

## Bendix® R-6™ Relay Valve

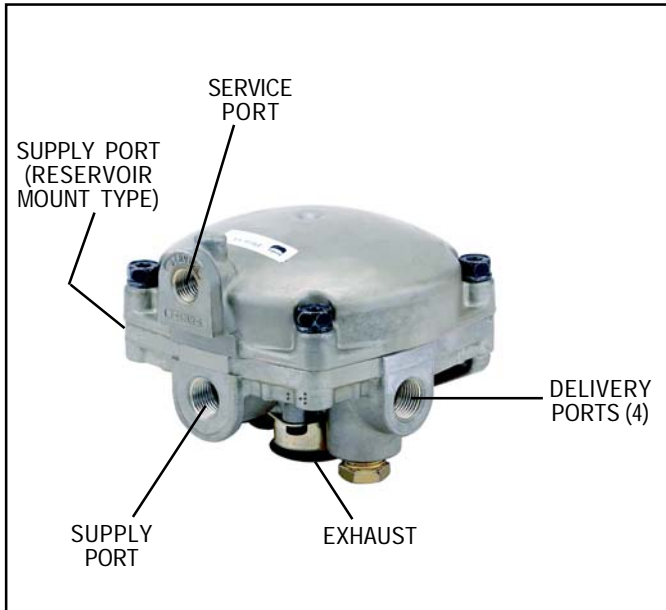


FIGURE 1

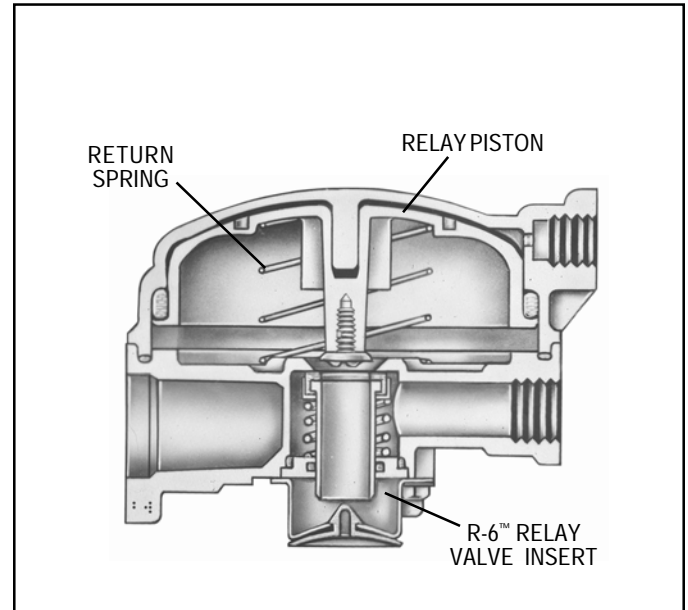


FIGURE 2

### DESCRIPTION

The relay valve in an air brake system functions as a relay station to speed up the application and release of the brakes. The valve is normally mounted at the rear of the vehicle in proximity to the chamber it serves. The valve operates as a remote controlled brake valve that delivers or releases air to the chamber in response to the control air delivered to it from the foot brake valve or other source. The R-6™ relay valve is a piston operated valve. For ease of servicing, an “insert” or “cartridge” type inlet/exhaust valve is employed. This feature permits service of the inlet/exhaust valve without line removal. The R-6™ relay valve may be mounted directly to or remotely from the reservoir which provides its supply pressure. Standard porting consists of one (1) service port and four (4) delivery ports. There are two (2) supply ports in the reservoir mounted valve and one (1) supply port in the remote mount valve.

### OPERATION

#### APPLYING

Air pressure delivered to the service port enters the small cavity above the piston and moves the piston down. The exhaust seat moves down with the piston and seats on the inner or exhaust portion of the inlet/exhaust valve, sealing off the exhaust passage. At the same time, the outer or inlet portion of the inlet/exhaust valve moves off its seat, permitting supply air to flow from the reservoir, past the open inlet valve and into the chambers.

#### BALANCED

The air pressure being delivered by the open inlet valve also is effective on the bottom area of the relay piston. When air pressure beneath the piston equals the service air pressure above, the piston lifts slightly and the inlet spring returns the inlet valve to its seat. The exhaust remains closed as the service line pressure balances the delivery pressure. **(NOTE:** Some valves are equipped with a piston return spring which will assist the lifting of the piston). As delivered air pressure is changed the valve reacts instantly to the change holding the brake application at that level.

## RELEASING

When air pressure is released from the service port and air pressure in the cavity above the relay piston is exhausted, air pressure beneath piston lifts the relay piston and the exhaust seat moves away from the exhaust valve, opening the exhaust passage. With the exhaust passage open, the air pressure in the chambers is then permitted to exhaust through the exhaust port, releasing the brakes.

## PREVENTIVE MAINTENANCE

**Important:** Review the Bendix Warranty Policy before performing any intrusive maintenance procedures. A warranty may be voided if intrusive maintenance is performed during the warranty period.

No two vehicles operate under identical conditions, as a result, maintenance intervals may vary. Experience is a valuable guide in determining the best maintenance interval for air brake system components. At a minimum, the valve should be inspected every 6 months or 1500 operating hours, whichever comes first, for proper operation. Should the valve not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

## OPERATING AND LEAKAGE TEST

1. Fully charge air brake system and adjust brakes.
2. Make several brake applications and check for prompt application and release at all appropriate wheels.
3. With brake valve in released position, coat the exhaust port with soap solution and check for inlet valve and valve guide o-ring leakage; 1" bubble in 5 seconds leakage permitted.

4. Make and hold a brake valve application; coat the exhaust port with soap solution and check for leakage; 1" bubble in 3 seconds leakage permitted.

If leakage is detected, replacing the inlet/exhaust valve may correct the problem. If leakage still occurs, leakage may be caused by relay piston o-ring or exhaust valve seat.

5. Make and hold a brake valve application; coat outside of valve body in area where cover joins the body for cover o-ring leakage. No leakage permitted. If the valve does not function as described above, or if leakage is excessive, it is recommended that the valve be replaced with a new or remanufactured unit, or repaired with genuine Bendix parts available at Bendix outlets.

## REMOVING AND INSTALLING

### REMOVING

Block and hold vehicle by means other than air brakes.

Drain air brake system reservoirs.

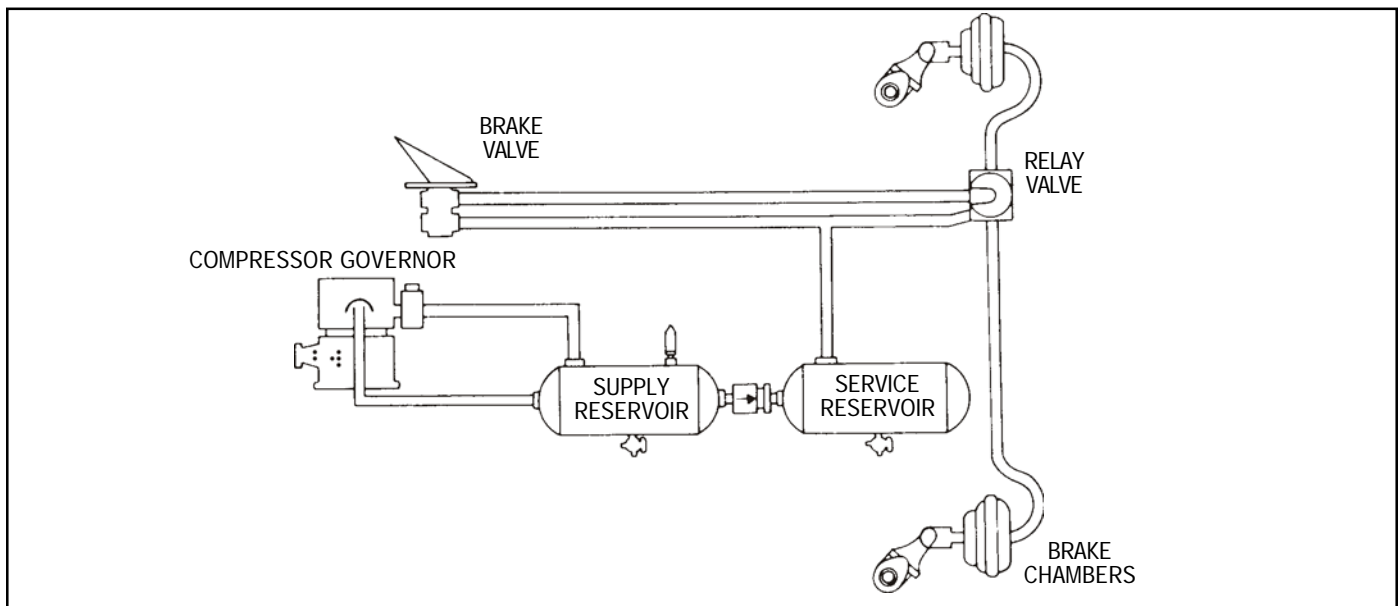
If entire valve is to be removed, identify air lines to facilitate installation.

Disconnect air lines from valve\*.

Remove mounting bolts, then valve.

\*It is generally not necessary to remove entire valve to service the inlet/exhaust valve. The inlet/exhaust valve insert can be removed by removing the two exhaust cover cap screws and cover. Insert then may be pulled out.

**CAUTION:** DRAIN RESERVOIRS BEFORE REMOVING INSERT. Use care so as not to damage inlet/exhaust valve or guide o-ring.



TYPICAL RELAY VALVE PIPING SINGLE CIRCUIT SYSTEM

## INSTALLING

Clean air lines connecting to valve.

Inspect all lines and/or hoses for damage and replace as necessary.

Install valve and tighten mounting bolts.

Connect air lines to valve (Plug any unused ports).

Test valve as outlined in "Operating and Leakage Tests."

## DISASSEMBLY

NOTE: Prior to disassembly, mark location of cover to body to facilitate assembly.

1. Remove cover cap screws (1). Remove cover (2) with relay piston (4) and spring (6) (if so equipped).
2. Remove relay piston (4) from cover.
3. Remove piston o-ring (3) from piston (4) and cover seal o-ring from body.
4. Remove exhaust cover cap screws, (19) exhaust cover, and remove inlet/exhaust valve insert (8) from body(7).
5. Remove exhaust seat (5) from relay piston (4) and exhaust check valve(18). (Remove only if new parts are to be installed).

## INLET/EXHAUST VALVE INSERT DISASSEMBLY

NOTE: If complete inlet/exhaust valve is replaced, disregard steps 6 to 9.

6. Depress and hold valve guide down against valve spring tension and remove retainer (16).
7. Remove valve insert seal o-ring (13), valve guide (14), spring (12), and valve retainer (11).
8. Remove the inlet/exhaust valve (9) from its body (10).
9. Remove inner o-ring (15) from valve guide (14).

## CLEANING AND INSPECTION

Wash all metal parts in mineral spirits; wipe all rubber parts dry. Inspect all parts for signs of wear and/or deterioration. Inspect springs for cracks, distortion or corrosion.

Inspect inlet seat and exhaust seat for nicks and burrs and replace as necessary. It is recommended that all rubber parts be replaced, and that any part showing signs of wear or deterioration be replaced.

## ASSEMBLY

NOTE: All torques specified in this manual are **assembly** torques and can be expected to fall off after assembly. **Do not retorque** after initial assembly torques fall. (For assembly, hand wrenches are recommended)

1. Prior to assembly, lightly lubricate the relay piston guide post, o-rings, cover bore and inlet body with Dow Corning Silicone 55-M Pneumatic grease (Bendix Pc. No. 291126).

## INLET/EXHAUST VALVE ASSEMBLY

NOTE: If new inlet/exhaust valve assembly insert is used, disregard Steps 2 to 6.

2. Install inlet/exhaust valve (9) over valve body (10), smooth surface up.
3. Position valve retainer (11) over inlet valve body (10) and valve.
4. Install inlet valve spring (12) over inlet body (10) and install o-ring (15) in the inner groove in the valve guide (14).
5. Depress and hold guide down against inlet spring and install retainer ring (16) (A 9/16" twelve point socket can be used to push the retainer ring down until it snaps in the groove in the inlet valve body).
6. Install valve insert seat o-ring (13).

## COMPLETE VALVE ASSEMBLY

7. Install insert (8) in valve body (7), install exhaust cover (17) and secure with 10-24 screws (19) torque to approximately **20-30** inch pounds.
8. Install exhaust check diaphragm (18) into exhaust cover (17).
9. Install cover seal o-ring.
10. Install relay piston o-ring (3) on relay piston (4), then position relay piston in cover.
11. If valve utilizes relay piston spring (6) position spring over guide in body.
12. Position cover/relay piston assembly in correct relative position with body; if equipped with piston return spring, make sure exhaust seat is centered inside spring.
13. Install cover cap screws. Torque to approximately **80-120** inch pounds.
14. Test valve as outlined in "Operating and leakage Tests" section.

**WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:**

**When working on or around a vehicle, the following general precautions should be observed at all times.**

1. **Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.**

2. Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.
3. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
4. If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning **ANY** work on the vehicle. If the vehicle is equipped with an AD-IS™ air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.
5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.

