

## 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 service brake system and the parking brake system.

In the service brake system, oil pressure is generated in the master cylinder by treading on the brake pedal. This pressure causes the brake lever to press the pressure pin which gives braking pressure to the disk carrier.

In the parking brake system, the brake lever is operated by cable. Therefore the pressure pin makes braking pressure onto the disk carrier.

#### 2. SPECIFICATION

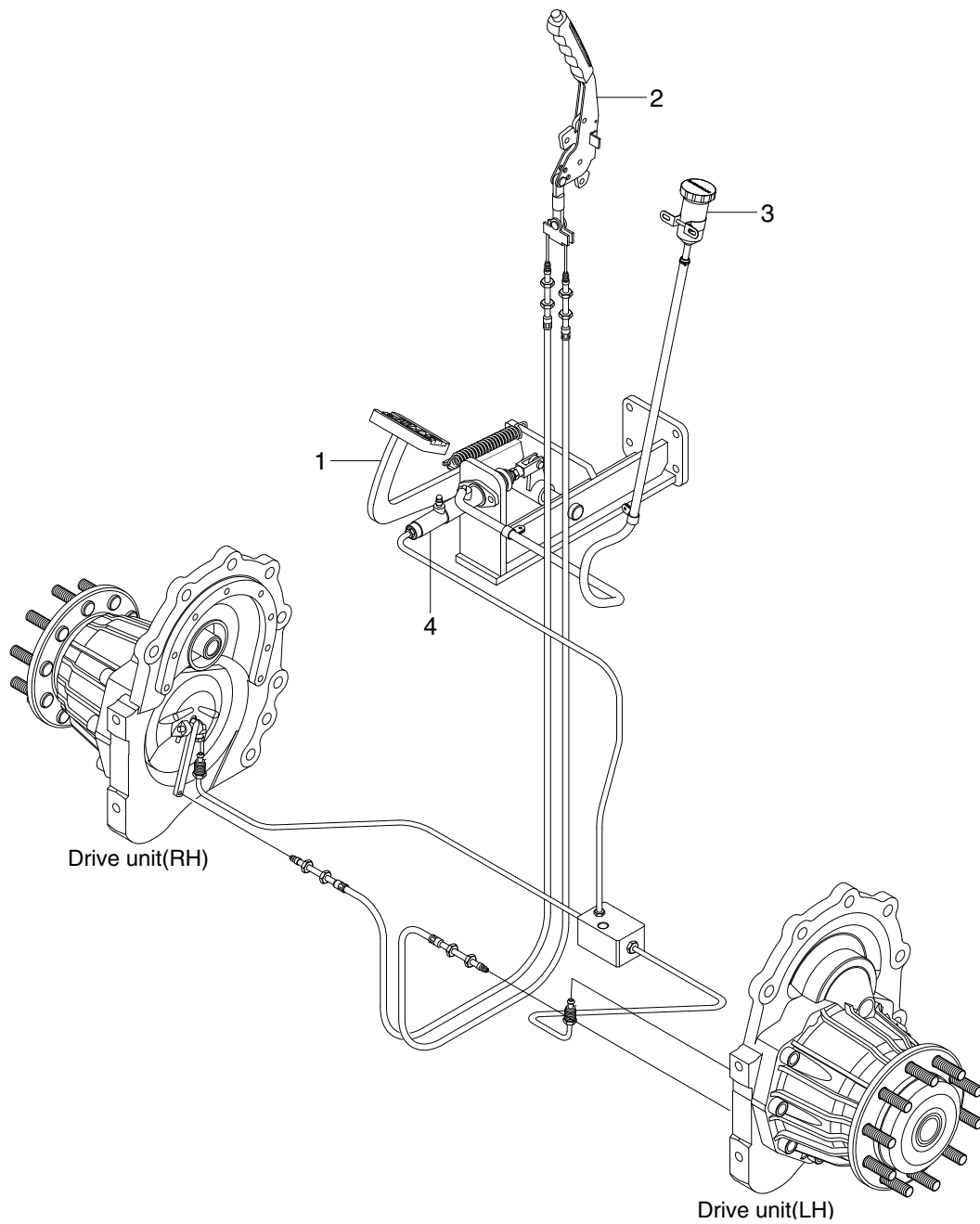
##### 1) BRAKE

Item	Criteria	Unit	Specification
Braking pressure	· In operation	bar/psi	58-80/725-1161
	· Nominal (max const)	bar/psi	60/870
	· Limit (peaks)	bar/psi	90/1305
Brake fluid	-	-	DOT3
Volume in the brake cylinder	· In operation	cm <sup>3</sup> /cu.in.	7/0.43
	· Upon max wear	cm <sup>3</sup> /cu.in.	14/0.85

##### 2) PARKING BRAKE

Item	Specification
Type	Ratchet, internal expanding mechanical type
Parking lever stroke (Drive unit)	13 mm (Initial condition)
Parking cable stroke (Parking lever)	28 mm (Initial condition)

### 3. BRAKE PEDAL AND PIPING

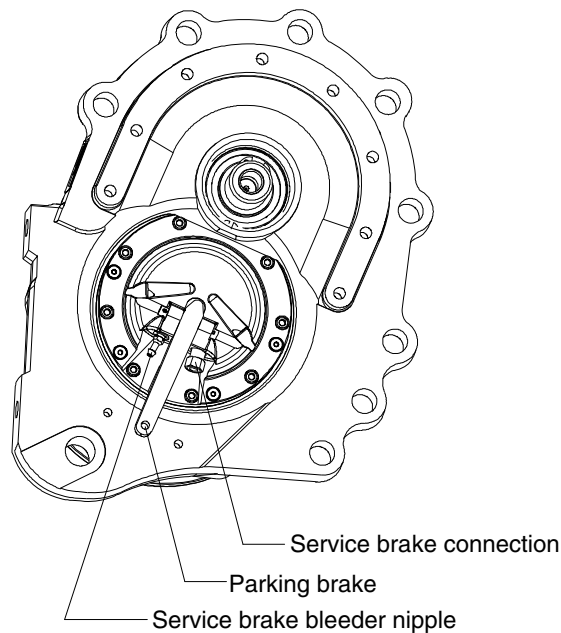


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- 1 Brake pedal & bracket assy
- 2 Parking lever assy

- 3 Reservoir tank assy
- 4 Brake master cylinder

## 4. BRAKE INSTALLATION

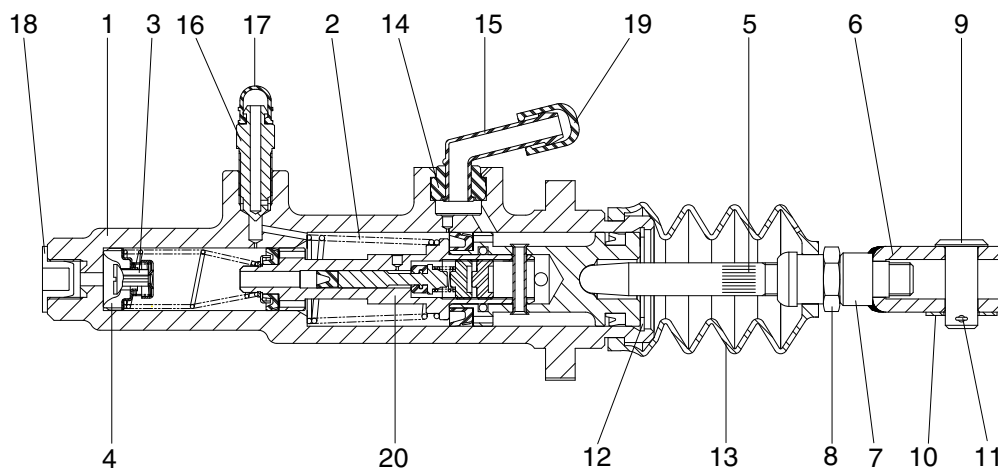


35B7BS10

- 1) The brakes chamber shares the reduction gear oil and it is continuously feeded during the working processing. During the installation of the reduction gear, it is necessary to verify that the handbrake's draught cable is not under tension and that the gap between the brake disks is not reduced: this would compromise the correct working of the brake.
- 2) It is necessary to check every 2000 working hours that the stroke of the brake piston is not over 3.5 mm, otherwise it is necessary to replace the brake disk. In order to estimate the worn of the discs, disconnect the brake rod. Move the lever closer the brake piston, then pull it strongly and measure the stroke of the lever: it has not to be over 21 mm. In case the stroke exceed this value, it's required to replace the disc pack.
- 3) The M10 × 1 plug is used as connection to the hydraulic service brake circuit.
- 4) The bleeder nipple located in the opposite side of the service brake connection is used for bleeding the braking circuit before it is started.

## 5. BRAKE MASTER CYLINDER

### 1) STRUCTURE



35B7BS09

1	Body	6	Head	11	Snap pin	16	Air bleeder
2	Spring (Large)	7	Head pin	12	Stop ring	17	Cap
3	Check valve	8	Boot nut	13	Boot	18	Cap
4	Valve seat	9	Pin	14	Retainer	19	Cap
5	Rod	10	Washer	15	Nipple	20	Piston kit

### 2) DISASSEMBLY

- (1) Remove the master cylinder boot (13) and remove the rod (5).
- (2) Remove the stop ring (12) and take out the piston kit (20) and spring (2).
- (3) Specification of master cylinder.

- Cylinder bore diameter : 19.05/28.57 mm
- Piston stroke : 25 mm

### 3) INSPECTION

- (1) Clean and check these components.
  - ※ Use isopropyl alcohol or brake fluid for washing the components. Do not use gasoline, kerosene or any other mineral oils. When using alcohol, do not leave rubber parts in the liquid for more than 30 seconds.
- (2) Inspect the inside wall of the master cylinder, and if any faults are found, replace the cylinder assembly.
- (3) Replace the boot (8), piston kit (20), 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.

## GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

### 1. OPERATIONAL CHECKS

#### 1) BRAKE PIPING

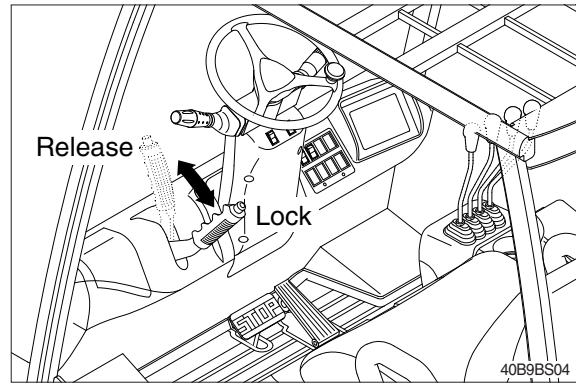
- (1) Check pipes, hoses and joints for damage, oil leakage or interference.
- (2) Operate brake pedal and check operating force when pedal is depressed. Check also change in operating force, and change in position of pedal when pedal is kept depressed.

#### 2) BRAKING FORCE

- (1) Select a dry, flat, paved surface and, drive truck at maximum speed. When signal is given, stop truck immediately and measure distance from point where signal was given to point where truck stopped (unloaded)
  - Stopping distance : Within 5 m (16' 5")
- (2) Check that there is no pulling of steering wheel, pulling by brakes to one side or abnormal noise when making emergency stops.

#### 3) PARKING BRAKE

- (1) Operating force of parking lever is 25~35 kgf (55 ~ 77 lbf).
- (2) Check that parking brake can hold machine in position when loaded on 15% slope. If there is no slope available, travel at low speed and check braking effect of parking brake.



## 2. TROUBLESHOOTING

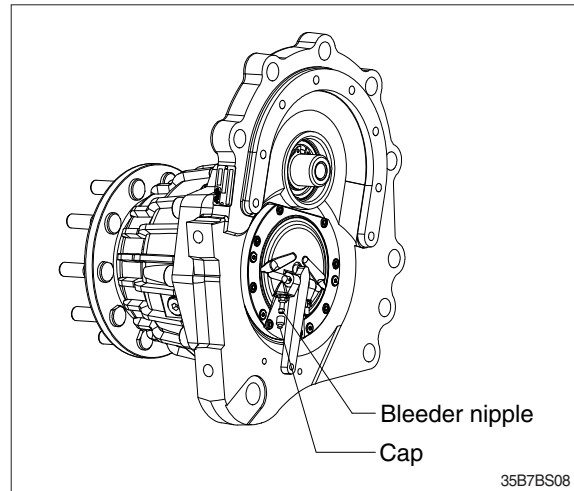
Problem	Cause	Remedy
Brakes do not work	<ul style="list-style-type: none"><li>· Oil leakage in the system or oil too low in tank.</li><li>· Air trapped in the system.</li><li>· Worn out or deteriorated piston cup in master cylinder resulting in oil leakage</li></ul>	<ul style="list-style-type: none"><li>· Repair oil leakage. After bleeding fill oil tank of master cylinder to specified level with brake oil.</li><li>· Bleed air completely from the brake lever.</li><li>· Inspect cylinder and piston for degree of wear. On satisfactory, replace cup.</li></ul>
Brake pedal travel too large	<ul style="list-style-type: none"><li>· Air trapped in the system.</li></ul>	<ul style="list-style-type: none"><li>· Bleed air completely out.</li><li>· Inspect oil tube joints &amp; connections and replace leaking parts.</li></ul>
Wheel feel heavy	<ul style="list-style-type: none"><li>· Return port in master cylinder closed by piston cup.</li></ul>	<ul style="list-style-type: none"><li>· Inspect master cylinder.</li><li>· Repair or replace pedal return spring.</li></ul>

## GROUP 3 TESTS AND ADJUSTMENTS

### 1. BLEED THE BRAKE SYSTEM

The brake system must be bled after replenishing with brake fluid.

- 1) Remove cap from bleeder nipple and fit proper hose to collect escaping brake fluid in a vessel.
- 2) Apply pressure by operating the brake pedal.
- 3) Open bleeder nipple approx. half a turn with a spanner and press the brake pedal simultaneously to bleed the system.



- ※ Collect escaping brake fluid into a suitable vessel.  
Do not drain brake fluid into the soil or the gutters.

**▲ Close the bleeder nipple before releasing the brake pedal.**

- ※ Repeat this procedure until the brake fluid escapes without bubbles.  
Check the brake fluid container for sufficient fluid and refill if necessary.

- 4) When brake fluid escapes without bubbles tighten bleeder nipple, remove hose and put dust protector onto the bleeder nipple.
  - Tightening torque : 5 kgf · m (37 lbf · ft)

### 2. ADJUSTMENT OF PEDAL

#### 1) BRAKE PEDAL

- (1) Pedal height from floor plate adjust with stopper bolt.
  - Pedal height : 130 mm
- (2) Play
  - Adjust with rod of mast cylinder.
  - Pedal play : 4~6 mm

