SECTION 4 BRAKE SYSTEM

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SECTION 4 BRAKE SYSTEM

GROUP 1 STRUCTURE AND FUNCTION

1. OUTLINE

There are two brake systems, the foot brake system and the parking brake system.

The foot brake adopts the brake system of oil type at drive axle.

Oil pressure is generated in maximum 60 kgf/cm^2 through brake oil input path of the left and right drive axle housing, this pressure allows the piston brake to advance and compresses a friction plate and a plate.

So when the transportation travels, it is possible to brake.

The parking brake works by the switch installed on steering column.

2. SPECIFICATION

1) DISK BRAKE

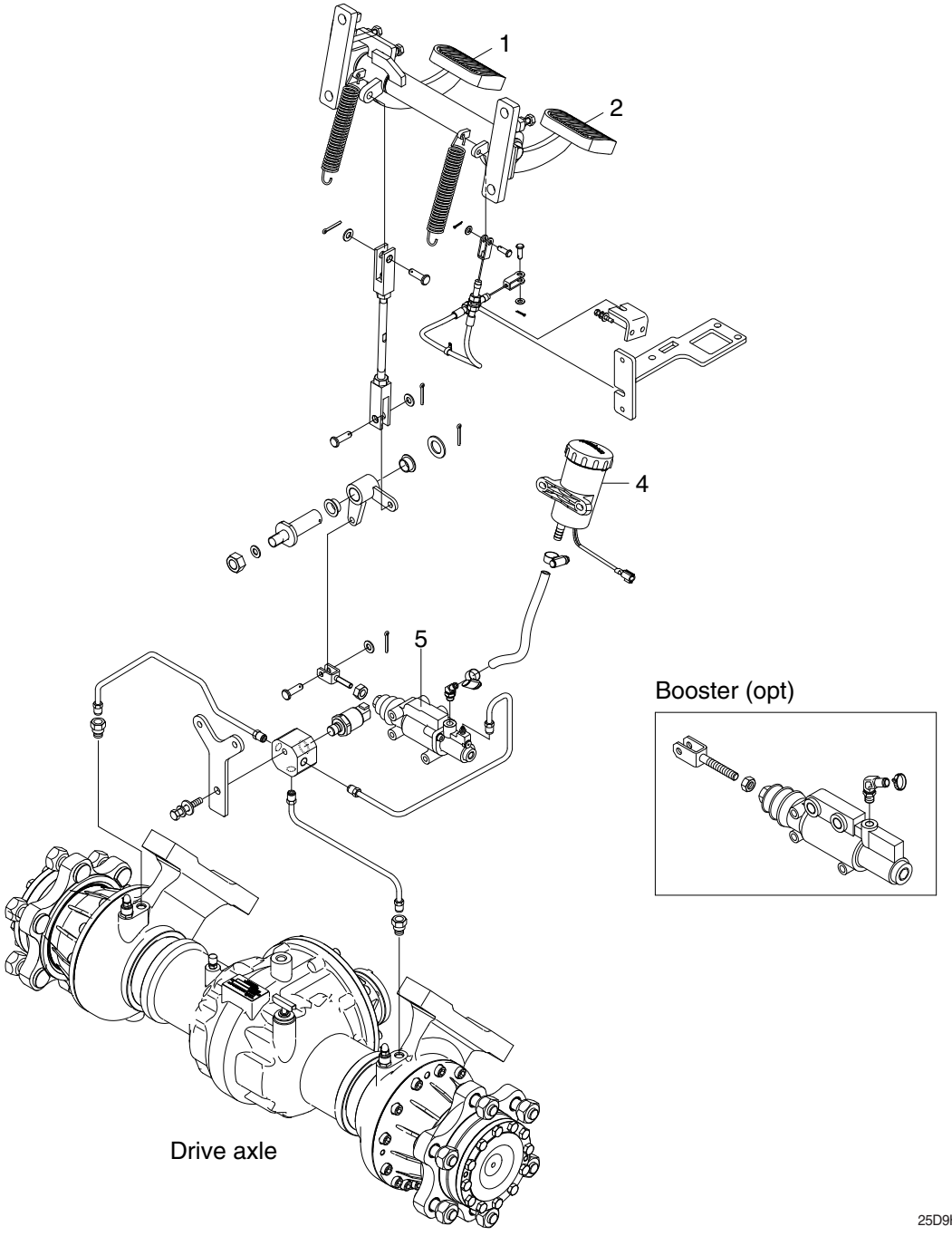
Item			Specification
Type			Wet disk brake
Piston bore diameter		Non-booster Booster (option)	33 mm (1.3 in) 22.23 mm (0.9 in)
Pedal adjustment	Height		118±2 mm (4.6±0.08 in)
	Play		2~4 mm (0.08~0.16 in)
Brake oil			Azolla ZS32 (ISO VG32 hydraulic oil)

2) PARKING BRAKE

Item	Specification
Type	Wet disk (negative brake)
Switch location	Steering column
Disc location	Transmission assembly

3. BRAKE PEDAL AND PIPING

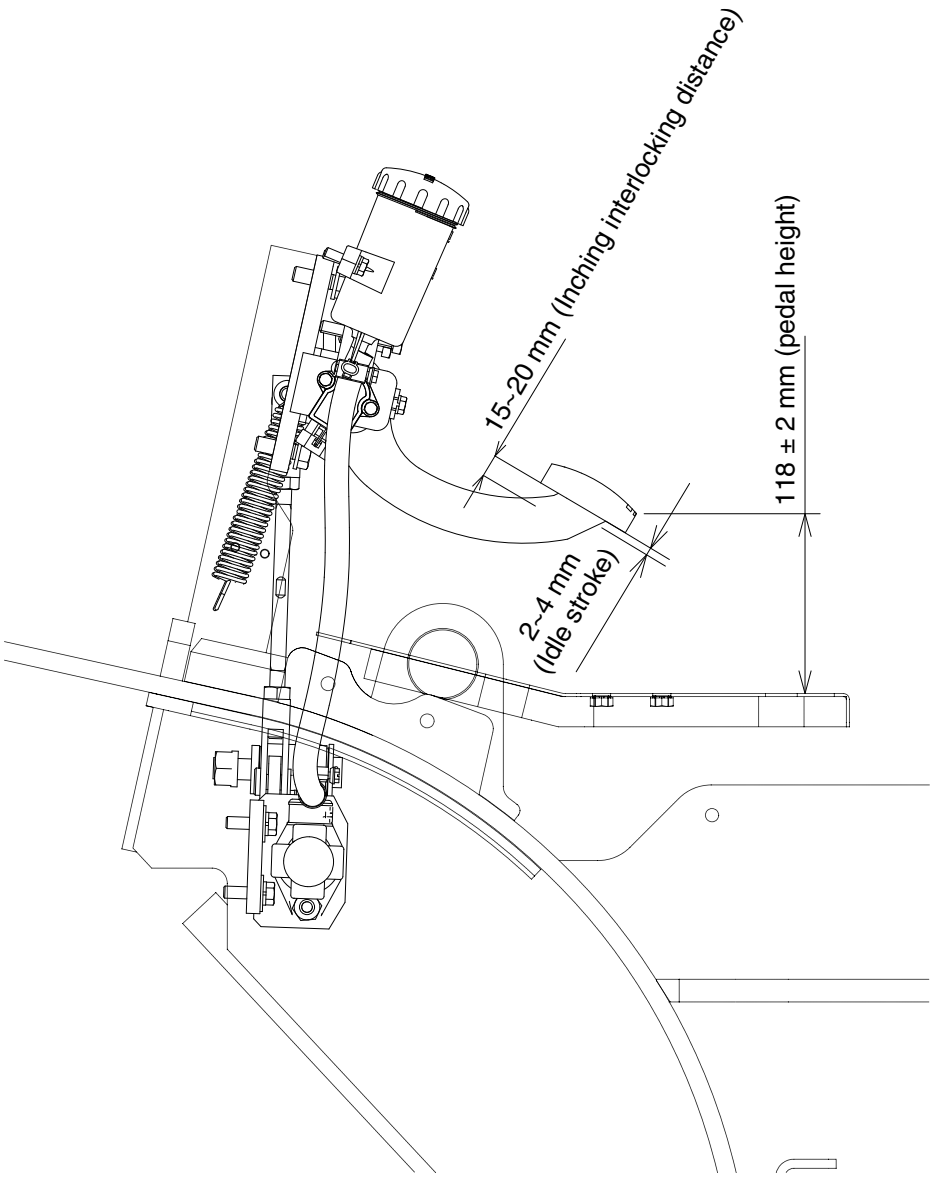
1) STRUCTURE



1 Brake pedal
2 Inching pedal
3 Reservior tank
4 Brake valve

4. INCHING PEDAL AND LINKAGE

The brake pedal serves to actuate the hydraulic brakes on the front axle. At the beginning of the pedal stroke, the inching spool of the transmission control valve is actuated to shift the hydraulic clutch to neutral and turn off the driving force. By treading the pedal further, the brake is applied.



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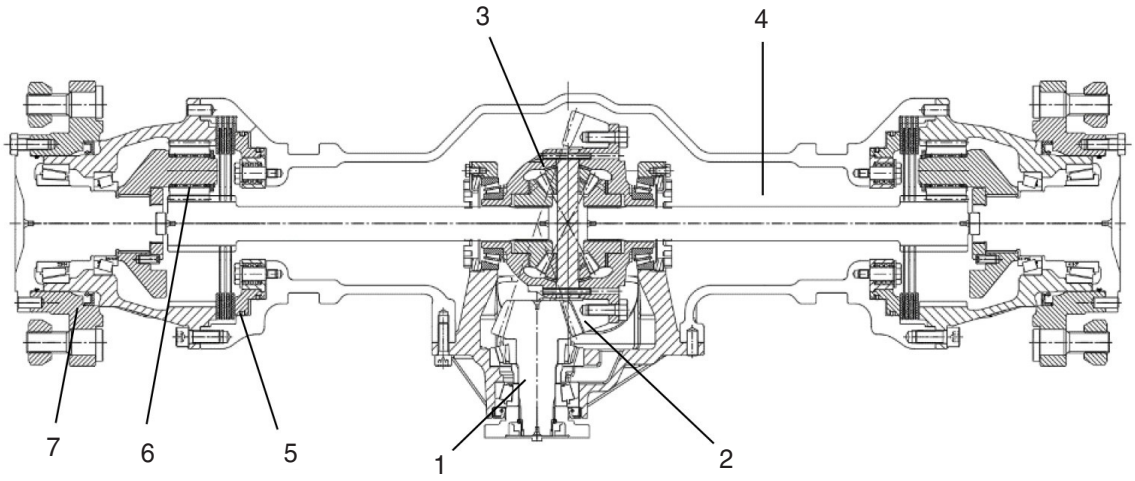
5. WET DISK BRAKE (SERVICE)

1) STRUCTURE



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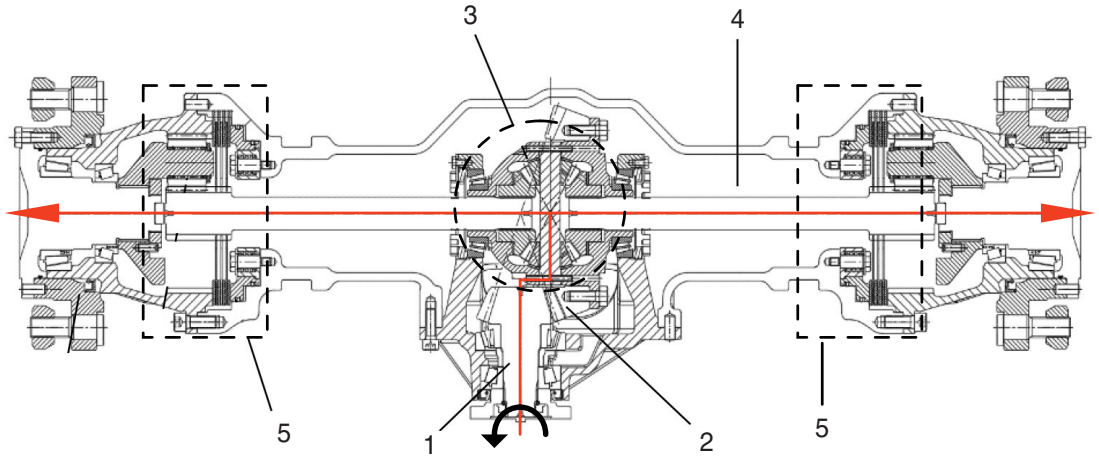
1	Pinion shaft	4	Axle shaft	7	Hub
2	Ring gear	5	Service brake		
3	Differential device	6	Hub reduction		

2) OPERATION

The drive axle is connected with the transmission output gear by drive shaft assembly. The power transferred by the drive shaft assembly is connected to the pinion shaft of drive axle, the pinion shaft delivers the power to the differential device through the ring gear. The differential device deliver the power to hub reduction through axle shaft.

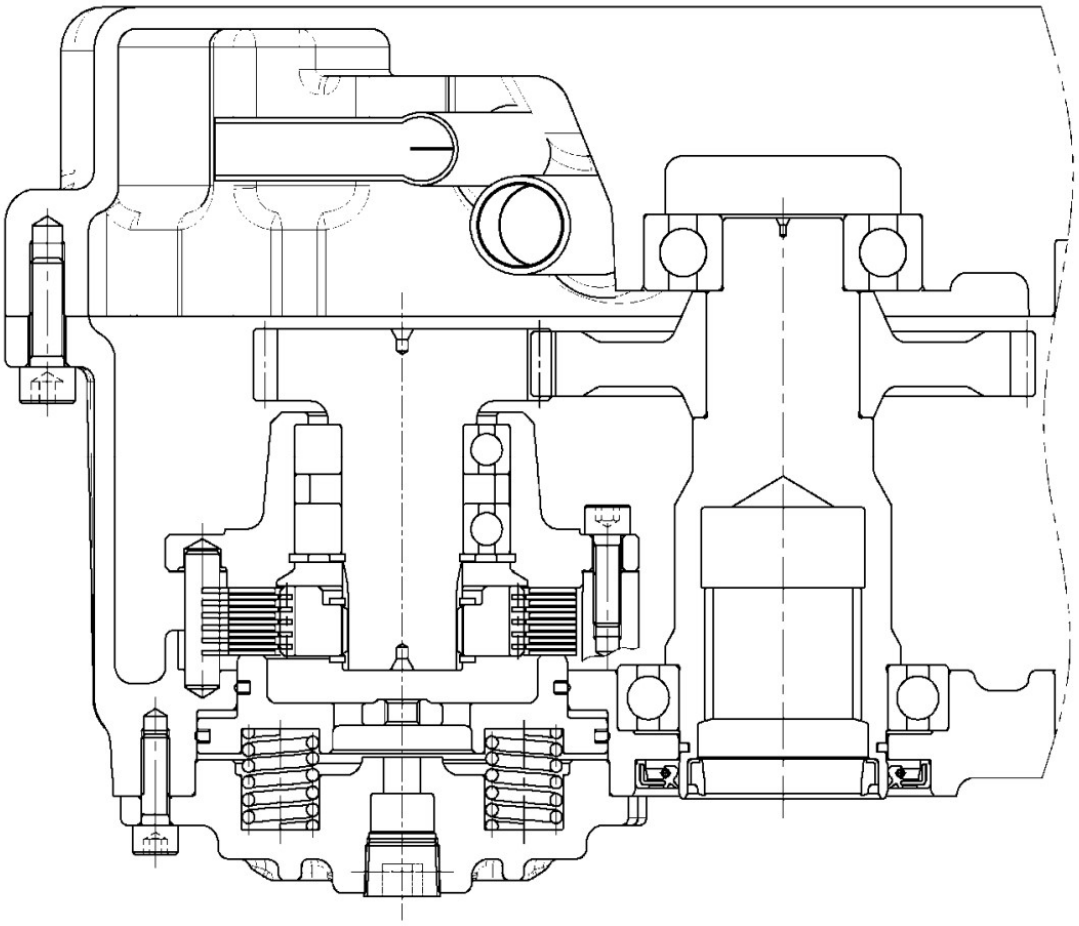


25D9V3PS103

1	Pinion shaft	3	Differential device	5	Hub reduction
2	Ring gear	4	Axle shaft	6	Service brake

6. PARKING BRAKE

Transmission includes plates which friction braking parking brake. Parking brake, like as service brake system consists of several friction plate functions braking by sticking to each friction plate when parking brake switch is operated.



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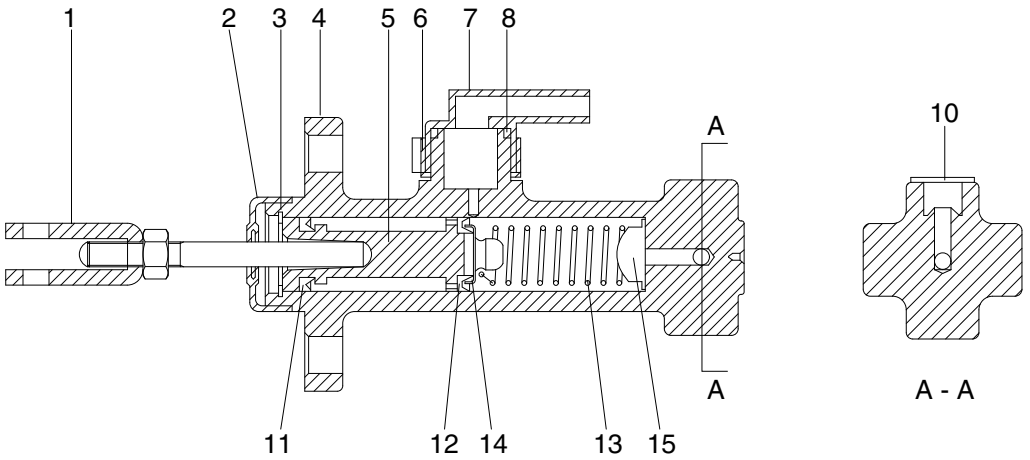
7. BRAKE VALVE (NON-BOOSTER BRAKE)

1) STRUCTURE



22D9BS04

1	Rod assy	6	Union	13	Spring
2	Boot	7	Elbow	14	Spring seat
3	Snap ring	8	O-ring	15	Spring seat
4	Body	11	Secondary cup		
5	Piston	12	Primary cup		

2) DISASSEMBLY

(1) Remove the master cylinder boot (2) and remove the rod assy (1).

(2) Remove the snap ring (3) and take out the piston (5), the secondary cup (11), primary cup (12), spring (13) and spring seat (14, 15).

(3) Specification of master cylinder.

- Piston bore diameter : 22.23 mm (0.88")
- Piston stroke : 28 mm (1.1")
- Max operating pressure : 150 kgf/cm^2 (2130 psi)

3) INSPECTION

(1) Clean and check these components.

※ Use clean mineral oils.

(2) Inspect the inside wall of the master cylinder, and if any faults are found, replace the cylinder assembly.

(3) Replace the boot (2), the secondary cup (11), primary cup (12) and piston (5), if deformation or any other defect is found.

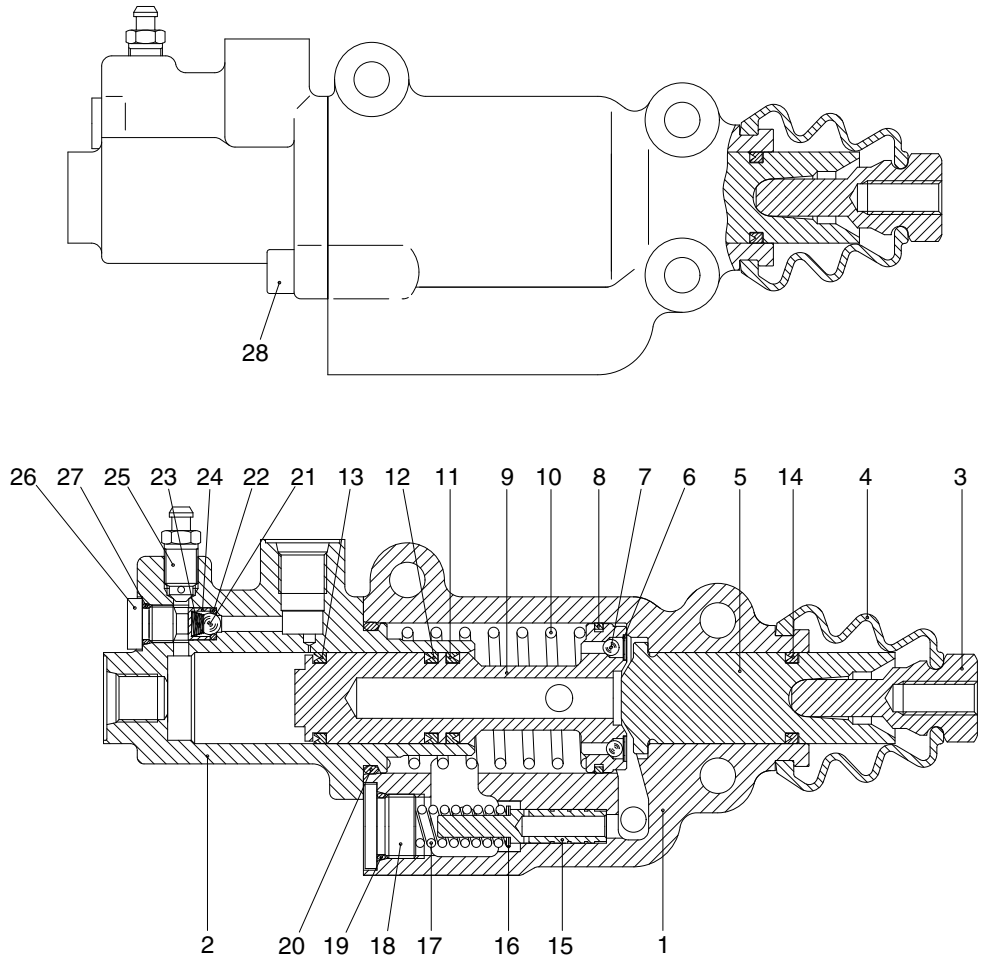
4) ASSEMBLY

※ Prior to assembly make sure again of no contaminant of the components. Apply a thin coat of brake oil to the components.

※ Assembly is in opposite order to disassembly.

8. BRAKE VALVE (BOOSTER BRAKE, OPTION)

1) STRUCTURE

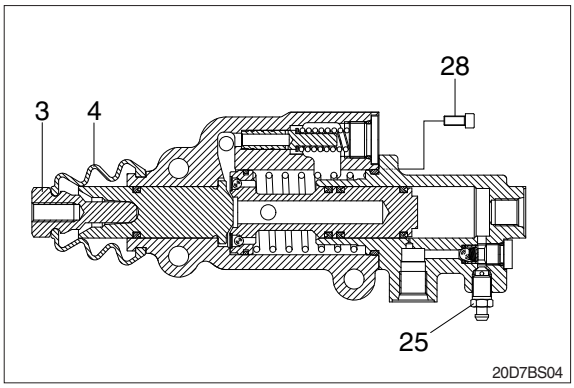


20D7BS03

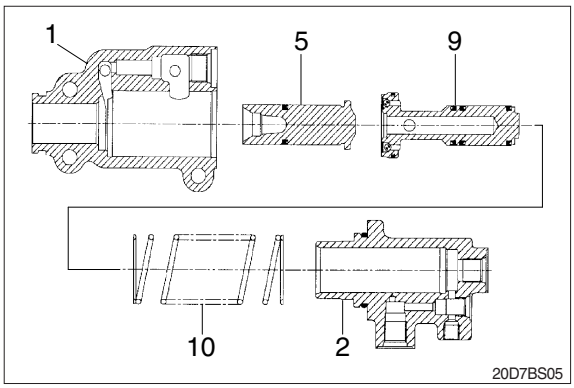
1	Front housing	11	Seal	21	Check ball
2	Rear housing	12	Seal	22	O-ring
3	Push rod	13	Seal	23	Check spring
4	Bellows	14	Seal	24	Cage
5	Master piston	15	Relief piston	25	Air bent
6	Lock washer	16	Shim	26	Check plug
7	Piston ball	17	Relief spring	27	O-ring
8	Piston ring	18	Relief plug	28	Bolt
9	Servo piston	19	O-ring		
10	Servo spring	20	O-ring		

2) DISASSEMBLY

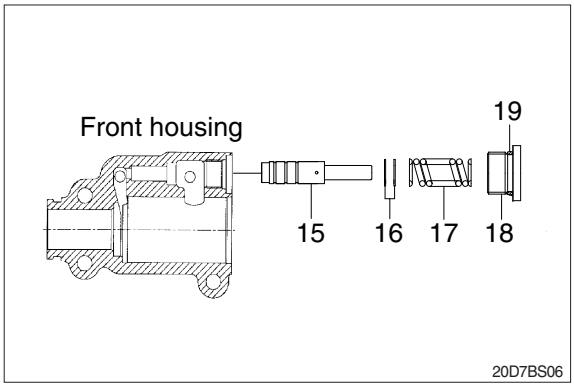
(1) Remove push rod (3), bellows (4), air vent (25) and bolt (28).



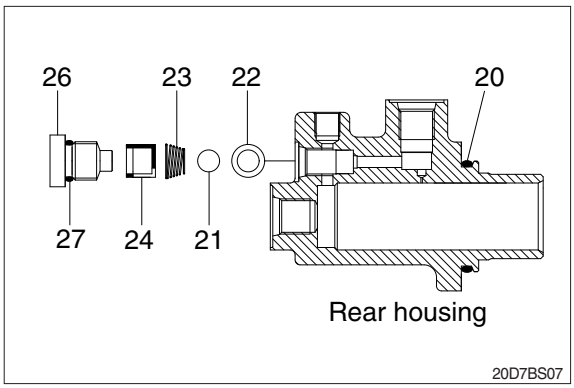
(2) Remove front housing (1), rear housing (2), servo spring (10), servo piston (9) and master piston (5).



(3) Remove relief plug (18) with O-ring (19), relief spring (17), shim (16) and relief piston (15).



(4) Remove O-ring (20), check plug (26) with O-ring (27), cage (24), check spring (23), check ball (21) and O-ring (22).



3) INSPECTION AND ASSEMBLY

(1) Clean all parts thoroughly and lubricate the parts either with mineral or with hydraulic oil, according to their use destination.

(2) All single parts are to be checked for damage and replaced, if required.

(3) Assembly is in opposite order to disassembly.

(4) Seal kit : XKAU-00176

⚠ Use only brake fluid (ZS 32, ISO VG 32) into the compensation reservoirs.

GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

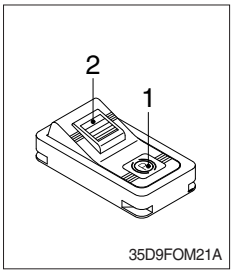
1. OPERATIONAL CHECKS

1) BRAKE PIPING

(1) Check pipes, hoses and joints for damage, oil leakage or interference.
(2) Operate brake pedal and check operating force when pedal in depressed. Check also change in operating force, and change in position of pedal when pedal is kept depressed.

2) PARKING BRAKE

(1) Position 1
Parking brake is applied and front wheel is locked.
(2) Position 2
Parking brake is released.
※ **Before moving the truck be sure the parking brake is released.**



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2. TROUBLESHOOTING

1) BRAKE SYSTEM

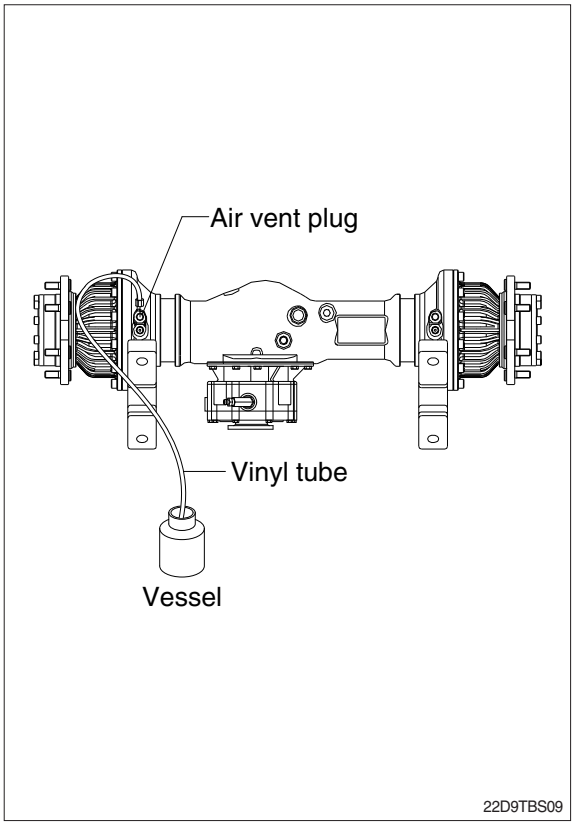
Problem	Cause	Remedy
1. Insufficient braking force	· Hydraulic system leaks oil. · Hydraulic system leaks air. · Disk worn. · Brake valve malfunctioning. · Hydraulic system clogged.	· Repair and add oil. · Bleed air. · Replace. · Repair or replace. · Clean.
2. Brake acting unevenly. (Machine is turned to one side during braking.)	· Tires unequally inflated. · Brake out of adjustment. · Disk surface roughened. · Wheel bearing out of adjustment. · Hydraulic system clogged.	· Adjust tire pressure. · Adjust. · Repair by polishing or replace. · Adjust or replace. · Clean.
3. Brake trailing.	· Pedal has no play. · Piston cup faulty. · Brake valve return port clogged. · Hydraulic system clogged. · Wheel bearing out of adjustment.	· Adjust. · Replace. · Clean. · Clean. · Adjust or replace.
4. Brake chirps	· Brake trailing. · Piston fails to return. · Disk worn. · Disk surface roughened.	· See above. · Replace. · Replace. · Repair by polishing or replace.
5. Brake squeaks	· Disk surface roughened. · Disk worn. · Excessively large friction between disk plate.	· Repair by polishing or replace. · Replace. · Clean and apply brake grease.
6. Large pedal stroke	· Brake out of adjustment. · Hydraulic line sucking air. · Oil leaks from hydraulic line, or lack of oil. · Disk worn.	· Adjust. · Bleed air. · Check and repair or add oil. · Replace.
7. Pedal dragging.	· Twisted push rod caused by improperly fitted brake valve. · Brake valve seal faulty.	· Adjust. · Replace.

2) BRAKE SYSTEM OF THE DRIVE AXLE

Trouble symptom	Probable cause	Remedy
1. Inoperation of brake		
1) Service brake	· Non-inject or lack of brake oil	· Check oil level, set correct oil volume
	· Damage of brake seal	· Replace piston seal.
	· Wrong assemble brake seal	· After disassembly and adjust or replace part
	· Detect of slide on seal (Axle housing, pistion)	· Replace related part
	· Mix particle of slide on seal	· Wash slide part or replace piston seal
	· Damage of friction plate and plate	· After disassembly and adjust or replace part
	· Defect of material (or oil line)	· After disassembly and replace the part
2) Parking brake	· Damage of parking spring	· After disassembly and replace the part
	· Wrong assembly of parkgin spring	· After disassembly and adjust or replace part
	· Damage of friction plate and plate	· After disassembly and adjust or replace part
2. Impossible release of brake		
1) Service brake	· Failure of return at service brake piston	· After disassembly and adjust or replace part
	· Damage of friction plate and plate	· After disassembly and adjust or replace part
2) Leakage of parking brake	· Damage of brake seal	· After disassembly and replace the part
	· Wrong assemble brake seal	· After disassembly and adjust or replace part
	· Detect of slide on seal (Axle housing, Pistion)	· Replace related part
	· Mix particle of slide on seal	· Wash slide part or replace piston seal
	· Defect of material (or oil line)	· After disassembly and replace the part
3. Deterioration of brake	· Inadequate actuation fluid supply to brake	· Supply standard oil, replace seal of brake system
	· Inadequate pressure to apply brakes	· Check or replace of brake seal and brake oil line
	· Worn or damaged discs	· After disassembly and adjust or replace part
	· Air enter into brake system	· Remove air by air breather
	· Deform parking spring	· After disassembly and replace the part

1. AIR BLEEDING OF BRAKE SYSTEM

1) Air bleeding should be performed by two persons :
   One rides on truck for depressing and releasing brake pedal : the other person is on the ground and removes cap from air vent plug on wheel cylinder.
2) Block the front wheel securely and apply parking brake.
3) Start the engine.
4) Attach a vinyl tube to air vent plug and immerse other end of tube into a vessel filled with hydraulic oil.
5) Loosen air vent plug by turning it 3/4 with a wrench. Depress brake pedal to drain oil mixed with air bubbles from plug hole.
6) Depress brake pedal until no air bubbles come out of air vent plug hole.
7) After completion of air bleeding, securely tighten air vent plug. Install cap on plug.



2. ADJUSTMENT OF PEDAL

1) BRAKE PEDAL

(1) Pedal height from floor plate

Adjust with stopper bolt.

· Pedal height : 118±2 mm (4.6±0.08 in)

(2) Idle stroke

Adjust with rod of master cylinder

· Play : 2~4 mm (0.08~0.16 in)

2) INCHING PEDAL

(1) Pedal height from floor plate

Adjust with stopper bolt.

· Pedal height : 118±2 mm (4.6±0.08 in)

(2) Adjust bolt so that brake pedal interconnects with inching pedal at inching pedal stroke 15~20 mm (0.59~0.79 in)