Flow Control and Pressure Reducing Valve

Model 772-U

- Controlling over demand & pressure
- Balancing flow via parallel pressure reducing valves
- Controlling pipeline fill rate
- Pump cavitation & system over pressure protection
- Compensating during groundwater drawdown

The Model 772-U Flow Control and Pressure Reducing Valve is a hydraulically operated, diaphragm actuated control valve with two independent functions. It maintains both pre-set maximum flow and reduces higher upstream pressure to lower constant downstream pressure, regardless of varying demand or upstream pressure.

Features and Benefits

- **Line pressure driven –** Independent operation
- **Hydraulic flow sensor (upstream installation)**
  - No moving parts
  - No electronic components
  - No need for flow straightening
- **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

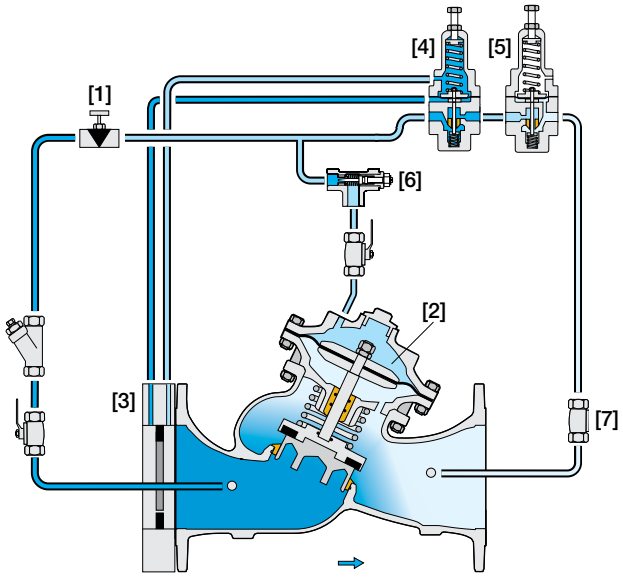
Major Additional Features

- Solenoid control – **772-55-U**
- Check feature – **772-20-U**
- Solenoid control & check feature – **772-25-U**
- Downstream over pressure guard – **772-48-U**

See relevant BERMAD publications.

Operation

The Model 772-U is a pilot controlled valve equipped with an orifice assembly and two adjustable, 2-Way pilots for Flow Control (FC) and Pressure Reducing (PR), operating independently in series.
The needle valve **[1]** continuously allows flow from valve inlet into the upper control chamber **[2]**.
Should orifice plate **[3]** differential pressure rise above FC pilot **[4]** setting, the pilot throttles causing pressure to accumulate in the upper control chamber. The main valve throttles closed maintaining maximum flow at pilot setting.
Should this differential pressure fall below FC pilot setting, the pilot releases accumulated pressure to the main valve outlet through the held open PR pilot **[5]** causing the main valve to modulate open. 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.
The needle valve controls the closing speed.
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.



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
Orifice Assembly
Body: Fusion Bonded Epoxy Steel or Stainless Steel
Orifice Plate: Stainless Steel

Pressure Reducing Pilot 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

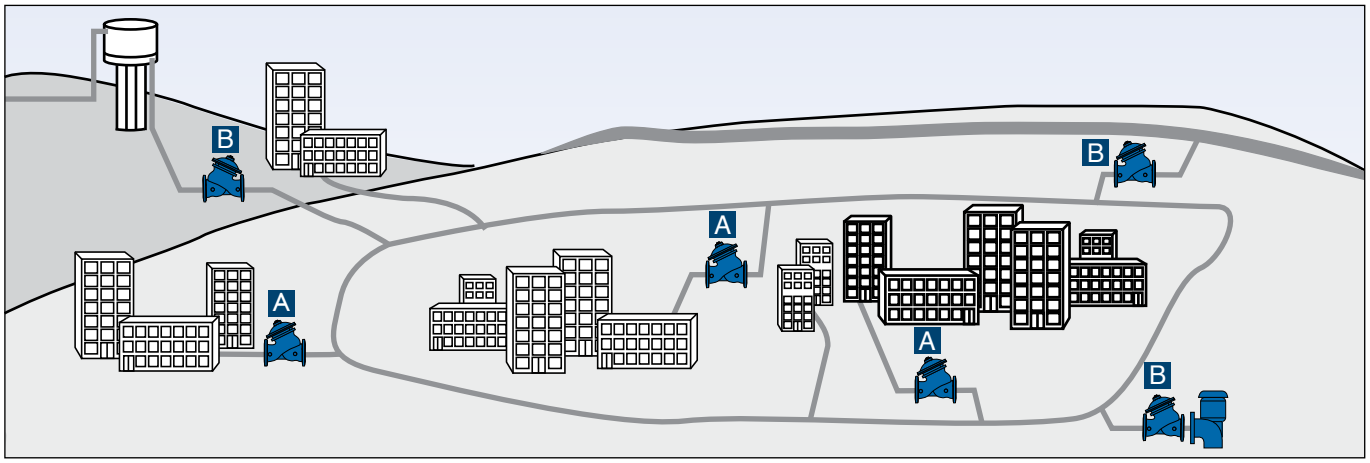
Notes:

- Orifice diameter is calculated for each valve.
- Flow Setting Range:
  (-)15% & (+)25% from predetermined flow
- The orifice additional head loss is 0.2 bar ; 2.8 psi
- Orifice assembly adds 25mm ; 1" to valve length
- Recommended continuous flow velocity:
  0.3-6.0 m/sec ; 1-20 ft/sec
- Minimum operating pressure: 0.7 bar ; 10 psi.
  For lower pressure requirements consult factory
- Inlet pressure, outlet pressure and flow rate are required for optimal sizing and cavitation analysis
- When minimum head loss is essential and flow velocity is higher than 1.0 m/sec, consider using the Model 770-j equipped with a pitot tube flow sensor and high sensitivity flow pilot #7

Typical Applications

Distribution Networks

The Model 772-U synergizes the advantages of flow control and pressure-reducing in one valve.



Better than Just Flow Control

System design starts from expected flow range that determines major system components:

- **Pump stations: Characteristics, location, quantity**
- **Supply lines: Layout, class, size**
- **Reservoirs: Location, volume, head**

Significant deviation from designed flow range might disrupt water supply or even damage system components. Appropriate design, placement, and use of the Model 770-U protects the system from excessive flow.

When pressure reducing is also required, choosing the Model 772-U **[A systems]**, instead of the Model 770-U, completes the solution.

Better than Just Pressure Reducing

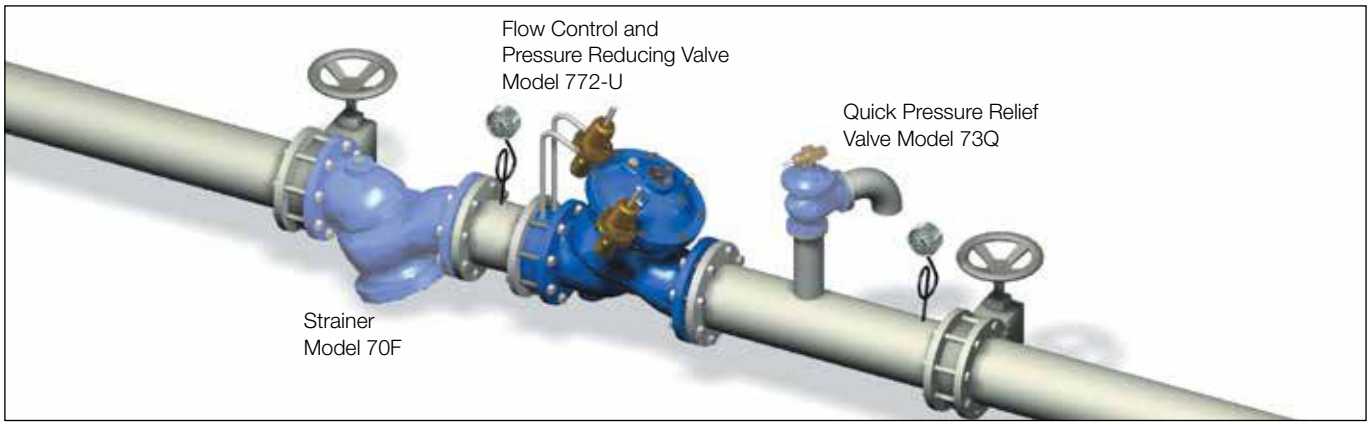
Where multiple sources with various pressures feed into a common network, multiple pressure reducing valves are installed to control network pressure. Their pressure settings are adjusted so that valves progressively “step-in” and “step-out” resulting in the minimum number of valves of the smallest size operating at any time.

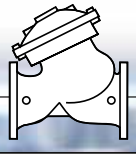
Where downstream pressure (as with the Model 720) is the only controlled characteristic, flow through any of the valves might rise above recommended values to damage the valves and cause each “step” to be fuzzy.

The Model 772-U **[B systems]** limits flow through each valve resulting in:

- Protection against excessive flow cavitation damage
- Sharp valve “step-in” and “step-out”

Typical Installation





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 (m^3/h; gpm)

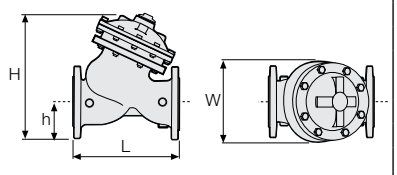
Kv = Metric system - valve flow coefficient (flow in m^3/h at 1 bar ΔP with 15°C water)

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

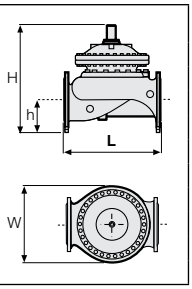
Cv = 1.155 Kv

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	700ES	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
		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
		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
700-ES	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
		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
		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
		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
700-EN	PN16; 25	L (mm / inch)	-	-	-	-	-	-	310	12.2	350	13.8	480	18.9	600	23.6	730	28.7	850	33.5	-	-	-	-	-	-	-	-
		W (mm / inch)	-	-	-	-	-	-	200	7.9	235	9.3	320	12.6	390	15.4	480	18.9	550	21.7	-	-	-	-	-	-	-	-
		h (mm / inch)	-	-	-	-	-	-	100	3.9	118	4.6	150	5.9	180	7.1	213	8.4	243	9.6	-	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-	-
700 Flanged	"Y" PN16 Class 150	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
		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
		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
		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
		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
	"Y" PN25 Class 300	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
		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
		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
700 Threaded	"Y" PN16; 25 Class 150; 300	L (mm / inch)	155	6.1	155	6.1	212	8.3	250	9.8																		
		W (mm / inch)	122	4.8	122	4.8	122	4.8	163	6.4																		
		h (mm / inch)	40	1.6	40	1.6	48	1.9	56	2.2																		
		H (mm / inch)	201	7.9	202	8	209	8.2	264	10.4																		
		Weight (Kg/lb)	5.5	12	5.5	12	8	18	17	37																		
	Angle PN16; 25 Class 150; 300	L (mm / inch)	-	-	121	4.8	140	5.5	159	6.3																		
		W (mm / inch)	-	-	122	4.8	122	4.8	163	6.4																		
		R (mm / inch)	-	-	40	1.6	48	1.9	55	2.2																		
		h (mm / inch)	-	-	83	3.3	102	4	115	4.5																		
		H (mm / inch)	-	-	225	8.9	242	9.5	294	11.6																		
		Weight (Kg/lb)	-	-	5.5	12	7	15	15	33																		



		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



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

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