

SERVICE INFORMATION 2A-2A CONTROLAIR VALVE

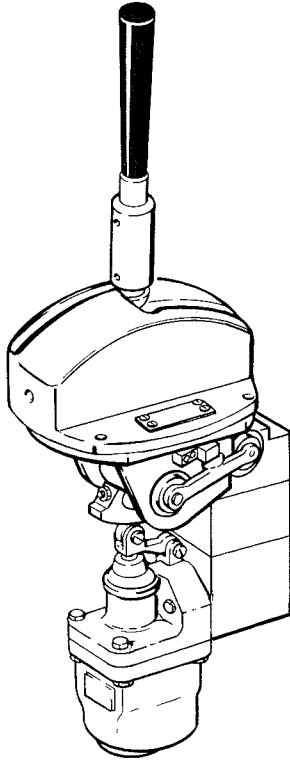


FIGURE 1 EXTERIOR VIEW

DESCRIPTION

The 2A-2A Controlair Valve is especially designed for marine application to provide single lever control of engine speed and reverse gear operation. Functionally the unit contains two "on-off" three-way poppet valves which are operated by sideways motion of the control handle to deliver full supply pressure from either port 6 or port 7 for ahead or astern clutch engagement signals. With the handle in the center detent, both clutch lines are exhausted. Fore and aft motion of the control handle operates the pressure graduating valve to deliver a speed signal pressure from port 8. This signal is a variable pressure proportional to the control handle position.

INSTALLATION

The 2A-2A Controlair Valve is designed for panel mounting, and can be installed and removed through the top of the panel. Allow ample clearance around the bottom of the unit for piping connections. Refer to outline view for dimensions.

MAINTENANCE

Maintenance periods will be determined by the frequency of use and the working environment of the valve. The speed regulating valve incorporates strainers in the IN and OUT passages. These strainers will protect the internal parts of the valve from large particles of foreign matter, but it is recommended that a filter be installed in the main supply line. Dismantle the complete valve for cleaning, inspection and lubrication. Refer to Figure 7 view.

Wash all metal parts with a non-flammable solvent and all rubber parts with soap and water. Blow dry with a low pressure air jet. Arrange the clean parts on a clean white surface in the order of disassembly (Reference exploded view Figure 7). Examine each part carefully for wear or damage. Flex the rubber parts to determine if they are in good condition.

Replace all parts that may not provide satisfactory performance until the next inspection period.

As reassembly proceeds, lubricate all moving metal surfaces with No. 107 Lubriplate and all rubber o-ring seals with No. 55 Pneumatic grease (Dow Corning). Do not lubricate the diaphragm. Equivalent greases to those recommended can be used.

OPERATION

Refer to the diagrammatic view Figure 2

With handle in "neutral" position, both pilot ports 6 and 7 are open to atmosphere through their respective pilot valves and port 8 is at minimum pressure. The handle moves through a "Z" slot in the cover to move the pilot valve shaft 26 right or left. The shaft moves levers 21 to operate a three-way "on-off" poppet valve. The valve operated depends on the direction of handle movement in the cross slot. Full supply pressure from port 12 is admitted to port 6 or 7 depending on direction of handle movement. Movement of the handle in the fore and aft cover slot operates the pressure control valve 45 converting supply pressure to controlled pressure through port 8. The controlled pressure increases or decreases relative to the handle position in the slot.

The 2A-2A Controlair Valve will automatically compensate for downstream pressure changes at port 8. The air pressure changes can be caused by line leakage, temperature changes, or load thrust. If air pressure at port 8 increases over that called for by handle position, the diaphragm 62 in the control portion will deflect downward moving the exhaust valve seat 63 away from the inlet and exhaust valve unit 66 and vent the excessive pressure. If the pressure drops below that called for by the handle position, the control spring 59 will force the diaphragm 62 upward. The exhaust valve seat 63 will move the inlet valve of the inlet and exhaust unit 66 from its seat opening port 12 to port 8 to maintain the pressure called for.

ADJUSTMENT

Six (6) adjustments can be made to the 2A-2A Controlair Valve. Refer to Figures 2, 3, 4, 5 and 6. The valve is factory set to provide the appropriate graduated pressure per part no. Identity Schedule along with the on-off valve operation. Factory adjustments can be simulated by referring to Figure 3. Adjustments can be made with the valve installed provided adequate access is available on all sides of the valve.

Adjusting screw 56 varies the speed pressure setting. Set screws 22A alters the pick-up point of pilot levers 21. Ahead and astern cam adjusting screws 28B provide adjustment for speed pressure from port 8 in both directions of handle travel. Eccentric cam roller pin 47 positions the roller at the center of the ahead and astern cam. Adjust per paragraph a) and b) as follows:

a) PILOT LEVER ADJUSTMENT

Use the adjustment set-up illustrated in Figure 3 and Figure 6. Place the Controlair Valve handle in "neutral" position. Back off set screw 22A one or two turns until there is clearance between the end of plunger 34 and valve lever 21. Turn in the set screw 22A until the plunger and lever are just touching. Make this adjustment for both valves. Move the handle back and forth on both sides of the "neutral" position and note the gauges for ports 6 and 7. Pressure must drop rapidly to zero when the handle is in "neutral" and must charge rapidly to full supply pressure in each side position. Lock 22B and recheck operation.

b) PRESSURE SETTING ADJUSTMENT

Use the adjustment set-up illustrated in Figures 2, 3, 4 and 5. Before attempting to adjust the pressure setting, loosen ahead and astern cam screws 28E and back out adjusting

screws 28B after loosening jam nuts 28H until the cams touch the holder. Adjust roller pin 47 for maximum roller 48 height.

Adjust screw 56 to obtain the required pressure setting at neutral per Identity Schedule on page 5.

Move the valve handle to the full astern position and adjust the astern cam screw 28B "inward" until the required full speed pressure is obtained. Move the valve handle to the full ahead position and adjust the ahead cam screw 28B "inward" until the required pressure is obtained. Recheck pressure setting at neutral, full ahead and full astern. Fine tune by repeating the above and by positioning valve handle to full astern and note exact pressure, shift valve handle to full ahead and note exact pressure. Any pressure difference can be balanced out by adjusting eccentric roller pin 47 to position the roller. Lock jam nuts 28H and tighten screws 28E when adjustment is complete.

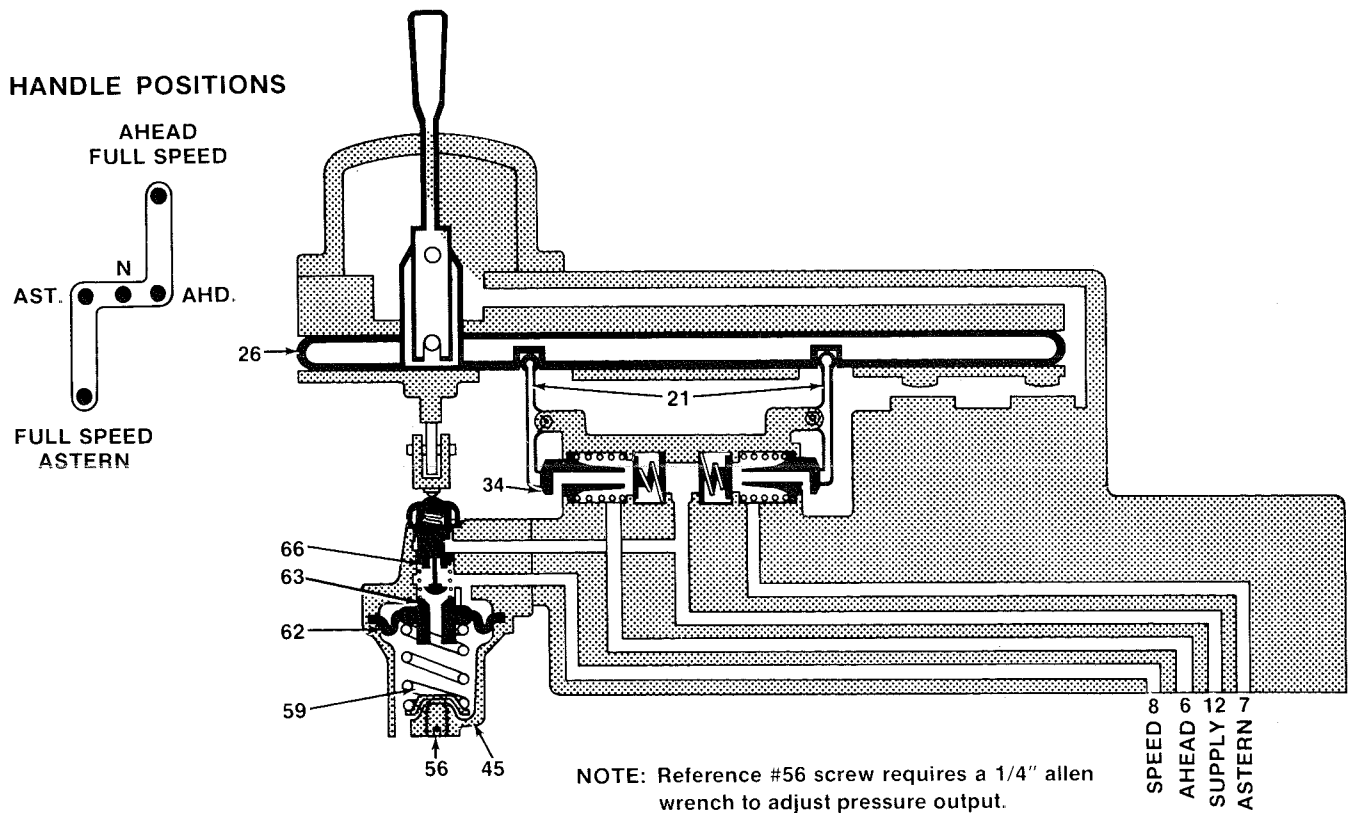
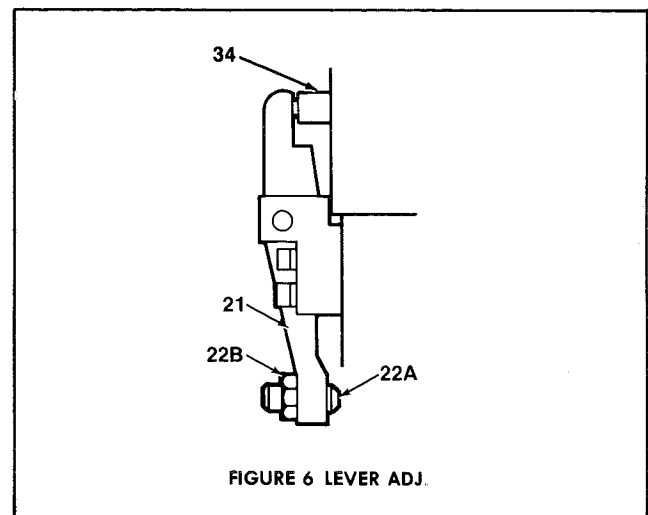
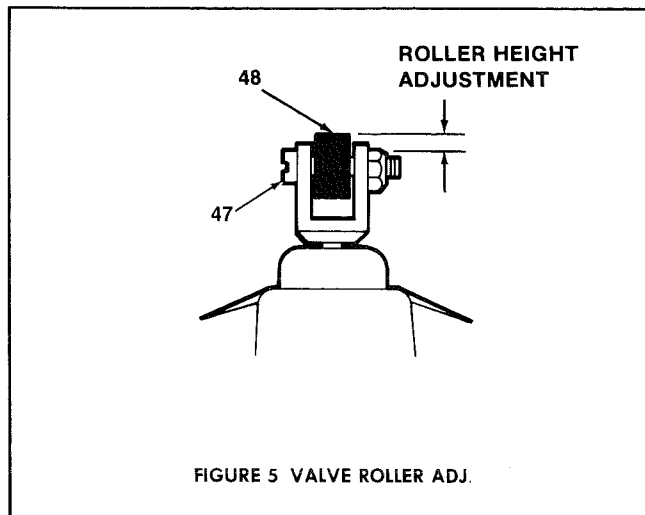
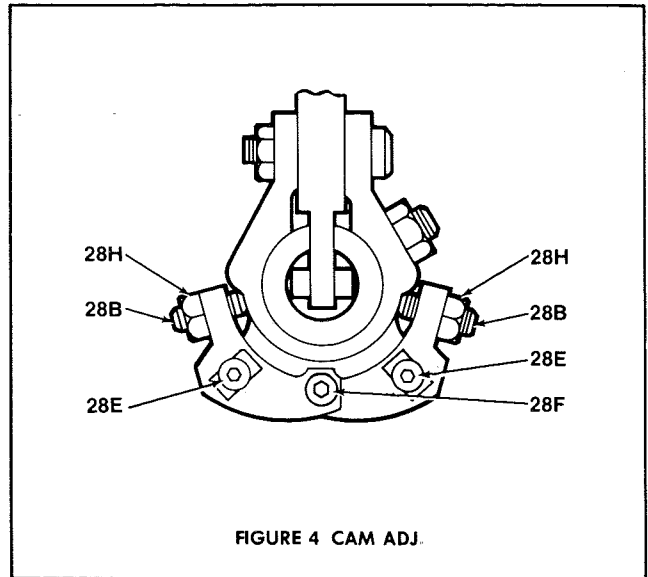
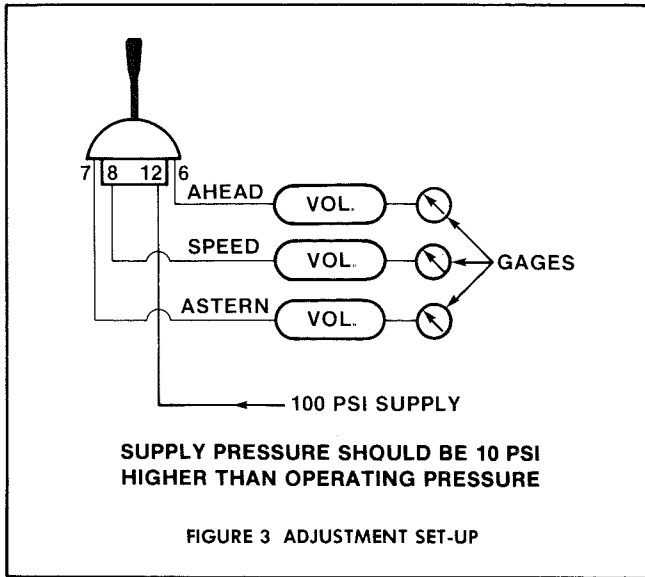


FIGURE 2 DIAGRAMMATIC VIEW



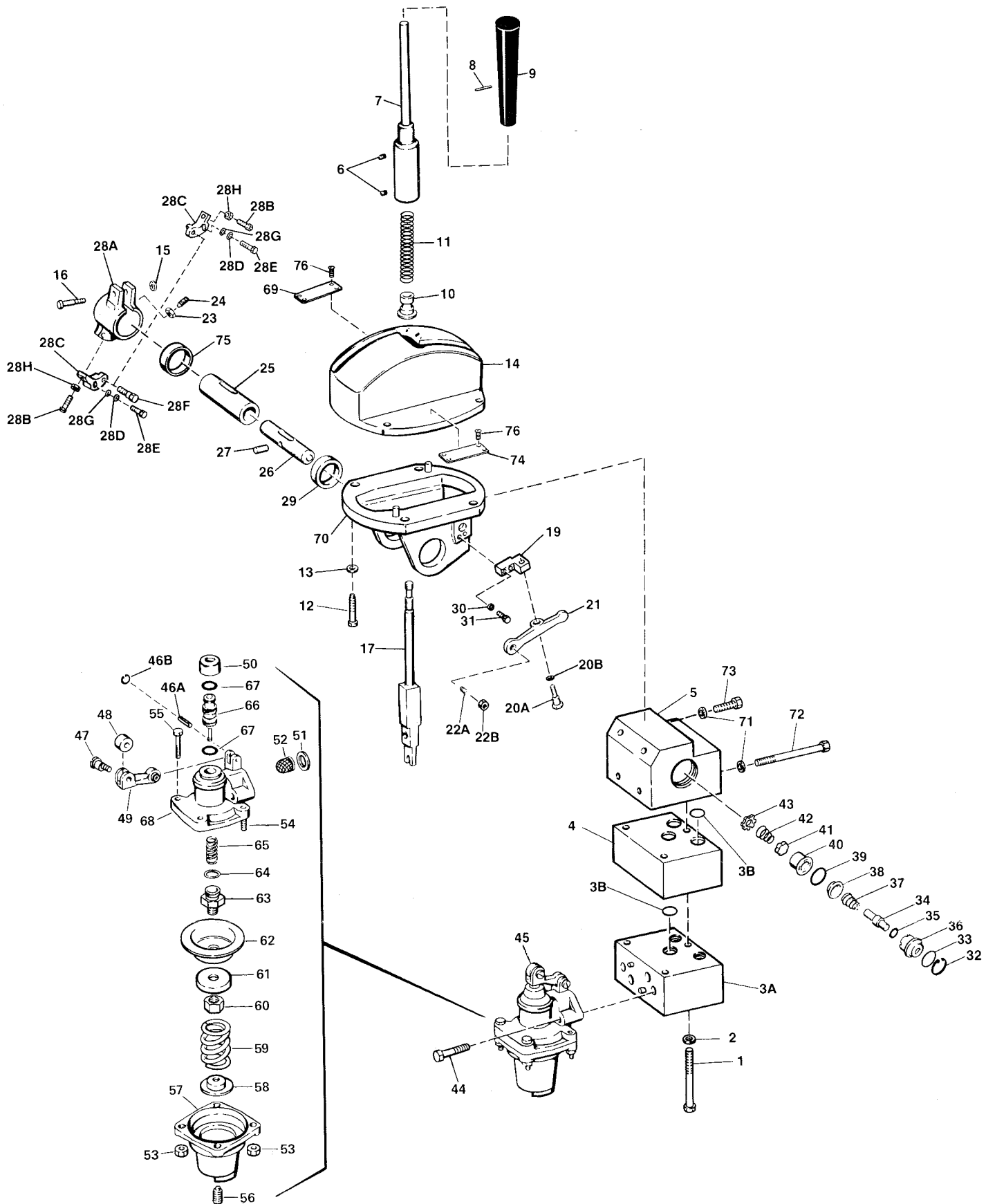


FIGURE 7 EXPLODED VIEW

IDENTITY SCHEDULE

MODEL	COMPLETE PART NO.	OBSOLETE PART NO.	PRESSURE RANGE (PSI)	CONTROL SPRING REF. 59
2A-2A	P65775	P50460-0001	6-60	P65000
2A-2A	P65775-0001	P60318-0002	28-70	P55442

PARTS LIST

Ref	Description	Qty	Part No	Part No	Ref	Description	Qty	Part No.	Part No
-	COMPLETE VALVE	1	P65775	P65775-1	37	SPRING, Exhaust Valve	2	P54144	
-	(Consisting of ref. 1-76)	-	-	-	38	SEAT, Inlet Valve	2	P54145	
1	SCREW, 1/4" - 20 x 5"	3	P49902-40	(Same as	39	*O-RING, 7/8" O.D.	2	P49708-115	
2	WASHER, 1/4" Lock	3	P49982-4	P65775	-	*Supply Valve Assy.	2	P55429-2	
3A	Bottom Segment	1	P65798	except as	-	(Consisting of ref. 40-43)	-	-	
3B	*O-RING, 11/16" O.D.	6	P49708-112	noted below)	40	SPACER, Valve	2	P59369-1	
4	Center Segment	1	P65802		41	VALVE, Inlet	2	P5205-2	
5	Top Segment	1	P65804		42	SPRING, Inlet Valve	2	P65102	
-	HANDLE, Complete	1	P65815-1		43	RING, Retaining	2	P49628-2	
-	(Consisting of ref. 7-9)	-	-		44	SCREW, 3/8" - 16 x 1-5/8	2	P49902-3	
6	SCREW, 1/4 - 20 Set	2	526761		45	Control Valve Portion	1	P66212-1	P66212-18
7	HANDLE	1	P65819		-	(Consisting of ref. 46-68)	-	-	
8	PIN, 1/8"	1	P49803-52		46A	PIN	1	P48189	
9	GRIP, Handle	1	P65796		46B	RING, Retainer	2	P49528-1	
10	LATCH, Handle	1	P50209		-	Lever Assy. CP	1	P51127-1	
11	SPRING, Latch	1	P64634		-	(Consisting of ref. 47, 48, 49)	-	-	
12	BOLT, 5/16" - 18 x 7/8	4	P49902-41		47	PIN, Fulcrum	1	P51856	
13	WASHER	4	P49982-6		48	ROLLER, Cam	1	P55496	
14	COVER, Top	1	P55515-1		49	LEVER, Cam CP.	1	P62056-1	
15	NUT, 5/16 - 18	1	P49903-50		-	PORTION, Valve	1	P66213-1	P66213-18
16	BOLT, Shoulder	1	P48015		-	(consisting of: ref. 50-68)	-	-	
17	SHAFT, Handle	1	P50748-3		50	*PROTECTOR, Dirt	1	526344	
19	BRACKET, Lever	2	P65789		51	*GASKET Port	2	P5211	
20A	SCREW, Shoulder	2	P48015-7		52	STRAINER, Port	2	P55382	
20B	WASHER	2	P49904-78		53	NUT, 5/16" - 18	4	P49901-20	
21	LEVER, Pilot	2	P65812		54	STUD, 5/16" - 18 x 1-5/16"	2	P49906-14	
22A	SCREW, 1/4 - 20 x 3/4	2	P49828-9		55	SCREW, 5/16 - 18" x 1-3/8"	2	850557	
22B	NUT, 1/4 - 20	2	P49903-48		-	Spring Housing, CP.	1	P66214	
23	NUT, 3/8 - 16	1	P49903-49		-	(Includes ref. 56-57)	-	-	
24	SCREW, 3/8 - 16	1	P49905-49		56	SCREW, Adjusting	1	P66209	
25	SHAFT, Cam	1	P65793		57	HOUSING, Spring	1	P66488	
26	SHAFT, Clutch CP. (consisting of: ref 26, 27)	1	522816		58	SEAT, Spring	1	P66210	
27	PIN, Shaft	1	P49462		59	SPRING, Control	1	(See Identity Schedule)	
28A	HOLDER, Cam	1	P65800		-	Diaphragm Assy	1	P64909	
28B	SCREW, 1/4 - 20 x 3/4	2	P49828-9		-	(Includes ref. 60-64)	-	-	
28C	CAM	2	P65790		60	NUT, 9/16" - 18	1	P49901-31	
28D	WASHER, No. 10	2	P49982-7		61	FOLLOWER, Diaphragm	1	P65968	
28E	SCREW, 10 - 24 x 3/4"	2	P49856-142		62	*DIAPHRAGM	1	P64911	
28F	SCREW, Shoulder	1	P48015-8		63	SEAT, Exhaust Valve	1	P55484	
28G	WASHER	2	P49904-79		64	*O-RING, 11/16 O.D.	1	P49708-15	
28H	NUT, 1/4 - 20	2	P49903-48		65	*SPRING, Exhaust Valve	1	P54653	
29	BEARING, Shaft	2	P65787		66	Inlet & Exhaust Valve, CP.	1	545536	
30	WASHER	4	P49982-7		-	(Includes 67)	-	-	
31	SCREW	4	P49856-145		67	*O-RING, 3/4" O.D.	2	P49708-113	
32	Ret. Ring	2	P49704		68	Body w/Studs	1	526874	
33	*O-RING, 15/16" O.D.	2	P49708-116		69	Instruction Plate	1	P55553-2	
34	PLUNGER	2	P54146-1		70	BODY, Yoke (incl Ref 29)	1	P65806-1	
35	*O-RING, 7/16" O.D.	2	P49708-11		71	WASHER, 1/4"	4	P49696-4	
36	SPACER	2	P61353		72	BOLT, 1/4 - 20 x 1-1/2	2	P49856-143	
					73	BOLT, 1/4 - 20 x 3	2	P49856-144	
					74	Name Plate	1	P55391-3	
					75	SPACER	2	P65791	
					76	SCREW, 6-32 x 1/4"	8	P49760-1	

*Recommended spare parts may be ordered in kits (refer to page 6.)

REPAIR KITS

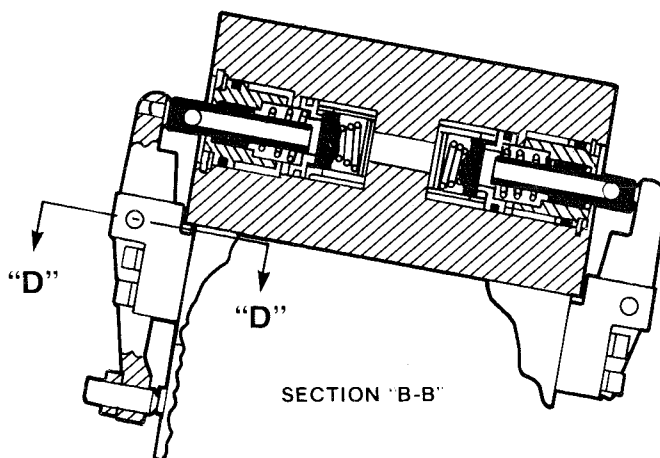
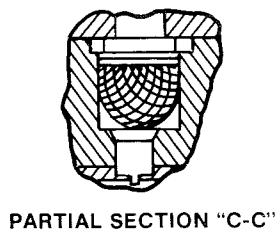
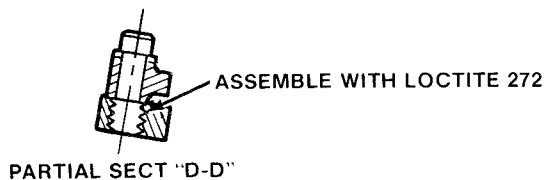
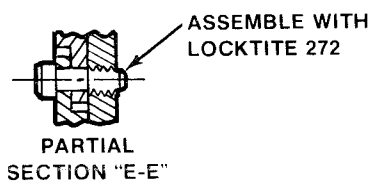
Major Repair Kit			P65817-0001 (Metal and Rubber Parts)
Item	Qty.	Description	Part No.
1	1	KIT, Grad Repair	P65018*
2	6	O-RING, 11/16 O.D.	P49708-0112
3	4	O-RING, 7/8 O.D.	P49708-0115
4	3	O-RING, 15/16 O.D.	P49708-0116
5	3	O-RING, 7/16 O.D.	P49708-0011
6	3	Assy. Supply Vlv.	P55429-0002

Graduating Valve Repair Kit			P65018*
Item	Qty.	Description	Part No.
1	1	Self Lapping Unit	P64993
2	2	GASKET	P5211
3	1	PROTECTOR, Dirt	526344
4	1	SPRING, Exh. Vlv.	P54653

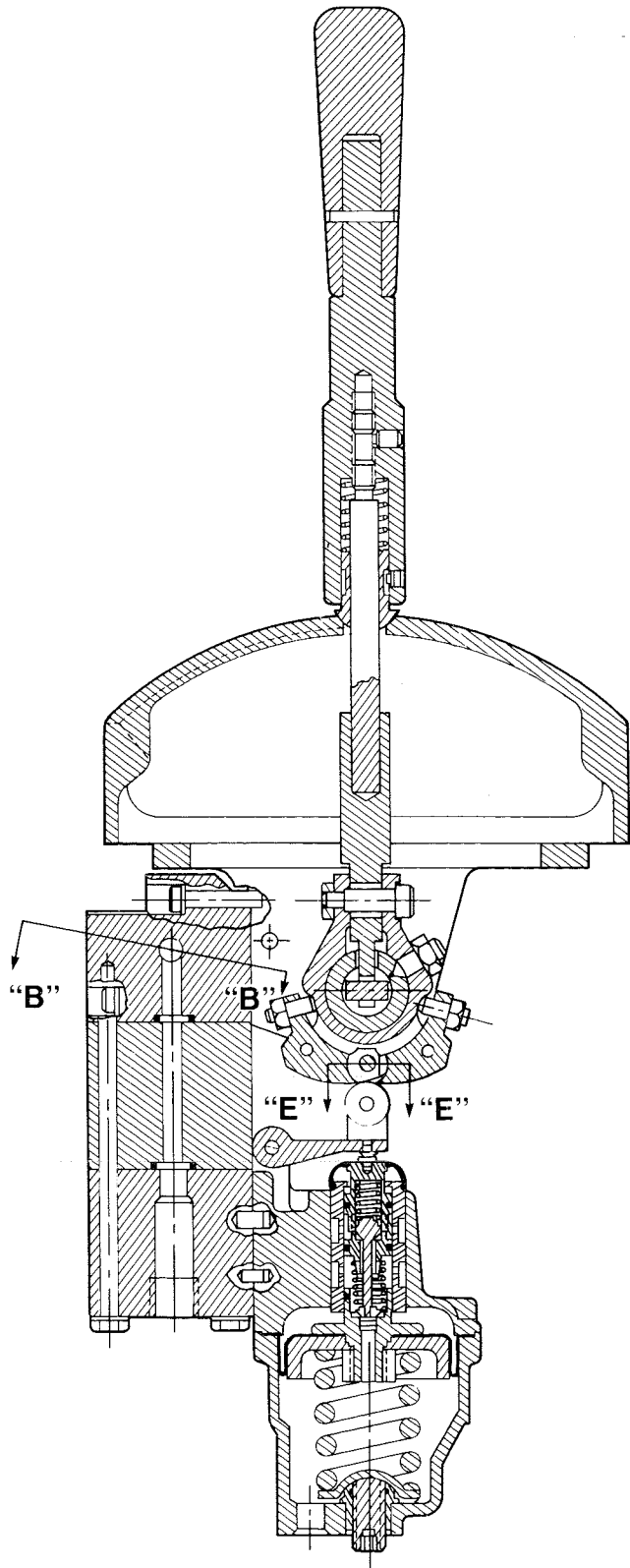
*Included with Major Repair Kit P65817-0001

Minor Repair Kit			P65817 (Rubber Parts)
Item	Qty.	Description	Part No.
1	6	O-RING, 11/16 O.D.	P49708-0112
2	4	O-RING, 7/8 O.D.	P49708-0115
3	3	O-RING, 15/16 O.D.	P49708-0116
4	3	O-RING, 7/16 O.D.	P49708-0011
5	1	O-RING, 11/16 O.D.	P49708-0015
6	2	O-RING, 3/4 O.D.	P49708-0113
7	3	ASSY., Supply	P55429-0002
8	2	GASKET	P5211
9	1	PROTECTOR, Dirt	526344
10	1	DIAPHRAGM	P64911

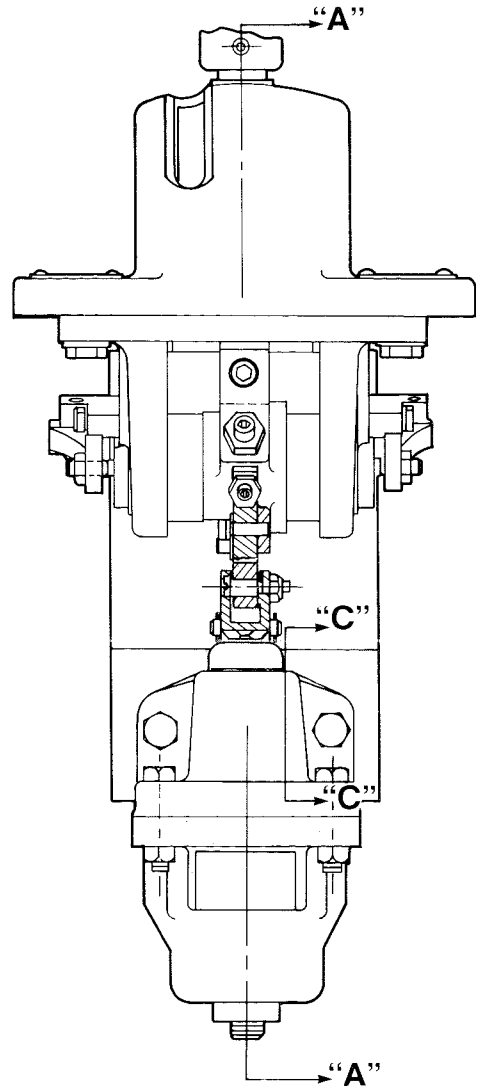
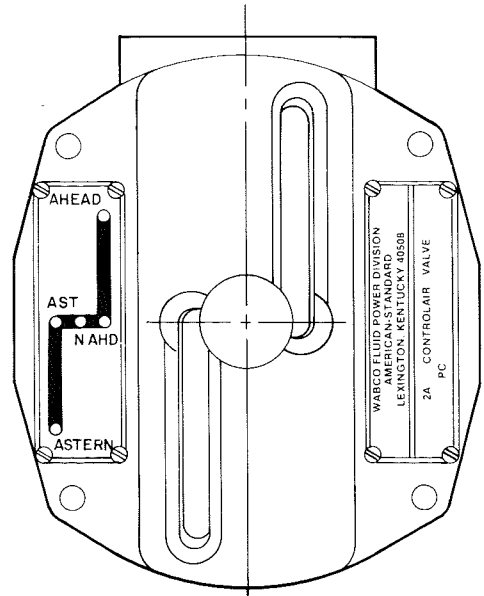
ASSEMBLY VIEW



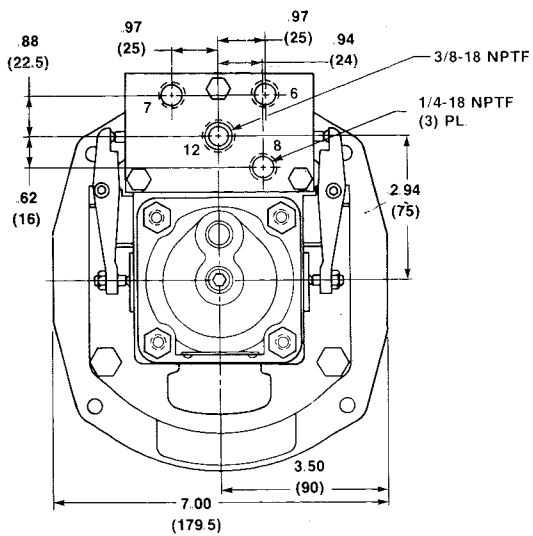
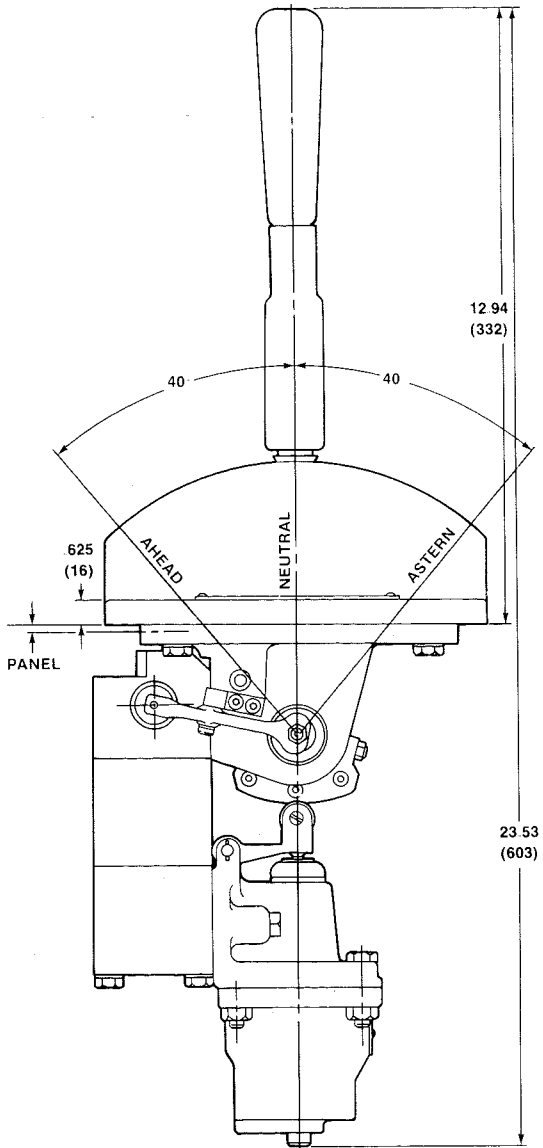
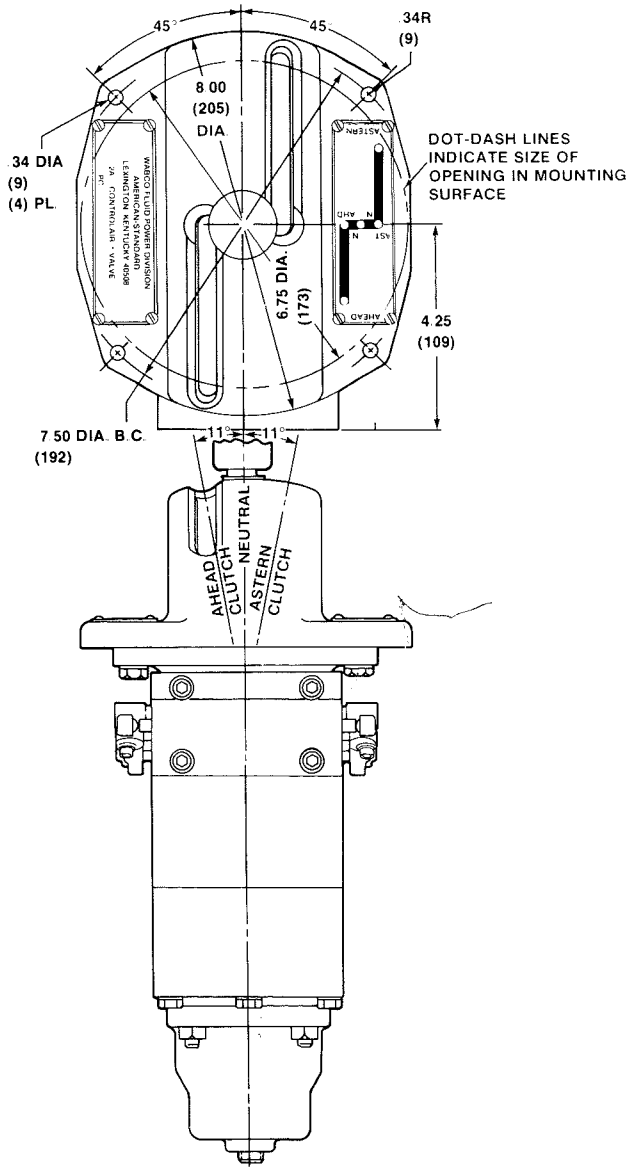
ASSEMBLY VIEW



SECTION "A-A"



OUTLINE VIEW



PORT CONNECTION LEGEND

- 6 - AHEAD
- 7 - ASTERN
- 8 - SPEED
- 12 - SUPPLY

COMPLETE PC NO.	CONTROL VALVE FACTORY SETTING
P65775	6 PSIG AT NEUTRAL 60 PSIG AT 40° HANDLE TRAVEL
P65775-1	28 PSIG AT NEUTRAL 70 PSIG AT 40° HANDLE TRAVEL

NOTICE TO PRODUCT USERS

1. WARNING: FLUID MEDIA

Bosch Rexroth pneumatic devices are designed and tested for use with filtered, clean, dry, chemical free air at pressures and temperatures within the specified limits of the device. For use with media other than air or for human life support systems, Bosch Rexroth must be consulted. Hydraulic cylinders are designed for operation with filtered, clean, petroleum based hydraulic fluid; operation using fire-resistant or other special types of fluids may require special packing and seals. Consult the factory.

2. WARNING: MATERIAL COMPATIBILITY

Damage to product seals or other parts caused by the use of noncompatible lubricants, oil additives or synthetic lubricants in the air system compressor or line lubrication devices voids Bosch Rexroth's warranty and can result in product failure or other malfunction. See lubrication recommendations below.

AIR LINE LUBRICANTS! In service higher than 18 cycles per minute or with continuous flow of air through the device, an air line lubricator is recommended.* (Do not use line lubrication with vacuum products.) However, the lubricator must be maintained since the oil will wash out the grease, and lack of lubrication will greatly shorten the life expectancy. The oils used in the lubricator must be compatible with the elastomers in the device. The elastomers are normally BUNA-N, NEOPRENE, VITON, SILICONE and HYTREL. Bosch Rexroth recommends the use of only petroleum based oils without synthetic additives, and with an aniline point between 180° F and 210° F.

COMPRESSOR LUBRICANTS! All compressors (with the exception of special "oil free" units) pass oil mist or vapor from the internal crankcase lubricating system through to the compressed air. Since even small amounts of non-compatible lubricants can cause severe seal deterioration (which could result in component and system failure) special care should be taken in selecting compatible compressor lubricants. It is recommended that users review the National Fluid Power Association "Recommended Guide Lines For Use Of Synthetic Lubricants In Pneumatic Fluid Power Systems" (NFPA T1.9.2-1978).

3. WARNING: INSTALLATION AND MOUNTING

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

INSTALLATION ! Do not attempt to install, operate or repair these devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision. Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect, disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

MOUNTING! Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

4. WARNING: APPLICATION AND USE OF PRODUCTS

The possibility does exist for any device or accessory to fail to operate properly through misuse, wear or malfunction. The user must consider these possibilities and should provide appropriate safe guards in the application or system design to prevent personal injury or property damage in the event of a malfunction.

5. WARNING: CONVERSION, MAINTENANCE AND REPAIR

When a device is disassembled for conversion to a different configuration, maintenance or repair, the device must be tested for leakage and proper operation after being reassembled and prior to installation.

MAINTENANCE AND REPAIR! Maintenance periods should be scheduled in accordance with frequency of use and working conditions. All Bosch Rexroth products should provide a minimum of 1,000,000 cycles of maintenance free service when used and lubricated as recommended. However, these products should be visually inspected for defects and given an "in system" operating performance and leakage test once a year. Where devices require a major repair as a result of the one million cycles, one year, or routine inspection, the device must be disassembled, cleaned, inspected, parts replaced as required, rebuilt and tested for leakage and proper operation prior to installation. See individual catalogs for specific cycle life estimates.

6. PRODUCT CHANGES

Product changes including specifications, features, designs and availability are subject to change at any time without notice. For critical dimensions or specifications, contact factory.

*Many Bosch Rexroth pneumatic valves and cylinders can operate with or without air line lubrication; see individual sales catalogs for details.

LIMITATIONS OF WARRANTIES & REMEDIES

Bosch Rexroth warrants its products sold by it to be free from defects in material and workmanship to the following:

For twelve months after shipment Bosch Rexroth will repair or replace (F.O.B. our works), at its option, any equipment which under normal conditions of use and service proves to be defective in material or workmanship at no charge to the purchaser. No charge will be made for labor with respect to defects covered by this Warranty, provided that the work is done by Bosch Rexroth or any of its authorized service facilities. However, this Warranty does not cover expenses incurred in the removal and reinstallation of any product, nor any downtime incurred, whether or not proved defective.

All repairs and replacement parts provided under this Warranty policy will assume the identity, for warranty purposes, of the part replaced, and the warranty on such replacement parts will expire when the warranty on the original part would have expired. Claims must be submitted within thirty days of the failure or be subject to rejection.

This Warranty is not transferable beyond the first using purchaser. Specifically, excluded from this Warranty are failures caused by misuse, neglect, abuse, improper operation or filtration, extreme temperatures, or unauthorized service or parts. This Warranty also excludes the use of lubricants, fluids or air line additives that are not compatible with seals or diaphragms used in the products. This Warranty sets out the purchaser's exclusive remedies with respect to products covered by it, whether for negligence or otherwise. Neither, Bosch Rexroth nor any of its affiliates will be liable for consequential or incidental damages or other losses or expenses incurred by reason of the use or sale of such products. Our liability (except as to title) arising out of the sale, use or operation of any product or parts, whether on warranty, contract or negligence (including claims for consequential or incidental damage) shall not in any event exceed the cost of replacing the defective products and, upon expiration of the warranted period as herein provided, all such liability is terminated. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.** No attempt to alter, amend or extend this Warranty shall be effective unless authorized in writing by an officer of Bosch Rexroth Corporation.

Bosch Rexroth reserves the right to discontinue manufacture of any product, or change product materials, design or specifications without notice.

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