

## 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 ± 51
3		Engine mounting bolt (Engine-Bracket)	M12 × 1.75	10.0 ± 1.0	72.3 ± 7.2
4		Radiator mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
5		Coupling mounting socket bolt	M18 × 2.5	32 ± 1.0	231 ± 7.2
6	Hydraulic system	Main pump housing mounting socket bolt	M10 × 1.5	4.8 ± 0.3	34.7 ± 2.2
7		Main pump mounting socket bolt	M20 × 2.5	42 ± 4.5	304 ± 32.5
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	45 ± 5.1	325 ± 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	12.2 ± 1.3	88.2 ± 9.4
13	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
14		Swing bearing upper mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
15		Swing bearing lower mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
16		Rear axle mounting bolt, nut	M24 × 2.0	100 ± 10.7	723 ± 77.4
17		Transmission bracket mounting bolt	M20 × 2.5	39 ± 4.2	282 ± 30.4
18		Transmission mounting bolt	M20 × 2.5	29.6 ± 3.2	214 ± 23.1
19		Oscillating cylinder mounting bolt	M22 × 1.5	83.2 ± 9.2	602 ± 66.5
20		Oscillating cylinder support mounting bolt	M16 × 2.0	29.6 ± 3.2	214 ± 23.1
21		Wheel nut	M20 × 1.5	60 <sup>0</sup> <sub>.5</sub>	434 <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	M36 × 3.0	308 ± 46	2228 ± 333
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) METRIC BOLT-Coarse thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.73 ~ 4.12	19.7 ~ 29.8
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 79.5	9.8 ~ 15.8	71 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 167
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 ~ 343
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	350 ~ 457	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.5	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1655
M36 × 4.0	174 ~ 236	1261 ~ 1703	250 ~ 310	1808 ~ 2242

### 2) METRIC BOLT-Fine thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 8 × 1.0	2.17 ~ 3.37	15.7 ~ 24.3	3.04 ~ 4.44	22.0 ~ 32.0
M10 × 1.25	4.46 ~ 6.66	32.3 ~ 48.2	5.93 ~ 8.93	42.9 ~ 64.6
M12 × 1.25	7.78 ~ 11.58	76.3 ~ 83.7	10.6 ~ 16.0	76.6 ~ 115
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 130	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 194	26.6 ~ 36.0	193 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 390	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 515	70.7 ~ 95.7	512 ~ 692
M24 × 2.0	68 ~ 92	491 ~ 664	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1338	182 ~ 248	1314 ~ 1795
M36 × 3.0	192 ~ 260	1389 ~ 1879	262 ~ 354	1893 ~ 2561

### 3) 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

### 4) 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

### 5) 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