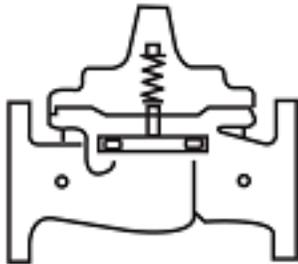

CLA-VAL

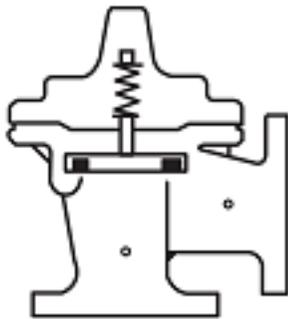
AUTOMATIC CONTROL VALVES

50B-5KG

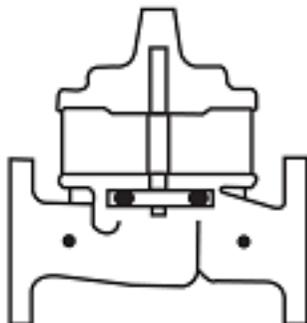
Place this manual with personnel responsible
for maintenance of this valve



Installation



Operation



Maintenance



Model **50B-5KG(Globe)/2050B-5KG (Angle)**

Pressure Sustaining Valve

This Valve is Factory Mutual Approved Sizes 3", 4", 6", & 8"

(For Fire Pump Service)

► OPERATING DATA**Pressure Sustaining Feature**

Pressure relief control **(2)** is a normally closed control that responds to remotely sensed pressure changes. An increase in remote pressure tends to open control **(2)** and a decrease in remote pressure tends to close control **(2)**. This causes main valve cover pressure to vary and the main valve modulates (opens and closes) maintaining a relatively constant pressure at the remote sensing location. When remote pressure is lower than the set point of control **(2)**, control **(2)** closes. This pressurizes the main valve cover chamber and the main valve closes. **Pressure relief control (2) adjustment:** Turn the adjusting screw clockwise to increase the setting.

Opening Speed Control

Flow control **(4)** controls the opening speed of the main valve. Turn the adjusting stem clockwise to make the main valve open slower.

► CHECK LIST FOR PROPER OPERATION

- System valves open upstream and downstream.
- Air removed from the main valve cover and pilot system at all high points.
- Periodical cleaning of strainer **(3)** is recommended.
- Remote sensing line properly connected.
- Flow control **(4)** open at least 4 turns.
- Isolation valve **(6)** closed during normal operation.



— MODEL — **50B-5KG**

Pump Suction Control Valve



50B-5KG



Sizes 3" - 8"

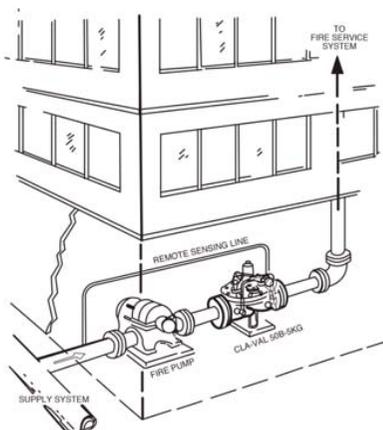
- Adjustable Opening Speed For Pump Suction Protection
- Pilot Control Provides Wide Flow Range With Minimal Pressure Variations
- Controlled Closing For System Protection
- Modulates Within 5% of Setting for Accurate Pressure Control
- Pressure Setting Adjustable
- Pressure Setting Not Affected by Pressure at Valve Discharge

The Model 50B-5KG Pump Suction Control Valve is designed specifically for Fire Pump Suction Control Service. It modulates to maintain the pump discharge in relation to the suction head available, thus assuring that the suction head pressure does not fall below the pre-set minimum. The 50B-5KG can be supplied with optional internal and external epoxy coating of the main valve wetted surfaces.

Typical Installation

When there is a demand in the Fire System, the pump is started, delivering water from the supply source to the area of demand. To assure that the fire pump draw does not exceed the available water supply, the Model 50B-5KG, sensing the pump suction, modulates to prevent suction pressure from dropping below a pre-set minimum.

By maintaining minimum pressure requirements in the supply main, the main is protected from possible damage or backflow conditions. Also, a minimum supply pressure is provided for local fire apparatus.



Specifications

Sizes Globe: 3" - 10" flanged
Angle: 3" - 10" flanged

End Details 150 and 300 ANSI B16.42

Pressure Ratings 150 class - 250 psi Max.
300 class - 400 psi Max

Temperature Range Water, to +180°F Max.

Materials **Main valve body & cover**
Ductile Iron ASTM A-536

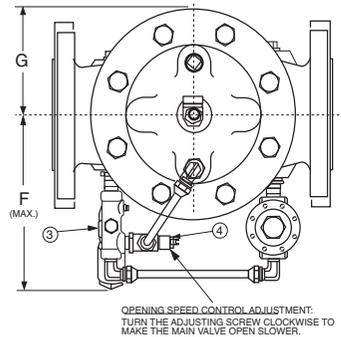
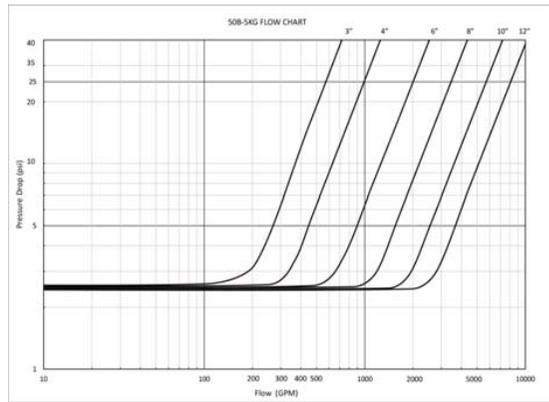
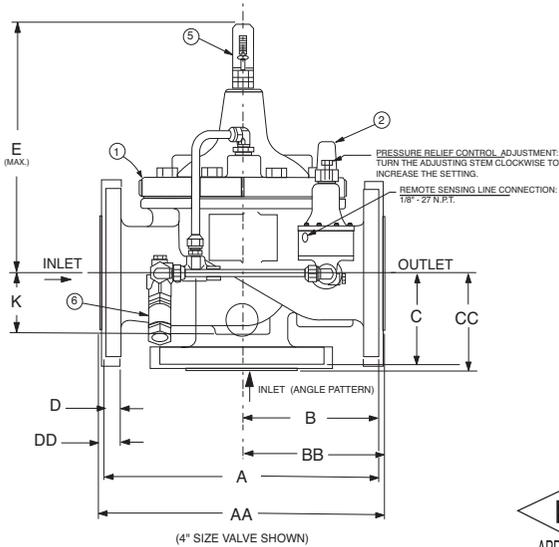
Main valve trim:
Brass QQ-B-626
Bronze Seat ASTM B61
Stainless Steel Stem 303
Delrin Sleeved

Pilot control system:
Cast Bronze ASTM B62 with
303 Stainless Steel trim

Adjustment Range Available in the following pressure range only:
5 to 25 psi
Set at 10 psi

Dimensions (in Inches)

Flow Chart



Item No.	Description
1	100KCGVX Hytrol (Main Valve)
2	CRL5A Pressure Relief Control
3	X44A Strainer and Orifice Assembly
4	CV Flow Control (Opening)
5	X101C Valve Position Indicator
6	CK2 (Blow-Off Valve)

VALVE SIZE	A	AA	B	BB	C	CC	D	DD	E	F	G	K
	150 LB. FLANGES	300 LB. FLANGES	150 LB. FLANGES	300 LB. FLANGES	150 LB. FLANGES	300 LB. FLANGES	(TYP.) 150 LB. FLANGES (MIN.)	(TYP.) 300 LB. FLANGES (MIN.)	(MAX.)	(MAX.)	(MAX.)	
3"	12.00	13.25	6.00	6.38	4.00	4.38	.75	1.12	15.75	13.50	4.62	2.56
4"	15.00	15.62	7.50	7.88	5.00	5.31	.94	1.25	17.75	15.00	5.75	3.19
6"	20.00	21.00	10.00	10.50	6.00	6.50	1.00	1.44	20.25	16.50	7.88	4.31
8"	25.38	26.38	12.75	13.25	8.00	8.50	1.12	1.62	23.00	20.00	10.00	5.31
10"	29.75	31.12	14.88	15.56	8.62	9.31	1.12	1.12				

Note:
10" and 12" are not FM Approved but built to FM standard

Purchase Specifications

The Fire Pump Suction Control Valve shall modulate to maintain a minimum pressure at the pump suction regardless of system demand. It shall control the pump discharge in relation to the suction head available, and shall not allow suction head pressure to fall below a pre-set minimum.

It shall be actuated by line pressure through a pilot control system which allows rapid response to changing pressure conditions without line surges. The pilot control shall be remote sensed to the pump suction head pressure.

The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single removable seat, a delrin-sleeved guided stem and a renewable resilient synthetic rubber disc with a rectangular cross

section, contained on three and one-half sides by a disc retainer and disc guide. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting.

A device indicating the percent at which the valve is open or closed shall be supplied on the assembly, together with a sediment evacuator and dampening device.

The valve shall be designed to allow for repair and servicing without removing the valve body from the line.

The valve shall be Factory Mutual Approved. It shall be the MODEL 50B-5KG FIRE PUMP SUCTION CONTROL VALVE as manufactured by Cla-Val, Newport Beach, California.

CLA-VAL

1701 Placentia Avenue • Costa Mesa CA 92627

800-942-6326 • Fax: 949-548-5441 • Web Site: cla-val.com • E-mail: info@cla-val.com



50B-5KG (R-04/2017)

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Fax: 905-563-4040
E-mail: sales@cla-val.ca

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CH-1032 Romanel/
Lausanne, Switzerland
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Fax: 41-21-643-15-50
E-mail: cla-val@cla-val.ch

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Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-mail: info@cla-val.co.uk

CLA-VAL FRANCE
Porte du Grand Lyon 1
ZAC du Champ du Pérrier
France - 01700 Neyron
Phone: 33-4-72-25-92-93
Fax: 33-4-72-25-04-17
E-mail: cla-val@cla-val.fr

CLA-VAL PACIFIC
45 Kennaway Road
Woolston, Christchurch, 8023
New Zealand
Phone: 64-39644860
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E-mail: info@cla-valpacific.com

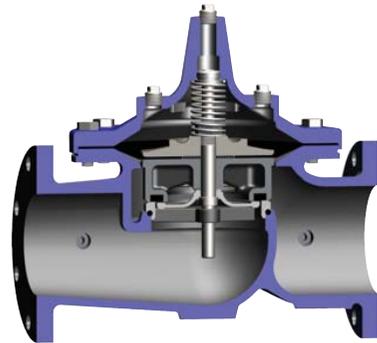


—MODEL— **100-01**
Hytrol Valve

Description

The Cla-Val Model 100-01 Hytrol Valve is a main valve for Cla-Val Automatic Control Valves. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and disc guide, forms a seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.

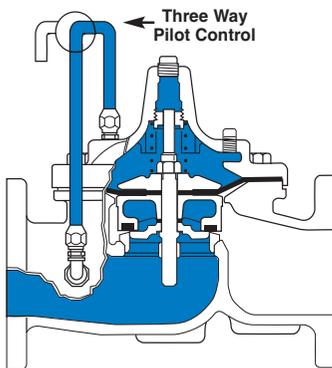


Installation

1. Before valve is installed, pipe lines should be flushed of all chips, scale and foreign matter.
2. It is recommended that either gate or block valves be installed on both ends of the 100-01 Hytrol Valve to facilitate isolating the valve for preventive maintenance and repairs.
3. Place the valve in the line with flow through the valve in the direction indicated on the inlet nameplate. (See "Flow Direction" Section)
Note: Valve can be installed in the vertical or horizontal position.
4. Allow sufficient room around valve to make adjustments and for disassembly.
5. Cla-Val 100-01 Hytrol Valves operate with maximum efficiency when mounted in horizontal piping with the cover UP, however, other positions are acceptable. Due to size and weight of the cover and internal components of 8 inch and larger valves, installation with the cover UP is advisable. This makes internal parts readily accessible for periodic inspection.

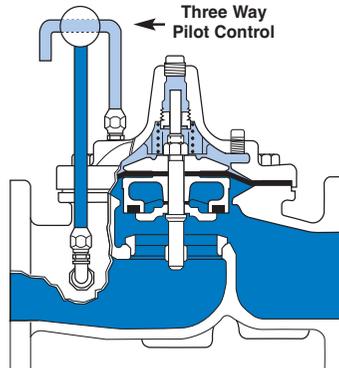
6. Caution must be taken in the installation of this valve to insure that galvanic and/or electrolytic action does not take place. The proper use of dielectric fittings and gaskets are required in all systems using dissimilar metals.
7. If a pilot control system is installed on the 100-01 Hytrol Valve, use care to prevent damage. If it is necessary to remove fittings or components, be sure they are kept clean and replaced exactly as they were.
8. After the valve is installed and the system is first pressurized, vent air from the cover chamber and pilot system tubing by loosening fittings at all high points.

Principles of Operation



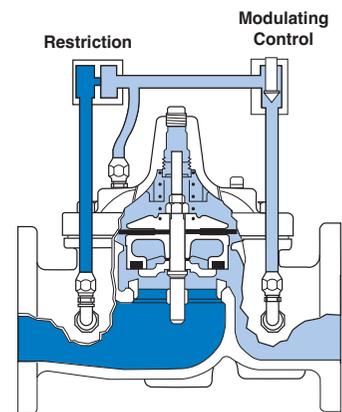
Tight Closing Operation

When pressure from the valve inlet (or an equivalent independent operating pressure) is applied to the diaphragm chamber the valve closes drip-tight.



Full Open Operation

When pressure in diaphragm chamber is relieved to a zone of lower pressure (usually atmosphere) the line pressure (5 psi Min.) at the valve inlet opens the valve.



Modulating Action

Valve modulates when diaphragm pressure is held at an intermediate point between inlet and discharge pressure. With the use of a Cla-Val. "modulating control," which reacts to line pressure changes, the pressure above the diaphragm is varied, allowing the valve to throttle and compensate for the change.

Flow Direction

The flow through the 100-01 Hytrol Valve can be in one of two directions. When flow is “up-and-over the seat,” it is in “normal” flow and the valve will fail in the open position. When flow is “over-the seat-and down,” it is in “reverse” flow and the valve will fail in the closed position. There are no permanent flow arrow markings.



Recommended Tools

1. Three pressure gauges with ranges suitable to the installation to be put at Hytrol inlet, outlet and cover connections.
2. Cla-Val Model X101 Valve Position Indicator. This provides visual indication of valve position without disassembly of valve.
3. Other items are: suitable hand tools such as screwdrivers, wrenches, etc. soft jawed (brass or aluminum) vise, 400 grit wet or dry sandpaper and water for cleaning.

Troubleshooting

The following troubleshooting information deals strictly with the Model 100-01 Hytrol Valve. This assumes that all other components of the pilot control system have been checked out and are in proper working condition. (See appropriate sections in Technical Manual for complete valve).

All trouble shooting is possible without removing the valve from the line or removing the cover. It is highly recommended to permanently install a Model X101 Valve Position Indicator and three gauges in unused Hytrol inlet, outlet and cover connections.

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to Close	Closed isolation valves in control system, or in main line.	Open Isolation valves.
	Lack of cover chamber pressure.	Check upstream pressure, pilot system, strainer, tubing, valves, or needle valves for obstruction.
	Diaphragm damaged. (See Diaphragm Check.)	Replace diaphragm.
	Diaphragm assembly inoperative. Corrosion or excessive scale build up on valve stem. (See Freedom of Movement Check)	Clean and polish stem. Inspect and replace any damaged or badly eroded part.
	Mechanical obstruction. Object lodged in valve. (See Freedom of Movement Check)	Remove obstruction.
	Worn disc. (See Tight Sealing Check)	Replace disc.
	Badly scored seat. (See Tight Sealing Check)	Replace seat.
Fails to Open	Closed upstream and/or downstream isolation valves in main line.	Open isolation valves.
	Insufficient line pressure.	Check upstream pressure. (Minimum 5 psi flowing line pressure differential.)
	Diaphragm assembly inoperative. Corrosion or excessive buildup on valve stem. (See Freedom of Movement Check)	Clean and polish stem. Inspect and replace any damaged or badly eroded part.
	Diaphragm damaged. (For valves in "reverse flow" only)	Replace diaphragm.

After checking out probable causes and remedies, the following three checks can be used to diagnose the nature of the problem before maintenance is started. They must be done in the order shown.

Three Checks

The 100-01 Hytrol Valve has only one moving part (the diaphragm and disc assembly). So, there are only three major types of problems to be considered.

First: Valve is stuck - that is, the diaphragm assembly is not free to move through a full stroke either from open to close or vice versa.

Second: Valve is free to move and can't close because of a worn out diaphragm.

Third: Valve leaks even though it is free to move and the diaphragm isn't leaking.

CAUTION:

Care should be taken when doing the troubleshooting checks on the 100-01 Hytrol Valve. These checks do require the valve to open fully. This will either allow a high flow rate through the valve, or the downstream pressure will quickly increase to the inlet pressure. In some cases, this can be very harmful. Where this is the case, and there are no block valves in the system to protect the downstream piping, it should be realized that **the valve cannot be serviced under pressure**. Steps should be taken to remedy this situation before proceeding any further.

Diaphragm Check (#1)

1. Shut off pressure to the Hytrol Valve by slowly closing upstream and downstream isolation valves. **SEE CAUTION.**
2. Disconnect or close all pilot control lines to the valve cover and leave only one fitting in highest point of cover open to atmosphere.
3. With the cover vented to atmosphere, slowly open upstream isolation valve to allow some pressure into the Hytrol Valve body. Observe the open cover tapping for signs of continuous flow. It is not necessary to fully open isolating valve. Volume in cover chamber capacity chart will be displaced as valve moves to open position. Allow sufficient time for diaphragm assembly to shift positions. If there is no continuous flow, you can be quite certain the diaphragm is sound and the diaphragm assembly is tight. If the fluid appears to flow continuously this is a good reason to believe the diaphragm is either damaged or it is loose on the stem. In either case, this is sufficient cause to remove the valve cover and investigate the leakage. (See "Maintenance" Section for procedure.)

COVER CHAMBER CAPACITY (Liquid Volume displaced when valve opens)

Valve size (inches)	Displacement	
	Gallons	Liters
1 1/4	.020	.07
1 1/2	.020	.07
2	.032	.12
2 1/2	.043	.16
3	.080	.30
4	.169	.64
6	.531	2.0
8	1.26	4.8
10	2.51	9.5
12	4.00	15.1
14	6.50	24.6
16	9.57	36.2
20	12.00	45.4
24	29.00	109.8
30	42.00	197.0
36	90.00	340.0

Freedom of Movement Check (#2)

4. Determining the Hytrol Valve's freedom of movement can be done by one of two methods.
5. For most valves it can be done after completing Diaphragm Check (Steps 1, 2, and 3). **SEE CAUTION.** At the end of step 3 the valve should be fully open.
6. If the valve has a Cla-Val X101 Position Indicator, observe the indicator to see that the valve opens wide. Mark the point of maximum opening.
7. Re-connect enough of the control system to permit the application of inlet pressure to the cover. Open pilot system cock so pressure flows from the inlet into the cover.
8. While pressure is building up in the cover, the valve should close smoothly. There is a hesitation in every Hytrol Valve closure, which can be mistaken for a mechanical bind. The stem will appear to stop moving very briefly before going to the closed position. This slight pause is caused by the diaphragm flexing at a particular point in the valve's travel and is not caused by a mechanical bind.
9. When closed, a mark should be made on the X101 Valve position indicator corresponding to the "closed" position. The distance between the two marks should be approximately the stem travel shown in chart.

STEM TRAVEL

(Fully Open to Fully Closed)

Valve Size (inches)		Travel (inches)	
Inches	MM	Inches	MM
1 1/4	32	0.4	10
1 1/2	40	0.4	10
2	50	0.6	15
2 1/2	65	0.7	18
3	80	0.8	20
4	100	1.1	28
6	150	1.7	43
8	200	2.3	58
10	250	2.8	71
12	300	3.4	86
14	350	4.0	100
16	400	4.5	114
20	500	5.6	143
24	600	6.7	165
30	800	7.5	190
36	900	8.5	216

10. If the stroke is different than that shown in stem travel chart this is a good reason to believe something is mechanically restricting the stroke of the valve at one end of its travel. If the flow does not stop through the valve when in the indicated "closed" position, the obstruction probably is between the disc and the seat. If the flow does stop, then the obstruction is more likely in the cover. In either case, the cover must be removed, and the obstruction located and removed. The stem should also be checked for scale build-up. (See "Maintenance, section for procedure.)

11. For valves 6" and smaller, the Hytrol Valve's freedom of movement check can also be done after all pressure is removed from the valve. **SEE CAUTION.** After closing inlet and outlet isolation valves and bleeding pressure from the valve, check that the cover chamber and the body are temporarily vented to atmosphere. Insert fabricated tool into threaded hole in top of valve stem, and lift the diaphragm assembly manually. Note any roughness. The diaphragm assembly should move smoothly throughout entire valve stroke. The tool is fabricated from rod that is threaded on one end to fit valve stem and has a "T" bar handle of some kind on the other end for easy gripping. (See chart in Step 4 of "Disassembly" Section.)

12. Place marks on this diaphragm assembly lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel shown in stem travel chart. If the stroke is different than that shown, there is a good reason to believe something is mechanically restricting the stroke of the valve. The cover must be removed, and the obstruction located and removed. The stem should also be checked for scale build-up. (See "Maintenance" Section for procedure.)

Tight Sealing Check (#3)

13. Test for seat leakage after completing checks #1 & #2 (Steps 1 to 12). **SEE CAUTION.** Close the isolation valve downstream of the Hytrol Valve. Apply inlet pressure to the cover of the valve, wait until it closes. Install a pressure gauge between the two closed valves using one of the two ports in the outlet side of the Hytrol. Watch the pressure gauge. If the pressure begins to climb, then either the downstream isolation valve is permitting pressure to creep back, or the Hytrol is allowing pressure to go through it. Usually the pressure at the Hytrol inlet will be higher than on the isolation valve discharge, so if the pressure goes up to the inlet pressure, you can be sure the Hytrol is leaking. Install another gauge downstream of isolating valve. If the pressure between the valves only goes up to the pressure on the isolation valve discharge, the Hytrol Valve is holding tight, and it was just the isolation valve leaking.

Maintenance

Preventative Maintenance

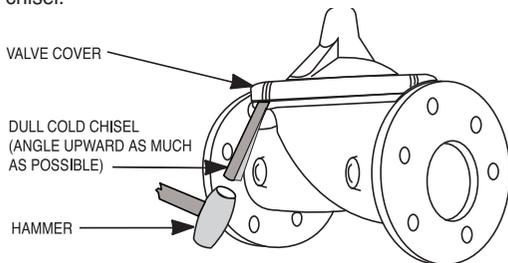
The Cla-Val Co. Model 100-01 Hytrol Valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the operating conditions of the system are affecting the valve. The effect of these actions must be determined by inspection.

Disassembly

Inspection or maintenance can be accomplished without removing the valve from the line. Repair kits with new diaphragm and disc are recommended to be on hand before work begins.

WARNING: Maintenance personnel can be injured and equipment damaged if disassembly is attempted with pressure in the valve. **SEE CAUTION.**

1. Close upstream and downstream isolation valves **and independent operating pressure when used** to shut off all pressure to the valve.
2. Loosen tube fittings in the pilot system to remove pressure from valve body and cover chamber. After pressure has been released from the valve, use care to remove the controls and tubing. Note and sketch position of tubing and controls for re-assembly. The schematic in front of the Technical Manual can be used as a guide when reassembling pilot system.
3. Remove cover nuts and remove cover. If the valve has been in service for any length of time, chances are the cover will have to be loosened by driving upward along the edge of the cover with a **dull cold chisel**.



On 6" and smaller valves block and tackle or a power hoist can be used to lift valve cover by inserting proper size eye bolt in place of the center cover plug. on 8" and larger valves there are 4 holes (5/8" – 11 size) where jacking screws and/or eye bolts may be inserted for lifting purposes. **Pull cover straight up** to keep from damaging the integral seat bearing and stem.

COVER CENTER PLUG SIZE

Valve Size	Thread Size (NPT)
1 1/4" – 1 1/2"	1/4"
2" – 3"	1/2"
4" – 6"	3/4"
8" – 10"	1"
12"	1 1/4"
14"	1 1/2"
16"	2"
20" & 24"	2"
30" & 36"	2"

4. Remove the diaphragm and disc assembly from the valve body. With smaller valves this can be accomplished by hand by **pulling straight up on the stem so as not to damage the seat bearing**. On large valves, an eye bolt of proper size can be installed in the stem and the diaphragm assembly can be then lifted with a block and tackle or power hoist. Take care not to damage the stem or bearings. The valve won't work if these are damaged.

VALVE STEM THREAD SIZE

Valve Size	Thread Size (UNF Internal)
1 1/4" – 2 1/2"	10–32
3" – 4"	1/4–28
6" – 14"	3/8–24
16"	1/2–20
20	3/4–16
24"	3/4–16
30"	3/4–16
36"	3/4–16

5. The next item to remove is the stem nut. Examine the stem threads above the nut for signs of mineral deposits or corrosion. If the threads are not clean, use a wire brush to remove as much of the residue as possible. Attach a good fitting wrench to the nut and give it a sharp "rap" rather than a steady pull. Usually several blows are sufficient to loosen the nut for further removal. On the smaller valves, the entire diaphragm assembly can be held by the stem in a vise **equipped with soft brass jaws** before removing the stem nut.

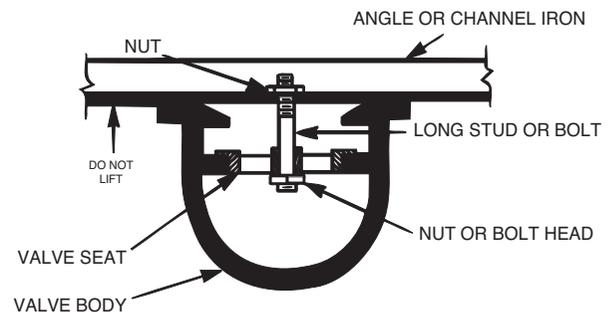
The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

6. After the stem nut has been removed, the diaphragm assembly breaks down into its component parts. Removal of the disc from the disc retainer can be a problem if the valve has been in service for a long time. Using two screwdrivers inserted along the outside edge of the disc usually will accomplish its removal. Care should be taken to preserve the spacer washers in water, particularly if no new ones are available for re-assembly.

7. The only part left in the valve body is the seat which ordinarily does not require removal. Careful cleaning and polishing of inside and outside surfaces with 400 wet/dry sandpaper will usually restore the seat's sharp edge. If, however, it is badly worn and replacement is necessary, it can be easily removed.

Seats in valve sizes 1 1/4" through 6" are threaded into the valve body. They can be removed with accessory X109 Seat Removing Tool available from the factory. On 8" and larger valves, the seat is held in place by flat head machine screws. Use a tight-fitting, long shank screwdriver to prevent damage to seat screws. If upon removal of the screws the seat cannot be lifted out, it will be necessary to use a piece of angle or channel iron with a hole drilled in the center. Place it across the body so a long stud can be inserted through the center hole in the seat and the hole in the angle iron. By tightening the nut a uniform upward force is exerted on the seat for removal.

NOTE: Do not lift up on the end of the angle iron as this may force the integral bearing out of alignment, causing the stem to bind.



Lime Deposits

One of the easiest ways to remove lime deposits from the valve stem or other metal parts is to dip them in a 5-percent muriatic acid solution just long enough for the deposit to dissolve. This will remove most of the common types of deposits. **CAUTION: USE EXTREME CARE WHEN HANDLING ACID.** Rinse parts in water before handling. If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water.

Reassembly

1. Reassembly is the reverse of the disassembly procedure. If a new disc has been installed, it may require a different number of spacer washers to obtain the right amount of “grip” on the disc. When the diaphragm assembly has been tightened to a point where the diaphragm cannot be twisted, the disc should be compressed very slightly by the disc guide. Excessive compression should be avoided. Use just enough spacer washers to hold the disc firmly without noticeable compression.

2. MAKE SURE THE STEM NUT IS VERY TIGHT. Attach a good fitting wrench to the nut and give it a sharp “rap” rather than a steady pull. Usually several blows are sufficient to tighten the stem nut for final tightening. Failure to do so could allow the diaphragm to pull loose and tear when subjected to pressure.

Inspection of Parts

After the valve has been disassembled, each part should be examined carefully for signs of wear, corrosion, or any other abnormal condition. Usually, it is a good idea to replace the rubber parts (diaphragm and disc) unless they are free of signs of wear. These are available in a repair kit. Any other parts which appear doubtful should be replaced. **WHEN ORDERING PARTS, BE SURE TO GIVE COMPLETE NAMEPLATE DATA, ITEM NUMBER AND DESCRIPTION.**

NOTE: If a new disc isn't available, the existing disc can be turned over, exposing the unused surface for contact with the seat. The disc should be replaced as soon as practical.

3. Carefully install the diaphragm assembly by lowering the stem through the seat bearing. Take care not to damage the stem or bearing. Line up the diaphragm holes with the stud or bolt holes on the body. on larger valves with studs, it may be necessary to hold the diaphragm assembly up part way while putting the diaphragm over the studs.

4. Put spring in place and replace cover. Make sure diaphragm is lying smooth under the cover.

5. Tighten cover nuts firmly using a cross-over pattern until all nuts are tight.

6. Test Hytrol Valve before re-installing pilot valve system.

Test Procedure After Valve Assembly

There are a few simple tests which can be made in the field to make sure the Hytrol Valve has been assembled properly. Do these before installing pilot system and returning valve to service. These are similar to the three troubleshooting tests.

1. Check the diaphragm assembly for freedom of movement after all pressure is removed from the valve. **SEE CAUTION.** Insert fabricated tool into threaded hole in top of valve stem, and lift the diaphragm assembly manually. Note any roughness, sticking or grabbing. The diaphragm assembly should move smoothly throughout entire valve stroke. The tool is fabricated from rod that is threaded on one end to fit valve stem (See chart in Step 4 of “Disassembly” section.) and has a “T” Bar handle of some kind on the other end for easy gripping.

Place marks on this diaphragm assembly lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel shown in stem travel chart. (See “Freedom of Movement Check” section.) If the stroke is different than that shown, there is a good reason to believe something is mechanically restricting the stroke of the valve. The cover must be removed, the obstruction located and removed. (See “Maintenance” Section for procedure.)

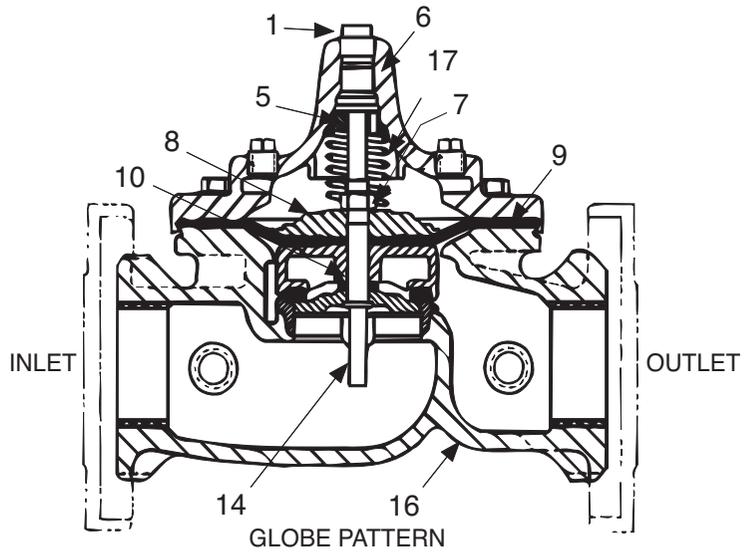
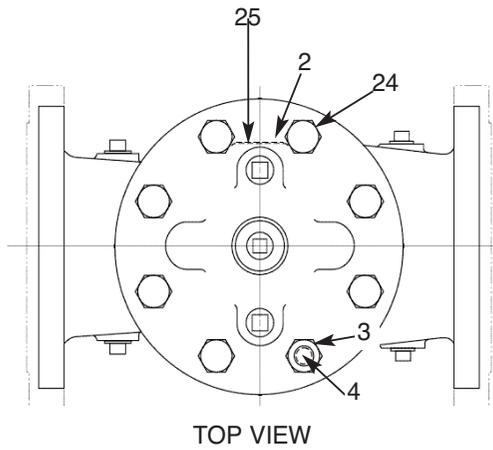
Due to the weight of the diaphragm assembly this procedure is not possible on valves 8” and larger. on these valves, the same determination can be made by carefully introducing a low pressure-less than five psi) into the valve body with the cover vented. **SEE CAUTION.** Looking in cover center hole see the diaphragm assembly lift easily without hesitation, and then settle back easily when the pressure is removed.

2. To check the valve for drip-tight closure, a line should be connected from the inlet to the cover, and pressure applied at the inlet of the valve. If properly assembled, the valve should hold tight with as low as ten PSI at the inlet. See “Tight Sealing Check” section.)

3. With the line connected from the inlet to the cover, apply full working pressure to the inlet. Check all around the cover for any leaks. Re-tighten cover nuts if necessary to stop leaks past the diaphragm.

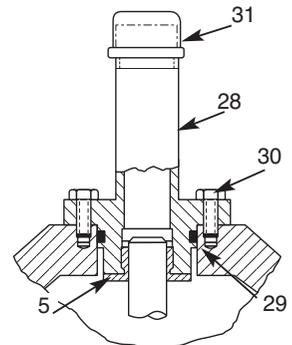
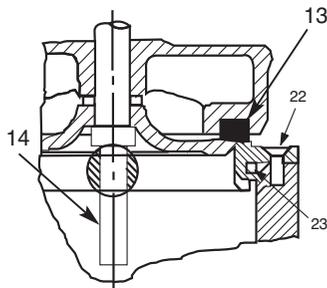
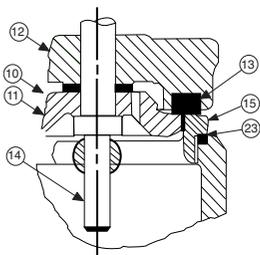
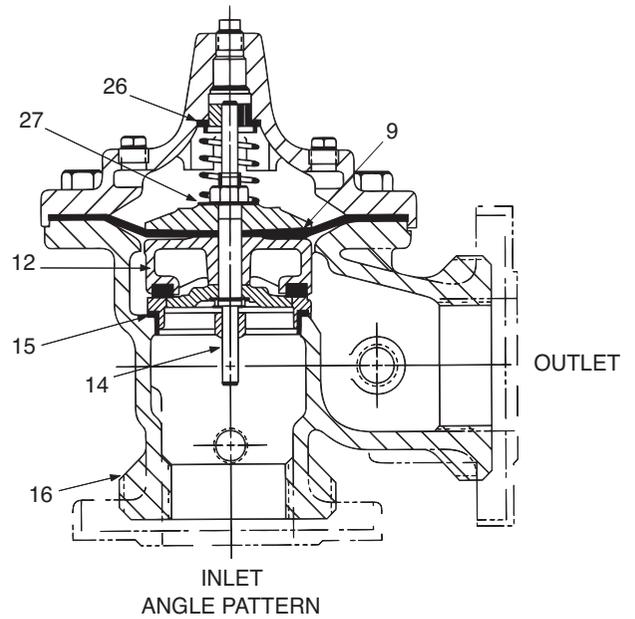
4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. **Bleed air from all high points.**

5. Follow steps under “Start-Up and Adjustment” Section in Technical Manual for returning complete valve back to service.



PARTS LIST

Item	Description
1.	Pipe Plug
2.	Drive Screws (for nameplate)
3.	Hex Nut (8" and larger)
4.	Stud (8" and larger)
5.	Cover Bearing
6.	Cover
7.	Stem Nut
8.	Diaphragm Washer
9.	Diaphragm
10.	Spacer Washers
11.	Disc Guide
12.	Disc Retainer
13.	Disc
14.	Stem
15.	Seat
16.	Body
17.	Spring
22.	Flat Head Screws (8" and larger)
23.	Seat O-Ring
24.	Hex head Bolt (1 1/4" thru 4")
25.	Nameplate
26.	Upper Spring Washer (Epoxy coated valves only)
27.	Lower Spring Washer (Epoxy coated valves only)
28.	Cover Bearing Housing (16" only)
29.	Cover O-Ring (16" only)
30.	Hex Bolt (16" only)
31.	Pipe Cap (16" only)





—MODEL—100-01 Hytrol Valve Service Data

Description 100-01 Hytrol Valve

The Cla-Val Model 100-01 Hytrol Valve is a main valve for Cla-Val Automatic Control Valves. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and disc guide, forms a seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.



Description 100-20 600 Series Hytrol Valve

The Cla-Val Model 100-20 Hytrol Valve (600 Series main valve) have only one part -the body- that is different from standard 100 Series Cla-Val main valve parts. The remaining parts of the 600 series main valve are standard Cla-Val main valve parts. All service and maintenance information for the standard 100 Series main valves also apply to the 600 series main valves.

The most important thing to remember when ordering main valve repair kits and replacement parts, except for the body, all other parts are going to be for a smaller size main valve. Cla-Val identifies main valve parts with the flange size of the standard 100 Series main valve. Refer to the "Main Valve Sizes" chart below.

HYTROL Service Data

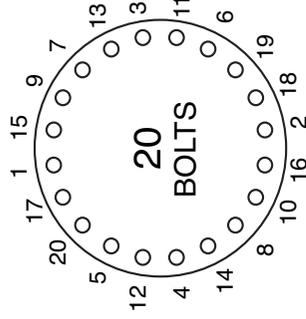
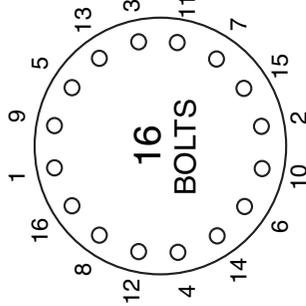
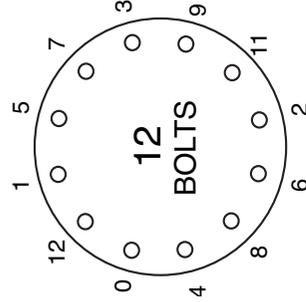
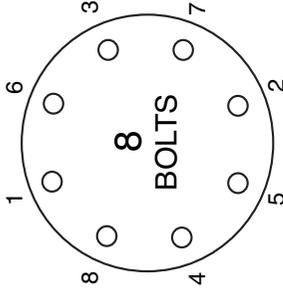
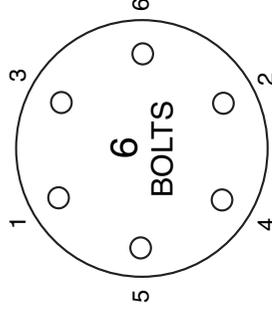
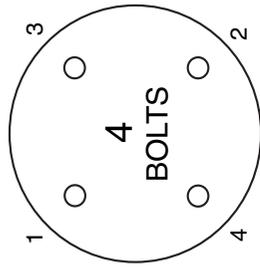
HYTROL SIZE		Stem Travel		Cover Capacity Displacement		Valve Stem Thread	Center Plug	Cover Nut or Bolt			Cover Lifting Holes UNC	Cover Plug		Cover Torque		Stem Nut**		Stem Nut Torque	
100-01	100-20	inches	mm	Gallons	Liters	UNF-Internal	NPT	Thread (Bolt)	Socket	Qty		Thread	Socket	ft. Lbs.	in. Lbs.	Thread	Socket (Long)	Lubed	DRY
1"	25							1/4" - 20 (B)	7/16"	8				4	48	3/8" - 24		4	6
1 1/4"	32					10 - 32	1/4"	5/16" - 18 (B)	1/2"	8				8	96	7/16" - 20		6	10
1 1/2"	40					10 - 32	1/4"	5/16" - 18 (B)	1/2"	8				8	96	7/16" - 20		6	10
2"	50					10 - 32	1/2"	3/8" - 16 (B)	9/16"	8		3/8"	7/16"	12	1/2" - 20	3/4"	10	15	
2 1/2"	65					10 - 32	1/2"	7/16" - 14 (B)	5/8"	8		1/2"	9/16"	20	5/8" - 18	15/16"	21	30	
3"	80	4"	100			0.080	0.30	1/2" - 13 (B)	3/4"	8		1/2"	9/16"	30	5/8" - 18	15/16"	21	30	
4"	100	6"	150			0.169	0.64	3/4" - 10 (B)	1 1/8"	8		3/4"	5/8"	110	3/4" - 16	1 1/16"	40	60	
6"	150	8"	200			0.531	2.00	3/4" - 10 (B)	1 1/8"	12		3/4"	5/8"	110	7/8" - 14	1 5/16"	85	125	
8"	200	10"	250			1.26	4.80	3/4" - 10	1 1/4"	16		5/8" - 11	1"	110	1 1/8" - 12	1 13/16"	125	185	
10"	250	12"	300			2.51	9.50	7/8" - 9	1 7/16"	20		3/4" - 10	1"	160	1 1/2" - 12	1 7/8"	252	375	
12"	300	16"	400			4.0	15.10	1 1/8" - 7	1 13/16"	20		3/4" - 10	1"	390	1 1/2" - 12	2 1/2"	270	400	
14"	350					6.5	24.60	1 1/4" - 7	2"	20		1"	13/16"	545	1 1/2" - 12	2 1/2"	280	420	
16"	400	20", 24"	600			9.6	36.20	1 1/4" - 7	2"	20		1"	13/16"	545	2" - 16	3"	500	750	
20"	500					12	45.40	1 3/8" - 6	2 1/8"	24		1"	13/16"	670	2 1/4" - 16	3 1/2"	930	N/R	
24"	600	30"	800			29.0	108.80	1 1/2" - 12	2 3/8"	24		1"	13/16"	800	3" - 12	Special	1350	N/R	

* Adapter p/n 2594101E inside 1/4" - 28"

Grade 5 Bolts
"Heavy" Grade Nuts
Tighten cover nuts in a "star" cross-over pattern

** Must Use ONLY Cla-Val Supplied part

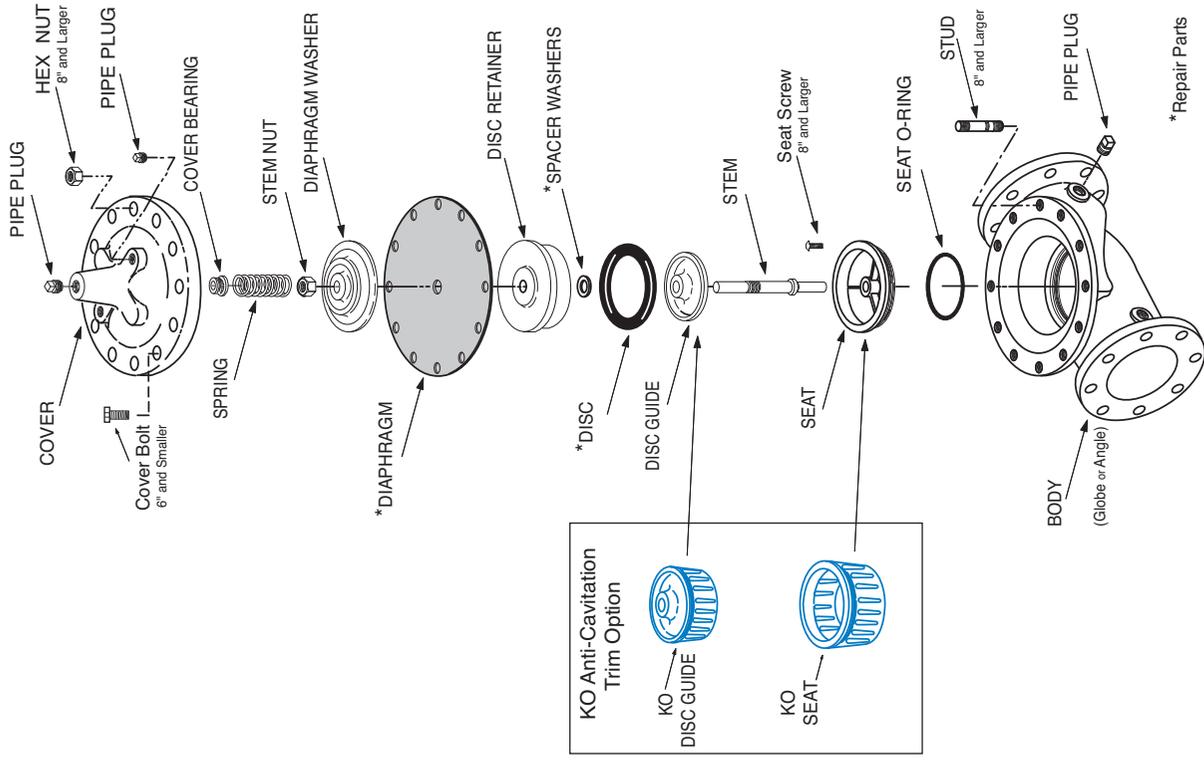
BOLT/NUT TORQUING PROCEDURES ON VALVE COVERS



Follow this procedure when reassembling MAIN Valve:

1. Tightens bolts/nuts in a "Star" or "Cross-Over" pattern following the numbers shown above to insure that cover seats evenly on the diaphragm material and body.
2. Torque the bolt/nuts in three stages with a "Star" or "Cross-Over" pattern for each stage:
 - A. To approximately 10% of final torque.
 - B. To approximately 75% of final torque.
 - C. To final required torque.
3. Valves that are to be tested to 375 PSI or higher should be retorqued after 24 hours.

100-01 Hytrol Main Valve Assembly



*Repair Parts



— MODEL — **CRL5A**
PRESSURE RELIEF CONTROL

DESCRIPTION

The CRL5A Pressure Relief Control is a direct-acting, spring-loaded, diaphragm-type relief valve. It may be used as a self-contained valve or as a pilot control for Cla-Val valves. It opens and closes within very close pressure limits.

INSTALLATION

The CRL5A Pressure Relief Control may be installed in any position. CRL5A body (7) has one inlet and one outlet ports with two smaller side ports. Side ports are for control connections or gauge installation. A flow direction indicator is cast into body. Control pressure sensing is through small side port in powerunit (6).

OPERATION

The CRL5A Pressure Relief Control is normally held closed by compression spring force above diaphragm, and controlling pressure is applied under diaphragm. When controlling pressure exceeds spring setting, control disc is lifted off its seat permitting flow through the control. When controlling pressure drops below spring setting, spring returns control to normally closed position.

ADJUSTMENT PROCEDURE

The CRL5A Pressure Relief Control can be adjusted to provide relief setting at any pressure within the range found on nameplate. Provision should be made for pressure gauge at CRL5A sensing point.

Pressure adjustment is made by first loosening jam nut (10) and turning adjustment screw (9) to vary spring pressure on diaphragm. Turning adjustment screw clockwise increases pressure required to open control. Counterclockwise decreases pressure required to open control.

When pressure adjustments are complete tighten jam nut (10) and replace protective cap (1). If there is a problem of tampering, lock wire holes are provided in cap and cover. Wire cap to cover and secure with lead seal.

DISASSEMBLY

The CRL5A Pressure Relief Control does not need to be removed from pipeline for disassembly and service. Make sure that CRL5A system pressure is shut down and bleed off before beginning disassembly. If CRL5A is removed from pipeline for disassembly, be sure to use a soft jawed vise to hold body (7) during work.

Refer to Parts List Drawing for Item Numbers.

1. Remove cap (1), loosen jam nut (10) and turn adjusting screw (9) counterclockwise until spring tension is relieved.
2. Remove eight screws (4) holding cover (3), and powerunit (6) to body (7). Note orientation of powerunit sensing port and cover relative to control body for correct reassembly. Hold cover (3) and powerunit together, remove from body (7) and place on suitable work surface.
3. Remove cover (3) from powerunit (6). Remove spring (12) and two spring guides (11) from cover (3). Thinner spring guide should be on spring top.
4. Carefully unthread upper diaphragm washer (15) from stem (19) and remove. Remove diaphragm (16), lower diaphragm washer (17), and upper stem O-ring (5).
5. Pull stem (19) with lower disc assembly attached through bottom of powerunit.
6. Unscrew and carefully remove large hex disc retainer (21) and remove disc assembly (23) from bottom of stem. Use soft jaw pliers or vise to hold stem. The polished surface of stem must not be scored or scratched, because o-ring leaks will occur.
7. The seat (22) need not be removed unless it is damaged. If removal is necessary use proper size socket wrench and turn counterclockwise. NOTE: some models have integral seat in body.

INSPECTION

Inspect all parts for damage, or evidence of cross threading or leaking. Check all rubber parts for tears, abrasions or other damage. Check all metal parts for damage, corrosion, or excessive wear.

REPAIR AND REPLACEMENT

Minor nicks and scratches on metal parts may be polished out using water and 400 grit (or finer) wet or dry sandpaper. CRL5A Repair kit p/n 20666E consists of all rubber parts should be installed. When ordering replacement metal parts or repair kits, be sure to include all nameplate data and to specify desired item description and item number.

Refer to Parts List for Item Numbers.

REASSEMBLY

In general, reassembly is reverse of disassembly steps. However, following steps should be followed.

1. Check that all parts are clean and in good condition before reassembly.
2. Before installing O-rings, lubricate them with waterproof grease (Dow Corning 44 medium grade or equal).
3. Use grease very sparingly and install stem seal O-ring (18) in powerunit (6).
4. Use soft jaw pliers or vise to hold stem (19) with large bottom end facing up. Place disc assembly (23) with rubber facing up, on stem bottom. Thread large hex disc retainer (21) onto stem (19) to hold disc assembly (23) in place. Tighten large hex disc retainer (21) until snug and rubber disc (23) remains flat. Do not overtighten.
5. Use grease very sparingly and install upper stem O-ring (5) on stem. Install stem (19) from below through powerunit. Use a rotating motion with slight pressure to let stem pass through O-ring without damage. Do not cut O-ring with stem.
6. With stem (19) all the way up, place lower diaphragm washer (17) on stem with serrated side up. Place diaphragm (16) on stem, then upper diaphragm washer (15). Tighten upper diaphragm washer (15) onto stem (19) until snug.
7. Position powerunit (6) with stem assembly on body (7). Locate powerunit (6) sensing port as shown on parts list drawing.
8. Continue reassembly in reverse of disassembly steps 1, 2, and 3.

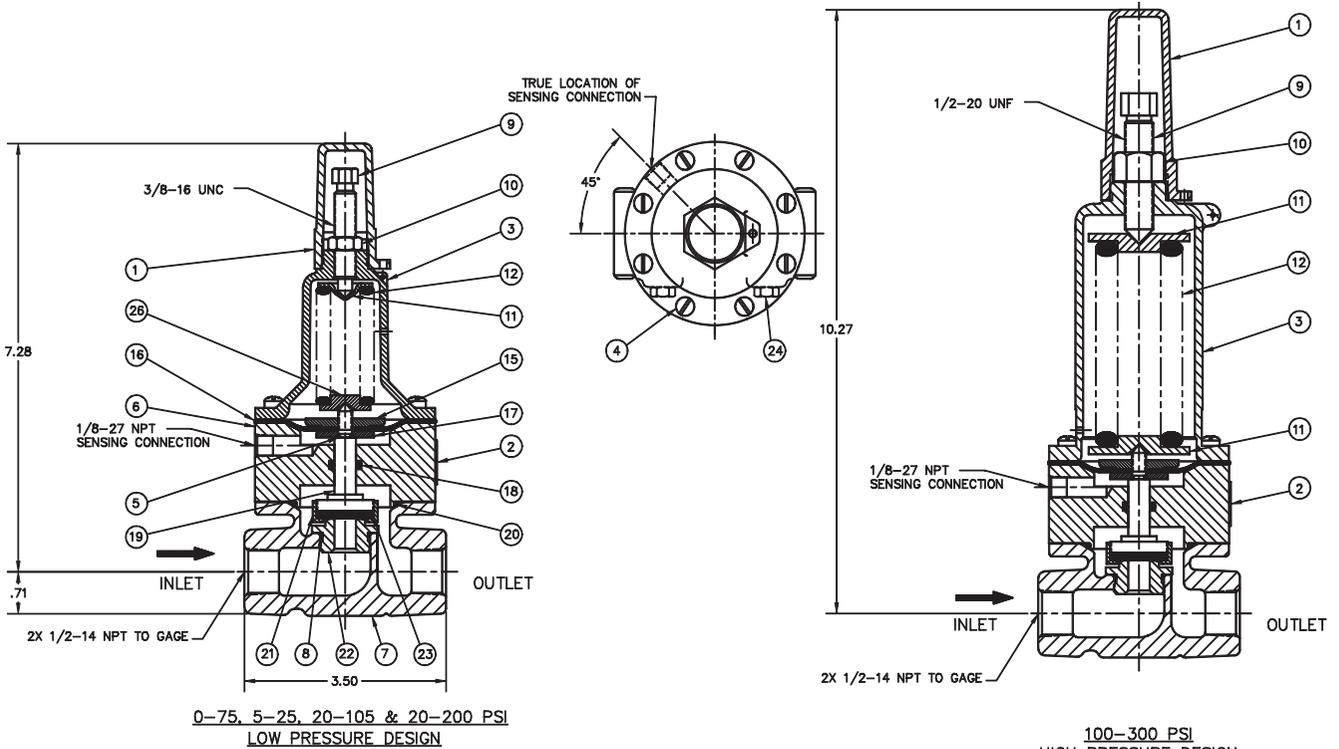
Note: Before 1985, high-pressure design CRL5A controls used different spring and spring guides that created a pre-load on assembly. During disassembly, four regular screws were removed first. Then four longer screws were used to "push" assembly apart. During reassembly, four longer screws were used to "pull" assembly together. Then remaining four regular screws were installed. Now with new spring and spring guides, eight regular screws (4) are used and control does not have pre-load to overcome.

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to open.	Controlling pressure too low.	Back off adjusting screw until valve opens.
Fails to open with spring compression removed.	Mechanical obstruction, corrosion, scale build-up on stem.	Disassemble, locate, and remove obstruction, scale.
Leakage from cover vent hole when controlling pressure is applied.	Diaphragm Damage	Disassembly replace damaged diaphragm.
	Loose diaphragm assembly.	Tighten upper diaphragm washer.
Fails to close.	No spring compression.	Re-set pressure adjustment.
Fails to close with spring compressed.	Mechanical obstruction.	Disassemble, locate and remove obstruction.



CRL5A

PRESSURE RELIEF CONTROL



CRL5A Range PSI	Approximate Increase for Each Clockwise Turn of Adjusting Screw (Item No. 9)
0 - 75	8.5 PSI
5 - 25	4.0 PSI
20 - 105	13.0 PSI
20 - 200	28.0 PSI
100 - 300	19.0 PSI



Item No.	Description	Qty			
			15	Washer, Diaphragm, Upper (Threaded Hole)	1
1	Cap	1	16	Diaphragm	1
2	Nameplate	1	17	Washer, Diaphragm, Lower	1
3	Cover	1	18	O-Ring (Stem Seal)	1
4	Screw, Fil HD	8	19	Stem	1
5	O-Ring (Stem, Upper)	1	20	O-Ring (Body)	1
6	Body, Powerunit	1	21	Retainer, Disc (Hex)	1
7	Body	1	22	Seat	1
8	O-Ring (Seat)	1	23	Disc Assembly	1
9	Screw, Adjusting	1	24	Plug, Pipe	2
10	Nut, Jam	1	26	Guide, Spring, Lower (For Low Pressure Design Only)	1
11	Guide, Spring	A/R		Repair Kit # 20666E includes:	
12	Spring	1		(Buna-N®, Diaphragm, Disc Assembly, O-rings)	

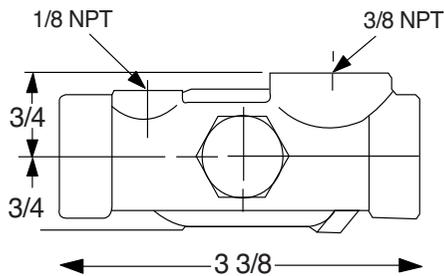


X44A

Strainer and Orifice Assembly

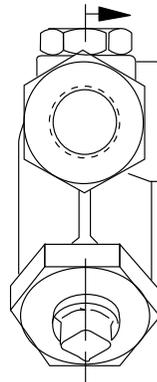
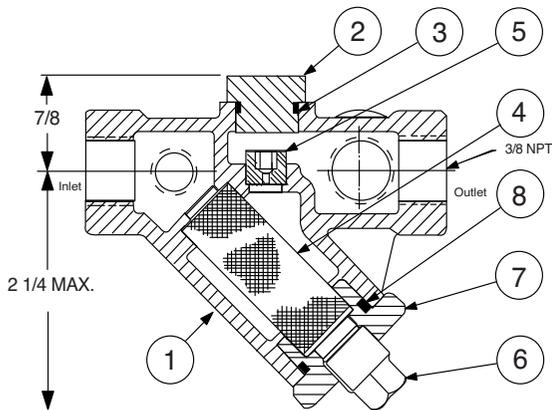
BRONZE BODY — DELRIN ORIFICE

3/8" x 3/8"



X44A STOCK NO.	ORIFICE DIA.	ORIFICE PLUG PART # (ITEM 5)
71310-01F	.031	94132-01
-02	.046	-02E
-03B	.062	-03C
-04K	.078	-04A
-05G	.093	-05H
-06	.109	-06
*-07C	.125	-07D
-08	.140	-08
-09	.156	-09
-10	.187	-10H
-11	.172	-11F

*Standard



When ordering parts, please specify:

- All Nameplate Data
- Item Number
- Description
- Recommended Spare Parts

ITEM	DESCRIPTION	MATERIAL	QTY.
1	Body	Red Brs.	1
2	Plug, Top	Brass	1
3	"O" Ring, Plug Top	Syn. Rub.	1
4	Screen	Monel	1
5	Orifice Plug	Delrin	1
6	Plug, Pipe	Brass	1
7	Strainer Plug	S.S.	1
8	"O" Ring, Strainer Plug	Syn. Rub.	1



—MODEL— **CV**
Flow Control



DESCRIPTION

The CV Control is an adjustable restriction which acts as a needle valve when flow is in the direction of the stem. When flow is in the reverse direction, the port area opens fully to allow unrestricted flow. When installed in the control system of a Cla-Val automatic valve, it can be arranged to function as either an opening or closing speed control.

OPERATION

The CV Flow Control permits full flow from port A to B, and restricted flow in the reverse direction. Flow from port A to B lifts the disc from seat, permitting full flow. Flow in the reverse direction seats the disc, causing fluid to pass through the clearance between the stem and the disc. This clearance can be increased, thereby increasing the restricted flow, by screwing the stem out, or counter-clockwise. Turning the stem in, or clockwise reduces the clearance between the stem and the disc, thereby reducing the restricted flow.'

INSTALLATION

Install the CV Flow Control as shown in the valve schematic. All connections must be tight to prevent leakage.

DISASSEMBLY

Follow the sequence of the item numbers assigned to the parts in the cross sectional illustration for recommended order of disassembly.

Use a scriber, or similar sharp-pointed tool to remove O-ring from the stem.

INSPECTION

Inspect all threads for damage or evidence of cross-threading. Check mating surface of seat and valve disc for excessive scoring or embedded foreign particles. Check spring for visible distortion, cracks and breaks. Inspect all parts for damage, corrosion and cleanliness.

CLEANING

After disassembly and inspection, cleaning of the parts can begin. Water service usually will produce mineral or lime deposits on metal parts in contact with water. These deposits can be cleaned by dipping the parts in a 5-percent muriatic acid solution just long enough for deposits to dissolve. This will remove most of the common types of deposits. **Caution: use extreme care when handling acid.** If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water. Rinse parts in water before handling. An appropriate solvent can clean parts used in fueling service. Dry with compressed air or a clean, lint-free cloth. Protect from damage and dust until reassembled.

REPAIR AND REPLACEMENT

Minor nicks and scratches may be polished out using a fine grade of emery or crocus cloth; replace parts if scratches cannot be removed.

Replace O-ring packing and gasket each time CV Flow Control is overhauled.

Replace all parts which are defective. Replace any parts which create the slightest doubt that they will not afford completely satisfactory operation. Use Inspection steps as a guide.

REASSEMBLY

Reassembly is the reverse of disassembly; no special tools are required.

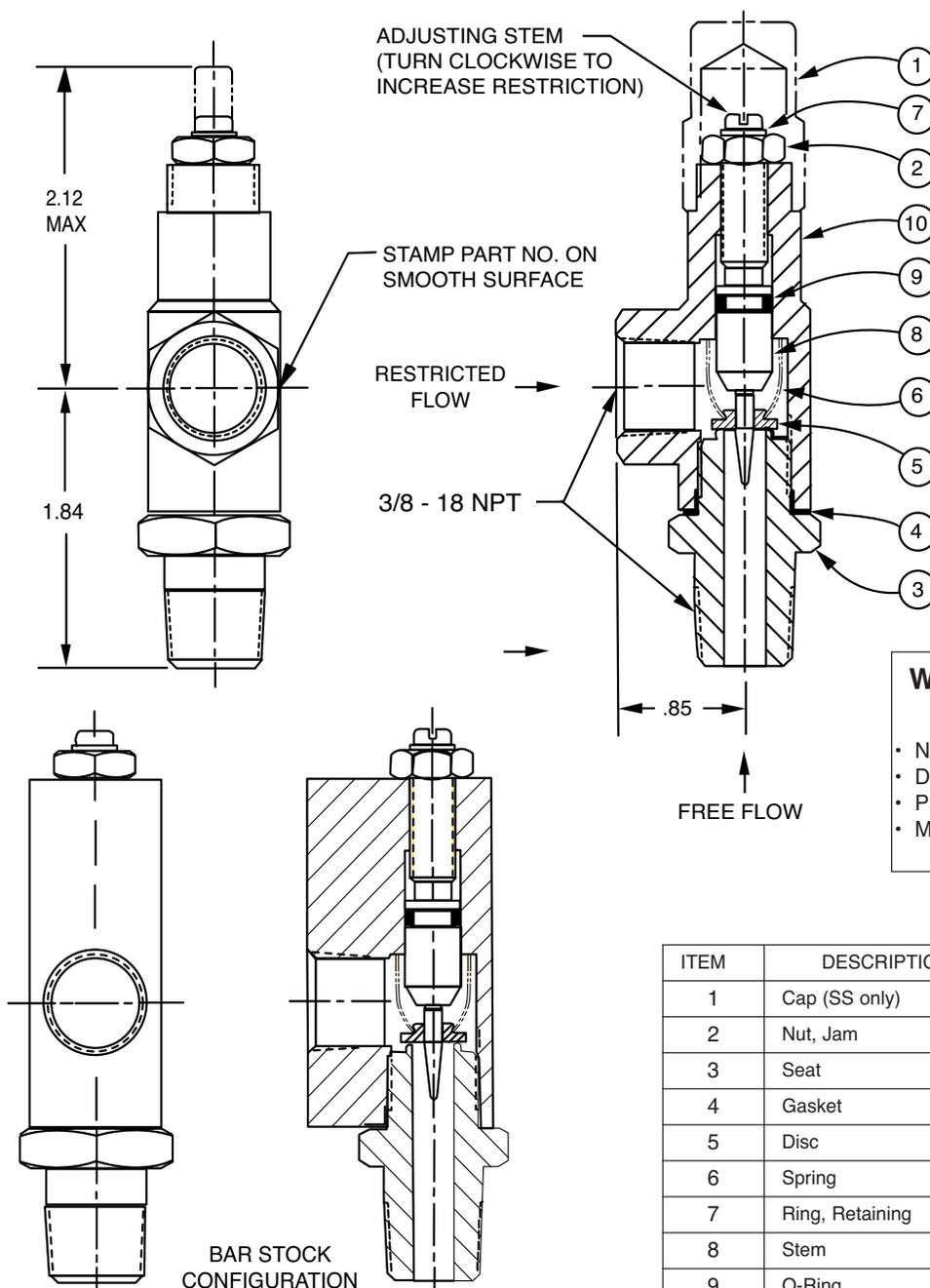
TEST PROCEDURE

No testing of the flow Control is required prior to reassembly to the pilot control system on Cla-Val Main Valve.



CV

3/8" Flow Control


**When ordering parts,
please specify:**

- Number Stamped on Side
- Description (CV Flow Control)
- Part Description
- Material

ITEM	DESCRIPTION	QTY
1	Cap (SS only)	1
2	Nut, Jam	1
3	Seat	1
4	Gasket	1
5	Disc	1
6	Spring	1
7	Ring, Retaining	1
8	Stem	1
9	O-Ring	1
10	Housing	1



—MODEL— **X101C**

Valve Position Indicator

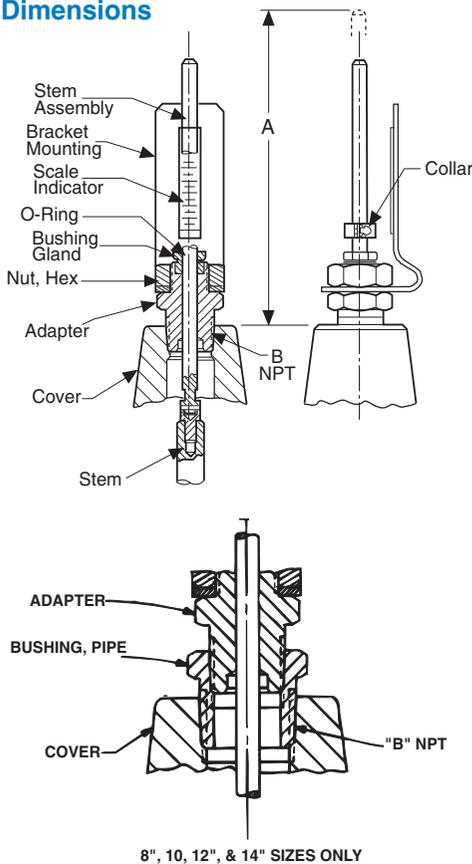


- **Accurate Percent of Opening Scale**
- **Positive Visual Indicator**
- **Frictionless**
- **Easy to Read**

The Cla-Val Model X101C Valve Position Indicator is designed to display Cla-Val valve position quickly and easily. A solid stainless steel indicator rod is fastened directly to the valve stem. The adjustable indicator is a collar attached to this rod. The percent of opening scale is attached to the mounting bracket. As the valve opens and closes, the percent open is read directly from the indicator scale.

The Model X101C is furnished complete for installation on specified size Cla-Val Automatic Control Valve.

Dimensions



Valve Size	A INCHES	B NPT
1 1/4"	10.19	1/4
1 1/2"	10.19	1/4
2"	7.45	1/2
2 1/2"	7.17	1/2
3"	7.34	1/2
4"	7.00	3/4
6"	6.69	3/4
8"	6.90	1
10"	9.88	1
12"	9.59	1 1/4
14"	9.16	1 1/2
16"	11.00	2
18"	9.76	2
20"	10.09	2
24"	11.41	2
30"	12.75	2
36"	13.91	2

Specifications

Sizes: 1 1/2" thru 30"

Materials: Brass, Stainless Steel

Pressure Rating: 400 psi

Installation

Can be installed on any Cla-Val basic main valve in a few minutes. Simply replace the fitting on top of the valve cover with the indicator assembly.

When Ordering, Please Specify

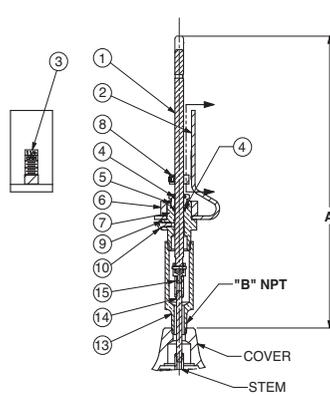
1. Valve Size
2. Catalog No. X101C
3. Valve Series No. (Appears on Valve Nameplate)

Dimension "A" is height added to valve by indicator assembly.

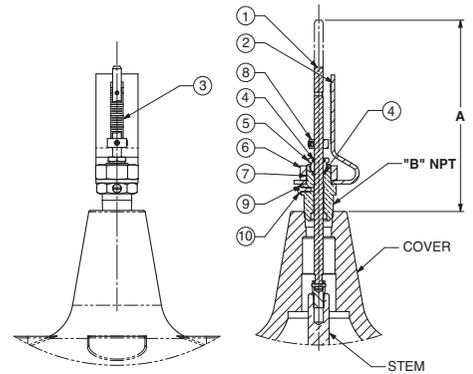
The Model X101C is included with FM Approved valves in 3", 4", 6", 8" sizes.

PARTS LIST

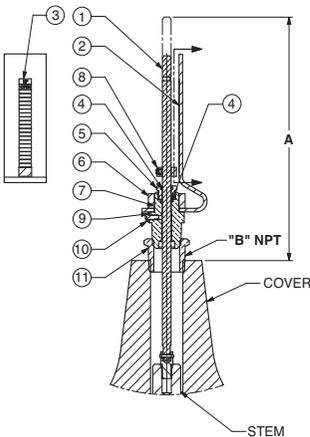
ITEM NO.	QTY.	DESCRIPTION
1	1	ACTUATING STEM ASSEMBLY
2	1	BRACKET, X101C
3	1	SCALE, INDICATOR X101C
4	2	O-RING (2-011)
5	1	BUSHING, GLAND
6	1	NUT, HEX JAM
7	1	ADAPTER, X105L
8	1	COLLAR ASSEMBLY, X105L
9	1	WASHER, FLAT
10	1	SCREW, ROUND HEAD #8-32 UNC
11	1	BUSHING, PIPE, HEX (8" & LARGER)
12	1	BELL REDUCER (16" SIZE ONLY)
13	1	ADAPTER (1 1/4"-1 1/2" SIZES ONLY)
14	1	STUD THREADED #10-32 UNF (1 1/4"-1 1/2" SIZES ONLY)
15	1	ADAPTER, X103A (1 1/4"-1 1/2" SIZES ONLY)



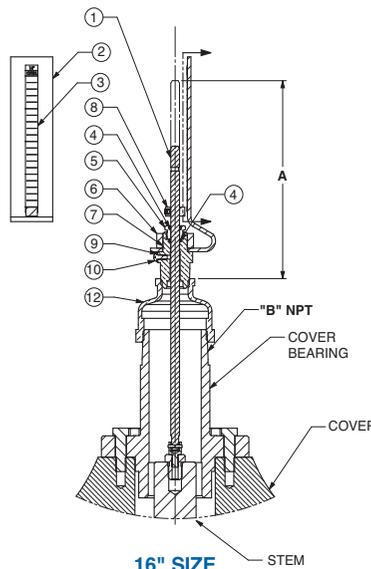
1 1/4" THRU 1 1/2" SIZES
(1 1/2" SIZE SHOWN)



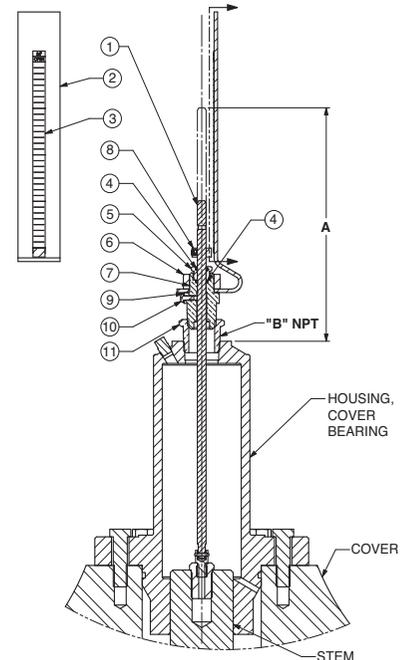
2" THRU 6" SIZES
(6" SIZE SHOWN)



8" THRU 14" SIZES
(10" SIZE SHOWN)



16" SIZE



18" THRU 36" SIZES
(24" SIZE SHOWN)



E-X101C (R-04/2018)

CLA-VAL

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Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-mail: info@cla-val.co.uk

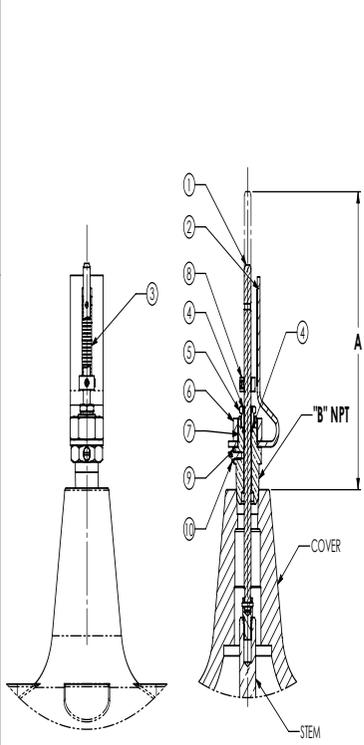
CLA-VAL FRANCE
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ZAC du Champ du Pérrier
France - 01700 Neyron
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Fax: 33-4-72-25-04-17
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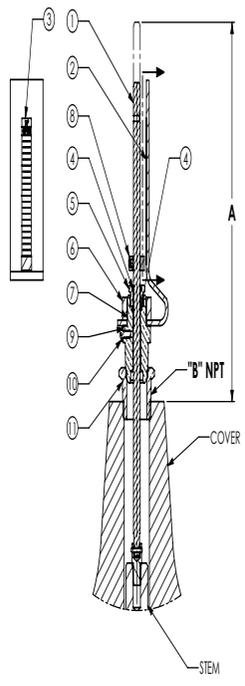
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VALVE SIZE	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
"A"	10.19	10.19	7.45	7.17	7.34	7.00	6.69	6.90	9.88	9.59	9.16	11.00	9.76	10.09	11.41	12.75	13.91
"B" NPT	1/4-18	1/4-18	1/2-14	1/2-14	1/2-14	3/4-14	3/4-14	1-1 1/2	1-1 1/2	1 1/4-1 1/2	1 1/2-1 1/2	2-1 1/2	2-1 1/2	2-1 1/2	2-1 1/2	2-1 1/2	2-1 1/2

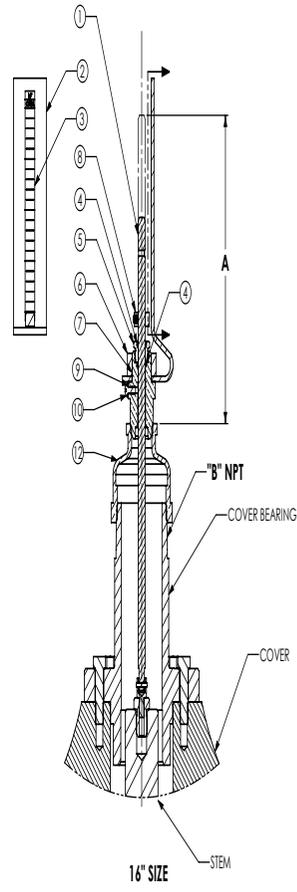
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A-D	SEE REVISION FILE		
E	REDRAWN IN SOLIDWORKS. ADDED SIZES 18" & 8" TO TABLE. UPDATED DIM "A" VALUE IN TABLE. UPDATED PARTS LIST (ECO 26392)	09-11-17	EK



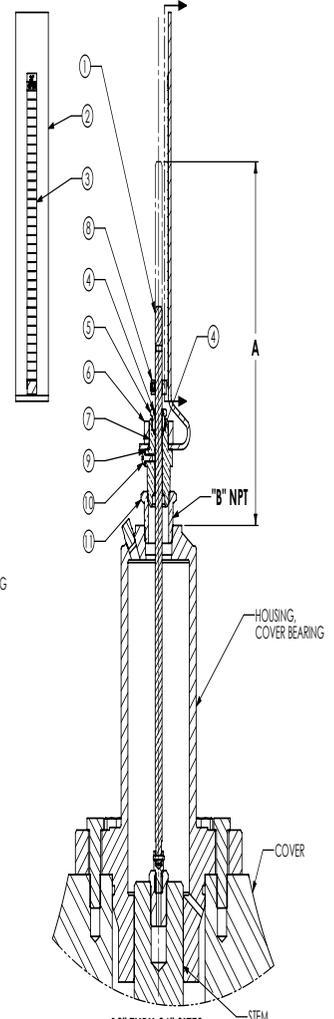
2" THRU 6" SIZES
(6" SIZE SHOWN)



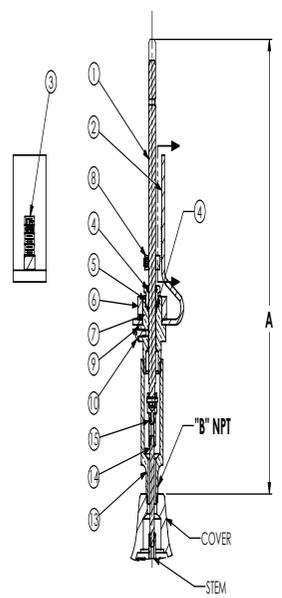
8" THRU 14" SIZES
(10" SIZE SHOWN)



16" SIZE



18" THRU 36" SIZES
(24" SIZE SHOWN)



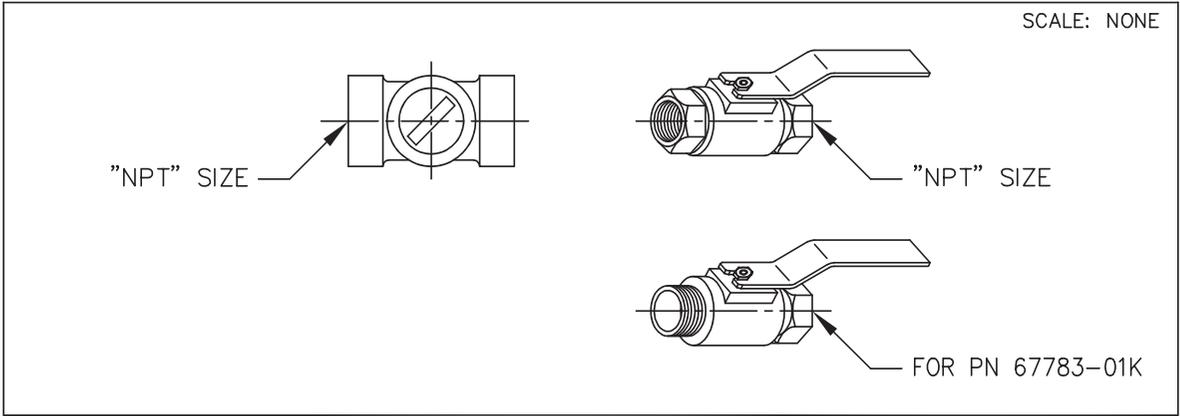
1 1/4" THRU 1 1/2" SIZES
(1 1/2" SIZE SHOWN)

ITEM NO.	QTY.	DESCRIPTION
15	1	ADAPTER, X103A (1 1/4"-1 1/2" SIZES ONLY)
14	1	STUD THREADED #10-32 UNF (1 1/4"-1 1/2" SIZES ONLY)
13	1	ADAPTER (1 1/4"-1 1/2" SIZES ONLY)
12	1	BELL REDUCER (1 1/6" SIZE ONLY)
11	1	BUSHING, PIPE, HEX(8" & LARGER)
10	1	SCREW, ROUND HEAD #8-32 UNC
9	1	WASHER, FLAT
8	1	COLLAR ASSEMBLY, X106L
7	1	ADAPTER, X105L
6	1	NUT, HEX JAM
5	1	BUSHING, GLAND
4	2	O-RING (2-011)
3	1	SCALE, INDICATOR X101C
2	1	BRACKET, X101C
1	1	ACTUATING STEM ASSEMBLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:		CONTRACT NO. -----		 NEWPORT BEACH, CALIFORNIA	
FRACTION	DECIMAL	ANGULAR	APPROVALS	DATE	TITLE
±1/16	.001 ±.001	±1/2°	APPROVED	DATE	X101C VALVE POSITION INDICATOR WITH CALIBRATED PERCENT OF OPENING SCALE 1 1/4"-36" SIZES
			DRAWN	D.P.	1-29-78
			CHECKED	M.F.	1-30-78
			APPROVED	J.A.S.	1-30-78
SURFACE FINISH: ✓ BREAK CORNERS AND MAX FILLET RADIUS .001 -DO NOT SCALE DRAWING-			ISS. / CHG. CODE	DWG. NO.	REV.
SOLIDWORKS DWG.			D / 86184	80978	E
			SCALE	1/2"	SHEET 1 OF 1

AK	07-10-08	BB	ADDED PN'S 67783-62B (NED 62200)
AK	08-14-08	BC	ADDED PN'S 67783-63K (NED 62218)
PC	10-1-2008	BD	ADDED PN 67783-64H (NED 62446)
CAD REVISION RECORD - DO NOT REVISE MANUALLY		BY	DATE
LTR	DESCRIPTION		
A-AY	SEE REVISION FILE		
BA	ADDED PN'S 67783-59H, 67783-60F & 67783-61D (ECO 20434)	AK	03-14-06

 CLA-VAL CO. NEWPORT BEACH, CALIFORNIA	CATALOG NO.	DRAWING NO.	REV
		67783	BD
TYPE OF VALVE AND MAIN FEATURES		DESIGN	
<p style="text-align: center; font-size: 24pt;">CK2 COCK/BALL VALVE</p>		DRAWN	MGR 4-02-80
		CHK'D	KD 4-03-80
		APV'D	CH 4-07-80



CLA-VAL PART NO. AND MATERIAL								
BRONZE WITH HANDLE	STEEL WITH HANDLE	IRON WITH HANDLE	316 SST WITH HANDLE	316 SST W/ LOCKING HANDLE	BRONZE WITH HANDLE	MONEL WITH HANDLE	MONEL W/ LOCKING HANDLE	SIZE "NPT"
67783-01K*	-09C	-17F	-25J SUPSD BY-26G		-41F SUPSD BY-01K			1/8"
-02H	-10A	-18D	-26G	-51E SUPSD BY-26G -52C	-42D SUPSD BY-02H	-55F		1/4"
-03F * -59H***	-11J	-19B	-27E	-46E SUPSD BY-27E -53A	-45G -57B**	-48A SUPSD BY-49J	-63K	3/8"
-04D -60F***	-12G	-20K	-28C	-54J	-43B SUPSD BY-04D	-49J	-62B	1/2"
-05A -61D***	-13E	-21H	-29A	-64H	-44K SUPSD BY-05A	-56D		3/4"
-06J	-14C	-22F	-30J			-58K		1"
-07G	-15K	-23D	-31G					1 1/4"
-08E	-16H	-24B	-32E					1 1/2"
-50G			-47C					2"

- * SEE ENGINEERING APPROVED VENDORS TABLE (SHEET 2 OF 2).
- ** HAMMOND VALVE 8501 ONLY.
- *** WILKINS CK2 (SEE SHEET 2 OF 2)

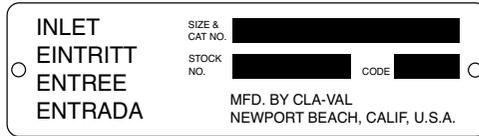
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Proper Identification

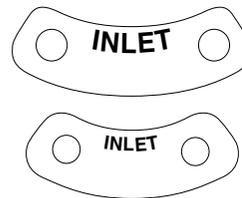
For ordering repair kits, replacement parts, or for inquiries concerning valve operation, it is important to properly identify Cla-Val products already in service by including all nameplate data with your inquiry. Pertinent product data includes valve function, size, material, pressure rating, end details, type of pilot controls used and control adjustment ranges.

Identification Plates

For product identification, cast-in body markings are supplemented by identification plates as illustrated on this page. The plates, depending on type and size of product, are mounted in the most practical position. **It is extremely important that these identification plates are not painted over, removed, or in any other way rendered illegible.**



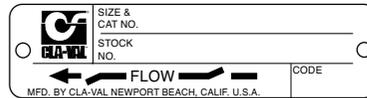
This brass plate appears on valves sized 2 1/2" and larger and is located on the top of the inlet flange.



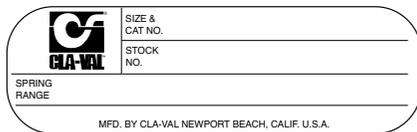
These two brass plates appear on 3/8", 1/2", and 3/4" size valves and are located on the valve cover.



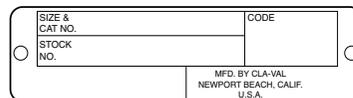
This brass plate appears on altitude valves only and is found on top of the outlet flange.



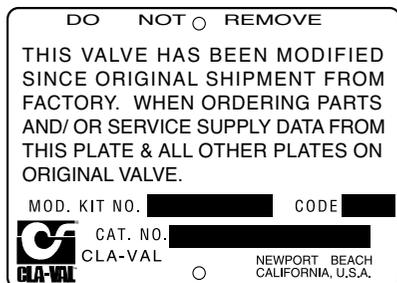
These two brass plates appear on threaded valves 1" through 3" size or flanged valves 1" through 2". It is located on only one side of the valve body.



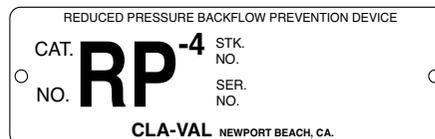
This tag is affixed to the cover of the pilot control valve. The adjustment range appears in the spring range section.



This brass plate is used to identify pilot control valves. The adjustment range is stamped into the plate.



This aluminum plate is included in pilot system modification kits and is to be wired to the new pilot control system after installation.



This brass plate is used on our backflow prevention assemblies. It is located on the side of the Number Two check (2" through 10"). The serial number of the assembly is also stamped on the top of the inlet flange of the Number One check.

HOW TO ORDER

Because of the vast number of possible configurations and combinations available, many valves and controls are not shown in published product and price lists. For ordering information, price and availability on product that are not listed, please contact your local Cla-Val office or our factory office located at:

P. O. Box 1325
Newport Beach, California 92659-0325
(949) 722-4800
FAX (949) 548-5441

SPECIFY WHEN ORDERING

- Model Number
- Globe or Angle Pattern
- Adjustment Range (As Applicable)
- Valve Size
- Threaded or Flanged
- Body and Trim Materials
- Optional Features
- Pressure Class

UNLESS OTHERWISE SPECIFIED

- Globe or angle pattern are the same price
- Ductile iron body and bronze trim are standard
- X46 Flow Clean Strainer or X43 "Y" Strainer are included
- CK2 Isolation Valves are included in price on 4" and larger valve sizes (6" and larger on 600 Series)

LIMITED WARRANTY

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment.

We will repair or replace defective material, free of charge, that is returned to our factory, transportation charges prepaid, if upon inspection, the material is found to have been defective at time of original shipment. This warranty is expressly conditioned on the purchaser's providing written notification to Cla-Val immediate upon discovery of the defect.

Components used by Cla-Val but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

DISCLAIMER OF WARRANTIES AND LIMITATIONS OF LIABILITY

The foregoing warranty is exclusive and in lieu of all other warranties and representations, whether expressed, implied, oral or written, including but not limited to any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services. No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product. The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

TERMS OF SALE

ACCEPTANCE OF ORDERS

All orders are subject to acceptance by our main office at Newport Beach, California.

CREDIT TERMS

Credit terms are net thirty (30) days from date of invoice.

PURCHASE ORDER FORMS

Orders submitted on customer's own purchase order forms will be accepted only with the express understanding that no statements, clauses, or conditions contained in said order form will be binding on the Seller if they in any way modify the Seller's own terms and conditions of sales.

PRODUCT CHANGES

The right is reserved to make changes in pattern, design or materials when deemed necessary, without prior notice.

PRICES

All prices are F.O.B. Newport Beach, California unless expressly stated otherwise on our acknowledgement of the order. Prices are subject to change without notice. The prices at which any order is accepted are subject to adjustment to the Seller's price in effect at the time of shipment. Prices do not include sales, excise, municipal, state or any other Government taxes. Minimum order charge \$100.00.

RESPONSIBILITY

We will not be responsible for delays resulting from strikes, accidents, negligence of carriers, or other causes beyond our control. Also, we will not be liable for any unauthorized product alterations or charges accruing there from.

RISK

All goods are shipped at the risk of the purchaser after they have been delivered by to the carrier. Claims for error, shortages, etc., must be made upon receipt of goods.

EXPORT SHIPMENTS

Export shipments are subject to an additional charge for export packing.

RETURNED GOODS

1. Customers must obtain written approval from Cla-Val prior to returning any material.
2. Cla-Val reserves the right to refuse the return of any products.
3. Products more than six (6) months old cannot be returned for credit.
4. Specially produced, non-standard models cannot be returned for credit.
5. Rubber goods such as diaphragms, discs, o-rings, etc., cannot be returned for credit, unless as part of an unopened vacuum sealed repair kit which is less than six months old.
6. Goods authorized for return are subject to a 35% (\$100 minimum) restocking charge and a service charge for inspection, reconditioning, replacement of rubber parts, retesting, repainting and repackaging as required.
7. Authorized returned goods must be packaged and shipped prepaid to Cla-Val, 1701 Placentia Avenue, Costa Mesa, California 92627.



E-Product I.D. (R-3/2011)

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Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50

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www.cla-val.com

Represented By:



—MODEL— **REPAIR KITS**

Model 100-01 Hytrol Main Valve

BUNA-N MATERIAL				
	RUBBER KIT	REPAIR KIT	REBUILD KIT	STUD & NUT KIT
	STOCK NO.	STOCK NO.	STOCK NO.	STOCK NO.
3/8"	9169801K		21176614B	21176633J
1/2"	9169802H	21176602F	21176615A	21176634H
3/4"	9169802H	21176602F	21176615A	21176634H
1" Non-Guided	9169803F	21176601G	21176616K	21176636F
1"	9169804D	21176603E	21176617J	21176636F
1 1/4"	9169804D	21176603E	21176617J	21176636F
1 1/2"	9169804D	21176603E	21176617J	21176636F
2"	9169805A	21176608K	21176618H	21176637E
2 1/2"	9169811J	21176609J	21176619G	21176638D
3"	9169812G	21176604D	21176620D	21176639C
4"	9169813E	21176605C	21176621C	21176640K
6"	9169815K	21176606B	21176622B	21176641J
8"	9817901D	21176607A	21176623A	21176642H
10"	9817902B	21176610F	21176624K	21176643G
12"	9817903K	21176611E	21176625J	21176644F
14"	9817904H	21176612D	21176626H	21176645E
16"	9817905E	21176613C	21176627G	21176645E

Model 100-20 Hytrol Main Valve

BUNA-N MATERIAL				
	RUBBER KIT	REPAIR KIT	REBUILD KIT	STUD & NUT KIT
	STOCK NO.	STOCK NO.	STOCK NO.	STOCK NO.
3"	9169805A	21176608K	21176618H	21176637E
4"	9169812G	21176604D	21176620D	21176639C
6"	9169813E	21176605C	21176621C	21176640K
8"	9169815K	21176606B	21176622B	21176641J
10"	9817901D	21176607A	21176623A	21176642H
12"	9817902B	21176610F	21176624K	21176643G
14"	9817903K	21176611E	21176625J	21176644F
16"	9817903K	21176611E	21176625J	21176644F

Consult factory for larger sizes

Rubber Kit Includes: Diaphragm, Disc, Spacer Washers

Repair Kit Includes: Diaphragm, Disc, Spacer Washers, Epoxy Coated Disc Retainer, Epoxy Coated Diaphragm Washer, Protective Washer

Rebuild Kit Includes: Diaphragm, Disc, Spacer Washers, Epoxy Coated Disc Retainer, Epoxy Coated Diaphragm Washer, Protective Washer, Stainless Steel Bolts & Washers (6" & Below), Stainless Steel Studs, Nuts, & Washers (8" & Above), Stem, Stem Nut, Disc Guide

Stud & Nut Kit Includes: Stainless Steel Bolts & Washers (6" & Below), Stainless Steel Studs, Nuts, & Washers (8" & Above)

Repair Kits for 100-02/100-21 Powertrol and 100-03/100-22 Powercheck Main Valves

For: Powertrol and Powercheck Main Valves—150 Pressure Class Only

Includes: Diaphragm, Disc (or Disc Assembly) and O-rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number 100-02	Valve Size	Kit Stock Number	
			100-02 & 100-03	100-21 & 100-22
3/8"	9169901H	2 1/2"	9169910J	N/A
1/2" & 3/4"	9169902F	3"	9169911G	9169905J
1"	9169903D	4"	9169912E	9169911G
1 1/4" & 1 1/2"	9169904B	6"	9169913C	9169912E
2"	9169905J	8"	99116G	9169913C
		10"	9169939H	99116G
		12"	9169937B	9169939H

Larger Sizes: Consult Factory.

Repair Kits for 100-04/100-23 Hy-Check Main Valves

For: Hy-Check Main Valves—150 Pressure Class Only

Includes: Diaphragm, Disc and O-Rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number		Valve Size	Kit Stock Number	
	100-04	100-23		100-04	100-23
4"	20210901B	N/A	12"	20210905H	20210904J
6"	20210902A	20210901B	14"	20210906G	N/A
8"	20210903K	20210902A	16"	20210907F	20210905H
10"	20210904J	20210903K	20"	N/A	20210907F
			24"	N/A	20210907F

Larger Sizes: Consult Factory.

Repair Kits for Pilot Control Valves (In Standard Materials Only)

Includes: Diaphragm, Disc (or Disc Assembly), O-Rings, Gaskets or spare Screws as appropriate.

BUNA-N® (Standard Material)				VITON (For KB Controls)	
Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number
CDB	9170006C	CFM-9	12223E	CDB-KB	9170012A
CDB-30	9170023H	CRA (w/bucking spring)	9170001D	CRA-KB	N/A
CDB-31	9170024F	CRD (w/bucking spring)	9170002B	CRD-KB (w/bucking spring)	9170008J
CDB-7	9170017K	CRD (no bucking spring)	9170003K	CRL-KB	9170013J
CDH-2	18225D	CRD-18	20275401K	CDHS-2BKB	9170010E
CDHS-2	44607A	CRD-22	98923G	CDHS-2FKB	9170011C
CDHS-2B	9170004H	CRL (55F, 55L)	9170007A	CDHS-18KB (no bucking spring)	9170009G
CDHS-2F	9170005E	CRL60/55L-60	9170033G	102C-KB	1726202D
CDHS-3C-A2	24657K	CRL60/55L60 1"	9170042H		
CDHS-8A	2666901A	CRL-4A	43413E		
CDHS-18	9170003K	CRL-5 (55B)	65755B		
CDS-4	9170014G	CRL-5A (55G)	20666E		
CDS-5	14200A	CRL-18	20309801C		
CDS-6	20119301A	Universal CRL	9170041K		
CDS-6A	20349401C	CV	9170019F		
CFCM-M1	1222301C	X105L (O-ring)	00951E	Buna-N®	
CFM-2	12223E	102B-1	1502201F		
CFM-7	1263901K	102C-2	1726201F	CRD Disc Ret. (Solid)	C5256H
CFM-7A	1263901K	102C-3	1726201F	CRD Disc Ret. (Spring)	C5255K

Repair Assemblies (In Standard Materials Only)

Control	Description	Stock Number
CF1-C1	Pilot Assembly Only	89541H
CF1-CI	Complete Float Control less Ball and Rod	89016A
CFC2-C1	Disc, Distributor and Seals	2674701E
CSM 11-A2-2	Mechanical Parts Assembly	97544B
CSM 11-A2-2	Pilot Assembly Only	18053K
33A 1"	Complete Internal Assembly and Seal	2036030B
33A 2"	Complete Internal Assembly and Seal	2040830J

When ordering, please give complete nameplate data of the valve and/or control being repaired. MINIMUM ORDER CHARGE APPLIES

CLA-VAL

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N-RK (R-08/2018)