

700 Series

# Flow Control Valve with Solenoid Control

#### Mod∈l 770-55-U

- Limiting consumers over demand
- Controlling pipeline fill rate
- Pump overload & cavitation protection
- Switching between "on-duty" valves
- Selecting system flow regime

The Model 770-55-U Flow Control Valve with Solenoid Control is a hydraulically operated, diaphragm actuated control valve that maintains preset maximum flow, regardless of fluctuating demand or varying system pressure. The valve opens and shuts off in response to an electric signal.



# Features and Benefits

- Line pressure driven Independent operation
- Hydraulic flow sensor (upstream installation)
  - No moving parts
  - No electronic components
  - No need for flow straightening
- Solenoid controlled
  - Low power consumption
  - Wide range of pressure and voltage
  - Normally Open, Normally Closed or Last Position
- In-line serviceable Easy maintenance
- Double chamber design
  - Moderated valve reaction
  - Protected diaphragm
- 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

- Flow control (constant downstream pressure) 727-U
- Solenoid control & check feature 770-25-U
- High sensitivity pilot 770-55-12-U
- Pressure Reducing **772-U**
- Electric override 770-59-U
- Level & flow control valve **757-U**
- Pump & flow control valve **747-U**
- Electronic control valve **718-03**

See relevant BERMAD publications.





Model 770-55-U 700 Series

#### **Operation**

The Model 770-55-U is a pilot controlled valve equipped with an adjustable, 2-Way flow pilot, an orifice assembly, and a solenoid pilot.

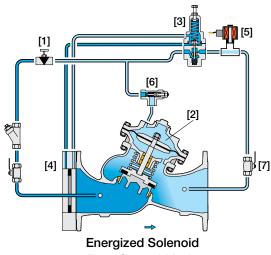
The needle valve [1] continuously allows flow from valve inlet into the upper control chamber [2]. The pilot [3] senses the differential pressure across the orifice plate [4], and together with the solenoid [5], controls outflow from the upper control chamber. Should orifice differential pressure rise above pilot setting, the pilot throttles, enabling pressure to accumulate in the upper control chamber, causing the main valve to throttle closed, thereby limiting flow to the pilot setting. Should orifice differential pressure fall below pilot setting, the pilot releases accumulated pressure causing the main valve to modulate open. Should the solenoid close, pressure in the upper control chamber accumulates causing the main valve to shut off.

The needle valve controls the closing speed.

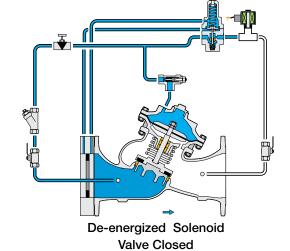
The one-way flow control needle valve [6] stabilizes the valve's reaction in hard regulation conditions, by restricting the flow out of the control chamber.

The downstream cock valve [7] enables manual closing.

Normally Closed, Normally Open and Last Position models are available.



Flow Control Mode



### Pilot System Specifications

#### Standard Materials:

## Pilot:

Body: Stainless Steel 316 or Bronze Elastomers: Synthetic Rubber Spring: Stainless Steel

#### Solenoid:

Body: Brass or Stainless Steel Elastomers: NBR or FPM Enclosure: Molded epoxy

## **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

#### Solenoid Electrical Data:

#### Voltages:

(ac): 24, 110-120, 220-240, (50-60Hz)

(dc): 12, 24, 110, 220

#### **Power Consumption:**

(ac): 30 VA, inrush; 15 VA (8W), holding or 70 VA, inrush; 40 VA (17.1W), holding

(dc): 8-11.6W

Values might vary according to specific solenoid model

#### 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
- When minimum head loss is essential and flow velocity is higher than 1.0 m/sec, consider using the Model 770-i equipped with a pitot tube flow sensor and high sensitivity flow pilot #7





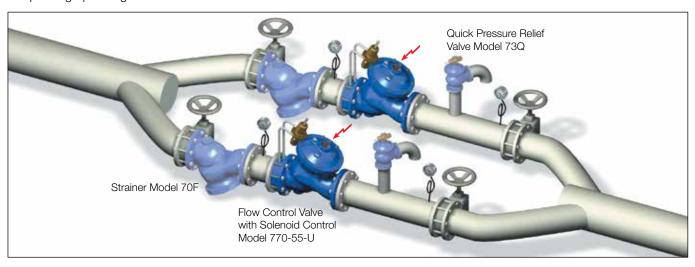
Model 770-55-U 700 Series

# **Typical Applications**

#### Parallel Valve Installation

In a distribution network, there is often a need to respond to several flow regimes. In flow control valves, the orifice limits the valve adjustment range to about  $\pm 15\%$ . Parallel installation of two Model 770-55-U valves enable:

- Flow limiting for various flow regimes
- Equalizing operating hours between valves

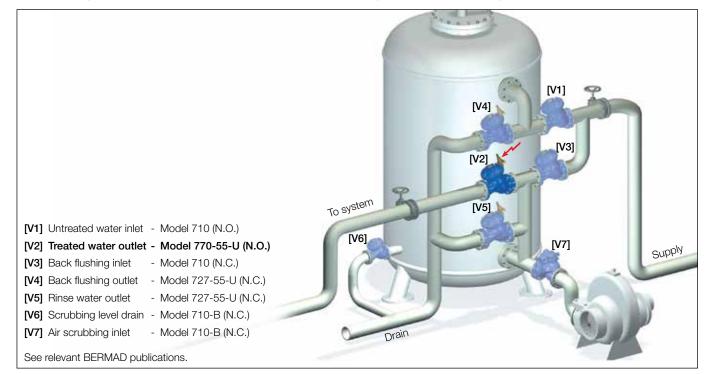


#### Filtration Systems

In a filter battery, installed as part of a water treatment system, excessive flow through any of the filters might cause:

- Unequal filter loading and blocking
- Reduced filter efficiency
- Structural damage to the filter element

The Model 770-55-U **[V2]** maintains the pre-set maximum flow through each of the filters. The solenoid control enables disconnecting each filter (in turn) from the filtration process allowing periodic back flushing.







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)

 $Q = Flow rate (m^3/h; gpm)$ 

**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  $\Delta P$  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	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
		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																		

		Weight (Kg/lb)	-	-	5.5	12	- /	15	15	33			
		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	
	PN1 150	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	
	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	
	٥	Weight (Kg/lb)	3,250	7,150	3,700	8,140	3,900	8,580	4,100	9,020	4,250	9,350	
	5	L (mm / inch)	1,500	59.1	1,650	65	1,750	68.9	1,850	72.8	1,850	72.8	
	PN25 300	W (mm / inch)	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	1,250	49.2	
	e F	h (mm / inch)	470	18.5	490	19.3	520	20.5	553	21.8	600	23.6	
	lobe	H (mm / inch)	1,965	77.4	1,985	78.1	2,015	79.3	2,048	80.6	2,095	82.5	

122 4.8

7.9 202 8 209

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)

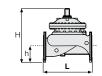
W (mm / inch)

R (mm / inch)

h (mm / inch)

H (mm / inch)

Weight (Kg/lb)





# 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



3,500 7,700 3,700 8,140 3,900 8,580 4,100 9,020 4,250 9.370

122 4.8 122 4.8 163 6.4

4.8 122 4.8

225 8.9 242 9.5 294 11.6

12 8

4.8 140 5.5 159 6.3

121

122

40 1.6 48 1.9 55 2.2

83 3.3 102 4 115 4.5

8.2 264

18 | 17 | 37

10.4

163 6.4