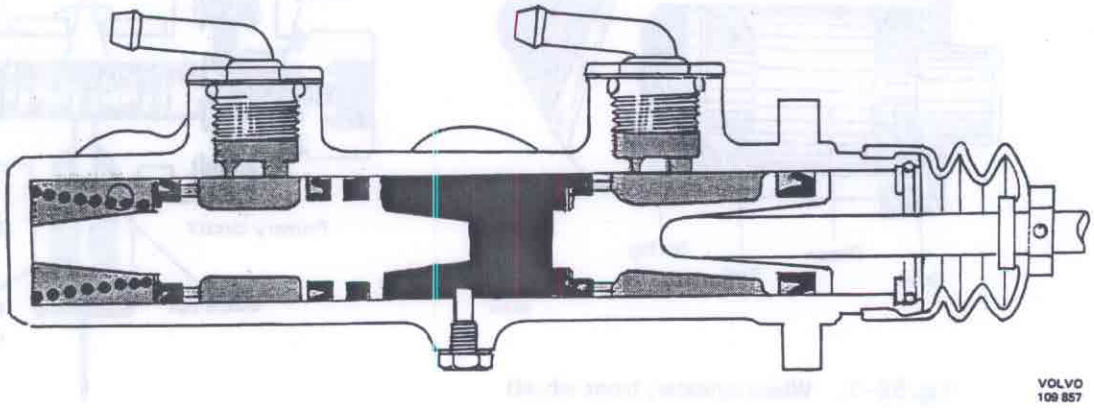


Fig. 52–4. Brake application with leakage in secondary circuit

If a leakage has arisen in the secondary circuit, no backpressure is formed in front of the secondary piston which is pushed inwards during brake application until stopped by the end of the cylinder. The hydraulic pressure between the pistons can thereafter rise and apply the brakes in the primary circuit.

If there is a leakage in the primary circuit, the primary piston is displaced during braking until it makes contact with the secondary piston. Both pistons are then pushed inwards, the pressure in front of the secondary piston rises and the brakes in the secondary circuit are applied.

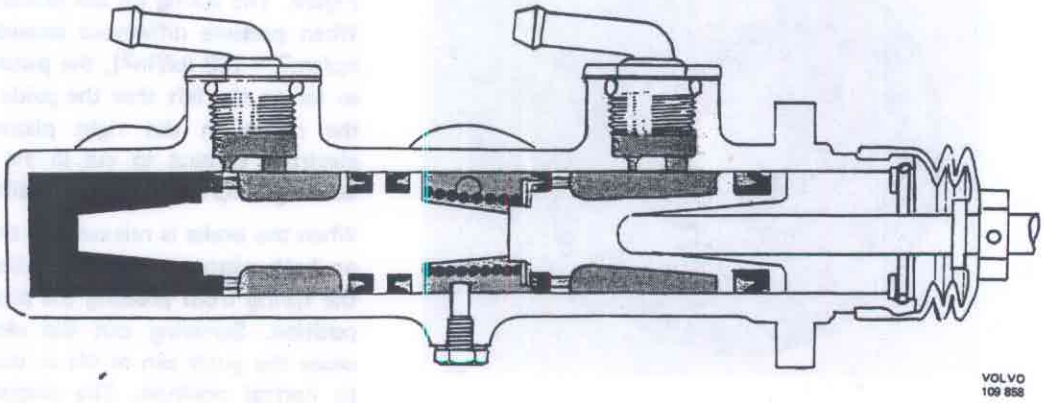


Fig. 52–5. Brake application with leakage in primary circuit

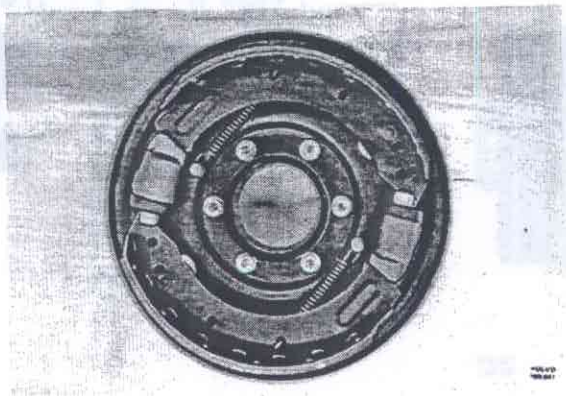


Fig. 52–6. Front wheel brake unit

WHEEL CYLINDERS

Each front wheel has two wheel cylinders. Fig. 52–6 shows the location and Fig. 52–7 the design. The leading cylinder is connected to the secondary circuit, the trailing to primary circuit. During braking, brake fluid pushes the piston outwards and applies one of the brake shoes. In the rest position, the piston is held pressed-in by the shoe's return spring.

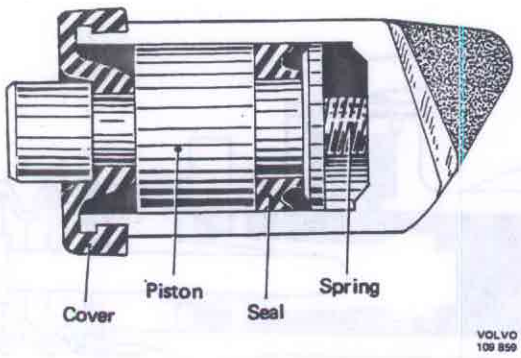


Fig. 52–7. Wheel cylinder, front wheels

Each rear wheel has a wheel cylinder. Fig. 52–8 shows the location and Fig. 52–9 the design. During braking, brake fluid pushes the piston outwards and the brake shoes are applied. In the rest position, the pistons are held pressed-in by the return springs for the shoes.

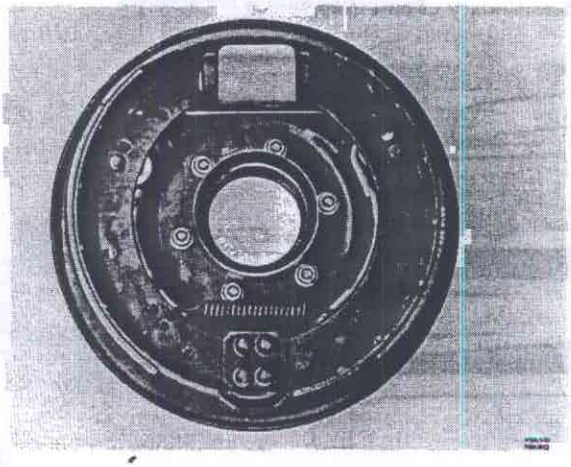


Fig. 52–8. Rear wheel brake unit

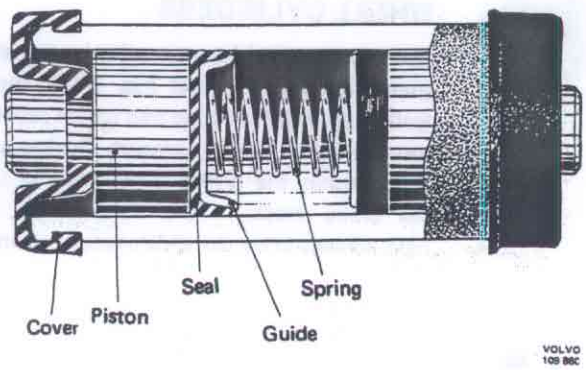


Fig. 52–9. Wheel cylinder, rear wheels

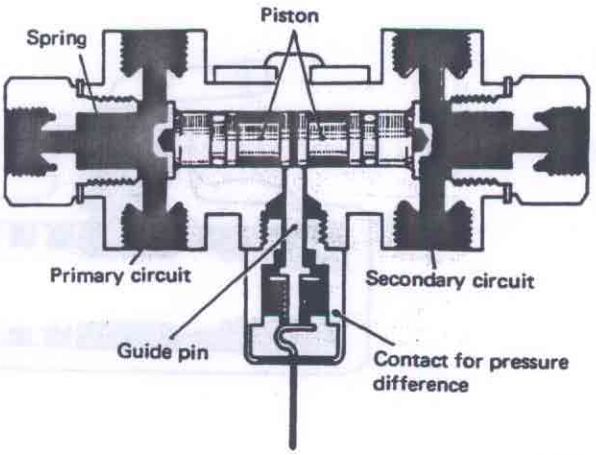


Fig. 52–10. Warning valve, normal position

WARNING VALVE

The warning valve design can be seen from Fig. 52–10. Concerning the electrical contacts for this valve, see Group 38.

During normal braking, pressure on both pistons is more or less the same. If the pressure in the secondary circuit is higher than that in the primary circuit, the pistons are pushed to the left on the Figure. The spring on the primary side opposes this. When pressure difference exceeds about 1 MPa (10 kp/cm^2 = 142 lbf/in^2), the pistons have been pushed so far to the left that the guide pin goes down into the recess in the right piston. This causes the electrical contact to cut in the current so that the warning lamp for the pressure difference goes on.

When the brake is relased and the hydraulic pressure on both pistons is the same, the guide pin prevents the spring from pressing the pistons back to normal position. Screwing out the electrical contact will cause the guide pin to lift so that the pistons return to normal position. The electrical contact should always be screwed out after warning position (and when bleeding) in order not to damage the guide pin and piston.

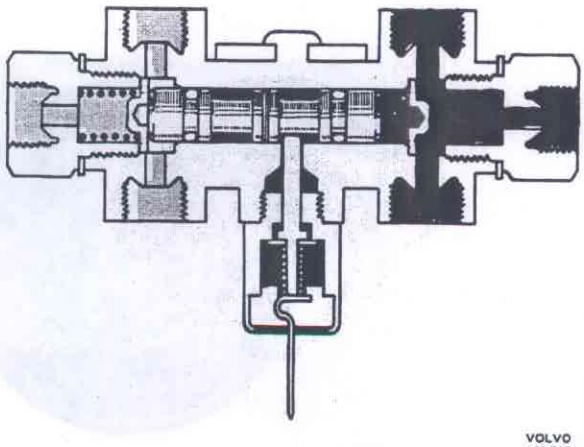


Fig. 52–11. Warning position

BRAKE PEDAL

The brake pedal is suspended, journalled in two bushings. The upper section actuates the push rod in the master cylinder. A stop bolt limits return travel.

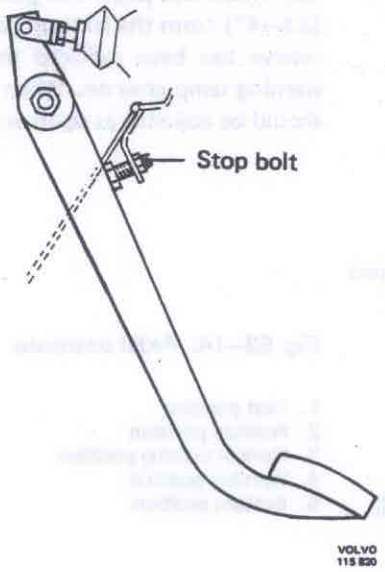


Fig. 52–12. Brake pedal

BRAKE SYSTEM WARNING DEVICES

Concerning the electrical part of the contacts, see Group 38. The location and connection of the electrical contacts can be seen from Fig. 52–13.

Contact for stop lights

The contact is mechanical and is actuated by the brake pedal. When the pedal is in rest position, there is no current to the ligths. When the pedal is depressed, current is cut in to the stop lights.

Contact for pressure difference

The contact is actuated by the warning valve. See under "Warning valve".

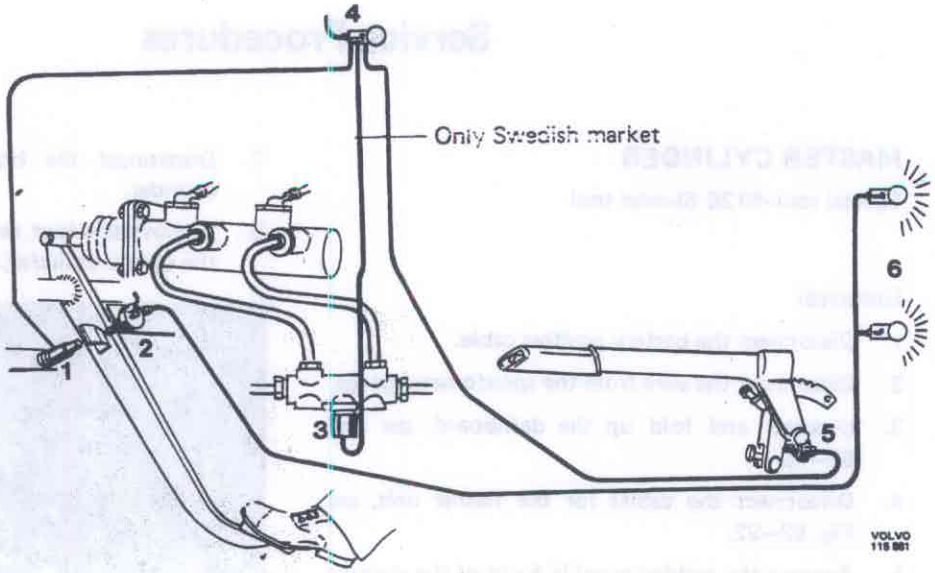
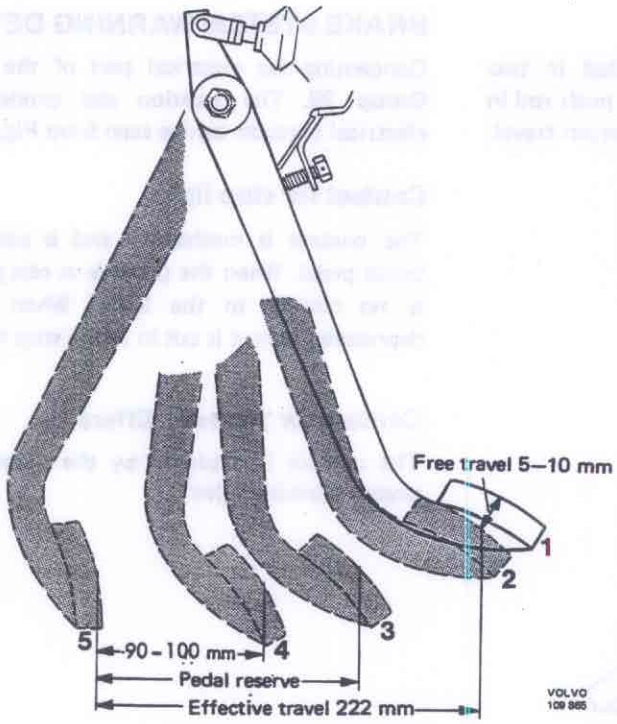


Fig. 52–13. Warning devices

1. Contact, brake pedal travel
2. Contact, stop lights
3. Contact, pressure difference
4. Warning lamp, brake system
5. Contact, parking brake
6. Stop lights



Contact for brake pedal travel

The contact is actuated by the pedal. The more the brake linings wear down, the greater will be the pedal travel. However, the pedal must not travel too far if the brakes are to function should one of the circuits fail. When the pedal has gone down to 90–100 mm (3.5–4") from the bottom position, that is, the pedal reserve has been reduced to this measurement, the warning lamp goes on. When this happens, the brakes should be adjusted as soon as possible.

Fig. 52–14. Pedal positions

1. Rest position
2. Pressure position
3. Normal braking position
4. Warning position
5. Bottom position

Service Procedures

MASTER CYLINDER

Special tool: 6126 Bleeder tool

Removal

1. Disconnect the battery positive cable.
2. Disconnect the wire from the speedometer gauge.
3. Unscrew and fold up the dashboard, see Fig. 52–15.
4. Disconnect the cables for the flasher unit, see Fig. 52–22.
5. Remove the padded panel in front of the steering column.
6. Place an empty vessel under the master cylinder. Remove the hoses from the master cylinder and plug them. To slow up the oil running out temporarily cover the breather hole in the cap of the brake fluid reservoirs with plastic cement or similar.
7. Disconnect the brake lines from the master cylinder.
8. Remove the four retaining bolts and lift forward the master cylinder, see Fig. 52–16.

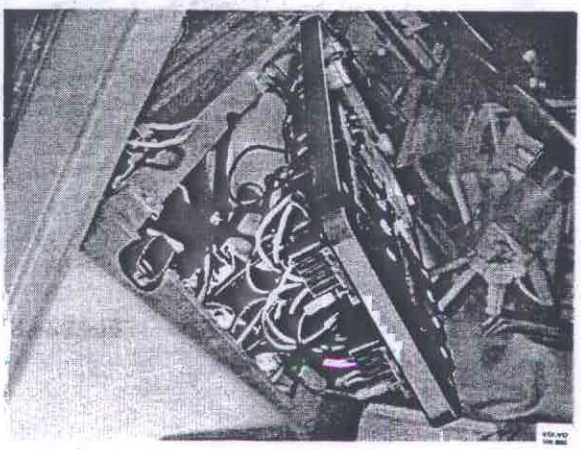


Fig. 52–15. Dashboard folded up

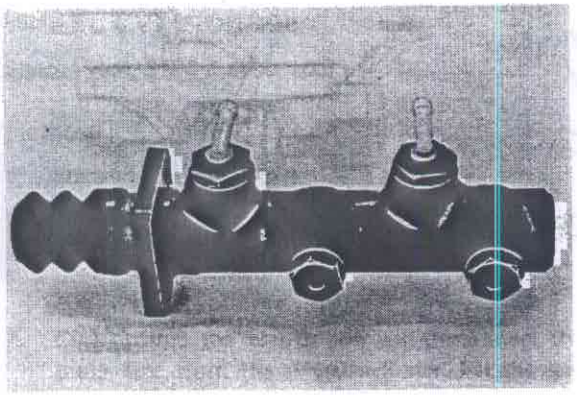


Fig. 52–16. Master cylinder removed

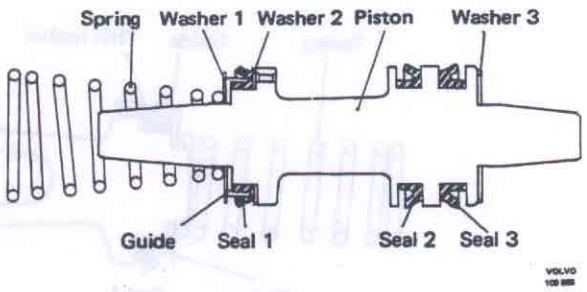


Fig. 52–17. Secondary piston

Dismantling

1. Fix the master cylinder flange securely in a vice.
2. Unscrew the connections for the brake fluid reservoirs.
3. Unscrew the ouput connections and remove the valves.
4. Unscrew the stop bolt.
5. Lever off the rubber cover and remove the push rod.
6. Remove the lock ring for the primary piston with the help of lock ring pliers. Shake out the valves, use compressed air if necessary.
7. Remove the parts from the pistons.

Checking and replacing parts

Before checking, clean the parts according to the instructions given under "Cleaning", Group 50.

Examine carefully the inside of the cylinder. If scored or damaged in any other way replace the cylinder. Rusting or similar can generally be removed by honing, etc. Clean the cylinder carefully after honing and check that all holes are open.

If wear is suspected on the cylinder or piston, measure the diameter with a micrometer or dial indicator. The cylinder bore may not exceed 28.68 mm (1.13") and the piston diameter may not be less than 28.42 mm (1.12").

Each time reconditioning is carried out, replace the used repair kit parts with new ones. The stop bolt, lock ring and all seals should also be replaced.

Assembling

Before assembling, coat the parts with brake paste.

1. Fit the thin washers 2, Fig. 52–17 and the seals on the secondary piston and make sure that the seals are turned correctly according to the Figure.
2. Fit the guide, washers 1 and 3 and the spring on the secondary piston, see Fig. 51–17. Carefully fit the piston in the cylinder. Use a feeler gauge for the seals, see Fig. 52–18.
3. Press in the piston and fit the stop bolt together with a new sealing washer.
4. Fit all the primary piston parts, see Fig. 52–19. Carefully insert the piston in the cylinder. Push in the pistons and fit the thrust washer and lock ring in position on the outside of the primary piston. This is made easier if the primary piston is held pressed in with the help of a 3 mm (1/8") drift through the by-pass hole.

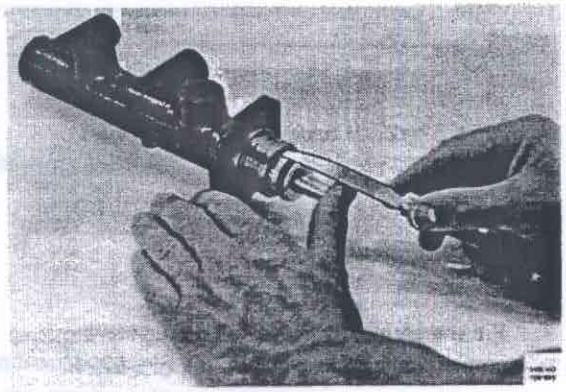


Fig. 52–18. Fitting the piston

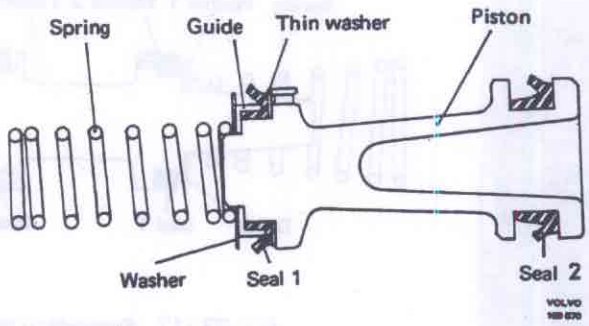


Fig. 52–19. Primary piston

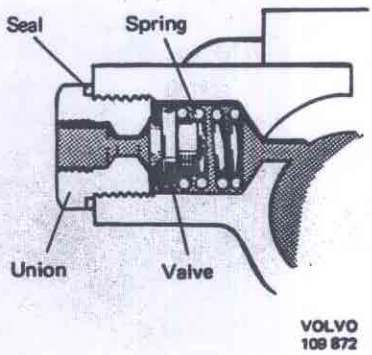


Fig. 52–21. Valves

5. Check the travel of the pistons and make sure that the through-flow holes are not blocked. Check the equalizing holes by inserting a soft copper wire with diameter 0.5 mm (1/64"), compare Fig. 52–20. If an equalizing hole is blocked, then generally the master cylinder has been incorrectly assembled.
6. Place in position the push rod and rubber cover.

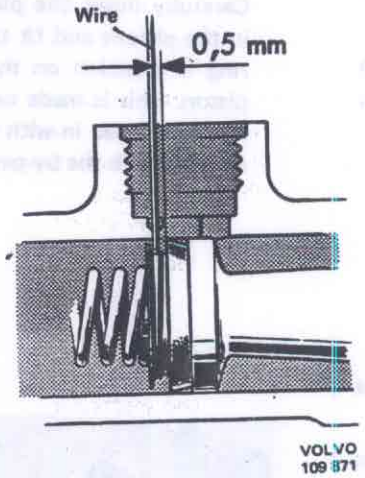


Fig. 52–20. Checking equalizing holes

Copper wire = 0.5 mm (1/64")

7. Fit the spring, valve, seal and plug for the output connections in their places, see Fig. 52–21.
8. Fit the seals and reservoir connections in their places.

Installing

1. Place the master cylinder in position. Tighten up the retaining bolts.
2. Fit the clamps and connect the hoses from the brake fluid reservoirs.
3. Pump with the brake pedal until brake fluid free from air bubbles emerges from the primary circuit connection. Connect up the brake line.

   Pump with the brake pedal until brake fluid fre from air bubbles emerges from the secondary circuit connection. Fit the brake line.
4. Run the cable through the hole and install the panel.
5. Connect the cables for the flasher unit as shown in Fig. 52–22.
6. Connect the wire to the speedometer.
7. Install the dashboard.
8. Connect up the battery.
9. Bleed the brake system, see page 4.

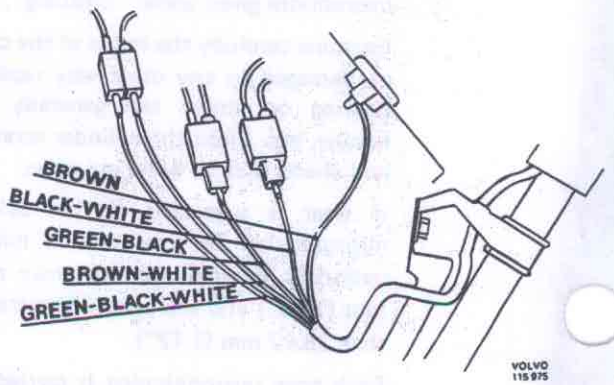


Fig. 52–22. Connecting the cable, flasher unit

WHEEL CYLINDERS

Special tool: 6126 Bleeder tool

Removal

1. Slacken the wheel nuts.
2. Jack up the vehicle and remove a wheel.
3. Adjust back both the brake shoes (anti-clockwise).
4. Clean round the connection and disconnect the brake line from the wheel cylinder. Fit the seal nipple.
5. Pull off the brake drum and remove the brake shoes according to the instructions given under "Front wheel brakes" and "Rear wheel brakes".
6. Remove the wheel cylinder bleeder nipple and retaining nuts. Lift forward the wheel cylinder.

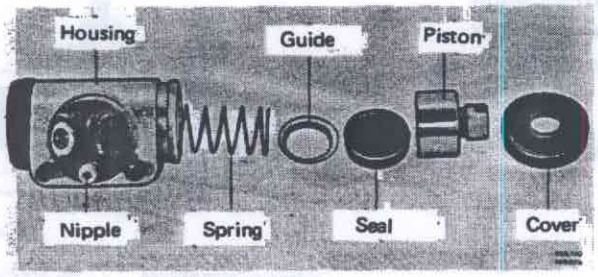


Fig. 52–23. Wheel cylinder parts, rear wheels

Overhauling

Lever off the rubber cover and take care of the piston and the other parts. Clean all the parts according to the instructions given under "Cleaning".

Examine the inside of the cylinder thoroughly. If scored or damaged in any other way, replace the cylinder. It would be pointless to hone or machine the inside of the cylinder in any other way since this would remove the rustproofing on the inside of the cylinder.

The clearance between the piston and cylinder may not exceed 0.26 mm (0.102") and can be measured with a feeler gauge. If the clearance exceeds 0.26 mm (0.102") try with a new piston. If this does not remedy the situation, replace the wheel cylinder.

Replace the seals and rubber covers each time reconditioning is carried out.

Put together the parts according to Figs. 52–24 and 52–25. Coat the piston and sela, also the groove for the rubber cover, with brake paste.

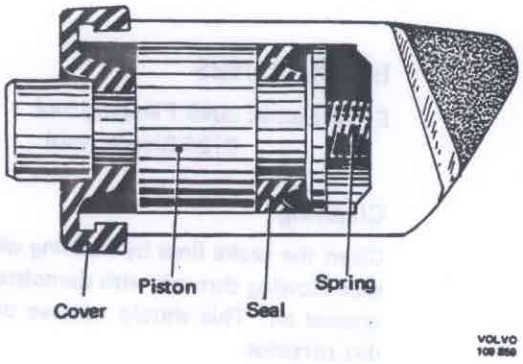


Fig. 52–24. Wheel cylinder, front wheels

Installing

1. Install the wheel cylinder, and if it applies to the front wheel brake unit also the seal, in position. Fit washers and nuts. Screw on the bleeder nipple.
2. Install the brake shoes according to the instructions given under "Front wheel brakes" and "Rear wheel brakes".
3. Install the brake drum. Adjust the wheel brakes.
4. Connect the brake line to the wheel cylinder.
5. Install the wheel.
6. Remove the seal on the breather hole in the brake fluid reservoir cap. Bleed the wheel brake unit.
7. Lower the vehicle and tighten the wheel nuts to a torque of 160–210 Nm (16–21 kpm = 227–299 lbftf).

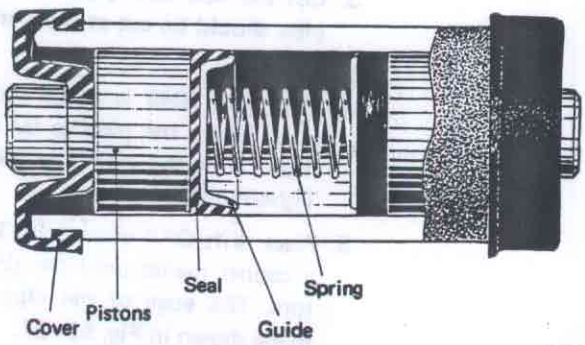


Fig. 52–25. Wheel cylinder, rear wheels

BRAKE LINES

Special tools: 2049 Flanging tool
6126 Bleeder tool

Cleaning

Clean the brake lines by flushing with brake fluid and then blowing through with demoistened, filtered compressed air. This should remove old brake fluid and dirt particles.

With full reconditioning, connect the bleeder unit to the master cylinder and then empty the system through the bleeder nipples. Next flush the system with brake fluid and blow it clean with compressed air. Then remove the main components in the hydraulic system and take each of them and thoroughly clean them.

If no bleeder unit is available, empty the lines by disconnecting them at the wheel cylinders and evacuating the brake fluid by pumping with the brake pedal. This will keep the liners blocked alternatively so that fluid is pressed out only through one line at a time.

IMPORTANT! Do not fill the system again with drained brake fluid.

Replacing the brake lines

With leakage or when the lines have been exposed to such damage that leakage or pinching can be expected, replace the damage lines according to the following instructions:

1. To prevent unnecessary loss of brake fluid, temporarily plug the cap on the brake fluid reservoirs with cement or similar.
2. Clean round the connections and remove the damaged brake line. Fit instead sealing nipples.
3. Cut the new steel pipe to the right lenght. The pipe should be cut at right angles all burr removed.
4. Place tool 2049 in a vice and double flange the pipe. Insert the pipe so far that its end comes flush with the clamping jaw, see Fig. 52–26. Tighten up the nuts.
5. Place drift OP 1 in the tool. Tip on the drift with a copper mallet until the drift goes to the bottom. The edge of the pipe then takes up the shape shown in Fig. 52–27.
6. Replace the drift with drift OP 2 and knock this into the bottom.
7. Fit the connection nuts and repeat points 4–6 at the other and of the pipe.

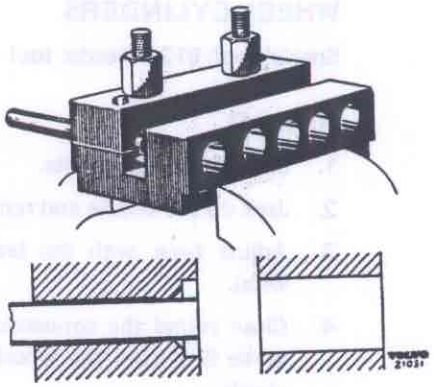


Fig. 52–26. Flanging the brake pipe

8. Bend the new brake line using the old one as a guide. The bending should be done round an object with the same radius as the bend desired.

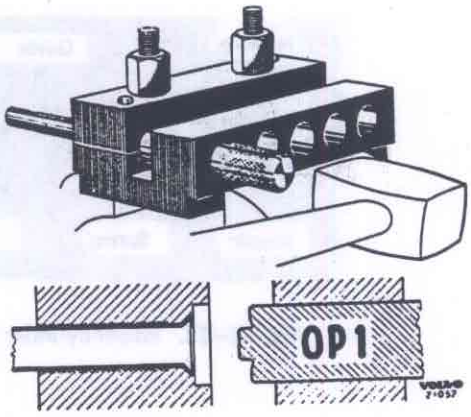


Fig. 52–27. Flanging the brake pipe

9. Blow the inside of the line clean and install it. Make sure that the line is routed so that it will not be damaged during driving.
10. Bleed the brake system. Remove the plug in the hole of the brake fluid reservoir cap.

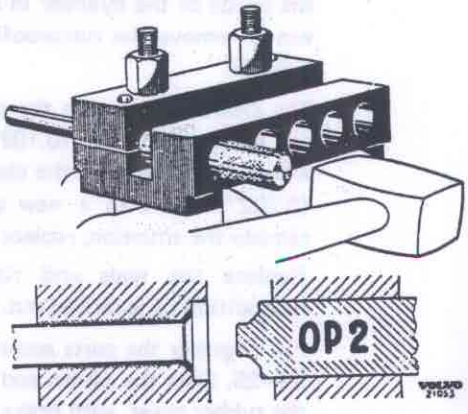


Fig. 52–28. Flanging the brake pipe