

Operation & Maintenance Instruction

30-CW MODULE, Part No. 582800

APRIL, 1990

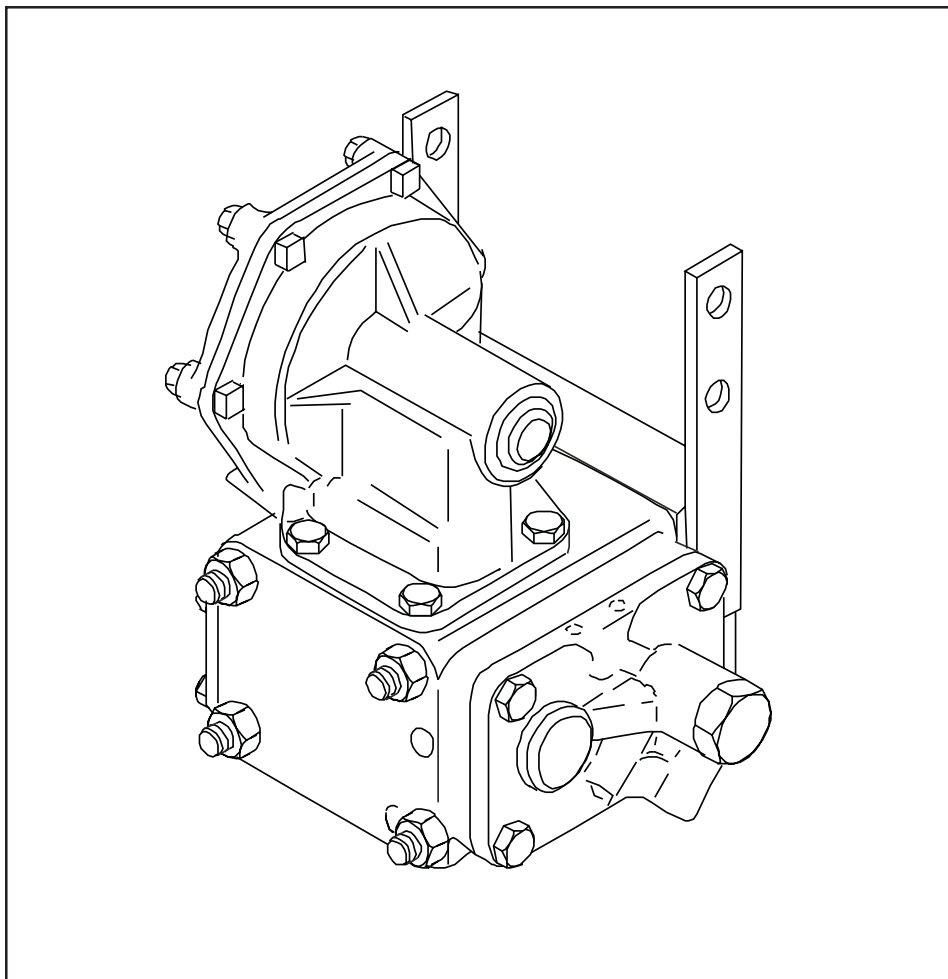
Supersedes issue dated April, 1985

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 ensure 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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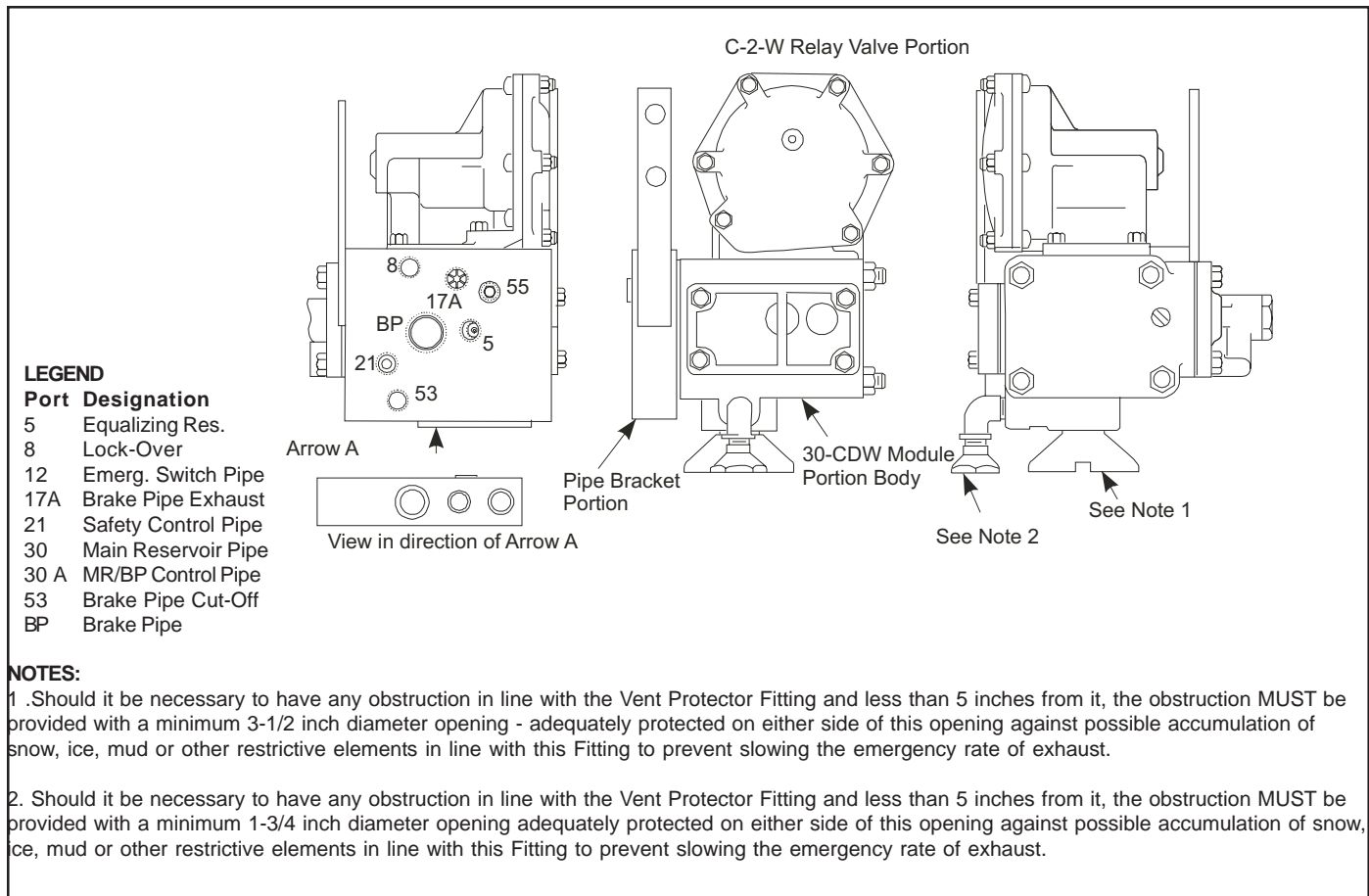


Figure 1 - Exterior View

1.0 DESCRIPTION

Designed for use in equipment arrangements where the air pressure does not exceed 150 psig the "30-CW" Module is used to complement and work in conjunction with a Wabtec Corporation "28-G" or "30-CDW" Type Brake Valve. This "30-CW" Module consists of a Pipe Bracket Portion, Part No. 583796 on which a "30-CW" Module Portion, Part No. 583679 is mounted. All pipe connections are made directly to the Pipe Bracket Portion. This arrangement permits the "30-CW" Module Portion to be removed for servicing or maintenance without disturbing the piping of the equipment arrangement.

The "30-CW" Module Portion includes a "C-2-W" Relay Valve Portion, Part No. 583682, which is mounted on the body of the Module Portion. Housed in the module body are the vent valve, brake pipe cutoff valve, two check valves, and emergency valve assemblies. The "C-2-W" Relay Valve Portion is secured to the module body by four cap screws and the Module Portion is secured to the Pipe Bracket by four cap screws. The "C-2-W" Relay Valve Portion is a diaphragm operated, relatively high capacity, self lapping

valve. It establishes a pressure in the brake pipe equal to the pressure in the equalizing reservoir. It either controls the buildup of brake pipe pressure or exhausts pressure from the brake pipe in response to changes in the equalizing reservoir pressure on the outer face of the diaphragm of this portion. During brake applications, the equalizing reservoir air pressure on the outer face of the diaphragm is reduced to permit the relay valve to exhaust brake pipe pressure an equal amount. The self lapping feature of the relay valve is designed to maintain the brake pipe pressure against overcharges and permissible trainline leakage.

The "30-CW" Module Portion (less Relay Valve Portion) houses a pneumatically closed brake pipe charging cutoff valve and a high capacity vent valve for brake pipe venting. Two check valves are also included in the Module Portion. The check valves function to direct the flow of either main reservoir air pressure or brake pipe air pressure, whichever is higher, for use of the brake pipe cutoff valve and the pneumatic (21 line) vent valve function.

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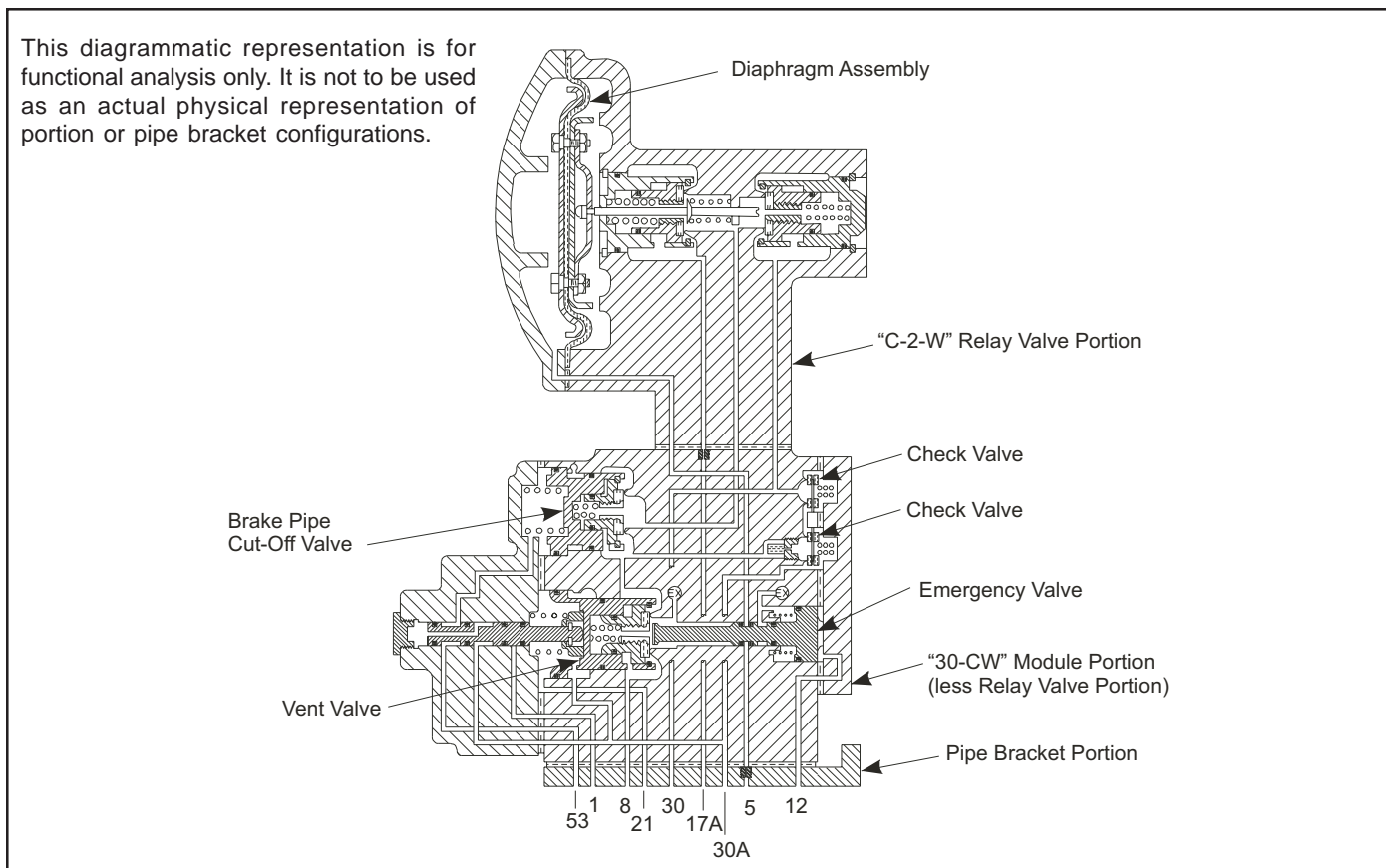


Figure 2 - Diagrammatic View

2.0 OPERATION (See Figure 2)

2.1 TRAIL OR DEAD

When the equipment arrangement is conditioned for "Trail or Dead" operation, main reservoir air, from an external source, directed into port 53 of the '30-CW" Module is routed through the spool valve associated with the vent valve, and is directed to the face of the brake pipe cutoff valve. This causes the cutoff valve to close. The closing of the cutoff valve cuts off communication between the relay valve and brake pipe.

2.2 GRADUATED RELEASE

When the equipment arrangement is conditioned for use with trains equipped with graduated release, air under pressure in passage 53 will be vented to atmosphere. This permits the brake pipe cutoff valve of the "30-CW" Module Portion to open. The opening of the cutoff valve establishes communication between the relay valve and brake pipe.

2.3 CHARGING

When the equipment arrangement is charged equalizing reservoir air is directed into port 12 of the "30-CW" Module and to the "C-2-W" Relay Valve Portion. The relay valve functions to direct and control brake pipe pressure equal to equalizing reservoir pressure. Brake pipe pressure then flows through the open brake pipe cutoff valve, past the vent valve, and out of the "30-CW" Module, into the trainlined brake pipe at a value established by the setting of the regulating valve on the Controlling Brake Valve.

The "C-2-W" Relay Valve Portion reacts to equalizing reservoir pressure to cause main reservoir pressure to flow into the brake pipe to charge, recharge, or maintain brake pipe pressure.

2.4 MINIMUM REDUCTION

When the handle of the controlling brake valve is moved to the minimum reduction position a reduction in equalizing reservoir pressure will occur. This pressure reduction causes the 'C-2-W" Relay Valve Portion of the "30-CW" Module to function to effect a similar brake pipe pressure reduction at a service rate.



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2.5 EMERGENCY

When the brake equipment arrangement is conditioned for emergency main reservoir air under pressure is directed into port 12 of the "30-CW" Module where it opens the vent valve to vent brake pipe at an emergency rate. Equalizing reservoir pressure is also vented from the piston of the "C-2-W" Relay Valve Portion to close the supply valve.

Simultaneously air pressure in port 21 of the "30-CW" Module is vented to atmosphere at the controlling brake valve. This causes the vent valve of the Module to open. The opening of this vent valve connects brake pipe to atmosphere. Movement of the vent valve piston connects main reservoir pressure to the brake pipe cutoff valve to operate this valve to isolate the "C-2-W" Relay Valve portion from brake pipe thus cutting off any potential brake pipe charging. This is a redundant feature, based on a venting or loss of pressure which augments the No.12 port actuation of the vent valve.

Movement of the vent valve piston also connects No. 21 pipe to No. 8 pipe at the associated spool valve. This condition is known as "lockover" and in the event of a nonhandle-initiated emergency is intended to prevent the brakes from being released until the operator takes some action to reset the equipment.

3.0 MAINTENANCE SCHEDULE

IMPORTANT: At least once every TWENTY FOUR MONTHS, or more frequently if service conditions so indicate, the "30-CW" Module Portion, is to be removed from the equipment arrangement, taken to the shop, be completely disassembled, the parts cleaned, inspected, lubricated, assembled using NEW Wabtec Corporation rubber parts and other specified NEW Wabtec Corporation parts and the Portion tested for correct operation.

4.0 PARTS CATALOG AND REPLACEMENT PARTS INFORMATION

4.1 PARTS CATALOG

IMPORTANT: When ordering replacement parts for the "30-CW" Module or any of its component Portions refer to the current issue of the Wabtec Corporation Parts Catalog 3208-50.

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

4.2 REPLACEMENT PARTS

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 & WARNINGS

Regular owner-operator and shop safety procedures **MUST BE** followed when working on the "30-CW" Module Portion or any of its components.

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 component parts to avoid any possible injury to the eyes.**
- **The use of solvents as cleaning agents and the use of lubricants can involve health and/or safety hazards. The manufacturers of the solvents and 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.**



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- Assembly may be under a spring load. Exercise caution during disassembly so that no parts spring out and cause bodily injury.
- All air supply to this device and/or to any component part must be cut off and any air in the device be allowed to vent before this device and/or any component part is removed from the equipment arrangement.
- Bottled up air under pressure (even though air supply is cut off) may cause gaskets and/or particles of dirt to become airborne and an increase in sound level when this device and/or any component part is removed from the equipment arrangement. Personal eye and ear protection must be worn and care taken to avoid possible injury when performing any work on this device and/or component part.
- To prevent receiving electrical shock when performing electrical tests, hands must be clear of electric 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 & LUBRICANTS

6.1 The solvent used to clean the metal parts of the "30-CW" Module **MUST BE** an aliphatic, organic solution, such as mineral spirits or naphtha, that will dissolve oil or grease and that will permit all metal parts to be cleaned without abrasion.

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

6.3 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 required for the lubrication of the threads of cleaned choke plugs before they are installed.

7.0 SPECIAL TOOLS

NOTE: In addition to the regular shop tools the following should be available.

7.1 1/2" Multi Spline Key, Part No. 517557, this key may be ordered from the Wabtec Corporation.

7.2 5/16" Multi Spline Key, Part No. 522525, this key may be ordered from the Wabtec Corporation.

8.0 REMOVAL & INSTALLATION OF "30-CW" MODULE PORTION "ON-VEHICLE"

8.1 Observe **ALL** owner-operating property safety procedures and the WARNINGS and procedures listed in Section 5.0.

8.2 **IMPORTANT:** **ALL** air flow to the "30-CW" Module is to be cut off. Chock wheels to prevent vehicle movement and place warning placards in the cab area and/or about the vehicle indicating that work is being performed.

8.3 The repair person will need the following parts.

8.3.1 A NEW or repaired and tested "30-CW" Module Portion, Part No. 583679.

8.3.2 A NEW pipe bracket mounting gasket (body gasket) Part No. 583767.

8.3.3 A NEW or serviced choke plug Part No. 528323. The choke plug threads are to be lubricated with the oil and graphite compound as listed in Section 6.3. Transport the lubricated choke plug in plastic bag.

8.3.4 A NEW or cleaned and undamaged 3/8" wasp excluder, Part No. 503476 whose threads have been lubricated with the graphite and oil compound as listed in Section 6.3.

8.4 **CAUTION:** The approximate net weight of the "30-CW" Module, including the Pipe Bracket Portion is 30 pounds. Exercise care when working with components so that no injuries occur when lifting or transporting the various Portions.

8.5 **IMPORTANT:** DO NOT use hard or sharp metal tools to remove gaskets. Care **MUST BE** exercised so that no damage is done to metal surfaces.

8.6 See Figure 3. Remove ALL free dirt from all exterior surfaces of the 30-CW Module by wiping with a clean, dry, lint-free cloth or rag, or by blowing the Module clean with a low pressure jet of clean, dry air.



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8.7 Remove the "30-CW" Module Portion from the Pipe Bracket (62) by first removing the four 1/2" hex nuts (1).

8.8 Remove and SCRAP the pipe bracket mounting (body) gasket (61).

8.9 Visually inspect the exposed mounting surface of the pipe bracket (62) to be sure that it is clean and undamaged. Be sure that the ports are clean and unrestricted. If necessary the ports may be "blown out" using a low pressure jet of clean, dry air.

8.10 Remove the wasp excluder (65) from the rear of the pipe bracket (62). The wasp excluder is located in exhaust port 17A. It is removed by turning it counterclockwise.

Visually inspect the exhaust port 17A to be sure that it is clean and unrestricted. The port may be "blown-out" if necessary with a low pressure jet of clean, dry air. **DO NOT** blow dirt back into the port.

8.11 Use a NEW or cleaned and undamaged wasp excluder, Part No. 503476 (65), whose threads have been lightly coated with the oil and graphite compound listed in Section 6.3, and install it in port 17A by turning it clockwise.

8.12 Remove the choke plug (62), located in port 5, from the pipe bracket (60).

Visually inspect the port from which the choke plug was removed to be sure that it is clean and unrestricted. A low pressure jet of clean dry air may be used to "blow out" the port if necessary. **DO NOT** blow dirt back into the port.

8.13 Use a NEW or cleaned and serviced choke plug (62), whose threads have been lightly coated with the oil and graphite compound listed in Section 6.3, and install it in port 5 of the pipe bracket (60).

IMPORTANT: The choke plug (62) **MUST BE** installed so that it is flush with or just below the mounting surface of the pipe bracket (60).

8.14 Install a NEW pipe bracket (body mounting) gasket (59) in place on the pipe bracket (60).

8.15 Remove all protective material from a NEW or repaired and tested "30-CW" Module Portion. Place the "30-CW" Module Portion on the pipe bracket being careful that the gasket (61) remains in proper position. Secure the Portion in place using four 1/2" hex nuts (1). Equally tighten the nuts.

8.16 **IMPORTANT:** Whenever the "30-CW" Module Portion and/or any component of the "30-CW" Module is removed from the equipment arrangement for any reason and it is reinstalled or replaced with a NEW or repaired and tested Portion or component part, a stationary vehicle test **MUST BE** made to be sure that the "30-CW" Module Portion and/or the "30-CW" Module function properly in the total equipment arrangement.

8.17 **IMPORTANT:** Whenever the "30-CW" Module Portion is removed from an equipment arrangement for any reason and it is reinstalled or replaced by a NEW or repaired and tested Portion a NEW mounting gasket (pipe bracket gasket) **MUST BE** used.

8.18 Provide adequate protection to prevent dirt or moisture from entering the removed "30-CW" Module Portion. Transport all removed parts to the shop area for servicing. The choke plug can be serviced following the same procedure as for cleaning the choke plug of the Portion body (58). See Section 9.2.3.3.1 to 9.2.3.3.4. The wasp excluder can be cleaned following the procedure for cleaning metal parts as listed in Section 9.2.4.

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

9.0 "30-CW"MODULE PORTION - MAINTENANCE PROCEUDRES (IN-SHOP)

See Figure 3

9.1 DISASSEMBLY

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

WARNINGS: Springs within the assembled valve components may be under or placed under tension and/or compression. Exercise care during the procedure which follow to avoid possible injuries should parts inadvertently "fly out" of the assemblies.

9.1.1 Remove the three 3/8" x 7/8" head bolts (10) and the 3/8" x 1 1/4" hex head bolt (9) that secure the "C-2-W" Relay Valve Portion (11) to the body (57).

9.1.2 Carefully lift the "C-2-W" Relay Valve Portion (11) from the body (57). Provide adequate protection to prevent dirt and/or moisture from entering this Portion and set it aside for later disassembly. (See Section 10.0).

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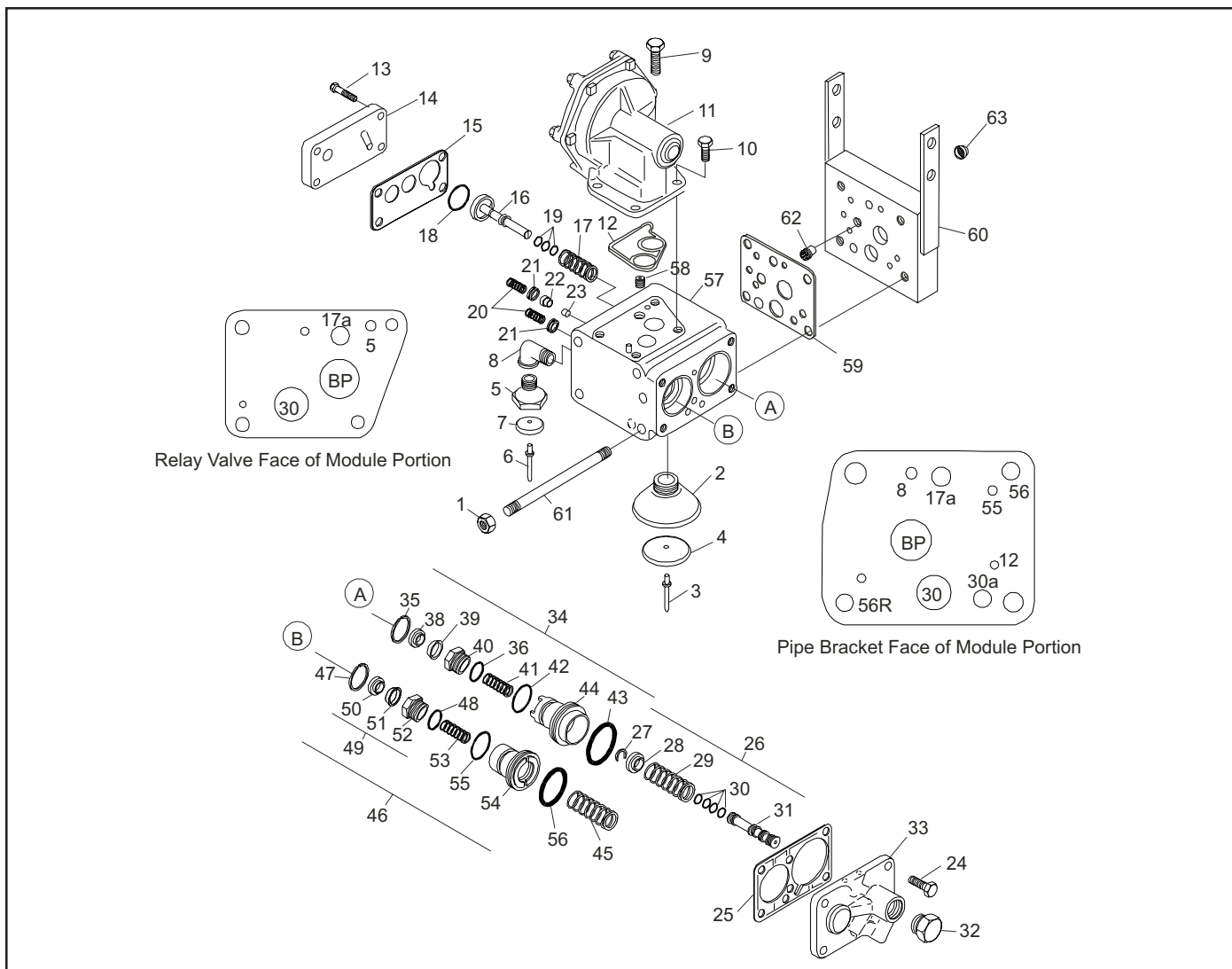


Figure 3 - Exploded View

9.1.3 Remove and SCRAP the relay valve portion mounting gasket (12).

9.1.4 Remove the vent protector assembly (2 to 4) as a unit from the body (57).

9.1.5 Remove the vent protector assembly (5 to 7) from the $\frac{3}{8}$ " x $\frac{3}{8}$ " NPT street elbow (8) as a unit.

9.1.6 Remove the four $\frac{3}{8}$ " - 16 x $1\frac{1}{4}$ " hex head screws (13) which secure the emergency valve cover (14) and cover gasket (15) to the body (57).

9.1.7 Remove the following parts from the body (57).

9.1.7.1 Emergency valve cover (14).

9.1.7.2 Cover gasket (15). SCRAP the gasket.

9.1.7.3 Emergency valve (16) with o-rings (18,19) as a unit.

9.1.7.4 Spring (17)

9.1.7.5 Springs (20) - (Two springs are used)

9.1.7.6 Check valves (21). SCRAP the check valves (Two check valves are used)

9.1.7.7 Strainer assembly (22, 23) as a unit.

9.1.7.8 $\frac{3}{8}$ " x $\frac{3}{8}$ " NPT street elbow (8)

9.1.8 Remove and SCRAP the $1\frac{1}{4}$ " O.D. o-ring (18) and the three $\frac{1}{2}$ " O.D. o-rings (19) from the emergency valve (16).



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9.1.9 Remove the four $\frac{3}{8}$ "-16 x 1" hex head screws (24) which secure the vent valve cover assembly (27 to 33) and the cover gasket (25) to the body (57).

9.1.10 Remove the following parts from the body (57).

9.1.10.1 Vent Valve cover assembly (27 to 33) as a unit.

9.1.10.2 Cover gasket (25). SCRAP the gasket.

9.1.10.3 Spring (45).

9.1.10.4 Brake Pipe cutoff valve assembly with o-rings (47 to 56) as a unit.

9.1.10.5 Vent Valve assembly with o-rings (35 to 43) as a unit.

9.1.11 Disassemble the vent valve cover assembly (27 to 33) as follows:

9.1.11.1 Remove the spring seat retainer (27) from the application valve (31), then remove the spring seat (28) and spring (29).

9.1.11.2 Remove the cap nut (32) from the vent valve cover (33), then push the application valve with o-rings (31, 30) out of the cover (33).

9.1.12 Remove and SCRAP the four $\frac{1}{2}$ " O.D. o-rings (30) from the application valve (31).

9.1.13 Disassemble the vent valve assembly (35 to 43) by removing the following parts from the valve cage (44).

9.1.13.1 $1\frac{3}{8}$ " O.D. o-ring (42). SCRAP the o-ring.

9.1.13.2 $2\frac{1}{8}$ " O.D. o-ring (43). SCRAP the o-ring.

9.1.13.3 Retaining ring (35)

9.1.13.4 Vent Valve seal assembly with o-ring (38 to 40) as a unit.

9.1.13.5 Spring (41)

9.1.14 Using a $\frac{1}{2}$ " multi-spline key while holding the seal housing (41) with the proper tool, remove the seal retainer (38) from the housing (40). Remove the following parts from the housing (40).

9.1.14.1 Valve seal (39). SCRAP the seal.

9.1.14.2 $1\frac{5}{16}$ " O.D. o-ring (36). SCRAP the o-ring.

9.1.15 Disassemble the brake pipe cutoff valve assembly (47 to 56) by removing the following parts from the valve cage (54).

9.1.15.1 $1\frac{3}{8}$ " O.D. o-ring (55). SCRAP the o-ring.

9.1.15.2 2" O.D. o-ring (56). SCRAP the o-ring.

9.1.15.3 Retaining ring (47)

9.1.15.4 Valve seal assembly with ring (48 to 52) as a unit.

9.1.15.5 Spring (53)

9.1.16 Using a $\frac{1}{2}$ " multi-spline key while holding the seal housing (52) with the proper tool remove the seal retainer (50) from the seal housing (52). Remove the following parts from the housing (52).

9.1.16.1 Valve seal (51). SCRAP the seal.

9.1.16.2 $1\frac{5}{16}$ " O.D. o-ring (48). SCRAP the o-ring.

9.2 CLEANING & INSPECTING

9.2.1 VENT PROTECTOR ASSEMBLIES

9.2.1.1 Using a lint-free, clean, cloth or rag which has been saturated with the cleaning solvent described in Section 6.1, wipe the exterior surfaces of each of the vent protector assemblies (2 to 4) (5 to 7) clean. Blow the assemblies dry using a low pressure jet of clean dry air.

9.2.1.2 Inspect the assemblies. If the seal is cracked, torn or damaged or if the rivet is bent or broken the assembly MUST be repaired or replaced.

9.2.1.3 If seal replacement is necessary the rivet may be removed by lifting the seal and using the correct tool cut off the head of the rivet.

Reassemble by using a NEW seal (4) Part No. 502465 for Vent Protector Reference (2) and a NEW seal (7) Part No. 551159 for Vent Protector Reference (5) and a NEW $\frac{3}{16}$ " x $\frac{1}{2}$ " pop rivet Part No. 571140. Reference (3 and 6).

9.2.2 STRAINER WITH FELT (See Figure 3)

9.2.2.1 Remove and SCRAP the felt (23) from the choke strainer (22).

9.2.2.2 Wash the strainer (22) in the cleaning solvent described in Section 6.1.



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9.2.2.3 Blow the strainer (22) completely dry using a low pressure jet of clean, dry air.

9.2.2.4 Install a NEW felt (23) into the strainer. Set this unit aside in a clean place for later assembly.

9.2.3 BODY (See Figure 3)

9.2.3.1 Wash the body (57) using the cleaning solvent described in Section 6.1.

9.2.3.2 After the body has been cleaned it **MUST BE** blown completely dry using a low pressure jet of clean, dry air.

9.2.3.3 Remove the choke plug (58) from port (17A) and service it as follows:

9.2.3.3.1 Place the choke plug in a bath of the cleaning solvent described in Section 6.1 to soak.

IMPORTANT: DO NOT use metallic tools to clean the choke plug as its size and shape **MUST NOT** be changed.

9.2.3.3.2 While the choke is soaking in the cleaning solvent examine the passage from which it was removed to see that it is clean and unrestricted. If necessary blow out the passage with a low pressure jet of clean, dry air.

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

9.2.3.3.4 Inspect the choke plug. If it is damaged in any way or if the size of the orifice, 0.250 Drill, has been changed, it **MUST BE** replaced with a NEW part obtained from the Wabtec Corporation. refer to Parts Catalog 3208- 50 for choke size and correct part number.

9.2.3.4 Lightly coat the threads of a NEW or cleaned and serviced choke plug (58) with the oil and graphite compound as listed in Section 6.3.

Install the choke plug (58) in place in port 17A in the body (57). The plug **MUST BE** installed so that it is flush with or just below the Relay Valve Portion mounting face of the body.

9.2.4 REMAINING METAL PARTS

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

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

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

9.2.4.4 Inspect the parts.

9.2.4.4.1 Replace any spring that is rusted, pitted, distorted or that has taken a permanent set. Refer to Parts Catalog 3208-50 for spring identification information.

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

9.2.4.4.3 Replace any part that is cracked, cut, broken, excessively worn, damaged in any way or is in such a condition that may result in unsatisfactory operation of the "C-2-W" Module Portion.

9.2.5 NON-REUSABLE PARTS

IMPORTANT: All gaskets, o-rings, rubber seated check valves and the felt strainer are to be **SCRAPPED** and replaced with NEW Wabtec Corporation Parts.

⚠ 9.3 ASSEMBLY (See Figure 3)

9.3.1 Install a NEW valve seal (51) in place in the seal housing (52).

9.3.2 Using the proper tool to hold the valve seal housing (52) secure, install the seal retainer (50) into the housing (52). Use a 1/2" multi-spline key to tighten the retainer (50).

9.3.3 Coat the surfaces of a NEW 15/16" O.D. o-ring (48) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring groove of the seal housing (52) and lubricate the bearing surfaces on the inside of the cage (54) with the lubricant.

9.3.4 Install the NEW lubricated 15/16" O.D. o-ring (48) into its groove on the seal housing (52). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

9.3.5 Coat the surfaces of a NEW 13/8" O.D. o-ring (55) and a NEW 2" O.D. o-ring (56) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves of the valve cage (54) with the lubricant.

9.3.6 Install the NEW lubricated 13/8" O.D. o-ring (55) and the NEW lubricated 2" O.D. o-ring (56) into their grooves on the valve cage (54). Excess lubricant may be removed by wiping with a clean, dry, lint-free cloth.



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9.3.7 Install the spring (53) and valve seal assembly with o-ring (48 to 52) into the valve cage (54). Use the retaining ring (47) to secure the spring (53) and valve seal assembly with o-ring (48 to 52) in place.

9.3.8 Install a NEW valve seal (39) in place in the seal housing (40).

9.3.9 Using the proper tool to hold the valve seal housing (40) secure, install the seal retainer (38) into the housing (40). Use a 1/2" multi-spline key to tighten the retainer (38).

9.3.10 Coat the surfaces of a NEW 15/16" O.D. o-ring (36), a NEW 1 3/8" O.D. o-ring (42), and a NEW 2 1/8" O.D. o-ring (43) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves of the seal housing (40), and the o-ring grooves of the valve cage (44) and coat the bearing surfaces of the inside of the valve cage (44) with the lubricant.

9.3.11 Install the NEW lubricated 15/16" O.D. o-ring in its groove on the seal housing (40). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

9.3.12 Install a NEW lubricated 1 3/8" O.D. o-ring (42) and a NEW lubricated 2 1/8" O.D. o-ring (43) into their grooves on the valve cage (44). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

9.3.13 Install the spring (41) and valve seal assembly with o-ring (36, 38 to 40) as a unit, into the valve cage (44). Use the retaining ring (35) to secure the valve seal assembly (36, 38 to 40) and spring (41) in place.

9.3.14 Lubricate the bushings of the body (58) lightly with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Install the brake pipe cutoff valve assembly (47 to 56) and the vent valve assembly (35 to 44) into their respective cavities in the body (57).

9.3.15 Coat the surfaces of four NEW 1/2" O.D. o-rings, (30) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves of the application valve (31) and lightly lubricate the bearing surfaces of the application valve bush in the cover (33) with the lubricant.

9.3.16 Install the four NEW 1/2" O.D. o-rings (30) into their grooves on the application valve (31). Remove any excess lubricant by wiping with a clean, dry lint-free cloth.

9.3.17 Install the application valve with o-rings (31, 30) in place in the vent valve cover (33).

9.3.18 Install the cap nut (32) in place in the vent valve cover (33).

9.3.19 Install the spring (29) and spring seat (28) on to the application valve (31) compressing the spring so that the spring seat retainer (27) can be snapped into its groove on the application valve (31).

9.3.20 Install the spring (45) in place in the valve cage (55) of the brake pipe cutoff valve assembly which was previously installed in the body (57).

9.3.21 Place a NEW cover gasket (25) in place on the body (57).

9.3.22 Install the vent valve cover assembly (27 to 33) in place on the body (57). The retainer end of the application valve assembly (27 to 31) should enter into the valve cage (44) of the vent valve assembly which was previously installed in the body (57).

9.3.23 Secure the vent valve cover assembly and cover gasket (25 to 33) to the body (57) using four 3/8" -16 x 1" hex head screws (24).

9.3.24 Install the 3/8" x 3/8" NPT street elbow (8) in place in the body (57). Orient the elbow so that the tapped opening faces the bottom (vent valve side) of the body (57).

9.3.25 Coat the surfaces of a NEW 1 1/4" O.D. o-ring (18) and three NEW 1/2" O.D. o-rings (19) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves of the emergency valve (16) with the lubricant.

9.3.26 Install the NEW lubricated 1 1/4" O.D. o-ring (18) and the three NEW lubricated 1/2" O.D. o-rings (19) into their grooves on the emergency valve (16). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

9.3.27 Install the following parts into the body (57).

9.3.27.1 Spring (17)

9.3.27.2 Emergency valve with o-rings (16,18,19) as a unit.

9.3.27.3 Strainer with felt (22, 23).

9.3.27.4 Two NEW check valves (21)

9.3.27.5 Two check valve springs (20)



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9.3.28 Place a NEW cover gasket (15) and the emergency valve cover (14) in place on the body (57) making certain that the two check valve springs (20) fit into the recesses in the cover.

9.3.29 Secure the emergency valve cover (14) and NEW cover gasket (15) to the body (57) using the four $\frac{3}{8}$ "-16 x $1\frac{1}{4}$ " hex head screws (13). Equally tighten the screws.

9.3.30 Install the smaller vent protector assembly (5 to 7) into the steel elbow (8) and the larger vent protector assembly (2 to 4) into the body (57).

9.3.31 Place a NEW relay valve portion mounting gasket (12) in position on the body (57).

9.3.32 Remove ALL protective material from the surfaces of a NEW or repaired and tested "C-2-W" Relay Valve Portion (11).

9.3.33 Place the "C-2-W" Relay Valve Portion (11) in position on the body (57) over the gasket (12). Be sure the gasket (12) remains in position.

9.3.34 Secure the Portion (11) in place by installing the $\frac{3}{8}$ " x $1\frac{1}{4}$ " hex head bolt (9) and the three $\frac{3}{8}$ " x $\frac{7}{8}$ " hex. head bolts (8). Equally tighten the bolts.

9.4 TESTING & ADDITIONAL INFORMATION

9.4.1 IMPORTANT: After the "C-2-W" Module Portion Part No. 583679 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-3689-O.

9.4.2 Installation procedures for the "C-2-W" Module Portion are found in Section 8.0.

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

10.0 "C-2-W" RELAY VALVE PORTION - MAINTENANCE PROCEDURES - "IN-SHOP"

10.1 DISASSEMBLY (See Figure 4)

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

WARNING: Springs within the assembled valve may be under, or placed under tension or compression. Exercise care during the procedures which follow to avoid possible injuries should parts inadvertently "fly out" of the assemblies.

10.1.1 Remove the following from the mounting face of the body (35).

10.1.1.1 Two ring retainers (1).

10.1.1.2 Two wire strainers (2).

10.1.2 Remove the six $\frac{5}{16}$ " hex nuts (3) from the six $\frac{5}{16}$ " hex head cap screws (4) which secure the diaphragm cover (5) to body (35).

10.1.2.1 Remove the six $\frac{5}{16}$ " square head bolts (4).

10.1.2.2 Remove the diaphragm cover (5).

10.1.3 Remove the following from the body (35):

10.1.3.1 The $\frac{9}{16}$ " O.D. ring gasket (6). SCRAP the gasket.

10.1.3.2 The diaphragm assembly (7 to 11) as a unit.

NOTE: The diaphragm assembly is held in place by means of a ball socket joint on the end of the diaphragm stem, and the upper diaphragm follower.

10.1.4 Disassemble the diaphragm assembly as follows:

10.1.4.1 Remove the #10 hex nut (8) from each of the three #10 retaining screws (7) freeing the lower follower (11), the diaphragm (10) and the upper follower (9). SCRAP the diaphragm.

10.1.5 Compress and remove the retaining ring (13) which holds the exhaust valve assembly (13 to 21) in the body (35).

10.1.6 Remove the diaphragm stem (15), the diaphragm stem spring (16) and the exhaust valve assembly (14, 17 to 23) from the body (35).

10.1.7 Disassemble the exhaust valve assembly as follows:

10.1.7.1 Remove and SCRAP the $\frac{1}{8}$ " O.D. o-ring (14) from the outer diameter of the exhaust valve cage (21).

10.1.7.2 Remove the retaining ring (24) from the inner bore of the slotted end of the exhaust valve cage (20) to free the seal assembly (18 to 23) and the exhaust valve spring (22).

10.1.8 Disassemble the seal assembly as follows:

10.1.8.1 Remove and SCRAP the $\frac{15}{16}$ " O.D. o-ring (23) from the smaller diameter of the seal housing (20).

10.1.8.2 Using a $\frac{1}{2}$ " multi-spline key remove the seal retainer (20).

10.1.8.3 Remove and SCRAP the valve seal (19) from the housing (20).



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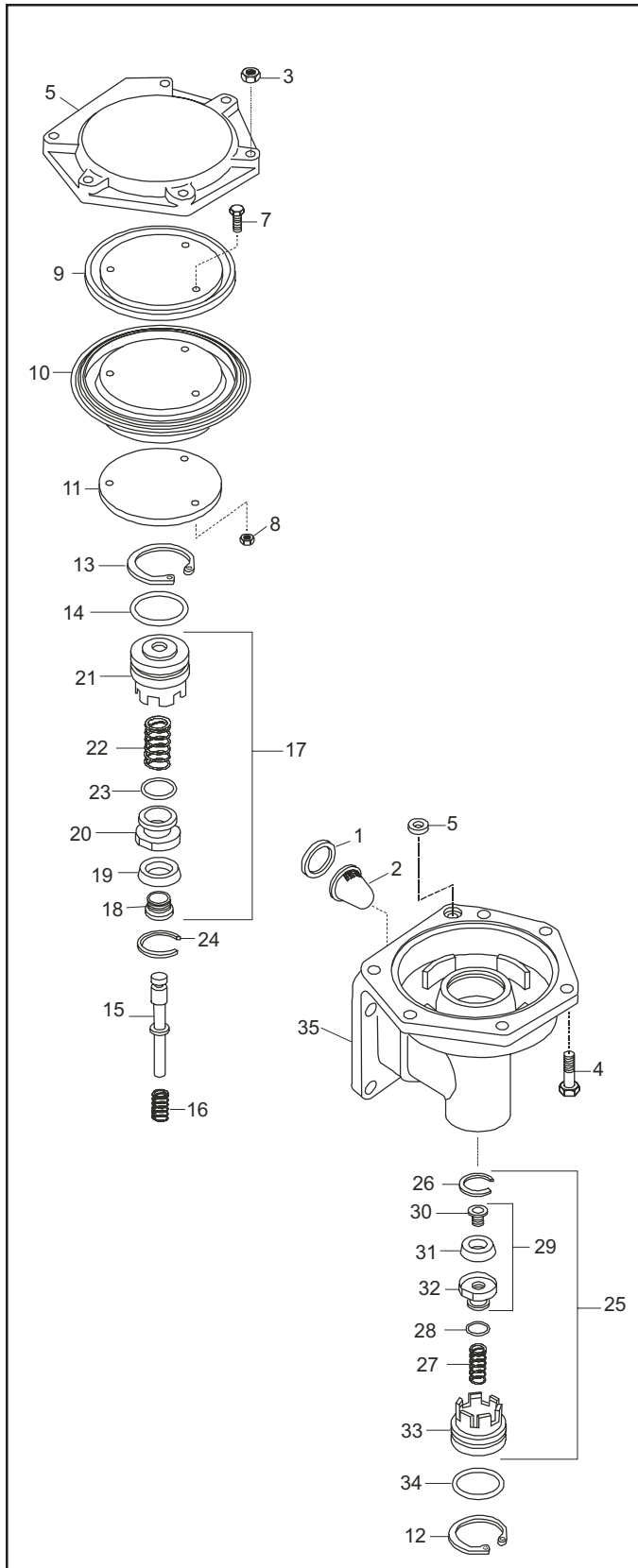


Figure 4 - C-2-W Relay Valve Portion

10.1.9 Compress and remove the retaining ring (12) which holds the supply valve assembly with o-ring (26 to 34) in the body (35).

10.1.10 Remove the supply valve assembly with o-ring (26 to 34) by carefully grasping the end of the cage (33) with a pair of pliers and pulling outward.

10.1.11 Disassemble the supply valve assembly with o-ring (26 to 34) as follows:

10.1.11.1 Remove and SCRAP the 1⁷/₁₆" O.D. o-ring (34) from the outer diameter of the supply valve cage (33).

10.1.11.2 Remove the retaining ring (26) from the inner bore of the slotted end of the supply valve cage (33) to free the supply valve seat assembly with o-ring (28, 30 to 32) and the supply valve spring (27), then remove them from the body (35).

10.1.12 Disassemble the supply valve seat assembly with o-ring (28, 30, 31, 32) as follows:

10.1.12.1 Remove and SCRAP 1¹/₁₆" O.D. o-ring (28) from the smaller diameter of the seal housing (32).

10.1.12.2 Using a 5⁵/₁₆" multi-spline key remove the seal retainer (30) from the seal housing (32).

10.1.12.3 Remove and SCRAP the seal (31) from seal housing (32).

10.2 CLEANING & INSPECTING

10.2.1 NON-REUSEABLE PARTS

IMPORTANT: ALL o-rings, gaskets, seals, wire strainers, and the diaphragm are to be SCRAPPED and replaced with NEW, Wabtec Corporation Parts.

10.2.2 BODY & COVERS

10.2.2.1 Wash the body and covers using the cleaning solvent described in Section 6.1. A clean lint-free cloth which has been saturated with the solvent may be used to clean the interior surfaces of the body and covers.

10.2.2.2 After the body and covers are cleaned they MUST BE completely dried. Use a low pressure jet of clean, dry air to blow the parts dry.

10.2.2.3 Inspect the 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 "C-2-W" Relay Valve Portion.



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10.2.3 REMAINING METAL PARTS

10.2.3.1 Wash all of the remaining metal parts with the cleaning solvent described in Section 6.1.

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

10.2.3.3 After the parts are cleaned, they MUST be blown completely dry with a low pressure jet of clean, dry air.

10.2.3.4 Inspect the parts.

Replace any spring that is rusted, pitted, distorted or has taken a permanent set. Refer to Parts Catalog 3208-50 for spring identification and information.

Replace any retaining ring or retainer 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 "C-2-W" Relay Valve Portion.

10.3 ASSEMBLY (See Figure 5)

10.3.1 Supply Valve Assembly (26 to 34)

10.3.1.1 Insert a NEW seal (31) into the seal housing (32).

10.3.1.2 Insert the seal retainer (30) through the seal (31). Using a $\frac{5}{16}$ " multi-spline key tighten the seal retainer into the seal housing (32) until the seal is lightly compressed.

10.3.1.3 Coat the surfaces of a NEW $\frac{11}{16}$ " O.D. o-ring (28) and a NEW $\frac{17}{16}$ " O.D. o-ring (34) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring grooves on the outer diameter of the seal housing (32) and the supply valve cage (33) and lightly lubricate the surfaces of the bushing in the body (35) with the lubricant.

10.3.1.4 Install the NEW lubricated $\frac{11}{16}$ " O.D. o-ring (28) in the proper groove on the outer diameter of the seal housing (32). Remove the excess lubricant by wiping with a clean, lint-free cloth.

10.3.1.5 Insert the supply valve spring (27) and assembled supply valve seal assembly (28,30 to 32) (smaller diameter first) into the slotted opening of the supply valve cage (33).

10.3.1.6 Depress and hold the supply valve seat assembly and spring (27 to 32) far enough into the supply valve cage (33) to expose the retaining ring groove in the inner bore of the cage (33).

10.3.1.7 Insert the retaining ring (26) into the proper groove in the cage (33).

10.3.1.8 Install a NEW lubricated $\frac{17}{16}$ " O.D. o-ring (34) in the proper groove on the outer diameter of the supply valve cage (33). Remove any excess lubricant by wiping with a clean, dry lint-free cloth.

10.3.2 Insert the assembled supply valve with o-ring (26 to 34) (seal end first) into the bottom opening on the valve body (35) far enough to expose the retaining ring groove in the opening.

10.3.3 Insert the retaining ring (12) into the proper groove in the valve body (35).

10.3.4 Exhaust Valve Assembly

10.3.4.1 Assemble the valve seal (19) into the seal housing (20).

10.3.4.2 Insert the seal retainer (18) through the valve seal (19) and into the threaded portion of the seal housing (20).

10.3.4.3 Using a $\frac{1}{2}$ " multi-spline key, tighten the seal retainer (18) to secure the valve seal (19) in place in the seal housing (20) until the valve seal is lightly compressed.

10.3.4.4 Coat the surfaces of a NEW $\frac{15}{16}$ " O.D. o-ring (23) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring groove on the smaller diameter end of the seal housing (20) with the lubricant.

10.3.4.5 Install the NEW, lubricated $\frac{15}{16}$ " O.D. o-ring (23) into its groove on the seal housing (20). Remove any excess lubricant by wiping with a clean, dry lint-free cloth.

10.3.5 Assemble the spring (22) and the valve seal assembly (18 to 20, 23) into the slotted end of the exhaust valve cage (21).

10.3.6 Depress and hold the valve seal and spring assembly (18 to 23) far enough into the exhaust valve cage (21) to expose the retaining ring groove in the inner bore of the exhaust valve cage (21).

10.3.7 Insert the retaining ring (24) into the proper groove in the exhaust valve cage (21).

10.3.8 Coat the surfaces of a NEW $\frac{15}{8}$ " O.D. o-ring (14) with Number 2 Silicone Grease, Wabtec Corporation Specification M-7680-2. Also fill the o-ring groove on the larger diameter end of the exhaust valve cage (22) with the lubricant.

10.3.9 Install the NEW, lubricated $\frac{15}{8}$ " O.D. o-ring (14) into its groove on the exhaust valve cage (22). Remove any excess lubricant by wiping with a clean, dry, lint-free cloth.

10.3.10 Insert the diaphragm stem (15), (larger diameter first) through the seal retainer portion of the exhaust valve assembly until the flanged portion of the diaphragm stem is in contact with the seal retainer (18).



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10.3.11 Assemble the diaphragm stem spring (16) over the slotted end of the diaphragm stem (15).

10.3.12 Carefully insert the exhaust valve and diaphragm stem assembly with o-ring (15 to 24) into the center opening of the diaphragm cover face of the body (35).

10.3.13 Depress and hold the valve cage (21) far enough in the body (35) to expose the retaining ring groove in the body (35).

10.3.14 Insert the retaining ring (13) into the proper groove in the body (35).

10.3.15 Preassemble the Diaphragm and Follower Assembly as follows:

10.3.15.1 Place a NEW diaphragm (10) on the flat face of the lower diaphragm follower (11), so that the three small holes in the diaphragm and the holes in the lower diaphragm follower are in alignment. Be sure that the bellows area of the diaphragm extends over the outer diameter of the follower.

10.3.15.2 Place the upper diaphragm follower (9) on the diaphragm (10) so that the three small holes are in alignment with those in the diaphragm and in the lower diaphragm follower and the contour of the outer edge of the follower matches that of the bellows area of the diaphragm (10).

10.3.15.3 Insert a #10 retaining screw (7) through each of the three small holes in the upper diaphragm follower (9).

10.3.15.4 Assemble a #10-24 nut (8) on each of the three screws (7). Equally tighten the nuts (8) to secure the diaphragm assembly (7 to 10) together.

10.3.16 Assemble the diaphragm assembly into the body (35) making certain that the ball socket joint of the diaphragm stem (15) is engaged in the slot on the lower follower (11).

10.3.17 Insert a NEW $\frac{9}{16}$ " O.D. ring gasket (6) into the proper recess in the diaphragm cover face of the body (35).

10.3.18 Position the diaphragm cover (5) against the diaphragm assembly on the valve body and properly align the six holes in the diaphragm cover (5) with those of the body (35).

10.3.18.1 Make certain that the bead of the diaphragm (10) is in the proper groove in the body (35).

10.3.19 Insert a $\frac{5}{16}$ " square head bolt (4) into each of the six holes in the body (35) and through the holes in the diaphragm cover (5).

10.3.20 Assemble a $\frac{5}{16}$ " hex nut (3) on each of the six bolts (4).

10.3.21 Equally tighten the nuts (3) to secure the diaphragm cover (5) in place.

10.3.22 Insert a wire strainer (2) into each of the two cavities in the mounting face of the body (35).

10.3.22.1 Secure the two wire strainers (2) in place by installing the two ring retainers (1).

10.4 TESTING & ADDITIONAL INFORMATION

10.4.1 **IMPORTANT:** After the "C-2-W" Relay Valve Portion, Pc.No. 583682 has been assembled, BUT BEFORE it is returned to service it MUST PASS a series of tests follow the procedure of the Wabtec Corporation Test Specification T-3439-O.

11.0 ADDITIONAL INFORMATION

11.1 **IMPORTANT:** WHENEVER THE "C-2-W RELAY" MODULE, PART NO. 582800, OR ANY OF ITS COMPONENT PORTIONS IS REMOVED FROM AN EQUIPMENT ARRANGEMENT FOR ANY REASON AND IT, OR ITS COMPONENT PORTION(S) IS REINSTALLED OR REPLACED WITH A NEW OR REPAIRED AND TESTED MODULE OR PORTION, A STATIONARY VEHICLE TEST MUST BE MADE TO BE SURE THAT THE "30-CW" MODULE AND ITS PORTIONS FUNCTION PROPERLY IN THE TOTAL BRAKE EQUIPMENT ARRANGEMENT.

11.2 **IMPORTANT:** WHENEVER THE "30-CW" MODULE PORTION IS REMOVED FROM THE BRAKE EQUIPMENT ARRANGEMENT FOR ANY REASON AND IT IS REINSTALLED OR REPLACED WITH A NEW OR REPAIRED AND TESTED PORTION A NEW MOUNTING GASKET MUST BE USED.

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

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