

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

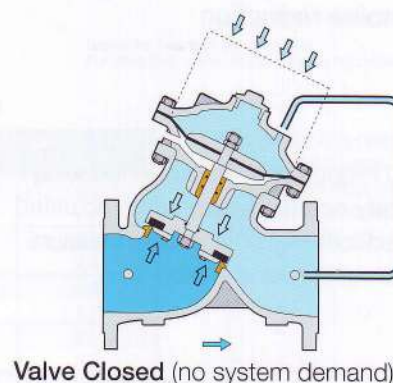
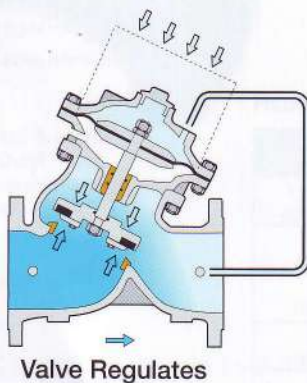
The Model 720-PD is a pilotless, double chambered, control valve. The downstream pressure is applied as the closing force on the top side of both the diaphragm and the seal disk areas. The upstream pressure is applied as the opening force on the bottom side of the seal disk area.

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

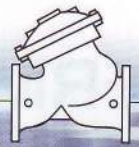
The Proportional Pressure Reducing Valve shall reduce higher upstream pressure to lower downstream pressure at a fixed ratio. The valve's control loop shall not consist of any pilot.

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.

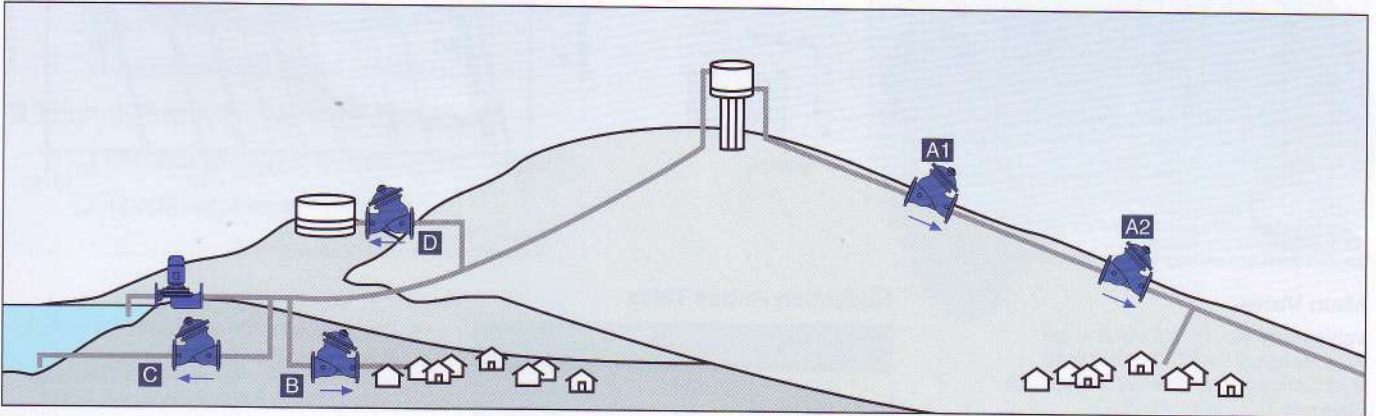
Quality Assurance: The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard. The main valve shall be certified as a complete drinking water valve according to NSF, WRAS, and other recognized standards.



Typical Applications

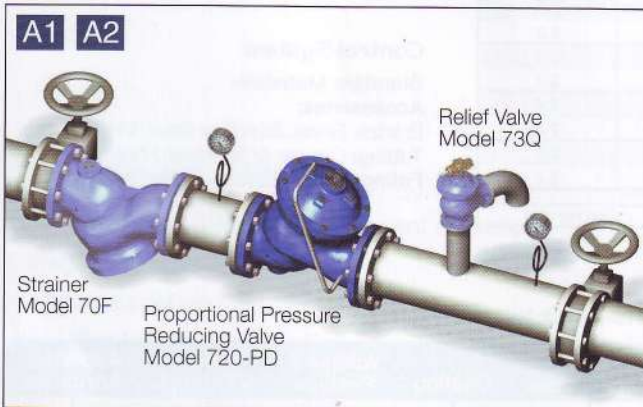
There are two major applications for the Model 720-PD Proportional Pressure Reducing Valve:

- 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.

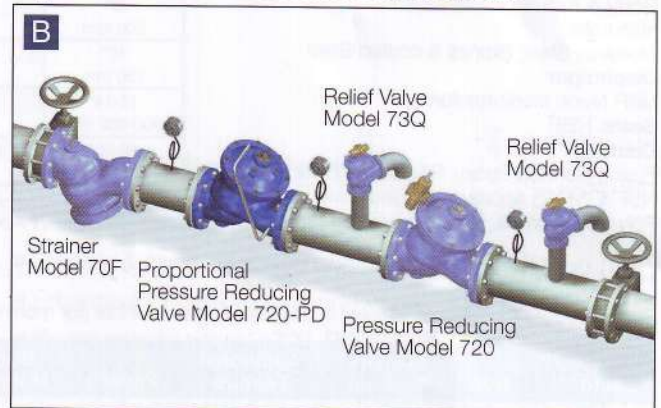


Typical Installations

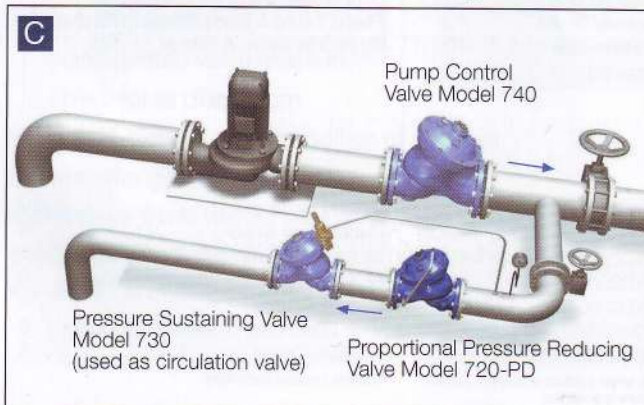
Downhill Serial Pressure Reducing



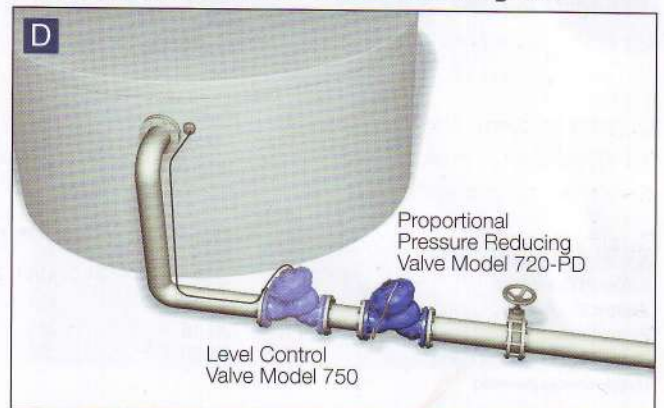
High Differential Pressure Reducing System

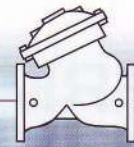


High Differential Pressure Circulation System



High Differential Pressure Level Control System



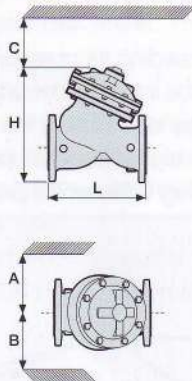


700 Series Model 720-PD

Technical Data

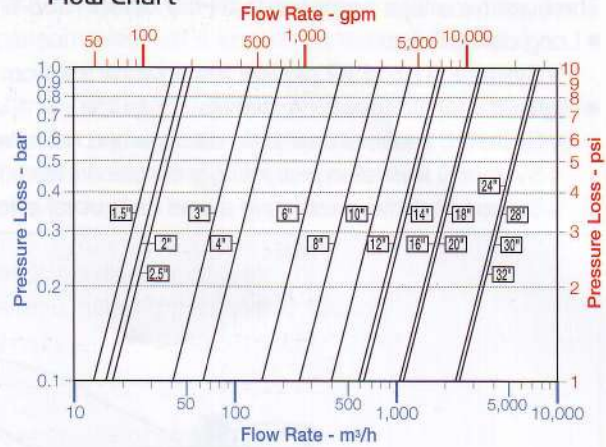
Dimensions and Weights

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 43.8	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

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.
- 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)	Y A G	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	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
Automatic Regulation Override		09	ISO-16	16		24VAC/50Hz - N.C.	4AC	Valve Position Indicator	I	
Solenoid Controlled		55	ISO-25	25		24VAC/50Hz - N.O.	4AO	V-Port Throttling Plug	V	
Electric Override		59	ANSI-150	A5		24VDC - N.C.	4DC	Electric Limit Switch	S	
Proportional Standard Ratio		PD	ANSI-300	A3		24VDC - N.O.	4DO	St. St. 316 Internal Trim (Closure & Seat)	T	
Proportional Optional Ratio		PD2	JIS-16	J6		24VDC - L.P.	4DP	St. St. 316 Actuator Internal Assembly	D	
Multiple choices permitted			JIS-20	J2		220VAC/50-60Hz N.C.	2AC	Delrin Bearing	R	
						220VAC/50-60Hz N.O.	2AO	Viton Elastomers for Seals & Diaphragm	E	
						Use when additional electric control feature is selected		Pressure Gauge	6	
								Multiple choices permitted		

