3. Tightening Torque

The bolts and nuts used in this engine employ ISO general metric threads stipulated in JIS (Japanese Industrial Standards). Pay careful attention to the thread dimensions when replacing bolts and nuts.
Tighten the bolts and nuts to the tightening torque given in the table below.

3-1 Main bolt and nut tightening torque

Location	Bolt/nut		1GM10(C)	2GM20(F)(C)	3GM30(F)(C)	3HM35(F)(C)	Remarks
Cylinder head	Cylinder head tightening bolt and nut	Thread diameter	M10	M12			Nut and bolt
			—	M8			Aux. bolt
		Quantity	4	6	8	8	Nut and bolt
			—	2	3		Aux. bolt
		Tightening torque kgf-m(ft-lb)	7.5(54.248)	12.0(86.8)		13(94.029)	Nut and bolt
			—	3.0(21.7)		3(21.699)	Aux. bolt
	Rocker arm support nut	Thread diameter	M8	M10			
		Quantity	1	2	3	3	
		Tightening torque kgf-m(ft-lb)	3.7(26.762)				
	Exhaust manifold nuts	Thread diameter × pitch mm	M8 × 1.25				
		Quantity	2	3	6		
		Tightening torque kgf-m(ft-lb)	4.5(32.549)				
	Anticorrosion zinc	Thread diameter	—	M25			
		Quantity	—	1			
		Tightening torque kgf-m(ft-lb)	—	5~6(36.165~43.398)			
Timing gear	Timing gear case mounting bolt	Thread diameter × pitch mm	M6 × 1.0	M8 × 1.25			
		Quantity	12				
		Tightening torque kgf-m(ft-lb)	0.9(6.510)	2.5(18.083)			
	Camshaft end nut	Thread diameter × pitch mm	M20 × 1.5			M18 × 1.5	
		Quantity	1				
		Tightening torque kgf-m(ft-lb)	7~8(50.631~57.864)				
	Governor weight set nut	Thread diameter × pitch mm	M26 × 1.5				
		Quantity	1				
		Tightening torque kgf-m(ft-lb)	8~10(57.864~72.330)				

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Location	Bolt/nut		1GM10(C)	2GM20(F)(C)	3GM30(F)(C)	3HM35(F)(C)	Remarks
Cylinder block	Mounting flange bolt	Thread diameter × pitch mm	M10 × 1.5				
		Quantity	6				
		Tightening torque kgf-m(ft-lb)	4.5(32.549)				
	Bottom cover bolt	Thread diameter × pitch mm	M6 × 1.0				
		Quantity	13	17	21	23	
		Tightening torque kgf-m(ft-lb)	0.9(6.510)				
	Oil pressure switch mounting	Thread diameter	PT 1/8				
		Quantity	1				
		Tightening torque kgf-m(ft-lb)	1.0(7.233)				
Crankshaft, pistons	Main bearing housing bolt	Thread diameter × pitch mm	M8 × 1.25				
		Quantity	6				
		Tightening torque kgf-m(ft-lb)	2.5(18.083)				
	Connecting rod bolt	Thread diameter × pitch mm	M7 × 1.0			M9 × 1.0	
		Quantity	1 × 2 = 2	2 × 2 = 4	3 × 2 = 6		
		Tightening torque kgf-m(ft-lb)	2.5(18.083)			4.5(0.6221)	
	Crankshaft V-pulley bolt	Thread diameter	M18				3HM35(F)(C) Counterclock-wise screw
		Quantity	1				
		Tightening torque kgf-m(ft-lb)	10(72.330)				
	Flywheel bolt	Thread diameter × pitch mm	M10 × 1.25				
		Quantity	5				
		Tightening torque kgf-m(ft-lb)	6.5~7.0(47.015~50.631)				
	Diameter disk bolt	Damper diameter × pitch mm	M8 × 1.25				
		Quantity	6			8	
		Tightening torque kgf-m(ft-lb)	2.5(18.083)				
	Intermediate main bearing housing bolt	Thread diameter × pitch mm	—	M8 × 1.25			
		Quantity	—	2 × 2 = 4	3 × 2 = 6		
		Tightening torque kgf-m(ft-lb)	—	3.0~3.5 (21.699~25.316)		4.5~5.0 (32.549~36.165)	
	Intermediate main bearing housing set bolt	Thread diameter × pitch mm	—	M10 × 1.25			
		Quantity	—	1	2		
		Tightening torque kgf-m(ft-lb)	—	4.5~5.0 (32.549~36.165)		7.0~7.5 (50.631~54.248)	
Cooling system	Water temperature sender bolt	Thread diameter	PT 3/8				
		Quantity	1				
		Tightening torque kgf-m(ft-lb)	1.0~1.5(7.2330~10.850)				

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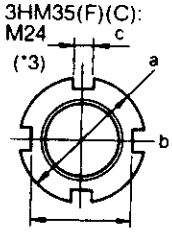
Location	Bolt/nut		1GM10(C)	2GM20(F)(C)	3GM30(F)(C)	3HM35(F)(C)	Remarks
Cooling system	Anticorrosion zinc mounting (Cylinder block)	Thread diameter × pitch mm					1GM10(C): Flange type 2GM20(C), 3GM30(C)and 3HM35(C): Plug type
		Quantity	1		2		
		Tightening torque kgf-m(ft-lb)	5~6(36.165~43.498)				
	Cooling water inlet joint	Thread diameter × pitch mm					
		Quantity	1				
		Tightening torque kgf-m(ft-lb)					
	Water pump body bolt	Thread diameter × pitch mm	M6×1.0	M8×1.25			
		Quantity	3	2			
		Tightening torque kgf-m(ft-lb)	0.9(6.5097)	2.5(18.083)			
Fuel system	Nozzle nut	Thread diameter × pitch mm	M20×1.5				
		Quantity	1	2	3		
		Tightening torque kgf-m(ft-lb)	10(72.330)				
	Delivery valve holder	Thread diameter	M18				
		Quantity	1	2	3		
		Tightening torque kgf-m(ft-lb)	4.0~4.5(28.932~32.549)				
	Fuel injection nozzle flange nut	Thread diameter × pitch mm	M8 × 1.25				
		Quantity	2 × 1 = 2	2 × 2 = 4	2 × 3 = 6		
		Tightening torque kgf-m(ft-lb)	2(14.466)				
Clutch system	Clutch housing nut	Thread diameter × pitch mm	M8×1.25				(*2) GM-series: M18 x 1.5 3HM35(F)(C): M24  a: 39.5 (1.5551) b: 32 (1.2598) c: 7 (0.2755)
		Quantity	8				
		Tightening torque kgf-m(ft-lb)	2.0~2.5(14.466~18.083)				
	Clutch mounting bolt	Thread diameter × pitch mm	M8×1.25				
		Quantity	8				
		Tightening torque kgf-m(ft-lb)	2.0~2.5(14.466~18.083)				
	Output shaft coupling tightening nut	Thread diameter × pitch mm	(*2)				
		Width B/C mm(in.)	30/34.6(1.1811/1.3622)		(*3)		
		Quantity					
		Tightening torque kgf-m(ft-lb)	10±1.5 (72.330~10.850)		9.5 (68.714)		
Electric system	Starter motor mounting top	Thread diameter × pitch mm	M10×1.5			M12	
		Quantity	2				
		Tightening torque kgf-m(ft-lb)	4.5~5.0 (32.549~36.165)			7.5~8.0 (54.248~57.864)	
	AC generator mounting bolt	Thread diameter × pitch mm	M8×1.25				
		Quantity	3				
		Tightening torque kgf-m(ft-lb)	2.2~2.7(15.913~19.530)				

3-2 General bolt and nut tightening torque

kgf-m(ft-lb)

Diameter of thread	General bolts 7T	Pipe joint bolts
M6	$0.9^{\pm 0.1}$ (5.9 ~ 7.2)	—
M8	$2.5^{\pm 0.2}$ (16.6 ~ 19.5)	1.2 ~ 1.7 (8.7 ~ 12.3)
M10	$4.7^{\pm 0.3}$ (31.8 ~ 36.2)	—
M12	$8.0^{\pm 0.5}$ (54.2 ~ 61.5)	2.5 ~ 3.5 (18.1 ~ 25.3)
M14	$13.0^{\pm 0.5}$ (90.4 ~ 97.6)	4.0 ~ 5.0 (28.9 ~ 36.2)
M16	$20.5^{\pm 0.5}$ (144.7 ~ 151.9)	5.0 ~ 6.0 (36.2 ~ 43.4)

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