



# 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

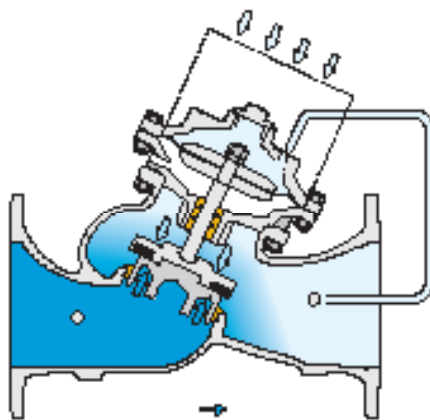
The Model 720-PD is a pilotless, double chambered, control valve. The downstream pressure is applied as the closing force on the top side of both the diaphragm and the seal disk areas. The upstream pressure is applied as the opening force on the bottom side of the seal disk area.

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.

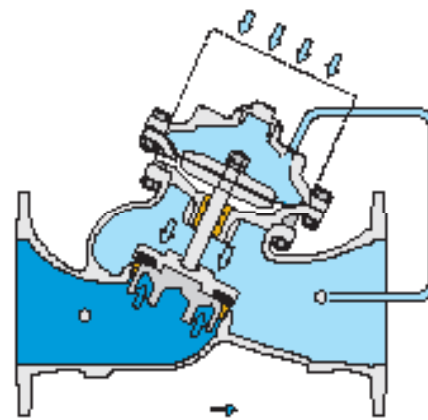
A rise in downstream pressure causes a momentary increase of the closing force. As a result, the valve throttles closed reducing downstream pressure according to the constant ratio.

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

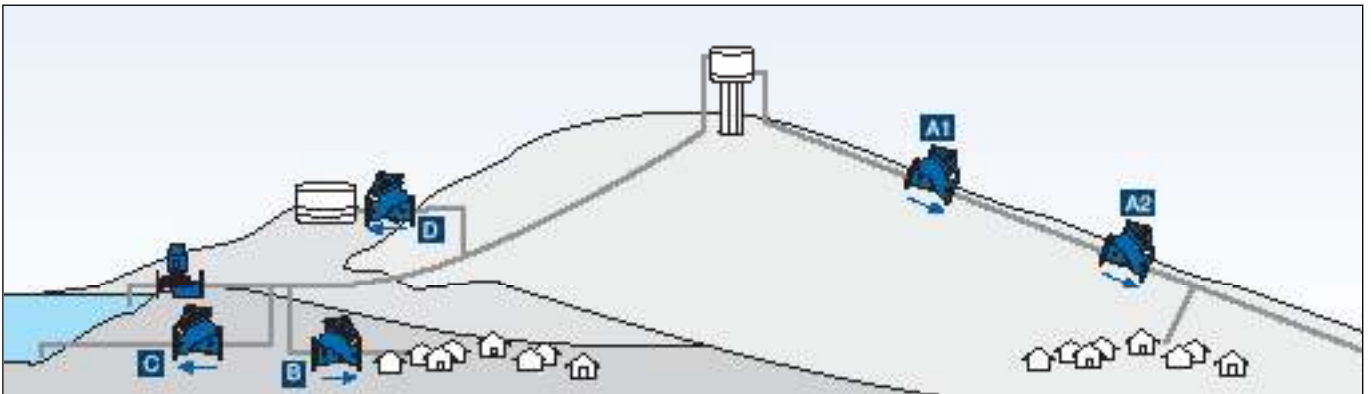




## Typical Applications

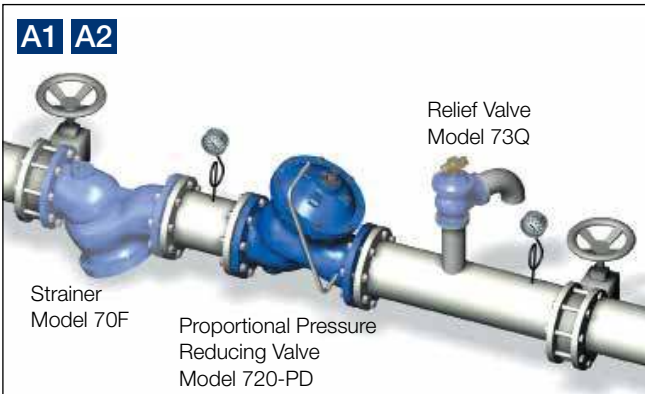
There are two major applications for the Model 720-PD Proportional Pressure Reducing Valve:

- 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.

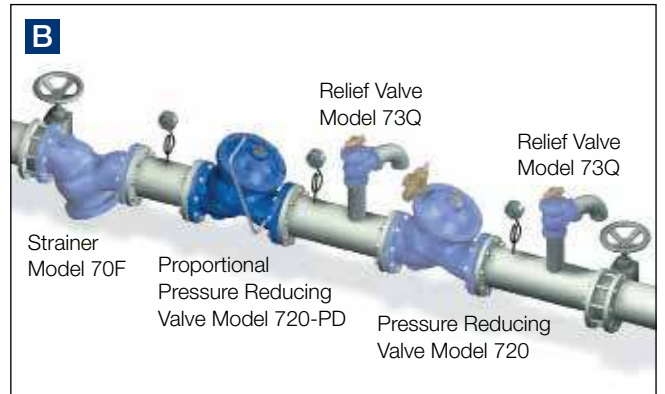


## Typical Installations

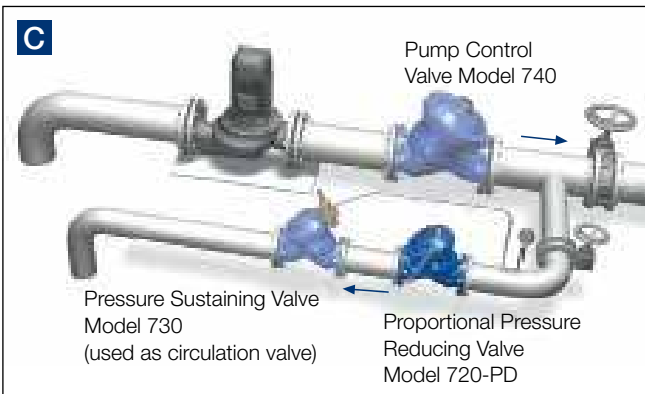
### Downhill Serial Pressure Reducing System



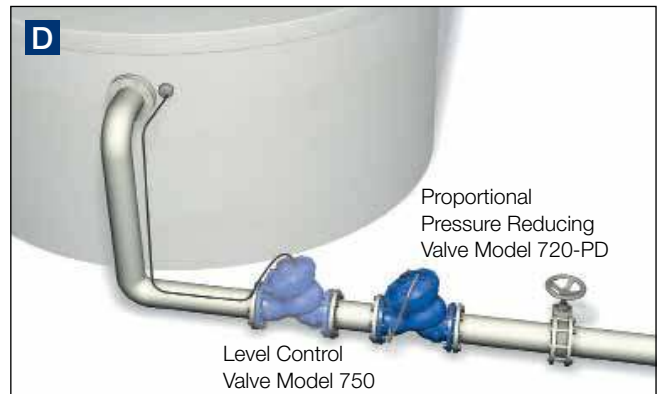
### High Differential Pressure Reducing System



### High Differential Pressure Circulation System



### High Differential Pressure Level Control System





### Technical Data

**Size Range:** DN40-900 ; 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 (m³/h; gpm)

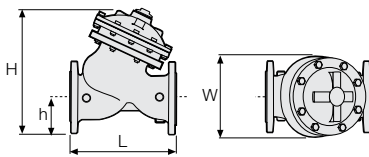
**Kv** = Metric system - valve flow coefficient  
(flow in m³/h at 1 bar ΔP with 15°C water)

**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 & 700ES	Kv / Cv - Flat																											
	700 & 700EN	Kv / Cv - V-Port																											
	700 & 700EN	Kv / Cv - "Y" Flat																											
700-ES	PN16; 25	Kv / Cv - "Y" V-Port																											
		L (mm / inch)																											
		W (mm / inch)																											
		h (mm / inch)																											
		H (mm / inch)																											
700-EN	PN16; 25	Weight (Kg/lb)																											
		L (mm / inch)																											
		W (mm / inch)																											
		h (mm / inch)																											
		H (mm / inch)																											
700 Flanged	"Y" PN16 Class 150	Weight (Kg/lb)																											
		L (mm / inch)																											
		W (mm / inch)																											
		h (mm / inch)																											
		H (mm / inch)																											
	"Y" PN25 Class 300	Weight (Kg/lb)																											
		L (mm / inch)																											
		W (mm / inch)																											
		h (mm / inch)																											
		H (mm / inch)																											
700 Threaded	"Y" PN16; 25 Class 150; 300	Weight (Kg/lb)																											
		L (mm / inch)																											
		W (mm / inch)																											
		h (mm / inch)																											
		H (mm / inch)																											
	Angle PN16; 25 Class 150; 300	Weight (Kg/lb)																											
		L (mm / inch)																											
		W (mm / inch)																											
		R (mm / inch)																											
		h (mm / inch)																											



### 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

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

