

GROUP 2 TIGHTENING TORQUE

1. MAJOR COMPONENTS

| No. | Descriptions | Bolt size | Torque | | |
|-----|--------------------|--|------------|------------|-------------|
| | | | kgf · m | lbf · ft | |
| 1 | Engine | Engine mounting bolt, nut (FR) | M22 × 2.5 | 70 ± 7.0 | 506 ± 51.3 |
| 2 | | Engine mounting bolt, nut (RR) | M24 × 3.0 | 100 ± 10 | 723 ± 72.3 |
| 3 | | Gear box mounting bolt | M12 × 1.75 | 12.3 ± 1.0 | 89 ± 7.2 |
| 4 | | Radiator mounting bolt | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 63 |
| 5 | | Oil cooler mounting bolt | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 63 |
| 6 | | Coupling mounting socket bolt | M10 × 1.5 | 27.0 ± 3.0 | 195 ± 21.7 |
| 7 | | Fan pump mounting bolt | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 8 | Hydraulic system | Main pump mounting socket bolt | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 63 |
| 9 | | Main control valve 1 mounting bolt | M20 × 2.5 | 42.6 ± 4.2 | 308 ± 30.3 |
| 10 | | Main control valve 2 mounting bolt | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 11 | | Fuel tank mounting bolt | M20 × 2.5 | 58 ± 6.0 | 420 ± 43.4 |
| 12 | | Hydraulic oil tank mounting bolt | M20 × 2.5 | 58 ± 6.0 | 420 ± 43.4 |
| 13 | | Turning joint mounting bolt, nut | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |
| 14 | Power train system | Swing motor mounting bolt | M24 × 3.0 | 100 ± 15 | 723 ± 108 |
| 15 | | Swing bearing upper part mounting bolt | M30 × 3.5 | 199 ± 10 | 1439 ± 72.3 |
| 16 | | Swing bearing lower part mounting bolt | M30 × 3.5 | 199 ± 10 | 1439 ± 72.3 |
| 17 | | Travel motor mounting bolt | M30 × 3.5 | 150 ± 10 | 1085 ± 72.3 |
| 18 | | Sprocket mounting bolt | M30 × 3.5 | 199 ± 10 | 1439 ± 72.3 |
| 19 | Under carriage | Carrier roller mounting bolt, nut | M20 × 2.5 | 57.9 ± 8.7 | 419 ± 63 |
| 20 | | Track roller mounting bolt | M27 × 3.0 | 140 ± 7.0 | 1013 ± 50.6 |
| 21 | | Track tension cylinder mounting bolt | M24 × 3.0 | 100 ± 10 | 723 ± 72.3 |
| 22 | | Track shoe mounting bolt, nut | M24 × 1.5 | 240 ± 2.0 | 1736 ± 145 |
| 23 | | Track guard mounting bolt | M27 × 3.0 | 140 ± 7.0 | 1013 ± 50.6 |
| 24 | Others | Counterweight mounting bolt | M42 × 3.0 | 390 ± 40 | 2821 ± 289 |
| 25 | | Cab mounting bolt | 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

Use following table for unspecified torque.

1) BOLT AND NUT

(1) 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) 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 | 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 |