

## GROUP 2 TIGHTENING TORQUE

### 1. MAJOR COMPONENTS

No.	Descriptions	Bolt size	Torque		
			kgf · m	lbf · ft	
1	Engine	Engine mounting bolt (bracket-frame, FR)	M20 × 2.5	55±3.5	398±25.3
2		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90±7.0	651±50.6
3		Engine mounting bolt (engine-bracket)	M12 × 1.75	10.0±1.0	72.3±7.2
4		Radiator mounting bolt, nut	M16 × 2.0	29.7±4.5	215±32.5
5		Coupling mounting bolt	M18 × 2.5	32.0±1.0	231±7.2
6	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	4.8±0.3	34.7±2.2
7		Main pump mounting bolt	M16 × 2.0	25.0±2.5	181±18.1
8		Main control valve mounting bolt	M12 × 1.75	12.2±1.3	88.2±9.4
9		Travel motor mounting bolt	M16 × 2.0	29.6±3.2	214±23.1
10		Fuel tank mounting bolt	M20 × 2.5	46±5.1	333±36.9
11		Hydraulic oil tank mounting bolt	M20 × 2.5	46±5.1	333±36.9
12		Turning joint mounting bolt, nut	M12 × 1.75	12.3±1.3	89±9.4
13	Power train system	Swing motor mounting bolt	M16 × 2.0	29.6±3.2	214±23.1
14		Swing bearing upper mounting bolt	M18 × 2.5	41.3±4.5	299±32.5
15		Swing bearing lower mounting bolt	M16 × 1.5	31.3±3.2	226±23.1
16		Real axle mounting bolt, nut	M20 × 2.5	58±6.3	419±45.5
17		Transmission bracket mounting bolt	M20 × 2.5	58.4±6.4	422±46.3
18		Transmission mounting bolt	M20 × 2.5	29.7±4.5	215±32.5
19		Oscillating cylinder mounting bolt	M22 × 1.5	83.2±9.2	602±66.5
20		Oscillating cylinder support bolt	M12 × 1.75	12.3±2.5	88.9±18.1
21		Wheel nut	M22 × 1.5	60 <sup>+0</sup> <sub>-5</sub>	433 <sup>+0</sup> <sub>-36.2</sub>
22		Front drive shaft mounting bolt, nut	M10 × 1.0	5.9±0.6	42.7±4.3
23	Rear drive shaft mounting bolt, nut	M10 × 1.0	5.9±0.6	42.7±4.3	
24	Others	Counterweight mounting bolt	M27 × 3.0	140±15	1013±108
25		Cab mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
26		Operator's seat mounting bolt	M 8 × 1.25	4.05±0.8	29.3±5.8

※ For tightening torque of engine and hydraulic components, see each components disassembly and assembly.

## 2. TORQUE CHART

The torques given are standard figures. Any figures specifically described in this manual has priority.

### 1) BOLT AND NUT

#### (1) Coarse thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 6 × 1.0	0.9 ~ 1.3	6.5 ~ 9.4	1.1 ~ 1.7	8.0 ~ 12.3
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.7 ~ 4.1	19.5 ~ 29.7
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60.0
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 81.0	9.8 ~ 15.8	70.9 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 163
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 344
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	349 ~ 458	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.0	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1656
M36 × 4.0	174 ~ 236	1261 ~ 1704	250 ~ 310	1808 ~ 2242

#### (2) Fine thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 8 × 1.0	2.2 ~ 3.4	15.9 ~ 24.6	3.0 ~ 4.4	21.7 ~ 31.8
M10 × 1.2	4.5 ~ 6.7	32.5 ~ 48.5	5.9 ~ 8.9	42.7 ~ 64.4
M12 × 1.25	7.8 ~ 11.6	56.4 ~ 83.9	10.6 ~ 16.0	76.7 ~ 116
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 131	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 195	26.6 ~ 36.0	192 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 391	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 516	70.7 ~ 95.7	511 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 665	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1339	182 ~ 248	1314 ~ 1796
M36 × 3.0	192 ~ 260	1390 ~ 1880	262 ~ 354	1894 ~ 2562

**2) PIPE AND HOSE (FLARE type)**

Thread size (PF)	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130.2
1"	41	21	151.9
1-1/4"	50	35	253.2

**3) PIPE AND HOSE (ORFS type)**

Thread size (UNF)	Width across flat (mm)	kgf · m	lbf · ft
9/16-18	19	4	28.9
11/16-16	22	5	36.2
13/16-16	27	9.5	68.7
1-3/16-12	36	18	130.2
1-7/16-12	41	21	151.9
1-11/16-12	50	35	253.2

**4) FITTING**

Thread size	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130.2
1"	41	21	151.9
1-1/4"	50	35	253.2