

## HC-2 CONTROLAIR® VALVE

### Service Information



### Description of Models

The **HC-2 Type Controlair Valves** are handle operated 4-way, exhausted center, pressure control valves.

The typical unit contains two directional control 3-way side valves and a pressure graduating portion that is arranged to increase, decrease or maintain air pressure to (2) separate delivery lines. In neutral position both 3-way side valves exhaust both delivery lines. A movement of 10 degrees either side of center position opens the appropriate side valve and directs pressure to the indicated outlet port. Continued movement past 10 degrees up to full travel or 46 degrees either side of neutral continues to actuate the pressure-graduating portion to deliver a graduated pressure according to the value of the control spring.

### Models

There are four models with similar valve functions, but different handle operating characteristics.

**HC-2-X Controlair Valve** - Handle is spring returned to neutral position from all positions in the handle travel. Some special models exist. See notes on Identity schedule on page 7.

**HC-2-LX Controlair Valve** - Handle is spring returned to neutral position from all positions except at the maximum pressure setting on both sides of center. The handle is held in both extreme positions by a mechanical detent.

**HC-2-FX Controlair Valve** - Handle is equipped with a friction brake that will hold the handle in any position selected in the handle travel.

**HC-2-SX Controlair Valve** - Handle holds in only one maximum pressure position. The handle is spring returned to neutral position from all other positions in the handle travel. The valve can be ordered to hold in either extreme position.

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# Installation and General Maintenance Recommendations

## 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.

## Installation and General Maintenance Recommendations

Before installing the Controlair® Valve, all air lines in the system should be cleaned to remove all dirt, moisture or contamination.

A strainer is furnished on the inlet port to protect the valve from large particles or foreign matter in the supply line. To ensure long, trouble-free service, a 10 micron or better filter should be installed in the supply line to the valve.

The HC-2 Controlair Valve is designed for panel mounting. The valve less the pipe bracket can be installed from the top of the panel. Refer to the installation view for panel opening dimension. Allow suitable clearance for installing or removing of the (3) pipe bracket screws which are 2 1/8" long.

## GENERAL MAINTENANCE AND REPAIR RECOMMENDATIONS

Maintenance periods should be scheduled in accordance with frequency of use and working environment of the Controlair Valve.

All valves must be visually inspected for wear and given an "In System" operating performance and leakage test at least once a year. If these visual observations indicate valve repair is required, the valve must be removed immediately and repaired.

A major overhaul is recommended at one million cycles. However, where frequency of use is such that it would require more than two years to obtain the one million cycles, the valve must be overhauled at the two year period.

When it is determined that the Controlair Valve requires a major repair as a result of the one million cycles, one year routine inspection or the two year service period has elapsed, the device must be disassembled, cleaned, inspected, parts replaced as required. The valve then must be tested for leakage and proper operation prior to installation, refer to the Major Repair and Maintenance Instructions and test procedures.

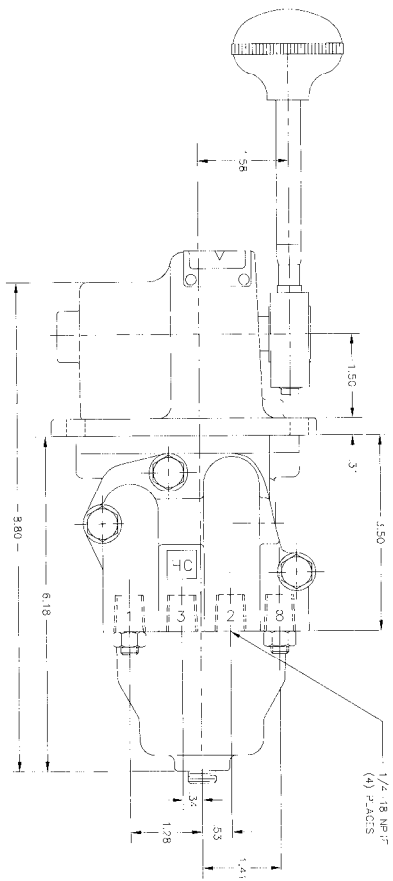
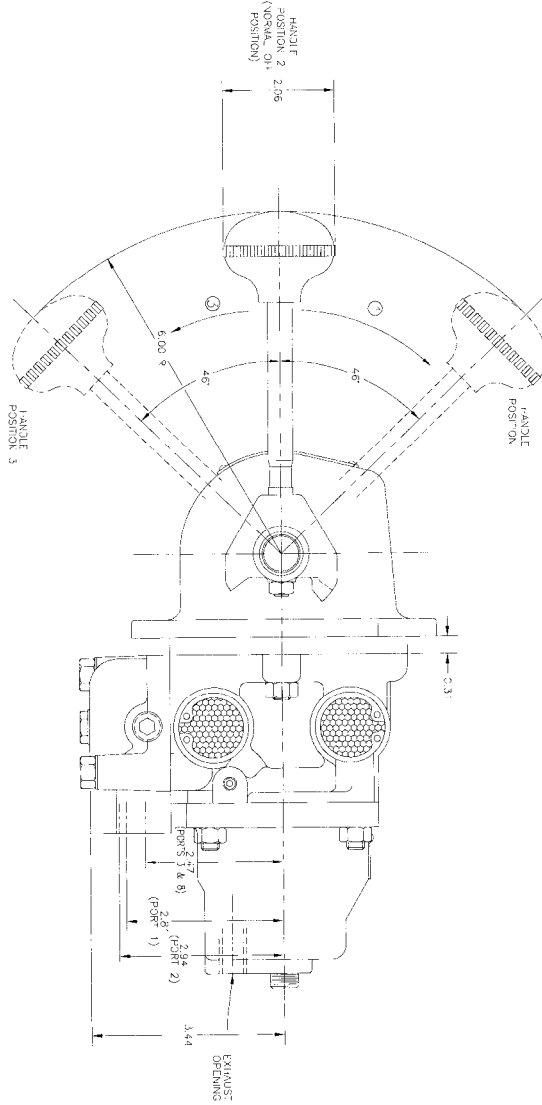
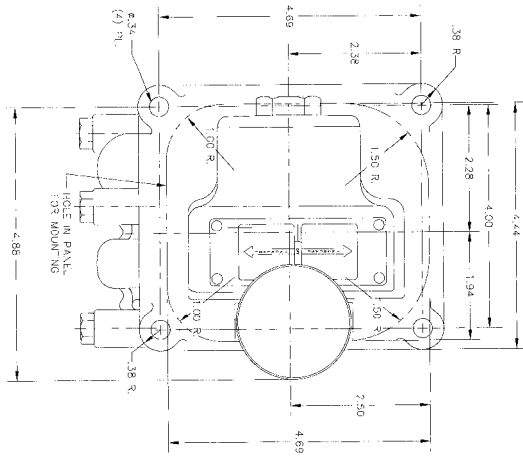
Notice that the operating portion of the valve can be removed without disturbing the pipe connections by just removing the (3) screws that hold the pipe bracket to the valve.

No special tools are required to maintain the Controlair valves, with the exception of internal snap-ring pliers. One complete Controlair valve should be kept in stock for every (4) valves in service. During the maintenance period, replacing the complete valve with the stand-by unit reduces production down time and affords inspection and replacement of parts at a more appropriate time and favorable location.

Technical Data:	
Max. Operating Pressure	<b>200 PSI (13.8 Bar)</b>
Admissible Mediums	<b>Clean &amp; Dry Compressed Air</b>
Operating Temperature	<b>-40° to 160° F (-40° to 71° C)</b>
Hysteresis	<b>1 1/2 Psi</b>
Control Pressure Range	<b>Ref. Identity Chart</b>
Pressure Change	<b>1/2 Psi Increments</b>
Mounting	<b>Flanged Plate</b>
Port Size	<b>1/4-18 NPTF</b>
Materials	
<b>Controlair Valve</b>	
Housing & Body	<b>Die Cast Aluminum</b>
Internal Parts	<b>Brass, Rubber, Aluminum, Steel, Plastic and Hytrel™</b>
Weight	<b>9 Lb. (4.1 Kgs.)</b>

# Outline View

## HC-2 Controlair® Valve



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## Description of Operation For HC-2 Controlair<sup>®</sup>

Note in the diagrammatic view that supply pressure is connected to port (2) and this supply pressure is directed only to the pressure-graduating portion. The delivery from the pressure graduating portion encounters plugged port (8) (a pressure gage can be connected at this port) and continues to become the supply air to each of the side valves. The delivery from the side valves is directed to outlet ports (1) or (3).

With the handle in neutral position, both outlet ports are exhausted to atmosphere through their respective side valve.

Movement of the handle through the first 10 degrees of travel from neutral operates one of the 3 way side valves to connect the graduated pressure from the graduating portion to the appropriate outlet port (1) or (3).

Movement of the handle beyond 10 degrees either side of center position starts the cam to push down on the pressure control plunger closing the exhaust valve and opening the upper supply valve that allows air to flow through the selected side valve to an outlet port. As the pressure builds up in the delivery line, it acts through the sensing port orifice and deflects the control diaphragm downward, compressing the control spring. When sufficient diaphragm deflection is obtained to allow the upper supply valve in the pressure control portion to close, the pressure in the delivery line is held to that value.

The value of the pressure delivered to the outlet port is proportional to the pressure graduating portion plunger movement. This movement in turn is controlled by the cam contour and is proportional to the handle travel.

The HC-2 Controlair Valve will automatically compensate for air pressures changes. These air pressure changes can be caused by line leakage, temperature change or load feedback. If air pressure at the outlet port increases over that called for by the handle position, the diaphragm in the control portion will deflect downward opening the lower exhaust valve and exhausting air until the original setting is obtained. If the pressure drops below that called for by the handle position, the decreased force on the diaphragm will allow the control spring to force the diaphragm upward, opening the upper supply valve to restore the set pressure.

The range of pressure is controlled by the strength of the diaphragm spring. Various values are available as shown on the Identity Schedule on page 7.

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# Repair and Maintenance Instructions

## Repair and Maintenance Instructions

When it has been determined that the Controlair® Valve requires repairs, the following general instructions are recommended.

### Disassembly, Cleaning and Lubrication

Completely disassemble the Controlair valve. Wash all metal parts in a non-flammable solvent. Rinse each part thoroughly and blow dry with low-pressure air.

Inspect and clean the inlet filter Item #2. Be sure all passages in the body and pipe bracket and sensing port orifice in top of the diaphragm chamber are clean and unrestricted.

To remove cam set screw Item #55, use of an impact wrench (set soft) will break it loose to remove the cam and shaft from cam housing.

Examine all parts carefully. Replace all rubber parts and all worn or damaged parts. *The use of repair kits is recommended.*

### Reassemble

Refer to exploded Parts and Assembly Views.

*Valves should always be reassembled using new rubber parts.*

Lubricate all metal to metal wear surfaces with Lubriplate 107 Grease. Lubricate all the rubber parts, **except the diaphragm** with Dow Corning No. 55 Pneumatic Grease.

The exhaust valve and seat if not replaced should be polished for minimum leakage using a 600 grit-lapping compound. Be sure to clean these parts prior to installing in the valve.

Installing the cam set screw Item #55: The cam set screw must be fully seated into the drill point location on the cam-shaft, items #62 or #63. When installing set screw Item #55 use a thread locker like Loctite TL242.

When installing the handle Item #53, seat the handle into the yoke, Item #52 before installing the nut, Item #51.

Do not over torque the cap nut, Item #60.

### Adjustments

Screw, Item #40 varies the graduated output pressure setting. Screw Item #23 adjusts the opening of the side valves and screw. Item #19 aligns the follower Item #18 with the cam Item #61. The nut Item #50 adjusts the brake tension on the HC-2-FX versions.

### Side Valve Lever Adjustments

With air supplied to the valve, turn adjusting screw Item #40 in until the control spring Item #30 is slightly compressed. Remove the snap rings and screens Item #15, 16 & 17. Move the Controlair Valve handle Item #53 back and forth, both sides of the neutral position, observing the action of the levers Items #20 & #22. The side valves should be fully open after the handle moves the first 10 degrees of travel.

Move the control handle to a maximum pressure position. With a 3/32" Allen wrench, back out adjusting screws Item #23 of the operated lever Items #20 or #22 just far enough to open the exhaust valve so that gage in the output line starts to show a drop in pressure. From this point, turn the adjusting screw in a full three (3) turns. This will open the inlet valve of the side valve to its maximum capacity.

Move the handle to the other extreme position and repeat these adjustments on the other side valve lever.

## Graduated Output Pressure Adjustments

Adjusting screw Item #40 varies the maximum pressure setting. Turning the adjusting screw in raises the *maximum* pressure. Turning the screw out decreases the *maximum* pressure. The maximum control pressure adjustment should not exceed the maximum control pressure shown in the Identity Schedule for part numbers. (Control springs are color-coded).

Changing the control spring Item #30 can change the maximum output pressure rating.

With air supplied to the valve, move handle in either direction from neutral to full travel position and hold. Adjust graduating valve screw Item #40 to obtain the maximum control pressure per Identity schedule. Move handle back to neutral position and *note* delivery line is exhausted to zero. Move handle to full travel position in the opposite direction and the delivery pressure should be the same as the other side. If the delivery pressure is higher or lower by 2 to 3 psi it can be corrected by adjusting the cam dog Item #18 with adjusting screw Item #19. Move the handle back to neutral position and *note* delivery line is exhausted to zero.

### Cam Dog Adjustment

The eccentric cam dog screw Item #19 aligns the cam follower Item #18 with the rise in the cam item #61. If the pressure setting is not within 2 to 3 psi from one full handle travel position to the other, turning the eccentric screw Item #19 either clockwise or counter-clockwise can compensate for the difference. This adjustment is accessible from the outside of the valve through the notch under the panel flange using a long flat bladed screwdriver.

The following procedure is recommended: move the valve handle to Full Travel in one direction (on detented models handle should be placed in detent position). Observe the output gage and note the pressure. Move the handle to the opposite position, turn the eccentric cam follower screw Item #19 to half way between the pressure difference. Continue adjustment until delivery gages (ports 1 and 3) match within 2 to 3 psi of each other for related handle position.

### Special Preload Setting

This setting calls for a predetermined delivery pressure when the handle is moved 10° from neutral in either direction.

Place handle 10° from neutral in either direction. Turn adjusting screw Item #40 in until the gage reads the desired preload pressure. Move the handle to the maximum pressure position. The delivery gage should read, preload pressure plus the range value of the control spring within ± 3 psi. Check handle setting in the opposite direction.

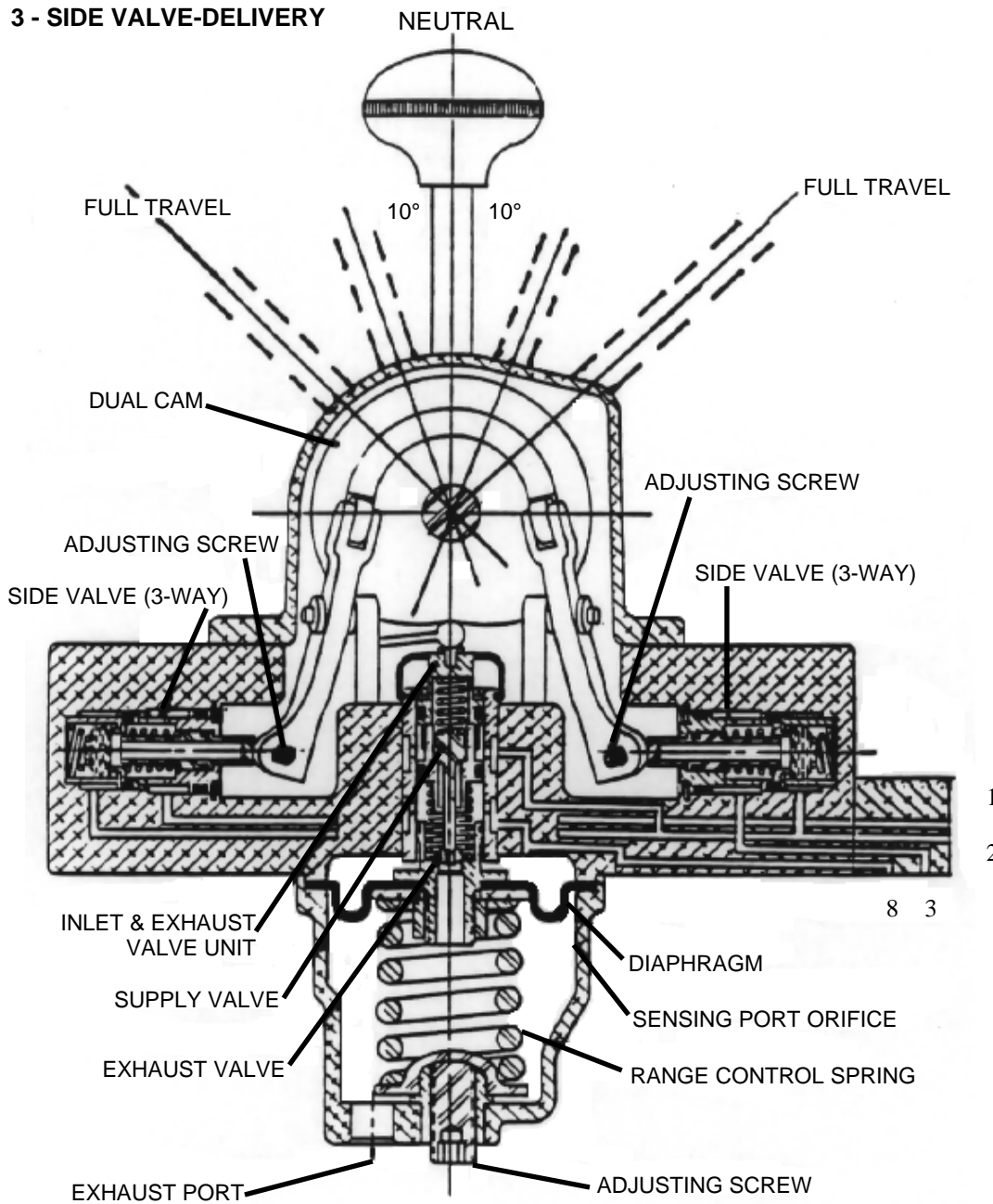
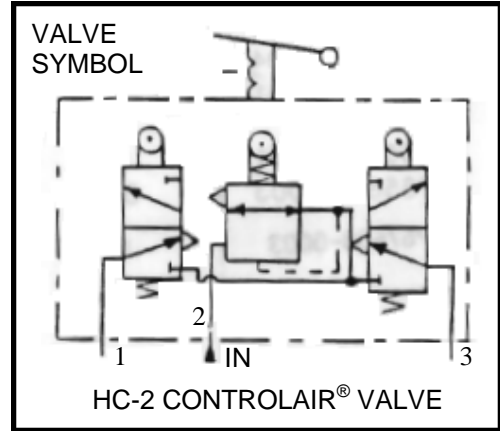
### Force Brake Adjustment

The handle force of the HC-2-FX Controlair Valve can be varied by adjusting nut Item #50 on the brake shoe holder Item #47. This adjustment increases or decreases the force required to move the handle in any position of the handle travel.

This adjustment is normally made on the cam housing portion before assembling to the control portion.

# DIAGRAMMATIC VIEW

- LEGEND - PIPE BRACKET**  
 2 - SUPPLY-IN  
 8 - GRADUATED-DELIVERY  
 1 - SIDE VALVE-DELIVERY  
 3 - SIDE VALVE-DELIVERY



# HC-2 IDENTITY SCHEDULE

Model	Complete Part Number	Control Pressure Range (PSI)	Control Spring & Color Code (Ref. # 29)	Cam Portion *Complete	Valve Portion **Complete	Remarks
HC-2-X	P-050975-00001	0 - 65	P55442 Brown	850253	P-055583-00001	
	P-050975-00002	0 - 100	526749 Yellow	850253	P-055583-00002	
	P-050975-00003	0 - 125	540577 Light blue	850253	P-055583-00003	
	P-050975-00004	0 - 150	P55441 Red	850253	P-055583-00004	
	P-050975-00008	0 - 30	P60295 Dark Blue	850253	P-055583-00008	
	P-052540-00004	0 - 150	P55441 Red	P52539	P-055583-00004	Note 1
	P-052878-00001	0 - 65	P55442 Brown	P52879	P-055583-00001	Note 2
	P-065238-00000	35 - 85	P64822 Silver	850253	P-055583-00016	Note 3
	P-065689-00001	0 - 65	P55442 Brown	P65690	P-055583-00001	Note 4
	P-065689-00003	0 - 125	540577 Light Blue	P65690	P-055583-00003	Note 5
P-067508-00003	0 - 125	540577 Light Blue	P67283	P-055583-00003	Note 6	
HC-2-FX	P-050976-00001	0 - 65	P55442 Brown	850259	P-055883-00001	
	P-050976-00002	0 - 100	526749 Yellow	850259	P-055583-00002	
	P-050976-00003	0 - 125	540577 Light blue	850259	P-055583-00003	
	P-050976-00004	0 - 150	P55441 Red	850259	P-055583-00004	
	P-050976-00008	0 - 30	P60295 Dark Blue	850259	P-055583-00008	
	P-050976-00015	0 - 175	P54159 Silver	850259	P-055583-00015	
	P-052943-00001	0 - 65	P55442 Brown	P65690	P-055583-00001	Note 7
	P-055781-00001	0 - 65	P55442 Brown	P65690	P-055583-00001	Note 8
	P-065123-00001	0 - 65	P55442 Brown	850260	P-055583-00008	Note 9
	P-065123-00002	0 - 100	540577 Light blue	850260	P-055583-00015	Note 10
	P-065123-00003	0 - 150	P55441 Red	850259	P-055583-00004	Note 11
	P-063511-00001	0 - 65	P55442 Brown	P65690	P-055583-00001	Note 12
	P-063511-00003	0 - 100	540577 Light blue	850260	P-055583-00015	Note 13
	P-063511-00004	0 - 150	P55441 Red	850259	P-055583-00004	Note 14
HC-2-LX	P-055582-00001	0 - 65	P55442 Brown	850430	P-055883-00001	
	P-055582-00002	0 - 100	526749 Yellow	850430	P-055583-00002	
	P-055582-00003	0 - 125	540577 Light blue	850430	P-055583-00003	
	P-055582-00004	0 - 150	P55441 Red	850430	P-055583-00004	
	P-068520-00003	0 - 125	540577 Light blue	P68525	P-055583-00003	Note 15
HC-2-SX	P-051206-00001	0 - 65	P55442 Brown	P51207	P-055883-00001	
	P-051206-00002	0 - 100	526749 Yellow	850430	P-055583-00002	
	P-051206-00003	0 - 125	540577 Light blue	850430	P-055583-00003	
	P-051206-00004	0 - 150	P55441 Red	P68525	P-055583-00004	
	P-052518-00002	0 - 100	526749 Yellow	P52649	P-055583-00002	Note 16
	P-052518-00003	0 - 125	540577 Light blue	P52649	P-055583-00003	Note 17
	P-067197-00003	0 - 125	540577 Light blue	P51207-0001	P-055583-00004	Note 18

\* Cam Portion - less valve portion, pipe bracket, screws and nameplate

\*\* Valve Portion - less pipe bracket, screws and cam portion.

Note 1 - Same as P50975-0004 except less yoke, handle and ball Items 52, 53 & 54

Note 2 - Same as P50975-0001 except long handle P50979 Item 53

Note 3 - Same as P50975 press range setting.

Note 4 - Same as P50975-0001 except items 38, 52 & 53 are chrome plated or stainless steel

Note 5 - Same as P50975-0003 except items 38, 52 & 53 are chrome plated or stainless steel

Note 6 - Same as P50975-0001 except item 56 is P50878-0002 and less centering spring

Note 7 - Same as P50976-0001 except less escutcheon plate item 67.

Note 8 - Same as P50976-0001 except less escutcheon plate and holes are plugged.

Note 9 - Same as P50976-0001 except items 38, 52 & 53 are chrome plated or stainless steel

Note 10 - Same as P50976-0002 except items 38, 52 & 53 are chrome plated or stainless steel

Note 11 - Same as P50975-0004 except items 38, 52 & 53 are chrome plated or stainless steel

Note 12 - Same as P50976-0001 except all exterior surfaces are painted with black epoxy paint.

Note 13 - Same as P50976-0003 except all exterior surfaces are painted with black epoxy paint.

Note 14 - Same as P50976-0004 except all exterior surfaces are painted with black epoxy paint.

Note 15 - Same as P55582-0003 except items 38, 52 & 53 are chrome plated or stainless steel.

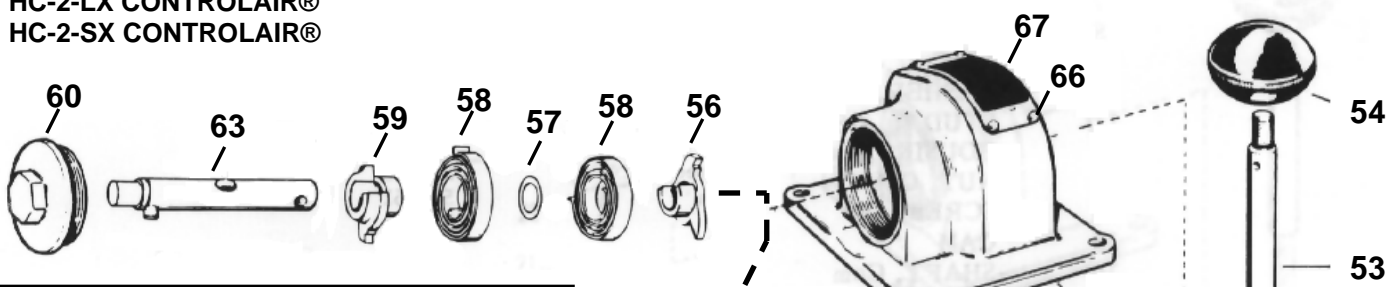
Note 16 - Same as P51206-0002 except less yoke, handle and ball Items 52, 53 & 54.

Note 17 - Same as P51206-0003 except less yoke, handle and ball Items 52, 53 & 54.

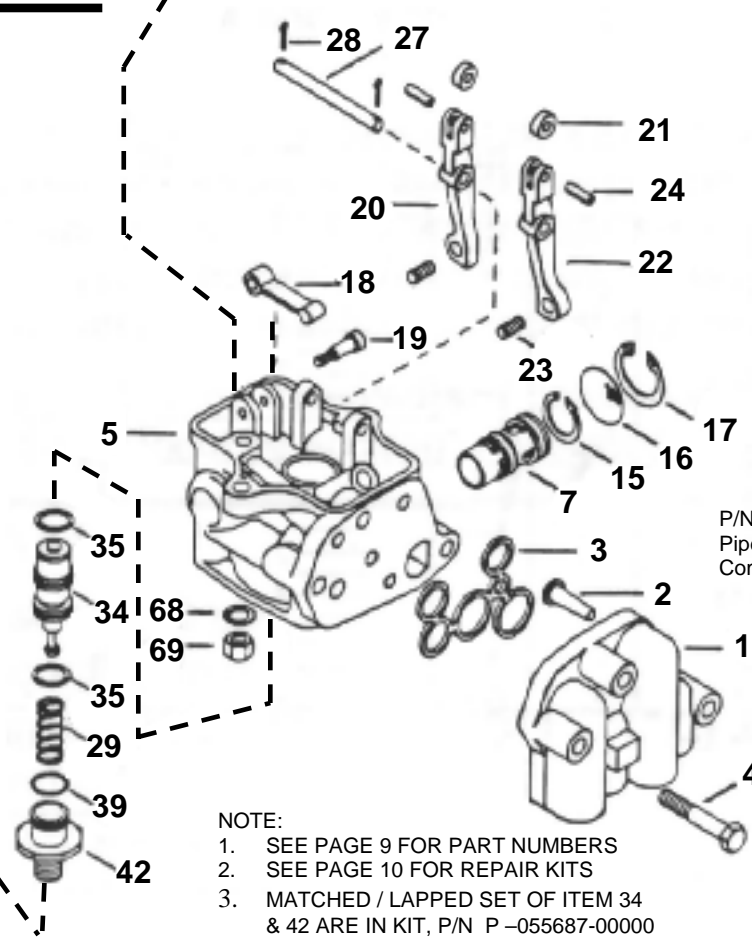
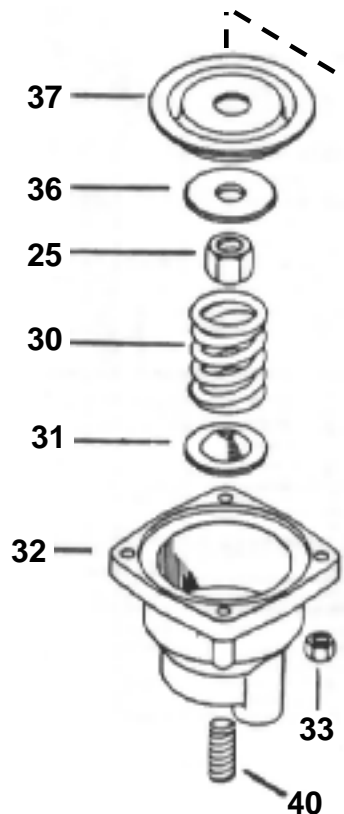
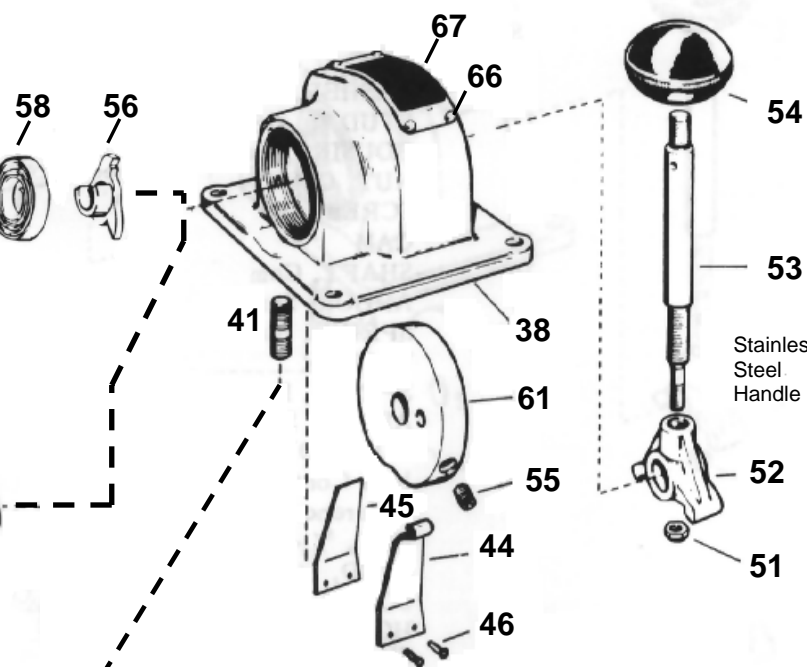
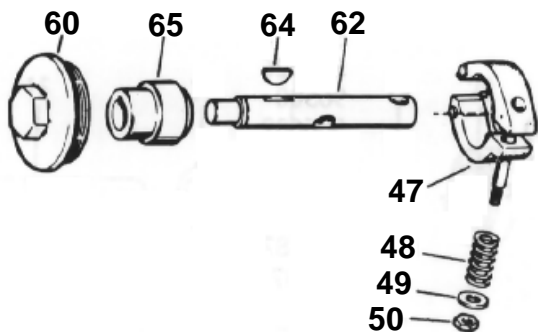
Note 18 - Same as P51206-0003 except latches in opposite maximum pressure position.

# EXPLODED VIEW

HC-2-X CONTROLAIR®  
 HC-2-LX CONTROLAIR®  
 HC-2-SX CONTROLAIR®



HC-2-FX CONTROLAIR®



P/N - P-066890-K000  
 Pipe Bracket Portion  
 Complete (Ref. 1,2,3, 4)

NOTE:  
 1. SEE PAGE 9 FOR PART NUMBERS  
 2. SEE PAGE 10 FOR REPAIR KITS  
 3. MATCHED / LAPPED SET OF ITEM 34  
 & 42 ARE IN KIT, P/N P-055687-00000



# HC-2 Controlair® Valve Parts List

Ref.	Qty.	Description	HC-2-X	HC-2-LX	HC-2-SX	HC-2-FX
		Complete Device	P -050975-0000X	P -055582-0000X	P -051206-0000X	P -050976-0000X
1	1	Pipe Bracket	P -066891-00005	P -066891-00005	P -066891-00005	P -066891-00005
2	**1	Filter	P66849	P66849	P66849	P66849
3	**1	Gasket	P66823	P66823	P66823	P66823
4	3	Screws	P49902-0048	P49902-0048	P49902-0048	P49902-0048
5	1	Complete Bottom Portion includes items 5 thru 33	<b>P55583-000X</b>	<b>P55583-000X</b>	<b>P55583-000X</b>	<b>P55583-000X</b>
Must specify spring range, same as last digit on valve						
6	1	Complete Body Bushed w/item 7	P51112-0001	P51112-0001	P51112-0001	P51112-0001
7	1	Cartridge Valve	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
8	2	Side Cartridge Valve w/2 "O" rings	P55474-0002	P55474-0002	P55474-0002	P55474-0002
8A	2	Side Cartridge Vlv w/2 "O" rings including	P57094-0001	P57094-0001	P57094-0001	P57094-0001
	4	•Snap rings	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
	2	•Screens	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
15	2	Snap Ring	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
16	2	Screen	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
17	2	Snap Ring	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
18	**1	Cam Dog	P52835	P52835	P52835	P52835
19	1	Cam Dog Pin	P51856	P51856	P51856	P51856
20	1	Left Lever, includes Items 21, 23 & 24	P58978-0001	P58978-0001	P58978-0001	P58978-0001
21	1	Roller included with lever				
22	1	Rt. Lever, includes items 21, 23 & 24	P58979-0001	P58979-0001	P58979-0001	
23	1	Adjusting screw included with lever				
24	1	Pin included with lever				
25	*1	Nut	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
27	1	Lever Pin	P50686-0007	P50686-0007	P50686-0007	P50686-0007
28	2	Cotter Pins	P49913-0001	P49913-0001	P49913-0001	P49913-0001
29	*3	Exhaust Valve Spring	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
30	1	Control Springs	See page 6	See page 6	See page 6	See page 6
31	1	Spring Seat	526347	526347	526347	526347
32	1	Spring Housing	P66488-0002	P66488-0002	P66488-0002	P66488-0002
33	4	Mounting Nuts	P49901-0020	P49901-0020	P49901-0020	P49901-0020
34	*1	Graduating Valve includes items 21 & 22	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
35	*2	3/4" "O" Rings	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
36	*1	Washer	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
	1	Complete Top Portion	850259	850430	P51207	850259
37	*1	Diaphragm	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
	1	Complete Cam Housing includes Items 38, 39, 40, 41, 63 & 64	538261	536908	536908	538261
38	*1	Cam Housing with bushing	P50851-0002	P50851-0002	P50851-0002	P50851-0002
39	*1	"O" Ring	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
40	1	Adjusting screw	P66209	P66209	P66209	P66209
41	2	Studs	P49906-0014	P49906-0014	P49906-0014	P49906-0014
42	*1	Exhaust Valve Seat	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
43	1	Brake Assembly includes items 47, 48, 49, 50 & 65			850187	850187
44	1	Latch		See Repair Kits	See Repair Kits	
45	1	Latch Spring		See Repair Kits	See Repair Kits	
46	2	Rivets		See Repair Kits	See Repair Kits	
47	1	Brake Shoe & Holder				See Repair Kits
48	1	Brake Spring				See Repair Kits
49	1	Washer				See Repair Kits
50	1	Nut				See Repair Kits
51	1	Nut	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
52	1	Yoke	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
53	1	Handle Shaft	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
54	1	Ball	See Repair Kits	See Repair Kits	See Repair Kits	See Repair Kits
55	1	Stop Pin included with cam #61				
56	1	Arbor	850254	850254	P67223	
57	1	Spacer Washer	See Repair Kits	See Repair Kits	See Repair Kits	
58	2	Return Springs	See Repair Kits	See Repair Kits	See Repair Kits	
59	1	Arbor	See Repair Kits	See Repair Kits	See Repair Kits	
60	1	End Cap Nut	P55465	P55465	P55465	P55465
61	1	Cam w/Stop Pin	P50878-0003	P50878-0003	P50878-0010	P63994
62	1	Cam Shaft				See Repair Kits
63	1	Cam Shaft	See Repair Kits	See Repair Kits	See Repair Kits	
64	1	Woodruff Key				P49767-0003
65	1	Brake Drum				See Repair Kits
66	4	Screws	P49987-0002	P49987-0002	P49987-0002	P49987-0002
67	1	Escutcheon Plate	536566	536566-1	536566	536566
68	2	Tooth Washers	P49898-0009	P49898-0009	P49898-0009	P49898-0009
69	2	Mounting Nuts	P49901-0020	P49901-0020	P49901-0020	P49901-0020

\* These items are in the a minor repair kit for graduating section

\*\* These items are in the major repair kit for graduating section.

See Page 10  
For Repair Kits

## Repair Kits for HC-2 Controlair® Valves

Piece Number	Quantity per valve	Description
P -055687-00000 Note 1	1	<b>Minor Graduating Valve Portion-Repair Kit</b> includes items 25, 29, 34, 35, 36, 37, 39 & 42
P -057136-00000 Note 1	1	<b>Major Graduating Valve Portion-Repair Kit</b> includes items 2, 3 & 18 and kit P55687
P -055474-00002	2	<b>Minor Side Valve Portion-Repair Kit</b> includes item 7 cartridge with "O" Rings
P -057094-00001	2	<b>Major Side Valve Portion-Repair Kit</b> includes snap rings, screen and kit P -055474-00002
P -064894-00002 Notes 1,2,3 & 4	1	<b>Complete Repair Kit for Control Portion -</b> includes (1) kit P -055687-00000, (2) kits P -057094-00001, items 2, 3, 16 & 17
P -064421-00001 Note 5	1	<b>Spring Latch Kit for LX and SX Models</b> includes items 44, 45 & 46
850187-00000 Note 5	1	<b>Friction Brake Kit for FX Models</b> includes items 47, 48, 49, 50 & 65
P -064421-00004 Note 5	1	<b>Cam Shaft Kit for FX Models</b> includes items 51, 52, 53, 54 & 62
P -064421-00005 Note 5	1	<b>Cam Shaft Kit for All Models</b> includes items 51, 52, 53, 54 & 63
P -064421-00009 Note 5	1	<b>Return Spring and Arbor Kit for X, LX &amp; SX Models</b> includes items 57, 58 & 59
P -066891-K0000	1	<b>Pipe Bracket Portion Kit for all Models</b> includes items 1, 2, 3 & 4

**NOTES:**

1. The inlet and exhaust valve unit Item 34 and exhaust valve seat Item 42 are lapped together to form a matched set. Kits that contain these items from the factory include matched sets.
2. Select replacement range control spring from identity schedule on page 7.
3. All kits above include small tubes of the recommended lubricants.
4. Valve portion kits listed above contain the seals and other parts that are needed to repair the valve portion.
5. Replace all worn or damaged components, especially in the mechanical portions of the valve. The mechanical parts are listed on pages 7, 8 and 9.

### Chrome plated HC-2 Controlair® Valves with chrome plated parts for item numbers listed (See notes 4, 5, 9, 10, 11 and 15 --Page 7)

Model	Complete Part Number	Item 38 Cam Housing Part Number	Item 52 Yoke Part Number	Item 53 Handle Shaft Part Number
HC-2-X	P -065689-00001	P -050851-00008	P -066852-00001	P -050979-00001
	P -065689-00003	P -050851-00008	P -066852-00001	P -050979-00001
HC-2-FX	P -065123-00001	P -050851-00008	P -066852-00001	P -050979-00001
	P -065123-00002	P -050851-00008	P -066852-00001	P -050979-00001
	P -065123-00003	P -050851-00008	P -066852-00001	P -050979-00001
HC-2-LX	P -068520-00003	P -050851-00008	P -066852-00001	P -050979-00001

# Testing and Test Set-Up

## Testing

After any repair or adjustments, the HC-2 Controlair Valve should be tested using the following procedures and test arrangements.

Pressure control valves need to be tested for the following:

- |                   |                       |
|-------------------|-----------------------|
| 1. Function       | 4. Flow Capacity      |
| 2. Pressure Range | 5. Response           |
| 3. Leakage        | 6. Mechanical Detents |

The adjustments affecting these points were described in the previous sections.

General instructions for accomplishing these tests are listed below.

1. **Function:** The HC-2 Controlair valve is a 4 way exhausted center valve capable of graduating pressure in one or the other delivery lines. This function must be checked using the test arrangement to insure that only one volume is charged in either direction of handle travel.
2. **Pressure Range:** The minimum and maximum pressure range generated in the delivery lines (1) and (3) is specified by the control spring in use. See the graduated output pressure setting *Adjustment Section*. After the valve is adjusted, confirm that the minimum and maximum pressure ranges are generated in the delivery lines (1) and (3) as per the *Identity Schedule* by moving the handle from neutral to first 10° then to the full travel position on both sides of center.
3. **Leakage:** Set supply pressure to 20 psi above maximum delivery pressure of the valve being tested. Using a soap and water solution, coat the valve at the pipe bracket and spring housing parting lines. No leakage is permitted in any handle position.
  - A. Port (1)
    1. On all valves with spring ranges less than 90 psi., set supply line pressure to 100 psi, handle to full travel position and hold (detent position on detented valves). Close valve in supply line to port (2) and valve in delivery line (1) to isolate graduating valve. Observe delivery pressure gage in line (1). A pressure drop of no more than 2 psi in 30 seconds is permitted.
    2. On all valves with spring ranges of 100 psi and above, set supply line pressure to 100 psi. Move valve handle to deliver 95 psi to delivery line (1) and hold in that position. Close valve in supply line to port (2) and valve in port (1) delivery line to isolate the graduating valve. Observe the delivery gage in line (1). A pressure drop of no more than 2 psi in 30 seconds is permitted.

## B. Port (3)

1. Repeat test A-1 for valves with 90 psi or less in opposite direction of the handle travel.
2. Repeat test A-2 for valves with 100 psi or more in opposite direction of the handle travel.

4. **Flow Capacity:** Set supply line pressure to 100 psi regardless of the control spring rating. Move the handle from neutral position in either direction to full travel position. The delivery volume (1) or (3) should start to fill within the time limits shown in Table 1.

Move the handle quickly from full travel position back to neutral position. This should exhaust volume (1) or (3) within the time limits shown on table 1. **Note** valve with less than 0 to 35 psi or less rated springs require an additional volume as shown in test arrangement diagram.

## 5. Response

- A. Port (1) Move valve handle to the full travel position and hold. Fully open the valve at test volume (1) so that that the air exhausts through the choke plugs. Observe the delivery pressure gage at volume (1). A pressure drop of no more than 3 psi permitted.
- B. Port (3) Repeat test 5A for opposite direction of handle travel.

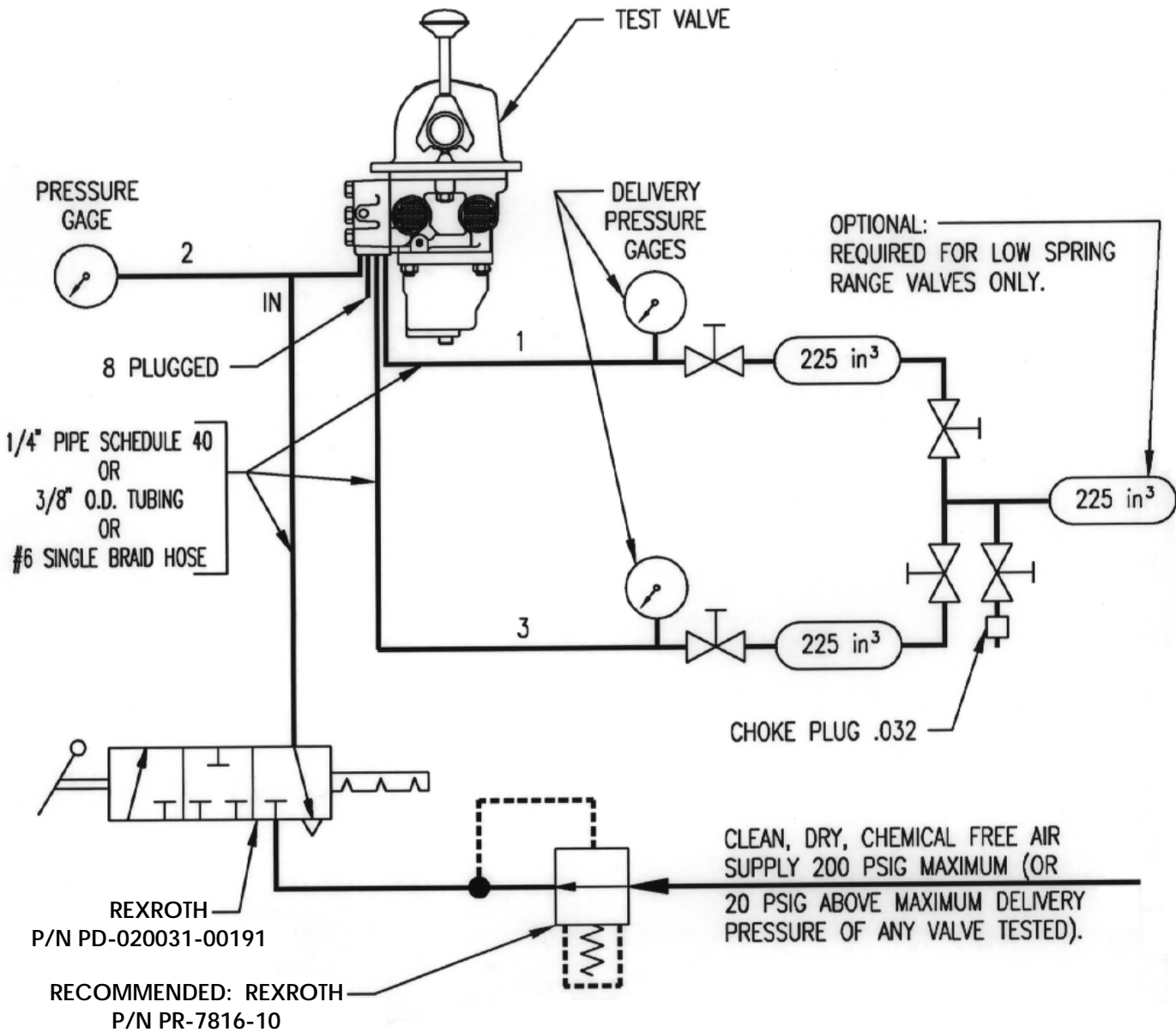
6. **Mechanical Detent** (HC-2-LX or SX Models only): Move handle to extreme detent position. Connect a spring scale just under the knob Item #54. The force required to pull the handle out of detent position should be at least 12-lbs. Check detent hold in both extreme handle positions.

Flow Capacity Tests- Ports 1 & 3 Test Ranges & Times					
Valve Range	Fill Psi	Maximum Time-Sec	Exhaust Psi	Max. Time	Test Vol.
0 to 15 psi	0 to 15 psi	2 sec	15 to 5 psi	2 sec.	450 cu.in.
0 to 20 psi	0 to 15 psi	2 sec	15 to 5 psi	2 sec.	450 cu.in.
0 to 25 psi	0 to 15 psi	2 sec	15 to 5 psi	2 sec.	450 cu.in.
0 to 30 psi	0 to 15 psi	2 sec	15 to 5 psi	2 sec.	450 cu.in.
0 to 35 psi	0 to 15 psi	2 sec	15 to 5 psi	2 sec.	450 cu.in.
0 to 65 psi	0 to 50 psi	2 sec.	50 to 10 psi	2 sec.	225 cu. In.
0 to 100 psi	0 to 50 psi	2 sec.	50 to 10 psi	2 sec.	225 cu. In.
0 to 125 psi	0 to 50 psi	2 sec.	50 to 10 psi	2 sec.	225 cu. In.
0 to 150 psi	0 to 50 psi	2 sec.	50 to 10 psi	2 sec.	225 cu. In.
0 to 65 psi	0 to 15 psi	2 sec.	50 to 10 psi	2 sec.	225 cu. In.
35 to 85 psi	35 to 70 psi	2 sec.	70 to 40 psi	2 sec.	225 cu. In.

# Test Arrangement Diagram

**Notes:**

1. Rexroth Taskmaster® Timing Volumes, part number TM-058887-00225 can be used for the volumes indicated.
2. The supply air line to the valve and the delivery lines must be full size as shown. Line must not exceed 3 Ft. between the supply valve and port (2), or between ports (1) & (3).
3. It is recommended that as large a gage as practical be used on the delivery lines. A 6" gage is recommended.



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