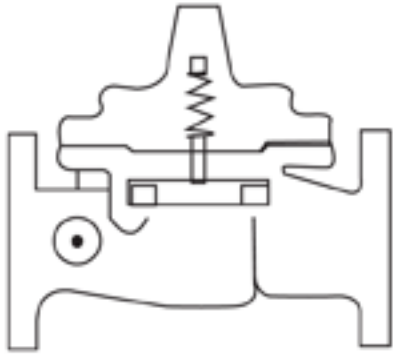
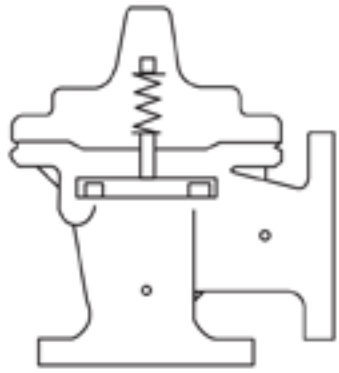
CLA-VAL
AUTOMATIC CONTROL VALVES

7100

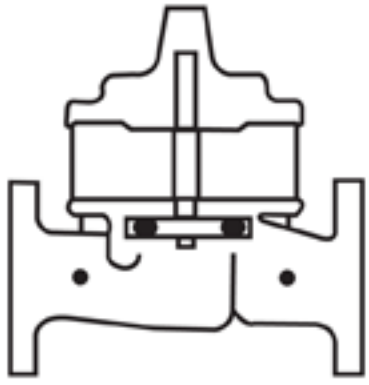
Place this manual with personnal responsible for maintenance of this valve



INSTALLATION



OPERATION



MAINTENANCE

CLA-VAL · P.O. BOX 1325 · NEWPORT, CA 92659-0325 · (949) 722-4800 · FAX: (949) 548-5441
CLA-VAL CANADA LTD. · 4687 Christie Drive · Beamsville, Ontario, LOR 1B4 Canada · (905) 563-4963

CLA-VAL™

— MODEL — **7100**

Remote Control Valve

- **Packless design--no lubrication**
- **Precisely engineered--close drip-tight**
- **Full line-sized opening--low flow resistance**
- **No internal or external orifice**
- **Diaphragm is fully supported for longer life**
- **Movable parts & seat ring replaceable without removing valve from line**
- **Fusion Bonded Epoxy Coating Standard**

The Cla-Val Model 7100 Valve is a diaphragm actuated, hydraulically operated valve designed for low original cost and long life. Simple, rugged construction allows the 7100 to perform dependably under the most severe operating conditions. Its compact design makes it easy to install.

The 7100 Valve is ideal for any application where the need is for On-Off control, the controlling medium of which is usually the liquid itself, passing through a remote control. The control pressure, when applied against the flexible diaphragm, produces a drip-tight seal between the valve disc and its seat. In the open position, the diaphragm assembly lifts to provide full flow.

The 7100 Valve provides all the advantages of an automatic control valve at a cost comparable to manual valves of the same size and quality.

Specifications

Sizes:	1-3 inch Threaded
End Details:	125 ASA B16.1
Pressure Rating:	125 Class-175 psi Max.
Temperature Range:	Water : 125°F Max. Petroleum Products: -40°F to 125°F Max

Material Specification

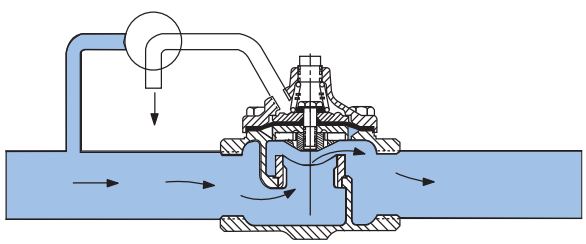
Main Body and Cover:	Cast Iron ASTM A-48 NSF-61 Epoxy Coating Standard
Main Valve Trim:	Delrin (DuPont 500) with Bronze seat (ASTM B-61)
Spring:	Stainless Steel AISI 302
Diaphragm and Disc:	Buna-N® Synthetic Rubber

Purchase Specification

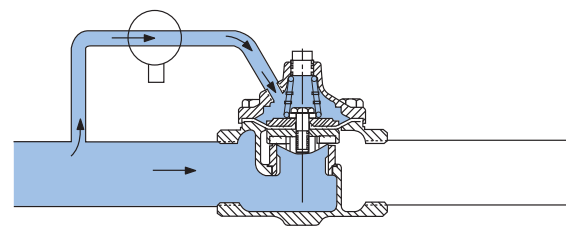
Valve shall be full line size, diaphragm actuated. It shall be hydraulically operated by employing the fluid flowing through it to open as well as close the valve. The diaphragm shall be fabricated of nylon reinforced synthetic rubber, and shall be fully supported in both the open and closed positions and not be used as a disc or seating element. There shall be no packing glands, internal orifice, or continuous bleeding.
The body and cover shall be NSF-61 Epoxy Coated inside and out.

The disc shall be synthetic rubber and have a cross section retained on 31/2 sides. The disc shall close drip-tight against the valve seat. The seat ring shall be replaceable and all necessary repairs shall be possible without removing valve from the line. Valve shall be similar in all respects to the Model 7100 Valve as manufactured by Cla-Val, Newport Beach, California, or approved equal.

Principle of Operation

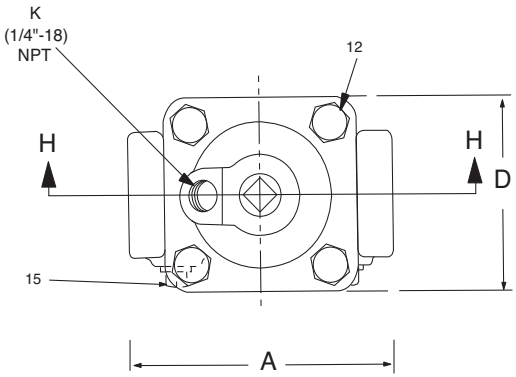


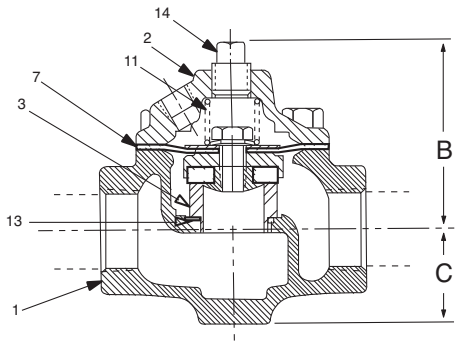
VALVE OPEN
When pressure in diaphragm chamber is relieved to a zone of lower pressure (usually atmosphere) the line pressure at the valve seat opens the valve.

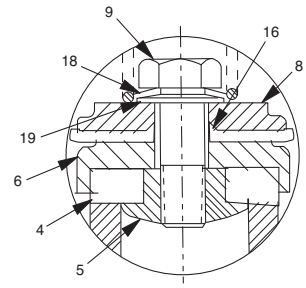


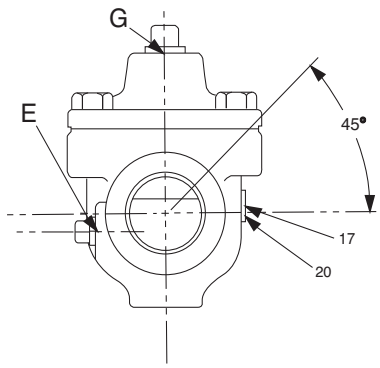
VALVE CLOSED
When pressure from the valve inlet (or an equivalent independent operating pressure) is applied to the diaphragm chamber the valve closes drip-tight.

CLA-VAL™









Dimensions

Valve Size (inches)	1	1 1/4	1 1/2	2	2 1/2	3
A 125 Threaded	4 1/8	5 1/4	5 1/4	6 1/2	7 3/8	8 1/4
B MAX.	3	4	4	4 7/8	5 1/2	6 1/8
C	1 1/2	1 7/8	1 7/8	2 1/2	3	3
D	3	4	4	4 7/8	5 3/4	6 1/2
E NPT	1/4	1/4	1/4	3/8	3/8	3/8
G NPT	3/8	1/2	1/2	1/2	1/2	1/2
K NPT	1/4	1/4	1/4	1/4	1/4	1/4

Parts List

Item No.	Description	Qty.
1.	Body	1
2.	Cover	1
3.	Seat	1
4.	Disc	1
5.	Guide, Disc	1
6.	Retainer Disc	1
7.	Diaphragm	1
8.	Washer, Diaphragm	1
9.	Bolt, Stem	1
10.	Nut, Hex	1
11.	Spring	1
12.	Bolt Hex Hd.	4
13.	O-Ring	1
14.	Plug, Pipe	1
15.	Plug, Pipe	1
16.	O-Ring	1
17.	Screw Drive	2
18.	Washer, Bellville	1
19.	Washers	1
20.	Nameplate	1

Liquid Volume Displaced from Diaphragm Chamber when Valve Opens

Valve Size	Displacement
1”	.0034 Gals.
1 1/4” & 1 1/2”	.0045 Gals.
2”	.020 Gals.
2 1/2”	.035 Gals
3”	.055 Gals.

Lower inlet pressure will have slightly less capacity -- Higher pressure slightly more due to diaphragm flexibility

When Ordering, Please Specify

1. Catalog No.7100
2. Valve Size
3. Number of valves required

Variations Available

Catalog No.	Description of Variable
7100 KH	Equipped with heavy spring
7100 KR	7100KH arranged for reverse flow
7100 KX	Equipped with extra heavy spring

Flow Characteristics

The clean, full-throated design of the Model 7100 VALVE provides minimum pressure loss and optimum C_V factors for all valve sizes.

$$C_V = \frac{\text{Flow Rate in GPM}}{\sqrt{\text{Pressure Loss in psi}}}$$

Valve Size	C_V Factor	Pressure Loss in psi With Valve Wide Open													
1”	13	.14	.6	1.3	2.3	5.1	9.2	14.5	21.						
1 1/4”	23		.18	.42	.74	1.7	3.0	4.7	6.7	12.0	18.8				
1 1/2”	25		.17	.38	.66	1.5	2.7	4.2	6.0	10.5	16.8				
2”	46				.19	.4	.8	1.2	1.7	3.0	4.7	10.5	18.8		
2 1/2”	72					.17	.4	.5	.7	1.3	1.9	4.4	7.6	17.0	
3”	106						.14	.2	.3	.6	.9	2.0	3.5	8.0	14.5
		5	10	15	20	30	40	50	60	80	100	150	200	300	400
		Flow of Water -- Gallons Per Minute													

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Represented By:

CLA-VAL

—MODEL— 7100

Remote Control Valve

DESCRIPTION

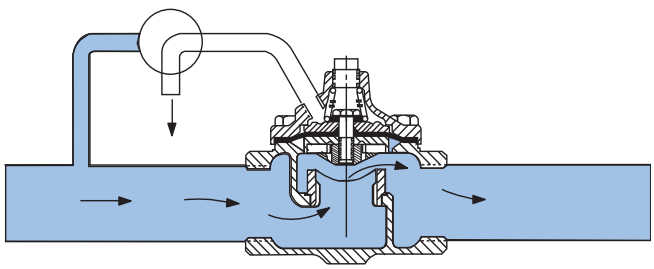
The Cla-Val 7100 Valve is a hydraulically operated, diaphragm actuated, globe pattern valve. This valve consists of three major components, the Body, with Fusion Bonded Epoxy Coating Standard, Diaphragm Assembly and Cover. The Diaphragm Assembly is the only moving part.

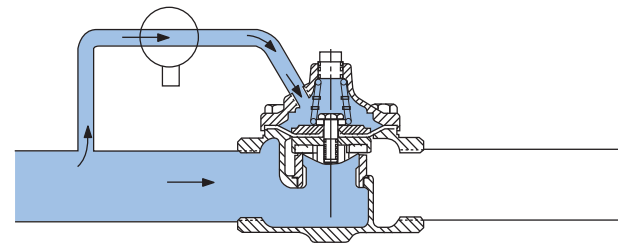
The Body contains a renewable seat insert.

The Diaphragm Assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc 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.

OPERATION

When equipped with a three-way control valve the Cla-Val 7100 Valve either opens wide or closes tight.





VALVE OPEN

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

VALVE CLOSED

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

INSTALLATION

1. Before valve is installed, pipe lines should be flushed of all chips, scale and foreign matter.
2. Place valve in the line with flow through the valve in the direction indicated on inlet plate or by flow arrows.
3. Allow sufficient room around valve to make adjustments, and for disassembly.
4. Cla-Val 7100 Valves operate in any position.
5. If a pilot control system is installed with the 7100 Valve, use care to prevent damage. If necessary to remove fittings or tubing, be sure they are kept clean and replaced exactly as they were.
6. After the valve is installed and the system is first pressurized, vent air from the cover chamber and tubing by loosening fittings at all high points.

MAINTENANCE

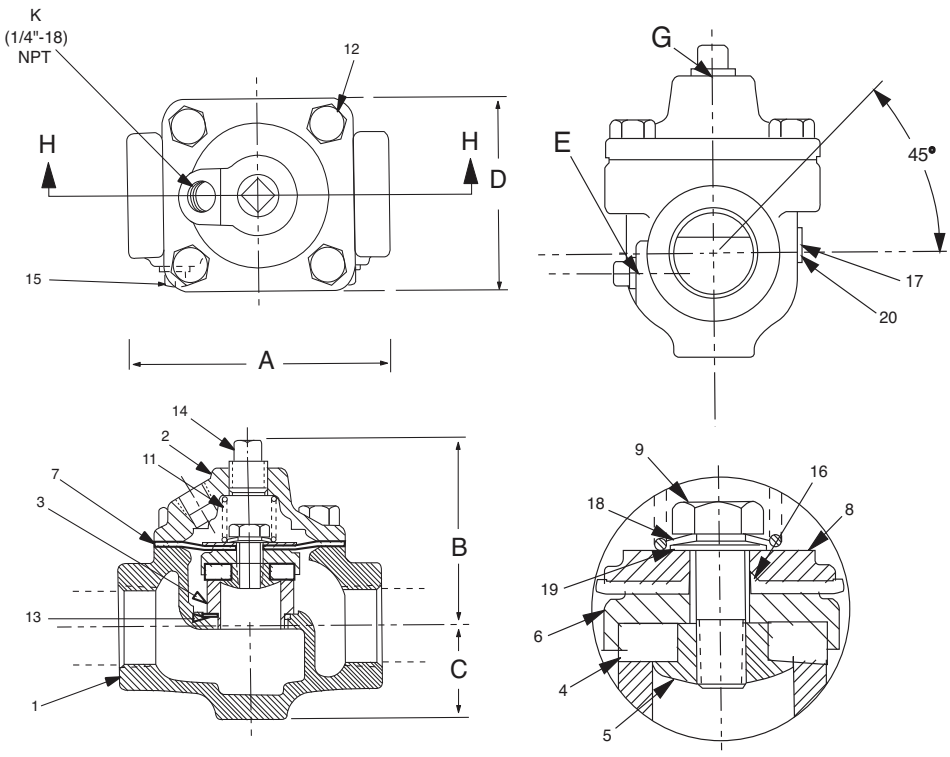
Cla-Val 7100 Valves require no lubrication or packing and a minimum of maintenance.

Disassembly

The inspection or maintenance of the 7100 Valve can be accomplished without removal from the line. After pressure has been shut off and the pressure released from the valve and cover chamber, unscrew cover bolts and remove Cover, Spring and Diaphragm Assembly. Remove seat only if damage is evident. Check Disc for excessive wear or embedded particles.

Reassembly

To reassemble reverse the order of disassembly.



Parts List

Item No.	Description	Qty.
1.	Body	1
2.	Cover	1
3.	Seat	1
4.	Disc	1
5.	Guide, Disc	1
6.	Retainer Disc	1
7.	Diaphragm	1
8.	Washer, Diaphragm	1
9.	Bolt, Stem	1
10.	Nut, Hex	1
11.	Spring	1
12.	Bolt Hex Hd.	4
13.	O-Ring	1
14.	Plug, Pipe	1
15.	Plug, Pipe	1
16.	O-Ring	1
17.	Screw Drive	2
18.	Washer, Bellville	1
19.	Washers	1
20.	Nameplate	1

SERVICE SUGGESTIONS

SYMPTOM	PROBABLE CAUSE	PROCEDURE
Fails to Close	Insufficient Pressure to Cover Chamber	**Check Pilot Control System Pressure**. In order for valve to close, pressure to valve cover chamber must be equal to, or greater than, pressure at valve inlet.
	Damaged Diaphragm	The following method will determine if there is a damaged diaphragm without removing the valve cover: Put pressure into the valve and disconnect control tube from valve cover chamber. If there is continuous flow through the tube connector fitting, the diaphragm is damaged, or the diaphragm assembly on the stem bolt is loose.
Closes but fails to hold drip tight	Mechanical Obstruction	Remove valve cover, and diaphragm-disc assembly. Check for foreign objects in valve seat or imbedded in valve disc.
	Worn disc or scarred seat	Check as above, and replace disc or seat if necessary.
Fails to Open	Insufficient line pressure	Minimum requirement with cover chamber vented to atmosphere, 7-10 psi (7100KH).
	Pilot Control System not draining to atmosphere	With line pressure in valve, disconnect control tube from valve cover chamber. Valve should open. Check for obstruction in control tube, pilot valve and pilot valve drain to atmosphere
Hammers while opening and continues to pulsate while flowing.	Low flow condition with fall of pipe at valve outlet creating negative pressure at valve outlet	At top of pipe fall, install air vent to break vacuum. A small spring loaded ball check may be installed in downstream body tapping of valve.

Technical Bulletin

7100KH Remote Control Valves Repair Parts

7100KH Diaphragm and Disc Assembly

PRE-ASSEMBLED and consists of items: Diaphragm Washer, Diaphragm, Belleville Washer, Disc Retainer, Disc, Disc Guide, O-ring, Stem Bolt, and Flat Washer. Reference Drawing 34792.

Assembly does NOT include spring (order separately).

Materials: Buna-N Rubber, Delrin and Brass, Temperature: 125 Degrees F. Maximum

Valve Size	Assembly	Diaphragm	Disc	Spring	Cover WIDTH Dim.	Diaphragm DIAM.
1"	**8255701J**	39953F	V5322C	82789K	3"	3.00" (Square)
1 1/4"	**8255702G**	33719G	V5562D	33722A	4"	3.74" (Round)
1 1/2"	**8255702G**	33719G	V5562D	33722A	4"	3.74" (Round)
2"	**8255703E**	33877C	81858D	C3152A	4 7/8"	4.60" (Round)
2 1/2"	**8255704C**	35011G	81219J	C3153J	5 3/4"	5.45" (Round)
3"	**8255705K**	35013C	80178H	C1106J	6 1/2"	6.30" (Round)

To determine valve size, do one of the following:
- measure cover width and compare with dimension above
- measure diaphragm diameter and compare with dimension above

If replacing Diaphragm or Disc only, the assembly has a brass bolt that tightens into Delrin threads and there is an O-ring seal. When tightening the assembly bolt there is no specific torque value. Tighten assembly bolt first by hand, then with small adjustable wrench until you see Belleville washer slightly flatten. Do not over tighten to avoid damage to Delrin parts.

Tighten four cover bolts evenly and in star or cross over pattern to avoid damage.

Valve Size	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
Cover Bolt Torque (foot-pounds)	10	18	18	30	35	40

7100 Series Hytrol Valves Parts and Assemblies

RDH990126

7100KH Diaphragm and Disc Assembly

Materials: Buna-N Rubber, Delrin and Brass - 125 Degrees F. Max

Valve Size	Assembly	List Price	Diaphragm	List Price	Disc	List Price
1"	8255701J		39953F		V5322C	
1 1/4"	8255702G		33719G		V5562D	
1 1/2"	8255702G		33719G		V5562D	
2"	8255703E		33877C		81858D	
2 1/2"	8255704C		35011G		81219J	
3"	8255705K		35013C		80178H	

7100KAT Diaphragm and Disc Assembly

Materials: Viton Rubber, Bronze and Brass - 250 Degrees F. Max

Valve Size	Assembly	List Price	Diaphragm	List Price	Disc	List Price
1"	64605K		63442A		64322A	
1 1/4"	64606H		63437J		44736H	
1 1/2"	64606H		63437J		44736H	
2"	64607F		63438G		44752E	
2 1/2"	64608D		63439E		44834A	
3"	64609B		63441A		44856D	

7100KX KX = Extra Heavy Spring

Valve Size	Valve	List Price	KX Spring	List Price
1"	83850J		39244K	
1 1/4"	83851G		37486J	
1 1/2"	83852E		37486J	
2"	83463A		V6339F	
2 1/2"	83853C		38037J	
3"	83116E		38038G	
3"	21143D		43559E	

7100KHKX KX = Extra Heavy Diaphragm (2 ply)

Valve Size	Valve	List Price	D & D Assy	List Price	Diaphragm	List Price
1"			10032B		3995301D	
1 1/4"						
1 1/2"						
2"	26511G		1625201H		42112D	
2 1/2"			1625202F		42402J	
3"					43122B	

7100KHKX KX = Extra Heavy Diaphragm (2 ply) and cover port to valve outlet

Valve Size	Valve	List Price	D & D Assy	List Price	Diaphragm	List Price
1"			10032B		3995301D	
1 1/4"						
1 1/2"						
2"	85682D		1625201H		42112D	
2 1/2"	85570A		1625202F		42402J	
3"	22447H				43122B	

7100KHR KR = KH Valve in Reverse flow - Cover rotated 180 degrees & new nametag

Valve Size	Valve	List Price
1"	84300	
1 1/4"	84301	
1 1/2"	84302	
2"	84303H	
2 1/2"	84304F	
3"	84305C	

Technical Bulletin

7100KH Valve Body and Seat Changes

7100KH valves in 2", 2 1/2", and 3" sizes (threaded ends only) have been redesigned recently to reduce manufacturing costs and increase reliability. The seat is now made of 304 Stainless Steel as standard and is thinner than the original bronze seat. The body is in Cast Iron but now the bridgewall and seat detail area is raised up inside the body to put the new seat in proper location to close tightly with standard diaphragm and disc assembly movement.

Also, the new body and cover are NSF-61 epoxy coated standard. The threads on seat and body remain the same. The bottom plug and the exterior valve dimensions remain unchanged. The part numbers for complete valves and parts remain the same.

However, this change does affect inter-changeability of replacement seats with older valves. Now, when a replacement seat is ordered, customers will have to order a new design epoxy-coated body with new seat and o-ring installed.

The same changes were made to these valves: 7100KR = KH with reverse flow (rotate cover); 7100KX = with extra heavy spring or other assembly option.

* * * * * * * * * * * * *NEW 7100KH PARTS * * * * * * * * * * * * * *

2"	Body and seat assembly KC	20662701F
	Body KC	20588901A
	Seat 304	20589002G
2 1/2"	Body and seat assembly KC	20663802B
	Body KC	20589101G
	Seat 304	20589202E
3"	Body and seat assembly KC	20663801C
	Body KC	20589301E
	Seat 304	20589402C