



Service Data

SD-03-4510

Bendix® SR-2™ Trailer Spring Brake Valve

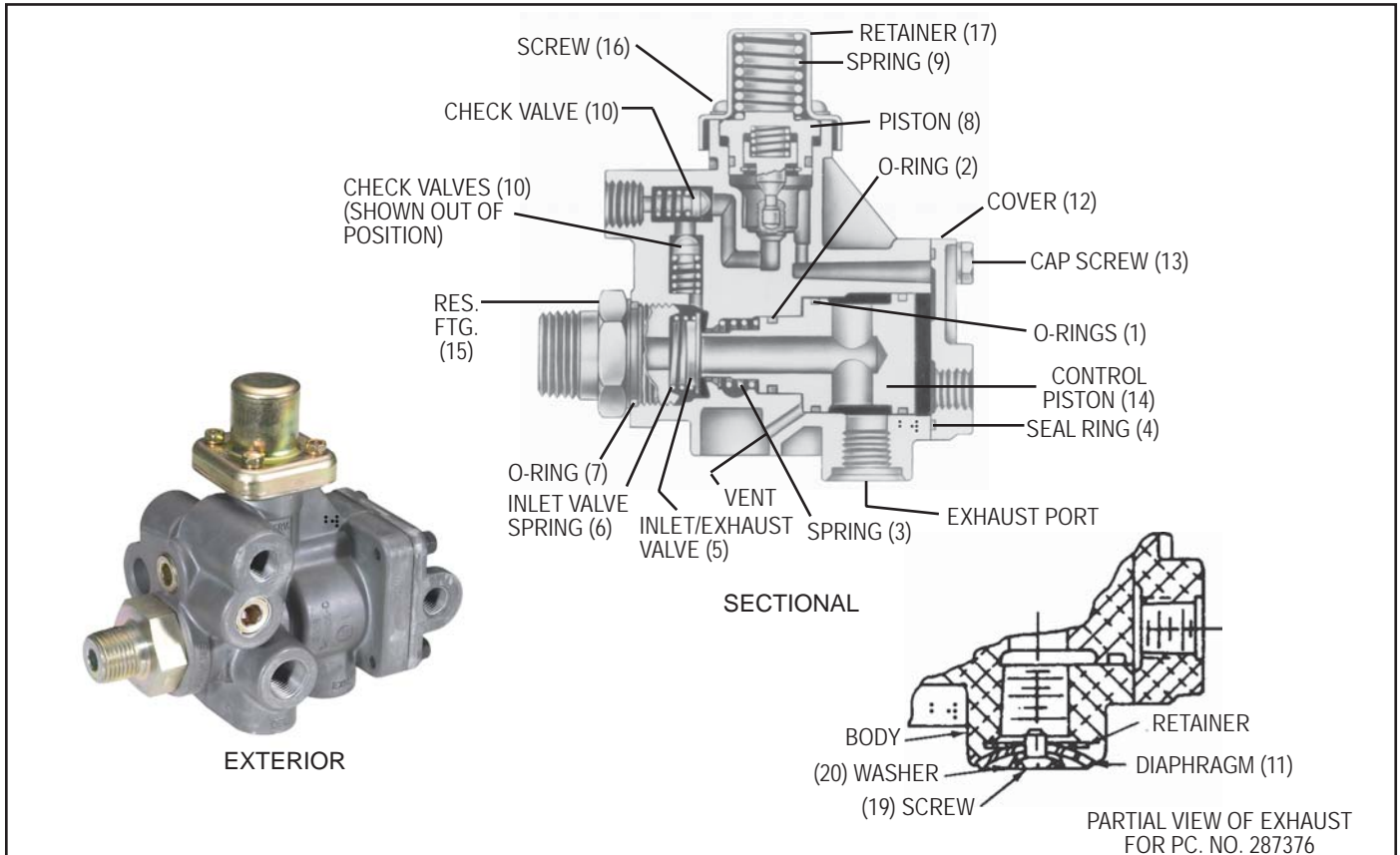


FIGURE 1

DESCRIPTION

In a trailer air brake system, the SR-2™ spring brake valve controls the functioning of the spring brakes during parking and emergency applications. It is responsible for automatically applying the spring brakes and preventing trailer air pressure loss in the event of breakaway or supply line failure. The SR-2™ valve also prevents the automatic application of the trailer spring brakes after the loss of trailer service reservoir pressure while allowing failure indication to occur in the tractor.

The SR-2™ valve is provided with one 3/4" male pipe thread connection for mounting the valve to the trailer brake reservoir. Other porting includes:

One - 1/4" pipe thread supply port

Four - 3/8" pipe thread delivery ports

Two - 1/4" pipe thread service reservoir ports

One - 3/8" pipe thread exhaust port

OPERATION

CHARGING (Figure 2)

Air from the trailer supply line enters the SR-2™ valve trailer supply port and moves the control piston into contact with the control inlet and exhaust valve, sealing off the exhaust passage through the control piston, and opening the inlet. Air entering the supply port is also conducted to the underside of the pressure protection piston. When air pressure builds to approximately 55 psi beneath the pressure protection piston, the piston moves against the force of the piston spring and the pressure protection inlet valve opens and remains open. Air flowing past the open pressure protection valve opens the service reservoir check valve. Air passing through the service reservoir check

valve flows out the service reservoir port and then opens the spring brake reservoir check valve, allowing air to fill the spring brake reservoir. As air is filling the spring brake reservoir, it also flows by the open control inlet and out the delivery ports of the SR-2™ valve into the spring brake emergency ports releasing the spring brakes.

PARK APPLICATION (Fig. 3)

To park the trailer, either the trailer supply valve or the parking control valve, which are located in the cab, are actuated and the trailer supply line is exhausted. When the trailer supply line is exhausted, air pressure is removed

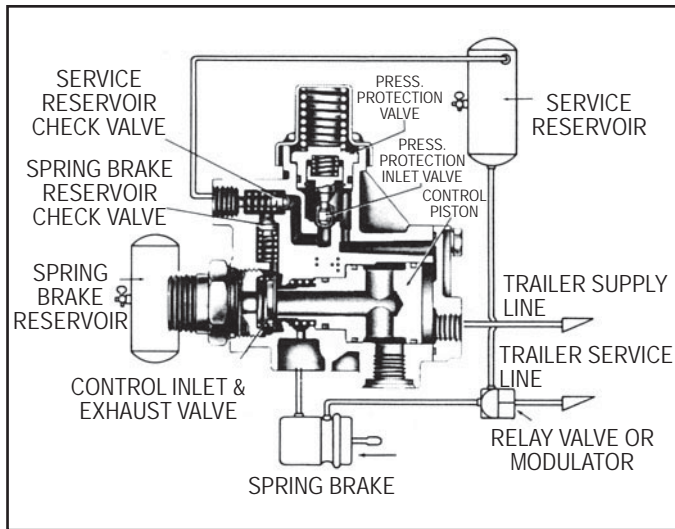


FIGURE 2 - SR-2™ TRAILER SPRING BRAKE VALVE CHARGING ABOVE 55 PSI

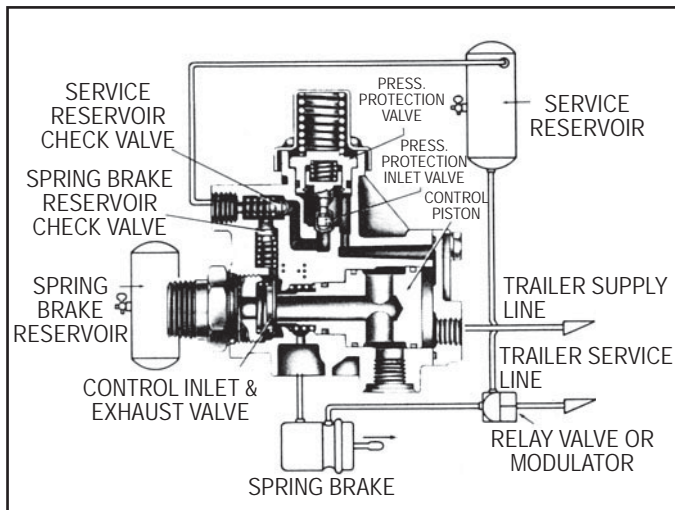


FIGURE 3 - SR-2™ TRAILER SPRING BRAKE VALVE PARK APPLICATION

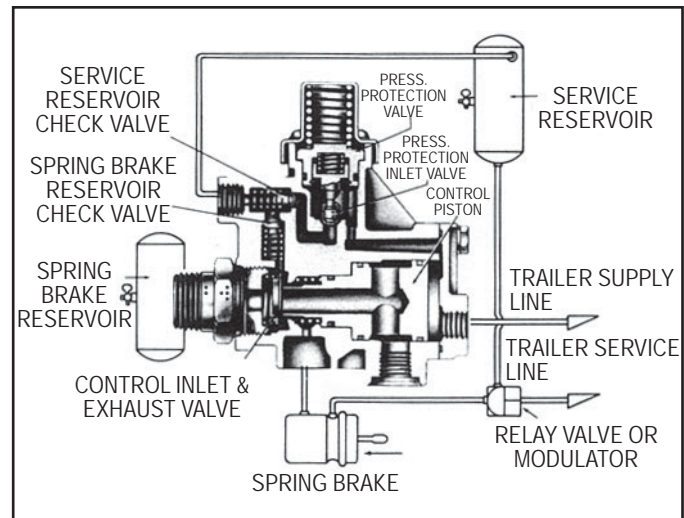


FIGURE 4 - SR-2™ TRAILER SPRING BRAKE VALVE OPTIONAL ANTI-COMPOUNDING

from the control and pressure protection pistons. With air pressure removed the control piston is moved by the return spring, control inlet valve closes and the exhaust passage through the control piston opens. Opening the exhaust allows air in the spring brake emergency section to be exhausted out the exhaust port of the SR-2™ valve. Spring force above the pressure protection piston closes the pressure protection valve while the service and spring brake reservoir check valves close and protect against the loss of pressure in either reservoir.

SERVICE APPLICATION WITH PARKING BRAKES APPLIED OPTIONAL ANTI-COMPOUNDING PIPING (Fig. 4)

With the optional anti-compounding feature of the SR-2™ valve in use, the exhaust port of the SR-2™ valve receives normal service application pressure through a line connecting it to the delivery of the trailer service system. If a service brake application is made while the spring brakes are applied, compounding of both applications is prevented by service air pressure entering the SR-2™ valve exhaust port, flowing through the exhaust passage of the control piston, past the open exhaust valve and out the SR-2™ valve delivery port to the emergency section of the spring brakes.

NOTE: During normal vehicle operation, with the spring brakes released, service air pressure will enter the SR-2™ valve as described, but will stop at the closed exhaust valve. See Figure 2.

SERVICE SYSTEM FAILURE (Fig. 5)

If air pressure is reduced in the service system, pressure in the trailer supply line (and likewise in the tractor) will be reduced, until the pressure protection piston and spring moves the piston and closes the inlet valve. With the pressure protection inlet valve closed approximately 50-60 psi will be retained in the trailer supply line and in the tractor service reservoir. With 50-60 psi pressure held in the trailer supply line and against the control piston in the SR-2™ valve, the trailer spring brakes will remain released while low pressure warning will occur in the tractor (60 psi minimum) to warn the driver. The spring brake reservoir check valve will protect against loss of air pressure.

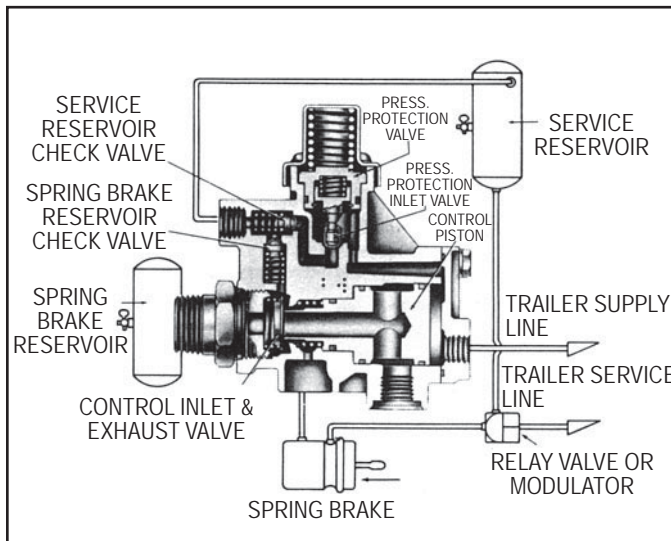


FIGURE 5 - SR-2™ TRAILER SPRING BRAKE VALVE SERVICE RESERVOIR FAILURE

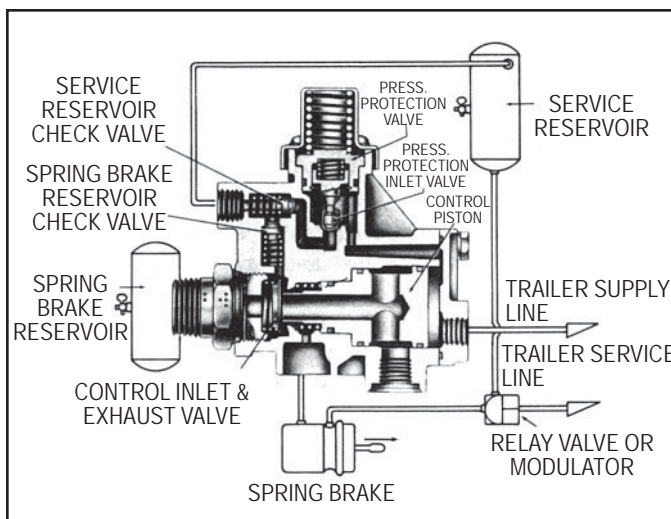


FIGURE 6 - SR-2™ TRAILER SPRING BRAKE VALVE SPRING BRAKES APPLIED (FAILED SERVICE RESERVOIR)

EMERGENCY APPLICATION WITH SERVICE SYSTEM FAILURE (Fig. 6)

To brake the trailer after the service system failure has occurred, the trailer supply valve or parking control valve is used to exhaust the remaining 55 psi trailer supply line pressure. Exhausting the trailer supply line removes air pressure from the control piston of the SR-2™ valve allowing the control inlet valve to seat and opening the exhaust valve. The spring brake emergency section is then exhausted through the SR-2™ valve. Sufficient pressure will be maintained in the spring brake reservoir to release the spring brake at least once after an emergency application has been made.

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 SR-2™ valve should be inspected every 6 months or 1500 operating hours, whichever comes first, for proper operation. Should the SR-2™ valve not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

SERVICE AND LEAKAGE TESTS

Check the tractor dash gauge against a test gauge known to be accurate prior to performing these tests. Connect the tractor air lines to the trailer on which the SR-2™ trailer spring brake valve is to be tested. Block all wheels or otherwise hold both vehicles by a means other than air brakes during these tests.

1. Install two separate test gauges or one dual test gauge with one line to the service reservoir. Build the tractor and trailer to full system pressure by placing the trailer supply valve in the charge position and the parking control valve in the brakes released position.

NOTE: As system pressure reaches approximately 55 psi, the service reservoir and the spring brake reservoir should begin to charge. When full system pressure has been obtained and the spring brakes are released, it is acceptable to have a slightly lower pressure reading in the service and spring brake reservoir than is registered on the dash gauge. Apply a soap solution to the cap nut, exhaust port and vent to detect possible leakage. A 1" bubble in 5 seconds is permissible.

- Place the trailer supply valve in the exhaust position; the spring brakes should be applied, Disconnect the trailer supply line and soap the hose coupling to check for leaks. A 1" bubble in 5 seconds is permissible.
- Reconnect supply hose coupling and push the trailer supply valve into the charge position. The spring brakes will release. Shut off the engine leaving the ignition on and open the drain cock on the trailer service reservoir. The tractor air system should bleed down to approximately 45 psi with low pressure indication occurring at 60 psi. There should be no noticeable drop in pressure in the spring brake reservoir, and the trailer service reservoir test gauge should read zero psi. Allow one minute for the air pressure in the service reservoir to stabilize after obtaining a zero psi reading on the test gauge. The trailer spring brakes should remain released. Soap the trailer service reservoir drain cock and the exhaust port of the SR-2™ valve checking for leaks. A 1" bubble in 3 seconds is permissible.
- Leaving tractor air system pressure at approximately 45 psi, place the trailer supply valve in the exhaust position. After making sure the trailer spring brakes are applied, place the trailer supply valve in the charge position and the spring brakes should release. The trailer supply valve and possibly the parking control valve may have to be held in.

NOTE: If the system functions as described, close the service reservoir drain cock as a final step in completing these tests.

- If the SR-2™ spring brake valve does not function as described above or leakage is excessive, repair the valve or replace it with a genuine Bendix service replacement valve.

REMOVAL OF VALVE FROM VEHICLE

- Block the vehicle wheels and drain all air system reservoirs completely.
- Disconnect all supply, delivery, and exhaust lines at the trailer spring brake valve. NOTE: Mark all air lines and their relation to the spring brake valve for reconnection.
- Remove the spring brake valve from the trailer spring brake reservoir.

REMOVAL AND DISASSEMBLY OF THE PRESSURE PROTECTIVE PISTON (Reference Fig. 1)

- Remove the four round head machine screws (16) which secure the spring retainer (17) to the valve body.
NOTE: Take caution when removing the spring retainer as it is spring loaded.
- Remove the spring (9) and pressure protection piston assembly (8).

- Remove the piston o-ring.

NOTE: Do not attempt to remove the retaining ring and stem from the piston.

REMOVAL AND DISASSEMBLY OF THE CONTROL

PISTON (Reference Fig. 1)

- Note and mark the position of the control piston cover (12) on the valve body. Remove the four 1/4" - 20 hex head cap screws (13) and lock washers which retain the cover to the body.
- Remove the cover, control piston assembly (14), and spring (3) from the valve body.
- From the control piston remove the three o-rings. (1) and (2).
- Remove the reservoir port fitting (15) from the valve body.
- From the reservoir port fitting remove the o-ring (7).
- Remove the inlet valve spring (6) and inlet and exhaust valve (5).
- If so equipped, (Figure 1) remove the screw (19), washer (20) and diaphragm (11) from the exhaust port.

REMOVAL AND DISASSEMBLY OF THE TWO SINGLE CHECK VALVES

- Remove the two 3/8" socket head pipe plugs which retain the two single check valves in the body.
- Remove the two check valve springs, spring guides and rubber check valves (10).

CLEANING AND INSPECTION

Wash all metal parts in mineral spirits and dry them. Inspect all parts for excessive wear or deterioration. Inspect the valve seats for nicks or burrs. Check the springs for cracks or corrosion. Replace all rubber parts and any part not found to be serviceable during inspection, using only genuine Bendix replacement parts.

ASSEMBLY

Prior to reassembling the SR-2™ valve lubricate all o-rings, o-ring grooves, piston bores, and metal to metal moving surfaces with Bendix silicone lubricant BW-650-M piece number 291126.

REASSEMBLY OF TWO SINGLE CHECK VALVES (10) (Figure 1 and 7)

Early revision of the SR-2™ valve contained single check valves for the service and spring brake reservoirs respectively consisting of a rubber valve, spring and spring guide per Figure 7. Since late 1974 the check valves have consisted of a sub-assembly pc. no. 288252, which includes the rubber valve and a revised spring (Figure 8). If the SR-2™ valve is being repaired with Maintenance Kit

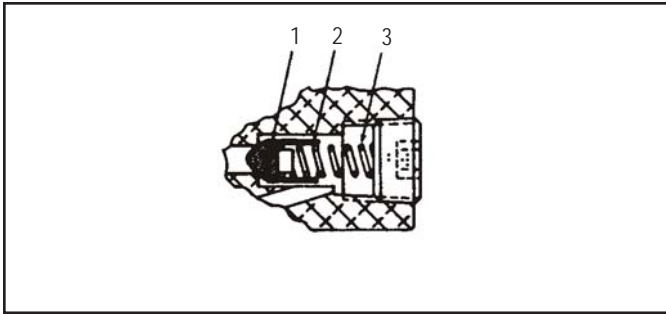


FIGURE 7 - OLD STYLE

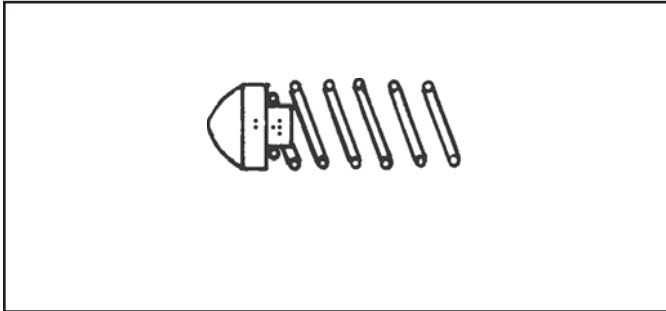


FIGURE 8 - NEW STYLE

287691 the revised check valve assemblies are included in the kit and the old ones should be discarded. If the old ones are being reused, the following applies:

1. Insert the rubber check valve (1) into the spring guides (2). See Fig. 7.
2. Position the check valve springs (3) into the spring guides and over the end of the rubber check valve (1) with a twisting motion.
3. Drop the check valve and guide assemblies into their respective bores in the valve body and install the two 3/8" socket head pipe plugs (18) and torque from 140 to 170 inch pounds.

REASSEMBLY OF CURRENT DESIGN CHECK VALVES (Figure 8)

1. Assemble the springs to each of the check valves with a twisting motion.
2. Drop the assemblies into their respective bores in the valve body and install the 3/8" pipe plugs. (19)

REASSEMBLY OF CONTROL PISTON

1. Insert the flat rubber inlet and exhaust valve (5) into the valve body.

NOTE: The flat side of the valve with the four ears protruding rests against the inlet and exhaust valve seat.

2. Install the inlet and exhaust valve spring (6) making sure the spring is aligned and rests evenly on the four ears of the inlet and exhaust valve.
3. Install the o-ring (7) in its proper groove on the reservoir port fitting (15).

4. Properly align the inlet and exhaust valve spring in the recess at the end of the reservoir port fitting. Install the fitting and torque from 200 to 300 inch pounds.
5. Install the three o-rings (1) and (2) in their respective grooves on the control piston (14).
6. Drop and position the piston spring (3) into the valve body.
7. Making sure all parts are properly aligned, install the control piston (14) in the valve body.
8. Re-install the control piston cover (12) in its proper position. Reference instruction # 5 under Removal and Disassembly of control piston, for proper positioning, screws (13) should be torqued from 40 to 60 inch pounds.
9. If so equipped, re-install the screw (19), washer (20), and exhaust diaphragm (11) in the control piston exhaust port. Torque screw from 15 to 25 inch pounds.

REASSEMBLY OF PRESSURE PROTECTION PISTON

1. Install the o-ring in its respective groove on the pressure protection piston (8), and install the piston assembly in the valve body.
2. Position the spring (9) and spring retainer (17) on top of the pressure protection piston assembly, and secure with the four round head machine screws (16). Screws should be torqued from 20 to 30 inch pounds.

TESTING THE REBUILT SR-2™ TRAILER SPRING BRAKE VALVE

Test the rebuilt SR-2™ trailer spring brake valve by performing the operation and leakage tests outlined in the Service Checks section of this manual.

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.
11. For vehicles with Antilock Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.

