

AIR RESERVOIRS AND FITTINGS

AIR RESERVOIRS

Description

The three reservoirs provide a stored volume of compressed air to operate the brakes, with reserve to permit several brake applications — even if the compressor is not functioning.

The sensing reservoir incorporates an automatic drain valve, safety valve, Schrader valve and a non-return valve fitted to the inlet port.

Each service reservoir incorporates a drain plug, test point and low air pressure warning switch. The switches activate a warning buzzer in the driver's cab if pressure falls below safe minimum.

The sensing reservoir is connected to the governor valve and it is the pressure in this reservoir which determines the cut-in and cut-out points of the governor valve — hence the term sensing reservoir. Air from the sensing reservoir is fed to the two service reservoirs and park brake system through the quadruple charge protection valve.

Maintenance

Check the operation of the automatic drain valve to ensure condensate is being exhausted from the sensing tank.

Release the air pressure from the reservoirs by repeatedly operating the foot AND hand control valves. Remove the drain plugs from the base of each service reservoir and drain out any condensate carried over from the sensing reservoir. Satisfactory draining is only accomplished by leaving the drain open after the residual air has escaped and until all drainage stops.

Apply Loctite 572 to the threads and refit the drain plugs. Recharge the air system and check that the plugs are not leaking.

Check the tightness of the reservoir mounting nuts and bolts.

Check the tightness of all the air connections on the reservoirs.

Pressure Test

Fully charge the air system and apply soap solution around all the air fittings on the reservoirs, including bosses, blanking plugs and drain plugs. Leakage at any point should not exceed a 25 mm (1 in) soap bubble in five seconds.

The accumulated leakage from more than one point can affect the efficiency of the air system, so the number of leak points must be reduced as much as possible.

To Remove

Disconnect the battery and drain the air system by operating the brake pedal.

Disconnect the electrical connections at the low air pressure warning switches.

Identify and disconnect the air lines at the reservoirs. Protect the air-lines and reservoir ports from the ingress of dirt.

Release the locknuts and securing bolts on the tank straps and remove the reservoirs.

To Dismantle

Remove the safety valve, Schrader valve, automatic drain valve and non-return valve from the sensing reservoir.

Remove the low pressure warning switch and drain plug from the service reservoirs.

Inspection and Overhaul

Examine all male and female threads for deterioration.

Examine the flanges on the threaded bosses for smooth surfaces.

Examine the interior and exterior surfaces of the reservoirs for corrosion. Wire brush external corrosion if it is not severe, apply metal primer and protective paint.

To Re-Assemble

Coat all male threads with Loctite 572 prior to assembly.

Refit all valves, connections and bridge pipes, maintaining the mounting angles noted on dismantling.

To Refit

Hold each reservoir in position and secure with the straps and nuts. Ensure that the locknuts are tightened securely.

Refit all air pipes and connections, maintaining their relative positions as noted on removal. Refit the valves and switches.

Reconnect the electrical connections at the low air pressure warning switch. Reconnect the battery.

Fully charge the air system, noting the operation of the low air pressure warning buzzer.

Check the operation of the safety valve and automatic drain valve.

Test all air connections on the reservoirs for air leaks.

NON-RETURN VALVE**Description**

A non-return valve is fitted to the inlet of the sensing reservoir. It allows compressed air to flow into the reservoir, but prevents air flowing out at the same point.

Operation

Air pressure at the inlet port greater than that already in the reservoir forces the check valve off its seat, against spring pressure, and air flows into the sensing reservoir.

Flow in the reverse direction is prevented by the valve being held on its seat by spring action and air pressure in the sensing reservoir.

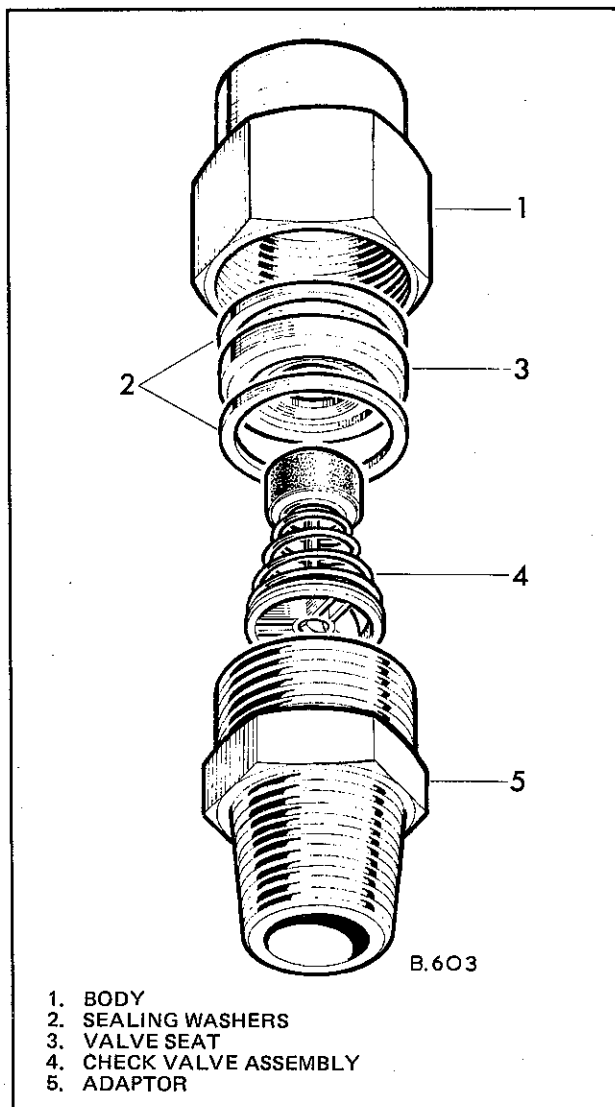


Fig. 1 Details of non-return valve

Maintenance

Check the tightness of the valve in the reservoir.

Check the tightness of the air connection to the valve.

At the time stated in the Maintenance Schedule, remove and dismantle the valve, renew the rubber check valve and copper sealing washers, refit and test for leaks.

Air Reservoirs and Fittings

Pressure Test

Fully charge the air system and stop the engine.

Clean the area around the air inlet to the non-return valve on the sensing reservoir, and disconnect the air line.

Coat the valve port with soap solution. Leakage must not exceed a 25 mm (1 in) soap bubble in five seconds.

Reconnect the air line, recharge the system and check the disturbed connection for leaks.

To Remove

Release the pressure in the air system by operating the foot control valve.

Clean the area around the valve. Disconnect the air line and unscrew the valve from the reservoir by applying a spanner to the smaller hexagon on the valve adaptor. Plug the air line and reservoir to prevent the entry of dirt.

To Dismantle

Hold the hexagon of the valve adaptor with a spanner or in a vice, unscrew the valve body and remove the sealing washers, valve seat and valve assembly.

Inspection and Overhaul

Examine the valve seat for wear and scoring.

Renew the check valve and sealing rings.

To Assemble

Lightly smear the check valve, valve seat and the bore of the valve body with engine oil.

Fit a sealing ring into the valve body, followed by the valve seat with the plain side towards the body, the second sealing ring and the check valve assembly.

Screw the adaptor into the body and tighten it securely.

To Refit

Apply Loctite 572 to the male thread of the adaptor that screws into the reservoir.

Screw the valve into the reservoir and tighten it securely.

Connect the air line. Fully charge the air system. Disconnect the air line and check the valve port and the thread of the adaptor for air leaks.

Reconnect the air line, recharge the air system and check the disturbed air line connection for leaks.

SAFETY VALVE**Description**

The safety valve is screwed into the sensing reservoir, and protects the compressed air system against excessive air pressure.

A steel ball is held on its seat by a spring in the valve body. A rubber dust cap is fitted over the valve body, retained by its nipple in the spring retaining washer.

Operation

If the air pressure in the reservoir rises above the safety valve setting 10.7-11.4 bar (155-165 lbf/in²) the ball valve will be lifted from its seat and air will escape through the exhaust port to atmosphere. When the pressure has been reduced the spring will force the ball valve back on its seat and stop the escape of air.

The safety valve will normally remain inoperative and only function if a fault in the unloader valve raises the air pressure above its normal working limit.

Maintenance

Remove the rubber dust cap and check that the exhaust port is not blocked. Check that the dust cap is in good condition and refit it.

At the time stated in the Maintenance Schedule, remove and dismantle the valve, examine the ball and spring, re-assemble with a new rubber dust cover, check the operating pressure and refit.

Operating Test

It is recommended that the safety valve is tested in a rig, either fitting the valve to a sensing tank on the rig or connecting the rig to the sensing tank inlet port on the vehicle.

It is not advisable to test the valve on the vehicle by by-passing the unloader valve. Apart from the difficulties of connecting suitable pipes there is a danger of overloading the compressor.

If the operating pressure is not within the limits given, drain the air system and fit a new valve.

Note: The valve is non-adjustable and must be renewed if found to be operating outside the stated pressure.

Pressure Test

Fully charge the air system.

Remove the rubber dust cover. Coat the exhaust port and base of the valve with soap solution.

Leakage must not exceed a 25 mm (1 in) soap bubble in five seconds. Refit the dust cover.

To Remove and Dismantle

Drain the air system by operating the brake pedal. Unscrew the valve from the sensing tank.

Remove the rubber cover.

Remove the circlip, withdraw the retaining washer, spring and ball.

Inspection and Overhaul

Examine the ball and seat for pitting and corrosion.

Examine the spring for pitting and corrosion.

Renew the rubber dust cap.

To Re-Assemble

If the body or ball valve has been renewed place the ball valve on its seat and tap it lightly, using a brass drift and hammer.

Insert the ball valve and spring into the body followed by the retaining washer. Depress the washer and spring and refit the circlip.

Fit the valve assembly to the test rig and check the pressure setting against that given in Data.

Refit the rubber dust cap.

To Refit

Screw the safety valve into the sensing tank, fully charge the air system and check the valve for air leaks.

Refit the rubber dust cap.

AUTOMATIC DRAIN VALVE**Description**

The automatic drain valve is screwed into a boss at the bottom of the air sensing reservoir. It ejects the water/oil condensate that is formed in the reservoir.

Operation

When the system is charging, the valve is held down by air pressure, opening the inlet port. Condensate from the reservoir passes through the filter to collect in the bottom cover. The outlet is sealed by the cone on the bottom of the valve.

When the system is not charging and the pressure in the reservoir is stable the air pressures each side of the valve are equal.

When any control valve is operated, provided a pressure drop of 0.14 bar (2 lbf/in²) occurs in the system, the pressure in the bottom cover acting on the lower face of the valve, being greater than that acting on the upper face of the valve, lifts the cone from the exhaust port allowing the air and condensate to exhaust from the unit. Then the higher pressure acting on the upper side of the valve closes the valve cone against the exhaust port allowing air and condensate to enter the bottom cover. The cycle is repeated each time the pressure drops.

Air Reservoirs and Fittings

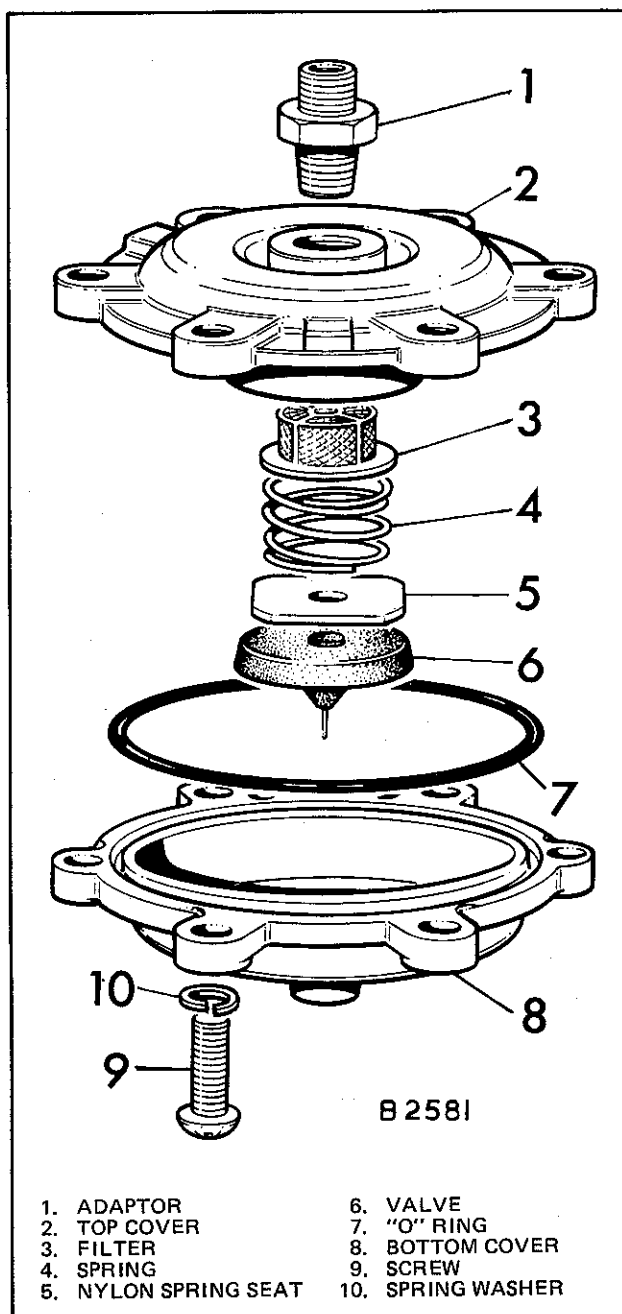


Fig. 2 Details of automatic drain valve

Maintenance

Check the valve for correct operation at the recommended service intervals. Fully charge the air system. Have an assistant to operate the foot-brake and check that the valve exhausts and ejects a small quantity of condensate.

If the valve does not exhaust, push up the small diameter rod in the exhaust port to check that the rubber valve is not sticky. If not satisfactory remove the valve from the reservoir for cleaning.

Remove the valve from the reservoir and clean the filter at the recommended service intervals.

At the time stated in the Maintenance Schedule, remove the valve, renew all rubber parts, refit and test for operation and leaks.

Air Leakage Test

Depressurise the air system.

Start the engine and check for leakage using soap solution at the valve exhaust port, body and adaptor whilst the tanks are being pumped up. No air leakage is permissible.

With the air system fully charged, stop the engine. Check for air leakage at the valve exhaust port. A constant air leakage is not permissible.

Note: If there is a constant leak elsewhere in the air system the automatic drain valve will exhaust at regular intervals, whenever the system pressure drops by 0.14 bar (2 lbf/in²).

To Remove

Depressurise the system by operating the brake pedal.

Unscrew the valve from the sensing tank.

To Dismantle

Remove six cross-head screws and spring washers securing the top and bottom covers.

Separate covers, extract "O" ring from bottom cover.

Remove valve, nylon spring seat, spring and filter from top cover.

Inspection and Overhaul

Clean the filter in paraffin and blow dry.

Thoroughly clean the valve components.

Examine the threads, inlet and outlet port seats for corrosion and damage.

Renew the rubber valve and "O" ring.

To Re-Assemble

Lightly smear the "O" ring, spring and valve with grease CDS 156 or Rocal E1A.

Fit a new "O" ring to the bottom cover.

Fit the filter, spring, nylon spring seat and valve into top cover.

Fit the bottom cover to top cover, ensuring that the valve rod locates in the exhaust port of the

bottom cover. Secure with six cross-head screws and spring washers.

To Refit

Apply Loctite 572 sealer to the adaptor threads and screw the valve into the sensing reservoir.

Recharge the air system. Check the operation of the valve. Test the valve for air leaks.