

SECTION 1 GENERAL



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GROUP 1 SAFETY HINTS

Careless performing of the easy work may cause injuries.

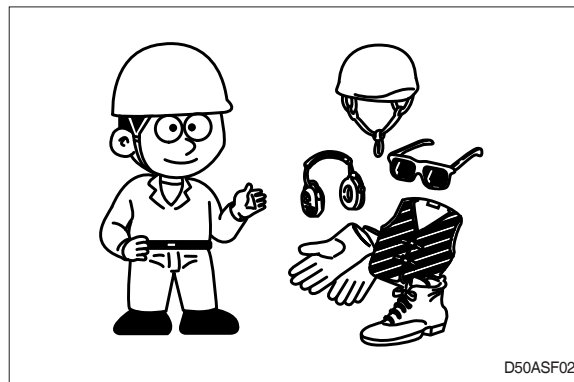
Take care to always perform work safely, at least observing the following.

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

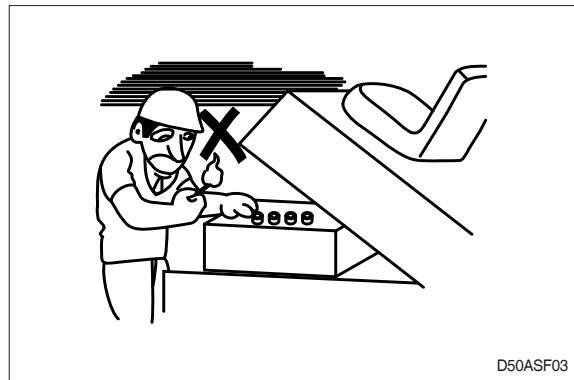
As preparation in case of fire, always know the location and directions for use of fire extinguishers and other firefighting lift.



- Wear well-fitting helmet, safety shoes and working clothes. When drilling, grinding or hammering, always wear protective goggles. Always wear safety clothes properly so that they do not catch on protruding parts of lift. 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 forklift, be careful not to lose your balance and fall.



- Place a caution sign in the operator's compartment (For example Do not start or Maintenance in progress).

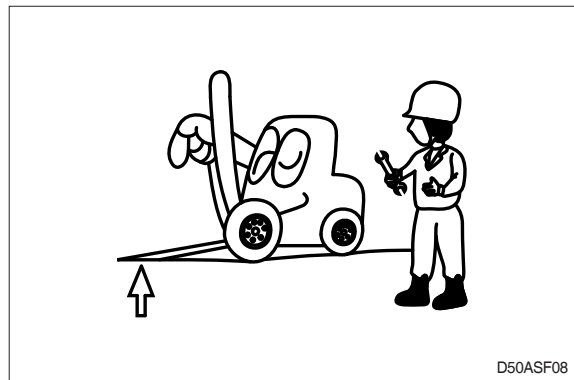
This will prevent anyone from starting or moving the forklift by mistake.



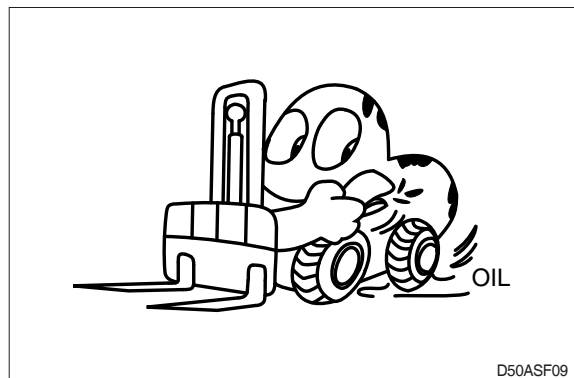
When inspecting running parts or near such parts, always stop the forklift first.

Before checking or servicing accumulator or piping, depress brake pedal repeatedly to release pressure.

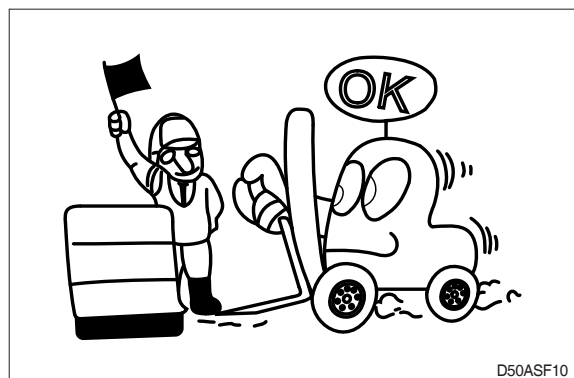
- Park the forklift on firm, flat ground.
Lower the fork to the ground and stop the engine.
Each level shall be positioned in neutral, and brake shall be operated.



- 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 forklift.



- 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.

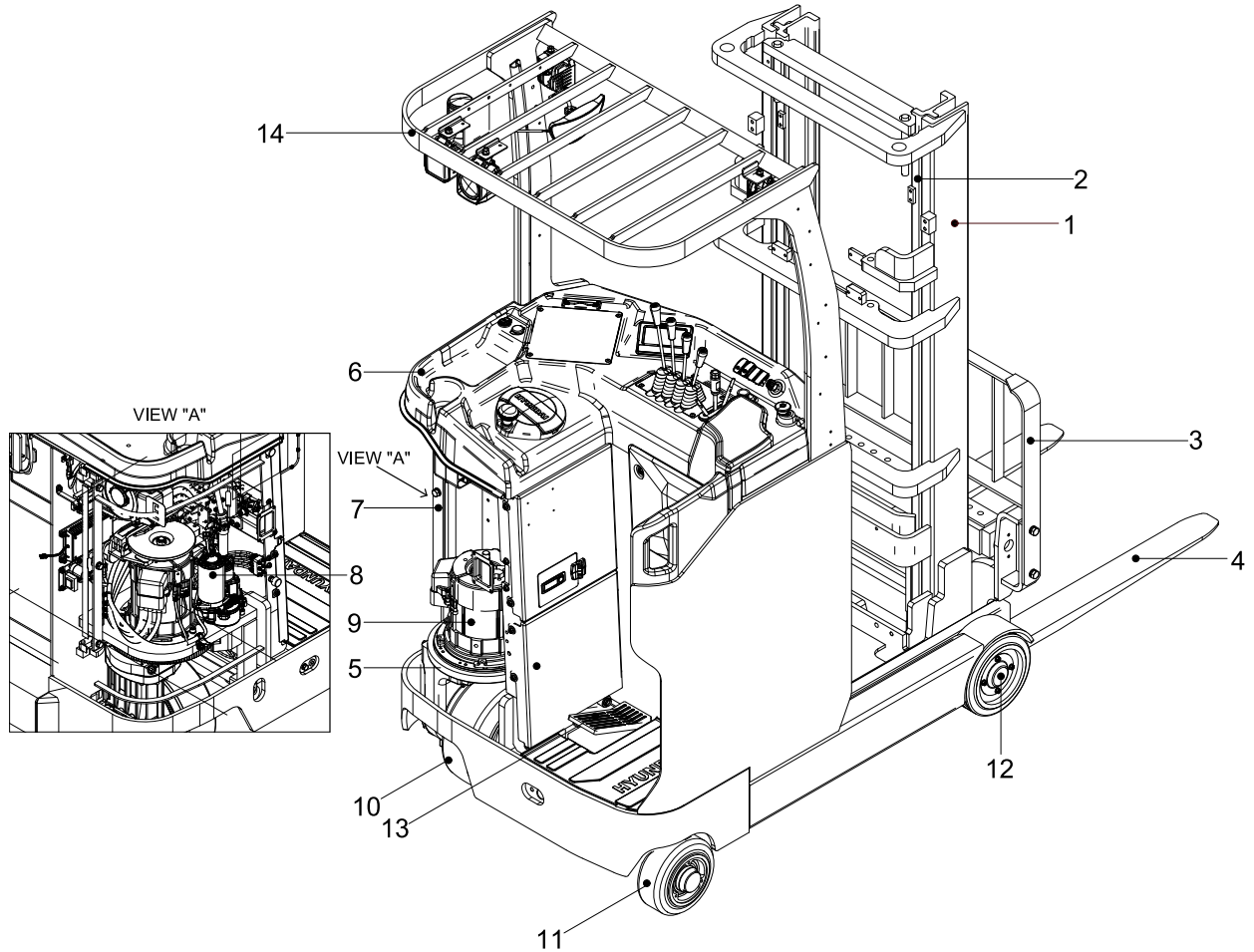


- Unless you have special instructions to the contrary, maintenance should always be carried out with the forklift stopped. If maintenance is carried out with the forklift running, there must be two men present : one sitting in the operator's seat and the other one performing the maintenance. In such a case, never touch any moving part.
- Thoroughly clean the lift. 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.
- 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 40C.
- After replacing the 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 forklift.
- 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. Empty everything from your pockets before removing the covers to inspect such cases. Be particularly careful to remove wrenches and nuts
- Way to use dipstick
Insert the dipstick inside the guide completely to take out again.

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 for help.

GROUP 2 SPECIFICATIONS

1. GENERAL LOCATIONS

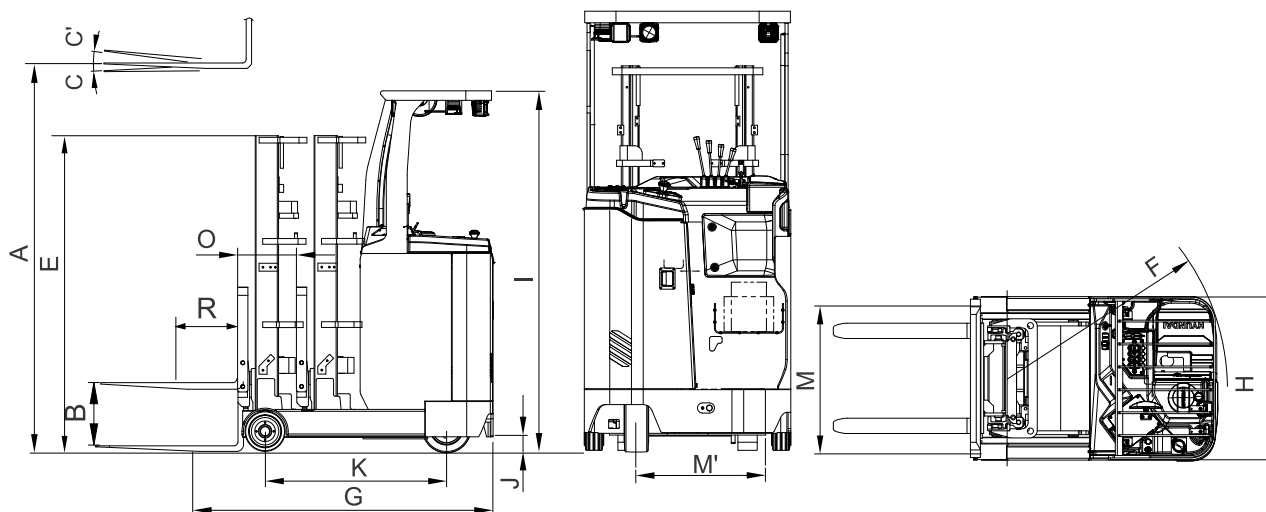


15BRXOM0701

- | | | |
|-------------------------|------------------|-------------------|
| 1 Mast | 6 Dash board | 11 Caster wheel |
| 2 Lift cylinder | 7 Frame | 12 Road wheel |
| 3 Carriage and backrest | 8 EPS motor | 13 Brake pedal |
| 4 Fork | 9 Driving motor | 14 Overhead guard |
| 5 Driving unit | 10 Driving wheel | |

2. SPECIFICATIONS

1) 15/18BR-X

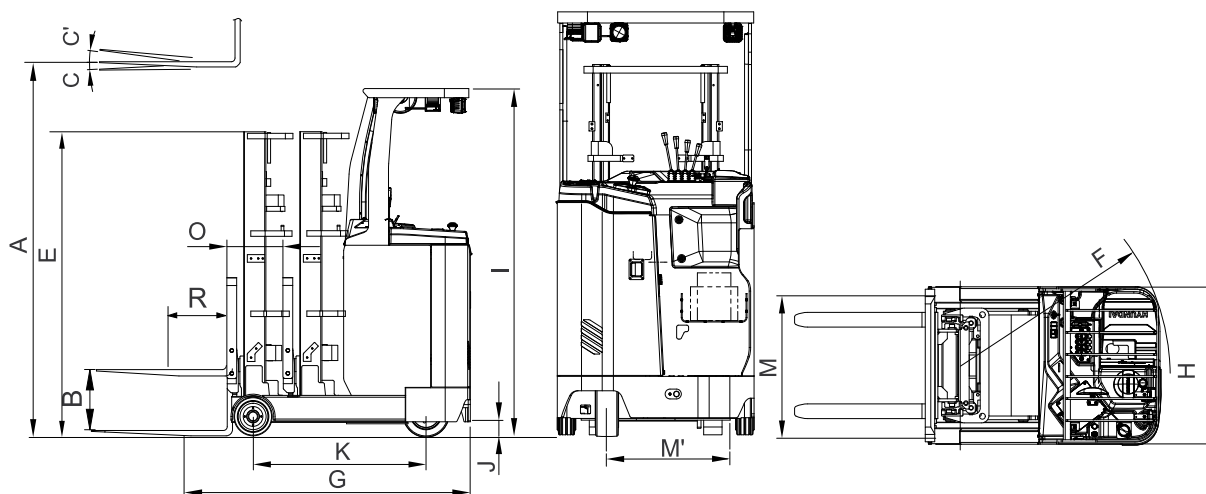


15BRXOM0801

| Item | | | Unit | 15BR-X | 18BR-X |
|--|----------------------------------|-------|---------|----------------|----------------|
| Rated Capacity | | | kg | 1500 | 1800 |
| Load Center | | R | mm | 500 | ← |
| Weight (Non-load, battery included) | | | kg | 2310 | 2334 |
| Fork | Lifting height | A | mm | 3000 | ← |
| | Free lift | B | mm | 210 | ← |
| | Ascending speed (non-load/load) | | mm/sec | 460/340 | 460/320 |
| | Descending speed (non-load/load) | | mm/sec | 450/500 | ← |
| | L × W × T | L,W,T | mm | 900×100×35 | ← |
| Mast | Tilt angle (forward/backward) | C/C' | degree | 5/5 | ← |
| | Max height | D | mm | 4025 | ← |
| | Min height | E | mm | 1991 | ← |
| Body | Driving speed (non-load) | | km/h | 10.0 | 10.0 |
| | Gradeability (non-load/load) | | % | 14/23 | 21/14 |
| | Min. turning radium (outside) | F | mm | 1596 | 1775 |
| ETC | Max hydraulic pressure | | kgf/cm² | 180 | ← |
| | Hydraulic oil tank | | l | 18 | ← |
| Overall length (including fork, reach retracted) | | G | mm | 2149 | 2150 |
| Overall width (Load wheel standard) | | H | mm | 1070 | ← |
| Overhead guard height | | I | mm | 2275 | ← |
| Ground clearance | | J | mm | 94 | ← |
| Wheel base | | K | mm | 1340 | 1525 |
| Distance between wheels (front/rear) | | M/M' | mm | 970 * 1070/639 | 994 * 1094/613 |
| Reach distance | | O | mm | 482 | 665 |

* Wide frame

2) 20/25BR-X



15BRXOM0801

| Item | | | Unit | 20BR-X | 25BR-X |
|--|----------------------------------|-------|---------|----------------|-----------------|
| Rated Capacity | | | kg | 2000 | 2500 |
| Load Center | | R | mm | 500 | ← |
| Weight (Non-load, battery included) | | | kg | 2657 | 2862 |
| Fork | Lifting height | A | mm | 3000 | ← |
| | Free lift | B | mm | 212 | ← |
| | Ascending speed (non-load/load) | | mm/sec | 460/300 | 470/280 |
| | Descending speed (non-load/load) | | mm/sec | 450/500 | ← |
| | L×W×T | L,W,T | mm | 1050×100×45 | ← |
| Mast | Tilt angle (forward/backward) | C/C' | degree | 5/5 | ← |
| | Max height | D | mm | 4030 | ← |
| | Min height | E | mm | 2025 | ← |
| Body | Driving speed (non-load) | | km/h | 10.5 | ← |
| | Gradeability (non-load/load) | | % | 14/21 | 14/18 |
| | Min. turning radium (outside) | F | mm | 1790 | 1980 |
| ETC | Max hydraulic pressure | | kgf/cm² | 190 | ← |
| | Hydraulic oil tank | | l | 25 | ← |
| Overall length (including fork, reach retracted) | | G | mm | 2380 | 2378 |
| Overall width (Load wheel standard) | | H | mm | 1200 | ← |
| Overhead guard height | | I | mm | 2294 | ← |
| Ground clearance | | J | mm | 85 | ← |
| Wheel base | | K | mm | 1510 | 1705 |
| Distance between wheels (front/rear) | | M/M' | mm | 994 * 1094/690 | 1060 * 1180/690 |
| Reach distance | | O | mm | 610 | 807 |

* Wide frame

3. SPECIFICATION FOR MAJOR COMPONENTS

1) 15/18BR-X

(1) MOTOR

| Item | Unit | Spec. | |
|---------------|------|-------------|------------|
| | | Drive motor | Pump motor |
| Model | - | AMDU6005 | ABDK4001 |
| Type | - | AC | ← |
| Rated voltage | Vac | 30V 3Ø | ← |
| Output | kW | 4.5 | 9 |
| Insulator | - | Grade F | ← |

(2) Battery

| Item | Unit | Spec. |
|---------------|-------|---------------|
| Type | - | VCF 280 |
| Rated voltage | V | 48 |
| Capacity | AH/hr | 280/5 |
| Electrolyte | - | Wet |
| Spec. (W×D×H) | mm | 994×378×581.7 |
| Connector | - | SB350 |
| Weight | kg | 480 |

(3) Charger

| Item | Unit | Spec. |
|-----------------------------|------|------------------------------------|
| Method | - | Constant current, constant voltage |
| Battery capacity for charge | V-AH | 48-280~365 |
| 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 | - | SB350 |

(4) GEAR PUMP

| Item | Unit | Spec. |
|------------------|--------|-------------------------------|
| Type | - | Fixed capacity-type gear pump |
| Capacity | cc/rev | 18.4 |
| Working pressure | bar | 210 |
| Speed(max/min) | rpm | 3500/500 |

(5) MAIN CONTROL VALVE

| Item | Unit | Spec. |
|----------------------------|------|------------|
| Type | - | 3, 4 spool |
| Operating method | - | Mechanical |
| Main relief valve pressure | bar | 180 |

(6) Driving unit

| Item | Unit | Spec. |
|--------------|------|-------|
| Gear ratio | - | 20.2 |
| Oil capacity | ℓ | 3.3 |

(7) WHEELS

| Item | Spec. |
|--------------------------------|------------------------|
| Type (Load/Driving/Caster) | Urethane/Rubber/Rubber |
| Quantity (Load/Driving/Caster) | 2 / 1 / 2 |
| Load wheel | 254 × 100 |
| Driving wheel | 345×140 |
| Caster wheel | 178×73 |

(8) Brake

| Item | Spec. |
|-----------------------------|------------|
| Brake (driving and parking) | Disk brake |

2) 20/25BR-X

(1) MOTOR

| Item | Unit | Spec. | |
|---------------|------|-------------|------------|
| | | Drive motor | Pump motor |
| Model | - | AMDG9001B | ABDD4002 |
| Type | - | AC | ← |
| Rated voltage | Vac | 30V 3Ø | ← |
| Output | kW | 6 | 14 |
| Insulator | - | Grade F | ← |

(2) Battery

| Item | Unit | Spec. |
|---------------|-------|---------------|
| Type | - | VCI 335 |
| Rated voltage | V | 48 |
| Capacity | AH/hr | 335/5 |
| Electrolyte | - | Wet |
| Spec. (W×D×H) | mm | 994×378×581.7 |
| Connector | - | SB350 |
| Weight | kg | 560 |

(3) Charger

| Item | Unit | Spec. |
|-----------------------------|------|------------------------------------|
| Method | - | Constant current, constant voltage |
| Battery capacity for charge | V-AH | 48-280~365 |
| 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 | - | SB350 |

(4) GEAR PUMP

| Item | Unit | Spec. |
|------------------|--------|-------------------------------|
| Type | - | Fixed capacity-type gear pump |
| Capacity | cc/rev | 18.4 |
| Working pressure | bar | 210 |
| Speed(max/min) | rpm | 3500/500 |

(5) MAIN CONTROL VALVE

| Item | Unit | Spec. |
|----------------------------|------|------------|
| Type | - | 3, 4 spool |
| Operating method | - | Mechanical |
| Main relief valve pressure | bar | 190 |

(6) Driving unit

| Item | Unit | Spec. |
|--------------|------|-------|
| Gear ratio | - | 20.8 |
| Oil capacity | ℓ | 4.0 |

(7) WHEELS

| Item | Spec. |
|--------------------------------|------------------------|
| Type (Load/Driving/Caster) | Urethane/Rubber/Rubber |
| Quantity (Load/Driving/Caster) | 2 / 1 / 2 |
| Load wheel | 267 × 114 |
| Driving wheel | 382 × 142 |
| Caster wheel | 204 × 76 |

(8) Brake

| Item | Spec. |
|-----------------------------|------------|
| Brake (driving and parking) | Disk brake |

4. TIGHTENING TORQUE FOR MAJOR COMPONENTS . TIGHTENING TORQUE FOR MAJOR COMPONENTS

1) 15/18BR-X

| No. | Item | | Size | kgf·m |
|-----|---------------------------|------------------------------|----------|----------|
| 1 | Electric system | Pump motor mounting bolt | M10×1.5 | 6.9±1.4 |
| 2 | | Traction motor mounting bolt | M8×1.25 | 3.9±0.2 |
| 3 | | Steering motor mounting bolt | M10×1.5 | 4.05±0.8 |
| 4 | Hydraulic system | Hydraulic pump mounting bolt | M10×1.5 | 6.9±1.4 |
| 5 | | MCV mounting bolt, nut | M10×1.5 | 5.0±0.5 |
| 6 | Power transmission device | Drive unit mounting bolt | M12×1.75 | 14.3±1.0 |
| 7 | | Driving wheel mounting nut | M14×1.5 | 14.3±1.4 |
| 8 | | Load wheel mounting bolt | M40×1.5 | 5.0±0.5 |
| 9 | | Caster wheel mounting bolt | M12×1.75 | 12.0±1.0 |
| 10 | ETC | Head guard mounting bolt | M14×2.0 | 19.1±3.8 |

2) 20/25BR-X

| No. | Item | | Size | kgf·m |
|-----|---------------------------|-------------------------------|----------|----------|
| 1 | Electric system | Pump motor mounting bolt | M10×1.5 | 6.9±1.4 |
| 2 | | Traction motor mounting bolt | M8×1.25 | 3.9±0.2 |
| 3 | | Steering motor mounting bolt | M10×1.5 | 4.05±0.8 |
| 4 | Hydraulic system | Hydraulic pump mounting bolt | M10×1.5 | 6.9±1.4 |
| 5 | | MCV mounting bolt, nut | M10×1.5 | 5.0±0.5 |
| 6 | Power transmission device | Drive unit mounting bolt, nut | M12×1.75 | 14.3±1.0 |
| 7 | | Driving wheel mounting nut | M14×1.5 | 14.3±1.4 |
| 8 | | Load wheel mounting nut | M50×1.5 | 5.0±0.5 |
| 9 | | Caster wheel mounting bolt | M12×1.75 | 12.0±1.0 |
| 11 | ETC | Head guard mounting bolt | M14×2.0 | 19.1±3.8 |

5. TORQUE CHART

Use the following table for unspecified torque

1) BOLT AND NUT

(1) Coarse thread

| Bolt size | 8T | 10T |
|------------|-------------|-------------|
| | kg·m | kg·m |
| M 6 × 1.0 | 0.85 ~ 1.25 | 1.14 ~ 1.74 |
| M 8 × 1.25 | 2.0 ~ 3.0 | 2.73 ~ 4.12 |
| M10 × 1.5 | 4.0 ~ 6.0 | 5.5 ~ 8.3 |
| M12 × 1.75 | 7.4 ~ 11.2 | 9.8 ~ 15.8 |
| M14 × 2.0 | 12.2 ~ 16.6 | 16.7 ~ 22.5 |
| M16 × 2.0 | 18.6 ~ 25.2 | 25.2 ~ 34.2 |
| M18 × 2.5 | 25.8 ~ 35.0 | 35.1 ~ 47.5 |
| M20 × 2.5 | 36.2 ~ 49.0 | 49.2 ~ 66.6 |
| M22 × 2.5 | 48.3 ~ 63.3 | 65.8 ~ 98.0 |
| M24 × 3.0 | 62.5 ~ 84.5 | 85.0 ~ 115 |
| M30 × 3.0 | 124 ~ 168 | 169 ~ 229 |
| M36 × 4.0 | 174 ~ 236 | 250 ~ 310 |

(2) Fine thread

| Bolt size | 8T | 10T |
|------------|--------------|-------------|
| | kg·m | kg·m |
| M 8 × 1.0 | 2.17 ~ 3.37 | 3.04 ~ 4.44 |
| M10 × 1.25 | 4.46 ~ 6.66 | 5.93 ~ 8.93 |
| M12 × 1.25 | 7.78 ~ 11.58 | 10.6 ~ 16.0 |
| M14 × 1.5 | 13.3 ~ 18.1 | 17.9 ~ 24.1 |
| M16 × 1.5 | 19.9 ~ 26.9 | 26.6 ~ 36.0 |
| M18 × 1.5 | 28.6 ~ 43.6 | 38.4 ~ 52.0 |
| M20 × 1.5 | 40.0 ~ 54.0 | 53.4 ~ 72.2 |
| M22 × 1.5 | 52.7 ~ 71.3 | 70.7 ~ 95.7 |
| M24 × 2.0 | 67.9 ~ 91.9 | 90.9 ~ 123 |
| M30 × 2.0 | 137 ~ 185 | 182 ~ 248 |
| M36 × 3.0 | 192 ~ 260 | 262 ~ 354 |

2) PIPE AND HOSE (FLARE TYPE)

| Hose Spec. | Screw Spec. (PF) | Hex. Across Flat (mm) | kgf · m |
|------------|------------------|-----------------------|---------|
| 1/4" | 1/4" | 19 | 4 |
| 3/8" | 3/8" | 22 | 5 |
| 1/2" | 1/2" | 27 | 9.5 |
| 3/4" | 3/4" | 36 | 18 |
| 1" | 1" | 41 | 21 |
| 1-1/4" | 1-1/4" | 50 | 35 |

3) PIPE AND HOSE (ORFS TYPE)

| Hose Spec. | Screw Spec. (UNF) | Hex. Across Flat (mm) | kgf · m |
|------------|-------------------|-----------------------|---------|
| 1/4" | 9/16-18 | 19 | 3 |
| 3/8" | 11/16-16 | 22 | 5 |
| 1/2" | 13/16-16 | 24 | 7 |
| 5/8" | 1-14 | 30 | 12 |
| 3/4" | 1-3/16-12 | 36 | 18 |
| 1" | 1-7/16-12 | 41 | 23 |
| 1-1/4" | 1-11/16-12 | 50 | 28 |
| 1-1/2" | 2-12 | 58 | 32 |

4) PITTING (O-RING SEAL TYPE)

| Hose Spec. | Screw Spec. (UN/UNF) | Hex. Across Flat (mm) | kgf · m |
|------------|----------------------|-----------------------|---------|
| 1/4" | 7/16-20 | 17 | 2 |
| 3/8" | 9/16-18 | 19 | 3 |
| 1/2" | 3/4-16 | 22 | 4 |
| | | 24 | 6 |
| 5/8" | 7/8-14 | 27 | 10 |
| | | 30 | 12 |
| 3/4" | 1-1/16-12 | 32 | 15 |
| | | 36 | 18 |
| 1" | 1-5/16-12 | 41 | 23 |
| 1-1/4" | 1-5/8-12 | 50 | 28 |
| 1-1/2" | 1-7/8-12 | 55 | 32 |

5) BAND CLAMP

| Tag. No. | Hose Spec. (mm) | Hex. Across Flat (mm) | kgf · m |
|----------|-----------------|-----------------------|---------|
| S20-15 | 8 ~ 14 | 9 | 0.3 |
| S20-17 | 11 ~ 17 | | |
| S20-22 | 13 ~ 20 | | 0.35 |
| S20-25 | 15 ~ 24 | | |
| S20-28 | 19 ~ 28 | | |
| S20-32 | 22 ~ 32 | 12 | 0.42 |
| S20-40 | 26 ~ 38 | 9 | |
| S20-45 | 32 ~ 44 | | |

6) BAND CLAMP (IDEAL, FLEX-GEAR TYPE)

| Hose Spec. | Screw Spec. (UNF) | Hex. Across Flat (mm) | kgf·m |
|------------|-------------------|-----------------------|-------|
| 41-212 | 32 ~ 54 | 15.9 | 1.1 |
| 41-262 | 45 ~ 67 | | |
| 41-312 | 57 ~ 79 | | |
| 41-362 | 70 ~ 92 | | |
| 41-412 | 83 ~ 105 | | |
| 41-462 | 95 ~ 117 | | |
| 41-512 | 108 ~ 130 | | |

6. RECOMMENDED LUBRICANTS

The following product or equivalent oil or more is used.

Do not mix different brand oil.

| Service point Point | Kind of fluid | Capacity ℓ | | Temperature °C | | | | | | | | |
|------------------------|---------------|------------|-----------|----------------|-----|-----|-----|---|----|----|----|----|
| | | 15/18BR-X | 20/25BR-X | -50 | -30 | -20 | -10 | 0 | 10 | 20 | 30 | 40 |
| Driving unit | Gear oil | 3.3 | 4.0 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Hydraulic oil | Hydraulic oil | 18 | 25 | ★ISO VG 15 | | | | | | | | |
| Hydraulic oil tank | | | | ISO VG 32 | | | | | | | | |
| | | | | ISO VG 46 | | | | | | | | |
| | | | | ISO VG 68 | | | | | | | | |
| Grease Feeder | Grease | 0.1 | 0.1 | NLGI No.1 | | | | | | | | |
| | | | | NLGI No.2 | | | | | | | | |

★ : Cold Region (Russia, CIS, Mongolia)

GROUP 3 SAFETY COMPONENT REPLACEMENT

Periodic check must be performed for safe operation, and the safety components in the following list must be replaced periodically.

These safety components 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).

It is important to understand that periodic replacement is irrelevant to the warranty service.

※ **Replacement of safety components are not included in the warranty.**

| No. | Item Name | Exchange/Replacement Cycle |
|-----|--|---|
| 1 | Hydraulic Tank - Air Breather Element | Every 1.5 months (Harsh operation) |
| 2 | Hydraulic Tank - Air Breather Element | Every 3 months (General operation) |
| 3 | Hydraulic Tank - Return Filter | Every 6 months |
| 4 | Hydraulic Tank - Suction Strainer | Every 1 year |
| 5 | Hydraulic tank - Oil | Every 1 year |
| 6 | Hydraulic tank - Oil (Hyundai Long Life Oil) | Every 2.5 year |
| 7 | Master cylinder, steering cylinder cap and dust seal | Every 1 year |
| 8 | Lift hose | Every 1 year (Harsh operation) Every 2 years (General operation) |
| 9 | Tilt hose | |
| 10 | Side shift hose | |
| 11 | Pump Outlet Hose | Every 2 year |
| 12 | Pump seal kit | Every 3 year |
| 13 | Pressure sensor | Every 5 year |
| 14 | Brake oil | Every 1 year |
| 15 | Differential gear oil | Every 1 year |
| 16 | Gear oil | Every 1 year |
| 17 | Wheel bearing grease | Every 1 year |
| 18 | Rubber parts inside the power steering | Every 1 year |
| 19 | Reservoir tank tube | Every 1 year |
| 20 | Lift chain | Every 2 year |
| 21 | Brake switch (Hydraulic) | Every 2 year |

* When replacing the hose, the O-ring and the gasket must be replaced together.

* When checking and replacing the hose, the clamp must be replaced when damaged.

* Normal Operation

- Indoor workplace, paved road workplace and 8-hour logistics unloading work

* Harsh Operation

- Harsh working environment

- Long overload work

- High or low temperature working environment

- Environment with sharp change in temperature

- Dusty or sandy working environment

- Working environment handling chemical substances with strong corrosiveness

- Working environment with high humidity level