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 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.

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**Typical Installations**

**Downhill Serial Pressure Reducing**

- **A1, A2**
  - Strainer Model 70F
  - Proportional Pressure Reducing Valve Model 720-PD

**High Differential Pressure Reducing System**

- **B**
  - Strainer Model 70F
  - Proportional Pressure Reducing Valve Model 720-PD
  - Pressure Reducing Valve Model 720

**High Differential Pressure Circulation System**

- **C**
  - Pump Control Valve Model 740
  - Pressure Sustaining Valve Model 730 (used as circulation valve)
  - Proportional Pressure Reducing Valve Model 720-PD

**High Differential Pressure Level Control System**

- **D**
  - Level Control Valve Model 750
  - Proportional Pressure Reducing Valve Model 720-PD
Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide).

### Technical Data

**Dimensions and Weights**

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<tr>
<th>Size</th>
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<th>C</th>
<th>L</th>
<th>H</th>
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<td>mm</td>
<td>mm</td>
<td>mm</td>
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*Data is for Y-pattern, flanged, PN16 valves

**Reduction Ratios Table**

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<td>400-550 mm</td>
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**Control System**

### How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide).

**Observations:**

- 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

**Main Valve**

Valve Patterns: “Y” (globe) & “∠”

Size Range: 1¹/₂ – 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 30°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)

**Accessories:**

- NSF & WRAS approved or Electrostatic Polyester Powder, RAL 6017 (Green)
- Data is for Y-pattern, flat disk valves
- For more flow charts, refer to Engineering Section