

## Bendix® TP-2™ Tractor Protection Valve

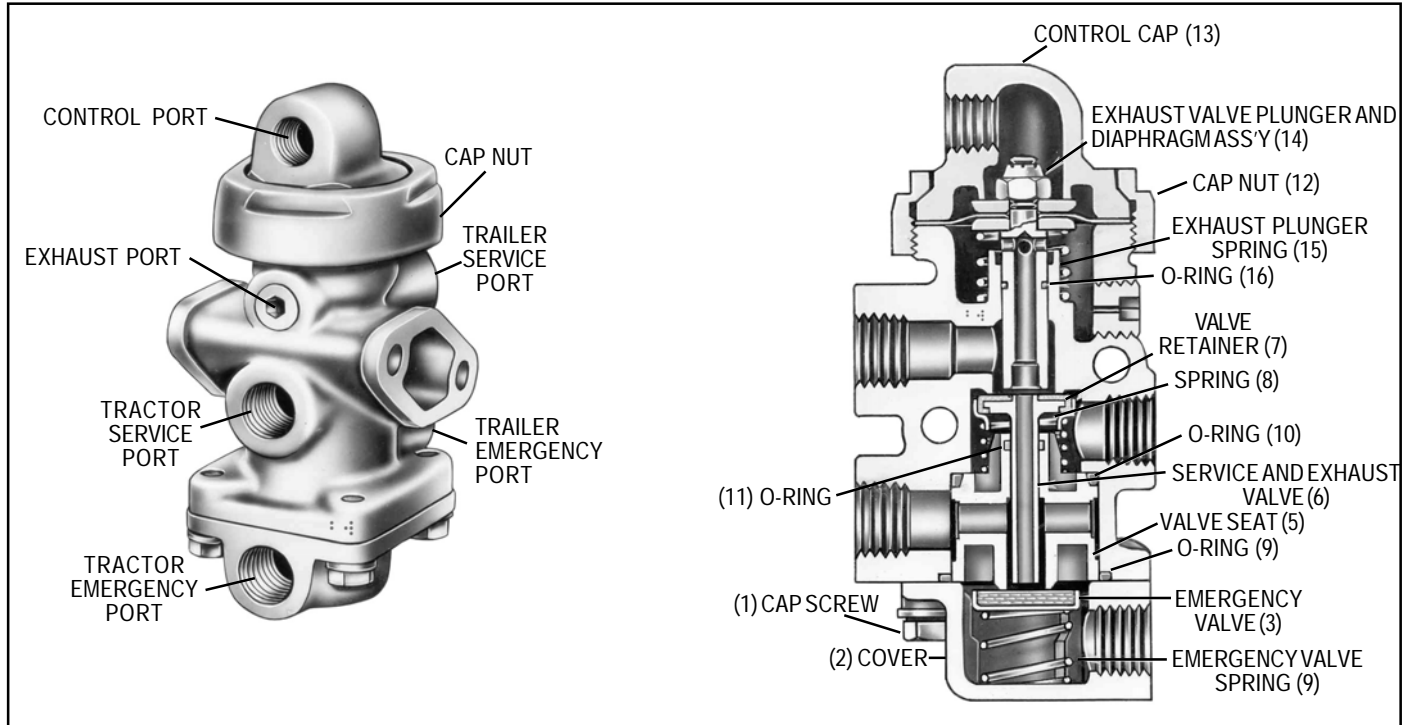


FIGURE 1 - TRACTOR PROTECTION SYSTEM

### DESCRIPTION

The Bendix® TP-2™ tractor protection valve functions as a set of remote controlled cut-out cocks, protecting the tractor air supply should a loss of air occur in the trailer side (delivery) of the valve. The TP-2™ valve is a three line system as compared to the TP-3™ valve which is a two line system.

The valve is normally piped as shown in Figure 2. Lines delivering service and supply (emergency) pressure to the trailer are routed through the valve. A third control line comes from the on-off control valve in the cab.

With the control valve in the “normal” (on) position and reservoir pressure at approximately 50 psi, the valve will open and service and emergency air is permitted to pass through the valve. With the control valve in the emergency position (off) position the valve is closed and service and emergency lines on the trailer (delivery) side of the valve are open to atmosphere through the valve’s exhaust port.

The valve will automatically close and vent delivery lines to atmosphere should air pressure drop below a safe operating

minimum pressure (approx. 40 psi), thus retaining and protecting the tractor air brake system against complete loss of air.

**NOTE:** With a TP-2™ valve system it should be noted that the pneumatic logic for the legally required automatic function is incorporated in the TP-2™ valve whereas in the current TP-3™ valve system the logic is in the supply valve in the cab. Consequently a TP-2™ valve should never be replaced by a TP-3™ valve unless the on-off control valve in the cab is replaced with either a PP-3™ or PP-7™ trailer supply valve.

### OPERATION - NORMAL POSITION

With air pressure at approximately 50 psi at the control port, the diaphragm and plunger assembly is depressed and the plunger contacts the service and exhaust valve surface sealing the exhaust passage through the center of the plunger. Continued travel of the plunger moves the service valve off its seat, opening the service passage from the

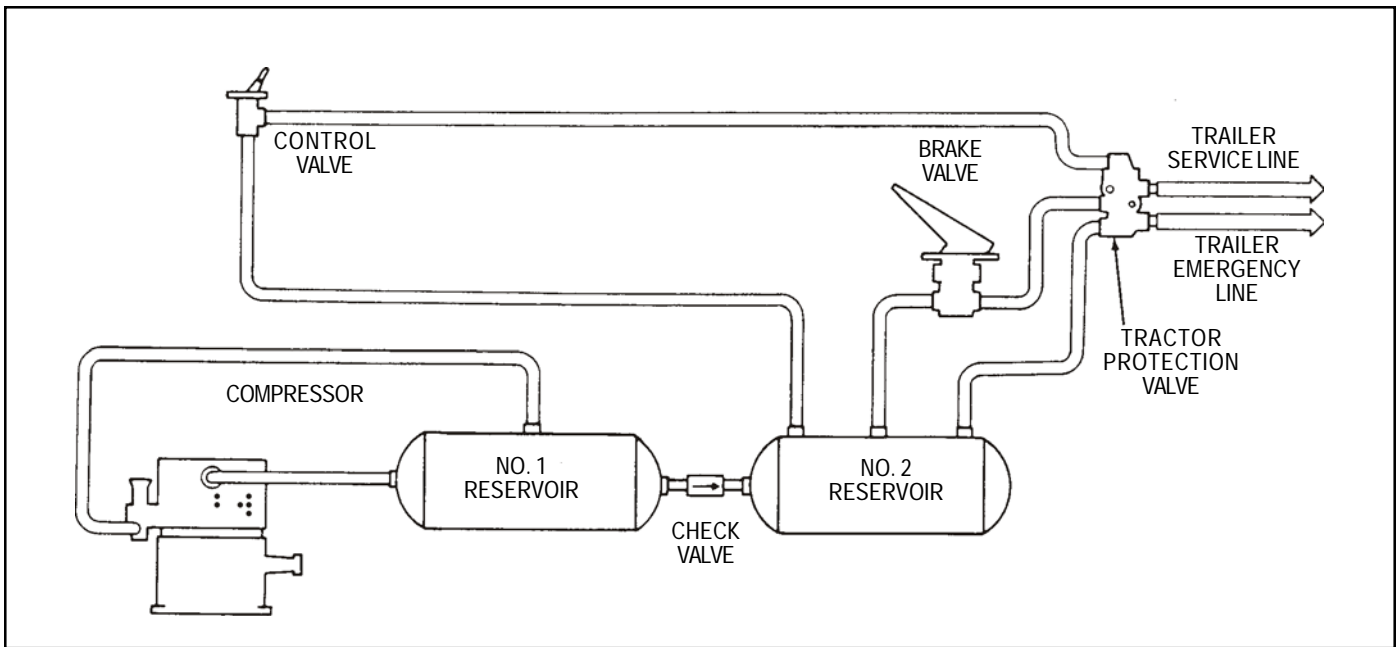


FIGURE 2 - TRACTOR PROTECTION SYSTEM

tractor service port to the trailer service port. The stem of the service and exhaust valve contacts the emergency valve, sealing the exhaust passage. Continued travel of the service and exhaust valve plunger moves the emergency valve off its seat and allows air to flow from the tractor emergency port to the trailer emergency port.

### EMERGENCY POSITION

If air pressure in the control port (and on top of the diaphragm and plunger assembly) drops below approximately 40 psi, the combined forces of the exhaust plunger spring, the service and exhaust valve spring and the emergency valve spring will return the diaphragm and plunger assembly allowing the service and exhaust valve and the emergency valve to close. Further flow of air through either the service or emergency ports is stopped. The loss in air pressure which would precede such action would be indicated to the driver, either visually or audibly by the low pressure warning device, before such action would occur.

### 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 TP-2™ valve should be inspected every 6 months or 1500 operating hours, whichever comes first, for proper operation. Should the TP-2™ 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 CHECK

NOTE: To make the following operating and leakage checks, an accurate test gauge installed in spare hose coupling is required. The vehicle dash gauge should be checked for accuracy against the test gauge prior to making these tests.

1. Block and/or hold the vehicle by means other than air brakes during these test.
2. Drain vehicle reservoirs. Then close drain cocks.
3. Disconnect vehicle emergency and service hose couplings and connect assembled hose coupling and test gauge in tractor emergency hose coupling.
4. Start engine and build up system pressure.
5. As pressure in system builds up there should be no pressure reading on test gauge. When system pressure reaches 30 psi on dash gauge, make and hold a foot or hand valve application and observe that no air escapes at the open service hose coupling.
6. When system pressure reaches 40 to 60 psi, valve should open and pressure reading show on test gauge. Allow system to build up to 100 psi and shut off engine.
7. With soap solution coat exhaust port of the Tractor Protection Valve. Leakage of a 1" bubble in 3 seconds is permissible (175 SCCM).
8. Place the tractor protection control valve in the "Emergency" position and note that emergency line pressure drops promptly to zero on test gauge. Disconnect coupling and test gauge.

9. With soap solution:
  - A. Coat emergency line coupling. Leakage of a 1" bubble in 5 seconds is permissible (100 SCCM).
  - B. Coat service line coupling. Make and hold a full hand or foot valve application. Leakage of a 1" bubble in 5 seconds is permissible (100 SCCM).
10. Connect the coupling and test gauge to the emergency line hose coupling. Place the tractor protection control valve to "Normal" position. (If necessary, re-start engine and build system pressure.) With ignition switch "on" slowly drain tractor air brake system observing that low pressure indicator occurs at prescribed pressure (normally at approximately 60 psi) observe that the emergency line will be vented by the tractor protection valve between 45 to 33 psi (test gauge will drop to 0 psi.)

If the TP-2™ tractor protection valve does not function as described or if leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit, or repaired with genuine Bendix parts, available at Bendix outlets.

## REMOVING AND INSTALLING

### REMOVING

1. Block and/or hold vehicle by a means other than air breaks. Drain air system reservoirs.
2. Identify lines and hoses so that correct lines are reconnected to proper ports when reinstalling.
3. Remove lines; remove valve.

### INSTALLING

1. Mount valve, checking to make certain control cap is properly positioned. If it is necessary to re-position cap, refer to No. 3 of "Assembly Instructions."
2. Connect lines making certain proper lines are connected to correct ports.

### DISASSEMBLY

**Important:** Mark position of control port and tractor emergency port location in relation to body in such a manner that mark will not be obliterated during cleaning of parts. Three (3) springs in valve should be carefully marked as to their proper location in valve as valve is disassembled.

1. Remove four (4) cap screws (1) Figure 1, lock washers, and cover (2) from valve.
2. Remove emergency valve (3) and emergency valve spring (4) from cover.
3. Remove valve seat (5) service and exhaust valve (6), valve retainer (7), spring (8).
4. Remove o-rings (9), (10), and (11).
5. Remove cap nut (12) and control cap. (13).

6. Remove exhaust valve plunger and diaphragm assembly from body. (14).
7. Remove exhaust plunger spring (15) from body.
8. Inspect bores in valve body to be sure they are not damaged or out of round. Clean body, control cap and cover.

## CLEANING AND INSPECTION

1. Clean all metal parts in mineral spirits and dry them completely.
2. Inspect all parts for excessive wear or deterioration. Inspect valve seats for nicks or burrs. Check the valve spring for cracks or corrosion.
3. Inspect the bores of the valve housing for deep scuffing or gouges.

Replace all parts that were discarded and any parts not found to be serviceable during inspection, using only genuine Bendix replacement parts.

## ASSEMBLY

Before assembling the TP-2™ valve, lubricate all o-rings, o-ring grooves, body bores and rubbing surfaces with Bendix silicone lubricant (Pc. No. 291126) or equivalent.

**NOTE:** When using pipe thread sealant during assembly and installation, take particular care to prevent the sealant from entering the valve itself. Apply the sealant beginning with the second thread back from the end.

1. Place in vise with control cap end up. Install o-ring (16) in groove in the stem of the exhaust valve plunger and diaphragm assembly (14).
2. Install exhaust plunger spring (15) in valve body and install exhaust plunger and diaphragm assembly (14).

**IMPORTANT:** Both sides of diaphragm and clamping surfaces of body and control cap must be free of grease. Plunger should be a neat sliding fit in bore.

3. Position control cap (13) and cap nut (12). Position control cap to desired port angle (as marked during disassembly). Install a short (4-6") 1/4" pipe nipple in control port of cap. Apply pressure firmly on cap, holding in position with pipe nipple and firmly tighten cap nut to approximately 50 ft. lbs.

It is important that the cap not be allowed to turn while tightening the cap nut. Remove pipe nipple from control port.

4. Place valve in vise with control cap down.
5. Install o-ring (10) in valve body (smaller of two o-rings).

6. Preassemble the following parts before installing in valve:
  - a. Install valve seat o-ring (11) in small bore of valve seat making certain it is properly seated in groove. Install spring (8) (the heavier of the two remaining springs) over protrusion on small bore end of valve seat.
  - b. Install valve retainer (7) on service and exhaust valve (6). Install stem of service and exhaust valve through center of spring and into small bore of valve seat.
7. Carefully install preassembled parts in body and hold in place.
8. Position o-ring (9) in groove of body.
9. Position emergency valve spring (4) in cover (2) and place emergency valve (3) (metal side of valve in contact with spring) on top of spring.
10. Install cover (2) in desired port position (as marked during disassembly.) Check to be certain o-ring (9) and emergency valve (3) are in position.
11. Install cap screws and lockwashers and tighten to approximately 100 in. lbs.

## TESTING REBUILT TP-2™ TRACTOR PROTECTION VALVE

Performance tests as outlined in "Operating and Leakage Checks" 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.

