

2. TIGHTENING TORQUE

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	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	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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Items	Size	kgf · m	lbf · ft		
1	Engine	Engine mounting bolt, nut(Rubber, 2EA)	M20×2.5	57.9 ± 8.7	419± 62.9	
2		Engine mounling bolt(Bracket, 8EA)	M12×1.75	10.7 ± 1.6	77.4± 11.6	
3		Engine mounting bolt(Fly wheel housing, 12EA)	M10×1.5	4.6 ± 0.9	33.3± 6.5	
4		Radiator mounting bolt	M16×2.0	29.7± 4.5	215± 32.5	
5		Fuel tank mounting bolt, nut	M16×2.0	29.7 ± 4.5	215± 32.5	
6	Hydraulic system	Main pump housing mounting bolt	M12×1.75	12.8 ± 3.0	92.6± 21.7	
7		Brake pump housing mounting bolt	M10×1.5	6.9 ± 1.4	49.9± 10.1	
8		Main control valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6± 21.7	
9		Steering unit mounting bolt	M10×1.5	6.9 ± 1.4	49.9± 10.1	
10		Steering valve(EHPS) mounting bolt	M8×1.25	2.5 ± 0.5	18.1± 3.6	
11		Brake valve mounting bolt	M8×1.25	2.5 ± 0.5	18.1± 3.6	
12		Cut-off valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6± 21.7	
13		Remote control lever mounting bolt	M6×1.0	1.1± 0.2	8.0± 1.4	
14		Pilot supply unit mounting bolt	M8×1.25	2.5 ± 0.5	18.1± 3.6	
15		Safety valve	M8×1.25	2.5 ± 0.5	8.1± 3.6	
16	Hydraulic oil tank mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 32.5		
17	Power train system	Transmission mounting bolt, nut(Rubber, 2EA)	M24×3.0	100 ± 15	723 ± 108	
18		Transmission mounting bolt(Bracket)	M20×2.5	46.3 ± 7.0	335± 50.6	
19		Front axle mounting bolt, nut	-#0293(VOLVO)	M24×2.0	100 ± 15	723± 108
			#0294-(ZF)	M27×2.0	135 ± 15	976± 108
20		Rear axle support mounting bolt, nut	M36×3.0	308 ± 46.2	2228± 334	
21		Tire mounting nut	M22×1.5	61 ± 2.0	441± 14.5	
22	Drive shaft joint mounting bolt, nut	1/2-20UNF	15 ± 2.0	108± 14.5		
23	Others	Counterweight mounting bolt	M30×3.5	199 ± 29.9	1439± 216	
24		Operator's seat mounting bolt	M8×1.25	3.4 ± 0.8	24.6± 5	
25		ROPS Cab mounting bolt(4EA)	M27×2.0	125 ± 15	904 ± 108	