

SECTION 1 GENERAL

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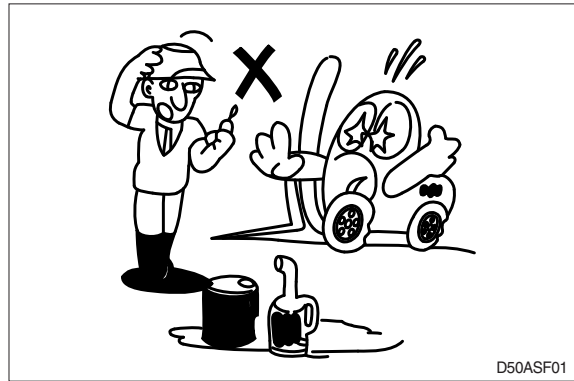
GROUP 1 SAFETY HINTS

Careless performing of the easy work may cause injuries.

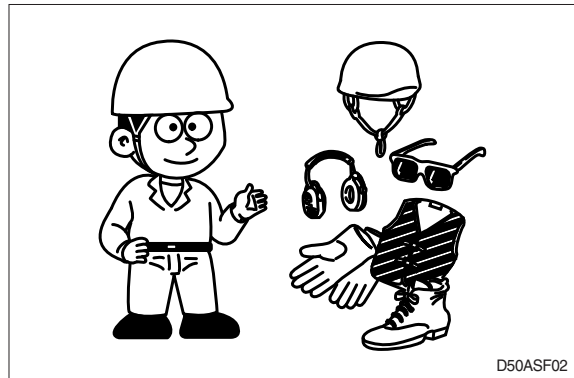
Take care to always perform work safely, at least observing the following.

- Oil is a dangerous substance. Never handle oil, grease or oily clothes in places where there is any fire or flame.

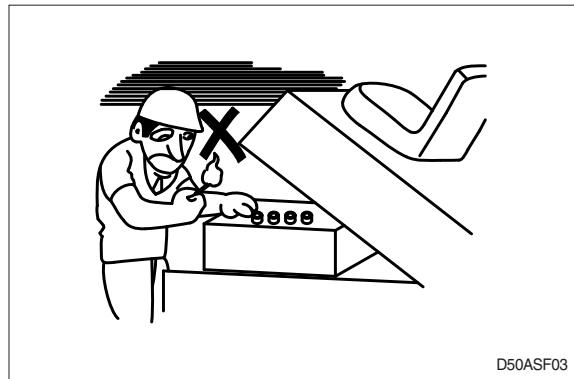
As preparation in case of fire, always know the location and directions for use of fire extinguishers and other fire fighting equipment.



- Wear well-fitting helmet, safety shoes and working clothes. When drilling, grinding or hammering, always wear protective goggles. Always do up safety clothes properly so that they do not catch on protruding parts of machines. Do not wear oily clothes. When checking, always release battery plug.



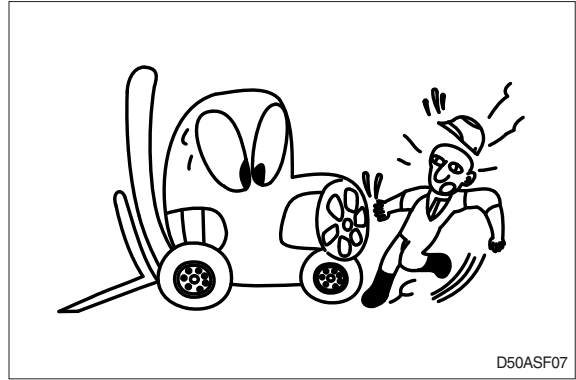
- Flames should never be used instead of lamps. Never use a naked flame to check leaks or the level of oil or electrolyte.



- When working on top of the machine, be careful not to lose your balance and fall.

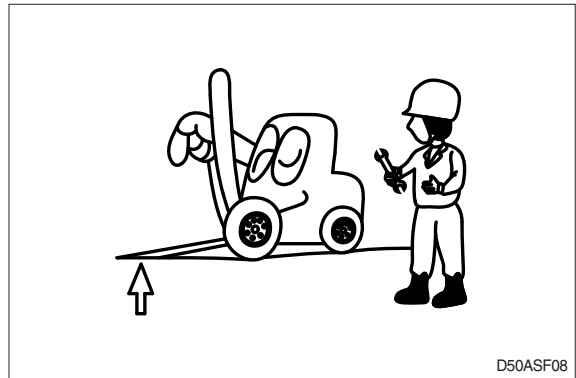


- Hand a caution sign in the operator's compartment (For example **Do not start** or **Maintenance in progress**).
This will prevent anyone from starting or moving the machine by mistake.

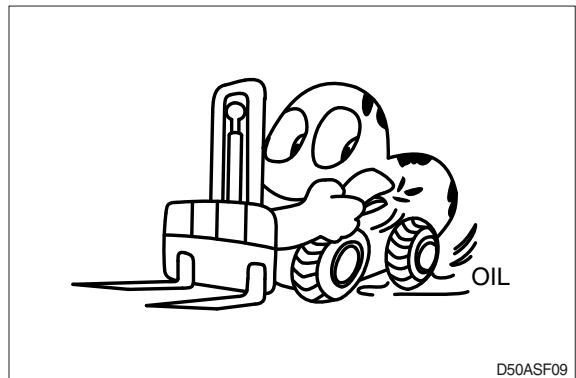


When inspecting running parts or near such parts, always stop the machine first.
Before checking or servicing accumulator or piping, depress brake pedal repeatedly to release pressure.

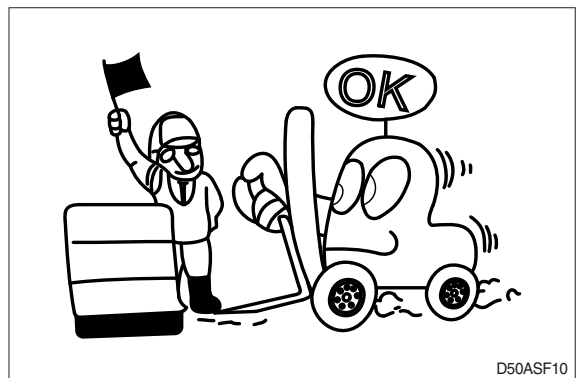
- Park the machine on firm, flat ground.
Lower the fork to the ground and stop the engine.
Return each lever to **NEUTRAL** and apply the brake lock.



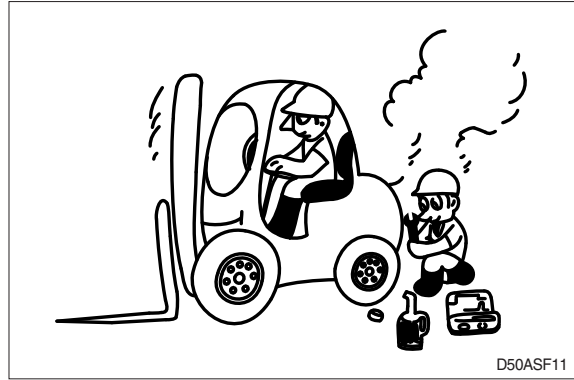
- Immediately remove any oil or grease on the floor of the operator's compartment, or on the handrail. It is very dangerous if someone slips while on the machine.



- When working with others, choose a group leader and work according to his instructions. Do not perform any maintenance beyond the agreed work.



- Always remember that the hydraulic oil circuit is under pressure. When feeding or draining the oil or carrying out inspection and maintenance, release the pressure first.

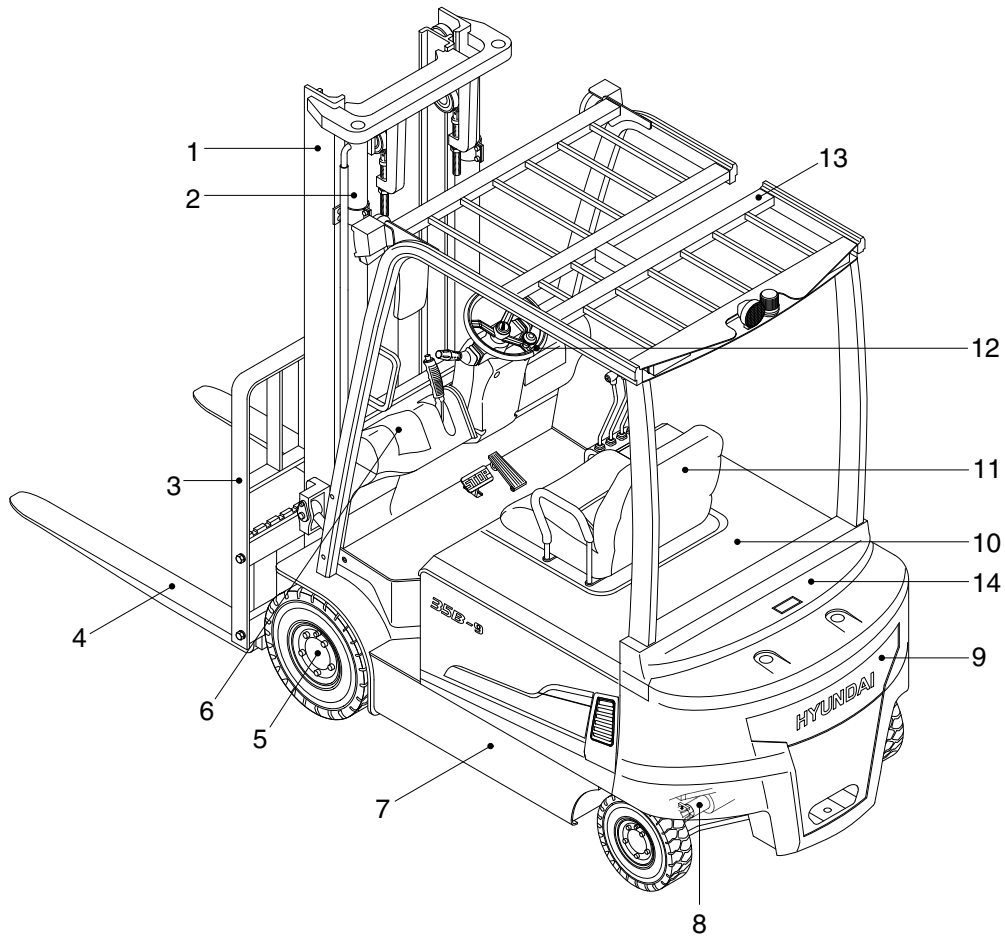


- Unless you have special instructions to the contrary, maintenance should always be carried out with the machine stopped. If maintenance is carried out with the machine running, there must be two men present : one sitting in the operator's seat and the other one performing the maintenance. In such a case, never touch any moving part.
- Thoroughly clean the machine. In particular, be careful to clean the filler caps, grease fittings and the area around the dipsticks. Be careful not to let any dirt or dust into the system.
- Always use HYUNDAI Forklift genuine parts for replacement.
- Always use the grades of grease and oil recommended by HYUNDAI Forklift. Choose the viscosity specified for the ambient temperature.
- Always use pure oil or grease, and be sure to use clean containers.
- When checking or changing the oil, do it in a place free of dust, and prevent any dirt from getting into the oil.
- Before draining the oil, warm it up to a temperature of 30 to 40° C.
- After replacing oil, filter element or strainer, bleed the air from circuit.
- When the strainer is located in the oil filler, the strainer must not be removed while adding oil.
- When changing the oil filter, check the drained oil and filter for any signs of excessive metal particles or other foreign materials.
- When removing parts containing O-ring, gaskets or seals, clean the mounting surface and replace with new sealing parts.
- After injecting grease, always wipe off the oil grease that was forced out.
- Do not handle electrical equipment while wearing wet places, as this can cause electric shock.
- During maintenance do not allow any unauthorized person to stand near the machine.
- Be sure you fully understand the contents of the operation. It is important to prepare necessary tools and parts and to keep the operating area clean.
- When checking an open gear case there is a risk of dropping things in. Before removing the covers to inspect such cases, empty everything from your pockets. Be particularly careful to remove wrenches and nuts.
- Way to use dipstick
Push the dipstick fully into the guide, and then pull out.

Carrying out other difficult maintenance work carelessly can cause unexpected accidents. If you consider the maintenance is too difficult, always request the HYUNDAI Forklift distributor to carry out it.

GROUP 2 SPECIFICATIONS

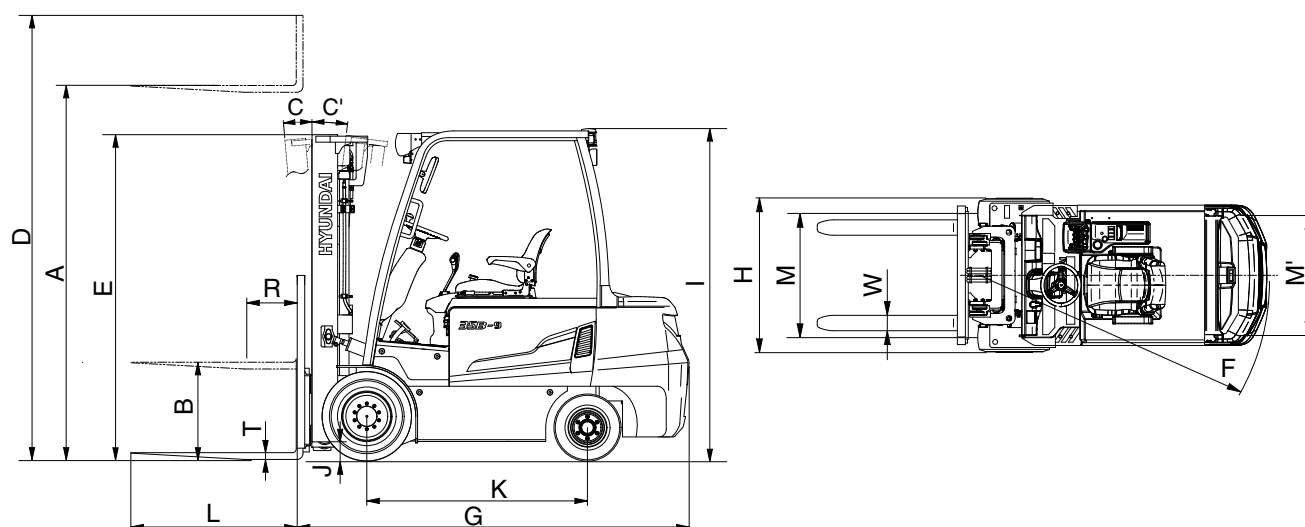
1. GENERAL LOCATIONS



22B9OM113

- | | | |
|-------------------------|------------------|-------------------|
| 1 Mast | 6 Dash board | 11 Seat |
| 2 Lift cylinder | 7 Frame | 12 Steering wheel |
| 3 Carriage and backrest | 8 Steering axle | 13 Overhead guard |
| 4 Forks | 9 Counterweight | 14 Rear cover |
| 5 Drive unit | 10 Battery cover | |

2. SPECIFICATIONS



22B9SP01

| Model | | Unit | 22B-9 | 25B-9 | 30B-9 | 32B-9 | 35B-9 |
|--------------------------|------------------------------|---------|---------------------|--------------------------------------|--------------|--|-------------------------------|
| Capacity | | kg (lb) | 2200 (4400) | 2500 (5000) | 3000 (6000) | 3200 (6500) | 3500 (7000) |
| Load center | R | mm (in) | 500 (24") | ← | ← | ← | ← |
| Weight | | kg (lb) | 4045 (8920) | 4310 (9500) | 4750 (10470) | 4935 (10880) | 5190 (11440) |
| Fork | Lifting height | A | mm (ft-in) | 3300 (10' 10") | ← | ← | ← |
| | Free lift | B | mm (in) | 115 (4.5") | ← | ← | ← |
| | Lifting speed (Unload/Load) | | mm/sec | 610/420 | 610/410 | 500/340 | 500/230 |
| | Lowering speed (Unload/Load) | | mm/sec | 450/500 | ← | ← | ← |
| | L × W × T | L, W, T | mm (inch) | 1050 × 100 × 45 (41" × 4" × 1.8") | ← | 1050 × 122 × 45 (41" × 4.8" × 1.8") | ← |
| Mast | Tilt angle forward/backward | C/C' | degree | 6/10 | ← | ← | ← |
| | Max height | D | mm (ft-in) | 4485 (14' 9") | ← | ← | ← |
| | Min height | E | mm (ft-in) | 2162 (7' 1") | ← | 2232 (7' 4") | 2243 (7' 4") |
| Body | Travel speed (Unload) | | km/h | 18.0 | ← | ← | ← |
| | Gradeability (Load) | | % | 34 | 31 | 27 | 26 |
| | Min turning radius (Outside) | F | mm | 1935 (6' 4") | ← | 2150 (7' 1") | 2164 (7' 1") |
| ETC | Max hydraulic pressure | | kgf/cm ² | 190 | ← | ← | ← |
| | Hydraulic oil tank | | l (usgal) | 32.8 (8.6) | ← | ← | ← |
| Overall length | | G | mm (ft-in) | 2295 (7' 6") | ← | 2488 (8' 2") | 2503 (8' 3") |
| Overall width | | H | mm (ft-in) | 1200 (3' 11") | ← | ← | 1250 (4' 1") |
| Overhead guard height | | I | mm (ft-in) | 2230 (7' 4") | ← | ← | ← |
| Ground clearance (Mast) | | J | mm (in) | 117 (4.6") | ← | ← | 128 (5") |
| Wheel base | | K | mm (ft-in) | 1400 (4' 7") | ← | 1600 (5' 3") | ← |
| Wheel tread (front/rear) | | M/M' | mm (ft-in) | 993/980 (3' 3 3/8"/3' 3") | ← | ← | 1005/980 (3' 4 1/8"/3' 3") |

3. SPECIFICATION FOR MAJOR COMPONENTS

1) CONTROLLER

| Item | Unit | Traction | Pump |
|---------------|------|---------------------|-------------|
| Model | - | ZAPI Dual AC2 power | ZAPI AC3 |
| Type | - | AC | ← |
| Dimension | mm | 340×256×179 | 280×250×179 |
| Current limit | A | 450±450 | 600 |
| Communication | - | CAN | ← |

2) MOTOR

| Item | Unit | Traction | Pump |
|---------------|------|----------|----------|
| Type | - | AQDG4001 | AMDL4001 |
| Rated voltage | Vac | 30 | 30 |
| Output | kW | 7.0×2 | 17 |
| Insulation | - | Class F | Class F |

3) BATTERY

| Item | Unit | 22/25B-9 | 30/32/35B-9 |
|---------------------|------|---------------------------------|--------------|
| Rated voltage | V | 48 | ← |
| Dimension (W×L×H) | mm | 1030×796×537 | 1030×990×537 |
| Min. Battery weight | kg | 970 | 1090 |
| Max. Battery weight | kg | 1300 | 1495 |
| Connector (CE spec) | - | SB 350 or SR 350 (SBE 320 BLUE) | |

4) CHARGER

| Item | Unit | Specification |
|-----------------------------|------|------------------------------------|
| Type | - | Constant current, constant voltage |
| Battery capacity for charge | V-AH | 48V/660~740 |
| AC input | V | Triple phase 410 |
| | | Single phase 220 |
| | | Triple phase 220/380 |
| | | Triple phase 440 |
| DC output | V | 64±1 |
| Charge time | hr | 6±2 |
| Connector (CE spec) | - | SB 350 or SR 350 (SBE 320 BLUE) |

5) GEAR PUMP

| Item | Unit | Specification |
|----------------------------|--------|------------------------------|
| Type | - | Fixed displacement gear pump |
| Capacity | cc/rev | 26.921 |
| Maximum operating pressure | bar | 230 |
| Rated speed (max/min) | rpm | 3000/500 |

6) MAIN CONTROL VALVE

| Item | Unit | Specification |
|----------------------------|------|------------------|
| Type | - | 3 spool, 4 spool |
| Operating method | - | Mechanical |
| Main relief valve pressure | bar | 190 |
| 2nd relief valve pressure | bar | 130 |

7) DRIVE AXLE UNIT

| Item | Unit | Specification |
|----------------------|-------------|-------------------|
| Max axle load | kg/lb | 4500/9920.8 |
| Max input rpm | rpm | 5000 |
| Gear ratio | - | 24.58 |
| Weight without fluid | kg/lb | 62 kg (137 lb)/EA |
| Oil quantity | l /U.S · qt | 1.0 (1.06) |

8) WHEELS

| Item | 22/25/30/32B-9 | 35B-9 |
|-----------------------|--------------------------------------|-----------------|
| Type (front/rear) | SOLID (OPT : NON-MARKING, PNEUMATIC) | |
| Quantity (front/rear) | 2/2 | |
| Front-drive | 23×9-10 (18PR) | 23×10-12 (16PR) |
| Rear-steering | 18×7-8 (16PR) | ← |

9) BRAKES & STEERING

| Item | | Specification |
|----------|---------|--|
| Brakes | Travel | Front wheel, Hydraulic, wet disc brake |
| | Parking | Mechanical |
| Steering | Type | Full hydraulic, power steering |

4. TIGHTENING TORQUE FOR MAJOR COMPONENTS

| NO | Items | | Size | kgf · m | lbf · ft |
|----|--------------------|----------------------------------|------------|------------|-------------|
| 1 | Electric system | Hyd pump motor mounting nut | M 8 × 1.25 | 3.4 ± 0.7 | 24.6 ± 5.0 |
| 2 | | Traction motor mounting bolt | M10 × 1.5 | 6.9 ± 1.4 | 50 ± 10 |
| 3 | Hydraulic system | Hydraulic pump mounting bolt | M10 × 1.5 | 6.9 ± 1.4 | 50 ± 10 |
| 4 | | MCV mounting bolt, nut | M10 × 1.5 | 6.9 ± 1.4 | 50 ± 10 |
| 5 | | Steering unit mounting bolt | M10 × 1.5 | 6.9 ± 1.4 | 50 ± 10 |
| 7 | | Brake cylinder mounting bolt | M10 × 1.5 | 8 ± 0.5 | 57.9 ± 3.6 |
| 9 | Power train system | Drive unit mounting bolt, nut | M20 × 2.5 | 55.5 ± 2.5 | 401 ± 18.0 |
| 10 | | Steering axle mounting bolt, nut | M20 × 2.5 | 62 ± 3.0 | 448 ± 21.7 |
| 11 | | Front wheel mounting nut | M14 × 1.5 | 15.7 ± 2.3 | 114 ± 16.6 |
| 12 | | Rear wheel mounting nut | M14 × 1.5 | 23 ± 1.0 | 166 ± 7.2 |
| 13 | ETC | Counterweight mounting bolt | M24 × 3.0 | 199 ± 15 | 1429 ± 108 |
| 14 | | Seat mounting nut | M 8 × 1.25 | 3.4 ± 0.7 | 24.6 ± 5.0 |
| 15 | | Head guard mounting bolt (front) | M12 × 1.75 | 12.8 ± 3 | 92.5 ± 21.5 |
| 16 | | Head guard mounting bolt (rear) | M16 × 2.0 | 29.7 ± 4.5 | 215 ± 32.5 |

5. 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 | 19.5 ~ 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 × 3.0 | 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 | 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 |
| 1" | 41 | 21 | 152 |
| 1-1/4" | 50 | 35 | 253 |

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 |
| 1-7/16-12 | 41 | 21 | 152 |
| 1-11/16-12 | 50 | 35 | 253 |

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 |
| 1" | 41 | 21 | 152 |
| 1-1/4" | 50 | 35 | 253 |

6. RECOMMENDED LUBRICANTS

Use only oils listed below or equivalent.

Do not mix different brand oil.

| Service point | Kind of fluid | Capacity <i>l</i> (U.S. gal) | Ambient temperature °C (°F) | | | | | | | | | |
|-------------------------|---------------|------------------------------|---------------------------------------|----------------------------------|-------------|-------------|-----------|------------|------------|------------|-------------|--|
| | | | -50 (-58) | -30 (-22) | -20 (-4) | -10 (14) | 0 (32) | 10 (50) | 20 (68) | 30 (86) | 40 (104) | |
| Axle | Gear oil | 2.0 (0.52) | | Mobilfluid 424 (API GL4/SAE 80W) | | | | | | | | |
| Hydraulic oil tank | Hydraulic oil | 32.8 (8.67) | ★ISO VG 15 | | | | | | | | | |
| | | | ISO VG 46 | | | | | | | | | |
| | | | ISO VG 68 | | | | | | | | | |
| Brake system | Brake oil | 0.5 (0.1) | ★HYDRAULIC OIL ISO VG10 (AZOLLA ZS10) | | | | | | | | | |
| | | | HYDRAULIC OIL ISO VG32 (AZOLLA ZS32) | | | | | | | | | |
| Fitting (Grease nipple) | Grease | 0.1 (0.03) | ★NLGI No.1 | | | | | | | | | |
| | | | NLGI No.2 | | | | | | | | | |

- API : American Petroleum Institute
- SAE : Society of Automotive Engineers
- ISO : International Organization for Standardization
- NLGI : National Lubricating Grease Institute

★ : Cold region
Russia, CIS, Mongolia

GROUP 3 PERIODIC REPLACEMENT

For operation safety, never fail to perform periodic maintenance or make periodic replacement of the consumable parts listed in the following.

These parts may deteriorate in time and are susceptible to wear. It is difficult to estimate the degree of wear at time of periodic maintenance; therefore, even if no apparent wear is found, always replace with new parts within the prescribed period of replacement (Or earlier if trouble is found).

Note that periodic replacement has nothing to do with guarantee service.

※ **Replacement of consumable service parts is not covered under warranty.**

| No. | Description | Period of replacement |
|-----|--|-----------------------|
| 1 | Hydraulic oil | Every 1 year |
| 2 | Brake fluid | Every 1 year |
| 3 | Differential oil | Every 1 year |
| 4 | Gear oil | Every 1 year |
| 5 | Wheel bearing grease | Every 1 year |
| 6 | Power steering hose | Every 1 year |
| 7 | Parking, seal and O-ring of steering cylinder | Every 2 year |
| 8 | Parking, seal and O-ring of lift and tilt cylinder | Every 2 year |
| 9 | Reservoir tank tube | Every 1 year |
| 10 | Lift chain | Every 2 year |
| 11 | Hydraulic equipment hose | Every 2 year |
| 12 | Brake hose or tube | Every 2 year |