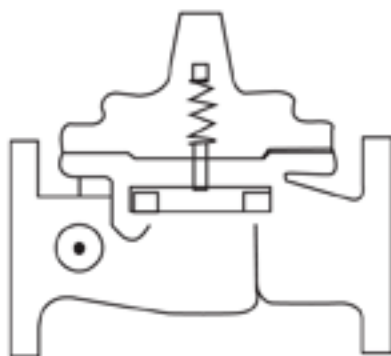


CLA-VAL

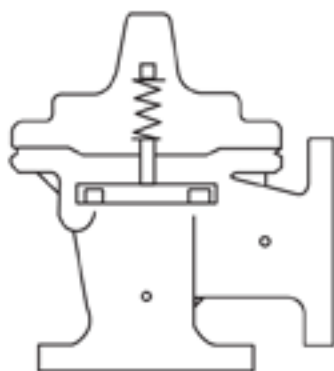
AUTOMATIC CONTROL VALVES

590-01

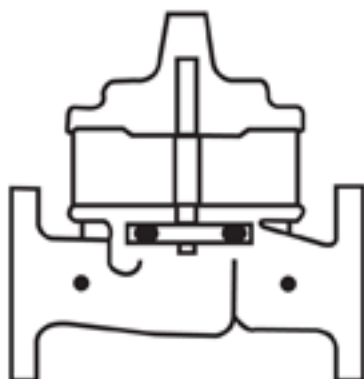
Place this manual with personnel responsible
for maintenance of this valve



INSTALLATION



OPERATION



MAINTENANCE



**CLA-VAL CO.**

NEWPORT BEACH, CALIFORNIA

CATALOG NO.

590-01/6590-01

DRAWING NO.

203573

REV.

A

TYPE OF VALVE AND MAIN FEATURES

PRESSURE REDUCING VALVE

DESIGN

DRAWN

AK

05-06-03

CHK'D

VL

05-08-03

APV'D

CH

5-09-03

OPERATING DATAI. PRESSURE REDUCING FEATURE:

PRESSURE REDUCING CONTROL (3) IS A NORMALLY OPEN CONTROL THAT SENSES MAIN VALVE OUTLET PRESSURE CHANGES. AN INCREASE IN OUTLET PRESSURE TENDS TO CLOSE CONTROL (3) AND A DECREASE IN OUTLET PRESSURE TENDS TO OPEN CONTROL (3). THIS CAUSES MAIN VALVE COVER PRESSURE TO VARY AND THE MAIN VALVE MODULATES (OPENS AND CLOSSES) MAINTAINING A RELATIVELY CONSTANT OUTLET PRESSURE. PRESSURE REDUCING CONTROL (3) ADJUSTMENT: TURN THE ADJUSTING SCREW CLOCKWISE TO INCREASE THE SETTING.

II. OPTIONAL FEATURE OPERATING DATA:SUFFIX A (FLOW CLEAN STRAINER)

A SELF-CLEANING STRAINER IS INSTALLED IN THE MAIN VALVE INLET BODY BOSS WHICH PROTECTS THE PILOT SYSTEM FROM FOREIGN PARTICLES.

SUFFIX B (ISOLATION VALVES)

CK2 COCKS (B) ARE USED TO ISOLATE THE PILOT SYSTEM FROM MAIN LINE PRESSURE. THESE VALVES MUST BE OPEN DURING NORMAL OPERATION.

SUFFIX C (CLOSING SPEED CONTROL)

FLOW CONTROL (C) CONTROLS THE CLOSING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE CLOSE SLOWER.

SUFFIX D (CHECK VALVES WITH COCK):

WHEN OUTLET PRESSURE IS HIGHER THAN INLET PRESSURE, CHECK VALVE (D2) OPENS AND (D1) CLOSSES. THIS DIRECTS THE HIGHER OUTLET PRESSURE INTO THE MAIN VALVE COVER AND THE MAIN VALVE CLOSSES.

SUFFIX S (OPENING SPEED CONTROL)

FLOW CONTROL (S) CONTROLS THE OPENING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE OPEN SLOWER.

SUFFIX Y (Y-STRAINER)

A Y-PATTERN STRAINER IS INSTALLED IN THE PILOT SUPPLY LINE TO PROTECT THE PILOT SYSTEM FROM FOREIGN PARTICLES. THE STRAINER SCREEN MUST BE CLEANED PERIODICALLY.

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DATE

BY

DESCRIPTION

SEE SHEET 1

LTR

**CLA-VAL CO.**

NEWPORT BEACH, CALIFORNIA

CATALOG NO.

590-01/6590-01

DRAWING NO.

203573

REV.

A

TYPE OF VALVE AND MAIN FEATURES

PRESSURE REDUCING VALVE

DESIGN

DRAWN

AK

05-06-03

CHK'D

VL

05-08-03

APV'D

CH

5-09-03

OPERATING DATA-CONTINUEDIII. CHECK LIST FOR PROPER OPERATION:

- () SYSTEM VALVES OPEN UPSTREAM AND DOWNSTREAM.
- () AIR REMOVED FROM THE MAIN VALVE COVER AND PILOT SYSTEM AT ALL HIGH POINTS.
- () CK2 COCKS (B) OPEN (OPTIONAL FEATURE).
- () PERIODIC CLEANING OF STRAINER (Y) IS RECOMMENDED (OPTIONAL FEATURE).
- () CV FLOW (C) AND (S) OPEN AT LEAST 4 TURNS (OPTIONAL FEATURE).

CAD REVISION RECORD - DO NOT REVISE MANUALLY

DATE

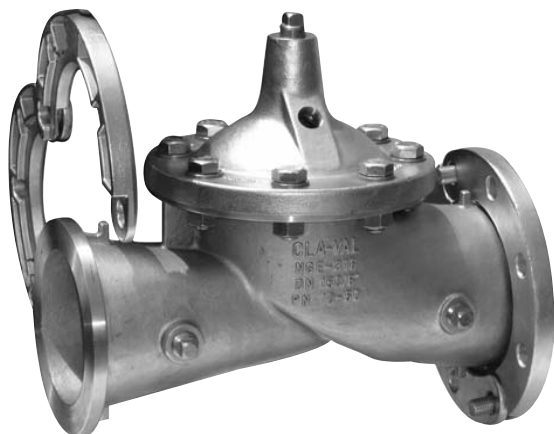
BY

DESCRIPTION

LTR

SEE SHEET 1

316SS Hytrol Valve

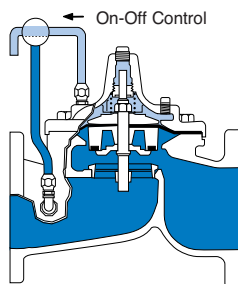


- All 316 Stainless Steel
- Reduced Cavitation Design
- Drip-Tight, Positive Sealing Action
- Service Without Removal From Line
- Every Valve Factory Tested
- Three-Year Warranty

The Cla-Val Model 100-44 Hytrol 316SS Valve is a hydraulically operated, diaphragm actuated, globe pattern valve with all 316 Stainless Steel metal parts. Specially designed 316 Stainless Steel removable slip-on flanges provide 150 or 300 ANSI class flange connections that meet ANSI and ISO standards. This valve is ideal for control valve applications where fluid compatibility is often a problem. The standard Electropolish finish on the 316 Stainless Steel parts offers extreme corrosion resistance to many industrial fluids such as seawater, high alkyl or high acid concentrations or other aggressive or corrosive fluids.

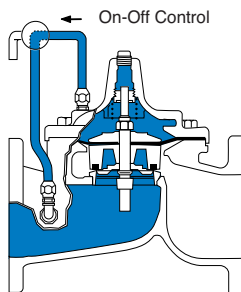
The Model 100-44 Hytrol consists of these major components: body, flanges, diaphragm assembly and cover. The diaphragm assembly is the only moving part and is guided top and bottom by a precision-machined stem. A non-wicking diaphragm of nylon fabric reinforced, synthetic rubber creates the control chamber for the valve. A resilient, synthetic rubber disc forms a drip-tight seal, with the renewable seat, when pressure is applied to the control chamber. The rugged simplicity of design and packless construction assures a long life of dependable, trouble-free operation. Smooth flow passages and fully guided diaphragm assembly assure optimum control, when used in piping systems requiring remote control, pressure regulation, solenoid operation, rate of flow control or check valve operation.

Principle of Operation



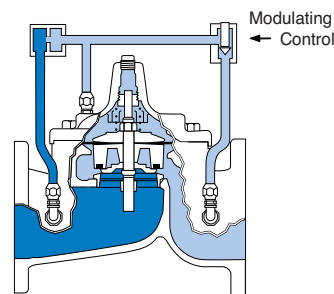
Full Open Operation

When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.



Tight Closing Operation

When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.



Modulating Action

The valve holds any intermediate position when operating pressure is equal above and below the diaphragm. Using a Cla-Val "Modulating" Control will allow the valve to automatically compensate for line pressure changes.

Specifications

Sizes

Globe (inch):
2", 2½", 3", 4", 6", 8", 10", 12"

End Detail

Slip-on Two Piece Flange
Dimensions Per ANSI B16.5

Pressure Rating

ANSI Class 150:
Maximum 285 psi
ANSI Class 300:
Maximum 400 psi

Higher Pressure Available
Please Contact Factory

Operating Temperature

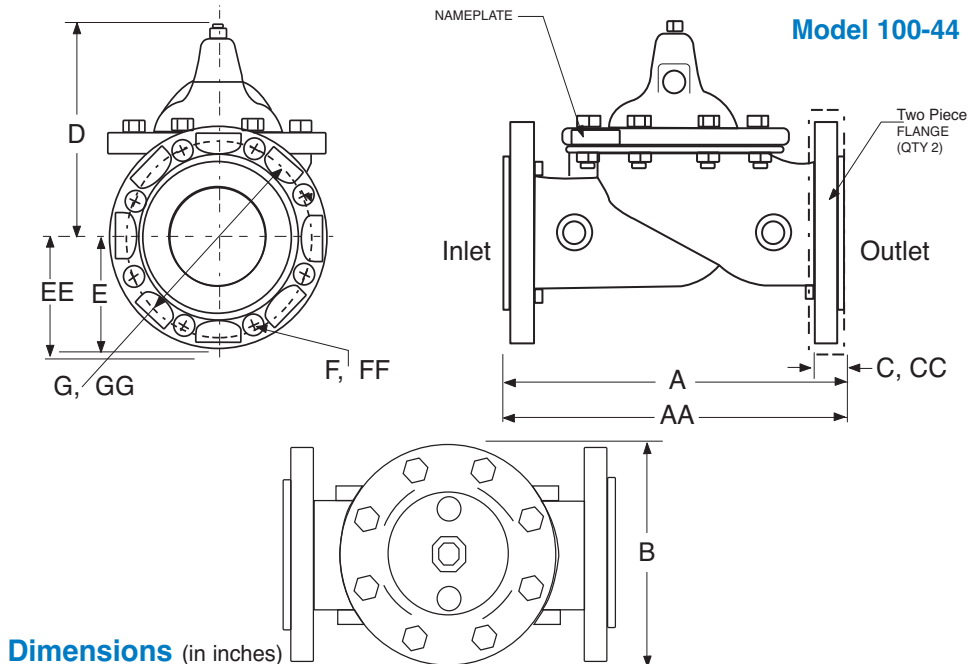
Fluids Compatible with Valve
Materials
-40° to 180° F (-40° to 82° C)

Materials

Body, Cover, Trim,
Diaphragm Assembly,
Flanges, and Fasteners
316 Series
Stainless Steel
Electropolished
Disc:
Buna-N® Rubber*
Diaphragm:
Nylon Fabric Reinforced
Synthetic Buna-N® Rubber*

*Contact Factory for Other
Disc or Diaphragm Materials

Note: 100-44 valve uses the same
internal parts as the basic Cla-Val
standard main reduced internal
port 100-20 Hytrol.



Dimensions (in inches)

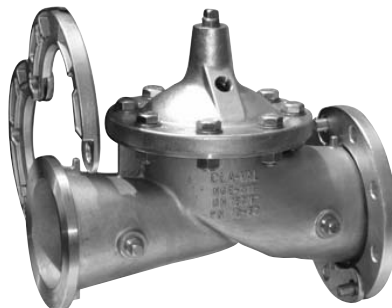
Size (Inches)	2	2 ½	3	4	6	8	10	12
Size (mm)	50	65	80	100	150	200	250	300
A 150 ANSI	9.06	11.42	12.20	13.78	18.90	23.62	28.74	33.46
AA 300 ANSI	9.06	11.42	12.20	13.78	18.90	23.62	28.74	33.46
B	5.70	8.06	6.69	9.25	11.61	15.75	20.08	23.62
C	.89	.89	.93	.93	1.02	1.15	1.15	1.25
CC 300 ANSI	.96	.96	1.00	1.00	1.10	1.15	1.46	1.50
D	6.50	7.95	8.20	10.12	13.32	16.39	19.12	20.95
E	3.05	3.54	3.74	4.53	5.61	6.79	7.97	9.55
EE 300 ANSI	3.25	3.75	4.13	5.01	6.30	7.48	8.76	10.24
F	.71	.71	.71	.71	.91	.87	1.02	1.02
FF 300 ANSI	.71	.75	.87	.87	.87	1.03	1.16	1.34
G	4.75	5.50	6.00	7.50	9.50	11.75	14.25	17.00
GG 300 ANSI	5.00	5.88	6.62	7.88	10.62	13.00	15.25	17.72
Flange Bolts (150 Class)	4	4	4	8	8	8	12	12
Flange Bolts (300 Class)	8	8	8	8	12	12	16	16
Approx. Ship Wt. Lbs.	25	40	40	75	160	290	419	728
Approx. Ship Wt. Kgs.	11.4	19	19	35	73	132	190	330

Reduced Port Functional Data

Size (Inches)	Cv (gpm)*	Cv (l/s)**
2	38	9
2½	50	12
3	67	16
4	138	33
6	242	58
8	555	133
10	923	222
12	1492	359

*Cv = gpm flow at 1 psi drop

**Cv = l/s flow at 1 bar drop



When Ordering Please Specify:

1. Catalog No. 100-44
2. Valve Size
3. Fluid Being Handled
4. Fluid Temperature
5. Inlet Pressure Range
6. Outlet Pressure Range
7. Maximum and Minimum Differential Pressure
8. Flow Rate Range



E-100-44 (R-10/2011)

CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325 • Phone: 949-722-4800
Fax: 949-548-5441 • Web Site: cla-val.com • E-mail: claval@cla-val.com

CLA-VAL CANADA
4687 Christie Drive
Beamsville, Ontario
Canada L0R 1B4
Phone: 905-563-4963
Fax: 905-563-4040
E-Mail: sales@cla-val.ca

CLA-VAL EUROPE
Chemin des Mésanges 1
CH-1032 Romanet/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50
E-Mail: cla-val@cla-val.ch

CLA-VAL UK
Dainton House, Goods Station Road
GB - Tunbridge Wells
Kent TN11 2 DH England
Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-Mail: info@cla-val.co.uk

Represented By:

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— MODEL — **CRD**

Pressure Reducing Control



DESCRIPTION

The Cla-Val Model CRD Pressure Reducing Control automatically reduces a higher inlet pressure to a lower outlet pressure. It is a direct acting, spring loaded, diaphragm type control that operates hydraulically or pneumatically. It may be used as a self-contained valve or as a pilot control for a Cla-Val main valve. It will hold a constant downstream pressure within very close pressure limits.

OPERATION

The CRD Pressure Reducing Control is normally held open by the force of the compression spring above the diaphragm; and delivery pressure acts on the underside of the diaphragm. Flow through the valve responds to changes in downstream demand to maintain a pressure.

INSTALLATION

The CRD 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 gage connection. A flow arrow is marked on the body casting.

ADJUSTMENT PROCEDURE

The CRD 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.
3. When pressure adjustment is completed tighten jam nut on adjusting screw and replace protective cap.
4. When this control is used, as a pilot control on a Cla-Val main valve, the adjustment should be made under flowing conditions. The flow rate is not critical, but generally should be somewhat lower than normal in order to provide an inlet pressure several psi higher than the desired setting

The approximate minimum flow rates given in the table are for the main valve on which the CRD is installed.

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

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to open when delivery pressure lowers	No spring compression	Tighten adjusting screw
	Damaged spring	Disassemble and replace
	Spring guide (8) is not in place	Assemble properly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly (refer to Reassembly)
Fails to close when delivery pressure rises	Spring compressed solid	Back off adjusting screw
	Mechanical obstruction	Disassemble and reassemble properly (refer to Reassembly)
	Worn disc	Disassemble remove and replace disc retainer assembly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly (refer to Reassembly)
Leakage from cover vent hole	Damaged diaphragm	Disassemble and replace
	Loose diaphragm nut	Remove cover and tighten nut

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 and 2-6.5 psi range onto plug (13) and fasten 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 diaphragm (12) diaphragm washer (11) and Belleville washer (20) on yoke. Screw on hex nut (10).
4. Hold the diaphragm so that the screw holes in the diaphragm and body align. Tighten diaphragm nut with a wrench. At the final tightening release the diaphragm and permit it to rotate 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 body screw holes $\pm 1/8"$.

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

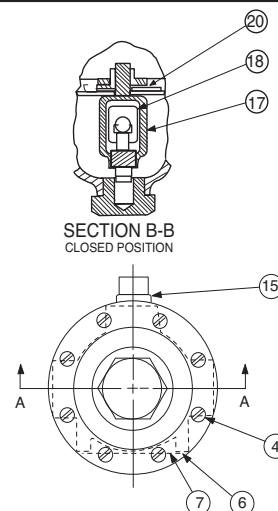
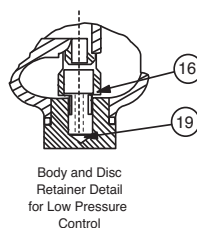
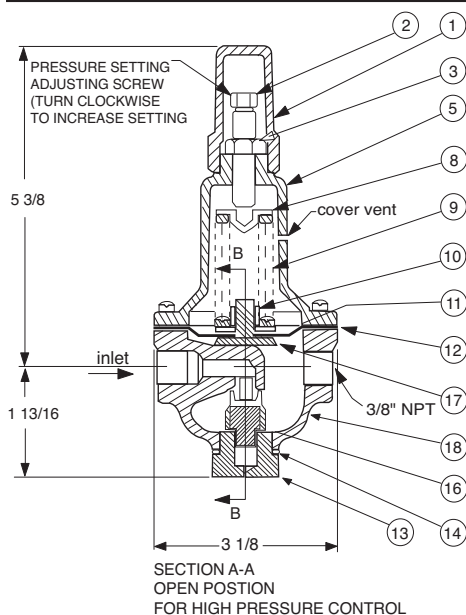
5. Install spring (9) with spring guide (8).
6. Install cover (5), adjusting screw (2) and nut (3), then cap (1).



CRD

Pressure Reducing Control

(Bronze Body with 303SS Trim)



Size (inch)	Stock Number	Adjustment Range	
		psi	Ft of Water
3/8	7194307A	2 - 6.5	4.5 - 15
3/8	7194308J	2 - 30	4.5 - 69
3/8	7194303K	15 - 75	35 - 173
3/8	7194311C	20 - 105	46 - 242
3/8	7194304H	30 - 300	69 - 692
Factory Set Pressure		PSI per Turn*	
	2 - 6.5 set @ 3.5 psi	.61	
	2 - 30 set @ 10 psi	3.0	
	15 - 75 set @ 20 psi	9.0	
	20 - 105 set @ 60 psi	12.0	
	30 - 300 set @ 60 psi	27.0	

*Approximate-Final Adjustment should be with a pressure gauge and with flow.

When ordering parts specify:

- All nameplate data
- Item Description
- Item number

Item	Description	Material	Part Number	List Price
1	Cap	PL	67628J	
2	Adjusting Screw	BRS	7188201D	
3	Jam Nut (3/8-16)	SS	6780106J	
4*	Machine Screw (Fil.Hd.) 8 Req'd	303	6757821B	
5	Cover	BRS	C2544K	
6	Nameplate Screw	SS	67999D	
7	Nameplate	BRS	C0022001G	
8	Spring Guide	302	71881H	
	Spring Guide (20 - 105 psi)	303	205620F	
9	Spring (15-75 psi)	CHR/VAN	71884B	
	Spring (2 - 6.5 psi)	SS	82575C	
	Spring (2 - 30 psi)	SS	81594E	
	Spring (20 - 105 psi)	316	20632101E	
	Spring (30 - 300 psi)	CHR/VAN	71885J	
10	Hex Nut	303	71883D	
11	Diaphragm Washer	302	71891G	
12*	Diaphragm	NBR	C6936D	
13	Plug, Body	BRS	V5653A	
14*	Gasket	Fiber	40174F	
15	Plug	BRS	6766003F	
16*	Disc Retainer Assy. (2 - 30 psi)	SS/Rub	C8348K	
	Disc Retainer Assy. (15 - 75 psi)	SS/Rub	37133G	
	Disc Retainer Assy. (20 - 105 psi)	SS/Rub	37133G	
	Disc Retainer Assy. (30 - 300 psi)	SS/Rub	37133G	
17	Yoke	VBZ	V6951H	
18	Body & 1/4" Seat Assy	BR/SS	8339702G	
19*	Bucking Spring (2 - 6.5 psi)(2 - 30psi)	302	V0558G	
20	Belleville Washer	STL	7055007E	
*	Repair Kit (No Bucking Spring)	Buna®-N	9170003K	
*	Repair Kit (with Bucking Spring)	Buna®-N	9170002B	

*SUGGESTED REPAIR PARTS



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 CRL-5A	0-7 0-7	.75 .75
.018 DIA.	82575C	--	S.S.	CRD CRD-10A	1.9-6.5 1.9-6.5	.61 .49
.116 DIA.	81594E	--	S.S.	CRD CRD-10A	2-30 2-30	3.0 2.4
.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.	C1124B	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	1630201A	CAD PLT	CHR VAN	CRL CRL-5A	100-300 100-300	18.00 18.00
.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
.187	20632101E	BLACK	316 SST	CRD CRL	20-105 20-105	13.0 13.0
WIRE SIZE	SPRING NUMBER	COLOR	WIRE MATERIAL	CATALOG NUMBER	FEET RANGE	*FEET 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.	V5097A	--	302SS	CVC	1-17	.7
.375 DIA.	2933502H 1 SPRING 2 SPRING 3 SPRING 4 SPRING 5 SPRING	EPOXY COATED	CHROME SILICON	CDS-6A	5-40 30-80 70-120 110-160 150-200	.75 1.50 2.20 3.00 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.

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500 Series 316 SS Hytrol 100-44 and 100-46

Installing two-part flange

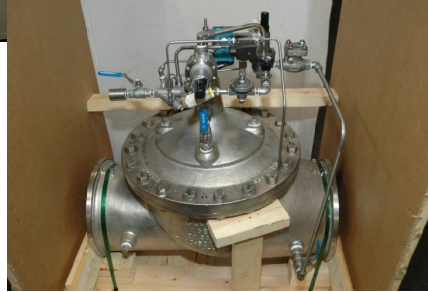
Two-Piece Flange Design



- Easy Conversion from 150 Class to 300 Class
- Four identical half-flanges for each valve
- 316 Stainless Steel



Look for Flange Halves shipped with valve



Two Half-Flanges Held Captive



- Flange studs and bolts hold valve flanges in place
- Textured side faces away from valve
- Smooth side faces toward valve





— MODEL — **X46**

Flow Clean Strainer



X46A Straight

X46B Angle

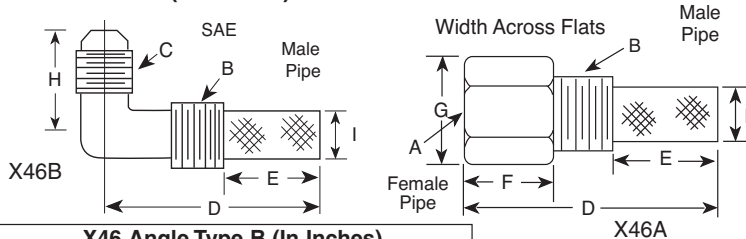


- Self Scrubbing Cleaning Action
- Straight Type or Angle Type

The Cla-Val Model X46 Strainer is designed to prevent passage of foreign particles larger than .015". It is especially effective against such contaminant as algae, mud, scale, wood pulp, moss, and root fibers. There is a model for every Cla-Val. valve.

The X46 Flow Clean strainer operates on a velocity principle utilizing the circular "air foil" section to make it self cleaning. Impingement of particles is on the "leading edge" only. The low pressure area on the downstream side of the screen prevents foreign particles from clogging the screen. There is also a scouring action, due to eddy currents, which keeps most of the screen area clean.

Dimensions (In Inches)



X46 Angle Type B (In Inches)

B(NPT)	C(SAE)	D	E	H	I
1/8	1/4	1-3/8	5/8	7/8	1/4
1/4	1/4	1-3/4	3/4	1	3/8
3/8	1/4	2	7/8	1	1/2
3/8	3/8	1-7/8	7/8	1	1/2
1/2	3/8	2-3/8	1	1-1/4	5/8

**When Ordering,
Please Specify:**

- Catalog Number X46
- Straight Type or Angle Type
- Size Inserted Into and Size Connection
- Materials

X46A Straight Type A (In Inches)

A (NPT)	B (NPT)	D	E	F	G	I
1/8	1/8	1-3/4	3/4	1/2	1/2	1/4
1/4	1/4	2-1/4	1	3/4	3/4	3/8
3/8	3/8	2-1/2	1	7/8	7/8	1/2
3/8	1/2	2-1/2	1-1/4	1/2	7/8	3/4
1/2	1/2	3	1-1/4	1	1-1/8	3/4
3/8	3/4	3-3/8	2	1/2	1	7/8
3/4	3/4	4	2	1	1-1/2	7/8
3/8	1	4-1/4	2-3/4	1/2	1-3/8	7/8
1	1	4-1/2	2-3/4	1-1/4	1-3/4	7/8
1/2	1	4-1/4	2-3/4	1/2	1-3/8	7/8

INSTALLATION

The strainer is designed for use in conjunction with a Cla-Val Main Valve, but can be installed in any piping system where there is a moving fluid stream to keep it clean. When it is used with the Cla-Val Valve, it is threaded into the upstream body port provided for it on the side of the valve. It projects through the side of the Main Valve into the flow stream. All liquid shunted to the pilot control system and to the cover chamber of the Main Valve passes through the X46 Flow Clean Strainer.

INSPECTION

Inspect internal and external threads for damage or evidence of cross-threading. Check inner and outer screens for clogging, embedded foreign particles, breaks, cracks, corrosion, fatigue, and other signs of damage.

DISASSEMBLY

Do not attempt to remove the screens from the strainer housing.

CLEANING

After inspection, cleaning of the X46 can begin. Water service usually will produce mineral or lime deposits on metal parts in contact with water. These deposits can be cleaned by dipping X46 in a 5-percent muriatic acid solution just long enough for deposit to dissolve. This will remove most of the common types of deposits.

Caution: use extreme care when handling acid. If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water. Rinse parts in water before handling. An appropriate solvent can clean parts used in fueling service. Dry with compressed air or a clean, lint-free cloth. Protect from damage and dust until reassembled.

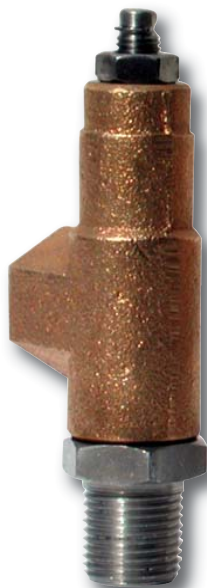
REPLACEMENT

If there is any sign of damage, or if there is the slightest doubt that the Model X46 Flow Clean Strainer may not afford completely satisfactory operation, replace it. Use Inspection steps as a guide. Neither inner screen, outer screen, nor housing is furnished as a replacement part. Replace Model X46 Flow Clean Strainer as a complete unit.

When ordering replacement Flow-Clean Strainers, it is important to determine pipe size of the tapped hole into which the strainer will be inserted (refer to column A or F), and the size of the external connection (refer to column B or G).



— MODEL — **CV**
Flow Control



DESCRIPTION

The Cla-Val Model CV Flow Control is a simply-designed, spring-loaded check valve. Rate of flow is full flow in one direction and restricted in other direction. Flow is adjustable in the restricted direction. It is intended for use in conjunction with a pilot control system on a Cla-Val Automatic Control Valve.

OPERATION

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

INSTALLATION

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

DISASSEMBLY

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

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

INSPECTION

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

CLEANING

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

REPAIR AND REPLACEMENT

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

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

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

REASSEMBLY

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

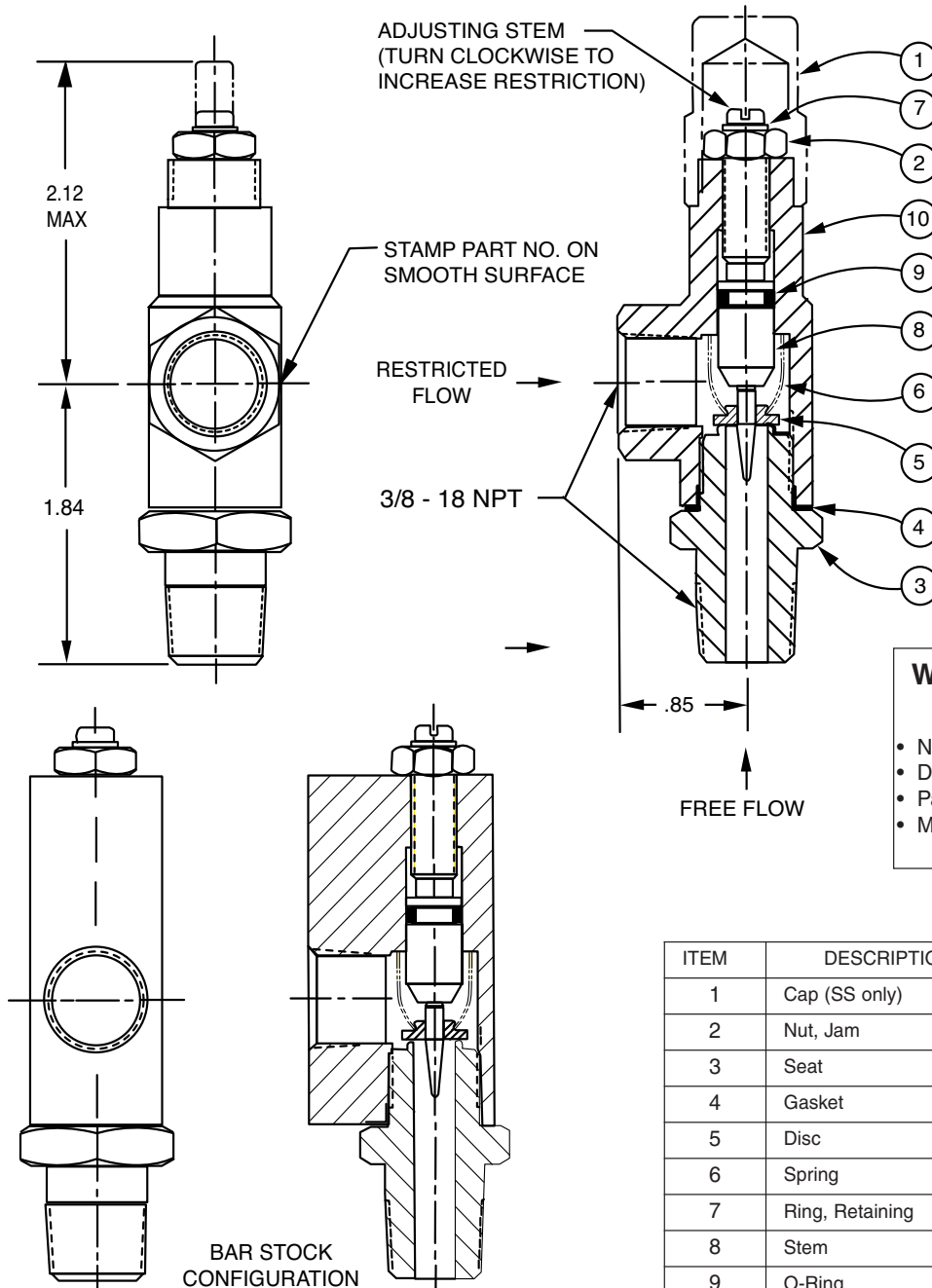
TEST PROCEDURE

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



CV

3/8" Flow Control



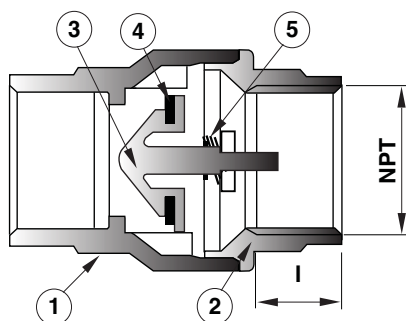
ITEM	DESCRIPTION	QTY
1	Cap (SS only)	1
2	Nut, Jam	1
3	Seat	1
4	Gasket	1
5	Disc	1
6	Spring	1
7	Ring, Retaining	1
8	Stem	1
9	O-Ring	1
10	Housing	1

—MODEL— **CDC-1**

Check Valve (Sizes 3/8" and 1/2")



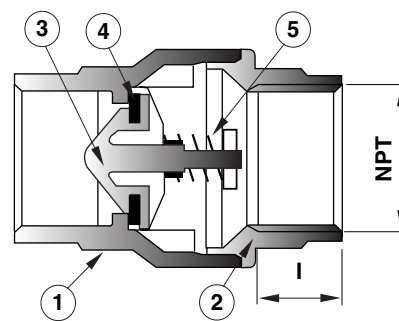
- NSF 61 Approved
- Meets low lead requirements
- Soft Seat for Bubble Tight Shutoff, Spring Loaded for Fast Seating Action
- Compact Design
- Low Cracking Pressure 1/2 psi
- Flow Profile Designed to Minimize Head Loss
- Perfect Seating both at High and Low Pressure, Wide Temperature Range: +10° to 210°F
- Polyetherimide Disc to ensure the Best Resistance for Corrosion and Abrasion
- Patented Disc Guide to Prevent Any Side Loading



Full Open Operation

Item	Description	Material
1	Body	Brass
2	End Connection	Brass
3	Disc	Polyetherimide
4	Seat	NBR
5	Spring	Stainless Steel

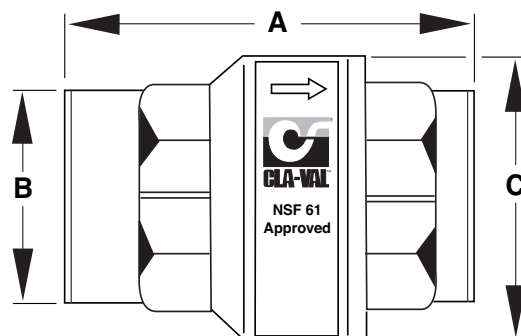
Available only in replacement assembly.



Tight Closing Operation

Dimensions

Size (NPT)	Stock Number	A	B	C	I	C _v	psi	Wt.
3/8"	9834501A	1.73	0.79	1.06	0.40	4.55	400	0.37
1/2"	9834502J	2.32	0.98	1.35	0.53	6.00	400	0.32





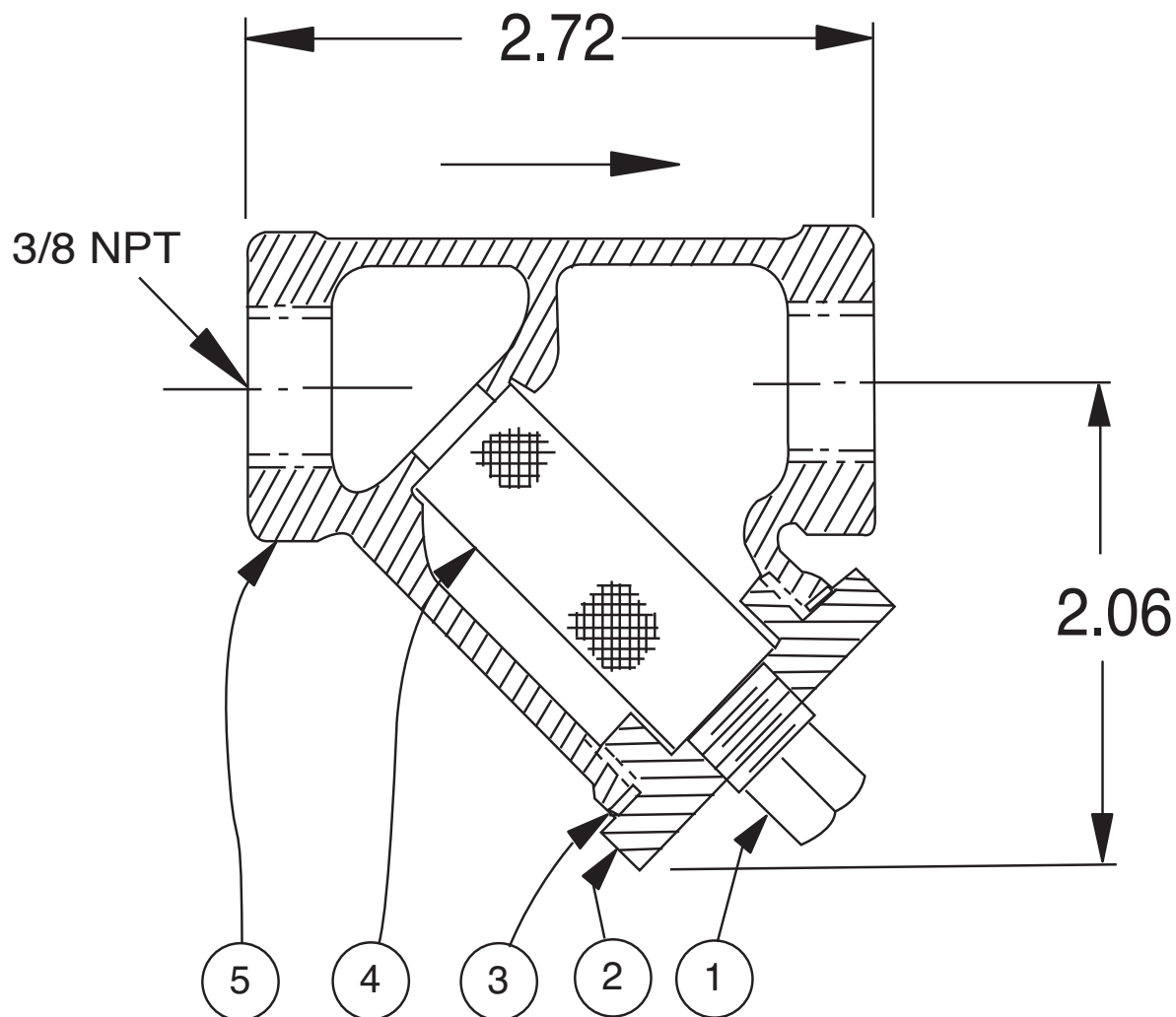
X43

Strainer

ITEM	DESCRIPTION	MATERIAL
1	Pipe Plug	Steel
2	Strainer Plug	Brass
3	Gasket	Copper
4	Screen	SST
5	Body	Brass
No parts available. Replacement assembly only.		

Standard 60 mesh pilot system strainer for fluid service.

Size	Stock Number
3/8 x 3/8	33450J

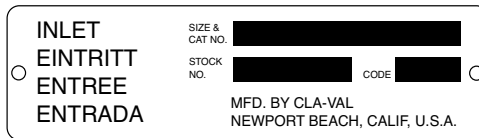


Proper Identification

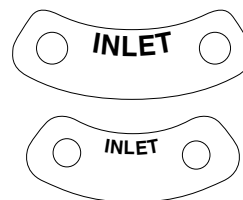
For ordering repair kits, replacement parts, or for inquiries concerning valve operation, it is important to properly identify Cla-Val products already in service by including all nameplate data with your inquiry. Pertinent product data includes valve function, size, material, pressure rating, end details,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



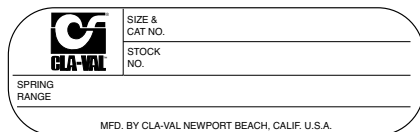
This brass plate appears on valves sized 2 1/2" and is located on the top of the inlet flange.



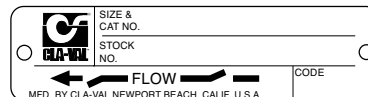
These two brass plates appear on 3/8", 1/2", and 3/4" size valves and are located on the valve cover.



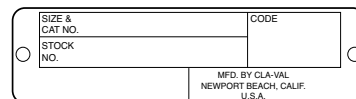
This brass plate appears on altitude valves only and is found on top of the outlet flange.



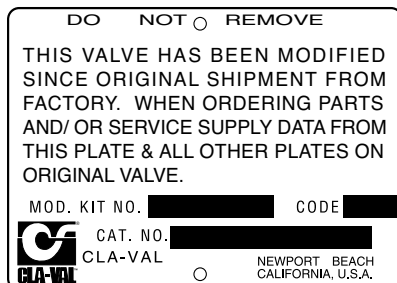
This tag is affixed to the cover of the pilot control valve. The adjustment range appears in the spring range section.



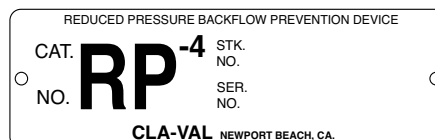
These two brass plates appear on threaded valves 1" through 3" size or flanged valves 1" through 2". It is located on only one side of the valve body.



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



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



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

HOW TO ORDER

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

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

LIMITED WARRANTY

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

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

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

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

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)

DISCLAIMER OF WARRANTIES AND LIMITATIONS OF LIABILITY

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

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

TERMS OF SALE

ACCEPTANCE OF ORDERS

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

CREDIT TERMS

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

PURCHASE ORDER FORMS

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

PRODUCT CHANGES

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

PRICES

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

RESPONSIBILITY

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

RISK

All goods are shipped at the risk of the purchaser after they have been delivered by 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 such as diaphragms, discs, o-rings, etc., cannot be returned for credit, unless as part of an unopened vacuum sealed repair kit which is less than six months old.
6. Goods authorized for return are subject to a 35% (\$100 minimum) restocking charge and a service charge for inspection, reconditioning, replacement of rubber parts, retesting, repainting and repackaging as required.
7. Authorized returned goods must be packaged and shipped prepaid to Cla-Val, 1701 Placentia Avenue, Costa Mesa, California 92627.



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

CLA-VAL

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

CLA-VAL CANADA

4687 Christie Drive
Beamsville, Ontario
Canada L0R 1B4
Phone: 905-563-4963
Fax: 905-563-4040

CLA-VAL EUROPE

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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www.cla-val.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		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	3/8" (Also 81-01)	9169806J
1/2" - 3/4" (Also 81-01)	9169802H	N/A	1/2" - 3/4" (Also 81-01)	9169807G	N/A	1/2" - 3/4" (Also 81-01)	9169807G
1"	9169803F	N/A	1"	9169808E	N/A	1"	9169808E
1 1/4" - 1 1/2"	9169804D	N/A	1 1/4" - 1 1/2"	9169809C	N/A	1 1/4" - 1 1/2"	9169809C
2"	9169805A	N/A	2"	9169810A	N/A	2"	9169810A
2 1/2"	9169811J	N/A	2 1/2"	9169817F	N/A	2 1/2"	9169817F
3"	9169812G	9169805A	3"	9169818D	9169810A	3"	9169818D
4"	9169813E	9169812G	4"	9169819B	9169818D	4"	9169819B
6"	9169815K	9169813E	6"	9169820K	9169819B	6"	9169820K
8"	9817901D	9169815K	8"	9169834A	9169820K	8"	9169834A
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 100-02	Valve Size	Kit Stock Number	
			100-02 & 100-03	100-21 & 100-22
3/8"	9169901H	2 1/2"	9169910J	N/A
1/2" & 3/4"	9169902F	3"	9169911G	9169905J
1"	9169903D	4"	9169912E	9169911G
1 1/4" & 1 1/2"	9169904B	6"	9169913C	9169912E
2"	9169905J	8"	99116G	9169913C
		10"	9169939H	99116G
		12"	9169937B	9169939H

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

Larger Sizes: Consult Factory.

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

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

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

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

Larger Sizes: Consult Factory.

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	1263901K	CDB-KB	9170012A
CDB-30	9170023H	CFM-7A	1263901K	CRA-KB	N/A
CDB-31	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	Buna-N®	
CFCM-M1	1222301C	102B-1	1502201F	CRD Disc Ret. (Solid)	C5256H
CFM-2	12223E	102C-2	1726201F	CRD Disc Ret. (Spring)	C5255K
		102C-3	1726201F		

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**