# Pressure Relief/Sustaining Valve

**Model 730**

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

The Model 730 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.

## Features and Benefits

- **Line pressure driven –** Independent operation
- **Balanced seal disk –** High relief flow capacity
- **In-line serviceable –** Easy maintenance
- **Double chamber design**
  - Moderated valve reaction
  - Protected diaphragm
- **Flexible design –** Easy addition of features
- **Variety of accessories –** Perfect mission matching
- **"Y" or angle, wide body –** Minimized pressure loss
- **Semi-straight flow –** Non-turbulent flow
- **Stainless Steel raised seat –** Cavitation damage resistant
- **Obstacle free, full bore –** Uncompromising reliability
- **V-Port Throttling Plug –** Low flow stability

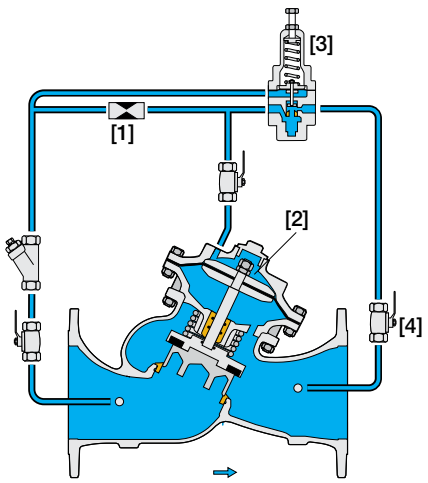
## Major Additional Features

- UL Listed and FM Approved for fire protection – **FP-730-UL/FM**
- Solenoid control – **730-55**
- Quick pressure relief valve – **73Q**
- Pressure sustaining & reducing valve – **723**
- Check feature – **730-20**
- High sensitivity pilot – **730-12**
- Level control & pressure sustaining valve – **753**
- Pump control & pressure sustaining valve – **743**
- Pump circulation & pressure sustaining valve – **748**
- Electrically selected multi-level settings – **730-45**
- High sensitivity hydraulic positioning – **730-85**
- Electronic pressure sustaining valve – **738-03**

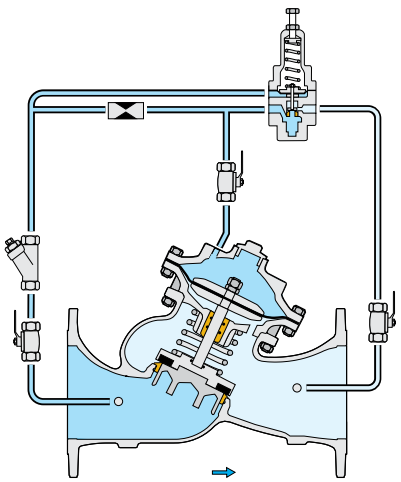
See relevant BERMAD publications.

## Operation - Pressure Sustaining (In-Line)

The Model 730 is a pilot controlled valve equipped with an adjustable, 2-Way pressure sustaining pilot.
The restriction **[1]** continuously allows flow from the main valve inlet into the upper control chamber **[2]**. The pilot **[3]** senses upstream pressure and should be set to minimum system pressure allowed.
Should upstream pressure tend to fall below pilot setting, the pilot throttles, enabling pressure to accumulate in the upper control chamber, causing the main valve to throttle, sustaining upstream (back) pressure at pilot setting.
Should upstream pressure be below pilot setting, the pilot closes, causing the main valve to close drip tight. Should upstream pressure tend to rise above pilot setting, the pilot releases accumulated pressure causing the main valve to modulate open.
The downstream cock valve **[4]** enables manual closing.




**Valve Regulates**

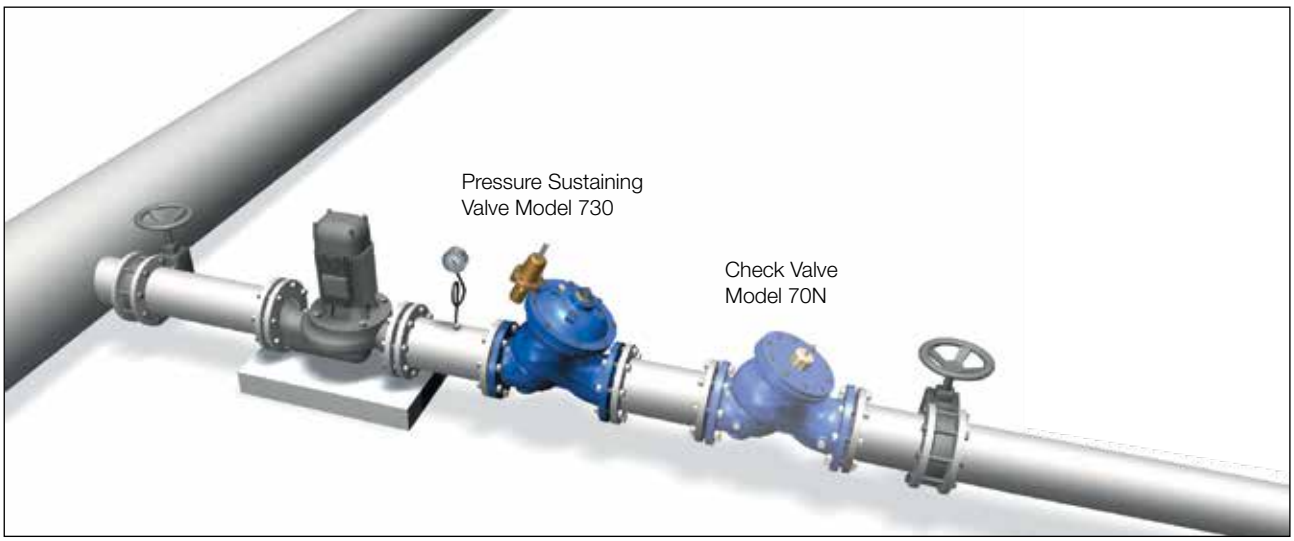


**Valve Closed**
(Upstream pressure below pilot setting)

## Typical Applications

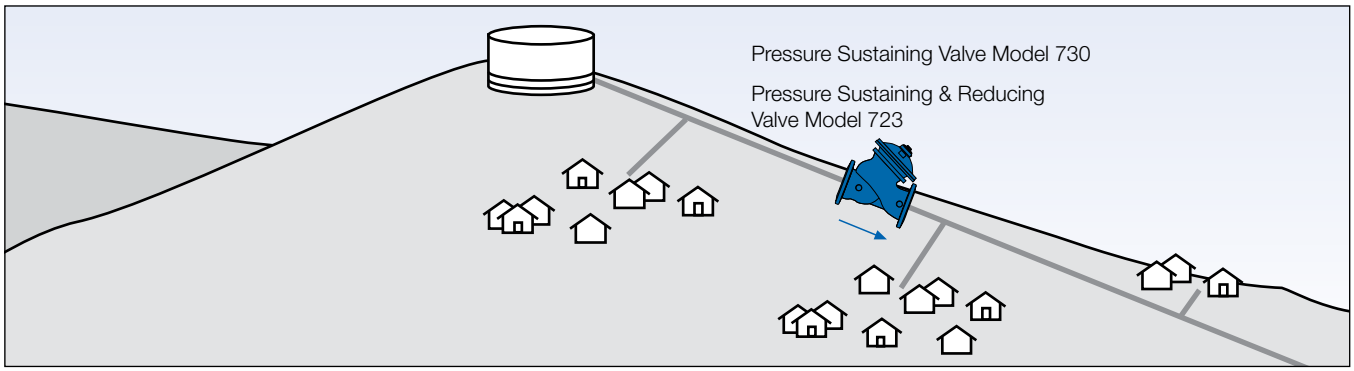
**Pump Overload and Cavitation Protection**

The Model 730 sustains pump discharge pressure, preventing pump overload and cavitation damage caused by excessive demand.
By connecting the pilot sensing line to pump suction, the Model 730 becomes Model 730R which sustains pump suction pressure.
Where suction pressure regimes vary, the Model 736 is needed to limit pump flow by sustaining pump differential pressure.



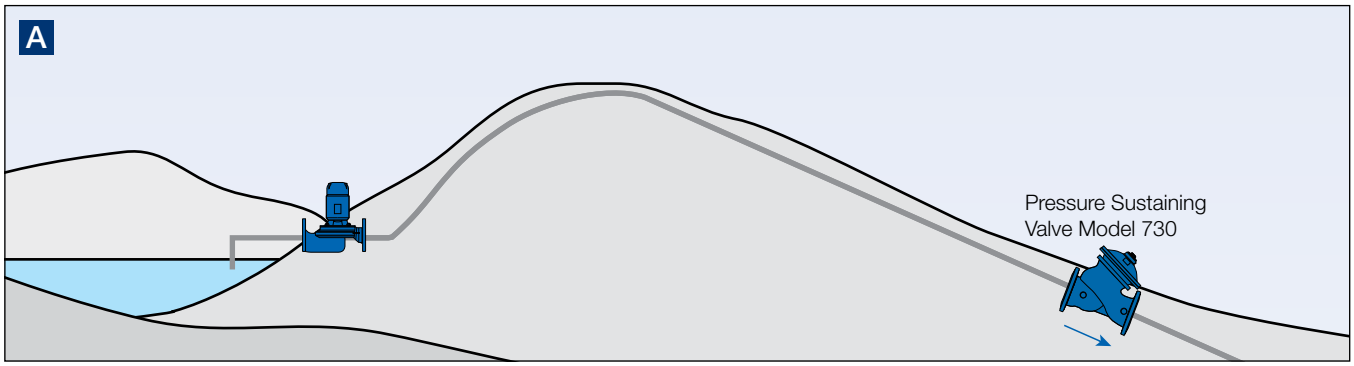
**Prioritizing One Zone over Another**

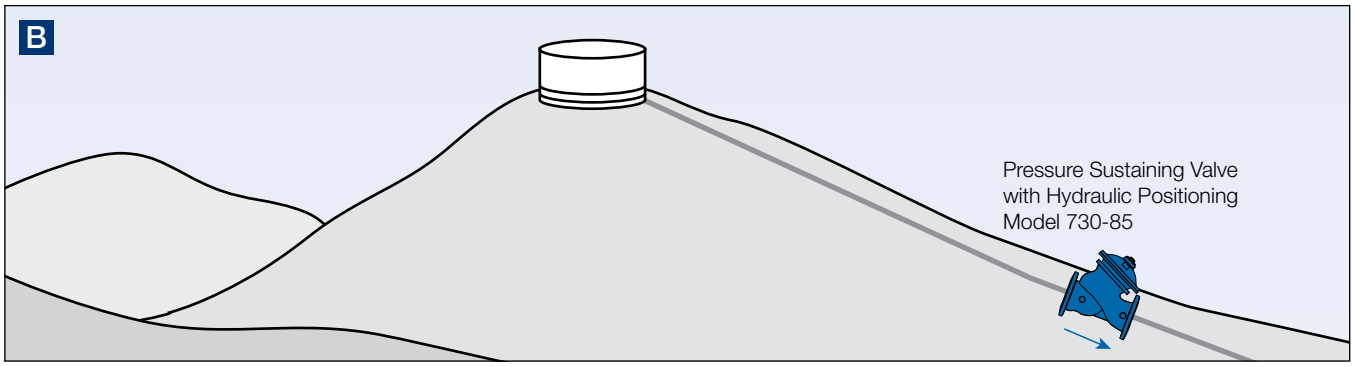
This application is usually found in gravity fed systems. The **Model 730** enables prioritizing the higher elevation zone over downhill consumers when they create excessive total demand.
By adding a pressure reducing feature to the primary pressure sustaining function, the Model 730 becomes a **Model 723** that also protects downhill consumers from over pressure during low demand.




**Preventing Line Emptying**

Line emptying presents a serious problem in water distribution networks. Preventing it in downhill networks requires setting the pilot slightly above the elevation differential between the highest point of the line and the valve.
Where a **pump** provides pressure A , the relatively high pressure causes the **Model 730** to open wide. When the pump stops, pressure drops below pilot setting and the valve closes drip-tight preventing line emptying.
Where a **reservoir** provides pressure B , there is only a small potential for variation in pressure (the difference in high and low reservoir levels). The problem is made worse by having a significant part of that potential pressure lost on line friction. The standard Model 730 might not be enough. The solution is to install a valve with very low head loss, super sensitivity, accuracy and repeatability.
Install the **Model 730-85** pressure sustaining with high sensitivity hydraulic positioning.



## Pilot System Specifications

### Standard Materials:

**Pilot:**

Body: Stainless Steel 316 or Bronze

Elastomers: Synthetic Rubber

Spring: Galvanized Steel or Stainless Steel

**Tubing & Fittings:**

Stainless Steel 316 or Copper & Brass

**Accessories:**

Stainless Steel 316, Brass and Synthetic Rubber Elastomers

### Pilot Adjustment Range:

0.5 to 3.0 bar ; 7 to 40 psi

0.8 to 6.5 bar ; 11 to 95 psi

1 to 16 bar ; 15 to 230 psi

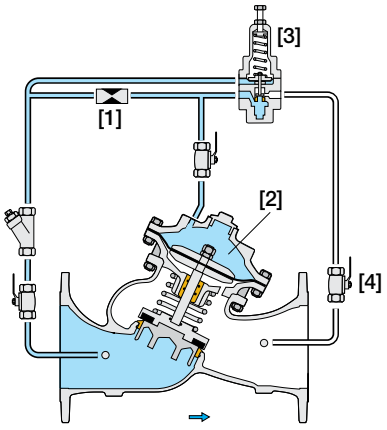
5 to 25 bar ; 70 to 360 psi

### Notes:

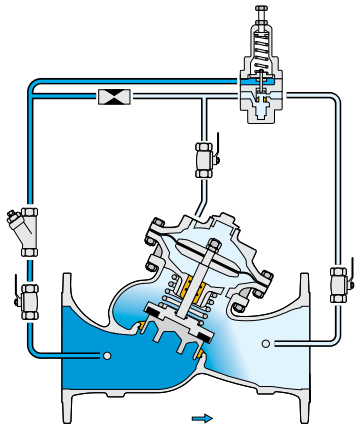
- Inlet pressure, outlet pressure and flow rate are required for optimal sizing and cavitation analysis
- Recommended continuous flow velocity: 0.3-6.0 m/sec ; 1-20 ft/sec
- Minimum operating pressure: 0.7 bar ; 10 psi. For lower pressure requirements consult factory.

## Operation - Pressure Relief (Circulation)

The Model 730 is a pilot controlled valve equipped with an adjustable, 2-Way pressure sustaining pilot.
The restriction **[1]** continuously allows flow from the main valve inlet into the upper control chamber **[2]**. The pilot **[3]** senses upstream pressure and should be set slightly above system working pressure.
Should upstream pressure rise above pilot setting, the pilot releases pressure from the upper control chamber, causing the main valve to modulate open, relieving excessive upstream pressure. Should upstream pressure fall, the pilot throttles, enabling pressure to accumulate in the upper control chamber, causing the main valve to throttle closed, sustaining upstream (back) pressure at the pilot setting. Should upstream pressure be below pilot setting, the pilot closes, causing the main valve to close drip tight.
The downstream cock valve **[4]** enables manual closing.




**Valve Closed**
(Upstream pressure below pilot setting)

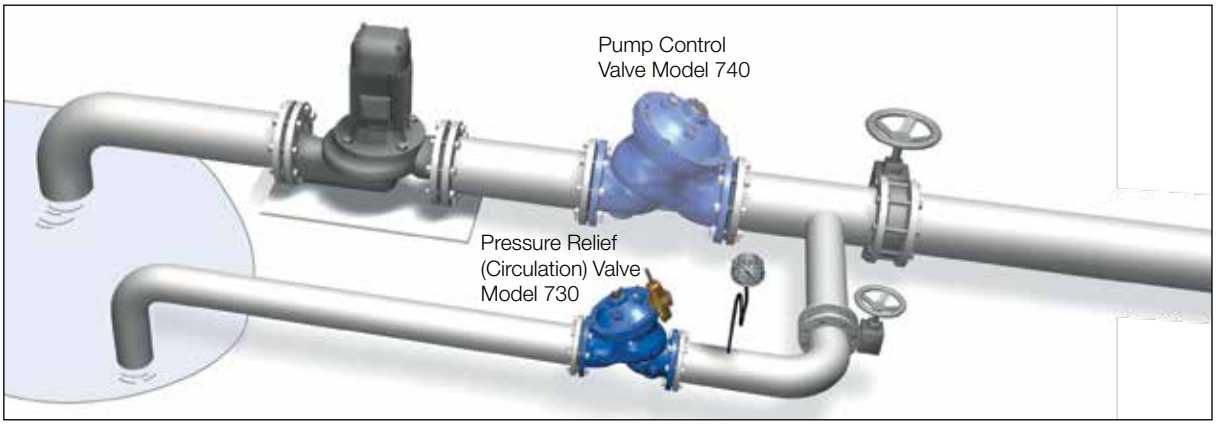


**Valve Regulates**

## Typical Applications

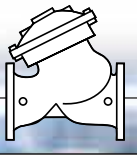
**Safeguarding Pump Minimum Flow**

The Model 730 relieves over pressure caused by excessive pump discharge during low demand. To keep a constant discharge pressure, the difference between pumped flow and consumer demand can be circulated back to pump suction.




Circulation valves are often exposed to severe cavitation because valve ΔP and velocity are usually high while downstream pressure is very low. On the other hand, the valves operate under these conditions for relatively short periods. Increased valve durability for applications requiring long operating periods will be achieved by using cavitation resistant materials, adding a downstream orifice, installing an upstream pressure reducing valve, increasing valve size, or any combination of these choices.

# BERMAD Waterworks



## 700 Series

## Technical Data

**Size Range:** DN40-900 ; 1½–36”
**End Connections (Pressure Ratings):**
**Flanged:** ISO PN16, PN25 (ANSI Class 150, 300)
**Threaded:** BSP or NPT
**Others:** Available on request
**Valve Patterns:** “Y” (globe) & angle, globe (DN600-900 ; 24”-36”)
**Working Temperature:** Water up to 80°C ; 180°F
**Standard Materials:**
**Body & Actuator:** Ductile Iron
**Internals:** Stainless Steel, Bronze & coated Steel
**Diaphragm:** Synthetic Rubber Nylon fabric-reinforced
**Seals:** Synthetic Rubber
**Coating:** Fusion Bonded Epoxy, RAL 5005 (Blue) approved for drinking water or Electrostatic Polyester Powder

## Differential Pressure Calculation

$$\Delta P = \left(\frac{Q}{(Kv;Cv)}\right)^2$$

**ΔP** = Differential Pressure for fully open valve (bar; psi)

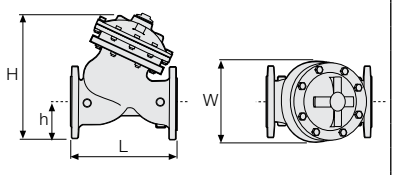
**Q** = Flow rate ($m^3/h$; gpm)

**Kv** = Metric system - valve flow coefficient (flow in $m^3/h$ at 1 bar ΔP with 15°C water)

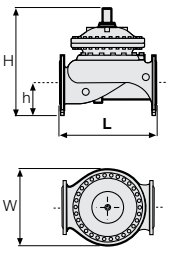
**Cv** = US system - Valve flow coefficient (flow in gpm at 1 psi ΔP with 60°F water)
Cv = 1.155 Kv

## Flow Data & Dimensions Table

| | | DN / Size | 40 | 1.5” | 50 | 2” | 65 | 2.5” | 80 | 3” | 100 | 4” | 150 | 6” | 200 | 8” | 250 | 10” | 300 | 12” | 350 | 14” | 400 | 16” | 450 | 18” | 500 | 20” |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Data | 700ES | Kv / Cv - Flat | 54 | 62 | 57 | 66 | 60 | 69 | 65 | 75 | 145 | 167 | 395 | 456 | 610 | 705 | 905 | 1,045 | 1,520 | 1,756 | - | - | 2,250 | 2,599 | - | - | 4,070 | 4,701 |
| | | Kv / Cv - V-Port | 46 | 53 | 48 | 56 | 51 | 59 | 55 | 64 | 123 | 142 | 336 | 388 | 519 | 599 | 769 | 888 | 1,292 | 1,492 | - | - | 1,913 | 2,209 | - | - | 3,460 | 3,996 |
| | 700 & 700EN | Kv / Cv - “Y” Flat | 42 | 49 | 50 | 58 | 55 | 64 | 115 | 133 | 200 | 230 | 460 | 530 | 815 | 940 | 1,250 | 1,440 | 1,850 | 2,140 | 1,990 | 2,300 | 3,310 | 3,820 | 3,430 | 3,960 | 3,550 | 4,100 |
| | | Kv / Cv - “Y” V-Port | 36 | 41 | 43 | 49 | 47 | 54 | 98 | 113 | 170 | 200 | 391 | 450 | 693 | 800 | 1,063 | 1,230 | 1,573 | 1,820 | 1,692 | 1,950 | 2,814 | 3,250 | 2,916 | 3,370 | 3,018 | 3,490 |
| 700-ES | PN16; 25 | L (mm / inch) | 230 | 9.1 | 230 | 9.1 | 290 | 11.4 | 310 | 12.2 | 350 | 13.8 | 480 | 18.9 | 600 | 23.6 | 730 | 28.7 | 850 | 33.5 | - | - | 1,100 | 43.3 | - | - | 1,250 | 49.2 |
| | | W (mm / inch) | 150 | 5.9 | 165 | 6.5 | 185 | 7.3 | 200 | 7.9 | 235 | 9.3 | 300 | 11.8 | 360 | 14.2 | 425 | 16.7 | 530 | 20.9 | - | - | 626 | 24.6 | - | - | 838 | 33 |
| | | h (mm / inch) | 80 | 3.1 | 90 | 3.5 | 100 | 3.9 | 105 | 4.1 | 125 | 4.9 | 155 | 6.1 | 190 | 7.5 | 220 | 8.7 | 250 | 9.8 | - | - | 320 | 12.6 | - | - | 385 | 15.2 |
| | | H (mm / inch) | 240 | 9.4 | 250 | 9.8 | 250 | 9.8 | 260 | 10.2 | 320 | 12.6 | 420 | 16.5 | 510 | 20.1 | 605 | 23.8 | 725 | 28.5 | - | - | 895 | 35.2 | - | - | 1,185 | 46.7 |
| | | Weight (Kg/lb) | 10 | 22 | 10.8 | 23.8 | 13.2 | 29 | 15 | 33 | 26 | 57.2 | 55 | 121 | 95 | 209 | 148 | 326 | 255 | 561 | - | - | 437 | 960 | - | - | 1,061 | 2,334 |
| 700-EN | PN16; 25 | L (mm / inch) | - | - | - | - | - | - | 310 | 12.2 | 350 | 13.8 | 480 | 18.9 | 600 | 23.6 | 730 | 28.7 | 850 | 33.5 | - | - | - | - | - | - | - | - |
| | | W (mm / inch) | - | - | - | - | - | - | 200 | 7.9 | 235 | 9.3 | 320 | 12.6 | 390 | 15.4 | 480 | 18.9 | 550 | 21.7 | - | - | - | - | - | - | - | - |
| | | h (mm / inch) | - | - | - | - | - | - | 100 | 3.9 | 118 | 4.6 | 150 | 5.9 | 180 | 7.1 | 213 | 8.4 | 243 | 9.6 | - | - | - | - | - | - | - | - |
| | | H (mm / inch) | - | - | - | - | - | - | 305 | 12 | 369 | 14.5 | 500 | 19.7 | 592 | 23.3 | 733 | 28.9 | 841 | 33.1 | - | - | - | - | - | - | - | - |
| | | Weight (Kg/lb) | - | - | - | - | - | - | 21 | 46.2 | 31 | 68.2 | 70 | 154 | 115 | 253 | 198 | 436 | 337 | 741 | - | - | - | - | - | - | - | - |
| 700 Flanged | “Y” PN16 Class 150 | L (mm / inch) | 205 | 8.1 | 210 | 8.3 | 222 | 8.7 | 250 | 9.8 | 320 | 12.6 | 415 | 16.3 | 500 | 19.7 | 605 | 23.8 | 725 | 28.5 | 733 | 28.9 | 990 | 39 | 1,000 | 39.4 | 1,100 | 43.3 |
| | | W (mm / inch) | 155 | 6.1 | 165 | 6.5 | 178 | 7 | 200 | 7.9 | 223 | 8.8 | 320 | 12.6 | 390 | 15.4 | 480 | 18.9 | 550 | 21.7 | 550 | 21.7 | 740 | 29.1 | 740 | 29.1 | 740 | 29.1 |
| | | h (mm / inch) | 78 | 3.1 | 83 | 3.3 | 95 | 3.7 | 100 | 3.9 | 115 | 4.5 | 143 | 5.6 | 172 | 6.8 | 204 | 8 | 242 | 9.5 | 268 | 10.6 | 300 | 11.8 | 319 | 12.6 | 358 | 14.1 |
| | | H (mm / inch) | 239 | 9.4 | 244 | 9.6 | 257 | 10.1 | 305 | 12 | 366 | 14.4 | 492 | 19.4 | 584 | 23 | 724 | 28.5 | 840 | 33.1 | 866 | 34.1 | 1,108 | 43.6 | 1,127 | 44.4 | 1,167 | 45.9 |
| | | Weight (Kg/lb) | 9.1 | 20 | 10.6 | 23 | 13 | 29 | 22 | 49 | 37 | 82 | 75 | 165 | 125 | 276 | 217 | 478 | 370 | 816 | 381 | 840 | 846 | 1,865 | 945 | 2,083 | 962 | 2,121 |
| | “Y” PN25 Class 300 | L (mm / inch) | 205 | 8.1 | 210 | 8.3 | 222 | 8.7 | 264 | 10.4 | 335 | 13.2 | 433 | 17 | 524 | 20.6 | 637 | 25.1 | 762 | 30 | 767 | 30.2 | 1,024 | 40.3 | 1,030 | 40.6 | 1,136 | 44.7 |
| | | W (mm / inch) | 155 | 6.1 | 165 | 6.5 | 185 | 7.3 | 207 | 8.1 | 250 | 9.8 | 320 | 12.6 | 390 | 15.4 | 480 | 18.9 | 550 | 21.7 | 570 | 22.4 | 740 | 29.1 | 740 | 29.1 | 750 | 29.5 |
| | | h (mm / inch) | 78 | 3.1 | 83 | 3.3 | 95 | 3.7 | 105 | 4.1 | 127 | 5 | 159 | 6.3 | 191 | 7.5 | 223 | 8.8 | 261 | 10.3 | 295 | 11.6 | 325 | 12.8 | 357 | 14.1 | 389 | 15.3 |
| | | H (mm / inch) | 239 | 9.4 | 244 | 9.6 | 257 | 10.1 | 314 | 12.4 | 378 | 14.9 | 508 | 20 | 602 | 23.7 | 742 | 29.2 | 859 | 33.8 | 893 | 35.2 | 1,133 | 44.6 | 1,165 | 45.9 | 1,197 | 47.1 |
| | | Weight (Kg/lb) | 10 | 22 | 12.2 | 27 | 15 | 33 | 25 | 55 | 43 | 95 | 85 | 187 | 146 | 322 | 245 | 540 | 410 | 904 | 434 | 957 | 900 | 1984 | 967 | 2,132 | 986 | 2,174 |
| 700 Threaded | “Y” PN16; 25 Class 150; 300 | L (mm / inch) | 155 | 6.1 | 155 | 6.1 | 212 | 8.3 | 250 | 9.8 | | | | | | | | | | | | | | | | | | |
| | | W (mm / inch) | 122 | 4.8 | 122 | 4.8 | 122 | 4.8 | 163 | 6.4 | | | | | | | | | | | | | | | | | | |
| | | h (mm / inch) | 40 | 1.6 | 40 | 1.6 | 48 | 1.9 | 56 | 2.2 | | | | | | | | | | | | | | | | | | |
| | | H (mm / inch) | 201 | 7.9 | 202 | 8 | 209 | 8.2 | 264 | 10.4 | | | | | | | | | | | | | | | | | | |
| | | Weight (Kg/lb) | 5.5 | 12 | 5.5 | 12 | 8 | 18 | 17 | 37 | | | | | | | | | | | | | | | | | | |
| | Angle PN16; 25 Class 150; 300 | L (mm / inch) | - | - | 121 | 4.8 | 140 | 5.5 | 159 | 6.3 | | | | | | | | | | | | | | | | | | |
| | | W (mm / inch) | - | - | 122 | 4.8 | 122 | 4.8 | 163 | 6.4 | | | | | | | | | | | | | | | | | | |
| | | R (mm / inch) | - | - | 40 | 1.6 | 48 | 1.9 | 55 | 2.2 | | | | | | | | | | | | | | | | | | |
| | | h (mm / inch) | - | - | 83 | 3.3 | 102 | 4 | 115 | 4.5 | | | | | | | | | | | | | | | | | | |
| | | H (mm / inch) | - | - | 225 | 8.9 | 242 | 9.5 | 294 | 11.6 | | | | | | | | | | | | | | | | | | |
| | | Weight (Kg/lb) | - | - | 5.5 | 12 | 7 | 15 | 15 | 33 | | | | | | | | | | | | | | | | | | |




| | | DN / Size | 600 | 24” | 700 | 28” | 750 | 30” | 800 | 32” | 900 | 36” |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Globe PN16 Class 150 | | L (mm / inch) | 1,450 | 57.1 | 1,650 | 65 | 1,750 | 68.9 | 1,850 | 72.8 | 1,850 | 72.8 |
| | | W (mm / inch) | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 |
| | | h (mm / inch) | 470 | 18.5 | 490 | 19.3 | 520 | 20.5 | 553 | 21.8 | 600 | 23.6 |
| | | H (mm / inch) | 1,965 | 77.4 | 1,985 | 78.1 | 2,015 | 79.3 | 2,048 | 80.6 | 2,095 | 82.5 |
| | | Weight (Kg/lb) | 3,250 | 7,150 | 3,700 | 8,140 | 3,900 | 8,580 | 4,100 | 9,020 | 4,250 | 9,350 |
| Globe PN25 Class 300 | | L (mm / inch) | 1,500 | 59.1 | 1,650 | 65 | 1,750 | 68.9 | 1,850 | 72.8 | 1,850 | 72.8 |
| | | W (mm / inch) | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 | 1,250 | 49.2 |
| | | h (mm / inch) | 470 | 18.5 | 490 | 19.3 | 520 | 20.5 | 553 | 21.8 | 600 | 23.6 |
| | | H (mm / inch) | 1,965 | 77.4 | 1,985 | 78.1 | 2,015 | 79.3 | 2,048 | 80.6 | 2,095 | 82.5 |
| | | Weight (Kg/lb) | 3,500 | 7,700 | 3,700 | 8,140 | 3,900 | 8,580 | 4,100 | 9,020 | 4,250 | 9.370 |




## Specify when ordering:

- Size
- Main model
- Additional features
- Pattern
- Body material
- End connection
- Coating
- Voltage & main valve position
- Tubing & Fittings materials
- Operational data (according to model)
- Pressure data
- Flow data
- Reservoir level data
- Settings

* Use Bermad’s Waterworks Ordering Guide

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