

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 | 0.9 ~ 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 × 3.5 | 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 | |
|------------|-------------|-------------|-------------|-------------|
| | kgf · m | lbf · ft | kgf · m | lbf · ft |
| M 8 × 1.0 | 2.2 ~ 3.4 | 15.9 ~ 24.6 | 3.0 ~ 4.4 | 21.7 ~ 31.8 |
| M10 × 1.25 | 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 |

4) TIGHTENING TORQUE OF MAJOR COMPONENT

| No. | Descriptions | Bolt size | Torque | | |
|-----|--------------------|--|------------|------------|-------------|
| | | | kgf · m | lbf · ft | |
| 1 | Engine | Engine mounting bolt (engine-bracket) | M12 × 1.75 | 10.0 ± 1.0 | 72.3 ± 7.2 |
| 2 | | Engine mounting bolt (bracket-frame, FR) | M20 × 2.5 | 55 ± 3.5 | 398 ± 25 |
| 3 | | Engine mounting bolt (bracket-frame, RR) | M24 × 3.0 | 97 ± 7.0 | 702 ± 51 |
| 4 | | Radiator mounting bolt | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 5 | | Coupling mounting socket bolt | M18 × 2.5 | 32 ± 1.0 | 231 ± 7.2 |
| 6 | | Fuel tank mounting bolt | M20 × 2.5 | 46 ± 5.1 | 333 ± 36.9 |
| 7 | Hydraulic system | Main pump housing mounting bolt | M10 × 1.5 | 4.8 ± 0.3 | 34.7 ± 2.2 |
| 8 | | Main pump mounting socket bolt | M10 × 1.5 | 4.8 ± 0.3 | 34.7 ± 2.2 |
| 9 | | Main control valve mounting nut | M12 × 1.75 | 12.3 ± 1.3 | 89.0 ± 9.4 |
| 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 ± 1.3 | 86.8 ± 9.4 |
| 12 | Power train system | Swing motor mounting bolt | M20 × 2.5 | 57.9 ± 5.8 | 419 ± 42 |
| 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 | Under carriage | Carrier roller mounting bolt, nut | M16 × 2.0 | 29.7 ± 3.0 | 215 ± 21.7 |
| 18 | | Track roller mounting bolt | M16 × 2.0 | 29.7 ± 3.0 | 215 ± 21.7 |
| 19 | | Track tension cylinder mounting bolt | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 20 | | Track shoe mounting bolt, nut | M20 × 1.5 | 78 ± 8.0 | 564 ± 57.9 |
| 21 | | Track guard mounting bolt | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 62.9 |
| 22 | Others | Counterweight mounting bolt | M36 × 3.0 | 340 ± 10 | 2460 ± 72.3 |
| 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 |

※ For tightening torque of engine and hydraulic components, see engine maintenance guide and service manual.