Priority valve

Introduction
The priority valve is mounted on the underside of the body, rearward of the centre crossmember. It is incorporated into the supply line to the levelling valve (No. 1 system).

The function of the priority valve is to prevent the flow of hydraulic system mineral oil to the levelling valve until a pressure of between 86,2 bar and 120,7 bar (1250 lbf/in² and 1750 lbf/in²) is attained in the accumulator. This flow prevention ensures there is sufficient pressure in the hydraulic system to operate the rear levelling without jeopardising the braking efficiency of the car.

If the pressure in the hydraulic braking system falls unduly while the engine is running, the priority valve will close and isolate the rear levelling system. The reduced hydraulic pressure is then totally utilized for braking purposes.

The priority valve may be overhauled involving the replacement of the 'O' ring and the aluminium washer located on the small end plug.

It must be noted that the priority valve is for use with hydraulic system mineral oil only and can be identified by its green outer body.

Note If contamination of the hydraulic system has occurred, overhauling of the assembly is essential and a thorough cleaning of components in petroleum ether (120/160°C) is of the utmost importance. Also, dry with dry compressed air, not with any type of cloth.

Priority valve – To remove
1. Depressurize the hydraulic systems as described in Section G3.
2. Disconnect the inlet and outlet pipe connections from the valve.
3. Remove the bracket retaining screws (self-tapping), then lower the valve and bracket assembly.
4. Remove the priority valve from the bracket.

Priority valve – To dismantle (see fig. G13-2)
1. Unscrew and remove the switch housing cap. Remove the terminal post assembly, taking care not to lose the shim(s) from the terminal post. Discard the 'O' ring.
2. Unscrew and remove the switch housing from the valve body. Care must be taken with the spring and associated components.
3. Unscrew and remove the small end plug. Withdraw the plunger valve.
4. Thoroughly clean all components in petroleum ether (120/160°C). Dry with dry compressed air, not with any type of cloth.

Priority valve – To assemble (see fig. G13-2)
1. Reverse the procedure given for dismantling, ensuring that a new 'O' ring and aluminium washer are fitted.
2. Torque tighten the switch housing to the valve body to between 75 Nm and 81 Nm (7,7 kgf m and 8,2 kgf m; 55 lbf ft and 60 lbf ft). Finally, torque tighten the switch housing cap to between 17 Nm and 20 Nm (1,7 kgf m and 2,0 kgf m; 12 lbf ft and 15 lbf ft).

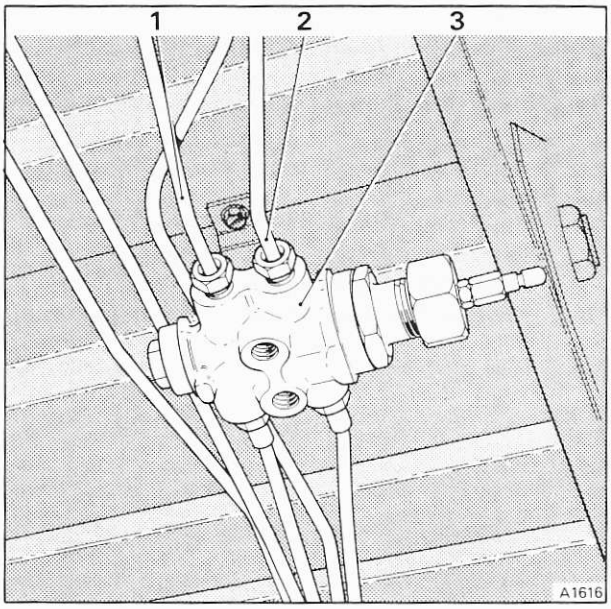

Fig. G13-1 Priority valve (No. 1 system)
1 High pressure line (Red No. 1 system)
2 Low pressure return (Black No. 1 system)
3 Priority valve body

Priority valve – To fit (see fig. G13-1)
Reverse the procedure given for removal, ensuring that the pipe connections are torque tightened to between 7 Nm and 9 Nm (0,7 kgf m and 0,9 kgf m; 5 lbf ft and 7 lbf ft).

Priority valve – To test
1. Depressurize the hydraulic systems as described in Section G3.
2. Connect the pressure gauge RH9727 into the service point of No. 1 system (refer to Section G5).
3. Add weight to the luggage compartment of the car equal to 140 kg (300 lb).
4. Start and run the engine at approximately 1000 rev/min.
5. Note the pressure registered on the pressure gauge at the point that the car commences to level.

This pressure must not exceed 120,7 bar (1750 lbf/in²).

The pressure warning lamp will extinguish before the valve opens and the maximum pressure has been attained.

6. Switch off the ignition.
7. Attach a bleed pipe to the rear suspension struts bleed screw.

Carefully open the bleed screw and allow the hydraulic system mineral oil to flow into a clean container until the levelling system is fully exhausted, indicating that the priority valve has closed.

Whilst the pressure is decreasing the priority valve must close before the pressure warning lamp illuminates.

8. The pressure retained in the braking system (registered on the gauge) with the priority valve closed must not be less than 86,2 bar (1250 lbf/in²).
9. If the priority valve operating pressures are not within the above limits the complete assembly must be renewed.
10. On completion of the test, top-up the reservoirs to the black line on the indicator sight glass, with clean hydraulic system mineral oil (see Chapter D).

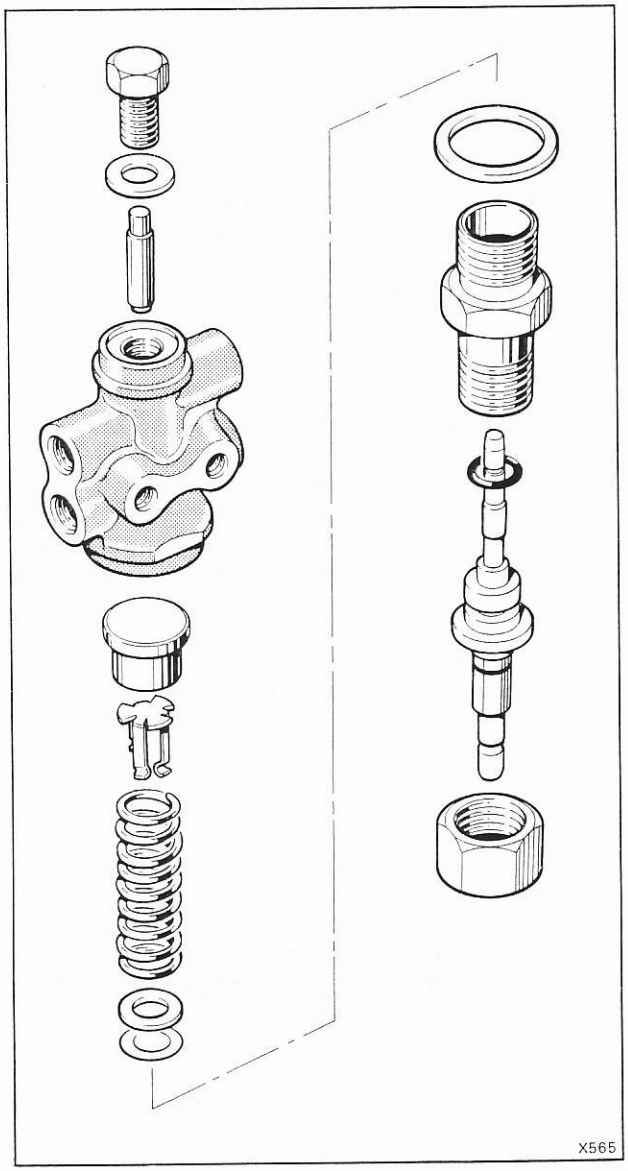

Fig. G13-2 Priority valve assembly

Pressure switches

Introduction
A pressure switch is fitted into both System 1 (red) and System 2 (orange) high pressure lines. They are situated adjacent to each other on the right-hand valance in the engine compartment (see fig. G14-1).

The pressure switches are actuated by mineral oil in the hydraulic systems and will illuminate the warning panel(s) situated on the facia if the pressure in the hydraulic system(s) falls below acceptable working limits. It is important therefore that the switches operate correctly at all times.

The switches are for use with mineral oil only and have a green identification disc beneath the top contact housing.

In the event of a pressure switch failure, or if contamination of the hydraulic systems has occurred, the complete switch assembly must be renewed.

Pressure switch – To remove (see fig. G14-1)
1. Depressurize the hydraulic systems as described in Section G3.
2. Disconnect the battery, then remove the electrical connection from the switch.
3. Unscrew the pressure switch from the 3-way connector. Discard the copper washer.

Pressure switch – To fit
To fit the pressure switch, reverse the procedure given for removal noting the following.
1. Always fit a new copper washer to the pressure switch prior to fitting to the 3-way connector.
2. Torque tighten the pressure switch to between 7 Nm and 9 Nm (0,7 kgf m and 0,9 kgf m; 5 lbf ft and 7 lbf ft).

Pressure switch – To test
1. Depressurize the hydraulic systems as described in Section G3.
2. Connect the pressure gauge RH9727 into the service point of the relevant system (refer to Section G5).
3. Start and run the engine at approximately 1000 rev/min.
4. Note the pressure registered on the gauge at the point when the pressure warning lamp is extinguished. The pressure must not exceed 97/98 bar (1400/1425 lbf/in^2).
5. Switch off the ignition.
6. Slowly open the bleed screw on the pressure gauge pipe and allow the hydraulic system mineral oil to flow into a clean container. Whilst bleeding, observe the pressure gauge needle descending. On reaching a pressure of between 83 bar and 76 bar (1200 lbf/in^2 and 1100 lbf/in^2) the warning lamp should illuminate.

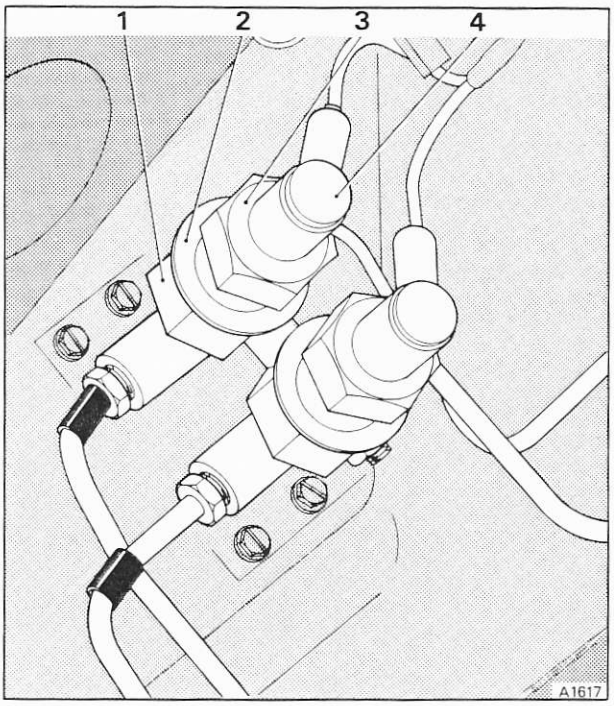

Fig. G14-1 Pressure switches
1 Switch body
2 Identification disc (green)
3 Contact housing
4 Electrical plug

7. If the pressure switch operating pressures are not within the above limits the complete pressure switch assembly must be renewed.
8. On completion of the test, top-up the reservoirs to the black line on the indicator sight glass, with clean hydraulic system mineral oil (see Chapter D).

Levelling valve

Introduction

The levelling valve is mounted on a bracket attached to the left-hand side of the rear sub-frame front crossmember.

Actuation of the levelling valve is controlled by a torsion rod. This rod is attached to the levelling valve ball pin lever at one end and to the rear anti-roll bar at the other (see fig. G15-1).

The levelling valve regulates the flow of hydraulic system mineral oil, either to or from the rear suspension struts, dependent on the variation in load applied to the rear suspension. Any sustained change in the ride height of the car operates the valve. Under conditions where extra load is applied (ride height low), pressurized hydraulic system mineral oil is allowed to pass from the accumulator, through the levelling valve to the rear suspension struts. When the load is reduced (ride height high), the levelling valve allows hydraulic system mineral oil to return from the rear suspension struts to the reservoir.

When work is being carried out on the levelling system, it should be noted that the levelling valve has a predetermined delay before it responds to movement of the ball pin operating lever. This delay period for 1 mm (0.040 in) movement of the valve is between 6.5 seconds and 12 seconds.

The levelling valve incorporates a seepage return hose. One end of the hose connects to the side of the levelling valve, the other end to the minimum pressure valve. This hose arrangement allows designed seepage within the levelling valve to return back to the reservoir.

The levelling valve is a non-serviceable unit. In the event of valve malfunction the complete valve assembly must be renewed. The outer diameter of the levelling valve is painted green for mineral oil identification purposes.

Levelling valve – To remove

1. Place the car on a ramp. Engage park position and chock the front wheels. Remove fuse A6 from fuse panel F2 on the main fuseboard.
2. Depressurize the hydraulic systems as described in Section G3.
3. Slacken the torsion bar 'U' bolt attached to the rear anti-roll bar.
4. Withdraw the torsion bar from the levelling valve ball pin lever and spherical bearing.
5. Disconnect the hydraulic pipes. Fit blanks to the pipe ends and ports. Also, fit a hose clamp to the seepage return hose and withdraw it from the levelling valve.
6. Support the valve assembly and remove the two mounting bolts. Remove the valve assembly from the car.

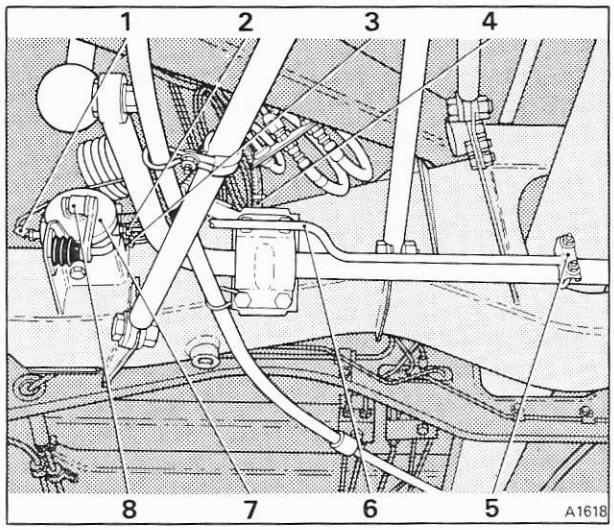

Fig. G15-1 Levelling valve assembly

1 High pressure feed to suspension struts
2 Low pressure return to reservoir
3 High pressure feed from accumulator
4 Seepage return hose
5 Torsion rod 'U' bolt
6 Torsion rod
7 Levelling valve
8 Levelling valve ball pin lever

Levelling valve – To fit

Fit the levelling valve by reversing the procedure given for removal noting the following.

1. When fitting a new levelling valve, ensure that it is filled with clean hydraulic system mineral oil before mounting on the car.
2. After positioning the valve on the bracket, torque tighten the bolts to between 21 Nm and 23 Nm (2,1 kgf m and 2,3 kgf m; 15 lbf ft and 17 lbf ft).
3. Ensure that new rubber sleeves are fitted to all pipe connections.
4. All pipe connections should be torque tightened to between 8 Nm and 9 Nm (0,8 kgf m and 0,9 kgf m; 6 lbf ft and 6.6 lbf ft).
5. Apply grease (Rocol MTS 1000) to the torsion bearing journal and lever fork. Connect the torsion bar to the levelling valve ball pin and spherical bearing. Ensure that neither the levelling valve ball pin bottoms in the operating jaw, or the torsion bar bearing journal contacts the spherical bearing rear cover.
6. Ensure that the area of contact between the torsion bar clamp and anti-roll bar is completely free of grease, oil, etc.

Levelled height – To set

1. Check that the fuel tank is full. However, if the tank is partially empty, weight equivalent to the amount of missing fuel should be positioned adjacent to the fuel tank. For each 4,5 litres (1 Imp gal, 1.2 US gal) of missing fuel add 3,4 kg (7.5 lb) of weight.
2. Ensure that the spare wheel, jack, tools etc., are fitted in their relevant positions.
3. Check the tyre pressures and adjust accordingly.
4. Drive the car onto a suitable level ramp. Chock the front road wheels.
5. Move the gear range selector lever to the park position. Remove fuse A6 from fuse panel F2 on the main fuseboard. Release the parking brake.
6. Depressurize the hydraulic systems by opening the bleed screw on the accumulators, allowing sufficient time for the mineral oil pressure to discharge back to the reservoirs.
7. Fit a pipe to the suspension struts bleed screw and slowly depressurize the struts by allowing the mineral oil to flow into a clean container. Remove the bleed screw and fit the pressure gauge RH 9727 GMF.
8. Start the engine and allow the hydraulic systems to fully pressurize (approximately four minutes).
9. Bleed the suspension struts and pressure gauge. Allow the car time to level (approximately one minute).
10. Slacken the 'U' bolt which clamps the torsion rod to the anti-roll bar.
11. Position an open ended spanner [maximum length not exceeding 152 mm (6.0 in)] onto the levelling valve operating lever. Then, push the lever towards the valve. Hold in this position until a pressure of approximately 34,5 bar (500 lbf/in²) is indicated on the pressure gauge.
12. Pull the lever away from the valve. The pressure will start to descend slowly.
13. Note the pressure on the gauge when it stops falling. This is the minimum pressure valve setting and should be between 24,1 bar and 26,2 bar (350 lbf/in² and 380 lbf/in²).
14. If the pressure is outside these limits, the minimum pressure valve should be adjusted as described in Section G17.

Note The adjustment procedure should then be repeated and approached from a higher pressure, approximately 34,5 bar (500 lbf/in²).

15. The correct levelling pressure is when the pressure gauge reads between 0,34 bar and 0,69 bar (5 lbf/in² and 10 lbf/in²) **higher** than the minimum pressure valve setting. Ensure that the levelling valve is in its 'dead area', then push the torsion bar as far as possible into the spherical bearing before withdrawing it between 0,50 mm and 0,75 mm (0.020 in and 0.030 in).
16. Torque tighten the torsion bar 'U' bolt clamp nuts to between 5,2 Nm and 6,2 Nm (0,53 kgf m and 0,63 kgf m; 3.8 lbf ft and 4.6 lbf ft).

Ensure that the area of contact between the torsion bar clamp and the anti-roll is completely free of grease, oil, etc.

17. Depressurize the hydraulic systems and suspension struts.
18. Remove the pressure gauge.
19. Bleed the hydraulic systems as described in Section G5.
20. Top-up the reservoirs as described in Section G7.

Filter block assembly and restrictors

Introduction

A filter is incorporated into the No. 1 system high pressure line, positioned in a connector block assembly. The assembly is mounted on the underside of the car between the priority valve and levelling valve (see fig. G16-1). Its function being, to ensure that no foreign matter proceeds further into the system.

Two restrictors are situated into the No. 1 system high pressure line to the rear suspension struts.

On cars not fitted with an anti-lock braking system, a restrictor is also fitted into each brake line.

The function of a restrictor is to reduce the flow of hydraulic system mineral oil under certain operating conditions.

Filter – To renew (see fig. G16-1)

1. Depressurize the hydraulic system as described in Section G3.
2. Disconnect the No. 1 system hydraulic pipe from the adapter. Blank off the pipe. Remove the adapter and discard the washer. Carefully remove the filter components. Blank off the port in the connector block.
3. Obtain a new washer. Thoroughly clean all the components with petroleum ether (120/160°C). Dry with dry compressed air, not with any type of cloth.
4. Remove the blank from the connector block. Assemble the components, fitting the new washer to the adapter. Torque tighten the adapter to the figures given in Chapter P.
5. Remove the blank from the hydraulic pipe and connect the pipe to the adapter. Torque tighten the pipe nut to between 7 Nm and 9 Nm (0,7 kgf m and 0,9 kgf m; 5 lbf ft and 7 lbf ft).
6. Bleed the hydraulic system as described in Section G5.

Restrictor – To renew

1. Depressurize the hydraulic system(s) as described in Section G3.
2. Disconnect the hydraulic pipe from the restrictor and blank off the pipe.
3. Inspect the restrictor and renew if necessary.
4. Thoroughly clean all the components with petroleum ether (120/160°C). Dry with dry compressed air, not with any type of cloth.
5. Fit the washer and restrictor. Connect the hydraulic pipe. Torque tighten the restrictors to between 17 Nm and 20 Nm (1,7 kgf m and 2,0 kgf m; 12 lbf ft and 15 lbf ft). Torque tighten the pipe nuts to between 7 Nm and 9 Nm (0,7 kgf m and 0,9 kgf m; 5 lbf ft and 7 lbf ft).
6. Bleed the hydraulic system as described in Section G5.

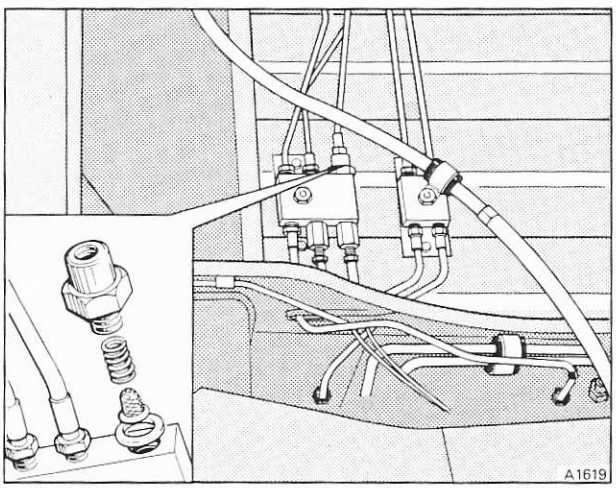

Fig. G16-1 Filter block assembly