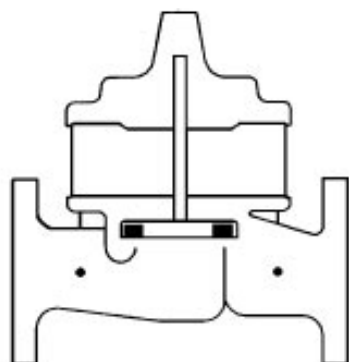

CLA-VAL™

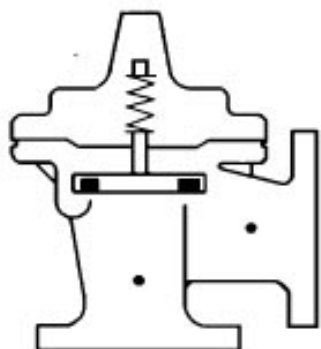
AUTOMATIC CONTROL VALVES

50B-4KG-1

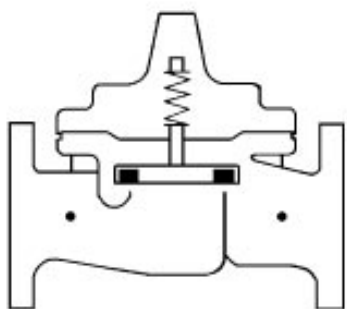
Place this manual with personnel responsible
for maintenance of this valve.



INSTALLATION



OPERATION



MAINTENANCE





NEWPORT BEACH, CALIFORNIA

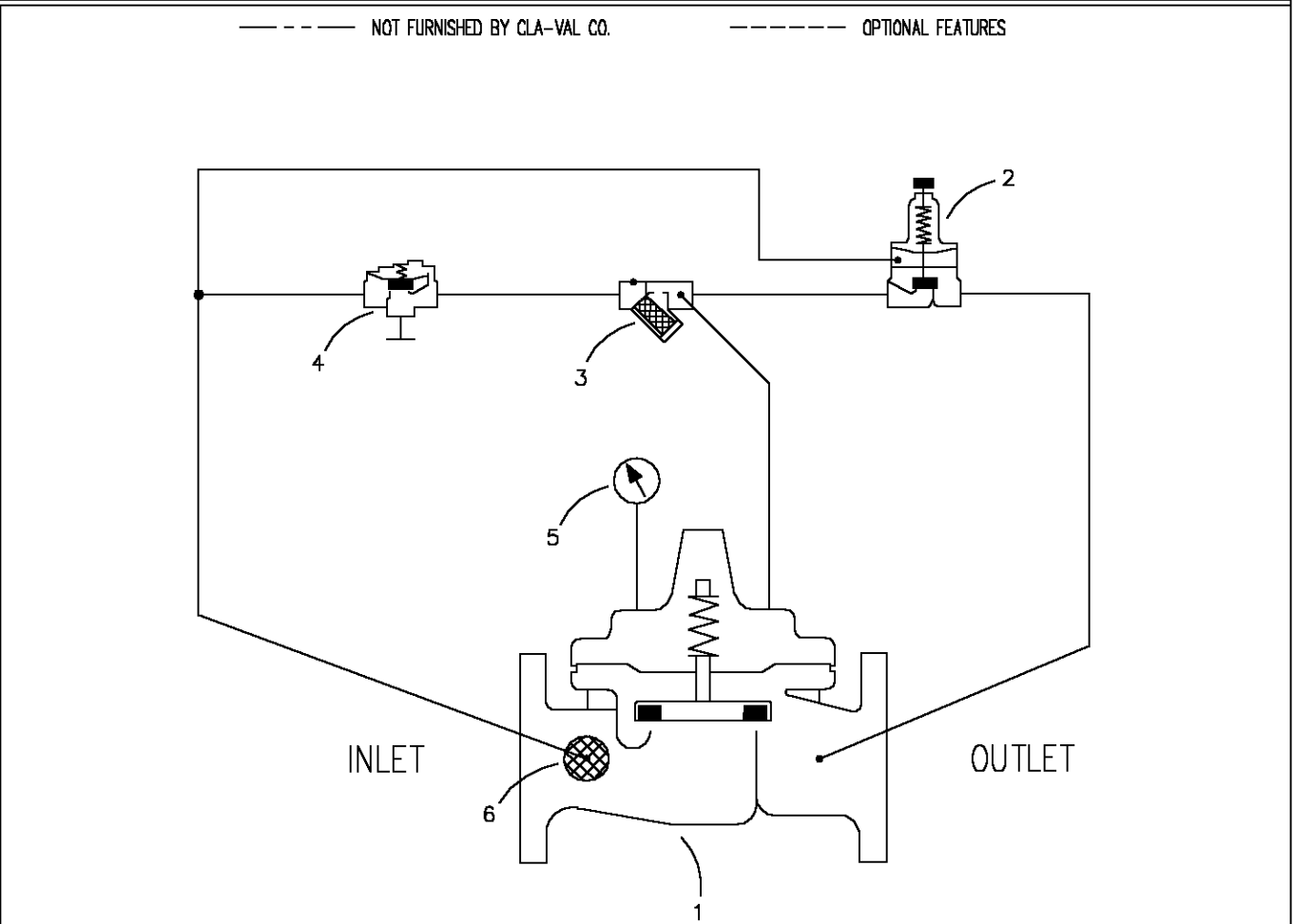
CATALOG NO.
50B-4KG1 (GLOBE)
2050B-4KG1 (ANGLE)

DRAWING NO.
80984

REV.
R

TYPE OF VALVE AND MAIN FEATURES
PRESSURE RELIEF VALVE
THIS VALVE IS FACTORY MUTUAL APPROVED, FM SERIAL NO. 21102, DATED MAY 12, 1972, & OM6A5. AH DATED OCT. 10, 1985 FOR SIZES 4", 6" & 8", (REF. E50B-4KG1) U.L. LISTED SIZES 3", 4" & 6".

DESIGN		
DRAW	MGR	8-18-80
CHK'D	CH	8-20-80
APVD	HWE	8-20-80



* FORMERLY 100HKG
** UL LISTING CRL
RANGE 20-200 PSI
100-300 PSI
FM APPROVED CRL
RANGE 20-200 PSI

NOTE: FACTORY MUTUAL APPROVAL NO. 21102 IS FOR SPLIT CASE PUMPS AND APPROVAL NO. OM6A5.AH IS FOR VERTICAL TURBINE PUMPS

ITEM NO.	BASIC COMPONENTS	QTY
1	*100-06 HYTROL (MAIN VALVE)	1
2	**CRL PRESSURE RELIEF CONTROL	1
3	X44A STRAINER & ORIFICE ASSEMBLY	1
4	81-01 CHECK VALVE	1
5	PRESSURE GAGE	1
6	X46A FLOW CLEAN STRAINER	1

OPTIONAL FEATURE SUFFIX	ADDED TO CATALOG NUMBER

CAD REVISION RECORD - DO NOT REVISE MANUALLY
 DESCRIPTION
 DATE
 BY
 LTR
 A-M SEE REVISION FILE
 N ADDED NOTE ON PRESSURE RELIEF FEATURE & REDRAWN ON CAD (ECO 11855)
 4-21-93
 2-27-97
 TLC
 JB
 P
 R
 10-17-91
 TLC

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CLA-VAL CO.

NEWPORT BEACH, CALIFORNIA

 CATALOG NO.
 50B-4KG1 (GLOBE)
 2050B-4KG1 (ANGLE)

DRAWING NO.

80984

REV.

R

TYPE OF VALVE AND MAIN FEATURES

PRESSURE RELIEF VALVE

THIS VALVE IS FACTORY MUTUAL APPROVED, FM SERIAL NO. 21102,
 DATED MAY 12, 1972, & OM6A5. AH DATED OCT. 10, 1985 FOR SIZES
 4", 6" & 8", (REF. E50B-4KG1) U.L. LISTED SIZES 3", 4" & 6".

DESIGN

DRAW

JM

8-3-71

CHK'D

JM

2-29-72

APVD

JM

2-29-72

OPERATING DATA

I. DESCRIPTION

THE CLAYTON 50B-4KG1 AND 2050B-4KG1 PRESSURE RELIEF VALVES ARE DIAPHRAGM ACTUATED PILOT CONTROLLED VALVES DESIGNED TO MAINTAIN A RELATIVELY CONSTANT PRESSURE AT THE MAIN VALVE INLET. THE PRESSURE RELIEF SET POINT IS EASILY ADJUSTED WITHIN THE RANGE SHOWN ON THE PRESSURE RELIEF CONTROL NAMEPLATE.

II. PRESSURE RELIEF FEATURE

PRESSURE RELIEF CONTROL (2) IS A SPRING LOADED, NORMALLY CLOSED PILOT CONTROL THAT RESPONDS TO SLIGHT PRESSURE CHANGES AT MAIN VALVE INLET. AN INCREASE IN INLET PRESSURE TENDS TO OPEN CONTROL (2) AND A DECREASE IN INLET PRESSURE TENDS TO CLOSE CONTROL (2). THIS CAUSES MAIN VALVE COVER PRESSURE TO VARY AND THE MAIN VALVE MODULATES (OPENS AND CLOSES) MAINTAINING A RELATIVELY CONSTANT PRESSURE AT THE MAIN VALVE INLET. A BRIEF EXPLANATION OF THE OPENING AND CLOSING CYCLE IS AS FOLLOWING:

OPENING CYCLE:

- (a) INLET PRESSURE IS DIRECTED THROUGH THE SENSING LINE TO THE ACTUATING DIAPHRAGM OF CONTROL (2).
- (b) WHEN FORCE CREATED BY INLET PRESSURE UNDER DIAPHRAGM OF CONTROL (2) EXCEEDS THE FORCE OF THE SPRING IN CONTROL (2), CONTROL (2) OPENS.
- (c) WHEN FLOW OUT OF MAIN VALVE COVER CHAMBER THROUGH CONTROL (2) EXCEEDS FLOW INTO THE MAIN VALVE COVER CHAMBER THROUGH STRAINER & ORIFICE (3), PRESSURE IN THE MAIN VALVE COVER CHAMBER IS REDUCED.
- (d) WITH REDUCED PRESSURE IN THE MAIN VALVE COVER CHAMBER AND FULL INLET PRESSURE UNDER THE MAIN VALVE DISC, THE MAIN VALVE OPENS.

CLOSING CYCLE:

- (a) WHEN FORCE CREATED BY INLET PRESSURE UNDER DIAPHRAGM OF CONTROL (2) IS LESS THE FORCE OF THE SPRING IN CONTROL (2), CONTROL (2) CLOSES.
- (b) THE MAIN VALVE COVER CHAMBER IS SLOWLY PRESSURIZED THROUGH STRAINER & ORIFICE (3) AND THE MAIN VALVE CLOSES.

III. PRESSURE RELIEF CONTROL (2) ADJUSTMENT

- (a) REMOVE PLASTIC CAP. (TURN COUNTERCLOCKWISE)
- (b) LOOSEN ADJUSTING SCREW JAM NUT. (TURN COUNTERCLOCKWISE)
- (c) TURN ADJUSTING SCREW CLOCKWISE TO INCREASE PRESSURE RELIEF SET POINT. (OR COUNTERCLOCKWISE TO DECREASE SET POINT.)
- (d) RE-TIGHTEN JAM NUT.
- (e) REPLACE PLASTIC CAP.

IV. CHECK VALVE FEATURE:

WHEN COVER PRESSURE IS HIGHER THAN INLET PRESSURE, CHECK VALVE (4) CLOSES. THIS MAINTAINS THE HIGHER PRESSURE IN THE MAIN VALVE COVER CHAMBER KEEPING THE MAIN VALVE CLOSED.

NOTES:

1. PERIODIC CLEANING OF STRAINER SCREEN IN ITEM (3) & (6) IS RECOMMENDED.
2. RELIEF VALVE (2) SHOULD BE TESTED AFTER INSTALLATION TO VERIFY SETTING.

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DATE

BY

DESCRIPTION

SEE SHEET 1

LTR

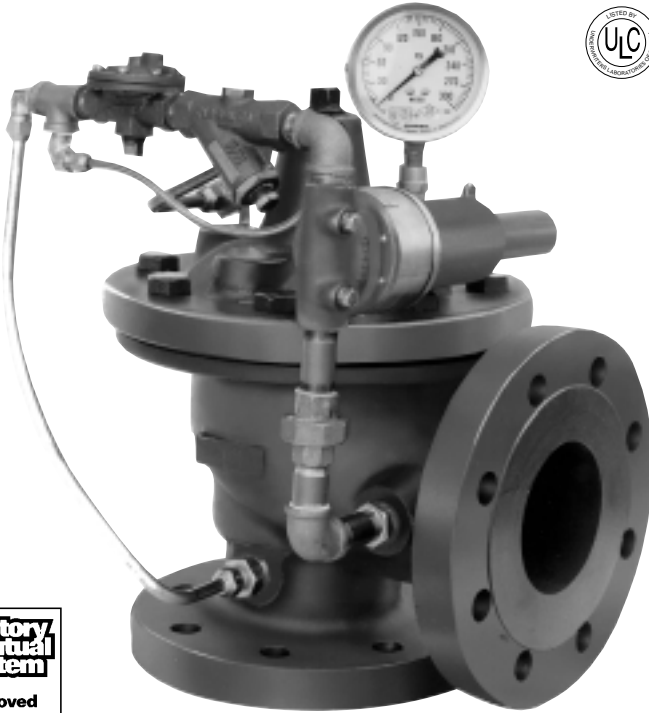


— MODEL — **50B-4KG-1**

Fire Protection Pressure Relief Valve



- **U.L. Listed/U.L.C. Listed**
- **Factory Mutual Approved**
- **Fast Opening to Maintain Steady Line Pressure**
- **Accommodates Wide Range of Flow Rates**
- **Closes Gradually for Surge-Free Operation**
- **Adjustable Pressure Settings, Not Affected by Pressure At Valve Discharge**



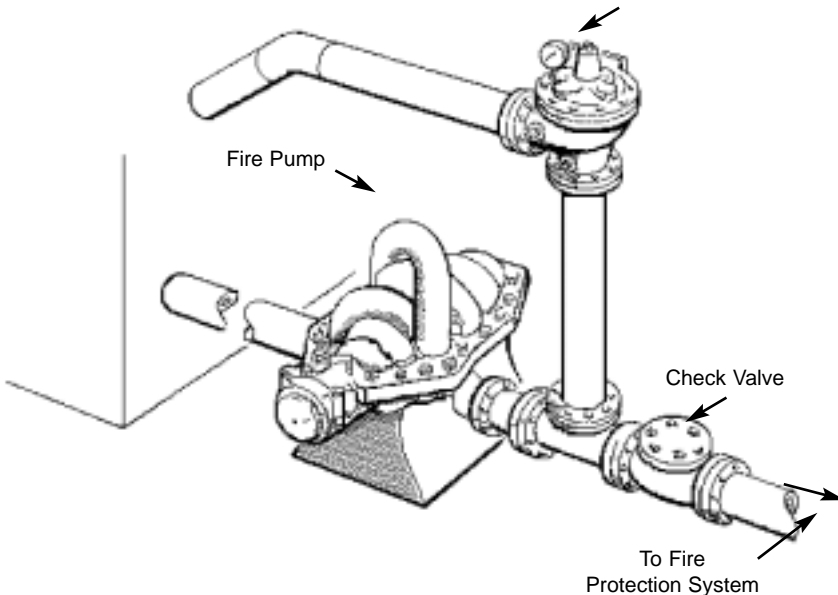
The Cla-Val Model 50B-4KG-1 Globe / 2050B-4KG Angle Pressure Relief Valve is designed specifically to automatically relieve excess pressure in fire protection pumping systems. Pilot controlled, it maintains constant system pressure at the pump discharge within very close limits as demands change.

U.L. Listed.....Sizes 3" thru 8"
 F.M. Approved.....Sizes 3" thru 8"
 U.L.C. Listed.....Sizes 2" thru 10"

2050B-4KG1 (Angle)

Typical Application

Model 2050B-4KG-1 Pressure Relief Valve (Angle Pattern)



Operation Sequence

At pump start, Cla-Val Relief Valve modulates to relieve excess pump capacity, maintaining positive system pressure at the pump discharge.

When fire demand slows or ceases, Cla-Val Model 50B-4KG-1 opens, diverting entire pump output to discharge, allowing fire pump to be stopped without causing surging in the lines.

(Please note that if the Model 50B-4KG-1 is to be used on a continuous duty basis to maintain fire-system pressure, suitable back pressure must be provided on the valve to prevent cavitation damage. Consult the factory for details.)

"Fluid Control at It's Best"



Specifications

Sizes Globe: 2" - 12" flanged
Angle: 2" - 12" flanged

End Details 150 and 300 ANSI B16.42

Pressure Ratings class - 175 psi Max.
class - 300 psi Max

Water, to 180°F Max.

Materials **Main Valve Body & Cover**
Ductile Iron ASTM A-536
Naval Bronze ASTM B61
Other Material Available
Standard Main Valve Trim:
Bronze Seat, Teflon Coated
Stainless Steel Stem, Delrin Sleeved
Standard Pilot Control System:
Cast Bronze with
Stainless Steel trim

Adjustment Range Available in the following relief pressure ranges:
20-200 psi (150 Class)
100-300 psi (300 Class)

Optional Protective epoxy resin coating of wetted surfaces of main valve cast iron components (UL listed HNFx EX2855)

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system. It shall maintain constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting. The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single, removable, teflon-coated seat, a delrin-sleeved stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3 1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. This valve shall be UL Listed and Factory Mutual approved. It shall be the MODEL 50B-4KG-1 (globe) or Model 2050B-4KG-1 (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

*Special Note:

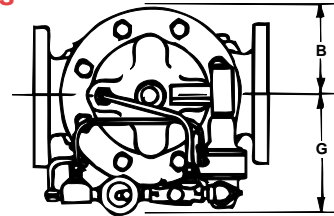
The Model 50B-4KG-1 Pressure Relief Valve is available with 300# ANSI inlet flange and 100# ANSI outlet flange. This valve is used on higher pressure systems where 300# flange connections are required, and allows for adapting of a discharge cone (generally supplied with 150# flange) to accommodate "atmospheric break" at relief valve discharge. This relief valve, with 300# X 150# flanges is available on special order, and is UNDERWRITERS LABORATORIES LISTED AND FACTORY MUTUAL APPROVED.

Specifications Seawater Service Option

Sizes Globe: 2" - 10" flanged
Angle: 2" - 10" flanged

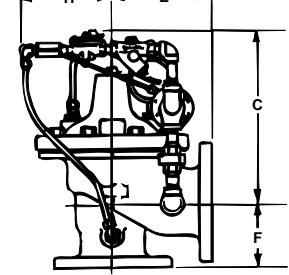
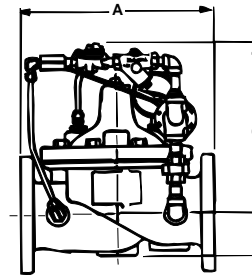
Consult factory for materials and flange ratings.

Dimensions



Model 50B-4KG-1 Globe

Model 2050B-4KG-1 Angle



We recommend providing adequate space around valve for maintenance work.

Valve Size (inches)	2"	2 1/2"	3"	4"	6"	8"	10"	12"
Screwed Ends	9.38	11.00	12.50	--	--	--	--	--
A 150 Flanged	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00
300 Flanged	10.00	11.62	13.25	15.62	21.00	26.38	31.72	35.50
300 x 150			12.88	15.31	20.56	26.38	30.44	34.75
B	3.37	4.06	4.62	5.81	8.00	10.12	11.87	14.06
C	12.00	12.25	12.50	13.00	14.31	16.31	18.00	20.56
D	1.50	1.69	2.19	3.19	4.31	5.31	9.25	10.75
Screwed Ends	4.75	5.50	6.25	--	--	--	--	--
E 150 Flanged	4.75	5.50	6.00	7.50	10.00	12.75	14.88	17.00
300 Flanged	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75
Screwed Ends	3.25	4.00	4.50	--	--	--	--	--
F 150 Flanged	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75
300 Flanged	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50
G & H	6.00	6.69	7.75	7.88	8.50	9.75	13.25	14.25

Valve Size (mm)	50	65	80	100	150	200	250	300
Screwed Ends	238	279	318	--	--	--	--	--
A 150 Flanged	238	279	305	381	508	645	756	864
300 Flanged	254	295	337	397	533	670	806	902
300 x 150	--	--	327	389	522	670	773	883
B	86	103	117	148	203	257	302	357
C	305	311	318	330	363	414	457	522
D	38	43	158	81	109	135	235	273
Screwed Ends	121	140	159	--	--	--	--	--
E 150 Flanged	121	140	152	191	254	324	378	432
300 Flanged	127	423	162	200	267	337	395	451
Screwed Ends	83	102	114	--	--	--	--	--
F 150 Flanged	83	102	102	127	152	203	219	349
300 Flanged	89	109	111	135	165	216	236	368
G & H	152	170	197	200	216	248	337	362

Valve Capacity

Valve Sizes in Inches:	2"	2 1/2"	3"	4"	6"	8"	10"	12"
NFPA 20 Maximum Recommended GPM	208	300	500	1000	2500	5000	11000	16000



E-50B-4KG-1 (R-6/00)

CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325
Phone: 949-722-4800 • Fax: 949-548-5441

CLA-VAL CANADA, LTD.

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Beamsville, Ontario
Canada LOR 1B4
Phone: 905-563-4963
Fax: 905-563-4040

CLA-VAL SA

Chemin des Mesanges 1
CH-1032 Romanel/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50

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Represented By:



— 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.

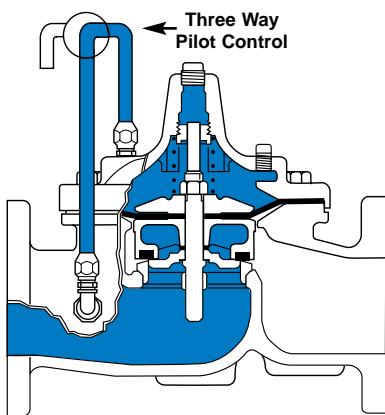


Installation

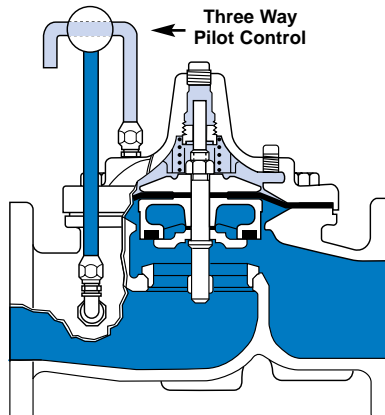
1. Before valve is installed, pipe lines should be flushed of all chips, scale and foreign matter.
2. It is recommended that either gate or block valves be installed on both ends of the 100-01 Hytrol Valve to facilitate isolating the valve for preventive maintenance and repairs.
3. Place the valve in 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 Co. 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.

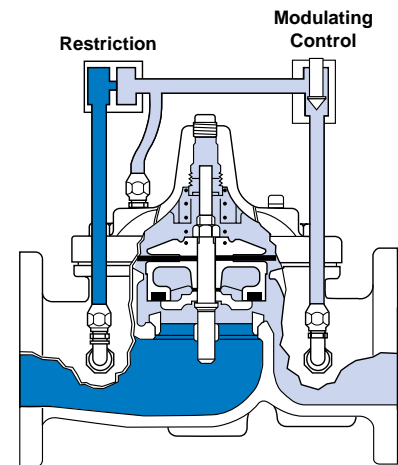
Principles of Operation



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.

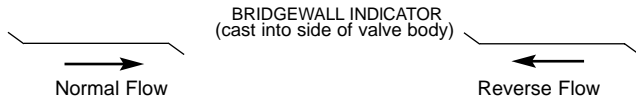


Modulating Action
Valve modulates when diaphragm pressure is held at an intermediate point between inlet and discharge pressure. With the use of a Cla-Val Co. "modulating control," which reacts to line pressure changes, the pressure above the diaphragm is varied, allowing the valve to throttle and compensate 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 cocks in control system, or in main line.	Open Cocks.
	Lack of cover chamber pressure.	Check upstream pressure, pilot system, strainer, tubing, cocks, 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 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

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 Co. 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	610	6.5	165

0. 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

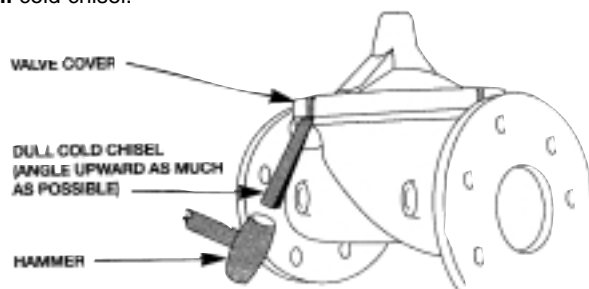
The Cla-Val Co. Model 100-01 Hytrol Valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the operating conditions of the system are affecting the valve. The effect of these actions must be determined by inspection.

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"	4 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)
1 1/4"—2 1/2"	10—32
3"—4"	1/4—28
6"—14"	3/8—24
16"	1/2—20
24"	3-12

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.

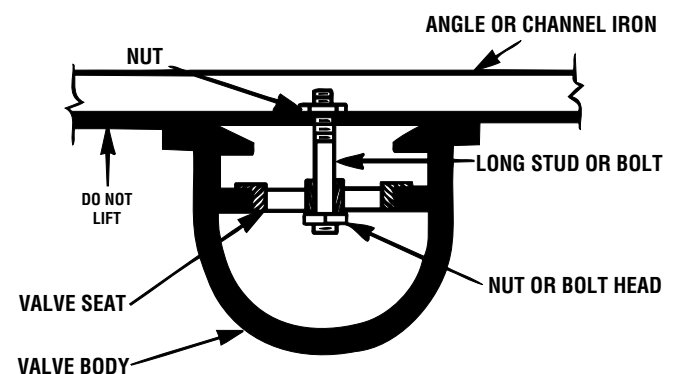
The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

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.)

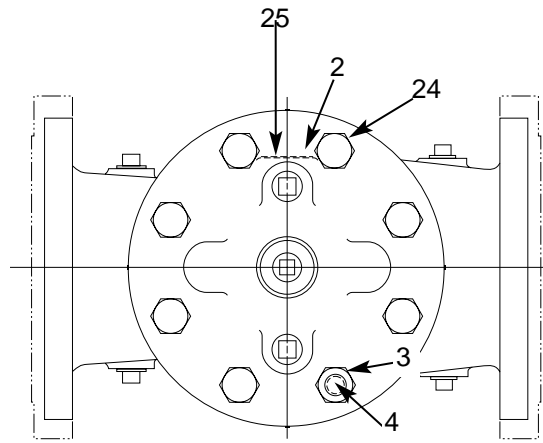
Due to the weight of the diaphragm assembly this procedure is not possible on valves 8" and larger. On these valves, the same determination can be made by carefully introducing a low pressure (less than five psi) into the valve body with the cover vented. **SEE CAUTION.** Looking in cover center hole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

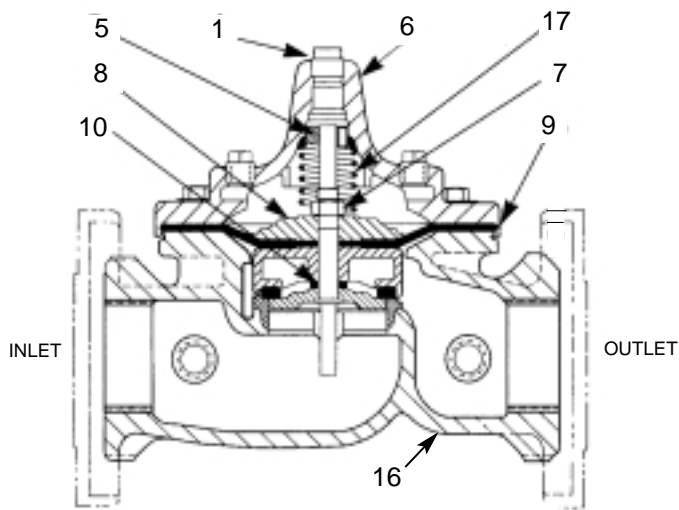
3. With the line connected from the inlet to the cover, apply full working pressure to the inlet. Check all around the cover for any leaks. Re-tighten cover nuts if necessary to stop leaks past the diaphragm.

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

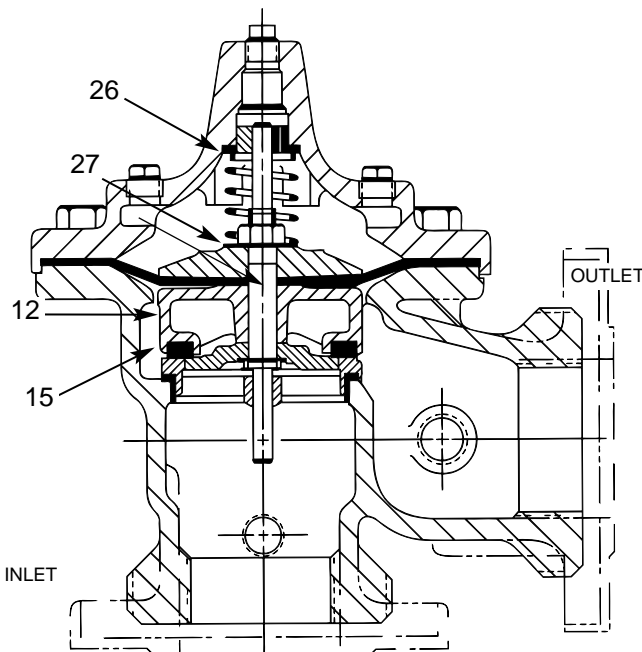
5. Follow steps under "Start-Up and Adjustment" Section in Technical Manual for returning complete valve back to service.



TOP VIEW

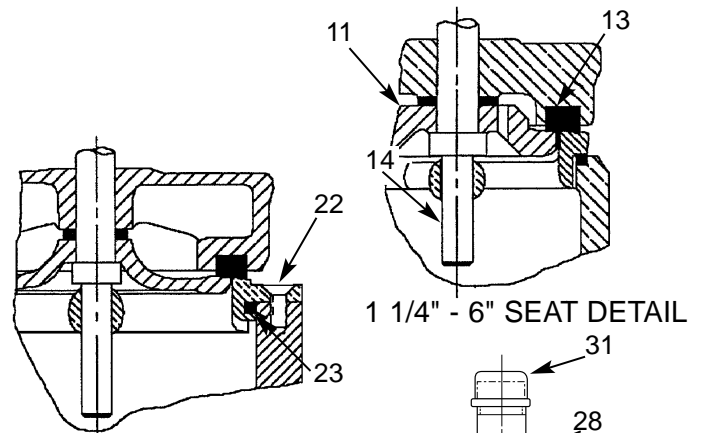


GLOBE PATTERN



ANGLE PATTERN

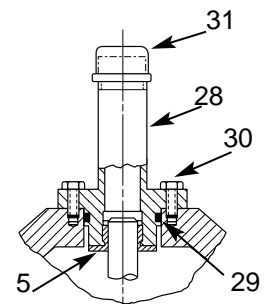
PARTS LIST	
Item	Description
1.	Pipe Plug
2.	Drive Screws (for nameplate)
3.	Hex Nut (6" and larger)
4.	Stud (6" and larger)
5.	Cover Bearing
6.	Cover
7.	Stem Nut
8.	Diaphragm Washer
9.	Diaphragm
10.	Spacer Washers
11.	Disc Guide
12.	Disc Retainer
13.	Disc
14.	Stem
15.	Seat
16.	Body
17.	Spring
22.	Flat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

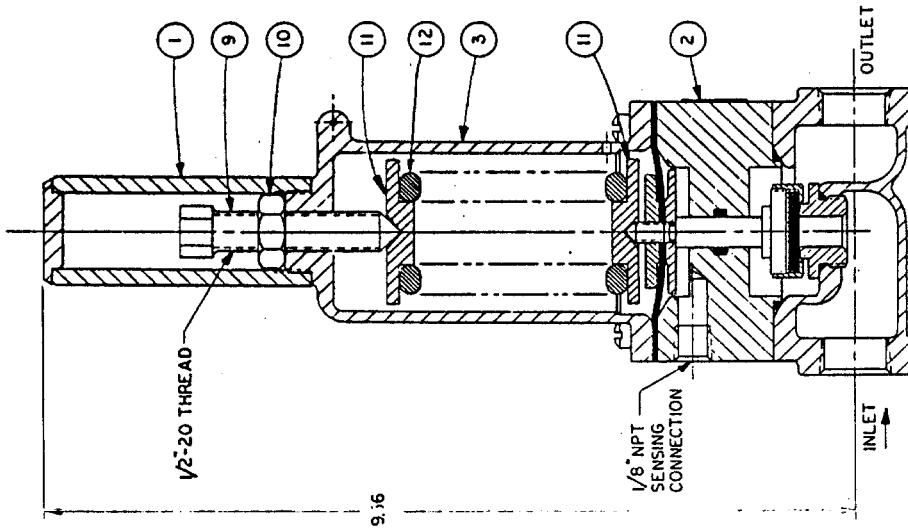
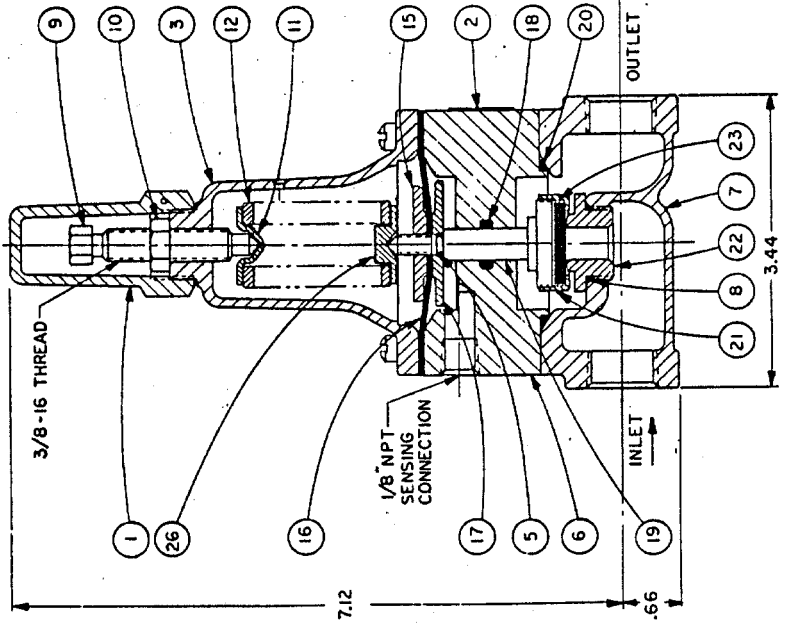
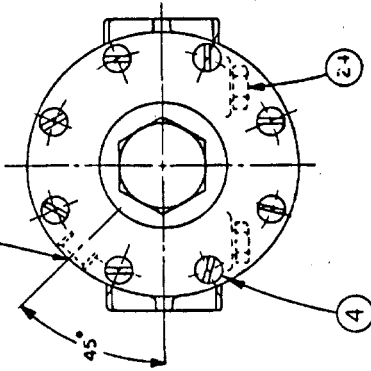


8" - 16" SEAT DETAIL



16" COVER DETAIL

TRUE LOCATION OF SENSING CONNECTION



100-300 PSI DESIGN

0-75, 5-25 & 20-200 PSI DESIGN

PARTS LIST

ITEM NO.	DESCRIPTION
1	CAP
2	BASEPLATE
3	COVER
4	SCREW, FILL. NO. 10-32 X 1-7/8 L.C.
5	O-RING
6	BODY, POWERUNIT
7	BODY
8	O-RING
9	SCREW, ADJUSTING
10	NUT, JAN
11	GUIDE SPRING
12	SPRING
13	
14	WASHER, DIAPHRAGM, UPPER
15	DIAPHRAGM
16	WASHER, DIAPHRAGM, LOWER
17	O-RING
18	STEM
19	O-RING
20	O-RING
21	RETAINER, DISC
22	SEAT
23	DISC ASSEMBLY
24	PLUG, PIPE
25	GUIDE SPRING
26	GUIDE SPRING

CRLSA RANGE PSI	APPROXIMATE INCREASE FOR EACH CLOCKWISE TURN OF ADJUSTING SCREW, ITEM NO. 9
0-75	8.5 PSI
5-25	4.0 PSI
20-200	28.0 PSI
100-300	18.0 PSI

REVISION	DESCRIPTION	DATE	BY
1	REVISED & REDRAWN	10/14/76	CH
2	REVISED ITEM NO. 15	10/19/76	DP
3	REVISED ITEM NO. 15	10/19/76	DP
4	REVISED ITEM NO. 15	10/19/76	DP
5	REVISED ITEM NO. 15	10/19/76	DP
6	REVISED ITEM NO. 15	10/19/76	DP
7	REVISED ITEM NO. 15	10/19/76	DP
8	REVISED ITEM NO. 15	10/19/76	DP
9	REVISED ITEM NO. 15	10/19/76	DP
10	REVISED ITEM NO. 15	10/19/76	DP
11	REVISED ITEM NO. 15	10/19/76	DP
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23	REVISED ITEM NO. 15	10/19/76	DP
24	REVISED ITEM NO. 15	10/19/76	DP
25	REVISED ITEM NO. 15	10/19/76	DP
26	REVISED ITEM NO. 15	10/19/76	DP

DATE	REVISION	RECORD
10/14/76	1	CH
10/19/76	2	DP
10/19/76	3	DP
10/19/76	4	DP
10/19/76	5	DP
10/19/76	6	DP
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10/19/76	23	DP
10/19/76	24	DP
10/19/76	25	DP
10/19/76	26	DP

CODE IDENT. NUMBER
86184

DESCRIPTION
CRLSA PRESSURE RELIEF CONTROL

NEWPORT BEACH, CALIFORNIA

CLA-VAL CO.



DRAWING NUMBER
90846

REV. G

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. CRL-5A	CDB-7 0-7	0-7 .75	.75
.080 DIA.	82575C	--	S.S. CRD-10A	CRD 1.9-6.5	1.9-6.5 .49	.61
.116 DIA.	81594E	--	S.S. CRD-10A	CRD 2-30	2-30 2.4	3.0
.120 DIA.	V5654J	GREEN	CHR VAN	CRL-5A CRD	5-25 10-40	4.0 4.0
.162 DIA.	32447F	NATURAL	S.S.	CDB-7 CRL-5A CRL-13	10-60 10-60 10-60	12.0 12.0 12.0
.162 DIA.	V5695B	YELLOW	MUSIC WIRE	CDB-7 CRL-5A CRL-13	20-80 20-80 20-80	14.5 14.5 14.5
.207 DIA.	C11124B	CAD PLT	MUSIC WIRE	CDB-7 CRL-13 CRL-5A	50-150 50-150 50-150	29.5 29.5 29.5
.225 DIA.	V6515A	RED	MUSIC WIRE	CDB-7 CRL-13 CRL-5A	65-180 65-180 65-180	44.0 44.0 44.0
.115 X .218	71884B	RED	CHR VAN	CRL CRD CRD-10A	0-75 15-75 15-75	8.5 9.0 7.2
.118 X .225	71885J	GREEN	CHR VAN	CRL CRD CRD-10A	20-200 30-300 30-300	28.0 27.0 22.4
.225 X .295	163021A	CAD PLT	CHR VAN	CRL-5A CRL	100-300 100-300	18.0 18.0
.440 X .219	48211H	CAD PLT	STEEL	CRA-18 CRD-22 CRL-4A	200-450 200-450 100-450	17.0 17.0 17.0
WIRE SIZE	SPRING NUMBER	COLOR	WIRE MATERIAL	CATALOG NUMBER	PSI RANGE	*PSI PER TURN
.080 DIA.	C0492D	BLUE	S.S.	CRA CRD-2	4.5-15 4.5-15	.82 .82
.375 DIA.	87719B 1 SPRING 2 SPRING 3 SPRING 4 SPRING 5 SPRING	EPOXY COATED	CHROME SILICON	CDS-5	5.40 30-80 70-120 110-120 150-200	1.0 2.0 3.0 4.0 5.0
.072 DIA.	V0597A	--	302SS	CVC	1-17	.7

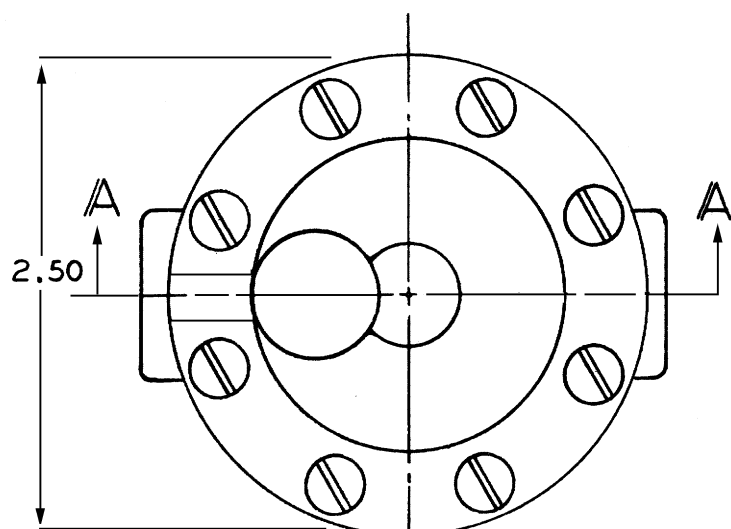
THE FOLLOWING CONTROL & SPRING P/N#S WERE REMOVED, 32656B, 31554K, 44591G, V65695B, & V5695B.
ADDED CRL-13, CRL-5A, CRA, CRA-10A, CHANGED SPRING RANGES TO MATCH CURRENT CONTROLS.

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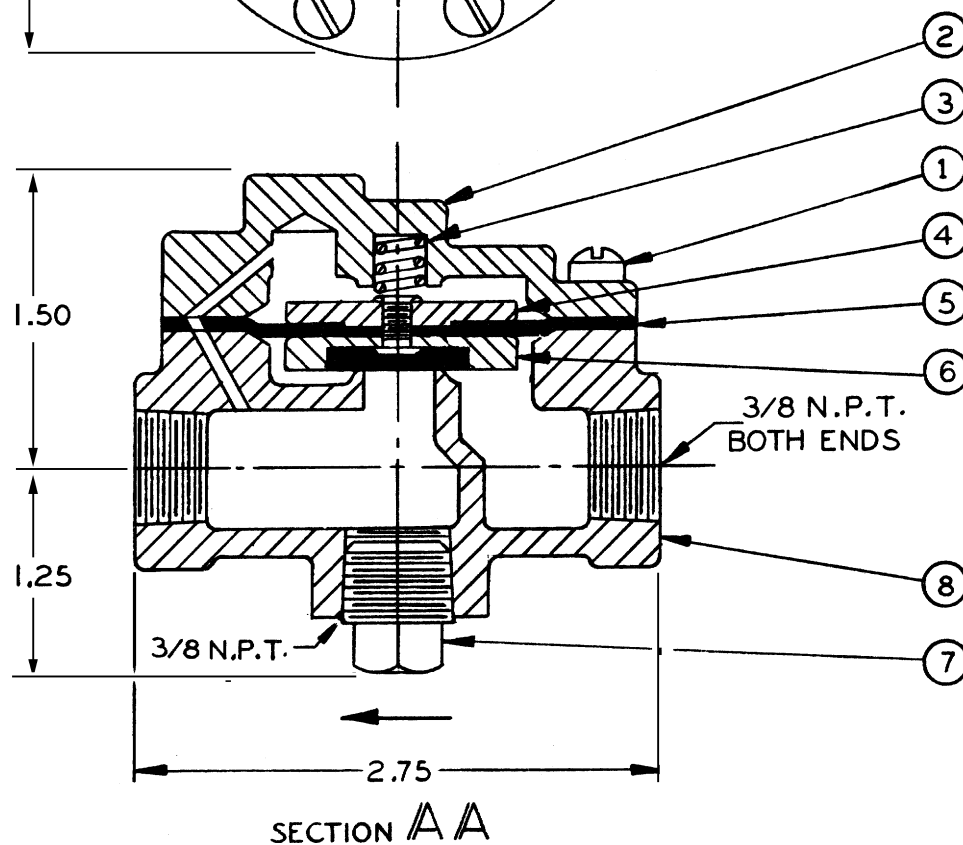
81-01

3/8" Check Valve



ITEM	DESCRIPTION
1.	Cover Screw (8 Required)
2.	Cover
*3.	Spring
4.	Diaphragm Washer
*5.	Diaphragm
*6.	Disc Retainer Assembly
7.	Body Plug (3/8 NPT)
8.	Body (Screwed)

*Recommended Spare Parts



When ordering parts, please specify:

- All nameplate data
- Description
- Part Number
- Item Number
- Material

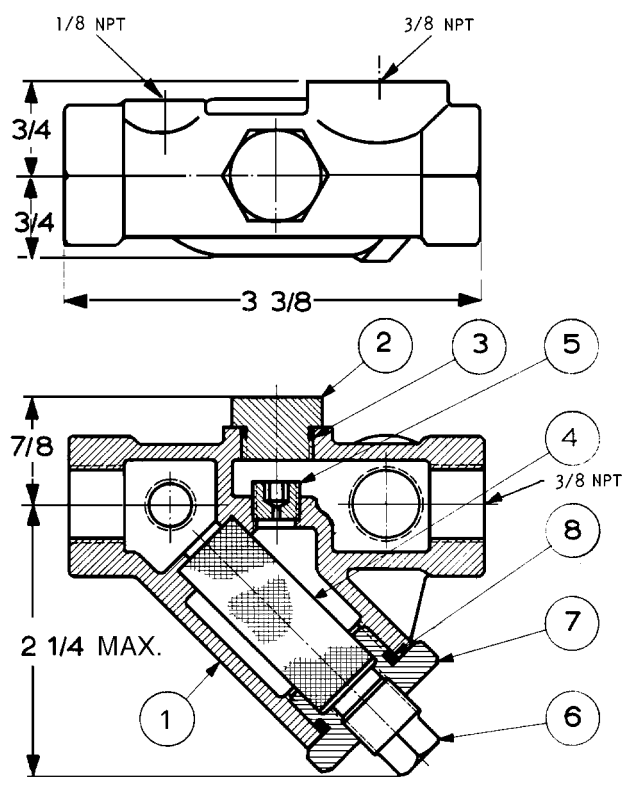


X44A

Strainer and Orifice Assembly

BRONZE BODY — S.S. ORIFICE

3/8" x 3/8"



X44A STOCK NO.	ORIFICE DIA.	ORIFICE PLUG PART # (ITEM 5)
71310-01	.031	94132-01
-02	.046	-02
-03	.062	-03
-04	.078	-04
-05	.093	-05
-06	.109	-06
*-07	.125	-07
-08	.140	-08
-09	.156	-09
-10	.187	-10

*Standard

When ordering parts, please specify:

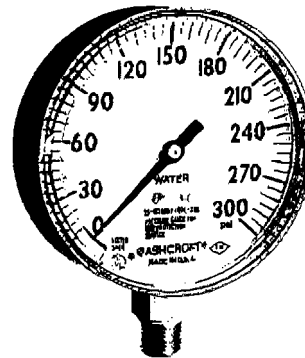
- All Nameplate Data
- Item Number
- Description
- Recommended Spare Parts

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



Fire Protection Sprinkler Service

- **UL listed and Factory Mutual approved**
- **Corrosion-resistant ABS case**
- **Heat-resistant polycarbonate push-in window**
- **Patented PowerFlex™ movements with polyester segment**
- **True Zero indication™, a unique safety feature**



Description

Ashcroft fire protection sprinkler gauges are Underwriters Laboratory listed and Factory Mutual approved for fire protection sprinkler service. The case material on Type 1 005P XUL gauges is ABS. The 0-300 psi pressure range is used on "wet" systems where water is available to the sprinkler heads. The 0-80 retard to 250 psi pressure range is used on dry systems where the lines are filled with air pressure until system activation.

True Zero indication, a standard feature on these gauges, reduces the potential risk of installing a damaged gauge on your equipment.

The patented PowerFlex movement with polyester segment is designed to provide unequalled shock and vibration resistance resulting in superior performance and extended gauge life.

Gauge Options

- Customized dials
- Other UL listed ranges on application

Specification

Type no:	1005P, XUL
Size:	3 1/2"
Case:	ABS (Acrylonitrile Butadiene Styrene)
Ring:	None
Window:	Polycarbonate. push-in
Dial:	Black figures on white Background
Pointer:	Black, aluminum
Bourdon tube:	"C" shaped bronze
Movement:	Patented PowerFlex
Socket:	Brass, soft soldered
Restrictor:	None
Connection:	1/4 NPT lower
Ranges:	0-300 psi (water) 0-80 retard to 250 psi (air) UL 393 Listed, UL of Canada Listed and FM approved. Equivalent (single or dual scale) metric scales are available

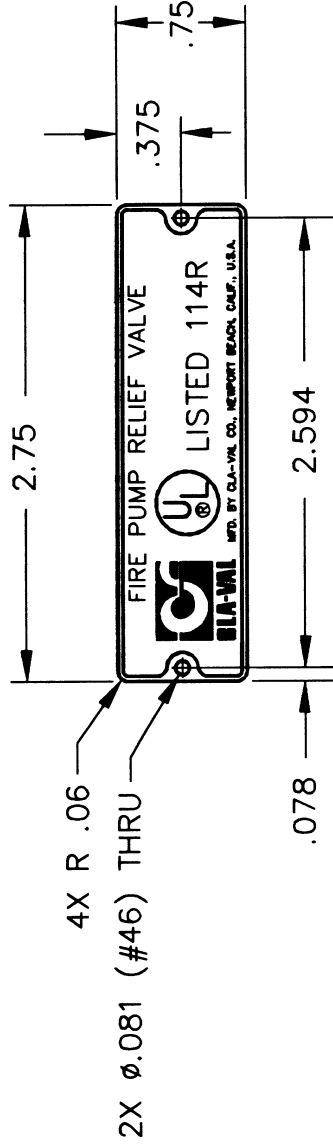
P/N 9028433C

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	REVISED NAMEPLATE	7-9-73	DP
B	ADD U.S.A	2-17-78	CH
C	REDRAWN ON CAD WITH NEW LOGO. (ECO 15424)	5-1-95	VL


NOTES:

1. BACKGROUND BLACK ETCH .003 DEEP.
2. LETTERING, LOGO, AND BORDER CLEAR POLISH.



86060B	BRASS	ASTM B16
PART NO.	MATERIAL	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		 GLA-VAL CO. NEWPORT BEACH, CALIFORNIA	
TOLERANCES ARE:		TITLE	
FRACTIONS	DECIMALS	NAMEPLATE--U.L. LISTED	
± 1/32	.XXX ± .03	SIZE	CAGE CODE
SURFACE FINISH 12g/		A 86184	DWG NO. 86060
BREAK CORNERS .010 MAX		SCALE 1/1	SIZE #25 GA (.020)
ANGULAR ± 1/2°		SHEET 1	OF 1
--DO NOT SCALE DRAWING--		REV. C	

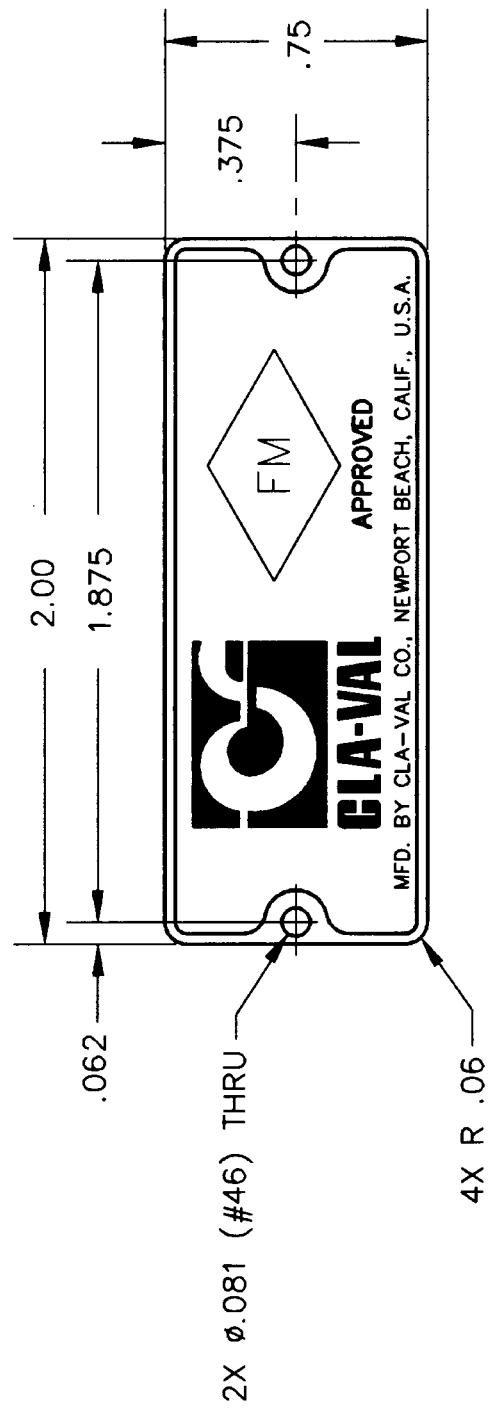
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REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	REDRAWN ON CAD WITH NEW LOGO. (ECO 15424)	5-1-95	VL

NOTES:

1. BACKGROUND BLACK ETCH .003 DEEP.
2. LETTERING, LOGO, AND BORDER CLEAR POLISH.
3. ART WORK MUST BE SUPPLIED BY AND RETURNED TO CLA-VAL CO.



94777-01J	BRASS	ASTM B16
PART NO.	MATERIAL	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGULAR	TITLE
±1/32	.xxx± .03	±.5°	CLA-VAL CO. NEWPORT BEACH, CALIFORNIA
.xxx± .010			NAMEPLATE-FACTORY MUTUAL
SURFACE FINISH 125/			SIZE
BREAK CORNERS .010 MAX			A 86184
---			DWG NO. 94777
---			REV. A
---			SCALE 2/1 SIZE #25 GA (.020)
			SHEET 1 OF 1

This drawing is the property of CLA-VAL CO. and some and copies thereof. If they should be returned to it upon completion of 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.



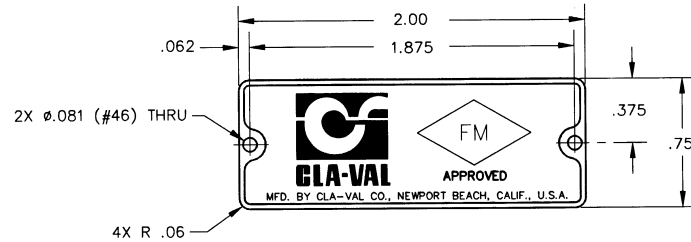
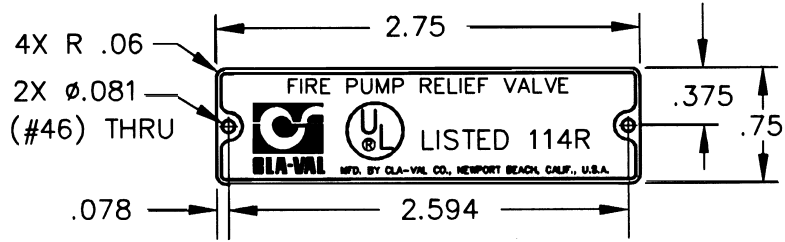
50B-4KG1/2050B-4KG1 Product Identification How to Order

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. Include 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 Plate

For product identification, cast in body markings are supplemented by the identification plate illustrated on this page. The plate is mounted in the most practical position. **It is extremely important that this identification plate is not painted over, removed, or in any other way rendered illegible.**



Specify when ordering

- Model Number
- Adjustment Range (As Applicable)
- Valve Size
- Optional Features
- Pressure Class

How To Order

There are many valves and controls manufactured by Cla-Val. that are not listed due to the sheer volume. For information not listed, please contact your local Cla-Val representative.

Unless Otherwise Specified

- X43 "Y" Strainer is included.
- CK2 Isolation Valves is included in price on 6" and larger valve sizes.

Limited Warranty

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

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. This 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 Cla-Val. shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Terms Of Sale

ACCEPTANCE OF ORDERS

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

CREDIT TERMS

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

PURCHASE ORDER FORMS

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

PRODUCT CHANGES

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

PRICES

All prices are F.O.B. Newport Beach, California, unless expressly stated otherwise on our acknowledgement of the order. Prices are subject to change without notice. The prices at which any order is accepted are subject to adjustment to the Seller's price in effect at the time of shipment. Prices do not include sales, excise, municipal, state or any other Government taxes. Minimum order charge \$75.00.

RESPONSIBILITY

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

Disclaimer Of Warranties And Limitations Of Liability

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

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

Risk

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

EXPORT SHIPMENTS

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

RETURNED GOODS

1. Customers must obtain written approval from Cla-Val prior to returning any material.
2. Cla-Val reserves the right to refuse the return of any products.
3. Products more than six (6) months old cannot be returned for credit.
4. Specially produced, non-standard models cannot be returned for credit.
5. Rubber goods cannot be returned for credit, unless as part of an unopened repair kit which is less than six months old.
6. Goods authorized for return are subject to a 35% (\$75 minimum) restocking charge and a service charge for inspection, reconditioning, replacement of rubber parts, retesting and repackaging as required.
7. Authorized returned goods must be packaged and shipped prepaid to Cla-Val., 1701 Placentia Avenue, Costa Mesa, California 92627-4475.



— 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
1/4"-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.
 Supplied Shrink Wrapped (4" and smaller) or Bagged (6" and larger)
 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)	9169801 K	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"	9817901 D	9169815K	8"	N/A	9169820K		
10"	9817902B	9817901 D					
12"	9817903K	9817902B					
14"	9817904H	N/A					
16"	9817905E	9817903K					
20"	N/A	9817905E					
24"	N/A	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

Supplied Shrink Wrapped (4" and Smaller) or Bagged (6" and larger)

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

Valve Size	Kit Stock Number	Valve Size	Kit Stock Number	
			100-02 & 100-03	100-21 & 100-22
3/18"	9169901H	2 1/2"	9169910J	N/A
1/2" - 3/4"	9169902F	3"	9169911G	9169905J
1"	9169903D	4"	9169912E	9169911G
1 1/4" & 1 1/2"	9169904B	6"	9169913C	9169912E
2"	9169905J	8"	99116G	9169913C
		10"	N/A	99116G

Larger Sizes: Consult Factory.

Repair Kits for Pilot Control Valves

Supplied Shrink Wrapped

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

BUNA-N® (Standard Material)				VITON (For KB Controls)	
Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number
CDB	9170006C	CFM-7 & 7-A	1263901K	CDB-KB	9170012A
CDB-7	9170017K	CRA (w/bucking spring)	9170001D	CRA-KB	9170018H
CDH-2	18225D	CRD (w/bucking spring)	9170002B	CRD-KB (w/bucking spring)	9170008J
CDHS-2	44607A	CRD-22	98923G	CRL-KB	9170013J
CDHS-2B	9170004H	CRL (55F)	9170007A	CDHS-2BKB	9170010E
CDHS-2F	9170005E	CRL-4A	43413E	CDHS-2FKB	9170011C
CDHS-3C-A2	24657K	CRL-5	65755B	CDHS-18KB (no bucking spring)	9170009G
CDHS-8A	2666901A	CRL-5A (55G)	20666E	102C-KB	1726202D
CDHS-18/CRD (no bucking spring)	9170003K	CV	9170019F		
CDS-4	9170014G	X105L (O-ring)	00951E	Buna-N®	
CDS-5	14200A	102B-1	1502201F	CRD DISC RET. (SOLID)	C5256H
CDS-6	20119301A	102C-2 & -3	1726201F	CRD DISC RET. (SPRING)	C5255K
CFM-2	12223E				

Repair Assemblies (In Standard Materials Only)

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

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

