Bendix® TC-2™ Trailer Control Brake Valve

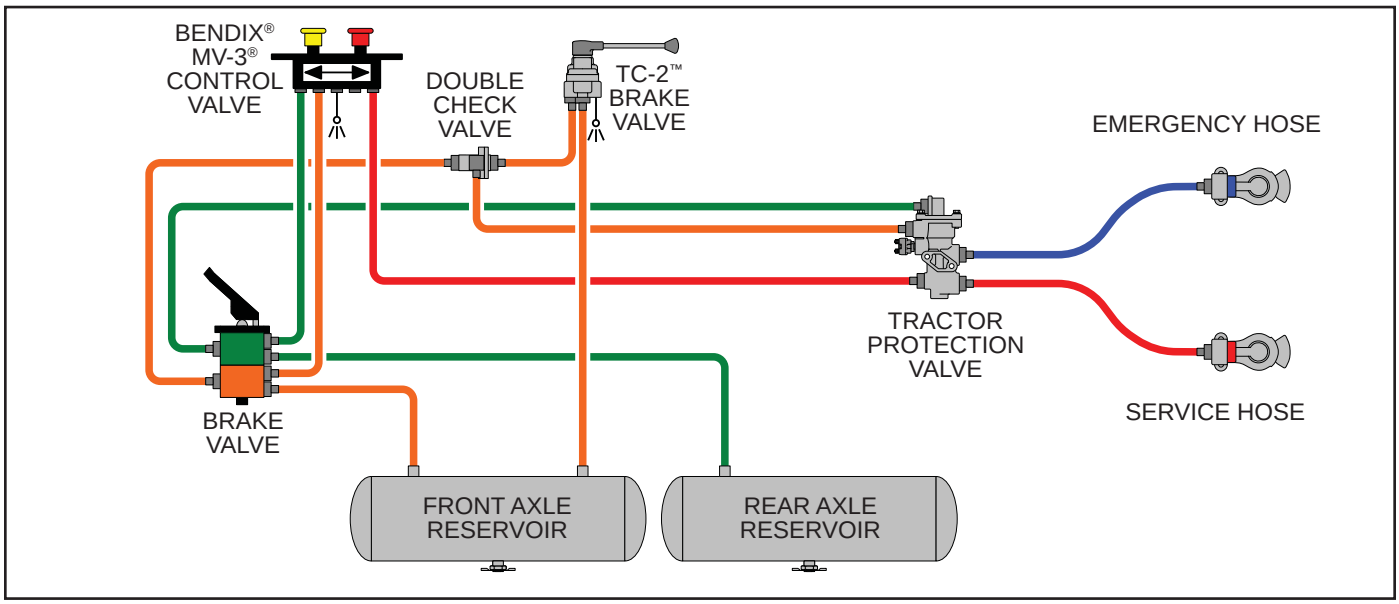

FIGURE 1 - BENDIX® TC-2™ TRAILER CONTROL BRAKE VALVE TYPICAL PIPING DIAGRAM

DESCRIPTION

The Bendix® TC-2™ trailer control brake valve is a hand operated control valve which features graduated air pressure control. The most common application is the control of trailer brakes independent of tractor brakes; however, the valve may be used wherever a hand-controlled pressure graduation operation is needed.

Two types of valves are available. The handle operated valve is normally mounted within reach of the driver. A typical installation is a steering column mount. The remote operated type valve is connected to the operating handle by a linkage rod.

The TC-2 brake valve is not intended for use as a parking control valve and should not be used for that purpose.

OPERATION

APPLYING

When the handle or actuating lever is moved in a clockwise direction from the released position, force is exerted on the pressure graduating spring through the action of the cam and cam follower. The force of the spring on the piston causes it to move down.

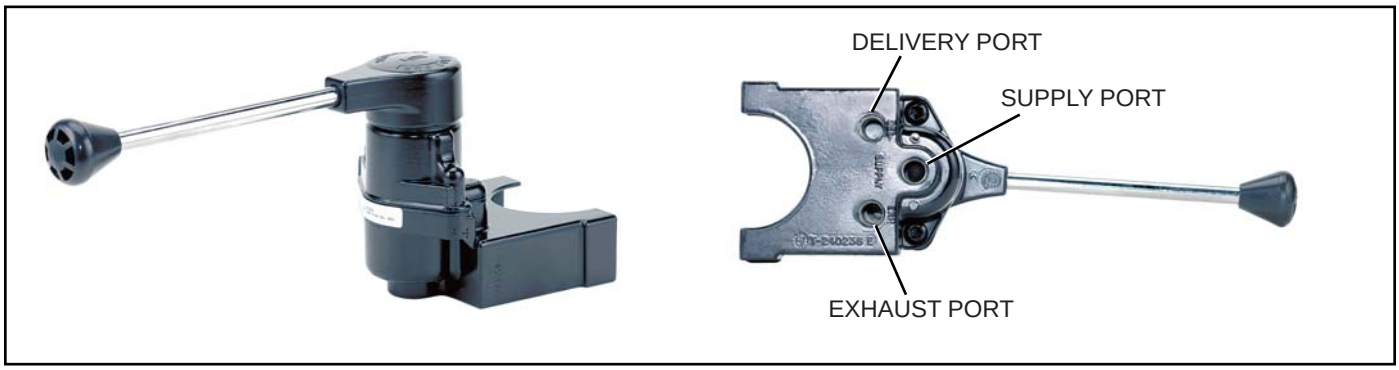

FIGURE 2 - EXTERIOR VIEW

The exhaust seat, which is in the center of the piston, contacts the exhaust valve and closes the exhaust passage in the piston. The continued downward movement of the piston moves the inlet valve off its seat. Reservoir air pressure flows by the open inlet valve and out the delivery port.

HOLDING

The air pressure that flows by the open inlet valve also becomes effective on the bottom area of the piston. As the force of the air pressure beneath the piston balances the force of the depressed graduating spring above, the piston lifts slightly and the inlet valve returns to its seat. The exhaust valve remains seated so that the flow of air through the valve is stopped and air pressure in the service line is held.

RELEASING

When the handle (or operating lever) is moved in a counterclockwise direction, the force above the piston is decreased. The air pressure beneath will then lift the piston, moving it away from the exhaust valve. With the exhaust passage open, air pressure in the service line will exhaust out the exhaust port of the valve.

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.

Visually check for physical damage to the brake valve such as broken air lines and broken or missing parts.

Every three (3) months, 25,000 miles, or 900 operating hours, perform Operating and Leakage Tests.

SERVICE CHECKS

OPERATING TEST

Connect an accurate test gauge to a delivery port. When the Bendix® TC-2™ valve handle is moved to the fully applied position, the gauge should register full reservoir pressure. NOTE: Some valves may be preset to deliver lower than reservoir pressure; however, the standard valves generally used on tractors are set to deliver full reservoir pressure. Intermediate positions should deliver proportional intermediate pressures. Upon release, the gauge should immediately register zero.

LEAKAGE TEST

Locate the exhaust port or exhaust line and apply a soap solution. (It is common practice to connect a line from the valve exhaust port to a location remote from the immediate driver's area.) With the valve in the released position, exhaust leakage should not exceed a 1" bubble in 5 seconds (100 sccm).

With the valve fully applied, leakage at the exhaust should not exceed a 1" bubble in 3 seconds (175 sccm). If the valve does not function as described, or leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit, or repaired with genuine parts available at an authorized Bendix outlet.

REMOVING AND INSTALLING

REMOVING

1. Block and hold the vehicle by means other than the air brakes.
2. Drain the air brake system.
3. If the valve is a remote-operated type, disconnect the operating mechanism.
4. Disconnect the air lines from the valve.
5. Remove the mounting clamp bolts, clamp, and then the valve.

INSTALLING

1. Check and clean the air lines to the valve.
2. The operating mechanism for the remote-type valve should be checked for functionally and for proper adjustment.
3. Mount the valve with the clamp and mounting bolts.
4. Tighten the mounting bolts evenly to approximately 200 inch pounds torque (3/8-16 bolt torque 180-220 inch pounds.)
5. If the valve is a remote-operated type, re-connect the operating mechanism.

DISASSEMBLY

HANDLE OPERATED VALVE

1. Drive out the spiral pin and remove the handle, head, and head seal o-ring.
2. Remove the handle o-ring.
3. For remote-operated type valve: Remove the set screw, head and head seal o-ring.
4. Remove the adjusting ring lock washer.
5. Remove the cap screws that hold the body and cover together; separate the cover from the body.
6. Remove the gasket and graduating spring.
7. Remove the cam and cam follower from the cover.
8. Unscrew and remove the adjusting ring.

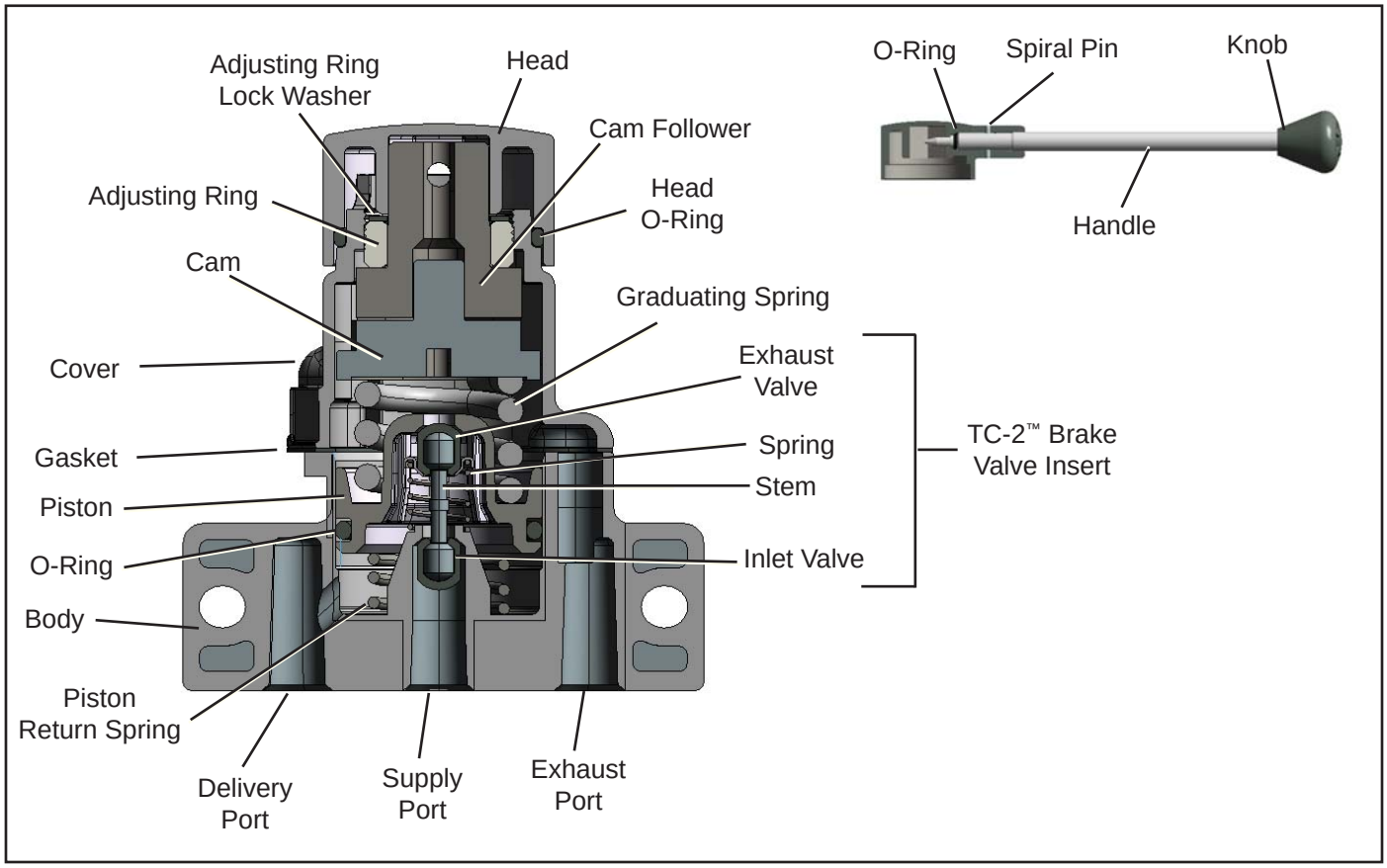

FIGURE 3 - BENDIX® TC-2™ SECTIONAL VIEW

9. Remove the piston and piston return spring from the body.
10. Remove the piston o-ring.
11. Remove the inlet and exhaust insert screws and lock washers, then the insert and o-ring seal.
12. The inlet and exhaust valve insert can be disassembled if desired or necessary.
13. Insert an object, such as a cap screw, in the supply port to hold the inlet valve on its seat.
14. Depress the exhaust valve guide and spring; remove the exhaust valve.
15. Remove the stem with inlet valve from the inlet seat and remove the inlet valve from the stem.

CLEANING AND INSPECTION OF PARTS

1. Clean all metal parts in mineral spirits.
2. Wipe all rubber parts clean.
3. Inspect the valve seats for nicks or burrs.
4. Check all springs for distortion, cracks, and corrosion.
5. All rubber parts should be inspected for wear or deterioration.
6. Replace all parts not considered serviceable, during their inspection, with genuine Bendix replacement parts. Refer to the Quick Reference Catalog (BW1114) for service parts and kits. To order or download this catalog visit the Bendix website at www.bendix.com.

ASSEMBLY

Prior to assembly, lubricate the body and cover bores, cam and cam follower, piston o-ring, and cover top with Dow Corning® 55-M pneumatic grease (Bendix piece number 291126).

1. Press the inlet valve on the stem. A little water in the boot valve or some soap on the stem will make it easier to press on the inlet valve.
2. Place the stem with the inlet valve installed in the inlet seat. Insert an object, such as a cap screw, to hold the inlet valve up against its seat.
3. Position the spring and the exhaust valve guide.
4. Depress the guide and spring, then press the exhaust valve on the stem.
5. Place the seal o-ring over the insert seat and – with the cap screws and lock washers – install the inlet and exhaust insert in the body. The recommended torque on the insert cap screws is 60 to 80 inch pounds.
6. Install the piston return spring.
7. Install the piston o-ring on the piston and install the piston in the body.
8. Install the adjusting ring in the cover and screw it down until it is flush with the top of the cover.
9. Place the cam follower and cam in the cover.
10. Position the graduating spring and gasket in the body.

11. Connect the body to the cover; tighten the cap screws evenly and torque to 75-95 inch pounds.
12. Install the adjusting ring lock washer, be sure to align the lock washer with the cover to prevent cross-threading.
13. Install the head seal o-ring and head.
14. Install the set screw in the head of remote-operated type valves. At this stage, before installing the handle and spiral pin of a handle-operated type valve, if facilities are available the rebuilt valve should be tested and adjusted. If the facilities are not available, the valve can be tested on the vehicle.

TESTING REBUILT BENDIX® TC-2™ BRAKE VALVE

Perform "Operating and Leakage Tests" as outlined in "Service Checks" section.

ADJUSTMENT

Generally, the TC-2™ trailer control brake valve should deliver full reservoir pressure; however, there are a few exceptions in special applications.

1. If the delivered pressure is below specified final delivery pressure, it can be adjusted by removing the head and the adjusting ring lock washer and rotating the adjusting ring clockwise to raise the delivery pressure.
2. If the delivery pressure is above the specified final delivery pressure, it can be lowered by rotating the adjusting ring counterclockwise.

A spanner wrench can be used to rotate the adjusting ring, but if such a wrench is not available, the adjusting ring can be turned with a small screwdriver inserted in one of the inner notches of the ring. Turning the adjusting ring one notch will raise the delivered pressure approximately 5 psi.

GENERAL SAFETY GUIDELINES

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 a Bendix® 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® brand 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 Automatic 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.**