INSTRUCTION LEAFLET

No. 2391, Sup. 3

STANDARD S-478
APRIL, 1987
Supersedes Issue - April, 1986)

SHOP MAINTENANCE

FREIGHT BRAKE "ABD" AND "ABDW" CONTROL VALVE PORTIONS

SPECIFIED BY THE
ASSOCIATION OF
AMERICAN RAILROADS

PRINTED AS A COURTESY OF

WABCO
WESTINGHOUSE AIR BRAKE DIVISION
AMERICAN STANDARD INC.
Wilmerding, Pennsylvania 15148

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1.0 Scope

1.1 This leaflet is intended to cover only the maintenance of "ABD" and "ABDW" Control Valve Portions as approved by the Association of American Railroads for use by certified air brake shops. The "ABD" and "ABDW" Control Valves have identical service portions.

2.0 Contents

3.0 Shop Maintenance "ABD" and "ABDW" Control Valve

3.1 General Procedures

3.1.1 The purpose of these instructions is to describe AAR approved maintenance procedures for certified air brake shops and to avoid unnecessary expense due to careless handling of parts. For example, it is possible to assemble or dismantle all parts of the valve readily. If excessive force is required, investigation must be made immediately as to the cause of the difficulty.

3.1.2 The "ABD" (Fig. 1) and "ABDW" (Fig. 2) Control Valves are composed of a pipe bracket and operating portions. Pipe connections are permanently made to the pipe bracket, which is bolted to the car underframing. The service and emergency operating portions, which are bolted to the pipe bracket, are removed when cleaning brakes on repair tracks and must be replaced by portions cleaned and tested in a certified air brake shop.

3.1.3 When the car brake equipment is maintained or tested at repair track facilities, the instructions for cleaning, gaging, and testing "AB" Type Brakes as contained in current issue of Instruction Leaflet No. 2391, Sup.1 and Instruction Pamphlet No. 5039-4, Sup. 1 must be followed.

3.1.4 All cleaning and re-lubricating of the valve portion parts must be done at a suitable bench in a clean, well lighted location. The operating portions or parts thereof must only be dismantled or have any parts removed or replaced in a certified air brake shop.

3.1.5 When dismantling and assembling the operating portions, care must be exercised to avoid distortion of bolts,

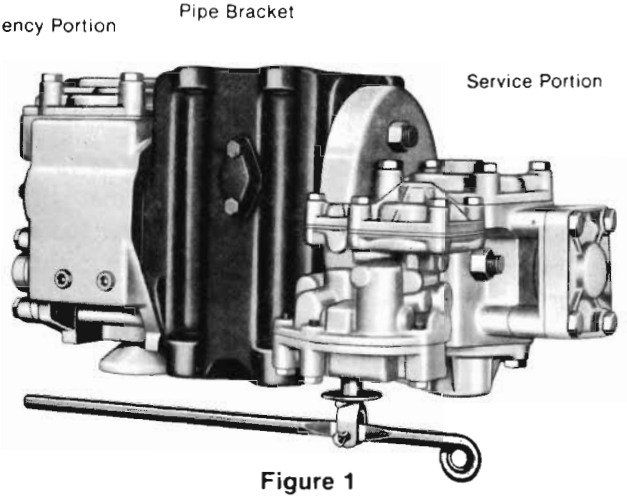

Figure 1

View of the "ABD" Control Valve Showing the Operating Portions and Pipe Bracket

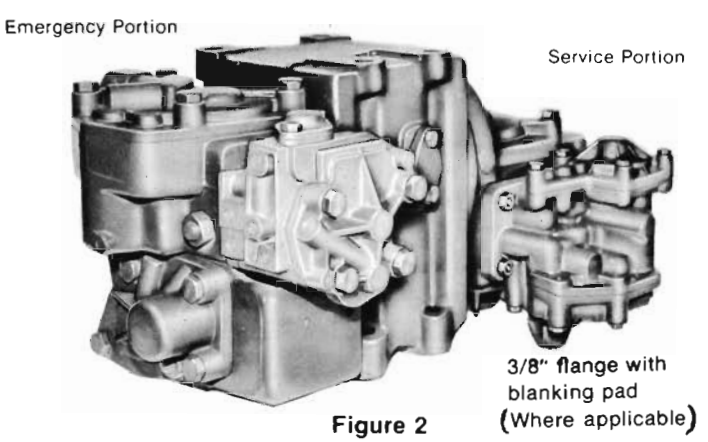

Figure 2

View of the "ABDW" Control Valve Showing the Operating Portions and Pipe Bracket

studs, nuts, etc. This can best be done by using tools especially adapted for this work. Special tools are shown in Figs. 27, 28, 29, 30 and 31, however, other designs may be used. Similar care must be taken to avoid mutilation or damage of pistons, springs, rubber parts, slide valves, graduating valves, etc.

3.1.6 All pistons, slide valves, graduating valves, and bushings must be thoroughly cleaned. To do this, the piston, slide valve and graduating valve assembly must be dismantled.

3.1.7 The operating portions must be completely dismantled and all parts inspected and cleaned. Parts, including the body interior, must be cleaned by an approved method that will dissolve oil and grease without damage or abrasion to the parts. The body must not be submerged in a solution. The exterior of body must be thoroughly cleaned. Before reassembly, the slide and graduating valves must be gaged after lapping. The body plug gages must be available and used at the assembly bench. The current issue of Instruction Leaflet No. 2356-3, Sup. 1 describes gages to be used.

3.1.8 When reassembling valve portions, it is important that cap screws and nuts are tightened sufficiently to prevent gasket leakage and yet not excessively to cause distortion of covers and gaskets.

3.1.9 Cleaned and repaired Service and Emergency Portions must pass prescribed tests on the AAR standard test rack or AAR approved automated test rack in accordance with the Code of Tests contained in the current issue of Instruction Pamphlet No. 5039-19, Sup. 1.

3.2 Chokes And Filters

3.2.1 The size of chokes is important for proper valve performance. Whenever a portion is dismantled, the choke fittings must be removed, cleaned and inspected to insure that they are not restricted. When cleaning chokes, the orifice size and shape must not be changed. Metallic filters must be cleaned and felt filters must be renewed.

3.2.2 Splined socket choke plugs can generally be removed or applied without damage to choke plug or to the thread in the tapped hole. If necessary to drill or tap, all drill chips must be thoroughly blown out of passages. The choke fittings for each portion are described later in the section under the heading for that particular portion.

3.2.3 While chokes are removed, passages must be checked for cleanliness and blown out if necessary. Chokes must then be replaced in their proper location.

3.3 Springs

3.3.1 When the portion is dismantled for general cleaning, all springs must be inspected after cleaning. Springs which show rust pits, distortion, or have permanent set, must be rejected and replaced by springs known to be correct.

3.3.2 Spring identification Tables are shown as follows:

Table 1 "ABD" Service Portion
Table 2 "ABD" Emergency Portion
Table 3 "ABDW" Emergency Portion

3.4 Rubber Parts (see also 11.0)

3.4.1 All rubber parts must be renewed at the time of reconditioning.

3.5 Lubrication

AAR specifications for lubricants referred to in this publication are as follows:

Lubricant	Current AAR Specifications
Triple Valve Oil	M-912
Dry Graphite	M-913
Brake Cylinder Lubricant	M-914

Air brake shop containers must be stencilled with AAR specifications identification.

3.5.1 Lubricate seats, faces and spring bearing surfaces of slide valves and graduating valve with lubricating oil (M-912).

3.5.2 Evenly spread one (1) drop of lubricating oil (M-912) around the piston guide at the time it is assembled.

3.5.3 Apply two (2) drops of lubricating oil (M-912) to the spring cage at the time of assembly. Evenly spread one drop of this lubricating oil around bearing surfaces at each end of the cage.

3.5.4 Where multi "O" ring arrangement is used, a thin wall type mandrel can be used to insert "O" ring into its groove to prevent damage possible if "O" ring is pushed over adjacent groove. Figure 3 illustrates a typical design. The supply of "O" rings kept on mandrel must not exceed daily requirements to prevent permanent stretch. In addition, precaution must be used to protect against contamination from dirt and other foreign matter damage to "O"rings and lubricant.

3.5.5 "O" ring, ring groove and bushing- During assembling lubricate with No. 2 Silicone grease, Current Spec. MIL-G-4343. Coat the "O" ring and fill groove with grease. After "O" ring is installed in ring groove, remove excess grease by wiping. Coat bearing surface of bushing with grease before "O" ring assembly is inserted into bushing.

3.5.6 The threads of choke plugs and all other removable plugs, as well as all other threaded parts which may later be difficult to remove must be coated lightly with brake cylinder lubricant (M-914) or a compound consisting of one part graphite (M-913) and two parts of oil (SAE-20) by weight. Discretion should be used tightening choke plug to facilitate removal.

3.5.7 Any air brake shop containers in which an approved M-912 triple valve oil is stored or used must first be stencilled "AAR Spec. M-912" or "Triple Valve Oil."

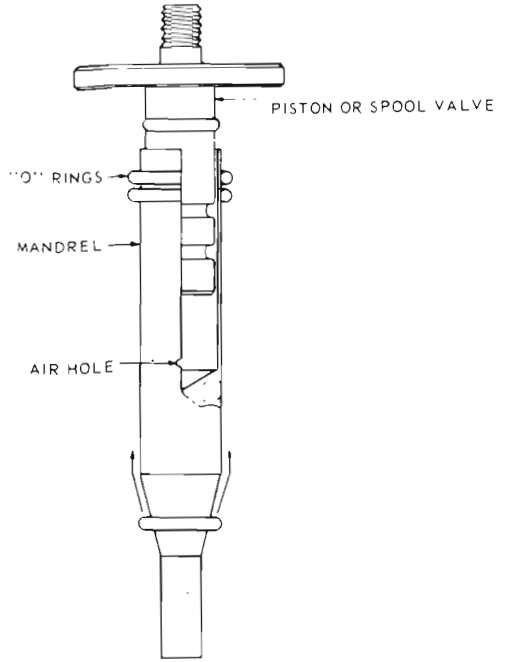

Figure 3
Mandrel for Installing "O" Rings

3.6 Piston And Diaphragm Assembly

3.6.1 All piston and diaphragm assemblies, except the emergency portion vent valve piston must have their respective diaphragms assembled to the piston with the piece number facing away from the piston. The vent valve piston must have its diaphragm assembled with the piece number side toward the piston.

3.6.2 Use Loctite Sealant 242, or its equivalent, on the cap screw threads. As an alternate standard to self-locking nuts, plain cadmium plated nuts may be used with Loctite Sealant 242, or its equivalent, on the nut threads.

3.6.3 The emergency portion inshot piston assembly must have the diaphragm follower assembled on the piston with its small diameter toward the diaphragm.

3.6.4 The diaphragm check valve must be assembled in the Accelerated Application Valve with its spring guide towards the diaphragm check valve spring.

3.6.5 The diaphragm between the filling piece assembly and accelerated application body of the accelerated application valve must be assembled with the plunger guide towards the plunger.

3.6.6 The following tabulation lists recommended torque limits for piston assemblies and cap nuts. In assembling the diaphragm, the piston must be held by suitable means which prevents damage to parts.

Piston Assembly	Torque Limits (Foot Pounds)
Service Portion	
Service Piston	45 to 50
Brake Cylinder Limiting Valve Piston	12 to 14
Accelerated Release Valve Piston	30 to 35
Release Valve Piston	12 to 14
Emergency Portion	
Emergency Piston	45 to 50
Inshot Piston	12 to 14
Small Vent Valve Piston	12 to 16
Plastic Cap Nut (Ref. 44, Fig. 23 & 24)	15 to 20
Metal Cap Nut (Ref. 44, Fig. 23 & 24)	55 to 65

3.6.7 Before the piston and diaphragm assembly is finally clamped in place, make certain that the piston moves and rotates freely through its full operating travel and that the diaphragm bead is properly positioned in its groove on body or cover.

3.7 Stenciling

3.7.1 After Acceptance Test, a suitable surface of each portion must be stenciled in accordance with Figure 4. Minimum dimensions of letters to be ½" high.

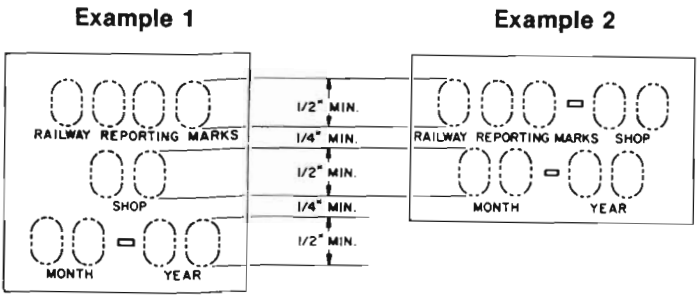

Figure 4

Examples of Valve Portion Stenciling with Required Information

4.0 Control Valve Service Portion

4.1 The service portion is used with "ABD", "ABD-1" and "ABDW" Control Valves.

4.2 Replace release valve bottom cover vent protector seal by drilling head off pop rivet, pushing out rivet, and replacing with a new 3/16" x ½" pop rivet with 5/8" diameter head.

4.3 Wasp excluders in the bottom cover must be cleaned if obstructed with dirt.

4.4 The service portion contains four choke plugs as shown in Fig. 5, which govern the flow of air through the ports in which they are located.

Choke 46A, which controls the rate of brake cylinder exhaust to the retainer, is located in the mounting face. Orifice size 3/32" (.0938").

Choke 46B, which controls the rate of brake pipe charge, is located in the mounting face. Orifice size No. 18 drill (.1695").

Choke 46C, which controls the rate of auxiliary reservoir charge is located in the mounting face. Orifice size No. 55 drill (.052").

Choke 46D, which controls the flow of air from the quick service volume to atmosphere, is located in the body underneath the cover. Orifice size 1/32" (.0312").

4.5 The service portion has a total of fifteen springs (fourteen coil and one leaf) which are identified in Fig. 6 and Table 1 by reference numbers as follows:

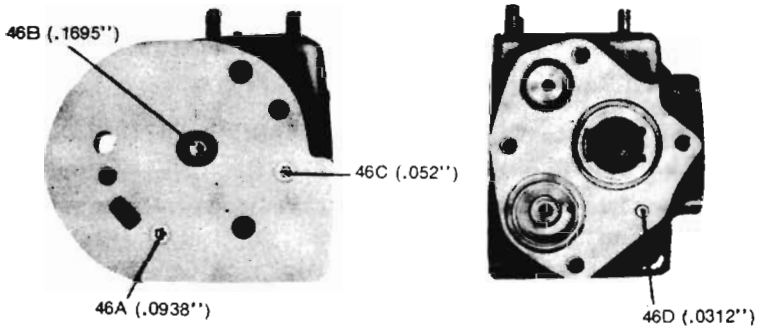

Figure 5

Views Showing Choke Locations in Service Portion

3-Graduating Valve Spring, which holds the graduating valve to its seat on the slide valve.

6-Slide Valve Spring, (leaf type), which holds the service slide valve to its seat.

17-Piston Spring, which is mounted in the piston stem and prevents movement of piston and graduating valve to preliminary quick service position until a predetermined difference in pressure between brake pipe and auxiliary reservoir is attained.

28-Brake Cylinder Limiting Valve Spring, which acts on the diaphragm of the quick service limiting valve to insure that a predetermined minimum brake cylinder pressure is developed regardless of brake pipe reductions.

30-Back Flow Check Valve Spring, which holds back flow check valve to its seat to prevent flow of brake pipe air to the accelerated service release valve.

32-Piston Return Spring, which prevents movement of the service piston to retarded recharge position unless brake pipe pressure is higher than auxiliary reservoir pressure.

42-Accelerated Release Valve Check Valve Spring, which serves to hold the check valve to its seat, must be Pc.571045 (CV-1195) colored red.

67-Release Valve Piston Spring, which acts on the diaphragm release valve piston to provide for release of brake cylinder pressure when initiated by duplex release valve handle.

70-Check Valve Springs (2) which serve to hold the auxiliary and emergency reservoir release check valves to their seats when the release valve plunger is down.

77-Check Valve Lifter Spring, which returns the plunger to normal position when the operating rod is released, so that the reservoir release check valves can return to their seats.

80-Spool Valve Spring, which acts on reset spool valve to provide for resetting of the diaphragm release valve piston and the service piston to release position when recharging after an emergency application.

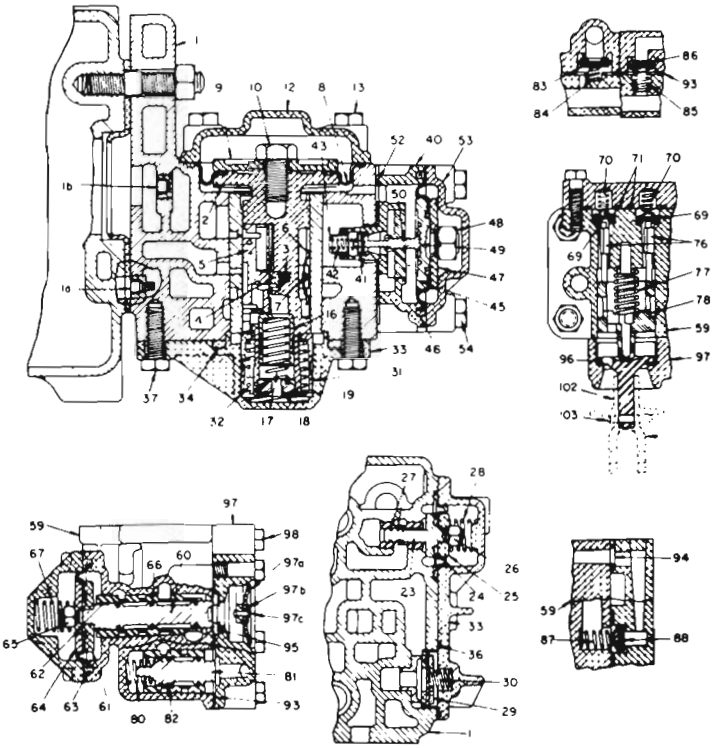

Figure 6

Sectional Views of "ABD" Control Valve Service Portion

84, 85 & 87-Check Valve Springs, (3), which serve to hold the return flow check valve, reset check valve and retaining check valve to their seats.

TABLE 1
SPRING IDENTIFICATION TABLE
"ABD" CONTROL VALVE SERVICE PORTION

Ref. No.	Piece Number W.A.B.	N.Y.A.B.	Approx. Outside Diameter	Approx. Diameter Wire	Approx. Free Height	Approx. No. Turns	Material
3	93940	CV-87	5/32"	1/64"	2 1/32"	13½	Bz.
17	563920	CV-870	5/8"	1/16"	1 15/16"	10½	Steel
28	566182	CV-972	55/64"	5/64"	1 3/64"	5	Steel (Blue)
30	94581	TV-35	31/64"	1/32"	1 7/64"	8½	Bz.
32	552280	CV-725	1 39/64"	9/64"	3 3/16"	7½	Steel
42	571045	CV-1195	½"	3/64"	1¼"	7	Steel (Red)
67	566207	CV-999	53/64"	5/64"	1 17/64"	6	Steel
70	552350	CV-747	9/32"	1/32"	1 5/16"	12	Music Wire
77	509512	EV-3787	41/64"	3/32"	1 55/64"	10	Steel
80	566210	CV-994	41/64"	1/16"	1⅛"	6½	Music Wire
84	513312	CR-854	21/64"	1/32"	2 1/32"	8½	Bz.
85	32533	SV-88	13/32"	1/32"	1 1/16"	9	S.S
87	32533	SV-88	13/32"	1/32"	1 1/16"	9	S.S

The actual springs will vary somewhat, due to small differences in wire diameter, coil diameter, number of coils, etc. This tabulation is intended for identification only and should not be used for any other purpose. It does not represent a specification for the springs mentioned.

5.0 "ABD" Control Valve Emergency Portion

5.1 This emergency portion is used only on "ABD" Control Valves.

5.2 The emergency portion contains 5 choke plugs which govern the flow of air through the ports in which they are located (see Fig. 7).

Choke 48A, which restricts the rate of flow from the brake pipe to the quick action chamber, is located underneath the emergency piston diaphragm. Orifice Size No. 76 drill (.020").

Choke 48H, which controls the rate of exhaust of quick action chamber air during emergency, is located in the body and is accessible by removing a 3/8" plug. The filter attached serves to prevent restriction of the choke by very fine dirt. Orifice Size No. 76 drill (.020").

Choke 48D, which restricts the rate of flow to the brake cylinder during the final stage of emergency brake cylinder pressure development, is located in the side of the body and is accessible by removing a 3/8" plug. Orifice Size No. 41 drill (.096").

Choke 48E, which controls the flow of brake cylinder air to the inshot valve piston chamber, is located in the side of the body and is accessible by removing a 3/8" plug. Orifice size No. 30 drill (.128").

Choke 48J, which reduces quick action chamber pressure at the same rate as brake pipe pressure during a service application, thereby preventing the emergency piston from moving to emergency position, is located in the body and is accessible by removing a 3/8" plug. Orifice size No. 46 drill (.081").

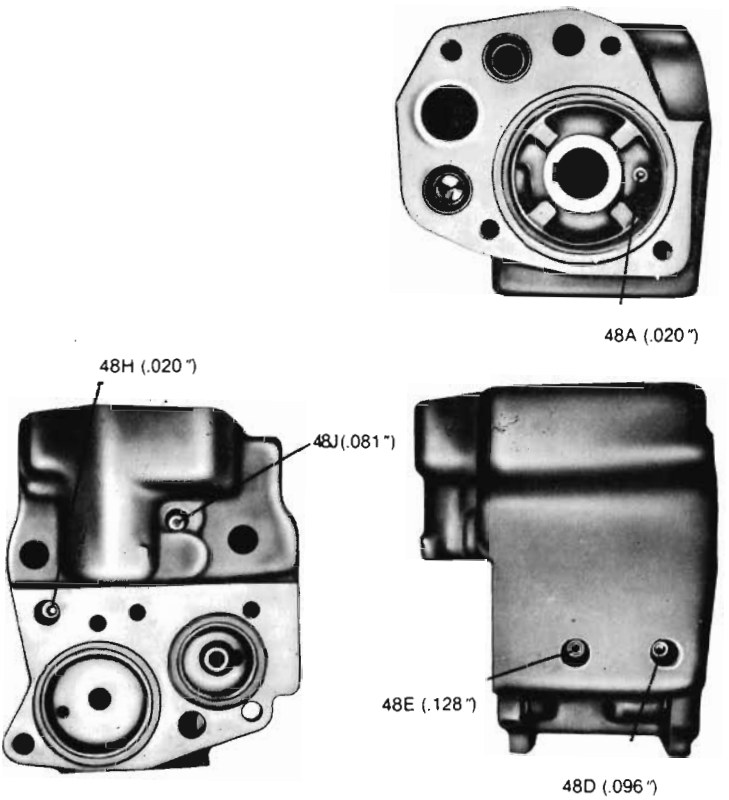

Figure 7

View Showing Choke Locations in Emergency Portion

5.3 The emergency portion has a total of eight springs which are identified in Fig. 8 and Table 2 by reference numbers as follows:

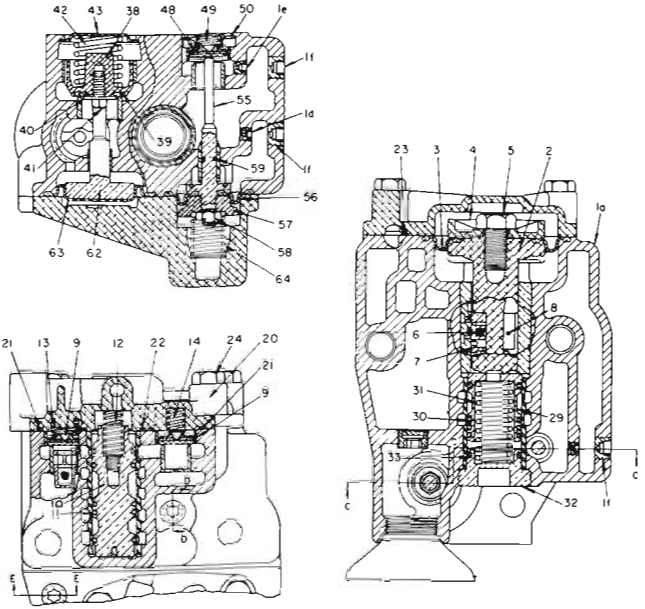

Figure 8

Sectional Views of "ABD" Control Valve Emergency Portion

TABLE 2
SPRING IDENTIFICATION TABLE
"ABD" CONTROL VALVE EMERGENCY PORTION

Ref. No	Piece Number W.A.B.	N.Y.A.B.	Approx. Outside Diameter	Approx. Diameter Wire	Approx. Free Height	Approx. No. Turns	Material
6	560538	CV-1120	13/64"	1/32"	31/64"	10	Bz.
12	567212	CV-1121	9/16"	1/16"	1 7/8"	12	Steel (Blue)
13	569087	CV-1159	1 1/16"	1/16"	55/64"	7	Steel
14	94581	TV-35	31/64"	1/32"	1 7/64"	8 1/2	Bz.
31	70642	CV-1160	1"	3/64"	2 23/32"	10 1/2	Steel
42	567222	CV-1122	1 1/32"	3/32"	2 9/16"	6 1/2	Steel
49	533932	CV-685	1 7/32"	1/32"	1 1/16"	6 1/2	Steel
64	569088	CV-1161	7/8"	3/32"	2 7/32"	8	Music Wire

The actual springs will vary somewhat, due to small differences in wire diameter, coil diameter, number of coils, etc. This tabulation is intended for identification only and should not be used for any other purpose. It does not represent a specification for the springs mentioned.

6-Slide Valve Spring, which holds the valve to its seat.

12-High Pressure Valve Return Spring, which returns high pressure spool valve after an emergency application and after quick action chamber pressure has vented.

13-Accelerated Emergency Release Check Valve Spring, which serves to hold check valve on its seat.

14-Spillover Check Valve Spring, which serves to hold check valve on its seat.

31-Emergency Accelerated Release Spool Valve Spring, which returns the spool valve and emergency piston from

accelerated release position to normal release position when quick action chamber pressure is re-established to approximately brake pipe pressure.

42-Vent Valve Piston Spring, which returns vent valve piston after an emergency application and after quick action chamber pressure has vented.

49-Inshot Check Valve Spring, which holds the check valve in contact with the inshot piston stem.

64-Inshot Piston Spring, which resists inshot piston movement until brake cylinder pressure rises a predetermined amount.

6.0 "ABDW" Control Valve Emergency Portion

6.1 This Emergency Portion is used only on "ABDW" Control Valve.

6.2 The emergency portion contains 8 choke plugs which govern the flow of air through the ports in which they are located (See Figures 9 and 10).

Choke 48A which restricts the rate of flow from the brake pipe to the quick action chamber, is located underneath the emergency piston diaphragm. Orifice Size No. 76 drill (.020").

Choke 48B, which restricts the rate of flow to the brake cylinder during the final stage of emergency brake cylinder pressure development, is located in the side of the body and is accessible by removing a ⅜" plug. Orifice size No. 41 drill (.096").

Choke 48C, which controls the flow of brake cylinder air to the inshot valve piston chamber, is located in the side of

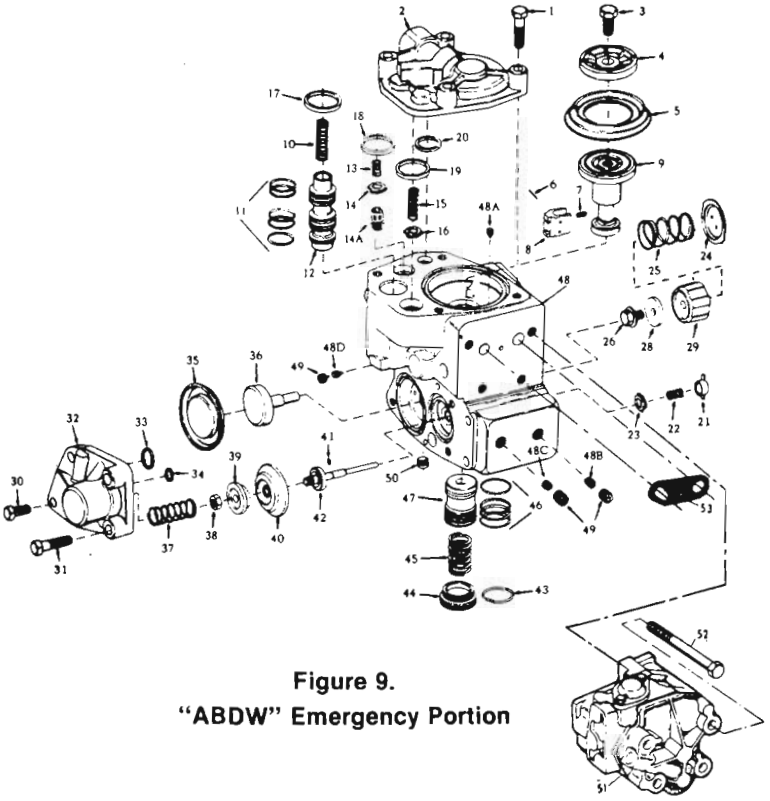

Figure 9.
"ABDW" Emergency Portion

the body and is accessible by removing a ⅜" plug. Orifice size No. 30 drill (.128").

Choke 48D, which controls the rate of exhaust of quick action chamber air during emergency, is located in the body and is accessible by removing a ⅜" plug. The filter attached serves to prevent restriction of the choke by very fine dirt. Orifice size No. 76 drill (.020").

Choke 9, which controls the quick action chamber exhaust, is located in the filling piece. Orifice size 1/64" drill.

Choke 10, which reduces quick action chamber pressure at the same rate as brake pipe pressure during a service application, thereby preventing the emergency piston from moving to emergency position, is located in the filling piece. Orifice size No. 46 drill (.081").

Choke 11, which controls the brake pipe supply, is located in the filling piece. Orifice size No. 68 drill (.0310").

Choke 24, which controls the volume exhaust, is located in the body. Orifice size No. 54 drill (.0550").

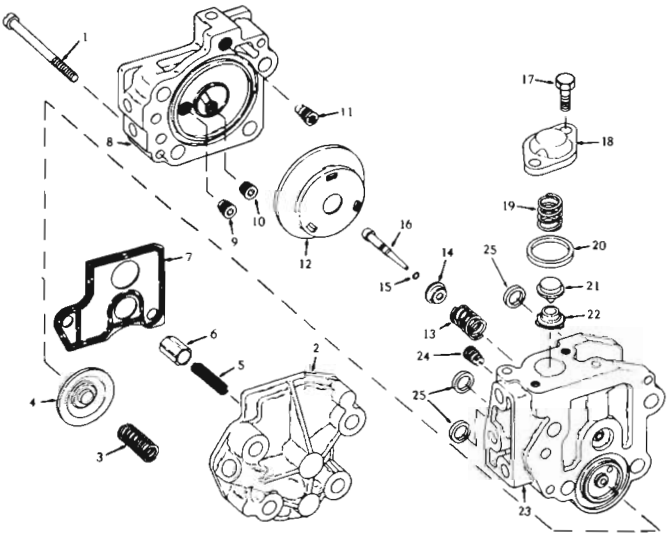

Figure 10. "ABDW"
Accelerated Application Valve

6.3 The emergency portion has a total of twelve springs which are identified in Figures 9 and 10 and Table 3 by reference numbers as follows:

See Figure 9

7—Slide Valve Spring, which holds the slide valve to its seat.

10—High Pressure Valve Return Spring, which returns high pressure spool valve after an emergency application and after quick action chamber pressure has vented.

13—Accelerated Emergency Release Check Valve Spring, which serves to hold check valve on its seat.

15—Spillover Check Valve Spring, which serves to hold check valve on its seat.

22— Inshot Check Valve Spring, which holds the check valve in contact with the inshot piston stem.

25—Vent Valve Piston Spring, which returns vent valve piston after an emergency application and after quick action chamber pressure has vented.

37—Inshot Piston Spring, which resists inshot piston movement until brake cylinder pressure rises a predetermined amount.

45—Emergency Accelerated Release Spool Valve Spring, which returns the spool valve and emergency piston from accelerated release position to normal release positon when quick action chamber pressure is reestablished to approximately brake pipe pressure.

See Figure 10

3—Diaphragm Check Valve Spring, which resists diaphragm check valve movement until brake pipe pressure rises a predetermined amount.

5—Spring, which resists check valve movement until quick action chamber pressure rises a predetermined amount.

13—Spring, which resists diaphragm movement until quick action chamber pressure rises a predetermined amount.

19—Check Valve Spring, which resists check valve movement until quick action chamber pressure rises a predetermined amount.

7.0 Control Valve Modifications

The following modifications must be made to all "ABD" portions which are not modified.

7.1 Service Portion

7.1.1 Only slide valves stamped "82" on the side can be used.

7.1.2 The back flow check valve bushing must be drilled with one 1/64" drill size by-pass port. Port may be drilled through the check valve seat in accordance with Figure 11.

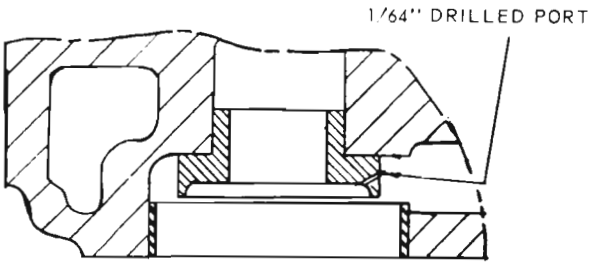

Figure 11
View of By-Pass Port Drilling

TABLE 3

SPRING IDENTIFICATION TABLE
"ABDW" CONTROL VALVE EMERGENCY PORTION

Ref. No.	Piece Number W.A.B.	Piece Number N.Y.A.B.	Approx. Outside Diameter	Approx Diameter Wire	Approx. Free Height	Approx. No. Turns	Material
			Reference - Figure 9				
7	560538	CV-1120	13/64"	1/32"	31/64"	10	Bz.
10	567212	CV-1121	9/16"	1/16"	1 7/8"	12	Steel (Blue)
13	569087	CV-1159	1 1/16"	1/16"	55/64"	7	Steel
15	94581	TV-35	31/64"	1/32"	1 7/64"	8½	Bz.
22	533932	CV-685	1/32"	1/32"	1 5/16"	6½	Steel
25	567222	CV-1122	1 1/32"	1/32"	2 9/16"	6½	Steel
37	569088	CV-1161	7/8"	1/32"	2 7/32"	8	Music Wire
45	70642	CV-1160	1"	9/64"	2 23/32"	10½	Steel
			Reference - Figure 10				
3	584197	CV-1275	31/64"	1/64"	1 23/64"	9	Music Wire (Yellow)
5	21085	DC-290	5/16"	3/64"	1¼"	18½	Bz.
13	580600	CV-1251	5/8"	3/64"	1 19/64"	7	Steel
19	581330	CV-1260	23/32"	1/16"	1 5/16"	9	Music Wire

The actual springs will vary somewhat, due to small differences in wire diameter, coil diameter, number of coils, etc. This tabulation is intended for identification only and should not be used for any other purpose. It does not represent a specification for the springs mentioned.

7.1.3 The release valve portion mounting studs on the "ABD" service portion must be the special ½ × ⅜" studs which utilize flange nuts.

The following procedure has been established for applying the special stud and nut kit, Pc. No. 578468, to the service portion.

7.1.3.1 Remove the three existing ½" studs from the service portion body. Clean the tapped holes of loose dirt and chips.

7.1.3.2 To the threads of the ½" end of the three ½" × ⅜" stainless steel reducing studs apply a few drops of Loctite, 271 (Studlock grade) or its equivalent.

7.1.3.3 Thread the three studs completely into the service portion until the shoulder engages the body.

7.1.3.4 Remove the excess Loctite from the mounting face.

7.1.3.5 Reapply the release valve portion on the new studs and secure to the service portion with the new ⅜" plated flange nuts, using a standard 9/16" open end wrench.

7.1.4 The accelerated service release spring (42) must be a red color indicating it has proper spring tension.

7.1.5 The bottom cover of the "ABD" Release Valve Portion must be modified when worn from the stem and end plate, to accept a nylon wear sleeve insert. Figure 12 shows the dimensions to which the cover must be machined. Machining may be done in a lathe or drill press as shown in Figure 13. To prevent corrosion after the cover is machined, the machined area must be treated with "Alodine 1200" or ap-

proved equivalent* according to treatment instructions and rinsed with water unless otherwise directed. After treatment, the Wear Sleeve Insert Pc. 580075 (CV-1228) must be pressed in place without lubrication or sealant. All new covers being manufactured are equipped with a nylon sleeve.

7.1.6 To delete the return flow function to conform with new equipment, the following procedure must be followed:

1) Remove return flow check valve (Ref. 72, Page 41) and spring (Ref. 73, Page 41).
2) When modifying NYAB Release Valve Body, apply LOCTITE 242 (or equivalent) to plug, Pc. No. CV-1274, and press into .939 dia. of check seat. (Refer to NYAB General Letter GL-372, Sup. 9).
3) When modifying WABCO Release Valve Body, apply LOCTITE 242 (or equivalent) to plug, Pc. No. 585156, and press into .950" (approximate) dia. of body. (Refer to WABCO Service Bulletin No. 68-6A).

7.1.7 Insert strainer, PC. 588168 (757635), into the retainer port under the ring gasket on the face of the release valve body as shown in figure 11.1. (Ref. NYAB General Letter 410 or WABCO Service Bulletin 68-8)

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*A commercially available chromate conversion coating for aluminum applied according to treatment instructions.

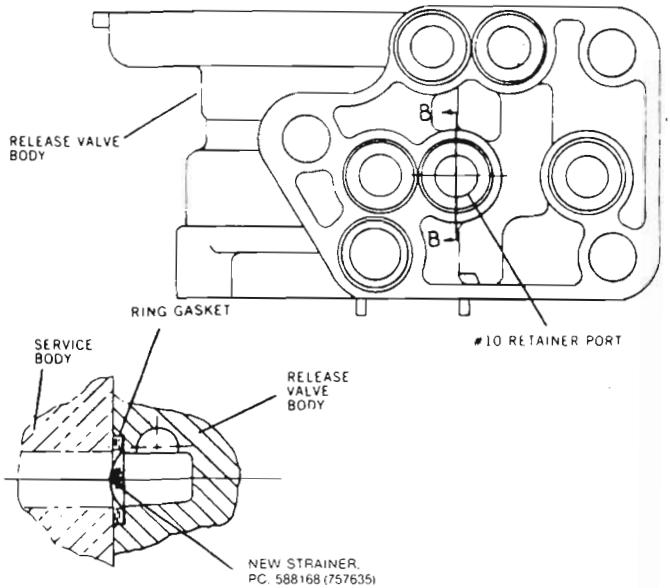


Figure 11.1

ABD Release Valve Body with Strainer to Protect Retaining Pipe Check Valve

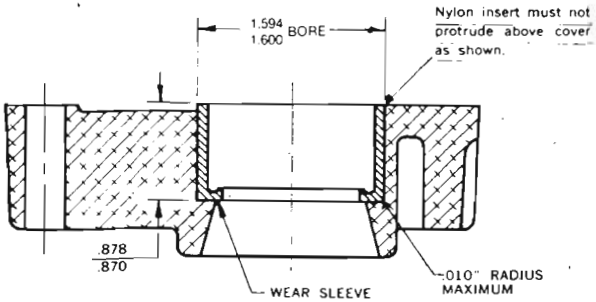


Figure 12

Modified Standard "ABD" Brake Cylinder Release Valve Bottom Cover with Nylon Wear Sleeve

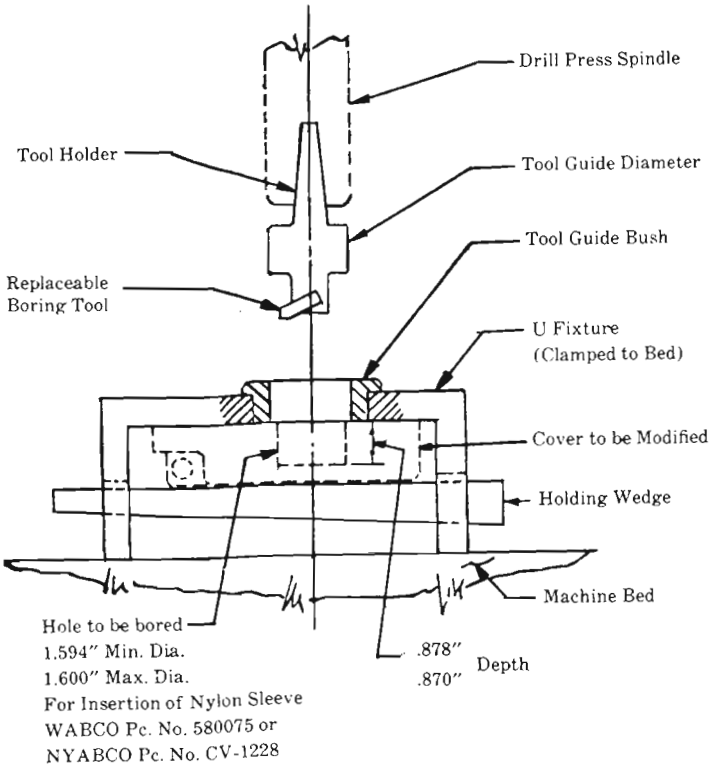


Figure 13

One Method for Machining of "ABD" Release Valve Portion Bottom Cover

7.2 Emergency Portion

7.2.1 The original design of the emergency piston must be modified to either of the designs shown in Fig. 14. The small end of the piston must be either bored $\frac{7}{8}$" diameter, $\frac{3}{64}$" deep or be drilled with a 1" drill until a $\frac{3}{64}$" lip remains. To prevent corrosion after the piston end has been machined, it must be treated with "Alodine 1200" or approved equivalent* according to treatment instructions and rinsed with water unless otherwise directed.

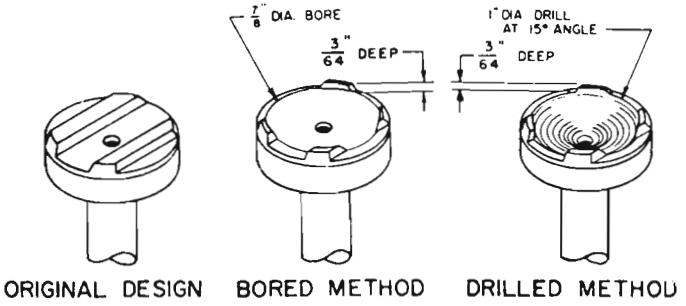


Figure 14

Methods for Modifying Original Design Emergency Piston

7.2.2 Other current approved piston designs do not require modification.

7.2.3. Diaphragm check valve spring (reference 3, Table 3) should be replaced with spring Pc. 584197 (CV-1275) which is colored yellow on end coils.

*A commercially available chromate conversion coating for aluminum applied according to treatment instructions.

7.2.4 Insert strainer, PC. 588105 (759721), into the emergency accelerated release check valve seat until locked by tabs as shown in Fig. 14.1. (Ref. NYAB General Letter 410 or WABCO Service Bulletin 68-8)

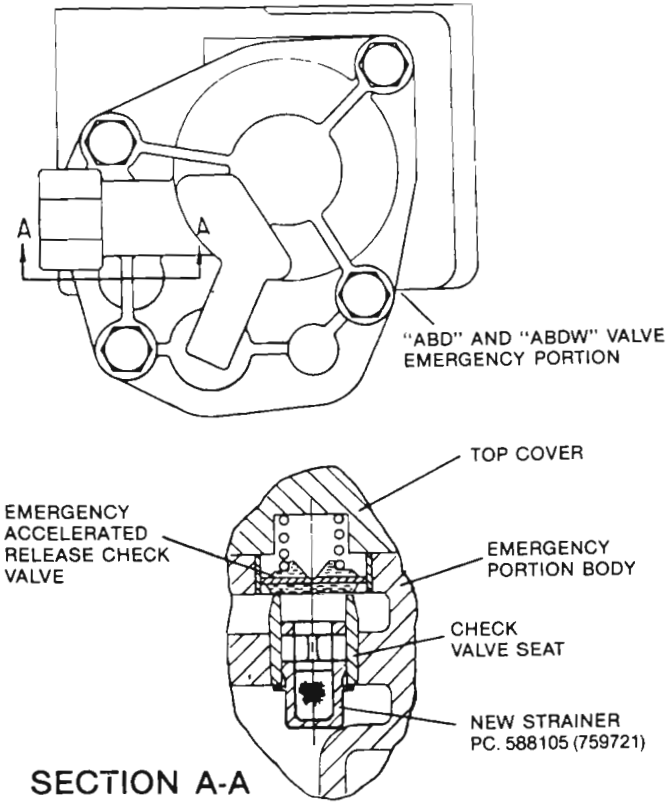


Figure 14.1
ABD or ABDW Emergency Portion with Strainer to Protect Emergency Accelerated Release Check Valve

8.0 Shipping Requirements

8.1 When the operating portions are not attached to the pipe bracket, the parts are exposed to dirt and, therefore, special covers and stem guards must be fitted for protection against dirt and damage. To secure this protection, special shipping covers as illustrated, or approved equivalents, are required. These covers and guards must be applied to the portions as soon as they have passed Code of Tests and removed from the test rack, and must not be removed until just ready to apply each cleaned portion to the car. Even then, special precautions must be taken to avoid damaging the parts or getting dirt into the operating portions when applying them.

8.2 One type "ABD" and "ABDW" Control Valve Service Portion shipping cover as shown in Fig. 15 is the same as the "AB" Control Valve Service Portion shipping cover except that one of the ⅝" × 6¾" studs. Pc. 98834 (CV-669) has been replaced by a ⅝" × 3" stud, Pc. 568998 (CV-1116) and cover gasket, Pc. 514100 (CV-575) has been replaced by cover gasket, PC. 569667 (CV-1173) held in place by drive screws, Pc. 98850 (CV-213). The "AB" Control Valve Service Portion shipping cover may be converted for use with "ABD"Control Service Portion by changing 6¾" stud with 3" stud and by cutting cover gasket as shown by Fig. 16. Examples of other approved valve portion shipping covers are shown in Fig. 17 and 18.

8.3 Only new pipe bracket strainers for ABD valves (Fig. 26, No. 3) when and if required to be shipped from shop.

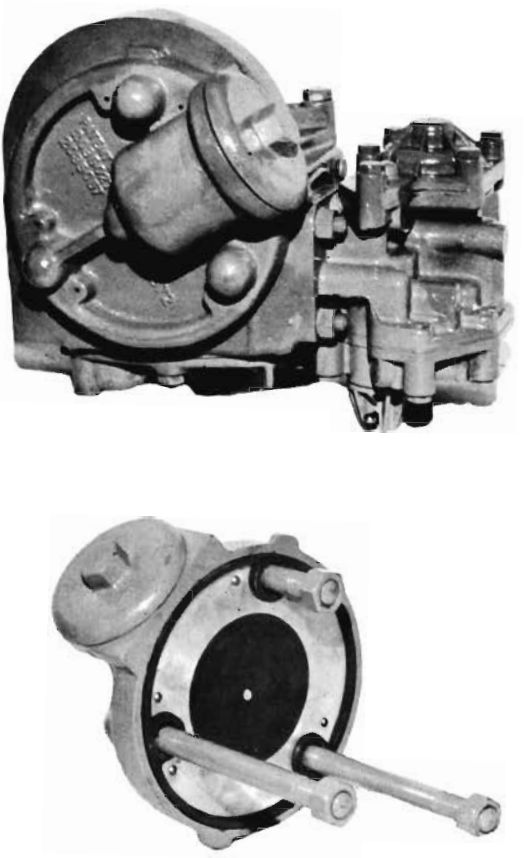


Figure 15

"ABD" Control Valve Service Portion with One Type Shipping Cover and Inside View of Cover, Pc. 569668 (CV-1172)

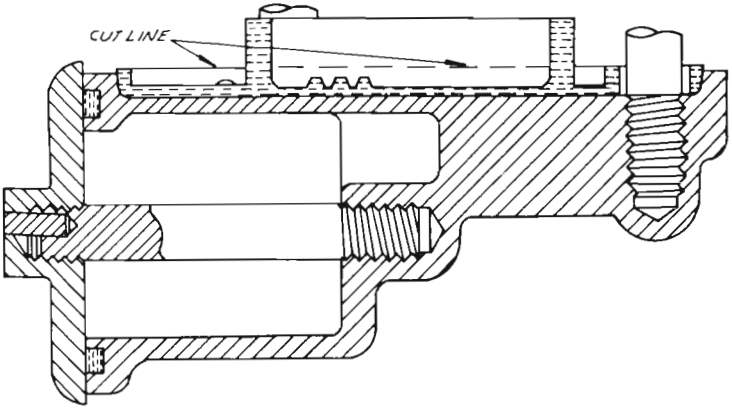
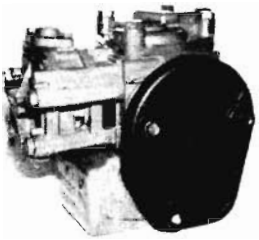
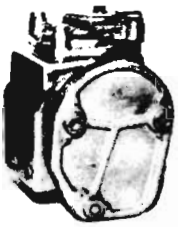


Figure 16

Conversion of "AB" control valve service portion shipping cover



"ABDW"



"ABD"

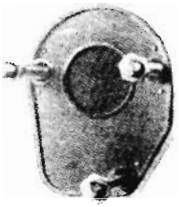
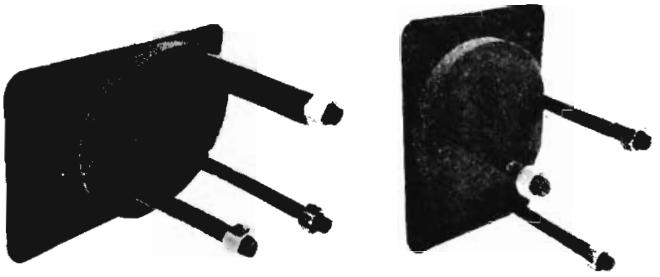


Figure 17

"ABD" and "ABDW" Control Valve Emergency Portion with One Type Shipping Cover and inside view of the cover, Pc. 98829 (CV-215)



Service Portion Emergency Portion

Figure 18

Alternate Approved Shipping Covers

8.4 Release valve stem guard, Fig 19, Pc. 569669 (CV-1174) is provided to protect the internal parts from damage. This stem guard, or an approved alternate, must be applied to release valve stem and held in place by cotter pin before transporting portion.

Standard Alternate Standard

Figure 19

Release Valve Stem Guards

8.5 A vent protector plug, Fig. 20, Pc. 513091 (CV-274) is also provided for the emergency portion. This plug, or approved alternate, must be applied when the emergency portion is removed from the test rack and must not be removed until ready to apply the portion to the car.

Standard Alternate Standard

Figure 20

Vent Protector Plug

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9.0 Parts of the "ABD" Control Valve

9.1 "ABD" Service Portion Parts (See Figure 21)

1 SCREW, Cap. H. Hd., ½ x 1¾ in. (4 Req'd)
2 COVER Top
3 GASKET, Ring
4 SCREW, Cap, H. Hd. ⅝ x 1 in.
5 FOLLOWER, Diaphragm
6 DIAPHRAGM
7 RETAINER, Spring
8 SEAT, Spring
9 SPRING, Piston
10 GUIDE, Piston Spring
11 PIN, Cylinder, 3/32 x 1 in.
12 SPRING, Slide Valve
13 SPRING, Grad., Valve
14 VALVE, Graduating
15 VALVE, Slide
16 PISTON, Service
17 SCREW, Cap, H. Hd., ½ x 2¾ in. (4 Req'd)
18 COVER, Service Acc. Rel. Valve
19 NUT, 9/16 in.
20 FOLLOWER, Diaphragm
21 DIAPHRAGM
22 PISTON, Ser. Acc. Rel. Valve
23 PLUNGER, Ser. Acc. Rel.
24 O-RING, ¼ in. O.D.
25 GASKET, Ring, 11/16 in. O.D.
26 SEAT, SPRING
27 SPRING, Check Valve
28 VALVE, Check. Acc. Rel.
29 FILLING PIECE, Ser. Por.
30 GASKET Filling Piece
31 SCREW, Cap. H. Hd., ½ x 1¼ in. (4 Req'd)
32 VALVE, Check, Back Flow
33 SPRING, Check Valve
34 CAGE, Spring, Piston Return
35 SPRING, Piston Return
36 SPRING, B. Cyl. Lim. Valve
37 NUT, ⅜ in.
38 FOLLOWER, Diaphragm
39 DIAPHRAGM
40 O-RING, ⅜ in. O.D. (2 Req'd)
41 PISTON, B.C. Lim. Valve
42 GASKET, Ring, 3⅜ in. O.D.
43 GASKET, Ring, 2 in. O.D.
44 GASKET, Ring, 11/16 in. O.D.
45 COVER, Bottom
45A EXCLUDER, Wasp (2 Req'd)
46 BODY, Service Valve
46A PLUG, Choke, (Port 10) ⅜ in. (3/32 Dr.)
46B PLUB, Choke, (Port 1) ⅜ in. (#18 Dr.)
46C PLUG, Choke, (Port 1A) ⅜ in. (#55 Dr.)
46D PLUG, Choke, ⅛ in. (1/32 Dr.)
46E NUT, Hex. Flanged, ⅜ in. (3 Req'd),
46F STUD, ½ to ⅜ x 1⅞ in. (3 Req'd)
47 GASKET, Ring, 13/16 in. O.D. (5 Req'd)
47A STRAINER, Release Valve
48 GASKET, Ring, ⅞ in. O.D.
49 RELEASE VALVE PORTION

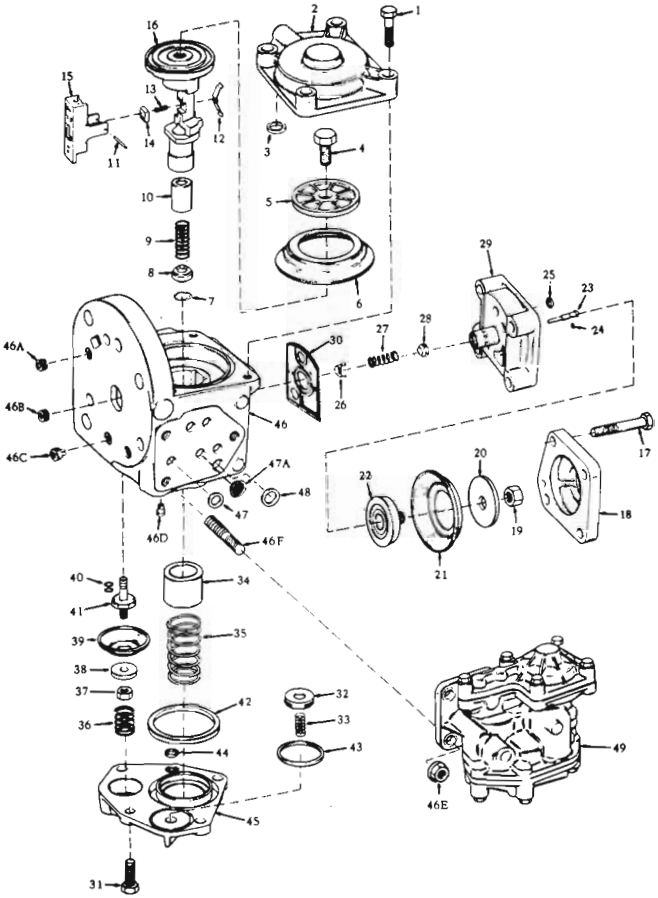


Figure 21

"ABD" Service Portion Parts

9.2 "ABD" Release Valve Portion Parts (See Figure 22)

50 SCREW, Cap, H. Hd. ⅜ × 1½ in. (5 Req'd)
51 COVER, Top
52 GASKETS, Ring, 1 in. O.D. (2 Req'd)
53 SPRING, Rel. Spool Valve
54 NUT, ⅜ in.
55 FOLLOWER, Diaphragm
56 DIAPHRAGM
57 PISTON
58 O-RING, ½ in. O.D.
59 VALVE, Rel. Spool
60 O-RING, ¾ in. O.D. (3 Req'd)
61 SPRING, Check V. (Emer. Res. & Aux. Res.) (2 Req'd)
62 VALVE, Check (Emer. Res. & Aux. Res.) (2 Req'd)
63 PLUNGER, (Emer. Res. & Aux. Res.) (2 Req'd)
64 SCREW, Cap., H. Hd., ⅜ × 1¾ in.5 Req'd)
65 SPRING, Reset Spool Valve
66 O-RING, ¾ in. O.D. (3 Req'd)
67 VALVE, Reset Spool
68 SPRING, Check V. (Retaining)
69 VALVE, Check Retaining
70 VALVE, Check, Reset
71 SPRING, Check V. (Reset)
72 VALVE, Check, Return Flow
73 SPRING, Check V. (Return Flow)
} Refer to para. **7.1.6**
74 SPRING Lifter
75 COTTER, 7/16 × 2 in.
76 GUARD, Rel. Valve Stem
77 LIFTER
78 STEM and END PLATE
79 GASKET, Bottom Cover
80 GASKET, Ring, ⅜ in. O.D.
81 SEAL, Valve
82 COVER Bottom
82A SEAL, Protector
82B RIVET, Pop Type
82C SLEEVE, Bottom Cover
83 BODY, Release Valve

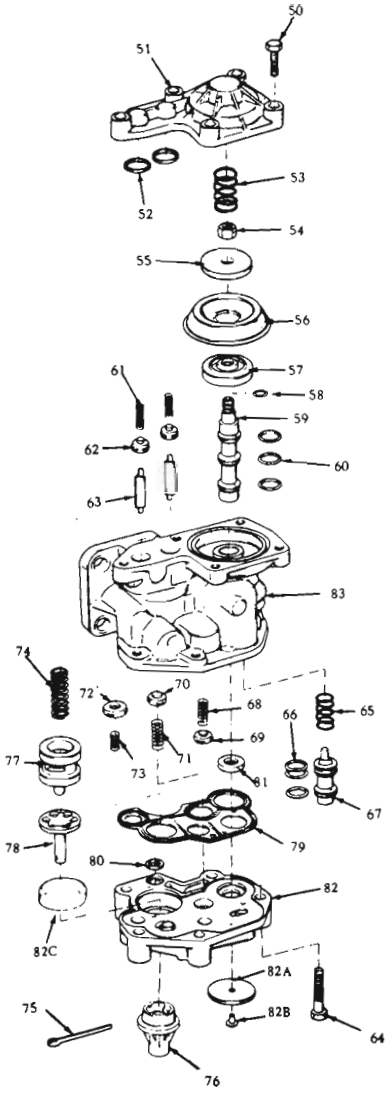


Figure 22 "ABD" Release Valve Portion Parts

9.3 "ABD" Control Valve Emergency Portion Parts (See Figure 23)

1 SCREW, Cap, H. Hd., ½ x 1¾ in. (4 Req'd)
2 COVER, Top
3 SCREW, Cap, H. Hd., ⅜ x 1 in.
4 FOLLOWER, Diaphragm
5 DIAPHRAGM, Emergency Piston
6 PIN, Cylinder, 3/32 x ¾ in.
7 SPRING, Slide Valve
8 VALVE, Emergency Slide
9 PISTON, Emergency
10 SPRING, Return, H.P. Valve
11 O-RING, 1-3/16 in. O.D. (5 Req'd)
12 VALVE, Spool, H.P.
13 SPRING, Check Valve (Emer. Acc. Rel.)
14 VALVE, Check, Acc. Rel. (Emer.)
14A STRAINER (Refer to para. 7.2.4)
15 SPRING, Check Valve (Spill-over Check)
16 VALVE, Check Spillover
17 GASKET, Ring, 1¾ in. O.D.
18 GASKET, Ring, 1½ in. O.D.
19 GASKET, Ring, 1½ in. O.D.
20 GASKET, Ring, 1⅛ in. O.D.
21 RETAINER, Inshot Spring
22 SPRING, Inshot, Check Valve
23 VALVE, Check Inshot
24 RETAINER, Spring
25 SPRING, Vent Valve Check
26 SCREW, With Washer, Cap H. Hd. ⅜ x ⅝ in.
28 SEAL, Vent Valve
29 PISTON, Small Vent Valve
30 SCREW, Cap. H. Hd., ½ x 1⅛ in. (2 Req'd)
31 SCREW, Cap., H. Hd., ½ x 1¾ in. (2 Req'd)
32 COVER, Vent Valve
33 GASKET, Ring, 15/16 in. O.D.
34 GASKET, Ring, ⅝ in. O.D.
35 DIAPHRAGM, V. V. Piston
36 PISTON, Vent Valve
37 SPRING, Inshot Piston
38 NUT, ⅜ in.
39 FOLLOWER, Diaphragm
40 DIAPHRAGM
41 O-RING, ⅜ in. O.D.
42 PISTON, Inshot
43 O-RING, 1½ in. O.D.
44 NUT, Cap
45 SPRING, Emer. Acc. Rel. Spool Valve
46 O-RING, 1½ in. O.D.
47 VALVE, Emer. Acc. Release Spool
48 BODY, Emergency Portion, Assembly
48A CHOKE, Charging, ⅛ in. (#76 Drill)
48D CHOKE, Inshot By-Pass Choke, ⅛ in. (#41 Dr.)
48E CHOKE, Inshot Volume Choke ⅛ in. (#30 Dr.)
48H CHOKE, Q.A. Blow-down, ⅛ in. (#76 Dr.)
48J CHOKE, Stability, ⅛ in. (#46 Dr.)
48K BODY, Portion
49 PLUG, ⅜ in. Splined, Pipe (4 Req'd)
50 FILTER, Special Exhaust

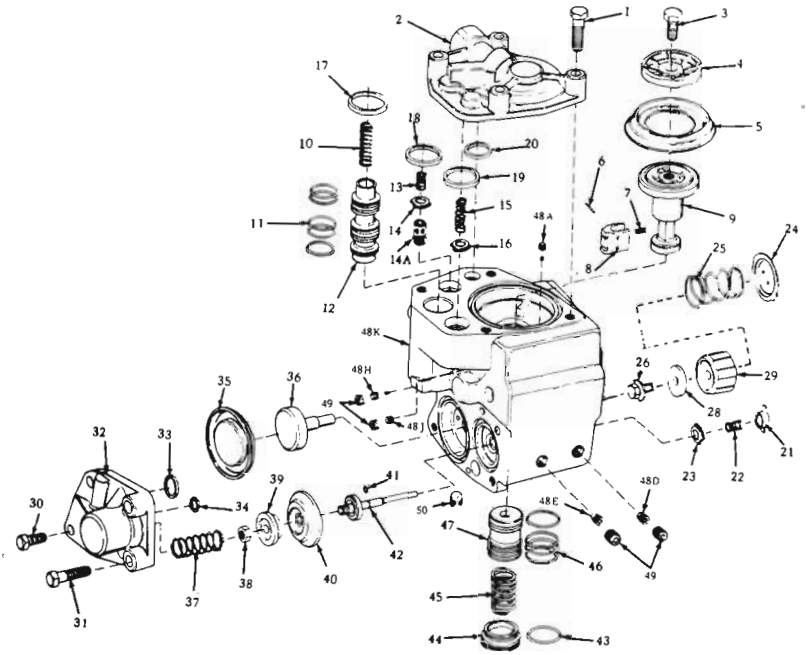


Figure 23

"ABD" Control Valve Emergency Portion Parts

9.4 "ABDW" Control Valve Emergency Portion Parts (See Figure 24)

1 SCREW, ½"—13 x 1¾ Hex Head Cap
2 COVER
3 SCREW, ⅜"—11 x 1" Hex Head Cap
4 FOLLOWER, Diaphragm
5 DIAPHRAGM, Piston
6 PIN, 3/32" x ¾" CYL. SPRING
7 SPRING, Slide Valve
8 VALVE, Emergency Slide
9 PISTON, Emergency
10 SPRING, Valve
11 1-3/16" O.D. "O" Ring (5 Req'd)
12 VALVE, High Pressure Spool
13 SPRING
14 VALVE, Check
14A STRAINER (Refer to para. 7.2.4)
15 SPRING
16 VALVE, Check
17 1¾" O.D. "O" Ring
18 1½" O.D. "O" Ring
19 1½" O.D. "O" Ring
20 1⅛" O.D. "O" Ring
21 RETAINER, Inshot Valve Spring
22 SPRING, Check Valve
23 VALVE, Check
24 RETAINER, Spring
25 SPRING, Vent Valve Piston
26 SCREW, ⅜"—16 x ⅝" Spec. Hex Hd. Cap
28 SEAL, Vent Valve
29 PISTON, Small Vent Valve
30 SCREW, ½"—13 x 1⅛" Hex Hd. Cap (2 Req'd)
31 SCREW, ½"—12 x 1¾" Hex Hd. Cap (2 Req'd)
32 COVER, Vent Valve Cap
33 15/16" O.D. Ring Gasket
34 ⅝" O.D. Ring Gasket
35 DIAPHRAGM, Vent Valve
36 PISTON, Vent Valve
37 SPRING, Inshot Valve
38 NUT, ⅜"—16 Hex
39 FOLLOWER, Diaphragm
40 DIAPHRAGM, Inshot Valve
41 ⅜" O.D. "O" Ring
42 PISTON, Inshot
43 1½" O.D. "O" Ring
44 NUT, Cap
45 SPRING
46 1½" O.D. "O" Ring (4 Req'd)
47 VALVE, Back Dump Spool
48 BODY, Bushed and Plugged
48B PLUG, ⅛" Choke, # 41 Drill
48C PLUG, ½" Choke, # 30 Drill
48D PLUG, ⅛" Choke, Complete (2 Req'd)
49 PLUG, ⅜" Splined, Pipe (3 Req'd)
50 FILTER, Special Exhaust
51 VALVE, Accelerated Application, Complete
52 SCREW, ½"—13 x 4¾" Hex Hd. Cap (4 Req'd)
53 GASKET, Between Emergency Portion and Filling Piece

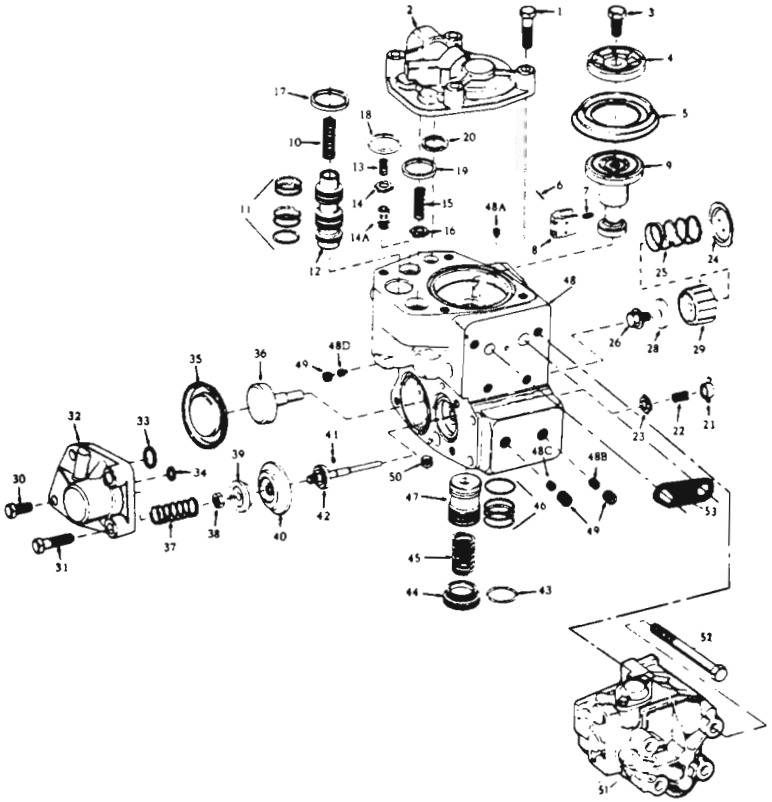


Figure 24

"ABDW" Control Valve Emergency Portion Parts

9.5 "ABDW" ACCELERATED APPLICATION VALVE PARTS (See Figure 25)

1 ¼"—20 x 3" Fil. Hd. Screw (2 Req'd)
2 COVER
3 SPRING, Diaphragm Check Valve
4 VALVE, Diaphragm Check
5 SPRING
6 VALVE, Check
7 GASKET, Cover
8 FILLING PIECE ASSEMBLY
(Includes 9, 10 and 11)
9 PLUG, Choke (Port 1)
10 PLUG, Choke (Port 5)
11 PLUG, Choke (Port 3)
12 DIAPHRAGM
13 SPRING
14 CAGE
14A STRAINER
15 ¼" O.D. "O" Ring
16 PLUNGER
17 ⅜"—16 x ⅞" Hex Hd. Cap Scres
(2 Req'd)
18 COVER, Check Valve
19 SPRING, Check Valve
20 1½" O.D. Ring Gasket
21 SEAT, Spring
22 VALVE, Check
23 BODY, Accelerated Application
(Includes 24)
24 PLUG, Choke
25 11/16" O.D. Ring Gasket (3 Req'd)

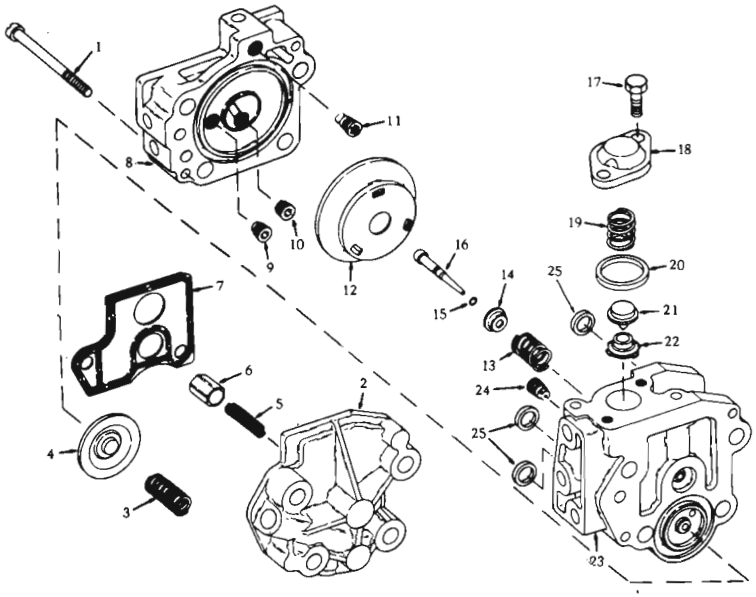


Figure 25

"ABDW" Accelerated Application Valve Parts

9.6 The "ABD" And "ABDW" Control Valve Pipe Bracket And Parts

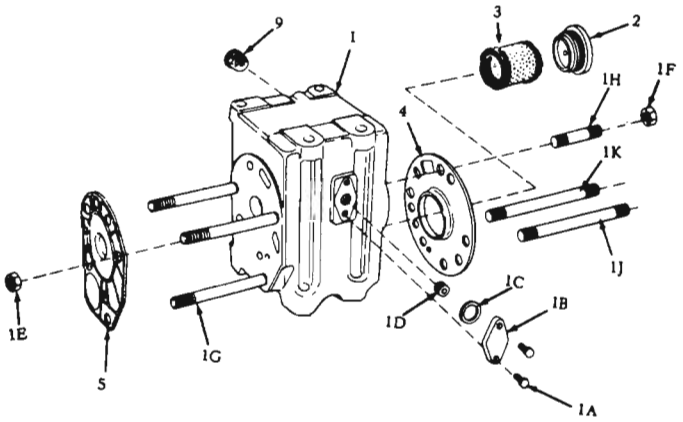


Figure 26

1	PIPE BRACKET, Assy.	Where applicable
1A	SCREW, Cap, Self-Locking, ⅜ x 1 in.	
1B	PAD, Blanking, ⅜ in. (Port 11)	
1C	GASKET, Ring	
1D	CHOKE, PORT 11, ⅜ in. (#½ Dr.)	
1E	NUT, Hex, ⅜ in.	
1F	NUT, Hex, ⅜ in.	
1G	STUD, ⅜ x 6⅝ in.	
1H	STUD, ⅜ x 3 in.	
1J	STUD, ⅜ x 7⅛ in.	
1K	STUD, ⅜ x 7⅜ in.	
2	NUT, Strainer	
3	STRAINER	
4	GASKET, Service Portion	
5	GASKET, Emergency Portion	
9	STRAINER, Wire (Ports 2 & 5)	

10.0 Special Tools

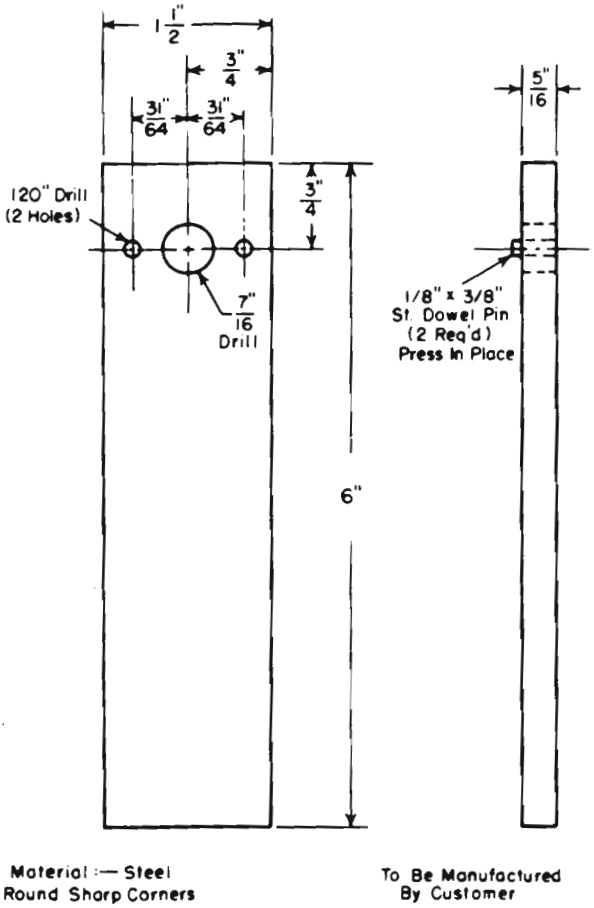


Figure 27.

Spanner Wrench For Limiting Valve

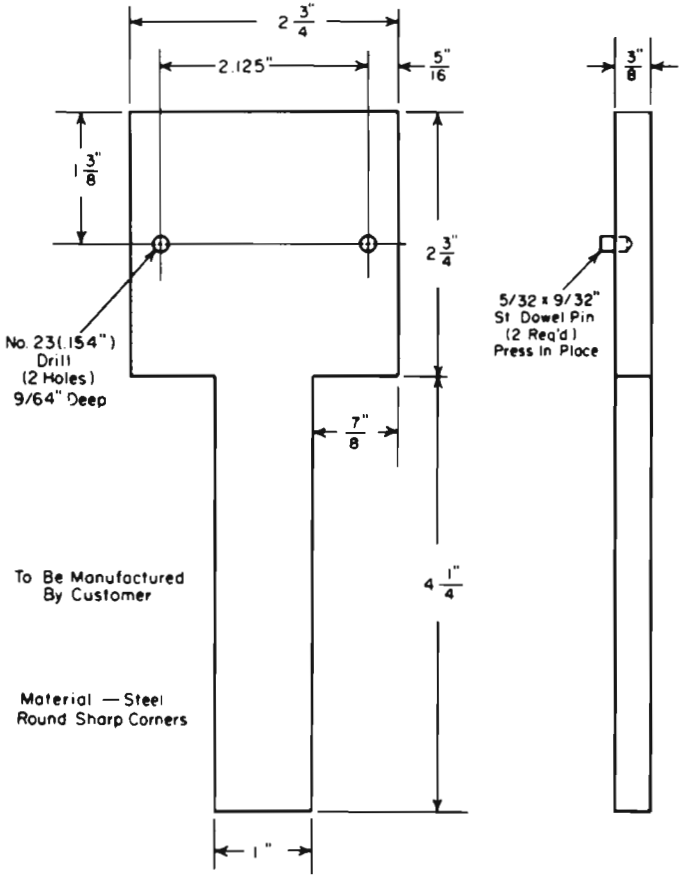


Figure 28.

Spanner Wrench For Accelerated Release Valve Portion

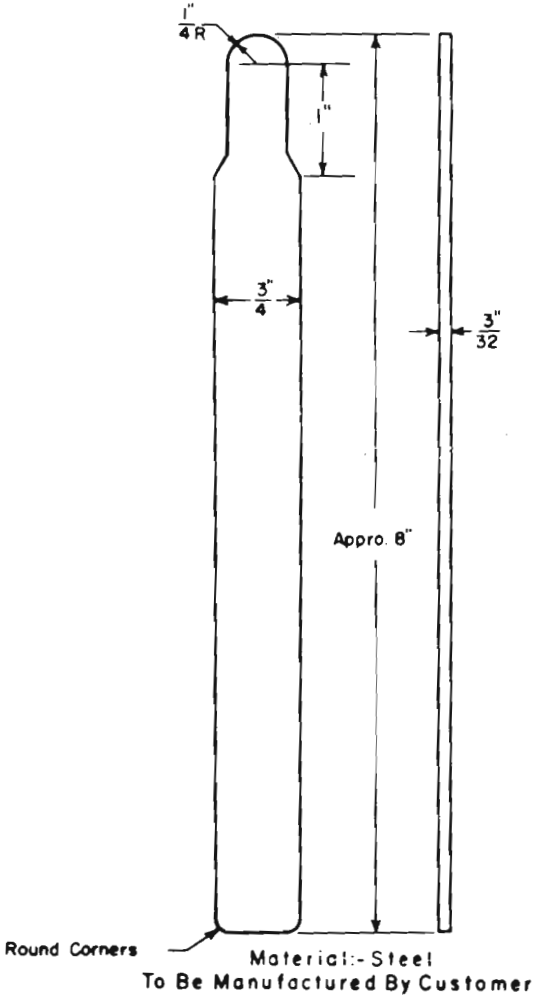
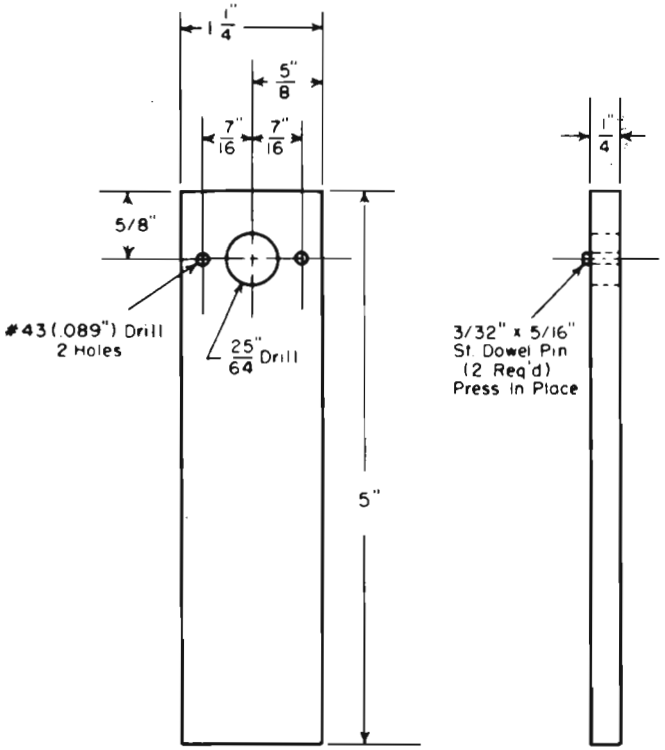


Figure 29.
Diaphragm Assembling Tool



To Be Manufactured
By Customers

Material — Steel
Round Sharp Corners

Figure 30.

Spanner Wrench For Inshot Piston

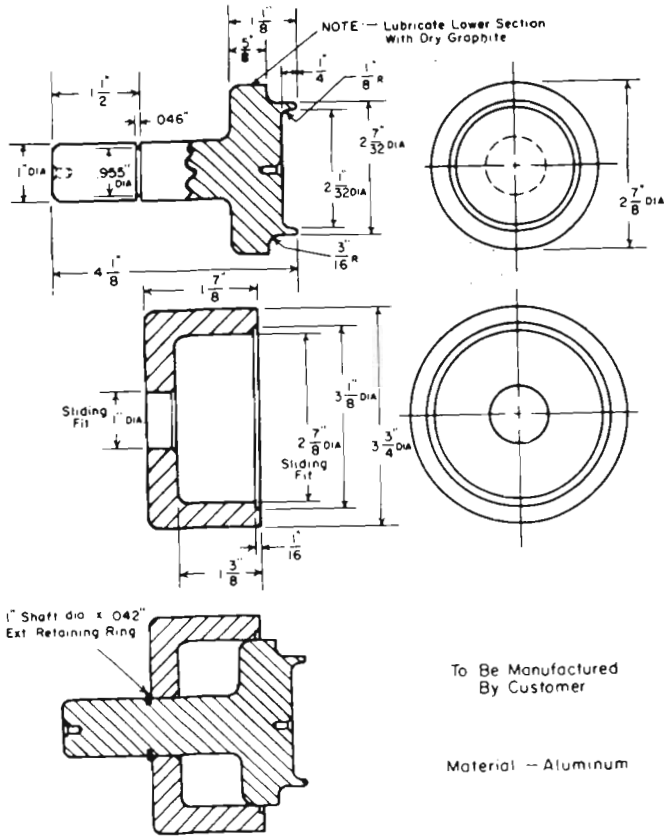


Figure 31.

Vent Valve Assembling Tool

11.0 Rubber Parts, Shelf Life and Storage

11.1 New rubber parts such as gaskets, "O" rings, rubber seated check valves, seals, diaphragms, etc., must not be applied if over five years old.

11.2 The storage area for rubber parts must be cool, dark, and free from dampness and mildew. Since most rubber goods are affected by Ozone, they must not be stored near electrical equipment that may generate Ozone.

11.3 To determine shelf life, new rubber repair kits must be dated with the oldest date (half year) of rubber components contained within the kit.

AAR PUBLICATIONS

Standard, Instruction Leaflet No. 2356-3
Instructions on the Use of Condemning Gages for the "AB" Control Valve

Standard, Instruction Leaflet No. 2356-3, Sup. 1
Instructions on the Use of Condemning Gages for the "ABD" and "ABDW" Control Valves

Standard, Instruction Leaflet No. 2391
Shop Maintenance, Freight Brake Equipment, "AB" Type Control Valves and Associated Devices

Standard, Instruction Leaflet No. 2391, Sup. 1
Repair Track Maintenance, Freight Brake Equipments, "AB" Type

Standard, Instruction Leaflet No. 2391, Sup. 3
Freight Brake "ABD" and "ABDW" Control Valve Portions — Shop Maintenance

Standard, Descriptive Leaflet No. 2416-1
B-1 Hose Clamping Machine and B-1 Hose Clamp Removal Machine

Standard, Specification No. 2518
Installation, Freight Car Brake Equipment

Standard, Instruction Pamphlet No. 5039-4, Sup. 1
Single Car Testing Device, Code of Tests

Standard, Instruction Pamphlet No. 5039-19
Code of Tests, "AB" Freight Equipment Valves. The "AB" Test Rack

Standard, Instruction Pamphlet No. 5039-19, Sup. 1
Code of Tests, "ABD" and "ABDW" Freight Equipment Valves. The "AB" Test Rack.