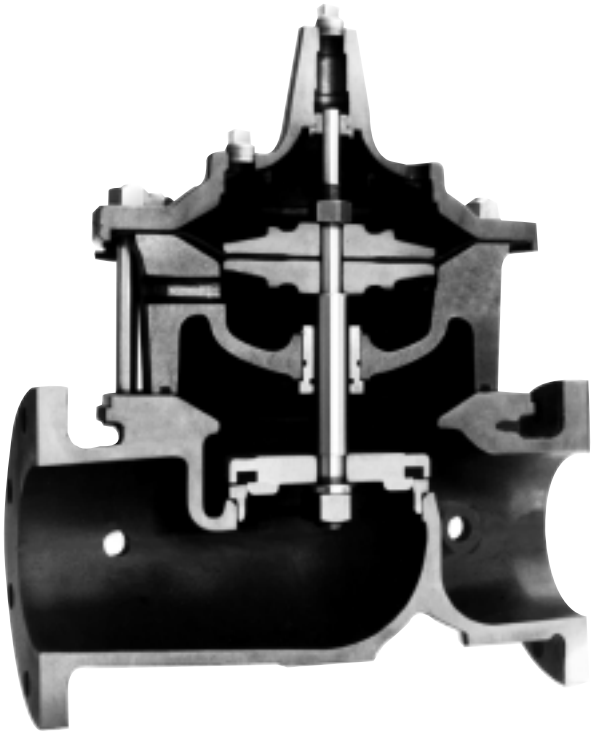
CLA-VAL™

— MODEL — **100-02**

Powertrol Valve



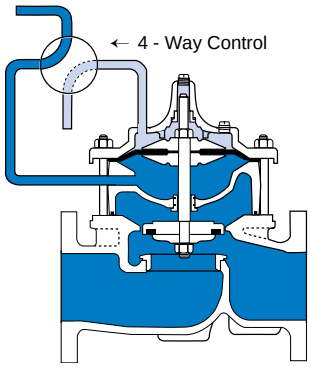
- **Drip-tight, positive seating**
- **Service without removal from line**
- **Screwed or flanged ends**
- **Globe or angle pattern**
- **Every valve factory-tested**

The Cla-Val Model 100-02 is a hydraulically operated, diaphragm actuated, globe, or angle pattern valve. It consists of four major components: body, intermediate chamber, diaphragm assembly, and cover. The diaphragm assembly is the only moving part.

The diaphragm assembly which is guided top and center by a precision machined stem, utilizes a non-wicking diaphragm of nylon fabric bonded with synthetic rubber. The diaphragm forms a seal between the cover chamber and intermediate chamber. A synthetic rubber disc retained on three and one half sides forms a drip-tight seal with the renewable seat when pressure is applied above the diaphragm. As pressure above the diaphragm is relieved and pressure is applied below the diaphragm, the valve opens wide for full flow. The rate of closing or opening can be controlled by modulating flow into or out of the diaphragm chambers.

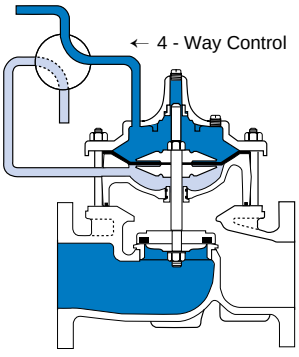
The Model 100-02 is recommended where independent operating pressure is desired. Available in various materials and in a full range of sizes, with either screwed or flanged ends, its applications are many and varied.

Principle of Operation



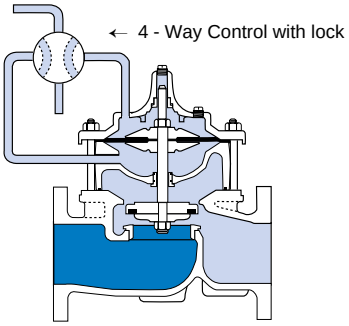
Full Open Operation

When operating pressure below the diaphragm is applied and operating, pressure is relieved from the cover chamber, the valve is held open, allowing full flow.



Tight Closing Operation

When pressure below the diaphragm is relieved and operating pressure 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. A Cla-Val four-way pilot control with "lock" position can maintain this balance by stopping flow in the pilot control system.

CLA-VAL™

Specifications

Model 100 - 02

Available Sizes

Pattern	Screwed	Flanged
Globe	⅜" - 3"	1½" - 24"
Angle	1½" - 3"	2" - 24"

Operating Temp. Range

Fluids
-40° to 180° F

2-1/2" Globe, Screwed

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class			
		Flanged			Screwed
Grade	Material	ANSI Standards*	150 lb.	300 lb.	End** Details
ASTM A536	Ductile Iron	B16.42	250	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400
ASTM B62	Bronze	B16.24	225	400	400
ASTM A743	Stainless Steel	B16.5	285	400	400
356-T6	Aluminum	B16.1	275	—	—

Note: *ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.
**End Details machined to ANSI B2.1 specifications.

4" Globe, Flanged

Materials

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	1" - 24"	1"- 24"	½" - 16"	½" - 16"	½" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional.			Stainless Steel is standard.	
Disc	Buna-N® Rubber				
Diaphragm	Nylon Reinforced Buna-N® Rubber				
Stem, Nut & Spring	Stainless Steel				

4" Angle, Flanged

Options

Epoxy Coating - suffix KC

An FDA approved fusion bonded epoxy coating for use with cast iron, ductile iron or steel valves. This coating is resistant to various water conditions, certain acids, chemicals, solvents and alkalies. Epoxy coatings are applied in accordance with AWWA coating specifications C550-90. Do not use with temperature above 175°F.

Viton® Rubber Parts - suffix KB

Optional diaphragm, disc and o-ring fabricated with Viton® synthetic rubber. Viton® is well suited for use with mineral acids, salt solutions, chlorinated hydrocarbons, and petroleum oils; and is primarily used in high temperature applications up to 250° F. Do not use with epoxy coating above 175°F.

Heavy Spring - suffix KH

The heavy spring option is used in applications where there is low differential pressure across the valve, and the additional spring force is needed to help the valve close. The option is best suited for valves used in on-off (non-modulating) service.

Low Temperature Diaphragm - suffix KA

This single ply diaphragm uses Buna-N® synthetic rubber, formulated for low temperature applications to -65° F. Operating pressures in excess of 125 psi are not recommended.

For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.

Valve Size		Inches	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	24
		mm.	10	15	20	25	32	40	50	65	80	100	150	200	250	300	350	400	600
C_V Factor	Globe Pattern	Gal./Min. (gpm.)	1.8	6	8.5	13.3	30	32	54	85	115	200	440	770	1245	1725	2300	2940	7655
		Litres/Sec. (l/s.)	.43	1.44	2.04	3.2	7.2	7.7	13	20.4	27.6	48	105.6	184.8	299	414	552	706	1837
	Angle Pattern	Gal./Min. (gpm.)	—	—	—	—	—	29	61	101	139	240	541	990	1575	2500*	3060*	4200*	—
		Litres/Sec. (l/s.)	—	—	—	—	—	7	14.6	24.2	33.4	58	130	238	378	600	734.4	1008	—
Equivalent Length of Pipe	Globe Pattern	Feet (ft.)	25	7	16	23	19	37	51	53	85	116	211	291	347	467	422	503	628
		Meters (m.)	7.6	2.2	4.8	7.1	5.7	11.4	15.5	16.0	25.9	35.3	64.2	88.6	105.8	142.4	128.6	153.6	191.6
	Angle Pattern	Feet (ft.)	—	—	—	—	—	46	40	37	58	80	139	176	217	222*	238*	247*	—
		Meters (m.)	—	—	—	—	—	13.9	12.1	11.4	17.8	24.5	42.5	53.6	66.1	67.8	72.7	75.2	—
K Factor	Globe Pattern		16.3	3.7	5.7	6.1	3.6	5.9	5.6	4.6	6.0	5.9	6.2	6.1	5.8	6.1	5.0	5.2	4.0
	Angle Pattern		—	—	—	—	—	7.1	4.4	3.3	4.1	4.1	4.1	3.7	3.6	2.9	2.8	2.6	—
Liquid Displaced from Diaphragm Chamber When Valve Opens		Fl. Oz	.12	.34	.34	.70	—	—	—	—	—	—	—	—	—	—	—	—	—
		U.S. Gal.	—	—	—	—	.02	.02	.03	.04	.08	.17	.53	1.26	2.51	4.0	6.5	9.6	29
		ml	3.5	10.1	10.1	20.7	75.7	75.7	121	163	303	643	—	—	—	—	—	—	—
		Litres	—	—	—	—	—	—	—	—	—	—	2.0	4.8	9.5	15.1	24.6	36.2	109.8

*Estimated

C_V Factor

Formulas for computing C_V Factor, Flow (Q) and Pressure Drop (ΔP):

$$C_V = \frac{Q}{\sqrt{\Delta P}} \qquad Q = C_V \sqrt{\Delta P} \qquad \Delta P = \left(\frac{Q}{C_V}\right)^2$$

K Factor (Resistance Coefficient)
The Value of K is calculated from the formula: $K = \frac{894\,d^4}{C_v^{\,2}}$
(U.S. system units)

Equivalent Length of Pipe
Equivalent lengths of pipe (L) are determined from the formula: $L = \frac{K\,d}{12\,f}$
(U.S. system units)

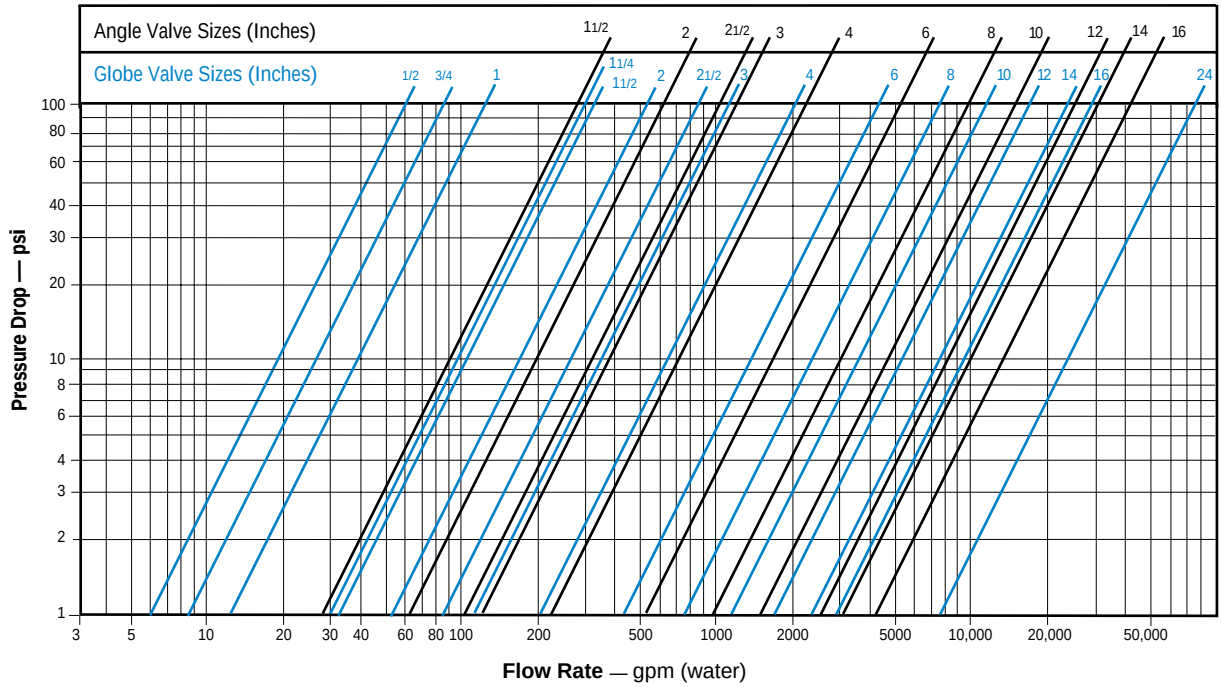
Fluid Velocity
Fluid velocity can be calculated from the following formula: $V = \frac{.4085\,Q}{d^2}$
(U.S. system units)

Where:

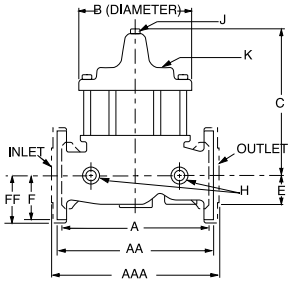
C_V = U.S. (gpm) @ 1 psi differential at 60° F water
□ □□□ or
=□ (l/s) @ 1 bar (14.5 PSIG) differential
□ at 15° C water

d = inside pipe diameter of Schedule 40 Steel Pipe (inches)
f = friction factor for clean, new Schedule 40 pipe
□ (dimensionless) (from Cameron Hydraulic Data,
□ 18th Edition)
K = Resistance Coefficient (calculated)
L = Equivalent Length of Pipe (feet)
Q = Flow Rate in U.S. (gpm) or (l/s)
V = Fluid Velocity (feet per second) or (meters per second)
ΔP = Pressure Drop in (psi) or (bar)

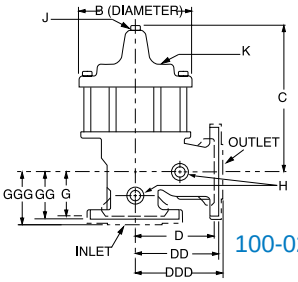
Model 100-02 Flow Chart (Based on normal flow through a wide open valve)



Dimensions



100-02 (Globe)



100-02 (Angle)

*1½" Size Only

Model 100 - 02

VALVE SIZE (Inches)	⅜	½-¾	1	1¼-1½	2	2 ½	3	4	6	8	10	12	14	16	24
A Screwed	2.75	3.50	5.12	7.25	9.38	11.00	12.50	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	—	8.50*	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	61.50
AAA 300 ANSI	—	—	—	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	63.24
B Dia.	2.50	3.15	4.38	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	53.16
C Max.	2.33	5.88	6.25	7.62	8.56	10.31	11.19	14.25	18.44	21.81	23.38	29.31	32.12	35.00	56.50
D Screwed	—	—	—	3.25	4.69	5.50	6.25	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	—	—	4.69	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.69	—
DDD 300 ANSI	—	—	—	—	5.00	5.81	6.63	7.81	10.50	13.19	15.56	17.75	20.25	21.75	—
E	1.25	.75	1.25	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	17.75
F 150 ANSI	—	—	—	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	19.25
FF 300 ANSI	—	—	—	3.06	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	21.25
G Screwed	—	—	—	1.88	3.25	4.00	4.50	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	—	—	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—
GGG 300 ANSI	—	—	—	—	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—
H NPT Body Tapping	—	⅛	¼	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1
J NPT Cover Center Plug	⅛	⅛	¼	¼	½	½	½	¾	¾	1	1	1¼	1½	2	1½
K NPT Cover Tapping	—	⅛	¼	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1
Valve Stem Internal Thread UNF	—	—	—	10-32	10-32	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	¾-16
Stem Travel	—	—	—	0.4	0.6	0.7	0.8	1.1	1.7	2.3	2.8	3.4	4.0	4.5	6.5
Approx. Shipping Wt. Lbs.	8	8	13	22	40	65	95	190	320	650	940	1675	2460	3100	6400

VALVE SIZE (mm)	**10**	**15 - 20**	**25**	**32-40**	**50**	**65**	**80**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**600**
A Screwed	70	89	130	184	238	279	318	—	—	—	—	—	—	—	—
AA 150 ANSI	—	—	—	216*	238	279	305	381	508	645	756	864	991	1051	1562
AAA 300 ANSI	—	—	—	229	254	295	337	397	533	670	790	902	1029	1105	1606
B DIA.	64	80	111	143	168	203	232	292	400	508	600	711	832	902	1350
C MAX.	59	149	159	194	217	262	284	362	468	554	594	744	816	889	1435
D Screwed	—	—	—	83	119	140	159	—	—	—	—	—	—	—	—
DD 150 ANSI	—	—	—	—	119	140	152	191	254	322	378	432	495	526	—
DDD 300 ANSI	—	—	—	—	127	148	168	198	267	335	395	451	514	552	—
E	32	19	32	28	38	43	52	81	109	135	235	273	321	394	451
F 150 ANSI	—	—	—	64	76	89	95	114	140	171	203	241	267	298	489
FF 300 ANSI	—	—	—	78	83	95	105	127	159	191	222	260	292	324	540
G Screwed	—	—	—	48	83	102	114	—	—	—	—	—	—	—	—
GG 150 ANSI	—	—	—	—	83	102	102	127	152	203	219	349	378	399	—
GGG 300 ANSI	—	—	—	—	89	109	111	135	165	216	236	368	397	419	—
H NPT Body Tapping	—	⅛	¼	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1
J NPT Cover Center Plug	⅛	⅛	¼	¼	½	½	½	¾	¾	1	1	1¼	1½	2	1½
K NPT Cover Tapping	—	⅛	¼	⅜	⅜	½	½	¾	¾	1	1	1	1	1	1
Valve Stem Internal Thread UNF	—	—	—	10-32	10-32	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	¾-16
Stem Travel	—	—	—	10	15	18	20	28	43	58	71	86	102	114	165
Approx. Ship Wt. Kgs.	1.4	4	6	10	18	30	43	86	145	295	426	760	1116	1406	2906

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions are acceptable. Due to component size and weight of 8 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

CLA-VAL

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

CLA-VAL CANADA, LTD.
4687 Christie Drive
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

www.cla-val.com

Represented By: