



Operation & Maintenance Instruction

26-B-1 BRAKE VALVE PORTION, PART NO. 5597550003

PART NO. 558377, c/w Pipe Bracket 559756 (internal connection)

PART NO. 562622, c/w Pipe Bracket 562623 (external connection)

August, 2000

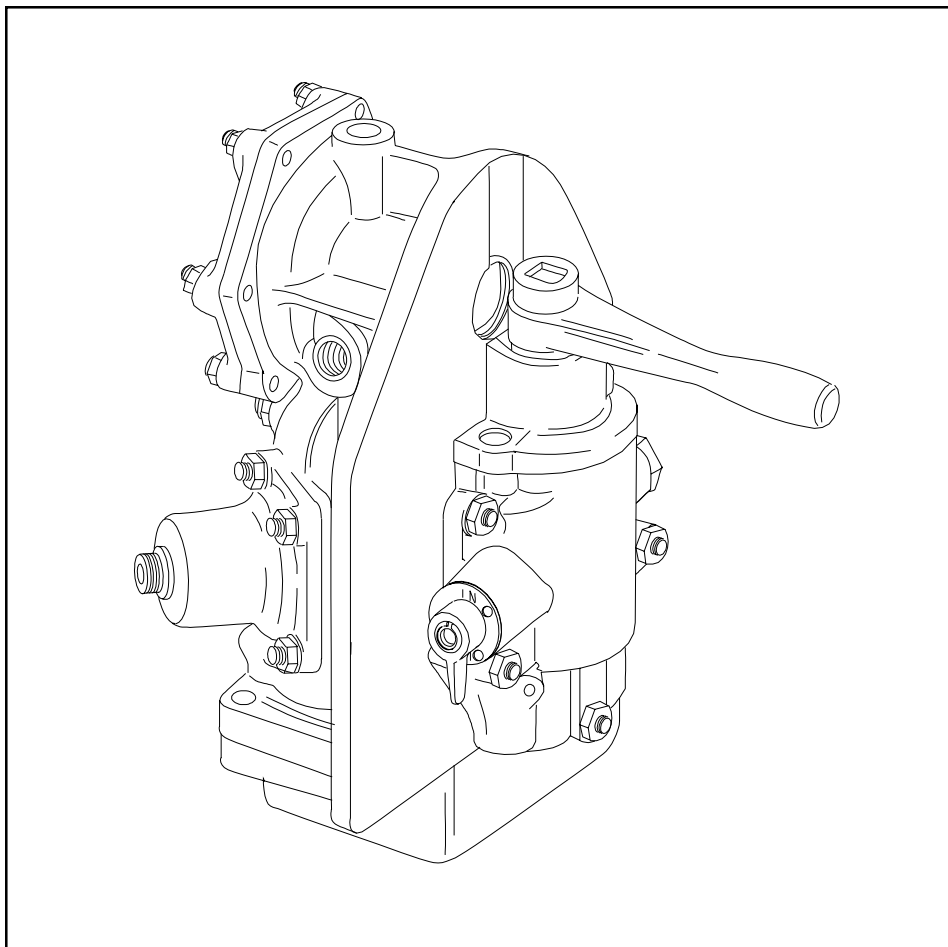
Supersedes issue dated June, 1996

NOTE: The following description and operation is based on this device and its components being new or this device and its components having been repaired, tested, installed and maintained in accordance with instructions issued by this and any other applicable Wabtec Corporation publications.

⚠ WARNING: At the time any part is replaced in this device, the operation of the complete device must pass a series of tests prescribed in the latest issue of the applicable Wabtec Test Specification. At the time this device is applied to the brake equipment arrangement, a stationary vehicle test must be made to insure that this device functions properly in the total brake equipment arrangement. (Consult your local Wabtec Corporation Representative for identity of the test specification, with latest revision date, that covers this device.)

IMPORTANT: Only Wabtec Corporation supplied parts are to be used in the repair of this device in order to obtain satisfactory operation. Commercially available non-O.E.M. parts are unacceptable.

NOTE: The part numbers and their associated descriptions are the property of Wabtec Corporation and may not be replicated in any manner or form without the prior sole written consent of an Officer of Wabtec Corporation.





Operation & Maintenance Instruction

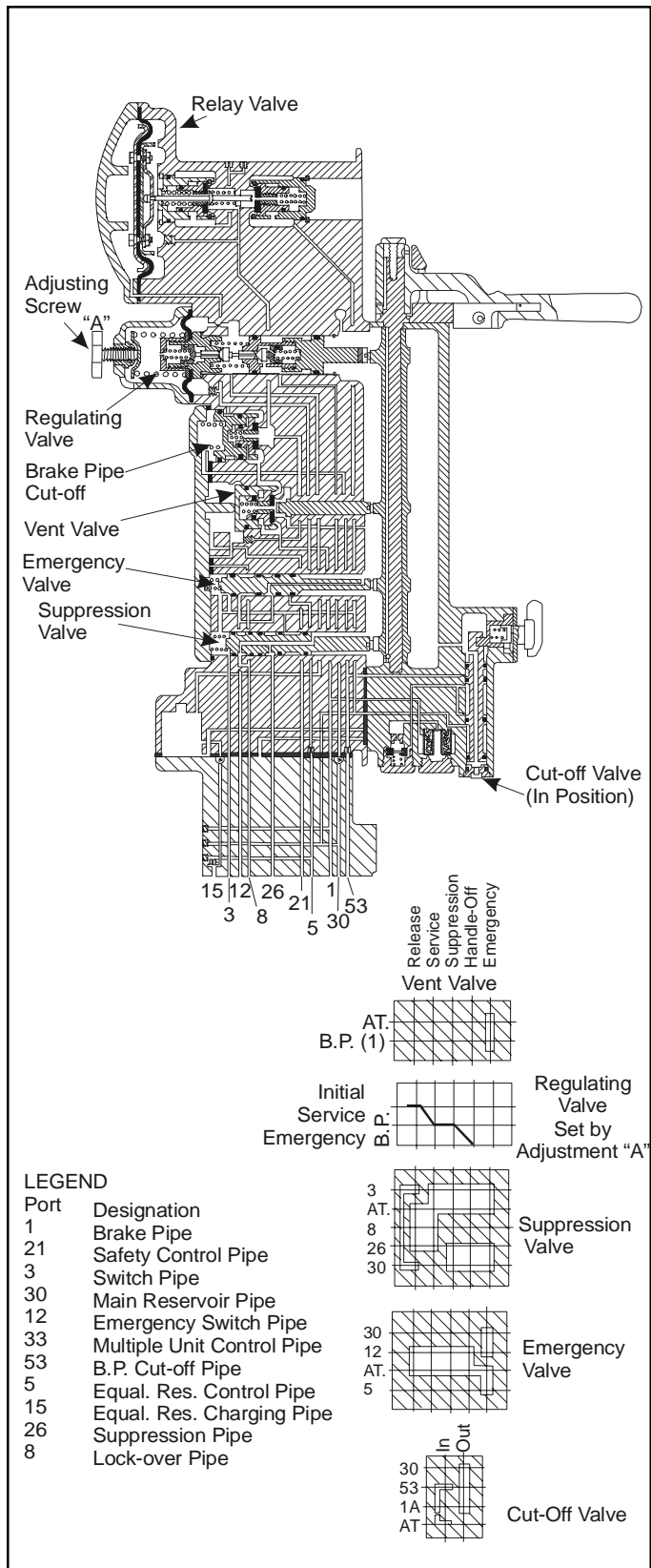


Figure 1 - Diagrammatic

I.0 DESCRIPTION

The 26-B-1 Brake Valve is a device manually operated by the engineman to initiate air actuation in the control of the pneumatic brake devices associated with passenger train operation. It has sensitive controls and interlocks for the most modern railway safety and operating features included in any conventional type passenger railway operation.

The brake valve consists of an operating portion that is secured to a pipe bracket in such a manner that it can easily be replaced. The pipe bracket makes all external pipe connections and is arranged to be mounted under a shelf. Most of the brake valve functions are accomplished with rubber check valves, spool valves with rubber o-rings and rubber diaphragms. The regulating valve portion is provided with a unique interlocking of metal valves and seats which serve to provide air consistently at the desired pressure.

NOTE: All 26-B-1 Brake Valve bodies having suffix coding -0003 on brake valve Part Nos., have flange faces for emergency exhaust piping. See Wabtec Corporation dwg. G925 for emergency exhaust piping to cab exterior of locomotive.

2.0 OPERATION

A. The brake valve is operated by manually moving the brake valve handle into the following positions:

1. Release or Running
2. Minimum Brake Application
3. Service Braking Zone
4. Full Service
5. Suppression
6. Handle Off
7. Emergency

B. Most of the various features of the brake valve are obtained by moving the brake valve handle, but some of the features are initiated by movement of the cutoff valve or by operation of some external device.

C. The brake valve has the following major features:

- 1. Self-Lapping Brake Pipe Pressure Control.** The major purpose of the brake valve is to control the application and release of all the brakes in the train by controlling brake pipe pressure at the brake valve. This is accomplished by positioning a highly sensitive regulating valve to control pressure to an equalizing reservoir. That pressure is used to control a high capacity relay portion that supplies and vents brake pipe to maintain brake pipe pressure the same as in the equalizing reservoir.



Operation & Maintenance Instruction

When the brake valve handle is in release position a regulating valve cam on the handle shaft forces the regulating valve against its spring to open the regulating supply valve. Main reservoir air flows through the equalizing reservoir charging pipe and to the regulating valve diaphragm until there is sufficient force to overcome the spring and permit the regulating valve to return to its lap position. While in release position the force of the regulating valve spring can be manually adjusted to the desired brake pipe pressure. The brake pipe pressure cannot be increased by handle movement above the manual setting in release position.

As the brake valve handle is moved into the service zone the cam is moved away from the regulating valve, opening the exhaust valve and reducing the force on the spring. The regulating valve will exhaust equalizing reservoir air until the pressure on the diaphragm is reduced to the new spring force. Equalizing reservoir pipe pressure will raise or lower as the brake valve handle is moved to release or into the service zone. Equalizing reservoir pressure and brake pipe pressure are always related to the brake valve handle position.

The regulating valve permits the equalizing reservoir pressure to be reduced or restored in increments of less than 1 psi. The capacity of the relay portion is such that brake pipe pressure can be restored quickly to normal pressure when the handle is moved to release position.

2. Brake Valve Cutout. Control of the train brakes can be established by manually turning an integral cutoff valve to "In" position or terminated by turning it to "Out" position. The valve makes the following air connections in:

a. "In" Position

- (1) The brake pipe cut-off valve spring chamber is vented, permitting communication past the valve, between brake pipe and the relay portion.
- (2) Line 53 is vented, providing a means of controlling an external device.

b. "Out" Position

- (1) Main reservoir pressure is directed to the brake pipe cutoff valve spring chamber, closing that valve to prevent control of brake pipe pressure by the relay portion.
- (2) Main reservoir pressure is admitted to line 53 to control an external device. Line 53 provides an interlock between the brake valve and an external device.

- (3) A Dead-Car feature is cut in to charge the main reservoirs in case the car compressor is out of service.

3. Dead-Car Feature. When the cutoff valve is in "Out" position brake pipe air can flow through a strainer and a choke, past a check valve, and through the cutoff valve to charge main reservoir. This feature permits a control car to operate as a coach in a conventional train that has no trainlined main reservoir pipe. The main reservoir charge is needed to supply the brake cylinders.

4. Interlocks for Optional Features. Certain optional features such as Safety Control, Overspeed Control and Train Control causes the initiation of an automatic brake application if actuated. Part of such features require the engineman to take certain action to suppress or release the application. The interlocks for these features are provided by a cam operated suppression valve controlling pressure in external lines 3, 8 and 26.

Other interlocks are required to cut in certain features when the brake valve is controlling the train brakes and to cut out the feature when the brake valve is in a trailing station. These interlocks are provided by the cutoff valve controlling pressure in external line 53.

Additional interlocks are required to cut out or actuate certain features only when the brake valve is in emergency position. This feature is provided by a cam operated emergency spool valve controlling pressure in external line 12.

5. Emergency Venting. An emergency brake application can be initiated at the brake valve by moving the handle to emergency position. In that position a large capacity vent valve is forced open by a cam on the handle shaft, permitting brake pipe pressure to vent at an emergency rate.

6. Emergency Brake Application. The large capacity vent valve can be opened remotely by venting pressure from line 21. This action vents the vent valve spring chamber and permits brake pipe pressure on the opposite side of the piston to force the valve open. When the vent valve is opened in this way a spool valve in the back cover is moved connecting:

- a. Main reservoir pressure to the spring chamber of the brake pipe cut-off valve. This feature breaks communication between the relay portion and brake pipe and prevents supplying main reservoir air to the brake pipe while it is being vented. The brake pipe cut-off valve will remain closed until the vent valve is reset.



Operation & Maintenance Instruction

- b. Line 21 to line 8. Line 8 remains open until the suppression spool valve is moved by moving the brake valve handle to suppression, handle off or emergency position. This feature requires the engineman to take some definite braking action, and is designed to prevent the brake equipment from automatically resetting by closing line 21.

7. Vent Valve Operation. The vent valve can be physically opened through a cam by manual movement of the brake valve handle to emergency position or pneumatically by a pressure differential caused by venting line 21. The vent valve is a large capacity valve capable of reducing brake pipe pressure at a rate that, when transmitted through a train, will cause control valves in the train to move to emergency position. The vent valve is held in its normally closed position by springs and by main reservoir pressure supplied through a choke in the vent valve. In its closed position, port No. 8 and the main reservoir port are closed off at the associated spool valve in the back cover. When the vent valve is operated through venting of line 21, main reservoir pressure is directed through the brake pipe cut-off valve to keep that valve closed and ports 8 and 21 are connected. As a result of this interlock, the vent valve can be reset only by closing the vent in line 21 and also by moving the brake valve handle to suppression position. In suppression position, port No. 8 is closed in the suppression valve and main reservoir pressure can then rebuild through the choke in the vent valve piston to permit sufficient build-up of pressure in line 21 to close the vent valve.

3.0 MAINTENANCE SCHEDULE

IMPORTANT: The 26-B-1 Brake Valve should be removed from the equipment arrangement, taken to the shop, be completely disassembled, the parts cleaned, lubricated, assembled, using **NEW** Wabtec Corporation rubber parts and other specified **NEW** Wabtec Corporation parts. The Valve is then tested according to the following vehicle application schedule, or more frequently if service conditions so indicate.

Recommended Type of Application	Frequency - At Least Once Every
Locomotives	24 Months
Freight	24 Months
Passenger Transit	24 Months

4.0 PARTS CATALOG & REPLACEMENT

4.1 Parts Catalog

IMPORTANT: When ordering replacement parts for the 26-B-1 Brake Valve, refer to the current issue of the appropriate Wabtec Corporation Parts Catalog.

NOTE: The reference numbers used in this publication and those used in the parts catalog may differ. Check the descriptive parts name to be sure that the desired part is ordered.


4.2 Replacement Parts

IMPORTANT: To obtain satisfactory operation and reliability of the 26-B-1 Brake Valve **ONLY** Wabtec Corporation replacement parts are to be used in the maintenance of the 26-B-1 Brake Valve. Commercially available parts are unacceptable.

5.0 SAFETY PROCEDURES AND WARNINGS

Regular car builder and/or owner-operating property and/or shop safety procedures **MUST BE** followed when performing any work on the 26-B-1 Brake Valve and/or its component parts. The work area should be clean.

WARNING:

The following statements of warning apply, all or in part, wherever the symbol  appears in the maintenance procedures. Failure to observe these precautions may result in serious injury to those performing the work and/or bystanders.

- The use of an air jet, which **MUST BE** less than 30 p.s.i.g., to blow parts clean or to blow them dry after being cleaned with a solvent will cause particles of dirt and/or droplets of the cleaning solvent to be airborne. Wire brushing may also cause particles of dirt, rust and scale to become airborne. These conditions may cause skin and/or eye irritation.
- When using an air jet do not direct it toward another person. Improper use of air jet could result in bodily injury.
- Personal eye protection **MUST BE** worn when performing any work on this device or its component parts to avoid any possible injury to the eyes.
- The use of solvents as cleaning agents and the use of lubricants can involve health and/or safety hazards. The manufacturers of the solvents and



Operation & Maintenance Instruction

lubricants should be contacted for safety data (such as OSHA Form OSHA-20 or its equivalent). The recommended precautions and procedures of the manufacturers should be followed.

- When performing any test or work on devices or equipment while they are on the vehicle (on-car test etc.) special precautions **MUST BE** taken to insure that vehicle movement will not occur which could result in injury to personnel and/or damage to equipment.
- Assembly may be under a spring load. Exercise caution during disassembly so that no parts spring out and cause bodily injury.
- All air supply to this device and/or to any component part **MUST BE** cut off and any air in the device be allowed to vent before this device and/or any component part is removed from the equipment arrangement.
- Bottled up air under pressure (even though air supply is cut off) may cause gaskets and/or particles of dirt to become airborne and an increase in sound level when this device and/or any component part is removed from the equipment arrangement. Personal eye and ear protection **MUST BE** worn and care taken to avoid possible injury when performing any work on this device and/or component part.
- To prevent receiving electrical shock when performing electrical test, hands **MUST BE** clear of electrical components, contacts and housing and the required "in-lab" grounding procedures **MUST BE** strictly adhered to. A wooden work bench should be used. Failure to heed this **WARNING** could result in severe injury or death.

6.0 TOOLS, CLEANING SOLVENT AND LUBRICANTS

6.1 Tools

6.1.1 The following tools **MUST BE** available for servicing the 26-B-1 Brake Valve.

- Spanner wrench - used for disassembling and assembling the regulating valve. Dimensions for this wrench are shown in Figure 2.
- $\frac{5}{16}$ " multi-spline key - Wabtec Part No. 522525.
- $\frac{7}{16}$ " multi-spline key - Wabtec Part No. 522527.
- $\frac{1}{2}$ " multi-spline key - Wabtec Part No. 517557.
- $\frac{3}{4}$ " multi-spline key - Wabtec Part No. 518032.
- $\frac{5}{16}$ " hex key.
- No. 1 Truarc retaining ring pliers.
- No. 3 Truarc retaining ring pliers.

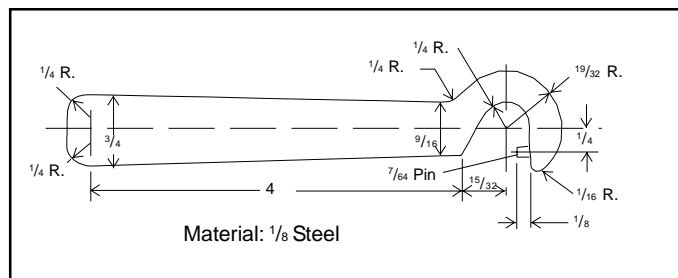


Figure 2 - Wrench

6.2 Solvents

6.2.1 The solvent used for cleaning **MUST BE** an aliphatic organic solution, such as mineral spirits or naphtha, that will dissolve oil or grease. The solvent must permit all parts to be thoroughly cleaned without abrasion.

⚠ WARNING: THE USE OF SOLVENTS AS CLEANING AGENTS CAN INVOLVE HEALTH AND/OR SAFETY HAZARDS. THE MANUFACTURERS OF THE SOLVENTS SHOULD BE CONTACTED FOR SAFETY DATA (SUCH AS OSHA FORM OSHA-20 OR ITS EQUIVALENT). THE RECOMMENDED PRECAUTIONS AND PROCEDURES OF THE SOLVENT MANUFACTURERS SHOULD BE FOLLOWED.

6.3 LUBRICANTS

6.3.1 The following lubricants **MUST BE** available when servicing the 26-B-1 Brake Valve:

- No. 2 Silicone Grease, Wabtec Corporation Specification M-7680-2 - used to lubricate o-rings, o-ring grooves and the bearing surface of the bushings into which the o-ring assemblies are installed.
- Dry Graphite, AAR Specification M-913, Wabtec Corporation Specification M-7695-2 and Oil (SAE-20) mixed in a compound of two parts oil to one part graphite by weight - used to lubricate the threads of the choke plugs.
- No. 1 Graphite Grease, Wabtec Corporation Specification M-7660-1 - used to lubricate the older style cams, (cams which do not have sandblasted surfaces).

⚠ CAUTION: LUBRICANTS MAY CAUSE SKIN AND/OR EYE IRRITATION. Exercise care when working with lubricants.

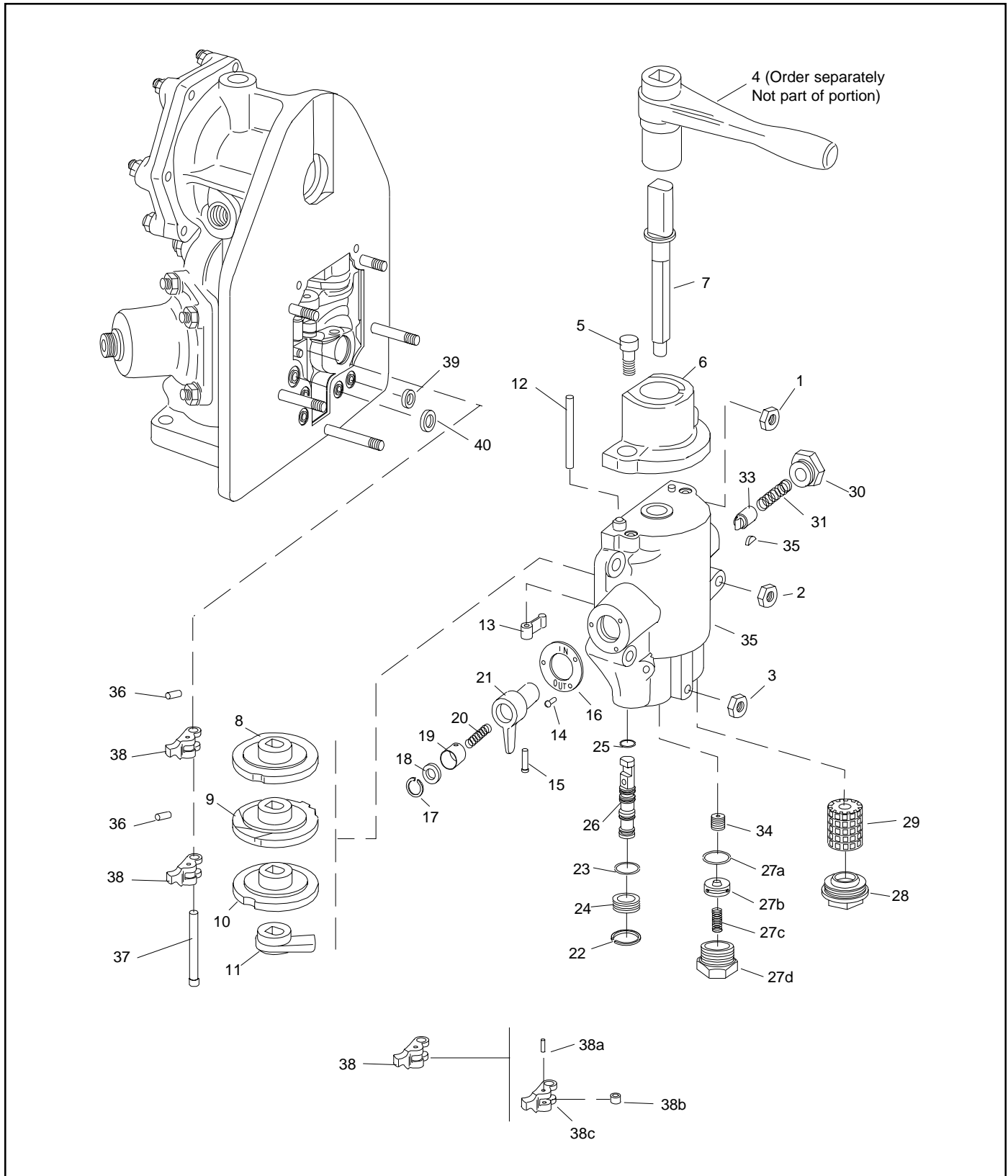


Figure 3 - 26-B-1 Brake Valve



Operation & Maintenance Instruction

(NOTE: General shop safety procedures **MUST BE** followed when working on or repairing the brake valve. The work area should be clean and free of debris. Safety goggles **MUST BE WORN** to protect the eyes from injury).

7.0 MAINTENANCE PROCEDURES

7.1 REMOVAL OF VALVE PORTION "ON-CAR"

7.1.1 IMPORTANT: ALL car builder and owner-operating property safety procedures in addition to warnings as listed in Section 5 of this publication **MUST BE** adhered to.

7.1.2 IMPORTANT: The handbrake(s) of the car **MUST BE** applied and the wheels of the car chocked to prevent unintentional car movement. Warning placards indicating that work is being performed are to be placed on and about the car.

7.1.3 IMPORTANT: ALL air flow to the 26-B-1 **MUST BE** allowed to deplete and subsequently be cut off.

7.1.4 The pipe bracket is hard piped to the car and is usually serviced 'on-car'. Remove the four cap screws (54) from the bottom of the pipe bracket (55). Remove the operating portion from the pipe bracket (55). Protect the ports on the operating portion by covering them with tape so that no dirt or other contaminants can enter the operating portion. The operating portion is then transported to the repair shop for servicing.

7.1.5 Remove and SCRAP gasket (56) and strainers (55a) from the pipe bracket.

7.1.6 Install NEW strainers (55a) into their seats in the pipe bracket (55).


7.1.7 Install a NEW gasket (56) on the pipe bracket (55).

7.1.8 Remove the protective covering on the ports of a NEW or reconditioned operating portion, and install it in its position on the pipe bracket (55). Install the four hex head cap screws (54).

7.2 DISASSEMBLY (Refer to Figures 3, 4 and 5)

IMPORTANT: The procedures which follow are to be performed in the repair shop.

IMPORTANT: When performing the procedures which follow, **DO NOT** use hard or sharp metal tools to remove key seals or gaskets. Exercise care so that no damage occurs to the metal parts.

 **WARNING:** The handle spring will be placed under tension. Exercise care so that the spring does not break and/or fly out of the assembly. A broken spring or a spring that is inadvertently expelled from the assembly may cause bodily injury and/or damage to property. Personal eye protection **MUST BE** worn to avoid any possible injury to the eyes.

7.2.1 Referring to Figure 3, with the brake valve handle (4) in the "Handle-Off" position, remove the handle from the brake valve.


7.2.2 Referring to Figure 5, turn the regulating valve adjusting screw (58) outward, using the 1/2" multi-spline key, (Wabtec Corporation Part No. 517557), to release tension on the regulating valve spring (61).

7.2.3 Referring to Figure 3, remove the three 3/8" machine screws (14) which secure the name plate (16) to the cam housing (35), then remove the name plate (16) and handle assembly.

7.2.3.1 Depress the latch (19) slightly, then push the detent pin (15) into the handle (21) and remove the name plate (16).

7.2.3.2 Remove the detent pin (15) from the handle (21).

7.2.3.3 Remove the retaining ring (17), washer (18), latch (19) and spring (20) from the handle (21).

 **CAUTION:** Exercise care that the spring **does not** "fly" out and cause bodily injury.

7.2.4 Remove the retainer ring (22) from the bottom of the cam housing (35), then remove the protection plug (24).

7.2.4.1 Remove and scrap the 13/16" O.D. o-ring (23) from the protection plug (24).

7.2.5 Remove the cut-off valve (26).

7.2.5.1 Remove and scrap the four 1/2" O.D. o-rings (25) from the cut-off valve (26).

7.2.6 Remove the brass spill-over check valve cap nut assembly (27) from the bottom of the cam housing (35).

7.2.6.1 Disassemble the spill-over check valve cap nut assembly (27) by removing the retaining ring (27a), check valve (27b) and spring (27c).

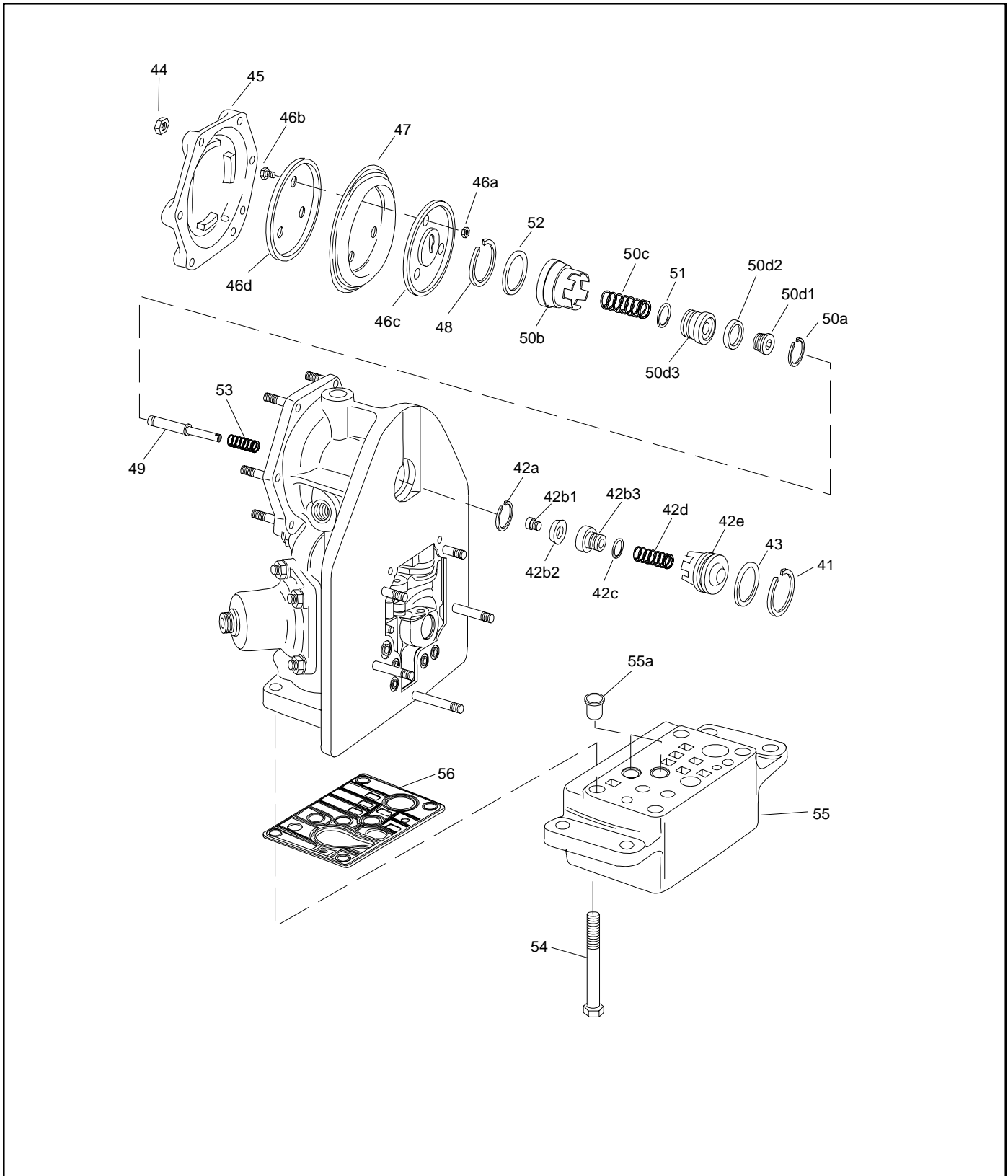


Figure 4 - 26-B-1 Brake Valve



Operation & Maintenance Instruction

⚠ CAUTION: Exercise care so that the spring **does not** “fly” out and cause bodily injury.

7.6.2.2 To remove the check valve retainer ring (27a) from the check valve assembly (27) insert a $\frac{1}{16}$ " rod into the hole in the side of the check valve cap nut (27d) then press inward on the retaining ring (27a) and remove the retaining ring.

7.2.7 Remove the strainer cap nut (28) and strainer assembly (29) from the cam housing (35).

7.2.8 Remove five $\frac{5}{16}$ " hex nuts (1, 2, 3) which secure the cam housing body (35) to the brake valve body (104). Remove the cam housing assembly from the brake valve body.

7.2.9 Remove the latch nut (30), spring (31) and latch (33) from the cam housing (35).

7.2.10 Remove the two $\frac{3}{8}$ x $\frac{7}{8}$ " hex socket screws (5) using the $\frac{5}{16}$ " hex key, then remove the handle guard (6) from the cam housing body (35). Remove the pin (12) from the handle guard mounting face of the cam housing (35) which secures the cam dog (13) to the cam housing (35) and remove the cam dog (13).

7.2.11 Remove the cam shaft (7) from the cam housing (35) and the four cams (8, 9, 10, 11) from the cam shaft (7).

7.2.11.1 Remove the pin (37) and cam dog (38) from the cam housing (35).

7.2.12 Remove and scrap the four $\frac{11}{16}$ " O.D. ring gaskets (39) and the $\frac{7}{8}$ " O.D. ring gasket (40) from the cam housing mounting face of the brake valve body.

7.2.13 Remove the cylindrical spring pin (36) from the cam pin (37), then remove the cam pin (37) and two cam dogs (38).

7.2.13.1 Remove the pin (38a) from each of the two cam dog assemblies, freeing the rollers (38b) as the pins (38a) are removed.

7.2.14 Referring to Figure 5, remove the four $\frac{3}{8}$ " hex nuts (73) and back cover assembly from the brake valve body (104).

7.2.14.1 Depress the application valve spring (77) and spring seat (76), then remove the retaining ring (75), spring seat (76) and spring (77).

7.2.14.2 Remove the cap nut (74) and application valve (79) from the back cover (80).

7.2.14.2.1 Remove and scrap the four $\frac{1}{2}$ " O.D. o-rings (78) from the application valve (79).

7.2.14.3 Remove the spring (84) from the brake pipe cut-off valve (89), the spring (81) from the emergency valve (86) and the spring (81) from the suppression valve (83).

7.2.14.4 Remove and scrap the back cover gasket (93) from the brake valve body (104).

7.2.14.5 Remove the emergency valve (86) from the brake valve body (104).

7.2.14.5.1 Remove and scrap the four $\frac{1}{2}$ " O.D. o-rings (85) from the emergency valve (86).

7.2.14.6 Remove the suppression valve (83) from the brake valve body (104).

7.2.14.6.1 Remove and scrap the five $\frac{1}{2}$ " O.D. o-rings (82) from the suppression valve (83).

7.2.14.7 Remove the vent valve assembly (92) from the brake pipe body (104).

7.2.14.7.1 Remove and scrap the $\frac{13}{8}$ " O.D. o-ring (90) and $2\frac{1}{8}$ " O.D. O-ring (91).

7.2.14.7.2 Remove the retainer ring (92a) from the vent valve cage (92c) then remove the valve seal assembly (92d) and spring (92b).

7.2.14.7.3 Remove and scrap the $\frac{15}{16}$ " O.D. o-ring (92e) from the valve seal assembly.

7.2.14.7.4 By means of a wrench, hold the seal housing (92d3), then with a $\frac{1}{2}$ " multi-spline key, Wabtec Corporation Part No. 517577, remove seal retainer (92d1) and seal (92d2). Scrap seal (92d2).

7.2.14.8 Remove the brake pipe cut-off valve assembly (89) from the brake valve body (104).

7.2.14.8.1 Remove and scrap the $\frac{13}{8}$ " O.D. o-ring (88) and 2" O.D. o-ring (87).

7.2.14.8.2 Remove the retaining ring (89a) from the valve cage (89c) then remove the valve seal assembly (89d) and spring (89b).

7.2.14.8.3 Remove and scrap the $\frac{15}{16}$ " O.D. O-ring (89e) from the valve seal assembly (89d).

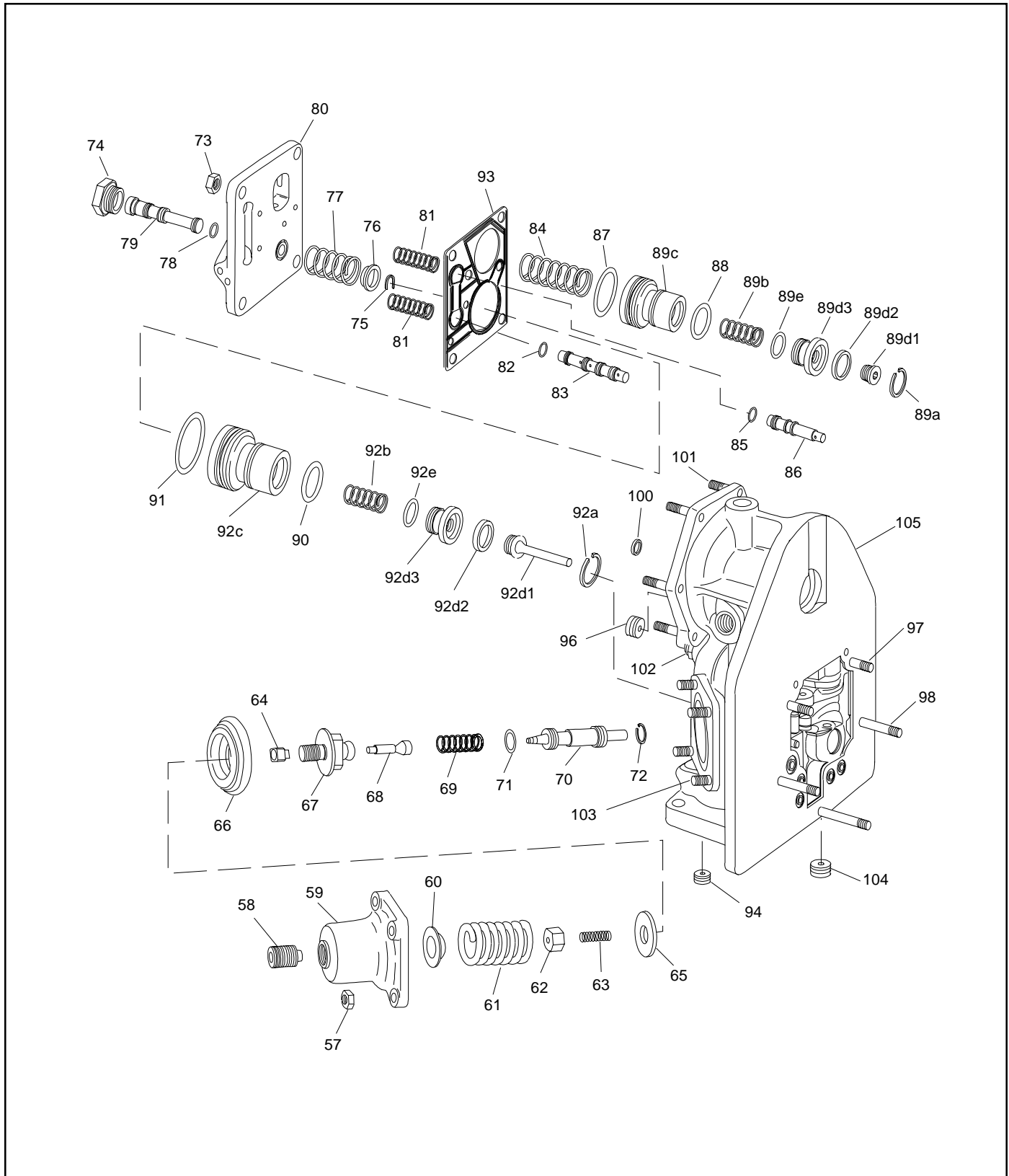


Figure 5 - 26-B-1 Brake Valve



Operation & Maintenance Instruction

7.2.14.8.4 By means of a wrench, hold the seal housing (89d3), then with the $\frac{3}{4}$ " multi-spline key Wabtec Corporation Part No. 518032, remove the seal retainer (89d1) and seal (89d2). Scrap seal (89d1)

7.2.15 Remove the four $\frac{5}{16}$ " hex nuts (57) which secure the spring housing (59) to the brake valve body (104).

7.2.15.1 Remove the following parts from the brake valve body (104):

- (1) Spring housing (59)
- (2) Spring seat (60)
- (3) Spring (61)
- (4) Diaphragm and exhaust valve spring seat assembly (62 to 67 incl.)

7.2.15.2 Disassemble the diaphragm and exhaust valve spring seat assembly (62 to 67 incl.) as follows:

7.2.15.2.1 Remove the exhaust valve spring seat (62) from the exhaust valve seat (67) freeing the exhaust valve spring (63) diaphragm follower (65), diaphragm (66) and spring seat (64). Scrap diaphragm (66)

7.2.15.3 Remove the following from the brake valve body (104):

- (1) Valve (68)
- (2) Spring (69)
- (3) Regulating valve (inlet valve) assembly (70).

7.2.15.4 Disassemble the regulating valve assembly (70) as follows:

7.2.15.4.1 Remove and scrap the two $\frac{13}{16}$ " O.D. O-rings (71) from the larger diameters of the regulating valve assembly (70).

7.2.15.4.2 (Referring to the assembly view, Figure 6). Carefully hold the inlet valve portion of the regulating valve with a suitable wrench, then use a spanner wrench (see Section 6) to remove the inlet valve spring housing portion of the

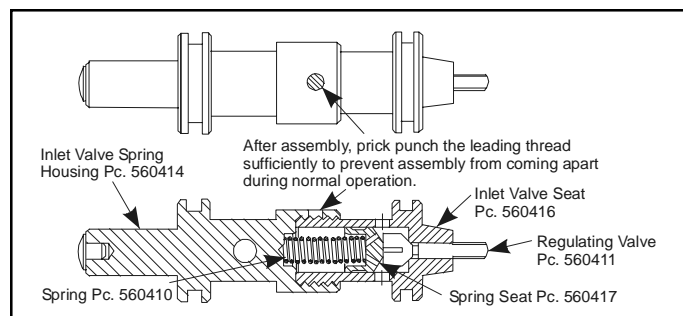


Figure 6 - Assembly View

regulating valve, thus freeing the regulating valve spring, the spring seat, and the valve.

⚠ CAUTION: EXERCISE CARE SO THAT NONE OF THE PARTS "FLY OUT" AND CAUSE BODILY INJURY.

NOTE: The inlet valve seat portion has the movable fluted portion of the regulating valve protruding from its smaller diameter.

NOTE: The inlet valve spring housing portion has the wearing tip on its smaller diameter.

7.2.15.5 Remove the retaining ring (72) from the regulating valve bushing in the brake valve body (104).

7.2.16 Referring to Figure 4, remove the six $\frac{5}{16}$ " hex nuts (44) and relay valve cover (45).

7.2.16.1 Remove and scrap the $\frac{9}{16}$ " ring gasket (99) from the brake valve body.

7.2.16.2 Refer to Figure 4. Carefully remove the diaphragm assembly (46).

NOTE: The relay valve diaphragm assembly is held in place by means of a ball socket joint on the end of the diaphragm stem (49) and the lower diaphragm follower (46c).

7.2.16.2.1 Disassemble the diaphragm assembly (46) by removing the three $\frac{3}{16}$ " nuts (46a), three $\frac{3}{16}$ " hex screws (46b), the upper diaphragm follower (46d) and the lower diaphragm follower (46c). Scrap the diaphragm (47)

7.2.16.3 Remove the retaining ring (48) which holds the exhaust valve assembly (50) in the brake valve body (104).

7.2.16.4 Remove the exhaust valve assembly (50), stem (49) and spring (53).

⚠ CAUTION: Exercise care so that no springs "fly" out of the assembly and cause bodily injury.

7.2.16.4.1 Remove the spring (53) from the stem (49).

7.2.16.4.2 Remove the stem (49).

7.2.16.4.3 Remove and scrap the $1\frac{5}{8}$ " O.D. O-ring (52) from the exhaust valve assembly (50).

7.2.16.4.4 Remove the retaining ring (50a).

7.2.16.4.5 Remove the valve seal assembly (50d) and spring (50c).



Operation & Maintenance Instruction

7.2.16.4.6 Remove and scrap the $^{15}/_{16}$ " O.D. O-ring (51) from the valve seal assembly (50) using the $^{3}/_{4}$ " multi-spline key (Wabtec Corporation Part No. 518032) remove the seal retainer (50d1) and seal (50d2) from the housing (50d3). Scrap the seal (50d2).

7.2.17 Remove the retaining ring (41) which holds the supply valve assembly (42) in the brake valve body (104).

7.2.17.1 Remove the supply valve assembly (42) by grasping the end of the assembly with a pair of pliers and pulling outward.

7.2.17.1.1 Remove and scrap the $^{17}/_{16}$ " O.D. o-ring (43).

7.2.17.1.2 Remove the retaining ring (42a).

7.2.17.1.3 Remove the valve seal assembly (42b) and spring (42d).

7.2.17.1.3.1 Remove and scrap the $^{11}/_{16}$ " O.D. o-ring (42c) and seal assembly (42b).

7.2.17.1.3.2 Using the $^{5}/_{16}$ " multi-spline key (Wabtec Corporation Part No. 522525) remove the seal retainer (42b1) and seal (42b2) from the seal assembly (42b). Scrap the seal (42b2).

7.3 CLEANING, INSPECTING AND REPAIRING

With the brake valve completely disassembled, all parts **MUST BE** cleaned and inspected.

(Refer to the appropriate Wabtec Corporation Parts Catalog).

7.3.1 METAL PARTS

7.3.1.1 All metal parts except the body and the cam housing **MUST BE** washed in the cleaning solvent described in Section 6.2. The exterior of the body and the cam housing **MUST BE** cleaned using a lint-free cloth or rag which is saturated with the cleaning solvent. After the parts are cleaned, they **MUST BE** completely dried with a low pressure (less than 30 psig) jet of clean, dry air. **SAFETY GOGGLES MUST BE WORN TO PROTECT THE EYES FROM INJURY.**

7.3.1.2 CHOKES - The size of the chokes is important and whenever a device is disassembled, choke fittings **MUST BE** cleaned and inspected to insure that they are not restricted.

7.3.1.2.1 (Referring to Figure 3 - 34 and Figure 5 - 94, 95 and 103) The chokes **MUST BE** removed, cleaned and replaced one at a time. Where this process is followed, misapplication

of the chokes should not occur. While the choke is removed, the passage **MUST BE** checked for cleanliness and blown out if necessary with a low pressure (less than 30 psig) jet of clean, dry air. Chokes can be cleaned by washing with the prescribed cleaning solvent (see Section 6.2) and then blown dry with a low pressure (less than 30 psig) jet of clean, dry air. **SAFETY GOGGLES MUST BE WORN TO PROTECT THE EYES FROM INJURY.**

⚠ WARNING: METALLIC TOOLS MUST NOT BE USED FOR CLEANING CHOKES AS THEIR SIZE MUST NOT BE CHANGED.

7.3.1.2.2 After the choke plugs have been thoroughly cleaned, threads of the choke plugs **MUST BE** coated with a compound of one part graphite (AAR Specification M-913) and two parts of oil (SAE-20) by weight before being assembled into the brake valve.

7.3.1.2.3 Springs may be wire brushed to assist in the removal of rust and scale. **SAFETY GOGGLES MUST BE WORN TO PROTECT THE EYES FROM INJURY.** Springs **MUST BE** replaced if they are rusted, distorted or have taken a permanent set.

7.3.1.2.4 Retaining rings should be replaced if they are broken or not elastic enough to clamp securely.

7.3.1.2.5 Reject and replace any part that is cracked, cut, broken, damaged in any way or is in such a condition which would result in unsatisfactory operation.

7.3.2 RUBBER PARTS

7.3.2.1 GASKETS, O-RINGS, DIAPHRAGM, CHECK VALVES and SEALS

7.3.2.1.1 ALL gaskets, O-rings, diaphragms, and seals are to be **SCRAPPED** and replaced with **NEW** Wabtec Corporation parts.

7.4 LUBRICATION

7.4.1 Just prior to assembly, lubricate all o-rings, the grooves and bushings into which they fit with No. 2 Silicone Grease (Wabtec Corporation Specification M-7680-2).

7.4.2 Coat the o-ring and fill the groove with grease. After the o-ring is installed in the groove, remove the excess grease by wiping with a lint-free cloth. Coat the bearing surface of the bushing with grease before the o-ring is inserted. **CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.** Exercise care when working with lubricants.



Operation & Maintenance Instruction

7.4.3 The cams and cam dogs which do not have sandblasted surfaces **MUST BE** lubricated before assembling with No. 1 Graphite Grease, Wabtec Corporation Specification M-7660-1.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

NOTE: The newer style emergency and suppression cams and cam dog rollers with sandblasted surfaces **MUST NOT** be lubricated, but should be maintained clean and dry to retain rolling friction which will prevent any sliding action of these parts.

7.5 ASSEMBLY

IMPORTANT: DURING ASSEMBLY, CAREFULLY INSTALL SPRINGS AND RETAINING RINGS TO PREVENT PARTS FROM "SPRINGING OUT" AND CAUSING PERSONAL INJURY. SAFETY GOGGLES **MUST BE** WORN TO PROTECT THE EYES FROM INJURY.

7.5.1 Referring to Figure 4, assemble the Supply Valve Assembly (42) as follows:

7.5.1.1 Insert a NEW seal (42b2) into the supply valve seat (seal housing) (42b3) and secure it in place with the seal retainer (42b1). Secure the retainer using the $\frac{5}{16}$ " multi-spline key (Wabtec Corporation Part No. 522525).

7.5.1.2 Install a NEW lubricated $1\frac{1}{16}$ " O.D. O-ring (42c) into the groove on the valve seal housing (42b3). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.1.3 Insert the spring (42d) and supply valve seal assembly (42b) into the supply valve cage (42e) and secure it in place with the retaining ring (42a) exercising care that the spring does not "fly" out and cause bodily injury.

7.5.1.4 Install a NEW lubricated $1\frac{7}{16}$ " O.D. O-ring (43) into the groove on the supply valve assembly (42). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.1.5 Carefully insert the supply valve assembly (42) into the brake valve body (104) and secure it in place with the retaining ring (41).

7.5.2 Reassemble the Exhaust Valve Assembly (50) as follows:

7.5.2.1 Insert a NEW seal (50d2) into the exhaust valve seat (housing) (50d3) and secure it in place with the seal retainer (50d1). Secure the retainer using the $\frac{3}{4}$ " multi-spline key (Wabtec Corporation Part No. 518032).

7.5.2.2 Install a NEW lubricated $1\frac{5}{16}$ " O.D. O-ring (51) into the groove on the valve seal housing (50d3). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.2.3 Insert spring (50c) and valve seal assembly (50d) into the exhaust valve cage (50b) and lock it in place with the retaining ring (50a).

7.5.2.4 Install a NEW lubricated $1\frac{5}{8}$ " O.D. O-ring (52) into the groove on the exhaust valve cage (50b). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.2.5 Insert the diaphragm stem (49) into the exhaust valve assembly (50).

7.5.2.5.1 Place the spring (53) on the stem (49).

7.5.2.6 Carefully insert the exhaust valve assembly (50) into the brake valve body and lock in place with the retaining ring (48).

7.5.3 Assemble a NEW relay valve diaphragm (47), the upper follower (46d) and the lower follower (46c) together with the three $\frac{3}{16}$ " hex screws (46b) and the three nuts (46a).

7.5.4 Install the relay valve diaphragm assembly (46) into the body (104) making certain that the ball socket joint of the stem is in the slot on the lower diaphragm follower (46c).

7.5.5 (Figure 5) Insert the right gasket (99) into the groove in the brake valve body at the relay valve cover mounting face.

7.5.6 (Figure 4) With the six $\frac{5}{16}$ " hex nuts (44), secure the relay valve cover (45) in place on the brake valve, making certain that the bead of the diaphragm (47) is in the groove in the brake valve body.



Operation & Maintenance Instruction

7.5.7 (Figure 5) Insert the retaining ring (72) into the regulating valve bush being careful not to score the bushing.

7.5.8 Preassemble each of the two cam dog assemblies (38) as follows:

7.5.8.1 Place the rollers (38b) in the clevis area of the cam dog (38c) so that the pin holes are aligned..

7.5.8.2 Insert the pin (38a) through the holes in the cam dog (38c) and roller (38b) to secure the roller (38b) in place.

7.5.9 Lubrication instructions for cams and cam dog rollers is found in Section 7.4. **WARNING: CAMS AND CAM DOG ROLLERS WHICH HAVE SANDBLASTED SURFACES MUST NOT BE LUBRICATED.** (Figure 4) Place the lower cam dog (38) on the cam pin (37), then insert the cam pin into the cam pin hole in the brake valve body and press it until the pin protrudes out the upper end of the pin hole of the brake valve body. Place the upper cam dog (38) in position in the brake valve body, then press the pin through the cam dog until the hole for the cylindrical spring pin has extended past the cam dog. Insert the cylindrical spring pin (36) into the hole at the end of the cam pin (37).

7.5.10 Lubrication instructions for cams and cam dog rollers if found in Section 7.4. **WARNING: CAMS AND CAM DOG ROLLERS WHICH HAVE SANDBLASTED SURFACES MUST NOT BE LUBRICATED.** (FIGURE 3) Insert the cam shaft (7) approximately 1" into the cam housing (35) then place No. 1 cam (8) on the shaft (7). place No. 2 cam (9) on the shaft, then press the shaft just through the No. 2 cam (9). Place No. 3 cam (10) on the cam shaft (7), then press the shaft just through the No. 3 cam. Place the vent valve cam (11) on the cam shaft, then press the cam shaft (7) through the vent valve cam (11) and into the lower bushing in the cam housing (35).

7.5.10.1 Insert the pin (12) into the hole in the handle guard mounting face of the cam housing (35). Place the cam dog (13) in position in the cam housing (35), then press the pin (12) into the cam housing and through the hole in the cam dog (13).

7.5.10.2 Secure the handle guard (6) to the cam housing (35) using the two $\frac{3}{8}$ x $\frac{7}{8}$ " hex socket screws (5).

7.5.10.3 Insert four NEW $\frac{11}{16}$ " O.D. ring gaskets (39) and the one NEW $\frac{7}{8}$ " O.D. ring gasket (40) into the gasket grooves in the brake valve body.

7.5.10.4 With the brake valve body (104) in a vertical position, turn the cam shaft (7) in the handle guard (6) to handle off

position. This will permit the regulating cam dog to drop into the indent in the regulating valve cam, then secure the cam housing (35) to the brake valve body (104) using the five $\frac{5}{16}$ " hex nuts (1, 2, 3).

7.5.11 Assemble the Spill-Over Check Valve Assembly as follows:

7.5.11.1 Place the spring (27c) and rubber check valve (27b) into the cap nut (27d) and lock in place with the retainer ring (27a) exercising care that the spring does not "fly" out and cause bodily injury.

7.5.11.2 Insert the spill-over check valve cap nut (27) into the bottom of the cam housing (35).

7.5.11.3 Insert the strainer assembly (29) and strainer cap nut (28) into the bottom of the cam housing (35).

7.5.12 Assemble the Brake Valve Cut-off Assembly as follows:

7.5.12.1 Insert the latch spring (20) latch (19) and washer (18) into the handle (21) and secure it with the retainer ring (17) exercising care that the spring does not "fly" out and cause bodily injury.

7.5.12.2 Insert the detent pin (15) into the handle (21) until the head of the pin (15) is flush with the handle (21).

7.5.12.3 Place the name plate (16) in position on the handle (21), then press the pin (15) into the handle (21) until the pin is properly positioned in the latch (19).

7.5.12.4 Install four NEW lubricated $\frac{1}{2}$ " O.D. o-rings (25) into the grooves on the cut-off valve (26). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

⚠ CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.12.5 With the milled slot in the cut-off valve (26) facing outward insert the cut-off valve into the bottom of the cam housing (35), until the slot is visible through the handle opening in the side of the cam housing. Insert the handle (21) into the cam housing (35). The eccentric cam of the handle must go into the milled slot in the cut-off valve. **HANDLE MUST BE TURNED SO THAT DETENT PIN IS IN LINE WITH ONE OF THE NOTCHES IN CAM HOUSING.**

7.5.12.6 Depress the latch (19) and turn the handle (21) one quarter turn and note that it locks in position.



Operation & Maintenance Instruction

7.5.12.7 Secure the name plate (16) to the cam housing (35) using the three $\frac{3}{8}$ " screws (14).

7.5.12.7.1 Depress the latch (19) and turn the handle (21) several times between "IN" and "OUT" position.

7.5.12.8 Insert a NEW lubricated $\frac{13}{16}$ " O.D. o-ring (23) into the groove on the cut-off valve protection plug (24). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth. **CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.** Install the plug (24) with o-ring (23) into the bottom of the cam housing (35) and lock the assembly in place with the retainer ring (22).

7.5.13 Place the brake valve handle (4) on the cam shaft (7) then move the handle (4) to "Release" position.

7.5.14 Insert the latch key (32) into the latch (33) and spring (31) into the cam housing (35) and secure them in place with the latch nut (30). Exercise care so that the spring does not "fly" out and cause bodily injury.

7.5.15 If the Regulating Valve (70) has been disassembled, reassemble it as follows.

7.5.15.1 Insert the inlet valve, spring seat and spring into the inlet valve housing. Using the spanner wrench (Figure 2) assemble the unit. Prick punch the leading thread through the hole in the spring housing sufficiently to prevent the assembly from coming apart during normal operation.

7.5.15.2 (Figure 5) Install two NEW lubricated $\frac{13}{16}$ " O.D. o-rings (71) into the grooves on the inlet valve assembly (70). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.15.3 Insert the inlet valve assembly (70) into the brake valve body.

7.5.15.4 Place the spring (69) on the inlet valve assembly (70).

7.5.15.5 Assemble the exhaust valve as follows:

7.5.15.5.1 Insert the spring seat (64) and spring (63) into the exhaust valve seat (67).

7.5.15.5.2 Place a NEW diaphragm (66) and follower (65) on the exhaust valve seat (67) then secure it in place with the spring seat (62).

7.5.15.5.3 Insert the exhaust valve (68) into the exhaust valve seat (67).

7.5.15.6 Assemble the spring housing as follows:

7.5.15.6.1 Insert the spring seat (60), spring (61) and exhaust valve seat assemble (62) into the regulating valve spring housing (59), then secure the spring housing to the brake valve body with the four $\frac{5}{16}$ " hex nuts (57).

7.5.16 (Figure 5) Assemble the Brake Pipe Cut-off Valve Assembly (89) as follows:

7.5.16.1 Assemble the cut-off valve (89d):

7.5.16.1.1 Insert a NEW rubber seal (89d2) into the seal housing (89d3) and secure it in place with the seal retainer (89d1) using the $\frac{3}{4}$ " multi-spline key (Wabtec Corporation Part No. 518032).

7.5.16.1.2 Insert a NEW lubricated $\frac{15}{16}$ " O.D. O-ring (89e) into the groove on the seal housing (89d3). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

7.5.16.2 Assemble the Cut-off Valve Cage.

7.5.16.2.1 Insert the spring (89b) and valve seal assembly (89d) into the valve cage (89c) then lock it in place with the retaining ring (89a). Exercise care that the spring does not "fly" out and cause bodily injury.

7.5.16.2.2 Install a NEW lubricated 2" o-ring (87) and a NEW $1\frac{3}{8}$ " O.D. o-ring (88) into the proper grooves on the valve cage (89c). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.16.3 Insert the brake pipe cut-off valve assembly (89) into the brake valve body.

7.5.17 Assemble the Vent Valve Assembly (92) as follows:

7.5.17.1 Assemble the Valve Seat Assembly (92d):

7.5.17.1.1 Insert a NEW valve seal (92d2) into the valve seal housing (92d3) and secure it in place with the seal retainer (92d1), using the $\frac{1}{2}$ " multi-spline key (Wabtec Corporation Part No. 517557).



Operation & Maintenance Instruction

7.5.17.1.2 Install a NEW lubricated $1^{5/16}$ " O.D. o-ring (92e) into the groove on the valve seal housing (92d3). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

⚠ CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.17.2 Assemble the Vent Valve Cage Assembly as follows:

7.5.17.2.1 Insert the spring (92b) and valve seal assembly (92d) into the vent valve cage (92c) and lock in place with the retainer ring (92a). Exercise care that the spring does not "fly" out and cause bodily injury.

7.5.17.2.2 Insert a NEW lubricated $1^{3/8}$ " O.D. o-ring (90) and a NEW lubricated $2^{1/8}$ " O.D. o-ring (91) into their grooves on the vent valve cage (92c). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

⚠ CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.18 Insert the vent valve assembly (92) into the brake valve body (104).

7.5.19 Assemble the Back Cover as follows:

7.5.19.1 Install four NEW lubricated $1/2$ " O.D. o-rings (78) into the grooves on the application valve (79). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.19.2 Insert the application valve (79) and cap nut (74) into the back cover (80).

7.5.19.3 Place the spring (77) and spring seat (76) over the application valve stem (79). Depress the spring seat (76) and secure it with the retaining ring (75). Exercise care so that the spring does not "fly" out and cause bodily injury.

7.5.20 Install four NEW lubricated $1/2$ " O.D. o-rings (85) into the grooves on the emergency valve (86). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth.

⚠ CAUTION: LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION.

7.5.21 Install five NEW lubricated $1/2$ " O.D. o-rings (82) into the grooves on the suppression valve (83). Lubrication procedure is found in Section 7.4. Remove the excess grease by wiping with a soft, clean, lint-free cloth. **CAUTION:** LUBRICANT MAY CAUSE SKIN AND/OR EYE IRRITATION. Insert the hardened tip end of the suppression valve (83) into the brake valve body (104) and press in place.

7.5.22 Place a NEW back cover gasket (93) on the brake valve body.

7.5.23 Place spring (84) on the brake pipe cut-off valve (89), one of spring (81) on the emergency valve and one of spring (81) on the suppression valve (83), then place the cover (80) on the brake valve and secure it in place with the four $3/8$ " hex nuts (73). Exercise care so that the springs do not "fly" out and cause bodily injury.

8.0 TESTING AND ADDITIONAL INFORMATION

8.1 After the brake valve has been assembled and before it is returned to service, it MUST pass a series of tests following the procedure of the current issue of the Wabtec Corporation Test Specification T-2457-0.

8.2 Consult your Wabtec Corporation Representative for information concerning the testing of the brake valve, or if additional information is required.

WABCO Locomotive Products

1001 Air Brake Avenue • Wilmerding, PA 15148

(412) 825-1000 • Fax (412) 825-1019

www.wabtec.com