CLA-VAL™

— MODEL —

100-23

600 Series

Hy-Check Valve

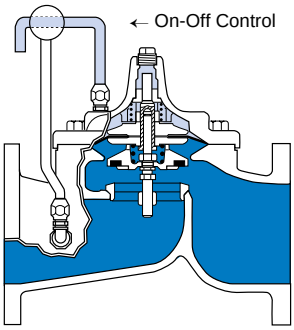
- **Built-in Automatic Check Valve**
- **Improved Flow Characteristics**
- **Drip Tight, Positive Seating**
- **Globe or Angle Pattern**
- **Packless Construction**

The Cla-Val Model 100-23 Hy-Check Valve is a hydraulically operated diaphragm valve with a built-in check feature to prevent return flow. Available in a globe or angle pattern, it consists of three parts: body, cover and diaphragm assembly. The only moving part is the diaphragm assembly which is guided top and bottom by a precision machined stem.

When operating pressure is applied above the non-wicking diaphragm, a synthetic rubber disc retained on three and one-half sides forms a drip-tight seal with the renewable seat. When pressure above the diaphragm is relieved the valve opens wide. The rate of closing or opening can be controlled by modulating the flow into or out of the diaphragm chamber. When a pressure reversal occurs the split valve stem will allow the disc retainer assembly to check closed **regardless of the position of the diaphragm.**

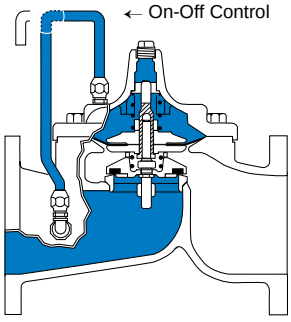
The Model 100-23 is used on system applications requiring remote control, pressure regulation, solenoid control, rate of flow control, liquid level control, or wherever a positive check feature is necessary to prevent reverse flow.

Principle of Operation



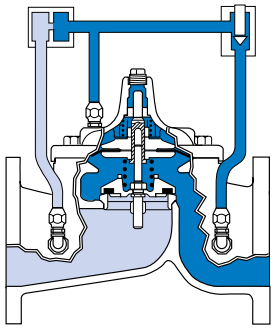
Full Open Operation

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.



Check Action

When a static condition or pressure reversal occurs, the split stem design allows the valve to instantly check closed. Return flow is prevented regardless of the diaphragm's position.

Note: For optimum operation of built-in check feature, installation with stem vertically up is recommended.

CLA-VAL™

Specifications

Available Sizes

Pattern	Flanged
Globe	6", 8",10", 12", 14", 16", 18", 20", 24"
Angle	6", 8"

Operating Temp. Range

Fluids
-40° to 180° F

Pressure Ratings (Recommended Maximum Pressure - psi)

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

Note: *ANSI standards are for flange dimensions only.
Flanged valves are available faced but not drilled.

Materials

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	6" - 24"	6" - 24"	6" - 16"	6" - 16"	6" - 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				

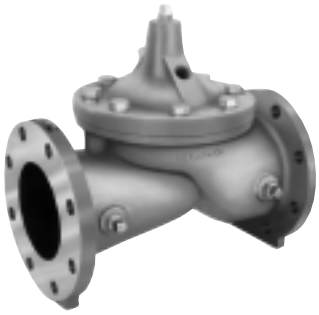
Options

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 temperatures 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.

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.



6" Globe, Flanged

6" Angle, Flanged

12" Globe, Flanged

20" Globe, Flanged

Functional Data

Model 100 - 23

Valve Size		Inches	6	8	10	12	14	16	18	20	24
		mm.	150	200	250	300	350	400	460	510	610
C_V Factor	**Globe Pattern**	Gal./Min. (gpm.)	229	480	930	1458	1725	2110	2940	3400*	3500*
		Litres/Sec. (l/s.)	55	115	223	350	414	506	705	816	840
	Angle Pattern	Gal./Min. (gpm.)	233	545	—	—	—	—	—	—	—
		Litres/Sec. (l/s.)	56	132	—	—	—	—	—	—	—
Equivalent Length of Pipe	**Globe Pattern**	Feet (ft.)	777	748	621	654	750	977	983	1125	3005
		Meters (m.)	237.1	228.1	189.5	199.4	228.7	298.1	299.9	343.2	916.6
	Angle Pattern	Feet (ft.)	751	580	—	—	—	—	—	—	—
		Meters (m.)	229	176.9	—	—	—	—	—	—	—
K Factor	**Globe Pattern**		23.1	15.7	10.4	8.5	8.9	10.2	8.4	8.8	19.1
	Angle Pattern		22.3	12.2	—	—	—	—	—	—	—
Liquid Displaced from Diaphragm Chamber When Valve Opens		Fl. Oz	—	—	—	—	—	—	—	—	—
		U.S. Gal.	.17	.53	1.26	2.51	4	4	9.6	9.6	9.6
		ml	—	—	—	—	—	—	—	—	—
		Litres	.64	2.0	4.8	9.5	15.1	15.1	36.2	36.2	36.2

*Estimated

C_V Factor

Formulas for computing C_V Factor, Flow (Q) and Pressure Drop ($\triangle P$):

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

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)

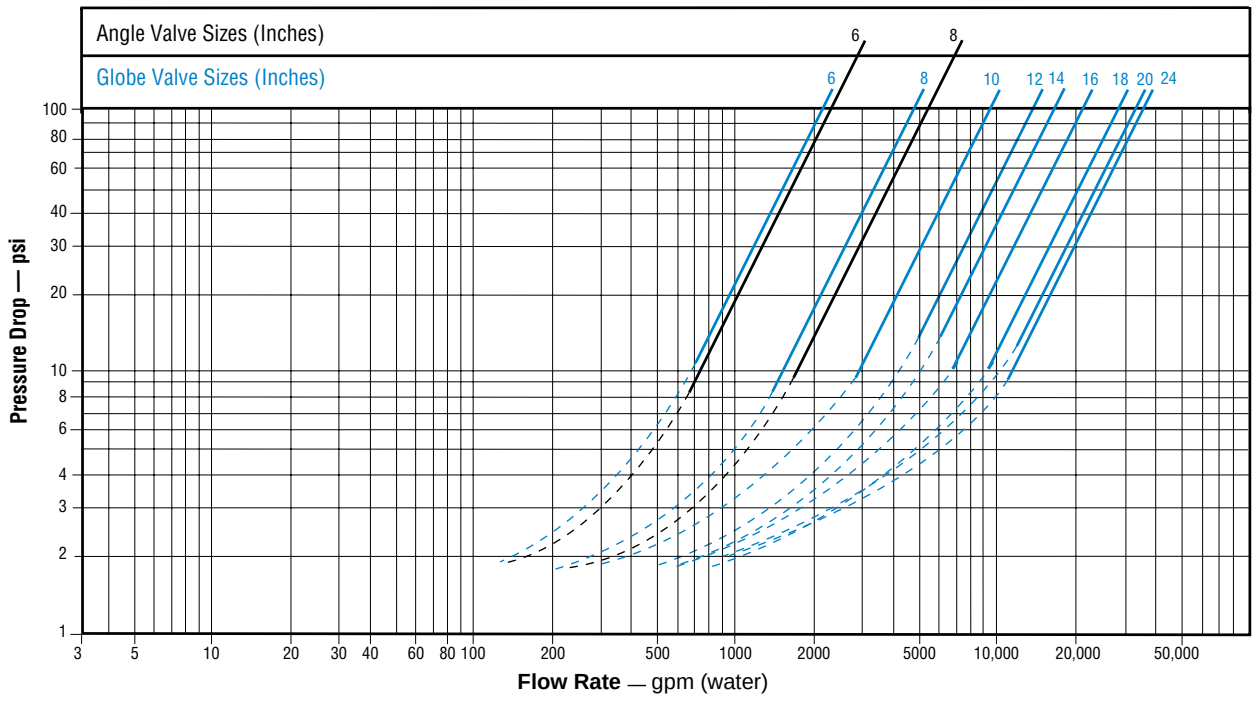
L = Equivalent Length of Pipe (feet)

Q = Flow Rate in U.S. (gpm) or (l/s)

V = Fluid Velocity (feet per second) or (meters per second)

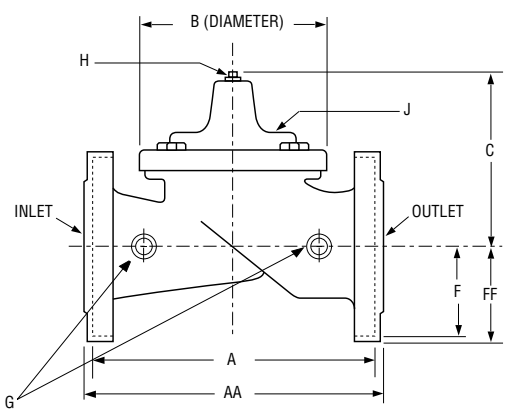
$\triangle P$ = Pressure Drop in (psi) or (bar)

Model 100-23 Flow Chart (Based on normal flow through a wide open valve)

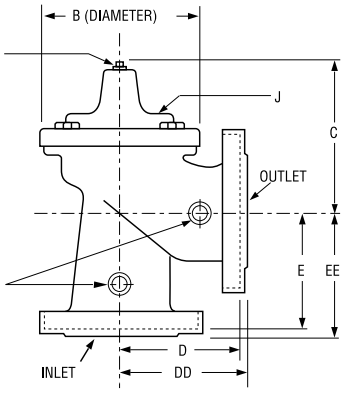


Dimensions

Model 100 -23



100-23 (Globe)



100-23 (Angle)

VALVE SIZE (Inches)	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**
A 150 ANSI	10.25	13.88	17.75	21.38	26.00	30.00	34.25	35.00	42.12	48.00	48.00
AA 300 ANSI	11.00	14.50	18.62	22.38	27.38	31.50	—	36.62	43.63	49.62	49.75
B DIA.	6.62	9.12	11.50	15.75	20.00	23.62	28.00	28.00	35.44	35.44	35.44
C MAX.	7.00	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.00	31.00
D 150 ANSI	—	6.94	8.88	10.69	—	—	—	—	—	—	—
DD 300 ANSI	—	7.25	9.38	11.19	—	—	—	—	—	—	—
E 150 ANSI	—	5.50	6.75	7.25	—	—	—	—	—	—	—
EE 300 ANSI	—	5.81	7.25	7.75	—	—	—	—	—	—	—
F 150 ANSI	3.75	4.50	5.50	6.75	8.00	9.50	11.00	11.75	15.88	14.56	17.00
FF 300 ANSI	4.12	5.00	6.25	7.50	8.75	10.25	—	12.75	15.88	16.06	19.00
G NPT Body Tapping	⅜	½	¾	¾	1	1	1	1	1	1	1
H NPT Cover Center Plug	½	½	¾	¾	1	1	1¼	1¼	2	2	2
J NPT Cover Tapping	⅜	½	¾	¾	1	1	1	1	1	1	1
Valve Stem Internal Thread UNF	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	½-20	½-20
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	4.5	4.5	4.5
Approx Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	1500	2550	2750

VALVE SIZE (mm)	**80**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**460**	**500**	**600**
A 150 ANSI	260	353	451	543	660	762	870	889	1070	1219	1219
AA 300 ANSI	279	368	473	568	695	800	—	930	1108	1260	1263
B DIA.	168	232	292	400	508	600	711	711	900	900	900
C MAX.	178	219	295	381	454	533	530	654	635	787	787
D 150 ANSI	—	176	226	272	—	—	—	—	—	—	—
DD 300 ANSI	—	184	238	284	—	—	—	—	—	—	—
E 150 ANSI	—	140	171	184	—	—	—	—	—	—	—
EE 300 ANSI	—	148	184	197	—	—	—	—	—	—	—
F 150 ANSI	95	114	140	171	203	241	279	298	403	370	432
FF 300 ANSI	105	127	159	191	222	260	—	324	403	408	483
G NPT Body Tapping	⅜	½	¾	¾	1	1	1	1	1	1	1
H NPT Cover Center Plug	½	½	¾	¾	1	1	1¼	1¼	2	2	2
J NPT Cover Tapping	⅜	½	¾	¾	1	1	1	1	1	1	1
Valve Stem Internal Thread UNF	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	½-20	½-20
Stem Travel	15	20	28	43	58	71	86	86	86	114	114
Approx. Ship Wt. Kgs.	20	39	89	150	284	409	568	627	681	1158	1249

Service Installation

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 10 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.

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