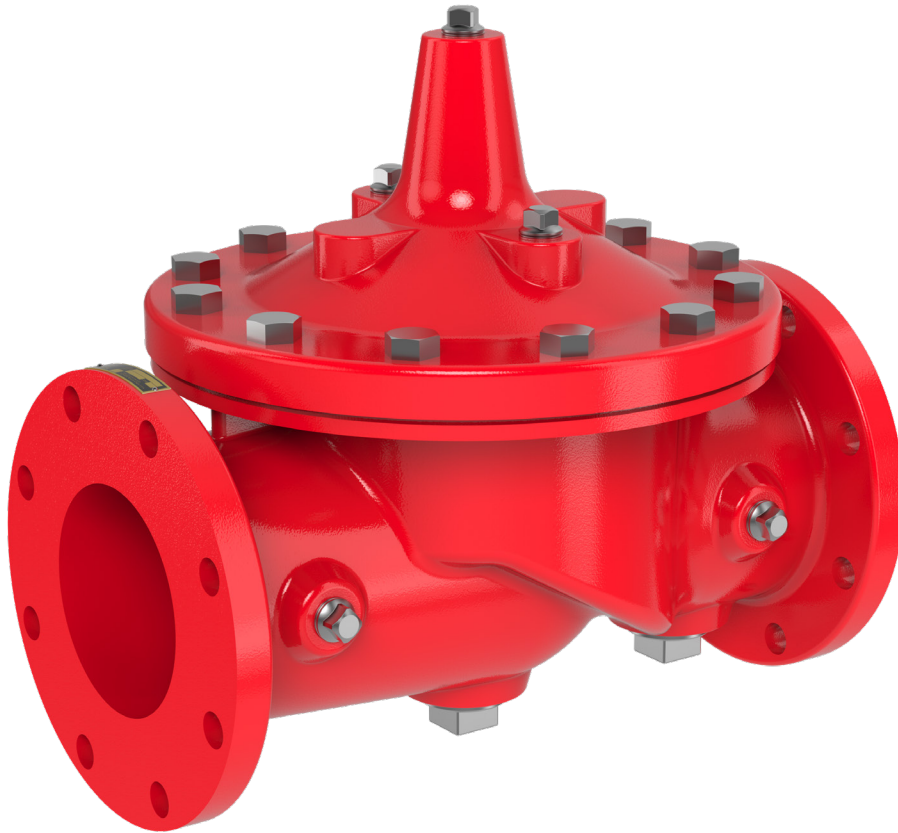




Model 100G-UU

UL Listed Deluge Valve

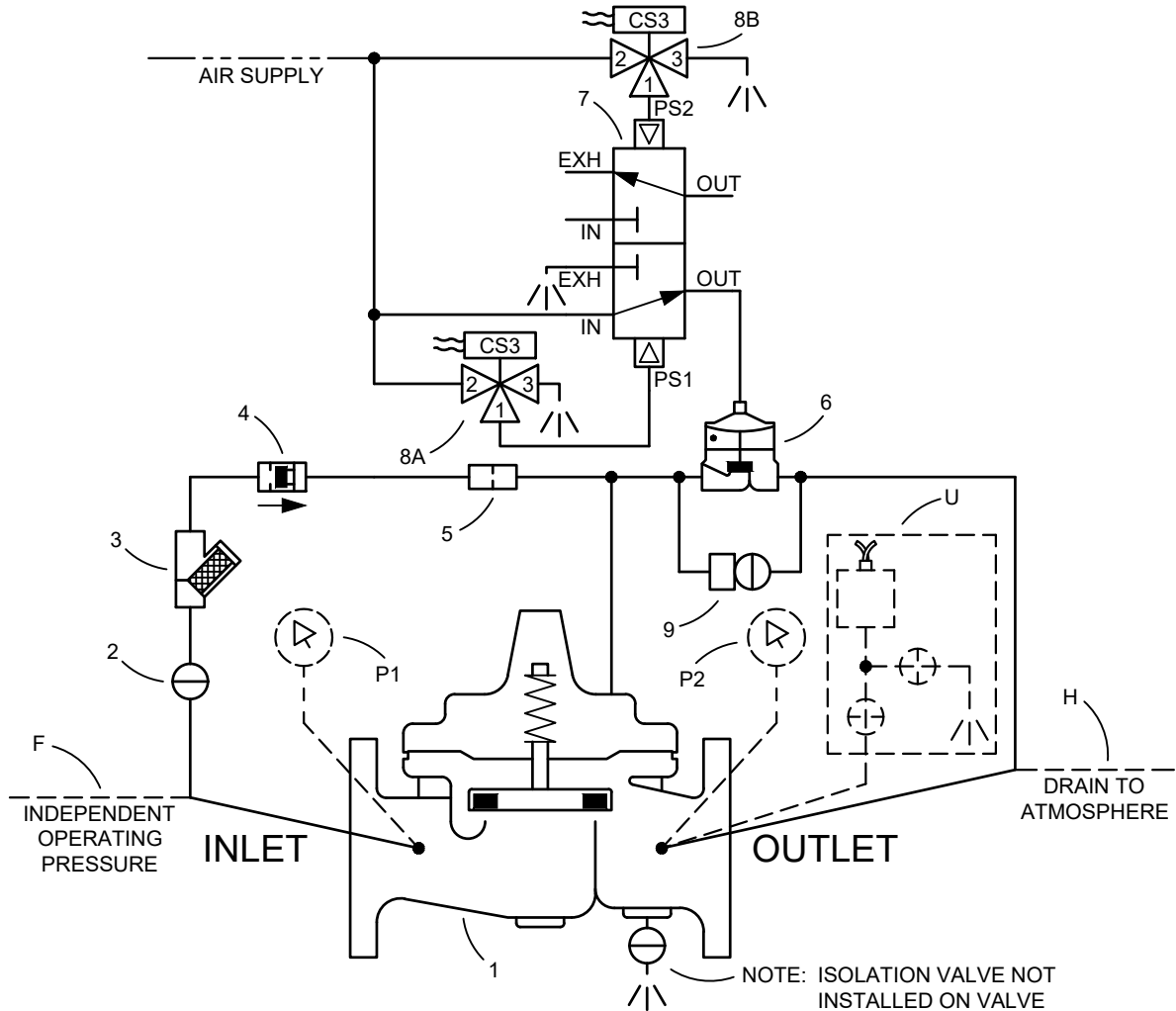


Installation / Operation / Maintenance



Model UU

Electrically Actuated Pneumatic ON/OFF Deluge Valve with Fail Last Position Pilot



NO.	BASIC COMPONENTS	QTY
1	UL LISTED VALVE	1
2	ISOLATION VALVE	1
3	"Y" STRAINER	1
4	CHECK VALVE	1
5	RESTRICTION FITTING	1
6	AUXILIARY POWERCONTROL	1
7	LATCHING DELUGE PILOT, FAIL LAST POSITION	1
8	SOLENOID CONTROL	2
9	EMERGENCY DELUGE VALVE RELEASE	1

NO.	OPTIONAL FEATURES	QTY
F	INDEPENDENT OPERATING PRESSURE	
H	DRAIN TO ATMOSPHERE	
P	PRESSURE GAUGE ASSEMBLY	2
U	PRESSURE SWITCH ASSEMBLY	1



Model **UU**

Electrically Actuated Pneumatic ON/OFF Deluge Valve with Fail Last Position Pilot

► OPERATING DATA

Solenoid Control Feature

Solenoid controls **(8A)** and **(8B)** are direct acting, 3-way solenoid controls that change position when the coil is de-energized or energized. This applies or relieves pressure in the cover chamber of powertrol **(6)** through deluge pilot **(7)** providing the operation shown in the following table:

Solenoid Control (8A)		Solenoid Control (8B)		Auxiliary Powertrol (6) Position	Main Valve (1) Position
Position	Ports Connected	Position	Ports Connected		
Energized	1 & 2	De-energized	1 & 3	Closed	Closed
De-energized	1 & 3	Energized	1 & 2	Open	Open

Fail Last Position Deluge Pilot Feature

The fail last position deluge pilot control **(7)** is a 3-way, two position, pilot operated, double acting, flow control valve. When supply pressure is applied in **(PS2)** and relieved from **(PS1)**, ports **"OUT"** and **"EXH"** are interconnected. This relieves pressure from the cover chamber of powertrol **(6)** and the main valve **(1)** opens. When supply pressure is applied in **(PS1)** and relieved from **(PS2)**, ports **"IN"** and **"OUT"** are interconnected. This applies inlet pressure to the cover chamber of powertrol **(6)** and the main **(1)** closes. The function is to **"fail (or remain) in the last position"**.

Note: Solenoid controls **(8A)** and **(8B)** can not be energized at the same time. Pilot control **(7)** will lock-up and not change position if solenoids are energized simultaneously. Solenoids must be energized for no less than 15 seconds, not more than 1 minute in duration.

Emergency Bypass Feature

Open emergency bypass ball valve **(9)** to bypass powertrol **(6)**, relieving pressure from the main valve **(1)** cover chamber and the main valve **(1)** opens. Emergency bypass ball valve **(9)** must be closed during normal operation.

Optional Features

(F) - Independent Operating Pressure:

Pilot supply pressure is obtained from an independent source. (Pilot supply pressure is obtained from the main valve inlet if suffix **(F)** is not specified.) Note: independent operating pressure must be equal to or greater than pressure at the main valve inlet at all times.

(H) - Atmospheric Drain:

Pilot system drain line is discharged to atmosphere. (Pilot system drain line is connected to the main valve outlet boss if suffix **(H)** is not specified.)

(P) - Pressure Gauge:

Pressure gauges **(P1)** and **(P2)** provide pressure reading in the inlet and cover connections.

(U) - Pressure Switch:

Pressure switch **(U)** sense the pressure at the main valve **(1)** inlet and outlet respectively. This transmits a signal to display the flow rate through the main valve **(1)**.



Model **UU**

Electrically Actuated Pneumatic ON/OFF Deluge Valve with Fail Last Position Pilot

► OPERATING DATA - CONTINUED

► 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.
- Isolation valve **(2)** open during normal operation.
- Correct voltage to solenoid controls **(8A)** and **(8B)**.
- EDVR **(9)** closed during normal operation.

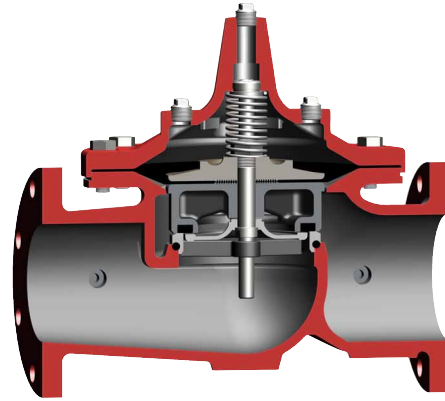


—MODEL— **100G/2100G**
UL Listed Main Valve

Description

The Cla-Val Model 100G/2100G is a UL Listed 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.

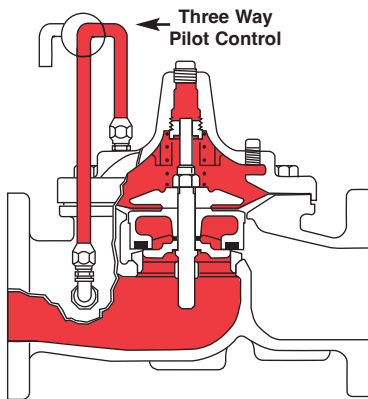


Installation

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 100G/2100G Main 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 100G/2100G Main 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.

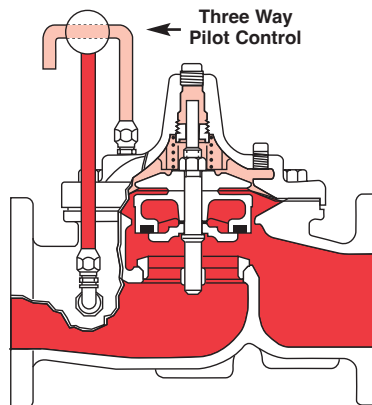
6. Caution must be taken in the installation of this valve to insure that galvanic and/or electrolytic action does not take place. The proper use of dielectric fittings and gaskets are required in all systems using dissimilar metals.
7. If a pilot control system is installed on the 100G/2100G Main Valve, 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



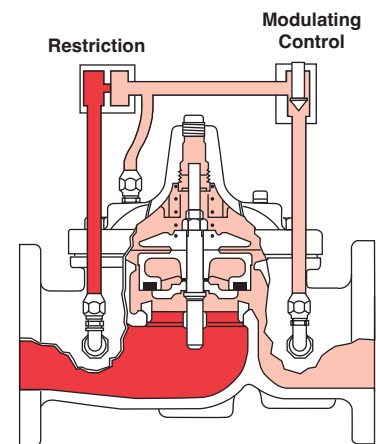
Tight Closing Operation

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.

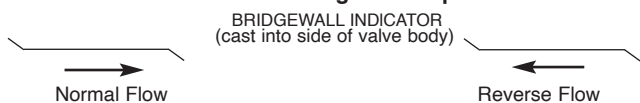


Modulating Action

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 100G/2100G Main 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. **The valve must be installed according to nameplate data.**



Recommended Tools

1. Two pressure gauges with ranges suitable to the installation to be put at Main Valve inlet and outlet 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 100G/2100G Main 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 two gauges in unused Main Valve inlet, outlet 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 100G/2100G Main 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 100G/2100G Main 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 Main 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 Main 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
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

Freedom of Movement Check (#2)

4. Determining the Main 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 Main 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.
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

STEM TRAVEL

(Fully Open to Fully Closed)

Valve Size (inches)		Travel (inches)	
Inches	MM	Inches	MM
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

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 Main 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 Main 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 Main Valve. Watch the pressure gauge. If the pressure begins to climb, then either the downstream isolation valve is permitting pressure to creep back, or the Main Valve is allowing pressure to go through it. Usually the pressure at the Main Valve 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 Main Valve 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 Main Valve is holding tight, and it was just the isolation valve leaking.

Maintenance

Preventative Maintenance

The Cla-Val Co. Model 100G/2100G Main 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

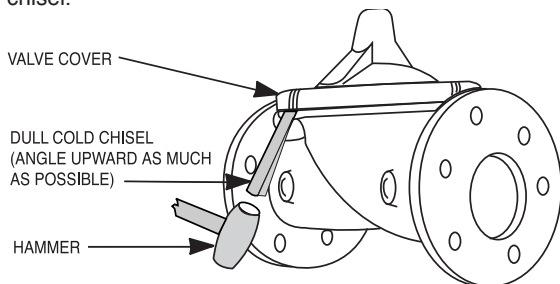
Inspection or maintenance can be accomplished without removing the valve from the line. Repair kits with new diaphragm and disc are recommended to be on hand before work begins.

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" — 1 1/2" 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)
3"	1/2"
4"–6"	3/4"
8"–10"	1"
12"	1 1/4"

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)
3"–4"	1/4–28
6"–12"	3/8–24

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.

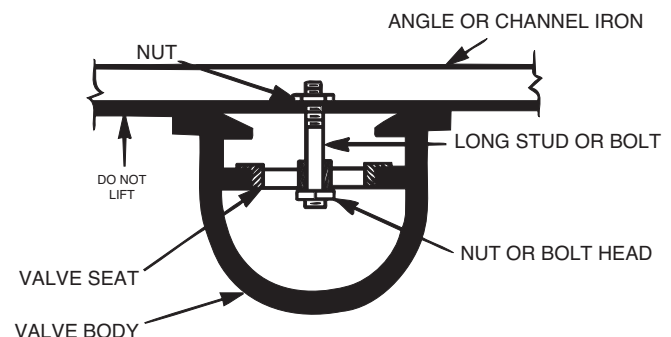
The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

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.

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.

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.

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 Main 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 Main 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.)

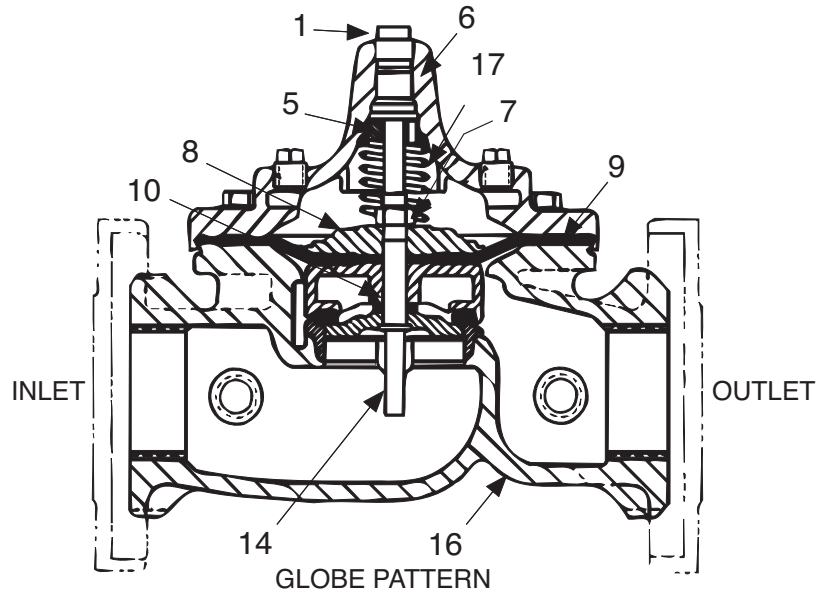
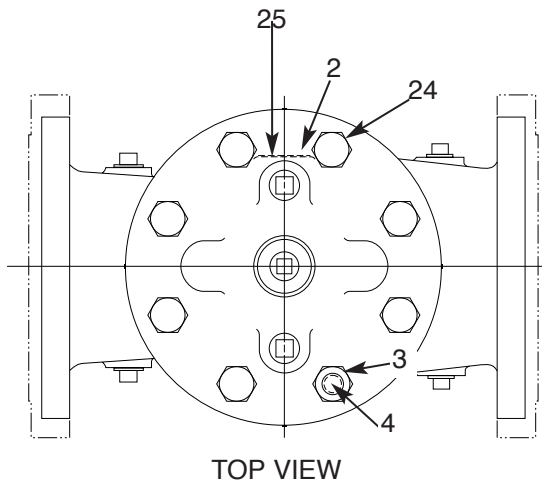
Due to the weight of the diaphragm assembly this procedure is not possible on valves 8" and larger. on these valves, the same determination can be made by carefully introducing a low pressure-less than five psi) into the valve body with the cover vented. **SEE CAUTION.** Looking in cover center hole 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.

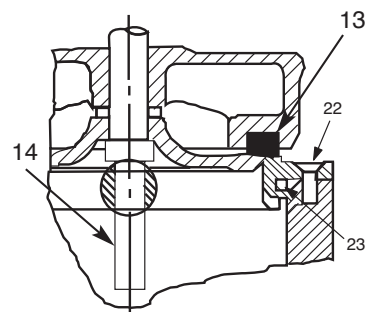
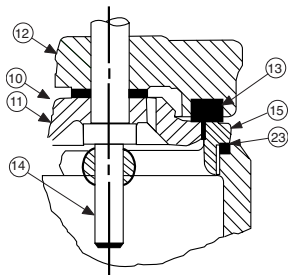
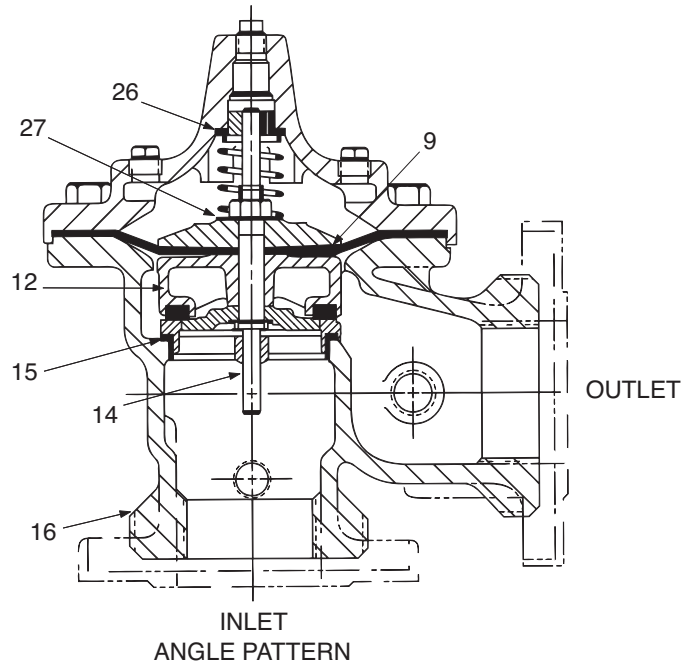
4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. **Bleed air from all high points.**

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)





—MODEL— 100G/2100G Main Valve Service Data

Description 100G/2100G Main Valve

The Cla-Val Model 100G/2100G Main Valve is a main valve for Cla-Val Deluge Valves. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

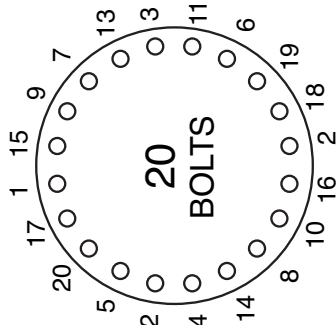
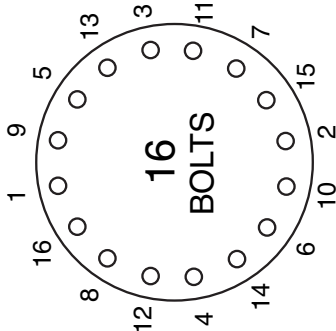
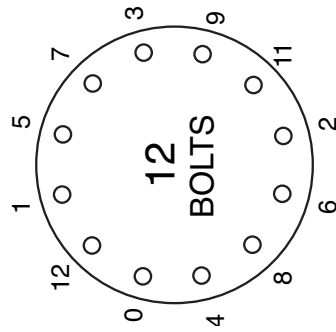
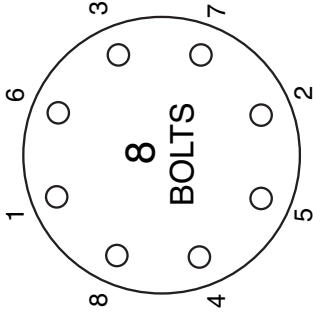
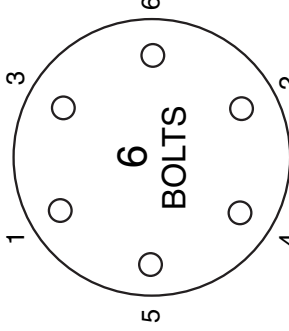
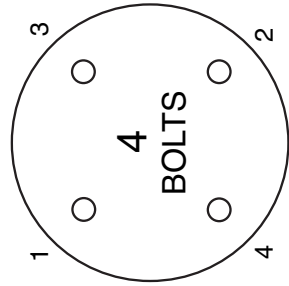
This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and 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.



HYTROL Service Data

HYTROL SIZE	Stem Travel		Cover Capacity Displacement		Valve Stem Thread UNF-internal	Cover Center Plug NPT	Cover Nut or Bolt		Cover Lifting Holes UNC	Cover Plug		Cover Torque		Stem Nut**		Stem Nut Torque (ft. Lbs.)	
	mm	inches	Gallons	Liters			Thread (Bolt)	Socket		Qty	Thread	Socket	Thread	ft. Lbs.	in. Lbs.	Thread	Socket (Long)
100G	inches	mm															
	3"	80	0.080	0.30	1/4 - 28	1/2"	1/2" - 13 (B)	3/4"	8		1/2"	9/16"	30	5/8" - 18	15/16"	21	30
	4"	100	0.169	0.64	1/4 - 28	3/4"	3/4" - 10 (B)	1 1/8"	8		3/4"	5/8"	110	3/4" - 16	1 1/16"	40	60
	6"	150	0.531	2.00	3/8 - 24	3/4"	3/4" - 10 (B)	1 1/8"	12		3/4"	5/8"	110	7/8" - 14	1 5/16"	85	125
	8"	200	1.26	4.80	3/8 - 24	1"	3/4" - 10	1 1/4"	16	5/8" - 11	1"	13/16"	110	1 1/8" - 12	1 13/16"	125	185
	10"	250	2.51	9.50	3/8 - 24	1"	7/8" - 9	1 7/16"	20	3/4" - 10	1"	13/16"	160	1 1/2" - 12	1 7/8"	252	375
12"	300	3.4	4.0	15.10	3/8 - 24	1 1/4"	1 1/8" - 7	20	3/4" - 10	1"	13/16"	390	1 1/2" - 12	2 1/2"	270	400	

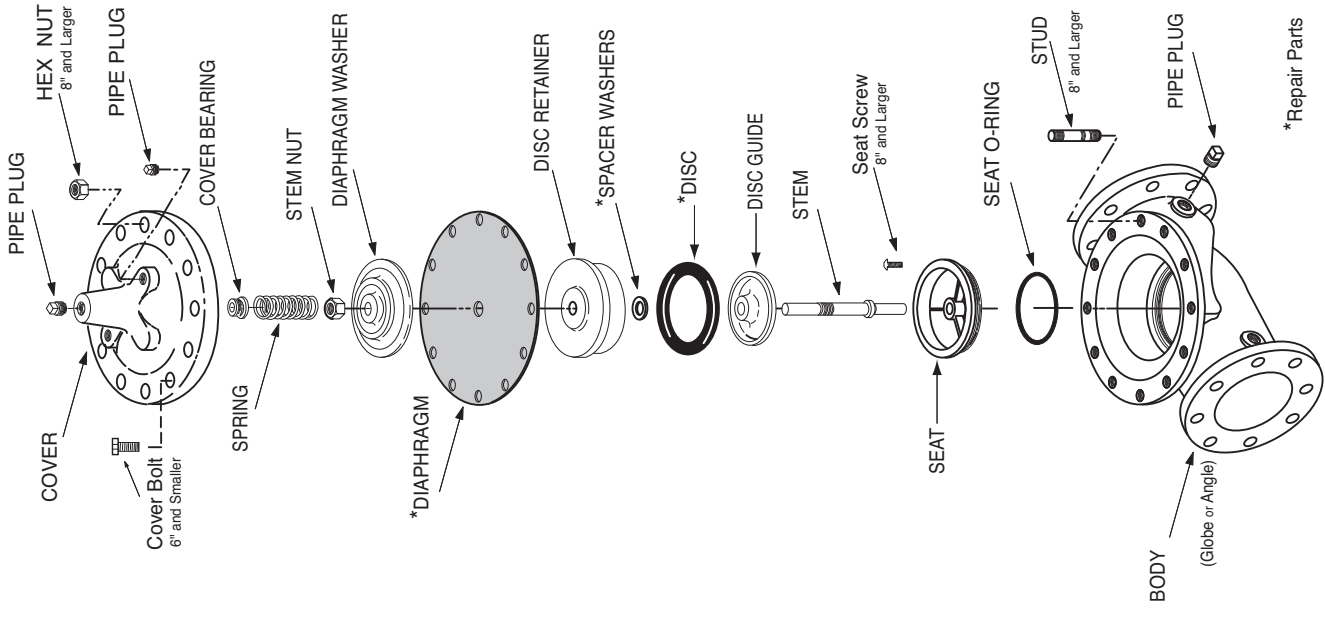
BOLT/NUT TORQUING PROCEDURES ON VALVE COVERS



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.

100G Hytrol Main Valve Assembly



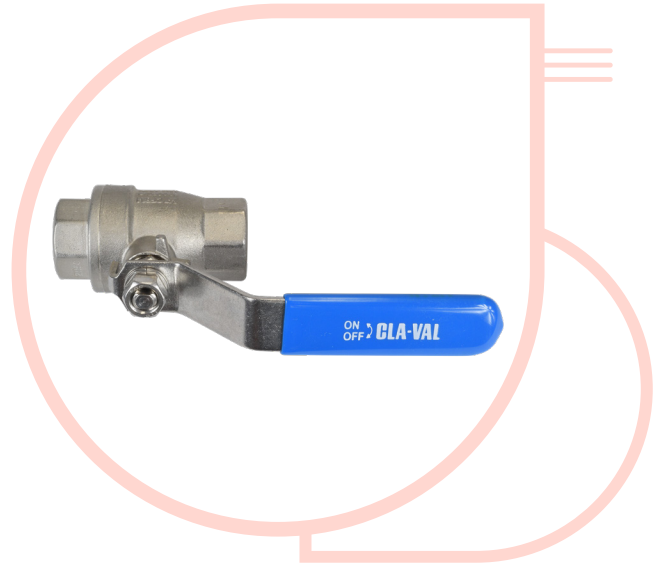
*Repair Parts



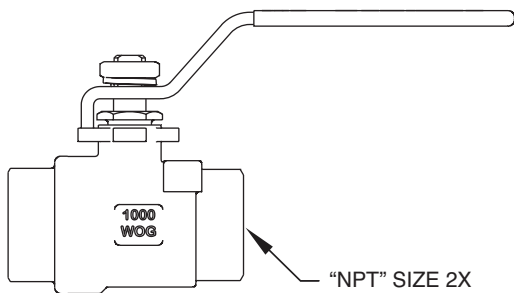
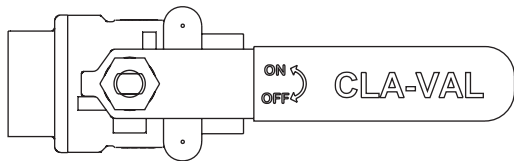
Model **CK2** ISOLATION VALVE

PRODUCT FEATURES

- Model CK2 is a ball valve used for isolating components within the pilot system.



DIMENSIONS



SPECIFICATIONS

- Size:** 3/8" thru 2" NPT Threaded
- Temperature Range:** 33°F to 180°F
- Standard Materials**
 - Body:** Stainless Steel
 - Handle & Nut:** Stainless Steel
 - Ball Seal:** RPTFE
- Ends:** Threaded ANSI/ASME B1.20 1
- Pressure Ratings:** 300 psi

CLA-VAL Company

www.cla-val.com

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S-CK2 (R-12/2021)

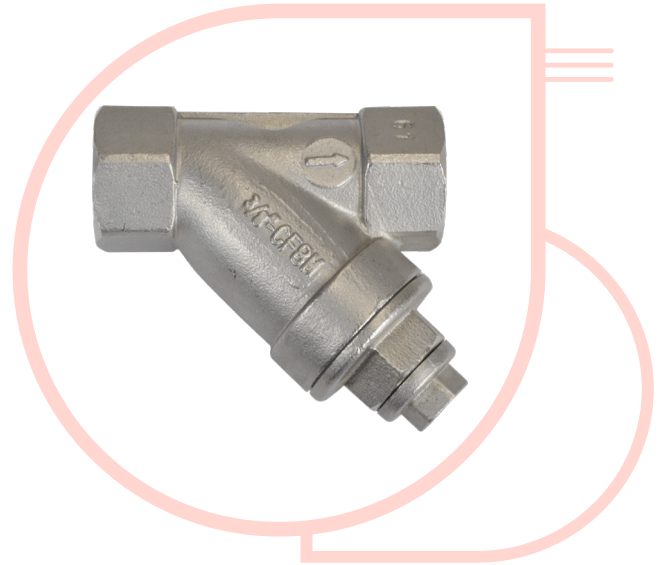




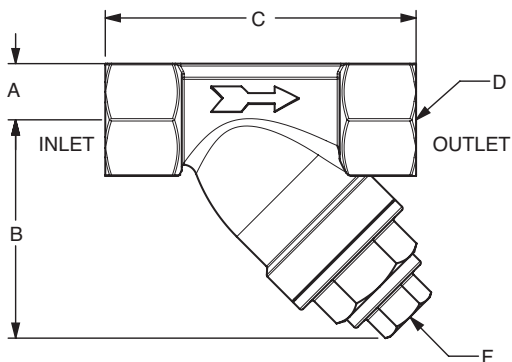
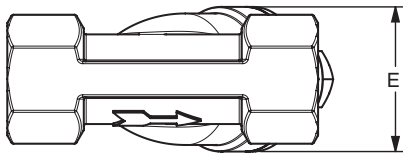
Model X43 "Y" STRAINER

PRODUCT DESCRIPTION

The Cla-Val Model X43 'Y' Strainer is an in-line strainer to be installed for the protection of pilot systems. These strainers are constructed of corrosion resistant materials. All sizes have blow-off connections ready for field hook-up.



DIMENSIONS



A	B	C	D	E	F
3/8	1 3/4	2 1/2	3/8	1 1/4	1/4
1/2	1 7/8	2 5/8	1/2	1 1/4	3/8
3/4	2 5/8	3 1/4	3/4	1 5/8	3/8
1	3 1/8	3 7/8	1	2 1/8	3/4

(Dimensions in inches)

SPECIFICATIONS

- Size:** 3/8", 1/2", 3/4", 1" NPT Threaded
- Temperature Range:** 33°F to 180°F
- Standard Materials***
 - Body:** Stainless Steel 316 (standard 3/8")
Low Lead Bronze (standard 1/2" and 3/4")
 - Screen:** Stainless Steel 316 (60 mesh)
 - Ends:** Threaded ANSI/ASME B1.20 1
 - Pressure Ratings:** 300 psi
 - Options:** Blowdown Ball Valve (see Model X43A)

*Optional Materials Available

CLA-VAL Company
www.cla-val.com
info@cla-val.com
 S-X43 (R-12/2021)

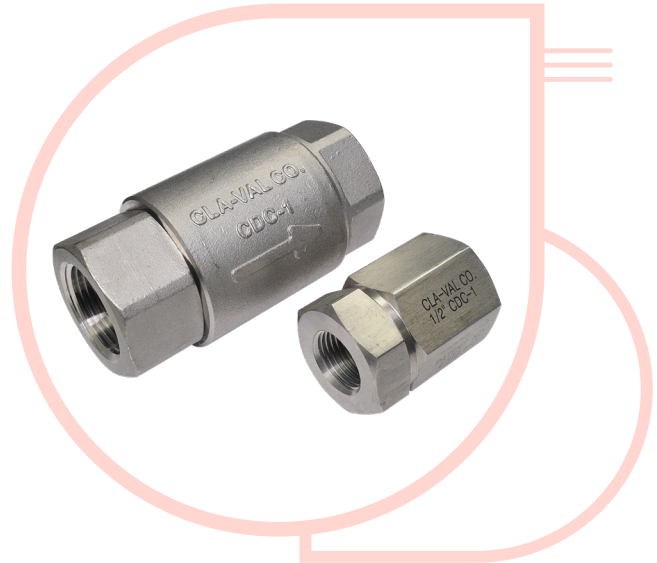


Model **CDC-1** CHECK VALVE

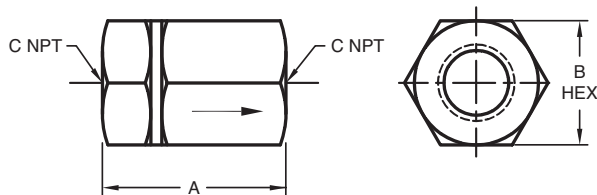
Sizes 3/8, 1/2, 3/4 and 1"

PRODUCT FEATURES

- The Cla-Val Model CDC-1 Check Valve is an inline disc check valve. The valve utilizes an internal disc to allow flow in one direction while closing off against flow in the reverse direction.
- Delrin® Disc Resists Corrosion and/or Mineral Build-up
- Flow direction arrow stamped on valve body



DIMENSIONS



CLA-VAL CHECK VALVE (1/2" SIZE SHOWN)

Size (NPT)	A	B	C
3/8"	2.06	1.06	.38 (3/8) - 18.0 NPT
1/2"	2.12	1.38	.50 (1/2) - 14.0 NPT
3/4"	4.06	2.26	.75 (3/4) - 14.0 NPT
1"	4.06	2.19	1.00 (1) - 11.5 NPT

SPECIFICATIONS

- **Size:** 3/8", 1/2", 3/4", 1" NPT Threaded
- **Temperature Range:** Water: to 180°F Max.
- **Standard Materials**
 - Body:** Stainless Steel 303 (3/8", 1/2")
Stainless Steel 316 (All Sizes Available)
 - Disc:** Delrin® (3/8", 1/2")
Buna-N® Synthetic Rubber (3/4", 1")
Optional EPR and Fluorocarbon
- **Pressure Ratings:** 300 psi

CLA-VAL Company

www.cla-val.com

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S-CDC-1 (R-12/2021)



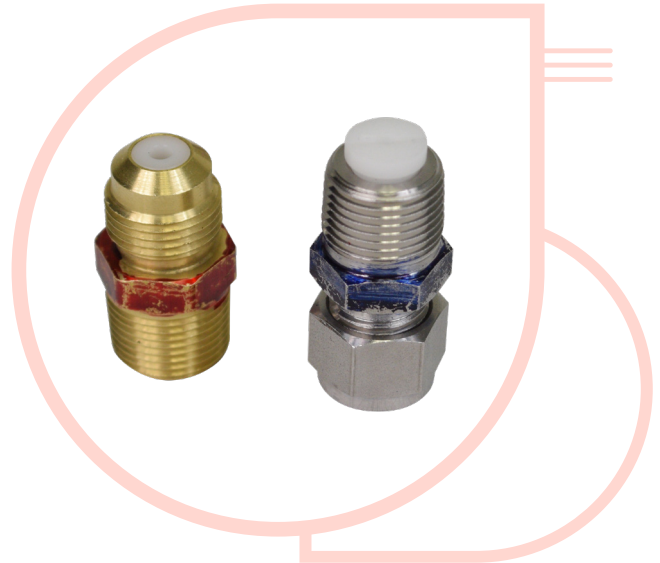


Model **X58C**

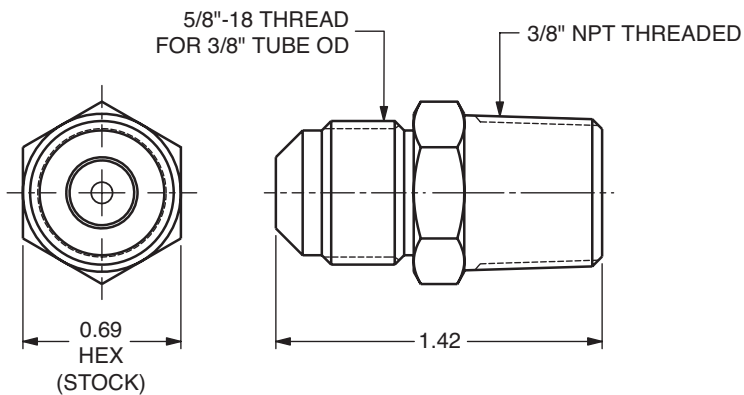
RESTRICTION ASSEMBLY

PRODUCT DESCRIPTION

The Cla-Val Model X58C Restriction Assembly is composed of a modified standard tube connector with a precision delrin orifice fitting installed. Flow direction is from tube to pipe connections. Orifice size color code is stained onto tube connector wrench flats. The X58C is installed as a part of pilot control systems on Cla-Val Valves.



DIMENSIONS



SPECIFICATIONS

Material*:

Brass
303 Stainless Steel
316 Stainless Steel
Monel
Super Duplex

***Optional Materials Available**

Orifice Sizes:

1/16" (.062)
3/32" (.093) - Blue
1/8" (.125) - Red

CLA-VAL Company

www.cla-val.com

info@cla-val.com

Model S-X58C (R-12/2021)

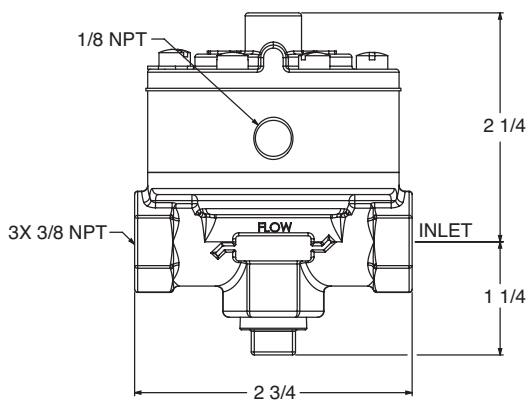
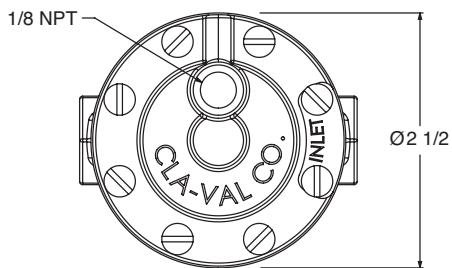


Model **100-02** POWERTROL VALVE

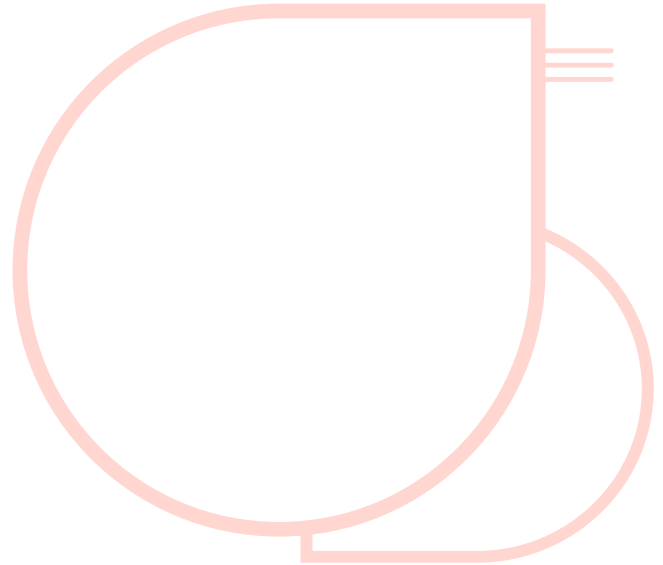
PRODUCT FEATURES

The Cla-Val Model 100-02 is a hydraulically operated, diaphragm type valve. The valve is single seated and uses two operating chambers sealed from one another by a flexible synthetic rubber diaphragm. Pressure applied to the upper chamber closes the valve; pressure is applied to the lower chamber opens the valve.

DIMENSIONS



(Dimensions in inches)



SPECIFICATIONS

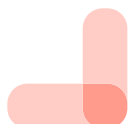
Size:	3/8" NPT Threaded
Temperature Range:	33°F to 180°F
Standard Materials*	
Body & Cover:	Low Lead Bronze
Trim:	Stainless Steel
Rubber:	Buna-N® Synthetic Rubber
Ends:	Threaded ANSI/ASME B1.20 1
Pressure Ratings:	300 psi

CLA-VAL Company

www.cla-val.com

info@cla-val.com

S-100-02 (R-12/2021)



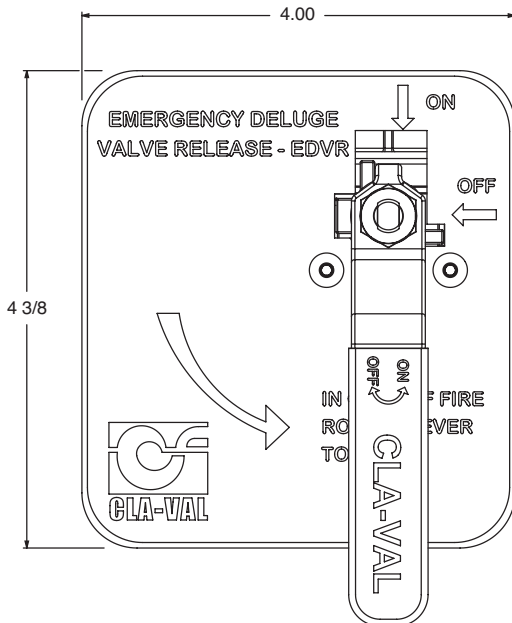


Model EDVR MANUAL RELEASE

PRODUCT FEATURES

- The Cla-Val Model EDVR is a Manual Release control installed to bypass the primary actuation pilot. In the event of an emergency, the EDVR control is opened relieving pressure in the main valve cover, resulting in the main valve opening.

DIMENSIONS



SPECIFICATIONS

- Size:** 3/8", 1/2" NPT Threaded
- Temperature Range:** 33°F to 180°F
- Standard Materials**
 - Body:** Stainless Steel
 - Handle & Nut:** Stainless Steel
 - Ball Seal:** RPTFE
- Ends:** Threaded ANSI/ASME B1.20 1
- Pressure Ratings:** 300 psi

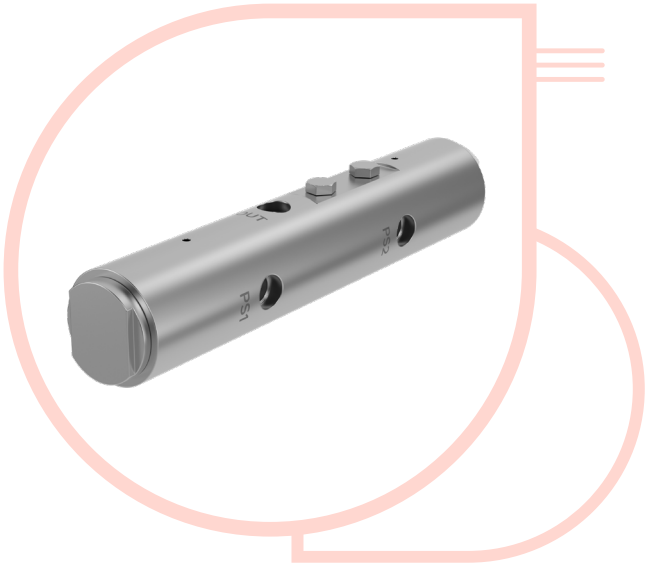
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S-EDVR (R-12/2021)



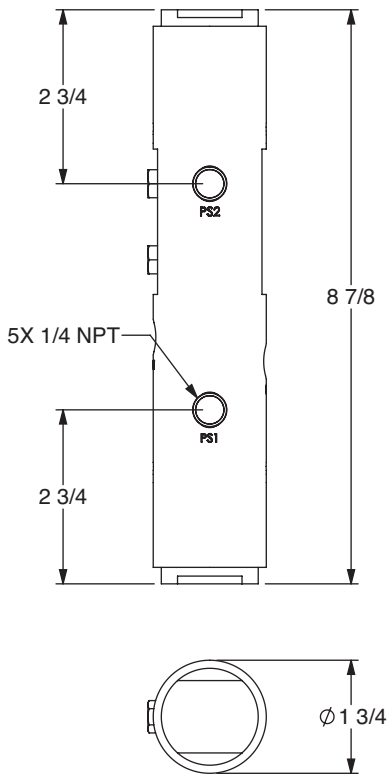
Model **CMDLL** FAIL LAST POSITION PILOT

PRODUCT FEATURES

The Cla-Val Model CMDLL is a 3-way, 2-position, double acting, pneumatic or hydraulically operated pilot. When supply pressure is applied in (PS2) and relieved from (PS1), ports "OUT" and "EXH" are interconnected, opening the main valve. When supply pressure is applied in (PS1) and relieved from (PS2), ports "IN" and "OUT" are interconnected, closing the main valve. The function is to "fail (or remain) in the last position."



DIMENSIONS



(Dimensions in inches)

SPECIFICATIONS

- Size:** 1/4" BSPT Threaded
- Temperature Range:** 33°F to 180°F
- Standard Materials***
 - Body & Cover:** Stainless Steel 316
 - Trim:** Stainless Steel 316
 - Rubber:** Buna-N® Synthetic Rubber
- Ends:** Threaded ANSI/ASME B1.20 1
- Pressure Ratings:** 300 psi

***Optional Materials Available**

MINIMUM PRESSURE TO ACTIVATE PILOT	
Inlet Pressure (psi)	Minimum Air (psi)
up to 275	35
300	60

CLA-VAL Company
www.cla-val.com
info@cla-val.com
 S-CMDLL (R-12/2021)



INSTALLATION AND MAINTENANCE INSTRUCTIONS

3-WAY SOLENOID VALVES, NORMALLY OPEN NORMALLY CLOSED AND UNIVERSAL CONSTRUCTION

**BULLETIN
8320**

ASCO
FORM NO. V5291R2

DESCRIPTION

Bulletin 8320 is a small 3-way solenoid operated valve with all three pipe connections located in the body. The bodies are of brass or stainless steel construction. Standard valves have General Purpose, Nema Type 1 Solenoid Enclosures. Valves that are equipped with a solenoid enclosure which is designed to meet Nema Type 4-Water tight, Nema Type 7 (C or D) Hazardous Locations - Class I, Group C or D, and Nema Type 9 (E, F or G) Hazardous Locations - Class II, Group E, F or G are shown on separate sheets of Installation and Maintenance Instructions, Form Numbers V-5391 and V-5381.

MANUAL OPERATORS (OPTIONAL)

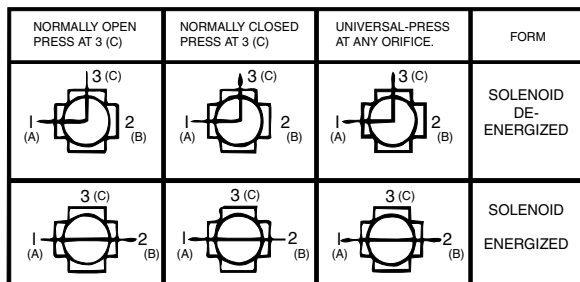
Valves with suffix "MO" or "MS" in catalog number are provided with a Manual Operator which allows manual operation when desired or during an interruption of electrical power.

OPERATION

Normally Closed: Applies pressure when solenoid is energized; exhausts pressure when solenoid is de-energized

Normally Open: Applies pressure when solenoid is de-energized; exhausts pressure when solenoid is energized.

Universal: For normally closed or normally open operation, selection or diversion of pressure can be applied at port 1 (A), 2 (B), or 3 (C).



NOTE: Port Markings 1, 2, and 3 correspond directly to A, B and C.

INSTALLATION

Check Nameplate for correct Catalog Number, pressure, voltage and service.

POSITIONING

Valve may be mounted in any position

PIPING

Connect piping to valve according to markings on valve body. Refer to Flow Diagram provided. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of piping. When tightening pipe, do not use valve as lever.

IMPORTANT: For protection of the solenoid valve, install a strainer or filter suitable for the service involved in the inlet side as close to the valve as possible. Periodic cleaning is required depending on the service conditions.

WIRING

Wiring must comply with local and National Electrical Codes. For valves equipped with an explosion-proof, watertight solenoid enclosure, the electrical fittings must be approved for use in the approved hazardous locations. Housings for all solenoids are made with connections for 1/2 inch conduit. The general purpose enclosure may be rotated to facilitate wiring by removing the retaining cap.

NOTE

Alternating Current (A-C) and Direct Current (D-C) solenoids are built differently. To convert from one to other, it is necessary to change the complete solenoid, including the core assembly.

SOLENOID TEMPERATURE

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched with the bare hand for only an instant. This safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

WARNING: Turn off electrical power and line pressure to valve before making repairs. It is not necessary to remove valve from pipe line for repairs.

CLEANING

A periodic cleaning of all valves is desirable. The time between cleanings will vary, depending on the media and service conditions. In general, if the voltage to the coils is correct, sluggish valve operation or excessive leakage will indicate that cleaning is required.

IMPROPER OPERATION

1. **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic click signifies the solenoid is operating. Absence of the click indicate loss of power supply. Check for loose or blown-out fuses, open-circuited or grounded coil, broken lead wires or splice.
2. **Burned-out Coil:** Check for open-circuited coil. Replace coil, if necessary.
3. **Low Voltage:** Check voltage across coil leads. Voltage must be at least 85% of nameplate ratings.
4. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within the range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit for best results.

COIL REPLACEMENT (REF. FIG. 2)

Turn off electrical power, disconnect coil lead wires and proceed as follows:

1. Remove retaining cap, nameplate and cover.
2. Slip yoke containing coil, sleeves and insulating washers off the solenoid base sub-assembly. Insulating washers are omitted when molded coil is used. In some D.C. Constructions, a single flux plate over the coil replaces yoke, sleeves and insulating washers.
3. Reassemble in reverse order of disassembly.

VALVE DISASSEMBLY AND REASSEMBLY (REF. FIG. 2)

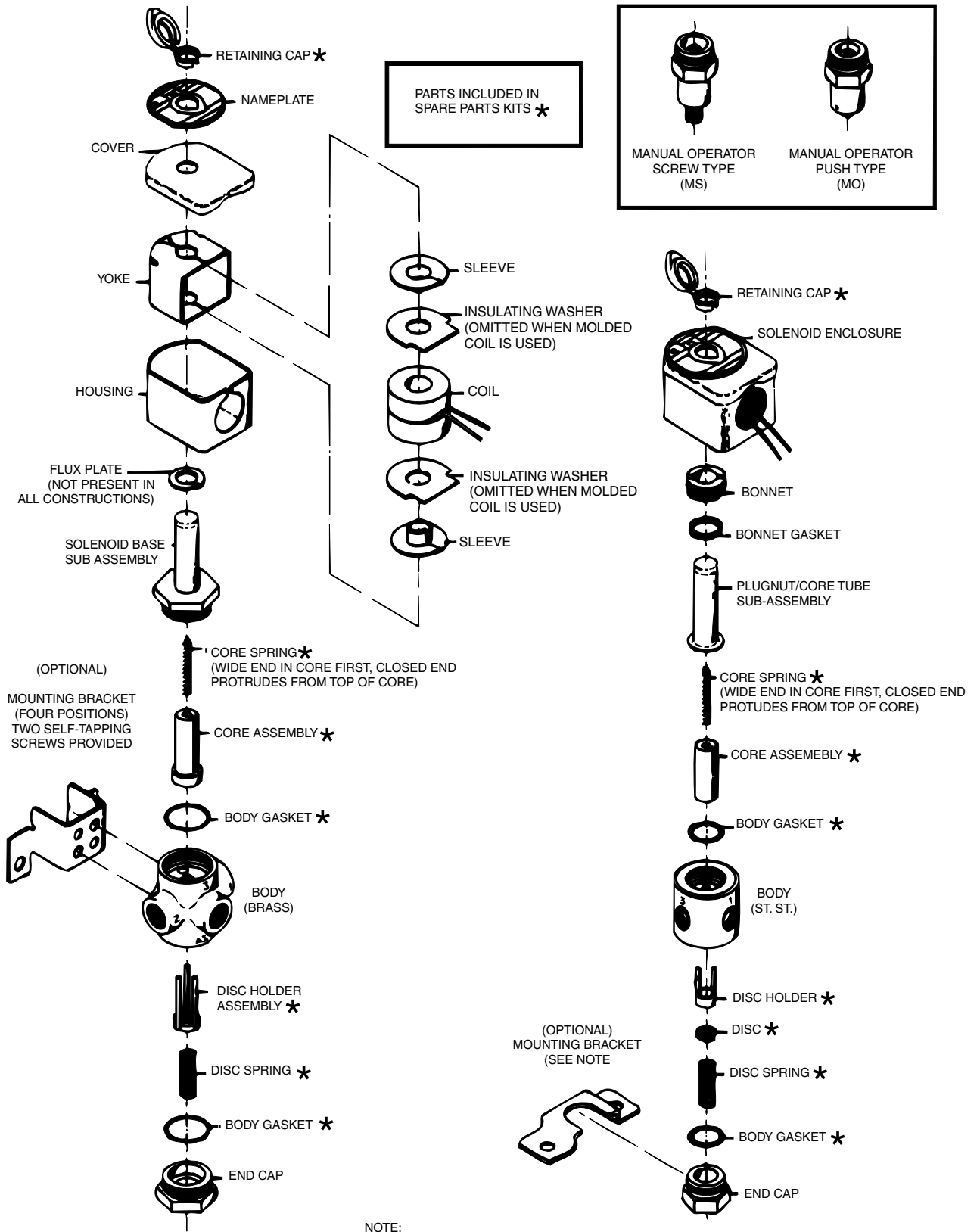
Turn off electrical power supply and de-pressurize valve.

1. Remove retaining cap and slip entire solenoid off solenoid base subassembly or plugnut/core tube sub-assembly.
2. Unscrew bonnet or solenoid base sub-assembly. Remove core assembly, core spring and body gasket.
3. Remove end cap, body gasket, disc spring, disc holder, disc or disc holder assembly.
4. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.
5. Reassemble in reverse order of disassembly paying careful attention to exploded view provided.

ORDERING INFORMATION FOR SPARE PARTS KITS

When Ordering Spare Parts Kits or Coils
Specify Valve Catalog Number,
Serial Number and Voltage

Spare Parts Kits and Coils are available for ASCO valves. Parts marked with

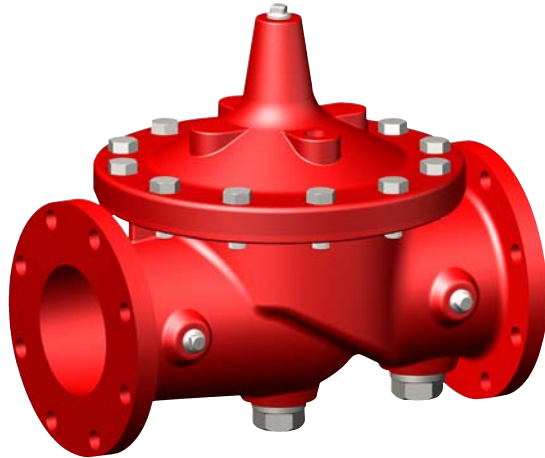


NOTE:
 1. FOR MOUNTING, A FLAT SURFACE MUST BE PROVIDED ACROSS THE ENTIRE LENGTH OF THE BRACKET. THE VALVE BODY BECOMES SECURE TO BRACKET, WHEN BRACKET IS TIGHTENED IN TO POSITION. IF THE VALVE HAS A MANUAL OPERATOR, A HOLE MUST BE MADE THROUGH THE MOUNTING SURFACE FOR THE OPERATOR STEM.

CLA-VAL WARRANTY

3 Year Warranty on Cla-Val Quality Products

This is a 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 Cal-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 which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment. The warranty is expressly conditioned on the purchaser's giving Cla-Val immediate written notice 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, and Cal-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Disclaimer of Warranties & Limitation 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.

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