

700 Series

# Pressure Sustaining and Reducing Valve

## Mod€l 723

- Protecting lower pressure zones
- Prioritizing higher pressure zones
- Preventing pipeline emptying
- Ensuring controlled pipeline fill-up
- Pump overload & cavitation protection
- Compensating during groundwater drawdown

The Model 723 Pressure Sustaining and Reducing Valve is a hydraulically operated, diaphragm actuated control valve with two independent functions. It sustains minimum pre-set upstream pressure regardless of fluctuating flow or varying downstream pressure, and it prevents downstream pressure from rising above maximum pre-set regardless of fluctuating flow or excessive upstream pressure.



# Features and Benefits

- Line pressure driven Independent operation
- In-line serviceable Easy maintenance
- Double chamber design
  - Moderated valve reaction
  - Protected diaphragm
- Flexible design Easy addition of features
- Variety of accessories Perfect mission matching
- "Y" or angle, wide body Minimized pressure loss
- 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 723-55
- Check feature **723-20**
- High sensitivity pilots **723-12**
- Solenoid control & check feature **723-25**
- Downstream over pressure guard 723-48
- Proportional **723-PD**

See relevant BERMAD publications.





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# **Operation**

The Model 723 is a pilot controlled valve equipped with two adjustable, 2-Way pilots, pressure sustaining (PS) and pressure reducing (PR), operating independently in series.

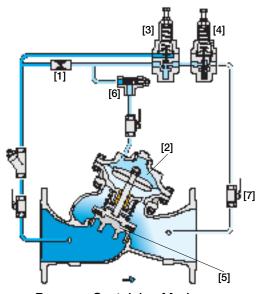
The restriction [1] continuously allows flow from the valve inlet into the upper control chamber [2]. The PS pilot [3] and the PR pilot [4] together control outflow from the upper control chamber.

Should upstream pressure fall below PS pilot setting, the pilot closes causing pressure to accumulate in the upper control chamber. The main valve throttles closed sustaining upstream pressure at the pilot setting. Should upstream pressure rise above PS pilot setting, the pilot releases accumulated pressure from the upper control chamber to the main valve outlet through the held open PR pilot, opening the main valve. Should opening the main valve cause downstream pressure to rise above PR pilot setting, the pilot closes, causing the main valve to throttle closed reducing downstream pressure to PR pilot setting.

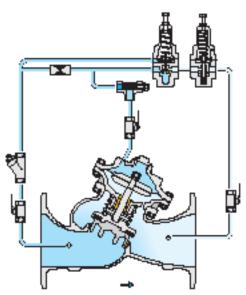
The V-Port plug (optional) [5] increases the ratio of flow to stem travel, providing more accurate, stable and smooth regulation. The integral orifice between the lower control chamber and valve outlet moderates valve reactions.

The one-way flow control needle valve [6] stabilizes the valve's reaction in hard regulation conditions, by restricting the flow out of the control chamber.

The downstream cock valve [7] enables manual closing.



Pressure Sustaining Mode



Pressure Reducing Mode

# Pilot System Specifications

# Standard Materials:

### Pilots:

Body: Stainless Steel 316 or Bronze Elastomers: Synthetic Rubber

Springs: Galvanized Steel or Stainless Steel

# Tubing & Fittings:

Stainless Steel 316 or Copper & Brass

### Accessories:

Stainless Steel 316, Brass and Synthetic Rubber Elastomers

Notes:

- Inlet pressure, outlet pressure and flow rate are required for optimal sizing and cavitation analysis
- Recommended continuous flow velocity:
   0.3-6.0 m/sec; 1-20 ft/sec

Pilots Adjustment Range:

0.5 to 3.0 bar; 7 to 40 psi

0.8 to 6.5 bar; 11 to 95 psi

1 to 16 bar; 15 to 230 psi

5 to 25 bar; 70 to 360 psi

Minimum operating pressure: 0.7 bar; 10 psi.
 For lower pressure requirements consult factory

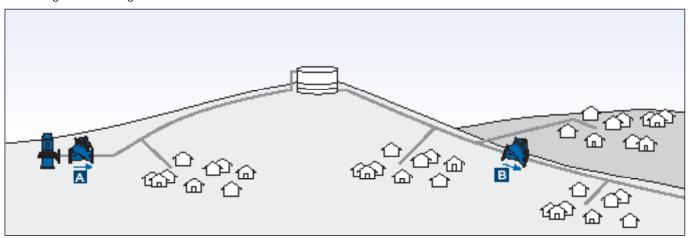




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# **Typical Applications**

Water is pumped from a deep well to the reservoir through a line also supplying nearby consumers along the way. Water is then supplied from the reservoir to both higher and lower elevation consumers. Both parts of the system require pressure sustaining and reducing solutions.



### Groundwater Draw Down System

In deep well pumping systems, the groundwater level varies according to: seasonal changes, seepage rate, and demand. These systems require a solution to a unique combination of issues:

- Consumer demand or filling an empty line results in pump overload and cavitation, requiring pressure sustaining.
- Deep well pumps boost a constant ΔP, resulting in high ground level raising the discharge pressure, requiring pressure reducing.

The Model 723 provides a complete solution for both of these issues. Adding check feature "20", saves the cost of a line-sized check valve.

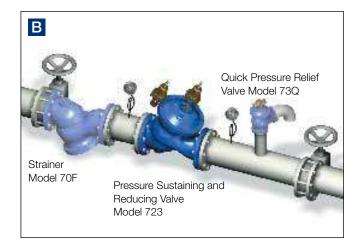
# Pump Circulation & Pressure Sustaining Valve Model: 748 Pressure-Sustaining and Reducing Valve with Check Feature Model 723-20

## Gravity Fed Supply Line

Where consumers at both higher and lower elevations use the same distribution network:

- Consumers located at higher elevation need protection against over demand by the lower zone.
- Lower zone consumers need protection against high gravity fed pressure.

The Model 723, being both a pressure sustaining and reducing valve, simultaneously fulfills both requirements.







700 Series

# **Technical Data**

Size Range: DN40-900; 11/2-36" 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**

$$\Delta P = \left(\frac{Q}{(Kv;Cv)}\right)^2$$

 $\Delta P$  = Differential Pressure for fully open valve (bar; psi)

Q = Flow rate (m<sup>3</sup>/h; gpm)

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

 $\mathbf{Cv} = \mathbf{US}$  system - Valve flow coefficient (flow in gpm at 1 psi  $\Delta P$  with 60°F water)  $\mathbf{Cv} = 1.155 \; \mathbf{Kv}$ 

# 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	ES	Kv / Cv - Flat	54	62	57	66	60	69	65	75	145	167	395	456	610	705	905	1,045	1,520	1,756	-	-	2,250	2,599	-	-	4,070	4,701
	700ES	Kv / Cv - V-Port	46	53	48	56	51	59	55	64	123	142	336	388	519	599	769	888	1,292	1,492	-	-	1,913	2,209	-	-	3,460	3,996
	700 & 700EN	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
	7007	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
	PN16; 25	L (mm / inch)	230	9.1	230	9.1	290	11.4	310	12.2	350	13.8	480	18.9	600	23.6	730	28.7	850	33.5	-	-	1,100	43.3	-	-	1,250	49.2
တ္သ		W (mm / inch)	150	5.9	165	6.5	185	7.3	200	7.9	235	9.3	300	11.8	360	14.2	425	16.7	530	20.9	-	-	626	24.6	-	-	838	33
700-ES		h (mm / inch)	80	3.1	90	3.5	100	3.9	105	4.1	125	4.9	155	6.1	190	7.5	220	8.7	250	9.8	-	-	320	12.6	-	-	385	15.2
202		H (mm / inch)	240	9.4	250	9.8	250	9.8	260	10.2	320	12.6	420	16.5	510	20.1	605	23.8	725	28.5	-	-	895	35.2	-	-	1,185	46.7
		Weight (Kg/lb)	10	22	10.8	23.8	13.2	29	15	33	26	57.2	55	121	95	209	148	326	255	561	-	-	437	960	-	-	1,061	2,334
		L (mm / inch)	-	-	-	-	-	-	310	12.2	350	13.8	480	18.9	600	23.6	730	28.7	850	33.5	-	-	-	-	-	-	-	-
Z	25	W (mm / inch)	-	-	-	-	-	-	200	7.9	235	9.3	320	12.6	390	15.4	480	18.9	550	21.7	-	-	-	-	-	-	-	-
700-EN	PN16;	h (mm / inch)	-	-	-	-	-	-	100	3.9	118	4.6	150	5.9	180	7.1	213	8.4	243	9.6	-	-	-	-	-	-	-	-
2	E	H (mm / inch)	-	-	-	-	-	-	305	12	369	14.5	500	19.7	592	23.3	733	28.9	841	33.1	-	-	-	-	-	-	-	-
		Weight (Kg/lb)	-	-	-	-	-	-	21	46.2	31	68.2	70	154	115	253	198	436	337	741	-	-	-	-	-	-	-	-
		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
	N16 150	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
	G SS	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
ed		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
Flanged		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
E		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
700	PN25	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
	Clas	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
	رم و	L (mm / inch)	155	6.1	155	6.1	212	8.3	250	9.8																		

		Wolgin (reg/lb)			0.0	12	,	10	10	00			
		DN / Size	600	24"	700	28"	750	30"	800	32"	900	36"	
	9	L (mm / inch)	1,450	57.1	1,650	65	1,750	68.9	1,850	72.8	1,850	72.8	ĺ
	PN1	W (mm / inch)	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	ĺ
		h (mm / inch)	470	18.5	490	19.3	520	20.5	553	21.8	600	23.6	
	Globe Class	H (mm / inch)	1,965	77.4	1,985	78.1	2,015	79.3	2,048	80.6	2,095	82.5	ĺ
	ര	Weight (Kg/lb)	3,250	7,150	3,700	8,140	3,900	8,580	4,100	9,020	4,250	9,350	ĺ
	2	L (mm / inch)	1,500	59.1	1,650	65	1,750	68.9	1,850	72.8	1,850	72.8	
	PN25	W (mm / inch)	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	ĺ
	- 40	h (mm / inch)	470	18.5	490	19.3	520	20.5	553	21.8	600	23.6	ĺ
	Globe Class	H (mm / inch)	1,965	77.4	1,985	78.1	2,015	79.3	2,048	80.6	2,095	82.5	
	ن ق	Weight (Kg/lb)	3,500	7,700	3,700	8,140	3,900	8,580	4,100	9,020	4,250	9.370	

122 4.8

7.9 202

40 1.6 40 1.6 48 1.9 56 2.2

201

5.5 12 5.5

W (mm / inch) h (mm / inch)

H (mm / inch)

Weight (Kg/lb)

L (mm / inch)

W (mm / inch)

R (mm / inch)

h (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



122 4.8 122 4.8 163 6.4

8.2

18 | 17 | 37

4 115 4.5

225 8.9 242 9.5 294 11.6

264 10.4

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