



# Service Data

SD-03-824

## Bendix® TC-7™ Trailer Control Brake Valve

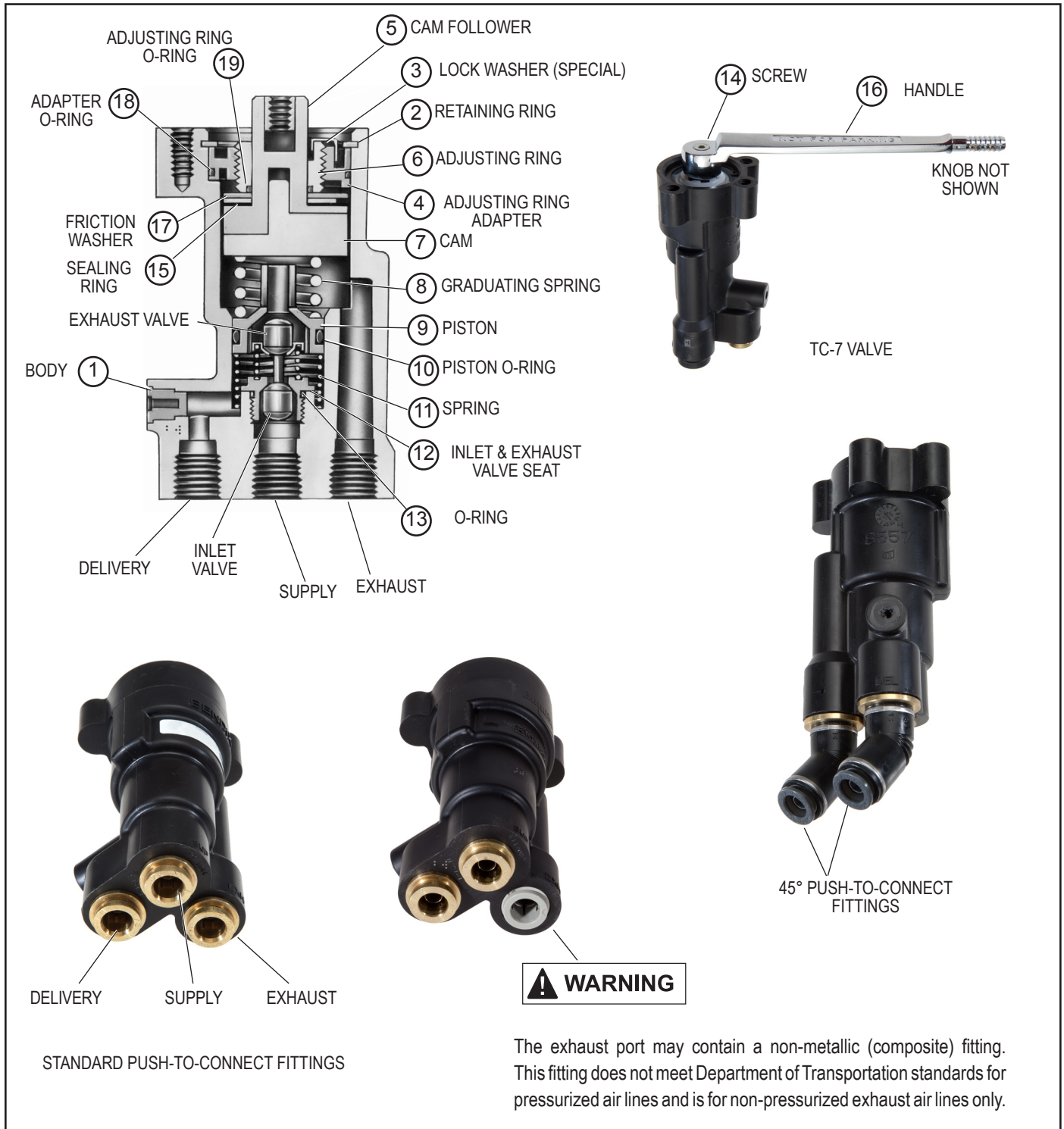


Figure 1 – Bendix TC-7 Valves



## 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 guidelines should be observed AT ALL TIMES:**

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the 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.
- ▲ 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.
- ▲ 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, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si® air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ 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.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ 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.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

## DESCRIPTION

The Bendix® TC-7™ trailer control brake valve is a hand operated control valve that provides graduated control of service brake air pressure. The most common vehicle application is the independent control of the trailer's service brakes on a tractor-trailer combination.

Typically, the TC-7 valve is mounted either inside the steering column or clamped to the exterior of the column. The three basic components of the TC-7 valve are available separately (valve, handle, bracket) to accommodate the appropriate mounting configuration.

Because of its use as a trailer service brake control valve, the TC-7 valve should **NOT** be used in lieu of the vehicle parking brakes. The handle is marked **NOT FOR PARKING**. In general, the vehicle should not be left unattended when the TC-7 valve is in use.

## 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.

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 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.



## 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 away from the immediate driver's area.) With the valve in the released position, exhaust leakage should not exceed a one inch bubble in five seconds (100 sccm).

With the valve fully applied, leakage at the exhaust should not exceed a one inch bubble in three 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 Bendix® parts available at Bendix parts outlets.

## REMOVAL & INSTALLATION

The removal, disassembly, assembly and installation procedures are number keyed to the sectional and exterior views of the Bendix® TC-7™ brake valve in Figure 1.

### REMOVAL

1. Block the wheels or hold the vehicle on a level surface by means other than the air brakes.
2. Drain the air pressure from all reservoirs.
3. Identify the air lines and connections and remove them from the TC-7 valve.
4. Consult the vehicle manual for instructions on disassembly of the steering column components.  
**NOTE:** *Some TC-7 valve installations will be on the exterior of the steering column, in which case Step 4 can be disregarded.*
5. Remove the TC-7 valve handle (16) by first removing the flat head Phillips® machine screw (14) from the center of the head/handle assembly.
6. Dismount the TC-7 valve from the steering column.

### DISASSEMBLY

The following assembly and disassembly instructions are written for the use of a Bendix Maintenance Kit 102145. Use the instructions included with the maintenance kit in lieu of this manual when servicing.

If the valve is disassembled in a vise, be sure that the vise is not overtightened as the body and internal parts will distort.

1. Remove the adjusting ring lock washer (3).
2. Remove the adjusting ring (6).  
**NOTE:** *A spanner wrench can be used to rotate the adjusting ring, but if such a wrench is not available, the adjusting ring can be returned with a small screwdriver inserted in one of the inner notches of the ring.*
3. Remove the retaining ring (2).

4. Remove the adjusting ring adapter (4), cam follower (5), sealing ring (15) and friction washer (17). Discard sealing ring (15) and o-rings (18 & 19). Retain all other parts. *Note whether the friction washer is installed with ribs against or away from the sealing ring. It must be installed the same way during assembly.*
5. Remove the cam (7) and the graduating spring (8).
6. Remove the piston (9) and the piston o-ring (10).
7. Remove the piston return spring (11).
8. Using an 11/16" deep well socket wrench, remove the inlet and exhaust valve assembly (12) and o-ring (13).
9. Discard all components replaced by the content of the maintenance kit.

### ASSEMBLY

Prior to assembly, wash parts retained during disassembly in mineral spirits and dry thoroughly. Using Bendix lubricant part number 291126—or a silicone lubricant equivalent to Dow Corning® 55-M—lubricate the body bores, cam, cam follower, and all o-rings and o-ring grooves. **NOTE:** *Do not lubricate the sealing ring, friction washer, or cam follower serrations.*

1. Install the o-ring on the inlet and exhaust valve assembly and using an 11/16" deep well socket wrench, install the inlet and exhaust valve assembly (12). Torque to 15 in-lbs.
2. Install piston return spring (11).
3. Install o-ring (10) on piston (9) and then install piston (9) in the TC-7 body (1).
4. Install the graduating spring (8) in the body (1).
5. Install the cam (7) in the body (1) with the flat side toward the graduating spring. Index the cam "ears" to corresponding slots in the body.
6. Install the rubber sealing ring (15) on the cam follower (5).
7. Install the friction washer (17) on the cam follower (5) in the same manner as noted in Step 4 of "Disassembly".
8. Install the cam follower (5) in the body.  
**NOTE:** *The Stop "ear" on the cam follower will not permit improper assembly of the cam follower; however, make certain that the positioning "ear" of the friction washer fits in the wide slot in the body.*
9. Install the o-ring (18) in the adjusting ring adapter (4) and install the o-ring (19) in the adjusting ring (6).
10. Install the adjusting ring (6) in the adapter (4) until the adjusting ring is flush with the underside of the adapter.  
**NOTE:** *There are two indexing lugs on the adapter that fit into slots in the valve body when the adapter is installed. Be sure to install the adjusting ring with its wrench slots accessible (up) after the valve is assembled.*

11. Position the adapter (4) and the adjusting ring assembly (6) over the cam follower (5), making certain the adapter lugs fit into the body slots.
12. Push down on the cam follower (5) and install the snap ring (2). Be certain the snap ring is completely seated in its groove.  
**NOTE:** *If the lugs on the adapter (4) are not in their body slots, the snap ring cannot be installed completely.*
13. Before installing the lock washer (3), adjust the valve as described in the "ADJUSTMENT" procedure.

### ADJUSTMENT

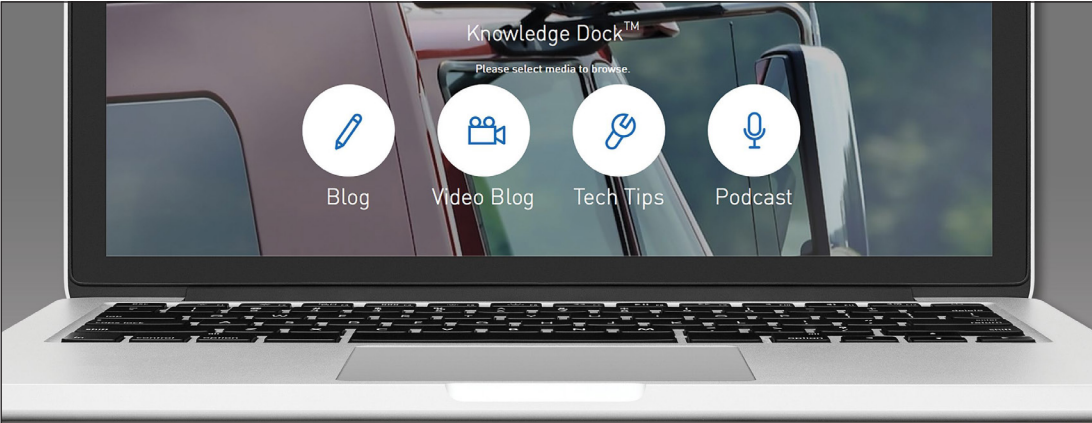
Generally, the Bendix® TC-7™ brake valve should deliver full reservoir pressure; however, there are a few exceptions in special applications.

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.  
Care should be taken not to raise the delivery pressure beyond the design limits; exhaust opening could be restricted.
2. If the delivery pressure is above specified final delivery pressure, it can be lowered by rotating the adjusting ring counterclockwise.  
**NOTE:** *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.*
3. After the adjustment is complete, install the lock washer (3) to hold the adjustment.

### INSTALLATION

1. Using the identification made during removal, reconnect the air lines to the TC-7 valve. **NOTE:** *Maximum torque for fittings is 10 ft-lbs.*
2. Consult the vehicle manual for instructions on remounting the TC-7 valve in or on the steering column. Do not over torque the three 1/4-20 mounting screws. Torque to 30-60 in-lbs (3.39-6.77 kPa).
3. Remount the TC-7 valve handle (16) on the hex cam follower (5) and secure the flat head screw (14). Torque to 30-60 in-lbs (3.39-6.77 kPa).


**NOTE:** *The handle position cannot be adjusted.*



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