

High Pressure, 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



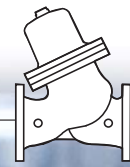
The Model 820-PP High Pressure, Proportional Pressure Reducing Valve is a hydraulically operated, piston actuated control valve that reduces higher upstream pressure to lower downstream pressure at a fixed ratio.

Features and Benefits

- **Robust structure, piston actuated** – High pressure service
- **Line pressure driven** – Independent operation
- **Elegant simplicity**
 - Most cost effective
 - Simple to maintain
 - Minimal external accessories
- **Built-in check feature** – Replacing line sized check valve
- **In-line serviceable** – Easy maintenance
- **Double chamber** – Moderated valve reaction
- **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 – **820-PP-55**
- Closing & opening speed control – **820-PP-03**
- Emergency pressure reducing valve – **820-PP-59**
- Pressure sustaining – **823-PB**



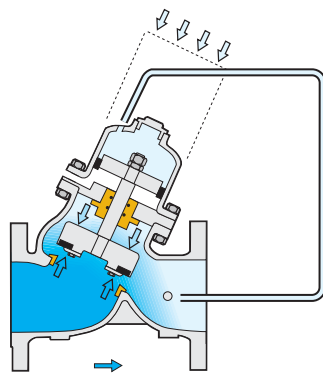
Operation

The Model 820-PP is a pilotless, double chambered control valve. The downstream pressure is applied as the closing force on the top side of both the piston and the seal disk areas. The upstream pressure is applied as the opening force on the bottom side of the seal disk area.

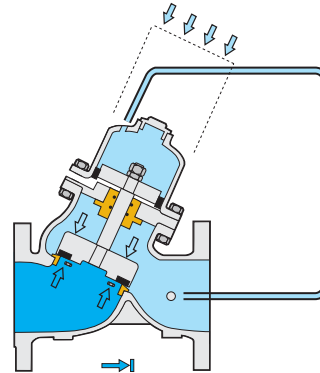
The net force, resulting from the two opposing dynamic forces acting on the actuator's piston and seal, determines the degree to which the valve is open. The valve seeks the point where these forces are equal. As the ratio of the areas of the seal disk and the piston is constant, the ratio of the upstream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

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)

Engineer Specifications

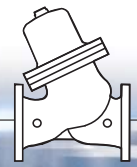
The Proportional Pressure Reducing Valve shall reduce higher upstream pressure to lower downstream pressure at a fixed ratio. The valves control loop shall not consist of any pilot. The reduction ratio shall not vary according to the flow.

Main Valve: The main valve shall be a center guided, piston 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. 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 piston and the main valve. 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.

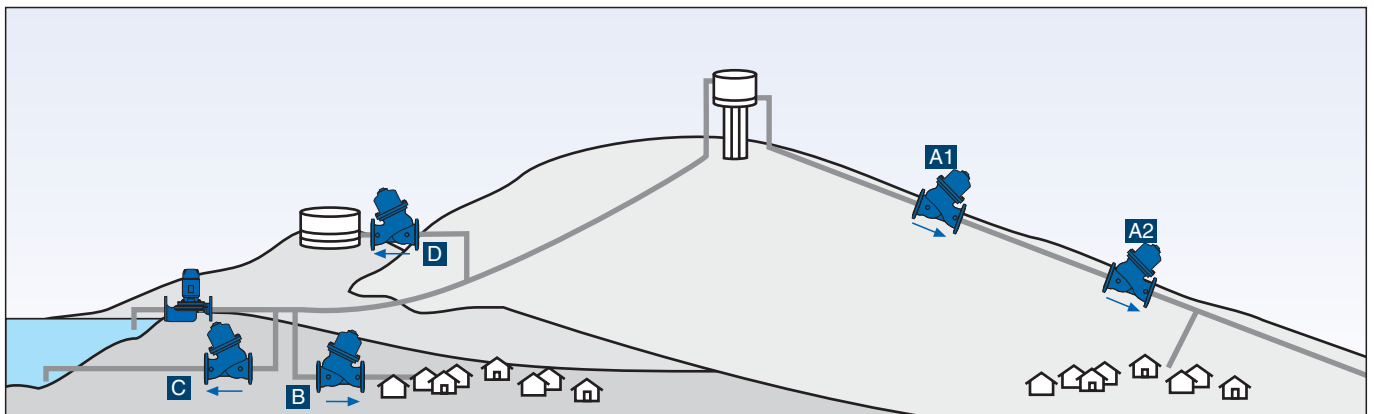
Quality Assurance: The valve manufacturer shall be certified according to the ISO 9001 Quality Assurance Standard.



Typical Applications

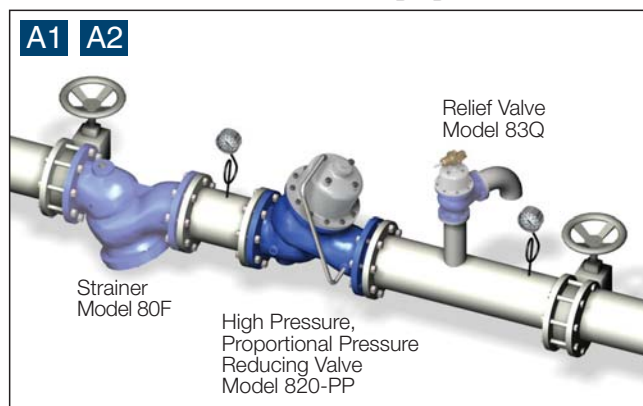
There are two major applications for the Model 820-PP High Pressure, Proportional Pressure Reducing Valve:

- 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 protection of a circulation valve from high differential pressure and resultant severe cavitation.
 - System D shows protection of a level control valve from high differential pressure.

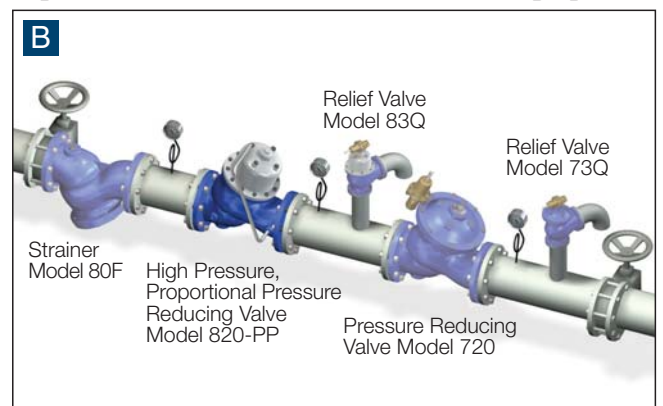


Typical Installations

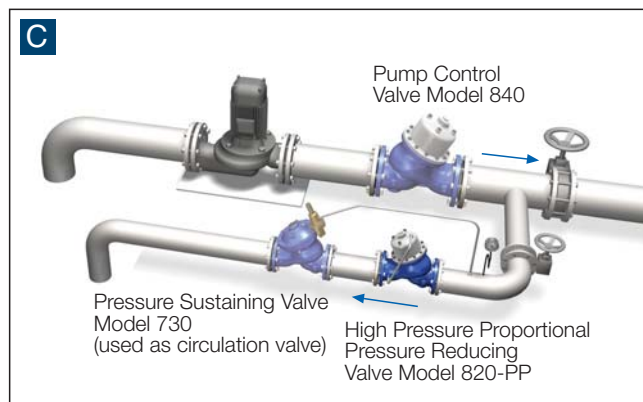
Downhill Serial Pressure Reducing System



High Differential Pressure, Pressure Reducing System

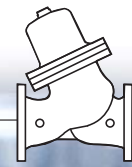


High Differential Pressure Circulation System



High Differential Pressure Level Control System



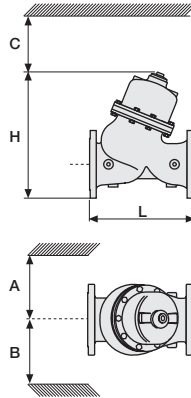


Technical Data

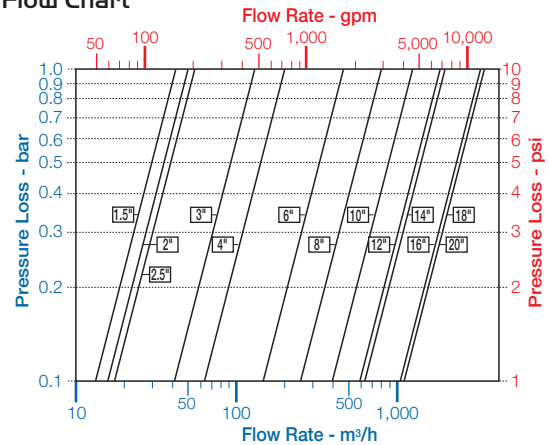
Dimensions and Weights

Size	A, B		C		L		H		Weight		
	mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
40	1 1/2"	210	8	180	7	205	8.1	260	10.2	11.8	26
50	2"	210	8	180	7	210	8.3	265	10.4	15	33
65	2 1/2"	210	8	180	7	222	8.7	278	10.9	18.4	40
80	3"	230	9	230	9	264	10.4	332	13.1	32	70
100	4"	255	10	275	11	335	13.2	422	16.6	56	123
150	6"	290	11	385	15	433	17	542	21.3	106	233
200	8"	335	13	460	18	524	20.6	666	26.2	190	418
250	10"	380	15	580	23	637	25.1	783	30.8	307	675
300	12"	405	16	685	27	762	30	961	37.8	505	1111
350	14"	405	16	685	27	767	30.2	996	39.2	549	1208
400	16"	505	20	965	38	1024	40.3	1179	46.4	1070	2354
450	18"	505	20	965	38	1030	40.5	1208	47.6	1095	2409
500	20"	505	20	965	38	1136	44.7	1241	48.9	1129	2484

Data is for Y-pattern, PN25,40/ANSI300,400 valves
Weight is for basic valves
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"-20" (40-500 mm)*
End Connections (Pressure Ratings):
Flanged: ISO PN16, PN25, PN40 (ANSI Class 150, 300, 400)
Others: Available on request
Working Temperature:
Water up to 80°C (180°F)
Standard Materials:
Body: Carbon Steel or Ductile Iron
Cover (piston cylinder):
Bronze or Stainless Steel
Internals:
Stainless Steel & Bronze
Seals: NBR
Coating:
Fusion Bonded Epoxy, RAL 5005 (Blue)
NSF & WRAS approved or Electrostatic Polyester Powder, RAL 6017 (Green)

* 16-20" (400-500mm) valves are rated PN25 (Class 300)

Reduction Ratios Table

Valve Size	Reduction Ratio
1 1/2- 2 1/2" 40- 65 mm	2.3
3" 80 mm	2.3
4" 100 mm	2.5
6" 150 mm	2.2
8" 200 mm	2.3
10" 250 mm	2.3
12-14" 300-350 mm	2.1
16-20"* 400-500 mm*	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"	820	PP	Y	S	40	EB	-	NN	VI
Waterworks	1 1/2 - 20"	Proportional Pressure Reducing	Oblique (up to 20") Angle (up to 18")	Y A	Cast Steel Ductile Iron Standard St. Steel 316 Nickel Alumin. Bronze	Epoxy FB Blue Polyester Green Polyester Blue Uncoated	EB PG PB UC	Copper Tubing & Brass Fittings St. St. 316 Tubing & Fittings	CB 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			ISO-16 ISO-25 ISO-40 ANSI-150 ANSI-300 ANSI-400	16 25 40 A5 A3		24VAC/50Hz - N.C. 24VAC/50Hz - N.O. 24VDC - N.C. 24VDC - N.O.	4AC 4AO 4DC 4DO		I V S T D	
Solenoid Controlled			ANSI-16 JIS-16	J6		24VDC - L.P. 220VAC/50-60Hz N.C. 220VAC/50-60Hz N.O.	4DP 2AC 2AO		R E 6	
Electric Override			ANSI-20 JIS-20	J2						
Proportional Standard Ratio			JIS-30	J3						
Multiple choices permitted										

