



Proportional Pressure Reducing Valve

Model 720-PD

- 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

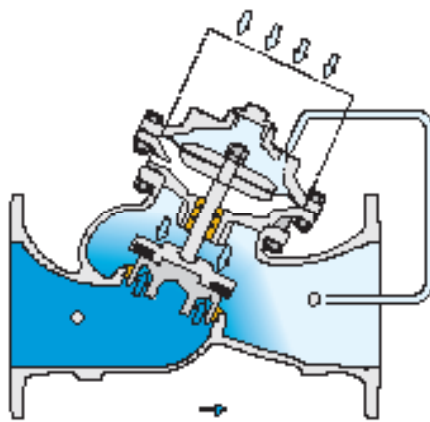
The Model 720-PD is a pilotless, double chambered, control valve. The downstream pressure is applied as the closing force on the top side of both the diaphragm and the seal disk areas. The upstream pressure is applied as the opening force on the bottom side of the seal disk area.

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.

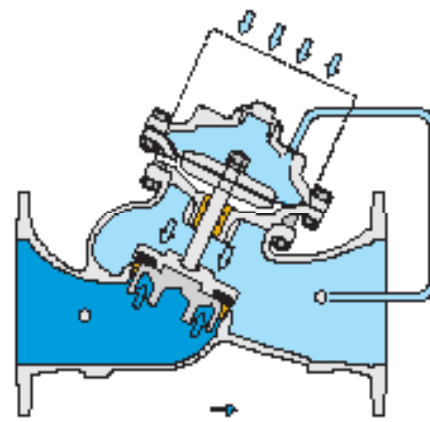
A rise in downstream pressure causes a momentary increase of the closing force. As a result, the valve throttles closed reducing downstream pressure according to the constant ratio.

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.



Valve Regulates



Valve Closed (no system demand)

Reduction Ratios Table

Valve Size		700; 700EN		700ES	
inch	mm	Flat-Disc	V-Port	Flat-Disc	V-Port
1.5", 2", 2.5"	40, 50, 65	3.7	4.0	2.8	3.2
3"	80	2.6	2.9	2.8	3.2
4"	100	2.5	2.8	2.6	2.9
5"	125	-	-	2.5	2.8
6"	150	2.5	2.7	2.5	2.8
8"	200	2.4	2.6	2.5	2.7
10"	250	2.3	2.5	2.4	2.6
12"	300	2.2	2.4	2.3	2.5
14"	350	2.2	2.4	-	-
16"	400	2.2	2.3	2.2	2.4
18"	450	2.2	2.3	-	-
20"	500	2.2	2.3	2.2	2.3

Notes:

- Reduction ratio may vary at extreme flow velocity & upstream pressure.
- Reduction ratios are based on flow velocity of 2.0-3.0 m/sec ; 6.5-10 ft/sec
- Recommended continuous flow velocity: 0.3-6.0 m/sec ; 1-20 ft/sec
- Minimum operating pressure: 0.7 bar ; 10 psi.

Pilot System Specifications

Standard Materials:

Tubing & Fittings:

Stainless Steel 316 or Copper & Brass

Accessories:

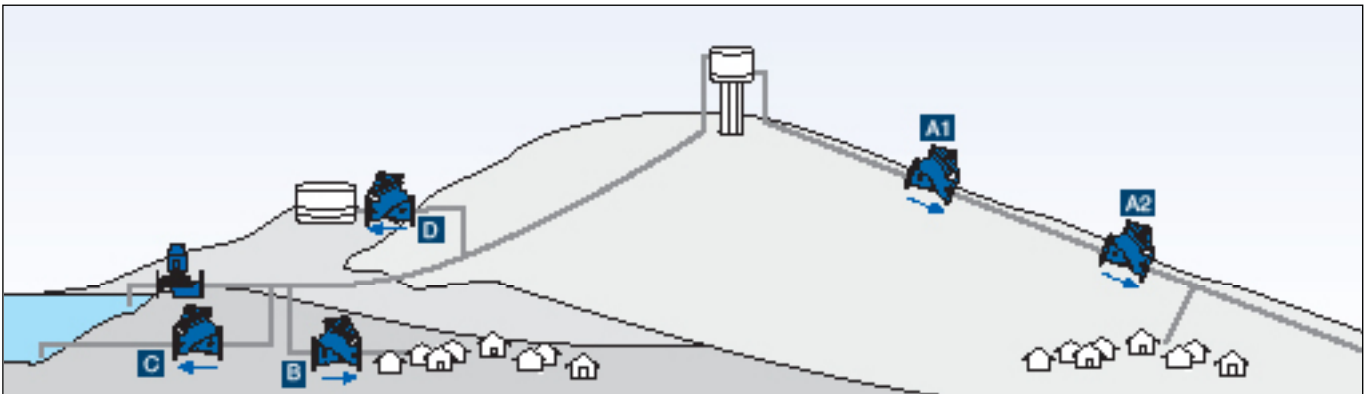
Stainless Steel 316 or Brass



Typical Applications

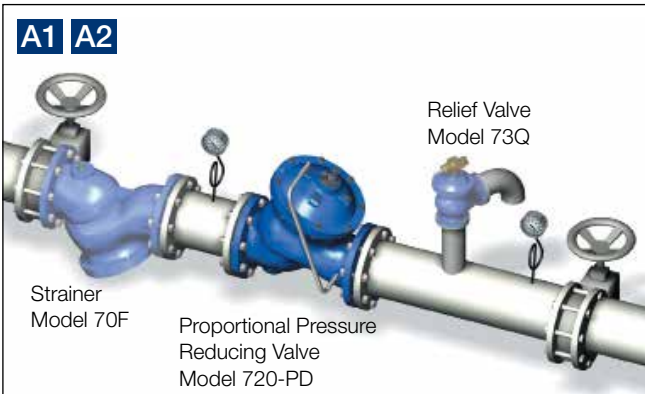
There are two major applications for the Model 720-PD Proportional Pressure Reducing Valve:

- 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.

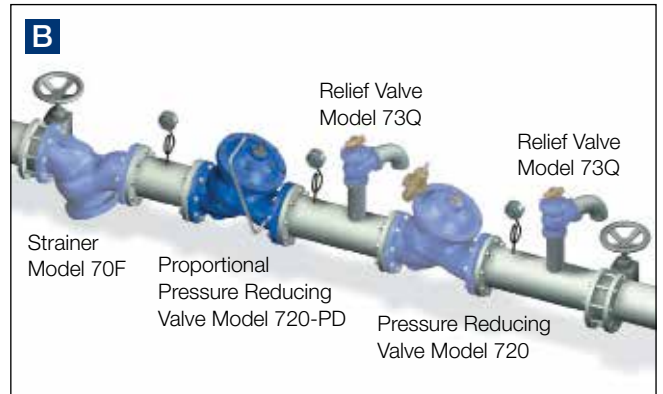


Typical Installations

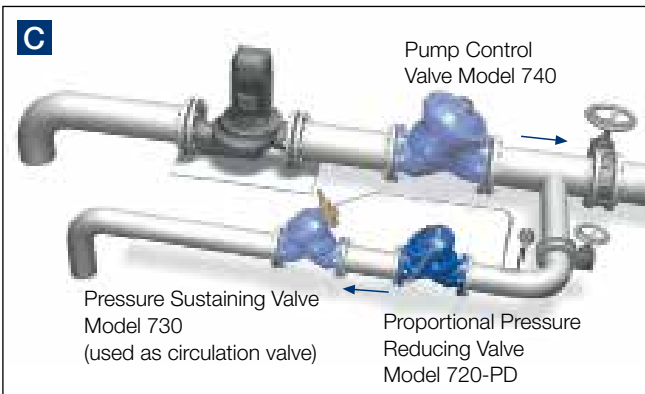
Downhill Serial Pressure Reducing System



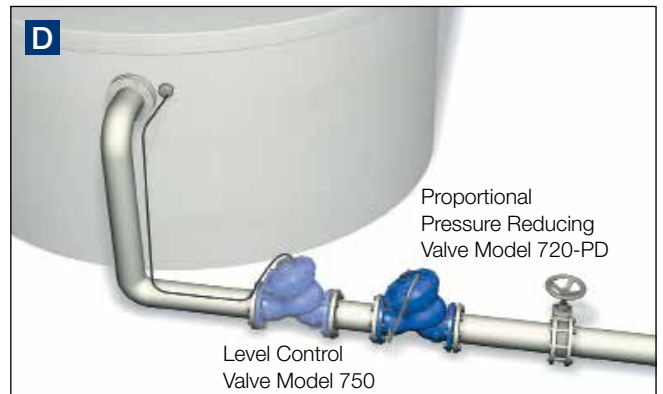
High Differential Pressure Reducing System



High Differential Pressure Circulation System



High Differential Pressure Level Control System





Technical Data

Size Range: DN40-900 ; 1 1/2-36"

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 (m³/h; gpm)

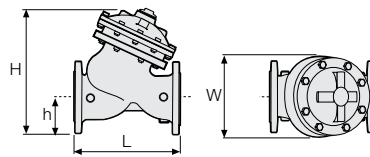
Kv = Metric system - valve flow coefficient
(flow in m³/h at 1 bar ΔP with 15°C water)

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	700-ES																													
	700-EN																													
	700-EN																													
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	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		
	"Y" PN25 Class 300	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		
		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		
	"Y" PN16 Class 150; 300	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		
		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																				
700 Threaded	"Y" PN16; 25 Class 150; 300	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																				
		L (mm / inch)	-	-	121	4.8	140	5.5	159	6.3																				
	Angle PN16; 25 Class 150; 300	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																						

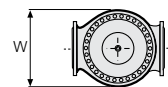
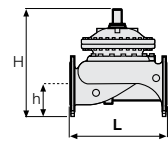


Specify when ordering:

- 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 Bernad's Waterworks Ordering Guide

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
Globe PN25 Class 300	Weight (Kg/lb)	3,250	7,150	3,700	8,140	3,900	8,580	4,100	9,020	4,250	9,350
	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
Globe PN25 Class 300	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





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