



operation & maintenance instruction

"26-C" BRAKE VALVE, PART NO. 562079-1000

For Passenger or Freight Service

SEPTEMBER, 1988

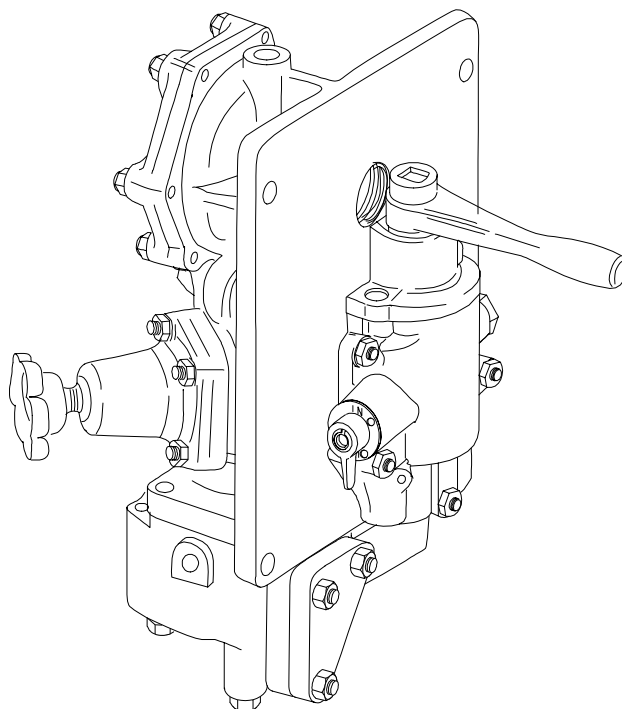
Supersedes issue dated September, 1985

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 Representative for identity of the test specification, with latest revision date, that covers this device.)

IMPORTANT: Only Wabtec 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.





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1.0 DESCRIPTION

Designed for use in “passenger or freight service” equipment arrangements, where the air pressure does not exceed 150 psig, this piston type, automatic self-lapping valve functions to provide pneumatic control of brake pipe air pressure in response to the manual positioning of the brake valve handle. The manual movement of the brake valve handle through various positions initiates, per the “26-C” concept, pneumatic brake applications and releases.

This “26-C” Brake Valve, Pc.No. 562079-1000, consists of a “26-C” Brake Valve Portion, Pc.No. 562073-1000, a Pipe Bracket Portion, Pc.No. 583491, and a Pipe Bracket Mounting Gasket, Pc.No. 557395.

The Brake Valve Portion is mounted to the Pipe Bracket Portion in such a way that it can be removed for maintenance and/or servicing without disturbing the equipment piping. External pipe connections are made directly to the Pipe Bracket Portion which is designed so that it can be installed or mounted under a shelf.

This “26-C” Brake Valve is furnished with Brake Valve Handle Assembly, Pc.No. 558494.

2.0 DESCRIPTION OF COMPONENTS OF THE “26-C” BRAKE VALVE PORTION

(FIGURE 2)

2.1 BRAKE VALVE HANDLE, SHAFT, & CAMS

Train air brake operation is obtained by manually moving the Brake Valve Handle into one of the externally detented quadrant positions, designated as, Release, Initial Reduction, Service, Suppression, Handle Off, and Emergency. The handle may be removed from the Brake Valve Portion in “Handle Off” position by first removing the handle cap screw and washer (shown in Figure 4 as Reference 4 and 4A), which are located on the top of the handle, and then lifting the handle upward.

Four cams, keyed to the handle shaft, operate the various pneumatic devices housed in the Brake Valve Portion. The cams, numbered one through four, are arranged on the shaft in numerical order with cam Number 1 on top, nearest the handle. A brief description of each cam follows:

Cam Number 1, the emergency valve cam, operates the emergency valve.

Cam Number 2, the regulating valve cam, operates to po-

sition the regulating valve and inlet spring housing.

Cam Number 3, the suppression valve cam, operates the suppression valve.

Cam Number 4, the vent valve cam, operates the emergency vent valve.

2.2 CUT-OFF VALVE PORTION

The Manual Cut-Off Valve is used to cut-in or cut-out the Brake Valve. When in the cut-out position, it also permits measurement of brake pipe leakage. This “26-C” Brake Valve is equipped with a three position Cut-Off Valve. The three positions are designated on the cut-off valve escutcheon plate. The positions are “**PASS**” (**Passenger**) “**FRT**” (**Freight**), and “**OUT**”. The handle of the Cut-Off Valve is firmly held, or detented, in each of its handle positions and it is necessary to first push the handle inward (toward the mounting bracket) before it can be moved from one position to another. When moving the cut-off valve handle, be sure that it is set in the detented position desired and that the handle is locked in the extended position.

IMPORTANT: When using this “26-C” Brake Valve as the **controlling brake valve** in a passenger train consist, the handle of the Cut-Off Valve **MUST BE IN THE “PASS” (Passenger) POSITION.**

When hauling a “26-C” Brake Valve equipped cab car or locomotive “**dead**” or as a **trailing unit** in a passenger train consist, the handle of the Cut-Off Valve **MUST BE IN THE “OUT” POSITION.**

IMPORTANT: When using this “26-C” Brake Valve as the **controlling locomotive brake valve** in a freight train consist, the handle of the Cut-Off Valve **MUST BE IN THE “FRT” (Freight) Position.**

When hauling a “26-C” Brake Valve equipped locomotive “**dead**” or as a **trailing unit** in a freight train consist, the handle of the Cut-Off Valve **MUST BE IN THE “OUT” POSITION.**

2.3 REGULATING VALVE

This cam operated valve functions to regulate the air pressure directed to equalizing reservoir charging pipe 15. This pressure is connected externally either by way of passages of a device or passages of devices that also require equalizing reservoir pressure interaction or else directly into equalizing reservoir control pipe 5 which leads



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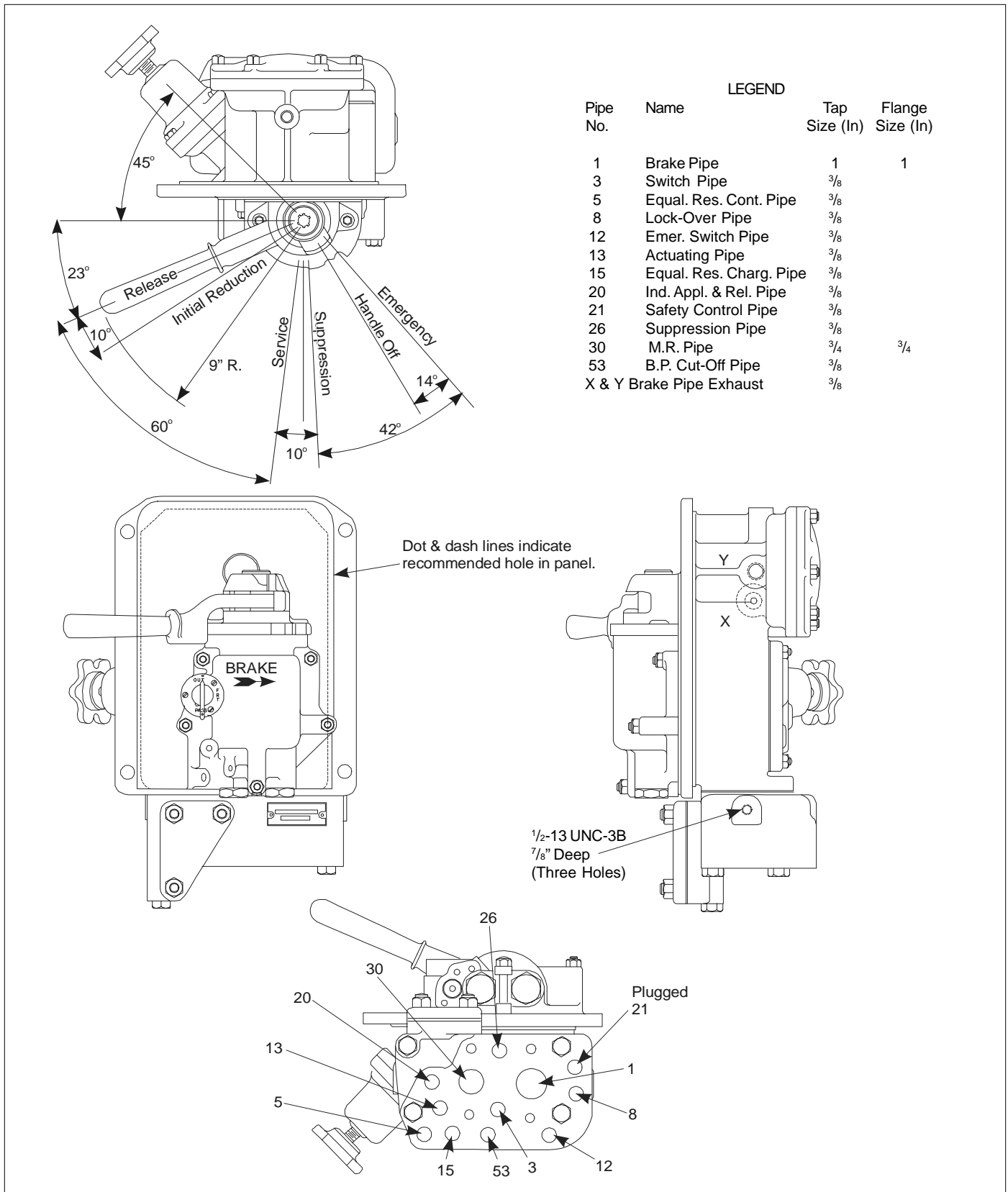
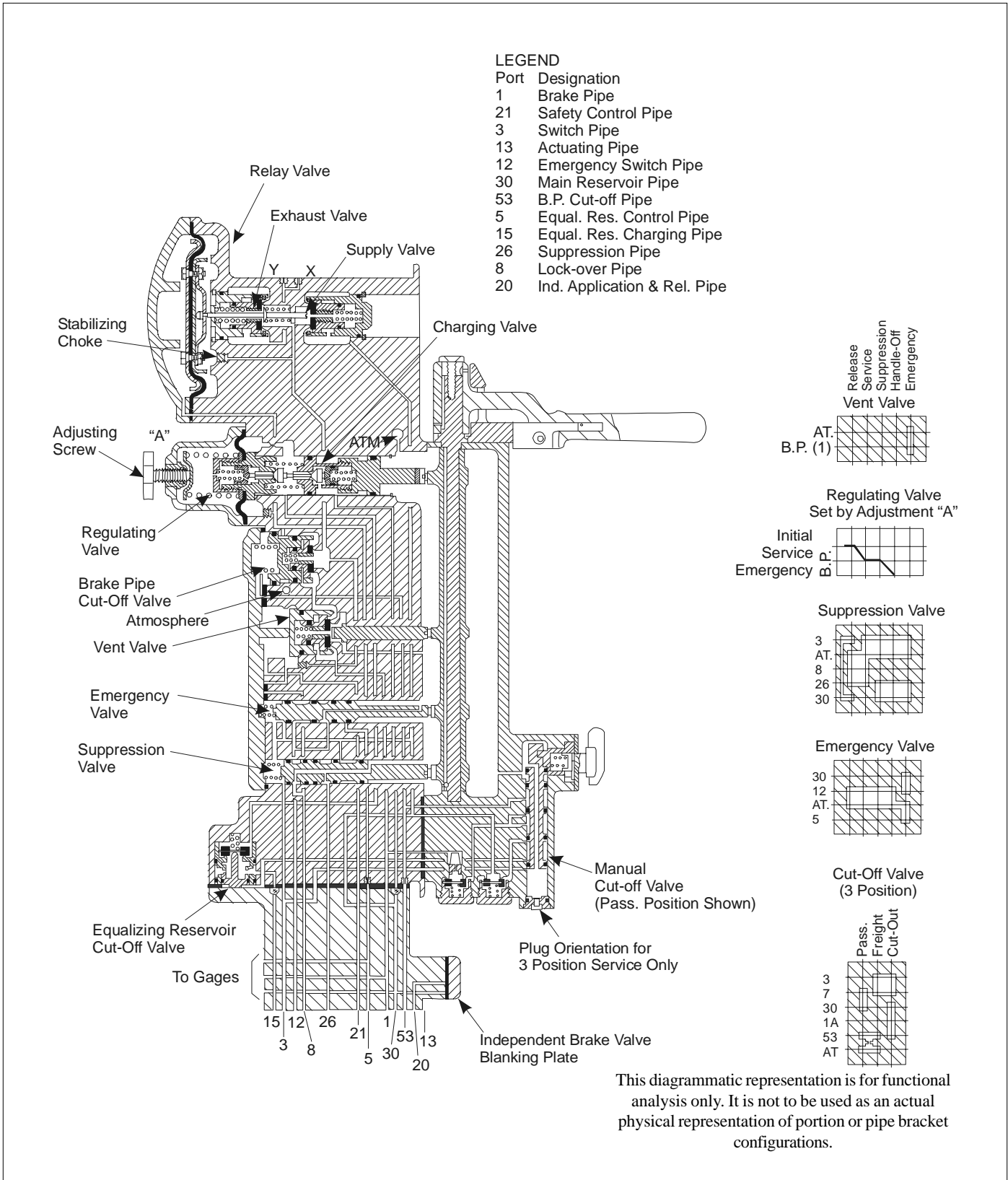


Figure 1 - Exterior Views



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This diagrammatic representation is for functional analysis only. It is not to be used as an actual physical representation of portion or pipe bracket configurations.

Figure 2 - Diagrammatic View



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to the outer diaphragm chamber of the relay valve. Movement of the brake valve handle from "Release" position through the service zone causes the regulating valve to reduce the pressure in pipe 15 and pipe 5. The reduction in pressure is proportional to the amount of handle movement, until a total service reduction is obtained in "Service" position. Adjustment of equalizing reservoir pressure is made in release position by turning adjusting handle "A" of the regulating valve. The self-lapping feature of the regulating valve maintains equalizing reservoir pressure against leakage.

WARNING: THIS ADJUSTMENT IS TO BE MADE ONLY WHEN THE TRAIN IS MOTIONLESS. MANUAL ADJUSTMENT WHEN THE TRAIN IS MOVING CAN RESULT IN IMPROPER BRAKE OPERATION WHICH MAY RESULT IN PROPERTY DAMAGE AND/OR PERSONAL INJURY.

2.4 RELAY VALVE

This diaphragm operated valve functions to establish a pressure in the brake pipe approximately equal to the pressure in equalizing reservoir. The Relay Valve either directs or exhausts brake pipe pressure in response to changes in equalizing reservoir pressure on the outer face of the diaphragm. During brake applications, the equalizing reservoir air pressure on the outer face of the diaphragm is reduced and the Relay Valve will exhaust brake pipe air pressure an equal amount. The self-lapping feature of the Relay Valve maintains the brake pipe pressure against overcharges and permissible train leakage.

2.5 BRAKE PIPE CUT-OFF VALVE

This valve functions to cut-off the flow of brake pipe air from the relay valve to the equipment arrangement when air is directed into Port 53 due to the movement of the manual cut-off valve into the "OUT" position or by the actuation of an auxiliary device, (which may or may not be furnished by the Wabtec Corporation), during a sudden train separation ("break-in-two"). Spring action will also close this valve if the brake valve handle is placed in the "Handle-Off" or "Emergency" Position when brake pipe pressure has reduced to a low pressure.

2.6 EMERGENCY VALVE

This cam operated valve is designed to operate when the brake valve handle is placed in the "Emergency" position. The "Emergency Valve" functions to direct main reservoir air pressure into emergency switch pipe 12, and exhausts equalizing reservoir air pressure in pipe 5.

2.7 VENT VALVE

This cam operated valve functions to quickly exhaust brake pipe air to atmosphere when the brake valve handle is moved to the "Emergency" Position.

2.8 SUPPRESSION VALVE

This cam operated valve functions to direct main reservoir air to suppression pipe 26 in "Suppression", "Handle-Off", and "Emergency" positions of the brake valve to suppress penalty brake applications. This valve also functions in these handle positions to blank lock-over pipe 8 for resetting an externally located brake application valve (if used) prior to releasing a penalty brake application. The Suppression Valve also functions to direct main reservoir air to switch pipe 3 with the brake valve handle in "Release" Position and to vent switch pipe 3 in ALL OTHER Brake Valve Handle Positions.

2.9 EQUALIZING RESERVOIR CUT-OFF VALVE

This valve is designed to function to permit the operation of equipment which employs either direct or graduated release type brakes.

When the Manual Cut-Off Valve Portion is positioned for Passenger Service (PASS.), the Equalizing Reservoir Cut-Off Valve is held open (i.e. main reservoir pressure in port 7 acting on the piston whose stem maintains the check valve off of its seat) **in ALL Brake Valve handle positions.** The equalizing reservoir air pressure may be partially restored for graduated releases.

3.0 BRAKE VALVE OPERATION

The functions of the "26-C" Brake Valve Portion are controlled by the movement of the brake valve handle through a zone of six positions. These functions are explained in the following sections.

(FIGURE 2)

3.1 RELEASE

⚠ WARNING: WITH THE BRAKE VALVE HANDLE IN THE "RELEASE POSITION", THERE IS NO BRAKE CYLINDER PRESSURE FROM THE AUTOMATIC BRAKE EQUIPMENT. THE LOCOMOTIVE INDEPENDENT BRAKE AND ALL HANDBRAKES MUST BE APPLIED TO PREVENT ANY VEHICLE/TRAIN MOVEMENT WHILE THE EQUIPMENT IS BEING CHARGED.



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“RELEASE” is the position used for charging the brake equipment and for releasing brake cylinder air after an automatic brake application. Main reservoir air enters Port 30 at the pipe bracket, flows to the supply valve in the relay valve portion, to the spool of the suppression valve, then to passage 3, and out port 3 of the pipe bracket. Main reservoir air also flows from Port 30 through the charging valve in the regulating valve assembly, and, at a lower pressure regulated value, past the unseated check valve in the equalizing reservoir cut-off valve to passage 15 as well as to the face of the regulating valve diaphragm. Regulating screw “A” can be adjusted to regulate the value of the equalizing reservoir pressure to be developed by the regulating valve portion. The pressure developed in Port 15 is likewise developed in the equalizing reservoir volume and Port 5. Port 5 in the pipe bracket is connected to the spool valve of the emergency valve and to the chamber on the outer face of the relay valve diaphragm.

A build-up of equalizing reservoir pressure on the outer face of the relay valve diaphragm will cause the diaphragm assembly and its attached stem to move inward to first seat the exhaust valve and then unseat the supply valve. This permits main reservoir air to flow past the unseated supply valve to the brake pipe Port 1 and through the stabilizing choke to the chamber on the inner face of the relay valve diaphragm. Brake pipe air in Port 1 also flows to the brake pipe cut-off valve, vent valve and then to pipe 1 in the pipe bracket.

When the brake pipe pressure build-up on the inner face of the relay valve diaphragm approaches equalizing reservoir pressure acting on the opposite side of the diaphragm, the diaphragm assembly and stem are positioned to permit the supply valve to be seated. This action terminates further flow of air from the main reservoir system to the brake pipe. The brake pipe is now fully charged; however, should brake pipe pressure decrease due to brake pipe leakage, the higher equalizing reservoir pressure acting on the outer face of the relay valve diaphragm will move the diaphragm assembly and stem inward to again unseat the supply valve to restore the brake pipe pressure to equalizing reservoir pressure, after which the supply valve will again become seated. This action is commonly referred to as “self-lapping”.

3.2 SERVICE (Includes Initial Reduction)

The “Service” sector consists of the “Initial Reduction” Position, the quadrant zone between “Initial Reduction” and “Service” (“Full Service”) Positions, Suppression Position, and the quadrant zone between “Suppression” and “Handle-Off” Positions. As the brake valve handle is manu-

ally moved through this sector, the reduction of brake pipe pressure is increased gradually, until the handle is in “Full Service” position, and a total service brake pipe reduction has been obtained. Movement of the brake valve handle to “Initial Reduction” position provides a reduction of nominally around 6 psi pressure in the equalizing reservoir, which is, in turn, reflected in a similar brake pipe pressure reduction by the relay valve portion.

⚠ WARNING: AN INITIAL MINIMUM REDUCTION OF LESS THAN 5 PSI WILL PROBABLY RESULT IN UNDESIRED PRESSURE WAVES IN THE BRAKE PIPE WHICH COULD CAUSE THE TRAIN BRAKES TO RELEASE. UNINTENTIONAL BRAKE RELEASE MAY RESULT IN EQUIPMENT DAMAGE AND/OR PERSONAL INJURY AND THEREFORE SUCH REDUCTION MUST NOT BE MADE.

When the brake valve handle is manually moved to some intermediate service position, the cam on the handle shaft allows the exhaust valve in the regulating valve to be unseated to permit equalizing reservoir charging pipe or passage air to reduce pressure. Equalizing reservoir air can flow past the open check valve and regulating valve exhaust valve to atmosphere to reduce equalizing reservoir pressure in an amount corresponding to brake valve handle position. A reduction in equalizing reservoir pressure creates a pressure differential across the relay valve diaphragm, causing the diaphragm assembly and stem to be moved outward to unseat the relay valve exhaust valve allowing brake pipe air to vent to atmosphere at the brake valve. Brake pipe air will continue to vent to atmosphere until its pressure has been reduced sufficiently to cause a pressure equalization across the relay valve diaphragm. When this occurs, the diaphragm assembly and stem, with the aid of the relay valve springs, positions the assembly to allow the exhaust valve to become seated. The brake valve can then be said to be in its “Lap” position.

When the brake valve handle is manually moved to “Full Service” position, the brake valve operates as previously described, except to cause the equalizing reservoir and brake pipe pressures to drop sufficiently to produce a total service brake application. Depletion of brake pipe air pressure at a service rate below 45 psi will not result in any higher brake cylinder pressure and, therefore, service reductions below 45 psi are not permitted in operation.

⚠ WARNING: UNDER NO CIRCUMSTANCES SHOULD A TRAIN BE PERMITTED TO CONTINUE IN OPERATION IF THE BRAKE PIPE AIR PRESSURE FALLS BELOW 45 PSI. IN SUCH CASES, THE TRAIN



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IS TO BE STOPPED AND THE BRAKE PIPE RECHARGED TO THE PRESCRIBED SETTING BEFORE PROCEEDING. FAILURE TO COMPLY WITH THIS WARNING MAY RESULT IN THE INABILITY TO CONTROL OR STOP THE TRAIN WHICH POTENTIALLY COULD RESULT IN PERSONNEL INJURY AND/OR EQUIPMENT DAMAGE.

3.3 SUPPRESSION

This position is used to nullify or suppress a penalty brake application. Such a penalty brake application can be avoided, depending on the pneumatic arrangement of other inter-related devices, if the brake valve handle is moved to "Suppression" position before the expiration of a predetermined delay period which is indicated by an audible warning whistle. However, the "26-C" Brake Valve is so designed that when the brake valve handle is placed in "Suppression" position, air at total service brake pressure is directed to the brake cylinder.

3.3.1 OVER REDUCTION ZONE

In certain special operating conditions, with initial brake pipe pressure of 80 to 90 psi, the zone provided to the right of "Suppression" position may be used to produce at least a 35 psi reduction in equalizing reservoir pressure. This reduction in pressure is proportional to the amount of the automatic brake valve handle movement as described under "Service" position. Beyond this location (handle position), the equalizing reservoir pressure reduces to 0 psi at a service rate. Under these circumstances, **the train is to be brought to a complete stop.**

⚠ WARNING: UNDER NO CIRCUMSTANCES SHOULD A TRAIN BE PERMITTED TO CONTINUE IN OPERATION IF THE BRAKE PIPE AIR PRESSURE FALLS BELOW 45 PSI. IN SUCH CASES, THE TRAIN IS TO BE STOPPED AND THE BRAKE PIPE RECHARGED TO THE PRESCRIBED SETTING BEFORE PROCEEDING. FAILURE TO COMPLY WITH THIS WARNING MAY RESULT IN THE INABILITY TO CONTROL OR STOP THE TRAIN WHICH POTENTIALLY COULD RESULT IN PERSONNEL INJURY AND/OR EQUIPMENT DAMAGE.

3.4 HANDLE OFF

The brake valve handle may be removed from the "26-C" Brake Valve when it is manually moved into the "Handle Off" position and the cap screw and washer, located on the top of the handle, are removed. This position is used to condition the "26-C" Brake Valve in trailing locomotive or cab car units or when a locomotive or cab car is being

hauled dead in a train consist; equalizing reservoir pressure will deplete to zero psi at a service rate; the Manual Cut-Off Valve **MUST BE** in the "OUT" Position.

⚠ 3.4.1 WARNING: BEFORE REMOVING THE AUTOMATIC BRAKE VALVE HANDLE, SPECIAL ATTENTION IS REQUIRED.

AFTER THE COMPLETION OF A BRAKE PIPE REDUCTION, AS NOTED AUDIBLY BY THE CESSATION OF BRAKE PIPE EXHAUST, BE SURE THAT BRAKE CYLINDER PRESSURE IS APPLIED TO THE VEHICLE, AND THAT THE PROPER PROCEDURES ARE FOLLOWED FOR CUTTING OUT BRAKE OPERATION CONTROL ON THE VEHICLE. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN UNINTENTIONAL VEHICLE MOVEMENT WHICH COULD POSSIBLY CAUSE DAMAGE TO EQUIPMENT AND/OR INJURY TO PERSONNEL.

3.5 EMERGENCY

The "Emergency" position is used when it is necessary to vent brake pipe pressure to zero at the fastest possible rate to produce an emergency brake pipe reduction. The flow of air to the brake pipe is cut off in this position. The emergency valve is positioned to vent equalizing reservoir air to zero from passage and pipe 5 to supplement the venting at the regulating valve exhaust valve and to allow main reservoir air to flow from Port 30 to Port 12. Also, with equalizing reservoir pressure at the outer face of the relay portion diaphragm reduced to zero, the diaphragm assembly and stem are moved to unseat the relay valve exhaust valve, allowing brake pipe air to also vent to zero. A cam on the brake valve handle shaft functions to unseat a large capacity vent valve to initiate the brake pipe venting, which results in a rapid or emergency rate of brake pipe pressure reduction at the brake valve.

⚠ WARNING: UNDER NO CIRCUMSTANCES SHOULD A TRAIN BE PERMITTED TO CONTINUE IN OPERATION IF THE BRAKE PIPE AIR PRESSURE FALLS BELOW 45 PSI. IN SUCH CASES, THE TRAIN IS TO BE STOPPED AND THE BRAKE PIPE RECHARGED TO THE PRESCRIBED SETTING BEFORE PROCEEDING. FAILURE TO COMPLY WITH THIS WARNING MAY RESULT IN THE INABILITY TO CONTROL OR STOP THE TRAIN WHICH POTENTIALLY COULD RESULT IN PERSONNEL INJURY AND/OR EQUIPMENT DAMAGE.

3.6 RELEASE AFTER EMERGENCY

Moving the brake valve handle to the "Release" position



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after an emergency application will cause the equipment to function to recharge as previously described in Section 3.1 RELEASE.

⚠ WARNING: WHEN THE BRAKE VALVE HANDLE IS IN THE “RELEASE” POSITION, THERE IS NO BRAKE CYLINDER PRESSURE FROM THE AUTOMATIC BRAKE EQUIPMENT. THE LOCOMOTIVE INDEPENDENT BRAKE AND ALL HANDBRAKES MUST BE APPLIED TO PREVENT VEHICLE/TRAIN MOVEMENT WHILE THE EQUIPMENT IS BEING RECHARGED. ANY ATTEMPT TO RECHARGE THE BRAKE EQUIPMENT ARRANGEMENT WITH THE BRAKE VALVE HANDLE IN ANY POSITION OTHER THAN “RELEASE” WILL NOT PROPERLY RECHARGE THE EQUIPMENT BUT WILL RELEASE BRAKE CYLINDER PRESSURE.

4.0 MAINTENANCE SCHEDULE

IMPORTANT: THE “26-C” BRAKE VALVE PORTION OF THIS DEVICE SHOULD BE REMOVED FROM THE EQUIPMENT ARRANGEMENT, TAKEN TO THE SHOP, BE THOROUGHLY DISASSEMBLED, THE PARTS CLEANED, INSPECTED, LUBRICATED, ASSEMBLED USING SPECIFIED NEW PARTS, AND THE PORTION TESTED ACCORDING TO THE FOLLOWING VEHICLE APPLICATION SCHEDULE, OR MORE FREQUENTLY IF SERVICE CONDITIONS SO DICTATE:

RECOMMENDED TYPE OF APPLICATION	FREQUENCY - AT LEAST ONCE EVERY
Locomotive	24 Months
Passenger-Cab Cars	24 Months

5.0 PARTS CATALOG AND REPLACEMENT PARTS INFORMATION

5.1 PARTS CATALOG

5.1.1 Refer to the current issue of the Wabtec Corporation Parts Catalog 3208-26, Sup. 2 when ordering replacement parts for Brake Valve, Pc.No. 562079-1000, or any of its component parts.

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.

5.2 REPLACEMENT PARTS

5.2.1 IMPORTANT: To obtain satisfactory operation and reliability of the “26-C” Brake Valve, ONLY Wabtec Corporation replacement parts are to be used in the maintenance of this device and/or its Component Portions.

5.2.2 A Kit of Rubber Repair Parts for the “26-C” Brake Valve, Pc.No. 562079-1000 may be obtained by ordering Pc.No. 559547. Refer to the current issue of Parts Catalog 3208-26, Sup. 2 for a description of the parts in this Kit.

6.0 SAFETY PROCEDURES & WARNINGS

Regular operating property and shop safety procedures must be followed when working on or maintaining the brake valve or any component.

The work area should be clean.

⚠ WARNINGS

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 components 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 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.**



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- 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 “Fly Out” and cause bodily injury.
- All air supply and/or electric current to this device and/or to any components part must be cut-off 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.

- An adequate support or lifting device must be available to support the Device and/or Valve Portion(s) during removal, installation and maintenance procedures.

7.0 CLEANING SOLVENT & LUBRICANTS

7.1 The cleaning solvent used to clean reusable parts of the “26-C” Brake Valve Portion **MUST BE** an aliphatic organic solution such as mineral spirits or naphtha that will dissolve oil or grease and that will permit all parts to be thoroughly cleaned without abrasion.

7.2 #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, such as E.F. Houghton Co. Cosmolube Number 615 or Dow Corning Corp. Molykote 55m, is required for the lubrication of o-rings, o-ring grooves and the bearing surfaces of the bushings into which the o-ring assemblies are installed.

7.3 #1 Calcium Base Grease, Wabtec Corporation Specification M-7650-1, such as Union Oil Co. Number 1 Cup Grease, is required for the lubrication of the cam dog pin, the eccentric cam of the operator shaft and the cam dog bearing surfaces of the Regulating Valve Cam, #2 Cam.

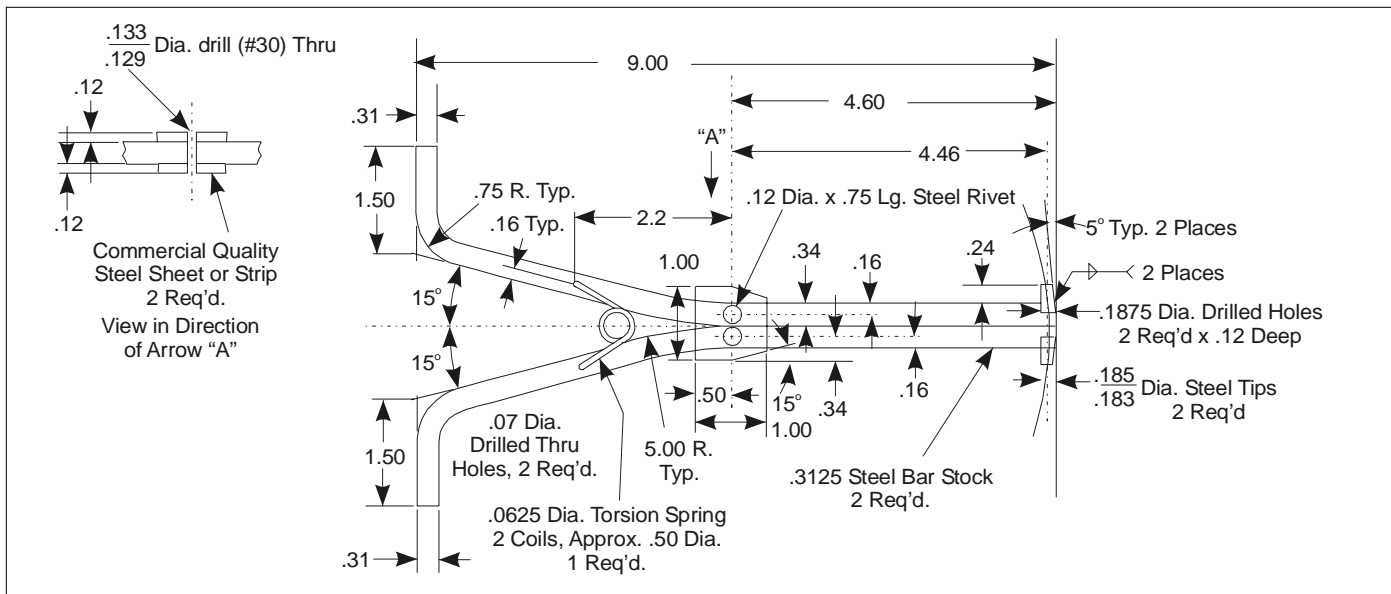


Figure 3 - Check Valve Seat Removal Tool

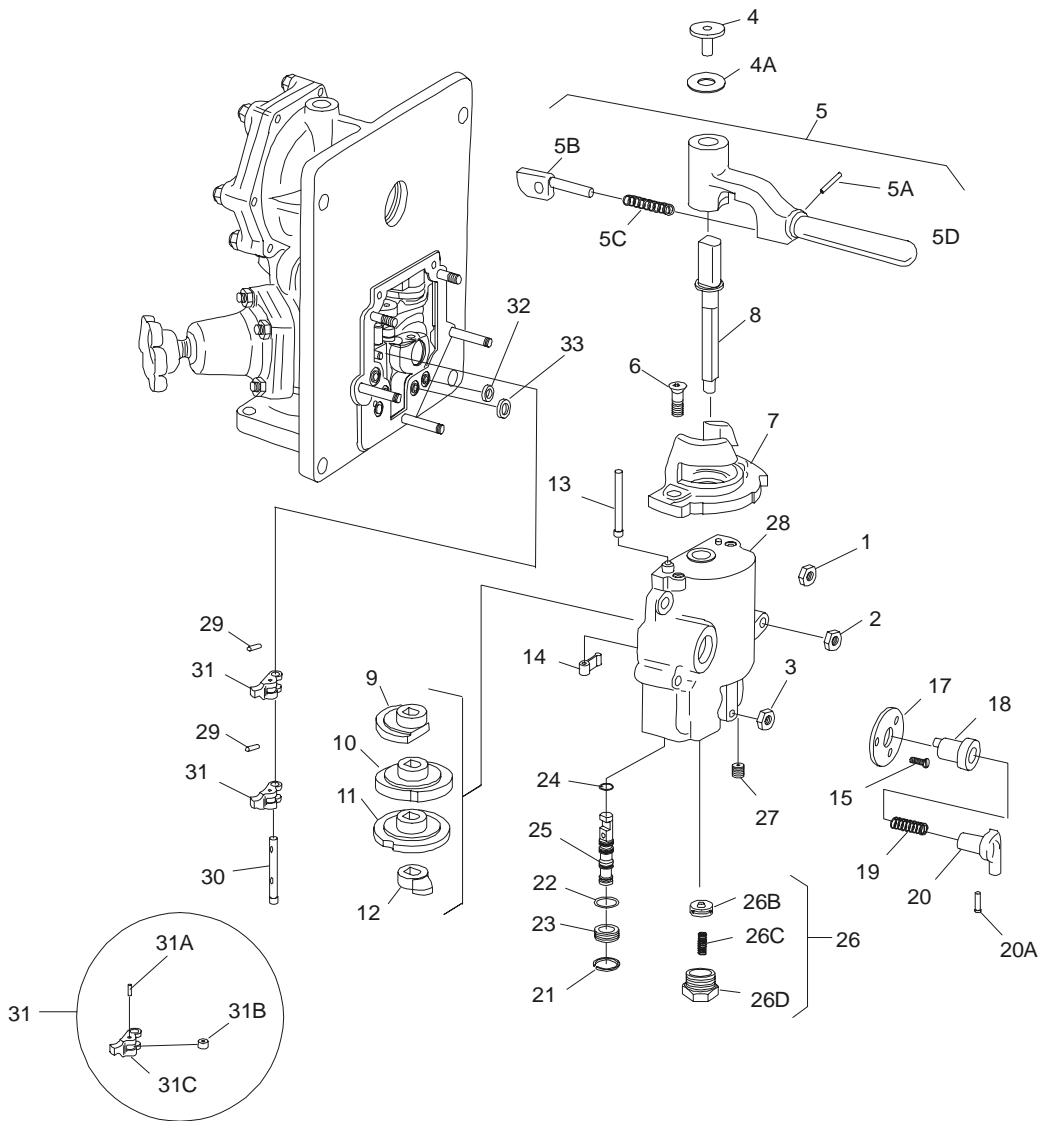


Figure 4 - Exploded View

7.4 A compound consisting of one part graphite, Wabtec Corporation Specification M-7695-2, such as Superior Flake Graphite Co. Superflake Number 597; Joseph Dixon Crucible Co. Microfyne Graphite; or, National Carbon Co. Number 38 or 39 Graphite, and two parts of SAE-20 oil by weight is to be used to coat the threads of the choke plugs after they have been cleaned.

8.0 SPECIAL TOOLS

In addition to the regular shop tools, the following MUST

BE AVAILABLE to the repair person when working on the Brake Valve Portion:

- 8.1 $\frac{5}{16}$ inch Multi-Spline Key - Pc.No. 522525.
- 8.2 $\frac{1}{2}$ inch Multi-Spline Key - Pc.No. 517557.
- 8.3 $\frac{3}{4}$ inch Multi-Spline Key - Pc.No. 518032.
- 8.4 $\frac{5}{16}$ inch Hex Key.



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- 8.5 #1 Truarc Retaining Ring Pliers (internal).
- 8.6 #3 Truarc Retaining Ring Pliers (internal).
- 8.7 #3 Truarc Retaining Ring Pliers (external).
- 8.8 $\frac{9}{64}$ inch Hex Key.
- 8.9 $\frac{11}{32}$ inch Open End Wrench.
- 8.10 Tool for removing the Equalizing Reservoir Cut-Off Valve Check Valve Seat. Information for making this Tool is shown in Figure 3.

IMPORTANT: The information shown in Figure 3 for making this tool is furnished as a convenience. The Wabtec Corporation shall have no responsibility for tools which they do not manufacture, and will not be responsible for the results when using such tools (including claims by third parties).

⚠ 9.0 "26-C" BRAKE VALVE PORTION, REMOVAL & INSTALLATION - "ON-CAR"

- 9.1 The repair person will require the following parts:
 - 9.1.1 A NEW or repaired and tested "26-C" Brake Valve Portion, Pc.No. 562073-1000.
 - 9.1.2 Two NEW wire mesh filters, Pc.No. 526835.
 - 9.1.3 A NEW pipe bracket gasket, Pc.No. 557395.
 - 9.2 ALL car builder and owner-operating property safety procedures and the safety procedures and WARNINGS listed in Section 6.0 MUST be adhered to.
 - 9.3 Car wheels **MUST BE** chocked to prevent car movement. Suitable placards indicating that work is being performed are to be placed on and about the car.
 - 9.4 Remove any free dirt from the exterior surfaces of the "26-C" Brake Valve by wiping with a clean, dry, lint-free cloth, or by blowing the surfaces clean with a low pressure jet of clean, dry, air.
- (Figure 6)
- 9.5 Disconnect any pipe connection made to the "26-C" Brake Valve Portion.
 - 9.6 Remove the "26-C" Brake Valve Portion from the

Pipe Bracket Portion by first removing the three $\frac{1}{2}$ " x 4" hex head cap screws (48) and the $\frac{1}{2}$ " x $5\frac{1}{2}$ " hex head cap screw (47).

- 9.7 Remove and SCRAP the pipe bracket gasket (50).
- 9.8 Remove the wire mesh filter (149A) from passage 15 and from passage 30 of the pipe bracket (149). Note the location of these filters, as NEW filters MUST BE installed in the same location. SCRAP the removed filters.
- 9.9 Visually inspect the pipe bracket mounting face to be sure that it is clean and undamaged. Inspect all ports to be sure that they are clean and unrestricted. Blow ports out, if necessary, using a low pressure jet of clean, dry air. **Be sure that no dirt is blown back into the passages or ports of the pipe bracket.**

NOTE: It is not necessary to remove the pipe bracket (149) from the equipment arrangement unless it is damaged. Should it be necessary to remove the pipe bracket, the car builder and/or owner-operating property instructions are to be followed. Damaged pipe brackets are not repairable and are to be replaced with a NEW Wabtec Corporation part.

- 9.10 Install a NEW wire mesh filter (149A) into passage 30 and passage 15 of the pipe bracket (149).
- 9.11 Install a NEW pipe bracket gasket (50) in proper position on the pipe bracket (149).
- 9.12 Remove ALL protective material from a NEW or repaired and tested "26-C" Brake Valve Portion, Pc.No. 562073-1000.
- 9.13 Carefully place the Brake Valve Portion on to the Pipe Bracket Portion (149) being sure that the gasket (50) remains in position. Install the three $\frac{1}{2}$ " x 4" hex head cap screws (48) and the $\frac{1}{2}$ " x $5\frac{1}{2}$ " hex head cap screw (47) to secure the Portions together. Equally tighten the screws.
- 9.14 Provide adequate protection to prevent dirt or moisture from entering the removed Brake Valve Portion and transport it to the shop area for maintenance.

9.15 IMPORTANT: When the "26-C" Brake Valve Portion or any component of the "26-C" Brake Valve is removed from an equipment arrangement for any reason, and it is reinstalled or replaced with a NEW or repaired and tested Portion, a stationary vehicle test MUST BE made to be sure that the "26-C" Brake Valve



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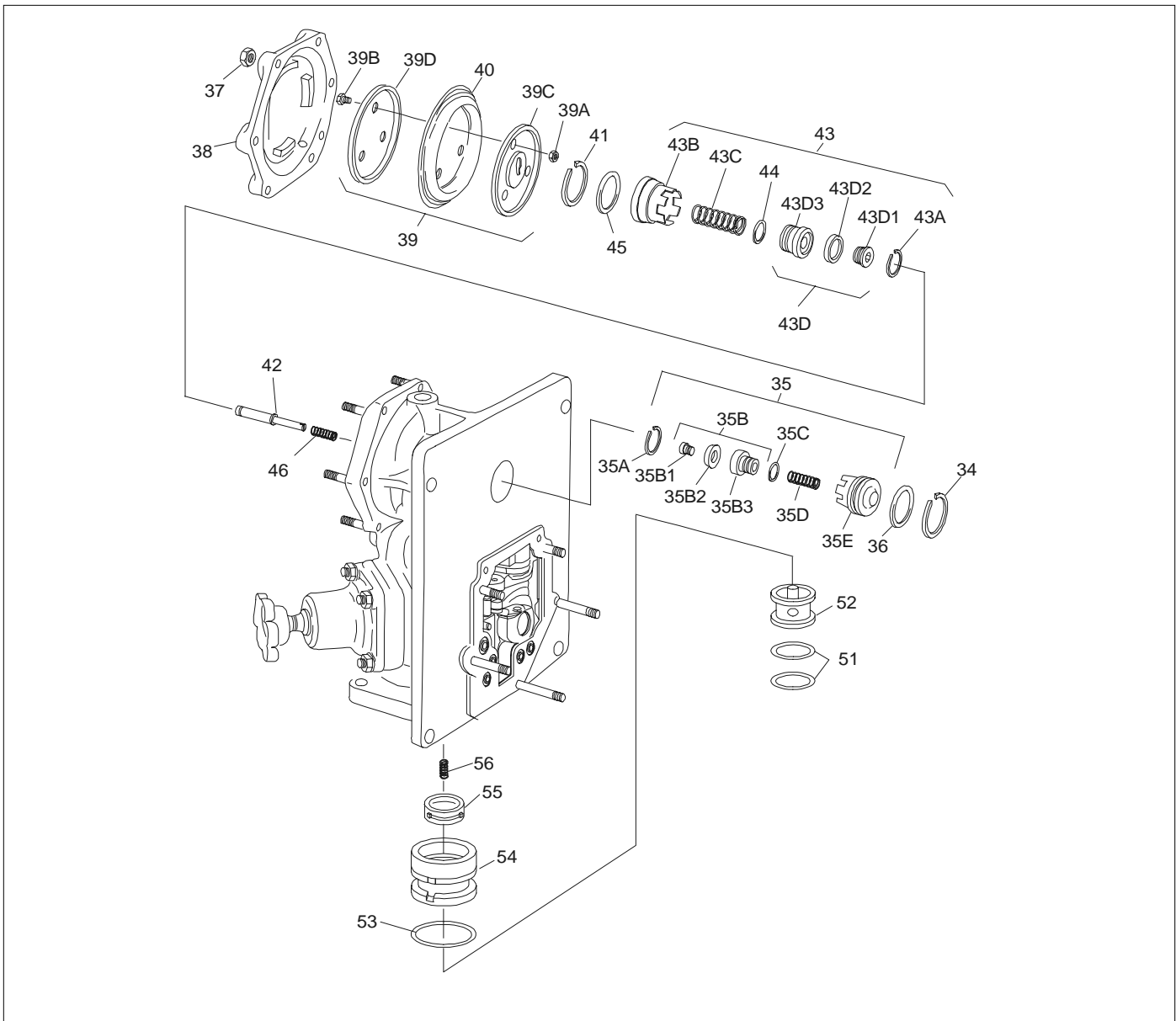


Figure 5 - Exploded View

Portion and the “26-C” Brake Valve function properly in the brake equipment arrangement.

10.0 “26-C” BRAKE VALVE PORTION - MAINTENANCE PROCEDURE - “IN-SHOP”

IMPORTANT: When performing the procedures which follow, **DO NOT** use hard or sharp metal tools to remove gaskets, seals, o-rings, or diaphragms. **Care MUST BE** taken so that no damage is done to metal parts.

⚠ 10.1 DISASSEMBLY (Figure 4)

10.1.1 Place the brake valve handle assembly (5) in the “Handle-Off” position.

10.1.2 If the handle assembly is so equipped, remove the handle cap screw (4) and washer (4A) from the handle assembly (5).

10.1.3 Remove the handle assembly (5) by lifting it vertically with a slight twisting action as the handle comes up

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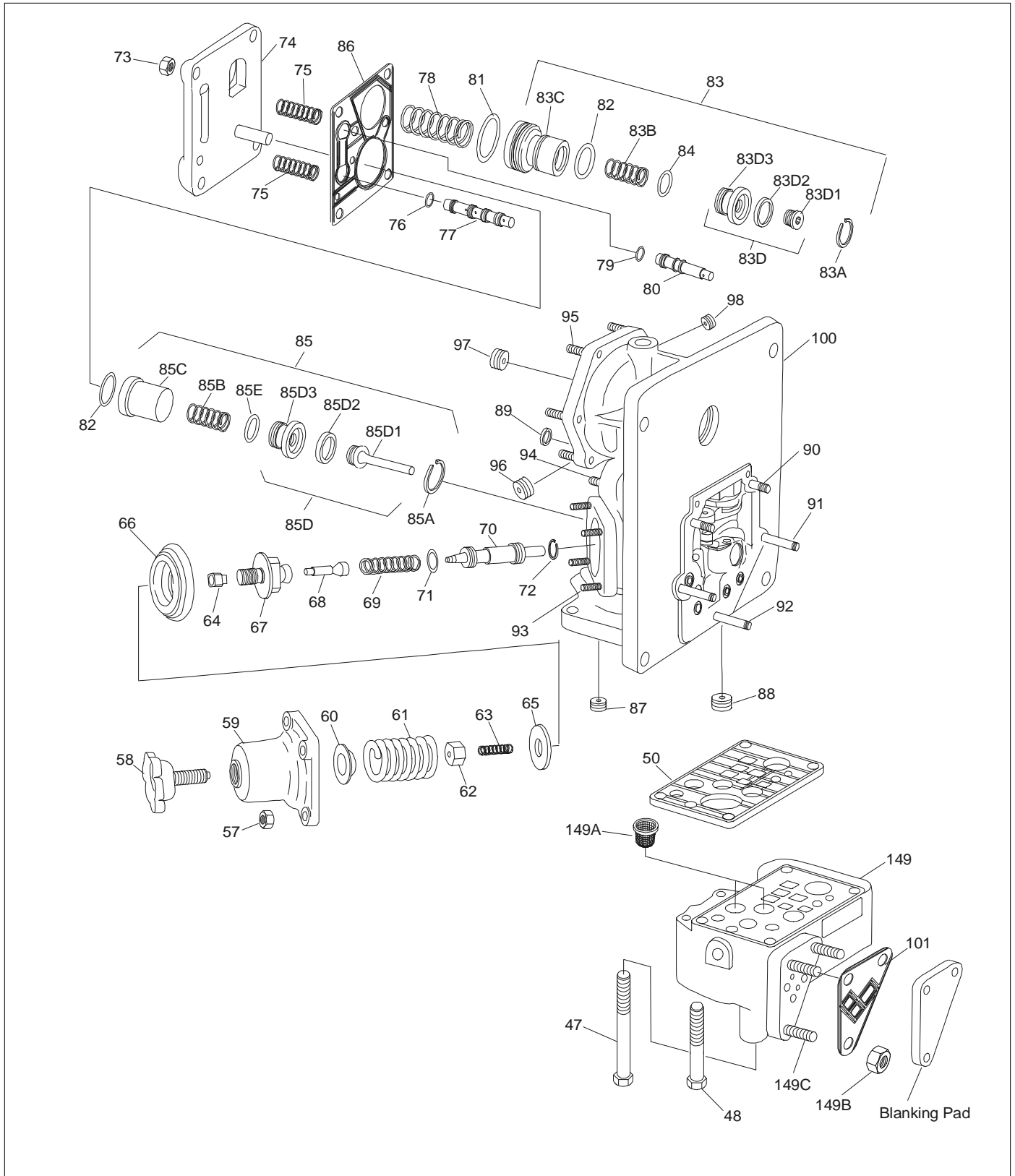


Figure 6 - Exploded View



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and OFF of the shaft (8).

⚠ 10.1.4 WARNING: Spring (5C) may be under tension. Exercise care during the following procedures to avoid physical injury should parts be inadvertently expelled.

Disassemble the handle assembly (5) as follows:

10.1.4.1 Remove the latch screw (5A), latch (5B), and latch spring (5C) from the handle body (5D).

10.1.5 Using a $\frac{5}{16}$ " hex key, remove the two $\frac{3}{8}$ " x $\frac{7}{8}$ " socket head screws (6) which secure the brake valve quadrant (7) to the cam housing body (28).

10.1.5.1 Remove the valve quadrant (7) from the cam housing body (28).

(Figure 6)

10.1.6 Turn the regulating valve adjusting handle (58) counterclockwise its full travel to release tension on the regulating valve spring (61).

(Figure 4)

10.1.7 Remove the cut-off valve (25) from the cam housing body (28) as follows:

10.1.7.1 Place the cut-off valve control knob (20) in the "Out" position. Depress the cut-off valve control knob (20) in the "Out" position, then turn the knob (20) clockwise approximately 45 degrees.

10.1.7.2 Remove the three #4 x $\frac{3}{8}$ " fillister head machine screws (15) which secure the escutcheon plate (17) to the cam housing body (28).

10.1.7.3 CAREFULLY turn the cut-off valve control knob (20) to the "Out" position.

WARNING: Spring (19) may be under tension. Exercise care during the following procedure to avoid physical injury should parts be inadvertently expelled.

10.1.7.3.1 Remove the control knob (20), spring (19), cut-off valve operating shaft (18), and the escutcheon plate (17) from the cam housing body (28).

10.1.7.4 Compress and remove the retaining ring (21) from the bottom of the cam housing body (28).

10.1.7.5 Remove the cut-off valve position selector plug (23) and the $\frac{13}{16}$ " O.D. o-ring (22) from the bottom of the cam housing body (28) as a unit.

Remove and SCRAP the $\frac{13}{16}$ " O.D. o-ring (22) from the cut-off valve position selector plug (23).

10.1.7.6 Remove the cut-off valve (25) with $\frac{1}{2}$ " O.D. o-rings (24) from the bottom of the cam housing body (28).

Remove and SCRAP the five $\frac{1}{2}$ " O.D. o-rings (24) from the cut-off valve (25).

10.1.8 Remove the two spill-over check valve cap nut assemblies (26) from the bottom of the cam housing body (28).

10.1.9 Remove the check valve (26B) and check valve spring (26C) from the cap nut (26D). SCRAP the check valve (26B).

10.1.10 Remove the five $\frac{5}{16}$ " hex nuts (1, 2, 3) which secure the cam housing body (28) to the brake valve body (100).

10.1.11 Remove the cam housing body (28) from the brake valve body (100).

10.1.12 Remove the cam shaft (8) from the cam housing body (28). The four cams (9 to 12 incl.) will be freed from the foolproofing pin on the cam shaft (8) as it is removed.

10.1.13 Remove the cam dog pin with retaining ring (13) through the top (quadrant face) of the cam housing body (28), freeing the cam dog (14) as the cam dog pin (13) is removed.

10.1.14 Remove and SCRAP the four $\frac{11}{16}$ " O.D. ring gaskets (32) and the $\frac{7}{8}$ " O.D. ring gasket (33) from the cam housing mounting face of the brake valve body (100).

10.1.15 Remove the cam dog assemblies (31) from the brake valve body (100) as follows:

10.1.15.1 Remove the two $\frac{1}{16}$ " x $\frac{7}{16}$ " cylindrical spring pins (29) from the top and center portions of the cam dog pin with retaining ring (30).

10.1.15.2 Remove the cam dog pin with retaining ring (30) through the bottom face of the brake valve body (100). Free the two cam dog assemblies (31) as the cam dog pin with retaining ring (30) is removed.



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10.1.15.3 Remove the pin (31A) from each of the two cam dog assemblies (31). Free the rollers (31B) as the pins (31A) are removed.

(Figures 5 and 6)

10.1.16 WARNING: Springs (35D, 43C, 56, 61, 63, 69, 75, 78, 83B, and 85B) may be under tension. Exercise care when performing the procedures which follow to avoid physical injury should parts be inadvertently expelled.

(Figure 6)

10.1.17 Remove the four $\frac{3}{8}$ " hex nuts (73) which secure the back cover (74) in place on the brake valve body (100).

10.1.18 Remove the back cover (74) from the brake valve body (100).

10.1.19 Remove the brake pipe cut-off valve spring (78).

10.1.20 Remove the emergency valve and suppression valve springs (75) from the cavities in the back cover face of the valve body (100).

10.1.21 **NOTE:** The Suppression and Emergency Valve Springs are identical. One is required for each valve.

10.1.22 Remove and SCRAP the back cover gasket (86) from the brake valve body (100).

10.1.23 Remove the emergency (spool type) valve with o-rings (79, 80) from the brake valve body (100).

10.1.23.1 Remove and SCRAP the four $\frac{1}{2}$ " O.D. o-rings (79) from the emergency spool valve (100).

10.1.24 Remove the suppression (spool type) valve with o-rings (77, 76) from the brake valve body (100).

10.1.24.1 Remove and SCRAP the four $\frac{1}{2}$ " O.D. o-rings (76) from the suppression valve (77).

10.1.25 Remove the vent valve assembly (85D) from the brake valve body (100).

10.1.26 Disassemble the vent valve assembly (85D) as follows:

10.1.26.1 Compress and remove the retaining ring (85A) from the smaller diameter bore of the vent valve cage

(85C).

10.1.26.2 Remove the vent valve seat assembly (85D) and spring (85B) from the smaller diameter bore of the vent valve cage (85C).

10.1.26.3 Remove and SCRAP the $1\frac{3}{8}$ " O.D. o-rings (82) from the external diameters of the vent cage (85C).

10.1.26.4 Remove the seal retainer (85D1) and seal (85D2) from the housing (85D3) using the proper size wrench and a $\frac{1}{2}$ " Multi-Spline Key. SCRAP the seal.

10.1.26.5 Remove and SCRAP the $\frac{15}{16}$ " O.D. o-ring (85E) from the housing (85D3).

10.1.27 Remove the brake pipe cut-off valve assembly with o-rings (81 to 83 incl.) from the brake valve body (100).

10.1.28 Disassemble the brake pipe cut-off valve assembly as follows:

10.1.28.1 Compress and remove the retaining ring (83A) from the smaller diameter bore of the valve cage (83C).

10.1.28.2 Remove the valve seal assembly (83D) and spring (83B) from the smaller diameter bore of the valve cage (83C).

10.1.28.3 Remove the 2" O.D. o-ring (81) and the $1\frac{3}{8}$ " O.D. o-ring (82) from the external diameters of the valve cage (83C). SCRAP the o-rings.

10.1.28.4 Using a $\frac{3}{4}$ " Multi-Spline Key remove the seal retainer (83D1) and seal (83D2) from the housing (83D3). SCRAP the seal.

10.1.28.5 Remove and SCRAP the $\frac{15}{16}$ " O.D. o-ring (84) from the housing (83D3).

10.1.29 Remove the four $\frac{5}{16}$ " hex nuts (57) which secure the spring housing (59) to the brake valve body (100).

10.1.30 Remove the following from the brake valve body (100):

10.1.30.1 Spring housing (59) with adjusting handle (58) as a unit.

NOTE: If it becomes necessary to remove the adjusting handle (58) from the spring housing lock nut due to damage, rotate the adjusting handle (58) counterclockwise, as



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viewed from the rear of the spring housing until the adjusting handle (58) comes free of the spring housing (59).

10.1.30.2 Spring seat (60).

10.1.30.3 Spring (61).

10.1.30.4 Diaphragm, exhaust valve seat, and exhaust valve assembly (62 to 68 incl.) as a unit.

10.1.31 Remove the exhaust valve (68) from the exhaust valve seat (67).

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

10.1.32.1 Remove the exhaust valve spring seat (62) from the exhaust valve seat (67) to free and remove the regulating exhaust spring (63), diaphragm follower (65), diaphragm (66), and spring seat (64). SCRAP the diaphragm.

10.1.33 Remove the spring (69) from the regulating valve (70).

10.1.34 Remove the regulating valve (70) with o-ring (71) from the valve body (100).

10.1.35 Remove and SCRAP the $13/16$ " O.D. o-ring (71) from the valve (70).

10.1.36 Remove the regulating valve retaining ring (72) from the valve bushing in the valve body (100).

(Figure 5)

10.1.37 Install a #10-24 machine screw into the tapped hole in the equalizing reservoir cut-off valve piston (52). Using the screw for a handle, remove the cut-off valve piston with o-ring assembly (51, 52) from the valve body (100).

10.1.38 Remove and SCRAP the two $15/8$ " O.D. o-rings (51) from the piston (52).

10.1.39 Using the special "V" shaped tool, as shown in Figure 3, remove the check valve seat with check valve assembly (53 to 56) from the valve body (100) as a unit. This can be done by inserting the tool so that the two arms of the V engage the openings in the check valve seat.

IMPORTANT: Exercise care when pulling the check valve seat from the body so that the seat bushing of the valve is not scratched, nicked, or damaged in any way.

10.1.40 Remove the check valve spring (56) from the check valve (55). Remove and SCRAP the check valve (55) and the two $2^{19/64}$ " O.D. o-rings (53) from the check valve seat (54).

10.1.41 Remove the six $5/16$ " hex nuts (37) which secure the relay cover (38) to the brake valve body (100), and then separate the cover (38) from the body (100).

10.1.42 Remove the following from the brake valve body (100):

(Figure 6)

10.1.42.1 $9/16$ " O.D. ring gasket (89). SCRAP the gasket.

(Figure 5)

10.1.42.2 Diaphragm assembly (39).

NOTE: The diaphragm assembly is held in place by means of a ball socket joint on the end of the diaphragm stem (42) and lower diaphragm follower (39C).

10.1.43 Disassemble the diaphragm assembly (39) as follows:

10.1.43.1 Remove the #10-24 hex nut (39A) from each of the three retaining screws (39B) to free the lower follower (39C), the diaphragm (40), and upper follower (39D). SCRAP the diaphragm.

10.1.44 Using the #3 Truarc retaining Ring Pliers (internal) compress and remove the retaining ring (41) which holds the exhaust valve assembly (43, 45) in the brake valve body (100).

10.1.45 Remove the diaphragm stem (42), the stem spring (46), and the exhaust valve assembly (43, 45) from the brake valve body (100).

10.1.46 Disassemble the exhaust valve assembly (43 to 45) as follows:

10.1.46.1 Remove and SCRAP the $15/8$ " O.D. o-ring (45) from the outer diameter of the valve cage (43B).

10.1.46.2 Remove the retaining ring (43A) from the inner bore of the slotted end of the valve cage (43B) to free and remove the valve seal assembly (43D, 44) and the valve spring (43C).



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10.1.46.3 Remove and SCRAP the $15/16$ " O.D. o-ring (44) from the smaller diameter of the housing (43D3).

10.1.46.4 Using a $3/4$ " Multi-Spline key remove the seal retainer (43D1).

10.1.46.5 Remove and SCRAP the seal (43D2) from the housing (43D3).

10.1.47 Using the #3 Truarc Retaining Ring Pliers (internal) compress and remove the retaining ring (34) which holds the supply valve assembly (35, 36) in the brake valve body (100).

10.1.48 Remove the supply valve assembly (35, 36) by CAREFULLY grasping the end of the supply valve cage (35E) with a pair of pliers and pulling outward.

10.1.49 Disassemble the supply valve assembly (35, 36) as follows:

10.1.49.1 Remove and SCRAP the $17/16$ " O.D. o-ring (36) from the outer diameter of the supply valve cage (35E).

⚠ 10.1.49.2 WARNING: The spring (35D) may be under tension. Exercise care during the procedure which follows to avoid physical injury should parts be inadvertently expelled.

Remove the retaining ring (35A) from the inner bore of the slotted end of the supply valve cage (35E) to free and remove the supply valve seat assembly (35B, 35C) and the spring (35D).

10.1.49.3 Remove and SCRAP the $11/16$ " O.D. o-ring (35C) from the smaller diameter of the seal housing (35B3).

10.1.49.4 Using a $5/16$ " Multi-Spline Key remove the seal retainer (35B1) from the seal housing (35B3).

10.1.49.5 Remove and SCRAP the seal (35B2) from the seal housing (35B3).

⚠ 10.2 CLEANING & INSPECTING

10.2.1 NON-REUSABLE PARTS

All gaskets, seals, o-rings, diaphragms, rubber seated check valves and any self-locking or elastic stop nuts are to be SCRAPPED and replaced with NEW Wabtec Corporation Parts.

10.2.2 BODY

10.2.2.1 Wash the body using the cleaning solvent described in Section 7.1. Use a soft, lint-free cloth or rag that has been saturated with the cleaning solvent to clean the interior and exterior surfaces of the brake valve body.

10.2.2.2 After the body has been thoroughly cleaned, it **MUST BE** blown dry with a low pressure jet of clean, dry air.

10.2.2.3 **IMPORTANT:** The size and cleanliness of the choke plugs located in the brake valve body are important. These choke plugs **MUST BE REMOVED ONE AT A TIME** for servicing to insure that they are returned to their proper location. The following procedure **MUST BE ADHERED TO** when servicing the choke plugs.

10.2.2.3.1 Remove **ONLY ONE** choke plug and place it a bath of the cleaning solvent as described in Section 7.1.

IMPORTANT: Metallic tools **MUST NOT** be used to clean chokes as their size and shape **MUST NOT** be changed. Refer to Parts Catalog 3208-26, Sup. 2 for choke sizes and locations.

10.2.2.3.2 While the choke plug is soaking in the cleaning solvent, the passage from which it was removed **MUST BE** checked for cleanliness and blown out if necessary with a low pressure jet of clean, dry air.

10.2.2.3.3 Remove the choke plug from the cleaning solvent and blow it dry with a low pressure jet of clean, dry air.

10.2.2.3.4 Inspect the choke plug to see that it is clean and unrestricted. If the choke plug is damaged in any way or if the size of the choke has been changed it **MUST BE** replaced. Refer to the Parts Catalog 3208-26, Sup. 2 for choke size.

10.2.2.3.5 Lightly coat the threads of the choke plug with the oil and graphite compound described in Section 7.4.

Assemble the choke plug into the passage from which it was removed. The choke plug **MUST BE** flush or below the surface of the body.

10.2.2.3.6 Remove the next choke plug and repeat steps 10.2.2.3.1 through 10.2.2.3.5 until all choke plugs have been serviced.



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10.2.3 REMAINING PARTS

10.2.3.1 Wash all of the remaining parts using the cleaning solvent described in Section 7.1. Use a lint-free cloth, which has been saturated with the cleaning solvent to clean the interior and exterior surfaces of the cam housing body, quadrant, relay cover, spring housing and back cover.

10.2.3.2 The springs may be wire brushed to assist in the removal of rust and scale.

10.2.3.3 After the parts have been cleaned, they **MUST BE** blown dry with a low pressure jet of clean, dry air.

10.2.3.4 Inspect all of the metal parts.

Replace any spring that is rusted, pitted, distorted or that has taken a permanent set. See Parts Catalog 3208-26, S.2 for spring information and identification.

Replace any retaining ring that is not elastic enough to hold securely.

Replace any part that is cracked, cut, broken, damaged in any way, excessively worn, or that is in such a condition that may result in unsatisfactory operation of the "26-C" Brake Valve Portion.

⚠ 10.3 ASSEMBLY

⚠ WARNING: During the assembly procedures springs will be placed under tension. Exercise care during the assembly of the components to avoid physical injury should parts be inadvertently expelled.

⚠ WARNING: During the assembly procedures, the lapping of seals by mechanical means involving the use of an abrasive substance or medium to "Improve Sealing Qualities" IS NOT PERMISSIBLE. Such lapping procedures will very likely ruin the surface sealing capabilities of the seal and render the seal useless. NEW seals are to be used during the assembly procedures.

(Figure 5)

10.3.1 Supply Valve Sub-Assembly

10.3.1.1 Insert a NEW seal (35B2), small sealing bead first, into the seal housing (35B3). **DO NOT LAP THE SEAL.**

10.3.1.2 Insert the seal retainer (35B1) through the valve

seal (35B2) and into the threaded portion of the seal housing (35B3).

Using a $\frac{5}{16}$ " Multi-Spline Key tighten the seal retainer (35B1) into the seal housing (35B3).

10.3.1.3 Coat the surfaces of a NEW $\frac{11}{16}$ " O.D. o-ring (35C) with #2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also lubricate the o-ring groove of the seal housing (35B3) and the bearing surfaces of the bushing of the body (100) into which the housing (35B3) will be installed with the lubricant.

Install the NEW lubricated o-ring (35C) into the proper groove of the seal housing (35B3). Excess lubricant may be removed by wiping with a clean lint-free cloth.

10.3.1.4 Insert the spring (35D) and supply valve seat assembly (35B, 35C), smaller diameter first, into the slotted opening of the supply valve cage (35E).

10.3.1.5 Depress and hold the supply valve seat assembly and spring (35B, 35C, 35D) far enough into the cage (35E) to expose the retaining ring groove in the inner bore of the supply valve cage (35E).

10.3.1.6 Insert the retaining ring (35A) in the retaining ring groove in the supply valve cage (35E).

10.3.1.7 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW $\frac{17}{16}$ " O.D. o-ring (36). Also fill the o-ring groove on the outer diameter of the supply valve cage (35E) with the lubricant.

Install the NEW, lubricated o-ring (36) into the o-ring groove of the supply valve cage (35E).

Excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.

10.3.2 Insert the supply valve assembly (35, 36), seal end first, into the top front opening on the brake valve body (100) far enough to expose the retaining ring groove in that opening.

10.3.3 Using the #3 Truarc Internal Retaining Ring Pliers, install the retaining ring (34) into the proper groove in the brake valve body (100).

10.3.4 Exhaust Valve Sub-Assembly

10.3.4.1 Insert a NEW valve seal (43D2), SMALL SEAL-



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ING BEAD FIRST, into the housing (43D3). **DO NOT LAP THE SEAL.**

10.3.4.2 Insert the seal retainer (43D1) through the seal (43D2) and into the threaded portion of the seal housing (43D3).

Using a $\frac{3}{4}$ " Multi-Spline Key, tighten the seal retainer to secure the seal (43D2) in place in the housing (43D3).

10.3.4.3 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, coat the surfaces of a NEW $\frac{15}{16}$ " O.D. o-ring (44). Also fill the o-ring groove on the housing (43D3) and lightly lubricant the bearing surfaces of the housing bushing in the body (100) with the lubricant.

Install the NEW lubricated o-ring (44) into its groove on the housing (43D3). Excess lubricant may be removed by wiping with a clean, lint-free cloth.

10.3.4.4 Insert the exhaust valve spring (43C) and the valve seal assembly (43D, 44) into the slotted end of the valve cage (43B).

10.3.4.5 Depress and hold the valve seal assembly (43C, 43D) and spring (44) far enough into the valve cage (43B) to expose the retaining ring groove in the inner bore of the cage (43B).

10.3.4.6 Install the retaining ring (43A) into the proper groove in the cage (43B).

10.3.4.7 Lubricate the surfaces of a NEW $1\frac{5}{8}$ " O.D. o-ring (45) with #2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring groove on the large diameter end of the valve cage (43B) with the lubricant.

Install the NEW lubricated o-ring (45) into its groove on the valve cage (43B). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.5 Insert the diaphragm stem (42), larger diameter first, through the seal retainer portion of the exhaust valve seat assembly (43) until the flanged portion of the diaphragm stem (42) is in contact with the seal retainer (43D1).

10.3.6 Assemble the stem spring (46) over the slotted end of the diaphragm stem (42).

10.3.7 Carefully insert the exhaust valve diaphragm stem and spring assembly (46, 42) into the center opening of the relay cover face of the brake valve body (100).

10.3.8 Depress and hold the valve cage (43B) far enough into the brake valve body (100) to expose the retaining ring groove in the body.

Using the #3 Truarc Internal Retaining Ring Pliers, insert the retaining ring (41) into the proper groove in the brake valve body (100).

10.3.9 Preassemble the diaphragm sub-assembly as follows:

10.3.9.1 Place a NEW diaphragm (40) on the flat face of the lower follower (39C) so that the three small holes are in alignment and the bellows area of the diaphragm extends over the outer diameter of the follower.

10.3.9.2 Place the upper follower (39D) on the diaphragm (40) so that the three small holes are in alignment and the contour of the outer edge of the follower matches that of the bellows area of the diaphragm.

10.3.9.3 Insert a #10-24 retaining screw (39B) through each of the three small holes in the upper follower (39D).

10.3.9.4 Assemble a #10-24 nut (39A) on each of the three screws (39B). Equally tighten the nuts (39A) to secure the diaphragm assembly (39, 40) together as a unit.

10.3.10 Insert the diaphragm assembly (39, 40) into the brake valve body (100) making certain that the ball socket joint of the diaphragm stem (42) is engaged in the slot on the lower follower (39C).

(Figure 6)

10.3.11 Install a NEW $\frac{9}{16}$ " O.D. ring gasket (89) into the proper recess in the relay cover face of the brake valve body (100).

(Figure 5)

10.3.12 Position the relay cover (38) over the studs (95) and against the diaphragm assembly (56) on the brake valve body (100).

Be sure that the bead of the diaphragm (40) is in the proper groove in the brake valve body (100).

10.3.13 Assemble a $\frac{5}{16}$ " hex nut (37) on each of the six studs (95).

Equally tighten the $\frac{5}{16}$ " hex nuts (37).



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10.3.14 Coat the surfaces of two NEW special 2¹⁹/₆₄" O.D. o-rings (53) and fill the o-ring grooves of the check valve seat (54) with #2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also lubricate the bearing surfaces of the check valve seat bushing of the valve body (100) with the lubricant.

10.3.15 Install the two NEW, lubricated, special o-rings (53) into their grooves on the check valve seat (54). Excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.

10.3.16 Install the equalizing reservoir cut-off valve check valve spring (56) into the spring seat cavity of the valve body (100). Be sure that the spring (56) is properly seated in the cavity.

10.3.17 Install a NEW equalizing reservoir cut-off valve check valve (55) into the check valve seat (54). Install the check valve seat with check valve assembly (53, 54, 55) into the valve body (100) being sure that the check valve spring (56) is properly positioned in the body (100) and that it contacts the spring seat area of the check valve (55).

10.3.18 Coat the surfaces of a NEW 1⁵/₈" O.D. o-ring (51) and fill the o-ring groove of the piston (52) with #2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also lightly coat the bearing surface of the inside of the check valve seat (54) where the piston (52) will be installed with the lubricant.

10.3.19 Install the NEW lubricated 1⁵/₈" O.D. o-ring (51) into its groove on the piston (52). Excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.

10.3.20 Install the piston with o-ring assembly (52, 51) into the check valve seat (54) using the #10-24 machine screw which was installed in the piston during disassembly as a handle. Remove the #10-24 machine screw from the piston (52).

(Figure 6)

10.3.21 Exercising care so that no damage is done to the regulating valve bushing of the valve body (100) carefully install the regulating valve retaining ring (72) in place in the regulating valve bush of the body (100).

(Figure 4)

10.3.22 Preassemble each of the two cam dog assemblies (31) as follows:

10.3.22.1 Place the un-lubricated roller (31B) in the clevis area of the cam dog (31C) so that the pin holes are in alignment.

10.3.22.2 Insert a pin (31A) through the holes in the cam dog (31C) and roller (31B) to secure the roller (31B) in place.

10.3.23 Apply a light coating of #1 Calcium Base Grease, Wabtec Corporation Specification M-7650-1, to the surface of the cam dog pin (30).

Place the lower cam dog assembly (31) over the cam dog pin (30) so that the cam dog (31C) faces to the left rear when the cam roller (31B) faces the front.

10.3.24 Insert the cam dog pin (30) upward through the cam pin hole in the front area of the brake valve body (100) far enough to place the upper cam dog assembly (31) over the cam dog pin (30).

10.3.25 Continue to insert the cam pin (30) upward through the hole in the upper cam dog assembly (31) until the hole for the cylindrical spring pin is exposed above the upper cam dog assembly.

10.3.26 Insert a 1¹/₁₆" x 7¹/₁₆" cylindrical spring pin (29) through each of the exposed holes in the upper and center portions of the cam dog pin (30) to secure the cam dog assemblies (31) in the brake valve body (100).

(Figure 6)

10.3.27 Regulating Valve Spring Housing (Inlet Valve) Sub-Assembly

10.3.27.1 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of two NEW 1³/₁₆" O.D. o-rings (71). Also fill the o-ring grooves of the regulating valve and lightly lubricate the bearing surfaces of the regulating valve bushing of the body (100) with the lubricant.

Install a NEW lubricated o-ring (71) into each of the two o-ring grooves on the regulating valve (70). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.28 Install the inlet valve with o-ring assembly (70,71) into the valve body (100).

10.3.29 Install the spring (69) on the inlet valve (70).

10.3.30 Insert the spring seat (64), smaller diameter



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first, into the bore at the threaded end of the exhaust valve seat (67).

10.3.31 Place the regulating exhaust spring (63) into the recess in the regulating valve spring seat (64).

10.3.32 Place a NEW diaphragm (66), with the loop of the bellows facing upward, down over the threaded portion of the exhaust valve seat (67).

10.3.33 Place the diaphragm follower (65) over the threaded portion of the exhaust valve seat (67).

10.3.34 Observe the size of the choke in the exhaust valve spring seat (62) which **MUST BE 0.046" diam. or #56 drill**. If the size or shape of this choke is changed a NEW spring seat (62) **MUST BE** used. Assemble the exhaust valve spring seat (62) to the threaded portion of the exhaust valve seat (67) and tighten with 35 to 40 foot pounds of torque.

10.3.35 Insert the valve (68), fluted end first, through the opening in the non-threaded end of the exhaust valve seat (67).

10.3.36 Insert the following into the spring housing (59).

10.3.36.1 Spring seat (60).

10.3.36.2 Spring (61).

10.3.36.3 Exhaust valve seat assembly (62 to 67 incl.), diaphragm end first.

10.3.37 Carefully assemble the spring housing assembly (62 to 67 incl.) over the four studs (93) on the regulating valve face on the back of the brake valve body (100).

10.3.38 Assemble a $\frac{5}{16}$ " hex nut (57) on each of the four studs (93) protruding from the spring housing (59).

Equally tighten the hex nuts (57).

(Figure 4)

10.3.39 Cam Housing Sub-Assembly

10.3.39.1 Insert the pinned cam shaft (8), small diameter end first, approximately one inch into the larger opening in the top of the cam housing body (28).

IMPORTANT: NO LUBRICANTS ARE TO BE USED AT ANY TIME ON THE CAMS, (9, 11, 12) CAM DOGS (31)

OR CAM DOG ROLLERS.

10.3.39.2 Place the #1 Cam (9) (Emergency Valve Cam), numbered side up, over the lower end of the pinned cam shaft (8). **DO NOT LUBRICATE THE CAM (9).**

10.3.39.3 Place the #2 Cam (10) (Regulating Valve Cam), numbered side up, over the lower end of the pinned cam shaft (8). Lightly coat the cam dog bearing surface of the Cam (10) with #1 Calcium Base Grease, Wabtec Corporation Specification M-7650-1.

10.3.39.4 Push the pinned cam shaft (8) through the #2 Cam (10) (Regulating Valve Cam).

10.3.39.5 Place the #3 Cam (11) (Suppression Valve Cam), numbered side up, over the lower end of the pinned cam shaft (8). **DO NOT LUBRICATE THE CAM (11).**

10.3.39.6 Push the pinned cam shaft (8) through the #3 Cam (11) (Suppression Valve Cam).

10.3.39.7 Place the #4 Cam (12) (Vent Valve Cam), numbered side up, over the lower end of the pinned cam shaft (8). **DO NOT LUBRICATE THE CAM (12).**

10.3.39.8 Push the pinned cam shaft (8) through the #4 Cam (12) (Vent Valve Cam) and into the lower bushing in the cam housing body (28).

10.3.39.9 Insert the cam dog pin with retaining ring (13) through the small bushed opening in the top face of the cam housing body (28).

10.3.39.10 Assemble the cam dog (14) into the proper cavity in the cam housing body (28) so that the cam dog pin with retaining ring (13), previously installed, may be pushed through the larger opening in the cam dog (14) and into the hole in the cam housing body (28).

10.3.39.11 Push the cam dog pin with retaining ring (13) as far as it will go into the cam housing body (28).

10.3.40 Insert four NEW $\frac{11}{16}$ " O.D. ring gaskets (32) and one $\frac{7}{8}$ " O.D. ring gasket (33) into the proper grooves on the cam housing face of the brake valve body (100).

10.3.41 Assemble the quadrant (7) on the cam housing body (34) as follows:

10.3.41.1 Position the quadrant (7) on the top face of the cam housing body (28) so that the two mounting holes are in alignment with the tapped holes in the cam housing



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body (28).

10.3.41.2 Insert the two $\frac{3}{8}$ " x $\frac{7}{8}$ " hex socket head screws (6) through the quadrant (7) and into the cam housing body (28).

10.3.41.3 Equally tighten the screws (6) to secure the quadrant (7) in place.

10.3.42 **IMPORTANT:** Turn the pinned cam shaft (8) in the cam housing (28) to assume the Handle OFF position to permit the regulating cam dog (14) to drop into the indent in the Regulating Valve Cam (Cam #2) (10).

10.3.43 Carefully place the cam housing body (28) over the five studs of the brake valve body (100).

10.3.44 Attach a $\frac{5}{16}$ " hex nut (1, 2, 3) to the threaded portion of each of the five studs of the brake valve body (100).

Equally tighten the five $\frac{5}{16}$ " hex nuts (1, 2, 3) to secure the cam housing body (28) to the brake valve body (100).

10.3.45 Assemble each of the two spill-over check valve assemblies (26) as follows:

10.3.46 Place the spring (26C) and NEW check valve (26B) into the open end of the cap nut (26D).

10.3.47 Depress the check valve and spring (26B, 26C) far enough into the cap nut (26D) to engage the lip in the bore of the cap nut (26D).

10.3.48 Install and tighten each of the two spill-over check valve assemblies (26) into their proper tapped openings in the bottom face of the cam housing body (100).

10.3.49 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of five NEW $\frac{1}{2}$ " O.D. o-rings (24). Also fill the o-ring grooves of the cut-off valve (25) and lightly lubricate the bearing surfaces of the cut-off valve bushing of the cam housing body (28) with the lubricant.

Install the five NEW lubricated o-rings (24) into their grooves on the cut-off valve (25). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.50 Insert the cut-off valve with o-rings (25, 24), slotted end first, into the proper opening in the bottom face of the cam housing body (28) so that the milled slot in the cut-off valve (25) is in the approximate center of the

operating shaft bushing on the front of the cam housing body (28).

10.3.51 Apply a light coat of #1 Calcium Base Grease, Wabtec Corporation Specification M-7650-1, to the eccentric cam of the cut-off valve operating shaft (18). Insert the cut-off valve operating shaft (18) into the proper opening in the front of the cam housing body (28) so that the eccentric cam of the operating shaft (18) comes to rest in the milled slot in the cut-off valve (25) and the operating shaft (18) is flush with the escutcheon plate mounting face of the cam housing body (28).

10.3.52 Turn the operating shaft (18) so that the slot in the operating shaft (18) is in alignment with any one of the notches in the escutcheon plate mounting face of the cam housing body (28).

⚠ 10.3.53 WARNING: During the following procedure spring (19) will be under tension. Exercise care to avoid physical injury should parts be inadvertently expelled.

Insert the spring (19) into the opening in the operating shaft (18).

10.3.54 Insert the shaft of the control knob (20) through the face of the escutcheon plate (17) which is marked "PASS" - "FRT" - "OUT".

10.3.55 Insert the control knob (20) into the opening on the cut-off valve operating shaft (18).

IMPORTANT: Depress and turn the control knob (20) $\frac{1}{8}$ turn. The knob **MUST LOCK** in this position.

10.3.56 Rotate the escutcheon plate (17) to bring the three mounting holes in alignment with the three tapped holes in the cam housing body (28).

10.3.57 Insert and tighten the three #4 x $\frac{3}{8}$ " fillister head machine screws (15) to secure the escutcheon plate (17) in place.

10.3.58 Depress and move the control knob (20) to its several positions. The knob **MUST** move freely. Finally, move the control knob (20) to the "OUT" position.

10.3.59 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW $\frac{13}{16}$ " O.D. o-ring (22). Also fill the o-ring groove of the cut-off valve position selector plug (23) with the lubricant.

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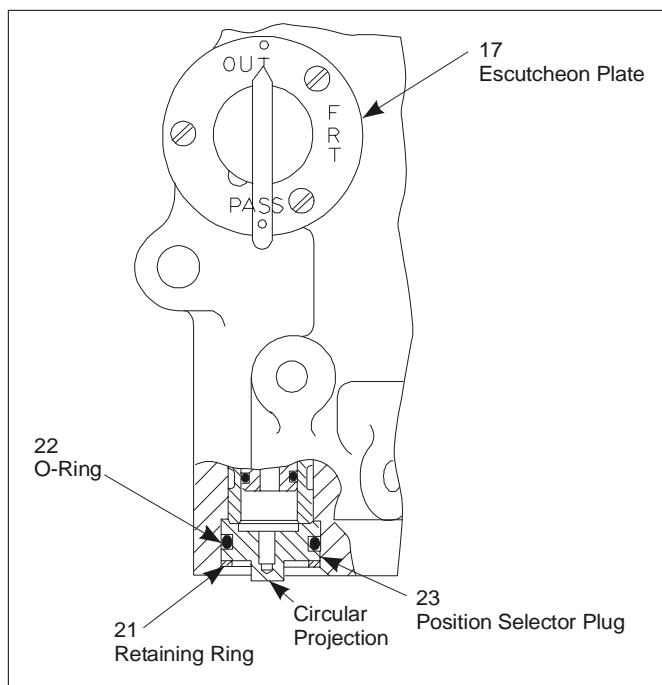


Figure 7 - Escutcheon Plate & Position Selector Plug Orientation Drawing

Install the NEW lubricated o-ring (22) in its groove on the position selector plug (23). Any excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.

10.3.60 Insert the cut-off valve position selector plug assembly (22, 23) into the proper opening in the bottom face of the cam housing body (28), so that the circular projection on the plug (23) extends outward from the spool valve chamber.

IMPORTANT: The piston selector plug (23) MUST BE installed as shown in Figure 7 for the valve portion to function properly.

10.3.61 Depress the cut-off valve position selector plug (23) far enough to expose the retaining ring groove in the cam housing body (28).

10.3.61.1 Compress and insert the retaining ring (21) into the proper groove in the cam housing body (28). Be sure that the retaining ring (21) snaps into its groove, then slowly release the position selector plug (23).

10.3.62 Handle Sub-Assembly

10.3.62.1 Place the latch spring (5C) over the cylindrical portion of the latch (5B).

10.3.62.2 Insert the latch spring (5C) and latch (5B) into the opening in the handgrip portion of the handle body (5D) so that the offset portion of the latch (5B) is facing away from the square hole in the handle body (5D).

10.3.62.3 Depress the latch (5B) against the spring (5C) enough to permit the insertion of the latch screw (5A) through the handle body (5D) and latch (5B).

Tighten the latch screw (5A) to secure the latch assembly (5B, 5C) in place in the handle body (5D).

10.3.64 Insert the handle assembly (5) into the handle opening in the quadrant (7).

10.3.64.1 Push the brake valve handle assembly (5) horizontally onto the pinned cam shaft (8) until the handle locks.

10.3.64.2 Push downward on the brake valve handle assembly (5) until the handle is in its normal operating groove in the quadrant (7).

10.3.65 Place the washer (4A) over the handle cap screw (4) if the valve is so equipped.

10.3.65.1 Insert the handle cap screw (4), with washer (4A) in place, into the tapped opening in the square end of the pinned cam shaft (8), if the valve is so equipped.

10.3.65.2 Tighten the cap screw (4) to secure the handle assembly (5) to the pinned cam shaft (8).

(Figure 6)

10.3.66 Brake Pipe Cut-Off Valve Sub-Assembly

10.3.66.1 Insert a NEW seal (83D2), small sealing bead first, into the large diameter bore of the housing (83D3). **DO NOT LAP THE SEAL.**

10.3.66.2 Using a $\frac{3}{4}$ " Multi-Spline Key, insert and tighten the seal retainer (83D1) through the seal (83D2) and into the housing (83D3).

10.3.66.3 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW $\frac{15}{16}$ " O.D. o-ring (84). Also fill the o-ring groove of the seal housing (83D3) with the lubricant.

Install the NEW lubricated o-ring (84) in its groove on the seal housing (83D3). Excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.



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10.3.66.4 Insert the spring (83B) and the valve seal assembly (84, 83D) into the cavity in the smaller diameter end of the valve cage (83C).

⚠ 10.3.66.5 WARNING: The spring (83B) and valve seal assembly (83D, 84) are to be assembled under tension. Exercise care when assembling to avoid physical injury should parts be inadvertently expelled.

Depress the valve seal assembly (83D, 84) and spring (83B) far enough into the valve cage (83C) to expose the retaining ring groove.

10.3.66.6 Insert the retaining ring (83A) in the proper groove in the bore of the valve cage (83C).

10.3.67 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW 1³/₈" O.D. o-ring (82) and the surfaces of a NEW 2" O.D. o-ring (81). Also fill the o-ring grooves of the valve cage (83C) with the lubricant.

Install the NEW lubricated o-rings (81, 82) into their grooves on the valve cage (83C). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.68 Carefully insert the brake pipe cut-off valve assembly with o-rings (81 to 84 incl.), valve seal end first, as far as it will go into the proper cavity in the back cover face of the brake valve body (100).

10.3.69 Vent Valve Sub-Assembly

10.3.69.1 Insert a NEW seal (85D2), small sealing bead face first, into the large diameter bore of the housing (85D3). **DO NOT LAP THE SEAL.**

10.3.69.2 Insert the seal retainer (85D1) through the seal (85D2) and into the housing (85D3). Tighten the retainer (85) to secure the seal (85D2) in place.

10.3.69.3 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW 1⁵/₁₆" O.D. o-ring (85E). Also fill the o-ring groove of the seal housing (85D3) with the lubricant.

Install the NEW lubricated 1⁵/₁₆" O.D. o-ring (85E) into the o-ring groove of the housing (85D3). Any excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.

10.3.69.4 Insert the spring (85B) and the valve seat assembly (85D) into the cavity in the smaller diameter end

of the vent valve cage (85C).

⚠ 10.3.69.5 WARNING: The Spring (85B) and Valve Seat Assembly (85D) are to be assembled under tension. Exercise care when assembling to avoid physical injury should parts be inadvertently expelled.

Depress the valve seat assembly (85D) far enough into the vent valve cage (85C) to expose the retaining ring groove.

10.3.69.6 Insert the retaining ring (85A) in the proper groove in the bore of the vent valve cage (85C).

10.3.69.7 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, coat the surfaces of a NEW 1³/₈" O.D. o-ring (82). Also fill the o-ring grooves of the vent valve cage (85C) with the lubricant.

Install the NEW lubricated 1³/₈" O.D. o-ring (82) in its groove on the vent valve cage (85C). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.70 Carefully insert the vent valve assembly (82, 85), seal end first, as far as it will go into the proper cavity in the back cover face of the brake valve body (100).

10.3.71 Lubricate the surfaces of five NEW 1/2" O.D. o-rings (76) with #2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves of the suppression valve (77) with the lubricant.

Install the NEW lubricated 1/2" O.D. o-rings (76) into their grooves on the suppression valve (77). Any excess lubricant may be removed by wiping with a dry, clean, lint-free cloth.

10.3.72 Carefully insert the suppression valve with o-ring assembly (76, 77), tip end first, as far as it will go into the proper cavity in the back cover face of the brake valve body (142).

10.3.73 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, coat the surfaces of four NEW 1/2" O.D. o-rings (79). Also fill the o-ring grooves of the emergency valve (80) with the lubricant.

Install the five NEW lubricated 1/2" O.D. o-rings (79) into their grooves on the emergency valve (80). Excess lubricant may be removed by wiping with a dry, clean, lint-free cloth.

10.3.74 Carefully insert the emergency valve with o-



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rings (79, 80), tip end first, as far as it will go into the proper cavity in the back cover face of the brake valve body (100).

10.3.75 Assemble a NEW back cover gasket (86) over the four studs (95) and onto the brake valve body (100).

10.3.76 Place the proper spring on each of the following valve assemblies in their respective locations in the brake valve body (100).

10.3.76.1 Spring (78) on the brake pipe cut-off valve assembly (81 to 83A incl.).

10.3.76.2 Spring (75) on the emergency valve assembly (79, 80).

10.3.76.3 Spring (75) on the suppression valve assembly (76, 77).

10.3.77 Place the back cover (74) over the four studs (95) and into position against the cover gasket (86) on the brake valve body (100).

10.3.78 Assemble a $\frac{3}{8}$ " hex nut (73) on each of the four studs (95).

Equally tighten the nuts (95) to secure the back cover (74) in place.

11.0 TESTING & ADDITIONAL INFORMATION

11.1 IMPORTANT: After the "26-C" Brake Valve Portion, Pc.No. 562073-1000 has been assembled, **BUT 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-2422-O.

11.2 Refer to Section 9.0 for installation procedures for the "26-C" Brake Valve. **A NEW pipe bracket gasket MUST BE used during installation.**

11.3 IMPORTANT: Whenever the "26-C" Brake Valve Portion is removed from a Brake Equipment Arrangement for any reason, and it is reinstalled or replaced with a new or repaired and tested Portion, a stationary vehicle air brake test **MUST BE** made to be sure that the "26-C" Brake Valve functions properly in the Brake Equipment Arrangement.

11.4 Consult your Wabtec Corporation Representative if additional information is required.



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