BERMAD Waterworks

Hydraulic Control Valves | 700 & 800 Series

CE

Water Control Solutions

BERMAD

BERMAD Waterworks

About Bermad

Founded in 1965, BERMAD knows the value of a single drop of water and how best to reap its full advantage. Today BERMAD serves global customers in a wide range of fields, anywhere in the world.

BERMAD – Provider of Solutions
Combining its expertise, leading-edge technology and precision engineering, BERMAD provides customized solutions for the control and management of water/fluid treatment and supply.

Main areas of activity include:

Waterworks – National, regional and municipal distribution networks, high-rise buildings and luxury hotels, water systems at industrial facilities, power stations.

Fire Protection – Factories and industrial yards, high-rise and public buildings, hazardous zones at oil and gas facilities, power plants, off-shore installations, aviation and marine environments, refineries.

Petroleum – Petroleum distribution terminals, tank farms.

Irrigation – Main networks for agricultural projects, purified waste water projects, central control-head and infield networks, greenhouses, commercial and residential gardening.

Water metering – Bulk in water supply systems, domestic water metering, remote read-out capabilities, pre-payment systems.

Efficiency and Quality – BERMAD's Core Competencies
BERMAD's workforce includes over 450 high skilled personnel. Computerized systems (Oracle ERP) enable full control and management at all levels of production, marketing and shipment, while ensuring rapid turnaround and always-on-schedule delivery. Strict Quality Assurance keeps BERMAD in compliance with ISO 9001-2000 and a range of international quality and ecology standards.

BERMAD – A Worldwide Presence
With 9 subsidiaries throughout the world, and operations in over 80 countries on 5 continents, BERMAD has a formidable global presence. Its worldwide customer training facilities and parts distribution networks ensure uninterrupted customer service anywhere in the world.

Precision Engineering – A BERMAD Commitment
Comprehensive fluid management systems are only as effective as their smallest component. That's why BERMAD systems are based on components designed, developed and manufactured in-house, with the ability to adapt solutions to any customer need; constantly integrating the latest, most reliable manufacturing techniques, and providing every customer with the most comprehensive commercial and technical support in the world.

BERMAD - a global leader in managing the world's most precious resources

BERMAD 700 & 800 Series, Control Valves for Waterworks & Industrial Applications

At the heart of BERMAD's waterworks activities, covering every water supply and distribution system application, is the BERMAD 700 Series line of control valves and its high-pressure version, the 800 Series. Developed by BERMAD's creative engineering and based on cutting-edge technologies, these Series offer a variety of control features from pressure reducing, relief and sustaining; through level, pump, surge, flow and burst control; to solenoid and electronic control. Optimally designed and expertly integrated by BERMAD engineers into systems providing just the right models and configurations, the BERMAD 700 & 800 Series control valves meet every national, regional, and municipal water supply need, as well as the special needs of industrial facilities, high-rise and public buildings, and luxury hotels.

For National, Regional and Municipal Distribution Networks, system design and operation starts with careful examination of expected flow and pressure ranges, the parameters that determine major system components, including pump stations, reservoirs, supply lines, water treatment plants and desalination systems. These components are then integrated into pressure zones with leakage reduction means, to ensure a continuous, reliable and smooth supply of water through an efficient and cost-effective network.

For Industrial Facilities, a reliable, uninterrupted supply of water is vital. When production processes rely on a high flow of high-quality water at a constant flow and temperature, any interruption or deviation can be devastatingly costly. Where fire hazards are in close proximity to workers, expensive equipment, or residential areas, absolutely reliable large-scale, self-supply, backup systems are a must.

BERMAD Waterworks

High-Rise Buildings have unique requirements, which must be taken into account when designing and installing their water supply and distribution systems.
BERMAD solutions give careful consideration to issues such as:

- While single source supply is common, supply cut-off is unacceptable.
- Water damage in a high-rise building can be extremely costly.
- Valves are often located in close proximity to prestigious residential and office space.
- The main supply line is exposed to increasingly high head at lower zones.
- A multiplicity of systems requires integration and control.
- Maintenance personnel are not always skilled with control valves.

Luxury Hotels have all the special requirements of high-rise buildings, with the additional requirement of catering to high-water-consumption facilities such as jacuzzis, spas, swimming pools, artificial waterfalls and fountains. These systems typically handle aggressive water with corrosive materials, while needing to operate very accurately under low-pressure conditions. Any system failure is a breach of customer service, which in the hospitality industry is totally unacceptable.

All the above systems require a multitude of valves with a variety of control features, construction materials and pressure ratings. BERMAD's double-chambered 700 and 800 Series control valves are built from optimal materials to provide long-term operating reliability under extremes of pressure, while allowing easy inline maintenance. The culmination of BERMAD's experience and know-how, the 700 and 800 Series ensures a smooth and reliable water supply, with efficient and integrated system operation backed by BERMAD's professional engineering support.

BERMAD is a world leader in its field with major market shares in North and South America, Europe, Asia, Africa, and Australia. The breadth of BERMAD's activities, through its subsidiaries, representatives and customers, allows us to stay close to our markets, continuing to increase and develop one of our most important assets - the accumulated know-how covering a range of systems, applications, and ideal solutions customized to every need.

This catalog is intended to be a useful working tool for project investors, consulting engineers, construction supervisors, installation contractors, and maintenance personnel.

Basic Valve

The basic Model 700/705 diaphragm actuated, and the 800/805 piston actuated valves are hydraulically operated globe valves in either the standard oblique (Y) or angle pattern design.
700 series valves are available in two basic configurations:
700ES – Anti-cavitation valves, designed to operate under difficult conditions while ensuring minimum cavitation damage and noise.
700EN – High capacity valves, full ported and designed to deliver high flow with minimum head loss.
Each valve comprises two major components: the body seat assembly and the actuator assembly.
The actuator assembly is unitized and is removable from the body as an integral unit. It consists of both an upper and a lower control chamber. Each basic valve can easily be configured on-site, either as a single chamber control valve (Model 705/805), or a double chamber control valve (Model 700/800). The shaft sub-assembly, in both single and double chambered versions, is center guided, providing an unobstructed seat area.
The Model 700/800 Basic double chambered valve operation is independent of valve differential pressure since the line pressure actually serves as the actuator differential pressure. This develops maximum power, ensuring immediate valve response. The upper control chamber is pressurized to close, and vented to open the valve. The lower control chamber is usually vented to the atmosphere, but can also be pressurized to power the valve open.
The Model 705/805 Basic Valve uses valve differential pressure to power the actuator open or closed. The lower control chamber, which serves to cushion the closing of the valve, is exposed to downstream pressure through a fixed orifice connected to the downstream side of the valve. The pressure in the upper control chamber varies, usually resulting from the combined action of a regulating pilot and a fixed orifice. This varying pressure modulates the valve to open or close.
The Basic Hydraulic Valve is available in a wide range of materials, sizes, pressure ratings, and end connections. Single or double chambered versions are used as the main valve in all 700 and 800 Series applications.

Diaphragm Actuated Valve

Piston Actuated Valve

DN 600 - DN 800 (24”-32”)

Large Diameter Hydraulic Control Valve
The Best of the Biggest

BERMAD DN 600, DN 700, DN 750 & DN 800 700 Series Control Valves are hydraulically operated, diaphragm actuated globe pattern valves. The valve is comprised of two major components, the body assembly and the actuator assembly. The actuator assembly is removable from the body as an integral unit. It consists of two control chambers, an upper and a lower. The actuator can be converted on-site from single to double-chambered actuator and vice-versa according to the required control function.
Independent Flow Check - the actuator can be equipped with an independent action, non-slam check feature.

Applications

- Large-scale pumping systems
- National and municipal distribution networks
- Reservoir and dam level control
- Large-scale industrial applications
- All 700 series applications: Pressure-reducing, Pressure-sustaining, Level-control etc.

13,000 m3/h Pressure-Reducing & Sustaining Station

IQNet – ISO 9001-2000	INTERNATIONAL	Certified quality system
WRAS Water Regulations Advisory Scheme	WRAS, UK	The product complies with the Water Regulation Advisory Scheme of UK and BS 6920
DVGW Zertifizierungsstelle (in process)	DVGW, Germany	Compliance with the European Standard EN 1074 – Valves for water supply.
AFNOR CERTIFICATION Groupe AFNOR	ACS, France	Tests are based on the French standard XPP 41-250-1 and -2 adapted. Acceptance criteria are defined in the French circular dated 25 Nov 2002.
GOSSTANDART OF RUSSIA	GOST, Russia	The product complies with the Russian Federation Std. GOST R 50460
ÖVGW	ÖVGW, Austria	The product complies with the criteria of the Austrian Std. ÖNORM B 5014 and EN 1074 – Valves for water supply.
BELGAQUA	BELGAQUA, Belgium	The product complies with the Belgian Standards for materials in contact with drinking water
NSF	NSF 61, USA	The product complies with the NSF/ ANSI 61 Std. – Valves for Water Supply

[1] - Double-Chambered Actuator

- Actuator assembly can be removed as one integral unit
- Simple on-site conversion to single-chambered
- Same valve body accepts both actuators (Diaphragm and Piston)

[2] - Diaphragm Assembly

The flexible, unshaped, nylon-reinforced diaphragm is supported over the majority of its surface. Diaphragm load is limited to only the stretching forces applied to the active area.

[3] - Piston Assembly

Vented lower chamber provides differential piston principle of operation and air cushioning. Constant active area together with the sturdy construction and unobstructed long travel ensures stable and accurate regulation. The “shaft diameter” central guiding and the dynamic piston-seal reduce friction and jamming risk.

[4] - Cover Plug

Enables on-site retrofit of:

- Indicator [4A]: For visual valve position indication
- Limit Switch: For signaling valve position.
- Position Transmitter: For analog transmission of valve position.

[5] - Inherent Separation Partition

The inherent separation includes the bearing [5A], which provides complete central guiding for the valve moving assembly. The separation partition separates the lower control chamber from the flow in both the single-chambered, and the double-chambered configurations.

[6] - Spring

Required for single-chambered configurations. Superfluous for double-chambered configurations (unless check feature is required).

[7] - Seal Disc Assembly

Self-aligning, seal disk assembly provides balanced, free movement and a resilient seal for perfect, drip-tight sealing. It enables using several variations of seals and plugs for a wide range of applications and working conditions.

[8] - Seat

Stainless steel, raised, replaceable in-line and on-site.

[9] - Wide Body (“Y” or Angle pattern)

Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation. Full bore, valve port area clear of obstructions; no ribs or stem guides. Increases capacity by 25% over standard globe valves.

[10] - End Connections

Conforms to pressure ratings and standards of: ISO, ANSI, JIS, and others.

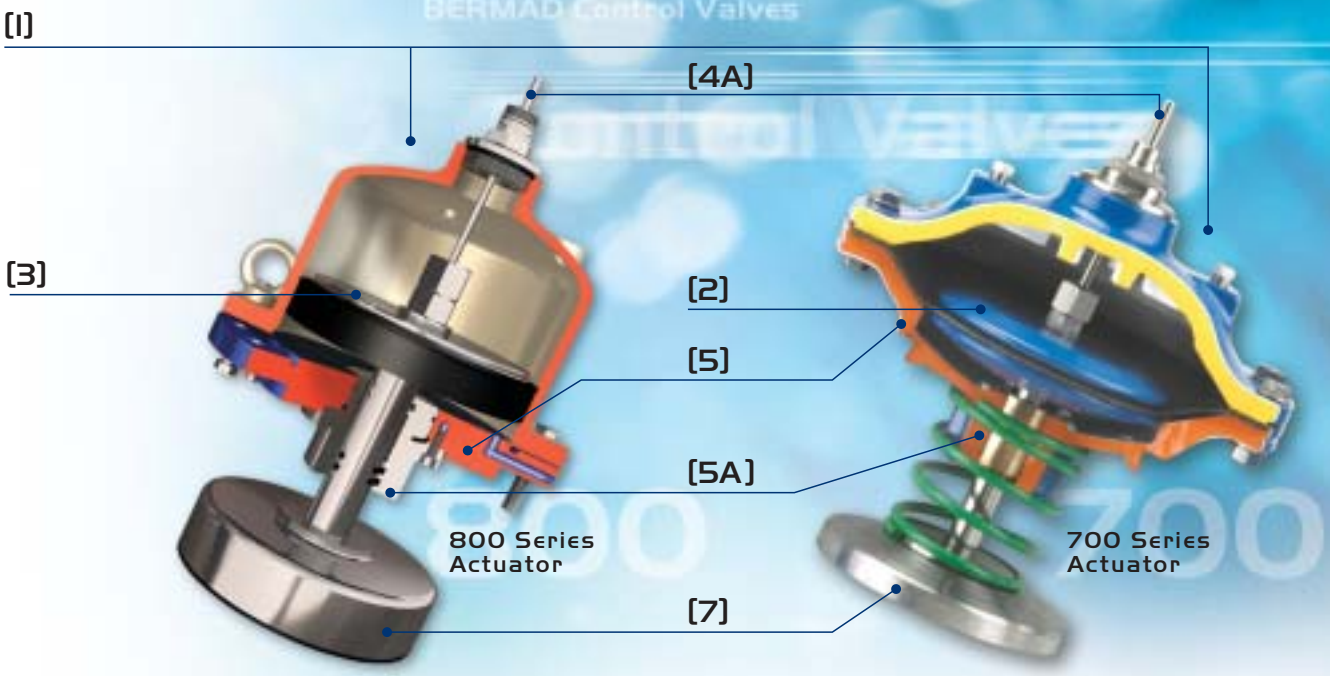
Valve Plug Options

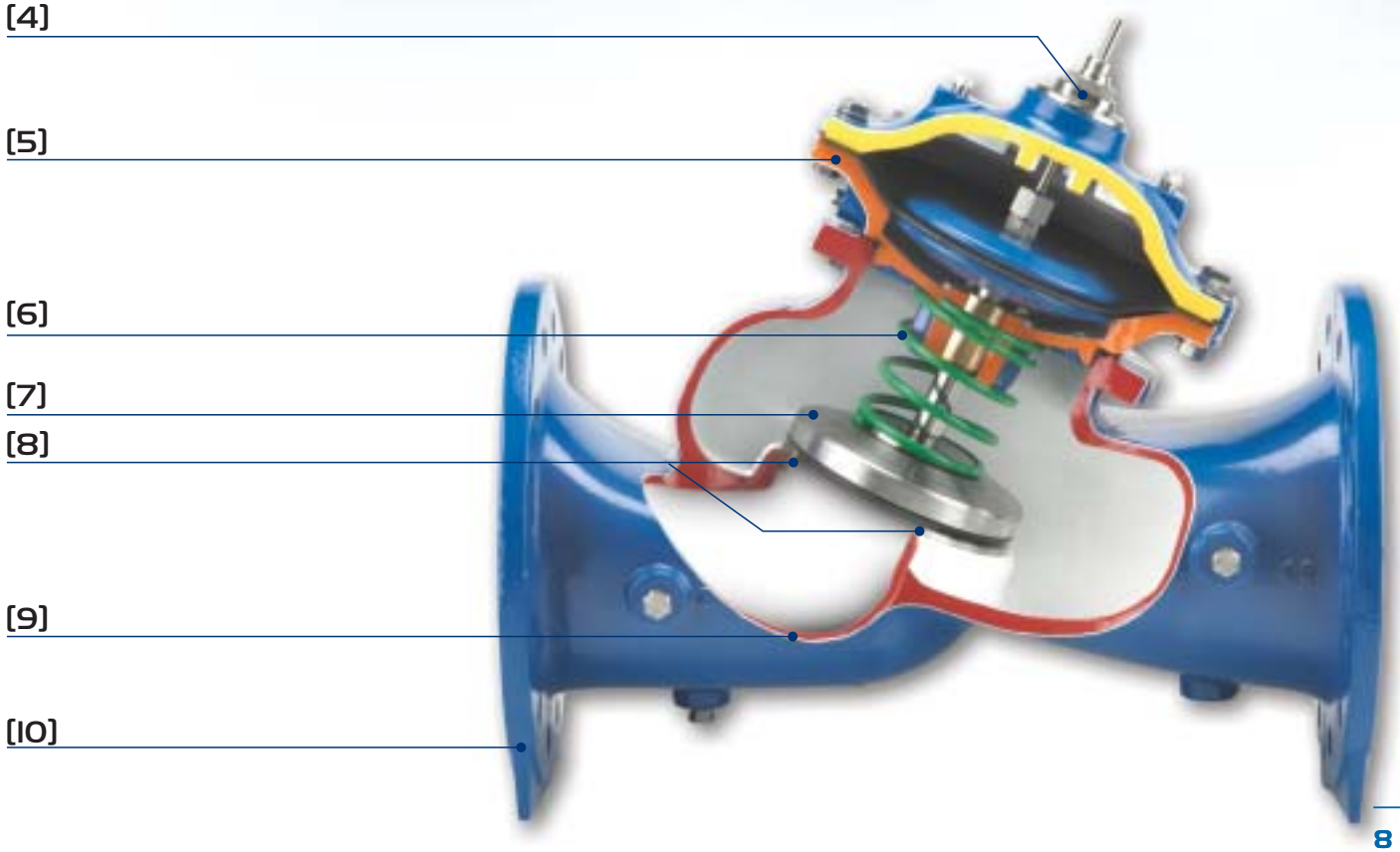
Flat disc

“Quick opening plug”: Standard plug provides high flow and quick response.

Throttling Plug

A throttling plug is used in order to provide more accurate, stable and smooth response for pressure and flow regulation while reducing noise and vibration. Two types are available:
“U” shape (standard) and “V” shape.


[1]
[4A]
[3]
[2]
[5]
[5A]
800 Series
Actuator
700 Series
Actuator
[7]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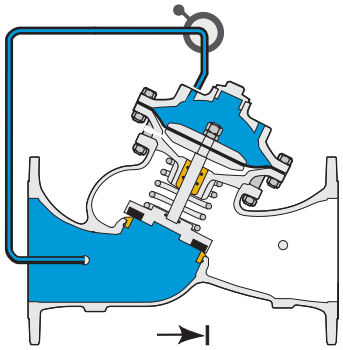
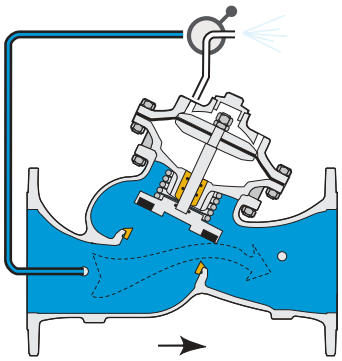
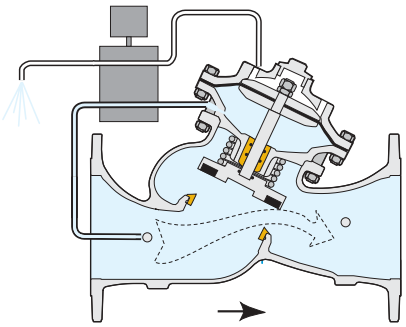
On-Off Modes



Closed Position
Line pressure applied to the upper control chamber of the valve creates a superior force that moves the valve to the closed position and provides drip-tight sealing.



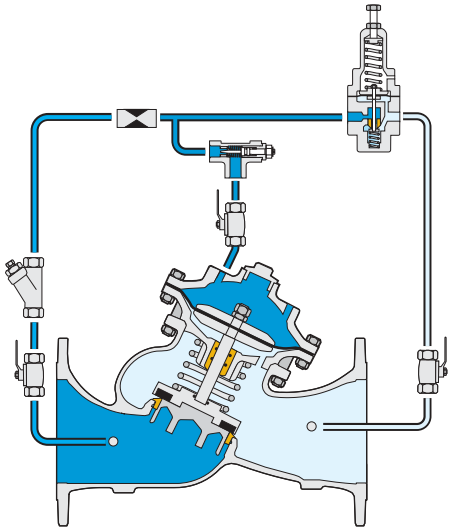
Open Position
Discharging the pressure in the upper control chamber to atmosphere or some other lower pressure zone causes the line pressure acting on the seal-disk to move the valve to the open position.



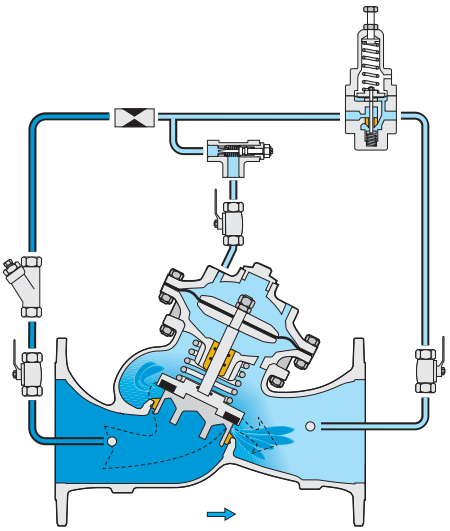
Powered Open Position
Line pressure is applied to the lower control chamber as pressure in the upper control chamber is vented. This, together with the line pressure acting on the seal-disk, creates a force that powers the valve to the open position.

Modulating Mode

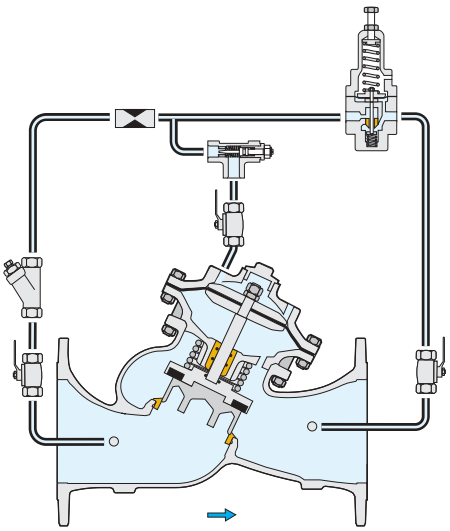
Pressure Reducing



Closed Position
The closed adjustable pilot valve traps line pressure in the upper control chamber. The resulting superior force moves the valve to the fully closed position and provides drip-tight sealing.

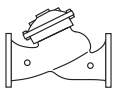


Modulating Position
The pilot valve senses line pressure changes and opens or closes accordingly. It controls the accumulated pressure in the valve upper control chamber, causing main valve to modulate to an intermediate position and maintain the preset pressure value.



Open Position
The open pilot valve releases line pressure from the upper control chamber. The line pressure acting on both the lower control chamber and the seal-disk, moves the valve to the open position.

* All text written above is valid for both 700 and 800 Series.



700 ES Series

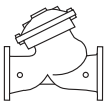
Available Sizes & Patterns
- DN 80 - DN 300 (3" - 12") - Y Pattern

Pressure Rating
- PN 25 (according to connection rating)

Connection Standard
- Flanged: ISO 7005-2 (ISO 10, 16 & 25)

Water Temperature
- Up to 80ºC

Standard Materials
- **Main valve body and cover**
  Ductile iron to EN 1563 or ASTM A-536
- **Main valve internals**
  Stainless steel, bronze & epoxy coated steel
- **Control Trim**
  Stainless steel, Brass, bronze accessories
  Stainless steel 316 fittings & tubing
- **Elastomers**
  Synthetic Rubber
- **Coating**
  Blue fusion bonded epoxy



700 EN Series

Available Sizes & Patterns
- DN 50 - DN 300 (2" - 12") - Y Pattern

Pressure Rating
- PN 25 (according to connection rating)

Connection Standard
- Flanged: ISO 7005-2 (ISO 10, 16 & 25)

Water Temperature
- Up to 80ºC

Standard Materials
- **Main valve body and cover**
  Ductile iron to EN 1563 or ASTM A-536
- **Main valve internals**
  Stainless steel, bronze & epoxy coated steel
- **Control Trim**
  Stainless steel, Brass, bronze accessories
  Stainless steel 316 fittings & tubing
- **Elastomers**
  Synthetic Rubber
- **Coating**
  Blue fusion bonded epoxy

700 Series

Available Sizes & Patterns
- DN 40 - DN 500 (1 1/2" - 20") - Y Pattern
- DN 40 - DN 450 (1 1/2" - 18") - Angle
- DN 600 - DN 800 (24" - 32") - Globe

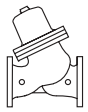
Connection Standard
- Flanged: ISO 7005-2 (ISO 10, 16 & 25)
- Threaded: BSP (Rp ISO 7/1) or NPT (DN 40-DN 80)

Water Temperature
- Up to 80ºC

Working pressure
- ISO PN 16: 16 bar
- ISO PN 25: 25 bar

Standard Materials
- **Main valve body and cover**
  Ductile iron to EN 1563 or ASTM A-536
- **Main valve internals**
  Stainless steel, bronze & epoxy coated steel
- **Control Trim**
  Brass, bronze accessories
  Stainless steel 316 fittings & tubing*
- **Elastomers**
  Synthetic Rubber
- **Coating**
  Blue fusion bonded epoxy

* (for DN40 to DN350)



800 Series

Available Sizes & Patterns
- DN 40 - DN 500 (1 1/2" - 20") - Y Pattern
- DN 40 - DN 450 (1 1/2" - 18") - Angle

Connection Standard
- Flanged: ISO 7005-1(ISO 10, 16, 25 & 40)

Water Temperature
- Up to 80ºC

Working pressure
- ISO PN 16: 16 bar
- ISO PN 25: 25 bar
- ISO PN 40: 40 bar

Standard Materials
- **Main valve body**
  Carbon steel to EN 10083-1or ASTM A-216-WCB
- **Valve cover (piston cylinder)**
  Stainless steel or bronze
- **Main valve internals**
  Stainless steel and bronze
- **Control Trim**
  Brass, bronze accessories
  Stainless steel 316 fittings & tubing
- **Elastomers**
  Synthetic Rubber
- **Coating**
  Blue fusion bonded epoxy

Pressure-Reducing Valves

Establishing various pressure zones is one of the most common means to achieve balance in water transmission and distribution networks. Pressure-Reducing Valves (PRV) “force” the dynamic parameters of the supply system into a constant predetermined delivery pressure. “Active PRV”, through definition of minimum required pressure at each pressure zone’s critical point, enables continuous readjustment of delivery pressure. This allows the system to work at a lower average pressure.

Model 720-ES-NVI

Model 720-ES-NVI

The Model 720-ES-NVI Pressure-Reducing Valve is a hydraulically operated, diaphragm-actuated, control valve that reduces higher upstream pressure to lower constant downstream pressure regardless of fluctuating demand or varying upstream pressure.

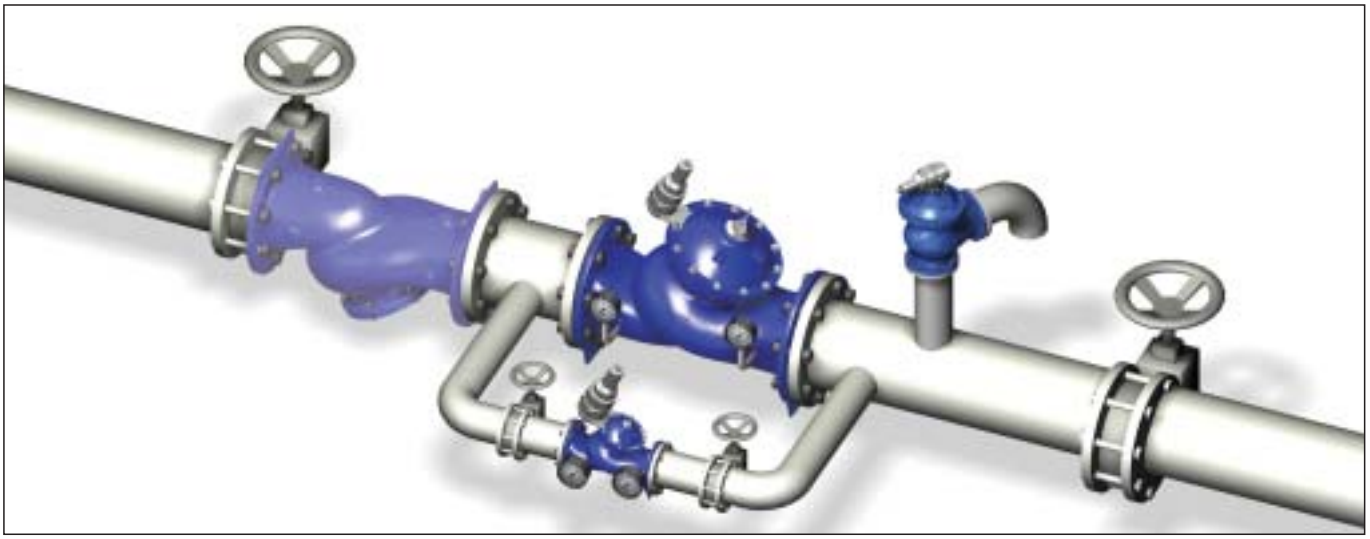
Model 820

Model 820

The Model 820 piston-actuated Pressure-Reducing Valve enables operation at higher upstream pressures. It extends the pressure-rating range upper-limit to 40 bar (600 psi).

Applications

- Flow and leakage reduction
- Cavitation damage protection
- Throttling noise reduction
- Burst protection
- System maintenance savings



Proportional Pressure-Reducing Valves

High differential pressure along supply lines and across valves represents major problems in distribution systems.

- Serial pressure-reduction - Prevents downhill line from exceeding its pressure rating.
- Primary pressure-reduction - Protects second stage valves against cavitation damage and from high throttling noise levels.

Proportional Pressure-Reducing Valves provide an elegant, cost-effective and simple answer to these problems.

Model 720-PD-ES-VI

Model 720-PD-ES-VI

The Model 720-PD-ES-VI Proportional Pressure-Reducing Valve is a hydraulically operated, diaphragm-actuated, control valve that reduces higher upstream pressure to lower downstream pressure at a fixed ratio.

Model 820-PP

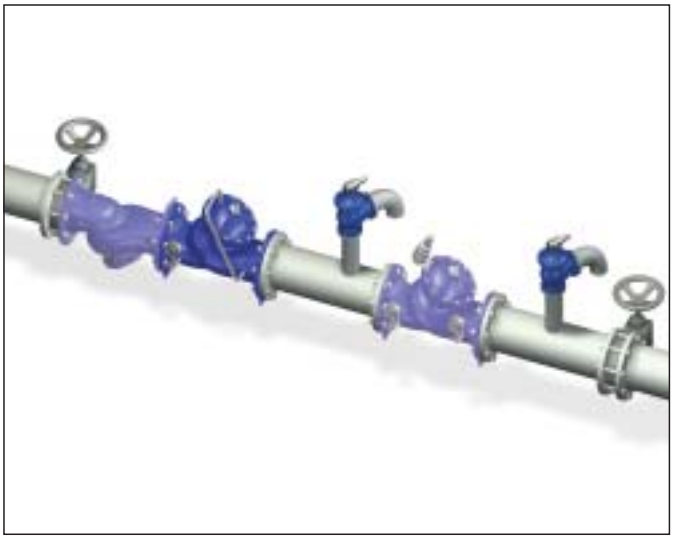
Model 820-PP

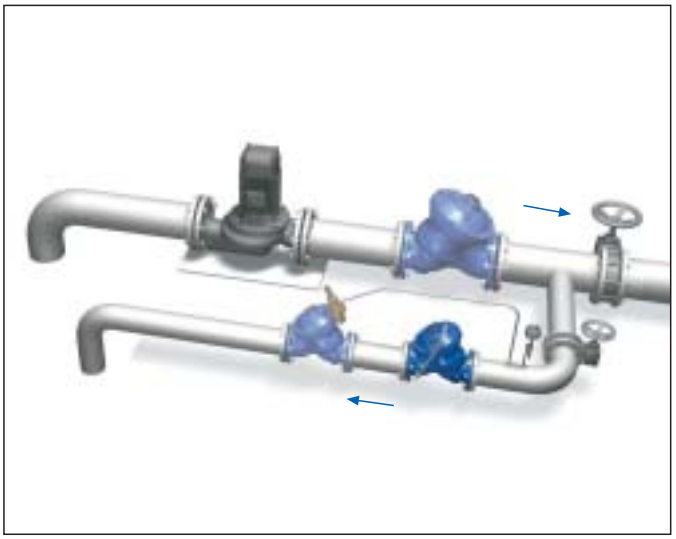
The Model 820-PP piston-actuated Proportional Pressure-Reducing Valve enables operation at higher upstream pressures.
It extends both the valve pressure-rating range upper-limit to 40 bar (600 psi) and the reduction fixed ratio selection.

Applications

- Long downhill lines
- Serial pressure-reduction
- Leakage and burst protection
- High differential pressure systems
- Protection against cavitation damage
- Throttling noise reduction

Note: see reduction ratio tabels at ordering guide pages 30, 32 & 34





Pressure Sustaining & Reducing Valve

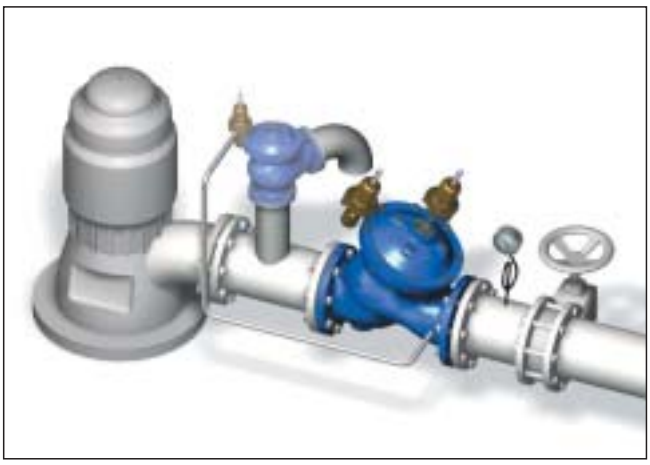
The establishment of pressure zones is a frequently employed means of achieving balance in water transmission and distribution networks. Where control of both upstream (back pressure) and downstream pressure is required, the Pressure Sustaining & Reducing Valve ideally provides two features in one valve.

Model 723-ES-VI

The Model 723-ES-VI Pressure Sustaining & Reducing Valve is a hydraulically operated, diaphragm actuated control valve with two independent functions. It sustains minimum pre-set upstream pressure regardless of fluctuating flow or varying downstream pressure, and it prevents downstream pressure from rising above the maximum pre-set pressure, regardless of fluctuating flow or excessive upstream pressure.

Applications

- Prioritizing higher pressure zones
- Protecting lower pressure zones
- Preventing pipeline emptying
- Ensuring controlled pipeline fill-up
- Pump overload and cavitation protection
- Compensating during groundwater drawdown



Quick Pressure Relief Valve

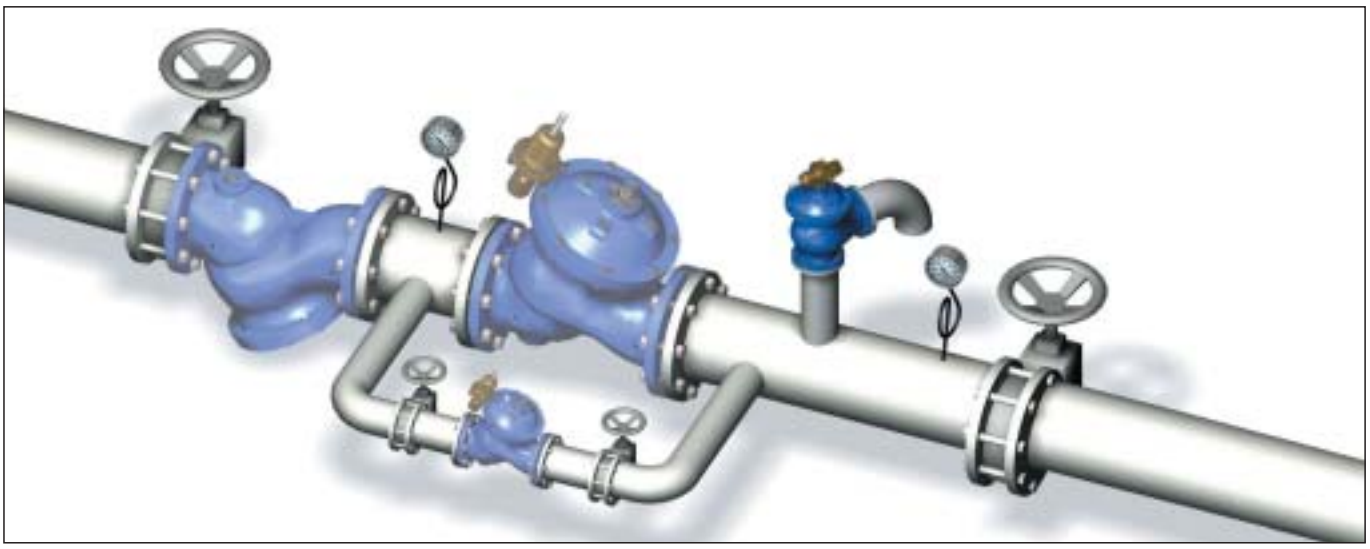
The establishment of pressure zones is a frequently employed means for maintaining hydraulic balance in water transmission and distribution systems. Quick Pressure Relief Valves, applied in a number of locations, protect the system against pressure rising above the maximum operating limit.

Model 73Q

The Model 73Q Quick Pressure Relief Valve is a hydraulically operated, diaphragm actuated control valve that relieves excessive system pressure above the pre-set value. It immediately, accurately, and with high repeatability, responds to a rise in system pressure by fully opening. In addition, the Model 73Q provides smooth drip tight closing.

Applications

- Eliminating momentary pressure peaks
- Visual indication of system failure
- Filtration system burst protection
- Thermal expansion over-pressure relief
- System maintenance savings



Level Control Valve with Float Pilot

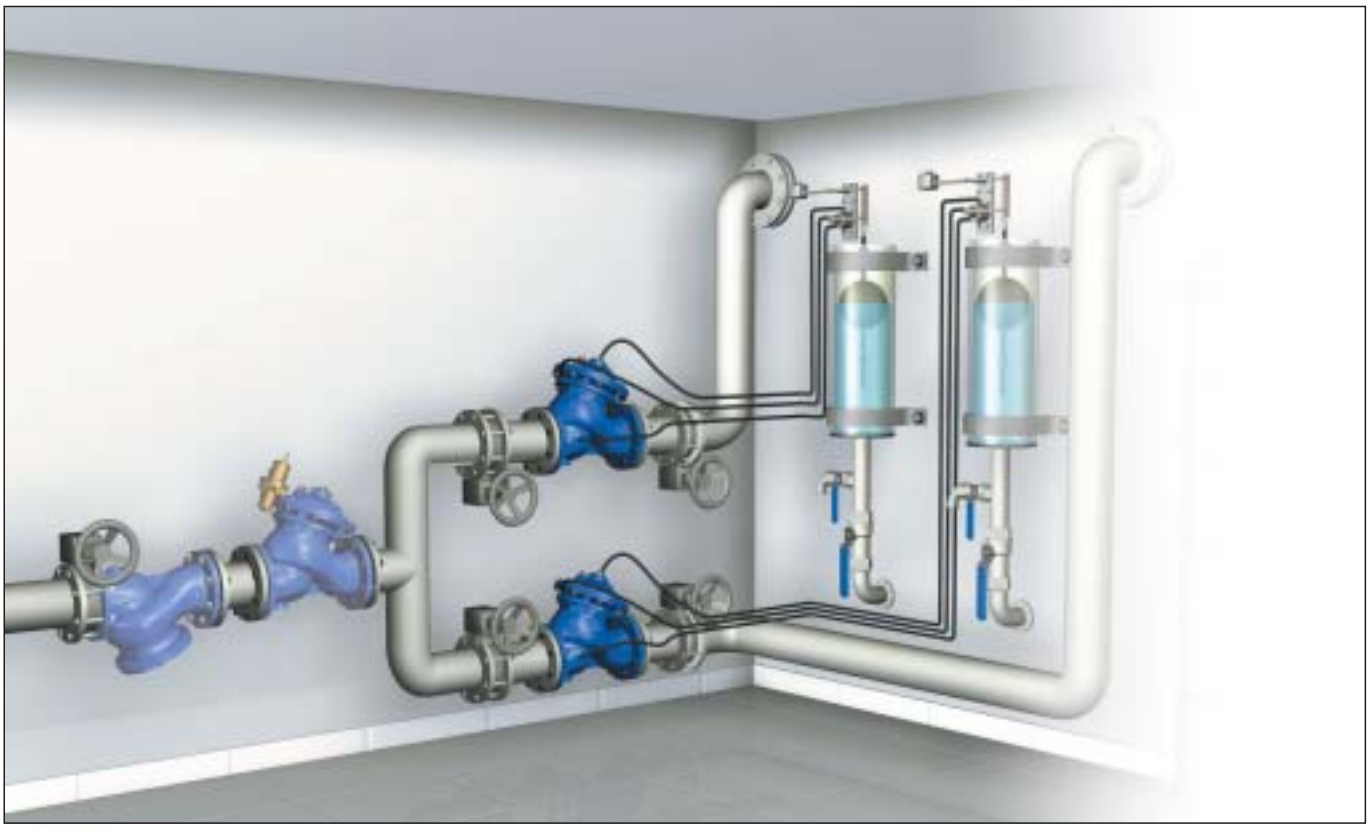
Float controlled valves combine the advantages of excellent hydraulic control valves with the simplicity of mechanical floats. The ability to separate the main valve from the float eliminates most of the installation and maintenance problems associated with mechanical float valves. The wide selection of floats types makes Float Control Valves the solution wherever level control is required.

Model 750-66-ES-B

The Model 750-66-ES-B Level Control Valve with Bi-Level Vertical Float is a hydraulically-controlled, diaphragm-actuated, double-chambered control valve. The valve is hydraulically powered to fully open at pre-set reservoir low-level, and to shut off at a pre-set high level regardless of valve differential pressure.

Applications

- Reservoir filling
- Very low supply-pressure
- Low noise generation
- Energy cost-critical systems
- Reservoir outlet-distribution routing



Level Control Valve with Altitude Pilot

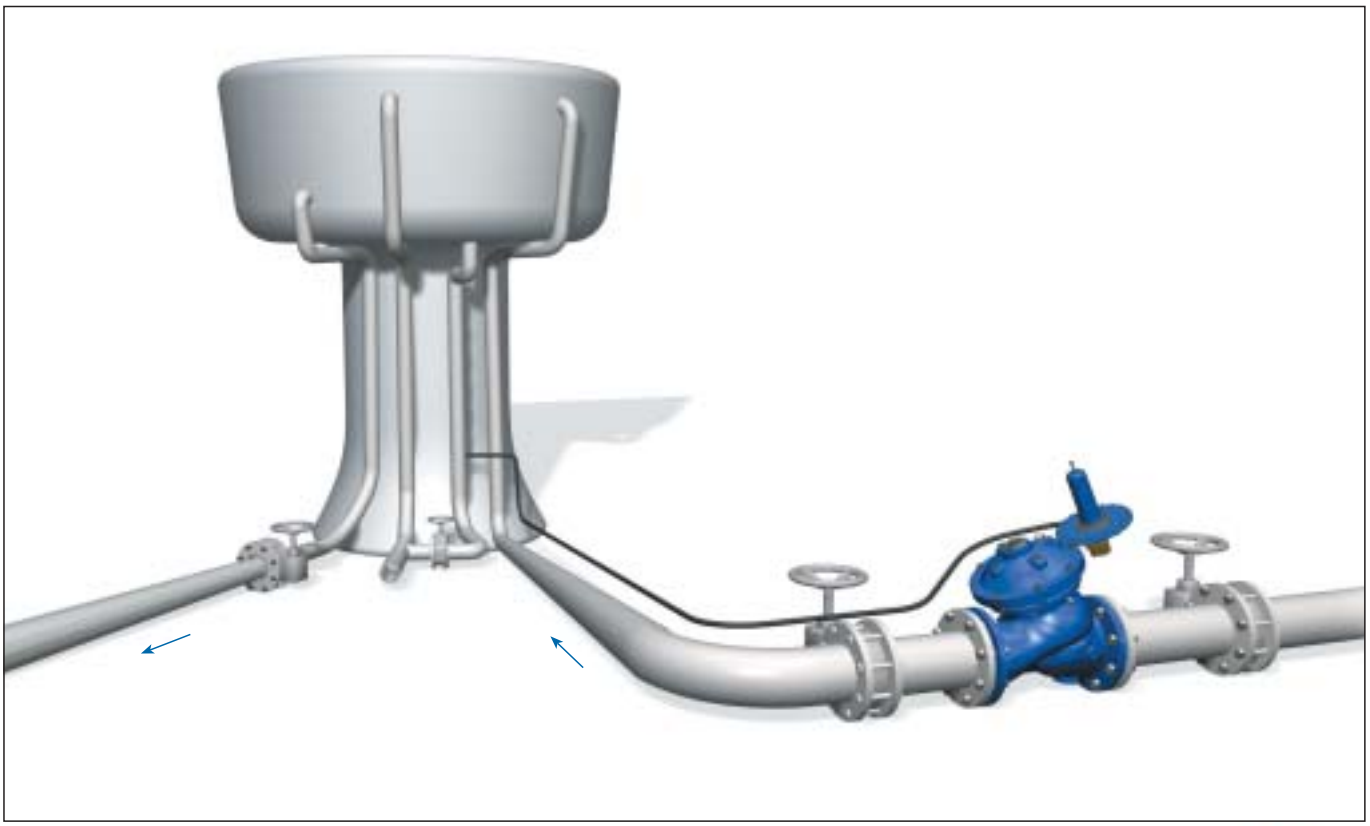
Water tanks, water towers, and existing reservoirs are some examples of places where level control is required but arrangements for installation of a float pilot are complicated and expensive. For these reservoirs, the Level Control Valves with Altitude Pilot saves the need for internal float installation, while retaining simplicity and reliability for a wide selection of applications.

Model 750-80-ES-X

The Model 750-80-ES-X Level Control Valve is a hydraulically-controlled, diaphragm-actuated, control valve that shuts off at a pre-set reservoir high-level and fully opens in response to an approximately one-meter (three-foot) level drop, as sensed by the 3-way altitude pilot mounted on the main valve.

Applications

- High-level reservoirs and water towers
- Energy cost-critical systems
- Systems with poor water-quality
- Inherent refreshing
- Level-sustaining at reservoir outlet



Booster Pump Control Valves

Pump Control Valves protect pumps, pipelines, and other system components by isolating the pipeline from the sudden velocity changes associated with pump starting and stopping. The “Active Check Valve” logic of operation is a pumping-system control method that prevents the system from experiencing surges rather than eliminating them.

Model 740-ES-S

Model 740-ES-S

The Model 740-ES-S Booster-Pump Control Valve is a hydraulically operated, diaphragm-actuated, active check valve that opens fully or shuts off in response to electric signals. It isolates the pump from the system during pump starting and stopping, to prevent pipeline surges.

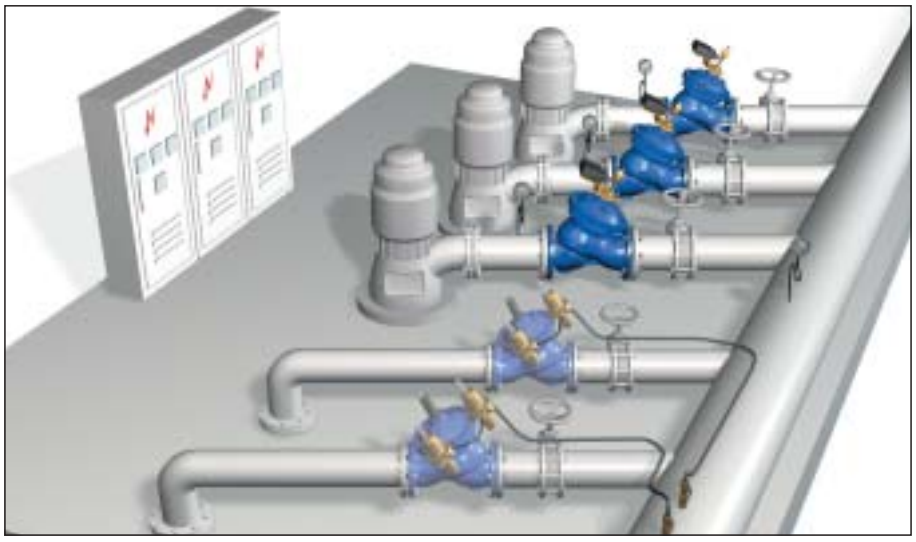
Model 840

Model 840

The Model 840 piston-actuated Booster-Pump Control Valve enables operation at high-pressure pumping systems. It extends the pressure-rating range upper-limit to 40 bar (600 psi).

Applications

- Isolation of pump start-and-stop effects from system, for:
  - Solitary single speed pumps
  - Battery of single speed pumps (add and switch)
  - Battery of variable speed pumps (add)



Surge Anticipating Valves

Abrupt pump stopping is followed by a pressure drop as the water column continues traveling along the line. The returning column hits the closed pump check valve, creating a high-pressure surge-wave, which travels at up to 4 Mach. Eliminating such a surge requires anticipation and pre-action. Surge Anticipating Valves react to the pressure drop, accepting the returning column while already open, thus eliminating the surge.

Model 735-ES-M

Model 735-ES-M

The Model 735-ES-M Surge-Anticipating Valve is an off-line, hydraulically-operated, diaphragm-actuated valve. The valve, sensing line pressure, opens in response to the pressure drop associated with abrupt pump stoppage. The pre-opened valve dissipates the returning high pressure wave, eliminating the surge. The Model 735-ES-M smoothly closes drip-tight as quickly as the relief feature allows, while preventing closing surge. The valve also relieves excessive system pressure.

Model 835-M

Model 835-M

The Model 835-M piston-actuated Surge-Anticipating Valve enables operation at high-pressure pumping systems. It extends the pressure-rating range upper-limit to 40 bar (600 psi).

Applications

- Eliminates surge for all pumping systems:
  - Booster and deep well, single & variable speed
- Eliminates surge for all distribution networks:
  - Municipal, high-rise buildings, sewage, HVAC, irrigation
  - Difficult to maintain, remote locations, older systems

Pressure-Relief/Sustaining Valves

Pressure-Relief/Sustaining Valves protect pumps and water distribution systems from two extreme situations:

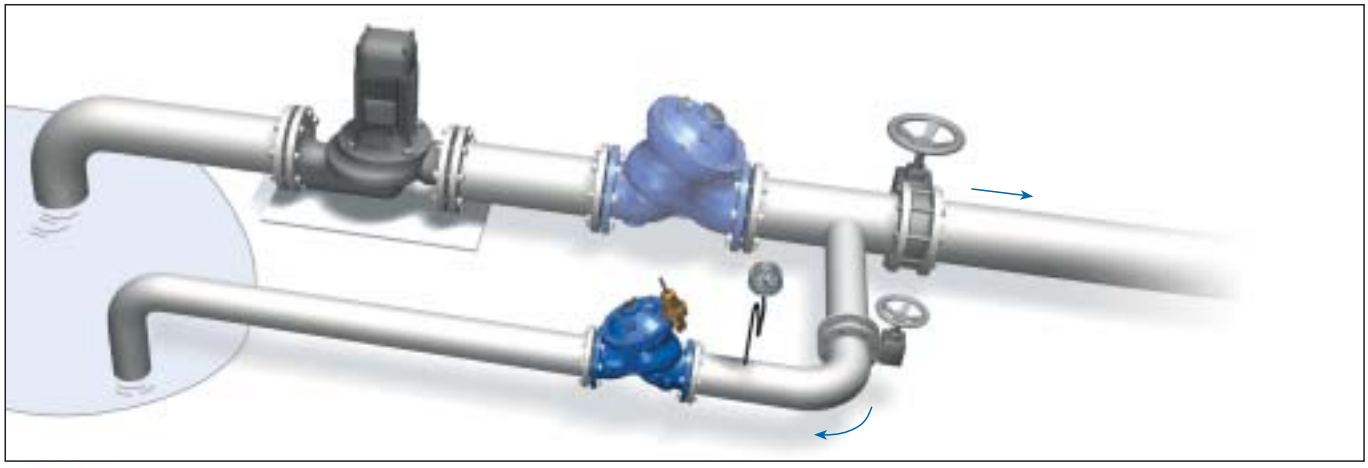
- When installed off-line, they relieve damaging excessive pressure
- When installed in-line, they sustain minimum back-pressure thus prioritizing pressure zones, preventing line emptying, pump overload, etc.

Model 730-ES-VI

The Model 730-ES-VI Pressure-Relief/Sustaining Valve is a hydraulically-operated, diaphragm-actuated, control valve that can fulfill either of two separate functions. When installed in-line, it sustains minimum pre-set, upstream (back-) pressure regardless of fluctuating flow or varying downstream pressure. When installed as a circulation valve, it relieves excessive line-pressure when above maximum pre-set.

Applications

- Prioritizing pressure zones
- Ensuring controlled pipeline fill-up
- Preventing pipeline emptying
- Pump overload & cavitation protection
- Safeguarding pump minimum flow
- Excessive line-pressure protection



Differential-Pressure Sustaining Valve

Differential-Pressure (ΔP) Sustaining Valves are well suited for:

- Pumps with varying suction pressure regimes that require constant ΔP as overload & cavitation protection.
- Filtration Systems upstream from firewater networks that require a bypass to progressively compensate for excessive demand.
- Air Conditioning Systems with varying demands that require constant ΔP between distribution and collection lines.

Model 736-ES-VI

The Model 736-ES-VI Differential-Pressure Sustaining Valve is a hydraulically-operated, diaphragm-actuated, control valve that sustains minimum pre-set, differential pressure between two points regardless of fluctuating flow or varying upstream pressure.

Applications

- Pump overload & cavitation protection
- Safeguarding pump minimum flow
- Emergency filter by-pass
- Balancing between circuits in HVAC systems

Flow Control Valve

System design starts from expected flow range that determines pump-stations characteristics and location, supply lines layout and size, reservoirs location and volume, etc. Significant deviation from designed flow range might disrupt water supply or even damage system components. Appropriate design, placement, and use of Flow Control Valves protect the system from excessive flow.

Model 770-ES-UVI

The Model 770-ES-UVI Flow Control Valve is a hydraulically operated, diaphragm-actuated, control valve that maintains pre-set maximum flow, regardless of fluctuating demand or varying system pressure.

Applications

- Securing design specifications
- Prioritizing main system over sub-system
- Limiting consumers over-demand
- Maintaining pre-set maximum flow through filters
- Pump overload and cavitation protection

Burst Control Valve

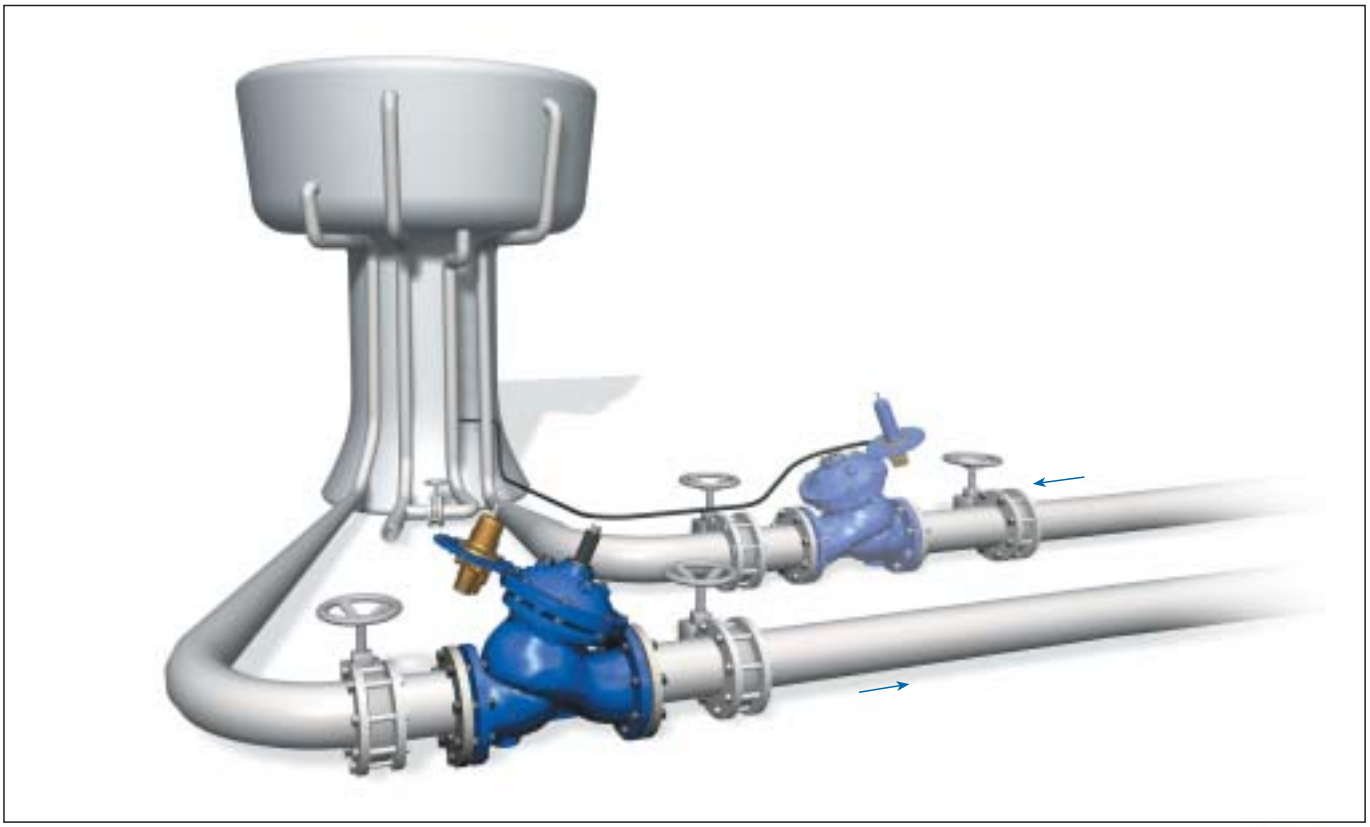
Every water system is vulnerable to bursts, whether due to system hydraulic and installation problems or external mechanical damage. Burst Control Valves isolate the damaged zone until manually reset, to minimize wasting of water, land erosion and the damage that can be caused to houses, roads and equipment.

Model 790-ES-M

The Model 790-ES-M Burst Control Valve is a hydraulically-operated, diaphragm-actuated, control valve that upon sensing flows in excess of setting, shuts off and locks drip-tight, until it is manually reset. As long as flow is lower than the setting, the valve remains fully open, minimizing head-loss.

Applications

- Zonal shut-off at burst
- "Older" burst-susceptible networks
- Outlets from reservoir at earthquake risk
- Vulnerable network infrastructure facilities
- Networks liable to mechanical damage



Solenoid-Controlled Valve

Solenoid-Controlled Valves, by using very low electric power, allow activation of on/off valves of all sizes saving the infrastructures involved when applying motorized valves. The electric signal used to activate the solenoid can be sent directly from timers, clocks, etc. or through a control system according to pressure, level, flow, quality and other system management considerations.

Model 710-ES-I

The Model 710-ES-I Solenoid-Controlled Valve is a hydraulically-operated, diaphragm-actuated, control valve that either opens fully or shuts off in response to electric signals.
For very low-pressure applications, refer to the Full-Powered Opening and Closing Model 710-ES-B.

Applications

- Network management optimizing
- Pressure-zone isolating
- Burst excess-flow shut-off
- Reservoir overflow safety back-up
- Switching between "on-duty" valves
- Automatic refreshing of reservoirs

Electronic-Control Valve

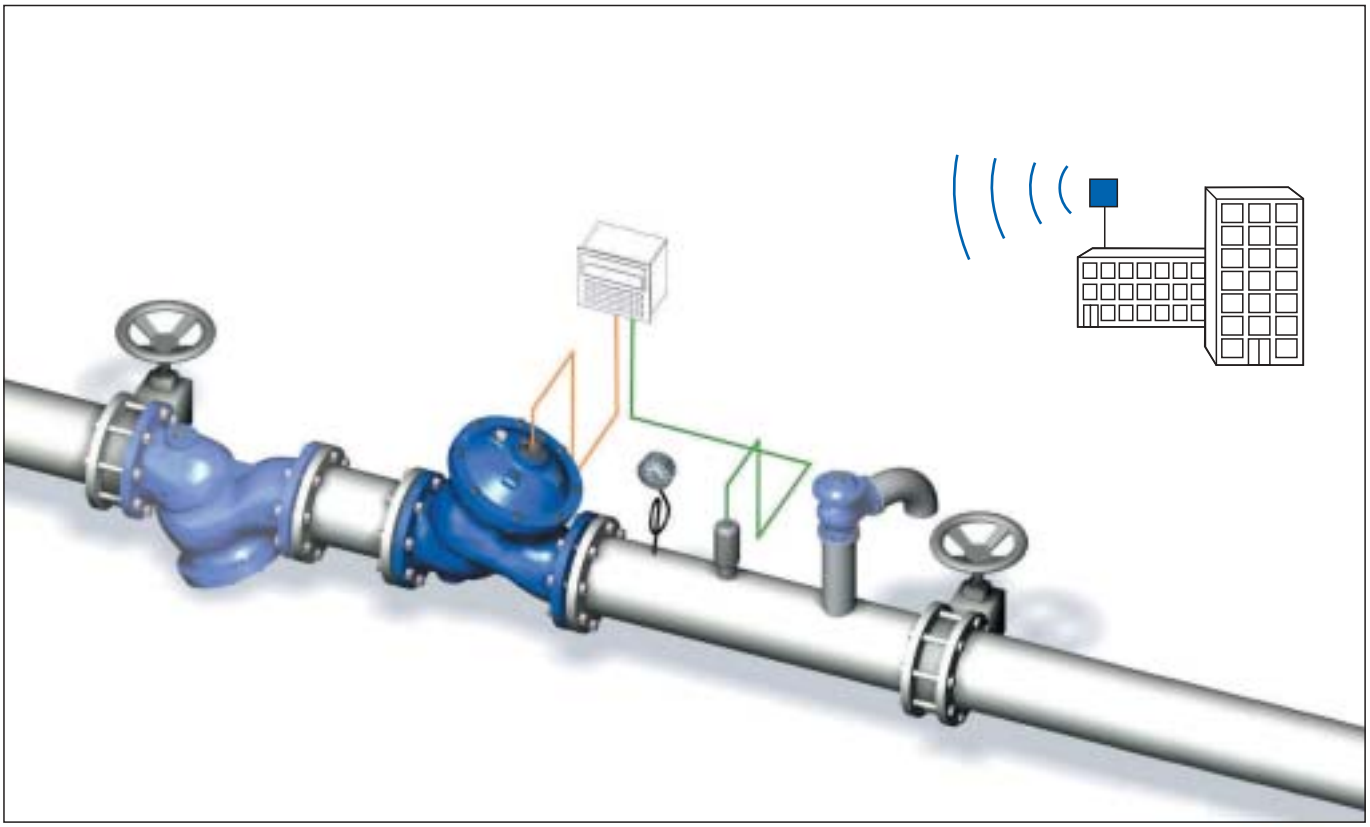
Electronic-Control Valves combine the advantages of excellent modulating, line-pressure driven, hydraulic valves with the electronic control world. In today's world of water supply - modern, dynamic and communication-intensive electronic control valves are needed for real-time control of pressures, flows, temperatures, levels, etc. both as single variables, and as a function of each other.

Model 718-03-ES-VI

The Model 718-03-ES-VI Electronic-Control Valve is a hydraulically-operated, diaphragm-actuated, control valve that, in response to signals from an electronic controller, modulates open or closed to control pressure, level, flow, temperature and/or other parameters requiring control, 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-ES-B.

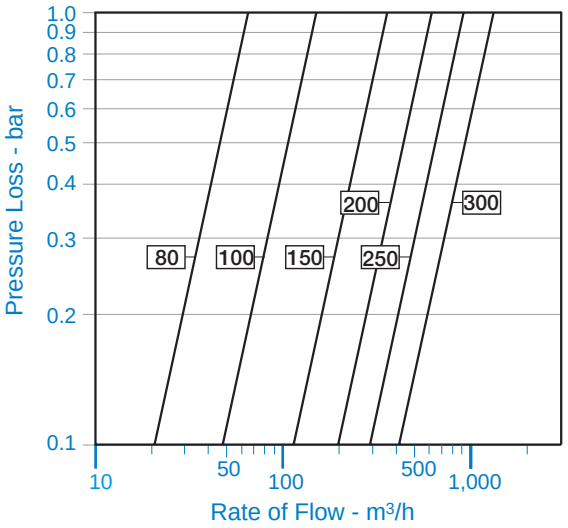
Applications

- Control pressure, flow, level, temperature, etc
- Flow control as a function of reservoir level
- Pressure control as a function of demand
- Flow control as a function of temperature in HVAC systems
- Mixture quality control in Mixing Junctions

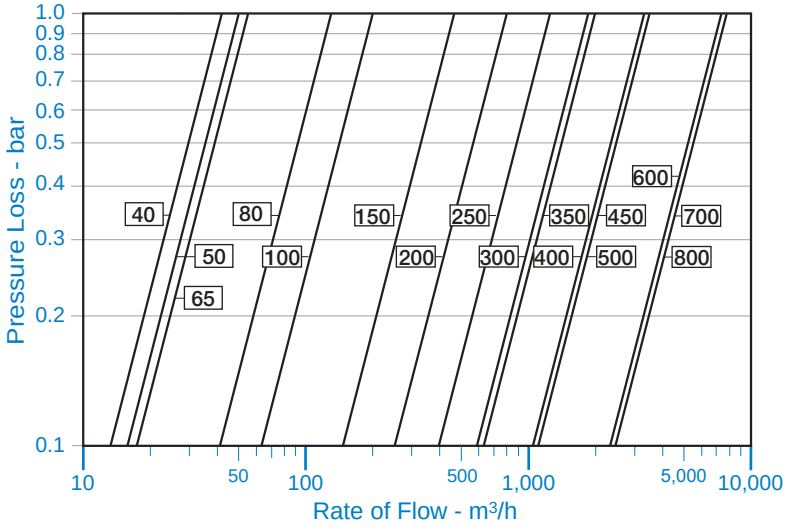


Flow Charts

700-ES



700-EN, 700, 800



Flow Properties

700-ES	DN	80	100	150	200	250	300
	inch	3”	4”	6”	8”	10”	12”
Y-Pattern Flat Disc	Kv	65	150	360	620	915	1,320
	Cv	100	235	560	965	1,425	2,055
Y-Pattern V-Port	Kv	55	125	305	525	780	1,120
	Cv	85	195	475	815	1,215	1,740

700-EN / 700 / 800	DN	40	50	65	80	100	150	200	250	300	350	400	450	500
	inch	1.5”	2”	2.5”	3”	4”	6”	8”	10”	12”	14”	16”	18”	20”
Y-Pattern Flat Disc	Kv	42	50	55	115	200	460	815	1,250	1,850	1,990	3,310	3,430	3,550
	Cv	49	58	64	133	230	530	940	1,440	2,140	2,300	3,820	3,960	4,100
Y-Pattern V-Port	Kv	36	43	47	98	170	391	693	1,063	1,573	1,692	2,814	2,916	3,018
	Cv	41	49	54	113	200	450	800	1,230	1,820	1,950	3,250	3,370	3,490
Angle Flat Disc	Kv	46	55	61	127	220	506	897	1,375	2,035	2,189	3,641	3,773	NA
	Cv	53	64	70	146	250	580	1,040	1,590	2,350	2,530	4,210	4,360	NA
Angle V-Port	Kv	39	47	51	108	187	430	762	1,169	1,730	1,861	3,095	3,207	NA
	Cv	45	54	59	124	220	500	880	1,350	2,000	2,150	3,580	3,710	NA

700 Large Diameter	DN	600	700	750	800
	inch	24”	28”	30”	32”
G-Pattern Flat Disc	Kv	7,350	7,500	7,500	7,500
	Cv	8,490	8,670	8,670	8,670

Valve flow coefficient, Kv or Cv $Kv(Cv)=Q\sqrt{\frac{Gf}{\Delta P}}$

Where:
Kv = Valve flow coefficient (flow in m³/h at 1bar Diff. Press.)
Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q = Flow rate (m³/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = Liquid specific gravity (Water = 1.0)

Cv = 1.155 Kv

Cavitation

The cavitation phenomenon has a significant affect on control valve and system performance.
Cavitation may damage the valve and piping by the affects of erosion and vibration. Cavitation also generates noise and may limit and ultimately choke the flow.
As the pressure differential across the valve increases, the static pressure of the flow passing through the throttling area of the valve (Vena Contracta) drops sharply.
When the fluid's static pressure reaches liquid vapor pressure, vapor cavities (bubbles) form and grow until they violently implode by the recovered pressure downstream to the valve seat.
The implosion of these cavities generates high-pressure surges, micro jets and intensive heat, which erode valve components and downstream piping. In its final stage, cavitation flashes and chokes the flow.
The Cavitation Guide is based on the formula commonly used in the valve industry:

σ = (P2-Pv) / (P1-P2)

Where:

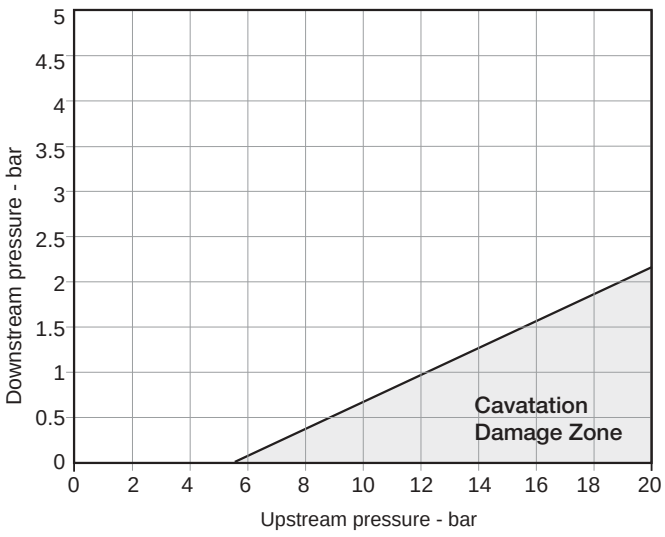
σ = Sigma, cavitation index, dimensionless
P1 = Upstream pressure, absolute
P2 = Downstream pressure, absolute
Pv = Liquid vapor pressure, absolute
(Water, 18^{O}C = 0.02 bar-a ; 65^{O}F = 0.3 psi-a)

Use these guides and your applications upstream and downstream pressures to determine whether their intersection lies in or out of the cavitation damage zone.
Considerations to avoid cavitation damage:
A) Reduce system pressure in stages designing each pressure stage to be above cavitation conditions.
B) Consider using other valve selection criteria
   a. Valve body and plug type
   b. Valve size
   c. Valve material

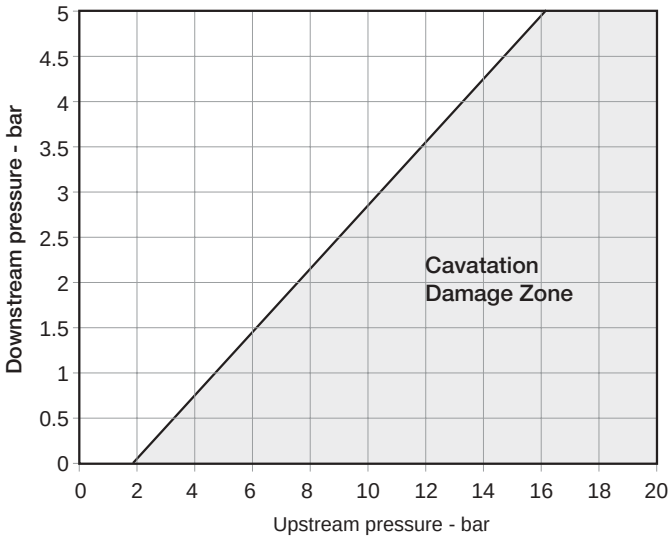
Notes:
1. An alternate cavitation index formula introduced by ISA is:
   σ_{ISA} = (P1-Pv) / (P1-P2) which equals σ+1
2. The above charts should be considered only as a general guide.
3. For optimum system and control valve application please consult Bermad.

Cavitation Guide

700-ES



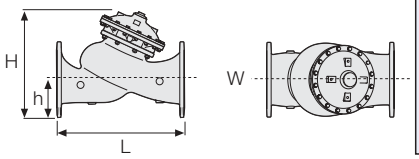
700-EN, 700, 800



Flanged

700-ES Series

Y Pattern

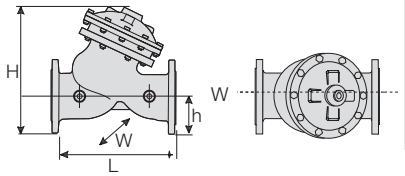


	DN	80	100	150	200	250	300
PN 10; 16; 25	L*	310	350	480	600	730	850
	W	196	234	296	356	412	480
	h	106	123	157	183	215	243
	H	305	320	390	507	597	710
	Weight (Kg)	15	26	55	95	148	255

* Length according to EN 558-1

700-EN Series

Y Pattern

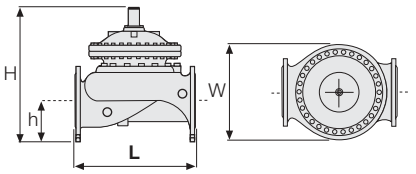


	DN	50	80	100	150	200	250	300
PN 10; 16; 25	L*	230	310	350	480	600	730	850
	W	165	200	235	320	390	480	550
	h	82.5	100	118	150	180	213	243
	H	244	305	369	500	592	733	841
	Weight (Kg)	9.7	21	31	70	115	198	337

* Length according to EN 558-1

700 Series – Large Diameter

G Pattern



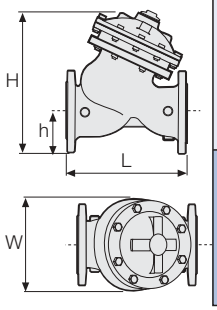
	DN	600	700	750	800
PN 10 ; 16	L*	1450	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3250	3700	3900	4100

	DN	600	700	750	800
PN 25	L*	1500	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3500	3700	3900	4100

* Length according to EN 558-1

700 Series

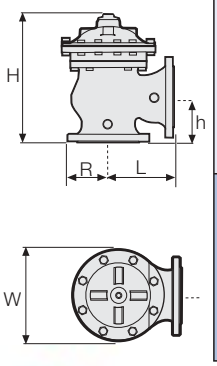
Y Pattern



On request (Y Pattern)

	DN	40	65	50	80	100	150	200	250	300	350	400	450	500
PN 10 ; 16	L*	205	222	210	250	320	415	500	605	725	733	990	1000	1100
	W	155	190	165	200	229	320	390	480	550	550	740	740	740
	h	78	95	83	100	115	143	172	204	242	268	300	319	358
	H	239	257	244	305	366	492	584	724	840	866	1108	1127	1167
	Weight (Kg)	9.1	13	10.6	22	37	75	125	217	370	381	846	945	962
PN 25	L	205	222	210	264	335	433	524	637	762	767	1024	1030	1136
	W	155	190	165	210	254	320	390	480	550	570	740	740	750
	h	78	95	83	105	127	159	191	223	261	295	325	357	389
	H	239	257	244	314	378	508	602	742	859	893	1133	1165	1197
	Weight (Kg)	10	15	12.2	25	43	85	146	245	410	434	900	967	986

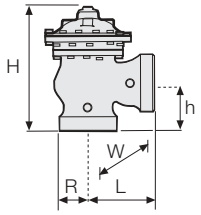
Angle Pattern



	DN	40	50	65	80	100	150	200	250	300	350	400	450
PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
	W	155	155	178	200	222	320	390	480	550	550	740	740
	R	78	83	95	100	115	143	172	204	248	264	299	320
	h	85	85	109	102	127	152	203	219	273	279	369	370
	H	227	227	251	281	342	441	545	633	777	781	1082	1082
	Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
PN 25	L	124	124	149	159	200	234	277	336	415	419	467	467
	W	165	165	185	207	250	320	390	480	550	550	740	740
	R	78	85	95	105	127	159	191	223	261	293	325	358
	h	85	85	109	109	135	165	216	236	294	299	386	386
	H	227	227	251	287	350	454	558	649	796	801	1099	1099
	Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

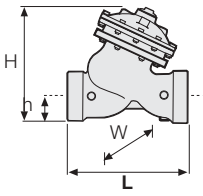
Threaded

Angle Pattern



	DN	50	65	80
BSP ; NPT	L	121	140	159
	W	122	122	163
	R	40	48	55
	h	83	102	115
	H	225	242	294
	Weight (Kg)	5.5	7	15

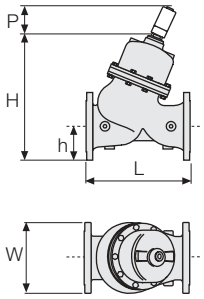
Y Pattern



	DN	40	50	65	80
BSP ; NPT	L	155	155	212	250
	W	122	122	122	163
	h	40	40	48	56
	H	201	202	209	264
	Weight (Kg)	5.5	5.5	8	17

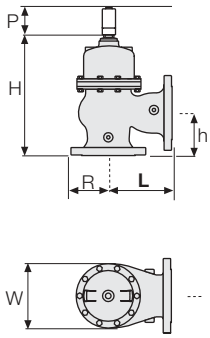
800 Series

Y Pattern



	DN	40	50	65	80	100	150	200	250	300	350	400	450	500
PN 10; 16	L	205	210	222	250	320	415	500	605	725	733	990	1000	1100
	W	156	166	190	200	229	286	344	408	484	536	600	638	716
	h	78	83	95	100	115	143	172	204	242	268	300	319	358
	H	260	265	278	327	409	526	650	763	942	969	1154	1173	1211
	P	N/A	N/A	N/A	N/A	N/A	135	135	142	154	154	191	191	191
	Weight (Kg)	10.7	13	16	28	48	94	162	272	455	482	1000	1074	1096
PN 25; 40	L	205	210	222	264	335	433	524	637	762	767	1024	1030	1136
	W	156	166	190	210	254	318	382	446	522	590	650	714	778
	h	78	83	95	105	127	159	191	223	261	295	325	357	389
	H	260	265	278	332	422	542	666	783	961	996	1179	1208	1241
	P	N/A	N/A	N/A	N/A	N/A	135	130	142	154	154	191	191	N/A
	Weight (Kg)	11.8	15	18.4	32	56	106	190	307	505	549	1070	1095	1129

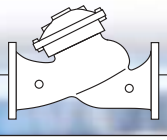
Angle Pattern



	DN	40	50	65	80	100	150	200	250	300	350	400	450
PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
	W	156	166	190	200	229	285	344	408	496	528	598	640
	R	78	83	95	100	115	143	172	204	248	264	299	320
	h	85	85	109	102	127	152	203	219	273	279	369	370
	H	252	252	271	308	390	476	619	717	911	915	1144	1144
	P	N/A	N/A	N/A	N/A	N/A	141	141	156	156	156	195	195
	Weight (Kg)	10.7	13	16	26	46	90	153	259	433	459	950	1020
PN 25 ; 40	L	124	124	149	159	200	234	277	336	415	419	467	467
	W	150	155	190	200	254	318	381	446	522	586	650	716
	R	78	85	95	105	127	159	191	223	261	293	325	358
	h	85	85	109	109	135	165	216	236	294	299	386	386
	H	252	264	271	315	398	491	632	733	930	935	1160	1160
	P	N/A	N/A	N/A	N/A	N/A	141	136	156	156	156	195	195
	Weight (Kg)	11.8	15	18.4	30	54	101	179	292	481	523	1017	1051

Control Chamber Displacement Volume (liter)

DN	40	50	65	80	100	150	200	250	300	350	400-500	600-800
Series 700-ES	-	-	-	0.125	0.3	0.5	2.15	4.5	8.5	-	-	-
Series 700-EN	-	0.125	-	0.3	0.45	2.15	4.5	8.5	12.4	-	-	-
Series 700	0.125	0.125	0.125	0.3	0.45	2.15	4.5	8.5	12.4	12.4	29.9	98.0
Series 800	0.04	0.04	0.04	0.12	0.3	1.1	2.3	4.0	8.0	8.0	18.7	-



WD	6”	720	ES	55	Y	C

Sector	Code
Drinking Water	WD

Model	Code
Anti Cavitation	ES
High Capacity	EN

Pattern	Code
Oblique	Y

Construction Materials	Code
Ductile Iron	C

EN

Size	Code
DN 50	2”
DN 80	3”
DN 100	4”
DN 150	6”
DN 200	8”
DN 250	10”
DN 300	12”

ES

Size	Code
DN 80	3”
DN 100	4”
DN 150	6”
DN 200	8”
DN 250	10”
DN 300	12”

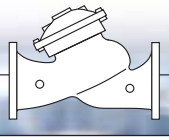
Primary Features	Code
Basic Valve (Double-Chambered Actuator)	700
Basic Valve (Single-Chambered Actuator)	705
Solenoid Controlled Valve	710
Electronic Control Valve	718
Pressure Reducing Control Valve	720
Pressure Sustaining & Reducing Valve	723
Differential Pressure Reducing Control Valve	726
Flow Control Valve, Constant Downstream Pressure	727
Electronic Pressure Reducing Valve	728
Pressure Sustaining Valve	730
Quick Pressure Relief Valve	73Q
Pressure Sustaining Valve Remote Sensing Type	730R
Surge-Anticipating Control Valve	735
Differential Pressure-Sustaining Valve	736
Electronic Pressure-Sustaining Valve	738
Booster Pump Control Valve, Single Chambered Actuator	740
Booster Pump Control Valve, Double Chambered Actuator	74Q
Booster Pump Control & Pressure Reducing Valve	742
Booster Pump Control & Pressure Sustaining Valve	743
Deep-Well Pump Hydraulic Control Valve	744
Deep-Well Pump Electric Control Valve	745
Booster Pump & Flow Control Valve	747
Pump Circulation & Pressure Sustaining Control Valve	748
Pump Circulation & Flow Control Valve	749
Level Control Valve	750
Level Control & Pressure Sustaining Valve	753
Level & Flow Control Valve	757
Level Sustaining Valve (Reservoir Outlet)	75A
Hydraulic Check Valve	760
Flow Control Valve	770
Flow Control & Pressure Reducing Control Valve	772
Flow Control & Pressure Sustaining Control Valve	773
Burst Control Valve, Excessive Flow	790
Check Valve, Lift-Type	70N
Strainer (Stone and Gravel Trap)	70F

Other primary features available on request.

Additional Features (Multiple Choices Permitted)	Code
No Additional Feature	00
Closing and Opening Speed-Control	03
Differential Pressure	06
Hydraulic Override	09
Check-Lock	11
High Sensitivity Pilot	12
Electronic Control	18
Check Feature	20
Solenoid-Controlled & Check Feature	25
Pressure Reducing Feature	2Q
Two-Stage Opening	30
Relief Override	3Q
Electrically Selected Multi-Level Setting	45
Downstream Over Pressure Guard	48
Closing Surge Prevention	49
Electronic Multi-Level Setting - Type 4R	4R
Electronic Multi-Level Setting - Type 4T	4T
Hydraulic Control	50
Hydraulic Accelerator Control	54
Solenoid-Controlled	55
Electric Override	59
Modulating Horizontal Float	60
Bi-Level Electric Float	65
Bi-Level Vertical Float	66
Modulating Vertical Float	67
Bi-Directional Flow	70
Altitude Pilot	80
Modulating Altitude Control	82
Sustaining Altitude Pilot	83
Hydraulic Positioning	85
Bi-Level Altitude Control	86
Altitude Control with Bi-Directional Flow	87
2-14 meter Setting	M6
5-22 meter Setting	M5
15-35 meter Setting	M4
25-70 meter Setting	M8
Closing at Downstream Pressure Drop	91
Proportional - Standard	PD
Proportional - Optional	PD2

Other additional features available on request.

BERMAD Standard Configuration



I6 **EB** **4AC** **NN** **VI**

End Connections		Code
Flanged	ISO-10	10
	ISO-16	16
	ISO-25	25

Coating	Code
Epoxy FB Blue RAL 5005	EB

Transparent Polyurethane top coating is available for epoxy coated valves.
Other coatings available on request.

Voltage-Main Valve Position (When Solenoid De-energized)			Code
24V	AC	24VAC/50Hz - Normally Closed	4AC
		24VAC/50Hz - Normally Open	4AO
		24VAC/50Hz - Last Position	4AP
		24VAC/60Hz - Normally Closed	46C
		24VAC/60Hz - Normally Open	46O
		24VAC/60Hz - Last Position	46P
	DC	24VDC - Normally Closed	4DC
		24VDC - Normally Open	4DO
		24VDC - Last Position	4DP
		24VDC - Latch Solenoid	4DS
220V	AC	220VAC/50Hz Last Position	2AP
		220VAC/50Hz Normally Closed	2AC
		220VAC/50Hz Normally Open	2AO
	DC	220VDC - Normally Closed	2DC
		220VDC - Normally Open	2DO
		220VDC - Latch Solenoid	2DS

Other electrical ratings available on request.

Tubing & Fittings	Code
St. St. 316 Tubing & Fittings	NN

Reduction Ratios Tables

Valve Size EN	Plug Type	
	Flat-Disc	V-Port
DN 50 - DN 65	3.7	4.0
2"- 21/2"	2.5	2.7
DN 80	2.6	2.9
3"	2.2	2.4
DN 100	2.5	2.8
4"	2.0	2.2
DN 150	2.5	2.7
6"	2.0	2.2
DN 200	2.4	2.6
8"	2.0	2.2
DN 250	2.3	2.5
10"	2.0	2.2
DN 300	2.2	2.4
12"	2.0	2.2

Valve Size ES	Plug Type	
	Flat-Disc	V-Port
DN 80	2.8	3.2
3"	-	-
DN 100	2.6	2.9
4"	2.2	2.4
DN 150	2.5	2.8
6"	2.0	2.2
DN 200	2.5	2.7
8"	2.0	2.2
DN 250	2.4	2.6
10"	2.0	2.2

- The reduction ratios are based on flow velocity of 2.0-3.0 m/sec.
- Reduction ratio may vary at extreme flow velocity & upstream pressure.

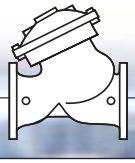
Optional ratio

Standard ratio

Additional Attributes Unlimited Selection	Code
V-Port Throttling Plug	V
Large Control Filter	F
Valve Position Indicator	I
Electric Limit-Switch	S
Valve Position Transmitter	Q
Flow Stem	M
Lifting Spring	L
Balancing Piston	G
Orifice Assembly	U
Pressure Separator	d
Double-Chambered (Active)	B
3-way Control Loop	X
Manual Selector	Z
Flow Over the Seat	O
St. St. 316 Control Accessories	N
St. St. 316 Actuator Internal Assembly	D
St. St. 316 Internal Trim (Closure & Seat)	T
Delrin Bearing	R
High-Grade Bearing & Stem	K
St. St. Bolts & Nuts	m
Special Elastomers for Seals & Diaphragm	E
Pressure Gauge	6

Other additional attributes are optional.
Please consult our sales department for further information.

BERMAD Standard Configuration



WW **6”** **720** **55** **Y** **C**

Sector	Code
Waterworks	**WW**
WW Aggressive Water	WA
WW Seawater	WS
WW Air Conditioning	WC
WW Hot Water	WH

Pattern	Code
Oblique (DN 40-DN 500)	**Y**
Angle (DN 40-DN 450)	A
Globe (DN 600-DN 800)	G

Construction Materials	Code
Ductile Iron	**C**
Cast Steel	S
Stainless Steel 316	N
Nickel Aluminum Bronze	U

Other materials available on request.

Size	
DN 40	1½”
DN 50	2”
DN 65	2½”
DN 80	3”
DN 100	4”
DN 125	5”
DN 150	6”
DN 200	8”
DN 250	10”
DN 300	12”
DN 350	14”
DN 400	16”
DN 450	18”
DN 500	20”
DN 600	24”
DN 700	28”
DN 750	30”
DN 800	32”

Primary Features	Code
Basic Valve (Double-Chambered Actuator)	700
Basic Valve (Single-Chambered Actuator)	705
Solenoid Controlled Valve	710
Electronic Control Valve	718
Pressure Reducing Control Valve	720
Pressure Sustaining & Reducing Valve	723
Differential Pressure Reducing Control Valve	726
Flow Control Valve, Constant Downstream Pressure	727
Electronic Pressure Reducing Valve	728
Pressure Sustaining Valve	730
Quick Pressure Relief Valve	73Q
Pressure Sustaining Valve Remote Sensing Type	730R
Surge-Anticipating Control Valve	735
Differential Pressure-Sustaining Valve	736
Electronic Pressure-Sustaining Valve	738
Booster Pump Control Valve, Single Chambered Actuator	740
Booster Pump Control Valve, Double Chambered Actuator	74Q
Booster Pump Control & Pressure Reducing Valve	742
Booster Pump Control & Pressure Sustaining Valve	743
Deep-Well Pump Hydraulic Control Valve	744
Deep-Well Pump Electric Control Valve	745
Booster Pump & Flow Control Valve	747
Pump Circulation & Pressure Sustaining Control Valve	748
Pump Circulation & Flow Control Valve	749
Level Control Valve	750
Level Control & Pressure Sustaining Valve	753
Level & Flow Control Valve	757
Level Sustaining Valve (Reservoir Outlet)	75A
Hydraulic Check Valve	760
Flow Control Valve	770
Flow Control & Pressure Reducing Control Valve	772
Flow Control & Pressure Sustaining Control Valve	773
Burst Control Valve, Excessive Flow	790
Check Valve, Lift-Type	70N
Strainer (Stone and Gravel Trap)	70F

Other primary features available on request.

Additional Features (Multiple Choices Permitted)	Code
No Additional Feature	00
Closing and Opening Speed-Control	03
Differential Pressure	06
Hydraulic Override	09
Check-Lock	11
High Sensitivity Pilot	12
Electronic Control	18
Check Feature	20
Independent Flow Check (24-32” only)	2S
Solenoid-Controlled & Check Feature	25
Pressure Reducing Feature	2Q
Two-Stage Opening	30
Relief Override	3Q
Electrically Selected Multi-Level Setting	45
Downstream Over Pressure Guard	48
Closing Surge Prevention	49
Electronic Multi-Level Setting - Type 4R	4R
Electronic Multi-Level Setting - Type 4T	4T
Hydraulic Control	50
Hydraulic Accelerator Control	54
Solenoid-Controlled	55
Electric Override	59
Modulating Horizontal Float	60
Bi-Level Electric Float	65
Bi-Level Vertical Float	66
Modulating Vertical Float	67
Bi-Directional Flow	70
Altitude Pilot	80
Modulating Altitude Control	82
Sustaining Altitude Pilot	83
Hydraulic Positioning	85
Bi-Level Altitude Control	86
Altitude Control with Bi-Directional Flow	87
2-14 meter Setting	M6
5-22 meter Setting	M5
15-35 meter Setting	M4
25-70 meter Setting	M8
Closing at Downstream Pressure Drop	91
Proportional - Standard	PD
Proportional - Optional	PD2

Other additional features available on request.

BERMAD Standard Configuration

I6 | EB | 4AC | CB | F

End Connections			Code
Flanged	ISO - 10		10
	ISO - 16		16
	ISO - 25		25
	ANSI - 150		A5
	ANSI - 300		A3
Threaded	BSP	(up to DN 80)	BP
	BSP - 25 bar		PH
	NPT		NP
	NPT - 25 bar		NH

Other end connections available on request.

Voltage-Main Valve Position (When Solenoid De-energized)			Code
24V	AC	24VAC/50Hz - Normally Closed	4AC
		24VAC/50Hz - Normally Open	4AO
		24VAC/50Hz - Last Position	4AP
		24VAC/60Hz - Normally Closed	46C
		24VAC/60Hz - Normally Open	46O
		24VAC/60Hz - Last Position	46P
	DC	24VDC - Normally Closed	4DC
		24VDC - Normally Open	4DO
		24VDC - Last Position	4DP
		24VDC - Latch Solenoid	4DS
220V	AC	220VAC/50-60Hz Last Position	2AP
		220VAC/50-60Hz Normally Closed	2AC
		220VAC/50-60Hz Normally Open	2AO
	DC	220VDC - Normally Closed	2DC
		220VDC - Normally Open	2DO
		220VDC - Latch Solenoid	2DS

Other electrical ratings available on request.

Tubing & Fittings	Code
St. St. 316 Tubing & Fittings	NN
Copper Tubing & Brass Fittings	CB
Plastic Reinforced Tubing & Brass Fittings	PB
Plastic Reinforced Tubing & Fittings	PP
Monel Tubing & Fittings	MM

Coating	Code
Epoxy FB Blue RAL 5005	EB
Polyester Blue RAL 5010	PB
Uncoated	UC

Transparent Polyurethane top coating is available for epoxy coated valves.
Other coatings available on request.

Reduction Ratios Table

Valve Size	Plug Type	
	Flat-Disc	V-Port
DN 40 - DN 65	3.7	4.0
1 1/2"- 2 1/2"	2.5	2.7
DN 80	2.6	2.9
3"	2.2	2.4
DN 100	2.5	2.8
4"	2.0	2.2
DN 150	2.5	2.7
6"	2.0	2.2
DN 200	2.4	2.6
8"	2.0	2.2
DN 250	2.3	2.5
10"	2.0	2.2
DN 300 - DN 350	2.2	2.4
12-14"	2.0	2.2
DN 400 - DN 500	2.2	2.3
16-20"	2.0	2.2

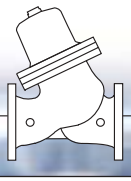
Standard ratio | Optional ratio

- The reduction ratios are based on flow velocity of 2.0-3.0 m/sec.
- Reduction ratio may vary at extreme flow velocity & upstream pressure.
- DN 600-DN 800 (24-32") reduction ratio: 2.2

Additional Attributes Unlimited Selection	Code
V-Port Throttling Plug (U-Type)	V
Large Control Filter	F
Valve Position Indicator	I
Electric Limit-Switch	S
Valve Position Transmitter	Q
Flow Stem	M
Lifting Spring	L
Balancing Piston	G
Orifice Assembly	U
Pressure Separator	d
Double-Chambered (Active)	B
3-way Control Loop	X
Manual Selector	Z
Flow Over the Seat	O
St. St. 316 Control Accessories	N
St. St. 316 Actuator Internal Assembly	D
St. St. 316 Internal Trim (Closure & Seat)	T
Delrin Bearing	R
High-Grade Bearing & Stem	K
St. St. Bolts & Nuts	m
Special Elastomers for Seals & Diaphragm	E
Pressure Gauge	6

Other additional attributes are optional.
Please consult our sales department for further information.

BERMAD Standard Configuration



WW **6”** **820** **55** **PB** **Y** **S**

Sector	Code
Waterworks	**WW**
WW Aggressive Water	WA
WW Seawater	WS
WW Air Conditioning	WC
WW Hot Water	WH

Pattern	Code
Oblique	**Y**
Angle	A

Construction Materials	Code
Cast Steel	**S**
Ductile Iron	C
St. Steel 316	N
Nickel Aluminum Bronze	U

Other constructional materials available on request.

Size		
DN 40	1 1/2”	
DN 50	2”	
DN 65	2 1/2”	
DN 80	3”	
DN 100	4”	
DN 150	6”	
DN 200	8”	
DN 250	10”	
DN 300	12”	
DN 350	14”	
DN 400	16”	(up to PN 25)
DN 450	18”	(up to PN 25)
DN 500	20”	(up to PN 25)

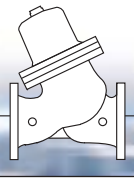
Primary Features	Code
Basic Valve (Double-Chambered Actuator)	800
Basic Valve (Single-Chambered Actuator)	805
Solenoid-Controlled Valve	810
Electronic Control Valve	818
Pressure-Reducing Control Valve	820
Pressure-Sustaining & Reducing Valve	823
Flow Control Valve, Constant Downstream Pressure	827
Pressure-Sustaining Valve	830
Pressure-Relief Valve, Quick Type	83Q
Surge-Anticipating Valve	835
Booster Pump Control Valve	840
Booster Pump Control & Pressure-Reducing Valve	842
Booster Pump Control & Pressure-Sustaining Valve	843
Deep-Well Pump Electric Control Valve	845
Booster Pump & Flow Control Valve	847
Pump Circulation & Pressure Sustaining Control Valve	848
Pump Circulation & Flow Control Valve	849
Level Control Valve	850
Hydraulic Check Valve	860
Flow Control Valve	870
Burst Control Valve (Excessive Flow)	890
Strainer (Stone and Gravel Trap)	80F
Check Valve (Lift Type)	80N

Other primary features available on request.

Additional Features (Multiple Choices Permitted)	Code
No Additional Feature	00
Closing and Opening Speed-Control	03
Hydraulic Override	09
Check-Lock	11
Electronic Control	18
Check Feature	20
Solenoid-Controlled & Check Feature	25
Pressure Reducing Feature	2Q
Two-Stage Opening	30
Relief Override	3Q
Electrically Selected Multi-Setting Levels	45
Downstream Over Pressure Guard	48
Closing Surge Prevention	49
Electronic Multi-Level Setting - Type 4R	4R
Electronic Multi-Level Setting - Type 4T	4T
Hydraulic Control	50
Hydraulic Accelerator Control	54
Solenoid-Controlled	55
Electric Override	59
Modulating Horizontal Float	60
Bi-Level Electric Float	65
Bi-Level Vertical Float	66
Modulating Vertical Float	67
Bi-Directional Flow	70
Altitude Pilot	80
Modulating Altitude Control	82
Sustaining Altitude Pilot	83
Hydraulic Positioning	85
Bi-Level Altitude Control	86
2-14 meter Setting	M6
5-22 meter Setting	M5
15-35 meter Setting	M4
25-70 meter Setting	M8
Closing at Downstream Pressure Drop	91
Proportional	PP
Single-Chambered	PA
Double-Chambered	PB

Other additional features available on request.

BERMAD Standard Configuration



40 **EB** **4AC** **NN** **FVI**

	End Connections	Code
Flanged	**ISO PN 40**	**40**
	ISO PN 10	10
	ISO PN 16	16
	ISO PN 25	25
	ANSI 150	A5
	ANSI 300	A3
	ANSI 400	A4

Other end connections available on request.

Coating	Code
Epoxy FB Blue RAL 5005	**EB**
Polyester Green RAL 6017	PG
Polyester Blue RAL 5010	PB
Uncoated	UC

Transparent Polyurethane top coating is available for epoxy coated valves.
Other coatings available on request.

Tubing & Fittings	Code
St. St. 316 Tubing & Fittings	**NN**
Copper Tubing & Brass Fittings	CB
Monel Tubing & Fittings	MM

Other tubing & fittings available on request.

Reduction Ratios Table

Valve Size	Reduction Ratio
DN 40 - DN 65 1 1/2"- 2 1/2"	2.3
DN 80 3"	2.3
DN 100 4"	2.5
DN 150 6"	2.2
DN 200 8"	2.3
DN 250 10"	2.3
DN 300 - DN 350 12-14"	2.1
*DN 400 - DN 500 *16-20"	2.2

* Available up to PN 25

Voltage-Main Valve Position (When Solenoid De-energized)			Code
24V	AC	**24VAC/50Hz - Normally Closed**	**4AC**
		24VAC/50Hz - Normally Open	4AO
		24VAC/50Hz - Last Position	4AP
		24VAC/60Hz - Normally Closed	46C
		24VAC/60Hz - Normally Open	46O
		24VAC/60Hz - Last Position	46P
	DC	24VDC - Normally Closed	4DC
		24VDC - Normally Open	4DO
		24VDC - Last Position	4DP
		24VDC - Latch Solenoid	4DS
220V	AC	220VAC/50-60Hz Last Position	2AP
		220VAC/50-60Hz Normally Closed	2AC
		220VAC/50-60Hz Normally Open	2AO
	DC	220VDC - Normally Closed	2DC
		220VDC - Normally Open	2DO
		220VDC - Latch Solenoid	2DS

Other electrical ratings available on request.

Additional Attributes Unlimited Selection	Code
V-Port Throttling Plug (U-Type)	V
Large Control Filter	F
Valve Position Indicator	I
Electric Limit-Switch	S
Valve Position Transmitter	Q
Flow Stem	M
Lifting Spring	L
Balancing Piston	G
Orifice Assembly	U
Pressure Separator	d
Double-Chambered (Active)	B
3-way Control Loop	X
Manual Selector	Z
Flow Over the Seat	O
St. St. 316 Control Accessories	N
St. St. 316 Actuator Internal Assembly	D
St. St. 316 Internal Trim (Closure & Seat)	T
Delrin Bearing	R
High-Grade Bearing & Stem	K
St. St. Bolts & Nuts	m
Special Elastomers for Seals & Diaphragm	E
Pressure Gauge	6

Other additional attributes are optional.
Please consult our sales department for further information.

BERMAD Standard Configuration

Waterworks

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