

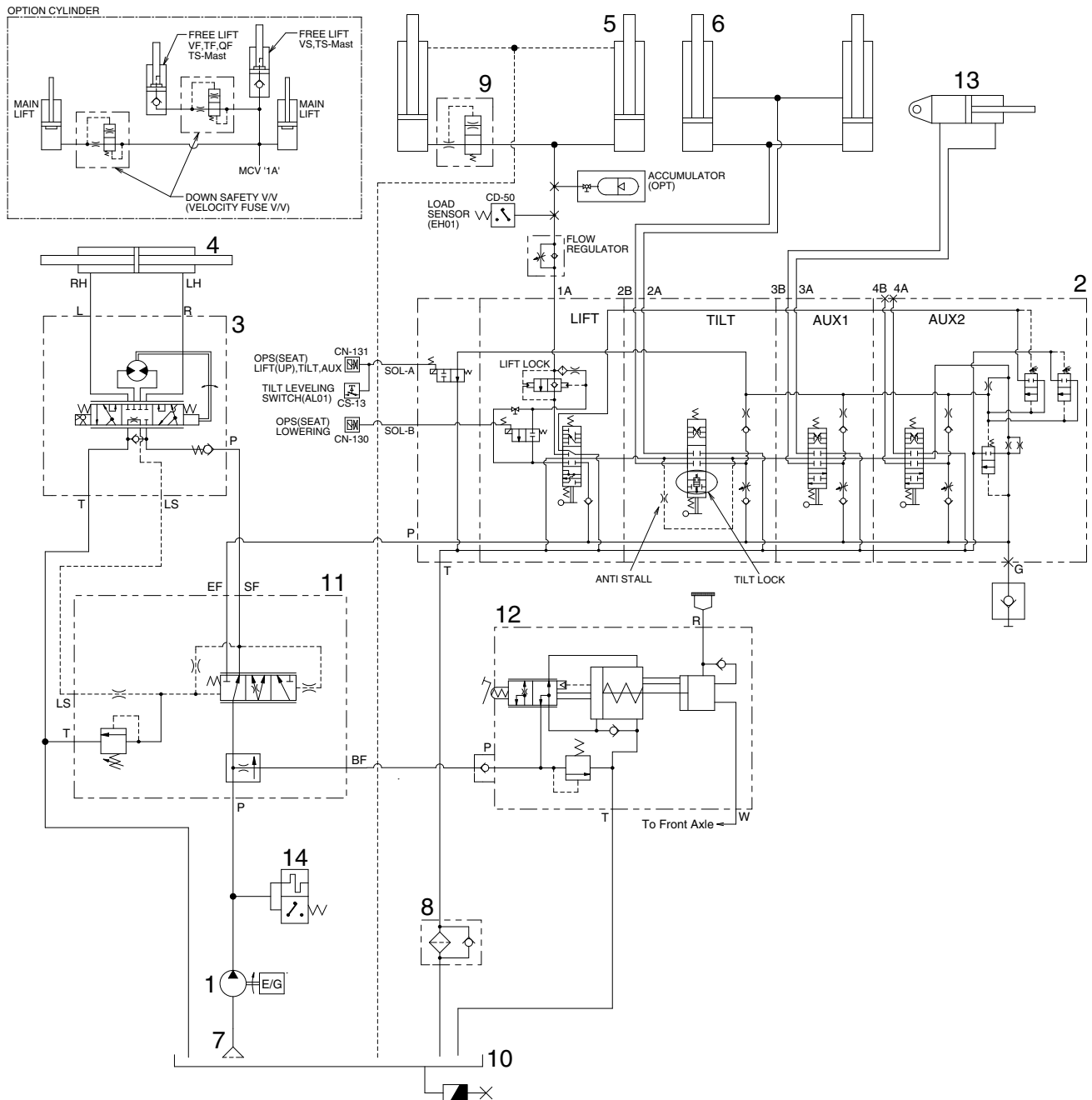
SECTION 6 HYDRAULIC SYSTEM

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SECTION 6 HYDRAULIC SYSTEM

GROUP 1 STRUCTURE AND FUNCTION

1. HYDRAULIC CIRCUIT

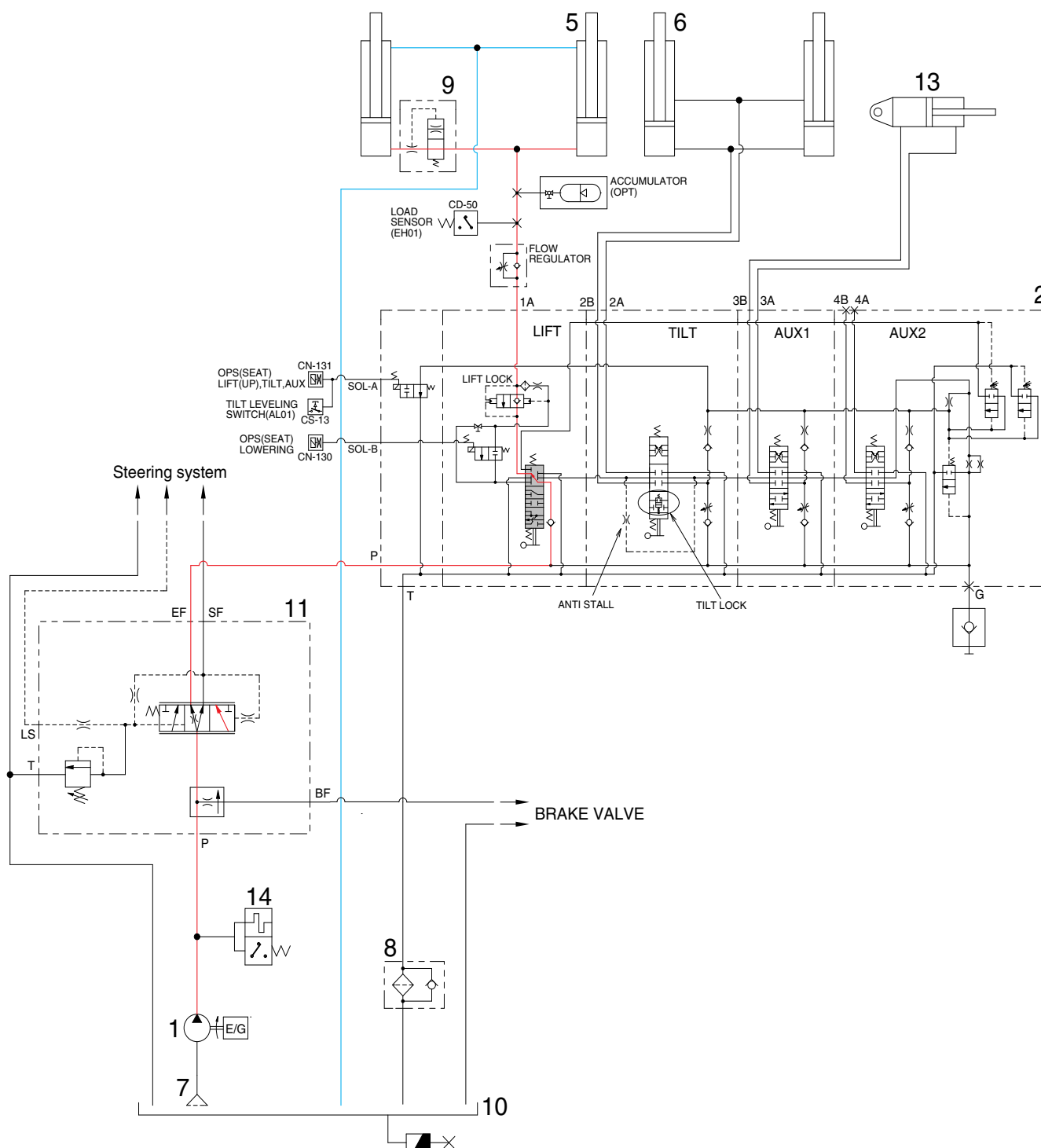


22D9THS01

- | | | | |
|---|---------------------|----|---------------------|
| 1 | Hydraulic gear pump | 8 | Return filter |
| 2 | Main control valve | 9 | Down safety valve |
| 3 | Steering unit | 10 | Hydraulic tank |
| 4 | Steering cylinder | 11 | Dual flow divider |
| 5 | Lift cylinder | 12 | Brake valve |
| 6 | Tilt cylinder | 13 | Side shift cylinder |
| 7 | Suction strainer | 14 | Temperature sensor |

※ The circuit diagram may differ from the equipment, so please check before a repair.

1) WHEN THE LIFT CONTROL LEVER IS IN THE LIFT POSITION



22D9THS03

When the lift control lever is pulled back, the spool on the first block moves to lift position. The oil from hydraulic gear pump (1) flows into main control valve (2) and then goes to the large chamber of lift cylinder (5) by pushing the load check valve of the spool. The oil from the small chamber of lift cylinder (5) returns to hydraulic oil tank (10) at the same time. When this happens, the fork goes up.

※ The circuit diagram may differ from the equipment, so please check before a repair.

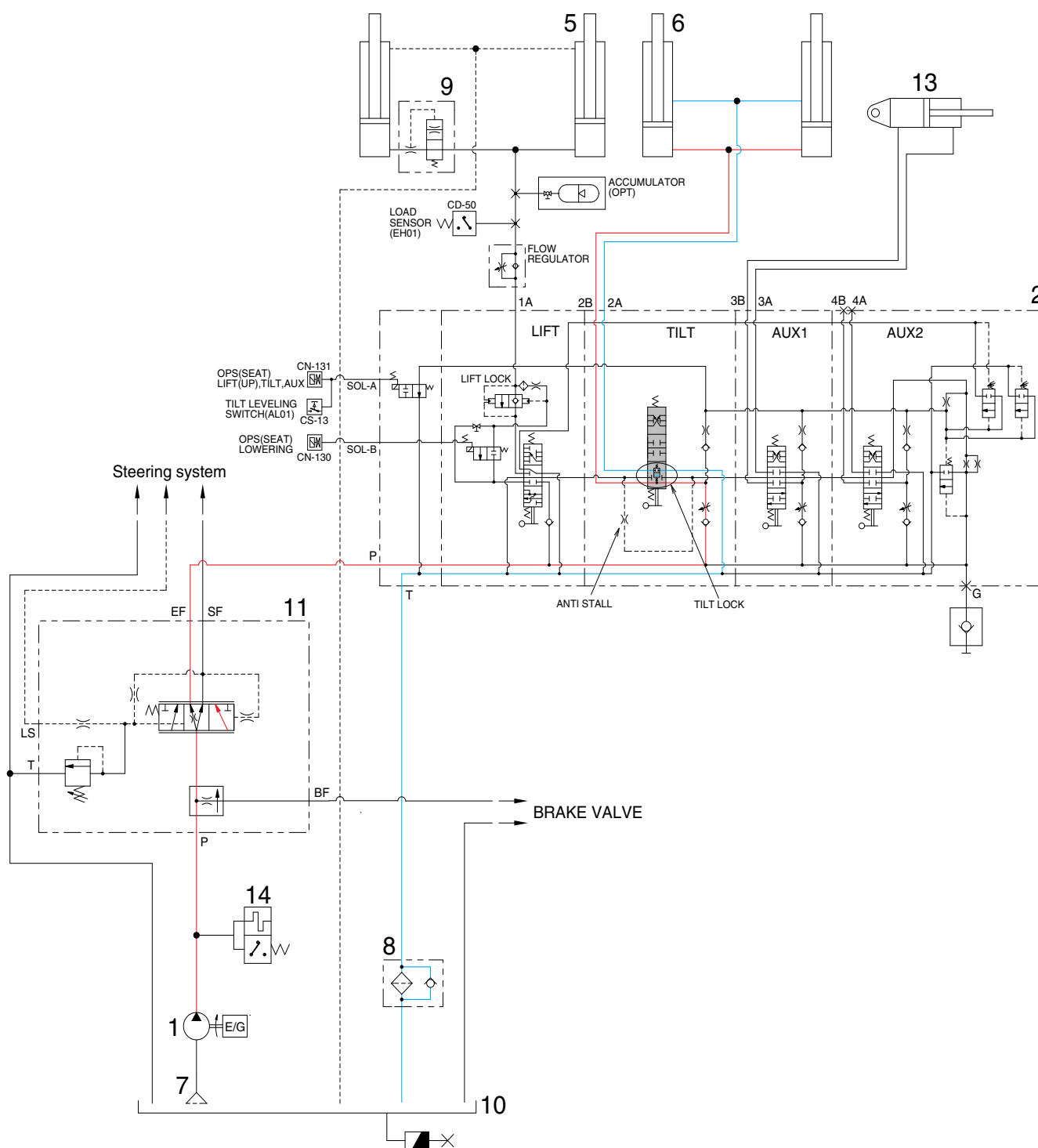
2) WHEN THE LIFT CONTROL LEVER IS IN THE LOWER POSITION



When the lift control lever is pushed forward, the spool on the first block moves to lower position. The work port (1A) and the small and the large chamber of lift cylinder are connected to the return passage, so the fork will be lowered due to its own weight.

※ The circuit diagram may differ from the equipment, so please check before a repair.

3) WHEN THE TILT CONTROL LEVER IS IN THE FORWARD POSITION



22D9THS05

When the tilt control lever is pushed forward, the spool on the second block is moved to tilt forward position.

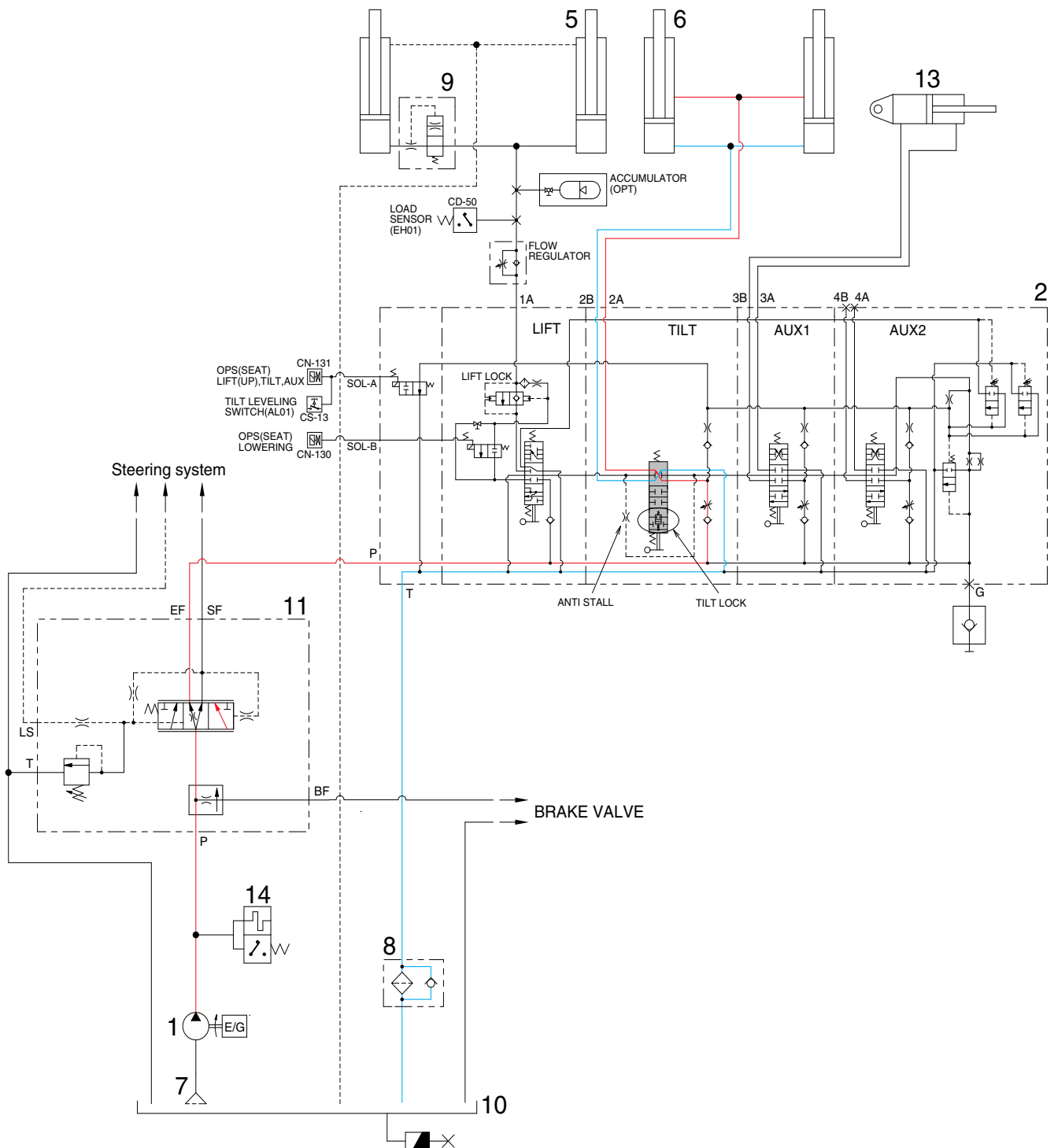
The oil from hydraulic gear pump (1) flows into main control valve (2) and then goes to the large chamber of tilt cylinder (6) by pushing the load check valve of the spool.

The oil at the small chamber of tilt cylinder (6) returns to hydraulic tank (10) at the same time.

When this happens, the mast tilt forward.

※ The circuit diagram may differ from the equipment, so please check before a repair.

4) WHEN THE TILT CONTROL LEVER IS IN THE BACKWARD POSITION



22D9THS06

When the tilt control lever is pulled back, the spool on the second block is moved to tilt backward position.

The oil from hydraulic gear pump (1) flows into main control valve (2) and then goes to the small chamber of tilt cylinder (6) by pushing the load check valve of the spool.

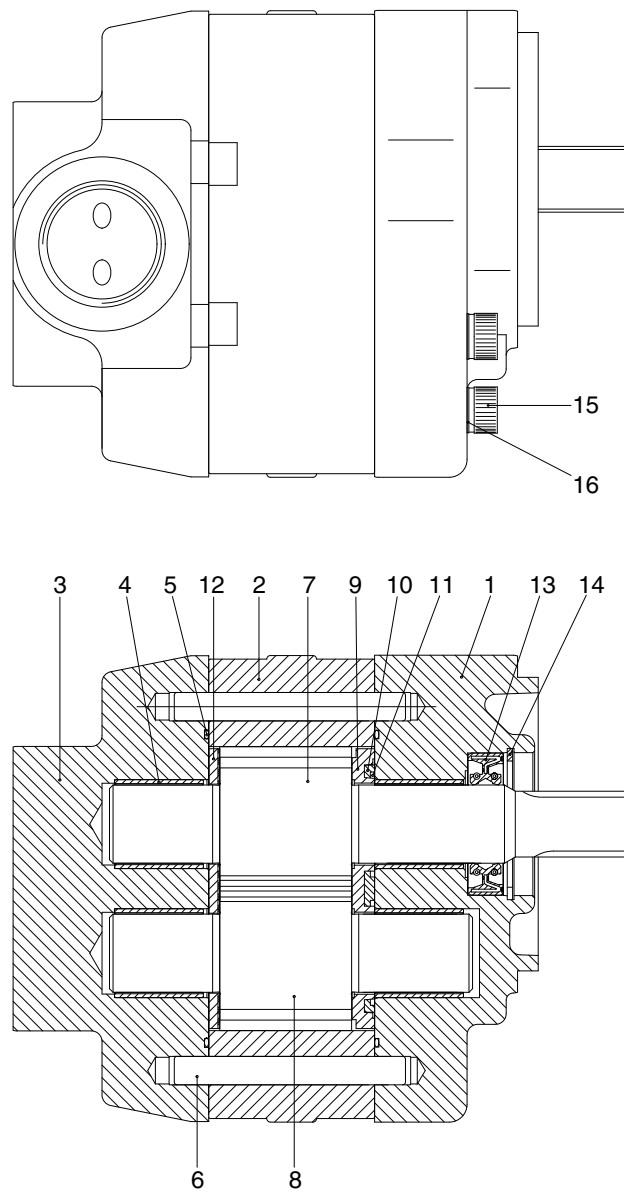
The oil at the large chamber of tilt cylinder (6) returns to hydraulic tank (10) at the same time.

When this happens, the mast tilts backward.

※ The circuit diagram may differ from the equipment, so please check before a repair.

2. HYDRAULIC GEAR PUMP

1) STRUCTURE (Booster brake)

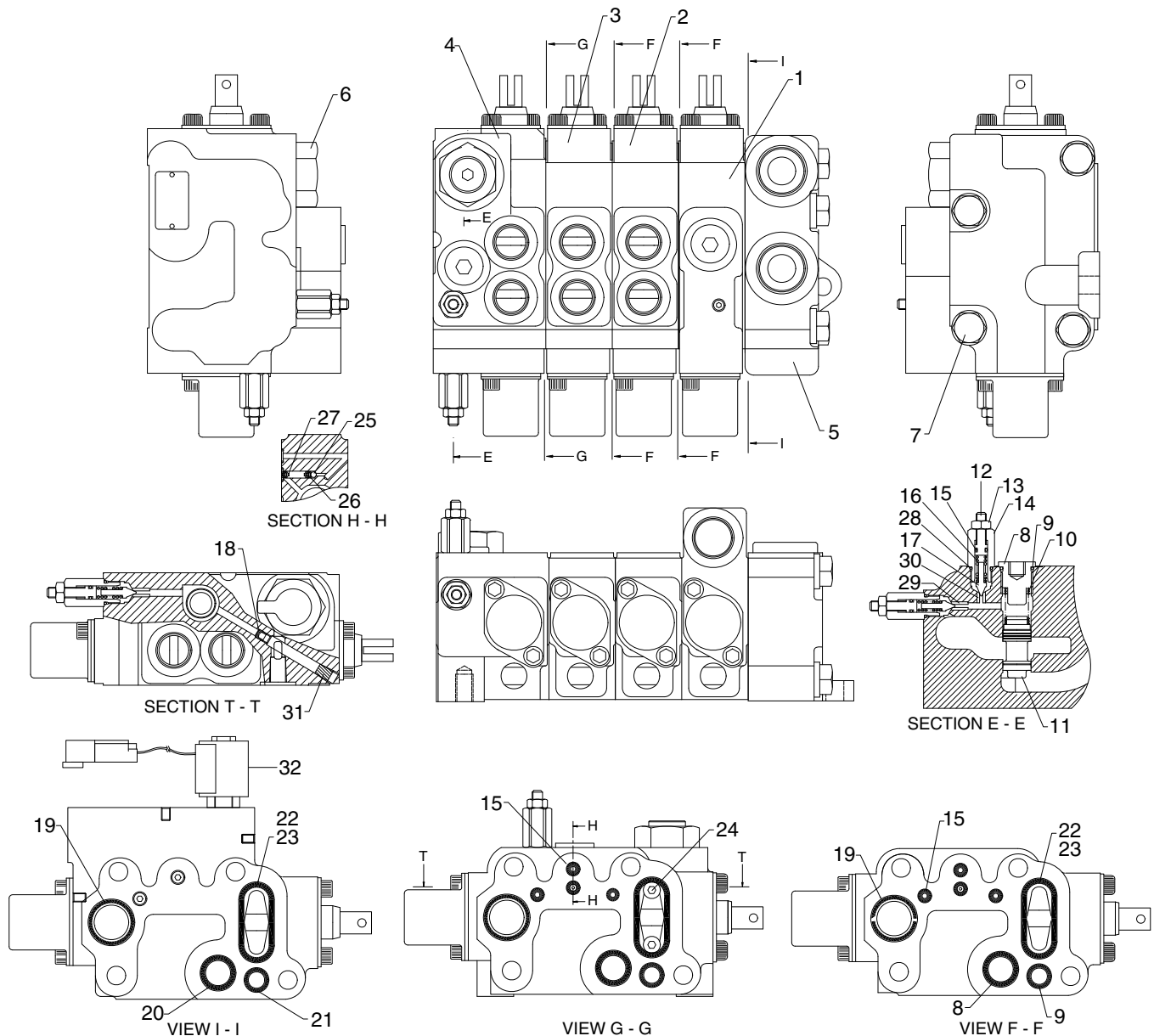


- | | | | | | |
|---|------------|----|--------------|----|------------|
| 1 | Housing | 7 | Drive gear | 12 | Side plate |
| 2 | Body | 8 | Idle gear | 13 | Oil seal |
| 3 | Rear cover | 9 | Side plate | 14 | Snap ring |
| 4 | Bushing | 10 | O-ring | 15 | Bolt |
| 5 | O-ring | 11 | Back up ring | 16 | Washer |
| 6 | Pin | | | | |

20D7HS14

3. MAIN CONTROL VALVE

1) STRUCTURE (4- Spool)



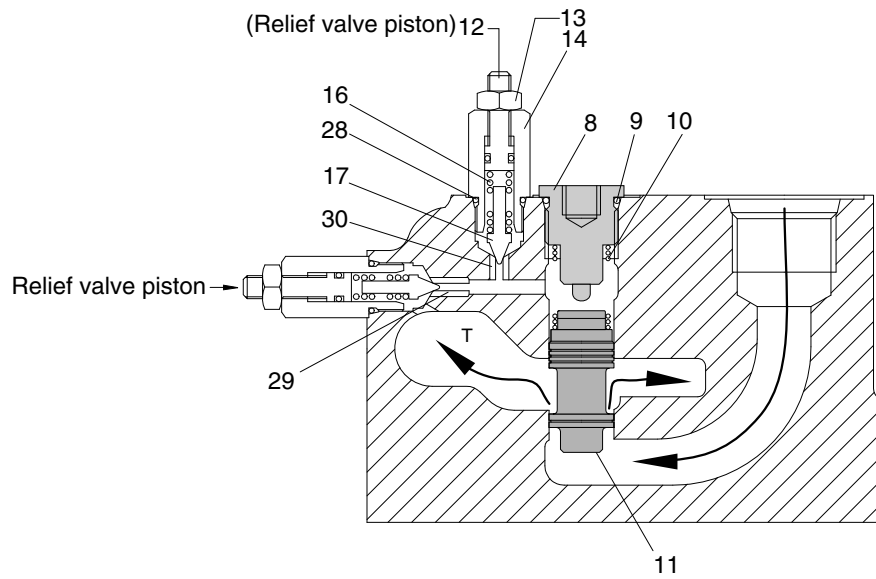
Port name	Size
Inlet port	1-1/16-12UNF-2B
Outlet port	1-1/16-12UNF-2B

20DEHS07

- | | | |
|---------------------|------------------|--------------------------|
| 1 Lift block assy | 12 Relief piston | 22 O-ring |
| 2 Tilt block assy | 13 Nut | 23 O-ring, retainer |
| 3 Aux1 block assy | 14 Relief plug | 24 Plug |
| 4 Aux2 block assy | 15 O-ring | 25 Steel ball |
| 5 T cover | 16 Relief spring | 26 Load sensor spring |
| 6 Gauge plug assy | 17 Pilot poppet | 27 Load sensor spring |
| 7 Long bolt | 18 Plug | 28 O-ring |
| 8 Hydrostat plug | 19 O-ring | 29 System relief seat |
| 9 O-ring | 20 O-ring | 30 Secondary relief seat |
| 10 Hydrostat spring | 21 O-ring | 32 Solenoid valve assy |
| 11 Hydrostat sleeve | | |

2) INLET SECTION OPERATION

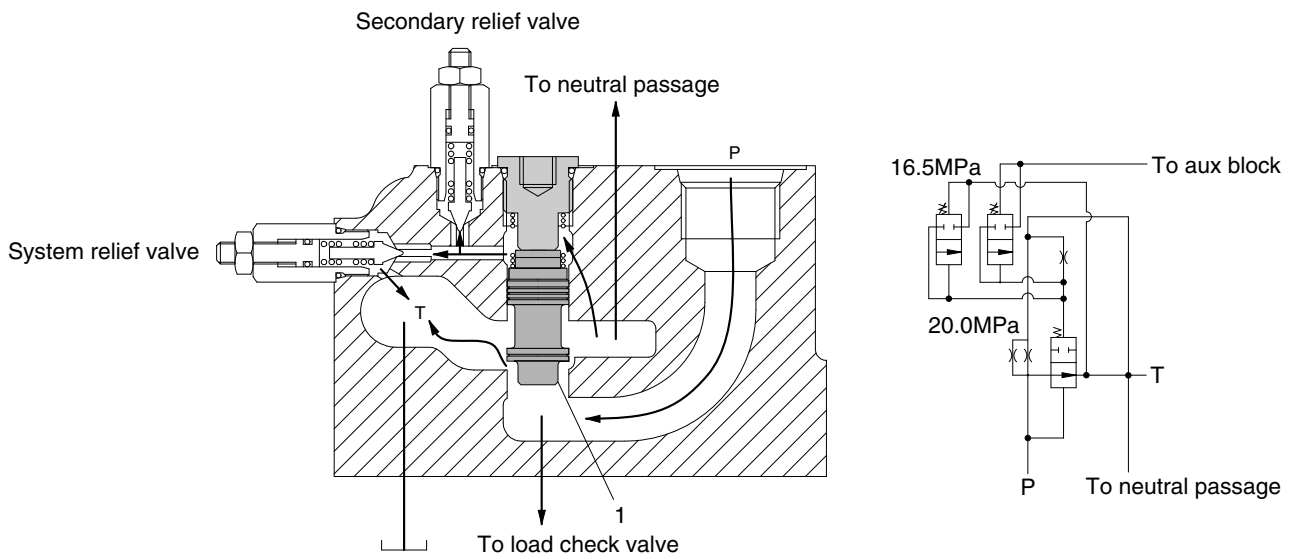
(1) Structure and description



20D7HS08

- | | | | |
|----|------------------|----|-----------------------|
| 8 | Hydrostat plug | 14 | Relief plug |
| 9 | O-ring | 16 | Relief spring |
| 10 | Hydrostat spring | 17 | Pilot poppet |
| 11 | Hydrostat sleeve | 28 | O-ring |
| 12 | Relief piston | 29 | System relief seat |
| 13 | Nut | 30 | Secondary relief seat |

(2) Operation

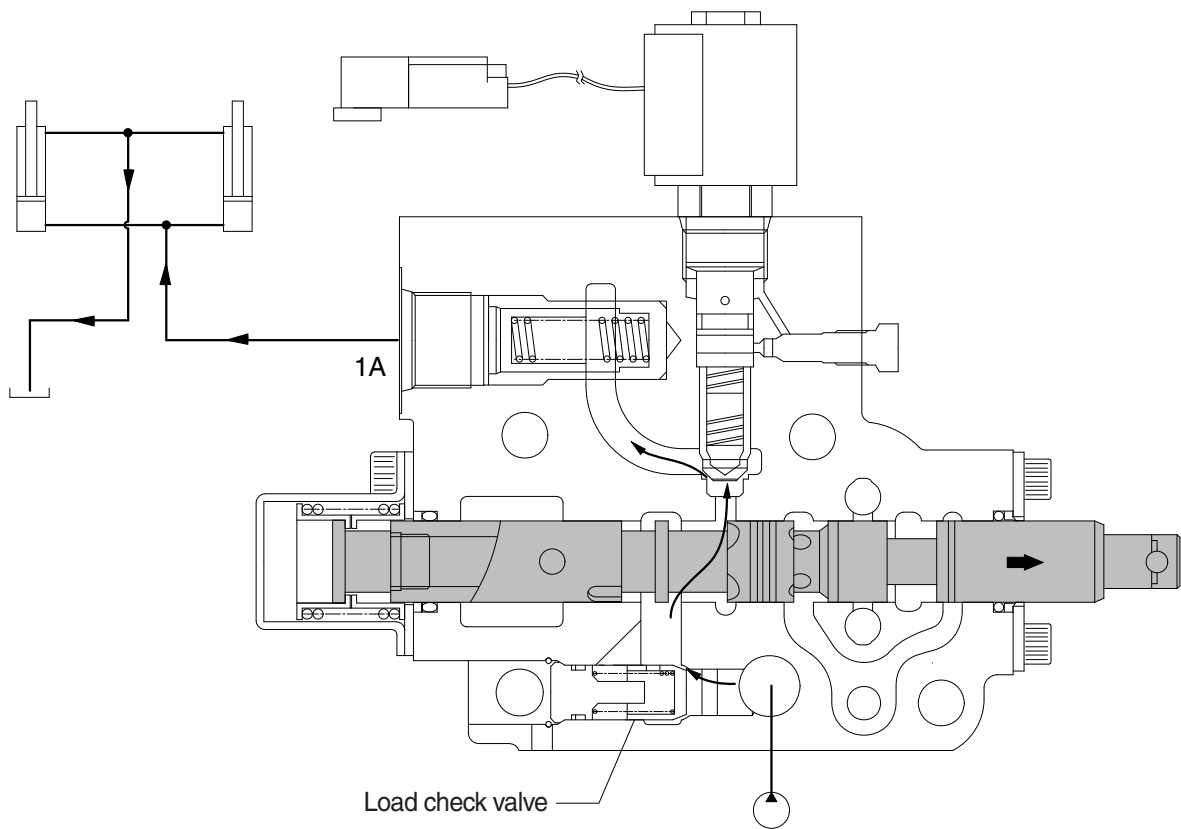


20D7HS15

Oil flows from P (pump) port to reservoir (T) by pushing hydrostat spool (1). Before the center bypass line closed, hydrostat spool is keep opening, so pump port (P) and tank port (T) are always connected in operation to minimize heat generation.

3) LIFT SECTION OPERATION

(1) Lift position



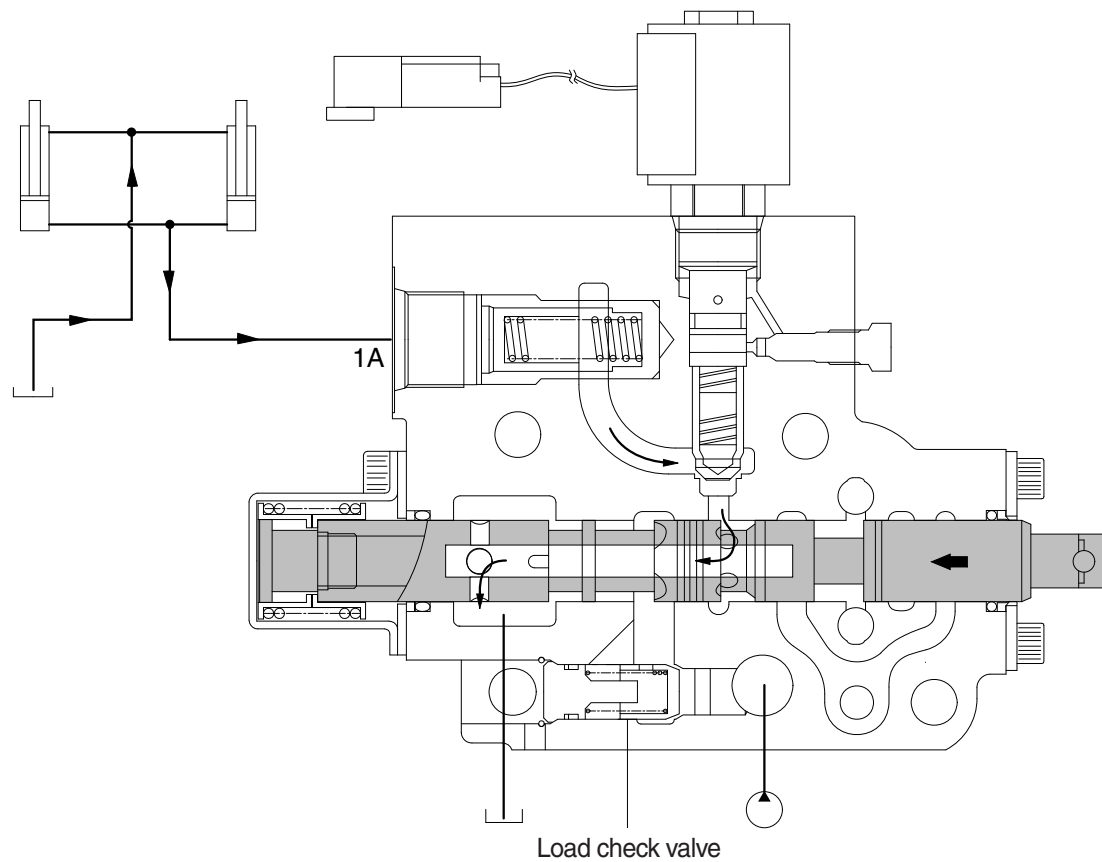
When the lift control lever is pulled back, the spool moves to the right and the neutral passage is closed.

The oil supplied from the pump pushes up the load check valve and flow into lift cylinder port (1A).

The pump pressure reaches proportionally the load of cylinder and fine control finished by shut off of the neutral passage.

The return oil from cylinder flows into the tank.

(2) Lower position



20DEHS10

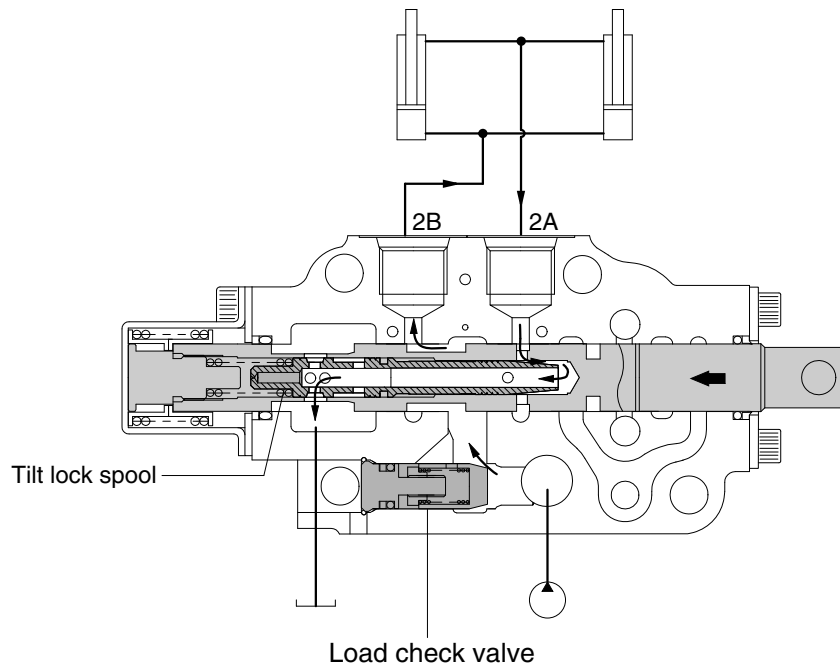
When the lift control lever is pushed forward, the spool moves to the left and the neutral passage is closed.

The spool moves to the lift lower position, opening up the neutral passage to tank and (1A) → T.

In lift lower position the fork drops due to its own weight.

4) TILT SECTION OPERATION

(1) Tilt forward position



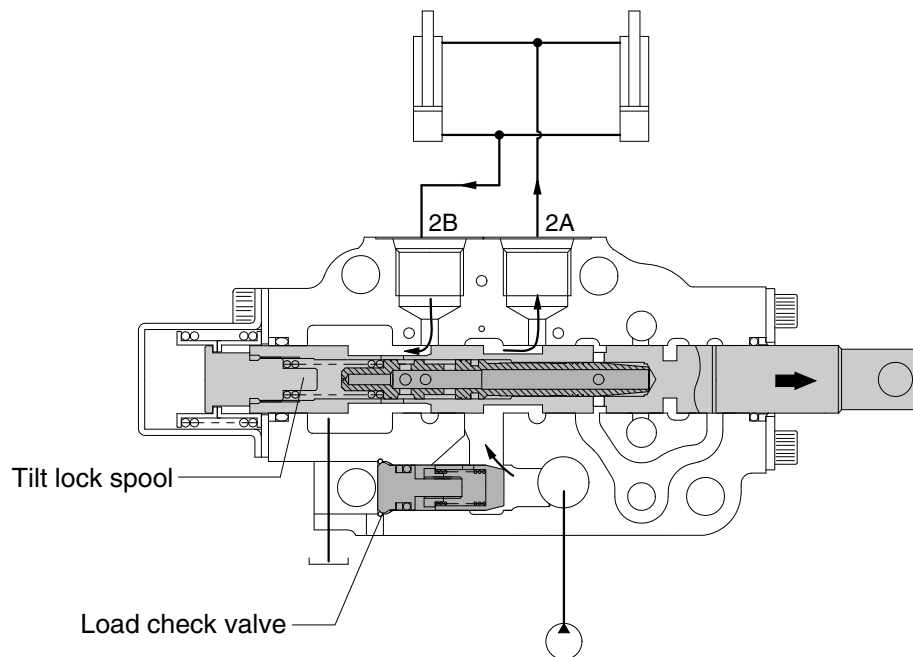
20D7HS11

When the tilt control lever is pushed forward, the spool moves to the left and the neutral passage is closed.

The oil supplied from the pump pushes up the load check valve and flow into tilt cylinder port (2B). The pump pressure reaches proportionally the load of cylinders and fine control finished by closing the neutral passage.

The return oil from cylinder port (2A) flows into the tank through the hole of the tilt lock spool.

(2) Tilt backward position



20D7HS12

When the tilt control lever is pulled back, the spool moves to the right and the neutral passage is closed.

The oil supplied from the pump pushes up the load check valve and flows into tilt cylinder port (2A). The pump pressure reaches proportionally the load of cylinder and fine control finished by shut off of the neutral passage.

The return oil from cylinder port (2B) flows into the tank via the low pressure passage.

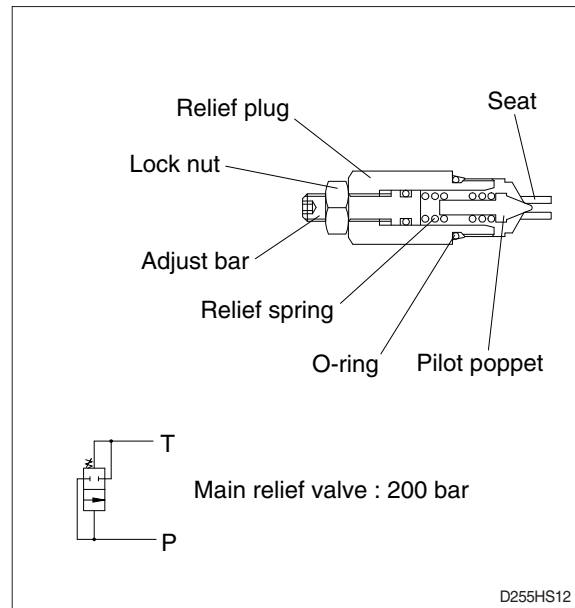
5) MAIN RELIEF VALVE

(1) Pressure setting

A good pressure gauge must be installed in the line which is in communication with the work port relief. A load must be applied in a manner to reach the set pressure of the relief unit.

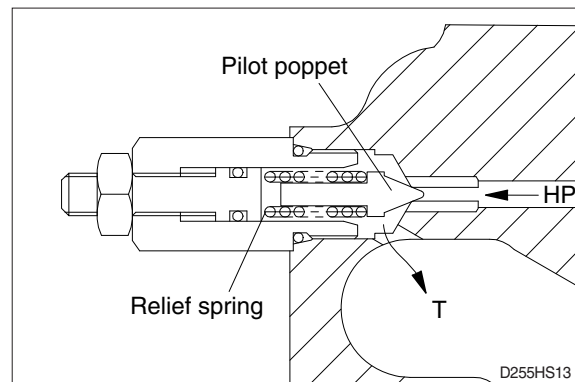
Procedure

- ① Loosen lock nut.
- ② Set adjusting bar to desired pressure setting.
- ③ Tighten lock nut.
- ④ Retest in similar manner as above.

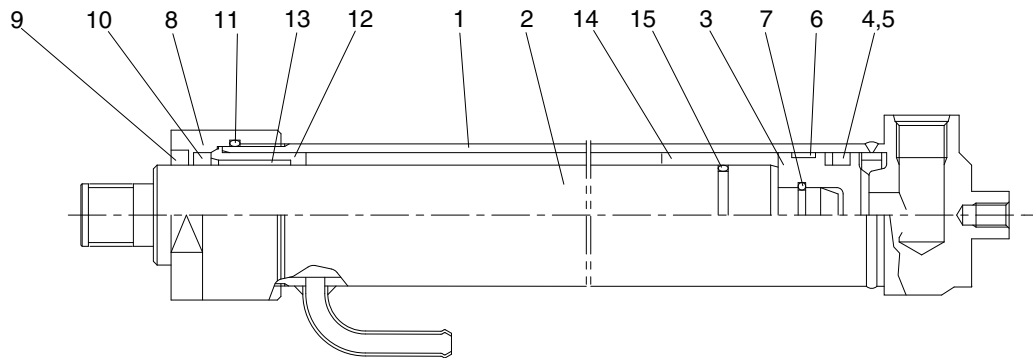


(2) Operation

Pressurized oil over the relief pressure pushes pilot poppet and flows to tank passage, therefore the system pressure keeps under the adjusted relief pressure.



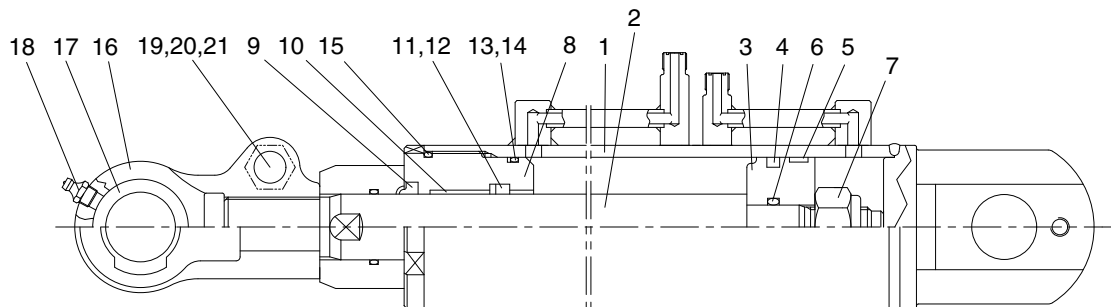
4. LIFT CYLINDER



D255HS18

- | | | |
|-----------------|------------------|---------------|
| 1 Tube assembly | 6 Wear ring | 11 O-ring |
| 2 Rod | 7 Retaining ring | 12 Guide |
| 3 Piston | 8 Gland | 13 DU bushing |
| 4 Piston seal | 9 Dust wiper | 14 Spacer |
| 5 Back up ring | 10 Rod seal | 15 O-ring |

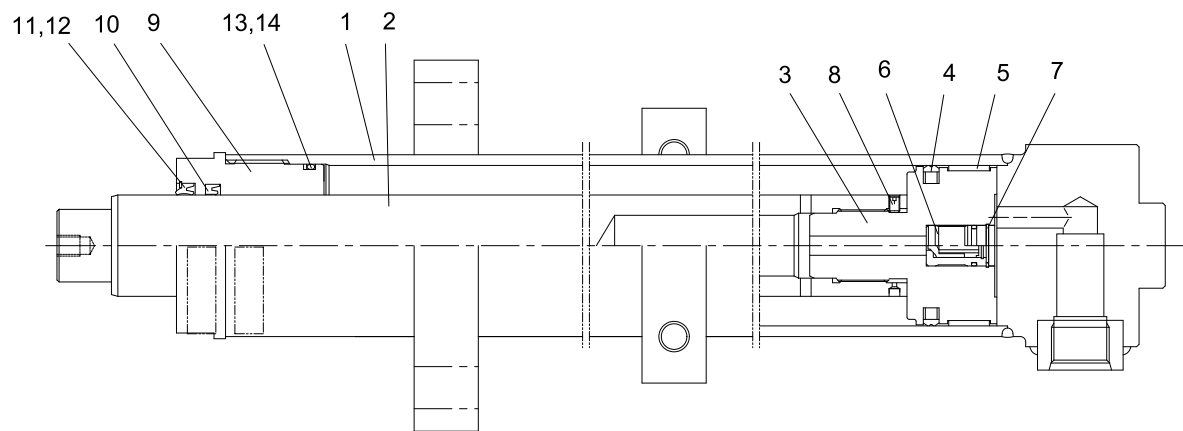
5. TILT CYLINDER



D255HS19

- | | | |
|-----------------|-----------------|----------------------|
| 1 Tube assembly | 8 Gland | 15 O-ring |
| 2 Rod | 9 Dust wiper | 16 Rod eye |
| 3 Piston | 10 Du bushing | 17 Spherical bearing |
| 4 Piston seal | 11 Rod seal | 18 Grease nipple |
| 5 Wear ring | 12 Back up ring | 19 Hexagon bolt |
| 6 O-ring | 13 O-ring | 20 Spring washer |
| 7 Hexagon nut | 14 Back up ring | 21 Hexagon nut |

6. FREE LIFT CYLINDER



D255HS20

- | | | | | | |
|---|---------------|----|--------------|----|--------------|
| 1 | Tube assembly | 6 | Check valve | 11 | Dust wiper |
| 2 | Rod | 7 | Back up ring | 12 | Snap ring |
| 3 | Piston | 8 | Set screw | 13 | O-ring |
| 4 | Piston seal | 9 | Gland | 14 | Back up ring |
| 5 | Wear ring | 10 | Rod seal | | |

GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

1. OPERATIONAL CHECKS

1) CHECK ITEM

- (1) Check visually for deformation, cracks or damage of rod.
- (2) Set mast vertical and raise 1m from ground. Wait for 10 minutes and measure hydraulic drift (amount forks move down and amount mast tilts forward).

• Check condition

- Hydraulic oil : Normal operating temp
- Mast substantially vertical.
- Rated capacity load.

• Hydraulic drift

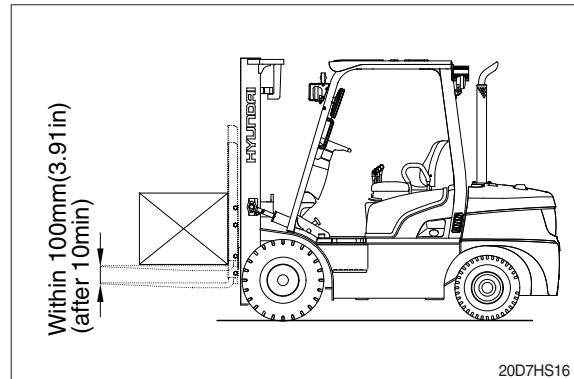
- Down (Downward movement of forks)
: Within 100 mm (3.9 in)
- Forward (Extension of tilt cylinder)
: Within 5°

- (3) If the hydraulic drift is more than the specified value, replace the control valve or cylinder packing.

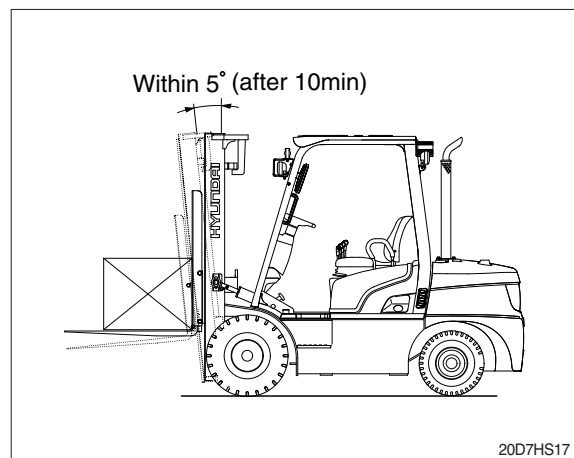
Check that clearance between tilt cylinder bushing and mounting pin is within standard range.

mm (in)

Standard	Under 0.6 (0.02)
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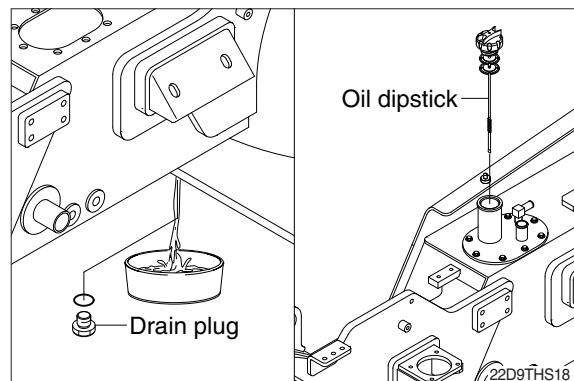
20D7HS16



20D7HS17

2) HYDRAULIC OIL

- (1) Using dipstick, measure oil level, and oil if necessary.
- (2) When changing hydraulic oil, clean suction strainer (screwed into outlet port pipe) and line filter (screwed into inlet pipe).



22D9THS18

3) CONTROL VALVE

- (1) Raise forks to maximum height and measure oil pressure.

Check that oil pressure is 200 kgf/cm².
(2845 psi)

2. TROUBLESHOOTING

1) SYSTEM

Problem	Cause	Remedy
Large fork lowering speed.	<ul style="list-style-type: none"> • Seal inside control valve defective. • Oil leaks from joint or hose. • Seal inside cylinder defective. 	<ul style="list-style-type: none"> • Replace spool or valve body. • Replace. • Replace packing.
Large spontaneous tilt of mast.	<ul style="list-style-type: none"> • Tilting backward : Check valve defective. • Tilting forward : tilt lock valve defective. • Oil leaks from joint or hose. • Seal inside cylinder defective. 	<ul style="list-style-type: none"> • Clean or replace. • Clean or replace. • Replace. • Replace seal.
Slow fork lifting or slow mast tilting.	<ul style="list-style-type: none"> • Lack of hydraulic oil. • Hydraulic oil mixed with air. • Oil leaks from joint or hose. • Excessive restriction of oil flow on pump suction side. • Relief valve fails to keep specified pressure. • Poor sealing inside cylinder. • High hydraulic oil viscosity. • Mast fails to move smoothly. • Oil leaks from lift control valve spool. • Oil leaks from tilt control valve spool. 	<ul style="list-style-type: none"> • Add oil. • Bleed air. • Replace. • Clean filter. • Adjust relief valve. • Replace packing. • Change to SAE10W, class CF engine oil. • Adjust roll to rail clearance. • Replace spool or valve body. • Replace spool or valve body.
Hydraulic system makes abnormal sounds.	<ul style="list-style-type: none"> • Excessive restriction of oil flow pump suction side. • Gear or bearing in hydraulic pump defective. 	<ul style="list-style-type: none"> • Clean filter. • Replace gear or bearing.
Control valve lever is locked	<ul style="list-style-type: none"> • Foreign matter jammed between spool and valve body. • Valve body defective. 	<ul style="list-style-type: none"> • Clean. • Tighten body mounting bolts uniformly.
High oil temperature.	<ul style="list-style-type: none"> • Lack of hydraulic oil. • High oil viscosity. • Oil filter clogged. 	<ul style="list-style-type: none"> • Add oil. • Change to SAE10W, class CF engine oil. • Clean filter.

2) HYDRAULIC GEAR PUMP

Problem	Cause	Remedy
Pump does not develop full pressure.	<ul style="list-style-type: none"> • System relief valve set too low or leaking. • Oil viscosity too low. • Pump is worn out. 	<ul style="list-style-type: none"> • Check system relief valve for proper setting. • Change to proper viscosity oil. • Repair or replace pump.
Pump will not pump oil.	<ul style="list-style-type: none"> • Reservoir low or empty. • Suction strainer clogged. 	<ul style="list-style-type: none"> • Fill reservoir to proper level. • Clean suction strainer.
Noisy pump caused by cavitation.	<ul style="list-style-type: none"> • Oil too thick. • Oil filter plugged. • Suction line plugged or too small. 	<ul style="list-style-type: none"> • Change to proper viscosity. • Clean filters. • Clean line and check for proper size.
Oil heating.	<ul style="list-style-type: none"> • Oil supply low. • Contaminated oil. • Setting of relief valve too high or too low. • Oil viscosity too low. 	<ul style="list-style-type: none"> • Fill reservoir to proper level. • Drain reservoir and refill with clean oil. • Set to correct pressure. • Drain reservoir and fill with proper viscosity.
Foaming oil.	<ul style="list-style-type: none"> • Low oil level. • Air leaking into suction line. • Wrong kind of oil. 	<ul style="list-style-type: none"> • Fill reservoir to proper level. • Tighten fittings, check condition of line. • Drain reservoir, fill with non-foaming oil.
Shaft seal leakage.	<ul style="list-style-type: none"> • Worn shaft seal. • Worn shaft in seal area. 	<ul style="list-style-type: none"> • Replace shaft seal. • Replace drive shaft and seal.

3) MAIN RELIEF VALVE

Problem	Cause	Remedy
Can't get pressure	<ul style="list-style-type: none"> • Poppet stuck open or contamination under seat. 	<ul style="list-style-type: none"> • Check for foreign matter between poppets and their mating parts. Parts must slide freely.
Erratic pressure	<ul style="list-style-type: none"> • Pilot poppet seat damaged. 	<ul style="list-style-type: none"> • Replace the relief valve. • Clean and remove surface marks for free movement.
Pressure setting not correct	<ul style="list-style-type: none"> • Normal wear. Lock nut & adjust screw loose. 	<ul style="list-style-type: none"> • See page 6-14 for How to set pressure on work main relief.
Leaks	<ul style="list-style-type: none"> • Damaged seats. • Worn O-rings. • Parts sticking due to contamination. 	<ul style="list-style-type: none"> • Replace the relief valve. • Install seal and spring kit. • Disassemble and clean.

4) LIFT CYLINDER

Problem	Cause	Remedy
Oil leaks out from gland through rod.	<ul style="list-style-type: none"> • Foreign matters on packing. • Unallowable score on rod. • Unusual distortion of dust seal. • Chrome plating is striped. 	<ul style="list-style-type: none"> • Replace packing. • Smooth rod surface with an oil stone. • Replace dust seal. • Replace rod.
Oil leaks out from cylinder gland thread.	<ul style="list-style-type: none"> • O-ring damaged. 	<ul style="list-style-type: none"> • Replace O-ring.
Rod spontaneously retract.	<ul style="list-style-type: none"> • Scores on inner surface of tube. • Unallowable score on the inner surface of tube. • Foreign matters in piston seal. 	<ul style="list-style-type: none"> • Smooth rod surface with an oil stone. • Replace cylinder tube. • Replace piston seal.
Wear (clearance between cylinder tube and wear ring)	<ul style="list-style-type: none"> • Excessive clearance between cylinder tube and wear ring. 	<ul style="list-style-type: none"> • Replace wear ring.
Abnormal noise is produced during tilting operation.	<ul style="list-style-type: none"> • Insufficient lubrication of anchor pin or worn bushing and pin. • Bent tilt cylinder rod. 	<ul style="list-style-type: none"> • Lubricate or replace. • Replace.

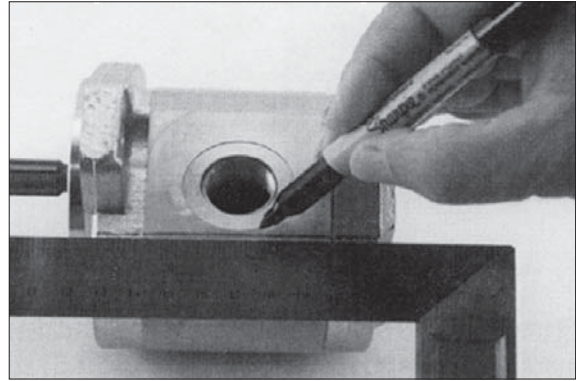
GROUP 3 DISASSEMBLY AND ASSEMBLY

1. HYDRAULIC GEAR PUMP

※ TOOLS REQUIRED

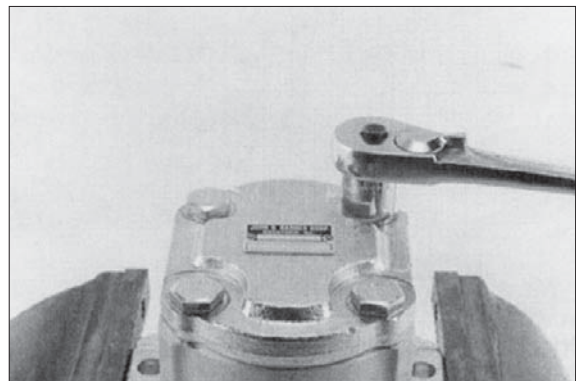
- Metric socket set
- Internal snap ring pliers
- Shaft seal sleeve
- Torque wrench

- (1) It is very important to work in a clean work area when repairing hydraulic products. Plug ports and wash exterior of pump with a proper cleaning solvent before continuing.
- (2) Remove port plugs and drain oil from pump.
- (3) Use a permanent marker pen to mark a line across the mounting flange, gear housing and end cover. This will assure proper reassembly and rotation of pump.
- (4) Remove key from drive shaft if applicable.



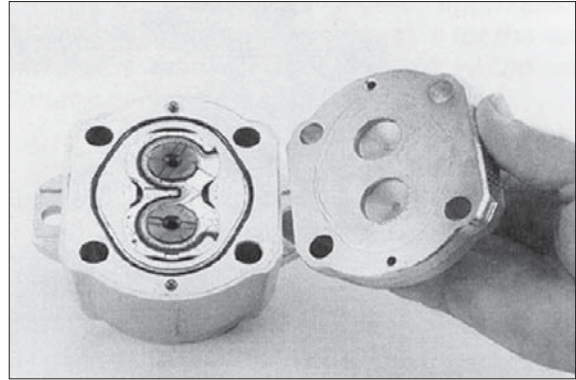
PUMP 01

- (5) Clamp mounting flange in a protected jaw vise with pump shaft facing down.
- (6) Loosen the four metric hexagon head bolts.
- (7) Remove pump from vise and place on clean work bench, remove the four hexagon head bolts and spacers applicable.



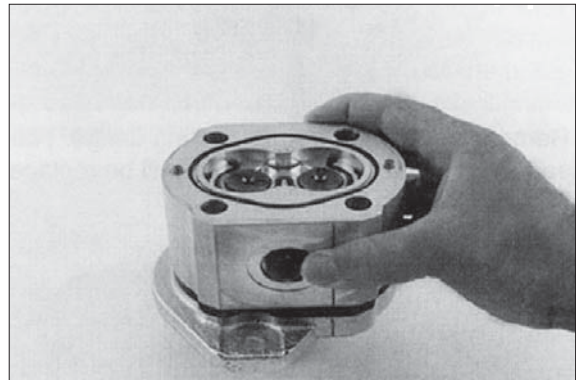
PUMP 02

(8) Lift and remove end cover.



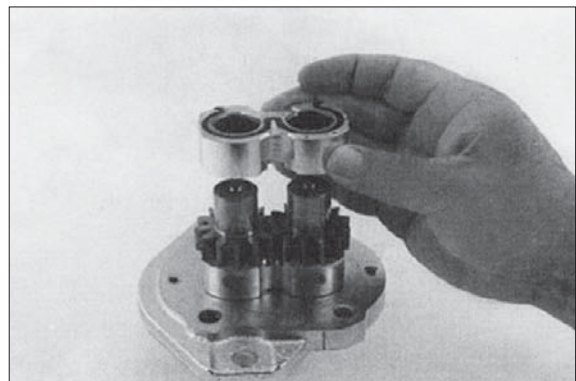
PUMP 03

(9) Carefully remove gear housing and place on work bench. Make sure the rear bearing block remains on the drive and idler shafts.



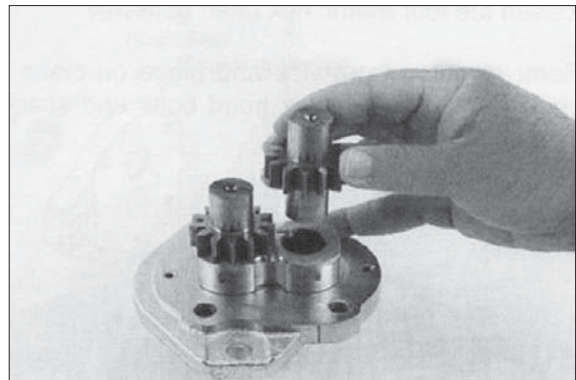
PUMP 04

(10) Remove rear bearing block from drive and idler shafts.



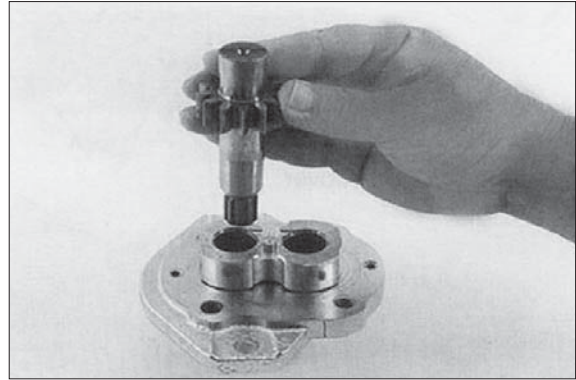
PUMP 05

(11) Remove idler shaft from bearing block.



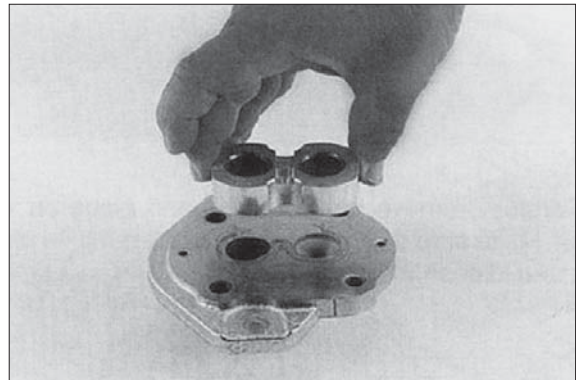
PUMP 06

- (12) Remove drive shaft from mounting flange.
There is no need to protect the shaft seal
as it will be replaced as a new item.



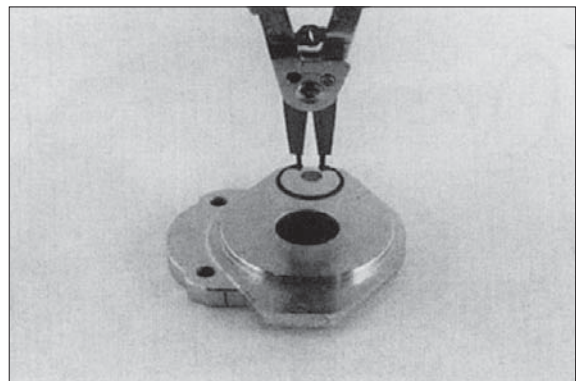
PUMP 07

- (13) Remove the front bearing block.



PUMP 08

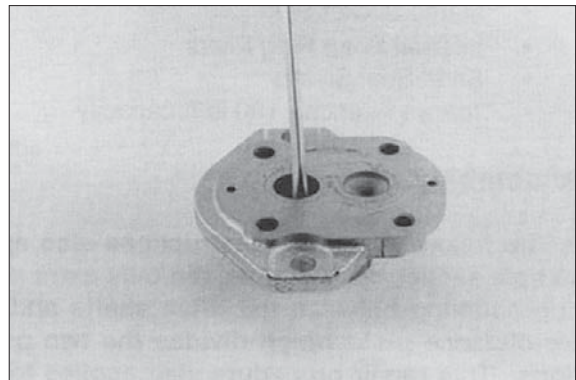
- (14) Turn mounting flange over, with shaft seal up, and remove the retaining ring with proper snap ring pliers.



PUMP 09

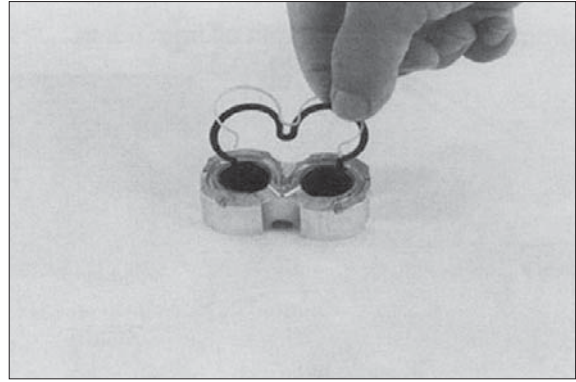
- (15) Remove the oil seal from mounting flange,
be careful not to mar or scratch the seal
bore.

- (16) Remove the dowel pins from the gear
housing. Do not lose pins.



PUMP 10

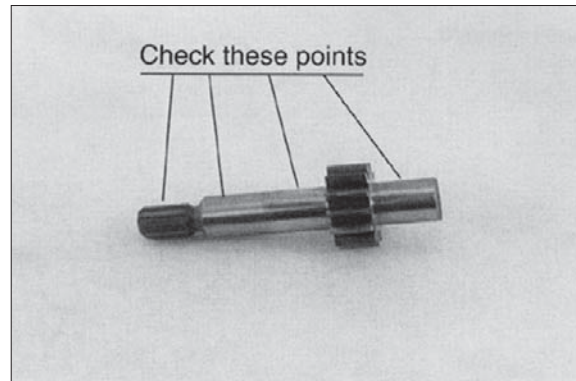
- (17) Remove seals from both bearing blocks and discard.



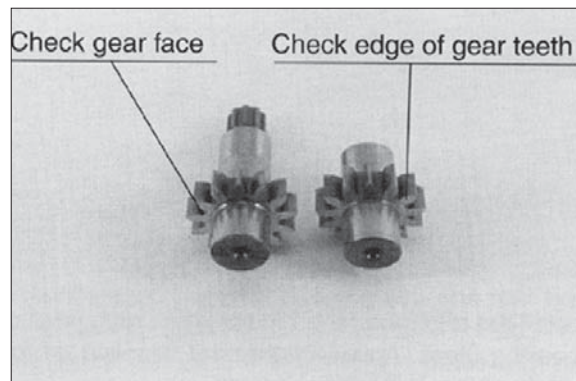
PUMP 11

2) INSPECT PARTS FOR WEAR

- (1) Clean and dry all parts thoroughly prior to inspection. It is not necessary to inspect the seals as they will be replaced as new items.
- (2) Check drive shaft spline for twisted or broken teeth, check keyed drive shaft for broken or chipped keyway. No marks or grooves on shaft in seal area, some discoloration of shaft is allowable.
- (3) Inspect both the drive gear shaft and idler gear shafts at the bearing points and seal area for rough surfaces and excessive wear.
- (4) Inspect gear face for scoring or excessive wear. If the face edge of gear teeth are sharp, they will mill into the bearing blocks. If wear has occurred, the parts are unusable.



PUMP 12



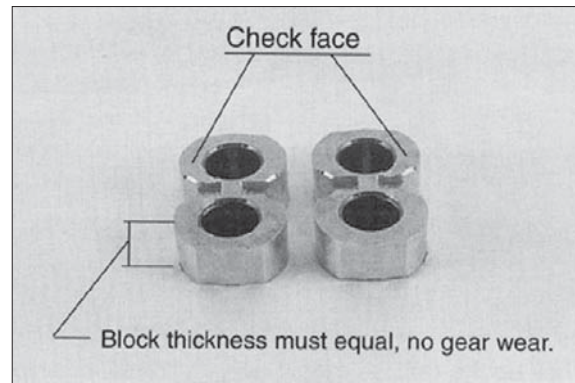
PUMP 13

- (5) Inspect bearing blocks for excessive wear or scoring on the surfaces which are in contact with the gears. Also inspect the bearings for excessive wear or scoring.
- (6) Inspect the area inside the gear housing. It is normal for the surface inside the gear housing to show a clean "wipe" on the inside surface on the intake side. There should not be excessive wear or deep scratches and gouges.

※ **General information**

It is important that the relationship of the mounting flange, bearing blocks and gear housing is correct. Failure to properly assemble this pump will result with little or no flow at rated pressure.

- ※ This pump is not bi-rotational.

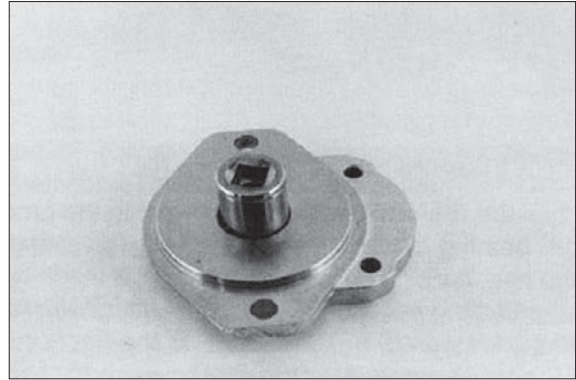


PUMP 14

3) ASSEMBLY

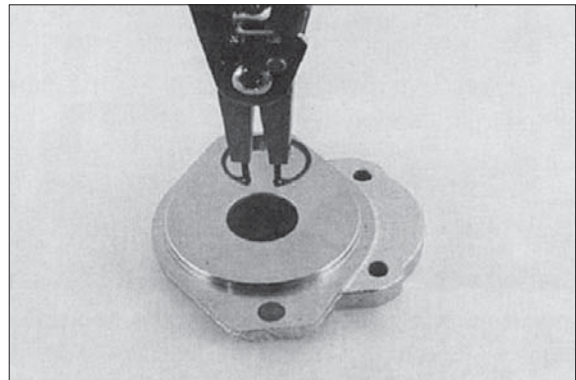
※ New seals should be installed upon reassembly of pump.

- (1) Install new shaft seal in mounting flange with part number side facing outboard. Press the seal into the seal bore until the seal reaches the bottom of the bore. Uniform pressure must be used to prevent misalignment or damage to the seal.



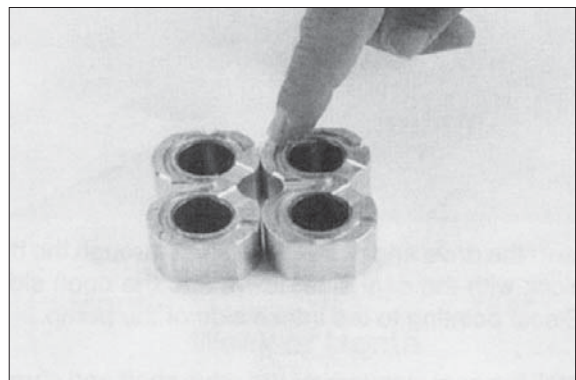
PUMP 15

- (2) Install retaining ring in groove in seal bore of mounting flange.



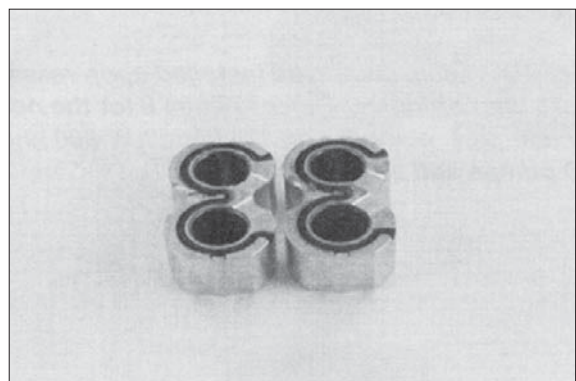
PUMP 16

- (3) Place front and back bearing blocks on a clean surface with the E-seal grooves facing up. Apply a light coating of petroleum jelly in the grooves. Also coat the E-seal and backup with the petroleum jelly, this will help keep the seals in place during assembly.



PUMP 17

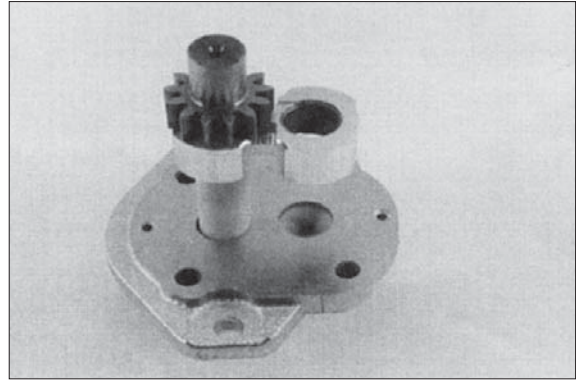
- (4) Place the E-seals, flat side outward, into the grooves in both bearing blocks. Follow by carefully placing the backup ring, flat side outward, in the groove made by the E-seal and the groove in the bearing block.
- (5) Place mounting flange, with shaft seal side down, on a clean flat surface.
- (6) Apply a light coating of petroleum jelly to the exposed face of the front bearing block.



PUMP 18

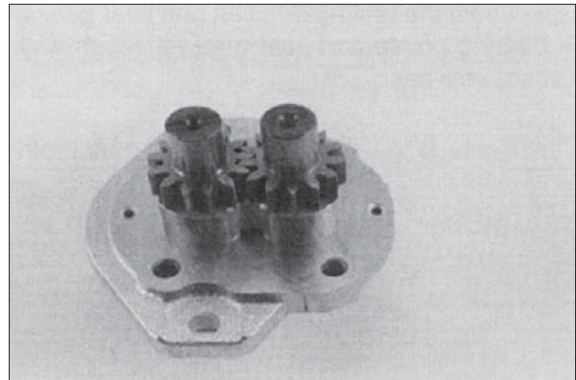
- (7) Insert the drive end of the drive shaft through the bearing block with the seal side down, and the open side of the E-seal pointing to the intake side of the pump.

- (8) Install the seal sleeve over the drive shaft and carefully slide the drive shaft through the shaft seal. Remove the seal sleeve from shaft.



PUMP 19

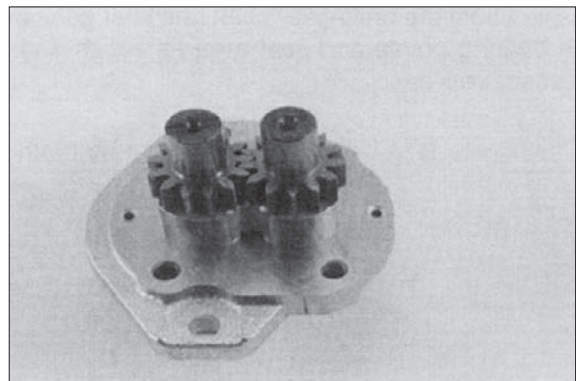
- (9) Install the idler gear shaft in the remaining position in the bearing block. Apply a light coat of clean oil to the face of the drive and idler gears.



PUMP 20

- (10) Pick up the rear bearing block, with seal side up and with open end of the E-seal facing the intake side of the pump, place over the drive and idler gear shafts.

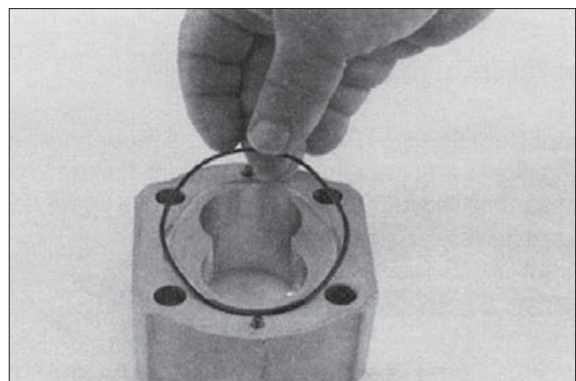
- (11) Install two dowel pins in the holes in the mounting flange or two long dowel pins through gear housing if pump is a multiple section pump.



PUMP 21

- (12) To install the O-rings in the gear housing, apply a light coating of petroleum jelly in the grooves on both sides of the gear housing.

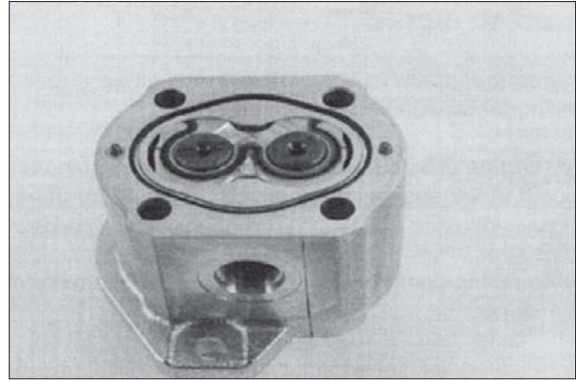
Also coat the new O-ring and install them in the grooves.



PUMP 22

- (13) Gently slide the gear housing over the rear bearing block assembly, slide housing down until the housing engages the dowel pins. Press firmly in place with hands, do not force or use any tool.

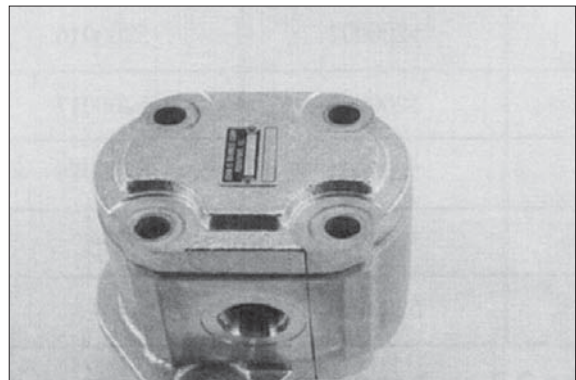
Check to make sure the intake port in the housing is on the same side as the open end of the E-seal and that the marked lines on the mounting flange and gear housing are in alignment.



PUMP 23

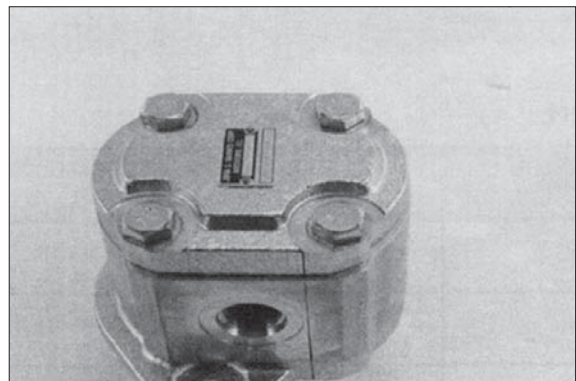
- (14) The surface of the rear bearing block should be slightly below the face of the gear housing. If the bearing block sits higher than the rear face of the gear housing then the E-seal or O-ring have shifted out of the groove. If this is the case, remove the gear housing and check for proper seal installation.

- (15) Install the two remaining dowel pins in the rear of the gear housing and place the end cover over the back of the pump.



PUMP 24

- (16) Install the four spacers and hexagon head bolts through the bolt holes in the end cover, hand tighten.



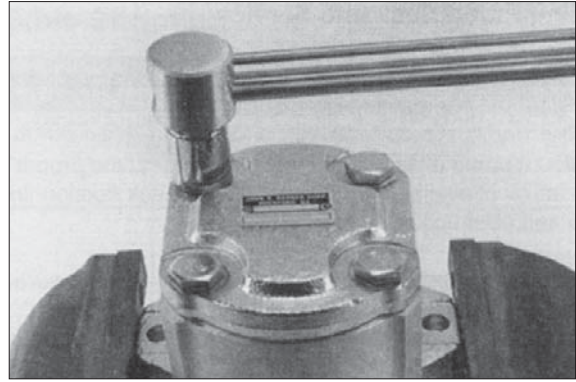
PUMP 25

(17) Place mounting flange of the pump back in the protected jawed vise and alternately torque the bolts.

- Tighten torque : 3.0~4.0 kgf-m
(22~29 lbf-ft)

(18) Remove pump from vise.

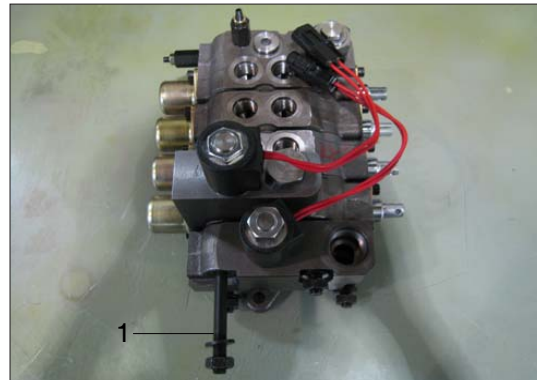
(19) Place a small amount of clean oil in the inlet of the pump and rotate the drive shaft away from the inlet one revolution. If the drive shaft binds, disassemble the pump and check for assembly problems, then reassemble the pump.



PUMP 26

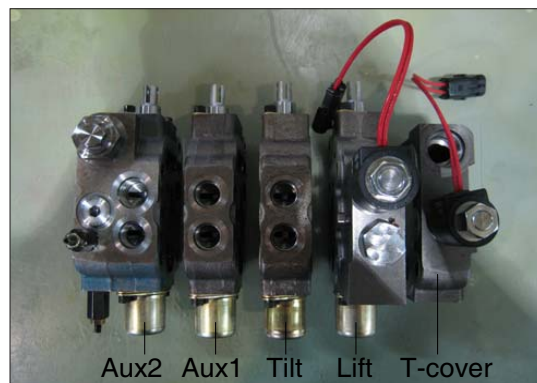
2. MAIN CONTROL VALVE

- 1) Remove bolt (1) to separate the valve section.
· Bolt torque (1) : $4.0^{+0.6}_0$ kgf·m



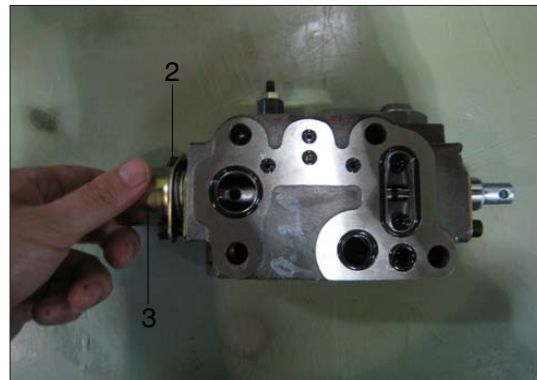
20D7MCV01

- 2) Divide the valve body.



20D7MCV02

- 3) Remove dust cap (3) and bolt (2) from the valve body.
· Bolt torque (2) : 1.2 kgf·m



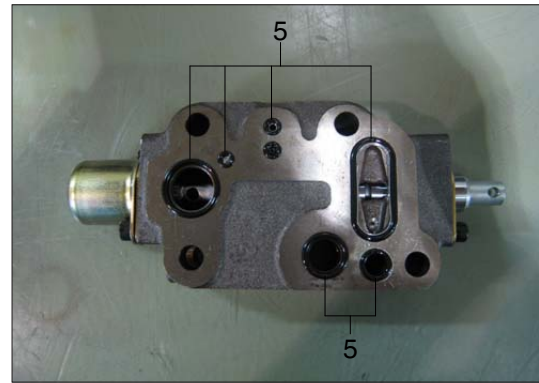
20D7MCV03

- 4) Remove attachment spool (4) from the valve body.



20D7MCV04

5) Remove O-ring seals (5) from the valve body.



20D7MCV05

6) Remove tilt spool (6) from the valve body.



20D7MCV06

7) Remove lift spool (7) from the valve body.

8) Remove lock poppet (8) from the valve body.

9) Remove normal close solenoid valve (9, Opt) from the valve body.



20D7MCV07

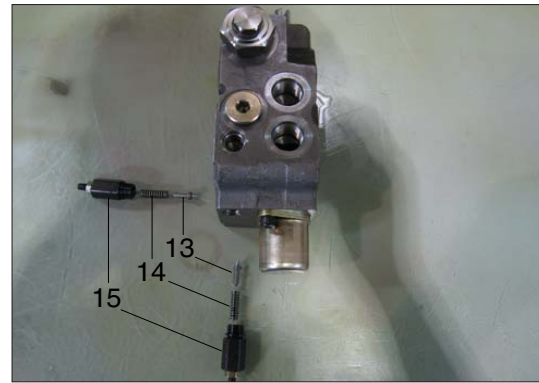
10) Remove plug (12) and spring (11).

11) Remove hydrostat (10).



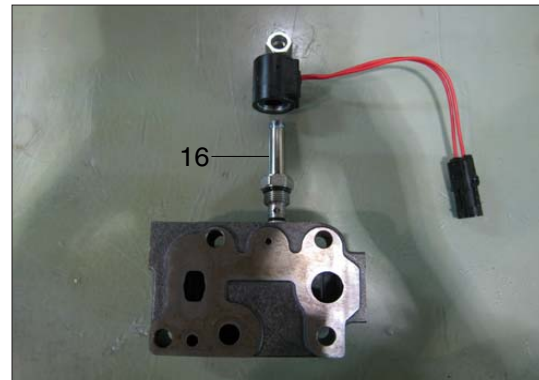
20D7MCV08

- 12) Remove relief plugs (15), springs (14) and poppets (13).
- Relief plugs torque (15) : 2.5 kgf · m



20D7MCV09

- 13) Remove normal open solenoid valve (16, Opt) from the valve body.

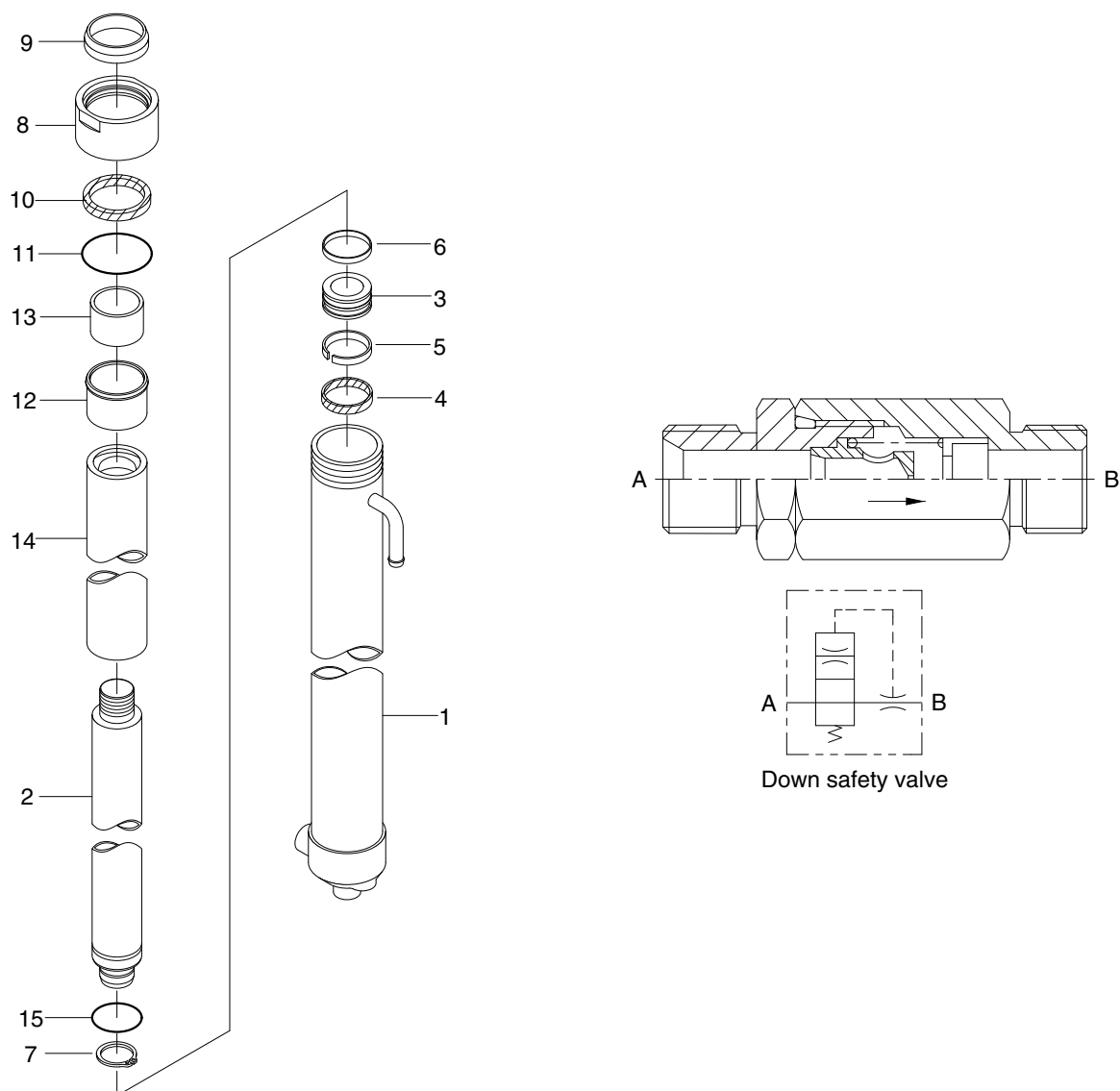


20D7MCV10

- 14) Assembly procedure of the main control valve is the reverse order of the removal procedure.

3. LIFT CYLINDER

1) STRUCTURE

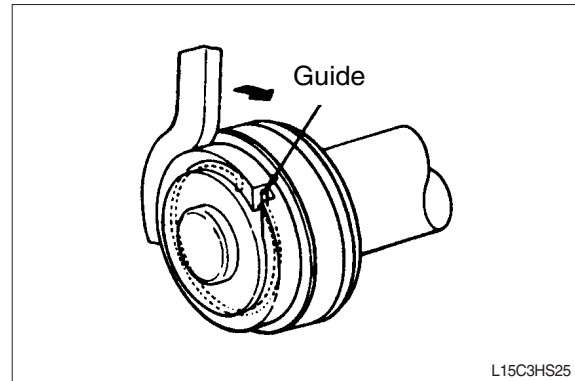


20D7HS19

- | | | | | | |
|---|--------------|----|----------------|----|------------|
| 1 | Tube assy | 6 | Wear ring | 11 | O-ring |
| 2 | Rod assy | 7 | Retaining ring | 12 | Guide |
| 3 | Piston | 8 | Gland | 13 | Du bushing |
| 4 | Piston seal | 9 | Dust wiper | 14 | Spacer |
| 5 | Back up ring | 10 | Rod seal | 15 | O-ring |

2) DISASSEMBLY

- (1) Hold the cylinder tube in a vice, loosen the cylinder head and remove it.
Remove the spacer from the cylinder tube and knock out the bushing. Hook a wrench in the hole in the retainer at the piston end and turn. Lever up the edge of the guide, then turn the guide in again and the guide can be removed.



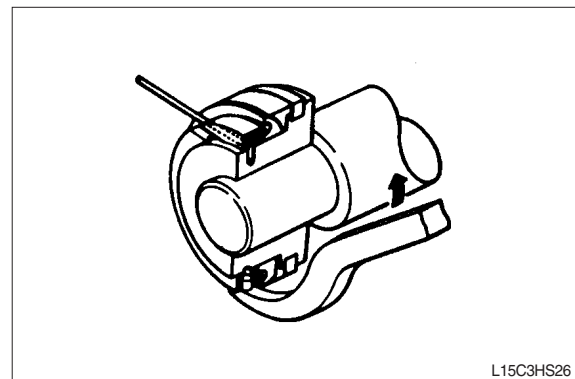
3) CHECK AND INSPECTION

mm (in)

Check item	Standard size	Repair limit	Remedy
Clearance between cylinder rod & bushing	0.072~0.288 (0.003~0.011)	0.5 (0.020)	Replace bushing
Clearance between piston ring & tube	0.05~0.030 (0.002~0.012)	0.5 (0.020)	Replace piston ring

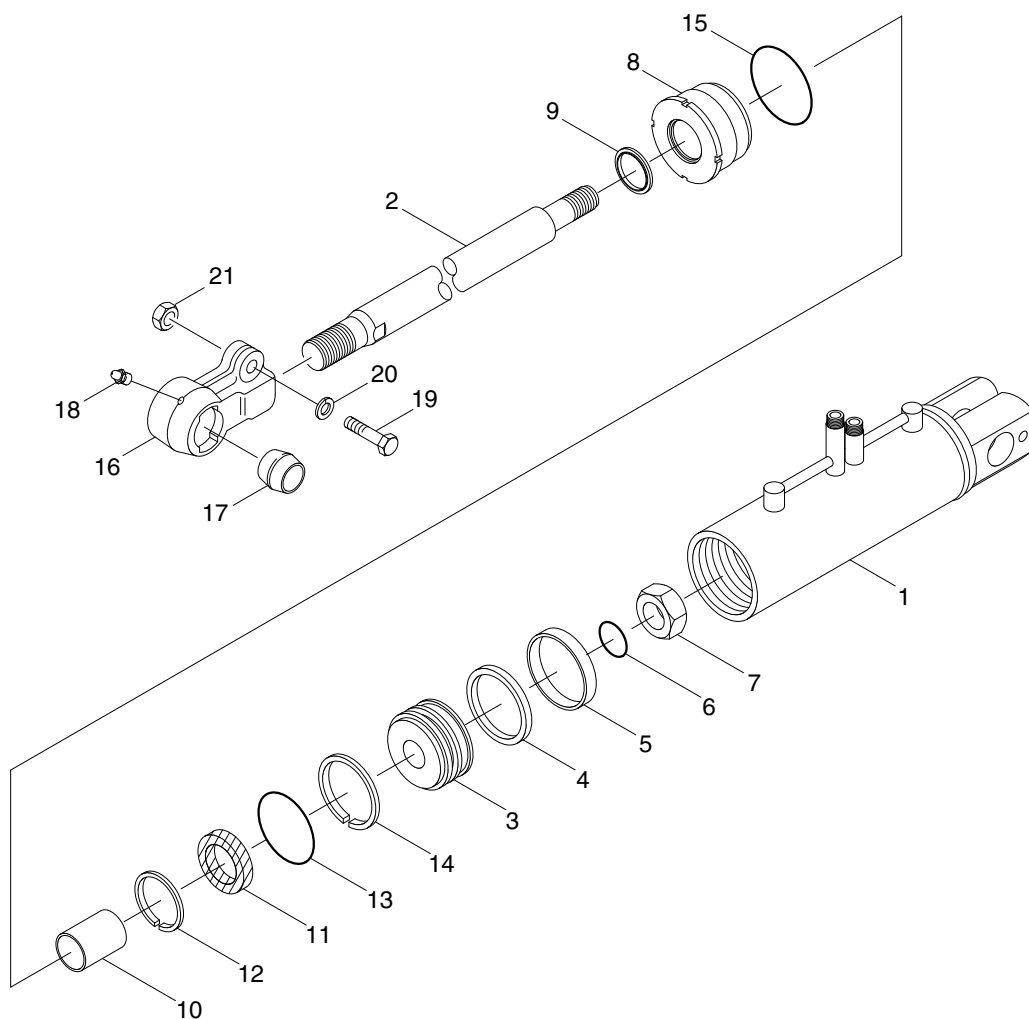
4) ASSEMBLY

- (1) Soak the piston ring in hydraulic oil at a temperature of 40 to 50°C, expand the inside diameter and assemble on the piston. Install a piston seal.
Bend the edge of the guide and rotate it to install the guide completely.



4. TILT CYLINDER

1) STRUCTURE



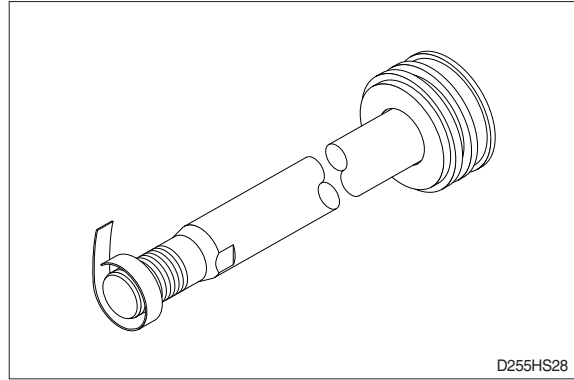
D255HS27

- | | | | | | |
|---|-------------|----|--------------|----|-------------------|
| 1 | Tube assy | 8 | Rod cover | 15 | O-ring |
| 2 | Rod | 9 | Dust wiper | 16 | Eye |
| 3 | Piston | 10 | DU bushing | 17 | Spherical bearing |
| 4 | Piston seal | 11 | Rod seal | 18 | Grease nipple |
| 5 | Wear ring | 12 | Back up ring | 19 | Hexagon bolt |
| 6 | O-ring | 13 | O-ring | 20 | Spring washer |
| 7 | Nylon nut | 14 | Back up ring | 21 | Hexagon nut |

2) DISASSEMBLY

- (1) Hold the parallel parts of the cylinder tube bottom in a vice and mark the rod head end to show how much it is screwed in, then remove the rod head. Next, hook a wrench into the notch at the cylinder head and remove the cylinder head from cylinder tube.

When doing this, wind tape round the threaded part of the rod and be careful not to damage the dust seal and rod seal inside cylinder head.



3) CHECK AND INSPECTION

mm (in)

Check item	Standard size	Repair limit	Remedy
Clearance between cylinder rod & bushing	0.072~0.288 (0.003~0.011)	0.5 (0.020)	Replace bushing
Clearance between rod head bushing & pin	0.10~0.35 (0.004~0.014)	0.6 (0.024)	Replace bushing