

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 ± 50.6 |
| 3 | | Engine mounting bolt (engine-bracket) | M12 × 1.75 | 10.0 ± 1.0 | 72.3 ± 7.2 |
| 4 | | Radiator mounting bolt, nut | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 5 | | Coupling mounting bolt | M18 × 2.5 | 32.0 ± 1.0 | 231 ± 7.2 |
| 6 | Hydraulic system Power train system | Main pump housing mounting bolt | M10 × 1.5 | 4.8 ± 0.3 | 34.7 ± 2.2 |
| 7 | | Main pump mounting bolt | M16 × 2.0 | 25.0 ± 2.5 | 181 ± 18.1 |
| 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 | 46 ± 5.1 | 333 ± 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 | 12.3 ± 1.3 | 89 ± 9.4 |
| 13 | Under carriage | Swing motor mounting bolt | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 62.9 |
| 14 | | Swing bearing upper mounting bolt | M20 × 2.5 | 58 ± 6.3 | 420 ± 45.6 |
| 15 | | Swing bearing lower mounting bolt | M20 × 2.5 | 58 ± 6.3 | 420 ± 45.6 |
| 16 | | Real axle mounting bolt, nut | M20 × 1.5 | 58 ± 6.3 | 420 ± 45.6 |
| 17 | | Transmission bracket mounting bolt | M20 × 2.5 | 58 ± 6.3 | 420 ± 45.6 |
| 18 | | Transmission mounting bolt | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 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 | M22 × 1.5 | 60 ⁰ ₋₅ | 433 ⁰ _{-36.2} |
| 22 | | Front drive shaft mounting bolt, nut | M10 × 1.25 | 5.9 ± 0.6 | 42.7 ± 4.3 |
| 23 | | Rear drive shaft mounting bolt, nut | M10 × 1.25 | 5.9 ± 0.6 | 42.7 ± 4.3 |
| 24 | Others | Counterweight mounting bolt | M30 × 3.0 | 199 ± 30 | 1439 ± 217 |
| 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 engine maintenance guide and service manual.

2. TORQUE CHART

The torques given are standard figures. Any figures specifically described in this manual has priority.

1) BOLT AND NUT

(1) Coarse thread

| Bolt size | 8T | | 10T | |
|------------|-------------|-------------|-------------|-------------|
| | kg · m | lb · ft | kg · m | lb · 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 × 3.0 | 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 | |
|------------|-------------|-------------|-------------|-------------|
| | kg · m | lb · ft | kg · m | lb · ft |
| M 8 × 1.0 | 2.2 ~ 3.4 | 15.9 ~ 24.6 | 3.0 ~ 4.4 | 21.7 ~ 31.8 |
| M10 × 1.2 | 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 |