

## 22R-E ENGINE STARTING SYSTEM

Starter	Rated voltage and output power No-load characteristic Current rpm	12 V, 1.0 kW		12 V, 1.4 kW	
				90 A or less	
		3,000 rpm or more at 11.5 V		3,500 rpm or more at 11.5 V	
Brush length	STD	13.5 mm	0.531 in.	15.5 mm	0.610 in.
	Limit	8.5 mm	0.335 in.	10.0 mm	0.394 in.
Commutator Outer diameter	STD	30 mm	1.18 in.		←
	Limit	29 mm	1.14 in.		←
	STD	0.6 mm	0.024 in.		←
Undercut depth	Limit	0.2 mm	0.008 in.		←
	Limit	0.05 mm	0.0020 in.		←
Circle runout		18 - 24 N			←
Spring installed load		(1,785-2,415 gf, 3.9-5.3 lbf)			
	Limit	12 N			←
		(1.2 kgf, 2.6 lbf)			

## CHARGING SYSTEM

Battery specific gravity When fully charged at 20°C 168°F)		1.25 - 1.27		
Alternator	Rated output ampere	60 A		
	Rotor coil resistance	2.8 - 3.0 Ω		
	Brush exposed length	STD	10.5 mm	0.413 in.
		Limit	1.5 mm	0.059 in.
Slip ring diameter	STD	14.2 - 14.4 mm	0.559 - 0.567 in.	
	Limit	12.8 mm	0.504 in.	
Alternator regulator	Regulator voltage	at 25°C (77°F)	13.9 - 15.1 V	
		at 115°C (239°F)	13.5 - 14.3 V	