Section G9

Brake distribution valves

Introduction

The brake distribution valves are situated one above the other within the brake actuation linkage assembly and are operated through linkage and a balance lever arrangement when the foot brake is applied (see Fig. G15).

The distribution valves are identical in operation but are not interchangeable due to differing mounting points and pipe arrangements. Corresponding valves on right-hand and left-hand drive cars are identical.

Complete distribution valve assemblies are available as service exchange units. Only the rubber end cover, return spring and end plug sealing washer are available as separate items. The remaining working parts are subject to very fine limits and are therefore selectively assembled by the manufacturer.

Note
The design of the valve is such that to provide adequate lubrication to the 0,0025 mm. (0.0001 in.) clearance between the operating valve and its bore a small fluid 'leak-off' is permitted. This leakage is visible and takes the form of a small droplet of fluid hanging from the valve base. This is normal.

When deciding whether a valve is leaking excessively, in order to warrant renewal or overhaul; if the fluid 'leak-off' does not impair the braking efficiency of the car or cause a noticeable drop in fluid level in the reservoir, then the valves should be regarded as satisfactory.

Brake distribution valves - To test (on the car)

1. Place the car on a ramp. Isolate the gearchange selector and depressurise the systems as described in Section G2.
2. Remove the undershield from around the brake actuation linkage.
3. Connect a zero kg/sq.cm. to 210 kg/sq.cm. (zero lb/sq.in. to 3 000 lb/sq.in.) pressure gauge with a length of high pressure pipe attached, into the high pressure outlet port of the distribution valve (blue or mauve pipe) or into any convenient junction between the valve and the brake calipers it supplies. The brake caliper bleed screw ports may be used if desired.
4. Start the engine then depress the brake pedal. The brake line pressure shown on the gauge should be proportional to the load applied to the pedal provided the accummulators are fully charged. For a 20,4 kg. (45 lb.) load on the pedal, the line pressure should be approximately 70,31 kg/sq.cm. (1 000 lb/sq.in.), It should also be possible to achieve a line pressure of 140,62 kg/sq.cm. (2 000 lb/sq.in.) for a pedal pressure of approximately 34,0 kg. (75 lb.).

When the brake pedal load is varied continuously, the brake line pressure should vary accordingly, without any marked lag or jerkiness.

If the above effort/pressures are not obtainable or actuation shows marked lag or jerkiness on the gauge, the distribution valve may be considered faulty and must be overhauled or renewed.

5. If a system internal leakage investigation, as described under Hydraulic accumulator - To test, show a distribution valve to be the cause of a loss of accumulator pressure the actual leakage can be checked as follows.
6. Disconnect the low pressure return line from the distribution valve port (black or white pipe). Blank the end of the pipe to prevent drainage of the reservoir.
7. Insert a union and a length of pipe into the distribution valve low pressure return port and place the open end of the pipe into a clean container.
8. Start the engine but do not depress the brake pedal.
9. Top-up the reservoir continuously to prevent the hydraulic fluid from falling below the 'minimum' level mark.

For the valve to be acceptable the fluid leakage should not exceed 25 ml. per half hour with the valve in the 'off' position (ie. brake pedal not applied) or 50 ml. per minute with the brake pedal depressed and held steady under a load of 20,41 kg. (45 lb.) which is equivalent to a brake line pressure of 70,31 kg/sq.cm. (1 000 lb/sq.in.). If the valve leakage exceeds these figures it must be overhauled or renewed.

Brake distribution valves - To remove

1. Place the car on a ramp and depressurise the hydraulic systems as described in Section G2.
2. Remove the undershield from around the brake actuation linkage.
3. Remove the pipes from each valve. Blank off the pipe ends and valve ports.
4. Unlock and remove the securing bolts from each valve, draw the rubber boot seal off the valve. Taking care not to bend the valve actuation push rod, move each valve forward and downward, out of the actuation linkage assembly.

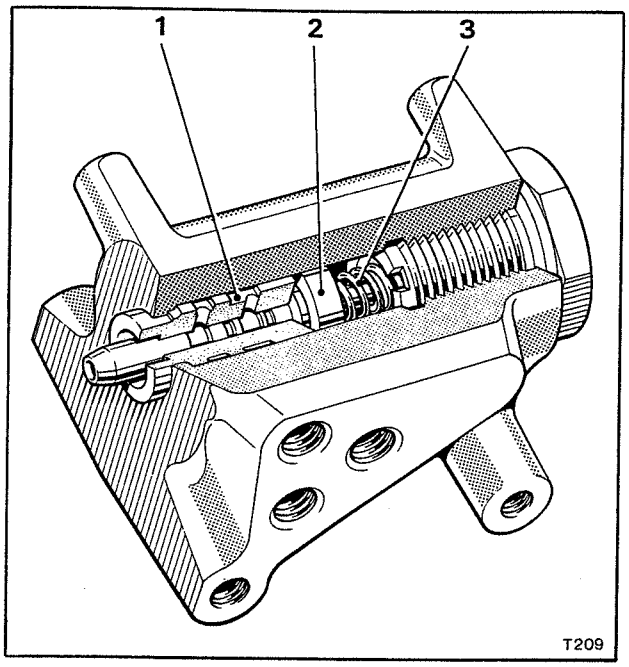

Fig. G14 Distribution valve
1 Valve insert
2 Valve stem
3 Return spring

Brake distribution valve - To dismantle (see Fig. G14)
1. Remove the end plug and sealing washer; collect the return spring.
2. Carefully remove the valve stem. Extreme care should be taken to ensure that the valve stem and its operating bore do not become scratched or damaged.
3. Carefully wash all parts in methylated spirits and dry with clean, dry compressed air.

Brake distrubition valve - To inspect
1. Carefully examine the fine limit bore of the valve insert and the outside diameter of the valve stem. Each surface should be smooth and free from scratches.
2. Lubricate the bore of the valve insert and the valve stem with clean brake fluid. Carefully fit the valve stem into the valve insert bore and check for any axial wear. There should only be sufficient clearance to allow the valve stem to slide freely in the bore, the stem and bore having a clearance of 0,0025 mm. (0.0001 in.).
3. Wash the parts in methylated spirits and dry with clean, dry compressed air.

Brake distribution valves - To assemble
1. Lubricate the bore of the valve insert and the valve stem with approved brake fluid (see Chapter D).
2. Carefully insert the valve stem into the valve insert bore until fully seated. Fit a new return spring.
3. Fit a new sealing washer to the end plug. Fit and torque tighten the plug to the figure quoted in Chapter P.
4. Ensure that the inward and return movement of the valve stem is smooth and does not bind or stick at any point along its travel.

Brake distribution valves - To fit
Fit the distribution valves by reversing the procedure given for removal noting the following points.
1. If a replacement valve is being fitted, remove one of the blanking plugs and allow any fluid to drain from the valve. Re-fit the plug.
2. Torque tighten the mounting bolts and pipe connections in accordance with the figures quoted in Chapter P. Lock the securing bolt tab washers.
3. On completion the hydraulic systems must be bled as described in Section G4.