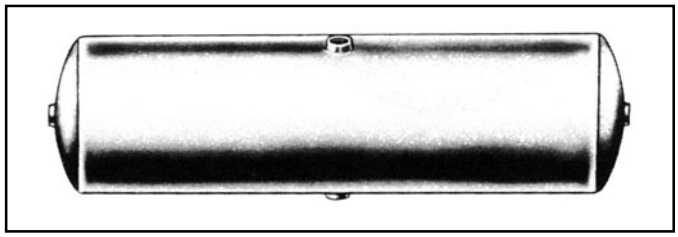
RESERVOIRS



TYPICAL SINGLE COMPARTMENT RESERVOIR

DESCRIPTION

The reservoir is a storage tank; its function is to provide a volume of compressed air for braking which will be adequate in relation to the volume used by the brake chambers and auxiliary devices. Reservoirs also provide a location in the system where the air, heated by compression, may be cooled and the water vapor condensed.

Bendix® reservoirs are built in accordance with SAE Standard Air Brake Reservoir Test Code and Inspection Procedure SAE J-10-a. They are made from steel sheet, with stamped heads and rolled shells. The seams are electrically welded, and each reservoir is internally coated for corrosion resistance. Each reservoir is tested at 300 PSI hydrostatic pressure.

Reservoirs are supplied in various pipe ferrule arrangements and lengths and in diameters from 3-1/2" to 14" having various volumes from approximately 100 cubic inches to 7600 cubic inches for tractors and trailers. All ferrules are tapped to SAE dryseal pipe thread standards.

Reservoirs are also supplied in double and triple compartment configurations and in some cases include an integral check valve between compartments in a double compartment reservoir. Figure 1 illustrates a two compartment reservoir. Two styles of check valves are shown in Figures 2 and 3. Figure 3 is the current design.

OPERATION

The reservoirs in an air brake system primarily serve to store energy in the form of compressed air. They also perform the less obvious function of providing a means of cooling the air as delivered from the compressor and thereby condensing water vapor into a liquid as well as collecting oil passed by the compressor. This water and oil collects as an emulsion; the greatest amount in the reservoir nearest the compressor. It should be drained off either manually or by means of an automatic drain device.

OPERATION OF INTEGRAL CHECK VALVE

The integral check valve provides a one-way passage of air from the upstream compartment to the downstream.

This check valve may serve to meet the legal requirement for a check valve to protect the service brake system in case of failure in the compressor, discharge lines or first reservoir compartment.

PREVENTIVE MAINTENANCE

All reservoirs should be drained daily. If an automatic drain device is used, it should be checked periodically for proper functioning. If an air dryer or aftercooler is used, the reservoirs should be manually drained periodically to verify the proper function of the drying device. Reservoirs, which have collected a considerable oily emulsion, should be drained by opening a drain cock and allow to drain until all drainage stops.

MAINTENANCE OF THE INTEGRAL CHECK VALVE

Every six months, 1,800 operating hours or 50,000 miles the check valve on the two compartment reservoir should be tested for leakage, as outlined below, and parts inspected for damage or deterioration and replaced if considered unserviceable.

OPERATING AND LEAKAGE TEST FOR TWO COMPARTMENT RESERVOIR CHECK VALVE

1. Determine the direction of the air flow.
2. Build up system air pressure to governor cut-out and turn off engine.
3. Completely drain compartment #1 (see Figure 1).

   NOTE: It may be necessary to remove automatic drain device if so equipped.
4. To determine pressure retention in #2 compartment, perform one of the following tests:
   a. Check dash gauge (if connected to #2 compartment).
   b. Apply service brake (if supplied from #2 compartment).

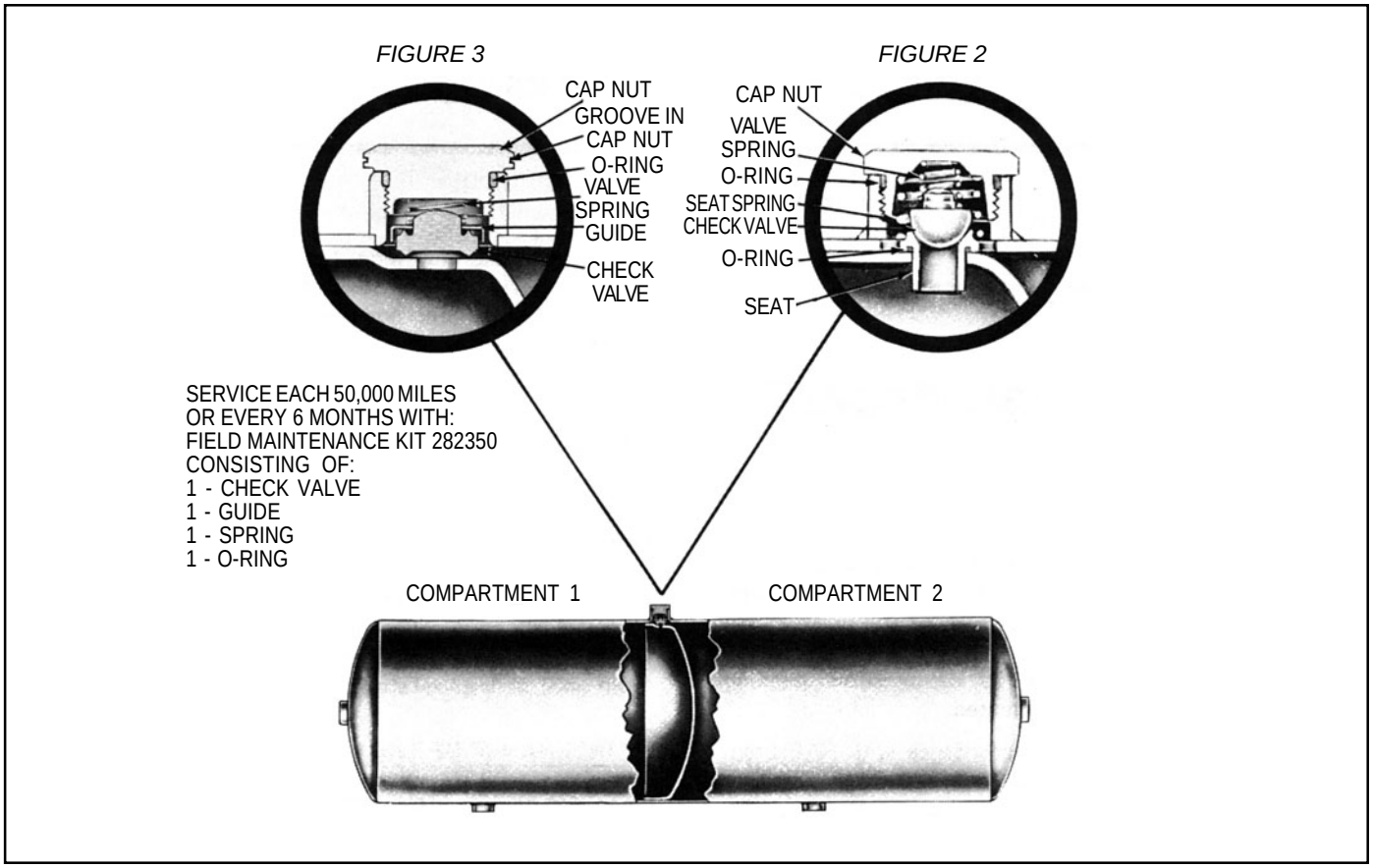


FIGURE 1 - TWO COMPARTMENT RESERVOIR WITH CHECK VALVE

c. Momentarily open drain device on # 2 compartment.

Do not completely drain #2 Compartment.

5. Apply a soap solution to the drain ferrule #1 compartment. A slight bubble leakage is permitted.

If #2 compartment fails to hold air pressure or if excessive leakage is evident at the drain ferrule of #1 compartment, the check valve should be inspected for serviceability and its parts replaced if necessary.

DISASSEMBLY

GENERAL

There are two types of two-compartment reservoir check valves and they are;

1. The old ball style check with a removable seat and a seat spring (see Figure 2).
2. The new flat style that has a non-removable stainless steel seat (see Figure 3).

Both types of check valves are located in a housing (large ferrule) with a cap nut cover. They are generally located on top of the reservoir shell.

DISASSEMBLY OF THE BALL STYLE CHECK VALVE (FIGURE 2)

Block and hold vehicle by means other than air brakes. Completely drain compartments #1 and #2. Remove cap nut and cap nut o-ring. Remove check valve and check valve spring. Remove seat spring. With a hook or similar device, carefully remove the check valve seat and its o-ring so as not to mar or scratch it.

DISASSEMBLY OF THE FLAT STYLE CHECK VALVE (FIGURE 3)

Block and hold vehicle by means other than air brakes.

Completely drain compartments #1 and #2.

Remove cap nut and cap nut o-ring.

Remove valve spring.

Remove valve and valve guide.

CLEANING AND INSPECTION

Wash all metal parts in a good cleaning solvent and dry them thoroughly. All rubber parts should be wiped clean. Inspect springs for distortion, corrosion, and cracks. Inspect valves and valve seats for nicks, cuts and burrs. Inspect all rubber parts for swelling and deterioration. Replace or repair as necessary.

ASSEMBLY

GENERAL

Before assembly, the o-rings should be coated with silicone lubricant BW-650-M Bendix pc. number 291126.

ASSEMBLY OF THE BALL STYLE CHECK VALVE

Replace seat o-ring and press seat into shell. Replace seat spring. Install check valve and valve spring. Replace o-ring on cap nut and install and tighten cap nut.

ASSEMBLY OF THE FLAT STYLE CHECK VALVE.

Replace valve guide on valve and install valve.

Install valve spring.

Replace o-ring on cap nut and install and tighten cap nut.

TEST

Perform tests as outlined in "Operation and Leakage Test" section.

INSTALLATION

Reservoirs should be securely mounted where they will be protected against outside damage and so they will not vibrate or move during normal operation of the vehicle. A vibrating reservoir usually causes broken tubing lines.

They should be the low point in the air brake system and all lines connected to them should drain toward the reservoir.

The pipe tapped openings in the reservoir should not under any circumstances be reduced in size from original installation.

A drain cock or draining device must be installed in the bottom connection of every reservoir and, in the case of the two-compartment reservoir, in each compartment.

The first reservoir or first compartment must be protected by installing a safety valve.

MINOR REPAIRS

Minor repairs to the reservoir consist of examining the reservoir mounting and the inspection of the outside for corrosion or damage. The outside should be kept painted to prevent the possibility of corrosion causing a failure.

MAJOR REPAIRS

Repairs involving welding should never be performed on reservoirs. If a reservoir has been damaged so as to be unfit for use, it should be replaced with a new one.

In exceptional cases where the inside of a reservoir has become excessively coated with sludge which cannot be drained off, it is sometimes advisable to remove it and clean with a solvent, steam, or water. If a solvent is used to clean the reservoir, the reservoir should be thoroughly aerated before reinstalling.

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.**