AlliedSignal Bendix

Service Data

SD-03-1068

R-12DC RELAY VALVE WITH BIASED DOUBLE CHECK

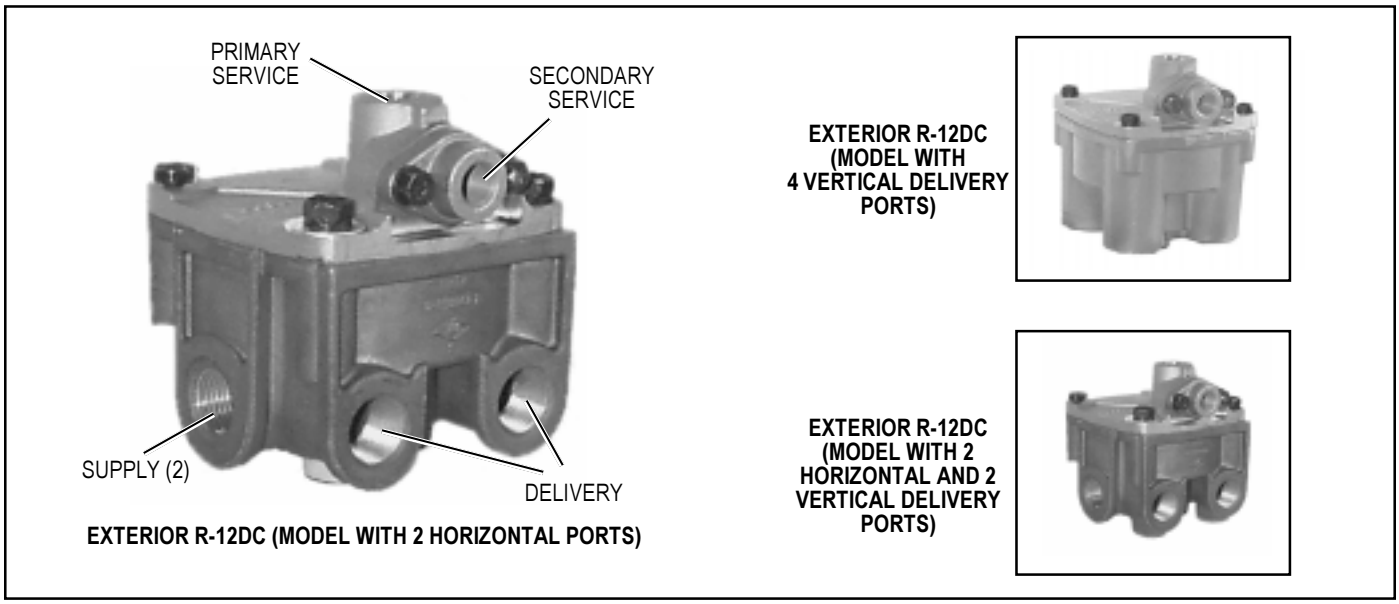


*FIGURE 1 - **EXTERIOR VIEWS.***

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 chambers it serves. The valve operates as a remote controlled brake valve that delivers or releases air to the chambers in response to the control air delivered to it from the foot brake valve.

The R-12DC Relay Valves are designed for either reservoir or frame mounting. (See Figure 1). For ease of servicing, the inlet/exhaust valve can be replaced without the need for line removal.

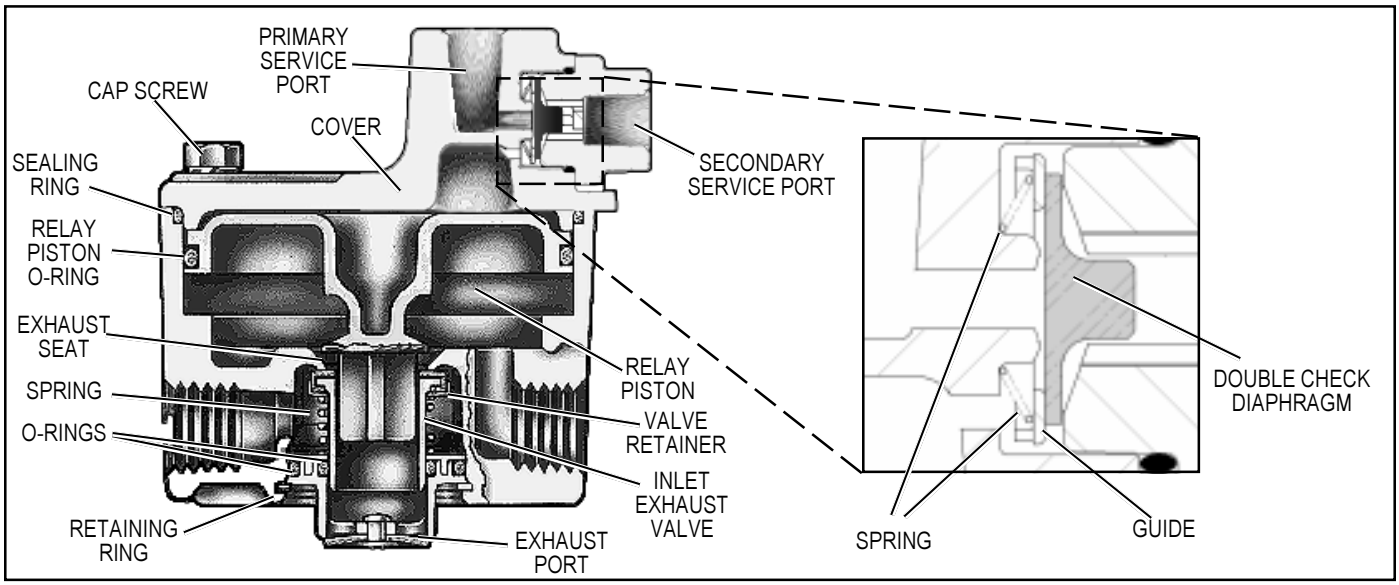


*FIGURE 2 - **R-12DC SECTIONAL VIEW***

OPERATION

APPLICATION

Under normal conditions, the internal biased double check valve assures that the primary service signal controls the valve. Air pressure delivered to the primary 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 service brake chambers. In the event of a loss of the primary service line, (see Figure 4) the double check valve mechanism in the cover of the R-12DC will move, shutting off the primary service line, and instead allow the secondary service line to apply the air pressure needed to operate the valve.

Note: Secondary service line may leak out of the primary service at control pressures up to 20 psi when the primary signal is not present.

BALANCE

The air pressure being delivered by the open inlet valve also is effective on the bottom area of the relay piston.

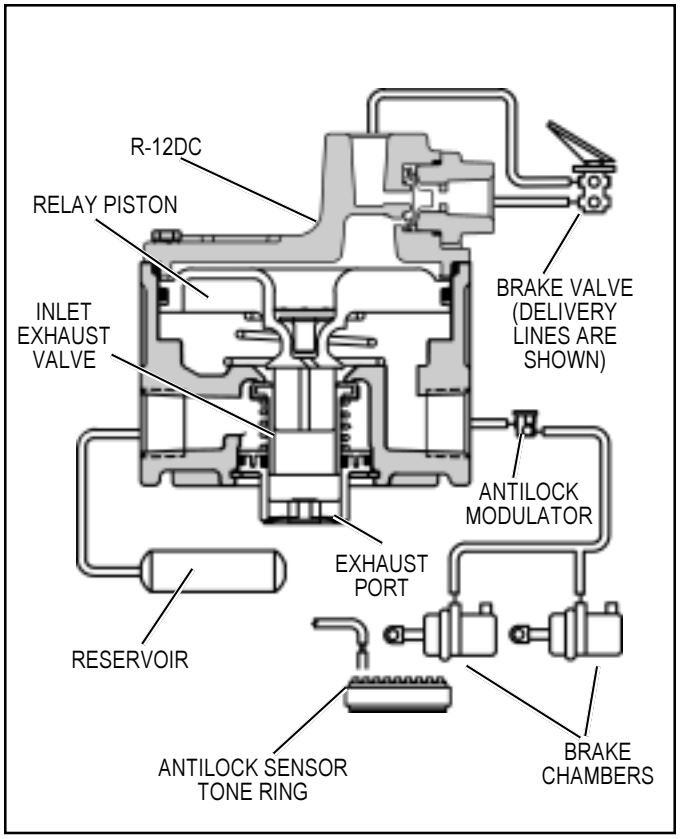


FIGURE 3 - ***R-12DC SECTIONAL VIEW WITH TYPICAL SYSTEM COMPONENTS***

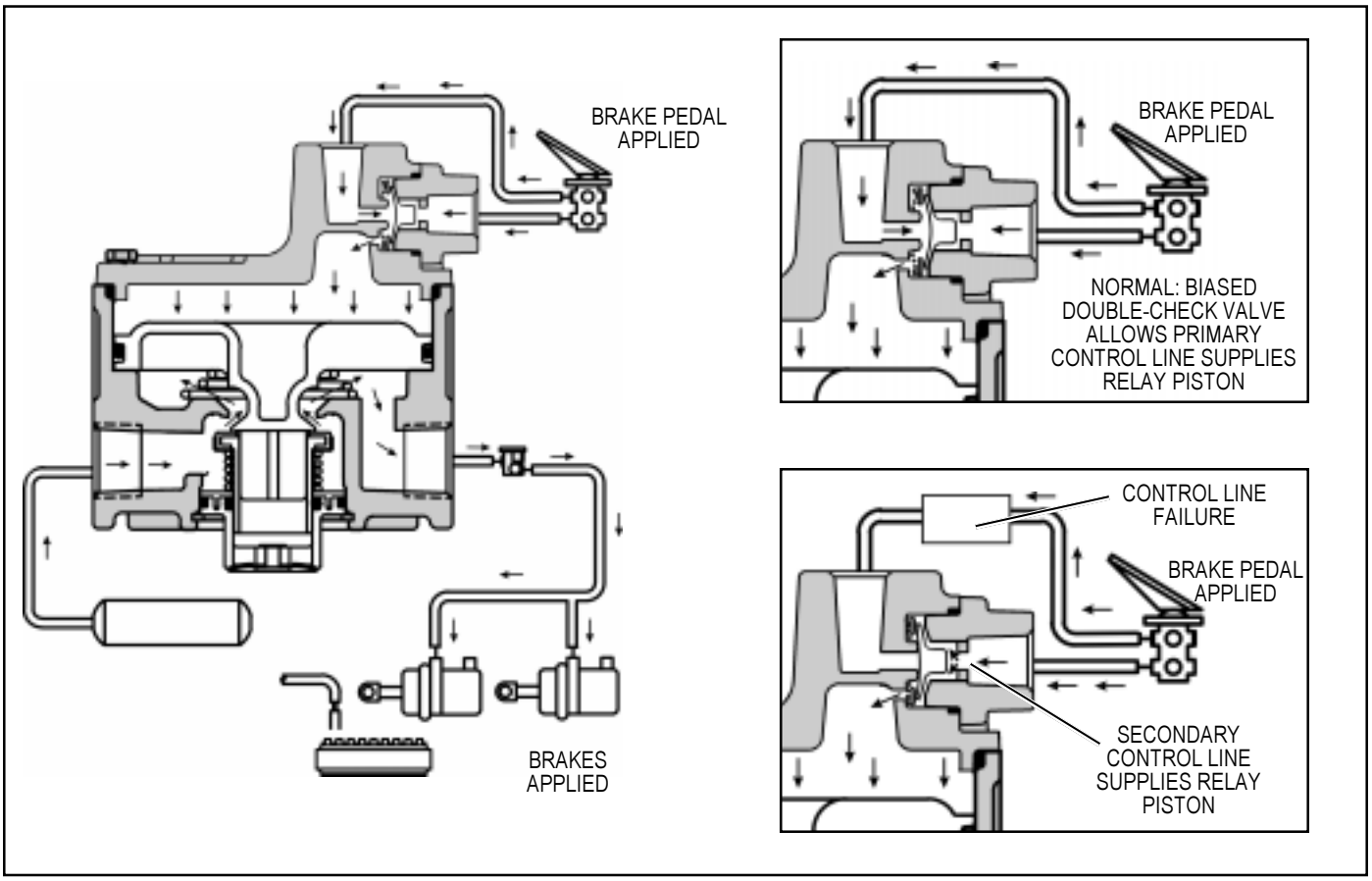


FIGURE 4 - ***R-12DC APPLIED POSITION (SHOWING BIASED DOUBLE CHECK OPERATIONAL VIEWS)***

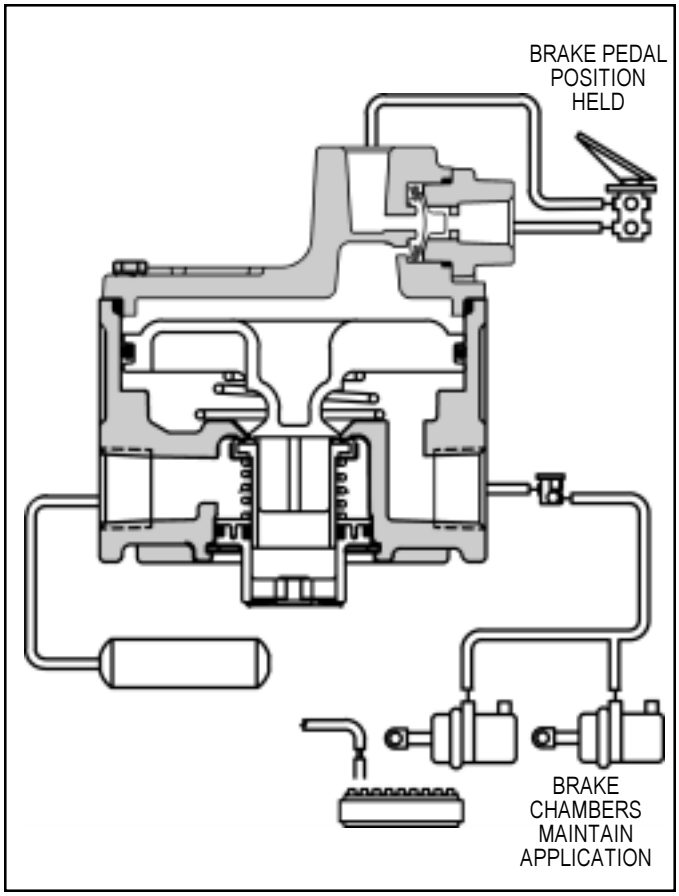


*FIGURE 5 - **R-12DC BALANCE POSITION***

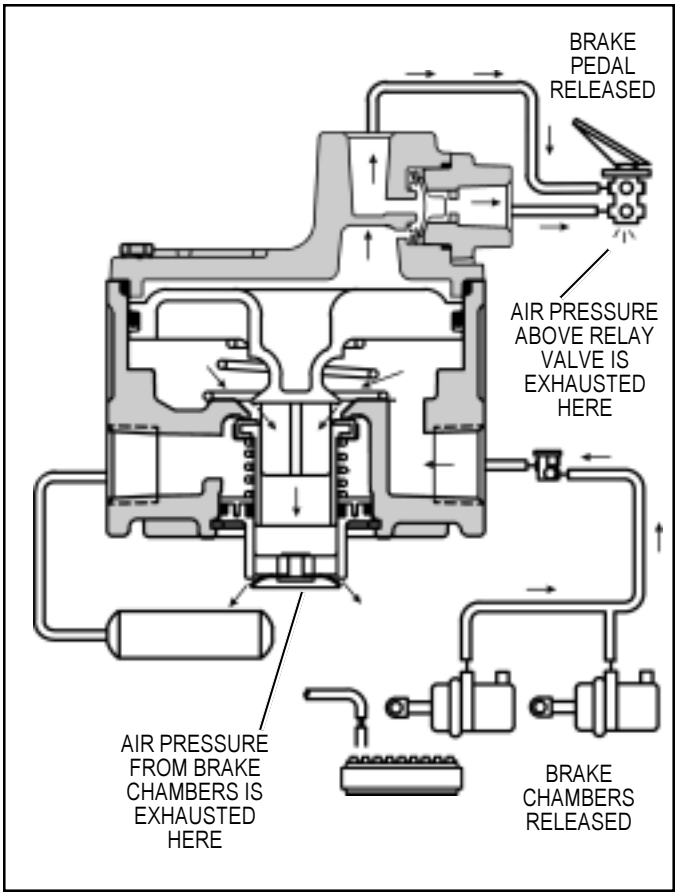


*FIGURE 6 - **R-12DC EXHAUST POSITION***

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. As delivered air pressure is changed, the valve reacts instantly to the change, holding the brake application at that level.

EXHAUST OR RELEASE

When air pressure is released from the service port and air pressure in the cavity above the relay piston is exhausted through the brake valve. At the same time, air pressure beneath the 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 brake chambers is then permitted to exhaust through the exhaust port, releasing the brakes.

PREVENTIVE MAINTENANCE

Important: Review the warranty policy before performing any intrusive maintenance procedures. An extended warranty may be voided if intrusive maintenance is performed during this period.

Because no two vehicles operate under identical conditions, maintenance and maintenance intervals will vary. Experience is a valuable guide in determining the best maintenance interval for any one particular operation.

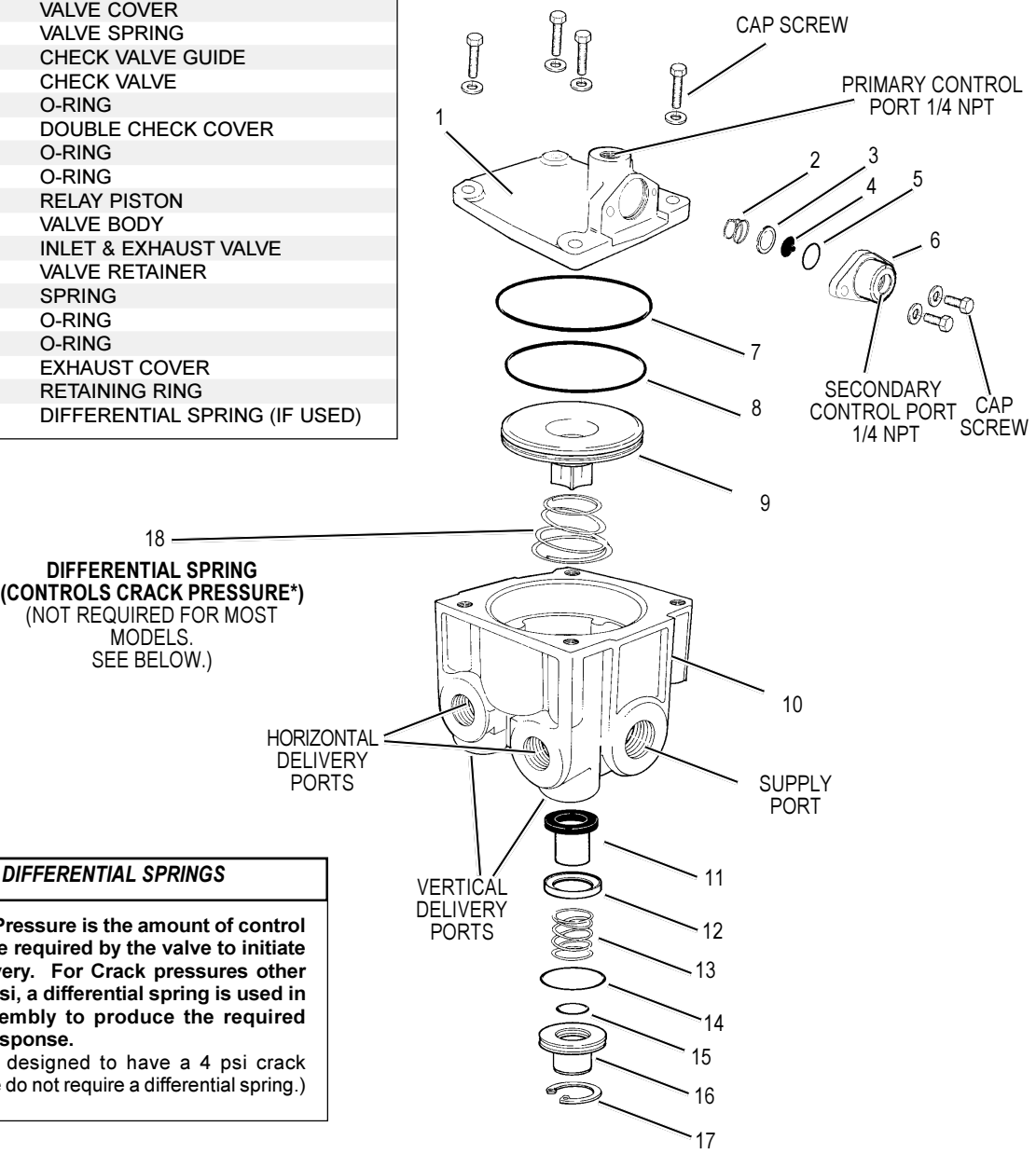
1. Every three months or 25,000 miles or 900 operating hours check for proper operation.
2. Every twelve months or 100,000 miles or 3600 operating hours: disassemble valve, clean parts with mineral spirits. Replace all rubber parts and any worn or damaged part. Check for proper operation before placing vehicle in service.

REMOVAL AND INSTALLATION

REMOVAL

1. Block and hold vehicle by means other than air brakes.
2. Drain air brake system reservoirs.
3. If entire valve is to be removed, identify air lines to facilitate installation. Prior to disassembly, remove as much contamination as possible from the exterior of the device taking care to keep all contamination from entering the open ports.
4. Disconnect air lines from valve.*
5. Remove valve from reservoir or if remotely mounted, remove mounting bolts and then valve.

Key No.	DESCRIPTION
1	VALVE COVER
2	VALVE SPRING
3	CHECK VALVE GUIDE
4	CHECK VALVE
5	O-RING
6	DOUBLE CHECK COVER
7	O-RING
8	O-RING
9	RELAY PISTON
10	VALVE BODY
11	INLET & EXHAUST VALVE
12	VALVE RETAINER
13	SPRING
14	O-RING
15	O-RING
16	EXHAUST COVER
17	RETAINING RING
18	DIFFERENTIAL SPRING (IF USED)



DIFFERENTIAL SPRINGS

***Crack Pressure is the amount of control pressure required by the valve to initiate air delivery. For Crack pressures other than 4 psi, a differential spring is used in the assembly to produce the required valve response.**
(Models designed to have a 4 psi crack pressure do not require a differential spring.)

*FIGURE 7 - **R-12DC EXPLODED VIEW***

*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 snap ring, exhaust cover assembly and then inlet/exhaust valve.

Caution: Drain all reservoirs before attempting to remove the inlet exhaust valve.

DISASSEMBLY

Note: Prior to disassembly, mark the location of the mounting bracket to the cover and the cover to the body.

CAUTION: The valve body may be lightly clamped in a bench vise during disassembly, however, over-clamping will result in damage to the valve and result in leakage and/or malfunction. If a vise is to be used, position the valve so that the jaws bear on the supply ports on opposing sides of the valve's body.

1. Remove the four cap screws securing the mounting bracket and cover to the body. Retain the cap screws for reuse.
2. Discard the mounting bracket.
3. Remove and discard sealing ring (7) from the cover (1).

a. Remove the 2 torx screws securing the double check cover (6) to the cover (1).

b. Remove the double check cover (6) from cover (1) and remove and discard spring (2), guide (3), double check diaphragm (4), and o-ring (5).

4. Remove and discard sealing ring (7) from the cover (1), and mounting bracket.
5. Remove piston (9) from the body (10) and retain for reuse.
6. Remove and discard o-ring (8) from piston (9).
7. Depress and hold the exhaust cover assembly (16) and remove and discard retaining ring (17) from the valve body (10).
8. Slowly release the holding force on the exhaust cover assembly (16) to relax the spring.
9. Remove and discard the following parts:
   a. Exhaust cover assembly (16)
   b. O-rings (14 & 15)
   c. Spring (13)
   d. Inlet exhaust valve (11)
   e. Retainer (12)

CLEANING AND INSPECTION

1. Wash all metal parts in mineral spirits and dry them thoroughly.

   (**Note:** When servicing the R-12DC, all springs and all rubber parts should be replaced.)
2. Inspect all metal parts for deterioration and wear, as evidenced by scratches, scoring and corrosion.
3. Inspect the exhaust valve seat on the relay piston for nicks and scratches which could cause excessive leakage.
4. Inspect the inlet valve seat in the body for scratches and nicks, which could cause excessive leakage.
5. Inspect the check valve seat in the R-12DC cover and make sure all internal air passages in this area are open and clean and free of nicks and scratches.
6. Replace all parts not considered serviceable during these inspections and all springs and rubber parts. Use only genuine Bendix replacement parts, available from any authorized Bendix parts outlet.

ASSEMBLY

Note: All torque specified in this manual are assembly torque and can be expected to fall off slightly after assembly. **Do not re-torque** after initial assembly torque fall. For assembly, hand wrenches are recommended.

Prior to assembly, lubricate all o-rings, o-ring bores and any sliding surface with a silicone lubricant equivalent to Dow Corning #10.

Wash all remaining parts in mineral spirits and dry thoroughly. Using the lubricant provided in this kit, lightly lubricate all o-rings, o-ring grooves, body bores any sliding surfaces.

1. Install o-rings (14 & 15) in the exhaust cover assembly (16).
2. Install o-ring (8) on piston (9).
3. Install sealing ring (7) on cover (1)
4. Install retainer (12) on inlet exhaust valve (11) and insert both in the body (10).
5. Install spring (13) in the body (10).
6. Install exhaust cover assembly (16) in the body (10). Depress and hold the exhaust cover assembly in the body.
7. Install retaining ring (17) in the body (10). Make certain the retaining ring is completely seated in the groove in the body.
8. Install piston (9) in body (10).
9. Install o-ring (5) on double check cover (6), install spring (2), guide (3) and double check diaphragm (4) in cover (1). Install cover (1) and torque torx head screws to 80-100 in. lbs.
10. Referring to the marks made during disassembly, install cover (1)
11. Install the mounting bracket (not shown) on the cover (1).
12. Install the four cap screws in the cover (1) and torque to 80-100 inch pounds
13. Test the valve as outlined in the *Operational and Leakage Test* section before returning the valve to service.

INSTALLATION

1. Clean air lines.
2. Inspect all lines and/or hoses for damage and replace as necessary.
3. Install valve and tighten mounting bolts.
4. Connect air lines to valve (plug any unused ports).
5. Test valve as outlined in *Operational and Leakage Tests*.

OPERATIONAL AND LEAKAGE TEST

1. Chock the wheels, fully charge air brake system and adjust the brakes.
2. Make several brake applications and check for prompt application and release at each wheel.

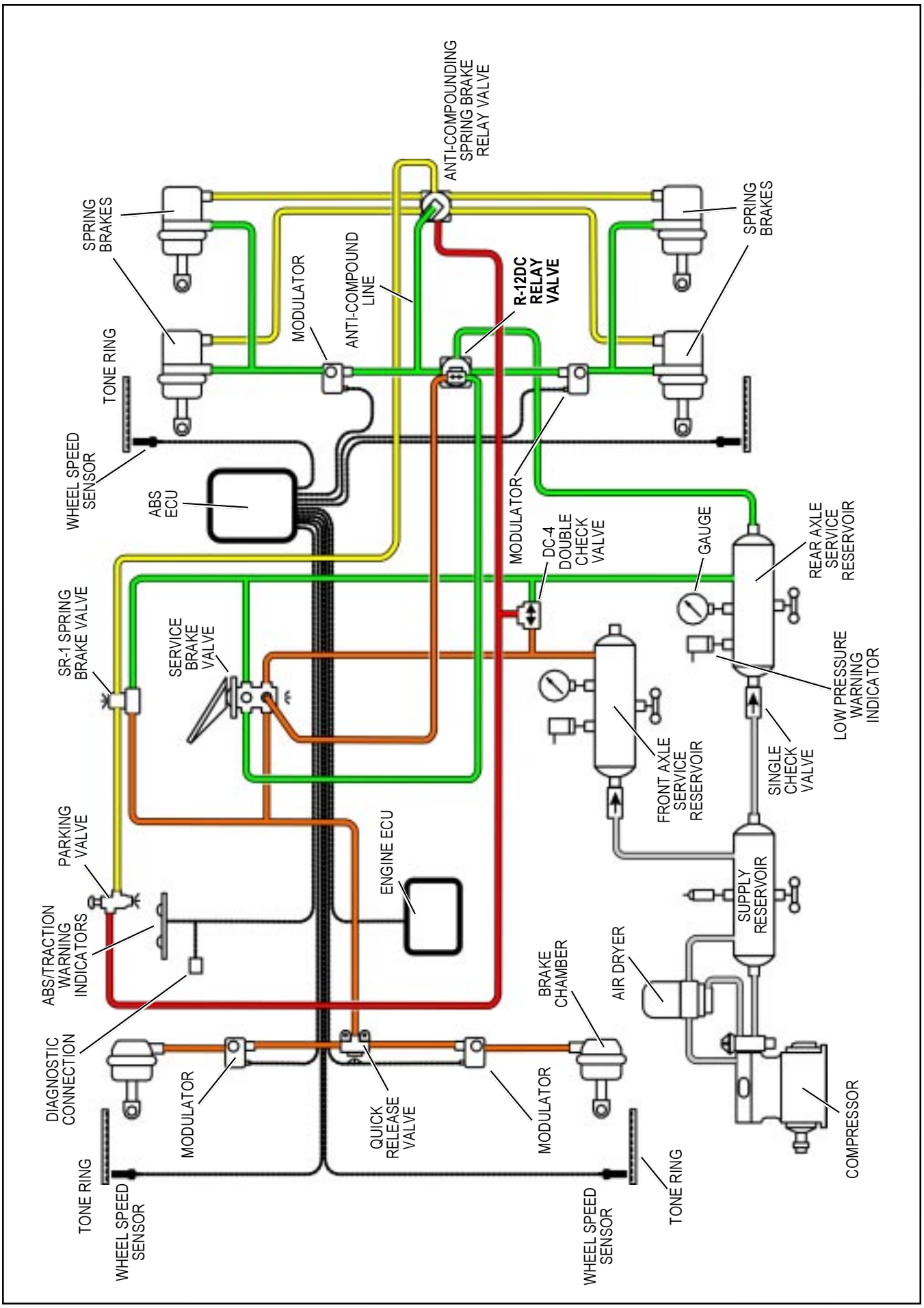


*FIGURE 8 - **TYPICAL PIPING SCHEMATIC***

3. Check for inlet valve and o-ring leakage. Make this check with the service brakes released. Coat the exhaust port and the area around the retaining ring with a soap solution; a 1 inch bubble in 3 seconds leakage is permitted.
4. Check for exhaust valve leakage. Make this check with the service brakes fully applied. Coat the outside of the valve where the cover joins the body to check for seal ring leakage; no leakage is permitted.

If the valves do not function as described above, or if leakage is excessive, it is recommended that the valves be replaced with new or remanufactured units or repaired with genuine Bendix parts, available at any authorized Bendix parts outlet.

IMPORTANT! PLEASE READ

When working on or around a vehicle, the following general precautions should be observed:

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels.
2. Stop the engine when working around the vehicle.
3. If the vehicle is equipped with air brakes, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle.
4. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that removes all electrical power from the vehicle.
5. When working in the engine compartment the engine should be shut off. 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.
6. 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.
7. Never exceed recommended pressures and always wear safety glasses.
8. 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.
9. Use only genuine Bendix replacement parts, components, and kits. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, and strength as original equipment and be designed specifically for such applications and systems.
10. Components with stripped threads or damaged parts should be replaced rather than repaired. Repairs requiring machining or welding should not be at tempted unless specifically approved and stated by the vehicle or component manufacturer.
11. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.