

Hand Control Valve (Air/Hyd.)

HAND CONTROL VALVE

Description

In the applied – ON – position the hand control valve exhausts air from the spring brake actuator so that the power springs are free to expand and apply the brakes.

In the – OFF – position the hand control valve supplies compressed air from the air reservoir to the spring brake actuator compressing the power springs and releasing the brakes.

The valve is mounted at the side of the driver's seat for easy hand operation, and the lever is spring loaded to the 'OFF' position. The lever knob is spring loaded to lock the lever in the 'ON' position and prevent accidental release of the brakes.

Operation

When the hand control lever is in the OFF position, the spring-loaded locking plunger is on the slide in the gate. The operating plunger and valve carrier are biased toward the base of the body by the action of the cam and operating plunger. The valve has delivered sufficient compressed air to just hold the springs in the actuator fully compressed. The compressed air acting on the top portion of the valve carrier has moved the valve carrier down the bore and closed the inlet seat.

When the driver wishes to apply the parking brakes, the lever is moved towards the PARK position, turning the cam back and allowing the plunger return spring to move the exhaust seat away from the inlet/exhaust valve exhausting some air from the actuator. If the lever is held stationary, the reduced air pressure on the valve carrier cannot overcome the thrust of the graduating spring and the valve carrier is moved up the bore closing the inlet/exhaust valve against the exhaust seat, shutting off further release of air.

If the lever is moved to PARK position, the air is totally exhausted from the spring brake chamber, allowing the springs in the actuator to apply the brakes. The lever is locked into this position by a locking device on the lever rod.

When the driver wishes to release the brakes, the locking plunger is moved out of the locked position and the lever held back against the thrust of the torsion spring. As the lever is moved towards OFF, the cam depresses the operating plunger causing the exhaust seat to close against the face of the inlet/exhaust valve. Further movement of the lever compresses the valve spring and moves the inlet/exhaust valve away from the inlet seat allowing compressed air to pass to the actuator. If the lever movement is halted, or moved very slowly, the air pressure, acting on the upper face of the valve carrier, overcomes the thrust of the graduating spring, moves the valve carrier down the bore, re-seating the inlet seat on the inlet/exhaust valve, shutting off the supply of compressed air. With the inlet and exhaust seats closed, the valve is in a balanced state. If the lever is moved further towards the OFF position and held stationary again, the operating plunger will re-open the inlet seat and the valve will admit compressed air until balance is reached at a lower pressure. Similarly, if the lever is partly moved back towards PARK to make a harder brake application, the plunger will lift, exhausting compressed air until balance is reached at a lower pressure. When the lever is at the limit of its travel at OFF, the valve remains in a balanced state, delivering only sufficient air pressure to hold the power springs in the actuator fully compressed.

Maintenance

Check the tightness of the mounting bolts.

Check that the union nuts of the air pipes are tight and not corroded.

Check that the action of the operating lever is smooth throughout its arc, with no signs of sticking and that there is a pronounced spring action of the lever towards the 'OFF' position.

Check that the lever is securely held in the 'ON' position by the locking plunger and spring.

Hand Control Valve (Air/Hyd.)**Operating Test**

Chock the wheels and fully charge the air system.

Note. The first 15° (approximately 25mm or 1 in) of lever movement from the 'ON' position should not produce any action of the valve.

Move the lever between full 'ON' and full 'OFF' positions several times, and observe that the brake actuator responds rapidly in accordance with lever movement.

Move the lever from the 'OFF' to the 'ON' position, stopping at several intermediate positions. Observe that each time the lever is moved towards 'ON' a volume of compressed air is exhausted from the hand control valve and also the quick release valve in the system. Exhaust must cease when the lever is held stationary.

If the valve does not react in this way it must be serviced, as a sluggish valve gives poor brake response and will not 'recover' air pressure correctly if there is a slight leak in the system. This could cause brake drag.

Air Leakage Test

The valve cannot be satisfactorily tested whilst mounted on the vehicle. If a leakage is suspected, the valve should be removed and tested in the following manner using a shop air line fitted with some form of adjustable reducer valve.

Place the lever in the PARK position and plug the delivery port (upper). Connect a shop air line of 7.0 bar (100 lb/in²) to the inlet port. Brush soap solution on the exhaust hole in the bottom cover and observe any leakage. Leakage in excess of a 2cm (0.8 in) soap bubble in 5 seconds is not permissible. Turn off the shop air line supply and remove the air line and plug, and place the lever in the OFF position. Screw the plug into the inlet port (lower) and connect the shop air line into the delivery port (upper). Reduce the shop air line pressure to 3.5 bar (50 lb/in²). Re-coat the exhaust hole with soap solution and turn on the air supply. Leakage in excess of a 2cm (0.8 in) soap bubble in 5 seconds is not permissible.

To Remove

Depressurise the system by operating the brake pedal.

Remove three cross-head screws securing the two piece moulding.

Remove moulding.

Note the relative positions of the air connections and disconnect the air lines.

Remove the two set screws securing the valve to the mounting bracket.

Remove the valve and mounting joint.

To Dismantle

Remove the unions and mounting joint.

Match mark the body and gate to assist correct assembly.

Remove the screws and separate the gate, gasket and body.

Identify the slots in the body into which the lugs of the operating plunger are fitted, and remove the plunger and spring.

Remove the screws from the bottom of the body and take off the cover plate, any shims that are fitted, the spring seat and the graduating spring.

Use a soft tool inserted in the top of the body to push the valve carrier out of the bottom.

Remove the circlip from the valve carrier and take out the inlet seat, spring seat, inlet/exhaust valve, valve spring and seal retaining plate.

If the gate and lever assembly is to be dismantled mark the underside of the gate to indicate where the legs of the spring abut the gate.

Move the lever to OFF and mark the cam, through the slot in the gate, to indicate to which slot in the cam the bridge piece of the spring is located. Also mark the gate and pivot pin with a scribed line across the face of the pin to assist correct re-alignment.

Mark the side of the gate that the lever abuts when the tension spring is allowed to move the lever to its stop.

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Use a pin punch 2mm ($\frac{5}{64}$ in.) diameter x 75mm (3 in.) long inserted into the hole in the pivot pin centre to drive out the tension pin.

Insert the tension pin or pin punch into one of the holes in the underside of the cam and take up the spring tension. Pull out the lever taking care that none of the parts of the locking mechanism is lost.

Release the tension on the spring, press out the pivot pin and separate the cam and spring.

Remove and discard all sealing rings.

Inspection and Overhaul

Clean all parts with solvent and blow dry with compressed air.

Examine the sliding surfaces of the valve carrier and operating plunger for wear.

Check the faces of the cam and operating plunger for wear.

Check that the locking mechanism of the operating lever is not worn or tapered, particularly where it enters the gate.

Check the valve body for cracks and damaged threads.

Check the springs for corrosion and distortion.

Renew all sealing rings.

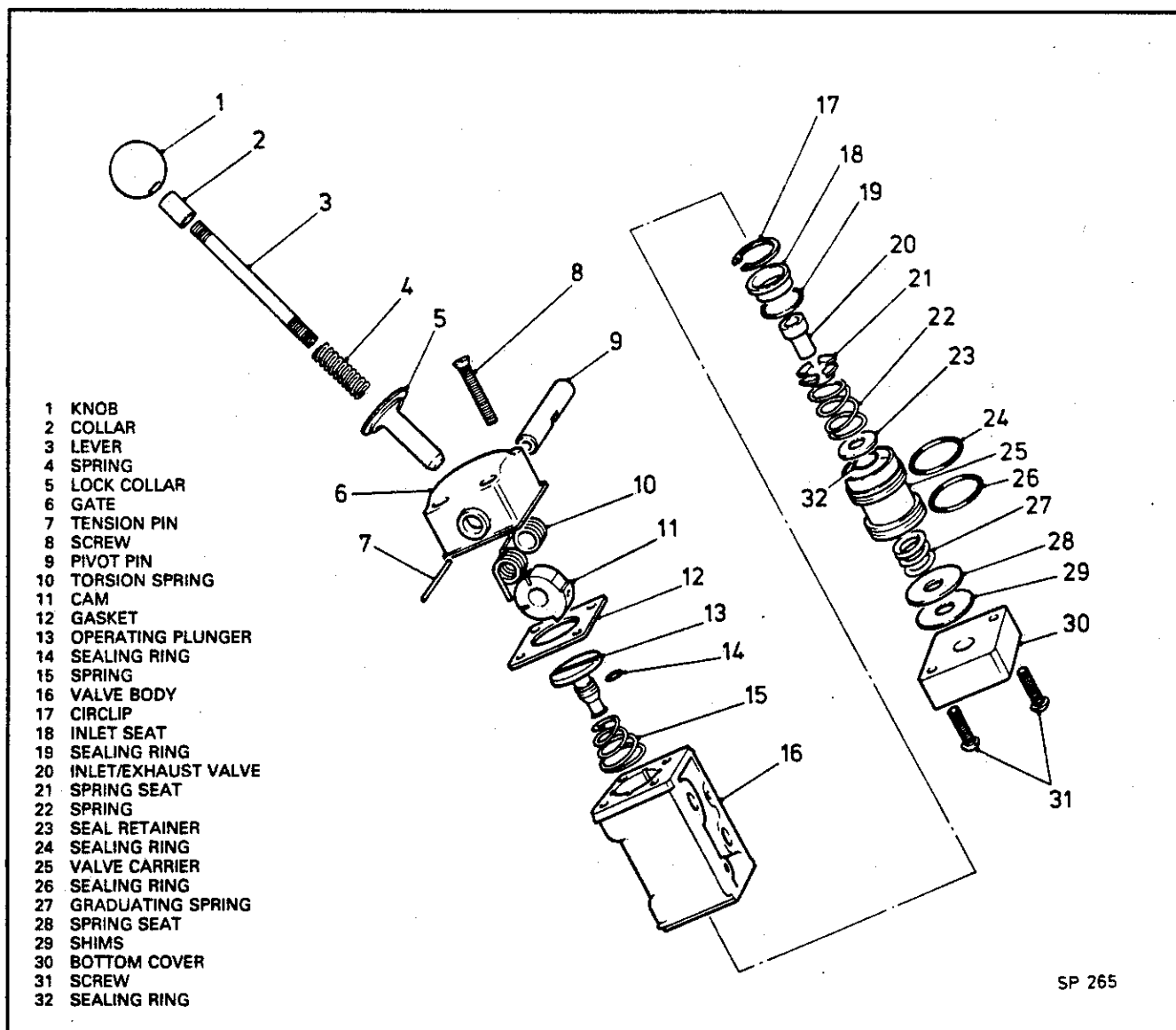


Fig. 1 Exploded view of hand control valve

Hand Control Valve (Air/Hyd.)**To Re-assemble**

All sliding and load bearing surfaces, sealing rings and springs must be coated with grease (CDS156) supplied in the repair kit, or Rocal E1A.

If necessary re-assemble the lever.

Fit the torsion spring in the marked position in the gate.

Fit the cam so that the marked slot engages the bridge of the spring and the nose of the cam is facing outwards.

Insert the pivot pin, aligning marks on pin and body.

Use the tension pin to turn the cam against spring tension so that the lever complete with locking part, can be pressed in.

Turn the lever until the hole aligns with that in the pivot pin and insert the tension pin until its end is flush with the pivot pin.

Fit the inlet/exhaust valve stem into the spring seat with the head of the valve in the seat recess. Place the valve spring on the seal retaining plate and fit the valve stem into the spring so that the lugs on the spring seat contact the spring.

Fit a new sealing ring on the outer diameter of the inlet seat and place the seat on the rubber face of the inlet/exhaust valve, with the sealing ring towards the valve. Press the parts into the valve carrier and fit the circlip.

Fit new sealing rings to the valve carrier. Insert the valve carrier into the base of the body, with the inlet/exhaust valve leading. Press the valve carrier fully into the body and position the body with the base uppermost.

Place the graduating spring (blue) in the recess, followed by the spring seat and shims. Fit the bottom cover, fit and tighten the screws. Turn the body upright.

Place the plunger return spring in the body, small coils to the top. Fit a new sealing ring to the stem of the operating plunger and fit the plunger into the body so that the lugs enter the slots marked on dismantling.

Fit the joint and top cover, aligning the marks made on dismantling. Fit and tighten the screws.

Refit the unions and mounting joint.

Testing and Adjusting Overhauled Valve

Connect the inlet port to an air supply of 8.6 bar (125 lb/in²).

Screw an accurate pressure gauge into the delivery port.

Move the lever to "OFF", the gauge reading should be within 0.3 bar (5 lb/in²) of the valve operating pressure of 6.5 bar (95 lb/in²).

If the pressure is incorrect, remove the bottom cover and remove or add shims to obtain the correct pressure setting.

If the pressure is considerably wrong, an incorrect colour coded graduating spring could be fitted.

After adjustment carry out an Air Leakage Test.

To Refit

Position the valve complete with mounting joint on the cab mounting bracket and secure with two setscrews.

Connect the air lines as noted on removal.

Fully charge the air system and check the valve for correct operation.

Refit the two piece moulding and secure with three cross-head screws.