 to 14 seconds.

If the pump does not operate as specified, repeat steps (a) to (c) and recheck the operating time.



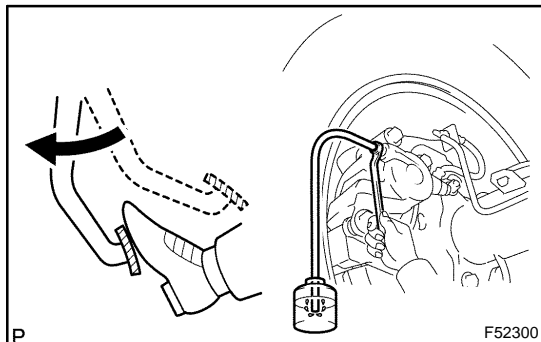
3. BLEED BRAKE LINE

(a) Front brake lines

- Turn the ignition switch to the ON position and wait until the pump motor has stopped.
- Connect the vinyl tube to the brake caliper.
- Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- At the point when the fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)

- Repeat (3) and (4) until all the air in the fluid has been bled out.
- Repeat the above procedures to bleed the other brake line.

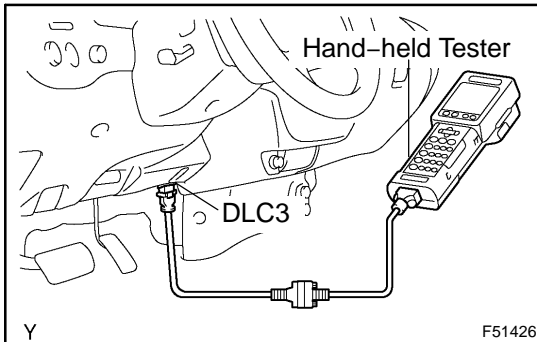


(b) Rear brake lines

- Turn the ignition switch to the ON position and depress the brake pedal.
- Connect the vinyl tube to the brake caliper.
- Loosen the bleeder plug and release air.

HINT:

Brake fluid is sent through the pump, so keep the brake pedal depressed until the air is completely bled out.



- (4) When the air is completely bled out of the brake fluid through the bleeder plug, tighten the bleeder plug.

Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)

- (5) Repeat the above procedures to bleed the other brake line.

4. BLEED MASTER CYLINDER SOLENOID

HINT:

Perform this step only if the master cylinder solenoid is removed and/or installed.

- Connect the Hand-held Tester to the DLC3.
- Turn the ignition switch to the ON position.
- Select "ACTIVE TEST" mode on the Hand-held Tester.
- Connect the vinyl tube to the rear brake caliper.
- Loosen the bleeder plug.
- Select "SRMF (SREC) & SRMR (STR)" to drive the solenoids and bleed air from the rear brake caliper.

NOTICE:

Do not depress the brake pedal.

HINT:

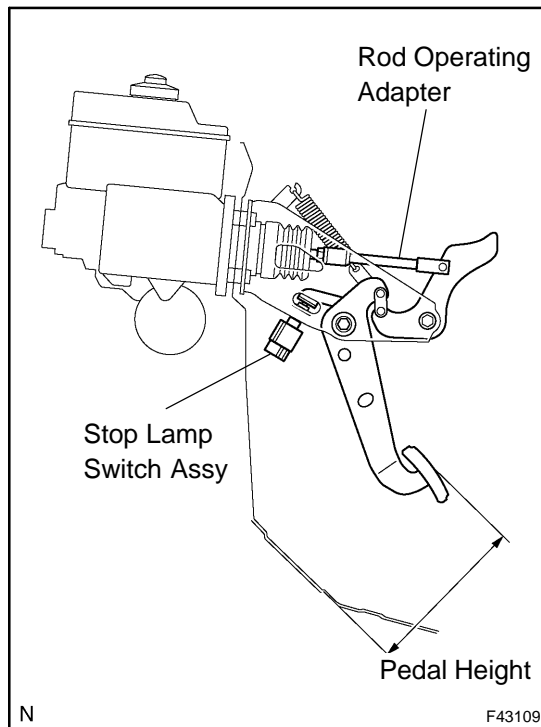
- Brake fluid is sent through the pump.
 - To protect the solenoids, the Hand-held Tester turns OFF automatically 2 seconds after every solenoid has been turned ON.
- Repeat step (f) until all the air in the brake fluid is bled out.
 - When the air is completely bled out of the brake fluid through the bleeder plug, tighten the bleeder plug.
- Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)**
- Repeat the above procedures to bleed the other brake line.
 - Turn the ignition switch off.
 - Turn the ignition switch to the ON position.
 - Clear DTC (see page 05-757).

5. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-14)

BRAKE PEDAL SUPPORT ASSY

ON-VEHICLE INSPECTION

320RQ-03



1. CHECK BRAKE PEDAL HEIGHT

- (a) Check the brake pedal height.

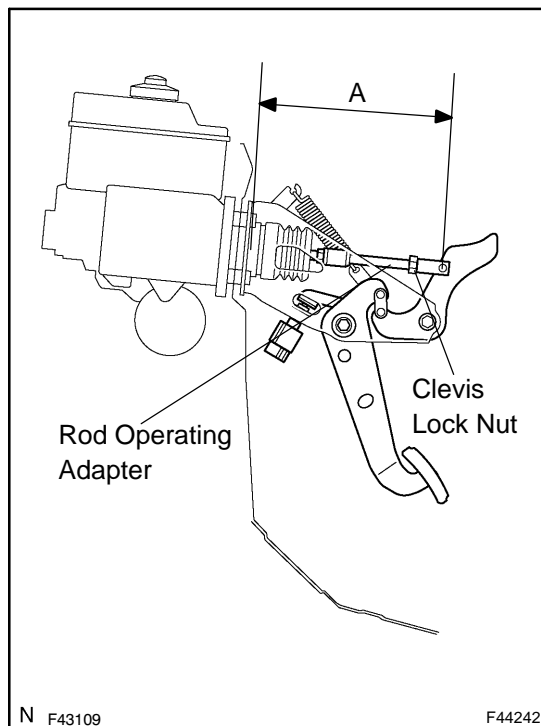
Pedal height from dash panel:

181.6 – 191.6 mm (7.150 – 7.543 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, adjust the rod operating adapter length.



- (b) Adjust the rod operating adapter length.

- (1) Remove the clip and clevis pin.
- (2) Loosen the clevis lock nut.
- (3) Adjust the rod operating adapter length by turning the pedal push rod clevis.

Rod operating adapter length "A":

220.2 – 221.2 mm (8.669 – 8.709 in.)

- (4) Tighten the clevis lock nut.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

- (5) Install the clip and clevis pin.

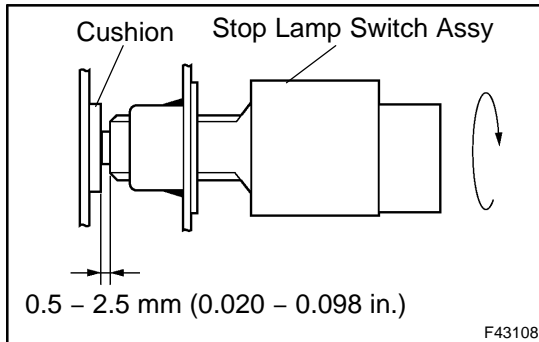
If the pedal height is incorrect even if the rod operating adapter is adjusted, check that there is no damage in brake pedal, brake pedal lever, brake pedal bracket and dash panel.

- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace them.

2. CHECK AND ADJUST STOP LAMP SWITCH**HINT:**

If the pedal height is incorrect, check and adjust the stop lamp switch clearance.

- (a) Disconnect the stop lamp switch assy connector from the stop lamp switch assy.
- (b) Turn the stop lamp switch assy counterclockwise and remove the stop lamp switch assy.



- (c) Insert the stop lamp switch assy until the body hits the cushion.

NOTICE:

When inserting the stop lamp switch assy, support the pedal from behind so that the pedal is not pushed in.

- (d) Make a quarter turn clockwise to install the stop lamp switch assy.

NOTICE:

The turning torque for installing the stop lamp switch assy.

HINT:

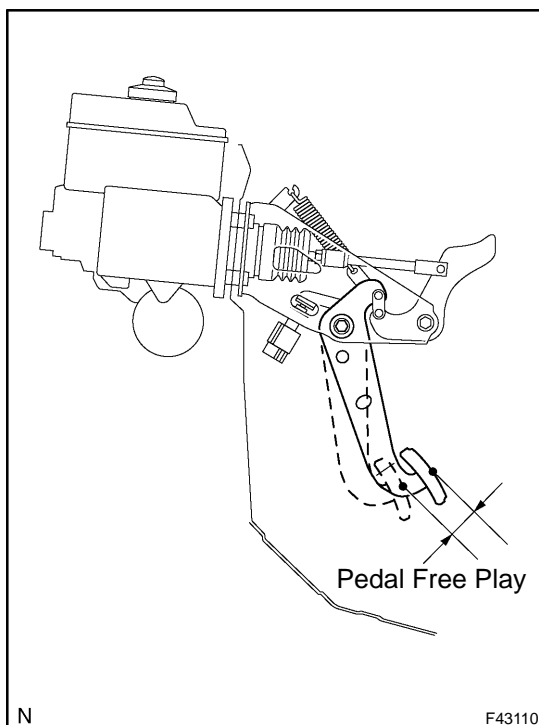
Due to the inverse screw structure, if the stop lamp switch assy is turned clockwise, the stop lamp switch assy moves in the direction to be pulled out.

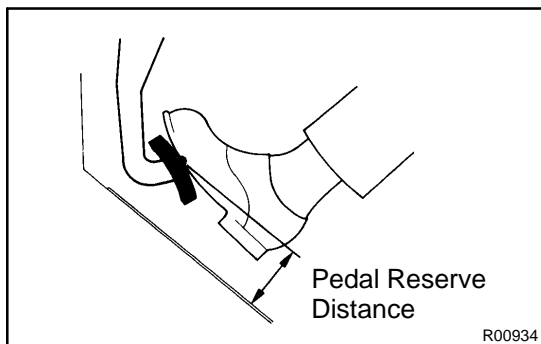
- (e) Connect the stop lamp switch connector to the stop lamp switch assy.
- (f) Check the protrusion of the rod.
Protrusion of the rod: 0.5 - 2.5 mm (0.020 - 0.098 in.)
- (g) Install the clevis pin and clip.
- (h) After adjusting the pedal height, check the pedal free play.

3. CHECK PEDAL FREE PLAY

- (a) Push in the pedal until the beginning of the resistance is felt. Measure the distance, as shown.

Pedal free play: 1 - 6 mm (0.04 - 0.24 in.)





4. CHECK PEDAL RESERVE DISTANCE

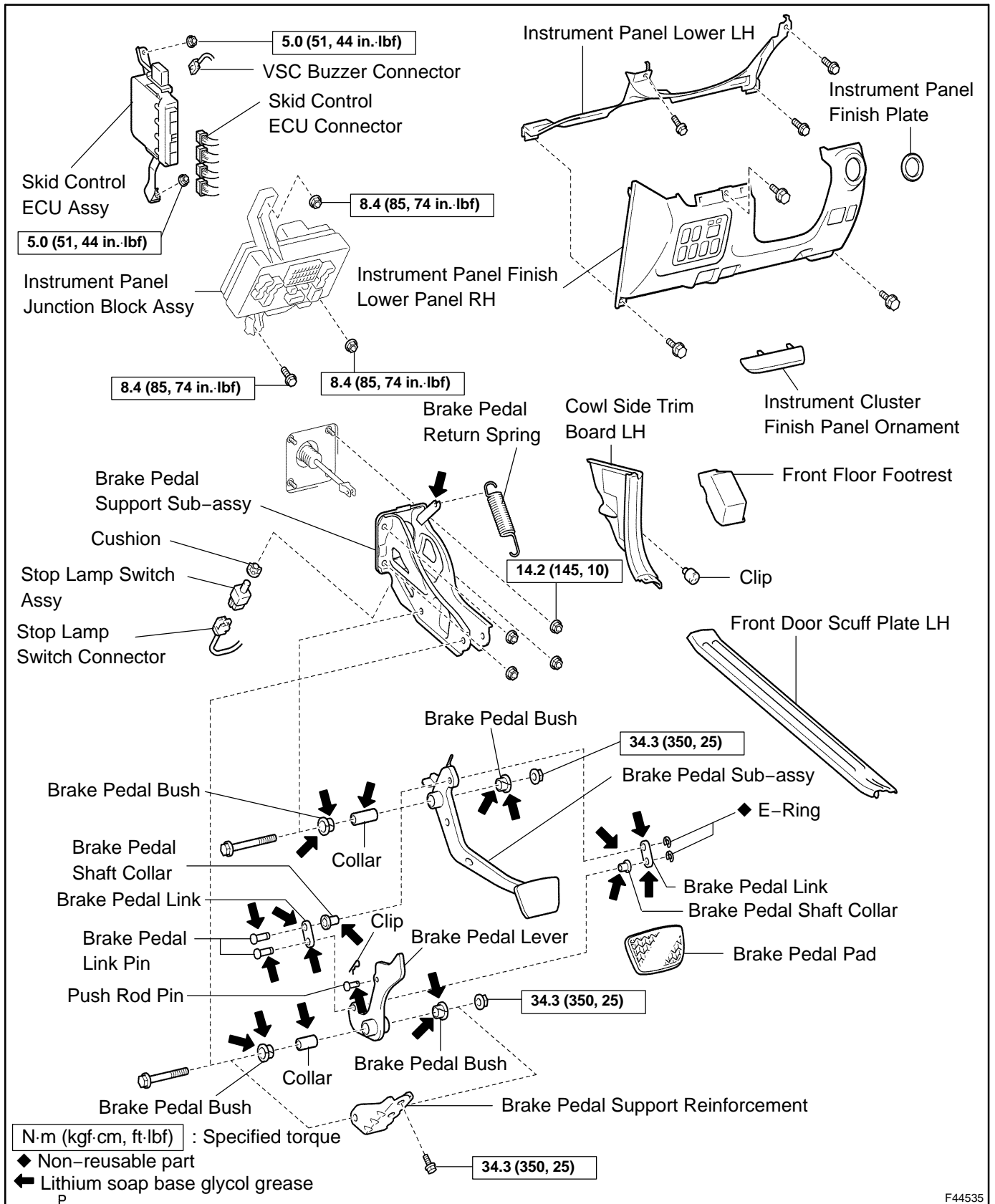
- (a) Release the parking brake pedal.

With engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 55 mm (2.17 in.)

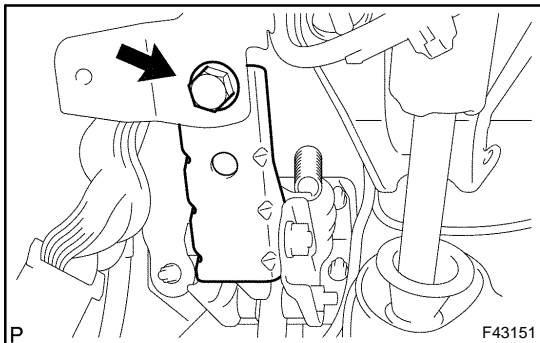
If incorrect, troubleshoot the brake system.

COMPONENTS

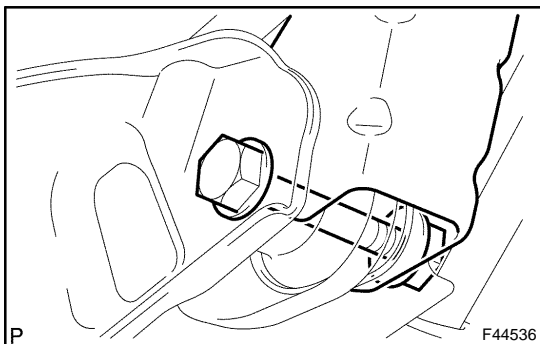


OVERHAUL

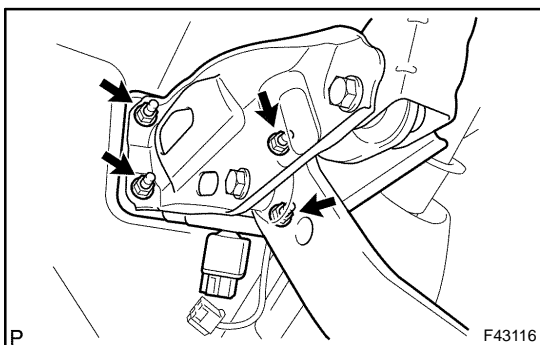
1. REMOVE FRONT DOOR SCUFF PLATE LH (See page 71-13)
2. REMOVE FRONT FLOOR FOOTREST (See page 71-13)
3. REMOVE COWL SIDE TRIM BOARD LH (See page 71-13)
4. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT (See page 71-13)
5. REMOVE INSTRUMENT PANEL FINISH PLATE (See page 71-13)
6. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH (See page 71-13)
7. REMOVE INSTRUMENT PANEL LOWER LH (See page 71-13)
8. REMOVE INSTRUMENT PANEL JUNCTION BLOCK ASSY
9. REMOVE BRAKE PEDAL PAD
10. REMOVE PUSH ROD PIN
 - (a) Remove the clip and push rod pin from the brake pedal lever.
11. REMOVE BRAKE PEDAL SUPPORT ASSY
 - (a) Disconnect the stop lamp switch connector from the stop lamp switch assy.



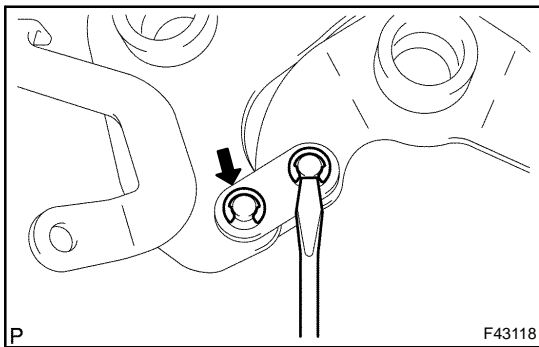
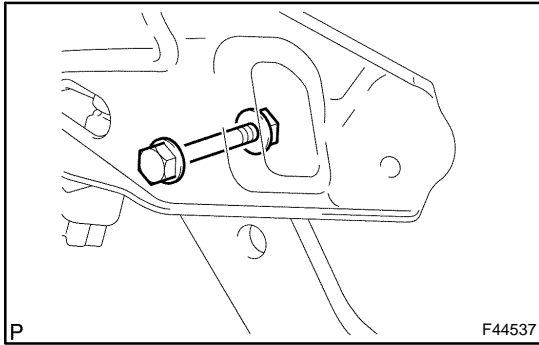
- (b) Remove the bolt from the brake pedal support reinforcement.



- (c) Loosen the bolt and nut.



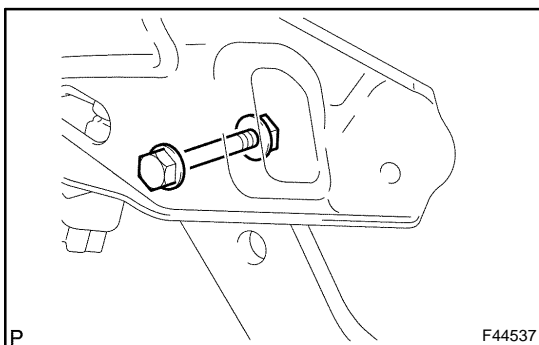
- (d) Remove the 4 nuts and brake pedal support sub-assy.

12. REMOVE BRAKE PEDAL RETURN SPRING**13. REMOVE BRAKE PEDAL**

- (a) Remove the bolt and nut, then remove the brake pedal support reinforcement from the brake pedal support sub-assy.
- (b) Remove the bolt and nut, then remove the brake pedal sub-assy from the brake pedal support assy.
- (c) Remove the 4 brake pedal bushes from the brake pedal and brake pedal lever.
- (d) Remove the 2 collars from the brake pedal sub-assy and brake pedal lever.
- (e) Using a screwdriver, remove the 2 E-rings from the brake pedal link pin.
- (f) Remove the 2 brake pedal link pins, 2 brake pedal shaft collars and 2 brake pedal links.
- (g) Remove the brake pedal lever from the brake pedal sub-assy.

14. INSTALL BRAKE PEDAL

- (a) Apply the lithium soap base glycol grease to the 2 brake pedal link pins, 2 pedal shaft collars and 2 brake pedal links.
- (b) Install the brake pedal lever with 2 brake pedal link pins, 2 brake pedal shaft collars and 2 brake pedal links to the brake pedal sub-assy.
- (c) Install the 2 new E-rings to each of the brake pedal link pins.
- (d) Apply the lithium soap base glycol grease to the 2 collars and 4 brake pedal bushes.
- (e) Install the 2 collars and 4 brake pedal bushes to the brake pedal sub-assy and brake pedal lever.

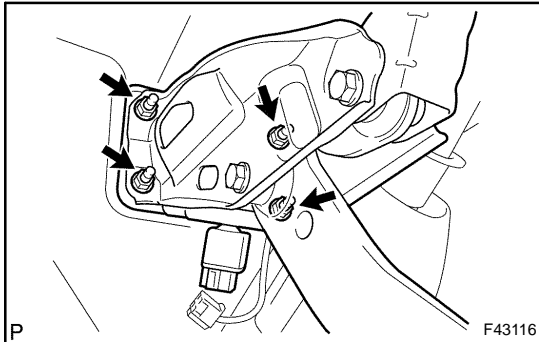


- (f) Install the brake pedal sub-assy with a bolt and nut to the brake pedal support sub-assy.

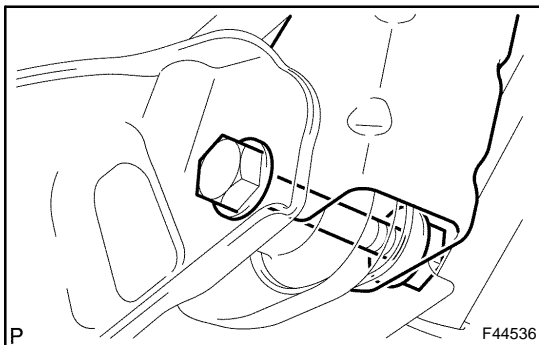
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

15. INSTALL BRAKE PEDAL RETURN SPRING

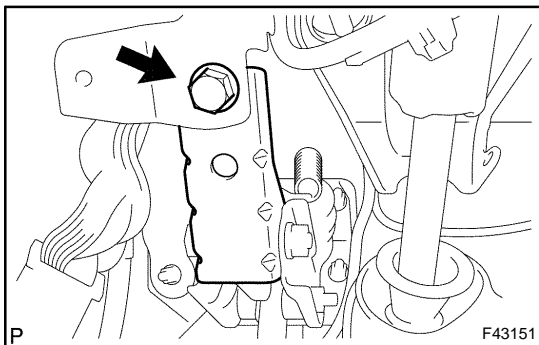
- (a) Apply the lithium soap base glycol grease to inner surface of the hole on the brake pedal support sub-assy.
- (b) Install the brake pedal return spring to the brake pedal support sub-assy.

**16. INSTALL BRAKE PEDAL SUPPORT ASSY**

- (a) Install the 4 nuts and brake pedal support sub-assy.
Torque: 14.2 N·m (145 kgf·cm, 10 ft·lbf)
- (b) Install the brake pedal support reinforcement to the brake pedal support sub-assy.



- (c) Temporarily tighten the bolt and nut to the brake pedal support sub-assy, brake pedal support reinforcement and brake pedal lever.



- (d) Install the bolt to the brake pedal support reinforcement.
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)
- (e) Tighten the bolt and nut.
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

17. INSTALL PUSH ROD PIN

- (a) Apply the lithium soap base glycol grease to the inner surface of the hole on the brake pedal lever.
- (b) Install the push rod pin and clip to the brake pedal lever.

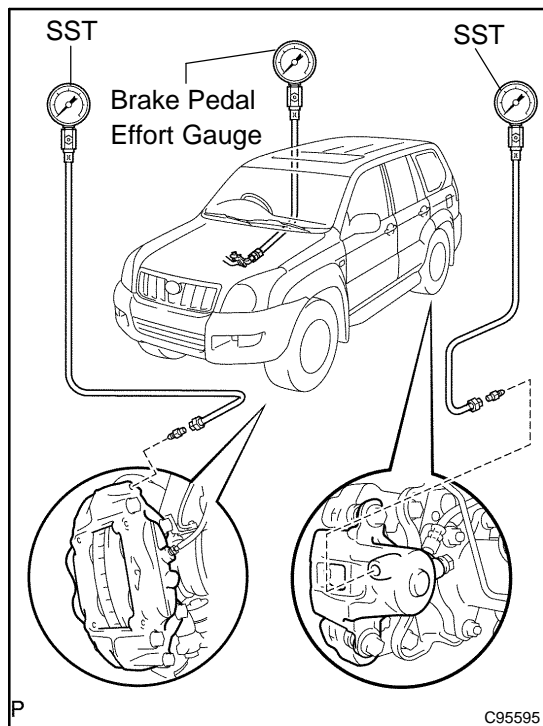
18. INSTALL BRAKE PEDAL PAD**19. INSTALL INSTRUMENT PANEL JUNCTION BLOCK ASSY****20. INSTALL INSTRUMENT PANEL LOWER LH****21. INSTALL INSTRUMENT PANEL FINISH LOWER PANEL RH****22. INSTALL INSTRUMENT PANEL FINISH PLATE****23. INSTALL INSTRUMENT CLUSTER FINISH PANEL ORNAMENT****24. INSTALL COWL SIDE TRIM BOARD LH****25. INSTALL FRONT FLOOR FOOTREST****26. INSTALL FRONT DOOR SCUFF PLATE LH****27. INSPECT BRAKE PEDAL HEIGHT (See page 32-6)****28. CHECK PEDAL FREE PLAY (See page 32-6)****29. CHECK PEDAL RESERVE DISTANCE (See page 32-6)**

30. CHECK VSC SENSOR SIGNAL (See page [05-738](#))

W/MASTER CYLINDER BRAKE BOOSTER ASSY

ON-VEHICLE INSPECTION

321HB-01



1. CHECK BRAKE MASTER CYLINDER FLUID PRESSURE CHANGE

- (a) Inspect the battery voltage.
Battery voltage: 11 to 14 V
- (b) Turn the ignition switch off and depress the brake pedal more than 40 times.

HINT:

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

- (c) Install the LSPV gauge (SST) and brake pedal effort gauge, and bleed air.

SST 09709-29018

- (d) When the booster does not operate:
Depress the brake pedal and check fluid pressure.
At 245 N (25 kgf, 55 lbf):

Front brake pressure	Rear brake pressure
3,150 kPa (32.1 kgf/cm ² , 457 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

At 343 N (35 kgf, 77 lbf):

Front brake pressure	Rear brake pressure
4,540 kPa (46.3 kgf/cm ² , 659 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

- (e) When the booster operates:
Depress the brake pedal and check fluid pressure.
 - (1) Turn the ignition switch to the ON position and wait until the pump motor has stopped.
 - (2) Depress the brake pedal and check fluid pressure.

At 49 N (5 kgf, 11 lbf):

Front brake pressure	Rear brake pressure
1,120 to 2,320 kPa (11.4 to 23.7 kgf/cm ² , 162 to 337 psi)	1,220 to 2,420 kPa (12.4 to 24.7 kgf/cm ² , 177 to 351 psi)

At 98 N (10 kgf, 22 lbf):

Front brake pressure	Rear brake pressure
3,840 to 5,040 kPa (39.2 to 51.4 kgf/cm ² , 557 to 731 psi)	4,500 to 5,700 kPa (45.9 to 58.1 kgf/cm ² , 653 to 827 psi)

At 147 N (15 kgf, 33 lbf):

Front brake pressure	Rear brake pressure
6,460 to 7,660 kPa (65.9 to 78.1 kgf/cm ² , 937 to 1,111 psi)	7,930 to 9,130 kPa (80.9 to 93.1 kgf/cm ² , 1,150 to 1,324 psi)

At 196 N (20 kgf, 44 lbf):

Front brake pressure	Rear brake pressure
8,720 to 9,920 kPa (88.9 to 101.2 kgf/cm ² , 1,265 to 1,439 psi)	11,330 to 12,530 kPa (115.5 to 127.8 kgf/cm ² , 1,644 to 1,818 psi)

2. INSPECT BRAKE MASTER CYLINDER OPERATION

(a) Inspect the battery voltage.

Battery voltage: 11 to 14 V

(b) Turn the ignition switch off and depress the brake pedal more than 20 times.

HINT:

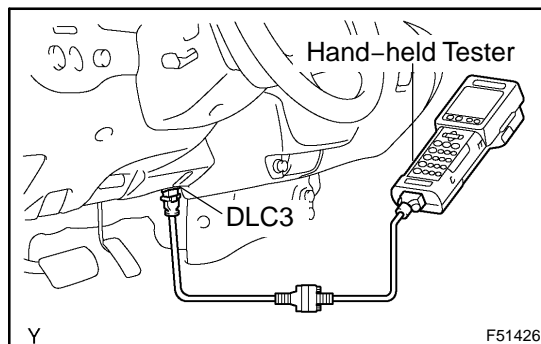
When pressure in the power supply system is released, reaction force decreases and stroke becomes longer.

(c) Check that the brake pedal reaction force decreases.

If the pedal reaction force does not decrease, check and replace the brake line and brake master cylinder.

(d) Turn the ignition switch to the ON position and check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (see page 32-23).



(e) Connect the Hand-held Tester to the DLC3.

(f) Turn the ignition switch to the ON position.

(g) Select "ACTIVE TEST" mode on the Hand-held Tester.

HINT:

Please refer to the Hand-held Tester operator's manual for further details.

(h) Jack up and support the vehicle.

(i) Release the parking brake lever.

(j) Shift the transfer shift lever to the "N" position and check that the rear wheels rotate by hand.

(k) Inspect front VSC solenoid (SMCF) operation.

(1) Select "SRCF (SMCF)" on the Hand-held Tester.

(2) Turn the "SRCF (SMCF)" ON with the Hand-held Tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

If the pedal can be depressed, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

(3) Release the brake pedal.

(4) When the solenoid is OFF, depress the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the brake master cylinder.

- (l) Inspect front VSC solenoid (SREA) operation.
- (1) Select "SRCR (SREA)" and "SRCF (SMCF)" on the Hand-held Tester.
 - (2) Turn the "SRCR (SREA)" and "SRCF (SMCF)" ON simultaneously with the Hand-held Tester, then depress the brake pedal with stable force.
 - (3) When the solenoids are ON, check that the front wheels do not rotate by hand.

If the front wheels rotate, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheels fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheels as slowly as possible.
- (4) When the solenoids are OFF, turn the "SRCF (SMCF)" ON again, and then depress the brake pedal. Then check the front wheels by rotating them by hand.

If the front wheels stop, replace the brake master cylinder.

- (5) When the "SRCF (SMCF)" is OFF, depress the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the brake master cylinder.

- (m) Inspect front ABS solenoid (SFRH) operation.
- (1) Select "SFRH" on the Hand-held Tester.
 - (2) Turn the "SFRH" ON with the Hand-held Tester, then depress the brake pedal with stable force.
 - (3) When the solenoid is ON, check the right front wheel by rotating it by hand.

If the right front wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoid is OFF, depress the brake pedal again and check that the right front wheel does not rotate by hand.

If the right front wheel rotates, replace the brake master cylinder.

HINT:

- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.

- (n) Inspect front ABS solenoid (SFLH) operation.
- (1) Select "SFLH" on the Hand-held Tester.
 - (2) Turn the "SFLH" ON with the Hand-held Tester, then depress the brake pedal with stable force.
 - (3) When the solenoid is ON, check the left front wheel by rotating it by hand.

If the left front wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.

- (4) When the solenoid is OFF, depress the brake pedal again and check that the left front wheel does not rotate by hand.

If the left front wheel rotates, replace the brake master cylinder.

- (o) Inspect front ABS solenoid (SFRR) operation.
 - (1) Select "SFRR" and "SFRH" on the Hand-held Tester.
 - (2) Depress the brake pedal with stable force, then turn the "SFRR" and "SFRH" ON simultaneously with the Hand-held Tester.
 - (3) When the solenoids are ON, check the right front wheel by rotating it by hand.

If the right front wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
 - When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoids are OFF, depress the brake pedal again and check that the right front wheel does not rotate by hand.

If the right front wheel rotates, replace the brake master cylinder.

- (p) Inspect front ABS solenoid (SFLR) operation.
 - (1) Select "SFLR" and "SFLH" on the Hand-held Tester.
 - (2) Depress the brake pedal with stable force, then turn the "SFLR" and "SFLH" ON simultaneously with the Hand-held Tester.
 - (3) When the solenoids are ON, check the left front wheel by rotating it by hand.

If the left front wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
 - When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoids are OFF, depress the brake pedal again and check that the left front wheel does not rotate by hand.

If the left front wheel rotates, replace the brake master cylinder.

- (q) Inspect rear VSC solenoid (SREC) operation.
 - (1) Select "SRMF (SREC)" on the Hand-held Tester.
 - (2) Depress the brake pedal with stable force, then turn the "SRMF (SREC)" ON with the Hand-held Tester.
 - (3) Release the brake pedal when the solenoid is on, and check that the rear wheels do not rotate by hand.

If the rear wheels rotate, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheels fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheels as slowly as possible.

- (4) When the solenoid is OFF, check the rear wheels by rotating them by hand.

If the rear wheels stop, replace the brake master cylinder.

- (r) Inspect rear VSC solenoid (STR) operation.

- (1) Select "SRMR (STR)" and "SRMF (SREC)" on the Hand-held Tester.
- (2) Turn the "SRMR (STR)" and "SRMF (SREC)" ON simultaneously with the Hand-held Tester.
- (3) When the solenoids are ON, check that the rear wheels do not rotate by hand.

If the rear wheels rotate, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheels fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheels as slowly as possible.
- (4) When the solenoids are OFF, turn the "SRMF (SREC)" ON again, and check the rear wheels by rotating them by hand.

If the rear wheels stop, replace the brake master cylinder.

- (5) When the "SRMF (SREC)" is OFF, depress the brake pedal again and check that the rear wheels do not rotate by hand.

If the rear wheels rotate, replace the brake master cylinder.

- (s) Inspect rear ABS solenoid (SRRH) operation.

- (1) Select "SRRH" on the Hand-held Tester.
- (2) Turn the "SRRH" ON with the Hand-held Tester, then depress the brake pedal with stable force.
- (3) When the solenoid is ON, check the right rear wheel by rotating it by hand.

If the right rear wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoid is OFF, depress the brake pedal again and check that the right rear wheel does not rotate by hand.

If the right rear wheel rotates, replace the brake master cylinder.

HINT:

- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.

- (t) Inspect rear ABS solenoid (SRLH) operation.

- (1) Select "SRLH" on the Hand-held Tester.
- (2) Turn the "SRLH" ON with the Hand-held Tester, then depress the brake pedal with stable force.
- (3) When the solenoid is ON, check the left rear wheel by rotating it by hand.

If the left rear wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.

- (4) When the solenoid is OFF, depress the brake pedal again and check that the left rear wheel does not rotate by hand.

If the left rear wheel rotates, replace the brake master cylinder.

- (u) Inspect rear ABS solenoid (SRRR) operation.
- (1) Select "SRRR" and "SRRH" on the Hand-held Tester.
 - (2) Depress the brake pedal with stable force, then turn the "SRRR" and "SRRH" ON simultaneously with the Hand-held Tester.
 - (3) When the solenoids are ON, check the right rear wheel by rotating it by hand.

If the right rear wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
 - When rotating the wheel too fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoids are OFF, depress the brake pedal again and check that the right rear wheel does not rotate by hand.

If the right rear wheel rotates, replace the brake master cylinder.

- (v) Inspect rear ABS solenoid (SRLR) operation.
- (1) Select "SRLR" and "SRLH" on the Hand-held Tester.
 - (2) Depress the brake pedal with stable force, then turn the "SRLR" and "SRLH" ON simultaneously with the Hand-held Tester.
 - (3) When the solenoids are ON, check the left rear wheel by rotating it by hand.

If the left rear wheel stops, replace the brake master cylinder.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

HINT:

- To protect the solenoids, the Hand-held Tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
 - When rotating the wheel too fast, the fail-safe function is activated and judgement cannot be made properly. Rotate the wheel as slowly as possible.
- (4) When the solenoids are OFF, depress the brake pedal again and check that the left rear wheel does not rotate by hand.

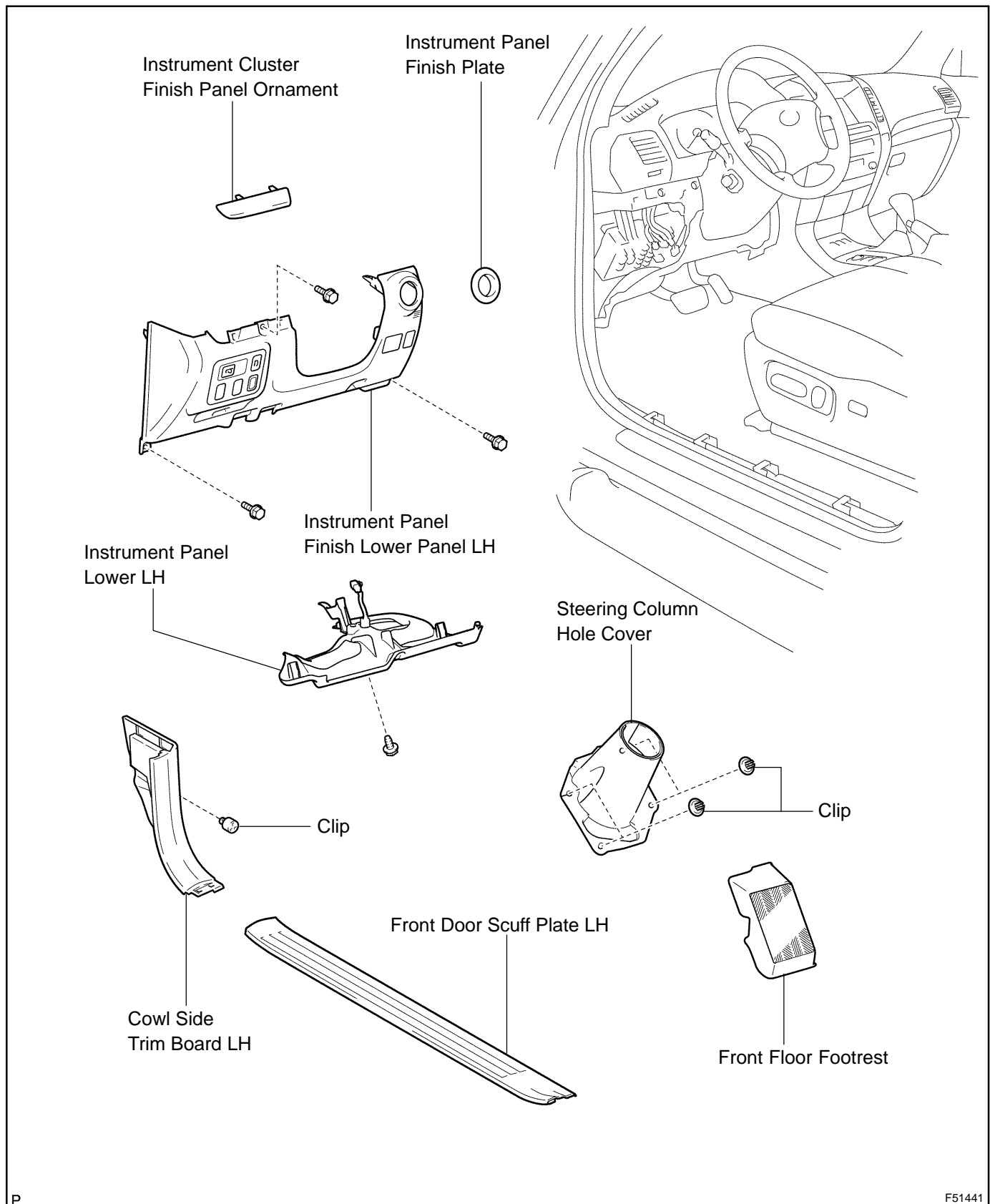
If the left rear wheel rotates, replace the brake master cylinder.

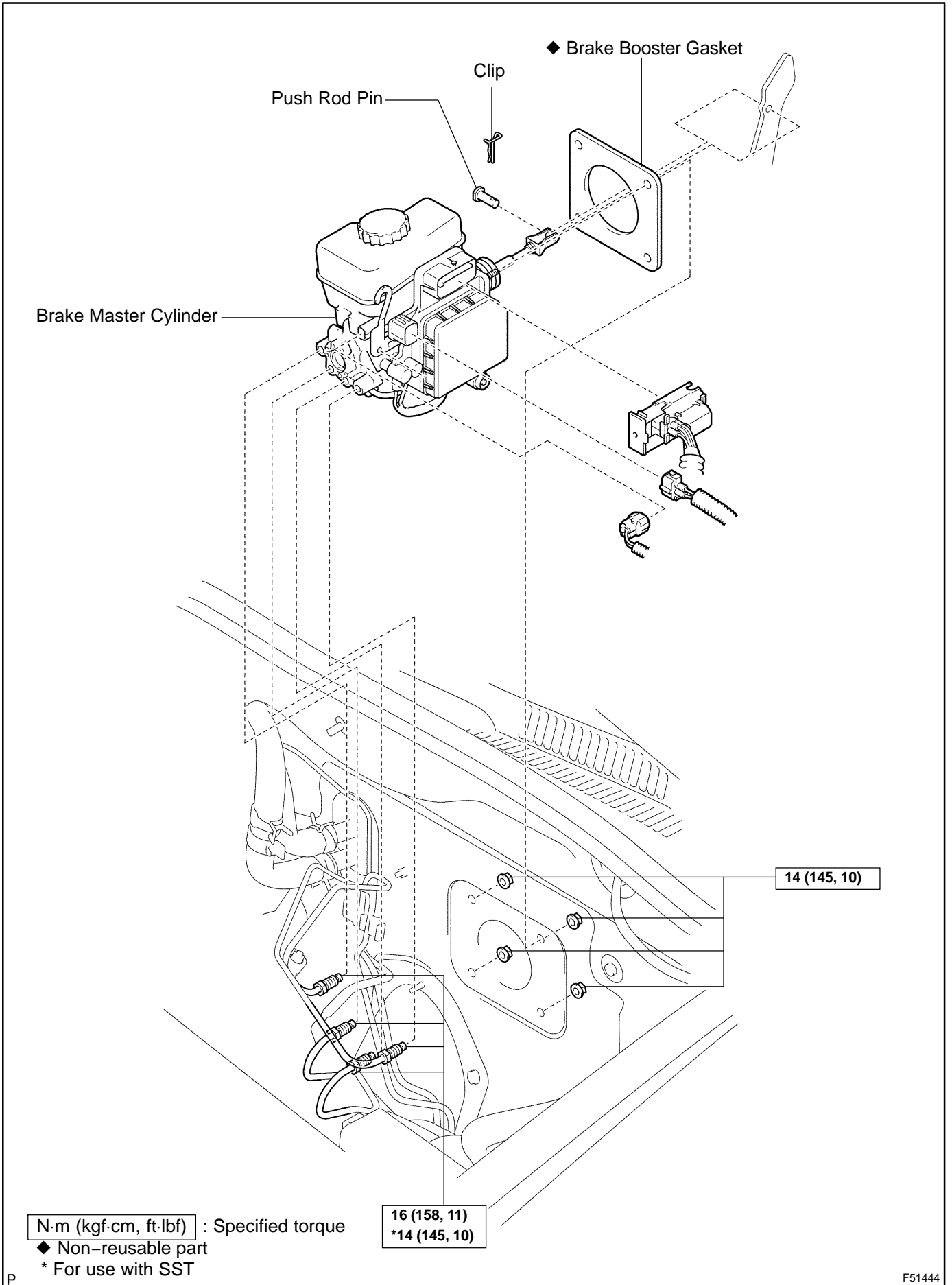
- (w) Lower the vehicle.
- (x) Disconnect the Hand-held Tester.

3. CHECK BRAKE FLUID LEVEL

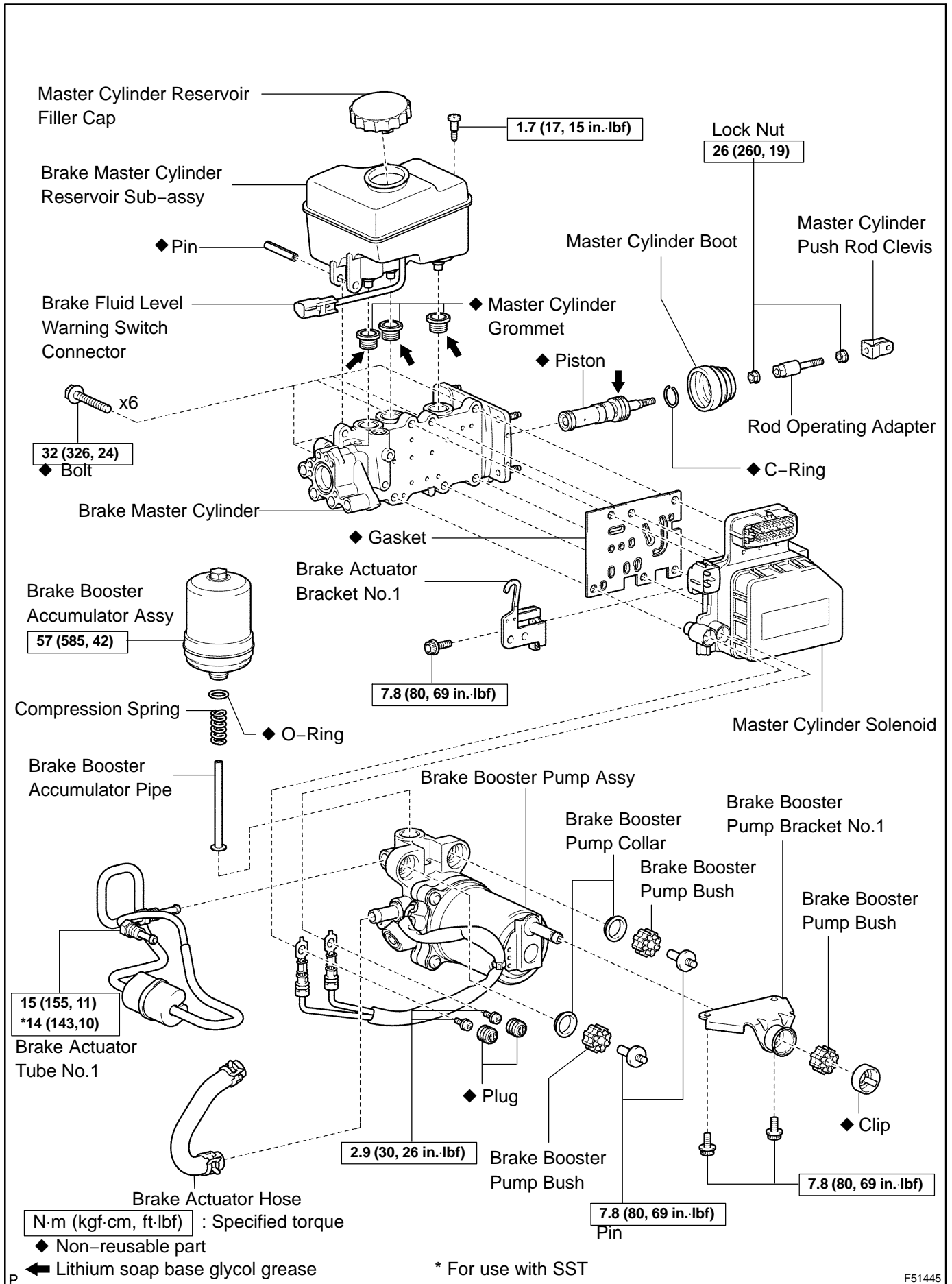
- (a) Turn the ignition switch off, depress the brake pedal 20 times or more (until the pedal reaction feels light and pedal stroke becomes longer), and adjust the fluid level to the MAX level.
- (b) When the ignition switch is turned to the ON position, brake fluid is sent to the accumulator and the fluid level decreases by approximately 5 mm from the level when the ignition switch is off (normal).

COMPONENTS





F51444



F51445

OVERHAUL

NOTICE:

- When installing, coat the parts indicated by arrows with lithium soap base glycol grease (see page 32-20).
- As high pressure is applied to the brake actuator tube No.1, never deform it.
- Until the work is over, do not turn the ignition switch to the ON position.
- Before starting the work, make sure that the ignition switch is off and depress the brake pedal more than 20 times.

HINT:

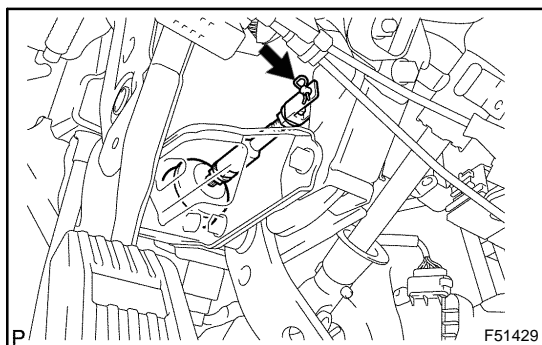
When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

1. DRAIN BRAKE FLUID

NOTICE:

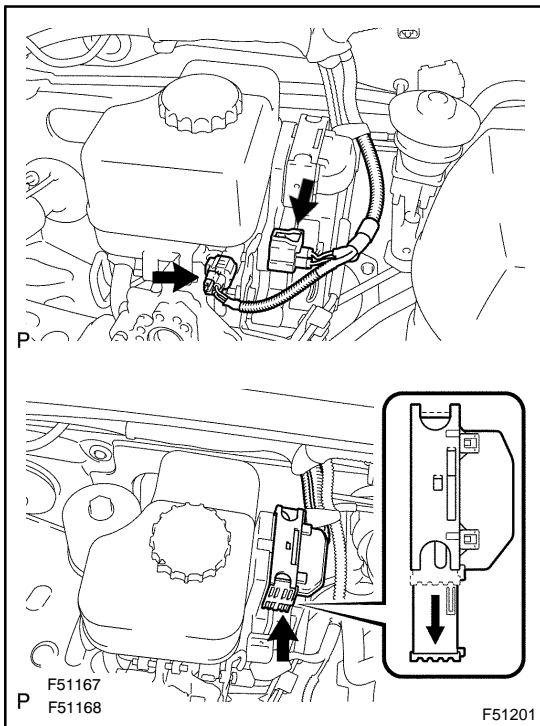
Wash off brake fluid immediately if it comes into contact with a painted surface.

2. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 71-13)
3. REMOVE FRONT FLOOR FOOTREST (SEE PAGE 71-13)
4. REMOVE COWL SIDE TRIM BOARD LH (SEE PAGE 71-13)
5. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT (SEE PAGE 71-13)
6. REMOVE INSTRUMENT PANEL FINISH PLATE (SEE PAGE 71-13)
7. REMOVE INSTRUMENT PANEL LOWER LH (SEE PAGE 71-13)
8. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL (SEE PAGE 71-13)
9. REMOVE STEERING COLUMN HOLE COVER
 - (a) Remove the 4 clips and steering column hole cover.



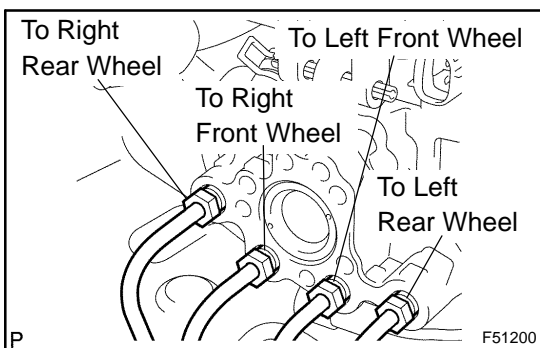
10. REMOVE PUSH ROD PIN

- (a) Remove the clip and push rod pin from the clevis.

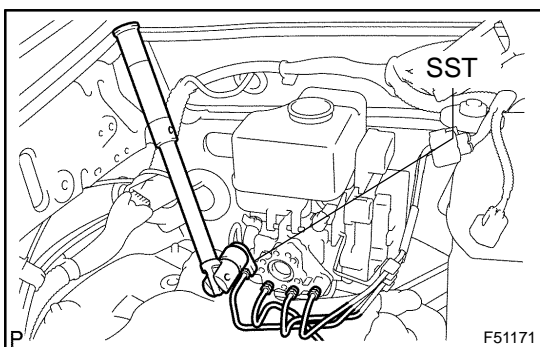


11. REMOVE BRAKE MASTER CYLINDER

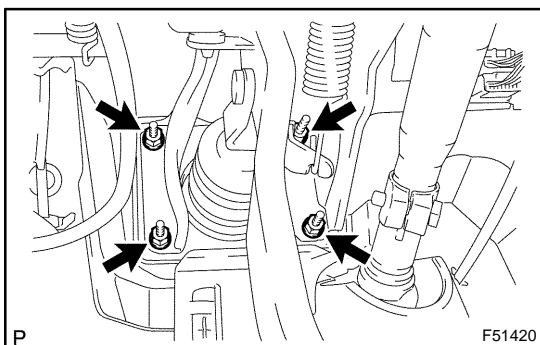
- (a) Disconnect the 3 connectors from the brake master cylinder assy.



- (b) Use tags or make a memo to identify the place to reconnect.



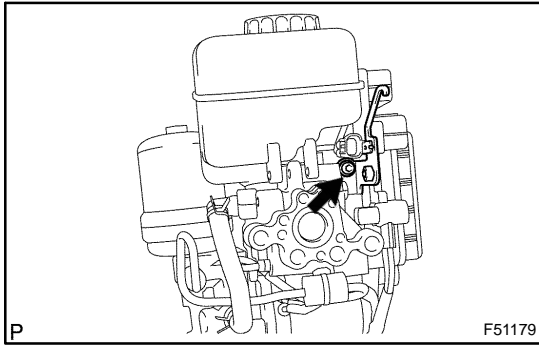
- (c) Using SST, disconnect the 4 brake lines from the brake master cylinder.
SST 09023-00101



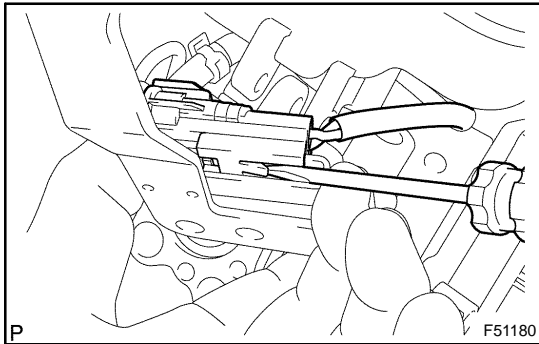
- (d) Remove the 4 nuts and pull out the brake master cylinder.

12. REMOVE BRAKE BOOSTER GASKET

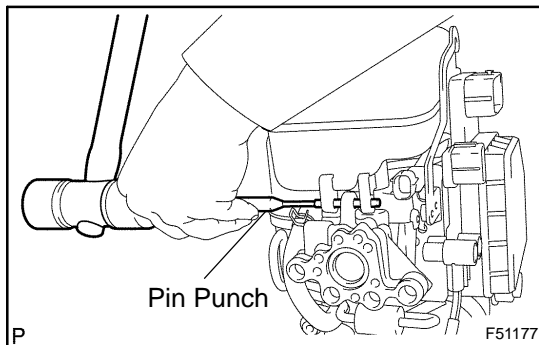
- (a) Remove the brake booster gasket from the brake master cylinder.

**13. REMOVE BRAKE ACTUATOR BRACKET NO.1**

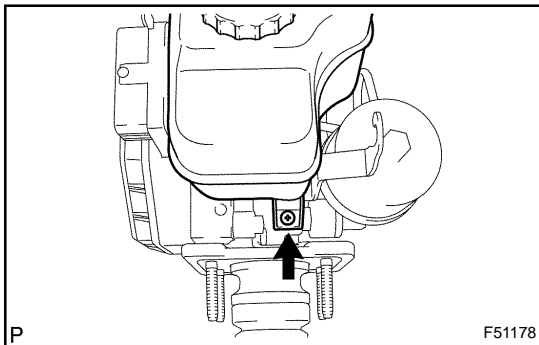
- (a) Using a hexagon wrench (5 mm), remove the bolt and brake actuator bracket No.1 from the brake master cylinder.



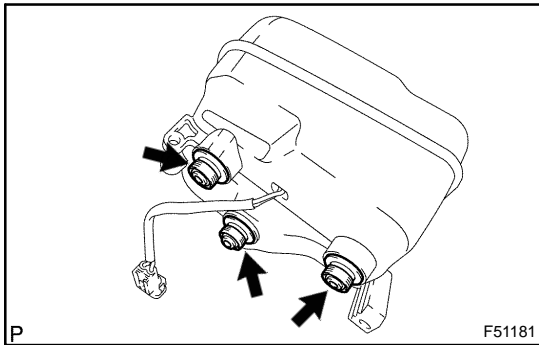
- (b) Using a screwdriver, remove the brake fluid level warning switch connector from the brake actuator bracket No.1.

**14. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY**

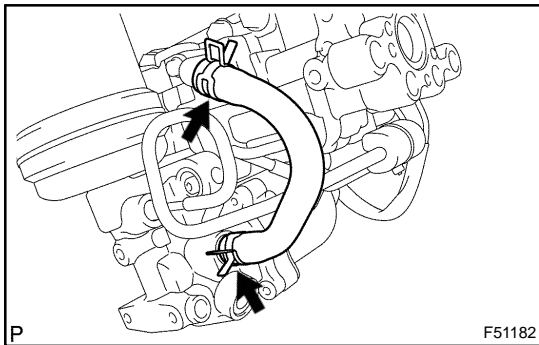
- (a) Using a pin punch and hammer, remove the pin from the brake master cylinder reservoir sub-assy.



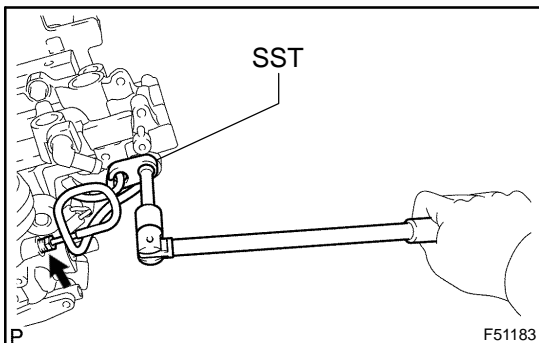
- (b) Remove the screw and pull out the brake master cylinder reservoir sub-assy.
 (c) Remove the master cylinder reservoir filler cap.

**15. REMOVE MASTER CYLINDER GROMMET**

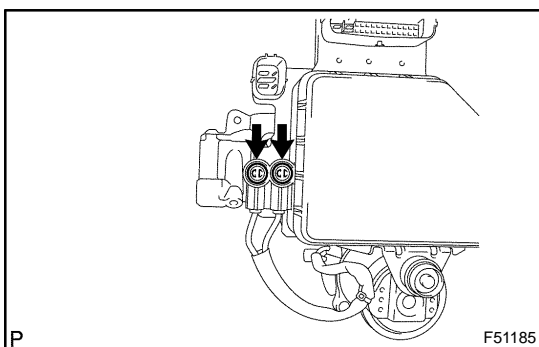
- (a) Remove the 3 master cylinder grommets from the master cylinder reservoir sub-assy.

**16. REMOVE BRAKE ACTUATOR HOSE**

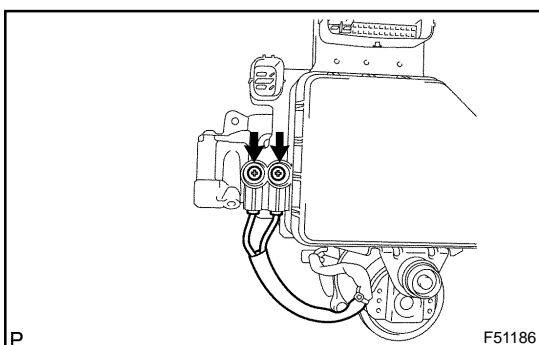
- (a) Using needle nose pliers, slide the 2 clips and remove the brake actuator hose and 2 clips.

**17. REMOVE BRAKE ACTUATOR TUBE NO.1**

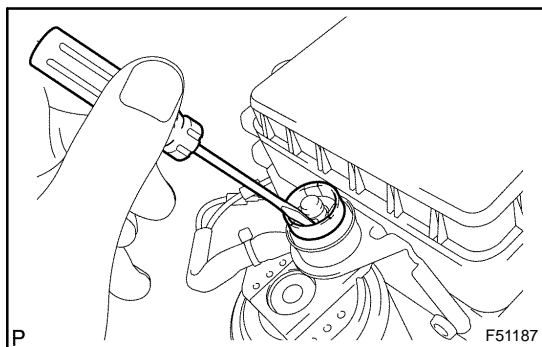
- (a) Using SST, remove the brake actuator tube No.1 from the brake master cylinder.
SST 09023-00101

**18. REMOVE BRAKE BOOSTER W/ACCUMULATOR PUMP ASSY**

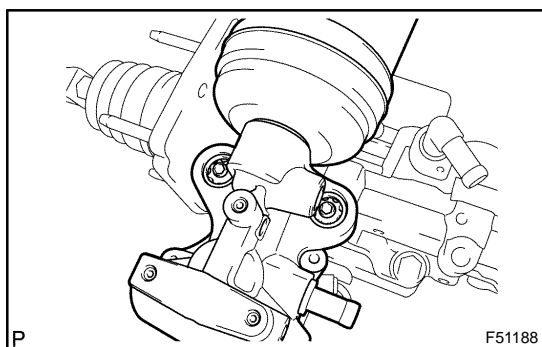
- (a) Using a screwdriver, remove the 2 plugs.



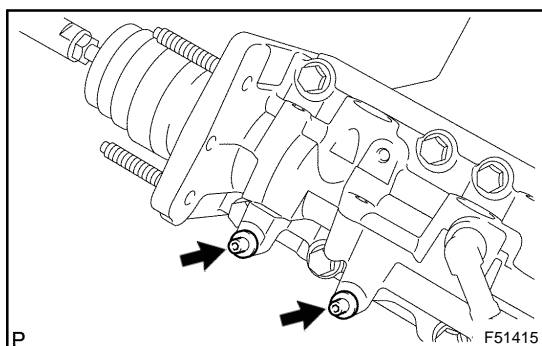
- (b) Remove the 2 screws and disconnect the wire harnesses from the master cylinder solenoid.



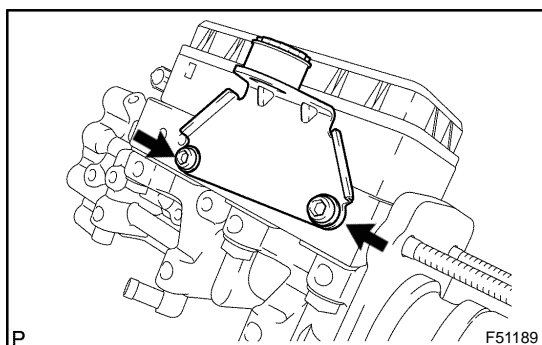
- (c) Using a screwdriver, remove the clip.



- (d) Remove the brake booster w/ accumulator pump assy from the brake master cylinder.
 (e) Remove the 2 brake booster pump collars and the 2 brake booster pump bushes from the brake booster w/ accumulator pump assy.

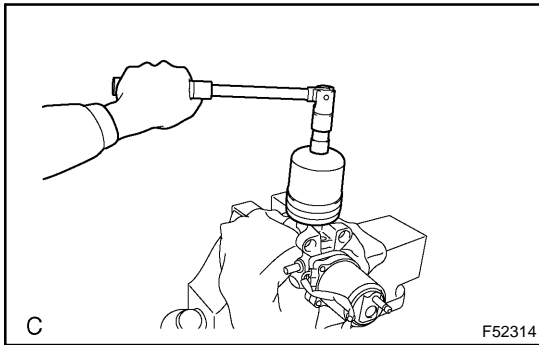


- (f) Using a hexagon wrench (4 mm), remove the 2 pins.



19. REMOVE BRAKE BOOSTER PUMP BRACKET NO.1

- (a) Using a hexagon wrench (5 mm), remove the 2 bolts and brake booster pump bracket No.1 from the brake master cylinder solenoid.
 (b) Remove the brake booster pump bush from the brake booster pump bracket No.1.

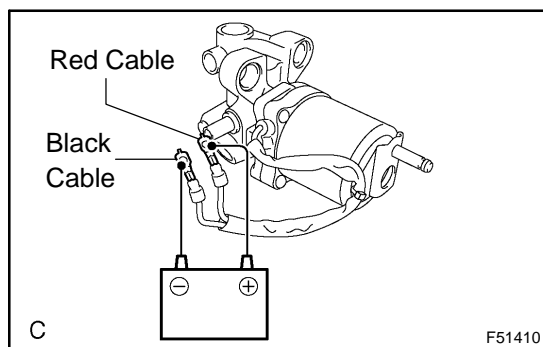


- 20. REMOVE BRAKE BOOSTER ACCUMULATOR ASSY**
- Secure the brake booster w/ accumulator pump assy in a vise.
 - Remove the brake booster accumulator assy.
 - Remove the O-ring from the brake booster accumulator assy.

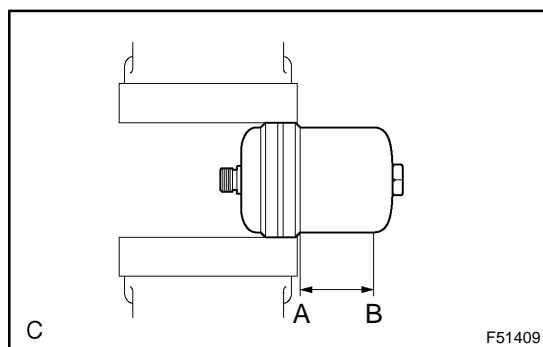
NOTICE:

Ensure no foreign matter enters the pump and accumulator.

- Remove the brake booster accumulator pipe and compression spring.

**21. INSPECT BRAKE BOOSTER PUMP ASSY**

- Connect the positive (+) lead from the battery to the red cable of the pump motor, and the negative (-) lead to the black cable.
- Check brake booster pump motor operation.

**22. DISPOSE OF BRAKE BOOSTER ACCUMULATOR ASSY**

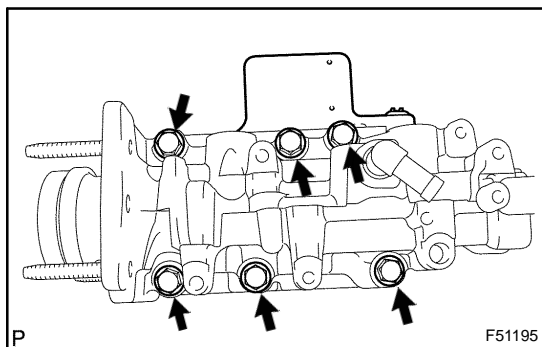
- Place the brake booster accumulator assy in a vise and cover it with a shop rag or piece of cloth.
- Using a saw, cut the brake booster accumulator body between A and B as shown in the illustration to discharge the gas inside.

CAUTION:

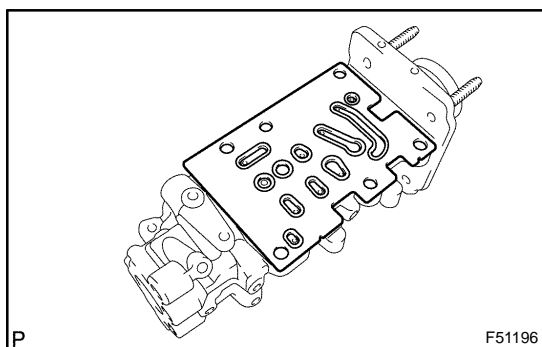
- **Cover with a shop rag or piece of cloth when working because gas may blow out.**
 - **Carefully, not abruptly, cut the accumulator.**
 - **Wear protective glasses.**
- When the outer body of the brake booster accumulator is cut, gas and liquid discharge.

HINT:

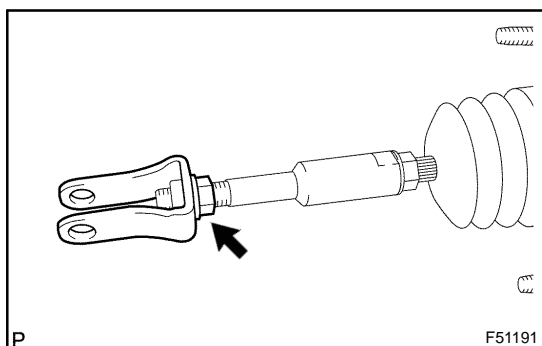
The gas is colorless, odorless and non-poisonous.

**23. REMOVE MASTER CYLINDER SOLENOID**

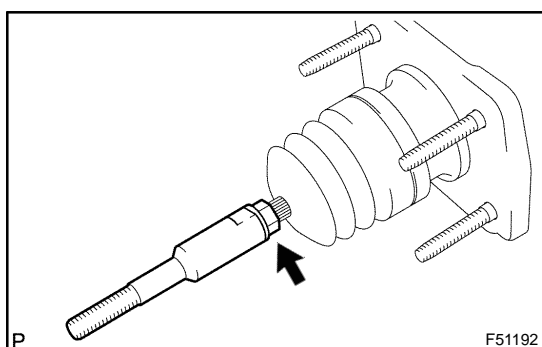
- (a) Remove the 6 bolts and master cylinder solenoid.



- (b) Remove the gasket.

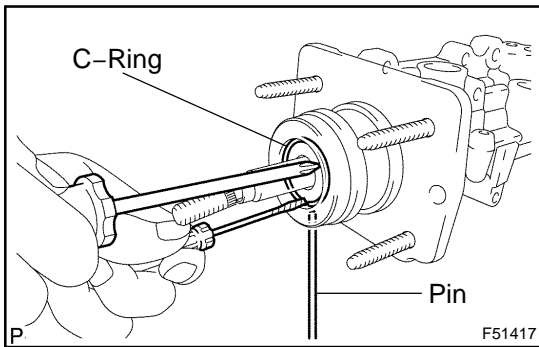
**24. REMOVE MASTER CYLINDER PUSH ROD CLEVIS**

- (a) Loosen the lock nut on the rod operating adapter, and remove the push rod clevis and lock nut.



- (b) Loosen the lock nut on the brake master cylinder side, and remove the rod operating adapter and lock nut.

25. REMOVE MASTER CYLINDER BOOT

**26. REMOVE BRAKE MASTER CYLINDER KIT**

- (a) Pressing the piston in with a screwdriver, use a pin or equivalent to push the C-ring from the hole in the master cylinder body then remove it with another screwdriver.

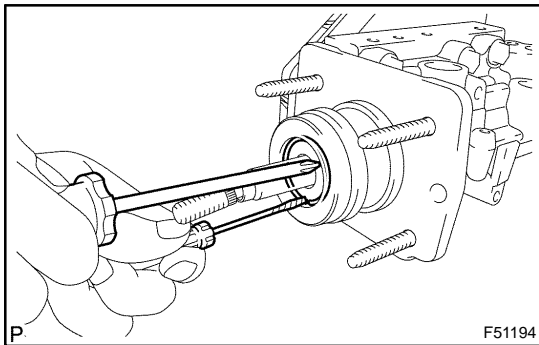
HINT:

Tape the screwdriver tip before use.

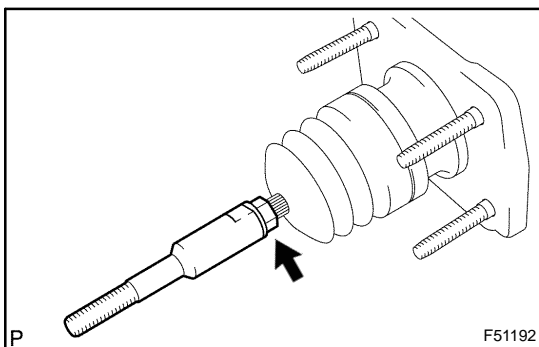
- (b) Remove the piston, pulling it straight out, not at an angle.

NOTICE:

If pulled out at an angle, there is a possibility that the cylinder bore could be damaged.

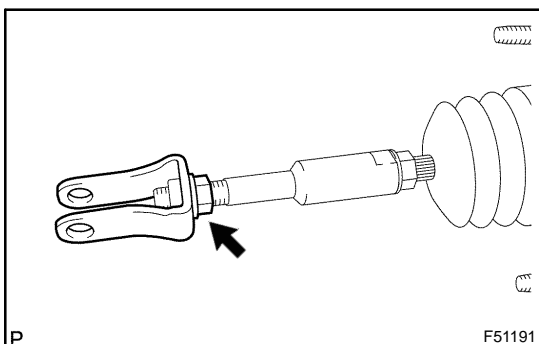
**27. INSTALL BRAKE MASTER CYLINDER KIT**

- (a) Apply lithium soap base glycol grease to a new piston.
 (b) Install the piston.
 (c) Using 2 screwdrivers, install a new C-ring while pressing on the piston.

28. INSTALL MASTER CYLINDER BOOT**29. INSTALL MASTER CYLINDER PUSH ROD CLEVIS**

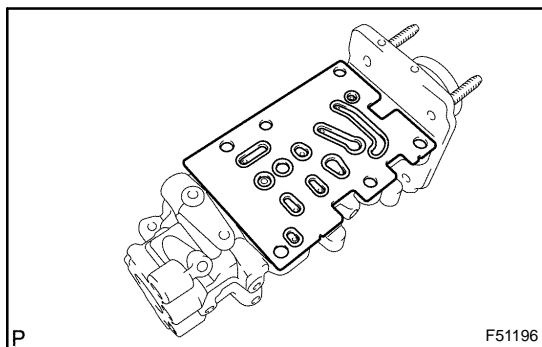
- (a) Install the brake master cylinder side lock nut and rod operating adapter on the brake master cylinder.

Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)



- (b) Install the lock nut and master cylinder push rod clevis on the rod operating adapter.

Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)

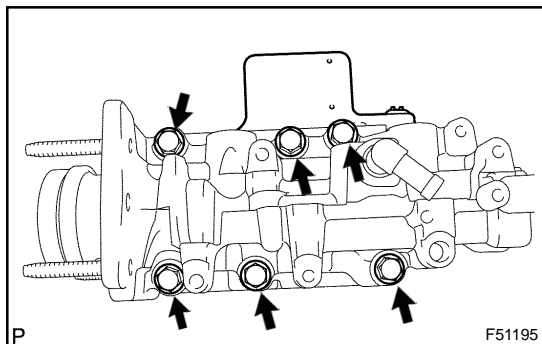


30. INSTALL MASTER CYLINDER SOLENOID

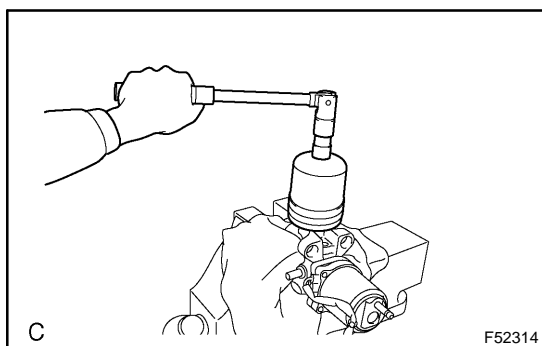
- (a) Install a new gasket.

NOTICE:

Keep all surfaces of the master cylinder solenoid, master cylinder and gasket, especially contact surfaces, away from water and dust.



- (b) Install the master cylinder solenoid with 6 new bolts.
Torque: 32 N·m (326 kgf·cm, 24 ft·lbf)



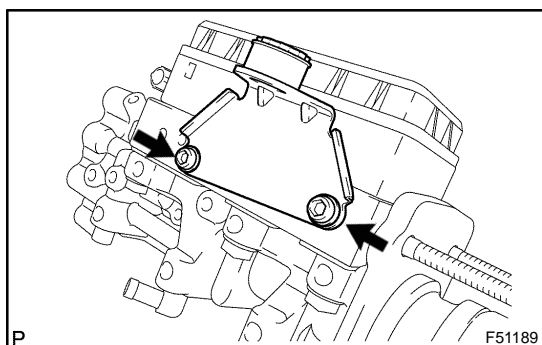
31. INSTALL BRAKE BOOSTER ACCUMULATOR ASSY

- (a) Install the brake booster accumulator pipe and compression spring.

NOTICE:

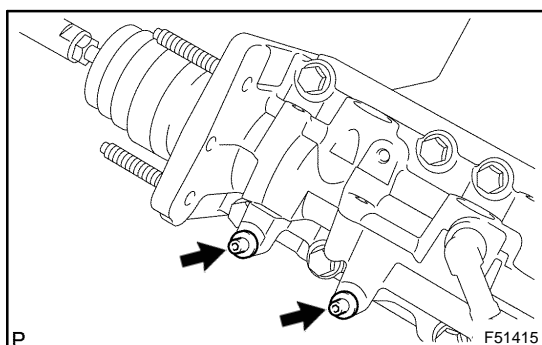
Ensure that no foreign matter enters the pump.

- (b) Install a new O-ring to the brake booster accumulator assy.
 (c) Install the brake booster accumulator assy.
Torque: 57 N·m (585 kgf·cm, 42 ft·lbf)



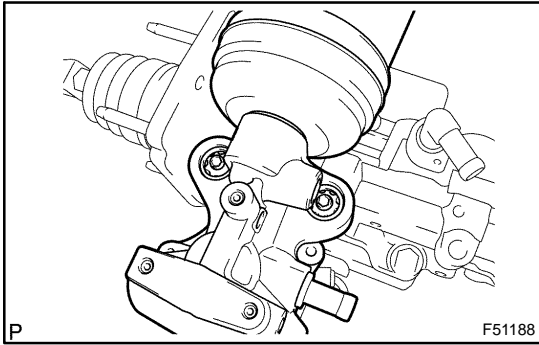
32. INSTALL BRAKE BOOSTER PUMP BRACKET NO.1

- (a) Install the brake booster pump bush to the brake booster pump bracket No.1.
 (b) Using a hexagon wrench (5 mm), install the brake booster pump bracket No.1 with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

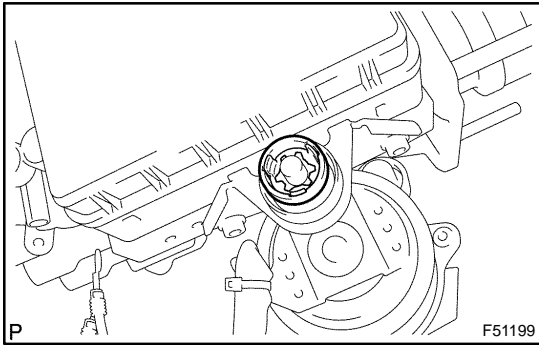


33. INSTALL BRAKE BOOSTER W/ACCUMULATOR PUMP ASSY

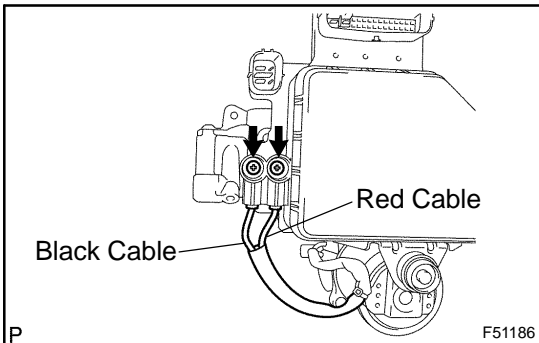
- (a) Using a hexagon wrench (4 mm), install the 2 pins to the brake master cylinder.
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)
 (b) Install the 2 brake booster pump collars and 2 brake booster pump bushes to the brake booster w/ accumulator pump assy.



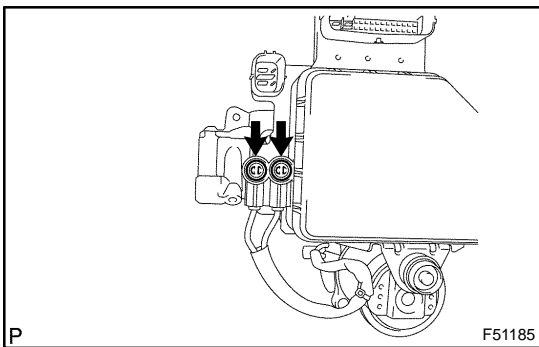
- (c) Install the brake booster w/ accumulator pump assy to the brake master cylinder.



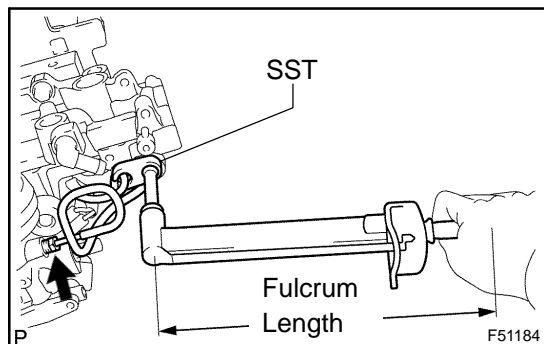
- (d) Install a new clip.



- (e) Install the wire harnesses with the 2 screws.
Torque: 2.9 N·m (30 kgf·cm, 26 in·lbf)



- (f) Install 2 new plugs.

**34. INSTALL BRAKE ACTUATOR TUBE NO.1**

- (a) Using SST, install the brake actuator tube No.1 to the brake master cylinder assy.

SST 09023-00101

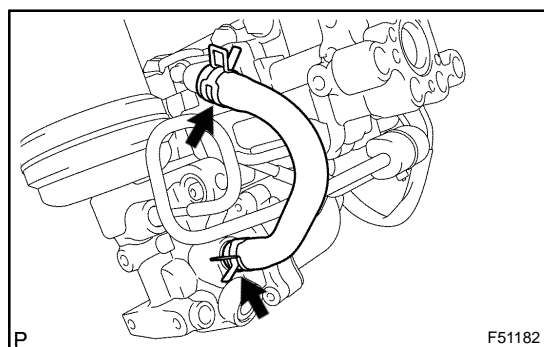
Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)

NOTICE:

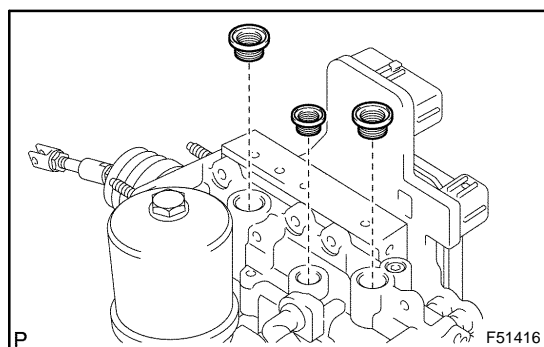
Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).

HINT:

This torque value is effective when SST is parallel to the torque wrench.

**35. INSTALL BRAKE ACTUATOR HOSE**

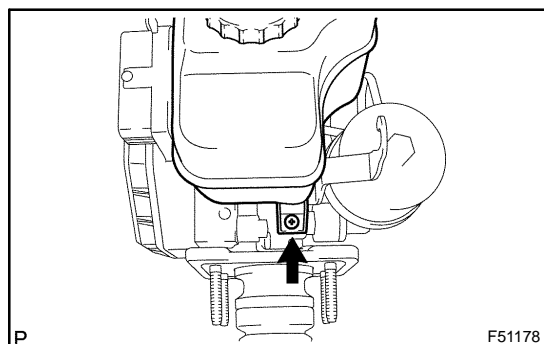
- (a) Using needle nose pliers, install the brake actuator hose and 2 clips.

**36. INSTALL MASTER CYLINDER GROMMET**

- (a) Apply lithium soap base glycol grease to 3 new master cylinder grommets.
- (b) Install 3 new master cylinder grommets to the brake master cylinder.

HINT:

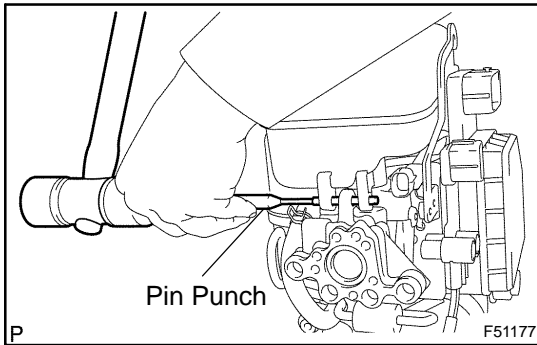
Be careful of the size of each grommet.

**37. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY**

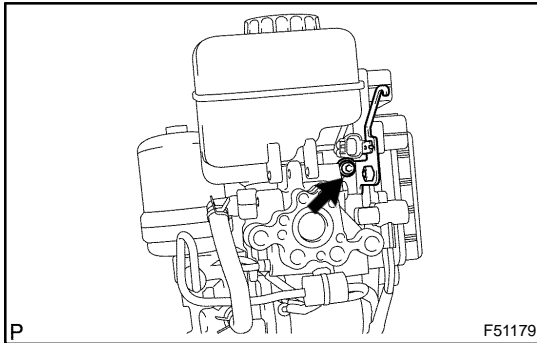
- (a) Install the brake master cylinder reservoir sub-assy with the screw.

Torque: 1.7 N·m (17 kgf·cm, 15 in·lbf)

- (b) Install the master cylinder reservoir filler cap.



- (c) Using a pin punch and hammer, install a new pin to the brake master cylinder reservoir sub-assy.

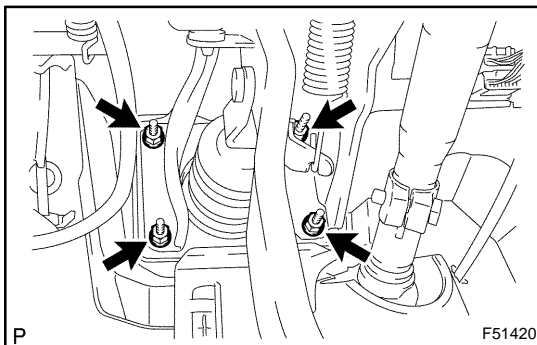


38. INSTALL BRAKE ACTUATOR BRACKET NO.1

- (a) Install the brake fluid level warning switch connector to the brake actuator bracket No.1.
- (b) Using a hexagon wrench (5 mm), install the brake actuator bracket No.1 to the brake master cylinder with the bolt.
Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

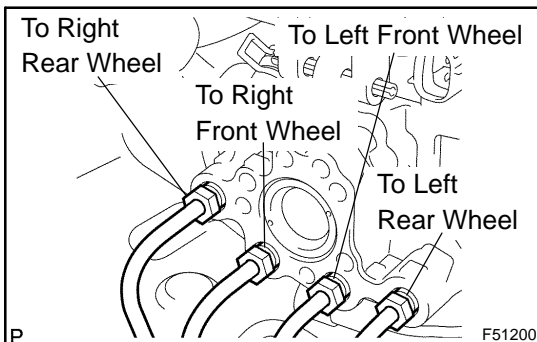
39. INSTALL BRAKE BOOSTER GASKET

- (a) Install a new brake booster gasket on the master cylinder.

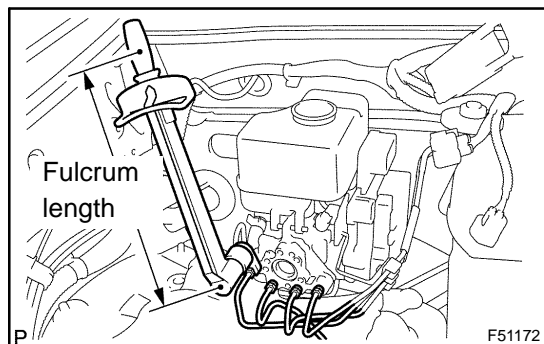


40. INSTALL BRAKE MASTER CYLINDER

- (a) Install the brake master cylinder with the 4 nuts.
Torque: 14 N·m (145 kgf·cm, 10 ft.-lbf)



- (b) Connect the 4 brake lines to the correct positions of the brake master cylinder as shown in the illustration.



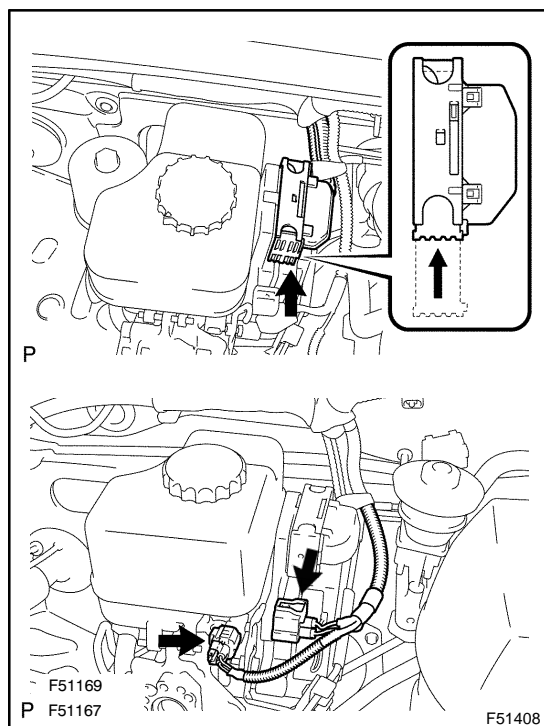
- (c) Using SST, torque the 4 brake lines.
SST 09023-00101
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)

NOTICE:

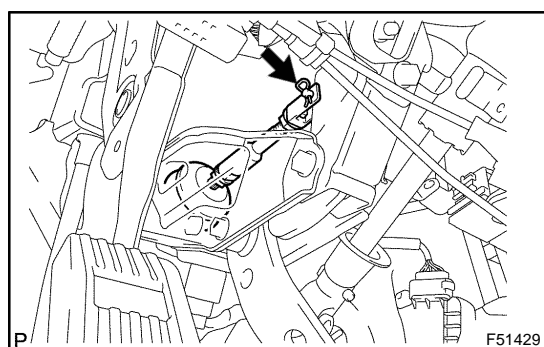
Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).

HINT:

This torque value is effective when SST is parallel to the torque wrench.



- (d) Connect the 3 connectors to the brake master cylinder.

**41. INSTALL PUSH ROD PIN**

- (a) Install the clip and push rod pin to the clevis.

42. INSTALL STEERING COLUMN HOLE COVER

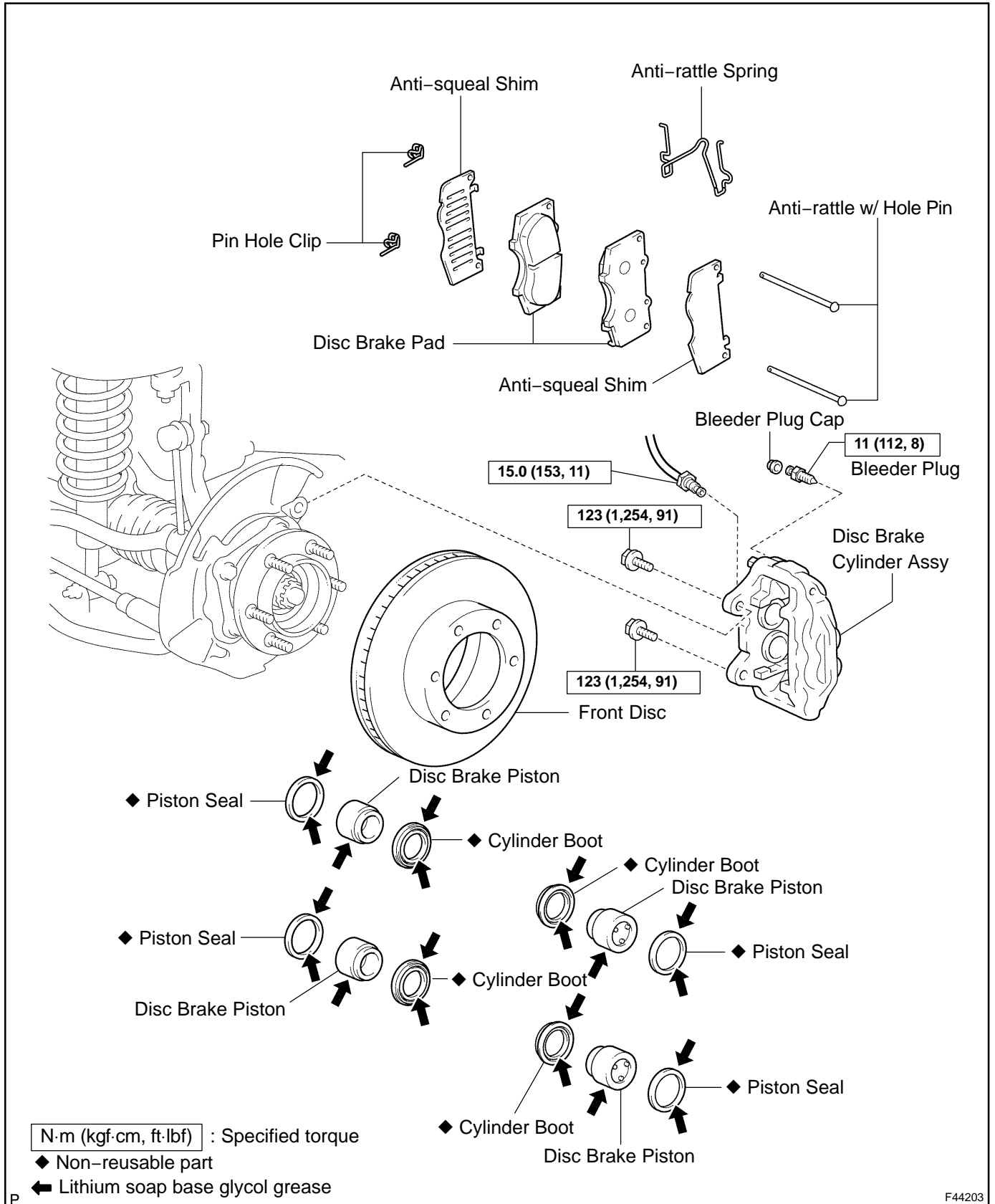
- (a) Install the steering column hole cover with the 4 clips.

43. INSTALL INSTRUMENT PANEL FINISH LOWER PANEL**44. INSTALL INSTRUMENT PANEL LOWER LH****45. INSTALL INSTRUMENT PANEL FINISH PLATE****46. INSTALL INSTRUMENT CLUSTER FINISH PANEL ORNAMENT****47. INSTALL COWL SIDE TRIM BOARD LH****48. INSTALL FRONT FLOOR FOOTREST****49. INSTALL FRONT DOOR SCUFF PLATE LH****50. BLEED BRAKE BOOSTER W/ACCUMULATOR PUMP ASSY (SEE PAGE 32-4)**

51. BLEED BRAKE LINE (SEE PAGE 32-4)
52. BLEED MASTER CYLINDER SOLENOID (SEE PAGE 32-4)
53. CHECK FOR BRAKE FLUID LEAKAGE
54. CHECK BRAKE MASTER CYLINDER OPERATION (SEE PAGE 32-14)
55. INSPECT BRAKE PEDAL HEIGHT (SEE PAGE 32-6)
56. CHECK PEDAL FREE PLAY (SEE PAGE 32-6)
57. CHECK PEDAL RESERVE DISTANCE (SEE PAGE 32-6)
58. CHECK FLUID LEVEL IN RESERVOIR (SEE PAGE 32-14)

FRONT BRAKE COMPONENTS

320D0-08



F44203

OVERHAUL

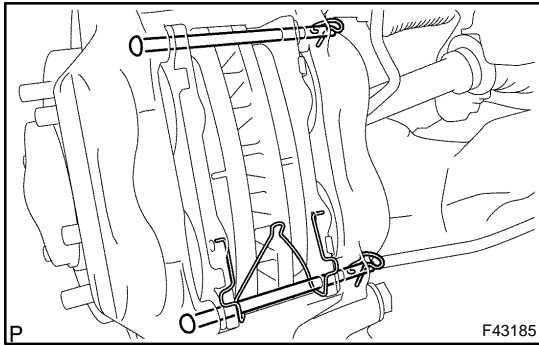
HINT:

Overhaul procedure of the RH side is the same as that of LH side.

1. REMOVE FRONT WHEEL
2. DRAIN BRAKE FLUID

NOTICE:

Wash off the brake fluid immediately if it comes into contact with a painted surface.



3. REMOVE FRONT DISC BRAKE ANTIRATTLE W/HOLE PIN

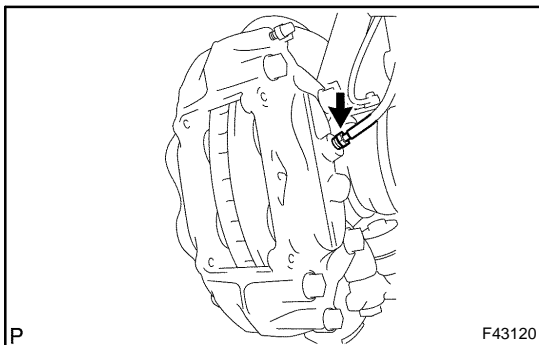
- (a) Remove the 2 pin hole clips, then remove the 2 anti-rattle w/ hole pins from the disc brake cylinder assy.
- (b) Remove the anti-rattle spring from the disc brake pad.

4. REMOVE DISC BRAKE PAD KIT FRONT (PAD ONLY)

- (a) Remove the 2 disc brake pads with anti-squeal shim from the disc brake cylinder assy.

5. REMOVE ANTI SQUEAL SHIM KIT FRONT

- (a) Remove the 2 anti-squeal shims from each of the disc brake pads.

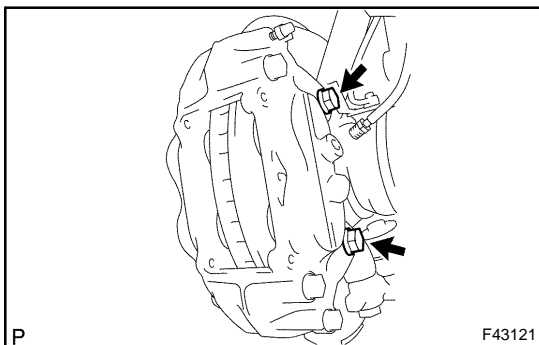


6. REMOVE DISC BRAKE CYLINDER ASSY LH

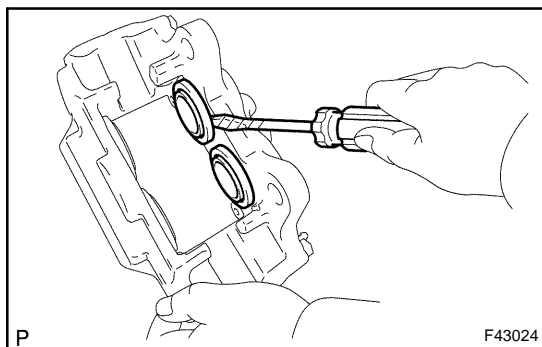
- (a) Using SST, disconnect the brake tube from the disc brake cylinder assy.
SST 09023-00101

HINT:

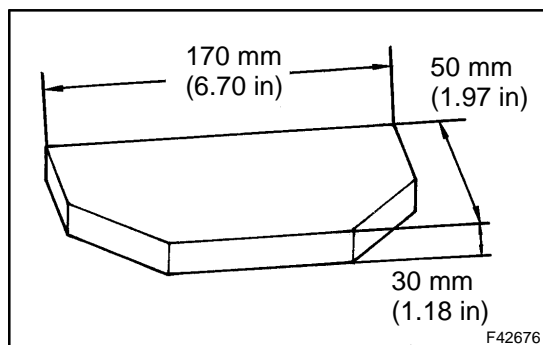
Use a container to catch brake fluid as it drains out.



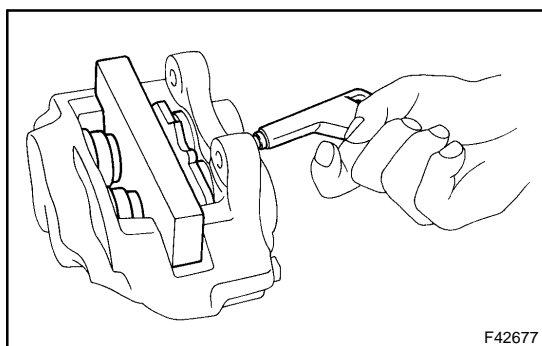
- (b) Remove the 2 bolts and remove the disc brake cylinder assy.

**7. REMOVE CYLINDER BOOT**

- (a) Using a screwdriver, remove the 4 cylinder boots from the caliper.

**8. REMOVE FRONT DISC BRAKE PISTON**

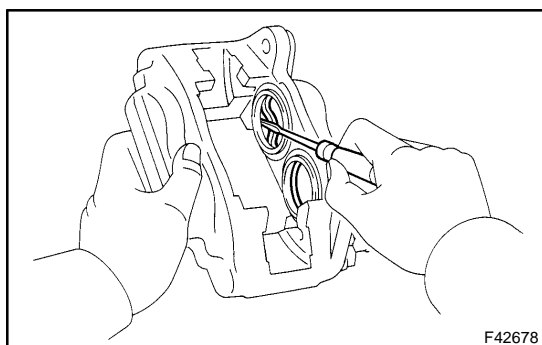
- (a) Prepare the wooden plate to hold the pistons.



- (b) Place the plate between the pistons and insert a pad at one side.
- (c) Use compressed air to remove the pistons alternately from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.

**9. REMOVE PISTON SEAL**

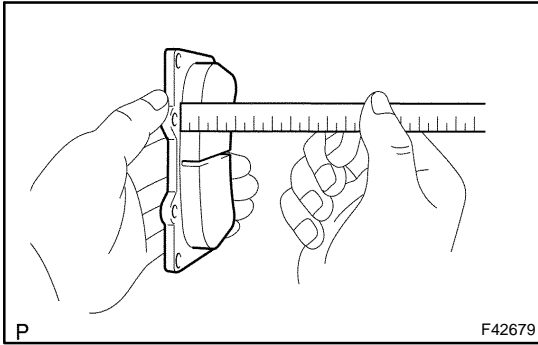
- (a) Using a screwdriver, remove the 4 piston seals from the cylinder.

10. REMOVE FRONT DISC BRAKE BLEEDER PLUG

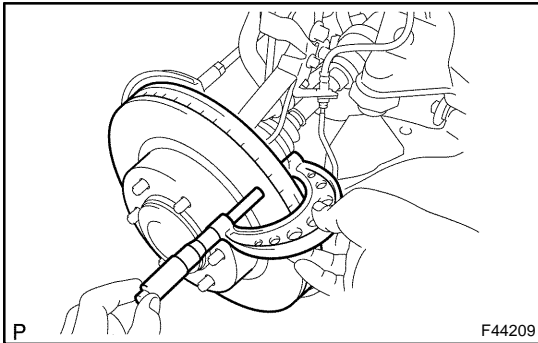
- (a) Remove the breeder plug cap and breeder plug from the disc brake cylinder assy.

11. INSPECT BRAKE CYLINDER AND PISTON

- (a) Check the cylinder bore and piston for rust or scoring.

**12. INSPECT PAD LINING THICKNESS**

- (a) Using a ruler, measure the pad lining thickness.
Standard thickness: 11.5 mm (0.453 in.)
Minimum thickness: 1.0 mm (0.039 in.)

**13. INSPECT DISC THICKNESS**

- (a) Using a micrometer, measure the disc thickness.
Standard thickness: 28.0 mm (1.102 in.)
Minimum thickness: 26.0 mm (1.024 in.)

14. REMOVE FRONT DISC

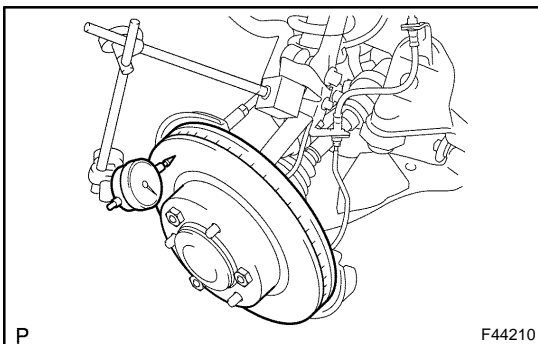
- (a) Make matchmarks on the disc and the axle hub.
 (b) Remove the front disc.

15. INSTALL FRONT DISC

- (a) Aligning the matchmarks on the rear disc and axle hub, install the front disc.

HINT:

When replacing the disc with a new one, select the installation position where the disc has the minimum run-out.

**16. INSPECT DISC RUNOUT**

- (a) Temporarily fasten the disc with hub nuts.
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
 (b) Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.
Maximum disc runout: 0.05 mm (0.0020 in.)
 (c) If the disc runout is the maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page 30-2). If the bearing play and axle hub runout are normal, adjust the disc runout or grind it on the "On-car" brake lathe.

17. TEMPORARILY TIGHTEN FRONT DISC BRAKE BLEEDER PLUG

- (a) Temporarily tighten the bleeder plug to the disc brake cylinder assy.
 (b) Install the breeder plug cap to the breeder plug.

18. INSTALL PISTON SEAL

- (a) Apply the lithium soap base glycol grease to the 4 new piston seals.
 (b) Install the 4 piston seals to the disc brake cylinder assy.

19. INSTALL FRONT DISC BRAKE PISTON

- (a) Apply the lithium soap base glycol grease to the 4 disc brake pistons.
- (b) Install the 4 disc brake pistons on the disc brake cylinder assy.

NOTICE:

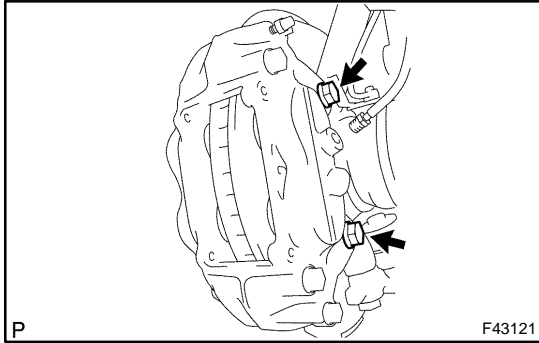
Do not screw the disc brake piston forcibly in the disc brake cylinder assy.

20. INSTALL CYLINDER BOOT

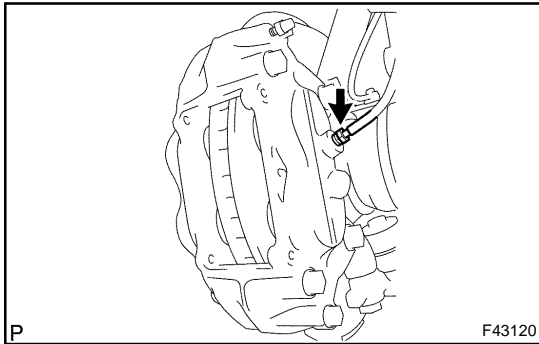
- (a) Apply the lithium soap base glycol grease to the 4 new cylinder boots.
- (b) Install the 4 cylinder boots on the disc brake cylinder assy.

HINT:

Install the cylinder boot securely on the grooves of the disc brake cylinder and piston.

**21. INSTALL DISC BRAKE CYLINDER ASSY LH**

- (a) Install the disc brake cylinder assy with 2 bolts.
Torque: 123 N·m (1,254 kgf·cm, 91 ft·lbf)



- (b) Using SST, connect the brake tube to the disc brake cylinder assy.
SST 09023-00101
Torque: 15.0 N·m (153 kgf·cm, 11 ft·lbf)

22. INSTALL ANTI SQUEAL SHIM KIT FRONT**NOTICE:**

If necessary, replace the anti-squeal shim kit when replacing the brake pad.

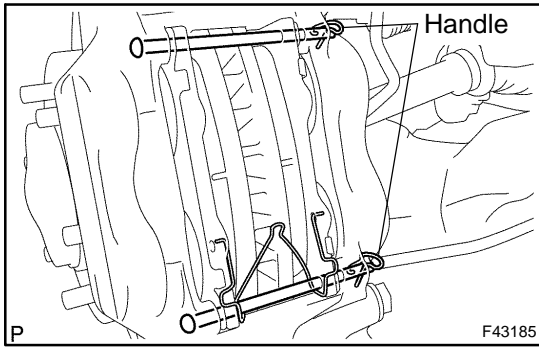
- (a) Install the 2 anti-squeal shims on each brake pad.

NOTICE:

There should be no oil or grease on the friction surfaces of the brake pads and the front disc.

23. INSTALL DISC BRAKE PAD KIT FRONT (PAD ONLY)

- (a) Install the 2 disc brake pads with anti-squeal shim to the disc brake cylinder assy.



24. INSTALL FRONT DISC BRAKE ANTIRATTLE W/HOLE PIN

- (a) Install the 2 anti-rattle w/ hole pins and anti-rattle spring to the disc brake cylinder.

HINT:

The anti-rattle spring is installed to the bottom side of anti-rattle w/hole pin.

- (b) Install the 2 pin hole clips to the anti-rattle w/ hole pin.

NOTICE:

When installing the pin hole clip, be sure to install the pin hole clip with the handle facing to the vehicle center.

25. BLEED BRAKE LINE (See page 32-4)

26. CHECK FLUID LEVEL IN RESERVOIR

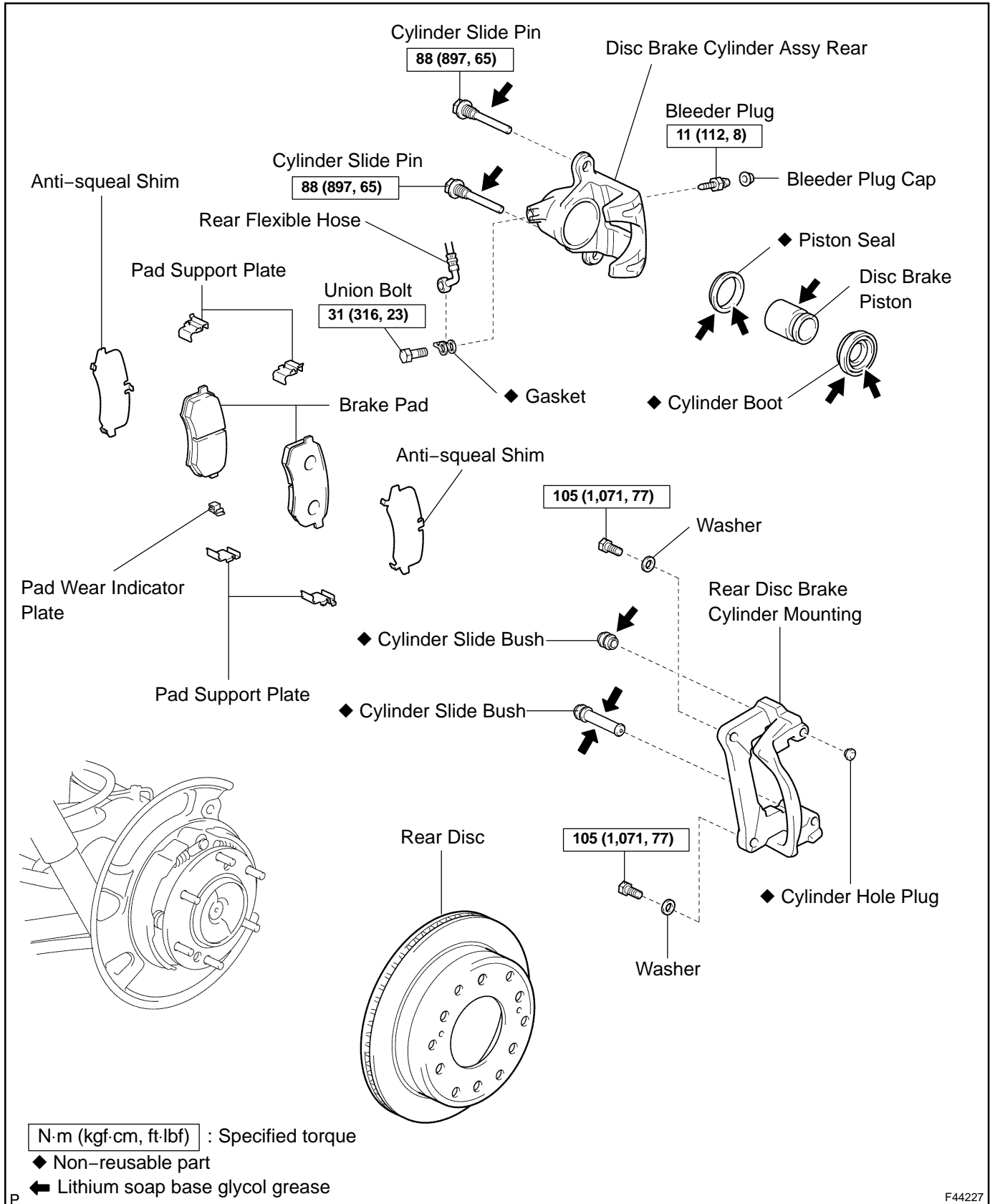
27. CHECK BRAKE FLUID LEAKAGE

28. INSTALL FRONT WHEEL

Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)

REAR BRAKE COMPONENTS

320RU-03



F44227

OVERHAUL

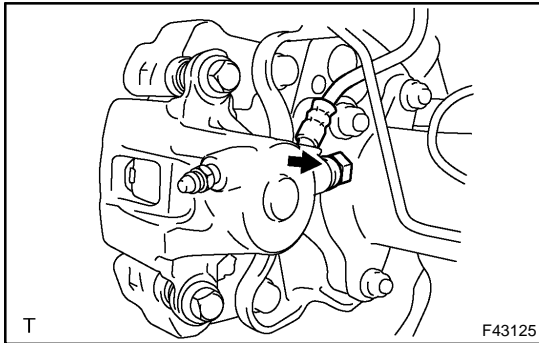
HINT:

Overhaul procedure of the RH side is the same as that of LH side.

1. REMOVE REAR WHEEL
2. DRAIN BRAKE FLUID

NOTICE:

Wash off the brake fluid immediately if it comes into contact with a painted surface.

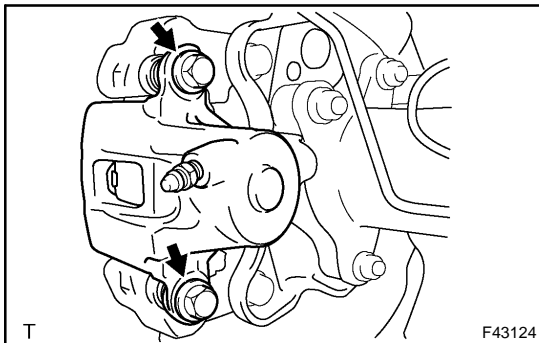


3. DISCONNECT REAR LH FLEXIBLE HOSE

- (a) Remove the union bolt and gasket from the disc brake cylinder, then disconnect the flexible hose from the disc brake cylinder assy rear.

HINT:

Use a container to catch brake fluid as it drains out.



4. REMOVE DISC BRAKE CYLINDER ASSY REAR LH

- (a) Remove the 2 cylinder slide pins from the disc brake cylinder assy rear.
- (b) Remove the disc brake cylinder assy rear from the rear disc brake cylinder mounting.

5. REMOVE DISC BRAKE PAD KIT REAR (PAD ONLY)

- (a) Remove the 2 brake pads with anti-squeal shims from the rear disc brake cylinder mounting.

6. REMOVE REAR DISC BRAKE ANTI-SQUEAL SHIM

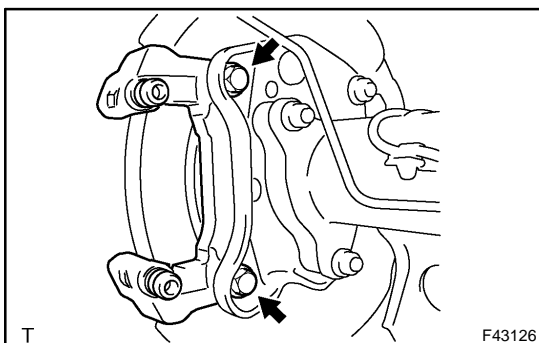
- (a) Remove the 2 anti-squeal shims from each disc brake pad.

7. REMOVE REAR DISC BRAKE PAD WEAR INDICATOR PLATE

- (a) Remove the pad wear indicator plate from the inner side disc brake pad.

8. REMOVE REAR DISC BRAKE PAD SUPPORT PLATE

- (a) Remove the 4 pad support plates from the rear disc brake cylinder mounting.

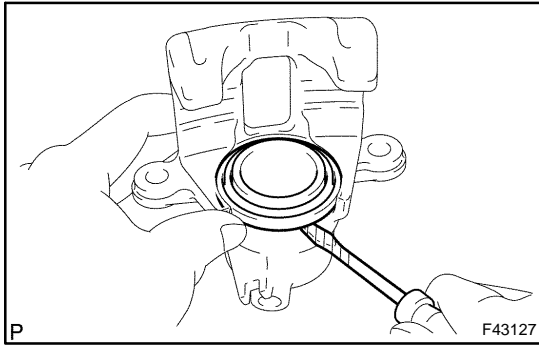


9. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH

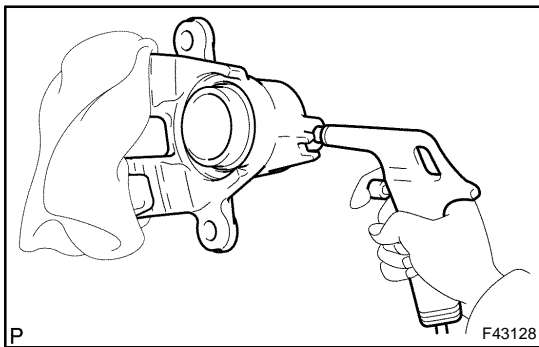
- (a) Remove the 2 bolts, 2 washers and rear disc brake cylinder mounting.

10. REMOVE REAR DISC BRAKE CYLINDER SLIDE BUSH

- (a) Remove the 2 cylinder slide bushes from the rear disc brake cylinder mounting.
- (b) Remove the cylinder hole plug from the rear disc brake cylinder mounting.

**11. REMOVE CYLINDER BOOT**

- (a) Using a screwdriver, remove the cylinder boot from the disc brake cylinder assy rear.

**12. REMOVE REAR DISC BRAKE PISTON**

- (a) Place a cloth or equivalent between the piston and the disc brake cylinder assy rear.
- (b) Use compressed air to remove the piston from the disc brake cylinder assy rear.

CAUTION:

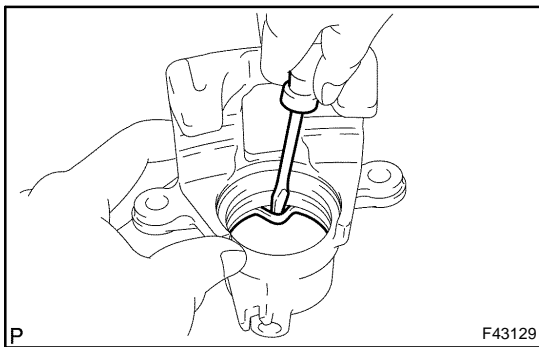
Do not place your fingers in front of the piston when using compressed air.

NOTICE:

Do not spatter the brake fluid.

13. REMOVE PISTON SEAL

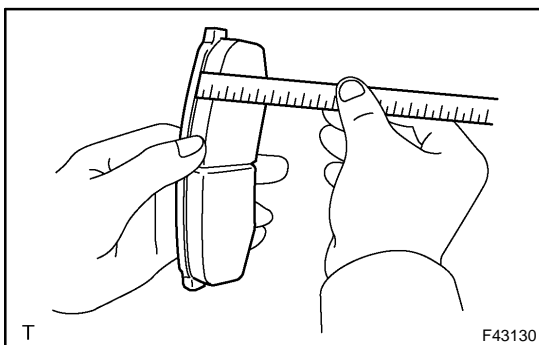
- (a) Using a screwdriver, remove the piston seal from the disc brake cylinder assy rear.

**14. REMOVE REAR DISC BRAKE BLEEDER PLUG**

- (a) Remove the bleeder plug cap and bleeder plug from the disc brake cylinder assy rear.

15. INSPECT BRAKE CYLINDER AND PISTON

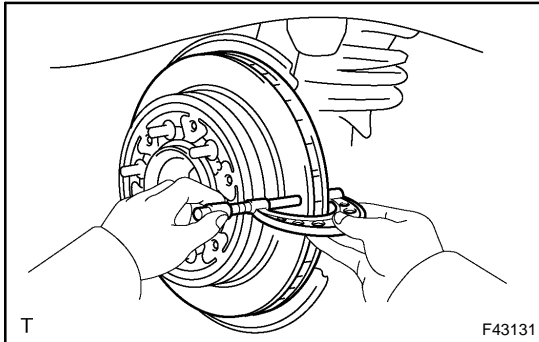
- (a) Check the cylinder bore and piston for rust or scarring.

**16. INSPECT PAD LINING THICKNESS**

- (a) Using a ruler, measure the pad lining thickness.
Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)

17. INSPECT REAR DISC BRAKE PAD SUPPORT PLATE

- (a) Inspect the 4 pad support plates. Make sure the plates have sufficient rebound check for deformation, cracks or wear, rust, dirt or foreign particles.

**18. INSPECT DISC THICKNESS**

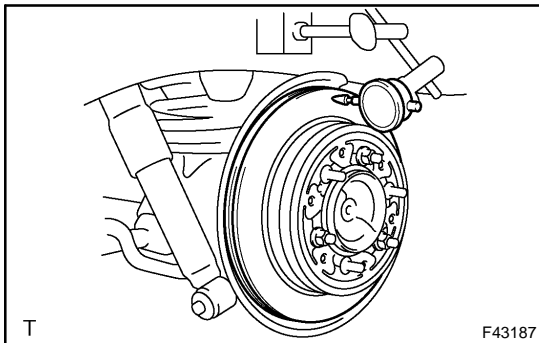
- (a) Using a micrometer, measure the disc thickness.
Standard thickness: 18.0 mm (0.709 in.)
Minimum thickness: 16.0 mm (0.630 in.)

19. REMOVE REAR DISC

- (a) Make matchmarks on the rear disc and the axle hub.
 (b) Remove the rear disc.

20. INSTALL REAR DISC

- (a) Align the matchmarks and install the rear disc.

**21. INSPECT DISC RUNOUT**

- (a) Temporarily fasten the disc with hub nuts.
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
 (b) Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.
Maximum disc runout: 0.20 mm (0.0079 in.)
 (c) If the disc runout is the maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page 30-2). If the bearing play and axle hub runout are normal, adjust the disc runout or grind it on the "On-car" brake lathe.

22. TEMPORARILY TIGHTEN REAR DISC BRAKE BLEEDER PLUG

- (a) Temporarily tighten the bleeder plug to the disc brake cylinder assy rear.
 (b) Install the bleeder plug cap on the bleeder plug.

23. INSTALL PISTON SEAL

- (a) Apply the lithium soap base glycol grease to a new piston seal.
 (b) Install the piston seal on the disc brake cylinder assy rear.

24. INSTALL REAR DISC BRAKE PISTON

- (a) Apply the lithium soap base glycol grease to the disc brake piston.
 (b) Install the disc brake piston on the disc brake cylinder assy rear.

NOTICE:

Do not screw the disc brake piston forcedly in the disc brake cylinder assy rear.

25. INSTALL CYLINDER BOOT

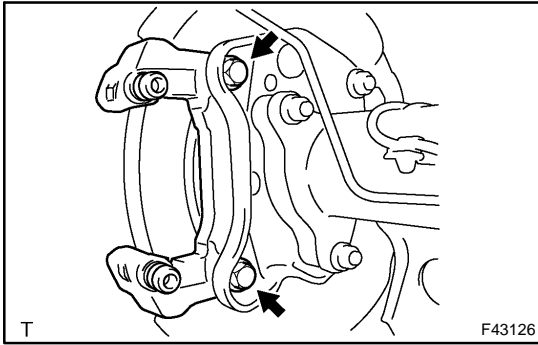
- (a) Apply the lithium soap base glycol grease to a new cylinder boot.
 (b) Install the cylinder boot on the disc brake cylinder

HINT:

Install the cylinder boot securely on the grooves of the disc brake cylinder assy and piston.

26. INSTALL REAR DISC BRAKE CYLINDER SLIDE BUSH

- (a) Apply the lithium soap base glycol grease to a new cylinder hole plug and 2 new cylinder slide bushes.
 (b) Install the cylinder hole plug and 2 cylinder slide bushes to the rear disc brake cylinder mounting.



27. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH

- (a) Install the rear disc brake cylinder mounting with 2 bolts and 2 washers.

Torque: 105 N·m (1,071 kgf·cm, 77 ft·lbf)

28. INSTALL REAR DISC BRAKE PAD SUPPORT PLATE

- (a) Install the 4 pad support plates on the rear disc brake cylinder mounting.

29. INSTALL REAR DISC BRAKE PAD WEAR INDICATOR PLATE

- (a) Install the pad wear indicator plate on the inner side disc brake pad.

HINT:

Install the pad wear indicator facing downward.

30. INSTALL REAR DISC BRAKE ANTI-SQUEAL SHIM

NOTICE:

If necessary, replace the anti-squeal shim kit when replacing the brake pad.

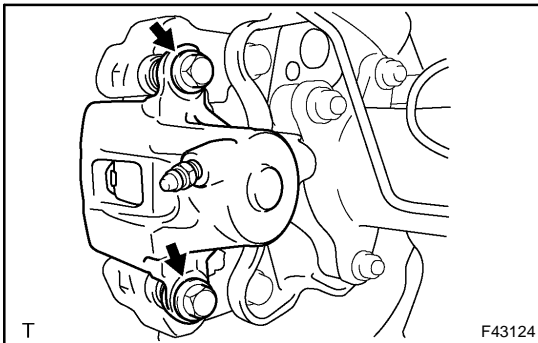
- (a) Install the anti-squeal shims on each brake pad.

NOTICE:

There should be no oil or grease on the friction surfaces of the brake pads and the rear disc.

31. INSTALL DISC BRAKE PAD KIT REAR (PAD ONLY)

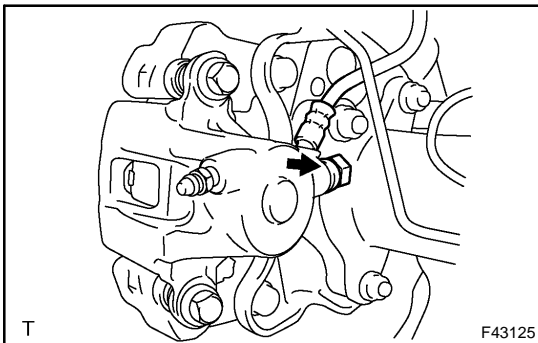
- (a) Install the 2 disc brake pads with anti-squeal shims to the disc brake cylinder assy.



32. INSTALL DISC BRAKE CYLINDER ASSY REAR LH

- (a) Apply the lithium soap base glycol grease to the sliding part of the 2 cylinder slide pins.
 (b) Install the disc brake cylinder assy rear with 2 cylinder slide pins.

Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)



33. CONNECT REAR LH FLEXIBLE HOSE

- (a) Connect the flexible hose with a union bolt and new gasket to the disc brake cylinder assy rear.

Torque: 31 N·m (316 kgf·cm, 23 ft·lbf)

34. BLEED BRAKE LINE (See page 32-4)

35. CHECK FLUID LEVEL IN RESERVOIR

36. CHECK BRAKE FLUID LEAKAGE

37. INSTALL REAR WHEEL

Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)

SPEED SENSOR FRONT LH

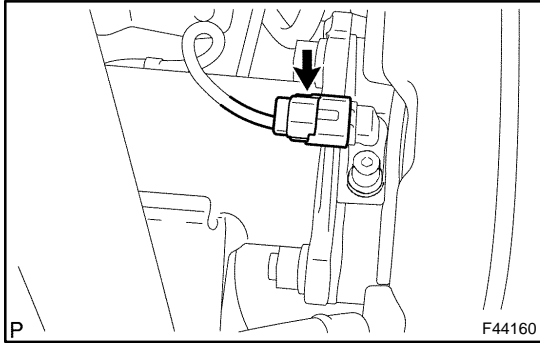
REPLACEMENT

320RZ-03

HINT:

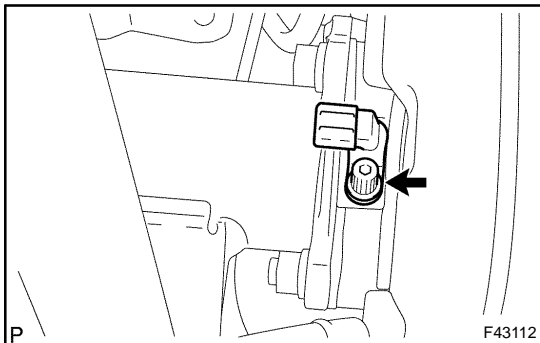
Replacement of RH side is same as that of LH side.

1. REMOVE FRONT WHEEL



2. REMOVE SPEED SENSOR FRONT LH

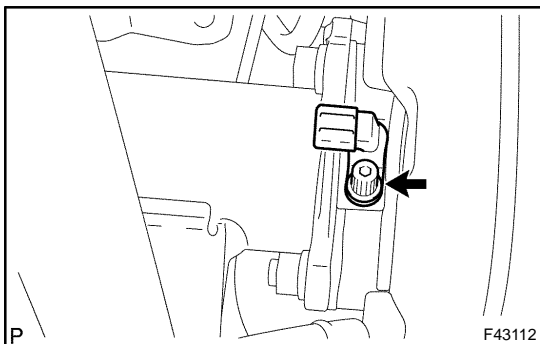
- (a) Disconnect the speed sensor connector.



- (b) Using a hexagon wrench (5 mm), remove the bolt and front speed sensor from the steering knuckle.

NOTICE:

- Do not stick a foreign matter on the sensor tip.
- Do not let the foreign matter into the sensor installation hole.



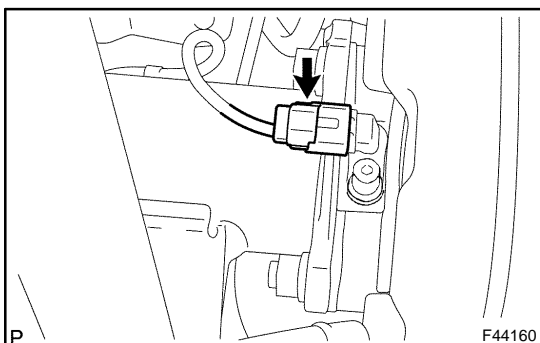
3. INSTALL SPEED SENSOR FRONT LH

- (a) Using a hexagon wrench (5 mm), install the front speed sensor with the bolt to the steering knuckle.

Torque: 8.3 N·m (85 kgf·cm, 73 in.-lbf)

NOTICE:

Make sure the sensor tip is clean.



- (b) Connect the speed sensor connector.

4. **INSTALL FRONT WHEEL**
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
5. **CHECK VSC SENSOR SIGNAL (See page [05-738](#))**

SPEED SENSOR REAR LH

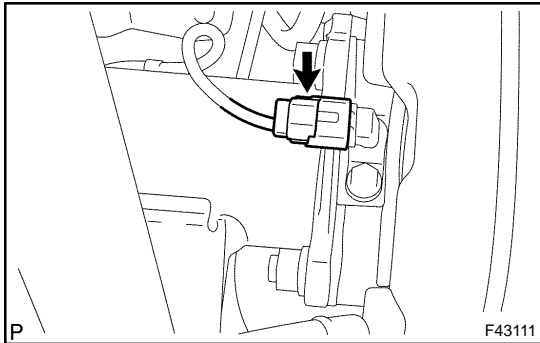
REPLACEMENT

320S0-03

HINT:

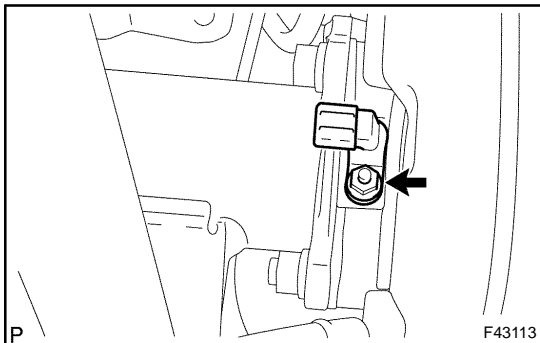
Replacement of RH side is same as that of LH side.

1. REMOVE REAR WHEEL



2. REMOVE SPEED SENSOR REAR LH

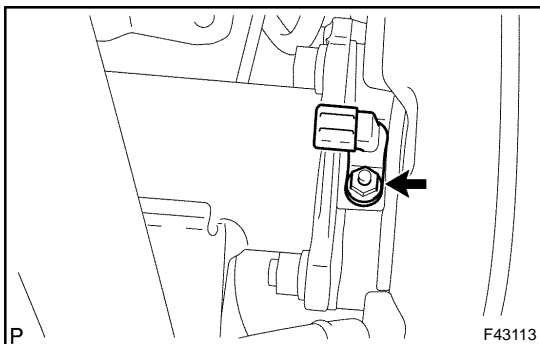
- (a) Disconnect the speed sensor connector.



- (b) Remove the nut and speed sensor rear from the axle hub.

NOTICE:

- Do not stick a foreign matter on the sensor tip.
- Do not let the foreign matter into the sensor installation hole.



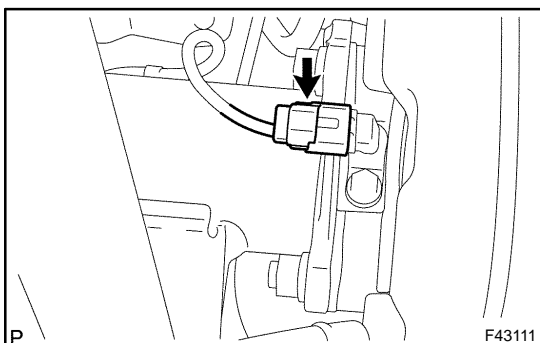
3. INSTALL SPEED SENSOR REAR LH

- (a) Install the rear speed sensor with the nut to the steering knuckle.

Torque: 8.3 N·m (85 kgf·cm, 73 in.-lbf)

NOTICE:

Make sure the sensor tip is clean.

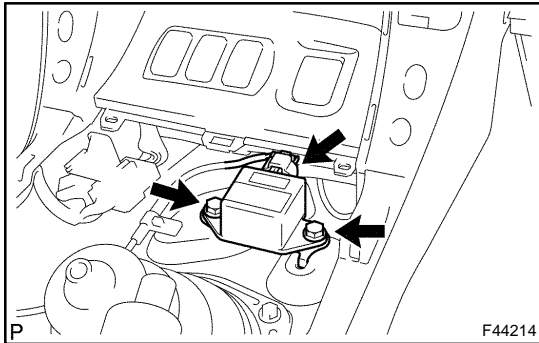


- (b) Connect the speed sensor connector.

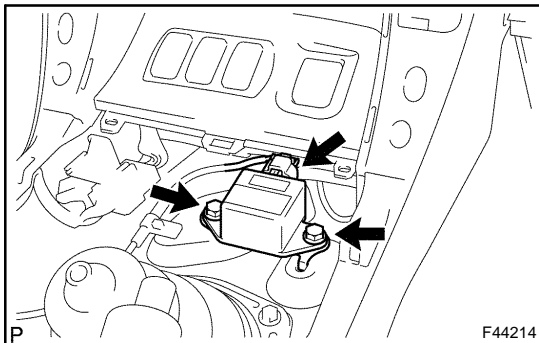
4. **INSTALL REAR WHEEL**
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)
5. **CHECK VSC SENSOR SIGNAL (See page [05-738](#))**

YAWRATE SENSOR REPLACEMENT

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. REMOVE SHIFT LEVER KNOB SUB-ASSY (See page 71-13)
3. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)
5. REMOVE CONSOLE PANEL UPPER ASSY (See page 71-13)



6. REMOVE YAWRATE SENSOR
 - (a) Disconnect the yawrate sensor connector.
 - (b) Remove the 2 bolts and yawrate sensor.



7. INSTALL YAWRATE SENSOR
 - (a) Install the yawrate sensor with 2 bolts.
Torque: 13.3 N·m (136 kgf·cm, 10 ft·lbf)

NOTICE:

Do not install the sensor back to front.

- (b) Connect the yawrate sensor connector.

8. INSTALL CONSOLE PANEL UPPER ASSY
9. INSTALL CONSOLE UPPER PANEL GARNISH NO.1
10. INSTALL CONSOLE UPPER PANEL GARNISH NO.2
11. INSTALL SHIFT LEVER KNOB SUB-ASSY
12. PERFORM YAWRATE SENSOR ZERO POINT CALIBRATION (See page 05-734)
13. CHECK VSC SENSOR SIGNAL (See page 05-738)

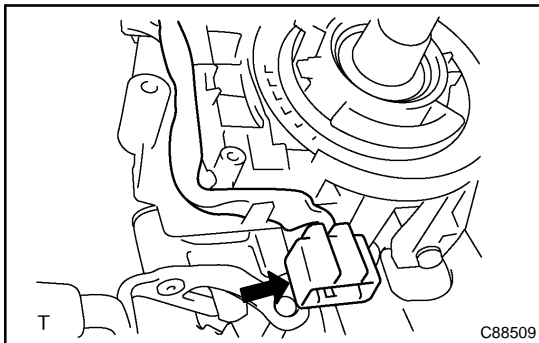
STEERING SENSOR REPLACEMENT

321HE-01

1. PRECAUTION (SEE PAGE 60-1)
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL (SEE PAGE 60-1)

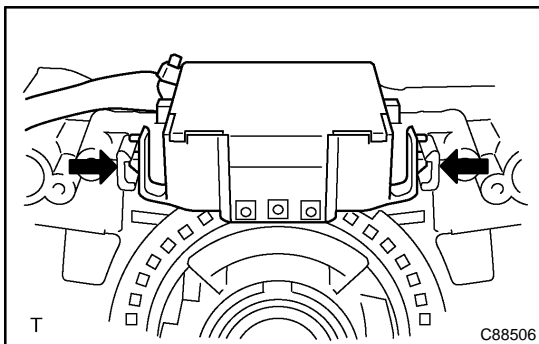
Wait for 90 seconds after disconnecting the cable to prevent the airbag working.

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
4. REMOVE STEERING WHEEL COVER LOWER NO.3 (SEE PAGE 60-20)
5. REMOVE STEERING WHEEL COVER LOWER NO.2 (SEE PAGE 60-20)
6. REMOVE HORN BUTTON ASSY (SEE PAGE 60-20)
7. REMOVE STEERING WHEEL ASSY (SEE PAGE 50-8)
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
8. REMOVE STEERING COLUMN COVER (SEE PAGE 50-8)
9. REMOVE SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)
10. REMOVE TURN SIGNAL SWITCH ASSY (SEE PAGE 65-22)

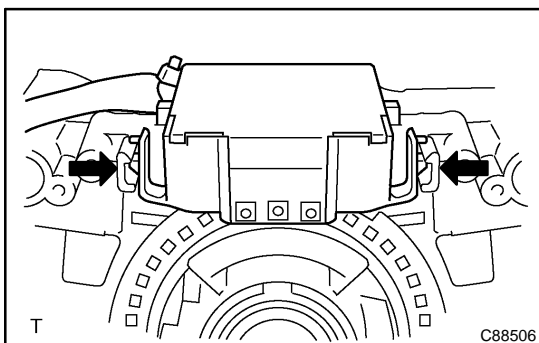


11. REMOVE STEERING SENSOR

- (a) Remove the steering sensor connector.

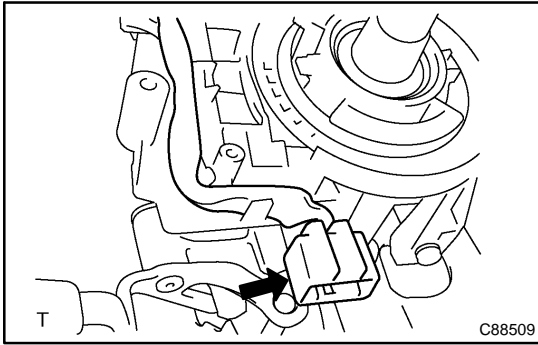


- (b) Release the 2 claws and remove the steering sensor.



12. INSTALL STEERING SENSOR

- (a) Install the steering sensor.



(b) Install the steering sensor connector.

13. INSTALL TURN SIGNAL SWITCH ASSY

14. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

15. INSPECT SPIRAL CABLE SUB-ASSY

(a) If the following condition is identified, replace the spiral cable sub-assy with new one.

Condition:

Scratches or cracks on the connector

Cracks, dents or chipping of the spiral cable sub-assy

16. INSTALL SPIRAL CABLE SUB-ASSY (SEE PAGE 60-28)

17. INSTALL STEERING COLUMN COVER (SEE PAGE 50-8)

18. CENTER SPIRAL CABLE (SEE PAGE 60-28)

19. INSTALL STEERING WHEEL ASSY (SEE PAGE 50-8)

20. INSPECT HORN BUTTON ASSY (SEE PAGE 60-20)

21. INSTALL HORN BUTTON ASSY (SEE PAGE 60-20)

22. INSTALL STEERING WHEEL COVER LOWER NO.2

23. INSTALL STEERING WHEEL COVER LOWER NO.3

24. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

25. PERFORM INITIALIZATION

Some systems need initialization when disconnecting the cable from the negative battery terminal.

26. INSPECT SRS WARNING LIGHT (SEE PAGE 05-1219)

PARKING BRAKE SYSTEM

PROBLEM SYMPTOMS TABLE

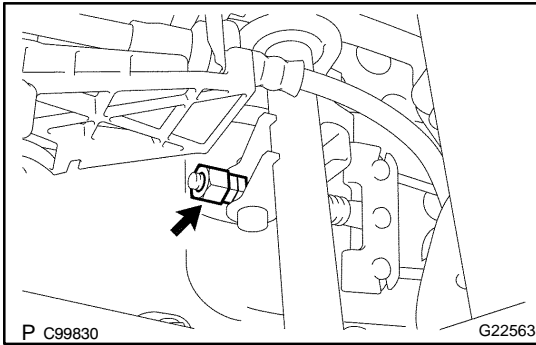
330AH-03

Use the table below to help find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Brake drag	<ol style="list-style-type: none"> 1. Parking brake lever travel (Out of adjustment) 2. Parking brake wire (Sticking) 3. Parking brake shoe clearance (Out of adjustment) 4. Parking brake shoe lining (Cracked or distorted) 5. Tension or return spring (Damaged) 	<p>33-2</p> <p>33-8</p> <p>33-12</p> <p>33-12</p> <p>33-12</p>

ADJUSTMENT

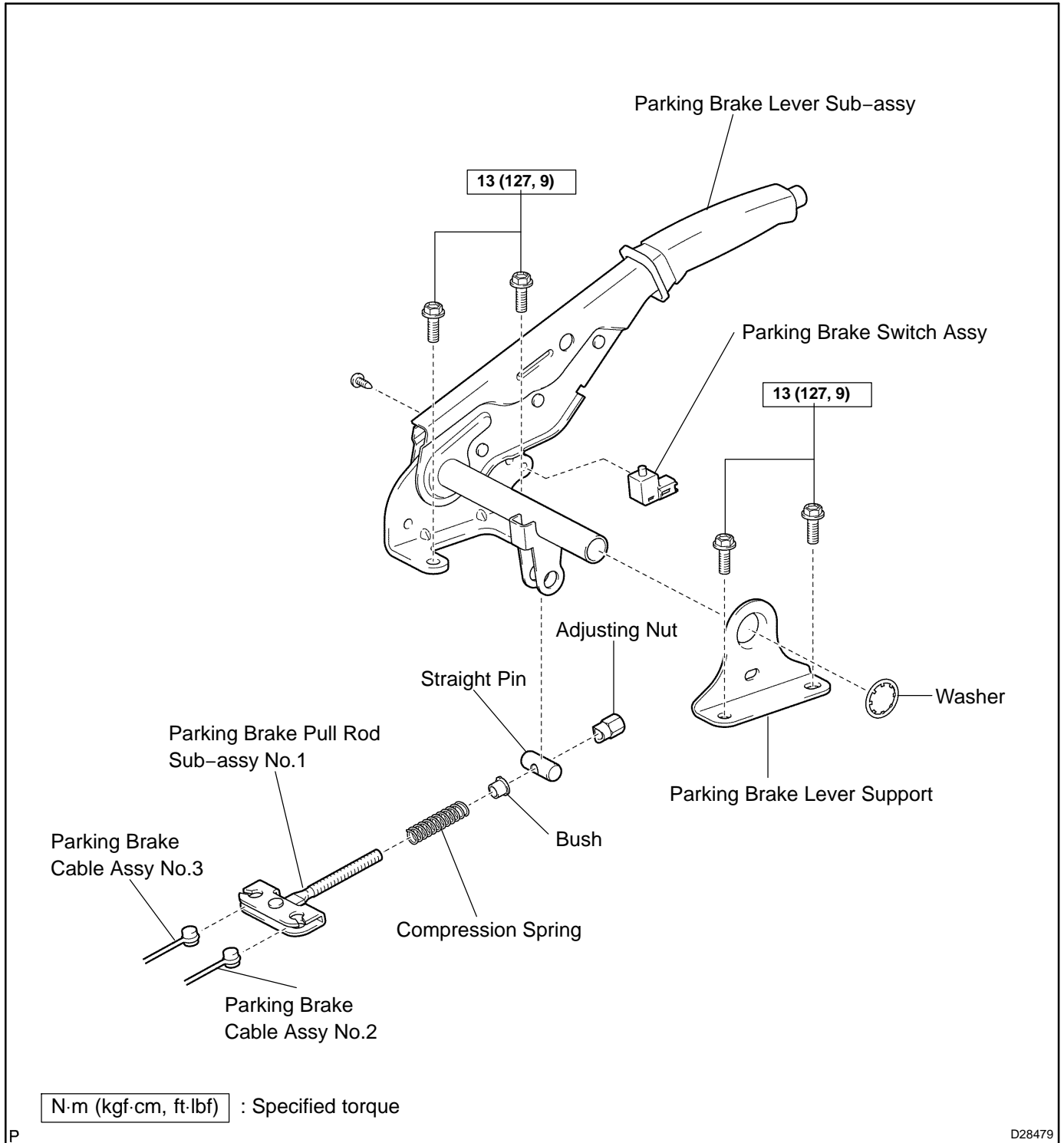
1. REMOVE REAR WHEEL
2. ADJUST PARKING BRAKE SHOE CLEARANCE (See page 33-12)
3. INSTALL REAR WHEEL
Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)
4. INSPECT PARKING BRAKE LEVER TRAVEL
 - (a) Pull the parking brake lever to the fully applied position, and count the number of clicks.
Parking brake lever travel at 196 N (20 kgf, 44 lbf): 5 – 7 clicks



5. ADJUST PARKING BRAKE LEVER TRAVEL
 - (a) Remove the console panel upper assy.
 - (b) Turn the adjusting nut until the parking brake lever travel becomes correct.
 - (c) Check whether parking brake drags or not.
 - (d) When operating the parking brake lever, check that the parking brake lever indicator light lights up.
 - (e) Install the console panel upper rear.

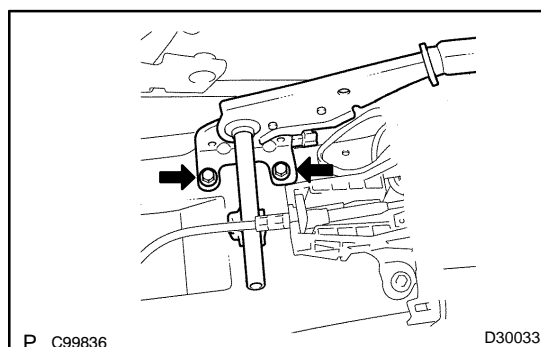
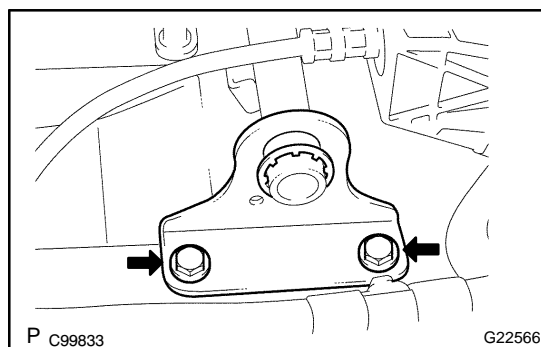
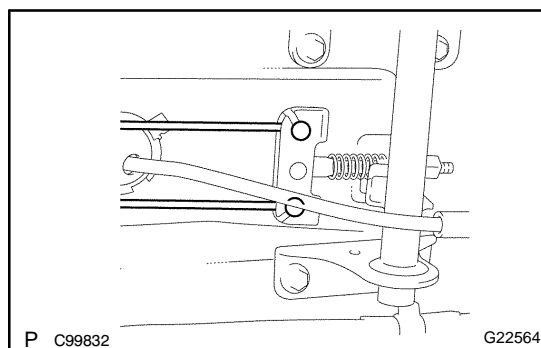
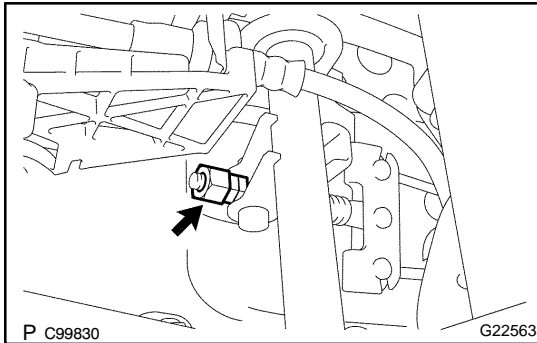
PARKING BRAKE LEVER SUB-ASSY COMPONENTS

330AJ-02



REPLACEMENT

1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)
3. REMOVE CONSOLE PANEL UPPER ASSY (See page 71-13)
4. REMOVE CONSOLE REAR END PANEL SUB-ASSY (See page 71-13)
5. REMOVE RR CONSOLE BOX ASSY (See page 71-13)
6. REMOVE PARKING BRAKE LEVER SUB-ASSY
 - (a) Release the parking brake lever.
 - (b) Disconnect the parking brake switch connector.
 - (c) Remove the adjusting nut.



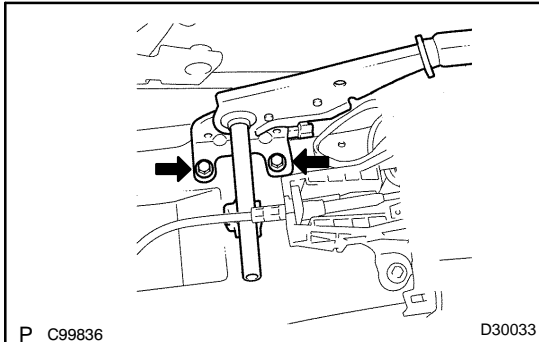
- (d) Separate the parking brake cable assy No.2 and No.3 from the parking brake pull rod sub-assy No.1.
- (e) Remove the parking brake pull rod sub-assy No.1, bush and compression spring from the parking brake lever.
- (f) Remove the straight pin from the parking brake lever.
- (g) Remove the 2 bolts, washer and parking brake lever support from parking brake lever sub-assy.
- (h) Remove the 2 bolts and parking brake lever sub-assy.

7. REMOVE PARKING BRAKE SWITCH ASSY

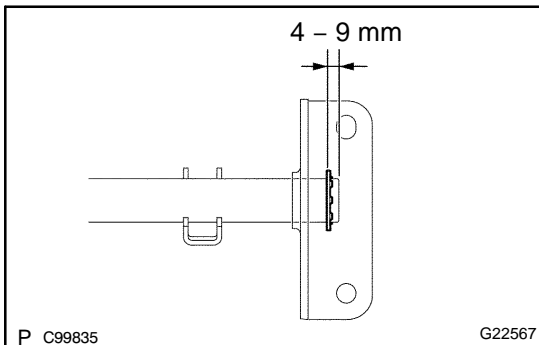
- (a) Remove the screw and parking brake switch assy.

8. INSTALL PARKING BRAKE SWITCH ASSY

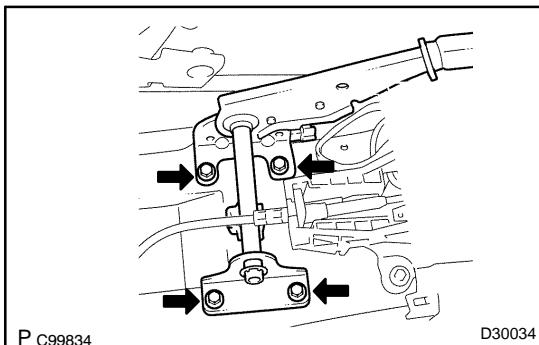
- (a) Install the parking brake switch assy with the screw.

**9. INSTALL PARKING BRAKE LEVER SUB-ASSY**

- (a) Install the parking brake lever sub-assy, temporarily tighten the 2 bolts.



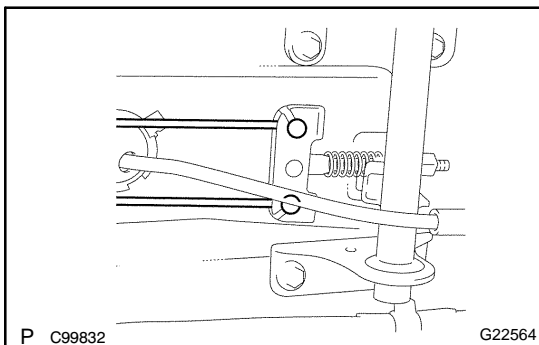
- (b) Install the washer and parking brake lever support to parking brake lever sub-assy.



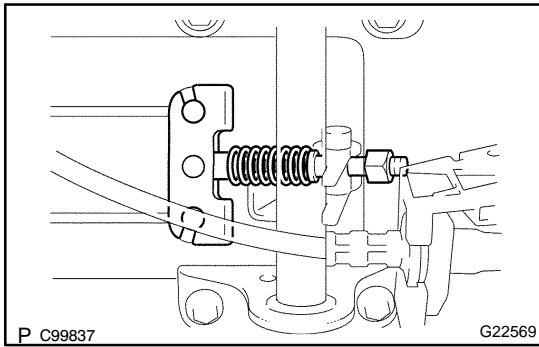
- (c) Install the parking brake lever with the 4 bolts.

Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

- (d) Install the straight pin to the parking brake lever.



- (e) Install the parking brake cable assy No.2 and No.3 to the parking brake pull rod sub-assy No.1.



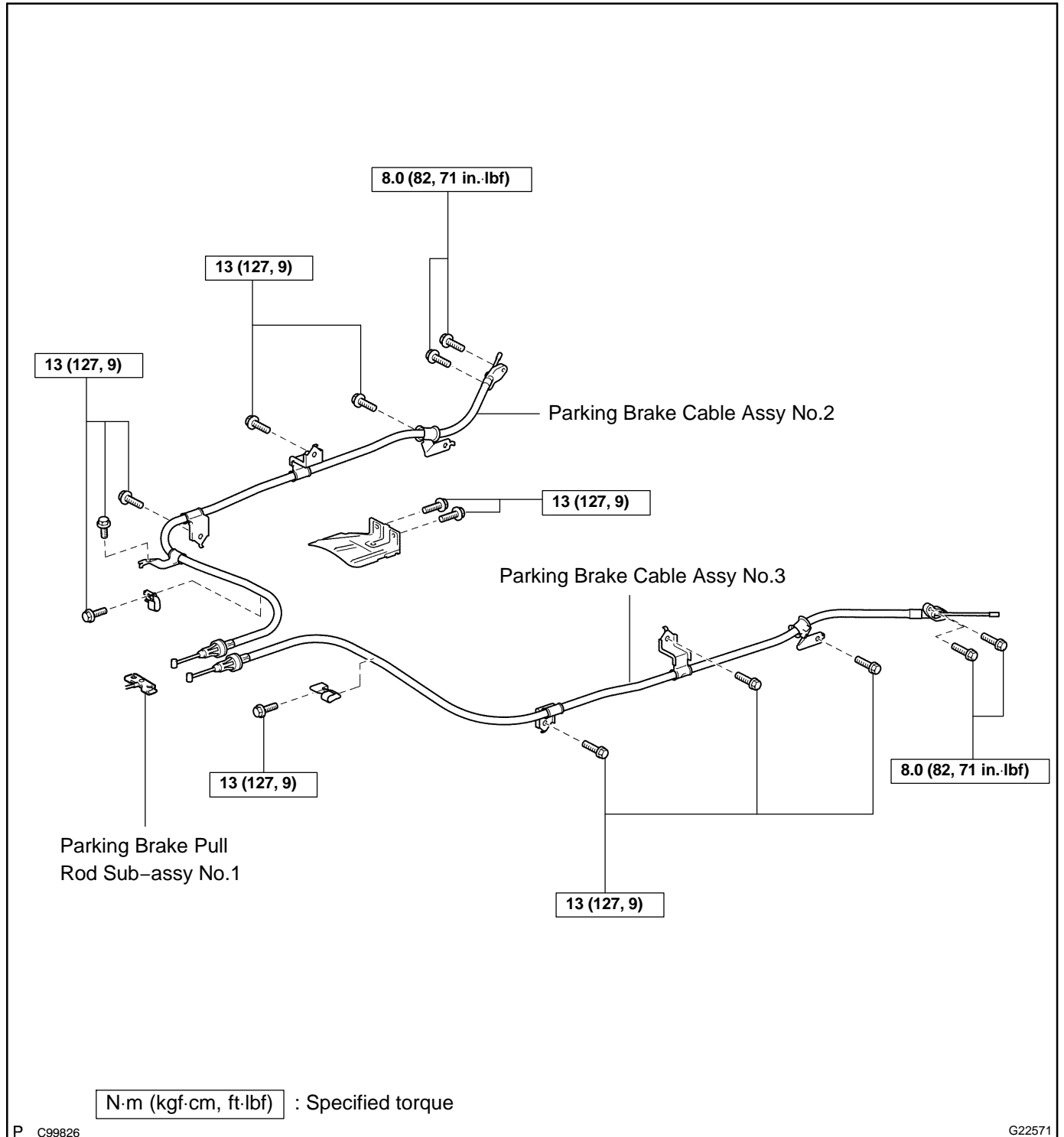
- (f) Install the bush, compression spring and parking brake pull rod sub-assy No.1 with the adjusting nut.
- (g) Connect the parking brake switch assy connector.

10. INSPECT PARKING BRAKE LEVER TRAVEL (See page 33-2)

11. ADJUST PARKING BRAKE LEVER TRAVEL (See page 33-2)

PARKING BRAKE CABLE ASSY NO.3 COMPONENTS

330AL-02



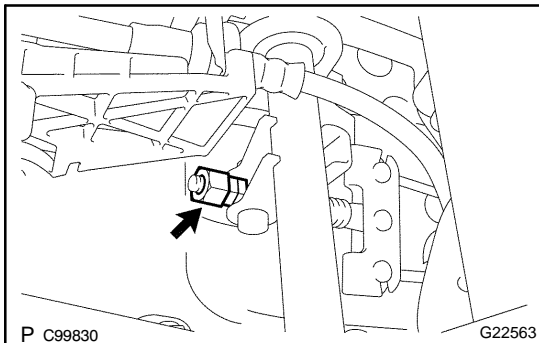
REPLACEMENT

1. REMOVE REAR WHEEL
2. SEPARATE REAR DISC BRAKE CALIPER ASSY LH
 - (a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

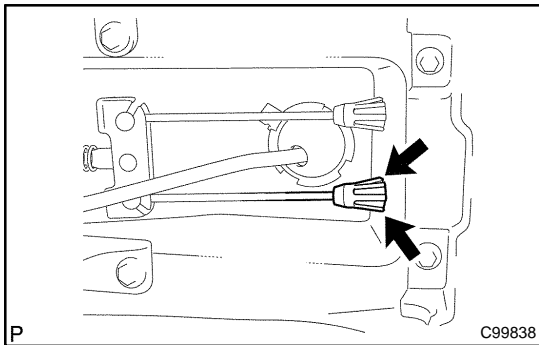
Do not disconnect the flexible hose from the brake caliper.

3. REMOVE REAR DISC
4. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
5. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
6. REMOVE PARKING BRAKE SHOE STRUT LH (See page 33-12)
7. REMOVE PARKING BRAKE SHOE (See page 33-12)
8. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)
9. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)
10. REMOVE CONSOLE PANEL UPPER ASSY (See page 71-13)
11. REMOVE CONSOLE REAR END PANEL SUB-ASSY (See page 71-13)
12. REMOVE RR CONSOLE BOX ASSY (See page 71-13)

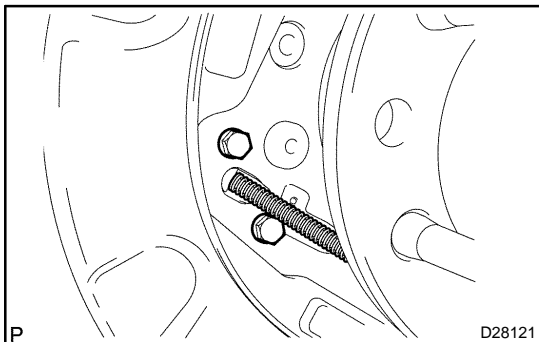


13. REMOVE PARKING BRAKE CABLE ASSY NO.3

- (a) Loosen the adjusting nut.
- (b) Separate the parking brake cable assy No.3 from the parking brake pull rod sub-assy No.1.

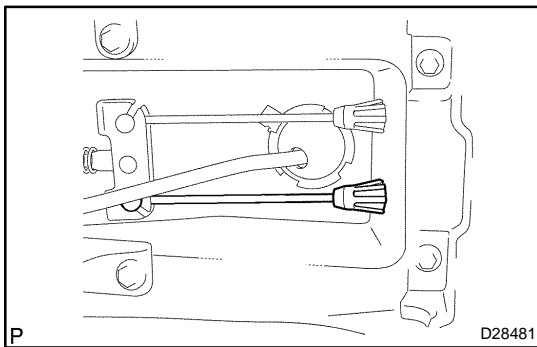
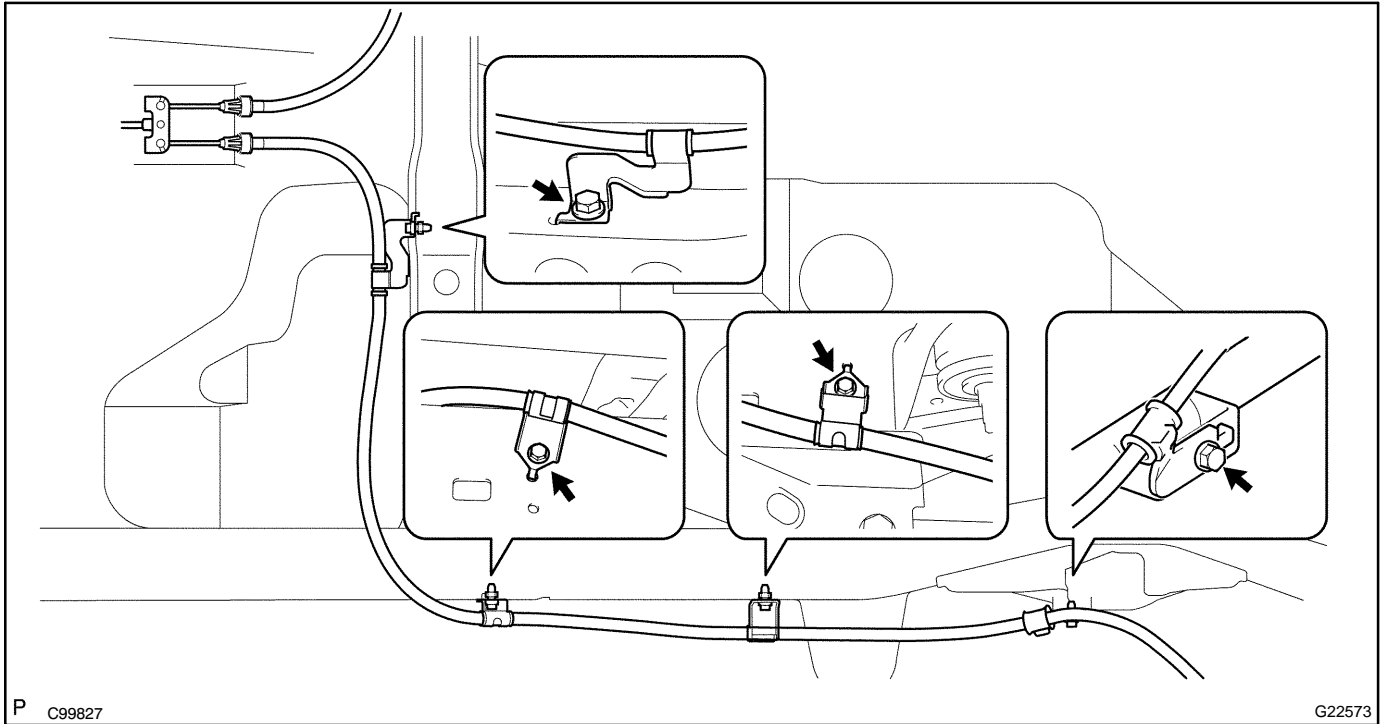


- (c) Contract the claw of the parking brake cable assy No.3 and push it outward of the vehicle a little.



- (d) Separate the parking brake cable assy No.3 with the 2 bolts.

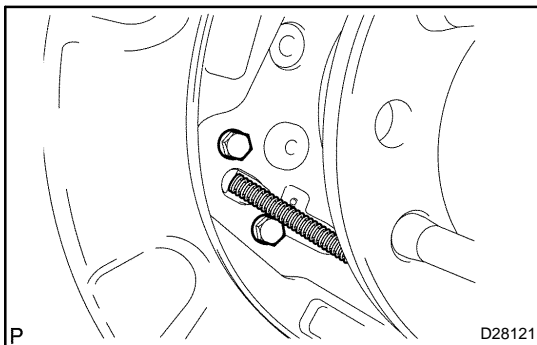
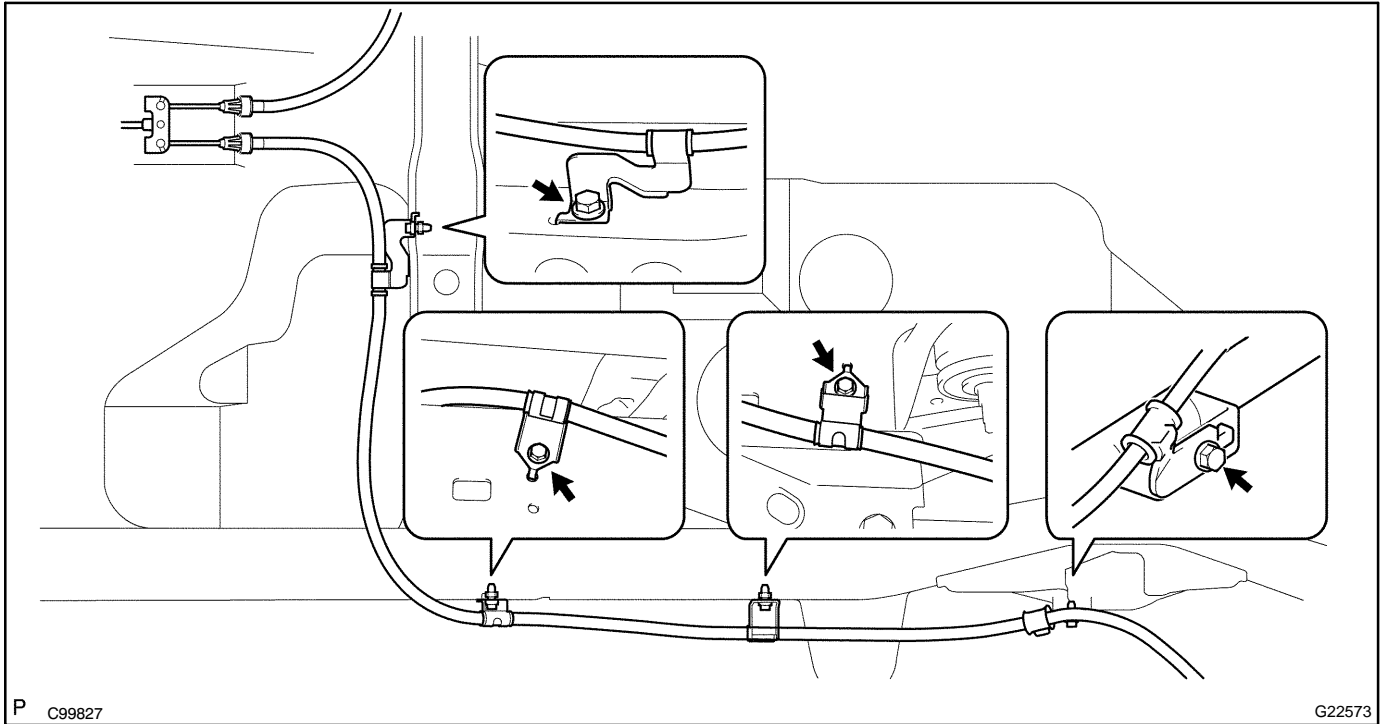
- (e) Remove the 4 bolts and the parking brake cable assy No.3.



14. INSTALL PARKING BRAKE CABLE ASSY NO.3

- (a) Install the parking brake cable assy No.3 to the parking brake pull rod sub-assy No.1.

- (b) Install the parking brake cable assy No.3 with the 4 bolts.
Torque: 13 N·m (127 kgf·cm, 9 ft·lbf)

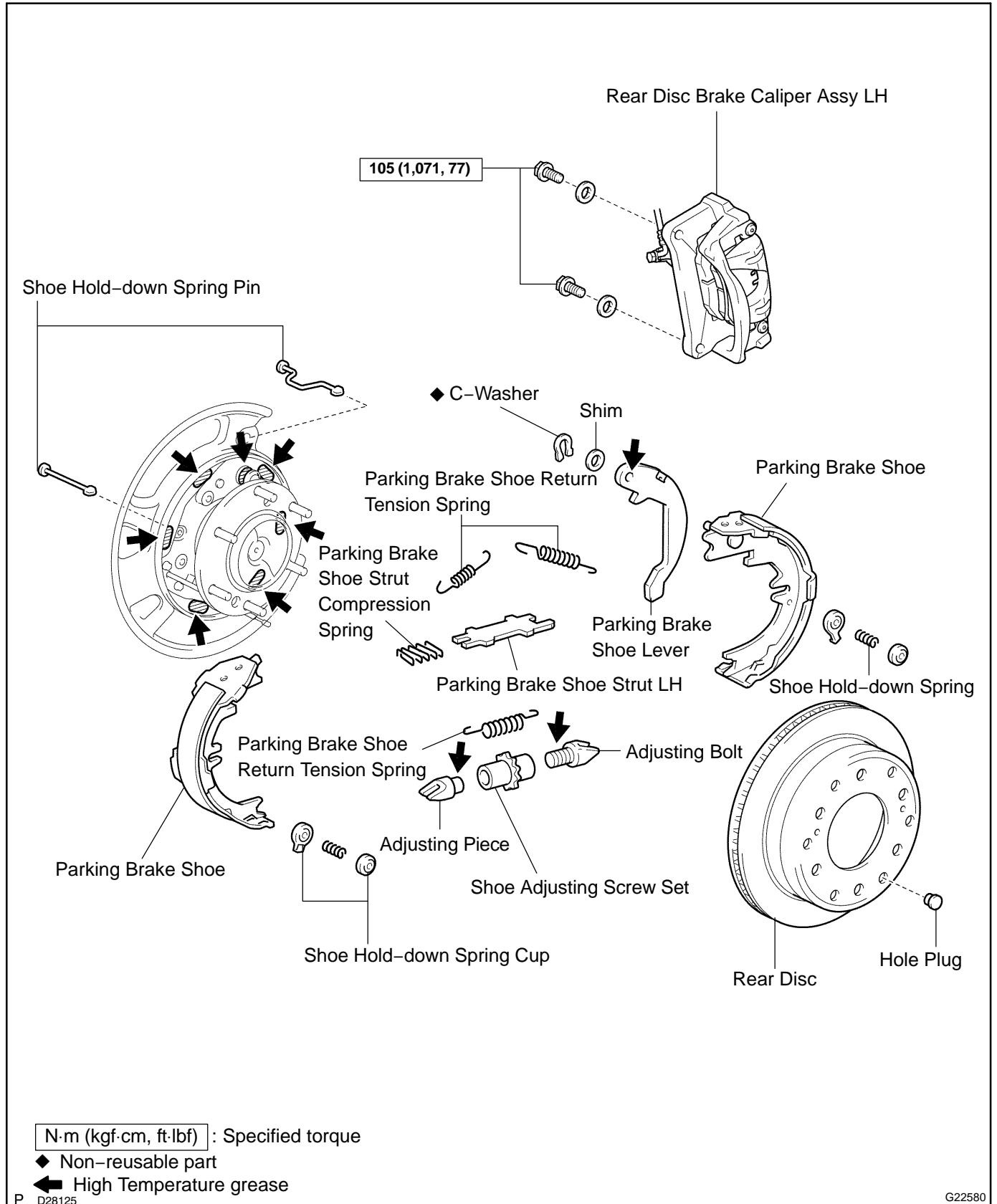


- (c) Install the parking brake cable assy No.3 with the 2 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

15. APPLY HIGH TEMPERATURE GREASE (See page 33-12)
16. INSTALL PARKING BRAKE SHOE (See page 33-12)
17. INSTALL PARKING BRAKE SHOE STRUT LH (See page 33-12)
18. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING (See page 33-12)
19. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING (See page 33-12)
20. CHECK PARKING BRAKE INSTALLATION (See page 33-12)
21. INSTALL REAR DISC
22. ADJUST PARKING BRAKE SHOE CLEARANCE (See page 33-12)
23. CONNECT REAR DISC BRAKE CALIPER ASSY LH
 - (a) Install the rear disc brake caliper assy LH with the 2 bolts.
Torque: 105 N·m (1,071 kgf·cm, 77 ft·lbf)
24. INSTALL REAR WHEEL
Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)
25. INSPECT PARKING BRAKE LEVER TRAVEL (See page 33-2)
26. ADJUST PARKING BRAKE LEVER TRAVEL (See page 33-2)

PARKING BRAKE ASSY COMPONENTS

330AN-02



OVERHAUL

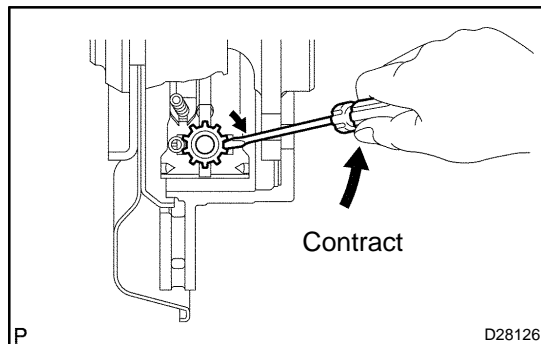
1. REMOVE REAR WHEEL

2. SEPARATE REAR DISC BRAKE CALIPER ASSY LH

- (a) Remove the 2 bolts and separate the rear disc brake caliper assy LH.

HINT:

Do not disconnect the flexible hose from the brake caliper.

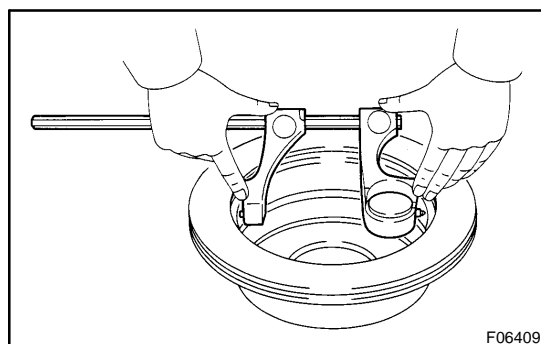


3. REMOVE REAR DISC

- (a) Release the parking brake, and remove the rear disc.

HINT:

- Put matchmarks on the disc and the axle shaft.
- If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.

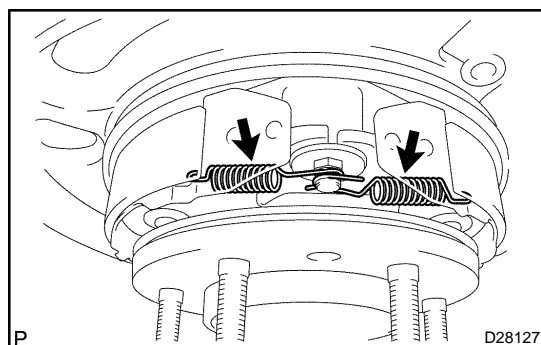


4. INSPECT BRAKE DISC INSIDE DIAMETER

- (a) Using a brake drum gauge or equivalent, measure the inside diameter of the disc.

Standard inside diameter: 210 mm (8.27 in.)

Maximum inside diameter: 211 mm (8.30 in.)



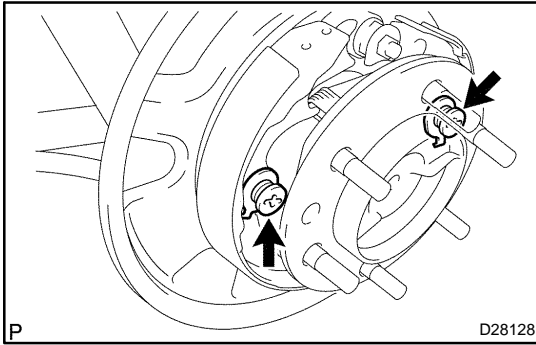
5. REMOVE PARKING BRAKE SHOE RETURN TENSION SPRING

- (a) Using needle-nose pliers, remove the 2 return tension springs.

6. REMOVE PARKING BRAKE SHOE STRUT COMPRESSION SPRING

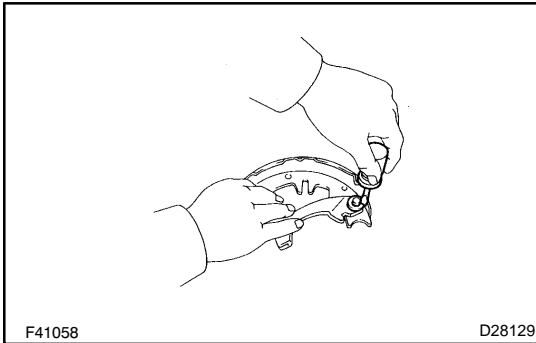
- (a) Slide out the front shoe and remove the compression spring.

7. REMOVE PARKING BRAKE SHOE STRUT LH

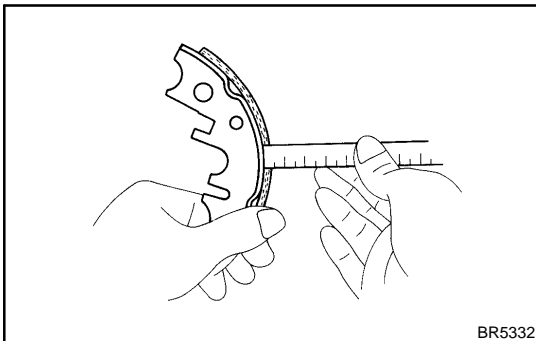


8. REMOVE PARKING BRAKE SHOE

- (a) Release the cup claw and remove the front and rear parking brake shoe.
- (b) Disconnect the parking brake cable from the shoe lever.
- (c) Remove the tension spring and shoe adjuster screw set from the front and rear shoes.
- (d) Remove the 2 shoe hold-down springs, 4 cups and 2 pins.



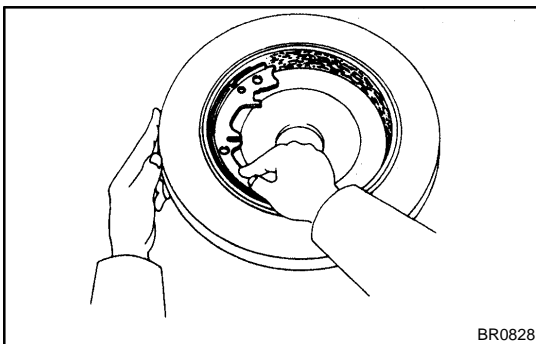
- (e) Using a screwdriver, remove the C-washer.
- (f) Remove the shim and shoe lever from the parking brake shoe.



9. INSPECT PARKING BRAKE SHOE LINING THICKNESS

- (a) Using a ruler, measure the thickness of the shoe lining.
Standard thickness: 4.0 mm (0.158 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe or uneven wear, replace the brake shoe.



10. INSPECT BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT

- (a) Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit.

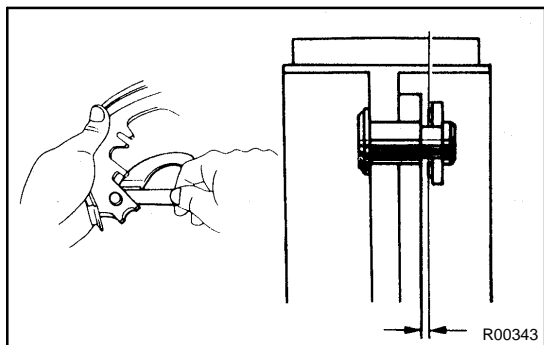
If the contact between the brake disc and the shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.

11. APPLY HIGH TEMPERATURE GREASE

- (a) Apply the high temperature grease to the shoe attached surface of backing plate. (See page [33-11](#))

12. INSTALL PARKING BRAKE SHOE

- (a) Install the shoe lever and shim to the rear shoe with a new C-washer.

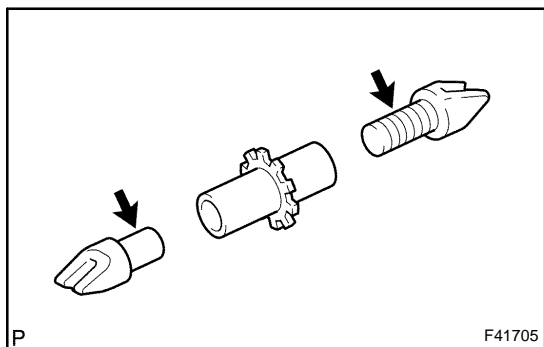


- (b) Using a feeler gauge, measure the clearance.

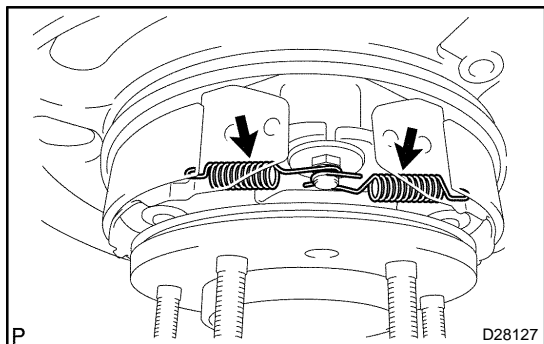
Standard clearance: Less than 0.25 mm (0.0098 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.6 mm (0.024 in.)
0.4 mm (0.016 in.)	0.9 mm (0.035 in.)
0.5 mm (0.020 in.)	-



- (c) Apply the high temperature grease to the adjusting bolt and Piece.
- (d) Install the shoe adjusting screw set and tension spring to the front and rear shoe.
- (e) Install the 2 pins, 4 cups and 2 shoe hold-down springs.
- (f) Connect the parking brake cable to the shoe lever.
- (g) Install the front and rear parking brake shoe.

13. INSTALL PARKING BRAKE SHOE STRUT LH**14. INSTALL PARKING BRAKE SHOE STRUT COMPRESSION SPRING****15. INSTALL PARKING BRAKE SHOE RETURN TENSION SPRING**

- (a) Using needle nose pliers, install the 2 return tension springs.

HINT:

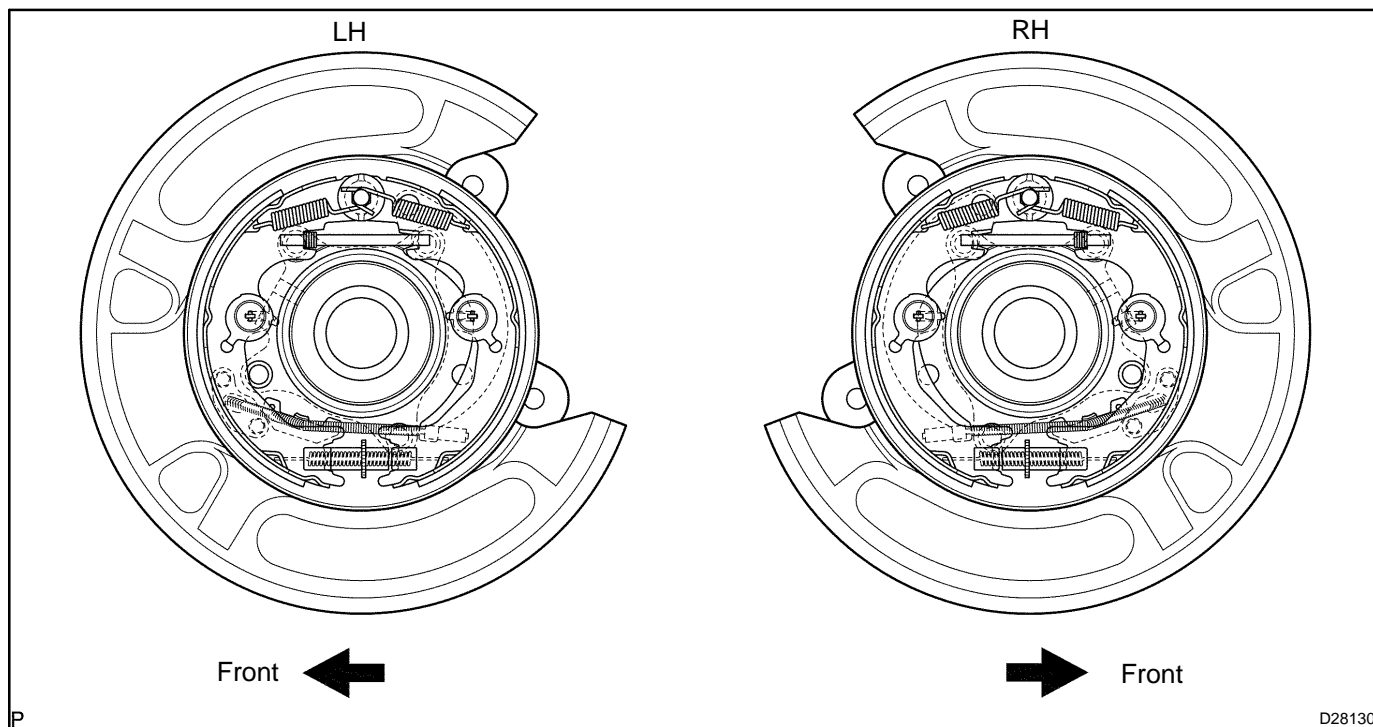
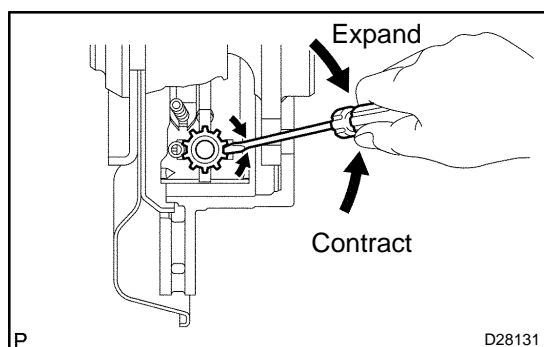
Install the front side spring first, then the rear side spring.

16. CHECK PARKING BRAKE INSTALLATION

- (a) Check that each part is installed properly.

NOTICE:

There should be no oil or grease adhering to the friction surface of the shoe lining and disc.

**17. INSTALL REAR DISC****18. ADJUST PARKING BRAKE SHOE CLEARANCE**

- Temporarily install the hub nuts.
- Remove the hole plug, and turn the adjuster and expand the shoes until the disc locks.
- Contract the shoe adjuster until the disc can rotate smoothly.
Standard : Return 8 notches
- Check shoe is no brake drag.
- Install the hole plug.

19. CONNECT REAR DISC BRAKE CALIPER ASSY LH

- (a) Install the rear disc brake caliper with the 2 bolts.

Torque: 105 N·m (1,071 kgf·cm, 77 ft·lbf)

20. INSTALL REAR WHEEL

Torque: 112 N·m (1,137 kgf·cm, 82 ft·lbf)

21. INSPECT PARKING BRAKE LEVER TRAVEL (See page 33-2)**22. ADJUST PARKING BRAKE LEVER TRAVEL (See page 33-2)**

AUTOMATIC TRANSMISSION ASSY

4017F-03

PRECAUTION

1. The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before reassembly because even a small nick could cause fluid leakage or affect the performance. The instructions here are organized so that you work on only one component group at a time. This will help to avoid confusion from similar-looking parts of different sub-assemblies being on your workbench at the same time. The component groups are inspected and repaired from the converter housing side. Inspect, repair and reassemble as much as possible before proceeding to the next component group. If a defect is found in a certain component group during reassembly, inspect and repair this group immediately. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of the group in a separate container while proceeding with disassembly, inspection, repair and reassembly of other component groups.

Recommended ATF: ATF WS

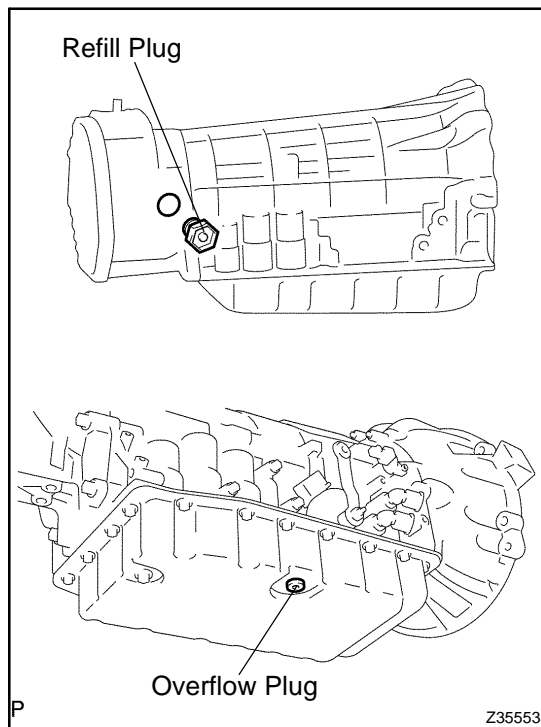
2. All disassembled parts should be washed clean and any fluid passages and holes should be blown through with compressed air.
3. Dry all parts with compressed air, never use shop rags.
4. When using compressed air, always do not aim at yourself to prevent accidentally spraying ATF or kerosene on your face.
5. The recommended automatic transmission fluid or kerosene should be used for cleaning.
6. After cleaning, the parts should be arranged in the correct order for efficient inspection, repairs, and reassembly.
7. When disassembling a valve body, be sure to match each valve together with the corresponding spring.
8. New discs for the brakes and clutches that are to be used for replacement must be soaked in ATF for at least 15 minutes before reassembly.
9. All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.
10. All gaskets and rubber O-rings should be replaced.
11. Do not apply adhesive cements to gaskets and similar parts.
12. Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
13. When replacing a worn bushing, the sub-assembly containing the bushing must also be replaced.
14. Check thrust bearings and races for wear or damage. Replace if necessary.
15. Use petroleum jelly to keep parts in place.
16. When working with FIPG material, you must perform the following.
Using a razor blade and a gasket scraper, remove all the old packing (FIPG) material from the gasket surface.
Thoroughly clean all components to remove all the material being come off.
Clean both sealing surfaces with a non-residue solvent.
Parts must be reassembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

AUTOMATIC TRANSMISSION FLUID ADJUSTMENT

4017G-03

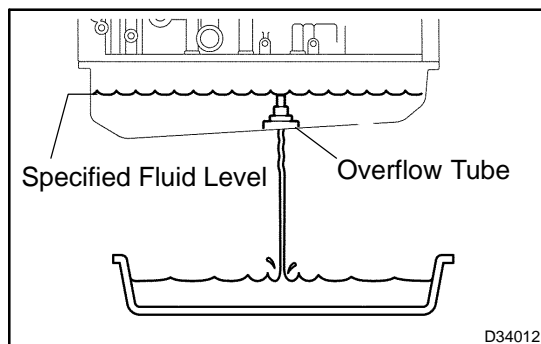
1. BEFORE TRANSMISSION FILL

- This transmission requires Toyota Genuine ATF WS.
- It is necessary to refill the transmission with the correct amount of fluid.
- The vehicle must remain level while adjusting the transmission fluid level.
- On vehicles equipped with active suspension, turn the suspension control switch OFF if it is necessary to jack up the vehicle with the engine running.



2. TRANSMISSION PAN FILL

- (a) Remove the refill plug and overflow plug.



- (b) Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.
- (c) Reinstall the overflow plug.

3. TRANSMISSION FILL

- (a) Fill the transmission with the correct amount of fluid as listed in the table below.
- (b) Reinstall the refill plug to avoid fluid splash.

Repair	Fill Amount
Transmission pan and drain plug removal	1.7 liters (1.8 US qts, 1.5 Imp. qts)
Transmission valve body removal	4.3 liters (4.5 US qts, 3.8 Imp. qts)
Torque converter removal	5.4 liters (5.7 US qts, 4.8 Imp. qts)

HINT:

If you cannot add the listed amount of fluid, do the following:

- Install the refill plug.
- Allow the engine to idle with the air conditioning OFF.
- Move the shift lever through entire gear range to circulate fluid.
- Wait for 30 seconds with the engine idling.
- Stop the engine.
- Remove the refill plug and add fluid.
- Reinstall the refill plug.

4. FLUID CIRCULATION

- (a) Allow the engine to idle with the air conditioning OFF.
- (b) Move the shift lever through entire gear range to circulate fluid.

5. FLUID TEMPERATURE CHECK

NOTICE:

The fluid temperature can be confirmed by checking the indicator light in the meter or by using the intelligent tester. When using the intelligent tester, it is necessary to change to temperature detection mode in order to idle the vehicle appropriately.

- (a) When using intelligent tester:
 - (1) Turn the ignition switch OFF.
 - (2) Connect the hand-held tester to the DLC3.
 - (3) Turn the ignition switch ON.
 - (4) Enter the following menus: DIAGNOSIS / OBD/ MOBD / ACTIVE TEST / TC/E1.
 - (5) Enter the following menus: DIAGNOSIS / OBD/ MOBD / DATA LIST / A/T OIL TEMP 1.
 - (6) Check ATF temperature.

NOTICE:

- **If the fluid temperature is below 46°C (115°F), proceed to the next step. Recommended fluid temperature is 36°C (97°F) or less.**
- **If the fluid temperature is 46°C (115°F) or more, turn the ignition switch OFF and wait until the fluid temperature is below 36°C (97°F).**

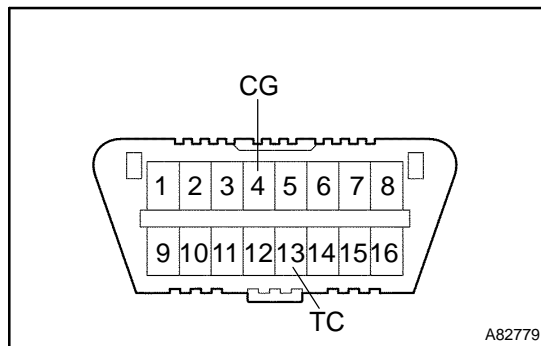
- (7) According to the display on the intelligent tester, perform the active test "TC/E1".
- (8) Start the engine.

HINT:

Indicator lights of the combination meter blink to output DTCs when TC and TE1 are connected.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.



- (b) When not using the intelligent tester (Using A/T OIL TEMP indicator):

- (1) Connect terminals between CG (4) and TC (13) of the DLC3 using SST.

SST 09843-18040

- (2) Start the engine.

HINT:

Indicator lights of the combination meter blink to output DTCs when TC and TE1 are connected.

NOTICE:

Check that electrical systems such as the air conditioning system, audio system and lighting system are off.

- (c) Slowly move the shift lever from P to L, and then return the shift lever to P.

HINT:

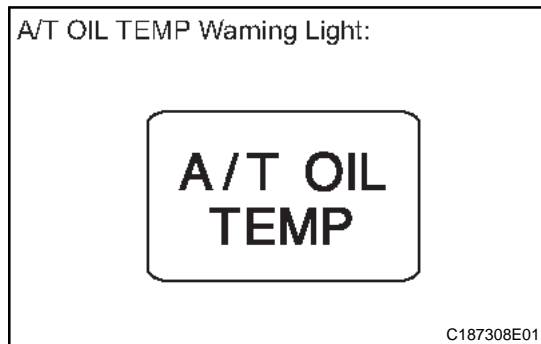
Slowly move the shift lever to circulate the fluid through each part of the transmission.

- (d) Move the shift lever to D, and quickly move it back and forth between N and D (once within 1.5 seconds) for six seconds. This will activate the fluid temperature detection mode.

Standard condition:

A/T OIL TEMP warning light remains illuminated for 2 seconds and then turns off.

- (e) When using the intelligent tester:
 - (1) Return the shift lever to P and press OFF on the active test display.
- (f) When not using the intelligent tester:
 - (1) Return the shift lever to P and remove the SST from the DLC3.
- (g) Allow the engine to idle until the fluid temperature reaches 36 to 46°C (97 to 115°F).
- (h) The A/T OIL TEMP warning light will come on again when the fluid temperature reaches 36°C (97°F) and will blink when it exceeds 46°C (115°F).

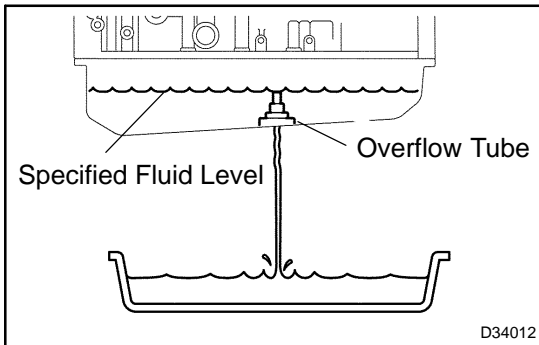


Indicator Indication of ATF Temperature

Below Proper Temperature	Proper Temperature	Higher than Proper Temperature
Data list: A/T OIL TEMP1 36°C (97°F) or less	Data list: A/T OIL TEMP1 36 to 46°C (97 to 115°F)	Data list: A/T OIL TEMP1 46°C (115°F) or higher
A/T OIL TEMP light Turns off	A/T OIL TEMP light Turns on	A/T OIL TEMP light Blinking

NOTICE:

Perform the fluid level inspection while the indicator light is on.



6. FLUID LEVEL CHECK

NOTICE:

The fluid temperature must be between 36°C (97°F) and 46°C (115°F) to accurately check the fluid level.

- (a) Remove the overflow plug with the engine idling.
- (b) Check that the fluid comes out of the overflow tube.

If fluid does not come out, proceed to step 7.

If fluid comes out, wait until the overflow slows to a trickle and proceed to step 8.

7. TRANSMISSION REFILL

- (a) Install the overflow plug.
- (b) Stop the engine.
- (c) Remove the refill plug.
- (d) Add 0.4 liters (0.42 US qts, 0.35 Imp qts) of fluid.
- (e) Allow the engine to idle and wait for 10 seconds.
- (f) Proceed to step 6.

8. COMPLETE

- (a) Install the overflow plug with a new gasket.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)
- (b) Stop the engine.
- (c) Install the refill plug with a new gasket.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

-MEMO-

-MEMO-

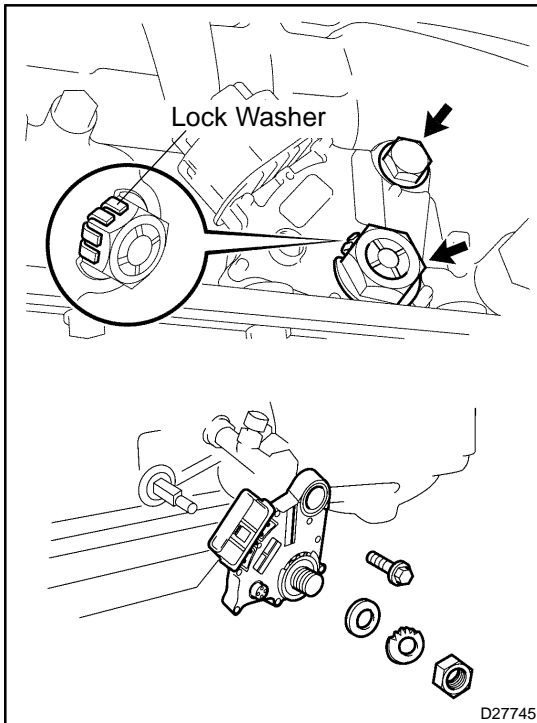
-MEMO-

-MEMO-

PARK/NEUTRAL POSITION SWITCH ASSY REPLACEMENT

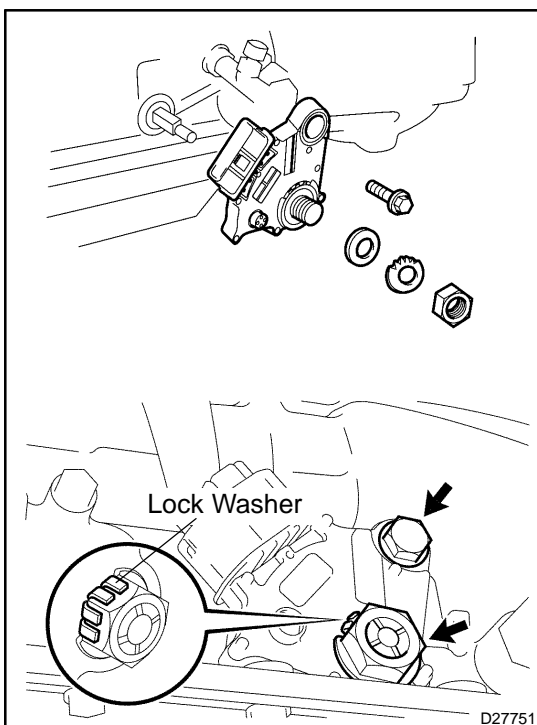
400XU-04

1. SEPARATE BATTERY NEGATIVE TERMINAL
2. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



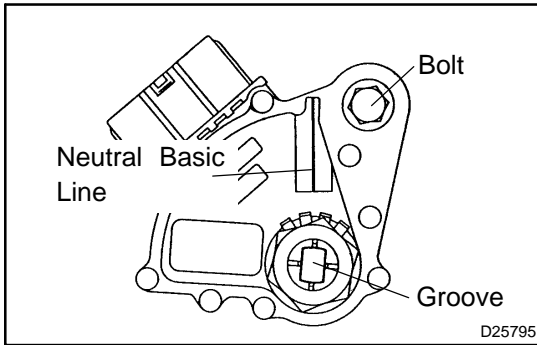
3. REMOVE PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Using a screwdriver, unstake the lock washer.
- (b) Remove the nut, lock washer and grommet.
- (c) Remove the bolt and park/neutral position switch.



4. INSTALL PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Install the park/neutral position switch onto the manual valve lever shaft and temporarily tighten the adjusting bolt.



- (b) Install the grommet and a new lock washer. Install the nut.
Torque: 6.9 N·m (70 kgf·cm, 61 in·lbf)
- (c) Using the manual valve lever shaft, fully turn the manual lever shaft back and back off 2 notches. It is now in neutral.
- (d) Align the neutral basic line with the switch groove, and tighten the adjusting bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
- (e) Bend the tabs of the lock washer.

HINT:

Bend at least 2 of the lock washer tabs.

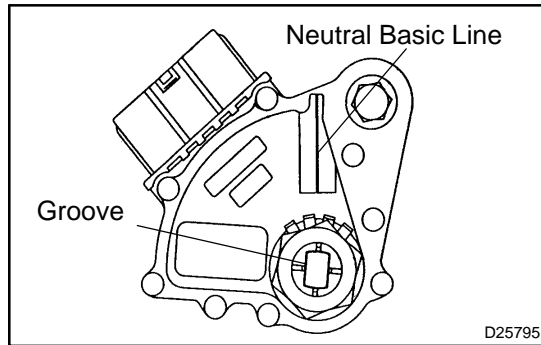
5. **CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR**
6. **CONNECT BATTERY NEGATIVE TERMINAL**
7. **INSPECT PARK/NEUTRAL POSITION SWITCH ASSY (See page 40-12)**
8. **ADJUST PARK/NEUTRAL POSITION SWITCH ASSY (See page 40-12)**
9. **ADJUST SHIFT LEVER POSITION (See page 40-45)**
10. **INSPECT SHIFT LEVER POSITION (See page 40-45)**

ADJUSTMENT

1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Apply the parking brake and turn the ignition switch ON.
- (b) Depress the brake pedal and check that the engine starts only when the shift lever is set in N or P position and it does not start in other positions.
- (c) Check that the back-up light is lit and the reverse warning buzzer sounds only when the shift lever is set in R position and these do not function in other positions.

If a failure is found, check the park/neutral position switch for continuity.

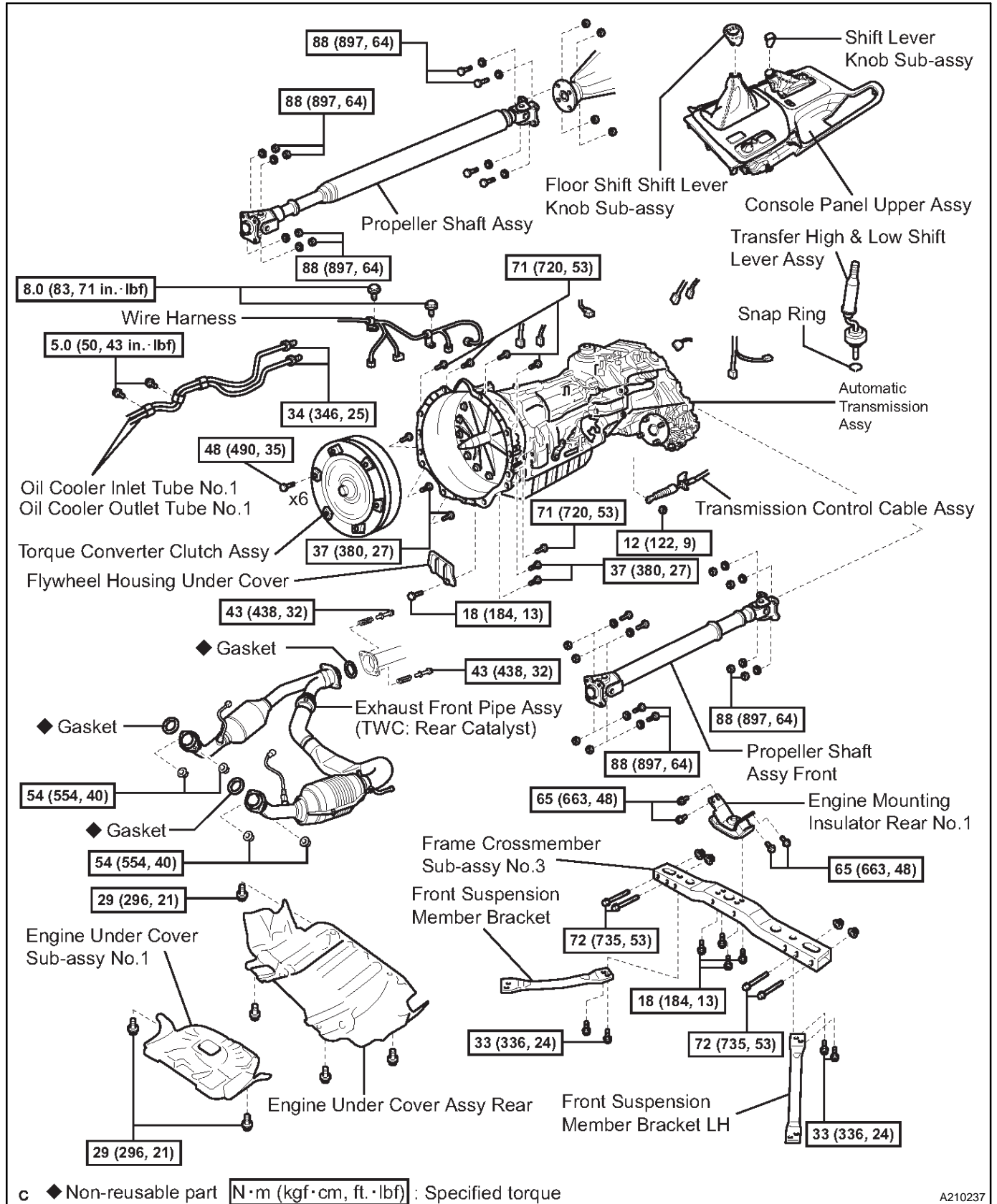


2. ADJUST PARK/NEUTRAL POSITION SWITCH ASSY

- (a) Loosen the bolt of park/neutral position switch and set the shift lever to the N position.
- (b) Align the groove and neutral basic line.
- (c) Hold the switch in position and tighten the bolt.
Torque: 13.0 N·m (130 kgf·cm, 9 ft·lbf)
- (d) After adjustment, perform the inspection described in step 1.

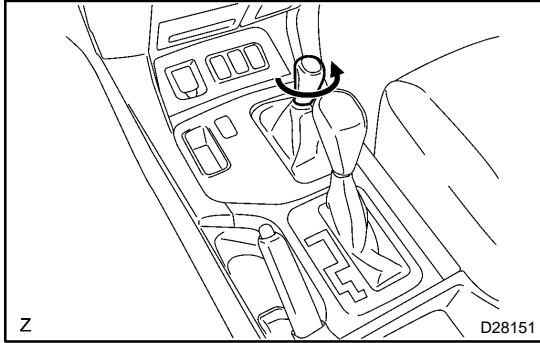
AUTOMATIC TRANSMISSION ASSY COMPONENTS

4017H-02



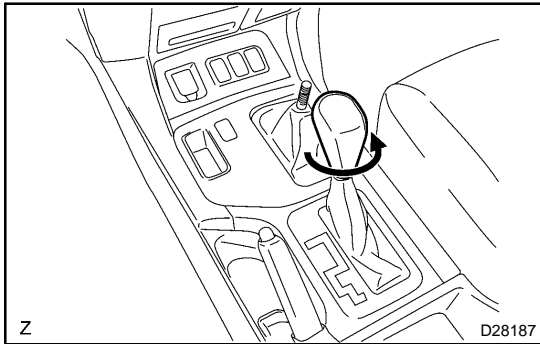
REPLACEMENT

1. SEPARATE BATTERY NEGATIVE TERMINAL



2. REMOVE SHIFT LEVER KNOB SUB-ASSY

- (a) Remove the shift lever knob sub-assy.

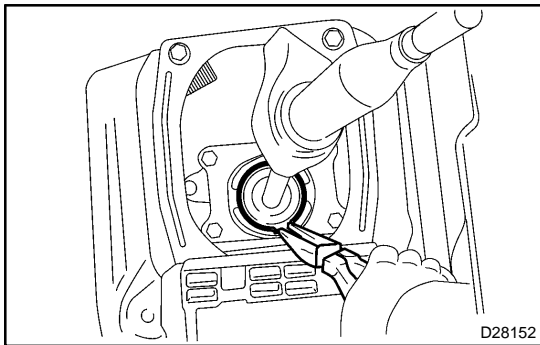


- (b) Remove the floor shift shift lever knob sub-assy.

3. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)

4. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)

5. REMOVE CONSOLE PANEL UPPER ASSY (SEE PAGE 71-13)

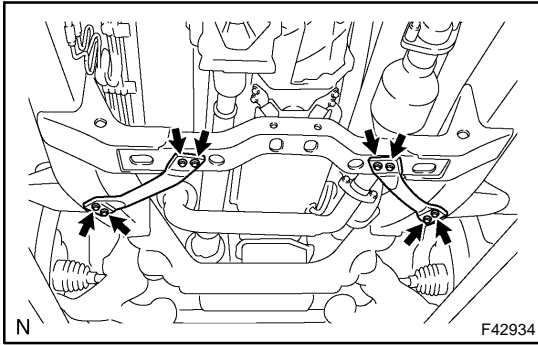


6. REMOVE TRANSFER HIGH & LOW SHIFT LEVER ASSY

- (a) Using needle nose pliers, remove the snap ring and pull out the transfer high & low shift lever assy from the transfer assy.

7. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1

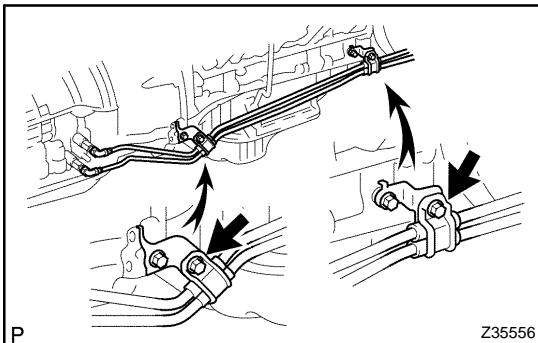
8. REMOVE ENGINE UNDER COVER ASSY REAR



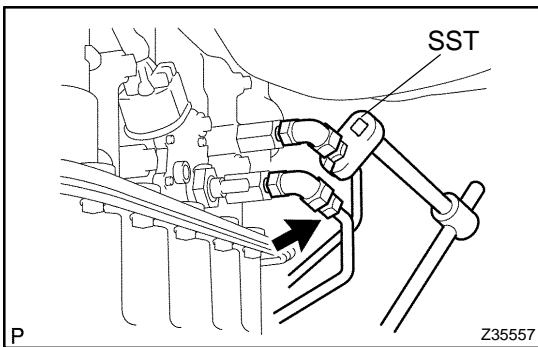
- 9. REMOVE FRONT SUSPENSION MEMBER BRACKET**
 - (a) Remove the 4 bolts and front suspension member bracket.
- 10. REMOVE FRONT SUSPENSION MEMBER BRACKET LH**
 - (a) Remove the 4 bolts and front suspension member bracket LH.

- 11. DISCONNECT OXYGEN SENSOR (SEE PAGE 15-2)**
- 12. REMOVE EXHAUST PIPE ASSY (SEE PAGE 15-2)**
- 13. REMOVE PROPELLER SHAFT ASSY FRONT (SEE PAGE 30-4)**
- 14. REMOVE PROPELLER SHAFT ASSY (SEE PAGE 30-12)**
- 15. DRAIN AUTOMATIC TRANSMISSION FLUID**
 - (a) Remove the drain plug, gasket and drain ATF.
 - (b) Install a new gasket and drain plug.

Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

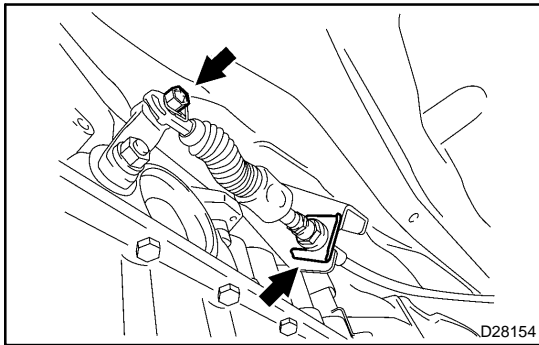


- 16. REMOVE OIL COOLER OUTLET TUBE NO.1**
 - (a) Remove the 2 bolts and 2 clamps.



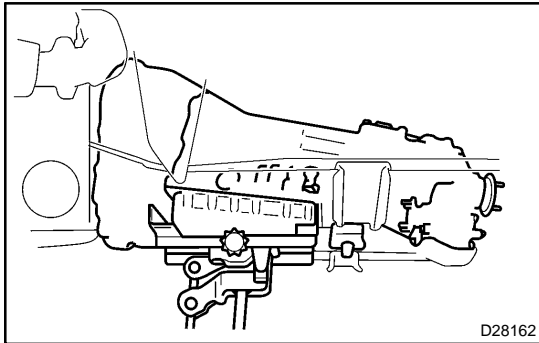
- (b) Using SST, disconnect the oil cooler outlet tube No.1.
SST 09023-12701

- 17. REMOVE OIL COOLER INLET TUBE NO.1**
 - (a) Using SST, disconnect the oil cooler inlet tube No.1.
SST 09023-12701



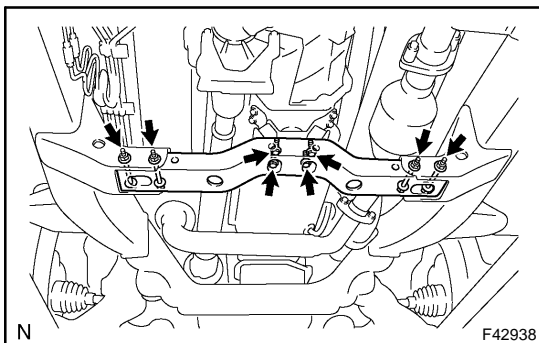
18. DISCONNECT TRANSMISSION CONTROL CABLE ASSY

- (a) Remove the nut and clip, disconnect the transmission control cable assy from the transmission control cable bracket.



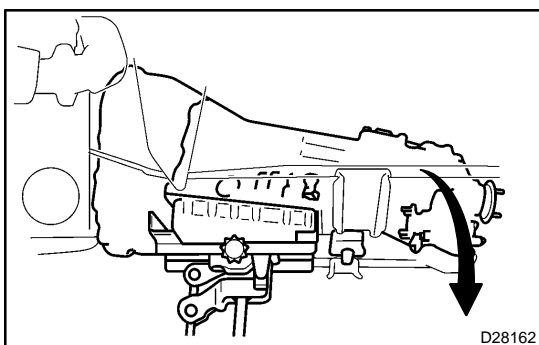
19. SUPPORT AUTOMATIC TRANSMISSION ASSY

- (a) Support the transmission with a transmission jack.



20. REMOVE FRAME CROSSMEMBER SUB-ASSY NO.3

- (a) Remove the 4 bolts on the frame crossmember sub-assy No.3.
- (b) Remove the 4 nuts, 4 bolts and frame crossmember sub-assy No.3.



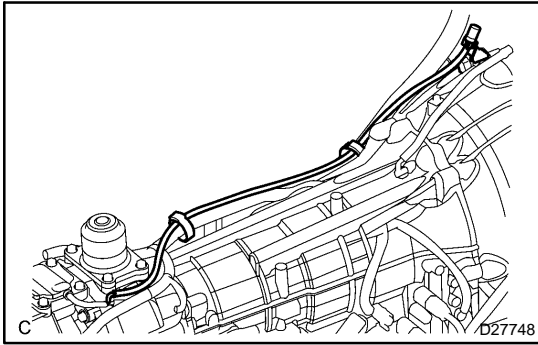
21. DISCONNECT CONNECTOR

- (a) Tilt down the transmission.

NOTICE:

Take care so that the cooling fan does not come in contact with the fan shroud.

- (b) Disconnect the park/neutral position switch connector.
- (c) Disconnect the transmission wire connector.
- (d) Disconnect the 2 speed sensor connectors.
- (e) Disconnect the speedometer sensor connector.
- (f) Disconnect the indicator No.1 switch connector. (Low)
- (g) Disconnect the indicator No.2 switch connector. (Neutral)
- (h) Disconnect the indicator No.3 switch connector. (Diff. lock)
- (i) Disconnect the transfer shift actuator connector. (w/ transfer shift actuator)

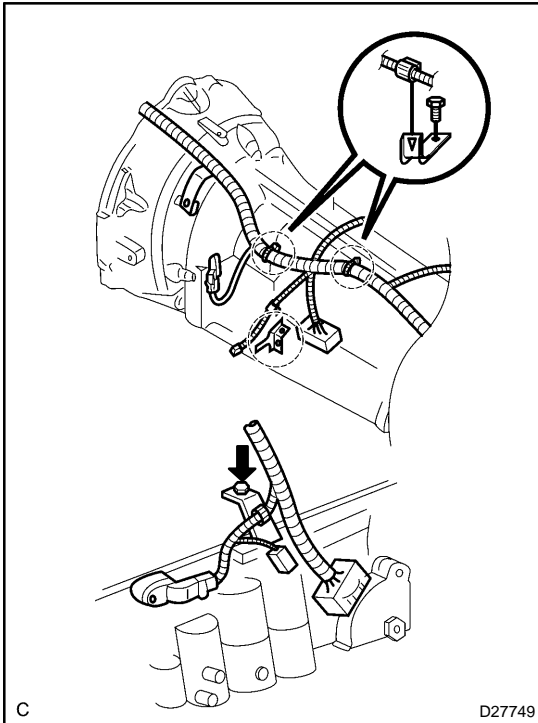


22. SEPARATE TRANSFER BREATHER HOSE SUB-ASSY

- (a) Separate the transfer breather hose sub-assy from the transmission assy.

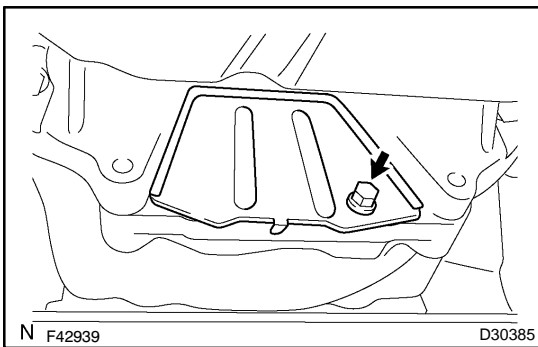
HINT:

The breather hose bracket is tightened together with the transmission housing.



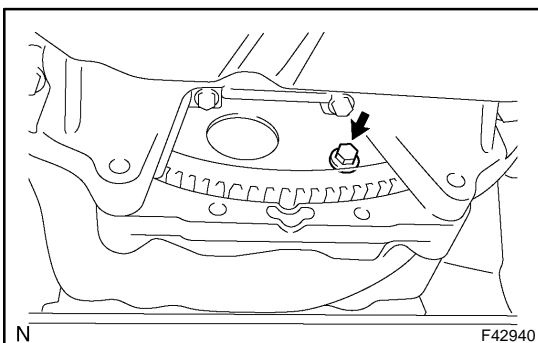
23. DISCONNECT WIRE HARNESS

- (a) Remove the 3 bolts and wire harness from the transmission and transfer.
- (b) Disconnect the wire harness from the transmission assy.



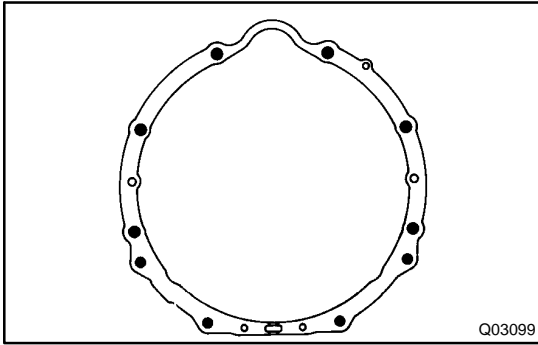
24. REMOVE FLYWHEEL HOUSING UNDER COVER

- (a) Remove the bolt and flywheel housing under cover.

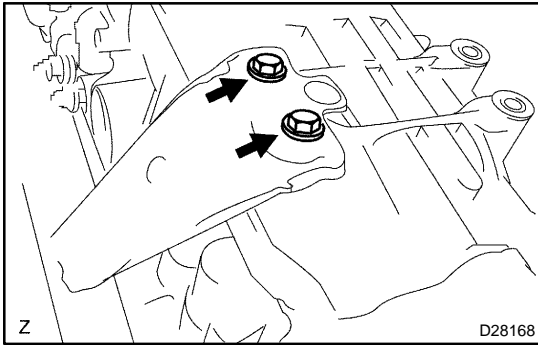


25. REMOVE AUTOMATIC TRANSMISSION ASSY

- (a) Turn the crankshaft to gain access to each bolt.
- (b) Hold the crankshaft pulley nut with a wrench and remove the 6 bolts.



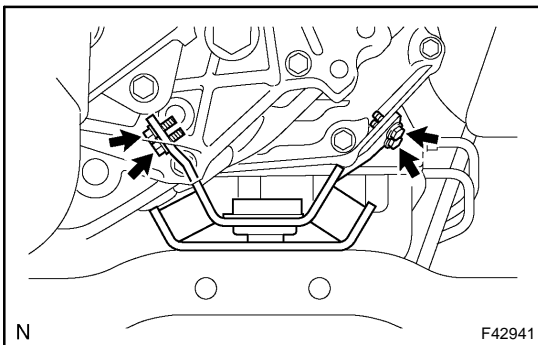
- (c) Remove the 10 bolts.
- (d) Separate and remove the automatic transmission.



26. REMOVE TRANSMISSION CONTROL CABLE BRACKET NO.1

- (a) Remove the 2 bolts and transmission control cable bracket.

27. REMOVE TRANSFER ASSY (SEE PAGE 31-12)



28. REMOVE ENGINE MOUNTING INSULATOR REAR NO.1

- (a) Remove the 4 bolts and engine mounting insulator rear No.1.

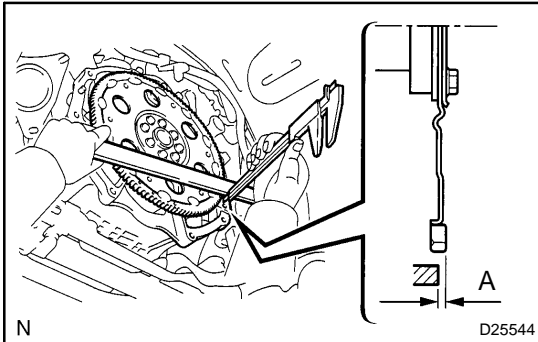
29. REMOVE TORQUE CONVERTER CLUTCH ASSY

30. INSPECT TORQUE CONVERTER CLUTCH ASSY (SEE PAGE 40-24)

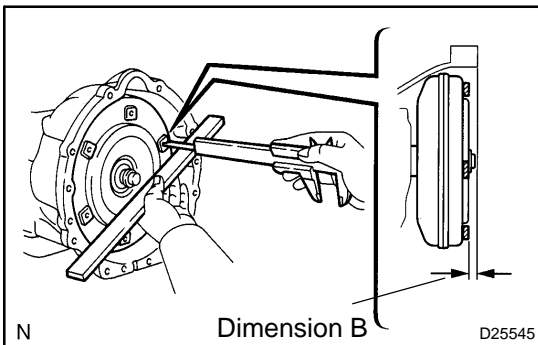
SST 09350-32014 (09351-32020)

31. INSTALL TORQUE CONVERTER CLUTCH ASSY

(a) Install the torque converter clutch to the automatic transmission.

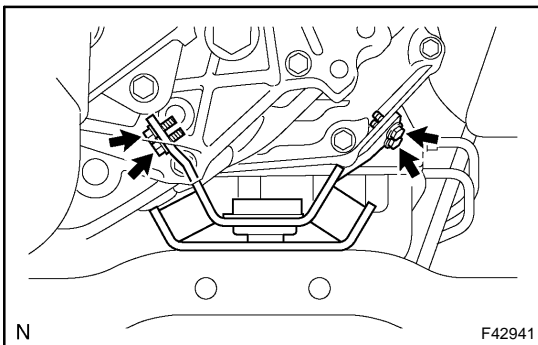


(b) Using calipers and a straight edge, measure dimension A between the transmission and the end surface of the drive plate.



(c) Using calipers and a straight edge, measure the dimension B shown in the illustration and check that B is greater than A measured in (b).

Standard: A + 1 mm or more

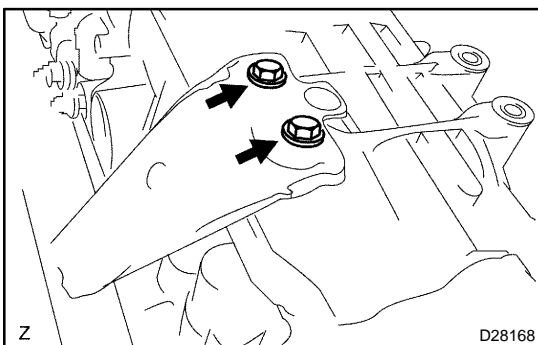


32. INSTALL ENGINE MOUNTING INSULATOR REAR NO.1

(a) Install the engine mounting insulator rear and 4 bolts to the automatic transmission.

Torque: 65 N·m (663 kgf·cm, 48 ft·lbf)

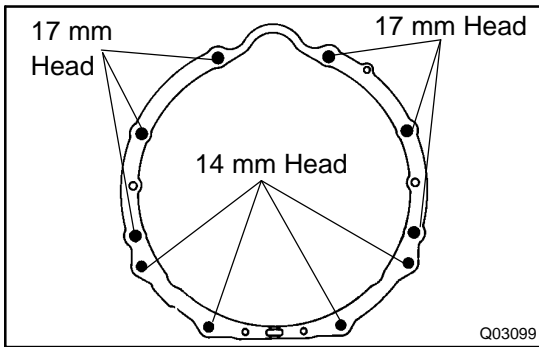
33. INSTALL TRANSFER ASSY (SEE PAGE 31-12)



34. INSTALL TRANSMISSION CONTROL CABLE BRACKET NO.1

(a) Install the transmission control cable bracket No.1 with 2 bolts.

Torque: 25 N·m (255 kgf·cm, 19 ft·lbf)



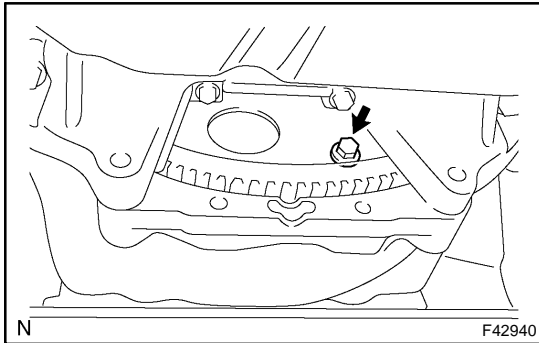
35. INSTALL AUTOMATIC TRANSMISSION ASSY

- (a) Install the automatic transmission and 10 bolts to the engine.

Torque:

17 mm head: 71 N·m (720 kgf·cm, 53 ft·lbf)

14 mm head: 37 N·m (380 kgf·cm, 27 ft·lbf)

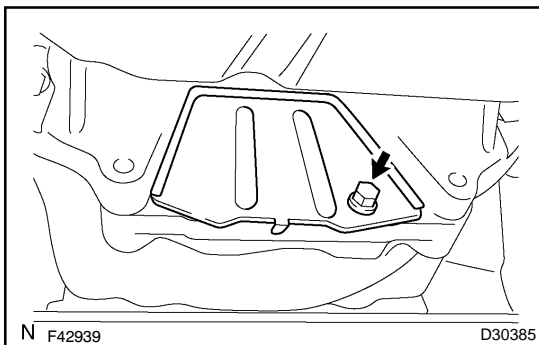


- (b) Install the 6 torque converter clutch mounting bolts.

Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

HINT:

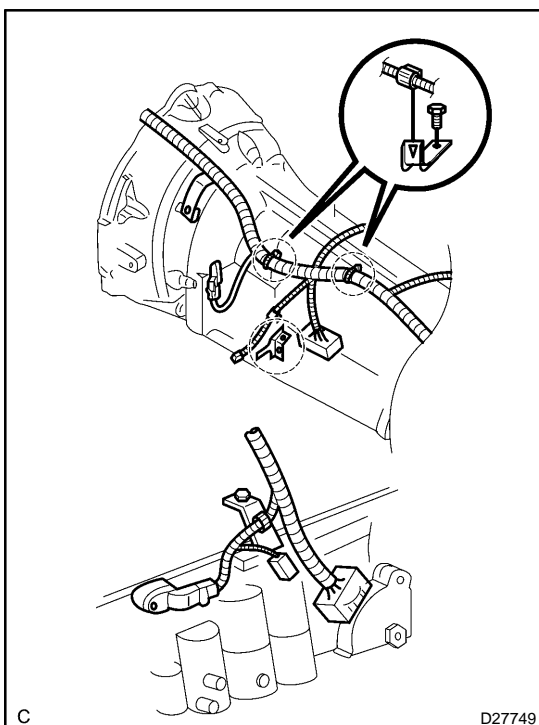
First install black colored bolt and then the 5 bolts.



36. INSTALL FLYWHEEL HOUSING UNDER COVER

- (a) Install the flywheel housing under cover and bolt.

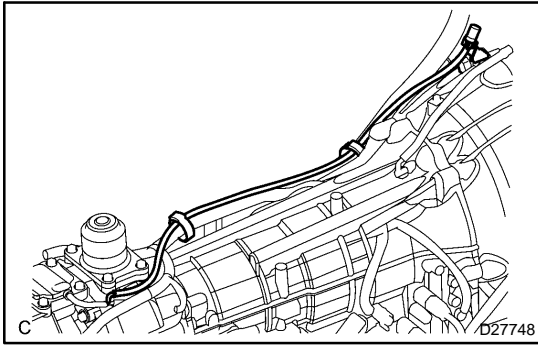
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



37. CONNECT WIRE HARNESS

- (a) Install the wire harness with the bolt.

Torque: 8.0 N·m (83 kgf·cm, 71 in·lbf)



38. INSTALL TRANSFER BREATHER HOSE SUB-ASSY

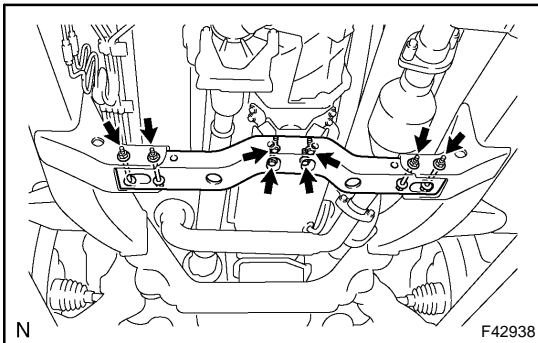
- (a) Install the transfer breather hose sub-assy.

HINT:

The breather hose bracket is tightened together with the transmission housing.

39. CONNECT CONNECTOR

- (a) Connect the speed sensor SP2 connector.
- (b) Connect the transmission wire connector.
- (c) Connect the park/neutral position switch assy connector.
- (d) Connect the temperature sensor connector.
- (e) Connect the speedometer sensor connector.
- (f) Connect the indicator No.1 switch connector.
(Low)
- (g) connect the indicator No.2 switch connector.
(Neutral)
- (h) Connect the indicator No.3 switch connector.
(Diff. lock)
- (i) Connect the transfer shift actuator connector.
(w/ transfer shift actuator)



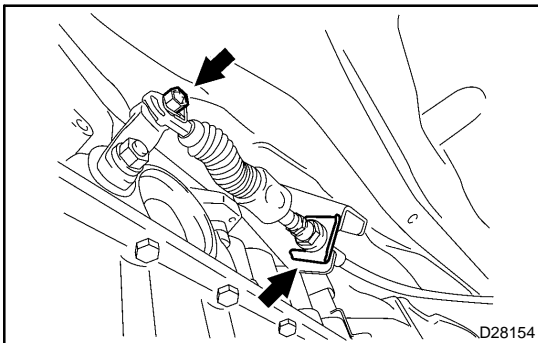
40. INSTALL FRAME CROSSMEMBER SUB-ASSY NO.3

- (a) Install the frame crossmember sub-assy No.3 with 4 bolts and 4 nuts.

Torque: 72 N·m (735 kgf·cm, 53 ft·lbf)

- (b) Install the frame crossmember sub-assy No.3 with 4 bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



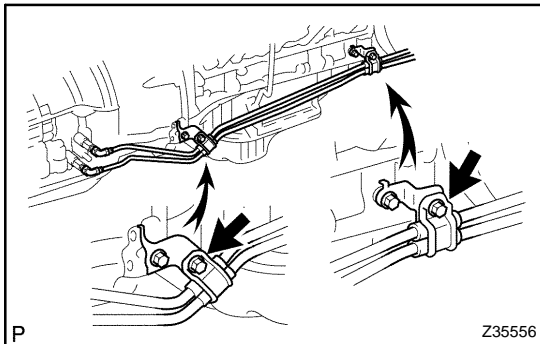
41. CONNECT TRANSMISSION CONTROL CABLE ASSY

- (a) Install the nut and clip on the transmission control cable assy.

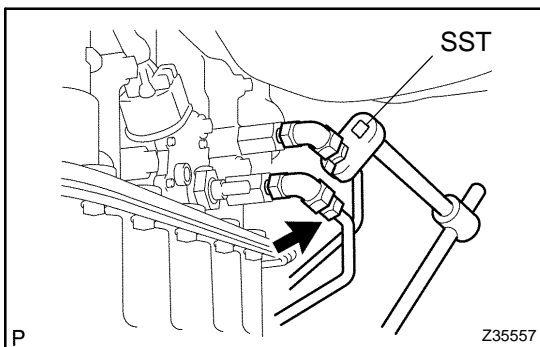
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

42. INSTALL OIL COOLER OUTLET TUBE NO.1

- (a) Temporarily install the oil cooler outlet tube No.1.
- (b) Temporarily install the oil cooler inlet tube No.1.



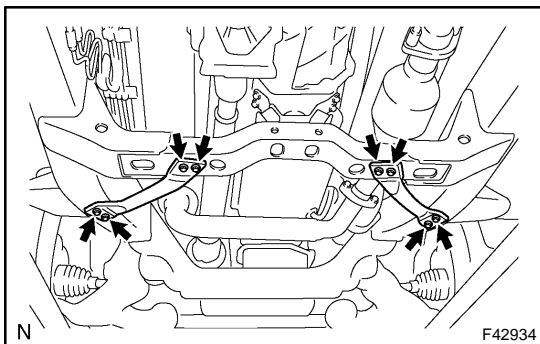
- (c) Install the 2 clamps and 2 bolts.
Torque: 5.0 N·m (51 kgf·cm, 43 in·lbf)



- (d) Using SST, tighten the oil cooler outlet tube No.1.
SST 09023-12701
Torque: 34 N·m (346 kgf·cm, 25 ft·lbf)

43. INSTALL OIL COOLER INLET TUBE NO.1

- (a) Using SST, tighten the oil cooler inlet tube No.1.
Torque: 34 N·m (346 kgf·cm, 25 ft·lbf)
SST 09023-12701

**44. INSTALL FRONT SUSPENSION MEMBER BRACKET LH**

- (a) Install the front suspension member bracket LH with 4 bolts.

Torque: 33 N·m (336 kgf·cm, 24 ft·lbf)

45. INSTALL FRONT SUSPENSION MEMBER BRACKET

- (a) Install the front suspension member bracket with 4 bolts.

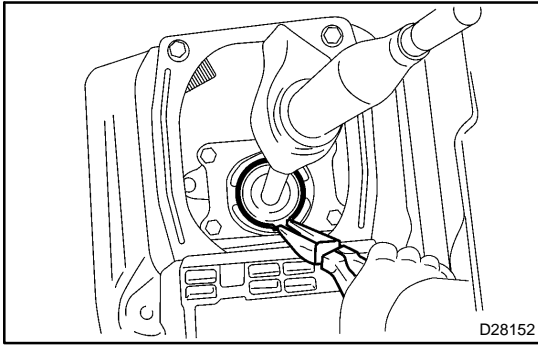
Torque: 33 N·m (336 kgf·cm, 24 ft·lbf)

46. INSTALL PROPELLER SHAFT ASSY (SEE PAGE 30-12)**47. INSTALL PROPELLER SHAFT ASSY FRONT (SEE PAGE 30-4)****48. ADJUST SHIFT LEVER POSITION (SEE PAGE 40-45)****49. INSTALL EXHAUST PIPE ASSY (SEE PAGE 15-2)****50. INSTALL OXYGEN SENSOR (SEE PAGE 15-2)****51. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1**

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

52. INSTALL ENGINE UNDER COVER ASSY REAR

Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



53. INSTALL TRANSFER HIGH & LOW SHIFT LEVER ASSY

- (a) Using needle nose pliers, install the transfer high & low shift lever assy with snap ring.

HINT:

Apply MP grease to the transfer shift lever.

54. INSTALL CONSOLE PANEL UPPER ASSY

55. INSTALL CONSOLE UPPER PANEL GARNISH NO.2

56. INSTALL CONSOLE UPPER PANEL GARNISH NO.1

57. INSTALL SHIFT LEVER KNOB SUB-ASSY

- (a) Install the shift lever knob on the shift lever.
 (b) Install the floor shift shift lever knob on the shift lever.

58. ADD AUTOMATIC TRANSMISSION FLUID (SEE PAGE 40-2)

59. INSPECT AUTOMATIC TRANSMISSION FLUID (SEE PAGE 40-2)

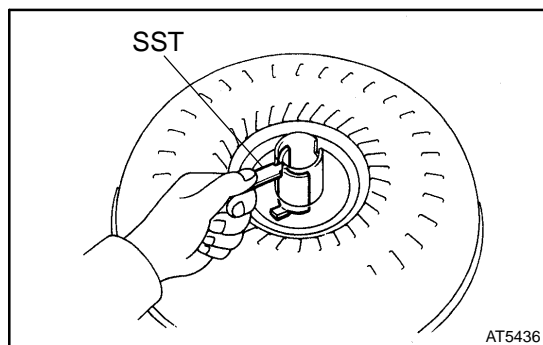
60. INSTALL BATTERY NEGATIVE TERMINAL

61. INSPECT SHIFT LEVER POSITION (SEE PAGE 40-45)

62. CHECK FOR EXHAUST GAS LEAKS (SEE PAGE 15-2)

TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

4007Y-07

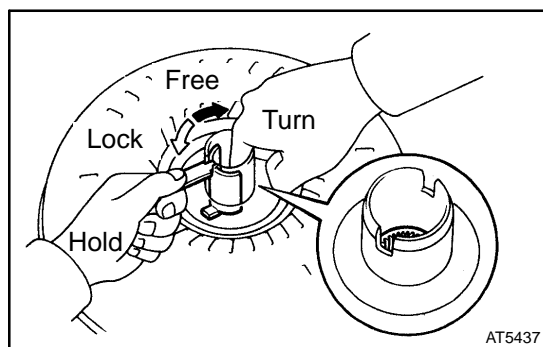


1. INSPECT TORQUE CONVERTER CLUTCH ASSY

(a) Inspect the one-way clutch.

- (1) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.

SST 09350-32014 (09351-32020)

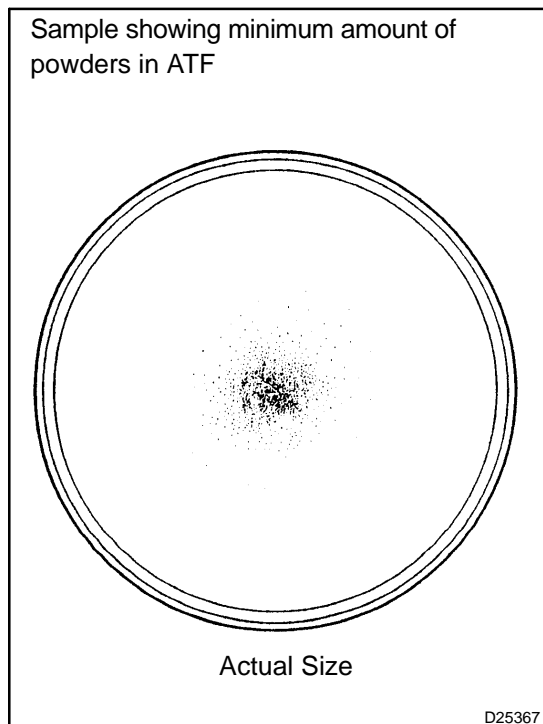


- (2) Press on the serrations of stator with a finger and rotate it.

Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.

If necessary, clean the converter and retest the one-way clutch.

Replace the converter if the one-way clutch still fails the test.



- (b) Determine the condition of the torque converter clutch assy.

- (1) If the inspection result of the torque converter clutch assy meets the following item, replace the torque converter clutch.

Malfunction item:

Any metallic sound is heard from the torque converter clutch during stall test or when the shift lever is in neutral position.

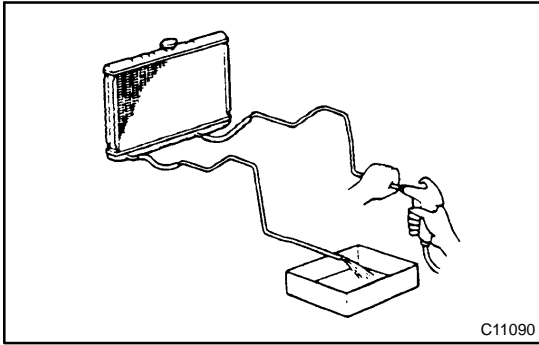
One-way clutch is free or locked in both directions. Fine powders exceeding the sample limit is identified in ATF. (See the sample.)

HINT:

The sample shows the auto fluid of approx. 0.25 liters (0.26 US qts, 0.22 Imp. qts) that is taken out from the removed torque converter clutch.

- (c) Replace the ATF in the torque converter clutch.

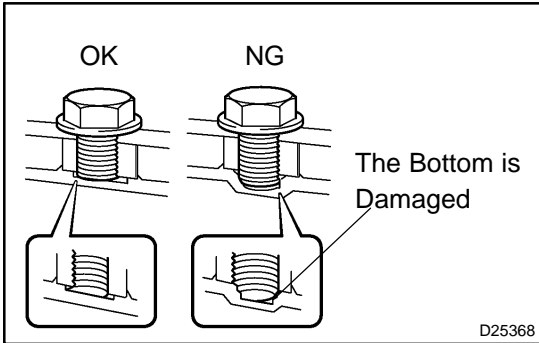
- (1) If the ATF is discolored and/or has a foul odor, completely stir the ATF in the torque converter clutch and drain it with the face for installation facing up.



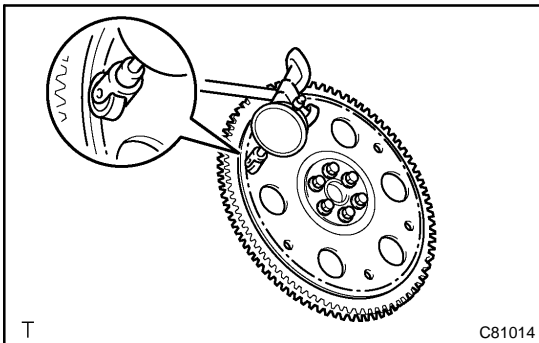
- (d) Clean and check the oil cooler and oil pipe line.
 - (1) If the torque converter clutch is inspected or the ATF is exchanged, clean the oil cooler and oil pipe line.

HINT:

- Spray compressed air of 196 kPa (2 kgf/cm², 28 psi) from the inlet hose.
- If plenty of fine powders are identified in the ATF, add new ATF using a bucket pump and clean it again.
 - (2) If the ATF is cloudy, inspect the oil cooler (radiator).



- (e) Prevent deformation of the torque converter clutch and damage to the oil pump gear.
 - (1) When any marks due to interference are found on the end of the bolt for the torque converter clutch and on the bottom of the bolt hole, replace the bolt and the torque converter clutch.
 - (2) All of the bolts shall have the same length.
 - (3) No missing spring washer.



2. INSPECT DRIVE PLATE & RING GEAR SUB-ASSY

- (a) Set up a dial indicator and measure the drive plate runout.

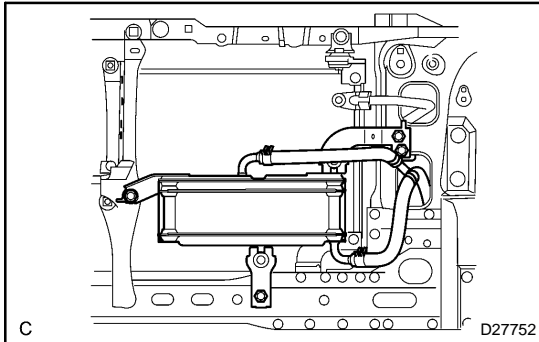
Maximum runout: 0.20 mm (0.0079 in.)
 - (b) Check the damage of the ring gear.
- If the runout is not within the specification or ring gear is damaged, replace the drive plate.

OIL COOLER ASSY (ATM)

REPLACEMENT

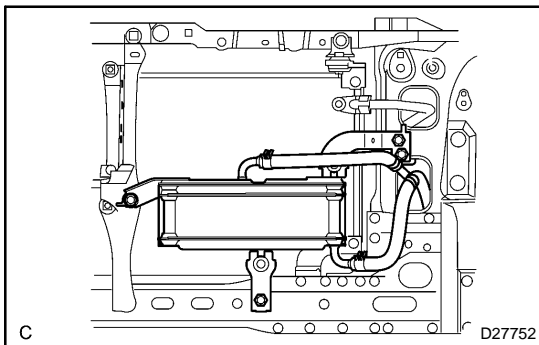
400XW-04

1. DRAIN AUTOMATIC TRANSMISSION FLUID



2. REMOVE OIL COOLER ASSY

- (a) Loosen the clip and disconnect the oil cooler hose.
- (b) Loosen the clip and disconnect the transmission oil cooler hose No. 1.
- (c) Disconnect the oil cooler sub tube.
- (d) Remove the bolt, 4 bolts and oil cooler assy.



3. INSTALL OIL COOLER ASSY

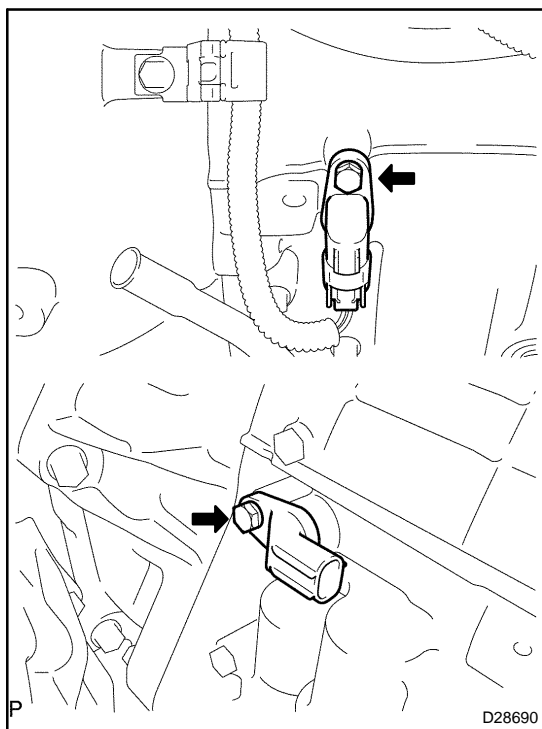
- (a) Install the oil cooler assy, bolt and 4 bolts.
Torque: 5.0 N·m (51 kgf·cm, 40 in.-lbf)
- (b) Install the transmission oil cooler hose No. 1 and clip.
- (c) Install the oil cooler sub tube.
- (d) Install the oil cooler hose and clip.

4. ADD AUTOMATIC TRANSMISSION FLUID (See page 40-2)

5. INSPECT AUTOMATIC TRANSMISSION FLUID (See page 40-2)

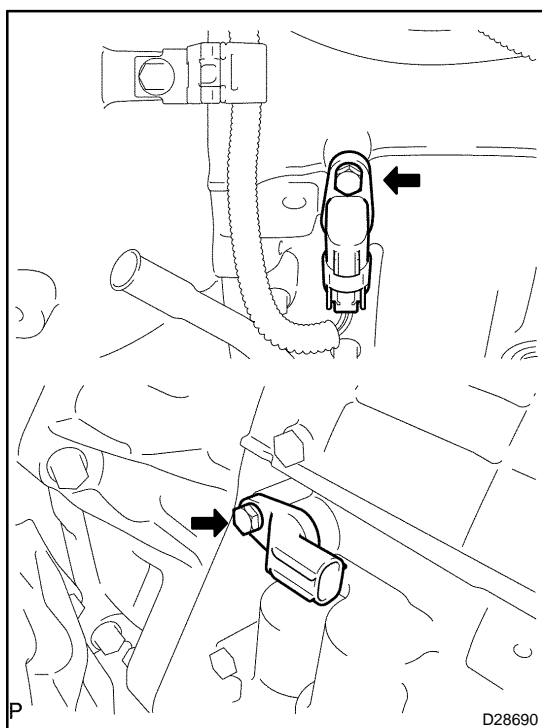
SPEED SENSOR REPLACEMENT

400UW-06



1. REMOVE SPEED SENSOR(SP2 and NT SENSOR)

- (a) Disconnect the connector.
- (b) Remove the bolt and speed sensor.



2. INSTALL SPEED SENSOR(SP2 and NT SENSOR)

- (a) Coat a new O-ring with ATF.
- (b) Install the speed sensor with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
- (c) Connect the connector.

TRANSMISSION WIRE

REPLACEMENT

400XY-04

CAUTION:

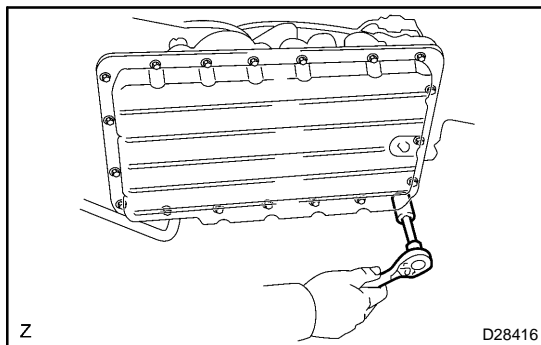
When working with FIPG material, you must observe the following items.

- Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-remove solvent.
- Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.

1. DRAIN AUTOMATIC TRANSMISSION FLUID

- Remove the drain plug, gasket and drain ATF.
- Install a new gasket and drain plug.

Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

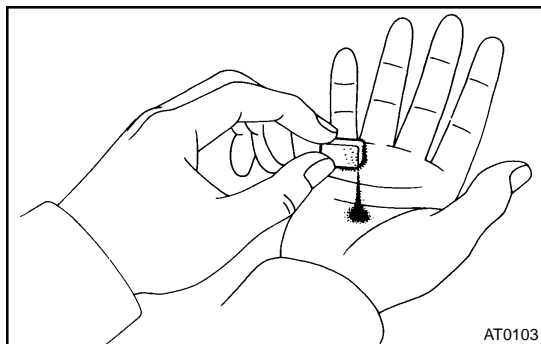


2. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

NOTICE:

Some fluid will remain in the oil pan.

- Remove the 20 bolts.

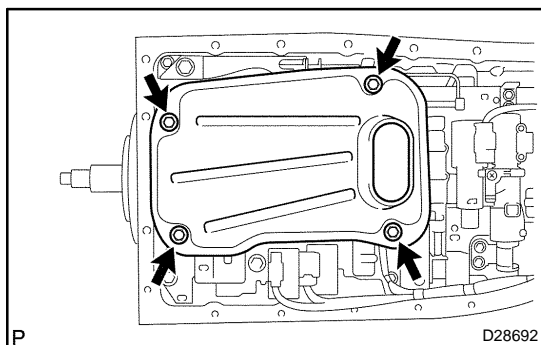


- Examine particles in pan.

- Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

Steel (magnetic) ... bearing, gear and clutch plate wear

Brass (non-magnetic) ... bushing wear

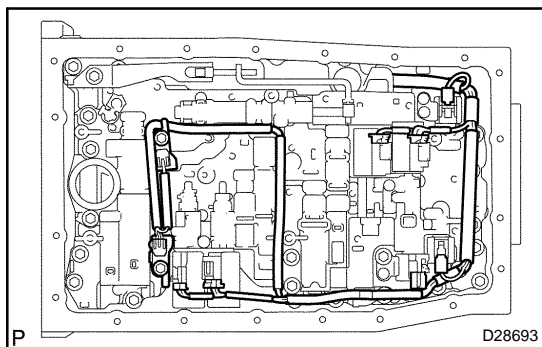


3. REMOVE VALVE BODY OIL STRAINER ASSY

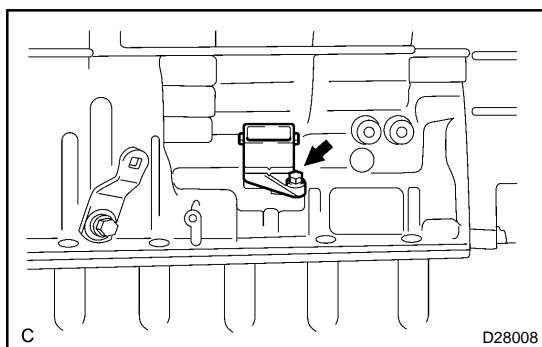
- Remove the 4 bolts and oil strainer.

NOTICE:

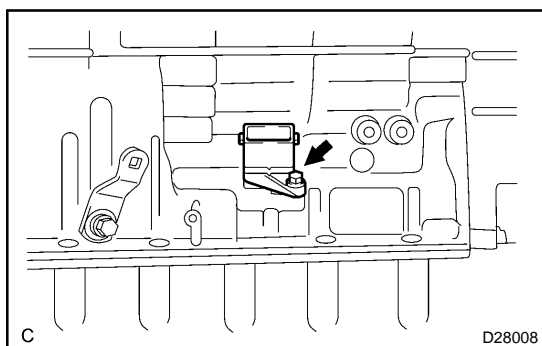
Be careful as some fluid will come out of the oil strainer.

**4. SEPARATE TRANSMISSION WIRE**

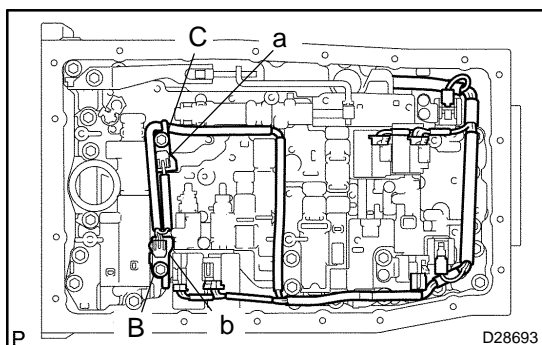
- (a) Remove the bolt and clamp.
- (b) Disconnect the ATF temperature sensor.
- (c) Disconnect the 7 connectors from the solenoid valves.

**5. REMOVE TRANSMISSION WIRE**

- (a) Disconnect the transmission wire connector.
- (b) Remove the bolt and pull out the transmission wire.

**6. INSTALL TRANSMISSION WIRE**

- (a) Install the transmission wire with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
- (b) Connect the transmission wire connector.

**7. CONNECT TRANSMISSION WIRE**

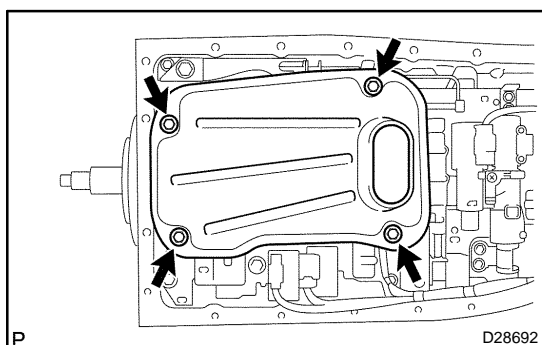
- (a) Connect the 7 connectors to the solenoid valves.
- (b) Install the clamp with the bolt.

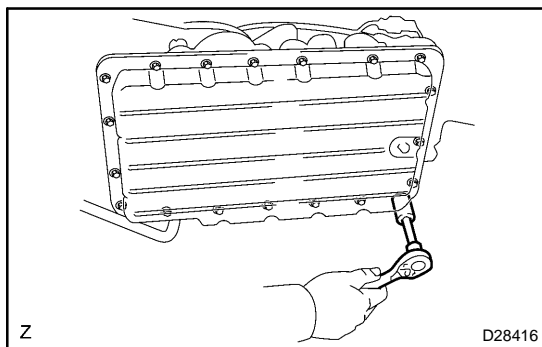
Torque:**B: 11 N·m (110 kgf·cm, 8 in.-lbf)****C: 10 N·m (100 kgf·cm, 7 in.-lbf)**

- (c) Connect the ATF temperature sensor.

Wiring color:**a: Orange****b: Blue****8. INSTALL VALVE BODY OIL STRAINER ASSY**

- (a) Install the a new O-ring and oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft.-lbf)





9. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

HINT:

Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.

- (a) Install the oil pan with the 20 bolts.

Torque: 4.4 N·m (45 kgf·cm, 39 in·lbf)

10. ADD AUTOMATIC TRANSMISSION FLUID (See page 40-2)

11. INSPECT AUTOMATIC TRANSMISSION FLUID (See page 40-2)

TRANSMISSION VALVE BODY ASSY

REPLACEMENT

400XX-04

CAUTION:

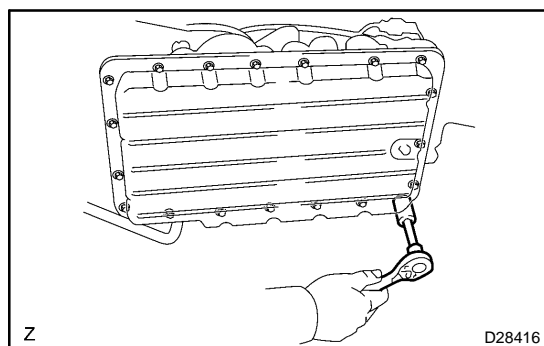
When working with FIPG material, you must observe the following items.

- Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-remove solvent.
- Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.

1. DRAIN AUTOMATIC TRANSMISSION FLUID

- Remove the drain plug, gasket and drain ATF.
- Install a new gasket and drain plug.

Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

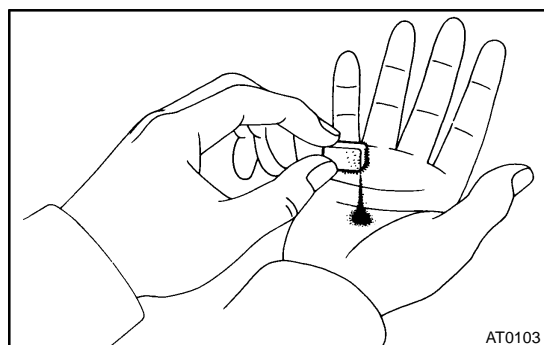


2. REMOVE AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY

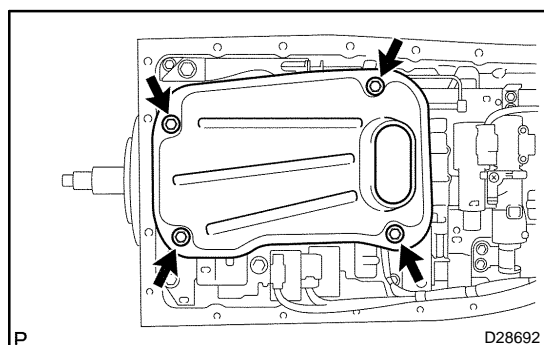
NOTICE:

Some fluid will remain in the oil pan.

- Remove the 20 bolts, gasket and oil pan sub-assy.



- Examine particles in pan.
 - Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.
 - Steel (magnetic) ... bearing, gear and clutch plate wear
 - Brass (non-magnetic) ... bushing wear

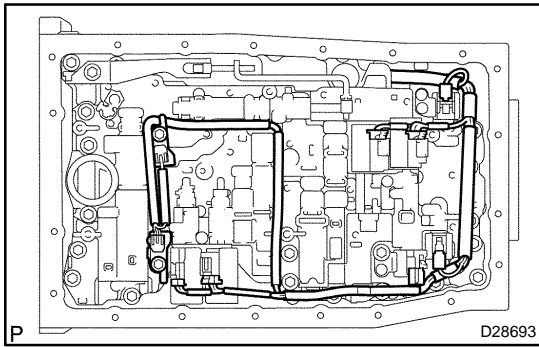


3. REMOVE VALVE BODY OIL STRAINER ASSY

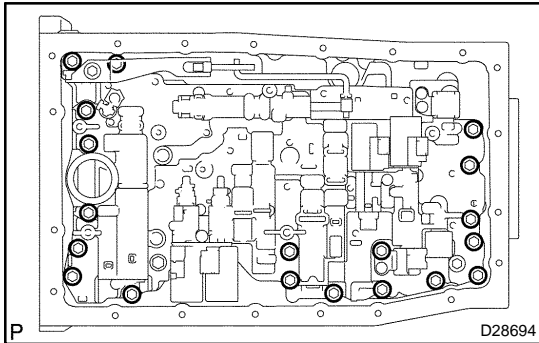
- Remove the 4 bolts, oil strainer and O-ring.

NOTICE:

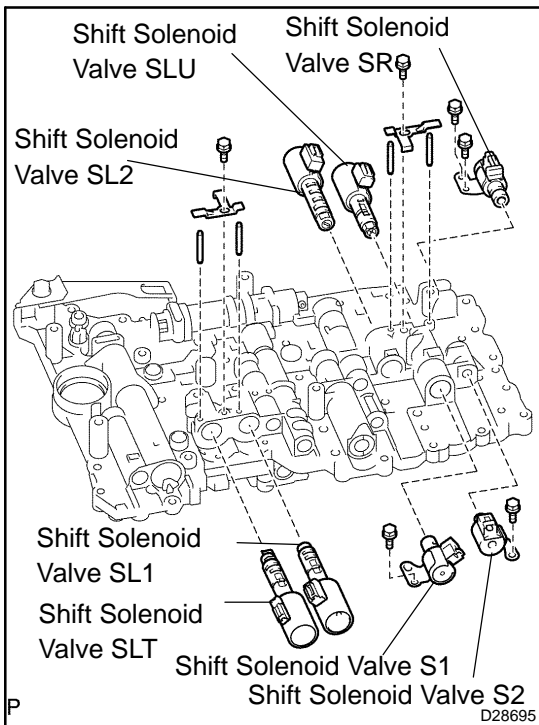
Be careful as some fluid will come out of the oil strainer.

**4. SEPARATE TRANSMISSION WIRE**

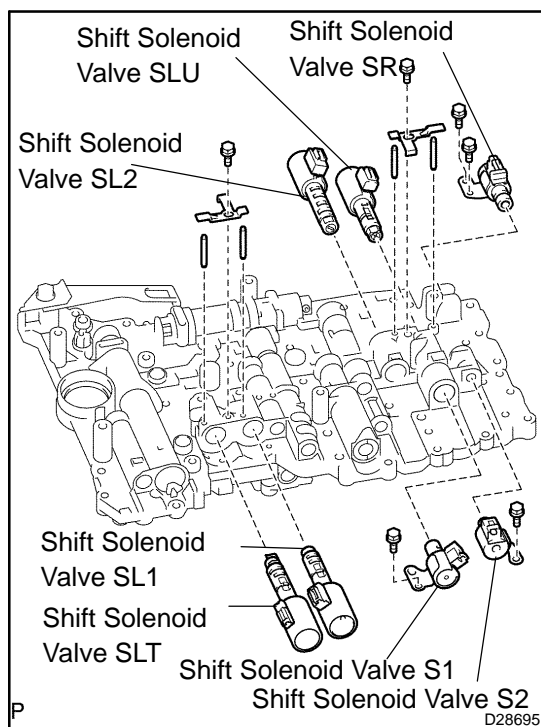
- (a) Remove the bolt and clamp.
- (b) Disconnect the ATF temperature sensor.
- (c) Disconnect the 7 connectors from the solenoid valves.

**5. REMOVE TRANSMISSION VALVE BODY ASSY**

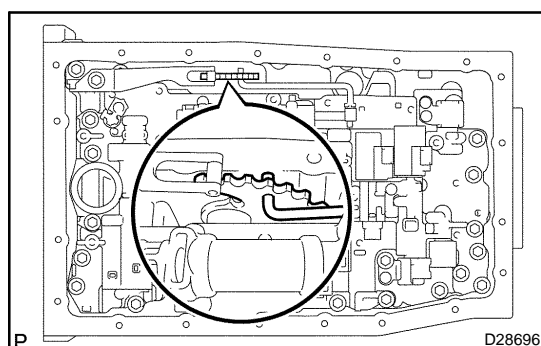
- (a) Remove the 19 bolts and valve body.
- (b) Remove the 3 drum seal gaskets.



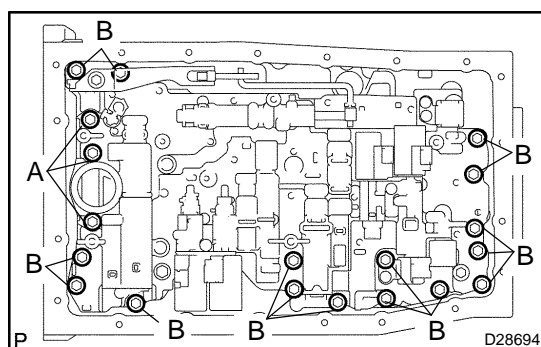
- (c) Remove the bolt, lock plate, pin and shift solenoid valve SLT and SL1.
- (d) Remove the bolt, lock plate, pin and shift solenoid valve SLU and SL2.
- (e) Remove the 2 bolts and shift solenoid valve SR.
- (f) Remove the bolt and shift solenoid valve S1.
- (g) Remove the bolt and shift solenoid S2.

**6. INSTALL TRANSMISSION VALVE BODY ASSY**

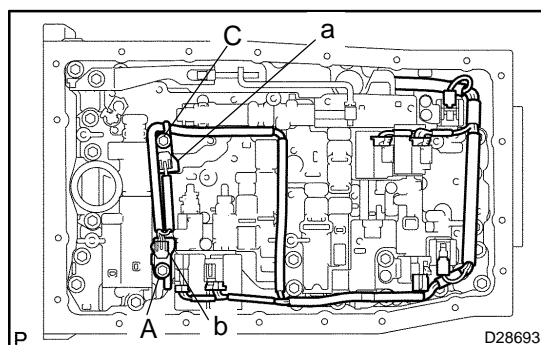
- (a) Install the shift solenoid valve S2 with the bolt.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
- (b) Install the shift solenoid valve S1 with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)
- (c) Install the shift solenoid valve SR with the 2 bolts.
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)
- (d) Install the shift solenoid valve SLU and SL2 with the pin, lock plate and bolt.
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)
- (e) Install the shift solenoid valve SLT and SL1 with the pin, lock plate and bolt.
Torque: 6.4 N·m (65 kgf·cm, 56 in·lbf)



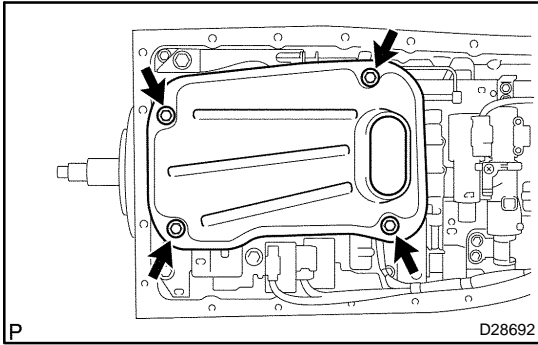
- (f) Align the groove of the manual valve to pin of the lever.



- (g) Install the 19 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt length:
Bolt A: 36 mm (1.42 in.)
Bolt B: 25 mm (0.98 in.)

**7. INSTALL TRANSMISSION WIRE**

- (a) Connect the 7 connectors to the solenoid valves.
- (b) Install the clamp with the bolt.
Torque:
A: 11 N·m (110 kgf·cm, 8 in·lbf)
C: 10 N·m (100 kgf·cm, 7 in·lbf)
- (c) Connect the ATF temperature sensor.
Wiring color:
a: Orange
b: Blue

**8. INSTALL VALVE BODY OIL STRAINER ASSY**

- (a) Install the a new O-ring and oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

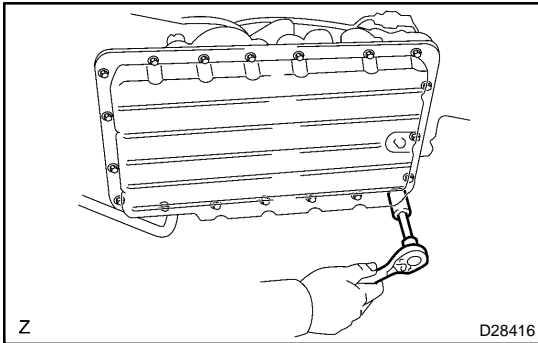
9. INSTALL AUTOMATIC TRANSMISSION OIL PAN SUB-ASSY**HINT:**

Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.

- (a) Install a new gasket and oil pan sub-assy.

- (b) Install the oil pan with the 20 bolts.

Torque: 4.4 N·m (45 kgf·cm, 39 in·lbf)

**10. ADD AUTOMATIC TRANSMISSION FLUID (See page 40-2)****11. INSPECT AUTOMATIC TRANSMISSION FLUID (See page 40-2)**

SHIFT LOCK SYSTEM

40082-09

ON-VEHICLE INSPECTION

1. CHECK SHIFT LOCK OPERATION

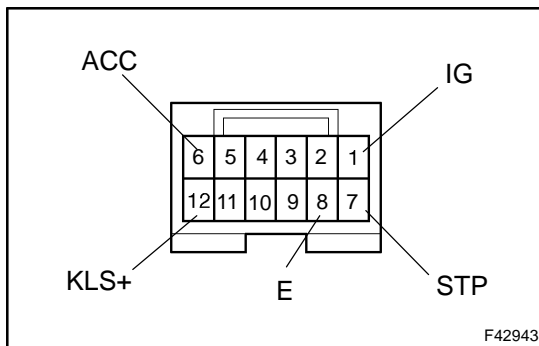
- (a) Shift the shift lever to P position.
- (b) Turn the ignition switch to LOCK.
- (c) Check that the shift lever cannot be shifted to any other positions than P.
- (d) Turn the ignition switch ON, depress the brake pedal and check that the shift lever can be shifted to any other positions.

2. CHECK SHIFT LOCK RELEASE LINK OPERATION

- (a) Using a small screwdriver, remove the shift lever cap.
- (b) When operating the shift lever with the shift lock release link pressed, check that the lever can be shifted to any position other than P.

3. CHECK KEY INTERLOCK OPERATION

- (a) Turn the ignition switch ON.
- (b) Depress the brake pedal and shift the shift lever to any other position than P.
- (c) Check that the ignition key cannot be turned to LOCK.
- (d) Shift the shift lever to P position, turn the ignition key to LOCK and check that the ignition key can be removed.



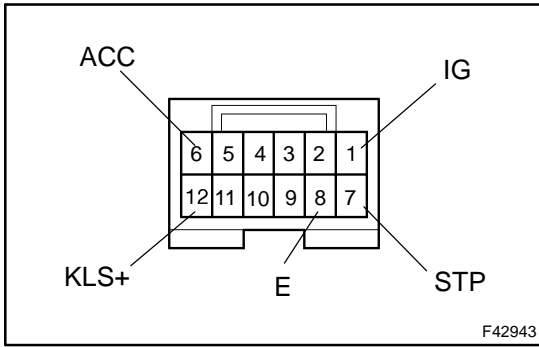
4. INSPECT SHIFT LOCK CONTROL ECU SUB-ASSY

- (a) Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control ECU connector.

Terminal	Measuring Condition	Voltage (V)
1 (KLS+) - 7 (E)	(1) Ignition switch ACC and P position	0
	(2) Ignition switch ACC and except P position	7.5 - 11
	(3) Ignition switch ACC and except P position (After approx. 1 second)	6 - 9
4 (ACC) - 7 (E)	Ignition switch ON	10 - 14
	Ignition switch ACC	10 - 14
	Ignition switch OFF	0
9 (STP) - 7 (E)	Depress brake pedal	10 - 14
	Release brake pedal	0
5 (IG) - 7 (E)	Ignition switch ON	10 - 14
	Ignition switch OFF	0



(b) Using an ohmmeter, measure the resistance at terminal E (7) and body ground.

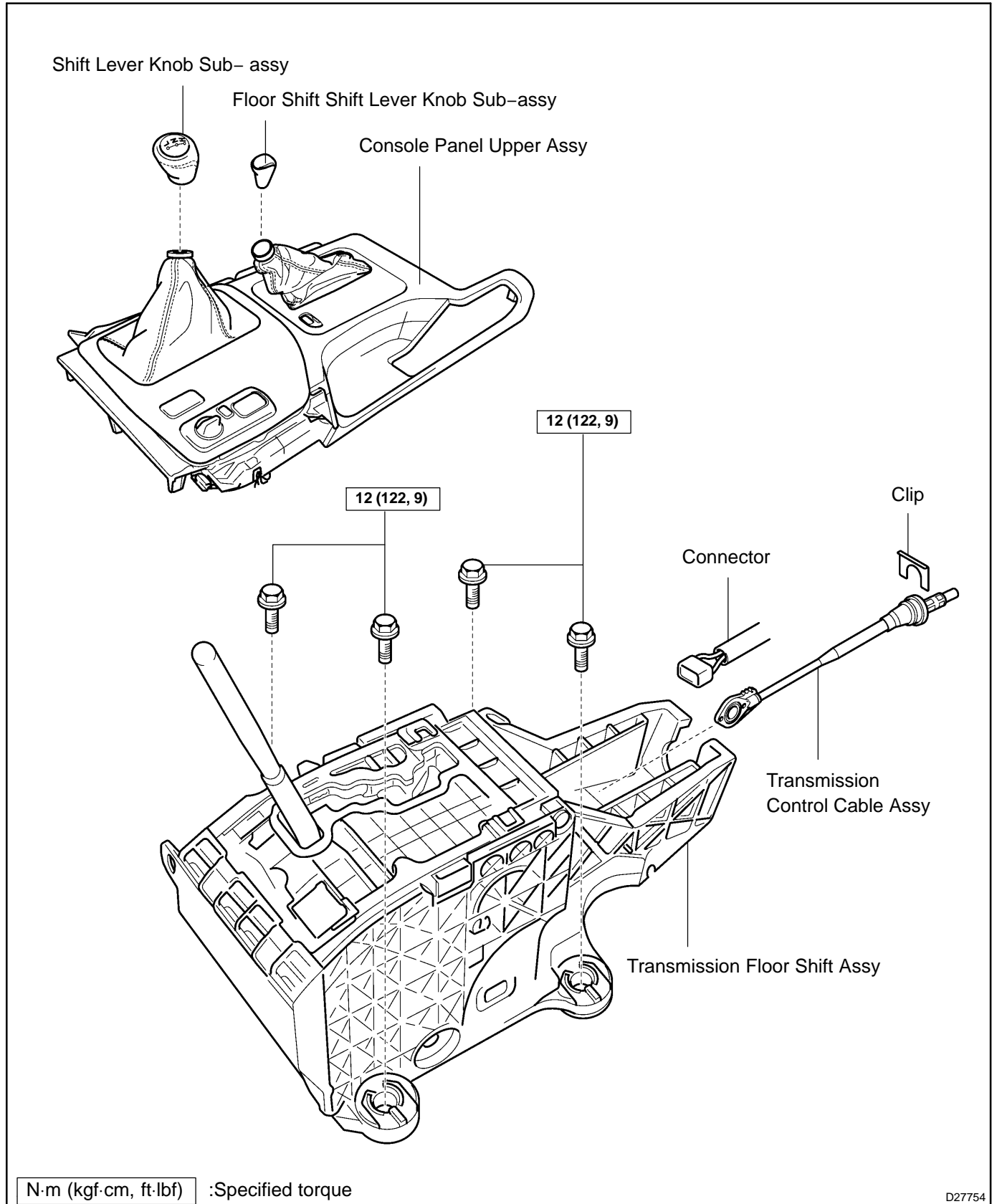
HINT:

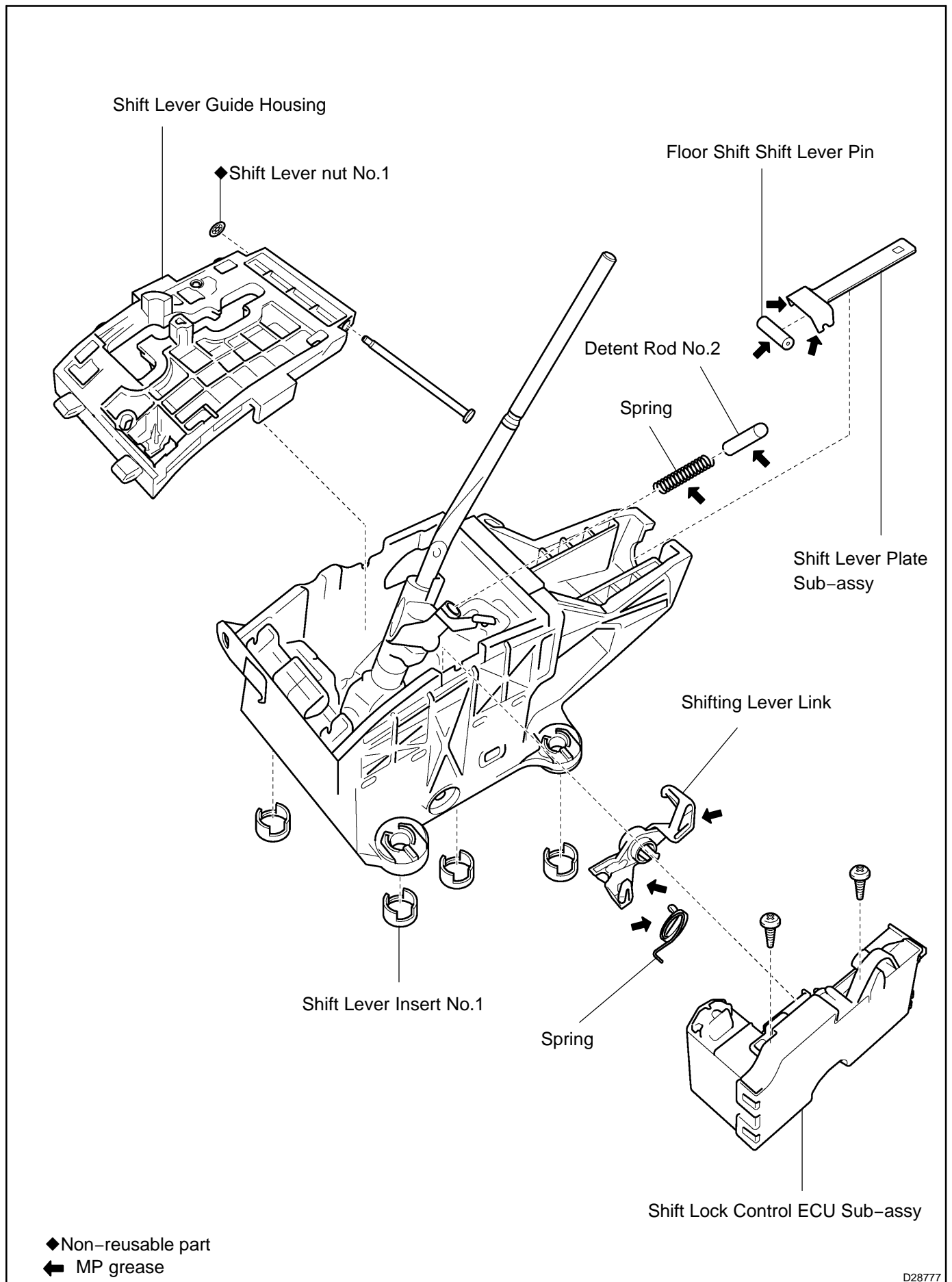
Do not disconnect the shift lock control ECU connector.

Terminal	Measuring Condition	Specified Value
7 (E) - Body ground	Always	Continuity

FLOOR SHIFT ASSY COMPONENTS

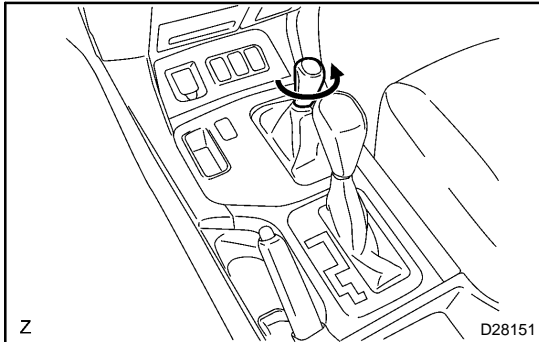
400Y0-03





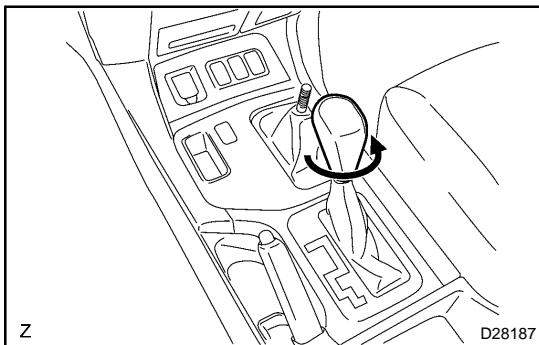
OVERHAUL

1. SEPARATE BATTERY NEGATIVE TERMINAL



2. REMOVE SHIFT LEVER KNOB SUB-ASSY

- (a) Remove the shift lever knob sub-assy.



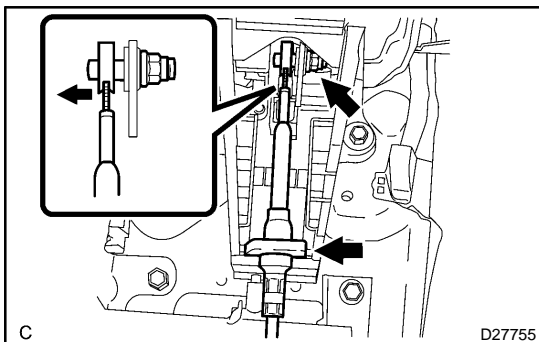
3. REMOVE SHIFT LEVER KNOB SUB-ASSY

- (a) Remove the floor shift shift lever knob sub-assy.

4. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)

5. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)

6. REMOVE CONSOLE PANEL UPPER ASSY (See page 71-13)



7. SEPARATE TRANSMISSION CONTROL CABLE ASSY

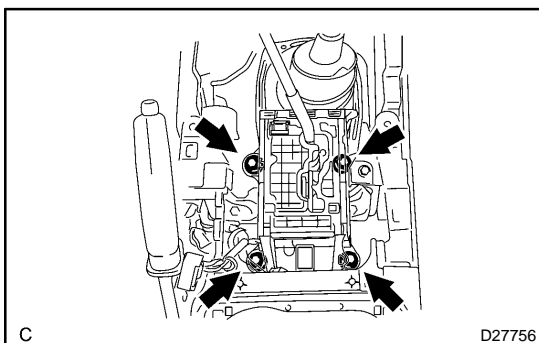
- (a) Remove the clip and separate the transmission control cable assy from the shift lever assy.

HINT:

When the transmission control cable end is pressed, it can be removed from the floor shift lever.

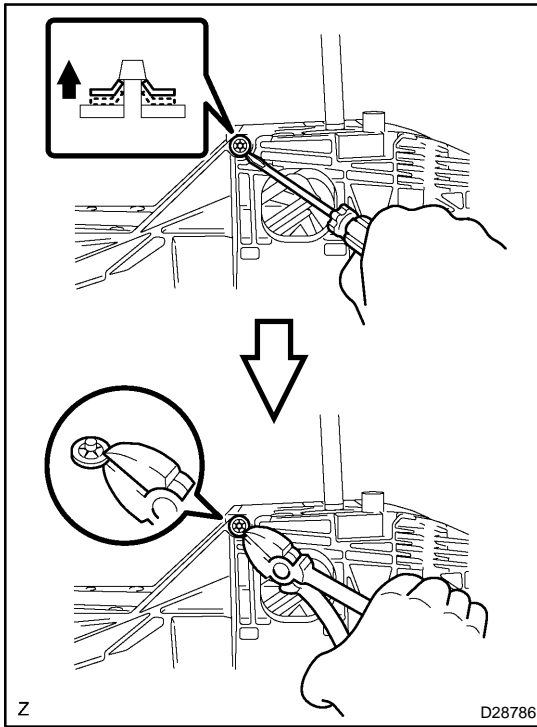
NOTICE:

The nut may be loosened (up to approx.1 mm), however, never remove it.

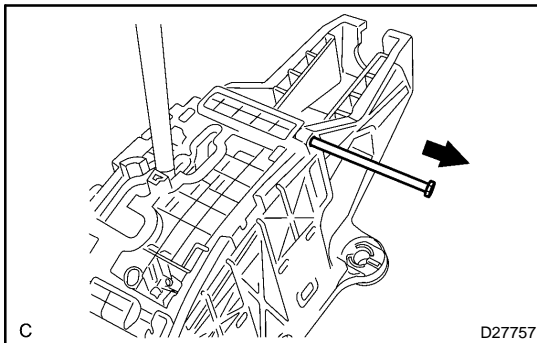


8. REMOVE TRANSMISSION FLOOR SHIFT ASSY

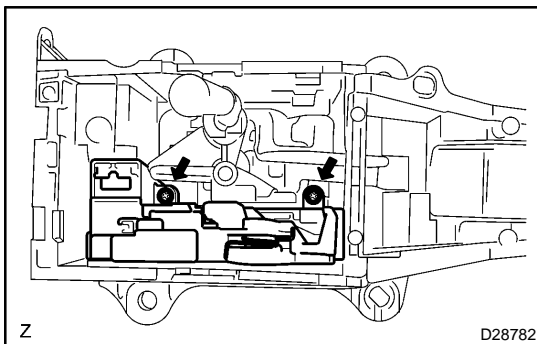
- (a) Disconnect the connector.
 (b) Remove the 4 bolts.
 (c) Remove the transmission floor shift assy.

**9. REMOVE SHIFT LEVER GUIDE HOUSING**

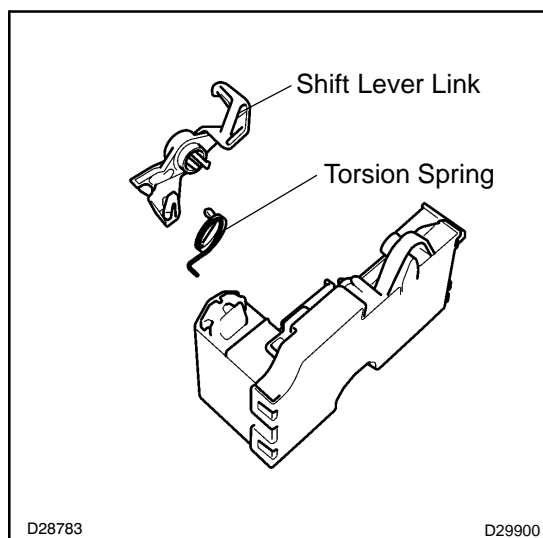
- (a) Using a screwdriver, pry up the shift lever nut No.1.



- (b) Using a screwdriver, pry up the floor shift lever lock pin.
 (c) Remove the shift lever guide housing.

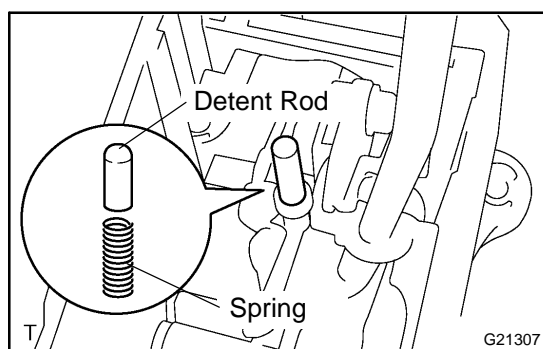
**10. REMOVE SHIFT LOCK CONTROL ECU SUB-ASSY**

- (a) Remove the 2 screws and shift lock control ECU sub-assy.



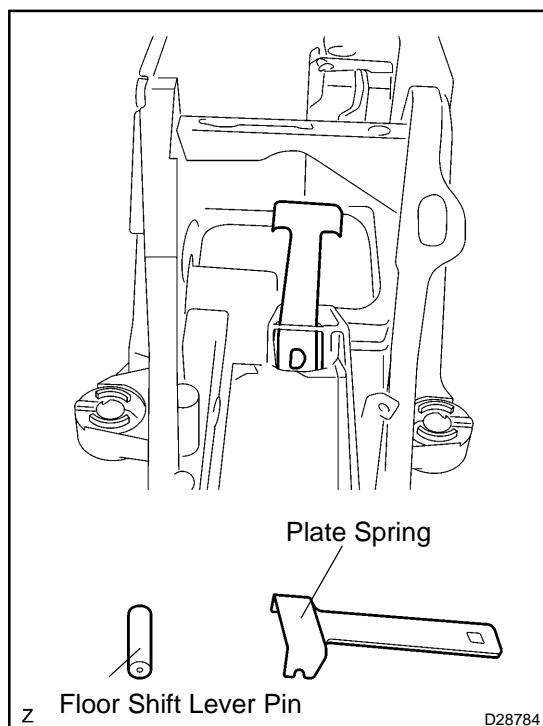
11. REMOVE SHIFTING LEVER LINK

- (a) Remove the shift lever link and torsion spring from the shift lock control ECU sub-assy.

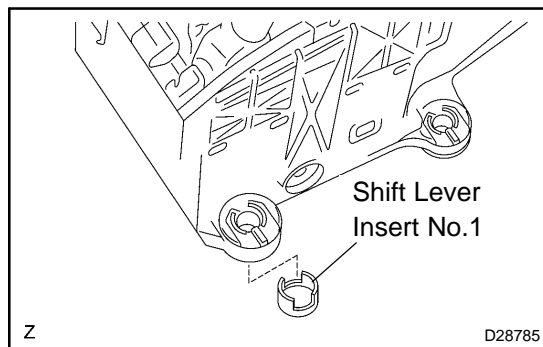


12. REMOVE FLOOR SHIFT SHIFT LEVER PIN

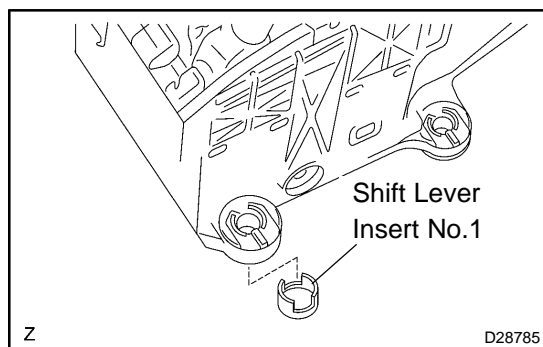
- (a) Remove the detent rod No.2 and spring from control shift lever.



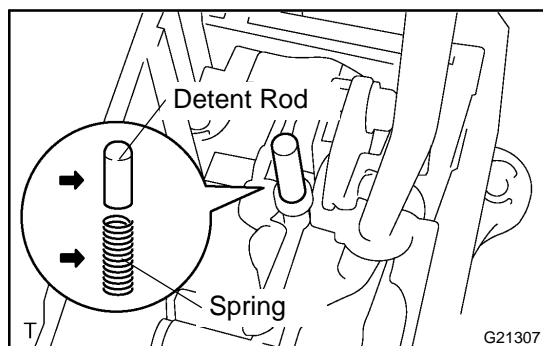
- (b) Remove the plate spring and floor shift shift lever pin from the shift lever plate sub-assy.

**13. REMOVE SHIFT LEVER INSERT NO.1**

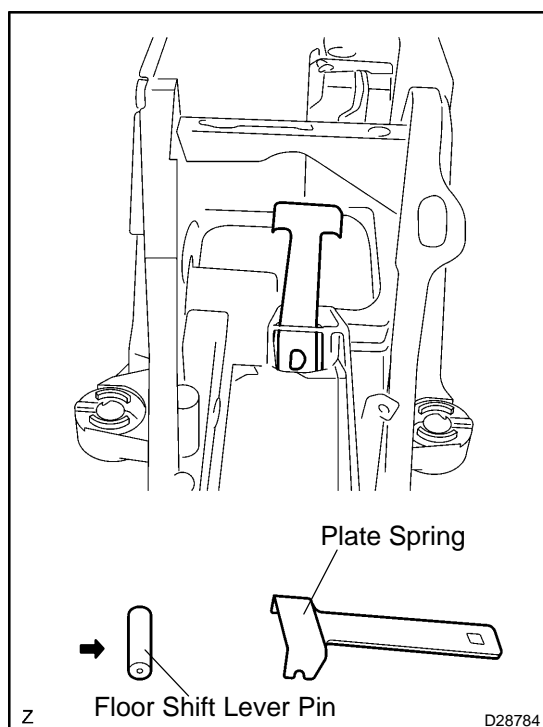
- (a) Remove the shift lever insert No.1 from the floor shift assy.

**14. INSTALL SHIFT LEVER INSERT NO.1**

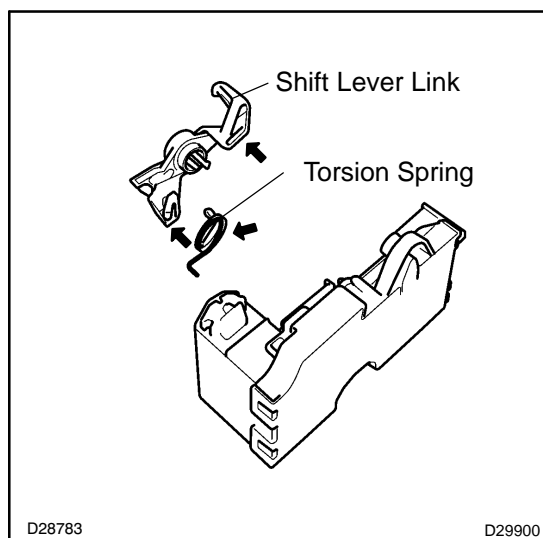
- (a) Install the shift lever insert No.1 to the floor shift assy.

**15. INSTALL FLOOR SHIFT SHIFT LEVER PIN**

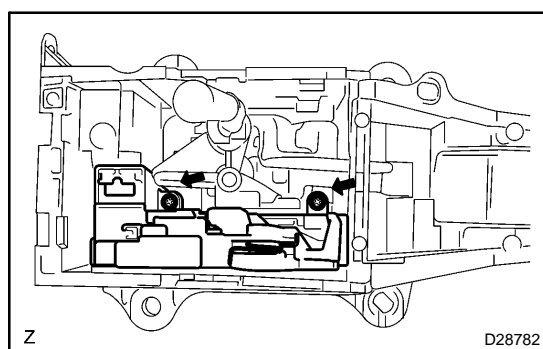
- (a) Apply MP grease to the detent rod No.2 and spring.
 (b) Install the detent rod No. 2 and spring on the control shift lever.



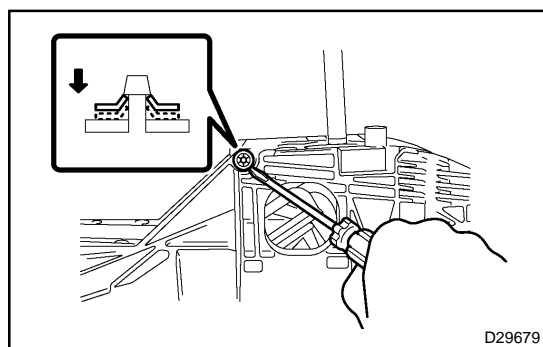
- (c) Apply MP grease to the floor shift shift lever pin.
 (d) Install the floor shift shift lever pin on the plate spring.

**16. INSTALL SHIFTING LEVER LINK**

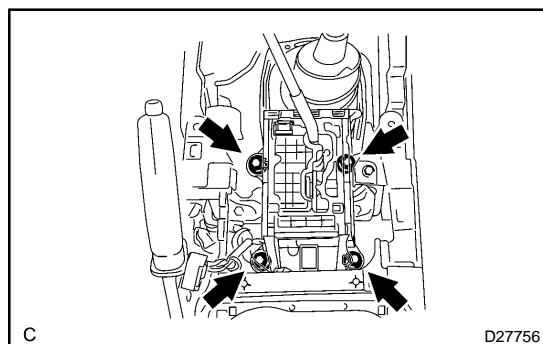
- (a) Apply MP grease to the shift lever link and torsion spring.
- (b) Install the shift lever link and torsion spring on the shift lock control ECU sub-assy.

**17. INSTALL SHIFT LOCK CONTROL ECU SUB-ASSY**

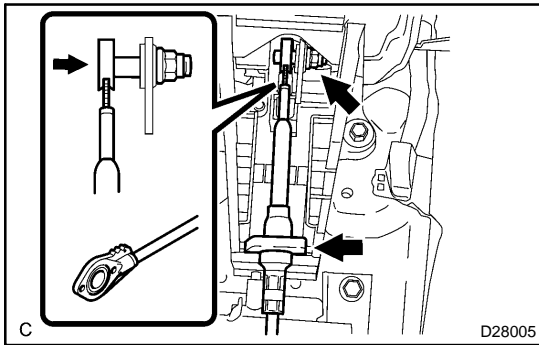
- (a) Install the shift lock control ECU sub-assy with the 2 screws.

**18. INSTALL SHIFT LEVER GUIDE HOUSING**

- (a) Install the shift lever guid housing with the shift lever lock pin and a new shift lever nut No.1.

**19. INSTALL TRANSMISSION FLOOR SHIFT ASSY**

- (a) Install the transmission floor shift assy with the 4 bolts.
Torque: 12 N·m (122 kgf·cm, 9.0 ft·lbf)
- (b) Connect the connector on the transmission floor shift assy.

**20. CONNECT TRANSMISSION CONTROL CABLE ASSY**

- (a) Connect the transmission control cable assy with the clip, from the floor shift lever assy.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

NOTICE:

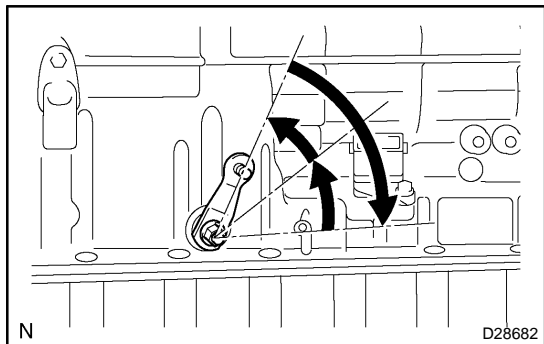
- **Protrusion facing upward.**
- **When the nut is remove, be sure to tighten the nut.**

21. **INSTALL CONSOLE PANEL UPPER ASSY**
22. **INSTALL CONSOLE UPPER PANEL GARNISH NO.2**
23. **INSTALL CONSOLE UPPER PANEL GARNISH NO.1**
24. **INSTALL SHIFT LEVER KNOB SUB-ASSY**
 - (a) Install the floor shift shift lever knob sub-assy.
25. **INSTALL SHIFT LEVER KNOB SUB-ASSY**
 - (a) Install the shift lever knob sub-assy.
26. **CONNECT BATTERY NEGATIVE TERMINAL**
27. **ADJUST SHIFT LEVER POSITION (See page 40-45)**
28. **INSPECT SHIFT LEVER POSITION (See page 40-45)**

ADJUSTMENT

1. INSPECT SHIFT LEVER POSITION

- When shift from P to R position only with ignition switch ON and depress brake pedal, make sure that the shifting lever moves smoothly and can be moderately operated.
- When starting engine, make sure that the vehicle moves forward when shifting from N to D position and moves rearward when shifting to R position.



2. ADJUST SHIFT LEVER POSITION

- Loosen the nut. (1 mm MAX)
- Be sure to position the outer lever of the transmission in N position.
- Put the shift lever in N position, and fasten the shift cable temporarily.
- Push the shift cable end into the rear side of the vehicle approx. 1 kgf of force and then fasten the shift cable completely with the specified torque.

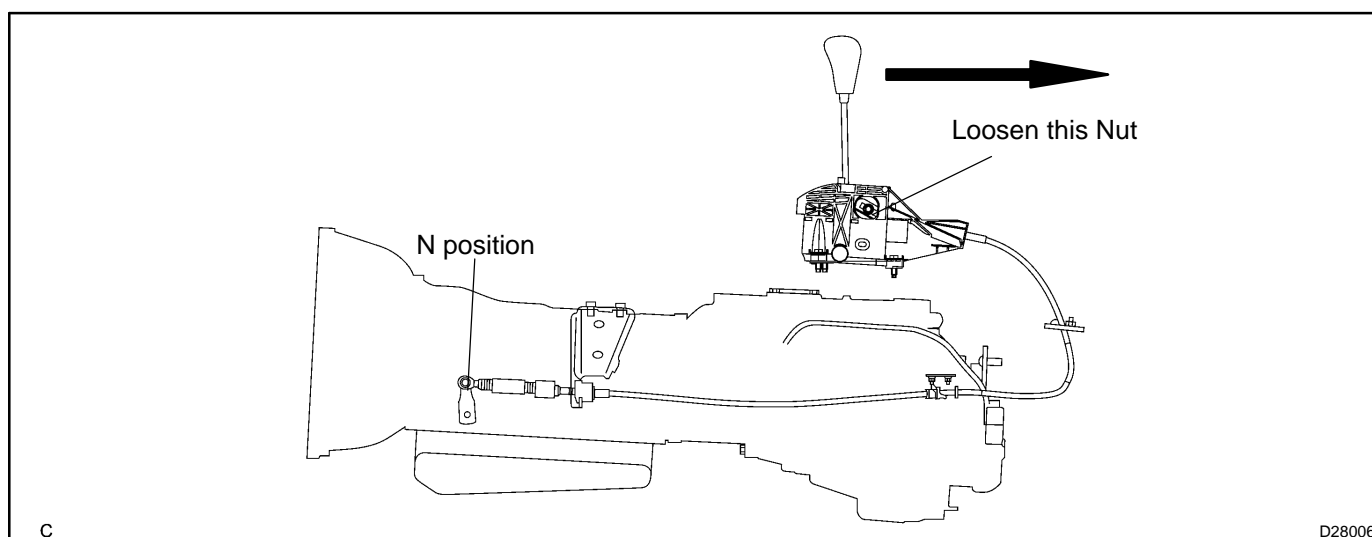
Torque: 12 N·m (122 kgf·cm, 9.0 ft·lbf)

NOTICE:

Put the shift lever in N position, and check that shifting to D position has less looseness than shifting it to P position.

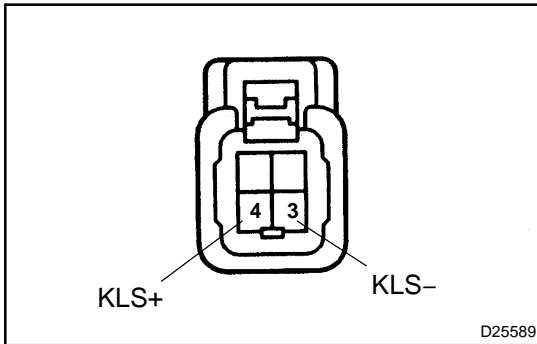
HINT:

- Hands can be released after pushing into the shift cable end.
- Perform the final fastening so as not to move the shift cable as much as possible.



KEY INTER LOCK SOLENOID INSPECTION

40085-09



1. INSPECT KEY INTER LOCK SOLENOID

- (a) Disconnect the solenoid connector.
- (b) Connect KLS+ (4) terminal to the batteries' positive (+) terminal, and KLS- (3) terminal to the battery negative (-) terminal, and apply about 12V between KLS+ - KLS- terminals.

Check that operation noise can be heard from the solenoid.

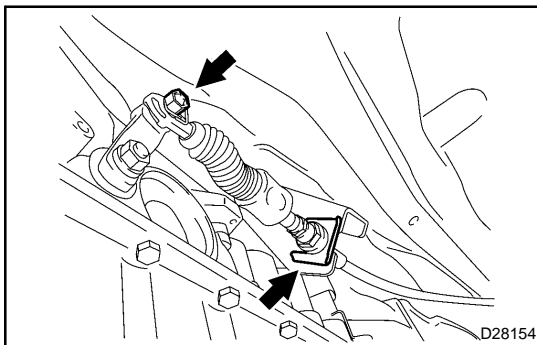
If the solenoid does not operate, replace the solenoid.

TRANSMISSION CONTROL CABLE ASSY (ATM)

REPLACEMENT

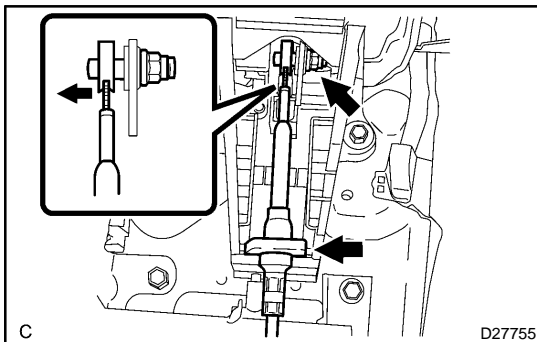
400XZ-03

1. SEPARATE BATTERY NEGATIVE TERMINAL
2. REMOVE SHIFT LEVER KNOB SUB-ASSY (See page 40-39)
3. REMOVE SHIFT LEVER KNOB SUB-ASSY (See page 40-39)
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)
6. REMOVE CONSOLE PANEL UPPER (See page 71-13)
7. REMOVE CONSOLE PANEL UPPER REAR (See page 71-13)



8. SEPARATE TRANSMISSION CONTROL CABLE ASSY

- (a) Remove the nut and clip, separate the transmission control cable assy from the transmission control cable bracket.



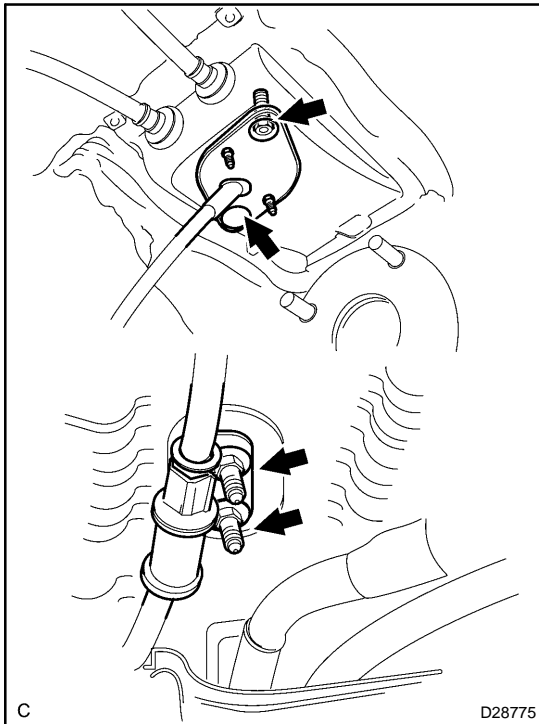
- (b) Remove clip, separate the transmission control cable assy from the floor shift lever assy.

HINT:

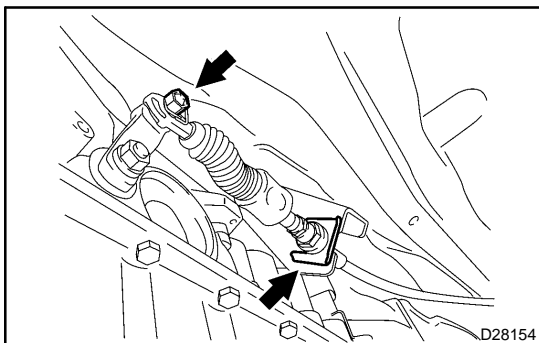
When the transmission control cable end is pressed, it can be removed from the floor shift lever.

NOTICE:

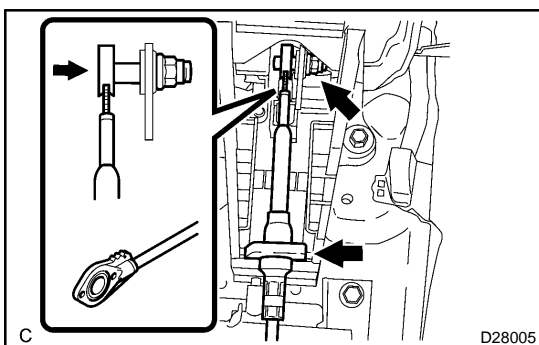
The nut may be loosened (up to approx. 1 mm), however, never remove it.



- 9. REMOVE TRANSMISSION CONTROL CABLE ASSY**
 (a) Remove the 4 nuts and pull out the transmission control cable assy.



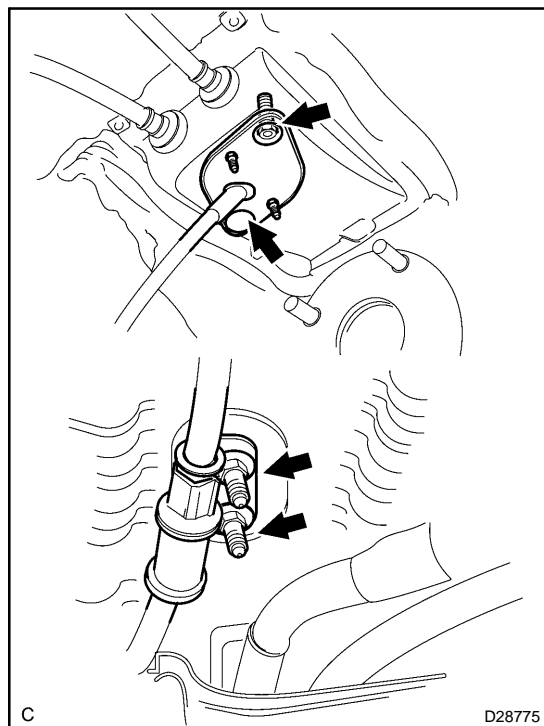
- 10. INSTALL TRANSMISSION CONTROL CABLE ASSY**
 (a) Connect the transmission control cable assy with the nut and clip from the transmission control cable bracket.
 (b) Pull in the transmission control cable assy to the body.



- (c) Connect the transmission control cable assy with the nut clip, from the floor shift lever assy.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

NOTICE:

- **Protrusion facing upward.**
- **When the nut is remove, be sure to tighten the nut.**



- (d) Install the transmission control cable assy with the 4 nuts.
Torque: 5.0 N·m (51 kgf·cm, 40 in.-lbf)

11. **INSTALL CONSOLE PANEL UPPER REAR**
12. **INSTALL CONSOLE PANEL UPPER**
13. **INSTALL CONSOLE UPPER PANEL GARNISH NO.1**
14. **INSTALL CONSOLE UPPER PANEL GARNISH NO.2**
15. **INSTALL SHIFT LEVER KNOB SUB-ASSY (See page 40-39)**
16. **INSTALL SHIFT LEVER KNOB SUB-ASSY (See page 40-39)**
17. **ADJUST SHIFT LEVER POSITION (See page 40-45)**
18. **INSPECT SHIFT LEVER POSITION (See page 40-45)**

STEERING

5002J-11

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

- (a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.

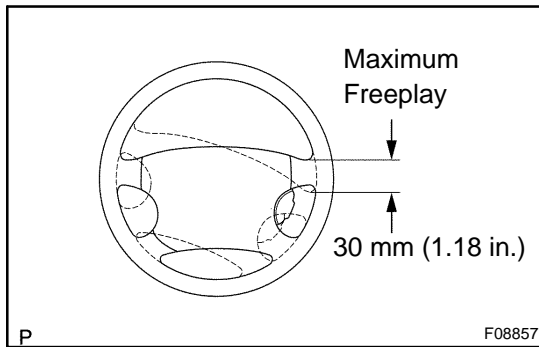
2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

- (a) The vehicle is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the supplemental restraint system (See page [60-1](#)).

PROBLEM SYMPTOMS TABLE

Use the table below to help find the cause of the problem. The numbers indicate the likelihood of the cause of the problem in the descending order. Repair or replace these parts as necessary.

Symptom	Suspected Area	See page
Hard steering	1. Tires (Improperly inflated)	28-1
	2. Power steering fluid level (Low)	51-3
	3. Drive belt (Loose)	51-3
	4. Front wheel alignment (Incorrect)	26-7
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	26-21
	7. Steering column (Binding)	-
	8. Power steering vane pump	51-9
	9. Power steering gear	51-19
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-7
	3. Steering column (Binding)	-
	4. Power steering gear	51-19
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	26-21
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Power steering gear	51-19
Abnormal noise	1. Power steering fluid level (Low)	51-3
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	51-9
	4. Power steering gear	51-19

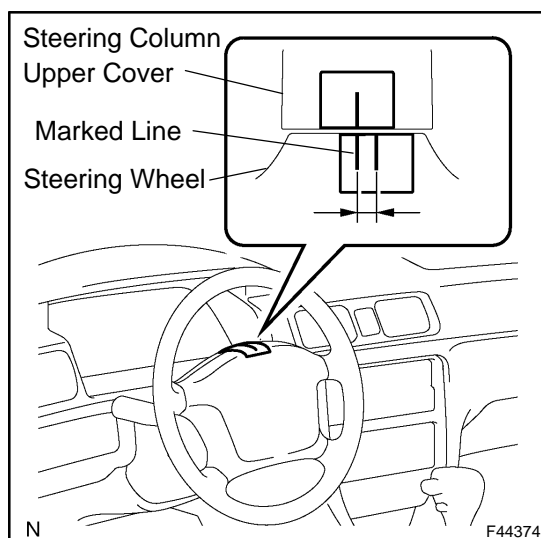
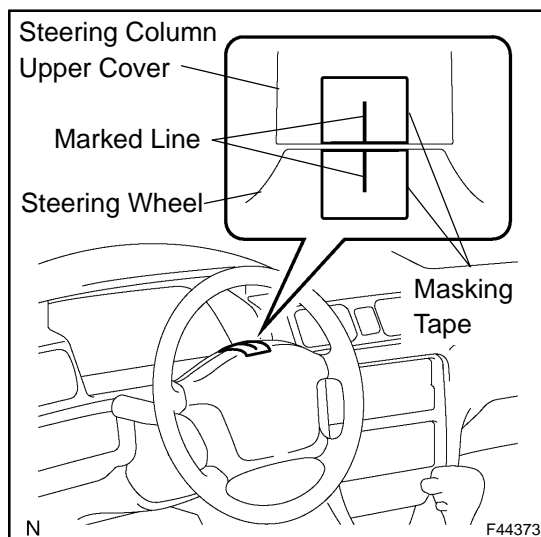
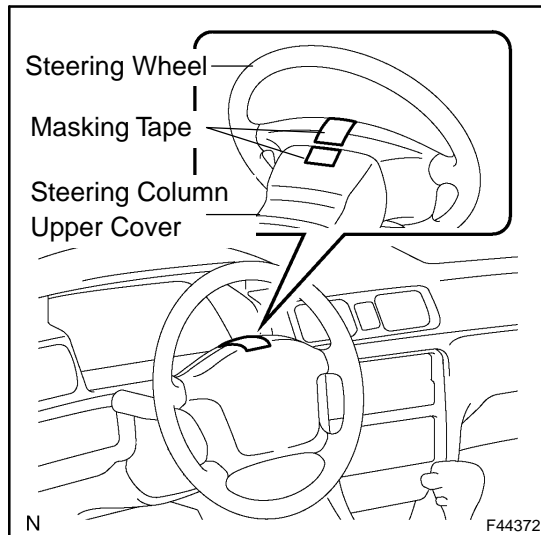


ON-VEHICLE INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

- (a) Park the vehicle and face the tires straight ahead.
- (b) Rock the steering wheel gently left and right with your hand, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)



REPAIR

1. STEERING OFF CENTER REPAIR PROCEDURE

- (a) Inspect steering wheel off center.
- (1) Apply masking tape on the top center of the steering wheel and steering column upper cover.
 - (2) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.

- (3) Draw a line on the masking tape as shown in the illustration.

- (4) Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

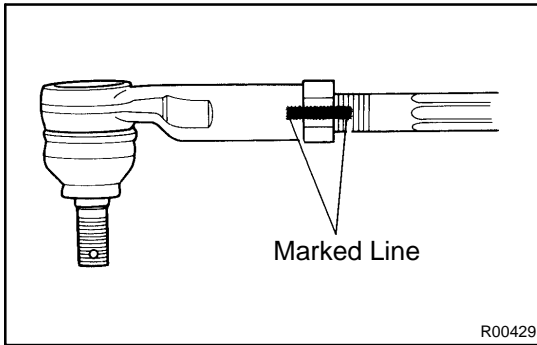
- (5) Draw a new line on the masking tape or the steering wheel as shown in the illustration.
- (6) Measure the distance between the 2 lines on the masking tape of the steering wheel.
- (7) Convert the measured distance to steering angle.

Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 deg.

HINT:

Make a note of the steering angle.

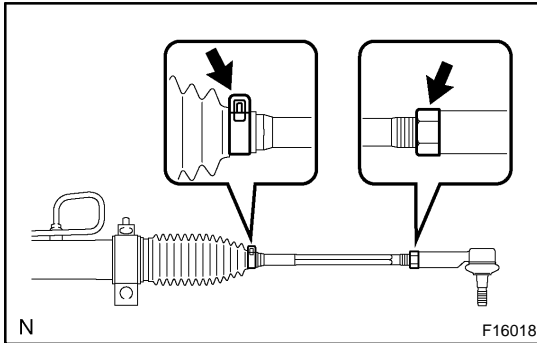
- (b) Adjust steering angle.



- (1) Draw a line on the RH and LH tie rod and on the RH and LH rack end which can easily be seen.
- (2) Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.

HINT:

- Measure the RH side and LH side.
- Make a note of the measured values.



- (3) Remove the RH and LH boot clips from the rack boots.
- (4) Loosen the RH and LH lock nuts.
- (5) Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.

1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) – 12 deg. of steering angle.

- (6) Tighten the RH and LH lock nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

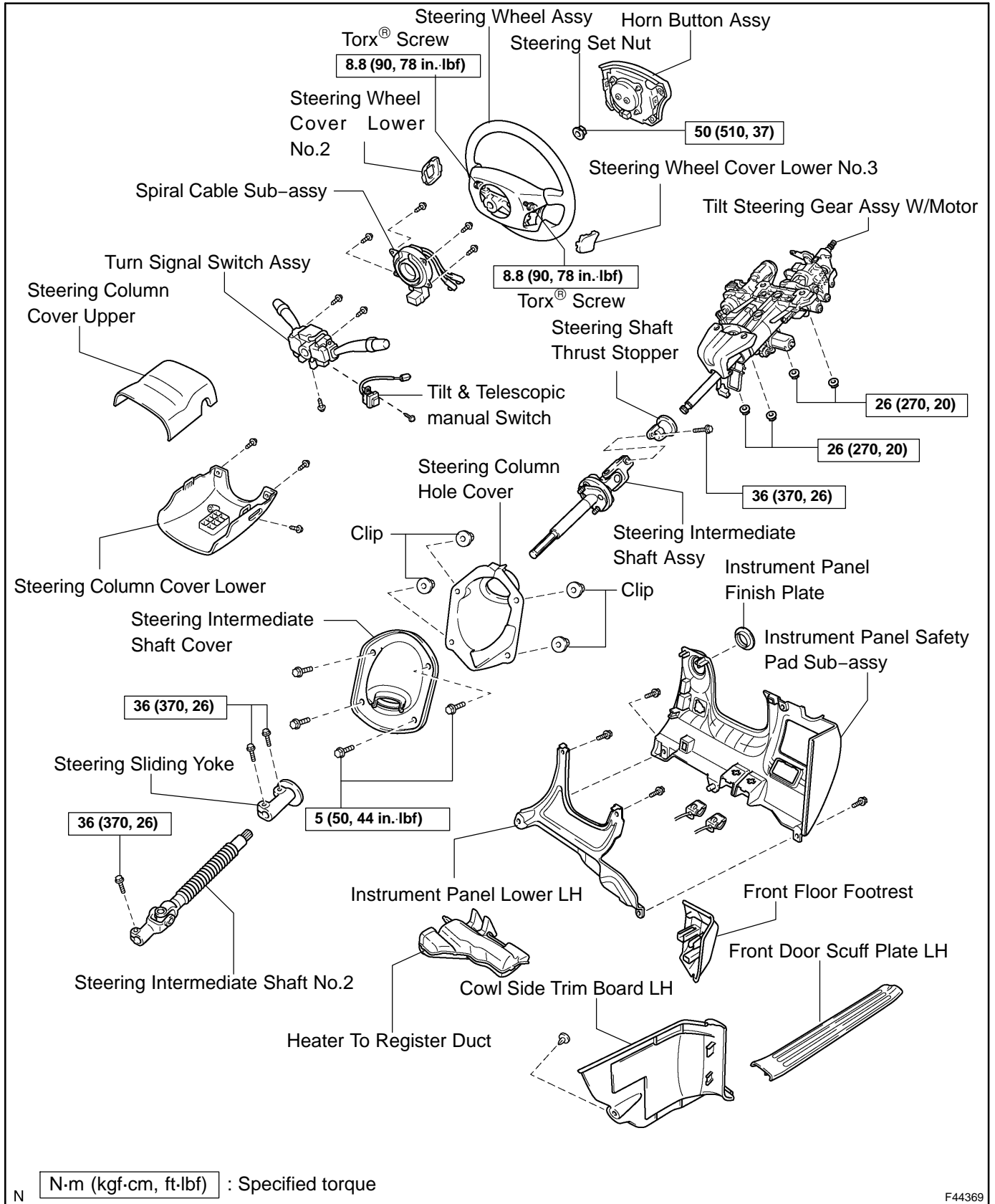
NOTICE:

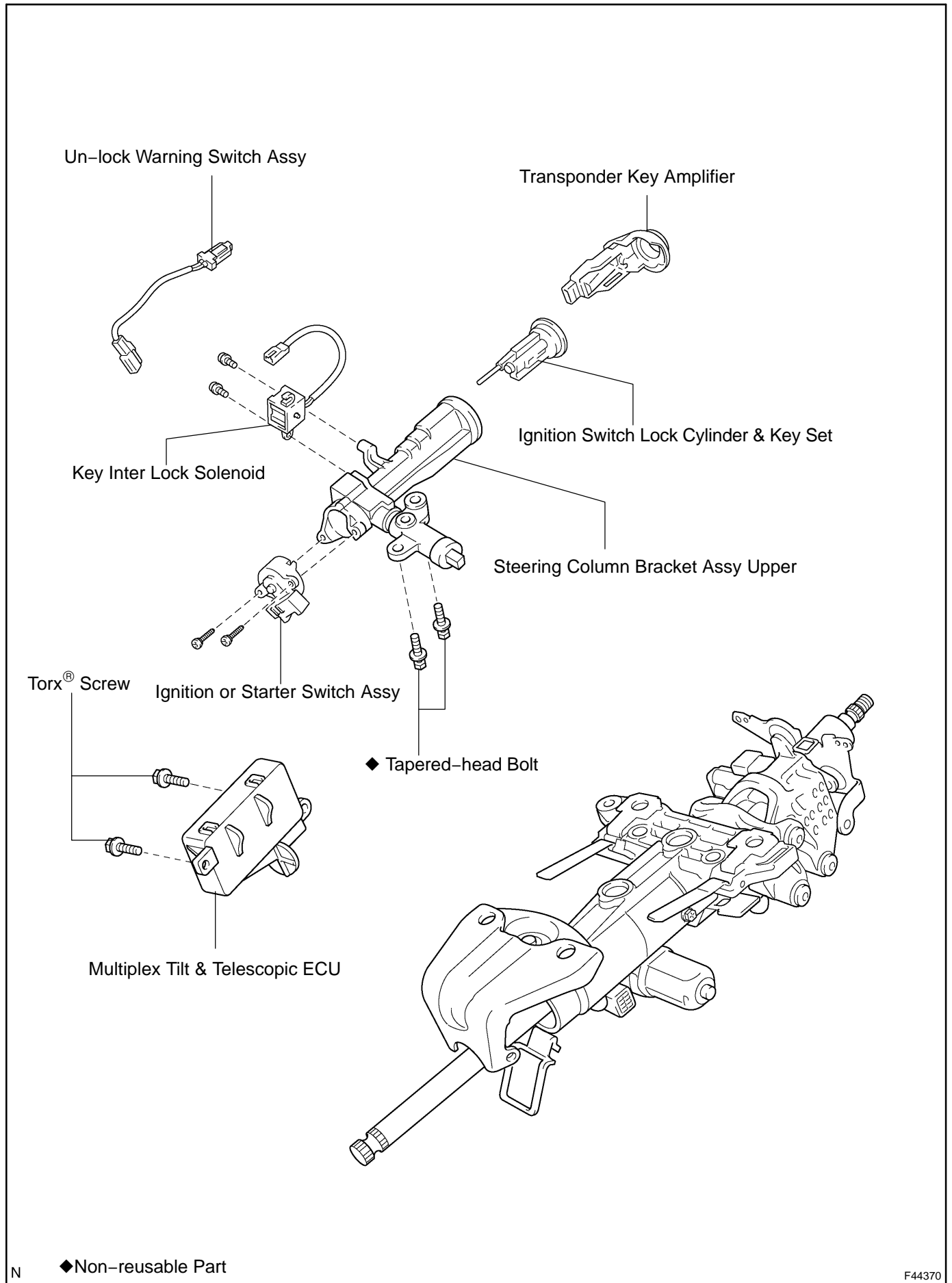
Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).

- (7) Install the RH and LH boot clips.

STEERING COLUMN ASSY COMPONENTS

5005P-03





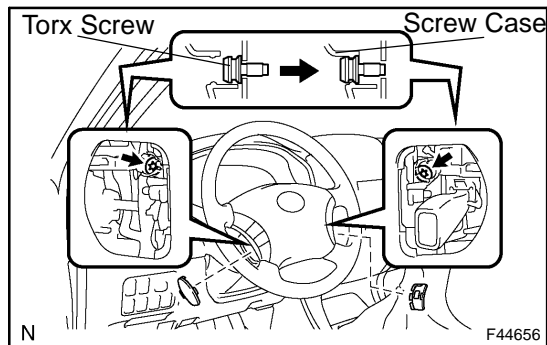
N

◆ Non-reusable Part

F44370

OVERHAUL

1. **PRECAUTION** (See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL** (See page 60-1)
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**

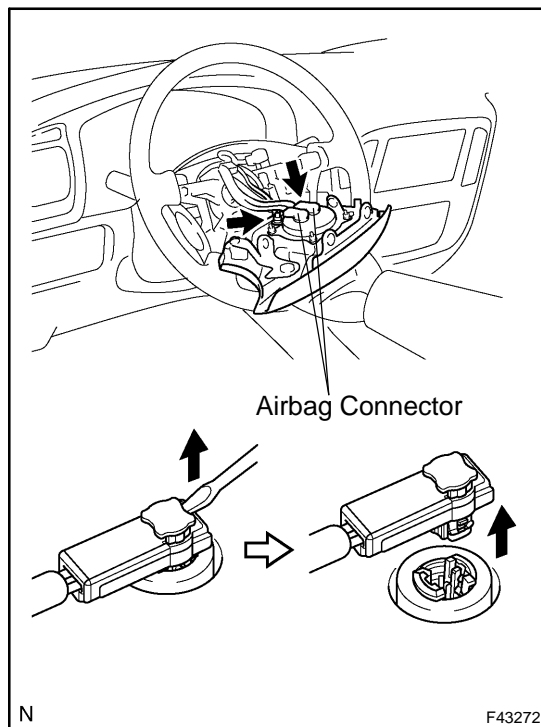


4. **REMOVE STEERING WHEEL COVER LOWER NO.3**
5. **REMOVE STEERING WHEEL COVER LOWER NO.2**
6. **REMOVE HORN BUTTON ASSY**

NOTICE:

If the airbag connector is disconnected with the ignition switch in the ON position, DTCs will be recorded.

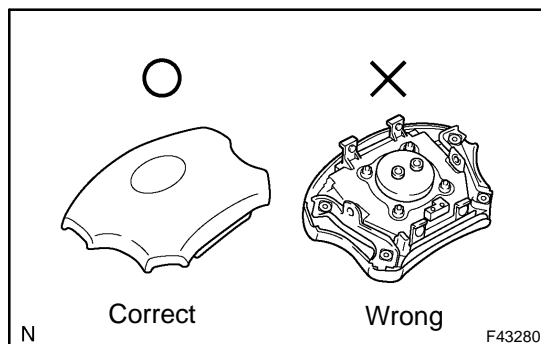
- (a) Using a torx[®] socket wrench (Torx[®] socket wrench (T=30)), loosen the 2 torx[®] screws until the groove along the screw circumference catches on the screw case.



NOTICE:

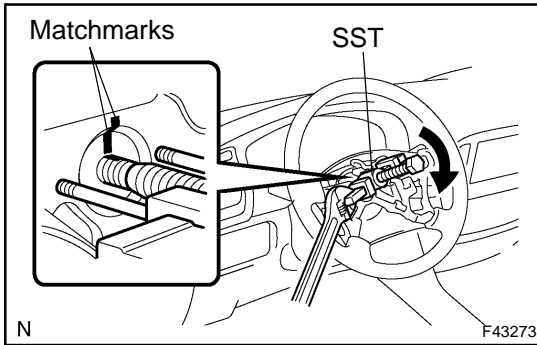
When removing the horn button assy, take care not to pull the airbag wire harness.

- (b) Pull out the horn button assy from the steering wheel assy.
- (c) Using a screwdriver, release the lock part of each of the airbag connectors and disconnect the 2 airbag connectors.
- (d) Disconnect the horn ground harness from the horn button assy.

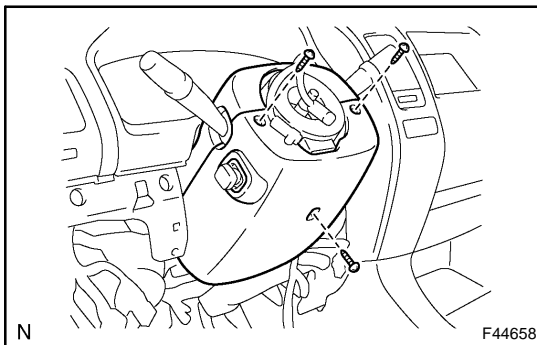


CAUTION:

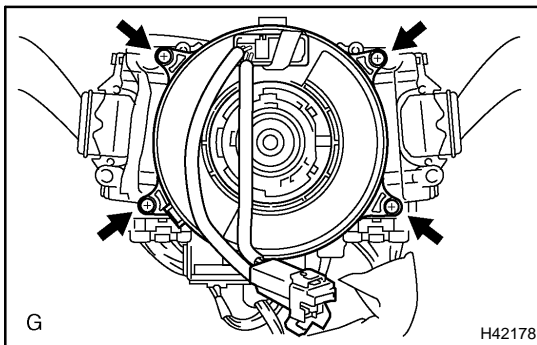
- When storing the horn button assy, keep the upper surface of the pad facing upward.
- Never disassemble the horn button assy.

**7. REMOVE STEERING WHEEL ASSY**

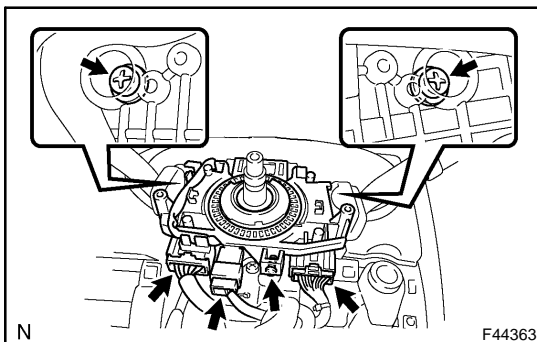
- (a) w/ Steering switch
Disconnect the steering switch connector.
- (b) Remove the steering wheel assy set nut.
- (c) Place matchmarks on the steering wheel assy and main shaft assy.
- (d) Using SST, remove the steering wheel assy.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

8. REMOVE FRONT DOOR SCUFF PLATE LH**9. REMOVE FRONT FLOOR FOOTREST****10. REMOVE COWL SIDE TRIM BOARD LH****11. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY****12. REMOVE INSTRUMENT PANEL LOWER LH****13. REMOVE SPIRAL CABLE SUB-ASSY**

- (a) Remove the 3 screws and steering column cover upper and lower.



- (b) Disconnect the 2 connectors from the spiral cable sub-assy.
- (c) Remove the 4 screws and spiral cable sub-assy.

**14. REMOVE TURN SIGNAL SWITCH ASSY**

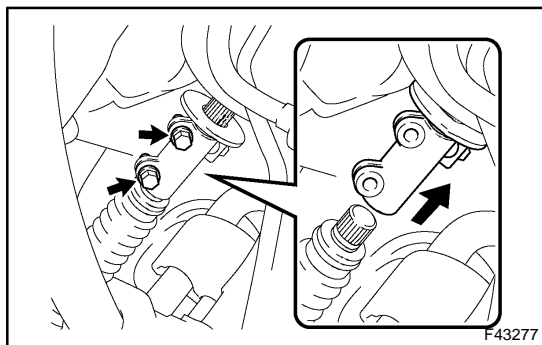
- (a) Disconnect the 3 connectors.
- (b) Remove the 3 screws and turn signal switch assy.

15. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1

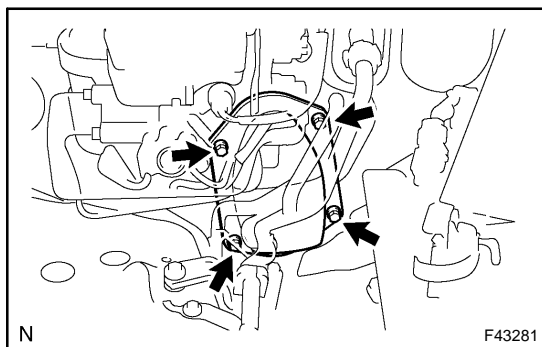
- (a) Remove the 4 bolts and engine under cover sub-assy No.1.

16. REMOVE ENGINE UNDER COVER ASSY REAR

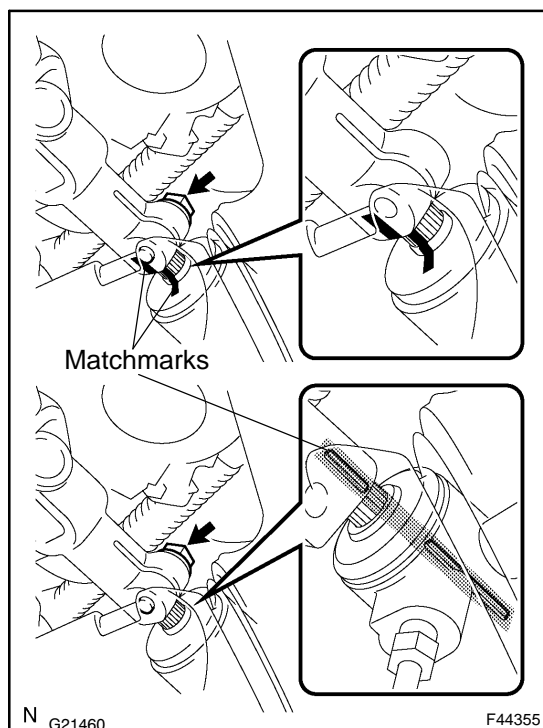
- (a) Remove the 4 bolts and engine under cover assy rear.

**17. REMOVE STEERING SLIDING YOKE**

- (a) Remove the 2 bolts from the steering sliding yoke.
 (b) Slide the steering sliding yoke up and separate it from the steering intermediate shaft sub-assy No.2.
 (c) Pull down the steering sliding yoke from the steering intermediate shaft assy to remove.

**18. REMOVE STEERING INTERMEDIATE SHAFT COVER**

- (a) Remove the 4 bolts and steering intermediate shaft cover.

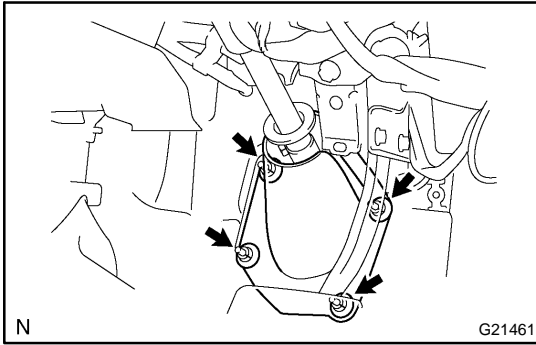
**19. REMOVE STEERING INTERMEDIATE SHAFT NO.2**

- (a) Put the matchmarks on the power steering gear assy and steering intermediate shaft sub-assy No.2.
 (b) Remove the bolt and intermediate shaft sub-assy No.2 from the power steering gear assy.

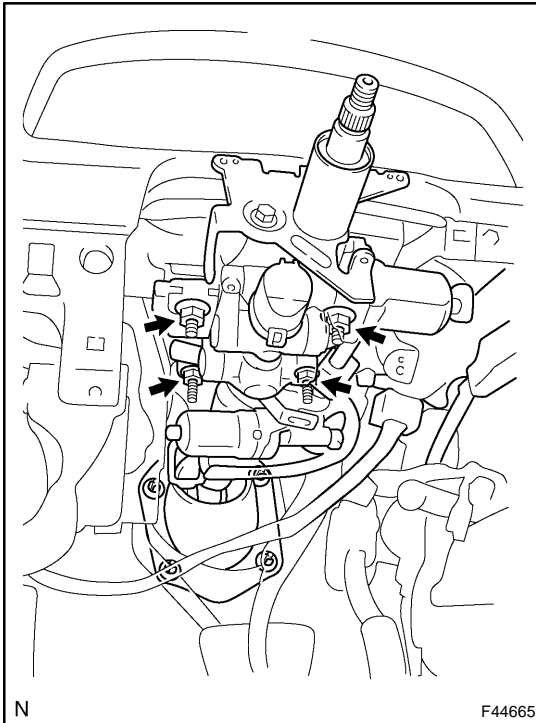
HINT:

When replacing the gear box with a new one, be sure to align the matchmarks with the protrusion to install.

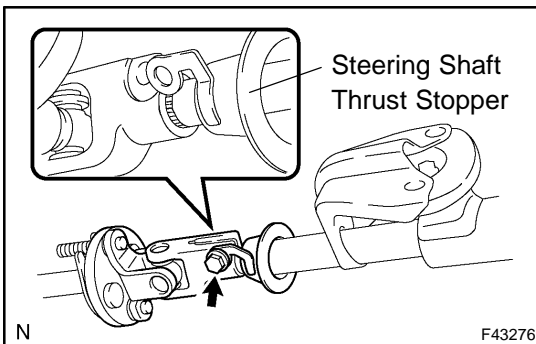
- (c) Align the notch with the protrusion of the gear box to make a matchmarks on the intermediate shaft No.2.

**20. REMOVE STEERING COLUMN HOLE COVER**

- (a) Remove the heater to register duct.
- (b) Remove the 4 clips and steering column hole cover.

**21. REMOVE TILT STEERING GEAR ASSY W/MOTOR**

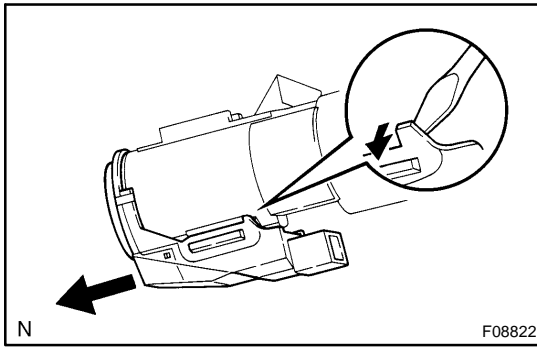
- (a) Disconnect each of the connectors from the steering column assy.
- (b) Disconnect the wire harness from the steering column assy.
- (c) Remove the 4 steering column set nuts.
- (d) Pull out the steering column assy with the intermediate shaft assy.

**22. REMOVE STEERING INTERMEDIATE SHAFT ASSY**

- (a) Remove the bolt and separate the steering shaft thrust stopper from the steering intermediate shaft assy.
- (b) Pull out the intermediate shaft assy and steering shaft thrust stopper from the tilt steering gear assy.

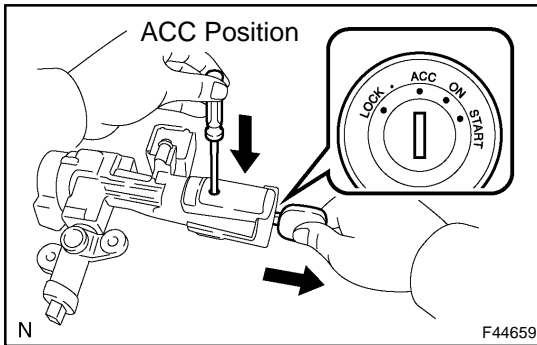
**23. REMOVE STEERING COLUMN BRACKET ASSY UPPER**

- (a) Using a 3 mm (0.12 in.) pin punch, mark the center of the 2 tapered-head bolts.
- (b) Using a 4 - 5 mm (0.12 - 0.16 in.) drill, drill a hole into the 2 tapered-head bolts.
- (c) Using a screw extractor, remove the 2 tapered-head bolts, steering column bracket assy upper, steering column upper clamp.

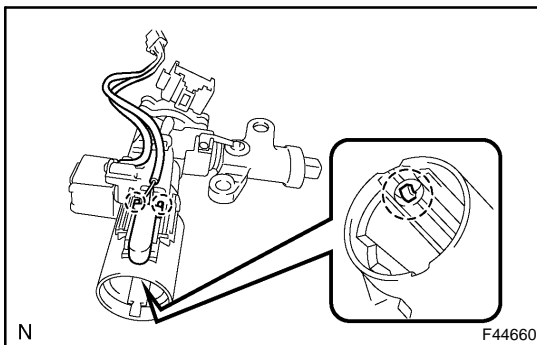
**24. REMOVE TRANSPONDER KEY AMPLIFIER****NOTICE:**

Take care not to use excessive force to prevent the case from being damaged.

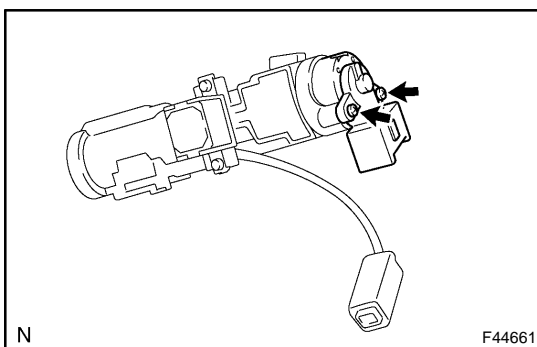
- (a) Expand the claw hung on the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.
- (b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

**25. REMOVE IGNITION SWITCH LOCK CYLINDER & KEY SET**

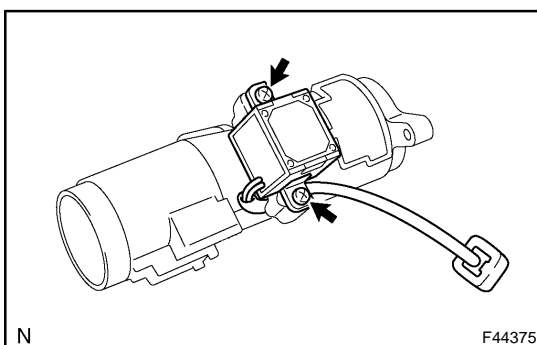
- (a) Place the ignition switch lock cylinder & key set at the ACC position.
- (b) Push down the stop pin with a screwdriver and pull out the ignition switch lock cylinder & key set.

**26. REMOVE UN-LOCK WARNING SWITCH ASSY**

- (a) Disconnect the un-lock warning switch assy connector from the ignition or starter switch assy.
- (b) Remove the un-lock warning switch assy toward the rear of the vehicle by pushing up the center part.

**27. REMOVE IGNITION OR STARTER SWITCH ASSY**

- (a) Remove the 2 screws and ignition or starter switch assy from the steering column bracket assy upper.

**28. REMOVE KEY INTER LOCK SOLENOID**

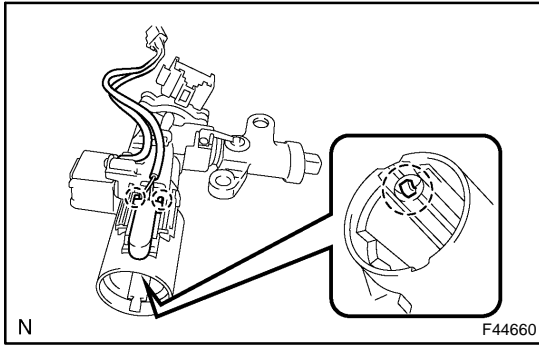
- (a) Remove the 2 screws and key inter lock solenoid from the steering column bracket assy upper.

29. INSTALL KEY INTER LOCK SOLENOID

- (a) Install the key inter lock solenoid to the steering column bracket assy upper with 2 screws.

30. INSTALL IGNITION OR STARTER SWITCH ASSY

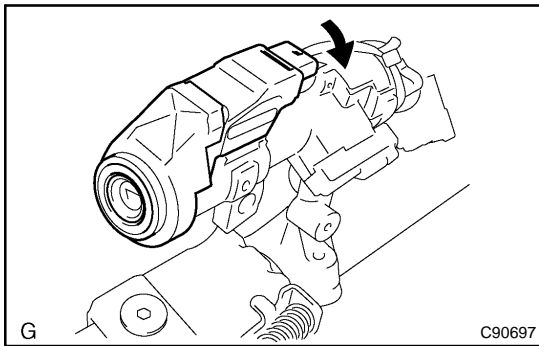
- (a) Install the ignition or starter switch assy to the steering column bracket assy upper with 2 screws.

**31. INSTALL UN-LOCK WARNING SWITCH ASSY**

- (a) Install the un-lock warning switch assy to the steering column bracket assy upper.
- (b) Connect the un-lock warning switch assy connector to the ignition or starter switch assy.

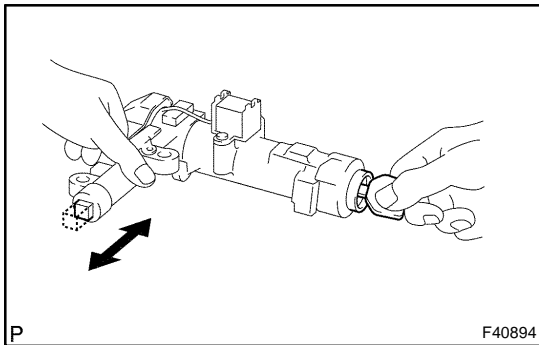
32. INSTALL IGNITION SWITCH LOCK CYLINDER & KEY SET

- (a) Make sure that the ignition switch lock cylinder assy is at the ACC position.
- (b) Install the ignition switch lock cylinder assy.

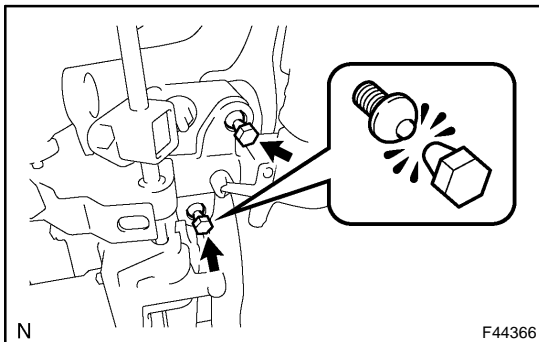
**33. INSTALL TRANSPONDER KEY AMPLIFIER****NOTICE:**

Take care not to push the amplifier up with excessive force to prevent it from being damaged.

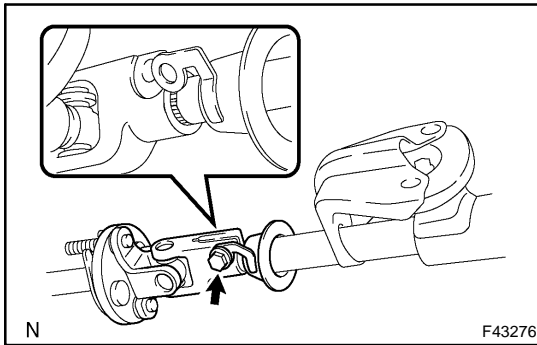
- (a) Align the transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.
- (b) Push up the transponder key amplifier and connect it to the upper bracket.

**34. INSPECT STEERING LOCK OPERATION**

- (a) Check that the steering mechanism is activated when removing the key.
- (b) Check that the steering mechanism is deactivated when inserting the key and turning it to the ACC position.

**35. INSTALL STEERING COLUMN BRACKET ASSY UPPER**

- (a) Temporarily install the steering column bracket assy upper and steering column upper clamp with the 2 new tapered-head bolts.
- (b) Tighten the 2 tapered-head bolts until the bolt heads break off.

**36. INSTALL STEERING INTERMEDIATE SHAFT ASSY**

- (a) Install the steering intermediate shaft assy and steering shaft thrust stopper to the tilt steering gear assy with the bolt.

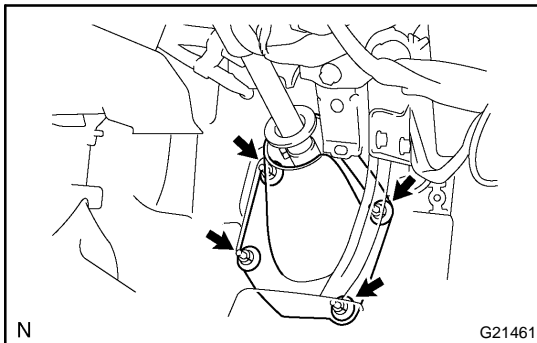
Torque: 36 N·m (370 kgf·cm, 26 ft·lbf)

37. INSTALL TILT STEERING GEAR ASSY W/MOTOR

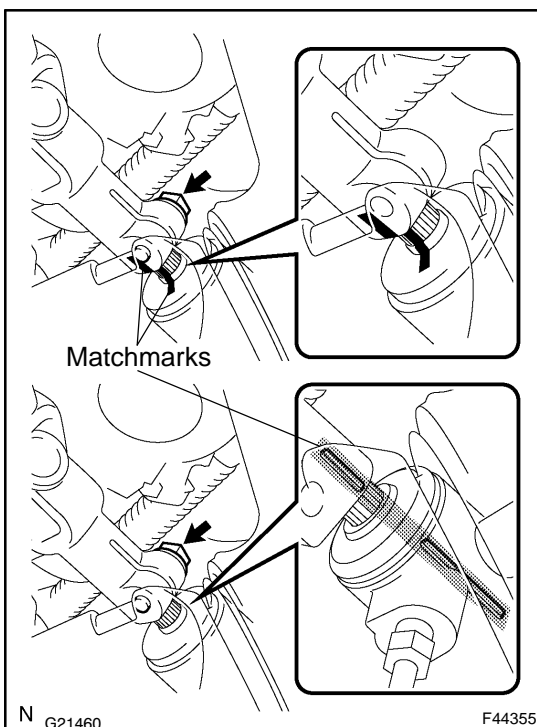
- (a) Install the steering column assy with the steering intermediate shaft assy with the 4 steering column set nuts.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

- (b) Connect the wire harness to the steering column assy.
 (c) Connect each of the connectors to the steering column assy.

**38. INSTALL STEERING COLUMN HOLE COVER**

- (a) Install the steering column hole cover with the 4 clips.
 (b) Install the heater to register duct to the heater unit.

**39. INSTALL STEERING INTERMEDIATE SHAFT NO.2**

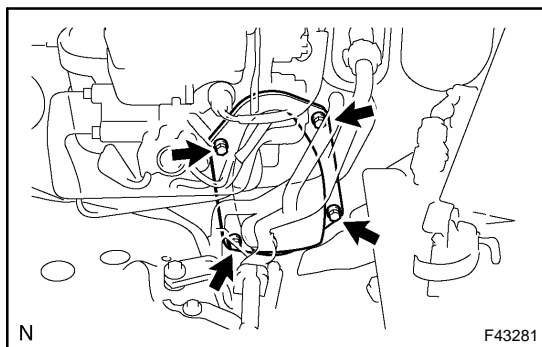
- (a) Align the matchmarks on the power steering gear assy and steering intermediate shaft No.2.
 (b) Install the steering intermediate shaft No.2 to the steering gear box with the bolt.

Torque: 36 N·m (370 kgf·cm, 26 ft·lbf)

HINT:

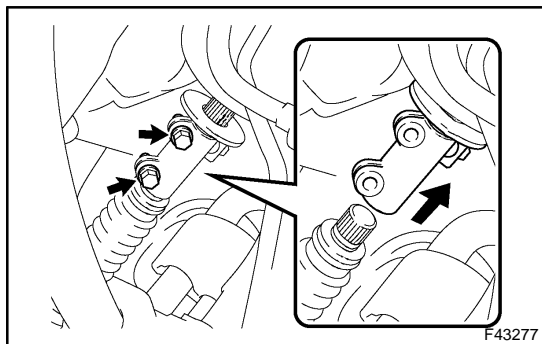
When replacing the gear box with a new one, be sure to align the matchmarks with the protrusion to install.

- (c) Align the notch on the power steering gear box assy and steering intermediate shaft No.2.
 (d) Install the steering intermediate shaft No.2 to the steering gear box with the bolt.

**40. INSTALL STEERING INTERMEDIATE SHAFT COVER**

- (a) Install the steering intermediate shaft cover with the 4 bolts.

Torque: 5 N·m (50 kgf·cm, 44 in·lbf)

**41. INSTALL STEERING SLIDING YOKE**

- (a) Install the steering sliding yoke to the steering column assy and slide it upward.
- (b) Install the steering sliding yoke to the intermediate shaft No.2 with the 2 bolts.

Torque: 36 N·m (370 kgf·cm, 26 ft·lbf)

42. INSTALL ENGINE UNDER COVER ASSY REAR

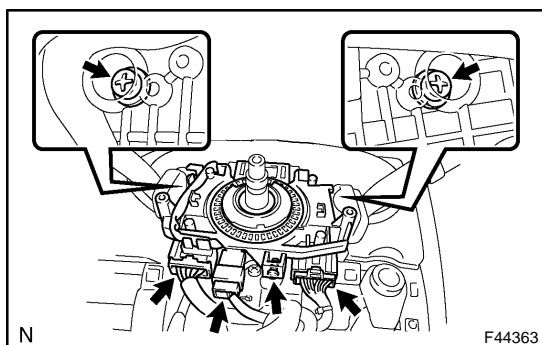
- (a) Install the engine under cover assy rear with the 4 bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

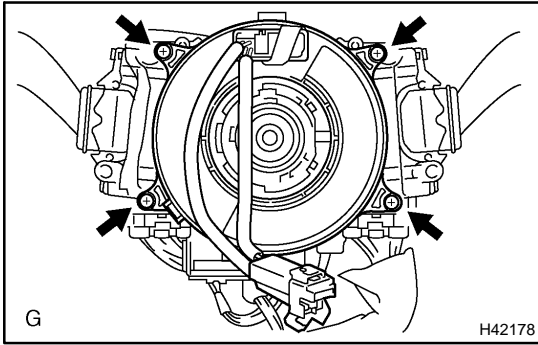
43. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

- (a) Install the engine under cover sub-assy No.1 with the 4 bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

**44. INSTALL TURN SIGNAL SWITCH ASSY**

- (a) Install the turn signal switch assy with the 3 screws.
- (b) Connect the 3 connectors to the turn signal switch assy.

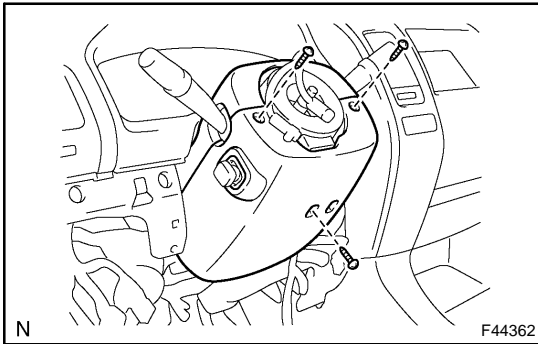
**45. INSTALL SPIRAL CABLE SUB-ASSY**

- (a) Check that the front wheels are facing straight ahead.
- (b) Turn the spiral cable counterclockwise by hand until it becomes difficult to turn.
- (c) Then rotate the spiral cable clockwise about 2.5 turns to align the mark.

HINT:

The spiral cable will rotate about 2.5 turns to either left or right of the center.

- (d) Install the spiral cable with the 4 screws.
- (e) Connect the 2 connectors to the spiral cable sub-assy.



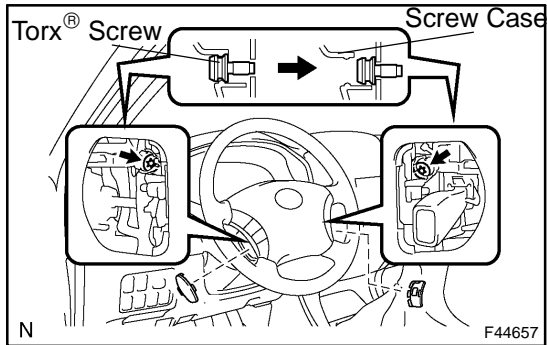
- (f) Install the steering column cover upper and lower with the 3 screws.

46. INSTALL INSTRUMENT PANEL LOWER LH**47. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY****48. INSTALL COWL SIDE TRIM BOARD LH****49. INSTALL FRONT FLOOR FOOTREST****50. INSTALL FRONT DOOR SCUFF PLATE LH****51. INSTALL STEERING WHEEL ASSY**

- (a) Align the matchmarks on the steering wheel and main shaft assy.
- (b) Install the steering set nut.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
- (c) w/ steering switch
Connect the connector.

52. INSTALL HORN BUTTON ASSY**NOTICE:**

- Never use airbag parts from another vehicle. When replacing parts, replace with new ones.
- Make sure the horn button assy is installed to the specified torque.
- If the horn button assy has been dropped, or there are cracks, dents or other defects in the case or connector, replace the horn button assy with a new one.
- When installing the horn button assy, take care that the wirings do not interfere with other parts and are not pinched between other parts.



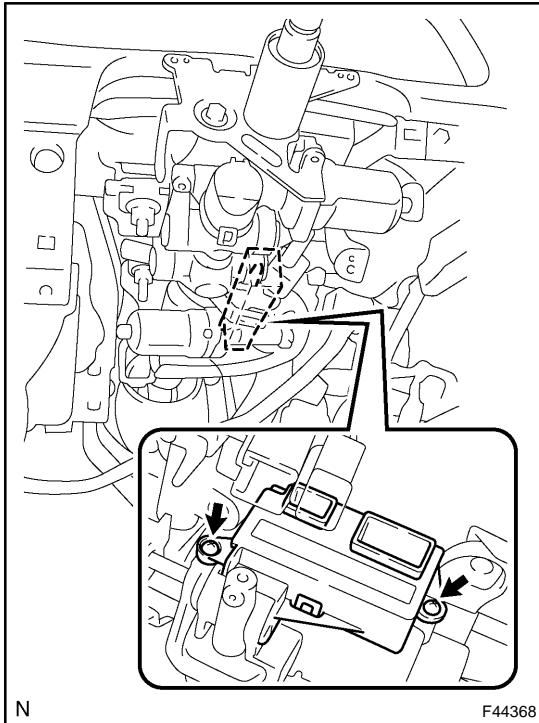
- Connect the horn ground harness to the horn button assy.
- Connect the 2 airbag connectors.
- Install the horn button assy after confirming that the circumference groove of torx[®] screw is caught on the screw case.
- Using a torx[®] socket wrench (Torx[®] socket wrench (T=30)), torque the 2 screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)

- 53. INSTALL STEERING WHEEL COVER LOWER NO.2**
- 54. INSTALL STEERING WHEEL COVER LOWER NO.3**
- 55. CHECK FRONT WHEELS FACING STRAIGHT AHEAD**
- 56. INSTALL BATTERY NEGATIVE TERMINAL**
- 57. INSPECT SRS WARNING LIGHT(See page 05-1213)**

MULTIPLEX TILT & TELESCOPIC ECU REPLACEMENT

5005N-03

1. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY
2. REMOVE INSTRUMENT PANEL LOWER LH



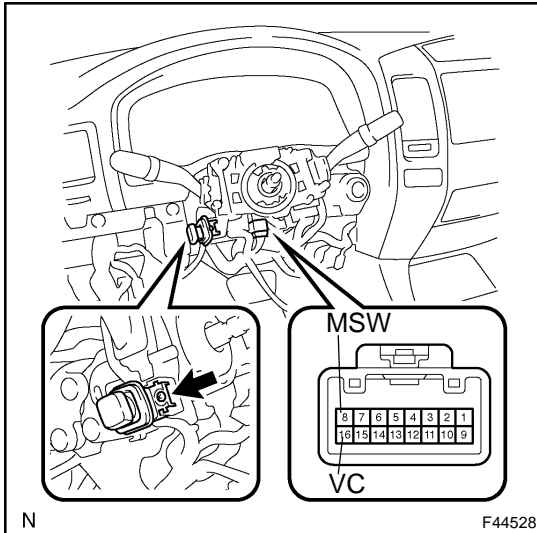
3. REMOVE MULTIPLEX TILT & TELESCOPIC ECU
 - (a) Remove the 2 screws and multiplex tilt & telescopic ECU.

4. INSTALL MULTIPLEX TILT & TELESCOPIC ECU
 - (a) Install the multiplex tilt & telescopic ECU with the 2 torx[®] screws.
5. INSTALL INSTRUMENT PANEL LOWER LH
6. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY

TILT & TELESCOPIC MANUAL SWITCH REPLACEMENT

50050-02

1. REMOVE STEERING COLUMN COVER
2. REMOVE TURN SIGNAL SWITCH ASSY
 - (a) Remove the 3 screws and turn signal switch assy.



3. REMOVE TILT & TELESCOPIC MANUAL SWITCH
 - (a) Disconnect the turn signal switch connector from the turn signal switch.
 - (b) Pull out the harness VC and MSW from the connector.
 - (c) Remove the screw and tilt & telescopic manual switch.

4. INSTALL TILT & TELESCOPIC MANUAL SWITCH
 - (a) Install the harness VC and MSV to the connector.
 - (b) Connect the connector to the switch assy.
 - (c) Install the tilt & telescopic manual switch assy with the screw.
5. INSTALL TURN SIGNAL SWITCH ASSY
 - (a) Install the turn signal switch assy with the 3 screws.
6. INSTALL STEERING COLUMN COVER

POWER STEERING SYSTEM

510BS-03

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

- (a) Care must be taken to when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

- (a) The vehicle is equipped with SRS (Supplemental Restraint System) such as the driver airbag. Failure to carry out service operation in correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the supplemental restraint system (See page [60-1](#)).

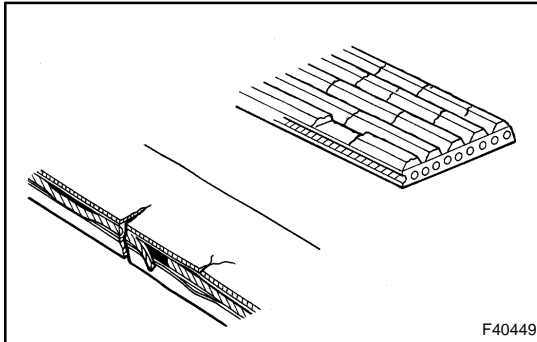
PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	28-1
	2. Power steering fluid level (Low)	51-3
	3. Front wheel alignment (Incorrect)	26-7
	4. Steering system joints (Worn)	-
	5. Suspension arm ball joints (Worn)	26-18 26-21
	6. Steering column (Binding)	-
	7. Power steering vane pump	51-9
	8. Power steering gear	51-19
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-7
	3. Steering column (Binding)	-
	4. Power steering gear	51-19
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	26-18 26-21
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	30-2
	5. Power steering gear	51-19
Abnormal noise	1. Power steering fluid level (Low)	51-3
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	51-9
	4. Power steering gear	51-19

ON-VEHICLE INSPECTION



1. INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords, etc.

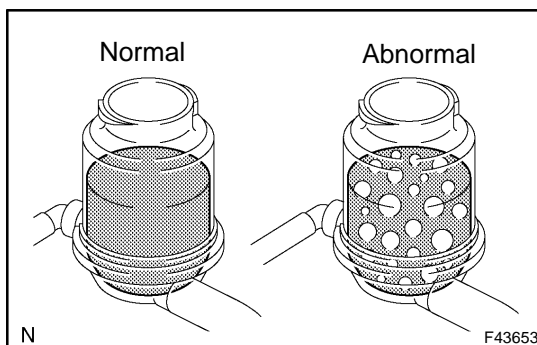
If any defect is found, replace the drive belt.

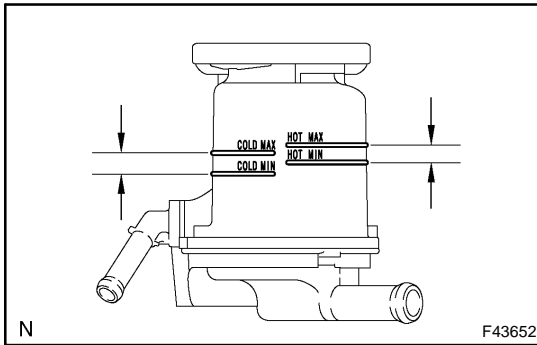
HINT:

Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.

2. BLEED POWER STEERING SYSTEM

- (a) Check the fluid level.
- (b) Jack up the front of the vehicle and support it with the stands.
- (c) Turn the steering wheel.
- (1) With the engine stopped, turn the wheel slowly from lock to lock several times.
- (d) Lower the vehicle.
- (e) Start the engine.
- (1) Run the engine at idle for a few minutes.
- (f) Turn the steering wheel.
- (1) With the engine idling, turn the wheel to the left or right full lock position and keep it there for 2 – 3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2 – 3 seconds.
- (2) Repeat (1) several times.
- (g) Stop the engine.
- (h) Check for foaming or emulsification. Especially, if the system has to be bled twice because of foaming or emulsification, check for fluid leaks in the system.
- (i) Check the fluid level.





3. CHECK FLUID LEVEL

- (a) Keep the vehicle level.
- (b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

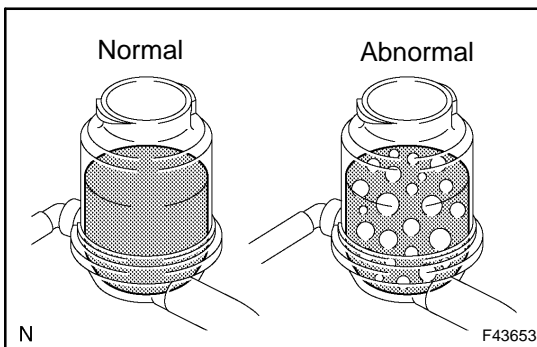
Fluid: ATF DEXRON® II or III

HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

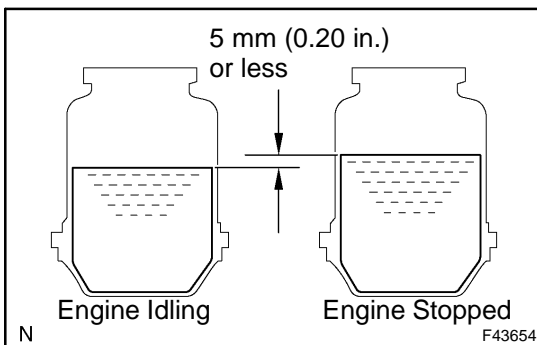
- (c) Start the engine and run it at idle.
- (d) Turn the steering wheel from lock to lock several times to raise fluid temperature.

Fluid temperature: 75 – 80 °C (167 – 176 °F)



- (e) Check for foaming or emulsification.

If foaming or emulsification is identified, bleed the power steering system.



- (f) With the engine idling, measure the fluid level in the oil reservoir.

- (g) Stop the engine.

- (h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed the power steering system.

- (i) Check the fluid level.

4. CHECK STEERING FLUID PRESSURE

- (a) Disconnect the pressure feed tube assy from the vane pump assy (See page 51-9).
- (b) Connect SST, as shown in the illustration on the next page.

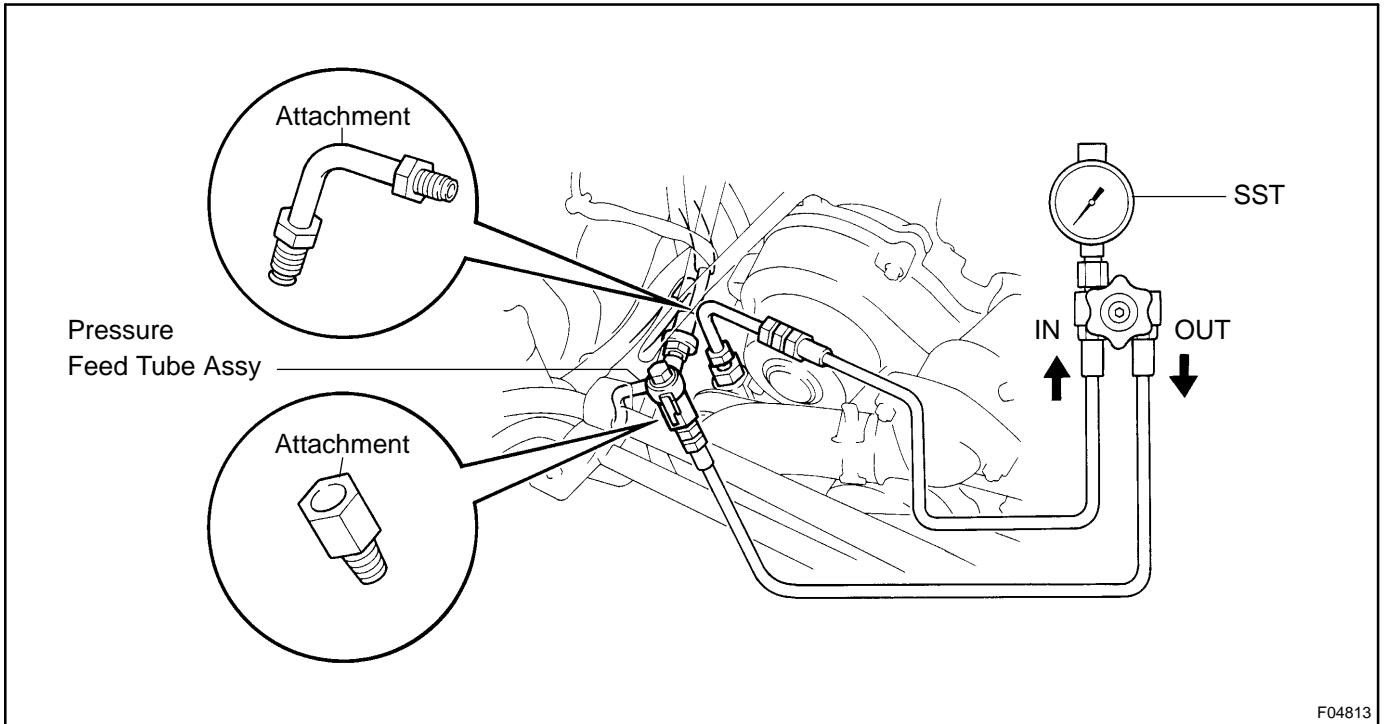
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

NOTICE:

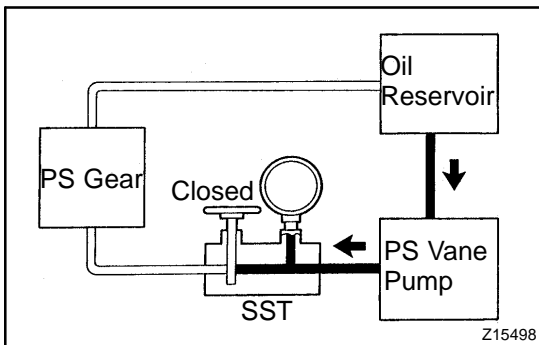
Check that the valve of the SST is in the open position.

- (c) Bleed the power steering system.
- (d) Start the engine and run it at idle.
- (e) Turn the steering wheel from lock to lock several times to raise fluid temperature.

Fluid temperature: 75 – 80 °C (167 – 176 °F)



F04813



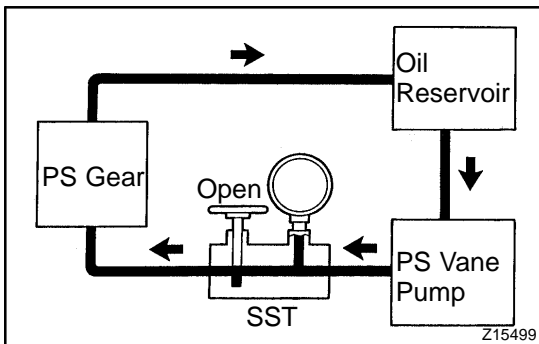
Z15498

- (f) With the engine idling, close the valve of the SST and observe the reading on the SST.

Minimum fluid pressure:
8,336 kPa (85 kgf/cm², 1,209 psi)

NOTICE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high.



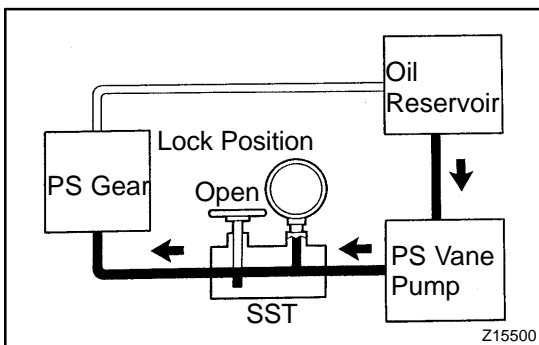
Z15499

- (g) With the engine idling, open the valve fully.
 (h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:
490 kPa (5 kgf/cm², 71 psi) or less

NOTICE:

Do not turn the steering wheel.



Z15500

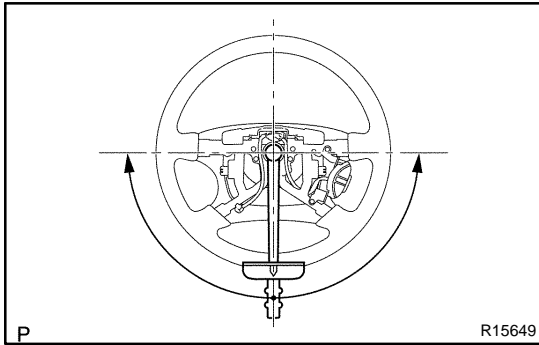
- (i) With the engine idling and valve fully opened, turn the steering wheel to full lock position.

Minimum fluid pressure:
8,336 kPa (85 kgf/cm², 1,209 psi)

NOTICE:

- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high.

- (j) Disconnect the SST.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)
- (k) Connect the pressure feed tube assy to the vane pump assy (See page 51-9).
- (l) Bleed the power steering system.



5. CHECK STEERING EFFORT

- (a) Center the steering wheel.
- (b) Remove the steering wheel pad (See page 50-8).
- (c) Start the engine and run it at idle.
- (d) Measure the steering effort in both directions.

Steering effort (Reference):

6 N·m (60 kgf·cm, 53 in.-lbf) or less

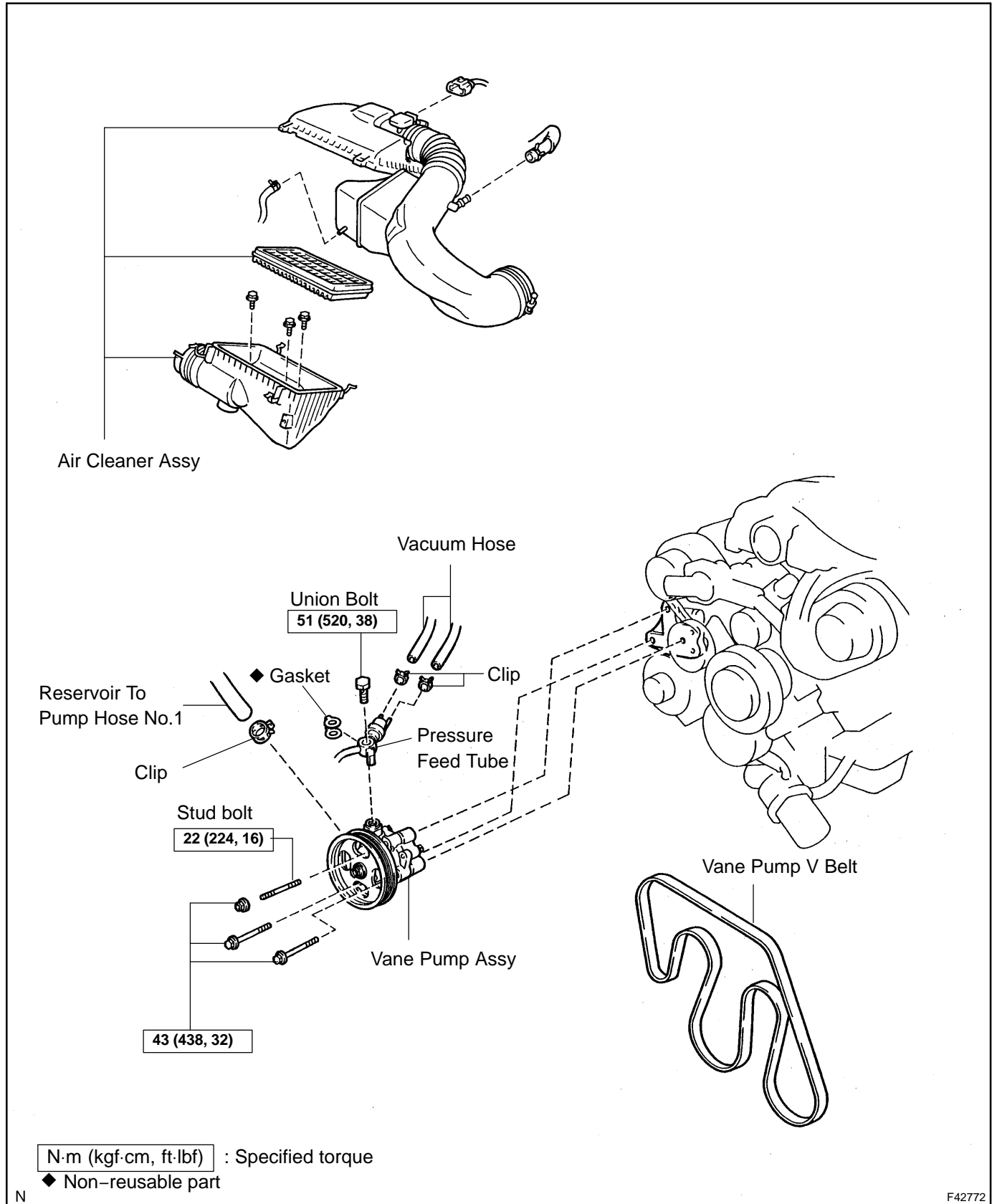
HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

- (e) Torque the steering wheel set nut.
Torque: 50 N·m (510 kgf·cm, 37 ft-lbf)
- (f) Install the steering wheel pad (See page 50-8).

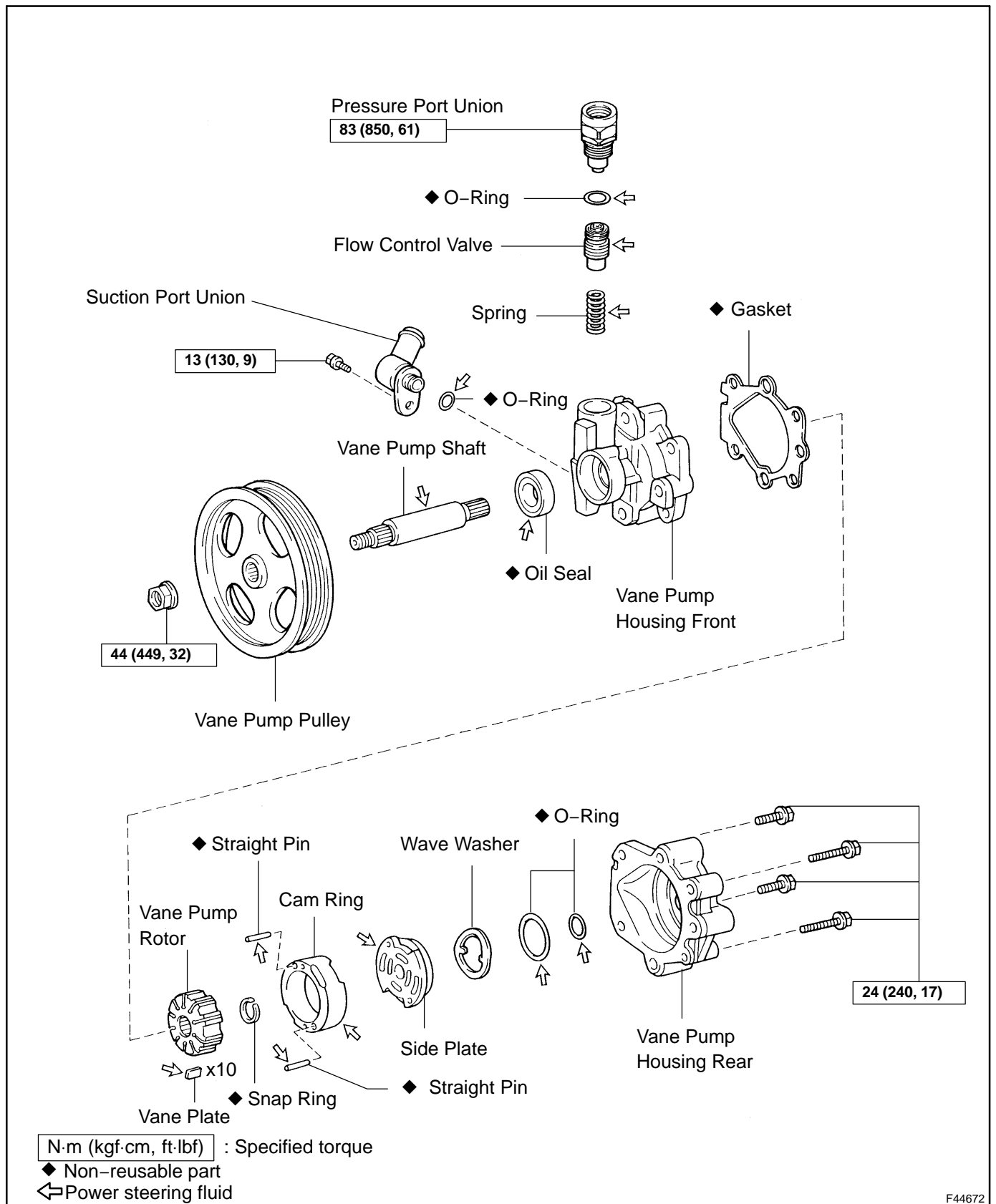
VANE PUMP ASSY COMPONENTS

510AD-02



N

F42772

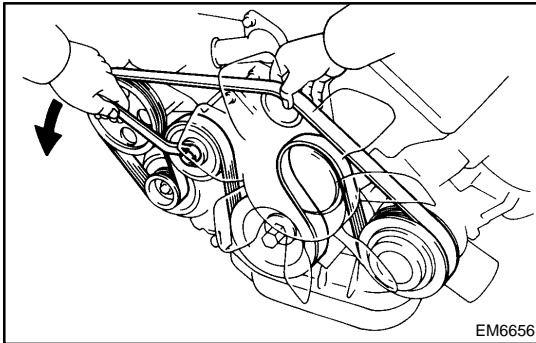


F44672

OVERHAUL

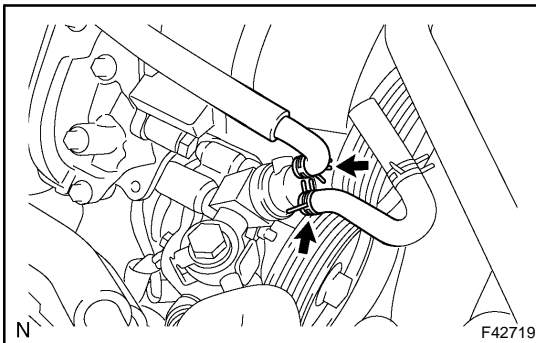
NOTICE:

- When using a vice, do not overtighten.
 - When installing, coat the parts indicated by the arrows with power steering fluid (See page 51-7).
1. DRAIN POWER STEERING FLUID (See page 51-3)
 2. REMOVE AIR CLEANER ASSY



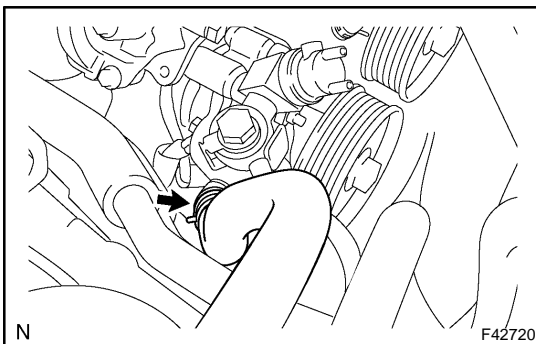
3. REMOVE VANE PUMP V BELT

- (a) Loosen the belt tension by turning the belt tensioner counterclockwise, and remove the belt.

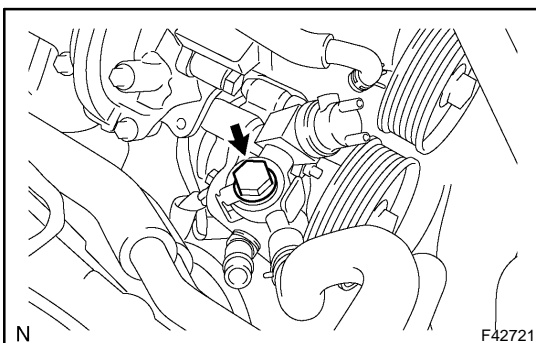


4. SEPARATE OIL RESERVOIR TO PUMP HOSE NO.1

- (a) Loosen the 2 clips and disconnect the 2 vacuum hoses.

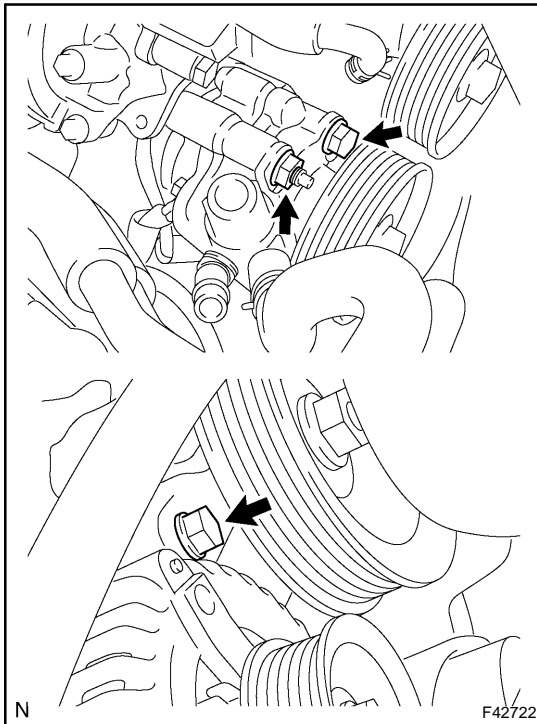


- (b) Loosen the clip and disconnect the hose.

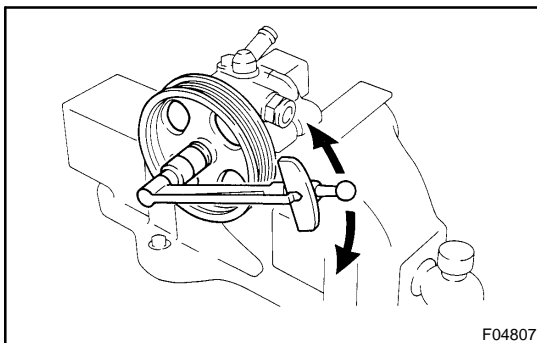


5. SEPARATE PRESSURE FEED TUBE ASSY

- (a) Remove the union bolt and a gasket, disconnect the pressure feed tube.

**6. REMOVE VANE PUMP ASSY**

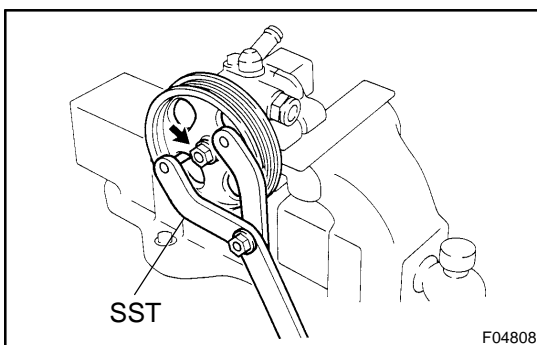
- (a) Remove the 2 bolts and nut.
- (b) Using a torx[®] socket (E10), remove the stud bolt.

**7. MEASURE VANE PUMP ROTATION TORQUE**

- (a) Check that the pump rotates smoothly without abnormal noise.
- (b) Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.27 N·m (2.8 kgf·cm, 2.4 in·lbf) or less

**8. REMOVE VANE PUMP PULLEY**

- (a) Using SST to stop the pulley rotating, loosen the nut.
SST 09960-10010 (09962-01000, 09963-01000)
- (b) Remove the nut and vane pump pulley from the vane pump shaft.

9. REMOVE POWER STEERING SUCTION PORT UNION

- (a) Remove the bolt and suction port union.
- (b) Remove the O-ring from the suction port union.

10. REMOVE PRESSURE PORT UNION

- (a) Remove the pressure port union, flow control valve and spring.
- (b) Remove the O-ring from the pressure port union.

11. REMOVE VANE PUMP HOUSING REAR

- (a) Remove the 4 bolts and vane pump housing rear.

HINT:

If the wave washer and side plate are stuck to the vane pump housing rear, lightly tap the vane pump housing rear with a plastic hammer, and remove the wave washer and side plate.

- (b) Remove the 2 O-rings from the rear housing.

12. REMOVE SIDE PLATE AND WAVE WASHER**13. REMOVE VANE PUMP CAM RING**

- (a) Using a screwdriver, remove the snap ring from the vane pump shaft.

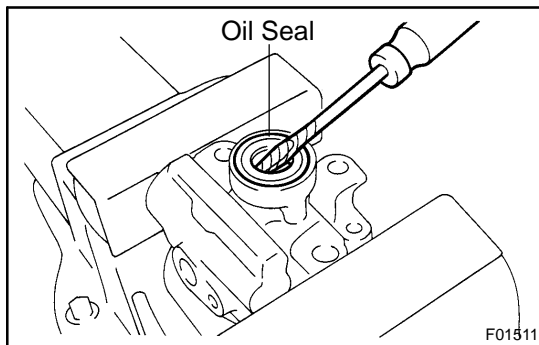
- (b) Remove the cam ring.

14. REMOVE VANE PUMP ROTOR

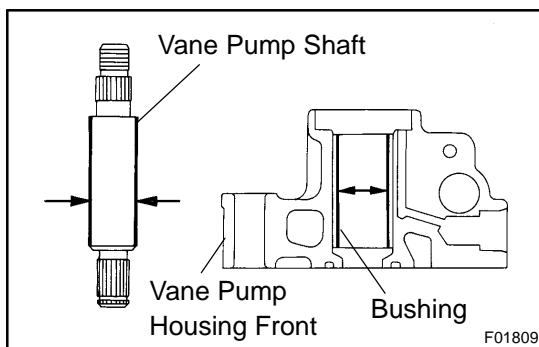
- (a) Remove the vane pump rotor with the 10 vane plates.

NOTICE:**Be careful not to drop the plate.****15. REMOVE VANE PUMP SHAFT****16. REMOVE STRAIGHT PIN**

- (a) Remove the 2 pins from the vane pump housing front.

**17. REMOVE VANE PUMP HOUSING OIL SEAL****NOTICE:****When using a vise, do not overtighten it.**

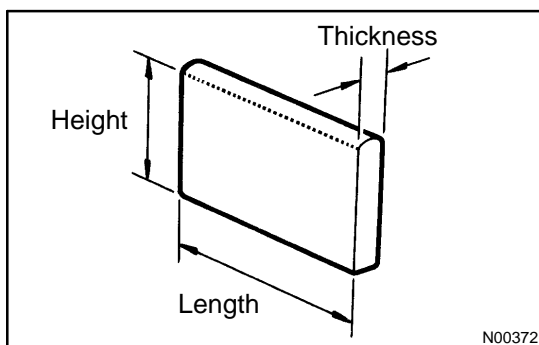
- (a) Using a screwdriver with vinyl tape wound around its tip, remove the housing oil seal.

NOTICE:**Be careful not to damage the vane pump housing front.****18. INSPECT OIL CLEARANCE**

- (a) Using a micrometer and a caliper gauge, measure the oil clearance.

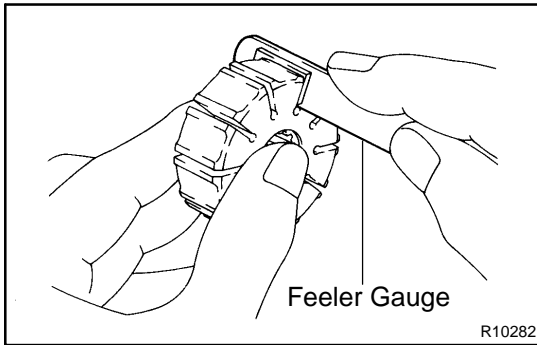
Standard clearance:**0.027 - 0.054 mm (0.0011 - 0.0021 in.)****Maximum clearance: 0.07 mm (0.0028 in.)**

If it is more than the maximum, replace the vane pump assy.

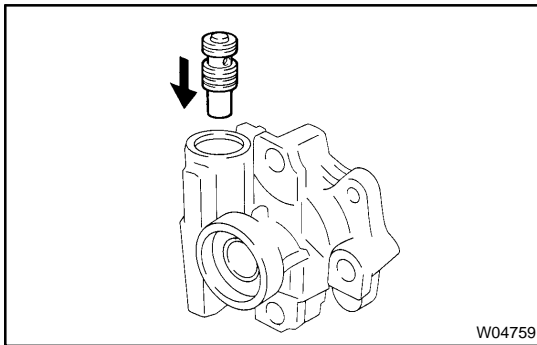
**19. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES**

- (a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.

Minimum height: 8.6 mm (0.33858 in.)**Minimum thickness:****1.397 mm (0.05500 in.)****Minimum length:****14.991 mm (0.59020 in.)**

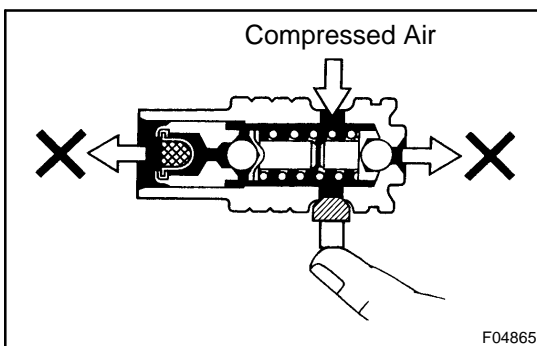


- (b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.
Maximum clearance: 0.033 mm (0.00130 in.)
 If it is more than the maximum, replace the vane pump assy.

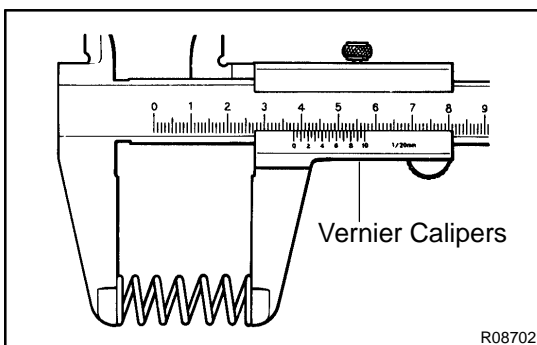


20. INSPECT FLOW CONTROL VALVE

- (a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the flow control valve hole by its own weight.



- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 – 490 kPa (4 – 5 kgf·cm², 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.
 If air comes out from the end holes, replace the vane pump assy.

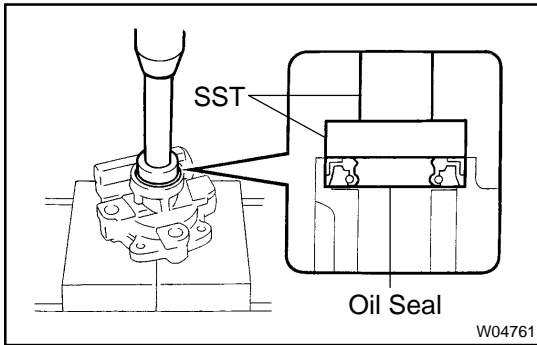


21. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

- (a) Using vernier calipers, measure the free length of the spring.
Minimum free length: 32.1 mm (1.264 in.)
 If it is not within the specification, replace the spring.

22. INSPECT PRESSURE PORT UNION

If the pressure union seat in the pressure port union is remarkably damaged and it may cause fluid leakage, fluid leakage, replace the pressure port union.

**23. INSTALL VANE PUMP HOUSING OIL SEAL**

- (a) Coat a new oil seal lip with power steering fluid.
- (b) Using SST, press in the oil seal.

SST 09950-60010 (09951-00320), 09950-70010
(09951-07100)

NOTICE:

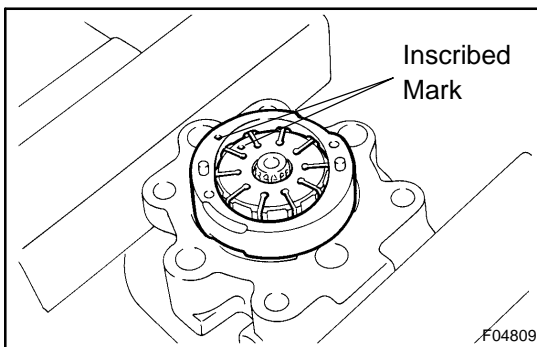
Make sure to install the oil seal in the correct direction.

24. INSTALL VANE PUMP SHAFT**25. INSTALL STRAIGHT PIN**

- (a) Using a plastic hammer, tap the 2 new pins to the vane pump housing front.

NOTICE:

Be careful no to damage the pins.

**26. INSTALL VANE PUMP CAM RING**

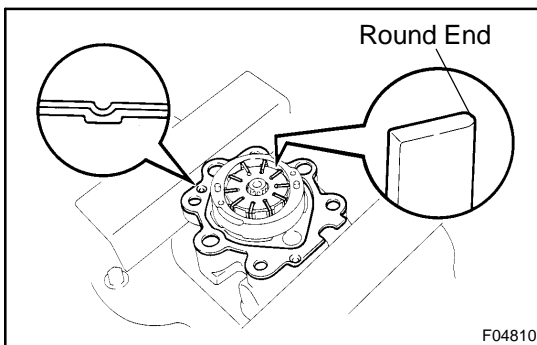
- (a) Install the cam ring with the inscribed mark facing outward.

HINT:

Align the holes of the cam ring with the straight pins.

27. INSTALL VANE PUMP ROTOR

- (a) Install the vane pump rotor with the inscribed mark facing outward.
- (b) Install a new snap ring to the vane pump shaft.



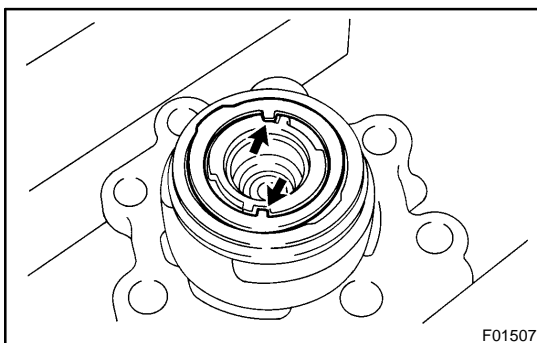
- (c) Install the 10 plates with the round end facing outward.
- (d) Install a new gasket on the front housing.

NOTICE:

Be careful of the direction of the gasket.

28. INSTALL VANE PUMP SIDE PLATE REAR

- (a) Align the holes of the plate and 2 straight pins.

**29. INSTALL VANE PUMP HOUSING REAR**

- (a) Install the wave washer so that its protrusions fit into the slots in the side plate.
- (b) Coat 2 new O-rings with power steering fluid and install them to the rear housing.
- (c) Install the rear housing with the 4 bolts.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

30. INSTALL PRESSURE PORT UNION

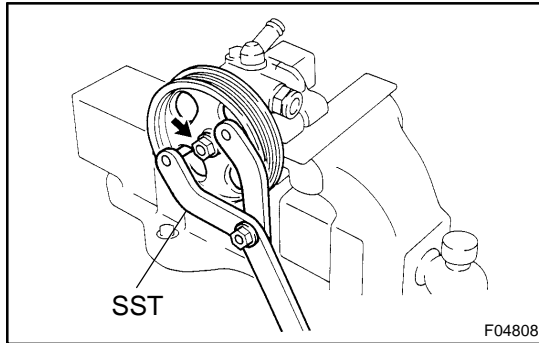
- (a) Install the spring to the vane pump housing front.
- (b) Install the flow control valve facing the correct direction (See page 51-7).
- (c) Coat a new O-ring with power steering fluid and install it to the pressure port union.
- (d) Install the pressure port union.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

31. INSTALL POWER STEERING SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid and install it to the suction port union.
- (b) Install the suction port union with the bolt.

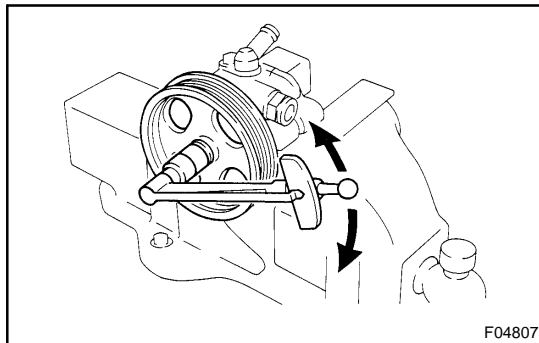
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

**32. INSTALL VANE PUMP PULLEY**

- (a) Install the vane pump pulley and nut to the vane pump shaft.
- (b) Using SST to stop the pulley rotating, torque a new pulley set nut.

SST 09960-10010 (09962-01000, 09963-01000)

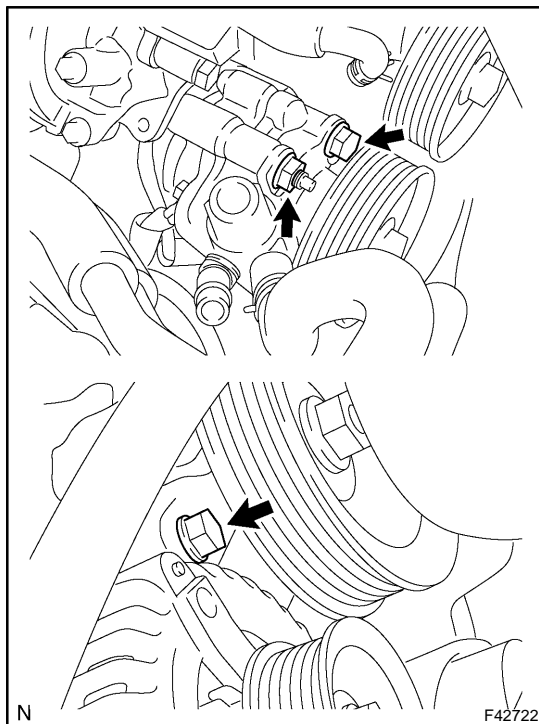
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

**33. MEASURE VANE PUMP ROTATION TORQUE**

- (a) Check that the pump rotates smoothly without abnormal noise.
- (b) Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.27 N·m (2.8 kgf·cm, 2.4 in·lbf) or less

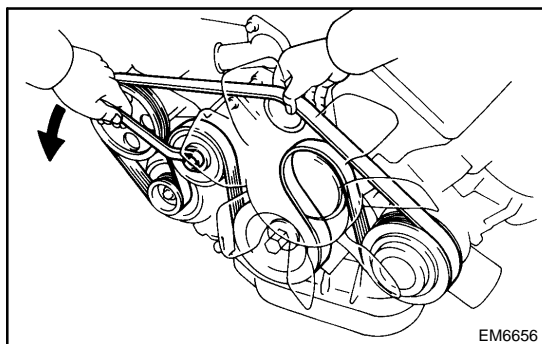
**34. INSTALL VANE PUMP ASSY**

- (a) Using a torx[®] socket (E10), install the vane pump with the stud bolt.

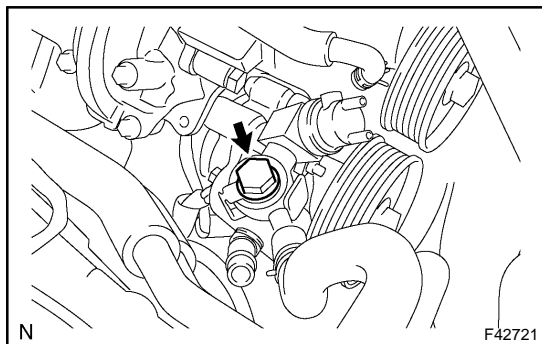
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

- (b) Install the 2 bolts and nut.

Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

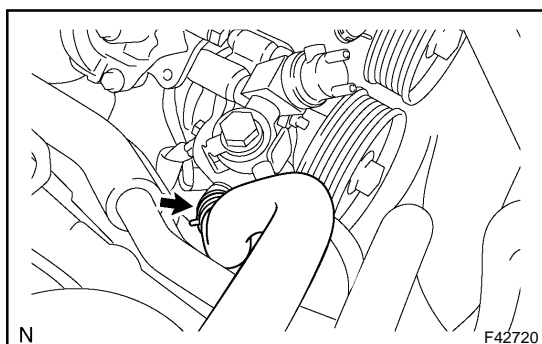
**35. INSTALL VANE PUMP V BELT**

- (a) Loosen the belt tension by turning the belt tensioner counterclockwise, and install the belt.

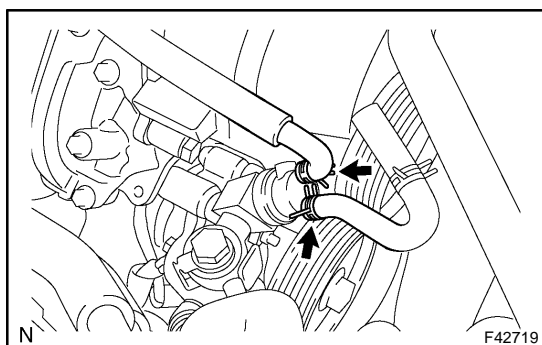
**36. CONNECT PRESSURE FEED TUBE ASSY**

- (a) Install the union bolt with a new gasket on each side of the tube.

Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

**37. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1**

- (a) Install the hose with the clip.

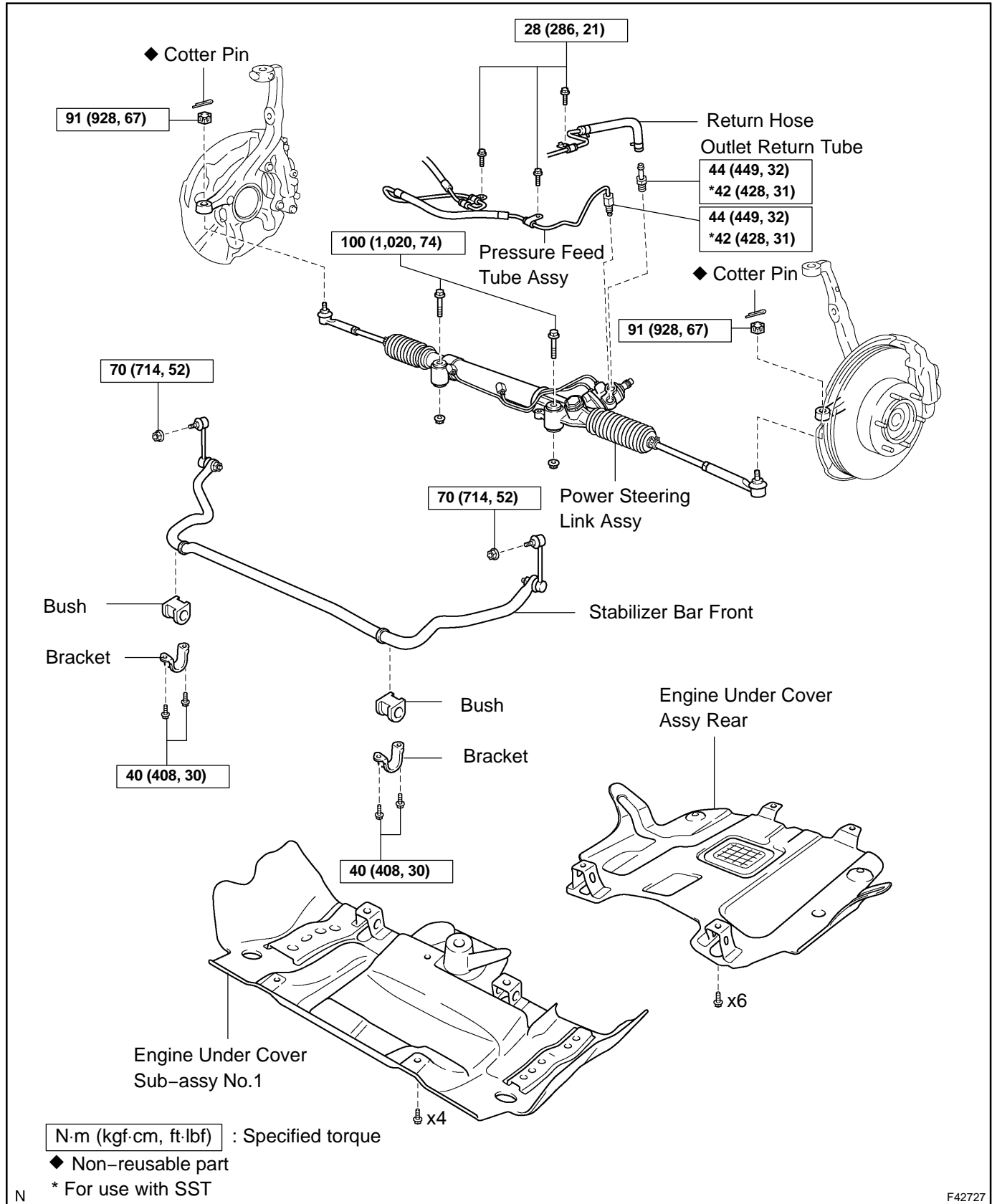


- (b) Install the 2 hoses with the 2 clips.

38. INSTALL AIR CLEANER ASSY**39. ADD POWER STEERING FLUID (See page 51-3)****40. BLEED POWER STEERING FLUID (See page 51-3)****41. INSPECT FLUID LEAK (See page 51-3)**

POWER STEERING LINK ASSY COMPONENTS

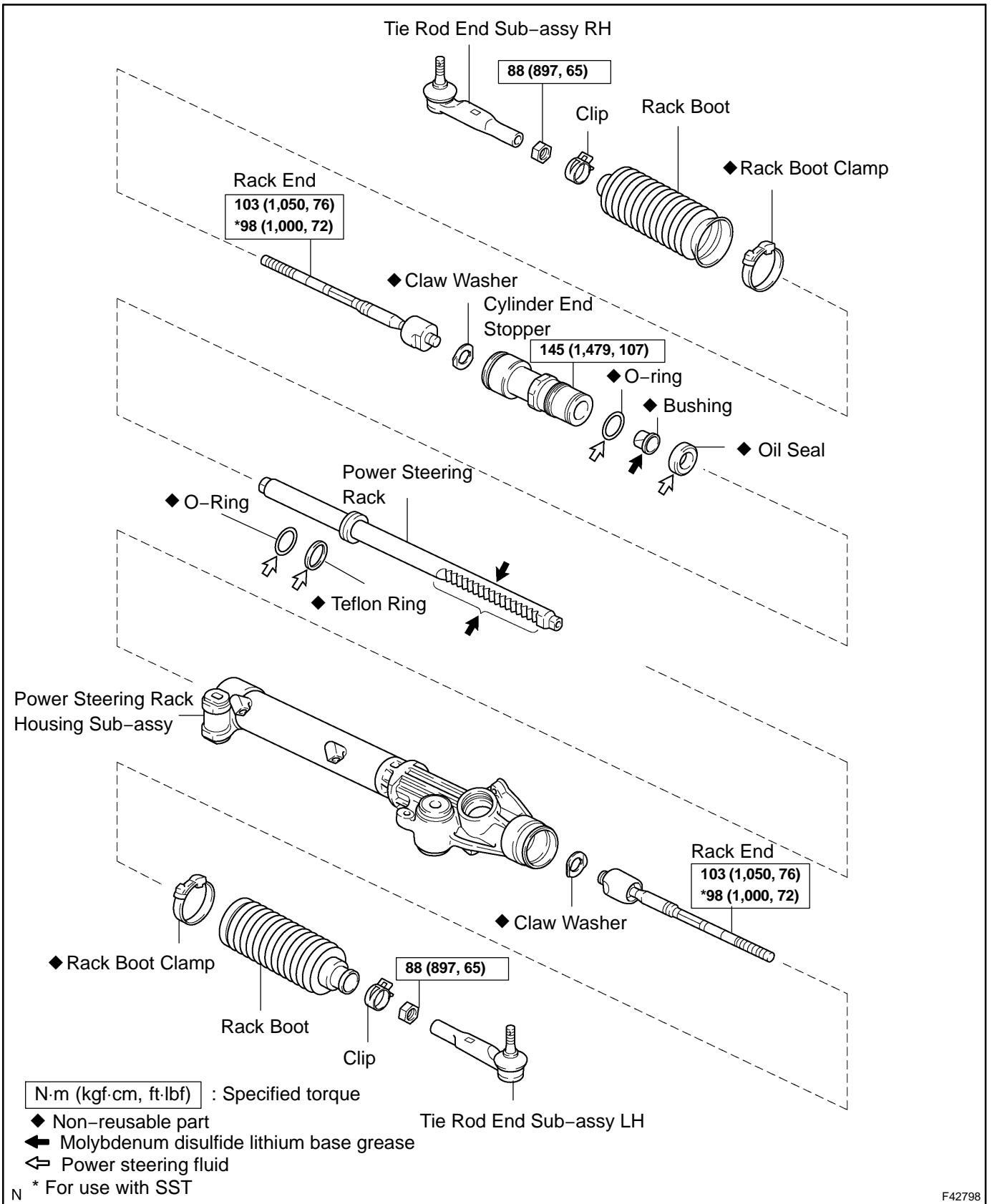
510BW-01



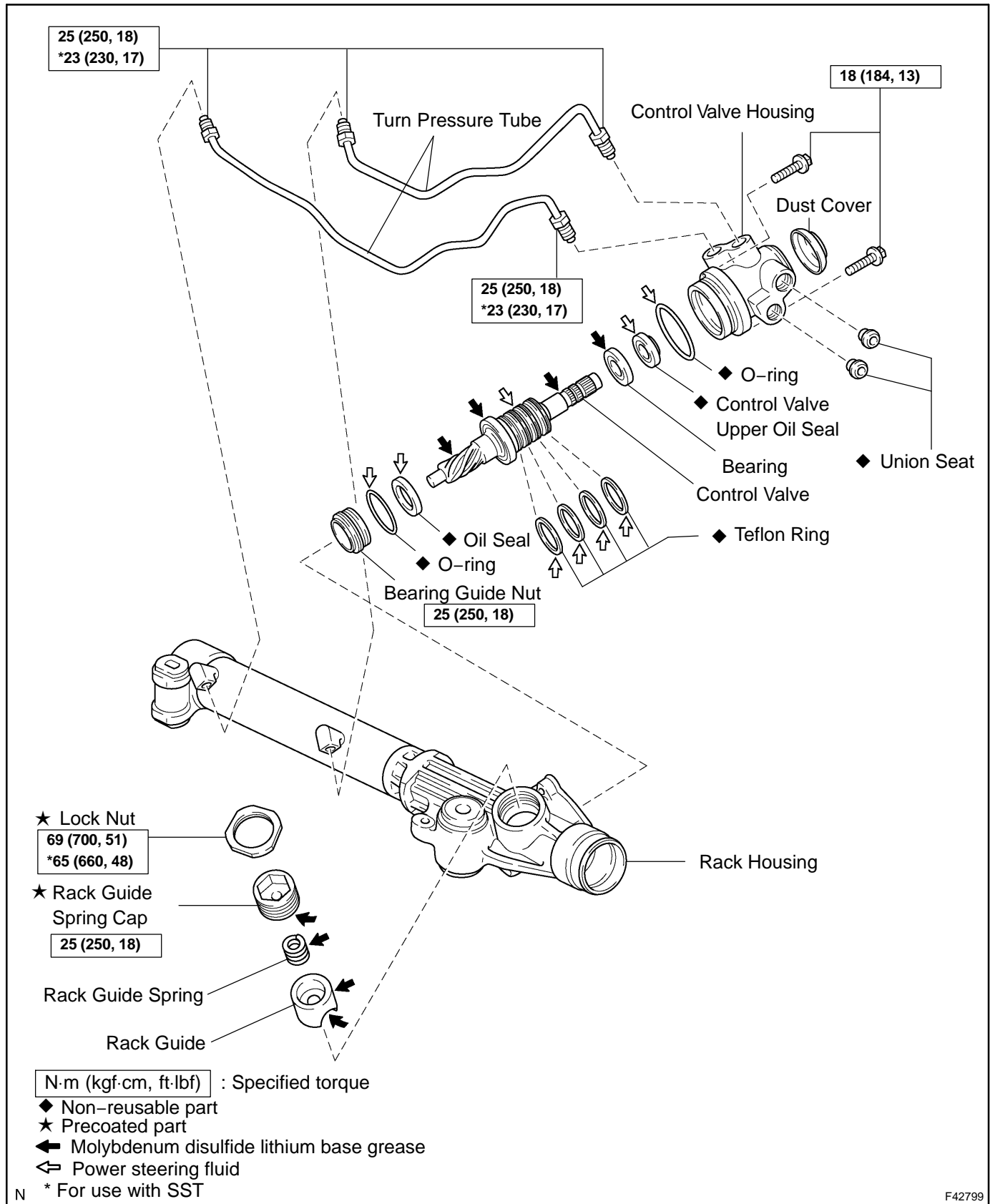
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POWER STEERING - POWER STEERING LINK ASSY



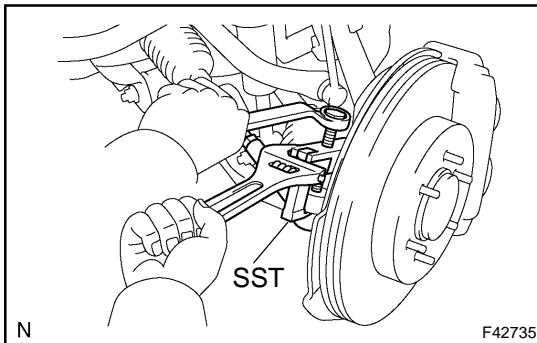
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OVERHAUL

1. **PRECAUTION** (See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD** (See page 50-8)
4. **REMOVE HORN BUTTON ASSY** (See page 60-20)
5. **REMOVE STEERING WHEEL ASSY** (See page 50-8)
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
6. **REMOVE STEERING COLUMN COVER LWR** (See page 50-8)
7. **REMOVE TURN SIGNAL SWITCH ASSY** (See page 50-8)
8. **REMOVE SPIRAL CABLE SUB-ASSY** (See page 50-8)
9. **REMOVE FRONT WHEEL**
10. **REMOVE ENGINE UNDER COVER ASSY REAR**
 - (a) Remove the 6 bolts and engine under cover assy rear.
11. **REMOVE ENGINE UNDER COVER SUB-ASSY NO.1**
 - (a) Remove the 4 bolts and engine under cover sub-assy No.1.
12. **REMOVE STABILIZER BAR FRONT** (See page 26-26)



13. SEPARATE TIE ROD END SUB-ASSY LH

- (a) Remove the cotter pin and nut.
- (b) Using SST, separate the tie rod end from the steering knuckle arm.
SST 09628-62011

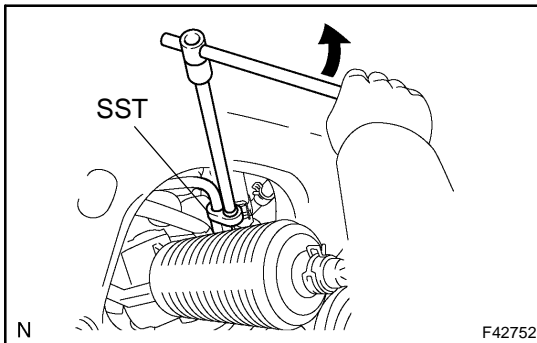
14. SEPARATE TIE ROD END SUB-ASSY RH

HINT:

Separate the RH side by the same procedures with the LH side.

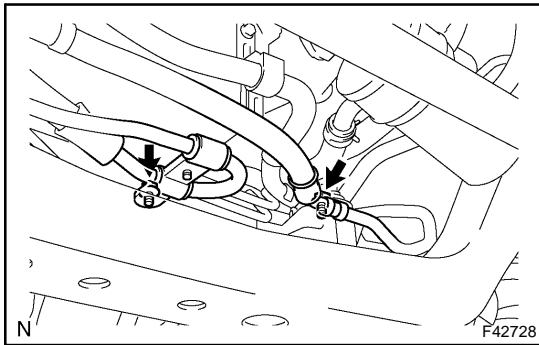
SST 09628-62011

15. REMOVE STEERING INTERMEDIATE SHAFT NO.2 (See page 50-8)

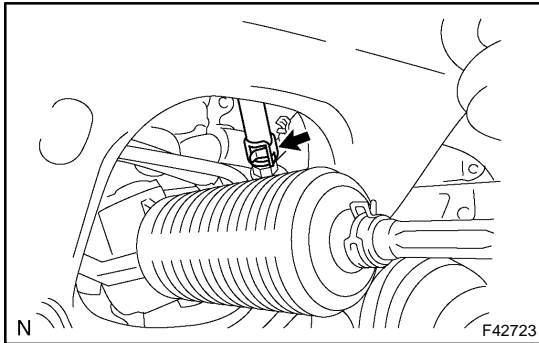


16. DISCONNECT PRESSURE FEED TUBE ASSY

- (a) Using SST, loosen the flare nut and disconnect the pressure feed tube.
SST 09023-12701

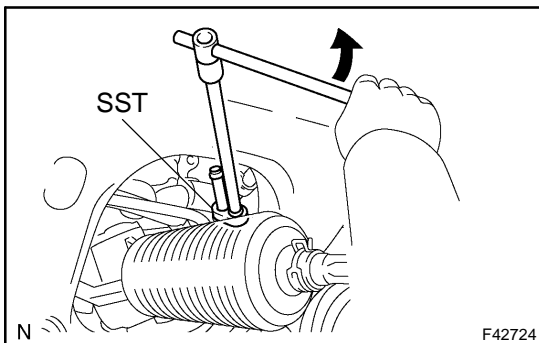


- (b) Remove the 2 bolts and separate the pressure feed tube assy from frame sub-assy.

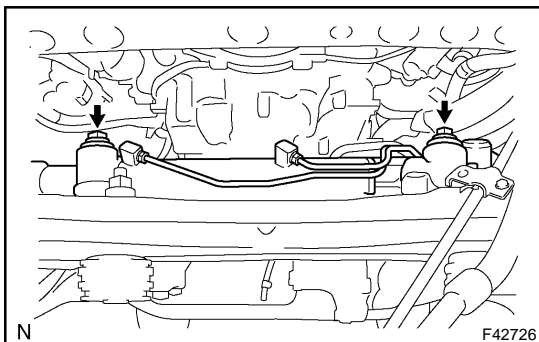


17. DISCONNECT STEERING GEAR OUTLET RETURN TUBE

- (a) Remove the clip and disconnect the return hose.



- (b) Using SST, remove the outlet return tube.
SST 09023-12701



18. REMOVE POWER STEERING LINK ASSY

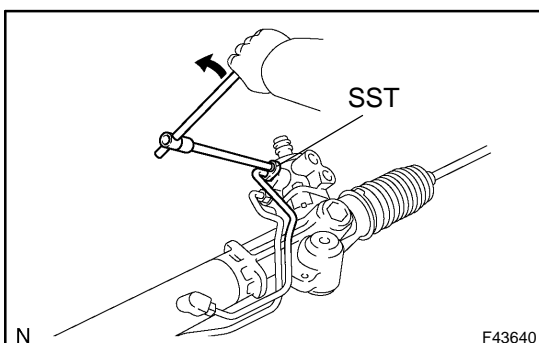
- (a) Remove the 2 bolts, 2 nuts and power steering link assy.

NOTICE:

The nut has a detent, so never turn the nut, be sure to turn the bolt.

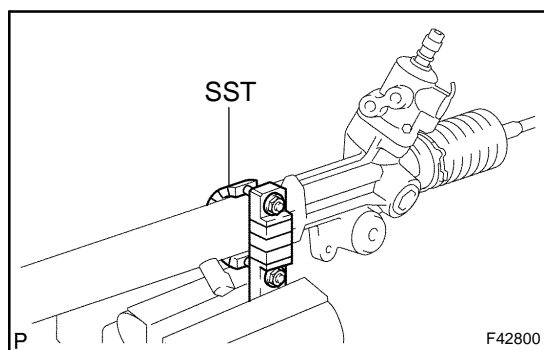
HINT:

After loosen the 2 bolts, raise the bolt from the frame, and slide the gear assy and the bolt as a unit to the position where the bolt can be pulled out, and then remove the bolt.

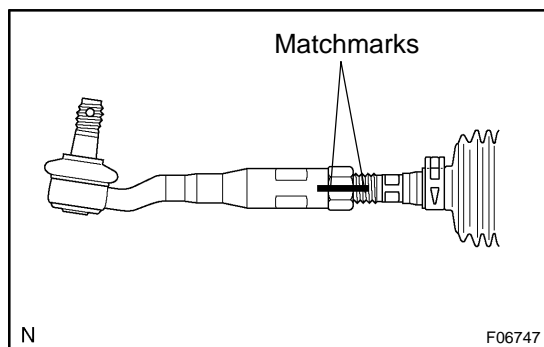


19. FIX POWER STEERING LINK ASSY

- (a) Using SST, remove the 2 turn pressure tubes.
SST 09023-38201



- (b) Using the SST, fix the gear assembly, between aluminum plates in a vise, as shown in the illustration.
SST 09612-00012



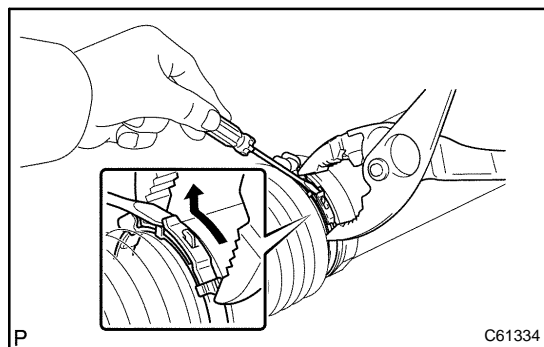
20. REMOVE TIE ROD END SUB-ASSY LH

- (a) Place matchmarks on the tie rod end, lock nut and rack end.
(b) Loosen the lock nut, remove the tie rod end and lock nut.

21. REMOVE TIE ROD END SUB-ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.



22. REMOVE STEERING RACK BOOT CLAMP LH

- (a) Using pliers and a screwdriver, loosen the clamp.

NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH boots.

23. REMOVE STEERING RACK BOOT CLAMP RH

HINT:

Remove the RH side by the same procedures with the LH side.

24. REMOVE STEERING RACK BOOT CLIP LH

- (a) Using pliers, remove the clip.

NOTICE:

Be careful not to damage the boot.

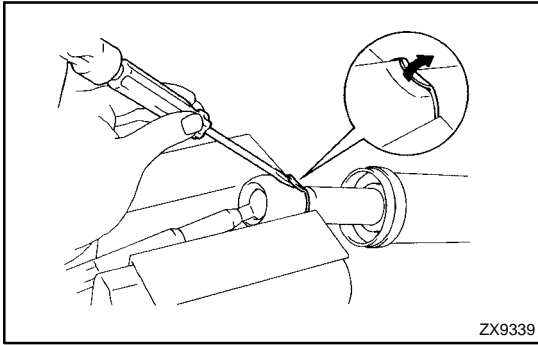
25. REMOVE STEERING RACK BOOT CLIP RH

HINT:

Remove the RH side by the same procedures with the LH side.

26. REMOVE STEERING RACK BOOT LH

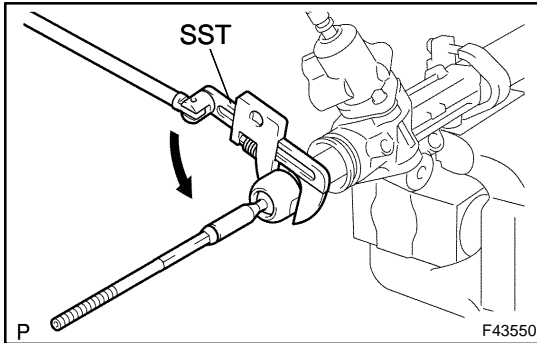
27. REMOVE STEERING RACK BOOT RH

**28. REMOVE STEERING RACK END SUB-ASSY**

- (a) Using a screwdriver and a hammer, stake back the washer.

NOTICE:

Avoid any impact to the steering rack.



- (b) Using a spanner to hold the steering rack steady, and using SST, remove the rack end.

SST 09922-10010

- (c) Remove the crawl washer.

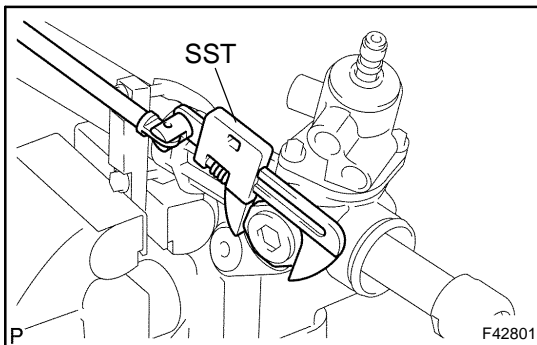
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

- (d) Perform the same manner described above on the other side.

HINT:

Mark the RH and LH rack ends.

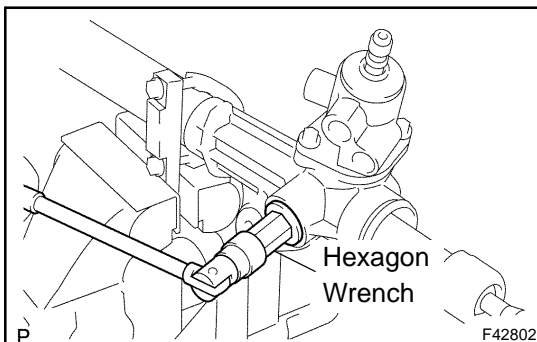
**29. REMOVE RACK GUIDE**

- (a) Using SST, remove the lock nut.

SST 09922-10010

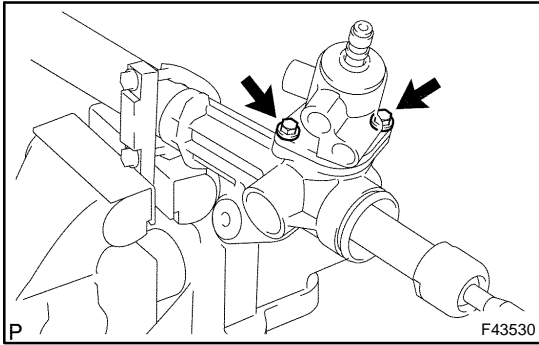
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

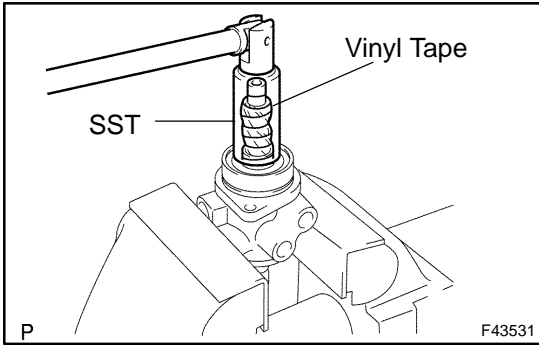


- (b) Using a hexagon wrench (24 mm), remove the rack guide spring cap.

- (c) Remove the spring and rack guide.



- 30. REMOVE POWER STEERING CONTROL VALVE**
- (a) Remove the 2 bolts.
 - (b) Pull out the control valve assembly with the control valve housing.
 - (c) Remove the O-ring.
 - (d) Carefully mount the control valve assembly in a soft jaw vise.

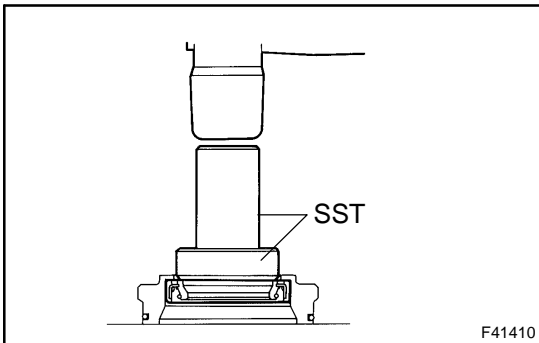


- (e) Using SST, remove the bearing guide nut.
SST 09631-20060

NOTICE:

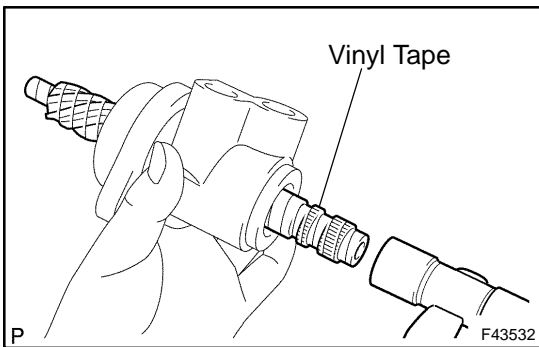
Be careful not to damage the oil seal lip.

- (f) Remove the O-ring.
- (g) Remove the dust cover.



- (h) Using SST and a hammer, drive out the oil seal from the bearing guide nut.
SST 09950-60010 (09951-00300), 09950-70010 (09951-07100)

- (i) Wind vinyl tape to the control valve shaft.



- (j) Using a plastic hammer, tap out the valve assembly with the bearing guide nut from the control valve housing.

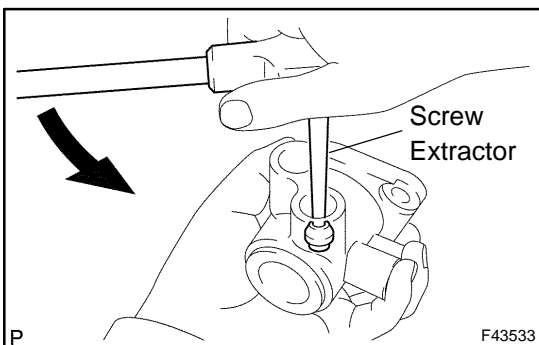
NOTICE:

Be careful not to damage the oil seal lip.

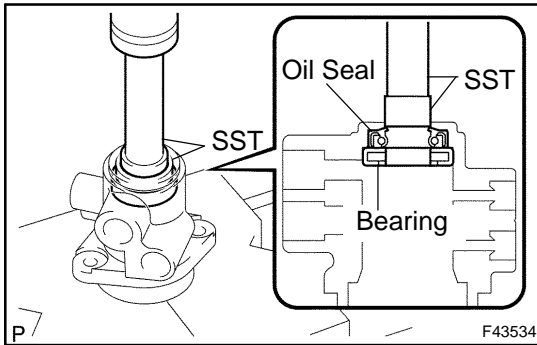
- (k) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the ring.

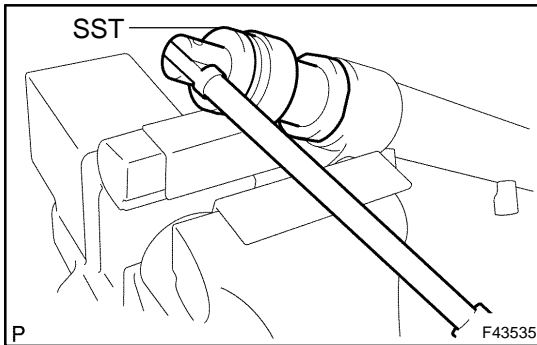


- (l) Using a screw extractor, remove the union seat from the control valve housing.



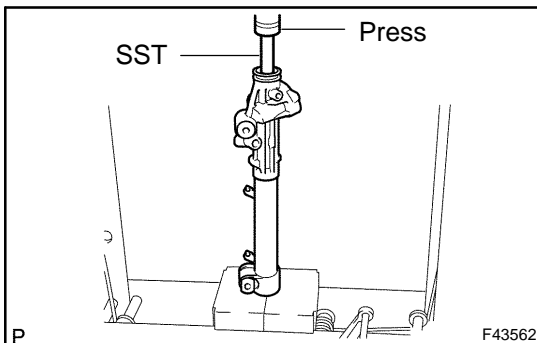
31. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

- (a) Using SST, press out the bearing and oil seal from the control valve housing.
SST 09950-70010 (09951-07150), 09950-60010 (09951-00250)



32. REMOVE CYLINDER END STOPPER

- (a) Using SST, remove the stopper.
SST 09631-20120
(b) Remove the O-ring from the stopper.



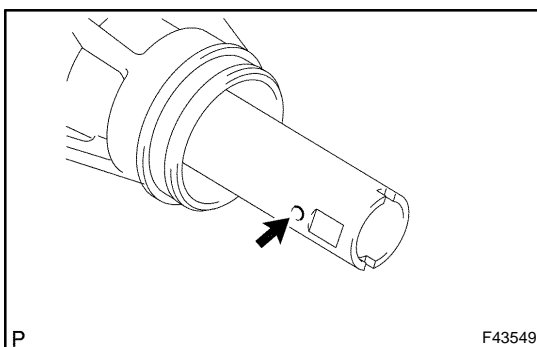
33. REMOVE STEERING RACK AND OIL SEAL

- (a) Using SST, press out the steering rack and oil seal.
SST 09950-70010 (09951-07200)

NOTICE:

Take care not to drop the steering rack.

- (b) Remove the oil seal from the steering rack.

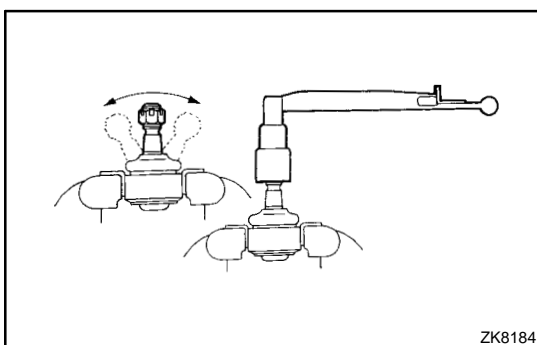


34. INSPECT POWER STEERING RACK

- (a) Insert a wire into the vent hole of the steering rack by 30 mm (1.18 in.), and ensure that the vent hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.



35. INSPECT TIE ROD END SUB-ASSY LH

- (a) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.
(b) Using a torque wrench, turn the nut continuously at a rate of 2 - 4 seconds per 1 turn and take the torque reading on the 5th turn.

Torque(Turning):

0.29 - 1.96 N·m (2.9 - 20.0 kgf·cm, 2.57 - 17.35 in.·lbf)

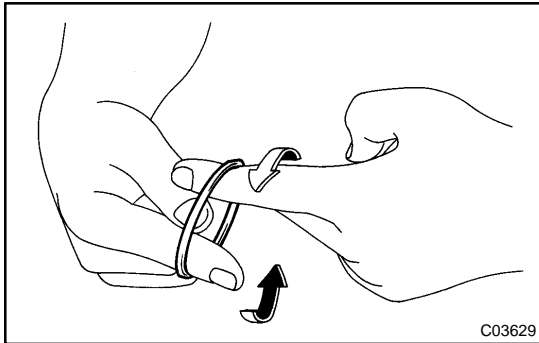
36. INSPECT TIE ROD END SUB-ASSY RH

HINT:

Inspect the RH side by the same procedures with LH side.

37. REMOVE STEERING RACK PISTON RING

(a) Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

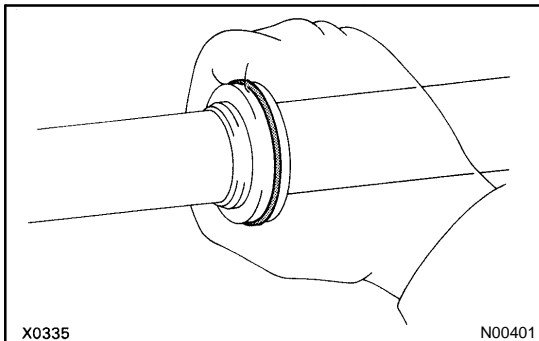
NOTICE:**Be careful not to damage the groove for the ring.****38. INSTALL STEERING RACK PISTON RING**

(a) Coat a new O-ring with power steering fluid and install it on steering rack.

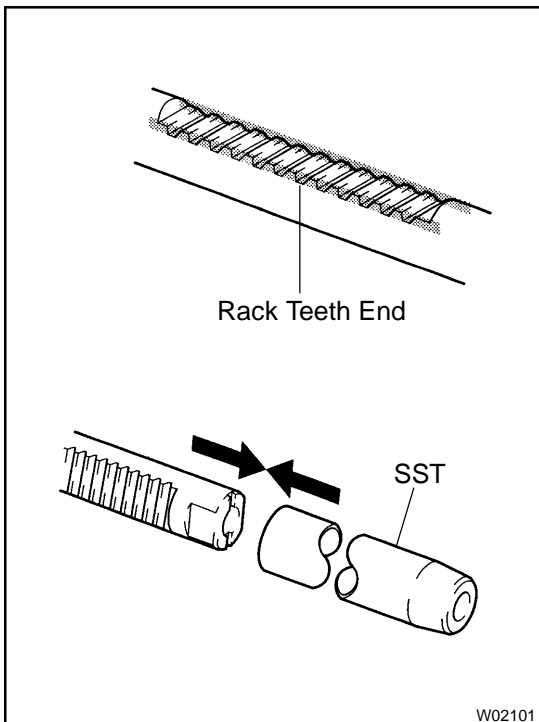
(b) Expand a new teflon ring with your fingers.

NOTICE:**Be careful not to overly expand the teflon ring.**

(c) Coat the teflon ring with power steering fluid.



(d) Install the teflon ring to the steering rack, and settle it down with your fingers.

**39. INSTALL POWER STEERING RACK**

(a) Coat SST with power steering fluid.

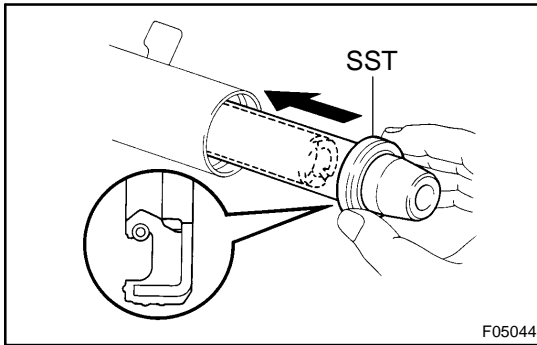
(b) Install SST to the rack.

SST 09631-00350

HINT:

If necessary, scrape the burrs off the rack teeth end and bur-nish.

(c) Install the rack into the rack housing.

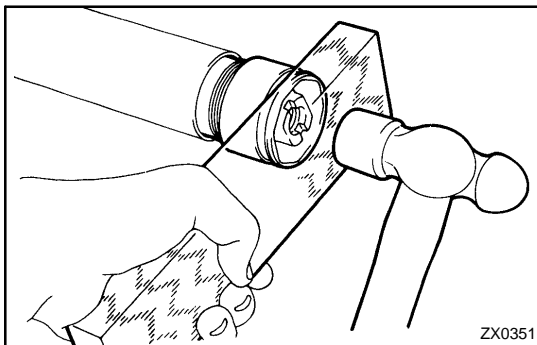


- (d) Coat SST with power steering fluid.
SST 09631-00350
- (e) Install SST to the steering rack opposite end.
- (f) Coat a new oil seal lip with power steering fluid, and install the oil seal by pushing it without tilting.

NOTICE:

- **Make sure to install the oil seal in the correct direction.**
- **Be careful not to damage the oil seal lip.**

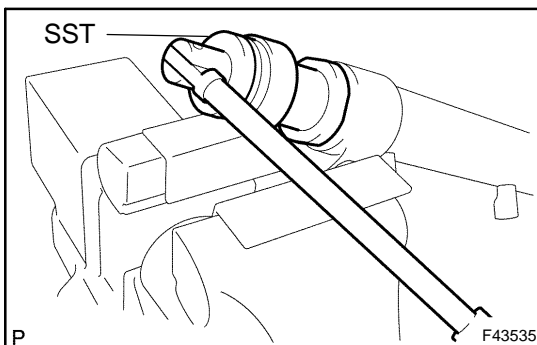
- (g) Remove the SST.
SST 09631-00350

**40. INSTALL CYLINDER END STOPPER**

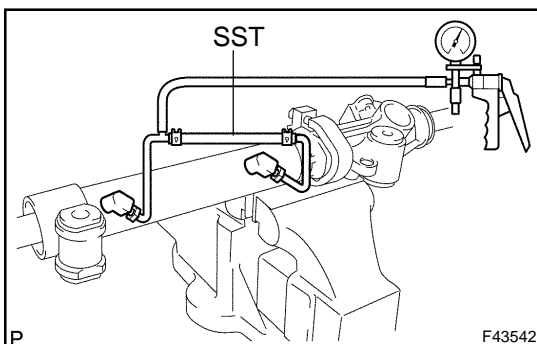
- (a) Coat a new O-ring with power steering fluid, and install it to the stopper.
- (b) Using a wooden block and a hammer, drive in the stopper until it is tightly installed.

NOTICE:

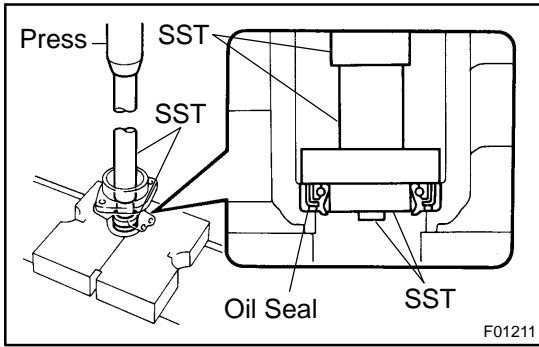
Be careful not to damage the O-ring.



- (c) Using SST, torque the stopper.
SST 09631-20120
Torque: 145 N·m (1,479 kgf·cm, 107 ft·lbf)

**41. AIR TIGHTNESS TEST**

- (a) Install SST to the unions of the rack housing.
SST 09631-12071 (09633-00010)
- (b) Apply 53.33 kPa (400 mmHg, 15.75 in Hg) of vacuum for about 30 seconds.
- (c) Check that there is no change in the vacuum.
If there is change in the vacuum, check the installation of the oil seals.

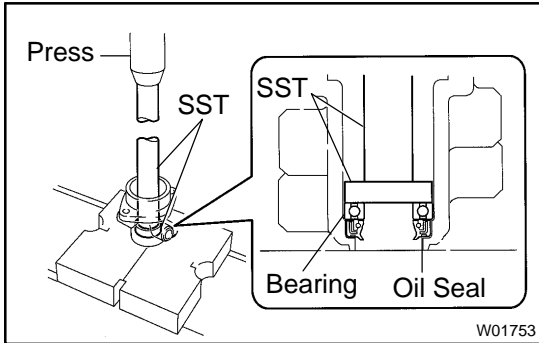


42. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL

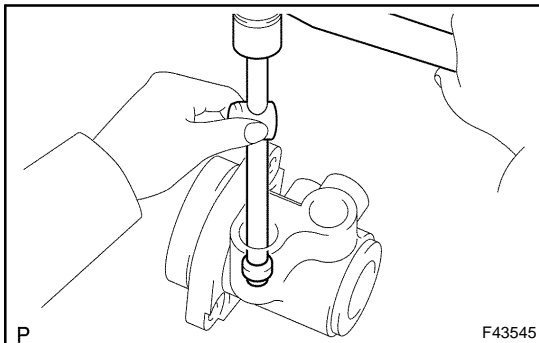
- (a) Coat a new oil seal lip with power steering fluid.
- (b) Using SST, press in the oil seal.
SST 09950-60010 (09951-00180, 09951-00320, 09952-06010), 09950-70010 (09951-07150)

NOTICE:

Make sure that the oil seal is installed in the correct direction.



- (c) Coat a new bearing with molybdenum disulfide lithium base grease.
- (d) Using SST, press in the bearing.
SST 09950-60010 (09951-00180, 09951-00340, 09952-06010), 09950-70010 (09951-07150)

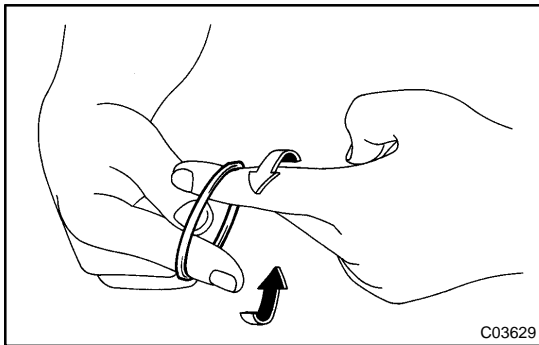


43. INSTALL POWER STEERING CONTROL VALVE

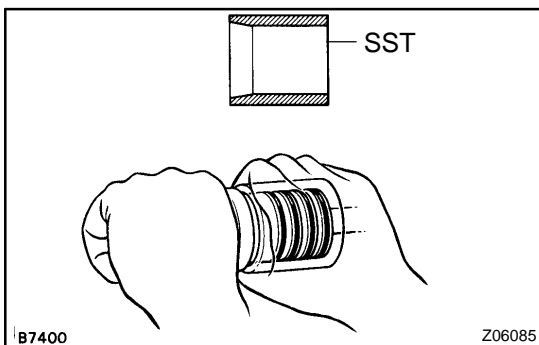
- (a) Using a plastic hammer and a sliding handle, lightly tap in a new union seat.

NOTICE:

Before installing the union seat, remove dust sticking to the control valve housing.



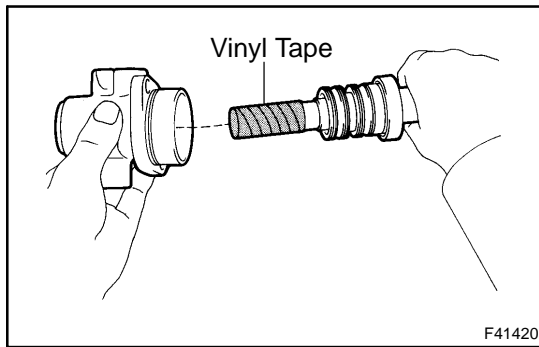
- (b) Coat the rings with power steering fluid.
- (c) Expand 4 new rings with your fingers.



- (d) Install the rings to the control valve assembly, and settle them down with your fingers.
- (e) Carefully slide the tapered end of SST over the rings until the ring fits to the steering rack.
SST 09631-20081

NOTICE:

Be careful not to overexpand the ring.

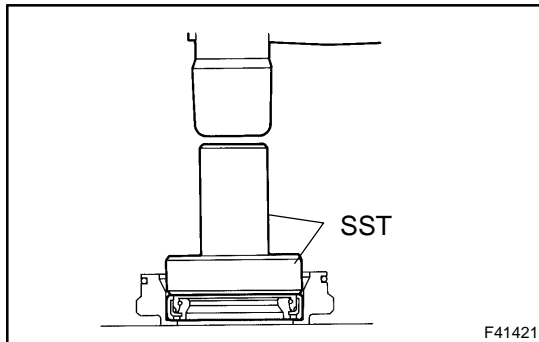


- (f) Coat the teflon rings with power steering fluid.
- (g) To prevent oil seal lip damage, wind vinyl tape on the serrated port of the control valve shaft.
- (h) Push the valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal lip.

- (i) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.
- (j) Coat a new oil seal lip with power steering fluid.

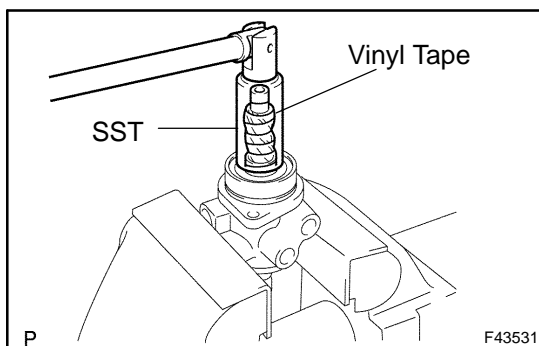


- (k) Using SST and a hammer, drive in the oil seal.
SST 09950-60010 (09951-00390), 09950-70010 (09951-07100)

NOTICE:

Make sure to install the oil seal in the correct direction.

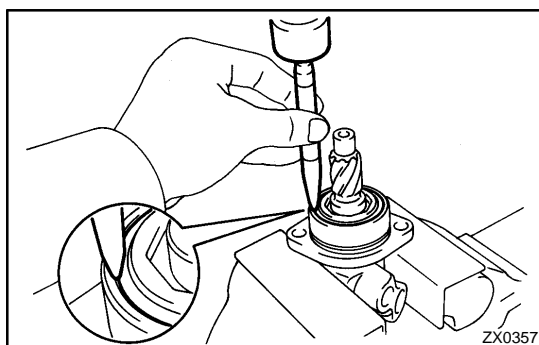
- (l) Lightly mount the control valve assembly between aluminum plates in a vise.
- (m) To prevent oil seal lip damage, wind vinyl tape on the pinion part of the control valve shaft.



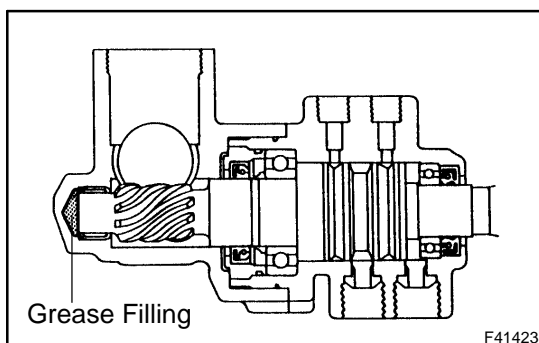
- (n) Using SST, torque the guide nut.
SST 09631-20060
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:

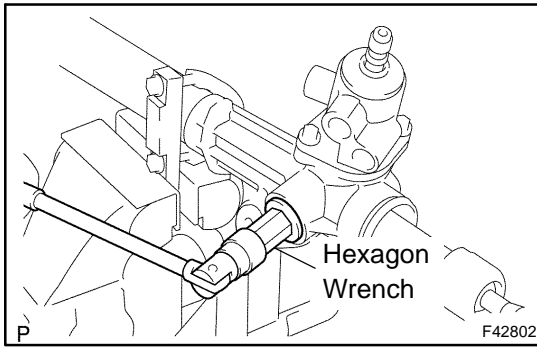
Be careful not to damage the oil seal lip.



- (o) Using a punch and a hammer, stake the nut.
- (p) Coat a new O-ring with power steering fluid, and install it to the valve housing.



- (q) Apply molybdenum disulfide base grease for the needle roller bearing inside the rack housing in the illustrated portion.
Volume of grease applied: Approximately 2 g (0.07 oz)
- (r) Install the control valve assembly with the 2 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

**44. INSTALL RACK GUIDE**

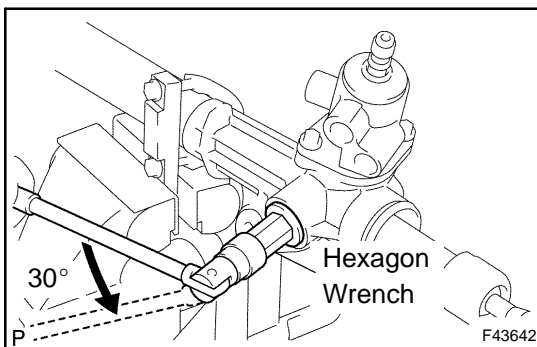
- (a) Install the rack guide and spring.
- (b) Apply sealant to 2 or 3 threads of the rack guide spring cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (c) Using a hexagon wrench (24 mm), temporarily install the spring cap.

45. ADJUST TOTAL PRELOAD

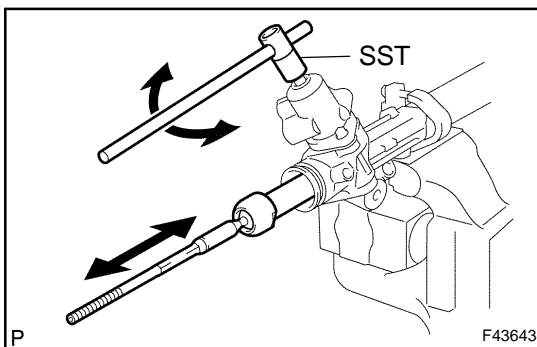
- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.



- (b) Using a hexagon wrench (24 mm), tighten the rack guide spring cap.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

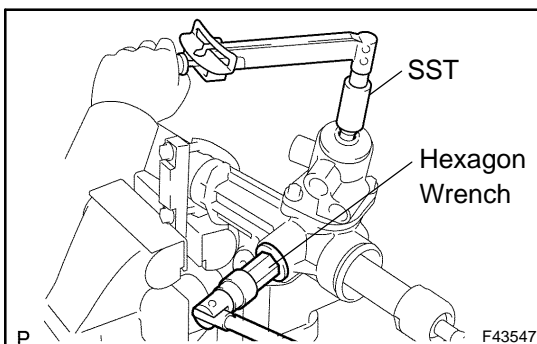
- (c) Return the cap 30°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616-00011

- (e) Using a hexagon wrench (24 mm), loosen the cap until the rack guide spring is not functioning.



- (f) Using SST, a torque wrench and a hexagon wrench (24 mm), tighten the cap until the preload is within specification.

SST 09616-00011

Preload in center position (turning):

1.35 - 1.55 N·m (13.77 - 15.81 kgf·cm, 11.94 - 13.71 in·lbf)

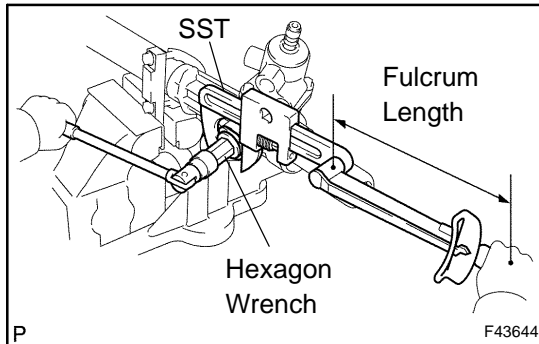
NOTICE:

Adjustment should be done in the tightening direction of the spring cap.

HINT:

Adjust the preload so that the turning torque of the control valve shaft, with the steering rack in the center position, is within the specification.

- (g) Apply sealant to 2 or 3 threads of the lock nut.
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
- (h) Temporarily install the lock nut.
- (i) Using a hexagon wrench (24 mm), holding the rack guide spring cap rotating, and using SST, torque the nut.
SST 09922-10010
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf) for use with SST



NOTICE:
 Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (j) Recheck the total preload.

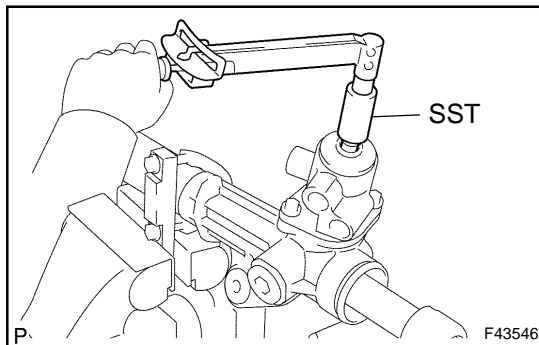
Preload in center position (turning):

1.35 - 1.55 N·m (13.77 - 15.81 kgf·cm, 11.94 - 13.71 in·lbf)

HINT:

Adjust the preload so that the turning torque of the control valve shaft, with the steering rack in the center position, is within the specification.

- (k) Remove the RH and LH rack ends.

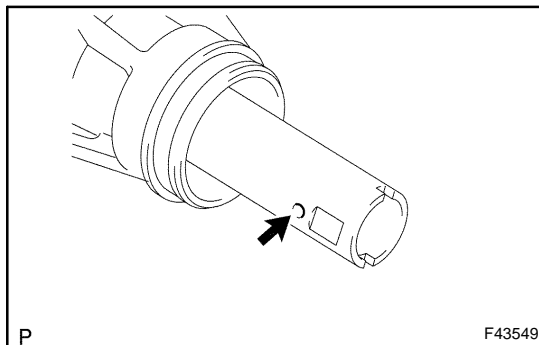


46. INSPECT POWER STEERING RACK

- (a) Insert a wire into the vent hole of the steering rack by 30 mm (1.18 in.), and ensure that the vent hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.



47. INSTALL STEERING RACK END SUB-ASSY

- (a) Install a new claw washer, and temporarily tighten the rack end.

HINT:

Align the claws of the washer with the steering rack grooves.

- (b) Using SST to hold the steering rack steady, and using another SST, torque the rack end LH.

SST 09922-10010

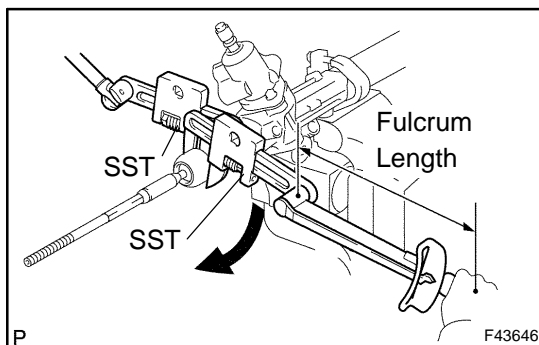
Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf) for use with SST

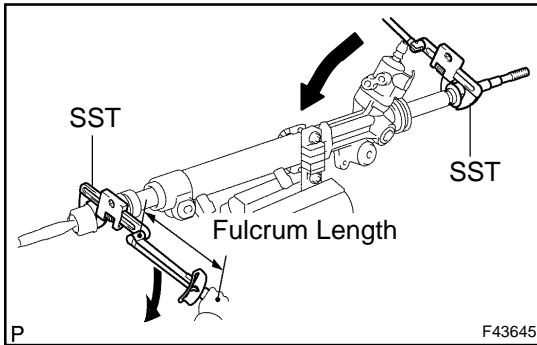
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.9 in.).





- (c) Using SST to hold the rack end LH steady, and using another SST, torque the rack end RH.

SST 09922-10010

Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf) for use with SST

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

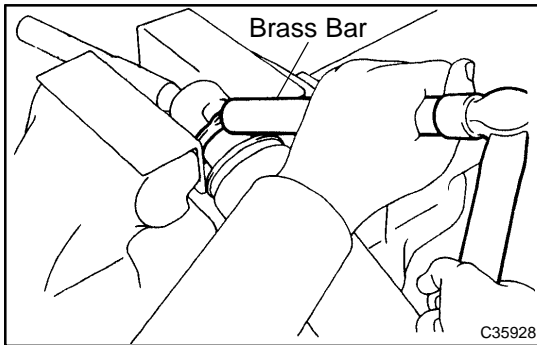
Use a torque wrench with a fulcrum length of 380 mm (14.9 in.).

- (d) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact to the rack.

- (e) Perform the same manner described above on the other side.



48. INSTALL STEERING RACK BOOT LH

- (a) Install the boot.

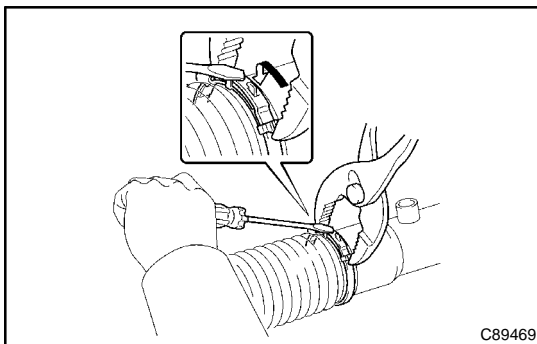
NOTICE:

Be careful not to damage or twist the boot.

49. INSTALL STEERING RACK BOOT RH

HINT:

Install the RH side by the same procedures with the LH side.



50. INSTALL STEERING RACK BOOT CLAMP LH

- (a) Using pliers and a screwdriver, install the clamp.

51. INSTALL STEERING RACK BOOT CLAMP RH

HINT:

Install the RH side by the same procedures with the LH side.

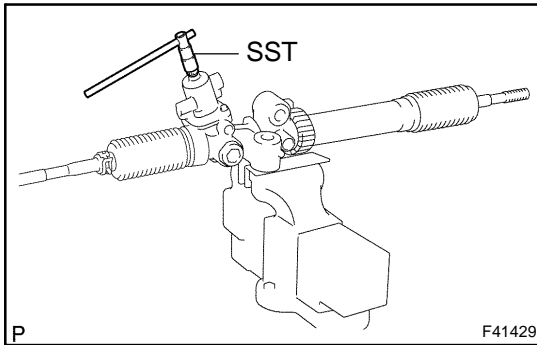
52. INSTALL STEERING RACK BOOT CLIP LH

- (a) Using pliers, install the clip.

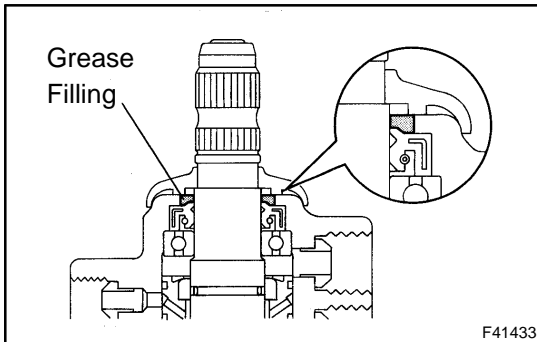
53. INSTALL STEERING RACK BOOT CLIP RH

HINT:

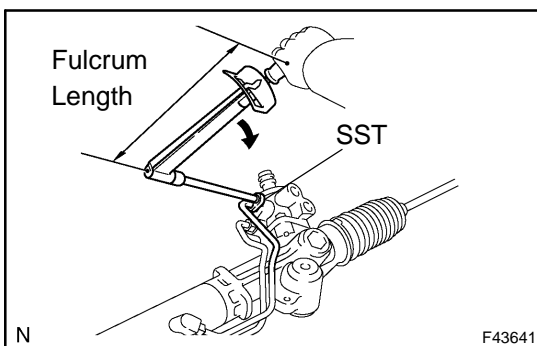
Install the RH side by the same procedures with the LH side.

**54. INSPECT POWER STEERING GEAR ASSY**

- (a) Using SST, check that the rack boot stretches smoothly when the control valve shaft is being rotated.
SST 09616-00011



- (b) Apply MP grease in the illustrated portion.
(c) Install the dust cover.

**55. INSTALL STEERING TURN PRESSURE TUBE**

- (a) Using SST, install the 2 turn pressure tubes.
SST 09023-38201

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf) for use with SST

HINT:

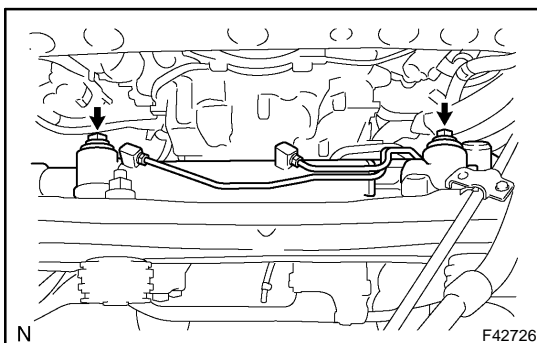
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

56. INSTALL TIE ROD END SUB-ASSY LH

- (a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.
(b) After adjusting toe-in, torque the nut.
Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)

57. INSTALL TIE ROD END SUB-ASSY RH**HINT:**

Install the RH side by the same procedures with the LH side.

**58. INSTALL POWER STEERING LINK ASSY**

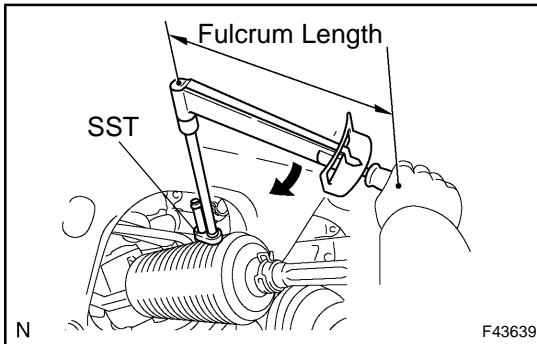
- (a) Install the power steering link assy with the 2 bolts and 2 nuts.
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)

NOTICE:

The nut has a detent, so never turn the nut, be sure to turn the bolt.

HINT:

Insert the bolt and slide it with the gear assy as a unit and then install the bolt on the frame.

59. INSTALL STABILIZER BAR FRONT (See page 26-26)**60. STABILIZE SUSPENSION (See page 26-11)****61. CONNECT STEERING GEAR OUTLET RETURN TUBE**

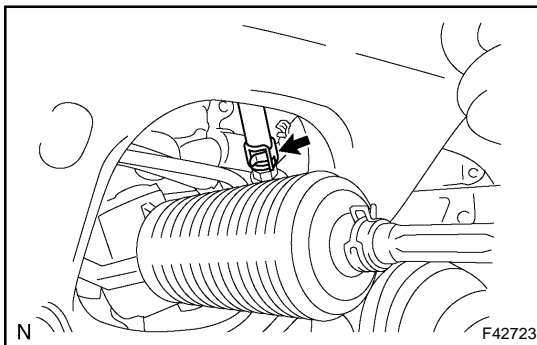
(a) Using SST, connect the outlet return tube.

SST 09023-12701

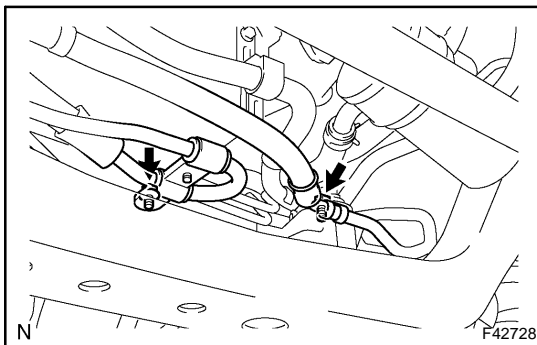
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf) for use with SST

HINT:

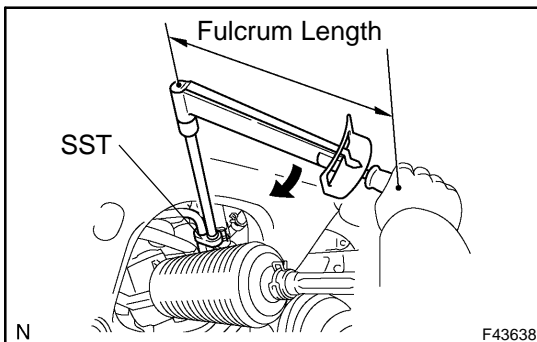
- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.



(b) Install the hose with the clip.

**62. CONNECT PRESSURE FEED TUBE ASSY**

(a) Install the pressure feed tube assy to the frame sub-assy with the 2 bolts.

Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

(b) Using SST, tighten the flare nut and connect the pressure feed tube.

SST 09023-12701

Torque: 42 N·m (420 kgf·cm, 31 ft·lbf) for use with SST

HINT:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

63. FULLY TIGHTEN STEERING INTERMEDIATE SHAFT NO.2 (See page 50-8)**64. CONNECT TIE ROD END SUB-ASSY LH**

- (a) Connect the tie rod end to the steering knuckle arm.
- (b) Install the nut and cotter pin.

Torque: 91 N·m (928 kgf·cm, 67 ft·lbf)

65. CONNECT TIE ROD END SUB-ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

66. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1**67. INSTALL ENGINE UNDER COVER ASSY REAR**

- (a) Install the engine under cover assy rear with the 6 bolts.

68. INSTALL FRONT WHEEL

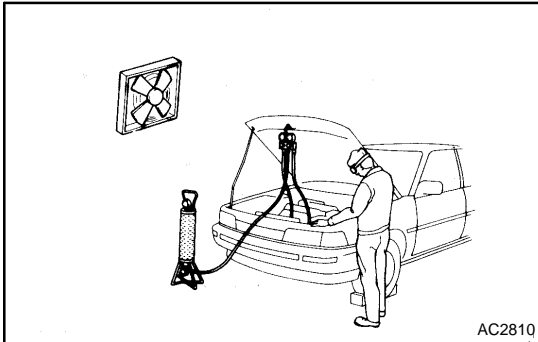
Torque: 112 N·m (1,142 kgf·cm, 83 ft·lbf)

69. PLACE FRONT WHEELS FACING STRAIGHT AHEAD (See page 50-8)**70. INSTALL TURN SIGNAL SWITCH ASSY (See page 50-8)****71. INSTALL SPIRAL CABLE SUB-ASSY (See page 50-8)****72. INSTALL STEERING COLUMN COVER LWR (See page 50-8)****73. CENTER SPIRAL CABLE (See page 50-8)****74. INSTALL STEERING WHEEL ASSY (See page 50-8)****75. INSPECT STEERING WHEEL CENTER POINT (See page 50-8)****76. INSTALL HORN BUTTON ASSY (See page 60-20)****77. INSPECT HORN BUTTON ASSY (See page 60-20)****78. INSPECT SRS WARNING LIGHT (See page 05-1213)****79. ADD POWER STEERING FLUID****80. BLEED POWER STEERING FLUID (See page 51-3)****81. CHECK POWER STEERING FLUID LEAKAGE (See page 51-3)****82. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-7)**

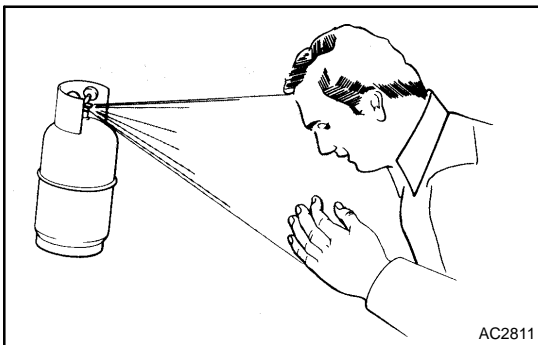
AIR CONDITIONING SYSTEM

PRECAUTION

550UR-02



1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME**
2. **ALWAYS WEAR EYE PROTECTION**



3. **BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN**

If liquid refrigerant gets in your eyes or on your skin.

- (a) Wash the area with lots of cold water.

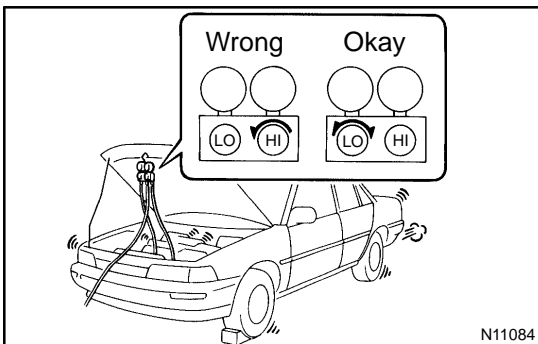
CAUTION:

Do not rub your eyes or skin.

- (b) Apply clean petroleum jelly to the skin.
- (c) Go immediately to a physician or hospital for professional treatment.

4. **NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME**

5. **BE CAREFUL NOT TO DROP CONTAINER OR APPLY PHYSICAL SHOCKS TO IT**



6. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM**

If there is not enough refrigerant in the refrigerant system, oil lubrication will be insufficient and compressor burnout may occur, so take care to avoid this, necessary care should be taken.

7. **DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING**

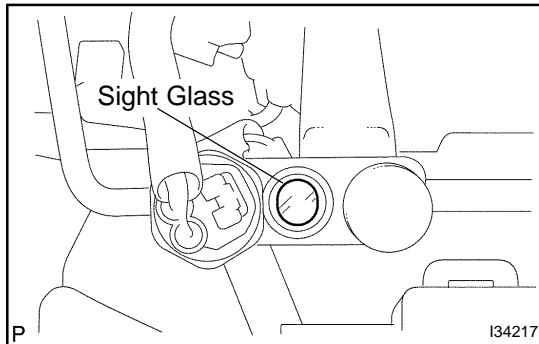
If the high pressure valve is opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close only the low pressure valve.

8. **BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT**

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating, etc.

REFRIGERANT ON-VEHICLE INSPECTION

550U9-03



1. INSPECT REFRIGERANT VOLUME

- (a) Observe the sight glass on the cooler refrigerant liquid pipe A.

Test conditions:

- Engine is running at 1,500 rpm
- Blower speed control switch is at "HI"
- A/C switch is ON
- Temperature control dial is at "MAX. COOL"
- Doors are fully open.

Item	Symptom	Amount of refrigerant	Corrective Actions
1	Bubbles exist	Insufficient*	(1) Check for gas leakage and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles exist	Empty insufficient or excessive	Refer 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
4	Considerable temperature difference between compressor inlet and outlet.	Proper or excessive	Refer to 5 and 6
5	Immediately after air conditioning is turned off, refrigerant clears	Excessive	(1) Discharge refrigerant (2) Remove air and supply proper amount or purified refrigerant
6	Immediately after air conditioning is turned off, refrigerant foams and then becomes clear	Proper	-

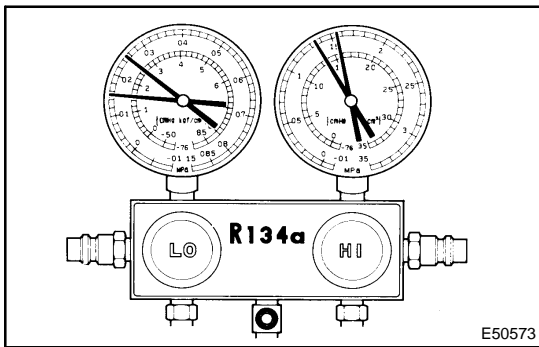
*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

(a) This is a method in which the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECIRC is 30 – 35 °C (86 – 95 °F)
- Engine is running at 1,500 rpm
- Blower speed control switch is at "HI"
- Temperature control dial is at "COOL"
- A/C switch is ON
- Doors are fully open.



(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm²)

High pressure side:

1.37 – 1.57 MPa (14 – 16 kgf/cm²)

(2) Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

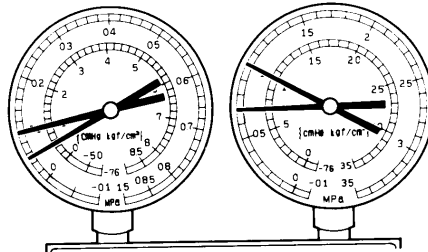
The image shows a close-up of the two gauges from the manifold gauge set. The low-pressure gauge (left) shows a reading of approximately 0.15 MPa. The high-pressure gauge (right) shows a reading of approximately 1.37 MPa. The gauges are mounted on a manifold.

I22117

Symptom	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes becomes a vacuum and sometime normal	Moisture in refrigeration system freezes at expansion valve orifice, causing a temporary stop of cycle. However, when it melts, normal state is restored.	<ul style="list-style-type: none"> • Drier in oversaturated state • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant 	<ul style="list-style-type: none"> (1) Replace condenser (2) Remove moisture in cycle by repeatedly evacuating air (3) Supply proper amount of new refrigerant

(3) Insufficient cooling

Condition: Cooling system does not function effectively.

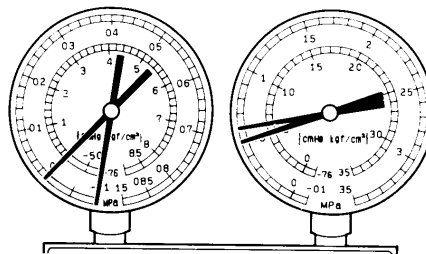


I22118

Symptom	Probable cause	Diagnosis	Corrective Actions
<ul style="list-style-type: none"> • Pressure is low on both low and high pressure sides • Bubbles are seen through sight glass continuously • Insufficient cooling performance 	Gas leakage in refrigeration system	<ul style="list-style-type: none"> • Insufficient refrigerant • Refrigerant leaking 	<ol style="list-style-type: none"> (1) Check for gas leakage and repair if necessary (2) Supply proper amount of new refrigerant (3) If indicated pressure value is close to 0 when connected to the gauge, create vacuum after inspecting and repairing the location of leakage.

(4) Poor circulation of refrigerant

Condition: Cooling system does not function effectively.

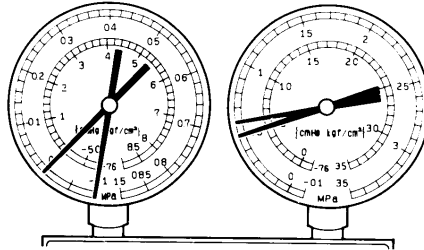


I22119

Symptom	Probable cause	Diagnosis	Corrective Action
<ul style="list-style-type: none"> • Pressure is low on both the low and the high pressure sides • Frost exists on pipe from condenser to unit 	Refrigerant flow is obstructed by dirt in the receiver	Receiver is clogged	Replace condenser

(5) Refrigerant does not circulate

Condition: Cooling system does not function. (Sometimes it may function.)

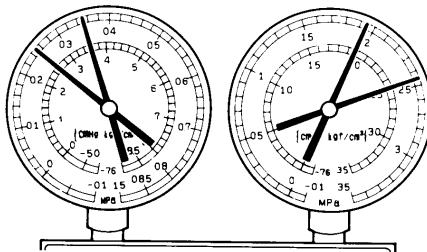


I22120

Symptom	Probable cause	Diagnosis	Corrective Actions
<ul style="list-style-type: none"> Vacuum is indicated on low pressure side and very low pressure is indicated on high pressure side Frost or dew is seen on piping on both sides of receiver/drier or expansion valve 	<ul style="list-style-type: none"> Refrigerant flow is obstructed by moisture or dirt in refrigeration system Refrigerant flow is obstructed by gas leak from expansion valve 	Refrigerant does not circulate	<ol style="list-style-type: none"> Check the expansion valve Clean out dirt in expansion valve by blowing air Replace condenser Evaporate air and supply proper amount of new refrigerant. For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant is overcharged or cooling of effectiveness of condenser is insufficient

Condition: Cooling system does not function.

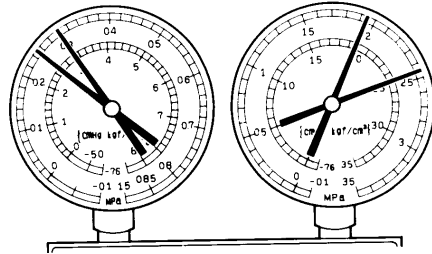


I22121

Symptom	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> Pressure is too high on both low and high pressure sides No air bubbles are seen through sight glass even when engine rpm lowers 	<ul style="list-style-type: none"> Unable to develop sufficient performance due to excessive use of refrigeration system Cooling effectiveness of condenser is insufficient. 	<ul style="list-style-type: none"> Excessive refrigerant in cycle→excessive refrigerant is supplied Condenser cooling effectiveness is insufficient→condenser fins are clogged at cooling fan 	<ol style="list-style-type: none"> Clean condenser Check cooling fan with cooling fan motor operation If (1) and (2) are in normal state, check the amount of refrigerant and supply proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Cooling system does not function.



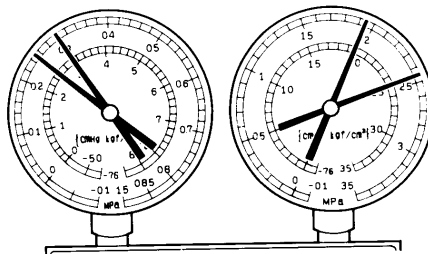
NOTE: These gauge indications are shown when the refrigeration system opens and the refrigerant is charged without vacuum purging.

I22122

Symptom	Probable cause	Diagnosis	Corrective Actions
<ul style="list-style-type: none"> • Pressure is too high on both low and the high pressure sides • The low pressure piping is too hot to touch • Bubbles can be seen through sight glass 	Air entered in refrigeration system	<ul style="list-style-type: none"> • Air present in refrigeration system • Insufficient vacuum purging 	<ol style="list-style-type: none"> (1) Check compressor oil to see if it is dirty or insufficient (2) Evacuate air and supply new refrigerant

(8) Expansion valve improper

Condition: Refrigerant functions insufficiently.

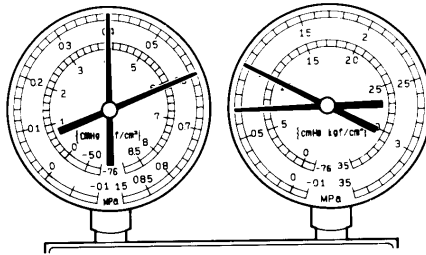


I22123

Symptom	Probable cause	Diagnosis	Corrective Actions
<ul style="list-style-type: none"> • Pressure is too high on both low and high pressure sides • Frost or large amount of dew on piping on low pressure side 	Trouble in expansion valve	<ul style="list-style-type: none"> • Excessive refrigerant in low pressure piping • Expansion valve opened too wide 	Check expansion valve

(9) Defective compression compressor

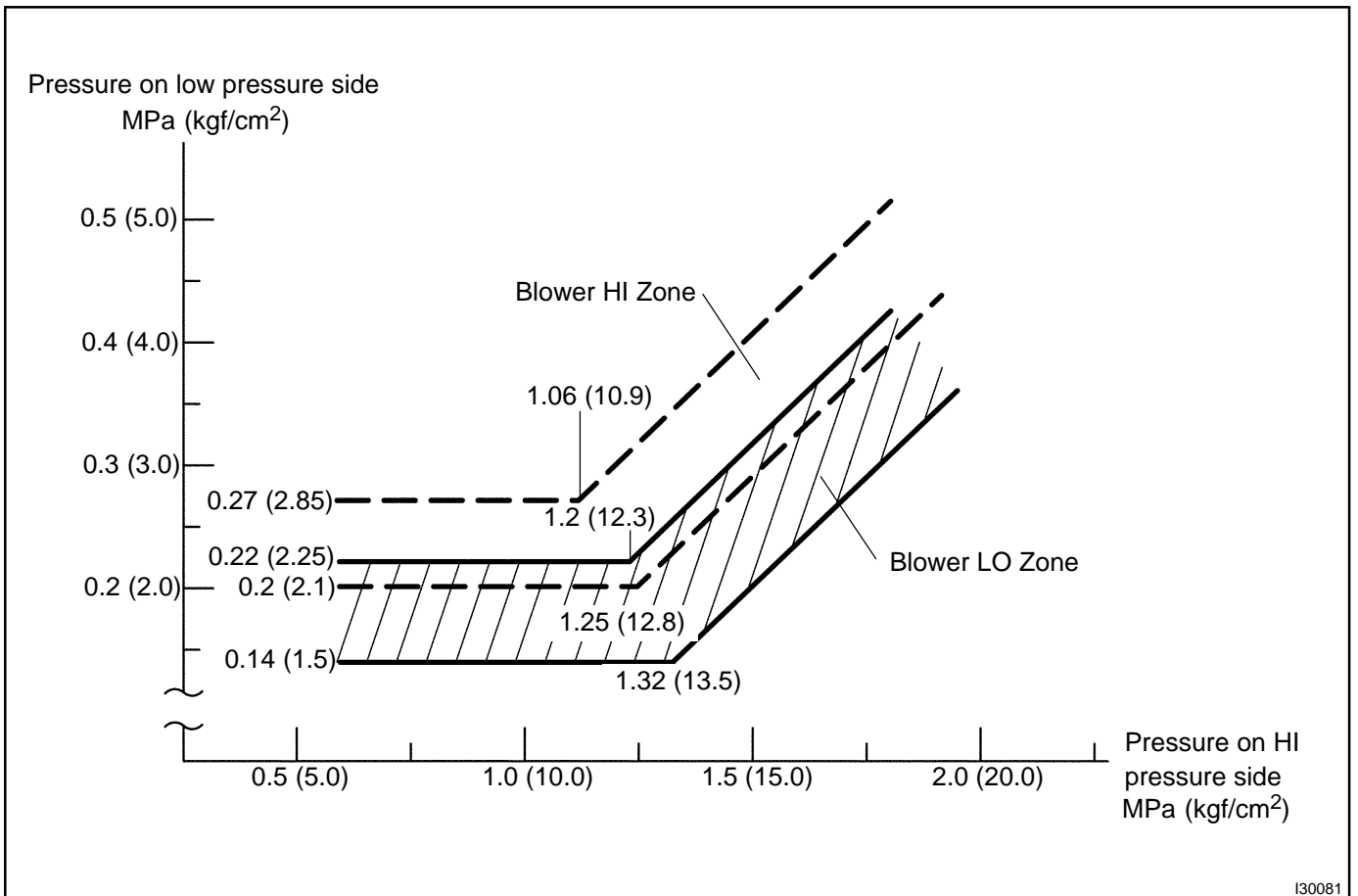
Condition : Refrigerant is not effective.



I22124

Symptom	Probable cause	Diagnosis	Corrective Actions
<ul style="list-style-type: none"> • Pressure is too high both on low and high pressure sides • Pressure is too low on high pressure side 	Internal leak in compressor	<ul style="list-style-type: none"> • Compression failure • Leakage from damaged valve or broken sliding parts 	Repair or replace compressor

Gauge readings (Reference)



I30081

REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

- Turn the A/C switch to ON.
- Operating the cooler compressor at the engine rpm of approx. 1,000 for 5 to 6 min., circulate the refrigerant and collect the compressor oil remaining in each component into the cooler compressor as much as possible.
- Stop the engine.
- Let the refrigerant gas out.
SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

2. CHARGE REFRIGERANT

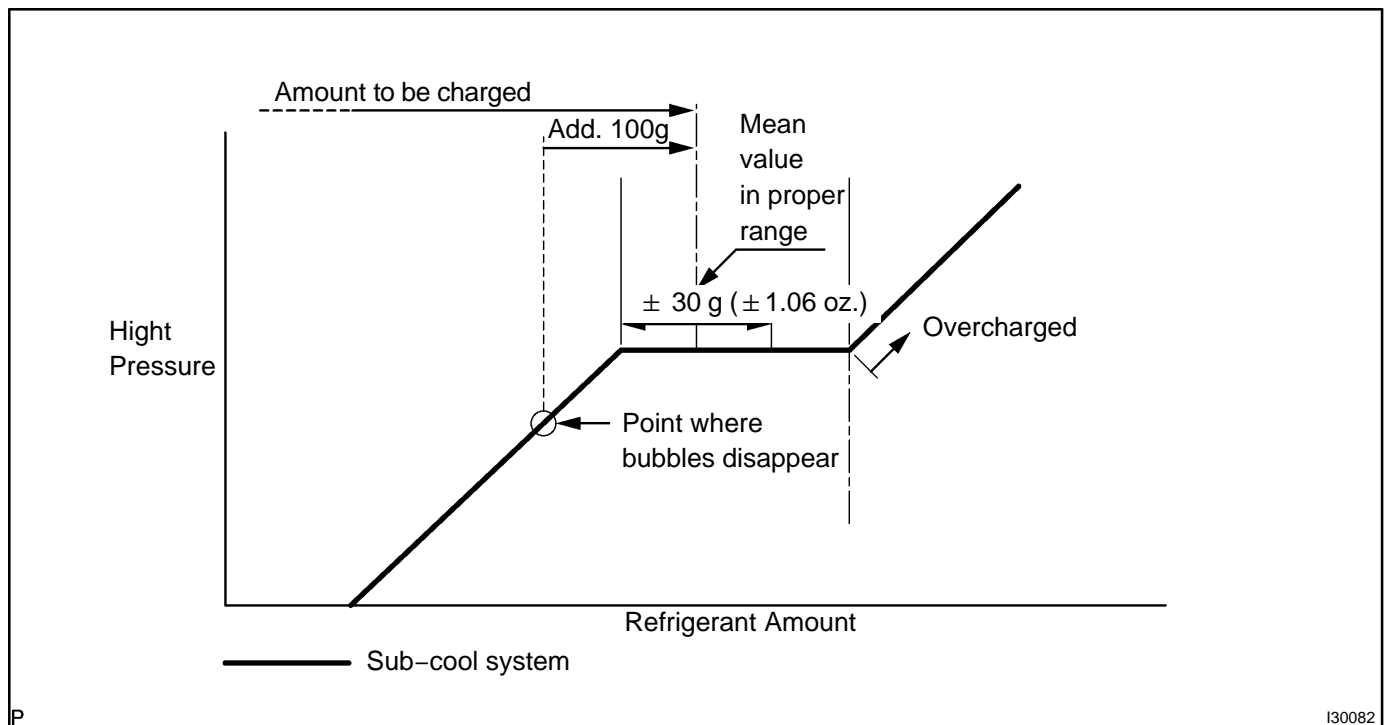
- Using a vacuum pump, perform a vacuum purging.
- Charge refrigerant, HFC-134a (R134a).

Standard:

Single A/C: 600 ± 30 g (21.16 ± 1.06 oz.)

Dual A/C: 800 ± 30 g (28.21 ± 1.06 oz.)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



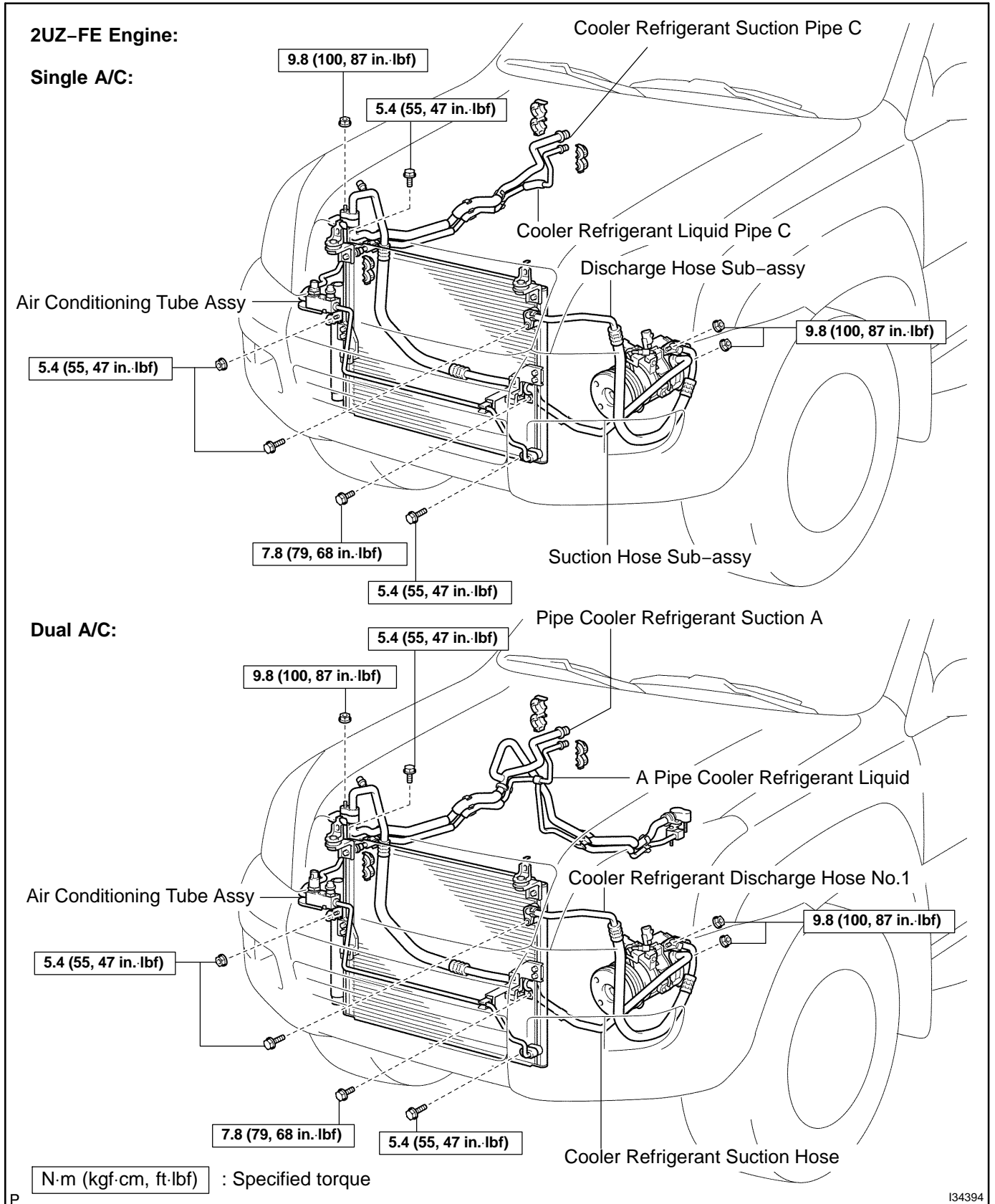
3. WARM UP ENGINE

4. INSPECT LEAKAGE OF REFRIGERANT

- Using a gas leak detector, check for leakage of the refrigerant.

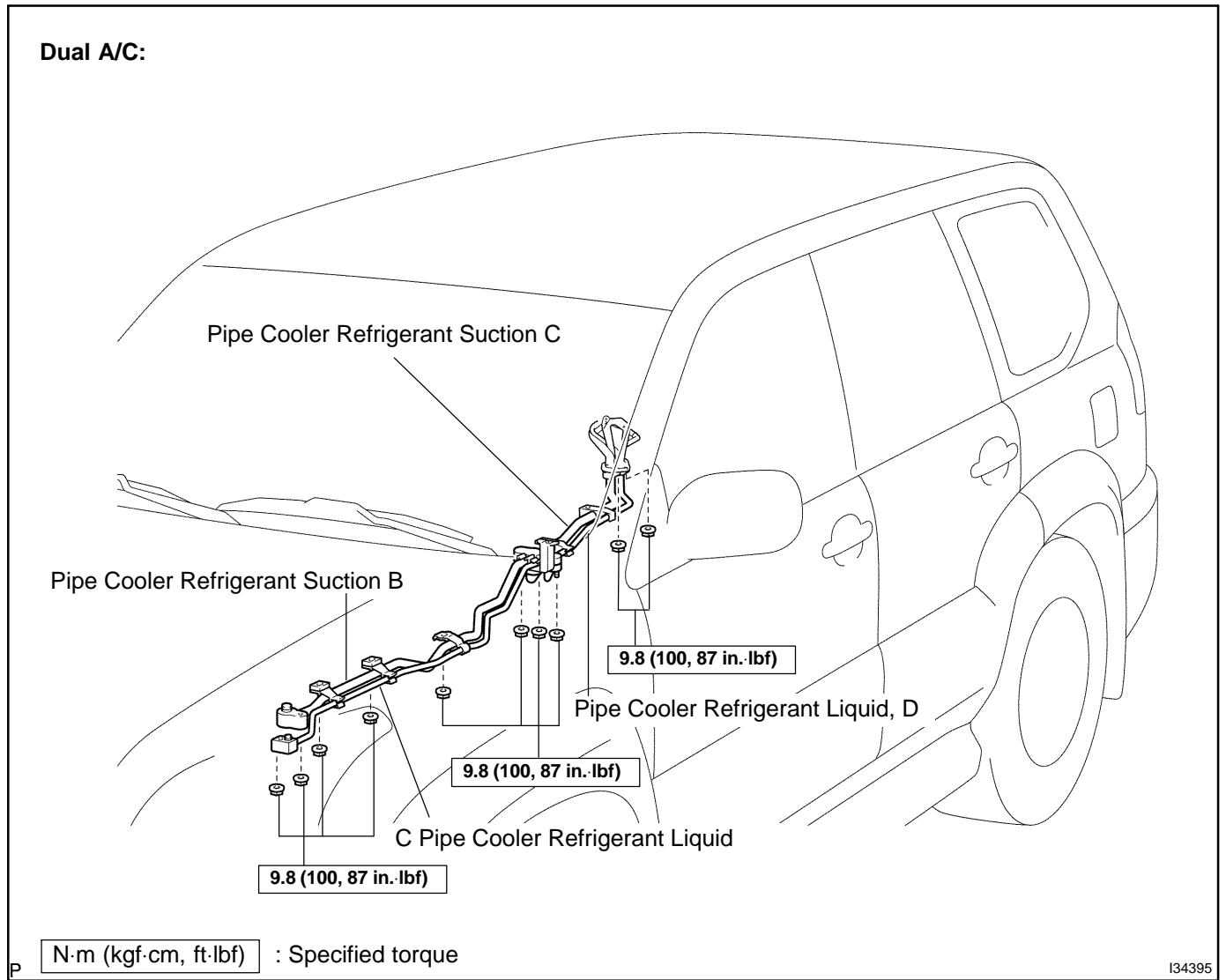
REFRIGERANT LINE COMPONENTS

550UB-02



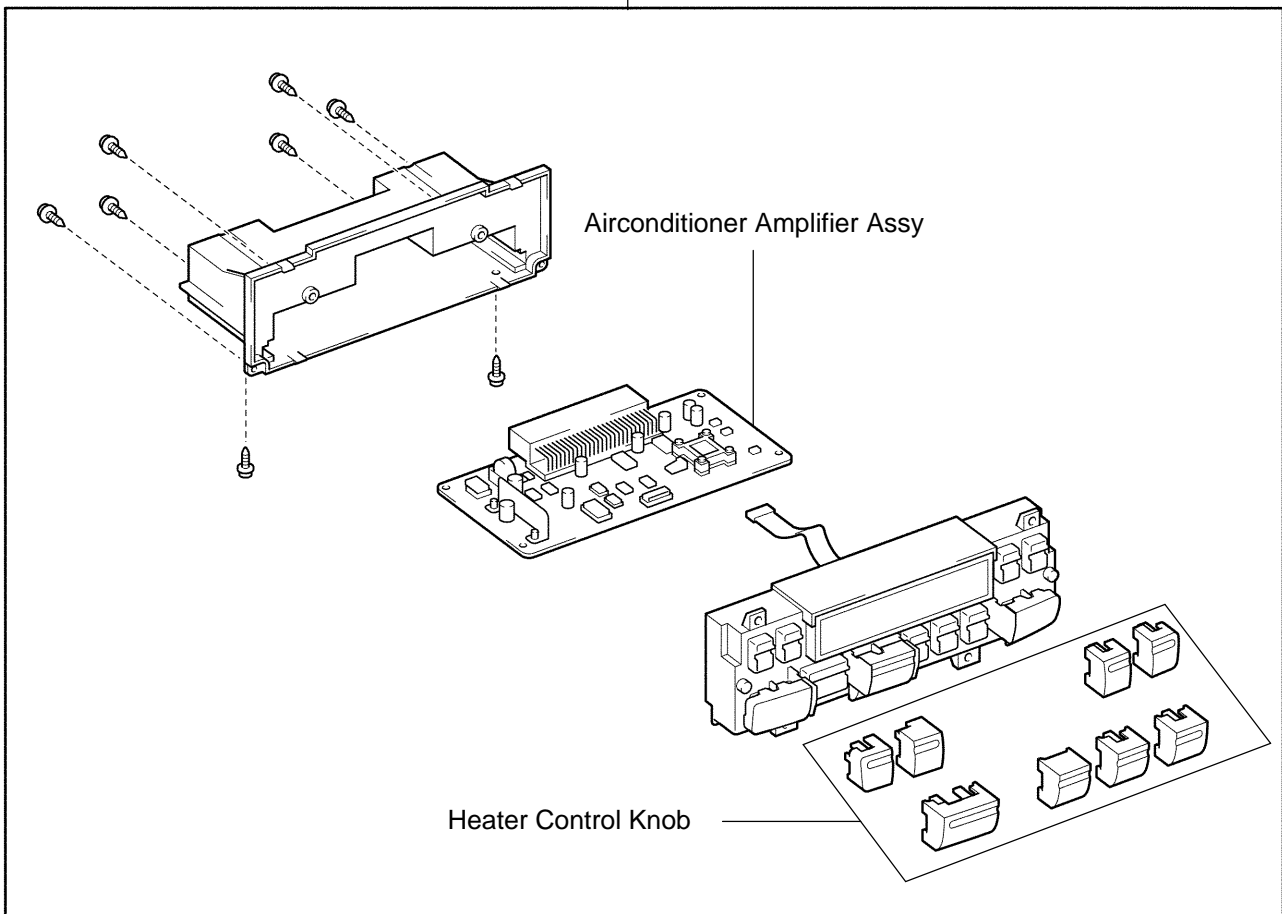
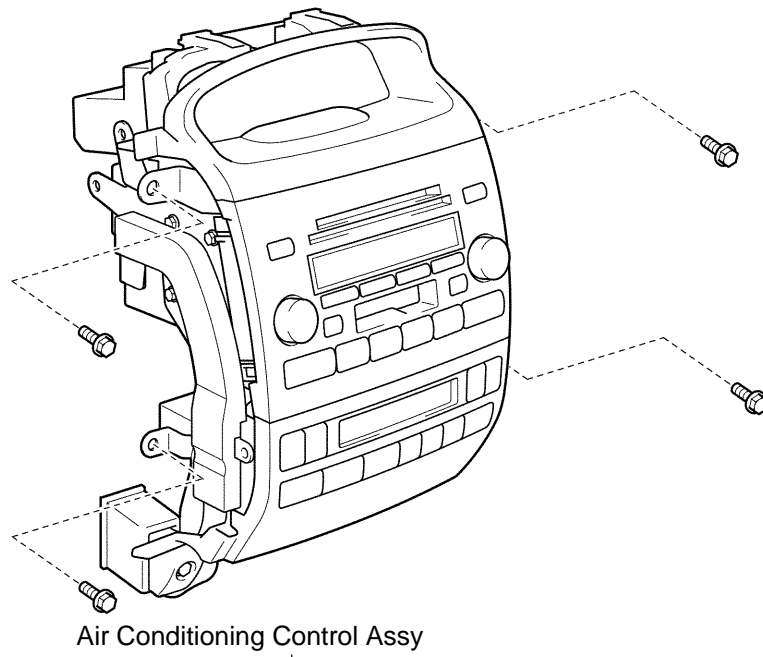
P

134394



AIR CONDITIONING CONTROL ASSY COMPONENTS

550UC-02



P

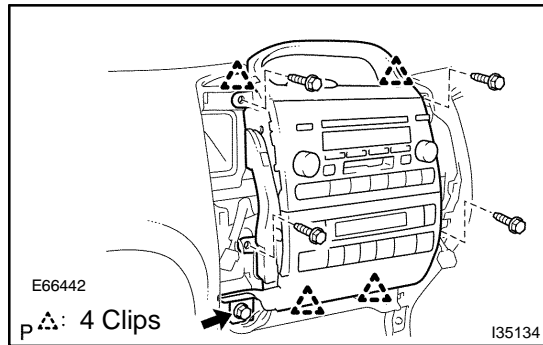
134227

OVERHAUL

HINT:

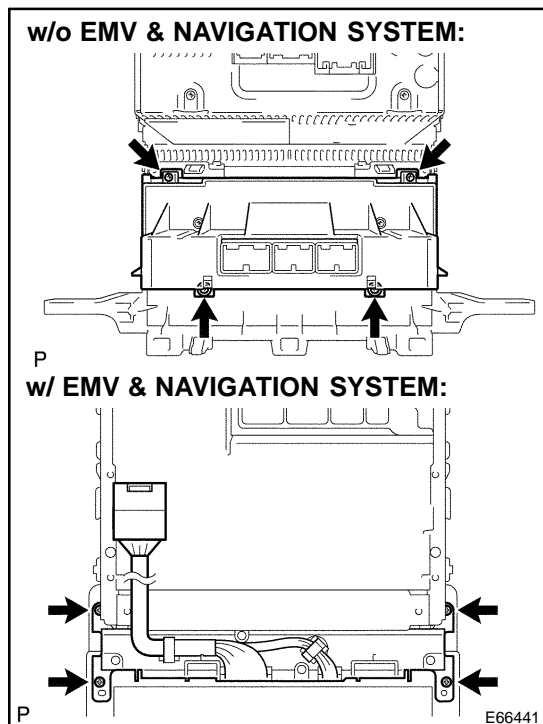
COMPONENTS: See page 55-11

1. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (See page 71-13)
2. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (See page 71-13)

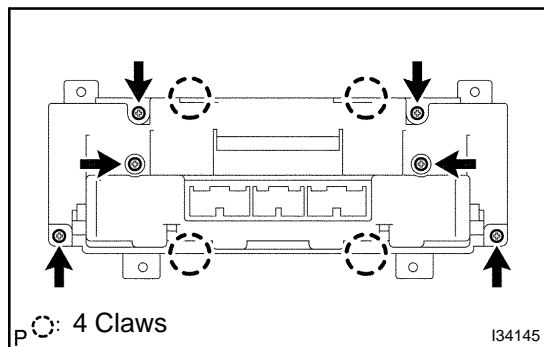


3. REMOVE INTEGRATION CONTROL & PANEL ASSY
 - (a) Loosen the bolt and remove the 4 bolts, the 4 clips and the integration control & panel assy.

4. REMOVE RADIO BRACKET NO.1 (See page 67-9)
5. REMOVE RADIO BRACKET NO.2 (See page 67-9)
6. REMOVE RADIO RECEIVER ASSY (W/ EMV & NAVIGATION SYSTEM) (See page 67-12)

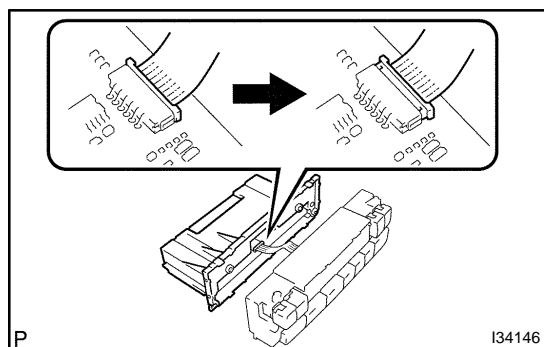


7. REMOVE AIR CONDITIONING CONTROL ASSY
 - (a) Remove the 4 screws and the air conditioning control assy.

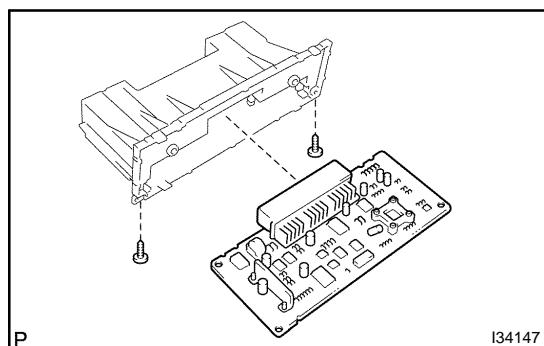


8. REMOVE AIRCONDITIONER AMPLIFIER ASSY (W/O EMV & NAVIGATION SYSTEM)

- (a) Release the 4 claw fittings and remove the 6 screws and the heater control housing.



- (b) Release the lock of the connector and disconnect the cable.



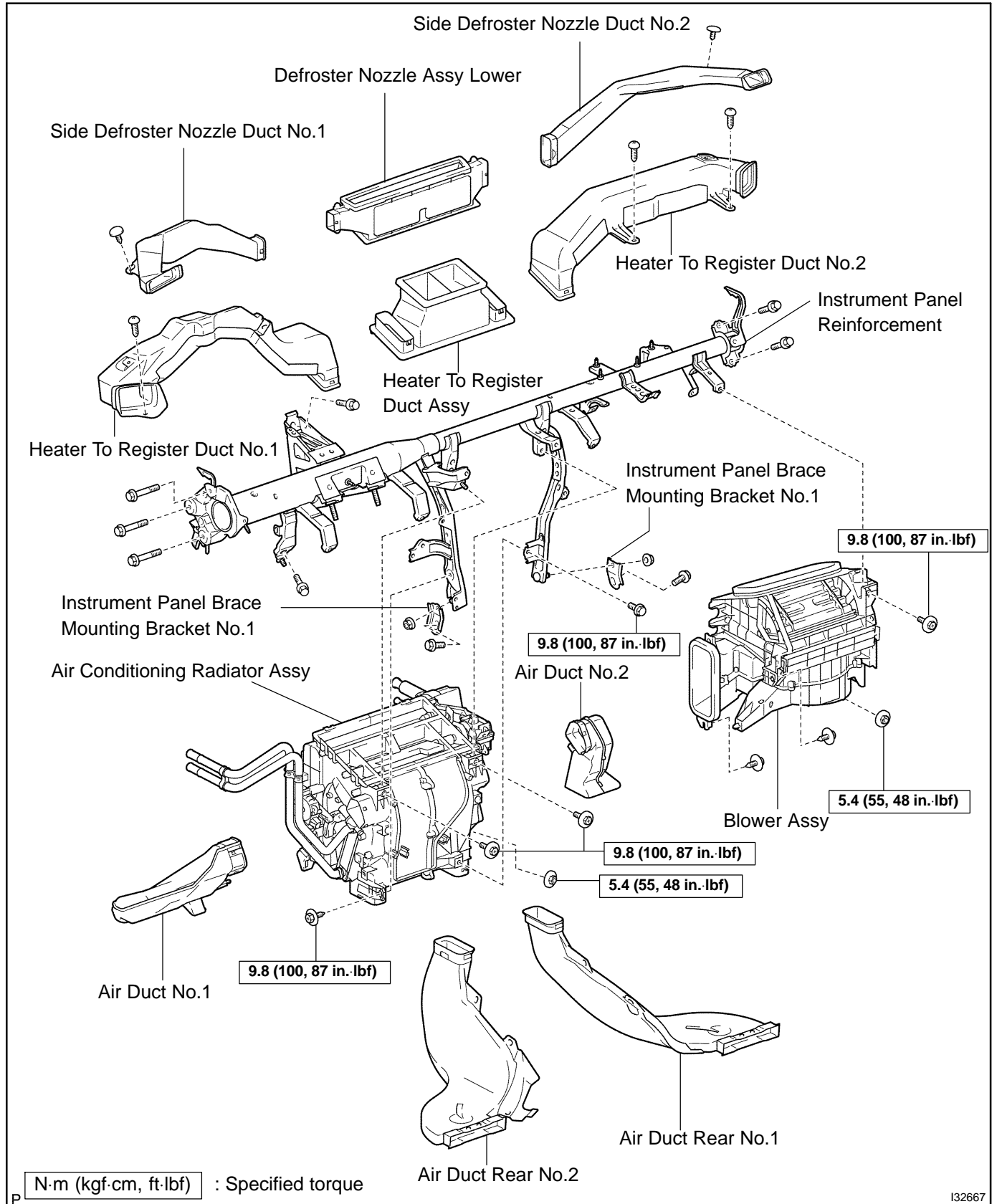
- (c) Remove the 2 screws and the air conditioner amplifier assy.

9. REMOVE AIR CONDITIONING CONTROL BULB (W/O EMV & NAVIGATION SYSTEM)

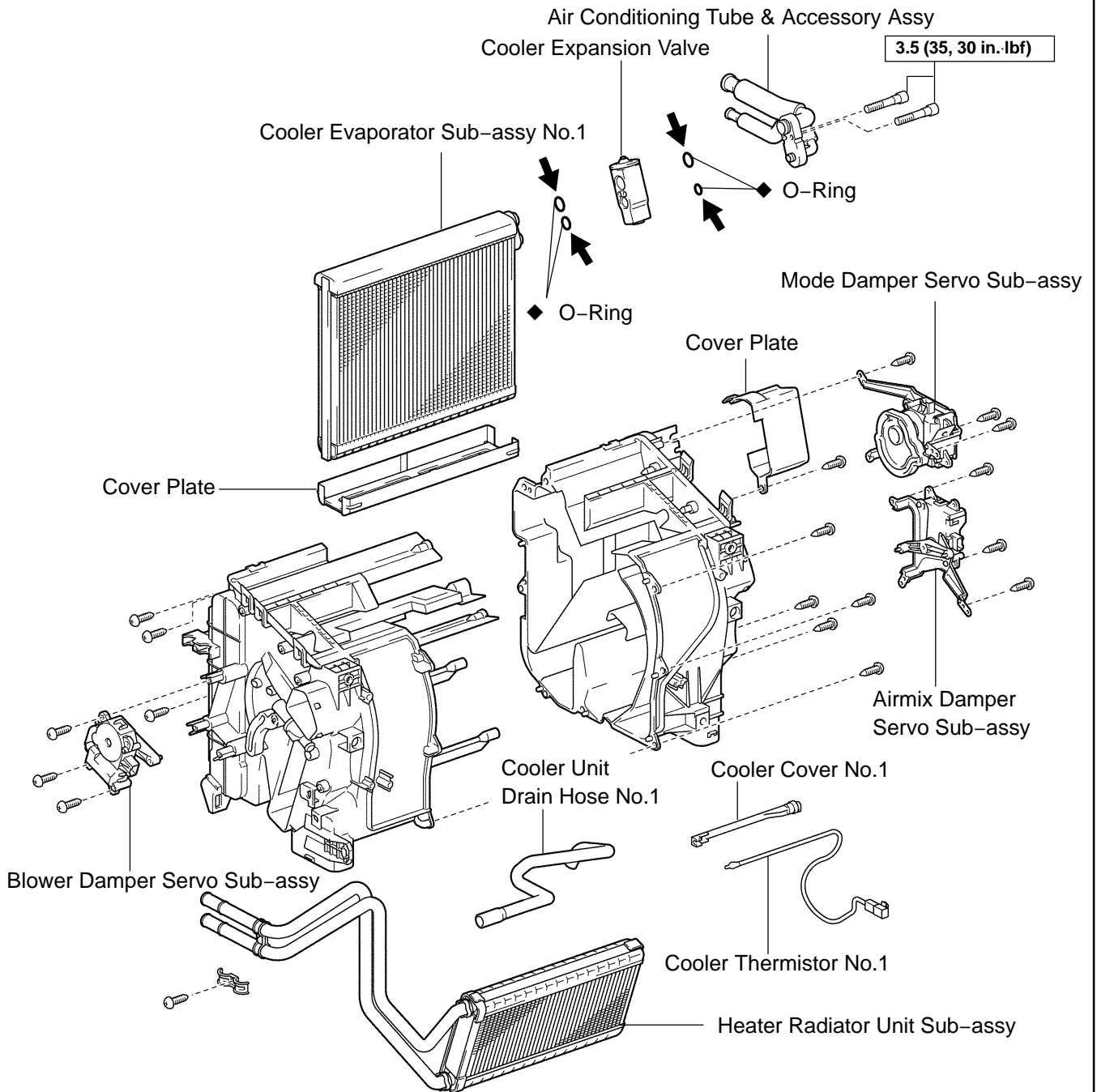
10. REMOVE HEATER CONTROL KNOB (W/O EMV & NAVIGATION SYSTEM)

AIR CONDITIONING RADIATOR ASSY COMPONENTS

550UE-02



132667



- N·m (kgf·cm, ft·lbf) : Specified torque
- ◆ Non-reusable part
- ← Compressor oil ND-OIL 8 or equivalent

OVERHAUL

HINT:

COMPONENTS: See page 55-14

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

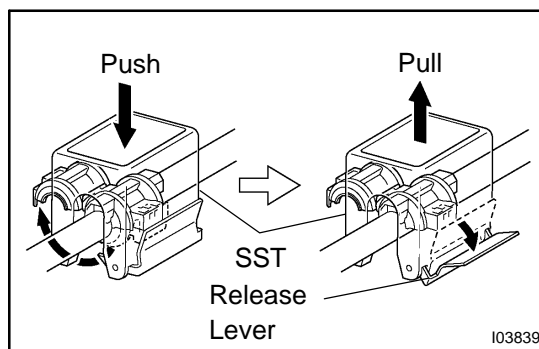
2. REMOVE COOLER REFRIGERANT SUCTION PIPE C (W/O REAR COOLER)

(a) Install SST on the piping clamp.

SST 09870-00015

HINT:

Make sure the direction of the piping clamp claw and SST by checking the illustration shown on the caution label.

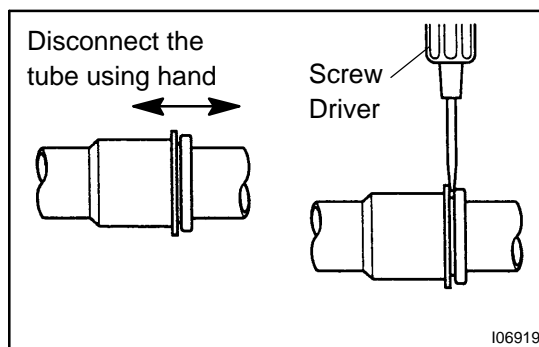


(b) Push down SST and release the clamp lock.

NOTICE:

Be careful not to deform the tube when pushing SST.

(c) Pull SST slightly and push the release lever, and then remove the piping clamp with SST.



(d) Disconnect the suction hose sub-assy.

NOTICE:

- Do not use tools like a screwdriver to remove the tube.
- Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

3. REMOVE PIPE COOLER REFRIGERANT SUCTION A (W/ REAR COOLER)

SST 09870-00015

HINT:

Disconnection of the pipe cooler refrigerant suction A is the same way as the cooler refrigerant suction pipe C.

4. REMOVE COOLER REFRIGERANT LIQUID PIPE C (W/O REAR COOLER)

SST 09870-00025

HINT:

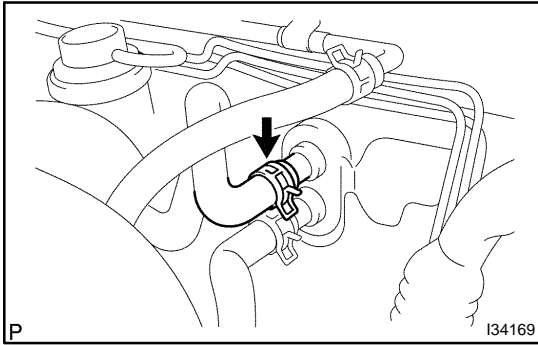
Disconnection of the cooler refrigerant liquid pipe C is the same way as the cooler refrigerant suction pipe C.

5. REMOVE COOLER REFRIGERANT LIQUID PIPE A (W/ REAR COOLER)

SST 09870-00025

HINT:

Disconnection of the cooler refrigerant liquid pipe A is the same way as the cooler refrigerant suction pipe C.



6. DISCONNECT HEATER WATER OUTLET HOSE A (FROM HEATER UNIT)

- (a) Using pliers, grip the claws of the clip and slide the clip to disconnect the heater water outlet hose A (from heater unit).

7. DISCONNECT HEATER WATER INLET HOSE A

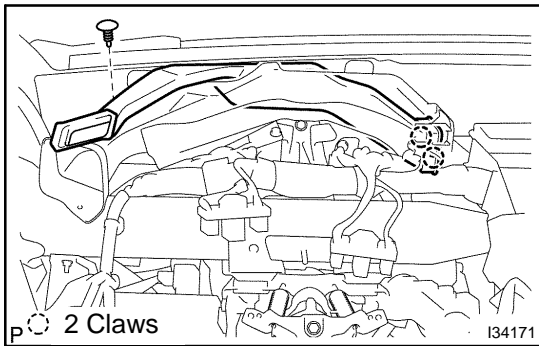
HINT:

Disconnection of the heater water inlet hose A is the same way as the heater water outlet hose A (from heater unit).

8. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT (See page 71-13)

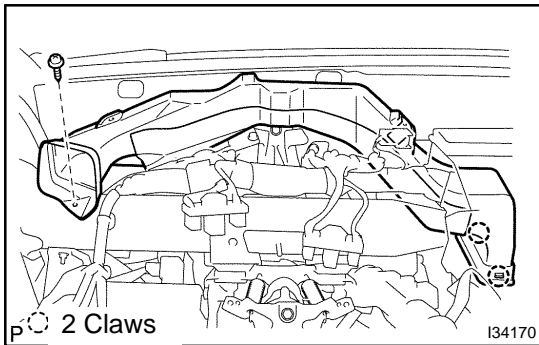
HINT:

Refer to the instructions for removal of the instrument panel safety pad sub-assy w/ defroster nozzle duct.



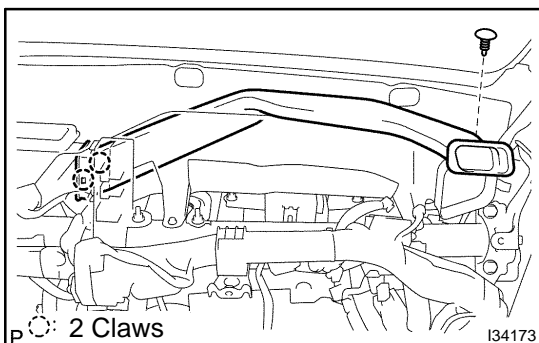
9. REMOVE SIDE DEFROSTER NOZZLE DUCT NO.1

- (a) Release the 2 claw fittings and remove the clip and side defroster nozzle duct No.1.



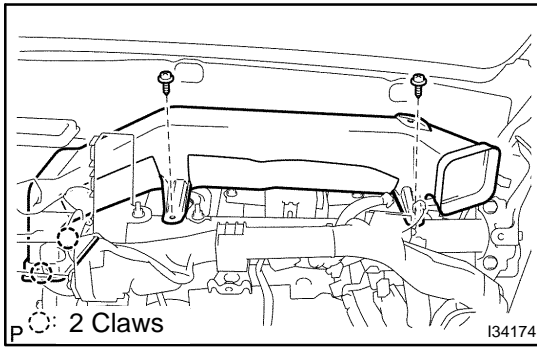
10. REMOVE SIDE DEFROSTER NOZZLE DUCT NO.2

- (a) Release the 2 claw fittings and remove the clip and the side defroster nozzle duct No.2.

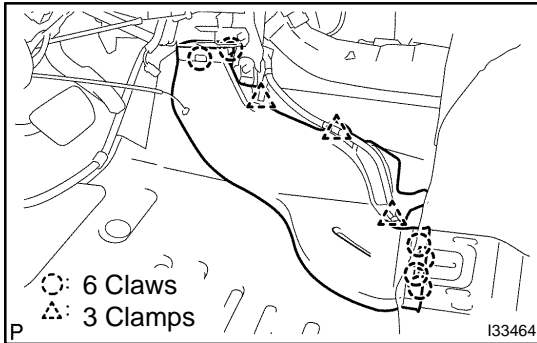


11. REMOVE HEATER TO REGISTER DUCT NO.1

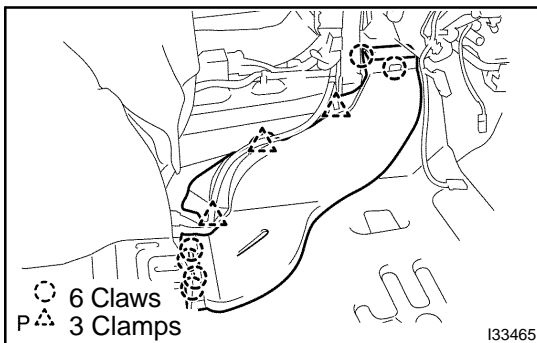
- (a) Release the 2 claw fittings and remove the screw and the heater to register duct No.1.

**12. REMOVE HEATER TO REGISTER DUCT NO.2**

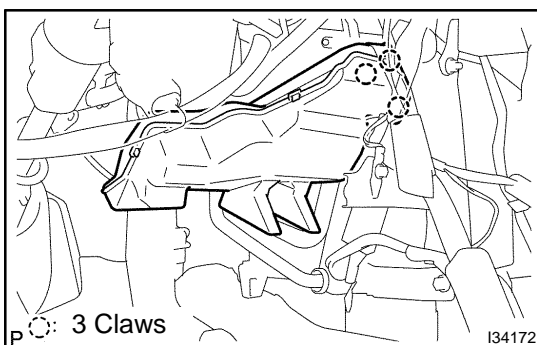
- (a) Release the 2 claw fittings and remove the 2 screws and the heater to register duct No.2.

**13. REMOVE AIR DUCT REAR NO.2**

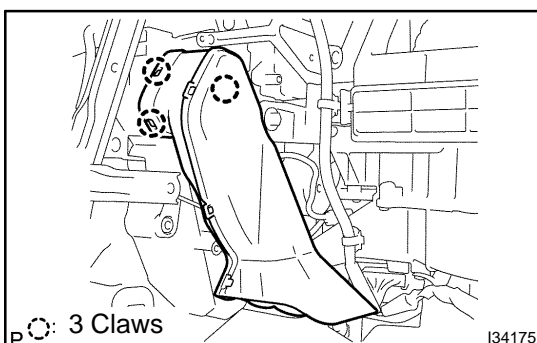
- (a) Release the 6 claw fittings and the 3 clamps, and remove the air duct rear No.2.

**14. REMOVE AIR DUCT REAR NO.1**

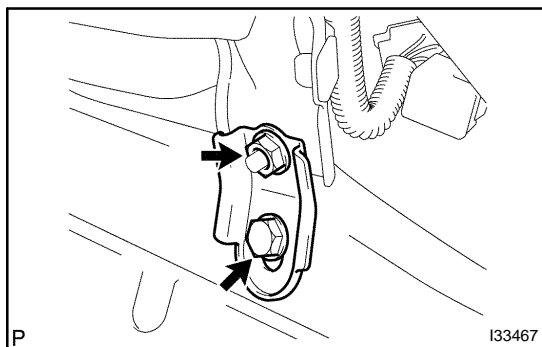
- (a) Release the 6 claw fittings and the 3 clamps, and remove the air duct rear No.1.

**15. REMOVE AIR DUCT NO.1**

- (a) Release the 3 claw fittings and remove the air duct No.1.

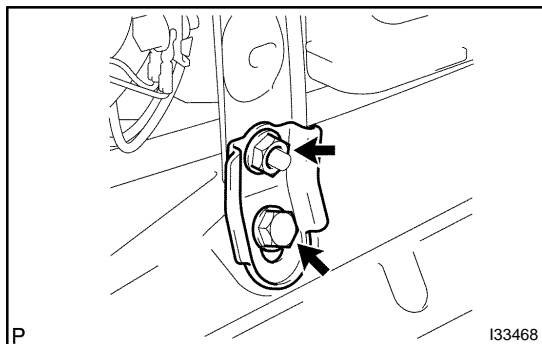
**16. REMOVE AIR DUCT NO.2**

- (a) Release the 3 claw fittings and remove the air duct No.2.

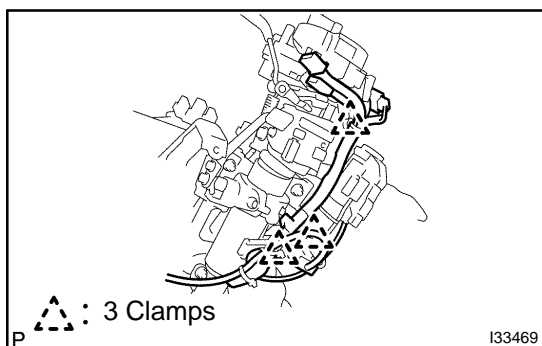


17. REMOVE INSTRUMENT PANEL BRACE MOUNTING BRACKET NO.1

- (a) Remove the bolt, the nut and the instrument panel brace mounting bracket No.1.

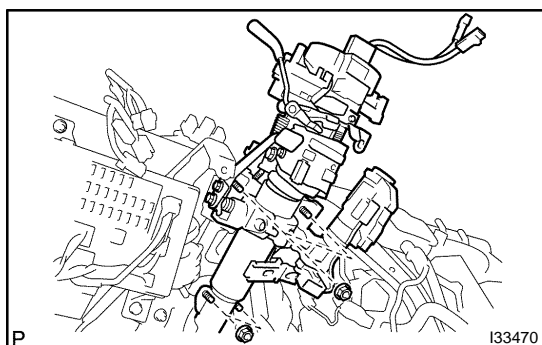


- (b) Remove the bolt, the nut and the instrument panel brace mounting bracket No.1.



18. DISCONNECT STEERING COLUMN ASSY

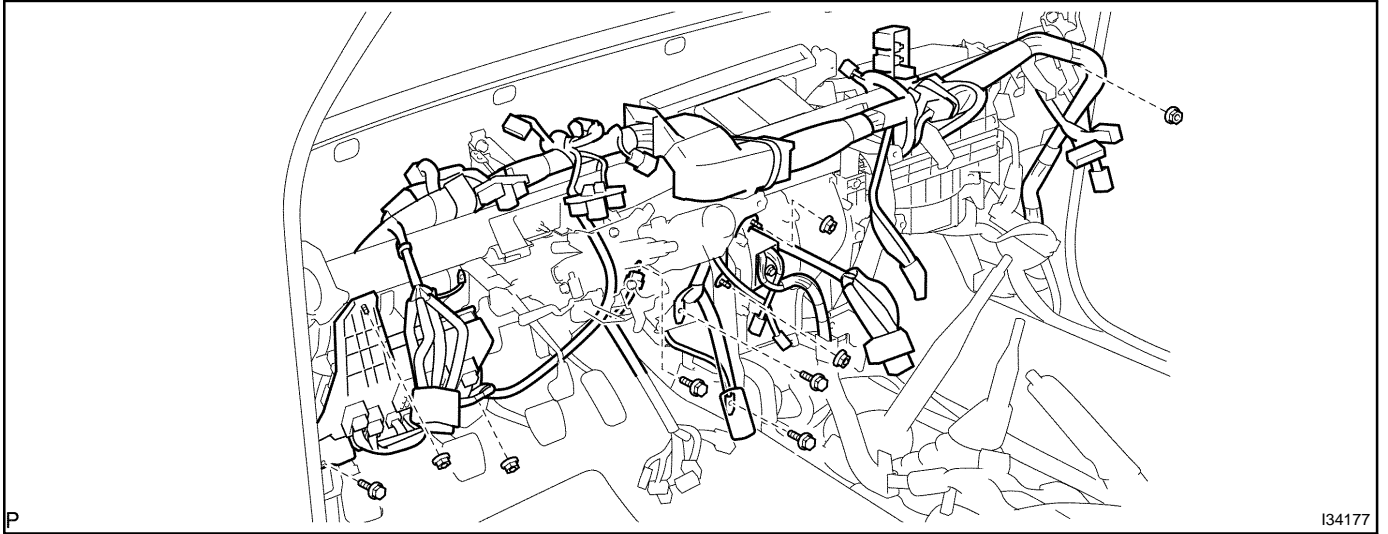
- (a) Release the 3 clamps and disconnect the connector.



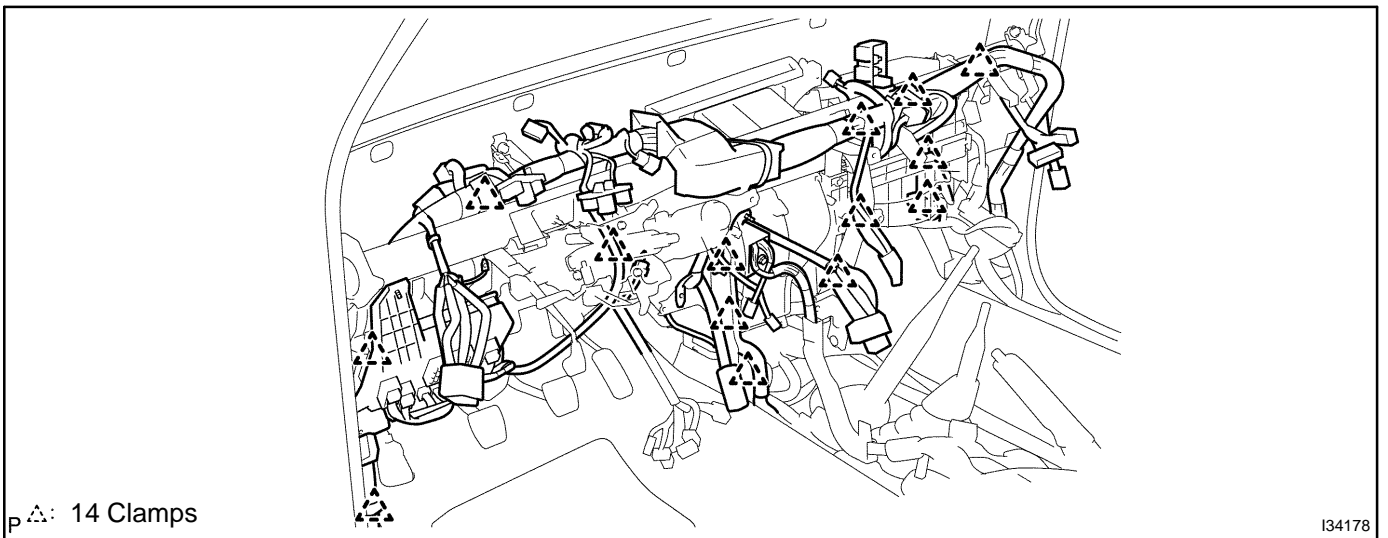
- (b) Remove the 4 nuts and disconnect the steering column assy.

19. REMOVE INSTRUMENT PANEL REINFORCEMENT

- (a) Remove the 4 bolts and the 5 nuts.

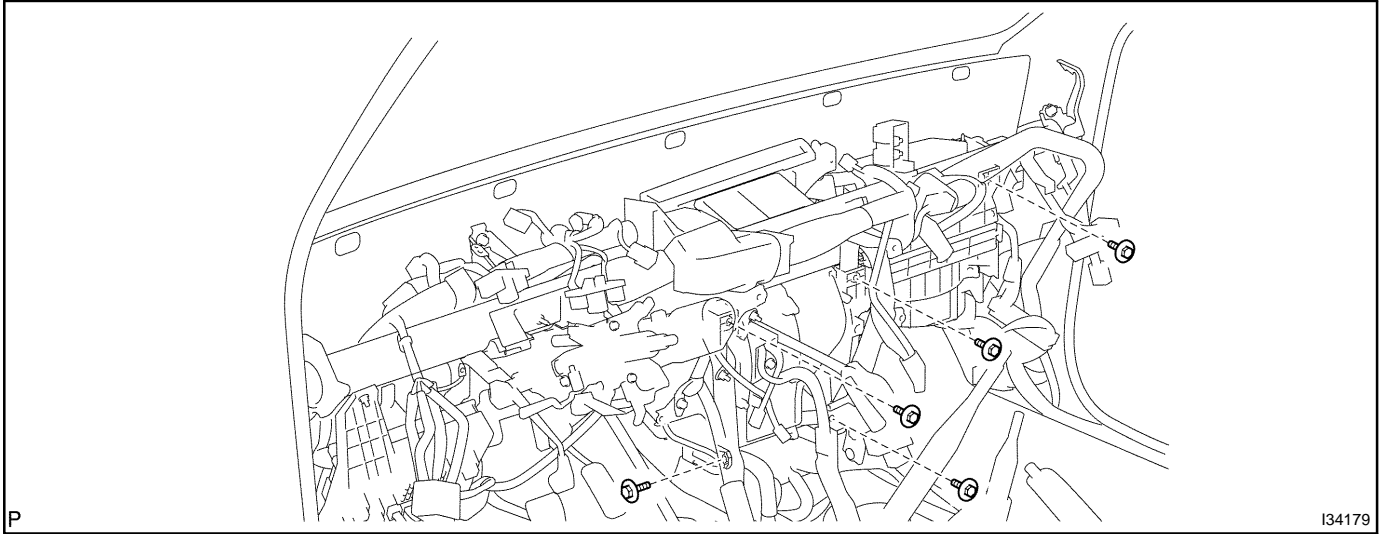


- (b) Release the 14 clamps.
(c) Disconnect the connectors.

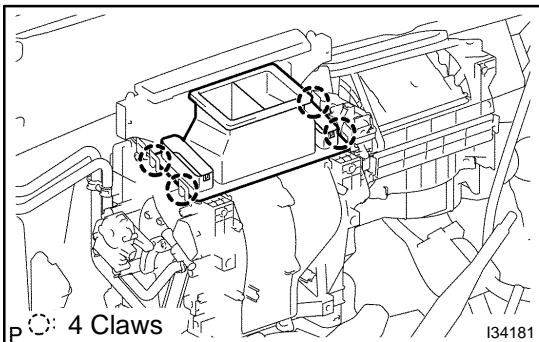
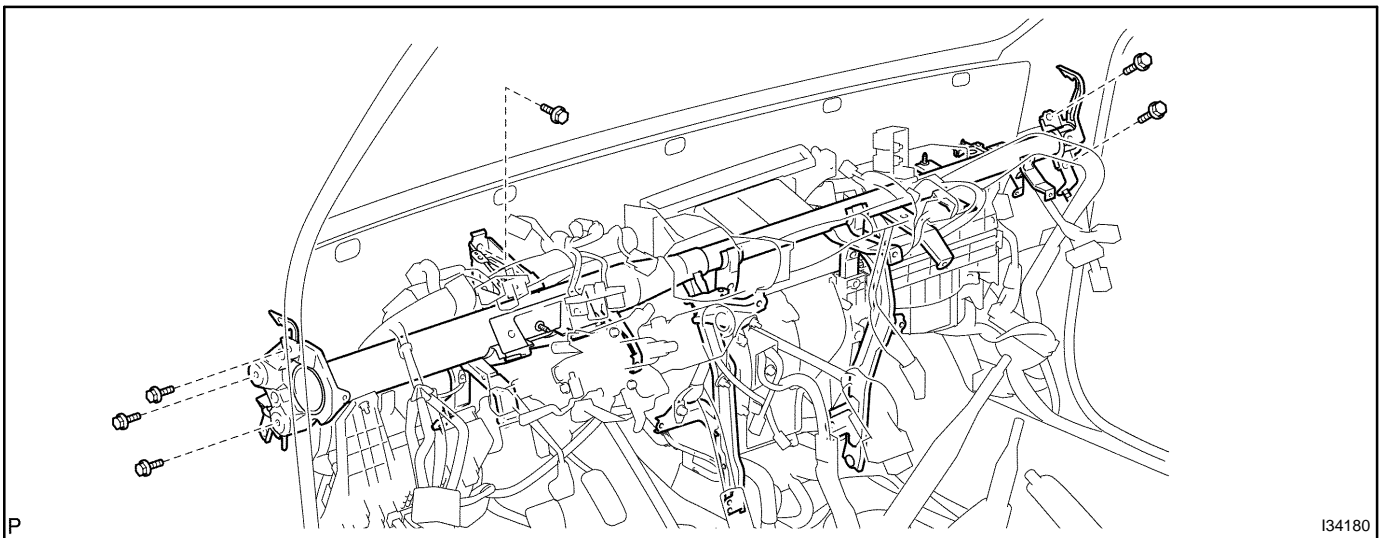


P \triangle : 14 Clamps

(d) Remove the 5 bolts.

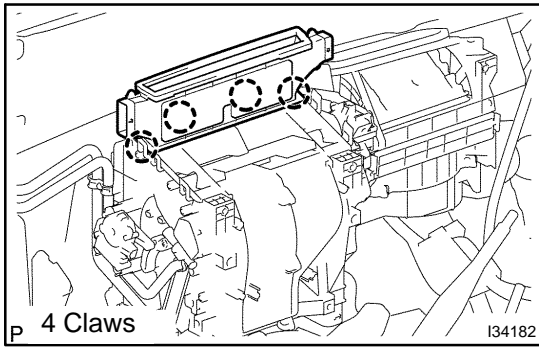


(e) Remove the 7 bolts and the instrument panel reinforcement.

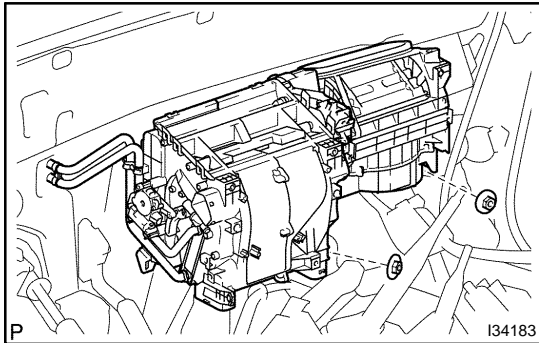


20. REMOVE HEATER TO REGISTER DUCT ASSY

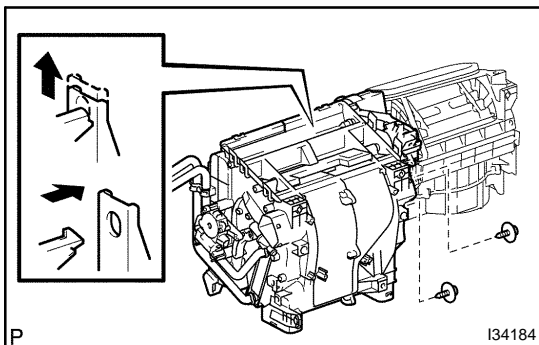
(a) Release the 4 claw fittings and remove the heater to register duct assy.

**21. REMOVE DEFROSTER NOZZLE ASSY LOWER**

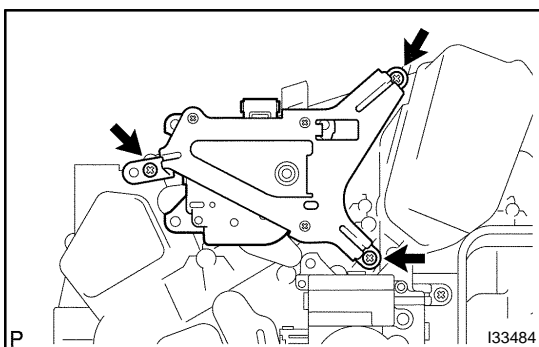
- (a) Release the 4 claw fittings and remove the defroster nozzle assy lower.

**22. REMOVE AIR CONDITIONER UNIT ASSY**

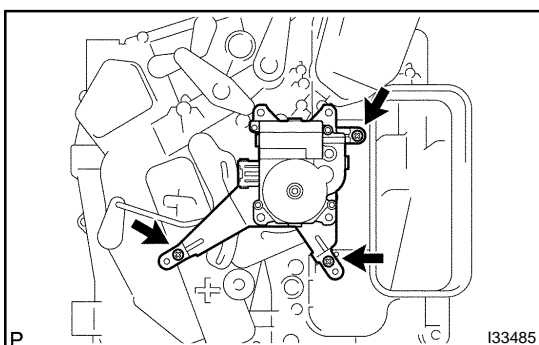
- (a) Disconnect the connectors.
 (b) Remove the 2 nuts and the air conditioner unit assy.

**23. REMOVE AIR CONDITIONING RADIATOR ASSY**

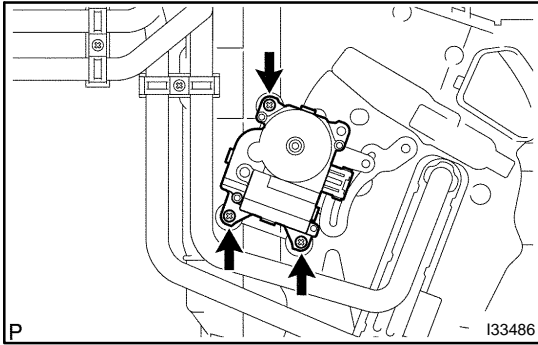
- (a) Remove the 2 screws and the air conditioning radiator assy.

**24. REMOVE MODE DAMPER SERVO SUB-ASSY**

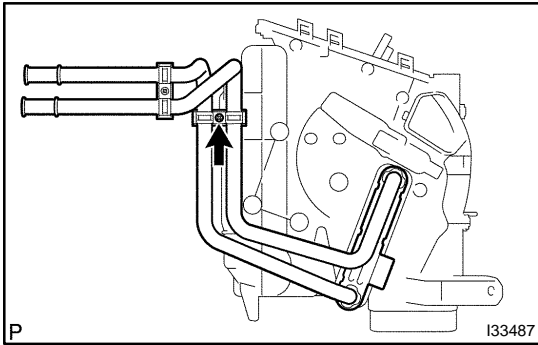
- (a) Remove the 3 screws and the mode damper servo sub-assy.

**25. REMOVE AIRMIX DAMPER SERVO SUB-ASSY**

- (a) Remove the 3 screws and the airmix damper servo sub-assy.

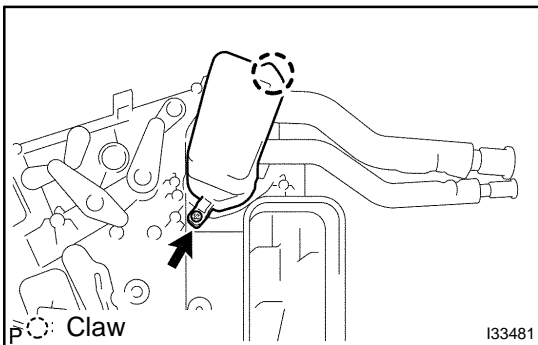


- 26. REMOVE BLOWER DAMPER SERVO SUB-ASSY**
 (a) Remove the 3 screws and the blower damper servo sub-assy.

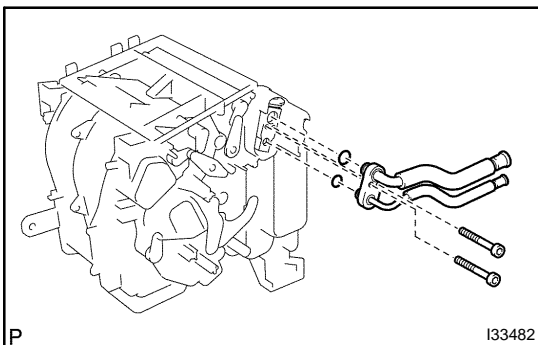


- 27. REMOVE HEATER RADIATOR UNIT SUB-ASSY**
 (a) Remove the screw, the clamp and the heater radiator unit sub-assy.

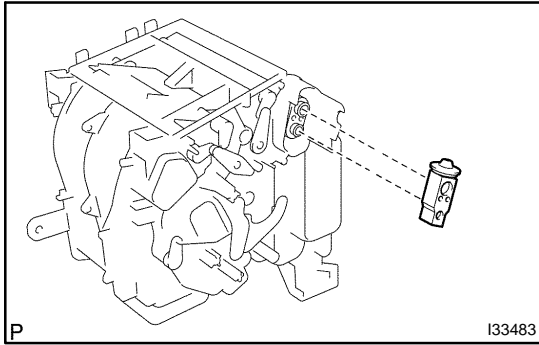
- 28. REMOVE COOLER COVER NO.1**
29. REMOVE COOLER THERMISTOR NO.1
30. REMOVE COOLER UNIT DRAIN HOSE NO.1



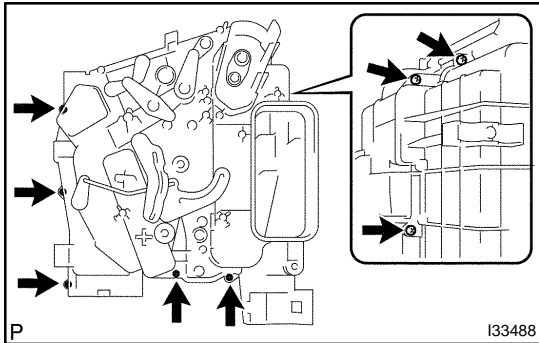
- 31. REMOVE COVER PLATE**
 (a) Remove the screw.
 (b) Release the claw fitting and remove the cover.



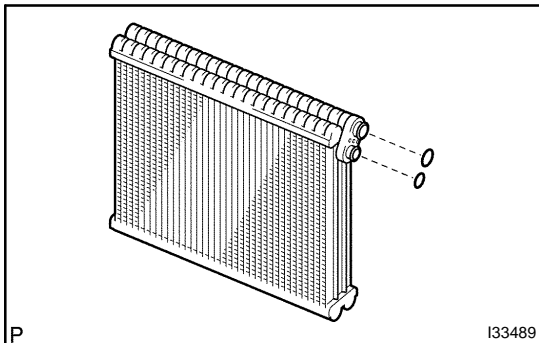
- 32. REMOVE AIR CONDITIONING TUBE & ACCESSORY ASSY**
 (a) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 2 hexagon bolts and the air conditioning tube assy.
 (b) Remove the 2 O-rings from the air conditioning tube assy.

**33. REMOVE COOLER EXPANSION VALVE**

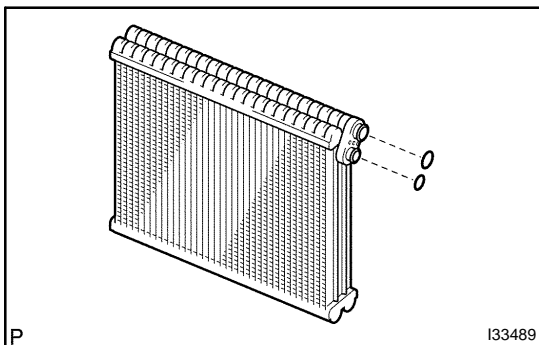
- (a) Remove the cooler expansion valve from the cooler evaporator sub-assy No.1.

**34. REMOVE COOLER EVAPORATOR SUB-ASSY NO.1**

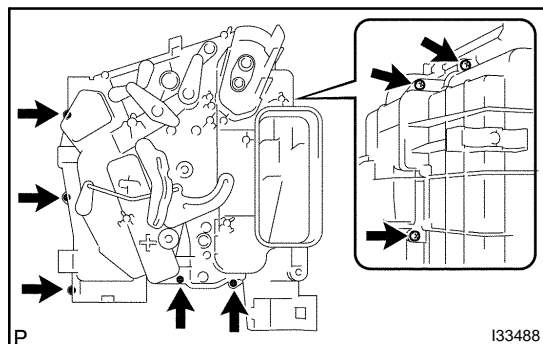
- (a) Remove the 8 screws and separate the heater case.
 (b) Remove the cooler evaporator sub-assy No.1.



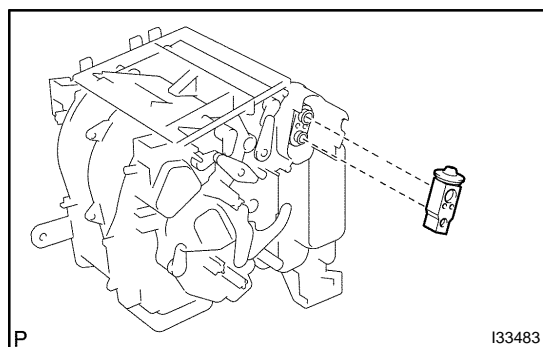
- (c) Remove the 2 O-rings from the cooler evaporator sub-assy No.1.

35. REMOVE COVER PLATE**36. INSTALL COOLER EVAPORATOR SUB-ASSY NO.1**

- (a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the cooler expansion valve.
Compressor oil: ND-OIL 8 or equivalent
 (b) Install the 2 O-rings on the cooler evaporator sub-assy No.1.

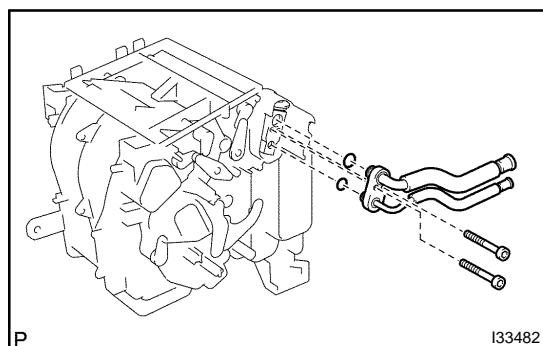


- (c) Install the cooler evaporator sub-assy No.1 on the heater case.
- (d) Install the heater case with the 8 screws.



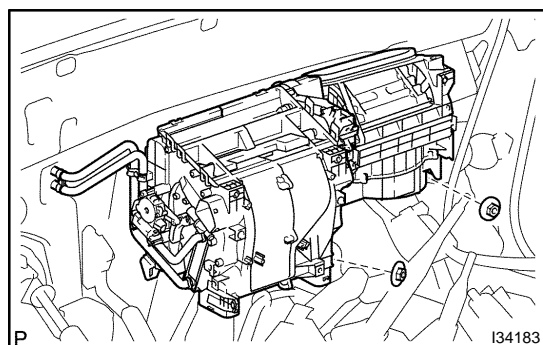
37. INSTALL COOLER EXPANSION VALVE

- (a) Install the cooler expansion valve to the cooler evaporator sub-assy No.1.



38. INSTALL AIR CONDITIONING TUBE & ACCESSORY ASSY

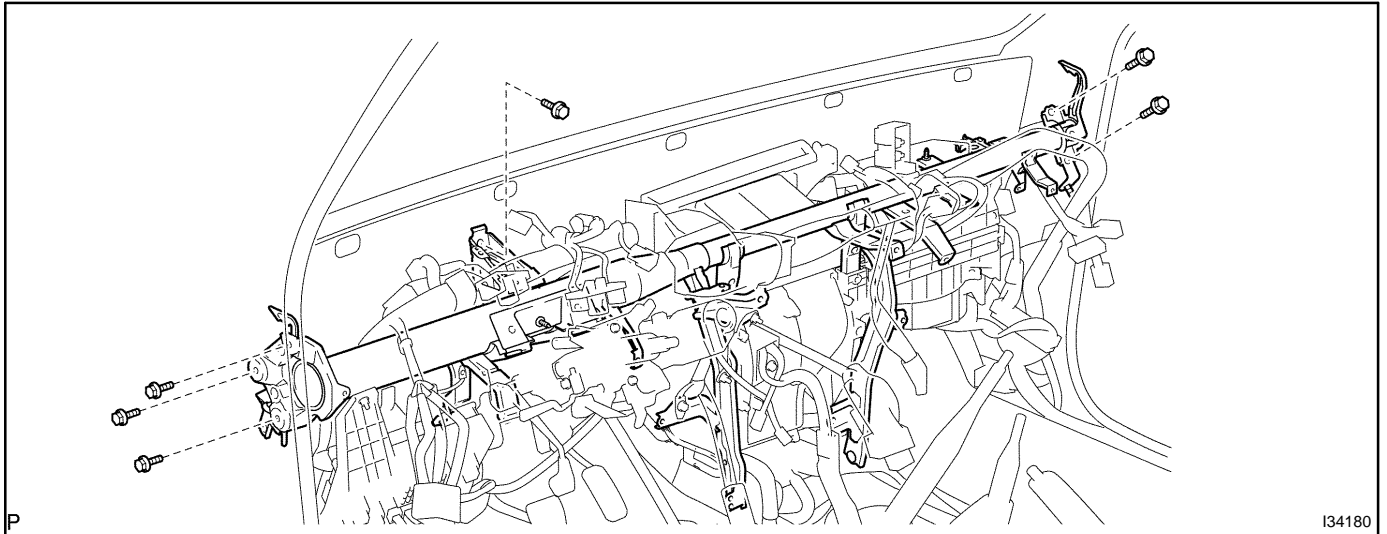
- (a) Sufficiently apply compressor oil on 2 new O-rings and the fitting surface of the air conditioning tube assy.
Compressor oil: ND-OIL 8 or equivalent
- (b) Install the 2 O-rings on the air conditioning tube assy.
- (c) Using a hexagon wrench 4.0 mm (0.15 in.), install the air conditioning tube assy with the 2 hexagon bolts.
Torque: 3.5 N·m (35 kgf·cm, 30 in.-lbf)



39. INSTALL AIR CONDITIONER UNIT ASSY

- (a) Install the air conditioner unit assy with the 2 nuts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
- (b) Connect the connectors.

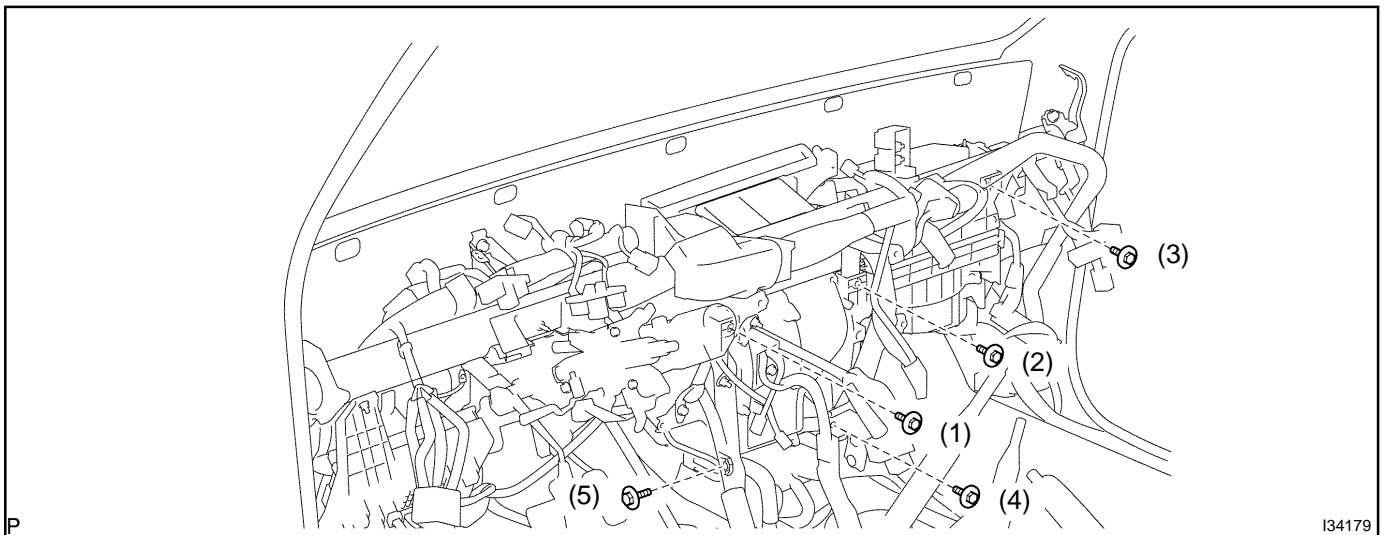
- 40. INSTALL INSTRUMENT PANEL REINFORCEMENT**
 (a) Install the instrument panel reinforcement with the 7 bolts.



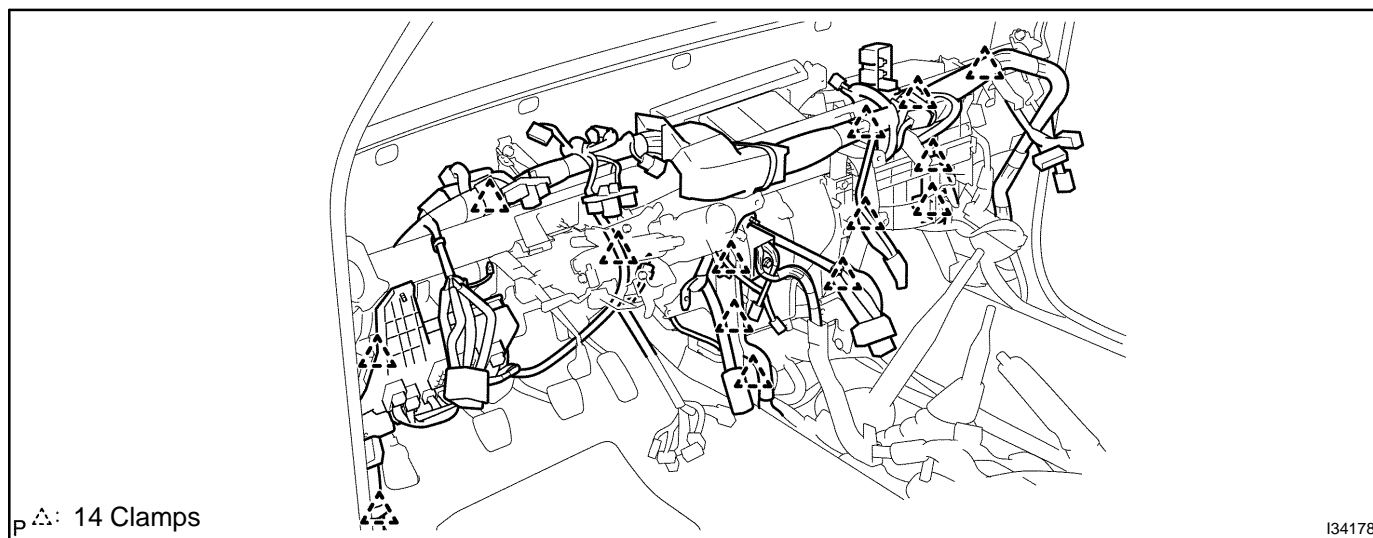
- (b) Install the 5 bolts.
Torque: 9.8 N·m (100 kgf·cm, 87 in.-lbf)

NOTICE:

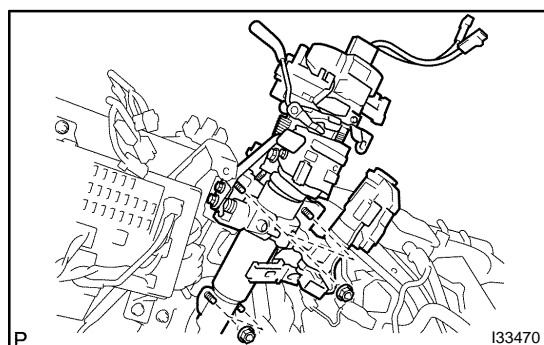
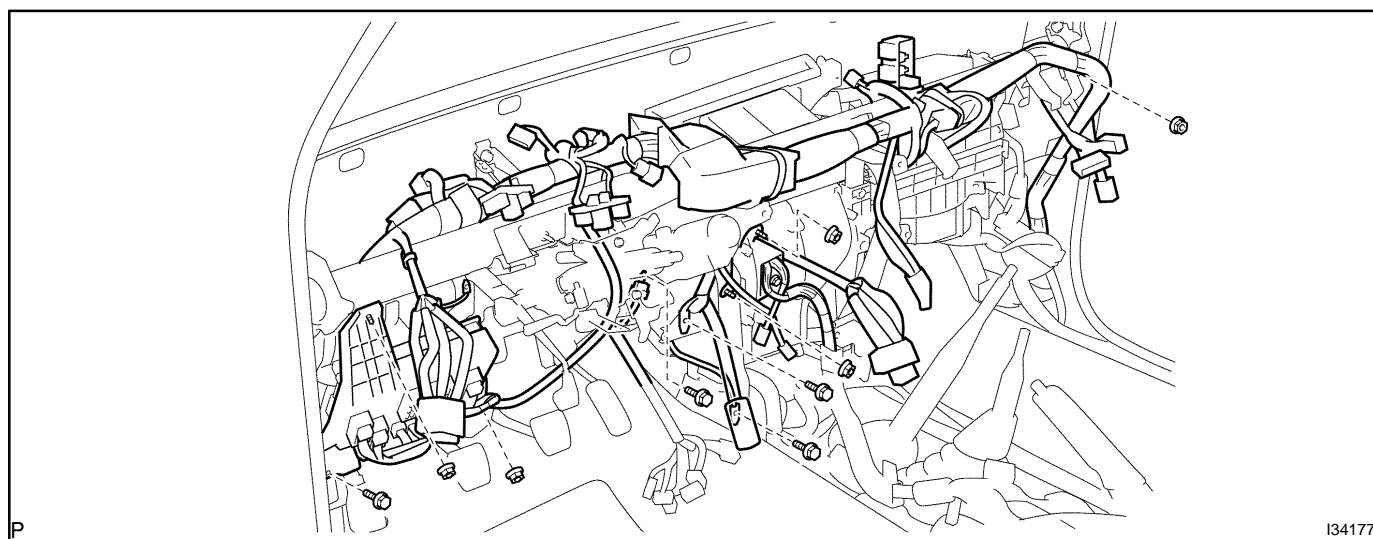
Tighten the bolts in the order shown in the illustration to install the air conditioner unit assy.



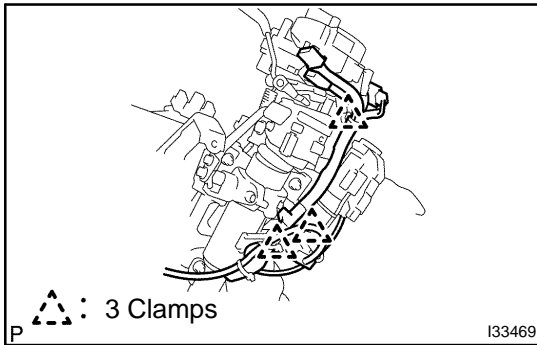
- (c) Install the 14 clamps.
- (d) Connect the connectors.



- (e) Install the 4 bolts and the 5 nuts.
Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

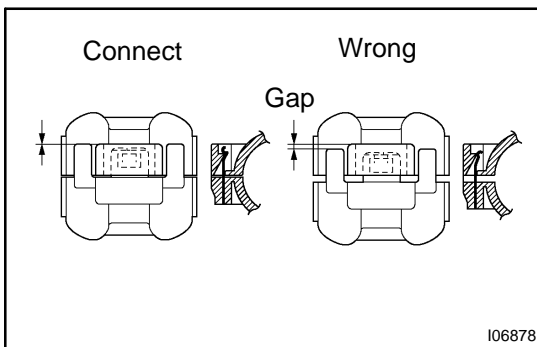


- 41. INSTALL STEERING COLUMN ASSY**
- (a) Install the steering column assy with the 4 nuts.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



- (b) Install the 3 clamps and connect the connectors.

42. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(See page 71-13)



43. REMOVE COOLER REFRIGERANT LIQUID PIPE C (W/O REAR COOLER)

- (a) Lubricate a new O-ring with compressor oil and install it on the hose.
Compressor oil: ND-OIL 8 or equivalent
- (b) Install the cooler refrigerant liquid pipe C and the piping clamp.

HINT:

After the connection, check the claw fitting of the piping clamp.

44. REMOVE COOLER REFRIGERANT LIQUID PIPE A (W/ REAR COOLER)

HINT:

Connection of the cooler refrigerant liquid pipe A is the same way as the cooler refrigerant liquid pipe C.

45. REMOVE PIPE COOLER REFRIGERANT SUCTION A (W/ REAR COOLER)

- (a) Lubricate a new O-ring with compressor oil and install it to the pipe.

Compressor oil: ND-OIL 8 or equivalent

- (b) Install the pipe cooler refrigerant suction A and the piping clamp.

HINT:

After the connection, check the claw fitting of the piping clamp.

46. REMOVE COOLER REFRIGERANT SUCTION PIPE C (W/O REAR COOLER)

HINT:

Connection of the cooler refrigerant suction pipe C is the same way as the pipe cooler refrigerant suction A.

47. ADD ENGINE COOLANT (See page 16-5)

48. CHARGE REFRIGERANT (See page 55-8)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

Specified amount:

Single A/C: 600 ± 30 g (21.16 ± 1.06 oz.)

Dual A/C: 800 ± 30 g (28.21 ± 1.06 oz.)

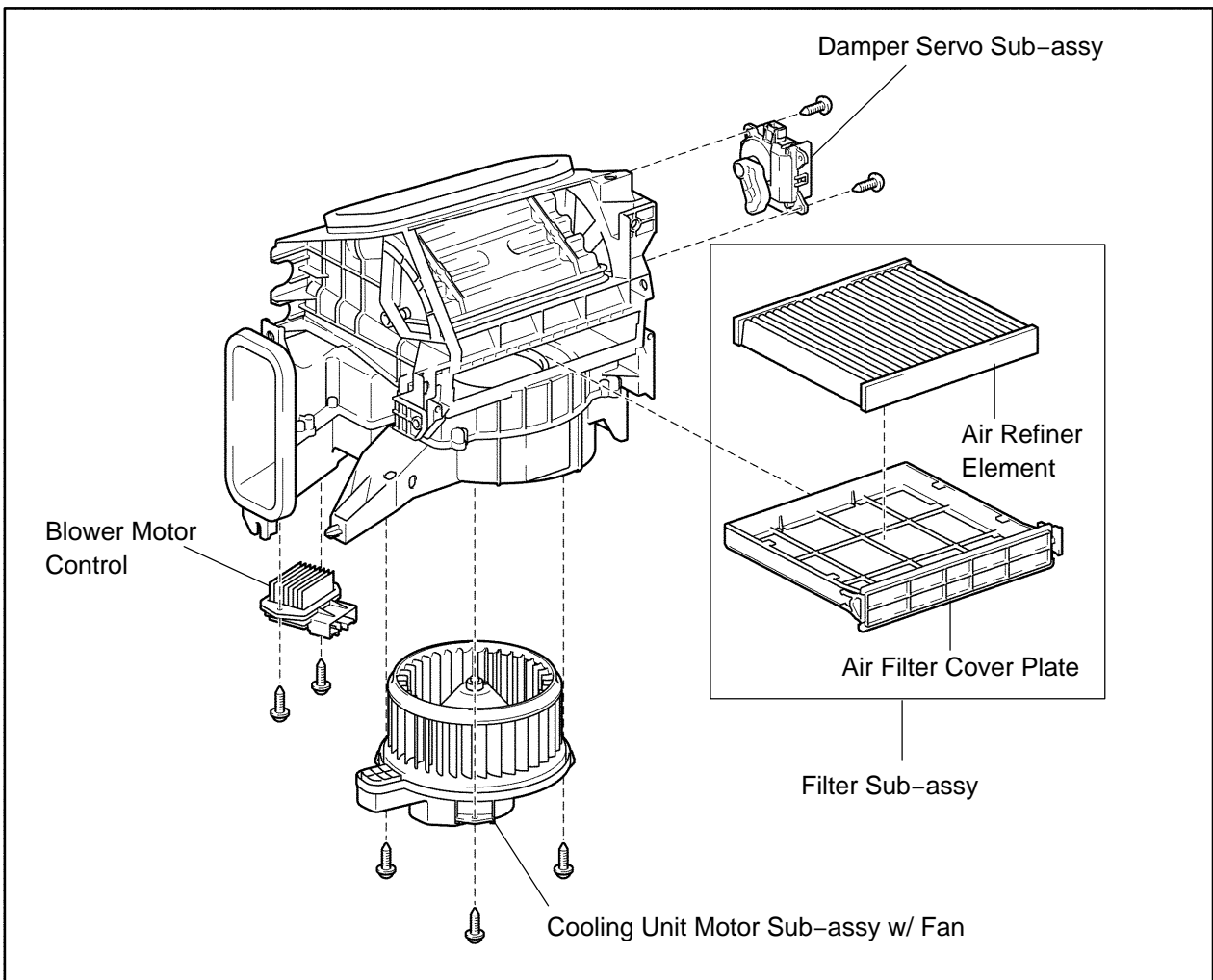
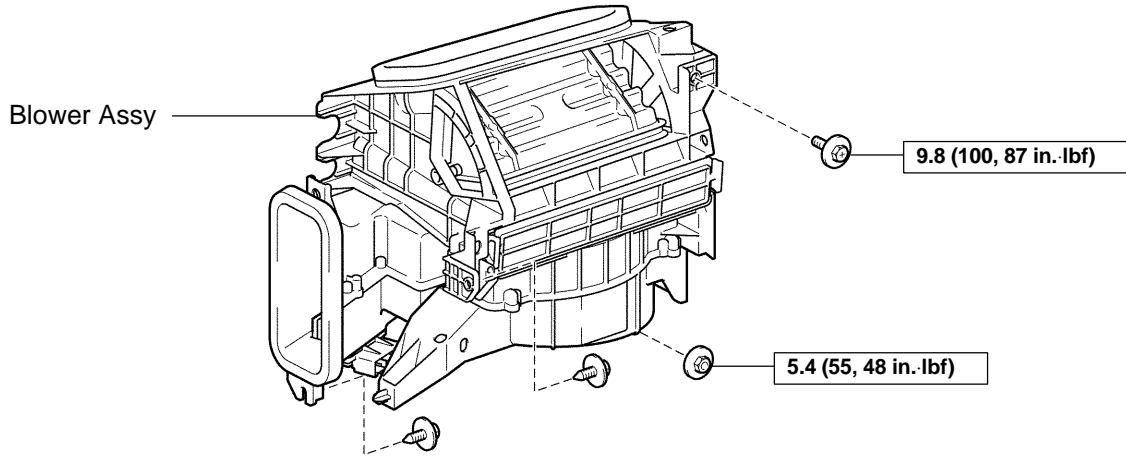
49. WARM UP ENGINE (See page 55-8)

50. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

51. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)

BLOWER ASSY COMPONENTS

550UG-03



N·m (kgf·cm, ft·lbf) : Specified torque

P

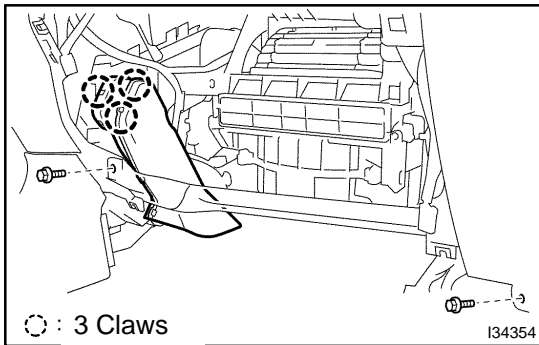
135140

OVERHAUL

HINT:

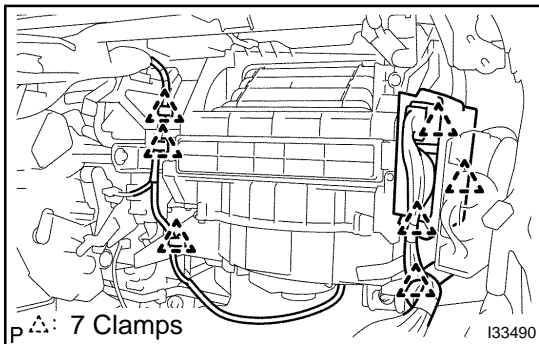
COMPONENTS: See page 55-29

1. REMOVE FRONT DOOR SCUFF PLATE RH (See page 71-13)
2. REMOVE COWL SIDE TRIM BOARD RH (See page 71-13)
3. REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (See page 71-13)
4. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY (See page 71-13)
5. REMOVE INSTRUMENT PANEL ORNAMENT (See page 71-13)



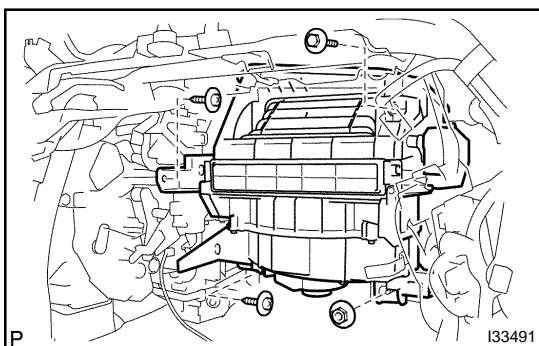
6. REMOVE AIR DUCT NO.2

- (a) Remove the 2 bolts.
- (b) Release the 3 claw fittings while slightly pulling the instrument panel safety pad toward the rear of the vehicle and remove the air duct No.2.

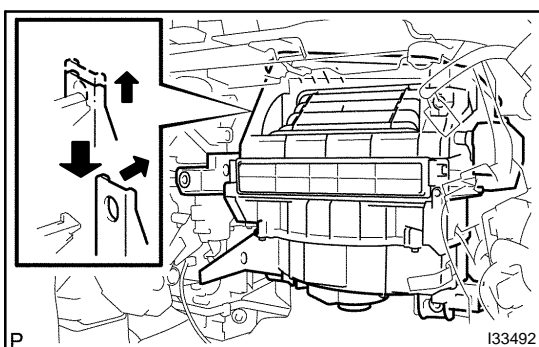


7. REMOVE BLOWER ASSY

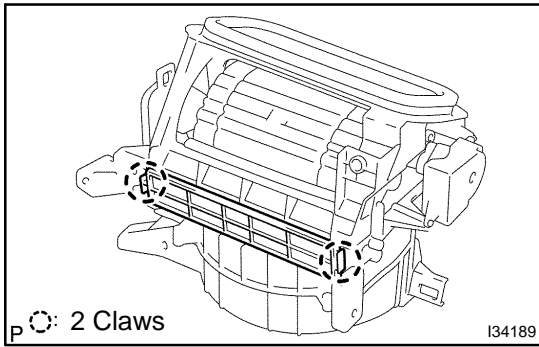
- (a) Release the 7 clamps and disconnect the connectors.



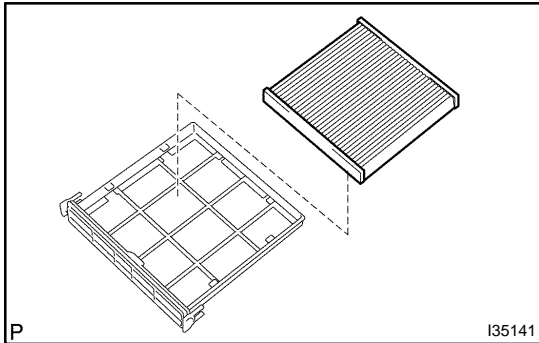
- (b) Remove the bolt, the 2 screws and the nut.



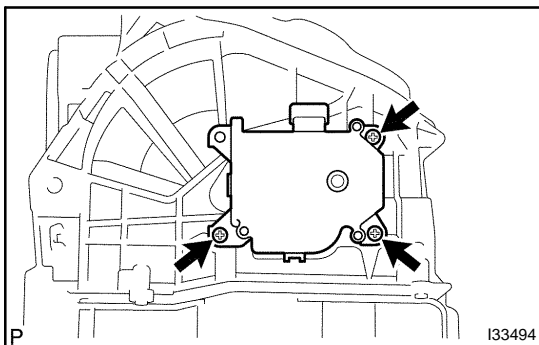
- (c) Release the claw fitting and remove the blower assy.

**8. REMOVE FILTER SUB-ASSY**

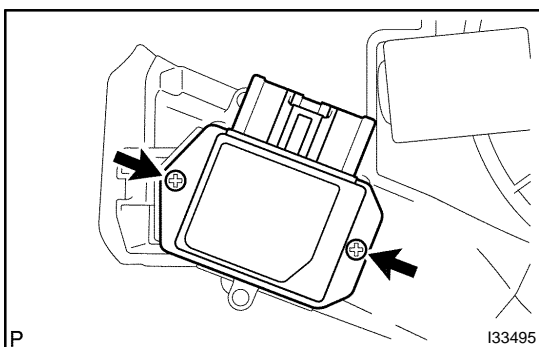
- (a) Release the 2 claw fittings and remove the air filter sub-assy.

**9. REMOVE CLEAN AIR FILTER**

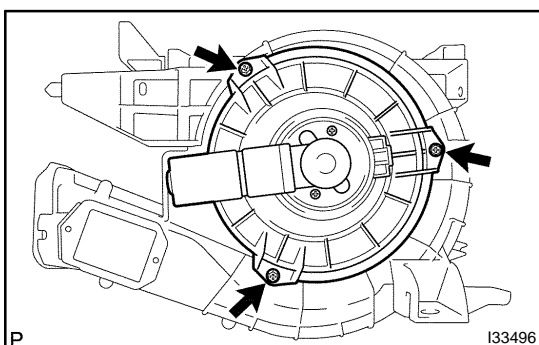
- (a) Remove the air refiner element from the air filter cover plate.

**10. REMOVE DAMPER SERVO SUB-ASSY**

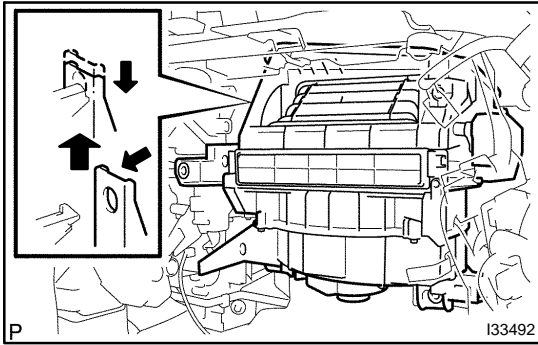
- (a) Remove the 3 screws and the blower damper servo sub-assy.

**11. REMOVE BLOWER MOTOR CONTROL**

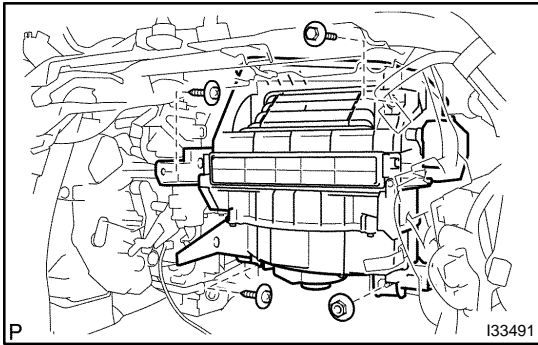
- (a) Remove the 2 screws and the blower motor control.

**12. REMOVE COOLING UNIT MOTOR SUB-ASSY W/FAN**

- (a) Remove the 3 screws and the cooling unit motor sub-assy w/ fan.

**13. INSTALL BLOWER ASSY**

- (a) Install the blower assy with the claw fitting.

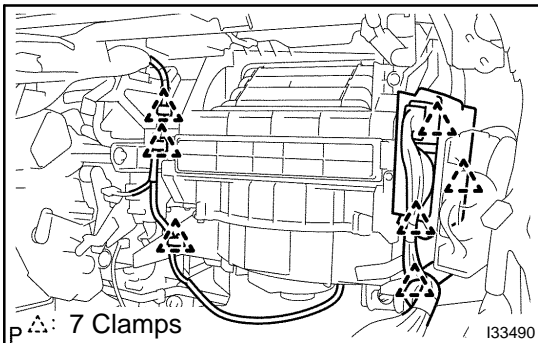


- (b) Install the bolt, the 2 screws and the nut.

Torque:

9.8 N·m (100 kgf·cm, 87 in·lbf) (Bolt)

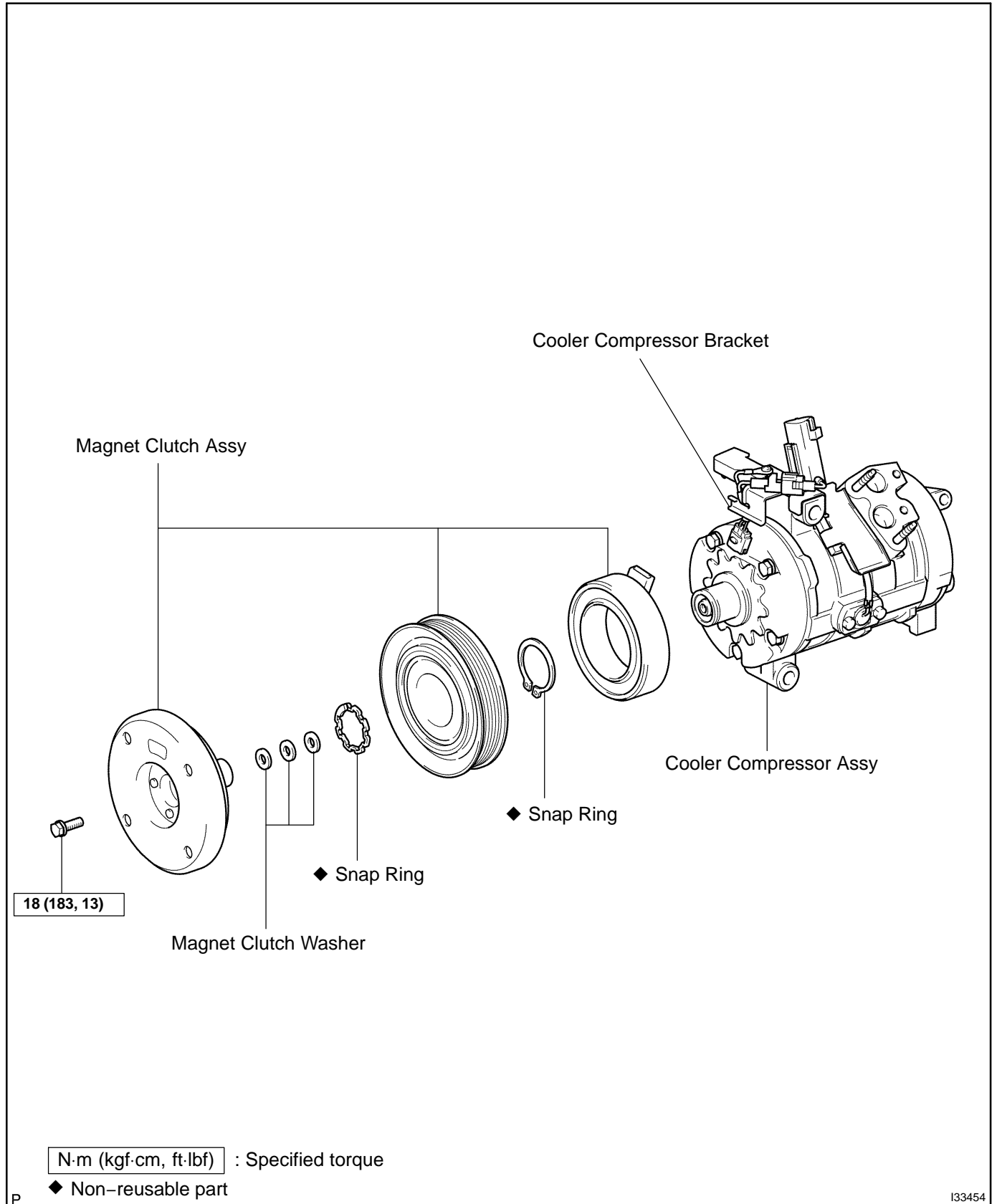
5.4 N·m (55 kgf·cm, 48 in·lbf) (Nut)



- (c) Install the 7 clamps and connect the connectors.

COOLER COMPRESSOR ASSY (2UZ-FE) COMPONENTS

550UI-02



REPLACEMENT

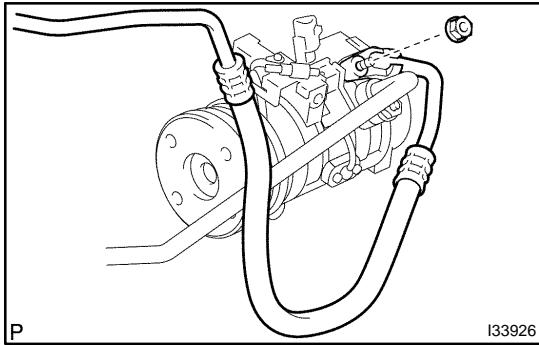
HINT:

COMPONENTS: See page 55-33

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

2. REMOVE FAN AND GENERATOR V BELT (See page 14-5)



3. DISCONNECT DISCHARGE HOSE SUB-ASSY (W/O REAR COOLER)

- Remove the nut and disconnect the discharge hose sub-assy from the compressor and magnetic clutch.
- Remove the O-ring from the discharge hose sub-assy.

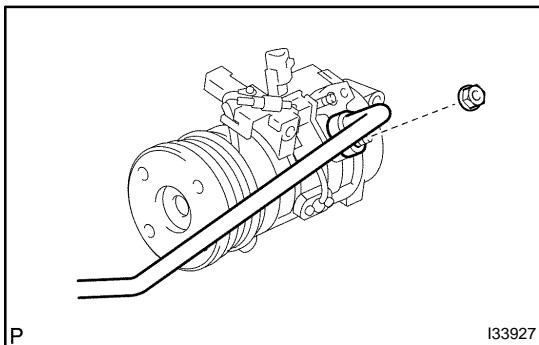
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

4. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1 (W/ REAR COOLER)

HINT:

Disconnection of the cooler refrigerant discharge hose No.1 is the same way as the discharge hose sub-assy.



5. DISCONNECT SUCTION HOSE SUB-ASSY (W/O REAR COOLER)

- Remove the nut and disconnect the suction hose sub-assy from the compressor and magnetic clutch.
- Remove the O-ring from the suction hose sub-assy.

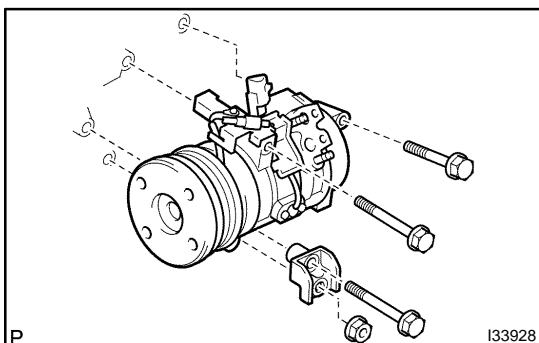
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

6. DISCONNECT COOLER REFRIGERANT SUCTION HOSE (W/ REAR COOLER)

HINT:

Disconnection of the cooler refrigerant suction hose is the same way as the suction hose sub-assy.

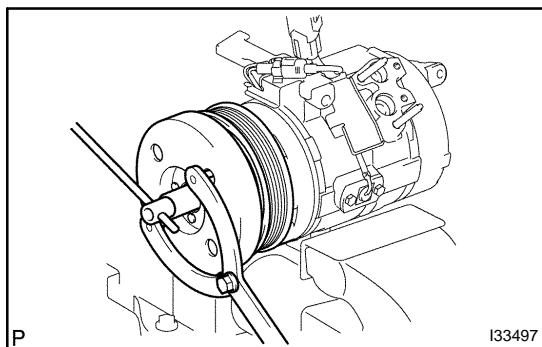


7. REMOVE COMPRESSOR AND MAGNETIC CLUTCH

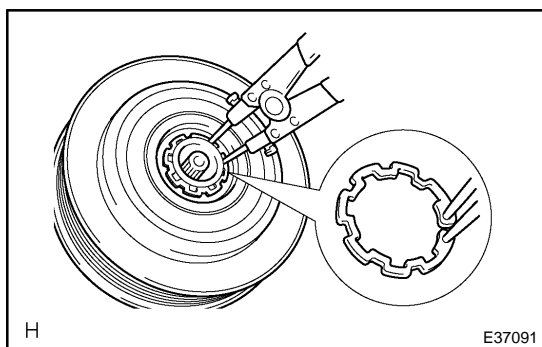
- Disconnect the connector.
- Remove the nut.
- Remove the 3 bolts, the stay, and the compressor and magnetic clutch.

8. REMOVE MAGNET CLUTCH ASSY

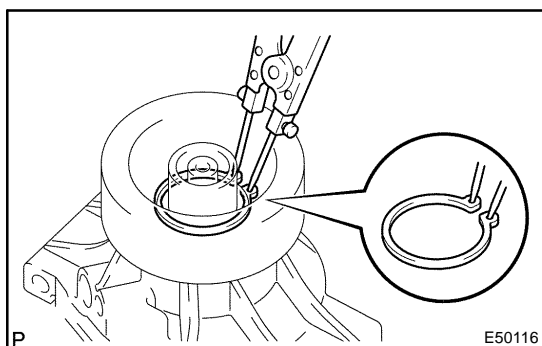
- Place the compressor and magnetic clutch in a vise.



- (b) Using SST, remove the bolt, the magnet clutch hub and the magnet clutch washer.
SST 09960-10010 (09962-01000, 09963-00500)



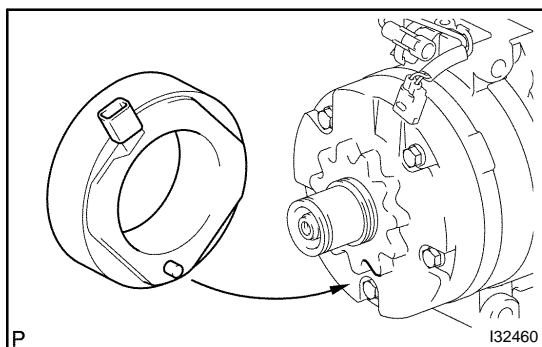
- (c) Using a snap ring expander, remove the snap ring and the magnet clutch rotor.
(d) Remove the screw and disconnect the connector.



- (e) Using a snap ring expander, remove the snap ring and the magnet clutch starter.

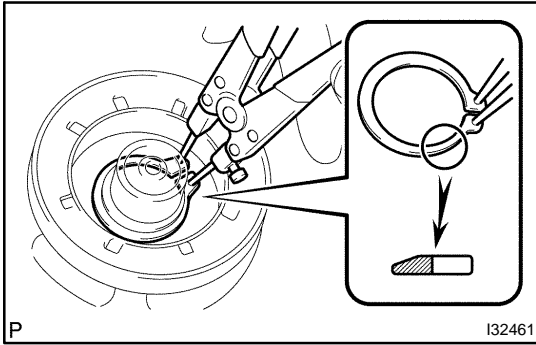
9. REMOVE COOLER COMPRESSOR BRACKET

10. REMOVE COOLER COMPRESSOR ASSY

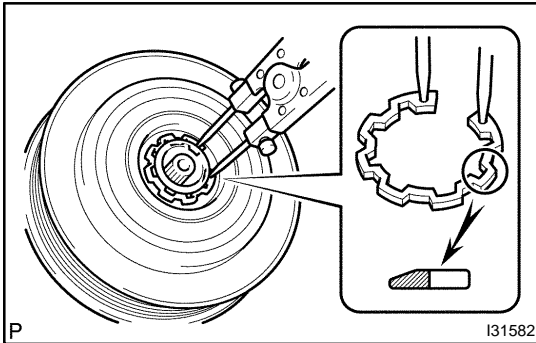


11. INSTALL MAGNET CLUTCH ASSY

- (a) Fit the parts as shown in the illustration, and install the magnet clutch starter.



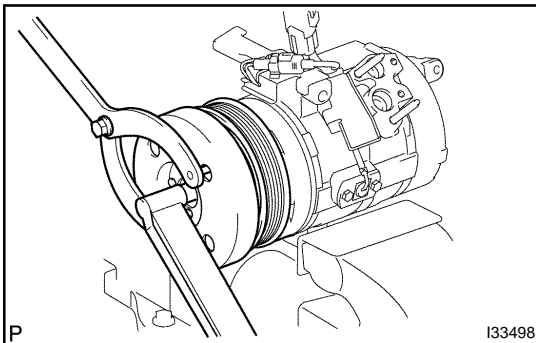
- (b) Using a snap ring expander, install a new snap ring with the chamfered side facing up.
- (c) Install the screw and connect the connector.



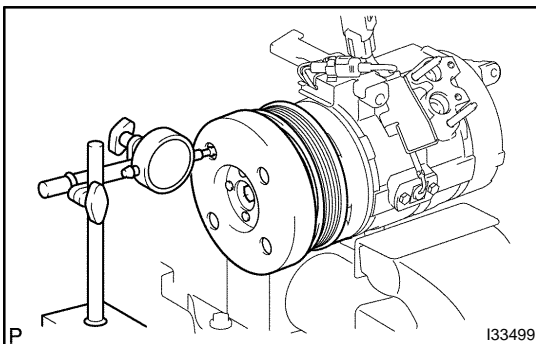
- (d) Using a snap ring expander, install the magnet clutch rotor and a new snap ring with the chamfered side facing up.
- (e) Install the magnet clutch washer and the magnet clutch hub.

NOTICE:

Do not change the combination of the magnet clutch washers used before disassembly.



- (f) Using SST, install the magnet clutch hub and the magnet clutch washer with the bolt.
- SST 09960-10010 (09962-01000, 09963-00500)
- Torque: 18 N·m (183 kgf·cm, 13 ft·lbf)**

**12. INSPECT MAGNETIC CLUTCH CLEARANCE**

- (a) Set the dial indicator to the magnet clutch hub.
- (b) Connect the battery positive lead to the terminal 1 of the magnet clutch connector and the negative lead to the earth wire. Turn on and off the magnet clutch and measure the clearance.

Standard clearance:

0.35 - 0.60 mm (0.013 - 0.023 in.)

If the measured value is outside the standard range, remove the magnet clutch hub and adjust it with the magnet clutch washers.

NOTICE:

Adjustment shall be performed with 3 or less magnet clutch washers.

13. INSPECT COMPRESSOR OIL

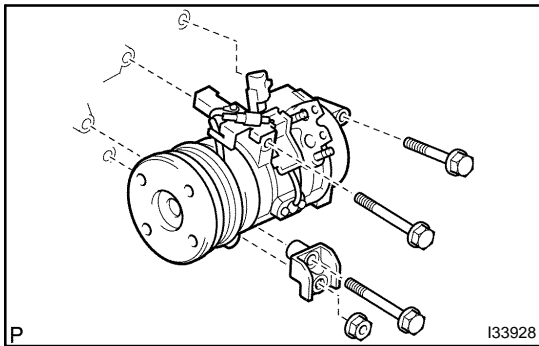
- (a) When replacing the compressor and magnetic clutch with a new one, after gradually removing the refrigerant gas from the service valve, drain the following amount of oil from the new compressor and magnetic clutch before installation.

Standard:

(Oil capacity inside new compressor and magnetic clutch: 120 + 15 cc (4.0 + 0.5 fl. oz.)) - (Remaining oil amount in the removed compressor and magnetic clutch) = (Oil amount to be removed when replacing)

NOTICE:

- When checking the compressor oil level, observe the precautions on the cooler removal/installation.
- Because compressor oil remains in the pipes of the vehicle, if a new compressor and magnetic clutch is installed without removing some oil inside, the oil amount becomes excessive, preventing heat exchange in the refrigerant cycle and causing refrigerant failure.
- If the remaining oil in the removed compressor and magnetic clutch is too small in volume, check for oil leakage.
- Be sure to use ND-OIL 8 for compressor oil.

**14. INSTALL COMPRESSOR AND MAGNETIC CLUTCH**

- (a) Install the compressor and magnetic clutch and the stay with the 3 bolts.

Torque: 46 N·m (469 kgf·cm, 34 ft·lbf)

- (b) Install the nut.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

- (c) Connect the connector.

15. INSTALL SUCTION HOSE SUB-ASSY (W/O REAR COOLER)

- (a) Remove the attached vinyl tape from the hose.

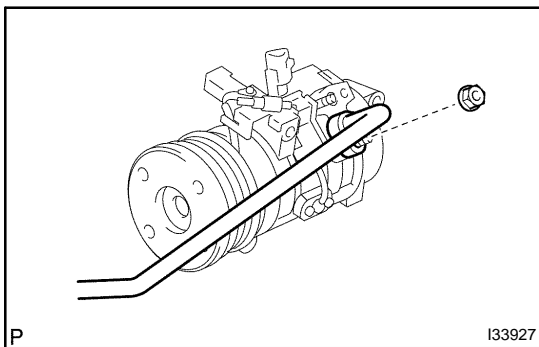
- (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the compressor and magnetic clutch.

Compressor oil: ND-OIL 8 or equivalent

- (c) Install the O-ring on the suction hose sub-assy.

- (d) Install the suction hose sub-assy on the compressor and magnetic clutch with the nut.

Torque: 9.8 N·m (100 kgf·cm, 87 in·lbf)

**16. INSTALL COOLER REFRIGERANT SUCTION HOSE (W/ REAR COOLER)****HINT:**

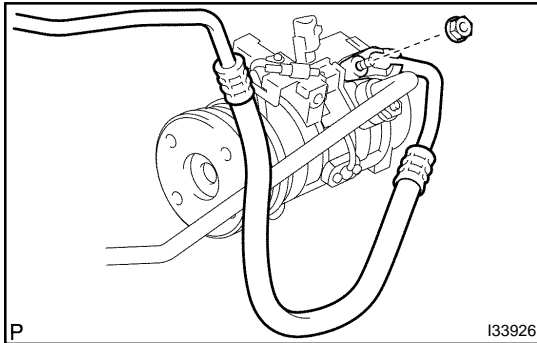
Connection of the cooler refrigerant suction hose is the same way as the suction hose sub-assy.

17. INSTALL DISCHARGE HOSE SUB-ASSY (W/O REAR COOLER)

- (a) Remove the attached vinyl tape from the hose.
- (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the compressor and magnetic clutch.

Compressor oil: ND-OIL 8 or equivalent

- (c) Install the O-ring on the discharge hose sub-assy.



- (d) Install the discharge hose sub-assy on the compressor and magnetic clutch with the nut.

Torque: 9.8 N·m (100 kgf·cm, 87 in.-lbf)**18. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1 (W/ REAR COOLER)**

HINT:

Connection of the cooler refrigerant discharge hose No.1 is the same way as the discharge hose sub-assy.

19. INSPECT V-RIBBED BELT TENSIONER ASSY (See page 14-5)**20. INSTALL FAN AND GENERATOR V BELT (See page 14-5)****21. CHARGE REFRIGERANT (See page 55-8)**

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050,
07117-88060, 07117-88070, 07117-88080)

Specified amount:**Single A/C: 600 ± 30 g (21.16 ± 1.06 oz.)****Dual A/C: 800 ± 30 g (28.21 ± 1.06 oz.)****22. WARM UP ENGINE (See page 55-8)****23. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)**

COOLER CONDENSER CORE

550UK-02

ON-VEHICLE INSPECTION

1. INSPECT COOLER CONDENSER ASSY

- (a) If the fin of the cooler condenser assy is dirty, clean it with water and dry it with compressed air.

NOTICE:

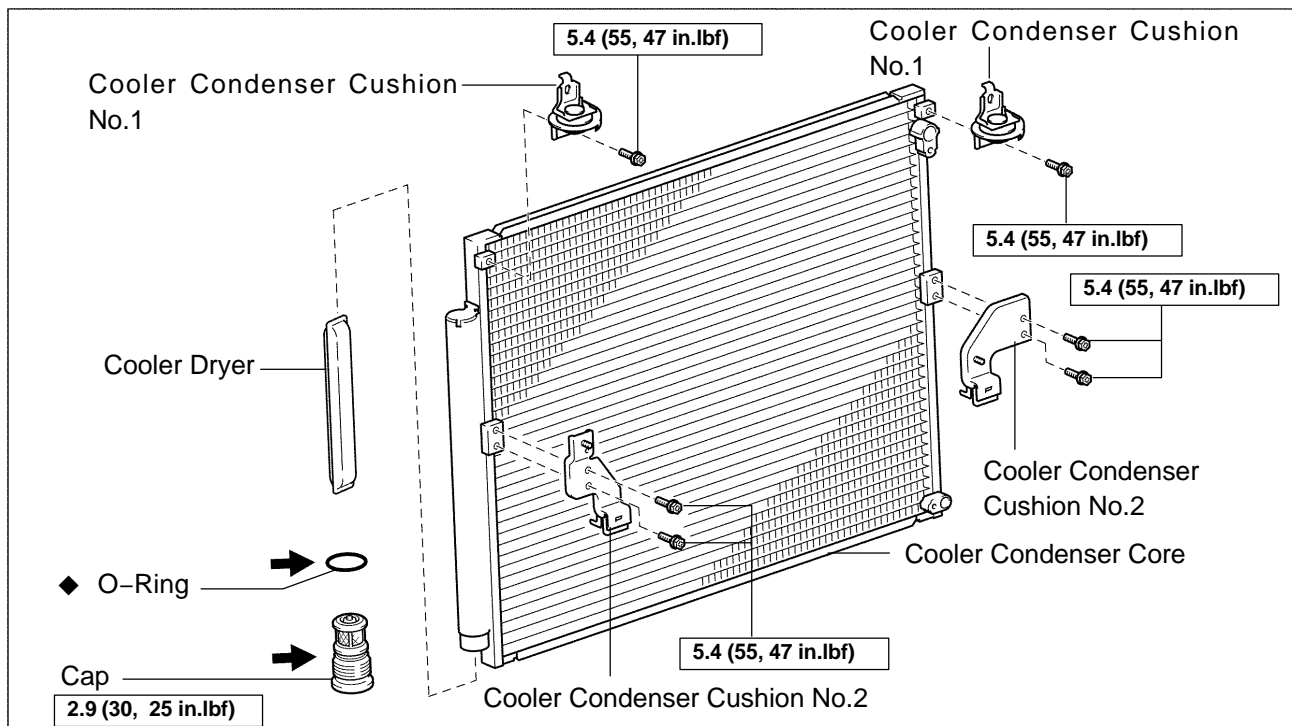
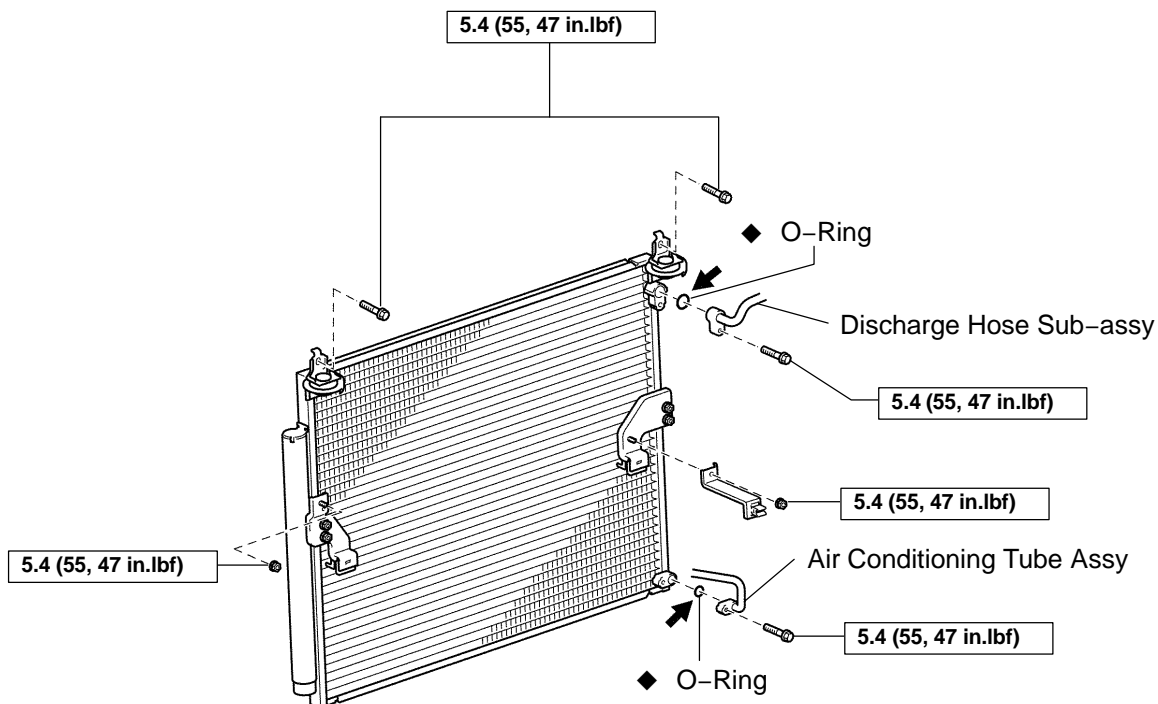
Do not damage the fin of the condenser assy.

- (b) If the fin of the condenser assy is bent, make it straight using a screwdriver or pliers.

2. INSPECT CONDENSER FOR LEAKAGE OF REFRIGERANT

- (a) Using a halogen leak detector, check the pipe joints for gas leakage.
(b) If gas leakage is detected in a joint, check the torque of the joint.

COMPONENTS



P N·m (kgf·cm, ft·lbf) : Specified torque
 ◆ Non-reusable part
 ← Compressor oil ND-OIL 8 or equivalent
 2005 LEXUS GX470 REPAIR MANUAL (RM1164U)

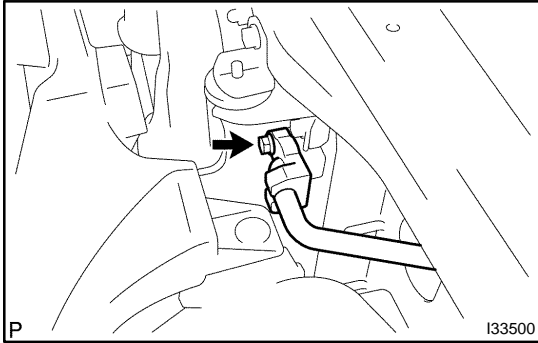
OVERHAUL

HINT:

COMPONENTS: See page 55-40

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



2. DISCONNECT DISCHARGE HOSE SUB-ASSY (W/O REAR COOLER)

- (a) Remove the bolt and disconnect the discharge hose sub-assy from the cooler condenser core.
- (b) Remove the O-ring from the discharge hose sub-assy.

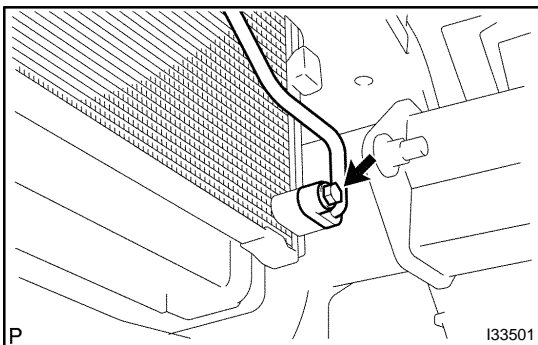
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

3. DISCONNECT COOLER REFRIGERANT DISCHARGE HOSE NO.1 (W/ REAR COOLER)

HINT:

Disconnection of the cooler refrigerant discharge hose No.1 is the same way as the discharge hose sub-assy.

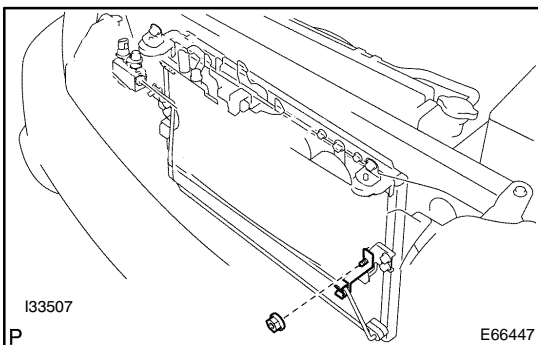


4. DISCONNECT AIR CONDITIONING TUBE ASSY

- (a) Remove the bolt and disconnect the air conditioning tube assy from the cooler condenser core.
- (b) Remove the O-ring from the air conditioning tube assy.

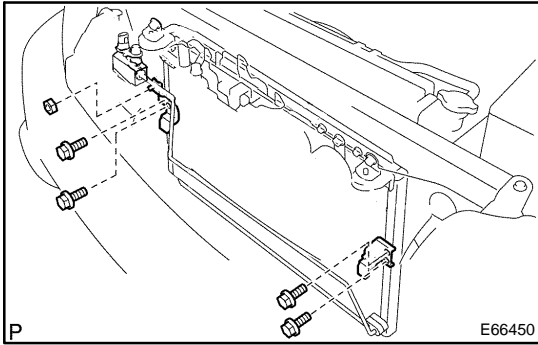
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

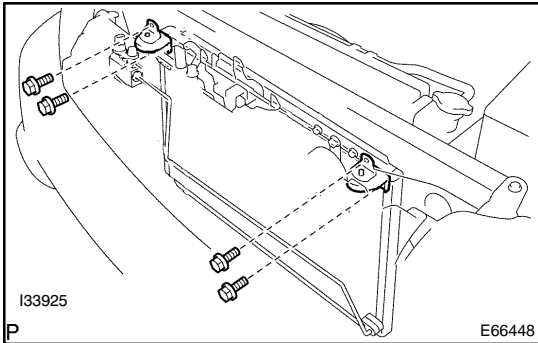


5. REMOVE COOLER CONDENSER BRACKET NO.1

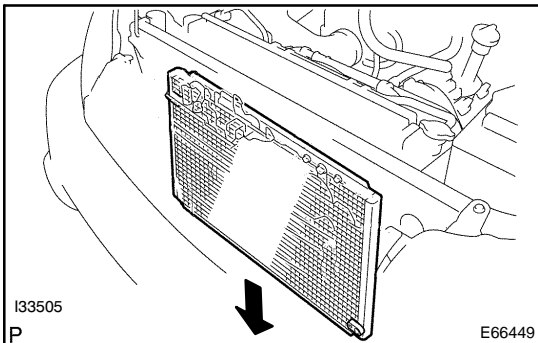
- (a) Remove the nut and the cooler condenser bracket No.1.



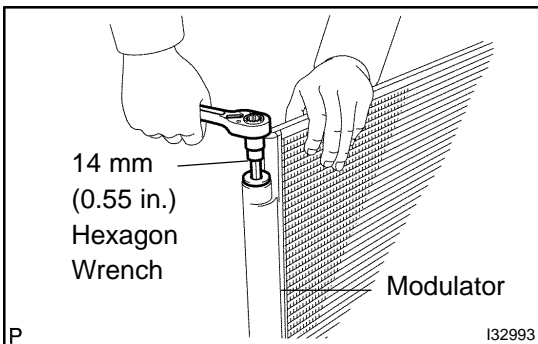
- 6. REMOVE COOLER CONDENSER CUSHION NO.2**
 (a) Remove the 4 bolts, the nut and the cooler condenser cushion No.2.



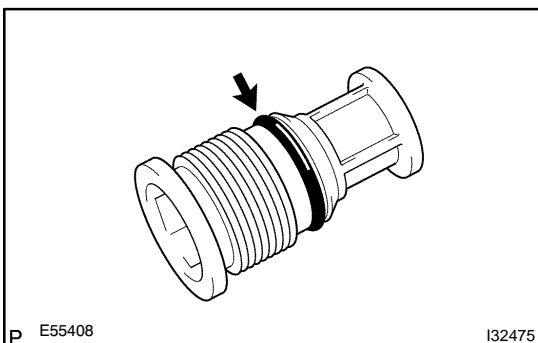
- 7. REMOVE COOLER CONDENSER CUSHION NO.1**
 (a) Remove the 4 bolts and the cooler condenser cushion No.1.



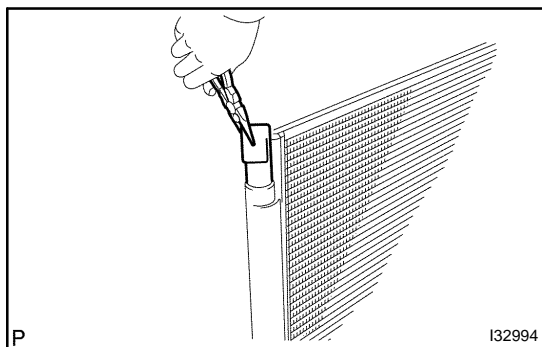
- 8. REMOVE COOLER CONDENSER CORE**
 (a) Remove the cooler condenser core.



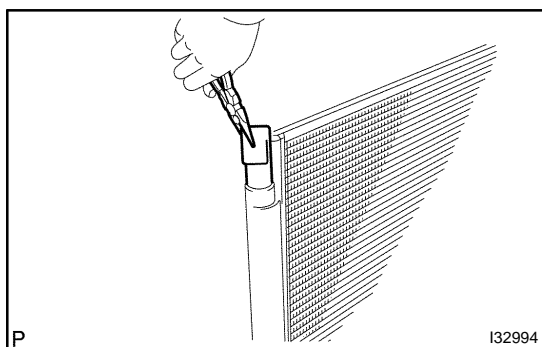
- 9. REMOVE COOLER DRYER**
 (a) Using a hexagon wrench 14 mm (0.55 in.), remove the cap from the modulator.



- (b) Remove the O-ring from the cap.

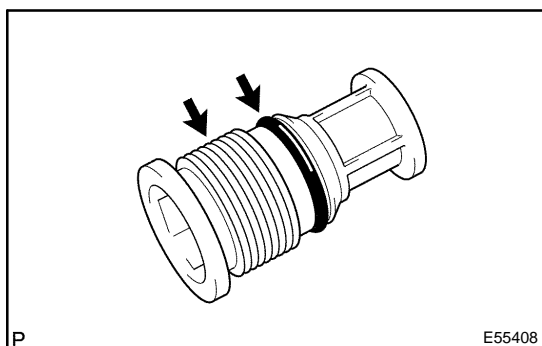


- (c) Using needle nose pliers, remove the cooler dryer.



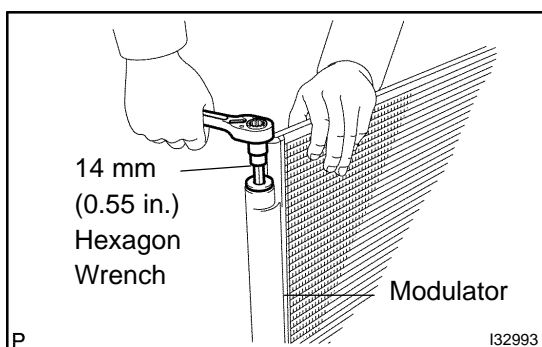
10. INSTALL COOLER DRYER

- (a) Using needle nose pliers, install the cooler dryer.

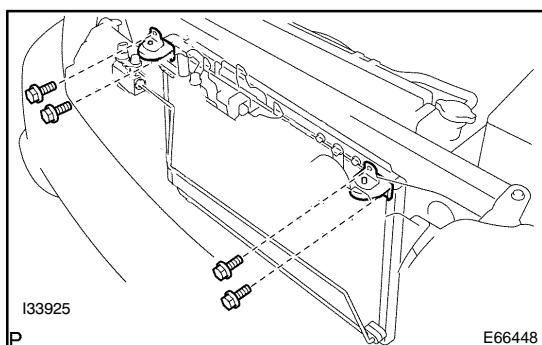


- (b) Install a new O-ring on the cap.
 (c) Sufficiently apply compressor oil to the fitting surfaces of the O-ring and the cap.

Compressor oil: ND-OIL 8 or equivalent

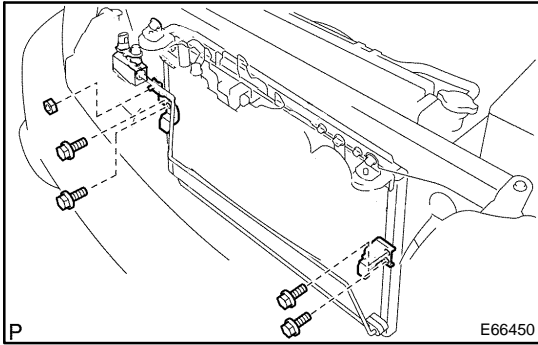


- (d) Using a hexagon wrench 14 mm (0.55 in.), install the cap to the cooler condenser assy.
Torque: 2.9 N·m (30 kgf·cm, 25 in.-lbf)



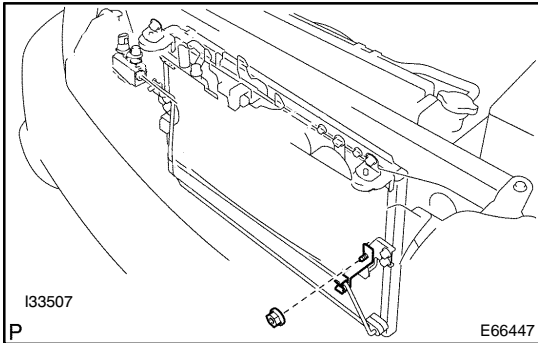
11. INSTALL COOLER CONDENSER CUSHION NO.1

- (a) Install the cooler condenser cushion No.1 with the 4 bolts.
Torque: 5.4 N·m (55 kgf·cm, 47 in.-lbf)

**12. INSTALL COOLER CONDENSER CUSHION NO.2**

- (a) Install the cooler condenser cushion No.2 with the 4 bolts and the nut.

Torque: 5.4 N·m (55 kgf·cm, 47 in·lbf)

**13. INSTALL COOLER CONDENSER BRACKET NO.1**

- (a) Install the cooler condenser bracket No.1 with the nut.

Torque: 5.4 N·m (55 kgf·cm, 47 in·lbf)

14. INSTALL AIR CONDITIONING TUBE ASSY

- (a) Remove the attached vinyl tape from the tube and the connecting part of the cooler condenser core.
 (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the pipe joint.

Compressor oil: ND-OIL 8 or equivalent

- (c) Install the O-ring on the air conditioning tube assy.
 (d) Install the air conditioning tube assy on the cooler condenser core with the bolt.

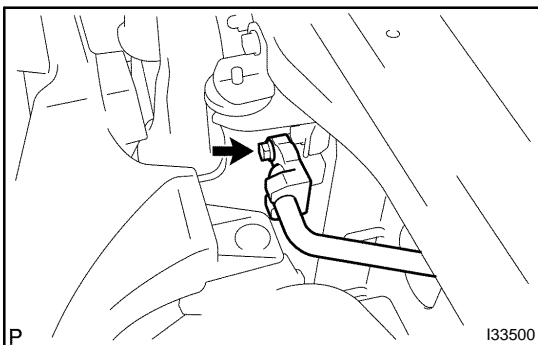
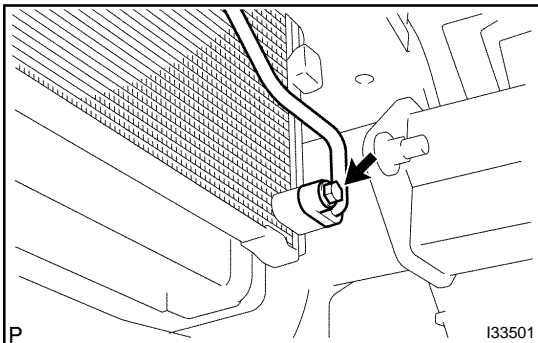
Torque: 5.4 N·m (55 kgf·cm, 47 in·lbf)

15. INSTALL DISCHARGE HOSE SUB-ASSY (W/O REAR COOLER)

- (a) Remove the attached vinyl tape from the tube and the connecting part of the cooler condenser core.
 (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the hose joint.

Compressor oil: ND-OIL 8 or equivalent

- (c) Install the O-ring on the discharge hose sub-assy.



- (d) Install the discharge hose sub-assy on the cooler condenser core with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 47 in·lbf)

16. INSTALL COOLER REFRIGERANT DISCHARGE HOSE NO.1 (W/ REAR COOLER)

HINT:

Connection of the cooler refrigerant discharge hose No.1 is the same way as the discharge hose sub-assy.

17. CHARGE REFRIGERANT (See page 55-8)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

Specified amount:

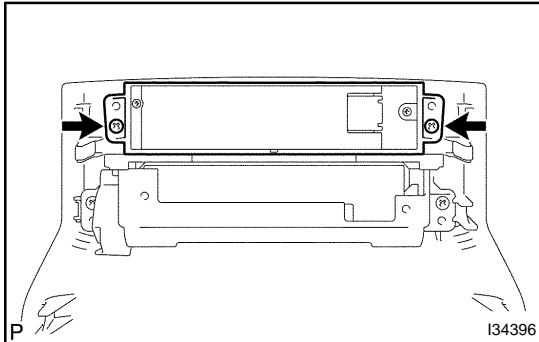
Single A/C: 600 ± 30 g (21.16 ± 1.06 oz.)

Dual A/C: 800 ± 30 g (28.21 ± 1.06 oz.)

18. WARM UP ENGINE (See page 55-8)**19. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)**

AIR CONDITIONER CONTROL ASSY OVERHAUL

1. REMOVE CONSOLE REAR END PANEL SUB-ASSY (See page 71-13)

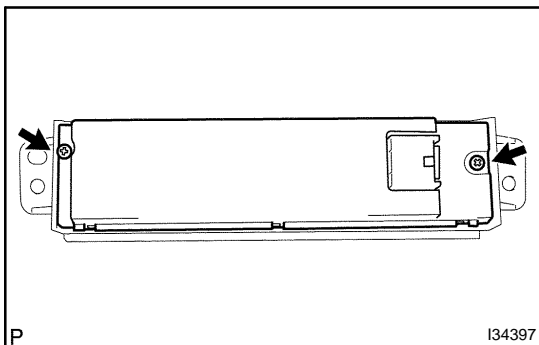


2. REMOVE AIR CONDITIONER CONTROL ASSY

- (a) Remove the 2 screws and the air conditioner Control assy.

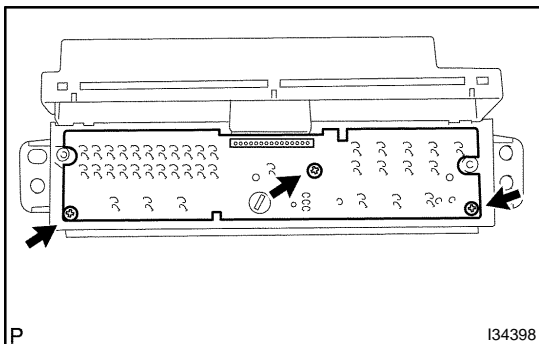
3. REMOVE COOLER CONTROL SWITCH KNOB

4. REMOVE HEATER CONTROL NAME SHEET NO.1

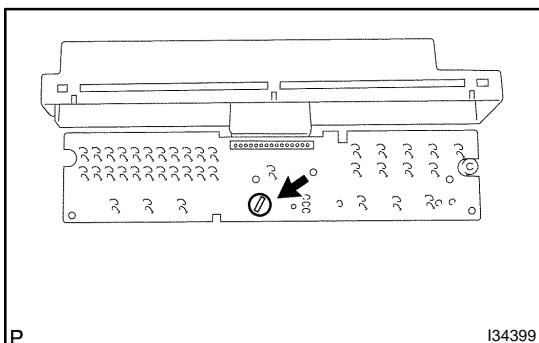


5. REMOVE HEATER CONTROL HOUSING

- (a) Remove the 2 screws.

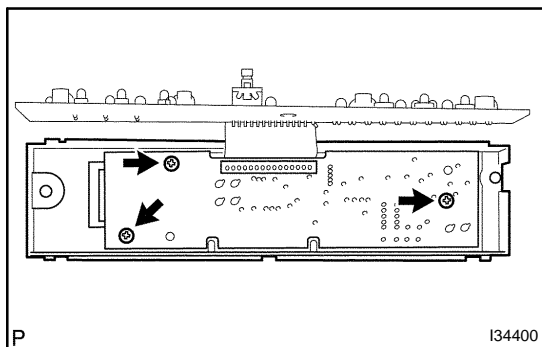


- (b) Remove the 3 screws and the heater control housing.



6. REMOVE AIR CONDITIONING CONTROL BULB

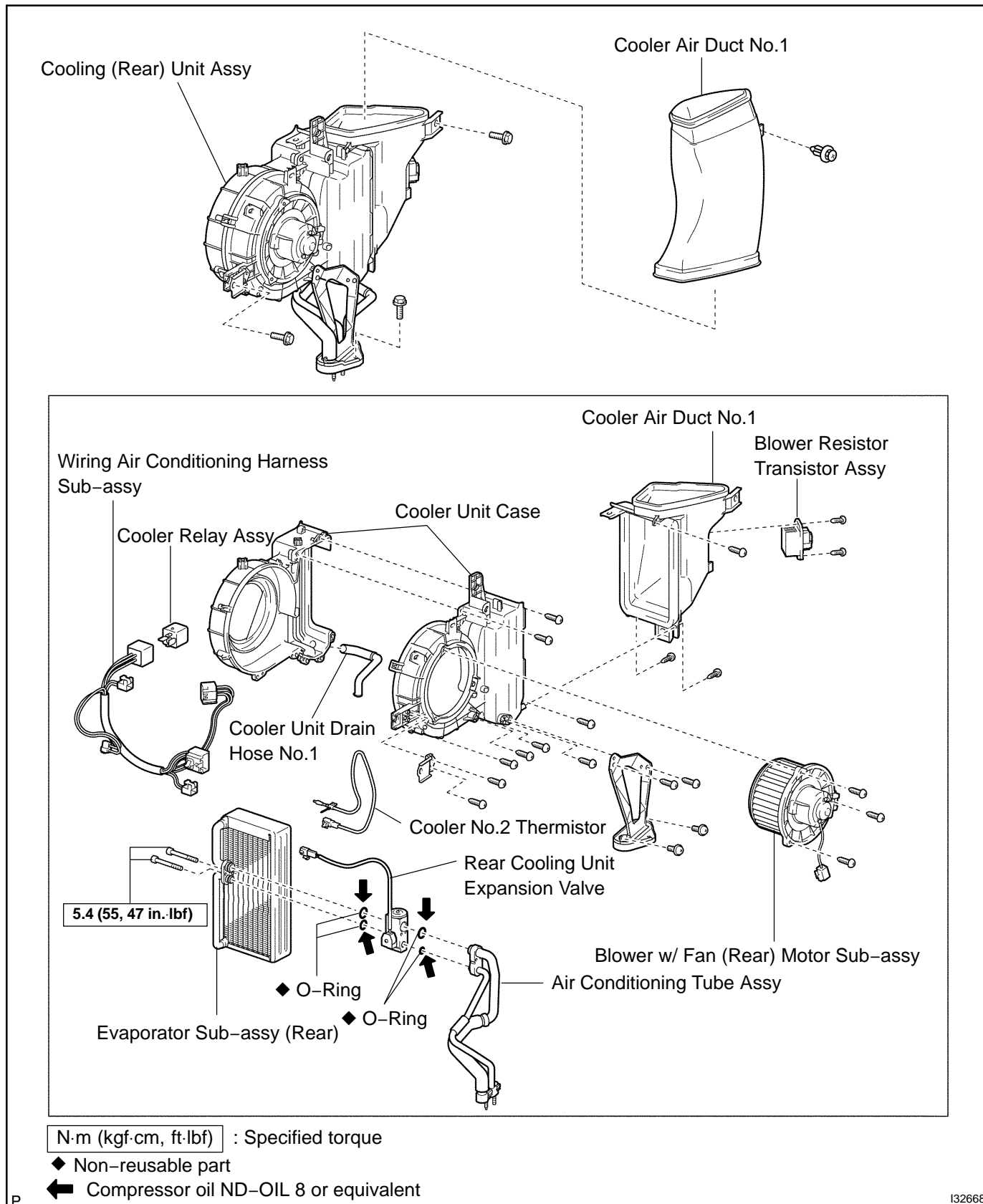
- (a) Remove the air conditioning control bulb.

**7. REMOVE INTEGRATION CONTROL & PANEL ASSY**

- (a) Remove the 3 screws and the integration control & panel assy.

COOLING (REAR) UNIT ASSY COMPONENTS

550UO-02



132668

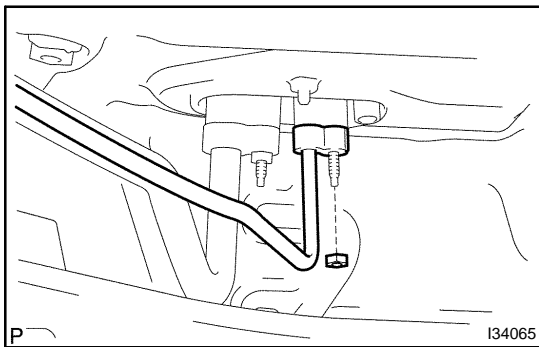
OVERHAUL

HINT:

COMPONENTS: See page 55-48

1. REMOVE REAR NO. 2 SEAT ASSY RH (See page 72-42)
2. REMOVE REAR DOOR SCUFF PLATE RH (See page 76-38)
3. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH (See page 76-38)
4. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (See page 76-38)
5. REMOVE PACKAGE TRAY TRIM PANEL ASSY (See page 76-38)
6. REMOVE QUARTER INSIDE TRIM BOARD RH (See page 76-38)
7. REMOVE ROOF SIDE GARNISH INNER RH (See page 76-38)
8. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page 55-8)

SST 07110-58060 (07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



9. DISCONNECT D PIPE COOLER REFRIGERANT LIQUID

- (a) Remove the nut and the pipe cooler refrigerant suction B.
- (b) Remove the O-ring from the pipe cooler refrigerant suction B.

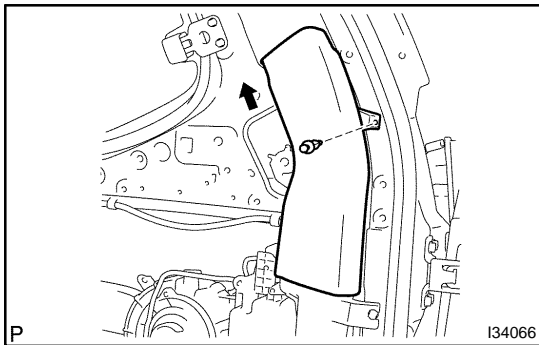
NOTICE:

Seal the opening of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering.

10. DISCONNECT PIPE COOLER REFRIGERANT SUCTION C

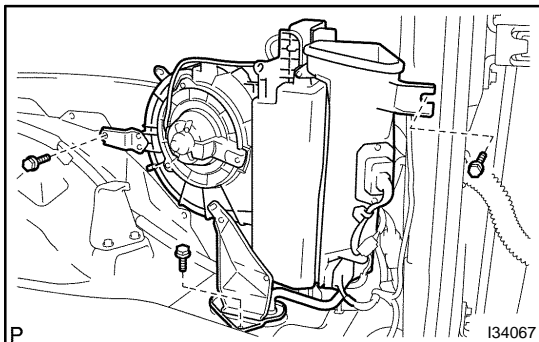
HINT:

Disconnection of the C pipe cooler refrigerant liquid is the same way as the pipe cooler refrigerant suction B.



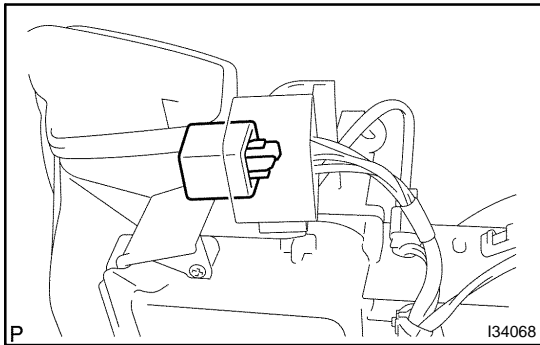
11. REMOVE COOLER AIR DUCT NO.1

- (a) Remove the clip and the cooler air duct No.1.

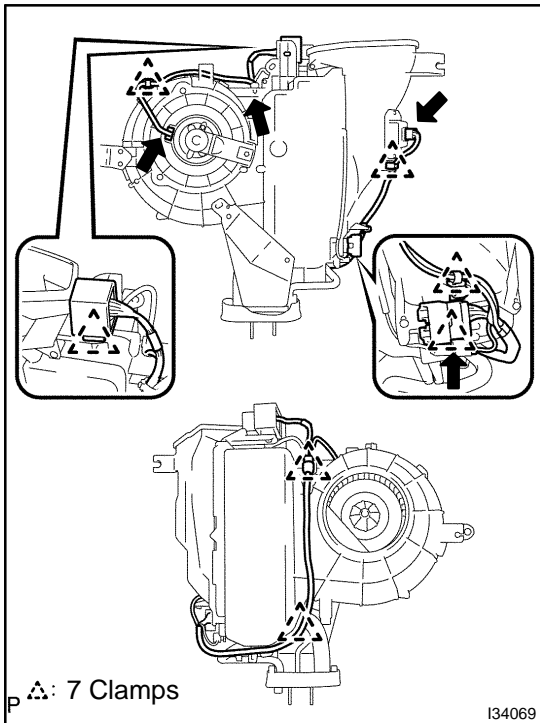


12. REMOVE COOLING (REAR) UNIT ASSY

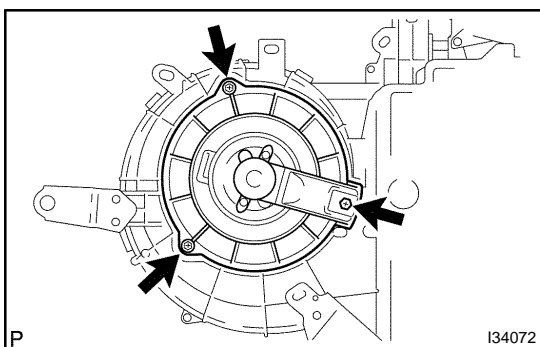
- (a) Disconnect the connectors.
- (b) Remove the 3 bolts and the cooling (rear) unit assy.

**13. REMOVE COOLER RELAY ASSY**

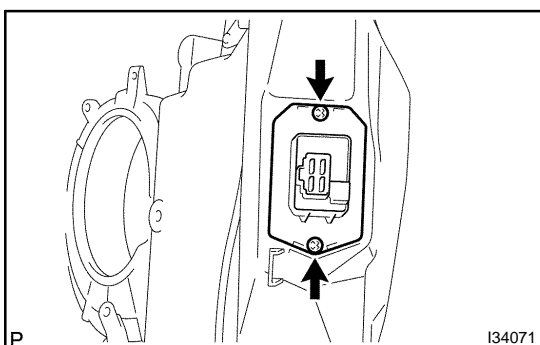
- (a) Disconnect the connector.
- (b) Remove the cooler relay assy.

**14. REMOVE WIRING AIR CONDITIONING HARNESS SUB-ASSY**

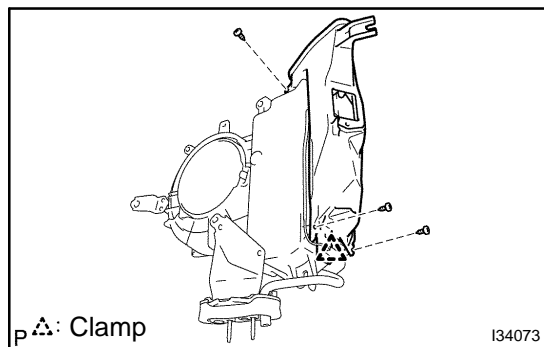
- (a) Disconnect the connectors.
- (b) Release the 7 clamps and remove the wiring air conditioning harness sub-assy.

**15. REMOVE BLOWER W/FAN (REAR) MOTOR SUB-ASSY**

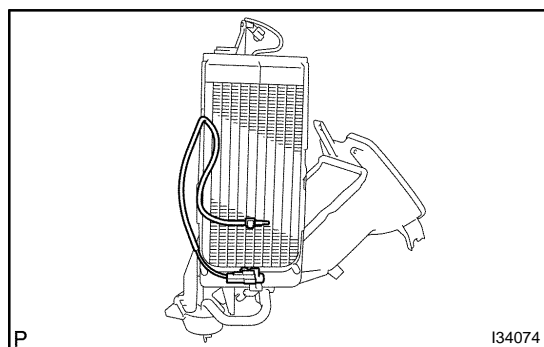
- (a) Remove the 3 screws and the blower w/ fan (rear) motor sub-assy.

**16. REMOVE BLOWER RESISTOR TRANSISTOR ASSY**

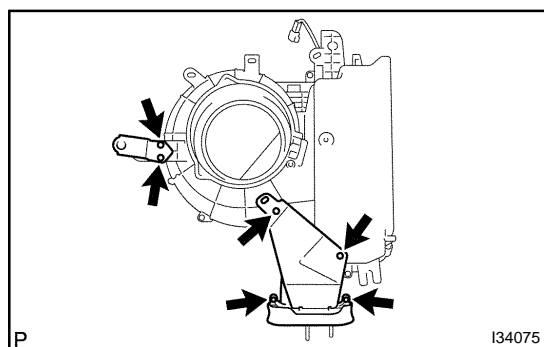
- (a) Remove the 2 screws and the blower resistor transistor assy.

**17. REMOVE COOLER AIR DUCT NO.1**

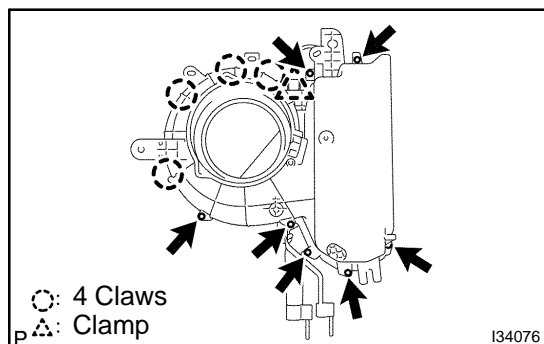
- (a) Release the clamp and remove the 3 screws and the cooler air duct No.1.

**18. REMOVE COOLER NO.2 THERMISTOR**

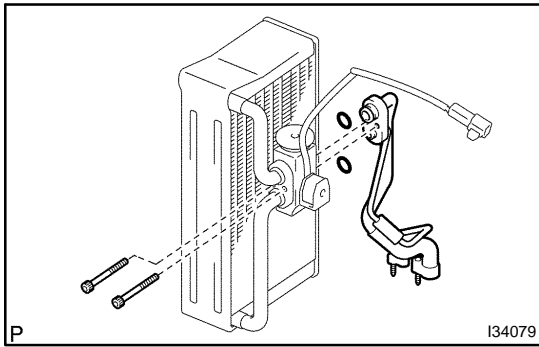
- (a) Remove the cooler No.2 thermistor.

19. REMOVE COOLER UNIT DRAIN HOSE NO.1**20. REMOVE COOLER UNIT CASE**

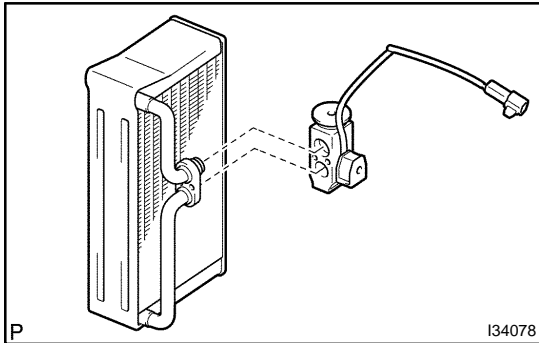
- (a) Remove the 6 screws and the 2 brackets.



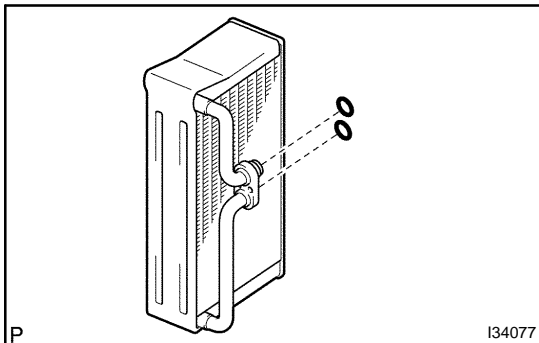
- (b) Release the 4 claw fittings and the clamp, and remove the 7 screws and the 2 cooler unit cases.

**21. REMOVE AIR CONDITIONING TUBE ASSY**

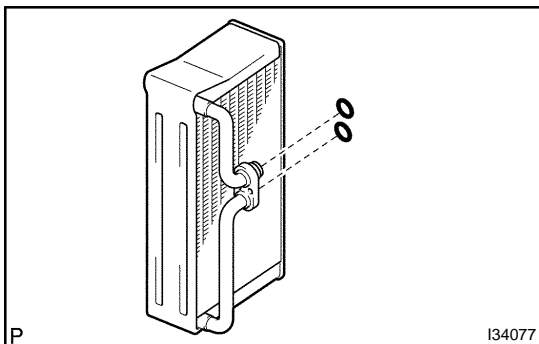
- (a) Using a hexagon wrench 4.0 mm (0.15 in), remove the 2 hexagon bolts and the air conditioning tube assy.
- (b) Remove the 2 O-rings from the air conditioning tube assy.

**22. REMOVE REAR COOLING UNIT EXPANSION VALVE**

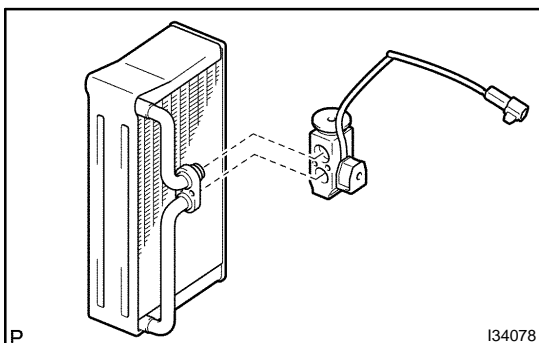
- (a) Remove the rear cooling unit expansion valve.

**23. REMOVE EVAPORATOR SUB-ASSY (REAR)**

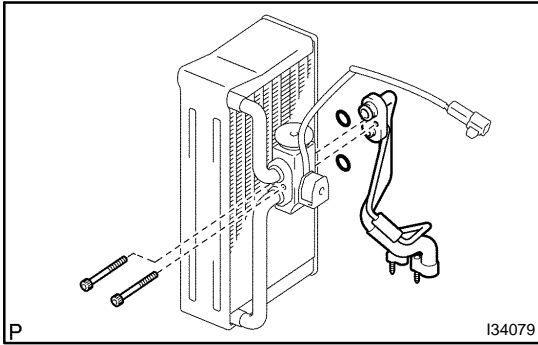
- (a) Remove the 2 O-rings from the evaporator sub-assy (rear).

**24. INSTALL EVAPORATOR SUB-ASSY (REAR)**

- (a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the rear cooling unit expansion valve.
Compressor oil: ND-OIL 8 or equivalent
- (b) Install the 2 O-rings to the evaporator sub-assy (rear).

**25. INSTALL REAR COOLING UNIT EXPANSION VALVE**

- (a) Install the rear cooling unit expansion valve.

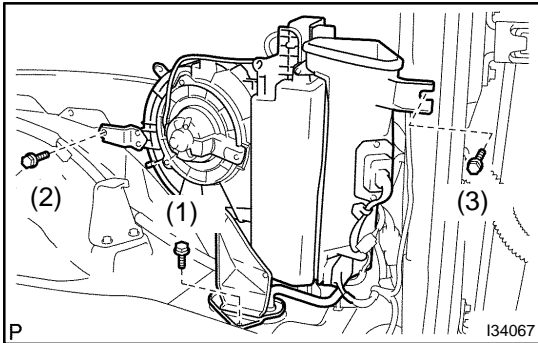
**26. INSTALL AIR CONDITIONING TUBE ASSY**

- (a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the air conditioning tube assy.

Compressor oil: ND-OIL 8 or equivalent

- (b) Install the 2 O-rings to the air conditioning tube assy.
 (c) Using a hexagon wrench 4.0 mm (0.15 in.), install the air conditioning tube assy with the 2 hexagon bolts.

Torque: 5.4 N·m (55 kgf·cm, 47 in.-lbf)

**27. INSTALL COOLING (REAR) UNIT ASSY**

- (a) Install the cooling (rear) unit assy with the 3 bolt.

NOTICE:

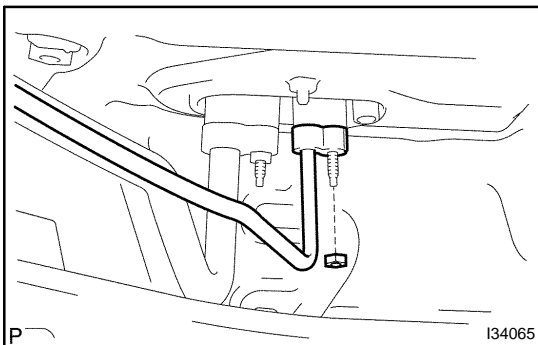
Tighten the bolts in the order shown in the illustration to install the cooling (rear) unit assy.

28. INSTALL D PIPE COOLER REFRIGERANT LIQUID

- (a) Remove the attached vinyl tape from the pipe.
 (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the rear cooler and accessory assy.

Compressor oil: ND-OIL 8 or equivalent

- (c) Install the O-ring on the pipe cooler refrigerant suction B.



- (d) Install the pipe cooler refrigerant suction B on the cooling (rear) unit assy with the nut.

Torque: 9.8 N·m (100 kgf·cm, 87 in.-lbf)

29. INSTALL PIPE COOLER REFRIGERANT SUCTION C**HINT:**

Connection of the C pipe cooler refrigerant liquid is the same way as the pipe cooler refrigerant suction B.

30. CHARGE REFRIGERANT (See page 55-8)

SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

Specified amount: 800 ± 30 g (28.21 ± 1.06 oz.)

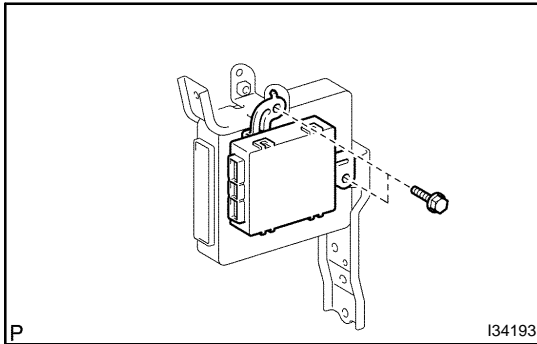
31. WARM UP ENGINE (See page 55-8)**32. INSPECT LEAKAGE OF REFRIGERANT (See page 55-8)**

AIR CONDITIONING AMPLIFIER ASSY

550UQ-02

REPLACEMENT

1. REMOVE FRONT DOOR SCUFF PLATE RH (See page 71-13)
2. REMOVE COWL SIDE TRIM BOARD RH (See page 71-13)
3. REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (See page 71-13)
4. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY (See page 71-13)
5. REMOVE INSTRUMENT PANEL ORNAMENT (See page 71-13)
6. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2 (See page 71-13)
7. REMOVE ECM (See page 25-16)



8. REMOVE AIR CONDITIONING AMPLIFIER ASSY
 - (a) Remove the 2 bolts and the air conditioning amplifier assy.

SUPPLEMENTAL RESTRAINT SYSTEM

6011A-01

PRECAUTION

CAUTION:

- The vehicle is equipped with SRS, which consists of a driver airbag, front passenger airbag, side airbag and curtain shield airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures indicated in the repair manual.
- Wait at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery before starting the operation. (The SRS is equipped with a back-up power source, so that if work is started within 90 seconds after disconnecting the negative (-) terminal cable of the battery, the SRS may be deployed.)
- Do not expose the horn button assy, instr pnl pass l/door airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear, seat position airbag sensor or occupant classification ECU directly to hot air or flames.
- Be sure to perform the initialization of the occupant classification ECU if any of the following conditions occur (see page 05-1209). If the initialization is not performed, the SRS may not operate properly.
 - The occupant classification ECU is replaced.
 - Accessories (seatback tray, seat cover, etc.) are installed to the vehicle.
 - The passenger seat is removed from the vehicle, and then reinstalled or replaced.
 - The passenger airbag ON/OFF indicator light ("OFF") comes on when the passenger seat is not occupied.
 - The vehicle is brought to the workshop for repair due to an accident or collision.

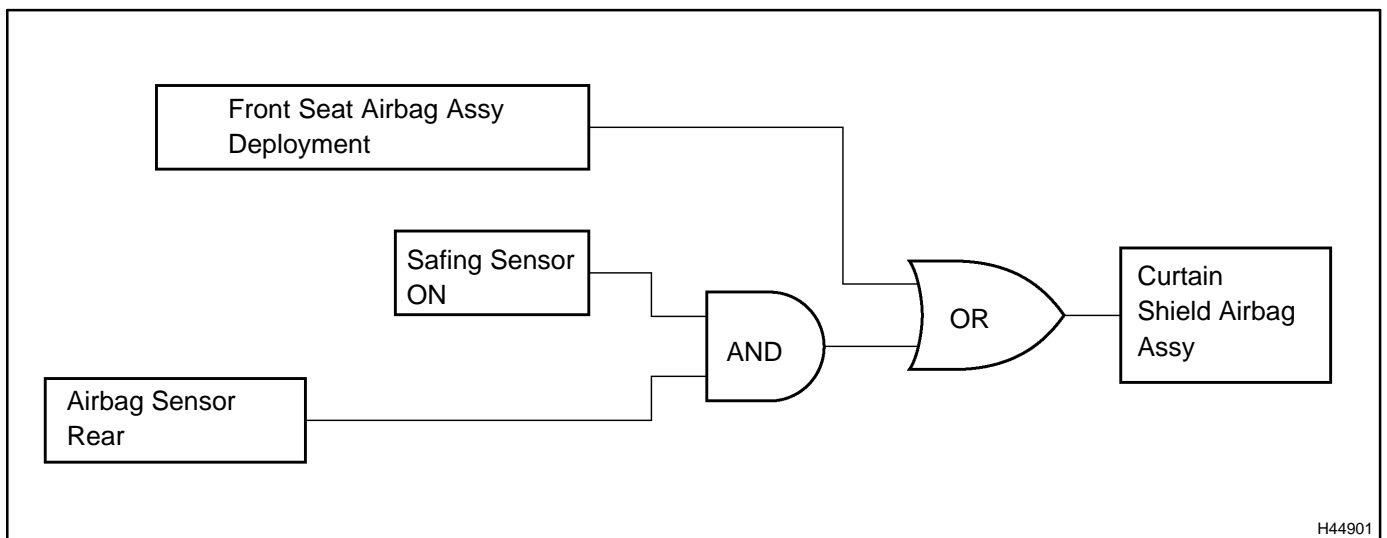
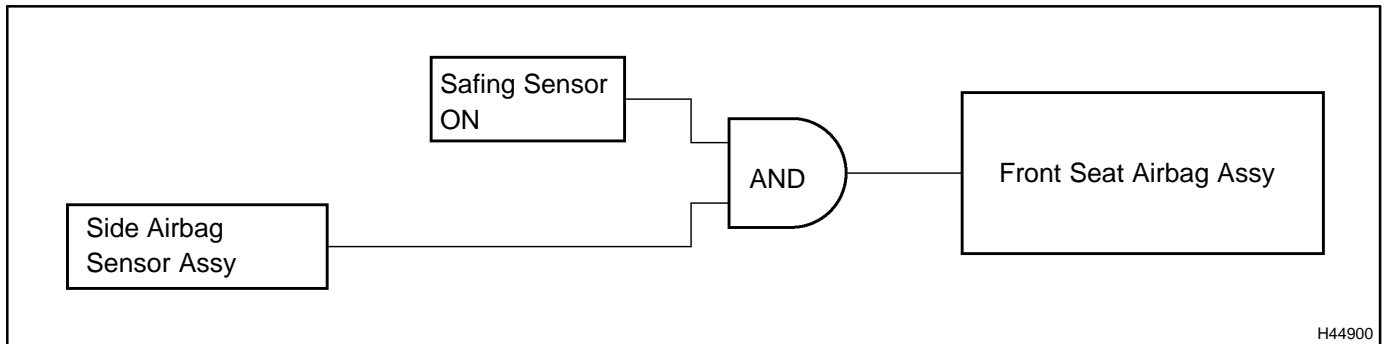
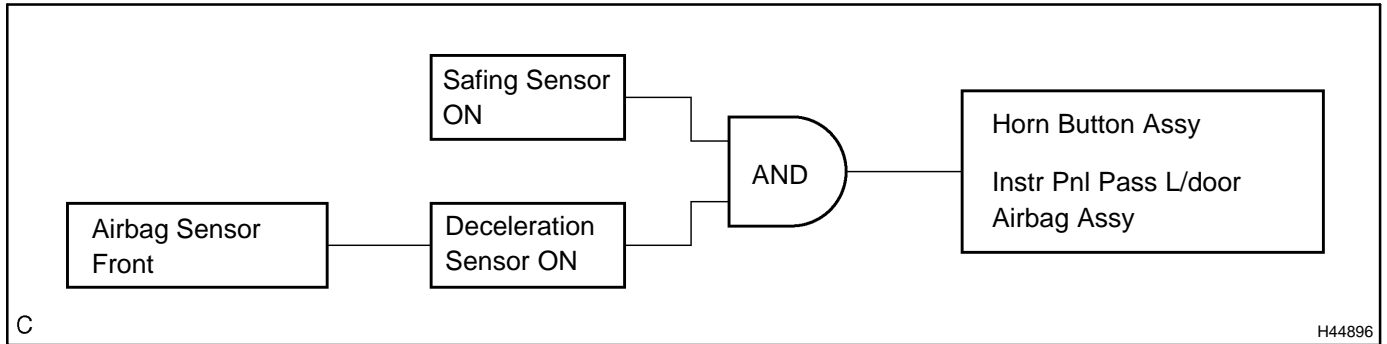
NOTICE:

- Malfunction symptoms of the SRS are difficult to confirm, so DTCs are the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect DTCs before disconnecting the battery.
- Even in the case of a minor collision when the SRS does not deploy, the horn button assy, instr pnl pass l/door airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear, seat position airbag sensor and occupant classification ECU should be inspected (see page 60-13).
- Before repair work, remove the airbag sensor if any kind of shock is likely to occur to the airbag sensor during the operation.
- Never use SRS parts from another vehicle. When replacing the parts, replace them with new ones.
- Never disassemble or repair the horn button assy, instr pnl pass l/door airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear, seat position airbag sensor or occupant classification ECU in order to reuse it.
- If the horn button assy, instr pnl pass l/door airbag assy, airbag sensor assy center, airbag sensor front, front seat airbag assy, side airbag sensor assy, curtain shield airbag assy, airbag sensor rear, seat position airbag sensor or occupant classification ECU has been dropped, or if there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.

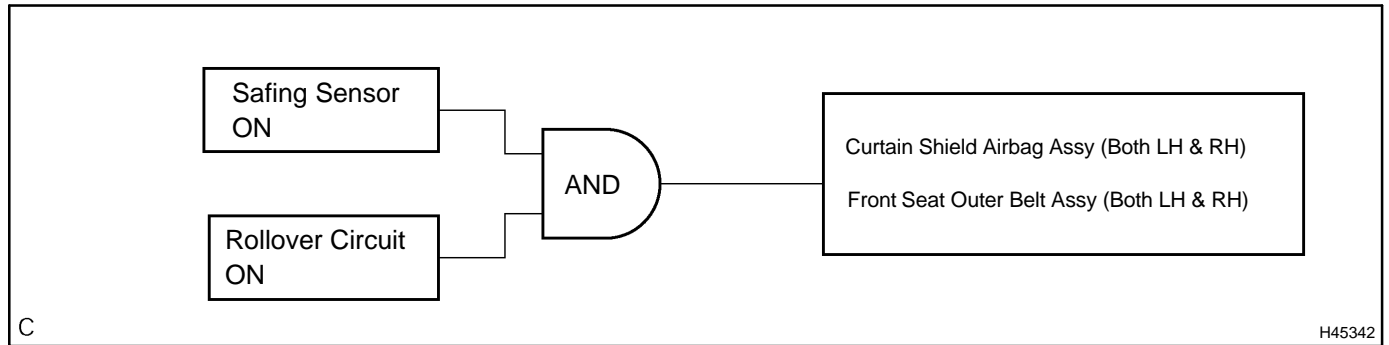
- Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting the electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions in the caution.
- After work on the SRS is completed, perform the SRS warning light check (see page 05-1213).
- When the negative (-) terminal cable is disconnected from the battery, the memory will be cleared. Because of this, be sure to make a record of the contents memorized in each system before starting work. When work is finished, adjust each system as it was before. Never use a back-up power supply from outside the vehicle to avoid erasing the memory in any system.
- If the vehicle is equipped with a mobile communication system, see page 01-5.

1. DEPLOYMENT CONDITION

(a) When the vehicle collides and the shock is greater than the specified value, the SRS is activated automatically. The airbag sensor assy center includes the safing sensor and deceleration sensor. The safing sensor was designed to be turned on at a smaller deceleration rate than the deceleration sensor. The deceleration sensor determines whether or not ignition is necessary based on signals from the airbag sensor front. Current flows to the squibs to deploy the SRS when the conditions shown in the illustrations below are met.



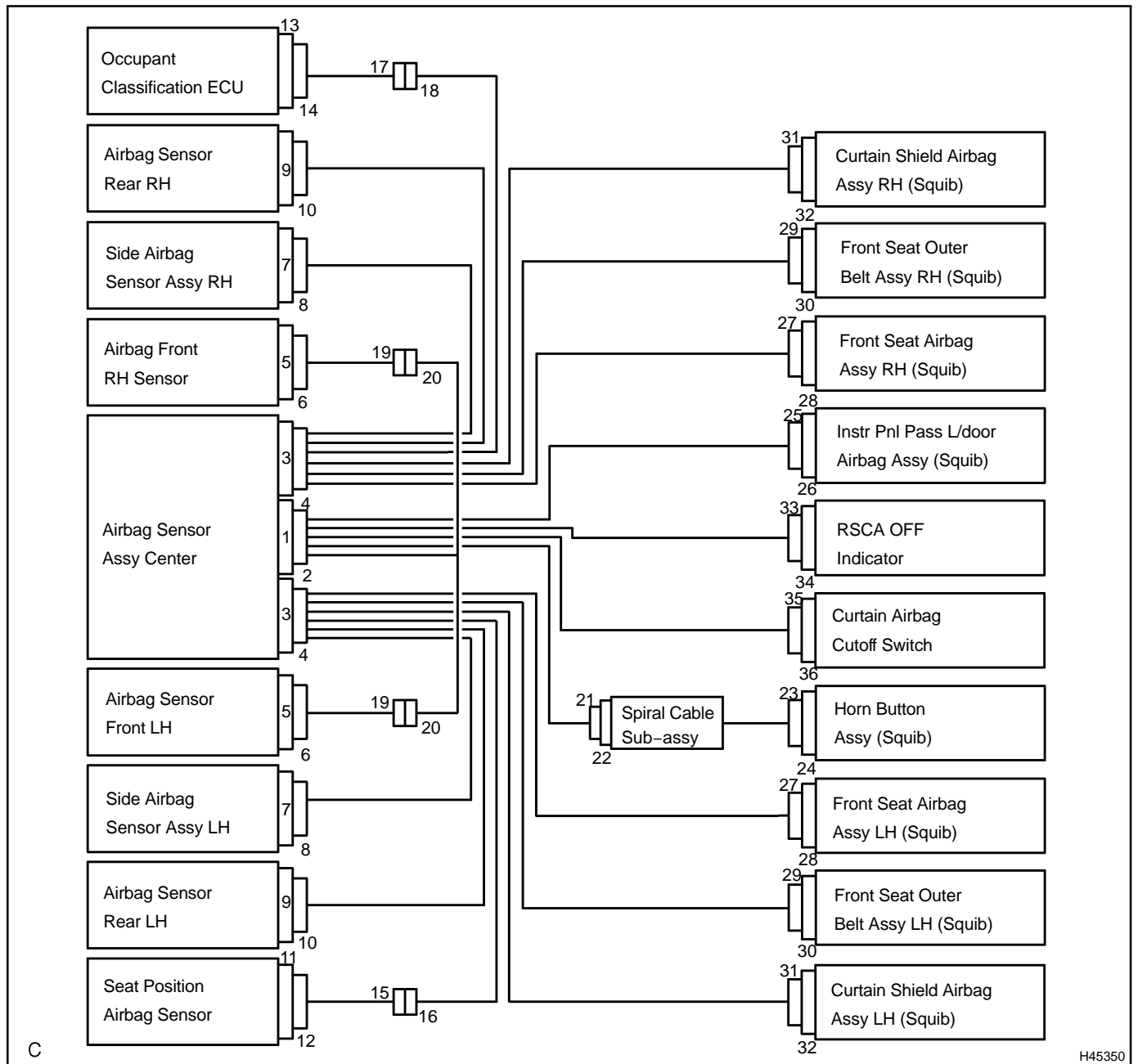
- (b) The vehicle is equipped with the function to activate the SRS in case of vehicle rollover. A circuit to detect vehicle rollover is built into the airbag sensor assy center. When the conditions for vehicle rollover are met, the SRS activates as shown in the illustration below.



2. SRS CONNECTORS

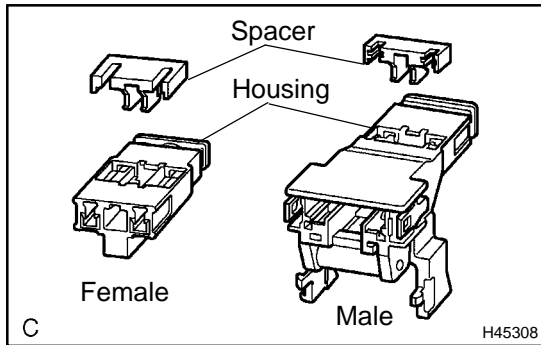
HINT:

SRS connectors are located as shown in the following illustration.

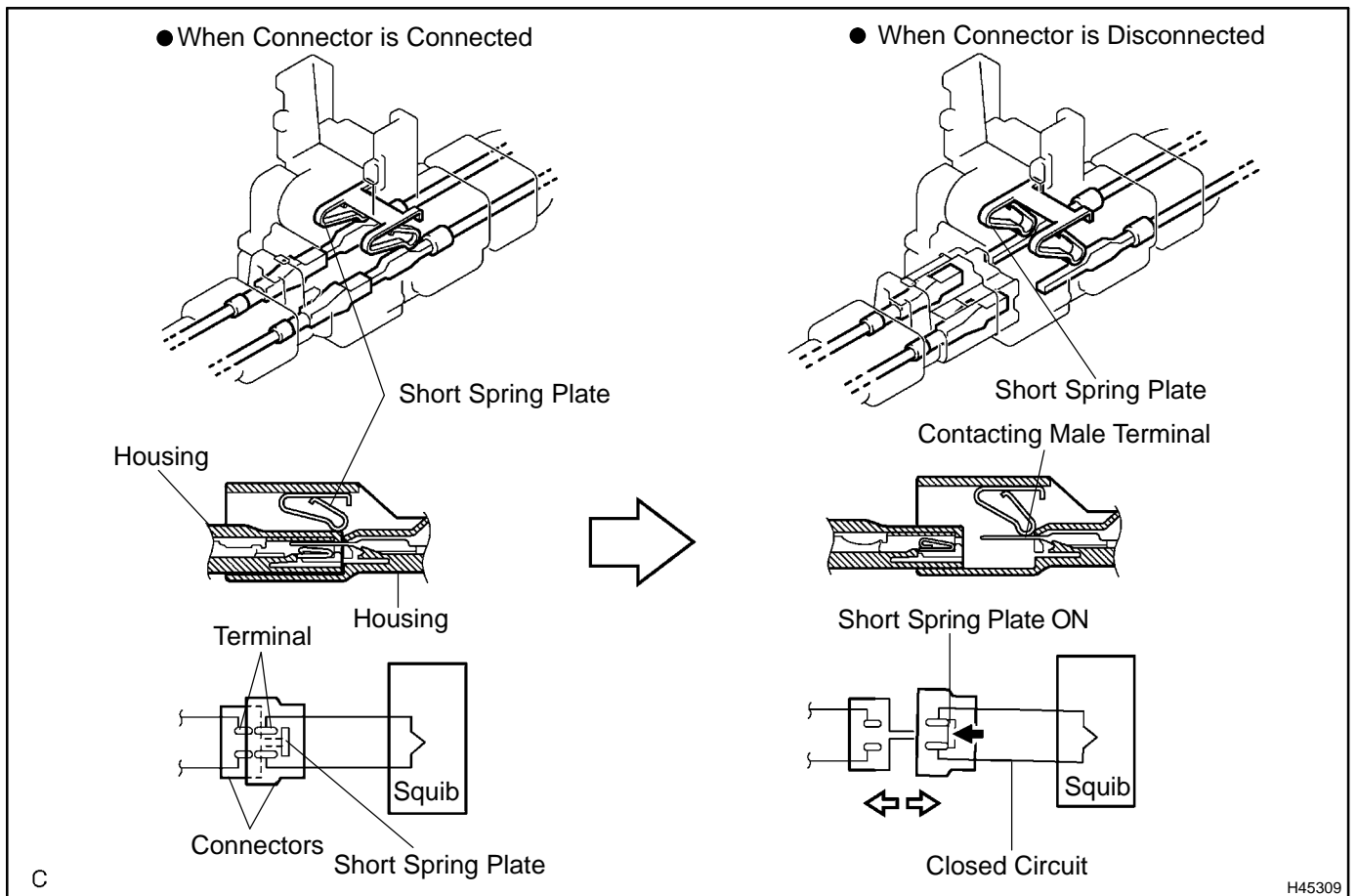


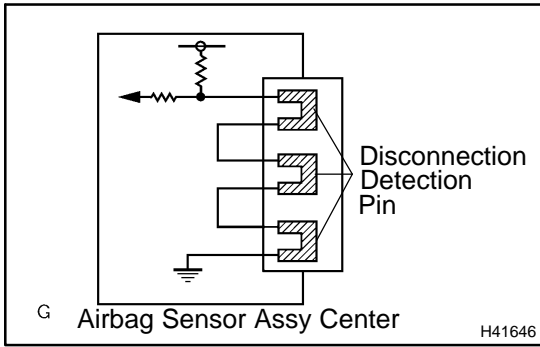
No.	Connector Type	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 2, 4, 6, 8, 10, 12, 17, 18, 19, 20, 21, 25, 27, 28, 35
(2)	Activation Prevention Mechanism	Connectors 2, 4, 22, 24, 26, 28, 30, 32
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3, 4
(4)	Half Connection Prevention Mechanism	Connectors 6, 8, 10, 19, 20, 21, 25, 27
(5)	Connector Lock Mechanism	Connectors 23, 29, 31

- (a) All connectors in the SRS, except the seat position airbag sensor connector and the occupant classification ECU connectors, are colored yellow to distinguish them from other connectors. These connectors have special functions, and are specially designed for the SRS. All SRS connectors use durable gold-plated terminals, and are placed in the locations shown on the previous page to ensure high reliability.

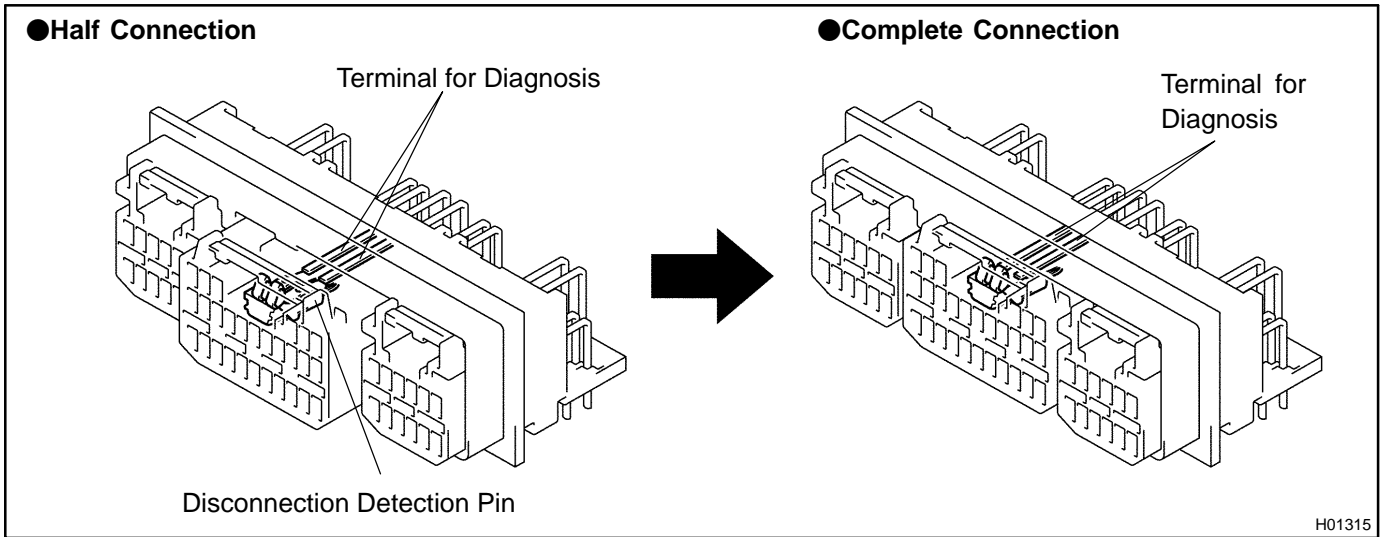


- (1) Terminal twin-lock mechanism:
Each connector has a two-piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.
- (2) Activation prevention mechanism:
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the positive (+) terminal and the negative (-) terminal of the squib.

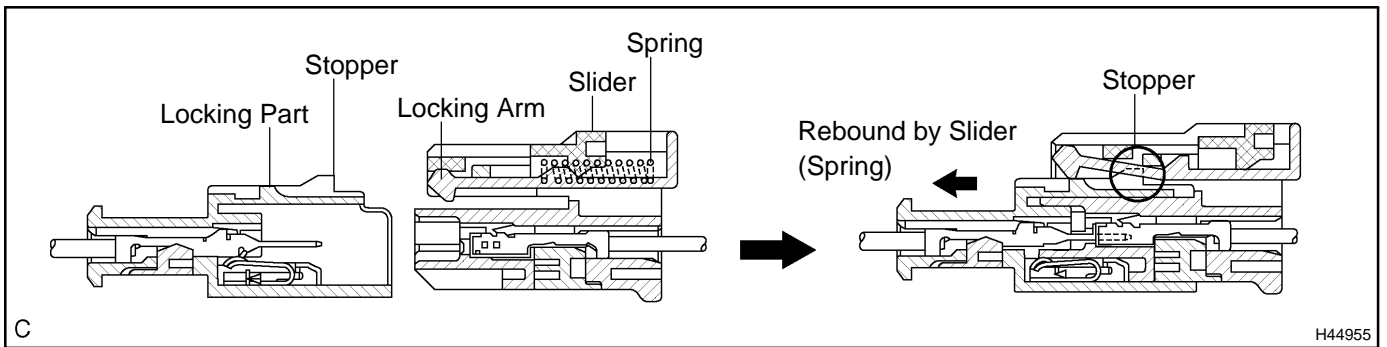




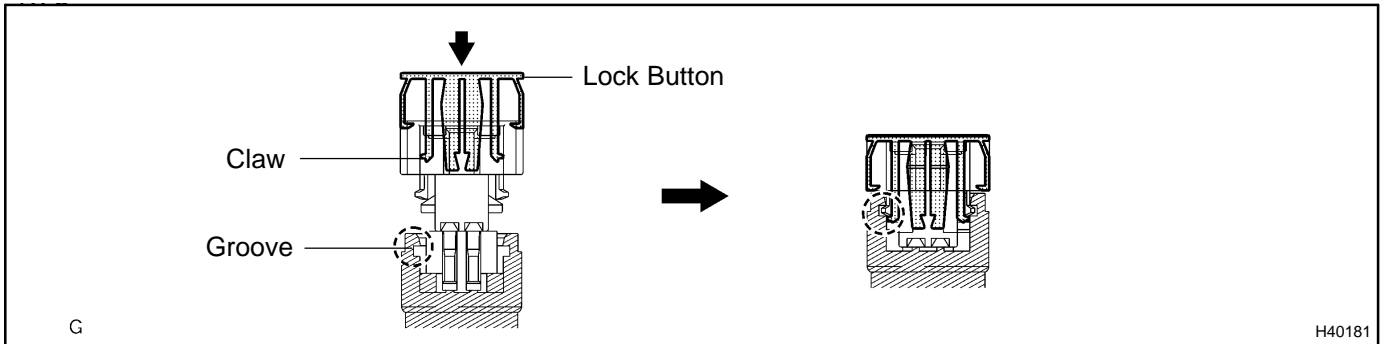
- (3) Electrical connection check mechanism:
 This mechanism electrically checks that the connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects the diagnosis terminals when the connector housing lock is locked.



- (4) Half connection prevention mechanism:
 If the connector is not completely connected, the connector is disconnected due to the spring operation so that no continuity exists.

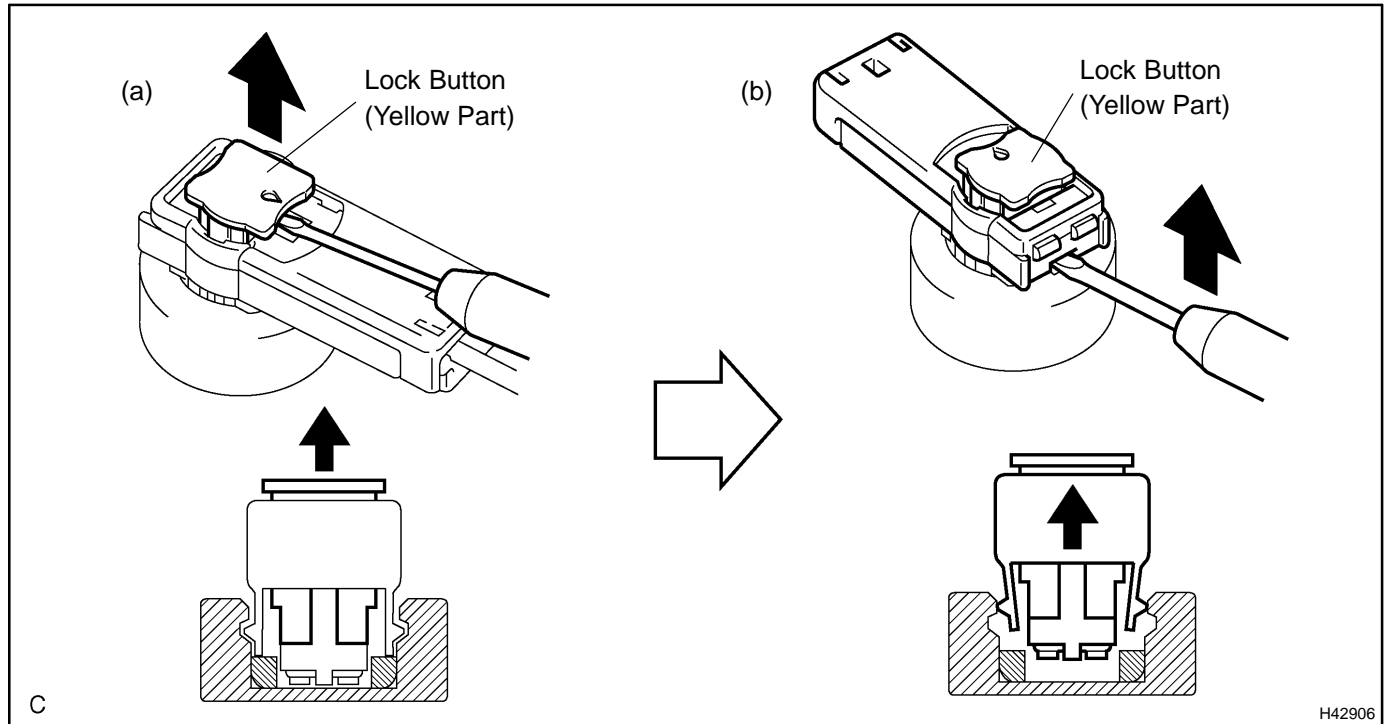


- (5) Connector lock mechanism:
Locking the connector lock button connects the connector securely.



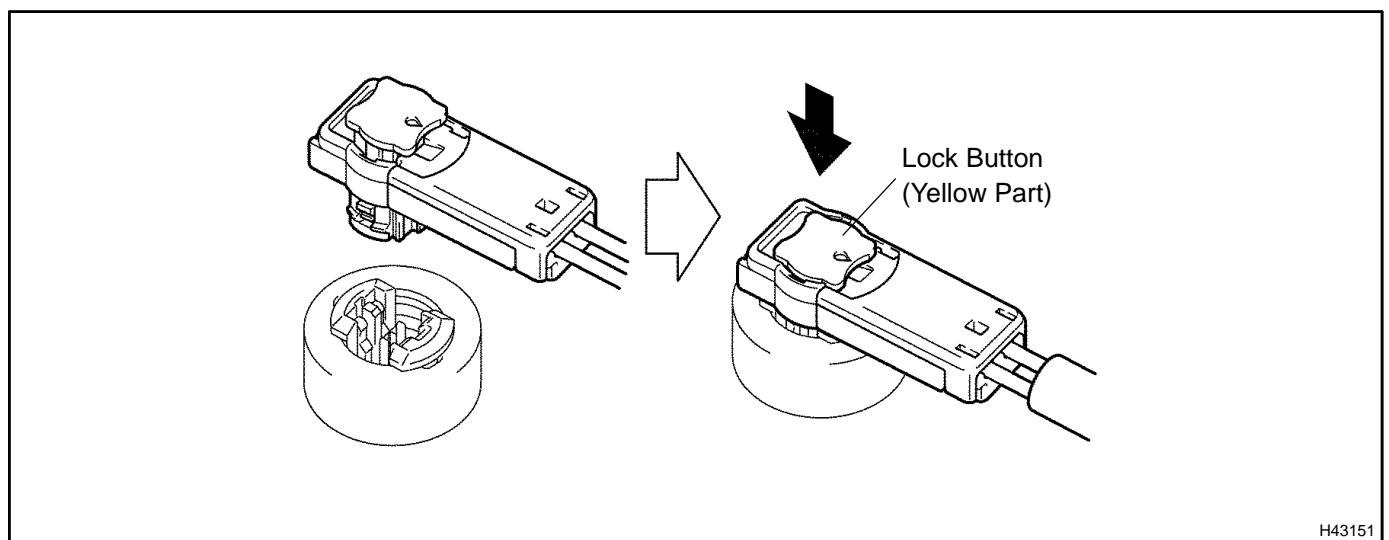
3. DISCONNECTION OF CONNECTORS FOR HORN BUTTON ASSY AND CURTAIN SHIELD AIRBAG ASSY

- (a) Release the lock button (yellow part) of the connector using a screwdriver.
- (b) Insert the screwdriver tip between the connector and the base, and then raise the connector.



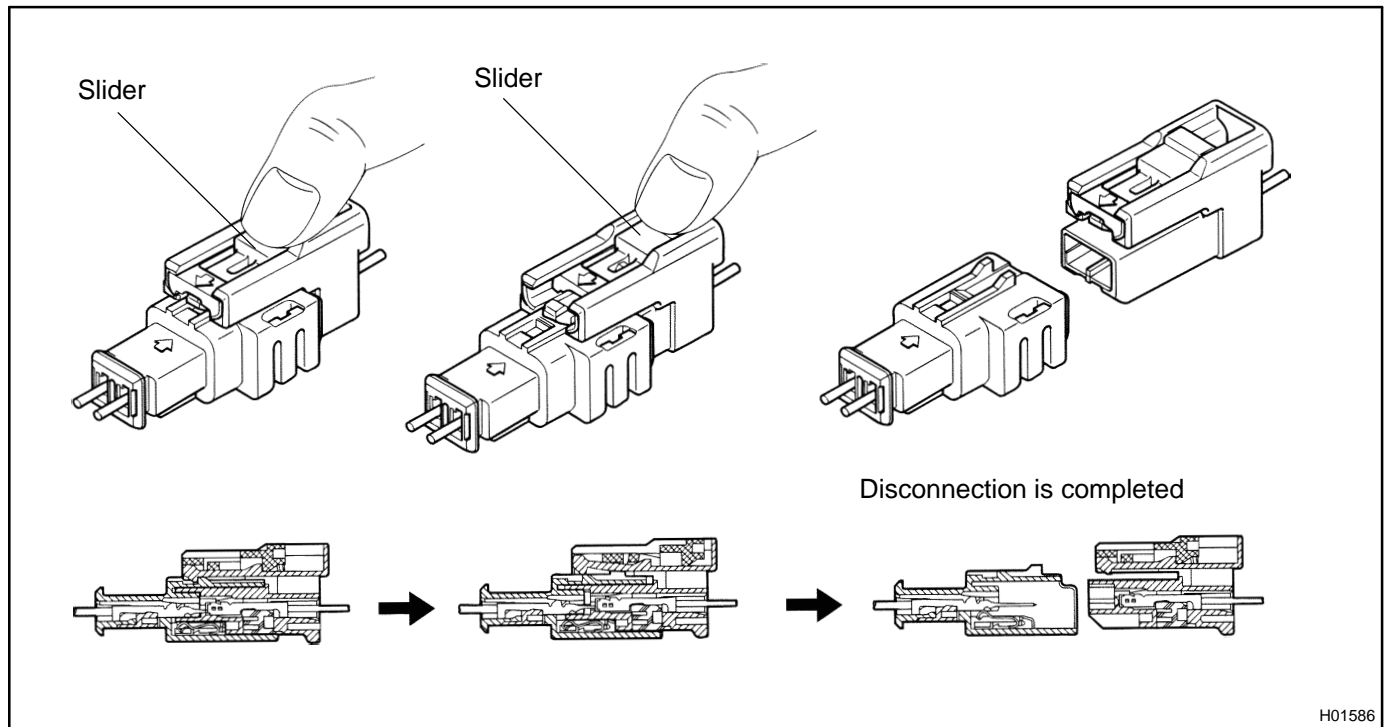
4. CONNECTION OF CONNECTORS FOR HORN BUTTON ASSY AND CURTAIN SHIELD AIRBAG ASSY

- (a) Connect the connector.
- (b) Push down securely on the lock button (yellow part) of the connector. (When locking, a click sound can be heard.)



5. DISCONNECTION OF CONNECTOR FOR INSTR PNL PASS L/DOOR AIRBAG ASSY

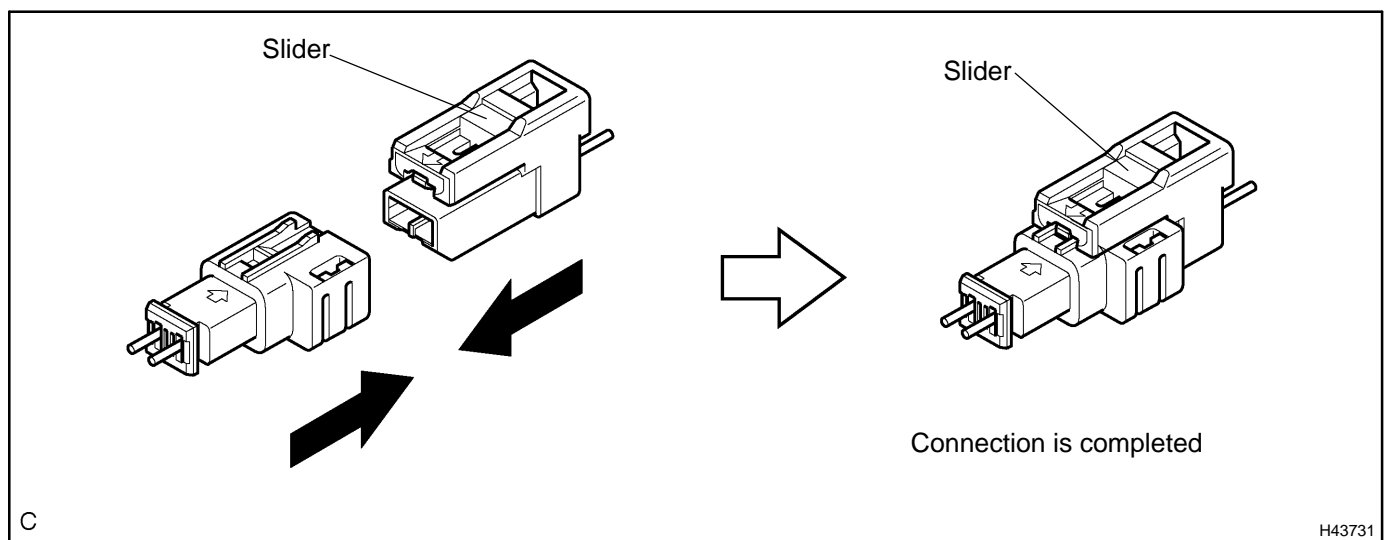
- (a) Place a finger on the slider, slide the slider to release the lock, and then disconnect the connector.

**6. CONNECTION OF CONNECTOR FOR INSTR PNL PASS L/DOOR AIRBAG ASSY**

- (a) Connect the connector as shown in the illustration. (When locking, make sure that the slider returns to its original position and a click sound can be heard.)

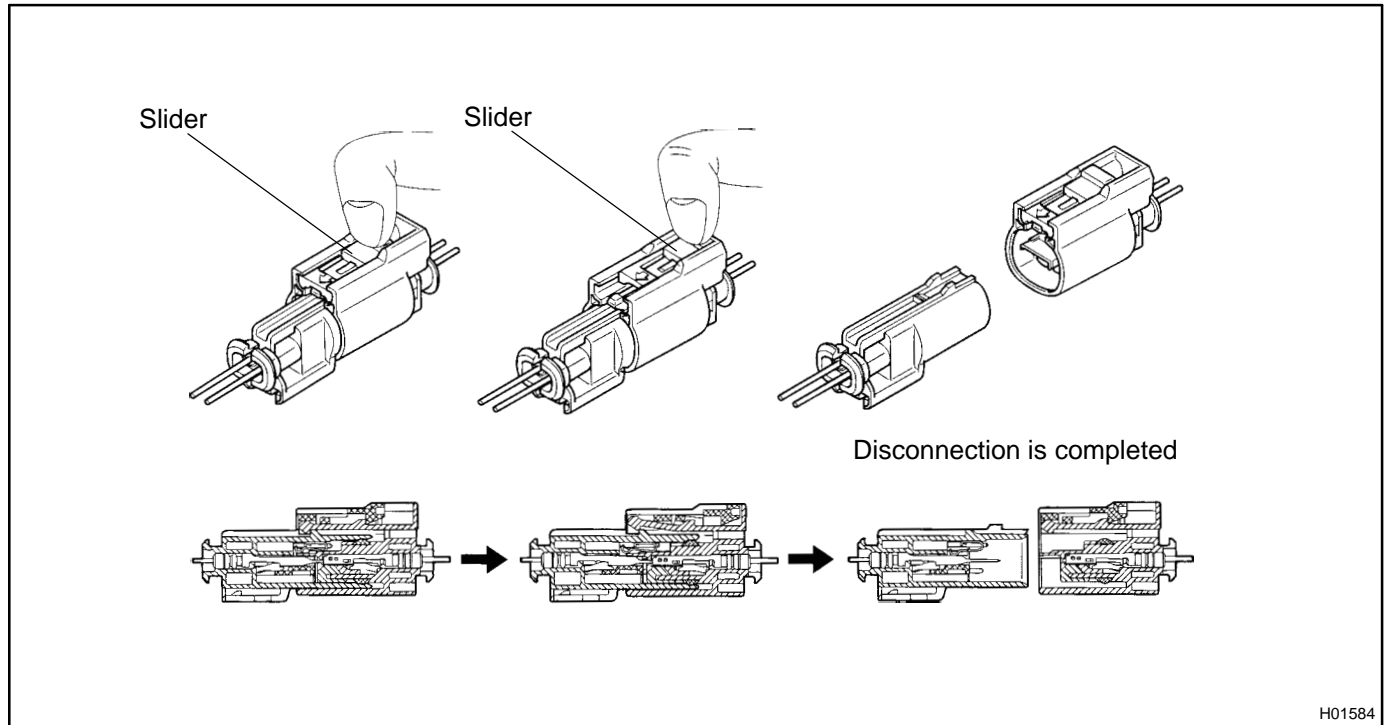
HINT:

When connecting, the slider will slide. Be sure not to touch the slider while connecting, as it may result in an insecure fit.



7. DISCONNECTION OF CONNECTOR FOR FRONT SEAT AIRBAG ASSY

- (a) Place a finger on the slider, slide the slider to release the lock, and then disconnect the connector.

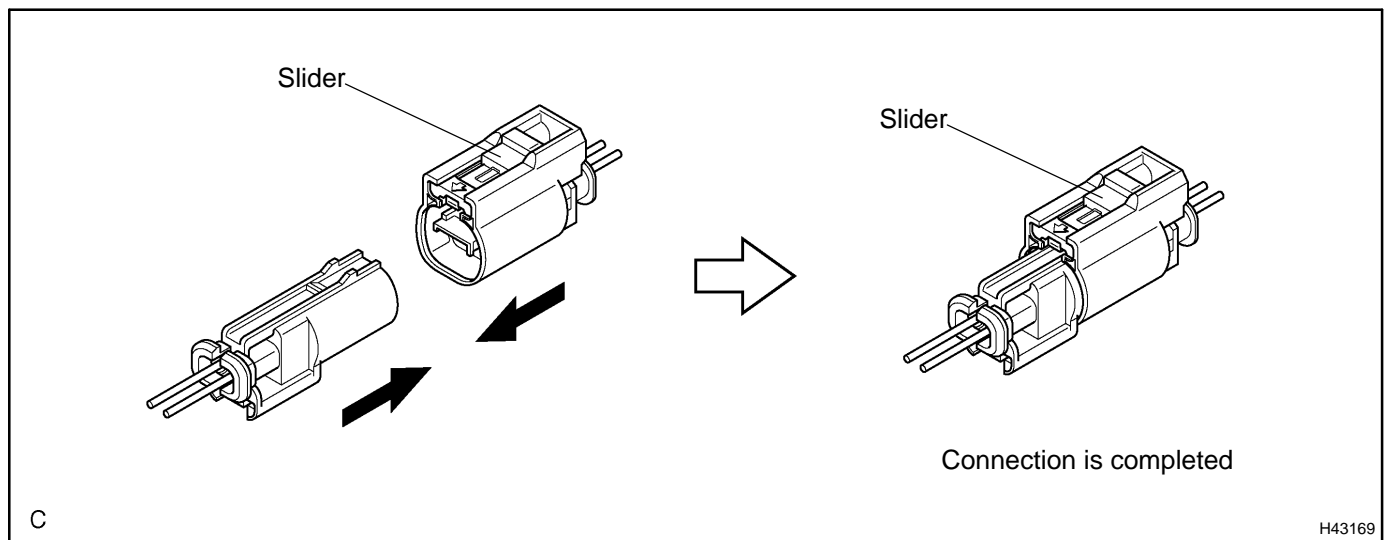


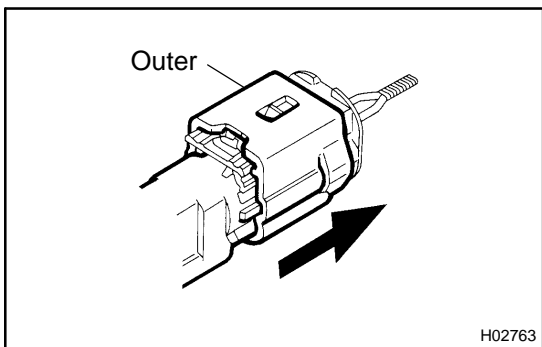
8. CONNECTION OF CONNECTOR FOR FRONT SEAT AIRBAG ASSY

- (a) Connect the connector as shown in the illustration. (When locking, make sure that the slider returns to its original position and a click sound can be heard.)

HINT:

When connecting, the slider will slide. Be sure not to touch the slider while connecting, as it may result in an insecure fit.



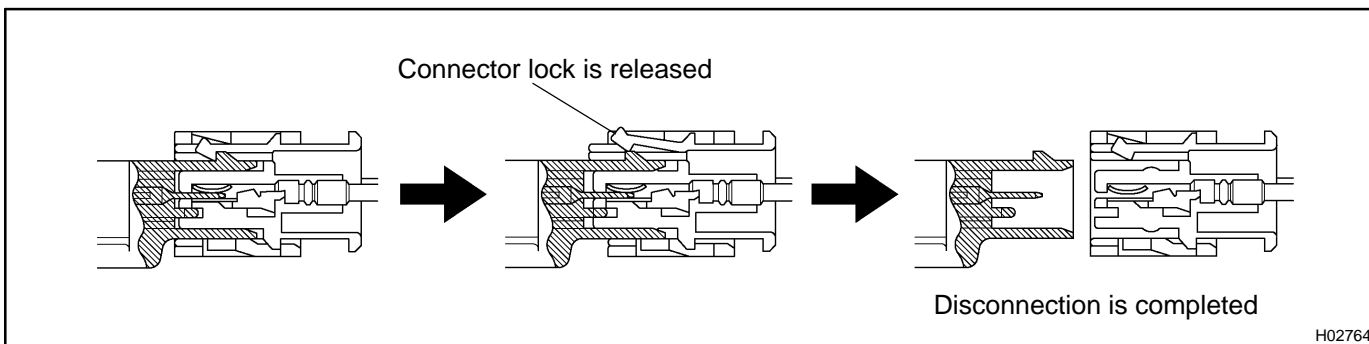


9. DISCONNECTION OF CONNECTORS FOR AIRBAG SENSOR FRONT, SIDE AIRBAG SENSOR ASSY AND AIRBAG SENSOR REAR

- (a) While holding both outer flank sides, slide the outer in the direction shown by the arrow.
- (b) When the connector lock is released, the connectors are disconnected.

HINT:

Be sure to hold both outer flank sides. Holding the top and bottom will make disconnection difficult.

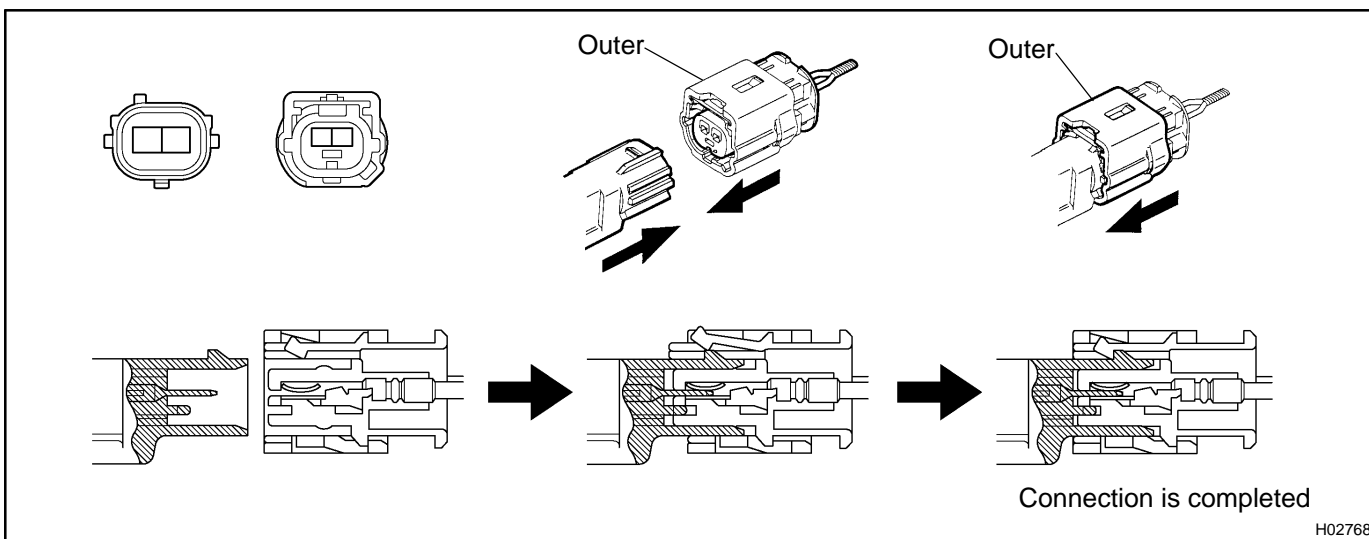


10. CONNECTION OF CONNECTORS FOR AIRBAG SENSOR FRONT, SIDE AIRBAG SENSOR ASSY AND AIRBAG SENSOR REAR

- (a) Connect the connector as shown in the illustration. (When locking, make sure that the outer returns to its original position and a click sound can be heard.)

HINT:

When connecting, the outer will slide. Be sure not to hold the outer while connecting, as it may result in an insecure fit.

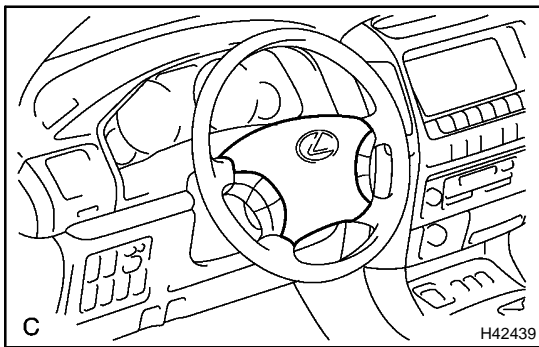


ON-VEHICLE INSPECTION

CAUTION:

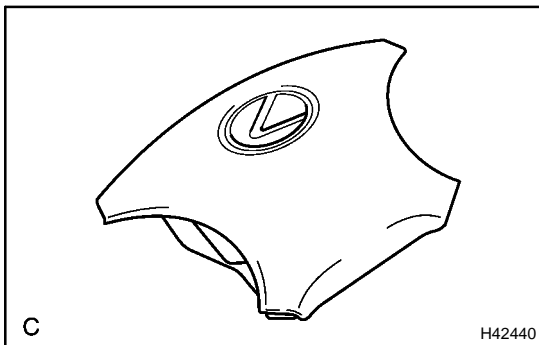
Be sure to perform the initialization of the occupant classification ECU if any of the following conditions occur (see page 05-1209). If the initialization is not performed, the SRS may not operate properly.

- The occupant classification ECU is replaced.
- Accessories (seatback tray, seat cover, etc.) are installed to the vehicle.
- The passenger seat is removed from the vehicle, and then reinstalled or replaced.
- The passenger airbag ON/OFF indicator light ("OFF") comes on when the passenger seat is not occupied.
- The vehicle is brought to the workshop for repair due to an accident or collision.



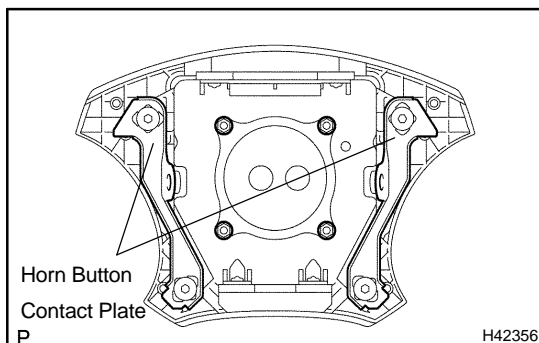
1. HORN BUTTON ASSY (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the horn button assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy with a new one:
 - Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.

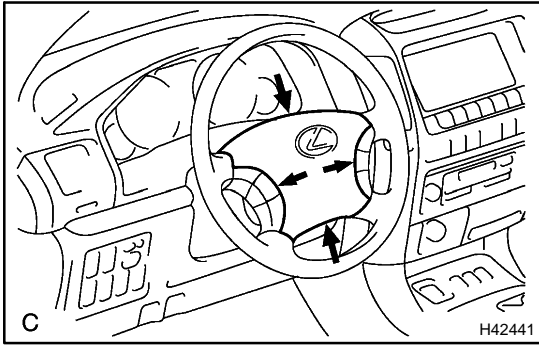


2. HORN BUTTON ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the horn button assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the horn button assy or steering wheel assy with a new one:
 - Cuts, minute cracks or marked discoloration on the horn button assy top surface or in the grooved portion.
 - Cracks or other damage to the connectors.
 - Deformation of the steering wheel assy.



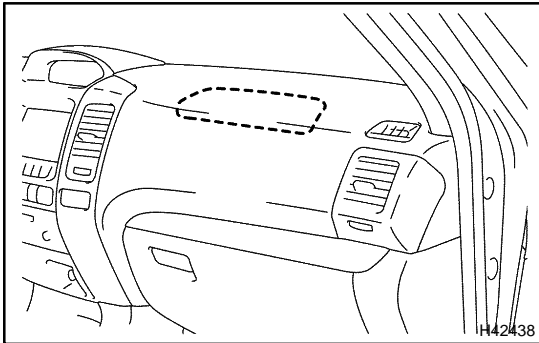
- Deformation of the horn button contact plate of the horn button assy.



- There should be no interference between the horn button assy and steering wheel assy, and the clearance should be uniform all the way around when the new horn button assy is installed on the steering wheel assy.

CAUTION:

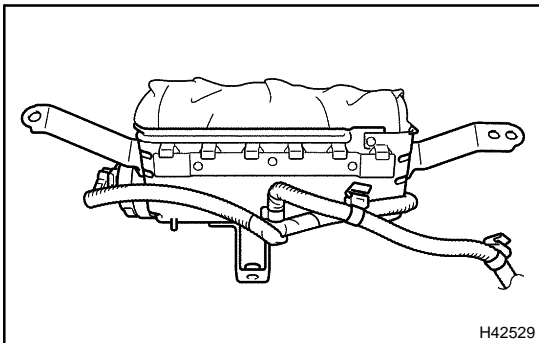
For removal and installation procedures of the horn button assy, see page 60-20. Be sure to follow the correct procedure.



3. INSTR PNL PASS L/DOOR AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

- Perform a diagnostic system check (see page 05-1219).
- With the instr pnl pass l/door airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the instrument panel with a new one:

Cuts, minute cracks or marked discoloration on the instrument panel around the instr pnl pass l/door airbag assy.



4. INSTR PNL PASS L/DOOR AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

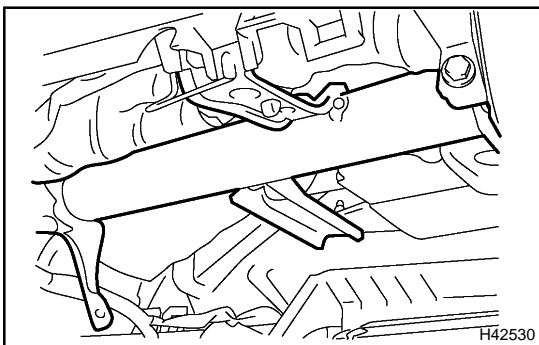
- Perform a diagnostic system check (see page 05-1219).
- With the instr pnl pass l/door airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the instr pnl pass l/door airbag assy, instrument panel or instrument panel reinforcement with a new one:

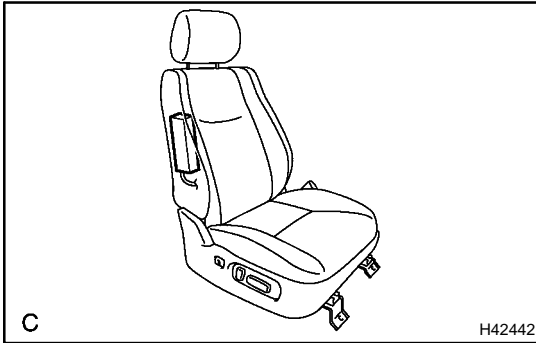
- Cuts, minute cracks or marked discoloration on the instr pnl pass l/door airbag assy.
- Cracks or other damage to the wire harness or connector.

- Deformation or cracks on the instrument panel or instrument panel reinforcement.

CAUTION:

For removal and installation procedures of the instr pnl pass l/door airbag assy, see page 60-31. Be sure to follow the correct procedure.

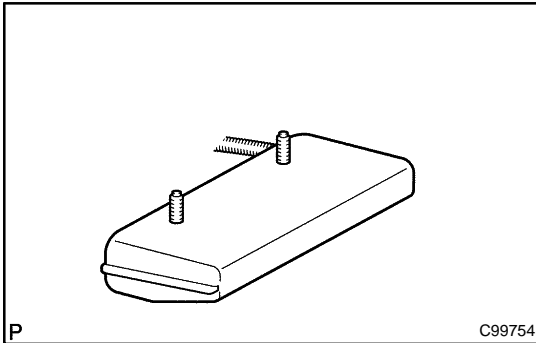




5. FRONT SEAT AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the front seat airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seatback assy with a new one:

Cuts, minute cracks or marked discoloration on the front seatback assy around the front seat airbag assy.



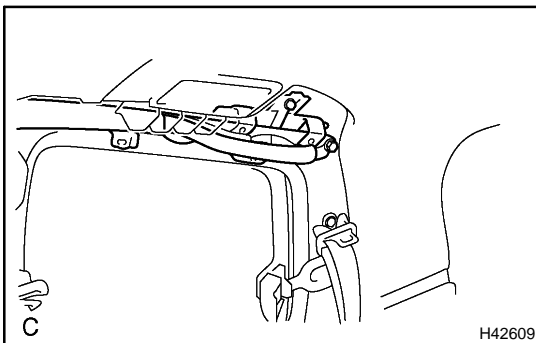
6. FRONT SEAT AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the front seat airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seat airbag assy with a new one:

- Cuts, minute cracks or marked discoloration on the front seat airbag assy.
- Cracks or other damage to the wire harness or connector.

CAUTION:

For removal and installation procedures of the front seat airbag assy, see page 72-20. Be sure to follow the correct procedure.



7. CURTAIN SHIELD AIRBAG ASSY (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the curtain shield airbag assy installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front pillar garnish or roof headlining assy with a new one:

Cuts, minute cracks or marked discoloration on the front pillar garnish or roof headlining assy around the curtain shield airbag assy.

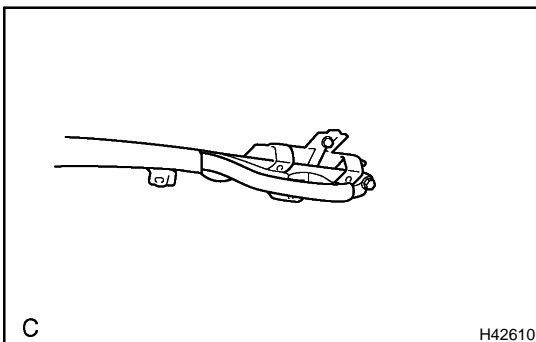
8. CURTAIN SHIELD AIRBAG ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) With the curtain shield airbag assy removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the curtain shield airbag assy with a new one:

- Cuts, minute cracks or marked discoloration on the curtain shield airbag assy.
- Cracks or other damage to the connector.

CAUTION:

For removal and installation procedures of the curtain shield airbag assy, see page 60-40. Be sure to follow the correct procedure.



9. AIRBAG SENSOR ASSY CENTER (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).

10. AIRBAG SENSOR ASSY CENTER (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).

11. AIRBAG SENSOR ASSY CENTER (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

- (a) Replace the airbag sensor assy center (see page 60-55).

CAUTION:

For removal and installation procedures of the airbag sensor assy center, see page 60-55. Be sure to follow the correct procedure.

HINT:

The airbag sensor assy center should be replaced after any of the airbags has deployed, as it has been subjected to the impact.

12. AIRBAG SENSOR FRONT (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).

13. AIRBAG SENSOR FRONT (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).

- (b) When the front bumper of the vehicle or its periphery is damaged, check if there is any damage to the airbag sensor front. If any of the airbag sensor front have defects as mentioned below, replace it with a new one:

- Cracks, dents or chips in the case.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:

For removal and installation procedures of the airbag sensor front, see page 60-57. Be sure to follow the correct procedure.

14. AIRBAG SENSOR FRONT (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

- (a) Replace the airbag sensor front (see page 60-57).

CAUTION:

For removal and installation procedures of the airbag sensor front, see page 60-57. Be sure to follow the correct procedure.

HINT:

The airbag sensor front on the impacted side should be replaced after the horn button assy or instr pnl pass l/door airbag assy has deployed.

15. SIDE AIRBAG SENSOR ASSY (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).

16. SIDE AIRBAG SENSOR ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).

- (b) When the center pillar of the vehicle or its periphery is damaged, check if there is any damage to the side airbag sensor assy. If there are any defects as mentioned below, replace the side airbag sensor assy with a new one:
- Cracks, dents or chips in the case.
 - Cracks or other damage to the connector.
 - Peeling off of the label or damage to the serial number.

CAUTION:

For removal and installation procedures of the side airbag sensor assy, see page 60-59. Be sure to follow the correct procedure.

17. SIDE AIRBAG SENSOR ASSY (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

- (a) Replace the side airbag sensor assy (see page 60-59).

CAUTION:

For removal and installation procedures of the side airbag sensor assy, see page 60-59. Be sure to follow the correct procedure.

HINT:

The side airbag sensor assy on the impacted side should be replaced after the front seat airbag assy and curtain shield airbag assy have deployed.

18. AIRBAG SENSOR REAR (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).

19. AIRBAG SENSOR REAR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) When the quarter panel of the vehicle or its periphery is damaged, check if there is any damage to the airbag sensor rear. If there are any defects as mentioned below, replace the airbag sensor rear with a new one:
- Cracks, dents or chips in the case.
 - Cracks or other damage to the connector.
 - Peeling off of the label or damage to the serial number.

CAUTION:

For removal and installation procedures of the airbag sensor rear, see page 60-62. Be sure to follow the correct procedure.

20. AIRBAG SENSOR REAR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

- (a) Replace the airbag sensor rear (see page 60-62).

CAUTION:

For removal and installation procedures of the airbag sensor rear, see page 60-62. Be sure to follow the correct procedure.

HINT:

The airbag sensor rear on the impacted side should be replaced after the curtain shield airbag assy has deployed.

21. SEAT POSITION AIRBAG SENSOR (VEHICLE NOT INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).

22. SEAT POSITION AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION)

- (a) Perform a diagnostic system check (see page 05-1219).
- (b) Even if the airbag was not deployed, check if there is any damage to the seat position airbag sensor. If there are any defects as mentioned below, replace the seat position airbag sensor with a new one:
- Cracks, dents or chips in the case.
 - Cracks or other damage to the connector.

CAUTION:

For removal and installation procedures of the seat position airbag sensor, see page 60-64. Be sure to follow the correct procedure.

23. OCCUPANT CLASSIFICATION ECU (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-1219).

24. OCCUPANT CLASSIFICATION ECU (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-1219).

(b) Even if the airbag was not deployed, check if there is any damage to the occupant classification ECU. If there are any defects as mentioned below, replace the occupant classification ECU with a new one:

- Cracks, dents or chips in the case.
- Cracks or other damage to the connectors.

CAUTION:

For removal and installation procedures of the occupant classification ECU, see page 60-67. Be sure to follow the correct procedure.

25. WIRE HARNESS AND CONNECTOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-1219).

26. WIRE HARNESS AND CONNECTOR (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page 05-1219).

(b) Check for breaks in all wires of the SRS wire harness and exposed conductors.

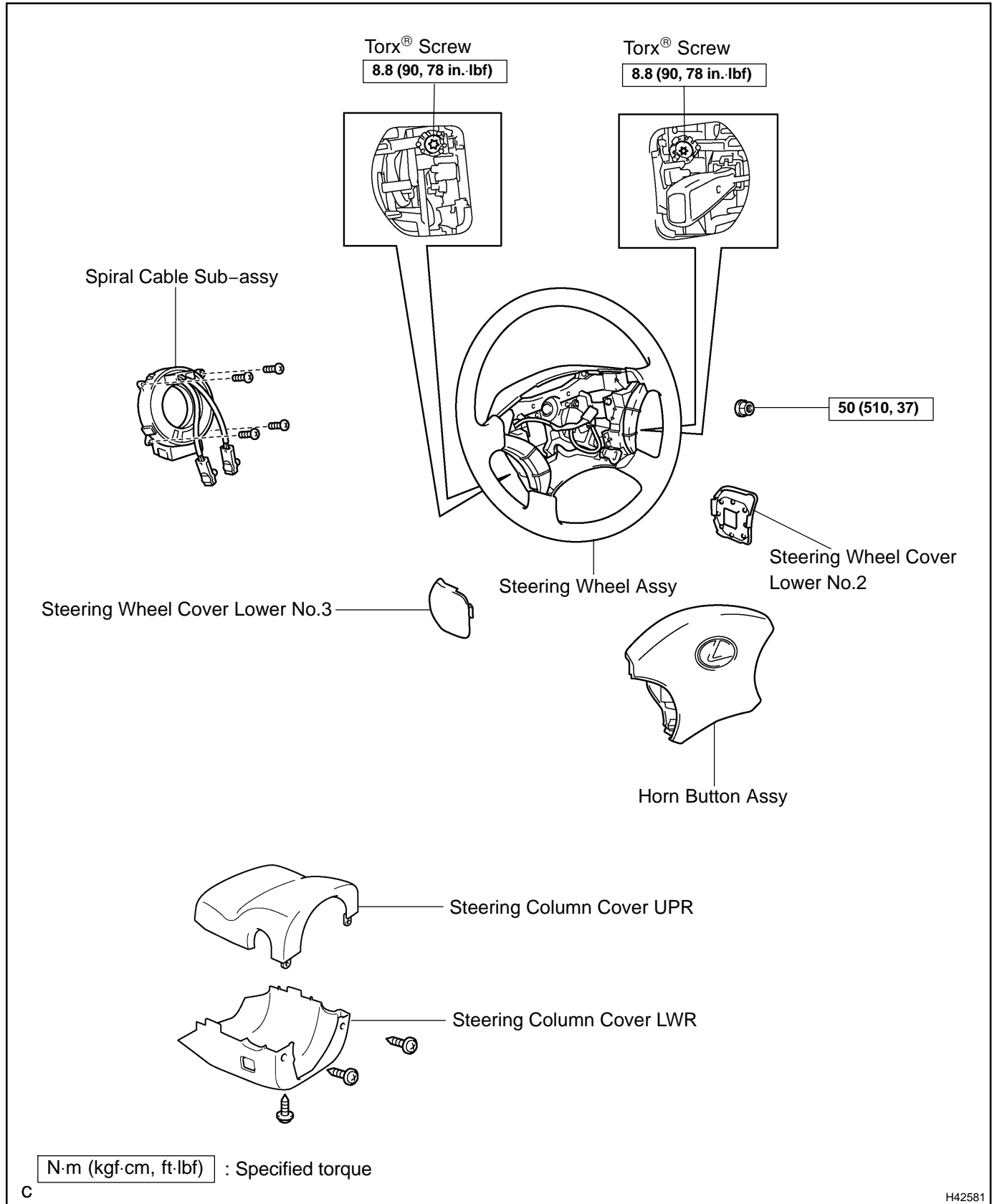
(c) Check to see if the SRS wire harness connectors are cracked or chipped.

HINT:

The SRS wire harness is integrated with the engine room main wire, instrument panel wire, floor wire and floor wire No.2.

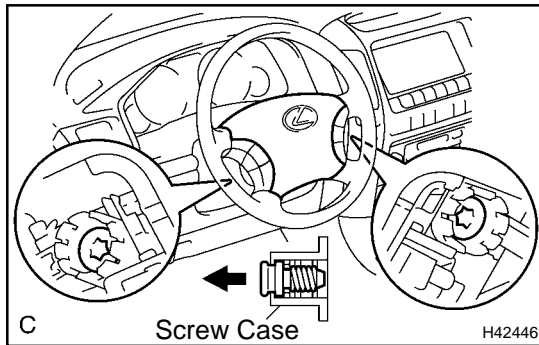
HORN BUTTON ASSY COMPONENTS

600HL-02



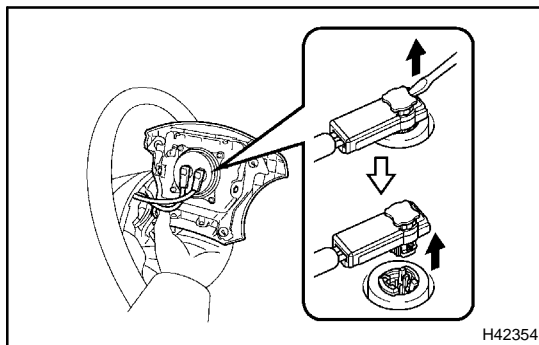
REPLACEMENT

1. **PRECAUTION** (See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL** (See page 60-1)
3. **REMOVE STEERING WHEEL COVER LOWER NO.2**
 - (a) Using a screw driver, remove the steering wheel cover lower No.2.
4. **REMOVE STEERING WHEEL COVER LOWER NO.3**
 - (a) Using a screw driver, remove the steering wheel cover lower No.3.



5. REMOVE HORN BUTTON ASSY

- (a) Place the front wheels facing straight ahead.
- (b) Using a torx[®] socket wrench (T30), loosen the 2 torx[®] screws until the groove along the screw circumference catches on the screw case.

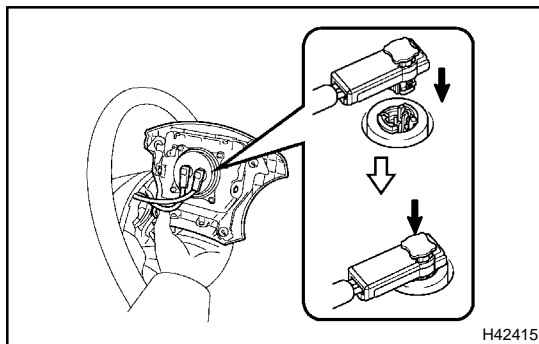


- (c) Pull out the horn button assy from the steering wheel assy and support the horn button assy one-handed as shown in the illustration.

NOTICE:

When removing the horn button assy, take care not to pull the airbag wire harness.

- (d) Using a screwdriver, disconnect the airbag connectors.
- (e) Disconnect the horn connector.
- (f) Remove the horn button assy.



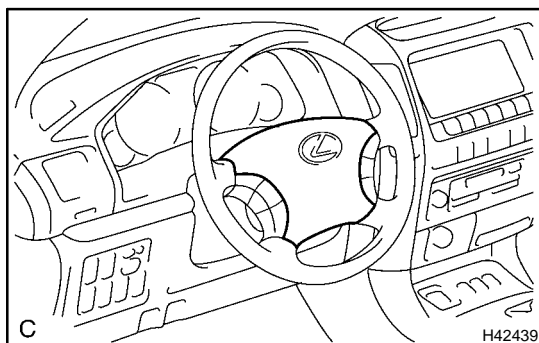
6. INSTALL HORN BUTTON ASSY

- (a) Support the horn button assy one-handed as shown in the illustration.
- (b) Connect the airbag connectors.
- (c) Connect the horn connector.
- (d) Install the horn button after confirming that the circumference groove of the torx screws is caught on the screw case.
- (e) Using a torx[®] socket wrench (T 30), install the 2 screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in·lbf)

7. INSPECT HORN BUTTON ASSY

- (a) Do a visual check which includes the following item with the horn button assy (with airbag) installed in the vehicle. Check cuts, minute cracks or marked discoloration on the horn button assy top surface and in the grooved portion.

8. INSPECT SRS WARNING LIGHT (See page 05-1213)



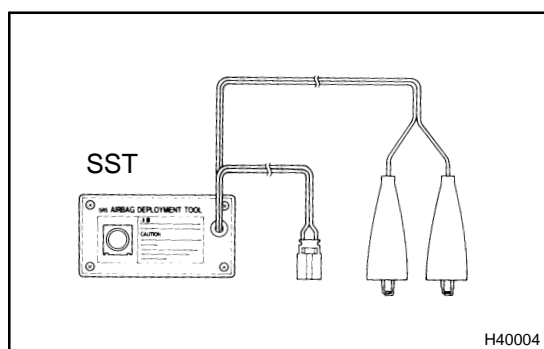
DISPOSAL

HINT:

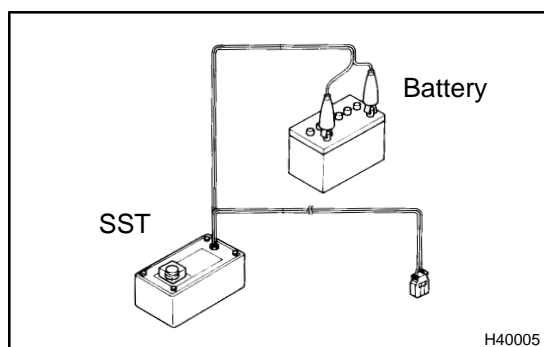
When scrapping vehicle equipped with an SRS or disposing of a horn button assy, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- Never dispose of a horn button assy which has an un-deployed airbag.
- The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.



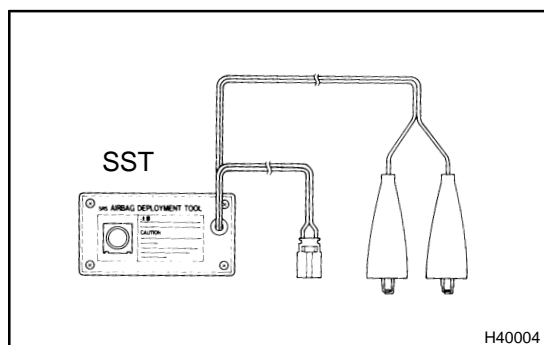
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the horn button assy.
- The horn button assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a horn button assy with the deployed airbag.
- Do not apply water, etc. to a horn button assy with the deployed airbag.
- Always wash your hands with water after completing the operation.



1. DISPOSE OF HORN BUTTON ASSY (WHEN SCRAPPING VEHICLE DEPLOYMENT METHOD)

HINT:

Have a battery ready as the power source to deploy the airbag.

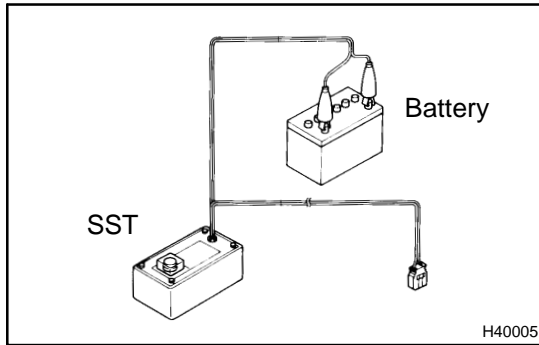


(a) Check functioning of the SST.

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

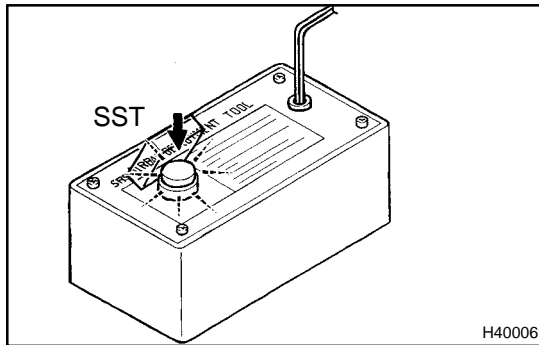
SST 09082-00700



- (1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.

HINT:

Do not connect the yellow connector of the SST which will be connected with the supplemental restraint system.

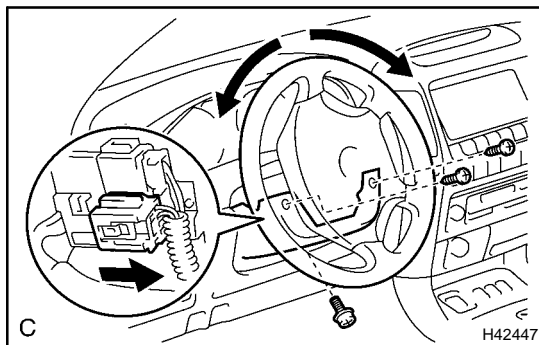


- (2) Check functioning of the SST.
Press the SST activation switch, and check that the LED of the SST activation switch comes on.

CAUTION:

If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

- (3) Disconnect the SST from the battery.

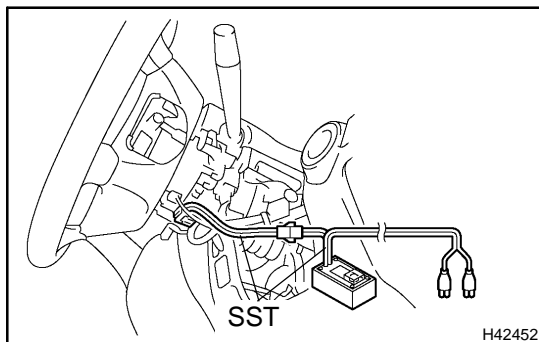


- (b) Install the SST.

CAUTION:

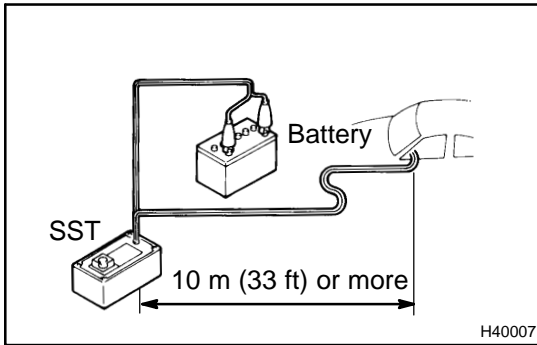
Check that there is no looseness in the steering wheel and horn button assy.

- (1) While turning the steering wheel right / left, remove the 3 screws and column lower cover.
- (2) While turning the steering wheel right / left, remove the 4 screws and column lower cover.
- (3) Disconnect the airbag connector of the spiral cable.



- (4) Connect the connectors of the SST to the airbag connector of the spiral cable.

SST 09082-00700, 09082-00780



- (5) Move the SST at least 10 m (33 ft) away from the front of the vehicle.
- (6) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (7) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (-) terminal.
- (c) Deploy the airbag.
- (1) Confirm that no one is inside the vehicle nor within 10 m (33 ft) area around the vehicle.
 - (2) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.

- (d) Dispose of the horn button assy (with airbag).

CAUTION:

- The horn button assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- When moving a vehicle for scrapping which has a horn button assy with deployed airbag, use gloves and safety glasses.
- Use gloves and safety glasses when handling a horn button assy with the deployed airbag.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a horn button assy with the deployed airbag.

HINT:

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the horn button assy still installed.

2. DISPOSE OF HORN BUTTON ASSY (WHEN DISPOSING OF AIRBAG ASSEMBLY DEPLOYMENT METHOD)

NOTICE:

- When disposing of the horn button assy (with airbag) only, never use the customers vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

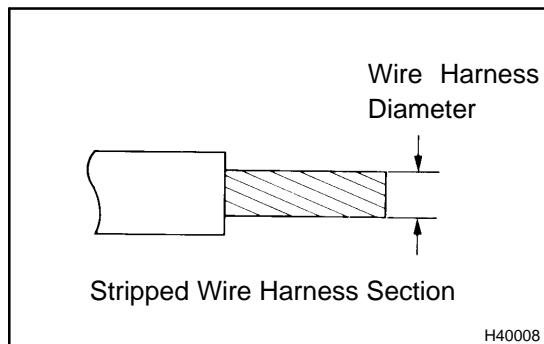
HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Remove the horn button assy (See page 60-20).

CAUTION:

When storing the horn button assy, keep the upper surface of the pad facing upward.



- (b) Using a service-purpose wire harness for the vehicle, tie down the horn button assy to the disc wheel.

**Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in.² or more)**

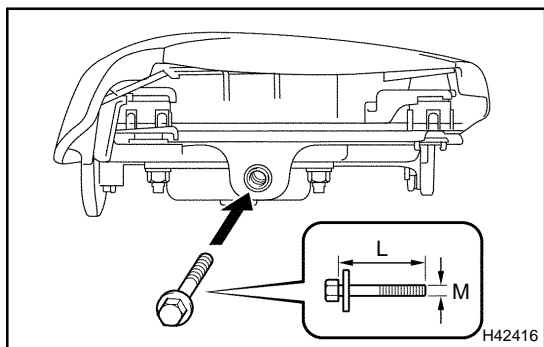
CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the horn button assy, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in.²).

HINT:

To calculate the square of the stripped wire harness section:

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$



- (1) Install the 2 bolts with washers in the 2 bolt holes in the horn button assy.

Bolt:

L: 35.0 mm (1.387 in.)

M: 6.0 mm (0.236 in.)

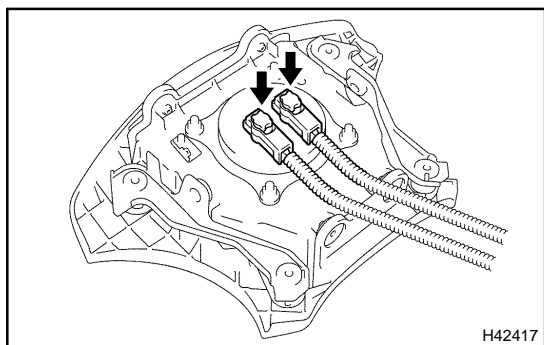
Pitch: 1.0 mm (0.039 in.)

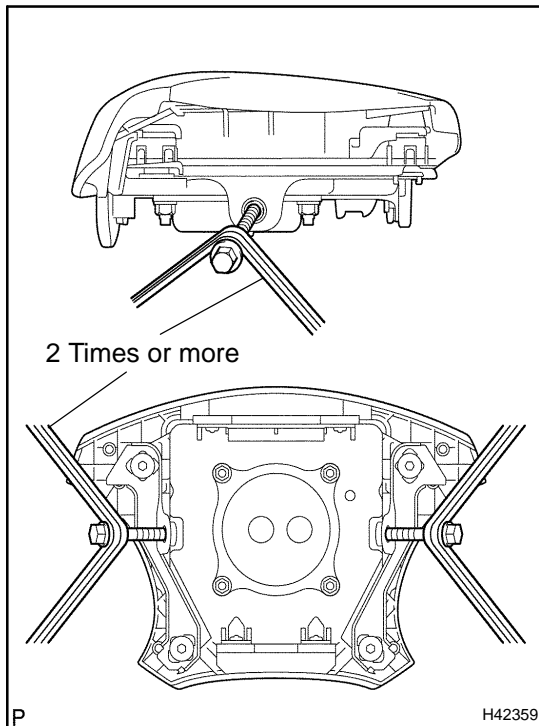
NOTICE:

- **Tighten the bolts by hand until the bolts become difficult to turn.**
- **Do not tighten the bolts excessively.**

- (2) After connecting the following to SST, connect them to the horn button assy.

SST 09082-00802 (09082-10801, 09082-30801)

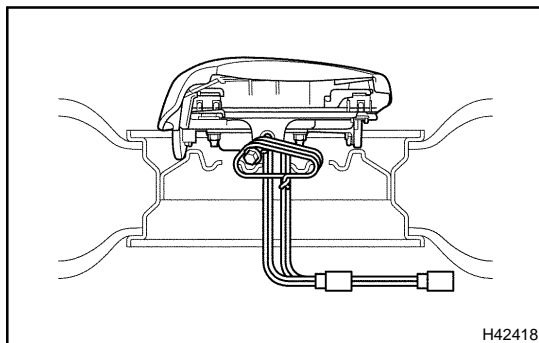




- (3) Using 3 wire harness, wind the wire harness at least 2 times each around the bolts installed on the left and right sides of the horn button assy.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **If there is slack in the wire harness, the horn button assy may come loose due to the shock when the air-bag is deployed. This is highly dangerous.**



- (4) Face the upper surface of the horn button assy upward. Separately tie the left and right sides of the horn button assy to the disc wheel through the hub nut holes. Position the horn button assy connector so that it hangs downward through a hub hole in the disc wheel.

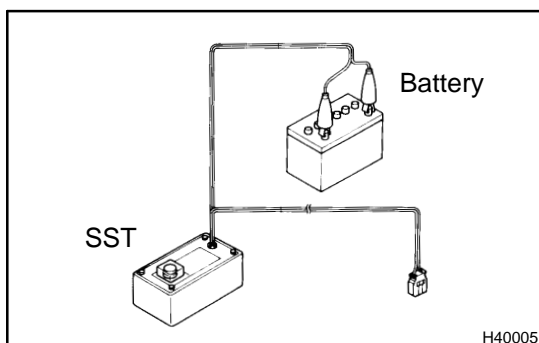
CAUTION:

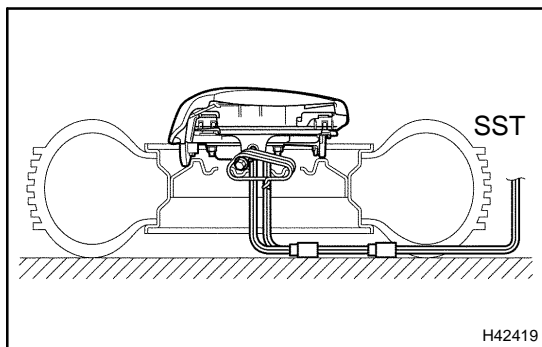
- **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the horn button assy coming free through the shock from the airbag deploying.**
- **Always tie down the horn button assy with the pad side facing upward. It is very dangerous if the horn button assy is tied down with the metal surface facing upward as the wire harness will be cut by the shock caused by the airbag deployment and the horn button assy will be thrown into the air.**

NOTICE:

The disc wheel will be marked by airbag deployment, so when disposing of the airbag use a redundant disc wheel.

- (c) Check the function of the SST (See step 1-(a)).





(d) Install the SST.

CAUTION:

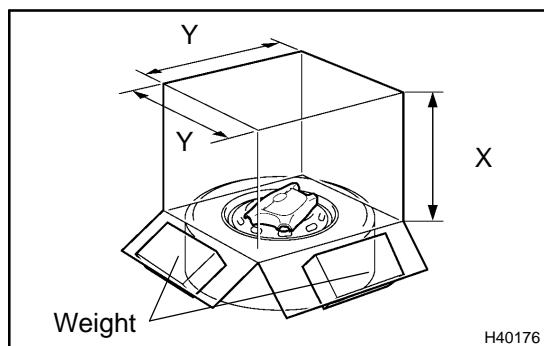
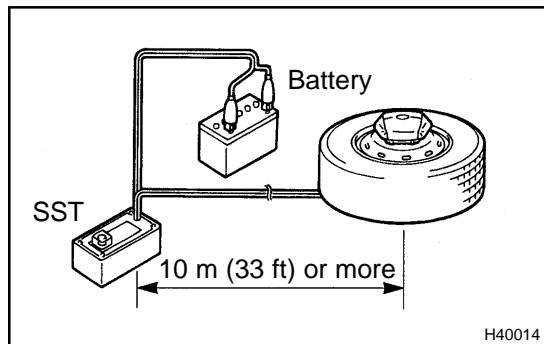
Place the disc wheel on the level ground.

- (1) Connect the connector of the SST.
SST 09082-00700

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.

- (2) Move the SST to at least 10 m (33 ft) away from the horn button assy tied down on the disc wheel.



- (e) Cover the horn button assy with a cardboard box or tires.
 - Covering method using a cardboard box:
Cover the horn button assy with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

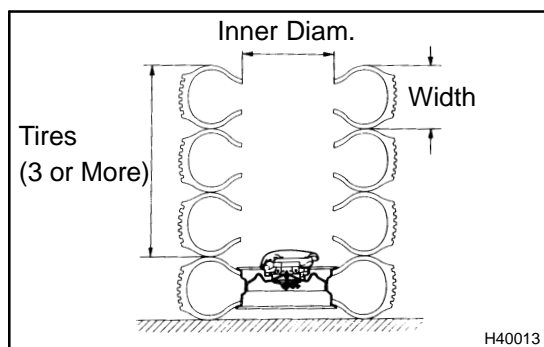
Size of cardboard box:

Must exceed the following dimensions:

- X = 460 mm (18.11 in.)**
Y = 650 mm (25.59 in.)

NOTICE:

- When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire to which the horn button assy is tied, X should be the following size.
X = 460 mm (18.11 in.) + width of tire
- If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.



- Covering method using tires:
Place at least 3 tires with no disc wheels on top of the tire with disc wheel to which the horn button assy is tied.

Tire size: Must exceed the following dimensions-

Width: 185 mm (7.28 in.)

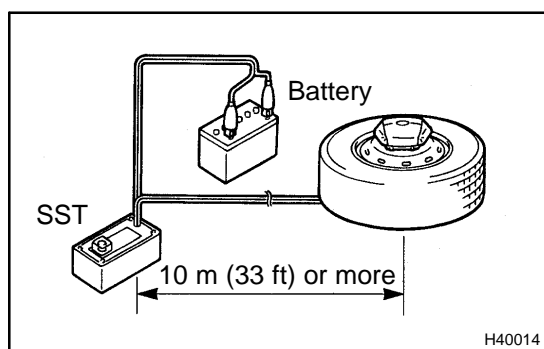
Inner diameter: 360 mm (14.17 in.)

CAUTION:

Do not use tires with disc wheels.

NOTICE:

The tires may be marked by the airbag deployment, so use the redundant tires.



- (f) Deploy the airbag.

- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
- (2) Check that no one is within 10 m (33 ft) area around the disc wheel which the horn button assy is tied to.
- (3) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.



- (g) Dispose of the horn button assy (with airbag).

CAUTION:

- The horn button assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
 - Use gloves and safety glasses when handling a horn button assy with the deployed airbag.
 - Do not apply water, etc. to a horn button assy with the deployed airbag.
 - Always wash your hands with water after completing the operation.
- (1) Remove the horn button assy from the disc wheel.
 - (2) Place the horn button assy in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.

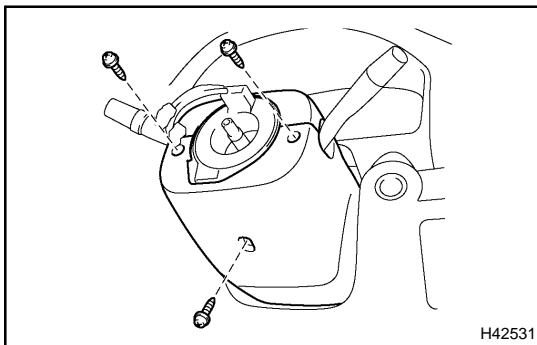
SPIRAL CABLE SUB-ASSY REPLACEMENT

60091-17

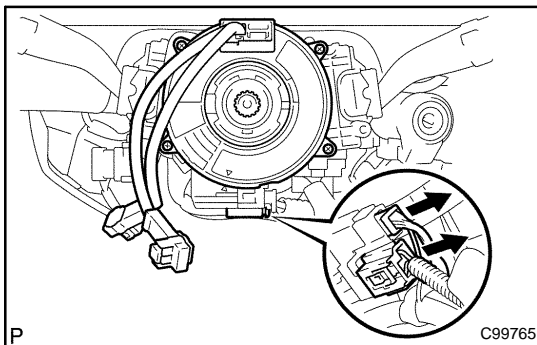
HINT:

COMPONENTS: See page 60-19

1. **PRECAUTION**(See page 60-1)
 2. **DISCONNECT BATTERY NEGATIVE TERMINAL**(See page 60-1)
 3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
 4. **REMOVE STEERING WHEEL COVER LOWER NO.2**
 5. **REMOVE STEERING WHEEL COVER LOWER NO.3**
 6. **REMOVE HORN BUTTON ASSY**(See page 60-20)
 7. **REMOVE STEERING WHEEL ASSY**(See page 50-8)
- SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)



8. **REMOVE STEERING COLUMN COVER**
 - (a) Remove the 3 screws and steering column cover LWR.
 - (b) Remove the steering column cover UPR.



9. **REMOVE SPIRAL CABLE SUB-ASSY**
 - (a) Disconnect the airbag connector and connector from the spiral cable sub-assy.
 - (b) Remove the 4 screws and spiral cable sub-assy.

10. INSPECT SPIRAL CABLE SUB-ASSY

- (a) If the following condition is identified, replace the spiral cable sub-assy with new one.

Condition:

Scratches or cracks on the connector

Cracks, dents or chipping of the spiral cable sub-assy

11. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

- (a) Check that the front wheels are facing straight ahead.

12. INSTALL SPIRAL CABLE SUB-ASSY

- (a) Set the turn signal switch in neutral position.

NOTICE:

Make sure of the neutral position since the pin of the turn signal switch may be snapped.

- (b) Install the spiral cable sub-assy with the 4 screws.

NOTICE:

When replacing the spiral cable sub-assy with new one, remove the lock pin before installing the handle.

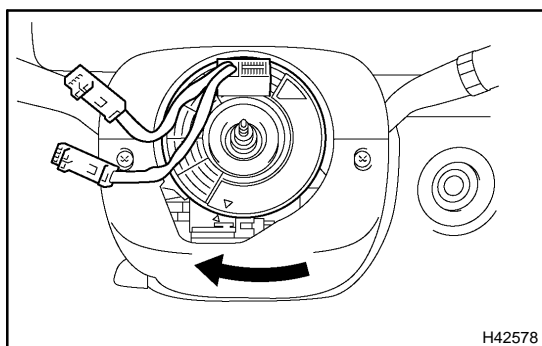
- (c) Connect the airbag connector and connector.
 (d) Install the steering column cover with the 3 screws.

13. CENTER SPIRAL CABLE

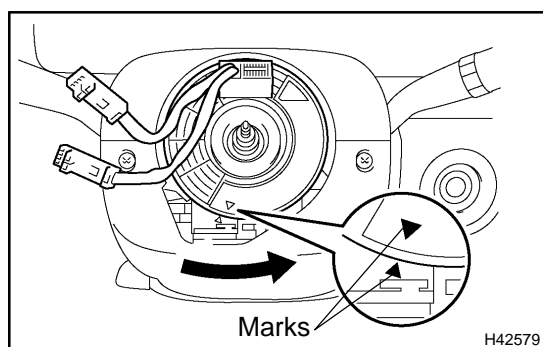
- (a) Check that the ignition switch is OFF.
 (b) Check that the battery negative terminal is disconnected.

NOTICE:

Do not start the operation for 90 seconds after removing the terminal.



- (c) Turn the cable clockwise by hand until it becomes harder to turn.



- (d) Then rotate the cable counterclockwise about 2.5 turns to align the marks.

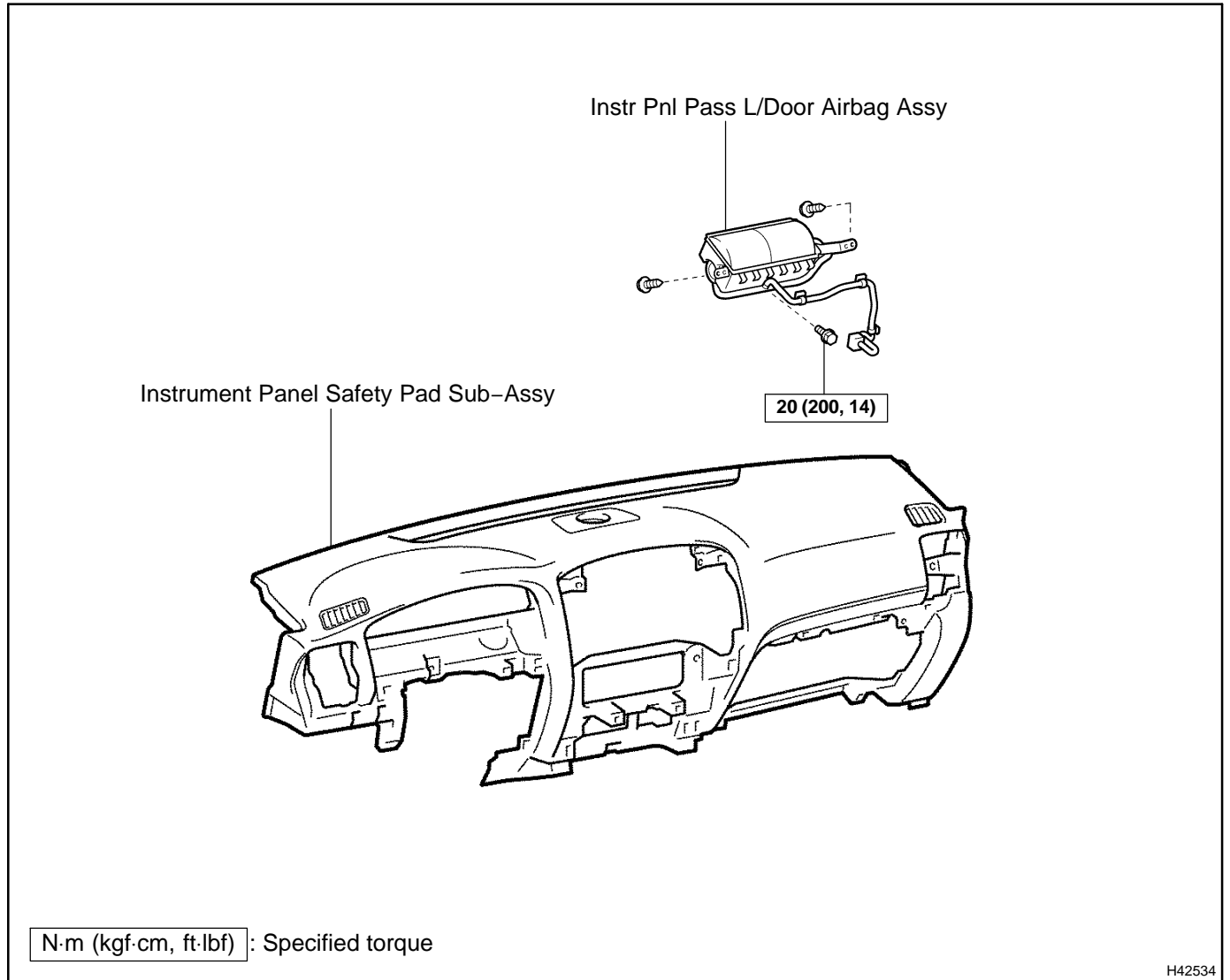
HINT:

The cable will rotate about 2.5 turns to both left and right of the center.

- 14. INSTALL STEERING WHEEL ASSY(See page 50-8)**
15. INSTALL HORN BUTTON ASSY(See page 60-20)
16. INSPECT HORN BUTTON ASSY(See page 60-20)
17. INSPECT SRS WARNING LIGHT(See page 05-1213)

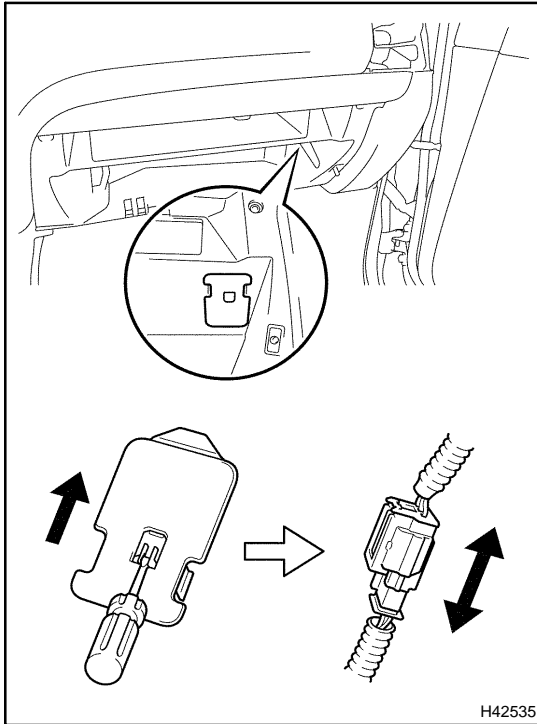
INSTR PNL PASS L/DOOR AIR BAG ASSY COMPONENTS

600HM-01



REPLACEMENT

1. PRECAUTION(See page 60-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL(See page 60-1)
3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD



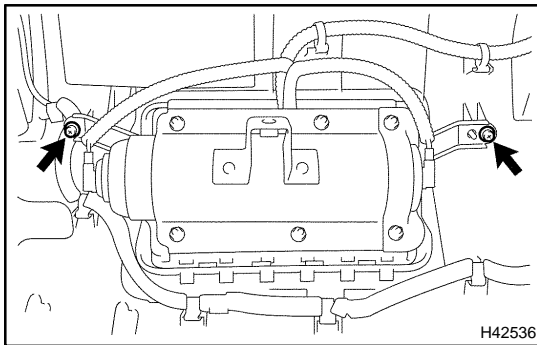
4. DISCONNECT PASSENGER AIRBAG CONNECTOR
 - (a) Remove the glove compartment door sub-assy.
 - (b) Remove the glove compartment door pad plate from the instrument panel finish panel lower No.2.

NOTICE:

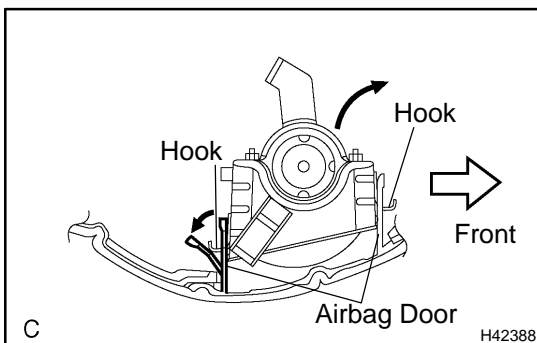
When handling the airbag connector, take care not to damage the airbag wire harness.

- (c) Using a screwdriver, slide the airbag connector to pull out from the glove compartment door pad plate.
- (d) Disconnect the airbag connector.

5. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY(See page 71-13)



6. REMOVE INSTR PNL PASS L/DOOR AIR BAG ASSY
 - (a) Remove the 2 screws.



- (b) Release the rear side wall of the airbag door from the hook by slightly deflecting it and roll the instr pnl pass l/door airbag assy forward.
- (c) Release the front side wall of the airbag door from the other hook and remove the instr pnl pass l/door airbag assy.

7. INSPECT INSTR PNL PASS L/DOOR AIR BAG ASSY(See page 60-13)
8. INSTALL INSTR PNL PASS L/DOOR AIR BAG ASSY
9. CENTER SPIRAL CABLE(See page 60-28)
10. INSTALL STEERING WHEEL ASSY(See page 50-8)
11. INSPECT STEERING WHEEL CENTER POINT
12. INSTALL HORN BUTTON ASSY(See page 60-20)
13. INSPECT HORN BUTTON ASSY(See page 60-20)
14. INSPECT SRS WARNING LIGHT(See page 05-1213)

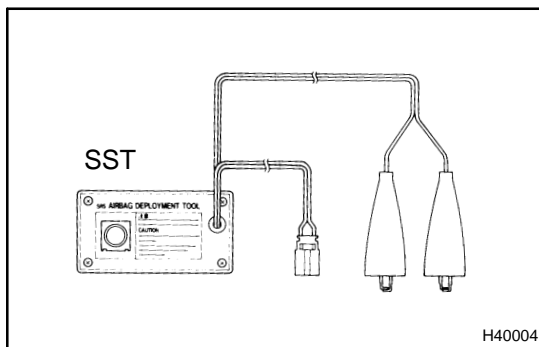
DISPOSAL

HINT:

When scrapping vehicle equipped with an SRS or disposing of a instr pnl pass l/door airbag assy, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- Never dispose of a instr pnl pass l/door airbag assy which has an undeployed airbag.
- The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.



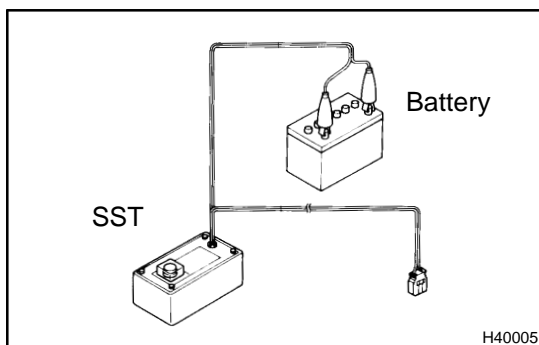
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the instr pnl pass l/door airbag assy.
- The instr pnl pass l/door airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a instr pnl pass l/door airbag assy with the deployed airbag.
- Do not apply water, etc. to a instr pnl pass l/door airbag assy with the deployed airbag.
- Always wash your hands with water after completing the operation.

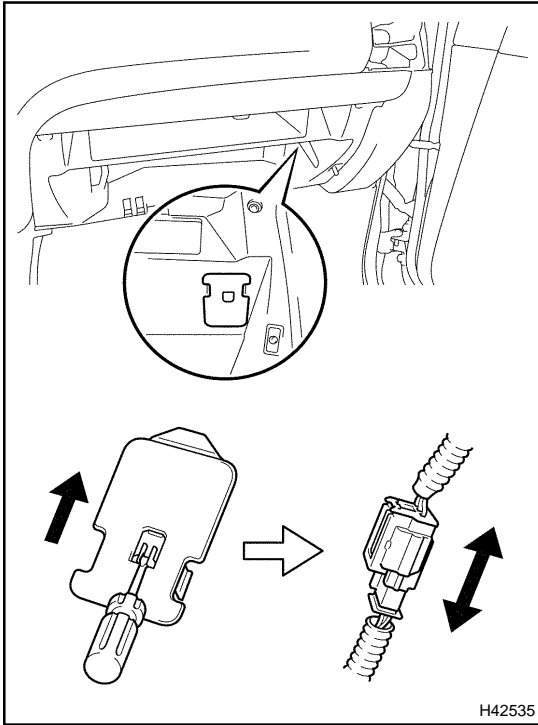
1. DISPOSE OF INSTR PNL PASS L/DOOR AIR BAG ASSY (WHEN SCRAPPING VEHICLE DEPLOYMENT METHOD)

HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check functioning of the SST (See step 1-(a) on page 60-21).



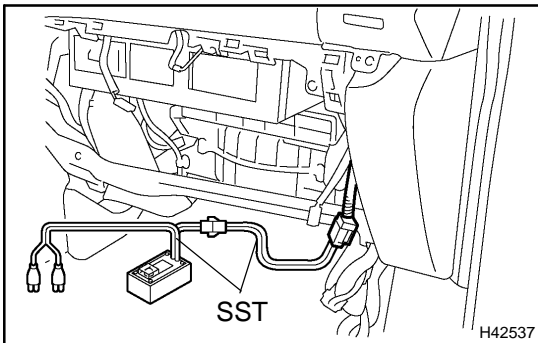


- (b) Disconnect the airbag connectors.
- (1) Remove the glove compartment door sub-assy.
 - (2) Remove the glove compartment door pad plate from the instrument panel finish panel lower No.2.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

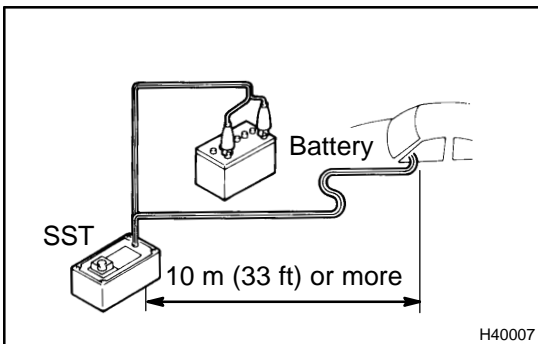
- (3) Using a screwdriver, slide the airbag connector to pull out from the glove compartment door pad plate.
- (4) Disconnect the airbag connector.



- (c) Install the SST.
- (1) Connect the connectors of the SST to the instr pnl pass l/door airbag assy connector.
- SST 09082-00700, 09082-00780

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.
- (3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (4) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the negative (-) terminal.

- (d) Deploy the airbag.
- (1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.
 - (2) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.

(e) Dispose of the instr pnl pass l/door airbag assy.

CAUTION:

- The instr pnl pass l/door airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a instr pnl pass l/door airbag assy with the deployed airbag.
- When moving a vehicle for scrapping which has a instr pnl pass l/door airbag assy with the deployed airbag, use gloves and safety glasses.
- Do not apply water, etc. to a instr pnl pass l/door airbag assy with the deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the instr pnl pass l/door airbag assy still installed.

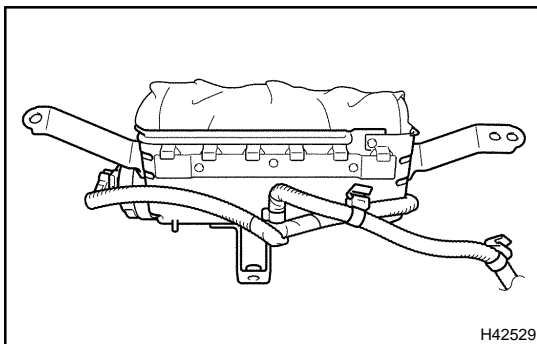
2. DISPOSE OF INSTR PNL PASS L/DOOR AIR BAG ASSY (WHEN DISPOSING OF AIRBAG ASSEMBLY DEPLOYMENT METHOD)

NOTICE:

- When disposing of the instr pnl pass l/door airbag assy only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

Have a battery ready as the power source to deploy the airbag.



(a) Remove the instr pnl pass l/door airbag assy (See page 60-31).

CAUTION:

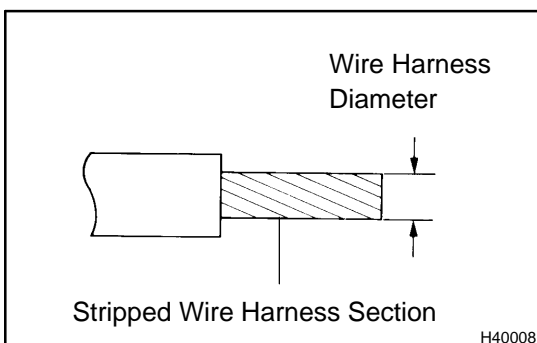
- When removing the instr pnl pass l/door airbag assy, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.
- Store the instr pnl pass l/door airbag assy with the airbag deployment side facing upward.

(b) Using a service-purpose wire harness for the vehicle, tie down the instr pnl pass l/door airbag assy to the tire.

Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in.² or more)

CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the instr pnl pass l/door airbag assy, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness which is at least 1.25 mm² (0.0019 in.²).



HINT:

To calculate the square of the stripped wire harness section:

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$

Position the instr pnl pass l/door airbag assy inside the tire with the airbag deployment side facing inside.

Tire size: Must exceed the following dimensions-

Width: 185 mm (7.28 in.)

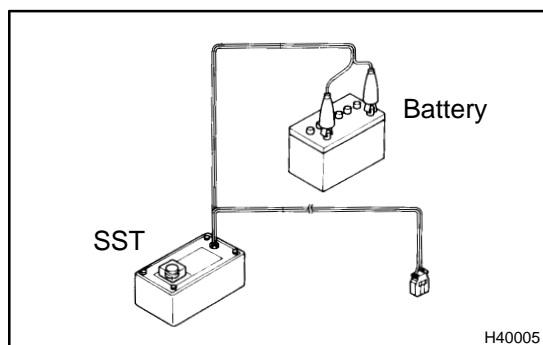
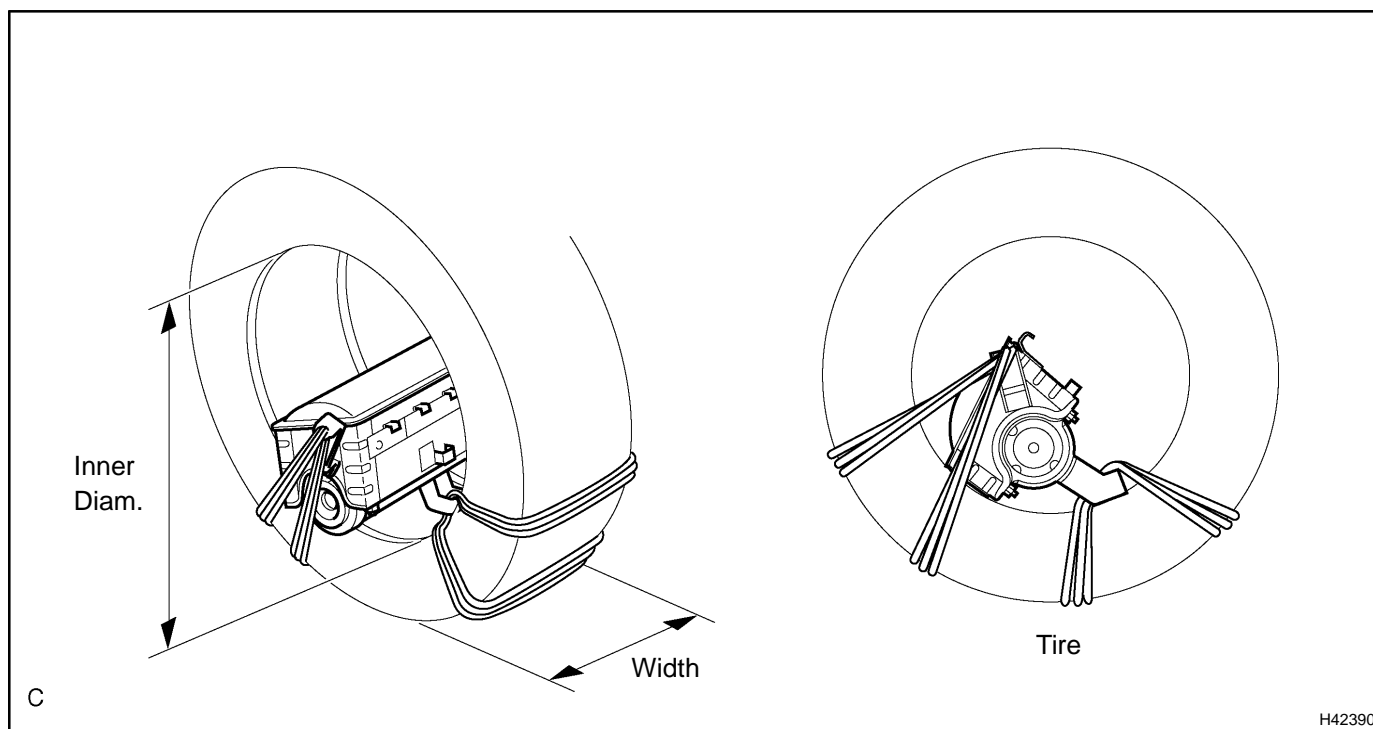
Inner diameter: 360 mm (14.17 in.)

CAUTION:

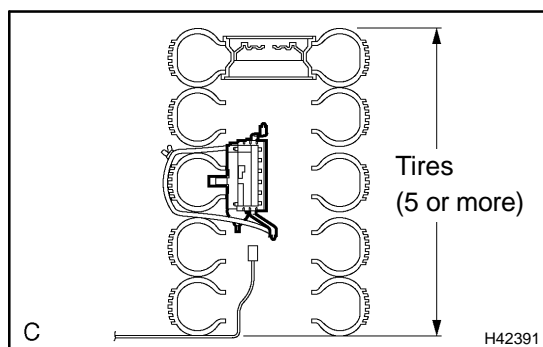
- **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the instr pnl pass l/door airbag assy coming free due to the shock from the airbag deploying.**
- **Always tie down the instr pnl pass l/door airbag assy with the airbag deployment side facing inside.**

NOTICE:

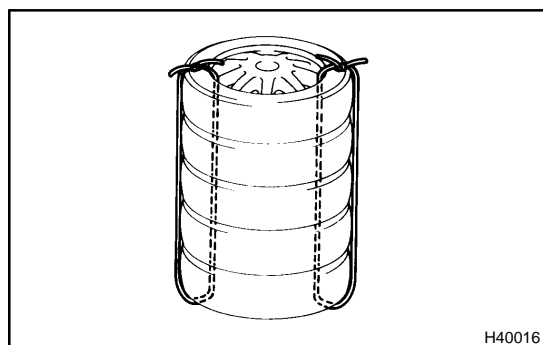
The tire will be marked by the airbag deployment, so use a redundant tire.



- (c) Check functioning of the SST (See step 1-(a) on page 60-21).



- (d) Place tires.
- (1) Place at least 2 tires under the tire to which the instr pnl pass l/door airbag assy is tied.
 - (2) Place at least 2 tires over the tire to which the instr pnl pass l/door airbag assy is tied. The top tire should have the wheel installed.



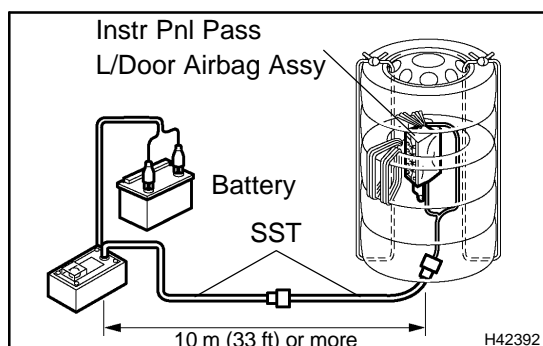
- (3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness result in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (e) Install the SST.
- Connect the connectors of the SST to the instr pnl pass l/door airbag assy connectors.
- SST 09082-00700, 09082-00780

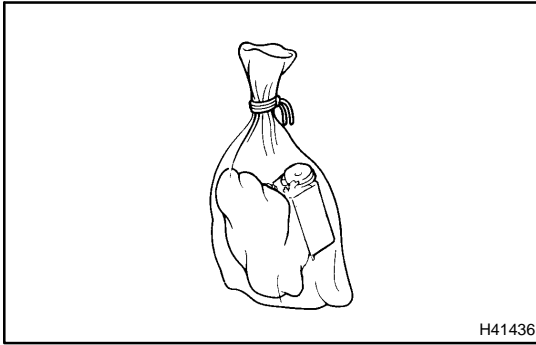
NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

- (f) Deploy the airbag.
- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
 - (2) Check that no one is within 10 m (33 ft) area around the tire which the instr pnl pass l/door airbag assy is tied to.
 - (3) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.



(g) Dispose of the instr pnl pass l/door airbag assy.

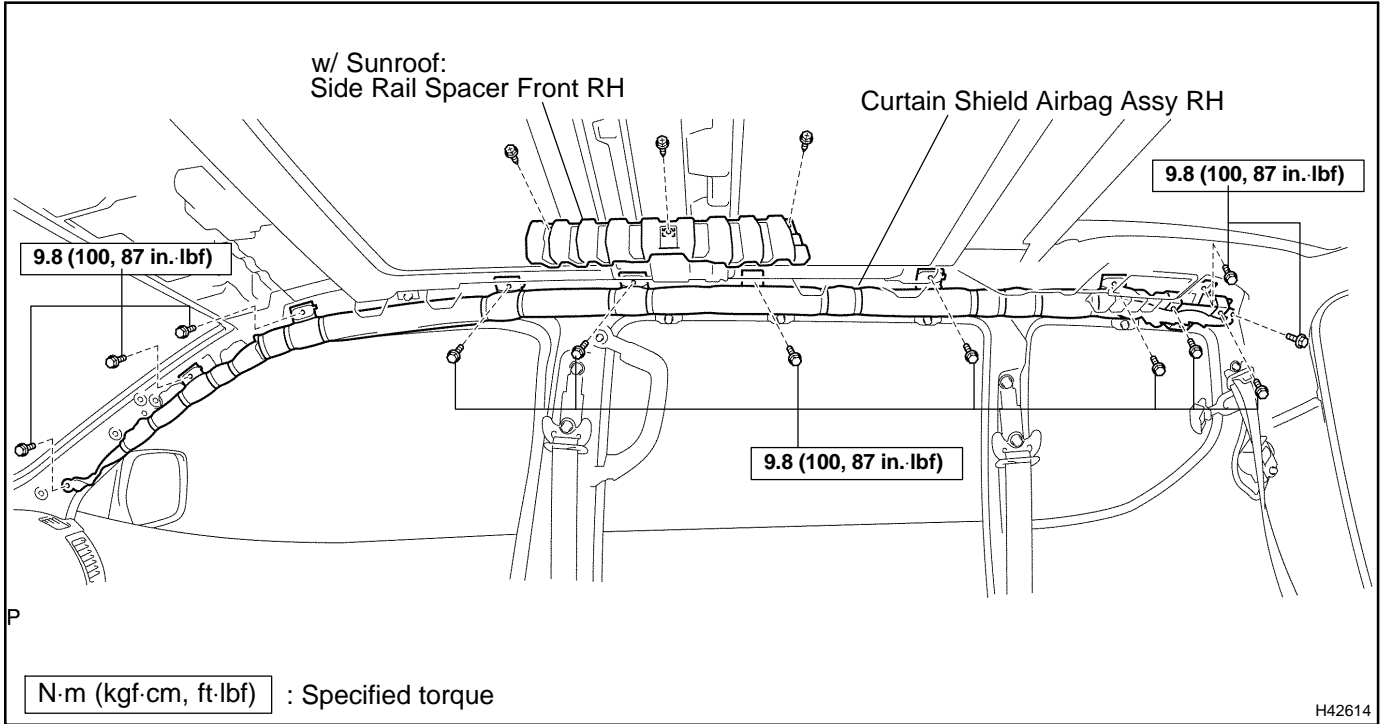
CAUTION:

- **The instr pnl pass l/door airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a instr pnl pass l/door airbag assy with the deployed airbag.**
- **Do not apply water, etc. to a instr pnl pass l/door airbag assy with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
 - (1) Remove the instr pnl pass l/door airbag assy from the tire.
 - (2) Place the instr pnl pass l/door airbag assy in a plastic bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

CURTAIN SHIELD AIR BAG ASSY RH

COMPONENTS

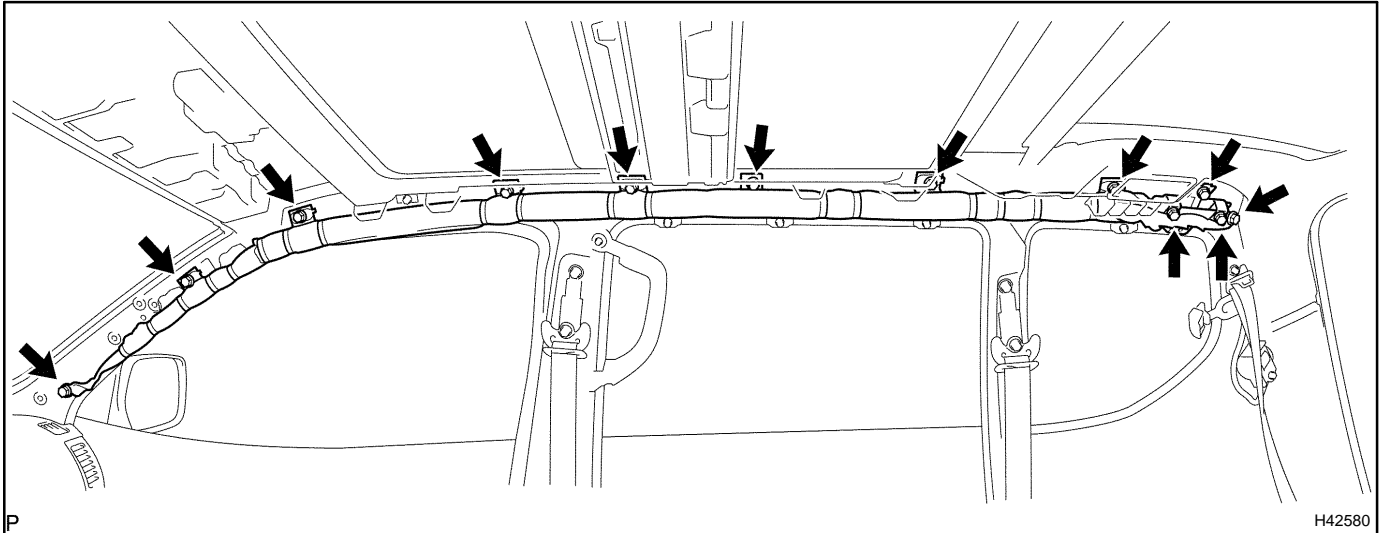
600HN-01



REPLACEMENT

1. **PRECAUTION**(See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**(See page 60-1)
3. **REMOVE ROOF HEADLINING ASSY**(See page 76-38)
4. **REMOVE CURTAIN SHIELD AIR BAG ASSY RH**
 - (a) Using a screwdriver, disconnect the connector of the curtain shield airbag assy RH.
 - (b) Remove the 12 bolts and curtain shield airbag assy RH.

HINT:
Remove the bolts from front side of the vehicle in order.

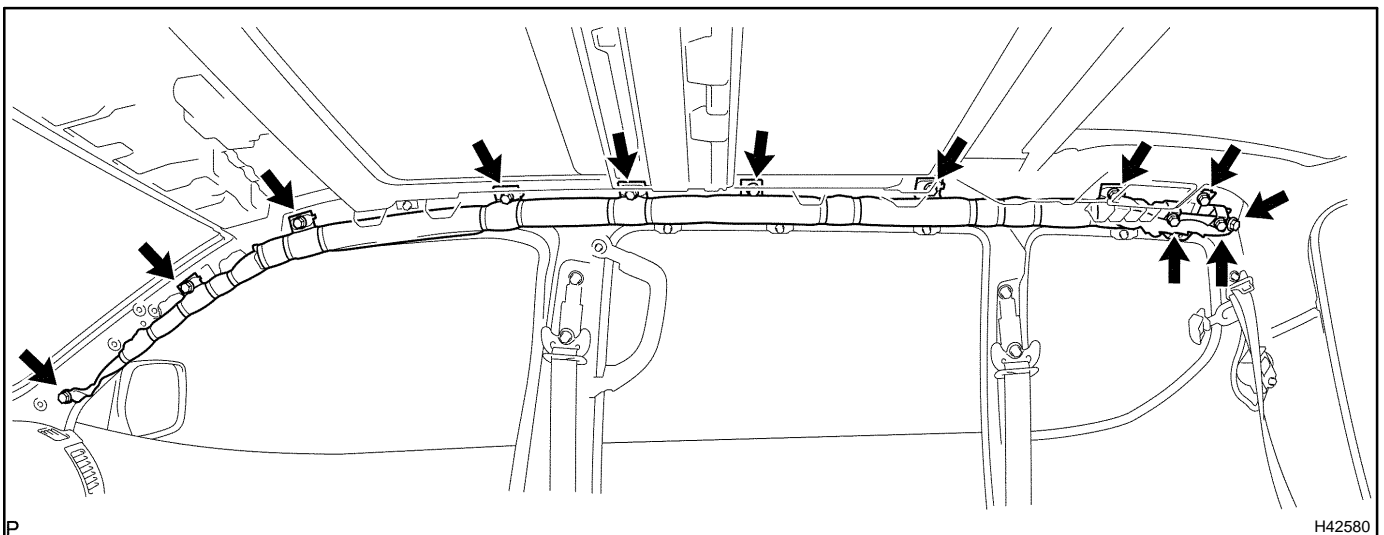


5. **INSPECT CURTAIN SHIELD AIR BAG ASSY RH**

6. **INSTALL CURTAIN SHIELD AIR BAG ASSY RH**
 - (a) Install the curtain shield airbag assy RH with the 12 bolts.
Torque: 9.8 N·m (100 kgf·cm, 87 in.-lbf)

HINT:
Install the bolts from rear side of the vehicle in order.

 - (b) Connect the curtain shield airbag assy RH connector.



7. **INSTALL ROOF HEADLINING ASSY(See page 76-38)**
8. **INSPECT SRS WARNING LIGHT(See page 05-1213)**

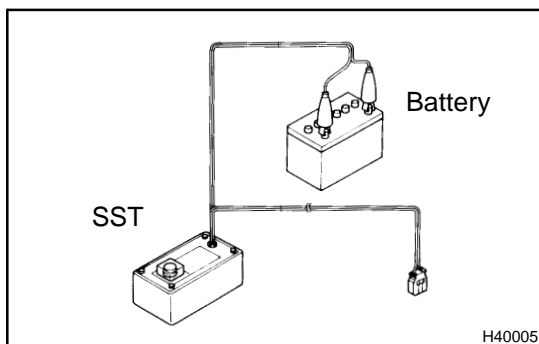
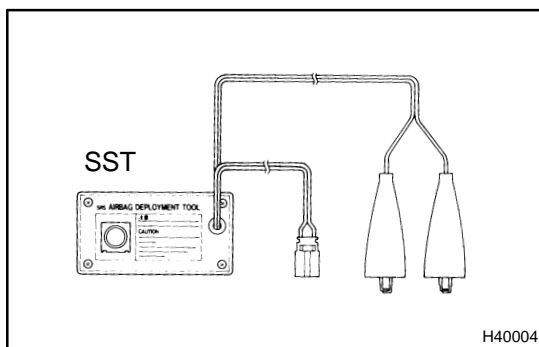
DISPOSAL

HINT:

When scrapping vehicle equipped with an SRS or disposing of a curtain shield airbag assy, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

- Never dispose of a curtain shield airbag assy which has an undeployed airbag.
- The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the curtain shield airbag assy.
- The curtain shield airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assy with the deployed airbag.
- Do not apply water, etc. to a curtain shield airbag assy with the deployed airbag.
- Always wash your hands with water after completing the operation.

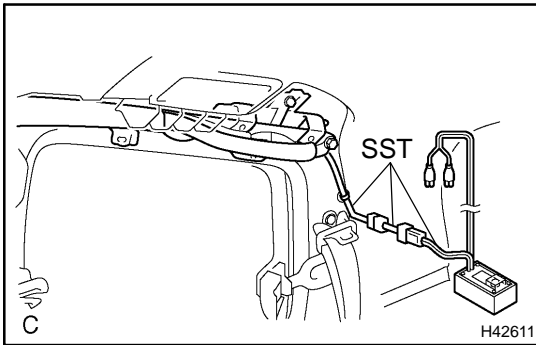


1. DISPOSE OF CURTAIN SHIELD AIR BAG ASSY RH (WHEN SCRAPPING VEHICLE DEPLOYMENT METHOD)

HINT:

Have a battery ready as the power source to deploy the airbag.

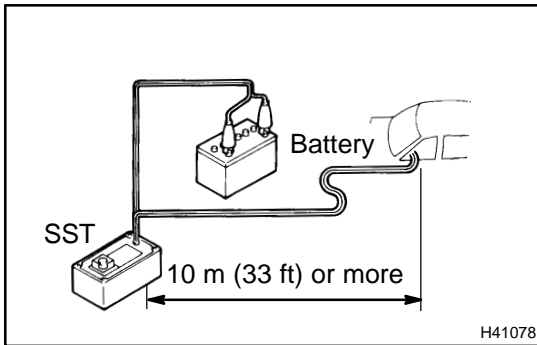
- (a) Check functioning of the SST (See step 1-(a) on page 60-21).
- (b) Disconnect the airbag connector.
 - (1) Remove the roof headlining assy (See page 76-38).
 - (2) Using a screwdriver, disconnect the curtain shield airbag assy RH connector.



- (c) Install the SST.
- (1) Connect the connectors of the SST to the curtain shield airbag assy RH connector.
- SST 09082-00700, 09082-00802 (09082-10801, 09082-20801)

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (2) Move the SST to at least 10 m (33 ft) away from the rear of the vehicle.
- (3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (4) Connect the red clip of the SST to the battery positive (+) terminal and the black of the SST clip to the negative (-) terminal.
- (d) Deploy the airbag.
- (1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.
 - (2) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.

- (e) Dispose of the curtain shield airbag assy RH.

CAUTION:

- The curtain shield airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assy RH with the deployed airbag.
- When moving a vehicle for scrapping which has a curtain shield airbag assy RH with the deployed airbag, use gloves and safety glasses.
- Do not apply water, etc. to a curtain shield airbag assy RH with the deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the curtain shield airbag assy RH still installed.

2. DISPOSE OF CURTAIN SHIELD AIR BAG ASSY RH (WHEN DISPOSING OF AIRBAG ASSEMBLY DEPLOYMENT METHOD)

NOTICE:

- When disposing of the curtain shield airbag assy RH only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

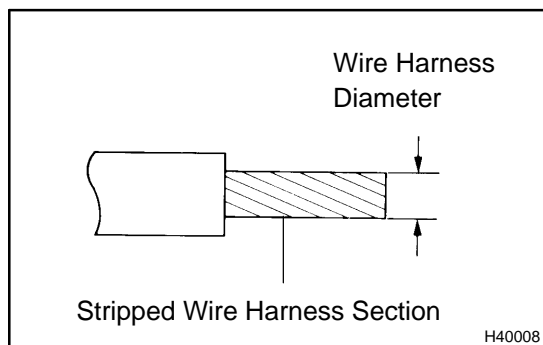
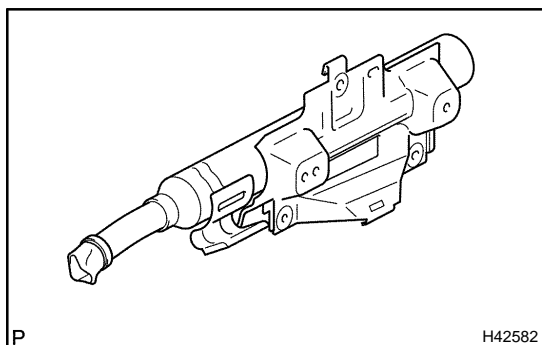
Have a battery ready as the power source to deploy the airbag.

- (a) Remove the curtain shield airbag assy RH (See page 60-40).

CAUTION:

When removing the curtain shield airbag assy RH, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

- (b) Cut off the deployment section in airbag from inflator.



- (c) Using a service-purpose wire harness for the vehicle, tie down the curtain shield airbag assy to the tire.

Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in.² or more)

CAUTION:

If the curtain shield airbag assy RH is tied down with too thin wire harness, it may snap. This is highly dangerous. Always use a wire harness which is at least 1.25 mm² (0.0019 in.²).

HINT:

To calculate the square of the stripped wire harness section:

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$

Position the curtain shield airbag assy RH inside the tire with the airbag deployment side facing inside.

Tire size: Must exceed the following dimensions–

Width: 185 mm (7.28 in.)

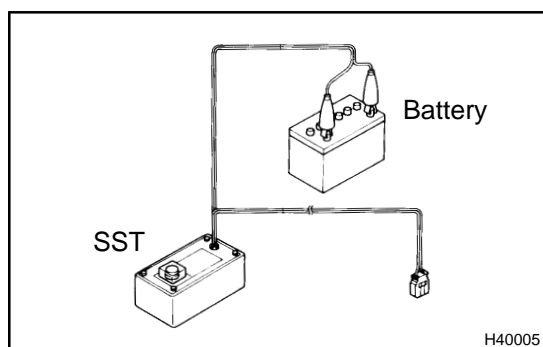
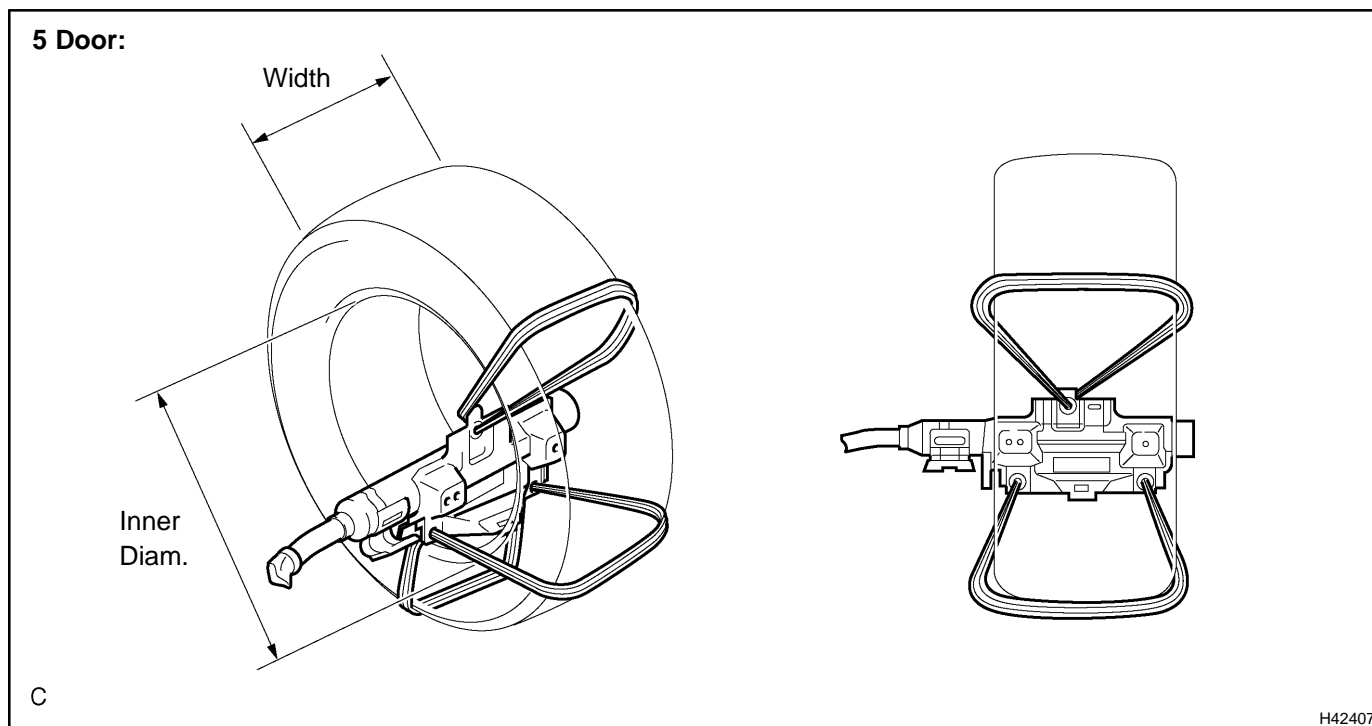
Inner diameter: 360 mm (14.17 in.)

CAUTION:

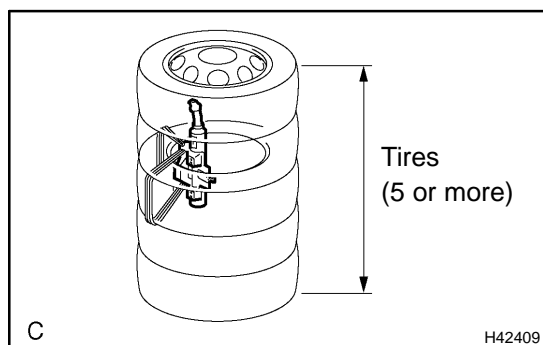
- Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the curtain shield airbag assy RH coming free due to the shock from the airbag deploying.
- Always tie down the curtain shield airbag assy RH with the airbag deployment side facing inside.

NOTICE:

The tire will be marked by the airbag deployment, so use a redundant tire.



- (d) Check functioning of the SST (See step 1-(a) on page 60-21).

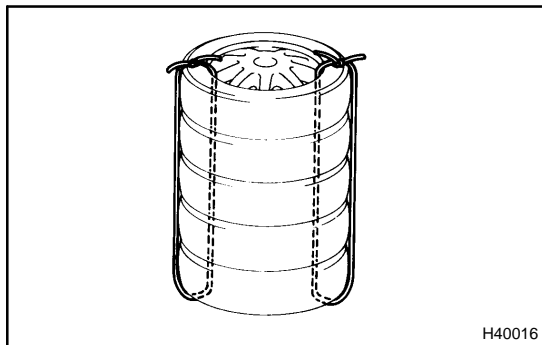


- (e) Place the tires.

CAUTION:

Place the tire so that the deployment direction of the curtain shield airbag assy RH will be downward.

- (1) Place at least 2 tires under the tire to which the curtain shield airbag assy RH is tied.
- (2) Place at least 2 tires over the tire to which the curtain shield airbag assy is tied. The top tire should have the wheel installed.



H40016

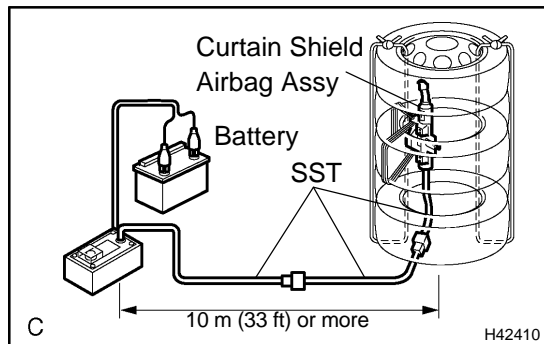
- (3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness result in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



H42410

- (f) Install the SST.
Connect the connectors of the SST to the curtain shield airbag assy RH connector.
SST 09082-00700, 09082-00802 (09082-10801, 09082-20801)

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

Also, secure some slack for the SST wire harness inside the tire.

- (g) Deploy the airbag.
- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
 - (2) Check that no one is within 10 m (33 ft) area around the tire which the curtain shield airbag assy RH is tied to.
 - (3) Press the activation switch of the SST and deploy the airbag.

HINT:

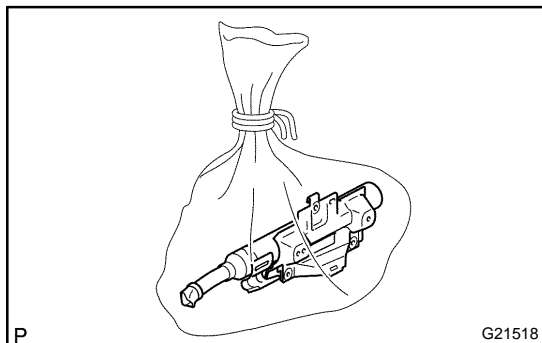
The airbag deploys as the LED of the SST activation switch comes on.

- (h) Dispose of the curtain shield airbag assy RH.

CAUTION:

- The curtain shield airbag assy RH is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a curtain shield airbag assy RH with the deployed airbag.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a curtain shield airbag assy RH with the deployed airbag.

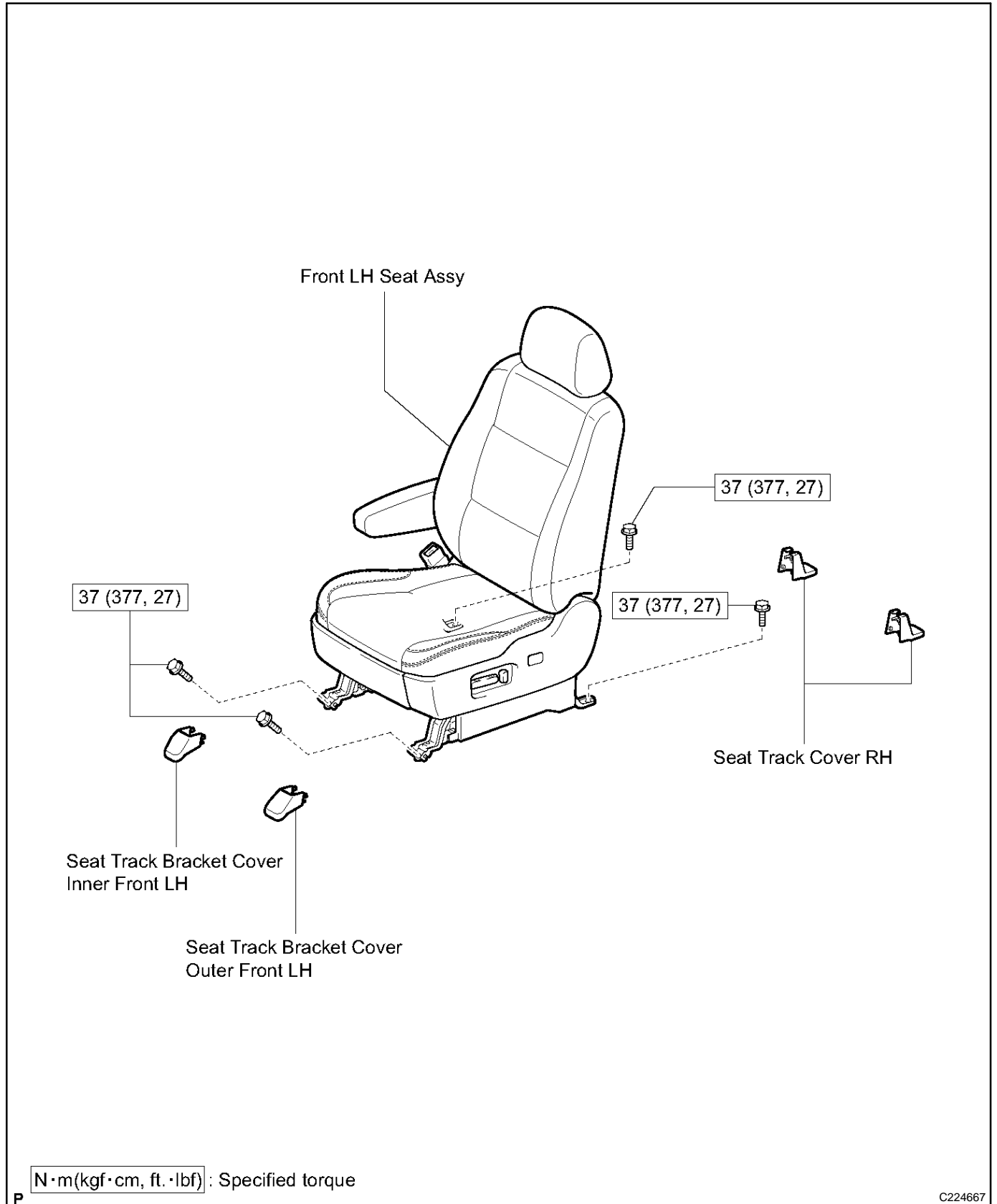
- (1) Remove the curtain shield airbag assy RH from the tire.
- (2) Place the curtain shield airbag assy RH in a plastic bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



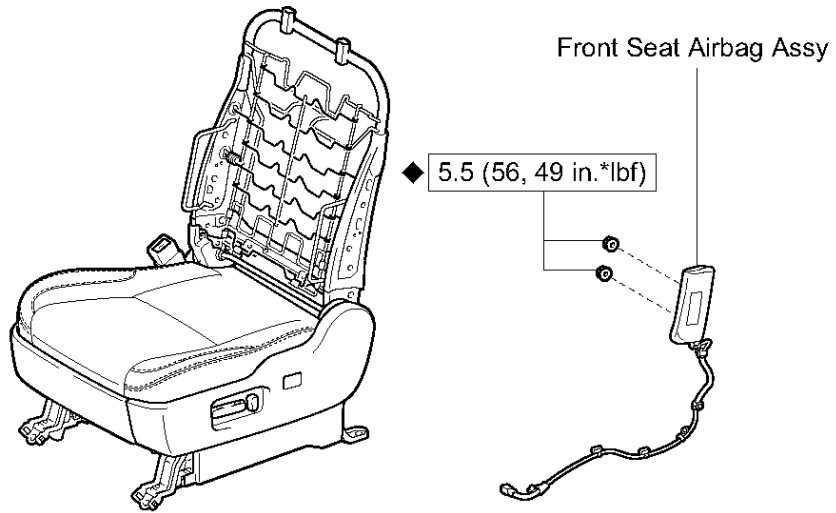
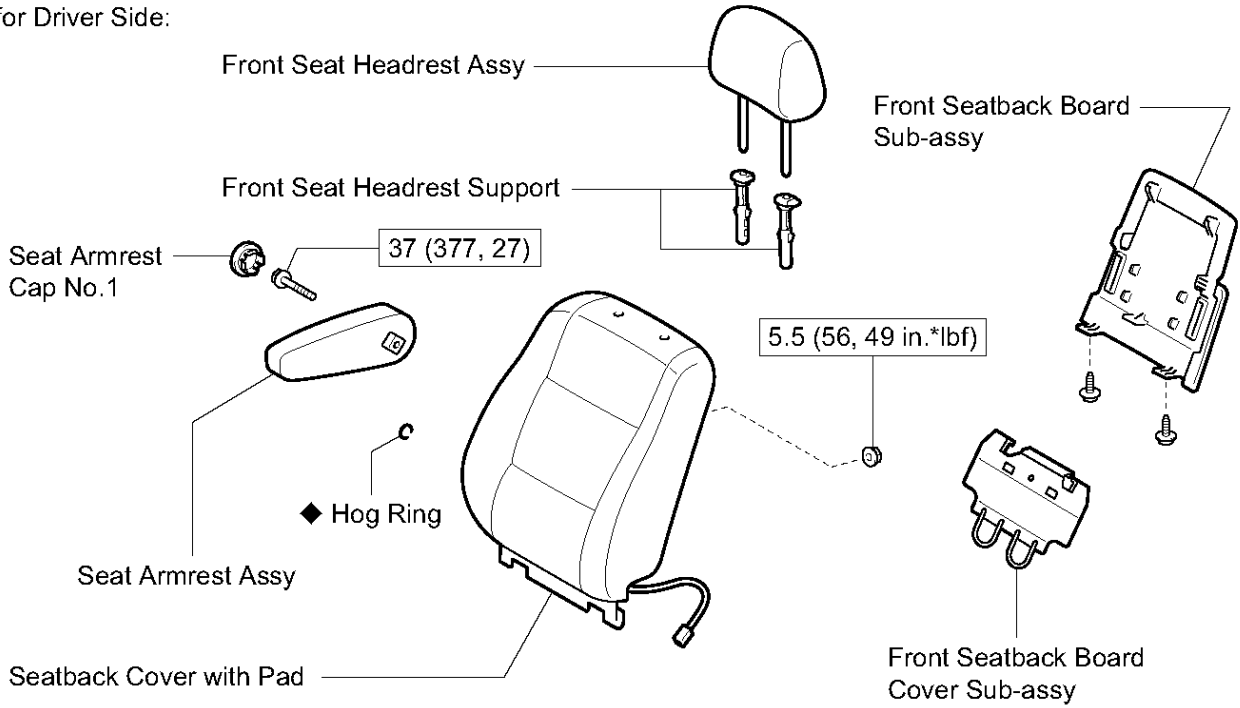
G21518

FRONT SEAT AIRBAG ASSY COMPONENTS

600HN-01



for Driver Side:



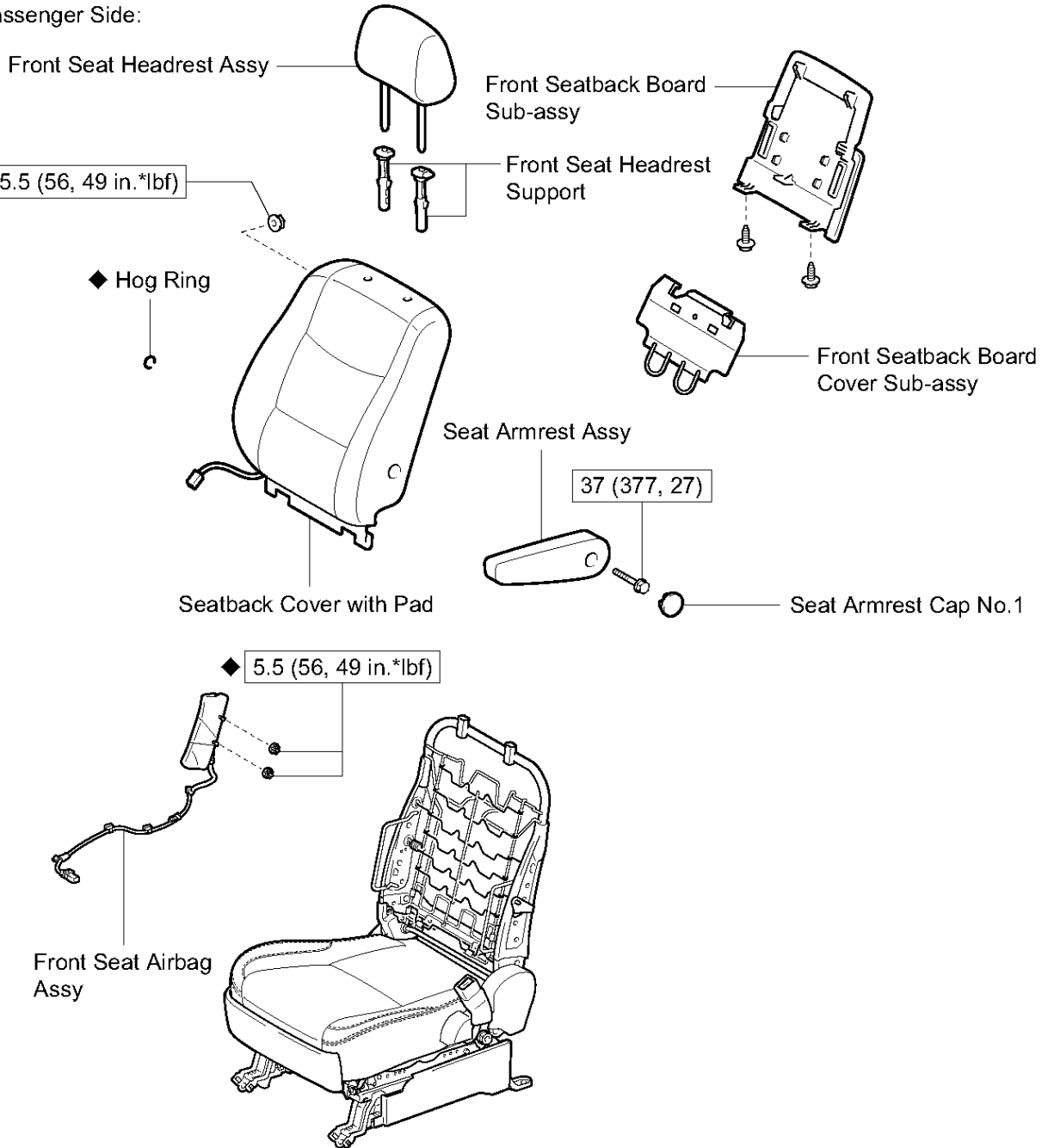
$N \cdot m (kgf \cdot cm, ft. \cdot lbf)$: Specified torque

◆ Non-reusable part

P

C224668

for Passenger Side:



$N \cdot m(kgf \cdot cm, ft. \cdot lbf)$: Specified torque

◆ Non-reusable part

P

C224669

REPLACEMENT

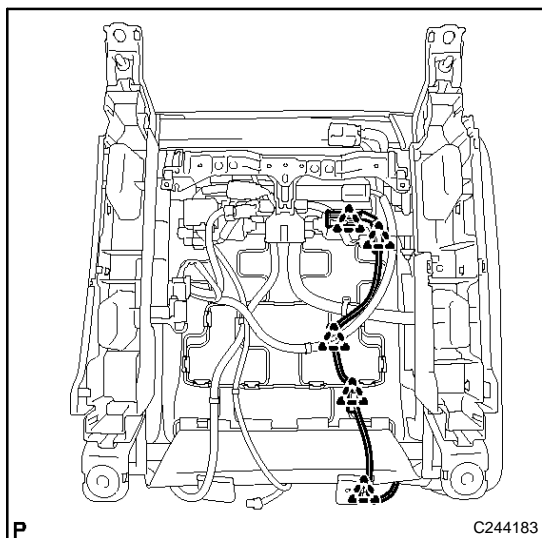
NOTICE:

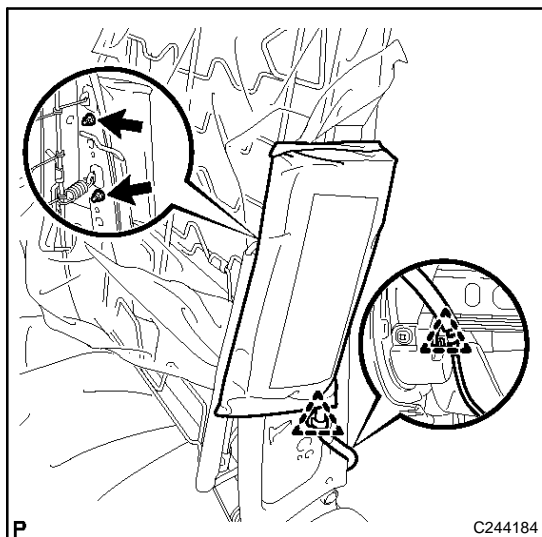
- Always wear gloves because the sharp edges of the seatback frame and seat adjuster may cause injury.
- Work must be started 90 seconds after the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery. (The SRS is equipped with a back-up power source. If work is started within 90 seconds after disconnecting the negative (-) terminal cable of the battery, the SRS may deploy.)

HINT:

- Installation is in the reverse order of removal. However, only installation procedures requiring additional information are included.
- Use the same procedures for the RH side and LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page 03-2).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE FRONT SEAT HEADREST ASSY**
3. **REMOVE FRONT SEAT ASSY (SEE PAGE 72-20)**
4. **REMOVE SEAT ARMREST ASSY (SEE PAGE 72-22)**
5. **REMOVE SEATBACK COVER WITH PAD (SEE PAGE 72-22)**
6. **REMOVE FRONT SEAT AIRBAG ASSY (DRIVER SIDE)**
 - (a) Disconnect the 5 wire harness clamps from under the seat.

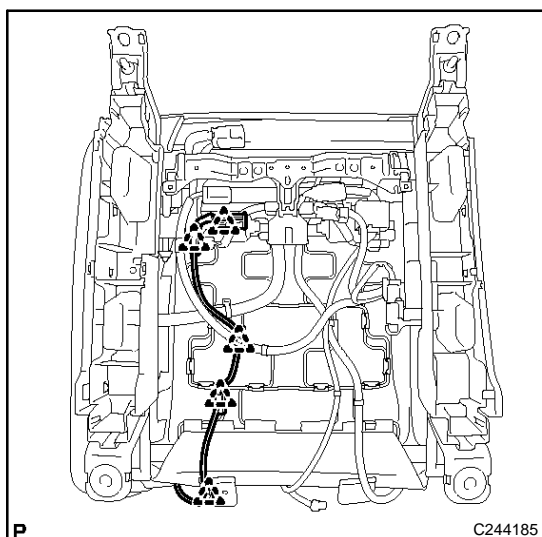




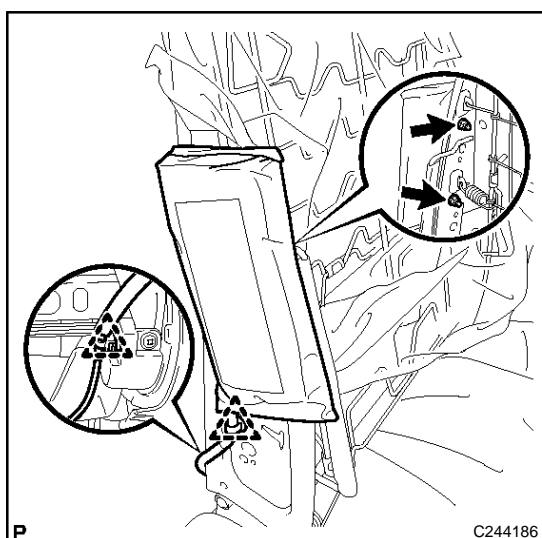
- (b) Disengage the 2 clamps and disconnect the wire harness.
- (c) Remove the 2 nuts and the front seat airbag assy.

CAUTION:

- The nuts must not be reused.
- Make sure that the seat frame assy is not deformed. If it is, replace it with a new one.

**7. REMOVE FRONT SEAT AIRBAG ASSY (FRONT PASSENGER SIDE)**

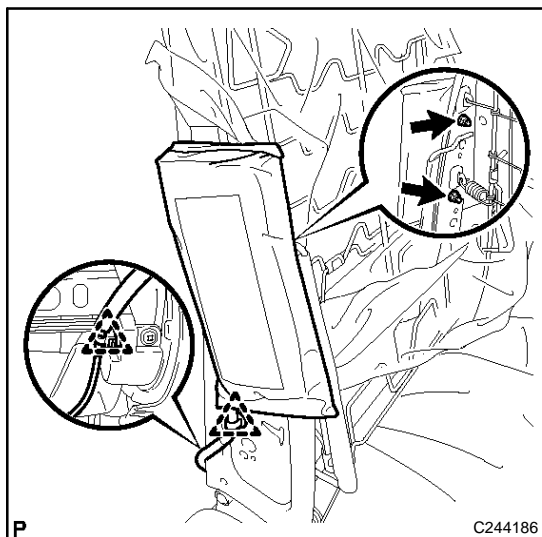
- (a) Disconnect the 5 wire harness clamps from under the seat.



- (b) Disengage the 2 clamps and disconnect the wire harness.
- (c) Remove the 2 nuts and the front seat airbag assy.

CAUTION:

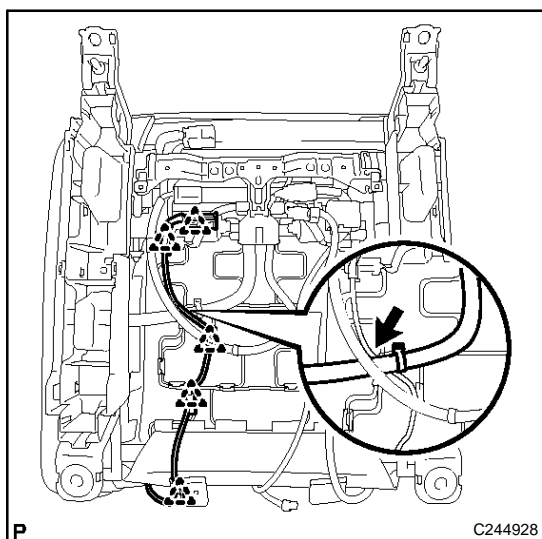
- The nuts must not be reused.
- Make sure that the seat frame assy is not deformed. If it is, replace it with a new one.



8. INSTALL FRONT SEAT AIRBAG ASSY (FRONT PASSENGER SIDE)

CAUTION:

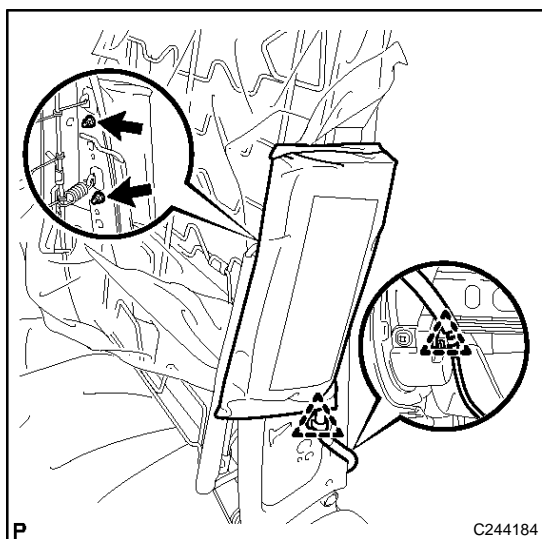
- The nuts must not be reused.
 - Make sure that the seat frame assy is not deformed. If it is, replace it with a new one.
- (a) Install the front seat airbag assy with 2 new nuts.
Torque: 5.5 N·m (56 kgf cm, 49 in·lbf)



- (b) Engage the 2 clamps to connect the wire harness.
(c) Connect the 5 wire harness clamps to under the seat.

NOTICE:

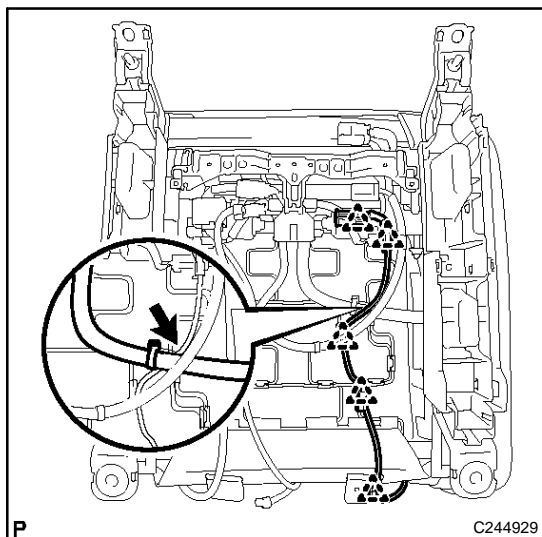
Pass the airbag harness under the main harness.



9. INSTALL FRONT SEAT AIRBAG ASSY (DRIVER SIDE)

CAUTION:

- The nuts must not be reused.
 - Make sure that the seat frame assy is not deformed. If it is, replace it with a new one.
- (a) Install the front seat airbag assy with 2 new nuts.
Torque: 5.5 N·m (56 kgf cm, 49 in·lbf)

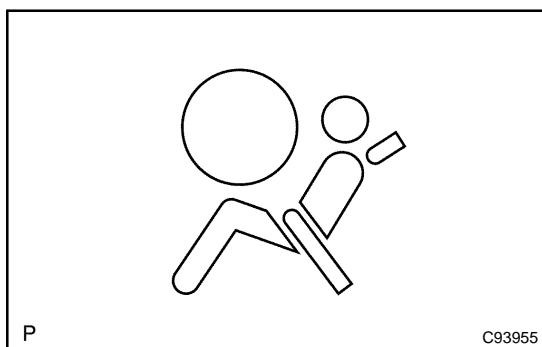


- (b) Engage the 2 clamps to connect the wire harness.
- (c) Connect the 5 wire harness clamps to under the seat.

NOTICE:

Pass the airbag harness under the main harness.

- 10. **INSTALL SEATBACK COVER WITH PAD (SEE PAGE 72-25)**
- 11. **INSTALL SEAT ARMREST ASSY (SEE PAGE 72-25)**
- 12. **INSTALL FRONT SEAT ASSY (SEE PAGE 72-26)**
- 13. **INSTALL FRONT SEAT HEADREST ASSY**
- 14. **CONNECT BATTERY NEGATIVE TERMINAL**



- 15. **CHECK AIRBAG INDICATOR LIGHT (SRS WARNING LIGHT)**

- (a) Turn the ignition switch ON.

Standard:

The indicator is illuminated for approximately 6 seconds and turned off.

If this remains on, check DTCs of the airbag system.

- 16. **CHECK POWER SEAT OPERATION**
- 17. **CHECK SEAT HEATER OPERATION**

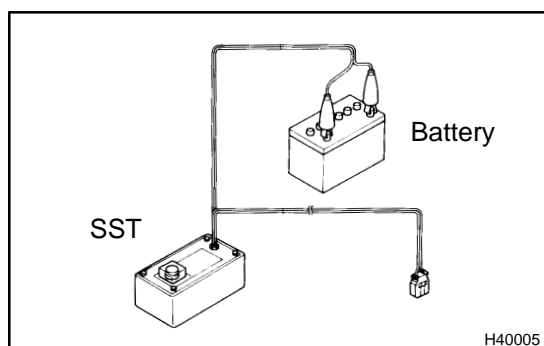
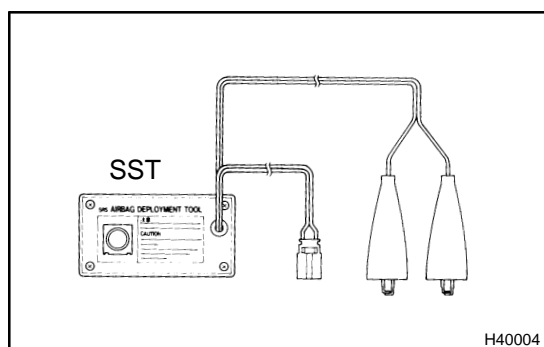
DISPOSAL

When scrapping vehicles equipped with an SRS or disposing of the front seat airbag assy always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

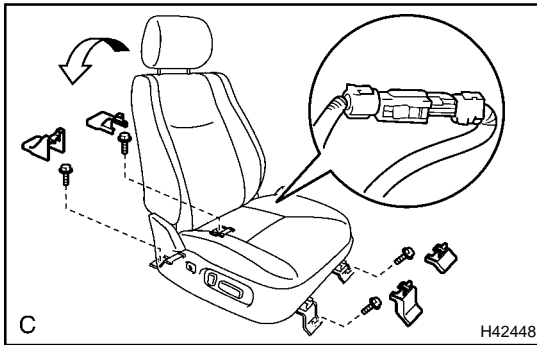
When disposing of a front seat airbag assy with an airbag deployed in a collision, follow the same procedure given in step 1-(e) in "DISPOSAL".

CAUTION:

- Never dispose of a front seat airbag which has an undeployed airbag.
- The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool), perform the operation in a place away from electrical noise.
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assy.
- The front seat airbag assy is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling front seat airbag assy with the deployed airbag.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat airbag assy with the deployed airbag.



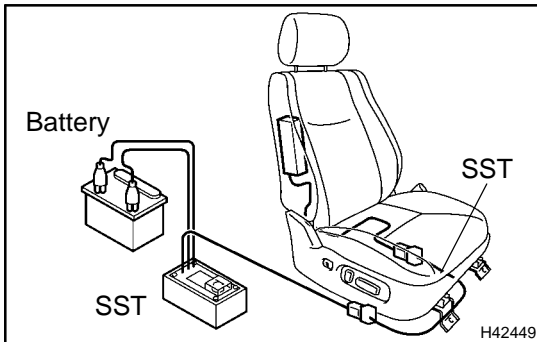
1. **DISPOSE OF FRONT SEAT AIRBAG ASSY RH (WHEN SCRAPPING VEHICLE DEPLOYMENT METHOD)**
 - (a) Check functioning of the SST (See step 1- (a) on page 60-21).



- (b) Remove the front seat assy RH.
 (c) Disconnect the front seat airbag connector.

NOTICE:

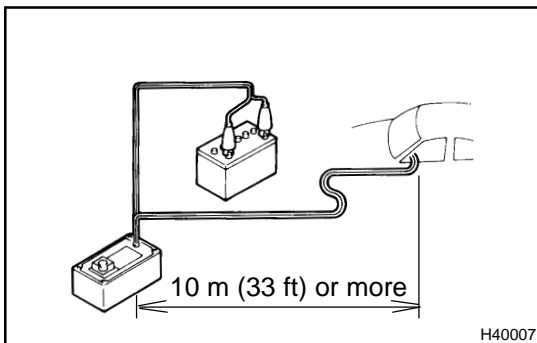
When handling the airbag connector, take care not to damage the airbag wire harness.



- (d) Install the SST.
 (1) Connect the connectors of the SST connector to the front seat airbag connector.
 SST 09082-00700, 09082-00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.
 (3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (4) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
 (e) Deploy the airbag.
 (1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.
 (2) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.

- (f) Dispose of the front seat airbag assy RH.

CAUTION:

- The front seat airbag assy RH is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- Use gloves and safety glasses when handling a front seat airbag assy RH with the deployed airbag.
- When moving a vehicle for scrapping which has a front seat airbag assy RH with the deployed airbag, use gloves and safety glasses.
- Do not apply water, etc. to a front seat airbag assy RH with the deployed airbag.
- Always wash your hands with water after completing the operation.

HINT:

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front seat airbag assy RH still installed.

2. DISPOSE OF FRONT SEAT AIRBAG ASSY RH (WHEN DISPOSING OF AIRBAG ASSEMBLY DEPLOYMENT METHOD)

NOTICE:

- When disposing of the front seat airbag assy RH only, never use the customer's vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

Have a battery ready as the power source to deploy the airbag.

- Remove the front seat airbag assy RH.
 - Remove the 2 nuts and front seat airbag assy from the seatback assembly.

CAUTION:

Store the front seat airbag assy RH with the airbag deployment side facing upward.

- Using a service-purpose wire harness, tie down the front seat airbag assy RH.

**Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in² or more)**

CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the front seat airbag assy RH, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in²).

HINT:

To calculate the square of the stripped wire harness section :

Square = 3.14 x (Diameter)² divided by 4

- Install the 2 nuts in the front seat airbag assy RH.
- Wind the wire harness around the stud bolts of the front seat airbag assy RH as shown in the illustration.
- Position the front seat airbag assy RH inside the tire with the airbag deployment direction facing inside.

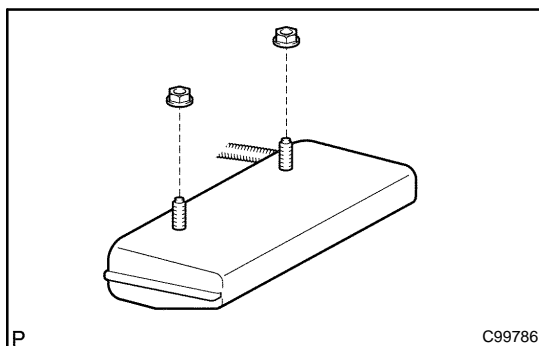
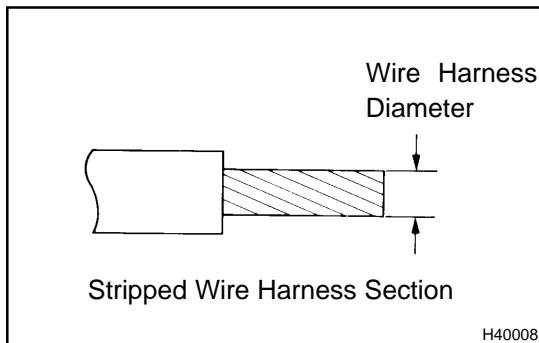
Tire size : Must exceed the following dimensions:-

Width 185 mm (7.28 in.)

Inner diameter 360 mm (14.17 in.)

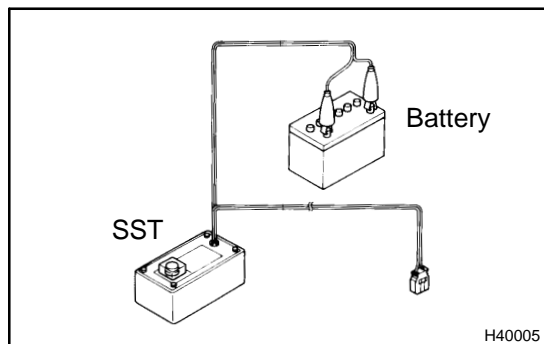
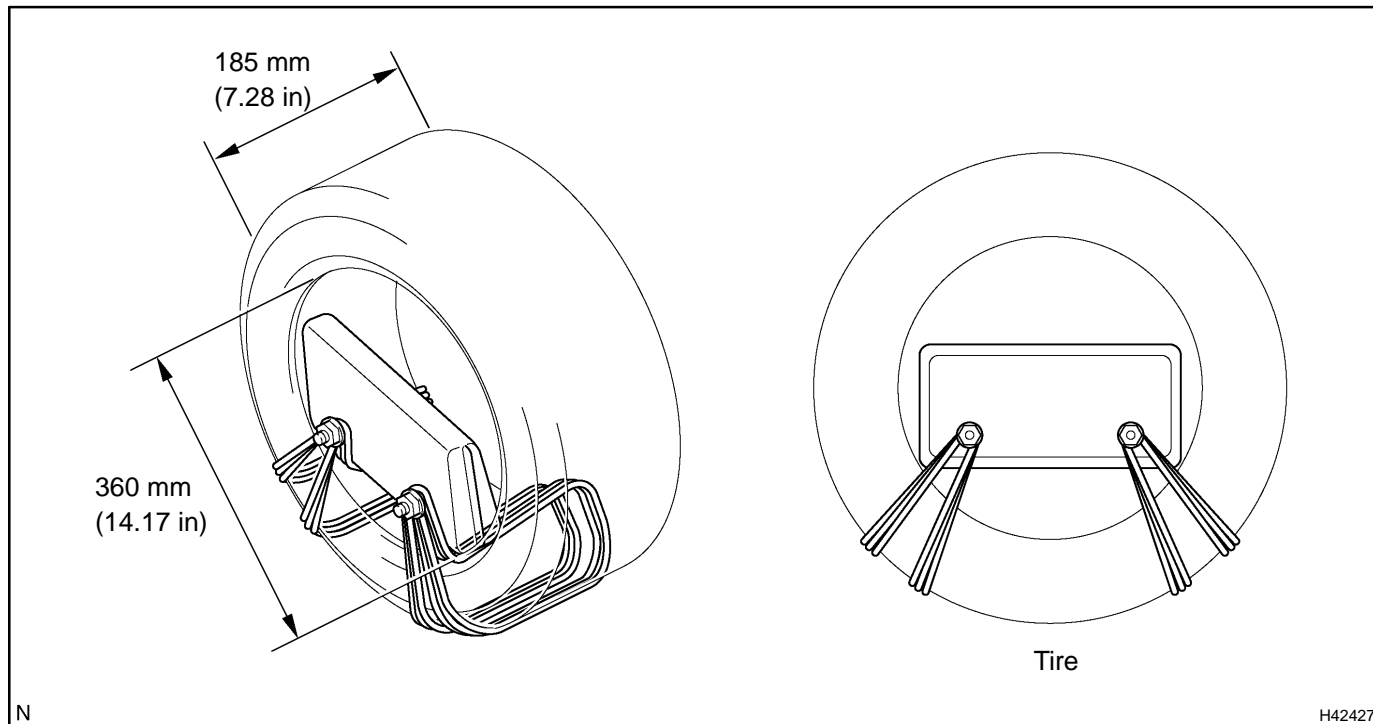
CAUTION:

- Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the front seat airbag assy RH coming free due to the shock from the airbag deploying.
- Always tie down the front seat airbag assy RH with the airbag door facing inside.

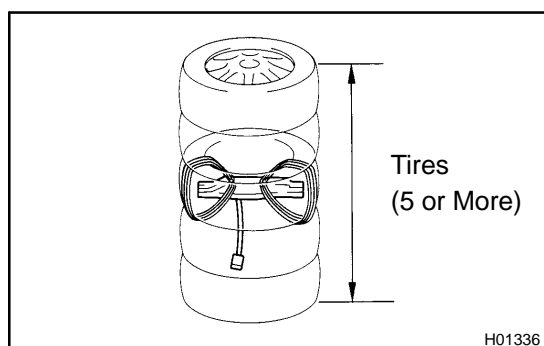


NOTICE:

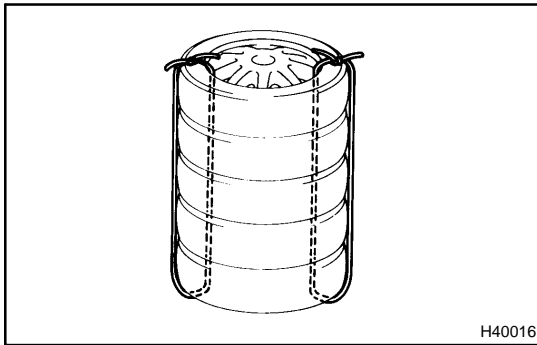
The tire will be marked by the airbag deployment, so use the redundant tire.



- (c) Check functioning of the SST (See step 1-(a) on page 60-21).



- (d) Place the tires.
- (1) Place at least 2 tires under the tire to which the front seat airbag assy RH is tied.
 - (2) Place at least 2 tires over the tire to which the front seat airbag assy RH is tied. The top tire should have the wheel installed.



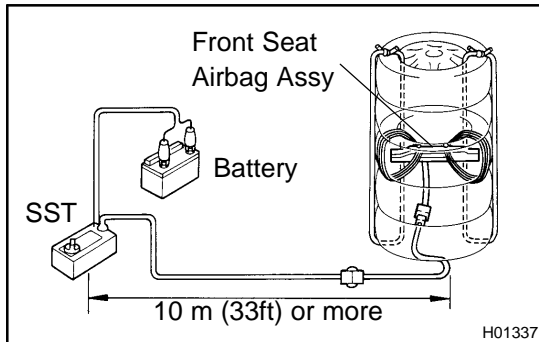
- (3) Tie the tires together with 2 wire harnesses.

CAUTION:

Make sure that the wire harnesses are tight. It is very dangerous if looseness in the wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (e) Install the SST.
Connect the connector of SST to the front seat airbag assy connector.

SST 09082-00700, 09082-00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

- (f) Deploy the airbag.
- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
 - (2) Check that no one is within 10 m (33 ft) area around the tire which the front seat airbag assy is tied to.
 - (3) Press the activation switch of the SST and deploy the airbag.

HINT:

The airbag deploys as the LED of the SST activation switch comes on.

- (g) Dispose of the front seat airbag assy RH.

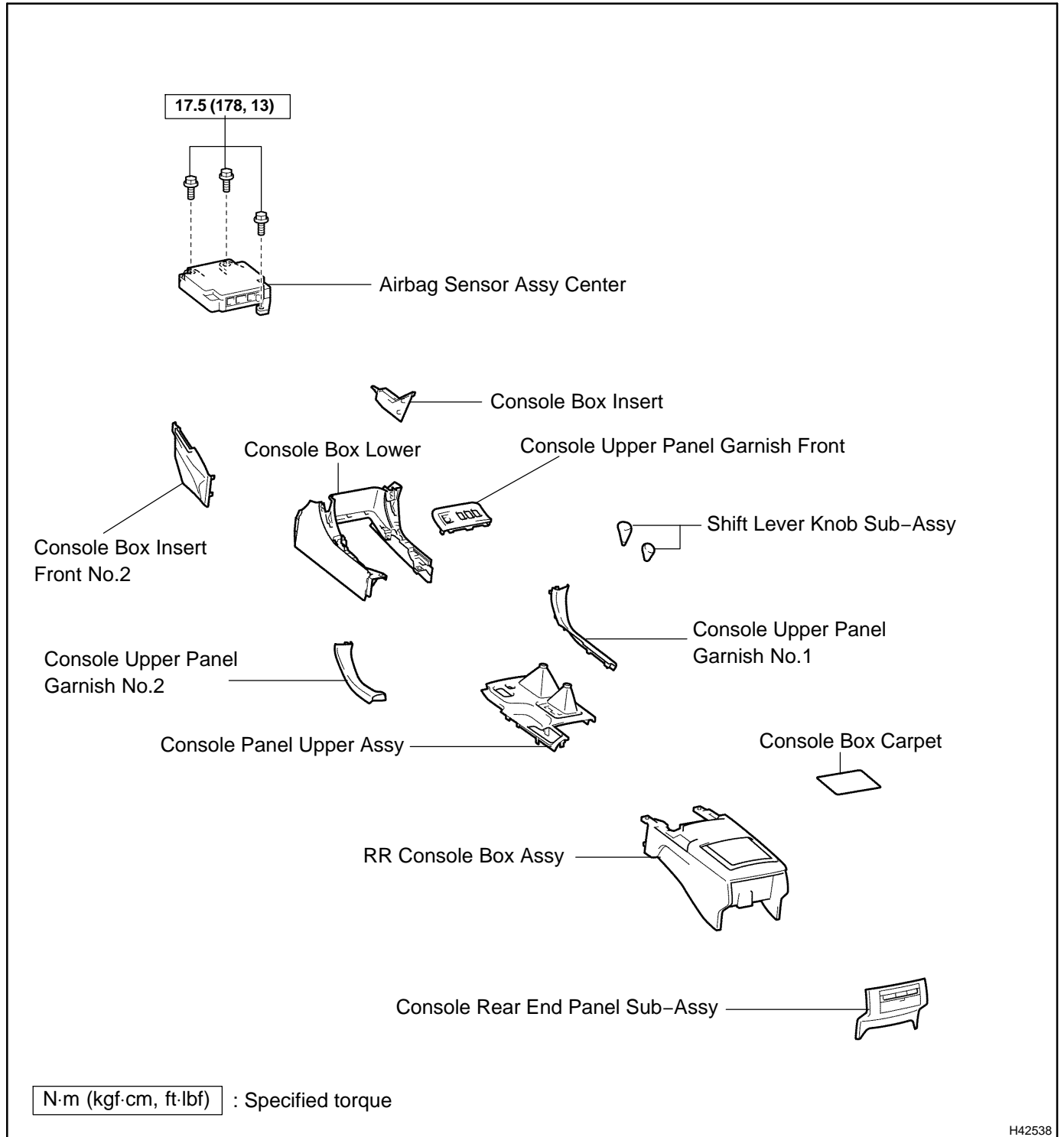
CAUTION:

- **The front seat airbag assy RH is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
 - **Use gloves and safety glasses when handling a front seat airbag assy RH with the deployed airbag.**
 - **Do not apply water etc. to a front seat airbag assy RH with the deployed airbag.**
 - **Always wash your hands with water after completing the operation.**
- (1) Remove the front seat airbag assy RH from the tire.
 - (2) Place the front seat airbag assy RH in a plastic bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



AIR BAG SENSOR ASSY CENTER COMPONENTS

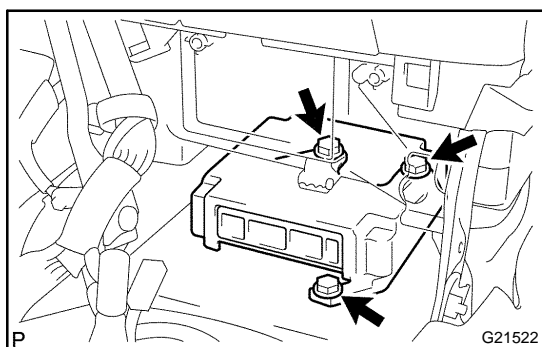
600HR-01



H42538

REPLACEMENT

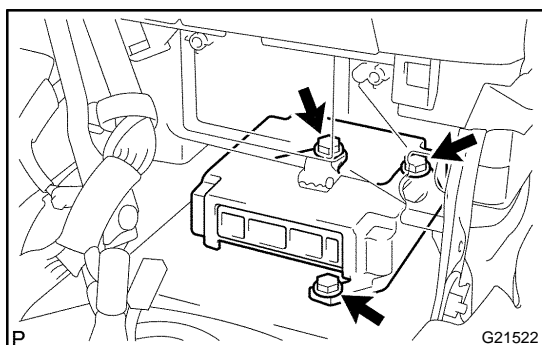
1. PRECAUTION(See page 60-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL(See page 60-1)
3. REMOVE SHIFT LEVER KNOB SUB-ASSY(See page 71-13)
4. REMOVE SHIFT LEVER KNOB SUB-ASSY(See page 71-13)
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.2(See page 71-13)
6. REMOVE CONSOLE UPPER PANEL GARNISH NO.1(See page 71-13)
7. REMOVE CONSOLE PANEL UPPER ASSY(See page 71-13)
8. REMOVE CONSOLE REAR END PANEL SUB-ASSY(See page 71-13)
9. REMOVE RR CONSOLE BOX ASSY(See page 71-13)
10. REMOVE CONSOLE BOX INSERT FRONT NO.2(See page 71-13)
11. REMOVE CONSOLE BOX INSERT(See page 71-13)
12. REMOVE CONSOLE UPPER PANEL GARNISH FRONT(See page 71-13)
13. REMOVE CONSOLE BOX LOWER(See page 71-13)



14. REMOVE AIR BAG SENSOR ASSY CENTER

- (a) Disconnect the 3 connectors from the airbag sensor assy center.
- (b) Remove the 3 bolts and airbag sensor assy center.

15. INSPECT AIR BAG SENSOR ASSY CENTER(See page 60-13)



16. INSTALL AIR BAG SENSOR ASSY CENTER

- (a) Check that the ignition switch turn OFF.
- (b) Check that the battery negative (-) terminal is disconnected.

NOTICE:

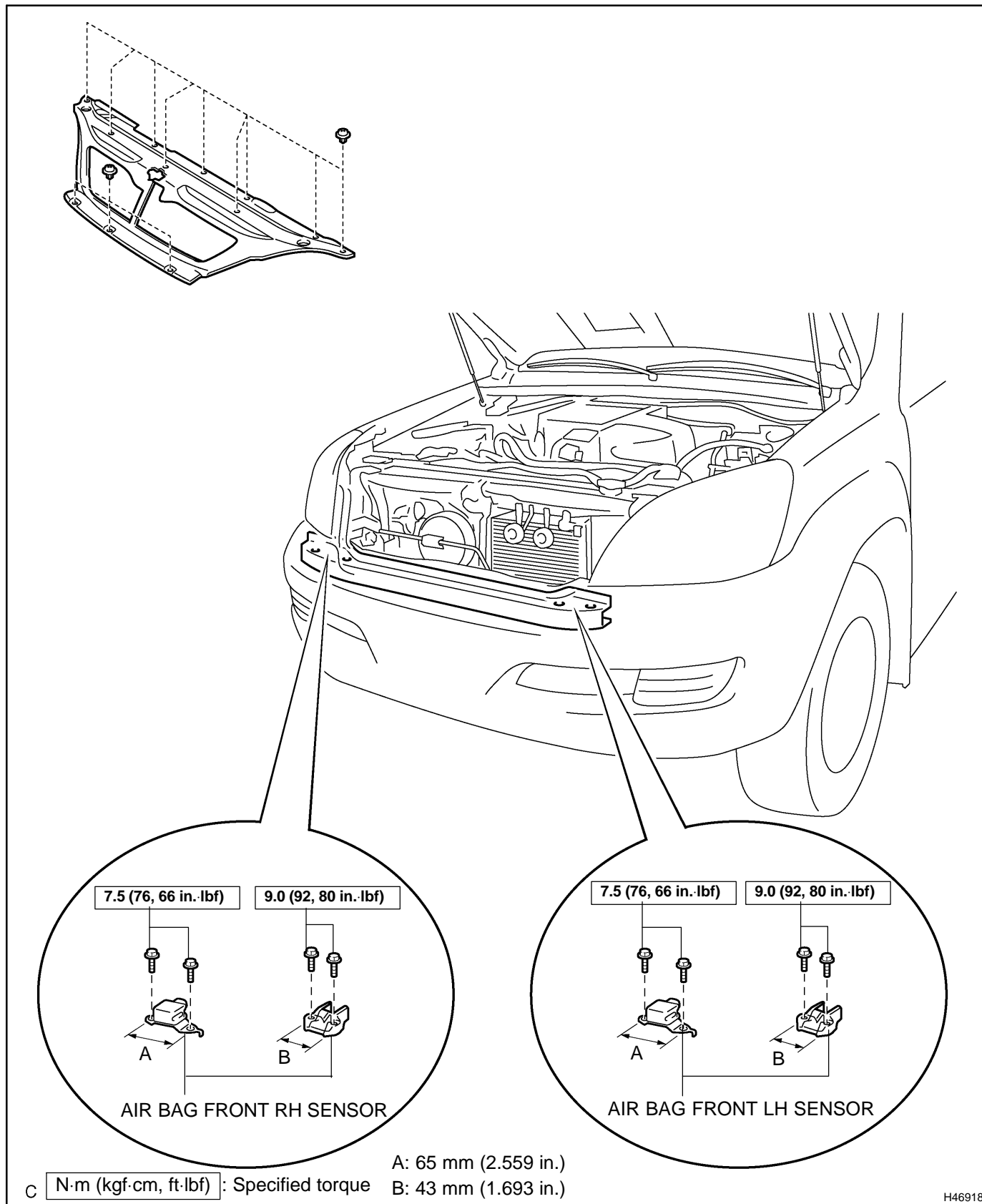
Do not start the operation for 90 seconds after removing the terminal.

- (c) Temporarily install the airbag sensor assy center with the 3 bolts.
- (d) Tighten the 3 bolts to the specified torque.
Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)
- (e) Connect the connector to the airbag sensor assy center.
- (f) Check that no play is identified.
- (g) Check that the water-proof sheet is properly set.

17. INSPECT SRS WARNING LIGHT(See page 05-1213)

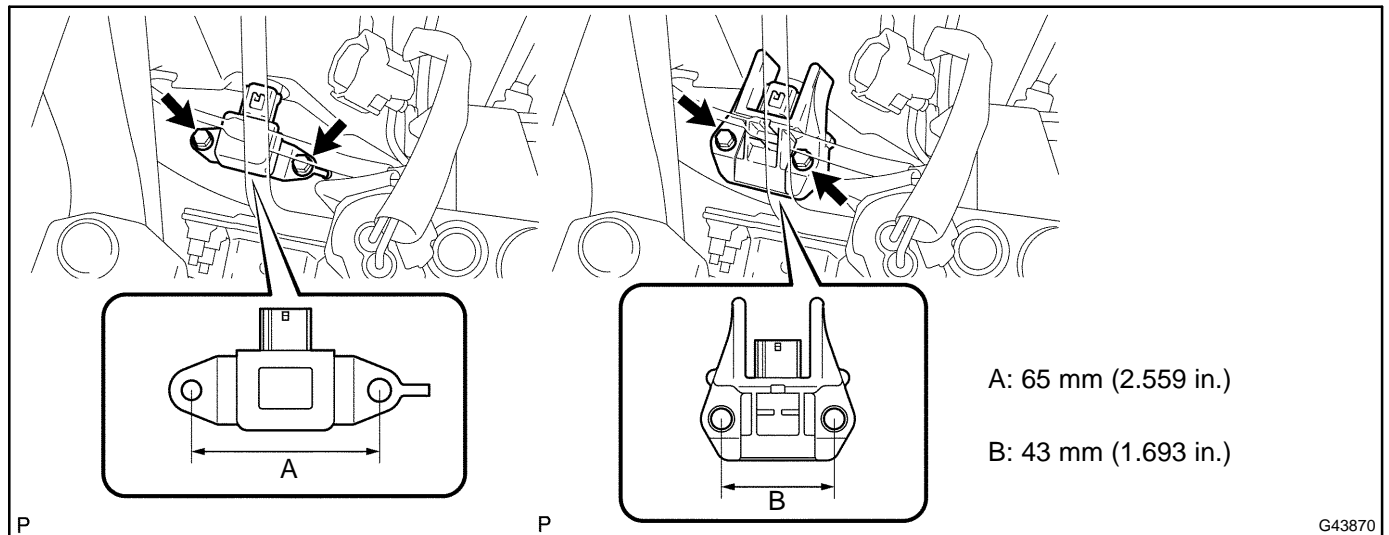
AIR BAG FRONT RH SENSOR COMPONENTS

600HT-01



REPLACEMENT

1. **PRECAUTION**(See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**(See page 60-1)
3. **REMOVE RADIATOR SUPPORT SEAL UPPER**(See page 14-22)
4. **REMOVE AIR BAG FRONT RH SENSOR**
 - (a) Remove the bolt and airbag front RH sensor.
 - (b) Disconnect the connector from the airbag front RH sensor.



5. **INSPECT AIR BAG FRONT RH SENSOR**(See page 60-13)
6. **INSTALL AIR BAG FRONT RH SENSOR**
 - (a) Check that the ignition switch turn OFF.
 - (b) Check that the battery negative terminal is disconnected.

NOTICE:

Do not start the operation for 90 seconds after removing the terminal.

- (c) Install the airbag front RH sensor with the bolt.

Torque:

7.5 N·m (76 kgf·cm, 66 in·lbf): Length A 65 mm (2.559 in.)

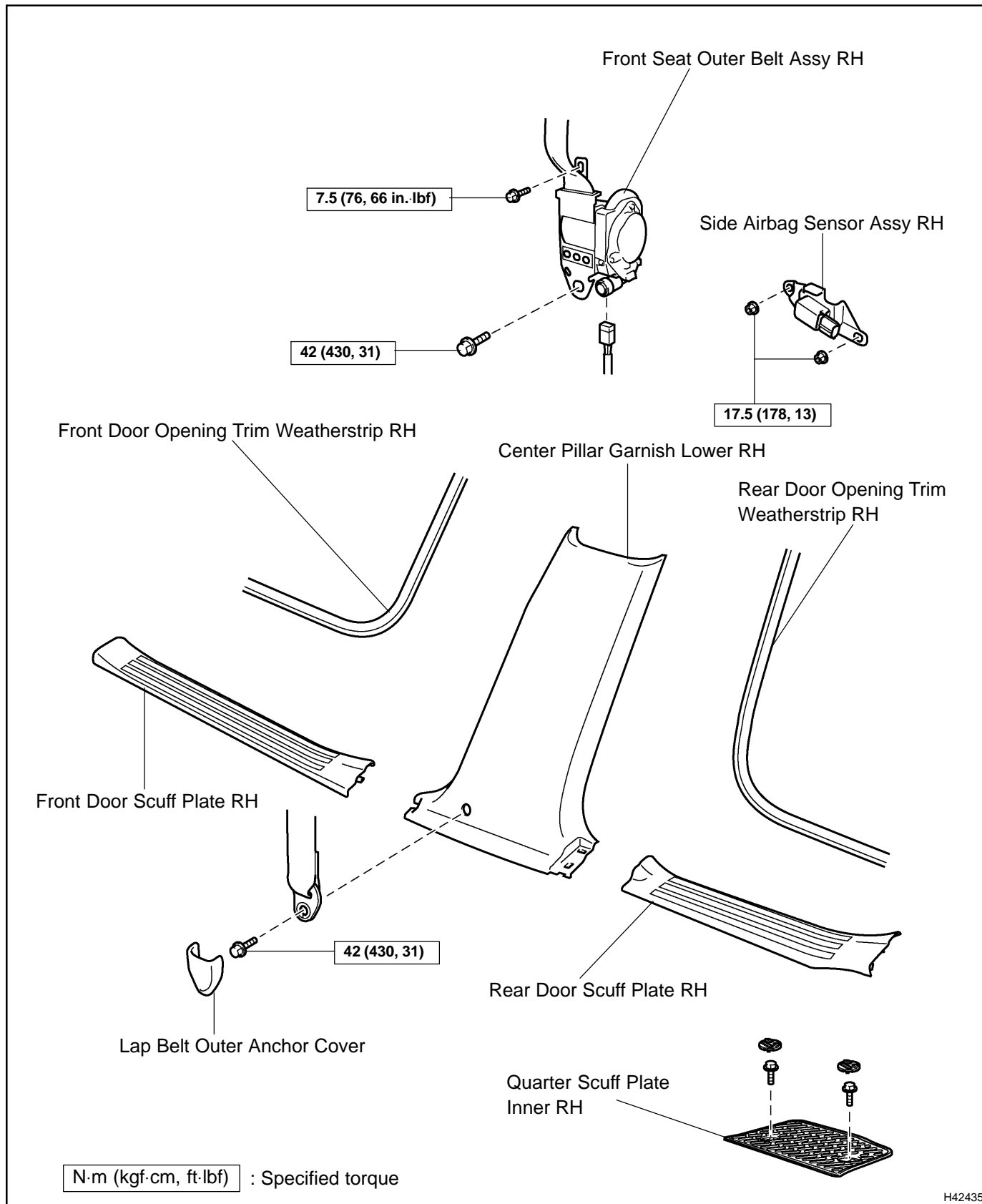
9.0 N·m (92 kgf·cm, 80 in·lbf): Length B 43 mm (1.693 in.)

- (d) Connect the connector to the airbag front RH sensor.
- (e) Check that no play is identified.

7. **INSPECT SRS WARNING LIGHT**(See page 05-1213)

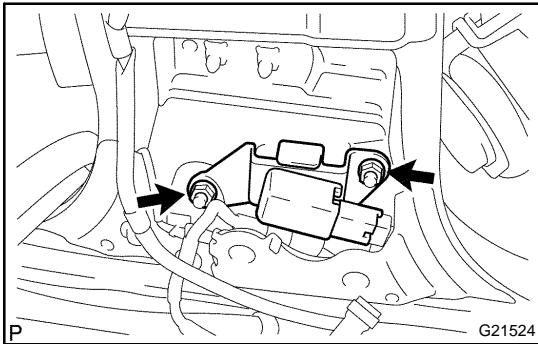
SIDE AIR BAG SENSOR ASSY RH COMPONENTS

600HU-01



REPLACEMENT

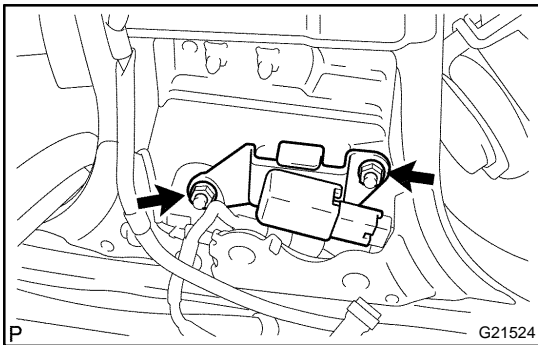
1. PRECAUTION(See page 60-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL(See page 60-1)
3. REMOVE QUARTER SCUFF PLATE INNER RH(See page 76-38)
4. REMOVE FRONT DOOR SCUFF PLATE RH(See page 76-38)
5. REMOVE QUARTER SCUFF PLATE INNER RH(See page 76-38)
6. REMOVE REAR DOOR SCUFF PLATE RH(See page 76-38)
7. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH(See page 76-38)
8. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH(See page 76-38)
9. REMOVE LAP BELT OUTER ANCHOR COVER(See page 61-13)
10. REMOVE CENTER PILLAR GARNISH LOWER RH(See page 61-13)
11. REMOVE FRONT SEAT OUTER BELT ASSY RH(See page 61-13)



12. REMOVE SIDE AIR BAG SENSOR ASSY RH

- (a) Remove the 2 nuts and side airbag sensor assy RH.
- (b) Disconnect the connector from the side airbag sensor assy RH.

13. INSPECT SIDE AIR BAG SENSOR ASSY RH(See page 60-13)



14. INSTALL SIDE AIR BAG SENSOR ASSY RH

- (a) Connect the side airbag sensor assy RH connector.
- (b) Install the side airbag sensor assy RH with the 2 nuts.
Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)

NOTICE:

- Installation of the connector is done with the sensor assy installed. Make sure the sensor assy is installed with the specified torque.
- If the sensor assy has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assy with a new one.
- When installing the sensor assy, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installation, shake the sensor assy to check that there is no looseness.

15. INSTALL FRONT SEAT OUTER BELT ASSY RH(See page 61-13)

Torque:

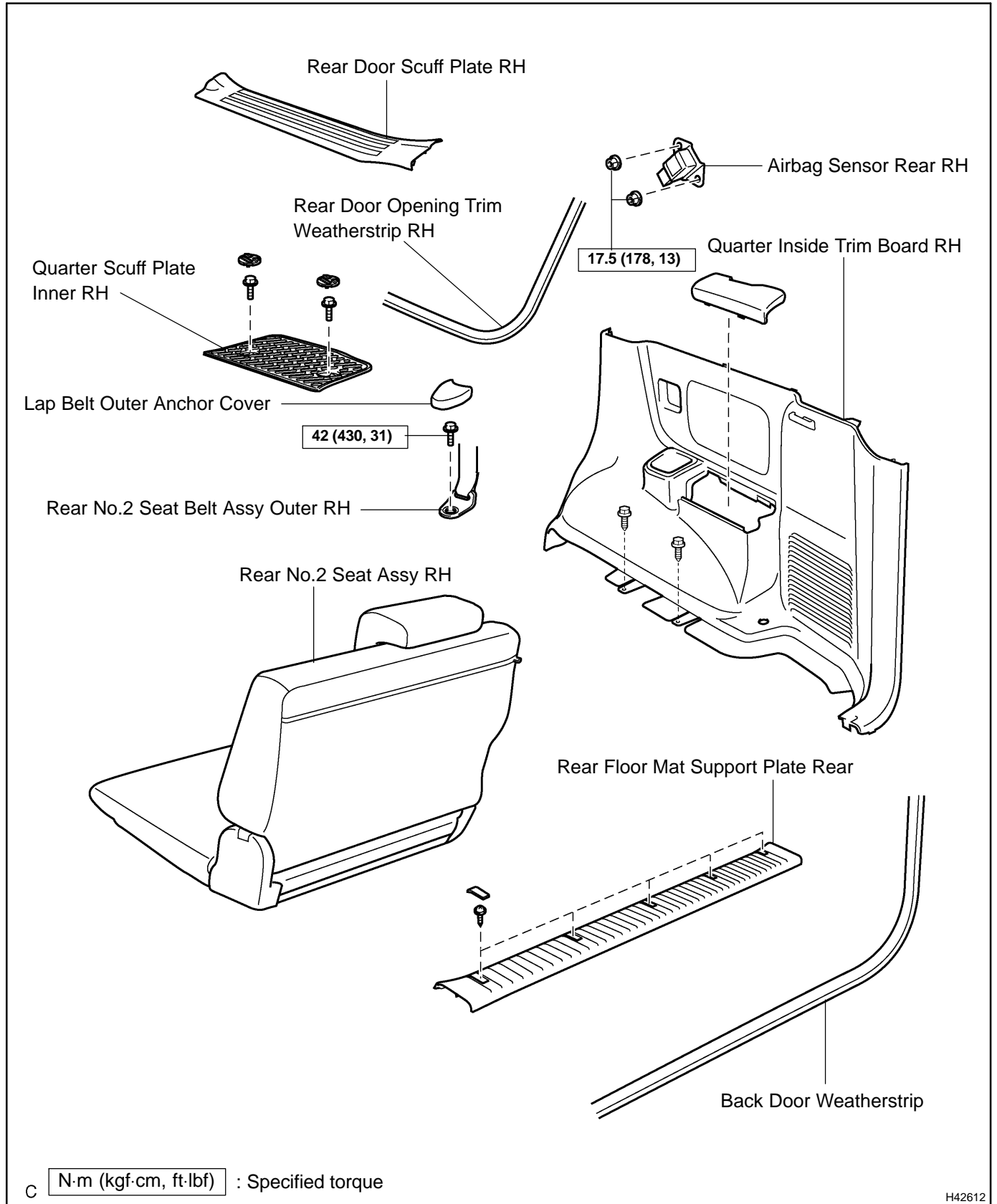
Upper bolt: 7.5 N·m (76 kgf·cm, 66 in·lbf)

Lower bolt: 42 N·m (430 kgf·cm, 31 ft·lbf)

16. INSPECT SRS WARNING LIGHT(See page 05-1213)

AIR BAG SENSOR REAR RH COMPONENTS

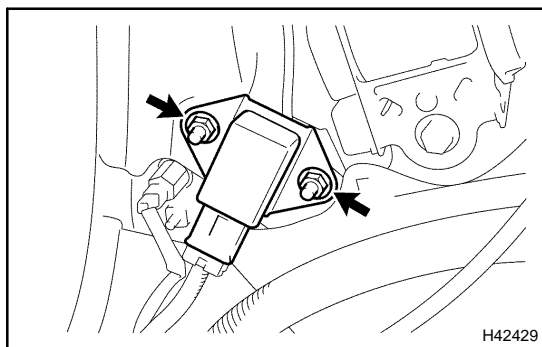
600HW-01



H42612

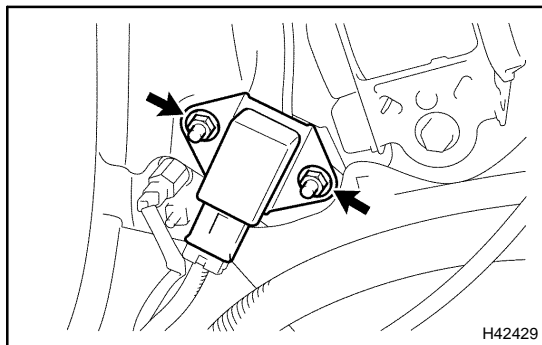
REPLACEMENT

1. PRECAUTION(See page 60-1)
2. DISCONNECT BATTERY NEGATIVE TERMINAL(See page 60-1)
3. REMOVE QUARTER SCUFF PLATE INNER RH(See page 76-38)
4. REMOVE REAR DOOR SCUFF PLATE RH(See page 76-38)
5. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH(See page 76-38)
6. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR(See page 76-38)
7. REMOVE BACK DOOR WEATHERSTRIP(See page 76-38)
8. REMOVE REAR NO. 2 SEAT ASSY RH(See page 72-42)
9. REMOVE LAP BELT OUTER ANCHOR COVER REAR NO.1 SAET(See page 61-26)
10. REMOVE REAR NO.2 SEAT BELT ASSY OUTER RH(See page 61-26)
11. REMOVE QUARTER INSIDE TRIM BOARD RH(See page 76-38)



12. REMOVE AIR BAG SENSOR REAR RH

- (a) Disconnect the connector of the airbag sensor rear RH.
- (b) Remove the 2 nuts and the airbag sensor rear RH.



13. INSTALL AIR BAG SENSOR REAR RH

- (a) Install the airbag sensor rear RH with the 2 nuts.
Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)
- (b) Connect the connector of the airbag sensor rear RH.

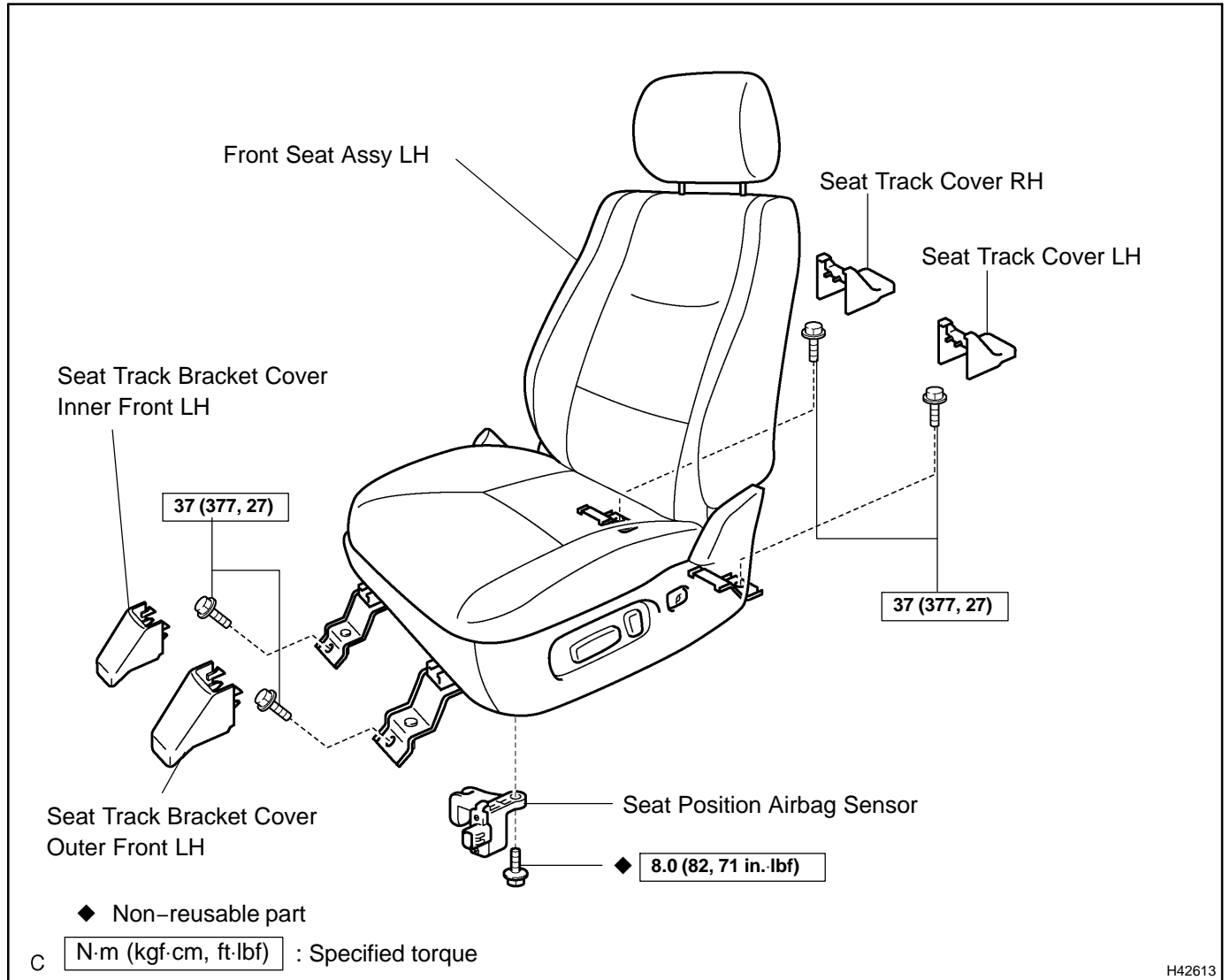
NOTICE:

- Installation of the connector is done with the sensor assembly installed. Make sure the sensor assembly is installed with the specified torque.
- If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installation, shake the sensor assembly to check that there is no looseness.

14. INSPECT AIR BAG SENSOR REAR RH(See page 60-13)
15. INSTALL REAR NO.2 SEAT BELT ASSY OUTER RH(See page 61-26)
16. INSPECT SRS WARNING LIGHT(See page 05-1213)

SEAT POSITION AIR BAG SENSOR COMPONENTS

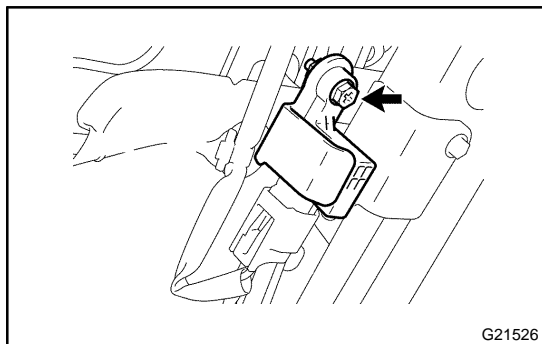
600HY-01



H42613

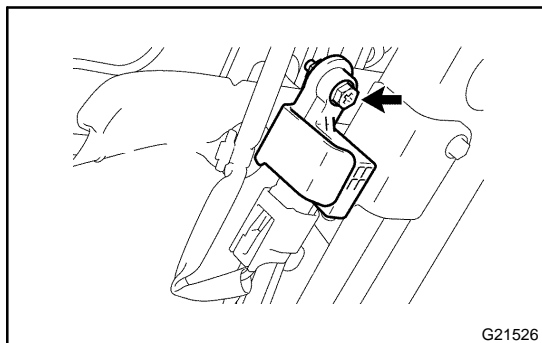
REPLACEMENT

1. PRECAUTION(See page 60-1)
2. SEPARATE BATTERY NEGATIVE TERMINAL(See page 60-1)
3. REMOVE SEAT TRACK BRACKET COVER OUTER FRONT LH(See page 72-20)
4. REMOVE SEAT TRACK BRACKET COVER INNER FRONT LH(See page 72-20)
5. REMOVE SEAT TRACK COVER RH(See page 72-20)
6. REMOVE SEAT TRACK COVER RH(See page 72-20)
7. REMOVE FRONT SEAT ASSY LH(See page 72-20)



8. REMOVE SEAT POSITION AIR BAG SENSOR

- (a) Disconnect the connector of the seat position airbag sensor.
- (b) Remove the bolt and seat position airbag sensor.



9. INSTALL SEAT POSITION AIR BAG SENSOR

- (a) Install the seat position airbag sensor with a new bolt.
Part No.:
Bolt: 90119-06871
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
- (b) Connect the connector of the seat position airbag sensor.

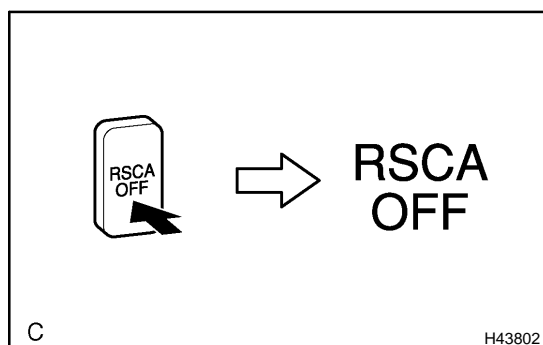
NOTICE:

- Installation of the connector is done with the sensor assy installed. Make sure the sensor assy is installed with the specified torque.
- If the sensor assy has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assy with a new one.
- When installing the sensor assy, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installation, shake the sensor assy to check that there is no looseness.

10. INSTALL FRONT SEAT ASSY LH(See page 72-20)
11. INSPECT SRS WARNING LIGHT(See page 05-1213)

CURTAIN AIRBAG CUTOFF SWITCH INSPECTION

600U7-02

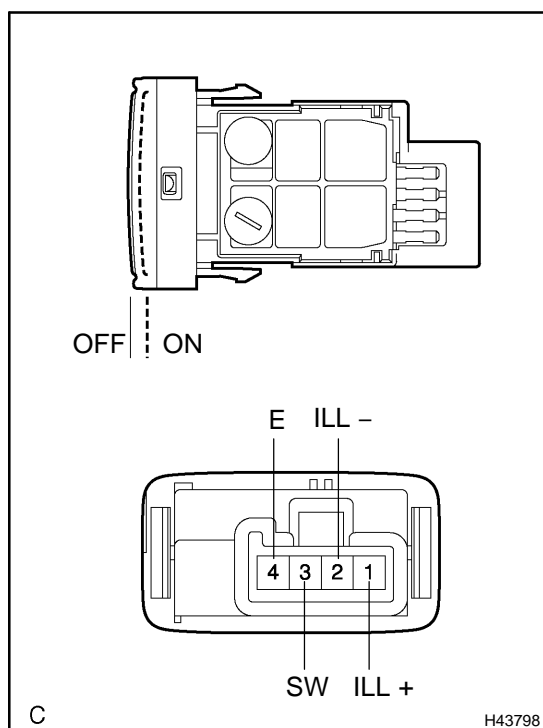


1. INSPECT RSCA OFF INDICATOR

- (a) Turn the ignition switch to the ON position.
- (b) Check that the RSCA OFF indicator comes on for approximately 3 seconds and then goes off.
- (c) Check that the RSCA OFF indicator comes on after pressing the curtain airbag cutoff switch for approximately 2 seconds.

2. INSPECT CURTAIN AIRBAG CUTOFF SWITCH

- (a) Remove the instrument panel finish lower panel RH (see page 71-13).
- (b) Remove the curtain airbag cutoff switch from the instrument panel finish panel sub-assy lower.



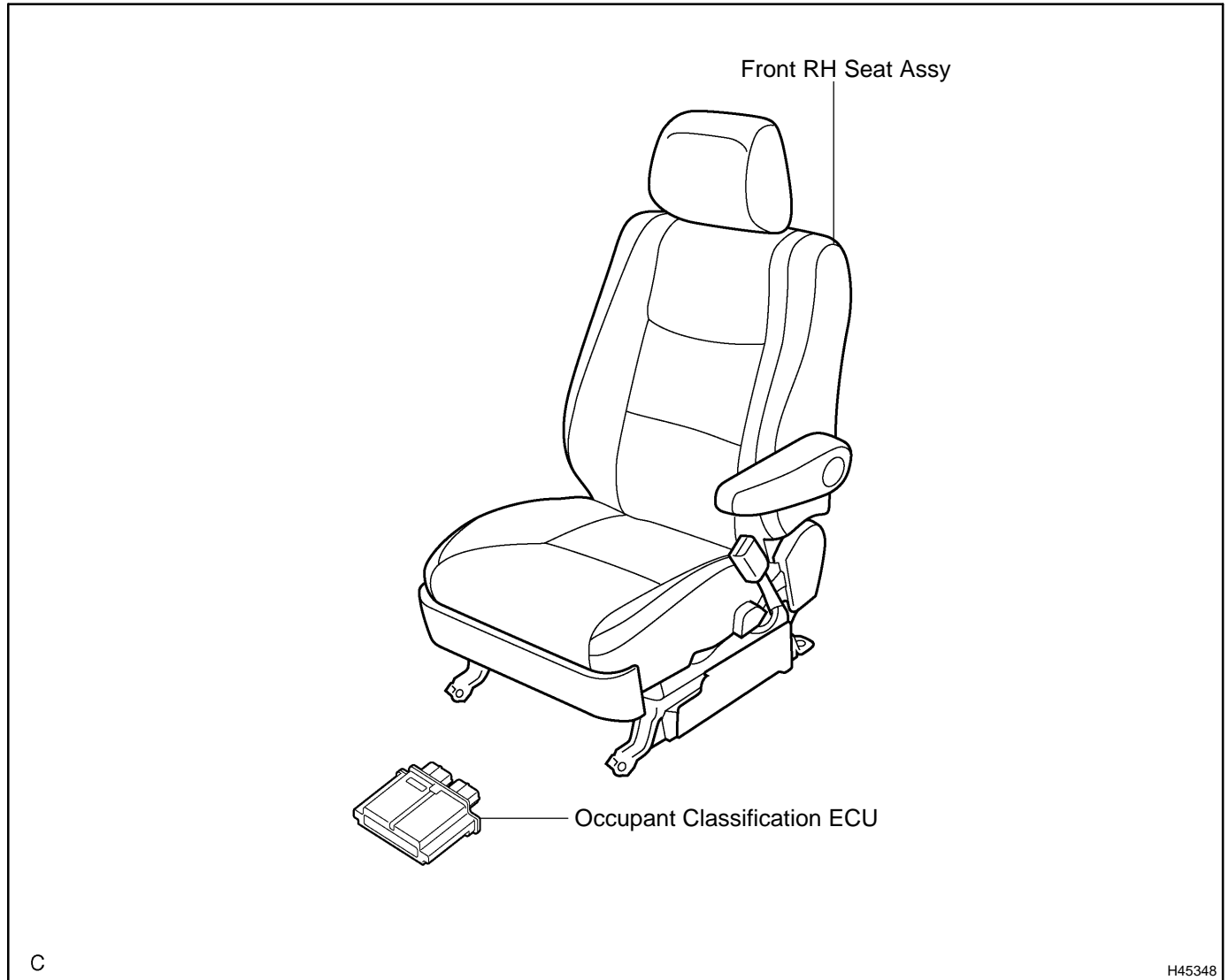
- (c) Measure the resistance according to the value(s) in the table below.

Tester connection	Condition	Specified condition
SW (3) - E (4)	OFF (Release)	10 k Ω or higher
SW (3) - E (4)	ON (Pushed in)	Below 1 Ω

- (d) Inspect the illumination operation.
 - (1) Connect the battery positive terminal to terminal ILL + (1) of the connector, and the battery negative terminal to terminal ILL - (2), and check that the indicator comes on.

OCCUPANT CLASSIFICATION ECU COMPONENTS

600KX-11

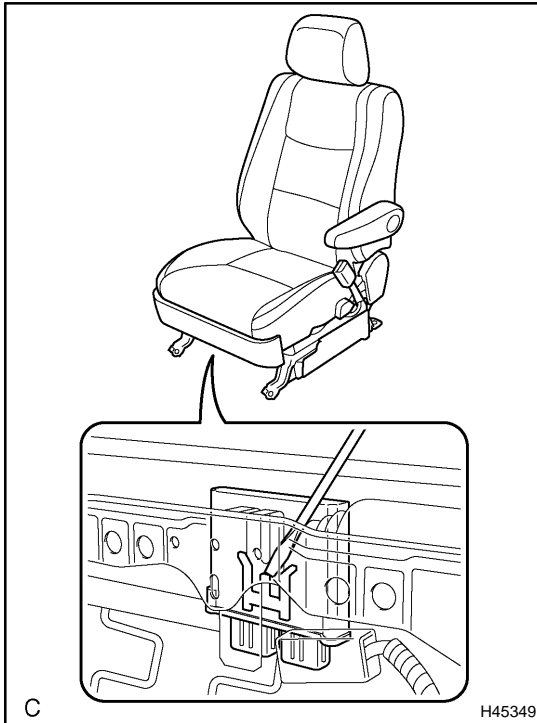


REPLACEMENT

1. **PRECAUTION (SEE PAGE 60-1)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

Wait for 90 seconds after disconnecting the cable to prevent the airbag working.

3. **REMOVE FRONT RH SEAT ASSY (SEE PAGE 72-20)**



4. **REMOVE OCCUPANT CLASSIFICATION ECU**

- (a) Disconnect the 2 connectors from the occupant classification ECU.
- (b) Using a screwdriver, remove the occupant classification ECU.

5. **INSTALL OCCUPANT CLASSIFICATION ECU**

- (a) Check that the ignition switch is off.
- (b) Check that the battery negative (-) terminal is disconnected.

CAUTION:

After removing the terminal, wait for at least 90 seconds before starting the operation.

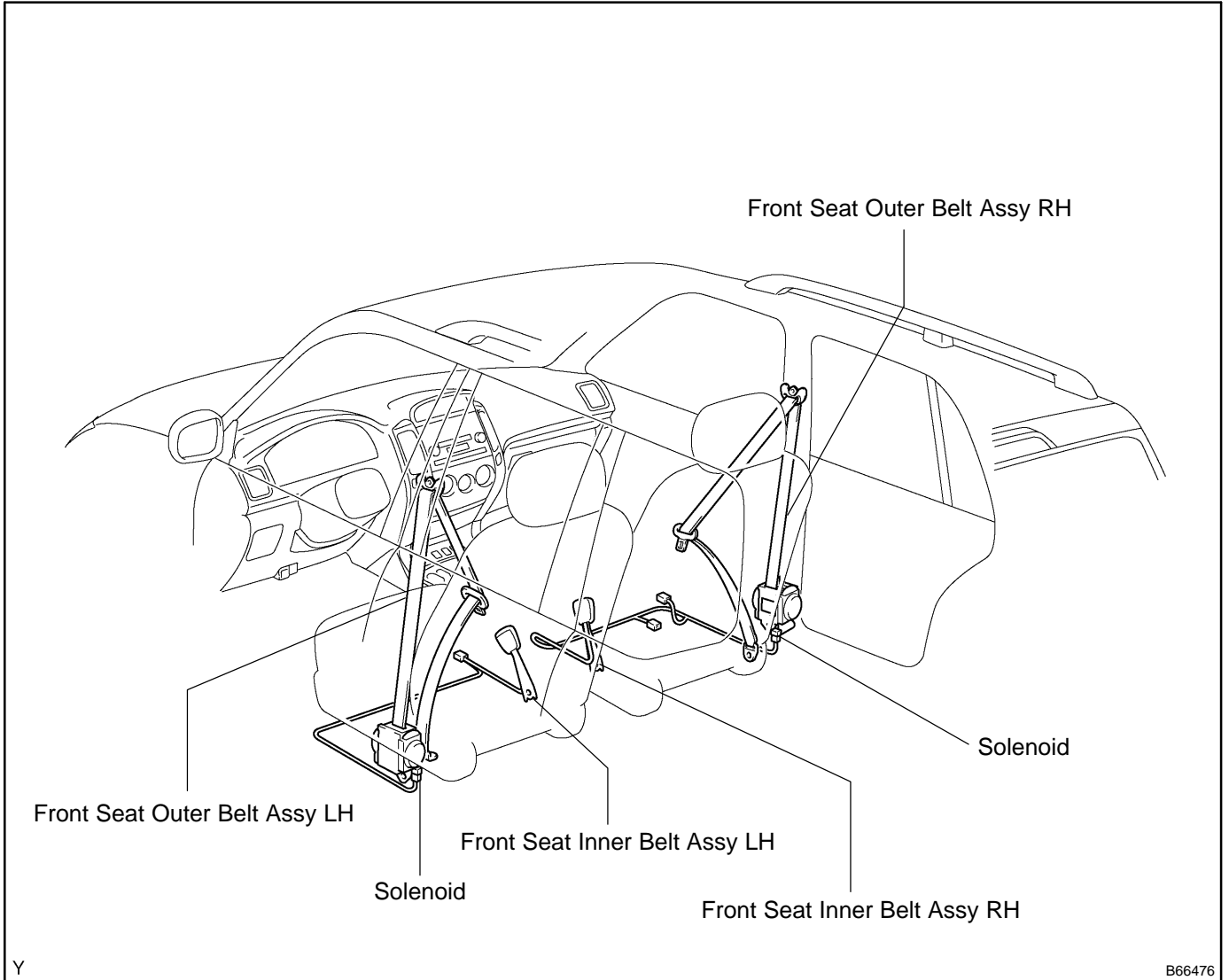
- (c) Install the occupant classification ECU.
- (d) Connect the 2 connectors to the occupant classification ECU.

NOTICE:

- If the occupant classification ECU has been dropped, or there are cracks, dents or other defects in the case or connector, replace it with a new one.
 - When installing the occupant classification ECU, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.
6. **INSTALL FRONT RH SEAT ASSY (SEE PAGE 72-20)**
 7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
 8. **INSPECT SRS WARNING LIGHT (SEE PAGE 05-1213)**

SEAT BELT TENSION REDUCER SYSTEM LOCATION

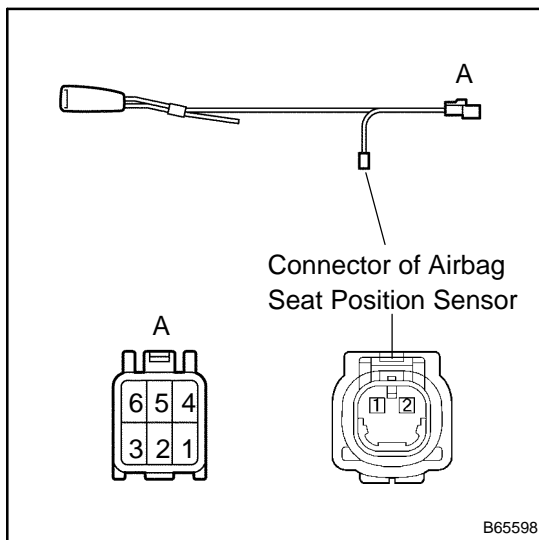
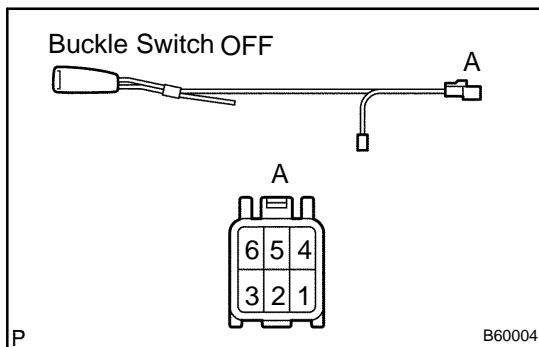
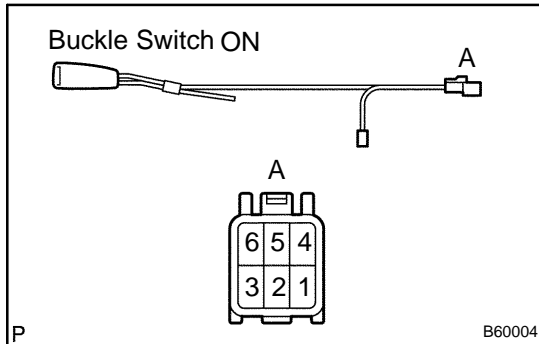
610C2-01



PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Tension reducer for driver side seat belt does not operate	<ol style="list-style-type: none"> 1. GAUGE fuse 2. Front seat inner belt assy LH 3. Front seat outer belt assy LH 4. Wire harness 	<p style="text-align: center;">—</p> <p style="text-align: center;">61-3</p> <p style="text-align: center;">61-3</p> <p style="text-align: center;">—</p>
Tension reducer for passenger side seat belt does not operate	<ol style="list-style-type: none"> 1. GAUGE fuse 2. Front seat inner belt assy RH 3. Front seat outer belt assy RH 4. Wire harness 	<p style="text-align: center;">—</p> <p style="text-align: center;">61-3</p> <p style="text-align: center;">61-3</p> <p style="text-align: center;">—</p>

INSPECTION



1. INSPECT FRONT SEAT INNER BELT ASSY LH

- (a) Inspect the buckle switch.
- (1) Fasten the seat belt (Buckle switch is ON).
 - (2) Check the continuity or resistance between the terminals.

Standard:

Terminal No.	Specified Condition
A-1 ↔ A-4	1,330 Ω
A-1 ↔ A-6	Continuity

- (3) Release the seat belt (Buckle switch is OFF).
- (4) Check the continuity or resistance between the terminals.

Standard:

Terminal No.	Specified Condition
A-1 ↔ A-4	330 Ω
A-1 ↔ A-6	No continuity

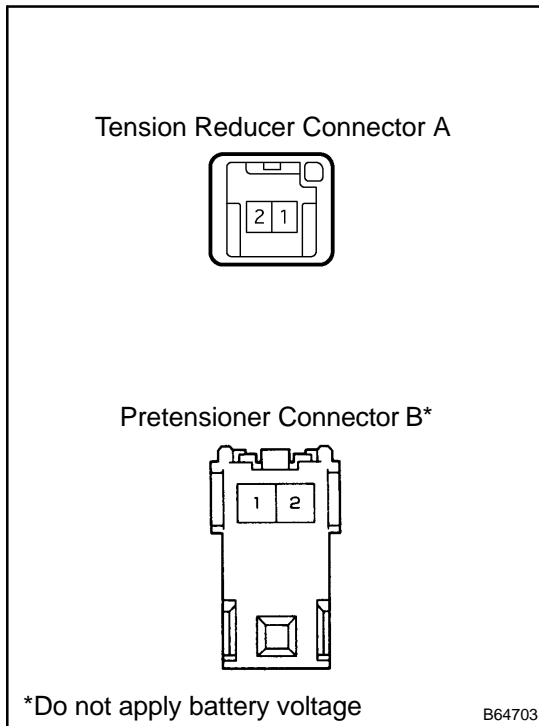
If the result is not as specified, replace the inner belt assy.

- (b) Inspect the circuit for the airbag seat position sensor.
- (1) Check the continuity between the terminals of connector A and the connector of the airbag seat position sensor.

Standard:

Terminal No.	Specified Condition
A-5 ↔ 1 (Connector of airbag seat position sensor)	Continuity
A-3 ↔ 2 (Connector of airbag seat position sensor)	

If the result is not as specified, replace the inner belt assy.



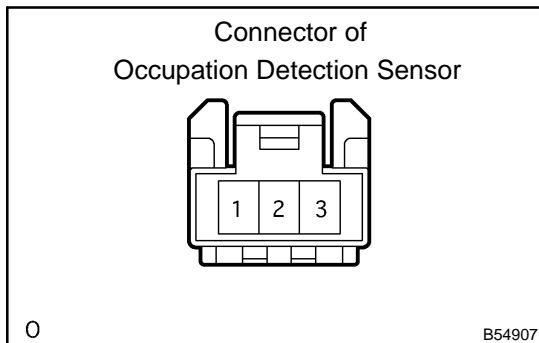
2. INSPECT FRONT SEAT OUTER BELT ASSY LH

NOTICE:

Do not apply battery voltage to the pretensioner connector.

- (a) Inspect operation of the tension reducer.
 - (1) Connect the positive (+) lead from the battery to terminal 1 of connector A and the negative (-) lead to terminal 2.
 - (2) Check that the operating noise that the magnetized solenoid is attracting the plunger is heard.
 - (3) Check that the rewinding volume of the seat belt increases when the seat belt is pulled out and the battery negative (-) lead is disconnected.

If the result is not as specified, replace the outer belt assy.



3. INSPECT FRONT SEAT INNER BELT ASSY RH

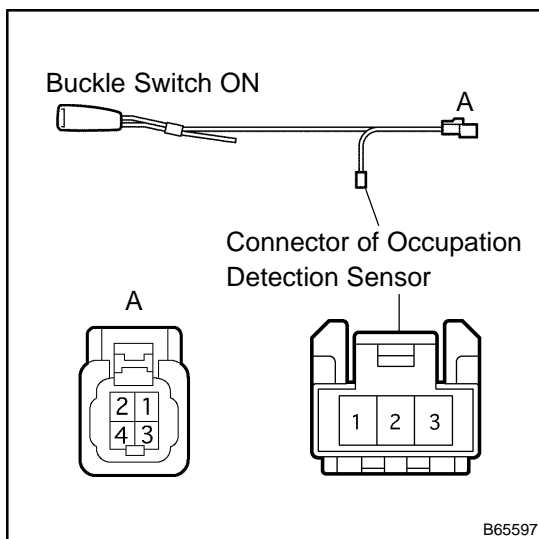
- (a) Inspect the buckle switch.
 - (1) Short the circuit between connector terminals 1 and 3 of the occupation detection sensor (Seat is occupied).

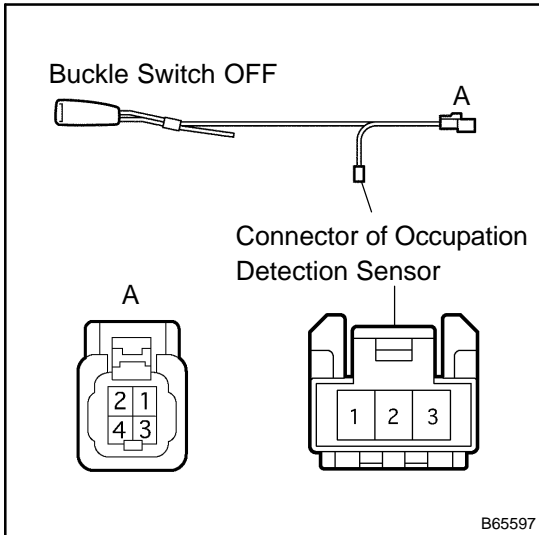
- (2) Fasten the seat belt (Buckle switch is ON).

- (3) Check the continuity between the terminals.

Standard:

Terminal No.	Specified Condition
A-2 ⇔ A-3	No Continuity
A-4 ⇔ A-3	No continuity
A-2 ⇔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ⇔ 3 (Connector of occupation detection sensor)	No continuity
A-4 ⇔ 3 (Connector of occupation detection sensor)	Continuity





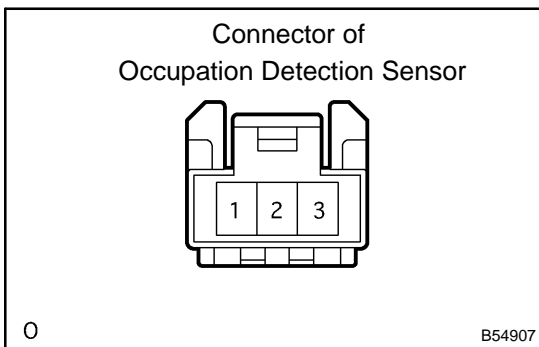
(4) Release the seat belt (Buckle switch is OFF).

(5) Check the continuity between the terminals.

Standard:

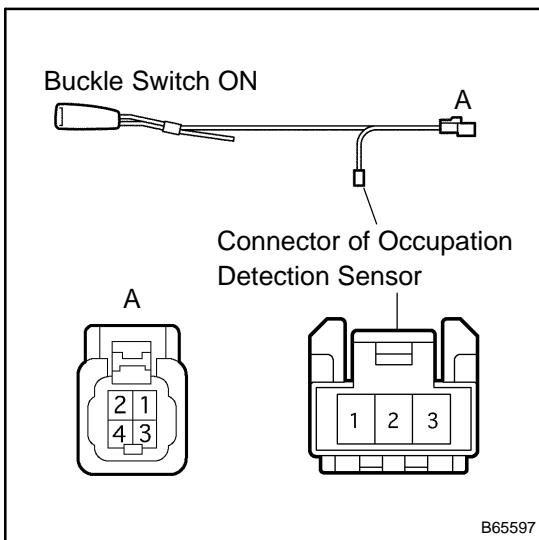
Terminal No.	Specified Condition
A-2 ↔ A-3	Continuity
A-3 ↔ A-4	Continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	Continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

If the result is not as specified, replace the inner belt assy.



(b) Inspect the buckle switch.

(1) Disconnect the occupation detection sensor connector (Seat is not occupied).

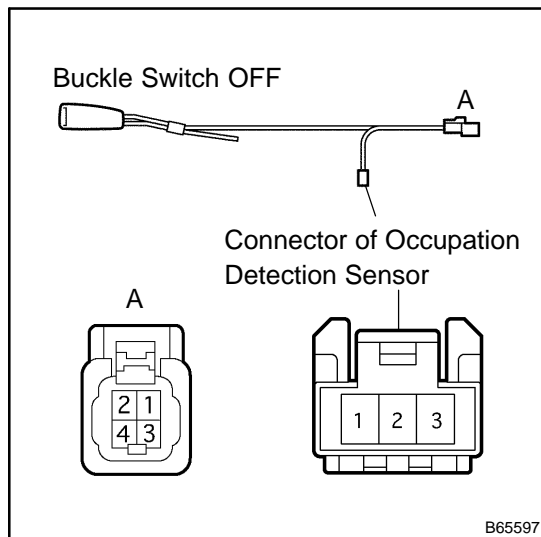


(2) Fasten the seat belt (Buckle switch is ON).

(3) Check the continuity between the terminals.

Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	No continuity
A-4 ↔ A-3	No continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	No continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

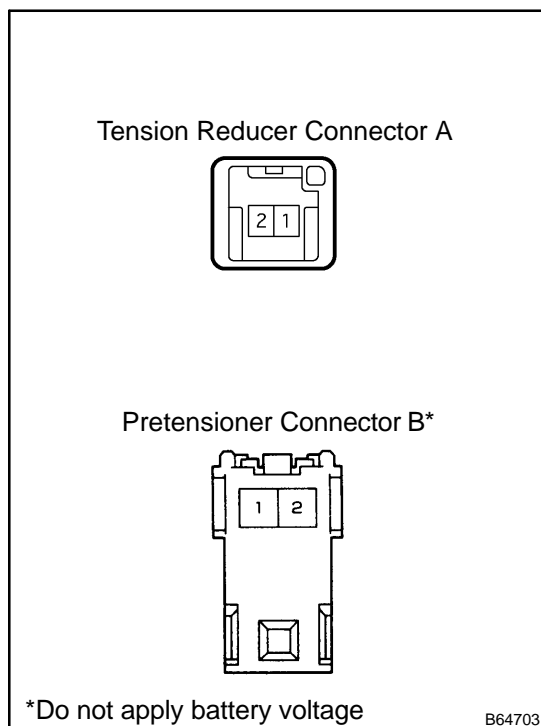


- (4) Release the seat belt (Buckle switch is OFF).
- (5) Check the continuity between the terminals.

Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	No continuity
A-3 ↔ A-4	Continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	Continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

If the result is not as specified, replace the inner belt assy.

**4. INSPECT FRONT SEAT OUTER BELT ASSY RH****NOTICE:**

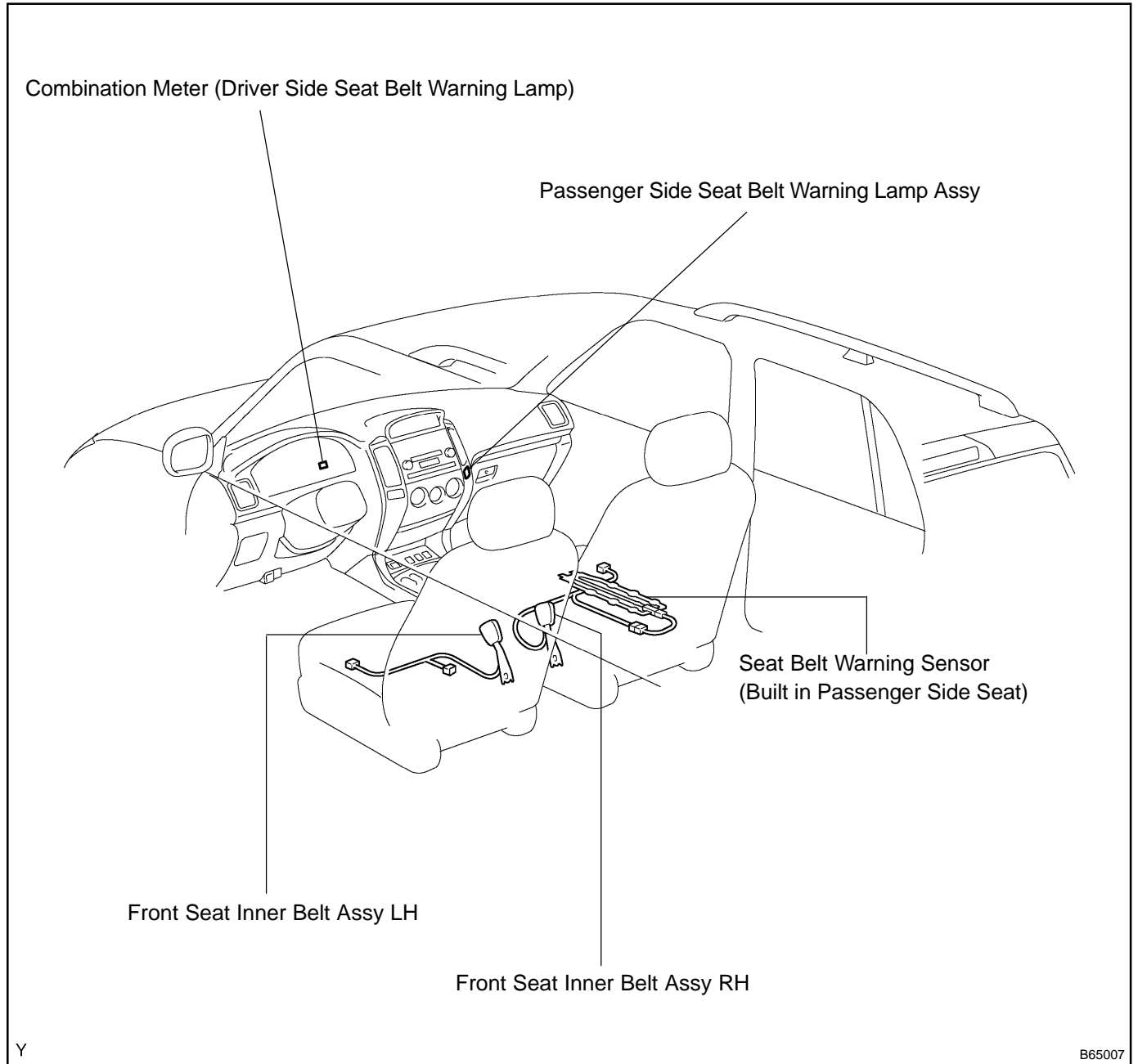
Do not apply battery voltage to the pretensioner connector.

- (a) Inspect operation of the tension reducer.
 - (1) Connect the positive (+) lead from the battery to terminal 1 of connector A and the negative (-) lead to terminal 2.
 - (2) Check that the operating noise of the magnetized solenoid attracting the plunger is heard.
 - (3) Check that the rewinding volume of the seat belt increases when the seat belt is pulled out and the battery negative (-) lead is disconnected.

If the result is not as specified, replace the outer belt assy.

SEAT BELT WARNING SYSTEM LOCATION

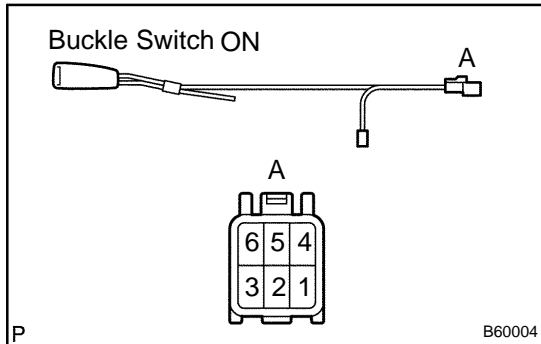
610CC-01



PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Driver side seat belt warning lamp does not light up	<ol style="list-style-type: none"> 1. Fuse 2. IG1 relay 3. Combination meter 4. Airbag sensor assembly center 5. Front seat inner belt assembly LH 6. Wire harness 	<p style="text-align: center;">-</p> <p style="text-align: center;">-</p> <p style="text-align: center;">71-24</p> <p style="text-align: center;">60-55</p> <p style="text-align: center;">61-9</p> <p style="text-align: center;">-</p>
Passenger side seat belt warning lamp does not light up	<ol style="list-style-type: none"> 1. Fuse 2. IG1 relay 3. Instrument panel garnish sub-assy RH 4. Front seat inner belt assembly RH 5. Wire harness 6. Combination meter 	<p style="text-align: center;">-</p> <p style="text-align: center;">-</p> <p style="text-align: center;">71-9</p> <p style="text-align: center;">61-9</p> <p style="text-align: center;">-</p> <p style="text-align: center;">71-24</p>

INSPECTION

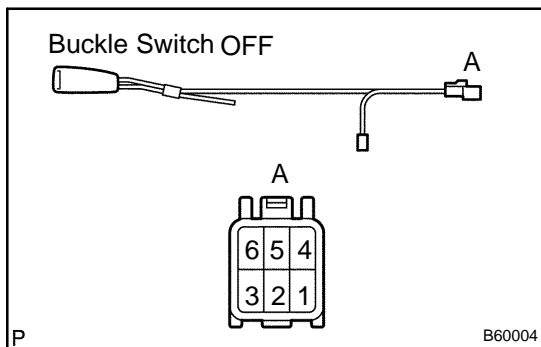


1. INSPECT FRONT SEAT INNER BELT ASSY LH

- (a) Inspect the buckle switch.
- (1) Fasten the seat belt (Buckle switch is ON).
 - (2) Check the continuity or resistance between the terminals.

Standard:

Terminal No.	Specified Condition
A-1 ↔ A-4	1,330 Ω
A-1 ↔ A-6	Continuity

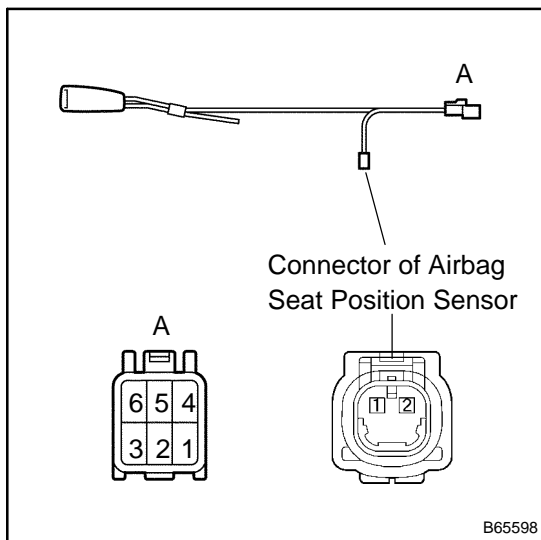


- (3) Release the seat belt (Buckle switch is OFF).
- (4) Check the continuity or resistance between the terminals.

Standard:

Terminal No.	Specified Condition
A-1 ↔ A-4	330 Ω
A-1 ↔ A-6	No continuity

If the result is not as specified, replace the inner belt assy.

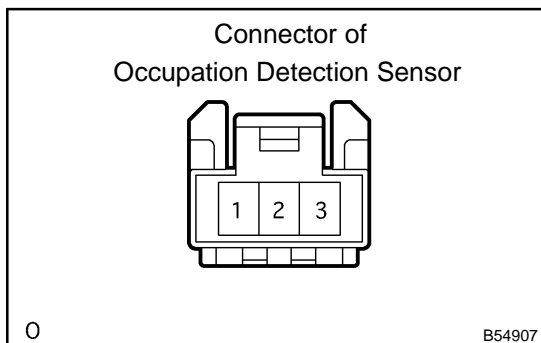


- (b) Inspect the circuit for the airbag seat position sensor.
- (1) Check the continuity between the terminals of connector A and the connector of the airbag seat position sensor.

Standard:

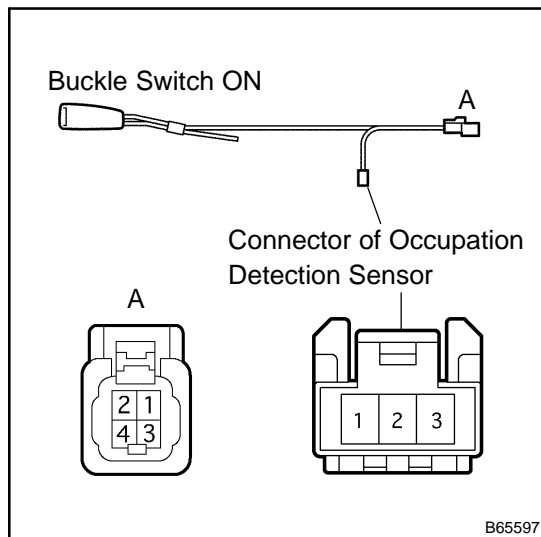
Terminal No.	Specified Condition
A-5 ↔ 1 (Connector of airbag seat position sensor)	Continuity
A-3 ↔ 2 (Connector of airbag seat position sensor)	

If the result is not as specified, replace the inner belt assy.



2. INSPECT FRONT SEAT INNER BELT ASSY RH

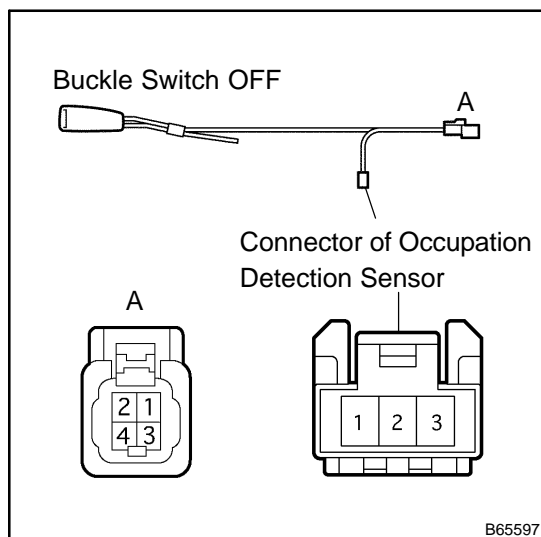
- (a) Inspect the buckle switch.
- (1) Short the circuit between connector terminals 1 and 3 of the occupation detection sensor (Seat is occupied).



- (2) Fasten the seat belt (Buckle switch is ON).
- (3) Check the continuity between the terminals.

Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	No Continuity
A-4 ↔ A-3	No continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	No continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

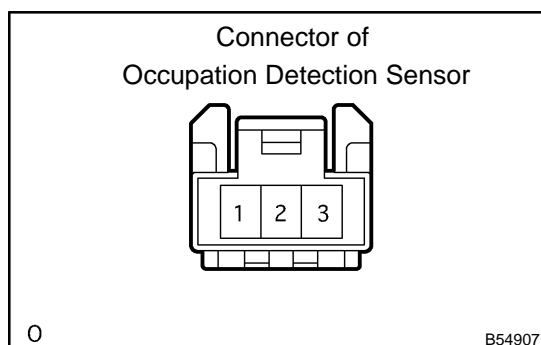


- (4) Release the seat belt (Buckle switch is OFF).
- (5) Check the continuity between the terminals.

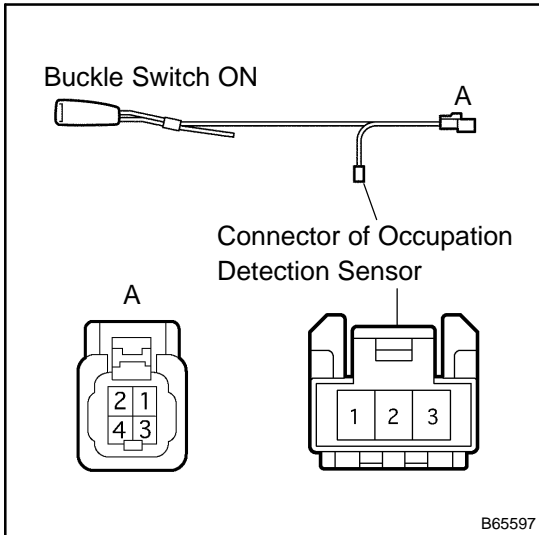
Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	Continuity
A-3 ↔ A-4	Continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	Continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

If the result is not as specified, replace the inner belt assy.



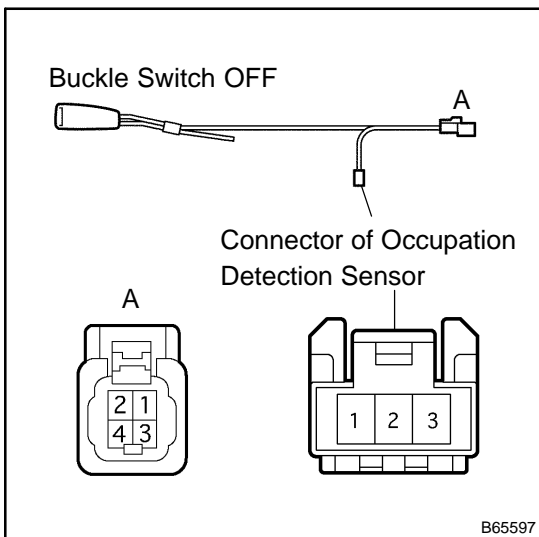
- (b) Inspect the buckle switch.
 - (1) Disconnect the occupation detection sensor connector (Seat is not occupied).



- (2) Fasten the seat belt (Buckle switch is ON).
- (3) Check the continuity between the terminals.

Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	No continuity
A-4 ↔ A-3	No continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	No continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity



- (4) Release the seat belt (Buckle switch is OFF).
- (5) Check the continuity between the terminals.

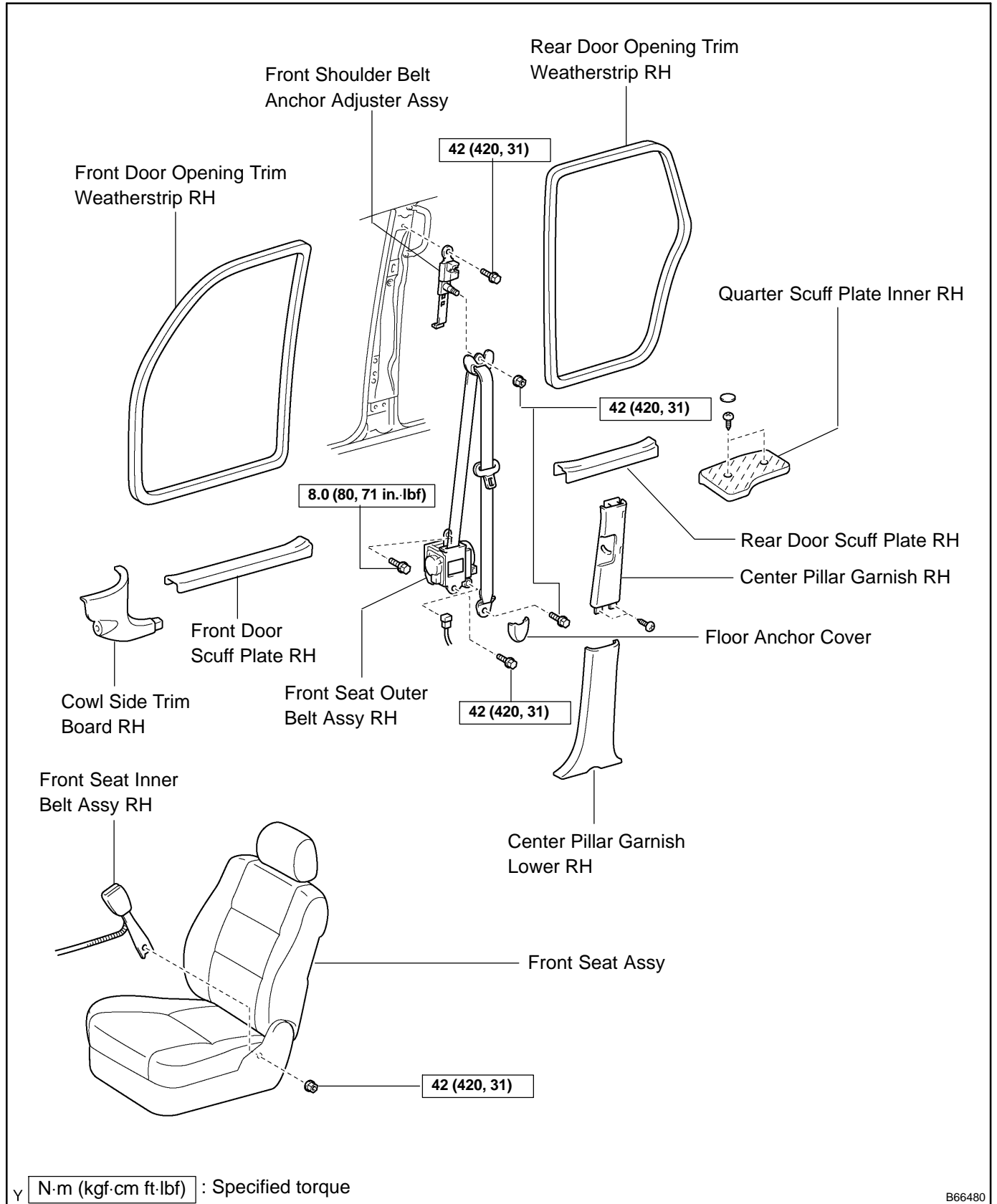
Standard:

Terminal No.	Specified Condition
A-2 ↔ A-3	No continuity
A-3 ↔ A-4	Continuity
A-2 ↔ 1 (Connector of occupation detection sensor)	Continuity
A-3 ↔ 3 (Connector of occupation detection sensor)	Continuity
A-4 ↔ 3 (Connector of occupation detection sensor)	Continuity

If the result is not as specified, replace the inner belt assy.

FRONT SEAT BELT COMPONENTS

610C9-01



REPLACEMENT

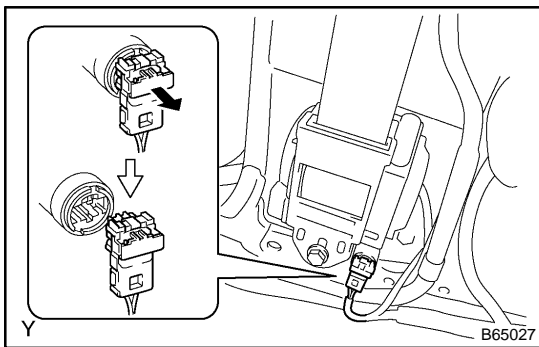
HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the LH side, use the same procedures as on the RH side.
1. **DISCONNECT BATTERY NEGATIVE TERMINAL**
 2. **REMOVE FRONT SEAT ASSY (See page 72-20)**
 3. **REMOVE FRONT SEAT INNER BELT ASSY RH**
 - (a) Remove the nut and inner belt.
 4. **REMOVE FRONT DOOR SCUFF PLATE RH (See page 76-38)**
 5. **REMOVE COWL SIDE TRIM BOARD RH (See page 76-38)**
 6. **REMOVE QUARTER SCUFF PLATE INNER RH (See page 76-38)**
 7. **REMOVE REAR DOOR SCUFF PLATE RH (See page 76-38)**
 8. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH**
 9. **REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH**
 10. **REMOVE CENTER PILLAR GARNISH LOWER RH (See page 76-38)**
 11. **REMOVE CENTER PILLAR GARNISH RH (See page 76-38)**

12. REMOVE FRONT SEAT OUTER BELT ASSY RH

NOTICE:

- Removal operation concerning the seat belt with the pretensioner must be started when 90 seconds or more have passed after the ignition switch is turned OFF and the battery negative terminal is disconnected.
 - Carefully read the notices for the "pretensioner" in the SRS airbag system section and the front seat outer belt assy section.
- (a) Remove the nut and the outer belt on the shoulder anchor side.
 - (b) Disconnect the pretensioner connector, as shown in the illustration.
 - (c) Disconnect the tension reducer connector.
 - (d) Remove the 2 bolts on the retractor side and thoroughly remove the outer belt assy.

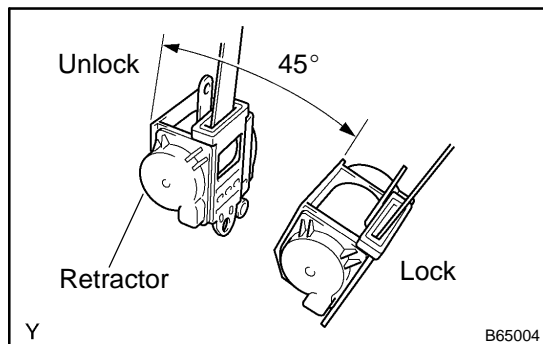


13. REMOVE FRONT SHOULDER BELT ANCHOR ADJUSTER ASSY

- (a) Remove the bolt and anchor adjuster assy.

14. INSTALL FRONT SHOULDER BELT ANCHOR ADJUSTER ASSY

- (a) Install the adjuster assy with the bolt.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)



15. INSTALL FRONT SEAT OUTER BELT ASSY RH

NOTICE:

Do not disassemble the retractor.

- (a) Check the degree of tilt when beginning to lock the ELR.
- (1) Check that the belt does not lock within 15° of tilt in all directions but that the belt locks with over 45° of tilt, when gently moving the retractor.

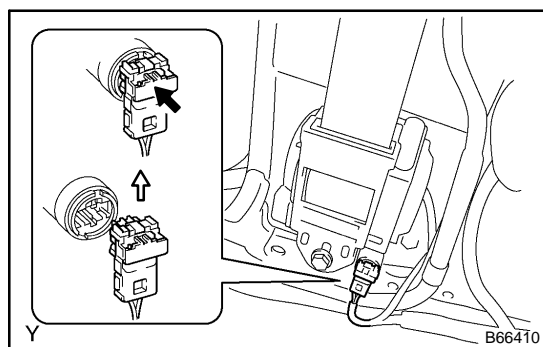
If operation is not as specified, replace the outer belt assy.

- (b) Install the outer belt assy with the 2 bolts on the retractor side.

Torque:

8.0 N·m (80 kgf·cm, 71 in·lbf) for upper bolt

42 N·m (420 kgf·cm, 31 ft·lbf) for lower bolt



- (c) Connect the pretensioner connector, as shown in the illustration.

- (d) Connect the tension reducer connector.

- (e) Install the outer belt assy with the nut on the shoulder anchor side.

Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

- (f) Install the outer belt assy with the bolt on the floor anchor side.

Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

- (g) Install the floor anchor cover.

- (h) Check the ELR lock.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt locks when pulling out the belt quickly when the belt is installed.

If operation is not as specified, replace the outer belt assy.

16. INSTALL FRONT SEAT INNER BELT ASSY RH

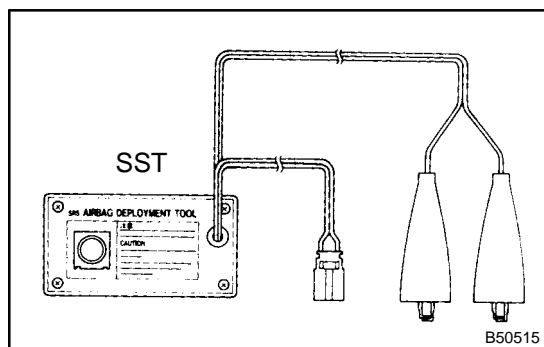
- (a) Install the inner belt assy with the nut.

Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

DISPOSAL

HINT:

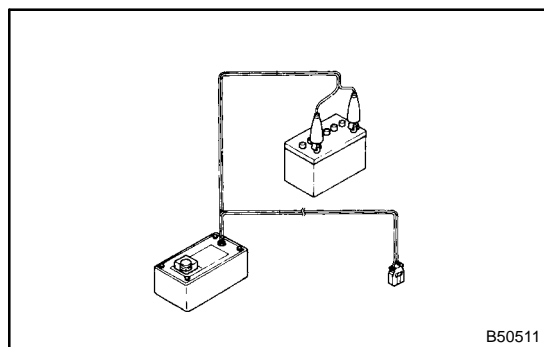
When scrapping vehicles equipped with a seat belt pretensioner or disposing of a front seat outer belt (with seat belt pretensioner), always first activate the seat belt pretensioner in accordance with the procedures described below. If any abnormality occurs in activation of the seat belt pretensioner, contact the SERVICE DEPT. of the TOYOTA MOTOR SALES, U.S.A., INC. When disposing of a front seat outer belt assy (with seat belt pretensioner) that was activated in a collision, follow the same procedures listed in step 1-(e) in "DISPOSAL".



CAUTION:

- Never dispose of a front seat outer belt assy with an inactivated pretensioner.
- The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation outdoors so that it will not be a nuisance to nearby residents.
- When activating a front seat outer belt (with seat belt pretensioner), control operation at least 10 m (33 ft) away from the front seat outer belt.
- Use gloves and safety glasses when handling a front seat belt with an activated pretensioner.
- Always wash your hands with water after completing activation.
- Do not apply water, etc. to a front seat outer belt with an activated pretensioner.
- When activating the seat belt pretensioner, always use the specified SST (SRS airbag deployment tool). Perform operation in a place away from electrical interference.

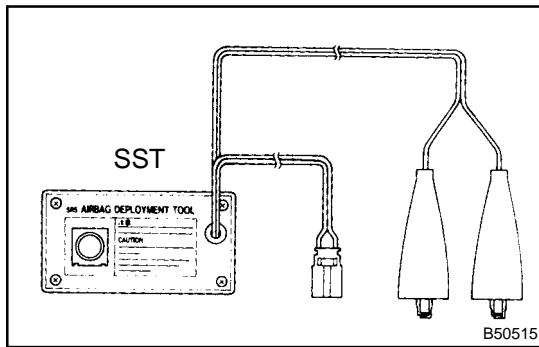
SST 09082-00700



1. DISPOSE OF FRONT SEAT OUTER BELT ASSY RH (WHEN INSTALLED IN VEHICLE)

HINT:

Check that the battery positive voltage is above 12 V.

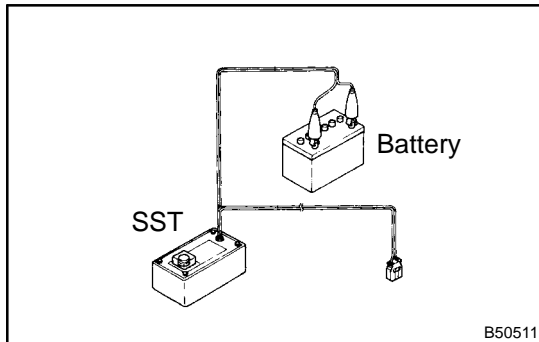


(a) Check the functioning of SST.

CAUTION:

When activating the seat belt pretensioner, always use the specified SST.

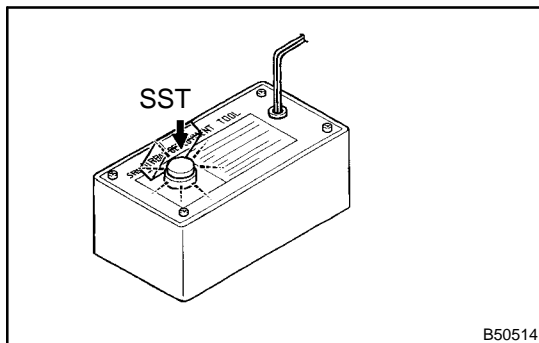
SST 09082-00700, 09082-00770



- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

HINT:

Do not connect the yellow connector which will be connected to the seat belt pretensioner.



- (2) Press the SST activation switch, and check that the LED of the SST activation switch lights up.

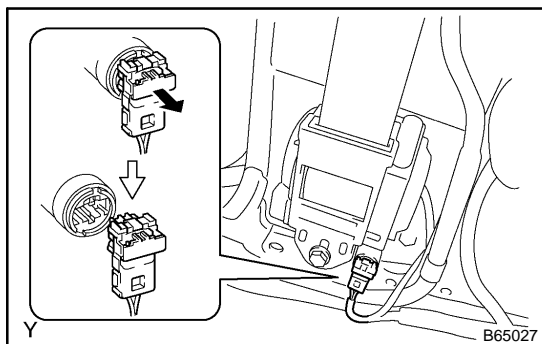
CAUTION:

If the LED lights up when the activation switch is not pressed, the SST may have a malfunction, so do not use the SST.

(b) Disconnect the SST from the battery.

(c) Disconnect the pretensioner connector.

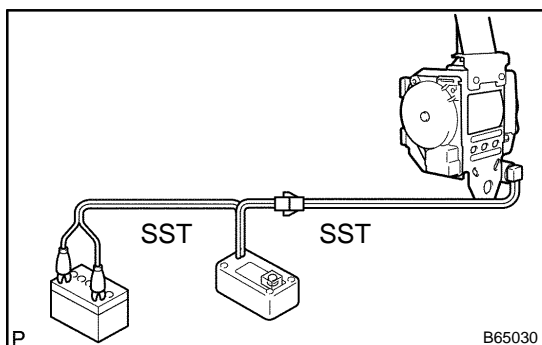
- (1) Disconnect the battery negative (-) terminal.
- (2) Check the SRS airbag system (See page 60-1).
- (3) Remove the front door scuff plate RH (See page 76-38).
- (4) Remove the cowl side trim board RH (See page 76-38).
- (5) Remove the quarter scuff plate inner RH (See page 76-38).
- (6) Remove the rear door scuff plate RH (See page 76-38).
- (7) Remove the front door opening trim weatherstrip RH.
- (8) Remove the rear door opening trim weatherstrip RH.
- (9) Remove the center pillar garnish lower RH (See page 76-38).



(10) Disconnect the pretensioner connector, as shown in the illustration.

(d) Connect SST.

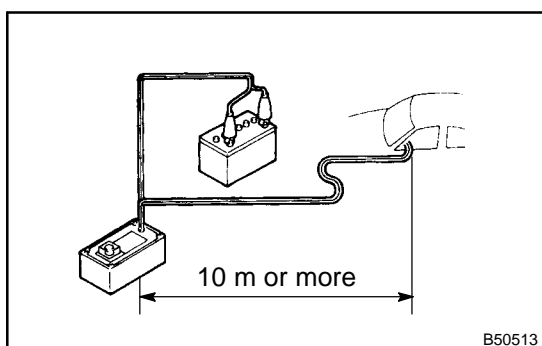
(1) Install the floor anchor of the seat belt.
SST 09082-00700, 09082-00770



(2) Connect SST, then connect them to the seat belt pretensioner.

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(4) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.

(e) Activate the seat belt pretensioner.

(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) of the vehicle.

(2) Press the SST activation switch and activate the seat belt pretensioner.

HINT:

The seat belt pretensioner operates simultaneously with the LED light for the SST activation switch.

(f) Dispose of the outer belt assy (with the seat belt pretensioner).

CAUTION:

- The outer belt is very hot when the seat belt pretensioner is activated, so leave it untouched for at least 30 minutes after the activation.
- Use gloves and safety glasses when handling the outer belt with pretensioner that has been activated.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to an outer belt assy with the pretensioner that has been activated.

HINT:

When scrapping a vehicle, activate the seat belt pretensioner, and then scrap the vehicle with the activated outer belt installed.

2. DISPOSE OF FRONT SEAT OUTER BELT ASSY RH (WHEN NOT INSTALLED IN VEHICLE)

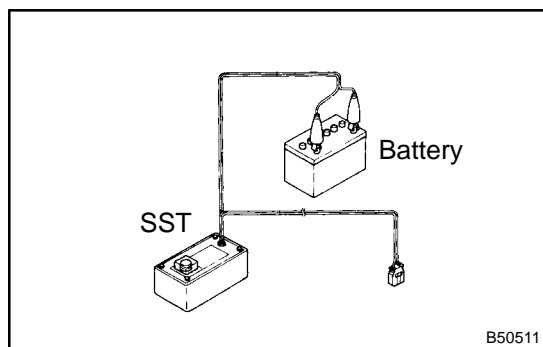
NOTICE:

- When disposing of the front seat outer belt (with the seat belt pretensioner) only, never use the customer's vehicle to activate the seat belt pretensioner.
- Be sure to follow the procedures below when activating the seat belt pretensioner.

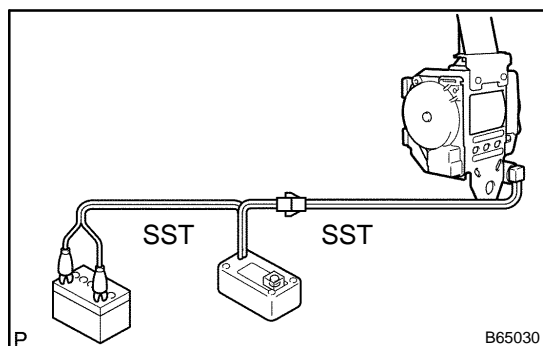
(a) Remove the outer belt assy RH (See page 61-13).

HINT:

Cut the belt near the seat belt retractor.



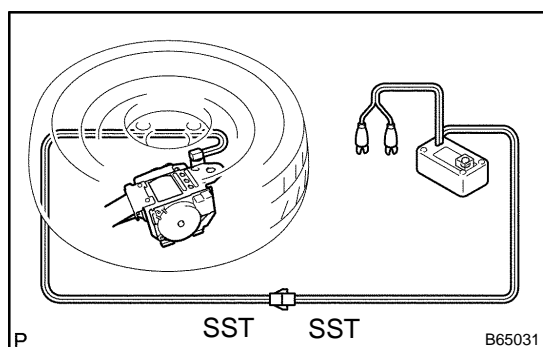
- (b) Check the functioning of SST (See step 1-(a)).
SST 09082-00700, 09082-00770



- (c) Connect SST.
(1) Connect SST, then connect them to the seat belt pretensioner.
SST 09082-00700, 09082-00770

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (2) Place the outer belt assy on the ground and cover it with a tire on a wheel.

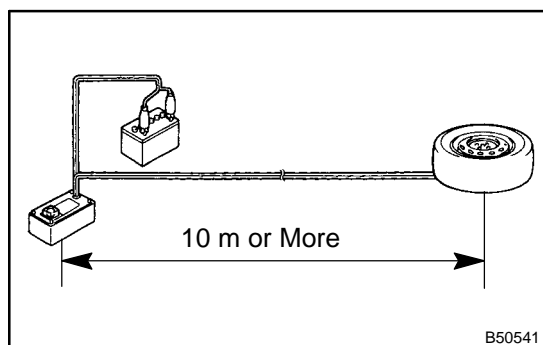
NOTICE:

Place the front seat outer belt assy, as shown in the illustration.

- (3) Move the SST at least 10 m (33 ft) away from the wheel.

NOTICE:

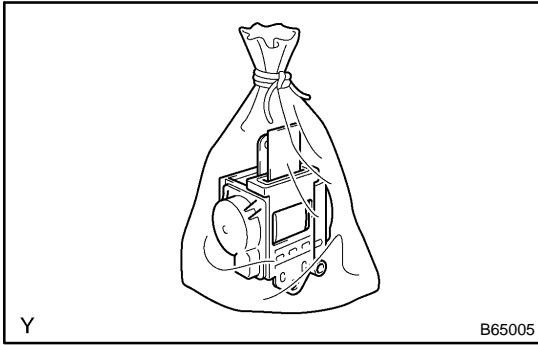
Take care not to damage the SST wire harness.



- (d) Activate the seat belt pretensioner.
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.
(2) Check that no one is within 10 m (33 ft) of the wheel.
(3) Press the SST activation switch and activate the seat belt pretensioner.

HINT:

The seat belt pretensioner operates simultaneously with the LED light for the SST activation switch.



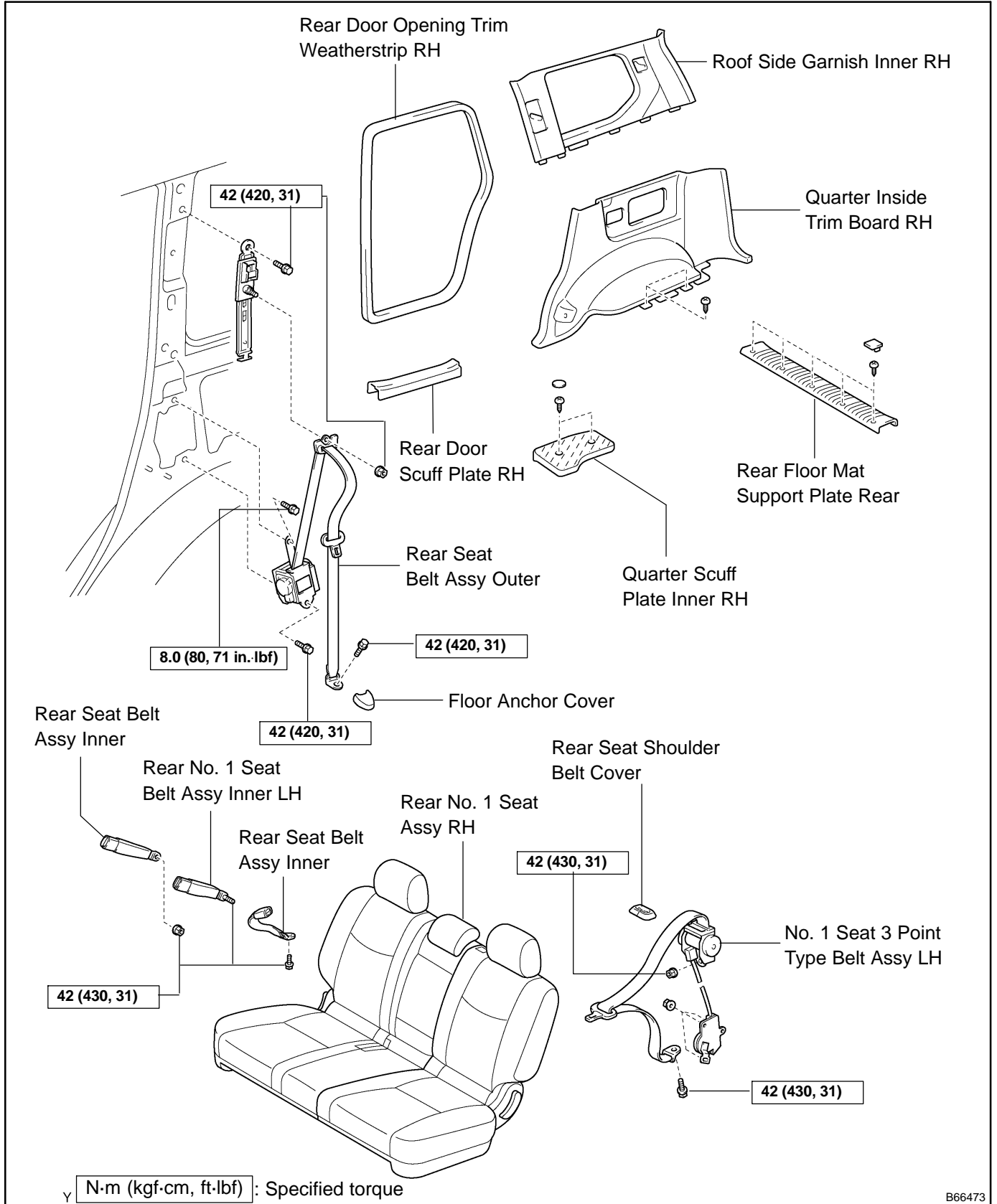
- (e) Dispose of the outer belt assy (with the seat belt pretensioner).

CAUTION:

- **The outer belt assy is very hot when the seat belt pretensioner is activated, so leave it untouched for at least 30 minutes after the activation.**
- **Use gloves and safety glasses when handling the outer belt assy with activated pretensioner.**
- **Always wash your hands with water after completing operation.**
- **Do not apply water, etc. to an outer belt assy with activated pretensioner.**
 - (1) Remove the wheel and SST.
 - (2) Place the outer belt assy in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts.

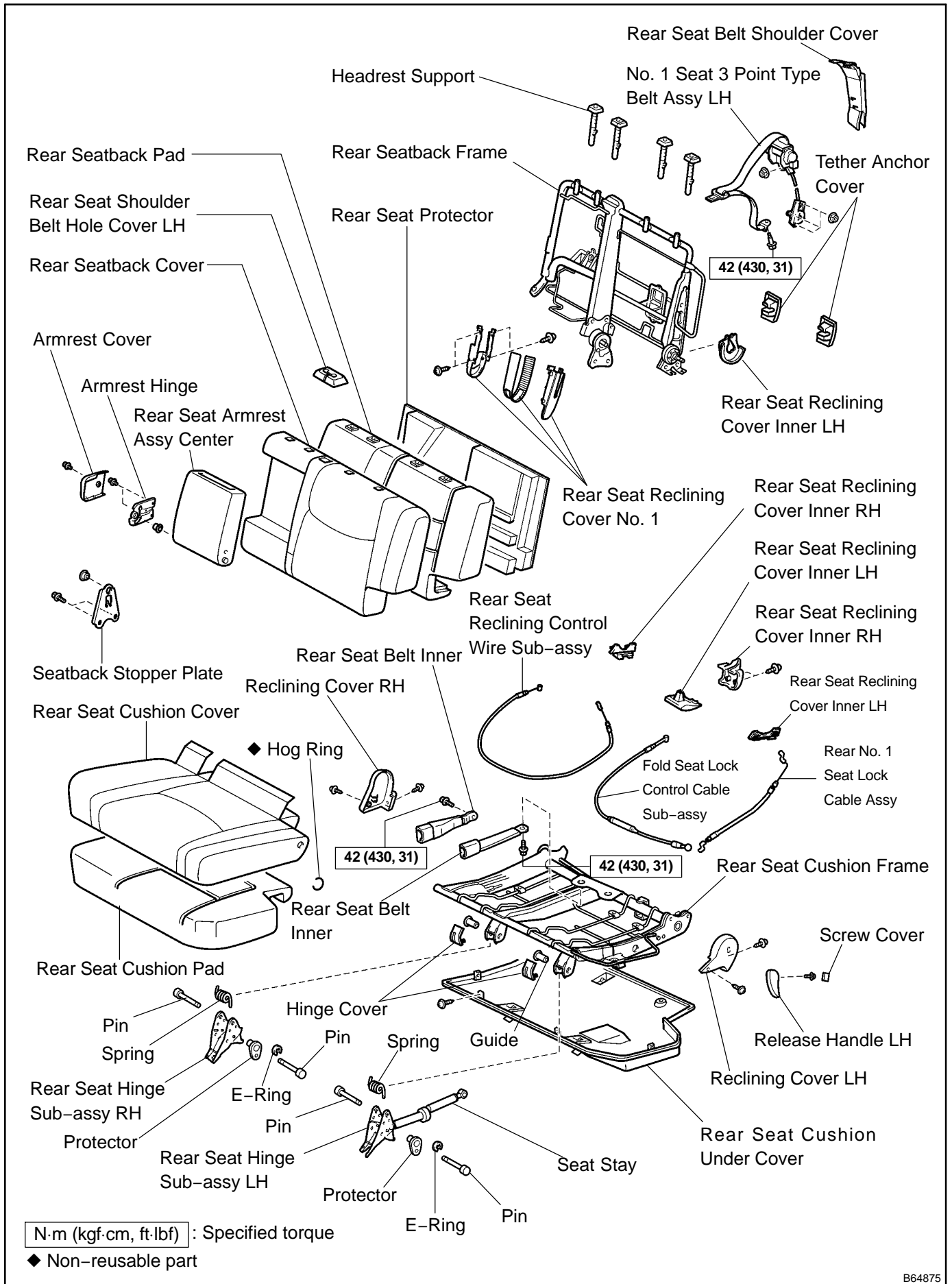
REAR NO.1 SEAT BELT COMPONENTS

610C7-01



B66473

SEAT BELT - REAR NO.1 SEAT BELT

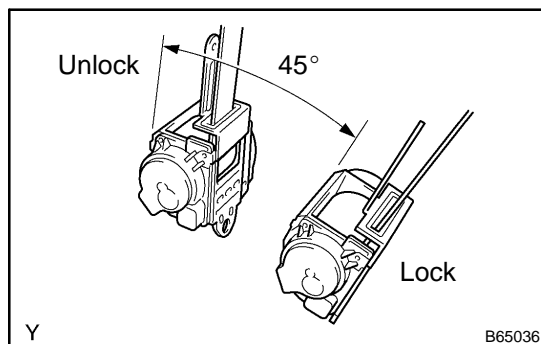


B64875

REPLACEMENT

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the LH side, use the same procedures as on the RH side.
1. **REMOVE REAR NO. 1 SEAT ASSY RH (See page 76-38)**
 2. **REMOVE QUARTER SCUFF PLATE INNER RH (See page 76-38)**
 3. **REMOVE REAR DOOR SCUFF PLATE RH (See page 76-38)**
 4. **REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH**
 5. **REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (See page 76-38)**
 6. **REMOVE QUARTER INSIDE TRIM BOARD RH**
 - (a) Remove the floor anchor cover.
 - (b) Remove the bolt and the seat belt assy outer on the floor anchor side.
 - (c) Remove the trim board (See page 76-38).
 7. **REMOVE ROOF SIDE GARNISH INNER RH (See page 76-38)**
 8. **REMOVE REAR SEAT BELT ASSY OUTER**
 - (a) Remove the bolt and the seat belt assy on the shoulder anchor side.
 - (b) Remove the bolt on the retractor side, and thoroughly remove the seat belt assy.
 9. **REMOVE NO.1 SEAT 3 POINT TYPE BELT ASSY LH**
 - (a) Remove the rear seatback board LH (See page 76-38).
 - (b) Remove the rear seat shoulder belt cover (See page 76-38).
 - (c) Remove the bolt and belt assy on the floor anchor side.
 - (d) Remove the 2 nuts on the retractor side, and thoroughly remove the belt assy.
 10. **REMOVE REAR SEAT BELT ASSY INNER**
 - (a) Remove the bolt and the rear seat belt assy inner.
 11. **REMOVE REAR SEAT BELT ASSY INNER**
 - (a) Remove the bolt and the rear seat belt assy inner.
 12. **REMOVE REAR NO.1 SEAT BELT ASSY INNER LH**
 - (a) Remove the bolt and the rear No. 1 seat belt assy inner LH.
 13. **INSTALL NO.1 SEAT 3 POINT TYPE BELT ASSY LH**
 - (a) Install the belt assy with the 2 nuts on the retractor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)



- (b) Check the degree of tilt when the belt begins to lock the ELR.
 - (1) Check that the belt does not lock within 15° of tilt in all directions but that the belt locks with over 45° of tilt, when gently moving the retractor.
- If operation is not as specified, replace the seat belt assy.
- (c) Install the belt assy with the bolt on the floor anchor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)
 - (d) Check the ELR lock.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt locks when pulling out the belt quickly when the belt is installed.

If operation is not as specified, replace the belt assy outer.

14. INSTALL REAR NO.1 SEAT BELT ASSY INNER LH

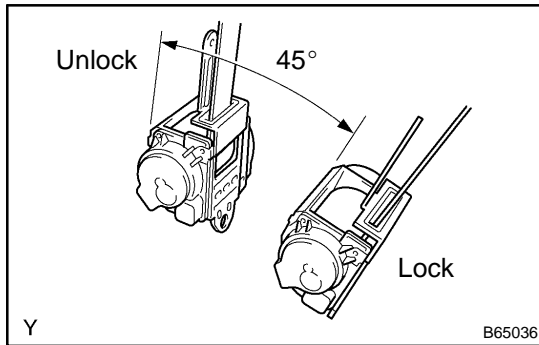
- (a) Install the No. 1 seat belt assy with the bolt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

15. INSTALL REAR SEAT BELT ASSY INNER

- (a) Install the seat belt assy with the bolt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

16. INSTALL REAR SEAT BELT ASSY INNER

- (a) Install the seat belt assy with the bolt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

**17. INSTALL REAR SEAT BELT ASSY OUTER****NOTICE:**

Do not disassemble the retractor.

- (a) Check the degree of tilt when the belt begins to lock the ELR.
 (1) Check that the belt does not lock within 15° of tilt in all directions but that the belt locks with over 45° of tilt, when gently moving the retractor.

If operation is not as specified, replace the belt assy.

- (b) Install the belt assy with the bolt on the retractor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)
 (c) Install the belt assy with the bolt on the floor anchor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)
 (d) Check the ELR lock.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt locks when pulling out the belt quickly when the belt is installed.

If operation is not as specified, replace the belt assy outer.

- (e) Check the fastening function of the child restraint system.

NOTICE:

The check should be performed with the assembly installed.

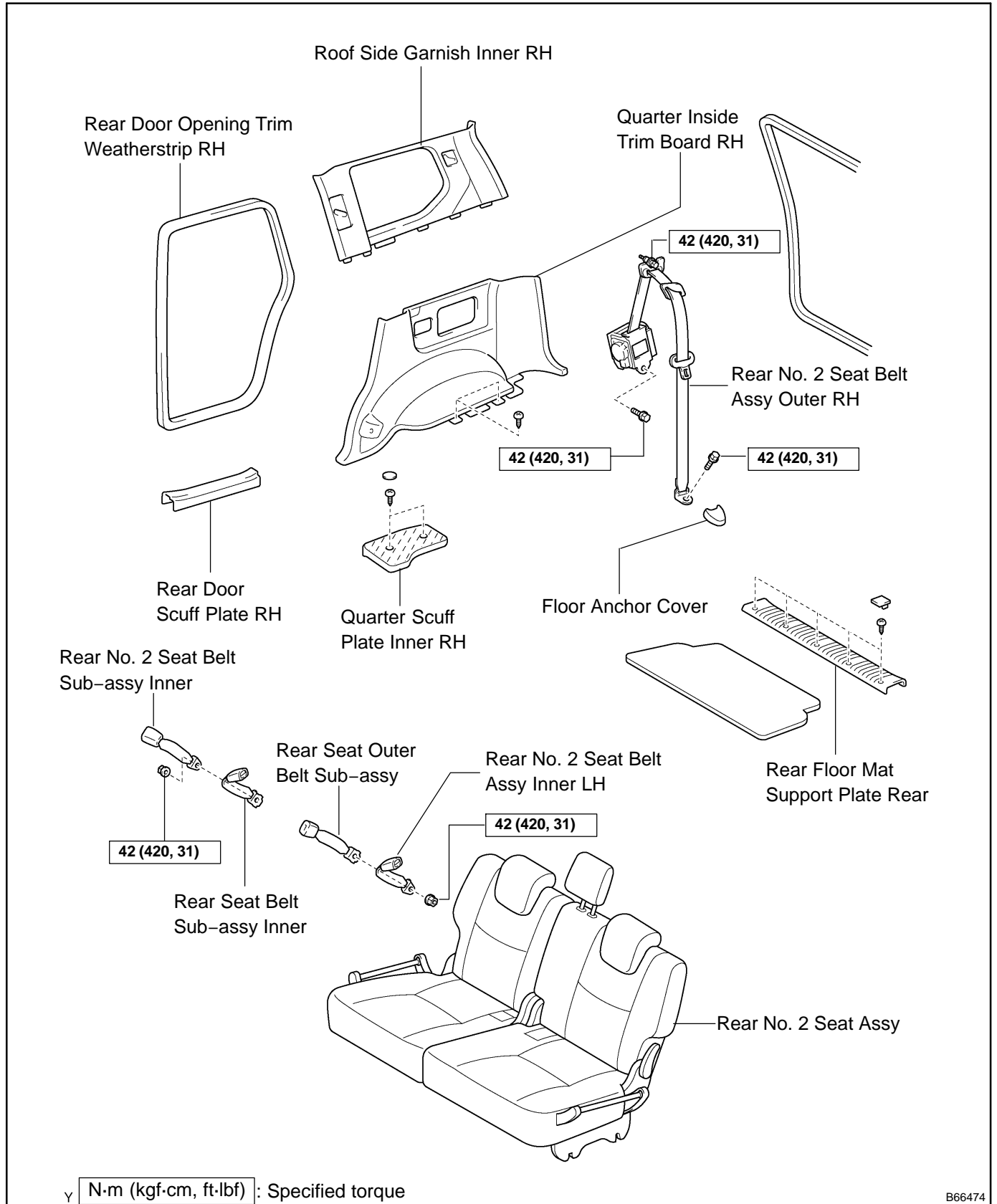
- (1) Check that the belt cannot be pulled out any more but can be rewound after the belt is fully pulled out.
 (2) Check that the belt can be pulled out and rewound after the belt is fully rewound.

If operation is not as specified, replace the belt assy.

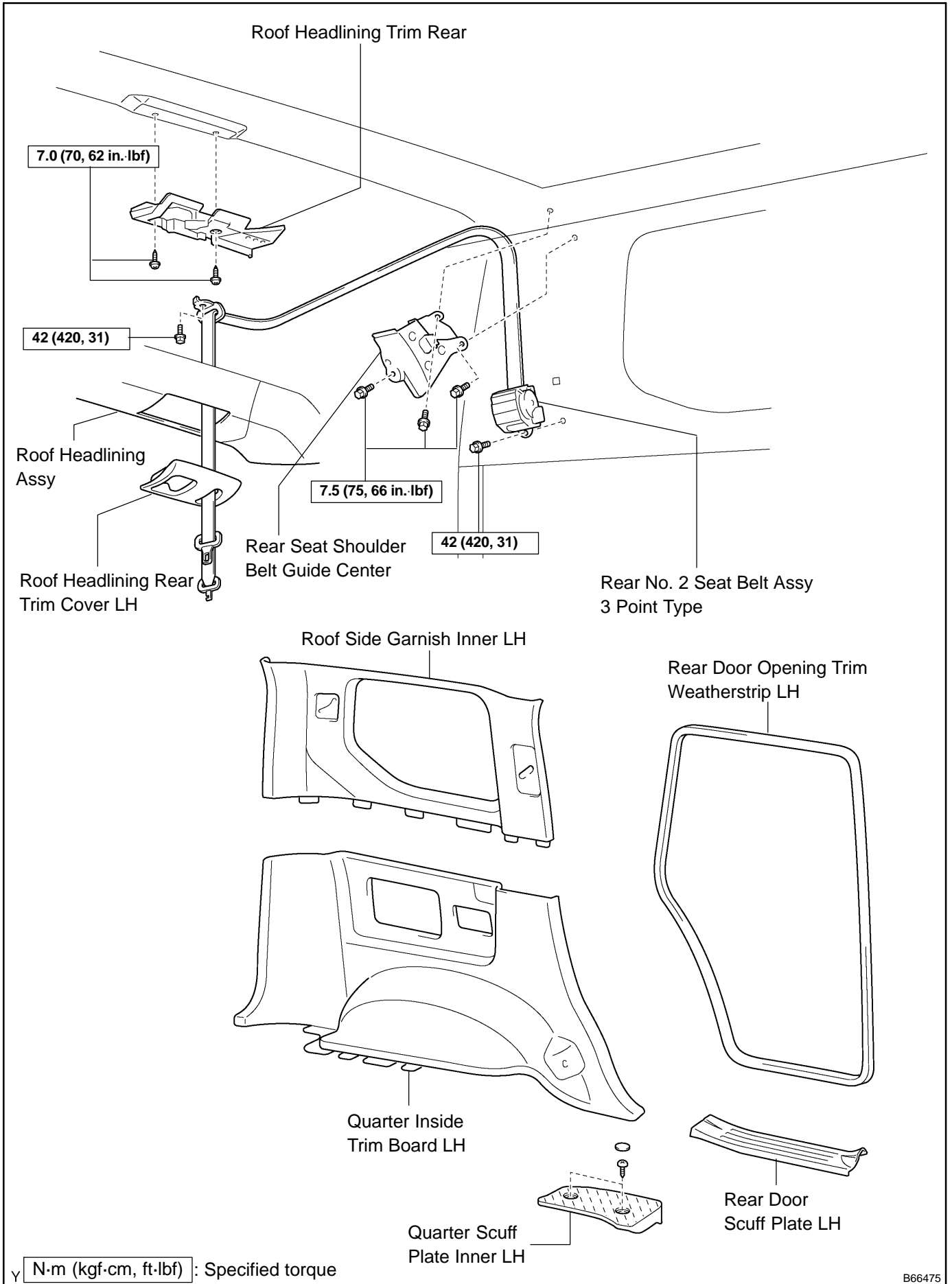
18. INSTALL REAR NO. 1 SEAT ASSY RH (See page 72-36)

REAR NO.2 SEAT BELT COMPONENTS

610C5-01



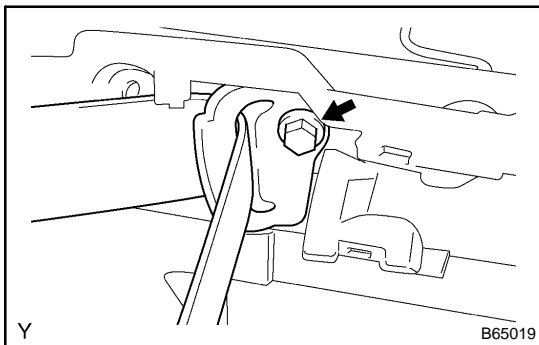
SEAT BELT - REAR NO.2 SEAT BELT



REPLACEMENT

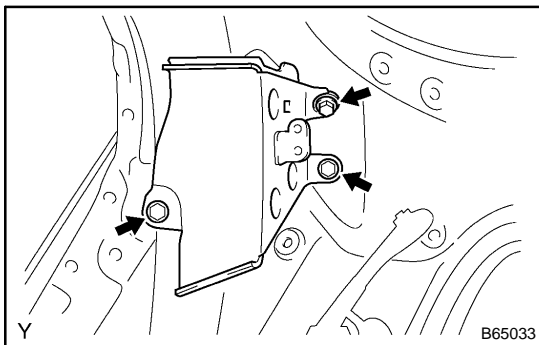
HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the LH side, use the same procedures as on the RH side.
1. **REMOVE REAR NO. 2 SEAT ASSY (See page 72-42)**
 2. **REMOVE ROOF HEADLINING ASSY (See page 76-38)**
 3. **REMOVE REAR NO.2 SEAT BELT ASSY OUTER RH**
 - (a) Remove the floor anchor cover.
 - (b) Remove the bolt and the seat belt assy on the floor anchor side.
 - (c) Remove the bolt and the seat belt assy on the shoulder anchor side.
 - (d) Remove the bolt on the retractor side, and thoroughly remove the seat belt assy.
 4. **REMOVE REAR NO. 2 SEAT BELT SUB-ASSY INNER**
 - (a) Remove the bolt and the rear seat belt sub-assy inner.



5. REMOVE REAR NO.2 SEAT BELT ASSY 3 POINT TYPE

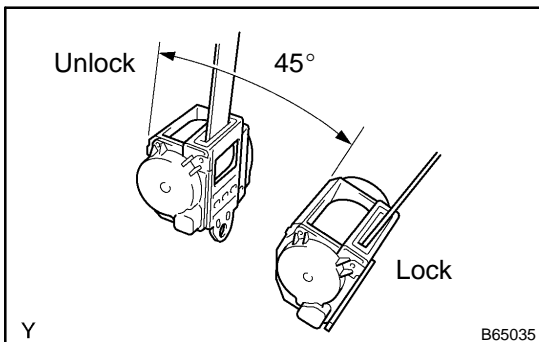
- (a) Remove the bolt on the shoulder anchor side from the roof headlining trim rear.
- (b) Remove the 2 bolts and roof headlining trim rear.
- (c) Remove the bolt and door control receiver.



- (d) Remove the 3 bolts and shoulder belt guide center.
- (e) Remove the bolt on the retractor side and thoroughly remove the seat belt assy.

6. INSTALL REAR NO.2 SEAT BELT ASSY 3 POINT TYPE

- (a) Install the seat belt assy with the bolt on the retractor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)



- (b) Check the degree of tilt when the belt begins to lock the ELR.

- (1) Check the belt does not lock within 15° of tilt in all directions but that the belt locks with over 45° of tilt, when gently moving the retractor.

If operation is not as specified, replace the seat belt assy.

- (c) Check the ELR lock.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt locks when pulling out the belt quickly when the belt is installed.

If operation is not as specified, replace the belt assy.

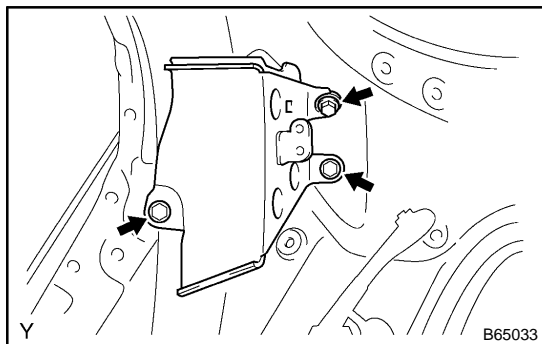
- (d) Check the fastening function of the child restraint system.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt cannot be pulled out any more but can be rewound after the belt is fully pulled out.
- (2) Check that the belt can be pulled out and rewound after the belt is fully rewound.

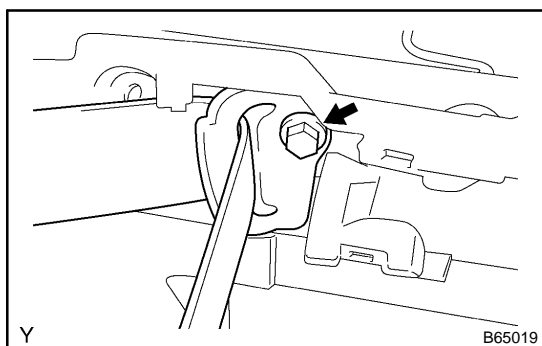
If operation is not as specified, replace the belt assy.



- (e) Install the shoulder belt guide center with the 3 bolts.
Torque: 7.5 N·m (75 kgf·cm, 66 in·lbf)

- (f) Install the door control receiver with the bolt.

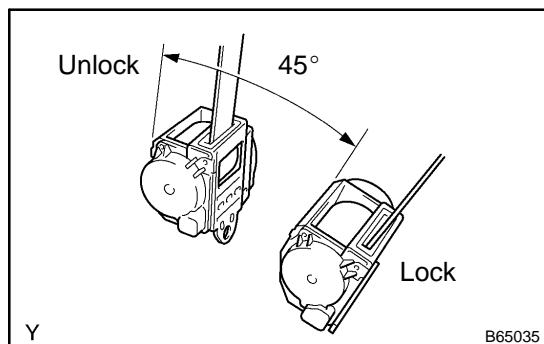
- (g) Install the roof headlining trim rear with the 2 bolts.
Torque: 7.0 N·m (70 kgf·cm, 62 in·lbf)



- (h) Install the seat belt assy with the bolt on the shoulder anchor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

7. INSTALL REAR NO. 2 SEAT BELT SUB-ASSY INNER

- (a) Install the seat belt sub-assy with the bolt.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)



8. INSTALL REAR NO.2 SEAT BELT ASSY OUTER RH

NOTICE:

Do not disassemble the retractor.

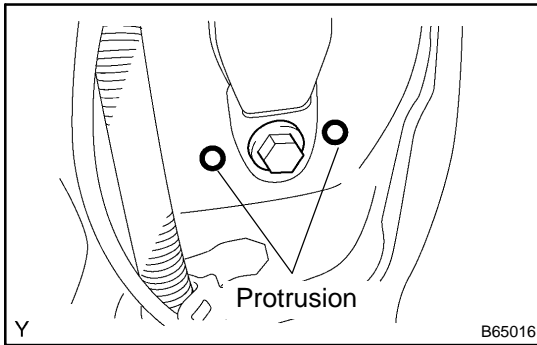
- (a) Check the degree of tilt when the belt begins to lock the ELR.
- (1) Check that the belt does not lock within 15° of tilt in all directions but that the belt locks with over 45° of tilt, when gently moving the retractor.

If operation is not as specified, replace the belt assy.

- (b) Install the belt assy with the bolt on the retractor side.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

- (c) Install the belt assy with the bolt on the shoulder anchor side.

Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)



- (d) Install the belt assy on the floor anchor side with the bolt.
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

NOTICE:

Do not make the anchor part run onto the protrusion part of the floor panel.

- (e) Check the ELR lock.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt locks when pulling out the belt quickly when the belt is installed.

If operation is not as specified, replace the belt assy.

- (f) Check the fastening function of the child restraint system.

NOTICE:

The check should be performed with the assembly installed.

- (1) Check that the belt cannot be pulled out any more but can be rewound after the belt is fully pulled out.
 (2) Check that the belt can be pulled out and rewound after the belt is fully rewound.

If operation is not as specified, replace the belt assy.

9. **INSTALL ROOF HEADLINING ASSY (See page 76-38)**
 10. **INSTALL REAR NO. 2 SEAT ASSY (See page 72-42)**

LIGHTING SYSTEM

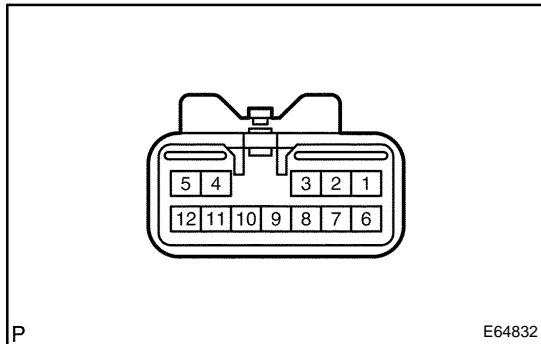
650PD-08

PRECAUTION

1. PRECAUTION OF HEADLIGHT BULB REPLACEMENT

- (a) If the adhered oil is left unremoved from the halogen lamp surface, the lamp service life is shortened as it becomes hot when it is turned on.
- (b) Since the internal pressure of a halogen lamp is high, dropping, hitting or damaging the bulb may cause the glass to scatter. Therefore, handle it with great care.
- (c) When replacing a bulb, do not remove it until a new bulb is prepared because if it is left being removed for a long period of time, the lens may be covered with dirt or moisture.
- (d) Be sure to replace with a bulb of the same watt.
- (e) Firmly reinstall the socket after replacing a bulb. Otherwise, cloudy lens or water leakage will be caused.

ON-VEHICLE INSPECTION



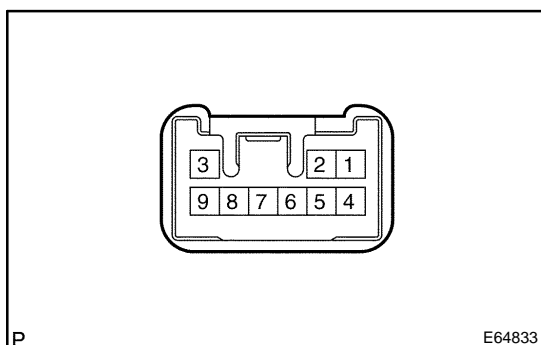
1. INSPECT TURN SIGNAL FLASHER CIRCUIT

- (a) Measure voltage between terminals as shown in the chart below.

Tester connection	Condition	Specified condition
9 - Ground	Always	Continuity
1 - Ground	Turn ignition switch ON	Battery positive voltage
1 - Ground	Turn ignition switch OFF	No voltage
6 - Ground	Always	Battery positive voltage

- (b) Connect the connector to the turn signal flasher and turn the ignition switch to ON. Inspect the wire harness side connector from the back side as shown in the chart.

Tester connection	Condition	Specified condition
2 - Ground	Hazard switch OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
2 - Ground	Turn signal switch (right turn) OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
2 - Ground	Hazard switch ON → OFF	0 V ↔ 10 - 14 V (60 to 120 time per minutes) → 10 - 14 V
3 - Ground	Hazard switch OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
3 - Ground	Turn signal switch (right turn) OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
4 - Ground	Hazard switch OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
4 - Ground	Turn signal switch (left turn) OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
4 - Ground	Turn signal switch (left turn) ON → OFF	0 V ↔ 10 - 14 V (60 to 120 time per minutes) → 10 - 14 V
5 - Ground	Hazard switch OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
5 - Ground	Turn signal switch (left turn) OFF → ON	0 V ↔ 10 - 14 V (60 to 120 time per minutes)
7 - Ground	Turn signal switch (left turn) OFF → ON	10 - 14 V → 0 V
8 - Ground	Turn signal switch (right turn) OFF → ON	10 - 14 V → 0 V
10 - Ground	Hazard switch OFF → ON	10 - 14 V → 0 V
12 - Ground	Turn ignition switch ON and engine OFF → ON	10 - 14 V → 0 V



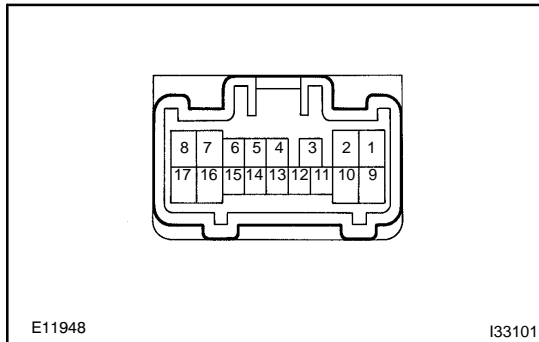
2. INSPECT TOWING CONVERTER RELAY

- (a) Measure voltage between terminals as shown in the chart below.

LIGHTING - LIGHTING SYSTEM

Tester connection	Condition	Specified condition
1 - Ground	Always	Battery positive voltage
2 - Ground	Turn signal switch (right turn) OFF → ON	0V → 10 - 14 V (60 to 120 time per minutes)
2 - Ground	Depress the brake pedal	Battery positive voltage
3 - Ground	Turn signal switch (right turn) OFF → ON	0V → 10 - 14 V (60 to 120 time per minutes)
4 - Ground	Turn signal switch (left turn) OFF → ON	0V → 10 - 14 V (60 to 120 time per minutes)
4 - Ground	Depress the brake pedal	Battery positive voltage
6 - Ground	Always	Continuity
8 - Ground	Depress the brake pedal	Battery positive voltage
9 - Ground	Turn signal switch (left turn) OFF → ON	0V → 10 - 14 V (60 to 120 time per minutes)

INSPECTION

**1. HEADLAMP DIMMER SWITCH ASSY**

(a) Inspect the light control switch continuity.

- (1) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
TAIL	14 - 16	Continuity
HEAD	13 - 16 - 14	Continuity
AUTO	16 - 12	Continuity

(b) Inspect the headlamp dimmer switch continuity.

- (1) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
FLASH	7 - 8 - 16	Continuity
LOW BEAM	16 - 17	Continuity
HI BEAM	7 - 16	Continuity

(c) Inspect the turn signal switch continuity.

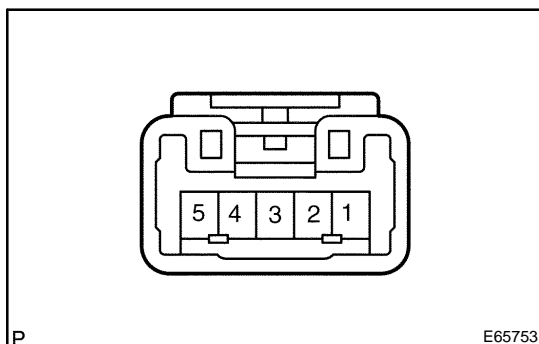
- (1) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
Right turn	2 - 3	Continuity
Neutral	-	No continuity
Left turn	1 - 2	Continuity

(d) Inspect the front fog lamp switch continuity.

- (1) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
ON	10 - 11	Continuity

**2. HAZARD WARNING SIGNAL SWITCH ASSY**

(a) Check continuity between terminals at each switch position as shown in the chart.

Switch operation	Tester connection	Specified condition
OFF	2 - 3	No continuity
ON	2 - 3	Continuity
Illumination circuit	4 - 5	Continuity

(b) Inspect illumination operation.

- (1) Connect the battery positive (+) lead to terminal 4 and the battery negative (-) lead to terminal 5, then check that the illumination comes on.

3. FRONT DOOR COURTESY LAMP SWITCH ASSY

- (a) Inspect courtesy lamp assy continuity.
 - (1) Check continuity between terminals when the switch is operated.

Standard:

ON (When shaft is pressed): No continuity

OFF (When shaft is not pressed): Continuity

4. REAR DOOR COURTESY LAMP SWITCH ASSY

- (a) Inspect courtesy lamp assy continuity.
 - (1) Check continuity between terminal and the switch body when the switch is operated.

Standard:

ON (When shaft is pressed): No continuity

OFF (When shaft is not pressed): Continuity

5. BACK DOOR COURTESY LAMP SWITCH ASSY

- (a) Inspect courtesy lamp assy continuity.
 - (1) Check continuity between terminal and the switch body when the switch is operated.

Standard:

ON (When shaft is pressed): No continuity

OFF (When shaft is not pressed): Continuity

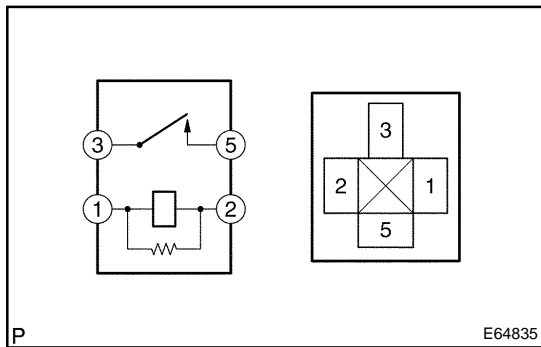
6. GLOVE BOX LAMP SWITCH

- (a) Inspect courtesy lamp assy continuity.
 - (1) Check continuity between terminals when the switch is operated.

Standard:

ON (When shaft is pressed): No continuity

OFF (When shaft is not pressed): Continuity

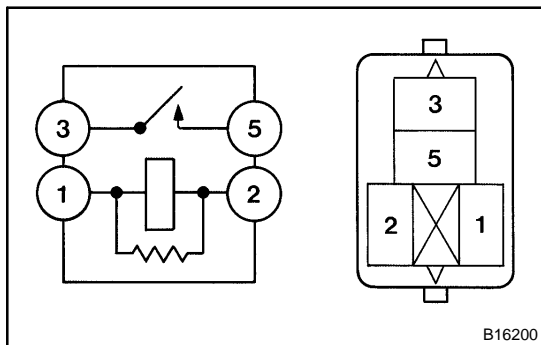


7. HEADLAMP RELAY

- (a) Inspect relay continuity.

Standard:

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

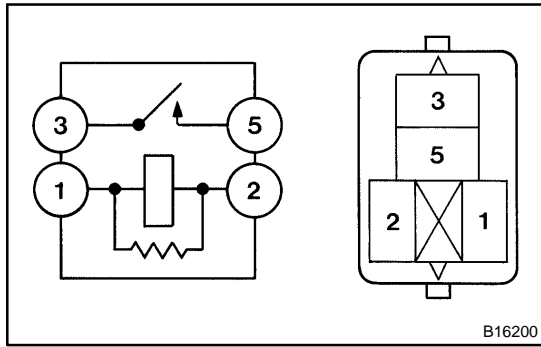


8. TAIL LAMP RELAY

- (a) Inspect relay continuity.

Standard:

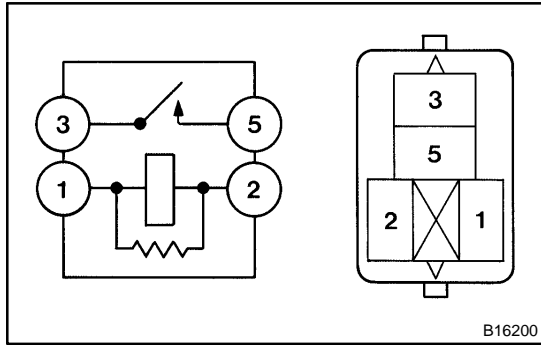
Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity



9. FOG LAMP RELAY

(a) Inspect the relay continuity.

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminals 1 and 2.	3 - 5	Continuity

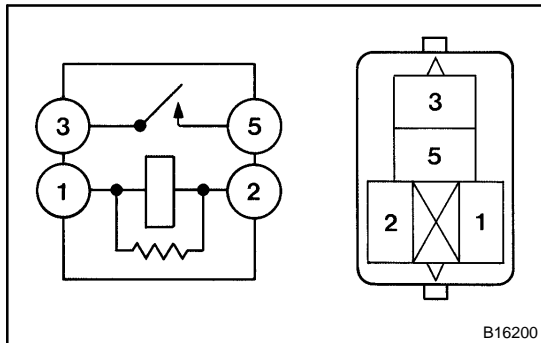


10. ROOM LAMP CONTROL RELAY (DOME RELAY)

(a) Inspect relay continuity.

Standard:

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

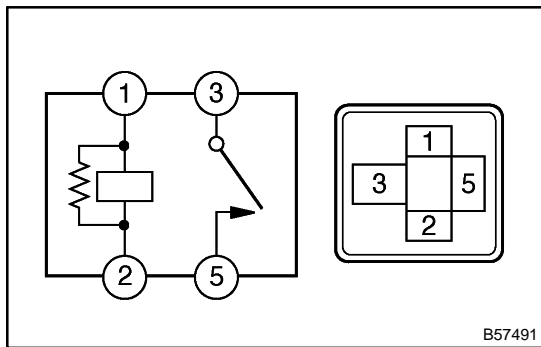


11. PARK/NEUTRAL POSITION SWITCH RELAY (BK/UP RELAY)

(a) Inspect relay continuity.

Standard:

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

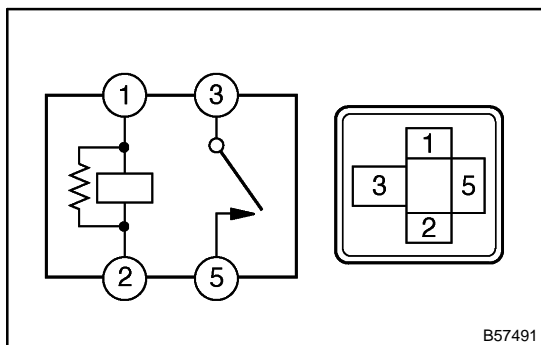


12. TOWING CONVERTER RELAY (BATT CHG RELAY)

(a) Inspect relay continuity.

Standard:

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity

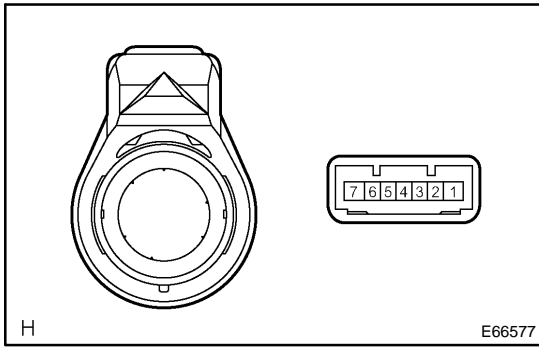


13. TOWING CONVERTER RELAY (TOWING TAIL RELAY)

(a) Inspect relay continuity.

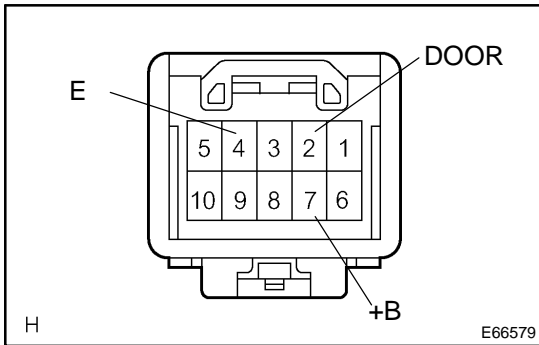
Standard:

Condition	Tester connection	Specified condition
Always	1 - 2	Continuity
Always	3 - 5	No continuity
Apply +B between terminal 1 and 2	3 - 5	Continuity



14. TRANSPONDER KEY AMPLIFIER

- (a) Connect the battery positive (+) lead to terminal 2 and the battery negative (-) lead to terminal 6, and check that the indicator light comes on.

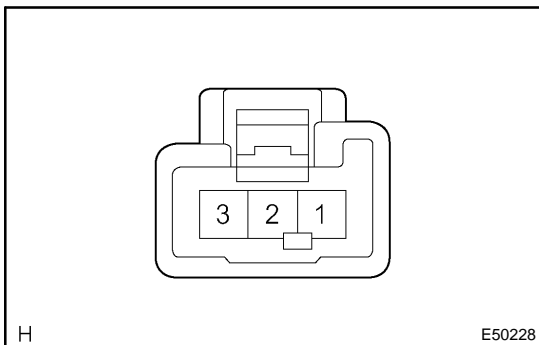


15. MAP LAMP ASSY

- (a) Inspect map light assy continuity.
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
DOOR	7(+B) - 2(DOOR)	Continuity
ON	7(+B) - 4(E)	Continuity

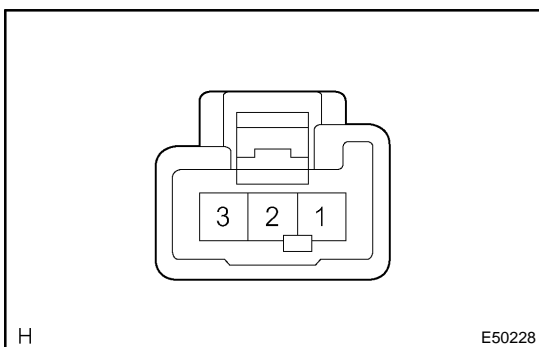


16. ROOM LAMP ASSY NO.1

- (a) Inspect room lamp assy No.1 continuity.
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
DOOR	1 - 2	Continuity
ON	1 - 3	Continuity



17. ROOM LAMP ASSY NO.2

- (a) Inspect room lamp assy No.2 continuity.
 - (1) Check continuity between terminals at each switch position as shown in the chart.

Standard:

Switch operation	Tester connection	Specified condition
OFF	-	No continuity
DOOR	1 - 2	Continuity
ON	1 - 3	Continuity

18. FRONT DOOR COURTESY LAMP ASSY RH

- (a) Check continuity between terminals.

Standard: Continuity exists

19. FRONT DOOR COURTESY LAMP ASSY LH

- (a) Check continuity between terminals.

Standard: Continuity exists

20. GLOVE BOX LAMP ASSY

- (a) Check continuity between terminals.

Standard: Continuity exists

21. RH VISOR ASSY

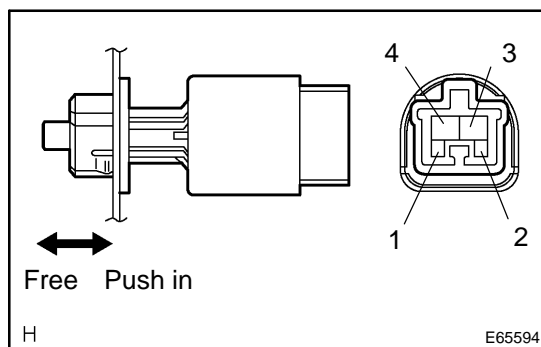
(a) Inspect vanity light continuity.

(1) Check continuity between terminals 1 and 2 when the light is operated.

Standard:**OFF (closed): No continuity****ON (opened): Continuity****22. LH VISOR ASSY**

(a) Inspect vanity light continuity.

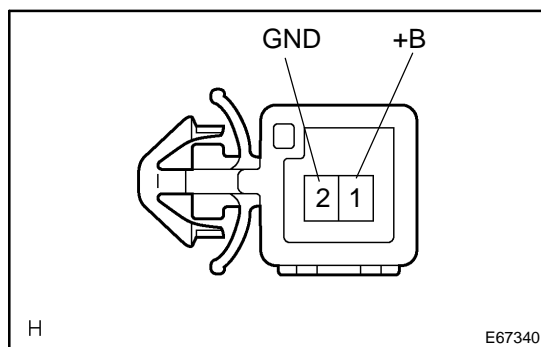
(1) Check continuity between terminals 1 and 2 when the light is operated.

Standard:**OFF (closed): No continuity****ON (opened): Continuity****23. STOP LAMP SWITCH ASSY**

(a) Check continuity between terminals at each switch position as shown in the chart.

Standard:

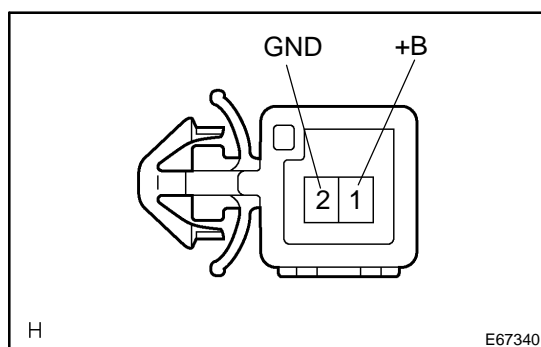
Switch position	Tester connection	Specified condition
Switch pin free	1-2	No continuity
Switch pin free	3-4	Continuity
Switch pin pushed in	1-2	Continuity
Switch pin pushed in	3-4	No continuity

**24. LAMP ASSY, INTERIOR ILLUMINATION, NO.1
(Inside Handle Illumination)**

(a) Check continuity between terminals 1 (+B) and 2 (GND).

Standard: Continuity**HINT:**

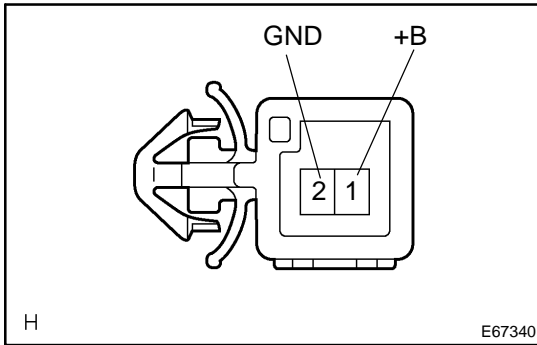
Connect the positive (+) terminal of the tester to the terminal 1 (+B) of the connector, and the negative (-) terminal of the tester to the terminal 2 (GND) of the connector to check the continuity.

**25. INTERIOR ILLUMINATION LAMP ASSY NO.2
(Driver Side Foot Light)**

(a) Check continuity between terminals 1 (+B) and 2 (GND).

Standard: Continuity**HINT:**

Connect the positive (+) terminal of the tester to the terminal 1 (+B) of the connector, and the negative (-) terminal of the tester to the terminal 2 (GND) of the connector to check the continuity.



26. INTERIOR ILLUMINATION LAMP ASSY NO.2 (Front Passenger Side Foot Light)

- (a) Check continuity between terminals 1 (+B) and 2 (GND).
Standard: Continuity

HINT:

Connect the positive (+) terminal of the tester to the terminal 1 (+B) of the connector, and the negative (-) terminal of the tester to the terminal 2 (GND) of the connector to check the continuity.

27. STEP LAMP ASSY(RH Side)

- (a) Inspect the side step lamp assy.
(1) Check continuity between terminals when the courtesy lamp switch is operated.

Standard:

ON: Continuity

OFF: No continuity

28. STEP LAMP ASSY(LH Side)

- (2) Check continuity between terminals when the courtesy lamp switch is operated.

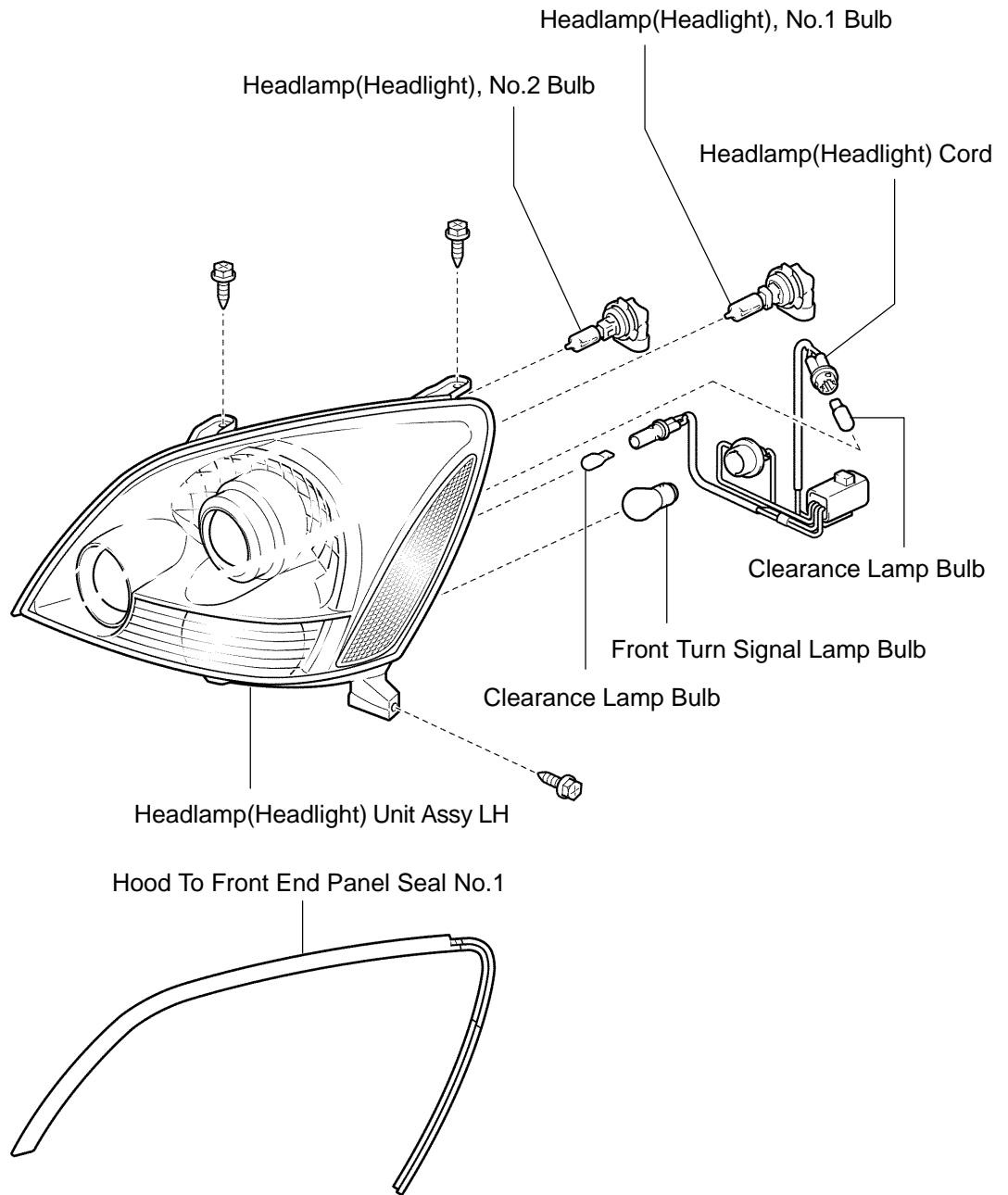
Standard:

ON: Continuity

OFF: No continuity

HEADLAMP UNIT ASSY LH COMPONENTS

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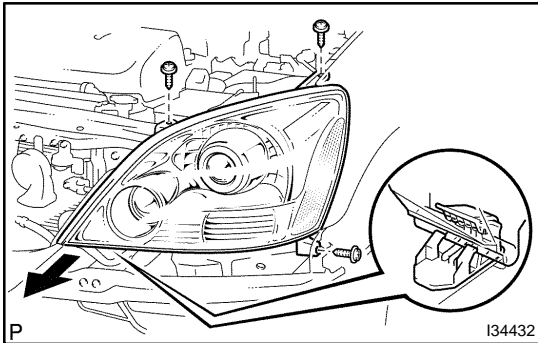
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REPLACEMENT

HINT:

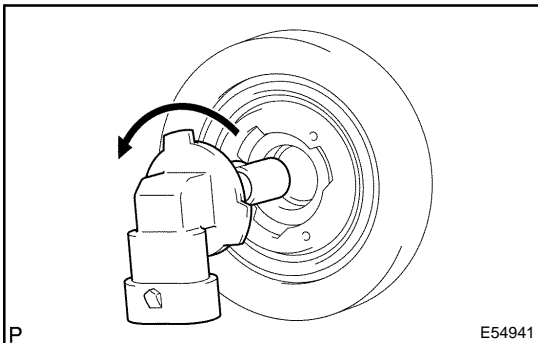
COMPONENTS: See page 65-10

1. REMOVE RADIATOR SUPPORT SEAL UPPER (See page 16-9)
2. REMOVE FRONT BUMPER GUARD (See page 76-2)
3. REMOVE FRONT FENDER LINER RH (See page 76-2)
4. REMOVE FRONT FENDER LINER LH (See page 76-2)
5. REMOVE FRONT BUMPER COVER (See page 76-2)



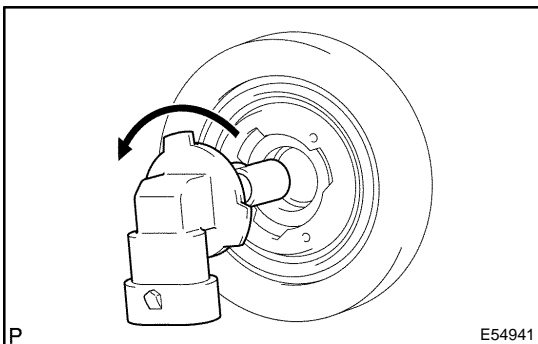
6. REMOVE LH HEADLAMP ASSY

- (a) Remove the 3 screws.
- (b) Disconnect the each connector.
- (c) Pull out the headlamp unit forward, then disengage the bracket on the body side.



7. REMOVE HEADLAMP, NO.1 BULB

- (a) Rotate the headlamp No.1 bulb in the direction of the arrow and pull it off toward the rear of the vehicle.



8. REMOVE HEADLAMP, NO.2 BULB

- (a) Rotate the headlamp No.2 bulb in the direction of the arrow and pull it off toward the rear of the vehicle.

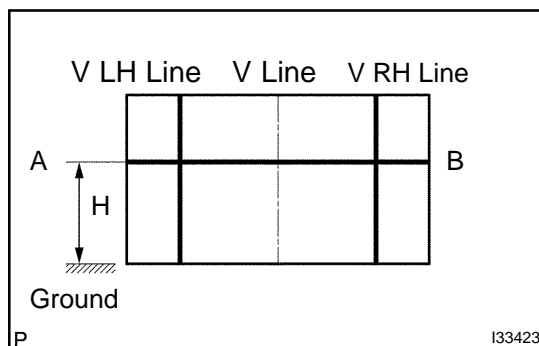
9. REMOVE HOOD TO FRONT END PANEL SEAL NO.1
10. REMOVE HEADLAMP UNIT ASSY LH
 - (a) Remove the headlamp cord with 3 bulbs
 - (b) Remove the headlamp unit assy LH.
11. INSTALL FRONT FENDER LINER RH (See page 76-2)
12. INSTALL FRONT FENDER LINER LH (See page 76-2)
13. ADJUST HEADLIGHT AIM ONLY (See page 65-12)
14. PUT VEHICLE THESE CONDITIONS (See page 65-15)
15. ADJUST FOG LIGHT AIM (See page 65-15)

ADJUSTMENT

1. ADJUST HEADLIGHT AIM ONLY

HINT:

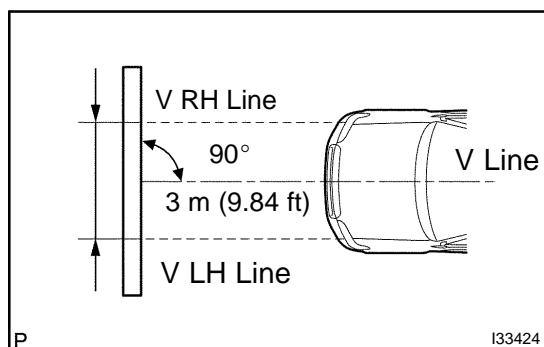
- Perform the headlight aiming adjustment with Low beam.
 - Since the Low-beam light or High-beam light is a unit, if either aiming of them is proper, the other should also be proper. However, check the both beams just to make sure.
- (a) Prepare vehicle in the following conditions.
- Any damages or deformations does not exist around the headlight.
 - Fuel is full.
 - Tire inflation pressure is in the specified level.
 - The vehicle is parked on a level surface.
 - A person with standard weight sit on the driver seat.
 - The vehicle is bounced up and down to stabilize the suspension to the normal position.



- (b) Prepare a thick white paper (Draw a based line).

HINT:

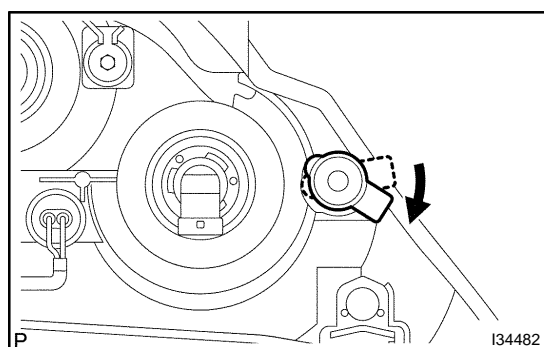
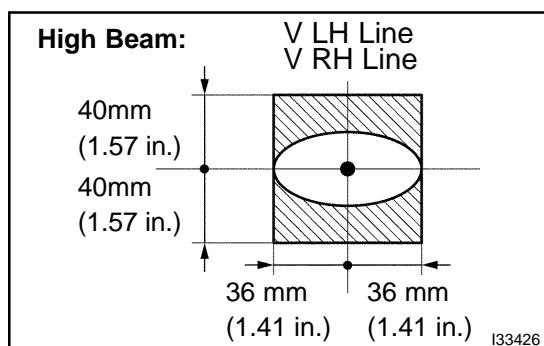
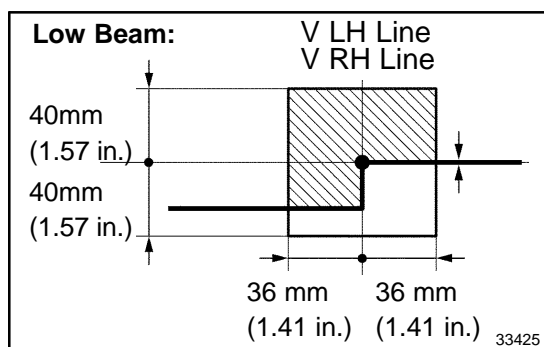
- Stand the paper perpendicular to the ground.
 - The based line differs in "Low-beam inspection" and "High-beam inspection".
- (1) H line (Headlight height)
For the vehicle, when checking the height from the ground to the center mark of Low-beam (or High-beam), draw a horizontal line A-B at the height of Low-beam (or High-beam).
- (2) V LH line, V RH line (Center mark position of right and left head lamp)
Draw a V LH line and V RH line in the width of the center mark of the right and left Low-beam (when checking High-beam, draw a V LH line and V RH line in the width of the center mark of the right and left Hi-beam).
- (3) V line (Vehicle Center position)
At the middle of the V LH line and V RH line, draw a line to align the center of the paper with that of the vehicle.



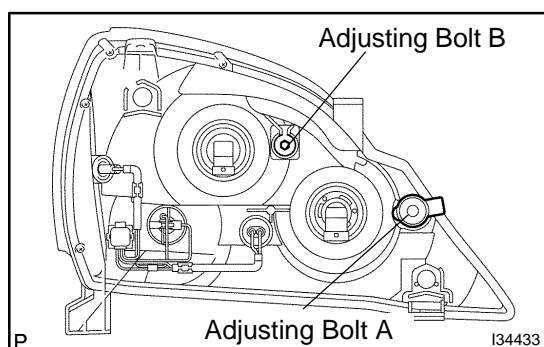
- (c) Check the headlight aiming.
- (1) Align the paper with the vehicle position.
 - Make a distance of 3 m (9.84 ft) between the head lamp and the paper, and put the paper on the wall with the H line being at the height of the center mark.
 - Align the center line of the vehicle with the V line on the paper, and make the center line of the vehicle and the paper 90 degrees.
 - (2) Start the engine of the vehicle with air suspension.
 - (3) Turn the headlight on and check that the aiming is between the specified values.

HINT:

When checking the aiming of the High-beam, shut off the Low-beam or disconnect the Low-beam head lamp connector so that the Low-beam does not interrupt.



- (d) Unlock the headlight aiming cap as shown in the illustration.



- (e) When adjusting the aiming in the vertical direction.
- (1) Using adjusting bolt A, adjust the headlight aim to the specified range.

HINT:

Turning a screwdriver clockwise makes the optical axis aim downward and turning it counter clockwise makes it upward.

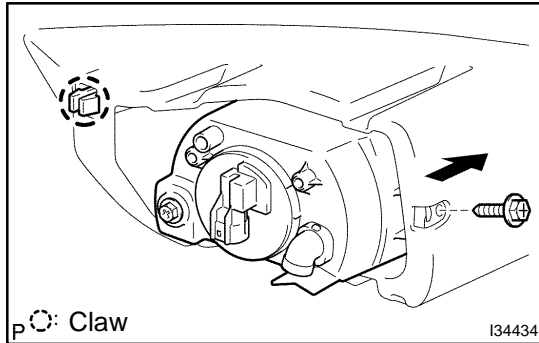
- (f) When adjusting the aiming in the horizontal direction.
- (1) Using adjusting bolt B, adjust the headlight aim to the specified range.

FOG LAMP LAMP UNIT LH

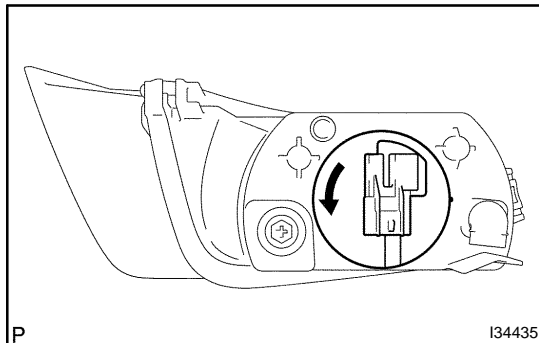
REPLACEMENT

650P6-02

1. REMOVE RADIATOR SUPPORT SEAL UPPER (See page 16-9)
2. REMOVE FRONT BUMPER GUARD (See page 76-2)
3. REMOVE FRONT FENDER LINER RH (See page 76-2)
4. REMOVE FRONT FENDER LINER LH (See page 76-2)
5. REMOVE FRONT BUMPER COVER (See page 76-2)



6. REMOVE FOG LAMP LAMP UNIT LH
 - (a) Remove the screw.
 - (b) Disengage the claw and remove the fog lamp assy.

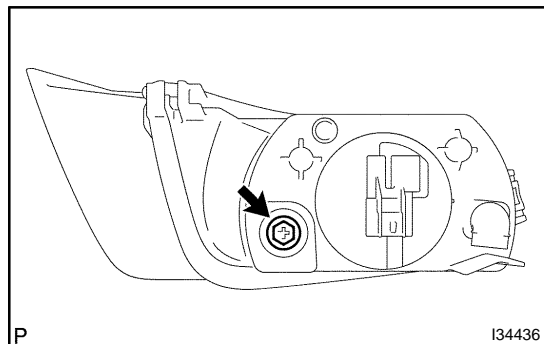


- (c) Remove the fog lamp cover and the fog lamp bulb.

7. INSTALL FRONT FENDER LINER RH (See page 76-2)
8. INSTALL FRONT FENDER LINER LH (See page 76-2)
9. PUT VEHICLE THESE CONDITIONS (See page 65-15)
10. ADJUST FOG LIGHT AIM (See page 65-15)

ADJUSTMENT

1. REMOVE FRONT FENDER LINER LH (See page 76-2)
2. PUT VEHICLE THESE CONDITIONS
 - (a) Tire inflation pressure is in the specified value. (See page 28-1)
 - (b) Engine is running.

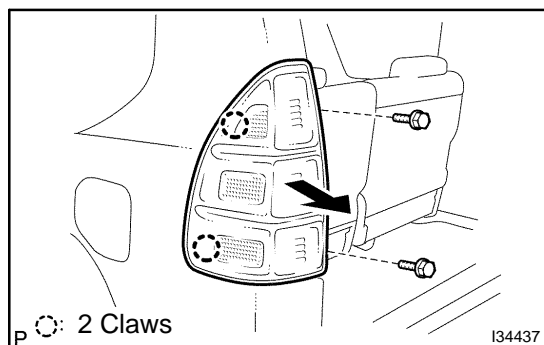


3. ADJUST FOG LIGHT AIM
 - (a) Adjust the fog light aiming by moving the aiming screw in the vertical direction.

4. INSTALL FRONT FENDER LINER LH (See page 76-2)

REAR COMBINATION LAMP LENS LH REPLACEMENT

650P8-02



1. REMOVE REAR COMBINATION LAMP ASSY LH

- (a) Remove the 2 bolts and release the 2 claws.
- (b) Disconnect the connector and remove the rear combination lamp assy LH.

2. REMOVE REAR COMBINATION LAMP LENS LH

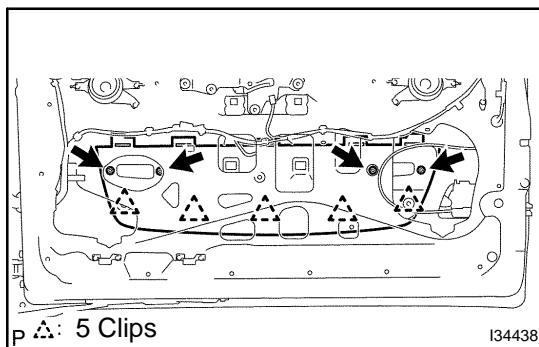
- (a) Remove the 3 sockets with 3 bulbs.

BACK-UP LAMP LENS & BODY LH

REPLACEMENT

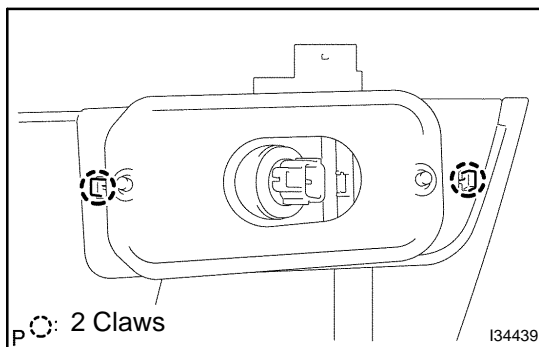
650P9-02

1. REMOVE BACK DOOR GARNISH CENTER (See page 75-39)
2. REMOVE BACK DOOR SIDE GARNISH RH (See page 75-39)
3. REMOVE BACK DOOR SIDE GARNISH LH (See page 75-39)
4. REMOVE TOOL BOX PANEL SUB-ASSY UPPER (See page 75-39)
5. REMOVE DOOR PULL HANDLE SUB-ASSY (See page 75-39)
6. REMOVE BACK DOOR TRIM BOARD (See page 75-39)
7. REMOVE BACK DOOR SERVICE HOLE COVER (See page 75-39)
8. REMOVE LICENSE REAR LAMP COVER (See page 76-34)



9. REMOVE BACK DOOR OUTSIDE GARNISH

- (a) Disconnect the connectors.
- (b) Remove the 4 nuts.
- (c) Release the 5 clips, and remove the back door outside garnish.

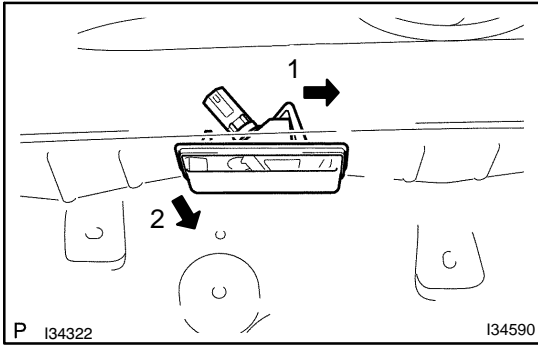


10. REMOVE BACK-UP LAMP LENS & BODY LH

- (a) Remove the back up lamp body gasket LH.
- (b) Remove the socket with the bulb.
- (c) Release the 2 claws and remove the back-up lamp lens & body LH.

LICENSE PLATE LAMP LENS REPLACEMENT

650PA-02

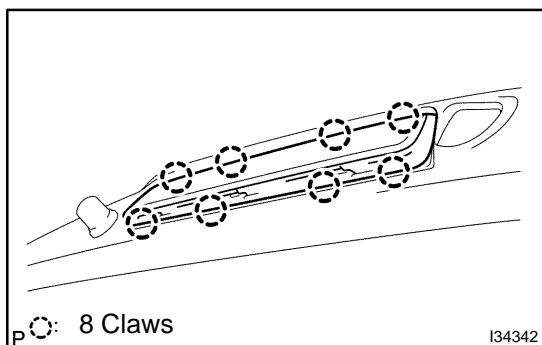


1. REMOVE LICENSE PLATE LAMP LENS

- (a) Disconnect the connector.
- (b) Remove the license plate lamp assy as shown in the illustration.
- (c) Remove the license plate lamp socket and the wire with the license plate lamp bulb from license plate lamp lens.

CENTER STOP LAMP ASSY REPLACEMENT

650PB-02



1. REMOVE CENTER STOP LAMP ASSY

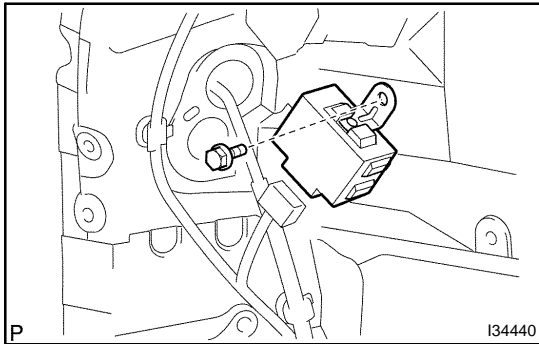
- (a) Using a clip remover wrapped around with the protective tape, disengage the 4 claws on the bottom side.
- (b) Disengage the 4 claws on the upper side and pull the center stop lamp assy.
- (c) Disconnect the connector and remove the center stop lamp assy.

TOWING CONVERTER RELAY

650MJ-04

REPLACEMENT

1. REMOVE REAR NO. 2 SEAT ASSY LH (See page 72-42)
2. REMOVE QUARTER SCUFF PLATE INSIDE LH (See page 76-38)
3. REMOVE REAR DOOR SCUFF PLATE LH (See page 76-38)
4. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
5. REMOVE BACK DOOR WEATHERSTRIP
6. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (See page 76-38)
7. REMOVE PACKAGE TRAY TRIM PANEL ASSY (See page 76-38)
8. REMOVE QUARTER INSIDE TRIM BOARD LH (See page 76-38)
9. REMOVE ROOF SIDE GARNISH INNER LH (See page 76-38)

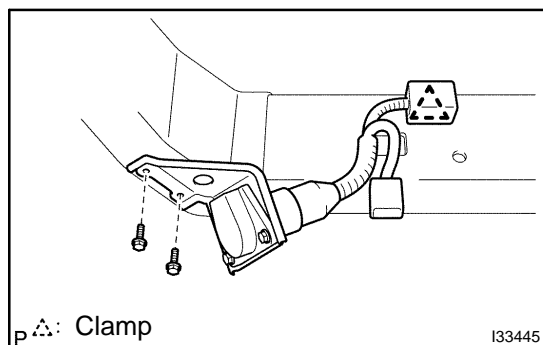


10. REMOVE TOWING CONVERTER RELAY
 - (a) Disconnect the connector.
 - (b) Remove the bolt and the towing converter relay.

11. INSTALL ROOF SIDE GARNISH INNER LH (See page 76-38)
12. INSTALL REAR NO. 2 SEAT ASSY LH (See page 72-42)

NO.3 WIRE FRAME REPLACEMENT

650MI-04



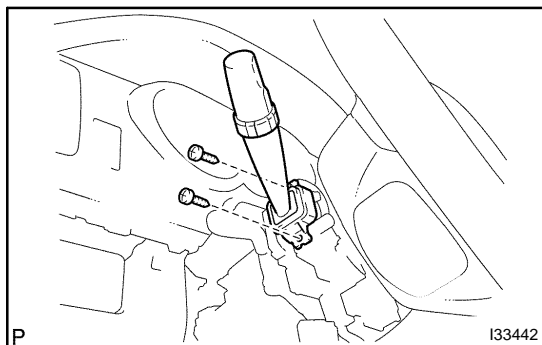
1. REMOVE NO.3 WIRE FRAME

- (a) Disconnect the connector.
- (b) Release the clamp and remove the 2 bolts and the No.3 wire frame.

HEADLAMP DIMMER SWITCH ASSY REPLACEMENT

650PC-02

1. REMOVE STEERING COLUMN COVER (See page 50-8)



2. REMOVE HEADLAMP DIMMER SWITCH ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and the headlamp dimmer switch assy.

3. INSTALL STEERING COLUMN COVER (See page 50-8)

WIPER AND WASHER SYSTEM

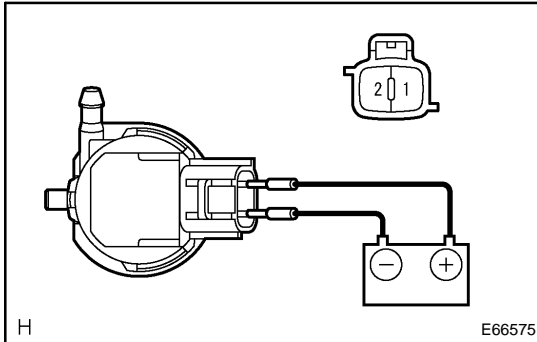
660B3-02

PRECAUTION

1. PRECAUTION OF WASHER NOZZLE ADJUSTMENT

- (a) Do not clean or adjust the washer nozzle with a safety pin etc. because;
 - (1) the washer nozzle tip is made of resin and could be damaged.
 - (2) adjustment is not necessary because the washer nozzle is a spray type.
- (b) If the washer nozzle is clogged with wax etc., remove the objects and clean the nozzle hole with a soft resin brush etc.

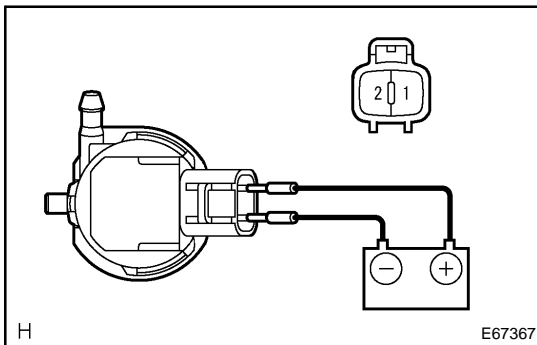
ON-VEHICLE INSPECTION



1. WASHER MOTOR (FRONT)

(a) Operation Check

- (1) Pour the water into the washer jar with the washer motor and the pump installed to the washer jar assy.
- (2) Connect the battery (+) to terminal 1 of the washer motor and the pump and the battery (-) to terminal 2 of the washer motor and the pump. Check that the water comes out from the washer jar.

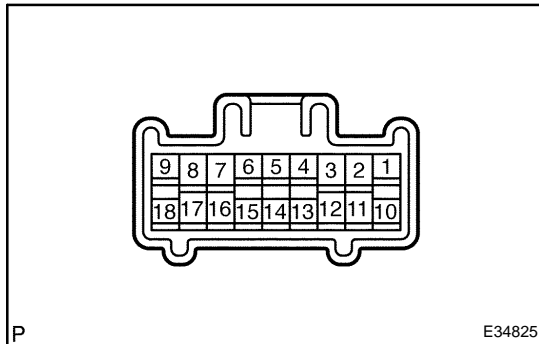


2. WASHER MOTOR (REAR)

(a) Operation Check

- (1) Pour the water into the washer jar with the washer motor and the pump installed to the washer jar assy.
- (2) Connect the battery (+) to terminal 1 of the washer motor and the pump and the battery (-) to terminal 2 of the washer motor and the pump. Check that the water comes out from the washer jar.

INSPECTION



1. WINDSHIELD WIPER SWITCH ASSY

(a) Continuity Check

- (1) Check the continuity of each terminal of the windshield wiper switch.

Front Wiper Switch (w/ Rain Sensor)

Switch position	Tester connection	Specified condition
OFF	16 (+S) - 7 (+1)	Continuity
AUTO	16 (+S) - 7 (+1), 4 (AUTO) - 14 (E)	Continuity
LO	17 (+B) - 7 (+1)	Continuity
HI	17 (+B) - 8 (+2)	Continuity

Front Wiper Switch (w/o Rain Sensor)

Switch position	Tester connection	Specified condition
OFF	16 (+S) - 7 (+1)	Continuity
INTO	16 (+S) - 7 (+1)	Continuity
LO	17 (+B) - 7 (+1)	Continuity
HI	17 (+B) - 8 (+2)	Continuity

Rear Wiper Switch

Switch position	Tester connection	Specified condition
OFF	-	No continuity
INT	2 (EW) - 13 (C1R)	Continuity
ON	2 (EW) - 10 (+1R)	Continuity

Front Washer Switch

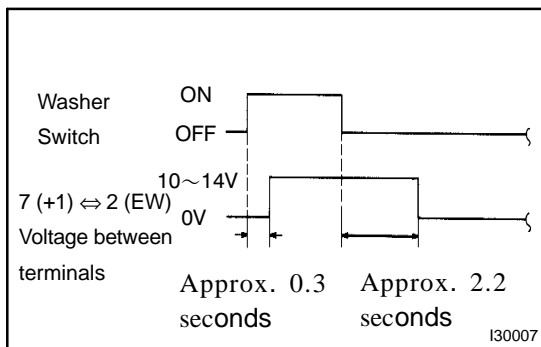
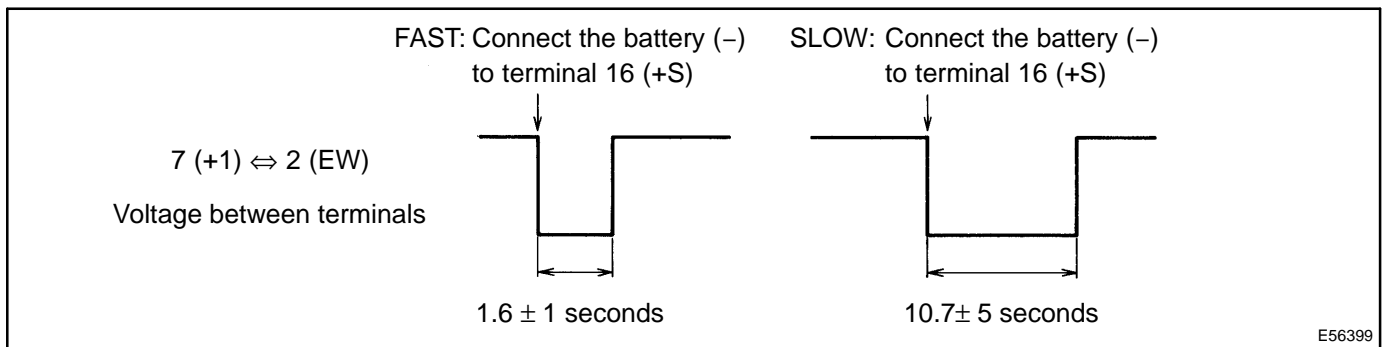
Switch position	Tester connection	Specified condition
OFF	11 (WF) - 2 (EW)	No continuity
ON	11 (WF) - 2 (EW)	Continuity

Rear Washer Switch

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON (OFF position side)	2 (EW) - 12 (WR)	Continuity
ON (ON position side)	2 (EW) - 10 (+1R) - 12 (WR)	Continuity

(b) Intermittent Operation Check

- (1) Connect the voltmeter (+) terminal to terminal 7 (+1) of the connector and the voltmeter (-) terminal to terminal 2 (EW) of the connector.
- (2) Connect the battery (+) to terminal 17 (+B) of the connector and the battery (-) to terminal 2 (EW) and 16 (+S) of the connector.
- (3) Turn the wiper switch to INT.
- (4) Connect the battery (+) to terminal 16 (+S) of the connector for 5 seconds.
- (5) Connect the battery (-) to terminal 16 (+S) of the connector. Operate the intermittent wiper relay and check voltage between terminal 7 (+1) and terminal 2 (EW).



(c) Operation Check (Front Wiper)

- (1) Turn the wiper switch to OFF.
- (2) Connect the battery (+) to terminal 17 (+B) of the connector and the battery (-) to terminal 16 (+S) and 2 (EW) of the connector.
- (3) Connect the voltmeter (+) terminal to terminal 7 (+1) of the connector and the voltmeter (-) terminal to terminal 2 (EW) of the connector. Turn the washer switch to ON and OFF, and check voltage between terminal 7 (+1) and terminal 2 (EW).

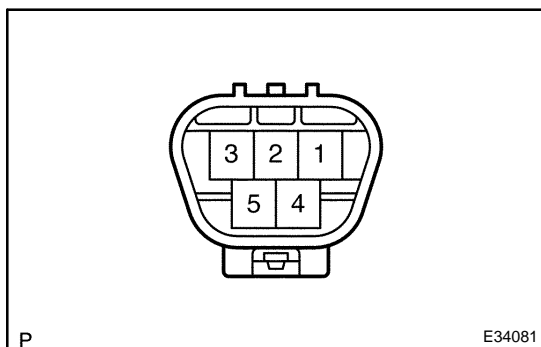
2. WINDSHIELD WIPER MOTOR ASSY

(a) LO Operation Check

- (1) Connect the battery (+) to terminal 1 (+1) of the connector and the battery (-) to terminal 5 (E) of the connector, and check that the motor operates with low speed (LO).

(b) HI Operation Check

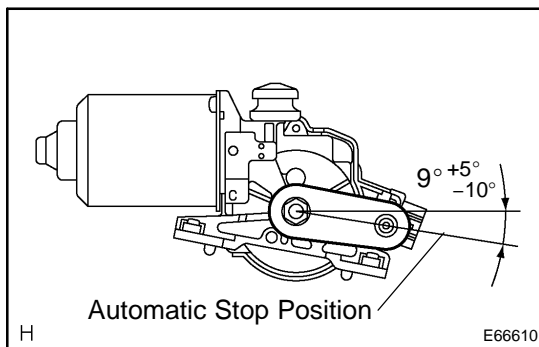
- (1) Connect the battery (+) to terminal 4 (+2) of the connector and the battery (-) to terminal 5 (E) of the connector, and check that the motor operates with high speed (HI).



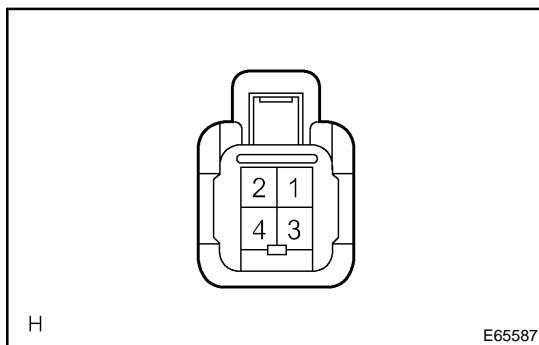
(c) Automatic Stop Operation Check

- (1) Connect the battery (+) to terminal 1 (+1) of the connector and the battery (-) to terminal 5 (E) of the connector. With the motor being rotated at low speed (LO), disconnect terminal 1 (+1) to stop the wiper motor operation at any position except the automatic stop position.
- (2) Using SST, connect terminal 1 (+1) to 3 (S) and the battery (+) to terminal 2 (B) to restart the motor operation at low speed.

SST 09843-18040

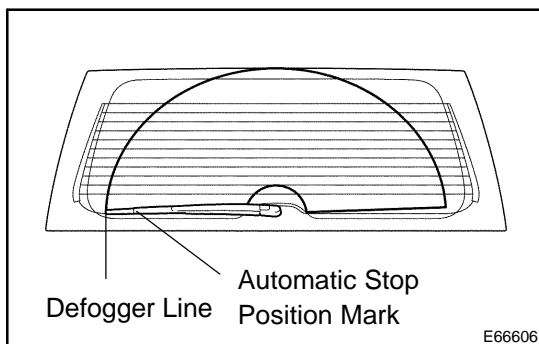


- (3) Check the automatic stop position.

Standard: See the illustration.**3. REAR WIPER MOTOR ASSY**

(a) Operation Check

- (1) Connect the battery (+) to terminal 1 (+B) of the connector and the battery (-) to terminal 3 (+1) of the connector, and check that the rear wiper motor operates.

NOTICE:**The body earth should be connected.**

(b) Automatic Stop Position Operation Check

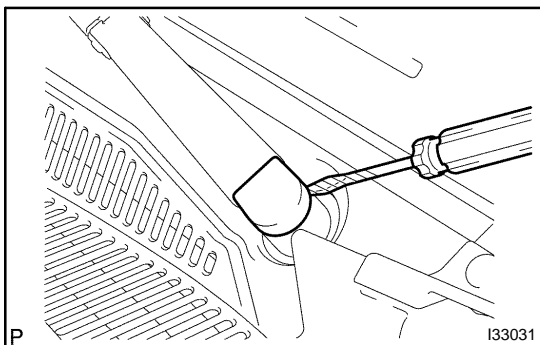
- (1) Connect the battery (+) to terminal 1 (+B) of the connector and the battery (-) to terminal 3 (+1) of the connector.

NOTICE:**The body earth should be connected.**

- (2) With the motor being rotated, disconnect terminal 1 (+B) and terminal 3 (+1) to stop the motor operation at any position except the automatic stop position.
- (3) Connect the battery (+) to terminal 1 (+B). Check that the motor is restarted and automatically stopped.

WINDSHIELD WIPER MOTOR ASSY REPLACEMENT

660B6-04



1. REMOVE WINDSHIELD WIPER ARM COVER

- (a) Using a small screwdriver, remove the 2 front wiper arm covers.

HINT:

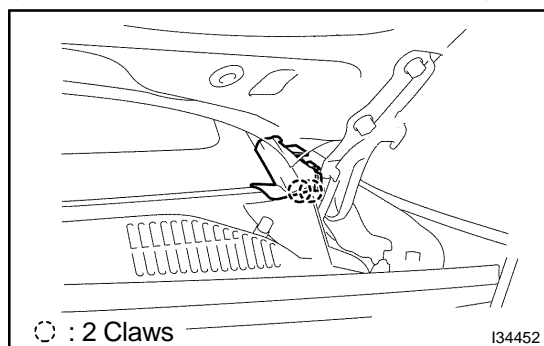
Tape up the screwdriver tip before use.

2. REMOVE FR WIPER ARM RH

- (a) Operate the wiper, and stop the windshield wiper motor assy at the automatic stop position.
(b) Remove the nut and the FR wiper arm RH.

3. REMOVE FR WIPER ARM LH

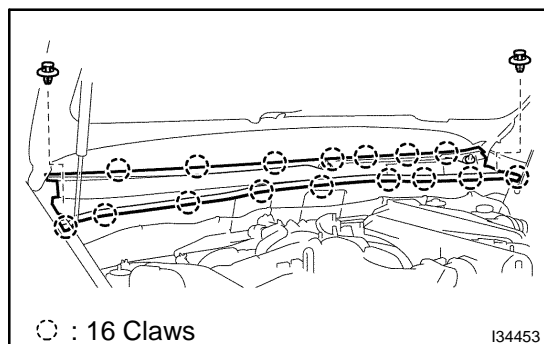
- (a) Remove the nut and the FR wiper arm LH.



4. REMOVE FRONT FENDER TO COWL SIDE SEAL RH

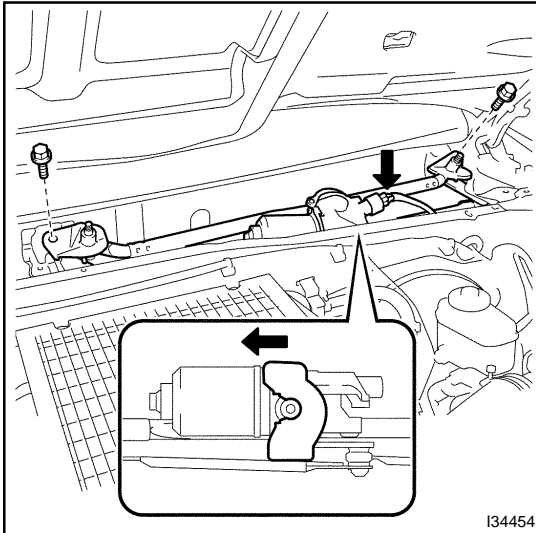
- (a) Release the 2 claws and remove the front fender to cowl side seal RH.

5. REMOVE FRONT FENDER TO COWL SIDE SEAL LH



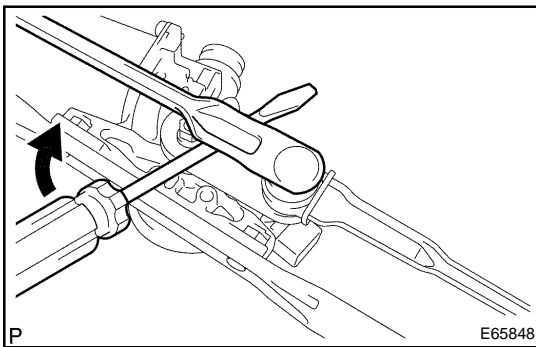
6. REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSY

- (a) Remove the 2 clips.
(b) Remove the 16 claws and the cowl top ventilator louver sub-assy.



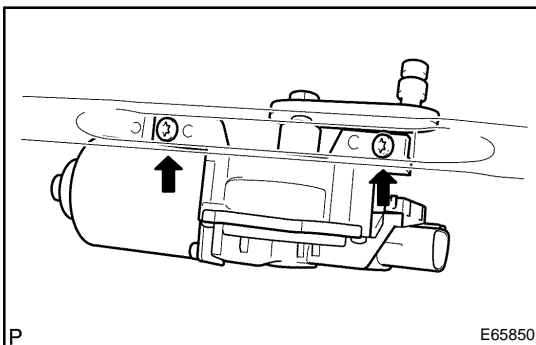
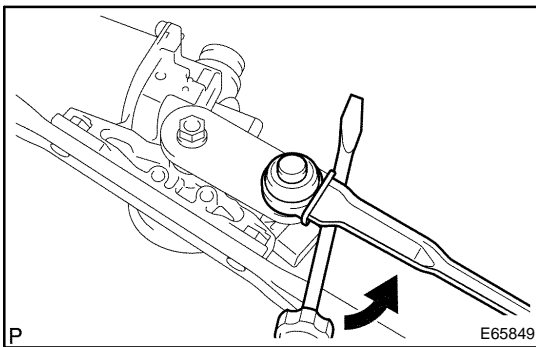
7. REMOVE WINDSHIELD WIPER MOTOR & LINK ASSY

- (a) Disconnect the connector and remove the 2 bolts.
- (b) Slide the wiper link assy to the vehicle's passenger's side. Disengage the meshing of the rubber pin, and remove the wiper link assy.

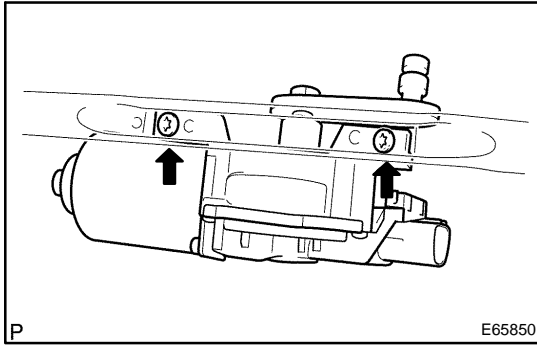


8. REMOVE WINDSHIELD WIPER MOTOR ASSY

- (a) Using a screwdriver, disengage the meshing of the 2 rods at the crank arm pivot of the windshield wiper motor assy.

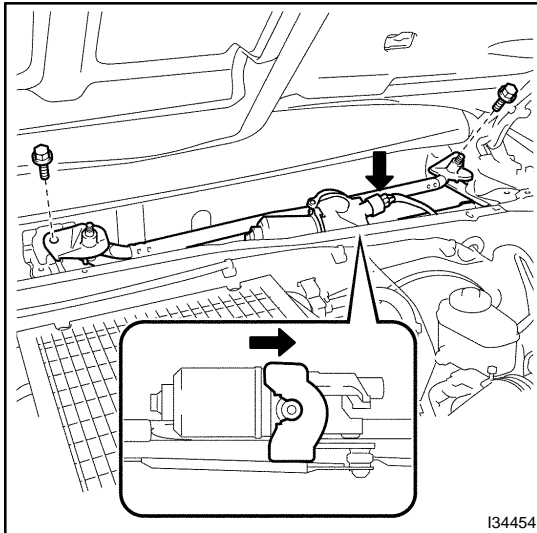


- (b) Remove the 2 torx[®] bolts and the windshield wiper motor assy.



9. INSTALL WINDSHIELD WIPER MOTOR ASSY

- (a) Apply MP grease to the crank arm pivot of the windshield wiper motor assy.
- (b) Install the windshield wiper motor assy to the windshield wiper link assy with the 2 torx[®] bolts.
Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

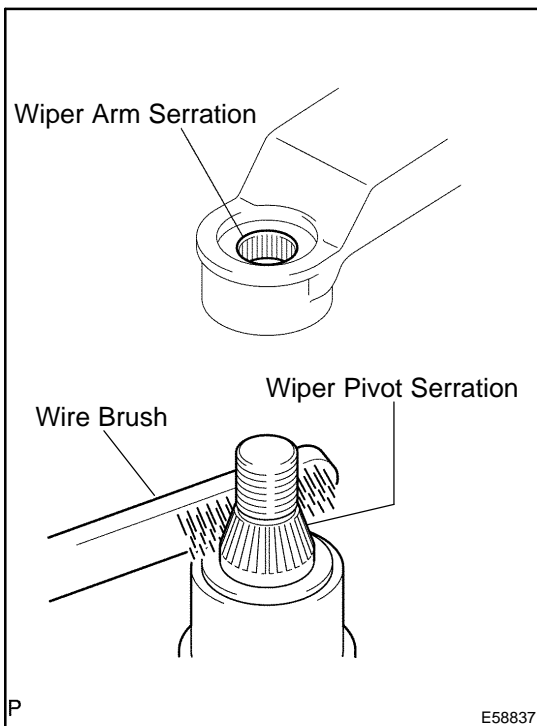


10. INSTALL WINDSHIELD WIPER MOTOR & LINK ASSY

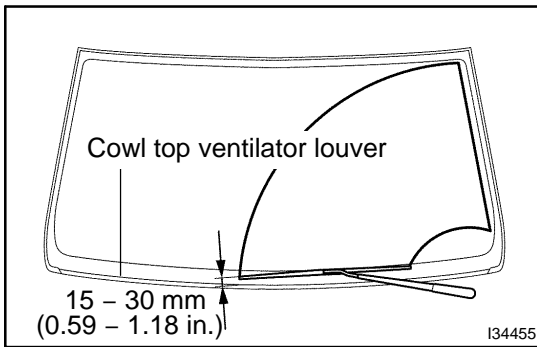
- (a) Slide the wiper motor assy to the driver's seat side as shown in the illustration and engage the rubber pin with the body.
- (b) Install the windshield wiper link assy with the 2 bolts.
Torque: 7.0 N·m (71 kgf·cm, 62 in·lbf)
- (c) Connect the connector.

11. INSTALL FR WIPER ARM LH

- (a) Operate the wiper, and stop the windshield wiper motor assy at the automatic stop position.



- (b) Scrape off the serration part of the wiper arm with a round file or equivalent.
- (c) Clean the wiper pivot serration with a wire brush.



- (d) Install the front wiper arm LH with the nut to the position shown in the illustration.

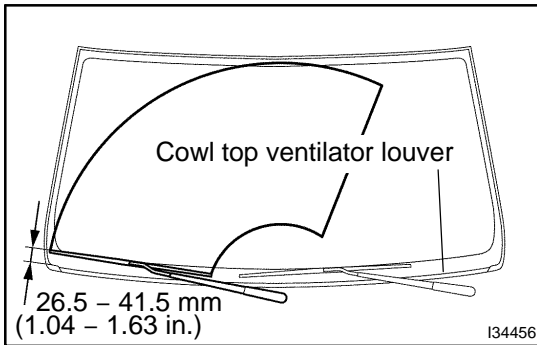
Torque: 25 N·m (254 kgf·cm, 18 ft·lbf)

HINT:

Hold down the arm hinge by hand to tighten the nut.

12. INSTALL FR WIPER ARM RH

- (a) Scrape off the serration part of the wiper arm with a round file or equivalent.
 (b) Clean the wiper pivot serration with a wire brush.



- (c) Install the front wiper arm RH with the nut at the position shown in the illustration.

Torque: 25 N·m (254 kgf·cm, 18 ft·lbf)

HINT:

Hold down the arm hinge by hand to tighten the nut.

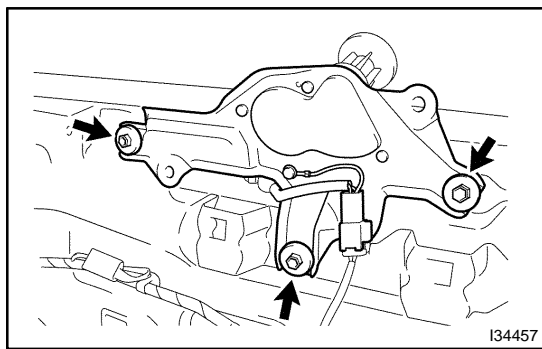
- (d) Operate the wiper while running the water or the washer fluid over the window, and check the wiping condition and that the front wiper does not hit against the vehicle body.

REAR WIPER MOTOR ASSY

660AW-02

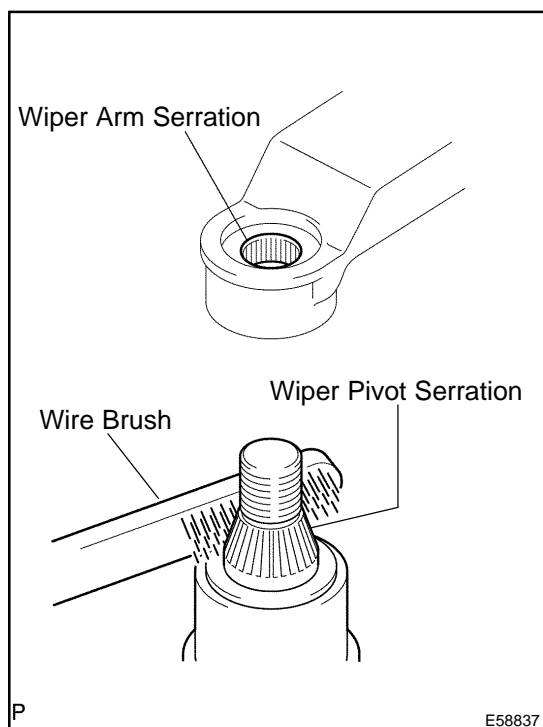
REPLACEMENT

1. REMOVE REAR WIPER ARM ASSY
 - (a) Remove the nut and the rear wiper arm.
2. REMOVE BACK DOOR GARNISH CENTER (See page 75-39)
3. REMOVE BACK DOOR SIDE GARNISH RH (See page 75-39)
4. REMOVE BACK DOOR SIDE GARNISH LH (See page 75-39)
5. REMOVE TOOL BOX PANEL SUB-ASSY UPPER (See page 75-39)
6. REMOVE DOOR PULL HANDLE SUB-ASSY (See page 75-39)
7. REMOVE BACK DOOR TRIM BOARD (See page 75-39)
8. REMOVE BACK DOOR SERVICE HOLE COVER (See page 75-39)

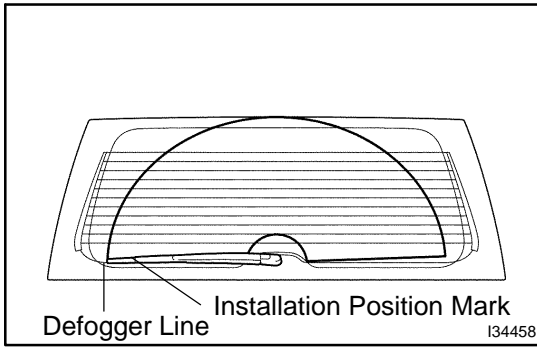


9. REMOVE REAR WIPER MOTOR ASSY
 - (a) Remove the 3 bolts.
 - (b) Disconnect the connector, and remove the rear wiper motor assy.

10. INSTALL REAR WIPER MOTOR ASSY
 - (a) Install the rear wiper motor assy with the 3 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)
 - (b) Connect the connector.



11. INSTALL REAR WIPER ARM ASSY
 - (a) Scrape off the serration part of the wiper arm with a round file or equivalent.
 - (b) Clean the rear wiper pivot serration with a wire brush.



- (c) Stop the rear wiper motor assy at the automatic stop position. Install the rear wiper arm at the position as shown in the illustration.

Torque: 5.5 N·m (56 kgf·cm, 49 in·lbf)

12. INSTALL BACK DOOR SERVICE HOLE COVER (See page 75-39)

WIPER RUBBER LH

REPLACEMENT

660AX-01

1. REMOVE FR WIPER BLADE LH

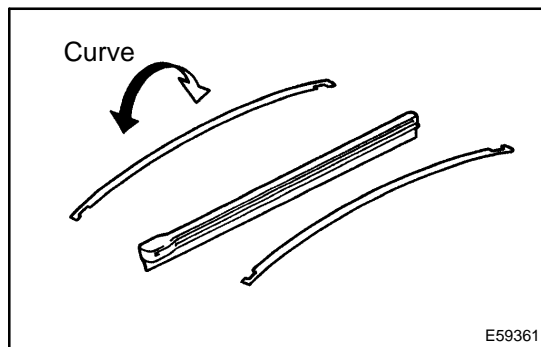
- (a) Remove the front wiper blade LH from the front wiper arm LH.

NOTICE:

Do not fold down the front wiper arm with the front wiper blade being removed from it.

2. REMOVE WIPER RUBBER LH

- (a) Remove the front wiper rubber LH from the front wiper blade.
 (b) Remove the 2 wiper rubber backing plates from the wiper rubber LH.

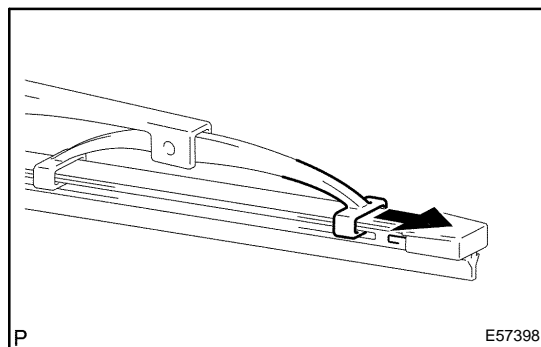


3. INSTALL WIPER RUBBER LH

- (a) Install the 2 wiper rubber backing plates to the wiper rubber LH.

NOTICE:

Be sure to install the wiper rubber backing plates in the right direction.



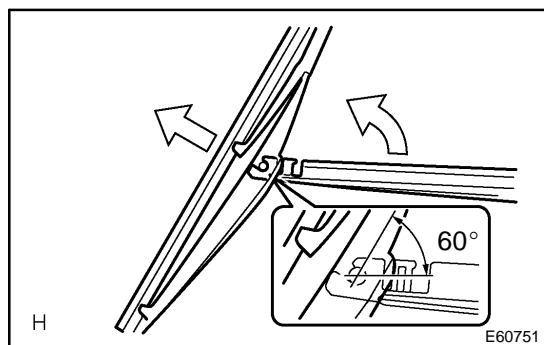
- (b) Install the wiper rubber LH so that the head part (Larger side) of the wiper rubber faces the arm axle side.

NOTICE:

Push the front wiper blade into the grooves of the wiper rubber to engage them completely.

REAR WIPER RUBBER REPLACEMENT

660AY-01



1. REMOVE REAR WIPER BLADE ASSY

- (a) Raise the rear wiper blade to the position as shown in the illustration where the meshing of the claw is disengaged with the click sound.

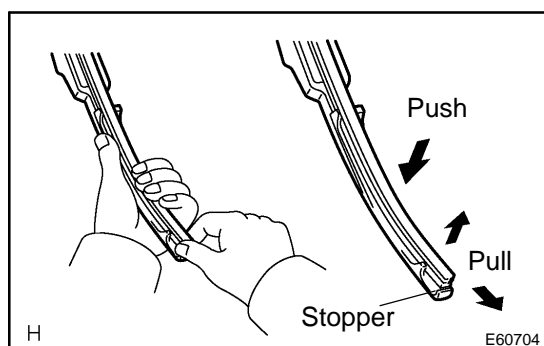
NOTICE:

Be careful not to break the claw.

- (b) Pull the rear wiper blade straight from the wiper arm toward the left side of the vehicle.

NOTICE:

Do not fold the rear wiper arm with the rear wiper blade being removed from it.



2. REMOVE REAR WIPER RUBBER

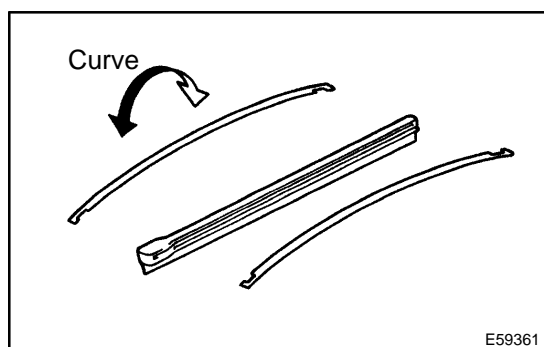
- (a) Pull the end of the rubber protruded from the blade stopper as shown in the illustration.

NOTICE:

Do not pull out the wiper rubber forcibly. Otherwise, the backing plates are deformed or blade claw is damaged.

HINT:

Pushing the position close to the middle of the blade raises the rubber, making easier to pull the rubber out.

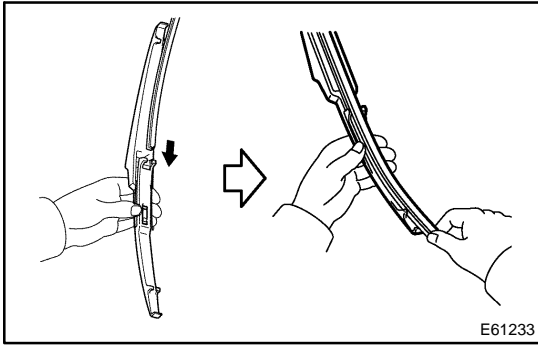


3. INSTALL REAR WIPER RUBBER

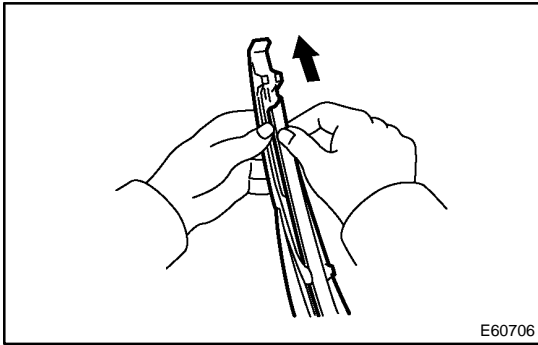
- (a) Install the 2 wiper rubber backing plates to the rear wiper rubber.

NOTICE:

Be sure to install the wiper rubber backing plates in the right direction.



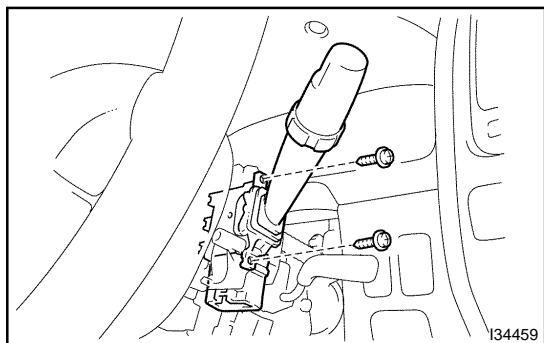
- (b) Insert the rear wiper rubber from the claw position of the middle of the rear wiper blade into the end position.
- (c) After passing the rear wiper rubber through the rear end side claw, protrude it from the rear end stopper and pass it through the front tip side claw.



WINDSHIELD WIPER SWITCH ASSY REPLACEMENT

660AZ-01

1. REMOVE STEERING COLUMN COVER (See page 50-8)



2. REMOVE WINDSHIELD WIPER SWITCH ASSY

- (a) Disconnect the connector.
- (b) Remove the 2 screws and the windshield wiper switch Assy.

WASHER NOZZLE

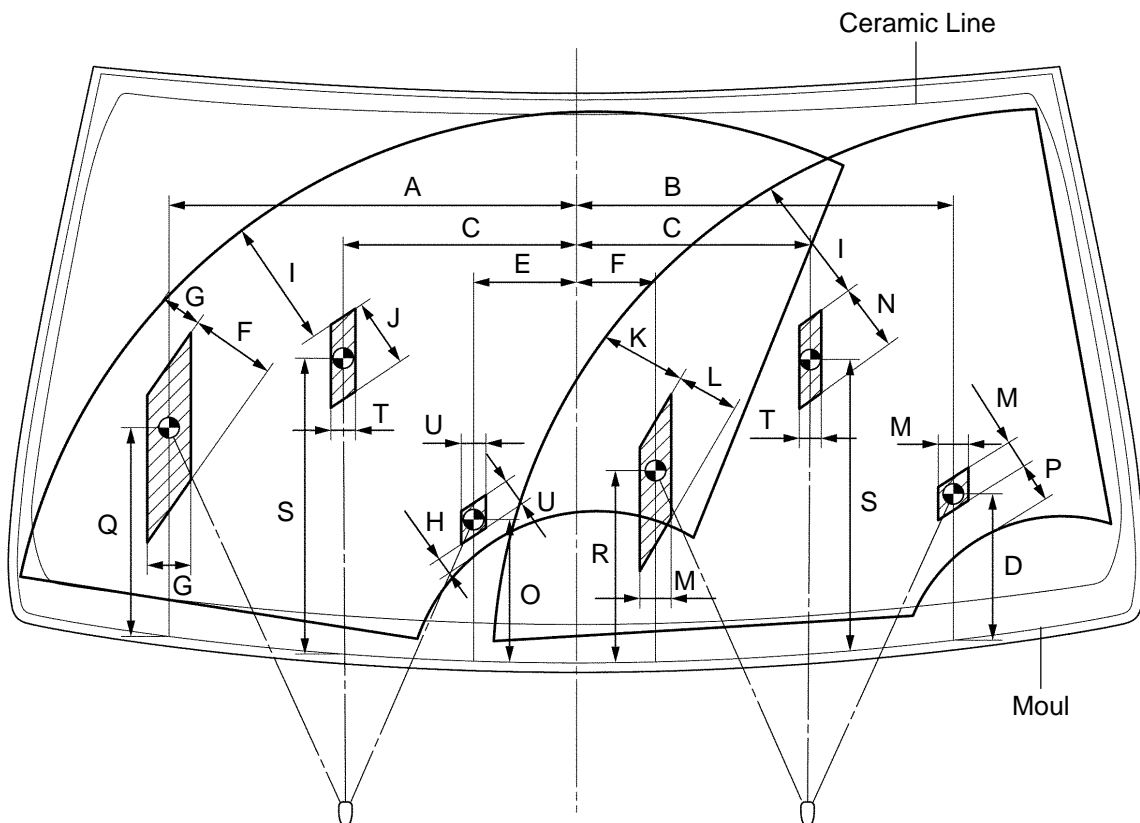
660B0-01

ADJUSTMENT

1. INSPECT WASHER NOZZLE

- (a) With the engine running, check that the point where the washer fluid hits the windshield and the rear window is within the range indicated by the hatched line.

Front:



A: 530 mm (20.86 in.)

B: 490 mm (19.29 in.)

C: 303 mm (11.92 in.)

D: 193 mm (7.59 in.)

E: 134 mm (5.27 in.)

F: 105 mm (4.13 in.)

G: 55 mm (2.16 in.)

H: 20 mm (0.78 in.)

I: 170 mm (6.69 in.)

J: 90 mm (3.54 in.)

K: 110 mm (4.33 in.)

L: 75 mm (2.95 in.)

M: 40 mm (1.57 in.)

N: 85 mm (3.34 in.)

O: 183 mm (7.20 in.)

P: 50 mm (1.97 in.)

Q: 274 mm (10.78 in.)

R: 250 mm (9.84 in.)

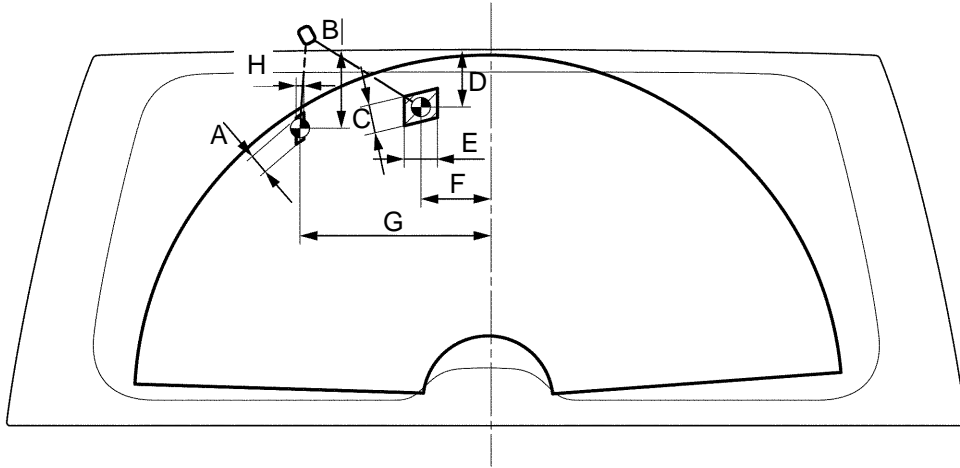
S: 383 mm (15.07 in.)

T: 30 mm (1.18 in.)

U: 35 mm (1.38 in.)

133696

Rear:



- A: 20 mm (0.78 in.)
- B: 97 mm (3.81 in.)
- C: 45 mm (1.77 in.)
- D: 75 mm (2.95 in.)
- E: 45 mm (1.77 in.)
- F: 98 mm (3.85 in.)
- G: 260 mm (10.23 in.)
- H: 5 mm (0.19 in.)

P

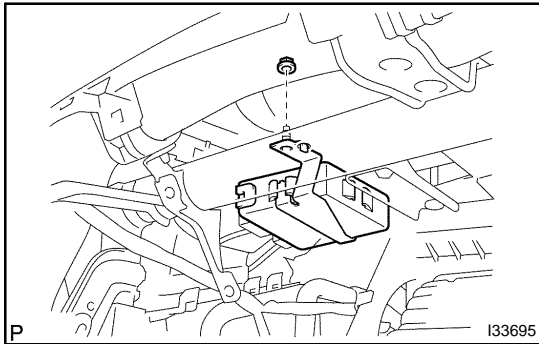
I34460

WINDSHIELD WIPER ECU

660B1-02

REPLACEMENT

1. REMOVE FRONT DOOR SCUFF PLATE RH (See page 76-38)
2. REMOVE COWL SIDE TRIM BOARD RH (See page 71-13)
3. REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (See page 71-13)
4. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY (See page 71-13)
5. REMOVE INSTRUMENT PANEL ORNAMENT (See page 71-13)
6. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2 (See page 71-13)
7. REMOVE DISC PLAYER CHANGER W/BRACKET (W/ CD CHANGER) (See page 67-30)

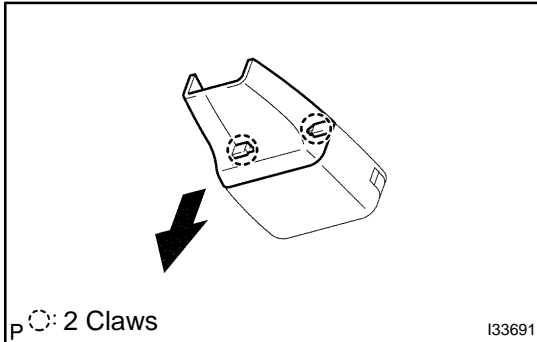


8. REMOVE WINDSHIELD WIPER ECU
 - (a) Disconnect the connector.
 - (b) Remove the nut and the windshield wiper ECU.

9. INSTALL DISC PLAYER CHANGER W/BRACKET (W/ CD CHANGER) (See page 67-30)

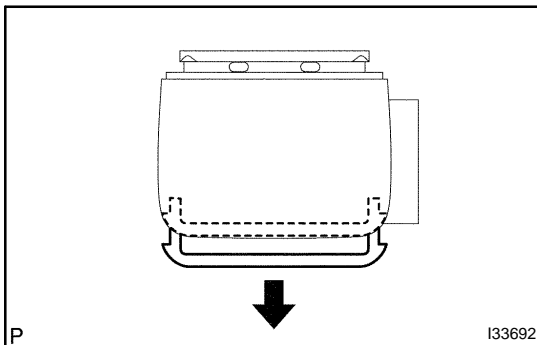
RAIN SENSOR REPLACEMENT

660B2-02



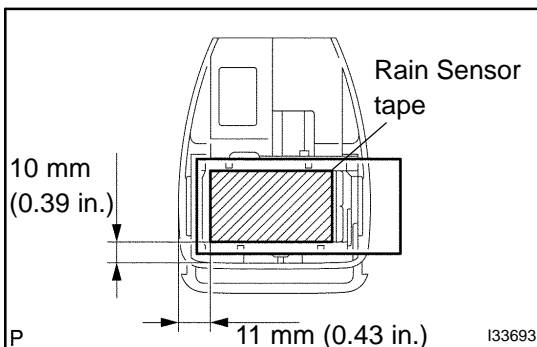
1. REMOVE RAIN SENSOR COVER

- (a) Release the 2 claws and remove the rain sensor cover.



2. REMOVE RAIN SENSOR

- (a) Pull out the stopper as shown in the illustration, and release the lock.
(b) Disconnect the connector and remove the rain sensor.

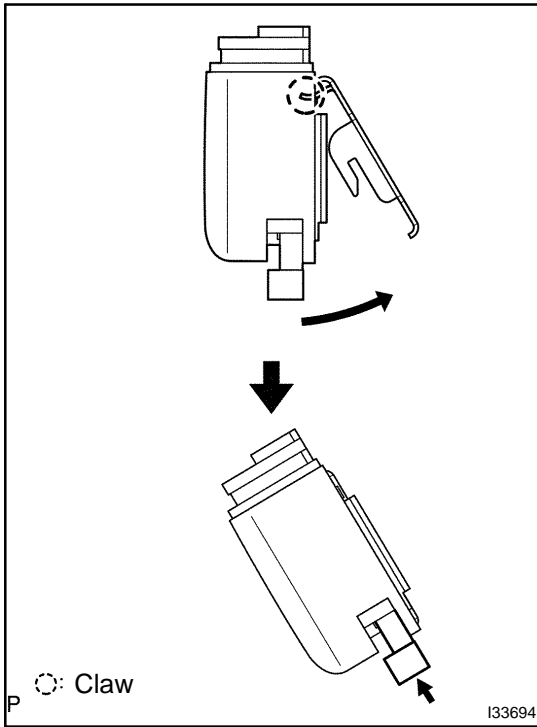


3. INSTALL RAIN SENSOR TAPE

- (a) Peel off the releasing sheet (yellow side) and attach the rain sensor tape on the position indicated in the illustration (the sensor part of the rain sensor) while pushing out air bubbles with fingers.
(b) Peel off the releasing sheet (white side).

NOTICE:

- When re-using the rain sensor, clean up dirt on the sensor part with a cloth, etc.
- Do not touch the silicon sheet surface directly with fingers.



4. INSTALL RAIN SENSOR

- (a) Engage the claw as shown in the illustration to set the position.
- (b) Gradually attach the rain sensor to the glass surface to prevent air bubbles in between.
- (c) Push in the stopper

NOTICE:

- Check that the rain sensor tape does not remain on the wind shield glass. If it does, remove it before installing the rain sensor.
- Do not touch the silicon sheet surface and the glass surface directly with fingers.
- Clean up dirt on the glass with a cloth, etc.
- The rain sensor tape can be re-used, however, replace it with a new one if it has dirt on or is damaged.
- After installing the rain sensor, air bubble should not exist between the wind shield glass and the rain sensor tape.

AUDIO & VISUAL SYSTEM

670NE-03

PRECAUTION

1. OBSERVE HANDLING AND OPERATIONAL PRECAUTIONS

- (a) Explain to the customer that when the negative terminal is disconnected from the battery, the AM/FM channel presets in the radio receiver are cleared. If necessary, make a note of the recorded channel information before the negative terminal is disconnected, then reset the information after the negative terminal is reconnected.
- (b) The removal/installation of the radio receiver should be performed after all cassette tapes and audio CDs are ejected from the radio receiver.

HINT:

If cassette tape or audio CD cannot be ejected due to a malfunction in the radio receiver, do not attempt to remove it forcefully. Bring the vehicle to a repair plant.

- (c) Fasten the earth bolt securely when the antennal cord is removed or installed.

HINT:

Failure to fasten the earth bolt securely causes noise when receiving radio waves.

- (d) Do not touch the cone paper of the speaker.

ON-VEHICLE INSPECTION

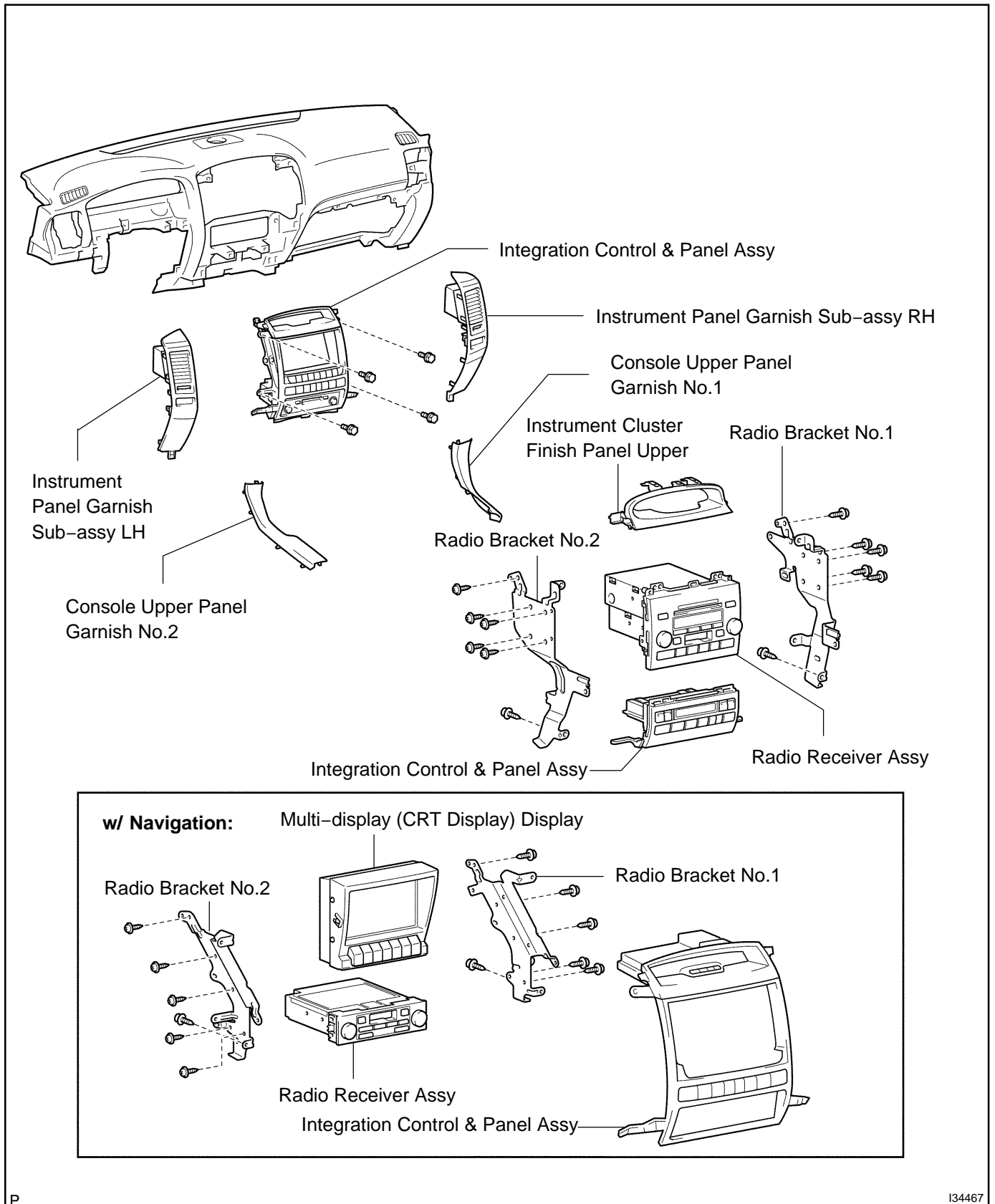
1. INSPECT VOLTAGE INVERTER ASSY



B33333

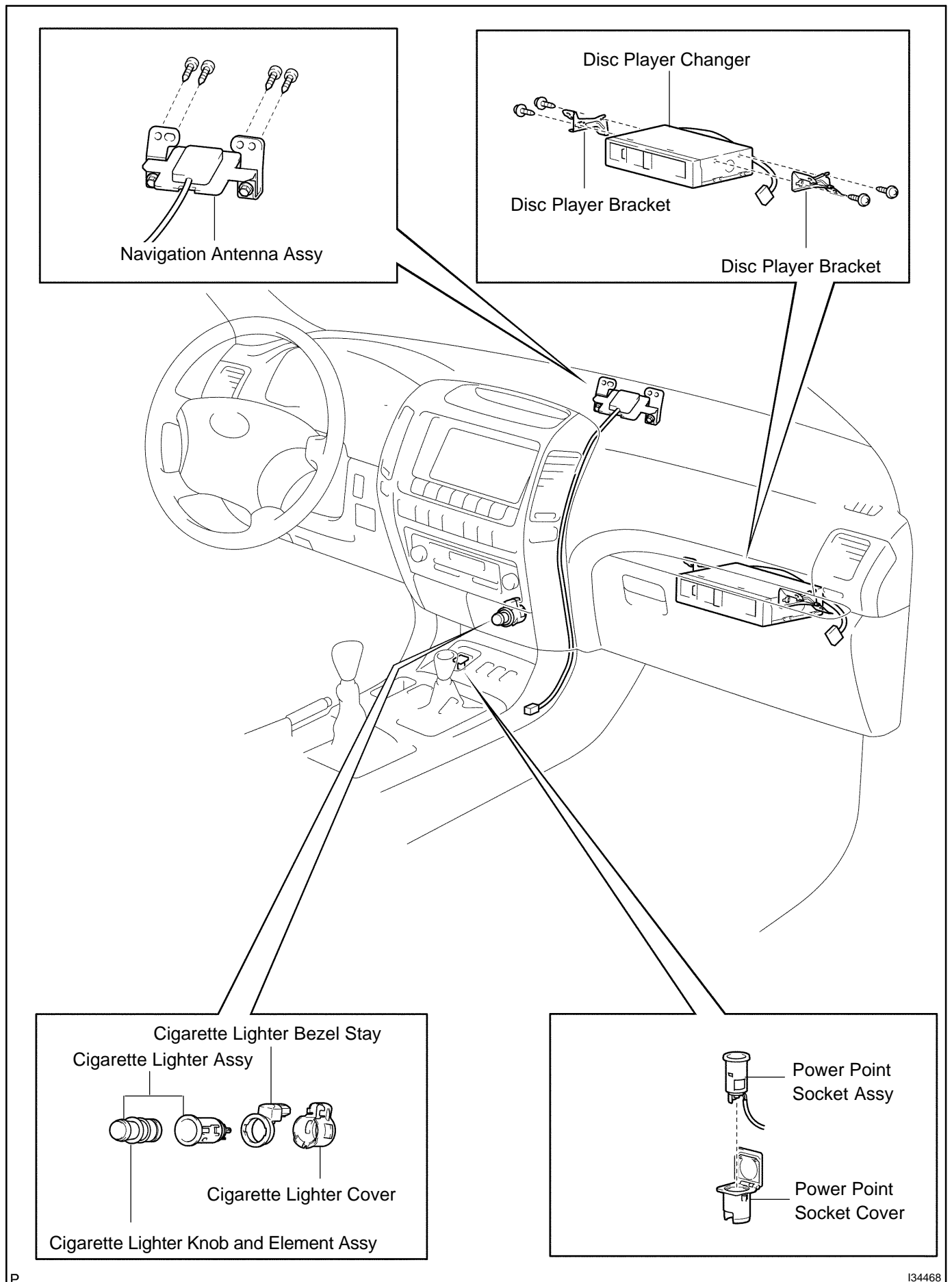
Tester connection	Condition	Specified condition
1 ↔ 4	IG switch ON	10 to 16 V
3 ↔ 4	IG switch ON, main switch ON	Pulse generation
4 ↔ Body Ground	Always	Continuity
7 ↔ 4	IG switch ON, main switch ON	Pulse generation

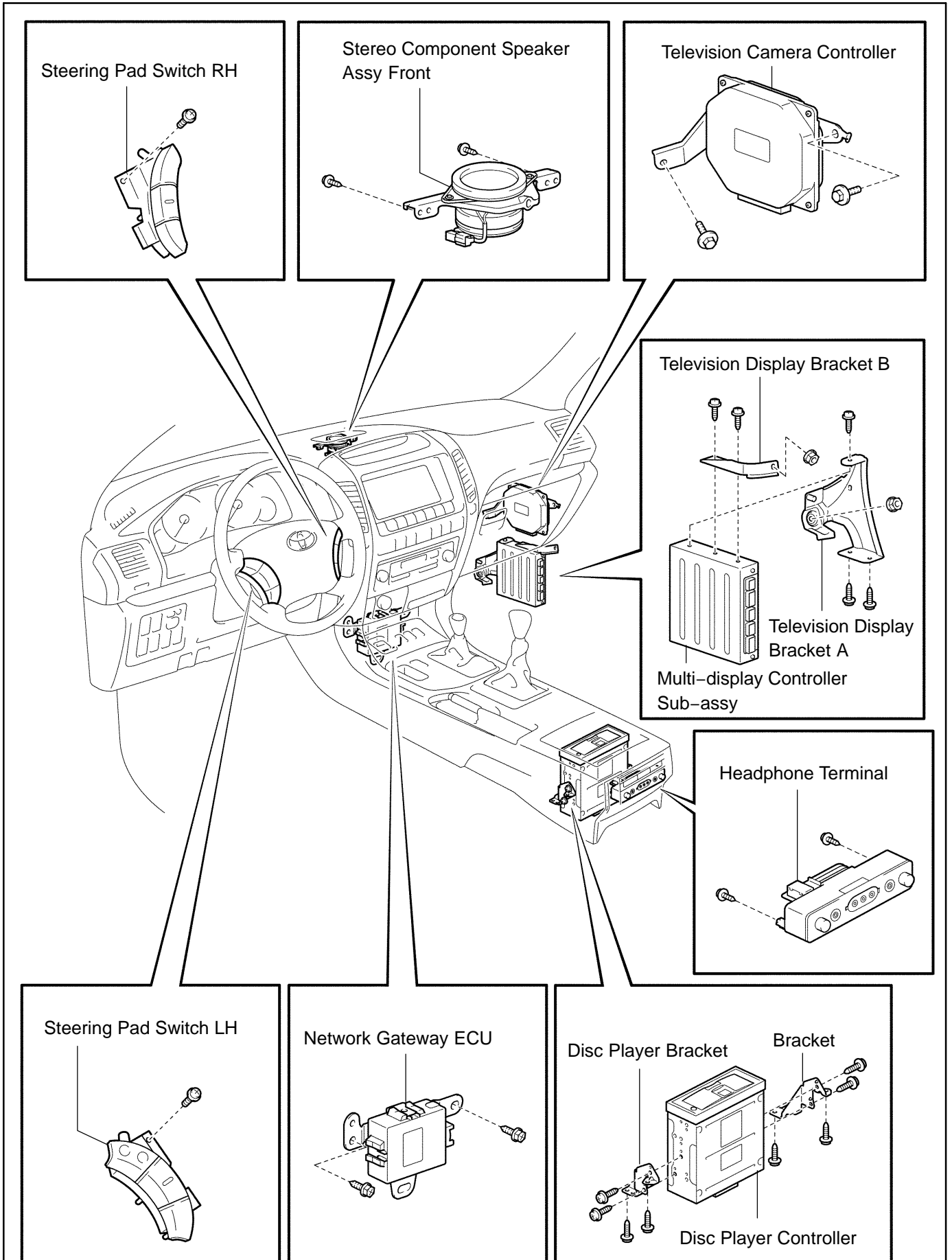
LOCATION



P

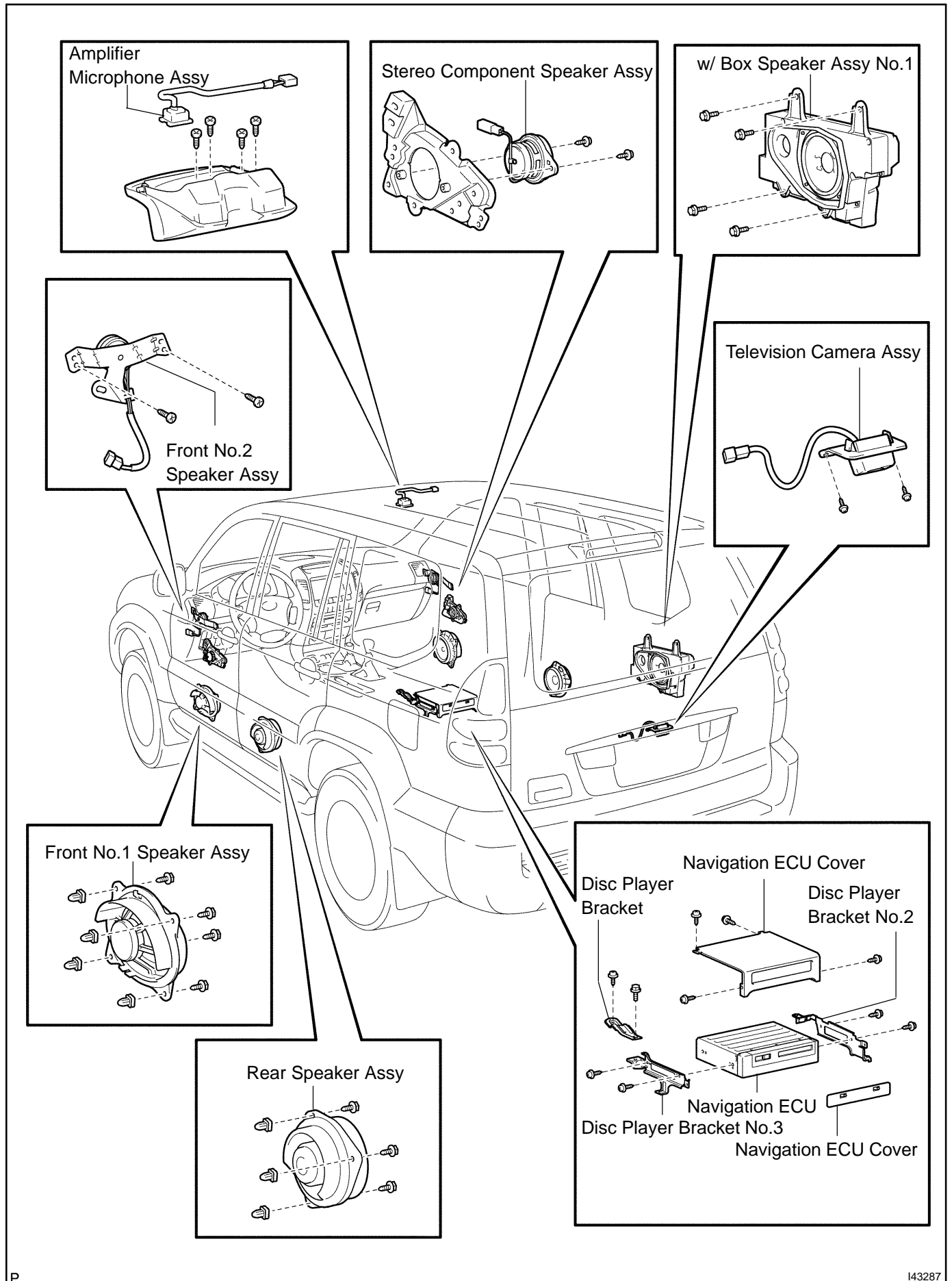
134467





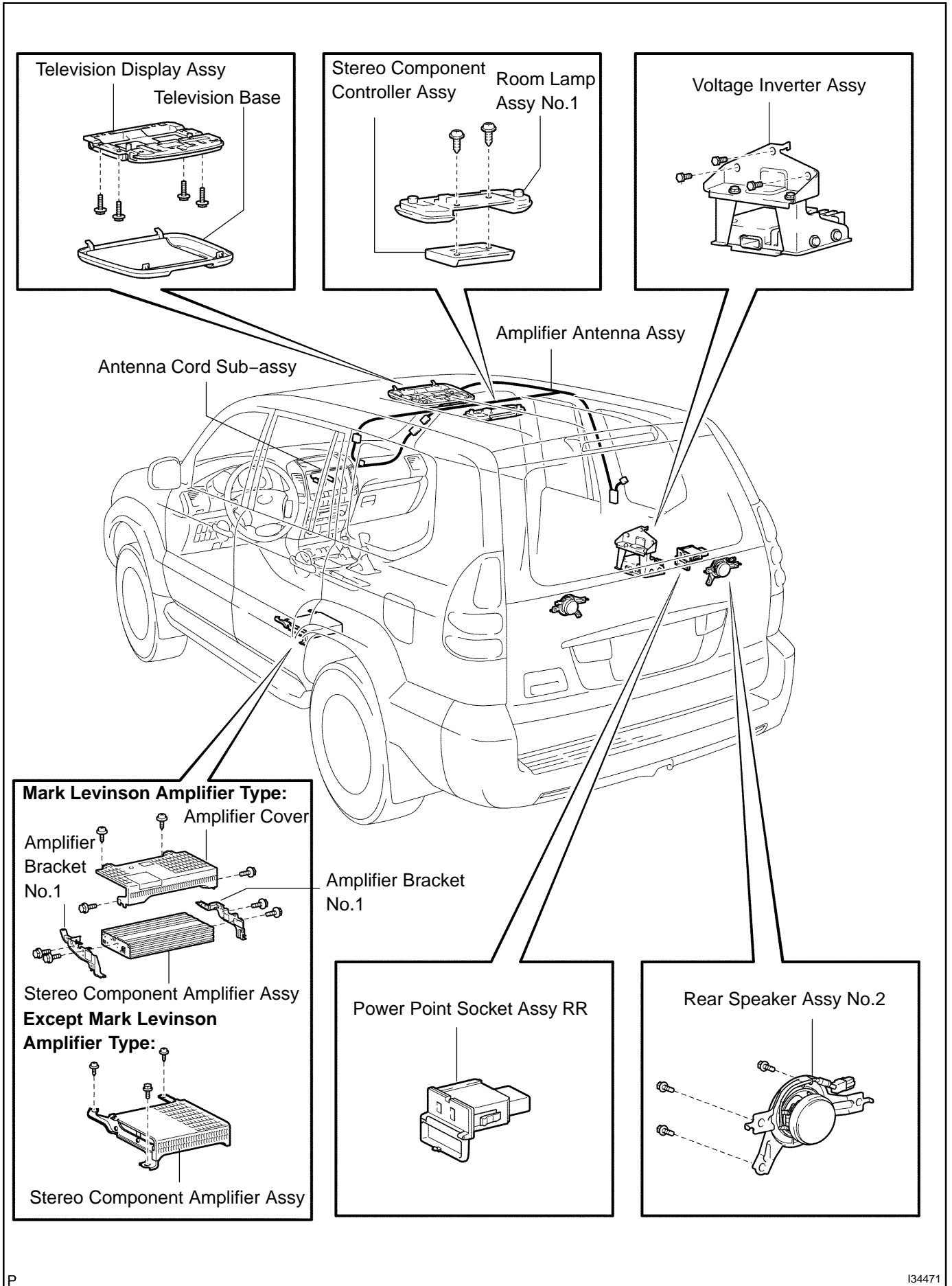
P

B76989



P

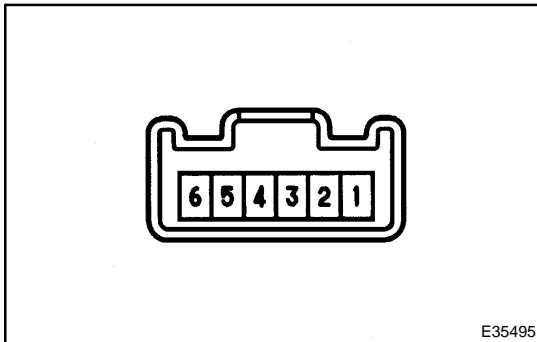
I43287



P

I34471

INSPECTION



1. INSPECT MAIN SWITCH ASSY

- (a) Inspect the continuity between terminals at each switch position shown in the chart.

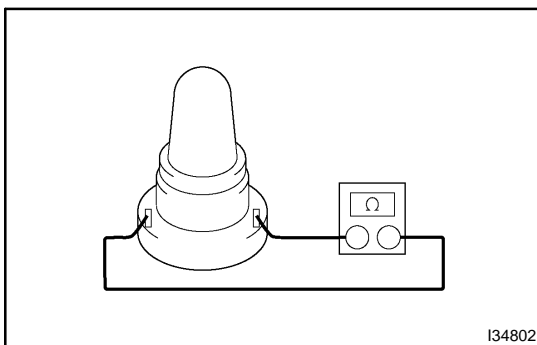
Switch operation	Tester connection	Specified condition
OFF	3 ↔ 4	No continuity
ON	3 ↔ 4	Continuity

If continuity is not as specified, replace the main switch assy.

- (b) Inspect the bulb state when connecting the battery to each terminal.

Inspection item	Battery connection	Specified condition
Indicator	Battery positive terminal ↔ 3 Battery negative terminal ↔ 6	Comes on
Illumination	Battery positive terminal ↔ 1 Battery negative terminal ↔ 2	Comes on

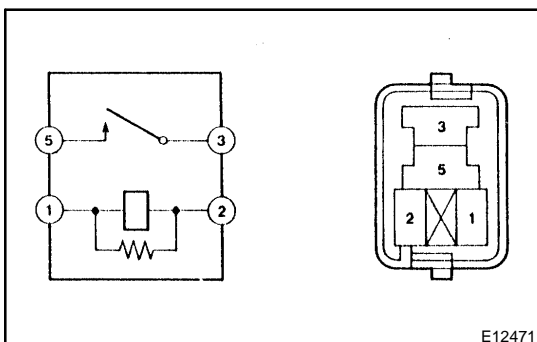
If operation is not as specified, check the faulty bulb.



- (c) Inspect continuity of the bulb by connecting the tester as shown in the illustration.

If continuity exists, replace the main switch assy.

If no continuity exists, replace the bulb.



2. INSPECT POWER POINT SOCKET RELAY

- (a) Inspect continuity between terminals according to the conditions in the chart.

Condition	Tester connection	Specified condition
Always	1 ↔ 2	Continuity
Always	3 ↔ 5	No continuity
Apply B+ between terminal 1 and 2	3 ↔ 5	Continuity

If continuity is not as specified, replace the point socket relay.

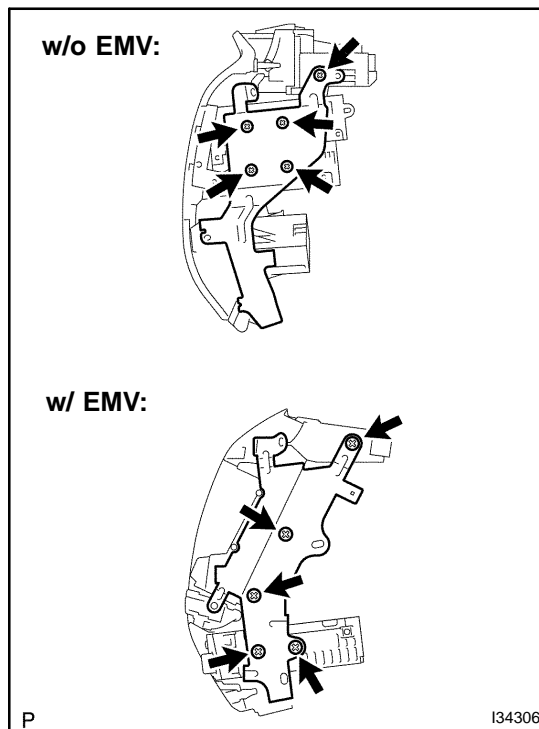
RADIO RECEIVER ASSY REPLACEMENT

670ND-03

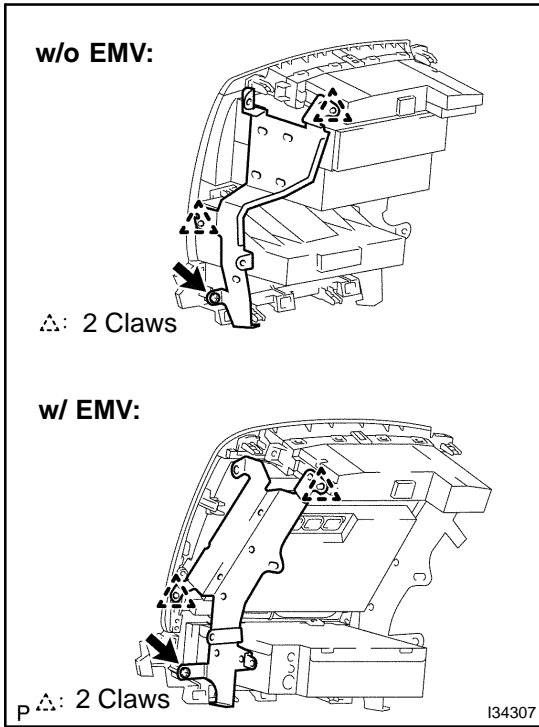
HINT:

COMPONENTS: See page 67-3.

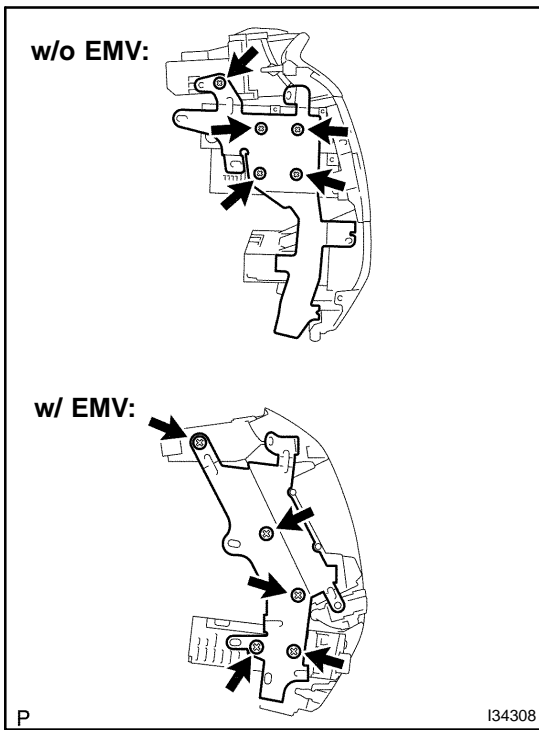
1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
3. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (SEE PAGE 71-13)
4. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (SEE PAGE 71-13)
5. REMOVE INTEGRATION CONTROL & PANEL ASSY (SEE PAGE 71-13)



6. REMOVE RADIO BRACKET NO.1
 - (a) Remove the 5 screws.

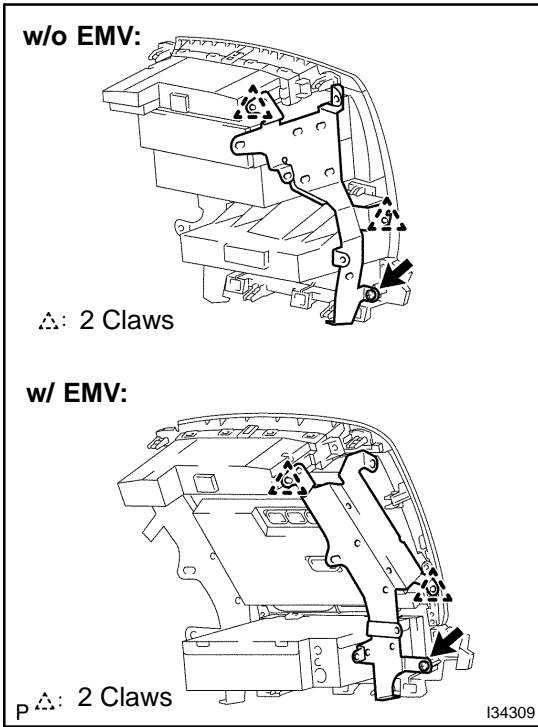


- (b) Remove the screw.
- (c) Release the 2 claws and remove the radio bracket No.1.

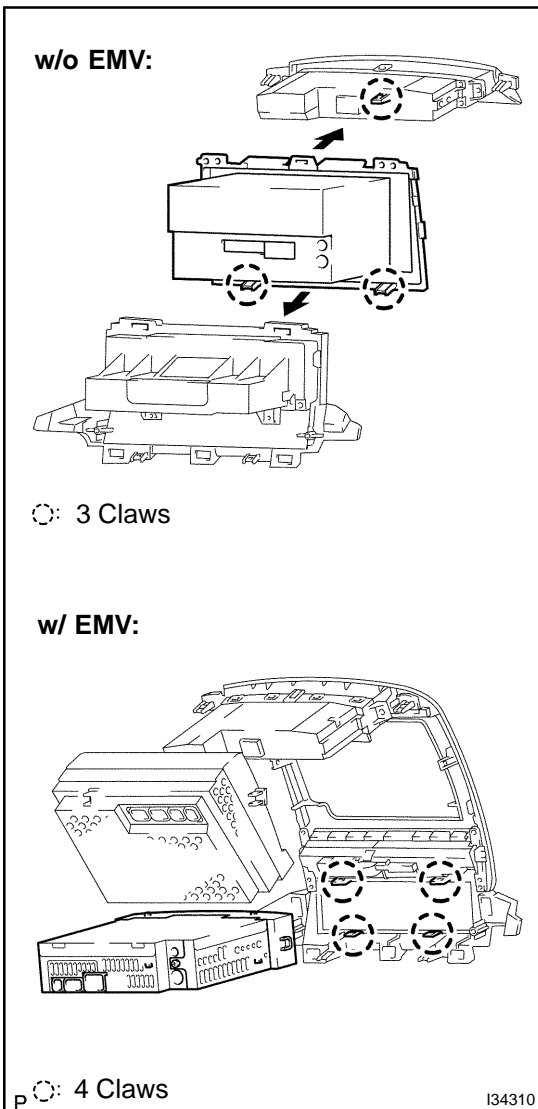


7. REMOVE RADIO BRACKET NO.2

- (a) Remove the 5 screws.



- (b) Remove the screw.
- (c) Release the 2 claws and remove the radio bracket No.2.



8. REMOVE RADIO RECEIVER ASSY

- (a) w/o EMV:
Release the 3 claws and remove the radio receiver assy.
- w/ EMV:
Release the 4 claws and remove the radio receiver assy.

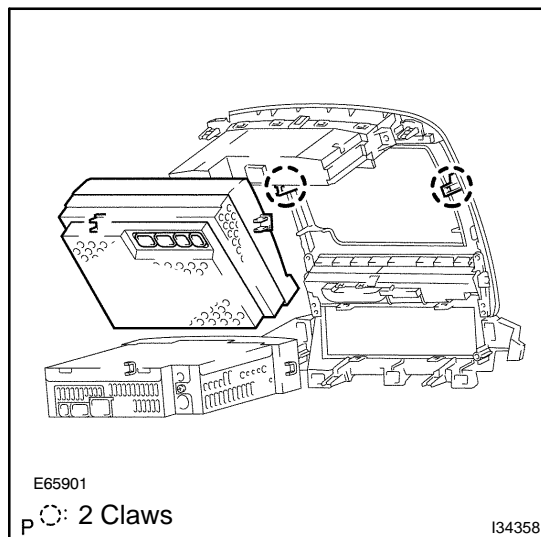
MULTI-DISPLAY (CRT DISPLAY) DISPLAY REPLACEMENT

670NG-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
3. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (SEE PAGE 71-13)
4. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (SEE PAGE 71-13)
5. REMOVE INTEGRATION CONTROL & PANEL ASSY (SEE PAGE 71-13)
6. REMOVE RADIO BRACKET NO.1 (SEE PAGE 67-9)
7. REMOVE RADIO BRACKET NO.2 (SEE PAGE 67-9)



8. REMOVE MULTI-DISPLAY (CRT DISPLAY) DISPLAY
 - (a) Release the 2 claws and remove the multi display.

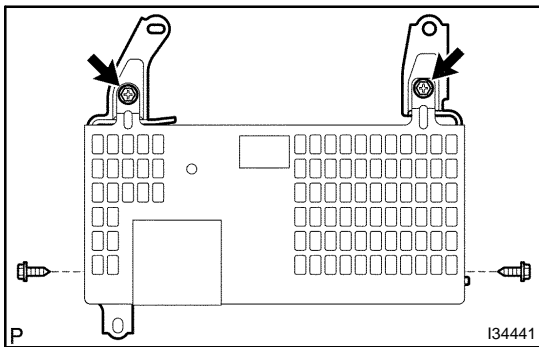
STEREO COMPONENT AMPLIFIER ASSY REPLACEMENT

670NI-03

HINT:

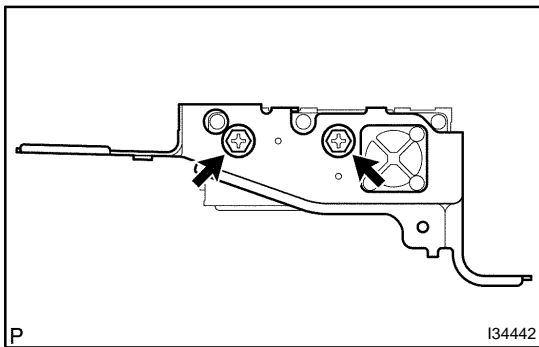
COMPONENTS: See page 67-3.

1. REMOVE FRONT LH SEAT ASSY (SEE PAGE 72-20)
2. REMOVE STEREO COMPONENT AMPLIFIER ASSY W/BACKET (MARK LEVINSON AMPLIFIER TYPE)
 - (a) Remove the 2 screws and bolt.
 - (b) Disconnect the connectors and remove the stereo component amplifier assy w/ bracket.



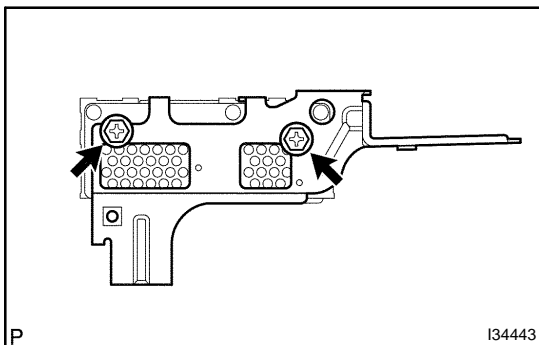
3. REMOVE AMPLIFIER COVER (MARK LEVINSON AMPLIFIER TYPE)

- (a) Remove the 4 screws and amplifier cover.



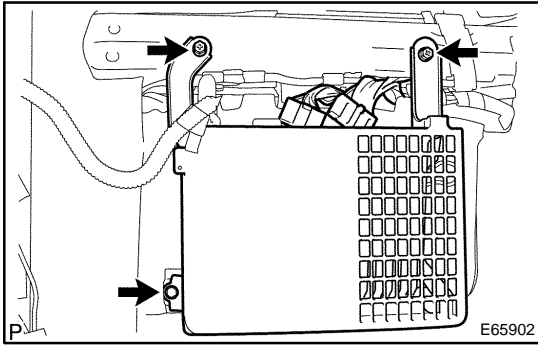
4. REMOVE AMPLIFIER BRACKET NO.1 (MARK LEVINSON AMPLIFIER TYPE)

- (a) Remove the 2 screws and amplifier bracket No.1.



5. REMOVE AMPLIFIER BRACKET NO.1 (MARK LEVINSON AMPLIFIER TYPE)

- (a) Remove the 2 screws and amplifier bracket No.1.



- 6. REMOVE STEREO COMPONENT AMPLIFIER ASSY (EXCEPT MARK LEVINSON AMPLIFIER TYPE)**
- (a) Remove the 2 screws and bolt.
 - (b) Disconnect the connectors and remove the stereo component amplifier assy.

- 7. INSTALL FRONT LH SEAT ASSY (SEE PAGE 72-20)**

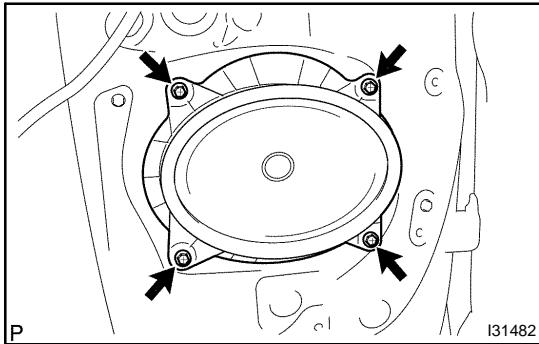
FRONT NO.1 SPEAKER ASSY REPLACEMENT

670NH-03

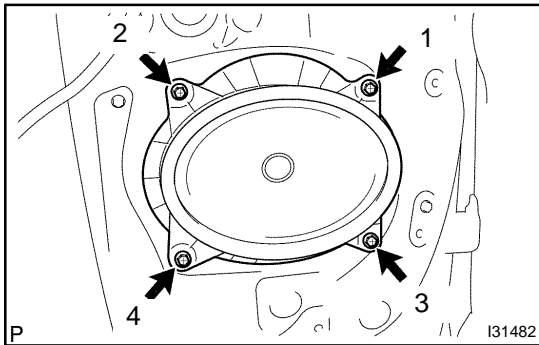
HINT:

COMPONENTS: See page 67-3.

1. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (SEE PAGE 75-13)
2. REMOVE FRONT DOOR INSIDE HANDLE BEZEL LH (SEE PAGE 75-13)
3. REMOVE FRONT ARMREST ASSY LH (SEE PAGE 75-13)
4. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSY (SEE PAGE 75-13)
5. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH (SEE PAGE 75-13)



6. REMOVE FRONT NO.1 SPEAKER ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 4 screws and front No.1 speaker assy.



7. INSTALL FRONT NO.1 SPEAKER ASSY
 - (a) Install the front No.1 speaker assy with the 4 screws.

NOTICE:
Install the screws in the order shown in the illustration.

 - (b) Connect the connector.

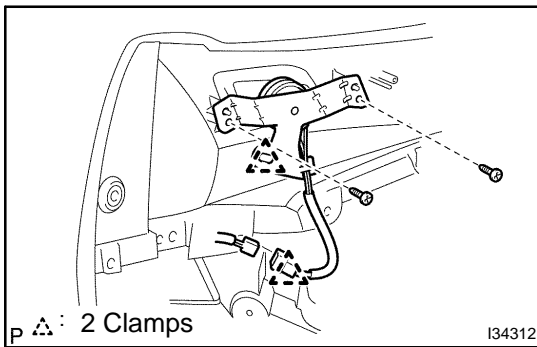
FRONT NO.2 SPEAKER ASSY REPLACEMENT

670NJ-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (SEE PAGE 75-13)
2. REMOVE FRONT DOOR INSIDE HANDLE BEZEL LH (SEE PAGE 75-13)
3. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSY (SEE PAGE 75-13)
4. REMOVE FRONT ARMREST ASSY LH (SEE PAGE 75-13)
5. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH (SEE PAGE 75-13)



6. REMOVE FRONT NO.2 SPEAKER ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 2 clamps.
 - (c) Remove the 2 screws and front No.2 speaker assy.

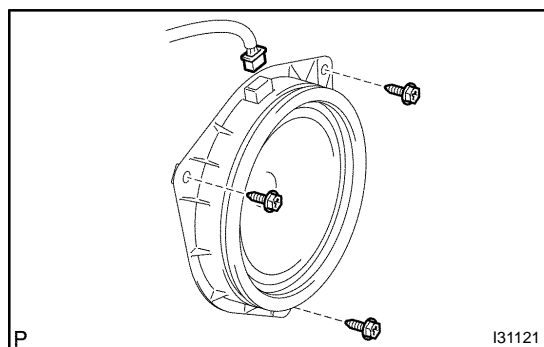
REAR SPEAKER ASSY REPLACEMENT

670NK-03

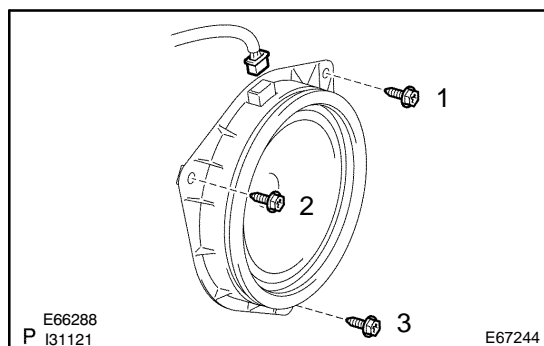
HINT:

COMPONENTS: See page 67-3.

1. REMOVE REAR DOOR INSIDE HANDLE BEZEL LH (SEE PAGE 75-26)
2. REMOVE REAR LH ARMREST ASSY (SEE PAGE 75-26)
3. REMOVE POWER WINDOW REGULATOR SWITCH ASSY REAR (SEE PAGE 75-26)
4. REMOVE REAR DOOR TRIM BOARD SUB-ASSY LH (SEE PAGE 75-26)



5. REMOVE REAR SPEAKER ASSY
 - (a) Disconnect the connector.
 - (b) Remove the 3 screws and rear speaker assy.



6. INSTALL REAR SPEAKER ASSY
 - (a) Install the rear speaker assy with the 3 screws.

NOTICE:

Install the screws in the order shown in the illustration.

- (b) Connect the connector.

STEREO COMPONENT SPEAKER ASSY FRONT

REPLACEMENT

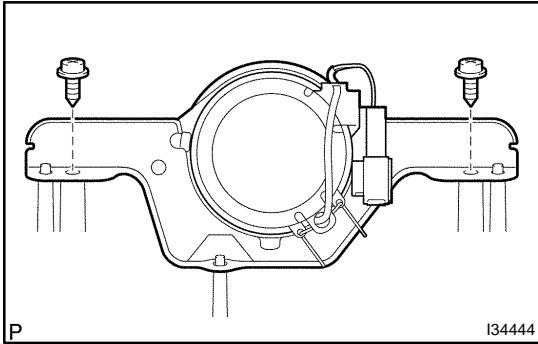
67ONL-03

HINT:

COMPONENTS: See page 67-3.

1. TABLE OF BOLT, SCREW AND NUT
2. DISCONNECT BATTERY NEGATIVE TERMINAL
3. REMOVE SHIFT LEVER KNOB SUB-ASSY
4. REMOVE SHIFT LEVER KNOB SUB-ASSY
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.2
6. REMOVE CONSOLE UPPER PANEL GARNISH NO.1
7. REMOVE CONSOLE PANEL UPPER ASSY
8. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH
9. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH
10. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER
11. REMOVE INTEGRATION CONTROL & PANEL ASSY
12. REMOVE CONSOLE REAR END PANEL SUB-ASSY
13. REMOVE RR CONSOLE BOX ASSY
14. REMOVE CONSOLE BOX INSERT FRONT NO.2
15. REMOVE CONSOLE BOX INSERT
16. REMOVE CONSOLE UPPER PANEL GARNISH FRONT
17. REMOVE CONSOLE BOX LOWER
18. REMOVE STEERING WHEEL COVER LOWER NO.2
19. REMOVE STEERING WHEEL COVER LOWER NO.3
20. REMOVE HORN BUTTON ASSY
21. REMOVE STEERING WHEEL ASSY
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
22. REMOVE STEERING COLUMN COVER
23. REMOVE TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY
24. REMOVE FRONT DOOR SCUFF PLATE LH
25. REMOVE FRONT DOOR SCUFF PLATE RH
26. REMOVE FRONT FLOOR FOOTREST
27. REMOVE COWL SIDE TRIM BOARD LH
28. REMOVE COWL SIDE TRIM BOARD RH
29. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1
30. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT
31. REMOVE SWITCH HOLE BASE NO.1
32. REMOVE INSTRUMENT PANEL FINISH PLATE
33. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH
34. REMOVE INSTRUMENT PANEL LOWER LH
35. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY
36. REMOVE COMBINATION METER ASSY
37. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1
38. REMOVE INSTRUMENT PANEL UNDER COVER NO.2
39. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY
40. REMOVE INSTRUMENT PANEL ORNAMENT
41. DISCONNECT PASSENGER AIRBAG CONNECTOR
42. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2
43. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2

44. REMOVE DISC PLAYER CHANGER W/BRACKET (W/ DISC PLAYER CHANGER)
45. REMOVE ASSIST GRIP ASSY
46. REMOVE FRONT PILLAR GARNISH LH
47. REMOVE FRONT PILLAR GARNISH RH
48. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)



49. REMOVE STEREO COMPONENT SPEAKER ASSY FRONT
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and stereo component speaker assy front.

50. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)
51. INSTALL COMBINATION METER ASSY
52. ADJUST SPIRAL CABLE SUB-ASSY
53. INSTALL STEERING WHEEL ASSY
54. INSTALL HORN BUTTON ASSY
55. INSPECT HORN BUTTON ASSY
56. INCLINATION SENSOR 0 \square CORRECTION
57. INSPECT SRS WARNING LIGHT

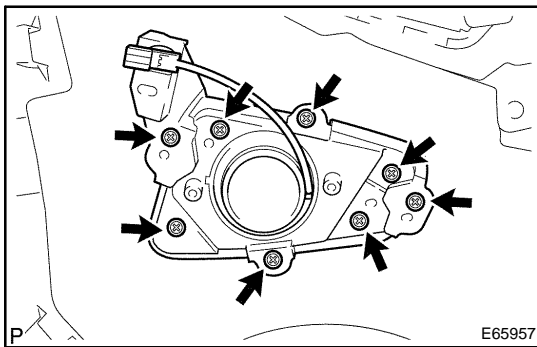
STEREO COMPONENT SPEAKER ASSY REPLACEMENT

670NM-03

HINT:

COMPONENTS: See page 67-3.

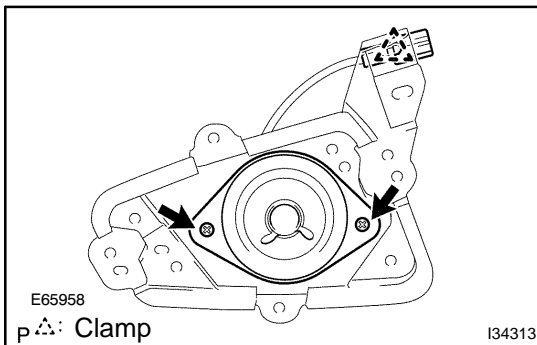
1. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (SEE PAGE 75-13)
2. REMOVE FRONT DOOR INSIDE HANDLE BEZEL LH (SEE PAGE 75-13)
3. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSY (SEE PAGE 75-13)
4. REMOVE FRONT ARMREST ASSY LH (SEE PAGE 75-13)
5. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH (SEE PAGE 75-13)



6. REMOVE STEREO COMPONENT SPEAKER ASSY
 - (a) Remove the 8 screws and stereo component speaker assy.

NOTICE:

Since the panel on the interior side is taken off with the stereo component speaker assy, be careful not to drop it.



- (b) Remove the clamp.
- (c) Remove the 2 screws and stereo component speaker assy.

REAR SPEAKER ASSY NO.2

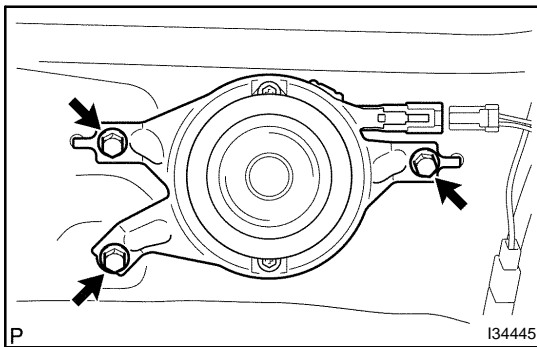
REPLACEMENT

670NO-03

HINT:

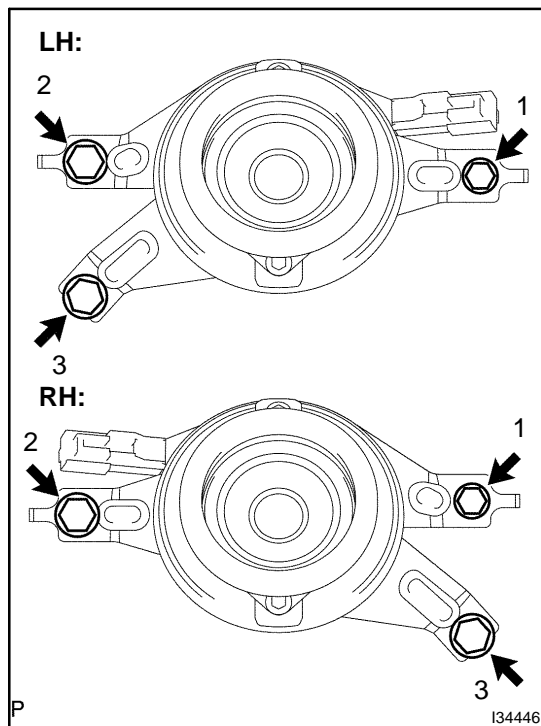
COMPONENTS: See page 67-3.

1. REMOVE BACK DOOR GARNISH CENTER (SEE PAGE 75-39)
2. REMOVE BACK DOOR SIDE GARNISH RH (SEE PAGE 75-39)
3. REMOVE BACK DOOR SIDE GARNISH LH (SEE PAGE 75-39)
4. REMOVE TOOL BOX PANEL SUB-ASSY UPPER (SEE PAGE 75-39)
5. REMOVE DOOR PULL HANDLE SUB-ASSY (SEE PAGE 75-39)
6. REMOVE BACK DOOR TRIM BOARD (SEE PAGE 75-39)



7. REMOVE REAR SPEAKER ASSY NO.2

- (a) Disconnect the connector.
- (b) Remove the 3 bolts and rear speaker assy No.2.



8. INSTALL REAR SPEAKER ASSY NO.2

- (a) Install the rear speaker assy No.2 with the 3 bolts.

NOTICE:

Install the bolts in the order shown the illustration.

- (b) Connect the connector.

W/BOX SPEAKER ASSY NO.1

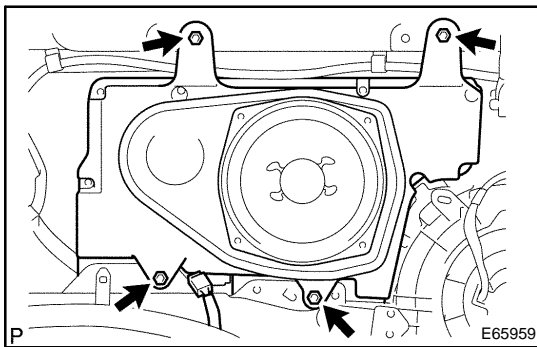
REPLACEMENT

670NP-03

HINT:

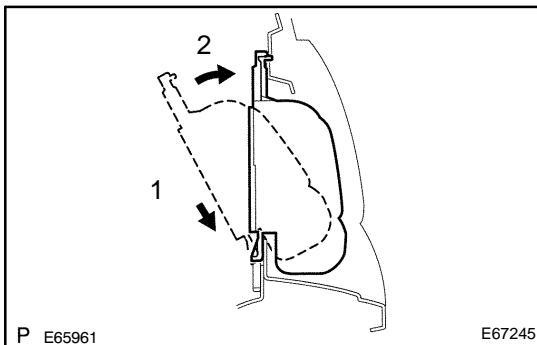
COMPONENTS: See page 67-3.

1. REMOVE REAR DOOR SCUFF PLATE RH (SEE PAGE 76-38)
2. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
3. REMOVE BACK DOOR WEATHERSTRIP
4. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (SEE PAGE 76-38)
5. REMOVE PACKAGE TRAY TRIM PANEL ASSY (SEE PAGE 76-38)
6. REMOVE QUARTER INSIDE TRIM BOARD RH (SEE PAGE 76-38)
7. REMOVE ROOF SIDE GARNISH INNER RH (SEE PAGE 76-38)



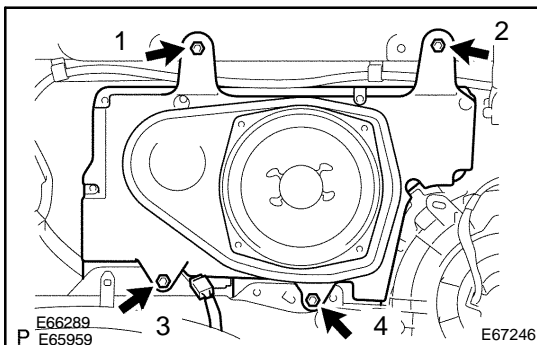
8. REMOVE W/BOX SPEAKER ASSY NO.1

- (a) Disconnect the connector.
- (b) Remove the 4 bolts and w/ box speaker assy No.1.



9. INSTALL W/BOX SPEAKER ASSY NO.1

- (a) Place the w/ box speaker assy No.1 temporarily on the body as shown in the illustration.



- (b) Install the w/ box speaker assy No.1 with the 4 bolts.

NOTICE:

Install the bolts in the order shown the illustration.

- (c) Connect the connector.

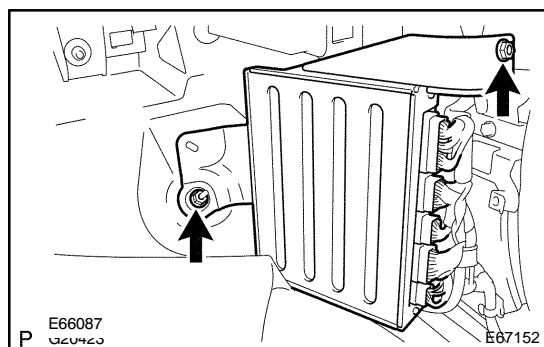
MULTI-DISPLAY CONTROLLER SUB-ASSY REPLACEMENT

670NQ-03

HINT:

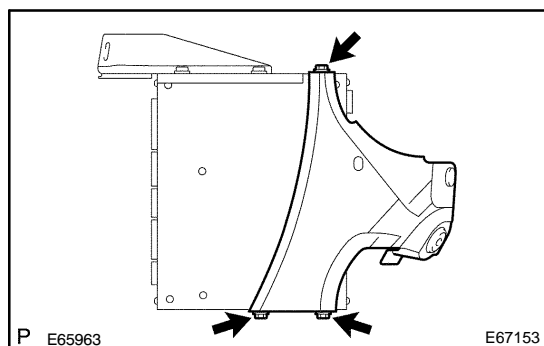
COMPONENTS: See page 67-3.

1. REMOVE FRONT DOOR SCUFF PLATE RH (SEE PAGE 76-38)
2. REMOVE COWL SIDE TRIM BOARD RH (SEE PAGE 76-38)



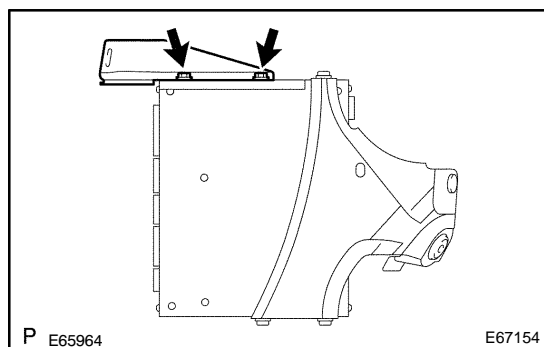
3. REMOVE MULTI-DISPLAY CONTROLLER W/BRACKET

- (a) Disconnect the connectors.
- (b) Remove the 2 nuts and multi-display controller w/ bracket.



4. REMOVE TELEVISION DISPLAY BRACKET A

- (a) Remove the 3 screws and television display bracket A.



5. REMOVE TELEVISION DISPLAY BRACKET B

- (a) Remove the 2 screws and television display bracket B.

TELEVISION CAMERA ASSY

REPLACEMENT

671G2-01

HINT:

COMPONENTS: See page [67-3](#).

1. REMOVE BACK DOOR GARNISH CENTER (SEE PAGE [75-39](#))
2. REMOVE BACK DOOR SIDE GARNISH RH (SEE PAGE [75-39](#))
3. REMOVE BACK DOOR SIDE GARNISH LH (SEE PAGE [75-39](#))
4. REMOVE TOOL BOX PANEL SUB-ASSY UPPER (SEE PAGE [75-39](#))
5. REMOVE DOOR PULL HANDLE SUB-ASSY (SEE PAGE [75-39](#))
6. REMOVE BACK DOOR TRIM BOARD (SEE PAGE [75-39](#))
7. REMOVE BACK DOOR SERVICE HOLE COVER (SEE PAGE [75-39](#))
8. REMOVE LICENSE REAR LAMP COVER (SEE PAGE [76-34](#))
9. REMOVE BACK DOOR OUTSIDE GARNISH (SEE PAGE [65-17](#))
10. REMOVE TELEVISION CAMERA ASSY

TELEVISION CAMERA CONTROLLER REPLACEMENT

671G3-01

HINT:

COMPONENTS: See page [67-3](#).

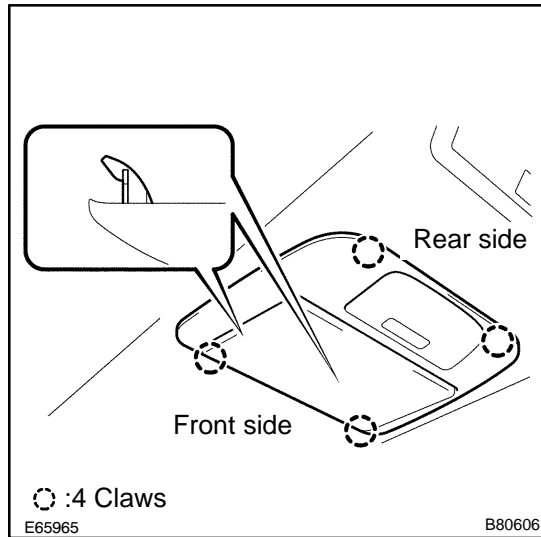
1. REMOVE FRONT DOOR SCUFF PLATE RH (SEE PAGE [76-38](#))
2. REMOVE COWL SIDE TRIM BOARD RH (SEE PAGE [76-38](#))
3. REMOVE INSTRUMENT PANEL UNDER COVER NO.2 (SEE PAGE [71-13](#))
4. REMOVE INSTRUMENT PANEL ORNAMENT (SEE PAGE [71-13](#))
5. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY (SEE PAGE [71-13](#))
6. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2 (SEE PAGE [71-13](#))
7. REMOVE ECM (SEE PAGE [10-16](#))
8. REMOVE TELEVISION CAMERA CONTROLLER

TELEVISION DISPLAY ASSY REPLACEMENT

670NR-03

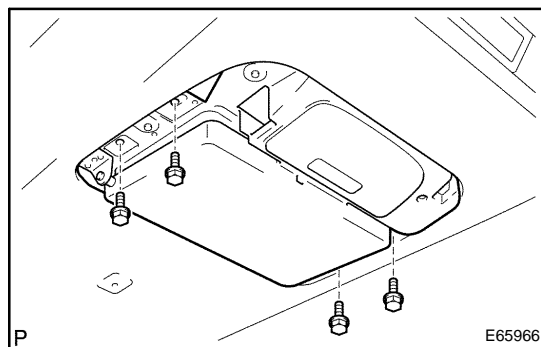
HINT:

COMPONENTS: See page 67-3.



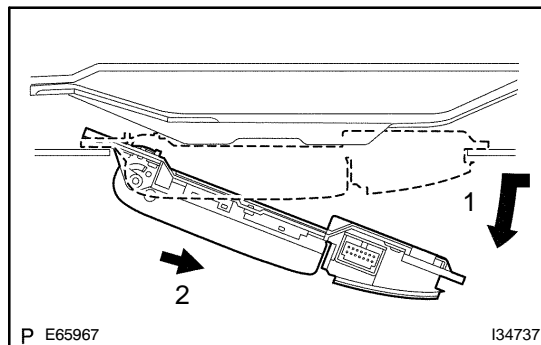
1. REMOVE TELEVISION BASE

- (a) Push the television base to the front of the vehicle in order to disengage the 2 claws on the backside.
- (b) Disengage the 2 claws on the frontside and remove the television base.



2. REMOVE TELEVISION DISPLAY ASSY

- (a) Disconnect the connector.
- (b) Remove the 4 bolts.



- (c) Remove the television display assy as shown in the illustration.

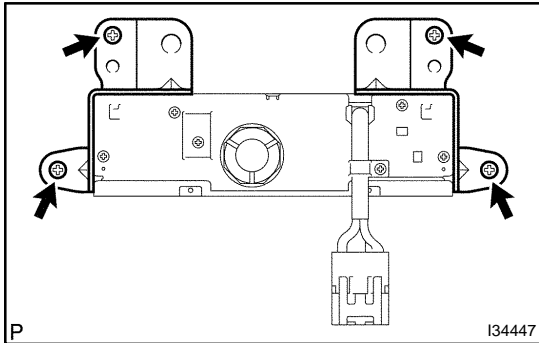
DISC PLAYER CONTROLLER REPLACEMENT

67ONS-03

HINT:

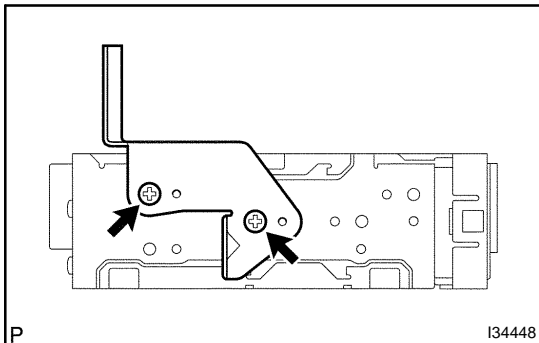
COMPONENTS: See page 67-3.

1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
3. REMOVE CONSOLE REAR END PANEL SUB-ASSY (SEE PAGE 71-13)
4. REMOVE RR CONSOLE BOX ASSY (SEE PAGE 71-13)



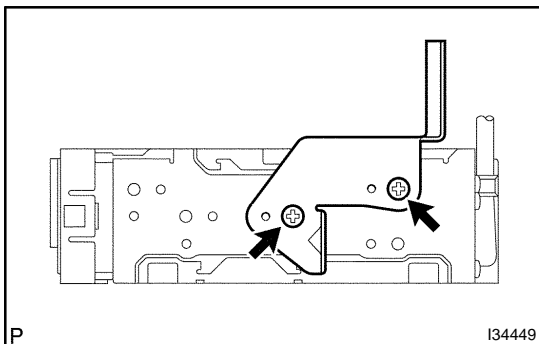
5. REMOVE DISC PLAYER CONTROLLER W/BRACKET

- (a) Remove the 4 screws and disc player controller w/ bracket.



6. REMOVE DISC PLAYER BRACKET

- (a) Remove the 2 screws and disc player bracket.



7. REMOVE BRACKET

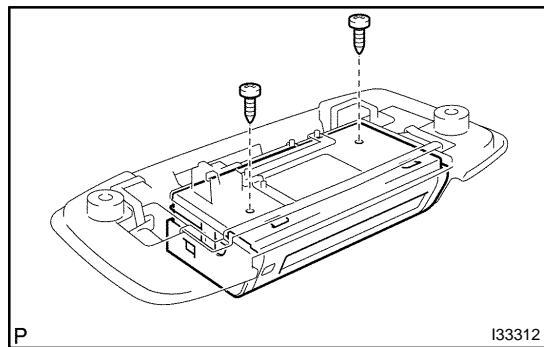
- (a) Remove the 2 screws and bracket.

STEREO COMPONENT CONTROLLER ASSY REPLACEMENT

67ONT-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE ROOM LAMP ASSY NO.1 (SEE PAGE 76-38)**2. REMOVE STEREO COMPONENT CONTROLLER ASSY**

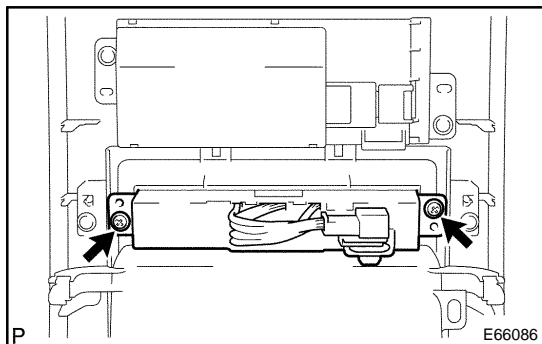
- (a) Remove the 2 screws and stereo component controller assy.

HEADPHONE TERMINAL REPLACEMENT

670NU-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE CONSOLE REAR END PANEL SUB-ASSY (SEE PAGE 71-13)**2. REMOVE HEADPHONE TERMINAL**

(a) Remove the 2 screws and headphone terminal.

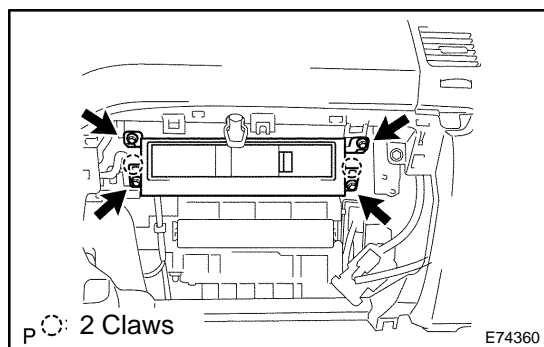
DISC PLAYER CHANGER REPLACEMENT

670NV-03

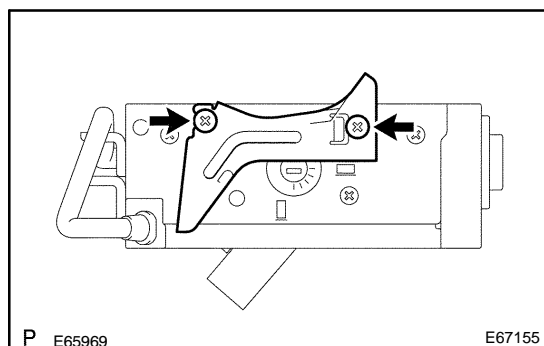
HINT:

COMPONENTS: See page 67-3.

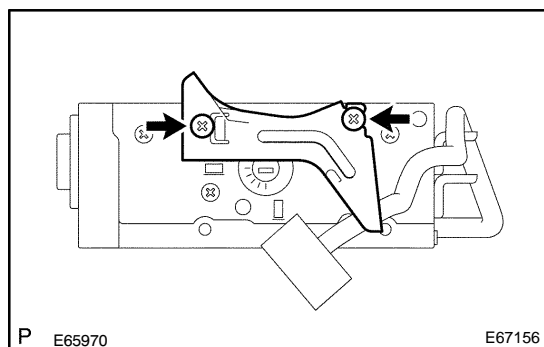
1. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY (SEE PAGE 71-13)
2. REMOVE INSTRUMENT PANEL ORNAMENT (SEE PAGE 71-13)
3. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2 (SEE PAGE 71-13)



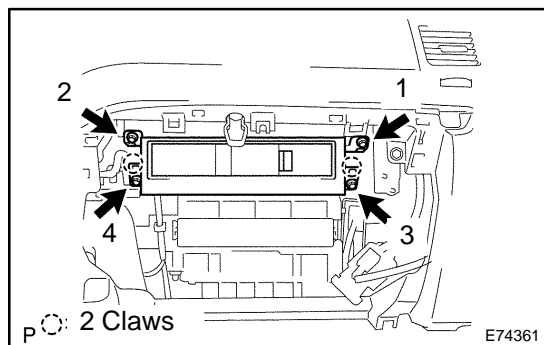
4. REMOVE DISC PLAYER CHANGER W/BRACKET
 - (a) Remove the 4 bolts.
 - (b) Release the 2 claws and pull the disc player changer w/ bracket.
 - (c) Disconnect the connectors and remove the disc player changer w/ bracket.



5. REMOVE DISC PLAYER BRACKET
 - (a) Remove the 2 screws and disc player bracket.



6. REMOVE DISC PLAYER BRACKET
 - (a) Remove the 2 screws and disc player bracket.



7. INSTALL DISC PLAYER CHANGER W/BRACKET
 - (a) Connect the connectors.
 - (b) Engage the 2 claws and place the disc player changer w/ bracket temporarily on the body.
 - (c) Install the 4 bolts and disc player changer w/ bracket.

NOTICE:

Install the bolts in the order shown in the illustration.

ANTENNA CORD SUB-ASSY

REPLACEMENT

670NW-03

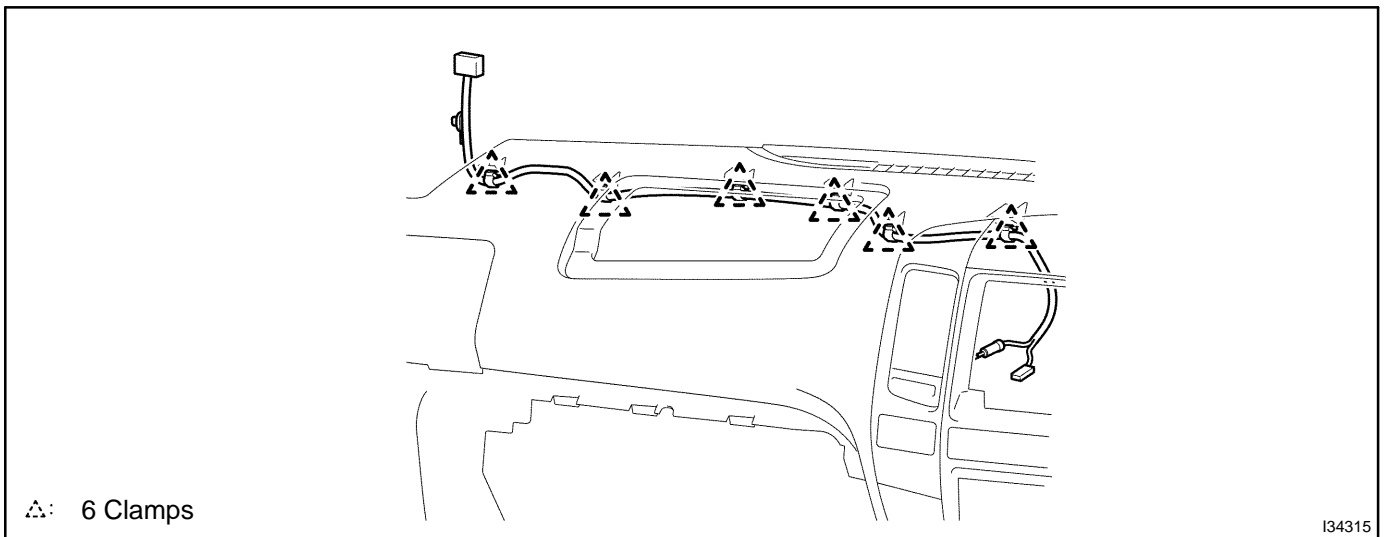
HINT:

COMPONENTS: See page 67-3.

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. REMOVE SHIFT LEVER KNOB SUB-ASSY
3. REMOVE SHIFT LEVER KNOB SUB-ASSY
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.2
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.1
6. REMOVE CONSOLE PANEL UPPER ASSY
7. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH
8. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH
9. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER
10. REMOVE INTEGRATION CONTROL & PANEL ASSY
11. REMOVE CONSOLE REAR END PANEL SUB-ASSY
12. REMOVE RR CONSOLE BOX ASSY
13. REMOVE CONSOLE BOX INSERT FRONT NO.2
14. REMOVE CONSOLE BOX INSERT
15. REMOVE CONSOLE UPPER PANEL GARNISH FRONT
16. REMOVE CONSOLE BOX LOWER
17. REMOVE STEERING WHEEL COVER LOWER NO.2
18. REMOVE STEERING WHEEL COVER LOWER NO.3
19. REMOVE HORN BUTTON ASSY
20. REMOVE STEERING WHEEL ASSY
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
21. REMOVE STEERING COLUMN COVER
22. REMOVE TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY
23. REMOVE FRONT DOOR SCUFF PLATE LH
24. REMOVE FRONT DOOR SCUFF PLATE RH
25. REMOVE FRONT FLOOR FOOTREST
26. REMOVE COWL SIDE TRIM BOARD LH
27. REMOVE COWL SIDE TRIM BOARD RH
28. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1
29. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT
30. REMOVE SWITCH HOLE BASE NO.1
31. REMOVE INSTRUMENT PANEL FINISH PLATE
32. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH
33. REMOVE INSTRUMENT PANEL LOWER LH
34. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY
35. REMOVE COMBINATION METER ASSY
36. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1
37. REMOVE INSTRUMENT PANEL UNDER COVER NO.2
38. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY
39. REMOVE INSTRUMENT PANEL ORNAMENT
40. DISCONNECT PASSENGER AIRBAG CONNECTOR
41. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2
42. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2
43. REMOVE DISC PLAYER CHANGER W/BACKET (W/ DISC PLAYER CHANGER)

44. REMOVE ASSIST GRIP ASSY
45. REMOVE FRONT PILLAR GARNISH LH
46. REMOVE FRONT PILLAR GARNISH RH
47. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)

48. REMOVE ANTENNA CORD SUB-ASSY
 - (a) Remove the 6 clamps and antenna cord sub-assy.



I34315

49. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)
50. INSTALL COMBINATION METER ASSY
51. CENTER SPIRAL CABLE
52. INSTALL STEERING WHEEL ASSY
53. INSTALL HORN BUTTON ASSY
54. INSPECT HORN BUTTON ASSY
55. INCLINATION SENSOR 0 \square CORRECTION
56. INSPECT SRS WARNING LIGHT

AMPLIFIER ANTENNA ASSY

REPLACEMENT

670NX-03

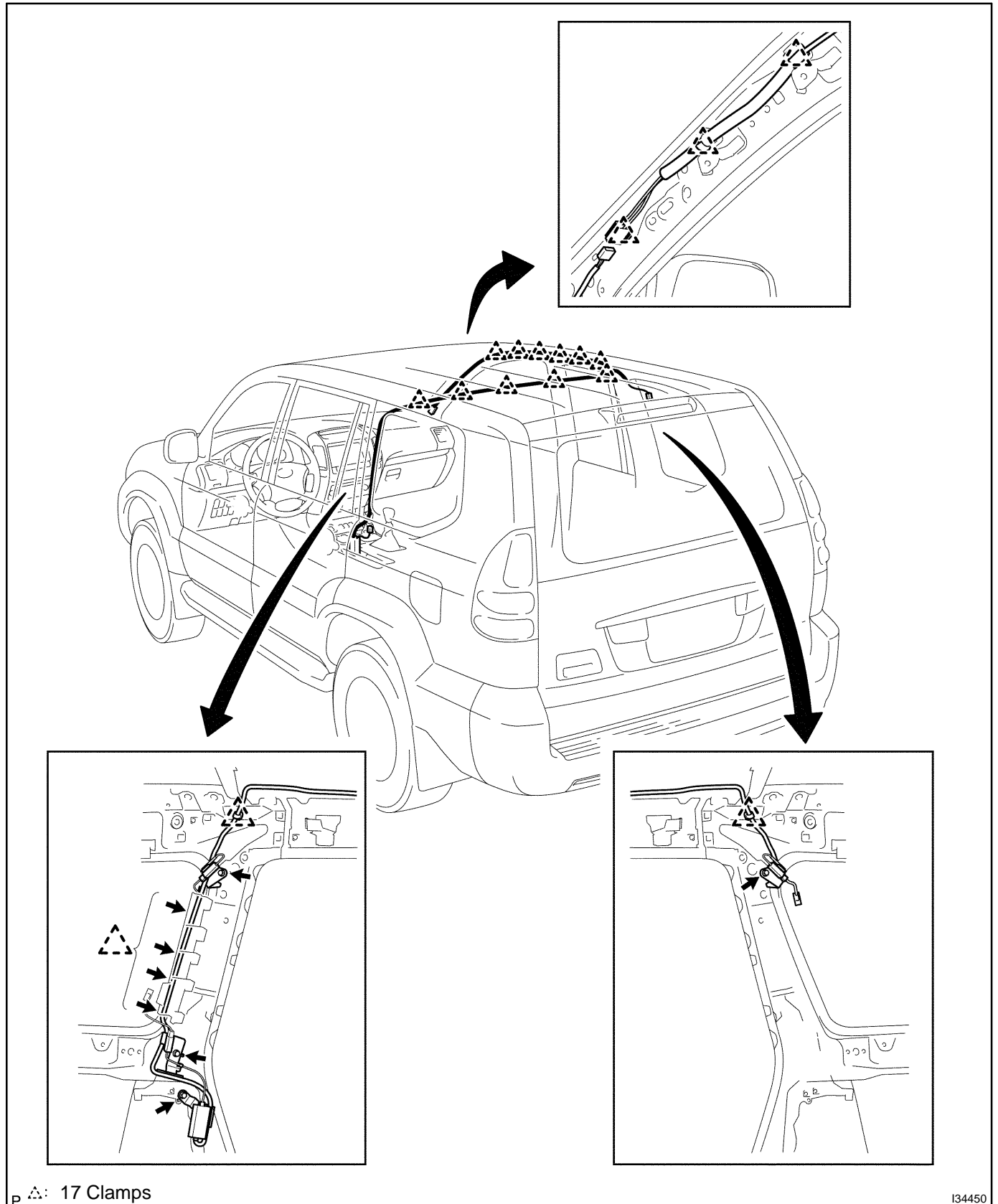
HINT:

COMPONENTS: See page 67-3.

1. REMOVE REAR NO. 2 SEAT ASSY LH
2. REMOVE REAR NO. 2 SEAT ASSY RH
3. REMOVE FRONT DOOR SCUFF PLATE LH
4. REMOVE FRONT DOOR SCUFF PLATE RH
5. REMOVE COWL SIDE TRIM BOARD LH
6. REMOVE COWL SIDE TRIM BOARD RH
7. REMOVE QUARTER SCUFF PLATE INSIDE LH
8. REMOVE QUARTER SCUFF PLATE INNER RH
9. REMOVE REAR DOOR SCUFF PLATE LH
10. REMOVE REAR DOOR SCUFF PLATE RH
11. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH
12. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH
13. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
14. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
15. REMOVE CENTER PILLAR GARNISH LOWER LH
16. REMOVE CENTER PILLAR GARNISH LOWER RH
17. REMOVE CENTER PILLAR GARNISH LH
18. REMOVE CENTER PILLAR GARNISH RH
19. REMOVE BACK DOOR WEATHERSTRIP
20. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR
21. REMOVE PACKAGE TRAY TRIM PANEL ASSY
22. REMOVE QUARTER INSIDE TRIM BOARD LH
23. REMOVE QUARTER INSIDE TRIM BOARD RH
24. REMOVE ROOF SIDE GARNISH INNER LH
25. REMOVE ROOF SIDE GARNISH INNER RH
26. REMOVE FRONT PILLAR GARNISH LH
27. REMOVE FRONT PILLAR GARNISH RH
28. REMOVE ASSIST GRIP ASSY
29. REMOVE TELEVISION BASE (W/ RR TELEVISION)
30. REMOVE ROOF CONSOLE BOX SUB-ASSY
31. REMOVE ROOM LAMP ASSY NO.1
32. REMOVE ROOM LAMP ASSY NO.2
33. REMOVE ROOF HEADLINING REAR TRIM COVER LH
34. REMOVE VISOR BRACKET COVER
35. REMOVE VISOR BRACKET COVER
36. REMOVE LH VISOR ASSY
37. REMOVE RH VISOR ASSY
38. REMOVE VISOR HOLDER
39. REMOVE ROOF HEADLINING ASSY (SEE PAGE 76-38)

40. REMOVE AMPLIFIER ANTENNA ASSY

- (a) Disconnect the connectors.
- (b) Remove the 4 bolts.
- (c) Remove the 17 clamps and amplifier antenna assy.



I34450

41. INSTALL AMPLIFIER ANTENNA ASSY

(a) Install the 4 bolts.

Torque: 8 N·m (82 kgf·cm, 71in.·lbf)

(b) Connect the connectors.

42. INSTALL ROOF HEADLINING ASSY (SEE PAGE 76-38)**43. INSTALL ROOF SIDE GARNISH INNER LH****44. INSTALL ROOF SIDE GARNISH INNER RH****45. INSTALL FRONT SEAT OUTER BELT ASSY LH****46. INSTALL FRONT SEAT OUTER BELT ASSY RH****47. INSTALL REAR SEAT BELT ASSY OUTER****48. INSTALL REAR SEAT BELT ASSY OUTER****49. INSTALL REAR NO. 2 SEAT ASSY LH****50. INSTALL REAR NO. 2 SEAT ASSY RH**

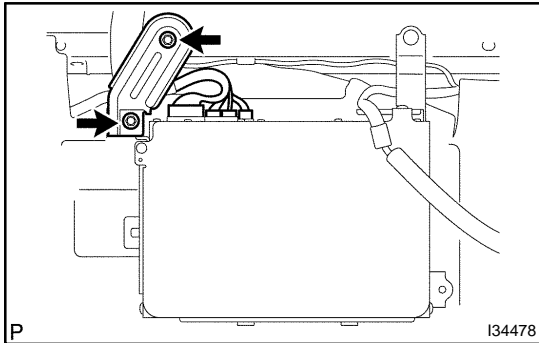
NAVIGATION ECU REPLACEMENT

670NY-03

HINT:

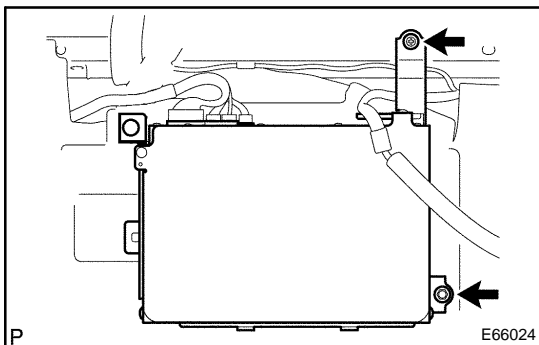
COMPONENTS: See page 67-3.

1. REMOVE FRONT RH SEAT ASSY (SEE PAGE 72-20)



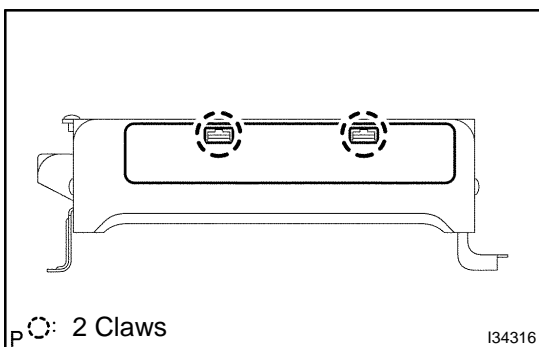
2. REMOVE DISC PLAYER BRACKET

- (a) Remove the bolt and screw.
- (b) Remove the disc player bracket.



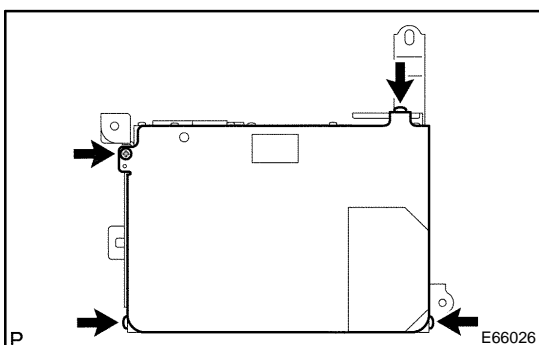
3. REMOVE NAVIGATION COMPUTER W/BRACKET

- (a) Disconnect the connectors and remove the bolt and screw.
- (b) Remove the navigation computer w/ bracket.

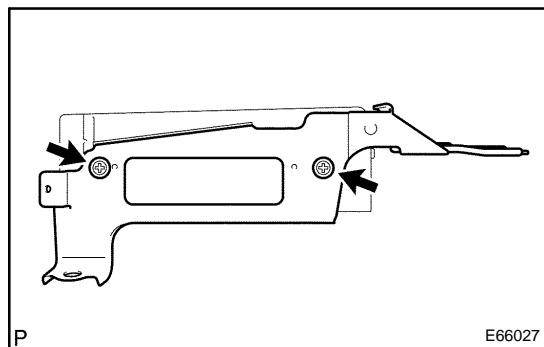


4. REMOVE NAVIGATION ECU COVER

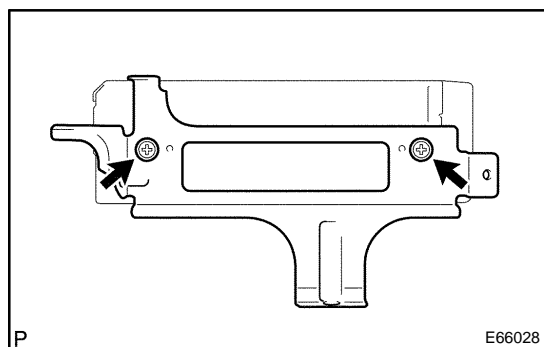
- (a) Release the 2 claws and remove the navigation ECU cover.



- (b) Remove the 4 screws and navigation ECU cover.

**5. REMOVE DISC PLAYER BRACKET NO.2**

- (a) Remove the 2 screws and disc player bracket No.2.

**6. REMOVE DISC PLAYER BRACKET NO.3**

- (a) Remove the 2 screws and disc player bracket No.3.

7. INSTALL FRONT RH SEAT ASSY (SEE PAGE [72-20](#))

NAVIGATION ANTENNA ASSY

REPLACEMENT

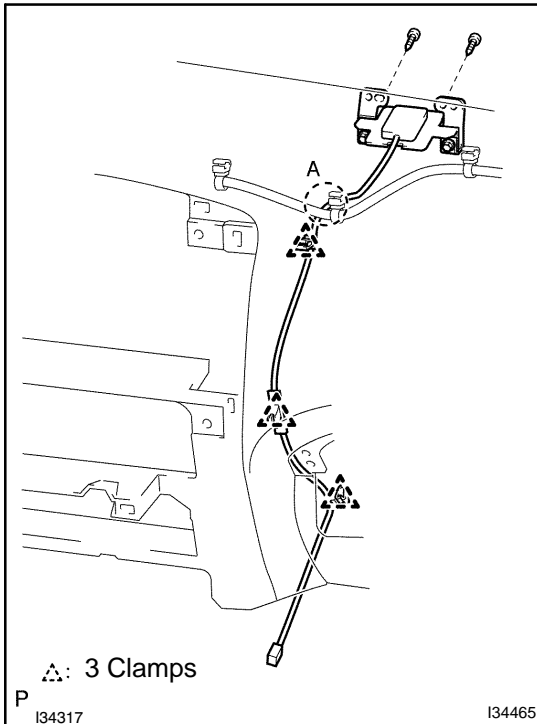
670NZ-03

HINT:

COMPONENTS: See page 67-3.

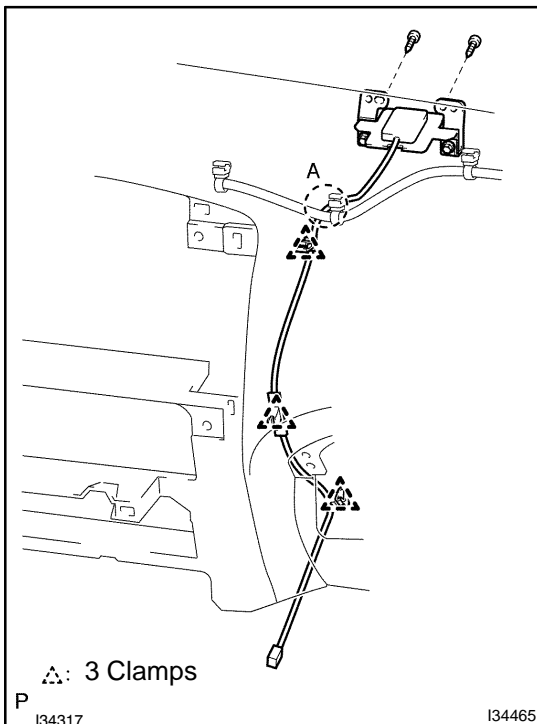
1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. REMOVE SHIFT LEVER KNOB SUB-ASSY
3. REMOVE SHIFT LEVER KNOB SUB-ASSY
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.2
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.1
6. REMOVE CONSOLE PANEL UPPER ASSY
7. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH
8. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH
9. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER
10. REMOVE INTEGRATION CONTROL & PANEL ASSY
11. REMOVE CONSOLE REAR END PANEL SUB-ASSY
12. REMOVE RR CONSOLE BOX ASSY
13. REMOVE CONSOLE BOX INSERT FRONT NO.2
14. REMOVE CONSOLE BOX INSERT
15. REMOVE CONSOLE UPPER PANEL GARNISH FRONT
16. REMOVE CONSOLE BOX LOWER
17. REMOVE STEERING WHEEL COVER LOWER NO.2
18. REMOVE STEERING WHEEL COVER LOWER NO.3
19. REMOVE HORN BUTTON ASSY
20. REMOVE STEERING WHEEL ASSY
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
21. REMOVE STEERING COLUMN COVER
22. REMOVE TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY
23. REMOVE FRONT DOOR SCUFF PLATE LH
24. REMOVE FRONT DOOR SCUFF PLATE RH
25. REMOVE FRONT FLOOR FOOTREST
26. REMOVE COWL SIDE TRIM BOARD LH
27. REMOVE COWL SIDE TRIM BOARD RH
28. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT
29. REMOVE SWITCH HOLE BASE NO.1
30. REMOVE INSTRUMENT PANEL FINISH PLATE
31. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH
32. REMOVE INSTRUMENT PANEL LOWER LH
33. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY
34. REMOVE COMBINATION METER ASSY
35. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1
36. REMOVE INSTRUMENT PANEL UNDER COVER NO.2
37. REMOVE GLOVE COMPARTMENT DOOR SUB-ASSY
38. REMOVE INSTRUMENT PANEL ORNAMENT
39. DISCONNECT PASSENGER AIRBAG CONNECTOR
40. REMOVE INSTRUMENT PANEL FINISH PANEL LOWER NO.2
41. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2
42. REMOVE DISC PLAYER CHANGER W/BRACKET (W/ DISC PLAYER CHANGER)
43. REMOVE ASSIST GRIP ASSY

44. REMOVE FRONT PILLAR GARNISH LH
45. REMOVE FRONT PILLAR GARNISH RH
46. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)



47. REMOVE NAVIGATION ANTENNA ASSY

- (a) Remove the 3 clamps.
- (b) Remove the 2 screws and navigation antenna assy.



48. INSTALL NAVIGATION ANTENNA ASSY

- (a) Install the navigation antenna assy with the 2 screws.
- (b) Install the 3 clamps.

NOTICE:

Pass the navigation antenna cord under the radio antenna cord as shown in the illustration.

49. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT
(SEE PAGE 71-13)
50. INSTALL COMBINATION METER ASSY
51. CENTER SPIRAL CABLE
52. INSTALL STEERING WHEEL ASSY
53. INSTALL HORN BUTTON ASSY
54. INSPECT HORN BUTTON ASSY
55. INCLINATION SENSOR ZERO DEGREE CORRECTION
56. INSPECT SRS WARNING LIGHT

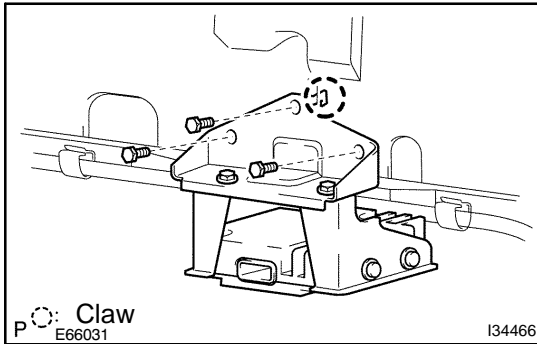
VOLTAGE INVERTER ASSY REPLACEMENT

67000-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE REAR DOOR SCUFF PLATE RH (SEE PAGE 76-38)
2. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
3. REMOVE BACK DOOR WEATHERSTRIP
4. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (SEE PAGE 76-38)
5. REMOVE PACKAGE TRAY TRIM PANEL ASSY (SEE PAGE 76-38)
6. REMOVE QUARTER INSIDE TRIM BOARD RH (SEE PAGE 76-38)



7. REMOVE VOLTAGE INVERTER ASSY
 - (a) Disconnect the connector and remove the 3 bolts.
 - (b) Release the claw and remove the voltage inverter assy.

STEERING PAD SWITCH LH

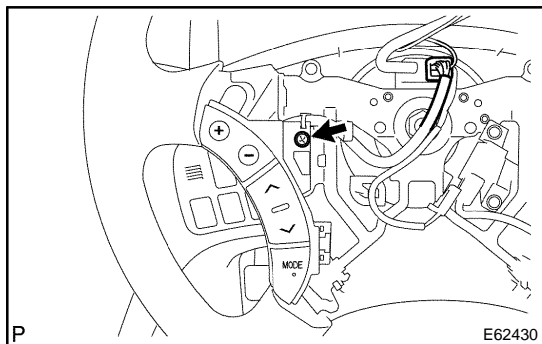
REPLACEMENT

67007-03

HINT:

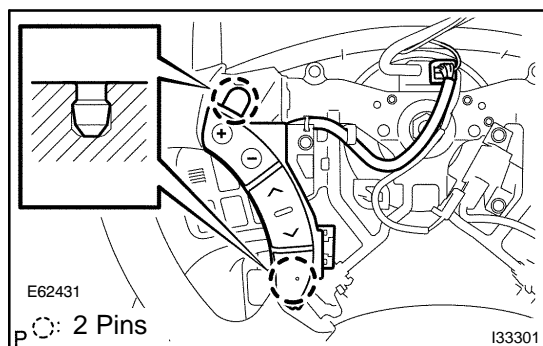
COMPONENTS: See page 67-3.

1. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
2. REMOVE STEERING WHEEL COVER LOWER NO.2 (SEE PAGE 60-20)
3. REMOVE STEERING WHEEL COVER LOWER NO.3 (SEE PAGE 60-20)
4. REMOVE HORN BUTTON ASSY (SEE PAGE 60-20)

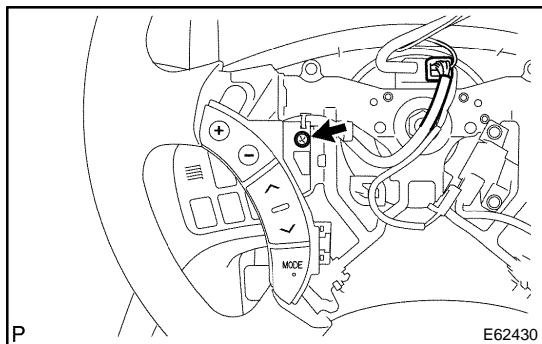


5. REMOVE STEERING PAD SWITCH LH (W/O STEERING PAD SWITCH RH)

- (a) Disconnect the connector.
- (b) Disconnect the connector of cruise control main switch.
- (c) Remove the screw.

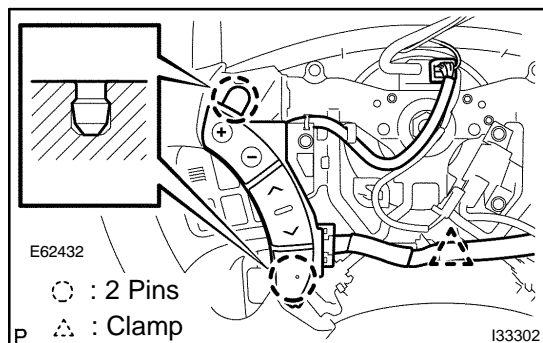


- (d) Disengage the 2 pins and remove the steering pad switch LH.

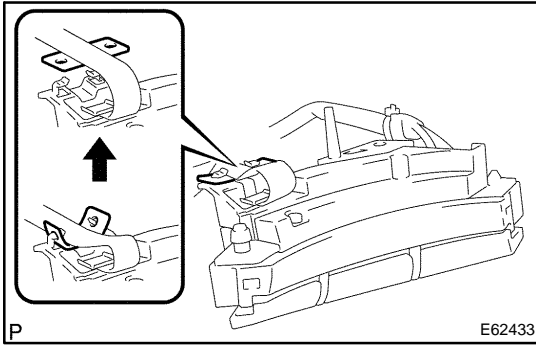


6. REMOVE STEERING PAD SWITCH LH (W/ STEERING PAD SWITCH RH)

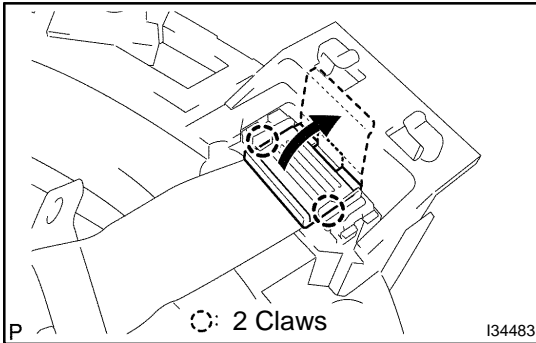
- (a) Disconnect the connector.
- (b) Disconnect the connector of cruise control main switch.
- (c) Remove the screw.



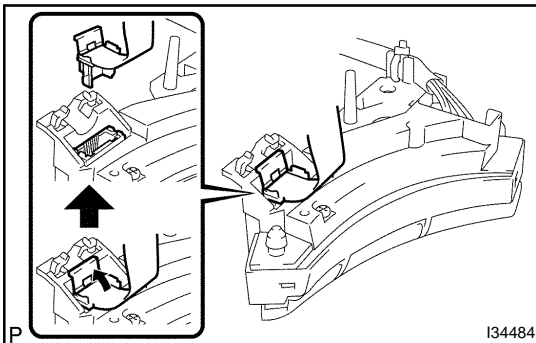
- (d) Remove the clamp.
- (e) Disengage the 2 pins and release the steering pad switch LH from the steering wheel.



- (f) Release the tab of steering pad switch cable from the steering pad switch LH as shown in the illustration.



- (g) Disengage the 2 claws as shown in the illustration and open the latch on the top of the connector.



- (h) Pull out the connector while pinching the latch with fingers and disconnect the steering pad switch cable from the steering pad switch LH.

7. **INSTALL HORN BUTTON ASSY (SEE PAGE 60-20)**
8. **INSPECT HORN BUTTON ASSY (SEE PAGE 60-1)**
9. **INSPECT SRS WARNING LIGHT (SEE PAGE 05-1213)**

STEERING PAD SWITCH RH

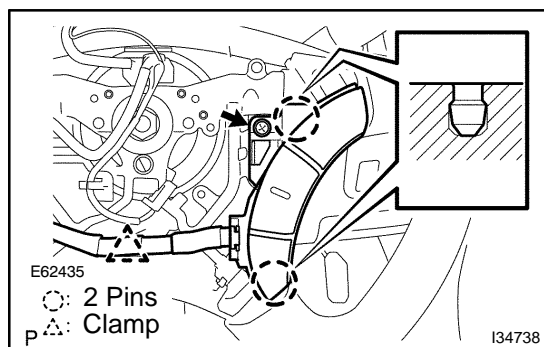
REPLACEMENT

67008-03

HINT:

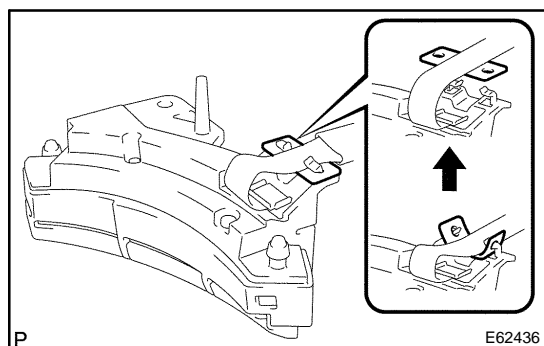
COMPONENTS: See page 67-3.

1. **DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)**
2. **REMOVE STEERING WHEEL COVER LOWER NO.2 (SEE PAGE 60-20)**
3. **REMOVE STEERING WHEEL COVER LOWER NO.3 (SEE PAGE 60-20)**
4. **REMOVE HORN BUTTON ASSY (SEE PAGE 60-20)**

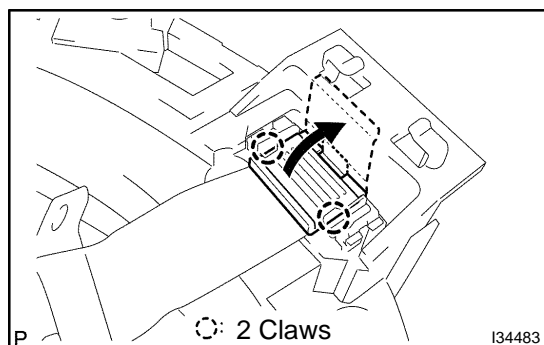


5. REMOVE STEERING PAD SWITCH RH

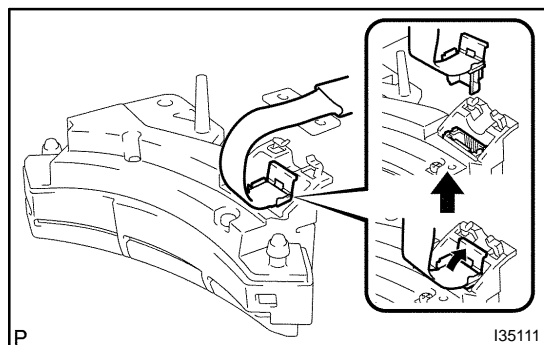
- (a) Remove the screw.
- (b) Remove the clamp.
- (c) Disengage the 2 pins and release the steering pad switch RH from the steering wheel.



- (d) Release the tab of steering pad switch cable from the steering pad switch RH as shown in the illustration.



- (e) Disengage the 2 claws as shown in the illustration and open the latch on the top of the connector.



- (f) Pull out the connector while pinching the latch with fingers and disconnect the steering pad switch cable from the steering pad switch RH.

6. **INSTALL HORN BUTTON ASSY (SEE PAGE 60-20)**
7. **INSPECT HORN BUTTON ASSY (SEE PAGE 60-1)**
8. **INSPECT SRS WARNING LIGHT (SEE PAGE 05-1213)**

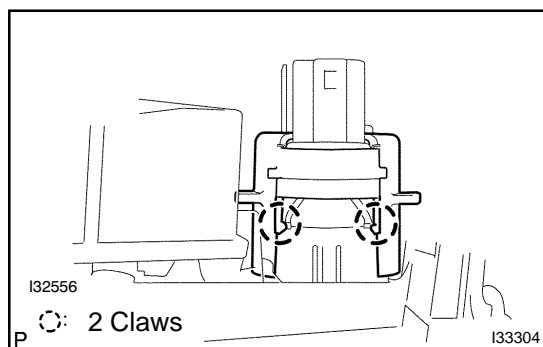
CIGARETTE LIGHTER ASSY REPLACEMENT

67001-03

HINT:

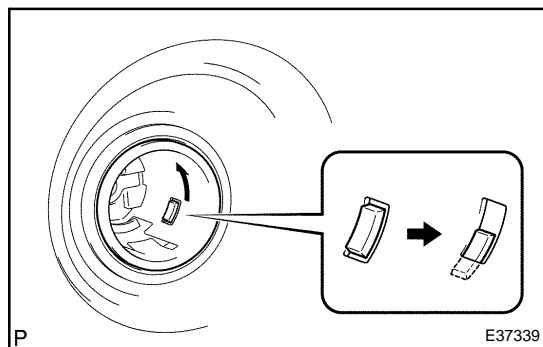
COMPONENTS: See page 67-3.

1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
3. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (SEE PAGE 71-13)
4. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (SEE PAGE 71-13)
5. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER (SEE PAGE 71-13)



6. REMOVE CIGARETTE LIGHTER COVER

- (a) Release the 2 claws, and remove the cigarette lighter cover.



7. REMOVE CIGARETTE LIGHTER ASSY

- (a) Remove the cigarette lighter knob and element Assy.
- (b) Turn the socket counterclockwise as shown in the illustration, disengage the claw between the socket and the cigarette lighter bezel stay, and push out the socket to the room side.
- (c) Align the socket with the notch on the cigarette lighter bezel stay, and remove the cigarette lighter Assy to the room side.

8. INSTALL CIGARETTE LIGHTER ASSY

- (a) Align the socket with the notch on the cigarette lighter bezel stay, and push in the cigarette lighter Assy as hard as possible to install it.
- (b) Install the cigarette lighter knob and element Assy.

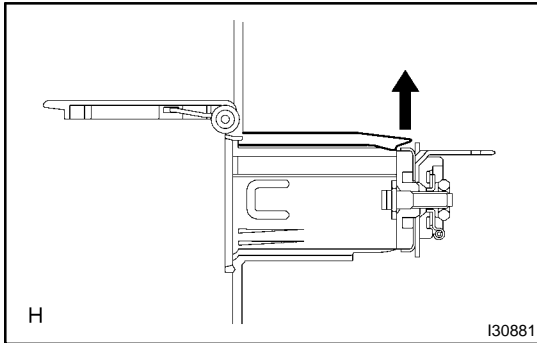
POWER POINT SOCKET ASSY REPLACEMENT

67002-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
2. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
3. REMOVE CONSOLE PANEL UPPER ASSY (SEE PAGE 71-13)
4. REMOVE CONSOLE UPPER PANEL GARNISH FRONT (SEE PAGE 71-13)



5. REMOVE POWER POINT SOCKET ASSY

- (a) Pressing the claw of the power point socket assy in the direction of the arrow, push the power point socket assy toward the room side to remove it.

6. INSTALL POWER POINT SOCKET ASSY

- (a) Align the claw of the power point socket assy with the cutout of the power point socket cover and fully push it to install.

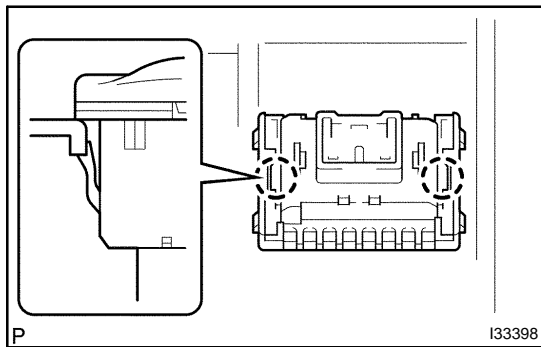
POWER POINT SOCKET ASSY RR REPLACEMENT

67003-03

HINT:

COMPONENTS: See page 67-3.

1. REMOVE REAR DOOR SCUFF PLATE LH (SEE PAGE 76-38)
2. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH
3. REMOVE BACK DOOR WEATHERSTRIP
4. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR (SEE PAGE 76-38)
5. REMOVE PACKAGE TRAY TRIM PANEL ASSY (SEE PAGE 76-38)
6. REMOVE QUARTER INSIDE TRIM BOARD LH (SEE PAGE 76-38)



7. REMOVE POWER POINT SOCKET ASSY RR
 - (a) Disengage the 2 claws and remove the power point socket assy RR.

NETWORK GATEWAY ECU

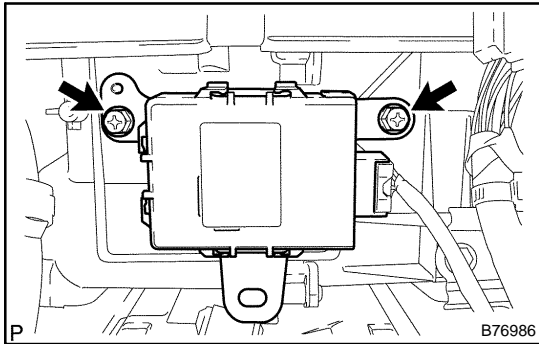
REPLACEMENT

6719P-02

HINT:

COMPONENTS: See page 67-3.

1. REMOVE SHIFT LEVER KNOB SUB-ASSY
2. REMOVE SHIFT LEVER KNOB SUB-ASSY
3. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (SEE PAGE 71-13)
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (SEE PAGE 71-13)
5. REMOVE CONSOLE PANEL UPPER ASSY (SEE PAGE 71-13)
6. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (SEE PAGE 71-13)
7. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (SEE PAGE 71-13)
8. REMOVE CONSOLE REAR END PANEL SUB-ASSY (SEE PAGE 71-13)
9. REMOVE RR CONSOLE BOX ASSY (SEE PAGE 71-13)
10. REMOVE CONSOLE BOX INSERT FRONT NO.2 (SEE PAGE 71-13)
11. REMOVE CONSOLE BOX INSERT (SEE PAGE 71-13)
12. REMOVE CONSOLE UPPER PANEL GARNISH FRONT (SEE PAGE 71-13)
13. REMOVE CONSOLE BOX LOWER (SEE PAGE 71-13)



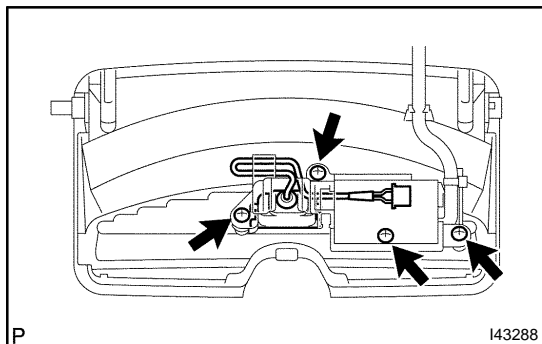
14. REMOVE NETWORK GATEWAY ECU
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and network gateway ECU.

AMPLIFIER MICROPHONE ASSY REPLACEMENT

671GA-01

HINT:

- COMPONENTS: SEE PAGE 67-3.
 - Installation is in the reverse order of removal.
1. **REMOVE ROOF CONSOLE BOX ASSY (SEE PAGE 76-38)**

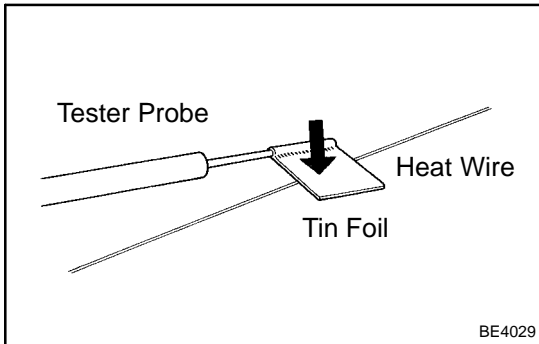


2. **REMOVE AMPLIFIER MICROPHONE ASSY**

- (a) Remove the 3 screws.
- (b) Disconnect the connector.
- (c) Remove the amplifier microphone assy.

WINDOW GLASS (ANTENNA WIRE) REPAIR

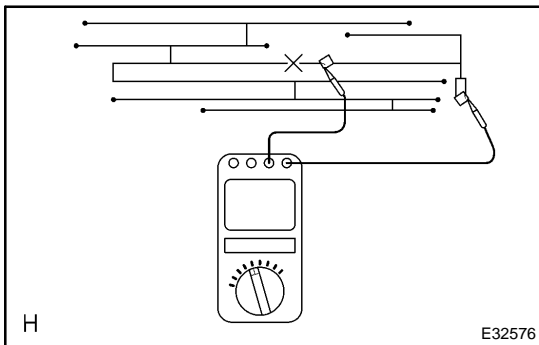
67004-03



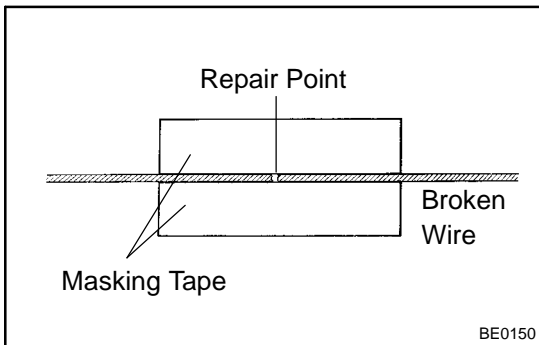
1. INSPECT WINDOW GLASS (ANTENNA WIRE)

NOTICE:

When cleaning the glass, use a soft and dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires. Do not use detergents or glass cleaners with abrasive ingredients. When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown in the illustration.

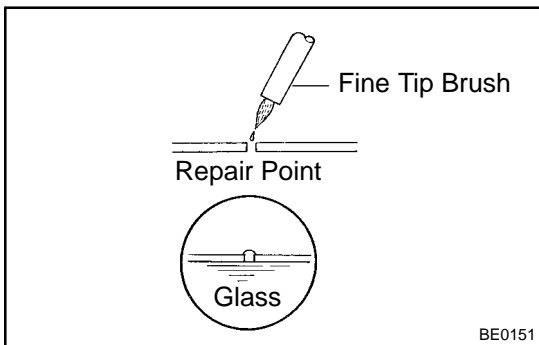


- (a) Inspect the continuity, at the center of each antenna wire, as shown in the illustration.



2. REPAIR WINDOW GLASS (ANTENNA WIRE)

- (a) Clean the broken wire tips with a grease, wax and silicone remover.
- (b) Place the masking tape along both sides of the wire to be repaired.
- (c) Thoroughly mix the repair agent (Dupont paste No. 4817).



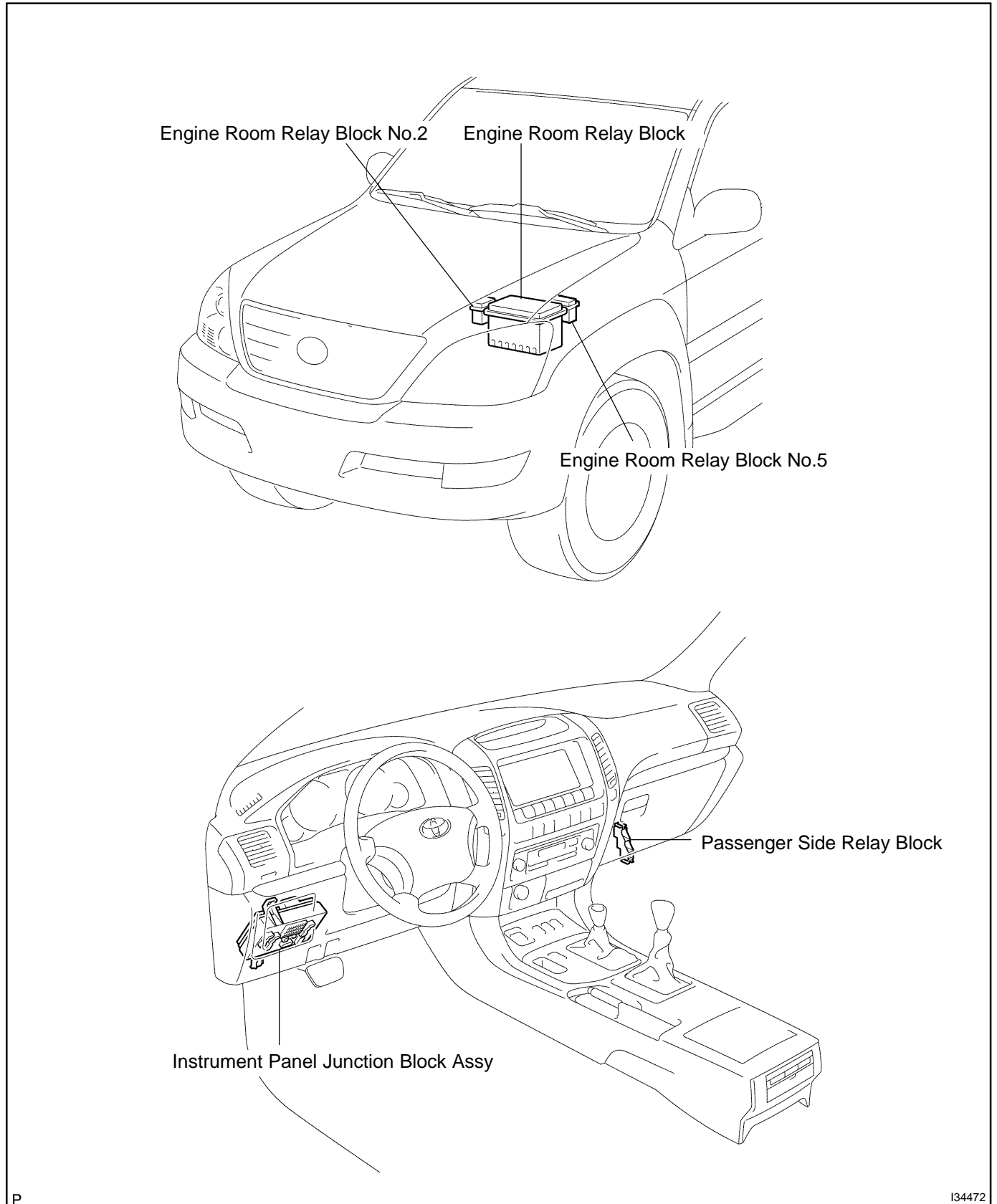
- (d) Using a fine tip brush, apply a small amount of the mixture to the wire.
- (e) After a few minutes, remove the masking tape.

NOTICE:

Do not repair the antenna wire for at least 24 hours.

POWER SOURCE LOCATION

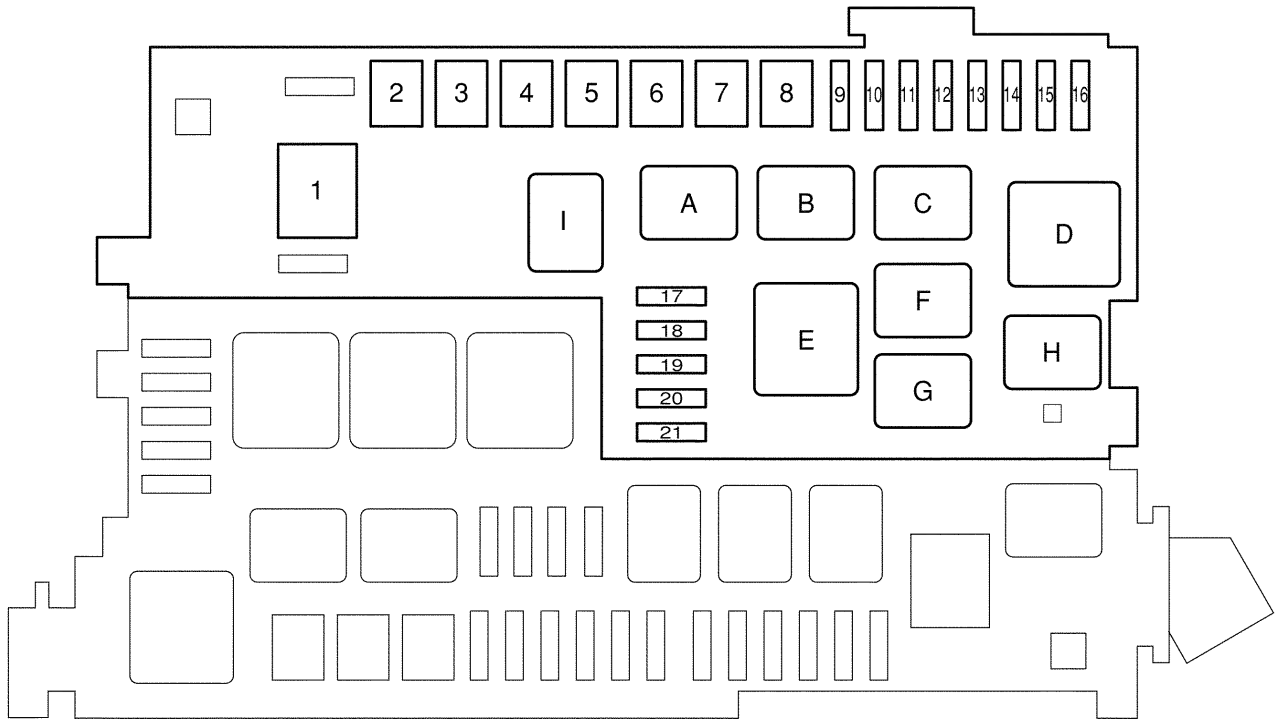
6804F-02



P

134472

Engine Room Relay Block

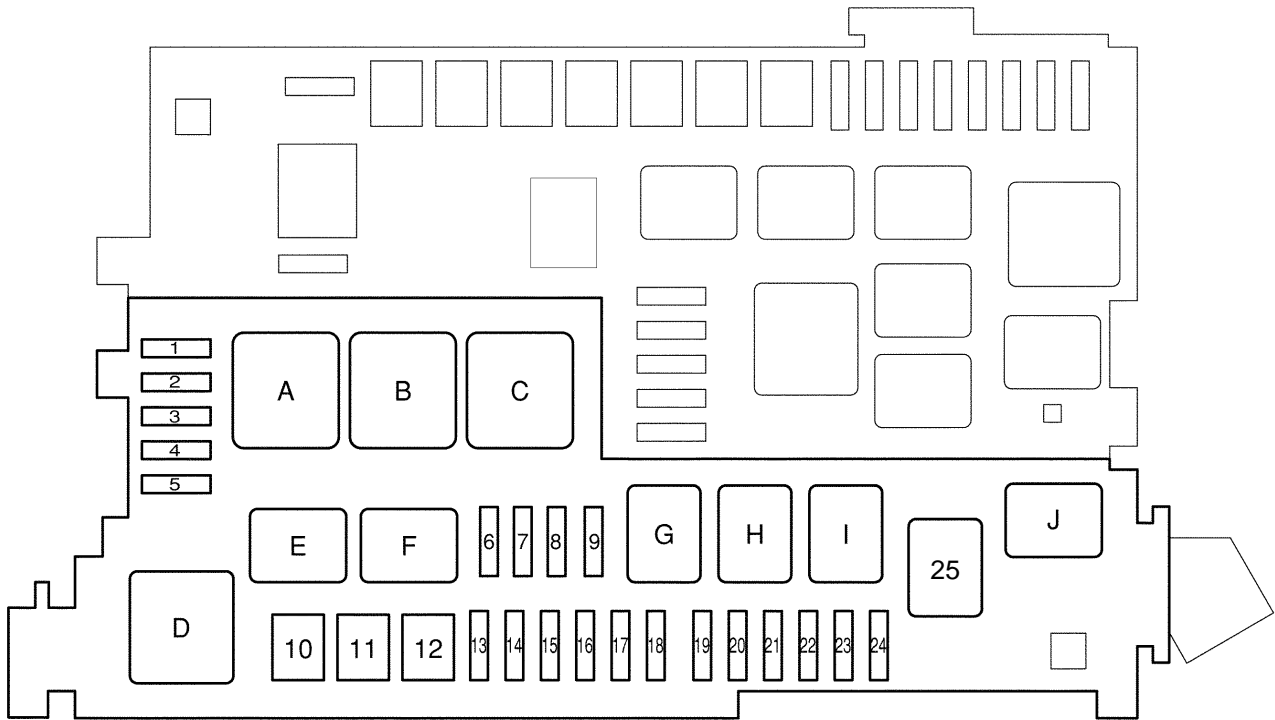


RELAY

FUSE

A. ACC CUT	1. ALT	140 A	12. STOP	10 A
B. FR FOG	2. HEATER	50 A	13. AC INV	15 A
C. STA	3. AIR SUS	50 A	14. FR FOG	15 A
D. IG	4. AM1	50 A	15. -	
E. HEATER	5. TOWING BRK	30 A	16. OBD	7.5 A
F. MG CLT	6. J/B	50 A	17. HEATER No.2	7.5 A
G. AC INV	7. BATT CHG	30 A	18. DEFOG	30 A
H. DEFOG	8. TOWING	40 A	19. AIR SUS No.2	10 A
I. CDS FAN	9. CDS FAN	20 A	20. -	
	10. RR A/C	30 A	21. SEAT HEATER	20 A
	11. MIR HEATER	10 A		

Engine Room Relay Block

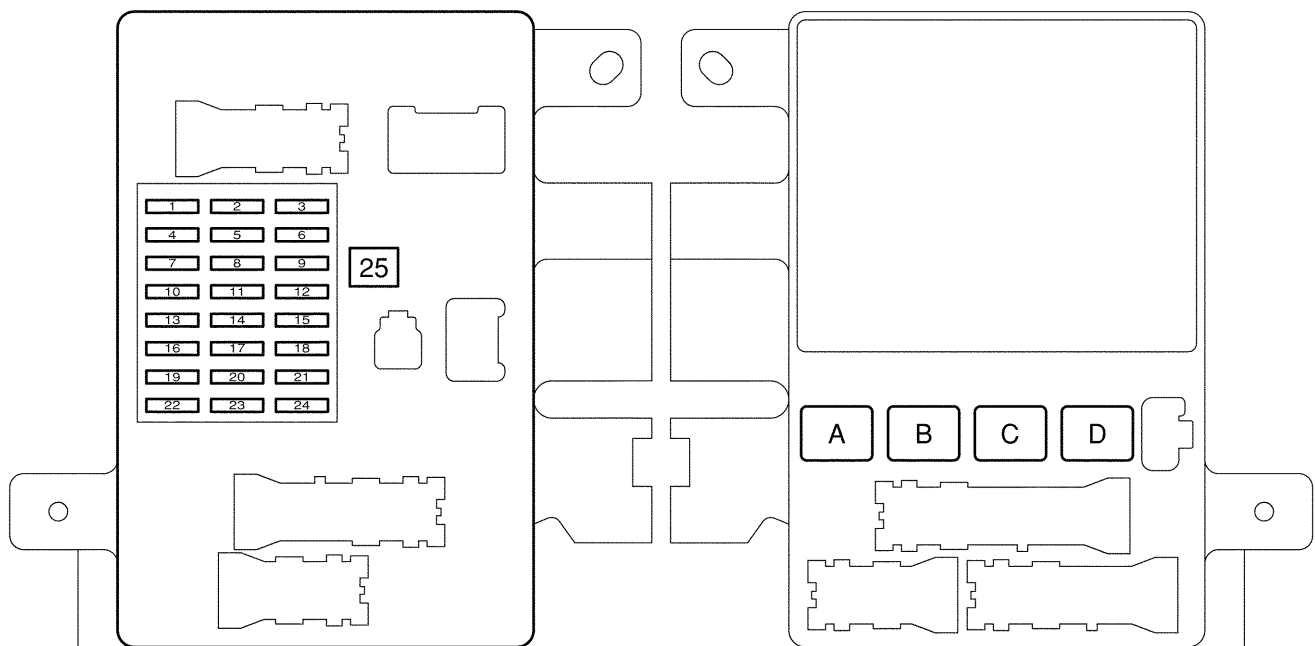


RELAY

FUSE

A. -	1. HEAD (LO RH) 10 A	13. SHORT PIN
B. -	2. HEAD (LO LH) 10 A	14. ALT-S 7.5 A
C. -	3. HEAD (HI RH) 10 A	15. MAYDAY 7.5 A
D. HEAD	4. HEAD (HI LH) 10 A	16. HORN 10 A
E. DAC	5. EFI No.2 10 A	17. A/F HEATER 15 A
F. C/OPN	6. DOME 10 A	18. TRN-HAZ 15 A
G. DOME	7. RADIO No.1 20 A	19. ETCS 10 A
H. EFI	8. ECU-B 10 A	20. EFI 20 A
I. A/F HEATER	9. ECU-B No.2 10 A	21. D FR P/W 20 A
J. FUEL PMP	10. ABS MTR 40 A	22. DR/LCK 25 A
	11. AM2 30 A	23. TOWING 30 A
	12. ABS SOL 30 A	24. RADIO No.2 30 A
		25. A/PUMP 50 A

Instrument Panel Junction Block Assy

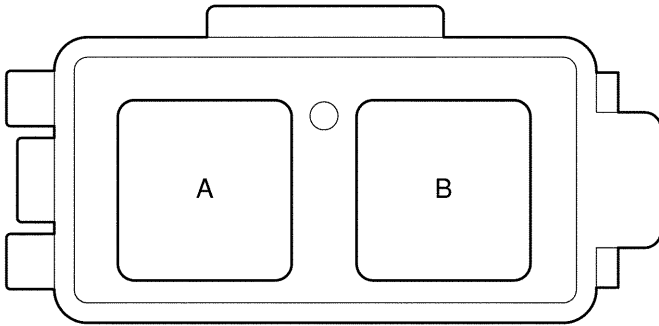
**RELAY**

- A. HORN
- B. TAIL
- C. POWER
- D. ACC SKT

FUSE

1. RR WIP	15 A	14. PWR OUTLET	15 A
2. IG 1	10 A	15. D RR P/W	20 A
3. CIG	10 A	16. GAUGE	7.5 A
4. DIFF	20 A	17. P P/SEAT	30 A
5. ECU-IG	10 A	18. P RR P/W	20 A
6. ACC	7.5 A	19. SRS	10 A
7. TEMS	20 A	20. D P/SEAT	30 A
8. RR WSH	15 A	21. P FR P/W	20 A
9. TAIL	10 A	22. IGN	10 A
10. FR WIP-WSH	30 A	23. -	
11. IG1 No.2	10 A	24. STA	7.5 A
12. PANEL	10 A	25. POWER or TI&TE	30 A
13. ST2	7.5 A		

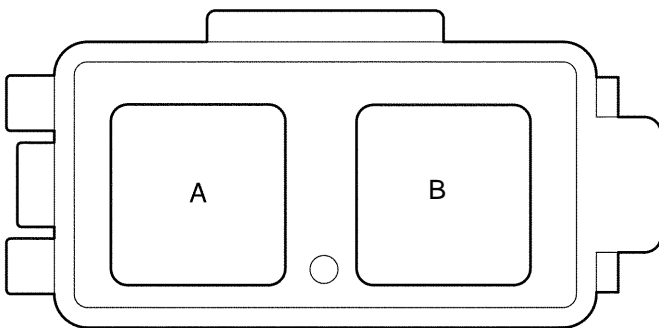
Engine Room Relay Block No.2



RELAY

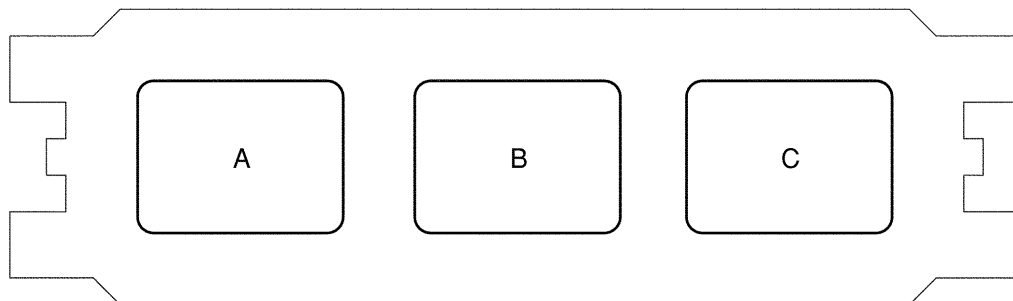
- A. AIR SUS
- B. -

Engine Room Relay Block No.5



RELAY

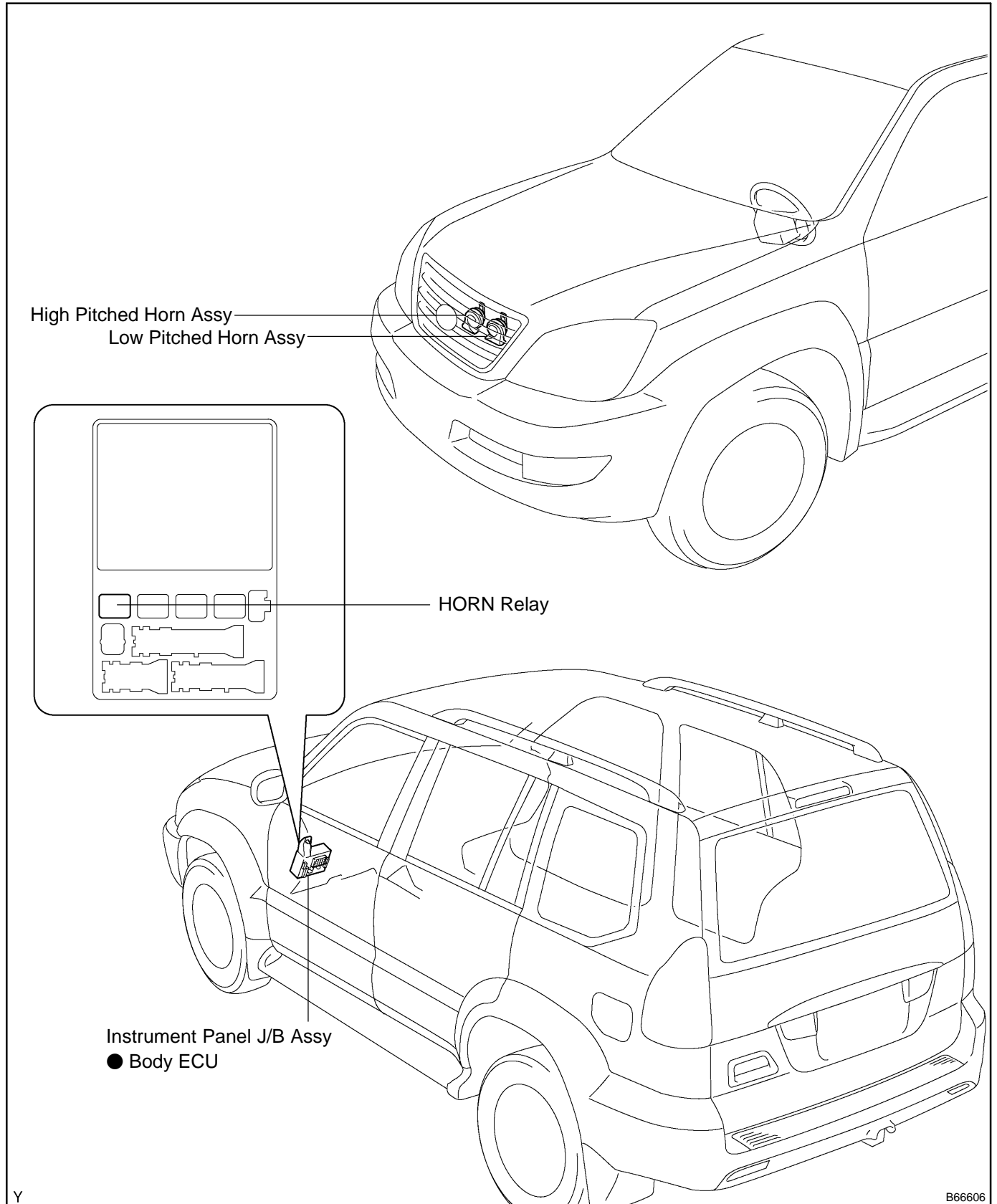
- A. BATT CHG
- B. TOWING TAIL

Passenger Side Relay Block**RELAY**

- A. MIR HTR
- B. BK/UP LP
- C. -

HORN SYSTEM LOCATION

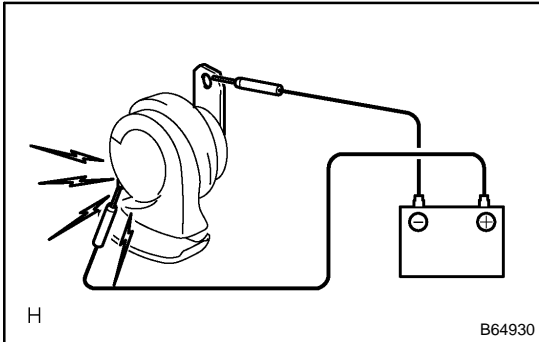
6906K-01



PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Horn does not sound	1. Horn button switch	-
	2. High pitched horn assy	69-3
	3. Low pitched horn assy	69-3
	4. HORN relay	69-3
	5. Wire harness	-

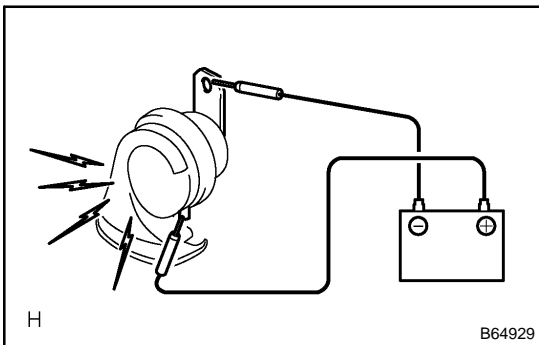
INSPECTION



1. INSPECT LOW PITCHED HORN ASSY

- (a) Connect the positive (+) lead from the battery to the terminal and the negative (-) lead to the horn body, and check that the horn blows.

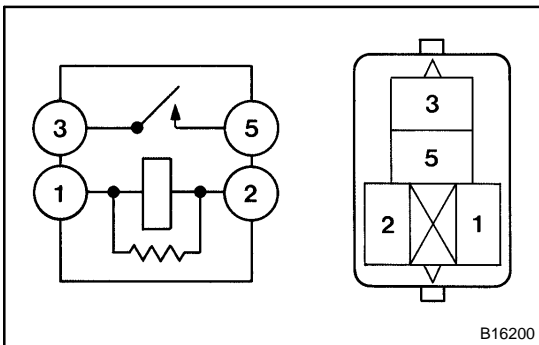
If the result is not as specified, replace the horn assy.



2. INSPECT HIGH PITCHED HORN ASSY

- (a) Connect the positive (+) lead from the battery to the terminal and the negative (-) lead to the horn body, and check that the horn blows.

If the result is not as specified, replace the horn assy.



3. INSPECT HORN RELAY ASSY

- (a) Remove the horn relay from the instrument panel junction block assy.
- (b) Inspect the horn relay continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Constant	Continuity
3 ↔ 5	Apply B+ between terminals 1 and 2	

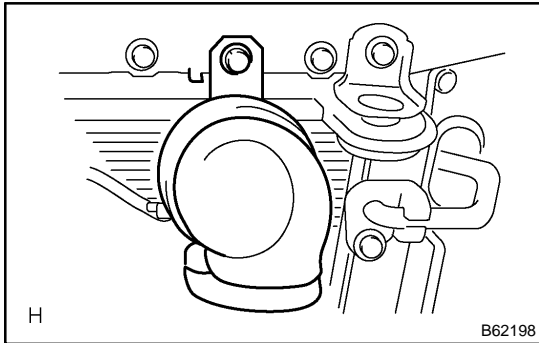
If the result is not as specified, replace the relay assy.

LOW PITCHED HORN ASSY REPLACEMENT

6906N-01

1. REMOVE LOW PITCHED HORN ASSY

- (a) Disconnect the connector.
- (b) Remove the bolt and horn.



2. INSTALL LOW PITCHED HORN ASSY

- (a) Place the stay onto the baffle part in the radiator support upper, and then install the horn with the bolt.

Torque: 20 N·m (199 kgf·cm, 15 ft·lbf)

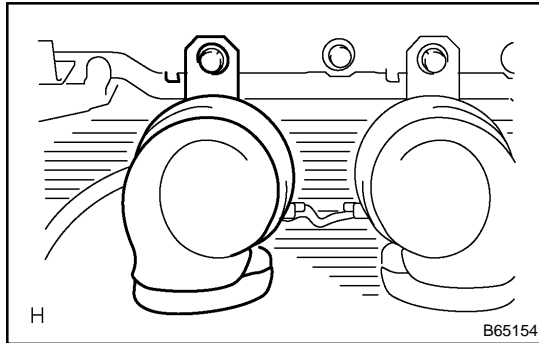
- (b) Connect the connector.

HIGH PITCHED HORN ASSY REPLACEMENT

69060-01

1. REMOVE HIGH PITCHED HORN ASSY

- (a) Disconnect the connector.
- (b) Remove the bolt and horn.



2. INSTALL HIGH PITCHED HORN ASSY

- (a) Place the stay onto the baffle part in the radiator support upper, and then install the horn with the bolt.

Torque: 20 N·m (199 kgf·cm, 15 ft·lbf)

- (b) Connect the connector.

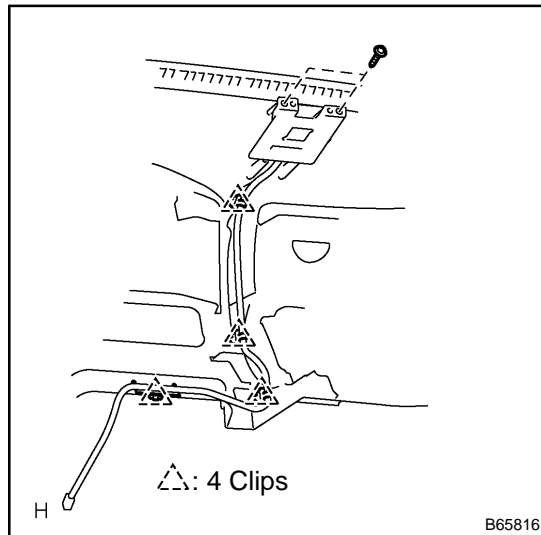
GPS ANTENNA REPLACEMENT

6906S-01

HINT:

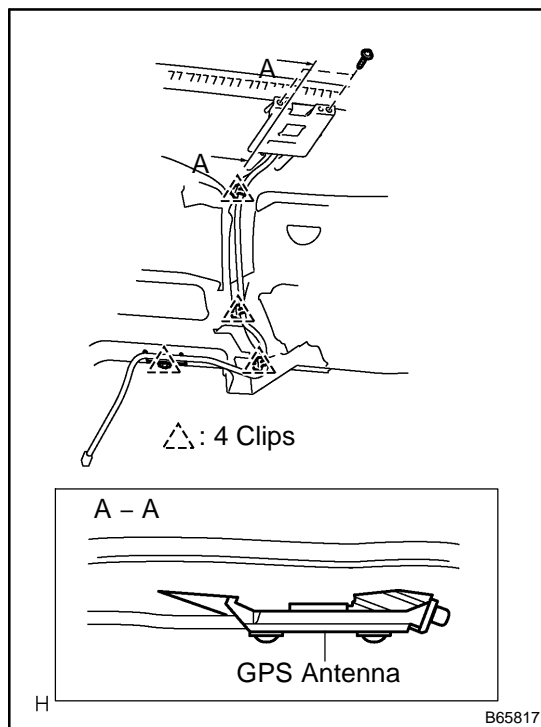
The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

- 1. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT**
(See page 71-13)



2. REMOVE GPS ANTENNA

- Disengage the 4 clips.
- Remove the 2 screws and GPS antenna.



3. INSTALL GPS ANTENNA

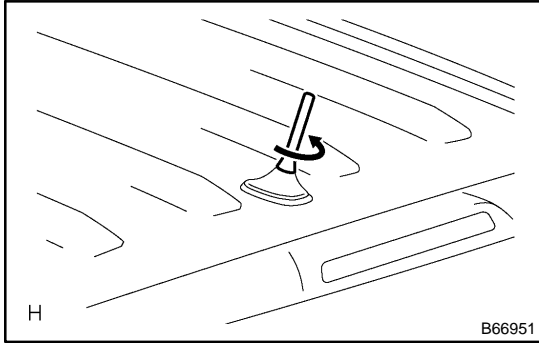
- Install the GPS antenna with the 2 screws.
- Install the 4 clips.

TELEPHONE ANTENNA BASE REPLACEMENT

6906T-01

HINT:

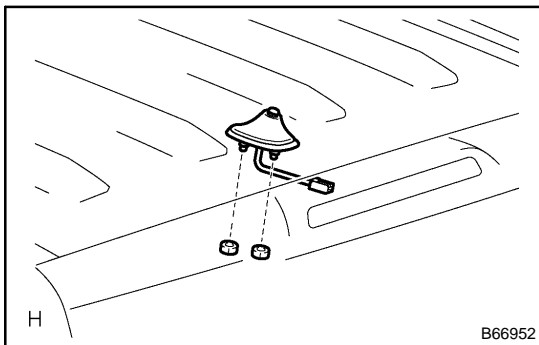
The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.



1. REMOVE TELEPHONE ANTENNA ROD

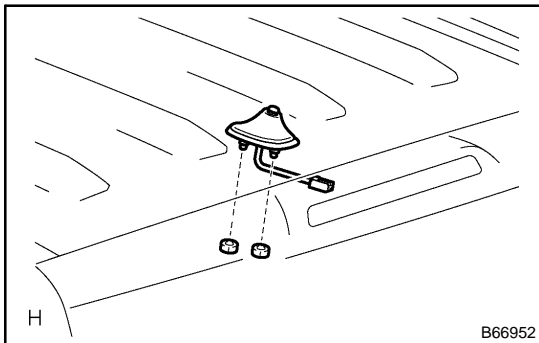
- (a) Turn the telephone antenna rod counterclockwise as indicated by the arrow mark in the illustration to remove it.

2. REMOVE ROOF HEADLINING ASSY



3. REMOVE TELEPHONE ANTENNA BASE

- (a) Disconnect the connector.
 (b) Remove the protector.
 (c) Remove the 2 nuts and telephone antenna base.

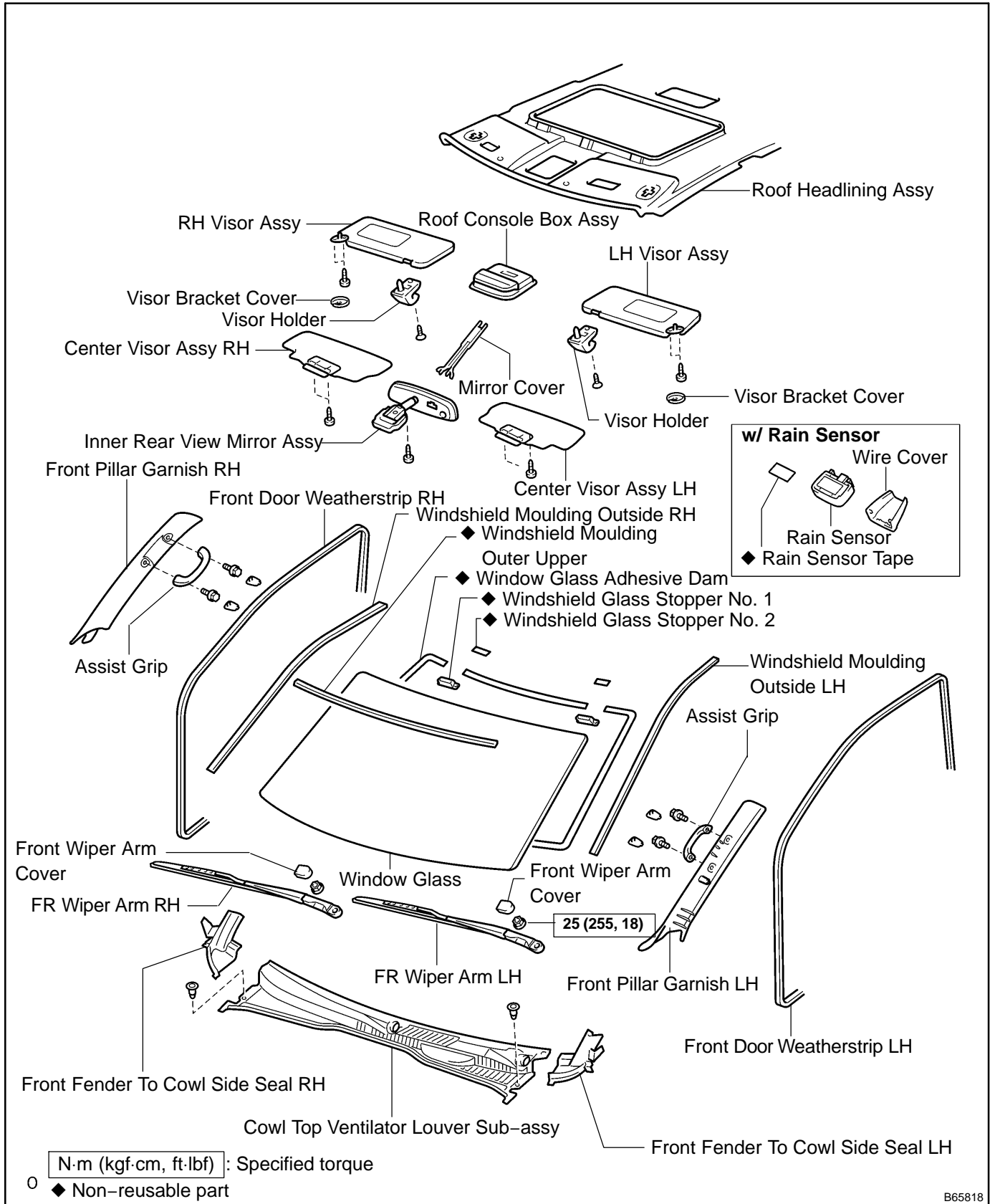


4. INSTALL TELEPHONE ANTENNA BASE

- (a) Install the telephone antenna base with the 2 nuts.
Torque: 3 - 9 N·m (31 - 92 kgf·cm, 27 - 80 in.·lbf)
 (b) Connect the connector.
 (c) Install the protector.

WINDSHIELD GLASS COMPONENTS

700PK-02



B65818

REPLACEMENT

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE ROOF HEADLINING ASSY (See page 76-38)

- (a) Remove the front door weatherstrip LH.
- (b) Remove the front door weatherstrip RH.
- (c) Remove the 2 assist grips.
- (d) Remove the front pillar garnish LH.
- (e) Remove the front pillar garnish RH.
- (f) Remove the 2 visor bracket covers.
- (g) Remove the LH visor assy.
- (h) Remove the RH visor assy.
- (i) Remove the center visor assy LH.
- (j) Remove the center visor assy RH.
- (k) Remove the 2 visor holders.
- (l) Remove the roof console box assy.
- (m) Remove the roof headlining assy.

2. REMOVE INNER REAR VIEW MIRROR ASSY (See page 70-36)

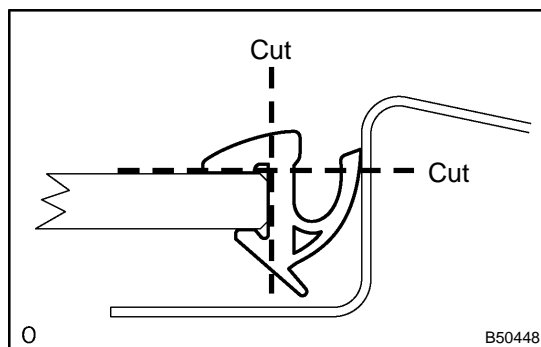
3. REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSY (See page 66-6)

- (a) Remove the 2 front wiper arm covers.
- (b) Remove the FR wiper arm LH.
- (c) Remove the FR wiper arm RH.
- (d) Remove the front fender to the cowl side seal LH.
- (e) Remove the front fender to the cowl side seal RH.
- (f) Remove the cowl top ventilator louver.

4. REMOVE RAIN SENSOR (w/ RAIN SENSOR) (See page 66-19)

5. REMOVE WINDSHIELD MOULDING OUTSIDE LH (See page 76-14)

6. REMOVE WINDSHIELD MOULDING OUTSIDE RH (See page 76-14)



7. REMOVE WINDSHIELD MOULDING OUTER UPPER

- (a) Using a knife, cut off the moulding, as shown in the illustration.

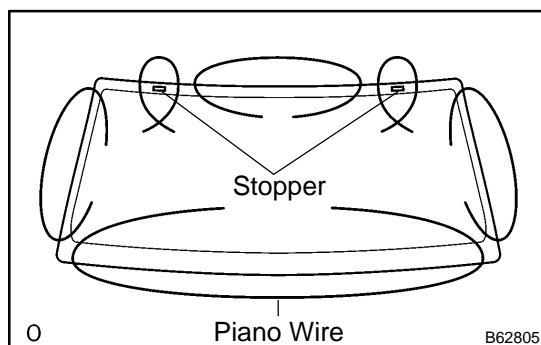
NOTICE:

Do not damage the body with the knife.

- (b) Remove the remaining moulding.

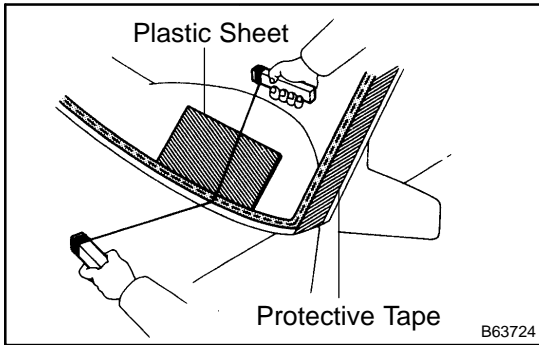
HINT:

When removing, partially cut, pull and remove it by hand.



8. REMOVE WINDSHIELD GLASS

- (a) Pass a piano wire between the body and glass from the interior.



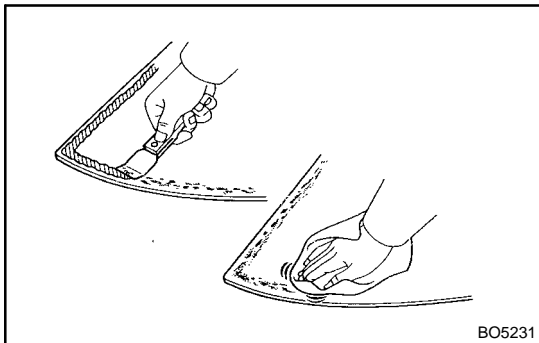
- (b) Tie both wire ends to wooden blocks or similar objects.
- HINT:**
Apply protective tape to the outer surface to prevent the surface from being scratched.

NOTICE:

- When separating the glass, take care not to damage the paint and the interior and exterior ornaments.
 - To prevent the safety pad from being scratched when removing the glass, place a plastic sheet between the piano wire and safety pad.
- (c) Cut off the adhesive by pulling the piano wire around the glass.
 - (d) Disengage the stoppers.
 - (e) Using a suction cup, remove the glass.

NOTICE:

Leave as much adhesive on the body as possible when removing the glass.

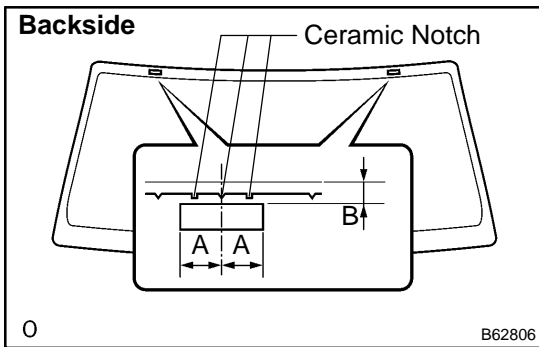


9. CLEAN WINDSHIELD GLASS

- (a) Using a scraper, remove the damaged stoppers, dam and adhesive sticking to the glass.
- (b) Clean the outer circumference of the glass with white gasoline.

NOTICE:

- Do not touch the glass surface after cleaning it.
- Be careful not to damage the body.



10. INSTALL WINDSHIELD GLASS STOPPER NO.2

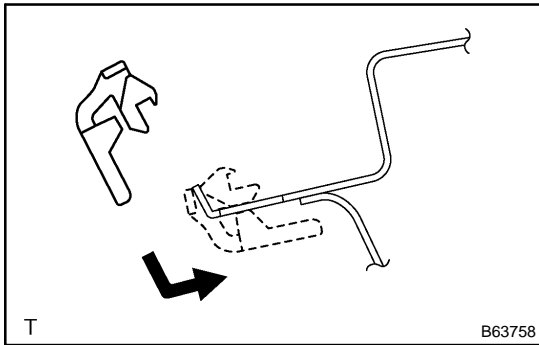
- (a) Coat the installation part of the stopper with Primer G.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
 - Do not keep any of the opened Primer G for later use.
 - Do not apply too much primer.
- (b) Install 2 new windshield glass stoppers onto the glass, as shown in the illustration.

Dimension:

A	40.0 mm (1.575 in.)
B	7.8 mm (0.307 in.)



11. INSTALL WINDSHIELD GLASS STOPPER NO.1

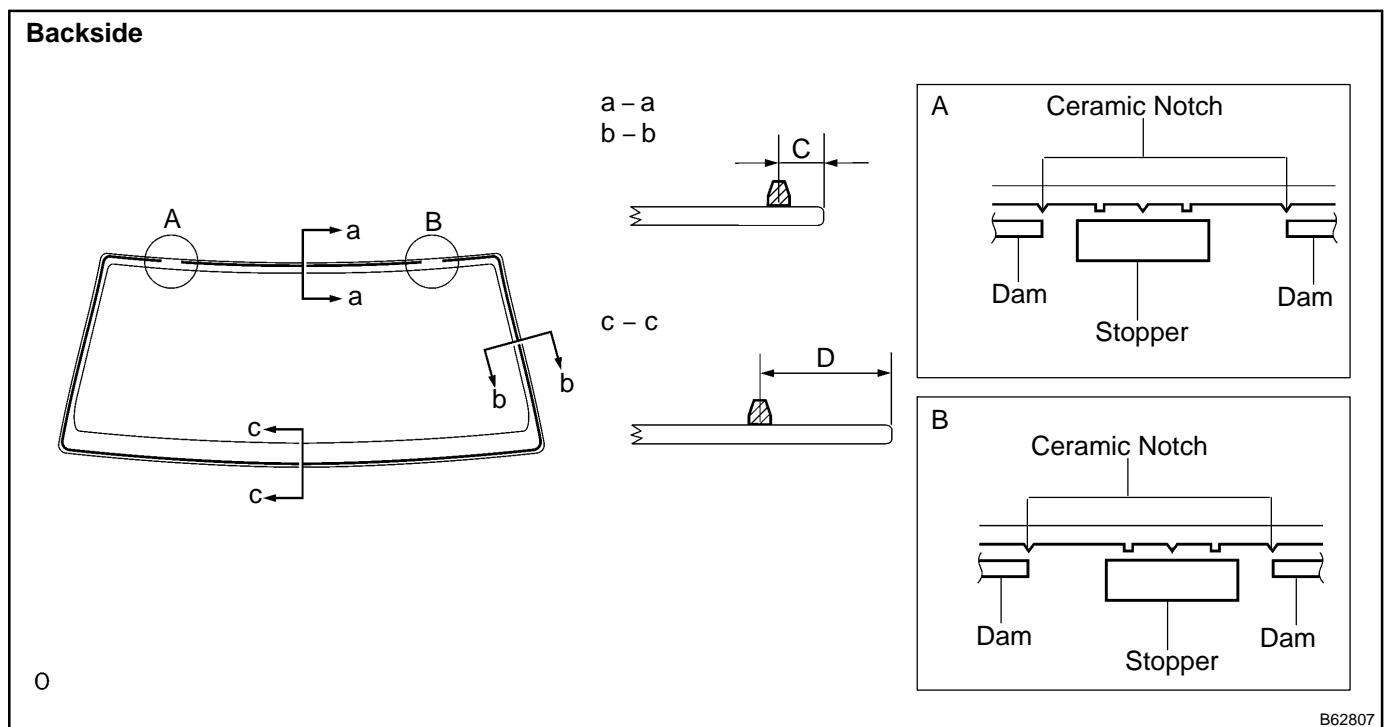
- (a) Install 2 new windshield glass stoppers to the body, as shown in the illustration.

12. INSTALL WINDOW GLASS ADHESIVE DAM

- (a) Coat the installation part of the window glass adhesive dam with Primer G.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
 - Do not apply too much primer.
- (b) Install new dam applying double-sided tape all the way around the glass except where the dam is installed, as shown in the illustration.



Dimensions:

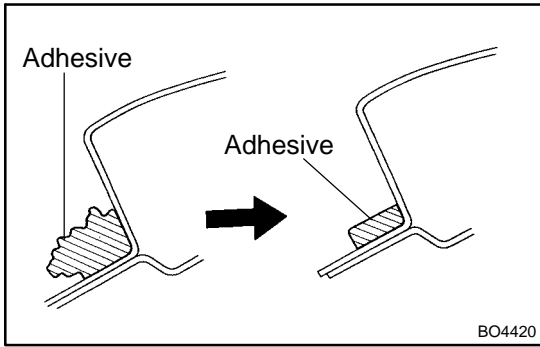
C	9.5 mm (0.374 in.)
D	31.4 mm (1.236 in.)

13. INSTALL WINDSHIELD MOULDING OUTER UPPER

- (a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
 - Do not coat the adhesive with Primer G.
 - Do not keep any of the opened Primer G for later use.
- (b) Install the windshield moulding outer upper.



14. INSTALL WINDSHIELD GLASS

- (a) Clean and shape the contact surface of the vehicle body.
- (1) Using a knife, cut away any rough adhesive on the contact surface of the body to ensure the appropriate surface shape.

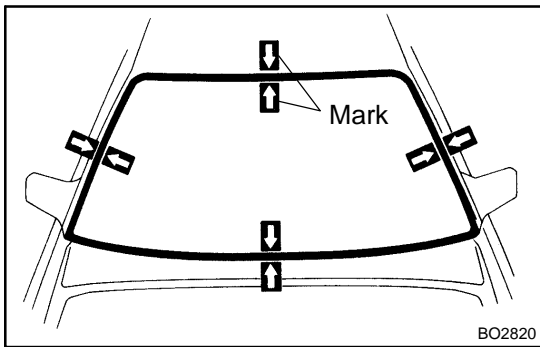
HINT:

Leave as much adhesive on the body as possible.

- (2) Clean the contact surface of the body with a piece of shop rag saturated with cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



- (b) Position the glass.

- (1) Using a suction cup, place the glass in the correct position.
- (2) Check that the whole contact surface of the glass rim is perfectly even.
- (3) Place reference marks between the glass and body.

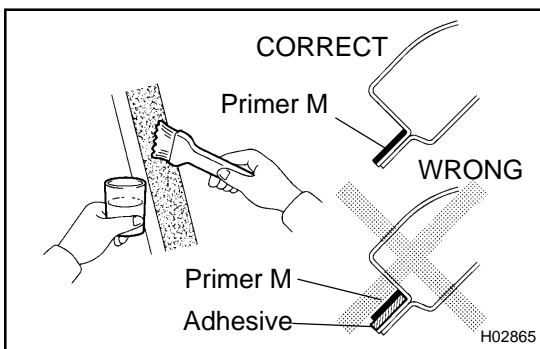
NOTICE:

Check that the stoppers are attached to the body correctly.

HINT:

When reusing the glass, check and correct the reference mark positions.

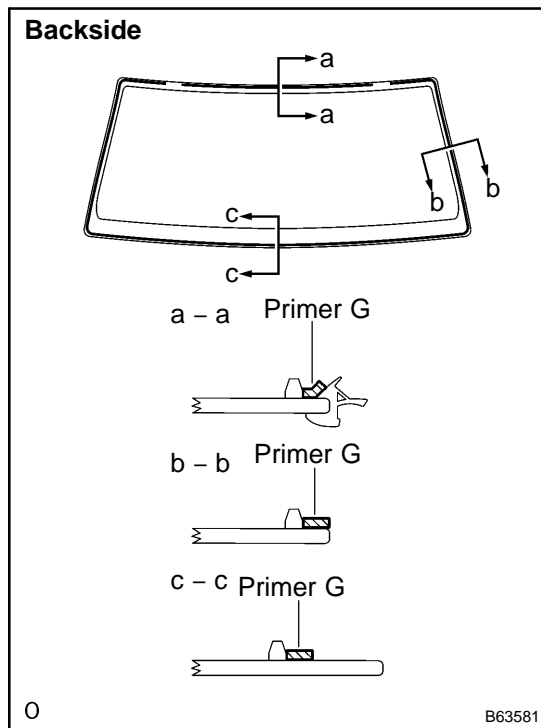
- (4) Remove the glass.



- (c) Using a brush, coat the exposed part of the body on the vehicle side with Primer M.

NOTICE:

- **Allow the primer coating to dry for 3 minutes or more.**
- **Do not coat the adhesive with Primer M.**
- **Do not keep any of the opened Primer M for later use.**



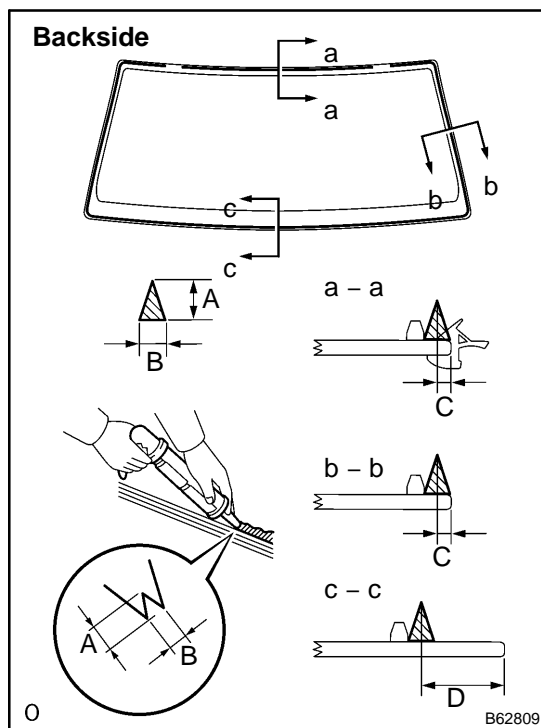
(d) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

HINT:

If an area other than that specified is coated by accident, wipe off the primer with a clean shop rag before it dries.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
- Do not keep any of the opened Primer G for later use.



(e) Apply adhesive.

Adhesive: Part No. 08850-00801 or equivalent

- (1) Cut off the tip of the cartridge nozzle, as shown in the illustration.

HINT:

After cutting off the tip, use all adhesive within the time described in the table below.

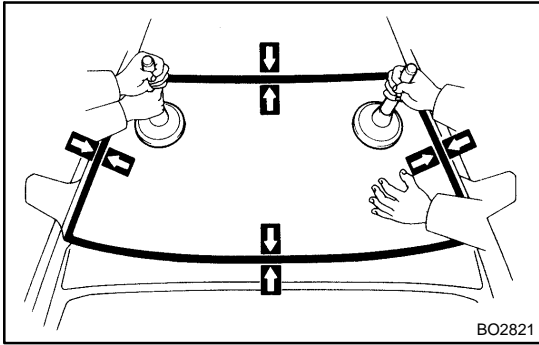
Tack free time:

Temperature	Tack free Time
35°C (95°F)	15 minutes
20°C (68°F)	100 minutes
5°C (41°F)	8 hours

- (2) Load the sealer gun with the cartridge.
- (3) Coat the glass with adhesive, as shown in the illustration.

Dimensions:

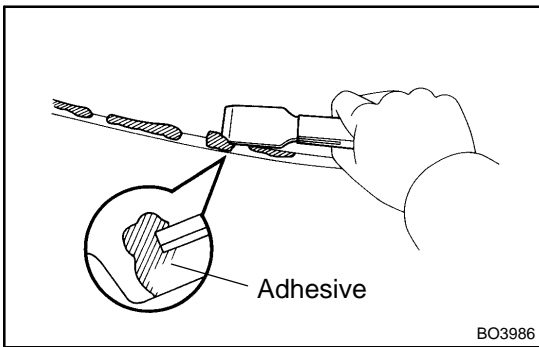
A	12.0 mm (0.472 in.)
B	8.0 mm (0.315 in.)
C	3.0 mm (0.118 in.)
D	24.9 mm (0.980 in.)



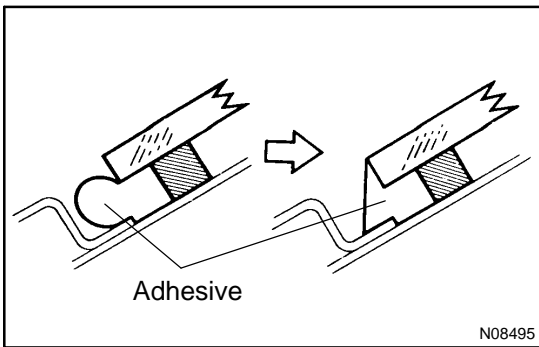
- (f) Install the glass.
- (1) Using a suction cup, position the glass so that the reference marks are aligned, and press it in gently along the rim.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
 - Check that the stoppers are attached to the body correctly.
 - Check the clearance between the body and glass.
- (2) Lightly press the front surface of the glass to ensure a close fit.



- (3) Using a scraper, remove any excess or protruding adhesive.



HINT:

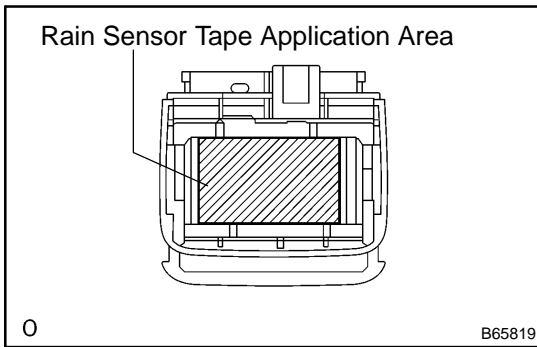
Apply adhesive onto the glass rim.

NOTICE:

The vehicle should not be driven until the time indicated in the table below has elapsed.

Minimum time:

Temperature	Minimum time prior to driving vehicle
35°C (95°F)	1.5 hours
20°C (68°F)	5 hours
5°C (41°F)	24 hours



15. INSTALL RAIN SENSOR (w/ RAIN SENSOR)

- (a) If reusing the rain sensor:
Install the new rain sensor tape.
- (1) Remove the used rain sensor tape from the windshield glass or rain sensor.
 - (2) Apply the new rain sensor tape on the lens surface of the rain sensor indicated by the hatched area.

NOTICE:

- **Make sure that no dust or fingerprints are on the tape surface.**
- **Apply the tape securely.**

- (b) Install the rain sensor.

NOTICE:

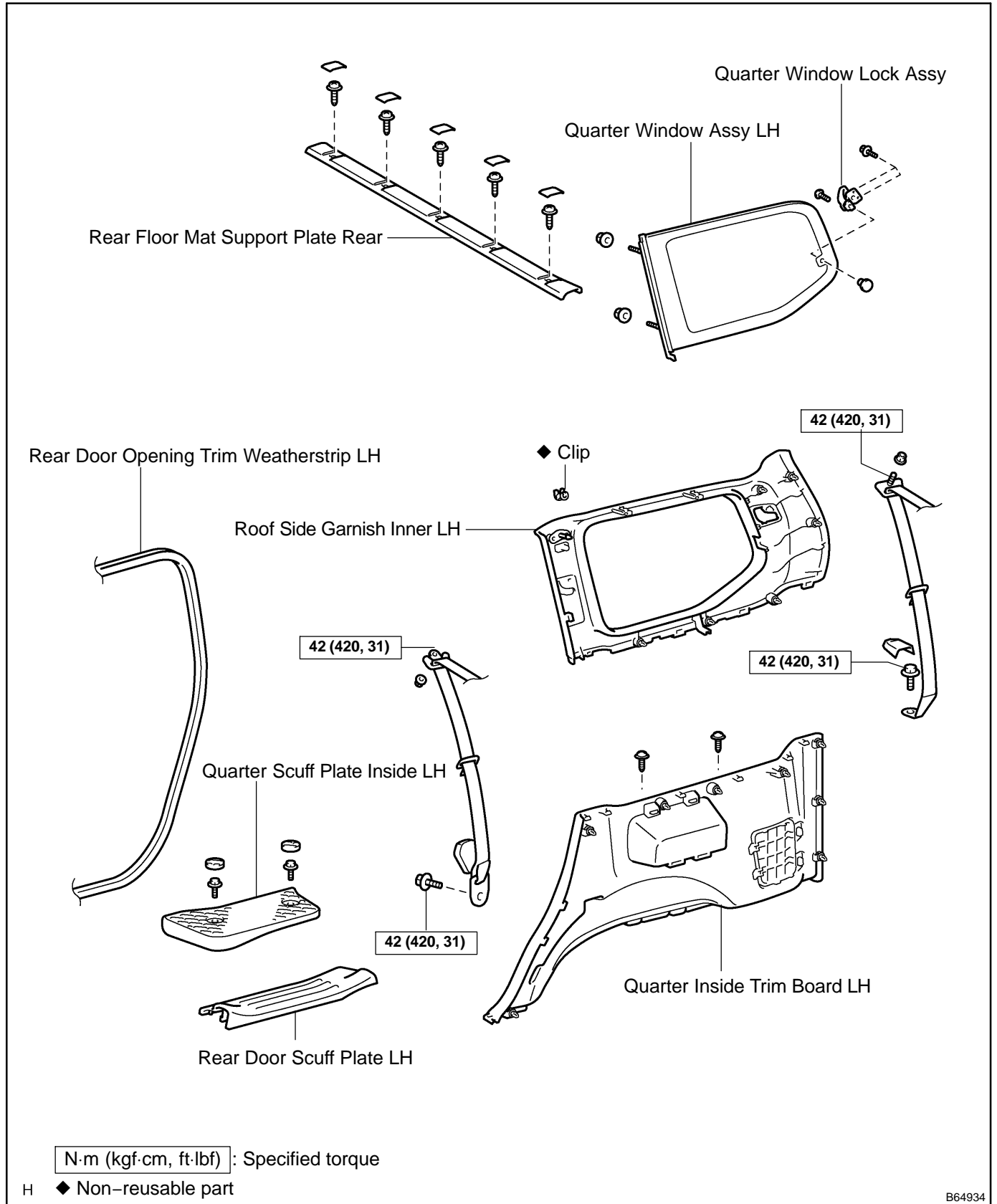
- **If reusing the windshield:**
Check that no rain sensor tape remains on the windshield after removing the rain sensor. If tape remains, remove it.
- **Clean the glass face with a shop rag, etc.**

16. INSPECT FOR LEAKS AND REPAIR

- (a) Conduct a leak test after the adhesive has completely hardened.
- (b) Seal any leaks with auto glass sealer.

QUARTER WINDOW ASSY LH COMPONENTS

700PM-01

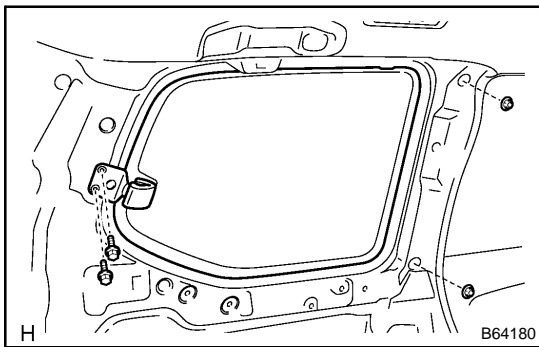


B64934

REPLACEMENT

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the RH side, use the same procedures as on the LH side.
1. **REMOVE REAR NO. 2 SEAT ASSY LH (See page 72-42)**
 2. **REMOVE ROOF SIDE GARNISH INNER LH (See page 76-38)**
 - (a) Remove the quarter scuff plate inside LH.
 - (b) Remove the rear door scuff plate LH.
 - (c) Remove the rear door opening trim weatherstrip LH.
 - (d) Remove the back door weatherstrip.
 - (e) Remove the rear floor mat support plate rear.
 - (f) Remove the quarter inside trim board LH.
 - (g) Remove the roof side garnish inner LH.



3. REMOVE QUARTER WINDOW ASSY LH

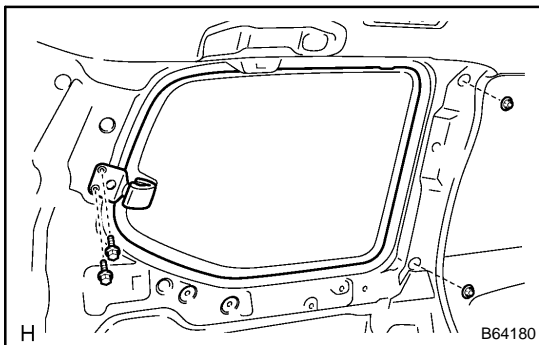
- (a) Disconnect the connectors.
- (b) Remove the 2 bolts and 2 nuts.
- (c) Remove the window assy LH.

NOTICE:

Be careful not to damage the body and glass.

4. REMOVE QUARTER WINDOW LOCK ASSY

- (a) Remove the screw and window lock assy.

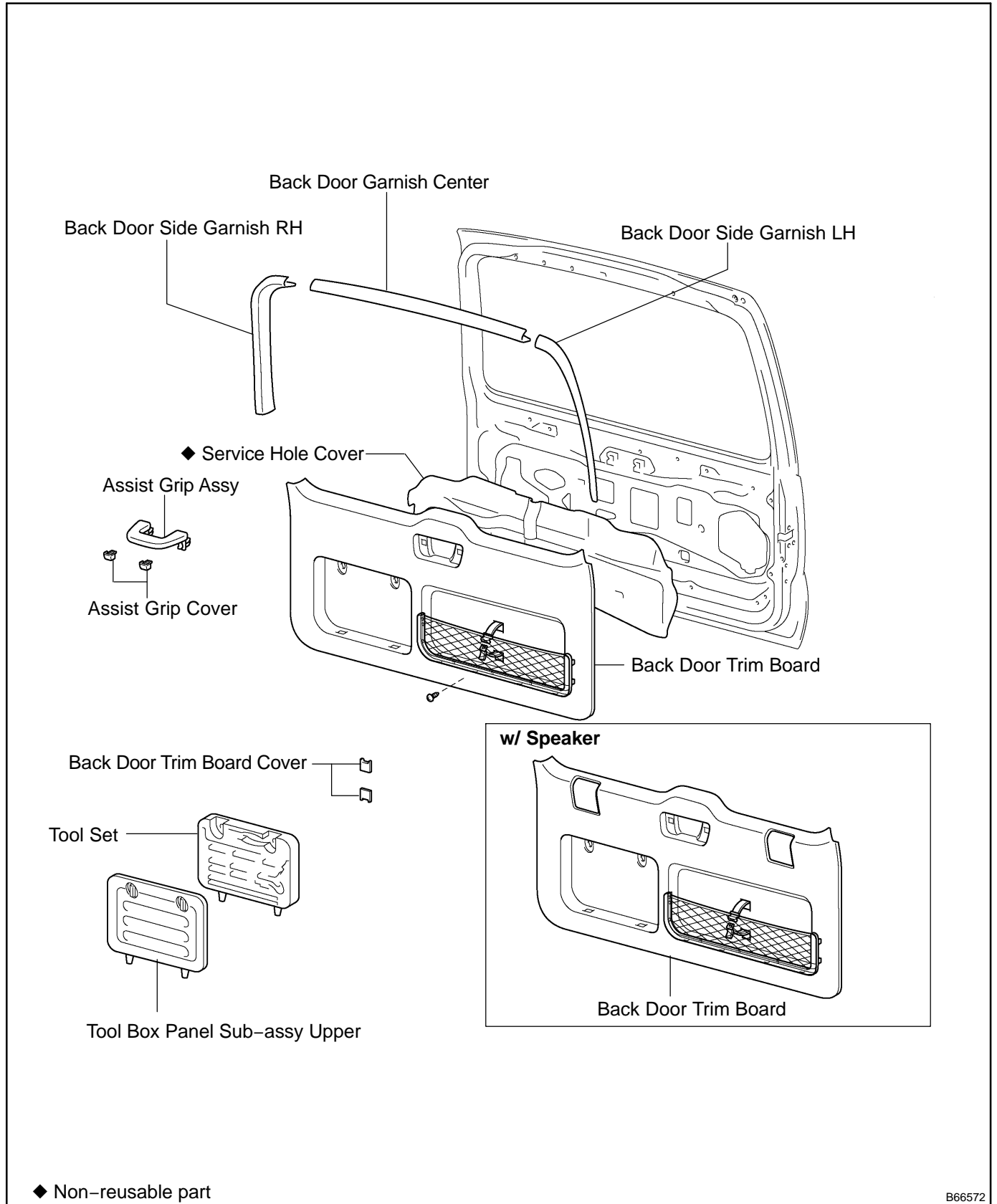


5. INSTALL QUARTER WINDOW ASSY LH

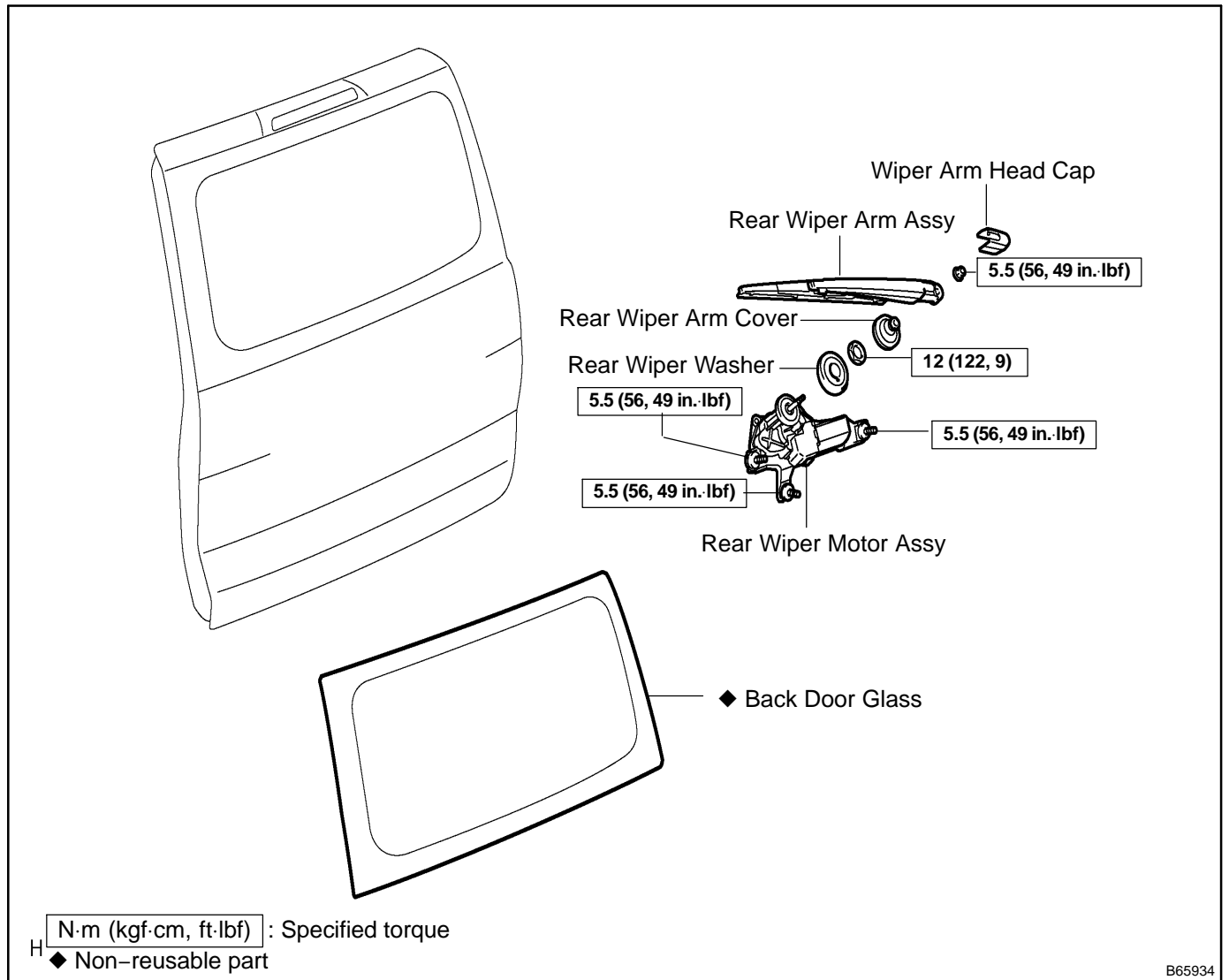
- (a) Install the window assy with the 2 bolts and 2 nuts.
- (b) Connect the connectors.

BACK DOOR GLASS COMPONENTS

700PO-01



B66572



B65934

REPLACEMENT

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE BACK DOOR TRIM BOARD (See page 75-39)

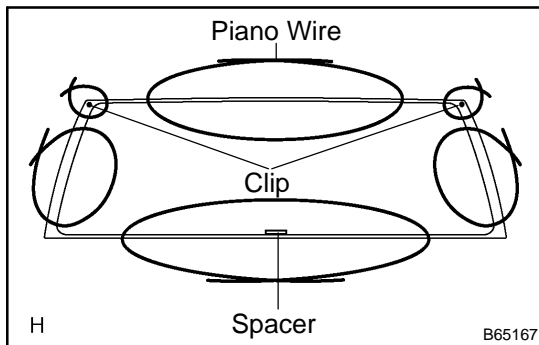
- (a) Remove the back door garnish center.
- (b) Remove the back door side garnish LH.
- (c) Remove the back door side garnish RH.
- (d) Remove the tool box panel sub-assy upper.
- (e) Remove the tool set.
- (f) Remove the assist grip assy.
- (g) Remove the back door trim board.
- (h) Remove the service hole cover.

2. REMOVE REAR WIPER ARM ASSY (See page 66-10)

- (a) Remove the wiper arm head cap.
- (b) Remove the rear wiper arm assy.

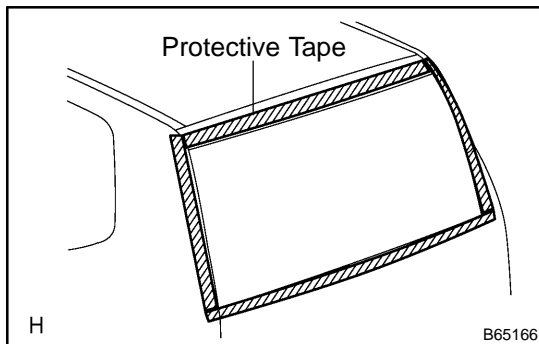
3. REMOVE REAR WIPER MOTOR ASSY (See page 66-10)

- (a) Remove the wiper motor assy.



4. REMOVE BACK DOOR GLASS

- (a) Pass a piano wire between the body and glass from the interior.
- (b) Tie both wire ends to wooden blocks or similar objects.



HINT:

Apply protective tape to the outer surface to prevent the surface from being scratched.

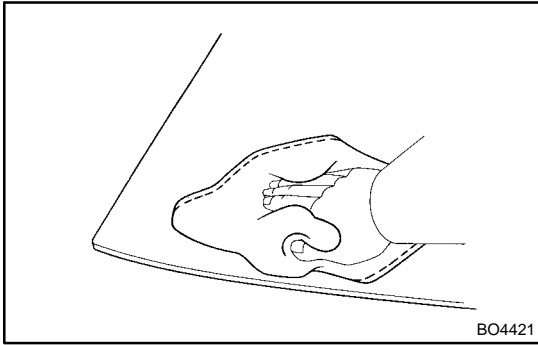
NOTICE:

- When separating the glass, take care not to damage the paint and interior and exterior ornaments.
- To prevent the safety pad from being scratched when removing the glass, place a plastic sheet between the piano wire and safety pad.

- (c) Cut off the adhesive by pulling the piano wire around it.
- (d) Using a suction rubber, remove the glass.

NOTICE:

Leave as much adhesive on the body as possible when removing the glass.

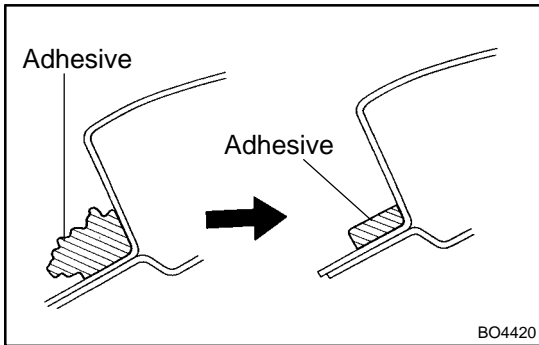


5. CLEAN BACK DOOR GLASS

- (a) Clean the outer circumference of the glass unleaded gasoline.

NOTICE:

- Do not touch the glass surface after cleaning it.
- Be careful not to damage the body.



6. INSTALL BACK DOOR GLASS

- (a) Clean and shape the contact surface of the vehicle body.
- (1) Using a knife, cut away any rough adhesive on the contact surface of the body to ensure the appropriate surface shape.

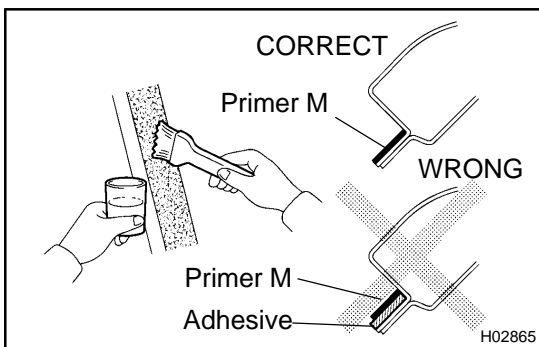
HINT:

Leave as much adhesive on the body as possible.

- (2) Clean the contact surface of the body with a piece of shop rag saturated with cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



- (b) Using a brush, coat the exposed part of the body on the vehicle side with Primer M.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
- Do not coat the adhesive with Primer M.
- Do not keep any of the opened Primer M for later use.

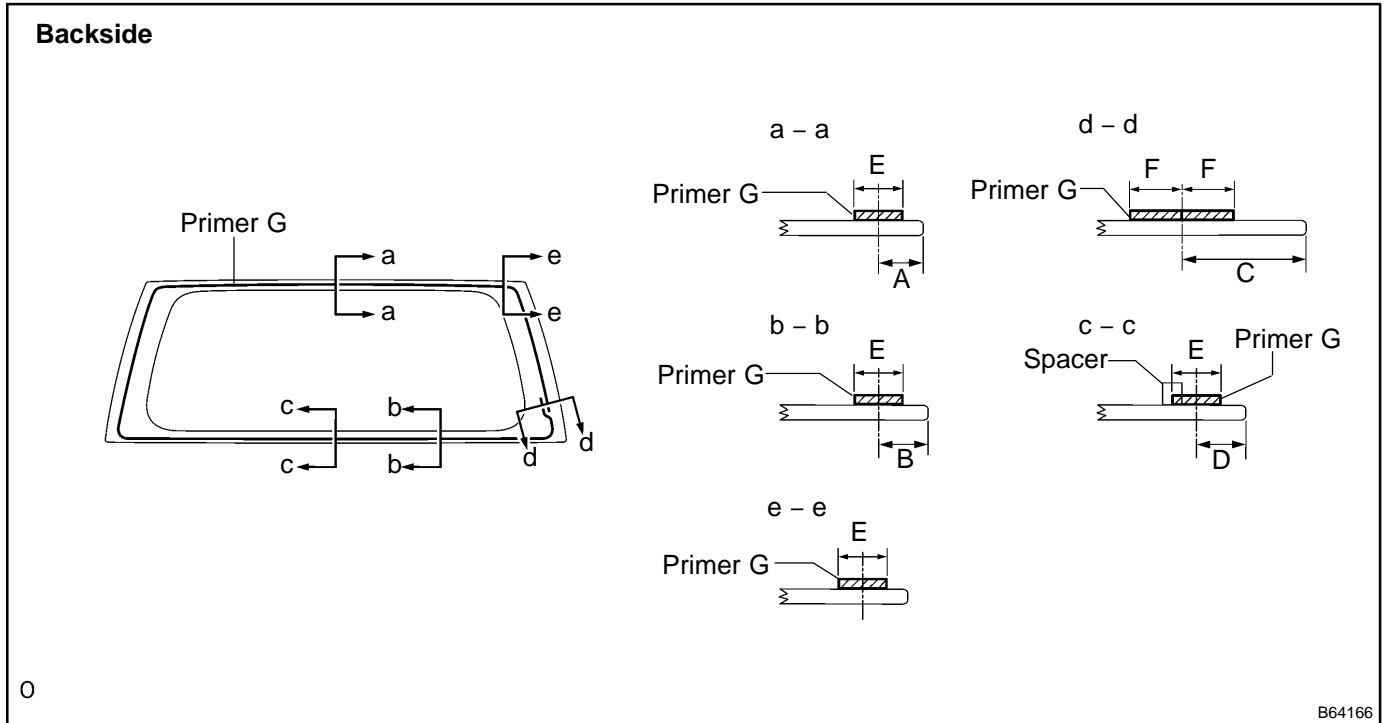
(c) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

HINT:

If an area other than that specified is coated by accident, wipe off the primer with a clean shop rag before it dries.

NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
- Do not keep any of the opened Primer G for later use.



Dimensions:

A	12.0 mm (0.472 in.)
B	13.0 mm (0.512 in.)
C	33.6 mm (1.323 in.)
D	13.0 mm (0.512 in.)
E	14.0 mm (0.551 in.)
F	11.0 mm (0.433 in.)

(d) Apply adhesive.

Adhesive: Part No. 08850-00801 or equivalent

(1) Cut off the tip of the cartridge nozzle, as shown in the illustration.

HINT:

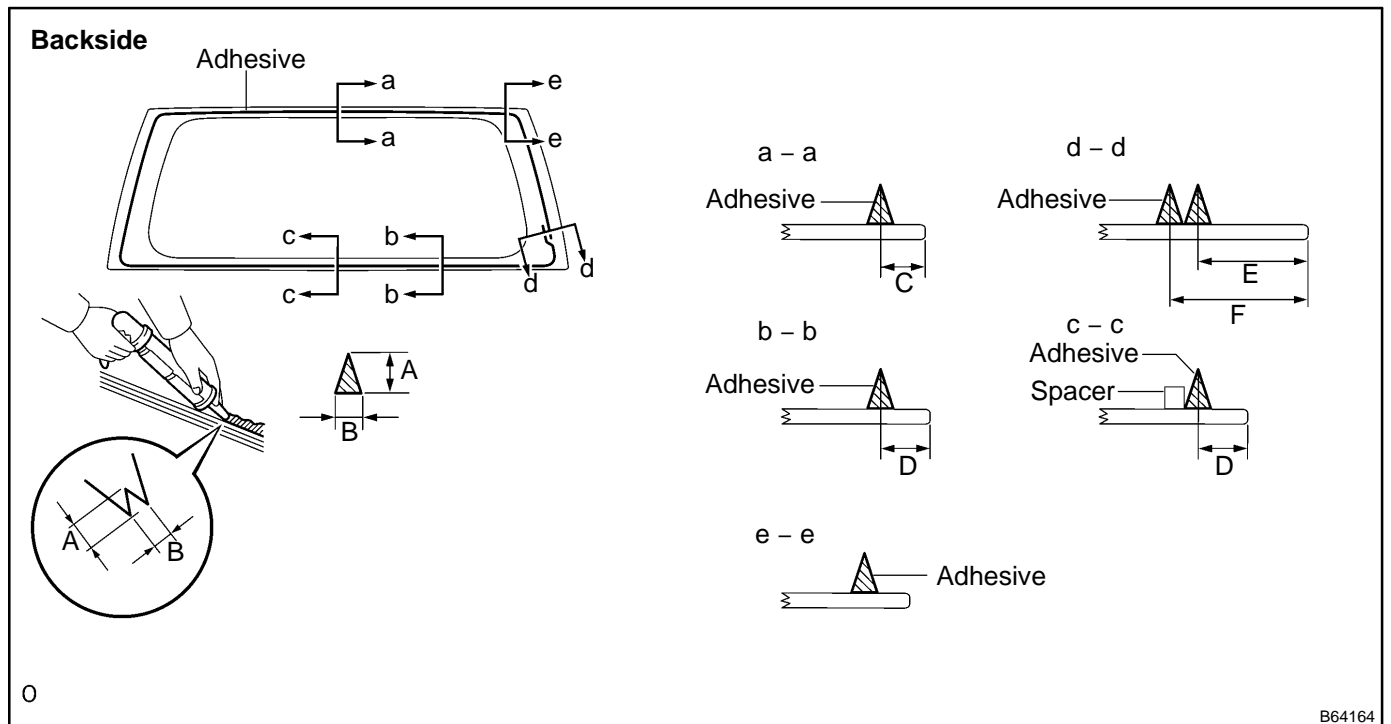
After cutting off the tip, use all adhesive within the time described in the table below.

Tack free time:

Temperature	Tack free Time
35°C (95°F)	15 minutes
20°C (68°F)	100 minutes
5°C (41°F)	8 hours

(2) Load the sealer gun with the cartridge.

(3) Coat the glass with adhesive, as shown in the illustration.



Dimensions:

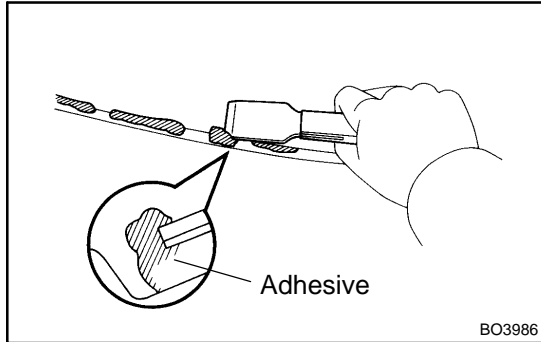
A	12.0 mm (0.472 in.)
B	8.0 mm (0.315 in.)
C	12.0 mm (0.472 in.)
D	13.0 mm (0.512 in.)
E	29.6 mm (1.166 in.)
F	37.6 mm (1.480 in.)

- (e) Install the glass to the body.
 - (1) Hold the back window glass in place securely with tape or equivalent to the body until the adhesive has hardened.

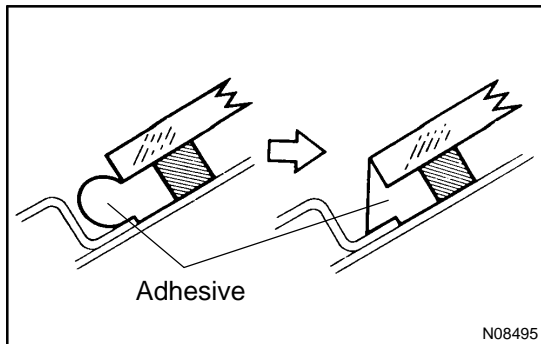
NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
- Check that the clips are attached to the body correctly.
- Check the clearance between the body and glass.

- (2) Lightly press the front surface of the glass to ensure a close fit.



- (3) Using a scraper, remove any excess or protruding adhesive.



HINT:

Apply adhesive onto the glass rim.

NOTICE:

The vehicle should not be driven until the time indicated in the table below has elapsed.

Minimum time:

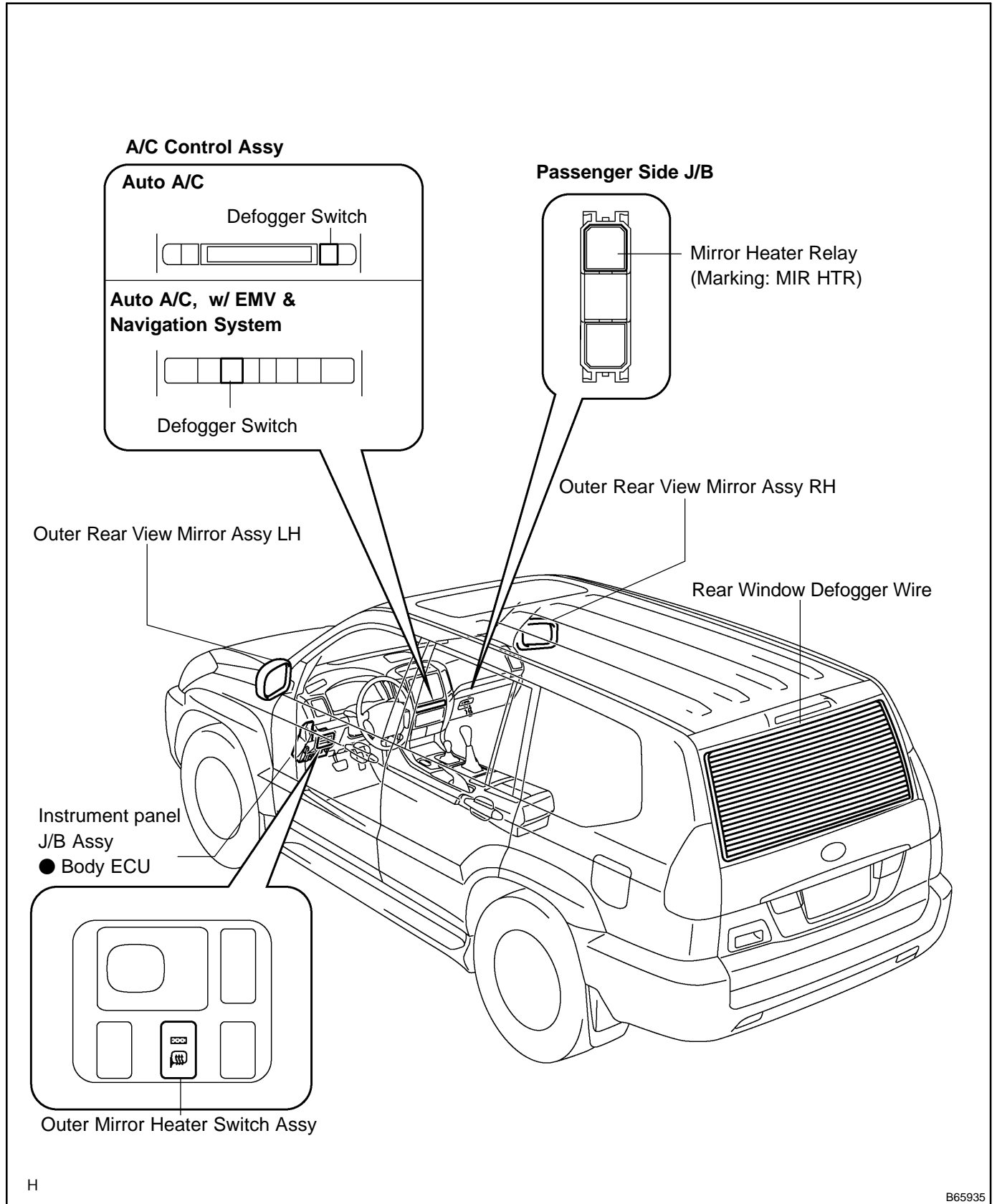
Temperature	Minimum time prior to driving vehicle
35°C (95°F)	1.5 hours
20°C (68°F)	5 hours
5°C (41°F)	24 hours

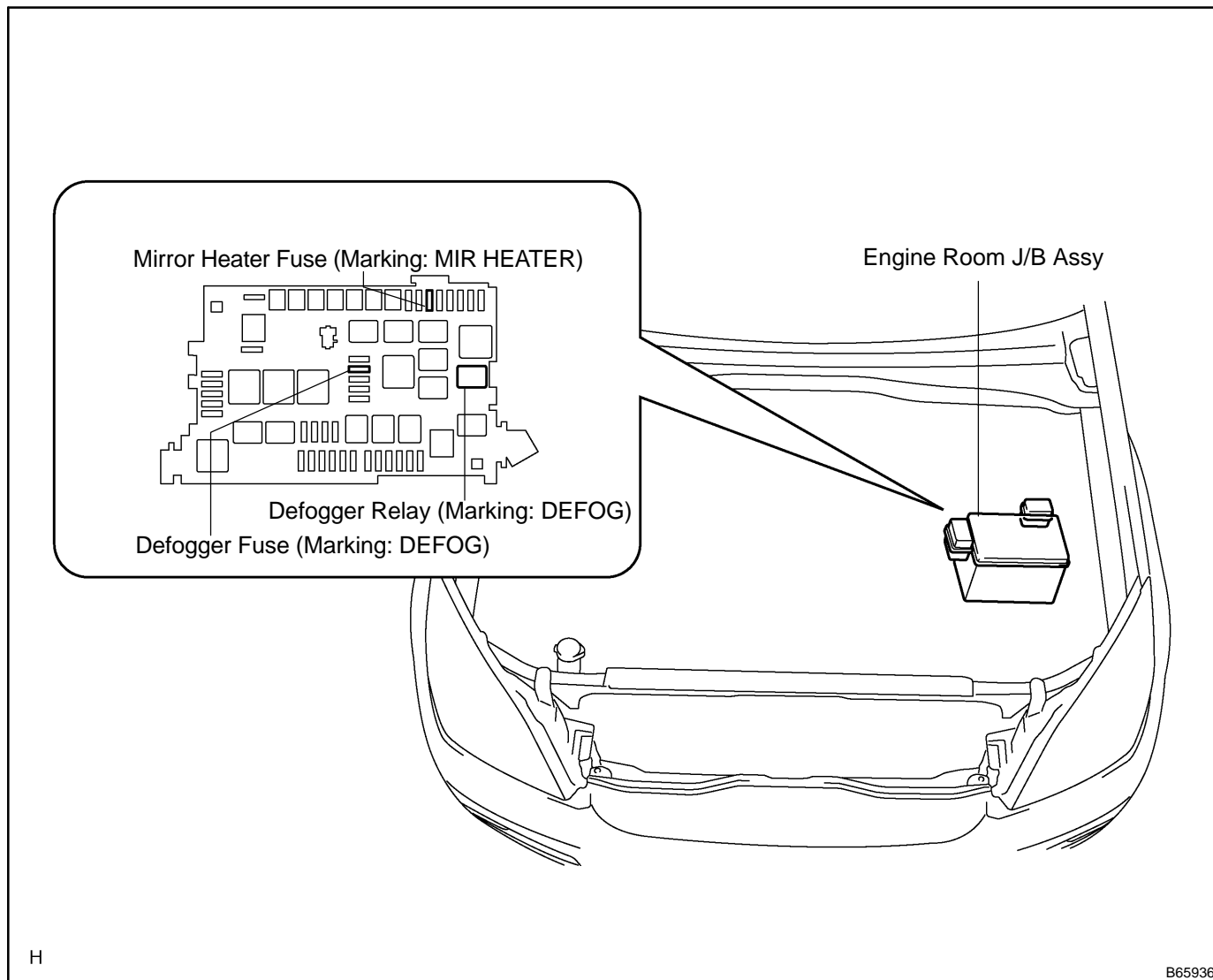
7. INSPECT FOR LEAKS AND REPAIR

- (a) Conduct a leak test after the adhesive has completely hardened.
- (b) Seal any leaks with auto glass sealer.

WINDOW DEFOGGER SYSTEM LOCATION

700PQ-01

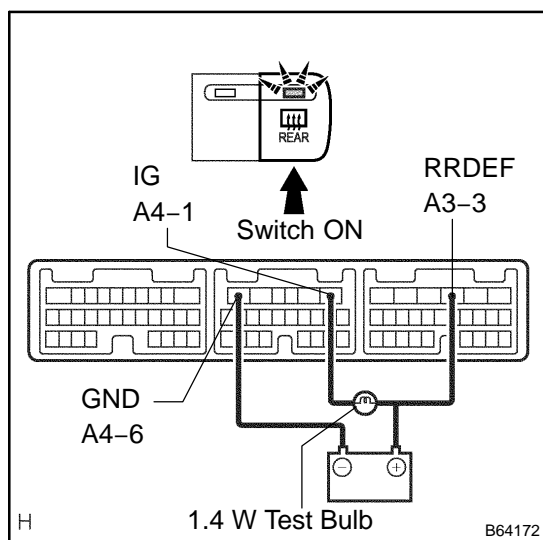




PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Rear window defogger does not operate (Indicator light ON)	6. DEFOG fuse 7. DEFOF relay 8. Rear window defogger wire 9. Wire harness 10. Instrument panel J/B assy	68-1 68-1 70-21 - -
Rear window defogger does not operate (Indicator light OFF)	1. DEFOG fuse 2. DEFOG relay 3. Air conditioning control assy 4. Rear window defogger wire 5. Wire harness 6. Instrument panel J/B assy	68-1 68-1 70-21 70-21 - -
Mirror heater does not operate (Indicator light ON)	1. MIR HEATER fuse 2. MIR HTR relay 3. Outer rear view mirror assy 4. Wire harness 5. Instrument panel J/B assy	68-1 68-1 70-21 - -
Mirror heater does not operate (Indicator light OFF)	1. MIR HEATER fuse 2. MIR HTR relay 3. Outer mirror heater switch assy 4. Outer rear view mirror assy 5. Wire harness 6. Instrument panel J/B assy	68-1 68-1 70-21 70-21 - -

INSPECTION



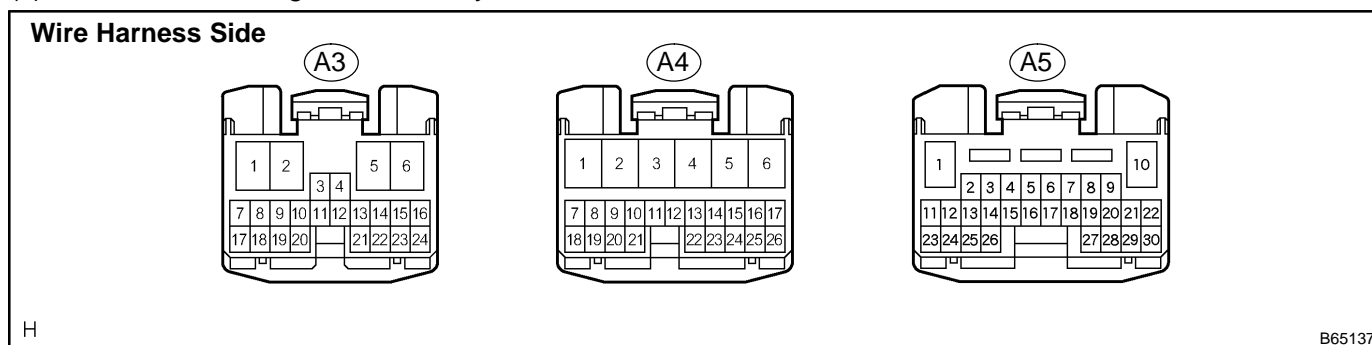
1. INSPECT AIR CONDITIONING CONTROL ASSY (AUTO AIR CONDITIONING)

- (a) Inspect operation of the defogger timer.
 - (1) Connect the positive (+) lead from the battery to terminal A3-3 and the negative (-) lead to terminal A4-6.
 - (2) Connect the positive (+) lead from the battery to terminal A4-1 through a 1.4 W test bulb.
 - (3) Push the defogger switch ON, check that the indicator light on the switch and the test bulb light up for 12 to 18 minutes, and then the indicator light and the test bulb go off.

If the result is not as specified, replace the A/C control assy.

(b) Disconnect the connector from the A/C control assy.

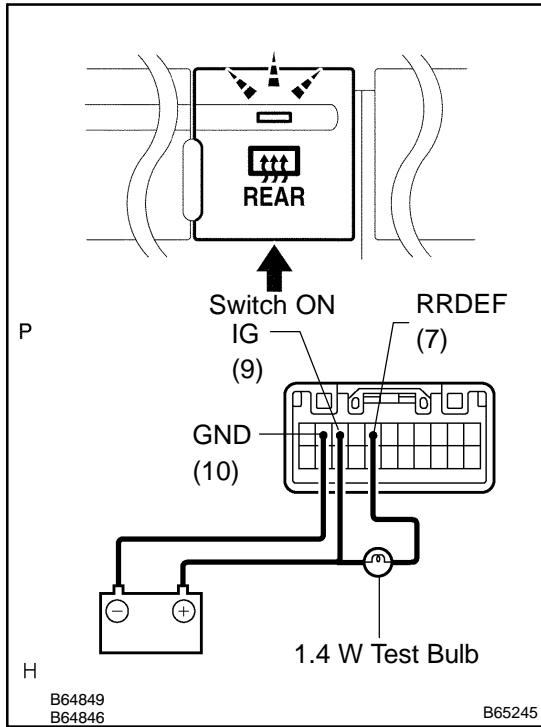
(c) Check the voltage or continuity of each terminal of the wire harness side connector.



Standard:

Terminal No.	Condition	Specified Condition
A4-6 ⇔ Body ground	Constant	Continuity
A4-1 ⇔ Body ground	Ignition switch Lock or ACC	No voltage
A4-1 ⇔ Body ground	Ignition switch ON	Battery positive voltage
A3-3 ⇔ Body ground	Ignition switch Lock or ACC	No voltage
A3-3 ⇔ Body ground	Ignition switch ON	Battery positive voltage

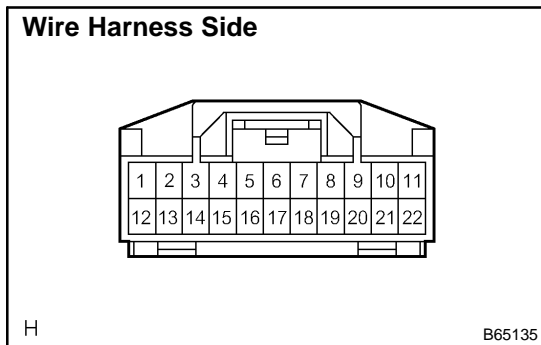
If the result is not as specified, there may be a malfunction on the wire harness side.



2. INSPECT AIR CONDITIONING CONTROL ASSY (AUTO AIR CONDITIONING, W/ EMV & NAVIGATION SYSTEM)

- (a) Inspect operation of the defogger timer.
 - (1) Connect the positive (+) lead from the battery to terminal 9 and the negative (-) lead to terminal 10.
 - (2) Connect the positive (+) lead from the battery to terminal 7 through a 1.4 W test bulb.
 - (3) Push the defogger switch ON, check that the indicator light on the switch and the test bulb light up for 12 to 18 minutes, and then the indicator light and the test bulb go off.

If the result is not as specified, replace the A/C control assy.

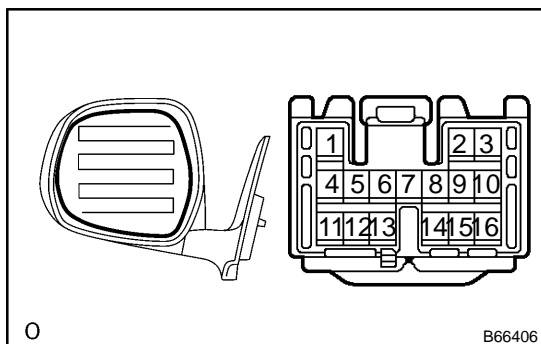


- (b) Disconnect the connector from the A/C control assy.
- (c) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Terminal No.	Condition	Specified Condition
10 ⇔ Body ground	Constant	Continuity
7 ⇔ Body ground	Ignition switch Lock or ACC	No voltage
7 ⇔ Body ground	Ignition switch ON	Battery positive voltage
9 ⇔ Body ground	Ignition switch Lock or ACC	No voltage
9 ⇔ Body ground	Ignition switch ON	Battery positive voltage

If the result is not as specified, there may be a malfunction on the wire harness side.



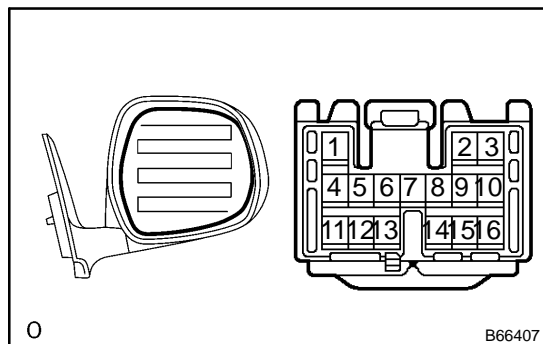
3. INSPECT OUTER REAR VIEW MIRROR ASSY LH (w/ OUTER MIRROR HEATER)

- (a) Inspect operation of the mirror heater.

Standard:

Measurement Condition	Specified Condition
Battery positive (+) → H+ (5) Battery negative (-) → H- (12)	Mirror becomes warm

If the result is not as specified, replace the mirror assy.



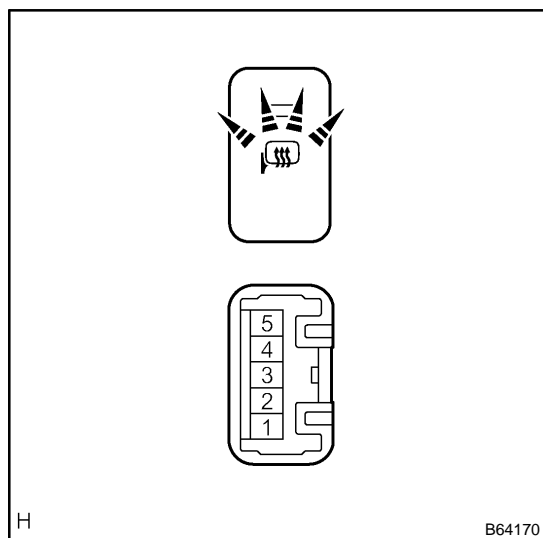
4. INSPECT OUTER REAR VIEW MIRROR ASSY RH (w/ OUTER MIRROR HEATER)

- (a) Inspect operation of the mirror heater.

Standard:

Measurement Condition	Specified Condition
Battery positive (+) → H+ (5) Battery negative (-) → H- (12)	Mirror becomes warm

If the result is not as specified, replace the mirror assy.



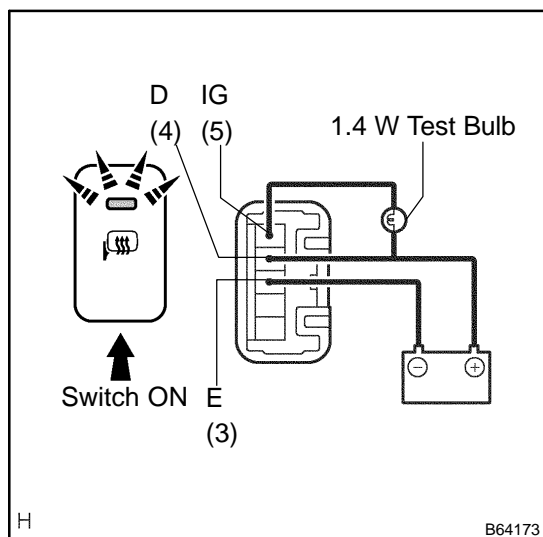
5. INSPECT OUTER MIRROR HEATER SWITCH ASSY (w/ OUTER MIRROR HEATER)

- (a) Inspect operation of the defogger switch illumination.

Standard:

Measurement Condition	Specified Condition
Battery positive (+) → ILL+ (1) Battery negative (-) → ILL- (2)	Illumination light lights up

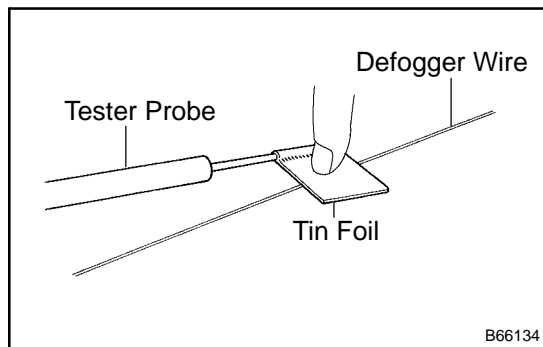
If the result is not as specified, replace the outer mirror heater switch assy or bulb.



- (b) Inspect operation of the defogger timer.

- (1) Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 3.
- (2) Connect the positive (+) lead from the battery to terminal 5 through a 1.4 W test bulb.
- (3) Push the outer mirror heater switch ON, check that the indicator light on the switch and the test bulb light up for 5 minutes, and then the indicator light and the test bulb go off.

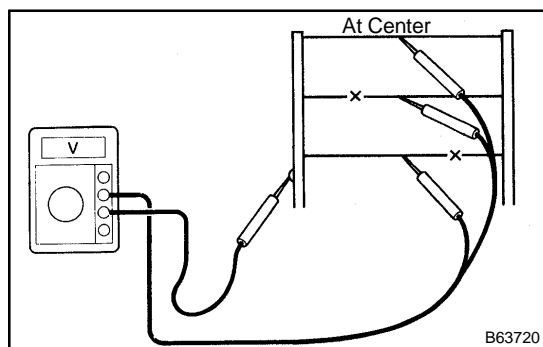
If the result is not as specified, replace the outer mirror heater switch assy.



6. INSPECT BACK WINDOW (DEFOGGER WIRE)

NOTICE:

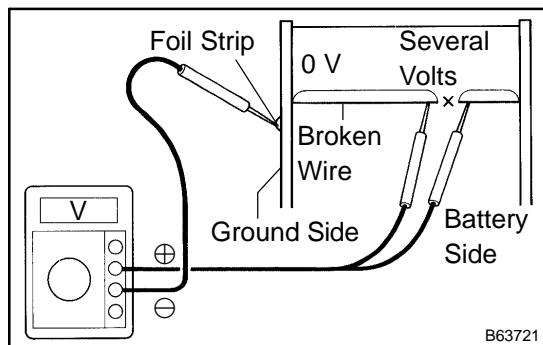
- When cleaning the glass, wipe the glass along the wire using a soft and dry cloth. Take care not to damage the wires.
- Do not use detergents or glass cleaners including abrasive ingredients.
- When measuring voltage, wrap a piece of tin foil around the tip of the negative probe and press the foil against the wire with your finger, as shown in the illustration



- Turn the ignition switch ON.
- Turn the defogger switch ON.
- Inspect the voltage at the center of each heat wire, as shown in the illustration.

Standard:

Voltage	Criteria
Approx. 5 V	OK, wire is not broken
Approx. 10 V or 0 V	Wire is broken



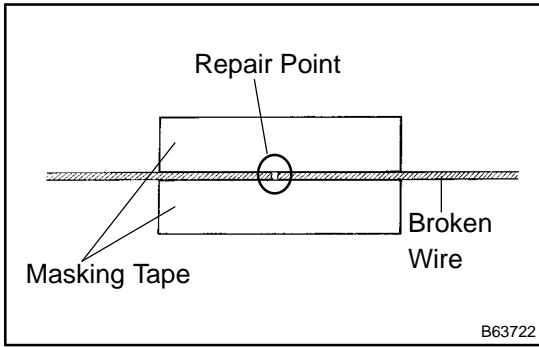
HINT:

If there is approximately 10 V, the wire may be broken between the center of the wire and the positive (+) end. If there is no voltage, the wire may be broken between the center of the wire and the ground.

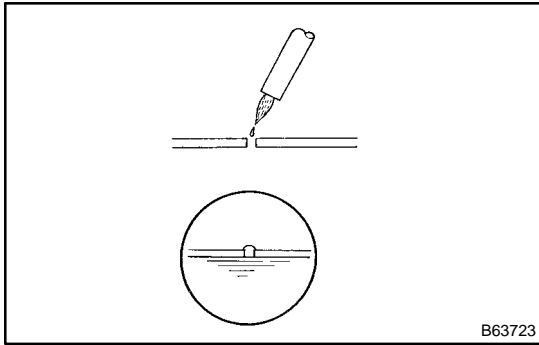
- Place the voltmeter positive (+) lead against the defogger wire on the battery side.
- Place the voltmeter negative (-) lead with the foil strip against the wire on the ground side.
- Slide the positive (+) lead from the battery side to the ground side.
- The point where the voltmeter drops from several volts to 0 V is the place where the defogger wire is broken.

HINT:

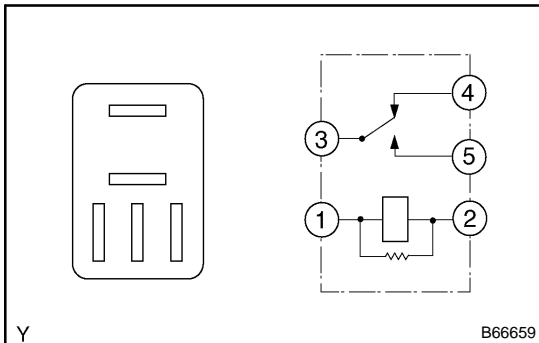
If the defogger wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the defogger wire but gradually increases to about 12 V as the meter probe moves to the other end.



- (h) If necessary, repair the defogger wire.
- (1) Clean the broken wire tips with grease, wax and silicone remover.
 - (2) Place the masking tape along the both sides of the wire.
 - (3) Thoroughly mix the repair agent (Dupont paste No. 4817).
 - (4) Using a fine tip brush, apply a small amount of the agent to the wire.
 - (5) After a few minutes, remove the masking tape.



NOTICE:
Do not repair the defogger wire for at least 24 hours.



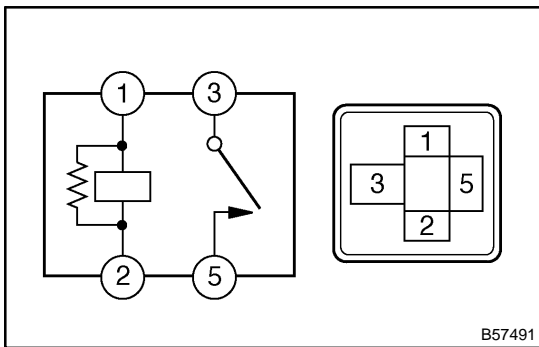
7. INSPECT DEFOGGER RELAY (Marking: DEFOG)

- (a) Inspect the continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Constant	Continuity
3 ↔ 4		
3 ↔ 5	Apply B+ between terminals 1 and 2	Continuity

If the result is not as specified, replace the relay.



8. INSPECT HEATER MIRROR RELAY (w/ OUTER MIRROR HEATER) (Marking: MIR HTR)

- (a) Inspect the continuity.

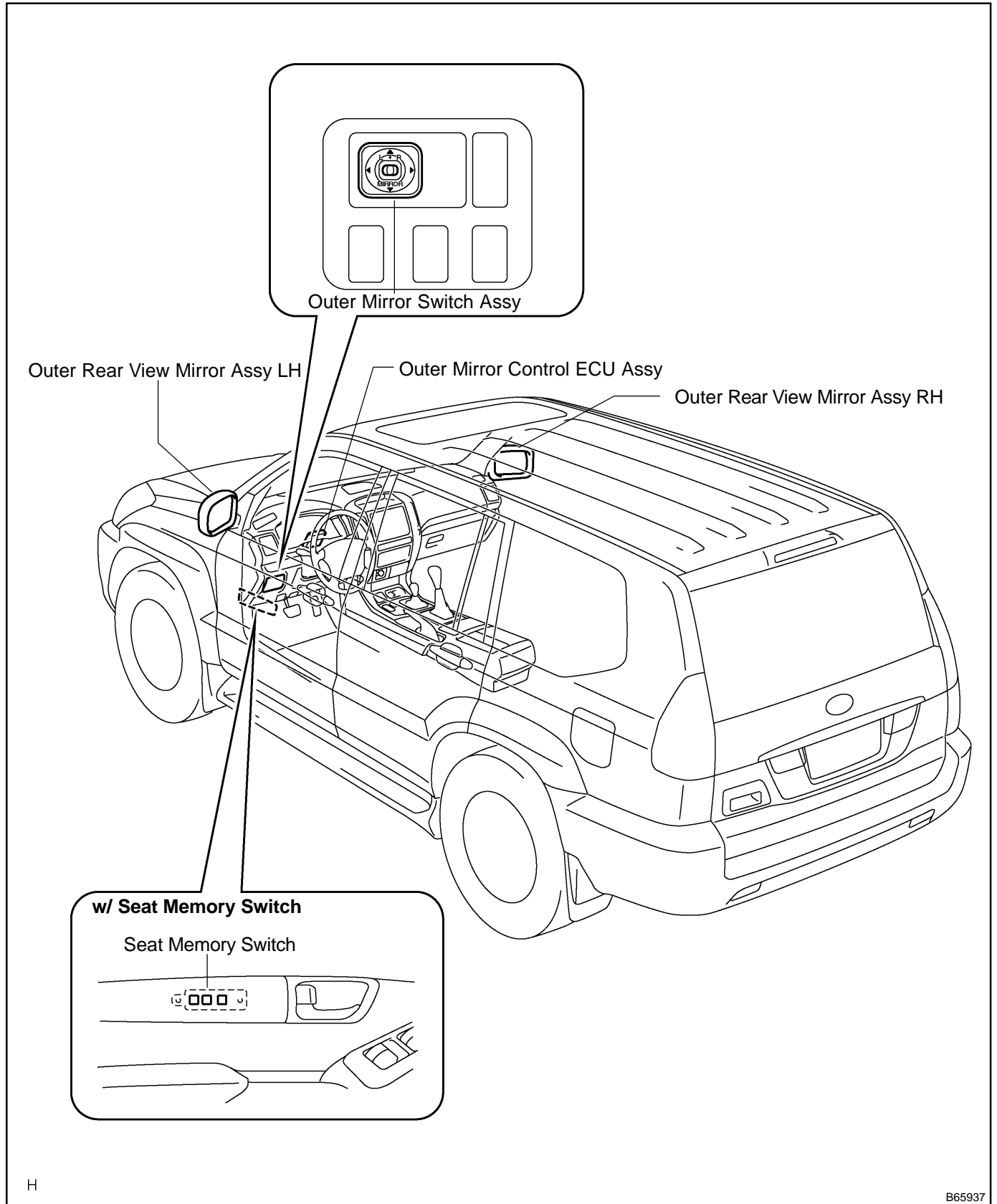
Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Constant	Continuity
3 ↔ 5	Constant	No continuity
3 ↔ 5	Apply B+ between terminals 1 and 2	Continuity

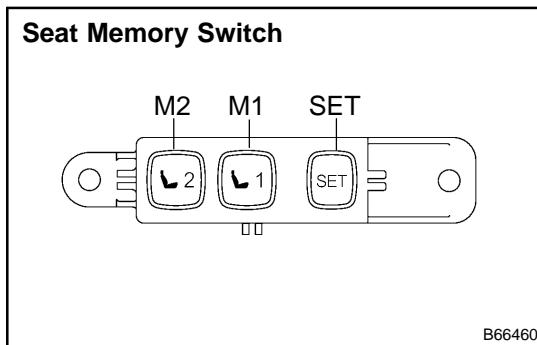
If the result is not as specified, replace the relay.

POWER MIRROR CONTROL SYSTEM LOCATION

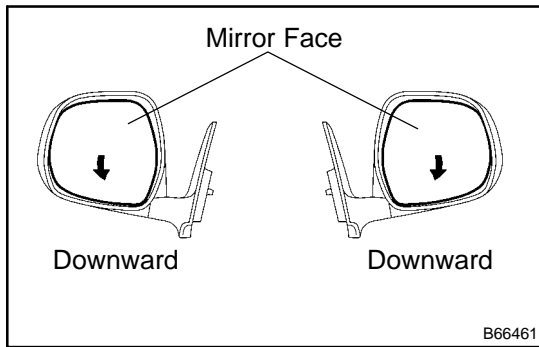
700PT-02



ON-VEHICLE INSPECTION



1. **CHECK MEMORY AND REACTIVATION FUNCTION**
 - (a) Turn the ignition switch ON and move the shift lever into the P range.
 - (b) Move the seat into the foremost position and uppermost position using each seat switch.
 - (c) Check that the buzzer sounds for 0.5 second and the seat position is recorded when the M1 switch is pressed while the SET switch is held down.
 - (d) Move the seat out of the foremost position and uppermost position using each seat switch.
 - (e) Check that the buzzer sounds for 0.5 second and the seat position is recorded when the M2 switch is pressed while the SET switch is held down.
 - (f) Check that the buzzer sounds for 0.1 second and the seat automatically moves into the foremost position and uppermost position (set positions) when the M1 switch is pressed.
 - (g) Check that the buzzer sounds for 0.1 second and the seat automatically moves out of the foremost position and uppermost position (set positions) when the M2 switch is pressed.
 - (h) Check that the seat automatically moves into the set position when the M1 or M2 switch is pressed within 30 seconds after the ignition switch is turned OFF, the key is pulled out from the key cylinder and the driver side door is opened.
 - (i) Move the seat into the maximum positions of the slide movement, and disconnect the negative terminal of the battery while the memory switch is in the ON position. Then leave the seat in the position for 3 minutes. The seat position memory will be erased.
 - (j) Move the seat into all the maximum positions (front/rear and up/down) using each seat switch.
 - (k) Check that the seat does not move (the seat position is not recorded) when the M1 switch or the M2 switch is pressed, after the M1 switch and M2 switch are pressed at one time while the SET switch is held down.



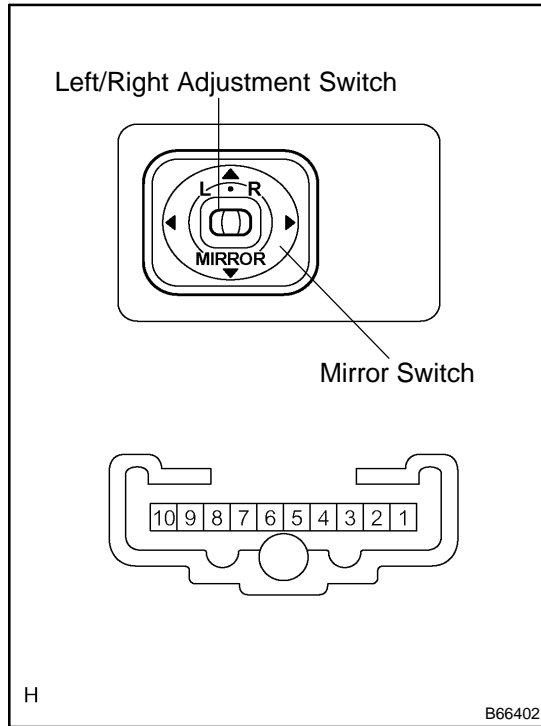
2. INSPECT REVERSE-SHIFT-LINKED OPERATION OF MIRRORS

- (a) Set the left/right adjustment switch in the L or R position.
- (b) Check that the mirror face returns to the opposite position (downward) when the shift lever is moved into the R range.

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Mirror does not operate	1. Outer mirror switch assy	70-30
	2. Outer rear view mirror assy	70-30
	3. Seat memory switch	70-30
	4. Mirror control ECU	70-30
	5. Wire harness	-
Mirror operates abnormally	1. Outer mirror switch assy	70-30
	2. Outer rear view mirror assy	70-30
	3. Seat memory switch	70-30
	4. Mirror control ECU	70-30
	5. Wire harness	-

INSPECTION



1. INSPECT OUTER MIRROR SWITCH ASSY (w/o RETRACT MIRROR)

- (a) The L side of the left/right adjustment switch:
Inspect the mirror switch continuity.

Standard (Left side):

Terminal No.	Switch Position	Specified Condition
-	OFF	No continuity
1 ↔ 8	UP	Continuity
3 ↔ 4		
7 ↔ 8		
1 ↔ 8	DOWN	Continuity
3 ↔ 8		
4 ↔ 7		
1 ↔ 8	LEFT	Continuity
4 ↔ 9		
7 ↔ 8		
1 ↔ 8	RIGHT	Continuity
4 ↔ 7		
8 ↔ 9		

If the result is not as specified, replace the switch assy.

- (b) The R side of the left/right adjustment switch:
Inspect the mirror switch continuity.

Standard (Right side):

Terminal No.	Switch Position	Specified Condition
-	OFF	No continuity
1 ↔ 8	UP	Continuity
2 ↔ 4		
7 ↔ 8		
1 ↔ 8	DOWN	Continuity
2 ↔ 8		
4 ↔ 7		
1 ↔ 8	LEFT	Continuity
7 ↔ 8		
4 ↔ 10		
1 ↔ 8	RIGHT	Continuity
4 ↔ 7		
8 ↔ 10		

If the result is not as specified, replace the switch assy.

- (c) When the left/right adjustment switch is off:
Inspect the mirror switch continuity.

Standard (Adjustment switch off):

Terminal No.	Switch Position	Specified Condition
7 ↔ 8	UP	Continuity
4 ↔ 7	DOWN	Continuity
7 ↔ 8	LEFT	Continuity
4 ↔ 7	RIGHT	Continuity

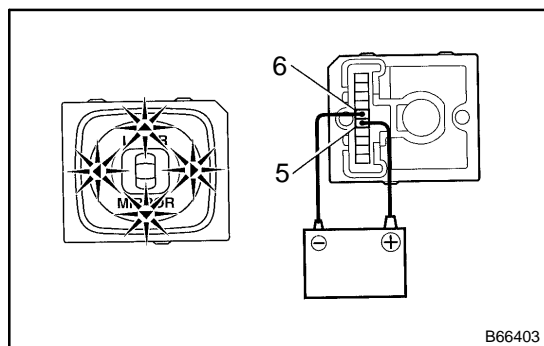
If the result is not as specified, replace the switch assy.

- (d) Inspect operation of the mirror switch illumination.

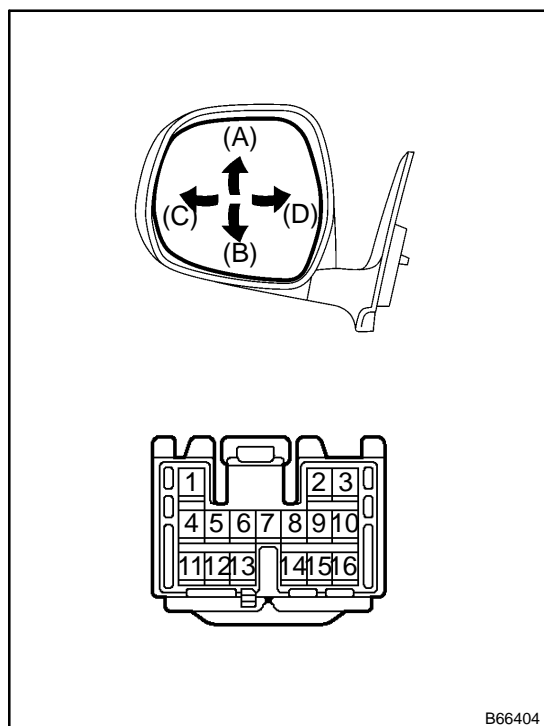
Standard:

Measurement Condition	Specified Condition
Battery positive (+) → ILL+ (5) Battery negative (-) → ILL- (6)	Illumination light lights up

If the result is not as specified, replace the switch assy or bulb.



B66403



B66404

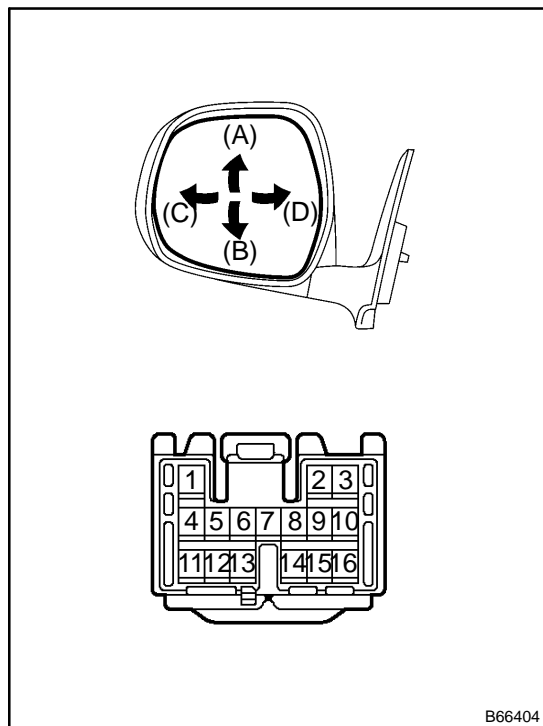
2. INSPECT OUTER REAR VIEW MIRROR ASSY LH

- (a) Disconnect the mirror connector.
(b) Apply battery voltage and inspect operation of the mirror face, as shown in the table and illustration.

Standard (LH):

Measurement Condition	Mirror Operation
Battery positive (+) → MV (7) Battery negative (-) → M+ (6)	Turns upward (A)
Battery positive (+) → M+ (6) Battery negative (-) → MV (7)	Turns downward (B)
Battery positive (+) → M+ (8) Battery negative (-) → MH (7)	Turns left (C)
Battery positive (+) → MH (7) Battery negative (-) → M+ (8)	Turns right (D)

If the result is not as specified, replace the mirror assy.



3. INSPECT OUTER REAR VIEW MIRROR ASSY LH (w/ SEAT MEMORY SWITCH)

- (a) Disconnect the mirror connector.
- (b) Apply battery voltage and inspect operation of the mirror face, as shown in the table and illustration.

Standard (LH):

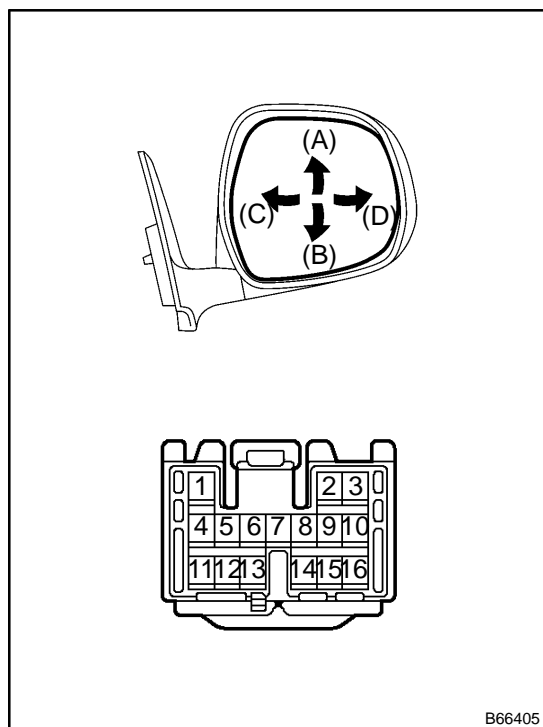
Measurement Condition	Mirror Operation
Battery positive (+) → MV (7) Battery negative (-) → M+ (6)	Turns upward (A)
Battery positive (+) → M+ (6) Battery negative (-) → MV (7)	Turns downward (B)
Battery positive (+) → M+ (8) Battery negative (-) → MH (7)	Turns left (C)
Battery positive (+) → MH (7) Battery negative (-) → M+ (8)	Turns right (D)

If the result is not as specified, replace the mirror assy.

- (c) Inspect operation of the mirror position sensor.
 - (1) Connect the positive (+) lead from the ohmmeter to terminal 9 and the negative (-) lead to terminal 15, and measure the resistance.

Standard: 700 – 1300 Ω

- (2) Check that the resistance between terminals 9 and 10 changes when slowly turning the mirror face right and left.
- (3) Check that the resistance between terminals 9 and 16 changes when slowly turning the mirror face right and left.



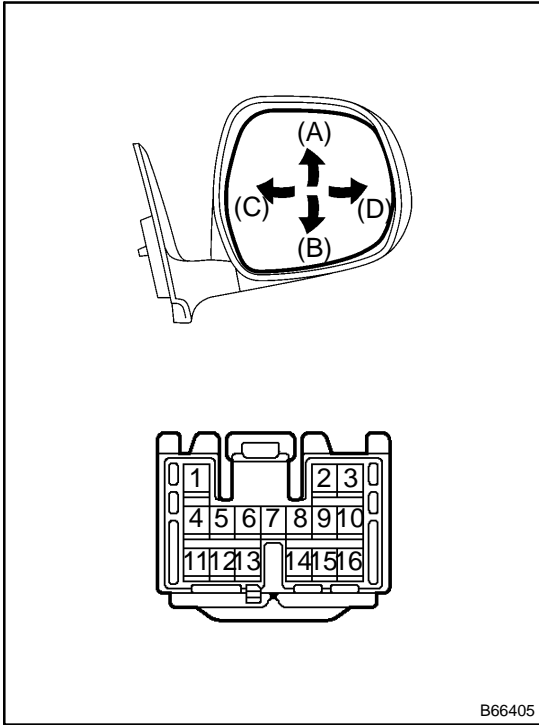
4. INSPECT OUTER REAR VIEW MIRROR ASSY RH

- (a) Disconnect the mirror connector.
- (b) Apply battery voltage and inspect operation of the mirror face, as shown in the table and illustration.

Standard (RH):

Measurement Condition	Mirror Operation
Battery positive (+) → MV (7) Battery negative (-) → M+ (6)	Turns upward (A)
Battery positive (+) → M+ (6) Battery negative (-) → MV (7)	Turns downward (B)
Battery positive (+) → M+ (8) Battery negative (-) → MH (7)	Turns left (C)
Battery positive (+) → MH (7) Battery negative (-) → M+ (8)	Turns right (D)

If the result is not as specified, replace the mirror assy.



5. INSPECT OUTER REAR VIEW MIRROR ASSY RH (w/ SEAT MEMORY SWITCH)

- (a) Disconnect the mirror connector.
- (b) Apply battery voltage and inspect operation of the mirror face, as shown in the table and illustration.

Standard (RH):

Measurement Condition	Mirror Operation
Battery positive (+) → MV (7) Battery negative (-) → M+ (6)	Turns upward (A)
Battery positive (+) → M+ (6) Battery negative (-) → MV (7)	Turns downward (B)
Battery positive (+) → M+ (8) Battery negative (-) → MH (7)	Turns left (C)
Battery positive (+) → MH (7) Battery negative (-) → M+ (8)	Turns right (D)

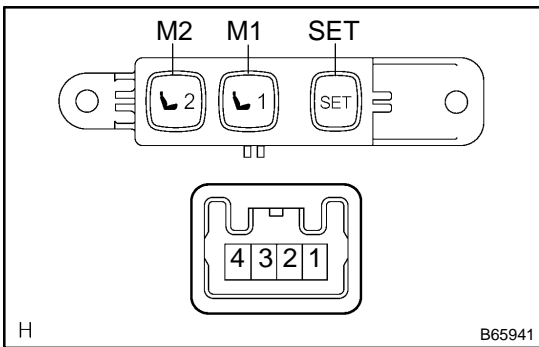
If the result is not as specified, replace the mirror assy.

- (c) Inspect operation of the mirror position sensor.
 - (1) Connect the positive (+) lead from the ohmmeter to terminal 9 and the negative (-) lead to terminal 15, and measure the resistance.

Standard:

700 – 1300 Ω

- (2) Check that the resistance between terminals 9 and 10 changes when slowly turning the mirror face right and left.
- (3) Check that the resistance between terminals 9 and 16 changes when slowly turning the mirror face right and left.



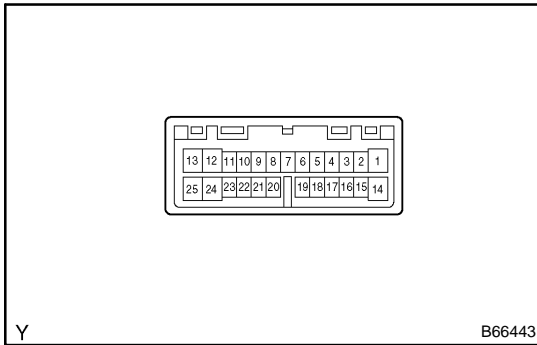
6. INSPECT SEAT MEMORY SWITCH (w/ SEAT MEMORY SWITCH)

- (a) Inspect the seat memory switch continuity.

Standard:

Terminal No.	Switch Position	Specified Condition
1 ↔ 2	SET Switch ON	Continuity
2 ↔ 3	SW1 Switch ON	Continuity
2 ↔ 4	SW2 Switch ON	Continuity

If the result is not as specified, replace the switch assy.

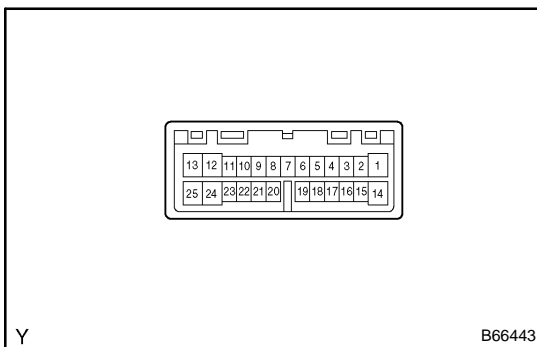
**7. INSPECT OUTER MIRROR CONTROL ECU ASSY**

- (a) Disconnect the connector from the mirror control ECU assy.
- (b) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Terminal No.	Switch Position	Specified Condition
1 ⇔ Body ground	Constant	10 - 14 V
2 ⇔ Body ground	Ignition switch OFF → ACC	0 V → 10 - 14 V
14 ⇔ Body ground	Constant	Continuity
15 ⇔ Body ground	Shift position P → R	0 V → 10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.



- (c) Connect the connector to the mirror control ECU assy.
- (d) Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Terminal No.	Switch Position	Specified Condition
10 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch OFF → RIGHT or DOWN	0 V → 8 V or more
11 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch OFF → LEFT	0 V → 8 V or more
12 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch OFF → UP	0 V → 8 V or more
22 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch R side, Mirror switch OFF → RIGHT or DOWN	0 V → 8 V or more
23 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch R side, Mirror switch OFF → LEFT	0 V → 8 V or more
24 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch R side, Mirror switch OFF → UP	0 V → 8 V or more

If the result is not as specified, replace the mirror assy.

Standard:

Terminal No.	Switch Position	Specified Condition
8 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch innermost → Outermost	Approx. 4 V → 0.23 V
9 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch uppermost → Lowermost	Approx. 3.7 V → 0.27 V
20 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch L side, Mirror switch innermost → Outermost	Approx. 4 V → 0.23 V
21 ⇔ Body ground	Ignition switch ACC, Left/right adjustment switch R side, Mirror switch uppermost → Lowermost	Approx. 3.7 V → 0.27 V

WINDSHIELD/WINDOWGLASS/MIRROR - POWER MIRROR CONTROL SYSTEM

Terminal No.	Switch Position	Specified Condition
13 ⇔ Body ground	Ignition switch OFF, All lights OFF, All doors closed and left untouched for 30 sec. or more → Any door open	No Hz output (0 Hz) → Hz output
25 ⇔ Body ground	Ignition switch OFF, All lights OFF, All doors closed and left untouched for 30 sec. or more → Any door open	No Hz output (0 Hz) → Hz output

If the result is not as specified, replace the mirror assy or the multiplex control may malfunction.

Standard:

Terminal No.	Switch Position	Specified Condition
7 ⇔ Body ground	Ignition switch OFF → ACC	0 V → 5 V

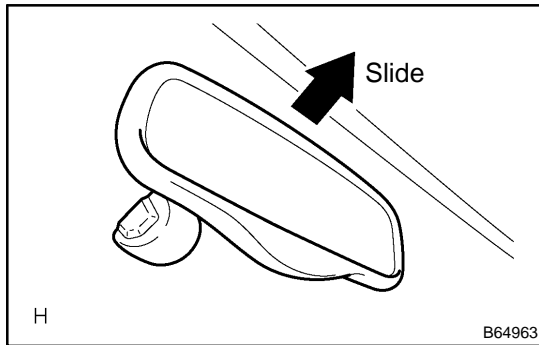
If the result is not as specified, replace the mirror control ECU assy .

INNER REAR VIEW MIRROR ASSY REPLACEMENT

700PY-01

HINT:

The installation is in the reverse order of the removal.



1. **REMOVE INNER REAR VIEW MIRROR ASSY (ELECTROCHROMIC MIRROR INNER MIRROR)**
 - (a) Remove the mirror cover.
 - (b) Disconnect the connector.
 - (c) Remove the mirror assy, as shown in the illustration.

PRE-CHECK

1. SELECT COMPASS DISPLAY MODE

- (a) The comp switch allows you to select the Display or Non-display mode of the compass.

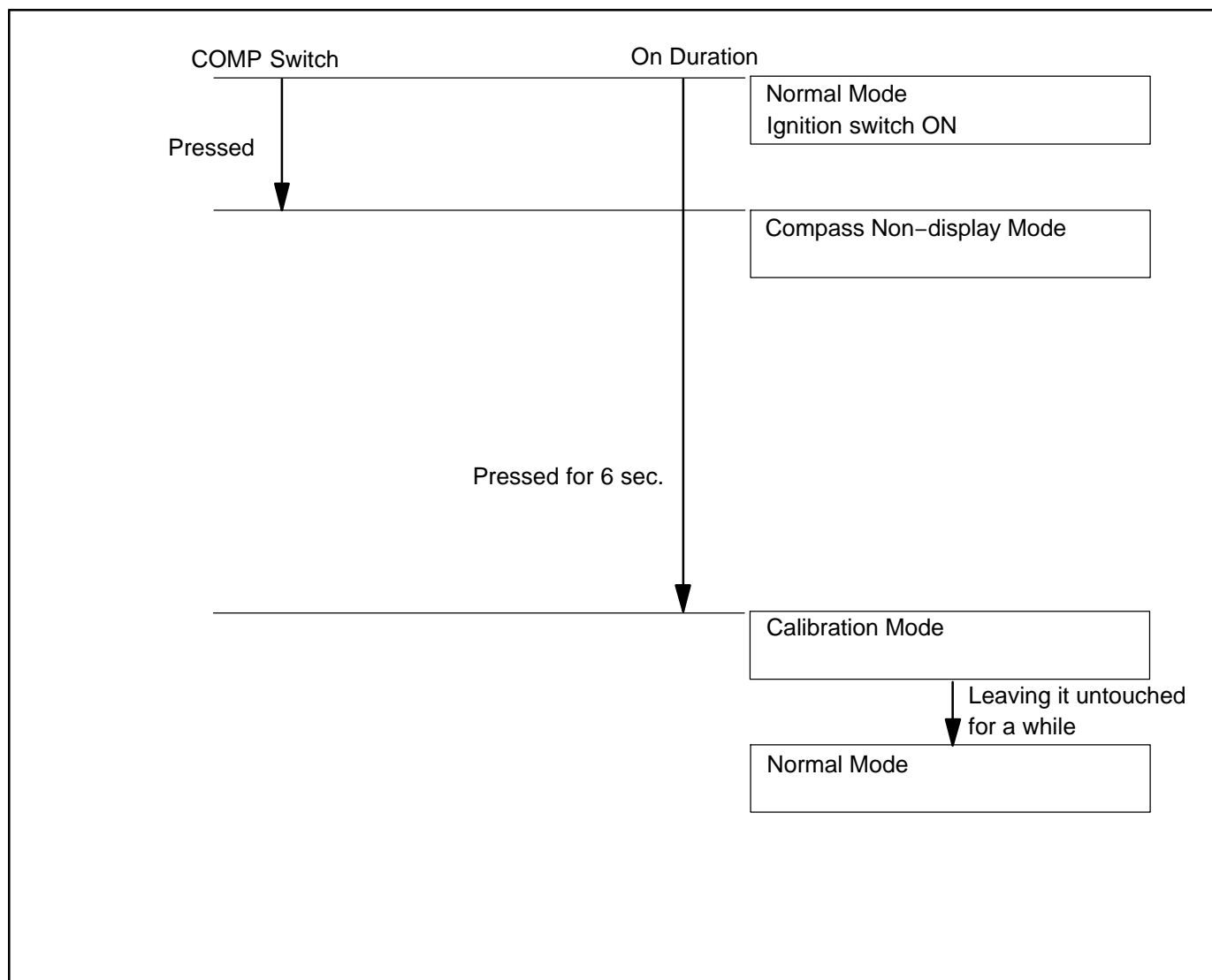
2. PERFORM CALIBRATION

- (a) Because each vehicle has its own magnetic field, calibration should be performed for each vehicle. This compass function is used when storing the record of the vehicle's magnetic field.

3. WHEN COMPASS IS MAGNETIZED:

- (a) A compass could be magnetized during shipping by vessels or freight. Therefore, make sure to perform calibration and ensure that calibration is performed properly before delivery. If it cannot be done (cannot be completed in spite of driving around several times), it may be caused by magnetization. Demagnetize the vehicle using a demagnetizer and perform calibration again.

4. SET COMPASS



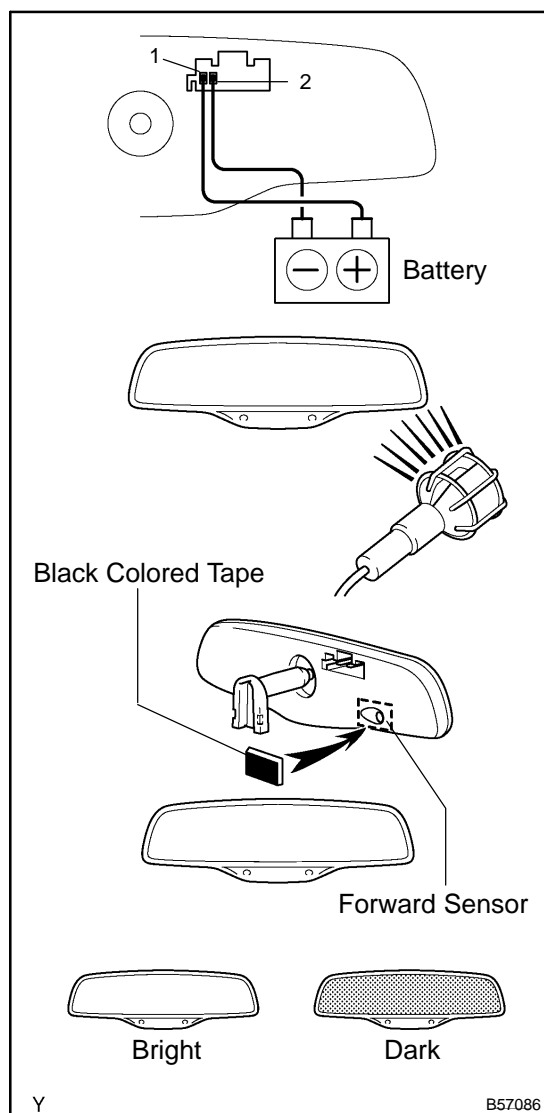
5. CALIBRATION SETTING MODE

- (a) Pressing the comp switch for 6 seconds in the normal mode, will also activate the calibration setting mode.
- (b) Drive the vehicle at a slow speed of 8 km/h (5 mph) or less in the circular direction.
- (c) Driving around the circle 1 to 3 times will display the azimuthal direction on the display, completing the calibration.

HINT:

After the calibration is completed, it is not necessary to perform the above procedures unless the magnetic field strength is drastically changed. If this happens, the azimuthal display will be changed to "C".

INSPECTION



1. INSPECT INNER REAR VIEW MIRROR ASSY

- (a) Inspect operation of the electrochromic inner mirror.
- (1) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
 - (2) Attach black colored tape to the forward sensor to prevent it from sensing.
 - (3) Light up the mirror with an electric light, and check that the mirror surface changes from bright to dark.

If the result is not as specified, replace the mirror assy.

OUTER REAR VIEW MIRROR ASSY LH

REPLACEMENT

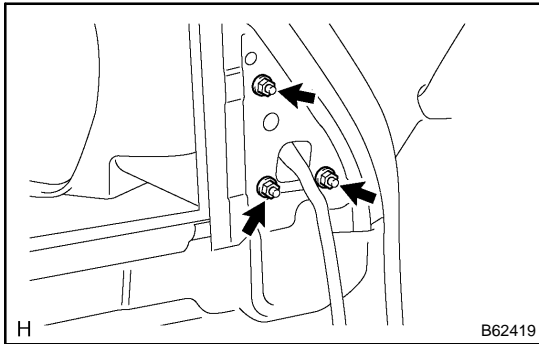
700PX-01

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedures as on the LH side.

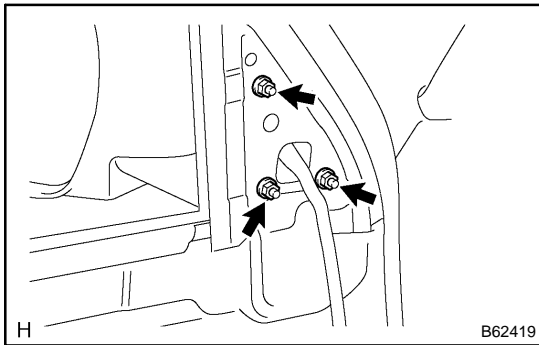
1. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH (See page 75-13)

- Remove the front door lower frame bracket garnish LH.
- Remove the front door inside handle bezel LH.
- Remove the power window regulator master switch assy.
- Remove the front armrest assy LH.
- Remove the front door trim board LH.



2. REMOVE OUTER REAR VIEW MIRROR ASSY LH

- Disconnect the connector.
- Remove the 3 nuts and mirror.



3. INSTALL OUTER REAR VIEW MIRROR ASSY LH

- Install the mirror with the 3 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)
- Connect the connector.

COMBINATION METER

PROBLEM SYMPTOMS TABLE

710E0-05

Warning Lights and Buzzer:

Symptom	Suspected Area	See page
Check Engine warning light does not come on.	1. Wire Harness or Connector 2. ECM 3. Combination Meter Assy	- 05-34 71-24
Discharge warning light does not come on.	1. Wire Harness or Connector 2. ECM 3. Combination Meter Assy	- 05-34 71-24
Brake warning light does not come on.	1. Wire Harness or Connector 2. Skid control ECU 3. Combination Meter Assy	- 05-728 71-24
Brake warning light does not go off.	1. Wire Harness or Connector 2. Skid control ECU 3. Combination Meter Assy	- 05-728 71-24
ABS warning light does not come on.	1. Wire Harness or Connector 2. Skid control ECU 3. Combination Meter Assy	- 05-863 71-24
ABS warning light does not go off.	1. Wire Harness or Connector 2. Skid control ECU 3. Combination Meter Assy	- 05-858 71-24
SRS warning light does not come on.	1. Wire Harness or Connector 2. Airbag Sensor Assy 3. Combination Meter Assy	- 05-1522 71-24
SRS warning light does not go off.	1. Wire Harness or Connector 2. Airbag Sensor Assy 3. Combination Meter Assy	- 05-1517 71-24
Open Door warning light does not come on.	1. Wire Harness or Connector 2. Front Door Courtesy Light 3. Body ECU 4. Combination Meter Assy	- 05-1543 - 71-24
Fuel Level warning light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-2058 - 71-24
Low Oil Pressure warning light does not come on.	1. Wire Harness or Connector 2. Low Oil Pressure Warning Switch 3. Combination Meter Assy	- 71-4 71-24
Engine immobilizer warning light does not come on.	1. Wire Harness or Connector 2. Theft deterrent ECU 3. Combination Meter Assy	- 05-2233 71-24
Driver's seat belt warning light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-2065 - 71-24
Passenger's seat belt warning light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-2067 - 71-24
VSC TRAC warning light does not come on.	1. Wire Harness or Connector 2. VSC Circuit 3. Combination Meter Assy	- 05-868 71-24
VSC TRAC warning light does not go off.	1. Wire Harness or Connector 2. VSC Circuit 3. Combination Meter Assy	- 05-865 71-24

Indicator Lights:

Symptom	Suspected Area	See page
Shift indicator lights do not come on.	1. Wire Harness or Connector 2. Neutral Start Switch Circuit 3. Combination Meter Assy	- 05-934 71-24
Turn indicator light does not come on.	1. Wire Harness or Connector 2. Turn Signal and Hazard Warning System 3. Combination Meter Assy	- 05-1543 71-24
2nd start indicator light does not come on.	1. Wire Harness or Connector 2. Pattern select switch 3. Combination Meter Assy	- 05-1057 71-24
VSC off indicator light does not come on.	1. Wire Harness or Connector 2. VSC Circuit 3. Combination Meter Assy	- 05-885 71-24
VSC off indicator light does not go off.	1. Wire Harness or Connector 2. VSC Circuit 3. Combination Meter Assy	- 05-865 71-24
SLIP indicator light does not come on.	1. Wire Harness or Connector 2. Skid Control ECU 3. Combination Meter Assy	- 05-880 71-24
SLIP indicator light does not go off.	1. Wire Harness or Connector 2. Skid Control ECU 3. Combination Meter Assy	- 05-877 71-24
CRUISE indicator light does not come on.	1. Wire Harness or Connector 2. Engine and ETC ECU 3. Combination Meter Assy	- 05-2373 71-24
AIR SUS indicator light does not come on.	1. Wire Harness or Connector 2. High control circuit 3. Combination Meter Assy	- 05-465 71-24
High Beam indicator light does not come on.	1. Wire Harness or Connector 2. Headlight Dimmer Switch 3. Combination Meter Assy	- 05-1543 71-24
KDSS indicator light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-625 - 71-24
RSCA OFF indicator light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-1229 - 71-24
TIRE PRS indicator light does not come on.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-640 - 71-24
TIRE PRS indicator light does not go off.	1. Refer to troubleshooting 2. Wire Harness or Connector 3. Combination Meter Assy	05-640 - 71-24

Meter Gauges:

Symptom	Suspected Area	See page
Tachometer, Fuel Gauge and Water Temperature Gauge do not operate.	1. Wire Harness or Connector 2. GAUGE Fuse 3. Combination Meter Assy	- - 71-24
Fuel Gauge does not operate or abnormal operation.	1. Wire Harness or Connector 2. Fuel Receiver Gauge 3. Combination Meter Assy	- - 71-24

Accessory Meter:

Symptom	Suspected Area	See page
Indicated average speed and possible cruising distance are in excessive error (Other meters operate normally).	1. Wire Harness or Connector 2. Accessory Meter 3. Combination Meter Assy	- - 71-24
Indicated average fuel consumption and instantaneous fuel consumption are in excessive error (Other meters operate normally).	1. Combination Meter Assy	05-2071
Incomplete display (Does not indicate numbers, some digital segments are missing).	1. Accessory Meter	-
Indicated clock has excessive error.	1. Accessory Meter	-
Time cannot be adjusted, Each mode cannot be switched, Date cannot be reset indicated outside temperature is in excessive error.	1. Switch Assy	-
Outside temperature indicator shows "--".	1. Ambient Temperature Sensor 2. Accessory Meter	05-2073 -
Indicated air pressure and altitude are in excessive error.	1. Accessory Meter	-
Indicated direction is in excessive error.	1. Accessory Meter	-

OTHERS:

Symptom	Suspected Area	See page
key reminder buzzer does not operate.	1. Wire Harness or Connector 2. Body ECU (KSW, DCTY) 3. Door Courtesy Switch 4. Key Unlock Warning Switch 5. Combination Meter Assy	- - - 18-2 71-24
Light reminder buzzer does not operate.	1. Wire Harness or Connector 2. Body ECU (DCTY) 3. Combination Meter Assy	- - 71-24
Seat belt Warning buzzer does not operate (Driver side).	1. Wire Harness or Connector 2. Seat Belt Buckle Switch 3. Combination Meter Assy	- 71-4 71-24
All buzzer does not operate (A/T reverse, Fuel sediment, Speed warning).	1. Wire Harness or Connector 2. Combination Meter Assy	- 71-24

ON-VEHICLE INSPECTION

1. INSPECT SPEEDOMETER

(a) Check the operation.

(1) Using a speedometer tester, check the speedometer indication according to the table below.

Reference: mph (U.S.A)

Standard indication	Allowable range
20 mph	20 to 23 mph
40 mph	40 to 43.5 mph
60 mph	60 to 64 mph
80 mph	80 to 84.5 mph
100 mph	100 to 105 mph
120 mph	120 to 125.5 mph

Reference: km/h (Canada)

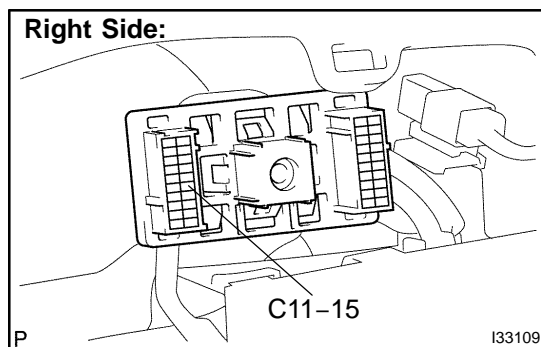
Standard indication (km/h)	Allowable range Data in () are for reference
20 km/h	(17.5 to 21.5 km/h)
40 km/h	38.0 to 42.0 km/h
60 km/h	58.0 to 63.0 km/h
80 km/h	78.0 to 84.0 km/h
100 km/h	98.5 to 104.5 km/h
120 km/h	119.0 to 125.0 km/h
140 km/h	139.0 to 146.0 km/h
160 km/h	159.0 to 167.0 km/h
180 km/h	179.0 to 188.0 km/h

NOTICE:

Tire wear and tire over or under inflation will increase the indication error.

(2) Check the deviation from the acceptable value of the speedometer indication.

Reference: Below 0.5 km/h (0.3 mph)



2. INSPECT OUTPUT SIGNAL OF VEHICLE SPEED

(a) Check for standard signal.

(1) While driving the vehicle at the speed of 10 km/h (6 mph), check the voltage between the terminals C11-15 of the combination meter assy and body ground.

Standard: Fluctuation between 10 to 14 V or less is repeated 7 times within 1 second.

NOTICE:

Check it with the ignition switch ON and the connector connected.

3. INSPECT TACHOMETER

(a) Check the operation

(1) Connect a tune-up test tachometer, and start the engine.

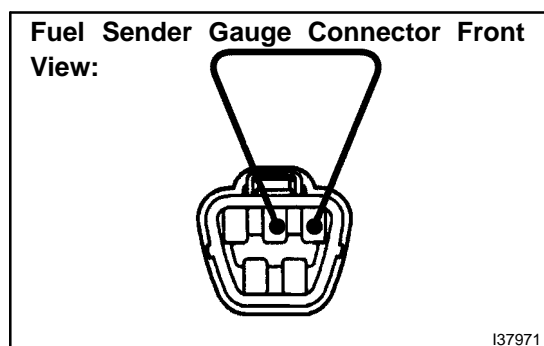
NOTICE:

- Reversing the connection of the tachometer will damage the transistors and diodes inside.
- When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.

(2) Compare the test and tachometer indications.

DC 13.5 V, at 25 °C (77 °F)

Standard indication (r/min)	Allowable range (r/min) Data in () are for reference
700	630 to 770
1,000	(900 to 1,100)
2,000	(1,850 to 2,150)
3,000	2,800 to 3,200
4,000	(3,800 to 4,200)
5,000	4,800 to 5,200
6,000	(5,750 to 6,250)



4. INSPECT FUEL RECEIVER GAUGE

(a) Inspect the circuit.

- (1) Disconnect the connector from the sender gauge.
- (2) Turn the ignition switch ON, then check the position of the receiver gauge needle.

OK:

Needle position is on EMPTY

- (3) Connect terminals 2 and 3 on the wire harness side connector and turn the ignition switch ON, then check the position of the receiver gauge needle.

OK:

Needle position is on FULL

5. INSPECT FUEL LEVEL WARNING LIGHT

(a) Inspect the circuit.

- (1) Disconnect the connector from the sender gauge.
- (2) Turn the ignition switch ON, check the fuel level needle and fuel level warning light.

OK:

Needle position is on EMPTY and fuel level warning light comes on.

6. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE WARNING LIGHT

(a) Inspect the circuit.

- (1) Disconnect the connector from the sender gauge.
- (2) Turn the ignition switch ON, check the position of the water temperature receiver gauge needle.

OK:

Needle position is on COOL

- (3) Ground terminal 2 on the wire harness side, then check the position of the water temperature receiver gauge needle.

OK:

Needle position is on HOT

7. INSPECT SEAT BELT WARNING LIGHT (DRIVER SIDE)

(a) Check the operation.

(1) Turn the ignition switch ON and check that the warning light.

OK:

Seat belt warning light comes on

(2) Fasten the outer belt to the inner belt and check that the warning light.

OK:

Seat belt warning light goes off

(3) Disconnect the connector from the buckle switch and ground terminal on the wire harness side connector.

(4) Turn the ignition switch ON and check that the warning light.

OK:

Seat belt warning light comes on

8. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Inspect the circuit.

(1) Disconnect the connector from the low oil pressure switch.

(2) Turn the ignition switch ON.

(3) Connect the terminal of wire harness side connector and ground, then check the warning low oil pressure warning light.

OK:

Low oil pressure warning light comes on

9. INSPECT BRAKE WARNING LIGHT

(a) Inspect the parking brake warning light.

(1) Disconnect the connector from the parking brake switch and ground terminal on the wire harness side connector.

(2) Turn the ignition switch ON and check that the warning light lights up.

OK:

Parking brake warning light comes on

(b) Inspect the brake fluid level warning light.

(1) Disconnect the connector from the brake fluid level warning switch and connect terminals on the wire harness side connector.

OK:

Brake fluid level warning light comes on

(2) Turn the ignition switch ON and check that the warning light lights up.

10. INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Inspect the continuity.

(1) Remove the reservoir tank cap and strainer.

(2) Disconnect the connector.

(3) Check that the continuity exists between the terminals.

Float up (switch off): No continuity

(4) Use syphon, etc., to take fluid out of the reservoir tank.

(5) Check that the continuity exists between the terminals.

Float down (switch on): Continuity

11. INSPECT KEY REMINDER WARNING BUZZER

(a) Check warning buzzer function.

(1) Turn the ignition switch ON and check that the key reminder warning sounds if the ignition key is inserted in the key cylinder and the front driver side door is opened.

OK:

Key reminder warning buzzer sounds

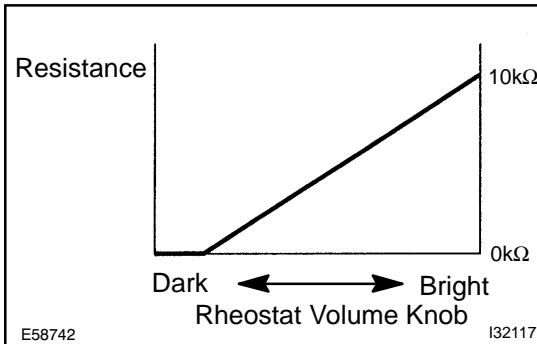
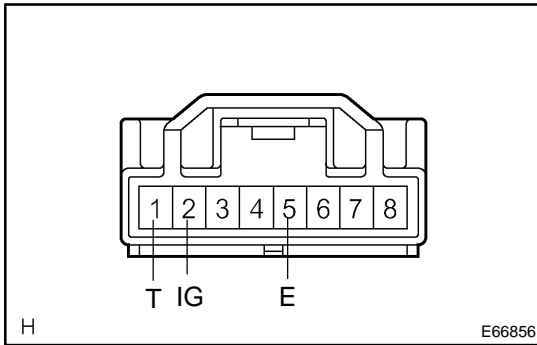
12. MAINTENANCE LIQUID RESETTING PROCEDURE**Indicator Condition:**

State	Condition	Specified State
Blinking	The vehicle runs 4,500 to 5,000 miles after the previous setting	The indicator blinks for 12 seconds after the ignition switch is on (including 3 seconds for a bulb check).
Continuously Illuminated	The vehicle runs over 5,000 miles after the previous setting	The indicator is continuously illuminated after the ignition switch is on.

- (a) Set the display window to ODO.
- (b) Turn the ignition switch off.
- (c) While pressing the reset switch, turn the ignition switch to ON. Keep pressing the reset switch for at least 5 seconds to complete the reset procedure. Check that the "OIL MAINT" indicator light goes off.

HINT:

- If the ignition switch is turned off during the reset procedure:
LCD: off
IND: off
- If the reset switch is not pressed for at least 5 seconds during the reset procedure:
LCD: return to ODO
IND: previous state



INSPECTION

1. LIGHT CONTROL RHEOSTAT ASSY

- (a) Check the continuity of light control rheostat when the light control rheostat operates as shown in chart below.

Standard:

Terminal (Symbol)	Condition	Specified condition
1 (T) - Body ground	Ignition switch ON, Tail-light switch OFF → ON	Below 1V → 10 to 14V
2 (IG) - Body ground	Ignition switch OFF → ON	Below 1V → 10 to 14V
5 (E) - Body ground	Always	Below 1 Ω

- (b) Check resistance.

- (1) Check the resistance between terminal 4 (RV) and terminal 3 (T) when operating the light control rheostat volume knob. Also, check that the resistance changes continuously.

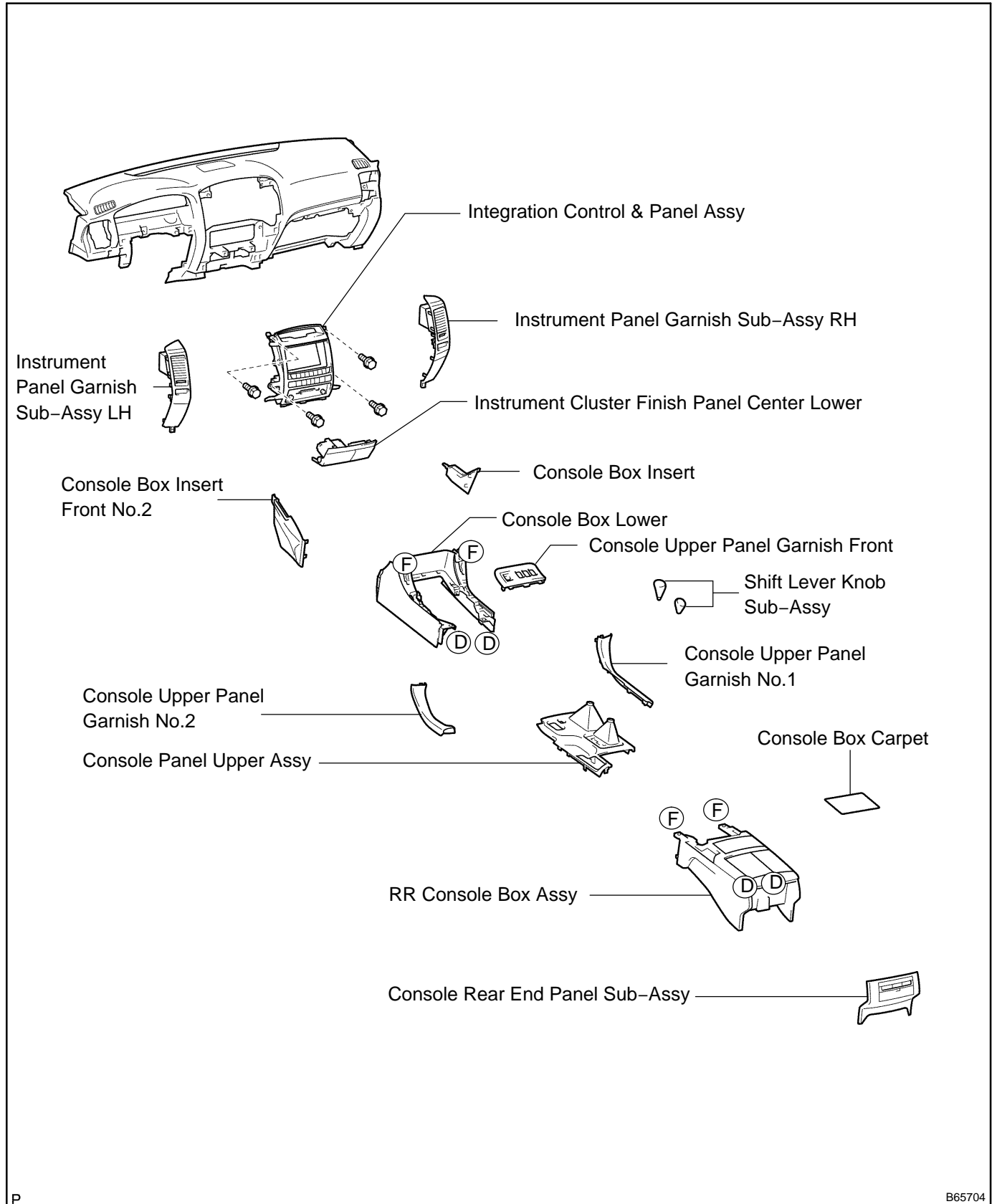
Standard resistance:

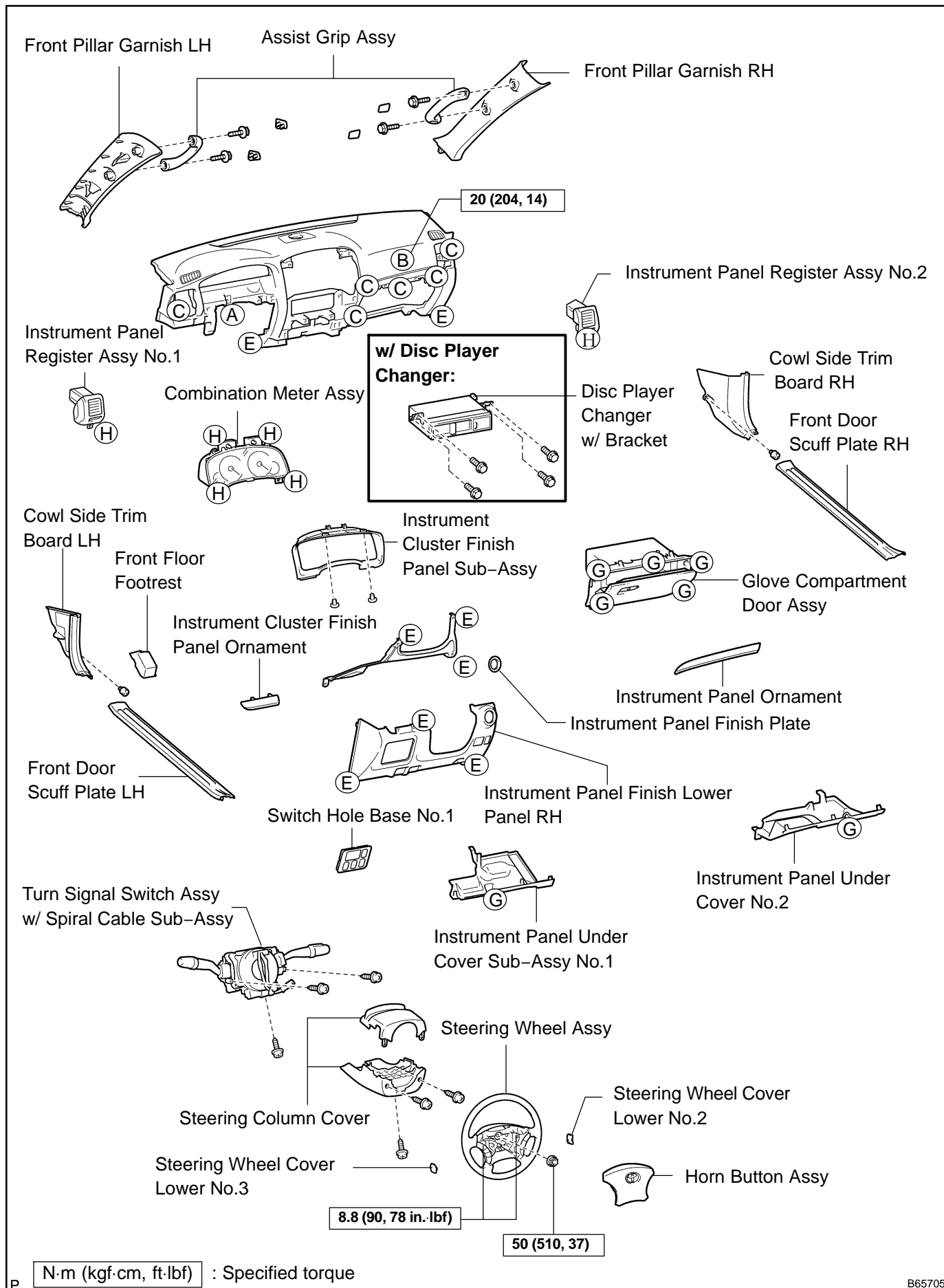
Turn the knob to maximum: **Approx. 10 kΩ**

Turn the knob to minimum: **Approx. 0 kΩ**

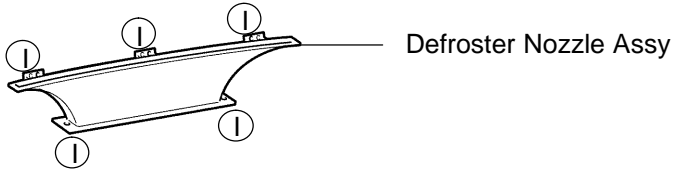
INSTRUMENT PANEL/METER COMPONENTS

710DT-02

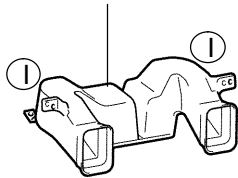




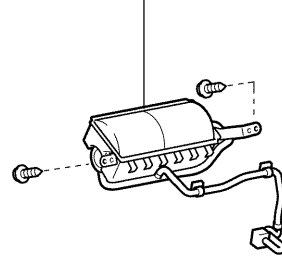
B65705



Heater to Register Duct No.3



Instrument Panel Passenger Air Bag Assy

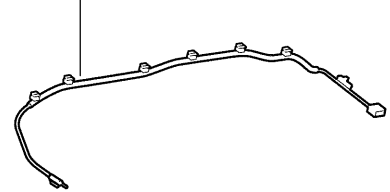


w/ 12 Speaker:

Instrument Panel Speaker Panel Sub-assy No.1

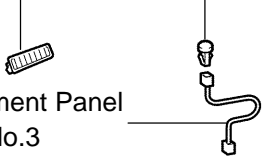
Stereo Component Speaker Assy Front

Antenna Code Sub-Assy

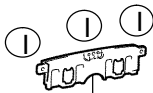


Side Defroster Nozzle No.1

Automatic Light Control Sensor



Instrument Panel Wire No.3



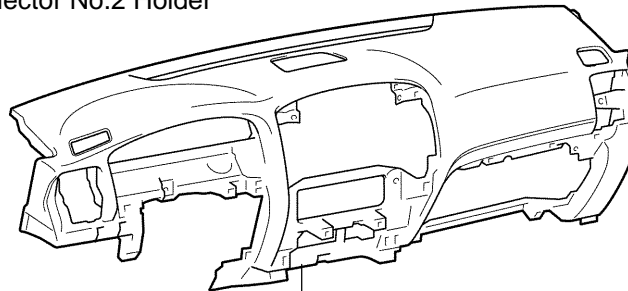
Connector No.2 Holder

Side Defroster Nozzle No.2



w/ Navigation System:

Navigation Antenna Assy



Instrument Panel Safety Pad Sub-Assy



Instrument Panel Bracket Sub-Assy Center

INSTRUMENT PANEL SAFETY PAD SUB-ASSY

710DU-02

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

- (a) Some operations in this section may affect SRS airbags. Before performing the corresponding operations, read the NOTICE of the SRS airbags to perform the proper operations.

REPLACEMENT

HINT:

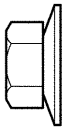
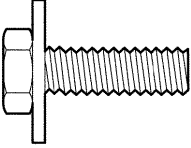
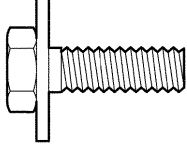
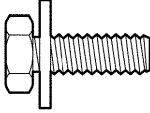
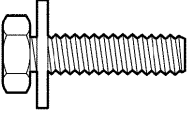
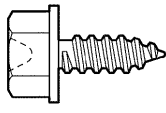
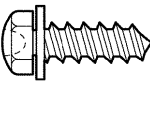
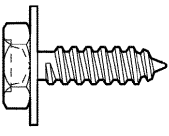
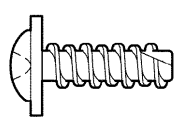
COMPONENTS: See page 71-9

1. TABLE OF BOLT, SCREW AND NUT

HINT:

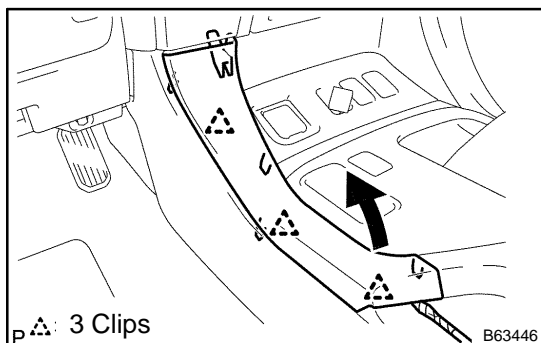
The bolts, screws and nuts, which are necessary for installation and removal of the instrument panel, are shown in the illustration below with alphabets.

mm (in.) (L = Length)

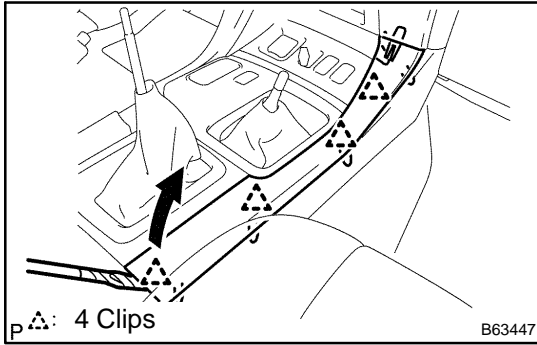
Code	Shape	Code	Shape	Code	Shape
<A>	 $\phi = 6$ (0.24)		 $\phi = 8$ (0.31) L = 24 (0.94)	<C>	 $\phi = 6$ (0.24) L = 20 (0.79)
	B51290 90179-06097		B50935 90119-08B72		B50534 91635-60620
<D>	 $\phi = 6$ (0.24) L = 16 (0.63)	<E>	 $\phi = 6$ (0.24) L = 18 (0.71)	<F>	 $\phi = 5$ (0.20) L = 14 (0.55)
	B62758 91635-G0616		B62758 91635-G0618		90159-50138
<G>	 $\phi = 5$ (0.20) L = 16 (0.63)	<H>	 $\phi = 5$ (0.20) L = 18 (0.71)	<I>	 $\phi = 5$ (0.20) L = 14 (0.55)
	90159-50105		B62761 90159-50311		B50620 93568-55014

B66079

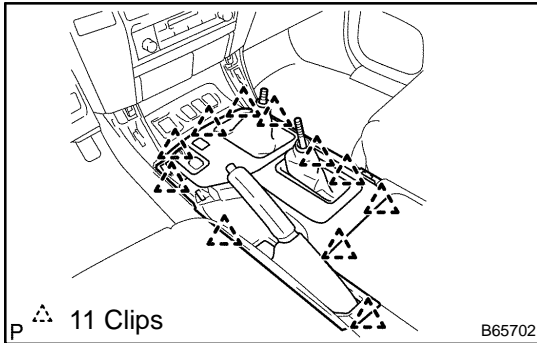
2. DISCONNECT BATTERY NEGATIVE TERMINAL (See page 60-1)
3. REMOVE SHIFT LEVER KNOB SUB-ASSY
4. REMOVE SHIFT LEVER KNOB SUB-ASSY



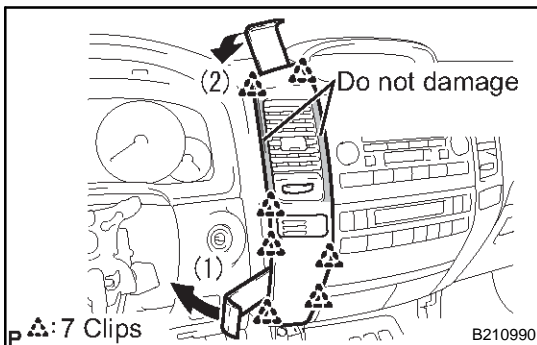
5. REMOVE CONSOLE UPPER PANEL GARNISH NO.2
 - (a) Disengage the 3 clips and remove the console upper panel garnish No.2.



- 6. REMOVE CONSOLE UPPER PANEL GARNISH NO.1**
 (a) Disengage the 4 clips and remove the console upper panel garnish No.1.

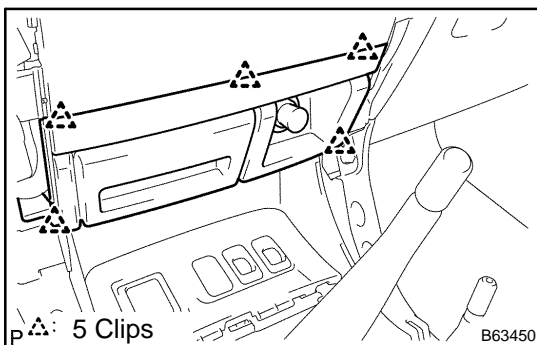


- 7. REMOVE CONSOLE PANEL UPPER ASSY**
 (a) Disengage the 11 clips and remove the console panel upper assembly, then disconnect the connectors.



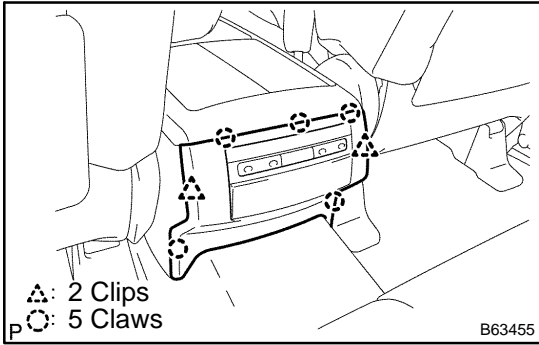
- 8. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH**
 (a) Using a moulding remover, disengage the bottom 2 clips.
 (b) Using a moulding remover, disengage the top 2 clips.
 (c) While wiggling the center part, disengage the center 3 clips carefully.
 (d) Disconnect the connector and remove the instrument panel garnish sub-assembly LH.

9. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH

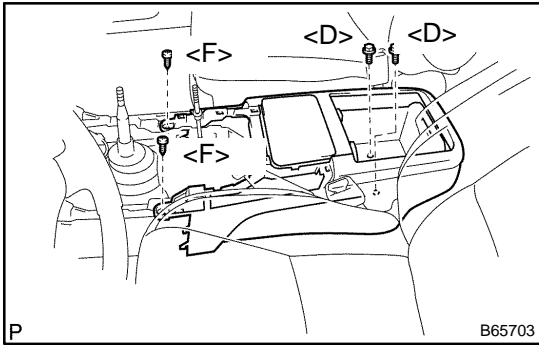


- 10. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER**
 (a) Disengage the 5 clips and remove the instrument cluster finish panel center lower, then disconnect the connectors.

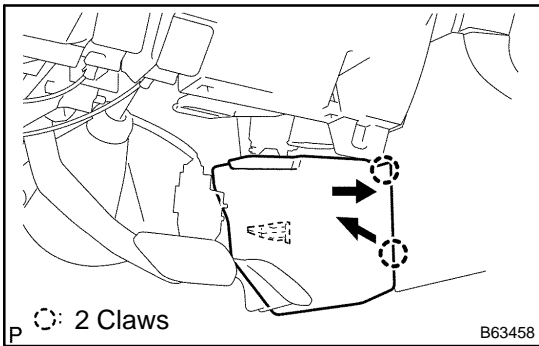
11. REMOVE INTEGRATION CONTROL & PANEL ASSY (See page 55-12)



- 12. REMOVE CONSOLE REAR END PANEL SUB-ASSY**
- (a) Disengage the 2 clips and the 5 claws, and then remove the console rear end panel sub-assy.
 - (b) Disconnect the connectors.

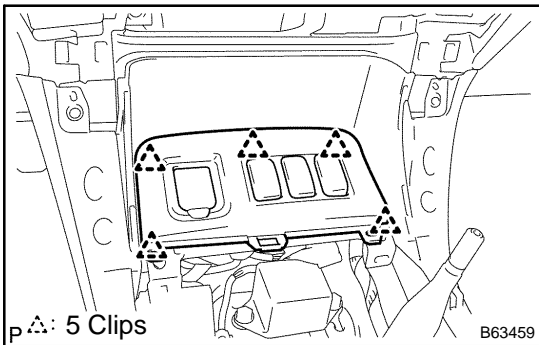


- 13. REMOVE RR CONSOLE BOX ASSY**
- (a) Remove the 2 bolts <D>, the 2 screws <F> and the RR console box assy.

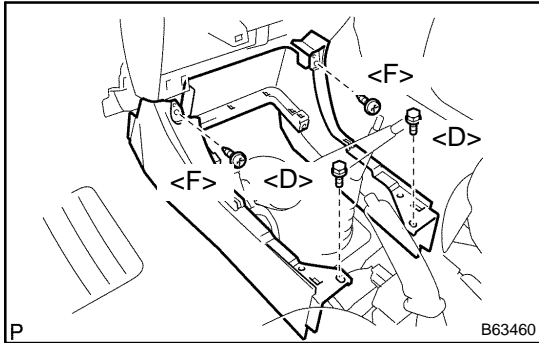


- 14. REMOVE CONSOLE BOX INSERT FRONT NO.2**
- (a) Disengage the 2 claws.
 - (b) Pull the console box insert front No. 2 rearward to remove it.

15. REMOVE CONSOLE BOX INSERT



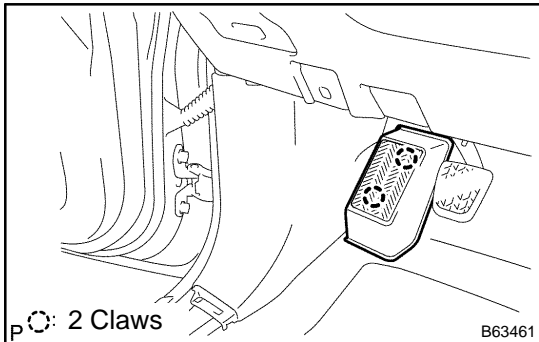
- 16. REMOVE CONSOLE UPPER PANEL GARNISH FRONT**
- (a) Disengage the 5 clips and remove the console upper panel garnish front, then disconnect the connectors.

**17. REMOVE CONSOLE BOX LOWER**

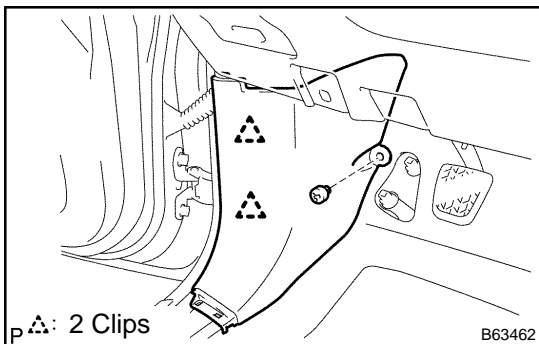
- (a) Remove the 2 bolts <D>.
- (b) Remove the 2 screws <F> and the console box lower.

18. REMOVE STEERING WHEEL COVER LOWER NO.2**19. REMOVE STEERING WHEEL COVER LOWER NO.3****20. REMOVE HORN BUTTON ASSY (See page 60-20)****21. REMOVE STEERING WHEEL ASSY (See page 50-8)**

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

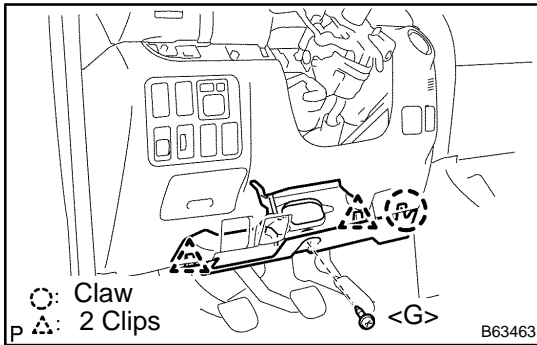
22. REMOVE STEERING COLUMN COVER (See page 50-8)**23. REMOVE TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY (See page 50-8)****24. REMOVE FRONT DOOR SCUFF PLATE LH (See page 76-38)****25. REMOVE FRONT DOOR SCUFF PLATE RH (See page 76-38)****26. REMOVE FRONT FLOOR FOOTREST**

- (a) Disengage the 2 claws and remove the front floor footrest.

**27. REMOVE COWL SIDE TRIM BOARD LH**

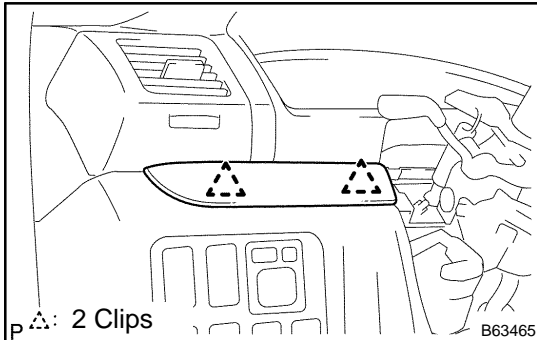
- (a) Remove the clip.
- (b) Disengage the 2 clips and remove the cowl side trim board LH.

28. REMOVE COWL SIDE TRIM BOARD RH



29. REMOVE INSTRUMENT PANEL UNDER COVER SUB-ASSY NO.1

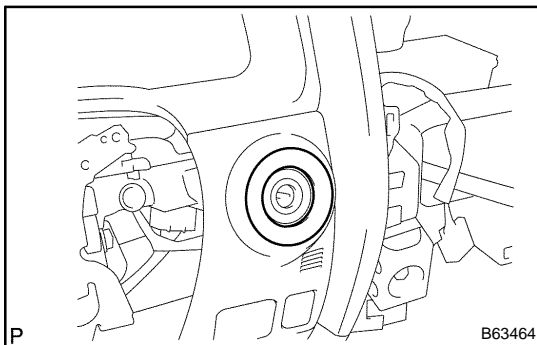
- (a) Remove the screw <G>.
- (b) Disengage the 2 clips and the claw, and then remove the instrument panel under cover sub-assy No.1.



30. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT

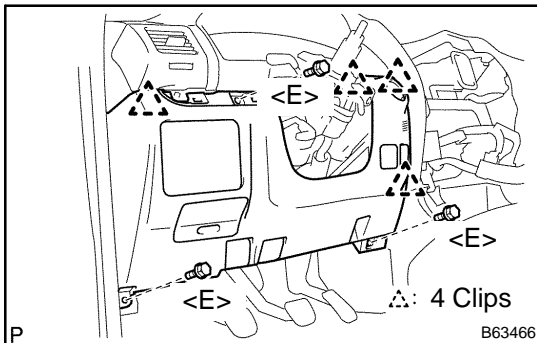
- (a) Disengage the 2 clips and remove the instrument cluster finish panel ornament.

31. REMOVE SWITCH HOLE BASE NO.1



32. REMOVE INSTRUMENT PANEL FINISH PLATE

- (a) Remove the instrument panel finish plate.

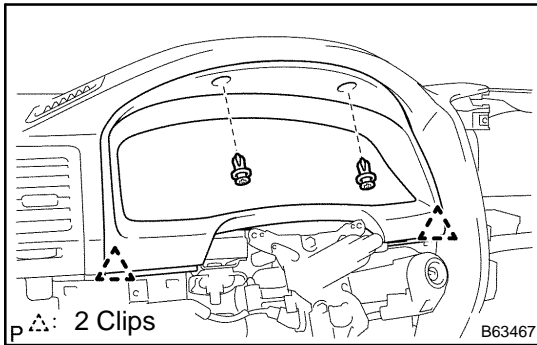


33. REMOVE INSTRUMENT PANEL FINISH LOWER PANEL RH

- (a) Remove the 3 bolts <E>.
- (b) Disconnect the hood lock control cable assy and the fuel lid lock control cable sub-assy.
- (c) Disengage the 4 clips.
- (d) Disconnect the connectors and remove the instrument panel finish lower panel RH.

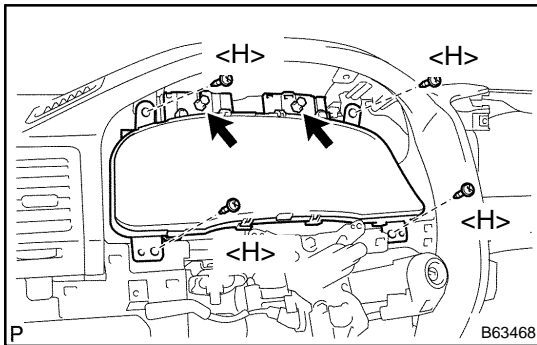
34. REMOVE INSTRUMENT PANEL LOWER LH

- (a) Remove the 3 bolts <E> and instrument panel lower LH.



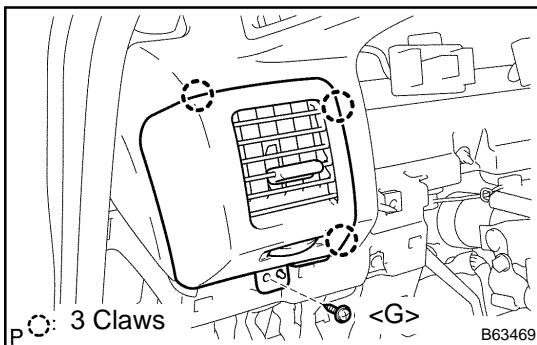
35. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY

- (a) Remove the 2 clips.
- (b) Disengage the 2 clips and remove the instrument cluster finish panel sub-assy.



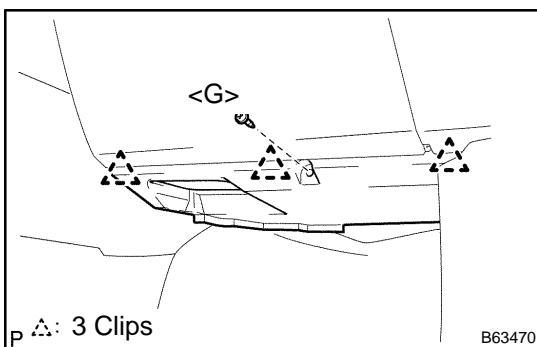
36. REMOVE COMBINATION METER ASSY

- (a) Remove the 4 screws <H>.
- (b) Loosen the 2 bolts and remove the combination meter assy.



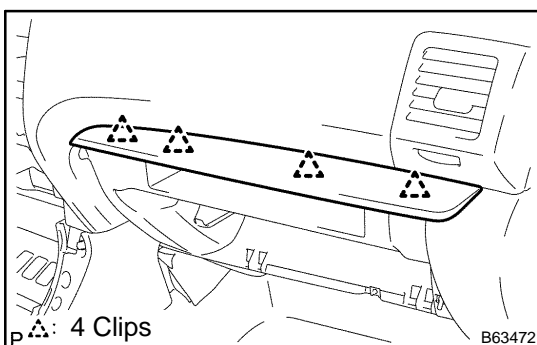
37. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1

- (a) Remove the screw <G>.
- (b) Disengage the 3 claws and remove the instrument panel register assy No.1.



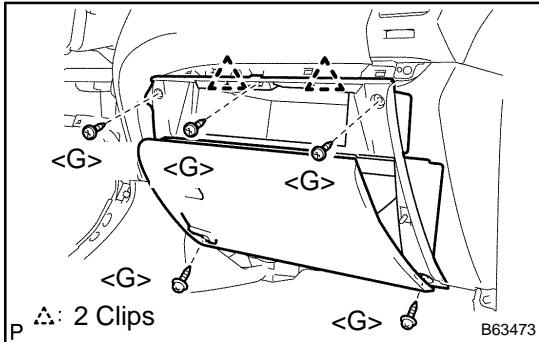
38. REMOVE INSTRUMENT PANEL UNDER COVER NO.2

- (a) Remove the screw <G>.
- (b) Disengage the 3 clips and remove the instrument panel under cover No.2.



39. REMOVE INSTRUMENT PANEL ORNAMENT

- (a) Disengage the 4 clips and remove the instrument panel ornament.

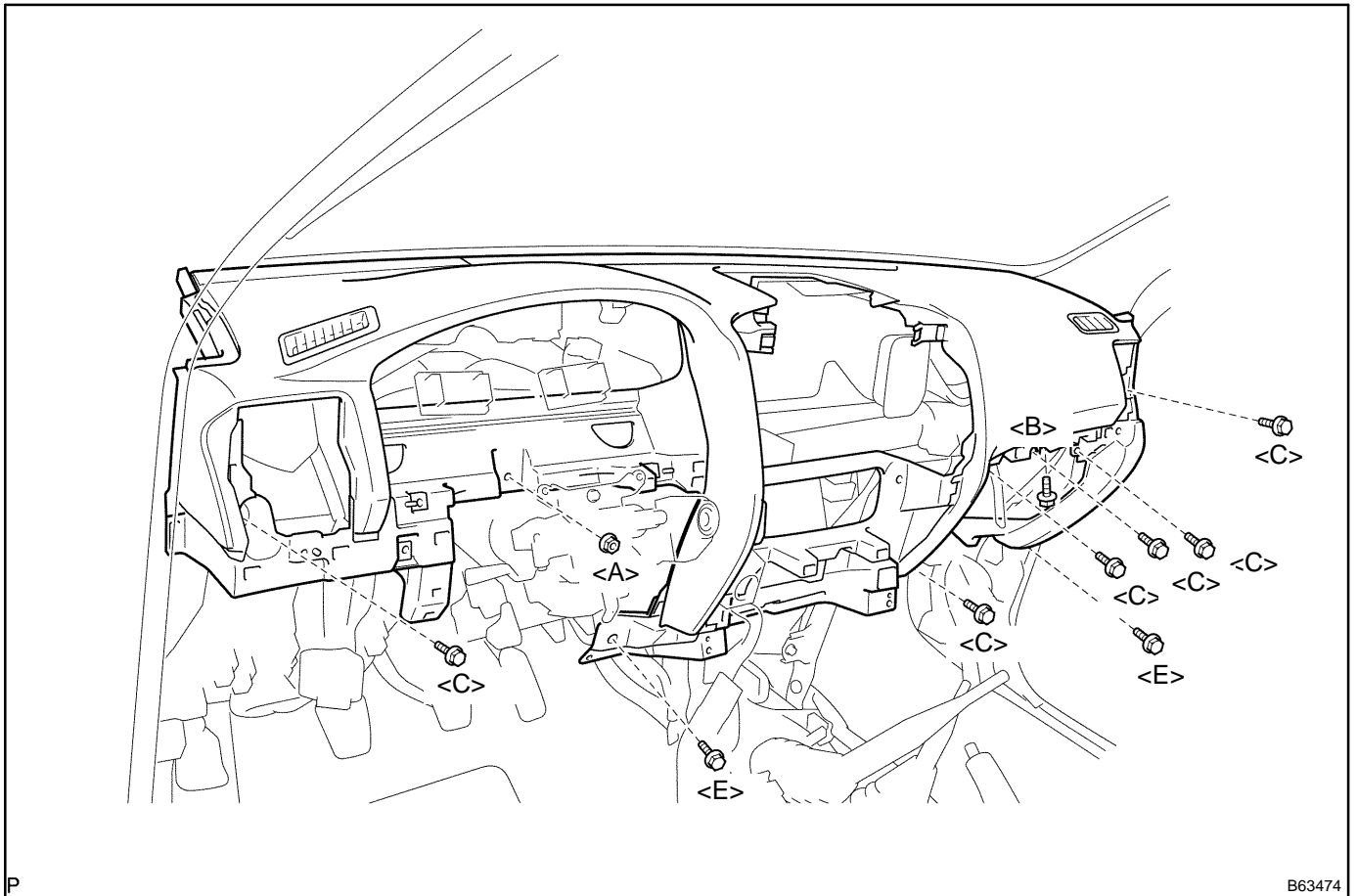
40. DISCONNECT PASSENGER AIRBAG CONNECTOR (See page 60-31)**41. REMOVE GLOVE COMPARTMENT DOOR ASSY**

- (a) Remove the 5 screws <G>.
- (b) Disengage the 2 clips and remove the glove compartment door assy, then disconnect the connectors.

42. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2**43. REMOVE DISC PLAYER CHANGER W/BACKET (W/ DISC PLAYER CHANGER)
(See page 67-27)****44. REMOVE ASSIST GRIP ASSY (See page 76-38)****45. REMOVE FRONT PILLAR GARNISH LH (See page 76-38)****46. REMOVE FRONT PILLAR GARNISH RH (See page 76-38)**

47. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT

- (a) Remove the 9 bolts <C> <E> and nut <A>.
- (b) Disconnect the connectors.
- (c) Remove the instrument panel safety pad sub-assy w/ defroster nozzle duct.



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48. REMOVE DEFROSTER NOZZLE ASSY

- (a) Remove the 5 screws <l> and defroster nozzle assy.

49. REMOVE HEATER TO REGISTER DUCT NO.3

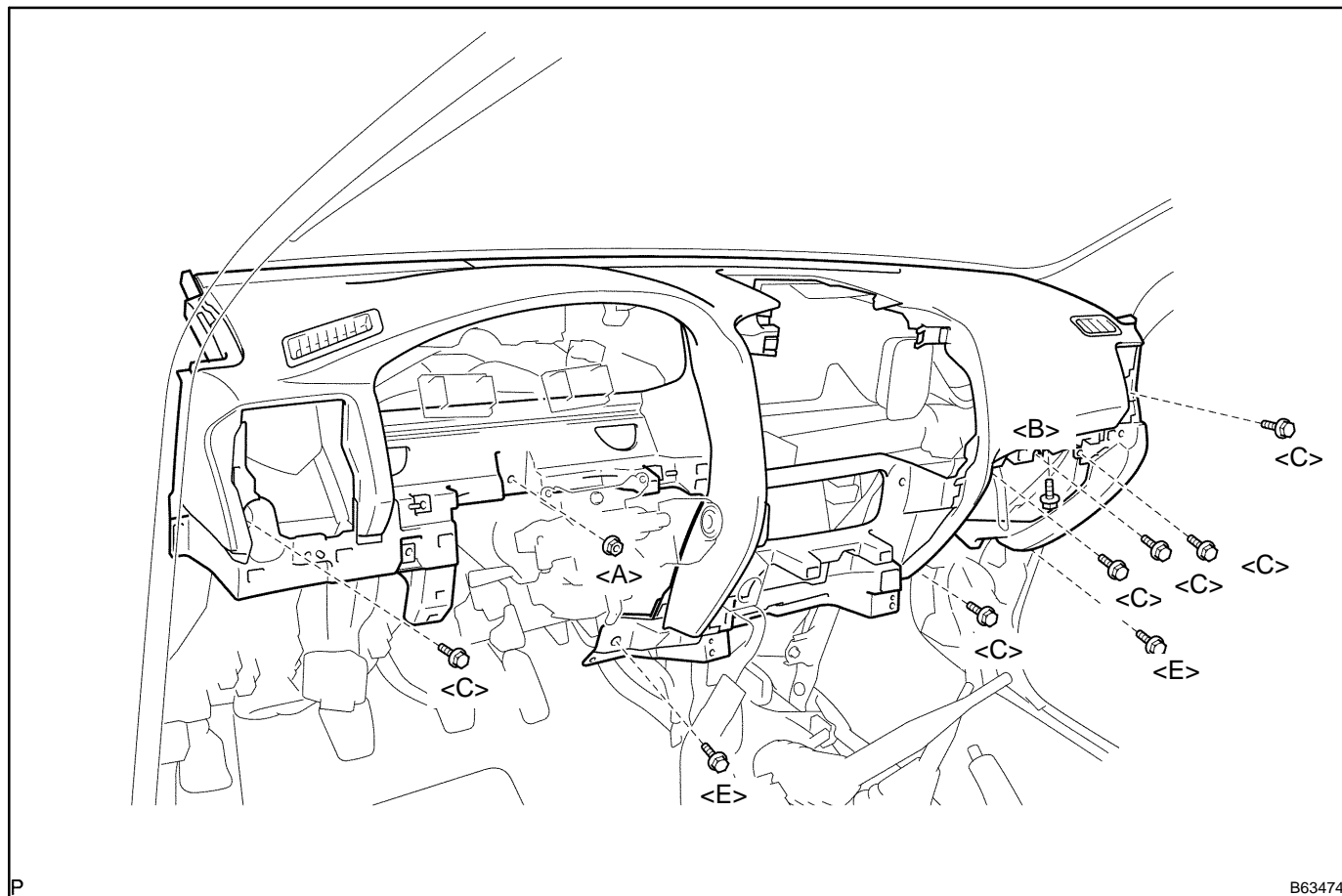
- (a) Remove the 2 screws <l> and heater to register duct No.3.

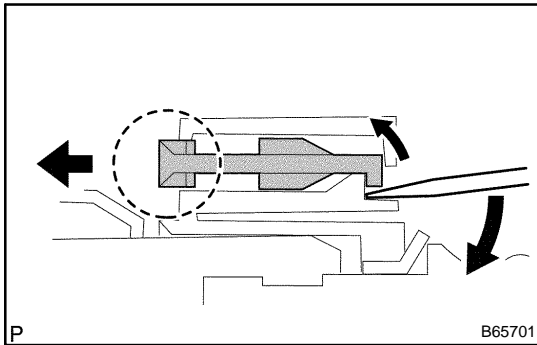
50. REMOVE SIDE DEFROSTER NOZZLE DUCT NO.1**51. REMOVE SIDE DEFROSTER NOZZLE DUCT NO.2****52. REMOVE AUTOMATIC LIGHT CONTROL SENSOR****53. REMOVE INSTRUMENT PANEL WIRE NO.3****54. REMOVE CONNECTOR NO.2 HOLDER****55. REMOVE INSTRUMENT PANEL SPEAKER PANEL SUB-ASSY NO.1 (W/ 12 SPEAKER)****56. REMOVE STEREO COMPONENT SPEAKER ASSY FRONT (W/ 12 SPEAKER)**(See page [67-18](#))**57. REMOVE ANTENNA CORD SUB-ASSY (See page [67-31](#))****58. REMOVE NAVIGATION ANTENNA ASSY (W/ NAVIGATION SYSTEM) (See page [67-38](#))****59. REMOVE INSTR PNL PASS L/DOOR AIR BAG ASSY (See page [60-31](#))****60. REMOVE INSTRUMENT PANEL SAFETY PAD SUB-ASSY****61. INSTALL INSTR PNL PASS L/DOOR AIR BAG ASSY (See page [60-31](#))**

62. INSTALL INSTRUMENT PANEL SAFETY PAD SUB-ASSY W/DEFROSTER NOZZLE DUCT

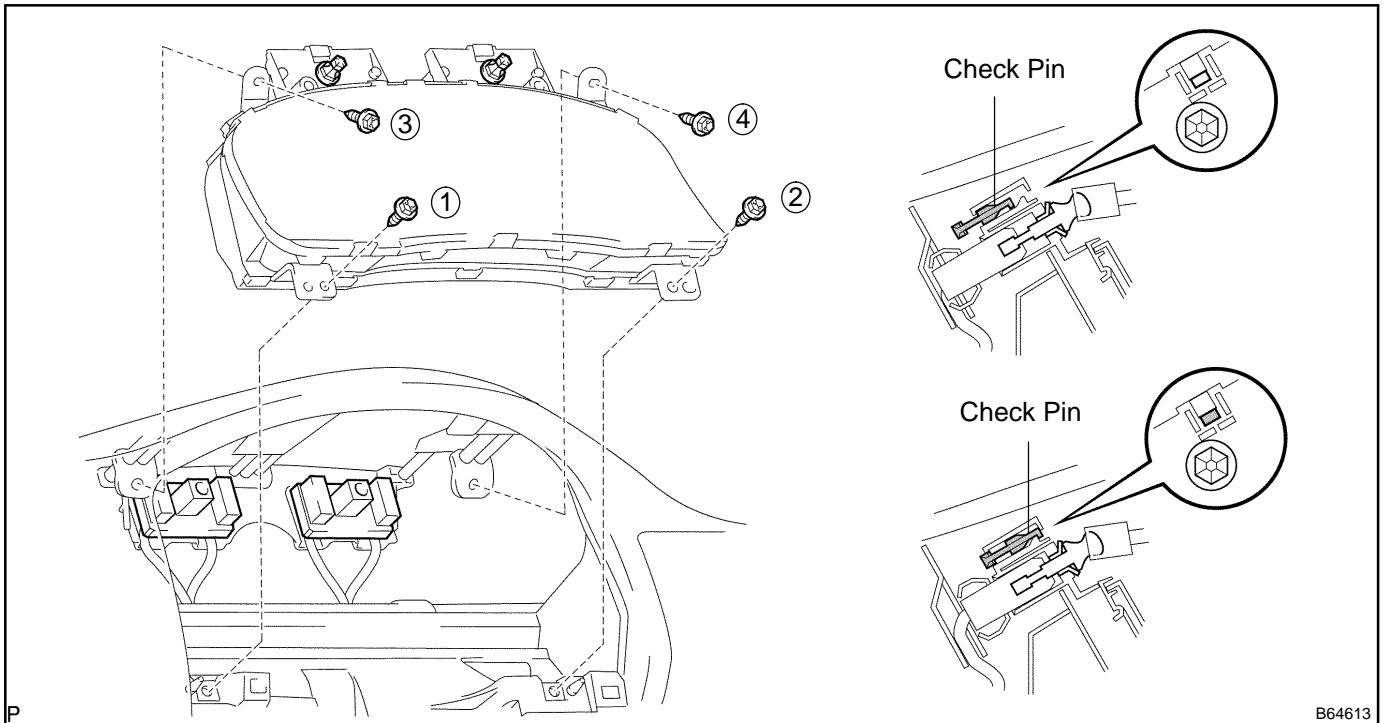
- (a) Using a torque wrench, install the bolt .

Torque: 20 N·m (204 kgf·cm, 14 ft·lbf)



**63. INSTALL COMBINATION METER ASSY**

- (a) Pull the check pin backward while pressing the check pin with a flat-head screwdriver as shown in the illustration.
- (b) Check that the wire harness connector is engaged in the instrument panel safety pad installation position.
- (c) Install the 4 screws in order as shown in the illustration.
- (d) Tighten the 2 connector fitting bolts until a clicking sound can be heard.
- (e) After tightening, check that the check pin protrudes.



64. ADJUST SPIRAL CABLE SUB-ASSY (See page 60-28)

65. INSTALL STEERING WHEEL ASSY (See page 50-8)

66. INSTALL HORN BUTTON ASSY (See page 60-20)

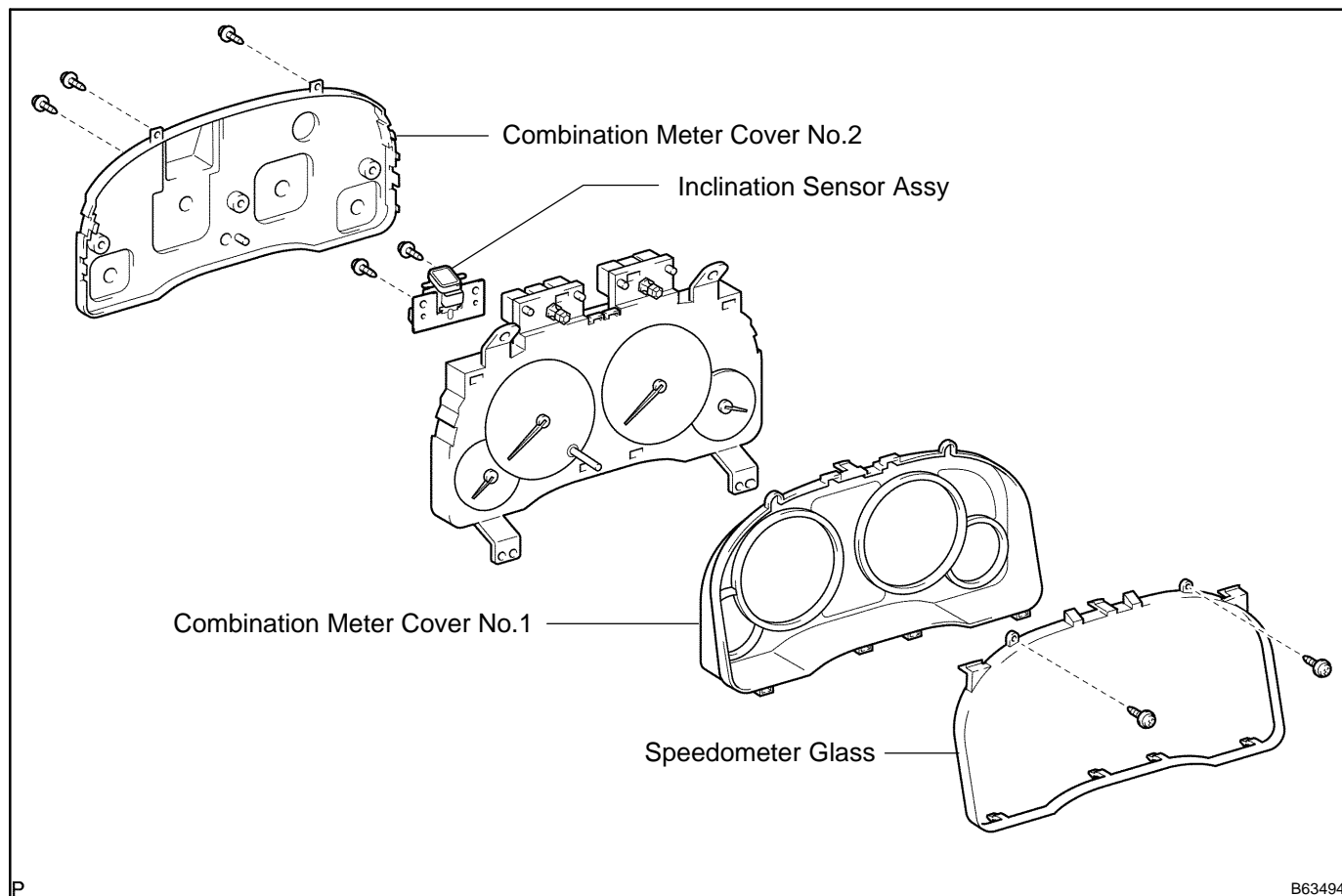
67. INSPECT HORN BUTTON ASSY (See page 60-13)

68. INCLINATION SENSOR ZERO DEGREE CORRECTION (See page 71-24)

69. INSPECT SRS WARNING LIGHT (See page 05-1206)

COMBINATION METER ASSY COMPONENTS

710DW-02

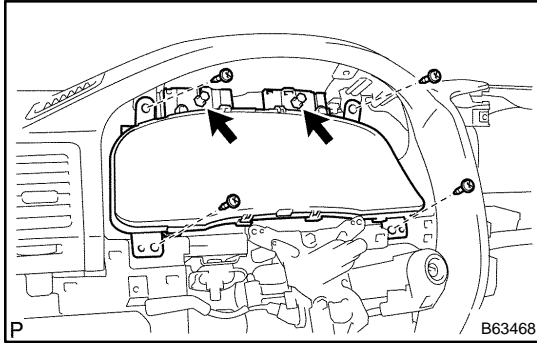


OVERHAUL

HINT:

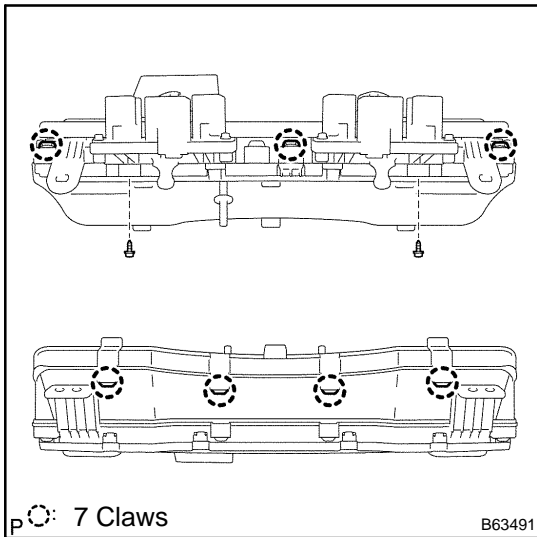
COMPONENTS: See page 71-23

1. REMOVE INSTRUMENT PANEL FINISH PLATE (See page 71-13)
2. REMOVE INSTRUMENT CLUSTER FINISH PANEL ORNAMENT (See page 71-13)
3. REMOVE INSTRUMENT CLUSTER FINISH PANEL SUB-ASSY (See page 71-13)



4. REMOVE COMBINATION METER ASSY

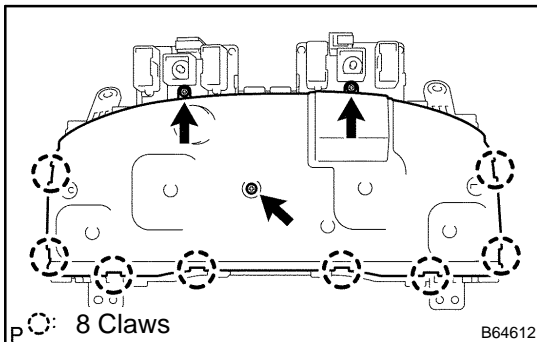
- (a) Remove the 4 screws.
- (b) Loosen the 2 bolts and remove the combination meter assy.



5. REMOVE SPEEDOMETER GLASS

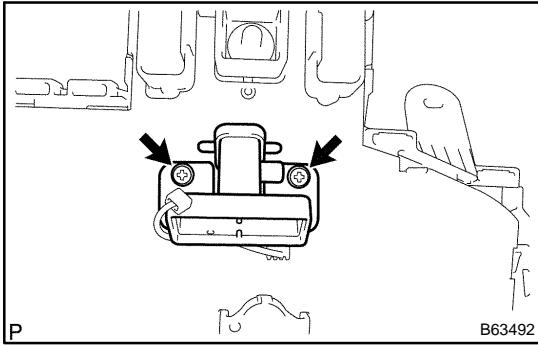
- (a) Remove the 2 screws.
- (b) Disengage the 7 claws and remove the speedometer glass.

6. REMOVE COMBINATION METER COVER NO.1

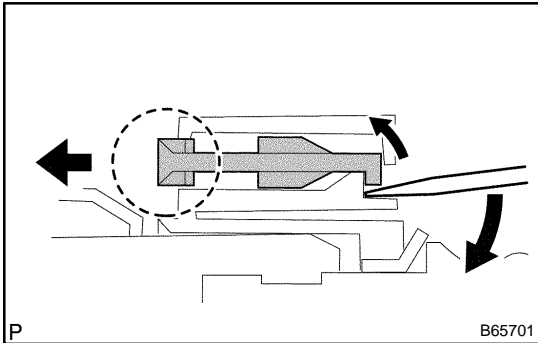


7. REMOVE COMBINATION METER COVER NO.2

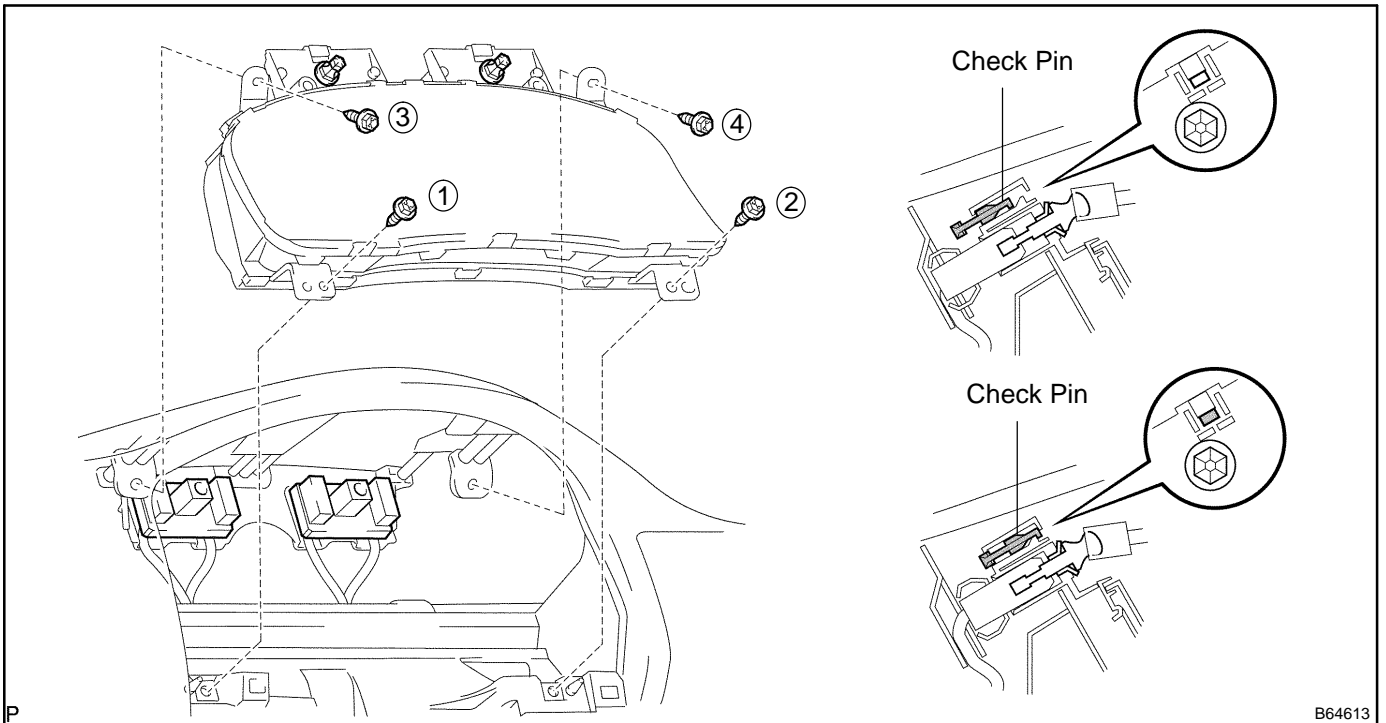
- (a) Remove the 3 screws.
- (b) Disengage the 8 claws and remove the combination meter cover No.2.

**8. REMOVE INCLINATION SENSOR ASSY**

- (a) Remove the 2 screws.
- (b) Disconnect the connectors and remove the inclination sensor assy.

**9. INSTALL COMBINATION METER ASSY**

- (a) Pull the check pin backward while pressing the check pin with a flat-head screwdriver as shown in the illustration.
- (b) Check that the wire harness connector is engaged in the instrument panel safety pad installation position.
- (c) Install the 4 screws in order as shown in the illustration.
- (d) Tighten the 2 connector fitting bolts until a clicking sound can be heard.
- (e) After tightening, check that the check pin protrudes.



10. INCLINATION SENSOR ZERO DEGREE CORRECTION

NOTICE:

- When replacing or removing/installing the combination meter assy and inclination sensor assy, be sure to perform zero degree correction of the inclination sensor.
 - When performing zero degree correction, install the combination meter assy and perform it in level surface.
 - Also perform zero degree correction when the body level setting is inclined because of vehicle height adjustment.
- (a) Turn the ignition switch off.
- (b) While pressing the RESET switch, turn the ignition switch on.
- (c) Within 5 seconds after the ignition switch is turned on, repeat pressing and releasing the RESET switch 3 times and keep holding the last press for more than 5 seconds. (Buzzer sounds for a second.)

NOTICE:

If the buzzer does not sound, perform this procedure from the beginning.

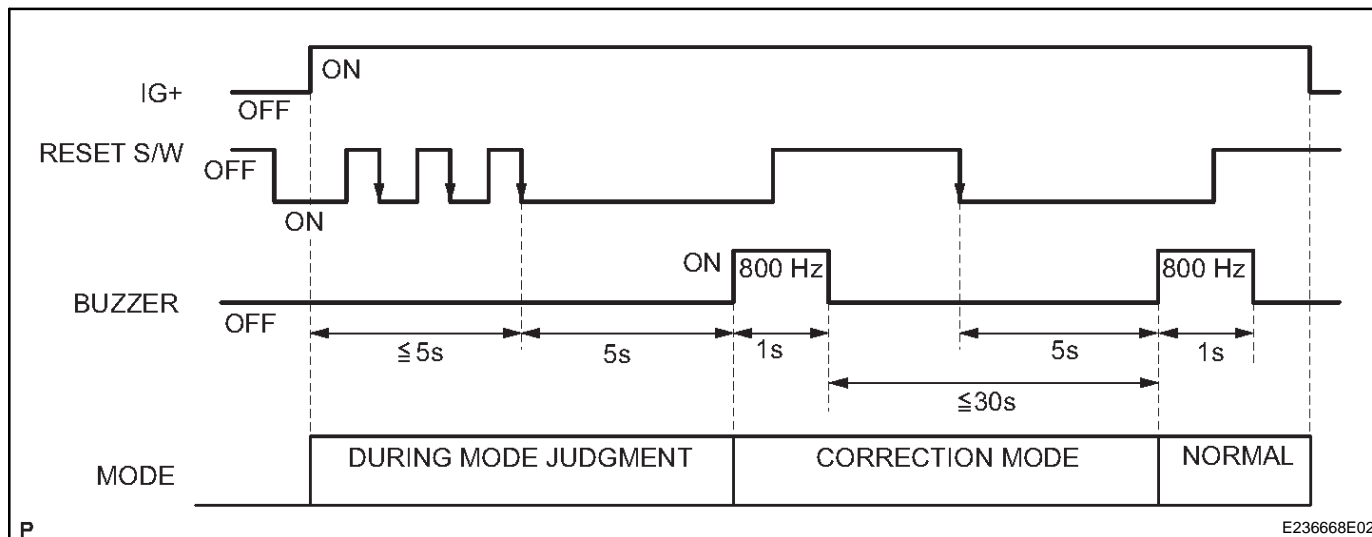
- (d) Release the RESET switch when buzzer sounds.
- (e) Press the RESET switch again and keep pressing for more than 5 seconds. (Buzzer sounds for a second again.)

HINT:

- When the buzzer sounds twice, reset operation is completed.
- The buzzer sound of the first and second time is the same.

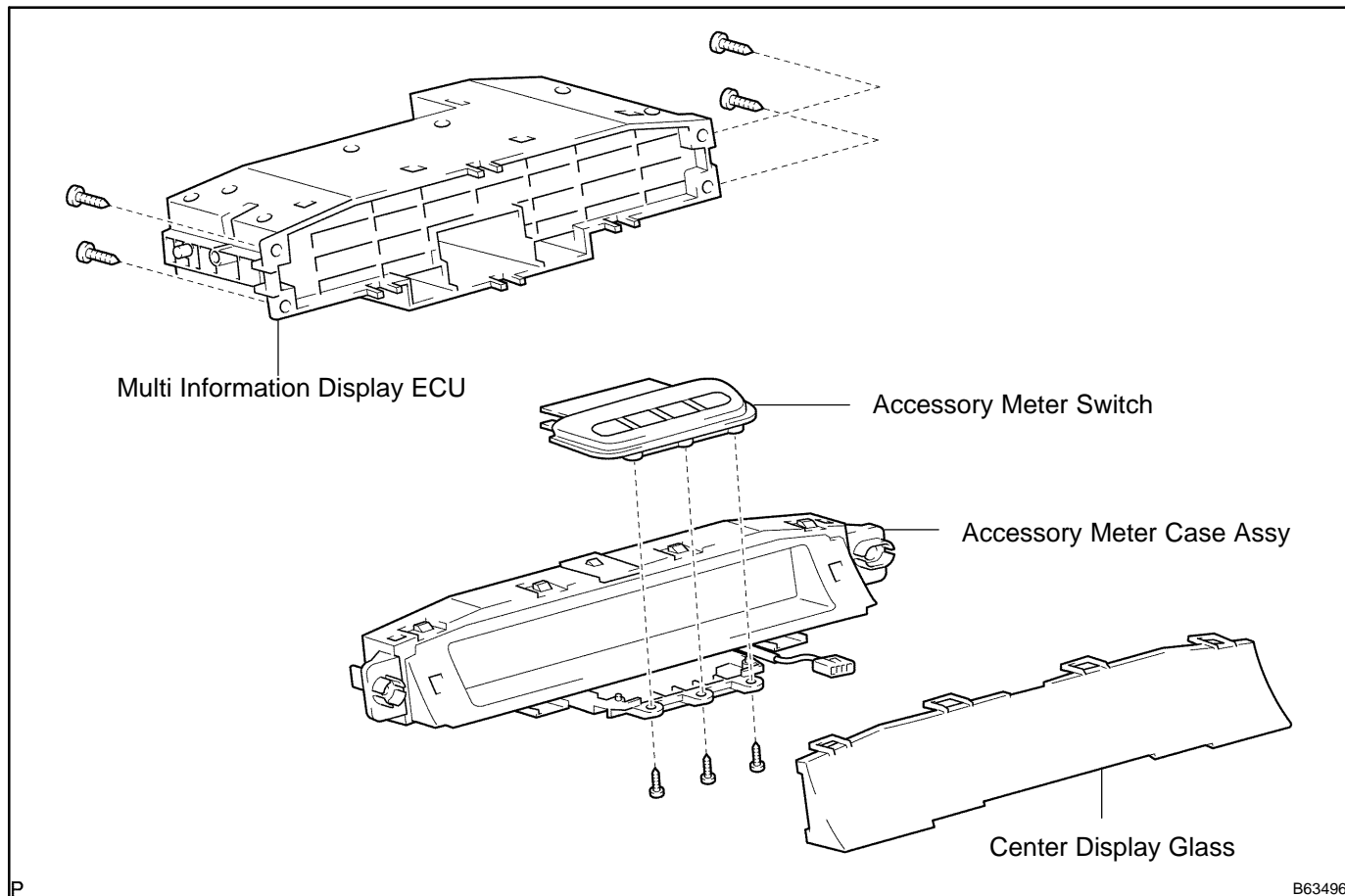
NOTICE:

If the buzzer does not sound or keep sounding for more than 1 second, perform the procedure from the beginning.



ACCESSORY METER ASSY(MULTI INFORMATION) COMPONENTS

710DY-02

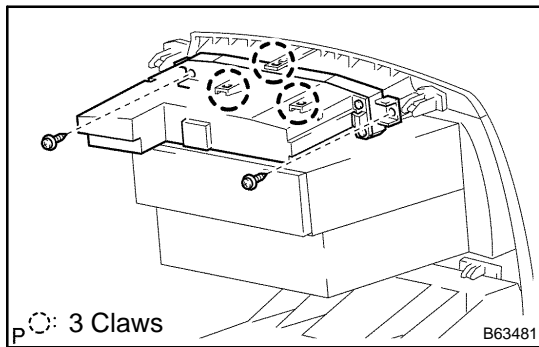


OVERHAUL

HINT:

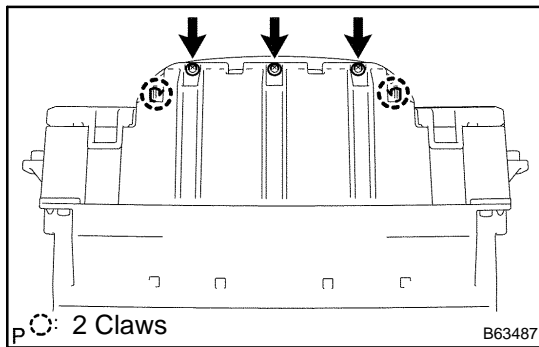
COMPONENTS: See page 71-27

1. REMOVE SHIFT LEVER KNOB SUB-ASSY
2. REMOVE SHIFT LEVER KNOB SUB-ASSY
3. REMOVE CONSOLE UPPER PANEL GARNISH NO.2 (See page 71-13)
4. REMOVE CONSOLE UPPER PANEL GARNISH NO.1 (See page 71-13)
5. REMOVE CONSOLE PANEL UPPER ASSY (See page 71-13)
6. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY LH (See page 71-13)
7. REMOVE INSTRUMENT PANEL GARNISH SUB-ASSY RH (See page 71-13)
8. REMOVE INSTRUMENT CLUSTER FINISH PANEL CENTER LOWER (See page 71-13)
9. REMOVE INTEGRATION CONTROL & PANEL ASSY (See page 55-12)
10. REMOVE RADIO BRACKET NO.1 (See page 67-9)
11. REMOVE RADIO BRACKET NO.2 (See page 67-9)



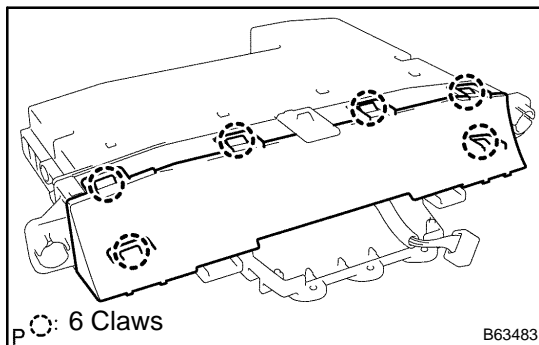
12. REMOVE ACCESSORY METER ASSY

- (a) Remove the 2 screws.
- (b) Disengage the 2 claws and remove the accessory meter assy.



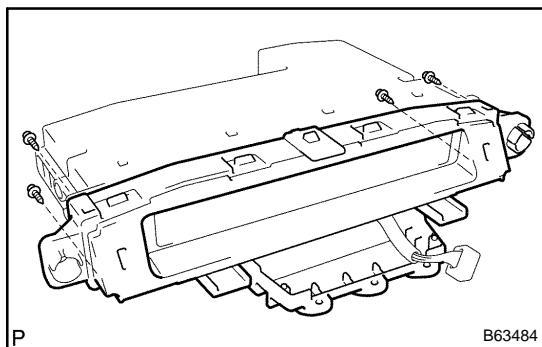
13. REMOVE ACCESSORY METER SWITCH

- (a) Remove the 3 screws.
- (b) Disengage the 2 claws.



14. REMOVE CENTER DISPLAY GLASS

- (a) Disengage the 6 claws and remove the center display glass.

**15. REMOVE ACCESSORY METER CASE ASSY**

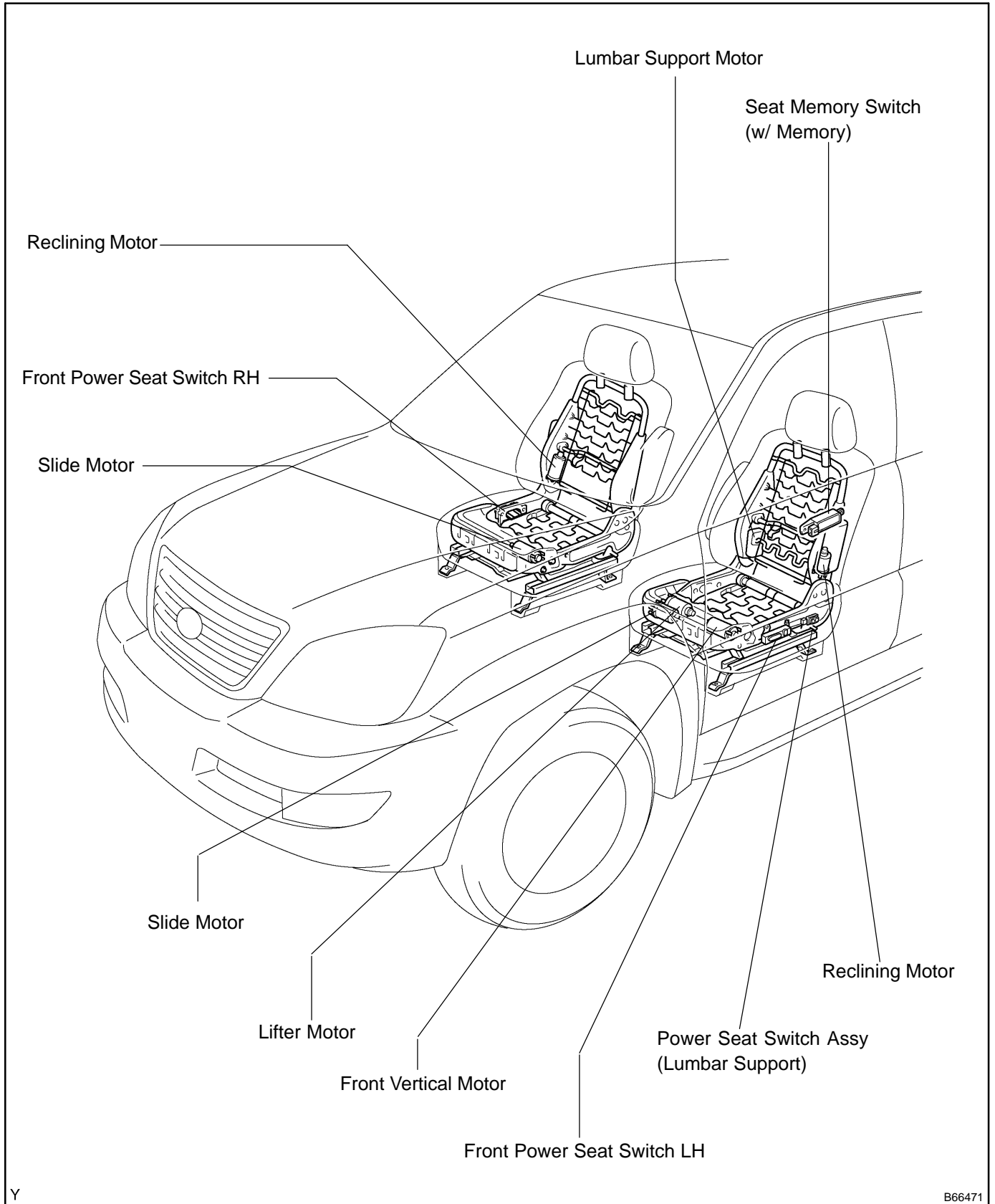
- (a) Remove the 4 screws and accessory meter case assy.

16. REMOVE ACCESSORY METER ECU

FRONT POWER SEAT CONTROL SYSTEM

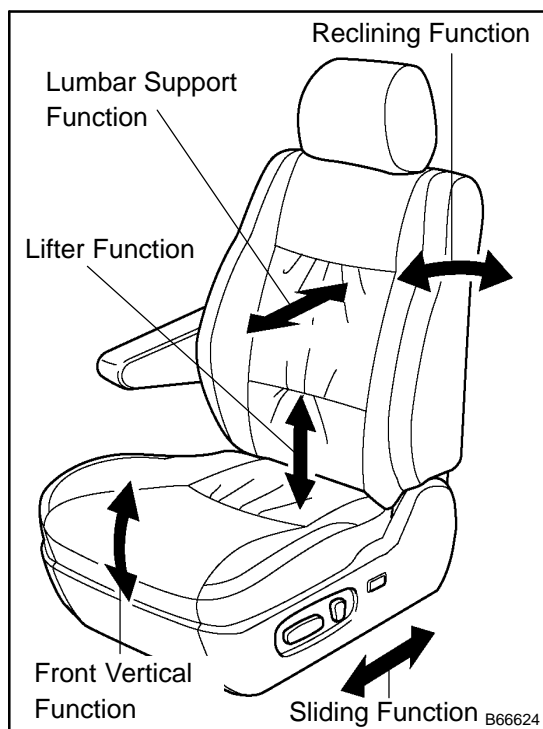
LOCATION

720GC-01



PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Power seat does not operate	<ol style="list-style-type: none"> 1. Front power seat switch 2. PWR SEAT fuse 3. Wire harness 	<p style="text-align: center;">72-6 68-1 -</p>
Only slide operation function does not operate	<ol style="list-style-type: none"> 1. Front power seat switch 2. Slide motor 3. Wire harness 4. Seat memory switch (w/ Memory) 	<p style="text-align: center;">72-6 72-6 - 72-6</p>
Only front vertical operation function does not operate (Driver seat only)	<ol style="list-style-type: none"> 1. Front power seat switch 2. Front vertical motor 3. Wire harness 4. Seat memory switch (w/ Memory) 	<p style="text-align: center;">72-6 72-6 - 72-6</p>
Only lifter operation function does not operate (Driver seat only)	<ol style="list-style-type: none"> 1. Front power seat switch 2. Lifter motor 3. Wire harness 4. Seat memory switch (w/ Memory) 	<p style="text-align: center;">72-6 72-6 - 72-6</p>
Only reclining operation function does not operate	<ol style="list-style-type: none"> 1. Front power seat switch 2. Reclining motor 3. Wire harness 4. Seat memory switch (w/ Memory) 	<p style="text-align: center;">72-6 72-6 - 72-6</p>
Only lumbar support function does not operate (Driver seat only)	<ol style="list-style-type: none"> 1. Power seat switch assy (Lumbar support) 2. Reclining motor 3. Wire harness 	<p style="text-align: center;">72-6 72-6 -</p>



ON-VEHICLE INSPECTION

1. CHECK POWER SEAT FUNCTION

- (a) Check that each part functions properly (sliding, front vertical, lifter, reclining, lumbar support) when operating the power seat switches.

2. CHECK POWER SEAT MOTOR ASSY (SLIDING, FRONT VERTICAL, LIFTER, RECLINING FUNCTIONS)

NOTICE:

- The inspection should be performed with the seat installed in the vehicle.
 - Perform this inspection for every maximum position.
- (a) Move the seat to any of the maximum positions by operating the power seat switch, and keep the seat there for approximately 60 seconds.
 - (b) Try to operate the power seat past the maximum position using the power seat switch and measure the time until the electrical current is shut off (motor operation sound will stop, inspection of current shut-off).

Standard: 4 to 90 seconds

- (c) Turn the power seat switch off after the inspection of current shut-off, and keep that condition for approximately 60 seconds.
- (d) Operate the power seat switch to move the seat to the opposite position and check that the motor operates.

3. CHECK LUMBAR SUPPORT ADJUSTER ASSY LH

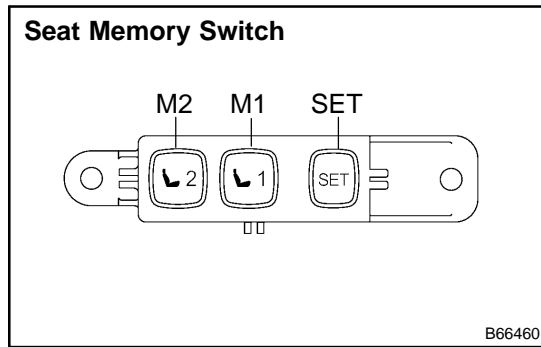
NOTICE:

The inspection should be performed with the seat installed to the vehicle.

- (a) Move the lumbar support to either the foremost or rearmost position by operating the lumbar support switch, and keep it there for approximately 60 seconds.
- (b) Try to move the lumbar support past the maximum position using the switch and measure the time until the electrical current is shut off (motor operation sound will stop, inspection of current shut-off).

Standard: 4 to 90 seconds

- (c) Turn the lumbar support switch off after the inspection of current shut-off, and keep that condition for approximately 60 seconds.
- (d) Operate the lumbar support switch to move the lumbar support to the opposite position and check that the motor operates.



4. CHECK MEMORY AND REACTIVATION FUNCTION (w/ MEMORY)

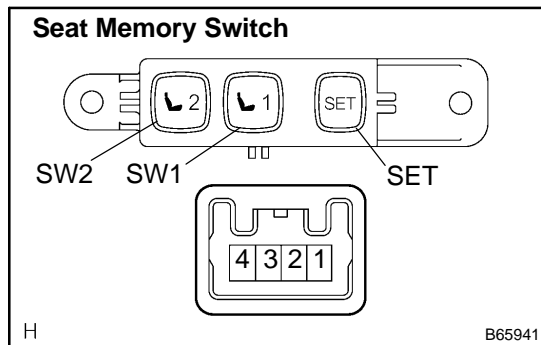
- (a) Turn the ignition switch ON and move the shift lever into the P range.
- (b) Move the seat into the foremost position and uppermost position using each seat switch.
- (c) Check that the buzzer sounds for 0.5 second and the seat position is recorded when the M1 switch is pressed while the SET switch is held down.
- (d) Move the seat out of the foremost position and uppermost position using each seat switch.
- (e) Check that the buzzer sounds for 0.5 second and the seat position is recorded when the M2 switch is pressed while the SET switch is held down.
- (f) Check that the buzzer sounds for 0.1 second and the seat automatically moves into the foremost position and uppermost position (set positions) when the M1 switch is pressed.
- (g) Check that the buzzer sounds for 0.1 second and the seat automatically moves out of the foremost position and uppermost position (set positions) when the M2 switch is pressed.
- (h) Check that the seat automatically moves into the set position when the M1 or M2 switch is pressed within 30 seconds after the ignition switch is turned OFF, the key is pulled out from the key cylinder and the driver side door is opened.
- (i) Move the seat into the maximum positions of the slide movement, and disconnect the negative terminal of the battery while the memory switch is pressed. Then leave the seat in the position for 3 minutes. The seat position memory will be erased.
- (j) Move the seat into all the maximum positions (front/rear and up/down) using each seat switch.
- (k) Check that the seat does not move (the seat position is not recorded) when the M1 switch or the M2 switch is pressed, after the M1 switch 1 and M2 switch are pressed at one time while the SET switch is held down.

5. INITIALIZATION CHECK (w/ MEMORY)

- (a) When replacing the power seat switch (seat ECU), perform an initialization by moving the power seat into the foremost and uppermost position.
- (b) When replacing the D/C OUT fuse, perform an initialization by moving the power seat into the foremost and uppermost position.

-MEMO-

INSPECTION



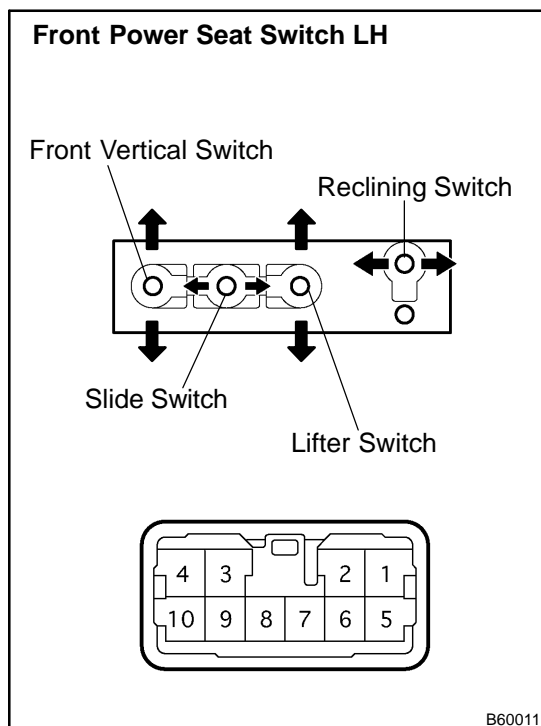
1. INSPECT SEAT MEMORY SWITCH (w/ MEMORY)

- (a) Inspect the switch continuity.

Standard:

Terminal No.	Switch Position	Specified Condition
1 ↔ 2	SET Switch ON	Continuity
2 ↔ 3	SW1 Switch ON	Continuity
2 ↔ 4	SW2 Switch ON	Continuity

If the result is not as specified, replace the switch assy.



2. INSPECT FRONT POWER SEAT SWITCH LH (w/o MEMORY)

- (a) Inspect the continuity between the terminals when each switch is operated.

Standard (Slide switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 9	FRONT	Continuity
4 ↔ 6		Continuity
4 ↔ 6 ↔ 9	OFF	Continuity
1 ↔ 6	REAR	Continuity
4 ↔ 9		Continuity

Standard (Front vertical switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 10	UP	Continuity
4 ↔ 5		Continuity
4 ↔ 5 ↔ 10	OFF	Continuity
1 ↔ 5	DOWN	Continuity
4 ↔ 10		Continuity

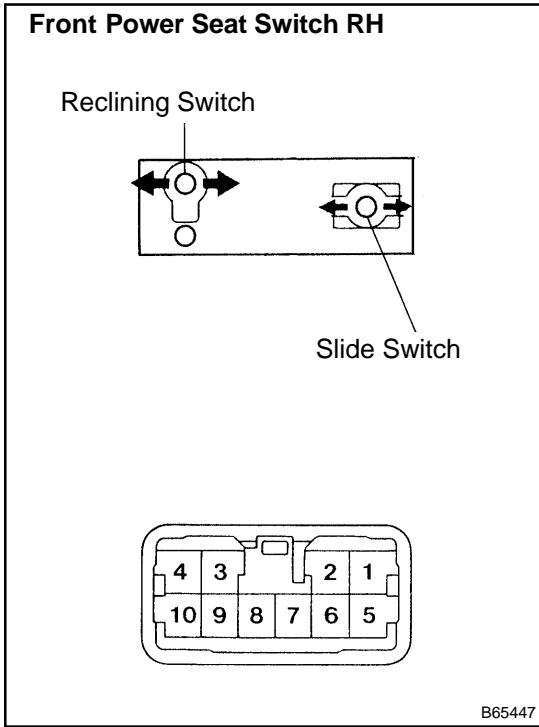
Standard (Lifter switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 7	UP	Continuity
4 ↔ 8		Continuity
4 ↔ 7 ↔ 8	OFF	Continuity
1 ↔ 8	DOWN	Continuity
4 ↔ 7		Continuity

Standard (Reclining switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 3	FRONT	Continuity
2 ↔ 4		Continuity
2 ↔ 3 ↔ 4	OFF	Continuity
1 ↔ 2	REAR	Continuity
3 ↔ 4		Continuity

If the result is not as specified, replace the front power seat switch.



3. INSPECT FRONT POWER SEAT SWITCH RH

- (a) Inspect the continuity between the terminals when each switch is operated.

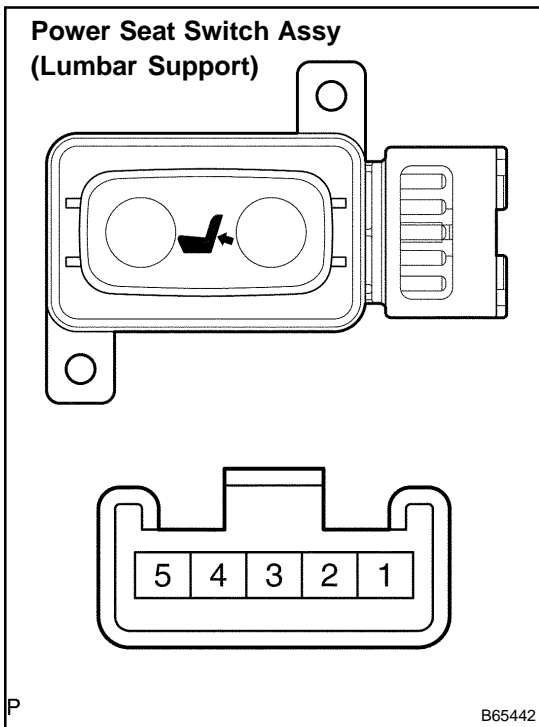
Standard (Slide switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 9	FRONT	Continuity
4 ↔ 6		
6 ↔ 4 ↔ 9	OFF	Continuity
4 ↔ 9	REAR	Continuity
1 ↔ 6		

Standard (Reclining switch):

Terminal No.	Switch Position	Specified Condition
1 ↔ 3	FRONT	Continuity
2 ↔ 4		
2 ↔ 4 ↔ 3	OFF	Continuity
1 ↔ 2	REAR	Continuity
3 ↔ 4		

If the result is not as specified, replace the front power seat switch.



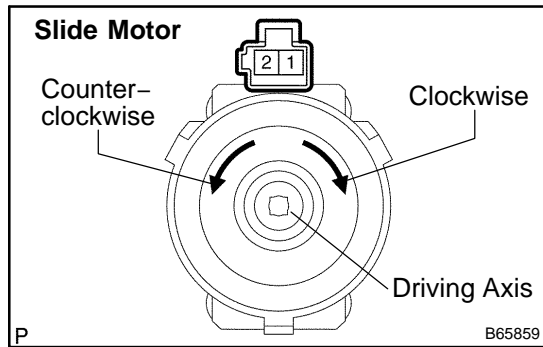
4. INSPECT POWER SEAT SWITCH ASSY (LUMBAR SUPPORT)

- (a) Inspect the continuity between the terminals when the switch is operated.

Standard:

Terminal No.	Switch Position	Specified Condition
1 ↔ 2	HOLD	Continuity
3 ↔ 4		
3 ↔ 2 ↔ 4	OFF	Continuity
1 ↔ 3	RELEASE	Continuity
4 ↔ 5		

If the result is not as specified, replace the power seat switch assy.



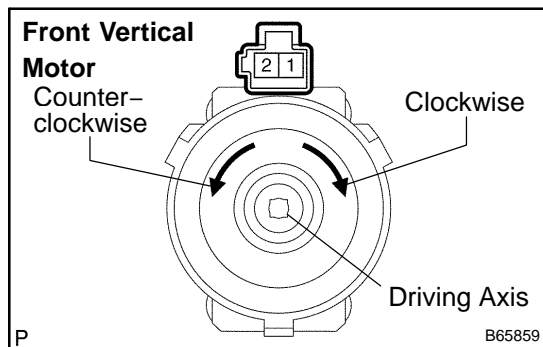
5. INSPECT FRONT SEAT ADJUSTER ASSY

- (a) Inspect operation of the slide motor.
 - (1) Check that the motor rotates smoothly when the battery is connected to the slide motor connector terminals.

Standard:

Tester Condition	Operational Direction
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

If the result is not as specified, replace the slide motor.

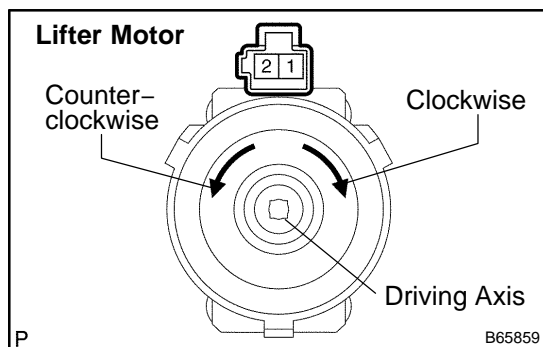


- (b) LH side:
 - Inspect operation of the front vertical motor.
 - (1) Check that the motor rotates smoothly when the battery is connected to the front vertical motor connector terminals.

Standard:

Tester Condition	Operational Direction
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

If the result is not as specified, replace the front vertical motor.

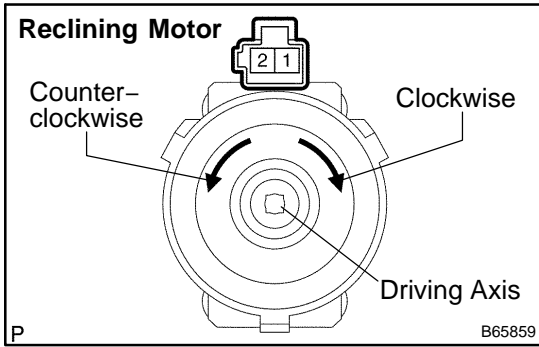


- (c) LH side:
 - Inspect operation of the lifter motor.
 - (1) Check that the motor rotates smoothly when the battery is connected to the lifter motor connector terminals.

Standard:

Tester Condition	Operational Direction
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

If the result is not as specified, replace the lifter motor.

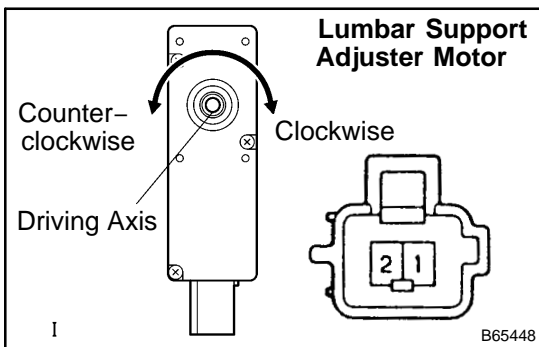


- (d) Inspect operation of the reclining motor.
 - (1) Check that the motor rotates smoothly when the battery is connected to the reclining motor connector terminals.

Standard:

Tester Condition	Operational Direction
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

If the result is not as specified, replace the reclining motor.



**6. LH side:
INSPECT LUMBAR SUPPORT ADJUSTER ASSY**

- (a) Inspect operation of the motor.

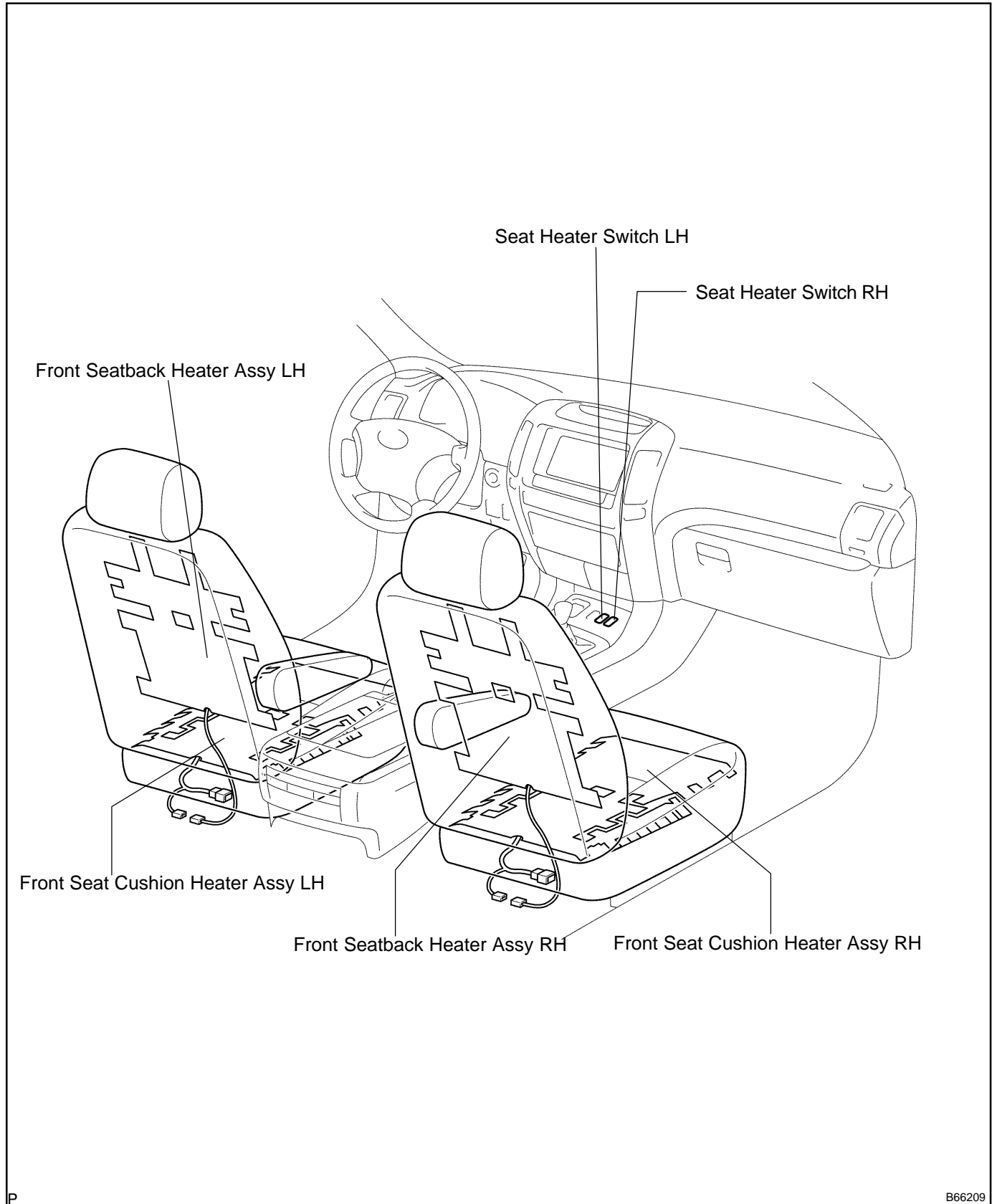
Standard:

Tester Condition	Operational Direction
Battery positive voltage → 1 Battery negative voltage → 2	Clockwise
Battery positive voltage → 2 Battery negative voltage → 1	Counterclockwise

If the result is not as specified, replace the lumbar support adjuster motor.

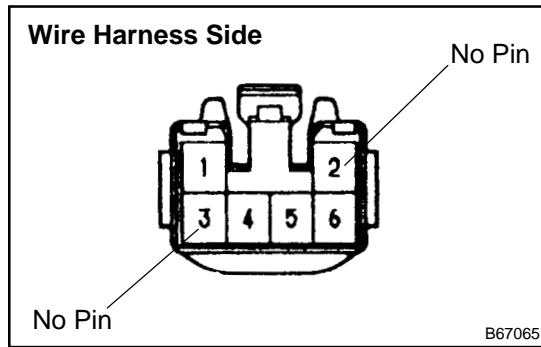
SEAT HEATER SYSTEM LOCATION

720GI-01



PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
Seat heaters do not operate (Seat is not warmed up)	1. SEAT HEATER fuse	68-1
	2. IG 1 fuse	68-1
	3. IG relay	68-1
	4. Front seat cushion heater assy LH	72-13
	5. Front seat cushion heater assy RH	72-13
	6. Front seatback heater assy LH	72-13
	7. Front seatback heater assy RH	72-13
	8. Seat heater switch LH	72-13
	9. Seat heater switch RH	72-13
	10. Wire harness	-
Temperature of seat heater cannot be adjusted	1. Seat heater switch LH	72-13
	2. Seat heater switch RH	72-13
	3. Wire harness	-



ON-VEHICLE INSPECTION

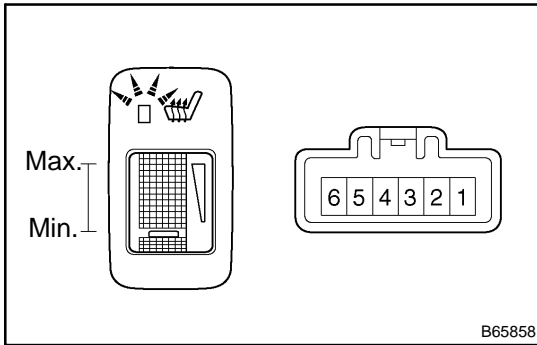
1. CHECK SEAT HEATER CONTROL

- Disconnect the connector from the seat heater control assy.
- Check the voltage or continuity of each terminal of the wire harness side connector.

Standard:

Terminal No.	Condition	Specified Condition
6 ↔ Body ground	Constant	Continuity
1 ↔ 6	(Seat heater switch) OFF → ON	0 V → 10 - 14 V
4 ↔ 6	Constant	10 - 14 V

If the result is not as specified, there may be a malfunction on the wire harness side or seat heater switch.



INSPECTION

1. INSPECT SEAT HEATER SWITCH LH

- (a) Inspect the continuity between the terminals when the switch is operated.

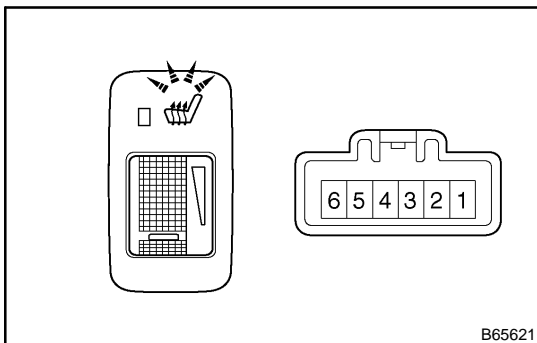
Standard:

Terminal No.	Switch Position	Specified Condition
3 ↔ 4	ON (Max.)	Continuity
1 ↔ 3	OFF	No continuity
2 ↔ 3	ON (Min.)	Continuity
5 ↔ 6	Illumination circuit	Continuity

- (b) Inspect the seat heater switch indicator light.

- (1) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 1.
- (2) Push the seat heater switch ON and check that the indicator light lights up.

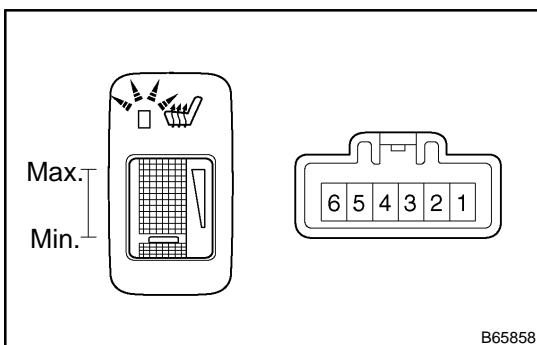
If the result is not as specified, replace the seat heater switch and inspect the circuits connected to the other parts.



- (c) Inspect the seat heater switch illumination.

- (1) Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 5.
- (2) Check that the switch illuminates.

If the result is not as specified, replace the seat heater switch or bulb.



2. INSPECT SEAT HEATER SWITCH RH

- (a) Inspect the continuity between the terminals when the switch is operated.

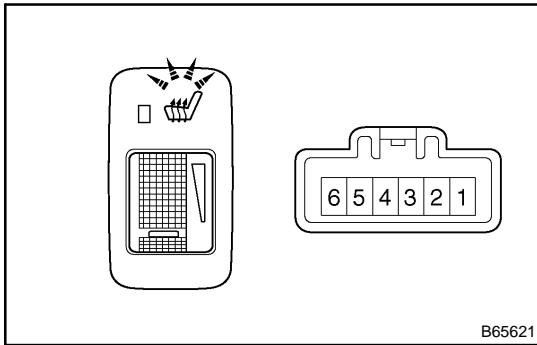
Standard:

Terminal No.	Switch Position	Specified Condition
3 ↔ 4	ON (Max.)	Continuity
1 ↔ 3	OFF	No continuity
2 ↔ 3	ON (Min.)	Continuity
5 ↔ 6	Illumination circuit	Continuity

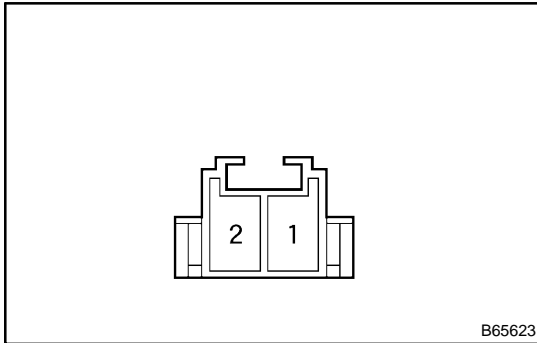
- (b) Inspect the seat heater switch indicator light.

- (1) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 1.
- (2) Push the seat heater switch ON and check that the indicator light lights up.

If the result is not as specified, replace the seat heater switch and inspect the circuits connected to the other parts.



- (c) Inspect the seat heater switch illumination.
- (1) Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 5.
 - (2) Check that the switch illuminates.
- If the result is not as specified, replace the seat heater switch or bulb.



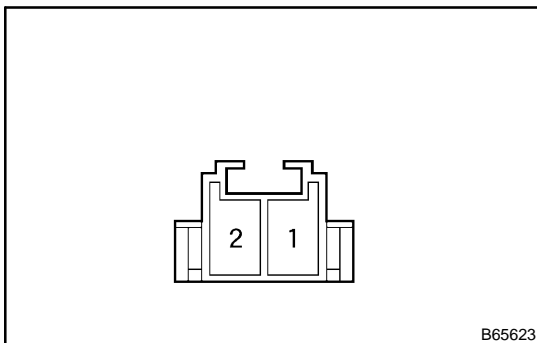
3. INSPECT FRONT SEAT BACK HEATER ASSY LH

- (a) Inspect the seatback heater continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Constant	Continuity

If continuity is not as specified, replace the seatback cover assy.



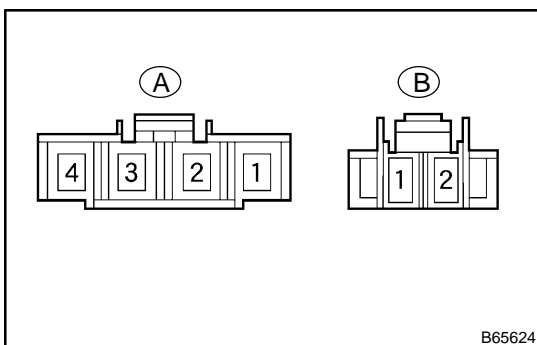
4. INSPECT FRONT SEAT BACK HEATER ASSY RH

- (a) Inspect the seatback heater assembly RH continuity.

Standard:

Terminal No.	Condition	Specified Condition
1 ↔ 2	Constant	Continuity

If continuity is not as specified, replace the seatback cover assy.



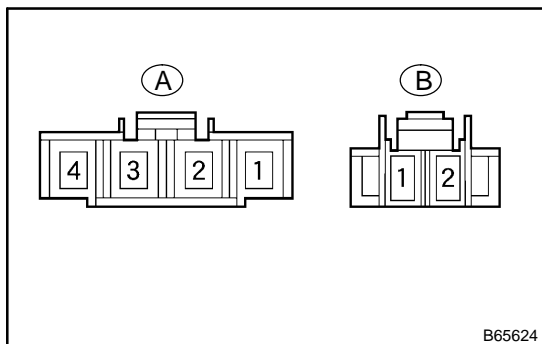
5. INSPECT FRONT SEAT CUSHION HEATER ASSY LH

- (a) Inspect the seat cushion heater continuity.
- (1) Inspect the seat cushion heater continuity between the terminals.

Standard:

Terminal No.	Condition	Specified Condition
A-1 ↔ B-2	Constant	Continuity
A-4 ↔ B-2		
A-1 ↔ A-4		
A-2 ↔ A-3		
B-1 ↔ B-2		

If the result is not as specified, replace the seat cushion cover assy.

**6. INSPECT FRONT SEAT CUSHION HEATER ASSY RH**

- (a) Inspect the seat cushion heater continuity.
 (1) Inspect the seat cushion heater continuity between the terminals.

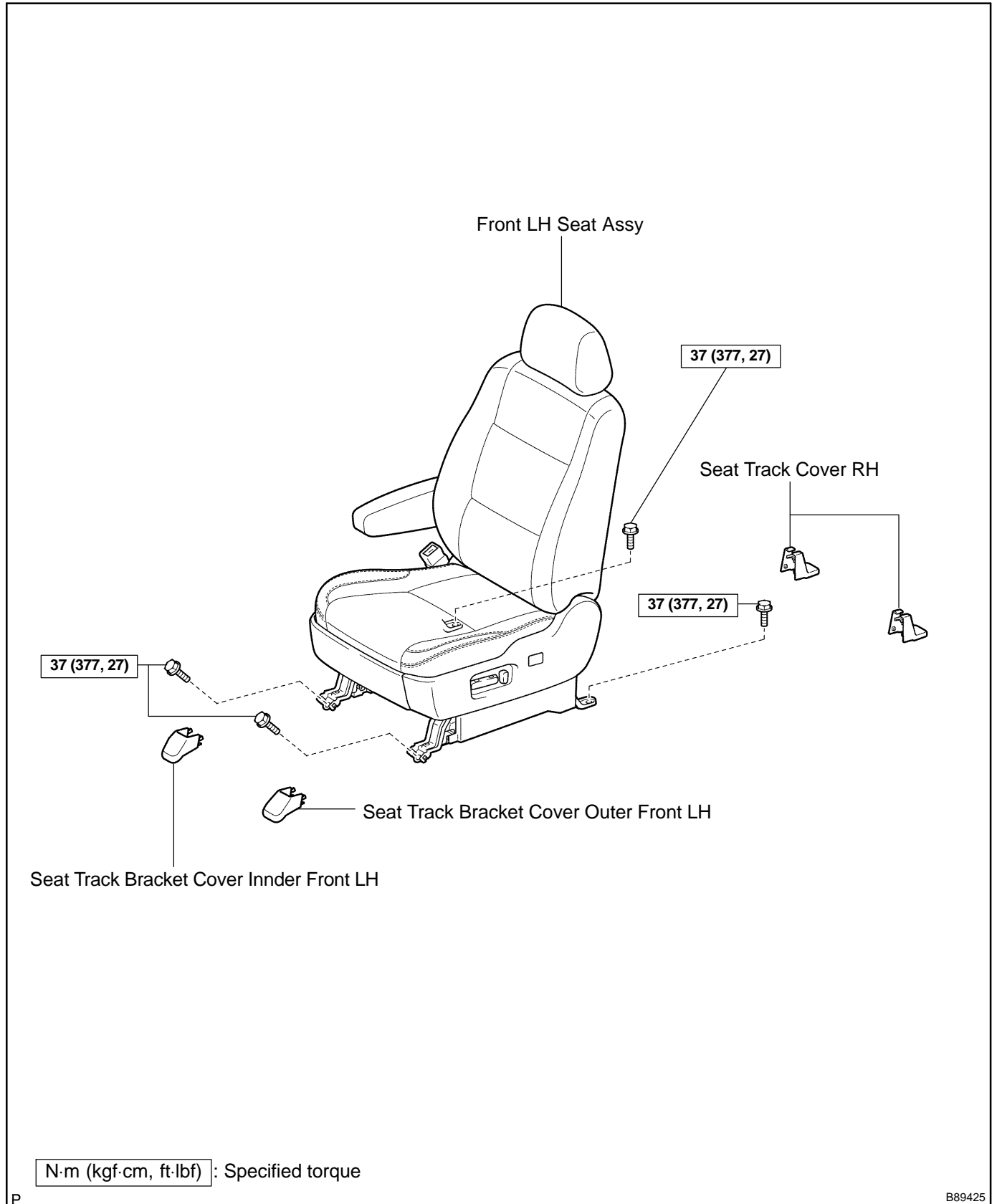
Standard:

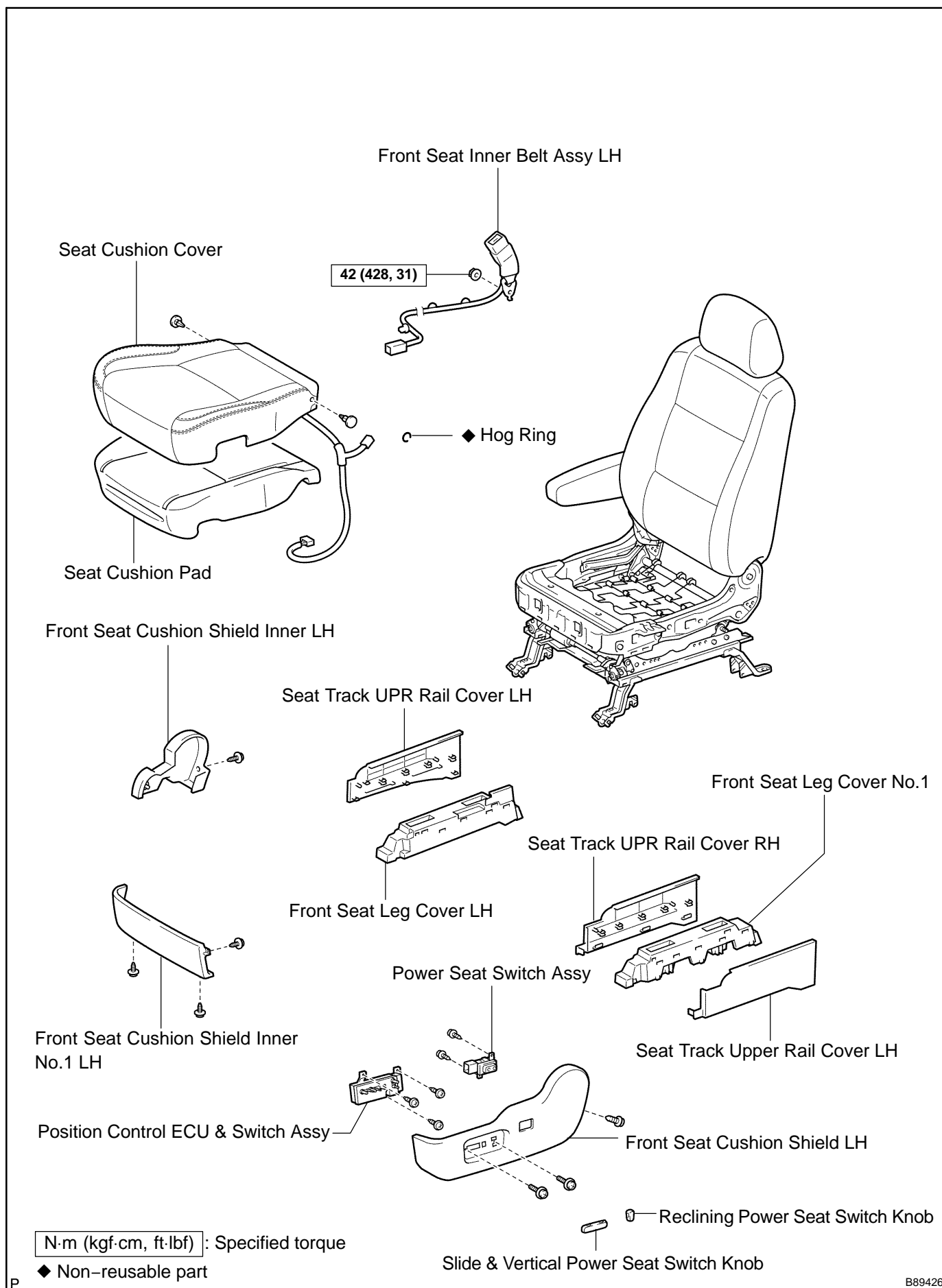
Terminal No.	Condition	Specified Condition
A-1 ↔ B-2	Constant	Continuity
A-4 ↔ B-2		
A-1 ↔ A-4		
A-2 ↔ A-3		
B-1 ↔ B-2		

If the result is not as specified, replace the seat cushion cover assy.

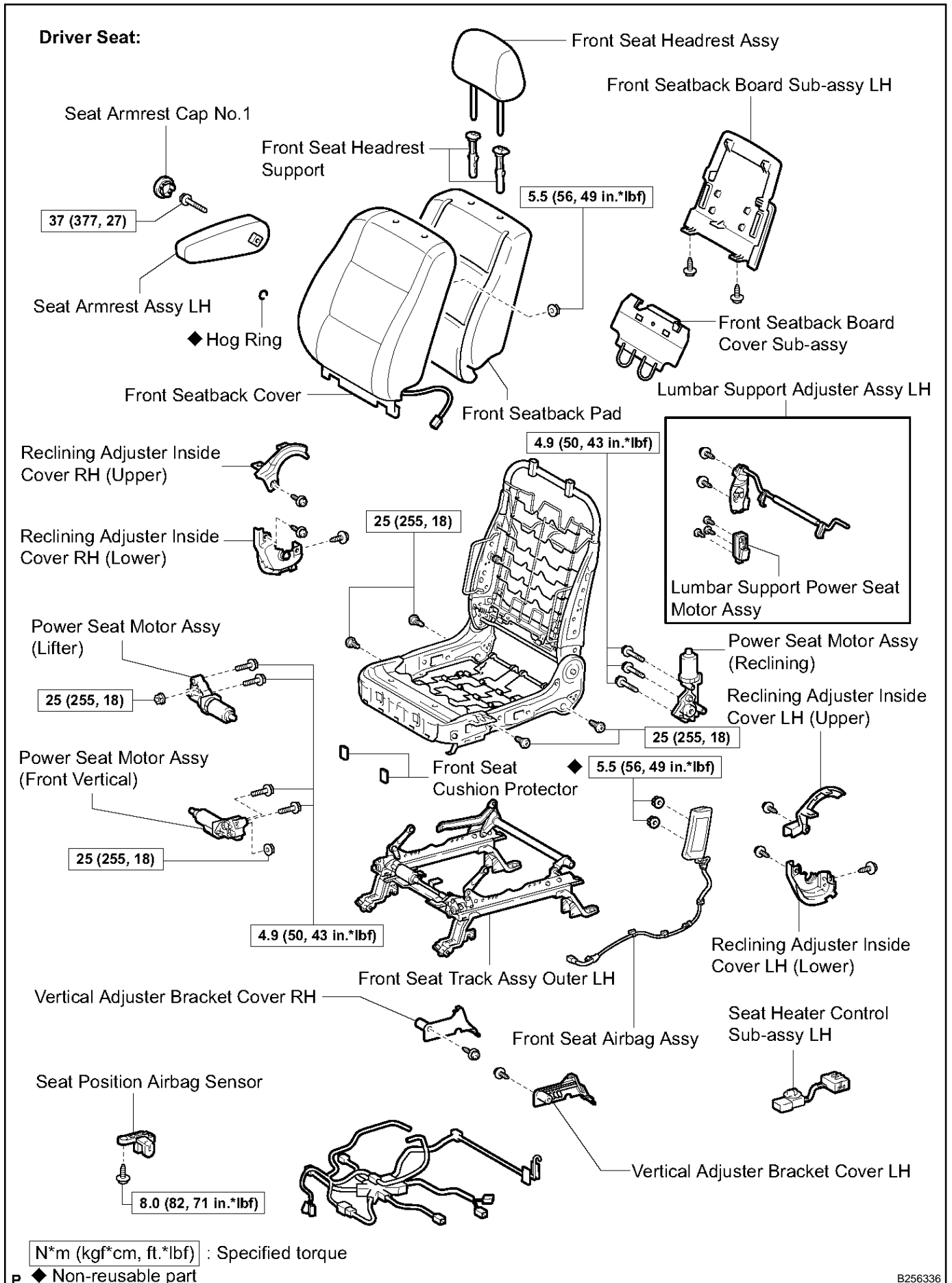
FRONT LH SEAT ASSY COMPONENTS

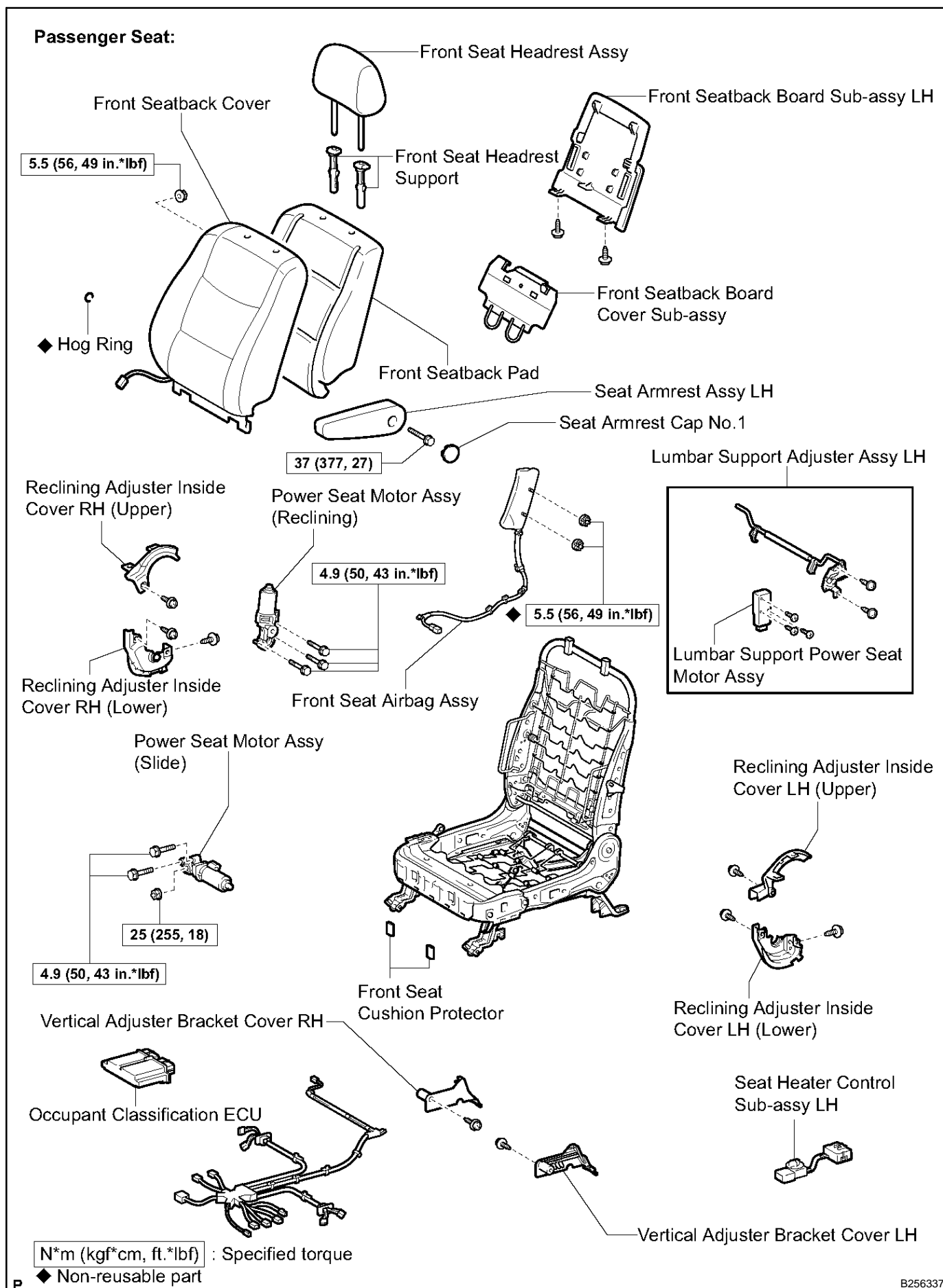
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OVERHAUL

CAUTION:

- Always wear gloves because the sharp edges of the seatback frame and seat adjuster may cause injury.
- Work must be started 90 seconds after the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery.

(The SRS is equipped with a back-up power source. If work is started within 90 seconds after disconnecting the negative (-) terminal cable of the battery, the SRS may deploy.)

HINT:

- Installation is in the reverse order of removal. However, only installation procedures requiring additional information are included.
- Use the same procedures for the RH side and LH side.
- A bolt without a torque specification is shown in the standard bolt chart (See page 03-2).
- Tape the screwdriver tip before using it to pry the parts.

1. DISCONNECT BATTERY NEGATIVE TERMINAL

2. REMOVE SEAT TRACK BRACKET COVER OUTER FRONT LH

- (a) Using a screwdriver, pry out the seat track bracket cover outer front LH.

3. REMOVE SEAT TRACK BRACKET COVER INNER FRONT LH

HINT:

Removal procedure of the seat track bracket cover inner front LH is the same as for the seat track bracket cover outer front LH.

4. REMOVE SEAT TRACK COVER RH

- (a) Using a screwdriver, pry out the 2 seat track cover RH.

5. REMOVE FRONT LH SEAT ASSY

- (a) Disconnect the connectors under the front LH seat assy.
- (b) Remove the 4 bolts and front LH seat assy.

NOTICE:

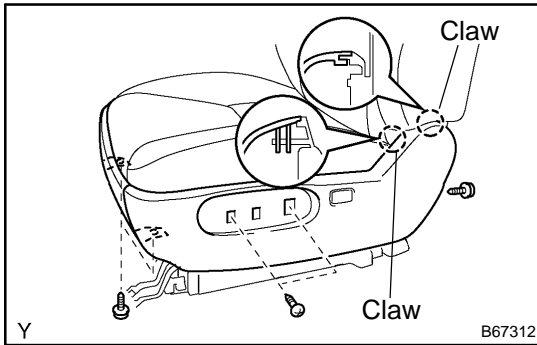
Be careful not to damage the body.

6. REMOVE RECLINING POWER SEAT SWITCH KNOB

- (a) Using a screwdriver, remove the reclining power seat switch knob.

7. REMOVE SLIDE & VERTICAL POWER SEAT SWITCH KNOB

- (a) Using a screwdriver, remove the slide & vertical power seat switch knob.



- 8. REMOVE FRONT SEAT CUSHION SHIELD INNER NO.1 LH**
 - (a) Remove the 5 screws.
 - (b) Using a screwdriver, disengage the 2 claws and remove the front seat cushion shield inner No.1 LH with the front seat cushion shield LH, and then disconnect the connector.
 - (c) Remove the screw and front seat cushion shield inner No.1 LH.

9. REMOVE POWER SEAT SWITCH ASSY

- (a) Remove the 2 screws and power seat switch assy.

10. REMOVE POSITION CONTROL ECU & SWITCH ASSY

- (a) Disconnect the connectors.
- (b) Remove the 3 screws and position control ECU & switch assy.

11. REMOVE FRONT SEAT INNER BELT ASSY LH (SEE PAGE 61-13)

12. REMOVE FRONT SEAT CUSHION SHIELD INNER LH

- (a) Remove the screw.
- (b) Using a screwdriver, disengage the claw and clip, and remove the front seat cushion shield inner LH.

13. REMOVE SEAT TRACK UPPER RAIL COVER LH

- (a) Using a screwdriver, remove the seat track upper rail cover LH.

14. REMOVE SEAT TRACK UPR RAIL COVER RH

HINT:

Removal procedure of the seat track UPR rail cover RH is the same as for the seat track upper rail cover LH.

15. REMOVE SEAT TRACK UPR RAIL COVER LH

HINT:

Removal procedure of the seat track UPR rail cover LH is the same as for the seat track upper rail cover LH.

16. REMOVE FRONT SEAT LEG COVER NO.1

- (a) Using a screwdriver, remove the front seat leg cover No.1.

17. REMOVE FRONT SEAT LEG COVER LH

HINT:

Removal procedure of the front seat leg cover LH is the same as for the front seat leg cover No.1.

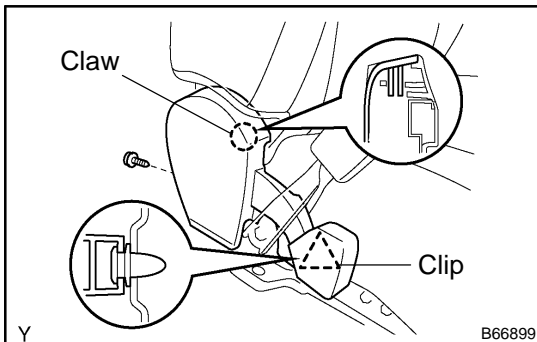
18. REMOVE SEAT CUSHION COVER WITH PAD

- (a) Disconnect the connector.
- (b) Remove the 2 clips.
- (c) Disengage the hook and remove the seat cushion cover together with the pad.

19. REMOVE SEAT CUSHION COVER

- (a) Remove the hog rings and seat cushion cover.

20. REMOVE FRONT SEAT HEADREST ASSY



21. REMOVE SEAT ARMREST CAP NO.1

- (a) Remove the seat armrest cap No.1.

22. REMOVE SEAT ARMREST ASSY LH

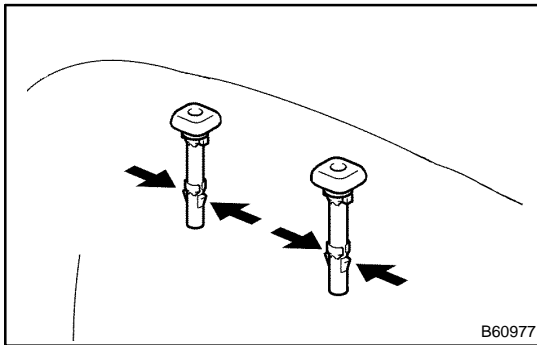
- (a) Remove the bolt and seat armrest assy LH.

23. REMOVE FRONT SEATBACK BOARD SUB-ASSY LH

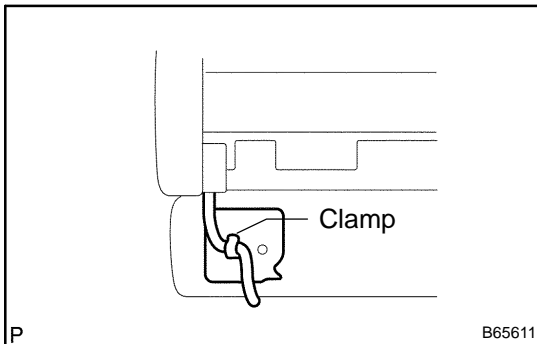
- (a) Remove the 2 screws and front seatback board sub-assy LH.

24. REMOVE FRONT SEATBACK BOARD COVER SUB-ASSY

- (a) Remove the front seatback board cover sub-assy.

**25. REMOVE FRONT SEAT HEADREST SUPPORT**

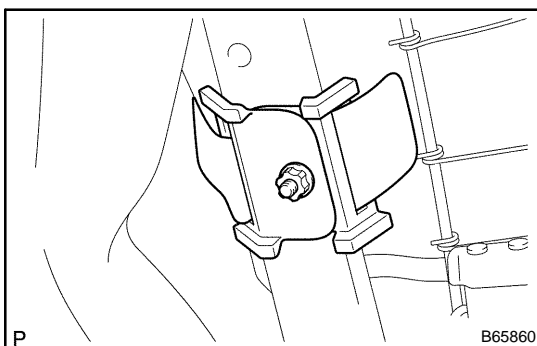
- (a) Remove the 2 front seat headrest supports.

**26. REMOVE SEATBACK COVER WITH PAD**

- (a) Disconnect the connector.
 (b) Disengage the clamp and disconnect the wire harness.

NOTICE:

Be careful not to damage the cover.



- (c) Remove the hog rings, nut and seatback cover bracket.
 (d) Remove the hog rings and seatback cover together with the pad.

27. REMOVE FRONT SEAT AIRBAG ASSY (SEE PAGE 60-46)**28. REMOVE FRONT SEATBACK COVER**

- (a) Remove the hog rings and front seatback cover.

29. REMOVE RECLINING ADJUSTER INSIDE COVER LH

- (a) Remove the 2 screws and reclining adjuster inside cover LH (lower).
 (b) Remove the screw and reclining adjuster inside cover LH (upper).

30. REMOVE RECLINING ADJUSTER OUTSIDE COVER RH

- (a) Remove the 2 screws and reclining adjuster inside cover RH (lower).
 (b) Remove the screw and reclining adjuster inside cover RH (upper).

- 31. REMOVE VERTICAL ADJUSTER BRACKET COVER LH**
 - (a) Remove the screw and vertical adjuster bracket cover LH.
- 32. REMOVE VERTICAL ADJUSTER BRACKET COVER RH**
 - (a) Remove the screw and vertical adjuster bracket cover RH.
- 33. REMOVE LUMBAR SUPPORT ADJUSTER ASSY LH**
 - (a) Disconnect the connector.
 - (b) Remove the 2 screws and lumbar support adjuster assy LH.
- 34. REMOVE LUMBAR SUPPORT POWER SEAT MOTOR ASSY**
 - (a) Remove the 3 screws and lumbar support power seat motor assy.
- 35. REMOVE POWER SEAT MOTOR ASSY (DRIVER SEAT ONLY)**
 - (a) Disconnect the connectors.
 - (b) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 3 hexagon bolts and power seat motor assy (reclining).
 - (c) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 2 hexagon bolts, nut and power seat motor assy (lifter).
 - (d) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 2 hexagon bolts, nut and power seat motor assy (front vertical).
- 36. REMOVE POWER SEAT MOTOR ASSY (PASSENGER SEAT ONLY)**
 - (a) Disconnect the connectors.
 - (b) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 3 hexagon bolts and power seat motor assy (reclining).
 - (c) Using a hexagon wrench 4.0 mm (0.15 in.), remove the 2 hexagon bolts, nut and power seat motor assy (slide).
- 37. REMOVE SEAT HEATER CONTROL SUB-ASSY LH**
 - (a) Disconnect the connector.
 - (b) Remove the seat heater control sub-assy LH.
- 38. REMOVE SEAT POSITION AIRBAG SENSOR (DRIVER SEAT ONLY) (SEE PAGE 60-64)**
- 39. REMOVE OCCUPANT CLASSIFICATION ECU (PASSENGER SEAT ONLY) (SEE PAGE 60-67)**
- 40. REMOVE FRONT SEAT TRACK ASSY OUTER LH (DRIVER SEAT ONLY)**
 - (a) Disconnect the connector.
 - (b) Using a torx® socket wrench (T40), remove the 6 torx® bolts and front seat track assy outer LH.
- 41. REMOVE FRONT SEAT CUSHION PROTECTOR**
 - (a) Remove the 2 front seat cushion protectors.

- 42. INSTALL FRONT SEAT TRACK ASSY OUTER LH (DRIVER SEAT ONLY)**
- (a) Using a torx® socket wrench (T40), install the front seat track assy outer LH with the 6 torx® bolts.
Torque: 25 N·m (255 kgf·cm, 18 in·lbf)
 - (b) Connect the connector.
- 43. INSTALL OCCUPANT CLASSIFICATION ECU (PASSENGER SEAT ONLY) (SEE PAGE 60-67)**
- 44. INSTALL SEAT POSITION AIRBAG SENSOR (DRIVER SEAT ONLY) (SEE PAGE 60-64)**
- 45. INSTALL POWER SEAT MOTOR ASSY (DRIVER SEAT ONLY)**
- (a) Using a hexagon wrench 4.0 mm (0.15 in.), install the power seat motor assy (front vertical) with the 2 hexagon bolts and nut.
Torque:
Bolt: 4.9 N·m (50 kgf·cm, 43 in·lbf)
Nut: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (b) Using a hexagon wrench 4.0 mm (0.15 in.), install the power seat motor assy (lifter) with the 2 hexagon bolts and nut.
Torque:
Bolt: 4.9 N·m (50 kgf·cm, 43 in·lbf)
Nut: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (c) Using a hexagon wrench 4.0 mm (0.15 in.), install the power seat motor assy (reclining) with the 3 hexagon bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in·lbf)
 - (d) Connect the connectors.
- 46. INSTALL POWER SEAT MOTOR ASSY (PASSENGER SEAT ONLY)**
- (a) Using a hexagon wrench 4.0 mm (0.15 in.), install the power seat motor assy (slide) with the 2 hexagon bolts and nut.
Torque:
Bolt: 4.9 N·m (50 kgf·cm, 43 in·lbf)
Nut: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (b) Using a hexagon wrench 4.0 mm (0.15 in.), install the power seat motor assy (reclining) with the 3 hexagon bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in·lbf)
 - (c) Connect the connectors.

47. INSTALL FRONT SEATBACK COVER

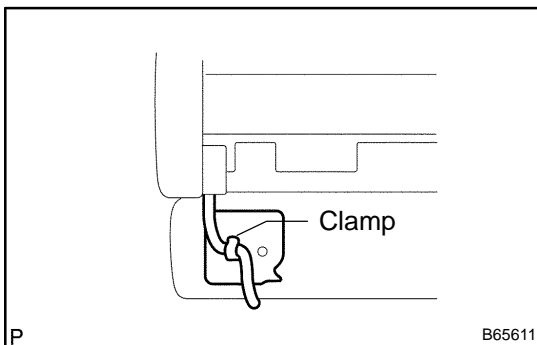
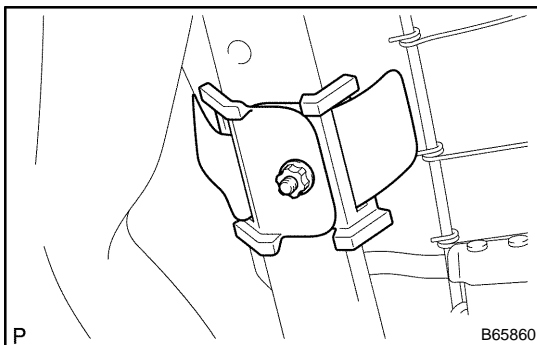
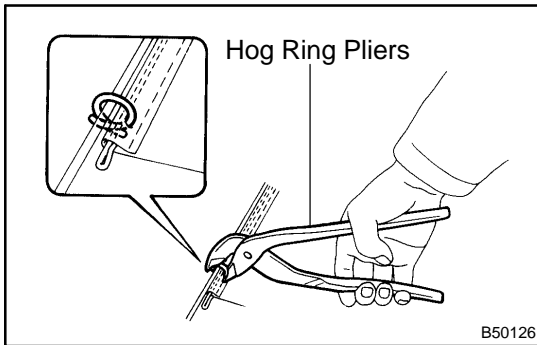
- (a) Install the seatback pad.
- (b) Cover the top of the seatback pad with the front seatback cover.
- (c) Using hog ring pliers, install the front seatback cover completely with new hog rings.

NOTICE:

- **Be careful not to damage the cover.**
- **When installing the hog rings, take care to prevent wrinkles as much as possible.**

48. INSTALL FRONT SEAT AIRBAG ASSY (SEE PAGE 60-46)**49. INSTALL SEATBACK COVER WITH PAD**

- (a) Install the seatback cover together with the pad with new hog rings.
- (b) Install the front seatback cover bracket with the nut.
Torque: 5.5 N·m (56 kgf·cm, 49 in·lbf)



- (c) Install the wire harness and clamp of the side airbag through the seat cushion cover end.

NOTICE:

Be careful not to damage the cover.

- (d) Connect the connector.

50. INSTALL SEAT ARMREST ASSY LH

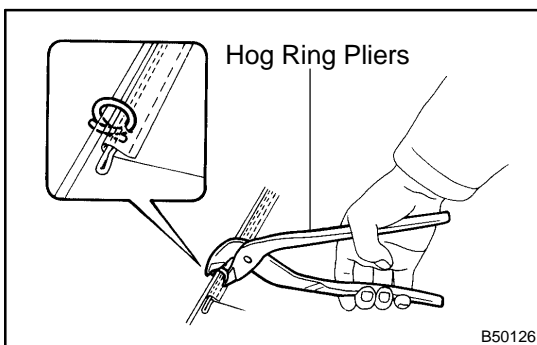
- (a) Install the seat armrest assy LH with the bolt.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

51. INSTALL SEAT CUSHION COVER

- (a) Install the seat cushion pad to the seat cushion cover.
- (b) Using hog ring pliers, install the seat cushion cover to the seat cushion pad with new hog rings.

NOTICE:

- **Be careful not to damage the cover.**
- **When installing the hog rings, take care to prevent wrinkles as much as possible.**

52. INSTALL FRONT SEAT INNER BELT ASSY LH (SEE PAGE 61-13)

53. INSTALL FRONT LH SEAT ASSY

- (a) Place the front LH seat assy in the cabin.

NOTICE:

Be careful not to damage the body.

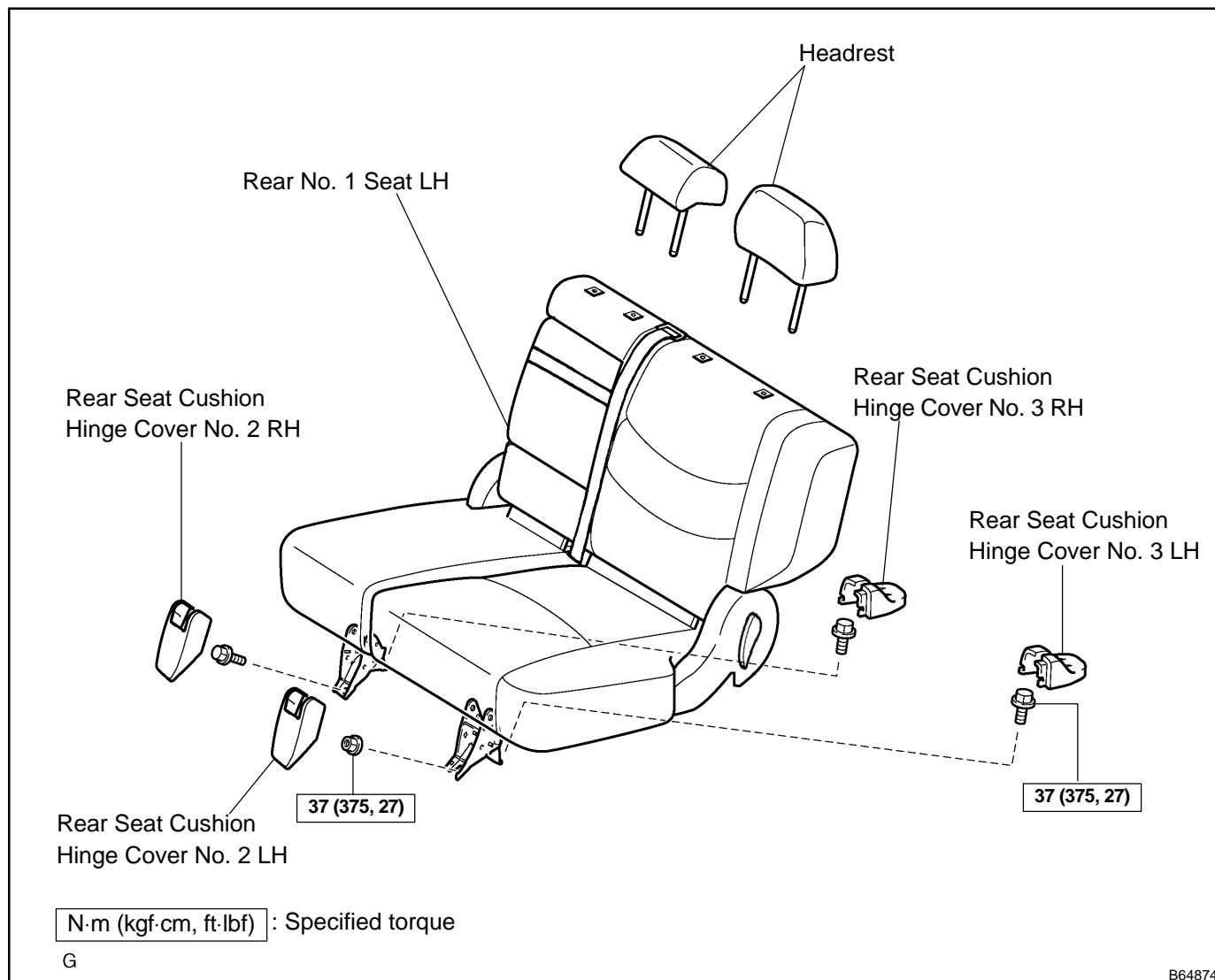
- (b) Connect the connectors under the front LH seat assy.
(c) Install the front LH seat assy with the 4 bolts.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

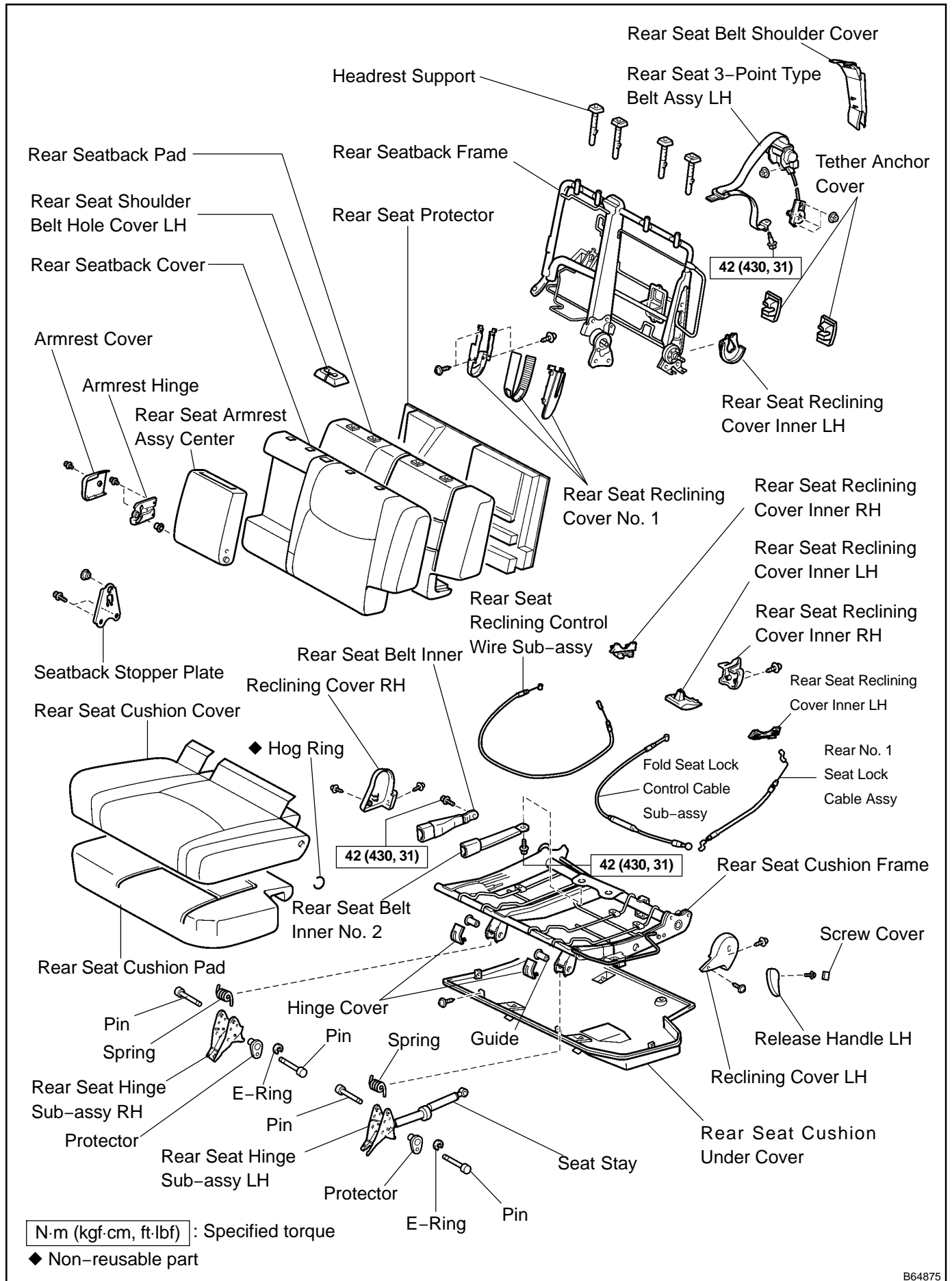
- 54. CHECK SRS WARNING LIGHT (SEE PAGE 05-1213)**
55. CHECK POWER SEAT OPERATION (SEE PAGE 72-3)
56. CHECK SEAT HEATER OPERATION
57. INITIALIZE FRONT PASSENGER OCCUPANT CLASSIFICATION SYSTEM (PASSENGER SEAT ONLY) (SEE PAGE 05-1213)

REAR NO.1 SEAT LH COMPONENTS

720G6-01



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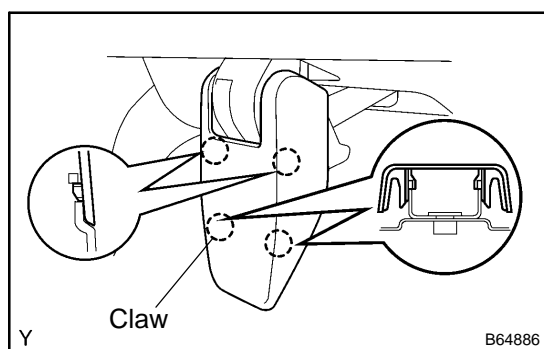
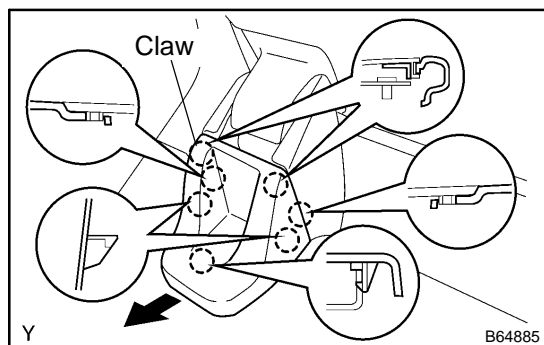


B64875

OVERHAUL

1. REMOVE REAR NO.1 SEAT LH

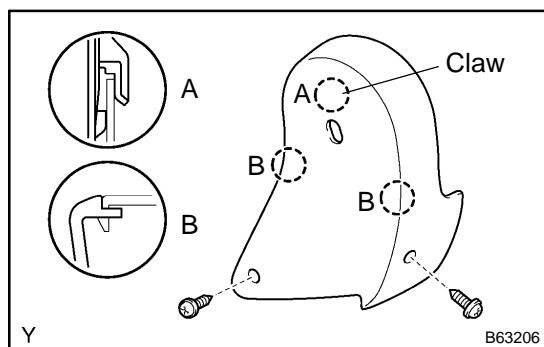
- (a) Remove the headrest.
- (b) Tumble the seat.
- (c) Disengage the claws, remove the rear seat cushion hinge covers No. 2 LH and RH.
- (d) Set the rear seat to the floor.



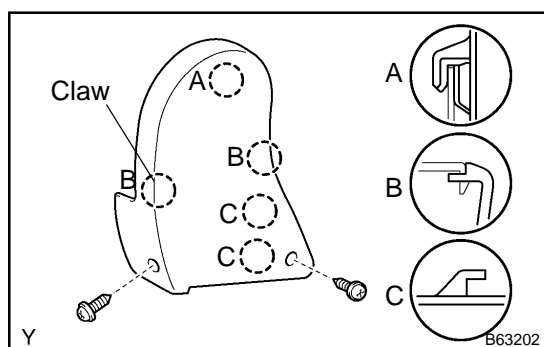
- (e) Disengage the claws, remove the rear seat cushion hinge covers No. 3 LH and RH.
- (f) Tumble the seat.
- (g) Remove the 3 bolts, nut and the seat.

2. REMOVE REAR SEAT CUSHION COVER LH

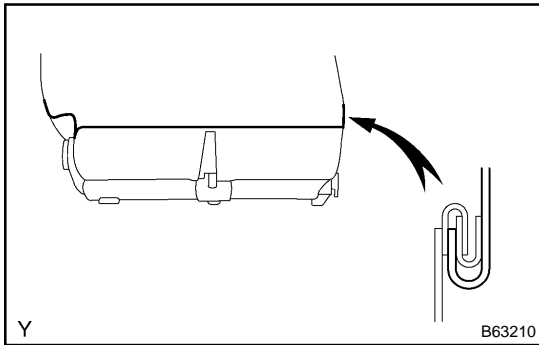
- (a) Using a screwdriver, remove the screw cover, screw and the release handle LH.



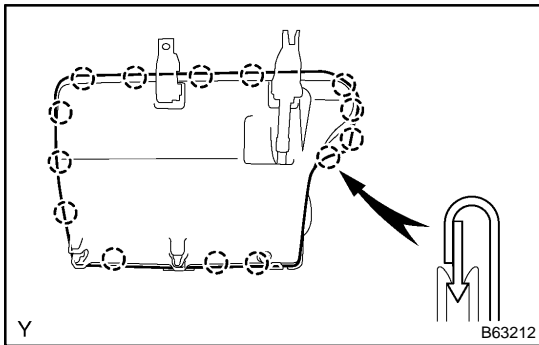
- (b) Disengage the claws, remove the 2 screws and the reclining cover LH.



- (c) Disengage the claws, remove the 2 screws and the reclining cover RH.



- (d) Disengage the seatback cover hem.



- (e) Insert a screwdriver between the seat cushion cover and seat cushion under cover.

NOTICE:

Tape the screwdriver tip before use.

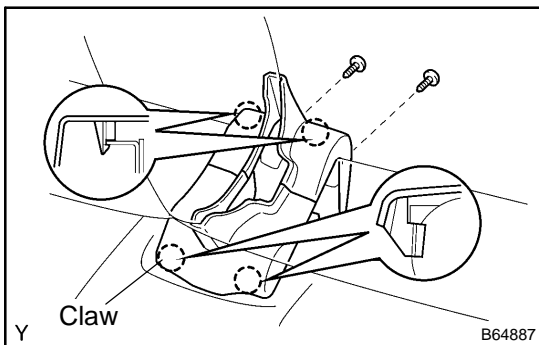
- (f) Pry the seat cushion cover hem to disengage it.
 (g) Cut the hog rings and bring out the seat cushion cover together with the pad.
 (h) Remove the nut and disconnect the rear seat 3 point type seat belt assy LH.
 (i) Remove the seat cushion cover together with the pad.
 (j) Cut the hog rings and remove the seat cushion cover from the pad.

3. REMOVE REAR SEAT ARMREST ASSY CENTER

- (a) Open the fastener of the seatback cover.
 (b) Remove the screw and the armrest cover.
 (c) Remove the 3 bolts, guide, armrest hinge and the armrest.

4. REMOVE REAR SEATBACK ASSY LH

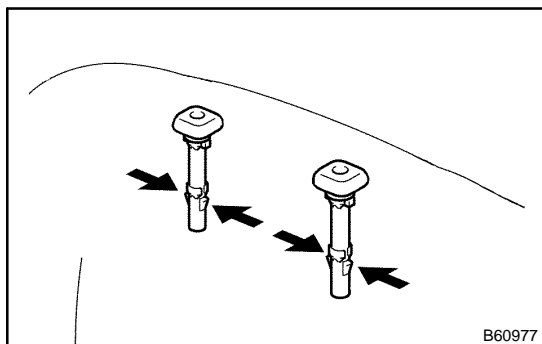
- (a) Disconnect the seat lock control cables from the seatback frame.
 (b) Remove the 3 bolts, washer, grommet and the seatback stopper plate.



- (c) Disengage the claws, remove the 2 screws and the 2 reclining covers.
 (d) Remove the 4 bolts and the rear seatback assy LH.

5. REMOVE REAR SEATBACK COVER LH

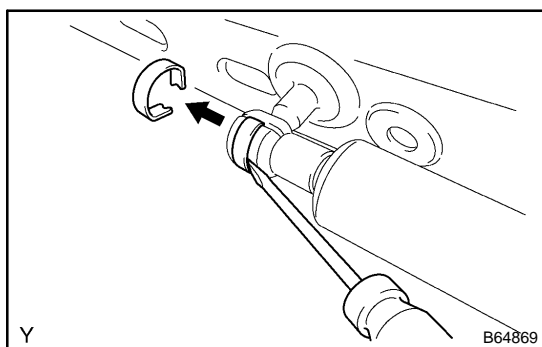
- (a) Remove the 2 tether anchor covers.
 (b) Remove the rear seat protector.



- (c) Push the claws and remove the 4 headrest supports.
- (d) Remove the rear seat shoulder belt hole cover.
- (e) Remove the seatback cover together with the pad.
- (f) Cut the hog rings and remove the seatback cover.

6. REMOVE REAR SEAT 3 POINT TYPE BELT ASSY LH

- (a) Remove the 2 screws and the reclining adjuster cover sub-assy.
- (b) Using a screwdriver, remove the rear seat shoulder belt hole cover.
- (c) Remove the 2 nuts, 2 screws and the seat belt.



7. REMOVE REAR SEAT HINGE SUB-ASSY LH

- (a) Using a screwdriver, remove the spring of the seat stay ball-joint.
- (b) Disconnect the ball-joint from the seat cushion frame.
- (c) Remove the hinge cover, E-ring, pin, hinge guide, spring and the hinge together with the seat stay.

8. REMOVE REAR SEAT HINGE SUB-ASSY RH

- (a) Remove the hinge cover, E-ring, pin, hinge guide and the hinge.

9. REMOVE REAR SEAT CUSHION UNDER COVER SUB-ASSY LH

- (a) Remove the 7 screws, cushion and the cover.

10. REMOVE REAR SEAT BELT INNER

- (a) Remove the nut and rear seat belt inner.
- (b) Remove the nut and rear seat belt inner No. 2.

11. REMOVE FOLD SEAT LOCK CONTROL CABLE ASSY NO.2

12. REMOVE REAR NO.1 SEAT LOCK CABLE ASSY

13. REMOVE REAR SEAT RECLINING CONTROL WIRE SUB-ASSY

14. INSTALL FOLD SEAT LOCK CONTROL CABLE ASSY NO.2

15. INSTALL REAR SEAT BELT INNER

- (a) Install the rear seat belt inner No. 2 with the nut.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

- (b) Install the rear seat belt inner with the nut.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

16. INSTALL REAR SEAT CUSHION UNDER COVER SUB-ASSY LH

- (a) Install the cover with the 6 screws.
- (b) Install the cushion with the screw.

17. INSTALL REAR SEAT HINGE SUB-ASSY RH

- (a) Install the hinge guide to the hinge.
- (b) Install the hinge with the pin and new E-ring.
- (c) Install the hinge cover.

18. INSTALL REAR SEAT HINGE SUB-ASSY LH

- (a) Install the spring to the ball-joint of the seat stay.
- (b) Connect the ball-joint to the seat cushion frame securely.
- (c) Install the spring and hinge guide to the hinge.
- (d) Install the hinge with the pin and new E-ring.
- (e) Install the hinge cover.

19. INSTALL NO.1 SEAT 3 POINT TYPE BELT ASSY LH

- (a) Install the seat belt with the 2 nuts and 2 screws.
- (b) Install the rear seat shoulder belt hole cover.
- (c) Install the reclining adjuster cover sub-assy with the 2 screws.

20. INSTALL REAR SEATBACK COVER LH

- (a) Install the seatback cover to the seatback pad with new hog rings.
- (b) Install the seatback cover together with the pad to the seatback frame.
- (c) Install the 2 headrest supports.

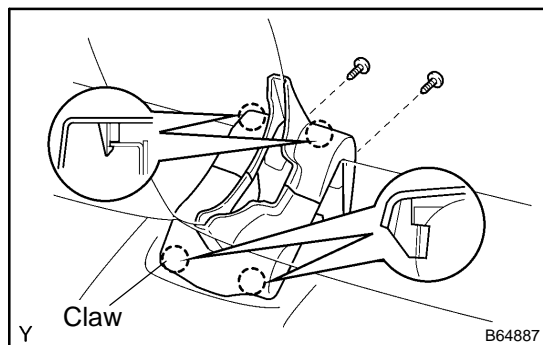
NOTICE:

Be careful not to mistake the headrest support direction.

- (d) Connect the rear seat lock cable to the rear seat reclining cover.
- (e) Install the rear seat protector.
- (f) Install the 2 tether anchor covers.

21. INSTALL REAR SEATBACK ASSY LH

- (a) Install the rear seatback assy LH with the 4 bolts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)



- (b) Install the 2 reclining covers with the 2 screws.
- (c) Install the seatback stopper plate to the seat cushion frame with the 2 bolts.
- (d) Install the grommet, washer and the bolt.
- (e) Connect the seat lock control cables to the seatback frame.

22. INSTALL REAR SEAT ARMREST ASSY CENTER

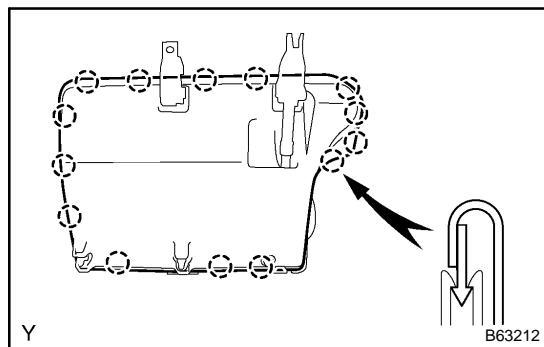
- (a) Install the armrest.
- (b) Install the guide to the armrest hinge.
- (c) Install the armrest hinge with the 3 bolts.
- (d) Install the armrest cover with the screw.
- (e) Close the fastener of the seatback cover.

23. INSTALL REAR SEAT CUSHION COVER LH

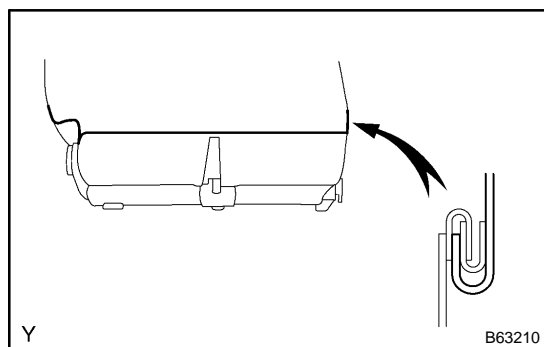
- (a) Install the seat cushion cover to the seat cushion pad with new hog rings.
- (b) Install the No .1 seat 3 point type belt through the seat cushion pad.
- (c) Install the No .1 seat 3 point type belt with the bolt.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

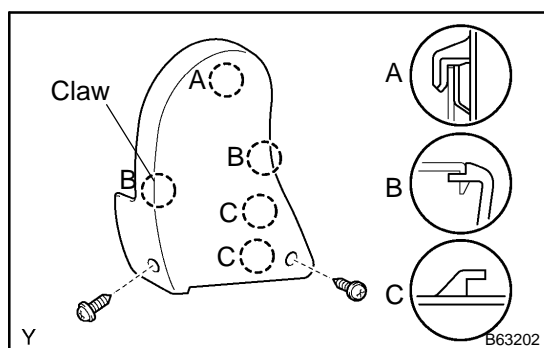
- (d) Install the seat cushion cover together with the pad to the seat cushion frame with new hog rings.



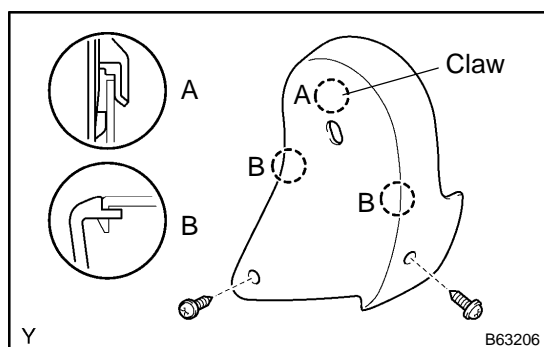
- (e) Securely engage the seat cushion cover hem to the seat cushion under cover.



- (f) Engage the seatback cover hem.



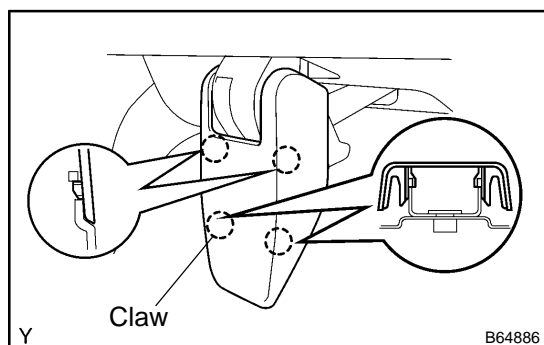
- (g) Install the reclining cover RH with the 2 screws.



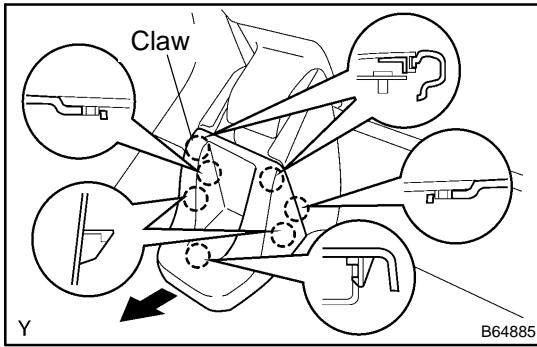
- (h) Install the reclining cover LH with the 2 screws.
 (i) Install the release handle LH with the screw.
 (j) Install the screw cover.

24. INSTALL REAR NO.1 SEAT LH

- (a) Install the seat with the 3 bolts and the nut.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)
 (b) Set the rear seat to the floor.



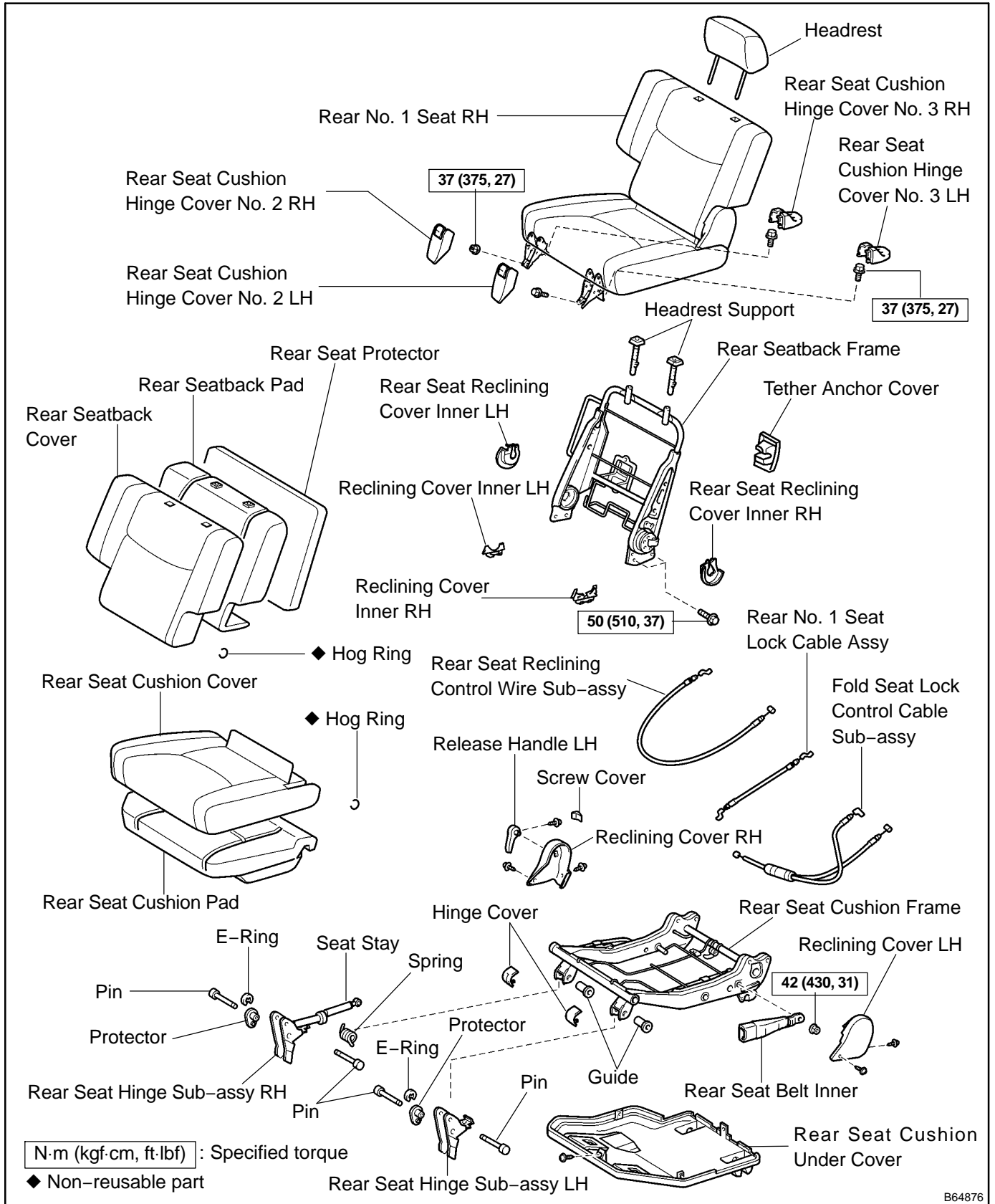
- (c) Install the rear seat cushion hinge covers No. 3 LH and RH.
 (d) Tumble the seat.



- (e) Install the rear seat cushion hinge covers No. 2 LH and RH.
- (f) Install the headrest.

REAR NO.1 SEAT RH COMPONENTS

720G8-01

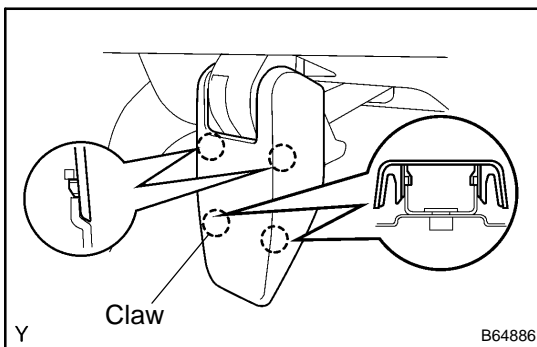
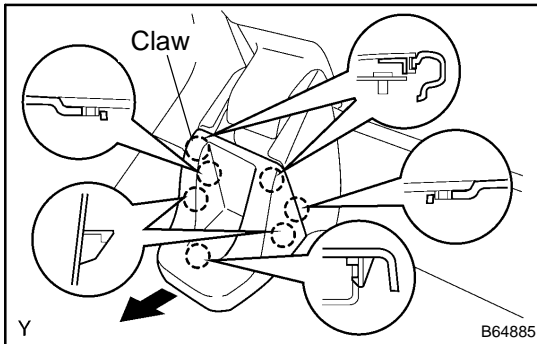


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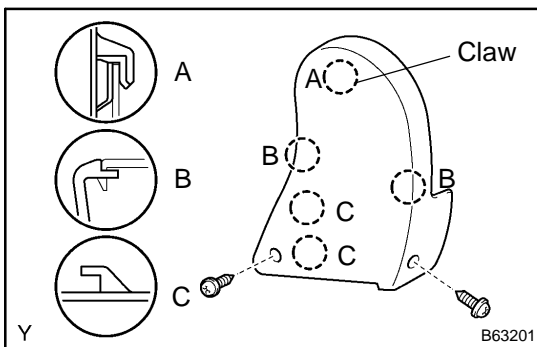
OVERHAUL

1. REMOVE REAR NO.1 SEAT RH

- (a) Remove the headrest.
- (b) Tumble the seat.
- (c) Disengage the claws, remove the rear seat cushion hinge covers No. 2 LH and RH.
- (d) Set the rear seat to the floor.

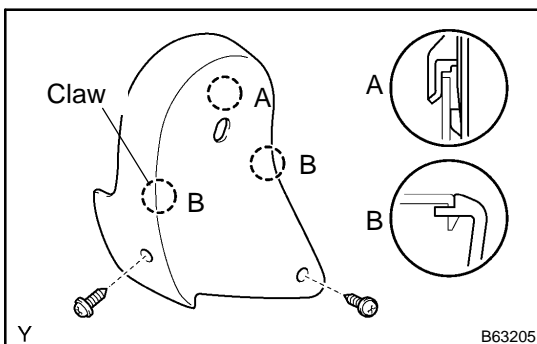


- (e) Disengage the claws, remove the rear seat cushion hinge covers No. 3 LH and RH.
- (f) Tumble the seat.
- (g) Remove the 3 bolts, nut and the seat.

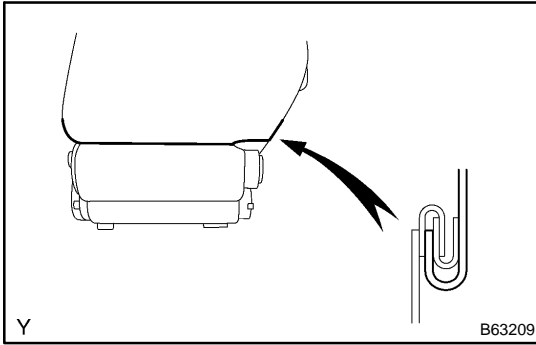


2. REMOVE REAR SEAT CUSHION COVER RH

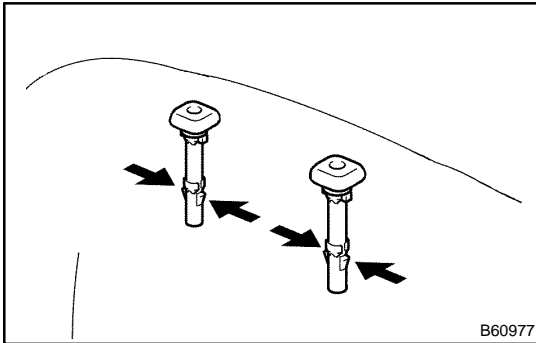
- (a) Disengage the claws, remove the 2 screws and the reclining cover LH.
- (b) Using a screwdriver, remove the screw cover, screw and the release handle RH.



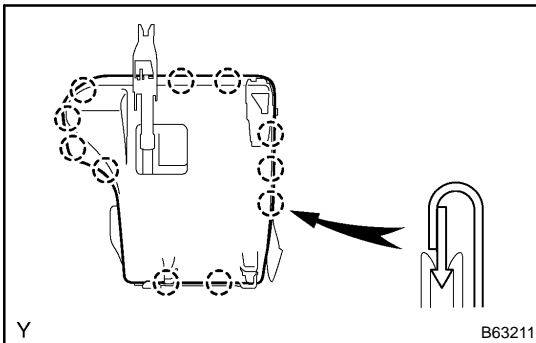
- (c) Disengage the claws, remove the 2 screws and the reclining cover RH.



- (d) Disengage the seatback cover hem.
- (e) Remove the tether anchor cover.
- (f) Open the fastener of the seatback cover, remove the rear seat protector.



- (g) Push the claws and remove the 2 headrest supports.
- (h) Remove the seatback cover together with the pad.
- (i) Cut the hog rings and remove the seatback cover.



3. REMOVE REAR SEATBACK COVER RH

- (a) Insert a screwdriver between the seat cushion cover and seat cushion under cover.

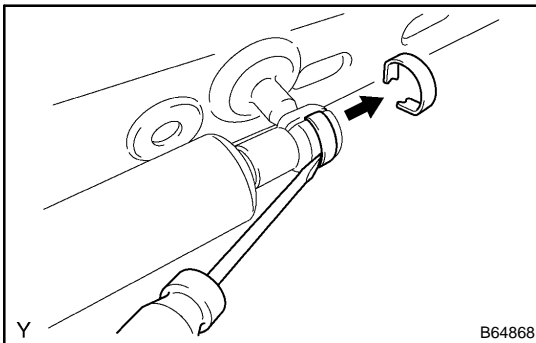
NOTICE:

Tape the screwdriver tip before use.

- (b) Pry the seat cushion cover hem to disengage it.
- (c) Cut the hog rings and remove the seat cushion cover together with the pad.
- (d) Cut the hog rings and remove the seat cushion cover.

4. REMOVE REAR SEAT HINGE SUB-ASSY LH

- (a) Remove the hinge cover, E-ring, pin, hinge guide and the hinge.



5. REMOVE REAR SEAT HINGE SUB-ASSY RH

- (a) Using a screwdriver, remove the spring of the seat stay ball-joint.
- (b) Disconnect the ball-joint from the seat cushion frame.
- (c) Remove the hinge cover, E-ring, pin, hinge guide, spring and the hinge together with the seat stay.

6. REMOVE REAR SEAT CUSHION UNDER COVER SUB-ASSY RH

- (a) Remove the 4 screws and the cover.

7. REMOVE REAR SEAT BELT INNER

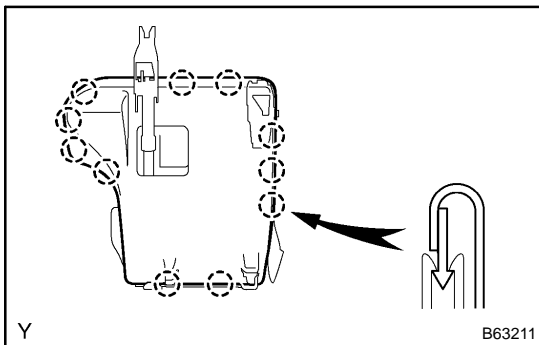
- (a) Remove the nut and the belt.

8. REMOVE REAR NO.1 SEAT LOCK CABLE ASSY

9. REMOVE FOLD SEAT LOCK CONTROL CABLE ASSY NO.2
10. INSTALL FOLD SEAT LOCK CONTROL CABLE ASSY NO.2
11. INSTALL REAR NO.1 SEAT LOCK CABLE ASSY
12. INSTALL REAR SEAT BELT INNER
 - (a) Remove the nut and the belt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)
13. INSTALL REAR SEAT CUSHION UNDER COVER SUB-ASSY RH
 - (a) Remove the 4 screws and the cover.
14. INSTALL REAR SEAT HINGE SUB-ASSY RH
 - (a) Install the spring to the ball-joint of the seat stay.
 - (b) Connect the ball-joint to the seat cushion frame securely.
 - (c) Install the spring and hinge guide to the hinge.
 - (d) Install the hinge with the pin and new E-ring.
 - (e) Install the hinge cover.
15. INSTALL REAR SEAT HINGE SUB-ASSY LH
 - (a) Install the hinge guide to the hinge.
 - (b) Install the hinge with the pin and new E-ring.
 - (c) Install the hinge cover.

16. INSTALL REAR SEAT CUSHION COVER RH

- (a) Install the seat cushion cover to the seat cushion pad with new hog rings.
- (b) Install the seat cushion cover together with the pad to the seat cushion frame with new hog rings.



- (c) Engage the seat cushion cover hem to the seat cushion under cover securely.

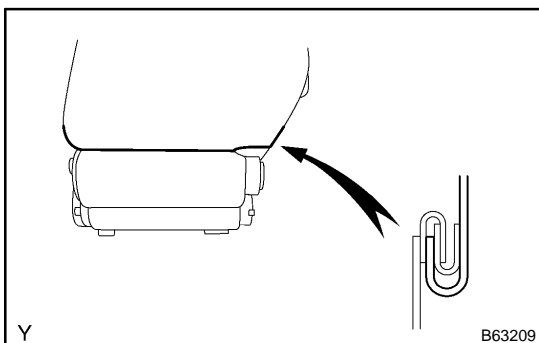
17. INSTALL REAR SEATBACK COVER RH

- (a) Install the seatback cover to the seatback pad with new hog rings.
- (b) Install the seatback cover together with the pad to the seatback frame.
- (c) Install the 2 headrest supports.

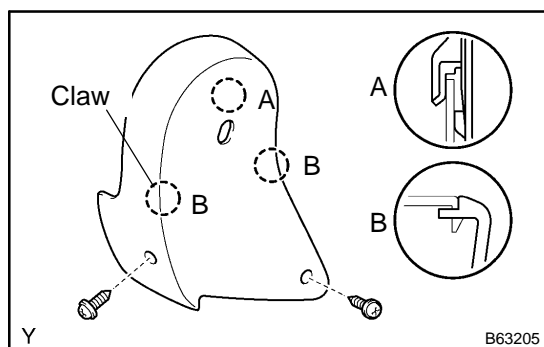
NOTICE:

Be careful not to mistake the headrest support direction.

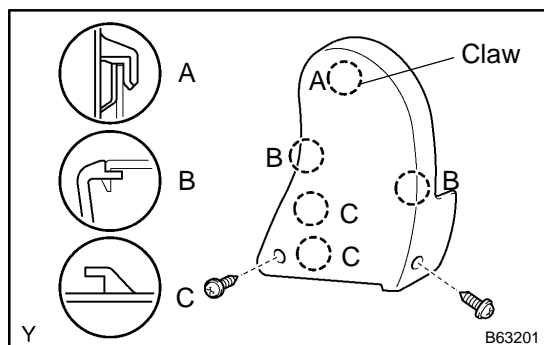
- (d) Install the rear seat protector and close the fastener of the seatback cover.
- (e) Install the tether anchor cover.



- (f) Engage the seat back cover hem.



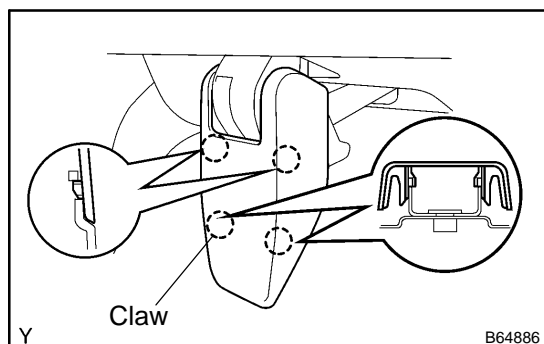
- (g) Install the reclining cover RH with the 2 screws.
- (h) Install the release handle RH with the screw.
- (i) Install the screw cover.



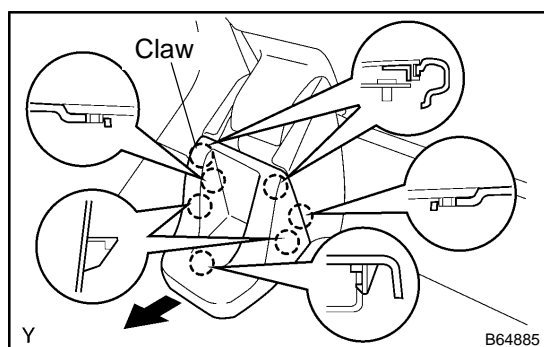
- (j) Install the reclining cover LH with the 2 screws.

18. INSTALL REAR NO.1 SEAT RH

- (a) Install the seat with the 3 bolts and the nut.
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)
- (b) Set the rear seat to the floor.



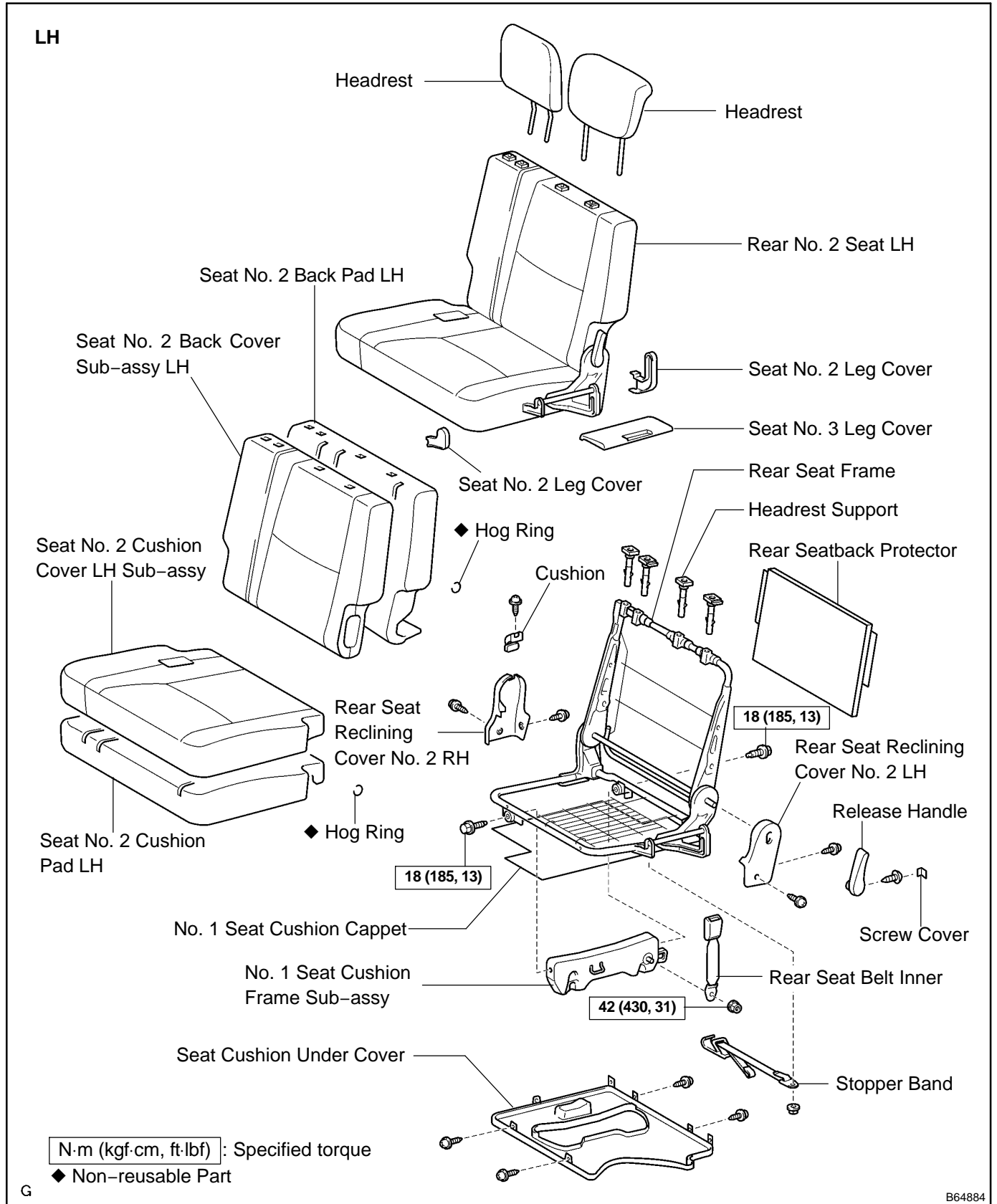
- (c) Install the rear seat cushion hinge covers No. 3 LH and RH.
- (d) Tumble the seat.



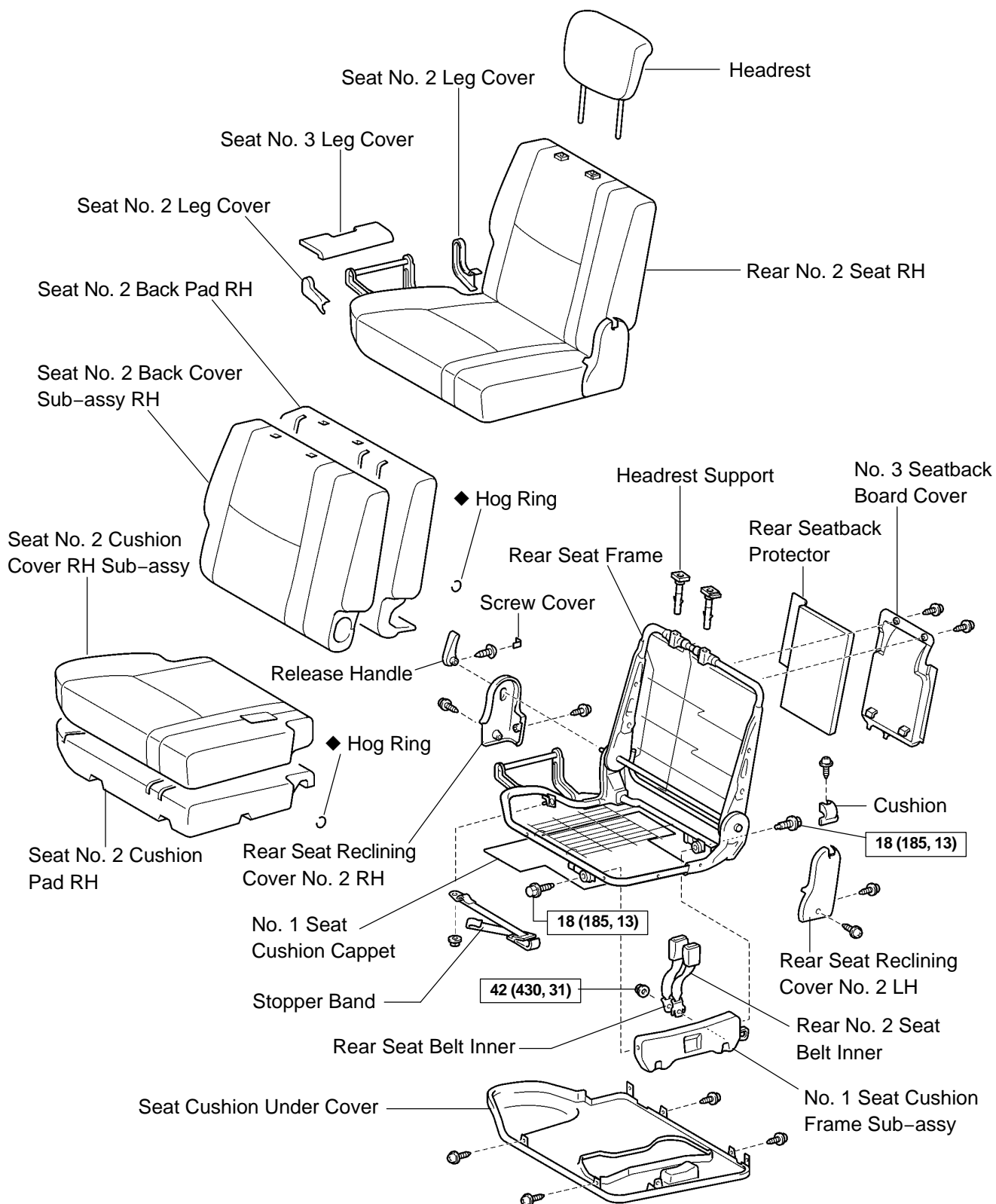
- (e) Install the rear seat cushion hinge covers No. 2 LH and RH.
- (f) Install the headrest.

REAR NO.2 SEAT LH COMPONENTS

720GA-01



RH



G

N·m (kgf·cm, ft·lbf) : Specified torque

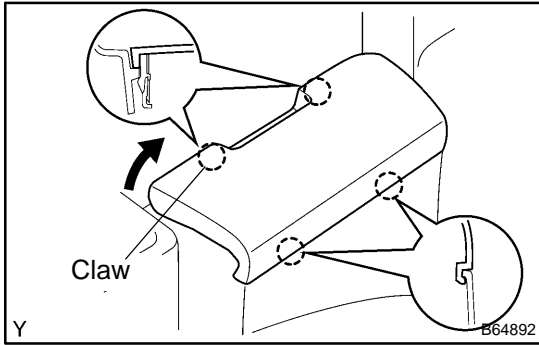
◆ Non-reusable Part

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OVERHAUL

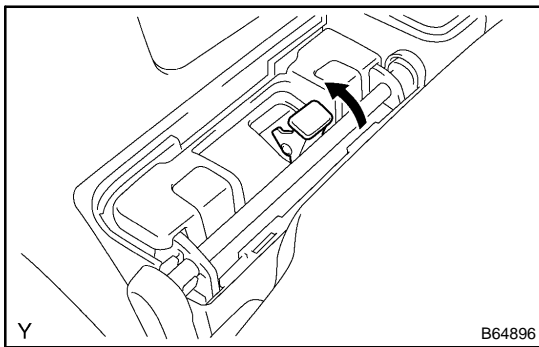
HINT:

On the RH side, use the same procedure as on the LH side.

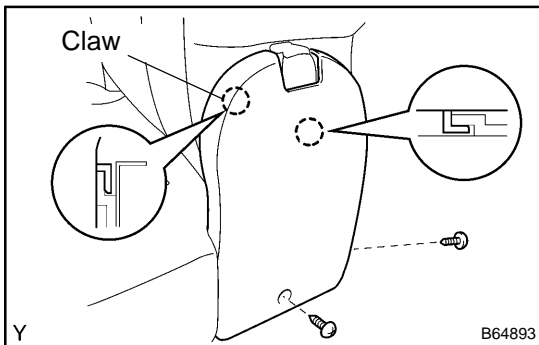


1. REMOVE REAR NO.2 SEAT LH

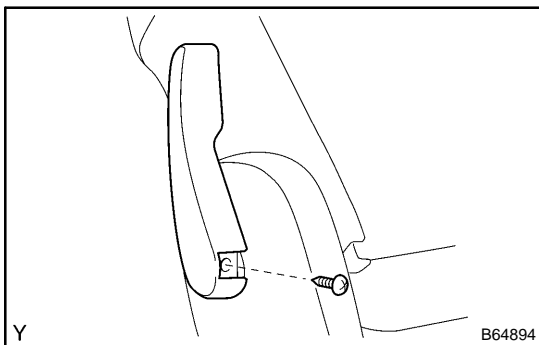
- (a) Disengage the claws, remove the seat leg cover.



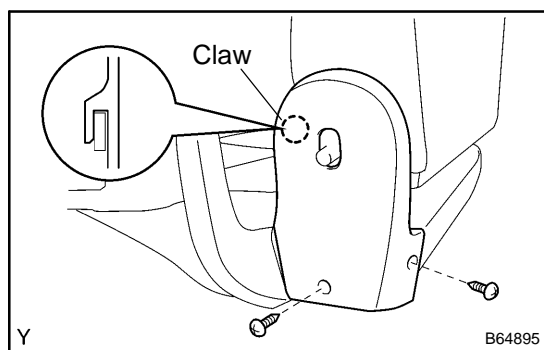
- (b) Release the rear seat lock and remove the seat.
(c) Remove the headrests.



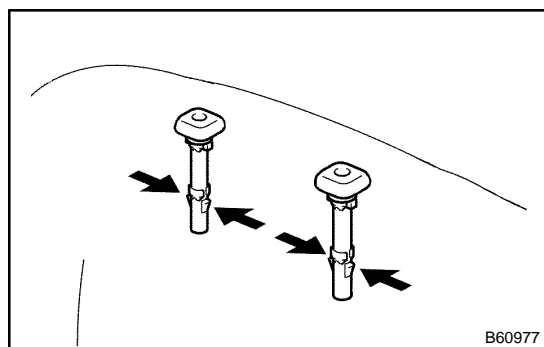
- ### 2. REMOVE NO.2 SEAT BACK COVER SUB-ASSY LH
- (a) Disengage the claws, remove the 2 screws and the reclining cover LH.



- (b) Remove the screw cover, screw and the release handle.



- (c) Disengage the claws, remove the 2 screws and the reclining cover RH.
- (d) Open the fastener of the seatback cover, remove the seatback protector.



- (e) Remove the headrest supports.
- (f) Remove the seatback cover together with the pad.
- (g) Cut the hog rings and remove the seatback cover.

3. REMOVE NO.2 SEAT CUSHION COVER SUB-ASSY LH

- (a) Insert a screwdriver between the seat cushion cover and seat cushion under cover.

NOTICE:

Tape the screwdriver tip before use.

- (b) Pry the seat cushion cover hem to disengage it.
- (c) Cut the hog rings and remove the seat cushion cover.

4. REMOVE REAR SEAT BELT INNER

- (a) Remove the nut and the seat belt inner.
- (b) Remove the seat belt inner No. 2 (rear No. 2 seat RH).

5. REMOVE NO.1 SEAT CUSHION FRAME SUB-ASSY LH

- (a) Remove the 4 screws and the seat cushion under cover.
- (b) Remove the nut and the stopper band.
- (c) Remove the 2 bolts, 2 springs and the seat leg.

6. INSTALL NO.1 SEAT CUSHION FRAME SUB-ASSY LH

- (a) Install the spring between the seat frame and seat leg.
- (b) Install the seat leg with the 2 bolts.

Torque: 18 N·m (185 kgf·cm 13 ft·lbf)

- (c) Install the stopper band with the nut.
- (d) Install the seat cushion under cover with the 4 screws.

7. INSTALL REAR SEAT BELT INNER

- (a) Install the seat belt inner with the nut.

Torque: 42 N·m (430 kgf·cm 31 ft·lbf)

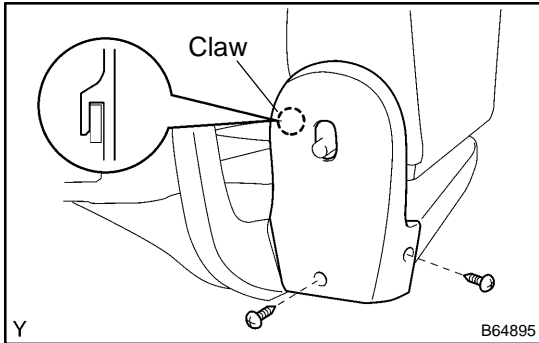
- (b) Install the seat belt inner and the seat belt inner No. 2 with the nut (rear No. 2 seat RH).

Torque: 42 N·m (430 kgf·cm 31 ft·lbf)

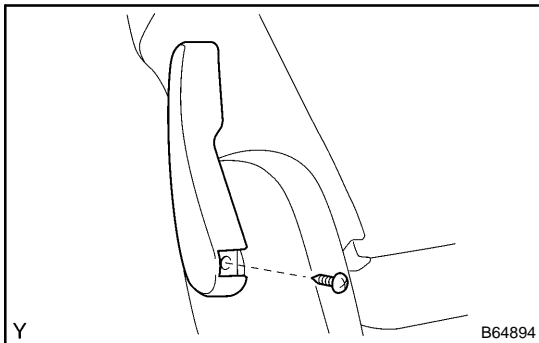
8. INSTALL NO.2 SEAT CUSHION COVER SUB-ASSY LH

- (a) Using hog ring pliers, install the the seat cushion cover with new hog rings.
- (b) Place the seat cushion cover together with the pad on the seat frame.
- (c) Engage the seat cushion cover hem to the seat cushion under cover securely.

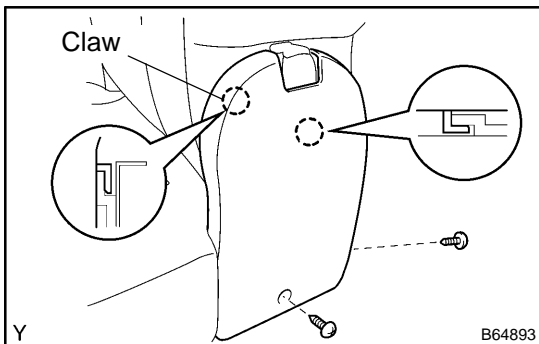
- 9. INSTALL NO.2 SEAT BACK COVER SUB-ASSY LH**
- Using hog ring pliers, install the the seatback cover with new hog rings.
 - Install the seat back cover together with the pad to the seat frame.
 - Install the headrest supports.
 - Install the seatback protector.
 - Close the fastener of the seatback cover.



- Install the reclining cover RH with the 2 screws.



- Install the release handle with the screw.
- Install the screw cover.



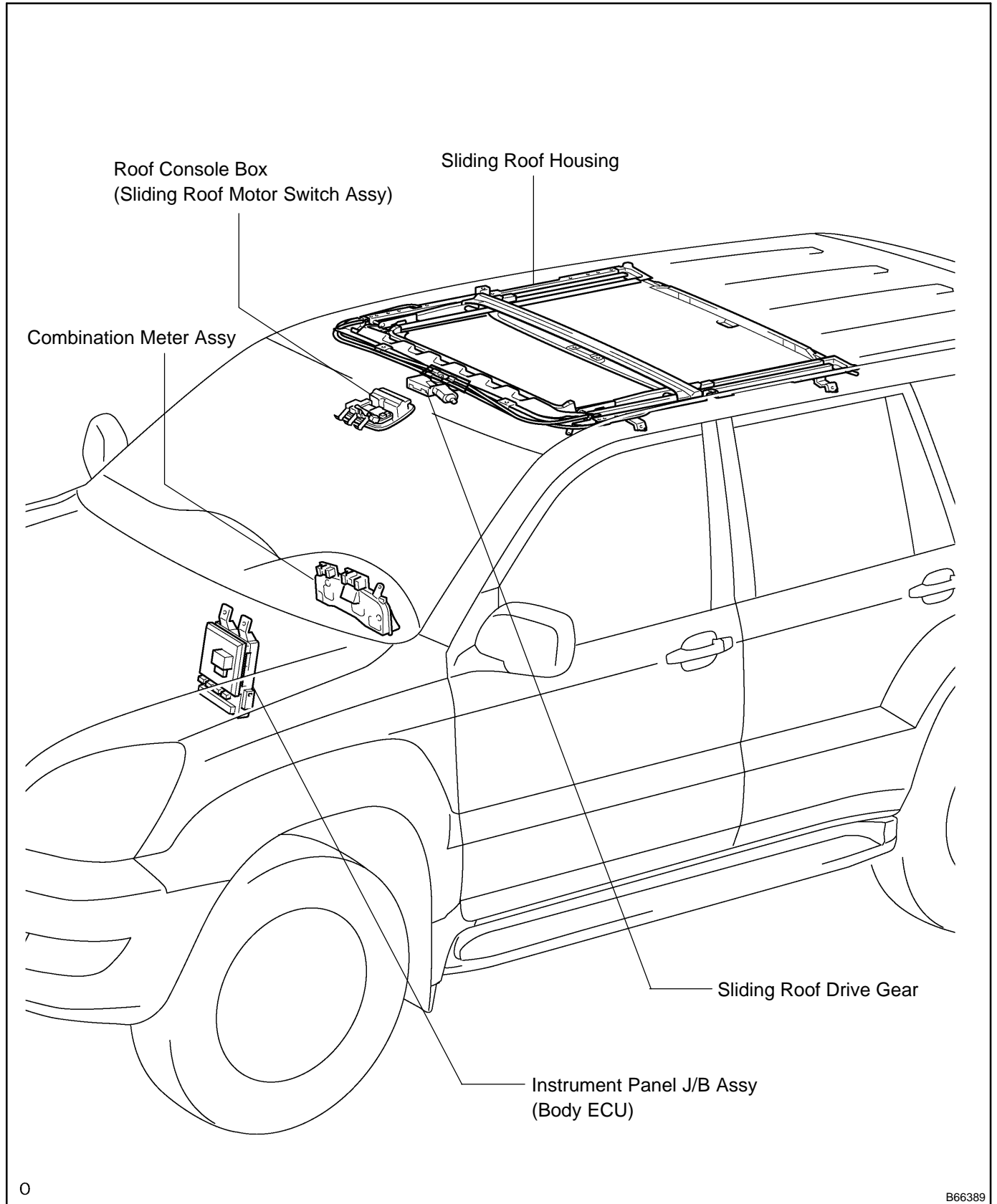
- Install the reclining cover LH with the 2 screws.

10. INSTALL REAR NO.2 SEAT LH

- Install the headrests.
- Install the seat.
- Install the seat leg cover.

SLIDING ROOF SYSTEM LOCATION

7407S-02



ON-VEHICLE INSPECTION

1. INSPECT WINDOW LOCK SWITCH

- (a) Check that operation of the door glasses except the driver side door glass, and the roof glass is disabled when the window lock switch of the power window master switch is pressed.
- (b) Check that the door glasses, the back door glass and the roof glass can be operated when the window lock switch is pressed again.

2. INSPECT AUTO SLIDE-OPEN/CLOSE FUNCTION

- (a) Check that the sliding roof switch can operate the roof glass as follows while the tilt-UP/DOWN function is not operating:

Condition	Switch	Switch Operation	Roof Glass
• Ignition switch ON • Window lock switch OFF	SLIDE OPEN	Press for more than 0.3 sec.	Fully open
	TILT UP		Fully closed

HINT:

The roof glass stops partway when the sliding roof switch is pushed on either side during AUTO operation.

3. INSPECT AUTO TILT-UP/DOWN FUNCTION

- (a) Check that the sliding roof switch can operate the roof glass as follows while the slide-OPEN/CLOSE function is not operating:

Condition	Switch	Switch Operation	Roof Glass
• Ignition switch ON • Window lock switch OFF	TILT UP	Press for more than 0.3 sec.	Fully tilted up
	SLIDE OPEN		Fully closed

HINT:

The roof glass stops partway when the sliding roof switch is pushed on either side during AUTO operation.

4. CHECK OPEN/CLOSE FUNCTION VIA DRIVER SIDE DOOR LOCK KEY CYLINDER

- (a) Check that the sliding roof operates as follows, when the key is inserted into the key cylinder.

Standard:

Condition	Key	Position/Operation
Ignition switch OFF	Turn right (LOCK) for more than 2.5 sec.	Sliding roof/Closed
	Turn left (UNLOCK) for more than 2.5 sec.	Sliding roof/Open

5. CHECK OPEN FUNCTION VIA TRANSMITTER

- (a) Check that the sliding roof operates as follows, when operating the transmitter.

Standard:

Condition	Transmitter	Position/Operation
Ignition switch OFF	Press UNLOCK for more than 2.5 sec.	Sliding roof/Open

6. INSPECT SLIDING ROOF OPERATION FUNCTION AFTER IGNITION OFF

- (a) When both of the following conditions are fulfilled, check that the door glasses and the roof glass can be operated even after the ignition switch is turned OFF:
- Within 45 seconds after the ignition switch is turned OFF
 - The driver side door and passenger side door is closed

7. INSPECT JAM PROTECTION FUNCTION

HINT:

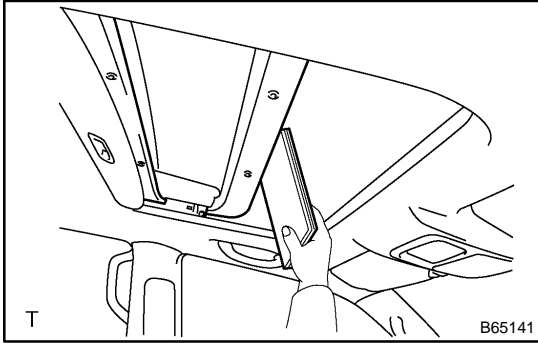
The jam protection function prevents any part of your body from getting caught by accident between the vehicle body and the roof glass during roof glass operation.

Operative condition:

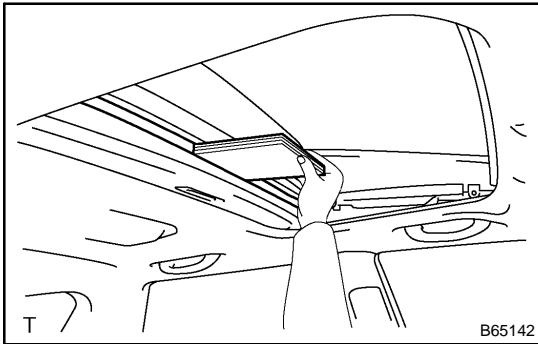
- AUTO CLOSE
- AUTO CLOSE during sliding roof operation after the ignition switch is turned OFF
- AUTO TILT-DOWN
- AUTO TILT-DOWN during sliding roof operation after the ignition switch is turned OFF

CAUTION:

- Do not check this function using a part of your body such as a hand. Also, pay thorough attention that nothing gets caught by accident in this process.
- If checking this function with something thin (less than 5 mm (0.2 in.)) inserted between the glass and vehicle body, this function may not operate.



- (a) When the slide-OPEN/CLOSE function is operating:
Check that the roof glass opens by approx 200 mm (7.87 in.) right when something gets caught between the vehicle body and the roof glass during roof glass operation.



- (b) When the tilt-UP/DOWN function is operating:
Check that the roof glass fully tilts up when something gets caught between the vehicle body and the roof glass during roof glass operation.

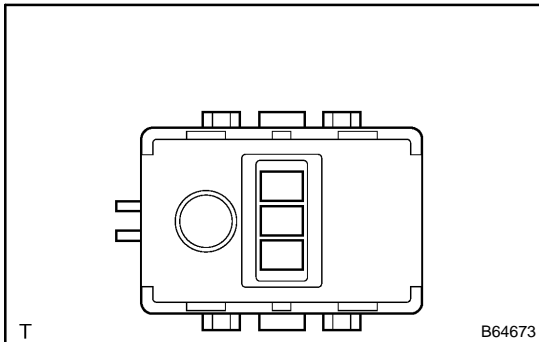
8. INSPECT FAIL-SAFE FUNCTION

- (a) If the roof glass is not closed because the jam protection function operates improperly, perform the following operation. Then, you can close the roof glass using the manual operation function.
- (1) Press the sliding roof switch on the TILT UP side and hold it for 10 seconds after the jam protection function operates. Then you can use the manual operation function.

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
AUTO function does not operate	1. Sliding roof motor assy	74-2
Sliding roof system does not operate	1. POWER fuse 2. POWER relay 3. Sliding roof housing assy 4. Sliding roof motor switch assy 5. Sliding roof motor assy 6. Wire harness	- - 74-8 74-5 74-2 74-5
Sliding roof system stops operation halfway	1. Sliding roof motor assy 2. Wire harness 3. Sliding roof housing assy	74-2 74-5 74-8

INSPECTION



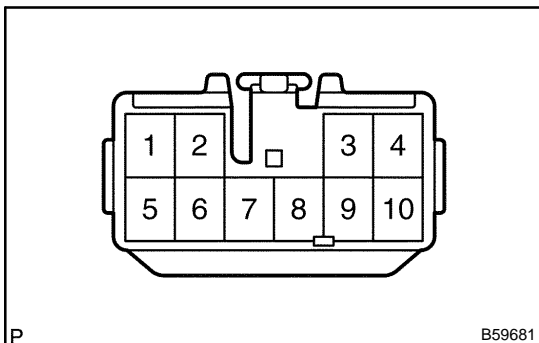
1. INSPECT ROOF CONSOLE BOX SUB-ASSY

- (a) Remove the sliding roof motor switch
(See page 76-38).
- (b) Check the continuity between the terminals when operating the switch.

Standard:

Terminals No.	Switch Operation	Specified Condition
1 ↔ 3	TILT UP is pressed	Continuity
2 ↔ 3	SLIDE OPEN is pressed	Continuity
1, 2 ↔ 3	OFF	No continuity

If the result is not as specified, replace the switch assy.



2. INSPECT HARNESS AND CONNECTOR (FOR SLIDING ROOF MOTOR ASSY)

- (a) Disconnect the sliding roof motor connector
(See page 76-38).
- (b) Check the continuity or voltage between the terminals of the wire harness side connector.

Standard:

Terminals No.	Condition	Specified Condition
8 ↔ Body ground	Constant	Continuity
9 ↔ 8	Ignition switch ON	10 - 14 V
10 ↔ 8	Constant	10 - 14 V
1 ↔ 8	Constant	Continuity
7 ↔ 8	TILT UP is pressed	Continuity
6 ↔ 8	SLIDE OPEN is pressed	Continuity

If the result is not as specified, there may be a malfunction on the wire harness side.

RESET

1. RESET SLIDING ROOF MOTOR

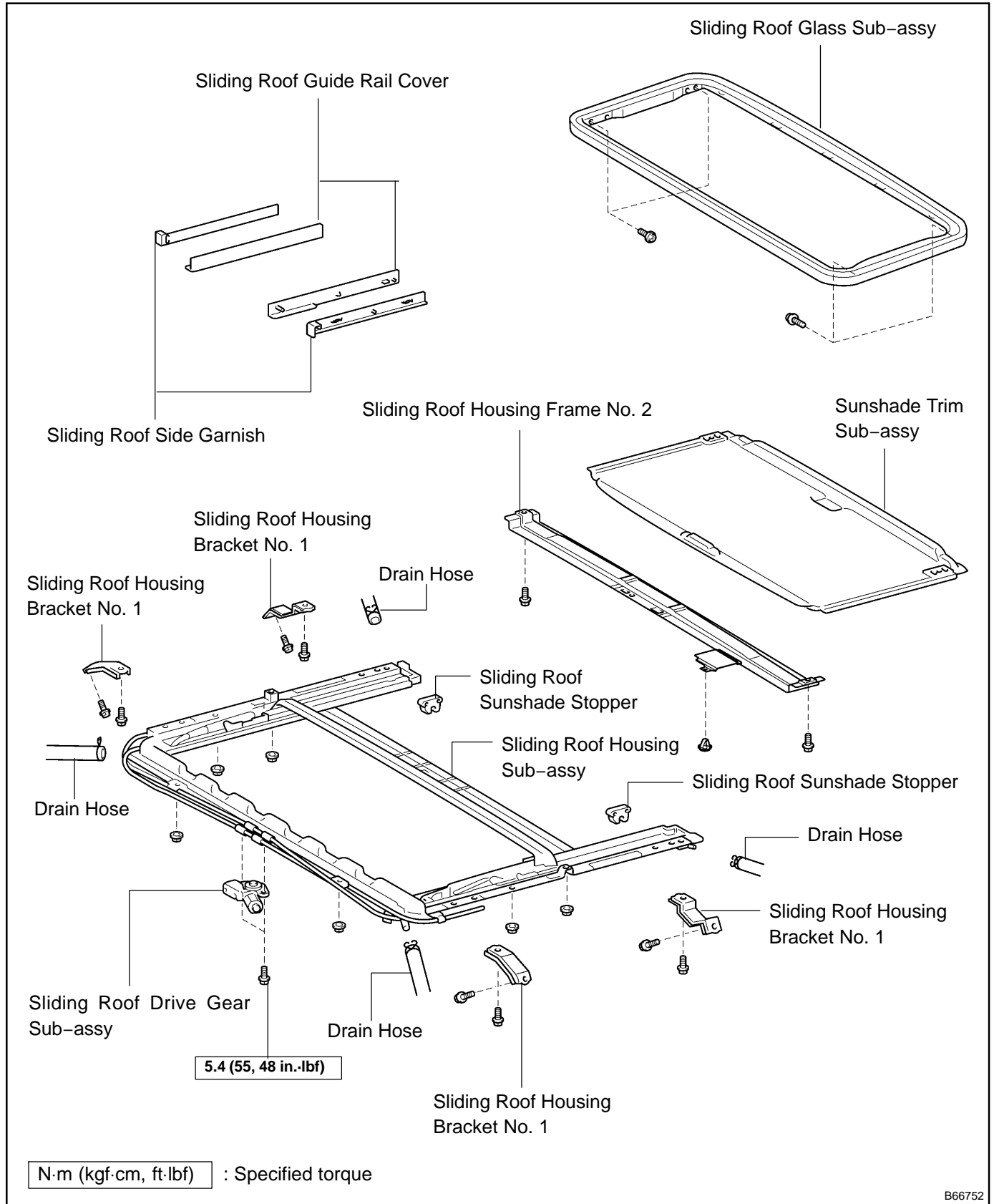
- (a) If the AUTO operation function does not operate, reset the sliding roof motor using the following method.
- (1) Press the sliding roof switch on TILT UP side and hold it. When the roof glass stops at the fully tilted-up position for 1 second, the reset of the motor is completed.

HINT:

If the battery terminal is disconnected or after the jam protection function has operated, the ECU of the sliding roof motor may not detect the position of the roof glass. If the AUTO operation function is still disabled even after the sliding roof motor is reset, the hall IC (built in the sliding roof motor assy) for detecting the roof glass position may be malfunctioning.

SLIDING ROOF HOUSING SUB-ASSY COMPONENTS

7407X-02

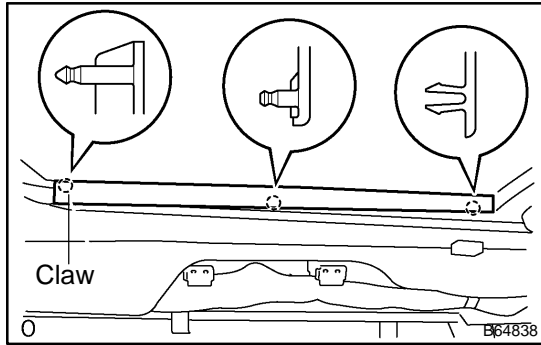


REPLACEMENT

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE ROOF HEADLINING ASSY (See page 76-38)

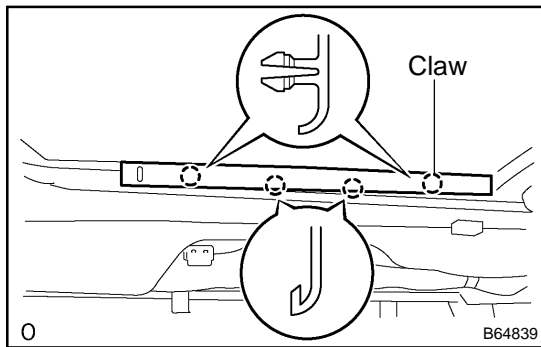


2. REMOVE SLIDING ROOF GUIDE RAIL COVER LH

- (a) Disengage the 3 claws and remove the rail cover.

3. REMOVE SLIDING ROOF GUIDE RAIL COVER RH

- (a) Disengage the 3 claws and remove the rail cover.



4. REMOVE SLIDING ROOF SIDE GARNISH LH

- (a) Disengage the 4 claws and remove the garnish.

5. REMOVE SLIDING ROOF SIDE GARNISH RH

- (a) Disengage the 4 claws and remove the garnish.

6. REMOVE SLIDING ROOF GLASS SUB-ASSY

- (a) Using a torx[®] wrench (T25), remove the 4 screws and sliding roof glass.

7. REMOVE SLIDING ROOF HOUSING BRACKET NO.1

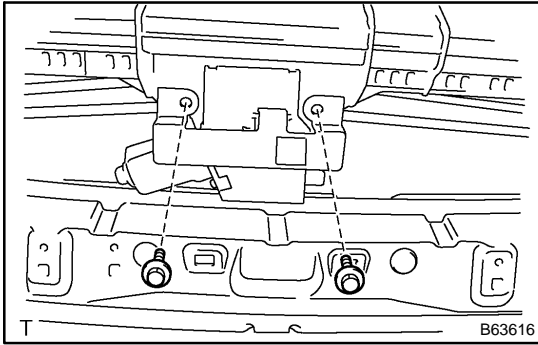
- (a) Remove the 4 bolts and 2 housing brackets.

8. REMOVE SLIDING REAR MOUNTING BRACKET

- (a) Remove the 4 bolts and 2 rear mounting brackets.

9. REMOVE SLIDING ROOF HOUSING SUB-ASSY

- (a) Disconnect the 4 drain hoses.
 (b) Remove the 6 nuts and housing sub-assy.

**10. REMOVE SLIDING ROOF DRIVE GEAR SUB-ASSY**

- (a) Disconnect the drive gear connector.
- (b) Remove the 2 bolts and drive gear sub-assy.

11. REMOVE SLIDING ROOF SUNSHADE STOPPER

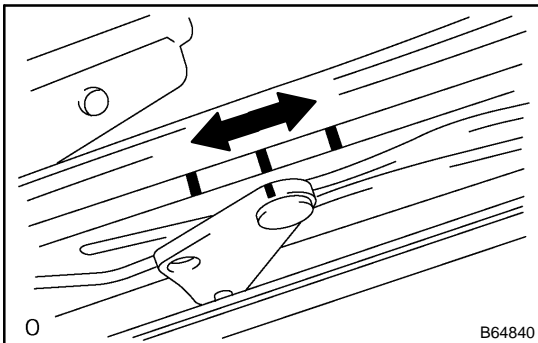
- (a) Using a screwdriver, remove the 2 sunshade stoppers.

HINT:

Tape the screwdriver tip before use.

12. REMOVE SUNSHADE TRIM SUB-ASSY

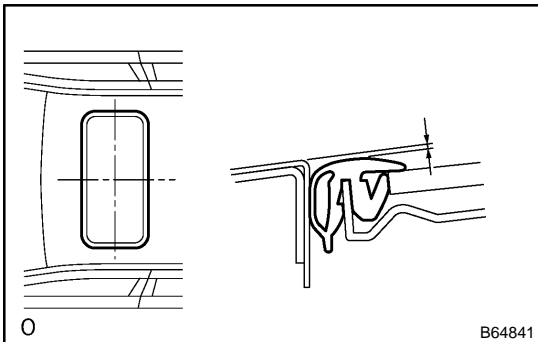
- (a) Sliding the sunshade trim backward, remove it.

**13. ADJUST FULLY CLOSED POSITION**

- (a) Using a screwdriver, slide the drive cable of the sliding roof to align the matchmarks.

HINT:

Tape the screwdriver tip before use.

**14. INSTALL SLIDING ROOF GLASS SUB-ASSY**

- (a) Check for a difference in levels between the sliding roof (weatherstrip) and roof panel.

Dimension (Corner of rear side):

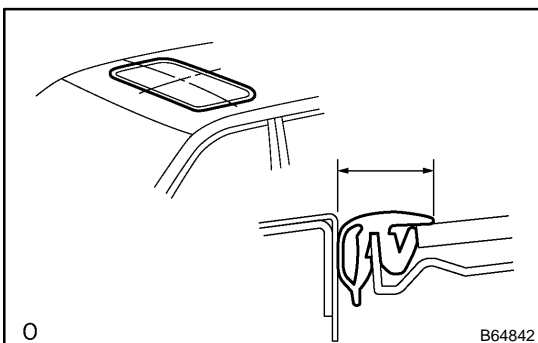
0 ± 1.5 mm (0 ± 0.059 in.)

- (b) Check for a difference in levels between the sliding roof (roof glass) and roof panel.

Dimension: 21.4 mm (0.843 in.)

NOTICE:

The clearance should be all around even.



15. ADJUST SLIDING ROOF GLASS SUB-ASSY

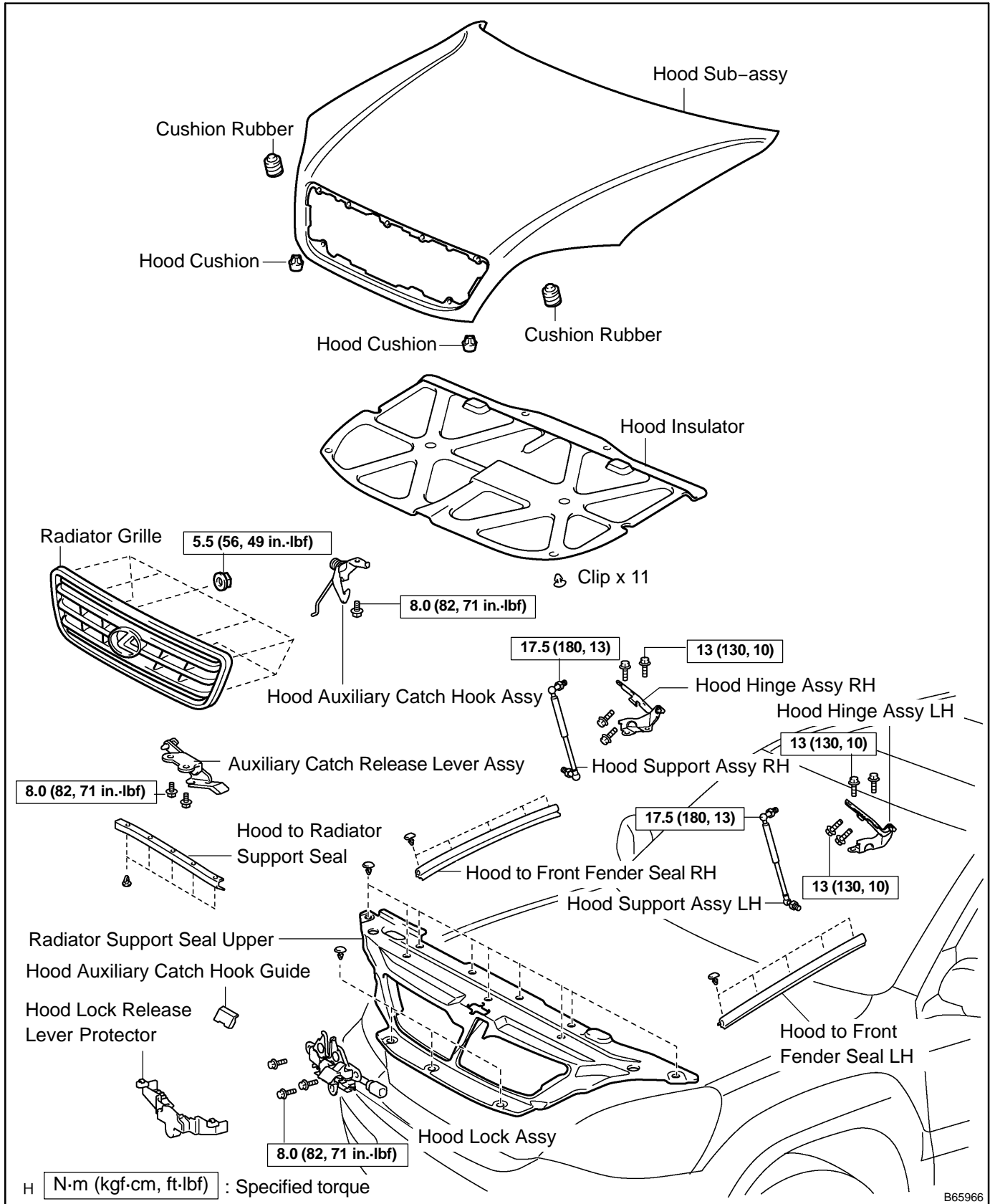
- (a) Adjust the roof panel.
- (1) Using a torx[®] wrench T25, loosen a screw to adjust the sliding roof panel position. When the adjustment has been done, tighten the screw there.

16. RESET SLIDING ROOF POSITION (See page 74-6)**17. INSPECT FOR LEAKS**

- (a) Adjusting the sliding roof, check that there is no water leak.
If water leaks, readjust the sliding roof.

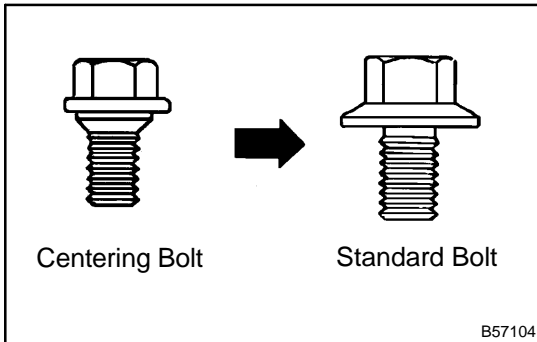
HOOD COMPONENTS

750JR-03



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ADJUSTMENT

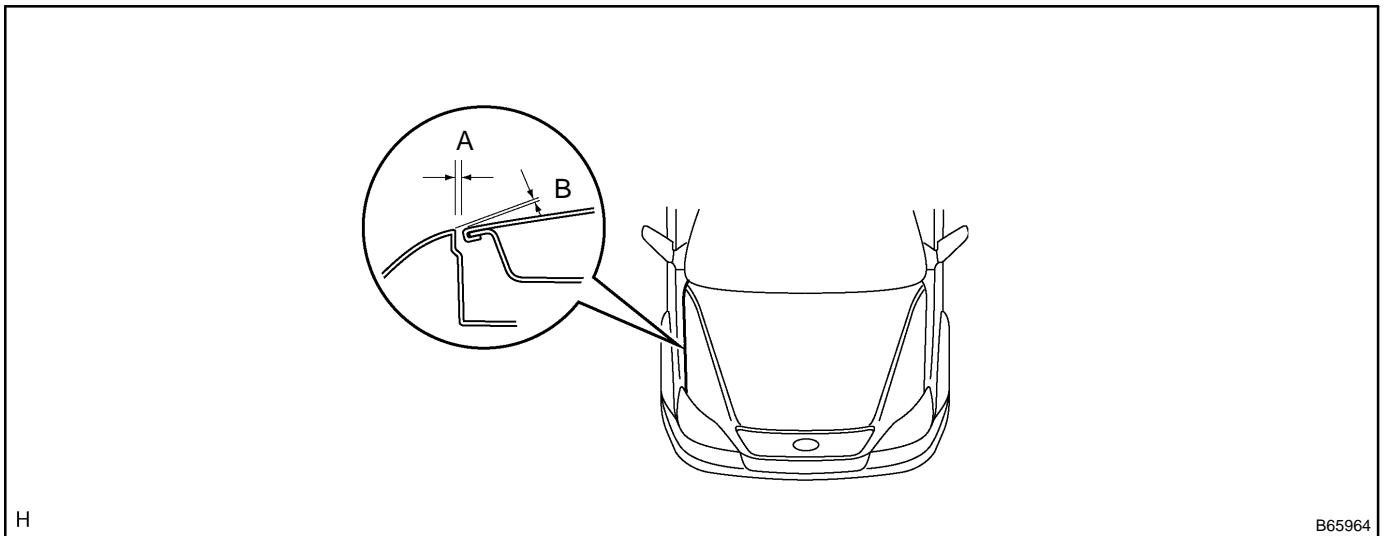


HINT:

Since a centering bolt is used as a hood hinge mounting bolt and hood lock mounting bolt, the hood and hood lock cannot be adjusted with them on. Substitute a bolt with a washer for the centering bolt.

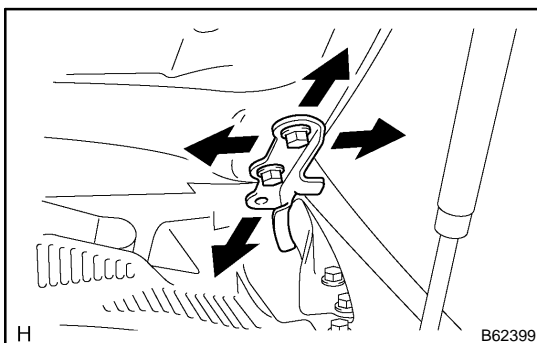
1. INSPECT HOOD SUB-ASSY

- (a) Check that the clearance is within the standard range.



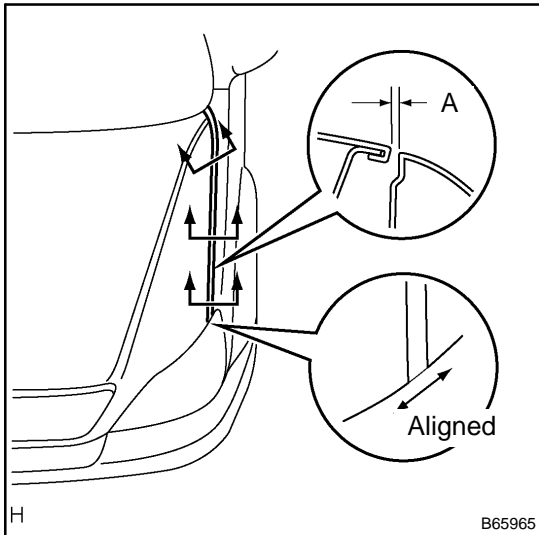
Standard:

A	$3.9 \pm 1.5 \text{ mm}$ ($0.154 \pm 0.059 \text{ in.}$)
B	$0.4 \pm 1.5 \text{ mm}$ ($0.015 \pm 0.059 \text{ in.}$)



2. ADJUST HOOD SUB-ASSY

- (a) Horizontally adjust the hood.
- (1) Loosen the 4 hood hinge mounting bolts on the hood side.

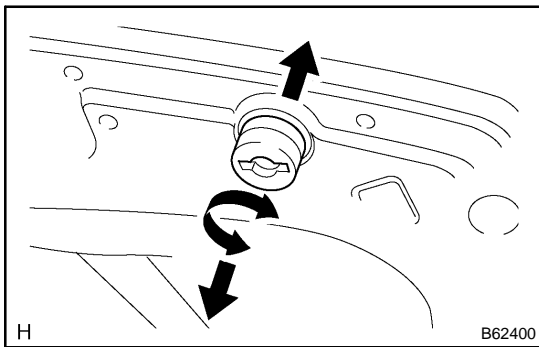


- (2) Adjust the clearance by moving the hood, so that it will be in the standard range.

Standard A: 3.9 ± 1.5 mm (0.154 ± 0.059 in.)

- (3) Tighten the hood side hinge bolts after the adjustment.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)



- (b) Adjust the height of the hood front end using the cushion rubber.

- (1) Adjust the cushion rubber so that the hood and the fender will be aligned.

HINT:

The cushion rubber goes up and down when turned.

- (c) Adjust the hood lock.

- (1) Using a clip remover, remove the 8 clips and radiator support upper.
- (2) Remove the radiator support upper.
- (3) Using a screwdriver, disengage the 4 clips.

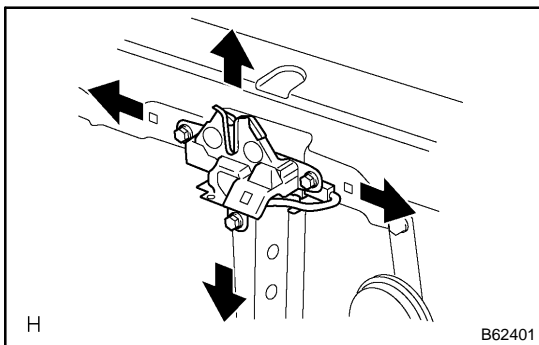
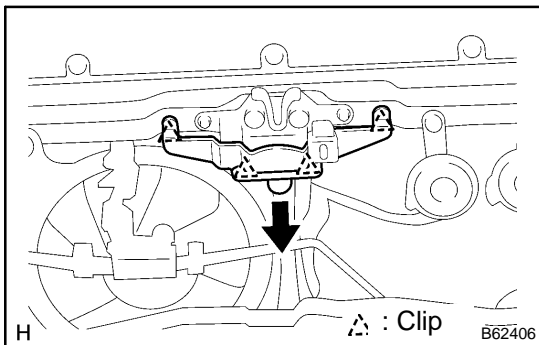
HINT:

Tape the screwdriver tip before use.

- (4) Remove the hood lock release lever protector.

NOTICE:

Removing the protector damages the clips inside the protector. Therefore, the use of a new protector is necessary for installation.



- (5) Adjust the hood lock position by moving the striker, so that the striker can enter smoothly.

- (6) Tighten the hood lock bolts after the adjustment.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

OVERHAUL

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE RADIATOR GRILLE

- (a) Remove the 2 bolts and auxiliary catch release lever assy.
- (b) Remove the bolt and auxiliary catch hook assy.
- (c) Remove the 8 nuts and radiator grille.

2. REMOVE HOOD INSULATOR

- (a) Using a clip remover, remove the 11 clips and hood insulator.

3. REMOVE HOOD SUPPORT ASSY LH (See page 75-6)

4. REMOVE HOOD SUPPORT ASSY RH (See page 75-6)

5. REMOVE HOOD SUB-ASSY

- (a) Remove the 4 bolts and hood sub-assy.

6. REMOVE HOOD HINGE ASSY LH

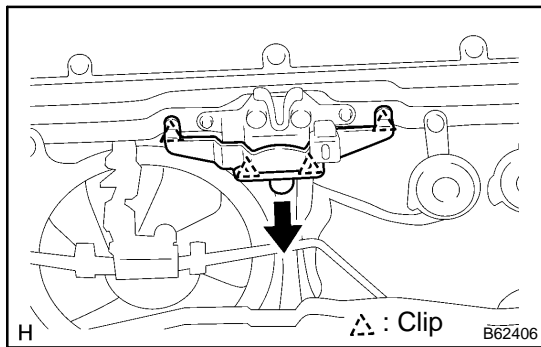
- (a) Remove the 2 bolts and hood hinge assy.

7. REMOVE HOOD HINGE ASSY RH

- (a) Remove the 2 bolts and hood hinge assy.

8. REMOVE RADIATOR SUPPORT SEAL UPPER

- (a) Using a clip remover, remove the 8 clips and support seal upper.



9. REMOVE HOOD LOCK ASSY

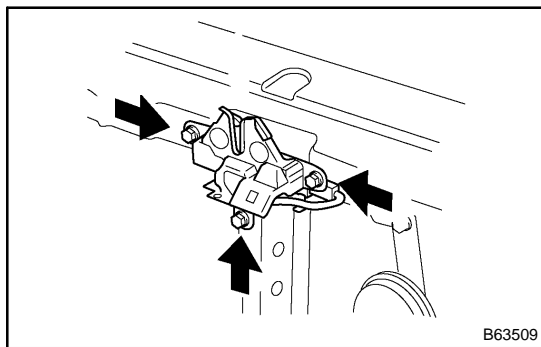
- (a) Using a screwdriver, disengage the 4 clips, and remove the hood lock release lever protector.

HINT:

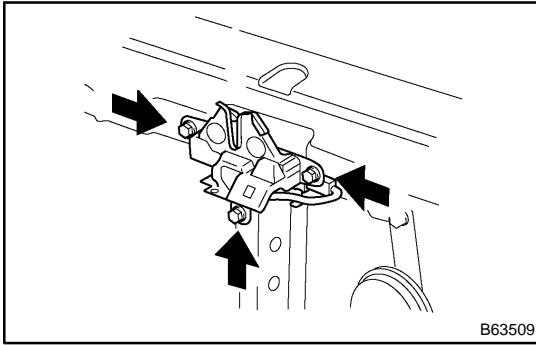
Tape the screwdriver tip before use.

NOTICE:

Removing the protector damages the clips inside the protector. Therefore the use of a new protector is necessary on the installation.



- (b) Remove the 3 bolts and hood lock assy.
- (c) Disconnect the connector.

**10. INSTALL HOOD LOCK ASSY**

- (a) Connect the connector.
- (b) Install the hood lock with the 3 bolts.
- (c) Adjust the hood lock position (See page 75-2).
- (d) Install the protector.

11. INSTALL HOOD HINGE ASSY LH

- (a) Install the hood hinge assy with the 2 bolts.
Torque: 13.0 N·m (130 kgf·cm, 10 ft·lbf)

12. INSTALL HOOD HINGE ASSY RH

- (a) Install the hood hinge assy with the 2 bolts.
Torque: 13.0 N·m (130 kgf·cm, 10 ft·lbf)

13. INSTALL HOOD SUB-ASSY

- (a) Install the hood sub-assy with the 4 bolts.
Torque: 13.0 N·m (130 kgf·cm, 10 ft·lbf)

14. INSTALL RADIATOR GRILLE

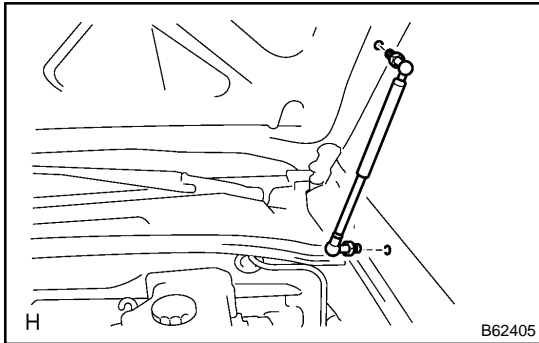
- (a) Install the radiator grille with the 8 nuts.
Torque: 5.5 N·m (56 kgf·cm, 49 in·lbf)
- (b) Install the auxiliary catch hook assy with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)
- (c) Install the auxiliary catch release lever assy with the 2 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

HOOD SUPPORT ASSY LH REPLACEMENT

750JU-01

HINT:

On the RH side, use the same procedures as on the LH side.

**1. REMOVE HOOD SUPPORT ASSY LH**

- (a) Remove the bolt and hood support assy from the hood panel.

HINT:

While supporting the hood panel by hand, remove the hood support.

- (b) Remove the bolt and hood support assy from the vehicle body.

2. INSTALL HOOD SUPPORT ASSY LH

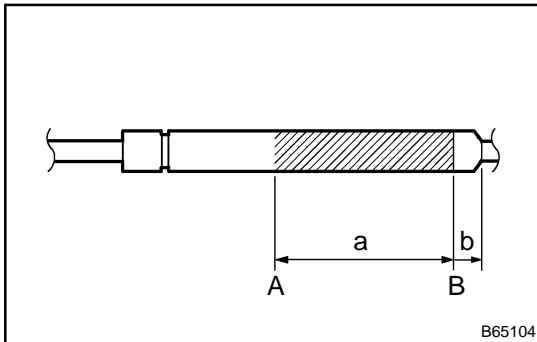
- (a) Install the hood support assy with the 2 bolts.

Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)

DISPOSAL

HINT:

On the RH side, use the same procedures as on the LH side.



1. DISPOSE OF HOOD SUPPORT ASSY LH

- (a) Horizontally fix the hood support assy in a vise with the piston rod pulled out.
- (b) Wearing safety glasses, gradually cut a part between A and B as shown in the illustration using a metal saw to gradually release the gas.

Dimension:

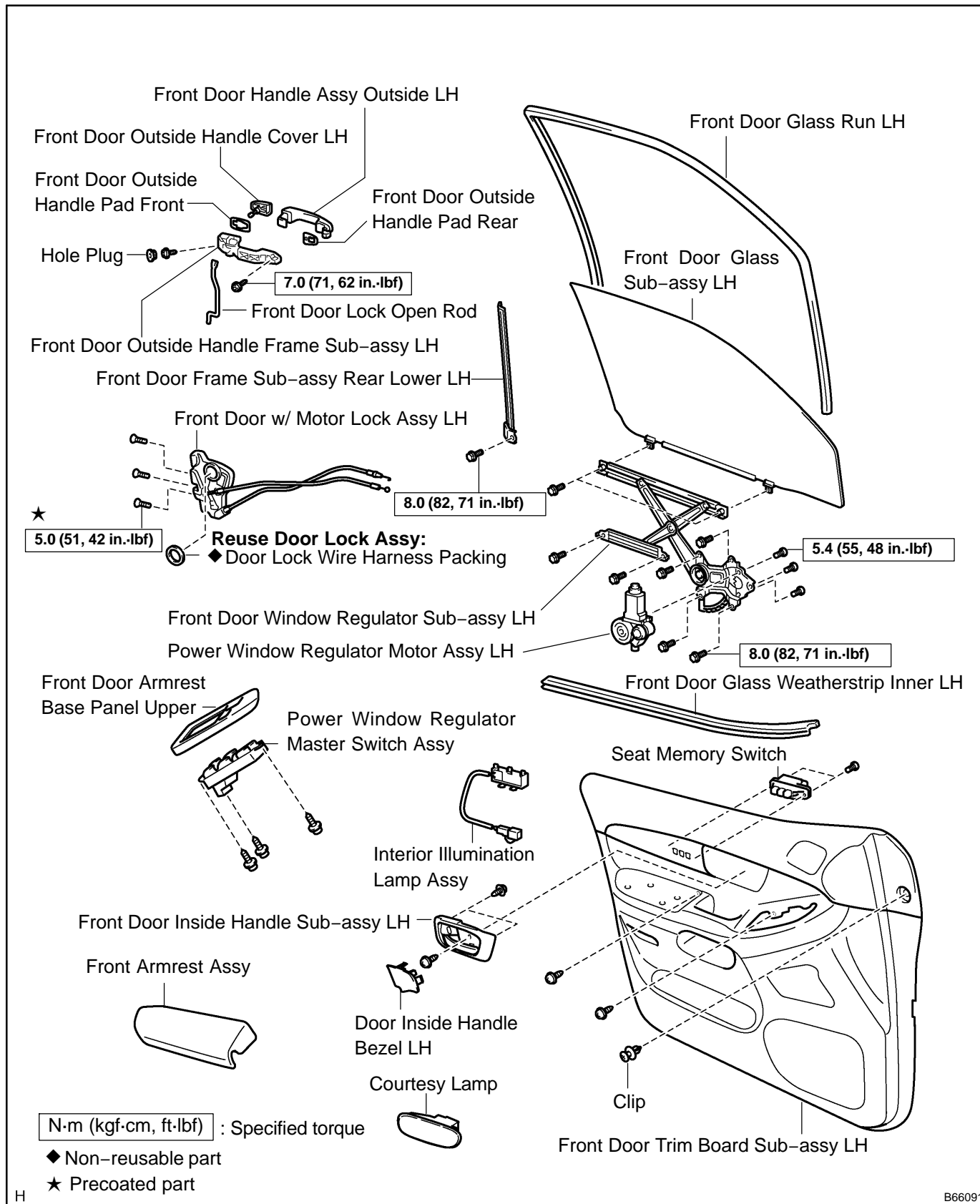
a	80 mm (3.15 in.)
b	20 mm (0.80 in.)

NOTICE:

Although the gas inside the hood support assy is colorless, odorless and harmless, there is a possibility that metal debris from cutting could enter the assy. Therefore, cover it with a cloth or something similar.

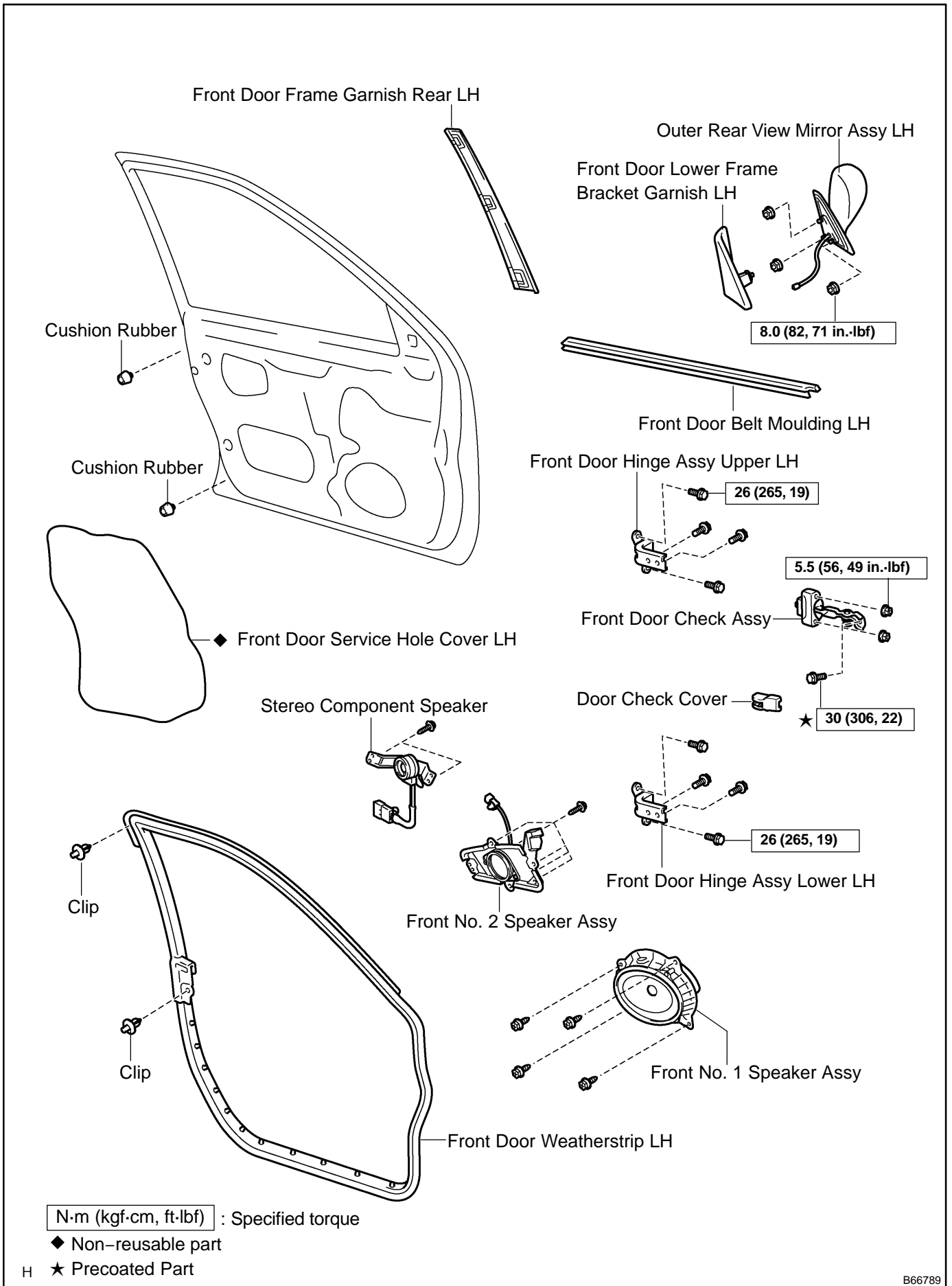
FRONT DOOR COMPONENTS

750JW-01



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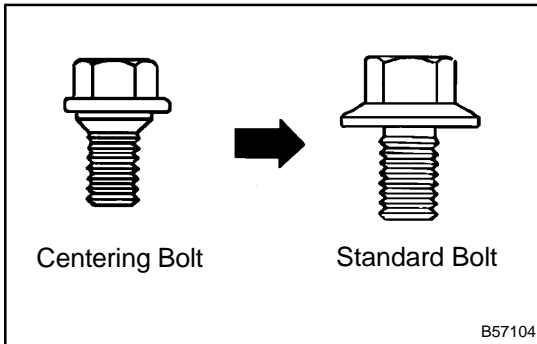


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ADJUSTMENT

HINT:

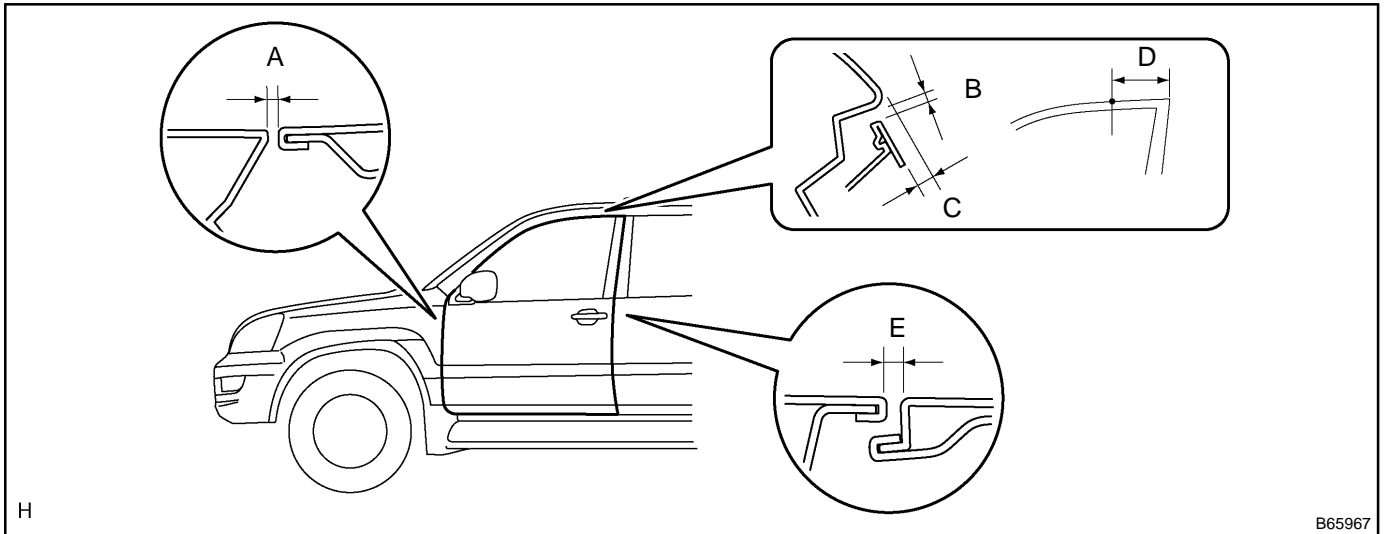
- On the RH side, use the same procedures as on the LH side.



- Since a centering bolt is used as a door hinge mounting bolt on the body side and the door side, the door cannot be adjusted with them on. Substitute a bolt with a washer for the centering bolt.

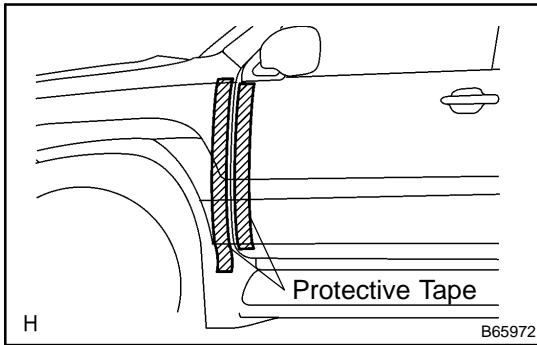
1. INSPECT FRONT DOOR PANEL SUB-ASSY LH

- (a) Check that the clearance is within the standard range.



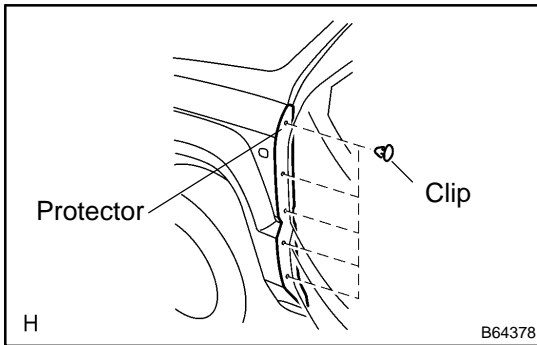
Standard:

A	4.5 ± 1.5 mm (0.177 ± 0.059 in.)
B	5.5 ± 1.5 mm (0.220 ± 0.059 in.)
C	5.9 ± 1.5 mm (0.232 ± 0.059 in.)
D	160 mm (6.30 in.)
E	5.0 ± 1.5 mm (0.197 ± 0.059 in.)



2. ADJUST FRONT DOOR PANEL SUB-ASSY LH

- (a) Put strips of protective tapes on the door panel and fender panel, as shown in the illustration.

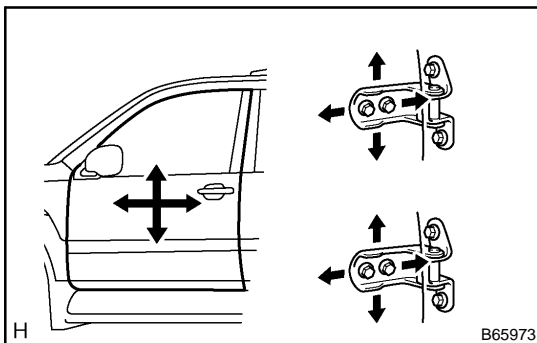


- (b) Open the door, and remove the 5 clips.

HINT:

If the clips are damaged, exchange them for new ones.

- (c) Remove the fender side panel protector LH from the gap between the fender and door.

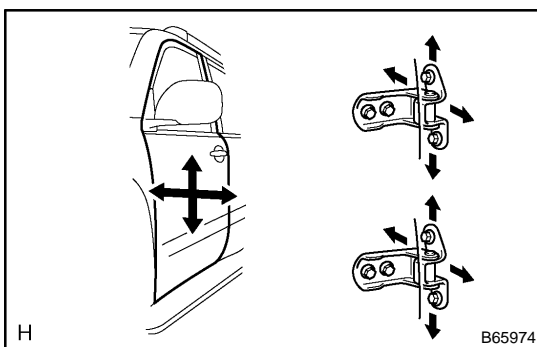


- (d) Using SST, horizontally and vertically adjust the door by loosening the body side hinge bolts.

SST 09812-00010, 09812-00020

- (e) Tighten the body side hinge bolts after the adjustment.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

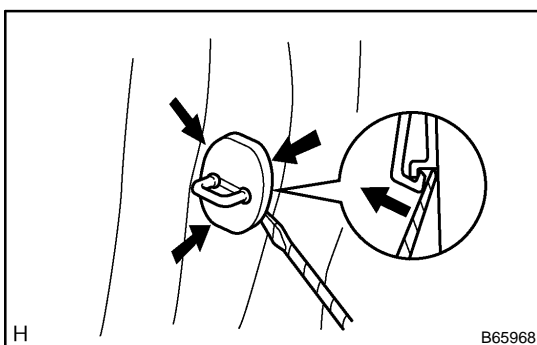


- (f) Adjust the door forward/rearward and vertically by loosening the door side hinge bolts.

- (g) Tighten the door side hinge bolts after the adjustment.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

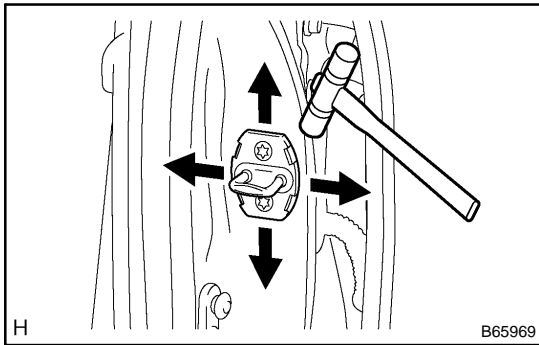
- (h) Install the fender side panel protector LH with the 5 clips.



- (i) Using a screwdriver, disengage the 4 claws and remove the cover.

HINT:

Tape the screwdriver tip before use.

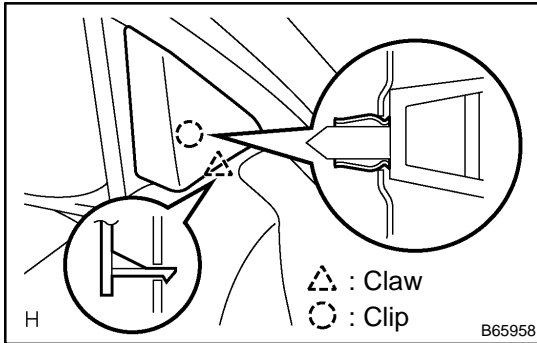


- (j) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.
- (k) Tighten the striker mounting screws after the adjustment.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

OVERHAUL

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedures as on the LH side.

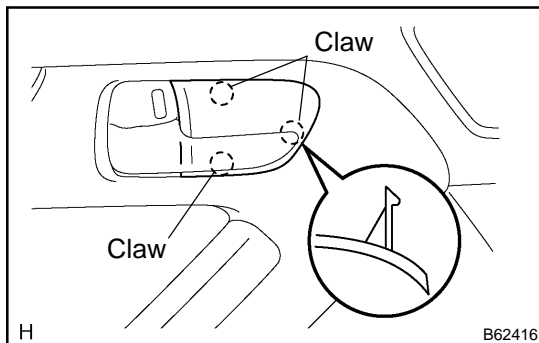


1. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH

- (a) Using a screwdriver, disengage the clip and claw, and remove the lower frame bracket garnish.

HINT:

Tape the screwdriver tip before use.

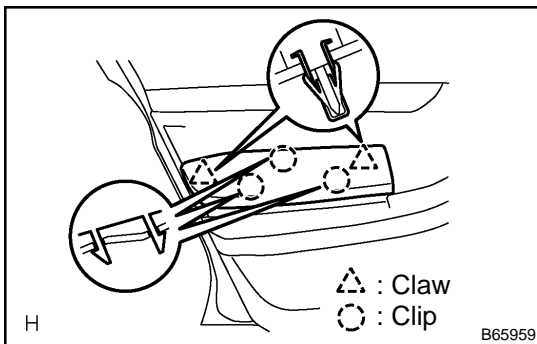


2. REMOVE FRONT DOOR INSIDE HANDLE BEZEL LH

- (a) Using a screwdriver, disengage the 3 claws and remove the inside handle bezel.

HINT:

Tape the screwdriver tip before use.

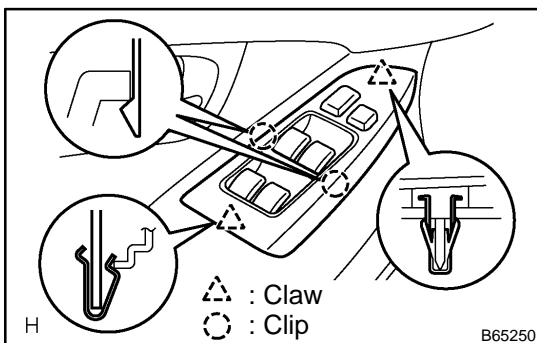


3. REMOVE FRONT ARMREST ASSY LH

- (a) Using a screwdriver, disengage the 2 claws and 2 clips, and then remove the armrest assy from the trim board sub-assy.

HINT:

Tape the screwdriver tip before use.



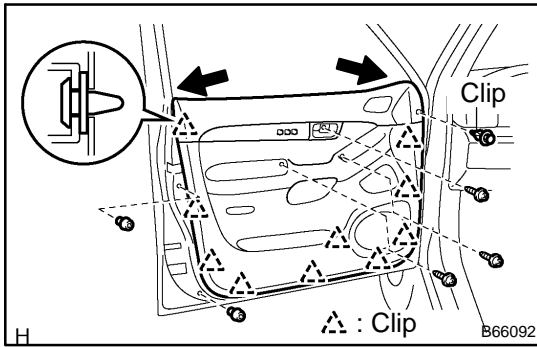
4. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSY

- (a) Using a screwdriver, disengage the 2 claws and 2 clips, and then remove the armrest base panel upper together with the master switch assy.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the master switch connector.
 (c) Remove the 3 screws and the master switch from the armrest base panel upper.

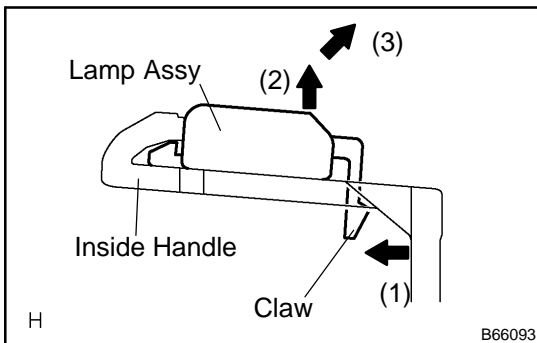
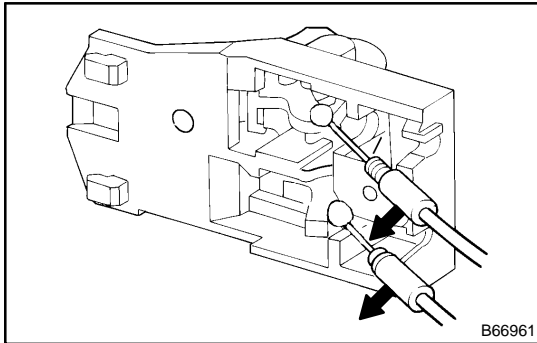
**5. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH**

- (a) Remove the 2 cushion rubbers.
- (b) Remove the 3 screws and the clip indicated.
- (c) Using a clip remover, disengage the other 10 clips.
- (d) Remove the trim board sub-assy upward.

HINT:

In order to prevent the door panel from being damaged, cover the parts indicated by arrow marks in the illustration with tape.

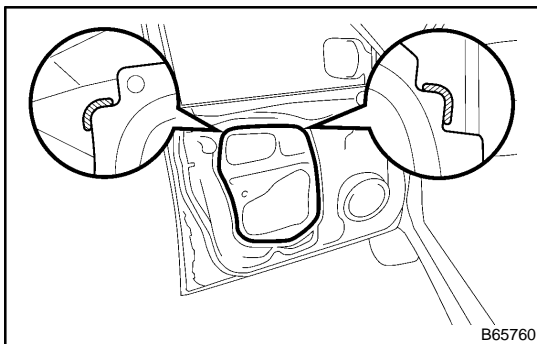
- (e) Disconnect the 2 speaker connectors.
- (f) Disconnect the 2 cables from the inside handle, as shown in the illustration.
- (g) Remove the inner weatherstrip.
- (h) Remove the No. 2 speaker (See page 67-16).
- (i) Remove the stereo component speaker (See page 67-20).
- (j) Remove the 2 screws and the inside handle sub-assy.



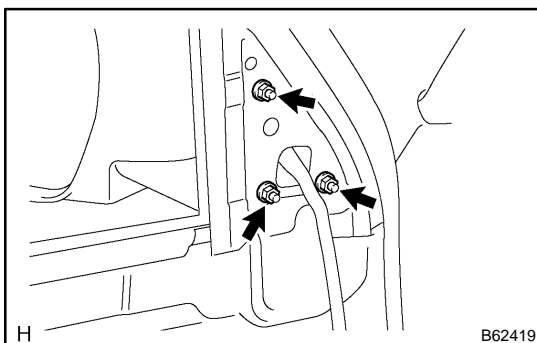
- (k) Using a screwdriver, disengage the claw and remove the illumination lamp assy, as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

**6. REMOVE FRONT DOOR SERVICE HOLE COVER LH****NOTICE:**

Remove the remaining tape on the door side.

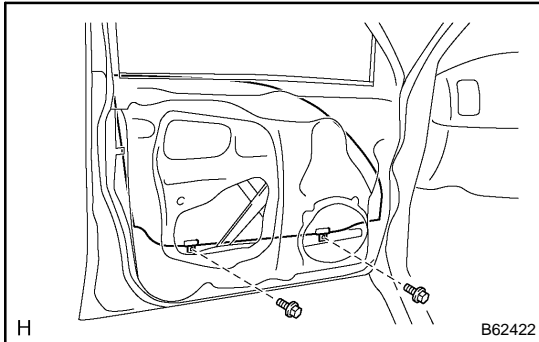
**7. REMOVE OUTER REAR VIEW MIRROR ASSY LH**

- (a) Disconnect the mirror connector.
- (b) Remove the 3 nuts and outer rear view mirror assy.

NOTICE:

When the nuts are removed, the outer rear view mirror assy may fall and become deformed.

8. REMOVE FRONT NO.2 SPEAKER ASSY (See page 67-15)
9. REMOVE FRONT DOOR WINDOW FRAME MOULDING REAR LH (See page 76-28)
10. REMOVE FRONT DOOR BELT MOULDING LH (See page 76-10)

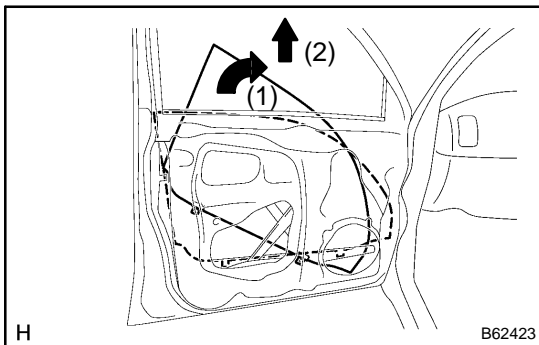


11. REMOVE FRONT DOOR GLASS SUB-ASSY LH

HINT:

Insert a shop rag inside the door panel to prevent the door glass sub-assy from being scratched.

- (a) Open the door glass until the bolts appear in the service holes.
- (b) Remove the 2 bolts holding the door glass sub-assy to the window regulator sub-assy.

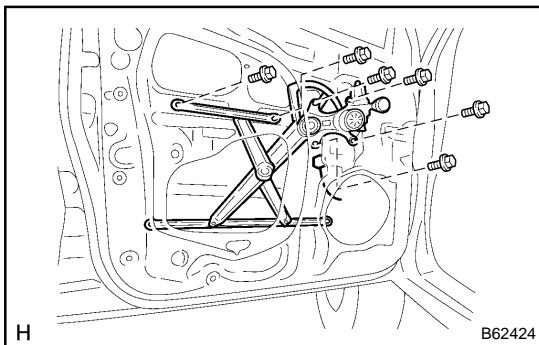


- (c) Remove the door glass sub-assy, as shown in the illustration.

NOTICE:

- Do not damage the door glass sub-assy.
- When the bolts are removed, the door glass sub-assy may fall and become deformed.

- (d) Remove the glass run.



12. REMOVE FRONT DOOR WINDOW REGULATOR SUB-ASSY LH

- (a) Disconnect the window regulator connector.
- (b) Remove the 6 bolts and window regulator sub-assy.

NOTICE:

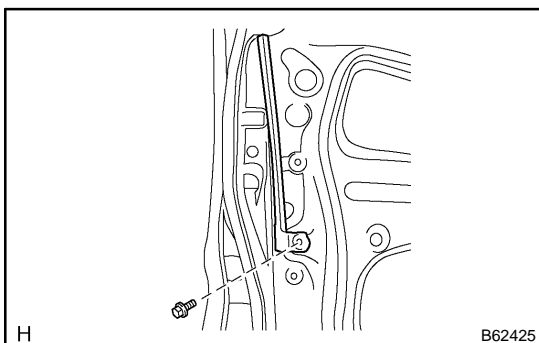
When the bolts are removed, the window regulator sub-assy may fall and become deformed.

HINT:

Remove the window regulator sub-assy through the service hole.

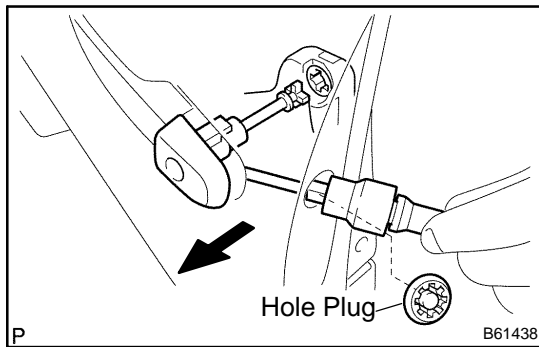
13. REMOVE POWER WINDOW REGULATOR MOTOR ASSY LH

- (a) Place matchmarks on the regulator motor gear and regulator gear.
- (b) Using a torx® driver (T25), remove the 3 screws and window regulator motor assy.



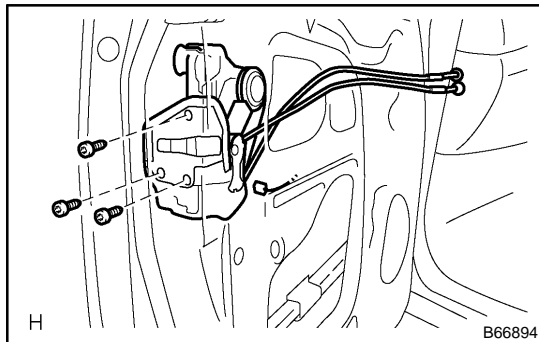
14. REMOVE FRONT DOOR FRAME SUB-ASSY REAR LOWER LH

- (a) Remove the bolt and frame sub-assy.



15. REMOVE FRONT DOOR OUTSIDE HANDLE COVER LH

- (a) Remove the hole plug.
- (b) Using a torx[®] socket wrench (T30), loosen the screw and remove the outside handle cover with the door lock key cylinder installed.

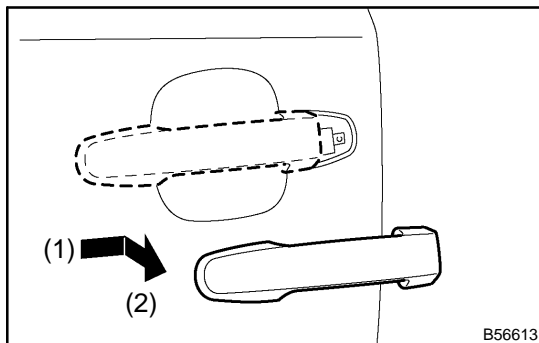


16. REMOVE FRONT DOOR W/MOTOR LOCK ASSY LH

- (a) Disconnect the door lock connector.
- (b) Using a torx[®] socket wrench (T30), remove the 3 screws and door lock assy.

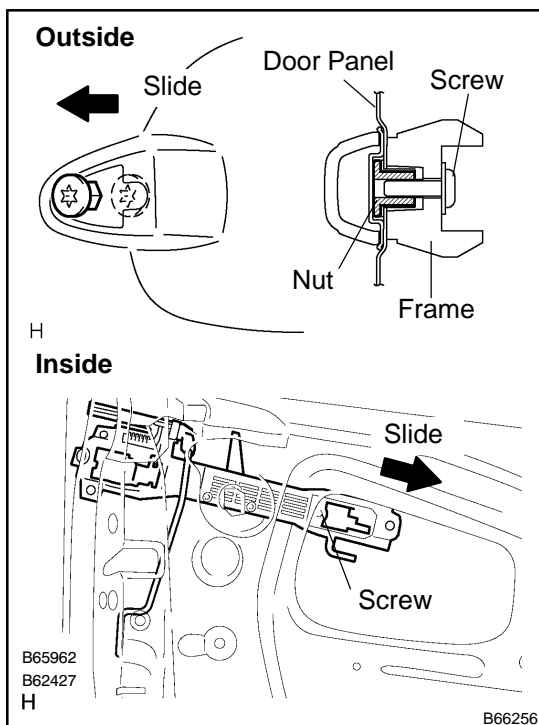
HINT:

Remove the door lock assy through the service hole.



17. REMOVE FRONT DOOR HANDLE ASSY OUTSIDE LH

- (a) Pushing and pulling the outside handle assy in the direction of the arrow mark as shown in the illustration, remove the outside handle.
- (b) Remove the outside handle pads front and rear.



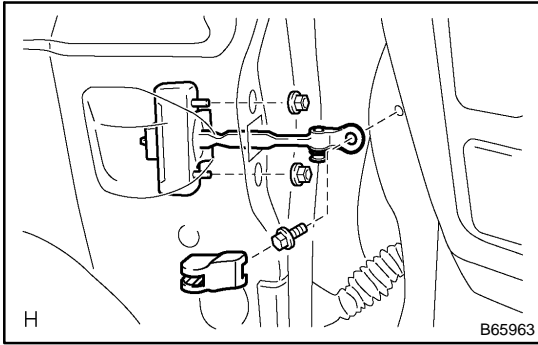
18. REMOVE FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSY LH

- (a) Using a torx[®] socket wrench (T30), loosen the screw.
- (b) Slide the outside handle frame sub-assy to remove it.

HINT:

Remove the outside handle frame sub-assy through the service hole.

- (c) Remove the lock open rod from the outside handle frame sub-assy.

**19. REMOVE FRONT DOOR CHECK ASSY LH**

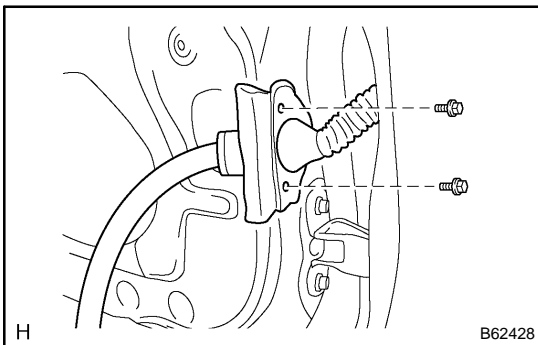
- (a) Remove the check cover.
- (b) Remove the 2 nuts, bolt and door check assy.

20. REMOVE FRONT DOOR WEATHERSTRIP LH

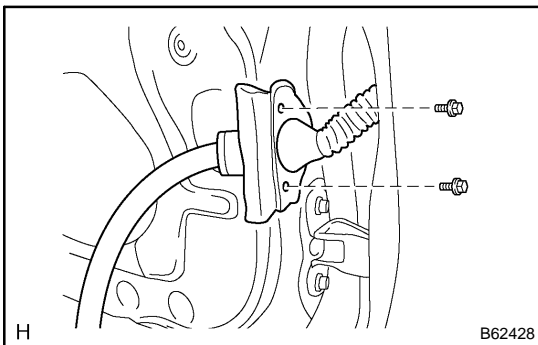
- (a) Using a clip remover, disengage the clips, and remove the weatherstrip.

HINT:

If the clips are damaged, exchange them for new ones.

**21. REMOVE FRONT DOOR WIRE LH**

- (a) Disconnect the wire clips.
- (b) Remove the 2 bolts and door wire.

**22. INSTALL FRONT DOOR WIRE LH**

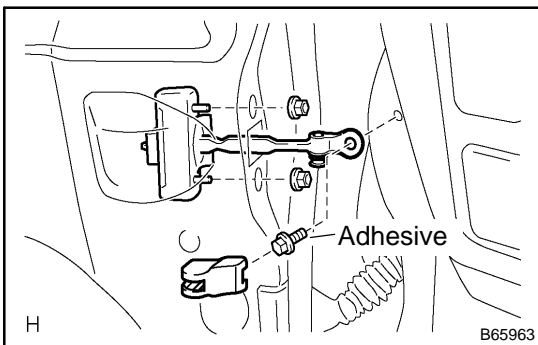
- (a) Install the door wire with the 2 bolts.

Torque (reference): 8.0 N·m (82 kgf·cm, 71 in.-lbf)

NOTICE:

In order to prevent water leakage, be sure that the lip of the rubber grommet does not turn up or is not deformed when installing the door wire.

- (b) Connect the wire clips.

**23. INSTALL FRONT DOOR CHECK ASSY LH**

- (a) Apply MP grease to the sliding parts of the door check assy.
- (b) Install the door check assy to the door panel with the 2 nuts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

HINT:

Install the door check assy so that the rivet head is up.

- (c) Apply adhesive to the threads of the bolt.

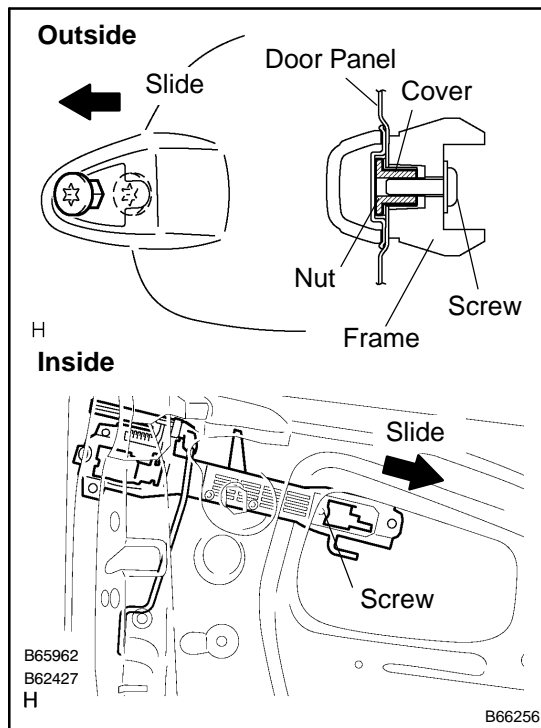
Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

- (d) Install the door check assy to the body with the bolt.

Torque: 30 N·m (306 kgf·cm, 22 in.-lbf)

- (e) Install the check cover.



24. INSTALL FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSY LH

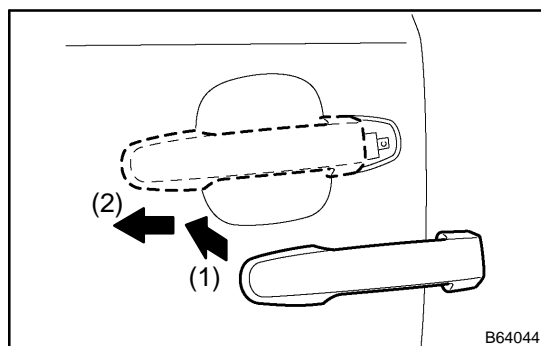
- (a) Install the lock open rod to the outside handle frame sub-assy.
- (b) Using a torx[®] socket wrench (T30), install the outside handle frame sub-assy with the screw.

Torque: 7.0 N·m (71 kgf·cm, 62 in.-lbf)

NOTICE:

A cover should be inserted between the nut and the door panel.

- (c) Install the outside handle pads front and rear.



25. INSTALL FRONT DOOR HANDLE ASSY OUTSIDE LH

- (a) Pushing the outside handle assy in the direction of the arrow mark as shown in the illustration, install the outside handle assy.

NOTICE:

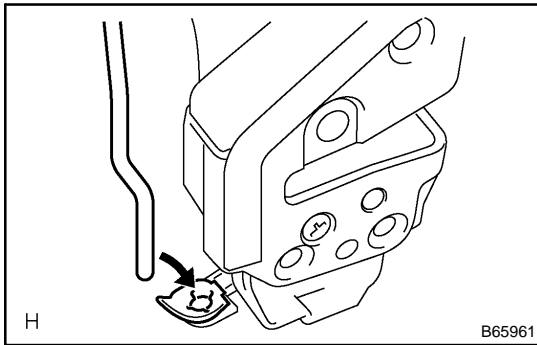
If the release plate is not pulled and held when installing the outside handle assy, the release plate will interfere with the outside handle assy, and damage the release plate.

26. INSTALL FRONT DOOR W/MOTOR LOCK ASSY LH

- (a) Apply MP grease to the sliding and rotating parts of the door lock assy.
- (b) If reusing the door lock assy:
Install a new door lock wire harness packing.

NOTICE:

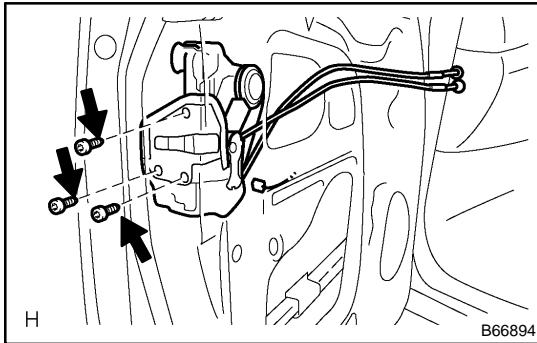
- **If reusing a door lock assy that has been removed, replace the packing in the connecting part with a new one.**
- **Be careful that no grease and dirt sticks to the packing surface in the connecting part.**
- **Reusing removed packing or using damaged packing will allow water to penetrate through to the connecting part, resulting in a malfunction of the door lock assy.**



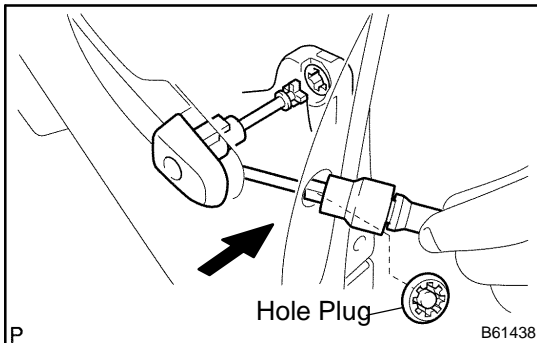
- (c) Insert the door lock open rod into the door lock assy, and then set it to the door panel.

NOTICE:

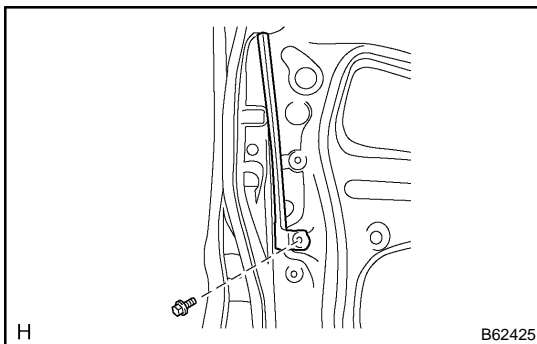
Make sure that the outside handle link is securely engaged with the door lock assy.



- (d) Apply adhesive to the threads of the screws.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent
- (e) Using a torx[®] socket wrench (T30), install the door lock assy with the 3 screws.
Torque: 5.0 N·m (51 kgf·cm, 42 in.-lbf)
- (f) Connect the door lock connector.

**27. INSTALL FRONT DOOR OUTSIDE HANDLE COVER LH**

- (a) Using a torx[®] socket wrench (T30), install the outside handle cover with the screw.
Torque: 7.0 N·m (71 kgf·cm, 62 in.-lbf)
- (b) Install the hole plug.

**28. INSTALL FRONT DOOR FRAME SUB-ASSY REAR LOWER LH**

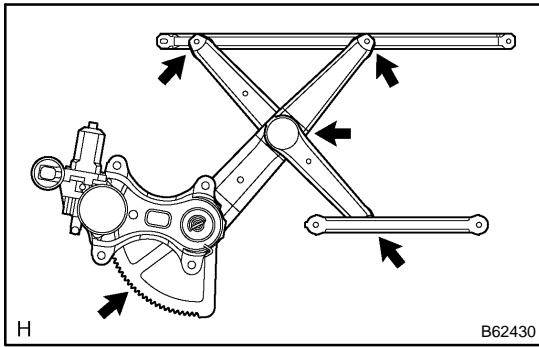
- (a) Install the door frame sub-assy with the bolt.
Torque: 5.0 N·m (51 kgf·cm, 42 in.-lbf)

29. INSTALL POWER WINDOW REGULATOR MOTOR ASSY LH

- (a) Align the matchmarks on the regulator motor gear and regulator gear.
- (b) Using a torx[®] driver (T25), install the regulator motor assy with the 3 screws.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

Never rotate the motor assy in the down direction until the window glass installation is done.

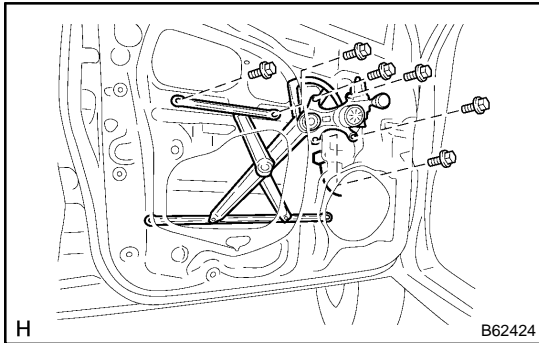


30. INSTALL FRONT DOOR WINDOW REGULATOR SUB-ASSY LH

- (a) Apply MP grease to the sliding and rotating parts of the window regulator sub-assy.

NOTICE:

Do not apply grease to the spring of the window regulator sub-assy.



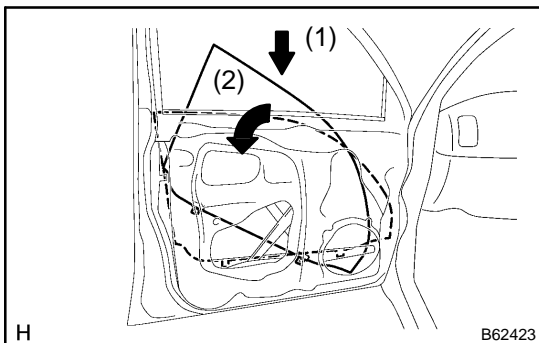
- (b) Install the window regulator sub-assy with the 6 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

- (c) Connect the window regulator connector.

NOTICE:

Be careful not to drop and deform the door window regulator sub-assy as this may cause deformation.

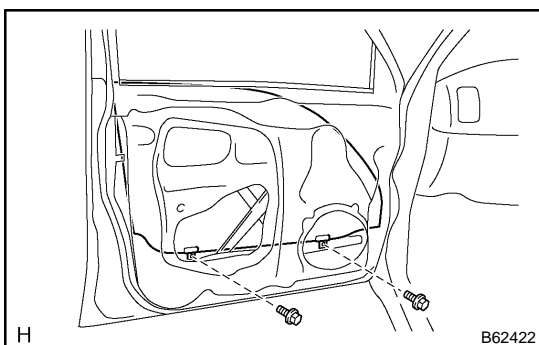


31. INSTALL FRONT DOOR GLASS SUB-ASSY LH

NOTICE:

Do not damage the door glass sub-assy.

- (a) Install the glass run.
 (b) Insert the door glass sub-assy into the door panel along the glass run, as shown in the illustration.



- (c) Install the door glass sub-assy to the window regulator sub-assy with the 2 bolts.

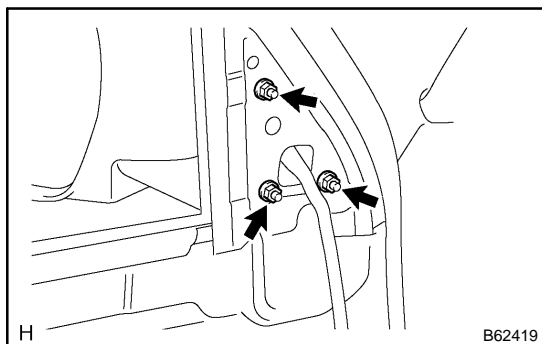
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

- (d) Inspect operation of the power window.

HINT:

When the installation point of the door glass sub-assy does not match, adjust the regulator position in manual operation.

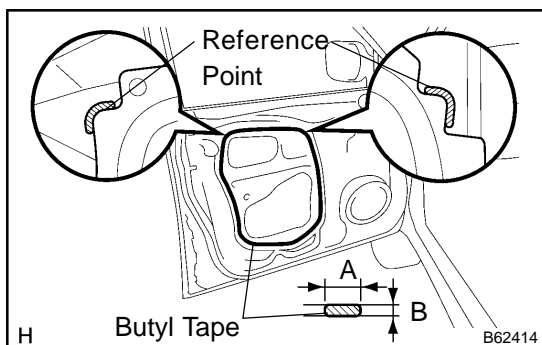
- (1) Connect the power window switch to the wire harness and turn the ignition switch ON.
 (2) Repeat UP and DOWN operation several times in manual operation.

**32. INSTALL OUTER REAR VIEW MIRROR ASSY LH**

(a) Install the outer rear view mirror assy with the 3 nuts.

Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

(b) Connect the outer mirror connector.

**33. INSTALL FRONT DOOR SERVICE HOLE COVER LH**

(a) Apply butyl tape to the door panel, as shown in the illustration.

Adhesive:

Part No. 08850-00065, Butyl Tape Set or equivalent

(b) Install the service hole cover.

Dimensions:

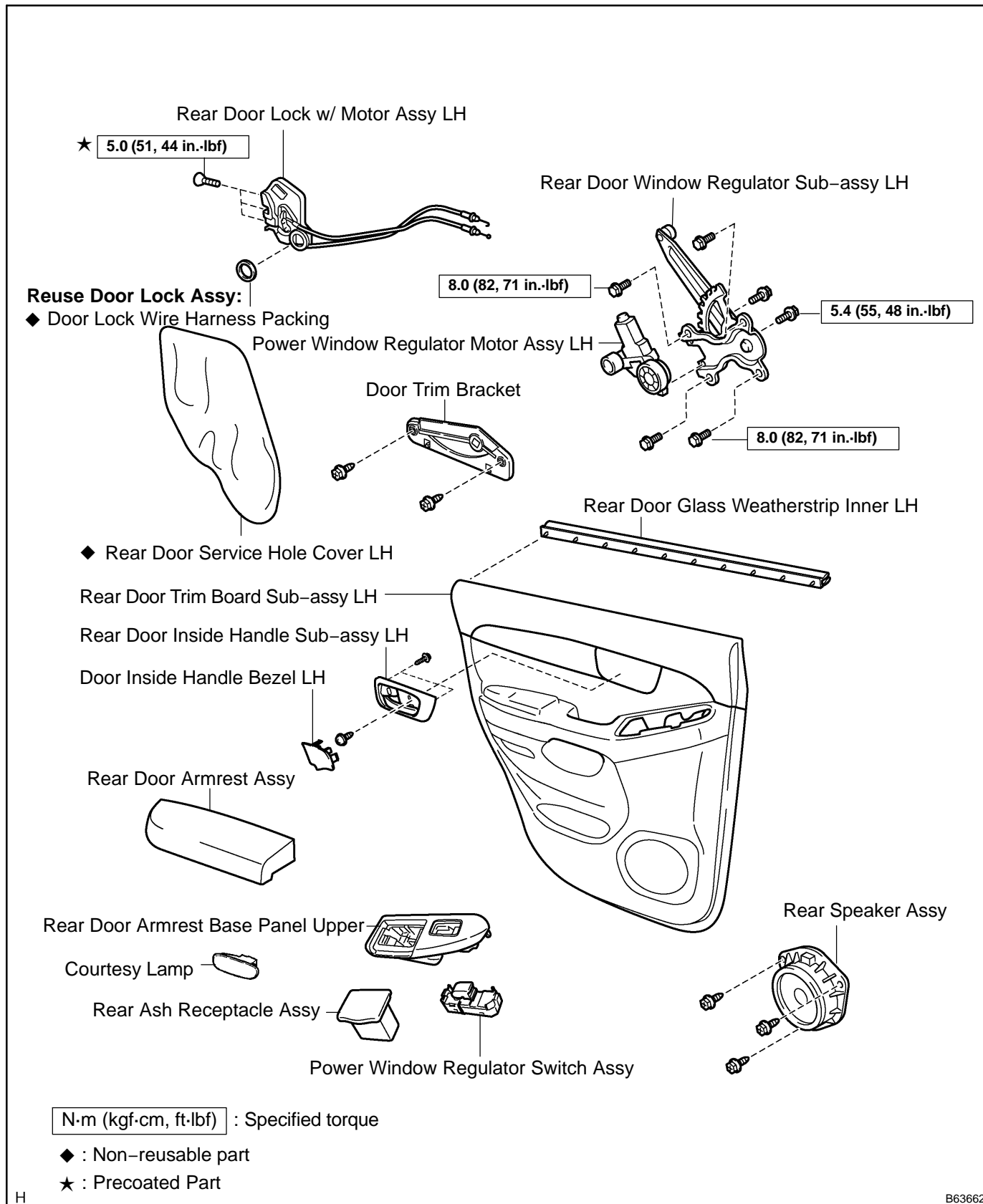
A	6.0 mm (0.236 in.)
B	2.0 mm (0.079 in.)

HINT:

- When installing the service hole cover, pull out the links and connectors through the service hole cover.
- There should be no wrinkles or folds after attaching the service hole cover.
- After attaching the service hole cover, confirm the sealing condition.

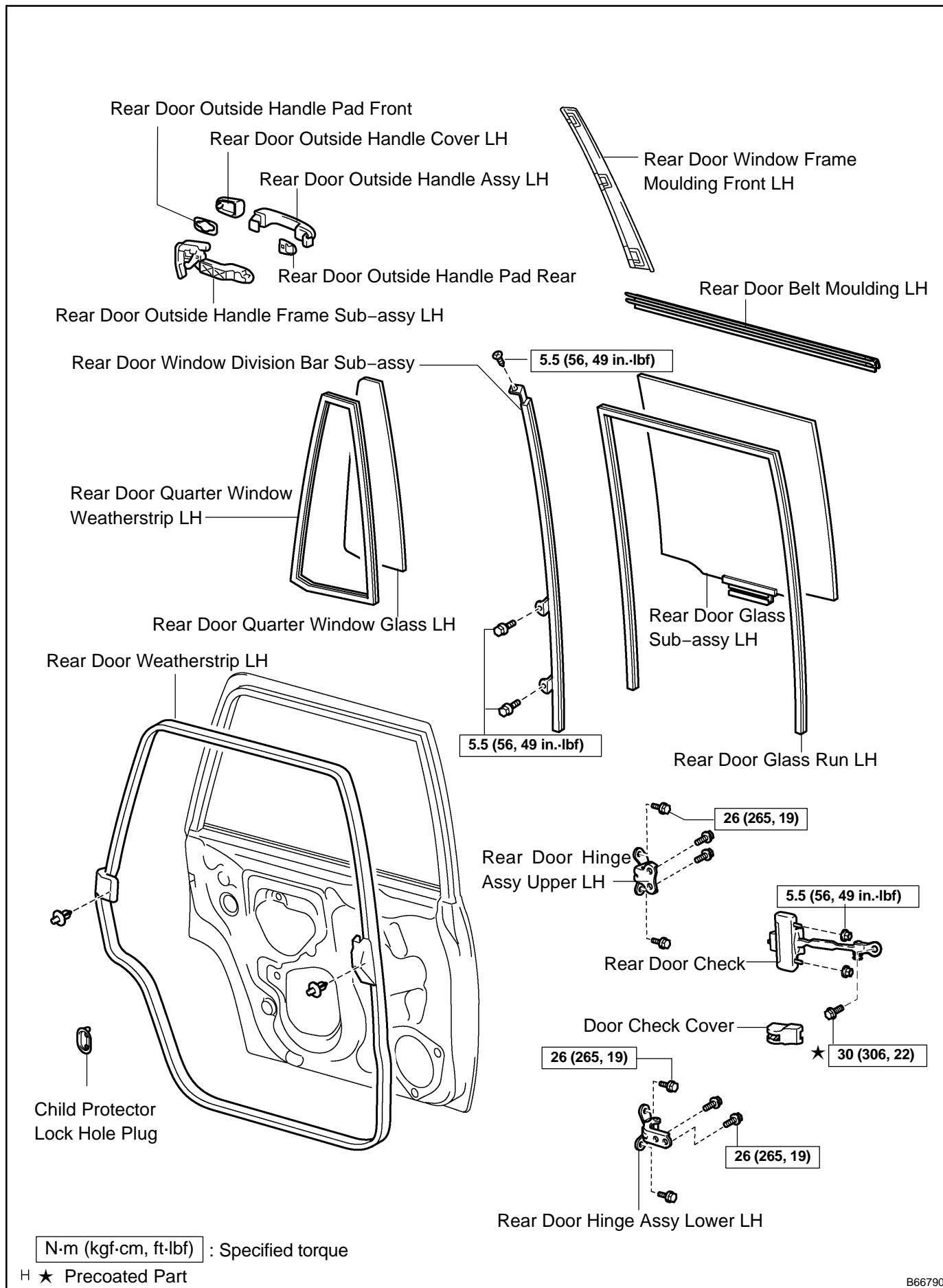
REAR DOOR COMPONENTS

750JZ-02



H

B63662

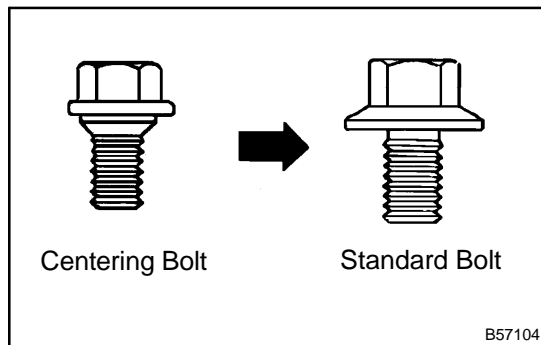


B66790

ADJUSTMENT

HINT:

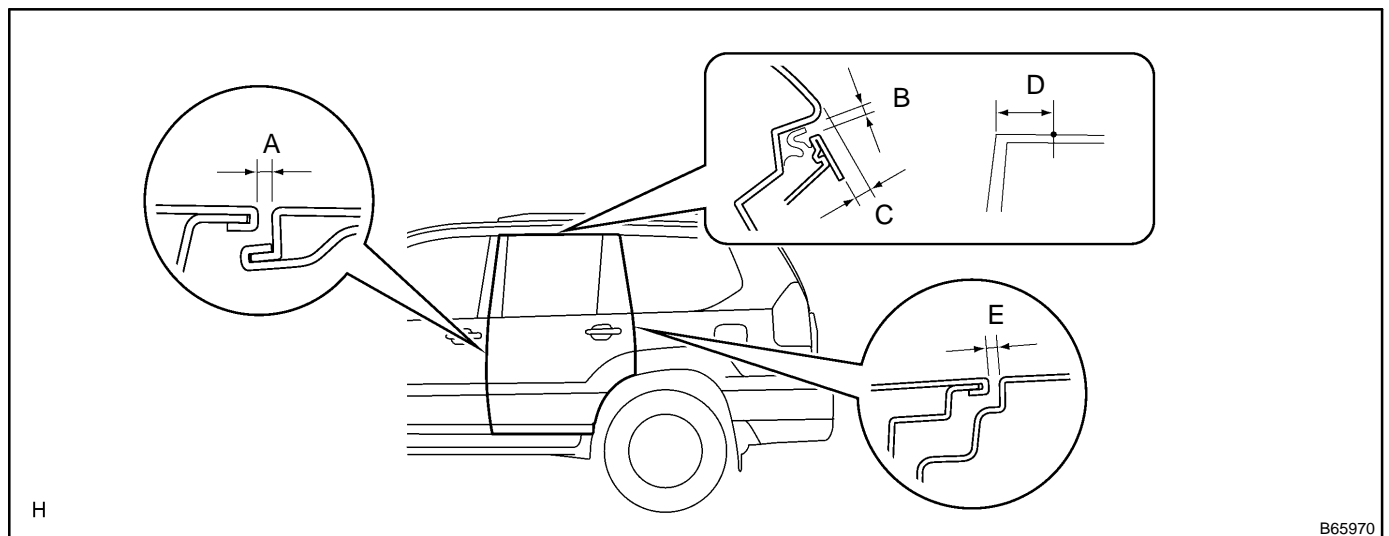
- On the RH side, use the same procedures as on the LH side.



- Since a centering bolt is used as door hinge mounting bolts on the body side and the door side, the door cannot be adjusted with them on. Substitute a bolt with a washer for the centering bolt.

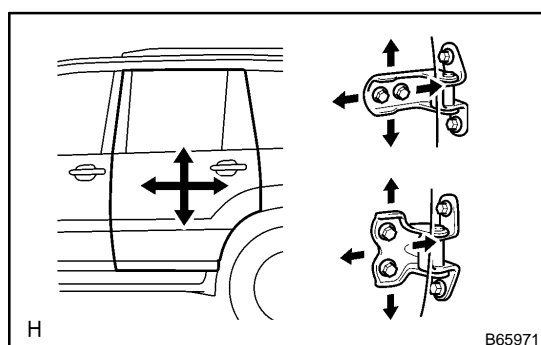
1. INSPECT REAR DOOR PANEL SUB-ASSY LH

- (a) Check that the clearance is within the standard range.



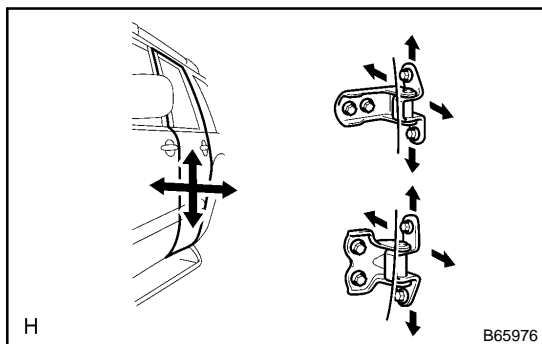
Standard:

A	5.0 ± 1.5 mm (0.197 ± 0.059 in.)
B	5.5 ± 1.5 mm (0.220 ± 0.059 in.)
C	6.2 ± 1.5 mm (0.244 ± 0.059 in.)
D	160 mm (6.30 in.)
E	4.5 ± 1.5 mm (0.177 ± 0.059 in.)

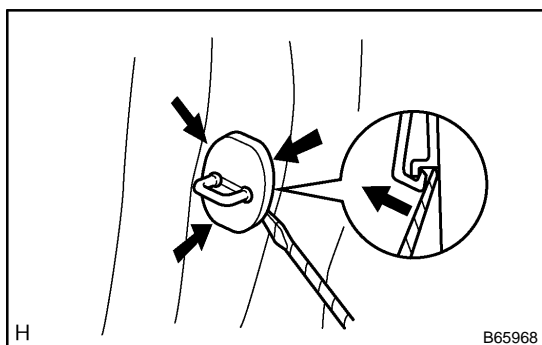


2. ADJUST REAR DOOR PANEL SUB-ASSY LH

- (a) Adjust the door forward/rearward and vertically by loosening the body side hinge bolts.
- (b) Tighten the body side hinge bolts after the adjustment.
- Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)**



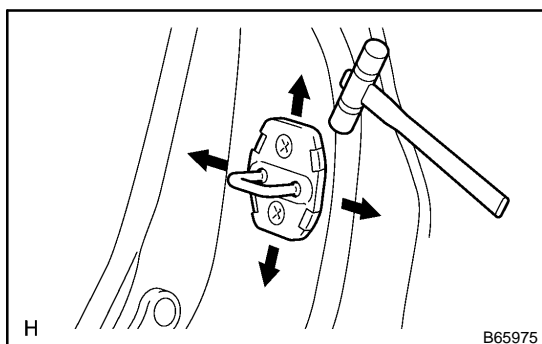
- (c) Horizontally and vertically adjust the door by loosening the door side hinge bolts.
- (d) Tighten the body side hinge bolts after the adjustment.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



- (e) Using the screwdriver, disengage the 4 claws, and remove the cover.

HINT:

Tape the screwdriver tip before use.

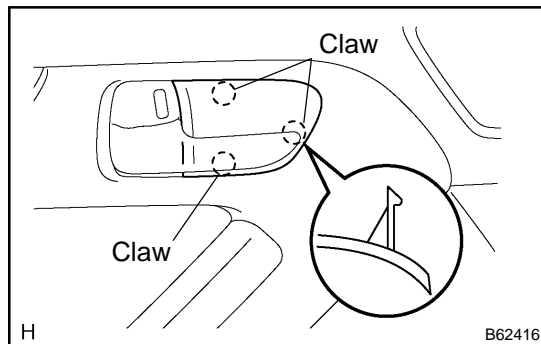


- (f) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.
- (g) Tighten the striker mounting screws after the adjustment.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

OVERHAUL

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedures as on the LH side.

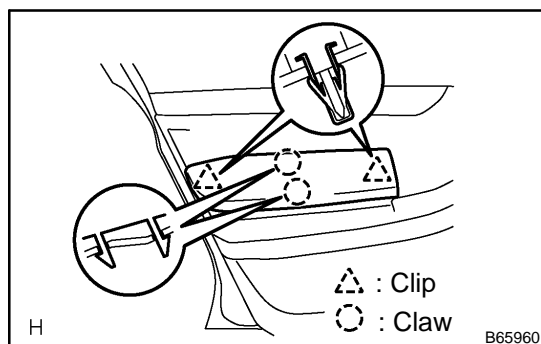


1. REMOVE REAR DOOR INSIDE HANDLE BEZEL LH

- Using a screwdriver, disengage the 3 claws and remove the inside handle bezel.

HINT:

Tape the screwdriver tip before use.

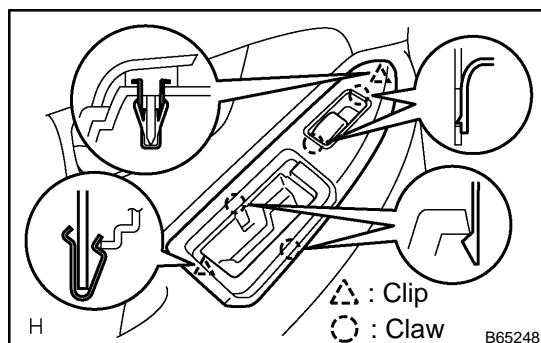


2. REMOVE REAR LH ARMREST ASSY

- Using a screwdriver, disengage the 2 claws and 2 clips, and remove the armrest assy.

HINT:

Tape the screwdriver tip before use.



3. REMOVE POWER WINDOW REGULATOR SWITCH ASSY REAR

- Remove the rear ash receptacle assy.
- Using a screwdriver, disengage the 2 claws and 2 clips, and remove the armrest base panel upper together with the window switch assy.

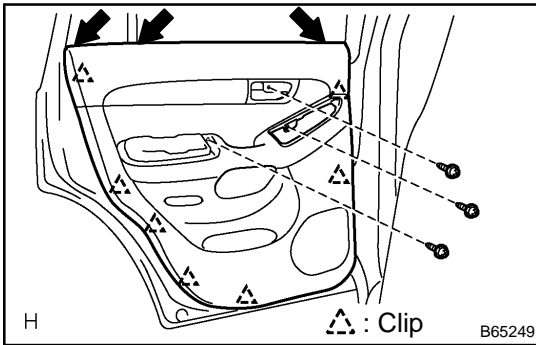
HINT:

Tape the screwdriver tip before use.

- Disconnect the power window switch connector.
- Using a screwdriver, disengage the 2 claws, and then remove the switch assy from the base panel upper.

HINT:

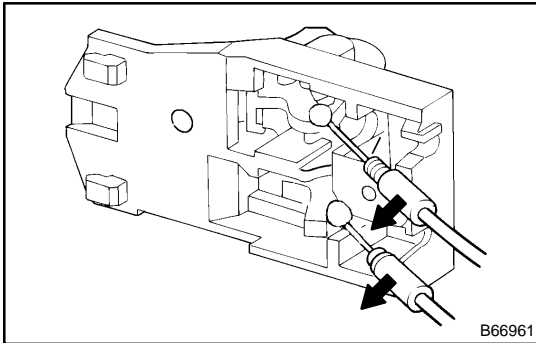
Tape the screwdriver tip before use.



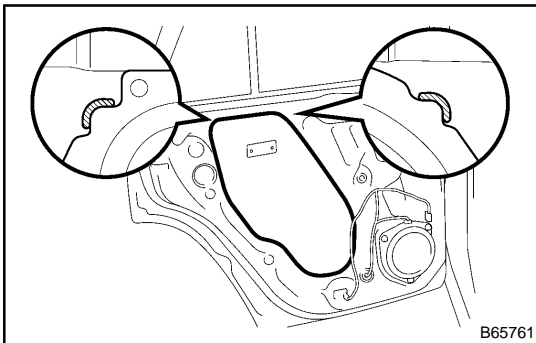
- 4. REMOVE REAR DOOR TRIM BOARD SUB-ASSY LH**
- Remove the 2 cushion rubbers.
 - Remove the 3 screws.
 - Using a clip remover, remove the 8 clips and remove the trim board sub-assy upward.

HINT:

In order to prevent the door panel from being damaged, cover the parts indicated by arrow marks in the illustration with tape.



- Disconnect the 2 cables from the inside handle sub-assy, as shown in the illustration.
- Remove the weatherstrip inner.
- Remove the 2 screws and inside handle sub-assy.

**5. REMOVE REAR DOOR SERVICE HOLE COVER LH**

- Remove the cover.

NOTICE:

Remove the remaining tape on the door side.

- Using a screwdriver, remove the 2 screws and trim bracket.

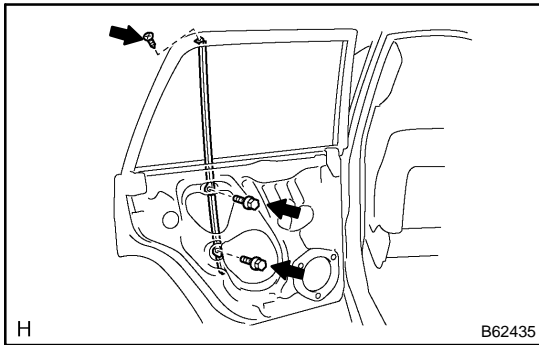
6. REMOVE REAR SPEAKER ASSY (See page 67-17)**7. REMOVE REAR DOOR WINDOW FRAME MOULDING FRONT LH (See page 76-30)****8. REMOVE REAR DOOR BELT MOULDING LH (See page 76-11)****9. REMOVE REAR DOOR WINDOW DIVISION BAR SUB-ASSY LH****HINT:**

Insert a shop rag inside the door panel to prevent the glass from being scratched.

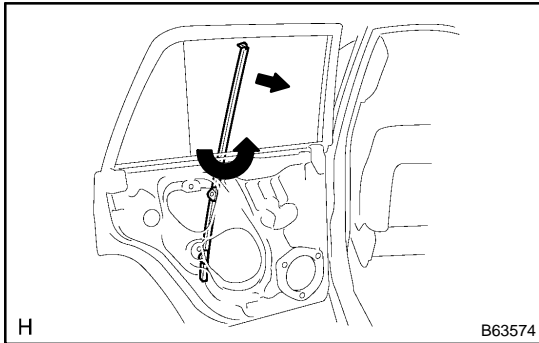
NOTICE:

Do not damage the door glass.

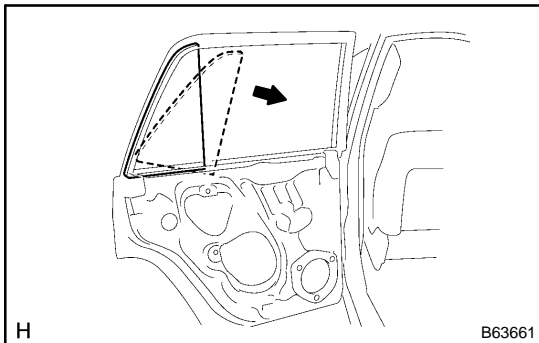
- Remove the glass run.



- (b) Remove the 2 bolts, screw and division bar.



- (c) Rotate the division bar sub-assy by 90° and pull it upward, as shown in the illustration.



10. REMOVE REAR DOOR QUARTER WINDOW GLASS LH

- (a) Remove the quarter window glass, as shown in the illustration.

NOTICE:

Do not damage the glass.

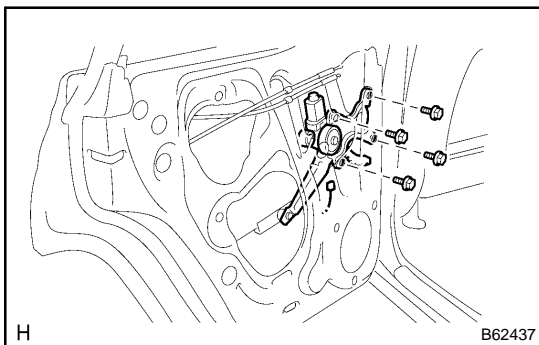
- (b) Remove the quarter window weatherstrip from the glass.

11. REMOVE REAR DOOR GLASS SUB-ASSY LH

- (a) Carefully pull up the door glass sub-assy out of the door panel .

HINT:

Insert a shop rag inside the door panel to prevent the door glass sub-assy from being scratched.



12. REMOVE REAR DOOR WINDOW REGULATOR SUB-ASSY LH

- (a) Disconnect the window regulator connector.
 (b) Remove the 4 bolts and window regulator sub-assy.

NOTICE:

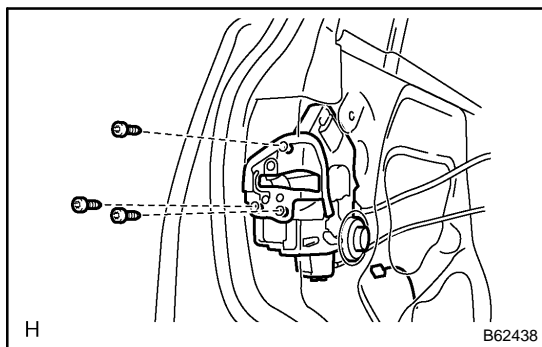
When the bolts are removed, the window regulator sub-assy may fall and become deformed.

HINT:

Remove the window regulator sub-assy through the service hole.

13. REMOVE POWER WINDOW REGULATOR MOTOR ASSY LH

- (a) Place matchmarks on the regulator motor gear and regulator gear.
 (b) Using a torx® driver (T25), remove the 3 screws and regulator motor assy.



14. REMOVE REAR DOOR W/MOTOR LOCK ASSY LH

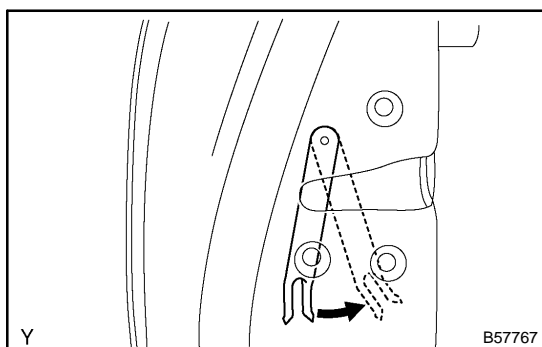
- (a) Disconnect the door lock connector.
- (b) Using a torx[®] socket wrench (T30), remove the 3 screws and door lock assy.

HINT:

Remove the door lock assy through the service hole.

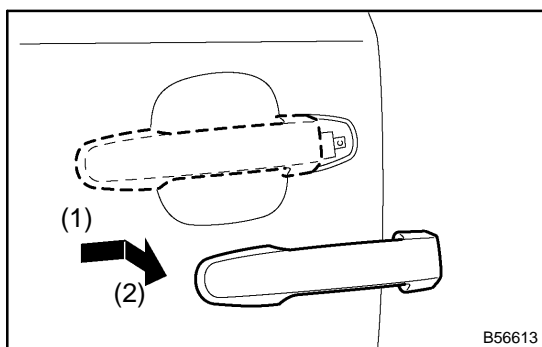
15. REMOVE REAR DOOR OUTSIDE HANDLE COVER LH

- (a) Using a torx[®] socket wrench (T30), loosen the screw and remove the outside handle cover.



16. REMOVE REAR DOOR OUTSIDE HANDLE ASSY LH

- (a) Pull and hold the release plate of the outside handle frame assy, as shown in the illustration.

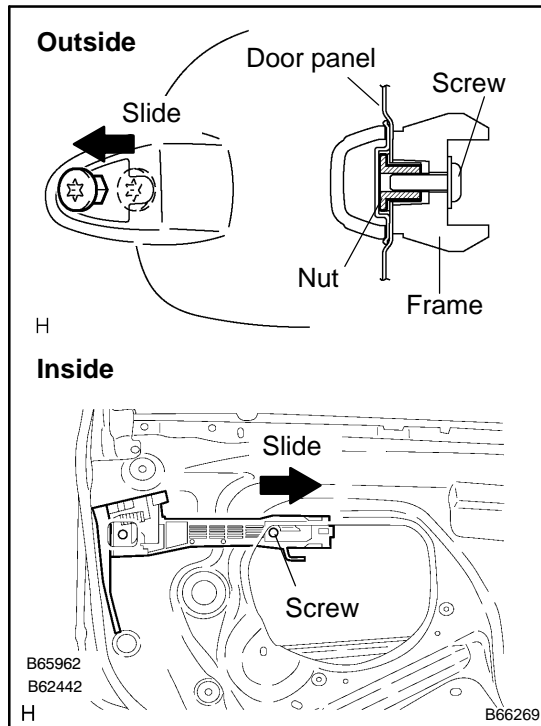


- (b) Pushing and pulling the outside handle assy in the direction of the arrow mark as shown in the illustration, remove the outside handle assy.

NOTICE:

If the release plate is not pulled and held when removing the outside handle assy, the release plate will interfere with the outside handle. It will damage the release plate.

- (c) Remove the outside handle pads front and rear.

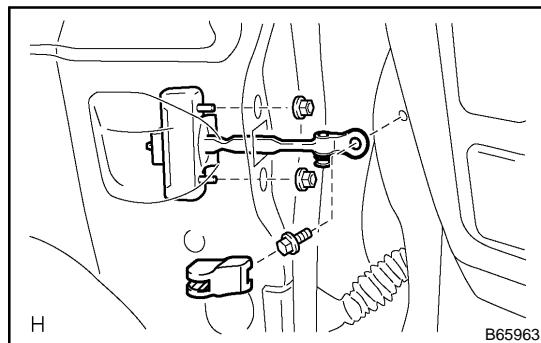


17. REMOVE REAR DOOR OUTSIDE HANDLE FRAME SUB-ASSY LH

- Using a torx[®] socket wrench (T30), loosen the screw.
- Slide the outside handle frame sub-assy to remove it.

HINT:

Remove the outside handle frame sub-assy through the service hole.



18. REMOVE REAR DOOR CHECK ASSY LH

- Remove the check cover.
- Remove the 2 nuts, bolt and door check assy.

HINT:

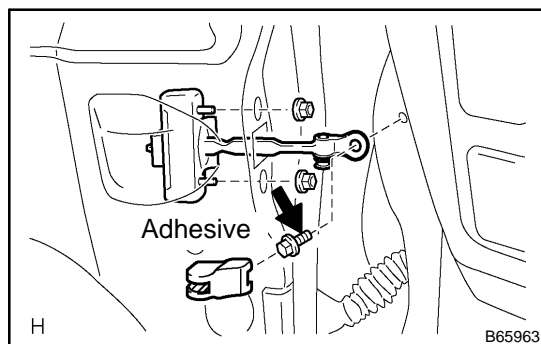
Remove the door check assy through the service hole.

19. REMOVE REAR DOOR WEATHERSTRIP LH

- Using a clip remover, disengage the clip, and remove the weatherstrip.

HINT:

If the clip is damaged, exchange it for new one.



20. INSTALL REAR DOOR CHECK ASSY LH

- Apply MP grease to the sliding and rotating parts of the door check assy.
- Install the door check assy to the door panel with the 2 nuts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

HINT:

Install the door check assy so that the rivet head is up.

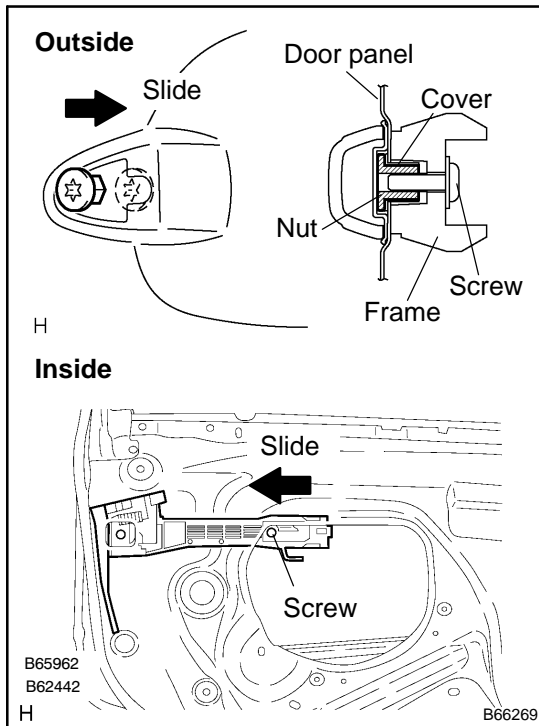
- Apply adhesive to the threads of the bolt.

Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

- Install the door check assy to the body panel with the bolt.
- Install the check cover.

Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



21. INSTALL REAR DOOR OUTSIDE HANDLE FRAME SUB-ASSY LH

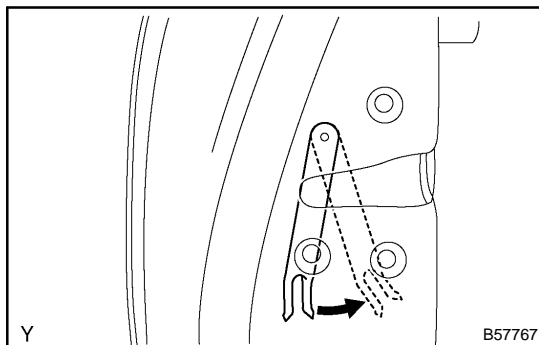
- (a) Using a torx[®] socket wrench (T30), install the handle frame sub-assy with the screw.

Torque: 7.0 N·m (56 kgf·cm, 49 in.-lbf)

NOTICE:

A cover should be inserted between the nut and the door panel.

- (b) Install the outside handle pads front and rear.



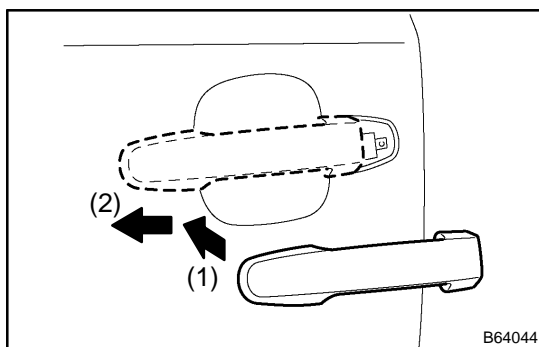
22. INSTALL REAR DOOR OUTSIDE HANDLE ASSY LH

- (a) Pull and hold the release plate of the outside handle frame sub-assy, as shown in the illustration.

- (b) Pushing the outside handle assy in the direction of the arrow marks as shown in the illustration, install the outside handle assy.

NOTICE:

If the release plate is not pulled and held when installing the outside handle assy, the release plate will interfere with the outside handle assy. It will damage the release plate.



23. INSTALL REAR DOOR OUTSIDE HANDLE COVER LH

- (a) Using a torx[®] socket wrench (T30), install the outside handle cover with the screw.
Torque: 7.0 N·m (71 kgf·cm, 62 in.-lbf)

24. INSTALL REAR DOOR W/MOTOR LOCK ASSY LH

- (a) Apply MP grease to the sliding and rotating parts of the door lock assy.
- (b) If reusing the door lock assy:
Install a new door lock wire harness packing.

NOTICE:

- If reusing a removed door lock assy, replace the packing in the connecting part with a new one.
 - Be careful that no grease and dirt sticks to the packing surface in the connecting part.
 - Reusing the packing or using a damaged packing will cause allow water to penetrate through the connecting part, resulting in a malfunction of the door lock.
- (c) Engage the door assy with the release plate of the outside handle sub-assy, and then set it to the door panel.

NOTICE:

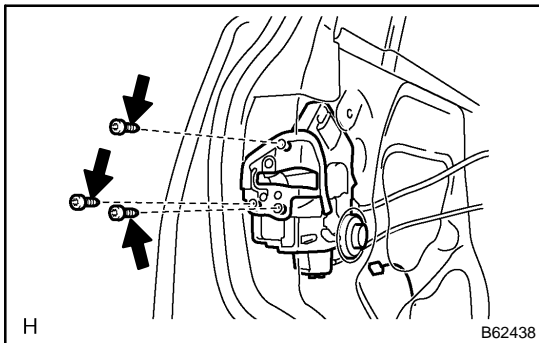
Make sure that the release plate of the outside handle frame sub-assy is securely engaged with the door lock assy.

- (d) Apply adhesive to the threads of the screws.

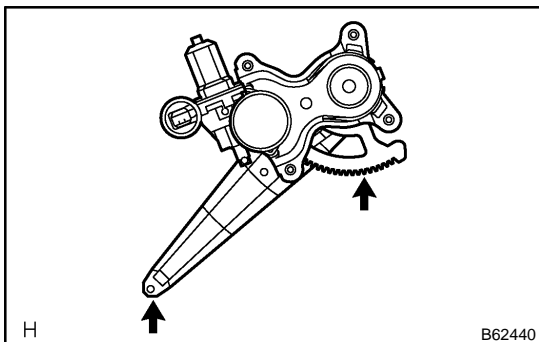
Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

- (e) Using a torx[®] socket wrench (T30), install the door lock assy with the 3 screws.
Torque: 5.0 N·m (51 kgf·cm, 42 in.-lbf)
- (f) Connect the door lock connector.

**25. INSTALL POWER WINDOW REGULATOR MOTOR ASSY LH**

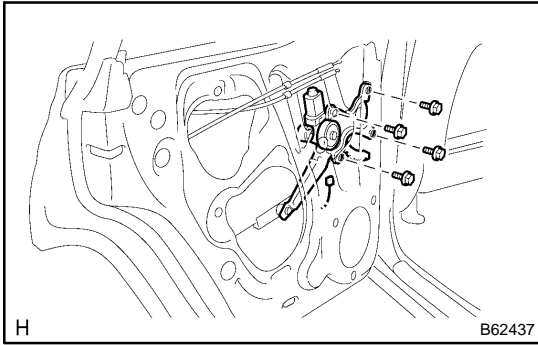
- (a) Using a torx[®] driver (T25), install the regulator motor assy with the 3 screws.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

**26. INSTALL REAR DOOR WINDOW REGULATOR SUB-ASSY LH**

- (a) Apply MP grease to the sliding and rotating parts of the window regulator sub-assy.

NOTICE:

Do not apply grease to the spring of the window regulator sub-assy.



- (b) Install the window regulator sub-assy with the 4 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

NOTICE:

Be careful not to drop the rear door window regulator sub-assy, as this may cause deformation.

- (c) Connect the window regulator connector.

27. INSTALL REAR DOOR GLASS SUB-ASSY LH**NOTICE:**

Be careful not to drop the glass sub-assy, as this may cause deformation.

- (a) Install the door glass sub-assy into the door panel.

HINT:

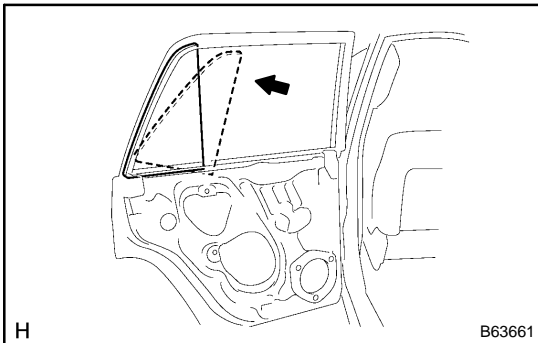
Insert a shop rag inside the door panel to prevent the door glass sub-assy from being scratched.

28. INSTALL REAR DOOR QUARTER WINDOW GLASS LH

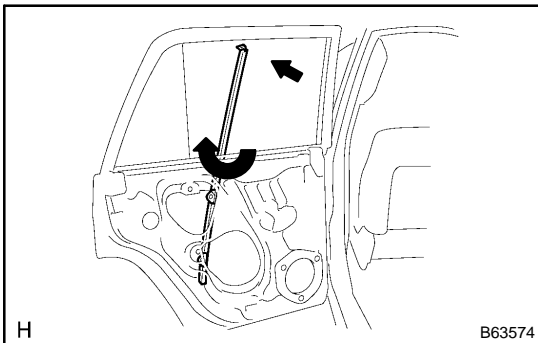
- (a) Install the quarter window weatherstrip on the glass.

NOTICE:

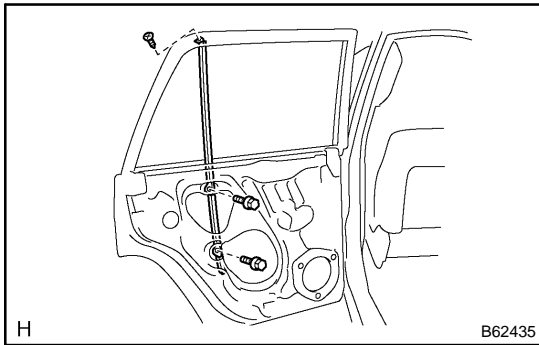
Do not damage the glass.



- (b) Install the quarter window glass, as shown in the illustration.

**29. INSTALL REAR DOOR WINDOW DIVISION BAR SUB-ASSY LH**

- (a) Insert the division bar sub-assy into the door panel, then rotate it by 90°, as shown in the illustration.
- (b) Mount the door glass sub-assy to the window regulator sub-assy.



- (c) Tighten the division bar sub-assy with the 2 bolts and screw.

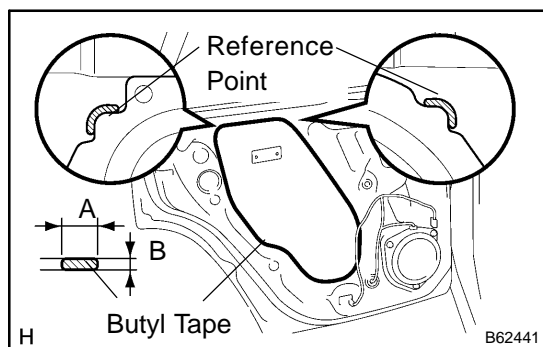
Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)

- (d) Install the glass run.
 (e) Inspect operation of the power window.

HINT:

When the installation point of the door glass does not match, adjust the window regulator position in manual operation.

- (1) Connect the power window switch to the wire harness and turn the ignition switch ON.
- (2) Repeat UP and DOWN operation several times in manual operation.



30. INSTALL REAR DOOR SERVICE HOLE COVER LH

- (a) Apply butyl tape to the door panel, as shown in the illustration.

Adhesive:

Part No. 08850-00065, Butyl Tape Set or equivalent

- (b) Install the service hole cover.

Dimensions:

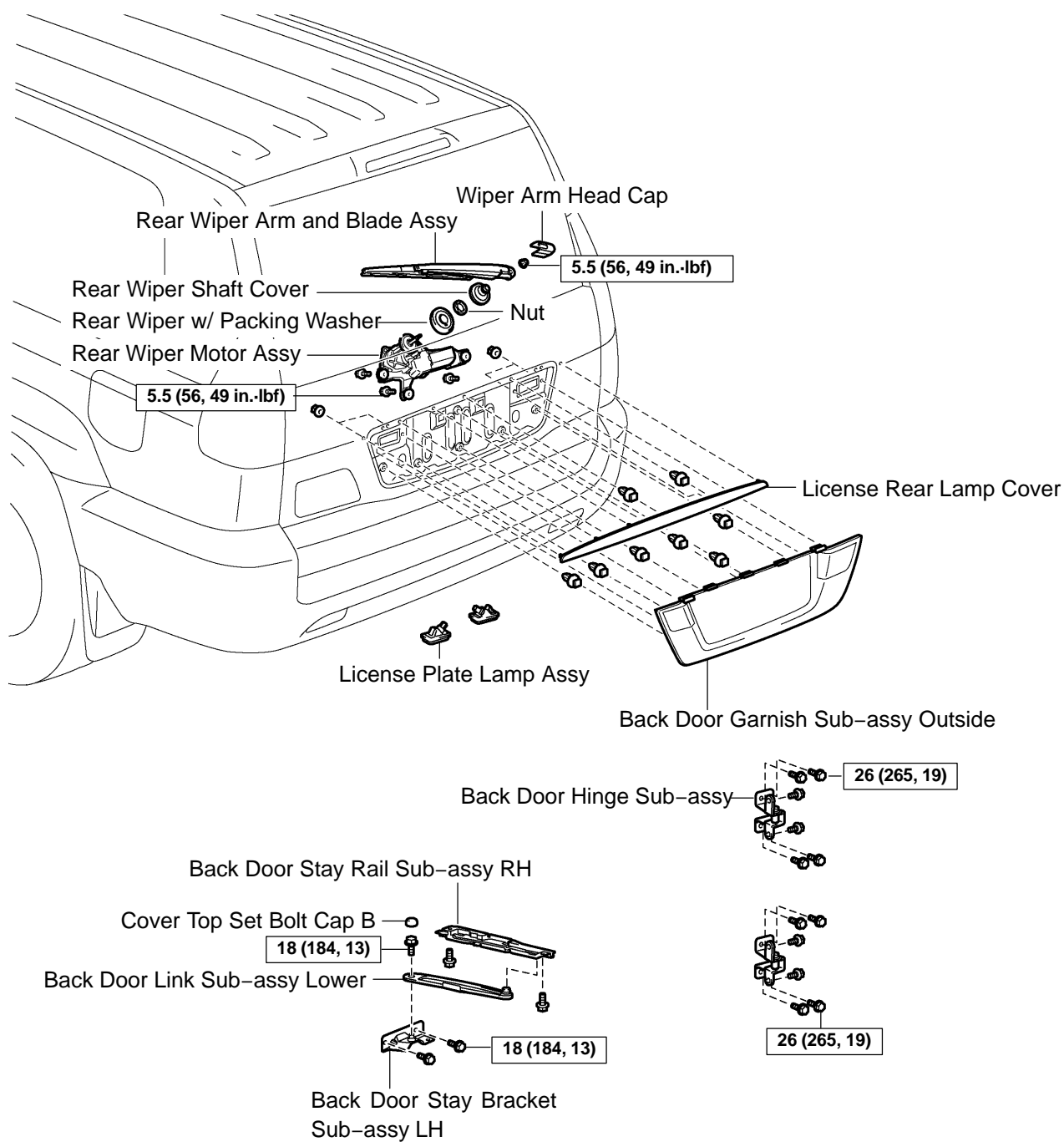
A	6.0 mm (0.236 in.)
B	2.0 mm (0.079 in.)

HINT:

- When installing the service hole cover, pull out the links and connectors through the service hole cover.
- There should be no wrinkles or folds after attaching the service hole cover.
- After attaching the service hole cover, confirm the sealing condition.

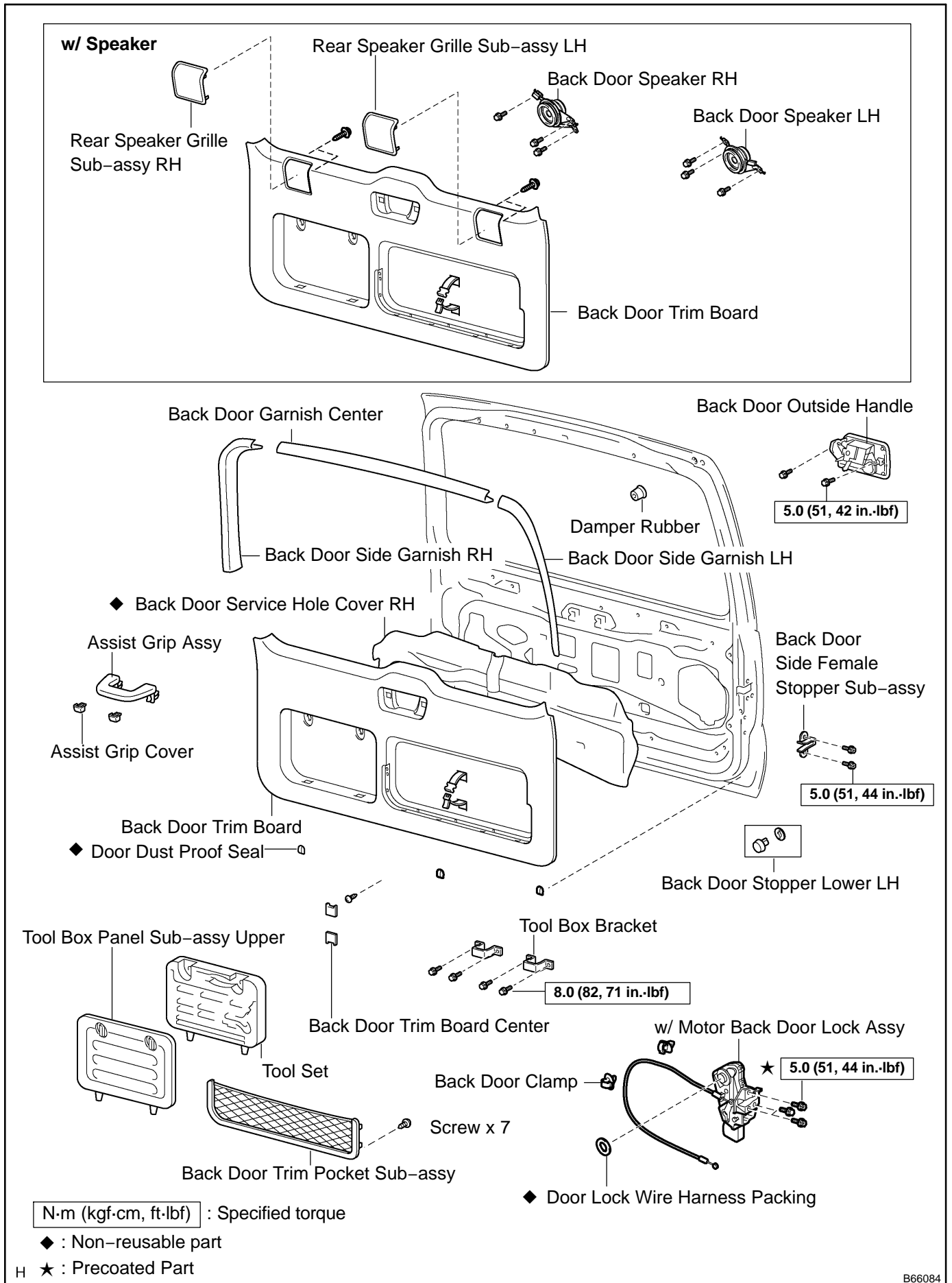
BACK DOOR COMPONENTS

750K2-03



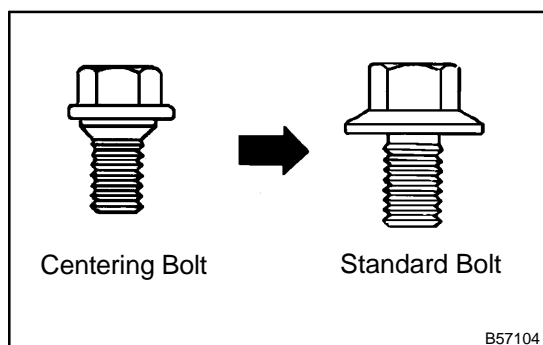
H N·m (kgf·cm, ft·lbf) : Specified torque

B65977



B66084

ADJUSTMENT

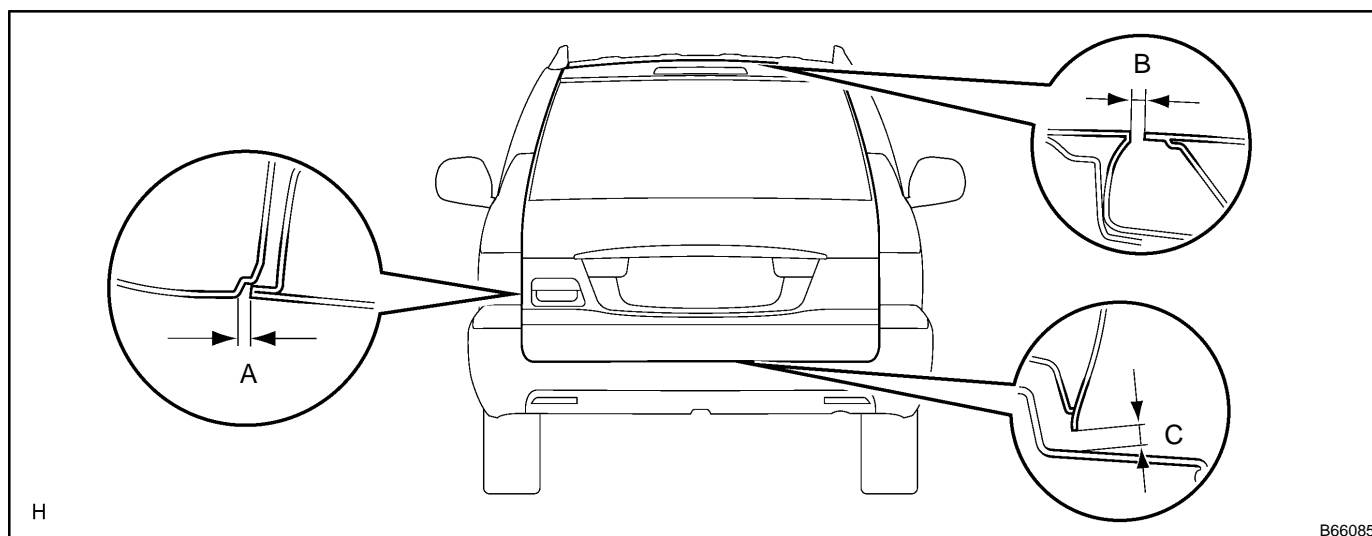


HINT:

Since a centering bolt is used as a door hinge mounting bolt on the body side and door side, the door cannot be adjusted with them on. Substitute a bolt with a washer for the centering bolt.

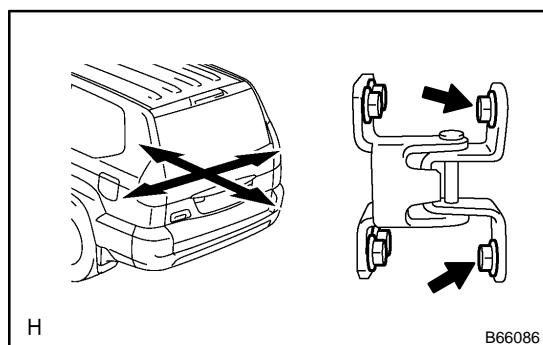
1. INSPECT BACK DOOR PANEL SUB-ASSY

- (a) Check that the clearance is within the standard range.



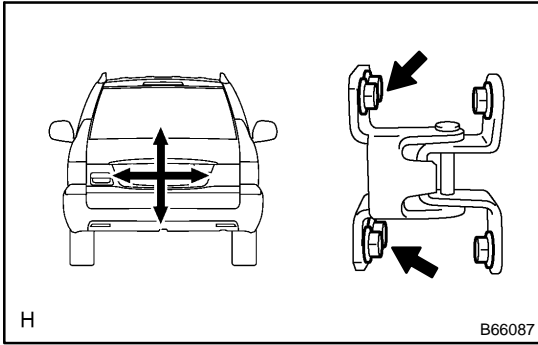
Standard:

A	$6.0 \pm 1.5 \text{ mm}$ ($0.236 \pm 0.059 \text{ in.}$)
B	$7.6 \pm 1.5 \text{ mm}$ ($0.299 \pm 0.059 \text{ in.}$)
C	$10.2 \pm 1.5 \text{ mm}$ ($0.402 \pm 0.059 \text{ in.}$)

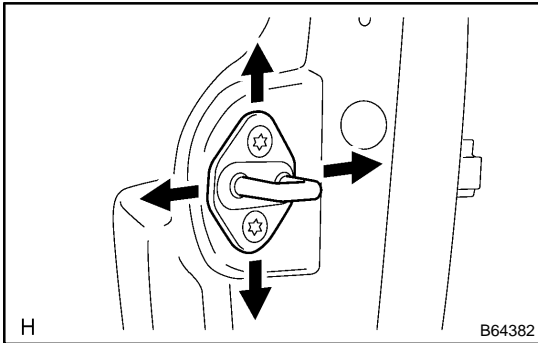


2. ADJUST BACK DOOR PANEL SUB-ASSY

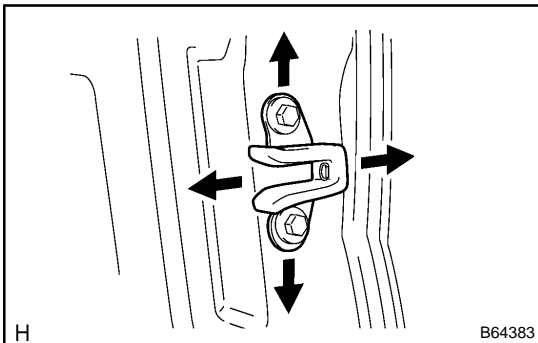
- (a) Adjust the door horizontally and forward/rearward by loosening the 4 body side hinge bolts.
- (b) Tighten the body side hinge bolts after the adjustment.
- Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)**



- (c) Horizontally and vertically adjust the door by loosening the 8 door side hinge bolts.
- (d) Tighten the door side hinge bolts after the adjustment.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



- (e) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.
- (f) Tighten the striker mounting screws after the adjustment.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

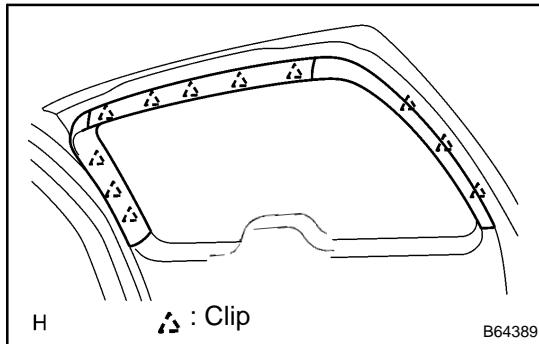


- (g) Adjust the side female stopper so that the door can be opened/closed smoothly, as shown in the illustration.
- (h) Tighten the side female stopper after the adjustment.
Torque: 7.0 N·m (71 kgf·cm, 62 in·lbf)

OVERHAUL

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.



1. REMOVE BACK DOOR GARNISH CENTER

- (a) Using a clip remover, disengage the 5 clips, and remove the garnish center.

2. REMOVE BACK DOOR SIDE GARNISH LH

- (a) Using a clip remover, disengage the 3 clips, and remove the side garnish.

3. REMOVE BACK DOOR SIDE GARNISH RH

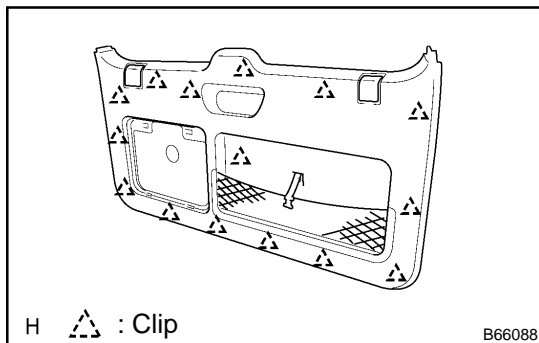
- (a) Using a clip remover, disengage the 3 clips, and remove the side garnish.

4. REMOVE TOOL BOX PANEL SUB-ASSY UPPER

- (a) Remove the tool cover and tool set.

5. REMOVE ASSIST GRIP ASSY

- (a) Remove the 2 assist grip covers and assist grip assy.



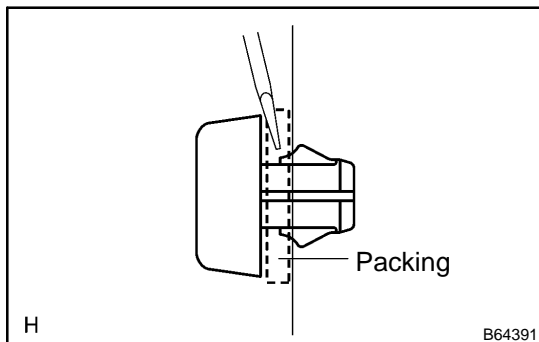
6. REMOVE BACK DOOR TRIM BOARD

- (a) Remove the 2 trim board covers.
 (b) Remove the screw.
 (c) Using a screwdriver, disengage the 15 clips and remove the trim board.

HINT:

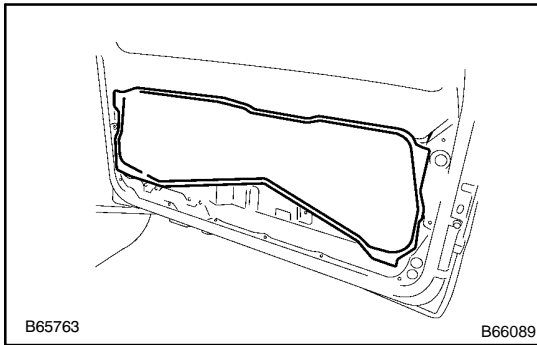
Tape the screwdriver tip before use.

- (d) Remove the 7 screws and trim pocket.
 (e) w/ Speaker
 Remove the 4 screws and rear speaker grille sub-assy LH and RH.

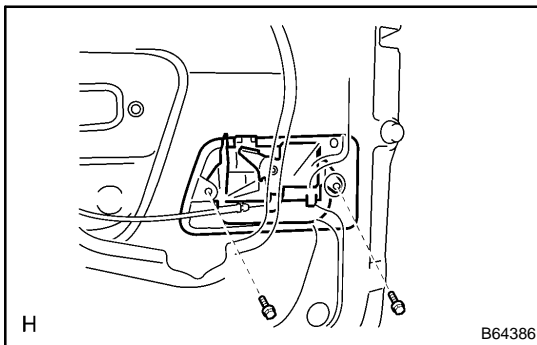


7. REMOVE BACK DOOR STOPPER LOWER

- (a) Remove the packing.
 (b) Using a screwdriver, disengage the claw, and remove the stopper lower.

**8. REMOVE BACK DOOR SERVICE HOLE COVER****NOTICE:**

Remove the remaining tape on the door side.

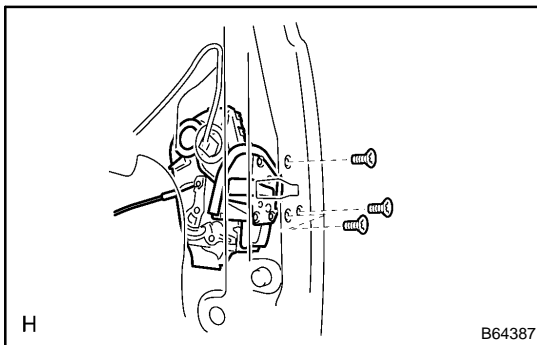
9. REMOVE STEREO COMPONENT SPEAKER ASSY (W/ SPEAKER) (See page 67-20)**10. REMOVE BACK DOOR OUTSIDE HANDLE**

(a) Remove the 2 bolts and outside handle.

(b) Remove the cable.

HINT:

Remove the outside handle through the service hole.

**11. REMOVE W/MOTOR BACK DOOR LOCK ASSY**

(a) Disconnect the door lock connector.

(b) Using a torx® socket wrench (T30), remove the 3 screws and door lock assy.

HINT:

Remove the door lock assy through the service hole.

12. REMOVE LICENSE REAR LAMP COVER (See page 76-34)**13. REMOVE BACK DOOR GARNISH SUB-ASSY OUTSIDE (See page 76-34)****14. REMOVE REAR WIPER MOTOR ASSY (See page 66-10)****15. REMOVE BACK DOOR SIDE FEMALE STOPPER SUB-ASSY RH**

(a) Remove the 2 bolts and female stopper sub-assy.

16. REMOVE BACK DOOR LINK SUB-ASSY LOWER

(a) Remove the top set bolt cap B.

(b) Remove the bolt and back door link sub-assy.

17. REMOVE BACK DOOR STAY RAIL SUB-ASSY RH

(a) Remove the 2 bolts and stay rail sub-assy.

18. REMOVE REAR BUMPER COVER (See page 76-5)**19. REMOVE BACK DOOR STAY BRACKET SUB-ASSY RH**

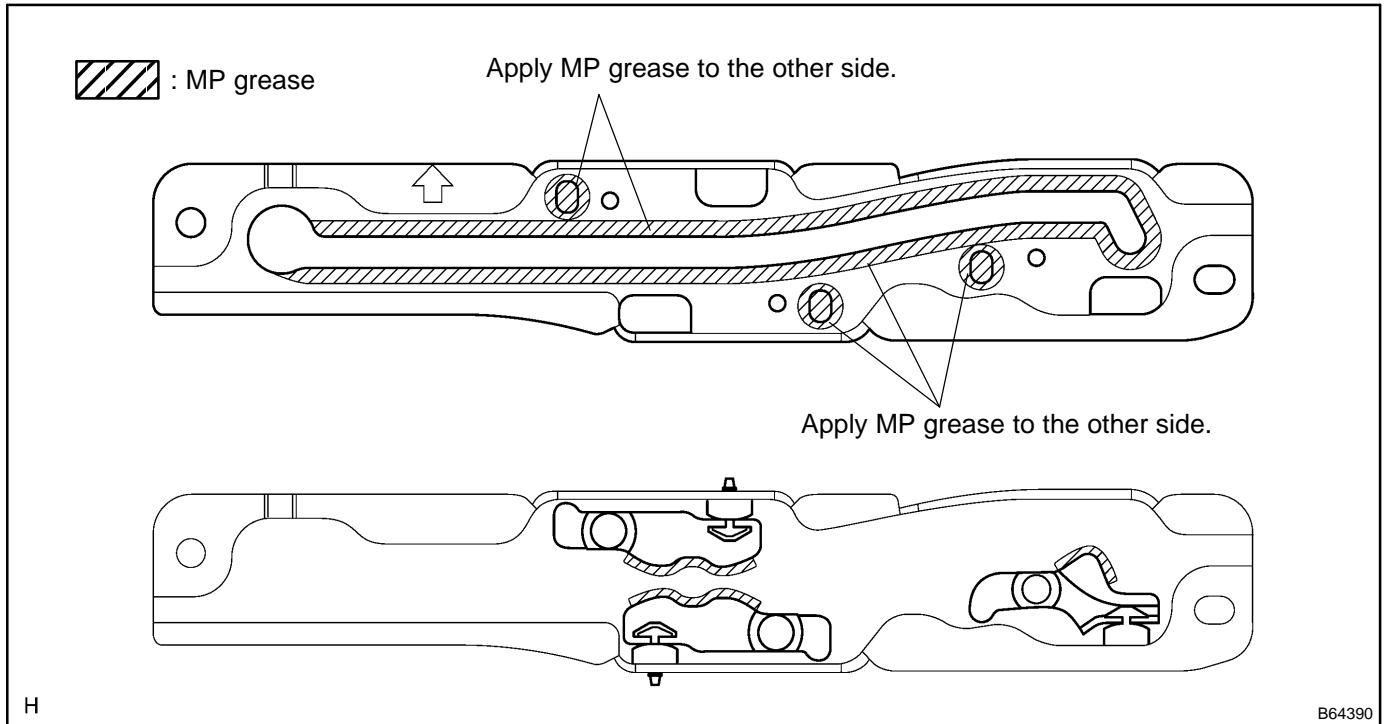
(a) Remove the 2 bolts and stay bracket sub-assy.

20. INSTALL BACK DOOR STAY BRACKET SUB-ASSY RH

- (a) Install the back door stay bracket sub-assy with the 2 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

21. INSTALL BACK DOOR STAY RAIL SUB-ASSY RH

- (a) Apply MP grease to the sliding parts of the stay rail sub-assy, as shown in the illustration.



- (b) Install the stay rail sub-assy with the 2 bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

- (c) Install the top set bolt cap B.

22. INSTALL BACK DOOR LINK SUB-ASSY LOWER

- (a) Install the link sub-assy with the bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

23. INSTALL BACK DOOR SIDE FEMALE STOPPER SUB-ASSY RH

- (a) Install the female stopper with the 2 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62 in·lbf)

24. INSTALL W/MOTOR BACK DOOR LOCK ASSY

- (a) Apply MP grease to the sliding and rotating parts of the door lock assy.
 (b) If reusing door lock assy:
 Install a new door lock wire harness packing.

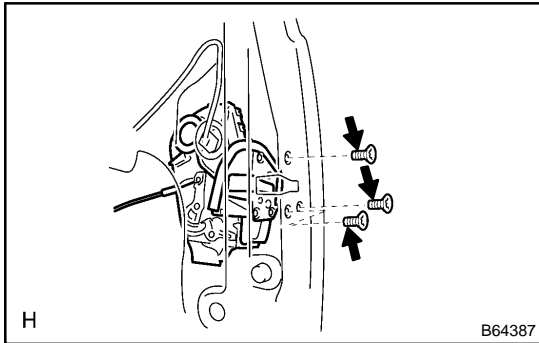
NOTICE:

- If reusing the door lock that has been removed, replace the packing in the connecting part with a new one.
- Be careful that no grease and dirt sticks to the packing surface in the connecting part.
- Reusing removed packing or using damaged packing will allow water to penetrate through to the connecting part, resulting in a malfunction of the door lock.

- (c) Insert the outside handle link into the door lock, and then set it to the door panel.

NOTICE:

Make sure that the outside handle link is securely engaged with the lock assembly.



- (d) Apply adhesive to the threads of the screws.

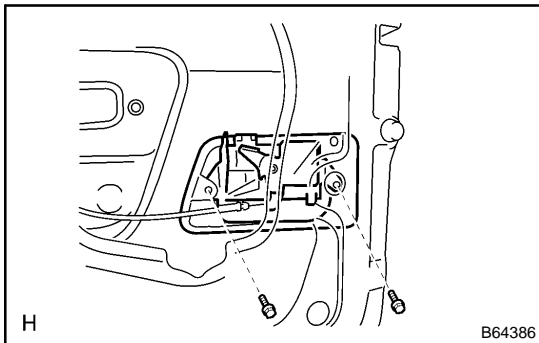
Adhesive:

Part No. 08833-00070, THREE BOND 1324 or equivalent

- (e) Using a torx[®] socket wrench (T30), install the door lock assy with the 3 screws.

Torque: 5.0 N·m (51 kgf·cm, 42 in·lbf)

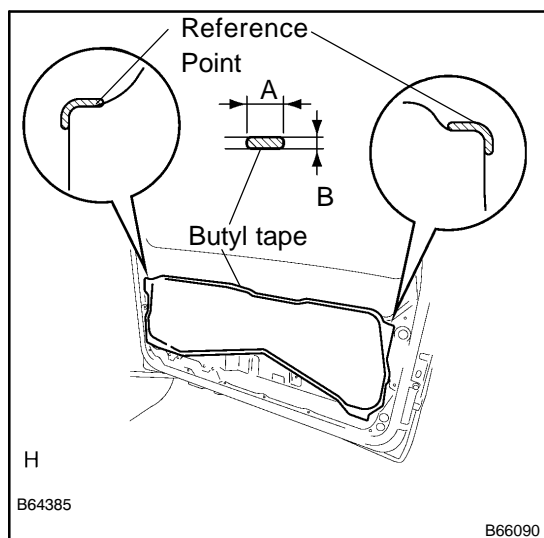
- (f) Connect the door lock connector.

**25. INSTALL BACK DOOR OUTSIDE HANDLE**

- (a) Install the handle with the 2 bolts.

Torque: 5.0 N·m (51 kgf·cm, 42 in·lbf)

26. INSTALL STEREO COMPONENT SPEAKER ASSY(W/ SPEAKER) (See page 67-20)



27. INSTALL BACK DOOR SERVICE HOLE COVER (W/ SPEAKER)

- (a) Apply butyl tape to the door, as shown in the illustration.

Adhesive:

Part No. 08850-00065, Butyl Tape Set or equivalent

- (b) Install the service hole cover.

HINT:

- When installing the service hole cover, pull out the links and connectors through the service hole cover.
- There should be no wrinkles or folds after attaching the service hole cover.
- After attaching the service hole cover, confirm the sealing condition.

Dimensions:

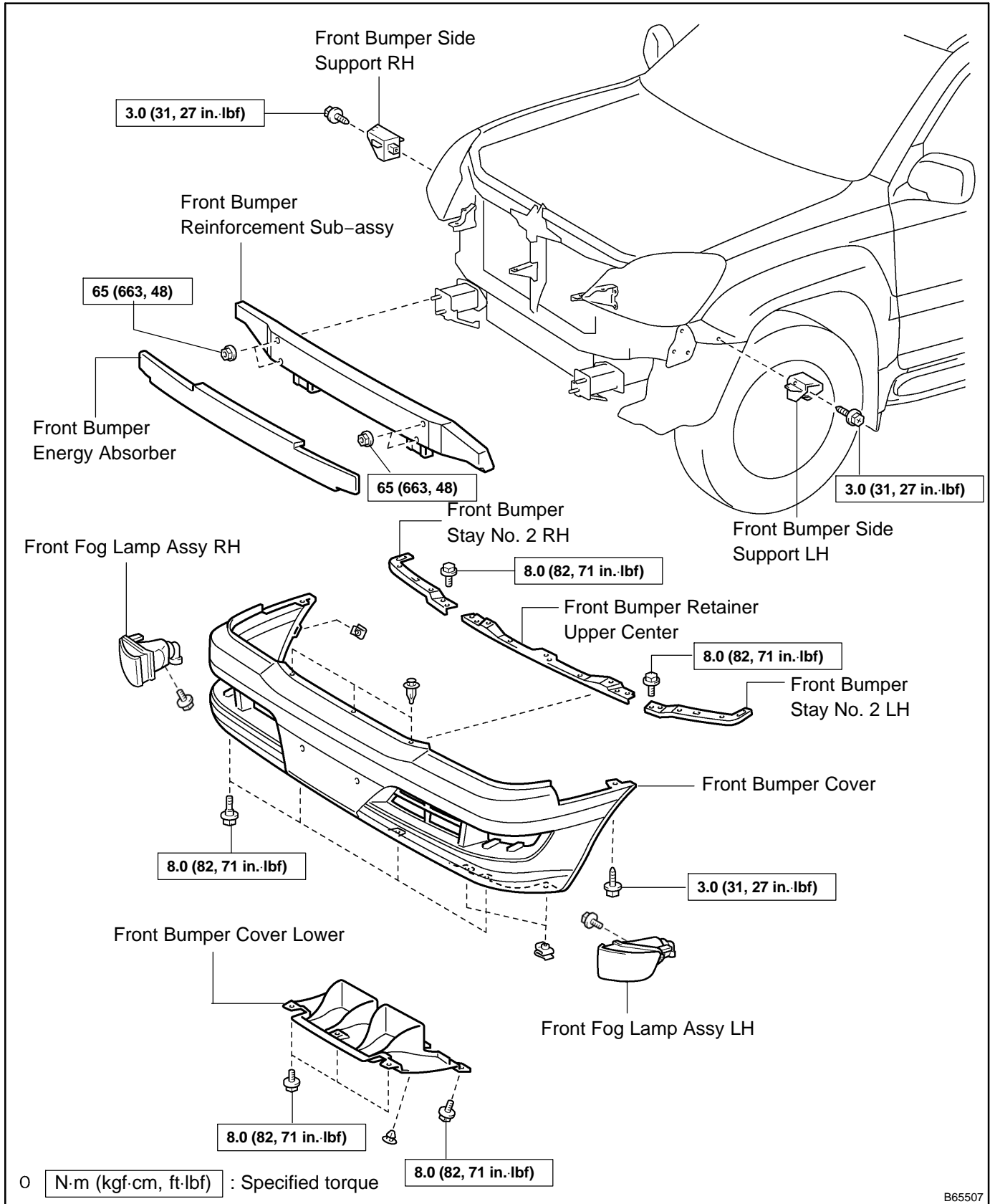
A	6.0 mm (0.236 in.)
B	2.0 mm (0.079 in.)

- (c) Install the 2 tool box brackets with the 4 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

FRONT BUMPER COMPONENTS

760RM-02

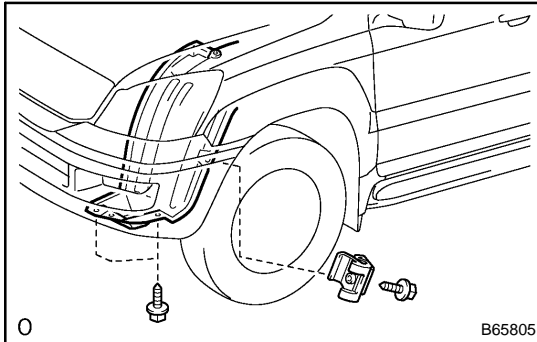


B65507

REPLACEMENT

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.



- 1. REMOVE FRONT FENDER LINER LH**
 - (a) Remove the 3 screws.
 - (b) Remove the front part of the fender liner.

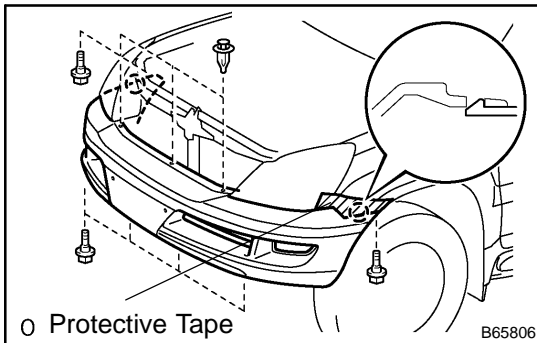
2. REMOVE FRONT FENDER LINER RH

HINT:

Use the same procedures above for the LH side.

3. REMOVE FRONT BUMPER COVER LOWER

- (a) Remove the 5 bolts, clip, and bumper cover lower.



- 4. REMOVE FRONT BUMPER COVER**
 - (a) Put protective tape under the front fender.
 - (b) Disconnect the fog lamp connector.
 - (c) Remove the 2 screws and 4 bolts.
 - (d) Remove the 3 clips.
 - (e) Using a screwdriver, disengage the 6 claws and remove the bumper cover.

HINT:

Tape the screwdriver tip before use.

5. REMOVE FRONT BUMPER STAY NO.2 LH

- (a) Remove the 2 bolts, 2 nuts, and bumper stay.

6. REMOVE FRONT BUMPER STAY NO.2 RH

- (a) Remove the 2 bolts, 2 nuts, and bumper stay.

7. REMOVE FRONT BUMPER RETAINER UPPER CENTER

- (a) Remove the bolt and bumper retainer upper center.

8. REMOVE FRONT BUMPER SIDE SUPPORT LH

- (a) Remove the screw and side support.

9. REMOVE FRONT BUMPER SIDE SUPPORT RH

- (a) Remove the screw and side support.

10. REMOVE FRONT BUMPER ENERGY ABSORBER

11. REMOVE FRONT BUMPER REINFORCEMENT SUB-ASSY

- (a) Remove the 4 nuts and reinforcement sub-assy.

12. REMOVE FRONT FOG LAMP ASSY LH

- (a) Remove the bolt and fog lamp.

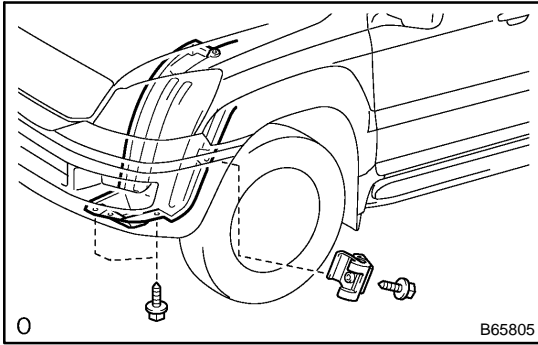
13. REMOVE FRONT FOG LAMP ASSY RH

- (a) Remove the bolt and fog lamp.

14. INSTALL FRONT BUMPER REINFORCEMENT SUB-ASSY

- (a) Install the front bumper reinforcement with the 4 nuts.

Torque: 65 N·m (663 kgf·cm, 48 ft·lbf)

**15. INSTALL FRONT FENDER LINER LH**

- (a) Install the front part of the fender liner.
- (b) Install the 3 screws.

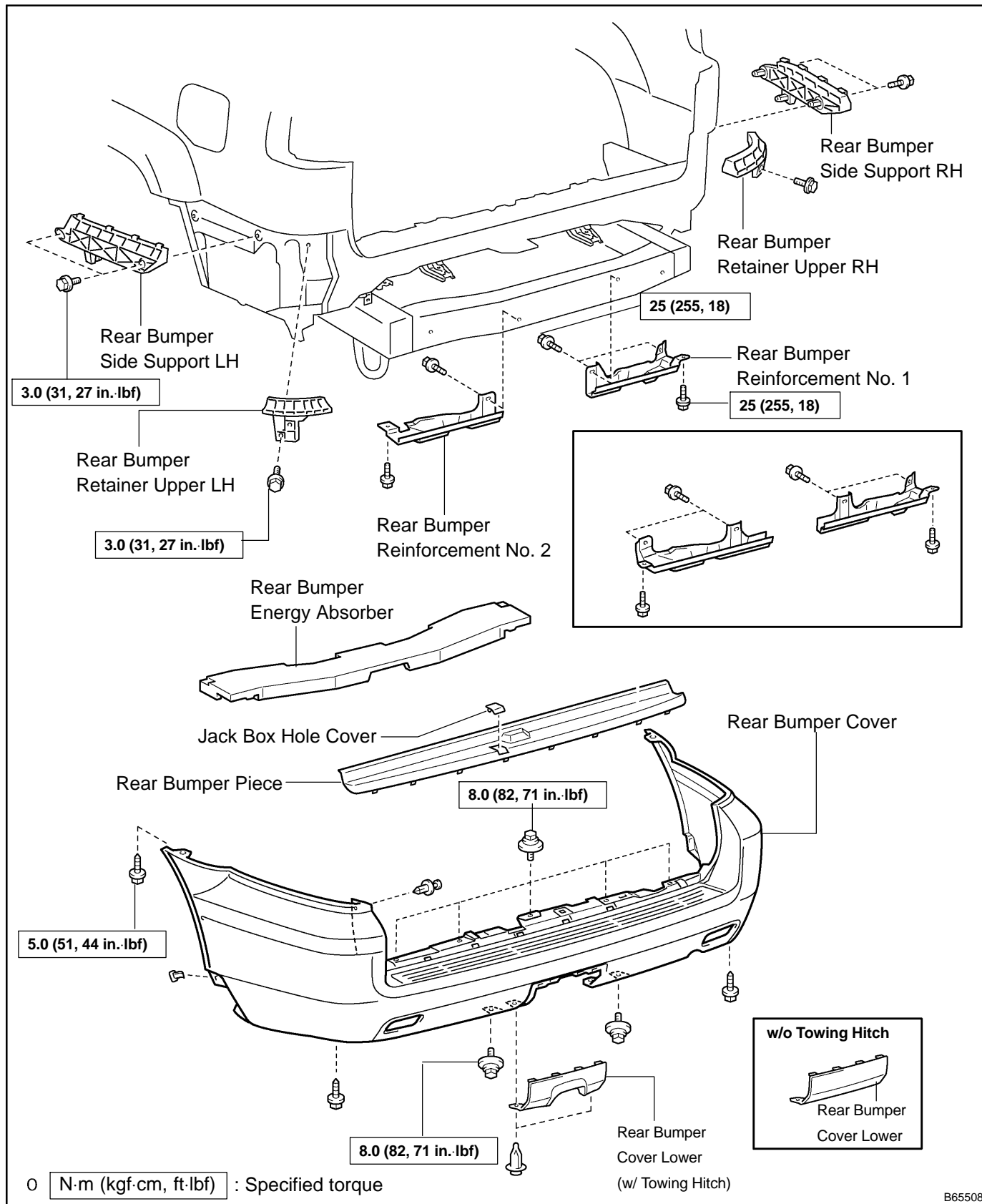
16. INSTALL FRONT FENDER LINER RH

HINT:

Use the same procedures above for the LH side.

REAR BUMPER COMPONENTS

760RQ-01



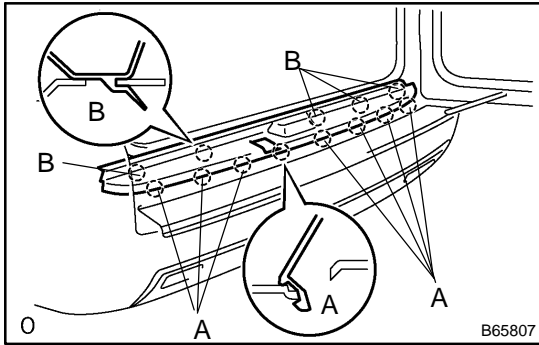
B65508

REPLACEMENT

HINT:

The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE BACK DOOR LINK SUB-ASSY LOWER



2. REMOVE REAR BUMPER PIECE

- (a) Using a screwdriver, disengage the claws and remove the hole cover.

HINT:

Tape the screwdriver tip before use.

- (b) Remove the bolt and back door stay.
 (c) Using a screwdriver, disengage the claws and remove the bumper piece.

HINT:

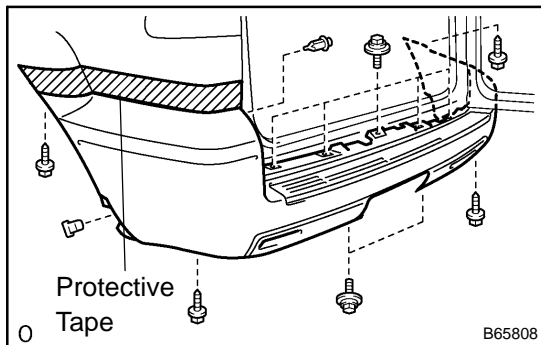
Tape the screwdriver tip before use.

3. REMOVE REAR BUMPER COVER LOWER

- (a) Remove the 2 clips.
 (b) Using a screwdriver, disengage the claws and remove the cover.

HINT:

Tape the screwdriver tip before use.



4. REMOVE REAR BUMPER COVER

- (a) Put protective tape under the quarter panel and over fender.
 (b) Remove the 7 bolts, 4 screws and clip.
 (c) Using a screwdriver, disengage the 10 claws and remove the bumper cover.

HINT:

Tape the screwdriver tip before use.

5. REMOVE REAR BUMPER ENERGY ABSORBER

6. REMOVE REAR BUMPER REINFORCEMENT NO.1

- (a) w/ Towing hitch:
 Remove the 3 bolts and reinforcement.
 (b) w/o Towing hitch:
 Remove the 3 bolts and reinforcement.

7. REMOVE REAR BUMPER REINFORCEMENT NO.2

- (a) w/ Towing hitch:
 Remove the 2 bolts and reinforcement.
 (b) w/o Towing hitch:
 Remove the 3 bolts and reinforcement.

8. REMOVE REAR BUMPER RETAINER UPPER LH

- (a) Remove the screw and retainer.

9. REMOVE REAR BUMPER RETAINER UPPER RH

- (a) Remove the screw and retainer.

- 10. REMOVE REAR BUMPER SIDE SUPPORT LH**
 - (a) Remove the 2 screws and side support.
- 11. REMOVE REAR BUMPER SIDE SUPPORT RH**
 - (a) Remove the 2 screws and side support.
- 12. INSTALL REAR BUMPER REINFORCEMENT NO.1**
- 13. INSTALL REAR BUMPER REINFORCEMENT NO.2**
- 14. INSTALL BACK DOOR LINK SUB-ASSY LOWER**

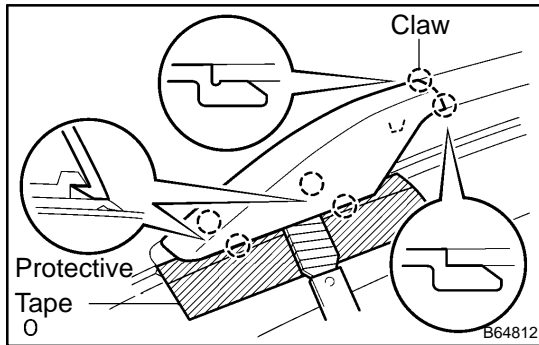
ROOF RACK ASSY LH

REPLACEMENT

760S2-01

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedure as on the LH side.



1. REMOVE ROOF RACK LEG COVER FRONT LH

- Put protective tape under the roof panel.
- Using a scraper, disengage the 6 claws and remove the leg cover.

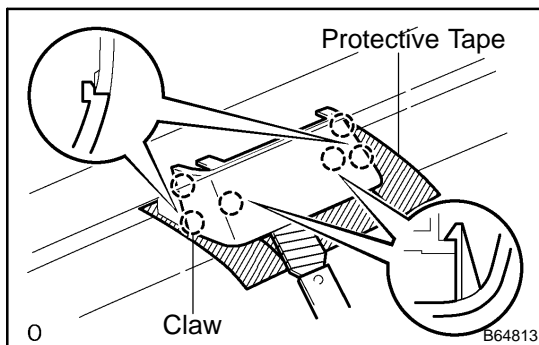
HINT:

Tape the scraper tip before use.

2. REMOVE ROOF RACK LEG COVER FRONT RH

HINT:

Use the same procedures described above for the LH side.



3. REMOVE ROOF RACK LEG COVER CENTER LH

- Put protective tape under the roof panel.
- Using a scraper, disengage the 6 claws and remove the leg cover.

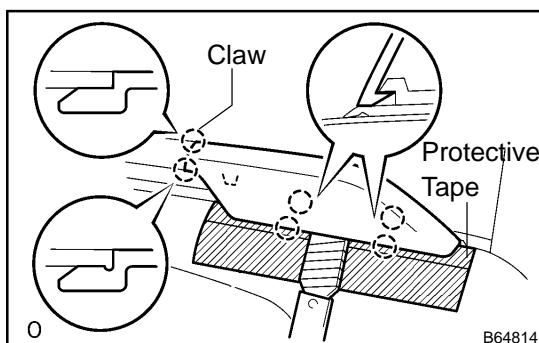
HINT:

Tape the scraper tip before use.

4. REMOVE ROOF RACK LEG COVER CENTER RH

HINT:

Use the same procedures described above for the LH side.



5. REMOVE ROOF RACK LEG COVER REAR LH

- Put protective tape under the roof panel.
- Using a scraper, disengage the 6 claws and remove the leg cover.

HINT:

Tape the scraper tip before use.

6. REMOVE ROOF RACK LEG COVER REAR RH

HINT:

Use the same procedures described above for the LH side.

7. REMOVE ROOF RACK ASSY LH

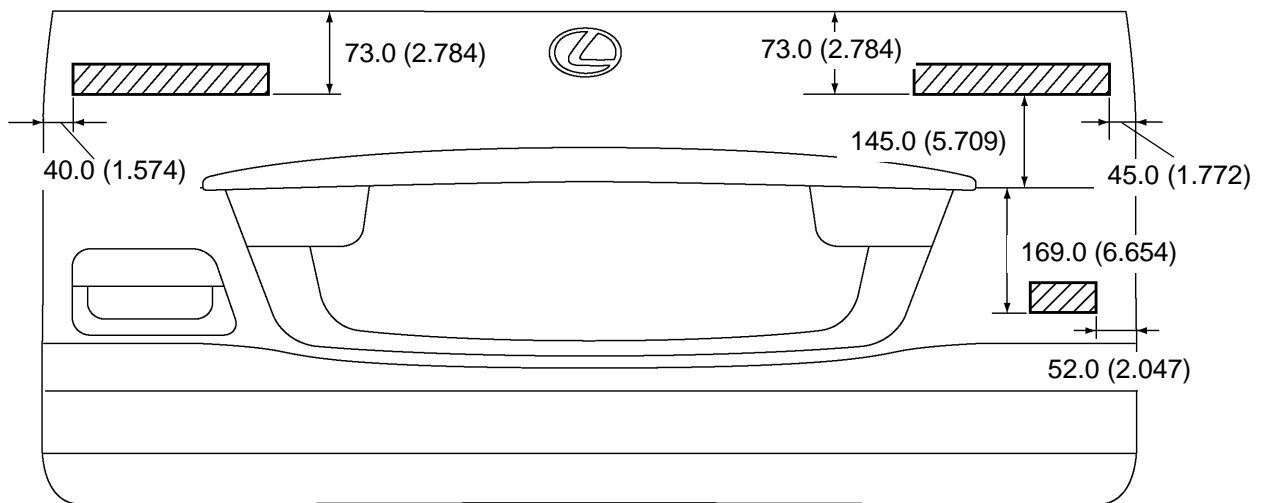
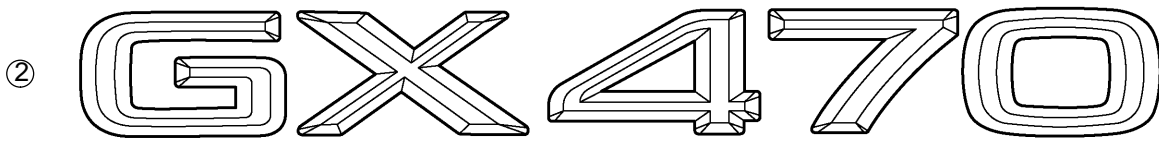
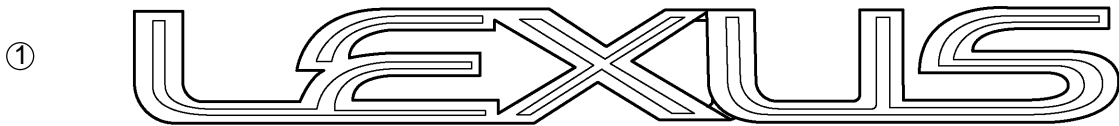
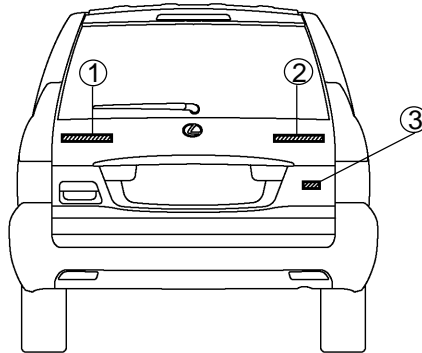
(a) Remove the 5 bolts and roof rack assy.

8. REMOVE ROOF RACK ASSY RH

(a) Remove the 5 bolts and roof rack assy.

NAME PLATE REPLACEMENT

760RR-01



H

mm (in.)

B65771

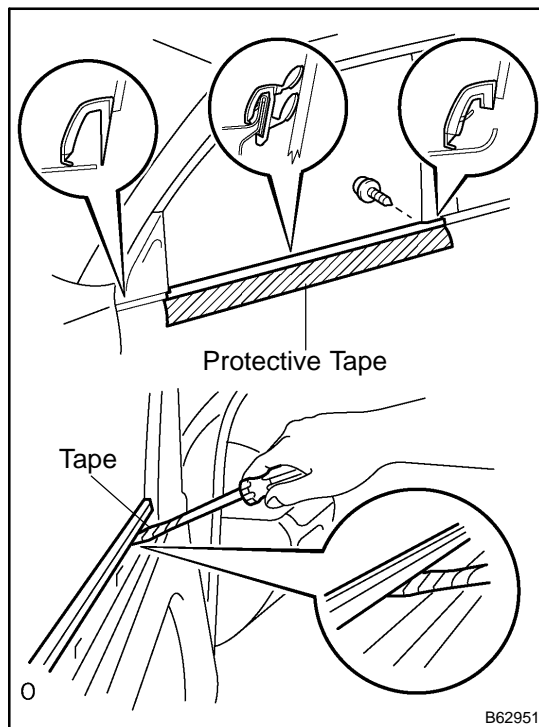
FRONT DOOR BELT MOULDING LH

REPLACEMENT

760RK-01

HINT:

- The installation is in the reverse order of the removal.
 - On the RH side, use the same procedures as on the LH side.
1. REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSY (See page 75-13)
 2. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page 75-13)
 3. REMOVE FRONT DOOR INSIDE HANDLE BEZEL LH (See page 75-13)
 4. REMOVE FRONT ARMREST ASSY LH (See page 75-13)
 5. REMOVE FRONT DOOR TRIM BOARD SUB-ASSY LH (See page 75-13)
 6. REMOVE FRONT DOOR SERVICE HOLE COVER LH (See page 75-13)
 7. REMOVE OUTER REAR VIEW MIRROR ASSY LH (See page 75-13)
 8. REMOVE FRONT DOOR WINDOW FRAME MOULDING REAR LH (See page 76-28)



9. REMOVE FRONT DOOR BELT MOULDING LH

- (a) Put protective tape under the moulding.
- (b) Remove the screw.
- (c) Using a screwdriver or moulding remover, disengage the claw and remove the moulding.

HINT:

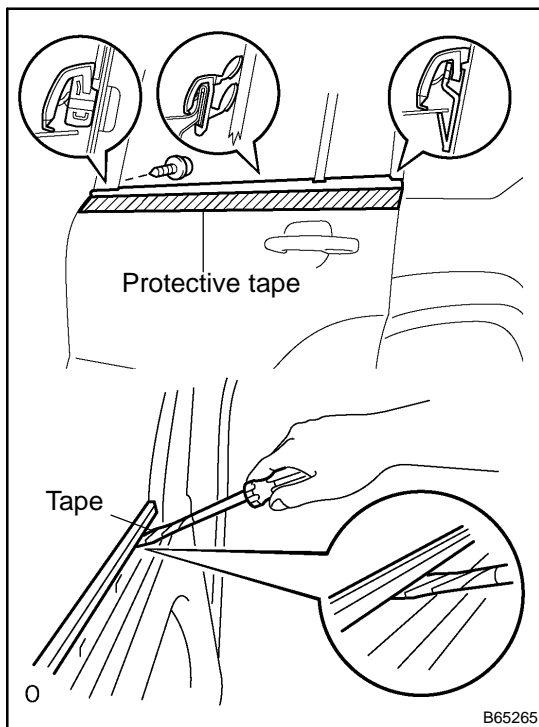
Tape the screwdriver tip before use.

REAR DOOR BELT MOULDING LH REPLACEMENT

760RL-01

HINT:

- The installation is in the reverse order of the removal.
 - On the RH side, use the same procedures as on the LH side.
1. REMOVE POWER WINDOW REGULATOR SWITCH ASSY REAR (See page 75-26)
 2. REMOVE REAR DOOR INSIDE HANDLE BEZEL LH (See page 75-26)
 3. REMOVE REAR LH ARMREST ASSY (See page 75-26)
 4. REMOVE REAR DOOR TRIM BOARD SUB-ASSY LH (See page 75-26)
 5. REMOVE REAR DOOR WINDOW FRAME MOULDING FRONT LH (See page 76-28)



6. REMOVE REAR DOOR BELT MOULDING LH

- (a) Put protective tape under the moulding.
- (b) Remove the screw.
- (c) Using a screwdriver or moulding remover, disengage the claw and remove the moulding.

HINT:

Tape the screwdriver tip before use.

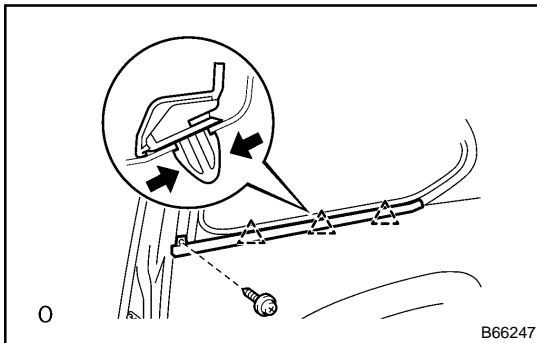
QUARTER BELT MOULDING LH

REPLACEMENT

760RZ-01

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the RH side, use the same procedures as on the LH side.
1. **REMOVE REAR NO. 2 SEAT ASSY LH (See page 72-42)**
 2. **REMOVE ROOF SIDE GARNISH INNER LH (See page 76-38)**
 - (a) Remove the quarter scuff plate inside LH.
 - (b) Remove the rear door scuff plate LH.
 - (c) Remove the rear door opening trim weatherstrip LH.
 - (d) Remove the back door weatherstrip.
 - (e) Remove the rear floor mat support plate rear.
 - (f) Remove the quarter inside trim board LH.
 - (g) Remove the roof side garnish inner LH.
 - (h) Remove the quarter window assy LH.



3. REMOVE QUARTER BELT MOULDING LH

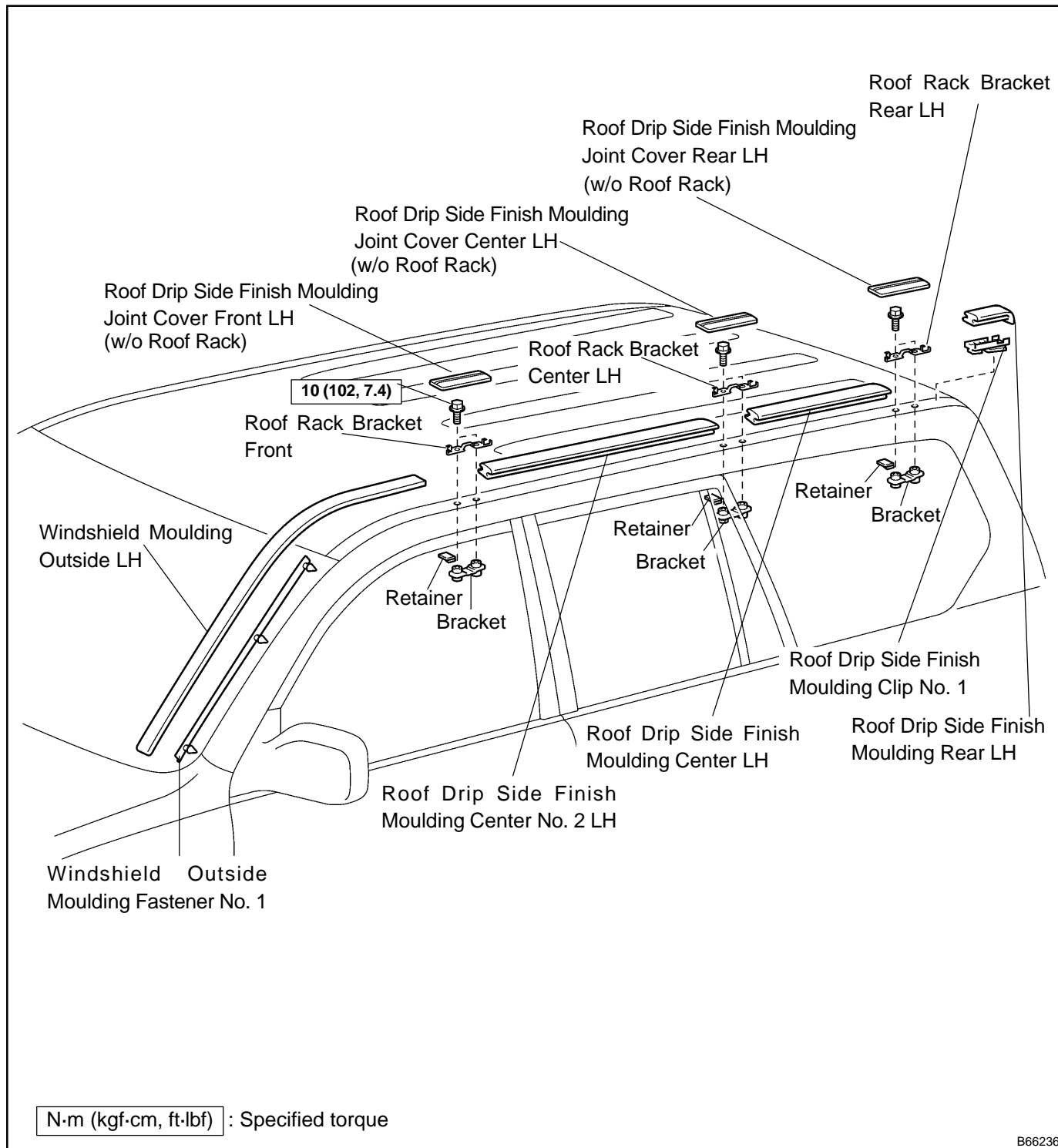
- (a) Remove the screw.
- (b) Using long nose pliers, disengage the 3 claws and remove the belt moulding.

HINT:

Tape the tips of the pliers before use.

ROOF DRIP SIDE FINISH MOULDING LH COMPONENTS

760RN-01

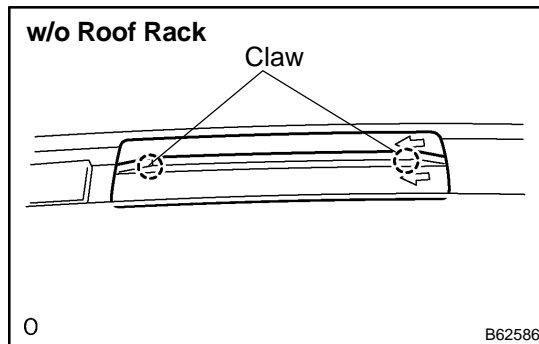


REPLACEMENT

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedures as on the LH side.

1. REMOVE ROOF RACK ASSY LH (w/ ROOF RACK) (See page 76-7)

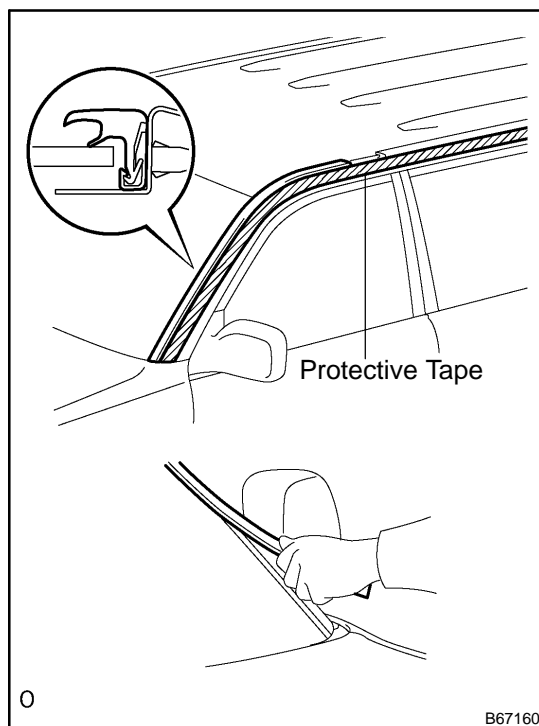


2. REMOVE ROOF DRIP SIDE FINISH MOULDING JOINT COVER FRONT LH (W/O ROOF RACK)

- (a) Using a screwdriver, disengage the 2 claws and remove the joint cover.

HINT:

Tape the screwdriver tip before use.

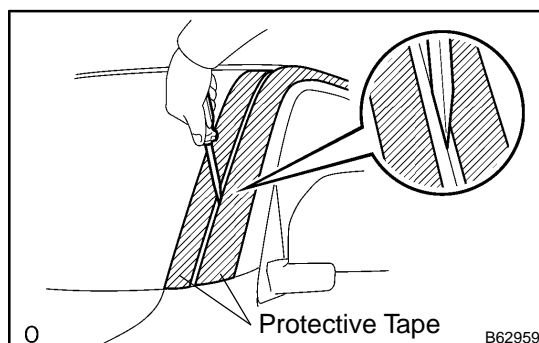


3. REMOVE WINDSHIELD MOULDING OUTSIDE LH

- (a) Put protective tape around the moulding.
- (b) Pull out the moulding by hand.

NOTICE:

- Be careful not to damage the moulding.
- If the moulding is damaged, exchange it for a new one.

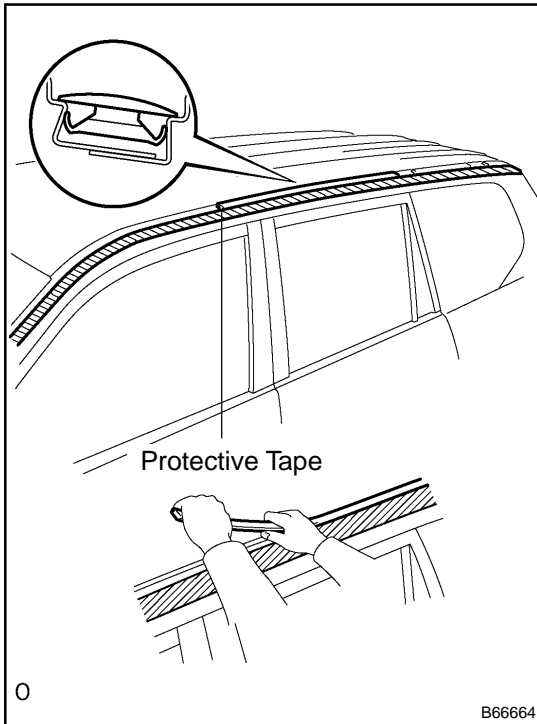


4. REMOVE WINDSHIELD OUTSIDE MOULDING FASTENER NO.1

- (a) Put protective tape around the fastener.
- (b) Using a screwdriver, disengage the 3 clips, and pull out the fastener by hand.

NOTICE:

- Be careful not to damage the windshield and fastener.
- If the windshield and fastener are damaged, exchange them for new ones.

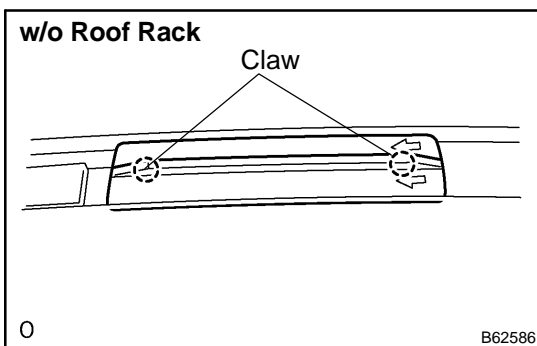


5. REMOVE ROOF DRIP SIDE FINISH MOULDING CENTER NO.2 LH

- (a) Put protective tape around the moulding.
- (b) Pull out the moulding by hand.

NOTICE:

Be careful not to damage the moulding.

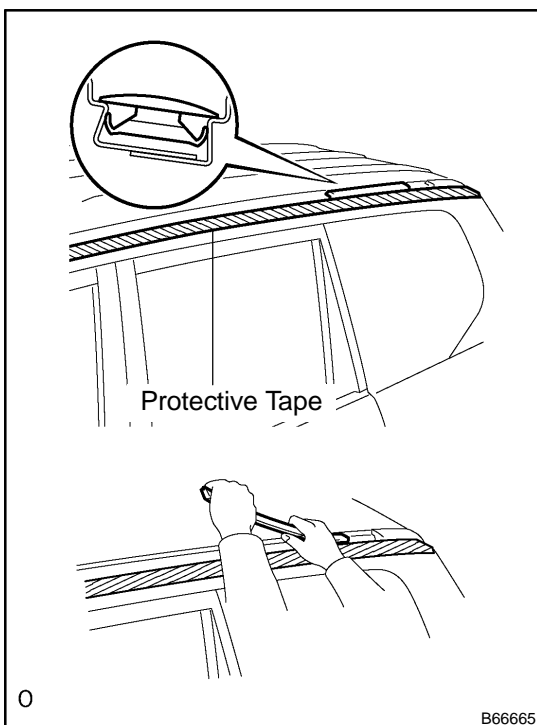


6. REMOVE ROOF DRIP SIDE FINISH MOULDING JOINT COVER CENTER LH (W/O ROOF RACK)

- (a) Using a screwdriver, disengage the 2 claws and remove the joint cover.

HINT:

Tape the screwdriver tip before use.

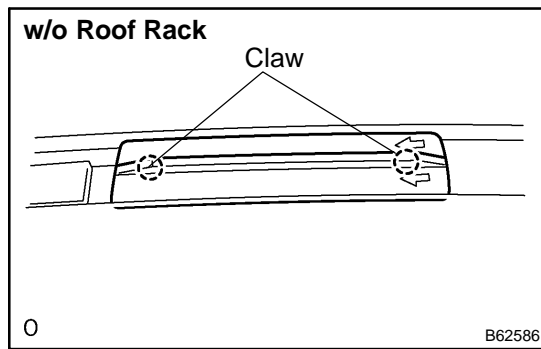


7. REMOVE ROOF DRIP SIDE FINISH MOULDING CENTER LH

- (a) Put protective tape around the moulding.
- (b) Pull out the moulding by hand.

NOTICE:

Be careful not to damage the moulding.

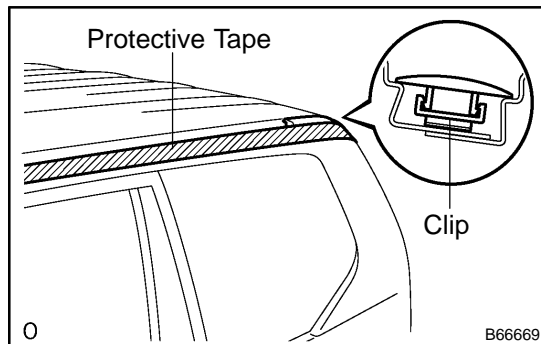


8. REMOVE ROOF DRIP SIDE FINISH MOULDING JOINT COVER REAR LH (W/O ROOF RACK)

- (a) Using a screwdriver, disengage the 2 claws and remove the joint cover.

HINT:

Tape the screwdriver tip before use.

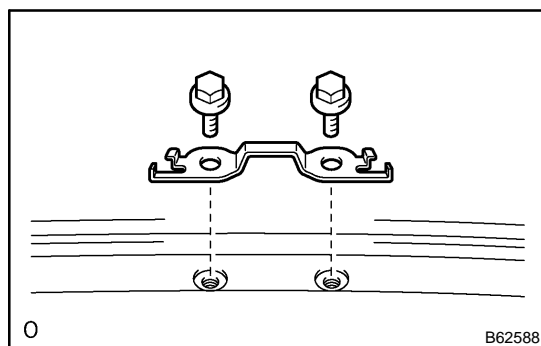


9. REMOVE ROOF DRIP SIDE FINISH MOULDING REAR LH

- (a) Put protective tape around the moulding.
 (b) Pull out the moulding by hand.

NOTICE:

- Be careful not to damage the moulding.
- Do not remove the clips.
- If the clips are damaged or removed accidentally, exchange them with new ones.



10. REMOVE ROOF RACK BRACKET FRONT

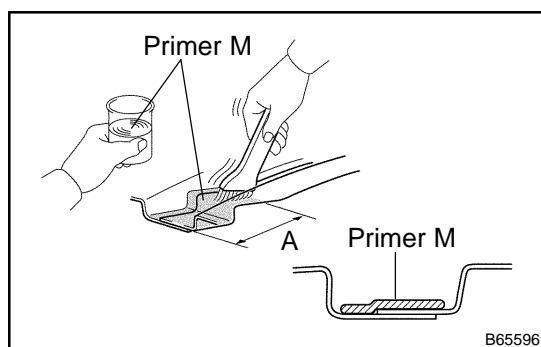
- (a) Remove the 2 bolts and bracket.

11. REMOVE ROOF RACK BRACKET CENTER LH

- (a) Remove the 2 bolts and bracket.

12. REMOVE ROOF RACK BRACKET REAR LH

- (a) Remove the 2 bolts and bracket.



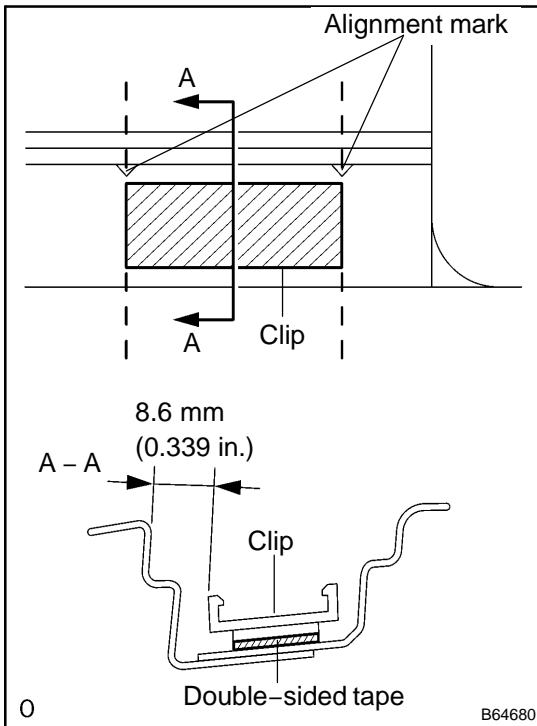
13. INSTALL ROOF DRIP SIDE FINISH MOULDING CLIP NO.1

- (a) Using a brush, coat the exposed parts of the body on the vehicle side with Primer M.

Dimension (A): 40.0 mm (3.125 in.)

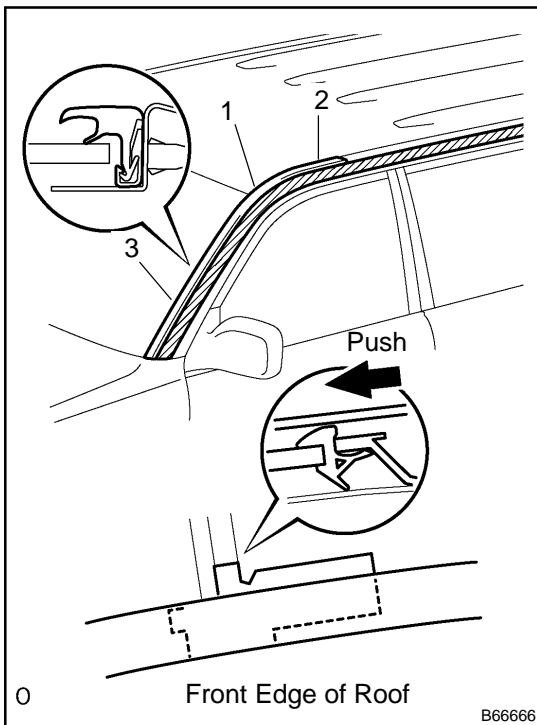
NOTICE:

- Allow the primer coating to dry for 3 minutes or more.
- Do not coat the adhesive with Primer M.
- Do not keep any of the opened Primer M for later use.



(b) Apply new double-sided tape to the clip, as shown in the illustration.

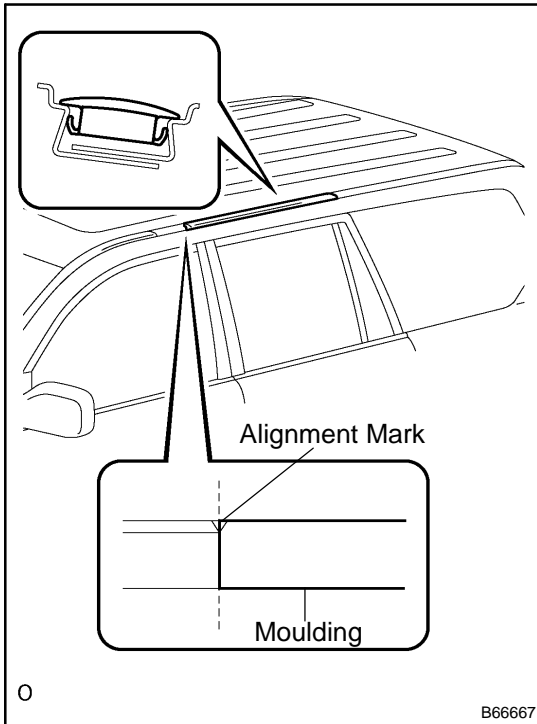
- (1) Attach the clip onto the protrusion on the vehicle body with double-sided tape.



14. INSTALL WINDSHIELD MOULDING OUTSIDE LH

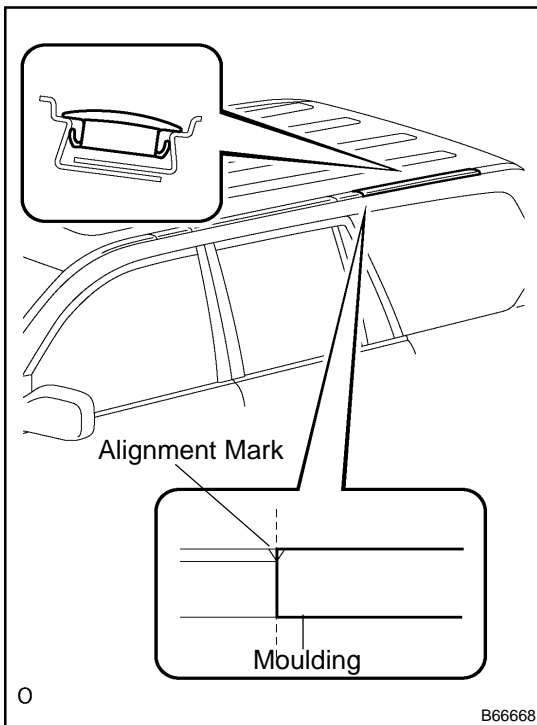
(a) Install the moulding, as shown in the illustration.

- (1) Install the middle of the moulding onto the front edge of the roof.
- (2) Install the rear end of the moulding along the side edge of the roof.
- (3) Install the front end of the moulding along the side edge of the windshield.



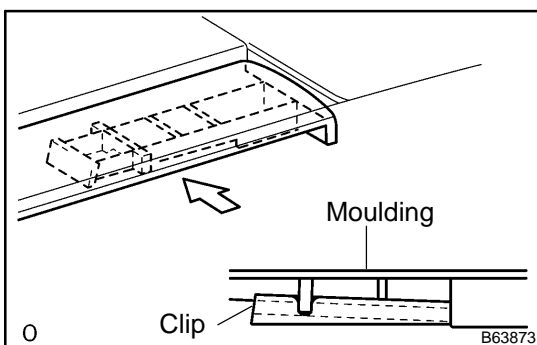
15. INSTALL ROOF DRIP SIDE FINISH MOULDING CENTER NO.2 LH

- (a) Install the moulding, as shown in the illustration.
 - (1) Aligning the front end of the moulding with the alignment mark on the body, install the moulding.



16. INSTALL ROOF DRIP SIDE FINISH MOULDING CENTER LH

- (a) Install the moulding, as shown in the illustration.
 - (1) Aligning the front end of the moulding with the alignment mark on the body, install the moulding.

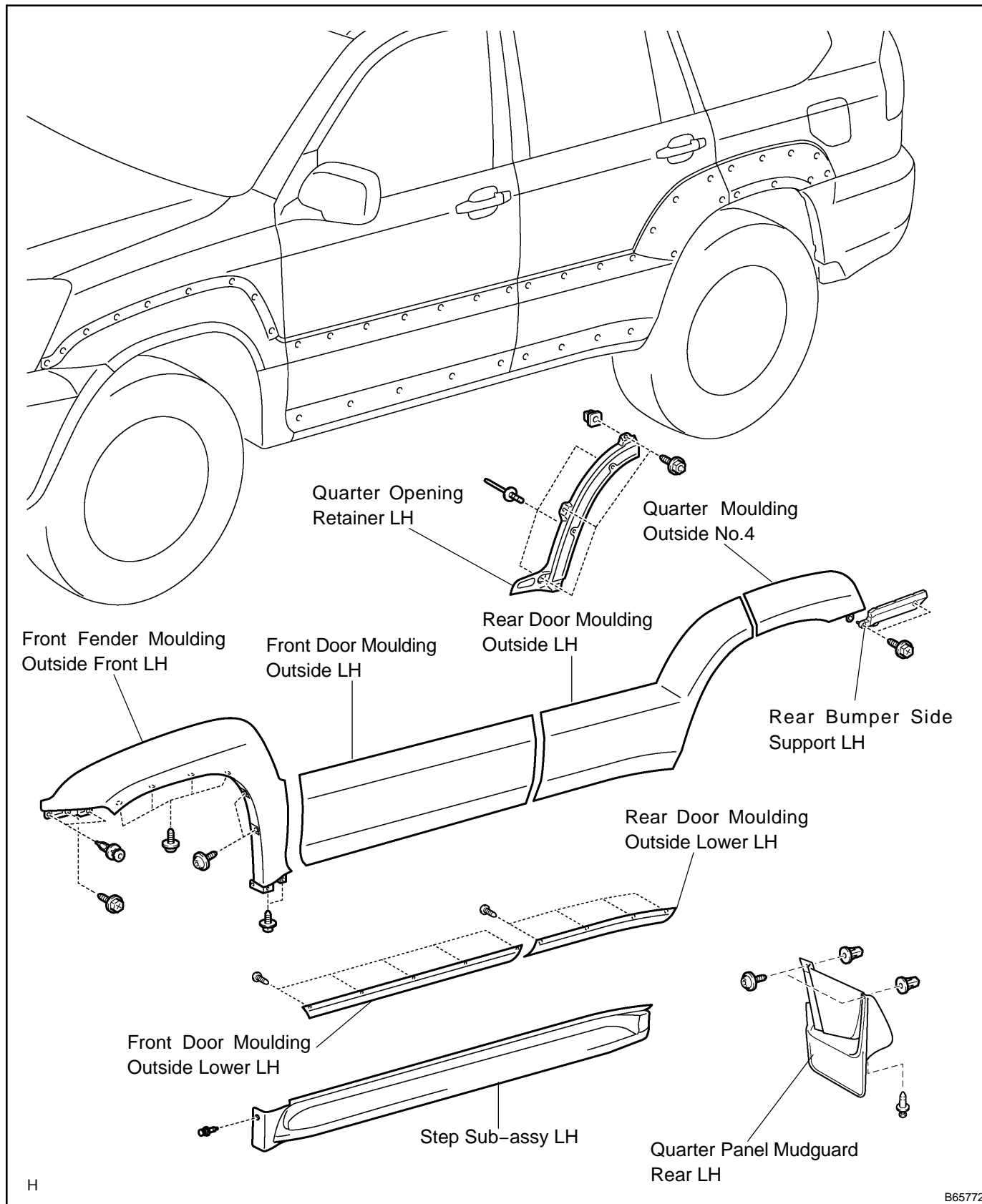


17. INSTALL ROOF DRIP SIDE FINISH MOULDING REAR LH

- (a) Install the moulding, as shown in the illustration.

OUTSIDE MOULDING COMPONENTS

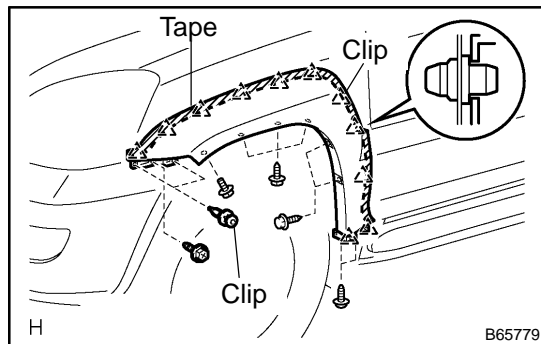
760RI-02



REPLACEMENT

HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
 - On the RH side, use the same procedures as on the LH side.
1. REMOVE FRONT WHEEL LH
 2. REMOVE FRONT BUMPER COVER (See page 76-2)
 3. REMOVE FRONT BUMPER SIDE SUPPORT LH (See page 76-2)
 4. REMOVE STEP SUB-ASSY LH (See page 76-33)



5. REMOVE FRONT FENDER MOULDING OUTSIDE FRONT LH

- (a) Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the moulding excessively.

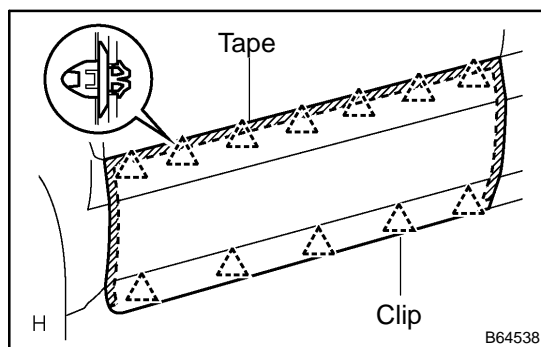
- (b) Using a knife, cut the double-sided tape.

NOTICE:

- If reusing the moulding, take care not to damage the moulding.
 - Do not damage the body.
- (c) Remove the 8 screws.
 - (d) Disengage the 13 clips and remove the moulding.

NOTICE:

If the clips are damaged, exchange them for new clips.



6. REMOVE FRONT DOOR MOULDING OUTSIDE LH

- (a) Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the moulding excessively.

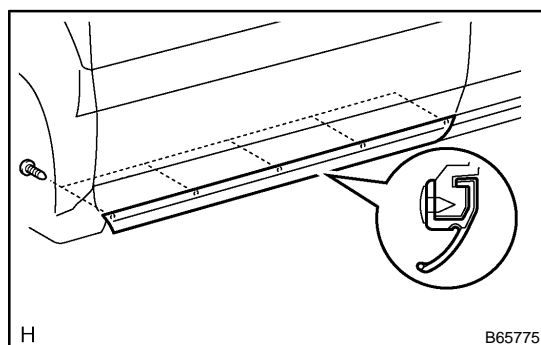
- (b) Using a knife, cut the double-sided tape.

NOTICE:

- If reusing the moulding, take care not to damage the moulding.
 - Do not damage the body.
- (c) Disengage the 12 clips and remove the moulding.

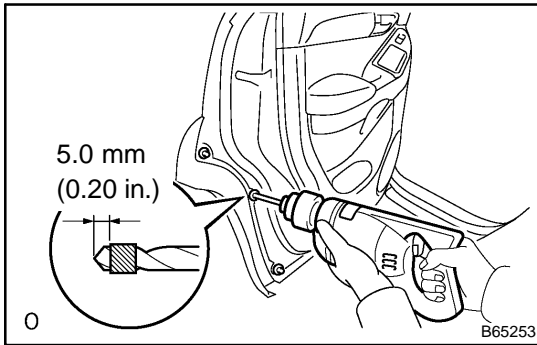
NOTICE:

If the clips are damaged, exchange them for new ones.



7. REMOVE FRONT DOOR MOULDING OUTSIDE LOWER LH

- (a) Remove the 5 screws.
- (b) Disengage the moulding.

**8. REMOVE REAR DOOR MOULDING OUTSIDE LH**

- (a) Using a drill of less than ϕ 4 mm (0.16 in.), gently and perpendicularly place the drill tip onto the rivet and cut the rivet flanges.

HINT:

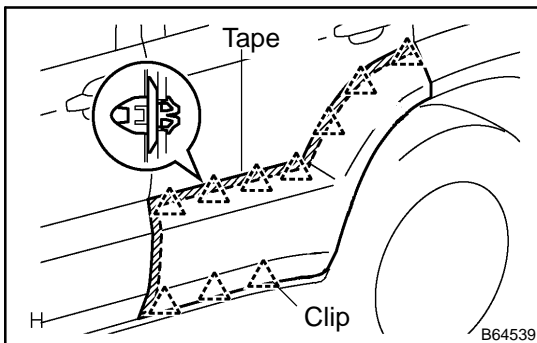
Wind tape around the drill blade so that the drill blade appears approx. 5.0 mm (0.20 in.) on the edge.

NOTICE:

- Be sure to gently place the drill perpendicular to the rivet, otherwise the rivet hole and the drill itself will be damaged.
 - Be careful when performing this task, as the cut rivet is hot.
- (b) Even if the flange is taken off, continue drilling and push out the remaining fragment with the drill.
- (c) Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the moulding excessively.



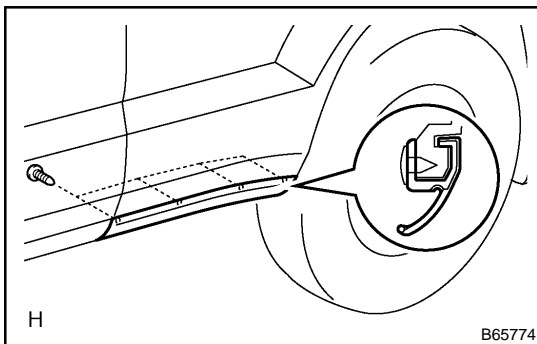
- (d) Using a knife, cut the double-sided tape.

NOTICE:

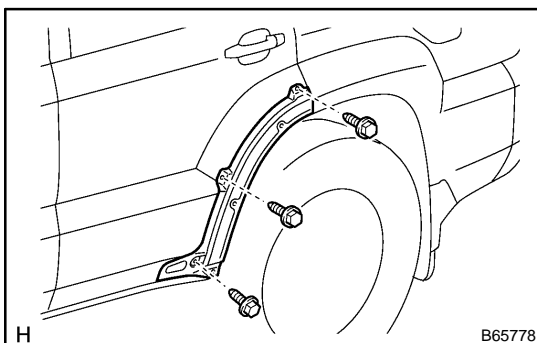
- If reusing the moulding, take care not to damage the moulding.
 - Do not damage the body.
- (e) Remove the 10 clips and the moulding.

NOTICE:

If the clips are damaged, exchange them for new ones.

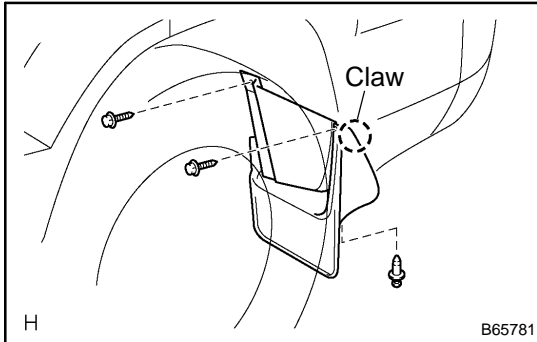
**9. REMOVE REAR DOOR OUTSIDE MOULDING LOWER LH**

- (a) Remove the 4 screws.
- (b) Disengage the moulding.

**10. REMOVE QUARTER OPENING RETAINER LH**

- (a) Remove the 3 screws and retainer.

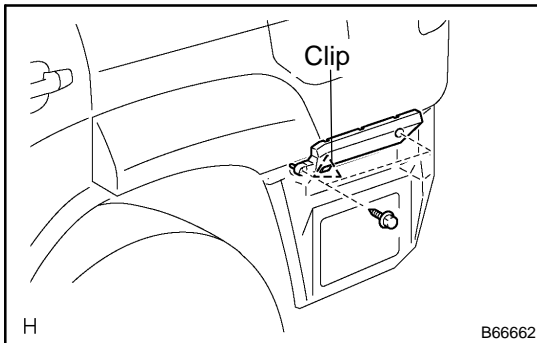
11. REMOVE REAR BUMPER COVER (See page 76-5)



12. REMOVE QUARTER PANEL MUDGUARD REAR LH

- (a) Remove the 2 screws, claw and mudguard.

13. REMOVE REAR WHEEL



14. REMOVE QUARTER MOULDING OUTSIDE NO.4

- (a) Remove the clip, and rear bumper side support LH.
 (b) Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

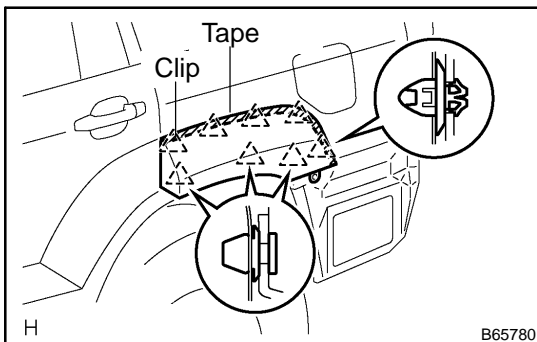
NOTICE:

Do not heat the moulding excessively.

- (c) Using a knife, cut the double-sided tape.

NOTICE:

- If reusing the moulding, take care not to damage the moulding.
- Do not damage the body.



- (d) Remove the screw, 8 clips and moulding.

NOTICE:

If the clips are damaged, exchange them for new ones.

15. INSTALL FRONT FENDER MOULDING OUTSIDE FRONT LH

- (a) Clean the body surface.
- (1) Using a heat light, heat the body surface between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the body excessively.

- (2) Remove the double-sided tape from the body.
- (3) Wipe off the stains with cleaner.
- (b) If reusing moulding:
Clean the moulding.
- (1) Using a heat light, heat the moulding between 20 – 30°C (68 – 86°F).

NOTICE:

Do not heat the moulding excessively.

- (2) Remove the double-sided tape from the moulding.
- (3) Wipe off the stains with cleaner.
- (4) Apply new double-sided tape to the moulding, as shown in the illustration.
- (c) Install the moulding.
- (1) Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the moulding and body excessively.

- (2) Release the peeling paper from the face of the moulding.

HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when releasing the moulding peeling paper.

- (3) Engage the 13 clips and install the moulding, and firmly press on the moulding.

NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

- (d) Install the 7 bolts.

16. INSTALL SUPPORT, FR BUMPER SIDE, LH

(See page 76-2)

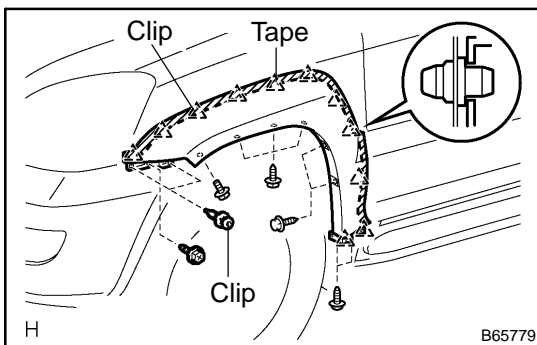
17. INSTALL FRONT DOOR MOULDING OUTSIDE LH

- (a) Clean the body surface.
- (1) Using a heat light, heat the body surface between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the body excessively.

- (2) Remove the double-sided tape from the body.
- (3) Wipe off the stains with cleaner.
- (b) If reusing the moulding:
Clean the moulding.

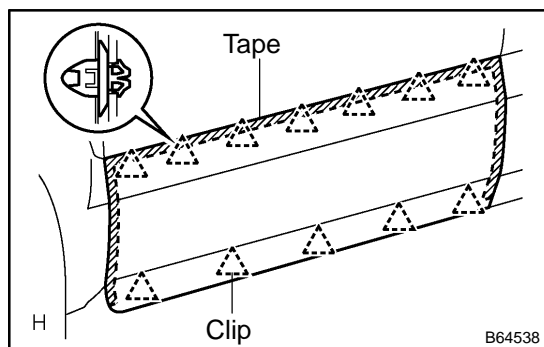


- (1) Using a heat light, heat the moulding between 20 – 30°C (68 – 86°F).

NOTICE:

Do not heat the moulding excessively.

- (2) Remove the double-sided tape from the moulding.
- (3) Wipe off the stains with cleaner.



- (4) Apply new double-sided tape to the moulding, as shown in the illustration.
- (c) Install the moulding.

- (1) Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the moulding and body excessively.

- (2) Release the peeling paper from the face of the moulding.

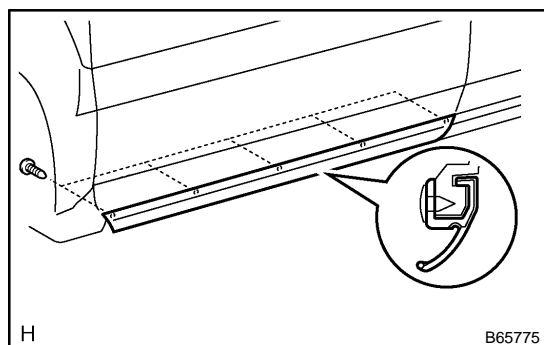
HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when releasing the peeling paper.

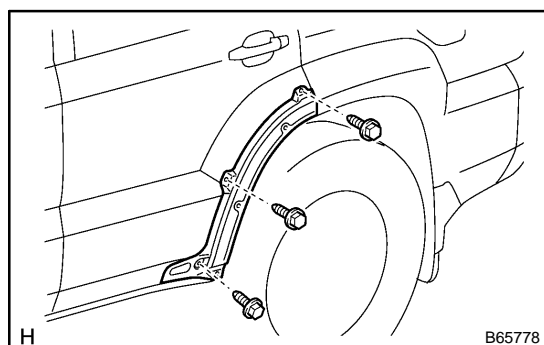
- (3) Engage the 12 clips, and firmly press on the moulding.

NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

**18. INSTALL FRONT DOOR MOULDING OUTSIDE LOWER LH**

- (a) Engage the moulding.
- (b) Install the 5 screws.

**19. INSTALL QUARTER OPENING RETAINER LH**

- (a) Install the retainer with the 3 bolts.

20. INSTALL REAR DOOR MOULDING OUTSIDE LH

- (a) Clean the body surface.
- (1) Using a heat light, heat the body surface between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the body excessively.

- (2) Remove the double-sided tape from the body.
- (3) Wipe off the stains with cleaner.
- (b) If reusing the moulding:
- Clean the moulding.
- (1) Using a heat light, heat the moulding between 20 – 30°C (68 – 86°F).

NOTICE:

Do not heat the moulding excessively.

- (2) Remove the double-sided tape from the moulding.
- (3) Wipe off the stains with cleaner.
- (4) Apply new double-sided tape to the moulding, as shown in the illustration.
- (c) Install the moulding.
- (1) Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the moulding and body excessively.

- (2) Release the peeling paper from the face of the moulding.

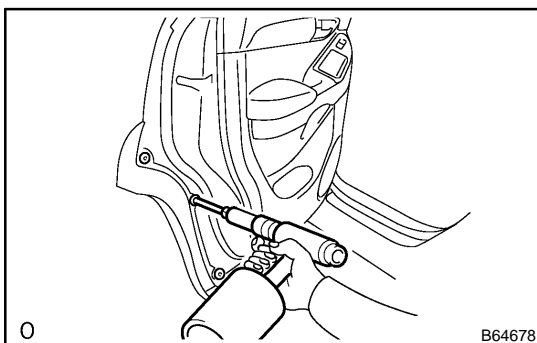
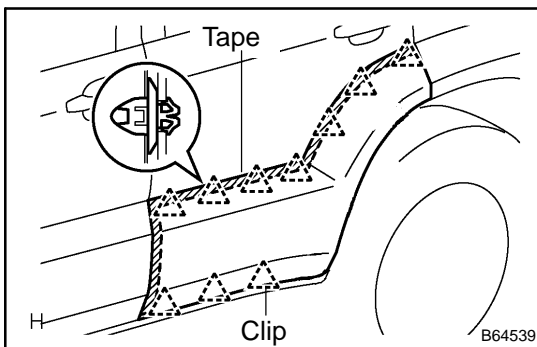
HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when releasing the peeling paper.

- (3) Engage the 10 clips, and firmly press on the moulding.

NOTICE:

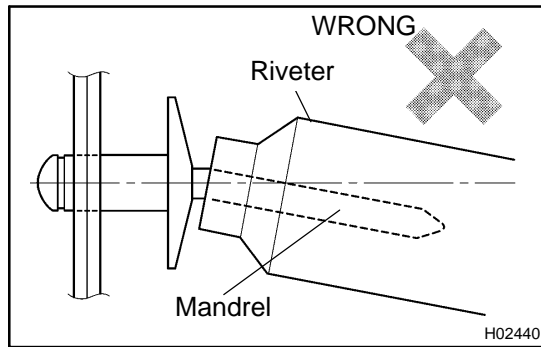
Do not apply excessive force onto the moulding, but steady pressure with your thumbs.



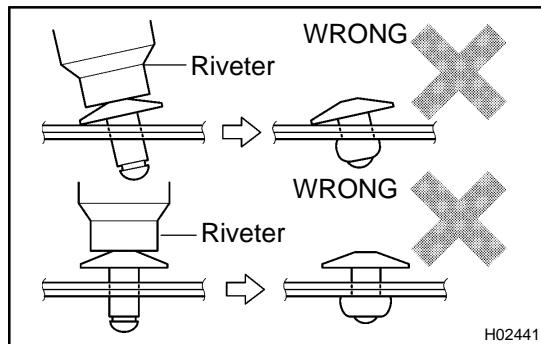
- (d) Using an air riveter or hand riveter with nose piece, strike the 3 rivets into the door panel to install the moulding to the door panel.

NOTICE:

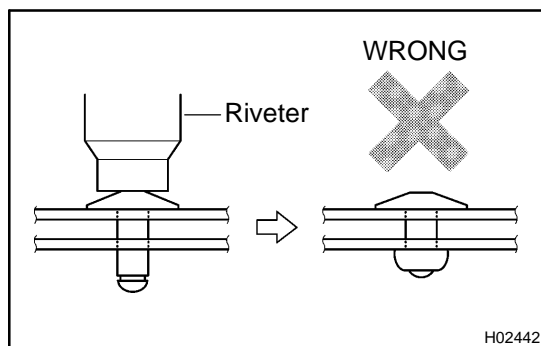
If the rivet is not positioned perpendicularly, it will bend the mandrel.

**NOTICE:**

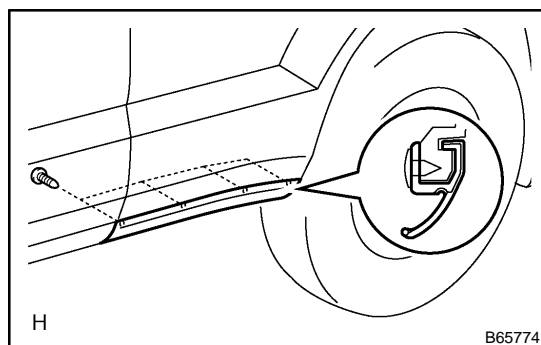
- Do not pry the rivet with the riveter, because the riveter will be damaged and the mandrel will be bent.



- Confirm that the rivets are seated properly against the speaker.
- Do not tilt the riveter when installing the rivet to the speaker.
- Do not leave any space between the rivet head and the speaker.



- Only install the rivet when there is no clearance between the materials to be secured.

**21. INSTALL REAR DOOR OUTSIDE MOULDING LOWER LH**

- Engage the moulding.
- Install the 4 screws.

22. INSTALL QUARTER MOULDING OUTSIDE NO.4

- Clean the body surface.
 - Using a heat light, heat the body surface between 40 – 60°C (104 – 140°F).

NOTICE:

Do not heat the body excessively.

- Remove the double-sided tape from the body.
 - Wipe off the stains with cleaner.
- If reusing the moulding:
Clean the moulding.

- (1) Using a heat light, heat the moulding between 20 – 30°C (68 – 86°F).

NOTICE:

Do not heat the moulding excessively.

- (2) Remove the double-sided tape from the moulding.
- (3) Wipe off the stains with cleaner.
- (4) Apply new double-sided tape to the moulding, as shown in the illustration.

- (c) Install the moulding.

- (1) Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the moulding and body excessively.

- (2) Release the peeling paper from the face of the moulding.

HINT:

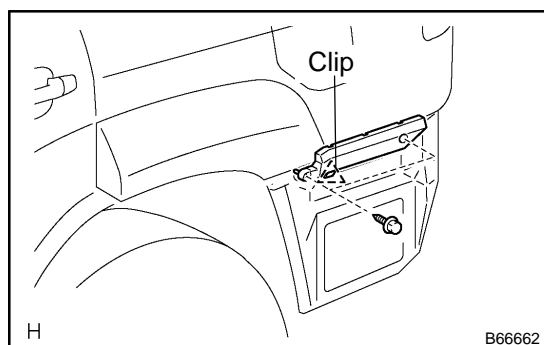
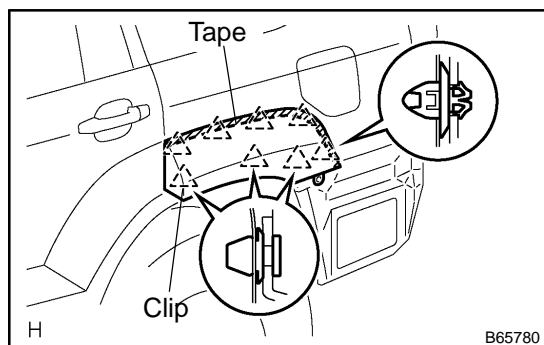
Be careful that dirt or foreign object does not stick to the adhesive part when releasing the peeling paper.

- (3) Engage the 8 clips, and firmly press on the moulding.

NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

- (d) Install the clip, and rear bumper side support LH.
- (e) Install the screw.

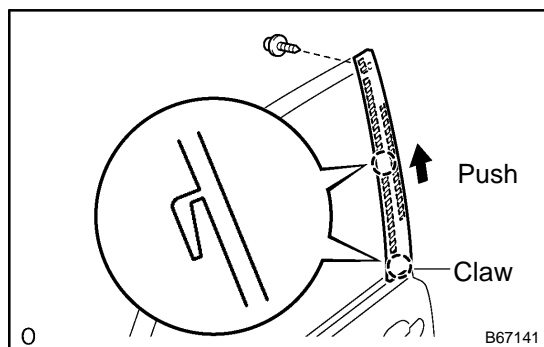


FRONT DOOR WINDOW FRAME MOULDING REAR LH REPLACEMENT

760RU-02

HINT:

On the RH side, use the same procedure as on the LH side.



1. REMOVE FRONT DOOR WINDOW FRAME MOULDING REAR LH

- (a) Remove the screw.
- (b) Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

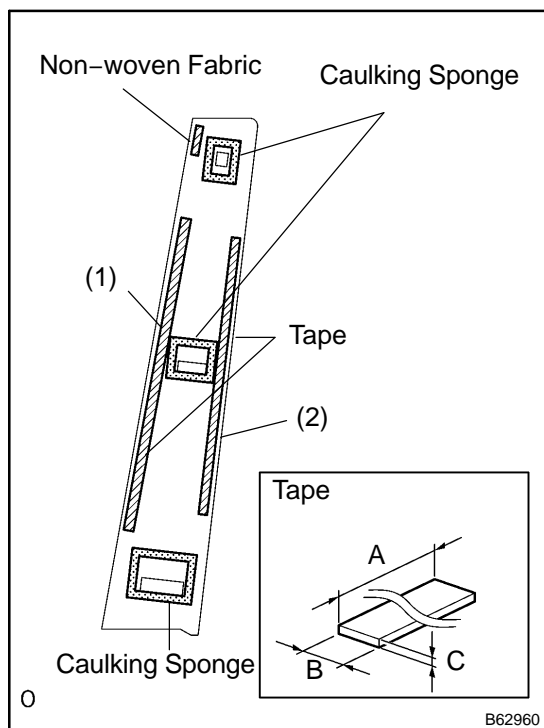
NOTICE:

Do not heat the moulding excessively.

- (c) Slide the moulding upward to remove the moulding.

NOTICE:

If reusing the moulding, take care not to damage the moulding.



2. INSTALL FRONT DOOR WINDOW FRAME MOULDING REAR LH

- (a) Using a shop rag, remove the double-sided tape from the moulding.
 - (1) Clean the contact surface of the body with shop rag saturated with white gasoline.
- (b) Clean the outer circumference of the moulding with white gasoline.
- (c) Apply new double-sided tape to the moulding, as shown in the illustration.

Dimensions:

A	(1) 330 mm (12.992 in.), (2) 265.0 mm (10.433 in.)
B	5.0 mm (0.197 in.)
C	(1) 0.8 mm (0.031 in.), (2) 1.2 mm (0.197 in.)

- (d) Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the body and moulding excessively.

- (e) Remove the peeling paper from the moulding face.

HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when releasing the peeling paper.

- (f) Engage the 2 claws and install the moulding with the screw.

NOTICE:

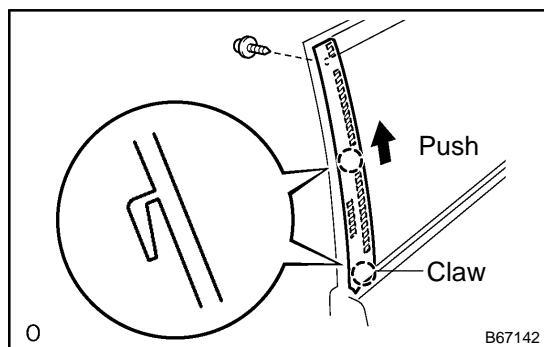
Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

REAR DOOR WINDOW FRAME MOULDING FRONT LH REPLACEMENT

760RW-02

HINT:

On the RH side, use the same procedure as for the LH side.



1. REMOVE REAR DOOR WINDOW FRAME MOULDING FRONT LH

- Remove the screw.
- Using a heat light, heat the moulding between 40 – 60°C (104 – 140°F).

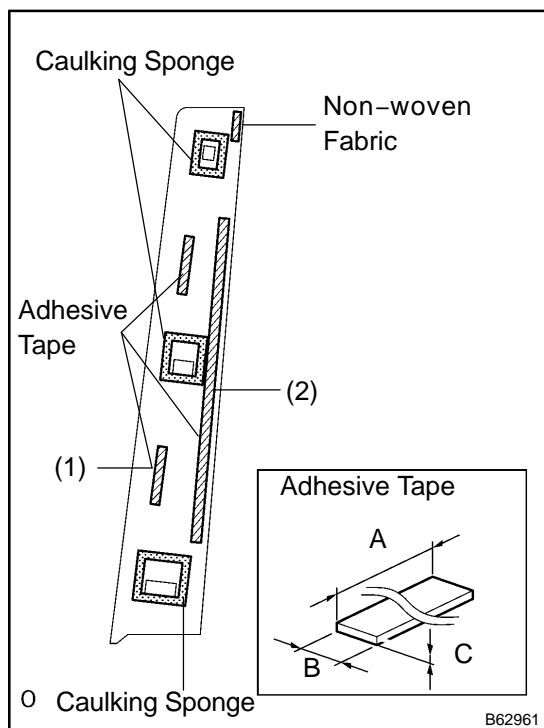
NOTICE:

Do not heat the moulding excessively.

- Slide the moulding upward to remove the moulding.

NOTICE:

If reusing the moulding, take care not to damage the moulding.



2. INSTALL REAR DOOR WINDOW FRAME MOULDING FRONT LH

- Using a shop rag, remove the double-sided tape from the moulding.
 - Clean the contact surface of the body with a shop rag saturated with white gasoline.
- Clean the outer circumference of the moulding with white gasoline.
- Apply new double-sided tape to the moulding, as shown in the illustration.

Dimension:

A	(1) 50.0 mm (1.969 in.), (2) 330 mm (12.992 in.)
B	5.0 mm (0.197 in.)
C	(1) 1.2 mm (0.047 in.), (2) 0.8 mm (0.031 in.)

- Using a heat light, heat the body and moulding.

Heating temperature:

Body	40 – 60°C (104 – 140°F)
Moulding	20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the body and moulding excessively.

- Remove the peeling paper from the moulding face.

HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when releasing the peeling paper.

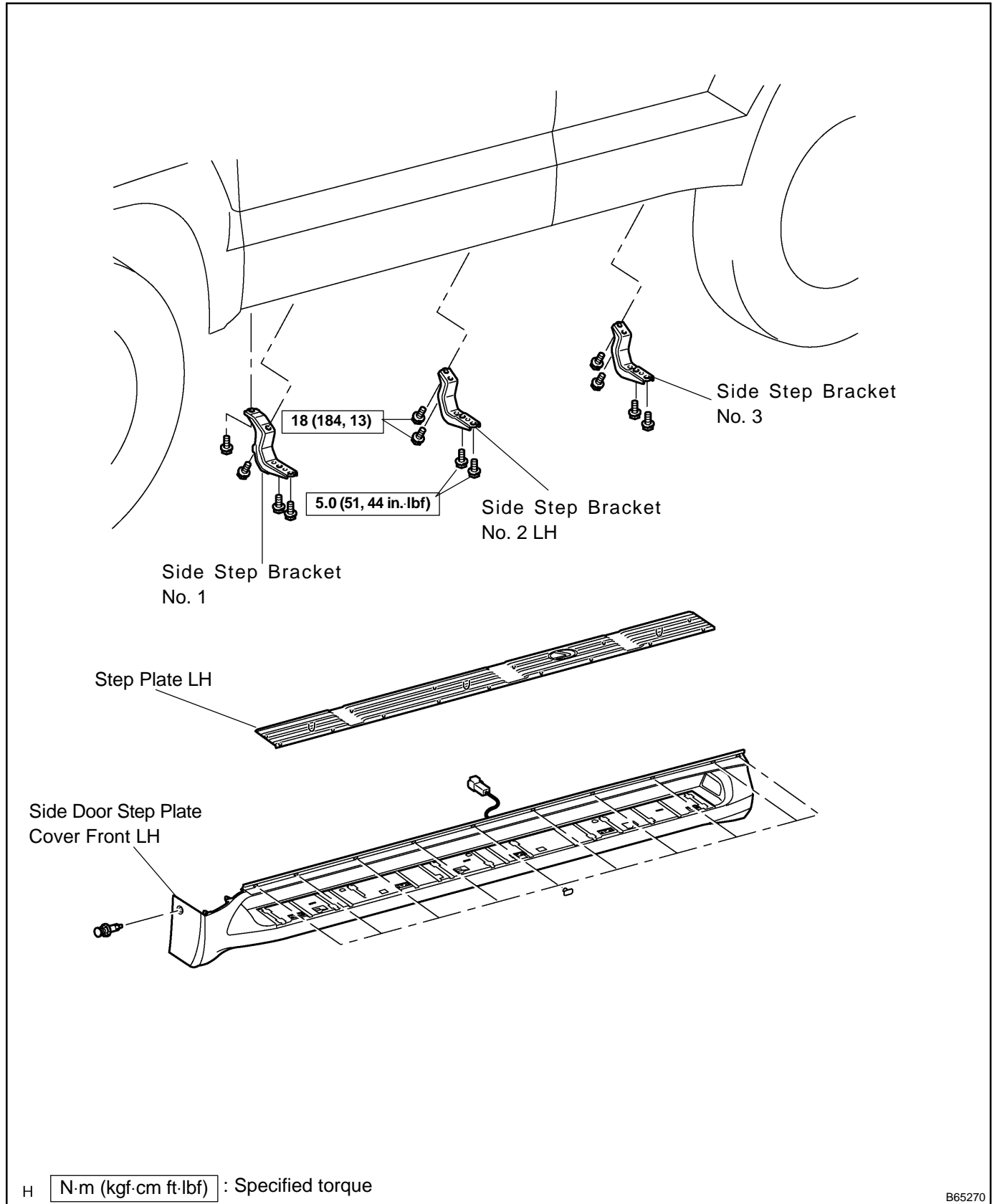
- (f) Engage the 2 claws and install the moulding with the screw.

NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

SIDE STEP COMPONENTS

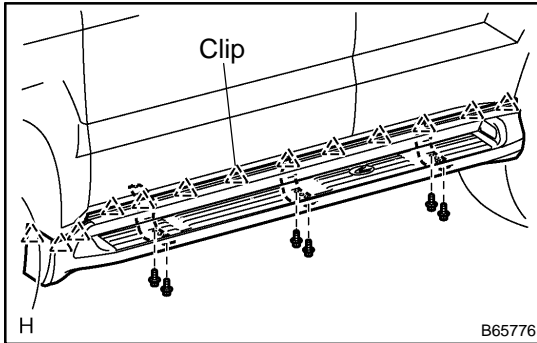
760S0-01



REPLACEMENT

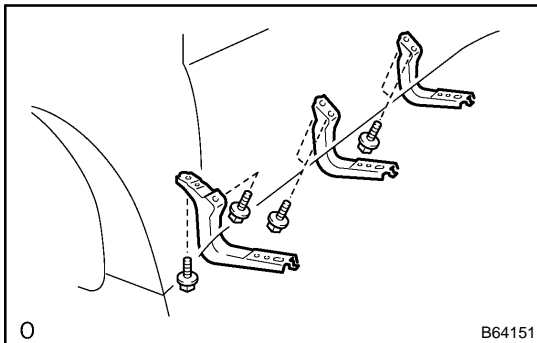
HINT:

- The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.
- On the RH side, use the same procedures as on the LH side.



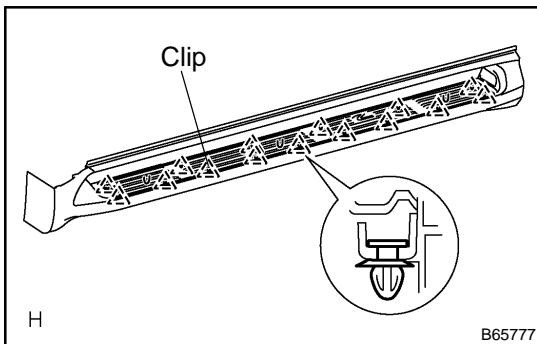
1. REMOVE STEP SUB-ASSY LH

- Remove the 6 bolts, 13 clips and step sub-assy.
- Disconnect the step lamp wiring connector.



2. REMOVE SIDE STEP BRACKET

- Remove the 6 bolts and 3 brackets.



3. REMOVE STEP PLATE LH

- Disengage the 15 clips and remove the step plate from the cover.

4. INSTALL SIDE STEP BRACKET

- Install the 3 brackets with the 6 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

5. INSTALL STEP SUB-ASSY LH

- Install the step sub-assy with the 6 bolts and 13 clips.
- Connect the step lamp wiring connector.
Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

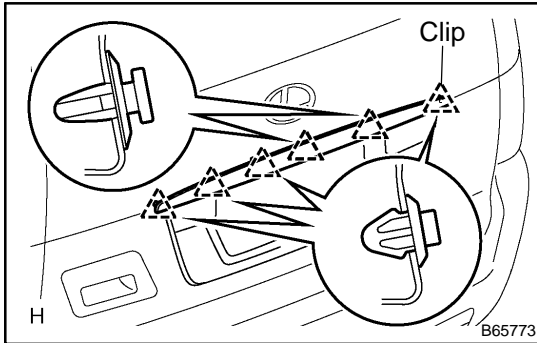
BACK DOOR GARNISH SUB-ASSY OUTSIDE REPLACEMENT

760RT-02

HINT:

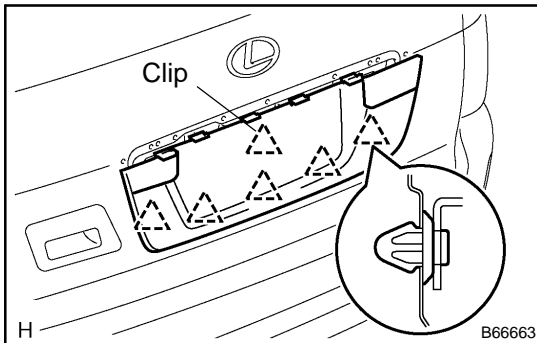
The installation is in the reverse order of the removal.

1. REMOVE BACK DOOR TRIM PANEL ASSY (See page 75-39)



2. REMOVE LICENSE REAR LAMP COVER

- (a) Remove the 6 clips and lamp cover.



3. REMOVE BACK DOOR GARNISH SUB-ASSY OUTSIDE

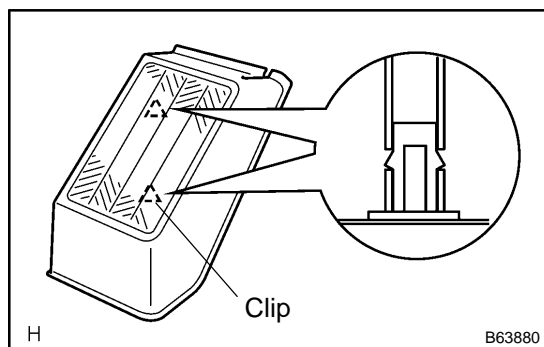
- (a) Remove the 6 clips and garnish sub-assy.

FR FLOOR FOOTREST LH REPLACEMENT

760RY-01

HINT:

The installation is in the reverse order of the removal.

**1. REMOVE FR FLOOR FOOTREST LH**

- (a) Using a screwdriver, disengage the 2 clips and remove the footrest.

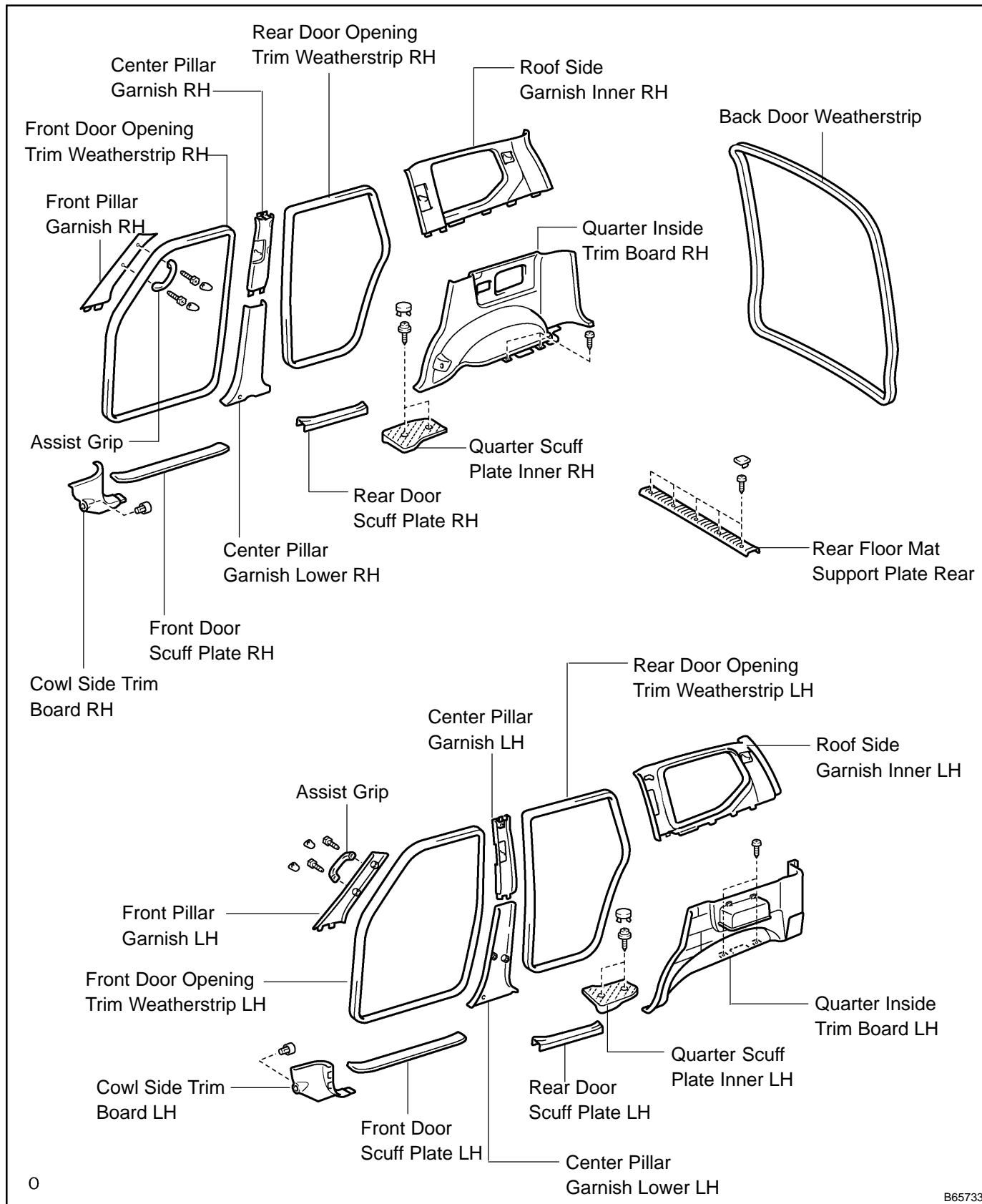
HINT:

Tap the screwdriver tip before use.

- (b) Disengage the clips, and then remove the 2 clips from the footrest.

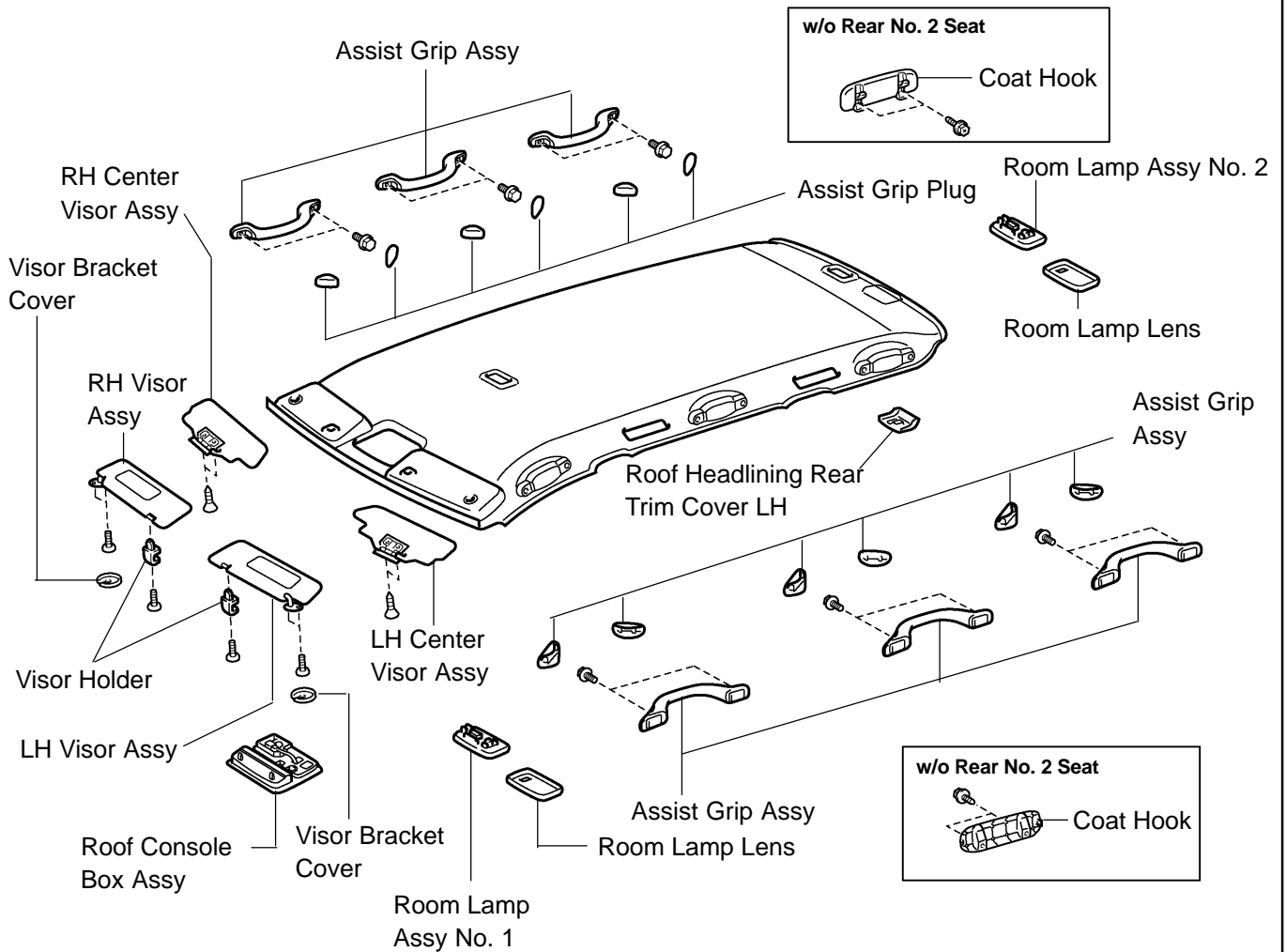
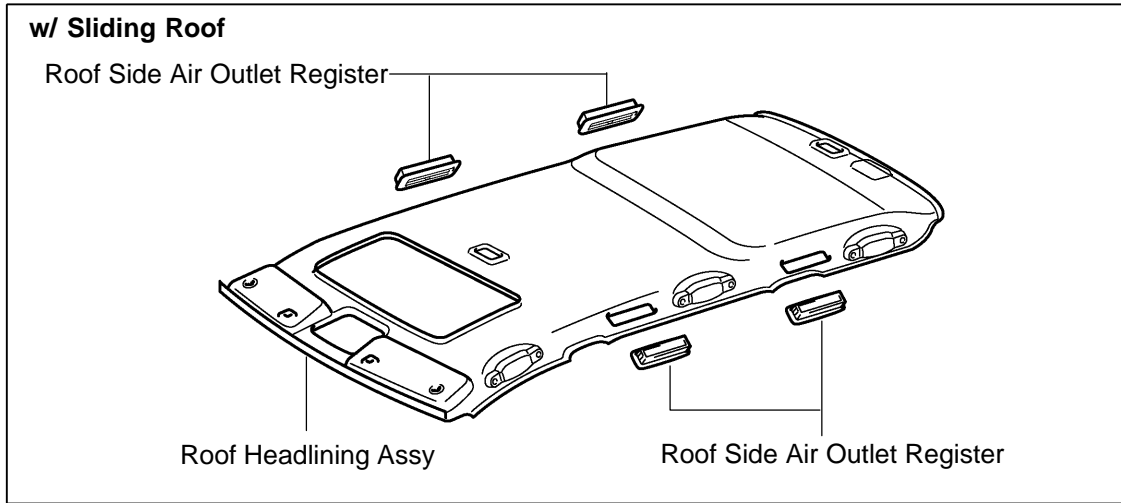
ROOF HEADLINING ASSY COMPONENTS

760RV-01



0

B65733



0

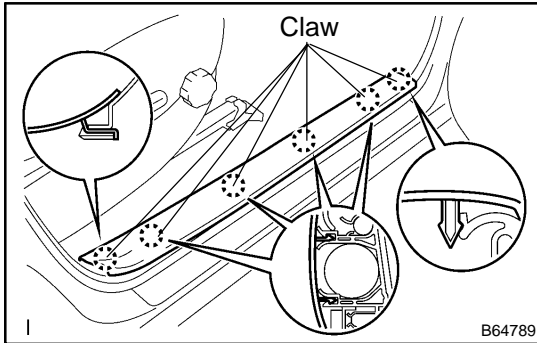
B65728

REPLACEMENT

HINT:

Installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. REMOVE REAR NO. 2 SEAT ASSY LH (See page 72-42)
2. REMOVE REAR NO. 2 SEAT ASSY RH (See page 72-42)



3. REMOVE FRONT DOOR SCUFF PLATE LH

- (a) Using a screwdriver, disengage the 6 claws and remove the scuff plate.

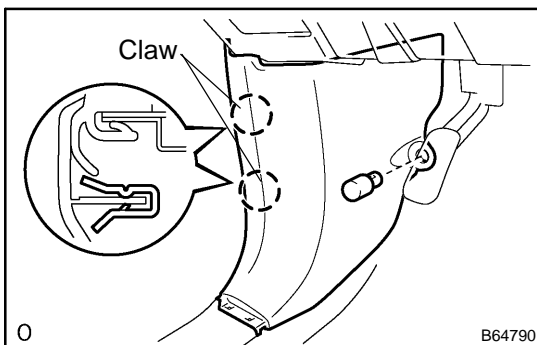
HINT:

Tape the screwdriver tip before use.

4. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedures described above for the LH side.



5. REMOVE COWL SIDE TRIM BOARD LH

- (a) Remove the cap nut.
- (b) Using a screwdriver, disengage the 2 claws and remove the trim board.

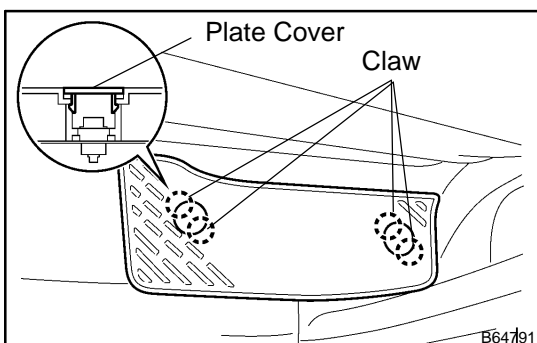
HINT:

Tape the screwdriver tip before use.

6. REMOVE COWL SIDE TRIM BOARD RH

HINT:

Use the same procedures described above for the LH side.



7. REMOVE QUARTER SCUFF PLATE INSIDE LH

- (a) Remove the 2 quarter scuff plate inner covers.
- (b) Using a screwdriver, disengage the 4 claws and remove the scuff plate.

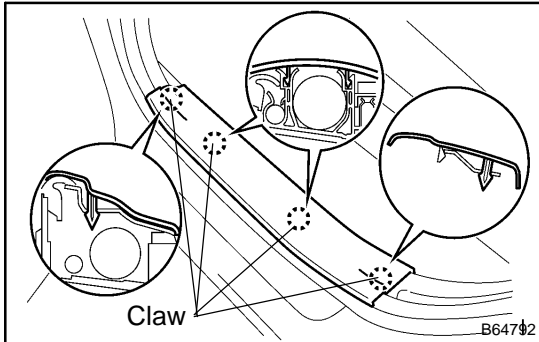
HINT:

Tape the screwdriver tip before use.

8. REMOVE QUARTER SCUFF PLATE INNER RH

HINT:

Use the same procedures described above for the LH side.

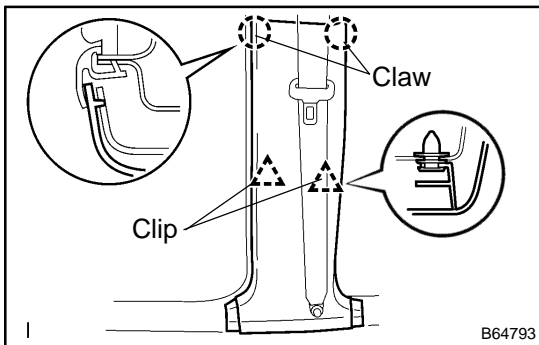
**9. REMOVE REAR DOOR SCUFF PLATE LH**

- (a) Using a screwdriver, disengage the 4 claws and remove the scuff plate.

10. REMOVE REAR DOOR SCUFF PLATE RH

HINT:

Use the same procedures described above for the LH side.

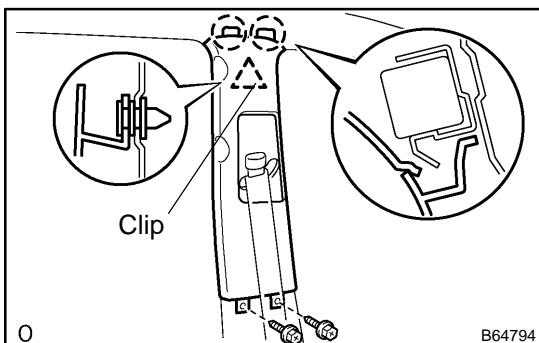
11. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH**12. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH****13. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH****14. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH****15. REMOVE CENTER PILLAR GARNISH LOWER LH**

- (a) Remove the front seat belt anchor bolt and front seat belt.
 (b) Disengage the 2 clips and 2 claws, and remove the center pillar garnish.

16. REMOVE CENTER PILLAR GARNISH LOWER RH

HINT:

Use the same procedures described above for the LH side.

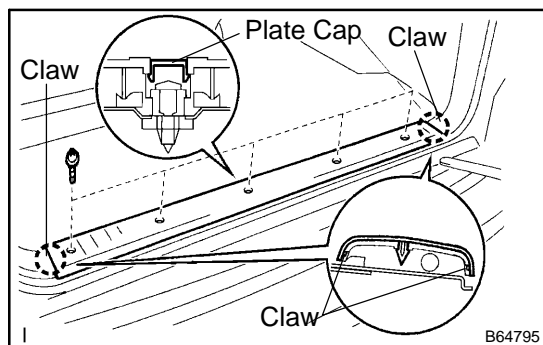
**17. REMOVE CENTER PILLAR GARNISH LH**

- (a) Remove the 2 screws.
 (b) Disengage the 2 claws and clip, and remove the pillar garnish.

18. REMOVE CENTER PILLAR GARNISH RH

HINT:

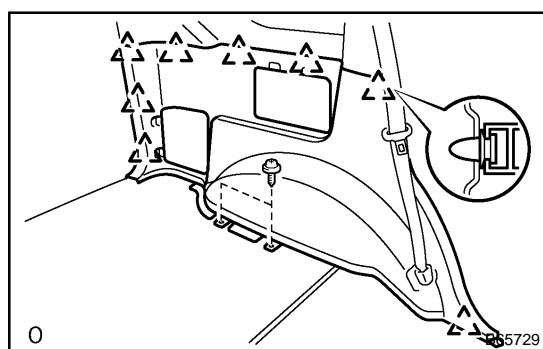
Use the same procedures described above for the LH side.

19. REMOVE BACK DOOR WEATHERSTRIP**20. REMOVE REAR FLOOR MAT SUPPORT PLATE REAR**

- Remove the 5 screws.
- Using a screwdriver, disengage the 2 claws and remove the mat support plate.

HINT:

Tape the screwdriver tip before use.

**21. REMOVE QUARTER INSIDE TRIM BOARD LH**

- Remove the bolt and the floor anchor part of the rear No. 1 seat belt assy.
- Remove the 3 screws .
- Using a screwdriver, disengage the 8 clips and remove the trim board.

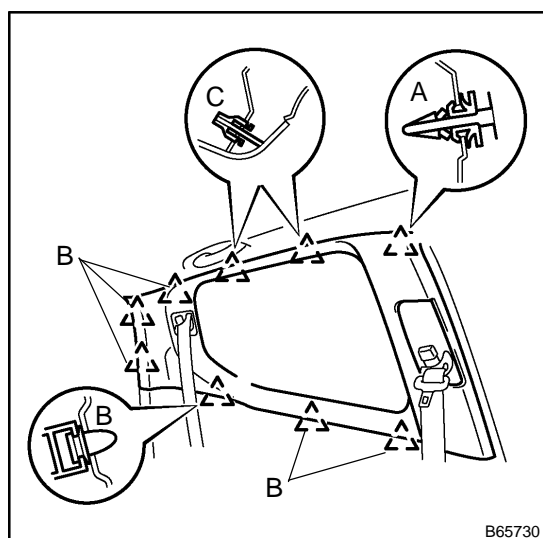
HINT:

Tape the screwdriver tip before use.

22. REMOVE QUARTER INSIDE TRIM BOARD RH

HINT:

Use the same procedures described above for the LH side.

**23. REMOVE ROOF SIDE GARNISH INNER LH**

- Remove the floor anchor part of the seat No. 2 belt assy.
- Using a screwdriver, firmly push the pin to disengage the clips (A).

HINT:

Tape the screwdriver tip before use.

- Using a screwdriver, disengage the 8 clips (B and C) and remove the garnish.

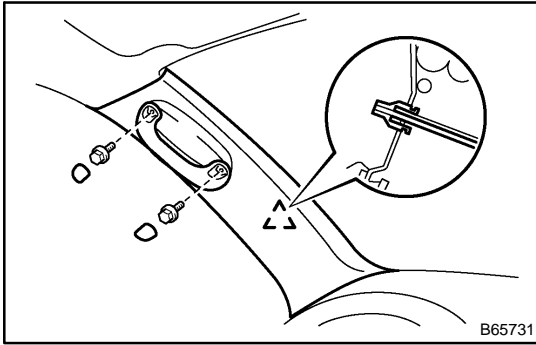
HINT:

- Tape the screwdriver tip before use.
- The clip (A) cannot be reused.

24. REMOVE ROOF SIDE GARNISH INNER RH

HINT:

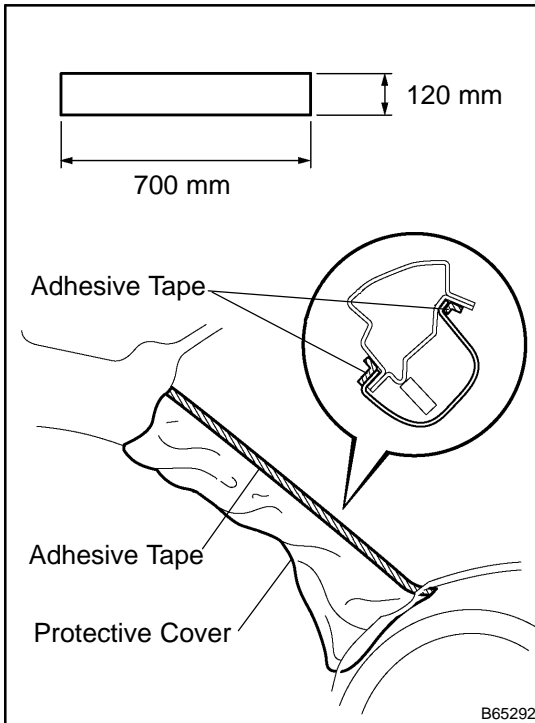
Use the same procedures described above for the LH side.

**25. REMOVE FRONT PILLAR GARNISH LH**

- (a) Remove the 2 grip plugs, 2 screws and assist grip.
- (b) Using a screwdriver, disengage the clip and remove the garnish.

HINT:

Tape the screwdriver tip before use.



- (c) Pull the garnish upward, and remove the pillar garnish from the instrument panel.

- (d) w/ Curtain shield airbag:
Protect the curtain shield airbag.

- (1) Thoroughly cover the airbag with cloth or nylon of 700 mm (27.56 in.) x 120 mm (4.72 in.) and fix the ends of the cover with adhesive tape, as shown in the illustration.

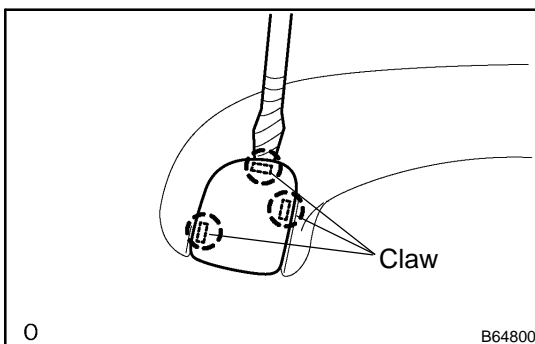
NOTICE:

Cover the curtain shield airbag with the protection cover as soon as the front pillar garnish is removed.

26. REMOVE FRONT PILLAR GARNISH RH

HINT:

Use the same procedures described above for the LH side.

**27. REMOVE ASSIST GRIP ASSY**

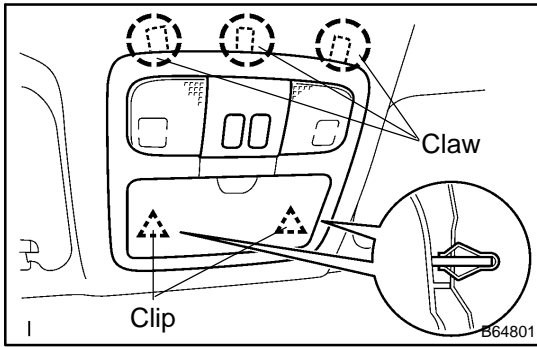
- (a) Using a screwdriver, disengage the 6 claws and remove the 2 assist grip plugs.

HINT:

Tape the screwdriver tip before use.

- (b) Remove the 2 screws and assist grip.

28. REMOVE TELEVISION BASE (W/ RR TELEVISION)

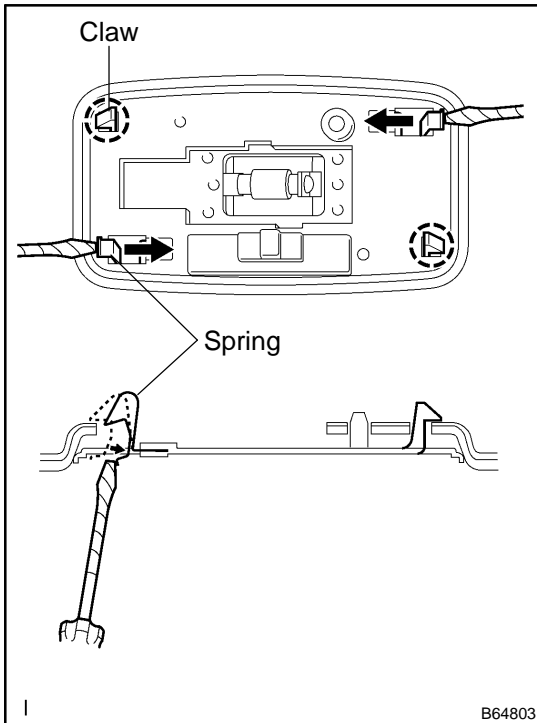
**29. REMOVE ROOF CONSOLE BOX SUB-ASSY**

- (a) Using a screwdriver, disengage the 3 claws and 2 clips, and remove the console box assy.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the map lamp switch connector and sliding roof switch connector.

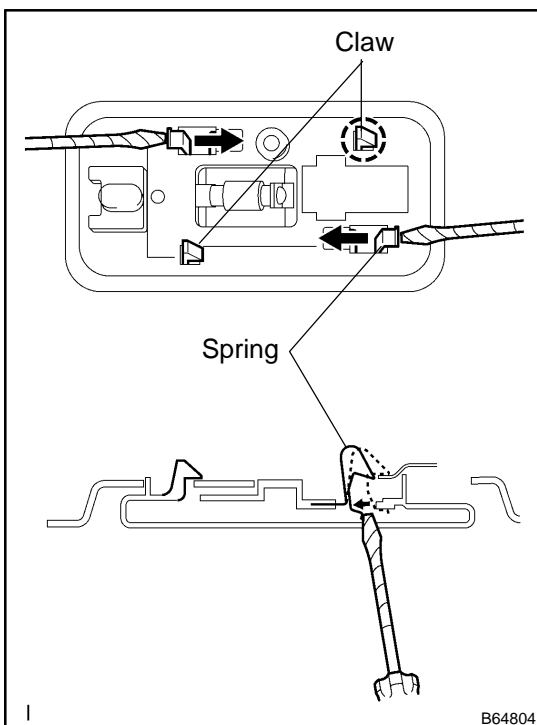
**30. REMOVE ROOM LAMP ASSY NO.1**

- (a) Using a screwdriver, remove the lens cover.
- (b) Using a screwdriver, disengage the 4 claws and remove the room lamp assy, as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the room lamp connector.

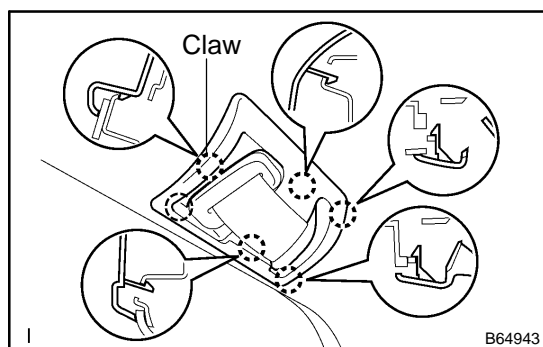
**31. REMOVE ROOM LAMP ASSY NO.2**

- (a) Using a screwdriver, remove the lens cover.
- (b) Using a screwdriver, disengage the 4 claws and remove the room lamp assy, as shown in the illustration.

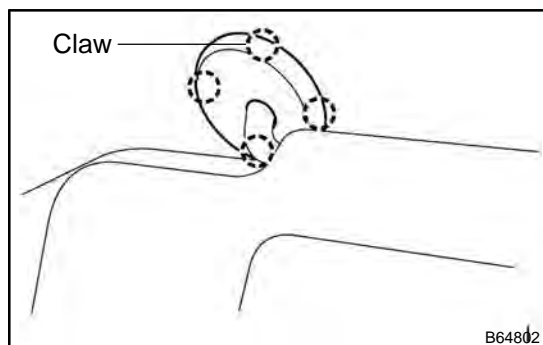
HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the room lamp connector.

**32. REMOVE ROOF HEADLINING REAR TRIM COVER LH**

- (a) Pull out the seat belt buckle from the roof headlining trim cover.
- (b) Using a roof moulding remover, disengage the 6 claws and remove the roof headlining trim cover.

**33. REMOVE VISOR BRACKET COVER**

- (a) Remove the 2 screws and center visor.
- (b) Using a screwdriver, disengage the 4 claws and remove the visor bracket cover.

HINT:

Tape the screwdriver tip before use.

34. REMOVE LH VISOR ASSY

- (a) Remove the 2 screws and visor assy.

35. REMOVE RH VISOR ASSY

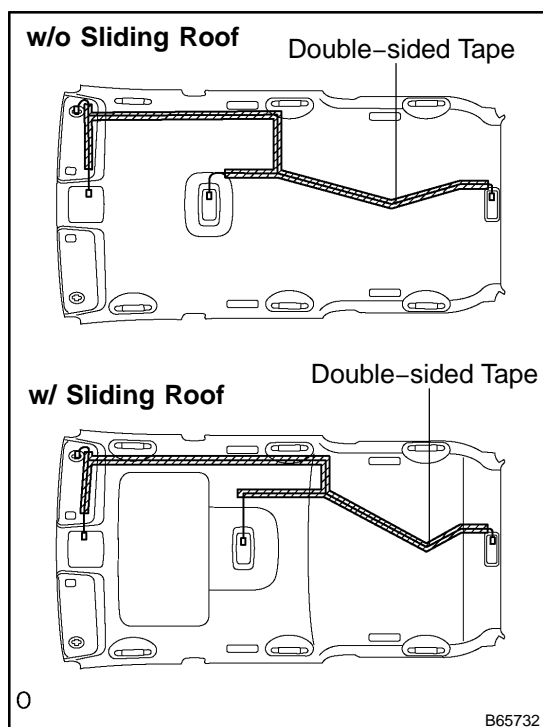
- (a) Remove the 2 screws and visor assy.

36. REMOVE VISOR HOLDER

- (a) Remove the screws and visor holders.

37. REMOVE ROOF HEADLINING ASSY**38. REMOVE ROOF SIDE AIR OUTLET REGISTER**

- (a) Remove the screw and register.

**39. INSTALL ROOF HEADLINING ASSY**

- (a) Attach double-sided tape along the markings on the roof panel, as shown in the illustration.

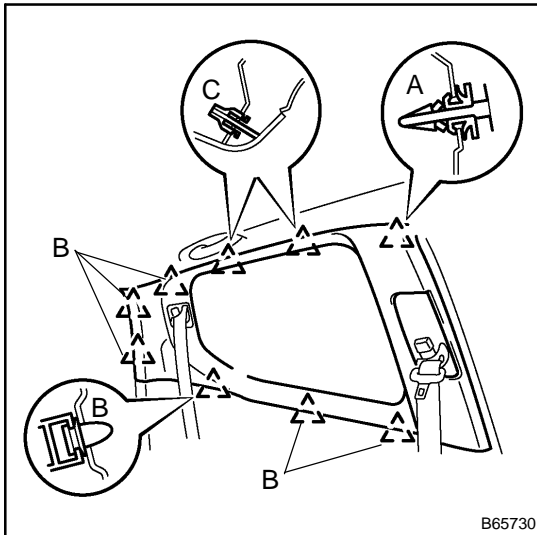
HINT:

Be careful that dirt or foreign object does not stick to the adhesive part when removing the peeling paper from the double-sided tape.

- (b) Attach the roof wire harness across the adhesive part.

NOTICE:

Attach roof wire harness securely.

**40. INSTALL ROOF SIDE GARNISH INNER LH**

- (a) Install the clip (A) in the pin on the garnish side.
- (b) Engage the claws and 8 clips.
- (c) Install the floor anchor part of the rear seat No. 2 belt assy.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

41. INSTALL ROOF SIDE GARNISH INNER RH

HINT:

- (a) Use the same procedures described above for the LH side.
- 42. INSTALL FRONT SEAT OUTER BELT ASSY LH**
- 43. INSTALL FRONT SEAT OUTER BELT ASSY RH**
- 44. INSTALL REAR SEAT BELT ASSY OUTER**
- 45. INSTALL REAR SEAT BELT ASSY OUTER**
- 46. INSTALL REAR NO. 2 SEAT ASSY LH (See page 72-42)**
- 47. INSTALL REAR NO. 2 SEAT ASSY RH (See page 72-42)**

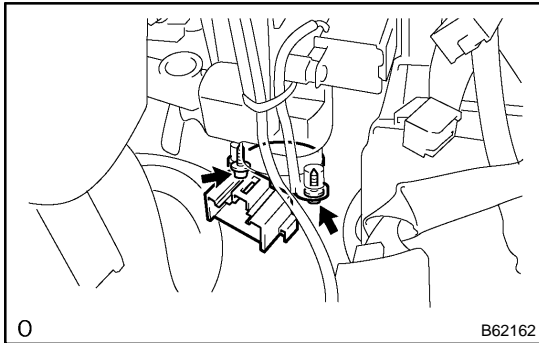
IGNITION OR STARTER SWITCH ASSY REPLACEMENT

80041-02

HINT:

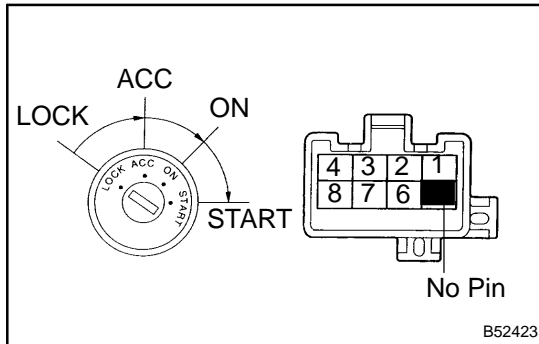
The installation is in the reverse order of the removal. However, when there is a special point concerning the installation, it is indicated.

1. **REMOVE STEERING COLUMN COVER LWR (See page 50-8)**
2. **REMOVE STEERING COLUMN COVER UPR (See page 50-8)**



3. **REMOVE IGNITION OR STARTER SWITCH ASSY**
 - (a) Disconnect the ignition switch connector and un-lock warning switch connector.
 - (b) Remove the clamp.
 - (c) Remove the 2 screws and ignition switch assy.

INSPECTION



1. INSPECT IGNITION OR STARTER SWITCH ASSY

(a) Inspect the switch continuity.

Standard:

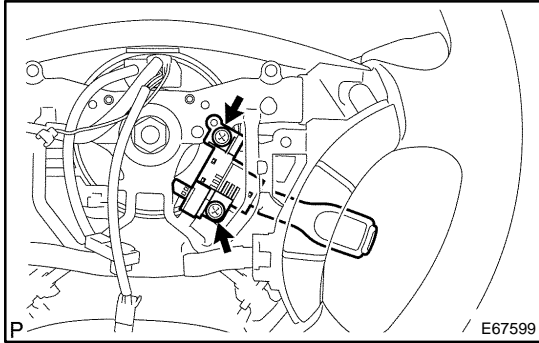
Terminal No	Switch Position	Specified Condition
-	LOCK	No continuity
2 ↔ 3	ACC	Continuity
2 ↔ 3 ↔ 4 6 ↔ 7	ON	Continuity
1 ↔ 2 ↔ 4 6 ↔ 7 ↔ 8	START	Continuity

If the result is not as specified, replace the switch assy.

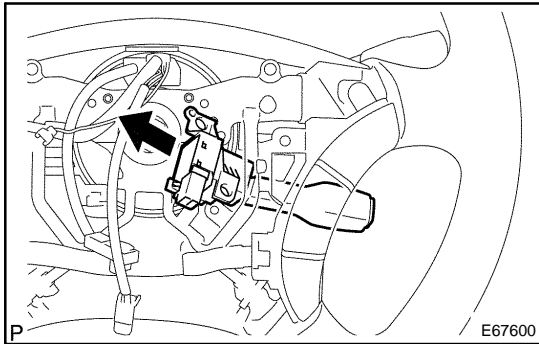
CRUISE CONTROL MAIN SWITCH REPLACEMENT

8202Y-04

1. DISCONNECT BATTERY NEGATIVE TERMINAL (See page 60-1)
2. REMOVE STEERING WHEEL COVER LOWER NO.2
3. REMOVE STEERING WHEEL COVER LOWER NO.3
4. REMOVE HORN BUTTON ASSY (See page 60-20)



5. REMOVE CRUISE CONTROL MAIN SWITCH
 - (a) Disconnect the connectors.
 - (b) Remove the 2 screws and cruise control main switch.



6. INSTALL HORN BUTTON ASSY (See page 60-20)
7. INSPECT HORN BUTTON ASSY (See page 60-13)
8. INSPECT SRS WARNING LIGHT (See page 05-1213)

OUTSIDE VEHICLE

GENERAL MAINTENANCE

9900V-21

HINT:

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.

These items include those which should be checked on a daily basis, those which, in most cases, do not require special tools and those which are considered to be reasonable for the owner to do.

Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless noted.
- Failure to do even one of the items can cause the engine to run poorly and/or increase the exhaust emissions.

2. TIRES

- (a) Check the pressure with a gauge. If necessary, make adjustment.
- (b) Check for cuts, damage or excessive wear.

3. WHEEL NUTS

- (a) When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

4. TIRE ROTATION

- (a) Check the owner's manual supplement in which the maintenance schedule is shown.

5. WINDSHIELD WIPER BLADES

- (a) Check for wear or cracks whenever they do not wipe clean. If necessary, replace them.

6. FLUID LEAKS

- (a) Check the underneath of the vehicle for leaks of fuel, oil, water or other fluid.
- (b) If you smell gasoline fumes or notice any leak, find and correct the cause.

7. DOORS AND ENGINE HOOD

- (a) Check that all the doors and the back door operate smoothly, and that all the latches lock securely.
- (b) Check that the secondary latch on the engine hood prevents the hood from opening when the primary latch is released.

INSIDE VEHICLE

GENERAL MAINTENANCE

9900W-22

HINT:

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.

These items include those which should be checked on a daily basis, those which, in most cases, do not require special tools and those which are considered to be reasonable for the owner to do.

Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
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- Maintenance service after the last period should be performed at the same interval as before unless noted.
- Failure to do even one of the items can cause the engine to run poorly and/or increase the exhaust emissions.

2. LIGHTS

- (a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.
- (b) Check the aim of the headlights.

3. WARNING LIGHTS AND BUZZERS

- (a) Check that all the warning lights and buzzers function properly.

4. HORN

- (a) Check that the horn works normally.

5. WINDSHIELD GLASS

- (a) Check for scratches, pits or abrasions.

6. WINDSHIELD WIPER AND WASHER

- (a) Check operation of the wipers and washer.
- (b) Check that the wipers do not streak.

7. WINDSHIELD DEFROSTER

- (a) Check that air comes out from the defroster outlet when operating the heater or air conditioner in the defroster mode.

8. REAR VIEW MIRROR

- (a) Check that the rear view mirror is mounted securely.

9. SUN VISORS

- (a) Check that the sun visors move freely and are mounted securely.

10. STEERING WHEEL

- (a) Check that the steering wheel has the specified free play. Be alert for changes in steering condition, such as hard steering, excessive free play or strange noises.

11. SEATS

- (a) Check that all the front seat controls such as seat adjusters, seatback recliner, etc. operate smoothly.
- (b) Check that all the latches lock securely in any position.
- (c) Check that the locks hold securely in any latched position.
- (d) Check that the head restraints move up and down smoothly and that the locks hold securely in any latched position.
- (e) Check that the latches lock securely, folding-down the rear seatbacks.

12. SEAT BELTS

- (a) Check that the seat belt system such as the buckles, retractors and anchors operate properly and smoothly.
- (b) Check that the belt webbing is not cut, frayed, worn or damaged.

13. ACCELERATOR PEDAL

- (a) Check the pedal for smooth operation, uneven pedal effort or catching.

14. BRAKE PEDAL (See page 32-6)

- (a) Check the pedal for smooth operation.
- (b) Check that the pedal has the proper reserve distance and free play.
- (c) Check the brake booster function.

15. BRAKES

- (a) At a safe place, check that the brakes do not pull to one side when applied.

16. PARKING BRAKE (See page 33-2)

- (a) Check that the lever has the proper travel.
- (b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

17. AUTOMATIC TRANSMISSION "PARK" MECHANISM

- (a) On a safe incline, check that the vehicle is held securely with the selector lever in the "P" position and all the brakes released.

UNDER HOOD

9900X-20

GENERAL MAINTENANCE

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless noted.
- Failure to do even one of the items can cause the engine to run poorly and/or increase the exhaust emissions.

2. WINDSHIELD WASHER FLUID

- (a) Check that there is sufficient fluid in the tank.

3. ENGINE COOLANT LEVEL

- (a) Check that the coolant level is between the LEVEL lines on the see-through reservoir at normal temperature (20°C (68°F)).

4. RADIATOR AND HOSES

- (a) Check that the front of the radiator is clean and not blocked by leaves, dirt or bugs.
- (b) Check the hoses for cracks, kinks, rot or loose connections.

5. BATTERY ELECTROLYTE LEVEL

- (a) Check the indicator.
- (b) Check that the electrolyte level of all the battery cells is between the upper and lower level lines on the case.

6. BRAKE FLUID LEVEL

- (a) Check that the brake fluid levels are near the upper level line on the see-through reservoirs.

7. ENGINE DRIVE BELT

- (a) Check the drive belt for fraying, cracks, wear or oiliness.

8. ENGINE OIL LEVEL

- (a) Check the level on the dipstick with the engine turned off.

9. POWER STEERING FLUID LEVEL

- (a) Check the level on the dipstick.
- (b) The level should be in the "HOT" or "COLD" range depending on the fluid temperature.

10. AUTOMATIC TRANSMISSION FLUID LEVEL

- (a) Park the vehicle on a level surface.
- (b) With the engine idling and the parking brake applied, shift the selector into all the positions from "P" to "L", and then shift into the "P" position.
- (c) Pull out the dipstick and wipe off the fluid with a clean shop rag. Re-insert the dipstick and check that the fluid level is in the "HOT" range.
- (d) Perform this check with the fluid at the normal driving temperature (70 to 80°C, 158 to 176°F).

HINT:

Wait until the engine cools down (approx. 30 min.) before checking the fluid level after extended driving at high speed, in hot weather, in heavy traffic or after pulling a trailer.

11. EXHAUST SYSTEM

- (a) Visually inspect for cracks, holes or loose supports.

If any change in the sound of the exhaust or the smell of the exhaust fumes is noticed, locate and correct the cause.

ENGINE

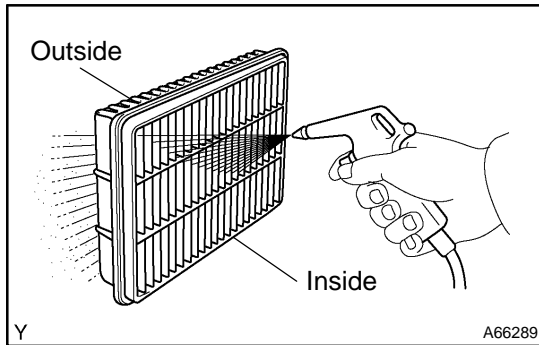
ON-VEHICLE INSPECTION

9900Y-30

HINT:

Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT (See page 14-115)**
2. **INSPECT DRIVE BELT (See page 19-13)**
3. **REPLACE SPARK PLUGS (See page 18-1)**



4. **Canada:** **INSPECT AIR FILTER**

- (a) Remove the air filter.
- (b) Visually check that the air filter is not excessively damaged or oily.

HINT:

Oiliness may indicate that the PCV valve is stuck.

If necessary, replace the air filter.

- (c) Clean the filter with compressed air.
First blow from the inside thoroughly, and then blow from the outside of the filter.
- (d) Reinstall the air filter.

5. **REPLACE AIR FILTER**

- (a) Replace the air filter with a new one.

6. **REPLACE ENGINE OIL AND OIL FILTER (See page 17-4)**

7. **REPLACE ENGINE COOLANT (See page 16-5) AND INSPECT RADIATOR FIN**

- (a) Check that the radiator and condenser are not blocked with leaves, dirt, or insets, and clean the hose connection.

8. **INSPECT GASKET IN FUEL TANK CAP (See page 12-3)**

9. **California, Massachusetts and New York:**

INSPECT CHARCOAL CANISTER (See page 12-3)

10. **INSPECT FUEL LINES AND CONNECTIONS, FUEL TANK VAPOR VENT SYSTEM HOSES AND FUEL TANK BANDS**

- (a) Visually check the fuel lines for cracks, leakage, loose connections, deformation or tank band looseness.

11. **INSPECT EXHAUST PIPES AND MOUNTINGS**

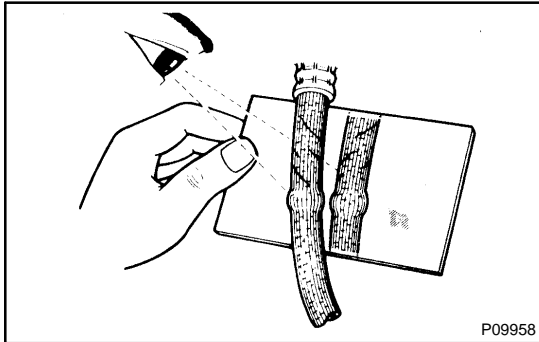
- (a) Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.

12. **INSPECT VALVE CLEARANCE (See page 14-6)**

BRAKE

ON-VEHICLE INSPECTION

9901M-10

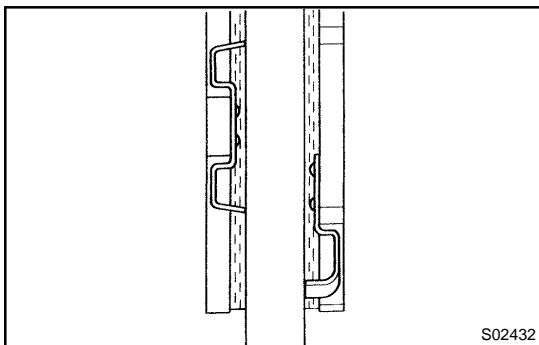


1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Check in a well-lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brakes.

- (a) Check all the brake lines and hoses for:
 - Damage
 - Wear
 - Deformation
 - Cracks
 - Corrosion
 - Leaks
 - Bends
 - Twists
- (b) Check all the clamps for tightness and connections for leakage.
- (c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.
- (d) Check that the lines are installed in grommets pass through the center of the grommets.



2. INSPECT FRONT BRAKE PADS AND DISCS (See page 32-38)

HINT:

If a squealing or scraping noise is heard from the brakes while driving, check the pad wear indicator.

If there are traces of the indicator contacting the disc rotor, the disc pad should be replaced.

3. INSPECT REAR BRAKE PADS AND DISCS (See page 32-44)
4. INSPECT REAR BRAKE LININGS AND DRUMS (See page 33-12)
5. INSPECT OR CHANGE BRAKE FLUID (See page 32-4)
Fluid: SAE J1703 or FMVSS No.116 DOT3

CHASSIS

9901N-05

ON-VEHICLE INSPECTION

1. INSPECT STEERING LINKAGE

- (a) Check the steering wheel free play (see page 50-3).
- (b) Check the steering linkage for looseness or damage.
 - (1) Check that the tie rod ends do not have excessive play.
 - (2) Check that the dust seals and boots are not damaged.
 - (3) Check that the boot clamps are not loose.

2. INSPECT STEERING GEAR HOUSING OIL

- (a) Check the steering gear housing for oil leakage.

If leakage is found, check and repair the cause.

3. INSPECT BALL JOINTS AND DUST COVERS

- (a) Inspect the ball joints for excessive looseness.
- (b) Check the dust cover for damage.

4. INSPECT DRIVE SHAFT BOOTS

- (a) Check the drive shaft boots for clamp looseness, oil leakage or damage. Tighten bolt looseness.

5. CHECK OIL LEVEL IN TRANSFER AND DIFFERENTIAL

- (a) Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) from the bottom edge of the hole.

If the level is low, add oil until it begins to run out of the filler hole, replace as necessary.

6. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION (See page 40-2)

7. REPACK FRONT WHEEL BEARINGS AND DRIVE SHAFT BUSHING GREASE

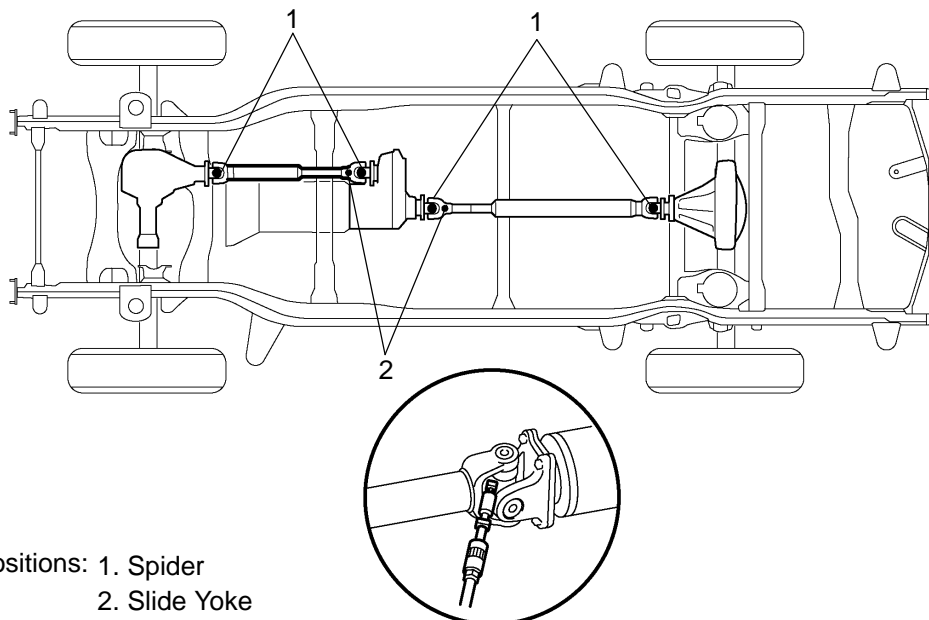
- (a) Change the front wheel bearing grease (see page 30-28).
- (b) Repack the drive shaft bushing grease (see page 30-19).

8. LUBRICATE PROPELLER SHAFT AND TIGHTEN BOLTS

- (a) Lubricate propeller shaft, referring to the lubrication chart. Before pumping in grease, wipe off any mud and dust on the grease fitting.

Grease grade:

Lithium base chassis grease (NLGI No. 2)



Lubricating Positions: 1. Spider
2. Slide Yoke

Y

D30371

- (b) Tighten the bolts for propeller shaft (see page 30-12).
- 9. ROTATE TIRES (See page 28-1)**

BODY

9901B-14

ON-VEHICLE INSPECTION

1. Canada:

TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

- (a) Where necessary, tighten all the parts of the chassis.
 - Steering system
 - Drive train
 - Suspension
 - Brake system
 - Engine mounting, etc.
- (b) Where necessary, tighten all the parts of the body.
 - Seat belts
 - Seats
 - Doors and hood
 - Body mountings
 - Fuel tank
 - Exhaust pipe system, etc.

2. REPLACE AIR CONDITIONING FILTER

- (a) Remove the glove compartment assembly.
- (b) Remove the filter case by holding both sides.
- (c) Remove the filter from the filter case.
- (d) Replace the filter with a new one.
- (e) The installation is in the reverse order of the removal.

3. BODY INSPECTION

- (a) Check the body exterior for dents, scratches and rust.
- (b) Check the underbody for rust and damage.

If necessary, replace or repair.

4. ROAD TEST

- (a) Check the engine and chassis for abnormal noises.
- (b) Check that the vehicle does not wander or pull to one side.
- (c) Check that the brakes work properly and do not drag.
- (d) Do setting of the parking brake shoes and drum.

5. FINAL INSPECTION

- (a) Check the operation of the body parts:
 - Hood:
 - Auxiliary catch operates properly
 - Hood locks securely when closed
 - Front and rear doors:
 - Door locks operate properly
 - Doors close properly
 - Back door:
 - Door lock operates properly
 - Seats:
 - Seat adjusts easily and locks securely in any position
 - Front seat back locks securely in any position
 - Folding-down rear seat backs lock securely

- (b) Be sure to deliver a clean car. Especially check:
- Steering wheel
 - Shift lever knob
 - All switch knobs
 - Door handles
 - Seats