

operation & maintenance instruction

"N-1" REDUCING VALVE PORTION, Part No. 587551-0000*

NOVEMBER, 1988

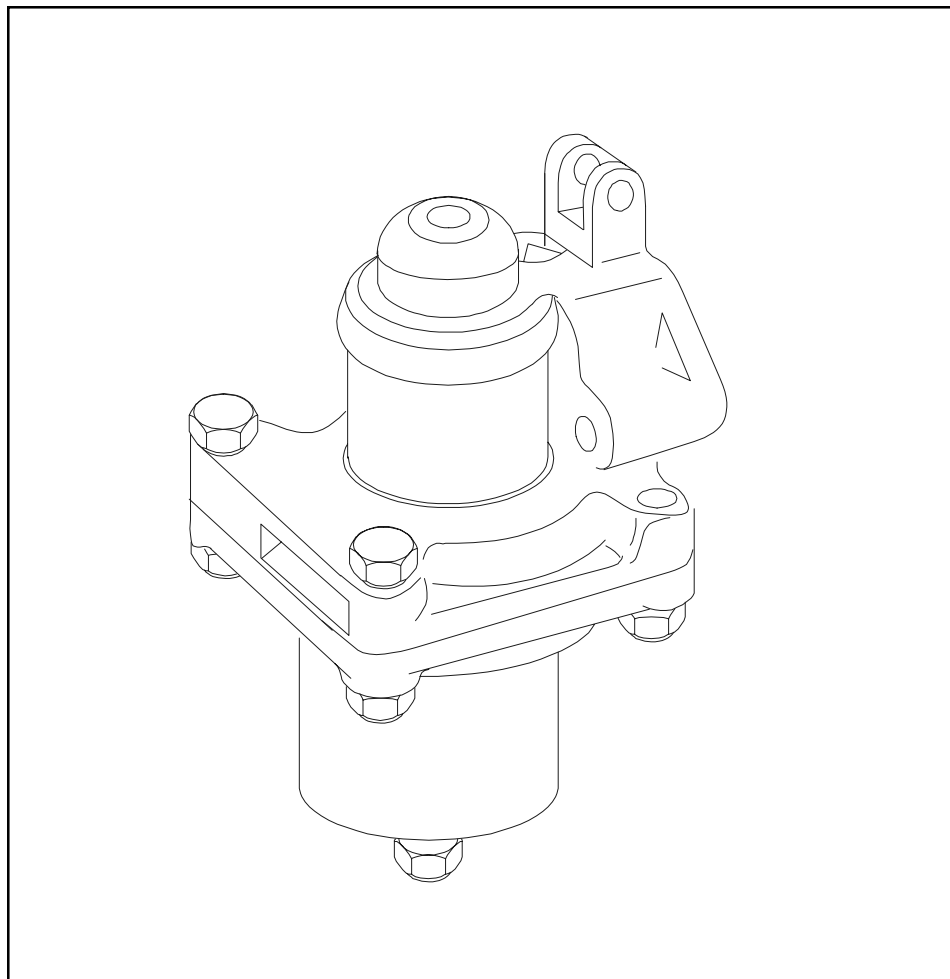
Supersedes Issue dated September, 1982

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.





operation & maintenance instruction

1.0 DESCRIPTION

Designed for use in equipment arrangements where the air pressure does not exceed 150 psig, this medium capacity, self-lapping, diaphragm operated type regulating valve functions to reduce an air supply pressure to that of a lower delivery pressure. The delivery pressure is determined by a control spring force that is manually adjustable within specific limits (up to 30 psig). The "N-1" Reducing Valve Portion, Pc.No. 587551, is designed to be mounted on a manifold, pipe bracket, or another device or portion in such a way that it can be removed for servicing or maintenance without disturbing the piping of the equipment arrangement.

*** IMPORTANT:** The identifying piece number (part number) for this "N-1" Reducing Valve Portion **MUST** include a four digit suffix code. The last two digits of the code indicate the pressure setting of the Portion, as examples: Pc.No. 587551-0010 indicates an "N-1" Reducing Valve Portion with a 10 psi setting; Pc.No. 587551-0030 indicates an "N-1" Reducing Valve Portion with a 30 psi setting.

2.0 OPERATION AND ADJUSTMENT

2.1 OPERATION

A control spring force under the diaphragm causes the exhaust valve seat to seal against a ball valve that is part of a two-ball valve "dumbbell" type inlet and exhaust valve unit. The two-ball valve is forced up to open the inlet valve. Air under pressure directed into the portion at the "IN" (Supply) port can then flow past the open inlet valve into the delivery passage and to the face of the diaphragm, forcing the diaphragm assembly down and compressing the control spring. When air pressure acting on the diaphragm produces a force equalizing the pre-adjusted spring force, the two-ball "dumbbell" valve moves down to seal the inlet valve. In this position, the Reducing Valve Portion is in a lap position, since both the inlet and exhaust valves are closed. If delivery air pressure is reduced for any reason, the control spring again raises the two-ball "dumbbell" valve to open the inlet valve, thus increasing the delivery pressure to that which is again equal to the spring force. If delivery air pressure is greater than the control spring force for any reason, the diaphragm assembly moves down to open the exhaust valve. The control spring returns the diaphragm assembly to lap position when delivery pressure on the diaphragm is again equal to the control spring force.

2.2 ADJUSTMENT

Manual adjustment of delivery pressure is made by manually

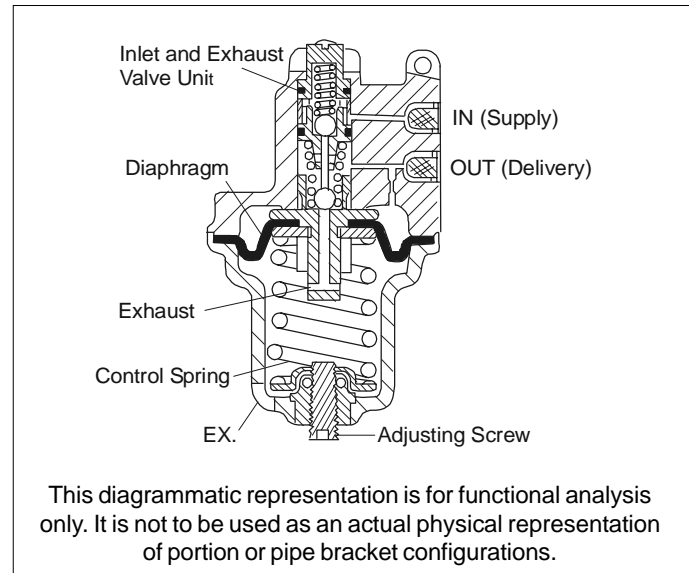


Figure 2 - Diagrammatic View

turning the adjusting screw, which acts on the control spring, clockwise or counterclockwise. If a higher pressure is desired, turning the adjusting screw clockwise will increase the compression on the control spring so that a higher delivery pressure will be required to lap the Valve Portion. If a lower pressure is desired, turning the adjusting screw counterclockwise will decrease the compression on the control spring so that a lower delivery pressure will be required to lap the Valve Portion.

⚠ WARNING: ALL owner-operating property safety procedures and the procedures and warnings listed in Section 5.0 of this publication are to be followed when making ANY adjustments to the "N-1" Reducing Valve Portion. Contact your Wabtec Corporation Representative for specific instructions on desired applications of this Valve Portion.

3.0 MAINTENANCE PROCEDURES AND TECHNIQUES

3.1 IMPORTANT: The "N-1" Reducing Valve Portion should be removed from the brake equipment arrangement in its entirety, taken to the shop, disassembled, thoroughly cleaned, inspected, lubricated, and assembled, using NEW Wabtec Corporation rubber parts and other specified NEW Wabtec Corporation parts, according to the following vehicle application schedule, or more frequently if service conditions so dictate.

| RECOMMENDED TYPE OF APPLICATION | FREQUENCY - AT LEAST ONCE EVERY |
|------------------------------------|------------------------------------|
| Locomotives | 12 Months |
| Passenger (Interstate) | 24 Months |
| Transit | 24 Months |



operation & maintenance instruction

4.0 PARTS CATALOG AND REPLACEMENT PARTS INFORMATION

4.1 PARTS CATALOG

IMPORTANT: When ordering replacement parts for the "N-1" Reducing Valve Portion, Pc.No. 587551, refer to the current issue of the Wabtec Corporation Parts Catalog 3209-3, S.1.

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

4.2 REPLACEMENT PARTS


IMPORTANT: To obtain satisfactory operation and reliability of this device, **ONLY** Wabtec Corporation replacement parts are to be used in the maintenance of this device.

5.0 SAFETY PROCEDURES AND WARNINGS

Regular owner-operating property and shop safety procedures are to be followed when performing any work on the "N-1" Reducing Valve Portion.

The work area is to 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 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.**
- **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.**
- **To prevent receiving electrical shock when performing electrical tests, 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.**

6.0 CLEANING SOLVENT AND LUBRICANT

6.1 CLEANING SOLVENT

The solvent used to clean reusable parts **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 cleaned without abrasion.

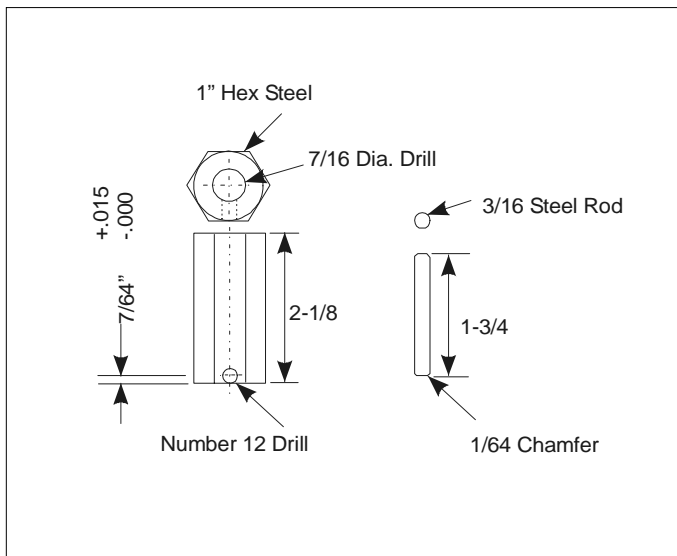


Figure 3 - Holding Fixture (Dwg. R-42-1)

6.2 Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2, such as Dow Corning Corporation Molykote 55M, is required for the lubrication of o-rings, o-ring grooves, and the bearing surfaces of bushings into which o-ring assemblies are installed.

7.0 SPECIAL TOOL

In addition to the regular shop tools, a holding fixture for disassembling and assembling the exhaust valve unit **MUST BE** available to the repair person. Dimensions and specifications for making this fixture are shown in Figure 3.

IMPORTANT: The information shown in Figure 3 for making the holding fixture is furnished as a convenience. The Wabtec Corporation of American Standard Inc. (WABCO) 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).

8.0 MAINTENANCE PROCEDURE - "IN-SHOP"

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

8.1 DISASSEMBLY (Figure 4)

8.1.1 Remove the two ring gaskets (1) and the two strainers (2) from the mounting face of the body (20). **SCRAP** the gaskets (1) and strainers (2).

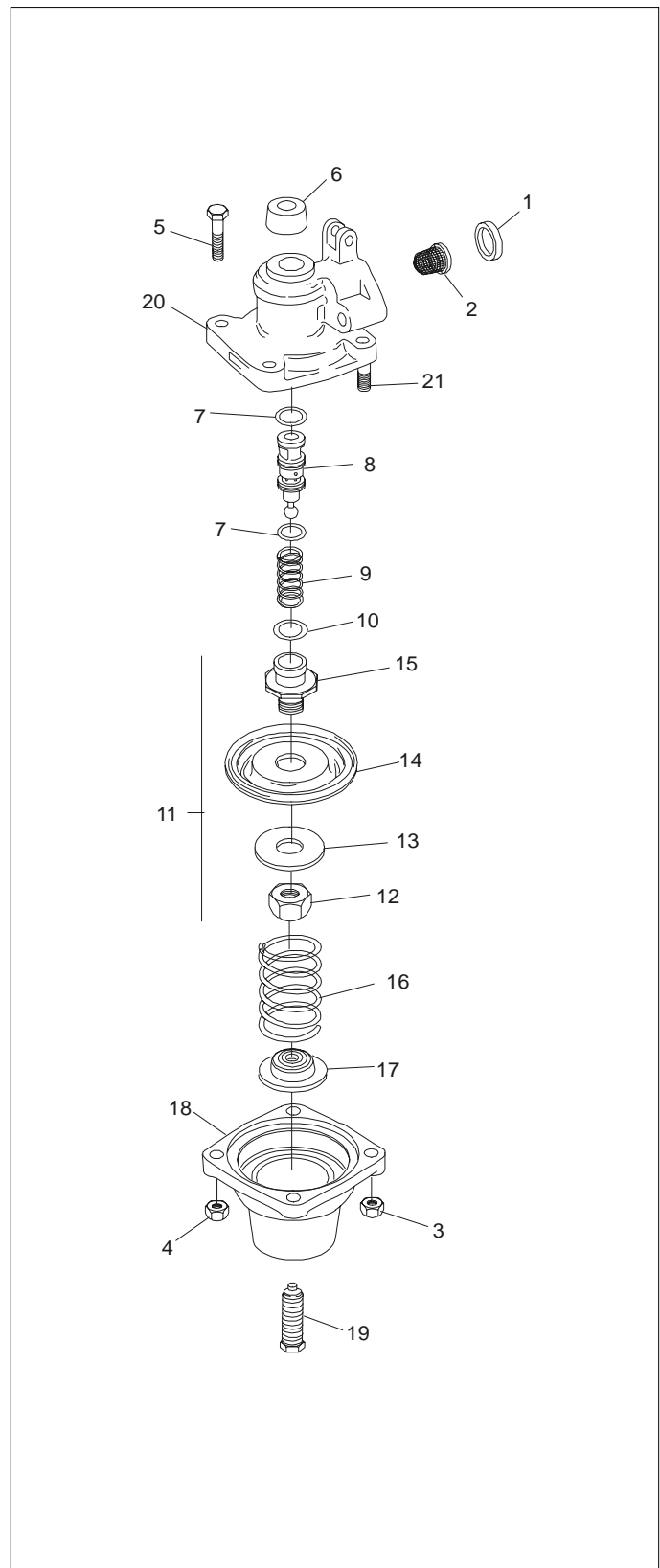


Figure 4 - Exploded View

operation & maintenance instruction

8.1.2 IMPORTANT: Using the proper tool, turn the adjusting screw (19) located in the spring housing (18) counterclockwise, as viewed from the spring housing end, TO RELIEVE ALL COMPRESSION on the control valve spring BEFORE ATTEMPTING THE DISASSEMBLY.

NOTE: It is not necessary to separate the adjusting screw from the housing during disassembly unless it is damaged, but care must be taken to insure all spring COMPRESSION is removed before proceeding to prevent possible personal injury.

8.1.3 Carefully remove the four $\frac{5}{16}$ " self-locking hex nuts (3, 4) which secure the spring housing (18) to the body (20). SCRAP the nuts (3, 4).

⚠ WARNING: EXERCISE CARE SO THAT THE SPRING HOUSING, SPRING SEAT, OR SPRING DO NOT "FLY OUT" OF THE SUB-ASSEMBLY AND CAUSE BODILY INJURY.

8.1.4 Remove the spring housing (18) diaphragm-exhaust valve seat assembly (10 to 15) as a unit, the spring (16) and spring seat (17).

8.1.5 Remove the two $\frac{5}{16}$ " x $1\frac{3}{8}$ " bolts (5) from the body (20). The studs (21) need not be removed from the body (20) unless they are damaged.

8.1.6 Disassemble the exhaust valve seat sub-assembly by removing the following parts from the exhaust valve seat (15).

8.1.6.1 $\frac{3}{4}$ " O.D. o-ring (10). SCRAP the o-ring.

8.1.6.2 $\frac{9}{16}$ " hex nut (12).

8.1.6.3 Diaphragm follower (13).

8.1.6.4 Diaphragm (14). SCRAP the diaphragm.

8.1.7 Remove the exhaust valve spring (9) from the body.

8.1.8 Remove the inlet and exhaust valve unit (8) with o-rings (7) from the body.

8.1.9 Remove and SCRAP the two $\frac{3}{4}$ " O.D. o-rings (7) from the valve unit (8).

(Figure 5)

8.1.10 Disassemble the inlet and exhaust valve unit (8) as follows:

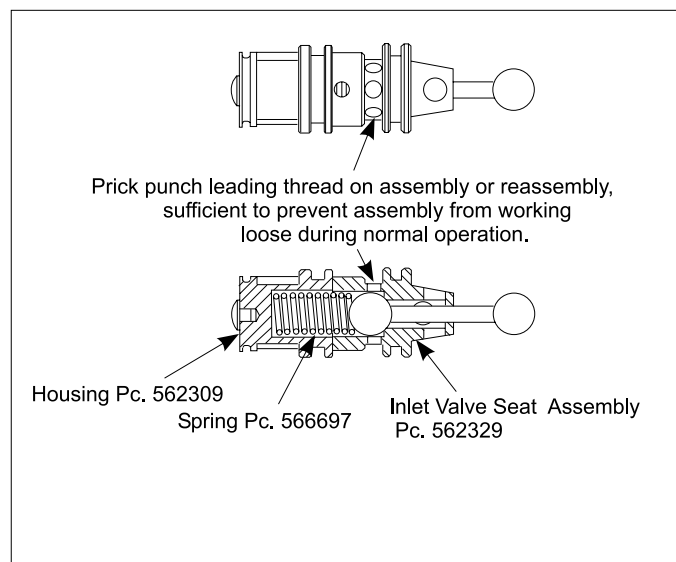


Figure 4 - Inlet and Exhaust Valve Unit - ASSEMBLY

8.1.10.1 The use of the holding fixture as shown in Figure 3 is required.

Insert the dumbbell end of the inlet and exhaust valve into the holding fixture so that the cross drill in the holding fixture aligns with the cross drill in the tapered end of the inlet valve seat.

8.1.10.2 Insert the $\frac{3}{16}$ " steel rod through the cross drill of the holding fixture and into the cross drill of the inlet valve seat.

8.1.10.3 Carefully remove the housing from the inlet valve seat.

8.1.10.4 Remove the spring from the inlet valve seat.

8.1.10.5 Remove the $\frac{3}{16}$ " steel rod from the inlet valve seat and the holding fixture.

8.1.10.6 Remove the inlet valve seat assembly from the holding fixture.

8.1.11 Remove and SCRAP the dirt protector (6) from the body (18).

⚠ 8.2 CLEANING AND INSPECTING

8.2.1 NON-REUSABLE PARTS

8.2.1.1 ALL gaskets, strainers, o-rings, the diaphragm, the dirt protector and self-locking nuts are to be SCRAPPED



and replaced with NEW Wabtec Corporation Parts.

8.2.2 REMAINING PARTS

8.2.2.1 Wash all of the remaining parts in the cleaning solvent described in Section 6.1.

8.2.2.2 Springs may be wire brushed to assist in the removal of rust and scale.

8.2.2.3 After cleaning, blow the parts dry with a low pressure jet of clean, dry air.

8.2.2.4 Inspect the springs. Replace any spring that is rusted, pitted, distorted, or that has taken a permanent set. Refer to Parts Catalog 3209-3, S.1 for spring information and identification.

8.2.2.5 Inspect the remaining parts. Replace any part that is cracked, cut, broken, excessively worn, damaged in any way or that is in such a condition that may result in the unsatisfactory operation of the "N-1" Reducing Valve Portion.

⚠ 8.3 ASSEMBLY

8.3.1 The use of the holding fixture, shown in Figure 3, is required during the procedures which follow.

(Figure 5)

Assemble the inlet and exhaust valve unit as follows:

8.3.1.1 Insert the dumbbell end of the inlet valve seat into the holding fixture so that the cross drill in the holding fixture aligns with the cross drill in the tapered end of the inlet valve seat.

8.3.1.2 Insert the $\frac{3}{16}$ " steel rod through the cross drill of the holding fixture and into the cross drill of the inlet valve seat.

8.3.1.3 Insert the inlet valve spring into the inlet valve seat.

8.3.1.4 Assemble the housing onto the inlet valve seat.

⚠ WARNING: EXERCISE CARE SO THAT THE SPRING DOES NOT INADVERTENTLY "FLY OUT" OF THE SUB-ASSEMBLY AND CAUSE BODILY INJURY.

8.3.1.5 **IMPORTANT:** Prick punch the leading thread of the seat assembly sufficiently to prevent the inlet and exhaust valve unit from coming apart during normal operations.

8.3.1.6 Remove the $\frac{3}{16}$ " steel rod from the inlet valve seat and the holding fixture.

8.3.1.7 Remove the inlet and exhaust valve unit from the holding fixture.

(Figure 4)

8.3.2 Using Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2, coat the surfaces of two NEW $\frac{3}{4}$ " O.D. ($\frac{9}{16}$ " I.D.) o-rings (7). Also fill the o-ring grooves of the inlet and exhaust valve unit (8) and lightly coat the surfaces of the valve bushing of the body (20) with the lubricant.

8.3.3 Install the two NEW lubricated $\frac{3}{4}$ " O.D. o-rings (7) into their grooves on the inlet and exhaust valve unit (8). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

8.3.4 Insert the inlet and exhaust valve unit (8) with o-rings (7), housing end first, into the body (20). Set this assembly aside in a clean protected area.

8.3.5 If the fluted socket adjusting screw (19) was removed from the spring housing (18) it **MUST BE** replaced at this time. Turn the screw into the housing a minimum number of threads in order to prevent unnecessary compression on the spring during the assembly procedures which follow.

8.3.6 Place a NEW diaphragm (14) and the diaphragm follower (13) on the exhaust valve seat (15). Install the $\frac{9}{16}$ " hex nut (12) to secure the parts together.

8.3.7 Using Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2, fill the o-ring groove of the exhaust valve seat (15) and coat the surfaces of a NEW $\frac{3}{4}$ " O.D. ($\frac{5}{8}$ " I.D.) o-ring (10). Install the NEW lubricated $\frac{3}{4}$ " O.D. o-ring (10) into the o-ring groove on the exhaust valve seat (15). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

8.3.8 Install the spring seat (17), spring (16) and diaphragm-exhaust valve seat - o-ring assembly (10 to 15) into the spring housing (18). Be sure that the diaphragm bead is properly fitted into its groove in the housing (18).

8.3.9 Install the exhaust valve spring (9) onto the inlet and exhaust valve unit (8) that was previously installed in the body (20).

8.3.10 With the exhaust opening of the spring housing (18) located so that it faces the direction of the mounting



operation & maintenance instruction

face of the body (20) CAREFULLY place the spring housing assembly (10 to 19) on the body (20). Be sure that the exhaust valve spring (9) fits into the exhaust valve seat (15) and that the diaphragm (14) remains in place.

8.3.11 Install the two $\frac{5}{16}$ " x $1\frac{3}{8}$ " hex head bolts (5) through the aligned holes of the housing and body. Install two NEW $\frac{5}{16}$ " self-locking hex nuts (4) on the two bolts (5) and two NEW $\frac{5}{16}$ " self-locking hex nuts (3) on the two studs (21). Equally tighten the four nuts.

8.3.12 Install the two NEW strainers (2) and two NEW $1\frac{1}{16}$ " O.D. ring gaskets (1) in place in the mounting face of the body (20).

IMPORTANT: It may be necessary to tape the strainers and gaskets in place while transporting or storing the "N-1" Reducing Valve Portion. ALL tape MUST BE removed before the "N-1" Reducing Valve Portion is tested and/or installed in a brake equipment arrangement.

8.3.13 Install a NEW dirt protector (6) over the exposed housing end of the inlet and exhaust valve unit (8) and onto the body (20).

8.4 TESTING AND ADDITIONAL INFORMATION

8.4.1 After the "N-1" Reducing Valve Portion, Pc.No. 587551, has been assembled, BUT BEFORE it is returned to service, it MUST pass a series of tests following the procedures of the current issue of the Wabtec Corporation Test Specification T-1605-0.

8.4.2 IMPORTANT: Whenever the "N-1" Reducing Valve Portion is removed from the brake equipment arrangement for any reason and it is re-installed or replaced with a NEW or repaired and tested Portion two NEW ring gaskets, Pc.No. 558515, MUST BE used. These gaskets are a part of the Portion and are shown as reference (1) in Figure 4.

8.4.3 **IMPORTANT:** Whenever the "N-1" Reducing Valve Portion is removed from the brake equipment arrangement for any reason and it is re-installed, or replaced with a NEW or repaired and tested portion a stationary vehicle air brake test MUST BE made to be sure that the Portion functions properly in the brake equipment arrangement.

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



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WABCO Locomotive Products
1001 Air Brake Avenue • Wilmerding, PA 15148
(412) 825-1000 • Fax (412) 825-1019
www.wabtec.com