1.75″ DIA. × 2.0″ TANDEM MASTER CYLINDER

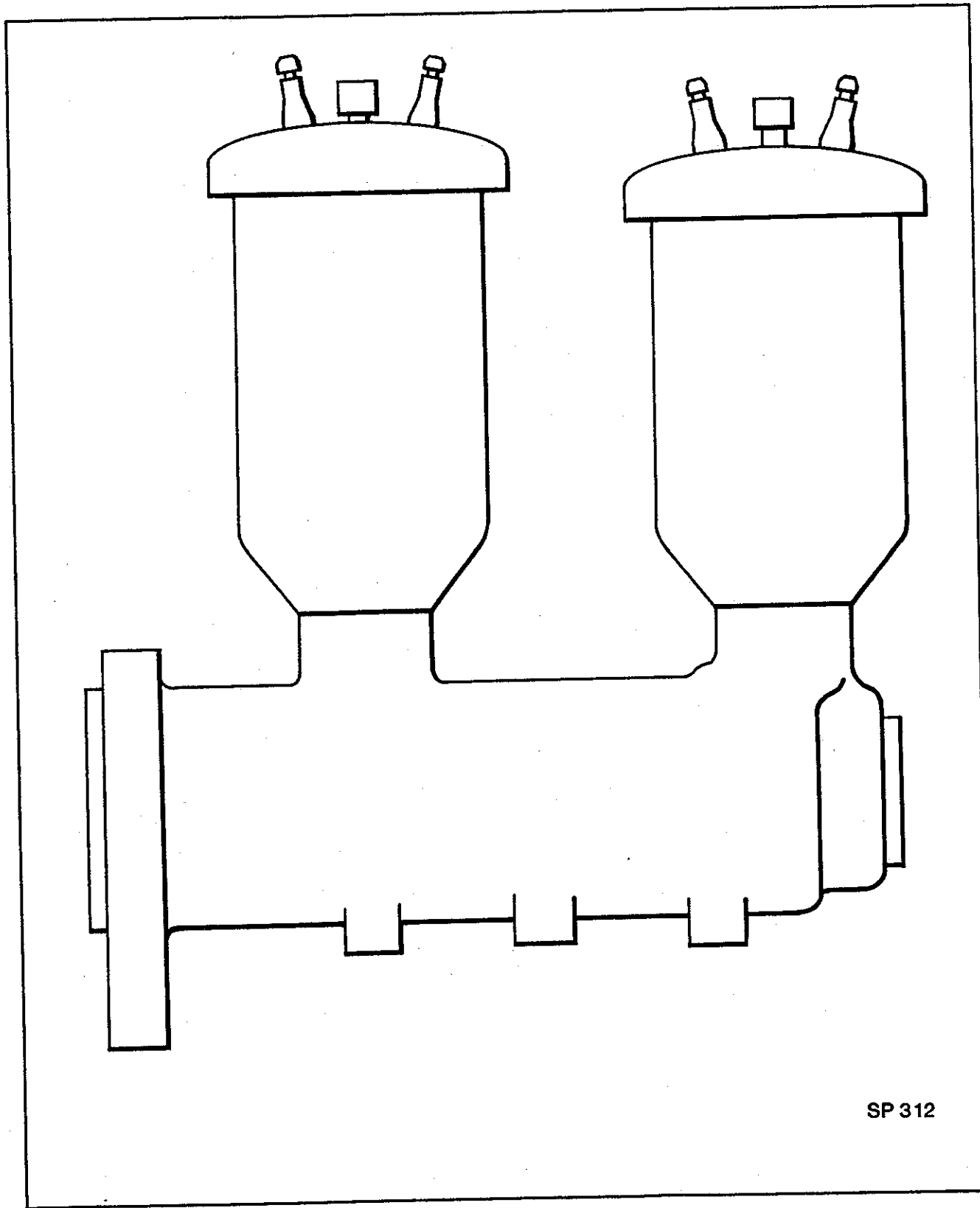


Fig. 1. *1.75 × 2.0 Tandem Master Cylinder*

DESCRIPTION

When the footbrake valve is applied the actuator push rod moves forward to engage the master cylinder primary piston. The primary piston moves down the bore allowing the spring under the recuperating valve to close the valve. Pressure is then built up against the secondary piston which causes it to move down the bore and close its recuperating valve. The fluid is now sealed in both chambers ready for the delivery part of the stroke. Further movement of the pistons builds up pressure in the delivery lines. The fluid then passes through the small holes in the seat and lifts the rubber flap valve of the residual line pressure valves. The pressure is then transmitted to the wheel cylinders.

When the foot brake valve is released, return springs return the actuator and master cylinder to the off position. The primary cylinder tilts its recuperating valve and the secondary piston allows its recuperating valve to open allowing both chambers to replenish if necessary with brake fluid. Back pressure in the delivery line acts upon the face of the residual line pressure valve and compresses the small spring which opens the valve and allows the fluid in the line to pass to the master cylinder by flowing around the seat. When the line pressure has fallen to 48/100 kN/m² (7/16 p.s.i.) the spring re-seats the line pressure valve holding the line pressure at that value.

If there is a leakage or failure in either hydraulic circuit, the other circuit is unaffected but the foot brake pedal travel will be excessive and only one axle will be braked.

If the primary system fails, a mechanical link must be made with the secondary piston before the secondary piston will produce any pressure.

If the secondary system fails, the hydraulic action of the primary piston must move the secondary piston to its stop before pressure can be built up by the primary piston.

TO REMOVE

Thoroughly clean the whole unit in situ before removing.

The master cylinder can be removed without disturbing the actuator.

Disconnect the electrical connections.

Disconnect the two hydraulic pipes and collect the brake fluid in a suitable tray or can.

Remove the three nuts holding the master cylinder. Remove the master cylinder leave the shims in place and replace the nuts to support the actuator.

Place the master cylinder on a clean bench. As the master cylinder is stripped lay the parts in order on a clean sheet of paper.

Remove the caps, filters and floats from the reservoirs.

Unscrew the fixings in the bottom of the reservoirs and lift off the reservoirs. Remove the fixings and any washers or seals.

Push the primary piston down the bore to clear the primary cylinder recuperating valve stem, unscrew and remove the recuperating valve body and its sealing ring.

Push the primary piston down the bore and remove the circlip (actuator end).

Withdraw the primary piston assembly and the spring between the two pistons.

Push the secondary piston down the bore and remove its stop bolt on the outside of the body together with the identity tag.

Remove the circlip at the other end of the master cylinder.

Push the end plug down the cylinder bore to eject both the secondary piston and the end plug. During this operation the rearward facing seal may well be damaged when forced over the circlip groove.

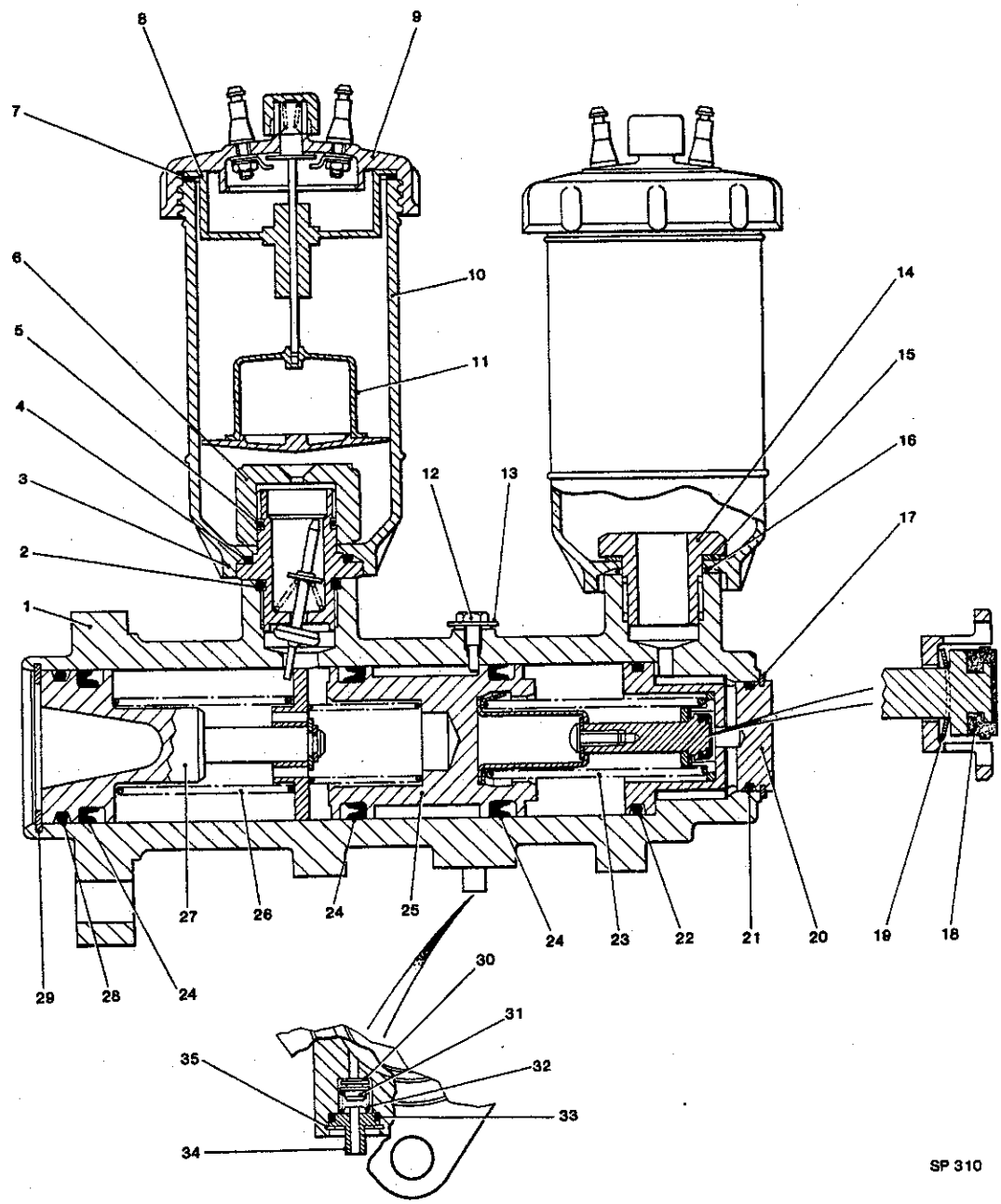
Remove the circlip securing the non return valve on the underside of the body.

Remove the drip pipe with its sealing ring, the spring and non return valve.

Remove the residual line pressure valves from both hydraulic outlet connections.

Discard all parts which will be renewed from the repair kit.

Master Cylinder (Air/Hyd.)



1 MASTER CYLINDER BODY
2 'O' RING
3 PRIMARY RECUPERATING VALVE
4 'O' RING
5 'O' RING
6 NUT PRIMARY RESERVOIR
7 SEAL
8 FILTER
9 RESERVOIR CAP
10 RESERVOIR BODY
11 FLOAT
12 STOP BOLT
13 IDENTITY TAG
14 CONNECTER SECONDARY RESERVOIR
15 SEALING WASHER
16 'O' RING
17 CIRCLIP
18 SECONDARY RECUPERATING VALVE
19 BELLVILLE WASHER
20 END CAP
21 'O' RING
22 'O' RING
23 SECONDARY RETURN SPRING
24 PISTON SEAL
25 SECONDARY PISTON
26 PRIMARY RETURN SPRING
27 PRIMARY PISTON
28 'O' RING
29 CIRCLIP
30 SEALING RING
31 NON RETURN VALVE
32 SPRING
33 'O' RING
34 DRIP PIPE
35 CIRCLIP

Fig. 2. *Section through tandem master cylinder*

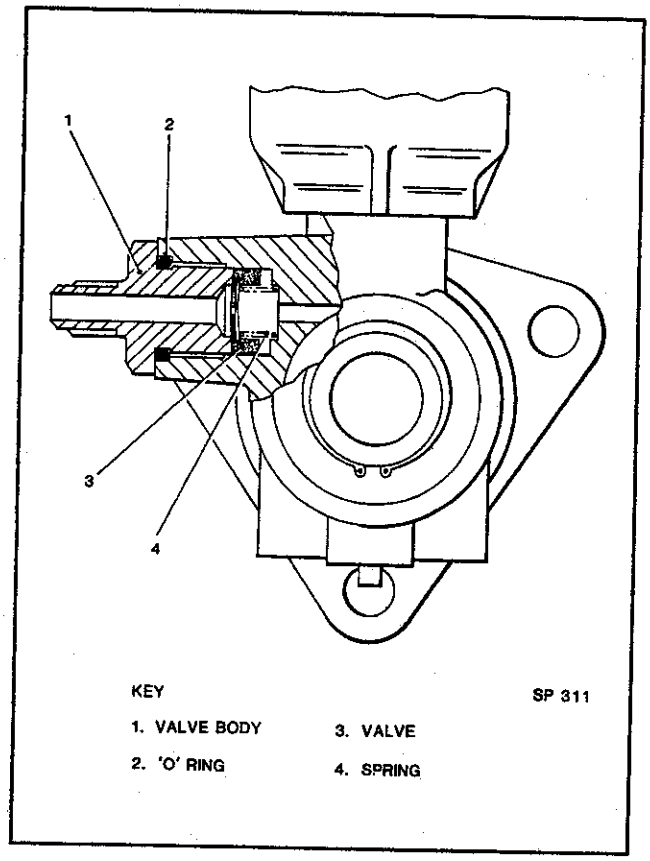


Fig. 3. *Residual line pressure valve*

CLEANING AND INSPECTION

Examine all remaining parts carefully for signs of deterioration, wear, corrosion etc.

A non mineral based cleaning fluid is recommended for master cylinder parts. The handling of hydraulic parts should be carried out with clean hands free from oil or grease and examined in a clean area.

Check all threads for damage.

Examine the master cylinder body for cracks, internal scoring or corrosion.

Examine the pistons for scores, cracks or other damage.

All springs not included in the repair kit must be examined for corrosion or permanent "set".

Renew all parts found to be defective.

RE-ASSEMBLY

Cleanliness must be strictly observed. Hands must be clean and free from oil and grease.

All parts should be lubricated with brake fluid before assembly.

Fit the 'O' rings to the end cap and slide the cap down the bore. Secure with the circlip.

Fit the seals to the secondary piston back to back (the open sides facing away from each other).

Carefully slide the secondary piston down the bore. Take particular care with the seals when passing over the circlip groove, especially the first seal which is forward facing.

Push the secondary piston right down the bore and fit the stop bolt, washer and identity tag. Torque tighten the stop bolt correctly.

Insert the spring which fits between the two pistons. Make sure it fits into the recess in the secondary piston.

Fit the two seals into the primary piston. The open end of the cup seal should face towards the spring.

Push the piston down the bore and fit the circlip. Take extra care with the seals when passing over the circlip groove. Expecially the forward facing seal.

Fit the sealing ring, non return valve and spring in to the underside of the master cylinder.

Fit the 'O' ring into the drip pipe recess, push the drip pipe (seal end first) into the body and secure with the circlip.

Assemble the residual line pressure valves correctly (see illustration) and insert these into the master cylinder body. Torque tighten the valves correctly.