TMG INDUSTRIAL

TMG-FLP25/30KU
PRODUCT MANUAL
v.2026.10.10

2.5 / 3 Ton LPG Forklift



⚠ WARNING



Please read and understand the product manual completely before assembly
- Check the parts list to make sure all parts are received.
- Wear safety goggles or other protective gear while assembling.
- Do not return products to dealers, who are not equipped to handle returns.

Missing parts or have questions on assembly?
Email: cs@tmgindustrial.com
Or visit: tmgindustrial.com

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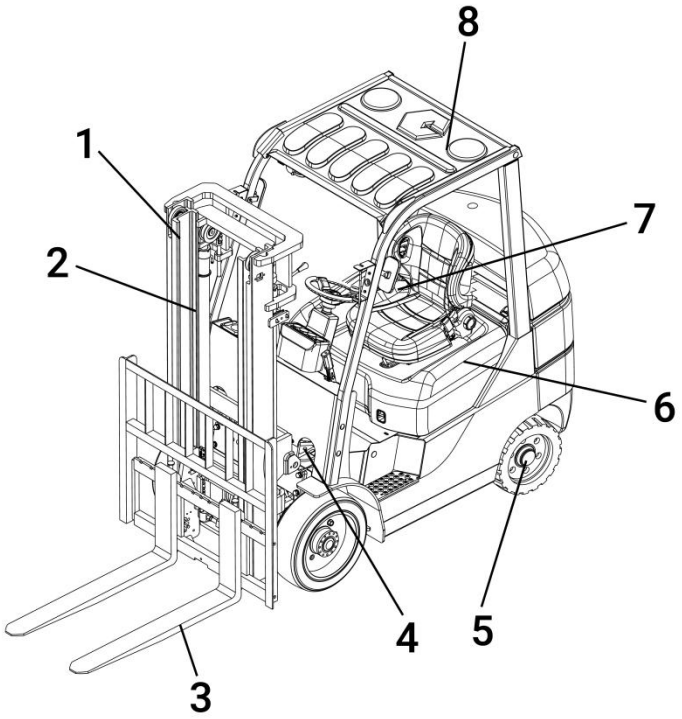
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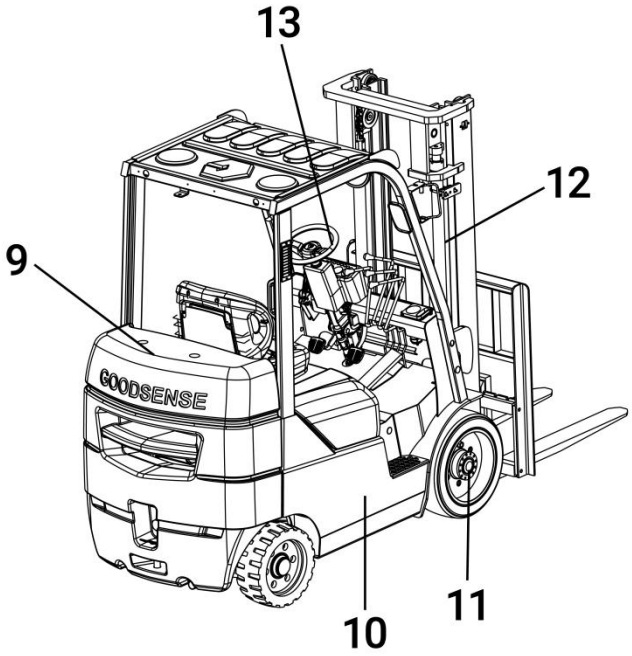
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1. Forklift Components Description and Warning Marks

1.1 Main components

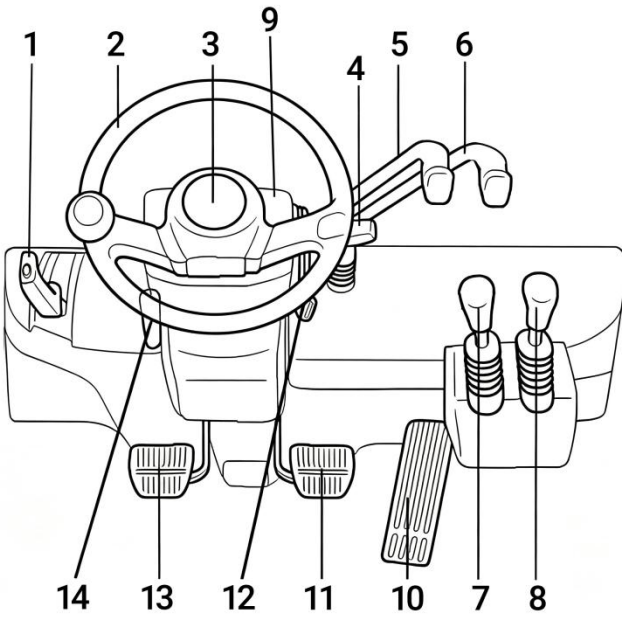


1. Mast
2. Chain
3. Fork
4. Tilt cylinder
5. Rear axle
6. Engine hood
7. Operator's seat
8. Head guard



9. Counter weight
10. Frame
11. Drive axle
12. Lift cylinder
13. Steering wheel

1.2 Driving controls and instrument panel



1. Parking brake lever
2. Steering wheel
3. Horn button
4. Light control and turn signal switch
5. Lift lever
6. Tilt lever
7. Gear shift lever (Forward-reverse) (Mechanical models)
8. Gear shift lever (High-low speed) (Mechanical models)
9. Combination meter
10. Accelerator pedal
11. Brake pedal
12. Ignition switch
13. Clutch pedal (mechanical transmission); Inching and brake pedal (hydraulic transmission)
14. Steering column tilt lever



(1) START

Check method of each warning lamp Please check if all warning lamps come on when the ignition switch is set ON.

Note: Use the light control switch to check the meter lighting lamp.

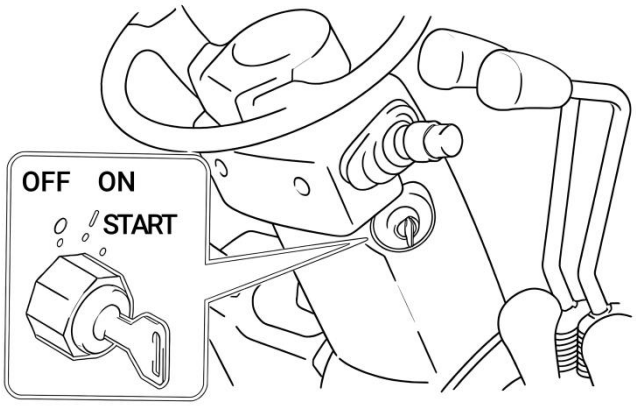
1.3 Switches and levers

Ignition switch (OFF) Engine stop position. The key may be inserted and removed only in this OFF position.

(ON) Engine operation position. Located one position clockwise from (OFF) position. The intake heater is preheated before starting in the diesel model.

START Engine start position. Located one position clockwise from the (ON) position.

After the engine starts, release the key and it will return to the (ON) position automatically. In the torque converter model, the engine cannot be started unless the shift lever is set to neutral.

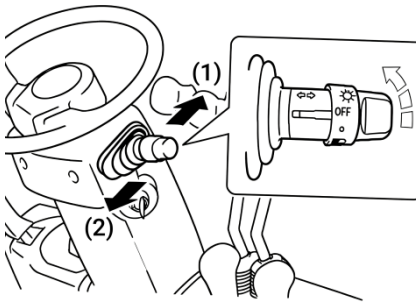


CAUTION

- Never operate the ignition switch without first being seated on the operator's seat. Otherwise, the forklift could start to move uncontrolled, causing an accident.
- Do not operate the ignition switch unless seated on the operator's seat. Leaving the key in the ON position can over-discharge the battery.
- Do not turn the switch to the START position while the engine is running.
- For safety, always start the engine with the transmission in neutral.
- Do not crank the starter motor for longer than 30 seconds at a time. Return the key to the OFF position and wait a minimum of 30 seconds before attempting to restart the engine.

CAUTION

- In case of the anti-restart ignition switch (optionally available), be sure to shift the switch to the (OFF) position before attempting to start the engine again.
- When the ignition switch OFF (engine off), the fork will not move down even if the lift lever is so operated. However, if you sit in the seat and turn on the ignition switch, you can lower the fork. Do not operate the lift lever before getting on the vehicle and starting the engine. (Key-Off Lift Lock)
- If the warning lamp does not go off even after the operator sits on the seat, the battery charge may be low. In such a case, do not drive the vehicle until the lamp goes off, otherwise the vehicle may not be operated properly. If you are obliged to drive the vehicle, do so with utmost care. Also, stop driving and contact your TMG dealer for inspection if the lamp does not go off 1-2 minutes after the engine starting, or when you race the engine for a while. (For diesel vehicles, the diagnosis lamp may be lighted for a while to warm up the engine after cold starting. This is, however, not engine trouble or failure.)



(1) Left turn (2) Right turn

Integrated light and turn signal switch This switch serves as both two-position light control and turn signal switch.

Light control switch Irrespective of the ignition key switch position, this switch allows you to turn on and off lighting. This switch has two positions. With the switch at each position, the lamp comes on as shown below.

Lamp name	Step 1	Step 2
Head lamps		○
Side marker lamps, tail lamps	○	○
Meter illumination lamp	○	○

CAUTION

Do not keep lamps, such as head lamps, on for a long time when the engine is stopped. Prolonged lamp operation with the engine off will drain the battery and prevent subsequent engine startup.

Turn signal switch (Option)

Make the turn signal lamps blink

Left turn: Push forward.

Right turn: Pull backward.

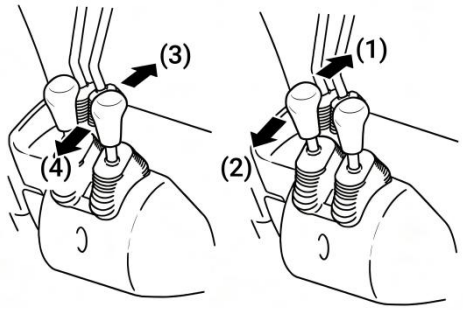
The signal switch will be operated when the ignition switch is ON.

Gear shift levers (Mechanical models) Forward-reverse gear shift lever (right-hand side) Lever for shifting between forward and reverse.

Forward: Push the lever forward.

Reverse: Pull the lever backward.

The neutral position is halfway between the forward and reverse positions.



(1) Forward
(2) Reverse
(3) Low speed
(4) High speed

CAUTION

The engine cannot be started unless the shift lever is at the neutral position. Stop the vehicle before shifting between forward and reverse.

High-low speed gear shift lever (left-hand side) Lever for shifting of traveling speed between the low (1st) speed and high (2nd) speed.

Low speed: Push the lever forward.

High speed: Pull the lever backward.

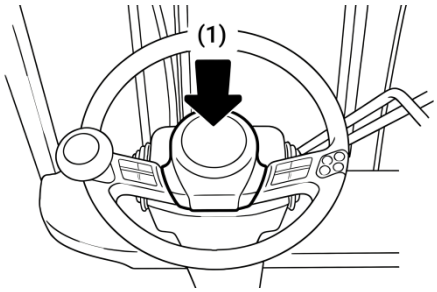
The neutral position is halfway between the high and low speed positions.

CAUTION

- Bring the forklift to a complete stop before actuating the forward-reverse shift lever.
- Always set the levers at the neutral positions before starting the engine.
- The engine cannot be started unless the gear shift lever is at the neutral position.

Horn button

Press the button in the center of the steering wheel to sound the horn. The horn functions even when the ignition is switched OFF.



(1) Push

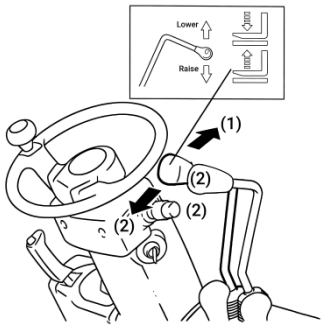
Lift lever

Raise and lower the forks.

Raise: pull the lever backward.

Lower: push the lever forward. Lifting speed is controlled by accelerator pedal travel and lever stroke.

The lowering speed can be adjusted only by the extent of lever travel.



(1) Lower (2)Raise

Forward-reverse lever

for shifting between forward and reverse.

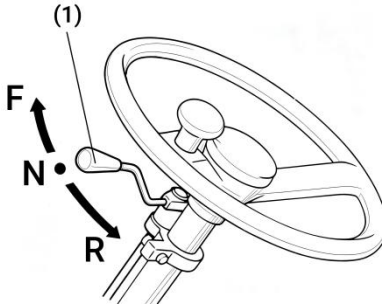
Forward: Push the lever forward(F).

Reverse: Pull the lever backward(R).

The neutral position(N) is halfway between the forward and reverse positions.

CAUTION

The engine cannot be started unless the shift lever is at the neutral position. Stop the vehicle before shifting between forward and reverse.



(1) Forward-reverse lev

Inching Pedal (1)

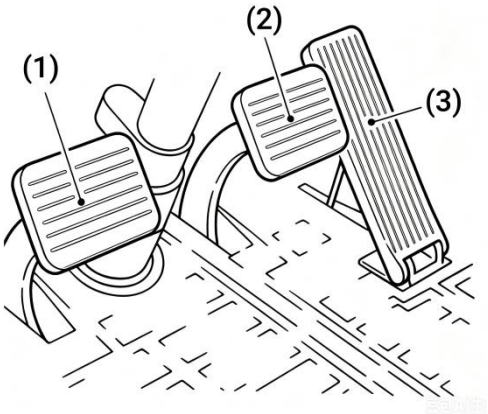
When the inching pedal is depressed, hydraulic clutch pressure decreases, enabling precise inching control during load handling. Use this pedal to inch the truck while operating the hoist system at a high speed. When fully depressed, the inching pedal acts as a service brake.

Accelerator Pedal (3)

The accelerator pedal increases the engine speed. With this pedal released, the engine runs at idle rpm.

Brake Pedal (2)

Press this brake pedal to slow or stop the truck. At the same time, the brake lights come on.



Tilt lever

Tilt the mast forward and backward.

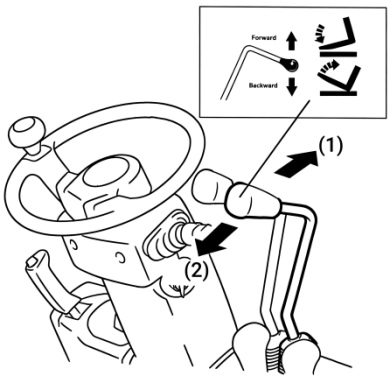
Forward: Push forward.

Backward: Pull backward.

The forward, backward or tilting speed can be adjusted by the degrees of accelerator pedal depression and lever operating stroke.

CAUTION

- Always operate the tilt lever from a seated position.



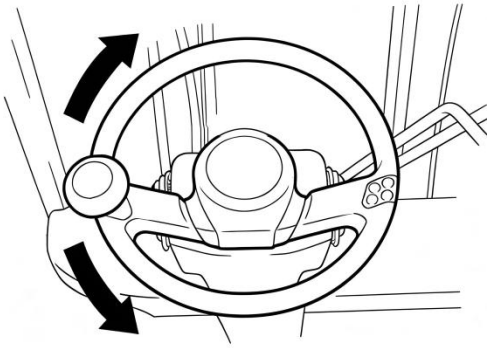
(1) Forward tilting

(2) Backward tilting

Steering wheel and round handle

The steering wheel controls the direction of turning left or right.

- Use your left hand to operate the round handle.

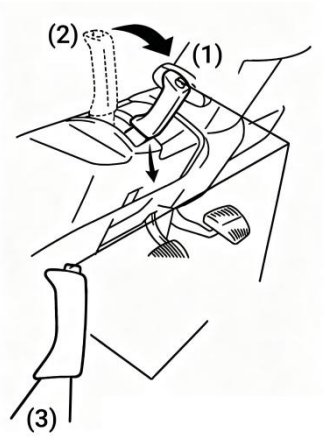


Parking brake lever

When parking, grasp the grip of the lever and fully pull it towards you. When releasing, grasp the grip of the lever and then push it back. Always fully depress the service brake pedal before engaging or releasing the parking brake lever.

CAUTION

- Never hold the lever at other than the grip because a finger may be pinched. When releasing the parking brake by holding the lever for starting on a slope, for example, hold the grip at above the protrusion.
- When parking on a slope, apply wheel chocks to the wheels.
- Operating the forklift with the parking brake engaged will degrade brake performance.



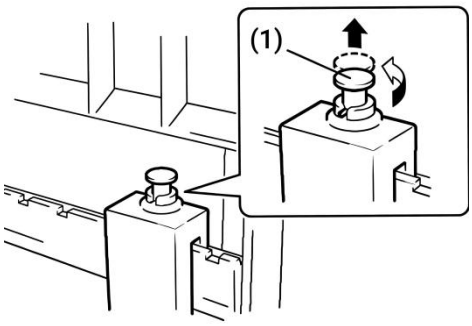
(1) Lock
(2) Release
(3) Grip

Forks

Lift each fork stop and rotate it to unlock, allowing the forks to be repositioned side-to-side.

Adjust the forks in the position most appropriate for the load.

When adjusting the forks, make sure that the center of gravity of the load corresponds to the center of the vehicle. After adjustment, turn the stoppers to lock the forks in place.



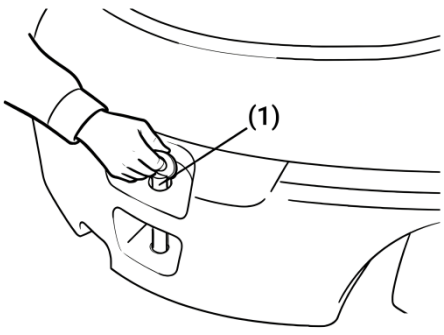
(1) Fork stopper

WARNING

Make sure the forks are locked before carrying a load.

Draw bar

The draw bar is located at the back of the counterweight, and is used to pull the vehicle when its tires drop into a gutter or become stuck in mud. It can also be used for loading the forklift onto a truck or another vehicle.



(1) Draw bar

CAUTION

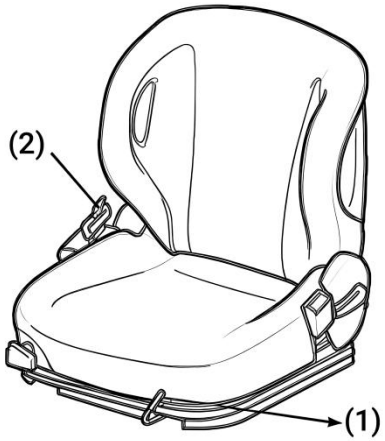
Do not use the drawbar to tow this forklift or pull other equipment.

Operator's seat

The operator's seat and seat belt are provided for your safety. Pull the seat adjustment lever upward to slide the seat forward or backward.

Suspension seat

The seat suspension mechanism provides a comfortable seating position according to the weight of the driver. The optimum driving position can be set by using the knob and levers. Elastic seat can reduce the vibration of running forklift.



(1) Seat slide lever (2) Seat belt

Seat slide lever

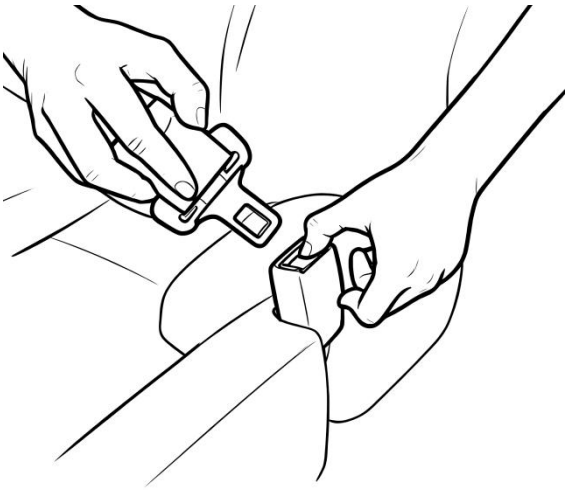
Pull slide lever to left, to adjust the back-and-forth position of the seat. The seat is secured in position when you release the lever.

CAUTION

After adjustment, lightly shake the seat forward and backward to confirm that the seat is firmly locked in position.

Seat belt

To fasten your seat belt, pull it out of the retract or and insert the tab into the buckle. You will hear a click when the tab locks into the buckle. Pull on the belt to make sure the buckle is securely latched. The seat belt length can be automatically adjusted to your size.



Disconnecting method

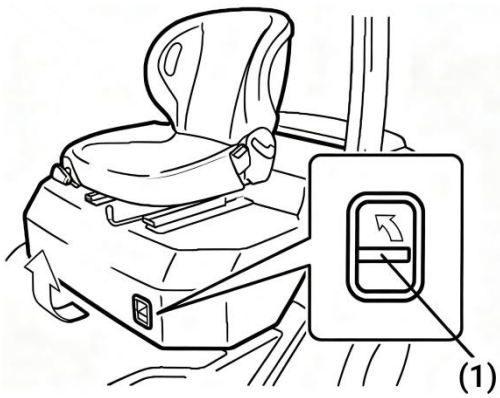
Push the release button and allow the belt to retract.

WARNING

- Buckle up. Your seat and seat belt can reduce the risk of serious injury or death in case of a truck tip over. Remaining inside the operator compartment during a tip-over drastically reduces the risk of severe injury or fatality.
- Always wear your seat belt when driving the truck. Trucks can be tipped over if operated improperly. To protect operators from the risk of serious injury or death in the event of a tip over, it is best to be held securely in the seat.
  The seat and seat belt will help to keep you safely within the truck and operator's compartment. In the event of a tip over, do not exit the vehicle. Firmly grip the steering wheel, brace your feet, and lean away from the direction of the tip-over, and stay with the truck. Please always buckle up your seat belt when driving your truck.

Engine hood Opening

1. Pulling up the engine hood lock release lever will release the engine hood lock, and the engine hood will pop up slightly.
2. Lift the engine hood.
3. Keep the engine hood open, Gently joggle the hood to confirm the gas strut is fully secured before releasing your grip.



(1) Engine hood lock release lever

Closing

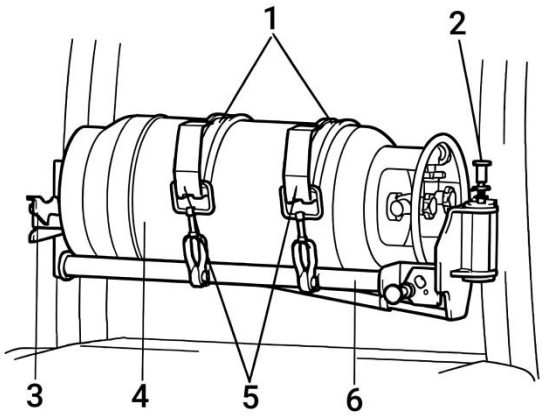
Close the engine hood quietly, and press down the hood until you hear a click sound.

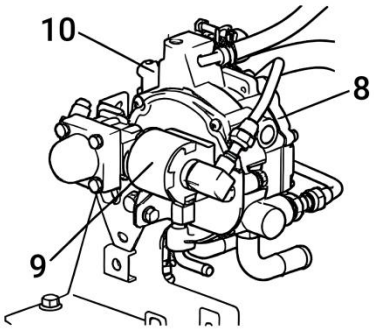
CAUTION

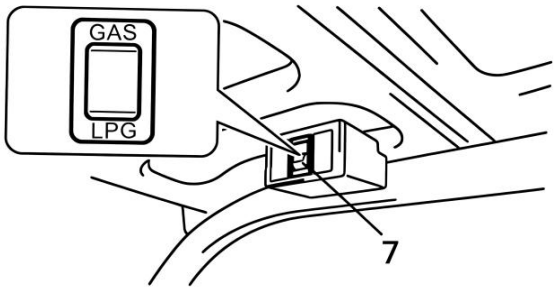
Operating the vehicle without firmly locking of the engine hood is very dangerous. Be sure to check firm locking before operating the vehicle.

1.4 LPG device (option) names of LPG device components

1. Tank band	2. Set pin	3. Tank bracket stopper	4. LPG tank
5. Tank clamp	6. Tank bracket	7. LPG switch	8. Filter
9. Solenoid valve	10. Regulator		



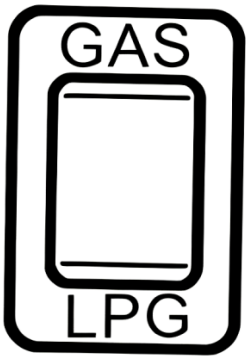




SWITCHES

Fuel Switch

Fuel selector switch (gasoline / LPG models): selects the LPG or gasoline fuel supply.



OFF: horizontal position.

Engine cannot be started up since no fuel is fed.

LPG: lever in the lower position.

GAS: lever in the upper position.

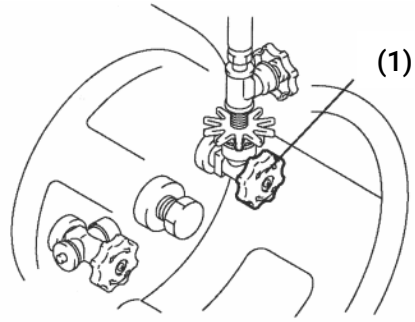
Note:

- With the engine switch OFF, no fuel will be fed even if the fuel switch is positioned at LPG or GAS.
- To turn off the LPG model engine, turn the fuel switch OFF, and run the engine until it naturally stops. After the engine has stopped, take out the gas tank, close the valve, turn the ignition switch OFF, and remove the key.

1.5 LPG tank and related parts

Outflow valve

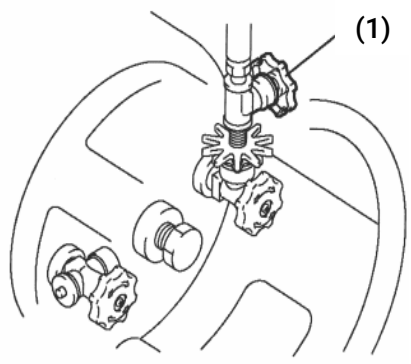
This valve regulates LPG flow from the tank to the vaporizer regulator.
To open the valve — rotate counterclockwise.
To close the valve — rotate clockwise.



(1) Outflow valve

Inflow valve

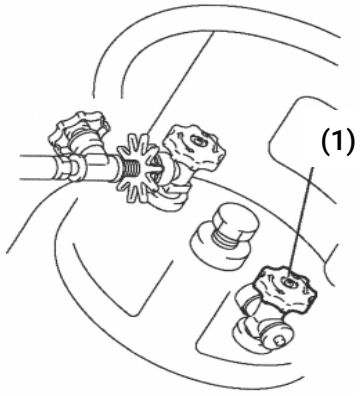
LPG is filled in the tank through this valve.
The tank must be filled by an LPG filling station attendant.
Be sure that this valve is shut tightly at all times during use.



(1) Inflow valve

Pipe valve

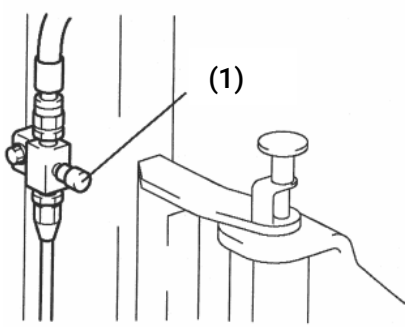
When the fuel hose needs to be disconnected for tank replacement, etc, close this valve to prevent the liquid from running out of the hose.
This valve is normally left open.
To open the valve: turn it counterclockwise.
To shut the valve: turn it clockwise.



(1) Pipe valve

Relief Valve

This relief valve relieves excess pressure that could develop if LPG pressure rises above the normal level or if the hose deteriorates.

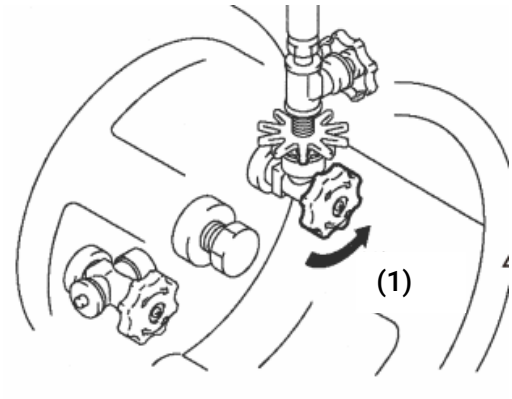


(1) Relief valve

1.6 Operating LPG-powered forklifts

Starting the Engine (LPG models)

1. Turn the outflow valve of the tank counterclockwise to open it.
2. Be sure that the pipe valve is open.

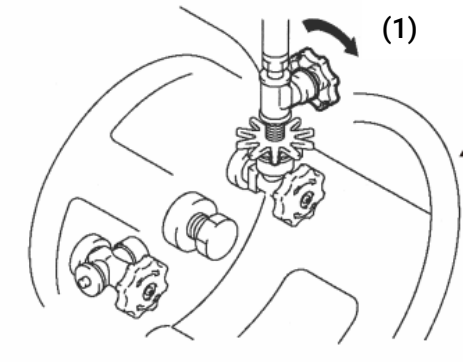


(1) Open

CAUTION

Never depress the accelerator pedal repeatedly or hold it down completely during starting. The engine will not start easily.

3. Once the engine begins to fire, lightly depress the accelerator pedal. After the engine is running steadily, turn the key to the ON position.
4. Let the engine idle for about 3 to 5 minutes to warm up.



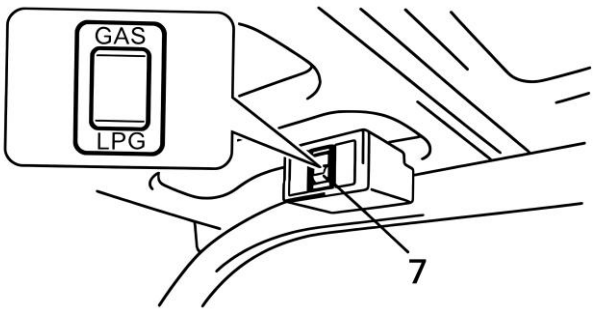
(1) Open

CAUTION

Avoid fully depressing the accelerator during startup. Excess LPG vaporization can ice up the regulator and cause engine damage.

Starting the Engine (Gasoline / LPG models)

If the ambient temperature is sufficiently high, start the engine in the same way as you would start the engine of LPG models. If the temperature is very low and starting the engine is difficult with LPG fuel, set the fuel switch to the GAS position and start the engine. Change the fuel setting to the LPG position after the engine becomes hot (stop the engine first).



1. Set the fuel switch to the GAS position.
2. Start and warm up the engine as you would start and warm up an ordinary gasoline engine. See the other Operator's Manual for engine starting procedures.
3. Set the fuel switch to the OFF position and let the engine stop naturally.
4. Set the fuel switch to the LPG position and start the engine again as you would start the engine of LPG models.

CAUTION

Do not switch fuel modes between gasoline and LPG while the engine is running. This will cause abrupt RPM spikes and severe engine damage.

To prolong the Engine Life

Refrain from handling and driving the vehicle roughly especially when it is new.

Parking

1. parking for a short time.
   (1) Set the fuel selector switch to the OFF position.

(2) Let the engine stop naturally so that any LPG fuel in the piping leaves the system. Turn the engine switch to the OFF position and remove the key.

2. Parking for a long time

(1) Turn the LPG tank outflow valve clockwise to shut the fuel supply.

(2) Let the engine stop naturally so that any LPG fuel in the piping leaves the system. Turn the fuel switch and the engine switch to the OFF position and remove the key.

1.7 Changing the LPG Tank

CAUTION

LPG cylinder replacement must never be performed near any ignition source, including lit cigarettes, matches, gas burners, electric heaters, electric motors, or any other equipment that generates sparks or open flames. (referred to collectively as “fire” below).

WARNING

To avoid serious injury from fire or explosion, you must follow these rules:

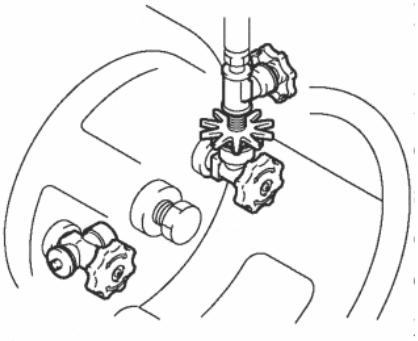
- Switch ignition and lights off.
- Change tanks only in well ventilated, approved areas.
- No fire or flames allowed.
- Check all connections for damage or missing parts.
- Check for leaks.
- Do not restart until all smell of gas is gone.
- If the truck will not restart, have a qualified mechanic inspect it.
- Cylinder refilling must be performed only by trained, authorized personnel using certified procedures.

1.8 Removing the LPG Tank

1. Stop the engine according to instructions for “Parking for a long time”.

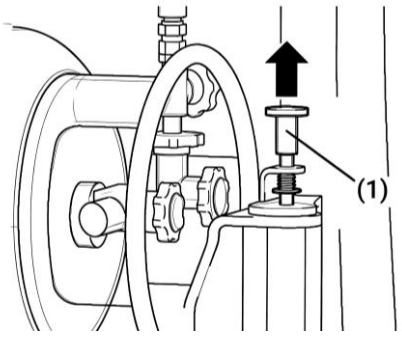
(1) Turn the LPG tank outflow valve clockwise to shut the fuel supply.

(2) Let the engine stop naturally. Turn the fuel switch to the OFF position.

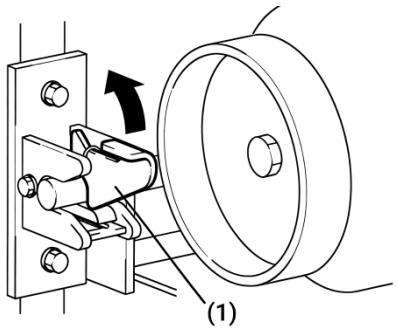


2. Turn the pipe valve clockwise to shut it.

3. Disconnect the fuel line fitting from the LPG cylinder (rotate the fitting nut counterclockwise).

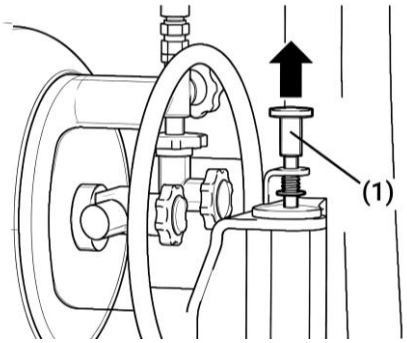


4. Lift up the tank bracket stopper for the left tank bracket and release the lock.



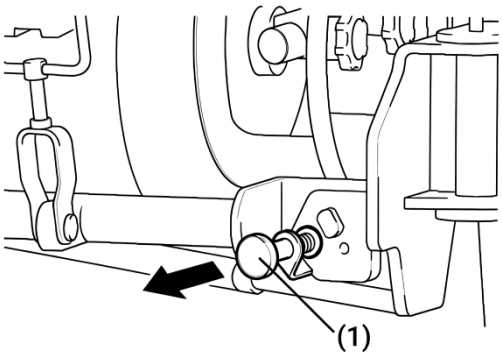
(1) Tank bracket stopper

5. Unlock the set pin (upper side) on the right side of the tank bracket by lifting it, turn the bracket rearward, and fix the set pin.



(1) Set pin (Upper side)

6. Pull the set pin (lower side) on the lower side of the tank bracket for unlocking. The tank bracket falls. Lower the tank bracket and fix the lock pin.

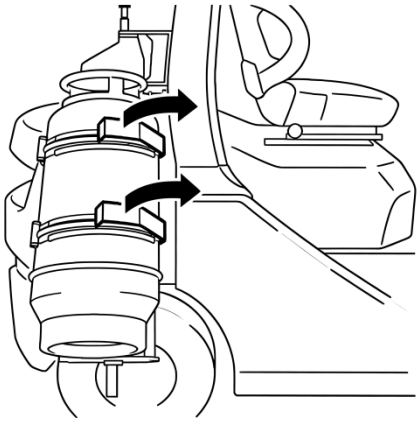


(1) Set pin (Lower side)

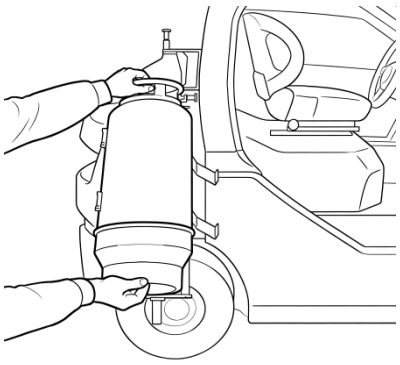
WARNING

- When removing the tank bracket lock pin, keep clear of the area beneath the bracket; it will fall under its own weight once unlocked.
- Never unlock the set pin when the tank is full. Otherwise, the tank bracket falls rapidly to cause a dangerous state.

7. Pull the tank clamp towards you and unlock the tank bands.

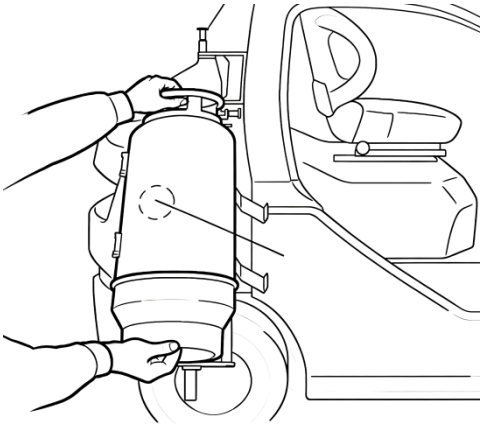


8. Raise the tank bands away from you and remove the LPG tank.



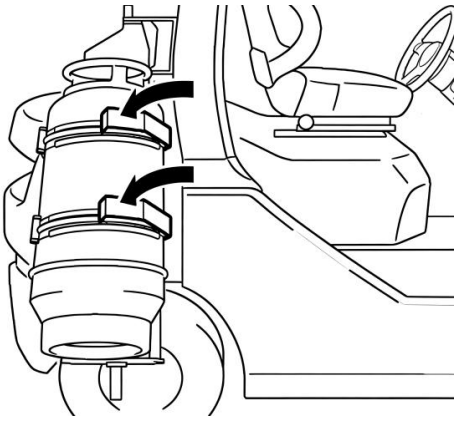
1.9 Installing the LPG Tank

1. Put the LPG tank on the bracket.
   (1) The outflow valve must face the right or upper side of the vehicle.
   (2) The tank must be placed with the correct side up. Find a mark on the tank. It must face upward or rearward.



(1) Mark

2. Put bands over the tank, hook clamps to bands and push clamps up to clamp the tank.

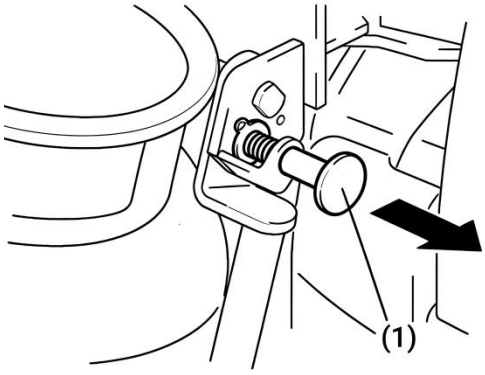


3. Unlock the tank bracket by pulling the set pin (lower side) under the tank bracket. Raise the tank bracket and fix the set pin.

WARNING

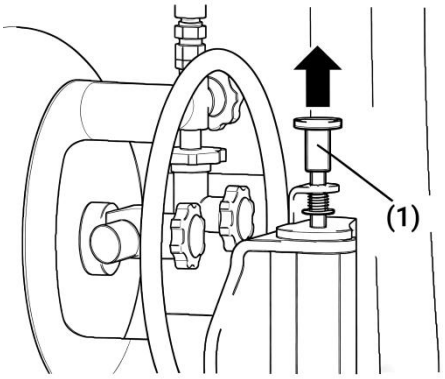
It is dangerous to unlock the set pin without the tank loaded, because the bracket may jump up due to spring force.

Unlock the set pin while the tank is loaded on the bracket. Remove the set pin, turn the tank bracket around the pivot and set the bracket stopper knob accurately.



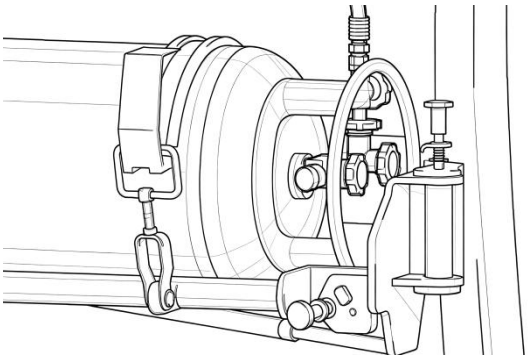
(1) Set pin (Lower side)

4. Connect the pipe to the outflow valve of the tank (turn the screw counterclockwise).



(1) Set pin (Upper side)

5. Wet the pipe connection to the tank with soap water or neutral detergent. Open the outflow valve and the pipe valve, and check the connection for any gas leaks. Wipe off the soap water or detergent after inspection is completed.



Important Information about Properties of LPG

- LPG contains an odorant that gives it a noticeable smell at concentrations of 1/200 or more in air. If a large amount of the LPG is leaking from the tank of the system, it can be detected by the smell. LPG contains no carbon monoxide and is non-toxic, though highly flammable and explosive.
- LPG is a highly pressurized gas and leaks very easily. Vaporized LPG expands to 250 times the volume of liquid LPG, and vapor is twice as dense as ambient air. Therefore, it collects in low places.
- LPG internal pressure rises as ambient temperature increases.

Safety Precautions about Operating LPG-Powered Forklifts

- LPG is inflammable. A tiny spark can cause a fatal explosion if it is handled carelessly. It is very crucial that the following precautions are observed most strictly to avoid hazards.
- All LPG-powered forklifts must be operated and maintained (including the LPG tank renewal) by designated persons only.
- Never stop or park an LPG-powered forklift near an ignition source.
- Whenever possible, do not stop or park an LPG-powered forklift directly in sunlight. It is strongly recommended to cover it with a sheet and to ensure the area is well ventilated.
- Do not operate an LPG-powered forklift in the presence of an ignition source.
- When operating or inspecting an LPG-powered forklift, post a visible “FIRE HAZARD” sign and keep persons using fire away from the vehicle.
- Remove the ignition key from a LPG-powered forklift before parking or storing it so that no unauthorized person can operate it.
- Use only soapy water or neutral detergent to check for gas leaks. Do not use any other fluid.

- If a gas-leak check must be performed at night, turn the flashlight on well away from the vehicle, then walk toward it. The flashlight might cause a spark when it is turned on and cause an accident.
- If a gas leak is detected, immediately put out any fire, ventilate the area and keep the area in a strictly fire free condition. Then call a qualified Good Sense dealer or service garage.
- Store LPG tanks in a strictly free area having a gas detector at all times.
- Have LPG tanks refilled only by a LPG gas filling station attendant.
- Use LPG of an appropriate chemical composition according to the climate. In hot climate, use LPG with a relatively high butane content; in cold climate, use LPG with a relatively high propane content.

Inspecting and servicing LPG-powered forklifts

Inspect and service LPG-powered forklifts as written below.

- Inspection before Starting Operation.
- LPG gas leak check.
- After the gas leak check is completed, wipe off the soap water or neutral detergent from wet parts.
- If gas leak is detected, immediately put out any fire, ventilate the area and keep the area in a strictly fire free condition. Then call a qualified Good Sense dealer or service garage.

CAUTION

Never perform LPG gas leak checks near fire. Make certain that there is no source of fire the area throughout the gas leak check.

WARNING

To avoid serious injury from fire or explosion, you must follow these rules;

- Switch ignition and lights off.
- Check for leaks only in well ventilated, approved areas.
- No smoking; no open flames allowed.
- Apply soapy water to all fuel line connections; bubbles will form at any leak point.
- Never use any other liquid, or any open flame for leak check.
- Do not attempt to start the engine until all smell of gas is gone.
- If any gas leakage is found, immediately report it to the supervisor for repairing it by a qualified mechanic or your Good Sense dealer. The truck is not allowed to be operated.

1. Turn the LPG tank outflow valve counterclockwise to open it.
2. The pipe valve must be open too.
3. Set the engine switch to the ON position.
4. Turn the fuel switch ON and OFF repeatedly for several times, and leave it in the OFF position finally.
5. Wet hose and LPG tank and regulator connections with soap water or neutral detergent. Check for gas leak.
6. Wet the hose and the regulator and carburetor connections with soap water or neutral detergent. Check for gas leak.

Monthly inspection and maintenance

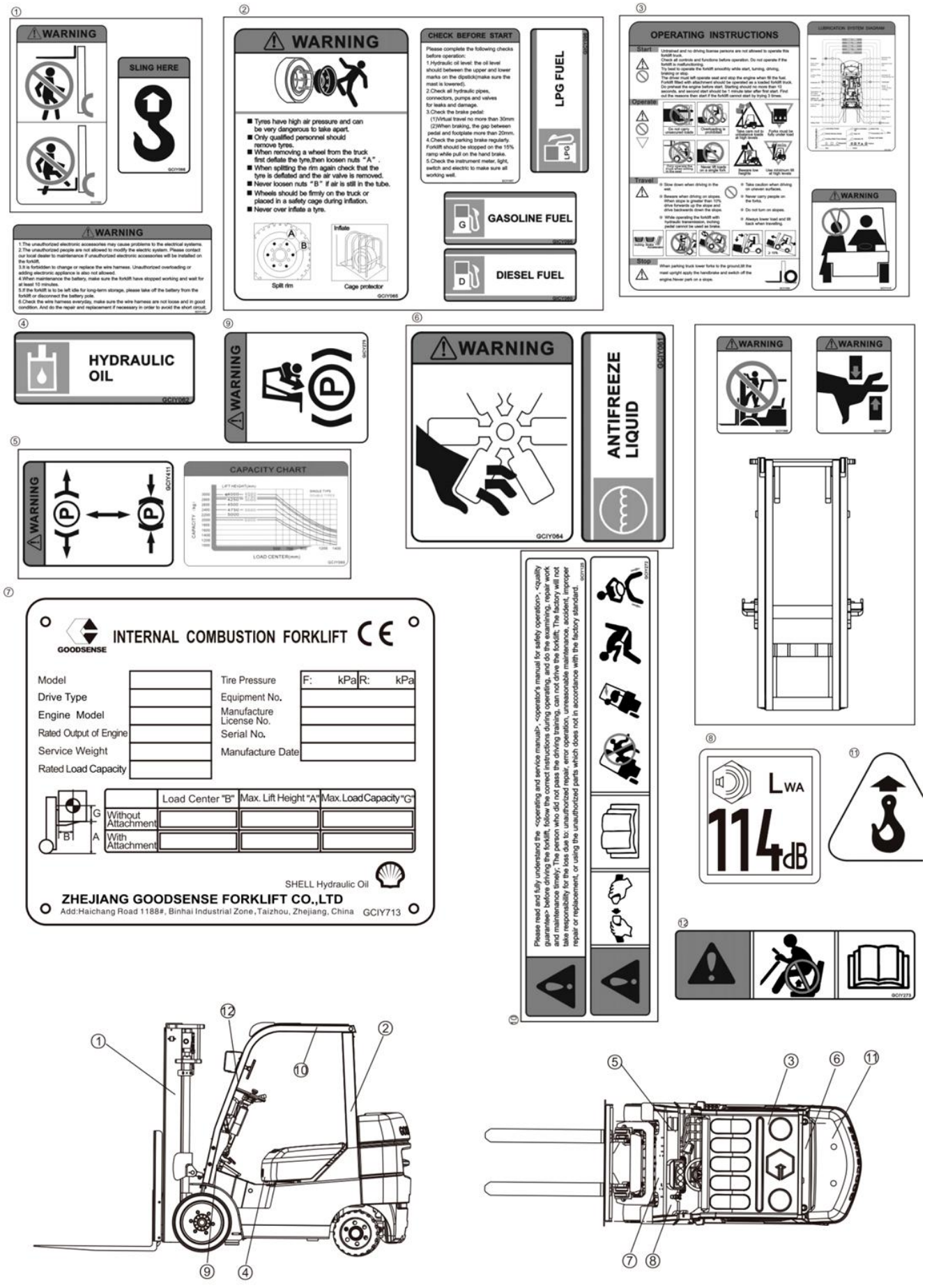
Item
Gas leak from pipes and joints (connections)
Damage to pipes and joints (connections)
Regulator adjustment
Crack, damage to and gas leak from the tank
Loose or damaged tank bracket
Damage to electrical wiring, loose terminals
Rotation of liquid drain valve
Gas leak from the regulator body

Quarterly inspection and maintenance

Item
Carburetor and adaptor
Regulator function (to be disassembled and serviced annually)
Solenoid valve

Warning Marks

Warning Marks are attached to a vehicle. Before driving it, please be sure to read them carefully.



2. The Driving, Operation and Daily maintenance of the forklift

The operator and the supervisor must keep “Safety First” in mind and operate the truck safely and in accordance with this manual and the operator’s handbook.

1 Transportation of the forklift

Observe the following when loading the forklift into a container or onto a vehicle:

(1) Engage the parking brake.

(2) Secure the mast and counterweight with steel cables at both front and rear, and install wheel chocks on all tires to prevent rolling during transit.

(3) When hoisting, follow the hand-signal instructions and lift the load accordingly.



2. Safekeeping of forklift

(1) If the coolant contains anti-rust and anti-freeze additives, the fuel tank does not need to be drained for long-term storage.

(2) Coat all unpainted metal surfaces with anti-rust oil, and lubricate all mast roller hinges.

(3) Lower the mast/forks to the lowest position.

(4) Engage the parking brake.

(5) Place wheel chocks on all wheels.

3. Pre-operation check

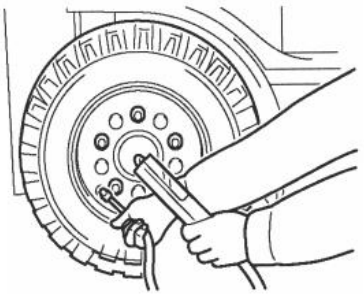
Pre-operation checks and weekly inspections are the responsibility of the Good Sense industrial vehicle users.
Be sure to perform a pre-operation check before starting work to ensure safety.

Item	Inspection
Previously detected malfunction	Correct it
Exterior	Vehicle body, oil leakage, water leakage, loose parts, exterior damage.
Wheels	Tire pressure, wear or damage, rims and hub nuts.
Lamps	Lamp condition, damaged lamps.
Hydraulic oil	Oil level, contamination, consistency.
Radiator	Coolant level, antifreeze requirement.
Engine	Oil level, contamination, consistency, noise, exhaust.
Clutch	Engagement, pedal, play.
Brake pedal	Pedal play, braking effect.
Brake fluid	Fluid level.
Parking brake	Operating force, braking effect.
Steering wheel	Looseness, play, vibration, veering.
Horn	Sound.
Instruments	Functioning.
Load handling system	Parts, oil leakage, cracking, looseness.
Fuel	Amount.

(1) Walk around inspection

Vehicle uprightness

Is the forklift leaning to one side? If yes, inspect for flat tires or undercarriage damage.



(2) **Beneath the vehicle**

Check for any oil or water leakage on the ground or floor where the vehicle is parked.

Inspect beneath the unit for fluid leaks, loose fasteners, or structural damage. Report any abnormalities to an authorized Good Sense service dealer for inspection.

(3) Tire inspection

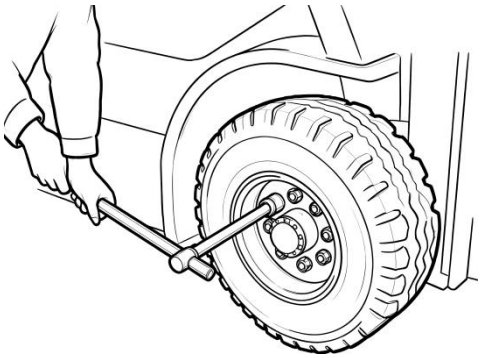
Tire pressure inspection

a. Use a tire pressure gauge and measure the inflation pressure. Adjust it to the proper level.

b. After the adjustment, check whether air is leaking from the valve.

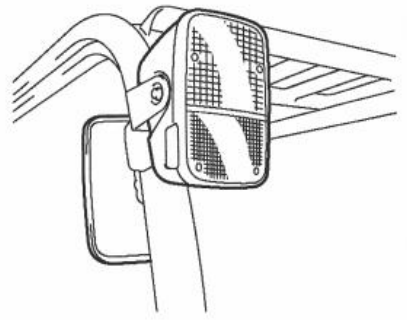
Damage, crack and wear of tires and rims

Check the tires for damage and wear, and the rims for bending. If the tires are damaged, or there is a marked difference in the wearing of tires between the front and rear or between the left and right is perceived, or bent rims are found, contact your TMG dealer for inspection.



(4) **Hub nut inspection**

Check the tightness of the hub nuts. Torque all wheel lug nuts evenly to the manufacturer-specified torque rating to avoid uneven load.



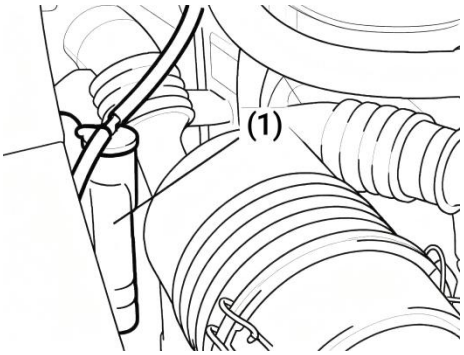
(5) Lamp inspection

Are the lamp filaments intact? Is there any lens damage? Keep the lenses clean to ensure proper illumination.

(6) Engine compartment inspection Engine coolant level check and supply

Coolant level inspection and top-up must only be completed with the engine and coolant fully cooled.

1.With the engine off, open the engine hood and check the engine coolant level in the reservoir tank.



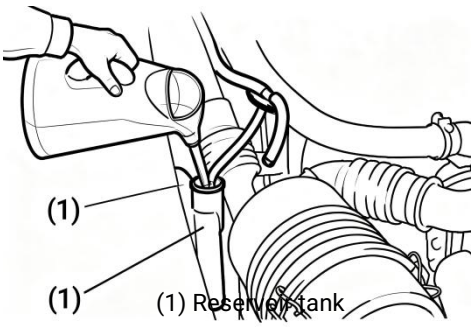
(1) Reservoir tank

Note:

The reservoir tank, which is attached to the radiator, automatically supplies coolant to the radiator when the coolant level in the radiator becomes low.

2.Keep the coolant level between the upper and lower limits. If the level is below the lower limit, adjust coolant to the upper limit.

3.The concentration of long-life coolant (LLC) must be mixed to a 30% concentration (50% for cold climate operation).

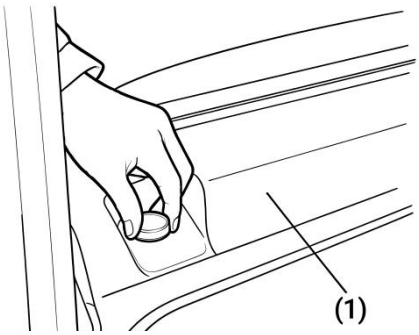


(1) Reservoir tank

Note: If no engine coolant remains in the reservoir tank. Be sure to check the coolant level in the radiator, too.

(7) Checking the engine coolant level in radiator

1. Remove the radiator cover.
2. Remove the cap and check the coolant level from the filler port.
3. If the engine coolant is not visible through the filler port, fill appropriately diluted coolant (LLC) into the port.



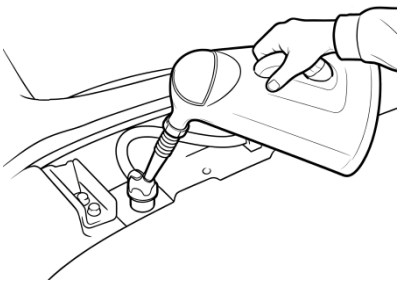
(1) Radiator cover

Note:

Close and tighten the radiator cap, match the pawl on the reverse side of the cap with

the notch on the filler port and turn the cap fully clockwise while applying a downward force.

WARNING



Never remove the radiator cap while the engine is hot — hot pressurized coolant will spray and cause severe burns. All coolant level checks must be done with a cold engine.

(8) Checking hydraulic oil level

Park the forklift on level ground, fully lower the forks to the floor, and shut off the engine before checking hydraulic oil level.

The oil contamination level should be kept within the acceptable limit (see the cleanliness rating specified for the system).

a. Open the engine hood and remove the oil cap.

b. Wipe the level gauge attached to the oil cap with clean cloth, and insert it again into the tank.

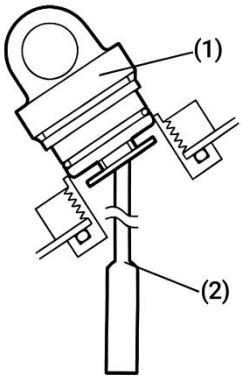
Note:

To take an accurate reading, rest the dipstick on the filler-neck opening; do not fully install the oil cap.

c. Extract the level gauge gently and check if the oil adhesion is up to the level line.

d. If the oil level is insufficient, add oil. Spilled and splashed oil must be wiped off thoroughly.

Adjust the oil level so it falls within +0 to +10 mm above the high-level mark on the gauge.



(1) Oil cap
(2) Level identifier

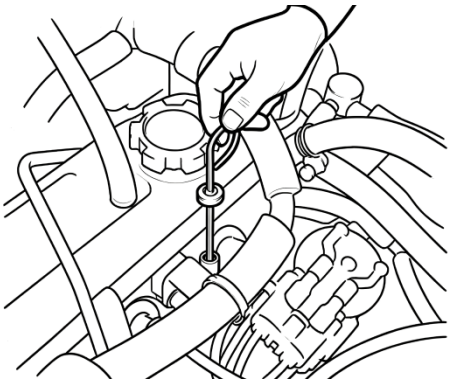
(9) Engine oil inspection

a. Park the vehicle on a flat ground. If the vehicle is inclined, the indicated level may be incorrect.

b. The oil level must be checked before starting the engine or at least 3 minutes after the engine is stopped.

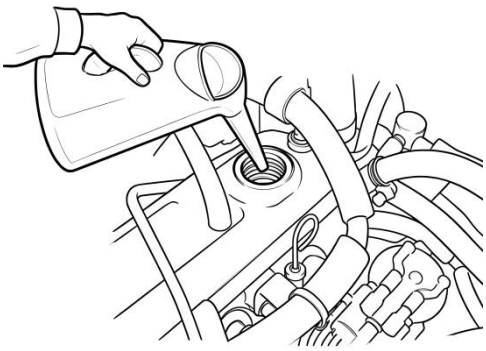
c. Extract the oil level gauge and wipe it with clean cloth. Insert it again and check if the oil level is between the F and L levels.

d. If the oil level is below the L line, add oil up to the F line.



(10) Adding engine oil

1. To supply oil, remove the filler cap and pour oil through the filler port. Never let the oil level exceed the F line.
2. The oil supplied must be appropriate for the season. SAE40 Ambient temperature higher than 30°C SAE40 Ambient temperature 0°C to 30°C SAE40 Ambient temperature -10°C to 0°C



CAUTION

Always use the same brand of oil if possible.

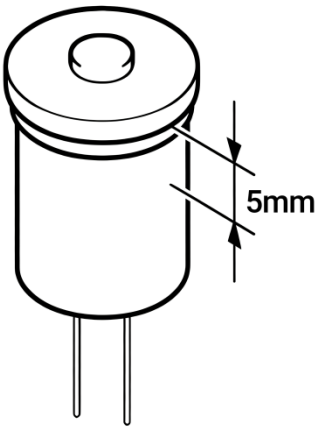
Leakage inspection

Check the engine compartment for any oil or fuel leakage.

Clean the radiator if it is clogged and check if there are any foreign objects, such as paper or others, onto the radiator grill.

(11) **Brake fluid inspection**

With the engine off, check the level of the brake fluid in the reservoir tank. The level should be within the range shown in the figure. If the level is below the lower limit, add brake fluid up to the proper level. If the decrease in brake fluid is excessive, the brake system may be leaky. Contact your TMG dealer for inspection as early as possible.



WARNING

- Never use any oil other than brake fluid.
- Prevent dirt from getting into the reservoir tank. Even a small amount of dirt in the brake fluid can prevent proper braking. This is extremely dangerous.
- Check the small vent hole in the reservoir tank cap frequently to make sure that it is not clogged with dirt.



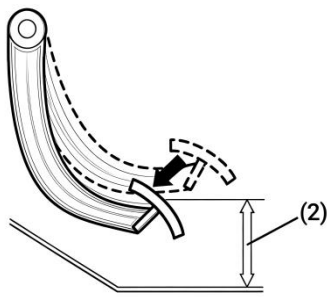
(12) **Brake pedal inspection**

a. Depress the brake pedal fully, and check the floor clearance (clearance between the pedal and floor).

b. Make sure that the pedal does not go any further when it is kept depressed.

c. Also check that no abnormality is observed with pedal depression and return.

d. Manually depress the brake pedal to check the play until a resistance is felt.



(1) Brake pedal
(2) Brake pedal floor clearance

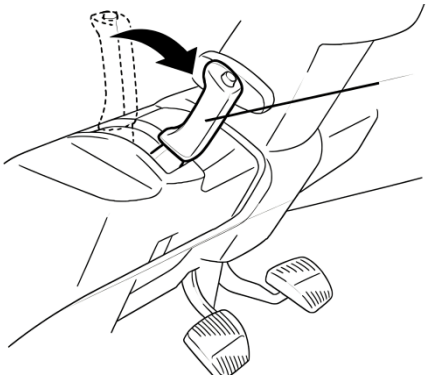
WARNING

Contact your TMG dealer for inspection if the play is excessive, pedal movement is abnormal or brake performance is improper.

(13) **Parking brake inspection**

Parking brake lever

Check the operating force required for pulling the parking lever fully.



WARNING

Contact your TMG dealer for inspection if any abnormality is found.

(14) Clutch pedal inspection (Mechanical models)

Note:

Since power clutch is adopted in oil clutch models, the clutch pedal must be inspected after starting the engine.

a. Manually depress the clutch pedal to check the play until a resistance is felt.

b. Depress the clutch pedal and check that there is no obstruction or abnormal resistance.



(1) Clutch pedal

CAUTION

Contact your TMG dealer for inspection when any abnormality is found

(15) Inching and brake pedal inspection (hydraulic transmission)

a. Manually depress the inching and brake pedal to check the play until a resistance is felt.

b. Depress the inching and brake pedal and check that there is no obstruction or abnormal resistance.



(1) Inching and brake pedal

CAUTION

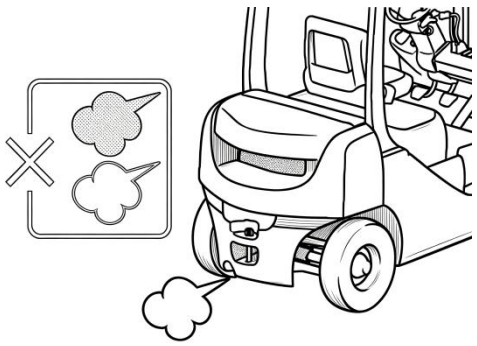
Contact your TMG dealer for inspection when any abnormality is found.

(16) Engine inspection Start the engine and warm it up sufficiently.

a. Check each meter and warning lamp to see there is no abnormality.

b. Check if the engine is generating abnormal sound or vibration.

c. Check the exhaust gas color to see it is normal. Colorless or light blue exhaust indicates complete combustion; black exhaust, incomplete combustion; and white exhaust, burning oil as a result of oil getting into the cylinders.



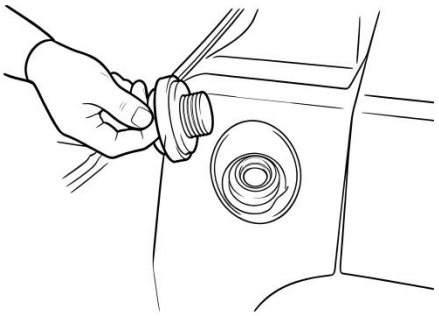
WARNING

- Exhaust gas is harmful. Before starting the engine inside a building or enclosure, ensure adequate ventilation.
- The gasoline engine carburetor is equipped with the automatic choke that keeps the engine running at a relatively high speed for a while.

This is normal; the engine returns to normal idle speed once it has warmed up.

(17) Fuel level check and supply

a. Observe the fuel meter to see if the fuel is sufficient.



Note:

After the end of daily operation, fill the tank with fuel to prevent the moisture of the air outside the tank from mixing with the fuel.

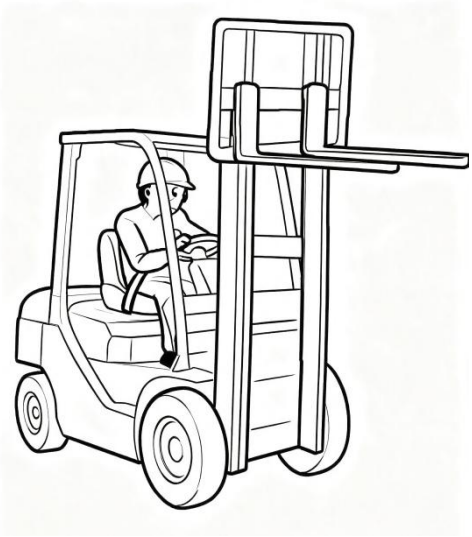
b. When supplying fuel, stop the engine, remove the fuel tank cap by turning it counterclockwise, and pour fuel through the fuel filler neck.

After fueling, be sure to tighten the fuel tank cap.

CAUTION

- Always stop the engine and keep any fire source away before and during the fueling operation.
- Carefully prevent entrance of water and dirt into the tank during fueling.

(18) Load handling system



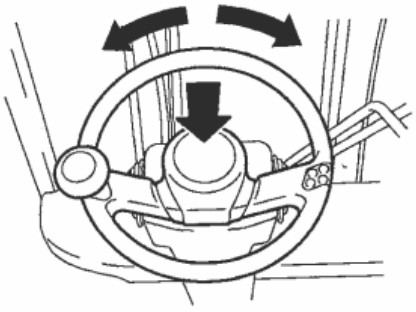
a. Check the fork installation state for cracks and bending.

b. Check for mast distortion, chain tension and oil leakage from cylinders and piping.

c. Operate the lift and tilt levers to check their operating state. If anything unusual is found,

- have the vehicle inspected at a Good Sense dealer.

(19) Steering wheel inspection Note: Perform inspection after starting the engine.



a. Check the steering wheel play with the rear wheel and set in the straight traveling direction.

b. Turn the steering wheel in the circumferential direction and also move it up and down to make sure there is no looseness.

c. Push the horn button to see the horn sounds normally.

d. If any abnormality is found, contact your TMG dealer for inspection.

(20) Safety Inspection

Note:

Keep broad safe space when inspection to prevent the sudden movement of forklift. Parking Brake Inspection :the forklift can not move or lift until the operator leaves the seat.

Checking step:

1. Forklifts should be on the stable and flat ground, and lock the parking brake lever.
2. Set the forward /backward switch on Neutral, starting switch ON and lift the fork 10 cm off ground.
3. Release the brake pedal and the accelerate pedal.
4. Set the forward / backward switch on F or R.
5. Set the starting switch on start shift to check if the starter can work.
6. Close the starting switch.

4. Operation of the forklift

(1) Only a trained, licensed operator may drive the forklift.

(2) The operator should wear the shoes, hat, clothes and gloves, which can be used as the safety protection during the operation.

(3) Check the controls and warning devices before driving. If damage or defects are found, repair them before operating.

(4) Do not exceed the rated load. Insert both forks fully beneath the load and center it evenly on the forks. Never lift a load with a single fork.

(5) Start, turn, steer, brake, and stop smoothly. Drive slowly when turning on wet or slippery surfaces.

(6) When traveling, tilt the mast backward and carry the load low.

(7) Drive carefully on ramps. When ascending a ramp with a grade greater than 10%, drive forward; when descending, drive in reverse. Do not turn, load, or unload on a ramp.

(8) Paying attention to passerby, barrier, pothole during the running, also the space above the forklift.

(9) Never stand on the forks or carry passengers.

(10) Standing under the forklift and walking under the forklift is not allowed.

(11) Operating the vehicles and apparatus out of the drive seat is not allowed.

(12) Pay attention to the goods in case of falling when lifting the forklift more than three meters, when necessary, take the protective action.

(13) Lean the bracket backward as often as possible. in terms of operating the longer lifting fork and the load work should be conducted upward and backward within the minimum range.

(14) Be more careful and drive slowly when driving on the quay or the interim board.

(15) The driver should not be on the forklift and extinguish the generator when adding the fuel and don't lit fire when checking the battery or the position of the oil tank.

(16) When operating the empty forklift, operate it like the loading forklift.

(17) Do not carry loose or unsecured loads; handle oversized loads with extra care.

(18) When leaving the truck, place the gear selector in neutral, shut off the engine, and engage the parking brake. When parking on a slope or for a long period, also chock the wheels.

(19) Do not open the radiator cap while the engine is hot.

(20) The relief valve and steering-unit pressures are factory-set. Do not adjust them during operation; incorrect pressure can damage the hydraulic system or its components.

(21) Charging the tire should follow the “Tire pressure” signal.

(22) Operator-seat noise is measured as sound pressure level and radiated noise as sound power level. Operator-seat noise shall not exceed 98 dB(A) and radiated noise shall not exceed 114 dB(A). Vibration transmitted to the operator shall be less than 5 m/s^2.

(23) In order to move the extra-wide goods, the users can choose “The super-long fork”. What should be mention is that the loading capacity of the super-long fork should comply with the loading curve. Within the standard loading criteria, its loading capacity should be equal to that of the standard forks, the loading center should be moved forward while downloading the work, but using the tip of fork or colliding the goods are not allowed. Attach great importance to safety when driving or twisting.

(24) Inspect the chains regularly and keep them properly lubricated. The tension of the left and right chains must be equal.

(25) Get protection from the accidental fires and personal injury. The position of fire extinguisher and fire aid boxes should be checked and usage of them should be familiar.

(26) Operating on rough ground produces noise and strong vibration that may cause bodily injury, such as back pain.

(27) Do not remove the overhead guard or backrest. They protect the operator from falling objects and meet applicable safety standards.

(28) Forbid to maintain the forklift at a high position.

(29) Do not disassemble the forklift without authorization. If disassembly is required, contact a TMG sales agent or the after-sales department first.

(30) Use only TMG genuine parts and accessories. TMG assumes no responsibility for damage caused by the use of non-genuine parts.

(31) Pay special attention to the disposal of rejectamenta in case of polluting environment. Waste liquid should be poured into appointed container. Strictly abide rules and prescribe when dealing with deleterious matters, e.g. sump, impregnate, battery, refrigeration oil.

(32) Repair the forklift promptly when a problem is found. Unless a part is explicitly user-serviceable in this manual, contact a TMG dealer for repairs.

(33) Forbid to install or change attachment privately, if in demand, please contact Good Sense sale agent or Good Sense dealers.

(34) Forbid to operate the forklift in the gale weather. The forklift may have the danger of turning over when loading the super big bulk goods in gale weather.

(35) Must check the emission value after maintenance.

5. Operating cautions:

(1) If the radiator boils over or the coolant temperature is high, do not open the radiator cap immediately. In order to find the reason, open the lid and let the engine run at the middle speed and then twist the radiator lid slowly, put the generator lid away again after a while to prevent the cooling liquid spurting and hurting the operators. While twisting the radiator lid, twist in the right position; otherwise cannot establish the standard pressure system.

(2) To the radiator which use the pure water as the cooling fluid, the water of the radiator can be discharged only when the water will be frozen in the cold weather. The radiator should be removed and be washed in the boiling soda water so as to eliminate the pollutants and sediments of the radiator.

(3) For radiators using an anticorrosion/antifreeze coolant (e.g., FD-2, -35 grade), do not mix different types of antifreeze or add plain water. The same type of the rustproof and antifreeze liquid should be added when the antifreeze liquid is leaking or evaporating. The antifreeze liquid can be used both in summer and winter and doesn't need to be changed for a whole year. Generally, it should be discharged and be filtered, then continue to use.

(4) According to the different working conditions, the dust on the surface of the generators should be removed regularly with detergents or the condensed air or high-pressure water (the pressure is less than 4kg/cm).

6. The oil of lift fork

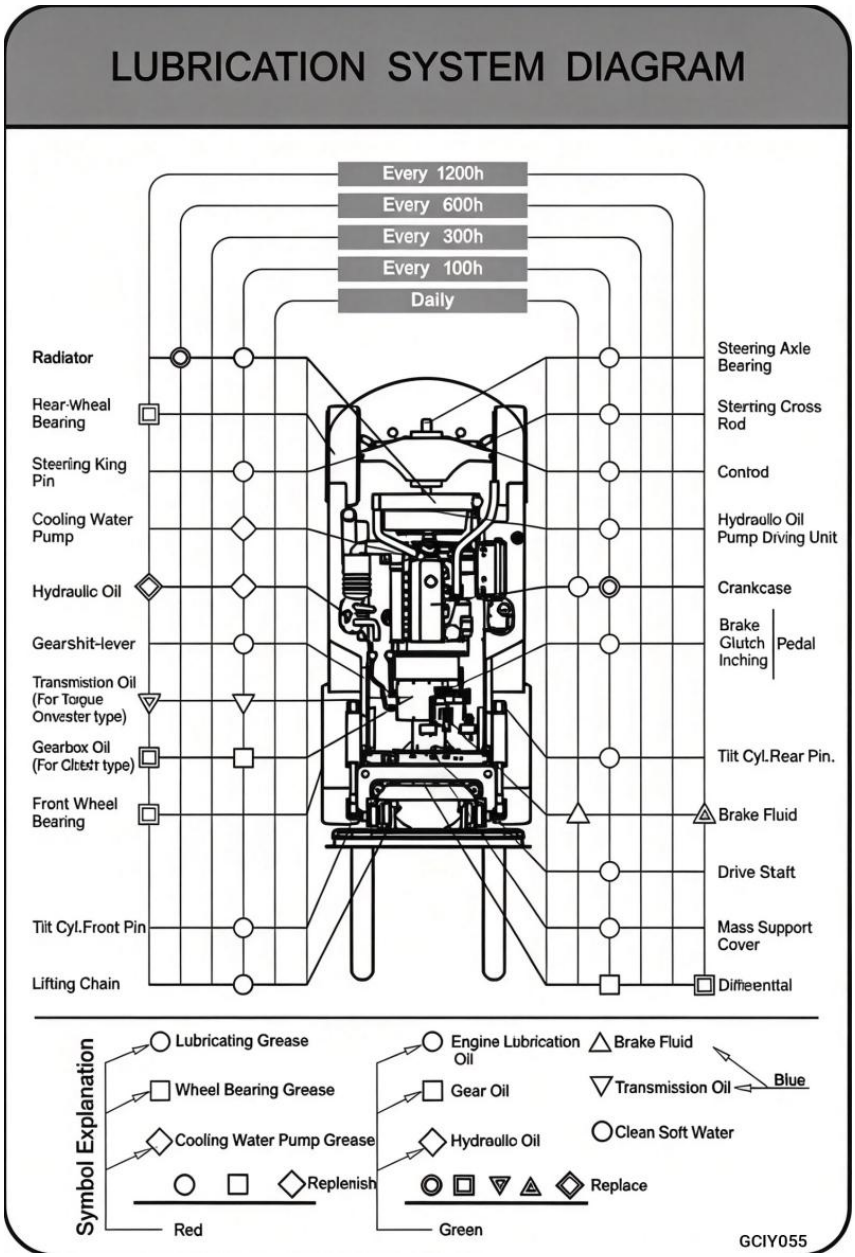
Name	Brand and temp. of using				
Gasoline	93# or 97#				
Diesel	Brand(diesel)	0#	-10#	-20#	-35#
	Temp. of using	⩾4	⩾-5	⩾-5~-14	⩾-14~-29
Engine oil (gasoline, SF Electric injection (SG)	Viscosity grade	5W/30	10W/40	10W/30	15W/40
	Temp. of using	-30~+30	-25~+40	-25~+30	-20~+40
Gear oil (diesel, CD)	Sticky grade	5W/30	10W/30	15W/40	20W/50
	Temp. of using	-30~+30	-25~+30	-20~+40	-15~+50
Hydraulic oil	Sticky grade	L-HM46 wearable hydraulic oil	L-HV32 low temp. wearable oil		
	Temp. of using	⩾-5	⩾-20(cold region)		
Torque converter oil	8# Tor-con oil				
Brake fluid	DOT3				
Lubricating grease	NLGI No. 3 lithium-based grease (-20 °C to 120 °C)				
Gear oil of heavy-laden vehicle	Sticky grade	85W/90GL-5	80W/90GL-5		
	Temp. of using	-15~+49	-25~+49		
Antifreeze fluid	Number	-25°C	-45°C		
	Temp. of using	⩾-25	⩾-45		

Recommended hydraulic oil: Shell Tellus (or equivalent) premium hydraulic oil.

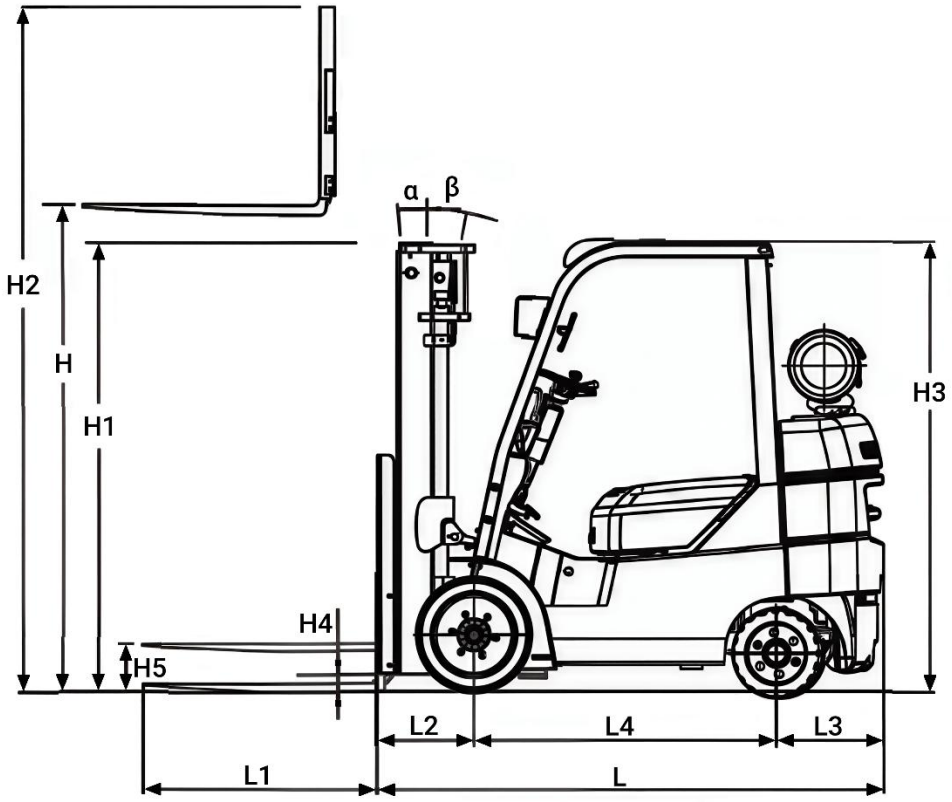
Removable parts

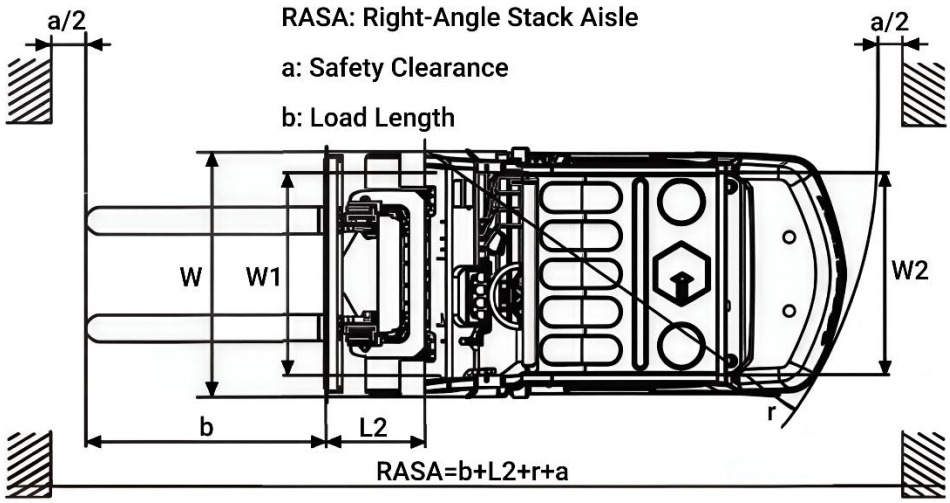
Item \ Model		Units	20	25	30	32
Mast	Exterior size	mm	1968×1140×544		1980×1200×570	
	weight	kg	710		710	
Counter weight	Exterior size	mm	480×1172×1070		480×1172×1070	
	weight	kg	1540	1625	1540	1625

7. Lubrication system picture:



3. Main Technical Specifications of the Forklift





Forklift Figure

Specifications

Model	Sign	Unit	TMG-FLP25KU	TMG-FLP30KU
Power Type			LPG	LPG
Rated Capacity at 3000mm lift height		kg	2500	3000
True Capacity at 3000mm lift height		kg	2500	3000
Load Centre		mm	500	500
Characteristic Dimension				
Lift Height (3 stage mast)	H	mm	4800	4800
Fork Size (L × W × T)	L1	mm	1070 × 120 × 40	1070 × 125 × 45
Mast Tilt Angle (F/R)	a/β	Deg	6°/6°	6°/6°
Front Overhang (Wheel center to fork face)	L2	mm	445	465
Ground Clearance (Bottom of mast)	H4	mm	80	80
Length to Face of Fork	L	mm	2355	2440
Overall Width	w	mm	1090	1120
Mast Lowered Height	H1	mm	2190	2210
Mast Extended Height (with backrest)	H2	mm	5875	5875
Overhead Guard Height	H3	mm	2080	2080
Turning Radius (outside)	r	mm	2110	2135
Min.intersecting aisle	Ra	mm	2316	2341
Performance				
Travel (Empty load)		km/h	17	17
Lifting (Full load)		mm/s	530	500
Max.Gradeability		%	20	20
Chassis				
Type Size (Front)			21 × 7 × 15	21 × 8 × 15
Type Size (Rear)			16(1/4) × 6 × 11 (1/4)	16 × 6 × 10.5
Wheelbase	L4	mm	1400	1450
Service		kg	4240	5040

4. The Structure, Principle, Adjustment and Maintenance of Forklift

4.1 Power system

This series include the model of gasoline, The engine is coupled to the transmission; it is mounted to the frame on rubber mounts to reduce vibration.

The main parameters of gasoline forklift

Parameter\Model	K21	K25	K25EPA	WG2503
Model	Four stroke, water cool, straight arrangement, preset air gate			
Number of cylinders / bore × stroke	4-89×83	4-89×100	4-89×100	4-88×102.4
Displacement (L)	2.065	2.488	2.488	2.491
Compression ratio	9.0	8.7	8.7	9.2
Rated power/rotate speed	31.2/2250	37.4/2300	42/2700	42.8/2600
Rated torque/rotate speed	143.7/1600	176.5/1600	185/1350	173.5/1400
Minimum idle speed (r/min)	800	800	700	800
Minimum specific fuel consumption (g/kW·h)	215	200	203	210
Length width height	688.2×561×677	708.2×561×677	708.2×561×677	670×508.8×760.9
Weight	159	161	140	212
Direction of rotation	Clockwise			
The cooling system	Forced cycled water cooling			
The lubrication system	Forced lubrication			
Battery voltage / capacity	12 V / 60 Ah			
Engine oil capacity	3.8 L			
Coolant capacity	3.5 L			

Installation and operation specifications of gasoline engine (Applicable to K21, K25, WG2503)

(1) Installation specifications for Japanese-manufactured gasoline engine

Forklift assembling cautions		Requirements	Remarks
The cooling system	The permitted temperature for cooling water	The general temperature 80 °C The highest temperature 110 °C (The temperature for exit)	To avoid the overheating of generator
	Radiator cap pressure	The general 88.3 kPa (0.9 kgf/cm² / approx. 12.8 psi)	Standard value
	Emission	When pouring into the cooling water, you should exhaust air from small faucet	
The lubrication system	Allowable temperature	The highest temperature in oil plate is 120 °C	

(2) The proceeding abided when using the gasoline machine made in Japan

Operating Precautions		Specifications	Notes
Cooling System	Intake negative pressure	Max: 6.18kPaNormal: below 0.98kPa	Mesh air filter element must be adopted. Normally replace every 6 months or 1200 hours. Replace in advance under severe working conditions. Otherwise, cylinder and piston will be damaged, and black smoke with CO will be emitted.
Exhaust System	Exhaust pressure	Normal:13.3kPa (Below 100mmHg)	Excessively high pressure will adversely affect engine power and noise.
PTO Power Output System	Permissible load of hydraulic pump	K21: 6.7kgm/3215rpmK25: 8.3kgm/3335rpm	Excessive load causes elongation and fracture of PTO connecting parts and engine speed drop.
Electric system	The capacity of accumulator	The standard value:12V-80Ah	It is generally used under -15 °C ~+35 °C
Operating environment	The environment temperature	The standard condition: -15 °C ~35 °C	
	The altitude of region	The standard condition: the standard height: under 1000m	When the gasoline machine used above altitude of 1000m, you should conduct the mixed compensation of the height

(3) Fuel, lubricants and additional requirements for Japanese gasoline engines

Project		Requirements	Remarks
Fuel oil		Use the non-lead ordinary gasoline The octane number 89Equal to JISK2202–1988	If use the lead gasoline, will destroy the components of the gasoline and pollute the environment.
Lubrication		The specification: API: above the SD level (above China QD level) SAE: to the general zone: 20WCold place: 10WReplace at initial 50 hrs, after that, change every 200 hrs	
Antifreeze fluid		Equal to JISK2234–1988 2LLC density: common region (above -15 °C)30%Cold region(above -35 °C) 50%Change every 2400 hrs or 12 months, Change slightly according to the different using environment and conditions	
Spare Component	The fuel filter	Use the original products from Japan, alternation every 300 hrs	
	Engine oil filter	Use the original products from Japan, replace at initial 50 hrs, after that, change every 200 hrs	
	Air filter	Use the original products from Japan, alternation every 300 hrs	

The above replacement intervals are formulated based on normal operating conditions (8 hours per day). Replace components in advance under 24-hour continuous operation or severe working conditions.

The check and adjustment of the generator

Air filter

(1) Take down the filter core

(2) Check the dusts and the damaged conditions of filter core. If dirty, use the low-pressure air to flow from the inside to the outside; if damaged, replace with new one.

(3) Clean the dusty lid

(4) Changing time (see table 1.2)

The machine oil filter

1. gasoline machine

(1) Remove the machine with the wrench and replace with the new filter.

(2) To drip several oil drops around the new filter, then install it, and then rotate two-thirds circles when the seal ring touches the body of machine.

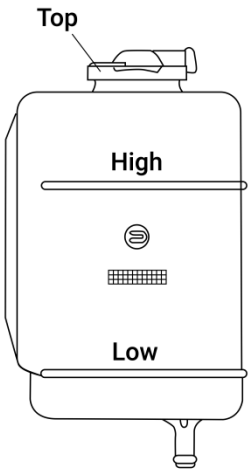
2. Diesel machine

(1) Remove the machine with the wrench and replace with the new filter.

(2) Drip a little oil to the surrounding of seal ring of the new filter, then install it, then twist two-thirds circles when the seal ring touches the body of machine.

(3) Changing time (see 1.2)

Water tank and attached water tank



Figl-1 attached water tank

(1) Check the volume of attached water tank check the volume of attached water tank, if the volume is below "low" scale mark, and then add the antifreeze fluid to the standard volume according to the density of LLC.

The fluid surface should be higher than the "high" scale mark when the generator will be hot and the fluid surface should be at two-thirds scale mark when the generator will be cool.

(2) Change the antifreeze fluid

(a) Wait thirty minutes after turning off the generator

(b) Remove the lid of water tank and loose the discharging switch on the water tank

(c) Loose the discharging switch of generator and drain the freezing liquid

(d) Twist the above two discharging switch

(e) Add the antifreeze liquid into the water tank according to the density of the antifreeze

liquid and with the adding speed no more than 2l/min

(f) Operate generator at the idling speed after fully adding and check the surface of the attached

water tank, if the liquid is lower than the criteria, continue to add until to the standard surface.

(g) Screw down the lid of water tank and add antifreeze liquid at any time until the level of the fluid surface is located above the two thirds of the container.

(3) Adjust tightness of fan belt

(a) Loosen the generator mounting bolts.

(b) Adjust belt tension by moving the engine. Press the belt with a force of about 10 kgf and check that it deflects about 10 mm.

Displacement

1. Diesel machine

(1) Pull the manual pump to add the oil to the fuel injection pump

(2) If it is heavy to pull down the manual pump, then pull down five to ten times for more.

Adjustment of generator speed

(1) Idle speed

(a) Warm machine until the cooling water temperature of generator reaches 85

(b) Furnish the speedometer on the generator, and then use the adjusting carburetor screw to adjust the rotate speed of generator to the standard value 700rpm.

(c) According to the direction of the increase speed of generator, adjust the screw of which the air throttle is the smallest opening

(d) Use carburetor to adjust standard engine rotate speed to 700rpm.

(2) Maximum rotate speed (gasoline engine)

The maximum rotation speed of generator can be adjusted through regulator and pay attention to the engine knock while the speed is too fast.

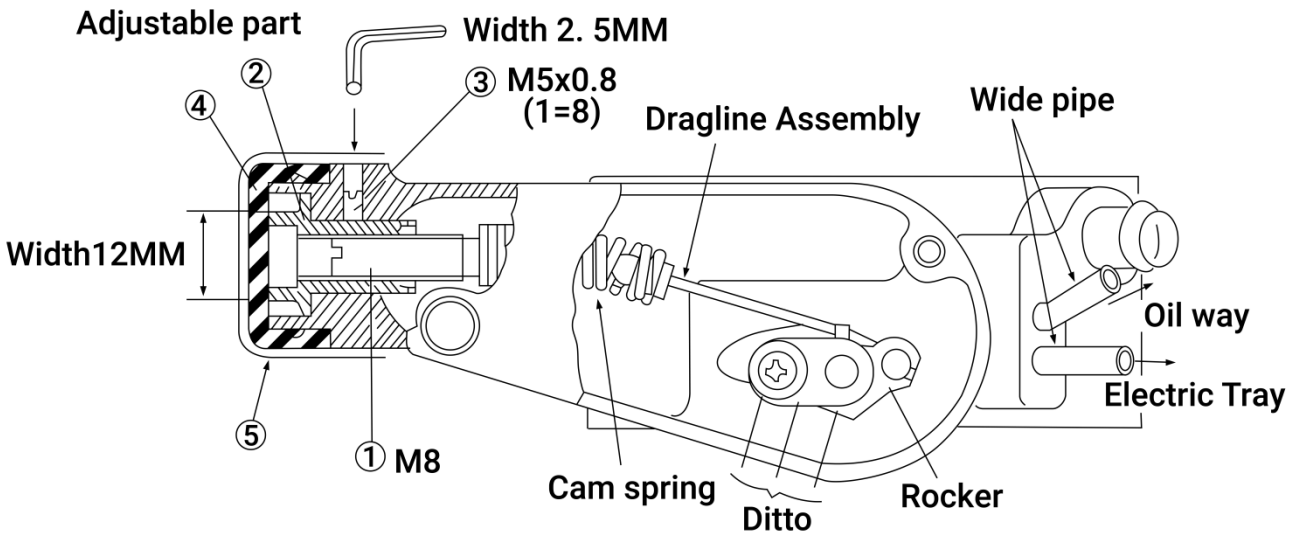


Fig. 1~2 Accelerator

1. The adjustment of the maximum rotation speed during no load Remove the rubber lid and rotate the adjusting part to reach the standard maximum rotation speed during no load. The adjusting part should be rotated clockwise and the speed will increase, vice versa.

2. The adjustment of maximum speed when loaded (the working of overflowing valve)

(a) Rotate the adjusting screw to adjust the maximum rotation speed in the loading condition, meanwhile, can also adjust the maximum rotation speed during no load (the adjusting screw of the maximum speed during no load is located in the internal adjusting part, the adjusting direction is the same as the direction of adjusting screw with the maximum rotation speed during no load).

(b) If can't achieve the maximum rotation speed by using the adjusting screw, use the convex tire to adjust, but it needs the high skill and the engine knock will be caused by slightly adjustment.

Parameter \ Model		K21	K25
THE Maximum rotate speed without load	Instant value	2990~3150	3050~3250
	Stable value	2820~3080	2900~3100

3. The check and adjustment of the engine knock the engine knock is the phenomenon of the instability of the generator rotation speed. No matter the maximum rotation speed during no load or the maximum rotation speed of loading is adjusted, you must pay attention to check the phenomenon of engine knock.

Check

- Close the hydraulic system and put it under the neutral gear. During the idle speed, you should button the pedal slowly and check the engine knock.

  Adjustment

  Adjustment in case of more than three times engine knock.
- Rotate and adjust the screw clockwise and adjust the maximum rotation speed during no load.
- If the above adjustments can't eliminate the engine knock, you can adjust the furnishing screw of convex tire.

The adjustment of other parts of generator can be observed and seen in each using and maintenance illustration book of the generator.

The fuel system

The fuel system consists of fuel tank, the fuel filter, the fuel volume indicator and the fuel quantity gauge, which indicates the fuel position.

The fuel tank

The fuel tank is welded and is integrated with the frame and located on the left side of the frame. The lid of the fuel tank is located on the surface of the tank, and the fuel sensor is located on the lid. The function of gasoline machine and diesel machine is same. But the former is the oil suction pipe and the latter is the returning fuel pipe.

Fuel volume Sensor

The function of fuel volume sensor is to transform the existing fuel volume into the current, you can see picture 1-5.

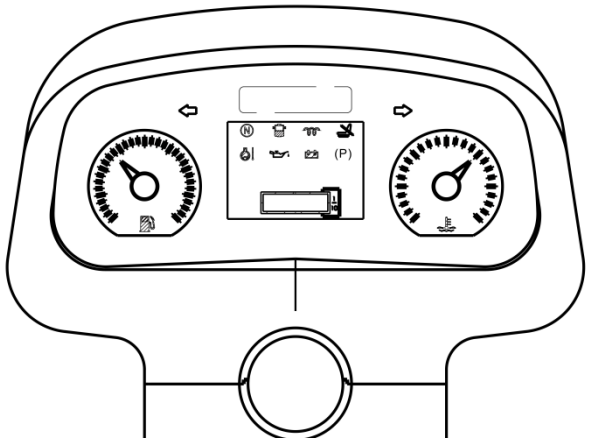
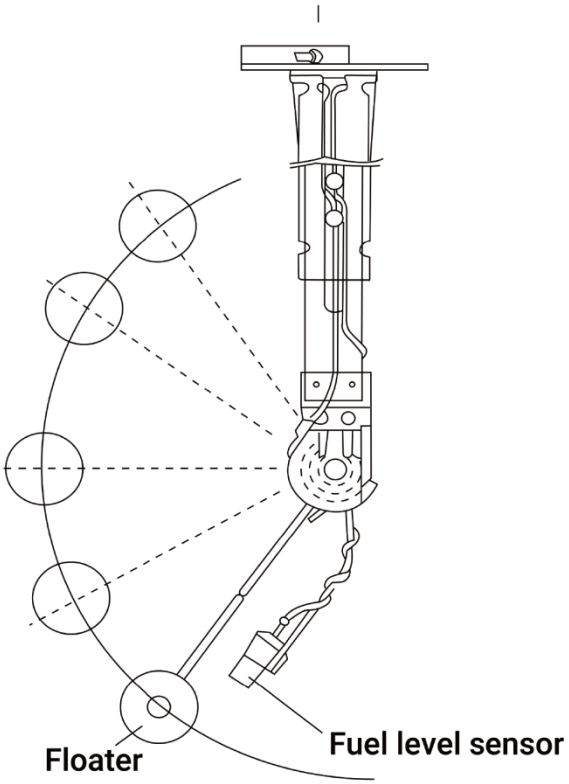


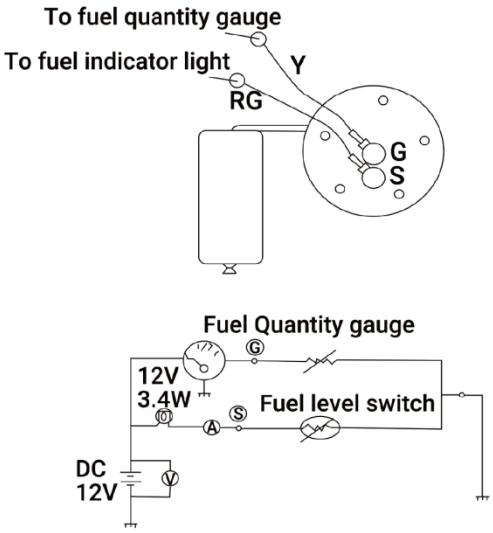
Fig 1-5 Digital Indicator

It has used a rheostat with nickel cable and a gliding part is connected with a floater. With the up-and-down movement of the floater, the resistance has changed so that the current of the rheostat has changed simultaneously.

The fuel quantity gauge belongs to the type of double metals and the swing amplitude of the clock needle depends on the electric current, which flows through the double metal component. When the floater is located in the highest place, the resistance of the fuel sensor is about 9.5 to 11 so that the bigger the current is, the more the double metal bends which will cause the needle of fuel gauge points to the fullest position “F”. On the contrary, with the decrease of the oil level, the floater will also decrease and the resistance will increase, the electric current will lessen which will cause the needle to point to the vacant side “E”.

The fuel quantity gauge is the solid pillar type, the more right the light pillar is, and the more fuel of the tank is. On the contrary, the more left the light pillar is, the less fuel of tank is. Of course buzzer will ring when the fuel is the minimum and it will remind drivers to refuel.



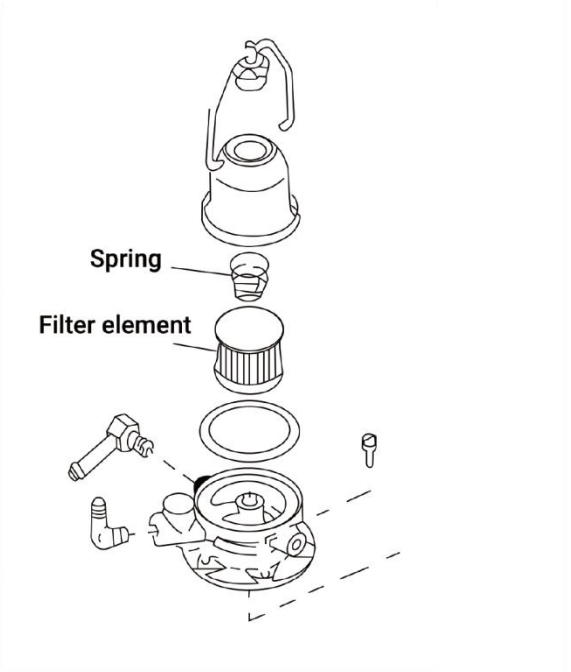


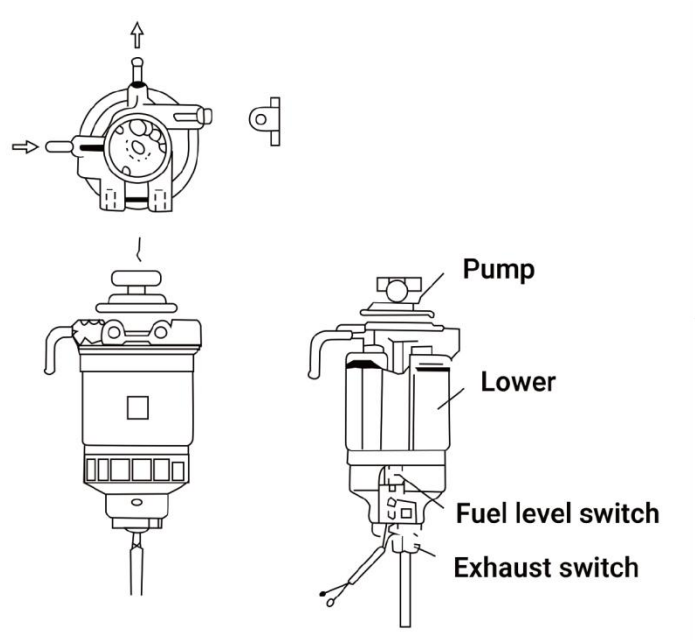
The maintenance of the fuel system

Maintain once every 100 hrs according to the below methods, clean the oil filter which is inside the tank once every 1200 hrs.

(1) The flaming fuel filter

Mounted on fuel pipeline (gasoline type) or on fuel tank (diesel type) is used to filter fuel supplied to the generator. It also functions to separate water from fuel.





1. The gasoline machine

(a) Clean the whole filter every 300 hrs.

(b) Loose the rotation tire and remove the lid.

(c) Loose the screw and remove the filter core.

(d) Clean or change the filter core.

(e) After refurnishing, Start the engine and let the gasoline fill the filter bowl, then check for leaks.

2. The Diesel Machine

(a) Replace the whole filter every 400 hrs.

(b) Inject a few drops of oil along the seal ring of new filter and then furnish it. After the seal ring touches the filter, then rotate the two-thirds circle again.

(c) When the alarming light of the filter is on, then loose the discharge switch to discharge the water. Ps After the discharge, ensure to turn off the discharge switch.

(2) Clean of flaming tank

Clean the oil tank every 2400 hrs.

For those gasoline forklifts, pay attention to the fireproof when washing.

The accelerator pedal

As the picture illustrates, the accelerator pedal furnished on the floor used to control the rotation speed of the generator and connects the generator by the handrail and drag line.

4.2 Electrical system

4.2.1 Summary

The electrical system uses a single-wire, ground-return circuit and consists of the following systems:

(1) Charging system:

Consists of the alternator, battery, and indicator lamp; supplies DC 12 V power to the truck's electrical equipment.

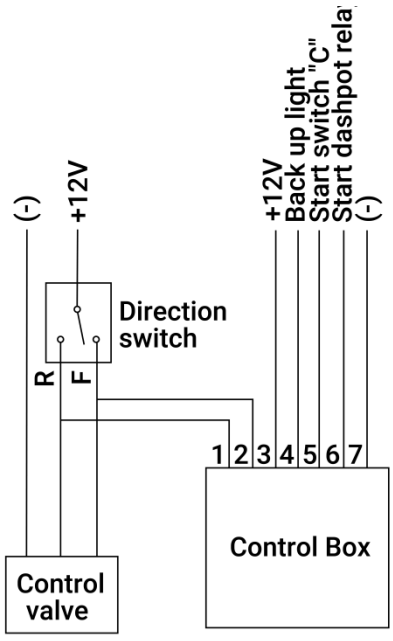
(2) Start system:

Consists of the preheat device (diesel models only), start switch, protective circuit, and starter; its function is to start the engine.

(3) The transfer and control system for electrohydraulic.

a. the principle picture of electric gas

b. the major components



The electro hydraulic control valve

The direction switch

The controlling box

(3) Summary

The electro hydraulic control valve is designed, invented on the basis of the original control switch.

(a) The similarity with the control switch

- Function • Gearbox connection's size
- The direction and size of the hydraulic fluid connection (input oil mouth, mini-move valve oil mouth, torque- converter oil-mouth, forward-gear oil-mouth, backward-gear oil-mouth)
- The property parameter of the positioning switch, flowing switch, adjusting switch

(b) Differ from controlling valve The control method of the slide valve is different.

The machine controls the slide valve of the control valve and the electric magnet valve controls the commutation of the electrohydraulic control valve. The former is the mechanic control and the later is the electric control.

(4) Illumination and signal equipment

Including different kinds of illumination, signal lamp, trumpet and buzzer. The forward lamp: 55W

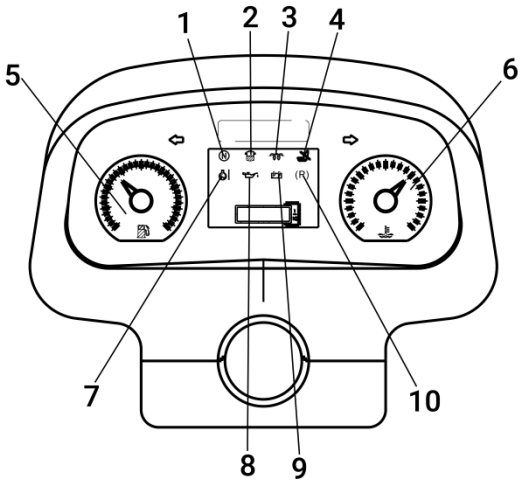
The forward combined lamp (transfer/indicating wide): 21W/8W Rear combined lamp (transfer/indicating wide/back the car): 21W(red)/8W(red) 10W (white)

The alarming lamp (Optional part): 21W

(5) Gauge system Including the hour gauge, oil volume gauge, water temperature gauge and the indicating signal lamp, which are the checkout equipment of the forklift.

The system adopts the joined gauge furnished by the American KEDISI core engine of the combustion, the oil volume table and the water temperature table of the combustion engine are indicated by the solid Band10 colored LED and the hour table is indicated by solid digital light.

Item	Name
1	Neutral
2	Oil-water separation instructions
3	Preheat instructions
4	Seat
5	Fuel instructions
6	Water temperature table
7	Oil temperature
8	Oil instructions
9	Not charging instructions
10	Handbrake



4.2.2 Brief operation's introduction:

(1) Startup

Before starting the generator, put the direction switch into zero; otherwise, the generator can't be operated. This is because the safety-start-protection function has been designed in the control box. Turn the key to the ON (first) position to power the gauges and indicator lamps, the diesel generator starts to become hot automatically and the indicating lamp is lit, after 3.5 seconds the preheat indicating lamp is extinguished automatically and the preheat hour is controlled for 13.5 seconds by relay.

Rotate the starting switch to the second gear—the starting gear and then operate the generator.

After starting the generator, push the directing switch forward, that is at the forward gear accelerate accelerograph, speed up the forklift. If push the directing switch backward, at that time the lamp which indicates backing the car will be on and buzzer will also be on.

(2) The lamp switch: push the first gear and the forward and backward lamp is on. Put to the second place and the forward big lamp is on, at that time, the lamp indicating the width is also on.

(3) Turn-signal indicator: move the turn-signal switch backward to operate the right turn signal, the transferring signal lamp of the forward combined lamp and the back combined lamp at the right side of forklift is twinkling. Push the switch of the lamp of transferring direction forward, the transferring signal lamp of the forward combined lamp and the back combined lamp at the left side of forklift is twinkling.

(4) Brake signal: when braking, depress the brake pedal and the rear combination lamp illuminates red.

(5) Reverse signal: move the direction switch to reverse; the rear combination lamp illuminates white and the reverse buzzer sounds.

(6) Charge (alternator) warning indicator: before starting the generator, put the starting switch on the electric gear, at this time, the indicating lamp is on and after starting the generator, the lamp will extinguish automatically. If the generator is on the work condition, the indicating lamp will be on indicating the chargeable circuit can't be charged and should be checked.

(7) Signal of oil pressure sequel of generator: before starting the generator, push the starting switch to the electric gear, at this time, the indicating light of oil pressure will be on, after the generator has started, the lamp will extinguish automatically. If the generator is on the working condition, the indicating lamp of the oil pressure will be on which indicates the oil pressure of generator is too low and the lubrication is not very good and it should be checked immediately.

(8) Signal of the oil—water separator: before starting the generator, put the starting switch to the electric gear, at this time, the indicating lamp of the oil—water separator will be on, after the generator has started, the lamp will extinguish automatically. If the indicating lamp is on in the course of the operation, which indicates the water in the oil—water separator has surpassed the alarming position. Then push the levy immediately to let out the water, and the light back to normal.

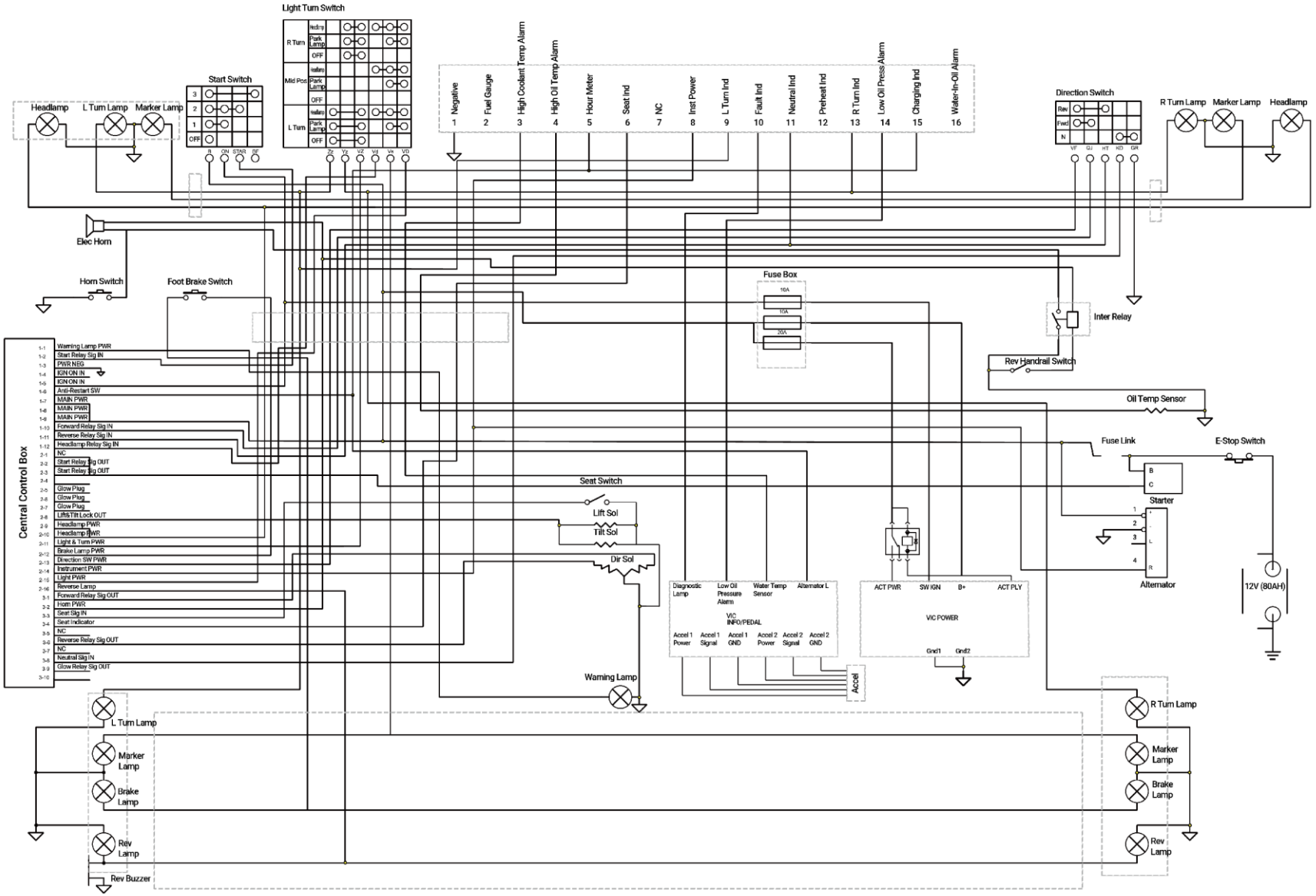
(9) Flaming oil gauge: indicating the reserve volume of the flaming oil in the oil tank, When the fuel gauge pointer reaches red, it indicates the reserve volume of oi in oil tank is too low and should add oil to the oil tank.

(10) Water temperature gauge: indicating the temperature of generator's cooling liquid.

(11) Gauge: accumulate work hour of the generator.

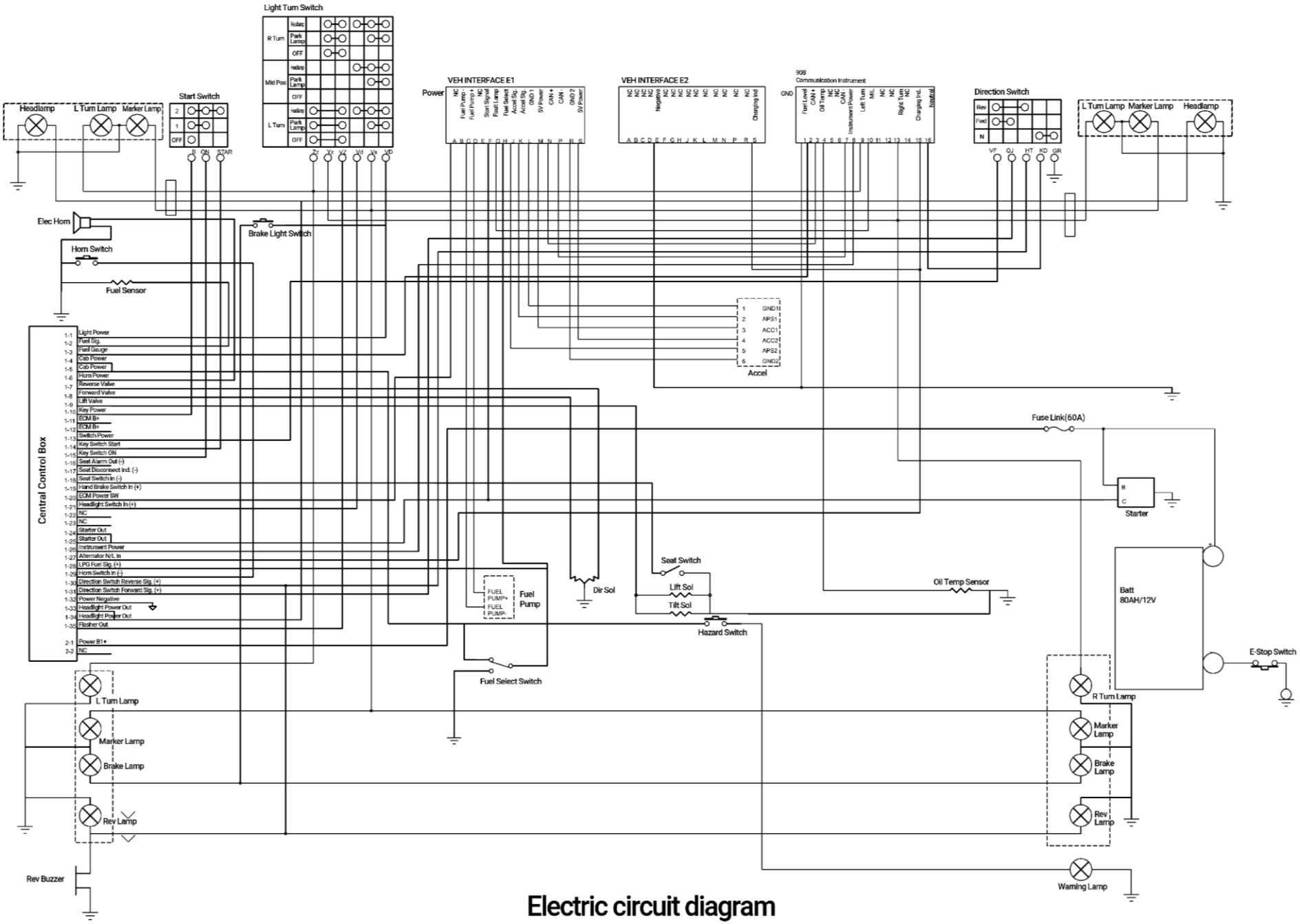
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▶cs@tmgindustrial.com



Electric circuit diagram

Model applicable:FY20~32D1-R4/R5/R6

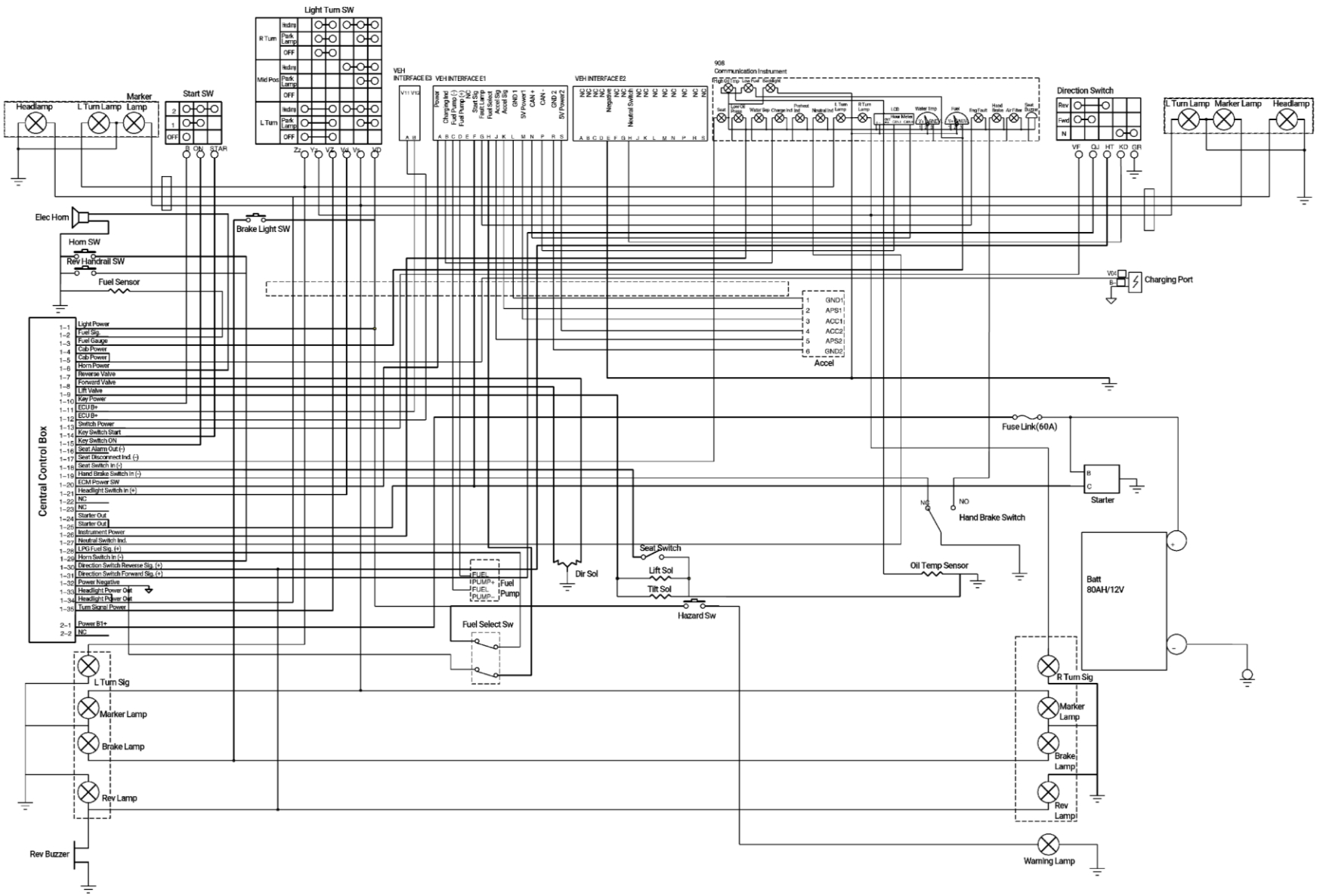


Electric circuit diagram

Model applicable:FY20~25D1-S6/S17

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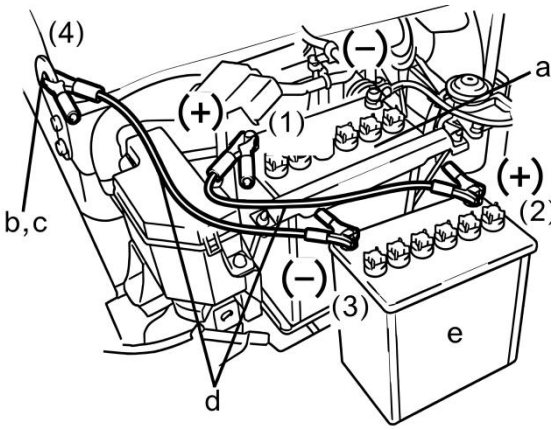


Electric circuit diagram
Model applicable:FY20~25D1-KB4

(12) When the battery is unavailable when a booster cable is available, it is possible to start the engine by using the battery of another vehicle.

Connect the booster cable following the sequence of the illustration.

Make sure of (+) and (-) terminals of the cable when connecting.



a. Dead-battery vehicle
b. Engine hanger
c. To frame d. Booster cable e. Rescue battery

CAUTION

Connection (1): The (+) terminal of dead battery.

- Connection (4): Use a frame apart from the battery.
- Do not directly connect batteries to avoid a danger of explosion. (An inflammable gas generated from batteries may catch fire.)

Note: The maintenance required to bring the energy release END!

4.3 Hydraulic transmission

Item	Parameter
The torque-converter	
Type	the three components, the single level, two phases
Torque ratio	3
The fixed pressure	0.5—0.68MPa
The oil pump	
Type	inner gear
Flowing volume	27L/min (200rpm, 1.5Mpa)
The transmission of liquid power	
Type	the changing opposition of power
Forward	15.3652
Backward	15.3652

4.3.1 Summary

The hydraulic forklift which is installed with the driving equipment and composed of torque converter and transmission (Fig. 3-1), has the following merits:

(1) The mini-valve can make the forklift conduct minute operation in the highspeed or low speed of the generator.

(2) The hydraulic clutch is installed with four friction plates and steels with the unique process, which increase the durability of the hydraulic clutch.

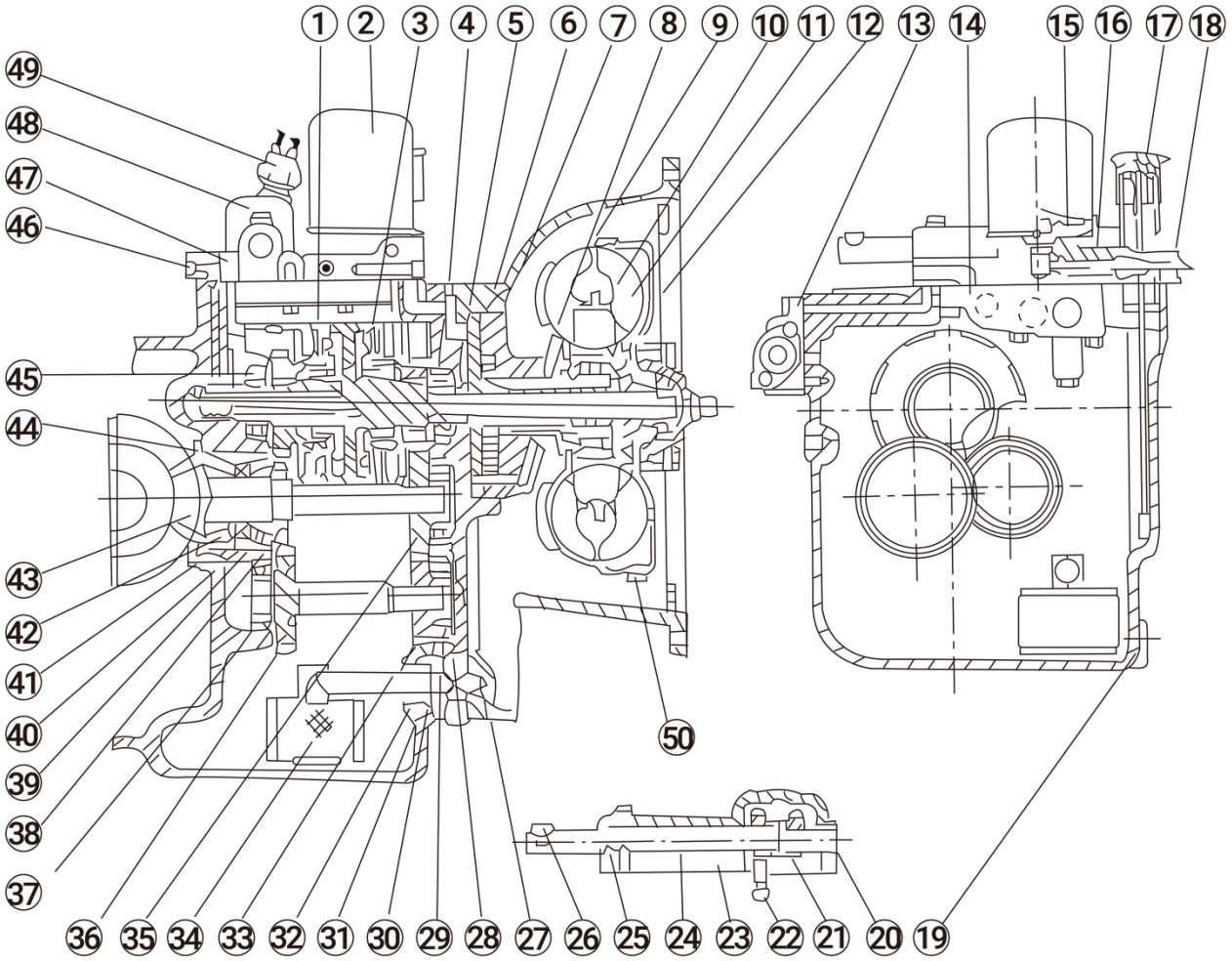


Fig 3-1 Hydraulic Transmission

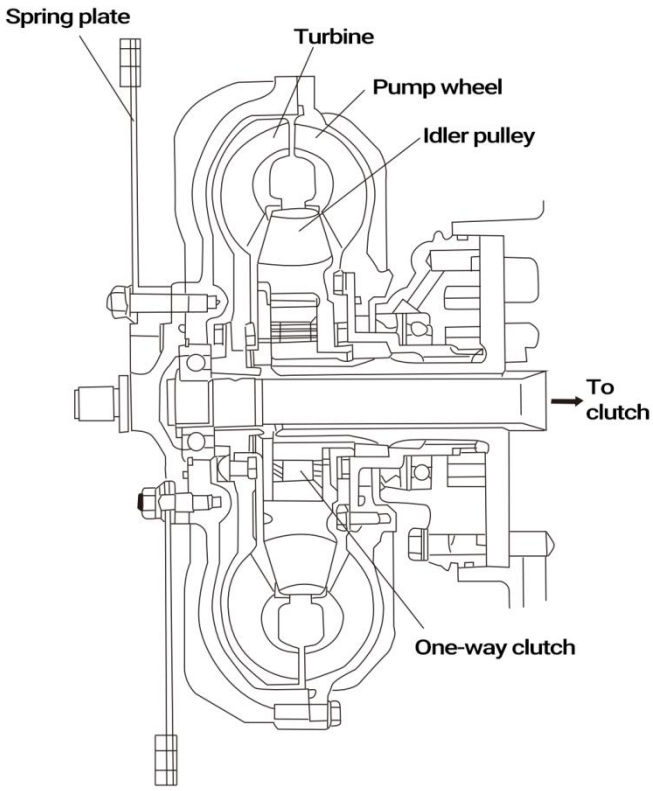
1. Advance clutch
2. Filter
3. Backup clutch
4. Single row radial ball bearing
5. Seal ring
6. “O” ring
7. Oil feed pumps assembly
8. Oil seal
9. And impeller
10. Idler pulley
11. Turbine
12. Elastic plate assembly
13. Inching valve assembly
14. Control valve assembly
15. Piston
16. Spring
17. Filler cap
18. Relief valve cap
19. Hexagon socket head cap screw
20. Plug
21. Spring-type straight pin
22. Shifting arm
23. Shell cover
24. Shifting arm axle
25. “O” ring
26. Whither key
27. Circlip for hole
28. Single row radial ball bearing
29. Single row radial ball bearing
30. “O” ring
31. Check ring
32. “O” ring
33. Idler
34. Filler
35. Driven gear
36. Idler shaft
37. Single row radial ball bearing
38. Bearing nut
39. Single row radial ball bearing
40. “O” ring
41. Oil seal
42. Single row radial ball bearing
43. Driven axle
44. Bearing plate
45. Single row radial ball bearing.
46. Hexagon socket head cap screw
47. Shell cover
48. Fixing bolt
49. Backup lamp switch
50. Fuel drain plug

(3) The one-way transcending separator installed in the torque converter has improved the efficiency of power transmission.

(4) There is a good filter in the oil-way of torque-converter, which improve the service time of the torque converter.

4.3.2 The torque converter

The torque converter mainly consists disk of pump, turbine and guide pulley. The disk of pump is driven by import axis. The liquid spurts to the blade lattice of turbine along the blade lattice of pump steel in the effect of centrifugal force and transmit the torque to output axis. The liquid apart from turbine changes the direction with the effect of guide pulley so that some parts of the liquid flow to the pump disk according to the certain angle, at that time produce the counteractive torque to accelerate the guide pulley so that the output torque has bigger counteractive torque value than the import torque. When the rotation speed of turbine has increased and close to the import rotation speed, then the angle change of the liquid flow has decreased and the output torque also has decreased. In order to prevent this situation, the transcending separator in the guide pulley makes the guide pulley rotate freely in the effect of counteractive torque.



This mode of torque converting can guarantee the efficiency and stable operation.

The torque converter of the gearing is connected with the flying wheel of generator through the elastic plate and rotates with the rotation of generator, the inner part of the torque-converter is filled with oil of torque-converter, the drive gear is connected with the pump disk by two claws so as to carry the oil pump to provide the oil to the torque-converter and the transmission of hydraulic power.

The turbine is connected with the axis of turbine by the spine and the power transmits to the power transmission by the axis of turbine.

4.3.3 The hydraulic clutch

The hydraulic multi-clutch is installed on the import driving axis of the hydraulic transmission and allocating the oil to the forward-and-backward separator through the controlling valve to achieve the forward and backward gearshift. The whole gears of the transmission are the engaged gear. Every separator is composed of the four parting slip (24), four friction plates and a piston, the inner and outer circle of piston are all installed with the seal circle to ensure the seal of the piston during the working time. During the neutral gear, the piston doesn't work and the separate piece is isolated from the friction plate, during the gearshift, the oil pressure affects the piston, the parting slip presses the friction plate with each other. The connecting machine formed by the friction power is used to transmit the power from torque converter to the drive gear (the forward gear4 or the backward gear13).

The power procedure from the torque converter to the hydraulic transmission is following:

Turbine——the import axis assembly——the parting slip——friction piece——forward gear or the backward gear——output axis

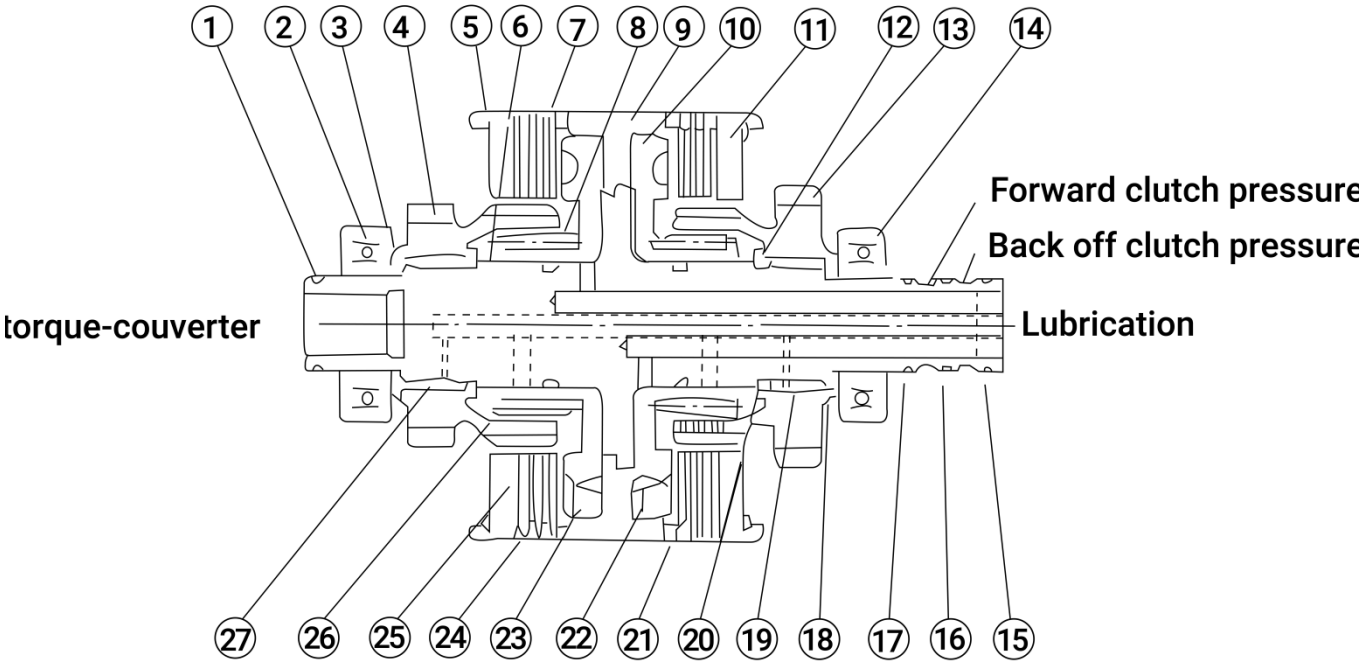


Fig 3-3 hydraulic clutch

1. Seal ring	2. Bearing	3. Thrust collar	4. Forward gear
5. Retaining ring	6. Elastic check ring	7. Spring seat	8. “O” ring
9. Driven axle assembly	10. Earring	11. End plate	12. Collapsible
13. Reverse gear	14. Bearing	15. Seal ring A	16. Seal ring A
17. Seal ring A	18. Thrust collar	19. Needle Bearing	20. Collapsible
21. Elastic check ring	22. Non-return ball	23. Piston assembly	24. Septa
25. Friction piece	26. Backward spring	27. Needle bearing	

4.3.4 Control valve, flowing valve, minuteness valve

1. The controlling valve is installed in inner side of the transmission lid, the controlling valve includes three parts: the controlling glide valve, the priority valve, and the adjusting valve. (The picture 3-4)
2. The priority valve is used to control the oil pressure of the hydraulic separator among 1.1 to 1.7MPa and transmit the oil to the overflowing valve then to the torque converter through it
3. Adjusting valve: located between the mini—moving valve and the controlling valve, when the controlling valve has opened completely, then the valve has worked to decrease the attack when the hydraulic separator touches.
4. Overflowing valve: connecting with the transmission shell maintains the oil pressure of lever changing machine among 0.5 to 0.7Mpa to avoid the corrosion.
5. Inching valve: installed on the outer side of transmission, the rolling of valve is connected with the rod of the mini-pedal, when stepping down the mini pedal, then the roller moves to the right and decreases the oil pressure of hydraulic separator in the short time to reach the effect of mini-moving

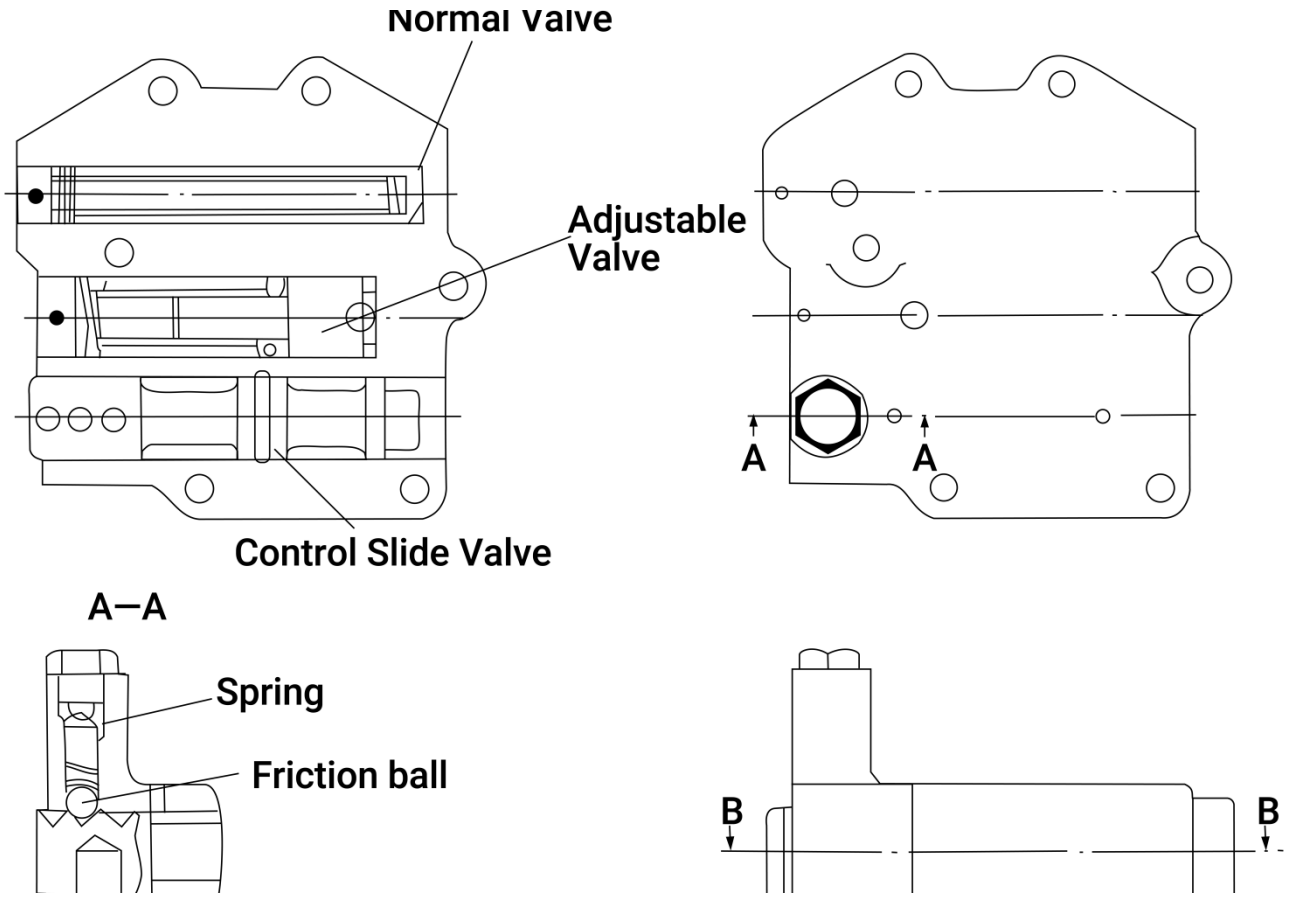


Fig 3-4 Control Valve

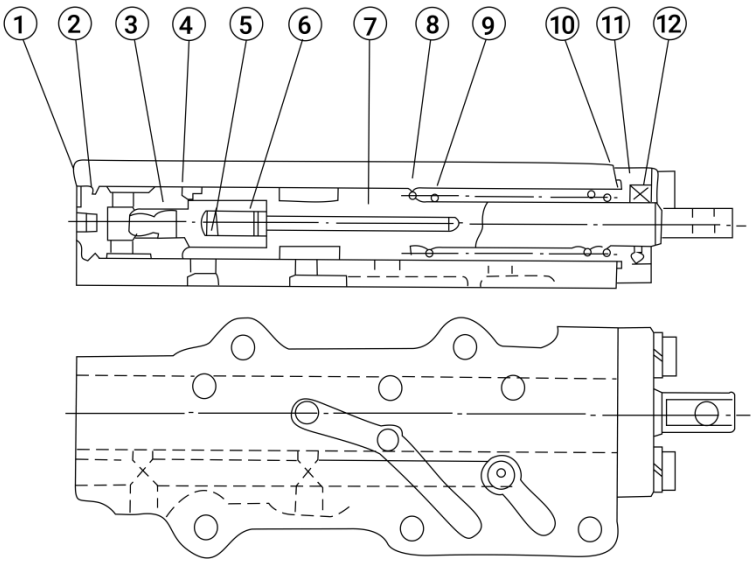


Fig 3-5 Inching valve

① Elasticity loop

② "O"–Ring

③ Inching valve levy

④ Elasticity loop

⑤ Spring

⑥ Valve core

⑦ Scroll

⑧ Valve body

⑨ Spring

⑩ "O"–Ring

⑪ Top

⑫ Oil seal

4.3.5 The transmission case shell

In addition to installing the import axis and output axis, the transmission shell also functions as the oil tank, its bottom has the oil filter Ⅰ (the filter mesh is 150 items) to filter and absorb the oil supplying the pump. The channel oil filter Ⅱ, the oil lid is installed above the shell lid.

4.3.6 The oil pump

The oil pump is installed between the torque converter and import axis, using the pump shaft to carry the gear pump composed by a pair of inside engaged gear and supply the torque converter, hydraulic transmission with oil.

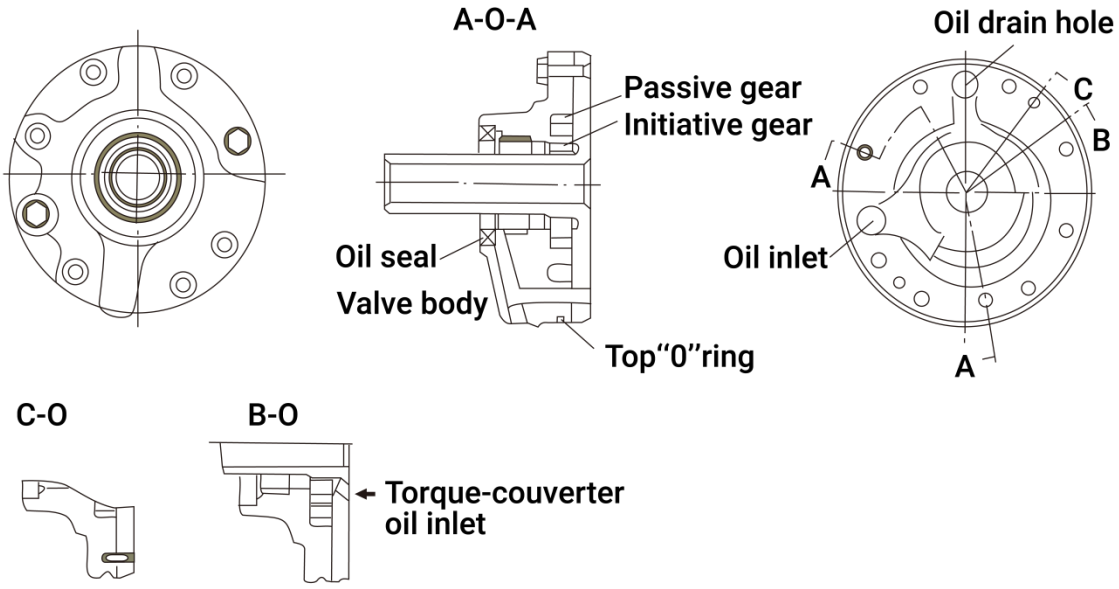


Fig 3-4 Control Valve

4.3.7 The hydraulic oil path (the hydraulic gearing)

After the generator starts, the oil feed pump takes out the oil from oil tank (the bottom of transmission case shell) through the oil filter and the oil flows through the controlling valve, dividing the pressure oil into two parts in the valve: the one part is for the hydraulic separator, the other is to supply oil to torque-converter.

The oil needed by the hydraulic separator flows into the fixed pressure valve (the pressure is set to 1.1–1.4Mpa), the oil from the fixed pressure valve further flows to the inching valve and controlling valve, on the other hand, the oil is also supplied to the leaf wheel of torque-converter through flowing valve the oil from torque-converter is cooled through the oil radiator, then the lubricant hydraulic separator then returns to the oil tank.

During the neutral gear, the oil way from the controlling valve to separator is close, at this moment the fixed pressure valve opens and transmits the oil to the torque converter completely through the overflowing valve. When the controlling valve is in the forward and backward position, the oil circuit from the selector to the forward separator or backward separator is integrated so that each separator can work respectively. When a separator works, the parting slip and the friction plate of the other separator are in the isolated condition and are lubricated by the cooling oil and carried away the heat. When the inching pedal operates the inching valve, a small part or a large part of the oil of the separator is sent to the oil tank through the inching valve rod, at that time the oil circulation of the torque-converter is the same during the neutral gear.

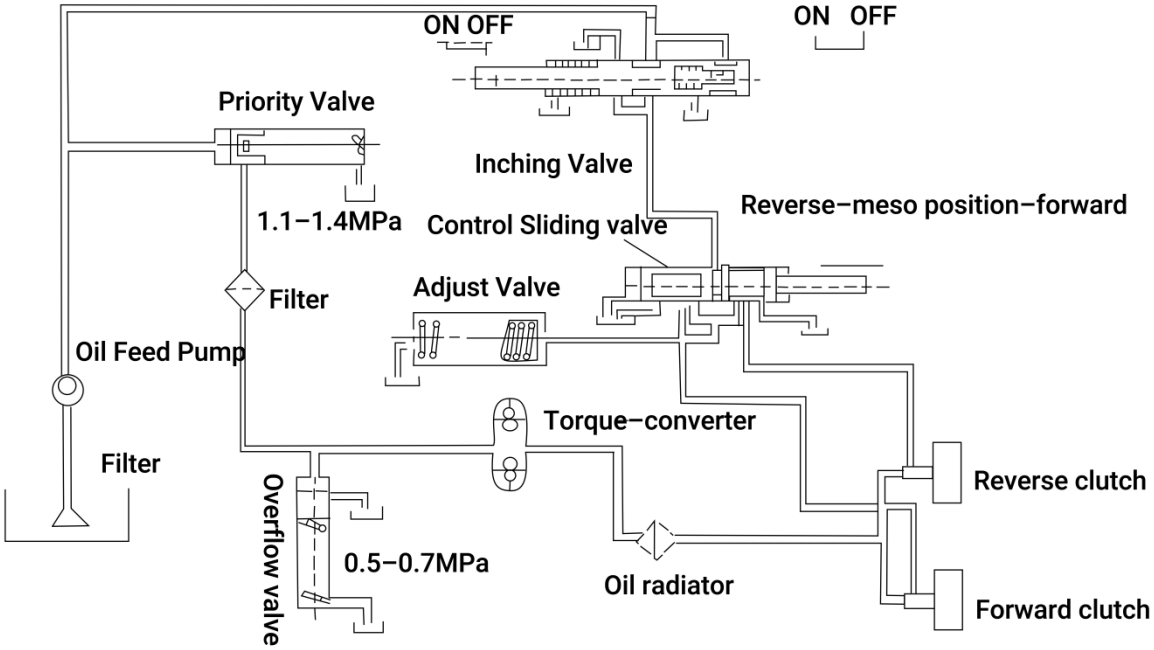


Fig 3-7 Hydraulic oil way

4.3.8 Towing the forklift for repair

When a hydraulic-drive forklift is disabled and must be towed, note the following: (1) disconnect the half-shafts from the front wheels; (2) place the transmission in neutral.

4.3.9 The linking position of oil outlet, the oil pressure and the measurement of oil temperature (see the picture of 3–8)

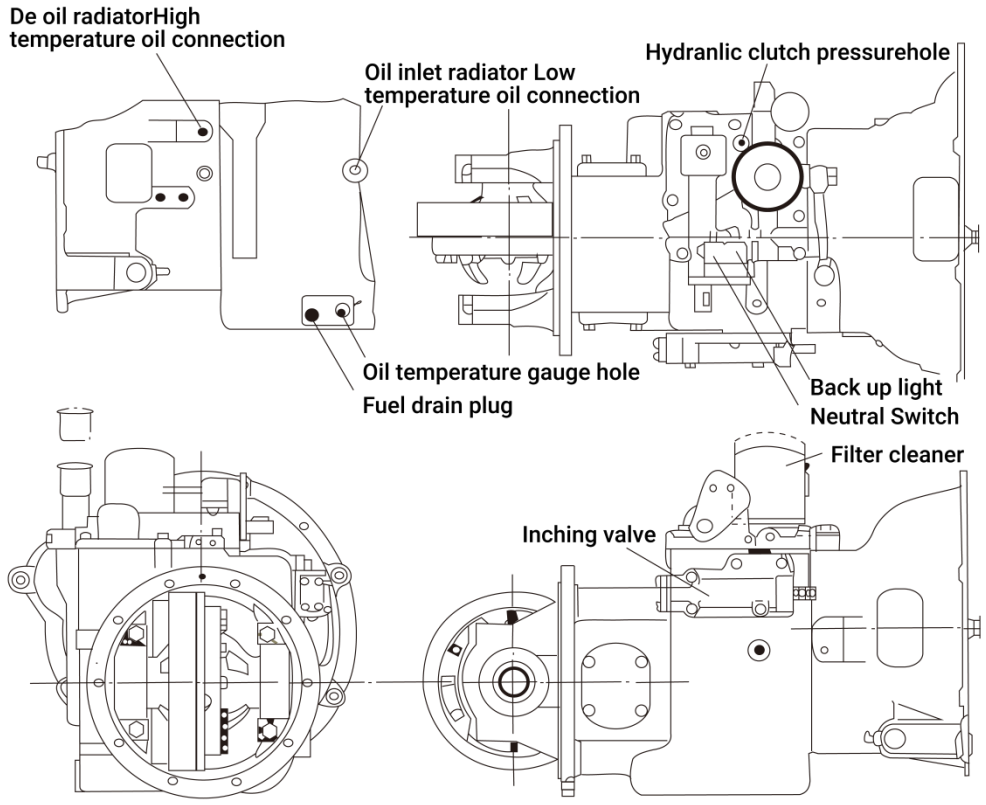


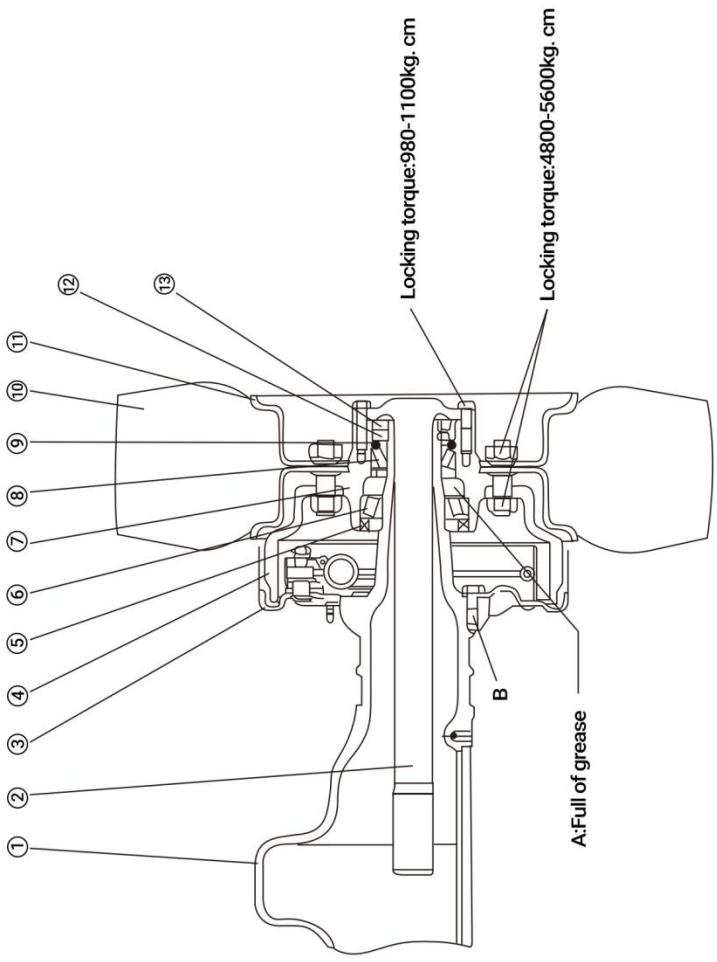
Fig 3-8 Oil temperature and oil pressure survey

4.4 The drive Axle

Model	Front-wheel driving, body of drive bridge fixed with frame, fully suspension	
Tonnage of forklift	2~2.5t	3~3.2t
	Solid tire pressure distribution type	
The size of tire	2-21×7×15	2-21×8×15
The size of hub	7.0-15	8.0-15

4.4.1 Summary

The drive axle mainly consists of the housing, the wheel-hubs, the half-shafts and the brakes. The axle housing is an integral one-piece casting. The tire with the rim is fixed to the hub with studs and nuts. The power is transmitted to the half-shafts through the differential and drives the front wheels through the hubs. Each hub is fixed on the housing with two tapered roll bearings. So that the half-shafts bear only the torque transmitted to the hubs. In the inside of the hub are oil seals to prevent water and dust from entering or oil leakage. The rim and the pressure of the front wheel.



1. Axle housing
2. Semi-axle
3. Rim brake
4. Brake drum
5. Oil seal
6. Taper roller bearing
7. Hub
8. Taper roller bearing
9. Oil seal
10. Tire
11. Hub
12. Adjusting nut
13. And locking nut

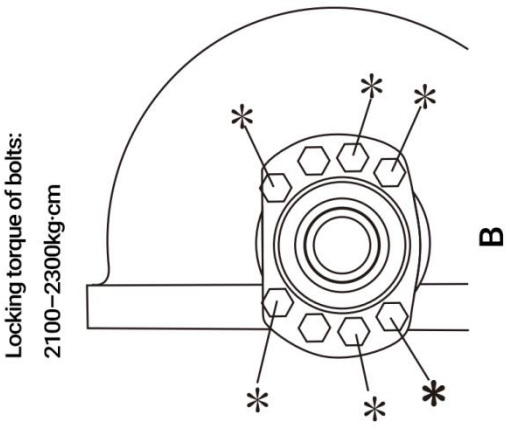


Fig 4-1 Differential

4.4.2 Inspection on Reassembly of Wheel hub

(1) Fill the wheel-hub cavity with about 100 cm³ of grease, then install the hub on the axle.

(2) Tighten the hub nut to 1 kgf·m (9.8 N·m), then loosen it 1/2 turn.

(3) Measure the torque value that the wheel hub starts rotating. When the torque value measured is up to 5–15kg. m, screw down the hub nut.

(4) Screw down the locking nut and lock the locking pin.

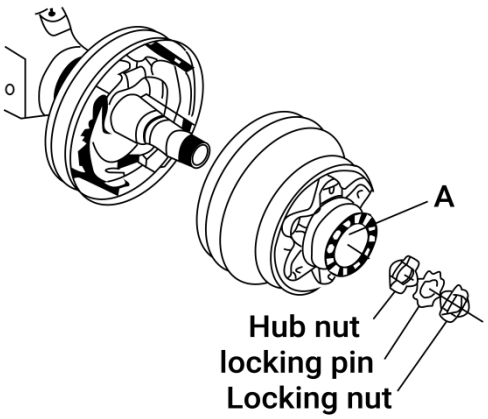


Fig. 4-2 Adding grease

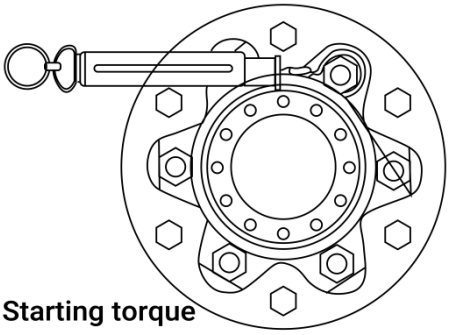


Fig. 4-3 Measure the starting torque

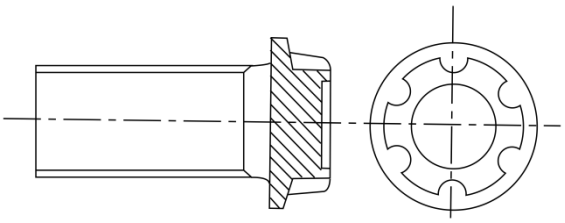
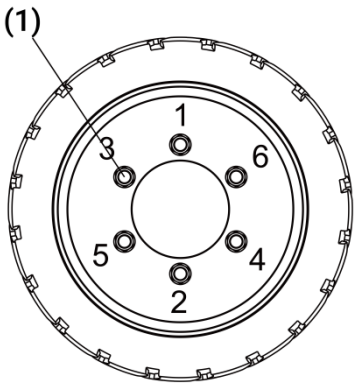


Fig4-3 Wheel bolt structure

1. Tire
2. Valve stem
3. Nut cap
4. Inner tire
5. Outer tire
6. Rim bolt

Front wheels

1. Unload the vehicle and place it on level ground.
2. Set the parking brake and chock the wheels. Locate the jack-up point on the bottom surface of the frame in the rear of a front tire. Securely insert the jack there. Confirm that the jack is properly positioned.
3. Jack up to just prior to the wheels coming up off the ground and loosen the hub nuts, remove the tire.
4. To reinstall the wheels after changing a tire, perform the steps for removing in reverse order. The hub nuts should be tightened evenly and in the sequence shown in the figure.



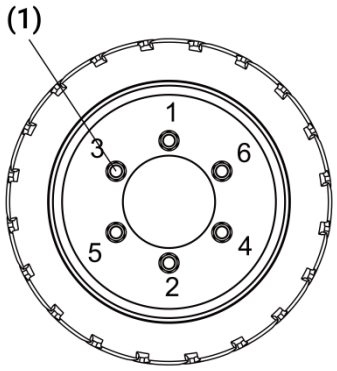
(1) Hub nuts

Rear wheels

1. Place the vehicle on level ground.

2. Set the parking brake and chock the wheels then insert the jack under the weight.

3. The top position of the wheel is about to leave the ground, unscrew the wheel nut, unload the tyres.

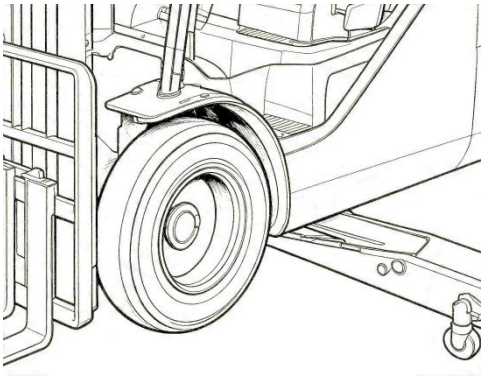


(1) Hub nuts

Changing tires

CAUTION

- Use proper safety precautions when jacking the vehicle. Never get under the forks or frame.
- Tire air pressure is very high, so pay attention to rim deformation, cracks, etc. Never exceed proper air pressure.



4.5 Steering system

Project \ Forklift type		2~2.5t	3~3.5t
Type		Real wheel steering	
Steering unit type		Orbitrol (full-hydrostatic steering)	
The number of redirectors		BZZ-63	BZZ-80
The turning Cylinder	Model	Double-action piston	
	Diameter of cylinder	56	70
	Diameter of the piston pile	40	50
	Distance	97	84.5
Radius of steering wheel		ϕ 300	
Specification of tire		Solid tire pressure distribution type16 1/4×6×11 1/4	Solid tire pressure distribution type16×6×10.5

Summary

The steering system mainly consists of the steering wheel, the steering axle and the steering unit, the steering axle connects with the steering unit by joint and the link connects with the steering wheel by joint. The column can lean to the appropriate position both forward and backward. (Picture 5-1)

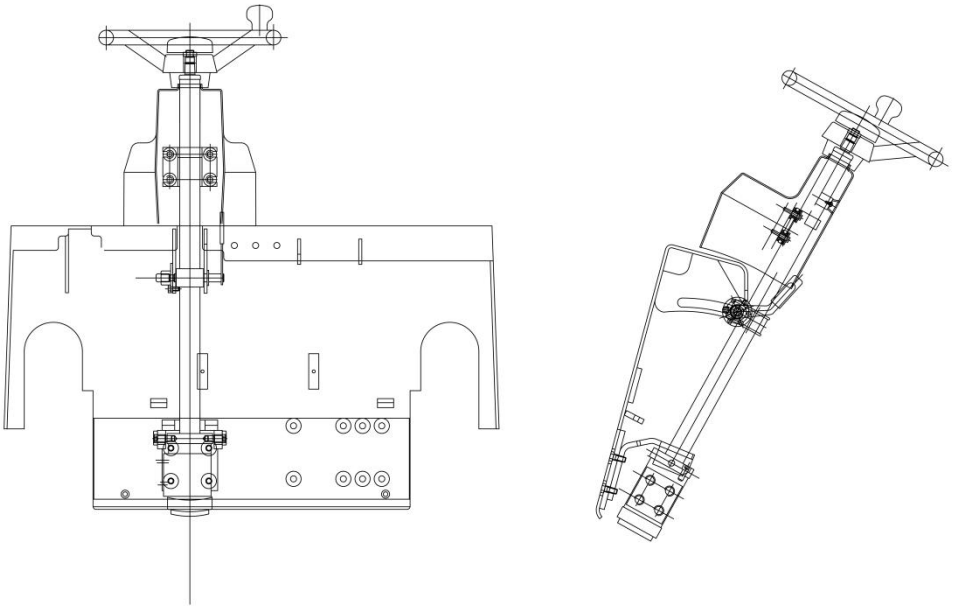


Fig 5-1 Turning control device

Arbitral

The Orbitrol steering unit (Fig. 5-2) directs pressurized oil from the valve to the steering cylinder in proportion to steering-wheel angle. When the generator extinguishes, then the oil pump can not provide oil and can be rotated by manpower.

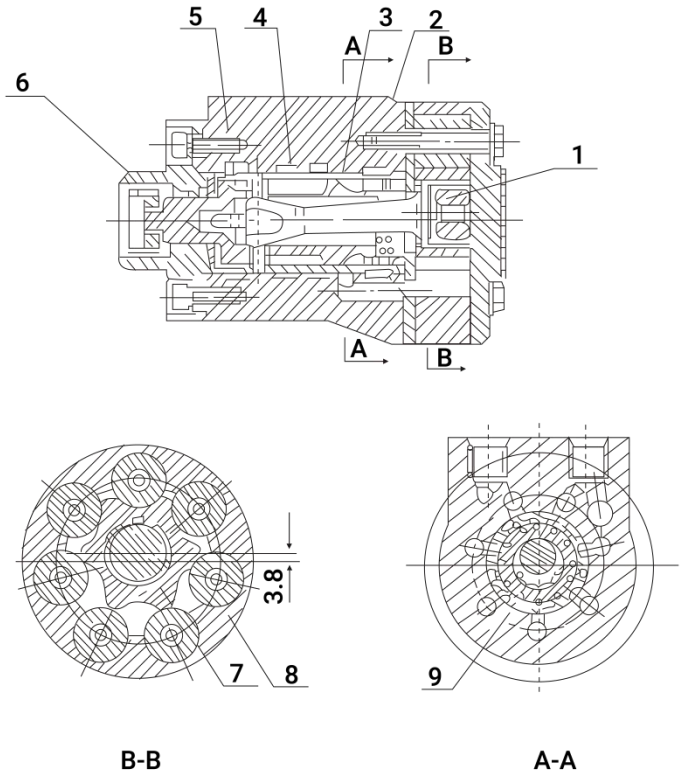


Fig. 5-2 Full hydraulic redirector

1.Limited column	4.Universal driving shaft	7.Rotor
2.Valve body	5.Spring plate	8.Stator
3.Valve core	6.Connecting piece	9. Valve cover

The inspect after reassembling the steering system

(1) Turning the steering hand-wheel right and left. Inspect whether the steering power is smooth.

(2) Inspect whether connection of the hydraulic pipeline is correct by turning the steering hand-wheel right and left.

(3) Lift up the rear wheels and slowly turn the steering hand-wheel right and left several times to exhaust air from the hydraulic pipeline and the steering cylinder.

Malfunction Description	Analyze Malfunction Reasons	Suggestions
Steering Problem	Oil pump damaged or malfunction	Replace
	Flow divider jammed or damaged	Clean or replace
	Hose or connection jammed or damaged	Adjust or clean
Heavy steering	Low pressure in flow divider	Adjust pressure
	Air in the oil way	Exhaust air
	Redirector restoration malfunction, fixed spring break or less elasticity	Replace the spring leaf
	steering cylinder internal leak too much	Check the plunger seal
Forklift Zigzagging or Vibrating	steering flow too much	
	spring break or less elasticity	Adjust the flow divider
Big Noise	Low oil volume in cylinder	Replace
	Sucker or oil filter jammed	Clean or replace
Oil leaking	Steering cylinder seal damaged or pipeline or connection damaged	Replace

4.6 Steering axle

4.6.1 General Description

The steering axle is of section-boxed welded construction type. (Picture 6-1). It consists of the axle body, the steering cylinder, the link, the knuckle and the steering wheel. The steering trapezoid uses the curved handle and the slippery piece, the pressure oil accelerates the joint to twist by the piston rod of cylinder through the link and make the roller twist. The steering axle is connected with the back bracket by the buffering machine.

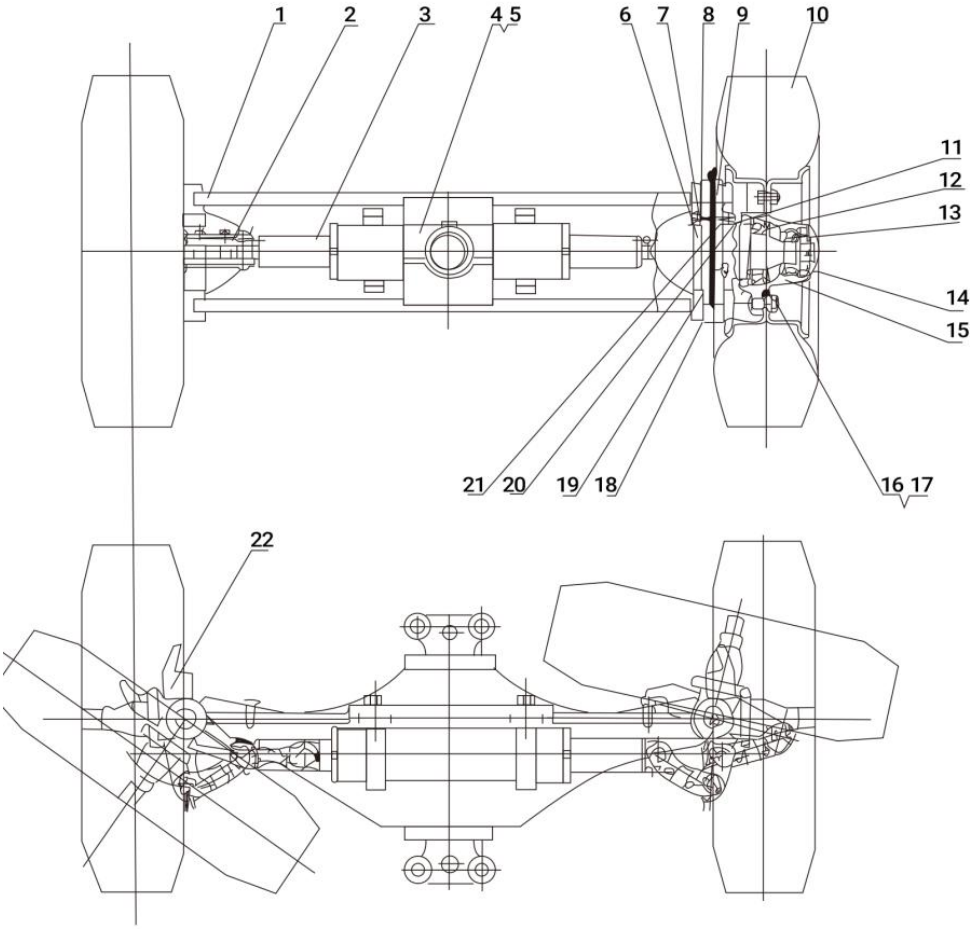


Fig. 6-1 Steering axle

1. Steering axle body
2. Connecting rod level
3. Steering cylinder
5. Back axle seat
5. Bushing
6. Clockwise knuckle assembly
8. Thrust bearing
8. Needle-bearing
9. Knuckle main pin
10. Tire
12. Oil seal
12. Taper roller bearing
13. Taper roller bearing
14. Hub cover
15. Hub
16. Hub bolts
17. Hub nut
18. Oil seal
19. “O” ring
20. Bushing
21. Dustproof cover
22. Left knuckle assembly

4.6.2 Steering knuckle and steering main pin

The steering knuckle is installed between the upper and lower of steering axle by the steering main pin, tapered rolling bearing, dust-proof cover and “o” ring, the top of the main pin is fixed on the body by check pin, the down of the main pin is fixed on the body using nuts.

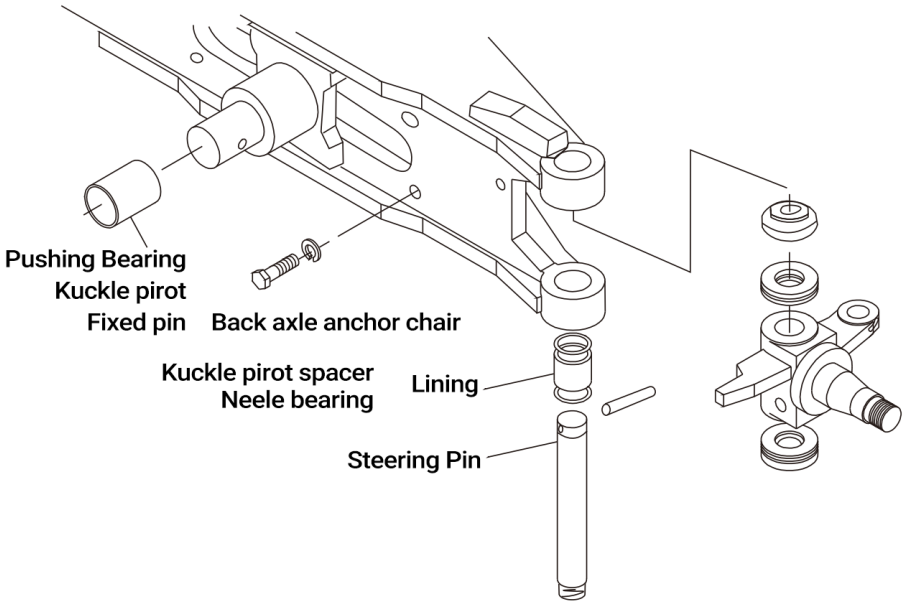


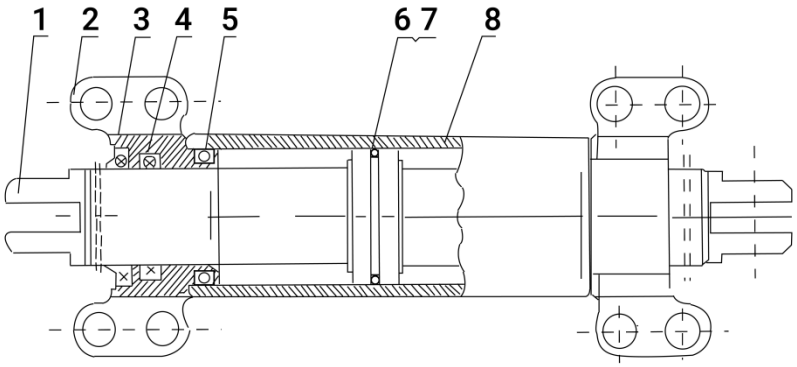
Fig. 6-2 Steering knuckle and king pin

4.6.3 Hub

Hub is installed on the knuckle by two Tapered roll bearing, tire is installed to hub by rim, there is oil seal in the inner side of bearing, maintaining the lubrication oil in the hub and cavity of knuckle, adjust the tightness of the bearing with nuts

4.6.4 Steering cylinder

The steering cylinder is of double-action piston type. The seal components of piston adopt the combination seal of supporting pin and “O” ring, the cover and rod of piston adopts YX Shaft seal ring, through the cover in both sides to fasten the steering cylinder to the steering axle.



1. Piston rod assembly
2. Cylinder cover
3. Dustproof ring 50*72
4. YX ring 50659
5. “O” ring 6.5*3.55
6. “O” ring 60*3.55
7. Back ring
8. Cylinder canister

Fig. 6-3 Steering cylinder

4.6.5 Rear Wheel bearing pre-load adjustment

(1) Shown in 6-4. Fill up the chamber formed by wheel hub bearing and wheel hub covers with lubricating grease. Coat the lips of the oil seals with lubricating grease.

(2) Press the hub bearing into the hub and fit the hub on the knuckle shaft.

(3) Fit a flat washer and tighten a castle nut to a torque of 206–235Nm(21–24kgm), and loosen it, and then tighten it, and then tighten it again to a torque of 9.8N·m(1kgm)

(4) To ensure firm installation of the hub, slightly knock at it with a wooden hammer and in the meantime, rotate the hub for 3–4 turns.

(5) Tighten the castle nut and align one of its notches with a cotter pin hole drilled in the steering knuckle.

(6) Again, slightly knock at the hub with a wooden hammer and in this time. Rotate manually the hub to ensure its smooth rotation with a specified torque of 2.94~7.8N·m(0.3-0.8kgm).

(7) If the torque value necessary to rotate the hub is more than the specified one above mentioned, screw out the castle nut for 1/6 turn and measure the torque value.

(8) When the torque value measured is up to the specified one. Lock the castle nut with a cotter pin.

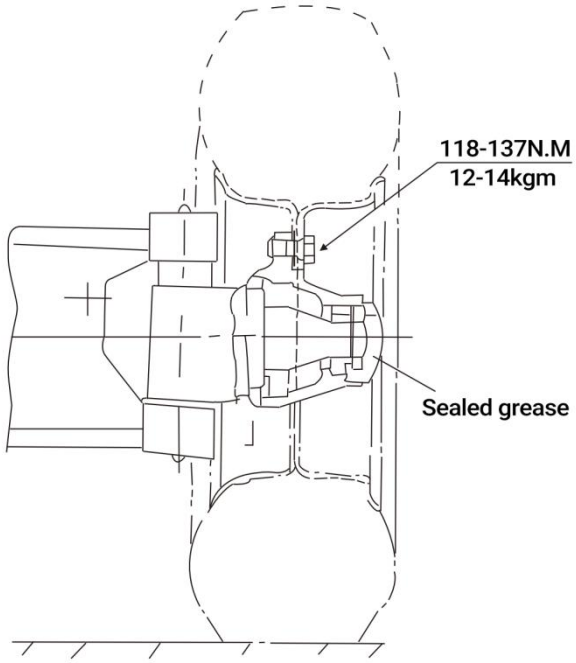


Fig. 6-4 Pre-load adjustment

4.7 Braking system

Brake type:	Front dual brakes, internal-expanding, hydraulic
Ratio of brake pedal:	5.66
Cylinder diameter of main pump:	19.05mm
Wheel brake	2~2.5t
Model:	with brake mechanism
Cylinder diameter of operating cylinder:	28.58mm
Brake lining size (L × W × T)	324×60×7mm
Area of friction plate	194.4cm² ×4
Inner diameter of brake drum:	310mm
Wheel brake	Front-double brake, internal swell, hydraulic

4.7.1 Summary

The brake system is the front two-wheel braking type consisting of a master cylinder, wheel brakes and brake pedal mechanism.

Braking schematic diagram

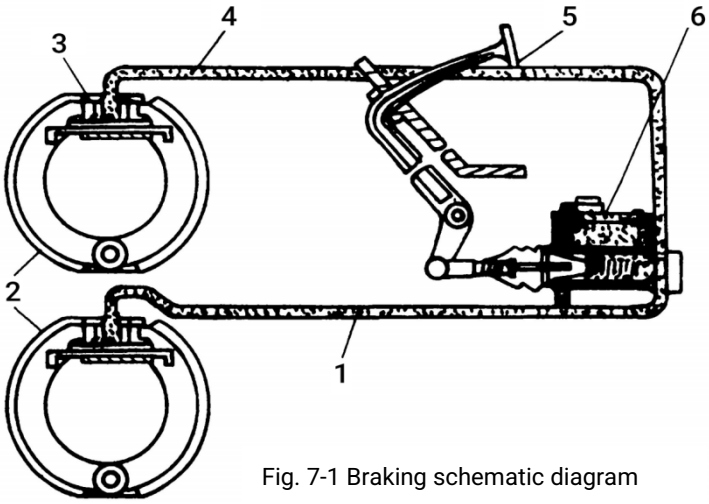


Fig. 7-1 Braking schematic diagram

1. Tube 2. Wheel brake 3. Brake wheel cylinder 4. Tube 7. Braking Pedal 6. Brake master cylinder

Brake pedal

The brake pedal assembly is shown in Fig. 7-2; it is mounted on the transmission via the bracket, when the pedal is moving, it accelerates the lever to move the piston and increase the pressure of oil circuit.

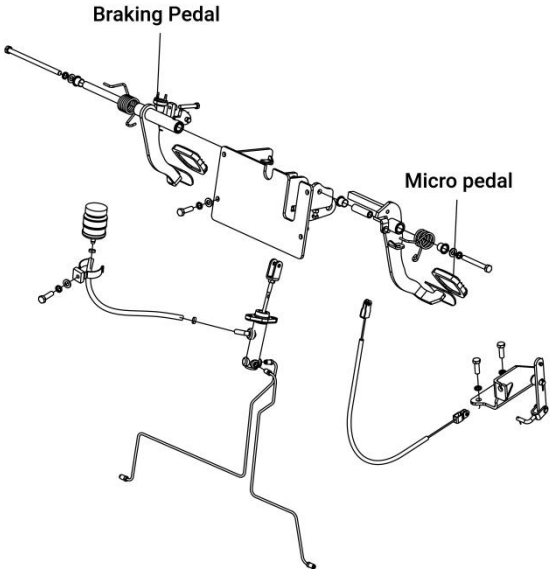
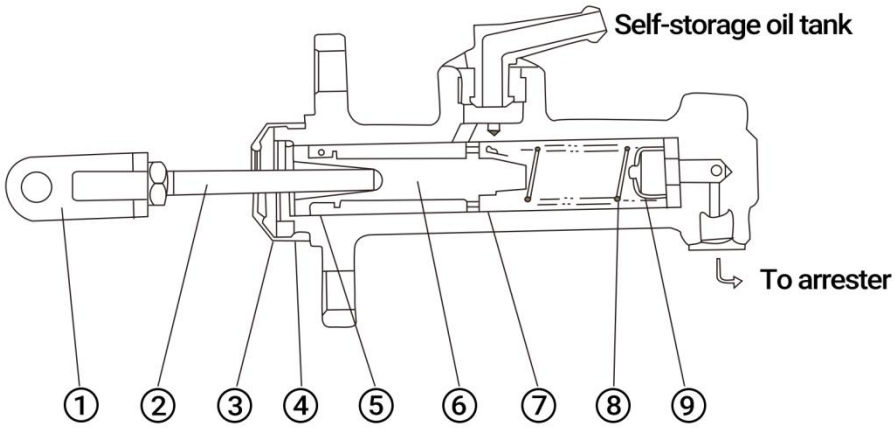


Fig. 7-2 Braking Pedal

The master cylinder

The master cylinder contains valve supports, check valve, return spring, primary cup, piston and secondary cup, which are all kept in place with a stop washer and a stop wire. The exterior of the cylinder is protected from dust by means of a rubber dust cover. The piston is actuated through the push rod by operation of the brake pedal. As the brake pedal is pressed, the push rod pushes the piston forwards. The brake fluid in the cylinder flow back to the reserve tank through the return port until the primary cup blocks up the return port. After the primary cup passes through the return port, the brake fluid in the cylinder is pressurized and opens the check valve, flowing through the brake pipeline to the operating cylinder; thus, each operating cylinder piston is forced outwards. This brings the friction pieces on the brake shoes into contact with the brake drum and slows or stops the truck. Meanwhile, the cavity caused behind the piston is filled with brake fluid led through the return port and inlet port. When the brake pedal is released. The piston is forced back by the return spring. At the same time. The brake fluid in each operating cylinder is pressurized by the return spring. Returning into the master cylinder through the check valve. With the piston in the original position, the fluid in the master cylinder flow into the reserve tank through the return port. The brake fluid in the brake pipeline and the operating cylinders has a residual pressure proportioned to the set pressure of the check valve, which makes each operating cylinder piston cup securely seated to prevent oil leakage and eliminates a possibility of air locking when the truck is sharply braked.



1. Connecting link
2. Push rod
3. Dustproof cover
4. Elastic check ring
5. Assistant cup ring
6. Piston
7. Main cup ring
8. Spring
9. Clappet valve

Fig. 7-3 Braking main pump

The wheel brake

The wheel brake is the hydraulic type of internal swell, composing of the brake shoe, spring, wheel cylinder, adjuster and soleplate, and two brakes are installed on the both sides of front axle respectively. The one side of brake shoe is connected with the supporting pin, the other side is connected with the clearance adjuster and is pressed towards the soleplate by spring and tie rod, the hand brake pull rod is installed on the main brake shoe, the adjusting rod of the automatic clearance adjuster is installed on the assistant brake shoe. See the picture 7-4.

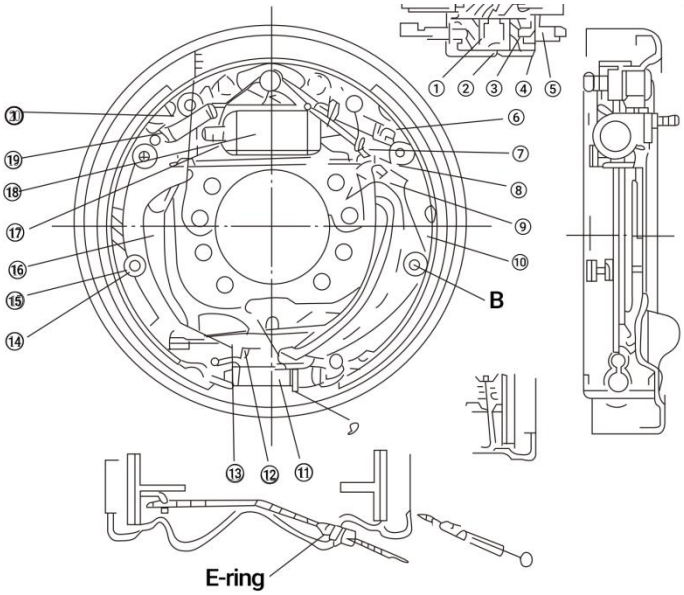


Fig.7-4 Arrester

1. Spring
2. Cup ring
3. Piston
4. Cylinder body
5. Piston mandrill
6. Return spring
7. Mandrill
8. Return spring
9. Adjusting lever
10. Assistant brake shoe
11. Clearance adjuster
12. Spring
13. Brake cable assembly
14. Compressor spring cover
15. Compressor spring pull rod
16. Hand brake pull rod
17. Hand brake push rod
18. Brake wheel cylinder assembly
19. Return spring
20. Man brake shoe.

(1) Movement of brake

The primary and secondary shoes are respectively given the same force to press the brake drum by the operating cylinder, till contact of the end of the secondary brake shoe hold-down pin, the brake shoe move to the twisting direction of the brake drum. By operation of the operating cylinder tubing the friction piece in contact with the brake drum. The Primary shoe forces between the friction piece and the drum, Due to this, the adjuster pushes the secondary shoe by the large force than that offered by operation of the operating cylinder.

The braking operation in the truck's reverse travel is performed contrary to that of forward reverse.

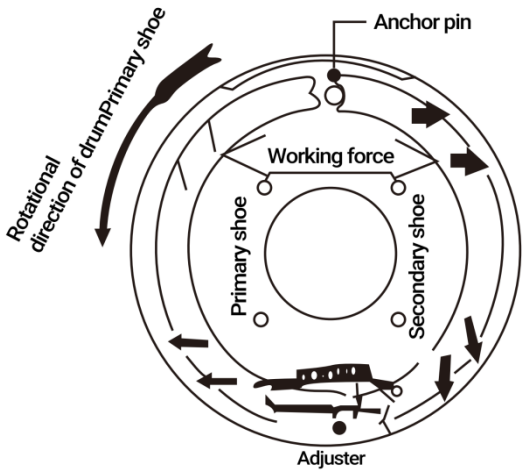


Fig.7-5 The movement of forward drive

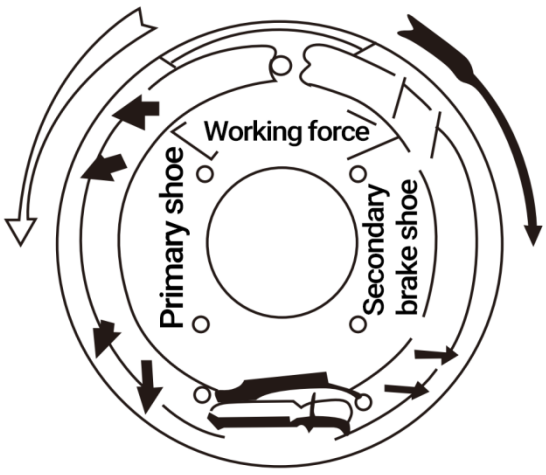


Fig.7-6 The movement of Backward drive

(2) Parking Brake

The parking brake is of mechanical, internal expansion type and built in the wheel brake. It shares the brake shoes and brake drum with the wheel brake system. When the parking-brake lever is applied, the brake cables pull the parking pull rod, which, via the pin acting as a fulcrum, pushes the parking push rod to the right, forcing the secondary shoe against the brake drum.

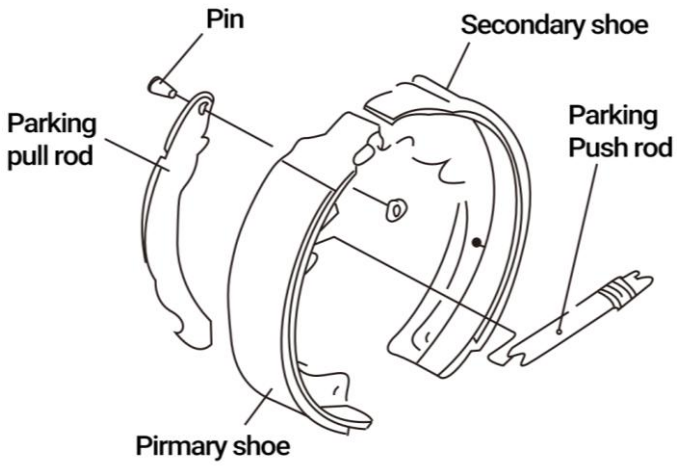


Fig. 7-7 Parking Braking mechanism

(3) Self-adjusting (automatic) clearance mechanism

The self-regulating clearance structure can maintain an appropriate clearance between the friction plate and brake drum. See the picture 7-8 and 7-9, the self-regulating clearance structure only works during the reverse driving. There are two kinds of self-regulating structure because of the different model.

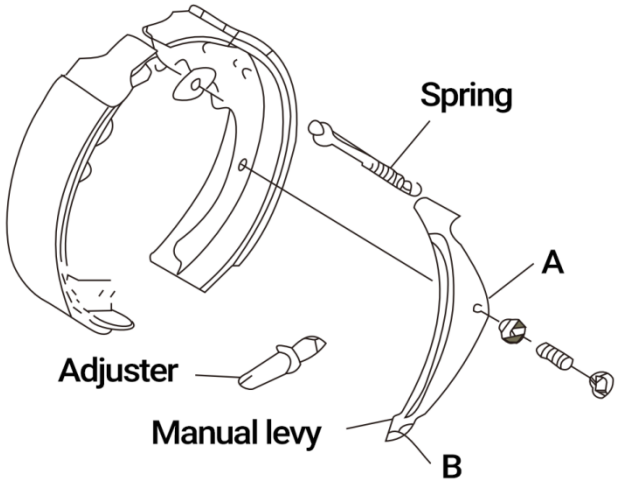


Fig. 7-8

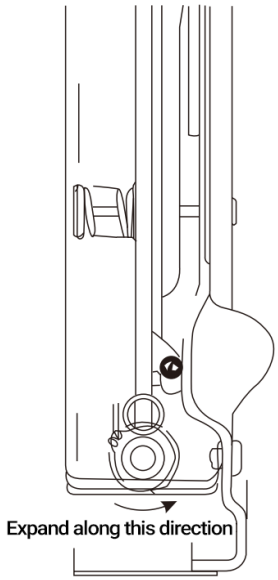


Fig. 7-9 Self-adjuster

The self-regulating clearance structure

Only work during the reverse movement. The assistant brake shoe touches the brake shoe and rotate together; therefore, the tie rod rotates rightward along point A, see the picture 8-9, The point B is elevated. After the brake is released, the pull rod rotates leftward under the action of the spring force and the point B falls.

When the distance between the friction plate and brake drum becomes bigger, the rotating vertical distance of the detent of point B becomes bigger, when the distance is more than 4mm, the adjuster is stirred by one tooth, the adjusting rod becomes longer and the clearance becomes smaller accordingly.

The range of clearance adjustment: within 0.4–0.45mm

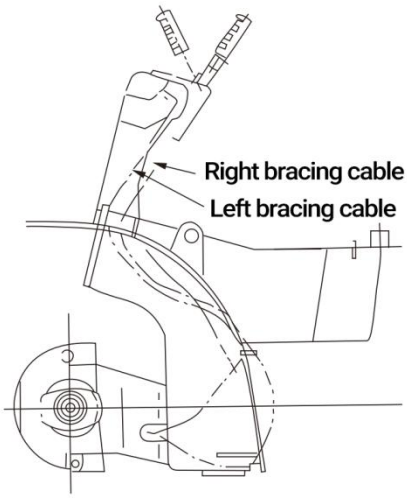
Parking brake mechanism

The parking-brake mechanism uses a cam-type lever; the adjuster located on the end of the handrail can adjust the brake force.

Adjustment of the brake force: Rotate the adjuster clockwise, the brake force will increase; rotate anticlockwise, brake force will decrease.

Force: 20–30kg

Note: rotate the screw inside of adjuster to adjust.



Brake pedal adjustment

(1) Shorten the push rod.

(2) Adjust the pedal to height of 130mm for the ton trucks.

(3) With the brake pedal pressed by the idle stroke of, pull the rod out until its front end comes into contact with the master cylinder piston.

(4) Tighten the push rod locking nut.

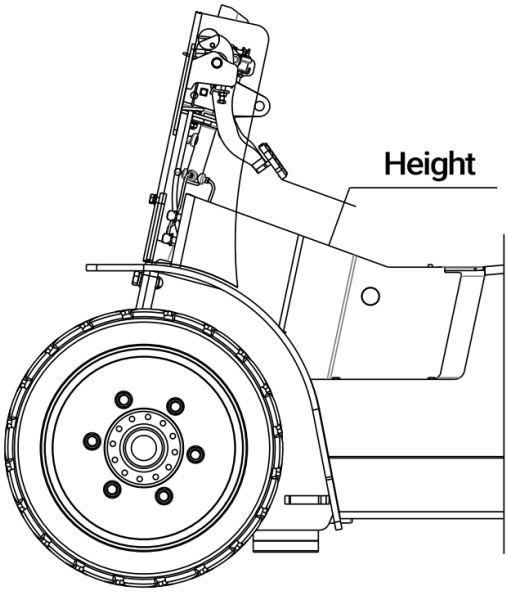
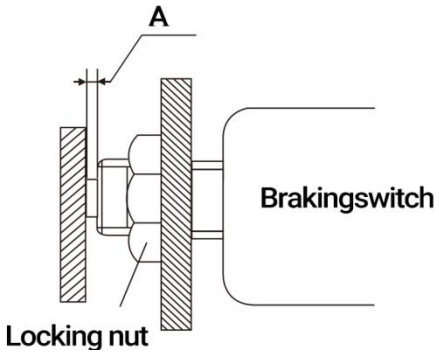


Fig.7-11 Adjust pedal height

Unit:mm

Ton / Type			Height	Free stroke	
				Brack	Tremor
K21	2-2.5t	TC	88	30	0
K25	2-2.5t	TC	88	30	0
K25EPA	2-2.5t	TC	88	30	0
WG2503	2-3.2t	TC	88	30	0

TC: Hydraulic forklift



Adjustment of brake switch

(A): After adjustment of the brake pedal height, loose the lock nuts of the brake switch.

(B): Pull out the plug and separate lead.

(C): Rotate the switch, making the clearance A=1mm

(D): Test stopping lamp when stepping down the brake pedal.

4.7.2 Maintenance of Wheel Brake

This section includes the covers the disassembly, reassembly and adjustment of the wheel brake and the adjustment of brake pedal.

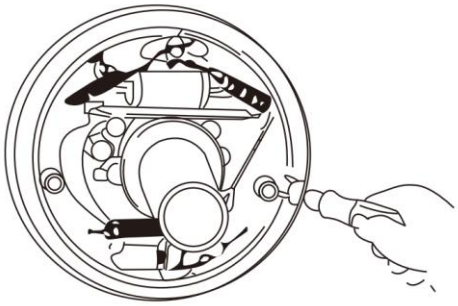


Fig. 7-12

Wheel brake Disassembly

(1) Remove toehold-down spring of secondary shoe.
Remove the adjusting lever, pole lever stopper and return spring for push rod.

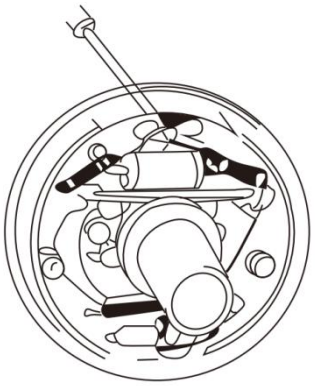


Fig. 7-13

(2) Remove two shoes return springs.

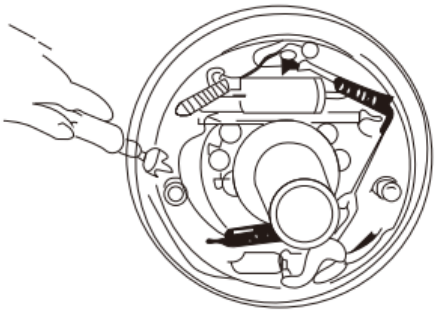


Fig. 7-14

(3) Remove three hold-down springs.

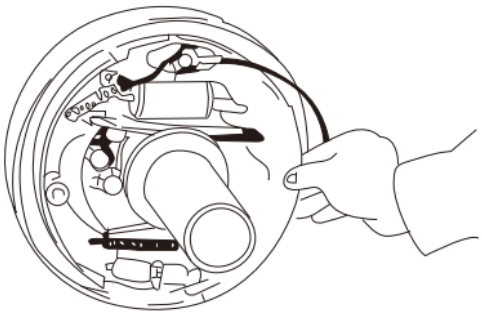


Fig. 7-15

(4) Remove the primary and secondary shoes.
At the same time, remove adjuster spring.

(5) Remove the brake line from the wheel cylinder, remove wheel cylinder mounting bolts and detach the wheel cylinder from the backing plate.

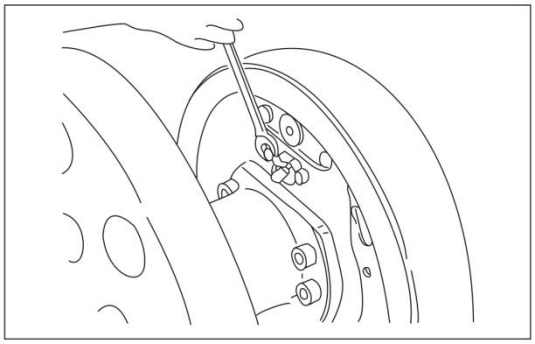


Fig. 7-16

(6) Remove the E-retainer for securing the parking brake cable to the backing plate. Remove the backing plate. Remove the backing plate mounting bolts and detach the backing plate from axle.

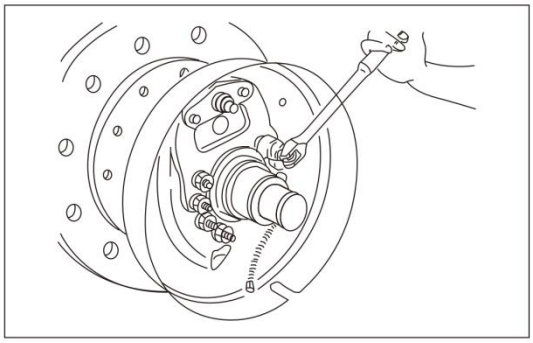


Fig. 7-17

(7) Remove the boot and push the piston assembly out of the operating cylinder.

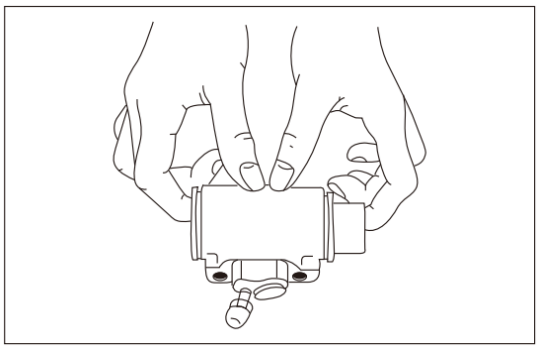


Fig. 7-18

Inspection of wheel brake

Inspect all parts to make sure if there's worn out or damaged part. If unqualified, repair or replace with new one.

(1) Check whether the operating cylinder inner surface and the piston periphery surface is rusted? Then measure the clearance between the piston and cylinder.

Specified clearance:0.03mm–0.10mm

Maximum clearance:0.15mm

(2) Visually check the piston cup for damage or deformation. If unqualified, replace with new one.

(3) Check the free length of the operating cylinder spring. If unqualified, replace it

(4) Check the thickness of the friction piece to see if it is excessive worn. If necessary, replace it.

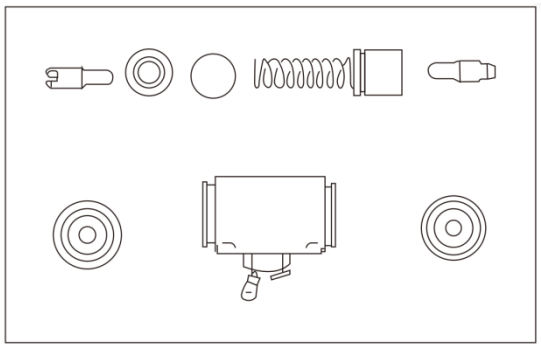


Fig. 7-19

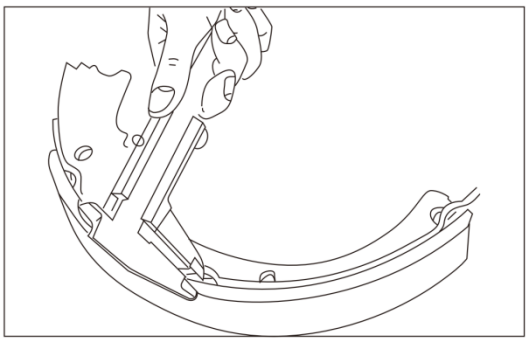


Fig. 7-20

Unit: mm

	2.0–3.2t
Standard value	7.2
Marginal value	5.0

(5) Check the inner surface of the brake drum, if any damage or worn-out, repair by machining or replace it.

Unit: mm

	2.0–3.2t
Standard value	310
Marginal value	312

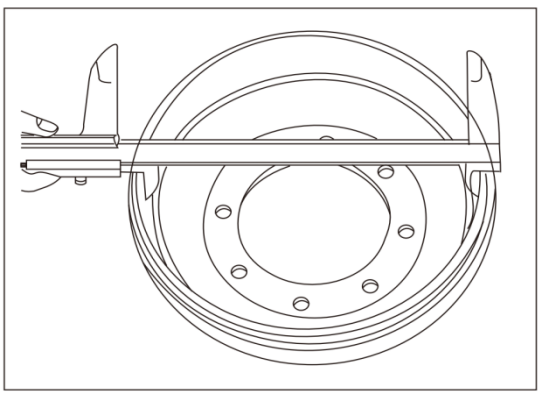


Fig. 7-21

Wheel Brake Reassembly

(1) Apply brake fluid to the piston and the piston cup, and reinstall the spring, cup, the piston and the dust cover in this order.

(2) Install the operating cylinder on the backing plate Caution: make sure that each component is in position when installing it; Tighten the bolts to 14.7~19.6N·m

(3) Install the backing plate on the front axle. Torque moment for bolts: 20.6~22.5N. M

(4) Add lubricating oil to the lubricating point, shown as Pic 7-22.

(a) Backing plate-bearing surfaces

(b) Anchor pin

(c) Contact surfaces between brake shoe and spring seat

(d) Parking pull rod pin

(e) Surfaces of the screw of the adjuster and other rotating part

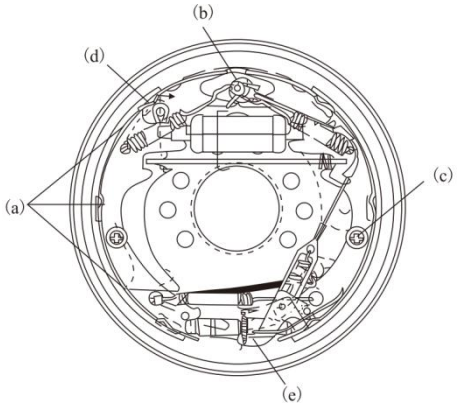
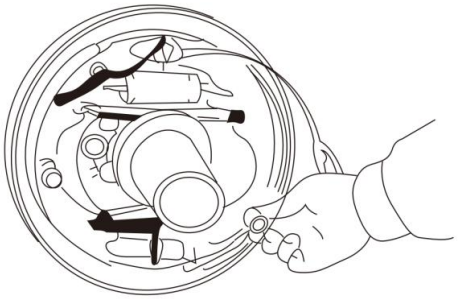


Fig. 7-22

(5) Install the brake cable assembly on the backing plate with an e-retainer.

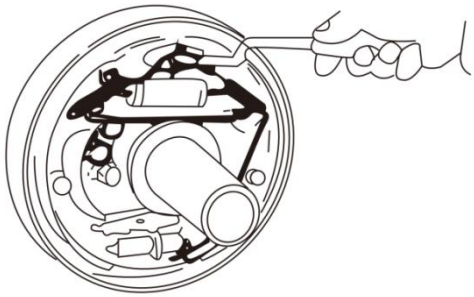

Fig. 7-23

(6) Install shoes on the backing plate with hold-down springs. However, the hold-down spring at the secondary shoe lower part should be fitted only after the spring seat and adjusting lever are properly mounted. Make sure the spring seat settles snugly in the shoe and the adjusting lever holes.

(7) Put the spring on the parking push rod then install the rod on the shoe.

(8) Install the shoe guide plate on the anchor pin, and install the shoe return spring.

(9) Install the adjuster. Adjuster spring.


Fig. 7-24

Push rod, and its return spring.

Pay attention to the following points:

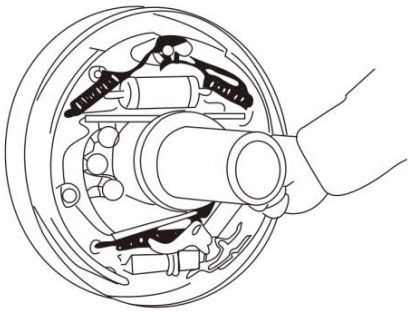
(A) Adjuster thread direction and its mounting direction.

(B) Adjuster spring direction.

(C) Return spring direction of the push rod: spring hook at anchor pin side should be located at the opposite side to push rod.

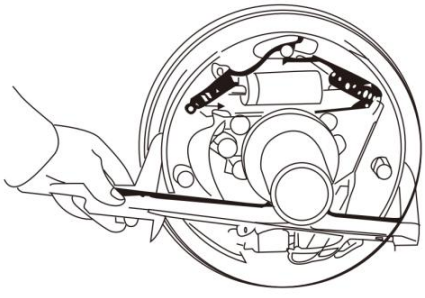
(D) Push rod and its return spring should be located in the groove on the anchor pin.

(E) Make sure that the adjusting lever end is in contact with the adjuster gear teeth.


Fig. 7-25

(10) Install the brake valve on the operating pump.

(11) Measure the inner diameter and outer diameter of the brake shoes. Adjust the adjuster to ensure the clearance between the drum inner diameter and the friction lining outer diameter is less than 1mm.


Fig. 7-26

Specified difference:

Operation Test to clearance self-adjuster

(1) Make the brake shoe diameter approach the specified mounting size. And pull the adjusting lever with your finger along the arrow marks as shown in … to turn the adjuster gear, when removing off your finger. The adjusting lever should return to its original position without rotation of the adjuster gear.
Note: The adjuster gear turn back with the adjusting lever motion when released. The adjuster will still operate normally after it is built in the machine.

(2) If the adjuster fails to do the above operation when the adjusting lever is pulled. Proceed with the following inspections:

(A): Make sure that the adjusting lever, push rod and the return spring for push rod are securely installed.

(B): Check to see if the adjusting lever and adjuster gear are damaged. If necessary, replace them. Also check if the adjusting lever is in contact with the gear. Check the push rod return spring and adjuster spring for deterioration. And also check the adjuster gear for rotating condition, and undue wear or damage of the meshing section.

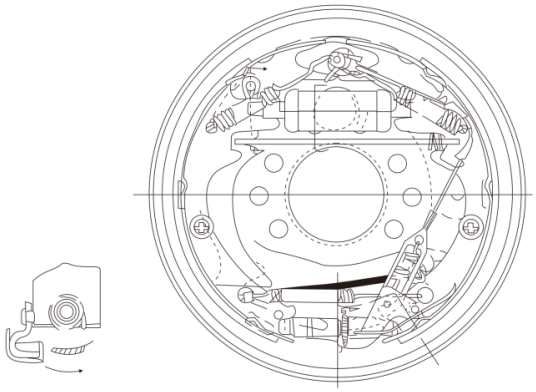


Fig. 7-27

Troubleshooting

Problem	Probable Cause	Remedy
Poor braking	1. oil leakage from brake system 2. Maladjustment of brake shoe clearance 3. Brake overheating 4. Poor contact between drum and friction piece 5. Foreign matter adhered on friction piece 6. Foreign matter mixed in brake fluid 7. Maladjustment of brake pedal (inching valve)	Repair Adjust the adjuster Check for skid Readjust Repair or replace Check brake fluid Adjust
Noisy brake	1. Hardened friction piece surface or foreign matter adhered there 2. Deformed backing plate or loose bolts 3. Deformed shoe or incorrect installation 4. Worn friction piece 5. Loose wheel bearing	Repair or replace Repair or replace Repair or replace Replace Repair or replace
Uneven braking	1. Oil-contaminated friction piece 2. Maladjustment of brake shoe Clearance 3. Malfunction of operating cylinder 4. Shoe return spring deteriorated 5. Deflected drum	Repair or replace Repair or replace Replace Repair or replace Repair
Soft or spongy brake	1. Brake fluid leakage 2. Maladjustment of brake shoe clearance 3. Air mixed in brake system 4. Maladjustment of brake pedal	Repair Adjust the adjuster Emit the air Readjust

4.8 Hydraulic system

Item	Forklift Type	2-2.5tGasoline machine	3-3.2tGasoline machine
Main Pump Multiport Valve	Type	Gear pump	
	Displacement	28ml/r	32ml/r
	Type	Double sliding Valve with Overflow Valve, flow divider and tilt self-lock valve	
	Adjustable pressure	17.5MPa	
	Pressure divided	7MPa	10MPa
	Flow divided	11L/min	13L/min
Lifting Cylinder	Type	Single-acting Piston	
	Cylinder diameter	50	56
	Stroke	1495mm (When lifting height 3m)	
Tilt Cylinder	Type	Double-acting piston	
	Cylinder diameter	70	
	Stroke	167mm	
Oil tank	Capacity	60L	

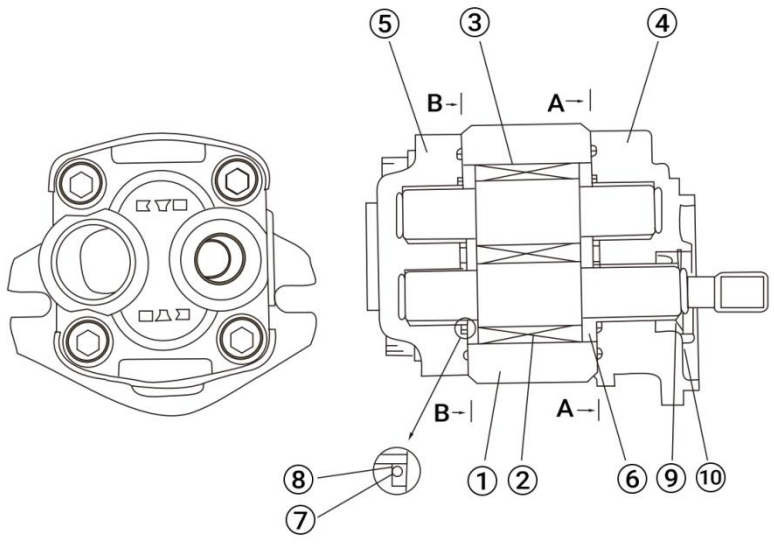
General description

The hydraulic system consists of a lift pump, steering pump, control valve, lift cylinder, tilt cylinder, and hydraulic lines.

Main pump

The main pump is a gear pump. It is driven directly by the power output mechanism of the generator, and conveys oil from the oil tank to the control valve.

The main pump is composed of pump body, a pair of gears, pressure plate and retaining ring. It adopts pressure balanced bearing and special lubrication structure to reduce gear clearance. The pressure balance principle relies on the pressure oil between the pressure plate and pump body to push the pressure plate against the gear side face.



1. Pump body
2. Drive gear
3. Driven gear
4. Front-end cover
5. After end cover
6. Scaleboard
7. Seal ring
8. Check ring
9. Oil seal
10. Elastic check ring.

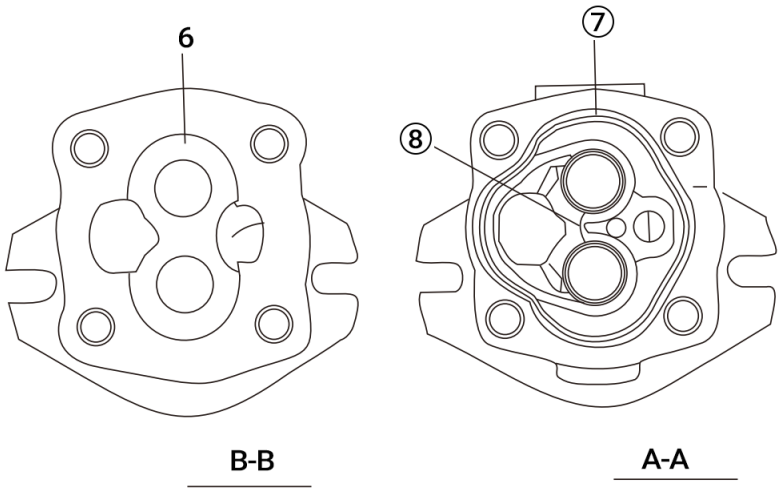


Fig. 8-1 Main Pump

Control Valve

The two-spool control valve is composed of a four-section valve body and two spools. The four-section valve body is fastened by three sets of bolts and nuts, and equipped with a relief valve. The tilt spool is integrated with a tilt lock valve.

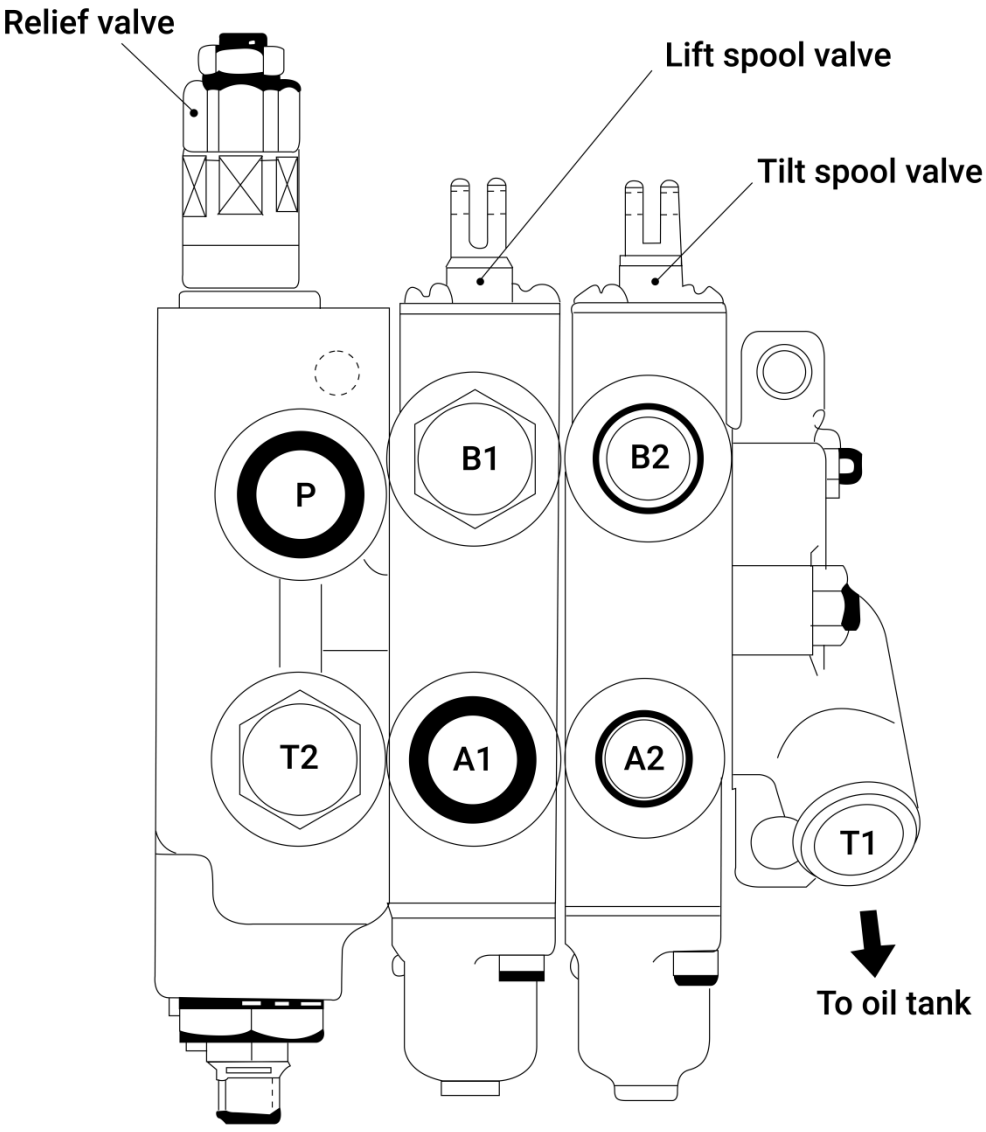


Fig. 8-2 Control valve

Slide valve operation (take the tilt slide valve for example)

(A): Neutral position

The high-pressure oil from lift pump returns to the oil tank through the mid-passage.

(B) Pushing-in of spool

In this time, the spool is pushed in to close the mid-passage. This causes the oil from the main oil inlet to push up the inlet check valve and to flow into the port “B”. The return oil from the port “A” flows through the low-pressure passage to the tank and the spool is restored to its neutral position by return spring.

(C) : Drawing-out of slide valve

With the mid-passage closed, the oil from the main oil-inlet pushes up the check valve and flows into the port “A” the return oil from the port “B”. flows through the low-pressure passage to the tank, the spool can be restored to its neutral position by return spring

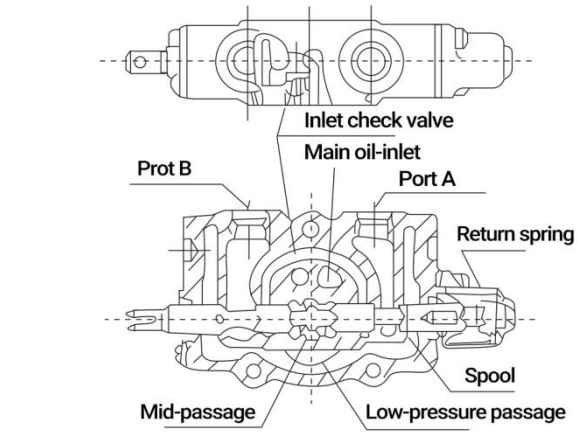


Fig. 8-3

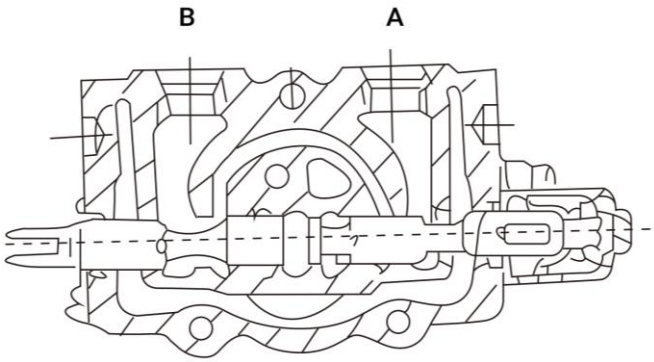


Fig. 8-4

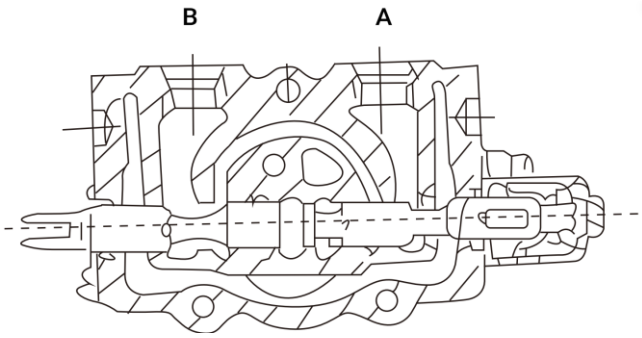


Fig. 8-5

Main safe overflow valve and the flow-dividing safe valve (picture 8-6)

The main relief valve consists of the main valve (A) and the pilot valve (B), when the selector valve reverses the direction, Q cavity is connected with the high-pressure oil of the working structure (such as the lifting cylinder, the leaning cylinder), the pressure oil acts on the conducting valve B through the fixed throttling orifice D, E, when the system pressure exceeds the set pressure, the pilot valve (B) opens and makes the pressure of cavity F fall, the whole valve core of main valve A moves towards right and makes the pressure oil cross through the low-pressure channel G, make the cavity Q saturate so as to ensure the stability of systematic pressure, the adjustment of screw can be used to adjust the stable pressure of the system.

The structure of flow-dividing valve is simple and is vertically overflowing and uses the principle of balancing the liquid pressure with the spring force directly to acquire the stable pressure value of steering system. When operating the steering wheel, the oil cavity M is connected with the high-pressure oil way, when the systematic pressure is bigger than the spring pressure, the valve core A moves right-ward, the pressure oil flows to the low-pressure oil way through the cavity T, then makes the cavity M unload to ensure the stability of the pressure of steering system and adjusting the screw K can adjust the stable pressure value of the system.

The L valve is a flow-divider (priority) valve, through the continuous change of the flowing capacity and the pressure, it makes the slide valve L moves leftward or rightward to change the opening of R, S, to ensure the flowing capacity to the cavity Q and the hydraulic steering machine from the output PS balance automatically and flow divide stably and proportionally. A is a fixed throttling orifice.

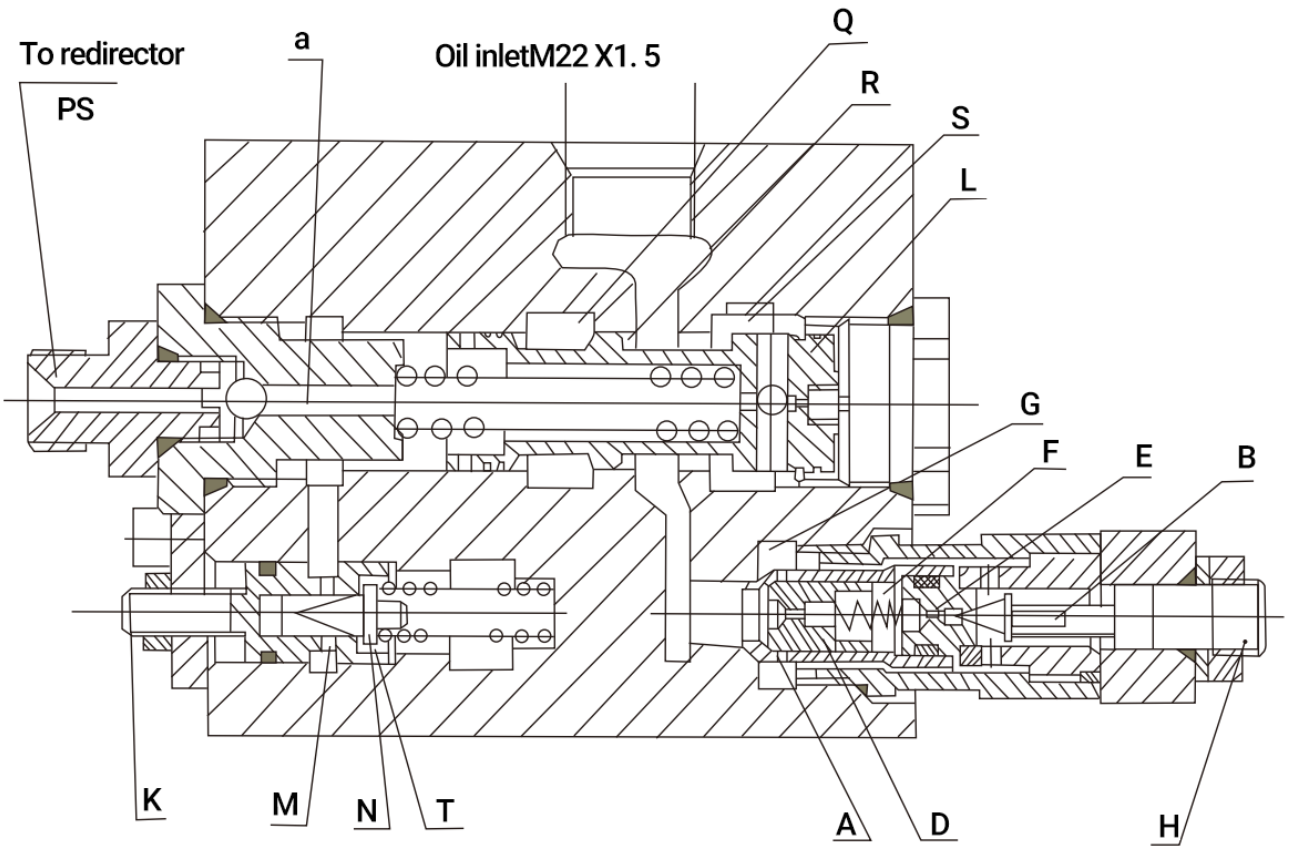


Fig. 8-6

Action of tilt-lock valve

Title slide valve housing contains a tilt-lock valve, the tilt lock valve is intended to prevent vibrations of the mast resulting from the negative pressure in the tilt cylinder and also to avoid danger incurred from mishandling of the slide valve. When the engine is not running, the mast cannot be tilted forward by pushing the tilt lever.

The interface A, B of the valve should be connected with the front and back cavity of the tilt cylinder piston, when pulling out the slide valve, the high-pressure oil (P) enters the interface A, the oil of the back cavity returns to the oil tank (T) through “B”, at this time, the bracket is in the backward leaning position.

When pushing in the tilt slide valve, the high-pressure oil enters the interface B, with the help of the high-pressure oil to move the self-locking valve of the spool valve, the point A connects with the low-pressure, when the generator extinguishes or stops operating there isn’t high-pressure oil to move the self-locking valve of the slide valve, so the interface “A” cannot be connected with the low pressure, the bracket will not lean forward and the leaning cylinder cannot form the negative pressure.

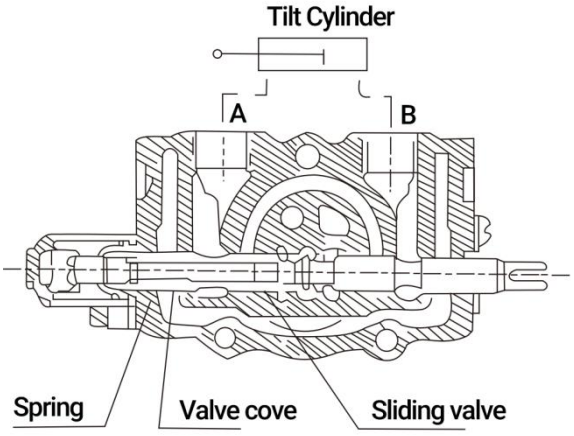


Fig. 8-7

Hydraulic Oil Circuit

The high-pressure oil from the lift pump comes to the control valve first, then high-pressure oil is sent to lift cylinder or tilt cylinder. When the lift and tilt spool are in neutral position, the oil from the lift pump directly returns to oil tank through the passage in the control valve, when the lift spool is pulled, the oil from the lift cylinder to push the piston up, when the lift spool is pushed, the circuit between the lower part of the lift cylinder and the oil tank is connected and the piston begins to descend due to the weight of the load and all of lifting parts. In this case, the oil flows returning to the control valve is regulated by the flow regulator valve, and the forks descend speed is controlled. When the tilt lever is operated, the high-pressure oil reaches the front or rear chamber of the cylinder and pushes the piston forward or backward. The oil is pushed to the oil tank through the control valve by the piston returns and the mast then tilts forward or backward.

The high-pressure oil from the steering pump comes to the powered steering until valve first. Then high-pressure oil is sent to the steering cylinder, when turning steering wheel right or left. The rear wheels are turning.

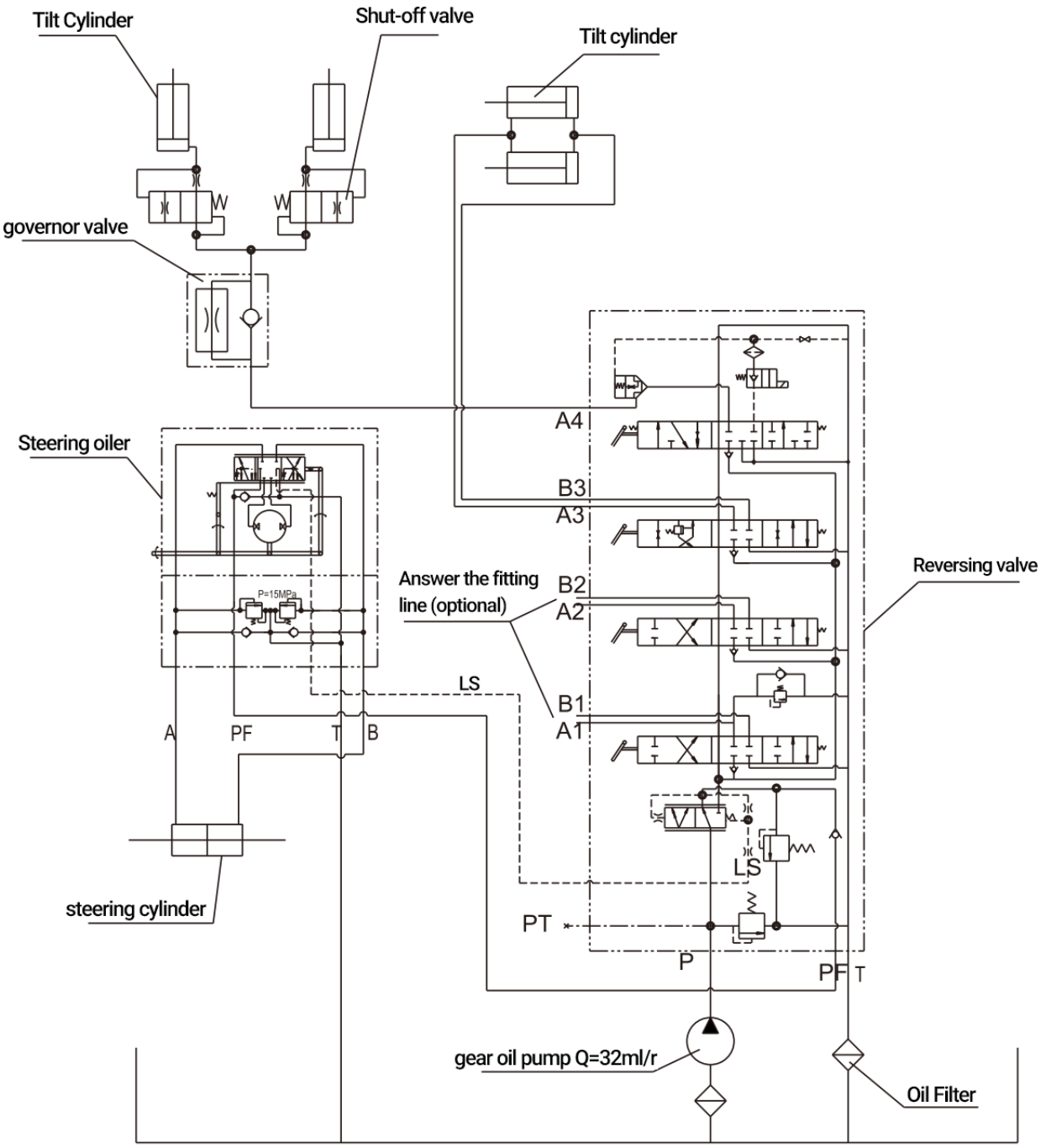


Fig.8-8 Hydraulic principle diagram

Operation of the multi-control valve

The control valve is operated with the valve levers. All valve levers are assembled together with a shaft and the shaft is assembled on the front guard with the bracket. The valve levers operate the control valve with the joins.

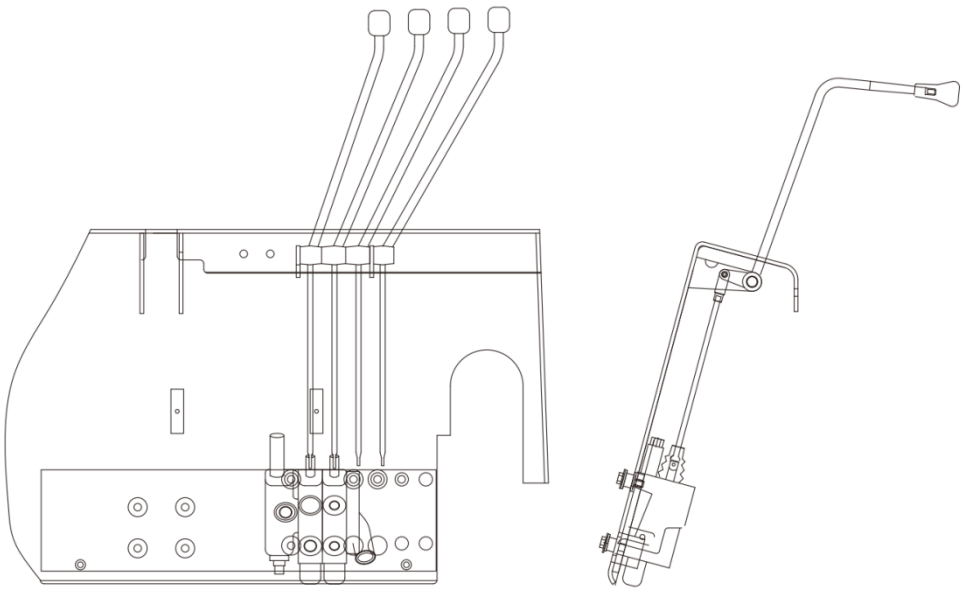


Fig. 8-9 Operation of the multi-control valve

Lifting cylinder

The two single acting type lift cylinder is composed of cylinder body, piston, piston rod, cylinder cap, cylinder base, and oil seals.

The bottom of the lifting cylinder is fixed on the lifting cylinder of outside bracket by pin and bolt; the top of cylinder (the top of piston rod) is connected with beam on the outside bracket.

The piston is fixed on the piston rod by the elastic spring; the outer ring of piston installs the oil seal and back-up ring.

There is a cut-off valve at the bottom of lifting cylinder (see the picture 8-11) when the high-pressure pipe cracks suddenly, the goods can be avoided to fall sharply.

The cylinder end installs bearing and oil seal to support the piston and avoid the entry of dust.

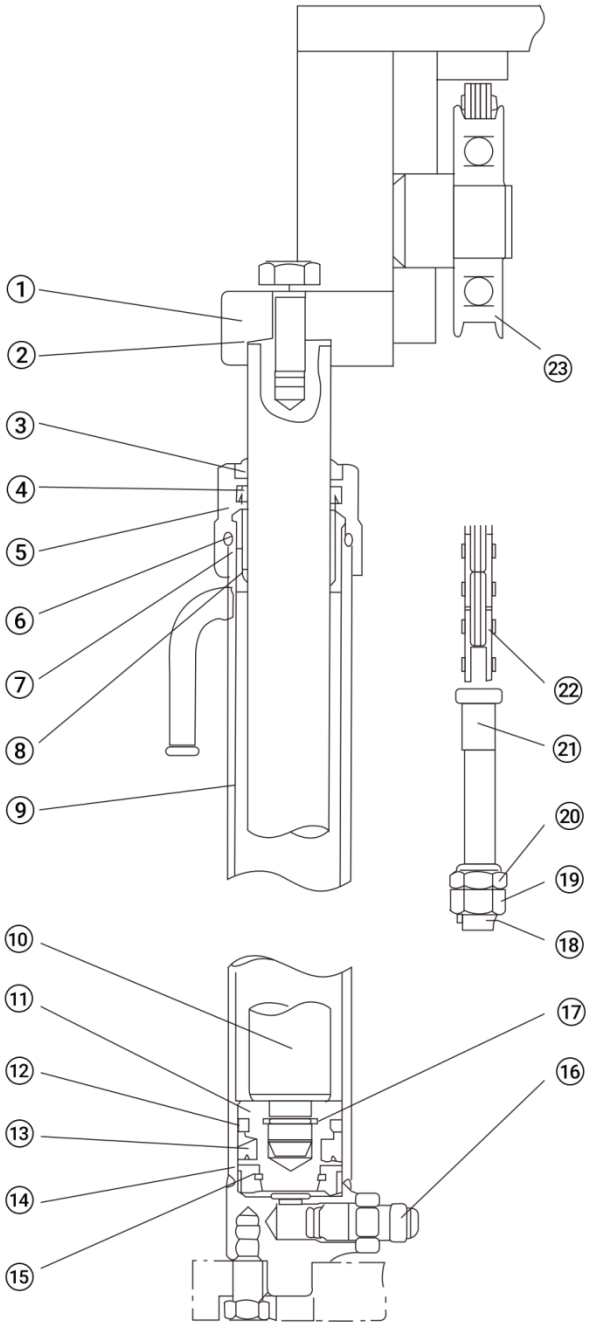
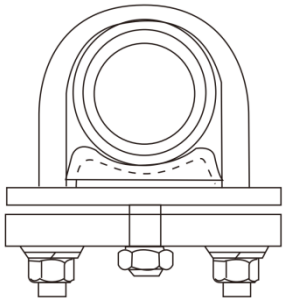


Fig.8-10 Lifting Cylinder



Cylinder support

1. Upper separator
2. Spacer
3. Dustproof cover
4. Oil seal
5. Guide sleeve
6. “O” ring
7. Cylinder end
8. Steel bearing
9. Cylinder body
10. Piston rod
11. Piston
12. Piston oil seal
13. Oil seal
14. Seat ring
15. Elastic check ring
16. Dump valve
17. Elastic lock ring
18. Cotter pin
19. Locking nut
20. Adjusting nut
21. End Connector
22. Chain
23. Chain wheel

There is a cut-off valve that operates when the high-pressure hose bursts for any reason to prevent the load from dropping down abruptly at the bottom of the lift cylinder. The oil from the lift cylinder flows through small holes under the circumference of the cut-off valve spool and produces a pressure difference between two chambers. As the pressure difference as a result of passing the holes is smaller than the spring force so that the cut-off valve spool won't move. If the high-pressure hose bursts. The pressure difference will be big enough to overcome the spring force, causing the spool to move until the holes on the circumference on the spool are blocked up and allowing only a small amount of oil to flow through the holes at the spool end to let the forks descend slowly.

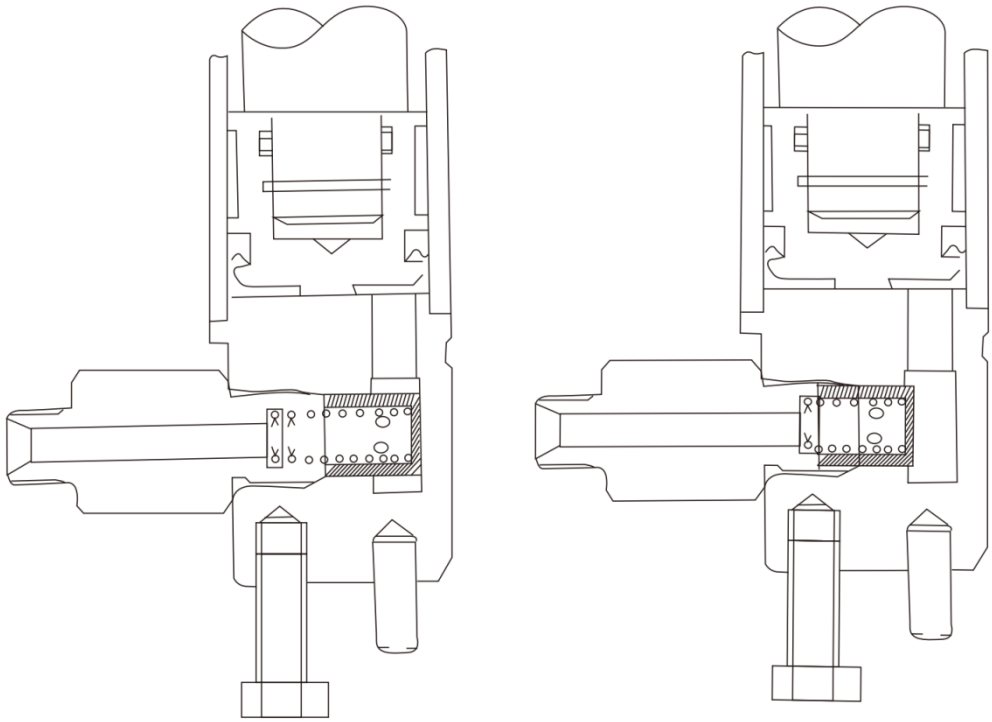
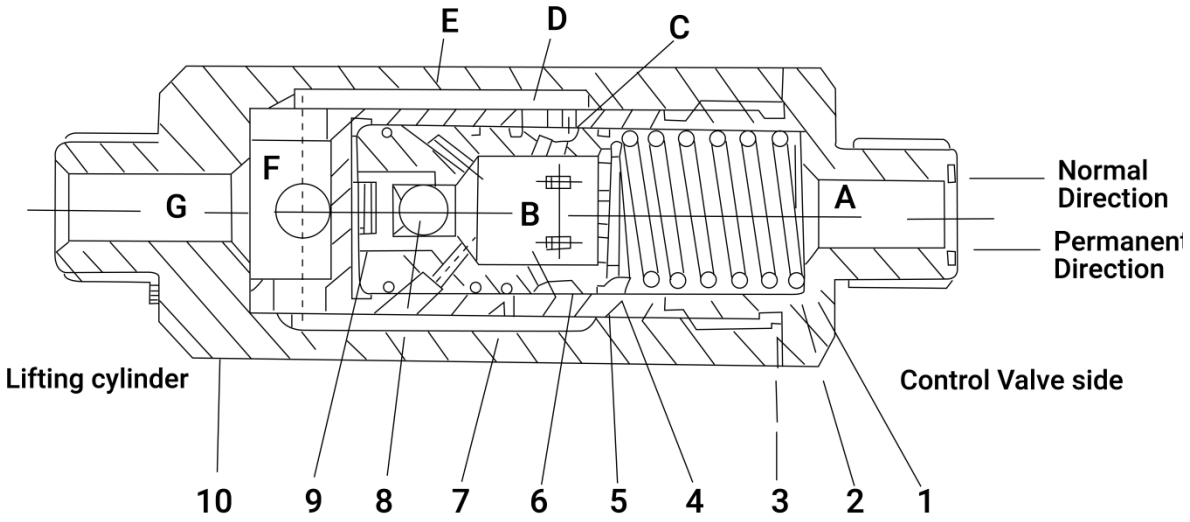


Fig. 8-11

Flow Regulator Valve

The flow regulator valve, located in the lift cylinder circuit to limit the descending speed of loaded forks, has the construction as shown in fig. When the lift spool is placed in the "lift" position, the oil from the control valve flows through the oil chambers A and B, oil holes C, D, E and F, and the chamber G to the lift cylinder without any regulation. When the lift spool is placed in the "down" position, the oil flows in the reverse direction. When the oil passes the orifice plate and a pressure difference generates between the chambers A and B, the pressure difference overcomes the force of the spring and moves the valve core right, thus the oil flow being decreased by narrowing of the hole D and C, and reduces the oil flow passing through the orifice plate.



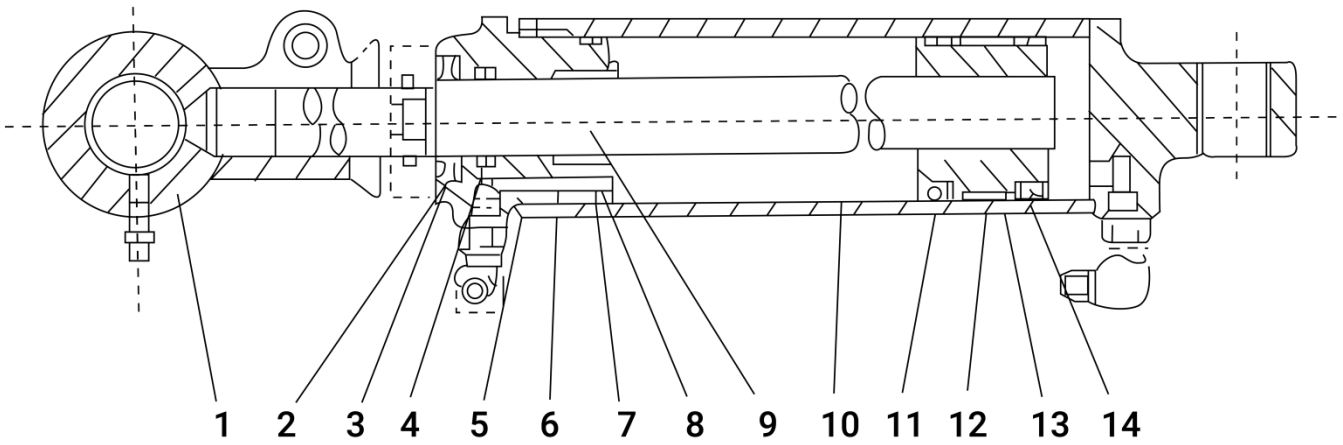
1. Tie-in
2. Spring
3. "O"seal ring
4. Check ring
5. Throttle plate
6. Valve sleeve
7. Valvecore
8. Nylon ball
9. Spring
10. Valve body

Fig. 8-12 Flow regulator valve

Tilt Cylinder

The tilt cylinder is of double-acting type. Each truck has two tilt cylinders that are installed on each side of the frame with pin while their piston rod ends are connected with the outer mast.

The tilt cylinder consists primarily of piston, piston rod, cylinder body, cylinder base, guider sleeve and seals. The piston, welded to the piston rod, is fitted with two Yx-ring, and one wear ring on its circumference, A bushing press-fitted to the inner side of the guide sleeve supports the piston rod. The guide sleeve is with dust seal, nap ring, Yx-ring and O-ring to prevent oil leakage and keep dust off. Fitted with them, the guide sleeve is screwed into the cylinder body.



1. Earring
2. Dustproof ring
3. Check ring
4. YX seal ring
5."0"ring
6. Guide sleeve
7. Bearing
8."O" ring
9. Piston rod
10. Cylinder body
11. Yx ring seal
12. Back ring
13. Piston
14. Yx seal ring

Fig. 8-13 Tilt cylinder

When the tilt lever is pushed forward, the high-pressure oil enters the cylinder body from the cylinder tail, moving the piston forward and causing the mast assembly tilting forward to 6 degrees. When the tilt lever is pulled backward, high-pressure oil enters the cylinder body from the guide sleeve and moves the piston backward, tilting the mast assembly backward to 12 degrees.

The hydraulic oil tank

The hydraulic oil tank, located on the right side of the frame, filters the oil and filters out dust.

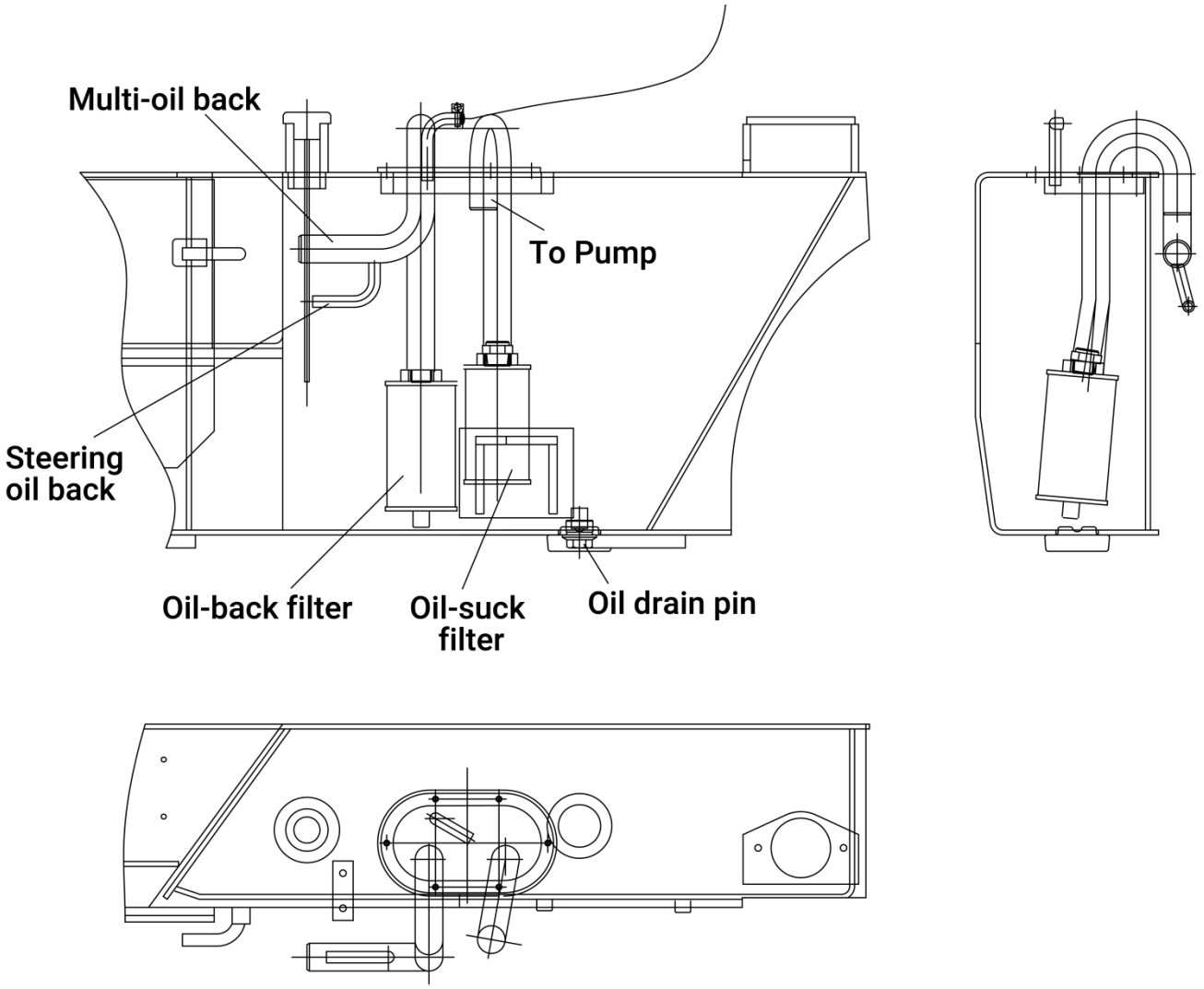


Fig. 8-14 Hydraulic oil tank

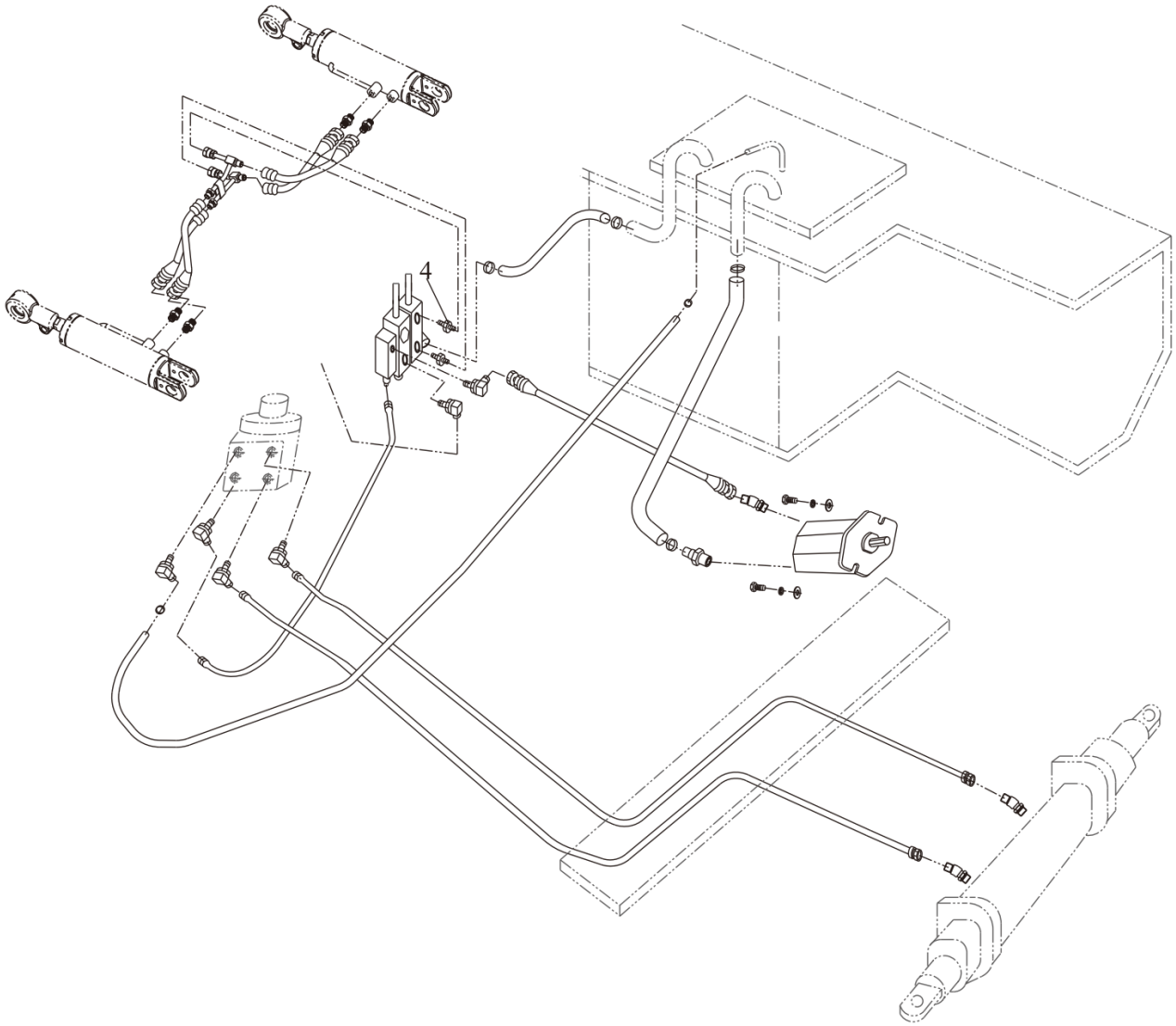


Fig. 8-15 Hydraulic Pipeline (Standard)

Maintenance of Main oil Pump

(1) Disassembly Before disassembling the pump, put the removed parts on the paper or cloth. Don't damage the parts.

(A): Hold the pump cleaned in a vice by lightly clamping the flange section.

(B): Remove bolts11, pump cover 5, and pump body 1.

(C): Remove bushing 6-drive gears 2, driven gear 3.

(D): Remove the seal ring and packing ring from front cover or rear cover.

Note: Don't remove the seal ring and packing ring from the front cover or rear cover, if the seal ring and packing ring needn't be replaced.

(2) Inspection Check the disassembled parts and wash them with engine oil, (Don't wash the rubber items with engine oil.)

(A) : Body inspection When the scraping trace becomes longer than 1/2 long of the inner periphery, replace the pump body.

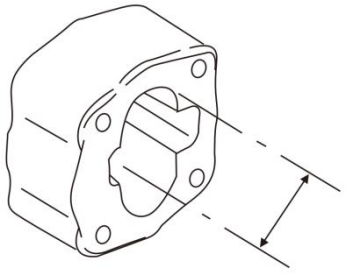


Fig. 8-16

(B) : Scale board inspection When surface of scale board is damaged or the thickness is less than the standard value, replace it. The standard thickness: 4.94mm

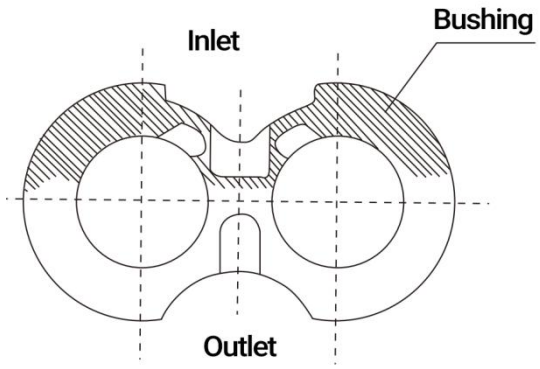


Fig. 8-17

(C) The front and rear pump cover If the lining of inner surface changes color (the brown) and surpasses the range of 150 then change them.

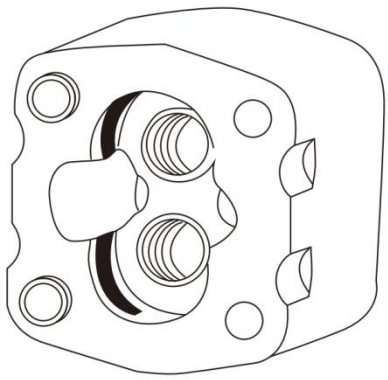


Fig. 8-18

(D) Check the drive gear and driven gear from the front and rear.
If the abrasion is excessive, change a pair of new one.
If the size D is smaller than the standard value, change several pairs.
D=20.961mm

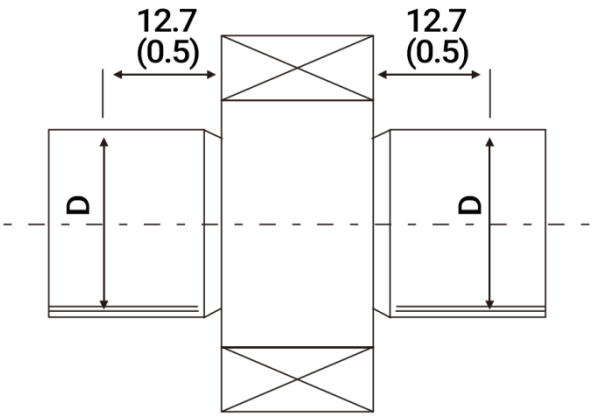


Fig. 8-19

(E) Change seal ring, the seal component of lining, the check ring, the oil seal and the spring check ring according to the condition.

(3) Assemble
(A) Install a new seal ring and a new check ring on the front cover of pump.

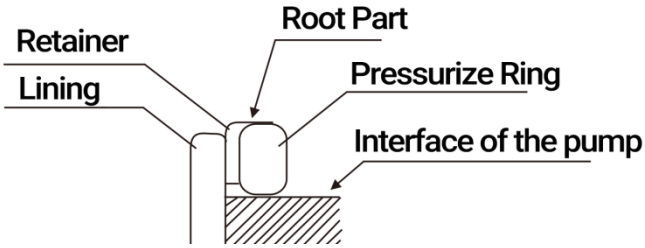


Fig. 8-20 Lining seal cap

(B) Install the scale board at the furrow of front cover; don't mistake the sucking inlet for the oil outlet.

(C) Install the driven gear on the front cover.

(D) Install the scale board on the side of gear to make the furrow aim at the gear point. Don't mistake the side of oil inlet for the side of oil outlet.

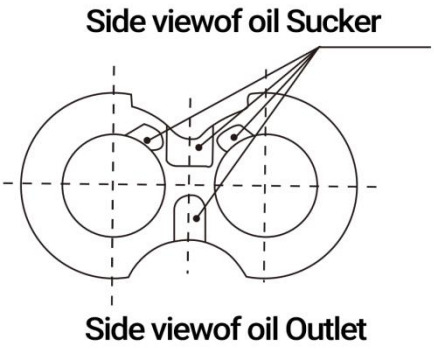
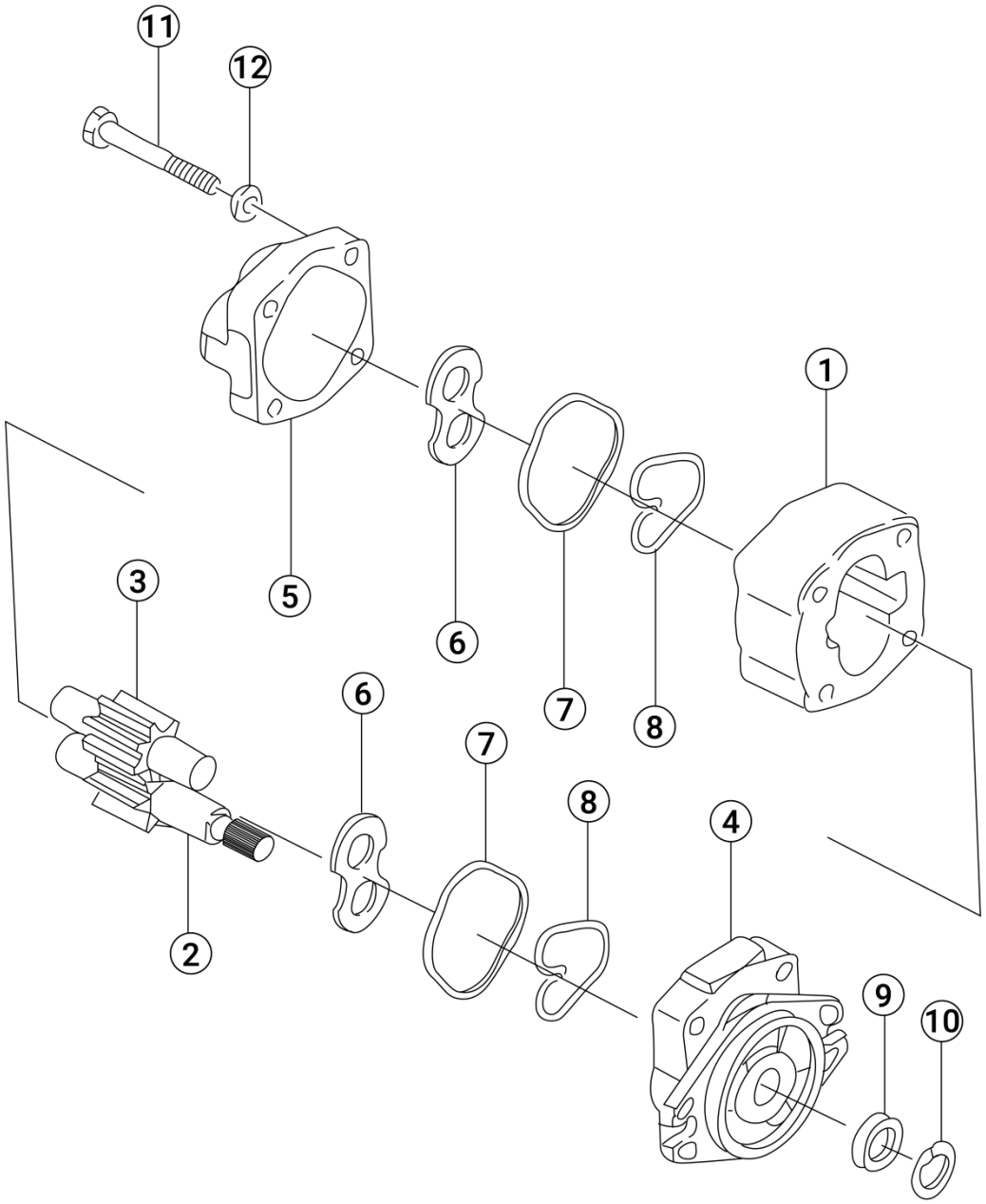


Fig. 8-20 Lining seal cap

(E) Install a new seal ring and check ring at the furrow of rear cover.

(F) Install the rear covers on the pump; don't mistake the oil inlet for oil outlet.

(G) After completing the assembly, twist the connecting bolt to the standard torque 9–10kg.m.



1. pump body
2. drive gear
3. driven gear
4. frontend cover
5. back end cover
6. scaleboard
7. seal ring
8. check ring
9. oil seal
10. elastic check ring
11. bolts
12. and spacer

Fig. 8-22 Gear pump

Testing.

The pilot operation makes the oil pump run in and check whether the operation is normal. Conduct the oil pump examination on the experiment desk and examine the pump on the forklift according to the following procedures:

(If the oil pump is decomposed and repaired because the hydraulic oil causes the serious damage, then before the pump is operated on the forklift, the hydraulic oil and filter should be changed.)

(a) Install the pump on the forklift and install the pressure gauge at the pressure detecting outlet of selector valve.

(b) Loose the overflowing valve and adjust the screw and twist the pump in about ten minutes. Ensure the oil pressure is less than 10kg/cm2.

(c) Increase the twisting speed of pump to the 1500–2000rpm and keep it about ten minutes.

(d) Maintain the twisting speed of pump 1500–2000rpm and increase the pressure once 20–30kg/cm2, the pump should twist five minutes until to the 175kg/cm2, then make each oil way work five minutes and change the strainer.

When increasing the oil pressure, pay attention to examine the temperature of oil, the surface temperature of pump and the operating sound, if the temperature of oil and the pump surface are too high, fall the loading to fall the oil temperature and continue to experiment. Make the overflowing pressure be at 175kg/cm2 after the experiment and measure the flux, the quantity of oil is measured through the lifting speed.

Troubleshooting

If the hydraulic system breaks down, Find the solution below and make necessary replacement.

(1) The selector valve

Malfunction	Reason	Repairing Method
The pressure of lifting oil way can't be enhanced	The slide valve jammed	Decompose then wash
	The oil hole blocked	Decompose then wash
Jolt and lift the pressure very slowly	The slide valve jammed	Decompose then wash
	The exhaust of air isn't sufficient	Discharge gas fully
The pressure of steering oil way is larger than the standard volume	The slide valve jammed	Decompose then wash
	The oil hole blocked	Decompose then wash
Can't meet the standard volume	The adjustment of overflowing valve isn't appropriate	Adjustment
Noise	The adjustment of overflowing valve isn't appropriate	Adjustment
	The slide surface damaged	Change the overflowing valve
Leak the oil(external)	O seal ring ageing or damaged	Change the O seal ring
The pressure is too low	The spring damaged	Change spring
	The valve surface damaged	Adjust or change the overflowing valve
Oil leakage(internal)	The valve surface damaged	Amend the valve surface
Pressure is too high	The valve door blocked	Decompose then wash

(2) Main pump

Problem	Possible cause	Remedies
Less oil deduction	Low oil level in the oil tank	Add oil up to specified lever
	Pipeline or oil filter is blocked	Clean them or replace oil if the oil is contaminated
Gear pump can not be pressurized	Worn bushing 3 and 4 or broken down packing 9, 10, 11	Replace
	Misadjusted relief valve	Adjust the pressure of the relief valve, Notice pressure gauge when increasing pressure
	Air entering into the pump	(1) Retighten loose connections for suction pipe (2) Add oil to oil tank (3) Check oil seal (4) Don't start the pump until no air bubble is in oil tank
Noisy in Operation	Twisted suction nose or cavitations incurred by oil filter blocked	Correct hose and clean filter
	Air entering in resulting from loose suction connections	Retighten each connection
	Too high oil stickiness incurring cavitations	(1) Use oil with proper stickiness (2) Start the pump until oil is at normal temperature.
	Air bubble in oil	Find out cause and correct them
	Eccentrically mounted gear pump	Concentric mounted gear pump
Oil leakage in pump	(1) Oil seal and packing in pump broken down (2) pump damaged	Replace

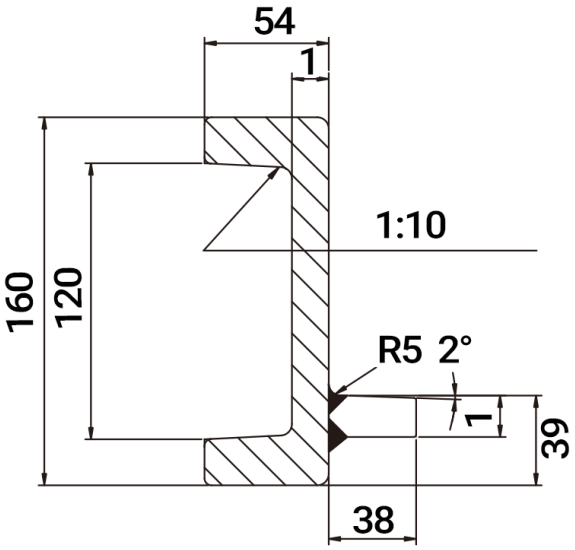
4.9 Lifting system

"J" type mast

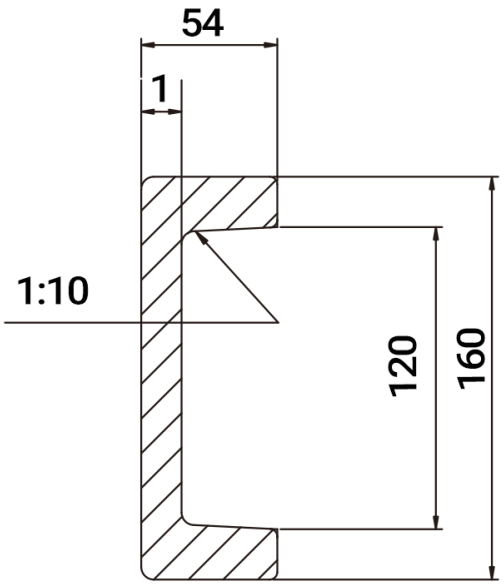
"C" type outer mast with free lift

Two stage extension type mast

Inner mast section



Outer mast section



Idler wheel	
Main idler wheel	ϕ 120.5
Choose idler wheel	ϕ 119.5
Choose idler wheel	ϕ 118.5
Lifting chain (ISO)	Lh1623 (2t~3t)
	Lh1634 (3.5t)

Fork mast lifting system: Hydraulic

Fork adjust system: Mechanical

General Description

The lifting system is a two-stage unit consisting of the inner mast, outer mast, and lift carriage.

Inner and outer Masts

The inner and outer masts both are welded parts, the bottom of outer mast is connected with the drive axle, and the outside middle of outer mast is connected with the frame by tilt cylinders. The mast assembly can be tilted forward and backward by operating tilt cylinders. The outer mast has C-shaped cross-section. The outer mast fixed with main rollers and side rollers on the top of it. And the inner mast has J-shaped cross-section. It fixed with main rollers and side rollers at the bottom of it.

The fork shelf and backrest

The fork shelf rolls in the inner bracket through the main roller, which installed on the main rolling axle stacked by the elastic check ring, the main rolling axle is welded on the fork shelf, the side roller is fixed on the fork shelf by bolt. They roll along the wing panel of inner bracket and can be adjusted by the adjusting cushion. To avoid the rolling clearance, using two fixed side roller to roll along the wing panel of inner bracket. The main roller supports the vertical loading, when the fork lifts to the top and the roller appears from the top of bracket. The cross loading is supported by the side roller. Backrest is fixed on the fork stand by bolt: the face of backrest should be parallel with the fork face, avoiding the goods slip down the fork.

The position of roller

There are two types of roller: The main roller and the side-roller. They are installed on the outer bracket, the inner bracket, and the fork shelf respectively. The main roller bears the front and rear loading; the side-roller bears the pressure of the side so that the inner bracket and fork shelf can move freely.

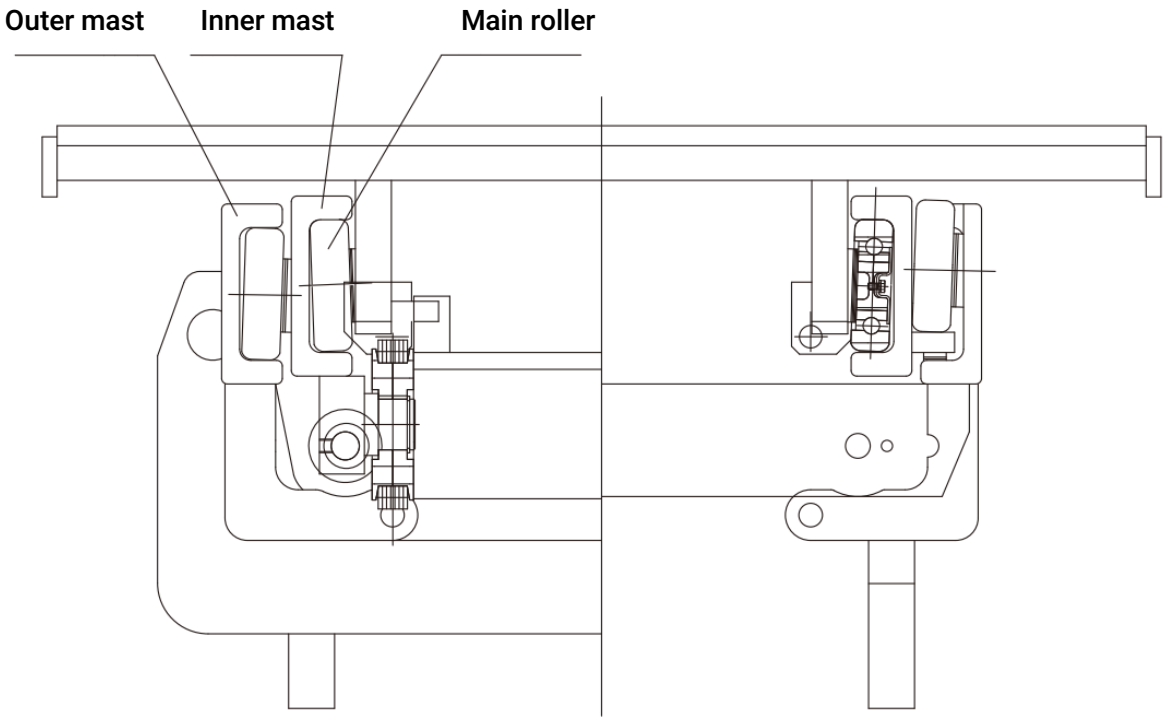


Fig. 9-1 Position of rollers

Attention

(A) Clearance of the side roller is 0.5mm

(B) Apply grease to the surfaces of the main rollers and the mast contact faces.

Maintenance

Adjust Lift Cylinder

It must readjust stroke of the lift cylinder when lifting cylinder, the inner mast or the outer mast is replaced. As following:

(1): Place piston rod heads with the upper beam of the inner mast without shims.

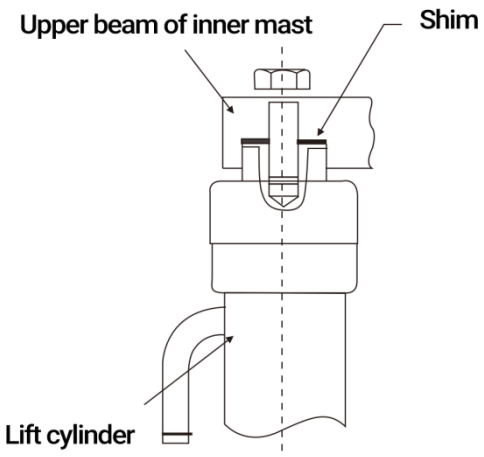


Fig. 9-2

(2): Ensure that two lift cylinders are lifted at the same time when the mast ascended the ultimately stroke.

(3): If they not lifted synchronously, add shims between the upper beam of the inner mast and the piston rod head which reaches the lift cylinder's ultimately stroke in movement. The shims' thickness is 0.2mm or 0.5mm.

(4): Adjust the tightness of lift chains. The adjustment of the lift cylinder also belongs to exalted maintenance, please be careful.

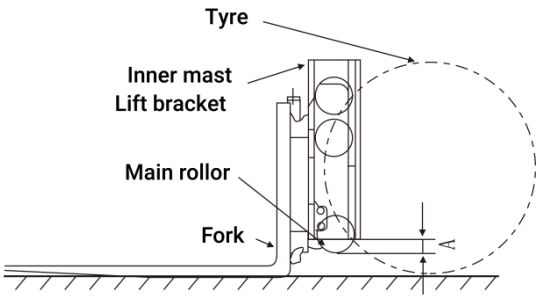


Fig. 9-3

Adjust lift bracket's Height

(1): The truck should be stopped on horizontal ground. and ensure the masts erect.

(2): Lower the forks on the ground; adjust the set nut of tie-in to the upper of chains to assure the distance A between main rollers and the lift bracket.

(3): Make the mast assembly tilt backward when forks descended to the ground.

Adjust the pulling force of lift chains and let the tightness of lift chains be equal.

The kind of forklift	A mm
2–2.5t	24–29

Fork and its width adjustment

Before loading and unloading, we should adjust the fork to a proper distance so as to fit the bracket size and loading.

WARNING

Be careful with your hand and fingers.

1. Drive the forklift to the loading goods and then step.

2. Adjust the mast to a upright position and then lift the fork 10 cm off the ground.

3. Tilt the mast forward.

4. Lift the button, turn 90 degrees, then loose it (under this condition, the fork can be moved to left or right.)

5. Adjust the fork distance according to loading goods, in order to let the load center in line with forklift center.

6. Adjust the mast to upright, turn the button 90 degrees, the button will be put in locking position (at this time, the fork is locked in right position).

7. After adjusting the fork distance, please check the fork is fastened by the block or not.

If the fork is not fastened by the block, when driving the forklift, the fork will move freely and maybe the goods may drop off.

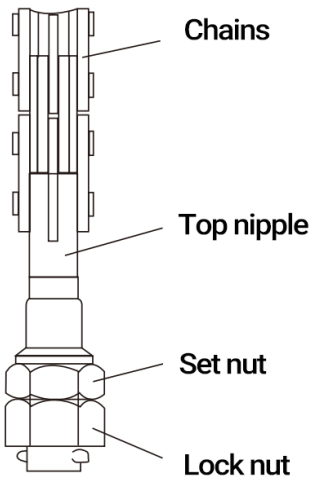
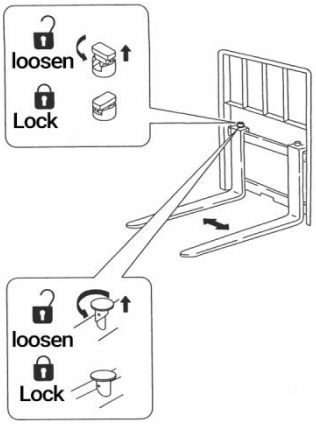


Fig. 9-4



Remark: There are two types of buttons, one is to turn 90 degrees and the other is to turn 180 degrees.

Replacing Rollers of the lift bracket

(1) Place a salver on the forks and make the forklift stop on the horizontal ground.

(2) Make the forks and salver descend to the ground.

(3) Take down tie-in top of the chains. And take out chains from sheave.

(4) Make the inner mast rise. (Fig. 9-5 ①)

(5) The forklift can be reversed when the lift bracket disengaged from the outer mast. (Fig. 9-5 ②)

(6) Replacing Main Rollers.

(a) Take apart all snap rings from the lift bracket and take out main rollers.

(b) Fit the new main roller (the same type as the old one) on the lift bracket and fastened with snap ring.

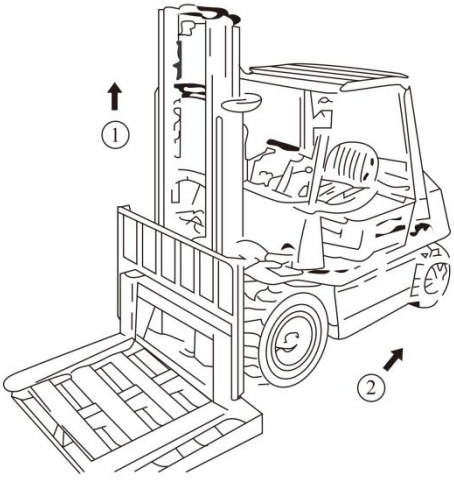


Fig. 9-5

Replacing Rollers of Masts

(1) Take apart the fork bracket from the inner mast, then replace the main roller follows the way as 9.5.4.

(2) Park the truck on the horizontal ground and lift up the wheel-wheel 250mm~300mm from the ground.

(3) Pull parking brake level fully, and use a wedge to make back-wheel stationary.

(4) Take apart bolts, which fastened, lift cylinders and the inner mast. Hang up the inner mast without losing shims of the piston rod heads carefully.

(5) Uninstall bolts which jointed lift cylinders and the bottom of outer mast and take part the oil-pipe between two lift cylinders without losing the nipple.

(6) Main rollers on the upper outer mast will be showed on the top of the inner mast as soon as main rollers were taken apart from the bottom of the inner mast after laying down the inner mast.

(7) Replacing main rollers.

(A) Take apart the upper main rollers without losing shims.

(B) Fit the new main roller and shims together on the outer mast

(8) Hang up the inner masts and let all rollers in the inner mast.

(9) Assembly the lift cylinder and the lift bracket as disassembly contrarily.

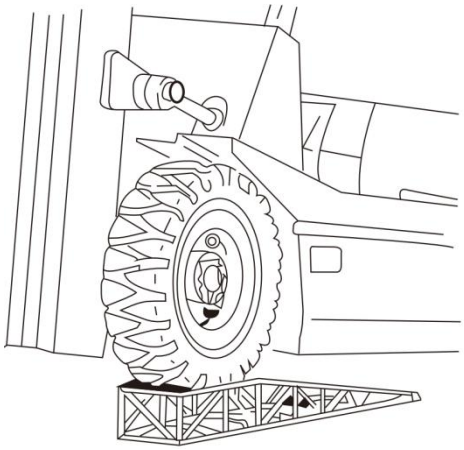


Fig. 9-6

5. Periodic servicing

This service schedule assumes the lift truck is used under normal operating conditions. If the lift truck is used under severe conditions, perform preventive maintenance more frequently.

(The black dots in the table means "Replacement".) G: Gasoline Truck D: Diesel Truck

Engine

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annually (2400hrs)
Engine	Visually inspect condition of engine rotation.		○	○	○	○	○
	Check for working noise from engine.		○	○	○	○	○
	Check that exhaust gas has proper-color.		○	○	○	○	○
	Check air cleaner element for dirt and clean.			Replace every 300 hrs			
	Check crankcase air breather for dirt and clean.				○	○	○
	Check that the valve clearance is correct.	Thickness gauge				○	○
	Retighten cylinder head bolt.	Torque wrench		All gas engines, for 1st time only			C240 diesel only
	Check cylinders for proper compression.	Compression gauge					○
PCV Device	Check metering valve and pipe for clogging or damage (G).					○	○
Governor or Injection Pump	Check no-load maximum rpm.	Tachometer					○
Lubrication System	Check for engine oil leak.			○	○	○	○
Lubrication System	Check engine oil for level and dirt.			○	○	○	○
	Replace engine oil.				Change at initial 50 hrs, after that, change every 200 hrs		
	Replace engine oil filter cartridge.				Change at initial 50 hrs, after that, change every 200 hrs		

Engine

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Fuel System	Visually check for fuel leak from pipe, pump or tank.		○	○	○	○	○
	Check fuel filter for clogging.				○	○	○
	Replace fuel filter (G).				Change every 300 hrs		
	Replace fuel filter cartridge (D)				Change every 400 hrs		
	Check that injection nozzle has correct inject press and pattern(D)	Nozzle tester				○	○
	Check the carburetor linkage for looseness or dirt (G).				○	○	○
	Check for ignition timing (G).	Timing light			○	○	○
	Check for ignition timing (D).						○
	Drain off water from fuel tank.				○	○	○
	Clean fuel tank.					○	●
	Check for fuel level.		○	○	○	○	○
Cooling System	Check for coolant level.		○	○	○	○	○
	Check for coolant leak.		○	○	○	○	○
	Check hoses for deterioration.				○	○	○
	Check radiator cap for condition and installation.		○	○	○	○	○
	Clean and change coolant.						●
	Check fan belt for tension and damage.		○	○	○	○	○

Power train

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Frictional Clutch	Check clutch pedal for free travel and clearance between pedal surface and floor when clutch is unlocked.	Scale	○	○	○	○	○
	Check for noise and operation.		○	○	○	○	○
	Check for slipping and engagement.		○	○	○	○	○
Transmission	Check change lever for operation and looseness.			○	○	○	○
	Check for oil leaks.		○		○	○	○
	Change oil.					●	●
Torque converter transmission	Check for oil leaks.		○	○	○	○	○
	Check for oil level, or change oil.			○	○	●	●
	Check change level for operation and looseness.			○	○	○	○
	Check control valve and clutch for proper operation.		○	○	○	○	○
	Check inching valve for proper operation.		○	○	○	○	○
	Check inching pedal for free travel and pedal travel.		○	○	○	○	○
	Replace line filter element.			●(at initial 200 hrs)		●	●
Front Axle	Check for oil leak.		○	○	○	○	○
	Change oil.					●	●
	Check mounting bolts for looseness.	Test hammer		○	○	○	○

Wheels

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Tires	Check for inflation pressure.	Tire gauge	○	○	○	○	○
	Check for cracks or damage.		○	○	○	○	○
	Check for tread wear.	Depth gauge		○	○	○	○
	Check for undue wear.		○	○	○	○	○
	Check for spikes, stones, or foreign matter.			○	○	○	○
Tire Fastners	Check for looseness.	Test hammer	○	○	○	○	○
	Check for damage.		○	○	○	○	○
Rim,side ring	Check for rim, side ring and disk wheel for damage.		○	○	○	○	○
Wheel Bearing	Check for looseness and noise.			○	○	○	○
	Clean and repack grease.					●	●
Axle	Check axle for deformation, cracks or damage.			○	○	○	○

Steering system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Steer Handwheel	Check for peripheral play.		○	○	○	○	○
	Check for vertical looseness.		○	○	○	○	○
	Check for sideways looseness.		○	○	○	○	○
	Check for proper operation.		○	○	○	○	○
Steering gear box	Check mounting bolts for looseness.			○	○	○	○
Knuckle rear axle	Check king pins for looseness or damage.			○	○	○	○

Steering system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Knuckle rear axle	Check for deflection,deformation, cracks or damage.			○	○	○	○
	Check for mounting condition.	Test hammer		○	○	○	○
Power steering	Check for operation.		○	○	○	○	○
	Check for oil leaks.		○	○	○	○	○
	Check for mounting parts and joints for looseness.			○	○	○	○

Brake system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Brake pedal	Check for free travel.		○	○	○	○	○
	Check for pedal travel.	Scale	○	○	○	○	○
	Check for proper operation.		○	○	○	○	○
	Check for air mixed in brake piping.		○	○	○	○	○
Parking Brake Lever	Check that lever is securely locked and has sufficient lever stroke.		○	○	○	○	○
	Check for proper operation.		○	○	○	○	○
Rod, cable, etc.	Check for operation.			○	○	○	○
	Check connections for looseness.			○	○	○	○
Hoses and pipes	Check for damage, leakage or collapse.			○	○	○	○
	Check for loose connections or clamping parts.			○	○	○	○
Brake master cylinde rwheel cylinder	Check for fluid leaks.			○	○	○	○
	Check for fluid level.		○	○	○	●	●

Brake system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annualy (2400hrs)
Brake master cylinder wheel cylinder	Check master cylinder and wheel cylinders for proper operation.						○
	Check master cylinder and wheel cylinders for fluid leaks or damage.						○
	Check master piston cup, and check valve for wear or damage. Change.						●
Brake Drum & Brake Shoe	Check drum mounting part for looseness.	Test hammer		○	○	○	○
	Check lining for wear.	Slide calipers					○
	Check brake shoes for proper operation.						○
	Check anchor pin for rust.						○
	Check return spring for deterioration.	Scale					○
	Check automatic clearance adjuster for operation.						○
	Check drum for wear or damage.						○
Back Plate	Check back plate deformation.						○
	Check for craks.	Penetrant test					○
	Check mounting parts for looseness.	Test hammer					○

Loading system

Checking Item	Service Required	Tools	Daily (8h)	Monthly (200h)	Trimonthly (600h)	Semiannually (1200h)	Annual (2400h)
Fork	Check forks for damage, deformation or wear.		○	○	○	○	○
	Check for stopper pins for damage or wear.				○	○	○
	Check fork base and hook weldings for defective cracks or wear.			○	○	○	○
Mast & Lift Bracket	Check cross members on outer and inner masts for defective weld, cracks or damage.			○	○	○	○
	Check tilt cylinder bracket and masts for defective weld, cracks or damage.			○	○	○	○

Loading system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semainnually (1200hrs)	Annualy (2400hrs)
Mast & Lift Bracket	Check outer and inner masts for defective weld, cracks or damage.			○	○	○	○
	Check for defective weld, cracks or damage of lift bracket.			○	○	○	○
	Check roller bearings for looseness.			○	○	○	○
	Check mast support bushings for wear or damage.						○
	Check mast support cap bolts for looseness.	Test hammer		○ (for 1st time only)		○	○
	Check lift cylinder tail bolts, piston rod head bolts, U-bolts, and piston head guide bolts for looseness.	Test hammer		○ (for 1st time only)		○	○
	Check rollers, roller pins and welded parts for cracks or damage.			○	○	○	○
Chains & Sheave	Check chains for tension, deformation, damage or rust.		○	○	○	○	○
	Lubrication of chains.			○	○	○	○
	Check connection of chain anchor pin and chain for looseness.			○	○	○	○
	Check sheave for deformation or damage.			○	○	○	○
	Check sheave for deformation or damage.			○	○	○	○
Optional Attachment	Perform general inspection			○	○	○	○

Cylinders	Check piston rod, screw and rod end for looseness, deformation or damage.	Test hammer	○	○	○	○	○
	Check cylinders for proper operation.		○	○	○	○	○
	Check for oil leaks.		○	○	○	○	○
	Check pins and cylinder bushings for wear or damage.			○	○	○	○
Hydraulic Pump	Check hydraulic pump for oil leaks or noise.		○	○	○	○	○
	Check pump drive gear for wear.			○	○	○	○

Hydraulic system

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annually (2400hrs)
Hydraulic Reservoir	Check for oil level. Change oil.		○	○	○	●	●
	Clean suction strainer.					○	○
	Drain foreign matter.					○	○
Return Filter	Replace return filter.					●	●
Control Lever	Check levers for looseness at link.		○	○	○	○	○
	Check for proper operation.		○	○	○	○	
Control Valve	Check for oil leaks.		○	○	○	○	○
	Check relief valve and tilt lock valve for proper operation.			○	○	○	○
	Measure relief pressure.	Oil pres. gauge.				○	○
Hose, piping hose Reel & Swivel Joint	Check for oil leaks, looseness, collapse, deformation and damage.		○	○	○	○	○
	Change hoses.						●(1 or 2 years)

Electricals

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annually (2400hrs)
Ignition Device(for gasoline truck)	Check distributor cap for crack.				○	○	○
	Check spark plug for burn.						○
	Adjust spark plug clearance	Plug gap gauge			○	○	○
	Clean spark plug .				○	○	○
	Check the distributor cap and high-voltage cables for proper installation.						○
	Check distributor segment for burn.						○
	Check distributor center piece for wear or damage.						○

Electricals

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannuall y (1200hrs)	Annually (2400hrs)
Ignition Device(for gasoline truck)	Apply grease on shaft, cam heel and breaker fulcrum.				○	○	○
	Check high-voltage cord for breakage.	Tester					○
Starter	Check pinion gear for correct engagement.				○	○	○
Battery	Check battery electrolyte level. Clean battery.			○	○	○	○
	Check specific gravity of electrolyte.	Hydrometer			○	○	○
Wiring	Check wire harness for damage and clamps for looseness.			○	○	○	○
	Check connections for looseness.				○	○	○

Safety apparatus & accessories

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annually (2400hrs)
Overhead Guard & Load Backrest	Check for tight installation.	Test hammer	○	○	○	○	○
	Check for deformation, cracks or damage.		○	○	○	○	○
Turn Signal	Check for proper operation and tight installation.		○	○	○	○	○
Horn	Check for proper operation and tight installation.		○	○	○	○	○
Lights & Lamps	Check for proper operation and tight installation.		○	○	○	○	○
Back-up Buzzer	Check for proper operation and tight installation.		○	○	○	○	○
Rear View Mirror	Check for dirt or damage.		○	○	○	○	○
	Check for good field of vision.		○	○	○	○	○
Meters	Check meters for proper operation.		○	○	○	○	○
Driver's Seat	Check for damage or loose bolts.					○	○
Body	Check frame and cross members for damage or cracks						○

Safety apparatus & accessories

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semiannually (1200hrs)	Annually (2400hrs)
Body	Check for loose rivets or bolts.	Test hammer					○
	Check items repaired in preceding inspection, if any.		○	○	○	○	○
	Inspection general condition of body.						○
Grease-up & oil change	After cleaning, check for greased condition of chassis.	Grease pump		○	○	○	○
	Check oil condition of oil and fluid in reservoir.						○

CAUTION

Local refined oils and cooling water, coolant, or anti-freeze do not allow the same operation period designated in this manual.

So must be changed more frequently as half or quarter of the designated period in this manual.

Multi-viscosity oils allow a wider temperature range for operation but must be changed more frequently as the addition that provides the multi-viscosity gradually deteriorates lowering the viscosity. Degradation of viscosity at the higher temperatures can be very detrimental to the hydraulic system.

Maintenance records

Name	Date	Inspection parts	Lubrication parts	Replacement parts	Remark

WARRANTY INFORMATION: Please refer to our website for detailed warranty conditions and coverage.
For the most up-to-date and comprehensive warranty information, visit **www.tmgindustrial.com**