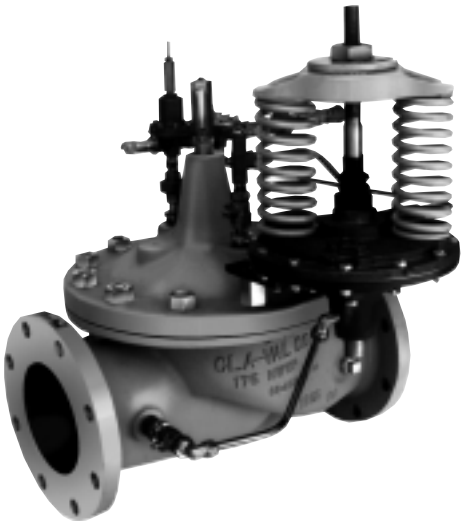
MODEL 210-03
610-03

Altitude Valve

For One-Way Flow with Delayed Opening



- **Accurate and Repeatable Level Control**
- **Drip Tight Positive Shut-off**
- **Reliable Hydraulic Operation**
- **Easily Adjustable Control**
- **Completely Automatic Operation**

The Cla-Val Model 210-03/610-03 Altitude Valve controls the high water level in reservoirs without the need for floats or other devices. It is a non-throttling valve that remains fully open until the shut-off point is reached. This valve closes at a high water level. Water is withdrawn from the reservoir through a separate discharge line or through a check valve located in a by-pass line around the altitude valve. The valve delays opening until the water in the reservoir lowers to a desired level. The low level is adjustable from 1 to 15 feet from the high water shutoff point.

This valve is hydraulically operated and pilot controlled. The pilot control operates on the differential in forces between a spring load and the water level in the reservoir. When the force of the spring is overcome by the force of the reservoir head, the pilot closes the main valve. The desired high water level is set by adjusting the spring force. The pilot control measures the reservoir head through a customer supplied sensing line* connected directly to the reservoir.

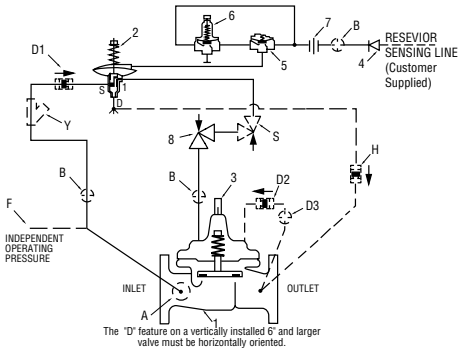
This valve can also be furnished with auxiliary controls to meet the need for multiple functions, such as: pressure sustaining, pressure reduction, rate of flow control, solenoid override, etc. If the check feature option is added and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber and the valve closes to prevent return flow.

Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	CDS6 Altitude Control
3	X101 Valve Position Indicator
4	Bell Reducer
5	81-01 Check Valve
6	CVC Flow Check Control
7	Union
8	CV Flow Control (Closing)

Optional Features

Item	Description
A	X46A Flow Clean Strainer
B	CK2 Cock (Isolation Valve)
D	Check Valves with Cock
F	Independent Operating Pressure
H	Dry Drain
S	CV Flow Control (Opening)
Y	X43 "Y" Strainer



Note: When "D" feature is ordered, the "H" feature is required.

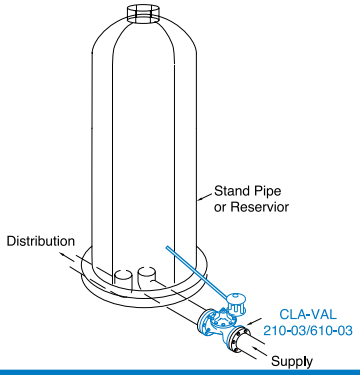
Typical Applications

Used on reservoirs where water is withdrawn from the reservoir through a separate line. When the water level lowers to the desired opening point, the pilot control opens the main valve to refill the reservoir. The difference between the high level shutoff and the low level opening is adjustable between a minimum of one and a maximum of 15 feet.

For more information see data sheet E-CDS6

*Note: The reservoir pressure sensing line should be ¾" minimum I.D. installed with a 2° slope from the valve to the reservoir to avoid air pockets.

We recommend protecting tubing and valve from freezing temperatures.



Model 210-03 (Uses Basic Valve Model 100-01)

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.

Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens

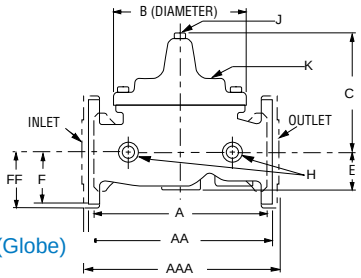
Valve Size	Displacement	Valve Size	Displacement
2"	.032 gal	10"	2.51 gal
2 - ½"	.043 gal	12"	4.00 gal
3"	.080 gal	14"	6.50 gal
4"	.169 gal	16"	9.57 gal
6"	.531 gal	24"	29.00 gal
8"	1.26 gal		

Materials

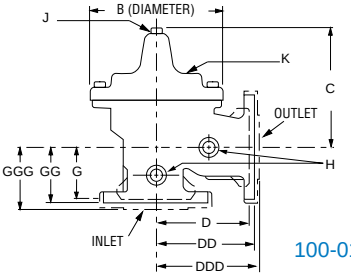
Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	2" - 16", 24	2" - 16", 24	2" - 16", 24	2" - 16"	2" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing	Bronze 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				

2" Globe, Screwed

4" Angle, Flanged



100-01 (Globe)



100-01 (Angle)

Model 210-03 Dimensions (In inches)

Valve Size (Inches)	**2**	**2 ½**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**24**
A Screwed	9.38	11.00	12.50	—	—	—	—	—	—	—	—
AA 150 ANSI	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	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	63.24
B Dia.	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	53.16
C Max.	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	43.93
D Screwed	4.75	5.50	6.25	—	—	—	—	—	—	—	—
DD 150 ANSI	4.00	4.75	6.00	7.50	10.00	12.75	14.88	17.00	19.50	20.81	—
DDD 300 ANSI	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—
E	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	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	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	—
G Screwed	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	⅜	½	½	¾	¾	1	1	1	1	1	1
J NPT Cover Center Plug	½	½	½	¾	¾	1	1	1 ¼	1 ½	2	1 ½
K NPT Cover Tapping	⅜	½	½	¾	¾	1	1	1	1	1	1
Valve Stem Internal Thread UNF	10-32	10-32	¼-28	¼-28	⅜-24	⅜-24	⅜-24	⅜-24	⅜-24	½-20	¾-16
Stem Travel	0.6	0.7	0.8	1.1	1.7	2.3	2.8	3.4	4.0	4.5	6.50
Approx. Ship Wt. Lbs.	35	50	70	140	285	500	780	1165	1600	2265	6200

Model 610-03 (Uses Basic Valve Model 100-20)

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.

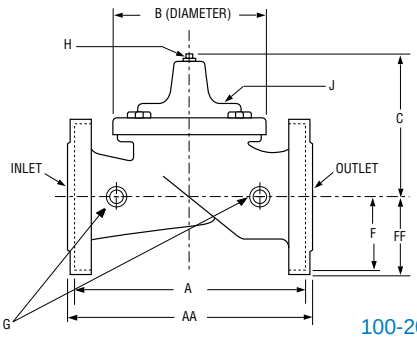
Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens			
Valve Size	Displacement	Valve Size	Displacement
3"	.032 gal	12"	2.51 gal
4"	.080 gal	16"	4.00 gal
6"	.169 gal	20"	9.57 gal
8"	.531 gal	24"	9.57 gal
10"	1.26 gal	30"	29.00 gal

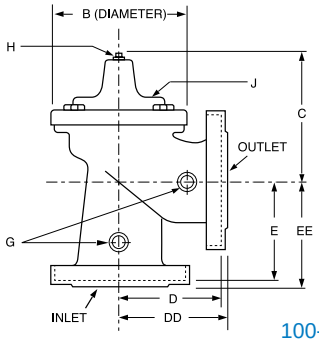
Materials

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	3"-30"	3"-30"	3"-16"	3"-16"	3"-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				

3" Globe, Flanged



100-20 (Globe)



100-20 (Angle)

6" Angle, Flanged

Model 610-03 Dimensions (In inches)

VALVE SIZE (Inches)	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**	**30**
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	63.25
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	53.19
C MAX.	7.00	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.00	31.00	43.94
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	19.88
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	1
H NPT Cover Center Plug	½	½	¾	¾	1	1	1¼	1¼	2	2	2	2
J NPT Cover Tapping	⅜	½	¾	¾	1	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	¾-16
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	4.5	4.5	4.5	6.5
Approx Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	2733	2551	2733	6500

Valve Selection

		These Symbols ▲ and ▲ Indicate Available Sizes															
	Inches	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30
	mm	32	40	50	65	80	100	150	200	250	300	350	400	450	500	600	750
	End Detail	Screwed	Screwed & Flanged				Flanged										
Model 210-03	Basic Valve 100-01 Globe			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲			▲	
	Basic Valve 100-01 Angle			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲			▲	
	Suggested Flow (GPM) Max. Continuous			210	300	460	800	1800	3100	4900	7000	8400	11000			25000	
	Suggested Flow (GPM) Max. Intermittent			260	370	580	990	2250	3900	6150	8720	10540	13700			31300	
	Suggested Flow (Liters/sec) Max. Continuous			13	19	29	50	113	195	309	441	529	693			1575	
	Suggested Flow (Liters/sec) Max. Intermittent			16.4	23	37	62	142	246	387	549	664	863			1972	
Model 610-03	Basic Valve 100-20 Globe					▲**	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Basic Valve 100-20 Angle						▲	▲	▲								
	Suggested Flow (GPM) Max. Continuous					260	580	1025	2300	4100	6400	9230	9230	16500	16500	16500	28000
	Suggested Flow (Liters/sec) Max. Continuous					16	37	65	145	258	403	581	581	1040	1040	1040	1764

× **610-03 is the reduced internal port size version of the 210-03.**

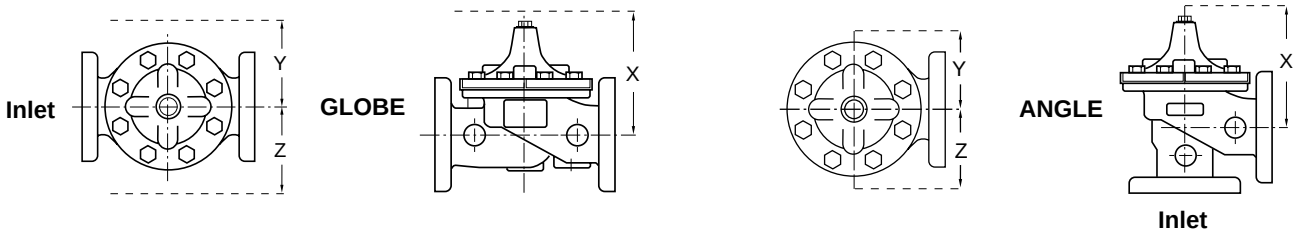
For 100-01 basic valves suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft/sec (6.1 meters/sec) & maximum intermittent is approx. 25 ft /sec (7.6 meters/sec). For 100-20 basic valves suggested flow calculations were based on flow through the valve seat. Approx. 26 ft/sec (7.9 meters/sec) is used for maximum continuous flow. Maximum continuous flow through the valve seat for the valve seat for the 30" 100-20 is approx. 20 ft/sec (6.1 meters/sec).

**Flanged End Detail Only

Pilot System Dimensions (In Inches)

We recommend providing adequate space around valve for maintenance work

Valve Size	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
X Max.	19.25	20.50	22.00	24.50	28.00	30.00	30.75	31.00	31.50	32.25	34.25	35.00	50.00	50.00
Y Max.	4.00	4.50	5.00	6.00	8.00	10.25	12.00	14.25	16.75	18.00	18.00	18.00	30.00	30.00
Z Max.	16.00	16.75	16.75	18.00	20.50	22.50	24.50	26.50	29.00	29.00	30.50	32.00	44.00	44.00



Pilot System Specifications

Adjustment Ranges

5 - 40 ft.
30 - 80 ft.
70 - 120 ft.
110 - 160 ft.
150 - 200 ft.

Temperature Range

Water: to 180°F

If flowing line pressure is less than 10 psi, consult factory for full details.

If inlet pressure is above 150 psi, consult factory for recommendations.

Materials

Standard Pilot System Materials

Pilot Control: Bronze ASTM B62
Trim: Stainless Steel Type 303
Rubber: Buna-N® Synthetic Rubber

Optional Pilot System Materials

Pilot Systems are available with optional Aluminum, Stainless Steel or Monel materials at extra cost.

Valve position indicator is standard.

When Ordering, Please Specify

1. Catalog No. 210-03 or No. 610-03
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Screwed or Flanged
6. Materials Desired
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

CLA-VAL®

CLA-VAL

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