

VIPER

LIFT TRUCKS

OPERATION & SERVICE MANUAL

3 - 3.5 TON

INTERNAL COMBUSTION ROUGH TERRAIN FORKLIFT TRUCK



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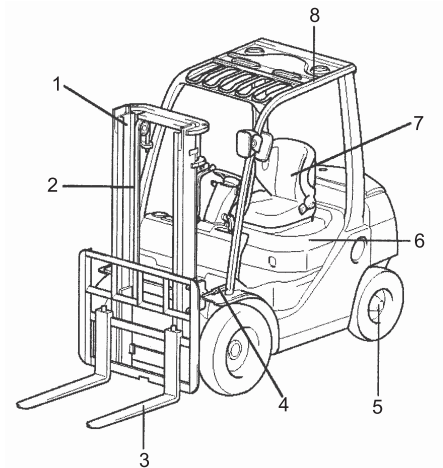
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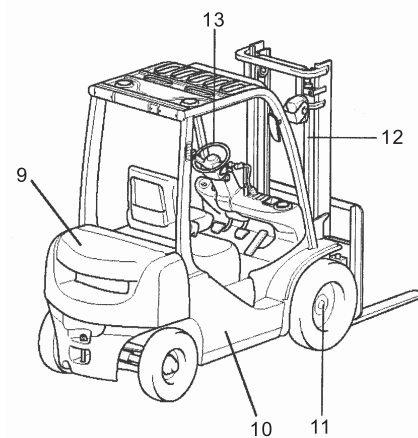
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I . Forklift components description and warning marks

MAIN COMPONENTS

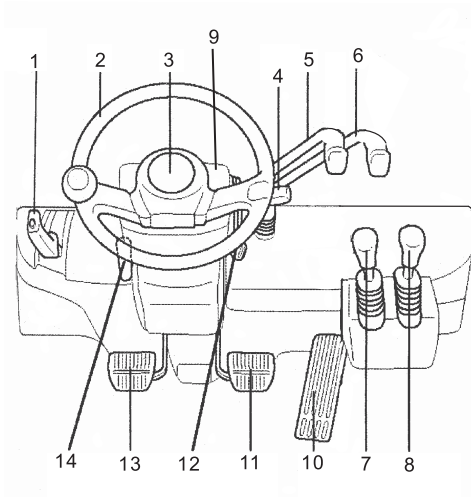


- 1.Mast
- 2.Chain
- 3.Fork
- 4.Tilt cylinder
- 5.Rear axle
- 6.Engine hood
- 7.Oprator's seat
- 8.Head guard

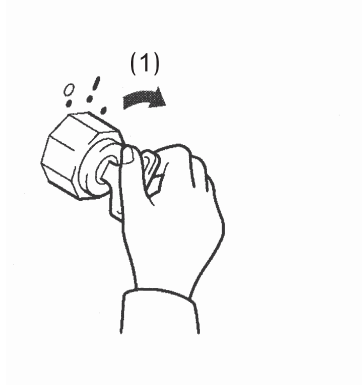


- 9.Counter weight
- 10.Frame
- 11.Drive axle
- 12.Lift cylinder
- 13.Steering wheel

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 wheel adjust lever



(1)START

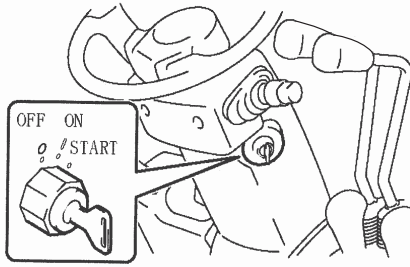
Check method of each warning lamp

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.

SWITCHES AND LEVERS



clockwise from the (ON) position .

After engine starting , release the key and it will return to the (ON) position automatically .

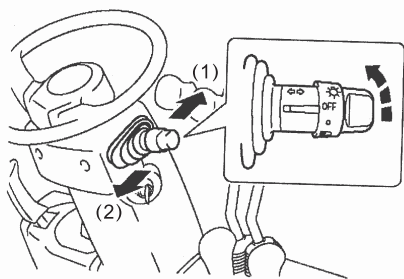
In the torque converter model , the engine does not start unless the control lever is in the neutral position .

Caution

- . Never operate the ignition switch without firstly sitting on the seat .Otherwise , the forklift could start to move uncontrolled , causing an accident .
- . Do not leave the switch in the (ON) position when the engine is stopped . It may cause over discharge of the battery .
- . Do not turn the switch to the START position while the engine is running .
- . For the sake of safety it is recommended to always start the engine of a vehicle with the transmission gear shift lever shifted in the neutral position .
- . Do not operate the starter motor for more than 30 seconds continuously . Return the switch to the (OFF) position and wait at least 30 seconds prior to attempt restarting .

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 diagnosis lamp does not go off even when the operator sits on the seats , the battery power 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 ask a Good Sense 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 a 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 clearance 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 . It may cause over discharge of the battery to make engine starting impossible .

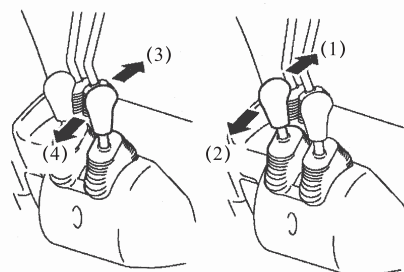
Turn signal switch (Option)

Make the turn signal lamps blink

Left turnPush forward

Right turnPull backward

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



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

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 .

⚠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.

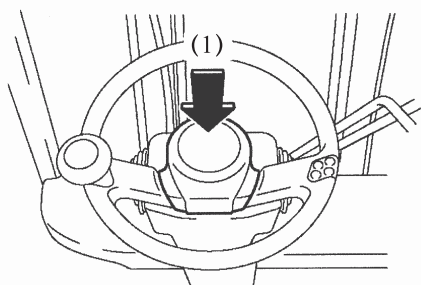
Low speed.....Push the lever forward

High speed.....Pull the lever backward

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

⚠ Caution

- Bring the vehicle to a perfect stop before operating 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 .

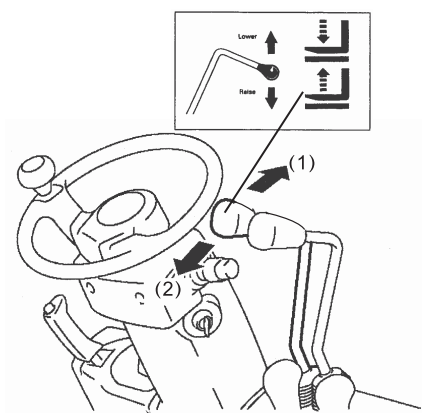


(1) Push

Horn button

Press the button in the center of the steering wheel to sound the horn .

The horn will sound even when the ignition switches off .



(1) Lower
(2) Raise

Lift lever

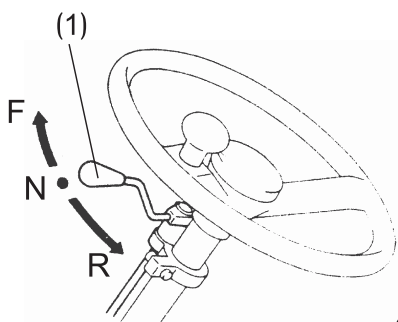
Raise and lower the forks .

Raise.....Pull backward

Lower.....Push forward

The lifting speed can be adjusted by the degrees of accelerator pedal depression and lever operating stroke .

The lowering speed can be adjusted only by the degree of lever operating stroke .



(1) Forward-reverse lever

Forward-reverse lever

Lever for shifting between forward and reverse .

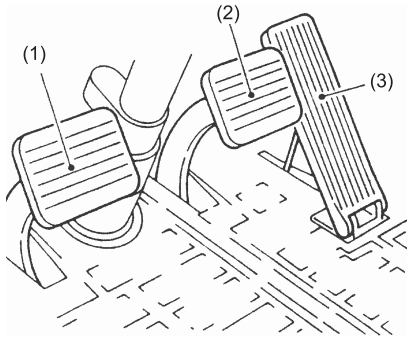
Forward IPush the lever forward(F)

Reverse IPull 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 .



Inching Pedal(1)

As the inching pedal is pressed, the oil pressure in the hydraulic clutch drops accordingly the oil allowing the operator to perform inching operation. Use this pedal to inch the truck while operating the hoist system at a high speed.

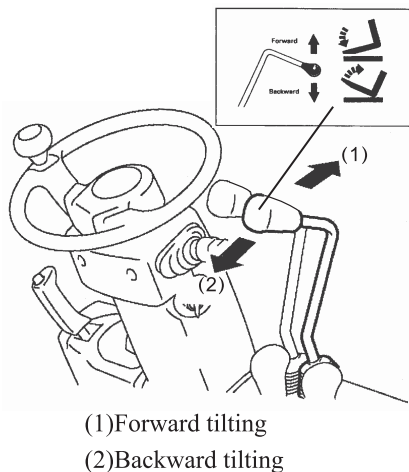
When pressed to the full, this inching pedal serves as a brake pedal.

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 .

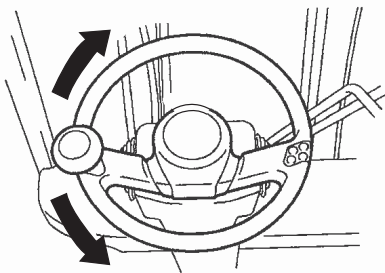
Forward.....Push forward

Backward.....Pull backward

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

⚠ Caution

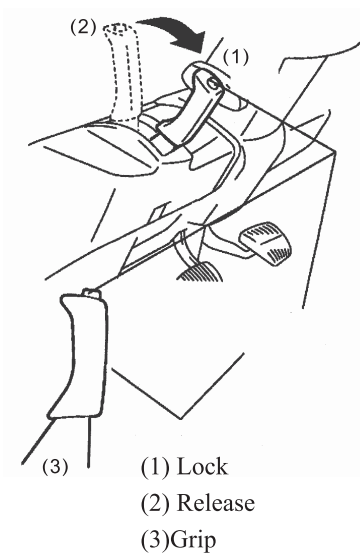
. Always operate the tilt lever from a seated position .



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 .

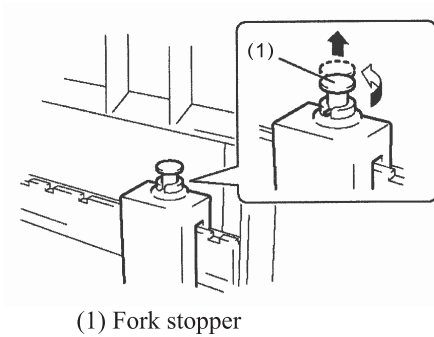


Parking brake lever

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 . while operating the parking brake lever , keep the brake pedal fully depressed .

⚠ 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 .
- Traveling without releasing the brake will spoil the brake performance .



Forks

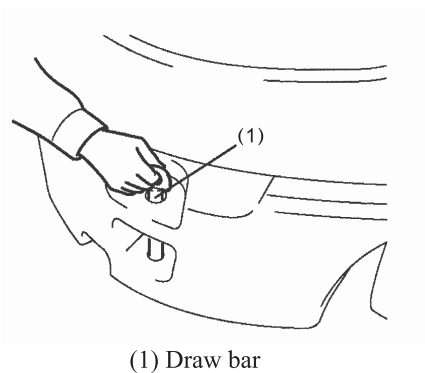
Lift each fork stopper and turn to release so that forks can be shifted left and right .

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 .

⚠ Warning

Make the forks are locked before carrying a load .



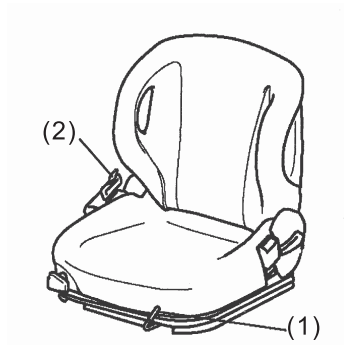
Draw bar

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 .

⚠ Caution

The draw bar should not be used for towing the forklift or for towing another vehicle using the forklift .



(1) Seat slide lever
(2) Seat belt

Operator's seat

The operator's seat and seat belt are provided for your safety .The seat can be moved back and forth for position adjustment while the adjust lever is pulled upward .

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 .

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

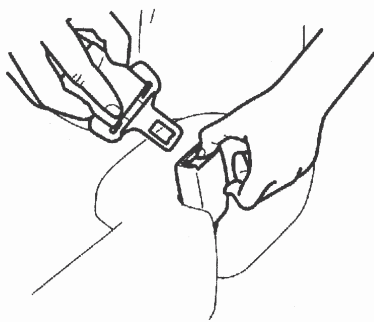
After adjustment , lightly shake the seat forward and backward to confirm that the seat is firmly locked in position .

Seat belt

To fasten your seat belt , pull it out of the retractor 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 .

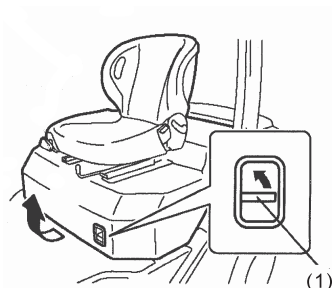
Disconnecting method

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 . Your chances for avoiding serious injury or death in a tip over are better if you stay with the truck in the operator's compartment.
- . 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 , don't jump , grip the steering wheel , brace your feet , lean away from the direction of tip over , and stay with the truck .Please always buckle up your seat belt when driving your truck .



(1) Engine hood lock release lever

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 , then shake the hood slightly to check that the gas spring has been securely fastened before letting go .

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 .

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



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

The driver and administrator of the forklift must keep “Safety First ” in mind and conduct the safe and standard operation according to the *Instruction book of utility and maintenance* and *The Driver manual*.

1. Transportation of forklift

Pay attention to the followings when carrying the forklift to the container or the car:

- (1) Brake the brake level.
- (2) Fix the mast and count weight by steel cable both front and rear, the front and rear tire should be cushioned .
- (3) When hanging, according to the instruction of the “ anging signal ” lift the loads.

2. Safekeeping of forklift

- (1) No fuel in tank don't let out if the cooling liquid is rustproof and antifreeze liquid.
- (2) Apply the rustproof oil to the nonlacquer surface and apply lubrication to the up-and-down roller hinge.
- (3) Low the bracket to the lowest level.
- (4) Put on the brake shift.
- (5) Cushion the forward and backward wheel.

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 beginning working with ensure safety .



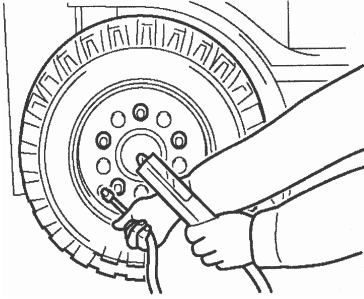
Item	Inspection
Previously detected malfunction	Correct
Exterior	Vehicle body , oil leakage , water leakage, loose parts, exterior damage .
Wheels	Tire pressure , wear or damage , rims hub nuts.
Lamps	Lamp condition , damaged lamps .
Hydraulic oil	Oil lever , contamination , consistency .
Radiator	Coolant lever , antifreeze requirement .
Engine	Oil lever , 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

Does the vehicle lean to one side or the other ?

If so , check for a tire puncture or a problem of the undercarriage .



(2) Beneath the vehicle

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

Check for loose parts or damage .

If any unusual condition is found , have the vehicle inspected with the help of a Good Sense dealer .

(3) Tire inspection

Tire pressure inspection

1. Use a tire pressure gauge and measure the inflation pressure .

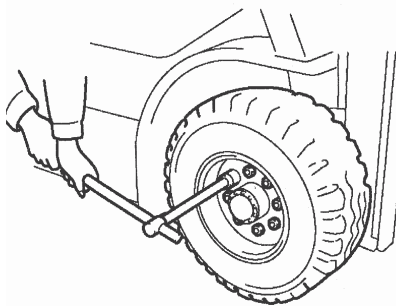
Adjust it to the proper level .

2. 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 .

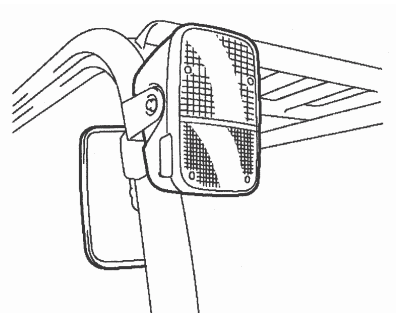
If the tires are damaged , or there is a marked difference in the wearing of tires between the front and rear or between the left and right is perceived , or bent rims are found , ask a Good Sense dealer for inspection .



(4) Hub nut inspection

Check the tightness of the hub nuts .

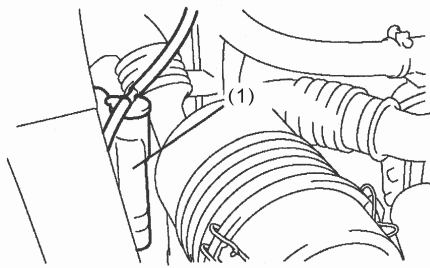
Avoid uneven torque and tighten all of the nuts uniformly .



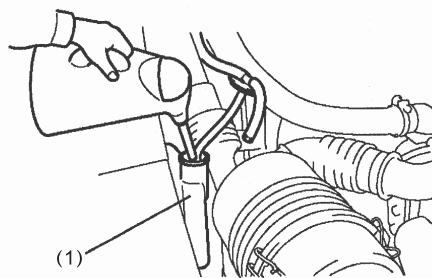
(5) Lamp inspection

Are the filaments intact ? Is there any lens damage ?

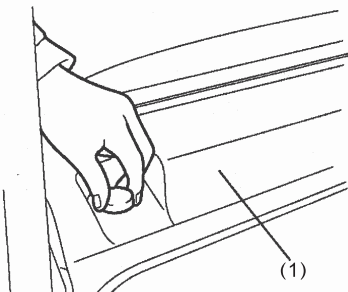
Always keep the lenses clean to ensure proper forward vision .



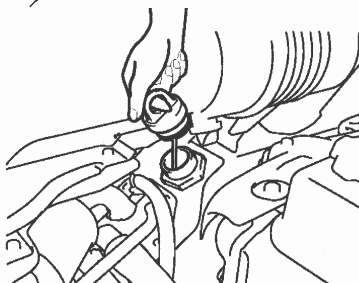
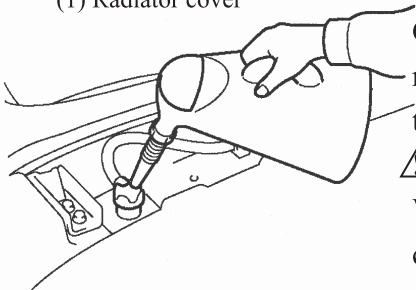
(1) Reservoir tank



(1) Reservoir tank



(1) Radiator cover



(6) Engine compartment inspection

Engine coolant level check and supply

Level check and supply of engine coolant shall be performed while the coolant is cool .

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

Note :

The reservoir tank equipment to the radiator automatically supplies the engine coolant when the coolant quantity in the radiator becomes insufficient .

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) in the engine coolant must be 30% (or 50% in a frigid zone .)

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 .

Note :

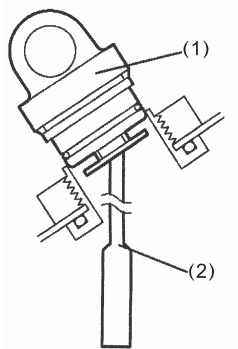
Close and tighten the radiator cap , match the pawl on the reverse side of the cap with the notch on the filler port and turn the cap fully clockwise while applying a downward force .

⚠ Warning

When the engine is hot , it is very dangerous to remove the cap. Coolant level check must always be performed when the engine is cold .

(8) Checking hydraulic oil level

Always stop the engine and lower the fork to the ground before checking the level of the hydraulic oil , while the vehicle is on level ground .Oil pollution level should be limited within twelve degrees.

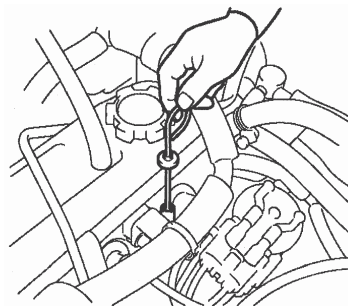


(1) Oil cap
(2) Level identifier

1. Open the engine hood and remove the oil cap .
2. Wipe the level gauge attached to the oil cap with clean cloth, and insert it again into the tank .

Note :

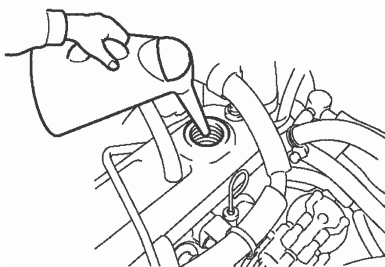
- Inspect the oil level by placing the level gauge on the opening of the oil supply inlet without pushing the oil cap in .
3. Extract the level gauge gently and check if the oil adhesion is up to the level line .
 4. If the oil level is insufficient , add oil . Spilled and splashed oil must be wiped off thoroughly . Adjust the oil level so that it will fall within a range of 0 thru +10mm from the lift-high mark on the gauge as illustrated on the left side .



(9) Engine oil inspection

1. Park the vehicle on a flat ground . If the vehicle is inclined , the indicated level may be incorrect .
2. The oil level must be checked before starting the engine or at least 3 minutes after the engine is stopped .
3. 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 .
4. 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

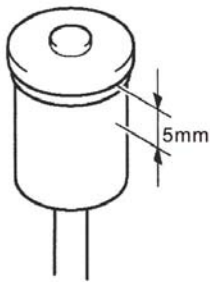
⚠ Caution

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

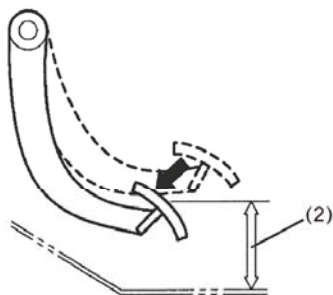
With the engine off , check the level of the brake fluid in the reservoir tank . The level should be within the range shown in the figure . If the level is below the lower limit , add brake fluid up to the proper level . If the decrease in brake fluid is excessive , the brake system may be leaky . Ask a Good Sense 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 .



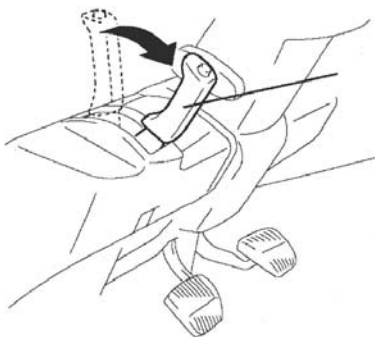
(1) Brake pedal
(2) Brake pedal floor clearance

(12) Brake pedal inspection

1. Depress the brake pedal fully , and check the floor clearance (clearance between the pedal and floor).
2. Make sure that the pedal does not go any further when it is kept depressed .
3. Also check that no abnormality is observed with pedal depression and return .
4. Manually depress the brake pedal to check the play until a resistance is felt .

⚠ Warning

Ask a Good Sense dealer for inspection if the play is excessive, pedal movement is abnormal or brake performance is improper .



(1) Parking Brake lever

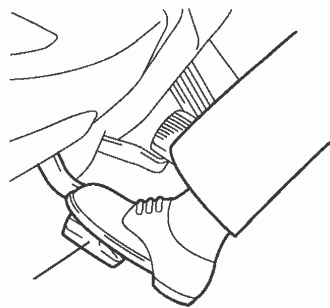
(13) Parking brake inspection

Parking brake lever

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

⚠ Warning

Ask a Good Sense dealer for inspection if any abnormality is found .



(1) Clutch pedal

(14) Clutch pedal inspection (Mechanical models)

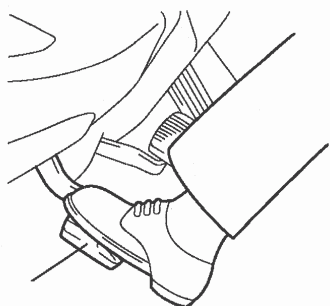
Note :

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

1. Manually depress the clutch pedal to check the play until a resistance is felt .
2. Depress the clutch pedal and check that there is no obstruction or abnormal resistance .

⚠ Caution

Ask a Good Sense dealer for inspection when any abnormality is found .



(1) Inching and brake pedal

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

1. Manually depress the inching and brake pedal to check the play until a resistance is felt .
2. Depress the inching and brake pedal and check that there is no destruction or abnormal resistance .

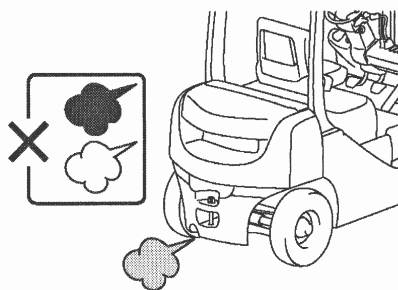
⚠ Caution

Ask a Good Sense dealer for inspection when any abnormality is found .

(16) Engine inspection

Start the engine and warm it up sufficiently .

1. Check each meter and warning lamp to see there is no abnormality .
2. Check if the engine is generating abnormal sound or vibration .
3. 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

. The exhaust gas is harmful . Before you start the engine inside a building or enclosure , insure a sufficient ventilation .

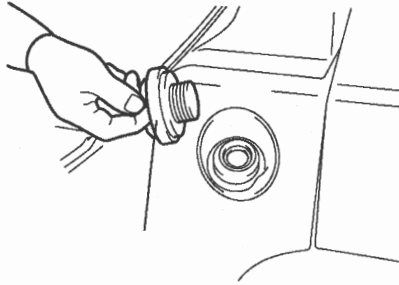
. The gasoline engine carburetor is equipped with the automatic choke that keeps the engine running at a relatively high speed for a while .

Do not be bothered , however , becomes the engine resumes a normal speed upon warning enough .

(17) Fuel level check and supply

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

Note :



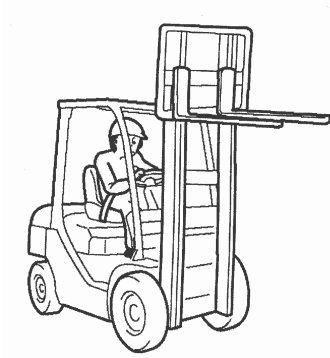
After the end of daily operation , fill the tank with fuel to prevent the moisture of the air out side the tank from mixing with the fuel .

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

3. 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 .



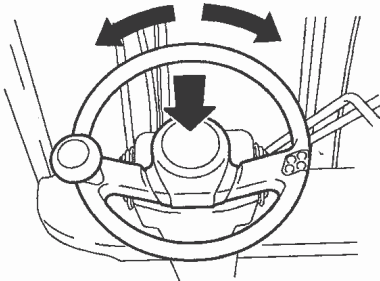
(18) Load handling system

1. Check the fork installation state for cracks and bending .
 2. Check for mast distortion , chain tension and oil leakage from cylinders and piping .
 3. 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 .



1. Check the steering wheel play with the rear wheel and set in the straight traveling direction .
2. Turn the steering wheel in the circumferential direction and also move it up and down to make sure there is no looseness .
3. Push the horn button to see the horn sounds normally .
4. If any abnormality is found , ask a Good Sense 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) The driver who has been trained and held the driver license can 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 control and alarm mechanism before driving .If find the damage or flaw, operate after repair
- (4) The load should not surpass the standard value during the transportation , the fork should completely insert fully below the goods and put the goods on the fork evenly , using single fork to lift the goods is not allowed
- (5)Successfully start the machine , turn around , steer , brake and stop . Drive slowly when turning around on dankish or slippy road surface .
- (6) Tilt the mast backward , and lower goods when running .
- (7) Carefully driving , when running on the ramp which lean degree more than tenth ,steering forward when up to the ramp , drive reverse when down to the ramp . Forbid turning around , loading and unloading when up or down to the ramp .
- (8) Paying attention to passerby , barrier , pothole during the running , also the space above the forklift .
- (9) Forbid to stand on the fork and not allowed carry people .
- (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) Don't carry unfixed or loose goods and carry the bigger goods more carefully.

(18) The fork should lay groundly, and make the handle on the neutral gear, cut off the power when leaving the forklift; Pull the parking brake when stopping on the slope or flat ground, if would stop for a long time, cushion the tire.

(19) Don't open the lid of the water tank when the generator is very hot.

(20) The pressure of relief valve of control valve and the steering unit has already been set after production, Don't adjust randomly during the operation so as to avoid to destroy the whole hydraulic system or the hydraulic components because of the pressure is too high.

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

(22) Forklift noise on the operator seat is measured by sound pressure level while around the operator is measured by sound power level. The noise in the operator seat is not more than 98dB(A), radiated noise is not more than 114dB(A). Vibration pass to operator is less than 5m/s².

(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) Check the chain regularly in the process of using in order to guarantee the good lubricating condition between the chains; the degree of loosening and tightening of the left and right hinge is the same. If the chain has the phenomenon of being damaged in the process of using. When the change values of hinge distance vary from the 2% of the standard volume, the chains must be changed so as to guarantee the safety.

(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) Operate on the rough ground , arouse noise and strengthened vibration could be result in hurting body , such as back pain . Please operate the forklift on the flat road or ground .

(27) Do not dismount the overhead guard and backrest ! Install them for protecting operators from the falling objects . Overhead safeguard meet the safety standard .

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

(29) Forbid to do dismantlement of Good Sense forklift privately, if indeed demanded , please contact sale agent and after service department first .

(30) Please strictly choose Good Sense preparative articles and spare parts. we will not take any corresponding responsibility if you don't normally use appointed Good Sense preparative articles and spare parts .

(31) Pay special attention to the disposal of rejectment 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 , impregnant , battery , refrigeration oil .

(32) Please repair the forklift in time when there is something wrong with the forklift . Except some parts which are prescribed in the manual can be repaired by oneself ,please contact the appointed sale agent or Good Sense dealers in time when the forklift should be repair urgently or rush to repair .

(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) In the process of using the forklift, if encountering the “ boiling of the pot ” of the radiator or the high temperature of the cooling water, don't open the radiator 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) To the radiator of which the cooling liquid often uses the rustproof or antifreeze liquid (model FD-2 minor 35), the different kind of antifreeze liquid and water can't be added randomly. 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

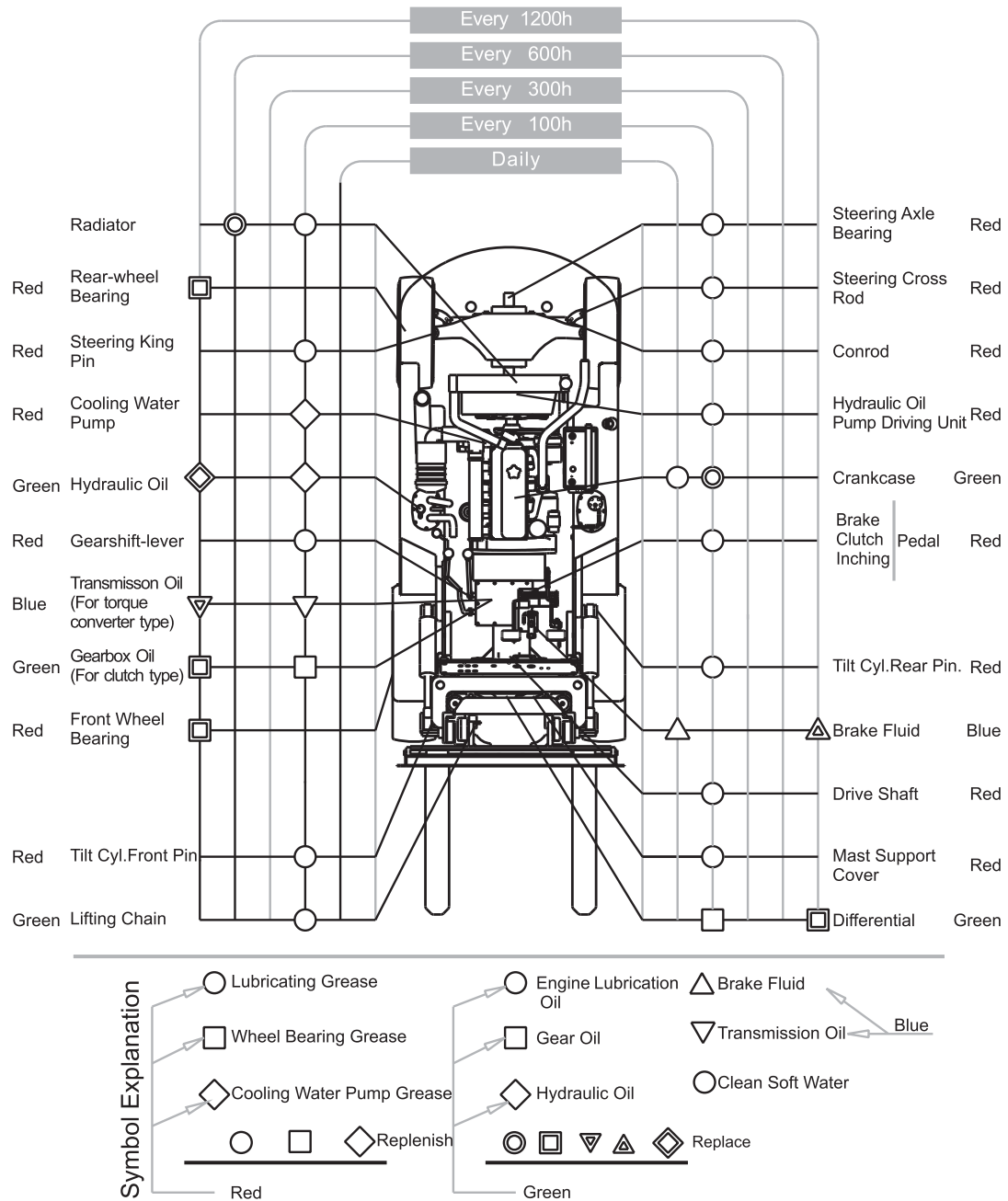
Name	Brand and temp. of using				
Diesel	Brand(diesel)	0#	-10#	-20#	-35#
	Temp. of using	≥4	≥-5	≥-5~-14	≥-14~-29
Gear oil (diesel,CD)	Sticky grade	5W/30	10W/30	15W/40	20W/50
	Temp. of using	-30~+30	-25~+30	-20~+40	-15~+50
Hydraulic oil	Sticky grade	L-HM46 wearable hydraulic oil		L-HV32 low temp. wearable oil	
	Temp. of using	≥-5		≥-20(cold region)	
Torque converter oil	8# Tor-con oil				
Brake fluid	D0T3 compound brake fluid GB12981				
Lubricating oil	3# lithium base grease (-20℃~120℃)				
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℃		-45℃	
	Temp. of using	≥-25		≥-45	

Removable parts

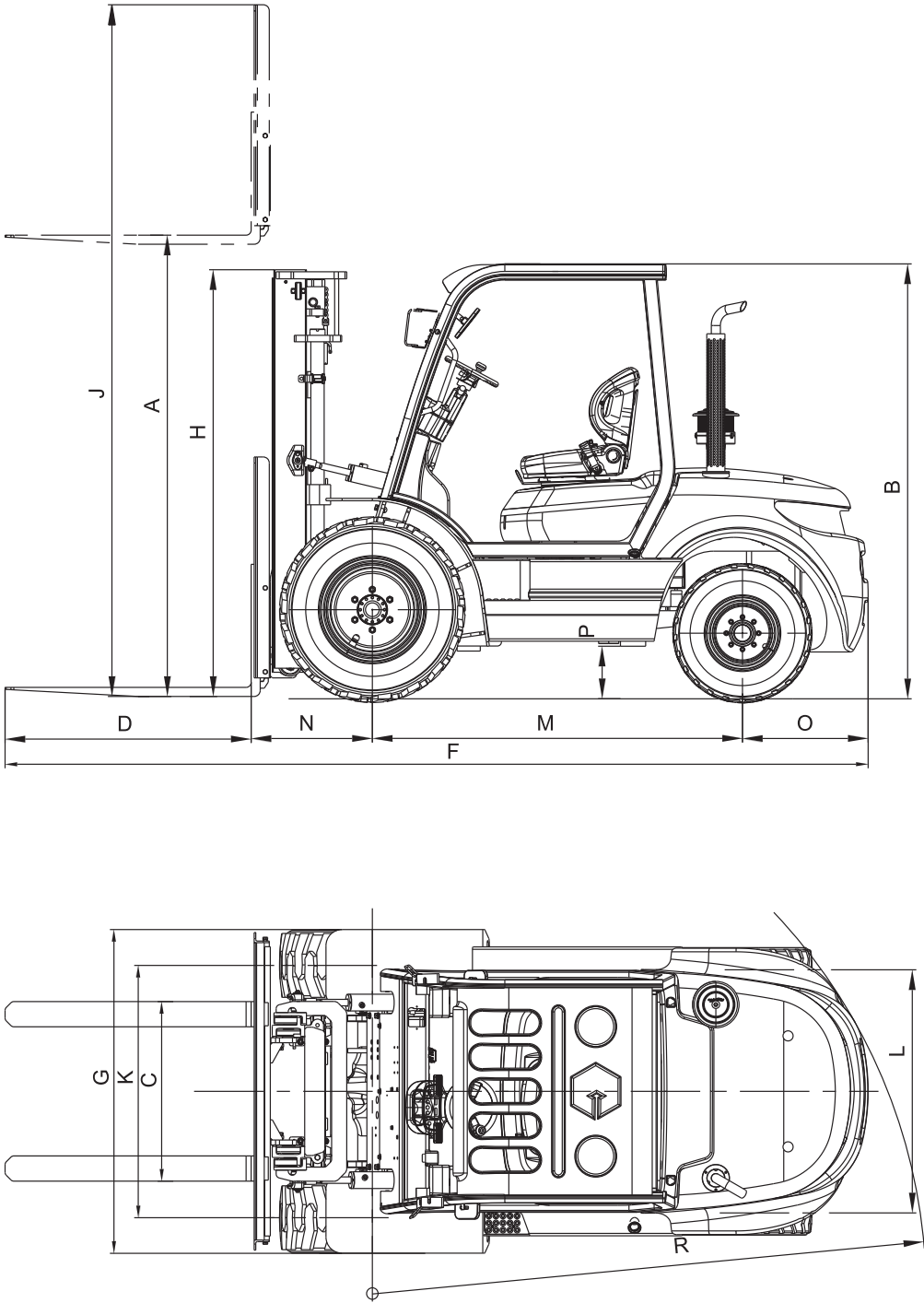
Item \ Model FD/FQ/FY		Units	30	35
Mast	Exterior size	mm	2110 $\times$ 1580 $\times$ 650	2110 $\times$ 1580 $\times$ 650
	weight	kg	835	870
Counter weight	Exterior size	mm	1135 $\times$ 1420 $\times$ 916	1135 $\times$ 1420 $\times$ 916
	weight	kg	1820	2150

7. Lubrication system picture:

LUBRICATION SYSTEM DIAGRAM



III. The main technical parameter of forklift



Forklift Figure

Main technical parameter

No	Sign	Item	Model	RTD30	RTD35
1	A	Lift height		3000	
2	C	Adjust internal for forklift		250/1500	250/1500
3	D	Length of forks		1070	1070
4	E	Mast tilt angle (Front~Rear)		8°~10°	
5	F	Whole length		4280	4330
6	G	Whole width		1600	1600
7	H	Whole height (bracket)		2210	2210
8	B	Whole height (head guard)		2200	2200
9	J	Whole height (bracket extension)		4250	4250
10	K	The distance of wheel (Front)		1250	1250
11	L	The distance of wheel (Rear)		1205	1205
12	M	The distance for axis		1835	1835
13	N	Front suspension		601	601
14	O	Back Suspension		632	678
15	P	Ground clearance (Frame)		305	305
		Ground clearance (Bracket)		190	190

Main technical parameter

Item \ Model			Unit	RTD30	RTD35	
Work capacity	Load center		Kg	3000	3500	
	Rated Capacity		mm	600	600	
	Lift height		mm	3000	3000	
	Mast tilt angle(Front-Rear)		°	10/12	10/12	
	The minimum turning radius		mm	2750	2810	
	The minimum width for right-angle heap		mm	2615	2675	
	Speed	Movement speed (No/Full load)	Km/h	22/22	22/22	
		Lift speed (No/Full load)	mm/s	480/450	480/450	
		Drop speed (No/Full load)	mm/s	400/500	400/500	
	Maximum tractive force		KN	17	17	
The degree for climb		%	16	16		
Tire	Tire type		Front		14-17.5-14PR	14-17.5-14PR
			Rear		27×10-12-12PR	27×10-12-12PR
	Inflation pressure		Front	bar	560	560
			Rear	bar	720	720
	Wheel base		mm	1835	1835	
Weight	Self weight		kg	4800	5150	
	Axis load	Full load	Front	kg	7000	7795
			Rear	kg	800	1005
		No load	Front	kg	1920	1975
			Rear	kg	2880	3325

IV.The structure ,principle ,adjustment and maintenance of forklift

1. Power system

1.1 This series include the model of diesel, the generator connects with the transmission mechanism, the generator connects with car frame through rubber cushion in order to lower vibration.

The main parameter for gasoline machine

	Unit	Parameter		
Model		4TNE98-BQFLC	4TNV94L-BXPHZ	B3.3-C65T3
Manufacturer		YANMAR	YANMAR	Cummins
Model		Four stroke, water cool, straight arrangement		
Rated power	Kw	42.1/2300	34.6/2400	48/2600
Rated torque	N.m	186-206/1700	191-208/1500	214/1600
The number of cylinders		4	4	4
cylinder diameter*distance	mm	98×110	94×110	95×115
Total dischargement	L	3.318	3.054	3.3
The ratio for compress		21.4	19	18.8
The minimum consumption rate for flaming fuel	g/kW-h	272	238	
Length*width*height	mm	711.5×520×718	729×560×718	711.5×520×718
Weight	Kg	225	260	245
The direction of twisting		Clockwise		
The cooling system		Forced cycled water cooling		
The lubrication system		Forced lubrication		
Battery voltage	V/Ah	12/90		
Lubrication fuel	L	2-7.5	2.4-7.6	2.5-7
Cooling water	L	4.2	4.2	4.5

1.2 The check and adjustment of the generator

1.2.1 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)

1.2.2 the machine oil filter

1. 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)

1.2.3 Water tank and 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.

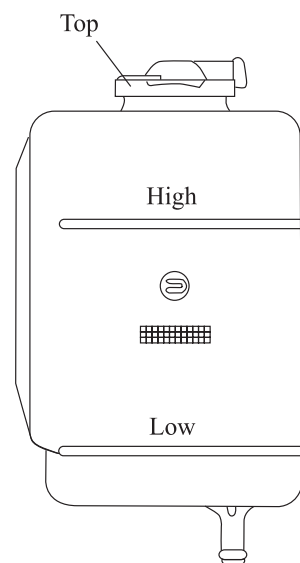


Fig1-1 attached water tank

- (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) Loose the generator and install the screw

(b) Adjust the tightness of the belt by moving engine, using finger to press belt with 10 Kg power, press down 10mm at maximum's length.

1. 2. 4 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.

1. 2. 5 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) 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.

1.3 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.

1.3.1 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.

1.3.2 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.

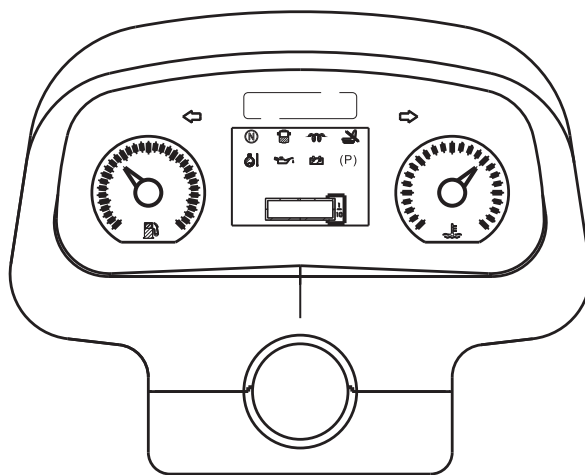
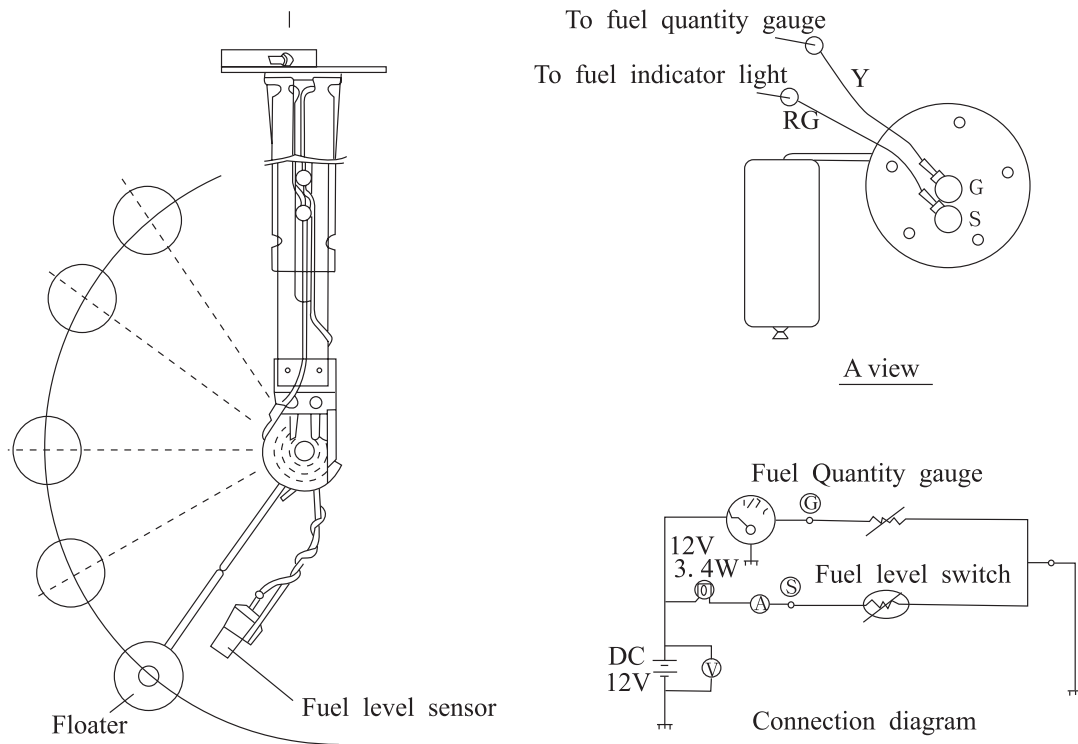


Fig 1-5 Digital Indicator

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 flaming 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 flaming fuel table 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 flaming fuel of the tank is. On the contrary, the more left the light pillar is, the less flaming fuel of tank is. Of course buzzer will ring when the fuel is the minimum and it will remind drivers to refuel.

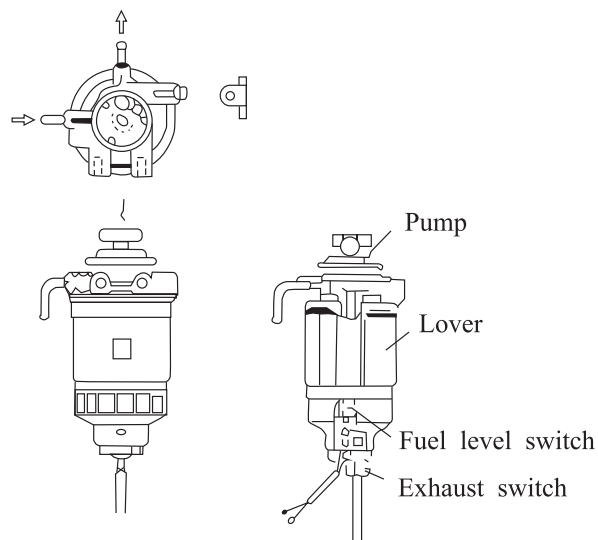


1.3.3 the maintenance of the flaming fuel system

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

Furnishing on the flaming fuel tank (diesel type) is used to filter the flaming fuel, which supplies the generator. Also acts the role of separating the water from the flaming fuel.



Diesel Type

1. 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.

1.4 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.

2. Electric gas system

2.1 Summary

The electric gas system is the single line circuit connecting ground and it consists of the following systems:

(1) Charging system

It consists of the generator, battery, indicating lamp and provides electric source, voltage : DC12V for the electric equipment of the forklift.

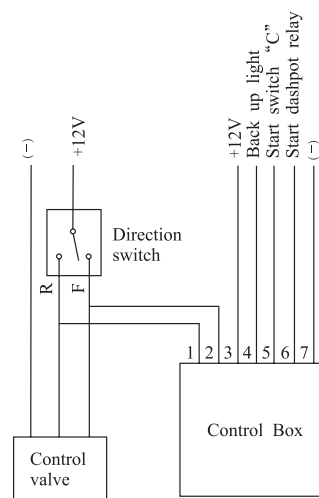
(2) Start system

The start system mainly consists of the preheating installation (only the diesel machine has), start switch, the protective circuit, starter and its function is to start generator.

(3) The transfer and control system for electrohydraulic.

<1>the principle picture of electric gas

<2>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 oilmouth, torque-comerter 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

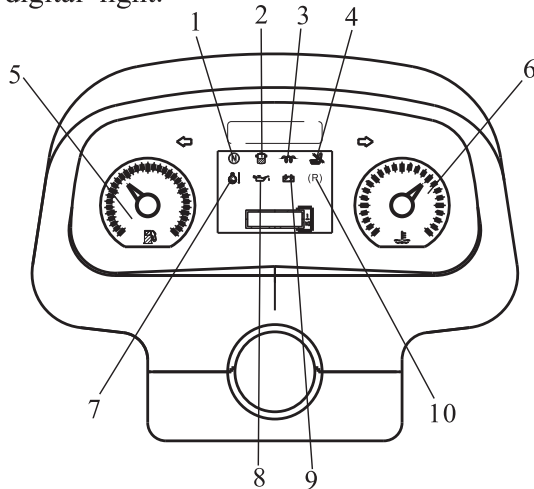
The forward combined lamp (transfer/indicating wide): 21W/8W Rear combined lamp (transfer/indicating wide/back the car): 21W (red)/8W (red) 10W (white)

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	Feul instructions
6	Water temperature table
7	Oil temperature
8	Oil instructions
9	Not charging instructions
10	Handbrake

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. Rotate the starting switch to first gear clockwise one — lectricity position, connect the gauge and the lit power supply, the diesel generator start 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 acelerograph, 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) The signal indicating the transfer of direction: push the switch of the lamp of transferring direction backward, 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) The breaking signal: when the forklift needs to brake, step the stepper and the back combined lamp will be on red.

(5) Backing signal: when the forklift needs to back, pull the direction switch backward, at that time the transmission is put on the backing gear then the car—backing lamp of the back combined lamp will be on white, meanwhile, the buzzer of the forklift backing is on.

(6) Indication of non—chargeable signal: 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.

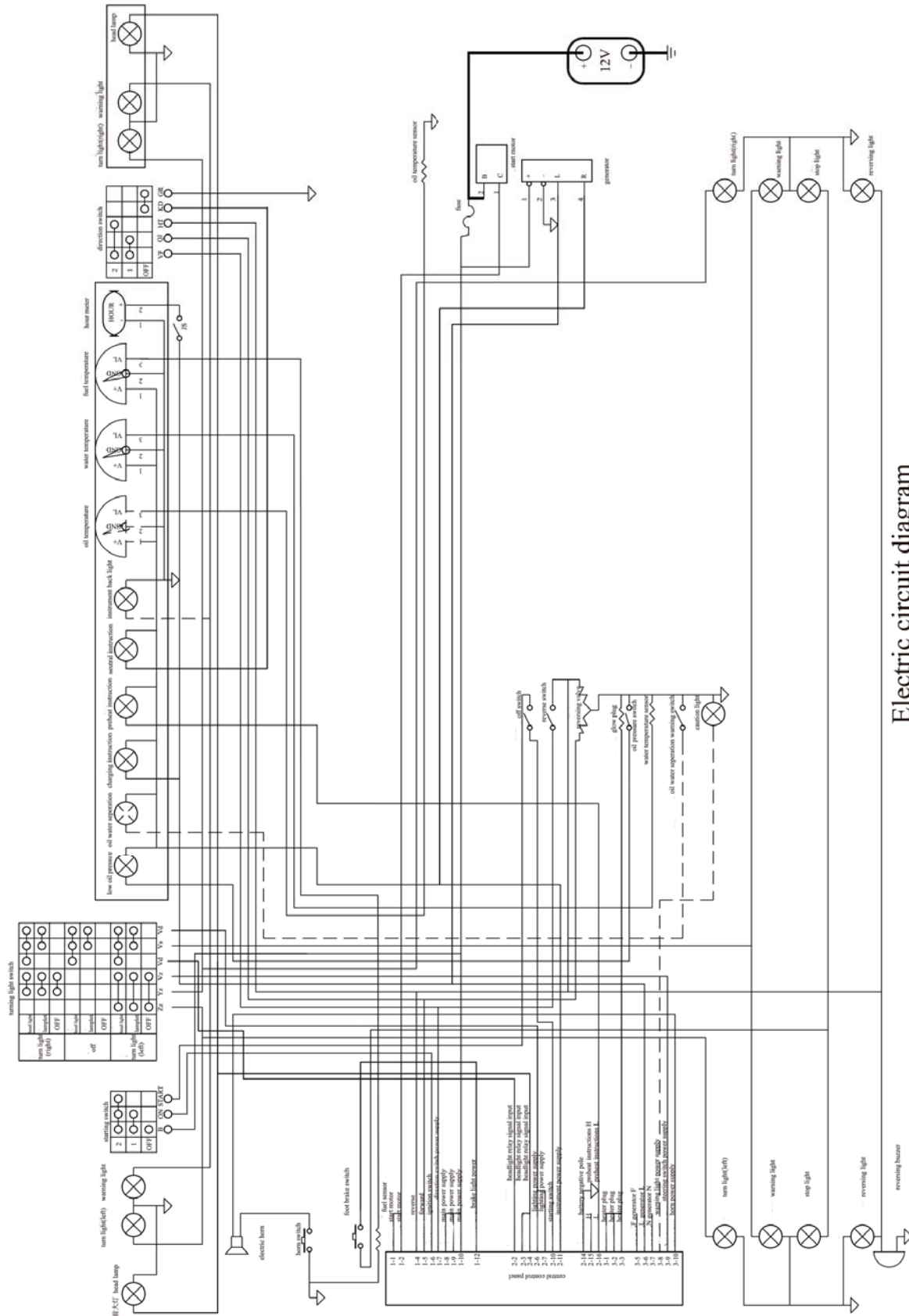
(7) Signal of oil pressure sequel of generator: before starting the generator, push the starting switch to the electric gear, at this time, the indicating light of oil pressure will be on, after the generator has started, the lamp will extinguish automatically. If the generator is on the working condition, 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.

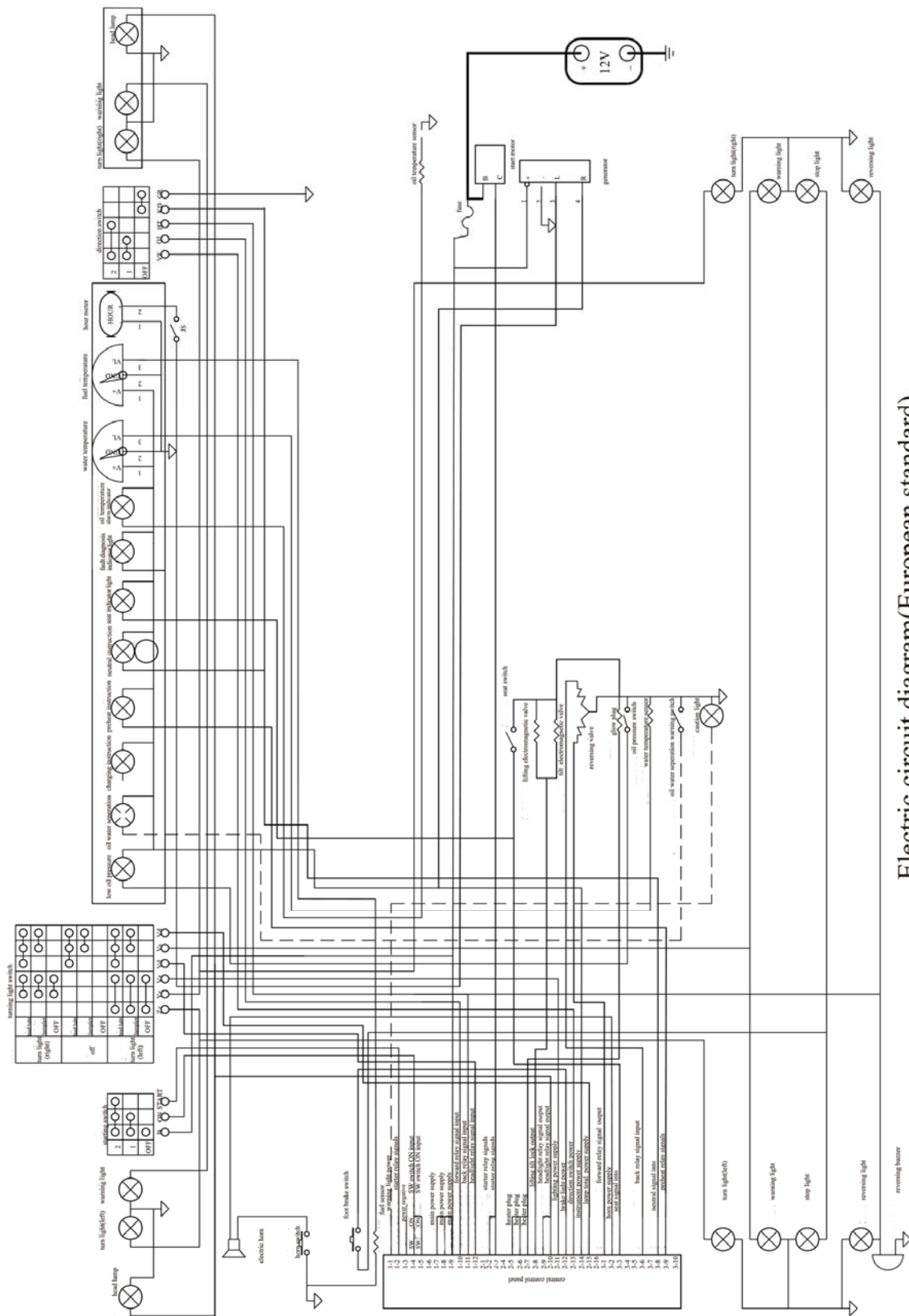
(8) Signal of the oil—water separator: before starting the generator, put the starting switch to the electric gear, at this time, the indicating lamp of the oil—water separator will be on, after the generator has started, the lamp will extinguish automatically. If the indicating lamp is on in the course 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 oil 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

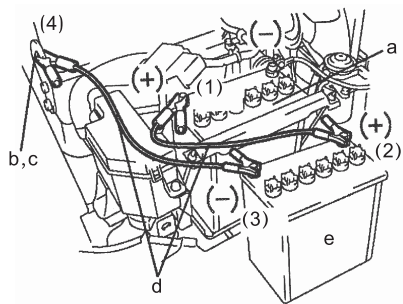
(11) Gauge: accumulate work hour of the generator





Electric circuit diagram(European standard)

Model applicable:RTD30,35-KMS4



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

(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 .

⚠ 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!

3. Brake pump

3. 1. 1 clutch wheel cylinder

The structure of the clutch wheel cylinder is illustrated in the picture 3-3, it is installed on the left side of the transmission. The wheel cylinder is made up of the piston, the spring, and the handspike. Pushing the rod can transmit the movement to the disengaging rod.

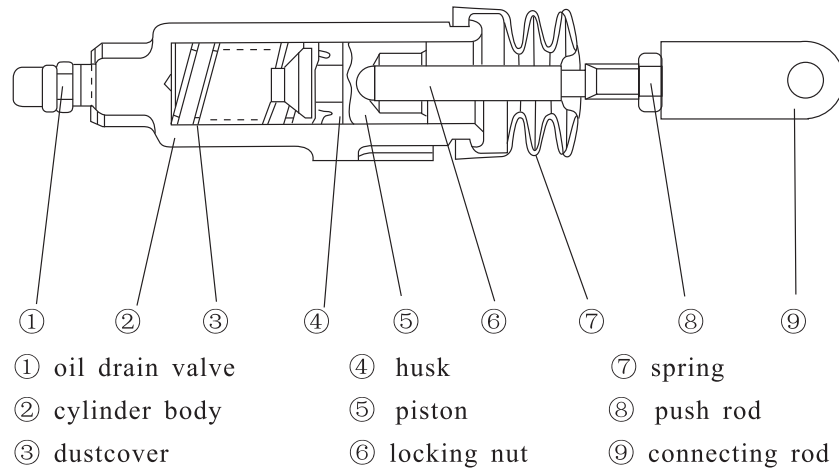


Fig 3-3 Clutch wheel cylinder

3. 1. 2 the clutch master cylinder

The structure of master cylinder is illustrated in the picture 34, installed on the pedal of clutch and the master cylinder is composed of piston, spring, oil reserving cup and handspike. The movement of pedal is transmitted to the piston through the handspike and transform the power of pedal to the hydraulic power.

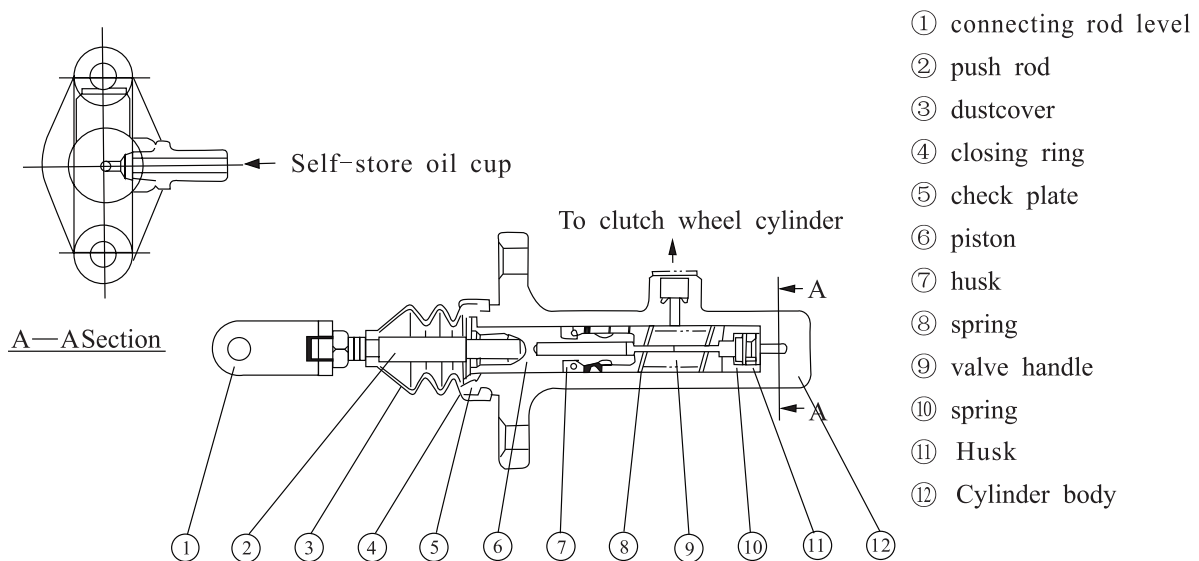


Fig 3-4 Clutch master cylinder

4. Hydraulic transmission device

4.1 overview

YQXD40MKS-XH limited slip type hydraulic drive gearbox is composed of hydraulic torque converter, and a hydraulic control gear shift gearbox for forward and back. It's used in forklift, tractor and other engineering vehicles.

YQXD40MKS-XH limited slip type hydraulic drive gearbox have been equipped with torque converter on work for single stage two phase three rounds of comprehensive. Hydraulic torque converter, has automatic adaptability, can be changed with the change of external load and corresponding its output torque and rotational speed. It can absorb and eliminate the impact of vibration from the engine and the drive system of the external load. Hydraulic transmission gearbox with limited slip differential half axle gear output. Using electric hydraulic control shift with micro valve, buffer valve, makes the manipulation simple, convenient, stable which reduced the labor intensity of operators.

When one side of forklift drive wheels are skid and cannot forward, the limited slip differential give the torque to another side by friction, so that the forklift truck continues to drive.

4.2 Technical Data

ITEM		YQXD40MKS-XH
Suitable Engine Power kW		33~40
Suitable Engine Speed r/min		2250~2650
Transmission Ratio	Forward	18.947
	Revers	18.947
The Main Oil Pressure Mpa		1.1~1.4
torque converter inlet pressure Mpa		0.5~0.7
Hydraulic torque converter	MODEL	YJH265
	Dimension mm	265
	Working condition of zero speed torque coefficient	$K_0 \geq 3$
	peak efficiency	≥ 0.8
	Nominal working condition of zero speed pump wheel torque N.m	$33.5_{-3.35}^0$
	Working condition of the peak efficiency Nominal pump wheel torque N.m	30_3^0
Direction of rotation		Clock Wise
Hydraulic Transmission Oil		6 or 8
Oil Temperature °C		70~95
Highest Oil Temperature °C		120 (No longer than 5min)
Size(L×W×H)mm×mm×mm		830×470×450
Net Weight kg		190

4.3.1 Transmission Principle

Hydraulic transmission gearbox diagram as shown in figure 1, hydraulic torque converter by elastic connecting plate 1, driven by a motor drives the pump wheel rotate 4, the fluid flow along the direction of high speed flow turbine 2 blades, turbine rotate. Roller 3 to produce torque converter, through the turbo shaft 5 to bring torque to hydraulic transmission assembly 11. When hanging in the forward, backward clutch idling, in turn 11 - a 7 - parts - a 20-21 pieces of the 17 - a 12-13 drives the limited slip differential 15 output. When hanging into the reverse, forward of the clutch idling, in turn the pieces of the 11 - a 10-18 - a 19-21 - parts - a 17-20 pieces of 12-13 drives the limited slip differential 15 output. Forward and reverse of the clutch is controlled by shifting control valve. Oil pump 6 is the internal gear pump, the pump wheel drive directly to the system to provide oil. Hydraulic torque converter working after the oil into the vehicle radiator, again into the gearboxes lubricated friction disc, bearing and gear.

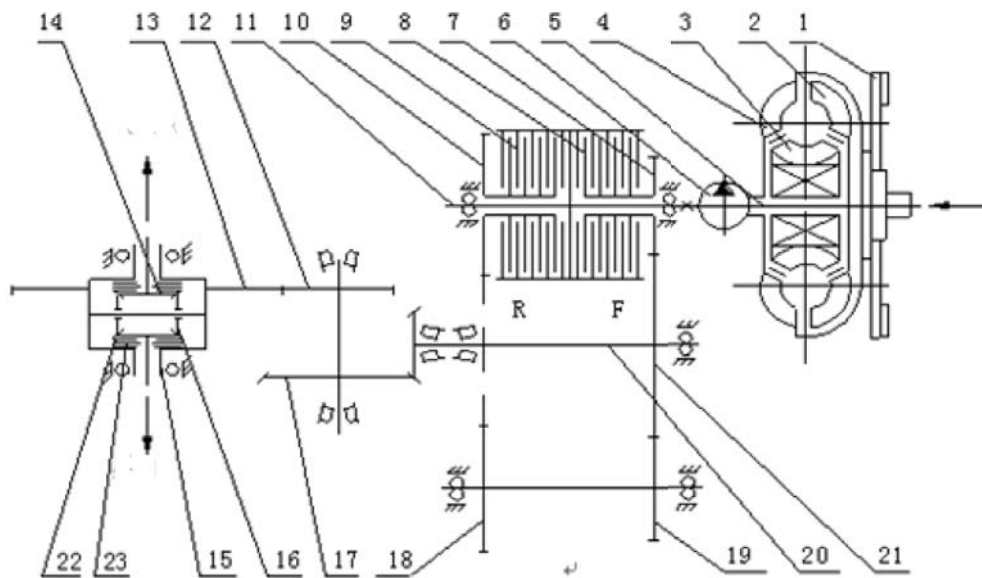


Fig 4-1 Yqxd40mks-xh Draft

- | | | | | |
|----------------------------|----------------------|--------------------------|--------------------------|---------------------------------------|
| 1.Elastic Connecting Plate | 2.Turbine | 3.Roller | 4.Pump wheel | 5.turbo shaft |
| 6.Oil pump | 7.Forward gear | 8.riction plate | 9.spacer | 10.Reverse gear |
| 11.input shaft assembly | 12.axis | 13.gear ring | 14.half axle gear | 15-Limited slip differential assembly |
| 16.planetary gear | 17.spiral bevel gear | 18.idler shaft | 19.idler | |
| 20.output shaft | 21.output gear | 22.inner attrition piece | 23.outside friction disc | |

other components of the 1, gear shaft at both ends by 2 bearing tapered roller bearing, both ends is equipped with adjusting shim, used to adjust the bevel gear shading marks and lateral clearance and the bearing clearance. Power coming from the gearbox through reducer reducer is produced by the limited slip differential assembly 15 differential drive axle shaft gear and axle shaft to the wheels.8 for gearbox shell, when the gears in gearbox shell gear, gear shifting clutch, gear and limited slip differential, tank itself plays a role.

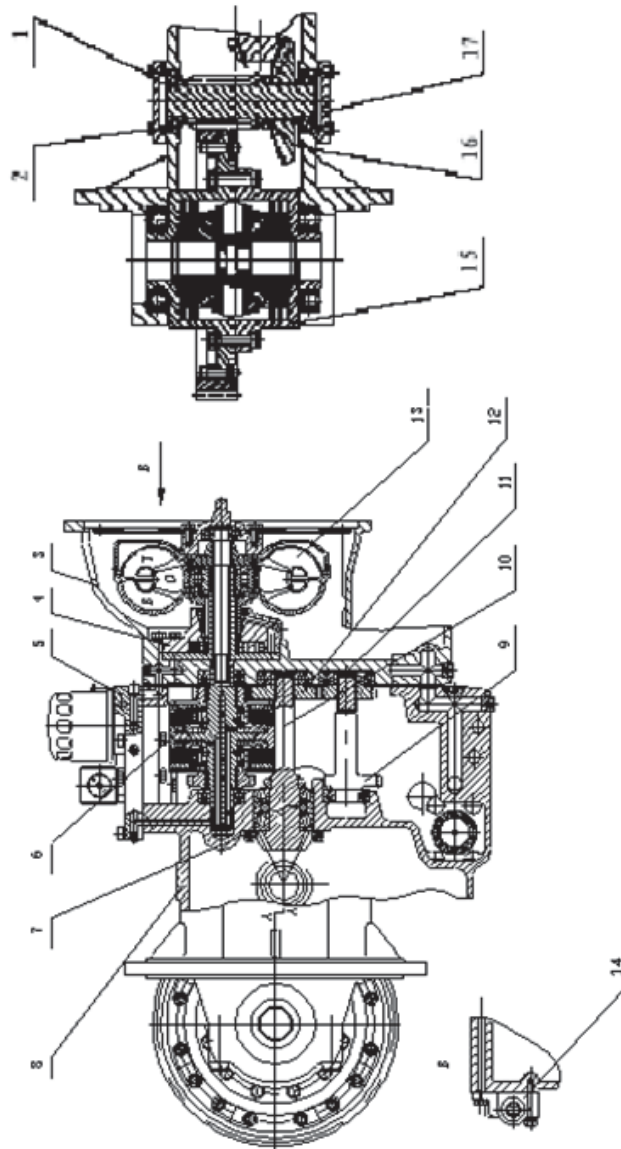


Fig 4-3 Yqxd40mks-xh Structure Chart

1.Axis 2.Bering 3.Torque converter shell components 4.Oil Pump Ass'y 5.Control valve Ass'y
6.Clutch Ass'y 7.Bearing Strip 8.Shell 9.Shaft 10.Output Shaft 11.Idler 12.Output Gear
13.Converter 14.Inching Valve Ass'y 15.Limited slip differential assembly 16.Gear 17.Bearing Cap

4.4.1.2 Dis-assembly and assembly sequence

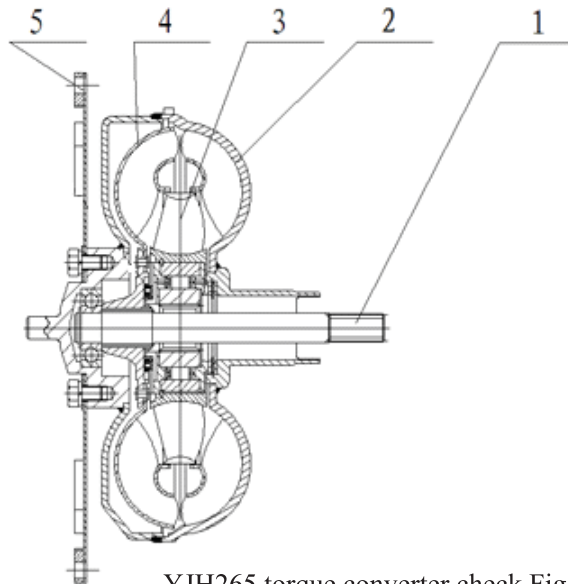
Please do as following:

- a) Open oil plug let the oil out;
- b) Remove the torque converter;
- c) Then remove limited slip assembly 15、 control valve Ass'y 5、 Oil Pump Ass'y 4、 Torque converter shell3、 Clutch Ass'y 6、 Inching Valve Ass'y14;
- d) Open Bering Cap 17, Remove Axis 1、 Gear 16 decomposition bearing 2;
- e) remove bearing strip 7, take out output shaft 10 and all other parts on it;
- f) Remove other parts.

Assembly sequence reverse order of removal.

4.4.2 hydraulic torque converter

1.turbine shaft 2、 Pump Pulley 3、 Guide Roller 4、 Turbine 5、 Elastic Gusset



YJH265 torque converter check Fig 4-4

Pump Pulley 2 through the elastic gusset 5 coupled to the engine flywheel. Pump Pulley make mechanical energy into kinetic energy of working fluid, and the flow direction of the blade along the high-speed flow into the turbine 4, to promote rotation of the turbine. The turbine output shaft 1 put out energy, and the torque transmitted to the gearbox and speed. After the stream outflow from the turbine into the guide roller 3. When the torque converter is in large load, low speed torque converter turbine stage, one-way clutch idler pulley is wedged can not rotate, the flow acting on the guide roller torque is counterproductive in the turbine, causing the turbine torque is equal to the pump and the torque of the wheel and the guide wheel, and thus the output torque is greater than the input torque, the torque generated automatically. When the ratio of the turbo pump speed and rotor speed is greater than a certain value, freely move guide roller is disengaged, the torque is terminated, this state is coupled state.

YJH265 a red welding-type torque converter, cannot be removed.

4.4.3 Oil Pump Ass'y

For pump assembly consists of a drive gear, idler pulley, Block 2, passive gear 3, the pump casing 4 and other parts. For pump assembly is mounted on the torque converter housing, the guide roller base 2 by spline coupling with guide wheel torque converter, the pump casing 4 is cast, cast high-pressure chamber and a low pressure chamber, and the torque converter pump drive gear 1 wheel coupled to the rotation driven by the engine to drive the driven gear 3, composed of meshing gear pump oil to the system.

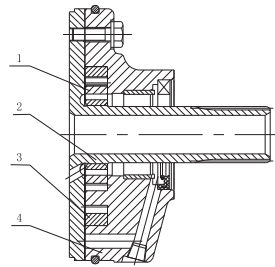


Fig 4-5 Yds30.906 Oil Pump Ass'y

1.Pump Drive Gear 2.Block 3.Gear 4.Pump Casing

4.4.4.1 YDS40HST.901 INTRODUCTION

YDS40HST.901 clutch assembly structure shown in Figure 6, it's for YQXD40MKS-XH limited-slip type hydraulic transmission gearbox. A clutch assembly by the input shaft, the forward gear 2, 4, the clutch housing 5, the piston friction plate 7, the separator 8, the return spring 9, 10 of reverse gear, the sealing ring 11 and other components. Left and right a wet multi-plate hydraulic clutch, each equipped with four phases of assembly and spacer 4 friction plates, clutch housing and input shaft welded into one, the oil pressure control valve by partitions into forward or reverse clutch to realize forward or reverse shift. In order to ensure the sealing of the clutch operation, cylindrical piston with sealing ring 6, the input shaft with the O-ring 3. When in neutral, no pressure oil into the clutch piston spring force of the return spring next time position, so that the friction plates and spacers in a separated state. When shifting oil pressure on the piston, the spacer and the friction plates bonded to each other, by friction of the power from the torque converter is transmitted to the gear forward gear or reverse gear.

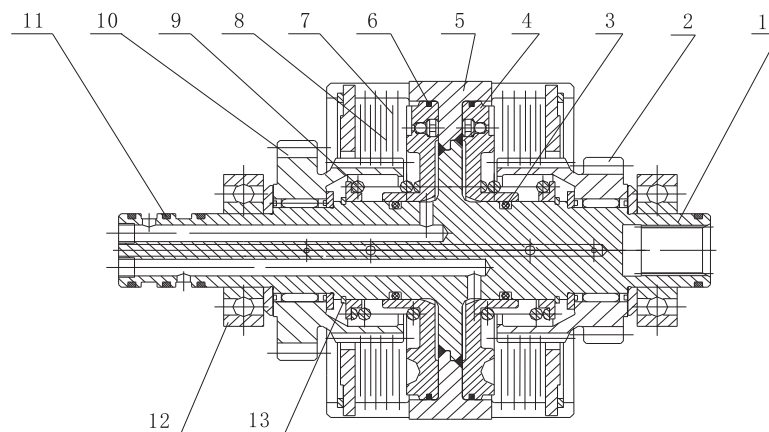


Fig 4-6 Yds40hst.901 Structure

- 1.Input shaft 2.Forward gear 3.Oring 4.piston 5.Clutch housing 6.Sealing ring
7.Friction plate 8.Spacer 9.Spring 10.Reverse gear 11.Saaling ring 12.Bearing 13.Ring

4.4.4.2 Dis-assembly and assembly sequence

Please follow the below step:

Remove the left and right bearing 12, then take out the forward gear 2, reverse gear 10, friction plate 7, spacer 8, spring 9, ring 13, piston 4 and spring 9.

Assembly sequence reverse order of removal.

4.4.5 YDS40-XH.905 Limited slip differential assembly

YDS40-XH.905 limited slip differential assembly structure shown in Figure 7, through both ends of the ball bearing 3 is supported on the gearbox housing. Limited slip differential assembly has two half axle gear 9 and four planetary gear 8, the planetary gear support 6 with a cross. Washer 7 installed in limited-slip differential and planetary gear housing. Limited slip differential internal friction plates 13 in turn fitted within the outer friction plate 14, the end plate 15, needle bearing thrust washer 5, the positioning shaft 11 and the butterfly spring 16. Limited slip differential case made left and right split, limited slip differential case 10 left and right limited slip differential housing 2 by a bolt coupling 17, a ring gear fixed to the right with a bolt 18 limited-slip differential housing 2.

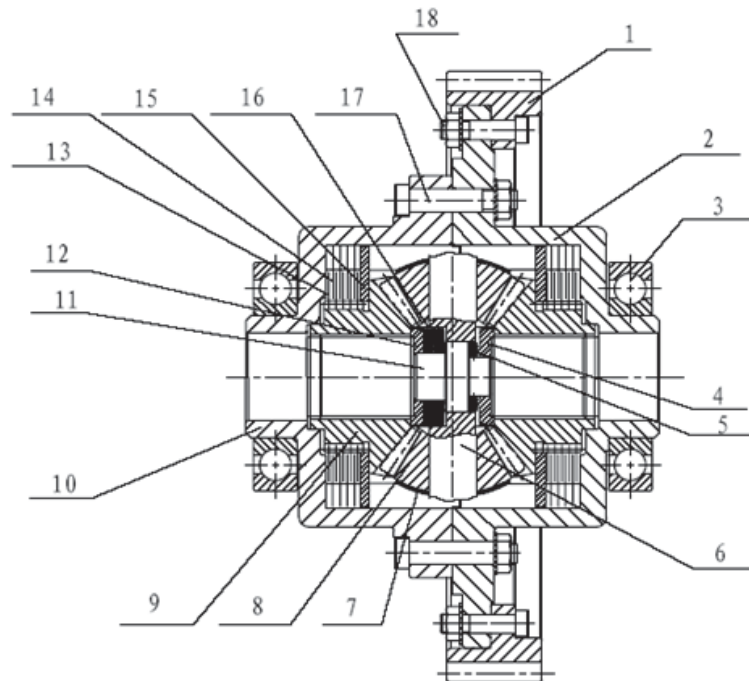


Fig 4-7 YDS40-XH.905

- 1.Gear Ring 2.Right limited-slip differential housing 3.Bering 4.Righter Holder
5.Bearing and washer 6.Cross 7.Washer 8.Planetary Gear 9.Half axle gear
10.Left limited-slip differential housing 11.Position shaft 12.Left Holder 13.internal friction plates
14.External friction plates 15.Plate 16.Butterfly Spring 17.Bolt 18.Bolt

- 1.Input shaft 2.Forward gear 3.Oring 4.piston 5.Clutch housing 6.Sealing ring
7.Friction plate 8.Spacer 9.Spring 10.Reverse gear 11.Saaling ring 12.Bearing 13.Ring

4.4.4.2 Dis-assembly and assembly sequence

Please follow the below step:

Remove the left and right bearing 12, then take out the forward gear 2, reverse gear 10, friction plate 7, spacer 8, spring 9, ring 13, piston 4 and spring 9.

Assembly sequence reverse order of removal.

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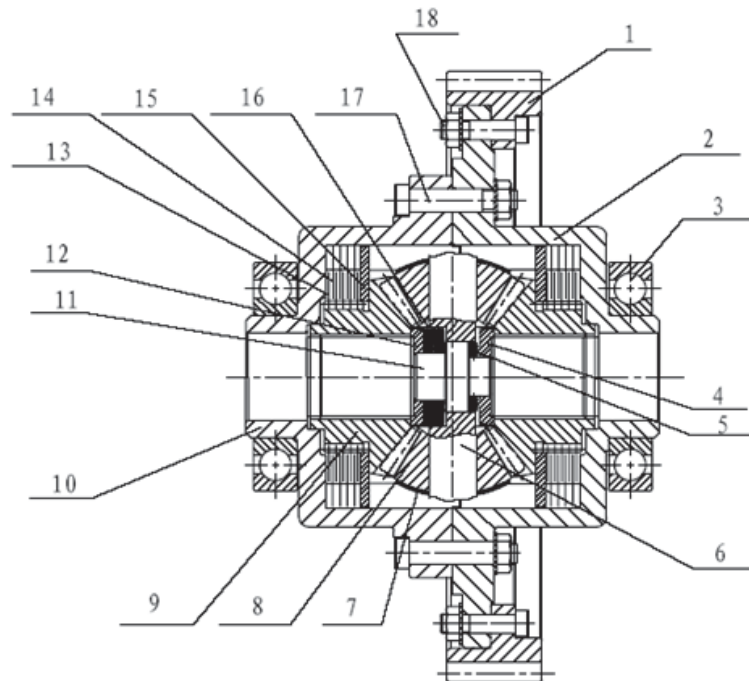


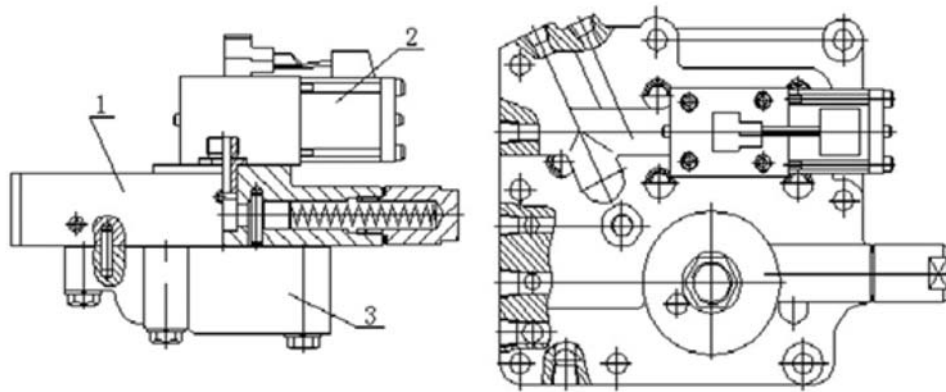
Fig 4-7 YDS40-XH.905

- 1.Gear Ring 2.Right limited-slip differential housing 3.Bering 4.Righter Holder
5.Bearing and washer 6.Cross 7.Washer 8.Planetary Gear 9.Half axle gear
10.Left limited-slip differential housing 11.Position shaft 12.Left Holder 13.internal friction plates
14.External friction plates 15.Plate 16.Butterfly Spring 17.Bolt 18.Bolt

4.4.6 DCCT5 control valve

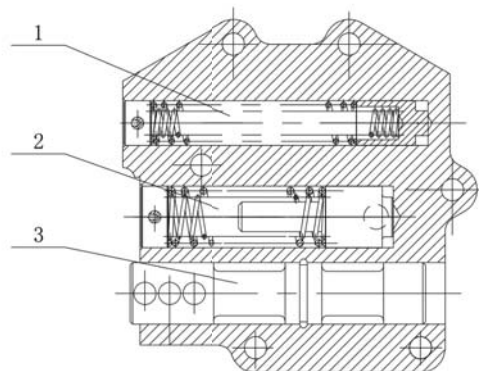
Control valve includes the housing cover, solenoid valve, and other components.

The control valve assembly is inside the housing, the housing cover is equipped with a torque converter oil spill valve. Control valves contains main pressure valve and two cushion valve. Line pressure control valve in the clutch oil pressure 1.1MPa ~ 1.4MPa range. Part of the oil through the jog valve into the control valve to achieve the shift; the oil pressure relief valve into the fluid part of the adjustment in the range of 0.5 MPa ~ 0.7MPa , and then enter the converter operation. Cushion valve is used to reduce the impact when the clutch is engaged and disengaged.



1.Alve housing 2.Solenoid 3.Control Valve Ass'y

Fig 4-8 DCCT5 Control Valve Structure



1.Main Pressure Valve 2.Cushion Valve 3.Operating Valve

Fig4-9 Photo of control valve ass'y

4.5 Install、Oil pressure measurement、notes

4.5.1 YQXD40MKS-XHLimited-slip coupling hydraulic transmission gearbox shape and dimension drawings see photo.

4.5.2 Before installing the product, please clean surface of the product. To avoid the oil leakage, no demolished or remove of the product.

4.5.3 Preventing hitting collision during install, in case affect the installation and precision.

4.5.4 Central mounting hole to check the engine fly wheel runout is no more than 0.15.5mm, fly wheel runout is no more than 0.1mm; mounting end surface of the flywheel housing runout is no more than 0.2mm, two dowel holes location of the mounting surface is no more than ϕ 0.1mm

4.5.5 Forklift control mechanism should ensure manipulate stem and stem stroke jog accurate and reliable positioning. Micro-Valve stem after the operator releases the foot pedal should be reset. Fretting valve characteristic curve shown in Figure 2. When install the jog valve stem, it should be linked with the brake pedal, and ensure that move the jog valve only after brake pedal-brake. The vehicle shift, turn the jog valve, and then shift.

4.5.6 When lifting the product, try to keep balance to prevent slipping.

4.5.7 Prohibited modifications to the gearbox oil system. To ensure the gearbox working, good lubrication, gearboxes, circulating fluid is not divided into other uses. Working oil shall comply with the requirements of this specification grades.

4.5.8 Working oil should be kept clean, without other impurities, the new gearbox begin first 100 hours of operation, should replace new oil. Then every 1000 hours or long-term disabled should be enabled replaced with new oil. Every 600 hours of work in a dirty environment changed to new oil. When replacing new oil, crude oil filter should also be cleaned and replace oil filter.

4.5.9 Inject working oil, check the oil level after 5 minutes drive. It should be within the prescribed oil-foot range. Filler cap as both a breather cap.

4.5.10 Paper core oil filter should be replaced every 10,000 km or 250 hours.

4.5.11 The crude oil filters should be cleaned every 500hours(or 5 month), and do regular checking.

4.5.12 The test driving of hydraulic transmission on forklift.

1) Before test should add enough oil, let the oil level above the minimum scale. Oil must be clean, when refueling to prevent impurities and water into the oil.

Because water evaporation is easy to produce bubbles, will reduce the efficiency of the engine, and damage to the seals.

2) When turn switch to the neutral position, the engine speed 600-800r / min, then commissioning for 1-2min, check the oil level after stop the operation, the oil should be within the standard range. And then turn forward and reverse each 1-2min. Also check tightness of the connecting portion, no oil leakage and leakage allowed.

3) After repeating the above transformation, continue running 40mins to check the entries and oil hydraulic gear housing should be in the range of 80-100 °C . If the temperature is too high should check the cooling system, eliminate congestion, rupture, the oil level is too low or bubbles fault system.

4.7 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 return 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.

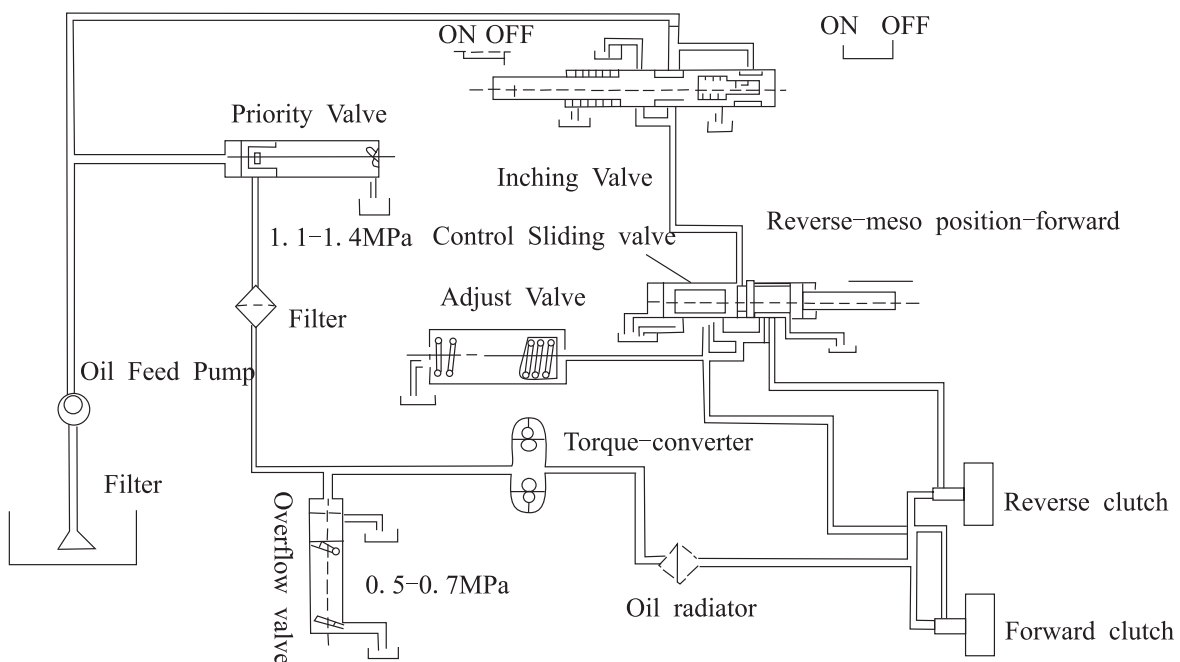


Fig 4-10 Hydraulic oil way

4.8 Drag the forklift to be repaired

When the hydraulic driven forklift is damaged, it needs to be towed by other cars, Pay attention to the following things:

- (1) The semi-axis should be taken down from the front wheel
- (2) The shifting rod should be set to neutral position

4.9 The linking position of oil outlet, the oil pressure and the measurement of oil temperature (see the picture of 4-11)

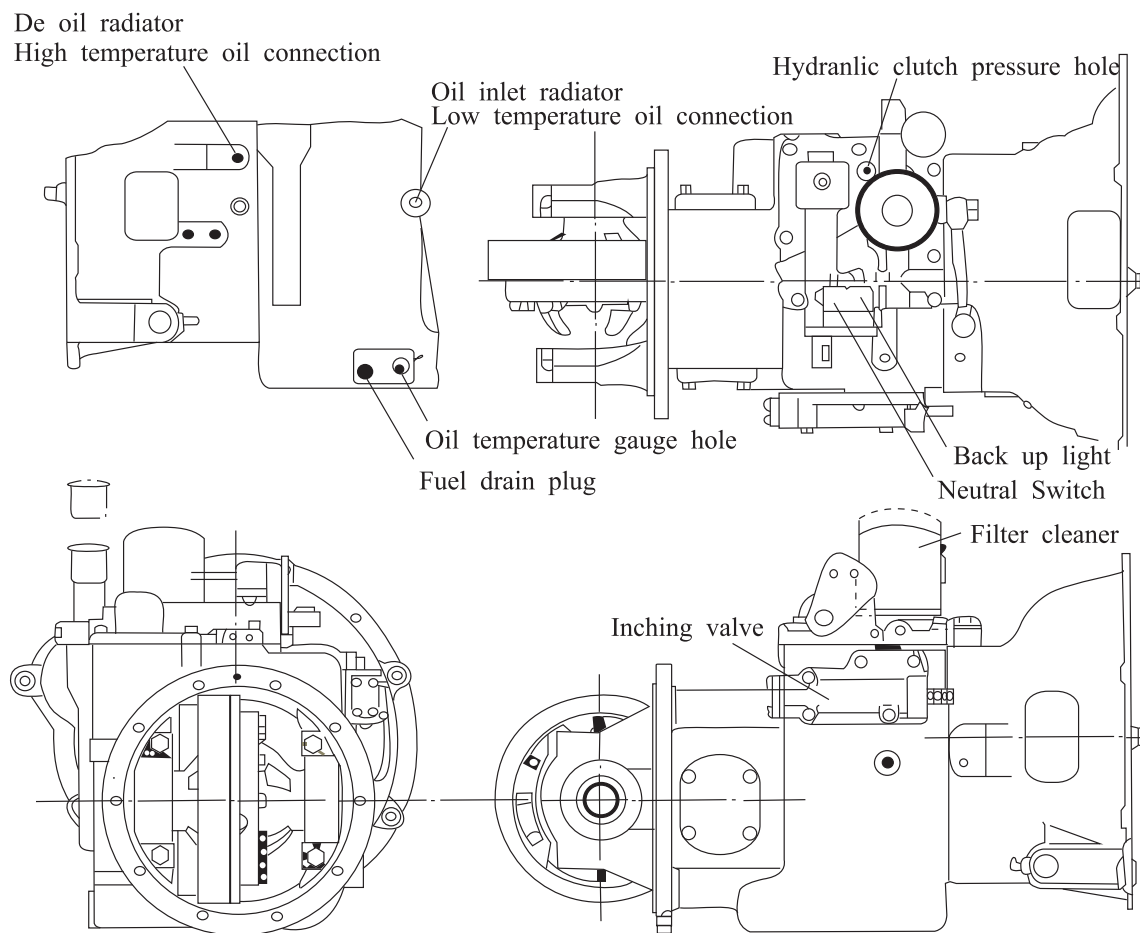


Fig 4-11 Oil temperature and oil pressure survey

5 The drive Axle

5.1 Summary

The drive axle mainly consists of the housing, the wheel-hubs, the half-shafts and the brakes. The housing is an integrally cast. 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.

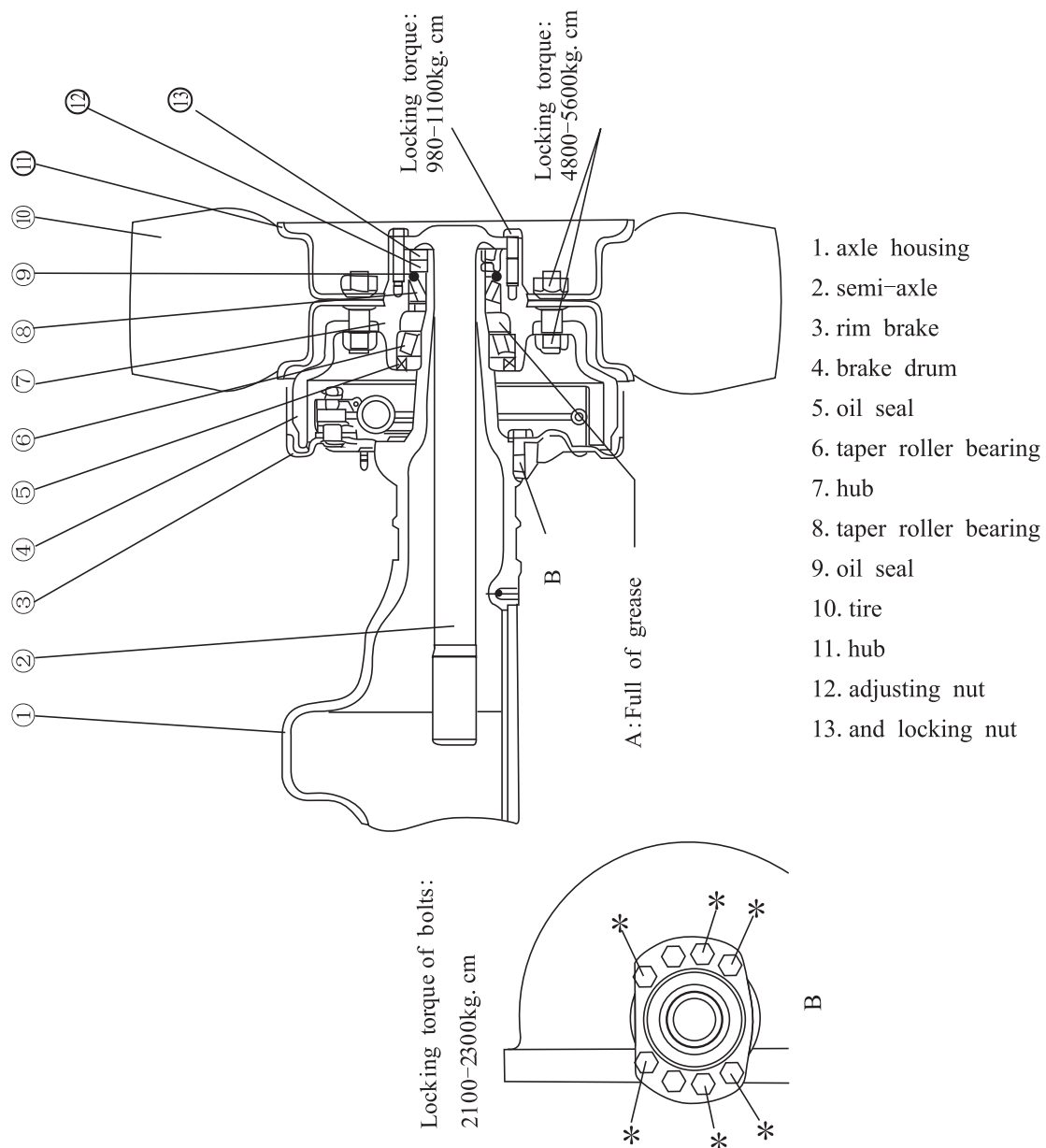


Fig 5-1 Differential

5.2 Inspection on Reassembly of Wheel hub

(1) Fill the chamber of wheel hub with lubricating grease about 100cc. then install it on the axis.

(2) Screw down the hub nut with a torque of 1kg. m, and then loosen it for 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.

(5) Assembling

Fix the drain tap and the cover on the tire, and screw down wheel-rim bolts.

Note

(a): The drain tap is on the harelip of rim and face outside.

(B): the end of rimbolt should be the same direction with drain tap

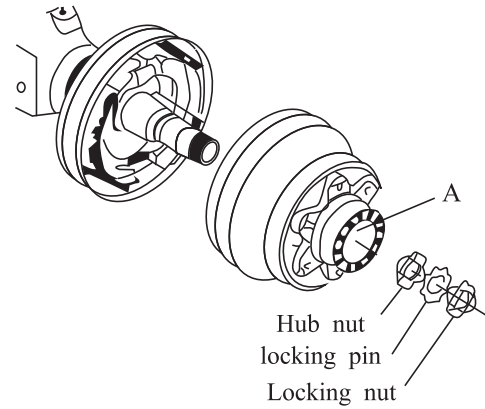


Fig. 5-2 Adding grease

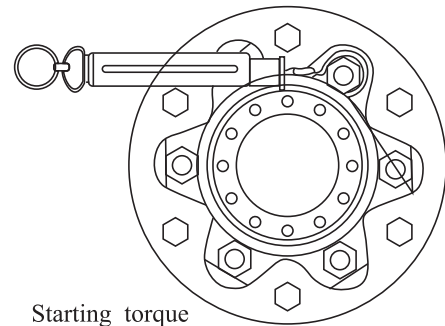


Fig. 5-3 Measure the starting torque

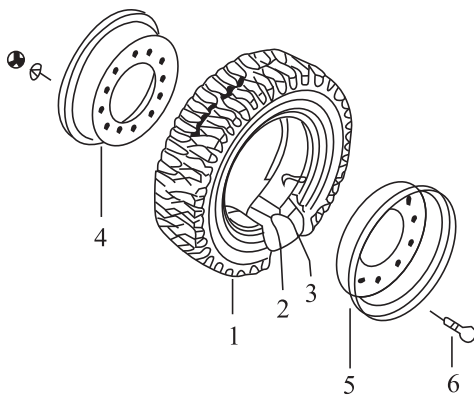


Fig. 5-4 Asseembly of tire

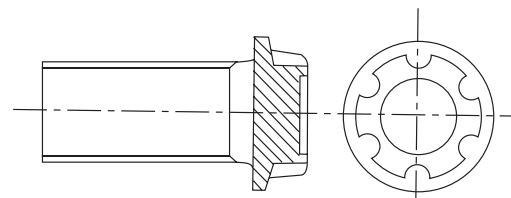
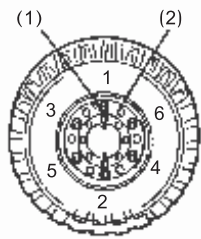
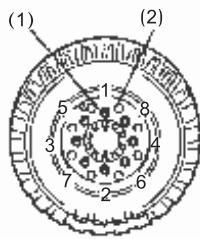


Fig. 5-3 Wheel bolt structure

- | | |
|---------------|---------------|
| 1. tire | 4. inner tire |
| 2. valve stem | 5. outer tire |
| 3. nut cap | 6. rim bolt |



(2T)



(3T)

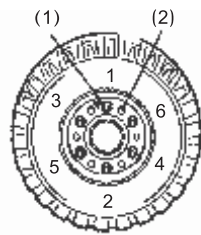
(1) Hub nuts

(2) Rim nuts

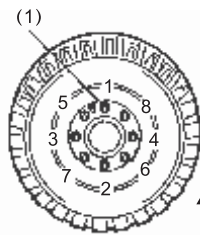
(Never loose without removing the air)

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 .
4. Jack up until the wheels come off the ground . Completely remove the air pressure from tires then remove the hub nuts and remove the wheels .
5. 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 .
6. After replacing the wheel, check and adjust the tire pressure.



(2T)



(3T)

(1) Hub nuts

(2) Rim nuts

(Never loose without removing the air)

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 .

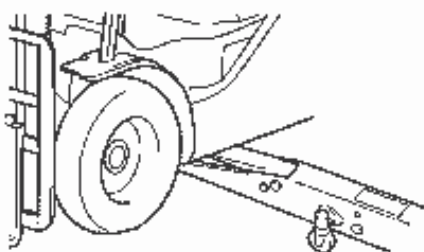
⚠Caution

Never loosen divided rim nuts .Should any of the nuts be found loose or otherwise abnormal , deflate tires and then loosen hub nuts to remove the tires .

Changing tires

⚠Caution

- . Use proper safety precautions when jacking the vehicle . Never get under the forks or frame .
- . In the case of a wheel with a divided rim , do not loosen the rim bolts and nuts when loosening the hub nuts . When loosening the rim nuts or removing the rim bolts , be sure to completely remove the air before loosening .
- . Refer to service data for hub nut tightening torque and tire air pressure .
- . Tire air pressure is very high , so pay attention to rim deformation , cracks , etc .Never exceed proper air pressure .



. Do not replace any tire without turning on the ignition switch before jacking up the vehicle . Upon completion of the tire replacement , return the ignition switch to the OFF position (SAS models .)

6. Steering system

Project	Forklift type	3~3.5t
	Type	Real wheel steering
The type of redirector		Arbitral
The number of redirector		BZZ-100
The turning Cylinder	Model	Double-action piston
	Diameter of cylinder	70
	Diameter of the piston pile	50
	Distance	160
Rated pressure		9
Radius of steering wheel		$\Phi 300$
Specification of tire		27 $\times$ 10-12-12PR
The air pressure of tire		0.72MPa

6.1 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. (Picture6-1)

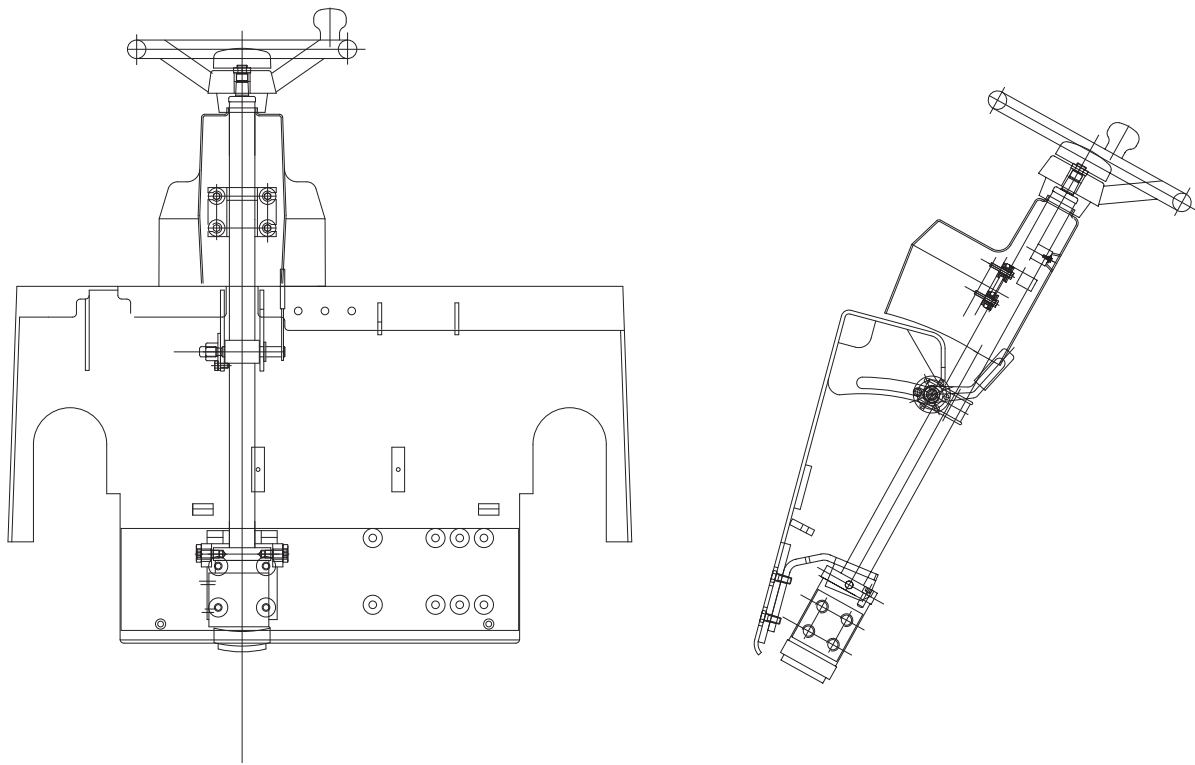


Fig 6-1 Turning control device

6.2 Arbitral

The arbitral (picture 6-2) can transmit the pressure oil from the valve to the steering cylinder by the channel according to the angle measurement. When the generator extinguishes, then the oil pump can not provide oil and can be rotated by manpower.

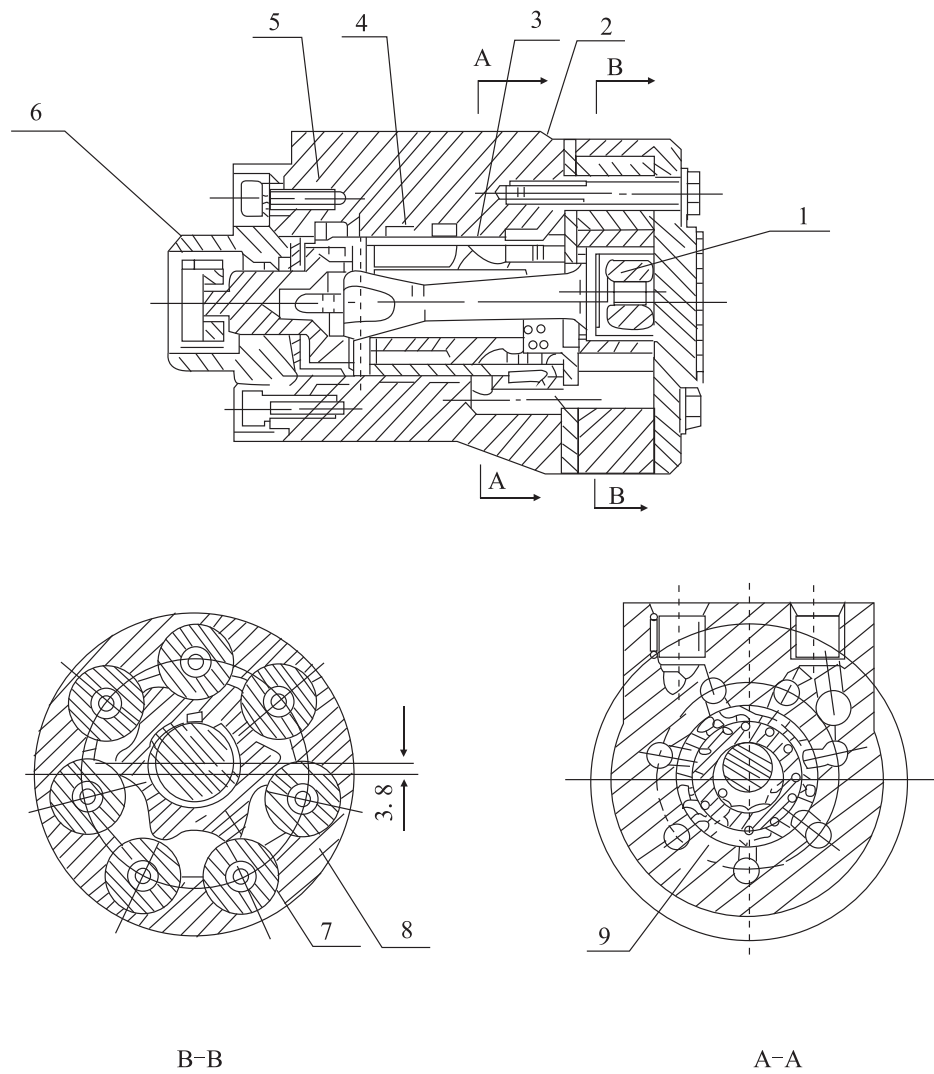


Fig. 6-2 Full hydraulic redirector

1. limited column

2. valve body

3. valve core

4. universal driving shaft

5. spring plate

6. connecting piece

7. rotor

8. stator

9. valve cover

6.3 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

7. Steering axle

7.1 General Description

The steering axle is of section-boxed welded construction type. (Picture 7-1). 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 accelerate 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.

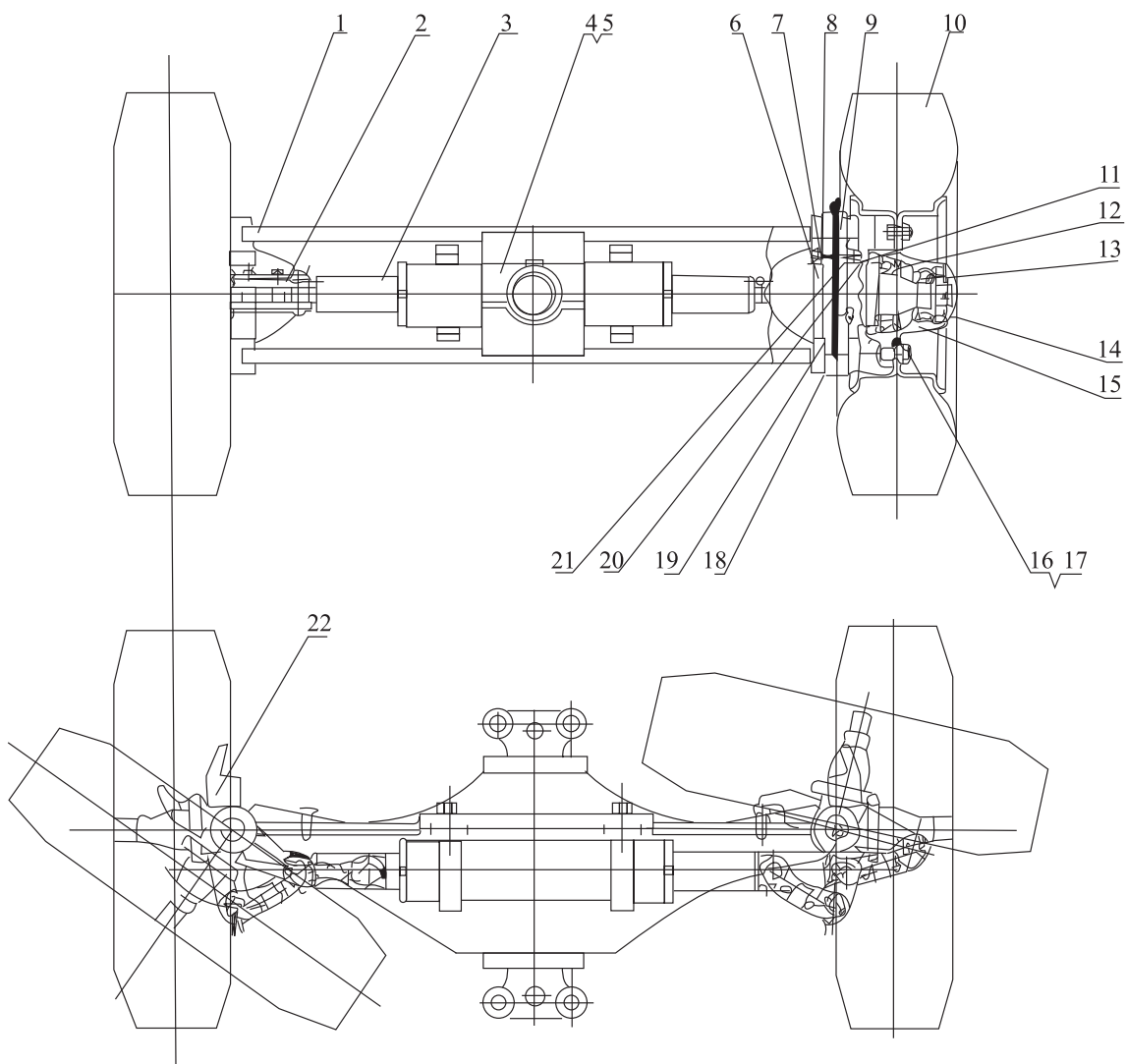


Fig. 7-1 Steering axle

- | | | |
|---------------------------|-------------------------|-------------------------------|
| 1. steering axle body | 2. connecting rod level | 3. steering cylinder |
| 4. back axle seat | 5. bushing | 6. clockwise knuckle assembly |
| 7. thrust bearing | 8. needle-bearing | 9. knuckle main pin |
| 10. tire | 11. 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 | | |

7.2 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.

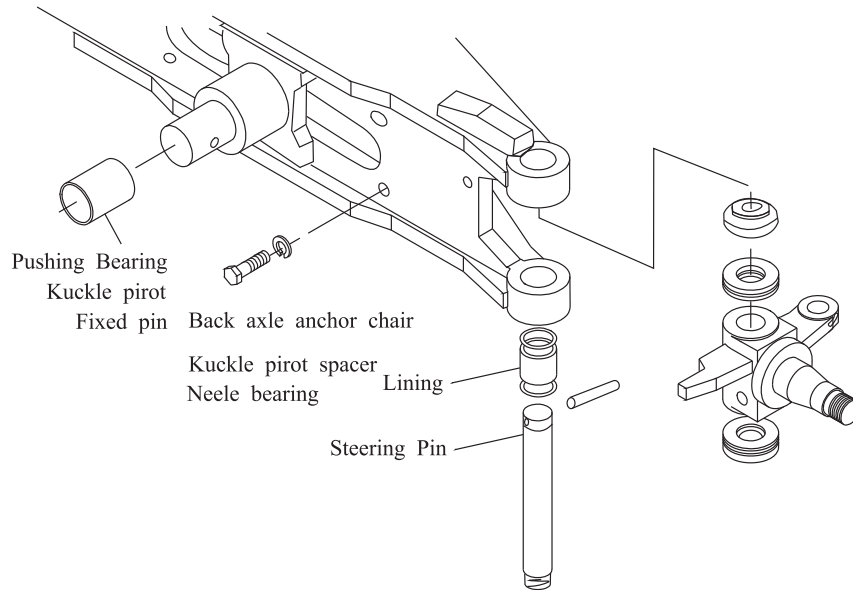


Fig. 7-2 Kuckle pirot

7.3 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

7.4 steering cylinder

The steering cylinder is of double-action piston type. The seal components of piston adopts 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 side to fasten the steering cylinder to the steering axle.

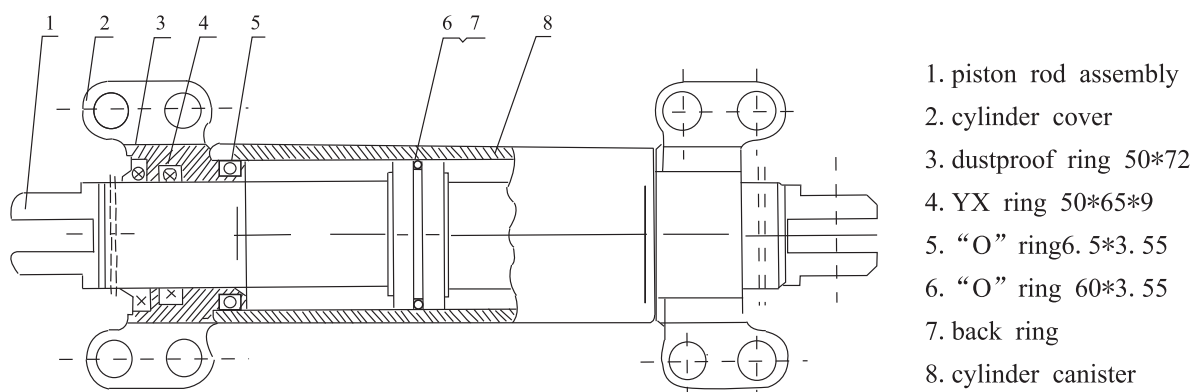


Fig. 7-3 Steering cylinder

7.5 Rear Wheel bearing pre-load adjustment

(1) Shown in 7-4. 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 valve.

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

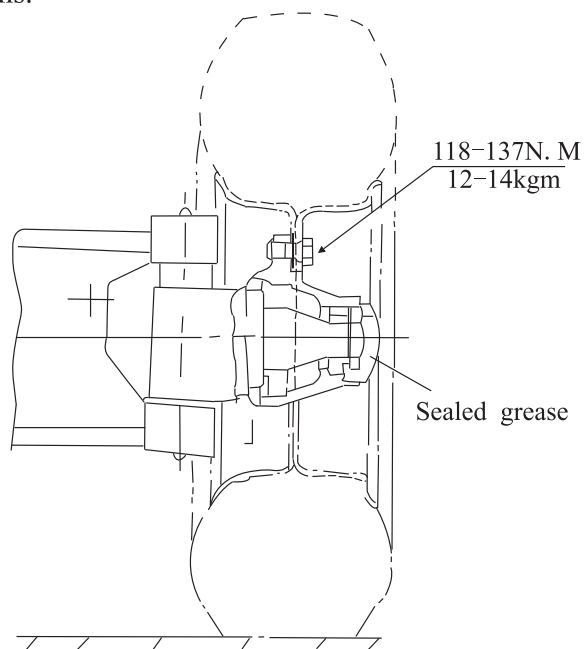


Fig. 7-4 Pre-load adjustment

8. Braking system

Model:	Front-double brake, internal swell, hydraulic
Ratio of brake pedal:	5.66
Cylinder diameter of main pump:	19.05mm
Wheel brake	3~3.5t
Model:	with brake mechanism
Cylinder diameter of operating cylinder:	28.58mm
The size of friction plate (l*w*t)	348*76*8mm
Area of friction plate	264cm*4
Inner diameter of brake drum:	314mm
Wheel brake	Front-double brake, internal swell, hydraulic

8.1 Summary

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

8.1.1 Brake pedal

The structure of the brake pedal is shown in fig.2-19-1, install it on the transmission through the bracket, when the pedal is moving, it accelerates the lever to move the piston and increase the pressure of oil circuit.

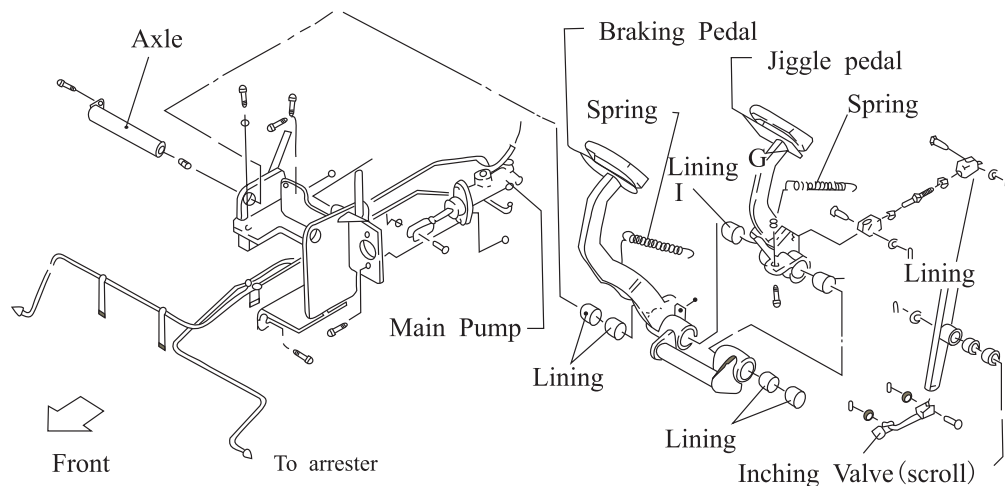


Fig. 8-1 Braking Pedal

8. 1. 2 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 than 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.

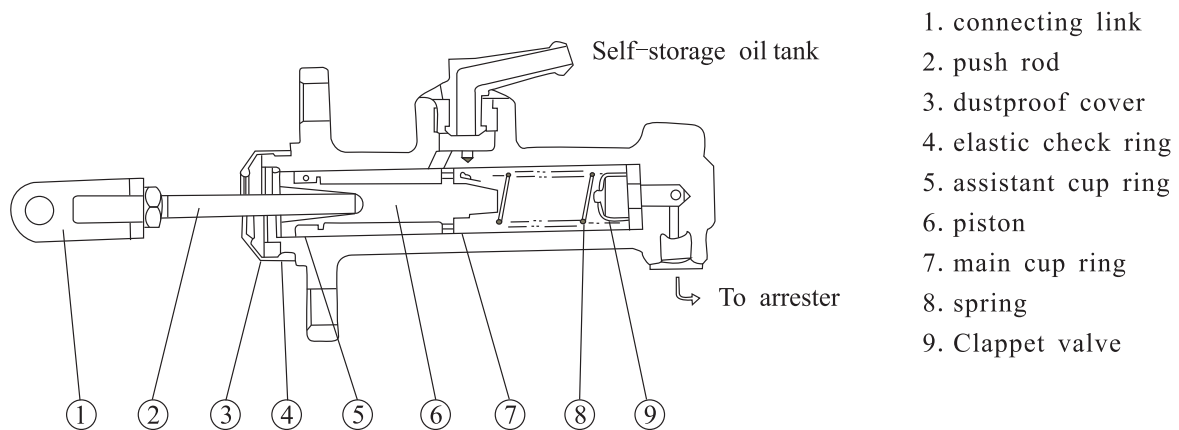


Fig. 8-2 Braking main pump

8. 1. 3 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 8-3.

1. brake wheel cylinder assembly
2. spring
3. cup ring
4. piston
5. wheel cylinder shell
6. piston mandrill
7. brake shoe return spring
8. friction plate
9. spring
10. hand brake push rod
11. spring mechanism
12. brake shoe
13. compression spring seat
14. compressor spring pull rod
15. compressor spring
16. spring
17. detent
18. spring
19. clearance adjuster assembly
20. pin
21. Soleplate
22. break shoe return spring
23. hand brake pull rod
24. brake cable assembly

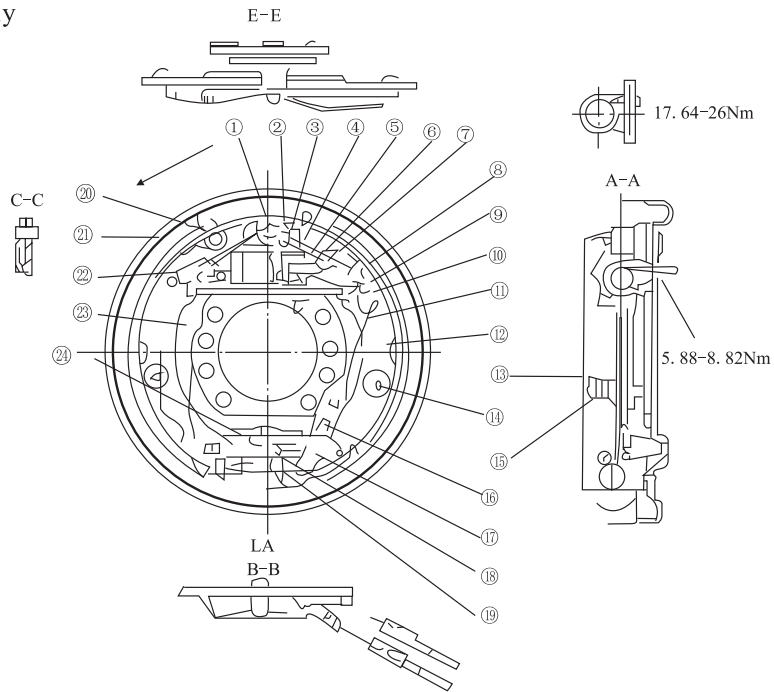


Fig. 8-3 Arrestor

(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.

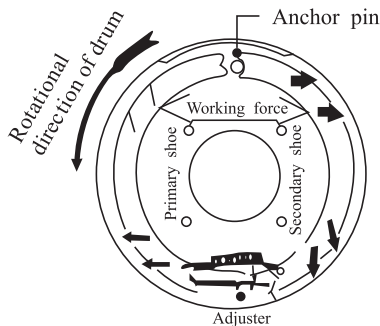


Fig. 8-4 The movement of forward drive

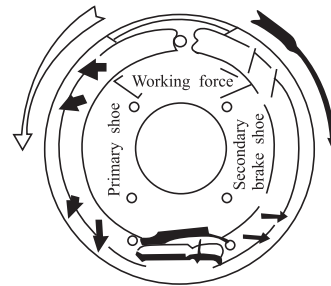


Fig. 8-5 The movement of Backward drive

(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. As the parking brake lever actuate, through the brake cables. Parking pull rod, which pushes. In turn, the parking push rod to the right with the aid of the pin as a fulcrum, forcing the secondary shoe against the brake drum.

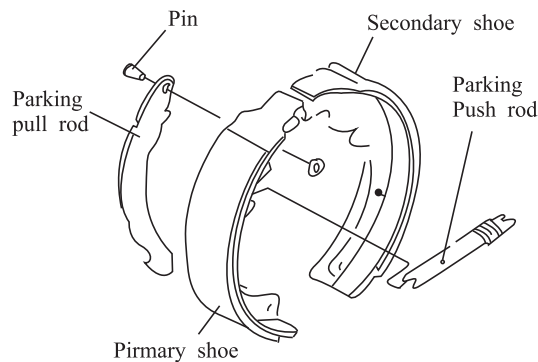


Fig. 8-6 Parking Braking mechanism

(3) Clearance Self-regulating structure

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

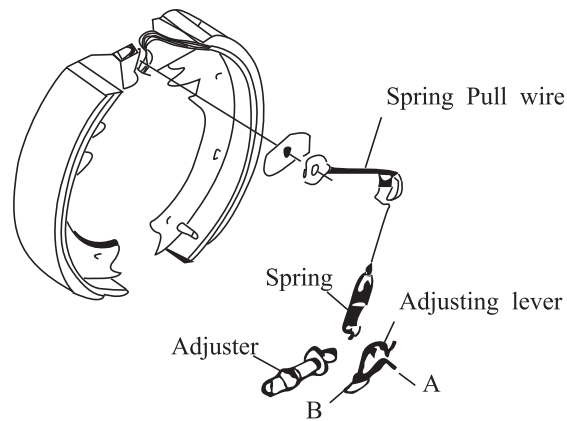


Fig. 8-7

The self-regulating clearance structure

Adjustment structure of forklift clearance

When the forklift brakes in the reverse motion, the assistant brake shoe touch the brake drum and rotate together. Therefore, the pull rod rotates rightward along point A, the detent of point B stir and adjust tooth of adjuster.

After the brake is released, the brake shoe returns to normal, the pull rod rotates leftwards along point A, the point B falls. Therefore, when the interval becomes bigger, the adjuster stirs to the next tooth.

The range of adjustment: within 0.25-0.4mm

8.1.4 Parking brake mechanism

The handrail of Parking brake mechanism is type of cam; 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

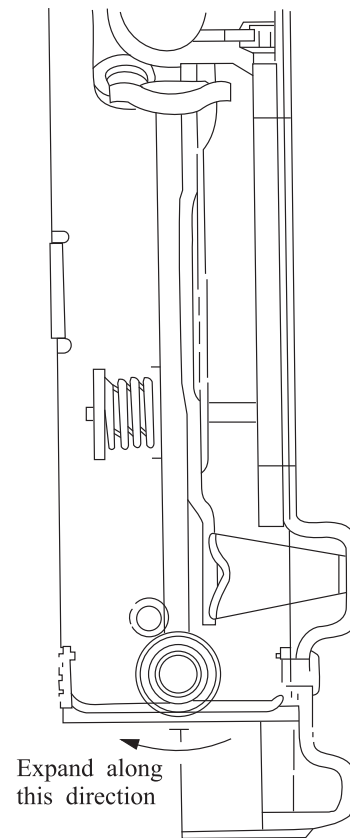


Fig. 8-8 Self-adjuster

8.1.5 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.

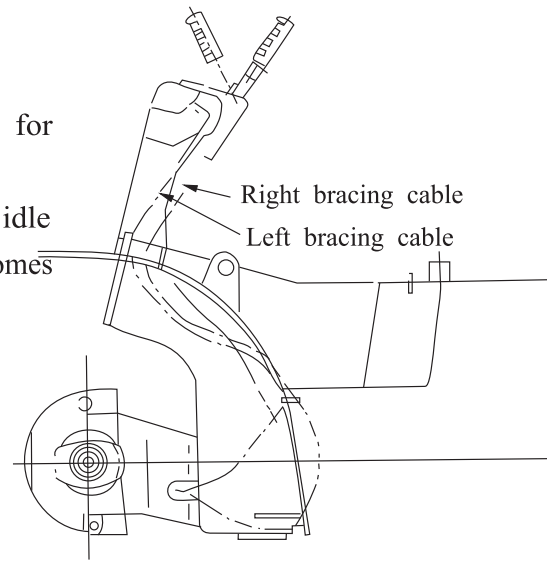


Fig. 8-9 Parking brake mechanism

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 $A=1\text{mm}$
- (D): Test stopping lamp when stepping down the brake pedal.

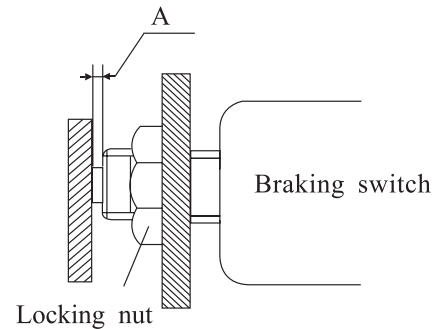


Fig. 8-10

8.2 Maintenance of Wheel Brake

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

8.2.1 Wheel brake Disassembly

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

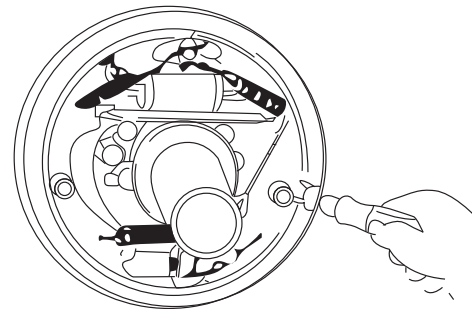


Fig. 8-11

(2) Remove two shoes return springs.

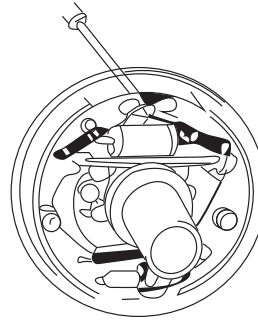


Fig. 8-12

(3) Remove three hold-down springs.

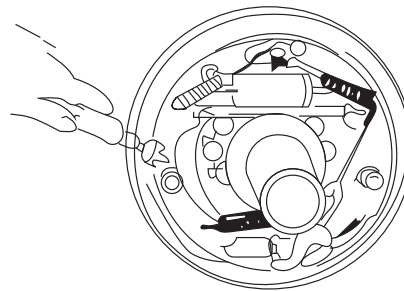


Fig. 8-13

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

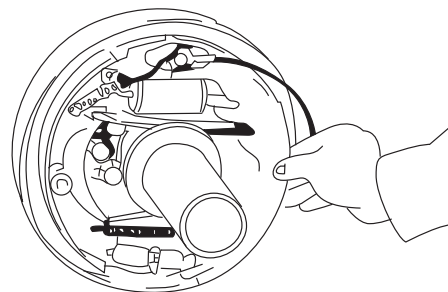


Fig. 8-14

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

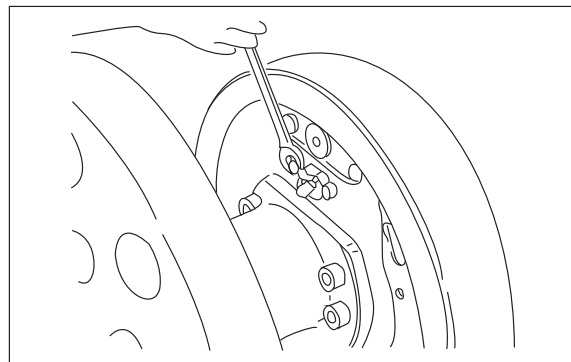


Fig. 8-15

(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.

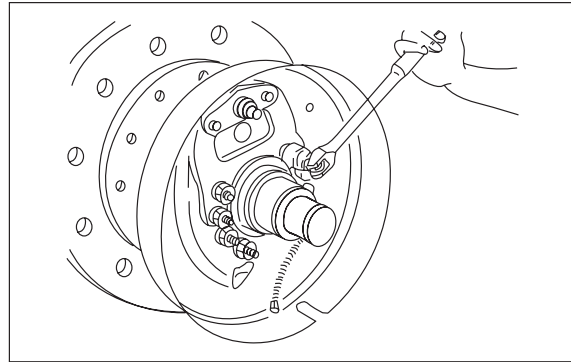


Fig. 8-16

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

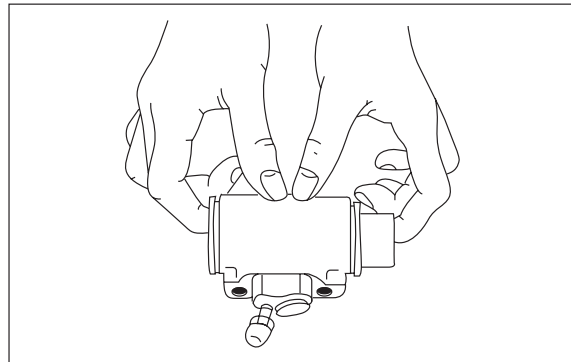


Fig. 8-17

9.2.2 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.

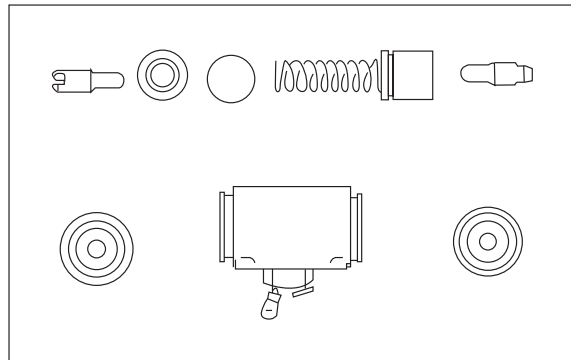


Fig. 8-18

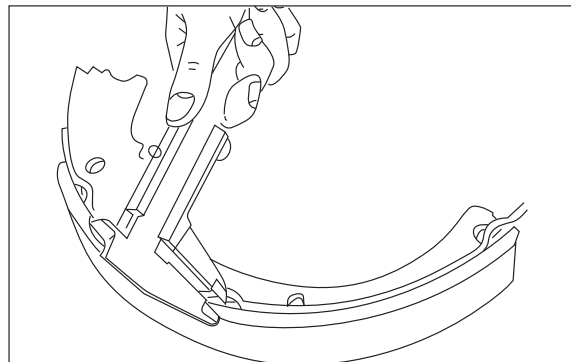


Fig. 8-19

Unit: mm

	3-3.5t
Standard value	8.0
Marginal value	6.0

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

Unit: mm

	3-3.5t
Standard value	314
Max value	316

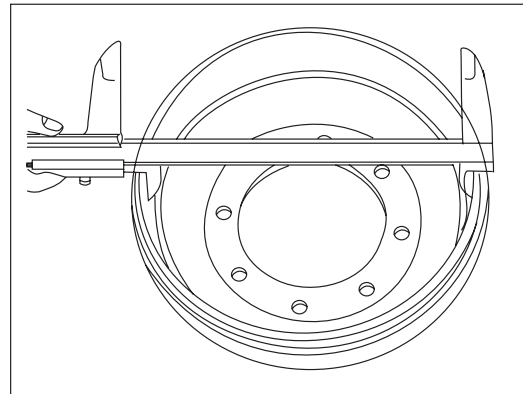


Fig. 8-20

8.2.3 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; Bolts should be a torque to 17.6~26.5N.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 8-21.

(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

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

(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.

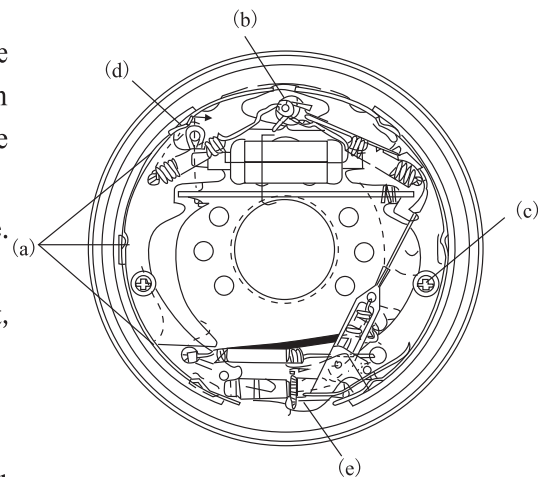


Fig. 8-21

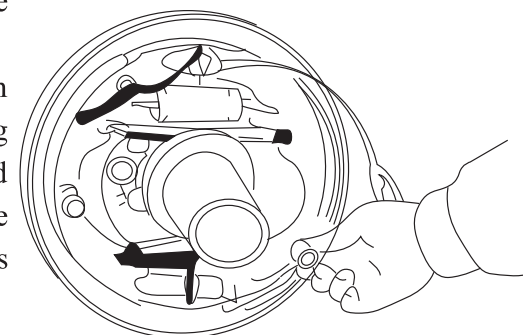


Fig. 8-22

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

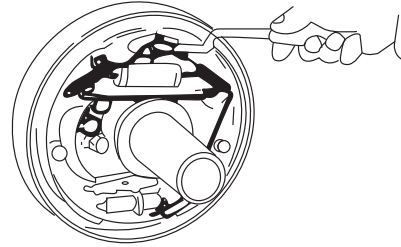


Fig. 8-22

(9) Install the adjuster. Adjuster spring. 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.

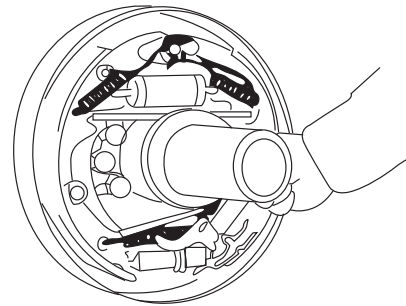


Fig. 8-23

(10) Install the brake vittaon the operating pump.

(11) Measure the insider diameter and outside diameter of the braking shoes. Adjust the adjuster to obtain the difference needed between the drum inner diameter and the friction piece outer diameter less than 1mm.

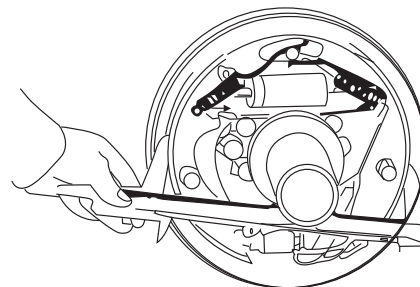


Fig. 8-24

Specified difference:

8.2.4 Operation Test to clearance self-adjuster

(1) Make the brake shoe diameter approach the speci-fied mounting size. And pull the adjusting level 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.

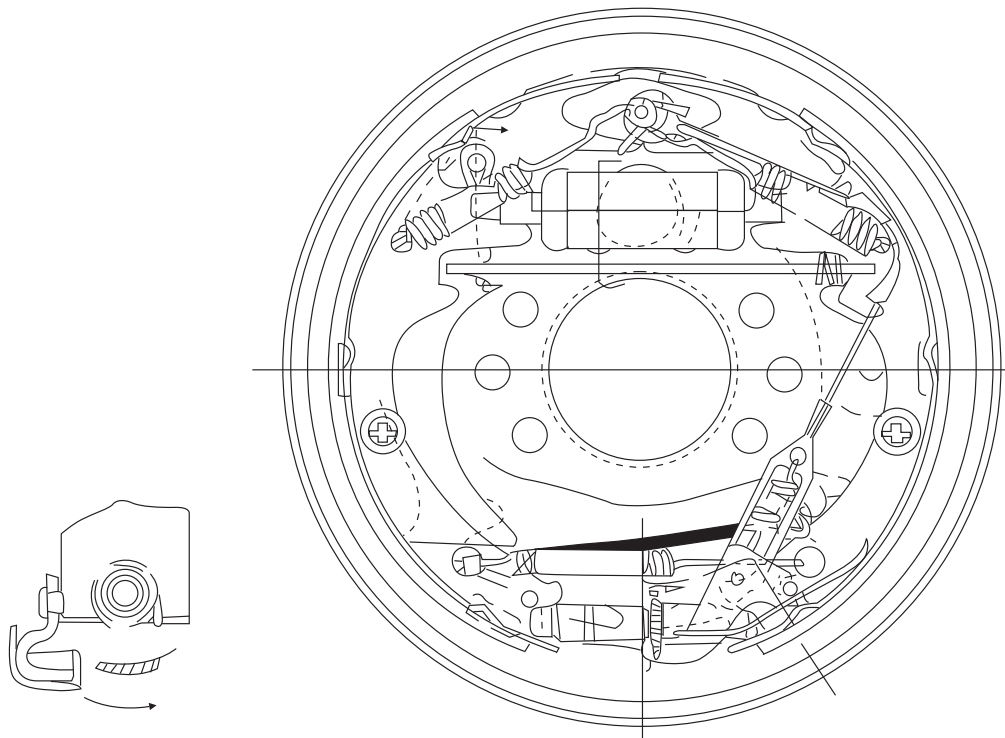


Fig. 8-25

8. 2. 5 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 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

9、Hydraulic system

Forklift Type		3~3.5t		
Item				
Motor Type		4TNE98	4TNV94L	B3.3
Main Pump Multiport Valve	Type	Gear pump		
	Displace- ment	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	45	50	56
	Stroke	1495mm (When lifting height 3m)		
Tilt Cylinder	Type	Double-acting piston		
	Cylinder diameter	63	80	
	Stroke	147mm	162mm	
Oil tank Capacity		45L	60L	

9.1 general description

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

9.2 Main pump

The main pump is the gear pump, it is driven directly by the power output mechanism of generator, and the oil of oil tank is transmitted to the control valve through the main pump.

The main pump consists of body of pump, a pair of gear, scale board and check ring. Use the bearing of pressure balance and the unique lubrication method to minimize the gap of the gear. The pressure balance method is to make the scale board press towards the side of gear because of the oil discharging between the scale board and pump.

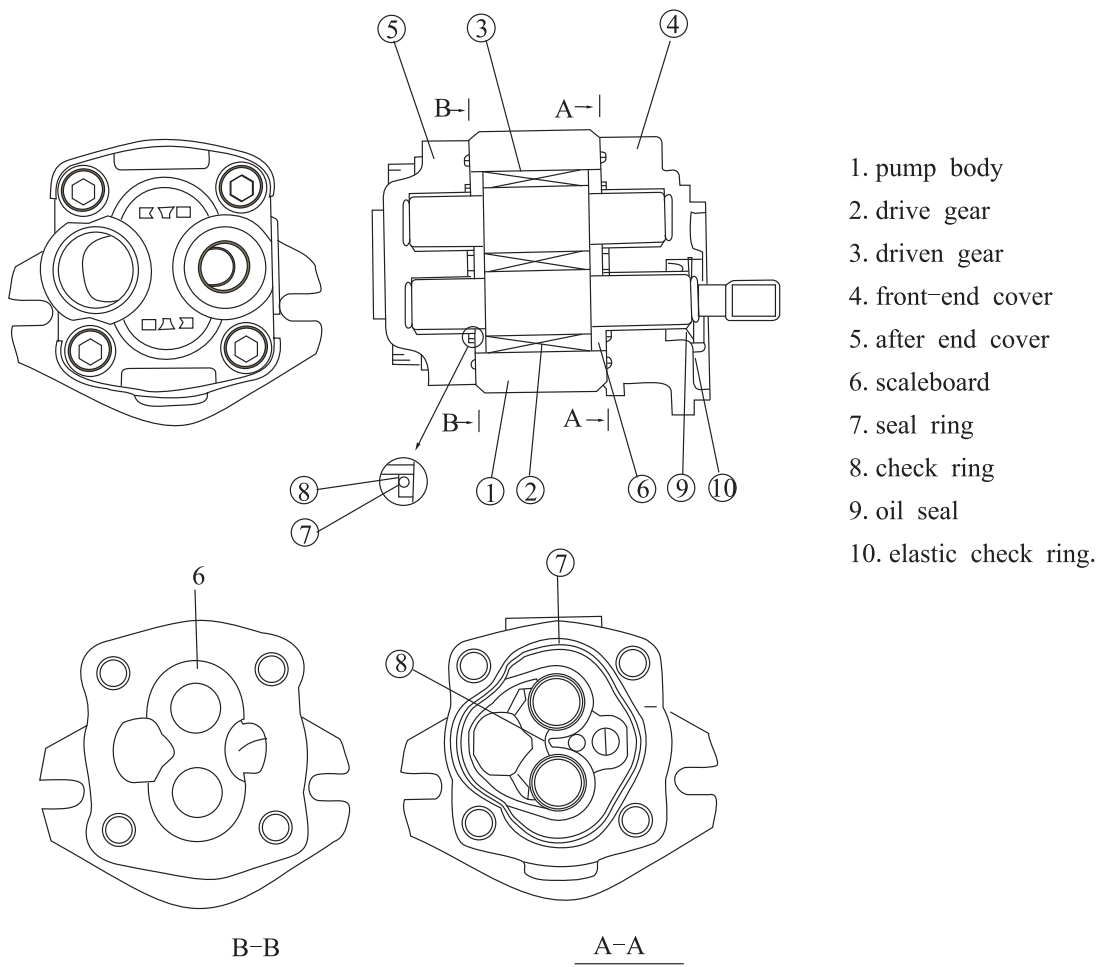


Fig. 9-1 Main Pump

9.3 Control valve

The control valve (2 spools type) consists of four-valve housing, two spools. On relief valve, the four-valve housing is assembled together with three bolts and nuts. The tilt spool valve contains a tilt lock valve

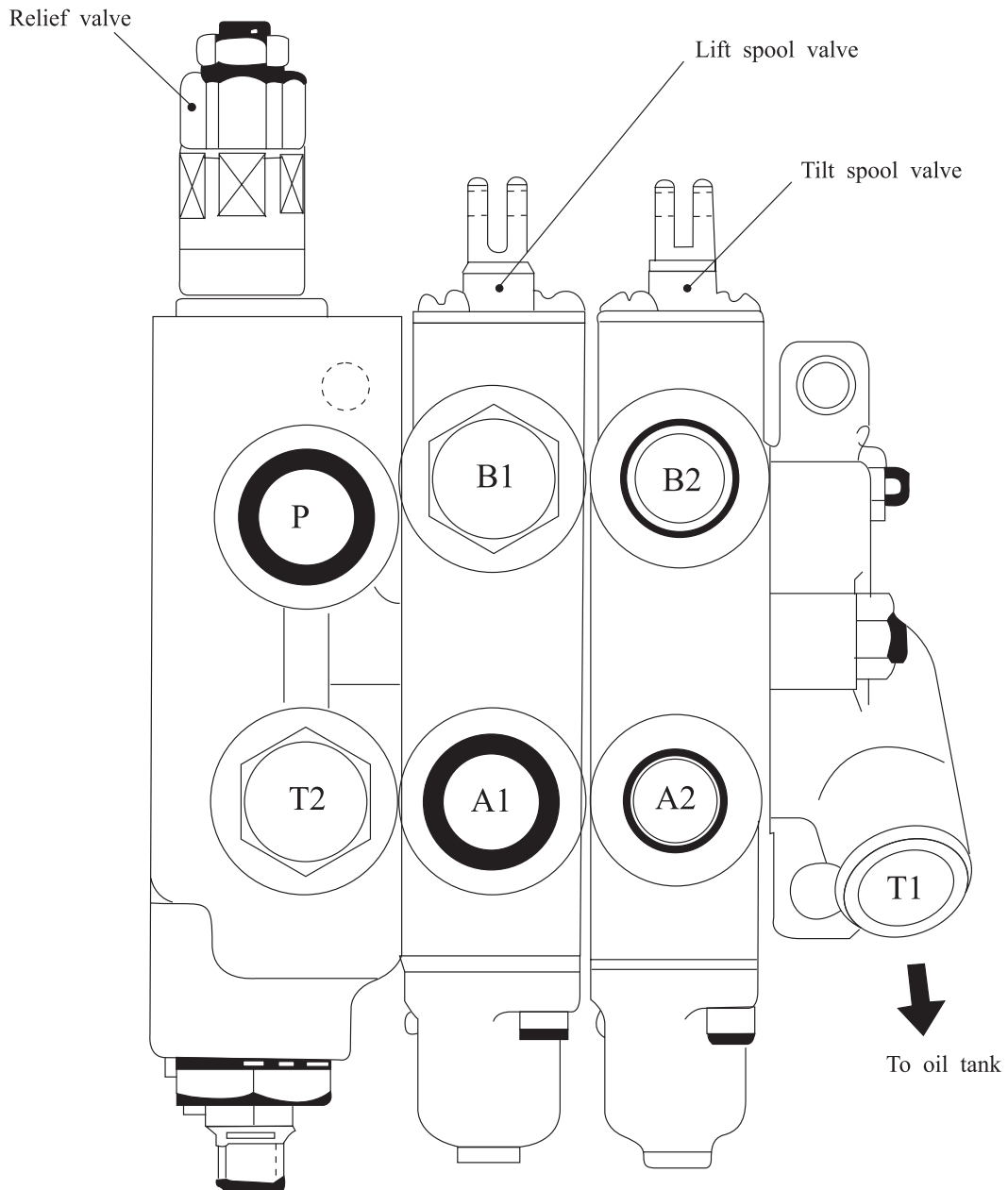


Fig. 9-2 Control valve

9.3.1 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

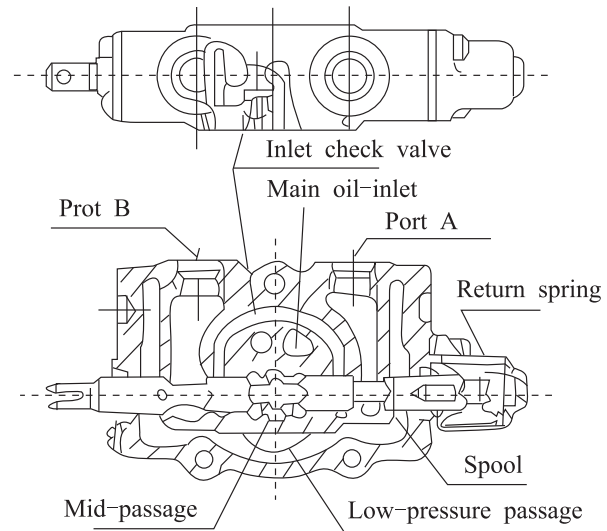


Fig. 9-3

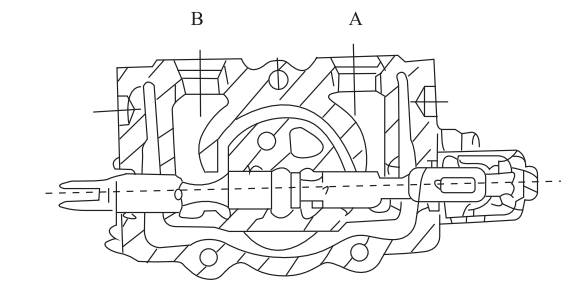


Fig. 9-4

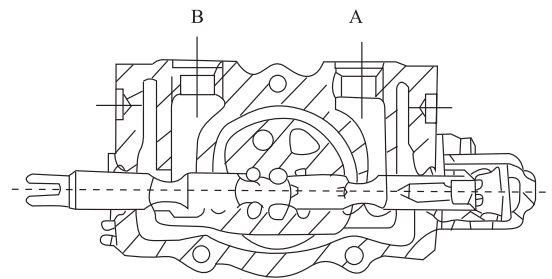


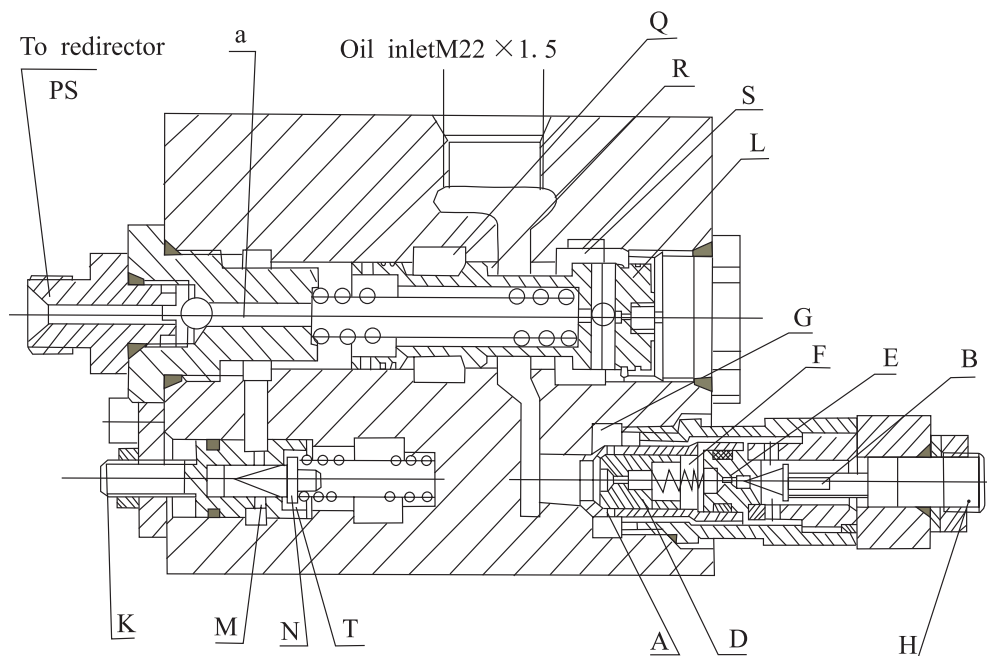
Fig. 9-5

9.3.2 Main safe overflow valve and the flow-dividing safe valve (picture 10-6)

The main safe overflow valve is composed of the main valve A and the conducting 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 theittling orifice D, E, when the systematic pressure is bigger than the adjusting pressure, then the conducting 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.

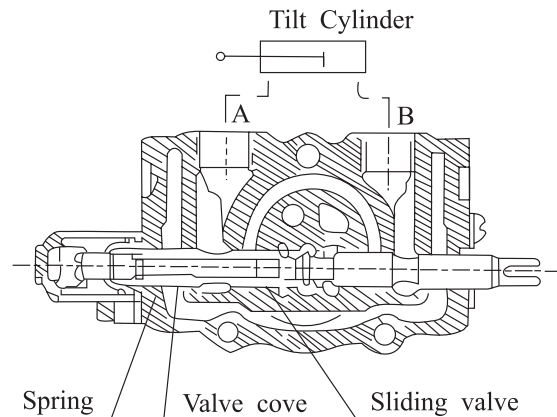
The structure of flow-dividing valve is simple and is vertically overflowing and uses the principle of balancing the liquid pressure with the spring force directly to acquire the stable pressure value of steering system. When operating the steering wheel, the oil cavity M is connected with the high-pressure 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.

L valve is the smooth slide 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 the fixed theittling orifice.



9.3.3 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 lift motor isn't running. The mast will not 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” can not be connected with the low pressure, the bracket will not lean forward and the leaning cylinder can not form the negative pressure.

9.4 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.

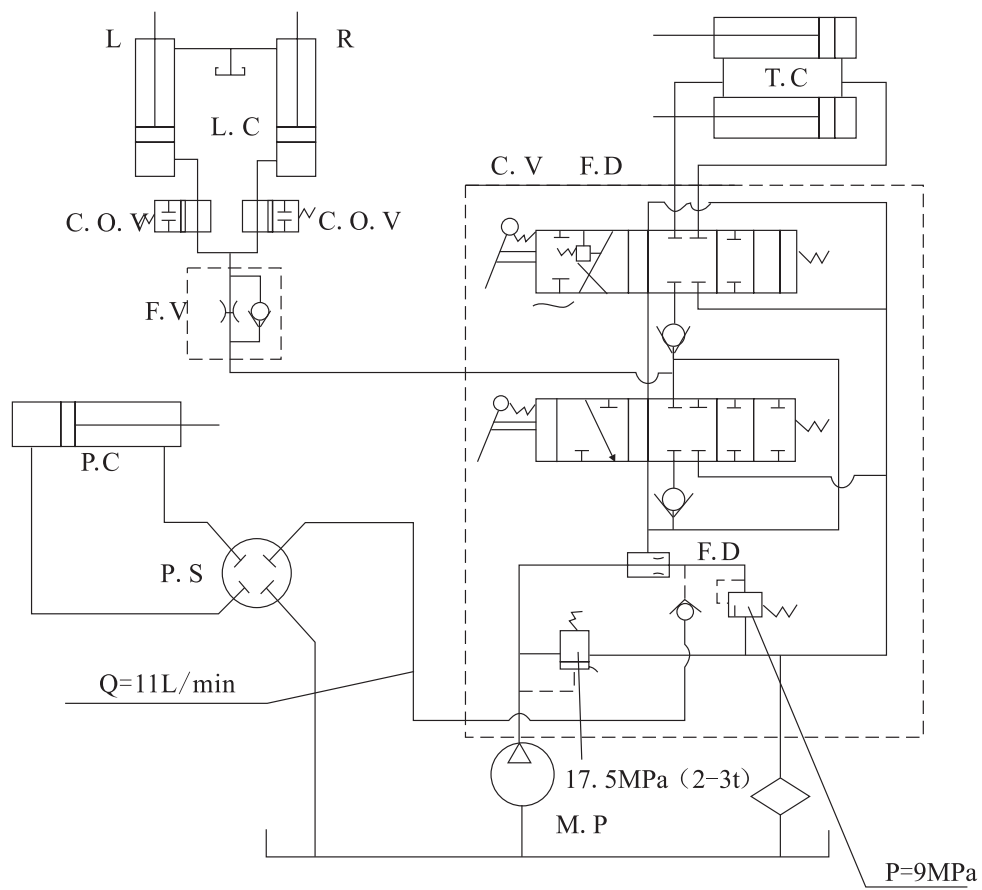


Fig. 9-8 Hydraulic System oil way

9.5 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.

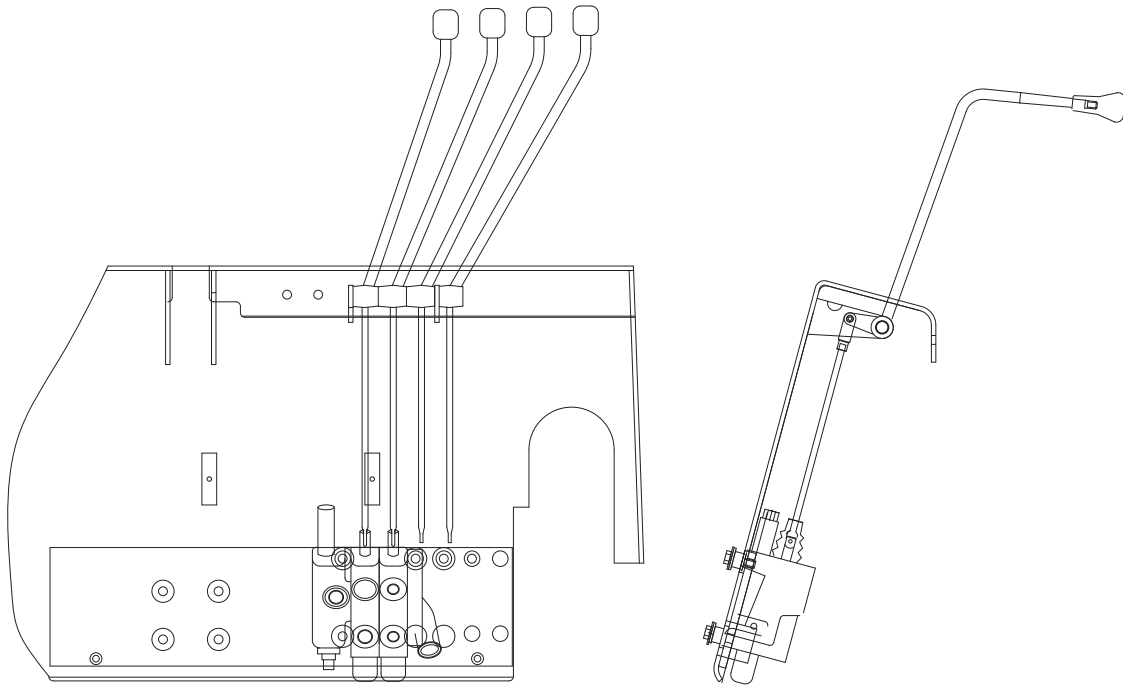


Fig. 9-9 Operation of the multi-control valve

9.6 Lifting cylinder

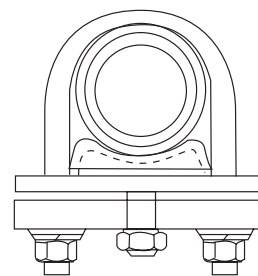
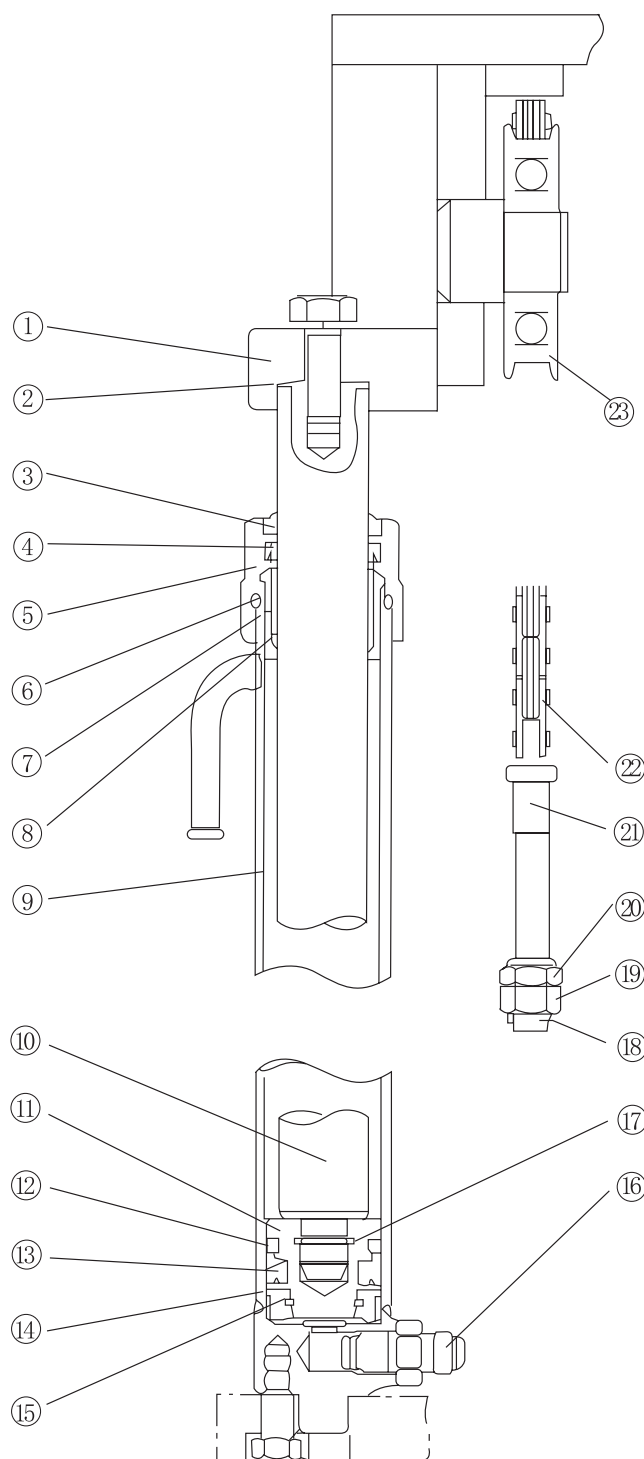
The two single acting type lift cylinder is composed of cylinder body, piston, piston rod, cylinder cap, cylinder base, and oil seals

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 9-11) 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.



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

Fig. 9-10 Lifting Cylinder

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.

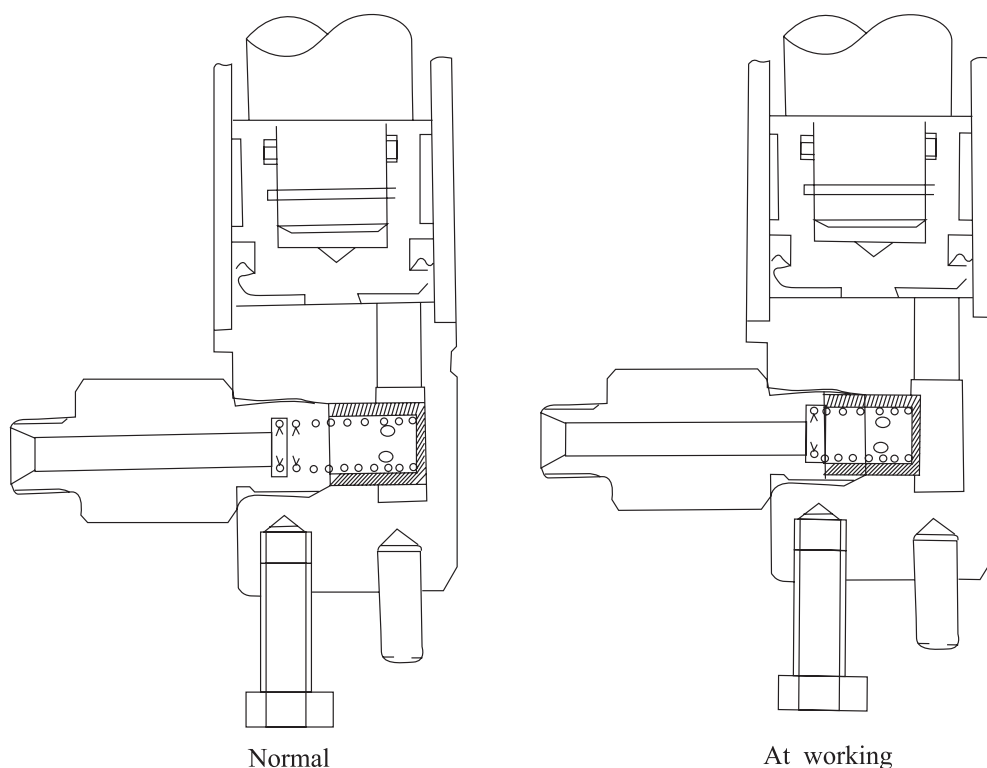


Fig. 9-11

9.7 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 hold D and C, and reduces the oil flow passing through the orifice plate.

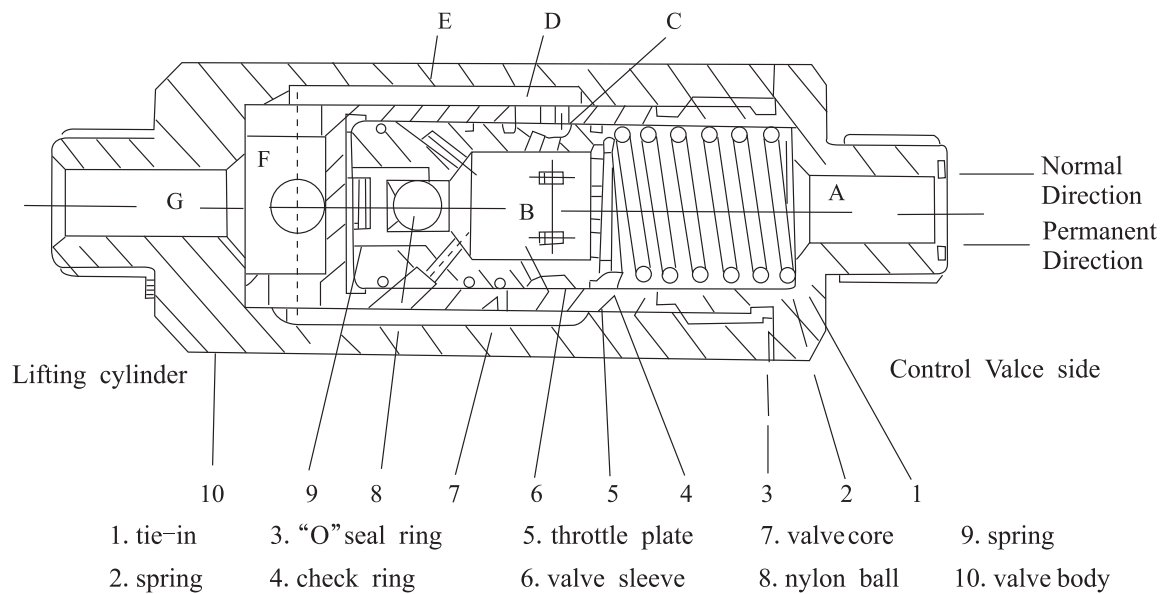


Fig. 9-12 Flow regulator valve

9.8 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.

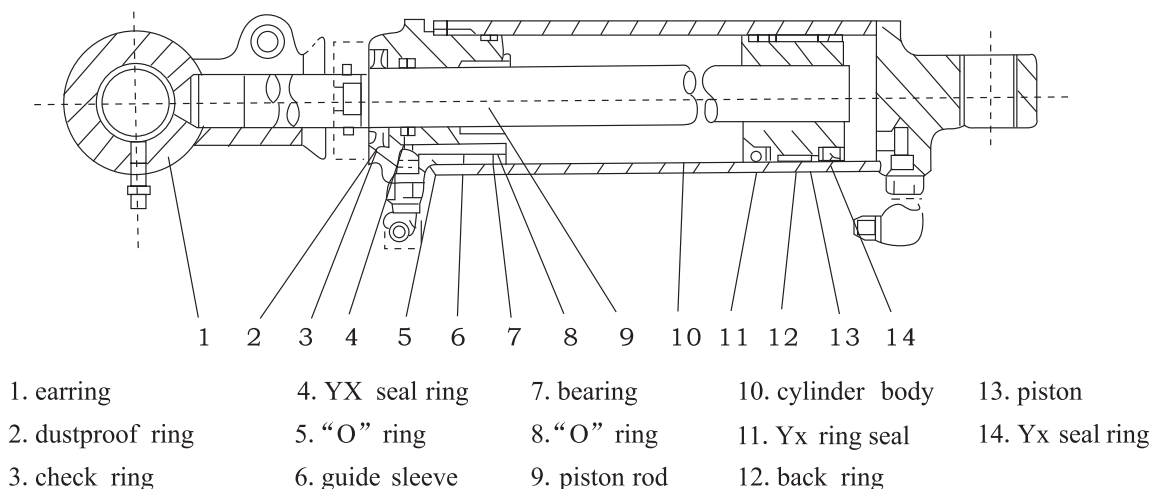


Fig. 9-13 Tilt cylinder

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.

9.9 The hydraulic oil tank

The hydraulic oil tank does not suck oil and filter the dust as the component of frame on the right tank.

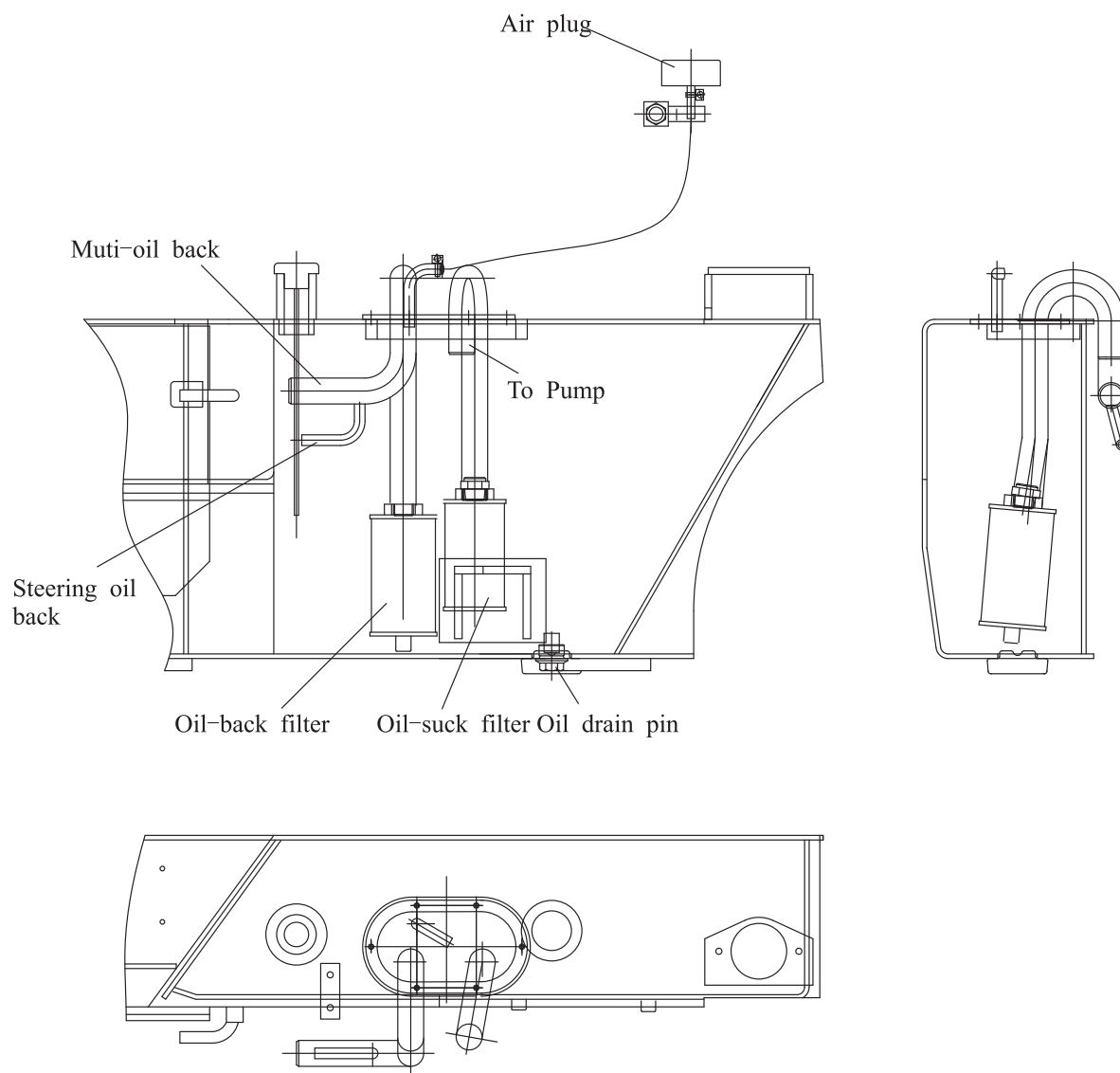


Fig. 9-14 Hydraulic oil tank

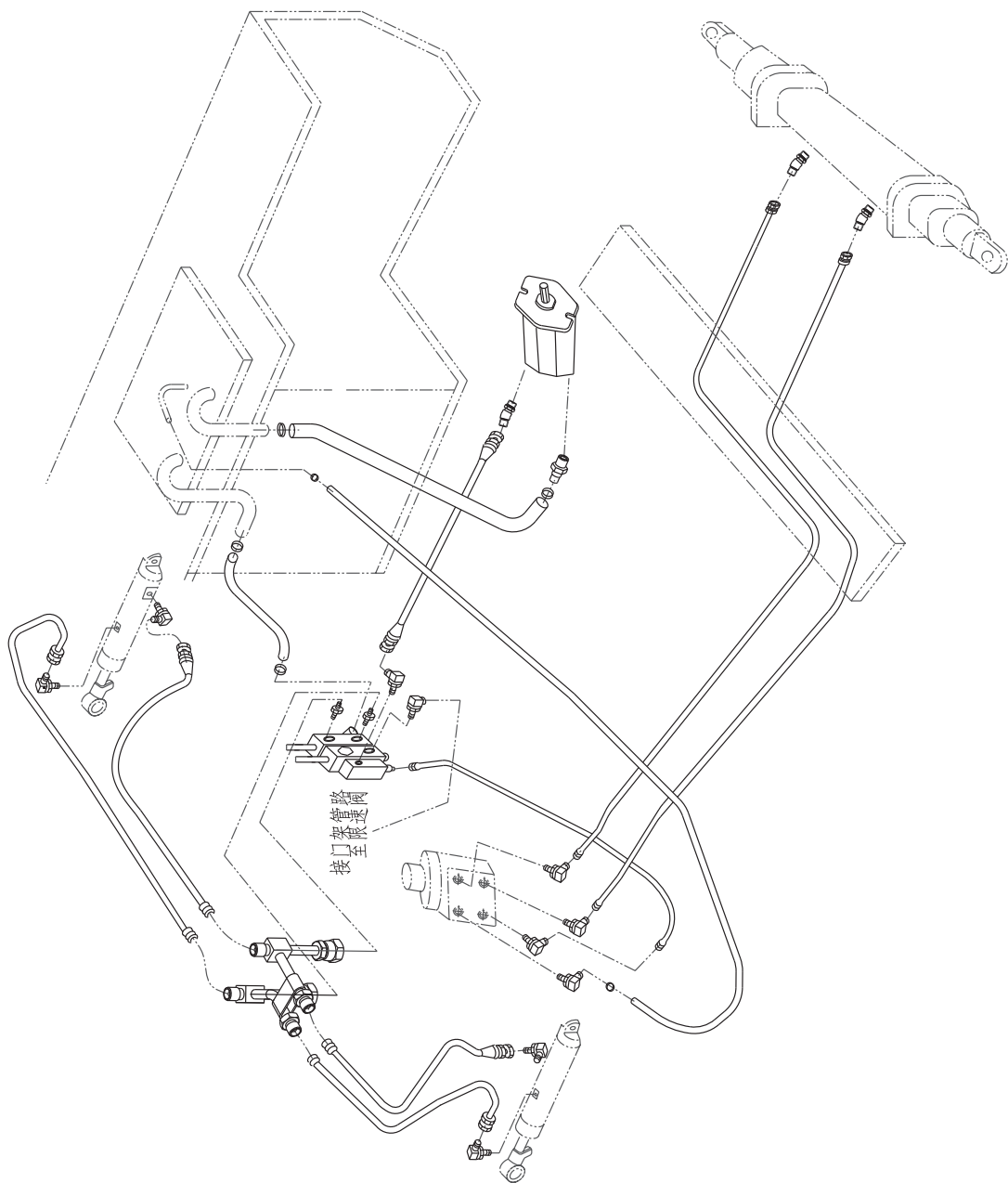


Fig. 9-15 Hydraulic Pipeline (Y2/Y3)



9.10 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 bolts 11, 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.

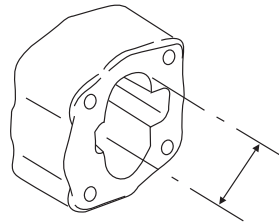


Fig. 9-17

(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

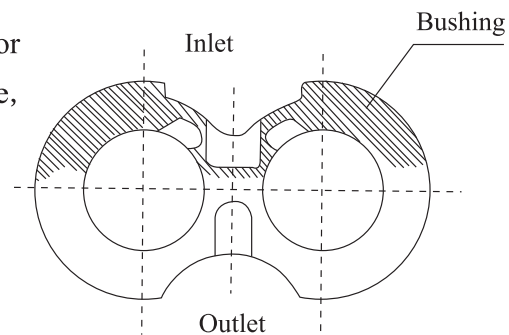


Fig. 9-18

(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.

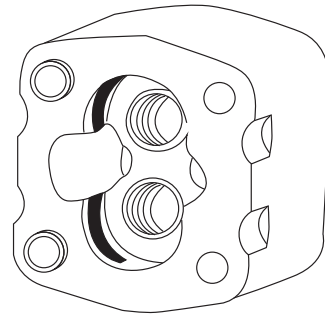


Fig. 9-19

(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.

$D=20.961\text{mm}$

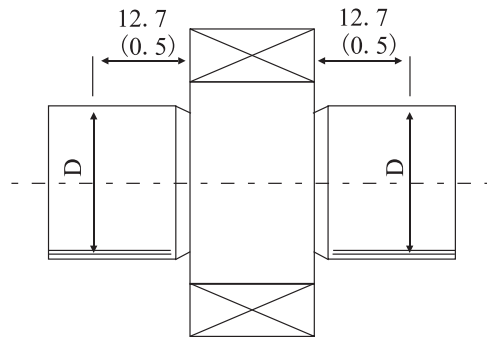


Fig. 9-21

(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.

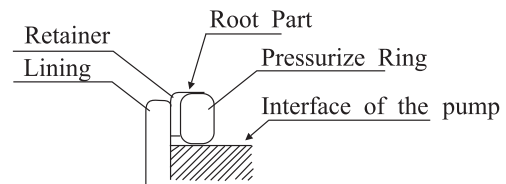


Fig. 9-21 Lining seal cap

(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.

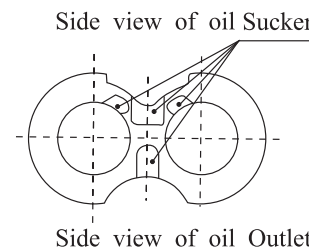
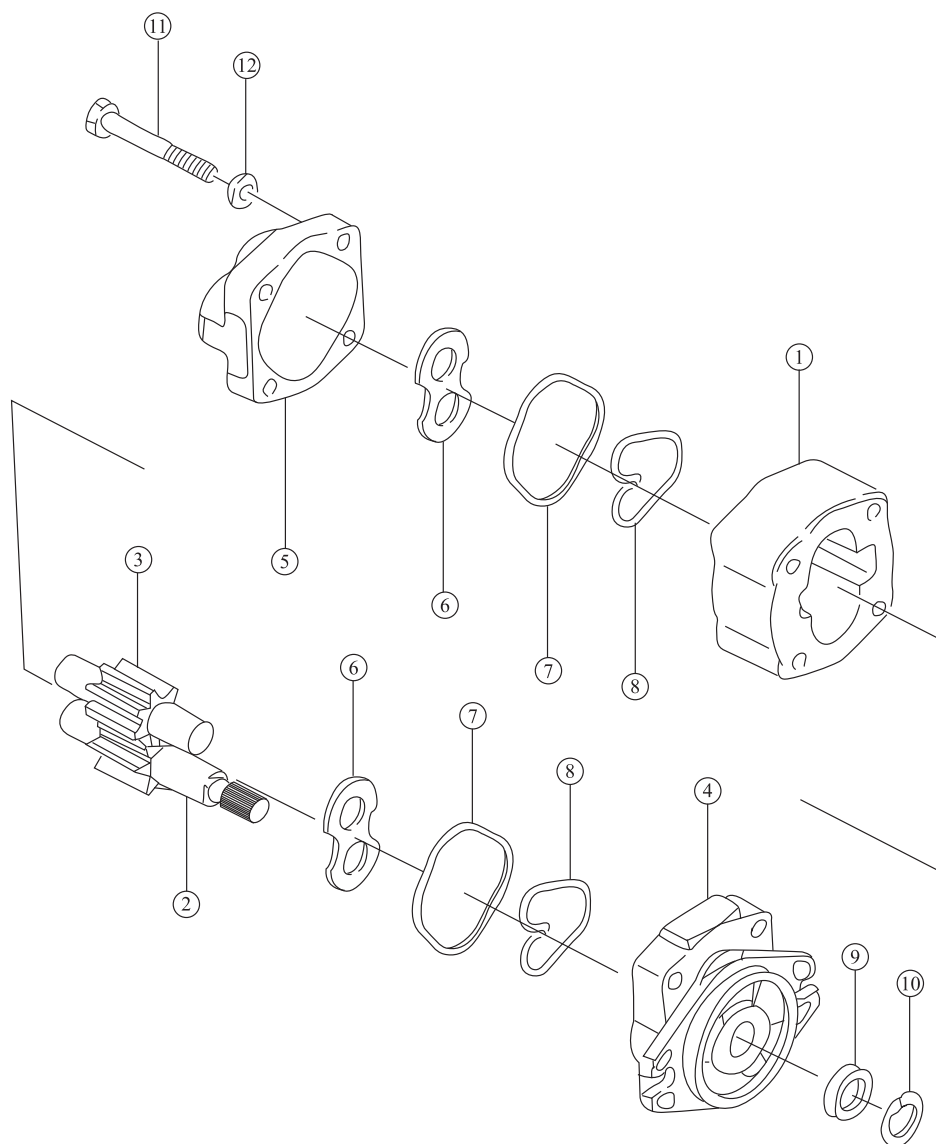


Fig. 9-22 Scale board

(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. 9-23 Gear pump

9. 11 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 .

9. 12 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	Lower oil lever 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

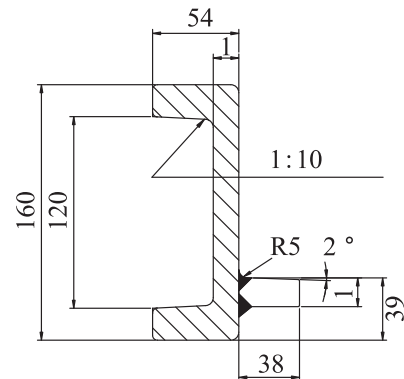
10. Lifting system

“J” type mast

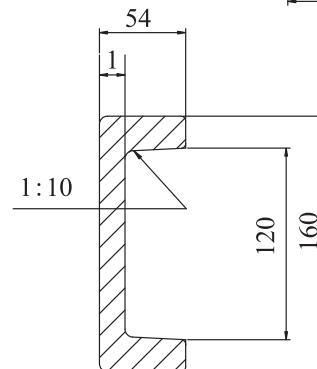
“C” type outer mast with free lift

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 (3t)
	Lh1634 (3.5t)

Fork mast lifting system	Hydraulic
Fork adjust system	Mechanical

10.1 General Description

The loading system is of the two-stage; it consists of the inner mast, the outer mast and the lift bracket.

10.2 Inner and outer Masts

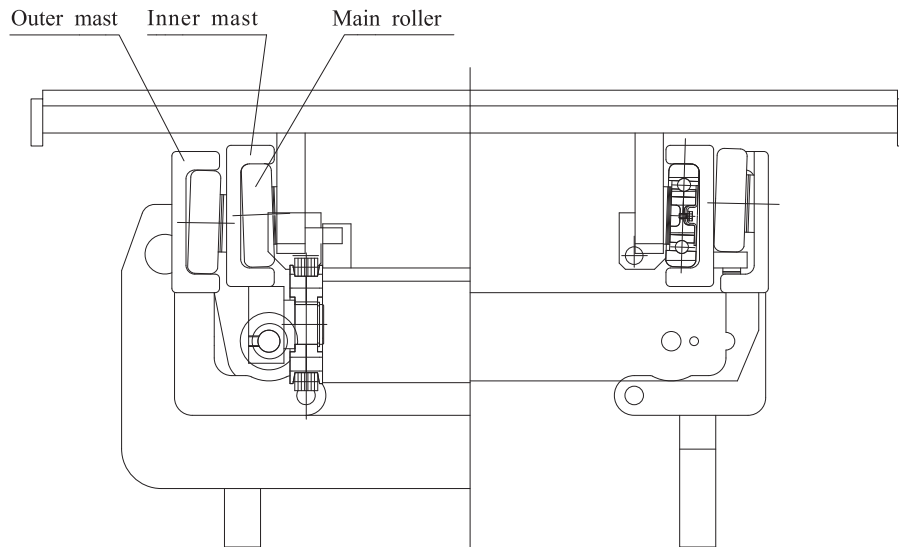
The inner and outer masts both are welded parts, the bottom of outer mast is connected with the drive axle, and the outside middle of outer mast is connected with the frame by tilt cylinders. The mast assembly can be tilted forward and backward by operating tilt cylinders. The outer mast has C-shaped 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.

10.3 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.

10.4 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.



Attention (A) Clearance of the side roller is 0.5mm

(B) Please add butter on the surface of main rollers and the interface of masts.

Fig. 10-1 Position of rollers

10.5 Maintenance

10.5.1 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.

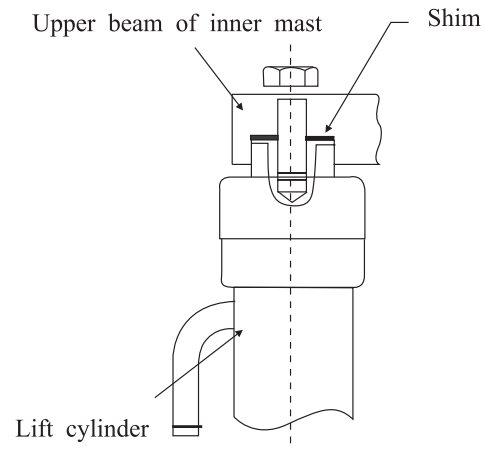


Fig. 10-2

(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.

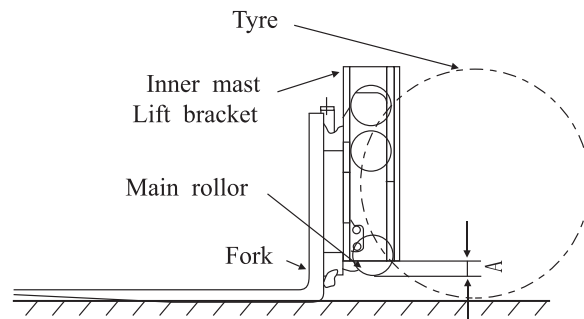


Fig. 10-3

10.5.2 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. $A=19-24\text{mm}$

(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.

10.5.3 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 .

Remark :

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

10.5.4 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. 11-5 ①)
- (5) The forklift can be reversed when the lift bracket disengaged from the outer mast. (Fig. 11-5 ②)
- (6) Replacing Main Rollers.
- (a) Take apart all snap rings from the lift bracket and take out main rollers.

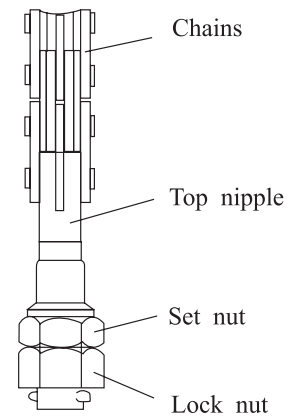


Fig. 10-4

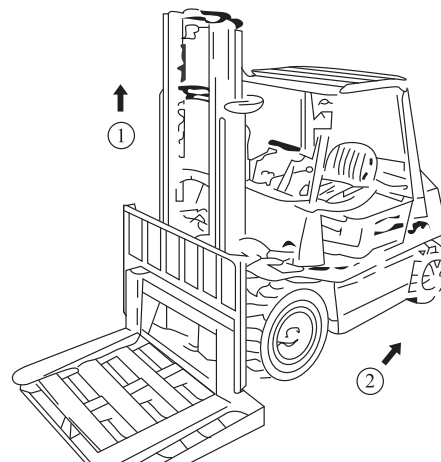
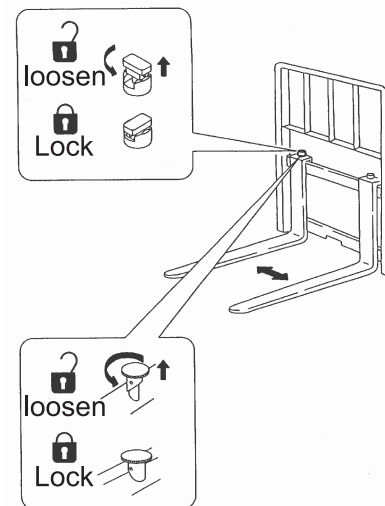


Fig. 10-5

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

10.5.5 Replacing Rollers of Masts

(1) Take apart the fork bracket from the inner mast, then replace the main roller follows the way as 11.5.4.

(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.

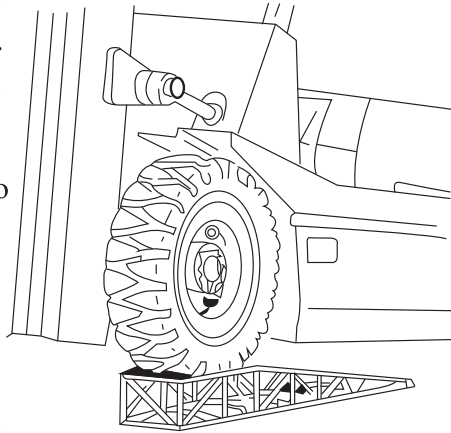


Fig. 10-6

V. Periodic servicing

This service schedule is worked out on the assumption that the lift truck will be used under typical working conditions. If the lift truck is used under severer working conditions, earlier preventive maintenance services are required. (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)	Semianually (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 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.		○	○	○	○	○
	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)	Semainnually (1200hrs)	Annually (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 carbureter link mechanism for looseneess 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)	Semianually (1200hrs)	Annually (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)	Semainnually (1200hrs)	Annually (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)	Semainnually (1200hrs)	Annually (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)	Semianually (1200hrs)	Annually (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)	Semianually (1200hrs)	Annually (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 cylinder wheel cylinder	Check for fluid leaks.			○	○	○	○
	Check for fluid level. Change brake fluid.		○	○	○	●	●

BRAKE SYSTEM

Checking Item	Service Required	Tools	Daily (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semainnually (1200hrs)	Annually (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 (8hrs)	Monthly (200hrs)	Trimonthly (600hrs)	Semainnually (1200hrs)	Annually (2400hrs)
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)	Semianually (1200hrs)	Annually (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)	Semianually (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)	Semianually (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 distributor cap high-voltage cord for 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)	Semianually (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)	Semianually (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)	Semianually (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.						○

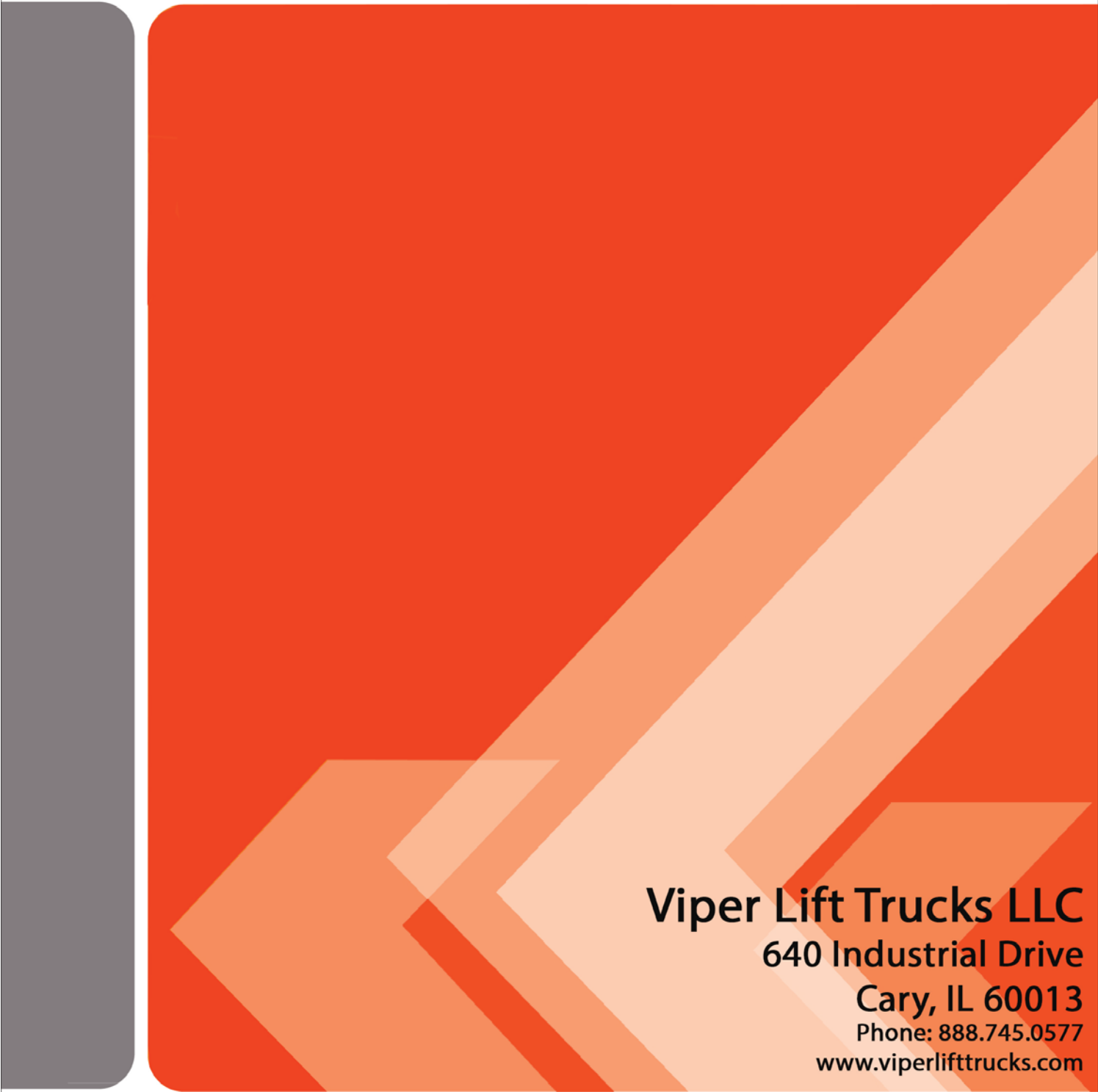
▲ CAUTION

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.

[illegible]

The logo features a large orange square with a grey vertical bar on the left. Overlaid on the orange square are several overlapping, semi-transparent geometric shapes in various shades of orange and grey, creating a dynamic, layered effect.

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