# Electronic Control Valve

- Pressure control
- Flow control
- Leakage control
- Level control
- Temperature control
- Mixture control at mixing junction

The Model 718-03 Electronic Control Valve combines the advantages of an excellent modulating, line pressure driven, hydraulic control valve with the advantages of electronic control. This valve responds to signals from the electronic controller BERMAD BE (optional), by changing its opening position according to the set values programmed into the controller.
For very low pressure applications, refer to the full powered opening and closing Model 718-03-B

## Features and Benefits

- **Line pressure driven** – Independent operation
- **Solenoid controlled**
  - Low power consumption
  - Wide ranges of pressures and voltages
  - Normally Open, Normally Closed or Last Position
- **Electronic Controller compatible**
  - Local & remote modification of set values
  - Suitable for conventional PLC methods
  - Data logging
- **In-line serviceable** – Easy maintenance
- **Double chamber**
  - Full powered opening (option “B”) and closing
  - Non-slam closing characteristic
  - Protected diaphragm
- **Semi-straight flow** – Smooth flow characteristics
- **Stainless Steel raised seat** – Cavitation damage resistant
- **V-Port Throttling Plug** – Low flow stability
- **Flexible design** – Easy addition of features

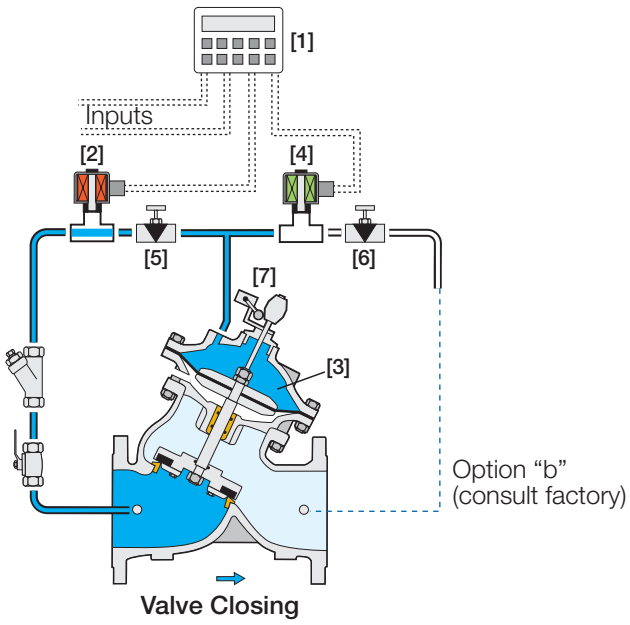
## Major Additional Features

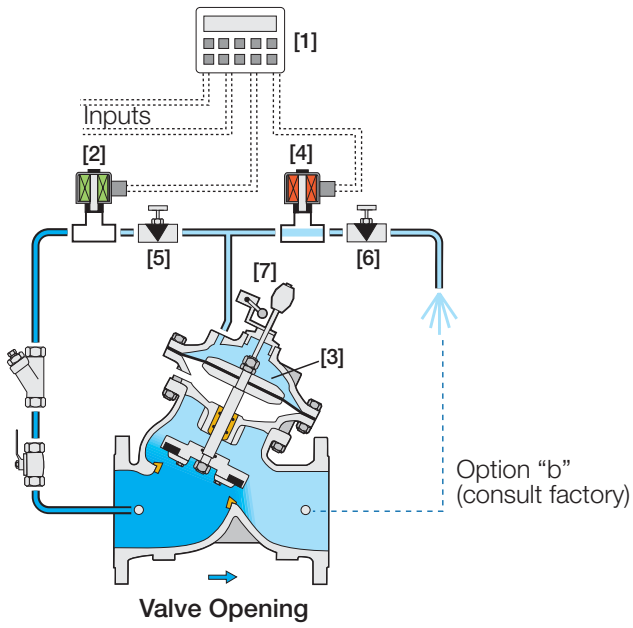
- Full powered opening & closing – **718-03-B**
- Downstream over pressure guard – **718-03-48**
- Relief override – **718-03-3Q**
- Check feature – **718-03-20**
- Flow-over-the-seat (fail-safe close) – **718-03-O**

See relevant BERMAD publications.

## Operation

The Model 718-03 is a Electronic Control Valve equipped with two 2-Way solenoid pilots.
The interaction between the two solenoids determines the required opening position as signaled by the dedicated electronic controller (optional BERMAD BE) **[1]**. The upstream solenoid **[2]** applies pressure to the upper control chamber **[3]** harnessing valve differential pressure to power the diaphragm actuator to a more closed position. The downstream solenoid **[4]** vents upper control chamber pressure resulting in a more open main valve. Needle valves **[5]** & **[6]** control the closing and opening speed of the valve. Valve position can be provided by either an optional limit switch **[7]**, or an analog transducer.
In cases where pipeline water is contaminated (corrosive, debris laden) external control fluid is often used.




## Engineer Specifications

The Electronic Control Valve shall respond to electric commands by changing its opening position to control a measurable characteristic (pressure, flow, level, salinity, temperature and others).

**Main Valve:** The main valve shall be a center guided, diaphragm actuated globe valve of either oblique (Y) or angle pattern design. The body shall have a replaceable, raised, non-threaded, stainless steel seat ring. The valve shall have an unobstructed flow path, with no stem guides, bearings or supporting ribs. The body and cover shall be ductile iron. All external bolts, nuts, and studs shall be Duplex® coated. All valve components shall be accessible and serviceable without removing the valve from the pipeline.

**Actuator:** The actuator assembly shall be double chambered with an inherent separating partition between the lower surface of the diaphragm and the main valve. The actuator assembly shall not consist any closing spring nor spring-like device. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as an integral unit. The stainless steel valve shaft shall be centrally guided by a bearing in the separating partition. The replaceable radial seal disk shall include a resilient seal and shall be capable of accepting a V-Port Throttling Plug by bolting.

**Control System:** The control system shall consist of two 2-Way solenoid pilot valves, isolating cock valves, two needle valve and a filter. All fittings shall be forged brass or stainless steel.
The assembled valve shall be hydraulically tested to customer requirements.

**Quality Assurance:** The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to the standards of NSF, WRAS and others.

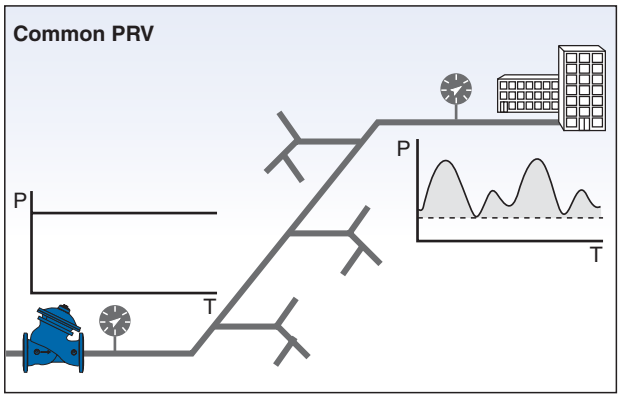
## Electronic Control of a Variable as a Function of Another Variable

This control method is suitable for those applications that require dynamic control of a dependant variable as a programmable function of a governing variable, is required. The system includes a Model 718-03 Electronic Control Valve, a dedicated electronic controller (optional BERMAD BE), and two transducers (one for each variable).
The controller receives continuous inputs from both transducers and corrects the valve opening in response to a comparison with the set value according to a programmed function.
This system can be used for a wide range of applications including:

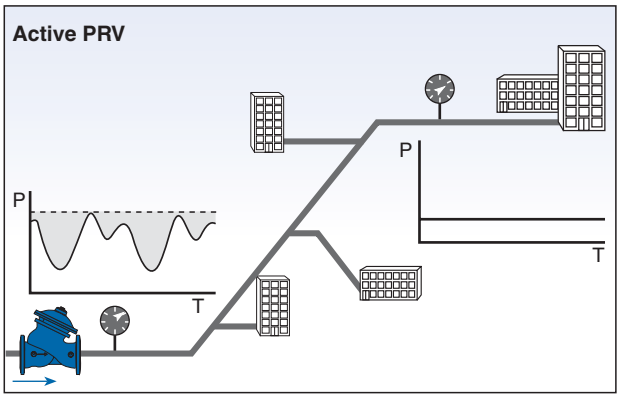
- **Leakage control** – Pressure control as a function of flow (see below)
- **Reservoir applications** – Inlet or outlet flow control as a function of reservoir level
- **Heating and cooling systems** – Flow control as a function of temperature or ΔP

### Leakage Control

Optimum network design requires active adjustment of the system set pressure to the minimum possible level.

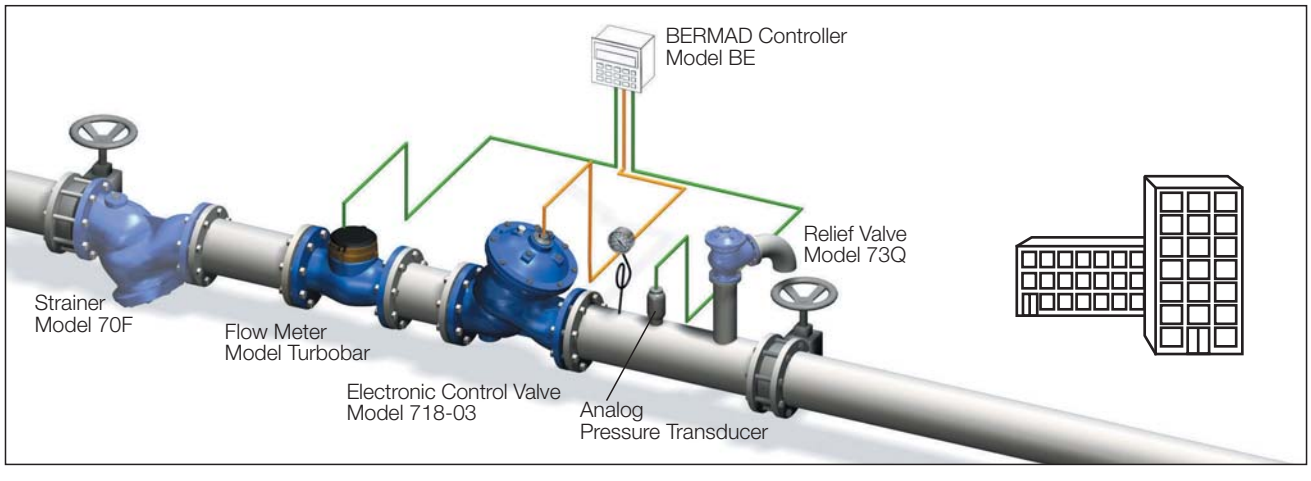



Common PRVs are set to keep the downstream pressure constant, ensuring sufficient pressure at the system critical point during "peak" demand (when line friction head loss is highest).
The shaded area represents the hours and levels when pressure is higher than required.




The Model 718-03 and controller continuously corrects the PRV's set value to ensure the minimum required pressure at the system critical point. As a result, the average network pressure dramatically decreases, reducing system leakage flow, burst, maintenance, energy and chemical costs.
The shaded area represents the hours and levels when leakage is reduced.

### Leakage Control Installation




Data logging and analysis of the distribution network parameter values enable establishing a function for real time adjustment of pressure according to system demand. The flow and pressure transducers continuously transmit to the controller which reacts by adjusting the Model 718-03 according to the pre-established function.

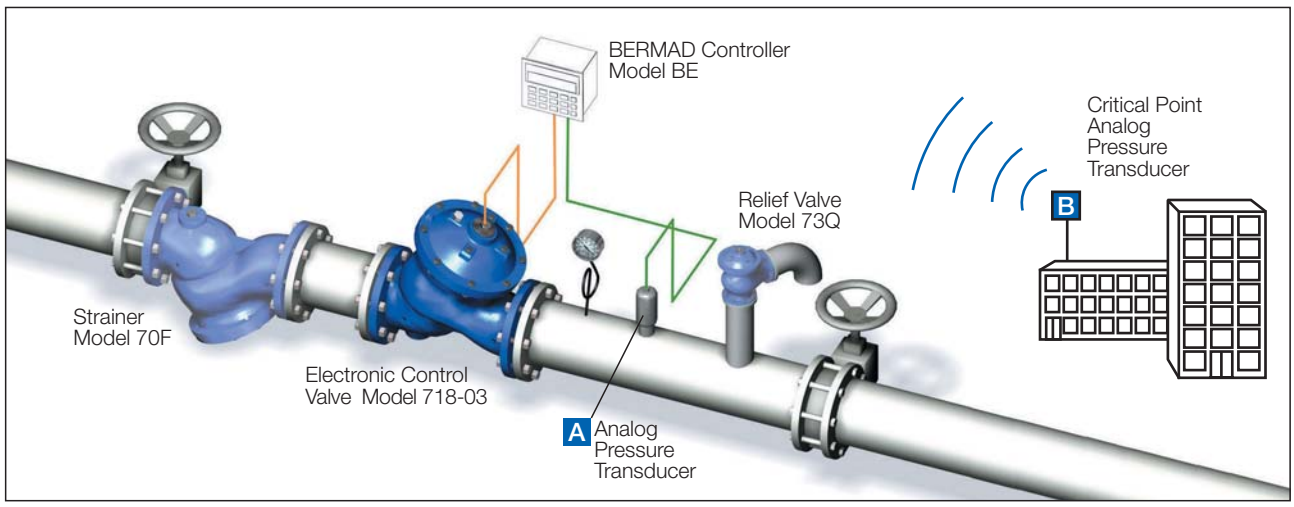
## Electronic Control of a Single Variable

This method is suited for those applications where dynamic control of a variable is required. The system includes a Model 718-03 Electronic Control Valve, a dedicated electronic controller (optional BERMAD BE), and an analog transducer. The controller receives continuous inputs from the analog transducer and corrects the valve opening in response to a comparison with the programmable set value. The set value can be changed either manually on the controller keyboard or remotely through PC, SMS or any other communication methods.

This system can be used for a wide range of applications including:

- **Pressure control** (see below)
- **Flow control**
- **Level control**

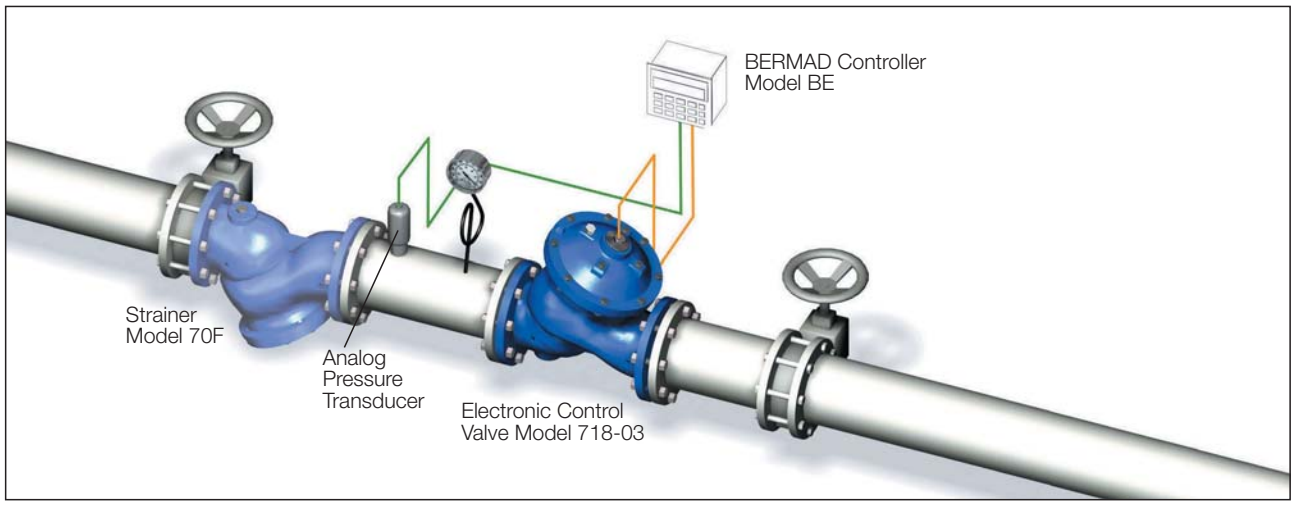
### Pressure Reducing




Installing the pressure transducer downstream from the valve provides a pressure reducing feature.
Either of two methods can be applied:

- Local pressure control as transmitted by pressure transducer **A**.
- Remote pressure control as transmitted by critical point pressure transducer **B**.

### Pressure Sustaining



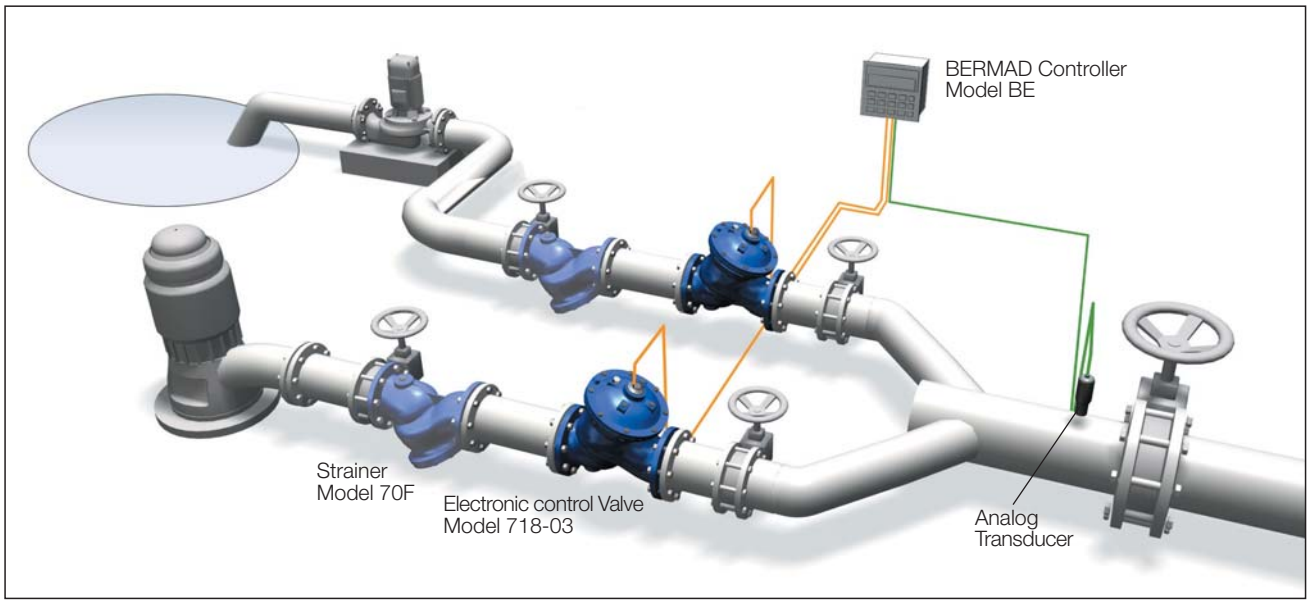

Installing the pressure transducer upstream from the valve provides a pressure sustaining feature:

- Sustaining pump discharge pressure
- Sustaining pump suction pressure
- Sustaining circulated discharge pressure
- Sustaining reservoir or canal level

## Electronic Control of Mixing Junctions

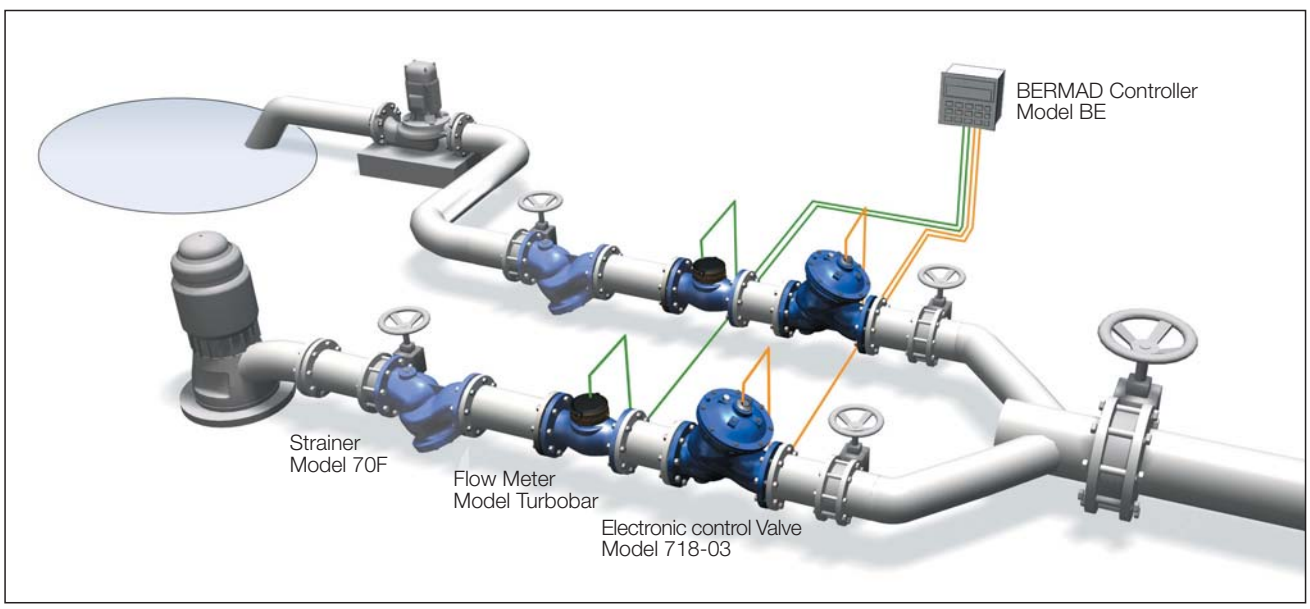
This method is suited for dynamic control of two parallel valves controlling the two separate sources of a mixing junction. These systems include two Model 718-03 Electronic Control Valves, and a dedicated electronic controller (optional BERMAD BE). Two types of systems are used.

### Type A - Sampling the Mixture




The controller receives continuous inputs from the analog transducer (conductivity, salinity, temperature etc.). and corrects, in real-time, the opening of each valve in comparison with the programmed value.

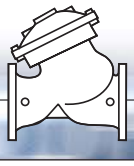
### Type B - Sampling the Sources




The controller receives continuous inputs from both flow transducers and corrects, in real-time, the opening of each valve, thus maintaining constant flow ratio between the two sources to achieve the desired result.

- Combination of both **Types A and B** is available also

# BERMAD Waterworks



## 700 Series

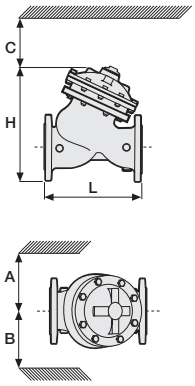
### Model 718-03

## Technical Data

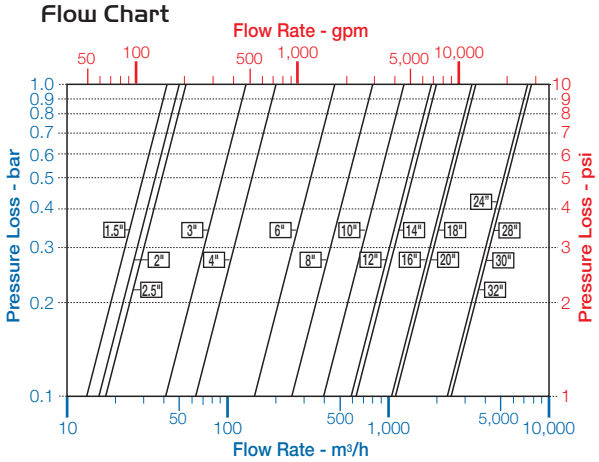
### Dimensions and Weights

| Size | | A, B | | C | | L | | H | | Weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | kg | lbs |
| 40 | 1½" | 350 | 14 | 180 | 7 | 205 | 8.1 | 239 | 9.4 | 9.1 | 20 |
| 50 | 2 | 350 | 14 | 180 | 7 | 210 | 8.3 | 244 | 9.6 | 10.6 | 23 |
| 65 | 2½" | 350 | 14 | 180 | 7 | 222 | 8.7 | 257 | 10.1 | 13 | 29 |
| 80 | 3" | 370 | 15 | 230 | 9 | 250 | 9.8 | 305 | 12.0 | 22 | 49 |
| 100 | 4" | 395 | 16 | 275 | 11 | 320 | 12.6 | 366 | 14.4 | 37 | 82 |
| 150 | 6" | 430 | 17 | 385 | 15 | 415 | 16.3 | 492 | 19.4 | 75 | 165 |
| 200 | 8" | 475 | 19 | 460 | 18 | 500 | 19.7 | 584 | 23.0 | 125 | 276 |
| 250 | 10" | 520 | 21 | 580 | 23 | 605 | 23.8 | 724 | 28.5 | 217 | 478 |
| 300 | 12" | 545 | 22 | 685 | 27 | 725 | 28.5 | 840 | 33.1 | 370 | 816 |
| 350 | 14" | 545 | 22 | 685 | 27 | 733 | 28.9 | 866 | 34.1 | 381 | 840 |
| 400 | 16" | 645 | 26 | 965 | 38 | 990 | 39.0 | 1108 | 43.6 | 846 | 1865 |
| 450 | 18" | 645 | 26 | 965 | 38 | 1000 | 39.4 | 1127 | 44.4 | 945 | 2083 |
| 500 | 20" | 645 | 26 | 965 | 38 | 1100 | 43.3 | 1167 | 45.9 | 962 | 2121 |

Data is for Y-pattern, flanged, PN16 valves
Weight is for PN16 basic valves
"C" enables removing the actuator in one unit
"L", ISO standard lengths available
For more dimensions and weights tables, refer to Engineering Section




### Flow Chart




Data is for Y-pattern, flat disk valves
For more flow charts, refer to Engineering Section

### Main Valve

**Valve Patterns:** "Y" (globe) & angle
**Size Range:** 1½–32" (40-800 mm)
**End Connections (Pressure Ratings):**
**Flanged:** ISO PN16, PN25
(ANSI Class 150, 300)
**Threaded:** BSP or NPT
**Others**: Available on request
**Working Temperature:**
Water up to 80°C (180°F)
**Standard Materials:**
**Body & Actuator:** Ductile Iron
**Internals:**
Stainless Steel, Bronze & coated Steel
**Diaphragm:**
NBR Nylon fabric reinforced
**Seals:** NBR
**Coating:**
Fusion Bonded Epoxy, RAL 5005 (Blue)
NSF & WRAS approved or Electrostatic Polyester Powder, RAL 6017 (Green)

### Control System

**Standard Materials:**
**Accessories:**
Bronze, Brass, Stainless Steel & NBR
**Tubing:** Copper or Stainless Steel
**Fittings:** Forged Brass or Stainless Steel
**Solenoid Standard Materials:**
**Body:** Brass or Stainless Steel
**Elastomers:** NBR or FPM
**Enclosure:** Molded epoxy
**Solenoid Electrical Data:**
**Voltages:**
(ac): 24, 110-120, 220-240, (50-60 Hz)
(dc): 12, 24, 110, 220
**Power Consumption:**
(ac): 30 VA, inrush; 15 VA (8W), holding or 70 VA, inrush; 40 VA (17.1W), holding
(dc): 8-11.6W

Values might vary according to specific solenoid model

### Solenoid Selection

| Valve Size | Solenoid Model | | | |
|---|---|---|---|---|
| | 330 | 311 | 281 | 404 |
| 1½-8" (40-200 mm) | ■ | | | |
| 1½-6" (40-150 mm) | | ■ | | |
| 10-20" (250-500 mm) | | | ■ | |
| 8-20" (200-500 mm) | | | | ■ |
| 24 -32" (600-800 mm) | | | ■ | |
| 24 -32" (600-800 mm) | | | | ■ |

PN 16 PN 25

The valve control loop consists of two solenoids

| Solenoid Location | Main Valve Position | | |
|---|---|---|---|
| | N.O. | N.C. | L.P. |
| Upstream (inlet) | N.C. | N.O. | N.C. |
| Downstream (outlet) | N.O. | N.C. | N.C. |

## How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

| Sector | Size | Primary Feature | Additional Feature | Pattern | Body Material | End Connections | Coating | Voltage & Position | Tubing & Fittings | Additonal Attributes |
|---|---|---|---|---|---|---|---|---|---|---|
| WW | 6" | 718 | 03 | Y | C | 16 | EB | 4AP | CB | VI |

**Sector:** WW — Waterworks

**Size:** 6" — 1½ - 32"

**Primary Feature:** 718 — Electronic Control

**Additional Feature:** 03

| | |
|---|---|
| No Additional Feature | 00 |
| Closing and Opening Speed Control | 03 |
| Automatic Regulation Override | 09 |
| Check Valve | 20 |
| Solenoid Controlled & Check Valve | 25 |
| Multi-Setting Levels - Electrically Selected | 45 |
| Downstream Over Pressure Guard | 48 |
| Hydraulic Control | 50 |
| Solenoid Controlled | 55 |
| Electric Override | 59 |

Multiple choices permitted

**Pattern:** Y

| | |
|---|---|
| Oblique (up to 20") | Y |
| Angle (up to 18") | A |
| Globe (24-32" only) | G |

**Body Material:** C

| | |
|---|---|
| Ductile Iron Standard | C |
| Cast Steel | S |
| St. Steel 316 | N |
| Nickel Alumin. Bronze | U |

**End Connections:** 16

| | |
|---|---|
| ISO-16 | 16 |
| ISO-25 | 25 |
| ANSI-150 | A5 |
| ANSI-300 | A3 |
| JIS-16 | J6 |
| JIS-20 | J2 |

**Coating:** EB

| | |
|---|---|
| Epoxy FB Blue | EB |
| Polyester Green | PG |
| Polyester Blue | PB |
| Uncoated | UC |

**Voltage & Position:** 4AP

| | |
|---|---|
| 24VAC/50Hz - N.C. | 4AC |
| 24VAC/50Hz - N.O. | 4AO |
| 24VAC/50Hz - L.P. | 4AP |
| 24VDC - N.C. | 4DC |
| 24VDC - N.O. | 4DO |
| 24VDC - L.P. | 4DP |
| 220VAC/50-60Hz N.C. | 2AC |
| 220VAC/50-60Hz N.O. | 2AO |

**Tubing & Fittings:** CB

| | |
|---|---|
| Copper Tubing & Brass Fittings | CB |
| Plastic Tubing & Brass Fittings | PB |
| St. St. 316 Tubing & Fittings | NN |

**Additonal Attributes:** VI

| | |
|---|---|
| Powered opening & closing | B |
| Valve Position Indicator | I |
| V-Port Throttling Plug | V |
| Large Control Filter | F |
| Electric Limit Switch | S |
| Valve Position Transmitter | Q |
| Flow-Over-the-Seat | O |
| St. St. 316 Control Accessories | N |
| St. St. 316 Internal Trim (Closure & Seat) | T |
| St. St. 316 Actuator Internal Assembly | D |
| Delrin Bearing | R |
| Viton Elastomers for Seals & Diaphragm | E |

Multiple choices permitted

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