

operation & maintenance instruction

“A-1” REDUCTION RELAY VALVE, Pc.No. 590406

(with “B-1” Quick Service Valve Portion, Pc.No. 565453,
and #8 Vent Valve Portion, Pc.No. 590421)

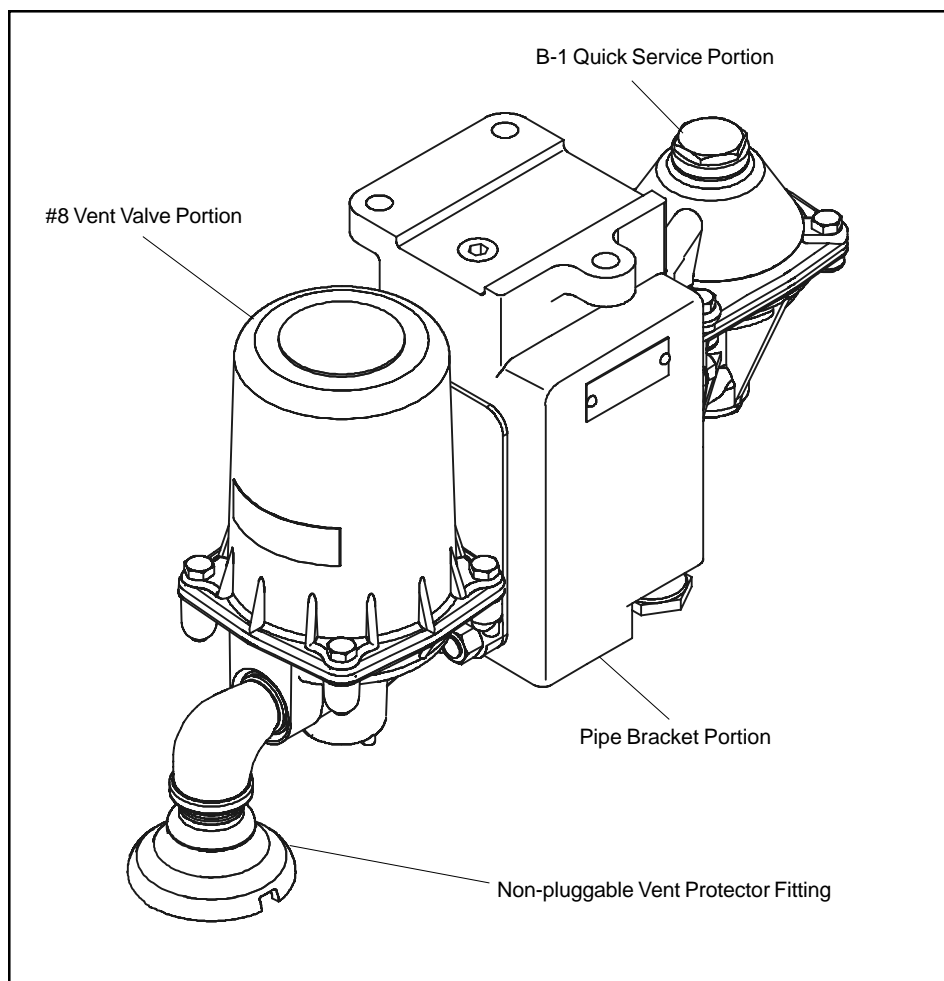
February, 1985

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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both sides of piston 3a equal, spring 2b moves the piston assembly 3a upward until check valve 2c is seated. Brake pipe air may unseat check valve 2c and continue to flow from chamber F through passage j into chamber E, passage 1b, and chamber B to maintain equal pressure on both sides of the diaphragm 4.

At the #8 Vent Valve Portion, brake pipe air flows from passage 1f through strainer 37 to charge chamber K. Piston 25 is moved upward into release position permitting spring 16 to seat vent valve exhaust valve 17a. Brake pipe air flows through cross-section passage b, passage c, d, and f to charge the vent valve chamber H.

2.2 SERVICE

When air pressure is gradually reduced out of passage 1, the brake pipe air pressure in the "B-1" Quick Service Valve Portion chamber A is reduced below that in chamber B. This differential of pressure causes piston 3a to be moved upward, unseating exhaust check valve 11d permitting brake pipe air to exhaust at a service rate locally at the "A-1" Reduction Relay Valve through exhaust choke 10a and passage 1d, thus propagating the effect of the brake pipe reduction on brake operation. At the same time, the lower end of piston 3a is unseated which connects chamber B below piston 3a and its volume G to exhaust through passage 1b, g, and choke 51.

During the gradual reduction of air pressure out of passage 1, the #8 Vent Valve Portion volume H reduces in pressure an amount corresponding to this pressure drop in order to maintain this valve in a stabilized position. When the pressure in chamber K is reduced, air from chamber H bleeds down through passages d, f, h, c and b, thus stabilizing the vent valve piston 25 to prevent any movement during service.

2.3 SERVICE LAP POSITION

When the desired pressure drop in passage 1 and chamber A of the "B-1" Quick Service Valve Portion is completed, and the air pressure in chamber B below piston 3a is reduced below this pressure, piston 3a is moved downward to a lap position. In this position, the lower end of piston 3a is seated on check valve 2c, preventing further drop of pressure in chamber B. At the upper end of the piston, spring 11b seats check valve 11d to prevent flow of brake pipe air into passage 1d and exhaust.

2.4 RELEASE & RECHARGE AFTER SERVICE APPLICATION

During a pressure reduction in passage 1, the #8 Vent Valve

Portion volume H reduces in pressure in order to follow the brake pipe pressure reduction. When the "B-1" Quick Service Valve Portion piston 3a returns to a release position, both the "B1" Quick Service Valve Portion and the #8 Vent Valve Portion are recharged as previously described under charging.

2.5 EMERGENCY POSITION

When an emergency rate of brake pipe reduction is effective in passage 1, air in chamber H of the #8 Vent Valve Portion cannot flow through passages f, d, c, and b at the same rate as chamber K is being evacuated. This differential of pressure across the piston 25 moves the piston stem 23 downward to contact and unseat exhaust valve 17a providing a large and direct passage for brake pipe air in passage 1f to flow through chamber K to atmosphere. This local rapid venting of brake pipe air accelerates the emergency reduction of brake pipe pressure serially and rapidly through the train by assisting in the prompt movement of similar valves on other vehicles into an emergency position.

2.6 RELEASE AFTER EMERGENCY

When releasing after an emergency brake application, as the brake pipe passage 1 is recharged, the "A-1" Reduction Relay Valve is recharged as previously described.

3.0 MAINTENANCE SCHEDULE

IMPORTANT: The "B-1" Quick Service Valve Portion and the #8 Vent Valve Portion of the "A-1" Reduction Relay Valve should be removed from the equipment arrangement, taken to the shop, be completely disassembled, the parts cleaned, inspected, lubricated, assembled and the Portion tested according to the following application schedule, or more frequently if service conditions so indicate.

RECOMMENDED TYPE OF APPLICATION	FREQUENCY - AT LEAST ONCE EVERY
Freight Cars	144 Months
Locomotives	12 Months
Passenger (Interstate)	36 Months
Transit	24 Months

4.0 PARTS CATALOG & RUBBER PARTS KIT INFORMATION

4.1 When ordering replacement parts for the "A-1" Reduction Relay Valve, Pc.No. 590406, or any of its component portions, refer to the current issue of the Wabtec Corporation Parts Catalog 3211-4, S. 1.



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.

IMPORTANT: To obtain satisfactory operation and reliability of the "A-1" Reduction Relay Valve and/or the Component Portions of this device, ONLY replacement parts supplied by the Wabtec Corporation are to be used in the maintenance of this device.


4.2 Rubber Part Kits are available for the "B-1" Quick Service Valve Portion, the #8 Vent Valve Portion and the Pipe Bracket Portion. Consult Parts Catalog 3211-4, S.1 and/or your Wabtec Corporation Representative for Kit part numbers, contents and ordering information.

5.0 SAFETY PROCEDURES & WARNINGS

Regular shop safety procedures are to be followed.

The work area is to 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.

- 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.
- 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 SOLVENTS & LUBRICANTS

6.1 The solvent used for cleaning the parts of the "A-1" Reduction Relay Valve and the parts of the various portions MUST BE an aliphatic, organic solution, such as mineral spirits or naphtha, that will dissolve oil and grease and that will permit all of the parts to be cleaned without abrasion.

6.2 The following lubricants are required when servicing the "A-1" Reduction Relay Valve Component Portions.

6.2.1 #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, which is used to lubricate all o-rings, o-ring grooves, and the bearing surface of the bushings into which the o-ring assemblies are installed as well as the threads of the cap nut assemblies of the "B-1" Quick Service Valve Portion.

6.2.2 Triple Valve Oil, Wabtec Corporation Specification M-7611-20 (AAR Specification M-912), which is to be used to lubricate piston stem guides (piston tail) of the Quick Service Valve and Vent Valve Portions.

6.2.3 A compound consisting of one part graphite, Wabtec



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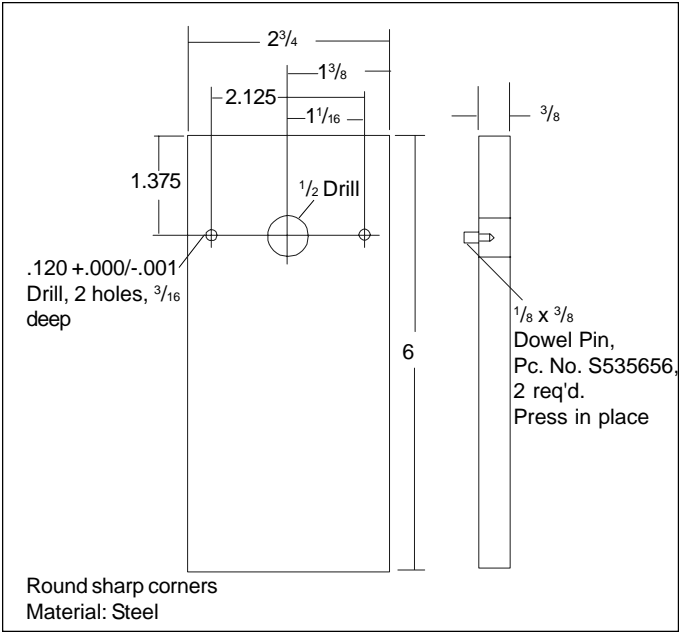


Figure 3 - Spanner Wrench (Drawing R-78)

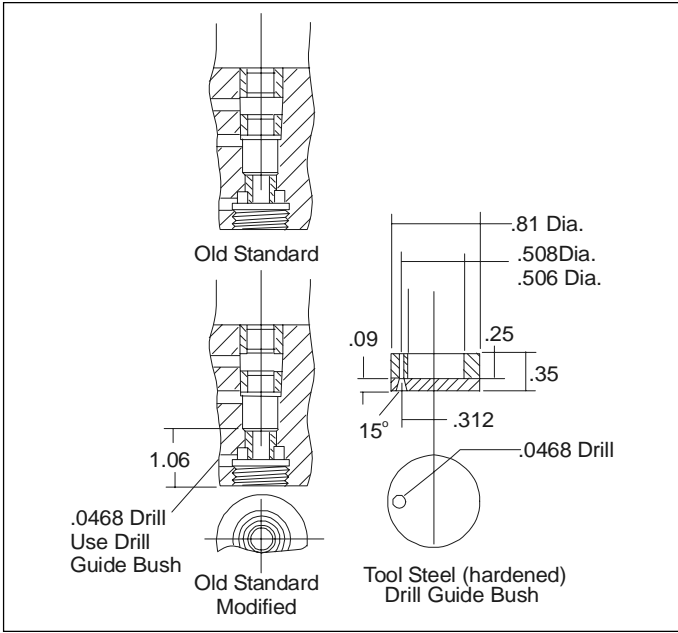


Figure 4 - Drill Jig (Drawing G-917)

Corporation Specification M-7695-2 (AAR Specification M-913) and two parts of SAE 20 Oil by weight is to be used to coat the threads of any choke plug that has been cleaned before it is installed in its proper position.

6.2.4 LOCTITE Pipe Sealant with Teflon - Wabtec Corporation Specification M-7499-15, used on threads of vent protector assemblies.

7.0 SPECIAL TOOLS

In addition to the regular shop tools, the following **MUST BE** available:

- 7.1 #3 TRUARC Retaining Ring Pliers.
- 7.2 An 1 1/16" open end wrench.
- 7.3 A spanner wrench, as shown on Drawing R-78, which is used to aid in disassembling and assembling the piston assembly of the "B-1" Quick Service Valve Portion. See Figure 3.
- 7.4 A drill jig, as shown on Drawing G-917, which is used when required for modification of the diaphragm bush of the "B-1" Quick Service Valve Portion. See Figure 4.
- 7.5 A 3/8" hexagon key, Pc.No. 567305.
- 7.6 **IMPORTANT:** The information shown in Figures 3 and

4 for making tools 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).

8.0 PORTION REMOVAL & INSTALLATION "ON-CAR" Figure 5

- 8.1 **IMPORTANT:** ALL owner-operating property safety procedures and the safety procedures and warnings listed in Section 5.0 **MUST BE** followed when performing any work on the "A-1" Reduction Relay Valve or the component portions.
- 8.2 Placards indicating that work is being performed should be placed in the cab area and about the car.
- 8.3 Wheel chocks **MUST BE** applied to car wheels to prevent car movement.
- 8.4 The repair person **MUST** have available the following parts:
 - 8.4.1 A **NEW** or repaired and tested "B-1" Quick Service Valve Portion, Pc.No. 565453.
 - 8.4.2 Three **NEW** 5/8" O.D. ring gaskets, Pc.No. 527560.
 - 8.4.3 Two **NEW** 1" O.D. ring gaskets, Pc.No. 533212.

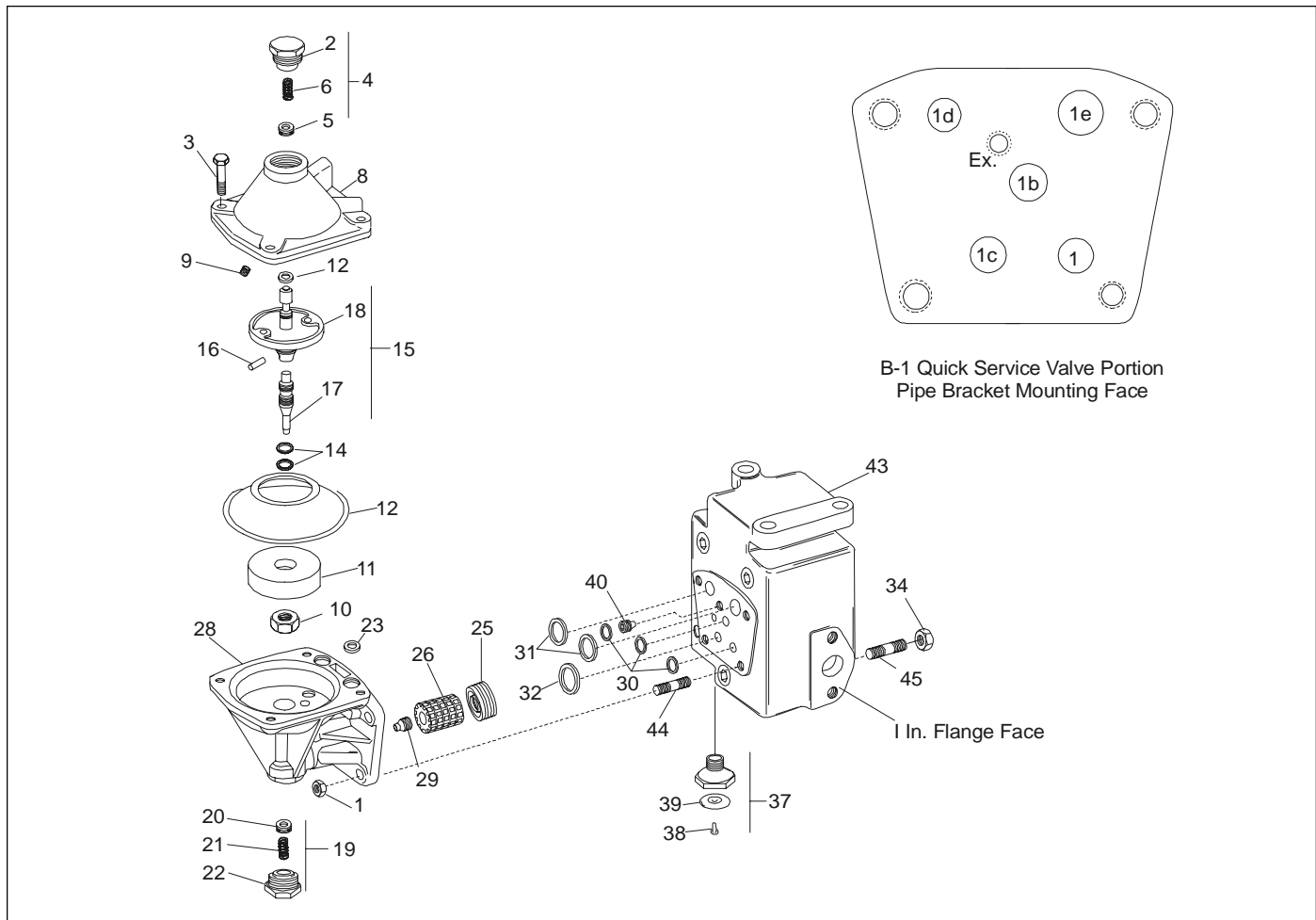


Figure 5 - "B-1" Quick Service Valve Portion & Pipe Bracket Portion - Exploded View

8.4.4 One NEW $1\frac{7}{8}$ " O.D. ring gasket, Pc.No. 540542.

8.4.5 A NEW, or a cleaned and inspected, $\frac{1}{8}$ " NPT (#54 - .0550 drill) choke plug, Pc.No. 578254. The threads of this choke plug are to be lubricated with the graphite and oil compound listed in Section 6.2.3.

8.4.6 A NEW or repaired and tested #8 Vent Valve Portion, Pc.No. 590421.

8.4.7 A NEW pipe bracket gasket, Pc.No. 93986.

8.4.8 A NEW or repaired vent protector assembly (37).

8.5 Remove ALL free dirt from the "A-1" Reduction Relay Valve by wiping with a clean lint-free cloth or rag, or blowing with a low pressure jet of clean, dry air.

8.6 "B-1" Quick Service Valve Portion

8.6.1 Remove the four $\frac{3}{8}$ " hex nuts (1) that secure the "B-1" Quick Service Valve Portion to the Pipe Bracket (43). Remove the Quick Service Valve Portion from the Pipe Bracket.

8.6.2 Remove and SCRAP the six ring gaskets (30, 31, 32) from the mounting face of the Valve Portion.

8.6.2 Visually inspect the mounting face of the pipe bracket (43) to be sure that the surface is clean and that the ports are clean and unrestricted. If necessary, blow the ports out using a low pressure jet of clean, dry air. Exercise care so that no dirt is blown into the ports.

A clean, lint-free cloth which has been saturated with the cleaning solvent described in Section 6.1 may be used to clean the mounting face of the pipe bracket.

8.6.4 Remove the $\frac{1}{8}$ " NPT choke plug (40) from the pipe bracket (43).



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8.6.5 Visually inspect the port from which the plug (40) was removed to be sure that it is clean and unrestricted. If necessary, the port may be blown out with a low pressure jet of clean, dry air.

8.6.6 Install a NEW or cleaned and inspected 1/8 NPT (#54 -.0550" drill) choke plug (40) into the port in the pipe bracket (43) from which the plug was removed in Section 8.5.4. Be sure that the threads of the plug are lightly coated with the oil and graphite compound described in Section 6.2.3 prior to installation.

8.6.6.1 **IMPORTANT:** Choke plug (40) is Pc.No. 578254. Be sure that it is installed so that when tightened in place that it is below or even with the mounting face surface of the pipe bracket.

8.6.7 Remove ALL protective material from a NEW or repaired and tested "B-1" Quick Service Valve Portion.

8.6.8 Install three NEW $\frac{5}{8}$ " O.D. ring gaskets (30), two NEW 1" O.D. ring gaskets (31), and a NEW $1\frac{7}{8}$ " O.D. ring gasket (32) in their respective grooves in the mounting face of the Quick Service Valve Portion.

8.6.9 Install the Quick Service Valve Portion with gaskets on the Pipe Bracket Portion (43) and secure it in place by installing four $\frac{3}{8}$ " hex nuts (1). Equally tighten the nuts.

8.6.10 Provide adequate protection for the removed "B-1" Quick Service Valve Portion and choke plug to protect them from dirt and moisture and transport them to the shop area for maintenance.

8.7 #8 VENT VALVE PORTION (Figure 5)

8.7.1 Remove the #8 Vent Valve Portion from the Pipe Bracket Portion (43) by first removing the two $\frac{1}{2}$ " hex nuts (34).

8.7.2 Remove and SCRAP the pipe bracket gasket (36).

8.7.3 Visually inspect the mounting flange of the pipe bracket to see that it is clean and unrestricted. The flange may be blown clean using a low pressure jet of clean, dry air.

8.7.4 Remove ALL protective material from a NEW or repaired and tested #8 Vent Valve Portion, Pc.No. 590421.

8.7.5 Install a NEW pipe bracket gasket (36), Pc.No. 93986, in the groove in the mounting flange of the Vent Valve Portion.

8.7.6 Install the Vent Valve Portion with gaske on the Pipe Bracket (43) and secure it in place using the two $\frac{1}{2}$ " hex nuts (34).

8.7.7 Provide adequate protection to prevent dirt and moisture from entering the removed #8 Vent Valve Portion and transport it to the shop for maintenance.

8.8 VENT PROTECTOR ASSEMBLY (Figure 5)

8.8.1 It is NOT necessary to remove the Vent Protector Assembly (37) from the Pipe Bracket (43) unless it is damaged or unless the seal is torn, damaged or missing.

8.8.2 If damaged in any way, remove the Vent Protector Assembly (37).

8.8.3 Apply Loctite Sealant with Teflon, Wabtec Corporation Specification M-7499-15, to the threads of a NEW or repaired Vent Protector Assembly (37) and install it in place.

8.8.4 Transport the removed Vent Protector to the shop for repair.

8.9 **IMPORTANT:** Whenever ANY Portion of the "A-1" Reduction Relay Valve is removed from the 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(s) and the "A-1" Reduction Relay Valve function properly in the equipment arrangement.

8.10 Remove ALL wheel chocks and warning placards before attempting to move vehicle.

⚠ 9.0 CHOKE PLUG MAINTENANCE - IN SHOP

9.1 The size and cleanliness of choke plugs is important. Choke plugs are to be handled and cleaned one at a time. If a Portion is being serviced, choke plugs are to be removed and serviced one at a time, and then returned to their proper location. The following procedure MUST BE USED when servicing choke plugs.

9.1.1 Remove only one choke plug and place it in the cleaning solvent as described in Section 6.1 to soak.

IMPORTANT: Metallic tools MUST NOT be used to clean chokes, as their size and shape MUST NOT be changed.

9.1.2 While the choke plug is soaking in the solvent, the passage from which it was removed MUST BE CHECKED FOR cleanliness and blown out, if necessary, with a low



pressure of clean, dry air.

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

9.1.4 Inspect the choke plug to be sure that it is clean and not restricted.

Lightly coat the threads of the choke plug with a compound consisting of one part graphite, Wabtec Corporation Specification M-7695-2 (AAR Specification M-913) and two parts SAE 20 oil by weight. Assemble the choke plug into the passage from which it was removed.

9.1.5 Remove the next choke plug and repeat procedures 9.1.1 to 9.1.4 until all choke plugs have been serviced.

10.0 "B-1" QUICK SERVICE VALVE PORTION - MAINTENANCE PROCEDURES - "IN-SHOP"

(Figure 5)

⚠ 10.1 DISASSEMBLY

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

CAUTION: Springs 6 and 21 may be under compression. Exercise care during the following procedures so that no parts inadvertently "fly out" of the assemblies and cause an injury.

10.1.1 Carefully remove the cap nut with o-ring assembly (7, 7A) from the cover (8). Remove the check valve spring (6) and check valve (5). SCRAP the check valve (5).

10.1.2 Remove and SCRAP the o-ring (7A) from the cap nut (7).

10.1.3 Carefully remove the cap nut with o-ring (22, 22A) from the body (28). Remove the check valve spring (21) and check valve (20). Remove the o-ring (22A) from the cap nut (22). SCRAP the check valve (20) and o-ring (22).

10.1.4 Remove the four hex head cap screws (3) which secure the cover (8) to the body (28).

10.1.5 Remove the cover (8) from the body (28).

10.1.6 Remove the diaphragm piston assembly (10 to 18 incl.) as a unit from the body (28). Disassemble the diaphragm piston assembly as follows:

10.1.6.1 Remove and SCRAP the two $\frac{1}{2}$ " O.D. o-rings (14) from the piston stem (17) and the $\frac{3}{8}$ " O.D. o-ring (13) from the piston (18).

10.1.6.2 Remove the $\frac{3}{32}$ " x $\frac{7}{16}$ " cylindrical spring pin (16) which secures the piston stem (17) to the piston (18), then remove the piston stem (17) from the piston (18).

10.1.6.3 Holding the piston (18) with the spanner wrench shown in Figure 3 (see Section 7.3), remove the $\frac{3}{4}$ " lock nut (10), diaphragm follower (11) and diaphragm (12) from the piston (18).

10.1.7 Remove and SCRAP the two $\frac{5}{8}$ " O.D. ring gaskets (23) from the cover mounting face of the body (28).

10.1.8 Using the $\frac{3}{8}$ " hexagon key, Pc.No. 567305, remove the strainer retainer nut (25) from the pipe bracket mounting face of the body (28).

10.1.9 Remove and SCRAP the strainer assembly (26) from the body (28).

⚠ 10.2 CLEANING & INSPECTING

10.2.1 NON-REUSABLE PARTS

ALL gaskets, o-rings, the diaphragm, check valves, and strainer are to be SCRAPPED and replaced with NEW Wabtec Corporation Parts.

10.2.2 COVER

10.2.2.1 Wash the cover (8) in the cleaning solvent described in Section 6.1.

10.2.2.2 After cleaning, blow the cover completely dry using a low pressure jet of clean, dry air.

10.2.2.3 Inspect the cover. If it is damaged in any way, is cracked, cut, broken or shows signs of excessive wear, it is to be replaced.

10.2.2.4 Remove the choke plug (9) from the cover (8) and service it following the procedure of Section 9.0. This is a $\frac{1}{8}$ " NPT choke plug, Pc.No. 91149, with a .070" drill.

10.2.2.5 Coat the threads of the choke plug lightly with the oil and graphite compound listed in Section 6.2.3.

Install the choke plug (9) in place in the cover (8). Set the cover assembly aside in a clean protected area.



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10.2.3 BODY

10.2.3.1 Wash the body (28) in the cleaning solvent described in Section 6.1.

10.2.3.2 After cleaning, blow the body completely dry using a low pressure jet of clean, dry air.

10.2.3.3 Inspect the body. If it is damaged in any way, is cracked, cut, broken, or shows signs of excessive wear, it is to be replaced.

10.2.3.4 Carefully inspect the diaphragm piston bush of the body which is located in the tapped opening end. Be sure that the seat portion of the bush is free of nicks, scratches, and/or flat spots. Also, be sure that there is a 3/64" diameter bypass port in this bush. If it is necessary to modify the bush to include the bypass port, the following procedure is to be used:

(Figure 4)

10.2.3.4.1 Insert the drill jig, as shown in Figure 4, recessed end first into the tapped opening in the body as far as it will go.

10.2.3.4.2 Carefully run a 3/64" diameter (.0468") drill through the pilot holes in the jig and into the bushed body as indicated in Figure 4.

IMPORTANT: DO NOT EXCEED a drilling depth of 1.06" from the top face of the drill jig.

(Figure 5)

10.2.3.5 Remove the 1/8 NPT choke plug (29) from the body (28) and service it following the procedure of Section 9.0. This is a 1/8 NPT choke plug, Pc.No. 578253, with a #76 (.0200") drill.

10.2.3.6 After servicing, coat the threads of the choke plug (29) lightly with the oil and graphite compound described in Section 6.2.3 and install it in the body.

10.2.4 REMAINING PARTS

10.2.4.1 Wash the remaining parts in the cleaning solvent described in Section 6.1.

Springs may be wire brushed to assist in the removal of any dirt, rust, or scale.

10.2.4.2 After cleaning, blow the parts completely dry with

a low pressure jet of clean, dry air.

10.2.4.3 Inspect the parts. Replace any spring that is rusted, pitted, distorted, or if it has taken a permanent set. Refer to Parts Catalog 3211-4, Sup. 1 for spring information and identification.

Replace the cylindrical spring pin (16) if it is bent, damaged, or not elastic enough to hold securely.

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 "B-1" Quick Service Valve Portion.

▲10.3 ASSEMBLY (Figure 5)

10.3.1 Using the spanner wrench shown in Figure 3 to hold the piston (18), assemble the diaphragm piston assembly as follows:

10.3.1.1 Install a NEW diaphragm (12) on the piston (18) so that the small bead of the diaphragm fits into the groove on the piston.

10.3.1.2 Install the diaphragm follower on the piston (18) and secure it in place by installing the 3/4" lock nut (10).

10.3.1.3 Set the piston stem (17) in place in the head of the piston (18) and secure it in place by installing the 3/32" x 7/16" cylindrical spring pin (16).

10.3.1.4 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW 3/8" O.D. o-ring (13) and two NEW 1/2" O.D. o-rings (14). Also fill the o-ring grooves of the piston stem (17) and lightly lubricate the piston bushing bearing surfaces of the body (28) with the lubricant.

10.3.1.5 Install the NEW lubricated 3/8" O.D. o-ring (13) and the two NEW lubricated 1/2" O.D. o-rings (14) into their grooves on the piston stem (17). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.2 Install the two 5/8" O.D. ring gaskets (23) in the proper grooves on the cover mounting face of the body (28).

10.3.3 CAREFULLY insert the piston diaphragm assembly (10 to 18 incl.) into the body (28).

10.3.4 EXERCISING CARE that the bead of the diaphragm (12) is in the groove in the body (28), CAREFULLY guide



the cover (8) over the piston (18) so that it is in its proper position on the body (28).

10.3.5 Secure the cover (8) to the body (28) with the four $\frac{3}{8}$ " x 1" hex head cap screws (3). Equally tighten the cap screws (3).

10.3.6 Apply a light coating of #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, to the surfaces of a NEW $1\frac{1}{16}$ " O.D. o-ring (7A). Also apply a light coating of the lubricant to the threads of the cap nut (7). Install the NEW lubricated $1\frac{1}{16}$ " O.D. o-ring (7A) on the cap nut (7).

10.3.7 Place the check valve spring (6) and a NEW check valve (5) in place in the cap nut (7).

10.3.8 Exercising care so that no parts "fly out" of the assembly and cause an injury, carefully install the cap nut assembly (5, 6, 7, 7A) in the cover (8) and tighten it securely.

10.3.9 Apply a light coating of #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, to the surfaces of a NEW $1\frac{1}{16}$ " O.D. o-ring (22A). Also apply a light coating of the lubricant to the threads of cap nut (22). Install the NEW lubricated $1\frac{1}{16}$ " O.D. o-ring (22A) on the cap nut (22).

10.3.10 Place the check valve spring (21) and a NEW check valve (20) in place in the nut (22).

10.3.11 Exercising care so that no parts "fly out" of the assembly and cause an injury, carefully install the cap nut assembly (20, 21, 22, 22A) in place in the body (28) and tighten it securely.

10.3.12 Install a NEW strainer (26) in the body (28) and secure it in place with the strainer retainer nut (25). Use the $\frac{3}{8}$ " hexagon key, Pc.No. 567305, to secure the nut (25).

10.4 TESTING & ADDITIONAL INFORMATION

10.4.1 After the "B-1" Quick Service Valve Portion, Pc.No. 565453, 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-2701-O.

10.4.2 After the "B-1" Quick Service Valve Portion has passed all tests, it may be returned to service. Installation procedure may be found in Section 8.0. NEW mounting gaskets MUST BE used.

10.4.3 **IMPORTANT:** Whenever the "B-1" Quick Service Valve Portion is removed from the "A-1" Reduction Relay Valve for any reason, and it is remounted or replaced with a new or repaired and tested "B-1" Quick Service Valve Portion, a stationary vehicle air brake test must be made to be sure that the valve portion functions properly in the brake equipment arrangement.

11.0 #8 VENT VALVE PORTION, PC.NO. 590421 MAINTENANCE PROCEDURES - "IN-SHOP"

⚠ 11.1 DISASSEMBLY

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

(Figure 6)

11.1.1 Remove the vent protector assembly (1) as a unit from the 90° street elbow (5).

11.1.2 Remove the 90° street elbow (5) from the #8 Vent Valve Portion (6), Pc.No. 567820.

(Figure 7)

11.1.3 If the mounting gasket is still in the groove of the mounting flange, it is to be removed and SCRAPPED.

11.1.4 Remove the four $\frac{3}{8}$ " x 1" hex head cap screws (12) that secure the diaphragm housing (13) to the body (29).

11.1.5 Remove the diaphragm housing with the diaphragm piston assembly (13 to 21) as a unit from the body (29).

11.1.6 Remove the diaphragm piston assembly (14 to 21) from the diaphragm housing (13).

11.1.7 Disassemble the diaphragm piston assembly (14 to 21) as follows:

11.1.7.1 Hold the piston stem (21) with an 11/16" open end wrench and remove the 1/2" lock nut (14) from the piston stem (21). SCRAP the locknut.

11.1.7.2 Remove the diaphragm follower (15), diaphragm (16), piston with seal and felt choke assembly (17, 18, 19) and washer (20) from the piston stem (21). SCRAP the diaphragm (16).

11.1.8 Remove the felt choke (17) and rubber seal (19) from the piston (18). SCRAP the seal (19).

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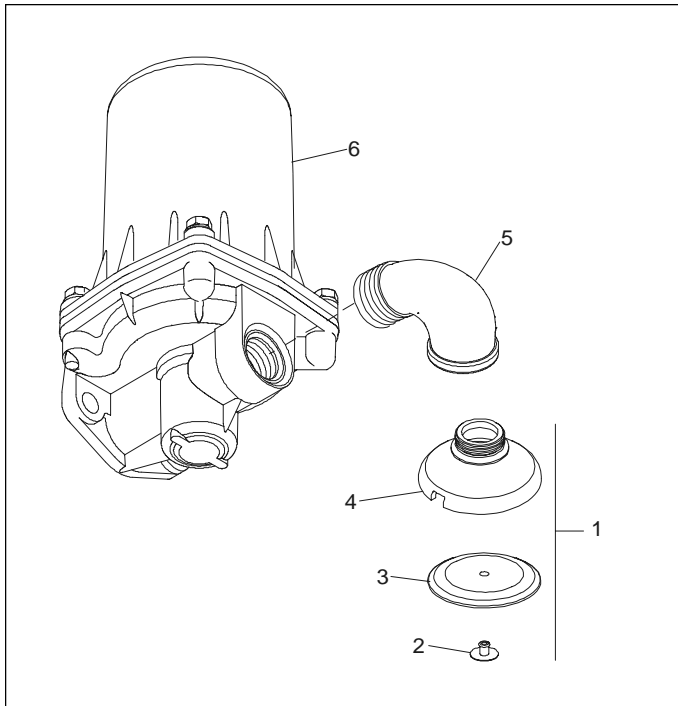


Figure 6 - #8 Vent Valve Portion & Vent Valve Protector Assembly - Exploded View

11.1.9 CAUTION: To avoid possible injuries, exercise care during the following procedures so that no parts are inadvertently expelled from the assembly.

Carefully depress the exhaust valve seat (24), valve (26) and spring (27) into the vent valve body (29), then using #3 TRUARC Retaining Ring Pliers, remove the retaining ring (22) from the body (29).

11.1.10 Remove the exhaust valve seat with o-ring (24, 23), exhaust valve with o-ring (26, 25) and spring (27) from the body (29).

11.1.10.1 NOTE: If the exhaust valve (26) sticks, use a piece of stiff wire with the end bent and insert it through the drilled hole to hook the valve and pull it out of the body.

11.1.11 Remove and SCRAP the 1³/₄" O.D. o-ring (23) from the exhaust valve seat (24).

11.1.12 Remove and SCRAP the 1¹/₂" O.D. o-ring (25) from the exhaust valve (26).

11.1.13 Remove and SCRAP the 1" O.D. ring gasket (6) from the mounting face of the body (29).

11.1.14 Remove the strainer (28) from the opening in the body (29).

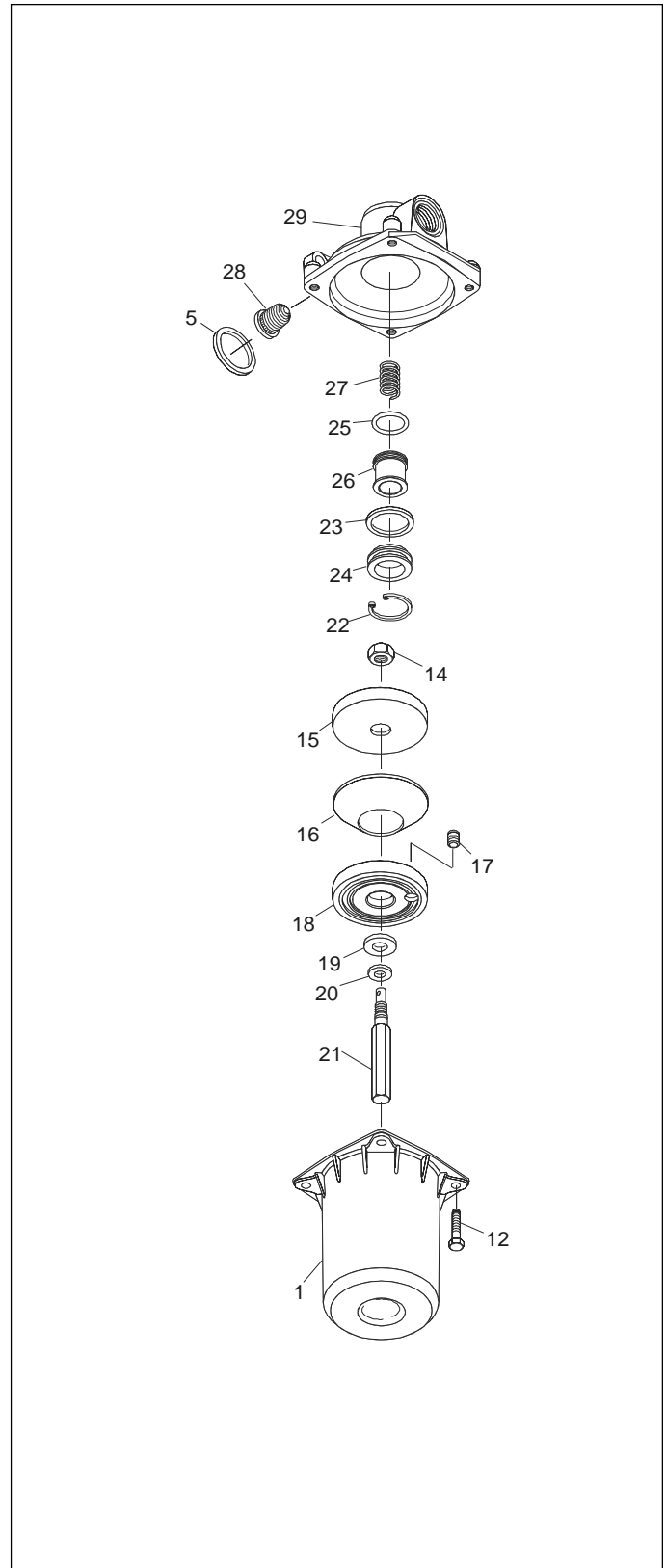


Figure 7 - #8 Vent Valve Portion - Exploded View

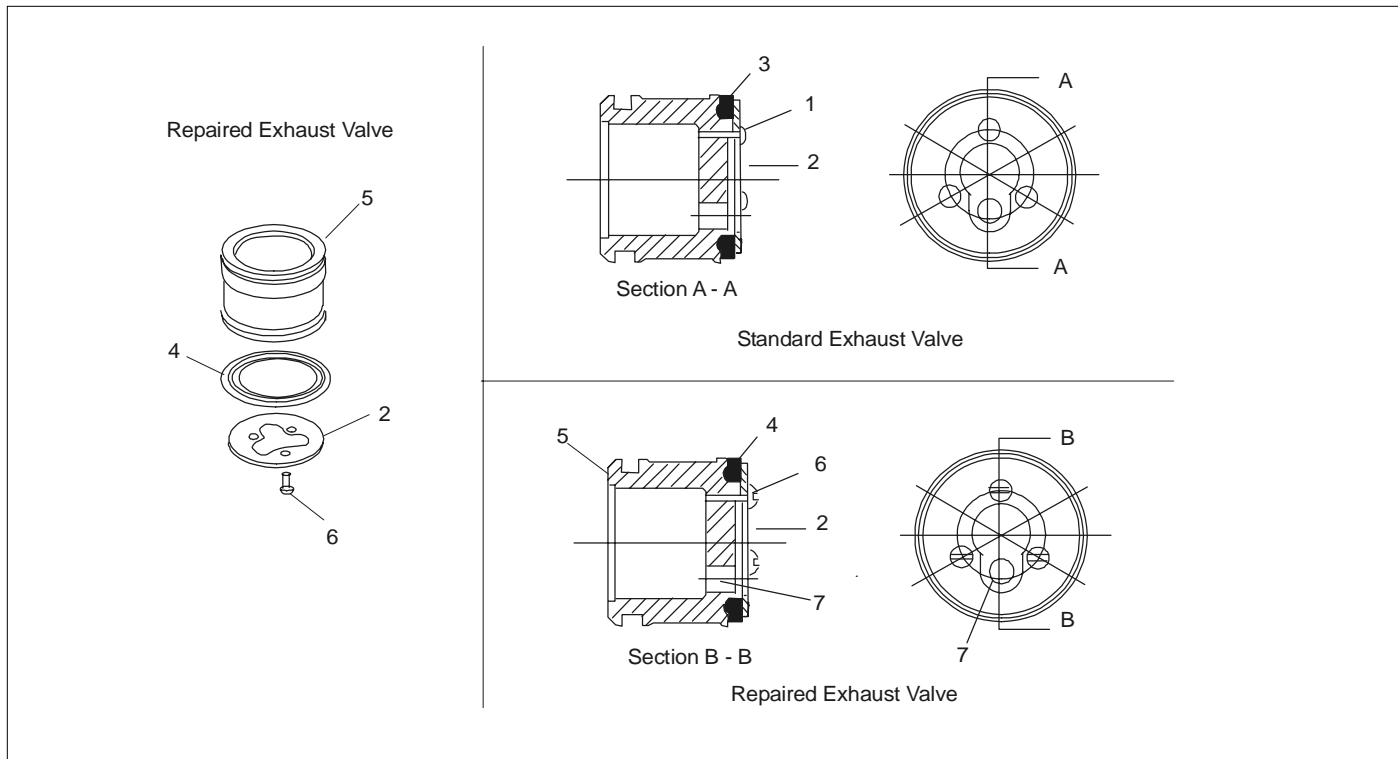


Figure 8 - Exhaust Valve

⚠ 11.2 CLEANING & INSPECTING

11.2.1 NON-REUSABLE PARTS

ALL gaskets, o-rings, self-locking nuts, the sealing wire, and the diaphragm are to be **SCRAPPED** and replaced with **NEW** Wabtec Corporation parts.

NOTE: A Rubber Parts Maintenance Kit is available for the #8 Vent Valve Portion. See Parts Catalog 3211-4, Sup. 1 for piece number and parts included in this kit.

11.2.2 FELT CHOKE

11.2.2.1 The felt choke (17) is to be air cleaned by blowing with a low pressure jet of clean, dry air.

11.2.2.2 If the felt choke (17) cannot be easily cleaned, or if it is damaged in any way, it is to be **SCRAPPED** and replaced with a **NEW** part.

11.2.3 EXHAUST VALVE

11.2.3.1 Clean the exhaust valve (26) by dipping it in a bath of the cleaning solvent as described in Section 6.1. **DO NOT** allow the exhaust valve to soak in the cleaning solution. Promptly wipe the exterior and interior surfaces

with a lint-free cloth and blow the valve completely dry using a low pressure jet of clean, dry air.

11.2.3.2 Inspect the seal of the exhaust valve (26). If it is cracked, cut, or worn excessively, it **MUST BE** replaced according to the following procedure.

(Figure 8)

11.2.3.2.1 Use a piece of $\frac{1}{16}$ " diameter drill rod to drive out the three driven fasteners (1), then remove the seal retainer (2) and seal (3). **SCRAP** the fasteners (1) and seal (3).

11.2.3.2.2 Place a **NEW** seal (4), Pc.No. 568997, on the exhaust valve (5) with the bead of the seal in the groove of the exhaust valve.

11.2.3.2.3 Position the retainer (2), Pc.No. 568995, in place on the seal (4).

⚠ WARNING: BE SURE THAT THE RETAINER DOES NOT COVER THE EXHAUST VALVE HOLE (7) IN ANY WAY.



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If the exhaust valve hole is restricted, improper Vent Valve operation could result which could lead to possible injury to personnel and/or equipment damage.

11.2.3.2.4 Using three NEW #3 self-tapping screws (6), Pc.No. 584117, secure the seal retainer (2) in place. Torque the screws to a maximum of 9.0 inch-pounds.

⚠ 11.2.4 VENT PROTECTOR ASSEMBLY (Figure 6)

11.2.4.1 Clean the exterior surfaces of the vent protector assembly (1) by wiping with a clean, lint-free cloth that has been saturated with the cleaning solvent described in Section 6.1.

11.2.4.2 After cleaning, blow the assembly completely dry using a low pressure jet of clean, dry air.

11.2.4.3 Inspect the assembly. If the body of the assembly is damaged or bent, the assembly is to be replaced. If the seal (3) is cracked, cut, torn or damaged, or if the rivet (2) is bent or damaged, a NEW seal (3) and rivet (7) are to be installed. When installing a NEW seal (3), Pc.No. 502465, a NEW $\frac{3}{16}$ " x $\frac{1}{2}$ " aluminum pop rivet (2), Pc.No. 571140, MUST BE used.

11.2.5 REMAINING PARTS (Figure 7)

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

11.2.5.2 The spring may be wire brushed to assist in the removal of any dirt, rust or scale.

11.2.5.3 Visually inspect the choke passages in piston (18) and piston stem (21) to be sure that they are clear and unrestricted. These passages may be cleaned by blowing with a low pressure jet of clean, dry air.

DO NOT use metallic tools to clean chokes as their size and shape MUST NOT be changed.

11.2.5.4 After the parts are cleaned, they are to be blown completely dry using a low pressure jet of clean, dry air.

11.2.5.5 Inspect the spring (27). It is to be replaced if it is rusted, pitted, distorted, damaged in any way, or if it has taken a permanent set. Refer to Parts Catalog 3211-4, Sup. 1 for spring information and identification.

11.2.5.6 Inspect the retaining ring (22). It MUST BE elastic enough to hold securely. During assembly, it MUST "snap" tightly into its groove.

11.2.5.7 Inspect the exhaust valve seat (24) to be sure that it is not scratched, scored, or damaged. If the valve seat requires reconditioning, the following recommended procedures are to be followed:

11.2.5.7.1 Use a perfectly flat cast iron lapping plate. Apply float emery to the entire surface of the plate. Condition the plate by rubbing in with a piece of flat brass such as a brass rotary valve which has a ground finished surface.

11.2.5.7.2 Lap the valve seat on the lapping plate by holding the valve flat and using a rotary motion.

CAUTION: NO MORE than 0.010" may be removed from the original valve seat thickness. Original thickness is 0.469".

11.2.5.7.3 Wipe the valve seat clean, using a clean, lint-free cloth that has been saturated with the cleaning solvent described in Section 6.1. Blow the seat completely dry with a low pressure jet of clean, dry air.

Visually inspect the valve seat surface. It should be perfectly smooth.

11.2.5.8 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 #8 Vent Valve Portion.

⚠ 11.3 ASSEMBLY (Figure 7)

11.3.1 Using #2 Silicone Grease, Wabtec Corporation Specification M-7680-2, lubricate the surfaces of a NEW $1\frac{1}{2}$ " O.D. o-ring (25) and a NEW $1\frac{3}{4}$ " O.D. o-ring (23). Also fill the o-ring grooves on the exhaust valve seat (24) and the exhaust valve (26) and lightly lubricate the exhaust valve bushing in the vent valve body (29) with the lubricant.

11.3.2 Install the NEW lubricated $1\frac{1}{2}$ " O.D. o-ring (25) into its groove on the exhaust valve (26). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

11.3.3 Install the NEW lubricated $1\frac{3}{4}$ " O.D. o-ring (23) into its groove on the exhaust valve seat (24). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

11.3.4 Install the exhaust valve spring (27), exhaust valve with o-ring assembly (25, 26) and exhaust valve seat with o-ring (23, 24) into the vent valve body (29).

11.3.5 Exercising care so that no parts are inadvertently expelled from the body (29), carefully press the valve seat



(24) into the vent valve body (29) far enough to expose the retaining ring groove. Install the retaining ring (22) so that it "snaps" into its groove.

Slowly release the valve seat (24).

11.3.6 Assemble the diaphragm piston assembly (14 to 21) as follows:

11.3.6.1 Install a NEW rubber piston seal (19) and the felt choke strainer (17) into the piston (18).

11.3.6.2 Place the washer (20) and piston assembly (17, 18, 19) on the piston stem (21) with the felt choke (17) toward the threaded end of the piston stem.

11.3.6.3 Place a NEW diaphragm (16) on the piston (18) with the bead of the diaphragm (16) down into the groove of the piston (18).

11.3.6.4 Place the diaphragm follower (15) on the diaphragm (16) with the ribbed side of the follower toward the threaded end of the piston stem (21).

11.3.6.5 Hold the piston stem (21) with an $11/16$ " open end wrench. Install a NEW $1/2$ " lock nut (14) on the piston stem (21). Tighten the nut (14) to secure the parts of the diaphragm piston assembly together.

11.3.7 Lubricate the tail of the piston guide stem (21) with Triple Valve Oil, Wabtec Corporation Specification M-7611-20. Install the diaphragm piston assembly (14 to 21) into the diaphragm housing (13) with the bead of the diaphragm (16) in the groove in the diaphragm housing (13).

11.3.8 Place the body (29) in position on the diaphragm housing (13) and secure it in place with four $3/8$ " x 1" hex head cap screws (12). Equally tighten the screws (12).

11.3.9 Install a NEW 1" O.D. ring gasket (5) in the proper groove on the mounting face of the body (29).

11.3.10 Install the strainer (28) into the port on the mounting face of the body (29).

NOTE: The assembled #8 Vent Valve Portion, Pc.No. 567820 (less Vent Protector and Elbow), is now ready for testing. The Vent Protector and Elbow are to be installed AFTER all tests have been passed.

11.4 TESTING & ADDITIONAL INFORMATION

11.4.1 After the #8 Vent Valve Portion, Pc.No. 567820, has been assembled, BUT BEFORE the Vent Protector and Elbow are installed and the Portion is returned to service, it MUST pass a series of tests following the current procedure of the Wabtec Corporation Test Specification T-2720-0 or T-2674-0.

11.4.2 After the Portion has passed all tests, the Vent Protector and Elbow are to be installed.

(Figure 6)

11.4.3 Apply a light coating of Loctite Sealant with Teflon, Wabtec Corporation Specification M-7499-15, to the threads of the 90° street elbow (5) and to the threads of the vent protector assembly (1).

11.4.4 Install the 90° street elbow (5) into the body of the Vent Valve Portion (6). The elbow is to be installed so that after it is tightened, the open end (tapped end) faces the diaphragm housing of the Portion (6).

11.4.5 Install the vent protector assembly (1) into the elbow (5).

11.4.6 The assembled #8 Vent Valve Assembly, Pc.No. 590421, is now ready for installation to the "A-1" Reduction Relay Valve. See Section 8.0 for installation procedure. A NEW mounting gasket MUST BE used.

11.4.7 **IMPORTANT:** Whenever #8 Vent Valve Portion of the "A-1" Reduction Relay 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 air brake test MUST BE made to be sure that the #8 Vent Valve Portion and the "A-1" Reduction Relay Valve function properly in the equipment arrangement.

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



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12.0 PIPE BRACKET PORTION VENT PROTECTOR MAINTENANCE - (IN-SHOP)

(Figure 5)

⚠ 12.1 MAINTENANCE PROCEDURE

12.1.1 Wash the Vent Protector Assembly (37) in the cleaning solvent described in Section 6.1.

12.1.2 After cleaning, blow the assembly completely dry with a low pressure jet of clean, dry air.

12.1.3 Visually inspect the Assembly (37). If the vent protector body is damaged, SCRAP the assembly. If the body passes inspection, replace the seal (39) and rivet (38) as follows:

12.1.3.1 Lift the seal (39) and, using the proper tool, cut off the head of the rivet. Remove the seal (39) and rivet (38).

12.1.3.2 Place a NEW seal (39), Pc.No. 551159, in place on the vent protector body and secure it in place by installing a NEW $\frac{3}{16}$ " x $\frac{1}{2}$ " aluminum pop rivet (38).

13.0 ADDITIONAL INFORMATION

Consult your Wabtec Corporation Representative should additional information be required on the "A-1" Reduction Relay Valve, or any of its Component Potions.

