

## Proportional Pressure Reducing Valve

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



The Model 720-PD 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.

### Features and Benefits

- **Line pressure driven** – Independent operation
- **Elegant simplicity**
  - Most cost effective
  - Simple to maintain
  - Minimal external accessories
- **Variety of reduction ratios** – Perfect mission matching
- **Built-in check feature** – Replacing line sized check valve
- **In-line serviceable** – Easy maintenance
- **Double chamber**
  - Moderated valve reaction
  - Protected diaphragm
- **Flexible design** – Easy addition of features
- **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

- Solenoid control – 720-PD-55
- Closing & opening speed control – 720-PD-03
- Emergency pressure reducing valve – 720-PD-59
- Pressure sustaining – 723-PD

See relevant BERMAD publications.



## Operation

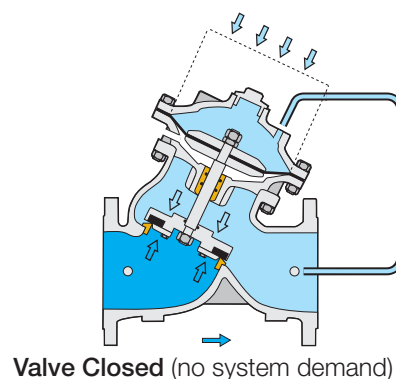
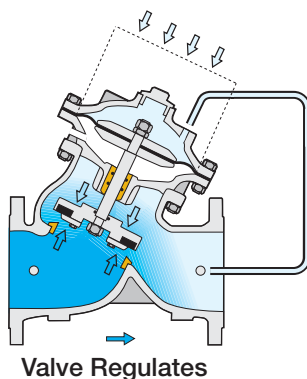
The Model 720-PD is a pilotless, double chambered, control valve. The downstream pressure is applied as the closing force on the top side of both the diaphragm and the seal disk areas. The upstream pressure is applied as the opening force on the bottom side of the seal disk area.

The net force, resulting from the two opposing dynamic forces acting on the actuator's diaphragm and seal, determines the degree to which the valve is open. The valve seeks the point where these forces are equal. As the ratio of the areas of the seal disk and the diaphragm is constant, the ratio of the upstream and downstream pressures is constant as well.

A rise in downstream pressure causes a momentary increase of the closing force. As a result, the valve throttles closed reducing downstream pressure according to the constant ratio.

Adding a V-Port Throttling Plug modifies valve ratio by increasing the effective diaphragm area.

When demand is zero, downstream pressure rises in proportion to the ratio, causing the valve to shut off.



## Engineer Specifications

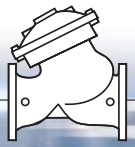
The Proportional Pressure Reducing Valve shall reduce higher upstream pressure to lower downstream pressure at a fixed ratio. The valve's control loop shall not consist of any pilot.

**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, 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 a sealed inherent separating partition between the lower surface of the diaphragm and the main valve. 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 center 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 a control tube connecting the upper control chamber to the valve outlet. All fittings shall be forged brass or stainless steel. The assembled valve shall be hydraulically tested to customer requirements.

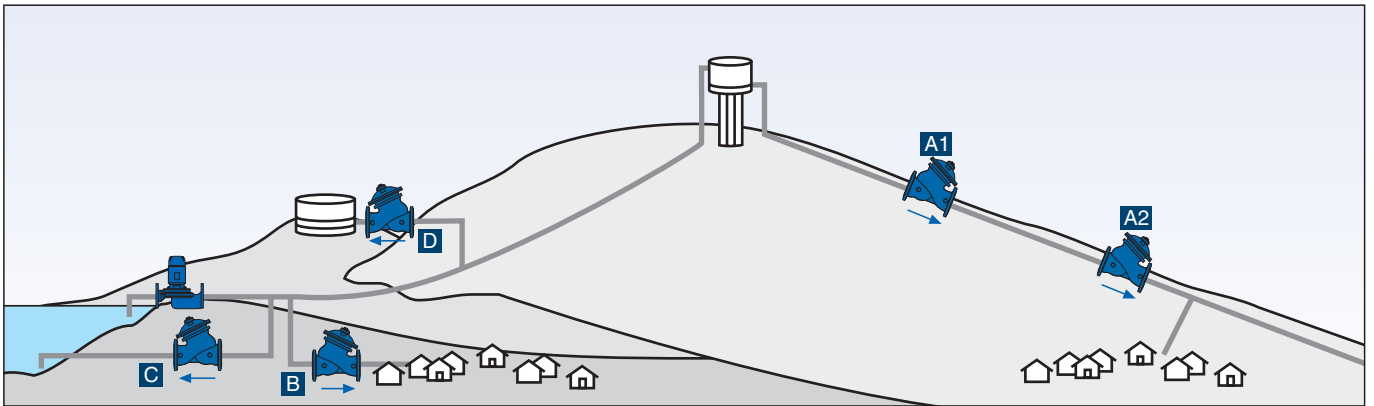
**Quality Assurance:** The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards.



## Typical Applications

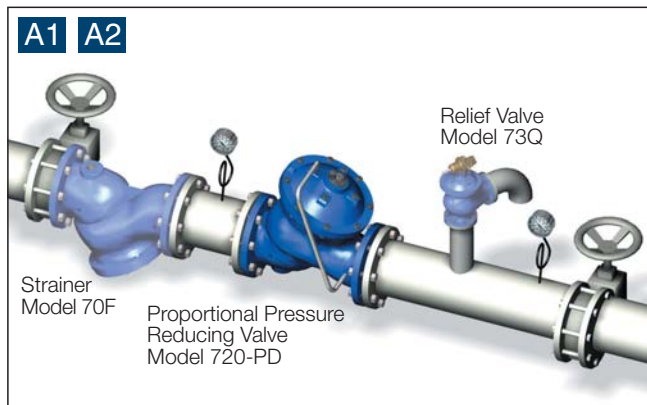
There are two major applications for the Model 720-PD Proportional Pressure Reducing Valve:

- Long downhill lines:
  - Systems A1 and A2 prevent the downhill line from exceeding its pressure rating.
- High differential pressure systems:
  - System B reduces cavitation damage and noise level by distributing the load of the high differential pressure.
  - System C illustrates protecting a circulation valve from high differential pressure and resultant severe cavitation.
  - System D shows protecting a level control valve from high differential pressure.

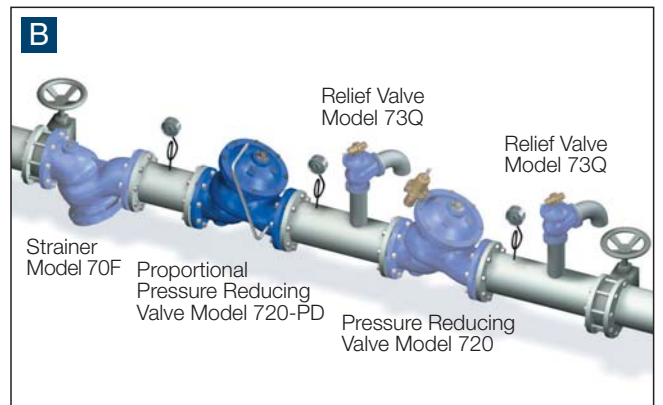


## Typical Installations

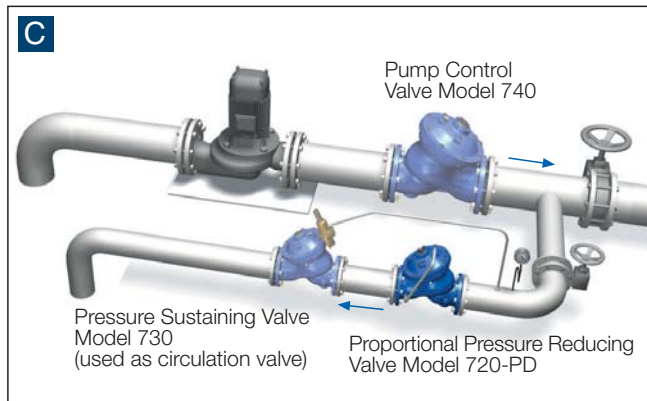
### Downhill Serial Pressure Reducing



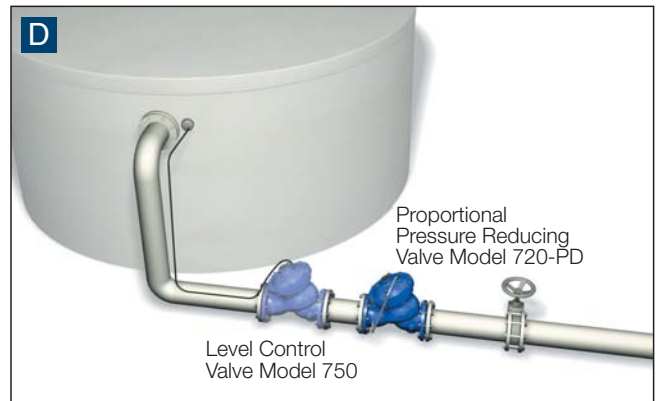
### High Differential Pressure Reducing System

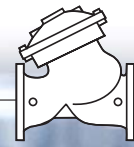


### High Differential Pressure Circulation System



### High Differential Pressure Level Control System

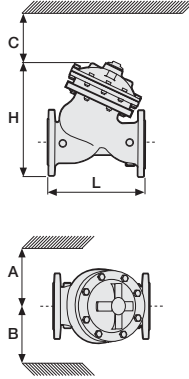




### Technical Data

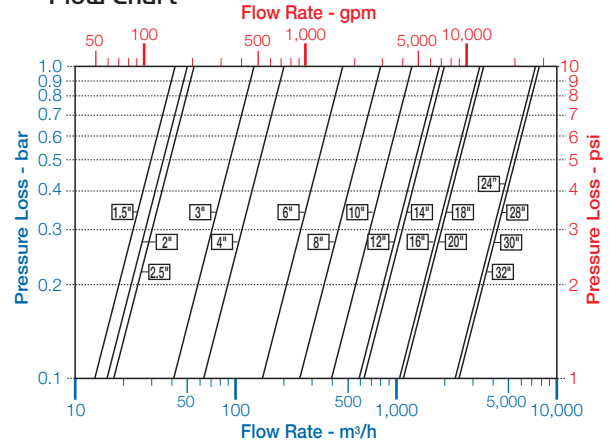
#### Dimensions and Weights

Size		A, B		C		L		H		Weight	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs
40	1 1/2"	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	2 1/2"	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:** 1 1/2"-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)

#### Reduction Ratios Table

Valve Size	Plug Type	
	Flat-Disc	V-Port
1 1/2- 2 1/2"	3.7	4.0
40- 65 mm	2.5	2.7
3"	2.6	2.9
80 mm	2.2	2.4
4"	2.5	2.8
100 mm	2.0	2.2
6"	2.5	2.7
150 mm	2.0	2.2
8"	2.4	2.6
200 mm	2.0	2.2
10"	2.3	2.5
250 mm	2.0	2.2
12-14"	2.2	2.4
300-350 mm	2.0	2.2
16-20"	2.2	2.3
400-500 mm	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.
- 24-32" (600-800 mm) reduction ratio: 2.2

#### Control System

**Standard Materials:**  
**Accessories:**  
 Bronze, Brass, Stainless Steel & NBR  
**Tubing:** Copper or Stainless Steel  
**Fittings:** Forged Brass or Stainless Steel

#### 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	Additional Attributes
WW	6"	720	PD	Y	C	16	EB	-	CB	VI
Waterworks	1 1/2 - 32"	Proportional Pressure Reducing		Oblique (up to 20") Angle (up to 18") Globe (24-32" only)	Ductile Iron Standard Cast Steel St. Steel 316 Nickel Alumin. Bronze	Epoxy FB Blue Polyester Green Polyester Blue Uncoated	EB PG PB UC		Copper Tubing & Brass Fittings Plastic Tubing & Brass Fittings St. St. 316 Tubing & Fittings	CB PB NN
Automatic Regulation Override			09	ISO-16	16	24VAC/50Hz - N.C. 24VAC/50Hz - N.O. 24VDC - N.C. 24VDC - N.O. 24VDC - L.P. 220VAC/50-60Hz N.C. 220VAC/50-60Hz N.O.	4AC 4AO 4DC 4DO 4DP 2AC 2AO		Valve Position Indicator V-Port Throttling Plug Electric Limit Switch St. St. 316 Internal Trim (Closure & Seat) St. St. 316 Actuator Internal Assembly Delrin Bearing Viton Elastomers for Seals & Diaphragm Pressure Gauge	I V S T D R E 6
Solenoid Controlled			55	ISO-25	25					
Electric Override			59	ANSI-150	A5					
Proportional Standard Ratio			PD	ANSI-300	A3					
Proportional Optional Ratio			PD2	JIS-16	J6					
				JIS-20	J2					

Multiple choices permitted

