

GROUP 2 TIGHTENING TORQUE

1. MAJOR COMPONENTS

No.	Descriptions	Bolt size	Torque		
			kgf · m	lbf · ft	
1	Engine	Engine mounting bolt (Bracket-Frame, FR)	M16 × 2.0	30 ± 3.5	217 ± 25.3
2		Engine mounting bolt (Bracket-Frame, RR)	M20 × 2.5	55 ± 3.5	398 ± 25.3
3		Engine mounting bolt (Engine-Bracket)	M12 × 1.75	10.0 ± 1.0	72.3 ± 7.2
4		Radiator mounting bolt, nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
5		Coupling mounting bolt	M16 × 2.0	22.0 ± 1.0	159 ± 7.2
6	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	6.9 ± 1.4	49.9 ± 10.1
7		Main pump mounting bolt	M16 × 2.0	22.0 ± 1.0	159 ± 7.2
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	29.7 ± 4.5	215 ± 32.5
10		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
11		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 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	M16 × 2.0	29.6 ± 3.2	215 ± 23.1
14		Swing bearing upper mounting bolt	M18 × 2.5	41.3 ± 6.2	299 ± 44.8
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	44 ± 2.0	318 ± 14.4
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 bolt	M12 × 1.75	12.3 ± 2.5	88.9 ± 18.1
21		Wheel nut	M22 × 1.5	62 ± 3.0	448 ± 21.7
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) 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