

## GROUP 2 TIGHTENING TORQUE

### 1. MAJOR COMPONENTS

No.	Descriptions	Bolt size	Torque	
			kgf · m	lbf · ft
1	Engine mounting bolt (engine-bracket)	M12 × 1.75	10 ± 1.0	72.3 ± 7.2
2	Engine mounting bolt (bracket-frame, FR)	M20 × 2.5	55 ± 3.5	398 ± 25.3
3	Engine mounting bolt (bracket-frame, RR)	M20 × 2.5	55 ± 3.5	398 ± 25.3
4	Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5	Coupling mounting socket bolt	M16 × 2.0	22 ± 1.0	159 ± 7.2
6	Main pump housing mounting bolt	M10 × 1.5	6.0 ± 1.5	43.4 ± 10.8
7	Main pump mounting socket bolt	M16 × 2.0	22 ± 1.0	159 ± 7.2
8	Main control valve mounting bolt	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
9	Fuel tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
10	Hydraulic oil tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
11	Turning joint mounting bolt, nut	M12 × 1.75	12.3 ± 1.3	88.9 ± 9.4
12	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
13	Swing bearing upper part mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
14	Swing bearing lower part mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
15	Travel motor mounting bolt	M16 × 2.0	23 ± 2.5	166 ± 18.1
16	Sprocket mounting bolt	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
17	Carrier roller mounting bolt, nut	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
18	Track roller mounting bolt	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
19	Track tension cylinder mounting bolt	M16 × 2.0	21.9 ± 3.3	158 ± 23.9
20	Track shoe mounting bolt, nut	5/8 - 18UNF	42 ± 4	304 ± 28.9
21	Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
22	Counterweight mounting bolt	M30 × 3.0	199 ± 30	1439 ± 217
23	Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
24	Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

## 2. TORQUE CHART

Use following table for unspecified torque.

### 1) BOLT AND NUT

#### (1) Coarse thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · 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) Fine thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · 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	67.9 ~ 91.9	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

**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