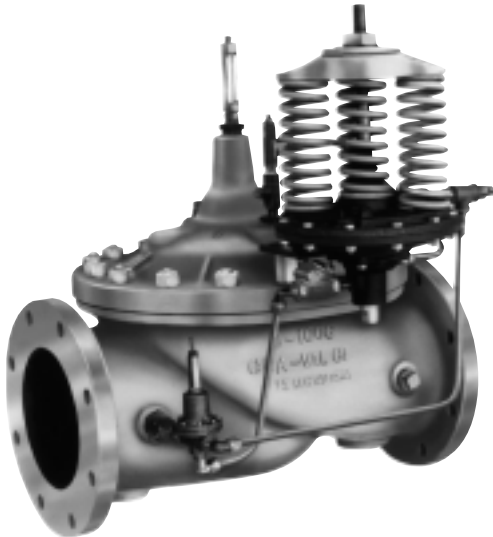




—MODEL— **210-02**
610-02 ✂

Altitude Valve

For Two-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 210-02/610-02 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 the high water level, and for return flow, delays its opening until the pressure at the valve inlet lowers to a pre-set adjustable pressure of one to seven pounds.

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.

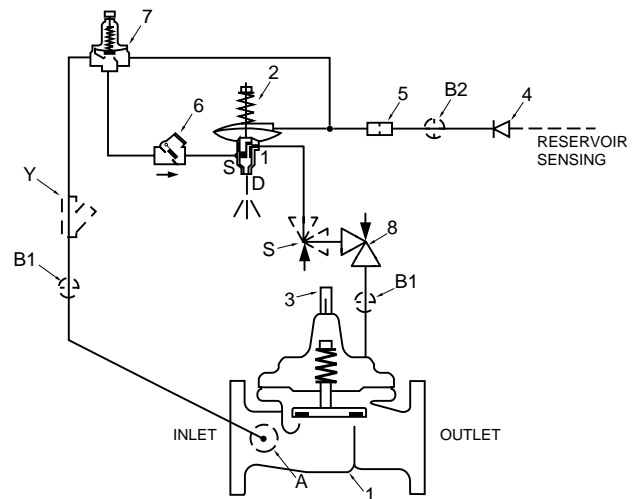
This valve can also be furnished with auxiliary controls to meet the need for multiple functions, such as: pressure sustaining, pressure reduction, rate of flow control, solenoid override, etc.

Schematic Diagram

| Item | Description |
|------|-------------------------------|
| 1 | Hytrol (Main Valve) |
| 2 | CDS6 Altitude Control |
| 3 | X101 Valve Position Indicator |
| 4 | Bell Reducer |
| 5 | X58A Restriction Assembly |
| 6 | CSC Swing Check Valve |
| 7 | CVC Flow Check Control |
| 8 | CV Flow Control (Closing) |

Optional Features

| Item | Description |
|------|----------------------------|
| A | X46A Flow Clean Strainer |
| B | CK2 Cock (Isolation Valve) |
| S | CV Flow Control (Opening) |
| Y | X43 "Y" Strainer |

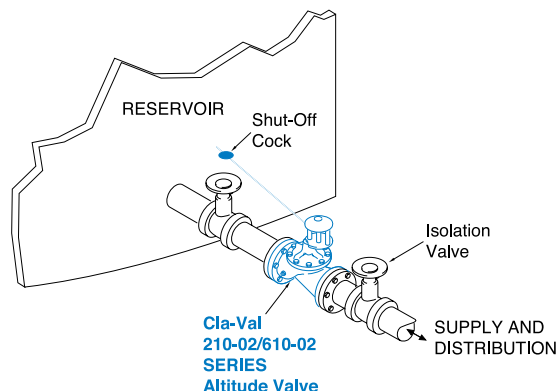


Typical Applications

Used on reservoirs where water is supplied and withdrawn through the altitude valve. The valve closes at the high water level. When pressure at the valve inlet lowers to the desired opening point, the pilot control opens the main valve for return flow to the system. The return flow pressure setting is adjustable to 6 psi below the shutoff pressure. For more information see data sheet E-CDS6

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

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



Model 210-02 (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.

Materials

| Component | Material Options | | | | | | |
|--|---|-------------|----------|------------------------------|----------|--|--|
| Body & Cover | Ductile Iron | Cast Steel | Bronze | Stainless Steel | Aluminum | | |
| Available Sizes | 2" - 16", 24 | 2"- 16", 24 | 2" - 16" | 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 | | | | | | |

Cover Capacity

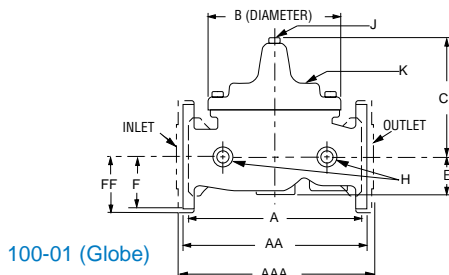
| Liquid Volume Displaced from Diaphragm Chamber When Valve Opens | | | |
|---|--------------|------------|--------------|
| Valve Size | Displacement | Valve Size | Displacement |
| 2" | .032 gal | 10" | 2.51 gal |
| 2 - ½" | .043 gal | 12" | 4.00 gal |
| 3" | .080 gal | 14" | 6.50 gal |
| 4" | .169 gal | 16" | 9.57 gal |
| 6" | .531 gal | 24" | 29.00 gal |
| 8" | 1.26 gal | | |



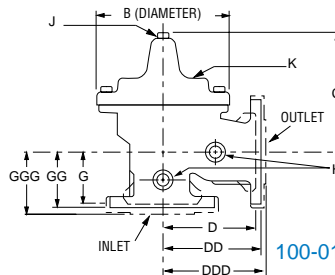
2" Globe, Screwed



4" Angle, Flanged



100-01 (Globe)



100-01 (Angle)

Model 210-02 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 | 4.75 | 5.50 | 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 | ¾ | 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 | ¾ | 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 610-02 (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

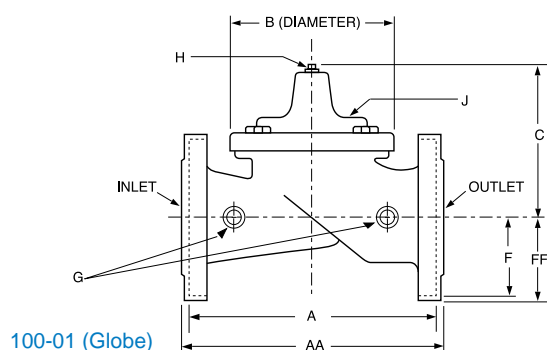
| Liquid Volume Displaced from Diaphragm Chamber When Valve Opens | | | |
|---|----------|------------|--------------|
| Valve Displacement Size | | Valve Size | Displacement |
| 3" | .080 gal | 14" | 2.51 gal |
| 4" | .169 gal | 16" | 4.00 gal |
| 6" | .531 gal | 18" | 4.00 gal |
| 8" | 1.26 gal | 20" | 9.57 gal |
| 10" | 1.26 gal | 24" | 9.57 ga |
| 12" | 2.51 gal | 30" | 29.00 gal |

Materials

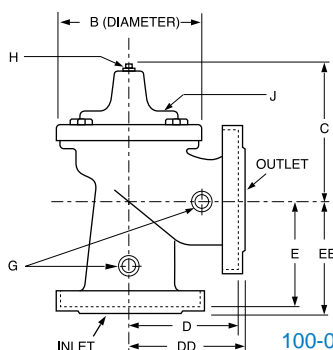
| Component | Material Options | | | | | | |
|--|---|------------|--------|------------------------------|----------|--|--|
| Body & Cover | Ductile Iron | Cast Steel | Bronze | Stainless Steel | Aluminum | | |
| Available Sizes | 3"-30" | 3"-30" | 3"-16" | 3"-16" | 3"-16" | | |
| Disc Retainer & Diaphragm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



100-01 (Globe)








































100-01 (Angle)



6" Angle, Flanged

| 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 | 3/8 | 1/2 | 3/4 | 3/4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| H NPT Cover Center Plug | 1/2 | 1/2 | 3/4 | 3/4 | 1 | 1 | 1 1/4 | 1 1/4 | 2 | 2 | 2 | 2 |
| J NPT Cover Tapping | 3/8 | 1/2 | 3/4 | 3/4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Valve Stem Internal Thread UNF | 10-32 | 1/4-28 | 1/4-28 | 3/8-24 | 3/8-24 | 3/8-24 | 3/8-24 | 3/8-24 | 1/2-20 | 1/2-20 | 1/2-20 | 3/4-16 |
| 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

| 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 210-02 | Basic Valve 100-01 | Globe | | |  |  |  |  |  |  |  |  |  | | | |  | |
| | | Angle | | |  |  |  |  |  |  |  |  |  | | | |  | |
| | Suggested Flow (GPM) | Max. Continuous | | | 210 | 300 | 460 | 800 | 1800 | 3100 | 4900 | 7000 | 8400 | 11000 | | | 25000 | |
| | | 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 | |
| | | Max. Intermittent | | | 16.4 | 23 | 37 | 62 | 142 | 246 | 387 | 549 | 664 | 863 | | | 1972 | |
| Model 610-02 | Basic Valve 100-20 | Globe | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
| | | 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 |

* 610-02 is the reduced internal port size version of the 210-02

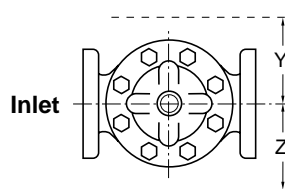
For 100-01 basic valves suggested flow calculations were based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft/sec (6.1 meters/sec) & maximum intermittent is approx. 25 ft/sec (7.6 meters/sec). For 100-20 basic valves suggested flow calculations were based on flow through the 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

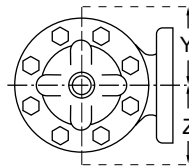
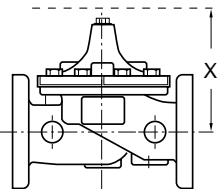
Pilot System Dimensions (In Inches)

We recommend providing adequate space around valve for maintenance work

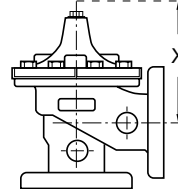
| Valve Size | 2" | 2½" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" | 30" |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| X Max. | 19.25 | 20.50 | 22.00 | 24.50 | 28.00 | 30.00 | 30.75 | 31.00 | 31.50 | 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 |



GLOBE



ANGLE



Inlet

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. 210-02 or No. 610-02
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

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

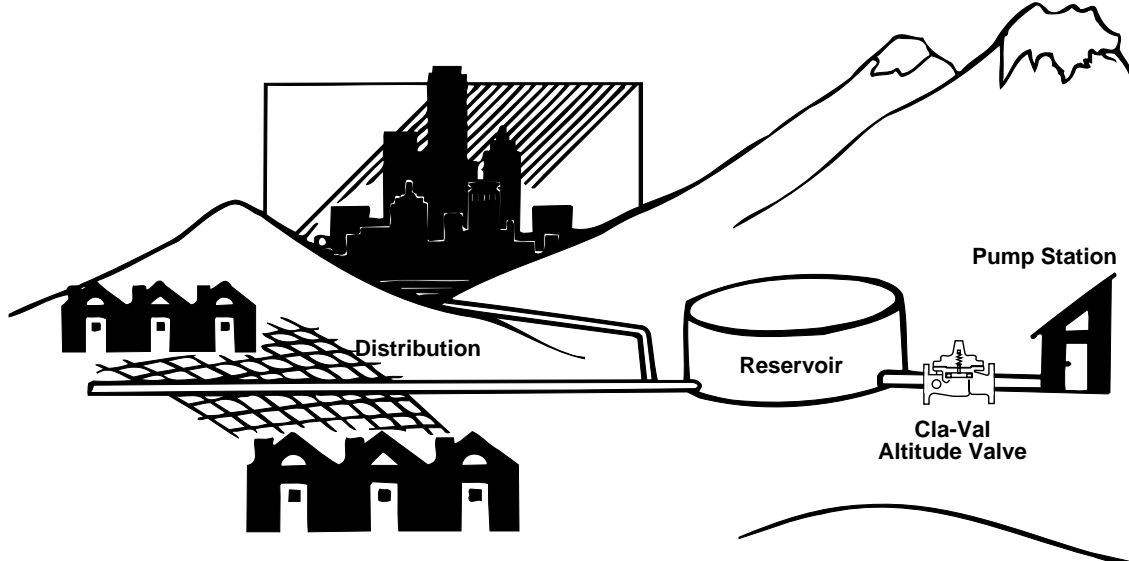
CLA-VAL SA

Chemin des Mesanges 1
CH-1032 Romanel/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50

© COPYRIGHT CLA-VAL 2001 Printed in USA
Specifications subject to change without notice.

www.cla-val.com

Represented By:



CLA-VAL LEVEL CONTROL VALVES

The water level of tanks and reservoirs can be controlled in many ways using automatic control valves. Fundamentally, all level control valves have in common the fact that they close on a high level in a tank or reservoir. To understand the various types of level control valves available, they can be grouped by the type of valve action. They form into two kinds of valve action: on-off or modulating. The on-off group of control valves provide a simple on-off high level shutoff function. The modulating group of control valves provide a variable amount of valve position and flow in relation to the changing water level in the tank. Within these two fundamental groups are combination level control valves, where a virtually unlimited number of other valve functions can be added to any valve, such as: back pressure, two-way flow, delayed opening, rate of flow control, check feature, solenoid override, ect.

ON-OFF GROUP

A simple, reliable way for smaller tank level control would be using a three-way float actuated pilot valve. The float pilot valve is mounted on the main hytrol valve for filling from the reservoir top, or the float pilot valve can be remotely mounted for reservoir filling from the bottom. (Cla-Val Series 124)

Larger reservoirs due to their size or height often require a "float-less" or altitude valve for level control. The pressure head of the reservoir is sensed through a separate line by the valve mounted pilot control which shifts to close the main hytrol valve when the reservoir is full. (Cla-Val Series 210)

When electricity is available at the reservoir site it can be used for operating a small solenoid pilot valve mounted on the main valve filling the reservoir. When the high level is reached a float switch or level probe signals the main hytrol valve to close by switching power to the solenoid pilot valve. (Cla-Val Series 136)

MODULATING GROUP

Tanks or reservoirs where the level must be held within closely controlled limits regardless of filling or lowering flow rates normally use a modulating type pilot control system arrangement. Modulating float valves are not normally recommended for straight on-off service. The pilot control senses the water level shift which in turn modulates the main hytrol valve to a new position between fully open and tight closed. (Cla-Val Series 427 and 428)

Reservoirs where the rising level is to match the closing of the valve also use a modulating type float pilot control system arrangement. As the reservoir fills the main hytrol valve is open then as the level approaches the shut off point the float pilot slowly modulates the valve closed. (Cla-Val Series 129)

Please call your Cla-Val regional office or sales agent for complete design assistance. Our goal is to provide the best automatic control valve solution for each application.