Actrol™

# Automatic Control Valve

# Flow Applications & Control Engineering company

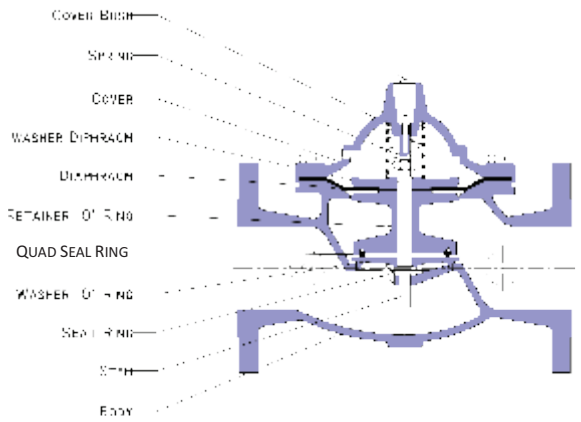
Brightech®
Liquid Control Solutions

An ISO 9001 Certified Company

# Actrol™

# The Basic Valve

The **Automatic Control Valve**, the word is self explanatory. It is a highly engineered Automatic Control Valve knowledgeably designed to operate of the line pressure or if desired, from an independent power source. Actrol valves are hydraulically operated, diaphragm actuated for multi-function control of non corrosive, non abrasive fluids.




## Main Valve Design

The main valve is Self Actuating Type, Pilot Operated, Globe/Angle Pattern, Top & Bottom Guided, Glandless, Hydraulically Operated, Diaphragm Actuated for **multifunction** control of less viscous, non corrosive, non abbrasive fluids.

Our wide range of control pilots makes it possible to offer combination models for variety of functions. The main valve contain only one moving part. This simplicity of design promotes dependibility, making the maintenance easier and extend the life of the valve.

The lower portion of main valve diaphragm assembly is a mechanical check feature, which acts independently of diaphragm position or pilot control system, and provide immediate check action when flow ceases.

## Main Valve Construction

The main valve consist only three major components; Body, Cover and the Top & Bottom Guided Diaphragm Assembly which is the only moving parts in the main valve making the online maintanence very easy.

With simplicity of design & packless construction, minimal part wear is there which assure trouble free operation & long life of dependable.

Actrol is available in various materials and in full range of sizes with flanged ends.

## Main Valve Operating Principle

The main valve is normally closed, when pressure is applied to the valve inlet the same pressure is applied to the cover also (upper chamber) the valve remains close. By controlling the pressure in the cover the valve can be made fully open or closed.

**Full Open:**
When pressure in the cover chamber is released to a lower pressure zone the line pressure at the valve inlet opens the valve allowing full flow.

**Tight Closing:**
When the pressure from the valve inlet is applied to the cover chamber, the valve closes drip tight.

**Modulating Action:**
Actrol valves are hydraulically operated ,by introducing or releasing the liquid from above the diaphragm at controlled rates. A pressure differential is required , either inlet to outlet or inlet to atmosphere, depending on application.

The control valve holds any intermediate position when operating pressures are equal above and below the diaphragm. The control pilot modulates the valve to automatically compensate for line pressure changes.

## Selection

Valves are sized to provide an appropriate pressure drop for each application. The minimum pressure drop should be 5 psi for inlet to atmosphere and 10 psi from inlet to outlet.

**Actrol** valves are design for use with clean liquid (water, ATF) application for other media is possible, consult factory.

**Actrol** is a single chamber full port engineered basic valve used in nearly all Brightech's model bearing its description. when the main valve is provided with different combination of pilot & accesories the valve perform a wide range of Automatic Fluid Control making it a specified valve for the **Municipal Water Works, Water Distribution System, Fire Protection, Irrigation, Industrial Petroleum & Aviation Fueling System, Loading terminal Automation of Tankers & Wagons, Marine Theme Park, Decorative Fountain etc.** for the system application like Remote Control, Pressure Regulation, Solenoid Operation, Rate of Flow Control, Liquid Level Control, Check Function and many more.

# BTA 11

# Cross-Section View

## Design Features & Benefits

- Operates automatically of the line pressure
- Heavy duty nylon-reinforced Buna-N/EPDM rubber diaphragm Isolate upper chamber operating pressure from bottom chamber line pressure
- **Rectangular** shaped resiliant seat seal provides drip tight class VI closure
- Diaphragm assembly is top & bottom guided ensure precise alignment
- Throttling seat retainer flow and pressure stability
- The main valve and pilot can be serviced without removal from line
- Diaphragm is replaceable without removing internal stem assembly
- Replaceable seat ring
- Ductile Iron and steel valves are epoxy coated for max. corrosion protection
- Every valve is factory tested including pressure test and a full functional, operational test when pilots and accessories are fitted to suit a particular application

## Specifications

- **Body and Cover**
  Ductile Iron ASTMA 395/ASTM A 216 Gr.WCB/ASTM A 351 GR/ CF8/CF8M
- **Seat**
  Stainless Steel 304/316/gun metal
- **Stem**
  AISI 304/316
- **Spring**
  SS 304/316
- **Elastomer Diphragm**
  Nylon reinforced Buna-N/Viton
- **Quard Seal**
  **Buna**-N/Viton
- **Hydraulic Control Pilots**
  ASTM A 351 CF8/8M with SS internals and elastomer seat & seal
- **Tubing & Fittings**
  SS 304/316 with SS fittings / Copper with brass fittings
- **Electrical**
  24 VDC /110 V AC / 230 V AC explosion proof
- **Flo-Clean Strainer/Speed Control Device/Isolation Valve**
  SS 304/316 / Brass
- **Working Pressure**
  400 psi for threaded end valves/150 psi for flanged end valves
- **Operating Temperature**
  Buna-N-160 F/EPDM-300 F/Viton - 250 F

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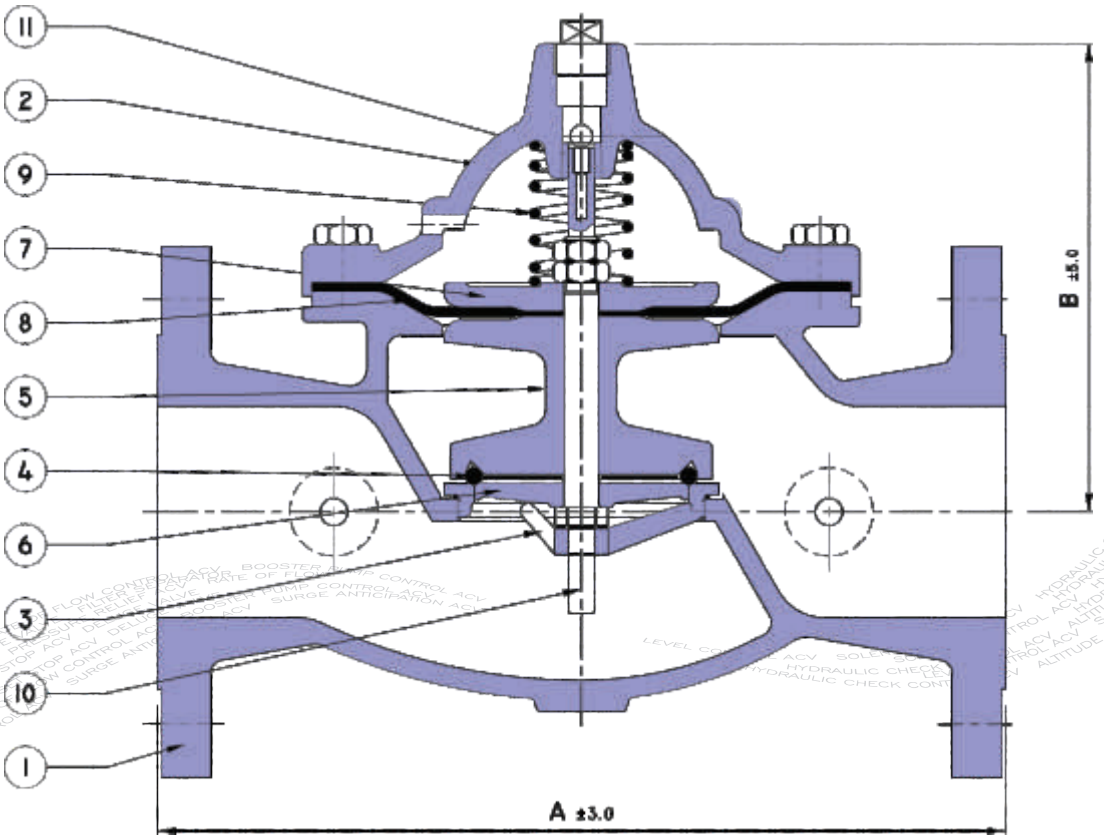
# GA Drawing

## with Material Specification & Dimension




### Material Specification

| SR.NO. | PART NAME | MATERIAL |
|---|---|---|
| 1 | BODY | ASTM A 216 GR WCB / ASTM A 351 GR CF8 / 8M |
| 2 | COVER | |
| 3 | SEAT RING | ASTM A 351 GR. CF8 / 8M |
| 4 | QUARD SEAL | BUNA N |
| 5 | RETAINER 'O' RING | ASTM A 351 GR. CF8 / 8M |
| 6 | WASHER 'O' RING | SS 304 / 316 |
| 7 | WASHER DIAPHRAGM | SS 304 / 316 |
| 8 | DIAPHRAGM | BUNA N |
| 9 | SPRING | SS 302 |
| 10 | STEM | SS 304 / 316 |
| 11 | COVER BUSH | SS 304 / 316 |

### Dimension (mm)

| SIZE | A | B | WEIGHT (KG) |
|---|---|---|---|
| 25MM | 152 | 75 | 8 |
| 40MM | 175 | 110 | 15 |
| 50MM | 203 | 140 | 18 |
| 65MM | 241 | 145 | 25 |
| 80MM | 305 | 170 | 30 |
| 100MM | 343 | 220 | 60 |
| 150MM | 432 | 305 | 120 |
| 200MM | 559 | 400 | 180 |
| 250MM | 757 | 475 | 370 |
| 300MM | 864 | 525 | 500 |
| 350MM | 991 | 570 | 725 |
| 400MM | 1060 | 660 | 1035 |

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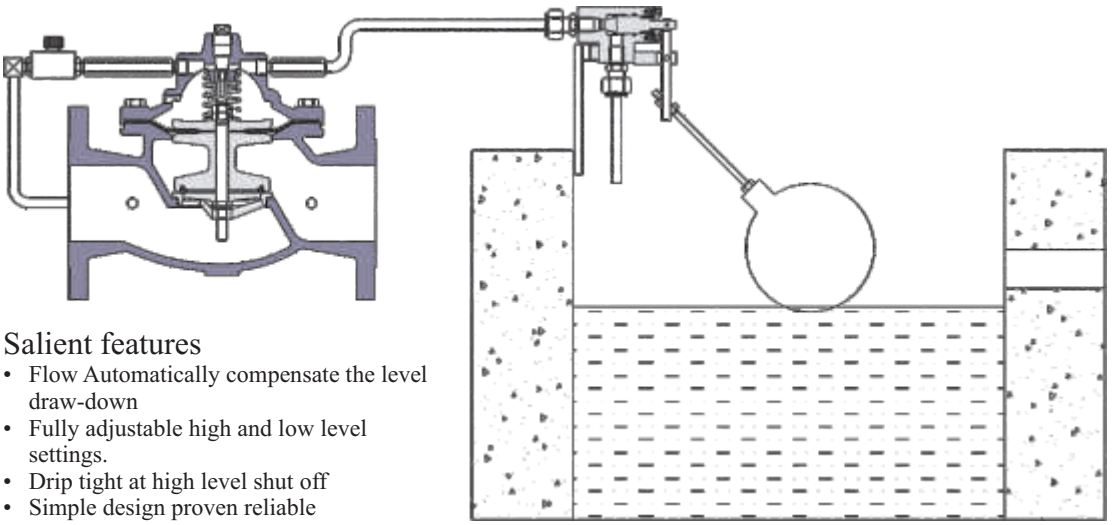
# Level Control Valve



## Salient features

- Flow Automatically compensate the level draw-down
- Fully adjustable high and low level settings.
- Drip tight at high level shut off
- Simple design proven reliable
- Completely Automatic Operation
- Can be service Online.

## Function

The model BTA-111, Modulating float control valve to maintain constant liquid level in storage tanks and reservoirs by companensating for variations in supply or demand, keeping the tank full.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve .The Ball type Float operated Pilot Control is Installed at the high liquid level in the tank / reservoir and is connected via tubing or pipe to the main valve. As the liquid level changes, the float control proportionally opens or closes the main valve, keeping the liquid level nearly constant.

## Application

## Additional Features

- Non-Modulating Type Float Control Valve

## Quick Sizing & Flow Capacity Chart

# BTA 111

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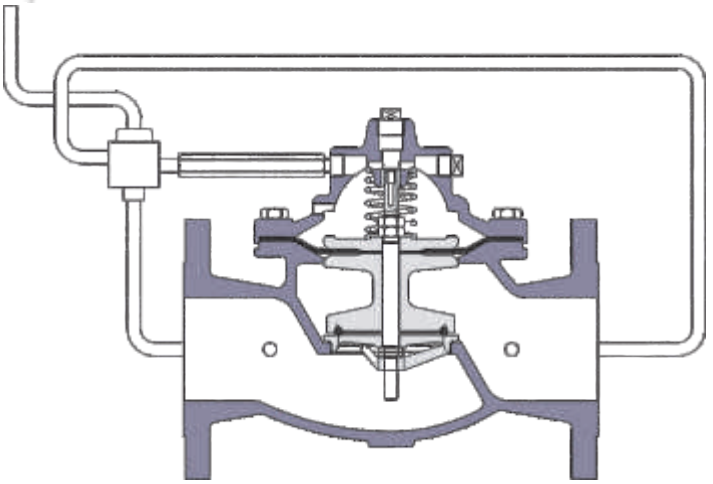
# Filter Separator Control Valve



## Salient features

- High capacity Pilot System Provides quick closing
- Completely Automatic operation
- Can be service Online.

## Function

This model has a specific purpose; to shut off the flow of fuel to a pre-set maximum in response to a signal from the float control of a fuel-water filter/separator. it is a hydraulically operated pilot controlled, diaphragm type globe valve. The valve will close drip tight in case of diaphragm failure providing fail safe operation.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve. The interface float pilot is down with little or no water in the sump of the filter separator. The float pilot routes vessel pressure to the bonnet of the three-way auxiliary pilot. This position the three-port auxiliary pilot to connect the bonnet to the main valve down stream, allowing the valve to open.

With a high water level in the sump of the filter separator, the float pilot of the interface pilot is up. The float pilot vents pressure from the cover to the three-way auxiliary pilot, shifting it to apply full inlet pressure to the cover to the main valve and drives the valve fully and tightly closed.

## Application

These Valves are designed to use for various application for control of Aviation Fuel in Storage, Distribution, Filter /water separator System and pumping station for completely automated fueling system of Aircrafts.

## Quick Sizing & Flow Capacity Chart

# BTA 211

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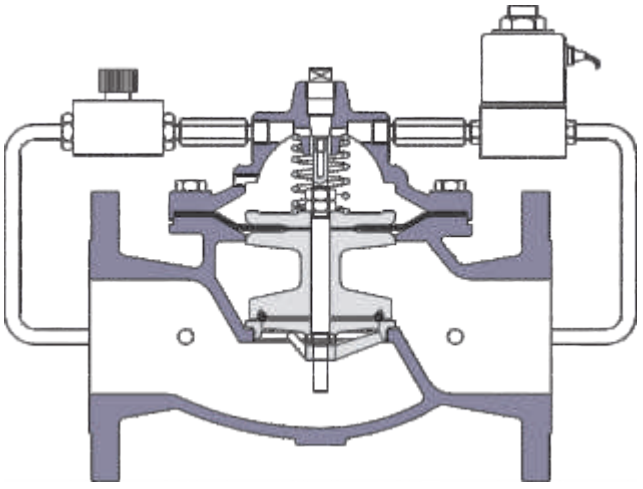
# Solenoid Control Valve [ Electrically On-Off Control Valve]



## Salient features

- Fast acting Solenoid controls
- Drip tight shut off
- Adjustable response speed
- Simple ON-OFF operation.
- Easy Installation & Maintenance

## Function

Operated by two way - three way solenoid pilot valve, BTA-311 a Solenoid Control Valve is an on-off control valve that either open or closes upon receiving an electrical signals to the solenoid pilot control, provides two position [On-Off ] Operation.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve .This Valve is consist of a " Actrol " main Valve and a two way solenoid valve. The main valve opens fully or closes drip tight depending upon the actuation position of the solenoid, energized to open/energized to close. The valve may be remotely operated by timers, relays, probes or any triggered device to the solenoid.

## Application

## Additional Features

- Electronic Flow Control and Metering System (Dual Solenoid)

## Quick Sizing & Flow Capacity Chart

# BTA 311

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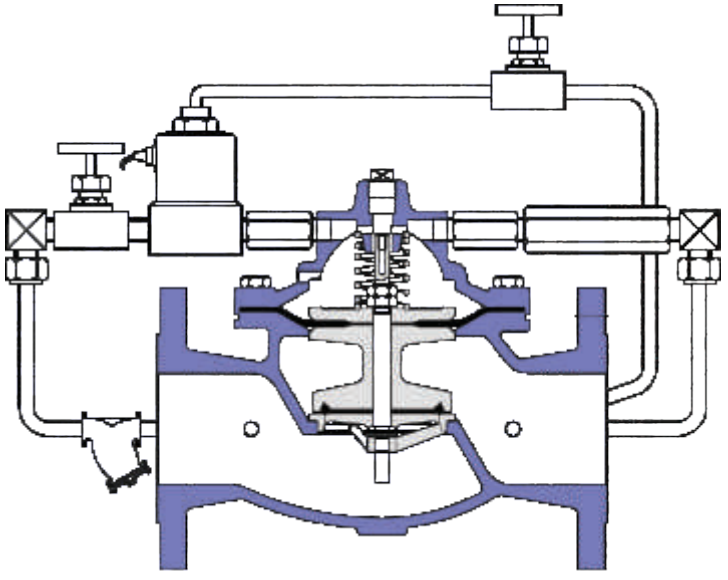
# Booster Pump Control Valve



## Salient features

- prevents pumps starting and stopping surges.
- Valve uses line pressure for operation.
- Very cost effective pump control system.
- Low head loss.
- Separate opening & closing speed controls.
- Can be service Online.

## Function

A Pilot (Solenoid) operated Booster pump control valve is designed for Installation on the discharge of Booster pump to control opening & closing on pump start up and shut down, eliminates pipe surges.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve . A three-way solenoid valve controls the valve operations equipped with hydraulic check feature to close valve on pressure reversal and shut off pump in event of pump failure. Valve and pump operations are interlocked by limit switch assembly.

## Application

## Additional Features

- By-Pass Pump Control Valve
- Hydraulic Check Valve

## Quick Sizing & Flow Capacity Chart

# BTA 311-64

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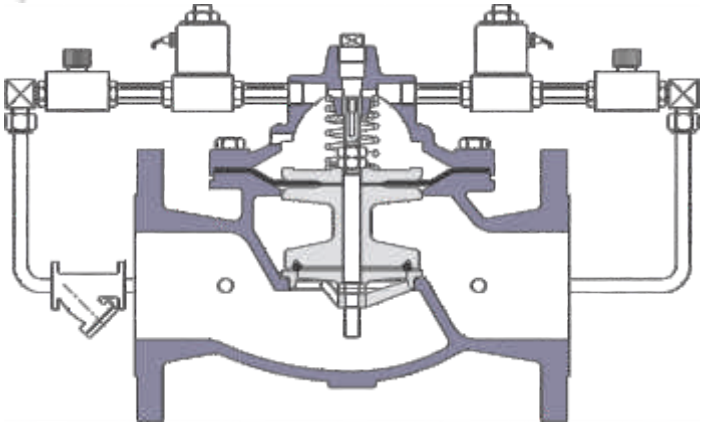
# Digital Control Valve [ Digital Set Stop Valve / Digital Preset Valve]



## Salient features

- Precise control from remote location.
- Electrically Operated Solenoid enable the valve to be open /close or held in any position.
- Independently adjustable opening & closing speed.
- Can be maintained Online.

## Function

It is an electrically operated, electronically diverted, hydraulically actuated, diaphragm valve. The flow into and out of the upper operating chamber is controlled by the two-way solenoid pilot. The electronic control determines whether the opening solenoid or the closing solenoid is operated. The change in valve position is dependent upon which solenoid is operated and the duration of the energized period. The electronic control determines the valve function. Virtually any hydraulic function can be achieved using open-close output from the controller to the valve.

## Operation

It is a Hydraulically operated, pilot controlled Diaphragm actuated Globe type Control Valve . The two way solenoid operate the main valve. The first connects the main valve inlet to the diaphragm chamber and when it is open, causes the main valve to close. The second solenoid connects the main valve outlet and, when it is open allows the main valve to open. A needle valve is provided in series with each solenoid, giving separate adjustment of the valve opening and closing speed.

## Application

This Valves are extensively Used for **Loading Arm Terminal Automation System in refineries and Storage tanks of Petroleum Products** for very effective and precise filling of tanker trucks & Railway wagons when used with Preset meters and Batch controller..

## Additional functions

Digital set stop valve with Rate of flow control

## Quick Sizing & Flow Capacity Chart

# BTA 311-66

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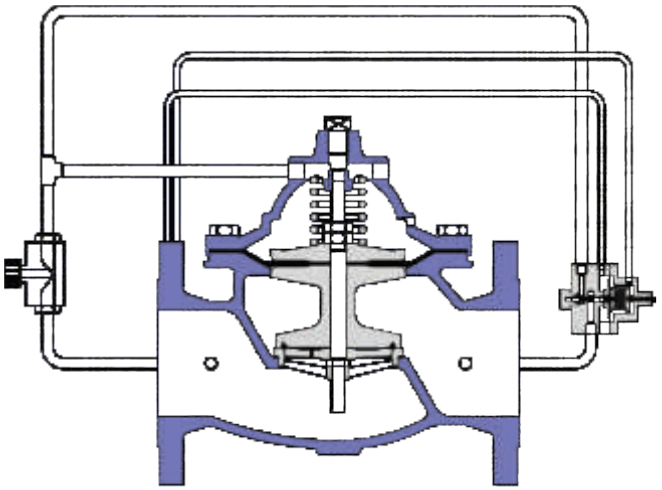
# Rate of Flow Control Valve



## Salient features

- Accurately limits the flow rate to a preset max.
- Easily adjustable flow limits.
- In built orifice plate for sensing flow rate.
- Adjustable response speed.
- Completely Automatic Operation.
- Can be service Online.

## Function

The BRIGHTECH Model BTA – 411 Rate of Flow Control Valve prevents the excessive flow by limiting flow to a pre selected max. rate regardless of changing line pressure.

## Operation

The pilot senses the differential pressure across the specially sized thin edge orifice plate mounted in the valve inlet flange. when the pressure differential is less than the set point, the main valve opens and allowing to maintain the desired flow. At the desired max. set point the pilot valve reacts to small changes in sensing pressure and controls the main valve position by modulating the pressure above the diaphragm.

When the pressure drop (across) the orifice exceeds the set point, the valve closes slightly, limiting the flow to pre-set minimum.

The orifice usually sized to generate a pressure differential of 3 to 5 psi at the desired max. flow. Adjusting the pilot setting permits the max. flow to be changed in the field above or below the original point.

## Application

## Additional functions

- Rate of flow control Valve & Solenoid Shut off
- Rate of flow control Valve & Check Valve.
- Rate of flow control Valve & Pressure reducing Valve.

## Quick Sizing & Flow Capacity Chart

# BTA 411

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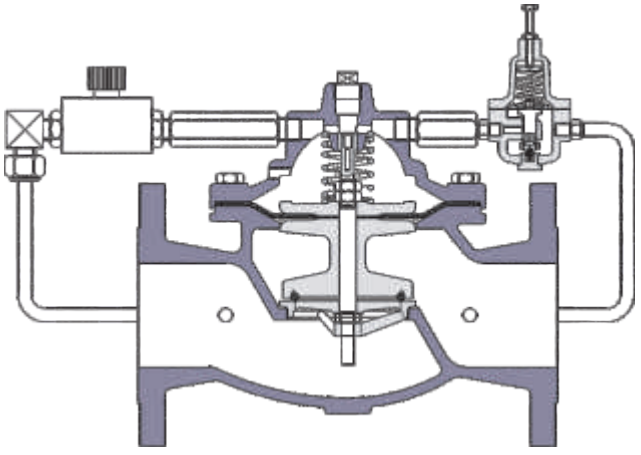
# Pressure Reducing Valve



## Salient features

- Sensitive & Accurate Pressure control.
- Easily adjustable & maintenance.
- Adjustable Opening / response Speed
- Completely Automatic Operation.
- Can be service On line.

## Function

Brightech™ manufactures a complete range of Automatic Control Valve and hence offers pilot operated pressure reducing valve, design to reduce higher inlet pressure (up-stream pressure) to a constant lower outlet pressure (down-stream pressure) regardless of varying of up stream pressure & flow rates.

## Operation

It is a Hydraulically operated , Pilot controlled Diaphragm actuated Globe type Control Valve . This is an accurate pilot operated pressure regulating valve capable of holding down stream pressure of a pre-determined limit. The pilot reacts to a small changes in pressure to control the main valve position by modulating the pressure above the diaphragm and when down stream pressure exceeds the pressure setting of control pilot the main valve and pilot close drip tight.

## Application

## Additional functions

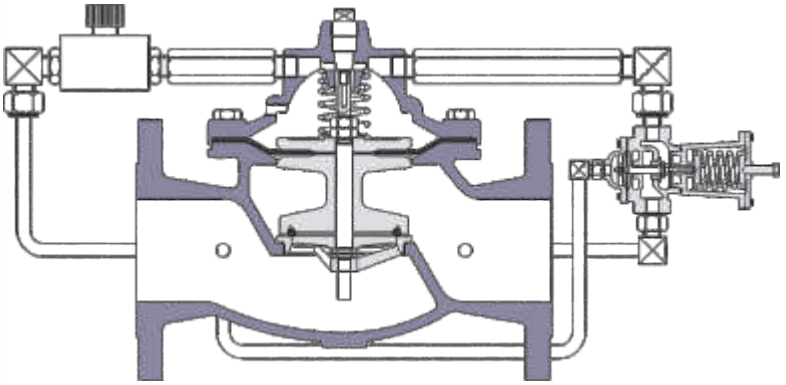
- Pressure reducing & Pressure sustaining Valve
- Pressure reducing & Surge Control Valve.
- Pressure reducing & Check Valve.
- Pressure reducing with low flow by pass Valve.
- Pressure reducing & Solenoid shut off Valve.

## Quick Sizing & Flow Capacity Chart

# BTA 511

Actrol™

# Pressure Relief Valve



## Salient features

- Accurate pressure control
- Fast opening to maintain line pressure
- Slow closing to prevent surge.
- Completely Automatic Operation.
- Can be Service On line.

## Function

A hydraulically operated pilot controlled modulating type pressure relief valve is design to maintain constant up stream pressure and to minimize surging.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve .The valve is actuated by line pressure through a pilot control system , opening fast to hold the upstream line pressure constant but closing gradually to Prevent surges. Operation is completely automatic and pressure settings may be easily changed.

Installed on a by-pass line, mainline pressure is accurately controlled by relief excess pressure. This valve can be used for pressure relief, back pressure, up stream pressure control and many more.

Installed in a mainline it prevents upstream pressure from dropping (sustain) below preset minimum.

## Application

## Additional Function

- Pressure relief & Surge anticipator Valve
- Pressure Sustaining/Solenoid 0n-0ff
- Surge Anticipating Relief Valve
- Pressure Reducing/Surge
- Surge Anticipating Relief on rise of pressure valve

## Quick Sizing & Flow Capacity Chart

**Also Known as Pressure sustaining / Up Stream Pressure Control / Back Pressure Control / Pump by pass Control & Auto recirculation Valve.**

# BTA 611

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# Altitude Control Valve [ High rise water tank level Control Valve ]

## Salient features

- Accurate & reliable level control
- Drip tight , Positive Shut off
- Operates within close limits with superior reliability.
- Easily adjustable control
- Completely Automatic Operation.
- Can be service Online.

## Function

The model BTA-711, one way Altitude valve controls the high water level in elevated Tanks or reservoirs. The altitude pilot senses the hydrostatic head of the reservoir to close on high water level. When the water level drops below the predetermined set point the valve opens to fill the reservoir. Supply pressure is greater than static head pressure. Tank discharge is by separate line.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve . This is a hydraulically operated and pilot controlled valve which operates on the differential in forces between a spring load and the water level in the reservoir. The desired high water level is set by adjusting the spring force. The pilot control measures the head through a sensing line directly connected to the reservoir.

## Application

## Quick Sizing & Flow Capacity Chart


# BTA 711

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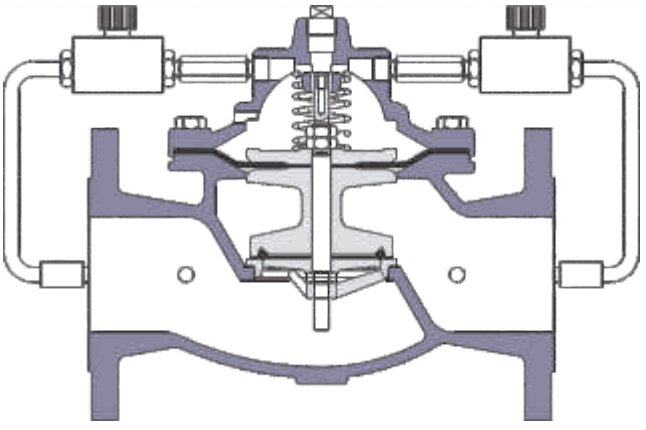
# Hydraulic Check Valve



## Salient features

- Adjustable opening and closing speed controls are provided to prevent surges.
- Drip Tight –Seal
- Smooth control unaffected by Power failure.
- No electrical connection is required.
- Completely service Online.

## Function

It permits the main valve to be fully open when inlet pressure exceeds outlet pressure in the normal direction and main valve close drip-tight on reverse flow. Opening and closing speeds are separately adjustable.

## Operation

It is a Hydraulically operated , pilot controlled Diaphragm actuated Globe type Control Valve . The Valve Operates on the differential between two pressure : upstream or inlet pressure acting under the seat of the valve , and downstream or outlet pressure acting on the diaphragm via single hydraulic line. When upstream pressure is greater of the forward flow , the valve opens at an adjustable rate to allow flow. When downstream pressure is greater , the valve is forced fully closed.

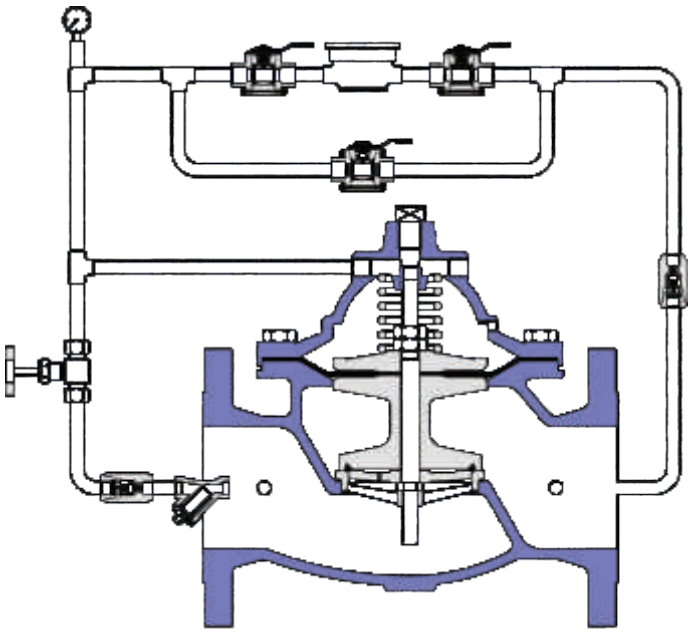
## Application

## Quick Sizing & Flow Capacity Chart

# BTA 811

Actrol™

# Deluge Valve



## Salient features

### Function

Brightech™ Deluge valve is a solenoid control on-off valve which either opens or closes upon receiving an electrical signal to the solenoid pilot control to provide water flow to the fire protection sprinkler system. This valve consist of a **Actrol** main valve, a three-way solenoid valve and an auxiliary pilot valve. This pilot control system alternatively applies pressure to/or relieves pressure from the diaphragm chamber of the main valve. it is provided either normally open or normally closed. pilot system can be hydraulically , pneumatically or manually operated.

### Operation

Energized the solenoid valve pressurizes the diaphragm chamber of the three-way auxiliary pilot valve. The pilot valve then shifts to relieve pressure from the diaphragm chamber of the main valve , allowing the main valve to open fully and admit water through the main line. The valve may also be opened by utilizing the manual override ball valve on the bonnet , which allows opening of the main valve regardless of solenoid pilot activation. The valve closes when the solenoid valve is de-energized.

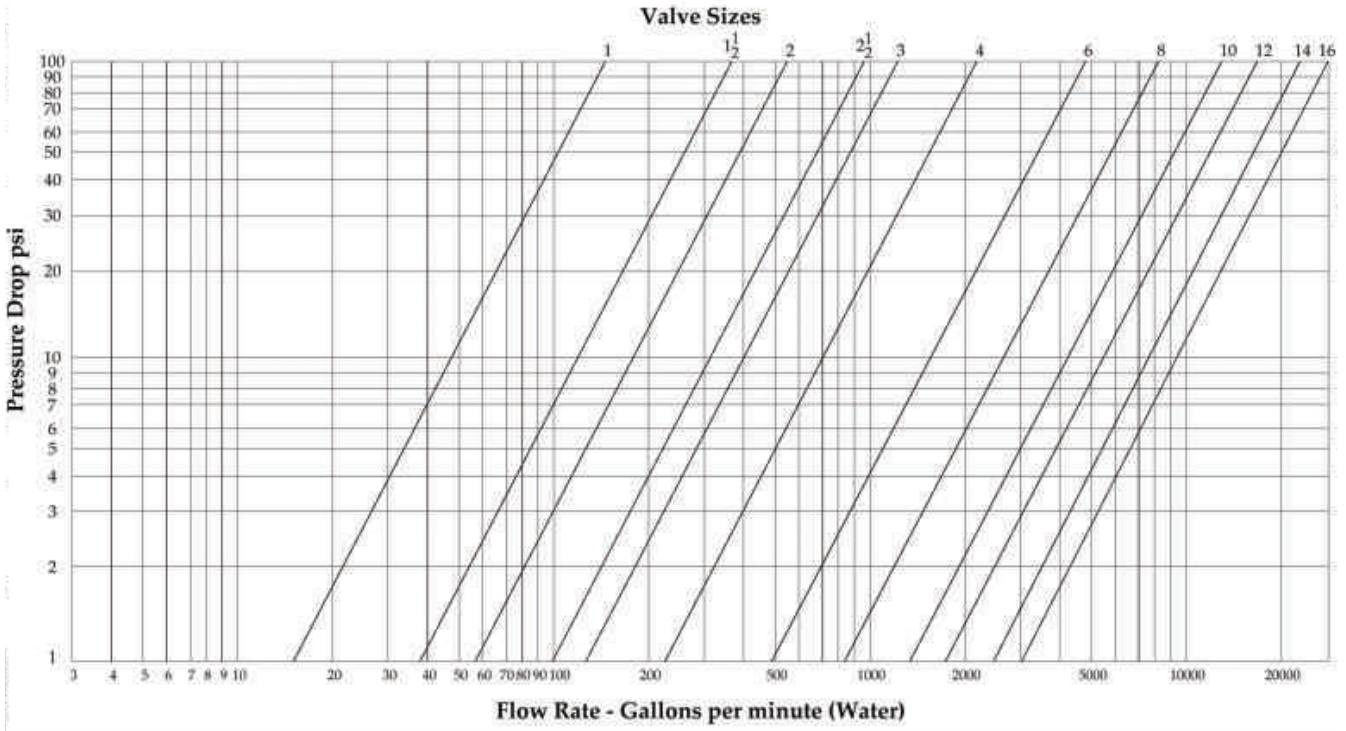
### Application

### Quick Sizing & Flow Capacity Chart

# BTA 1011

# ‘Actrol’ Flow Rate Chart

## Pressure Drop Chart BTA-11 (Globe)




## Flow Data BTA-11 (Globe)

| Valve Size | Inches | 1" | 1.1/2" | 2" | 2.1/2" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm. | 25 | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 |
| **Max. Continuous Flow Rate GPM (Water)** | | 55 | 125 | 208 | 300 | 460 | 800 | 1800 | 3100 | 4900 | 7000 | 8500 | 11000 |
| **Max. Intermittent Flow Rate GPM (Water)** | | 80 | 160 | 260 | 370 | 570 | 1000 | 2300 | 3900 | 6000 | 8600 | 10500 | 14000 |
| **CV Value (Globe)** | | 15 | 40 | 55 | 90 | 125 | 220 | 460 | 840 | 1400 | 1700 | 2350 | 2950 |

- Maximum Continuous flow based on pipe line velocity of 20 ft. per second.
- Maximum intermittent flow based on pipe line velocity of 25 ft. per second.
- The valve CV factor of a valve is the flow rate in USGPM at $60^0$ F that will cause a one psi drop in pressure.
- The factors stated are based on a fully open valve.
- CV factor can be used in the following equations to determine flow (Q) and Pressure Drop (△P)

Q (Flow) = CV $\sqrt{\triangle P}$.
△P (Pressure Drop) = (Q/CV) 2

### Other Products Range :

- Safety & Thermal Relief Valve
- Pressure Reducing/Regulating Valve
- Pressure Reducing & De-Super Heating Station (PRDS)
- Gas Regulator (Self Actuating & Pilot Operated)
- Pneumatic/Motorized Control Valve
- Teflon Lined Products

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# Actrol - Valve Matrix

| | Irrigation | Water works | Fire Protection | Petroleum | Aviation Fuel | Industrial |
|---|---|---|---|---|---|---|
| Pressure Reducing |  |  |  |  |  |  |
| Pressure Relief |  |  |  |  |  |  |
| Rate of Flow Control |  |  | |  |  |  |
| Pump Control |  |  |  | | | |
| Level Control |  |  |  |  |  |  |
| Solenoid Control |  |  |  |  |  |  |
| Hydraulic Check Control |  |  | |  |  |  |
| Altitude Control | |  |  | | |  |
| Surge Anticipation |  |  | | | | |
| Digital Set Stop | | | |  | | |
| Filter Seperator Control | | | | |  | |



Brightech® Liquid Control Solutions
An ISO 9001 Certified Company

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