

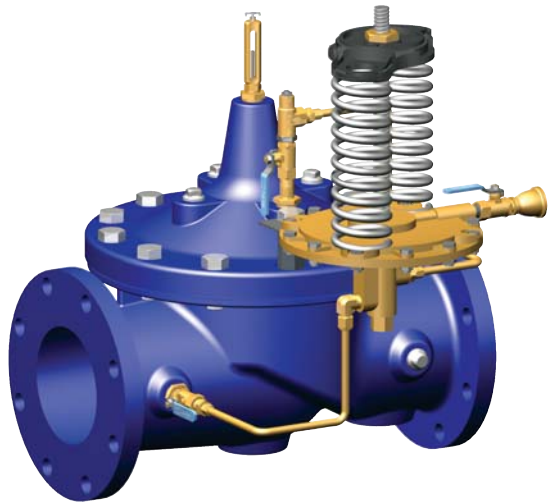


# Altitude and Solenoid Shut-Off Valve with Return Flow Feature

**210-27**  
(Full Internal Port)

MODEL

**610-27**  
(Reduced Internal Port)



- Accurate and Repeatable Level Control
- Easy Interface With Remote Control Systems
- Drip Tight Positive Shut Off
- Reliable Hydraulic Operation
- Easily Adjustable Control

The Cla-Val Model 210-27/610-27 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 solenoid is activated or the shut-off point of the hydraulic pilot control is reached. The valve closes at high water level and opens for return flow when the pressure at the valve inlet is less than reservoir pressure.

This valve is hydraulically-operated and pilot-controlled. The level pilot control operates on the differential in forces between a spring load and reservoir head level. When force of the spring is overcome by the force of reservoir head, the pilot shifts and closes main valve. Desired high water level is set by adjusting the spring force. The pilot control measures the reservoir head through a customer-supplied separate sensing line\* connected directly to the reservoir. A three-way solenoid control and a high-capacity three-way pilot control valve provide override shut-off of valve from a remote location, such as a SCADA control system. It is furnished either normally open (de-energize solenoid to open) or normally closed (energize solenoid to open).

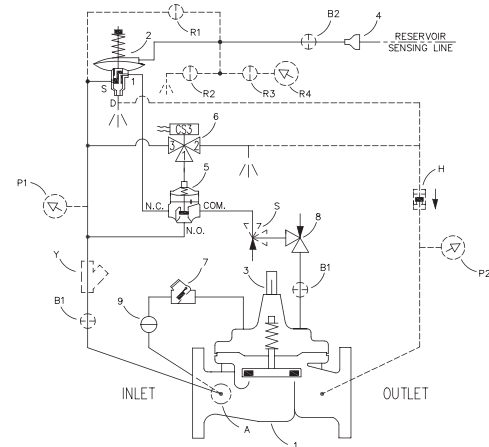
The valve can also be furnished with auxiliary controls to meet the need for additional functions, such as: pressure sustaining, rate of flow control, pressure reduction, etc.

## Schematic Diagram

Item	Description
1	Hytrol (Main Valve)
2	CDS6A Altitude Control
3	X101 Valve Position Indicator
4	Bell Reducer
5	102C-3H Three Way Valve
6	CS3 Solenoid Control
7	CSC Swing Check
8	CV Flow Control (Closing)
9	CK2 (Isolation Valve)

## Optional Features

Item	Description
A	X46A Flow Clean Strainer
B	CK2 (Isolation Valve)
H	CDC Check Valve
P	X141 Pressure Gauge
R	Reservoir Gauge with Tester
S	CV Flow Control (Opening)
Y	X43 "Y" Strainer

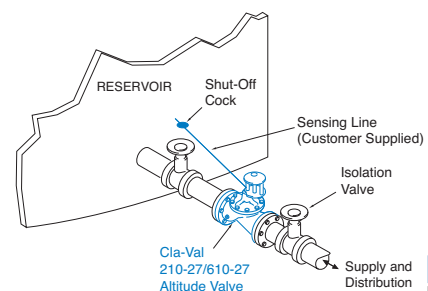


## Typical Applications

Used on reservoirs where water is supplied and withdrawn through the Altitude Valve. Valve closes at the desired high water level controlled remotely via SCADA system signal to solenoid or automatically with preset level control (usually set higher). Also, valve automatically opens for return flow when the pressure at the valve inlet lowers below the reservoir head pressure. For more information see data sheet E-CDS6A.

\*Note: The reservoir pressure sensing line should be 3/4" minimum I.D. installed with a 2° slope from valve to reservoir to avoid air pockets.

Note: We recommend protecting tubing and valve from freezing temperatures.



**Model 210-27** (Uses Basic Valve Model 100-01)

**Pressure Ratings** (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End† Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
ASTM B62	Bronze	B16.24	225	400	400	400

Note: \* ANSI standards are for flange dimensions only.  
 Flanged valves are available faced but not drilled.  
 † End Details machined to ANSI B2.1 specifications.  
**Valves for higher pressure are available; consult factory for details**

**Materials**

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	2" - 36"	2" - 16"	2" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

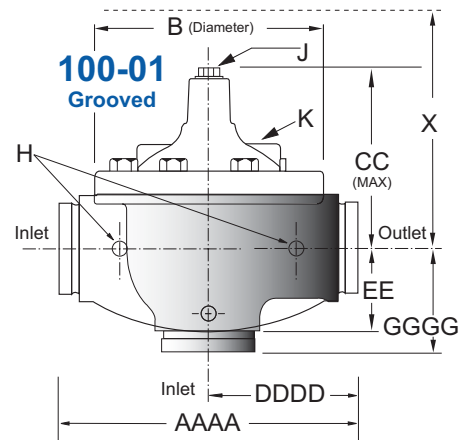
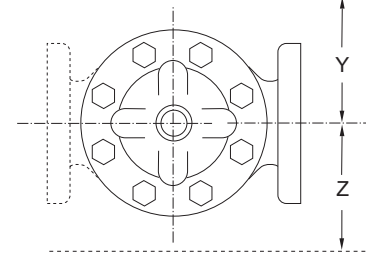
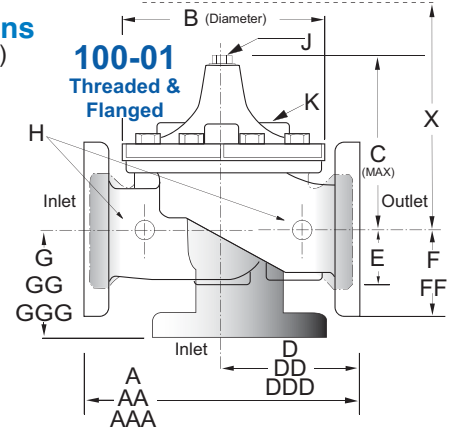
For material options not listed, consult factory.  
 Cla-Val manufactures valves in more than 50 different alloys.

**Dimensions**  
(In inches)

**Cover Capacity**

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens or Closes

Valve Size	Displacement
2"	.032 gal
2 1/2"	.043 gal
3"	.080 gal
4"	.169 gal
6"	.531 gal
8"	1.26 gal
10"	2.51 gal
12"	4.00 gal
14"	6.50 gal
16"	9.57 gal
18"	9.57 gal
20"	12.00 gal
24"	29.00 gal
36"	42.00 gal



**Model 210-27 Dimensions** (In Inches)

Valve Size (Inches)	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36
<b>A</b> Threaded	9.38	11.00	12.50	—	—	—	—	—	—	—	—	—	—	—	—
<b>AA</b> 150 ANSI	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38	46.00	52.00	61.50	63.00	76.00
<b>AAA</b> 300 ANSI	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50	47.64	53.62	63.24	64.50	76.00
<b>AAAA</b> Grooved End	9.00	11.00	12.50	15.00	20.00	25.38	—	—	—	—	—	—	—	—	—
<b>B</b> Dia.	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50	41.50	45.00	53.16	56.00	66.00
<b>C</b> Max.	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00	39.06	41.90	43.93	54.60	61.50
<b>CC</b> Max. Grooved End	5.75	6.88	7.25	9.31	12.12	14.62	—	—	—	—	—	—	—	—	—
<b>D</b> Threaded	4.75	5.50	6.25	—	—	—	—	—	—	—	—	—	—	—	—
<b>DD</b> 150 ANSI	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00	19.50	20.81	—	—	30.75	—	—
<b>DDD</b> 300 ANSI	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62	—	—	31.62	—	—
<b>DDDD</b> Grooved End	4.75	—	6.00	7.50	—	—	—	—	—	—	—	—	—	—	—
<b>E</b>	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50	12.95	15.00	17.75	21.31	24.56
<b>EE</b> Grooved End	2.50	2.88	3.12	4.25	6.00	7.56	—	—	—	—	—	—	—	—	—
<b>F</b> 150 ANSI	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	10.50	11.75	15.00	16.50	19.25	22.50	25.60
<b>FF</b> 300 ANSI	3.25	3.75	4.13	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.00	16.50	19.25	24.00	25.60
<b>G</b> Threaded	3.25	4.00	4.50	—	—	—	—	—	—	—	—	—	—	—	—
<b>GG</b> 150 ANSI	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69	—	—	22.06	—	—
<b>GGG</b> 300 ANSI	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50	—	—	22.90	—	—
<b>GGGG</b> Grooved End	3.25	—	4.25	5.00	—	—	—	—	—	—	—	—	—	—	—
<b>H</b> NPT Body Tapping	.375	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
<b>J</b> NPT Cover Center Plug	.50	.50	.50	.75	.75	1	1	1.25	1.5	2	1.5	1.5	1.5	2	2
<b>K</b> NPT Cover Tapping	.375	.50	.50	.75	.75	1	1	1	1	1	1	1	1	2	2
Stem Travel	0.6	0.7	0.8	1.1	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.63	6.75	7.5	8.5
Approx. Ship Wt. Lbs.	35	50	70	140	285	500	780	1165	1600	2265	2982	3900	6200	7703	11720
<b>X</b> Pilot System	13	14	15	17	29	31	33	36	40	40	43	47	68	79	85
<b>Y</b> Pilot System	9	10	11	12	20	22	24	26	29	30	32	34	39	40	45
<b>Z</b> Pilot System	9	10	11	12	20	22	24	26	29	30	32	34	39	42	47

Note: The top two flange holes on valve size 36 are threaded to 1 1/2"-6 UNC.

**Model 610-27** (Uses Basic Valve Model 100-20)

**Dimensions**  
(In inches)

**Pressure Ratings** (Recommended Maximum Pressure - psi)

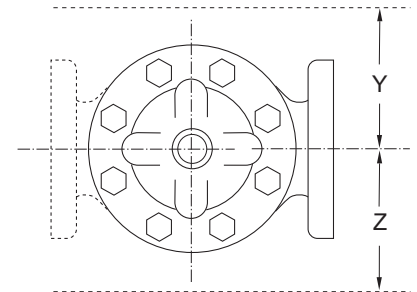
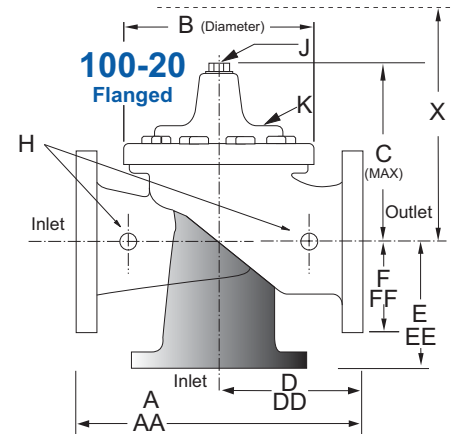
Valve Body & Cover		Pressure Class		
		Flanged		
Grade	Material	ANSI Standards*	150 Class	300 Class
ASTM A536	Ductile Iron	B16.42	250	400
ASTM A216-WCB	Cast Steel	B16.5	285	400
ASTM B62	Bronze	B16.24	225	400

Note: \* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled.  
**Valves for higher pressure are available; consult factory for details**

**Cover Capacity**

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens or Closes

Valve Size	Displacement
3"	.032 gal
4"	.080 gal
6"	.169 gal
8"	.531 gal
10"	1.26 gal
12"	2.51 gal
14"	2.51 gal
16"	4.00 gal
18"	4.00 gal
20"	9.57 gal
24"	9.57 gal
30"	29.00 gal



**Materials**

Component	Standard Material Combinations		
Body & Cover	Ductile Iron	Cast Steel	Bronze
Available Sizes	3" - 48"	3" - 16"	3" - 16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard Stainless Steel is Optional		
Disc	Buna-N® Rubber		
Diaphragm	Nylon Reinforced Buna-N® Rubber		
Stem, Nut & Spring	Stainless Steel		

For material options not listed, consult factory.  
Cla-Val manufactures valves in more than 50 different alloys.

**Model 610-27 Dimensions** (In Inches)

Valve Size (Inches)	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
<b>A</b> 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	65.00	76.00	94.50
<b>AA</b> 300 ANSI	11.00	14.50	18.62	22.38	27.38	31.50	35.75	36.62	43.63	49.62	49.75	63.75	67.00	76.00	94.50
<b>B</b> Dia.	6.62	9.12	11.50	15.75	20.00	23.62	27.47	28.00	35.44	35.44	35.44	53.19	56.00	66.00	66.00
<b>C</b> 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	54.60	61.50	61.50
<b>D</b> 150 ANSI	—	6.94	8.88	10.69	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
<b>DD</b> 300 ANSI	—	7.25	9.38	11.19	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
<b>E</b> 150 ANSI	—	5.50	6.75	7.25	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
<b>EE</b> 300 ANSI	—	5.81	7.25	7.75	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
<b>F</b> 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	25.50	28.00	31.50
<b>FF</b> 300 ANSI	4.12	5.00	6.25	7.50	8.75	10.25	11.50	12.75	15.88	16.06	19.00	22.00	27.50	28.00	31.50
<b>H</b> NPT Body Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
<b>J</b> NPT Cover Center Plug	.50	.50	.75	.75	1	1	1.25	1.25	2	2	2	2	2	2	2
<b>K</b> NPT Cover Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	3.4	4.5	4.5	6.5	7.5	8.5	8.5
Approx. Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	1500	2551	2733	6500	8545	12450	13100
<b>X</b> Pilot System	13	15	27	30	33	36	36	41	40	46	55	68	79	85	86
<b>Y</b> Pilot System	10	11	18	20	22	24	26	26	30	30	30	39	40	45	47
<b>Z</b> Pilot System	10	11	18	20	22	24	26	26	30	30	30	39	42	47	49

\*Consult Factory

Note: The top two flange holes on valve sizes 36 thru 48 are threaded to 1 1/2"-6 UNC.

<b>210-27 Valve Selection</b>	<b>100-01 Pattern:</b> Globe (G), Angle (A), <b>End Connections:</b> Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes															
	Inches	2	2½	3	4	6	8	10	12	14	16	18	20	24	30	36
	mm	50	65	80	100	150	200	250	300	350	400	450	500	600	750	900
Basic Valve 100-01	Pattern	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G, A	G	G	G, A	G	G
	End Detail	T, F, Gr	T, F, Gr*	T, F, Gr	F, Gr	F, Gr*	F, Gr*	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	210	300	460	800	1800	3100	4900	7000	8400	11000	14000	17000	25000	42000	50000
	Maximum Intermittent	260	370	580	990	2250	3900	6150	8720	10540	13700	17500	21700	31300	48000	62500
Suggested Flow (Liters/Sec)	Maximum	13	19	29	50	113	195	309	442	530	694	883	1073	1577	2650	3150
	Maximum Intermittent	16	23	37	62	142	246	387	549	664	863	1104	1369	1972	3028	3940

100-01 Series is the full internal port Hytrol.

\*Globe Grooved Only

<b>610-27 Valve Selection</b>	<b>100-20 Pattern:</b> Globe (G), Angle (A), <b>End Connections:</b> Flanged (F) Indicate Available Sizes															
	Inches	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
	mm	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1200
Basic Valve 100-20	Pattern	G	G, A	G, A	G, A	G	G	G	G	G	G	G	G	G	G	G
	End Detail	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
Suggested Flow (gpm)	Maximum	260	580	1025	2300	4100	6400	9230	9230	16500	16500	16500	28000	33500	33500	33500
Suggested Flow (Liters/Sec)	Maximum	16	37	65	145	258	403	581	581	1040	1040	1040	1764	2115	2115	2115

100-20 Series is the reduced internal port size version of the 100-01 Series.

### Pilot System Specifications

#### CDS6A 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.

#### Fluids

Air, water, light oils

#### Rubber Parts:

Buna-N® Synthetic Rubber

#### Solenoid Control

Body:

Brass ASTM B283

Enclosure:

NEMA Type 1,2,3,3S,4,4X general purpose watertight\*

NEMA Type 6,6P,7,9 watertight Explosion Proof available.

#### Voltages:

- 110, 220 - 50Hz AC
- 24, 120, 240, 480 - 60Hz AC
- 6, 12, 24, 120, 240 - DC
- Others available.

Max. operating pressure differential: 200 psi\*

#### Coil:

Insulation molded Class	F
Watts AC	6
AC Volt Amps Inrush	30
AC Volt Amps Holding	16
Watts DC	10.6

Manual operator available.

\*Supplied unless otherwise specified

#### 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.

Valve position indicator is standard.

#### When Ordering, Please Specify

1. Catalog No. 210-27 or No. 610-27
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Materials Desired
7. Engineered or de-engineered to open Main Valve
8. Solenoid Enclosure, Voltage & Hertz, Coil Insulation and Max. Operating Pressure Differential
9. Adjustment Range
10. Desired Options
11. When Vertically Installed