



High Pressure, Proportional Pressure Reducing Valve

Model 820-PP

- 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**



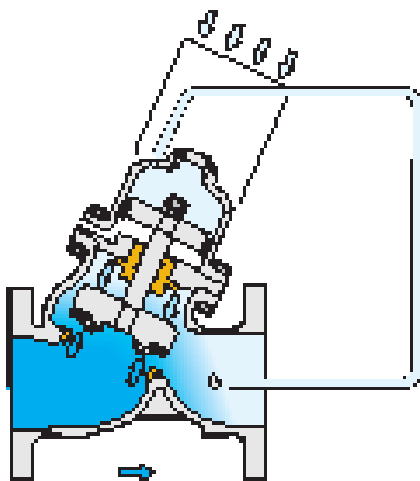
Operation

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.

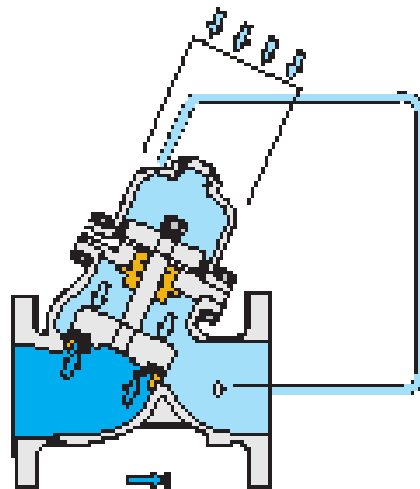
The net force, resulting from the two opposing dynamic forces acting on the actuator's piston and seal, determines the degree to which the valve is open. The valve seeks the point where these forces are equal. As the ratio of the areas of the seal disk and the piston is constant, the ratio of the upstream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

Pilot System Specifications

Standard Materials:

Tubing & Fittings:

Stainless Steel 316 or Copper & Brass

Accessories:

Stainless Steel 316 or Brass

Notes:

- Recommended continuous flow velocity:
0.3-6.0 m/sec ; 1-20 ft/sec
- Minimum operating pressure: 2.0 bar; 30 psi

Reduction Ratios Table

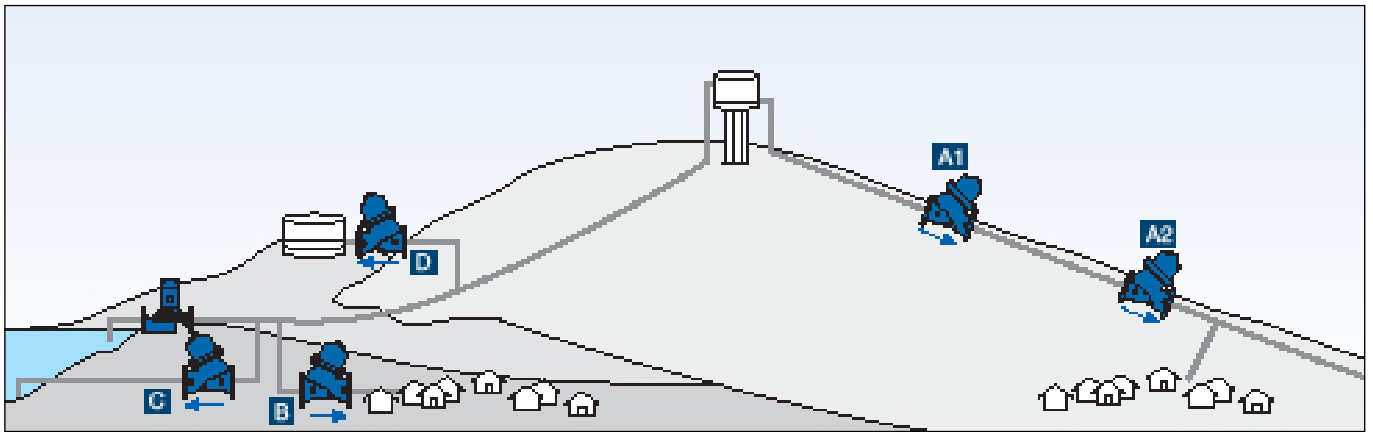
Valve Size		Reduction Ratio
inch	mm	
1.5"	40	2.3
2"	50	2.3
2.5"	65	2.3
3"	80	2.3
4"	100	2.5
6"	150	2.2
8"	200	2.3
10"	250	2.3
12"	300	2.1
14"	350	2.1
16"	400	2.2
18"	450	2.2
20"	500	2.2



Typical Applications

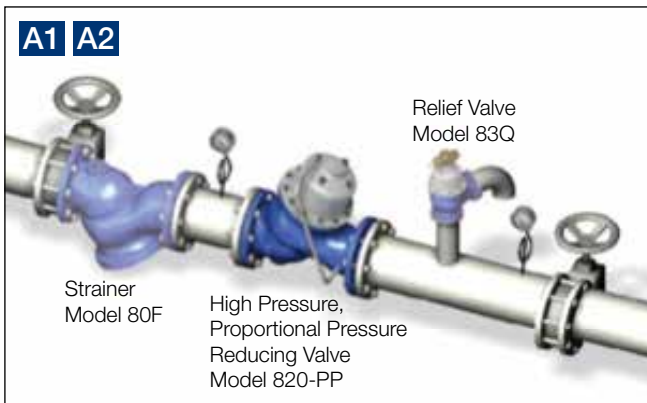
There are two major applications for the Model 820-PP High Pressure, Proportional Pressure Reducing Valve:

- 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.

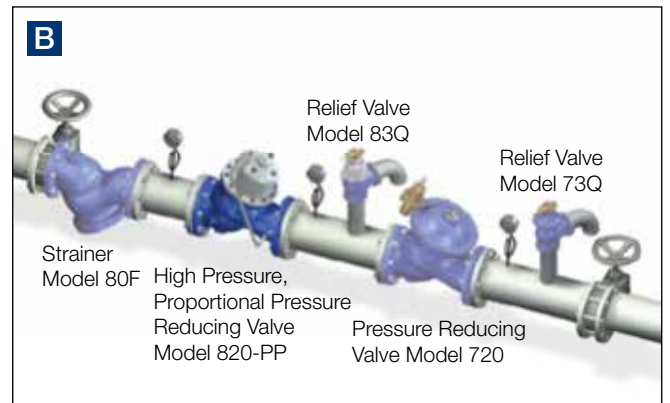


Typical Installations

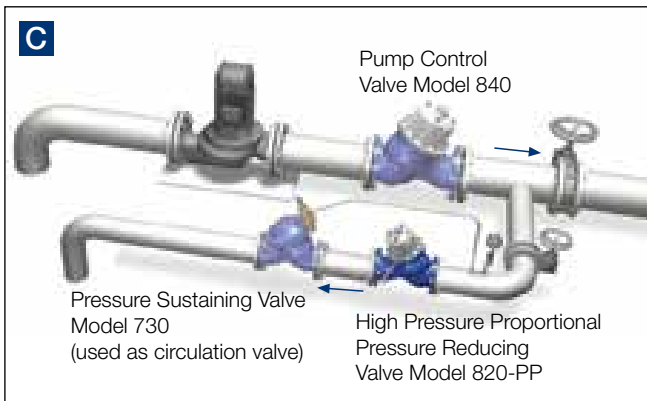
Downhill Serial Pressure Reducing System



High Differential Pressure, Pressure Reducing System

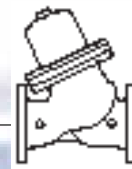


High Differential Pressure Circulation System



High Differential Pressure Level Control System





Technical Data

Size Range: DN40-500 ; 1 1/2-20"

End Connections (Pressure Ratings):

Flanged: ISO PN16, PN25, PN40 ; ANSI Class 150, 300, 400

Threaded: BSP or NPT

Others: Available on request

Valve Patterns: "Y" (globe) & angle

Working Temperature: Water up to 80°C ; 180°F

Standard Materials:

Body: Cast Carbon Steel; Ductile Iron; Stainless Steel 316

Cover: Stainless Steel 316; Bronze

Internals: Stainless Steel & Bronze

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)

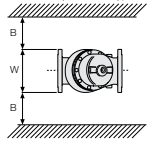
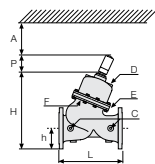
Cv = US system - Valve flow coefficient
(flow in gpm at 1 psi ΔP with 60°F water)

$$Cv = 1.155 Kv$$

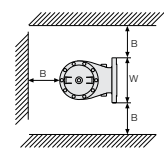
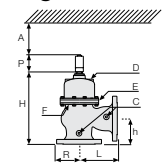
Flow Data & Dimensions Table

Flow Data		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"	
800 Yv	800 Angle	Kv / Cv - "Y" Flat	42	49	50	58	55	64	115	133	200	230	460	530	815	940	1,250	1,440	1,850	2,140	1,990	2,300	3,310	3,820	3,430	3,960	3,550	4,100	
		Kv / Cv - "Y" V-Port	36	41	43	49	47	54	98	113	170	200	391	450	693	800	1,063	1,230	1,573	1,820	1,692	1,950	2,814	3,250	2,916	3,370	3,018	3,490	
		Kv / Cv - "A" Flat	46	53	55	64	61	70	127	146	220	250	506	580	897	1,040	1,375	1,590	2,035	2,350	2,189	2,530	3,641	4,210	3,773	4,360	-	-	
800 Yv	800 Angle	Kv / Cv - "A" V-Port	39	45	47	54	51	59	108	124	187	220	430	500	762	880	1,169	1,350	1,730	2,000	1,861	2,150	3,095	3,580	3,207	3,710	-	-	
		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	39.0	1,000	39.4	1,100	43.3	
		W (mm / inch)	156	6.1	166	6.5	190	7.5	200	7.9	229	9.0	286	11.3	344	13.5	408	16.1	484	19.1	536	21.1	600	23.6	638	25.1	716	28.2	
800 Yv	800 Angle	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	8.0	242	9.5	268	10.6	300	11.8	319	12.6	358	14.1	
		H (mm / inch)	260	10.2	265	10.4	278	10.9	327	12.9	409	16.1	526	20.7	650	25.6	763	30.0	942	37.1	969	38.1	1,154	45.4	1,173	46.2	1,211	47.7	
		P (mm / inch)	-	-	-	-	-	-	-	-	-	-	-	135	5.3	135	5.3	142	5.6	154	6.1	154	6.1	191	7.5	191	7.5	191	7.5
800 Yv	800 Angle	Weight (Kg/lb)	10.7	24	13	29	16	35	28	62	48	106	94	207	162	356	272	598	455	1,001	482	1,060	1,000	2,200	1,074	2,363	1,096	2,411	
		L (mm / inch)	205	8.1	210	8.3	222	8.7	264	10.4	335	13.2	433	17.0	524	20.6	637	25.1	762	30.0	767	30.2	1,024	40.3	1,030	40.6	1,136	44.7	
		W (mm / inch)	156	6.1	166	6.5	190	7.5	210	8.3	254	10.0	318	12.5	382	15.0	446	17.6	522	20.6	590	23.2	650	25.6	714	28.1	778	30.6	
800 Yv	800 Angle	h (mm / inch)	78	3.1	83	3.3	95	3.7	105	4.1	127	5.0	159	6.3	191	7.5	223	8.8	261	10.3	295	11.6	325	12.8	357	14.1	389	15.3	
		H (mm / inch)	260	10.2	265	10.4	278	10.9	332	13.1	422	16.6	542	21.3	666	26.2	783	30.8	961	37.8	996	39.2	1,179	46.4	1,208	47.6	1,241	48.9	
		P (mm / inch)	-	-	-	-	-	-	-	-	-	-	-	141	5.6	141	5.6	156	6.1	156	6.1	156	6.1	191	7.5	191	7.5	191	7.5
800 Yv	800 Angle	Weight (Kg/lb)	11.8	26	15	33	18.4	40	32	70	56	123	106	233	190	418	307	675	505	1,111	549	1,208	1,070	2,354	1,095	2,409	1,129	2,484	
		L (mm / inch)	124	4.9	124	4.9	149	5.9	152	6.0	190	7.5	225	8.9	265	10.4	320	12.6	396	15.6	400	15.7	450	17.7	450	17.7	-	-	
		W (mm / inch)	156	6.1	166	6.5	190	7.5	200	7.9	229	9.0	285	11.2	344	13.5	408	16.1	496	19.5	528	20.8	598	23.5	640	25.2	-	-	
800 Yv	800 Angle	R (mm / inch)	78	3.1	83	3.3	95	3.7	100	3.9	115	4.5	143	5.6	172	6.8	204	8.0	248	9.8	264	10.4	299	11.8	320	12.6	-	-	
		h (mm / inch)	85	3.3	85	3.3	109	4.3	102	4.0	127	5.0	152	6.0	203	8.0	219	8.6	273	10.7	279	11.0	369	14.5	370	14.6	-	-	
		H (mm / inch)	252	9.9	252	9.9	271	10.7	308	12.1	390	15.4	476	18.7	619	24.4	717	28.2	911	35.9	915	36.0	1,144	45.0	1,144	45.0	-	-	
800 Yv	800 Angle	P (mm / inch)	-	-	-	-	-	-	-	-	-	-	141	5.6	141	5.6	156	6.1	156	6.1	156	6.1	195	7.7	195	7.7	-	-	
		Weight (Kg/lb)	10.7	24.0	13	29.0	16	35.0	26	57.0	46	101	90	198	153	337	259	570	433	953	459	1,010	950	2,090	1,020	2,244	-	-	
		L (mm / inch)	124	4.9	124	4.9	149	5.9	159	6.3	200	7.9	234	9.2	277	10.9	336	13.2	415	16.3	419	16.5	467	18.4	467	18.4	-	-	
800 Yv	800 Angle	W (mm / inch)	150	5.9	155	6.1	190	7.5	200	7.9	254	10.0	318	12.5	381	15.0	446	17.6	522	20.6	586	23.1	650	25.6	716	28.2	-	-	
		R (mm / inch)	78	3.1	85	3.3	95	3.7	105	4.1	127	5.0	159	6.3	191	7.5	223	8.8	261	10.3	293	11.5	325	12.8	358	14.1	-	-	
		h (mm / inch)	85	3.3	85	3.3	109	4.3	109	4.3	135	5.3	165	6.5	216	8.5	236	9.3	294	11.6	299	11.8	386	15.2	386	15.2	-	-	
800 Yv	800 Angle	H (mm / inch)	252	9.9	264	10.4	271	10.7	315	12.4	398	15.7	491	19.3	632	24.9	733	28.9	930	36.6	935	36.8	1,160	45.7	1,160	45.7	-	-	
		P (mm / inch)	-	-	-	-	-	-	-	-	-	-	-	141	5.6	141	5.6	156	6.1	156	6.1	156	6.1	195	7.7	195	7.7	-	-
		Weight (Kg/lb)	11.8	26	15	33	18.4	40	30	66	54	119	101	222	179	394	292	642	481	1,058	523	1,151	1,017	2,237	1,051	2,312	-	-	

"Y" Pattern



Angle Pattern



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

