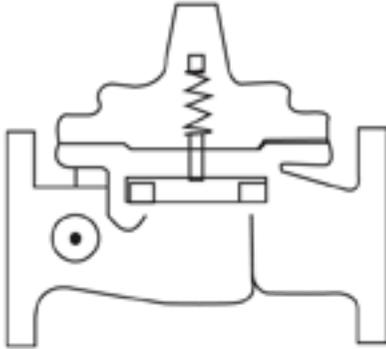


# CLA-VAL

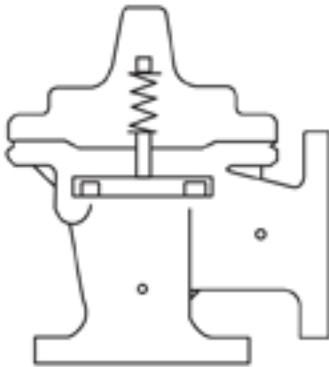
**AUTOMATIC CONTROL VALVES**

52-01

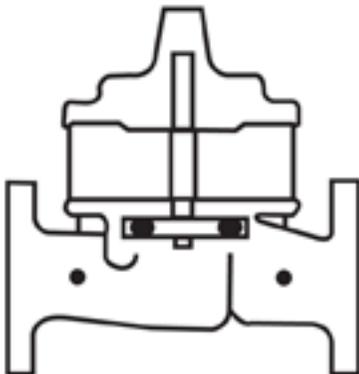
Place this manual with personal responsible  
for maintenance of this valve



## *INSTALLATION*



## *OPERATION*



## *MAINTENANCE*



**CLA-VAL CO.** NEWPORT BEACH, CALIFORNIA

CATALOG NO.  
52-01

DRAWING NO.  
90499

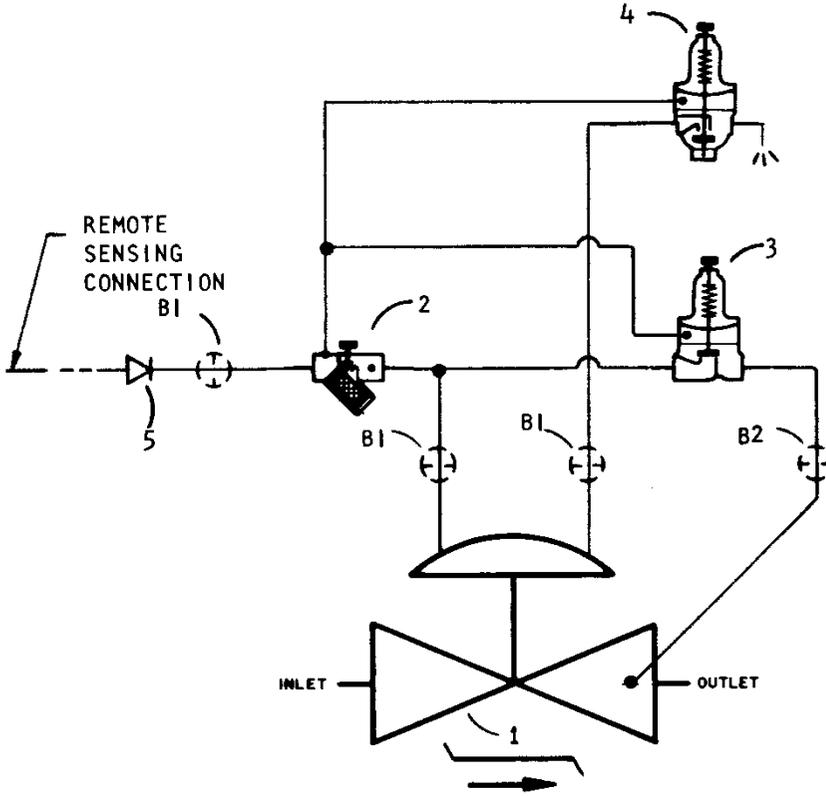
REV.  
C

TYPE OF VALVE AND MAIN FEATURES

**SURGE ANTICIPATOR VALVE**

DESIGN	
DRAWN	10-3-79 MGR
CHK'D.	
APP'D.	

----- NOT FURNISHED BY CLA-VAL CO. ----- OPTIONAL FEATURES



\* FORMERLY 100 OR 2100

ITEM NO.	BASIC COMPONENTS	QTY.
1	100-01 HYTROL	1
2	X42N-2 STRAINER NEEDLE VALVE	1
3	CRL PRESSURE RELIEF CONTROL	1
4	CRA PRESSURE REDUCING CONTROL	1
5	BELL REDUCER	1

OPTIONAL FEATURE SUFFIX		ADD TO CATALOG NUMBER
B	CK2 COCK (ISOLATION VALVES)	4

REVISION RECORD

BY	DATE
MGR	10-3-79

DESCRIPTION

C UPDATED DWG & CHG TITLE ECO 000751

"This drawing is the property of CLA-VAL CO. and same and copies made thereof, if any, shall be returned to it upon demand. Delivery and disclosure hereof are made solely upon condition that the same shall not be used, copied or reproduced, nor shall the subject hereof be disclosed in any manner to anyone for any purpose, except as here in authorized, without prior written approval of CLA-VAL CO. This drawing is submitted confidentially and may not be used in the manufacture of any material or product other than such materials and products furnished to CLA-VAL CO. Whether or not the equipment or information shown hereon is patented or otherwise protected, full title and copyrights, if any, in and to this drawing and/or information delivered or submitted are fully reserved by CLA-VAL CO."

FORM F38 3-25-77

 <b>CLA-VAL CO.</b> NEWPORT BEACH, CALIFORNIA CVCL 1 (2) 3 4	CATALOG NO.	DRAWING NO.	REV.
	52-01	90499	C

**SURGE ANTICIPATOR VALVE**

DESIGN	
DRAWN 9-8-75	MF
CHK'D. 9-9-75	MF
APP'D. 9-9-75	J.A.S.
SCALE	DIST CODE 002

OPERATING DATA

- I. SURGE CONTROL FEATURE:  
 PRESSURE RELIEF CONTROL (3) REMAINS CLOSED WHEN REMOTE SENSING PRESSURE IS LESS THAN THE SET POINT OF CONTROL (3). THIS PLACES THE MAIN VALVE UNDER THE COMMAND OF CONTROL (4). WHEN REMOTE SENSING PRESSURE EXCEEDS THE SET POINT OF CONTROL (3) IT OPENS. THIS RELIEVES MAIN VALVE COVER PRESSURE DOWNSTREAM AND THE MAIN VALVE OPENS TO RELIEVE THE SURGE PRESSURE. PRESSURE RELIEF CONTROL ADJUSTMENT: TURN THE ADJUSTING STEM CLOCKWISE TO INCREASE THE PRESSURE SETTING.
  
- II. LOW PRESSURE CONTROL FEATURE:  
 PRESSURE REDUCING CONTROL (4) REMAINS CLOSED WHEN REMOTE SENSING PRESSURE EXCEEDS THE LOW PRESSURE SETTING. THIS PRESSURIZES THE MAIN VALVE COVER CHAMBER AND THE MAIN VALVE (1) CLOSSES. WHEN REMOTE SENSING PRESSURE LOWERS TO THE SET POINT OF PRESSURE REDUCING CONTROL (4) IT OPENS. THIS RELIEVES MAIN VALVE COVER CHAMBER PRESSURE TO ATMOSPHERE AND THE MAIN VALVE OPENS. PRESSURE REDUCING CONTROL (5) ADJUSTMENT: TURN THE ADJUSTING SCREW CLOCKWISE TO INCREASE PRESSURE SETTING.
  
- III. CLOSING SPEED CONTROL:  
 NEEDLE VALVE (2) CONTROLS THE CLOSING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE CLOSE SLOWER. DO NOT CLOSE VALVE (2) COMPLETELY OR THE MAIN VALVE WILL NOT CLOSE. (SUGGESTED INITIAL SETTING OF NEEDLE VALVE IS 1/4 TO 1/2 TURN OPEN.)
  
- IV. OPTIONAL FEATURE OPERATING DATA:  
SUFFIX "B" (ISOLATION VALVES)  
 CK2 COCKS (B1) & (B2) ARE USED TO ISOLATE THE PILOT SYSTEM FROM MAIN LINE PRESSURE. THESE VALVES MUST BE OPEN DURING NORMAL OPERATION.
  
- V. CHECK LIST FOR PROPER OPERATION:  
 SYSTEM VALVES OPEN UPSTREAM AND DOWNSTREAM.  
 AIR REMOVED FROM MAIN VALVE COVER & PILOT SYSTEM AT ALL HIGH POINTS.  
 CK2 COCKS (B1) & (B2) OPEN. (OPTIONAL FEATURE)  
 CONTROL (3) MUST BE SET AT A HIGHER PRESSURE SETTING THAN CONTROL (4).

REVISION RECORD	DATE	
	BY	
DESCRIPTION		
LTR		

"This drawing is the property of CLA-VAL CO. and same and copies made thereof, if any, shall be returned to it upon demand. Delivery and disclosure hereof are made solely upon condition that the same shall not be used, copied or reproduced, nor shall the subject hereof be disclosed in any manner to anyone for any purpose, except as herein authorized, without prior written approval of CLA-VAL CO. This drawing is submitted confidentially and may not be used in the manufacture of any material or product other than such materials and products furnished to CLA-VAL CO. Whether or not the equipment or information shown hereon is patented or otherwise protected, full title and copyrights, if any, in and to this drawing and/or information delivered or submitted are fully reserved by CLA-VAL CO."

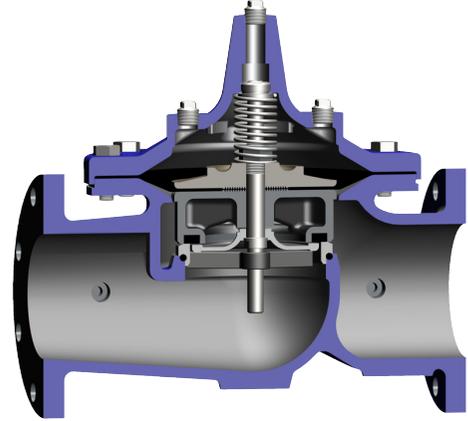


# —MODEL— 100-01 Hytrol Valve

## 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

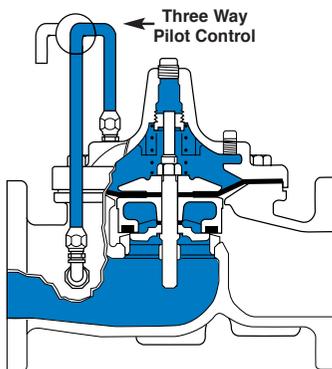
1. Before valve is installed, pipe lines should be flushed of all chips, scale and foreign matter.
2. It is recommended that either gate or block valves be installed on both ends of the 100-01 Hytrol Valve to facilitate isolating the valve for preventive maintenance and repairs.
3. Place the valve in the line with flow through the valve in the direction indicated on the inlet nameplate. (See "Flow Direction" Section)
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. 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.

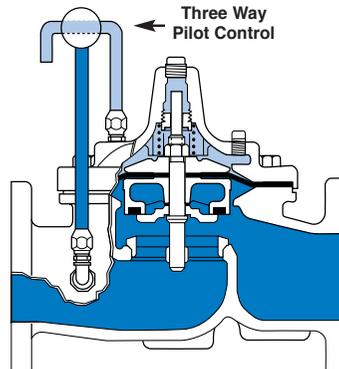
7. After the valve is installed and the system is first pressurized, vent air from the cover chamber and pilot system tubing by loosening fittings at all high points.

## Principles of Operation



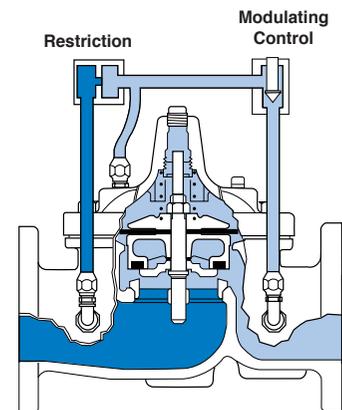
### Tight Closing Operation

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.



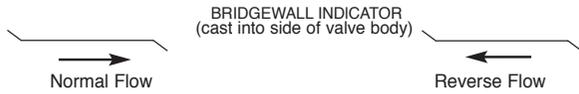
### Modulating Action

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.

**The valve must be installed according to nameplate data.**



## 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
24	29.00	109.8
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
24	600	6.5	165
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

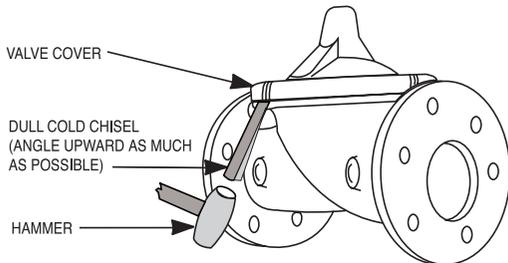
The Cla-Val Co. Model 100-01 Hytrol Valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the operating conditions of the system are affecting the valve. The effect of these actions must be determined by inspection.

### 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"
24"	2"
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
24"	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.

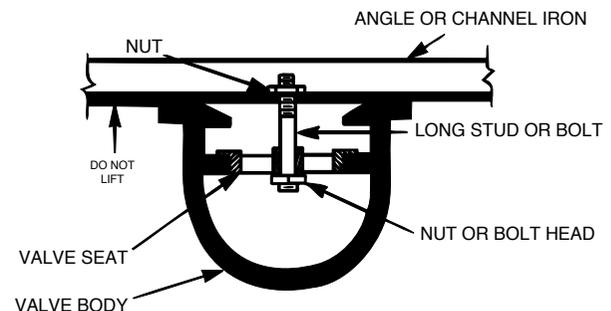
The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

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.

## 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 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.)

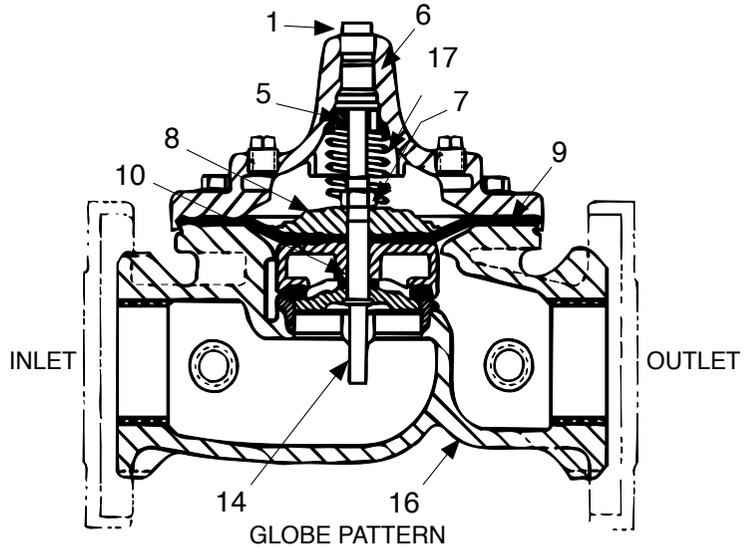
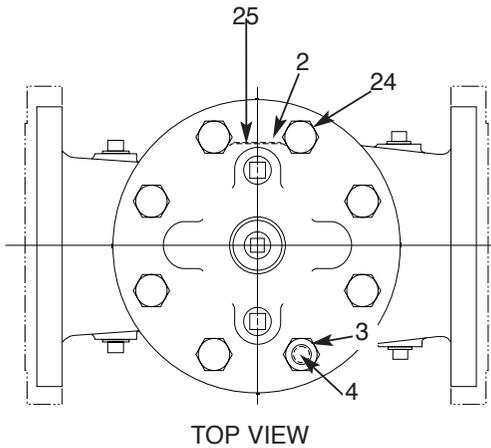
Due to the weight of the diaphragm assembly this procedure is not possible on valves 8" and larger. On these valves, the same determination can be made by carefully introducing a low pressure-less than five psi) into the valve body with the cover vented. **SEE CAUTION.** Looking in cover center hole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

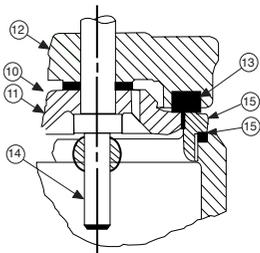
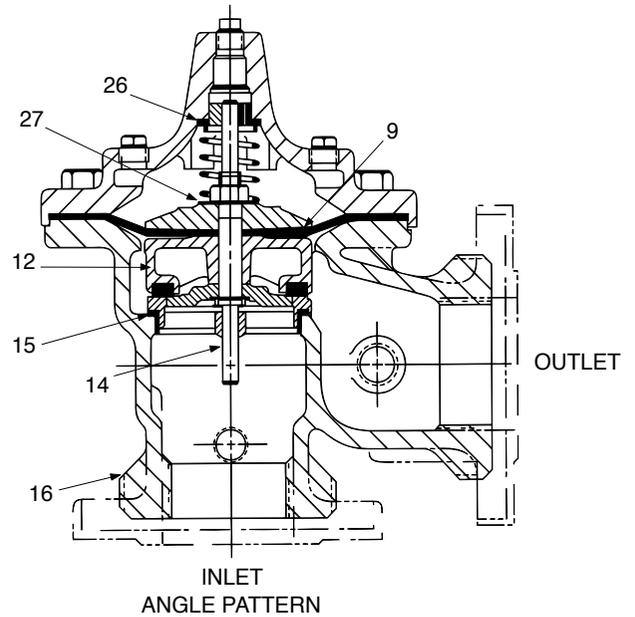
4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. **Bleed air from all high points.**

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

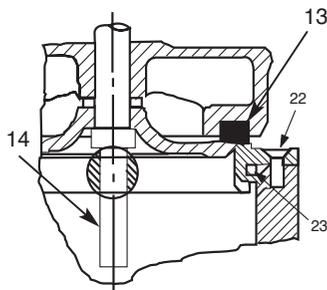


### PARTS LIST

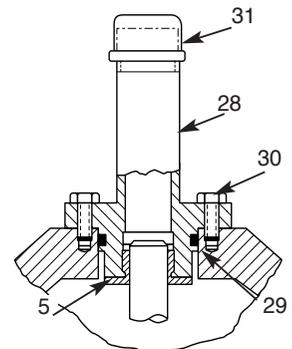
Item	Description
1.	Pipe Plug
2.	Drive Screws (for nameplate)
3.	Hex Nut (8" and larger)
4.	Stud (8" and larger)
5.	Cover Bearing
6.	Cover
7.	Stem Nut
8.	Diaphragm Washer
9.	Diaphragm
10.	Spacer Washers
11.	Disc Guide
12.	Disc Retainer
13.	Disc
14.	Stem
15.	Seat
16.	Body
17.	Spring
22.	Flat Head Screws (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)



1 1/4" - 6" SEAT DETAIL



8" - 24" SEAT DETAIL



16" COVER DETAIL

INSTALLATION / OPERATION / MAINTENANCE

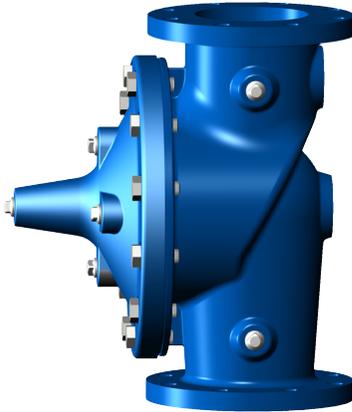


# — MODEL — 100-01 Hytrol Valve Service Data

## 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		Valve Stem Thread	Center Plug NPT	Cover Nut or Bolt		Cover Lifting Holes UNC	Cover Plug		Cover Torque		Stem Nut Torque				
inches	mm	inches	mm	Gallons	Liters	UNF-Internal		Thread (Bolt)	Socket	Qty	Thread	Socket	ft. Lbs.	in. Lbs.	Thread	Socket (Long)			
1"	25	0.3	8	0.020	0.07	10-32	1/4"	1/4" - 20 (B)	7/16"	8			4	48	3/8" - 24		Lubed	4	6
1 1/4"	32	0.4	10	0.020	0.07	10-32	1/4"	5/16" - 18 (B)	1/2"	8			8	96	7/16" - 20			6	10
1 1/2"	40	0.4	10	0.020	0.07	10-32	1/4"	5/16" - 18 (B)	1/2"	8			8	96	7/16" - 20			6	10
2"	50	0.6	15	0.032	0.12	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	0.7	18	0.043	0.16	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	0.8	20	0.080	0.30	1/4 - 28	3/4"	1/2" - 13 (B)	3/4"	8	1/2"	9/16"	30		5/8" - 18	15/16"		21	30
4"	100	1.1	23	0.169	0.64	3/8 - 24	1"	3/4" - 10 (B)	1 1/8"	8	3/4"	5/8"	110		3/4" - 16	1 1/16"		40	60
6"	150	1.7	43	0.531	2.00	3/8 - 24	1 1/8"	3/4" - 10 (B)	1 1/8"	12	3/4"	5/8"	110		7/8" - 14	1 5/16"		85	125
8"	200	2.3	58	1.26	4.80	3/8 - 24	1 1/2"	7/8" - 9	1 7/16	16	1"	13/16"	110		1 1/8" - 12	1 13/16"		125	185
10"	250	2.8	71	2.51	9.50	3/8 - 24	2"	1-1/8" - 7	2"	20	1"	13/16"	160		1 1/2" - 12	1 7/8"		250	375
12"	300	3.4	86	4.0	15.10	3/8 - 24	2"	1-1/8" - 7	2"	20	1"	13/16"	390		1 1/2" - 12	2 1/2"		270	400
14"	350	3.9	99	6.5	24.60	3/8 - 24	2"	1-1/4" - 7	2"	20	1"	13/16"	545		1 1/2" - 12	2 1/2"		280	420
16"	400	4.5	114	9.5	36.20	1/2 - 20	3/4"	1-1/4" - 7	2"	20	1"	13/16"	545		2" - 16	3"		500	750
24"	600	6.5	165	29.0	108.80	3/4 - 16 *	3/4"	1-1/2" - 12	2 3/8"	24	1"	13/16"	800		3" - 12	Special		1350	N/R

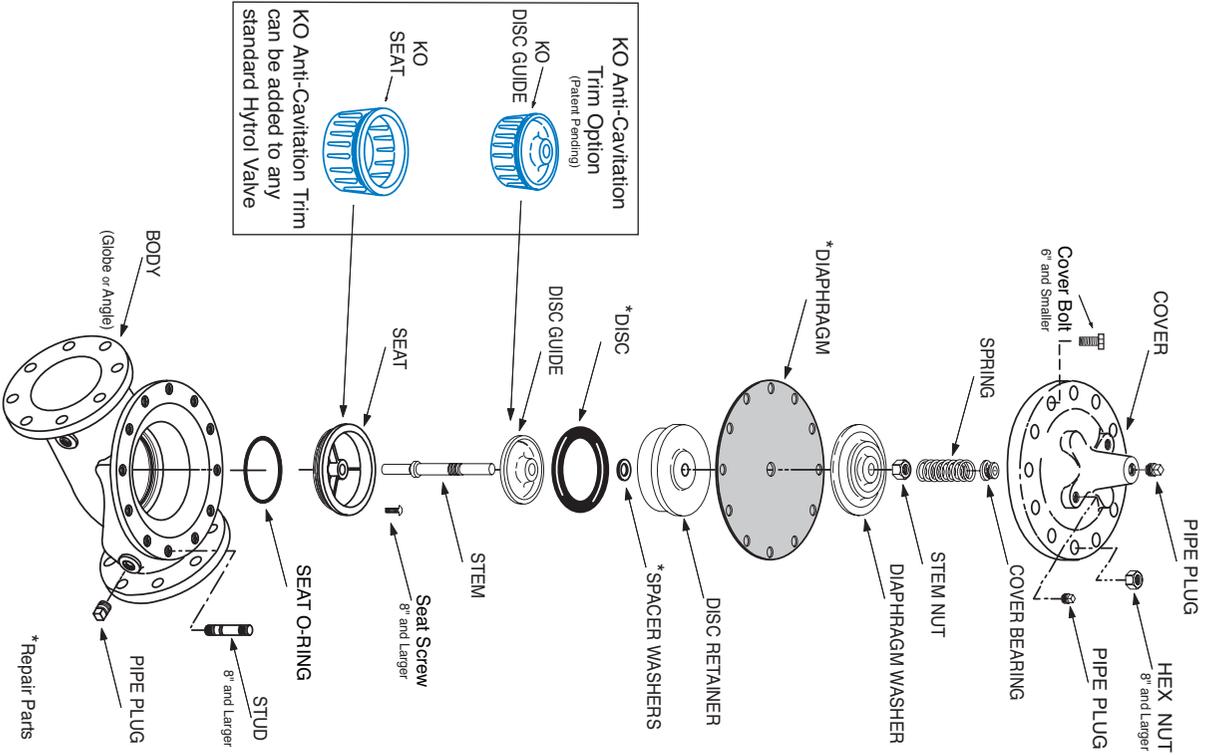
Grade 5 Bolts  
"Heavy" Grade Nuts

Tighten cover nuts in a "star" cross-over pattern

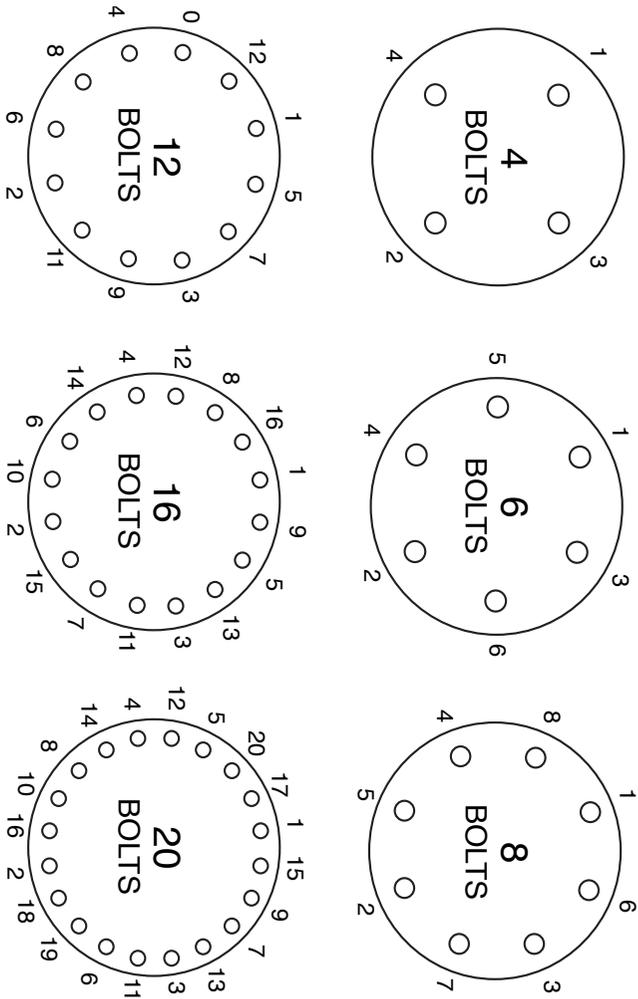
\*\*Must Use ONLY  
Cla-Val Supplied part

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

**100-01 Hytrol Main Valve Assembly**



**BOLT/NUT TORQUING PROCEDURES ON VALVE COVERS**



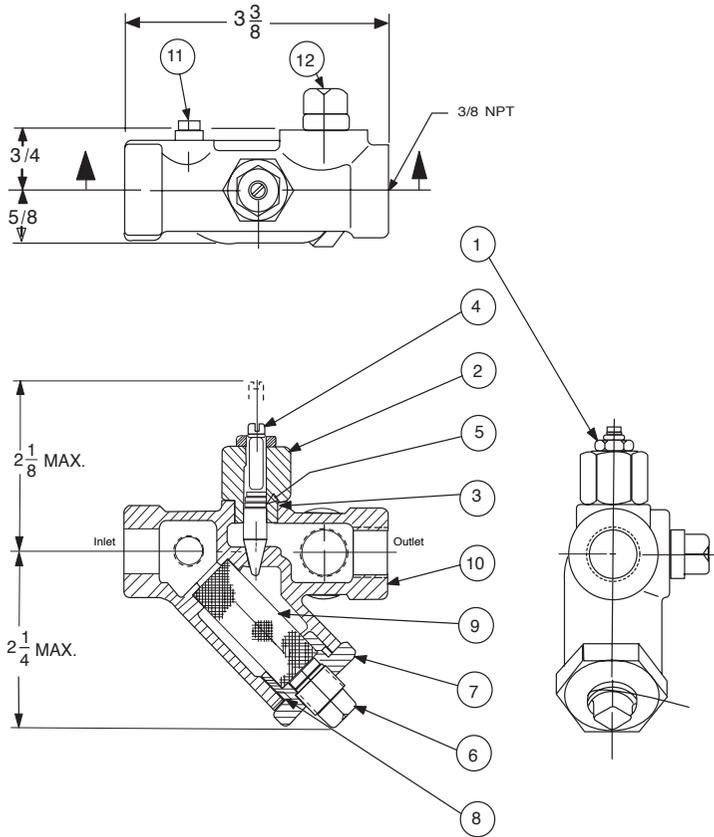
Follow this procedure when reassembling MAIN Valve:

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:
  - A. To approximately 10% of final torque value.
  - B. To approximately 75% of final torque value.
  - C. To final required torque value.
3. Valves that are to be tested to 375 PSI or higher should be retorqued after 24 hours.



# X42N-2

## Strainer and Needle Valve Assembly



**When ordering parts, please specify:**

- All nameplate data
- Item Number
- Description

Size	Stock Number
3/8" x 3/8"	68372C

ITEM	DESCRIPTION	MATERIAL	PART NO.
1	Jam Nut —Hex	Sil Brz	6779806G
2	Bonnet	S.S.	67910A
3	"O" Ring—Bonnet	Syn Rub	00713J
4	Stem	S.S.	67907G
5	"O" Ring—Stem	Syn Rub	00708J
6	Plug—Pipe 1/4	Bre.	6784702A
7	Strainer Plug	303	67911J
8	"O" Ring—Plug	NBR	00715J
9	Screen	Monel	68373A
10	Body	Rd Brs	67905A
11	Plug—Pipe 1/8	Brass	6784701C
12	Plug—Pipe 3/8	Brass	67660-03F



— MODEL — **CRA**  
REMOTE SENSING TYPE

# Pressure Reducing Control

## DESCRIPTION

The CRA Pressure Reducing Control automatically reduces a higher inlet pressure to a lower outlet pressure. It is a direct acting, spring loaded, diaphragm type valve that operates hydraulically or pneumatically and is designed to sense pressure from a remote point. It may be used as a self-contained valve or as a pilot control for a Cla-Val Co. main valve. It will hold a constant downstream pressure at the remote sensing point within very close pressure limits.

## OPERATION

The CRA Pressure Reducing Control is normally held open by the force of the compression spring above the diaphragm; delivery pressure acts on the underside of the diaphragm. Flow through the valve responds to changes in pressure at the the sensing point.

## INSTALLATION

The CRA Pressure Reducing Control may be installed in any position. There is one inlet port and two outlets, for either straight or angle installation. The second outlet port can be used for a gauge connection. A flow arrow is marked on the body casting.

## ADJUSTMENT PROCEDURE

The CRA Pressure Reducing Control can be adjusted to provide a delivery pressure range as specified on the nameplate.

Pressure adjustment is made by turning the adjustment screw to vary the spring pressure on the diaphragm. The greater the compression on the spring the higher the pressure setting.

1. Turn the adjustment screw in (clockwise) to increase delivery pressure.
2. Turn the adjustment screw out (counter-clockwise) to decrease the delivery pressure. When pressure adjustment is completed, tighten jam nut on adjustment screw and replace protective cap.

*Flow rates are not critical during pressure setting. The approximate minimum flow rates given in the table are for the main valve on which the CRA is installed.*

Valve Size	1 1/4"-3"	4"-8"	10"-16"
Minimum Flow GPM	15-30	50-200	300-650

## MAINTENANCE

### Disassembly

To disassemble follow the sequence of the item numbers assigned to parts in the sectional illustration.

### Reassembly

Reassembly is the reverse of disassembly. Caution must be taken to avoid having the yoke (17) drag on the inlet nozzle of the body (18). Follow this procedure:

1. Place yoke (17) in body and screw the disc retainer assembly (16) until it bottoms.
2. Install gasket (14) and spring (19) for 2-30 psi range onto plug (13) and screw into body. Disc retainer must enter guide hole in plug as it is assembled. Screw the plug in by hand. Use wrench to tighten only.
3. Place gasket (25) and powertrol body (21) on yoke extension (17). Refer to sectional view for proper reassembly of (21) onto body (18).
4. Place lower diaphragm washer (24), "o" ring (22), diaphragm (12), upper diaphragm washer (11), and belleville washer (20) on yoke extension (17). Screw on diaphragm nut (10) finger tight.
5. Place two machine screws (4) through (21) (25) and screw into body (18). Do not include the diaphragm (12) in this operation. This holds parts aligned for next step, and allows the diaphragm to move and be properly located during tightening of nut (10).
6. Hold the diaphragm so that screw holes in the diaphragm (12)

and powertrol body (21) align. Tighten diaphragm nut (10) with a wrench. At the final tightening release the diaphragm and permit it to rotate approximately 5° to 10°. The diaphragm holes should now be properly aligned with the body holes.

### To check for proper alignment proceed as follows:

Rotate diaphragm clockwise and counterclockwise as far as possible. Diaphragm screw holes should rotate equal distance on either side of powertrol body screw holes ±1/8".

Repeat assembly procedure until diaphragm and yoke are properly aligned. There must be no contact between yoke and body nozzle during its normal opening and closing movement. To simulate this movement hold powertrol body and diaphragm holes aligned. Move yoke to open and closed positions. There must be no evidence of contact or dragging.

7. Remove machine screws per step 5.
8. Install spring (9) with spring guide (8) on top of spring.
9. Install cover (5) using eight machine screws (4).
10. Replace adjusting screw (2) and nut (3), then cap (1).

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to open when pressure lowers	No spring compression	Tighten adjusting screw
	Mineral buildup on yoke extension (17)	Disassemble and clean part, Replace "O" rings (22) and (23).
	Damaged spring	Disassemble and replace.
	Spring guide (8) is not in place	Disassemble and place guide (8) on top of spring (9).
Fails to close when delivery pressure rises	Yoke dragging on inlet nozzle	Disassembled and reassemble use procedure.
	Spring compressed	Back off adjusting screw
	Mineral deposit on yoke extension (17)	Disassemble and clean part. Replace "o" rings (22) and (23).
	Mechanical obstruction	Disassemble and remove obstruction
	Worn disc	Disassemble, remove and replace disc retainer assembly. (16)
Leakage from cover vent hole	Yoke dragging on inlet nozzle	Refer to paragraph 6
	Damaged diaphragm (12)	Disassemble and replace
	Loose diaphragm nut (10)	Remove cover and tighten nut



# CRA

REMOTE SENSING TYPE

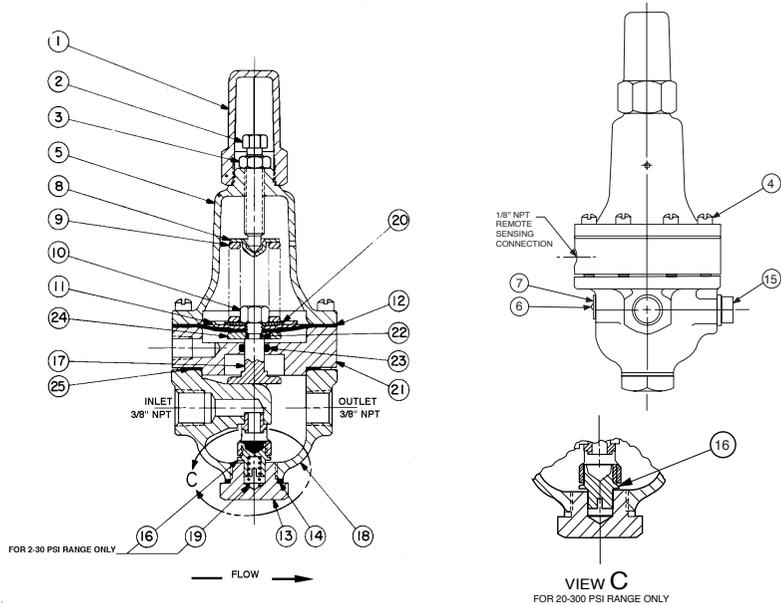
## Pressure Reducing Control

**When ordering parts specify:**

- All nameplate data
- Description
- Item number

SIZE (inch)	STOCK NUMBER	SEAT DIA	ADJ. RANGE (psi)
3/8	79744-03D	1/4	15-75
3/8	79744-04B	1/4	30-300
3/8	79744-06G	1/4	2-30
Factory set pressure:			PSI*per turn
15-75 set @ 20 psi			9.0
30-300 set @ 60 psi			27.0
2-30@ 10 psi			3.0

\* Approximate - Final adjustment should be made with a pressure gauge and with flow.



ITEM	DESCRIPTION	MATERIAL	PART NUMBER	LIST PRICE
1	Cap	PL	67628J	
2	Adjusting Screw	BRS	7188201D	
3	Jam Nut, 3/8—16	303	6780106J	
4*	Machine Screw 10-32 x 1-1/4"(Fil.Hd.) (8 required)	SS	6757874A	
5	Cover	BRS	C2544K	
6	Nameplate Screw	SS	67999D	
7	Nameplate	BRS	C002201G	
8	Spring Guide	302	71881H	
9	Spring			
	(15-75 psi)	CHR VAN	71884B	
	(30-300 psi)	CHR VAN	71885B	
	(2-30 psi)	SS	81594E	
10	Hex Nut 5/16 - 18	303	71883D	
11	Diaphragm Washer (upper)	302	71891G	
12*	Diaphragm	NBR	C6936D	
13	Plug, Body	BRS	V5653A	
14*	Gasket	FIB	40174F	
15	Plug, 3/8 NPT	BRS	6766003F	
16*	Disc Retainer Assy (15-75 psi & 30-300 psi)	BR/RUB	C5256H	
	Disc Retainer Assy (2-30 psi)	BR/RUB	C5255K	
17	Yoke	VBZ	C1799A	
18	Body & Seat Assy, Seat only 1/4"	BS	8339701J	
19*	Bucking Spring (Required with 2-30 psi)	302	VO5586	
20	Belleville Washer	STL	7055007E	
21	Powerrol Body	BRS	C3388A	
22*	O-Ring	NBR	00708J	
23*	O-Ring	NBR	00746J	
24	Diaphragm Washer (lower)	BRS	C1804J	
25	Gasket	NBC	8059401D	
	Repair Kit (no Bucking Spring) Item 19		9170003K	
	Repair Kit (with Bucking Spring) Item 19		9170001D	

\* Suggested Repair Parts



— MODEL — **CRL**

# Pressure Relief Control

## DESCRIPTION

The CRL 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 a Cla-Val Main valve. It opens and closes within very close pressure limits.

## INSTALLATION

The CRL Pressure Relief Control may be installed in any position. The control body (7) has one inlet and one outlet port with a side pipe plug (24) at each port. These plugs are used for control connections or gauge applications. The inlet in the power unit body (6) is the sensing line port. A flow arrow is marked on the body casting.

## OPERATION

The CRL Pressure Relief Control is normally held closed by the force of the compression spring above the diaphragm; control pressure is applied under the diaphragm.

When the controlling pressure exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control.

When controlling pressure drops below spring setting, the spring returns the control to its normally closed position.

## ADJUSTMENT PROCEDURE

The CRL Pressure Relief Control can be adjusted to provide a relief setting at any point within the range found on the nameplate.

Pressure adjustment is made by turning the adjustment screw (9) to vary the spring pressure on the diaphragm. Turning the adjustment screw clockwise increases the pressure required to open the valve. Counterclockwise decreases the pressure required to open the valve.

When pressure adjustments are complete the jam nut (10) should be tightened and the protective cap (1) replaced. If there is a problem of tampering, lock wire holes have been provided in cap and cover. Wire the cap to cover and secure with lead seal.

## DISASSEMBLY

The CRL Pressure Relief Control does not need to be removed from the line for disassembly. Make sure that pressure shut down is accompanied prior to disassembly. If the CRL is removed from the line for disassembly be sure to use a soft jawed vise to hold body during work.

Refer to Parts List Drawing for Item Numbers.

1. Remove cap (1), loosen jam nut (10) and turn adjusting screw counterclockwise until spring tension is relieved.
2. Remove the eight screws (4) holding the cover (3) and powerunit body (6). Hold the cover and powerunit together and place on a suitable work surface.  
See NOTE under REASSEMBLY.
3. Remove the cover (3) from powerunit body (6). The spring (12) and two spring guides (11).
4. Remove nut (13) from stem (19) and slide off the belleville washer (14), the upper diaphragm washer (15) and the diaphragm (16).
5. Pull the stem (19) with the disc retainer assembly (21) through the bottom of powerunit. The lower diaphragm washer (17) will slide off of stem top.
6. Remove jam nut (23) and disc retainer assembly (21) from stem. Use soft jawed pliers or vise to hold stem. The polished surface of stem must not be scored or scratched.
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 an integral seat in the body (7).

## INSPECTION

Inspect all parts for damage, or evidence of cross threading. Check diaphragm and disc retainer assembly for tears, abrasions or other damage. Check all metal parts for damage, corrosion or excessive wear.

## REPAIR AND REPLACEMENT

Minor nicks and scratches may be polished out using 400 grit wet or dry sandpaper fine emery or crocus cloth. Replace all O-rings and any damaged parts.

When ordering replacement parts, be sure to specify parts list item number and all nameplate data.

## REASSEMBLY

In general, reassembly is the reverse of disassembly. However, the following steps should be observed:

1. Lubricate the O-Ring (18) with a small amount of a good grade of waterproof grease, (Dow Corning 44 medium grade or equal). Use grease sparingly and install O-ring in powerunit body (6).
2. Install stem (19) in powerunit body (6). Use a rotating motion with minimum pressure to let stem pass through O-ring.  
Do Not Cut O-Ring.
3. Install O-ring (5) at top of stem (19). Place lower diaphragm washer (17) on the stem with the serrated side up. Position diaphragm (16), upper diaphragm washer (15), with serration down, and belleville washer (14) with concave side down.
4. Position powerunit body (6) as shown on parts list drawing (top view).
5. Continue reassembly as outlined in disassembly steps 1 through 3.

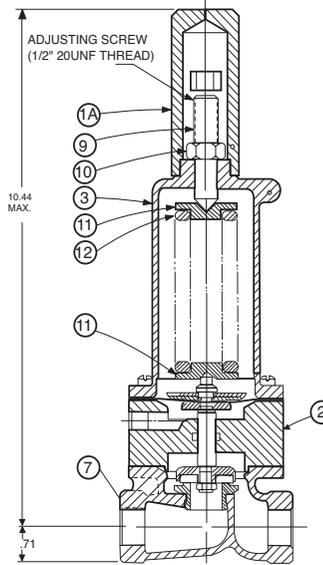
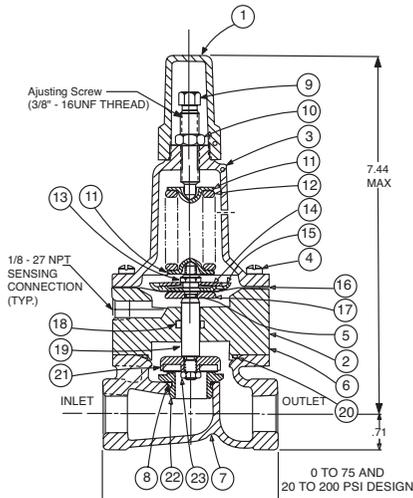
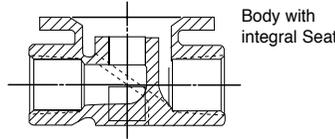
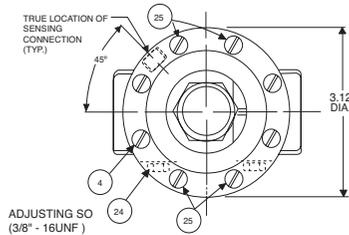
**Note:** Item (4) Screw will have a quantity of 8 for the 0-75 and 20-200psi design and a quantity of 4 for the 100-300psi design. Item (25) Screw is used on the 100-300psi design only. Install item (25), before item (4) for preload of item (12) spring.

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.



# CRL

## 1/2" & 3/4" PRESSURE RELIEF CONTROL



SIZE	SPRING RANGE	PART NUMBER
1/2"	0-75 PSI	79222-01E
1/2"	20-200 PSI	79222-02C
1/2"	100-300 PSI	82809-01D
3/4"	0-75 PSI	79229-01K
3/4"	20-200 PSI	79229-02H
3/4"	100-300 PSI	86005-01E

For 100-450 PSI Contact Factory

CRL RANGE PSI	APPROX. INCREASE FOR EACH CLOCKWISE TURN OF ADJUSTING SCREW
0 to 75	8.5 PSI
20 to 200	28.0 PSI
100 to 300	18.0 PSI

**When ordering parts please specify:**  
 1. All Nameplate Data  
 2. Item Part Number  
 3. Item Description

Item	Description	Material	Part Number	Part Number	Part Number
			0-75	20-200	100-300
1	Cap	Plastic	67628J	67628J	1257601D
1A	Cap 100 to 300 psi Design	Plastic	1257601D	1257601D	1257601D
2	Nameplate	Brass	--	--	--
3	Cover	Bronze	C2544K	C2544K	44587E
4*	Screw Fil.Hd.10-32 x 1.88	303 SS	6757867E	6757867E	6757867E
5*	O-Ring	Rubber	00902H	00902H	00902H
6	Body, Powerunit	Bronze	7920504D	7920504D	7920504D
7	1/2" Body	Bronze	C7928K	C7928K	C7928K
	3/4" Body	Bronze	C9083B	C9083B	C9083B
8*	O-Ring, Seat	Rubber	00718H	00718H	00718H
9	Screw, Adjusting	Brass	7188201D	7188201D	7188201D
10	Nut Hex (Locking)	303 SS	6780106J	6780106J	6780106J
11	Guide, Spring	303 SS	71881H	71881H	1630301J
12	Spring,	CHR/VAN	71884B	71885J	1630201A
13	Nut, Stem, Upper	Bronze	73034B	73034B	73034B
14	Washer, Belleville	Steel	7055007E	7055007E	7055007E
15	Washer, Diaphragm (upper)	303 SS	71891G	71891G	71891G
16*	Diaphragm	Rubber	C1505B	C1505B	C1505B
17	Washer, Diaphragm (lower)	303 SS	45871B	45871B	45871B
18*	O-Ring, Stem	Rubber	00746J	00746J	00746J
19	Stem	303 SS	8982401F	8982401F	8982401F
20*	O-Ring, Body	Rubber	00767E	00767E	00767E
21*	Retainer Assembly, Disc	303 SS	C8964D	C8964D	C8964D
22	Seat	303 SS	62187A	62187A	62187A
23	Nut, hex, Stem, Lower	Bronze	6779806G	6779806G	6779806G
24	Pipe Plug	Bronze	6784701C	6784701C	6784701C
25*	Screw Fil.Hd, 10-32 x 2.25 (Qty 4 on 100-300 psi)	303 SS	6757867E	6757867E	6757867E
	<b>FACTORY SET POINT</b>		<b>50 PSI</b>	<b>60 PSI</b>	<b>100 PSI</b>
	<b>REPAIR KIT*</b>		9170007A	9170007A	9170007A



# Regulator Spring Color Coding Chart

**Dwg#47117**

\*THESE FIGURES ARE ONLY APPROXIMATE. FINAL ADJUSTMENTS SHOULD BE MADE WITH A PRESSURE GAGE.

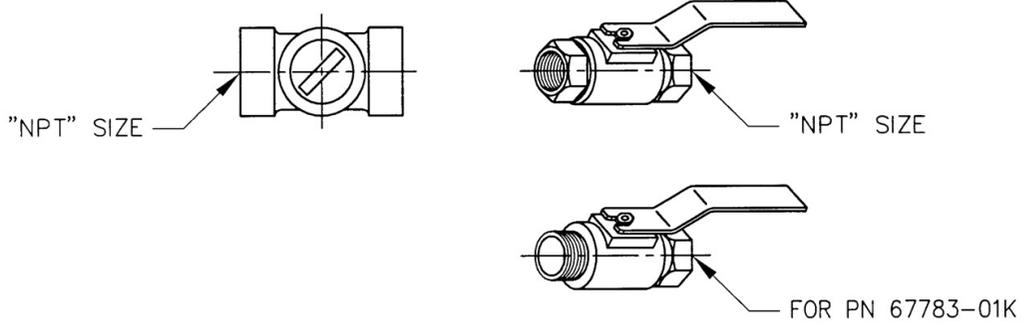
WIRE SIZE	SPRING NUMBER	COLOR	WIRE MATERIAL	CATALOG NUMBER	PSI RANGE	*PSI PER TURN
.080 DIA.	C0492D	BLUE	S.S.	CDB-7	0-7	.75
				CRL-5A	0-7	.75
.018 DIA.	82575C	--	S.S.	CRD	1.9-6.5	.61
				CRD-10A	1.9-6.5	.49
.116 DIA.	81594E	--	S.S.	CRD	2-30	3.0
				CRD-10A	2-30	2.4
.120 DIA.	V5654J	GREEN	CHR VAN	CRL-5A	5-25	4.0
				CRD	10-40	4.0
.162 DIA.	32447F	NATURAL	S.S.	CDB-7	10-60	12.0
				CRL-5A	10-60	12.0
				CRL-13	10-60	12.0
.162 DIA.	V5695B	YELLOW	MUSIC WIRE	CDB-7	20-80	14.5
				CRL-5A	20-80	14.5
				CRL-13	20-80	14.5
.207 DIA.	C1124B	CAD PLT	MUSIC WIRE	CDB-7	50-150	29.5
				CRL-13	50-150	29.5
				CRL-5A	50-150	29.5
.225 DIA.	V6515A	RED	MUSIC WIRE	CDB-7	65-180	44.0
				CRL-13	65-180	44.0
				CRL-5A	65-180	44.0
.115 X .218	71884B	RED	CHR VAN	CRL	0-75	8.5
				CRD	15-75	9.0
				CRD-10A	15-75	7.2
.118 X .225	71886J	GREEN	CHR VAN	CRL	20-200	28.0
				CRD	30-300	27.0
				CRD-10A	30-300	22.4
.225 X .295	1630201A	CAD PLT	CHR VAN	CRL	100-300	18.00
				CRL-5A	100-300	18.00
.440 X .219	48211H	CAD PLT	STEEL	CRA-18	200-450	17.0
				CRD-22	200-450	17.0
				CRL-4A	100-450	17.0
.187	20561901H	BLACK	STEEL	CRD	20-105	12.0
WIRE SIZE	SPRING NUMBER	COLOR	WIRE MATERIAL	CATALOG NUMBER	PSI RANGE	*FEET PER TURN
.080 DIA.	C0492D	BLUE	S.S.	CRA	4.5-15	.82
				CRD-2	4.5-15	.82
.375 DIA.	87719B 1 SPRING 2 SPRING 3 SPRING 4 SPRING 5 SPRING	EPOXY COATED	CHROME SILICON	CDS-5	5-40	1.0
					30-80	2.0
					70-120	3.0
					110-120	4.0
					150-200	5.0
.072 DIA.	V5097A	--	302SS	CVC	1-17	.7
.375 DIA.	2933502H 1 SPRING 2 SPRING 3 SPRING 4 SPRING 5 SPRING	EPOXY COATED	CHROME SILICON	CDS-6	5-40	.75
					30-80	1.50
					70-120	2.20
					110-120	3.00
					150-200	3.70

THE FOLLOWING CONTROL & SPRING P/N'S WERE REMOVED, 32656B, 31554K, 44591G, V65695B, & V5695B. ADDED CRL-13, CRL-5A, CRA, CRA-10A, CHANGED SPRING RANGES TO MATCH CURRENT CONTROLS.

\*This drawing is the property of CLA-VAL and same and copies made thereof, if any, shall be returned to it upon demand. Delivery and disclosure hereof are made solely upon condition that the same shall not be used, copied or reproduced, nor shall the subject here of be disclosed in any manner to anyone for any purpose, except as herein authorized, without prior approval of CLA-VAL. Whether or not the equipment or information shown hereon is patented or otherwise protected, full title and copy-rights if any, in and to this drawing and/or information delivered or submitted are fully reserved by CLA-VAL.

<b>CLA-VAL CO.</b> NEWPORT BEACH, CALIFORNIA	CATALOG NO.	DRAWING NO. <b>67783</b>	REV <b>AW</b>
TYPE OF VALVE AND MAIN FEATURES  <b>CK2 COCK/BALL VALVE</b>		DESIGN	
		DRAWN MGR	4-02-80
		CHK'D KD	4-03-80
		APVD CH	4-07-80

SCALE: NONE



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	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 *	-11J	-19B	-27E	-46E SUPSD BY-27E -53A	-45G -57B **	-48A SUPSD BY-49J	3/8"
-04D	-12G	-20K	-28C	-54J	-43B SUPSD BY-04D	-49J	1/2"
-05A	-13E	-21H	-29A		-44K SUPSD BY-05A	-56D	3/4"
-06J	-14C	-22F	-30J				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.

04-07-03	07-29-03	AK	AK	AK	AK
REMOVED COLUMN "MONEL W/ LOCKING HANDLE"; RELOCATED PN 67783-56D; ADDED VENDOR INFO FOR PN 67783-56D ON SHEET 2 (ECO 19327)					
ADDED PN 67783-57B ON SHEET 1 (ECO 19484)					
AV	AW				
CAD REVISION RECORD - DO NOT REVISE MANUALLY					
LTR	DESCRIPTION	BY	DATE		
A-AT	SEE REVISION FILE	AK	01-31-03		
AU ADDED PN 67783-56D (ECO 19284)					

THIS DRAWING IS THE PROPERTY OF CLA-VAL CO. AND SAME AND COPIES MADE THEREOF, IF ANY, SHALL BE RETURNED TO IT UPON DEMAND. DELIVERY AND DISCLOSURE HEREOF ARE SOLELY UPON CONDITION THAT THE SAME SHALL NOT BE USED, COPIED OR REPRODUCED, NOR SHALL THE SUBJECT HEREOF BE DISCLOSED IN ANY MANNER TO ANYONE FOR ANY PURPOSE, EXCEPT AS HEREIN AUTHORIZED, WITHOUT PRIOR WRITTEN APPROVAL OF CLA-VAL CO. THIS DRAWING IS SUBMITTED CONFIDENTIALLY AND MAY NOT BE USED IN THE MANUFACTURE OF ANY MATERIAL OR PRODUCT OTHER THAN SUCH MATERIALS AND PRODUCTS FURNISHED TO CLA-VAL CO. WHETHER OR NOT THE EQUIPMENT OR INFORMATION SHOWN HEREON IS PATENTED OR OTHERWISE PROTECTED, FULL TITLE AND COPYRIGHTS, IF ANY, IN AND TO THIS DRAWING AND/OR INFORMATION DELIVERED OR SUBMITTED ARE FULLY RESERVED CLA-VAL CO.



# Cla-Val Product Identification

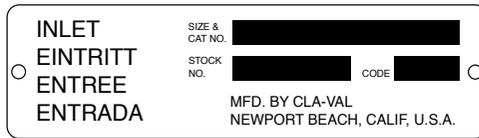
## How to Order

### Proper Identification

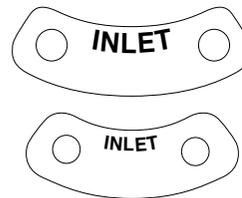
For ordering repair kits, replacement parts, or for inquiries concerning valve operation, it is important to properly identify Cla-Val products already in service by including all nameplate data with your inquiry. Pertinent product data includes valve function, size, material, pressure rating, end details,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



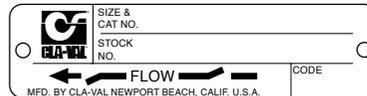
This brass plate appears on valves sized 2 1/2" and larger and is located on the top of the inlet flange.



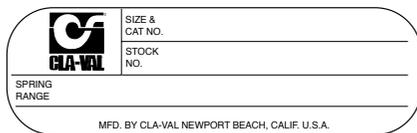
These two brass plates appear on 3/8", 1/2", and 3/4" size valves and are located on the valve cover.



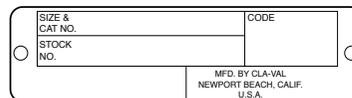
This brass plate appears on altitude valves only and is found on top of the outlet flange.



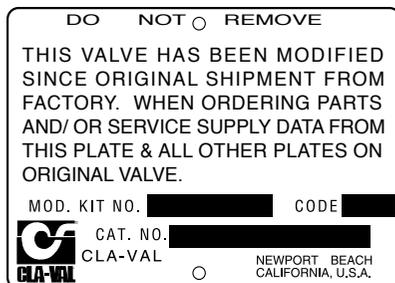
These two brass plates appear on threaded valves 1" through 3" size or flanged valves 1" through 2". It is located on only one side of the valve body.



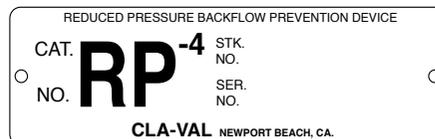
This tag is affixed to the cover of the pilot control valve. The adjustment range appears in the spring range section.



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**

Distributed By:  
M&M Control Service, Inc.  
Phone: 800-876-0036  
Fax: 847-356-0747  
Email: [sales@mmcontrol.com](mailto:sales@mmcontrol.com)

**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)
- 

NOTES:

---

NOTES:



**CLA-VAL**

Distributed By:  
M&M Control Service, Inc.  
Phone: 800-876-0036  
Fax: 847-356-0747  
Email: [sales@mmcontrol.com](mailto:sales@mmcontrol.com)

Represented By:



— MODEL — **REPAIR KITS**

**Complete Replacement Diaphragm Assemblies for 100-01 and 100-20 Hytrol Main Valves**  
*For:* Hytrol Main Valves with Ductile Iron, Bronze Trim Materials—**125/150 Pressure Class Only.**  
**FACTORY ASSEMBLED**

Includes: Stem, Disc Guide, Disc, Disc Retainer, Spacer Washers, Diaphragm, Diaphragm Washer and Stem Nut.

Valve Size	Diaphragm Assembly Stock Number		Valve Size	Diaphragm Assembly Stock Number	
	100-01	100-20		100-01	100-20
3/8" (Also 81-01 )	49097K	N/A	6"	40456G	33273E
1/2" - 3/4" (Also 81-01 )	C2518D	N/A	8"	45276D	40456G
1"	C2520K	N/A	10"	81752J	45276D
1 1/4"-1 1/2"	C2522 F	N/A	12"	85533J	81752J
2"	C2524B	N/A	14"	89067D	N/A
2 1/2"	C2523D	N/A	16"	89068B	85533J
3"	C2525J	C2524B	20"	N/A	89068B
4"	33273E	C2525J	24"	N/A	89068B

**Repair Kits for 100-01/100-20 Hytrol Valves**

*For:* Hytrol Main Valves—**125/150 Pressure Class Only.**

Includes: Diaphragm, Disc (or Disc Assembly) and spare Spacer Washers.

Buna-N® Standard Material				Viton (For KB Valves)			
Valve Size	Repair Kit Stock Number		Valve Size	Repair Kit Stock Number			
	100-01	100-20		100-01	100-20		
3/8" (Also 81-01 )	9169801K	N/A	3/8" (Also 81-01 )	9169806J	N/A		
1/2" - 3/4" (Also 81-01 )	9169802H	N/A	1/2" - 3/4" (Also 81-01 )	9169807G	N/A		
1"	9169803F	N/A	1"	9169808E	N/A		
1 1/4" - 1 1/2"	9169804D	N/A	1 1/4" - 1 1/2"	9169809C	N/A		
2"	9169805A	N/A	2"	9169810A	N/A		
2 1/2"	9169811J	N/A	2 1/2"	9169817F	N/A		
3"	9169812G	9169805A	3"	9169818D	9169810A		
4"	9169813E	9169812G	4"	9169819B	9169818D		
6"	9169815K	9169813E	6"	9169820K	9169819B		
8"	9817901D	9169815K	8"	9169834A	9169820K		
10"	9817902B	9817901D					
12"	9817903K	9817902B					
14"	9817904H	N/A					
16"	9817905E	9817903K					
20"	N/A	9817905E					
24"	9817906C	9817905E					

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

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

**For:** Powertrol and Powercheck Main Valves—125/150 Pressure Class Only

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

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

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

**For:** Hy-Check Main Valves—125/150 Pressure Class Only

Larger Sizes: Consult Factory.

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

**Repair Kits for Pilot Control Valves**

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

Larger Sizes: Consult Factory.

BUNA-N® (Standard Material)			VITON (For KB Control)		
Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number
CDB	9170006C	CRM-7	1263901K	CDB-KB	9170012A
CDB-3D	9170023H	CFM-7A	1263901K	CRA-KB	N/A
CDB-3I	9170024F	CFM-9	12223E	CRD-KB (w/bucking spring)	9170008J
CDB-7	9170017K	CRA (w/bucking spring)	9170001D	CRL-KB	9170013J
CDH-2	18225D	CRD (w/bucking spring)	9170002B	CDHS-2BKB	9170010E
CDHS-2	44607A	CRD (no bucking spring)	9170003K	CDHS-2FKB	9170011C
CDHS-2B	9170004H	CRD-18	20275401K	CDHS-18KB (no bucking spring)	9170009G
CDHS-2F	9170005E	CRD-22	98923G	102C-KB	1726202D
CDHS-3C-A2	24657K	CRL (55F, 55L)	9170007A		
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	CV	9170019F		
CDS-6A	20349401C	X105L (O-ring)	00951E		
CFCM-M1	1222301C	102B-1	1502201F		
CFM-2	12223E	102C-2	172601F		
		102C-3	172601F		
				Buna-N®	
				CRD Disc Ret. (Solid)	C5256H
				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