

GENERAL SERVICE INFORMATION

TIGHTENING TORQUES FOR STANDARD BOLTS AND NUTS

Use the correct amount of torque when you tighten fasteners on the machine. Applying excessive torque may damage the fastener or component and not enough torque may cause a leak or component failure.

Torque values shown in this manual are for clean, non-lubricated fasteners unless otherwise specified.

CAUTION

The tightening torque in the Standard Torque Chart should be applied only to the bolts with a "7" head. (JIS strength classification: 7T)

- Apply 60% torque to bolts that are not listed.
- Apply 80% torque when tightened to aluminum alloy.



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Item	Nominal Thread Diameter x Pitch	Tightening Torque	Remarks
Hexagon Bolt (7T) and Nut	M6 x 1.0 mm	7 - 9 lb-ft (87 - 104 lb-in., 9.8 - 11.8 N·m, 1.0 - 1.2 kgf·m)	Use 80% of the value at left when the tightening part is aluminum. Use 60% of the value at left for 4T bolts and locknuts.
	M8 x 1.25 mm	17 - 21 lb-ft (200 - 251 lb-in., 22.6 - 28.4 N·m, 2.3 - 2.9 kgf·m)	
	M10 x 1.5 mm	33 - 40 lb-ft (44.1 - 53.9 N·m, 4.5 - 5.5 kgf·m)	
	M12 x 1.75 mm	58 - 72 lb-ft (78.4 - 98.0 N·m, 8.0 - 10 kgf·m)	
	M14 x 1.5 mm	94 - 108 lb-ft (127.5 - 147.1 N·m, 13 - 15 kgf·m)	
	M16 x 1.5 mm	159 - 174 lb-ft (215.7 - 235.4 N·m, 22 - 24 kgf·m)	
PT Plug	1/8 mm	7 lb-ft (87 lb-in., 9.8 N·m, 1.0 kgf·m)	
	1/4 mm	14 lb-ft (173 lb-in., 19.6 N·m, 2.0 kgf·m)	
	3/8 mm	22 lb-ft (29.4 N·m, 3.0 kgf·m)	
	1/2 mm	43 lb-ft (58.8 N·m, 6.0 kgf·m)	

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Item	Nominal Thread Diameter x Pitch	Tightening Torque	Remarks
Pipe Joint Bolt	M8	9 - 12 lb-ft (112 - 148 lb-in., 12.7 - 16.7 N·m, 1.3 - 1.7 kgf·m)	-
	M10	14 - 19 lb-ft (173 - 225 lb-in., 19.6 - 25.4 N·m, 2.0 - 2.5 kgf·m)	
	M12	18 - 25 lb-ft (24.5 - 34.3 N·m, 2.5 - 3.5 kgf·m)	
	M14	29 - 36 lb-ft (39.2 - 49.0 N·m, 4.0 - 5.0 kgf·m)	
	M16	36 - 43 lb-ft (49.0 - 58.8 N·m, 5.0 - 6.0 kgf·m)	

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TIGHTENING TORQUES FOR SPECIAL BOLTS AND NUTS

Component	Model	Thread Diameter and Pitch	Torque	Lubricating Oil Application (Thread Portion and Seat Surface)	Reference Page
Crankcase Cover Bolt	L48V	14-M6 x 1.0 mm	96 - 114 lb-in. (10.8 - 12.8 N·m, 1.1 - 1.3 kgf·m)	Not Applied	-
	L70V, L100V	13-M8 x 1.25 mm	225 - 243 lb-in. (25.5 - 27.5 N·m, 2.6 - 2.8 kgf·m)		
Stiffener Bolts on Crankcase Cover	All Models	M8 x 1.25 mm	225 - 242 lb-in. (25.5 - 27.4 N·m, 2.6 - 2.8 kgf·m)	Not Applied	-
Connecting Rod Nuts and Bolts	L48V, L70V	2-M7 x 1.0 mm	200 - 243 lb-in. (22.6 - 27.5 N·m, 2.3 - 2.8 kgf·m)	Applied	-
	L100V	2-M8 x 1.0 mm	32.5 - 36 lb-ft (44.1 - 49.0 N·m, 4.9 - 5.0 kgf·m)		
Flywheel Nut	L48V	M16 x 1.5 mm	101.5 - 108.7 lb-ft (137.3 - 147.1 N·m, 14.0 - 15.0 kgf·m)	Applied	-
	L70V	M16 x 1.5 mm	116 - 123.2 lb-ft (156.9 - 166.7 N·m, 16.0 - 17.0 kgf·m)		
	L100V	M18 x 1.5 mm	159 - 166 lb-ft (215.7 - 225.6 N·m, 22.0 - 23.0 kgf·m)		
Cylinder Head Nuts (Final Torque)	L48V	M8 x 1.25 mm	21.5 - 24.4 lb-ft (29.4 - 33.3 N·m, 3.0 - 3.4 kgf·m)	Applied	-
	L70V	M9 x 1.5 mm	34.8 - 37.8 lb-ft (47 - 51 N·m, 4.8 - 5.2 kgf·m)		
	L100V	M10 x 1.25 mm	44.0 - 46.9 lb-ft (59.8 - 63.7 N·m, 6.1 - 6.5 kgf·m)		
Valve Rocker Arm Support	L48V, L70V	M6 x 1.00 mm	88 - 106 lb-in. (10 - 12 N·m, 1.0 - 1.2 kgf·m)	Not Applied	-
	L100V	M8 x 1.5 mm	225 - 243 lb-in. (25.5 - 27.5 N·m, 2.6 - 2.8 kgf·m)	Not Applied	-

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Component	Model	Thread Diameter and Pitch	Torque	Lubricating Oil Application (Thread Portion and Seat Surface)	Reference Page
Fuel Nozzle Case Nut	All Models	U-0.605-40UNS-2B	30 - 35 lb-ft (40.7 - 47.5 N·m, 4.2 - 4.8 kgf·m)	Not Applied	-
Fuel Pump Delivery Valve (If Equipped)		M14 x 15 mm	21.5 - 25 lb-ft (29.4 - 34.3 N·m, 3.0 - 3.5 kgf·m)	Not Applied	-
Fuel Injection Pump Nuts		3-M6 x 1.0 mm	87 - 104 lb-in. (9.8 - 11.8 N·m, 1.0 - 1.2 kgf·m)	Not Applied	-
Fuel Injection Nozzle Nuts		2-M6 x 1.0 mm	61.3 - 79 lb-in. (6.9 - 8.9 N·m, 0.7 - 0.9 kgf·m)	Not Applied	-
Fuel Injection Pump Inspection Window Plate Nuts		3-M6 x 1.0 mm	87 - 104 lb-in. (9.8 - 11.8 N·m, 1.0 - 1.2 kgf·m)	Not Applied	-
Fuel Limiter Mounting Nut		-	215 - 218 in.-lb (24.2 - 24.6 N·m, 2.4 - 2.5 kgf·m)	Not Applied	-
High Pressure Fuel Injection Line Nuts		-	19.8 - 23.5 lb-ft (26.9 - 31.9 N·m, 2.7 - 3.3 kgf·m)	Not Applied	-