IR-100 hYflow Basic Valve

The BERMAD basic Model IR-100 hYflow diaphragm actuated, hydraulically operated valve is at the leading edge of control valve design. It combines simple and reliable construction with superior performance, while at the same time being virtually free of the typical limitations associated with standard control valves.
BERMAD's automatic water control valves are designed for vertical or horizontal installation and are available in sizes of 2", $2\frac{1}{2}$", 3", 4" & 6"; DN: 50, 65, 80, 100 & 150.

The Model IR-100 hYflow, made from industrial durable glass-filled nylon, is engineered to meet rough service conditions with high chemical and cavitation resistance.

The hYflow 'Y' valve body design includes a full bore seat with unobstructed flow path, free of any in-line ribs, supporting cage, or shafts. Its unitized Flexible Super Travel (FST) diaphragm and guided plug provide a significantly 'look through' passage from end to end resulting in ultra-high flow capacity with minimal pressure loss. The combination of a long travel guided valve plug, peripherally supported diaphragm, and replaceable valve seal provides:

- No chattering or slamming closed
- Accurate and stable regulation with smooth motion
- Low operating pressure requirements
- No diaphragm erosion and distortion
- Diaphragm and spring fully meet the valve's operating pressure range requirements.

Designed for service under a wide range of pressure and flow conditions, from dripping to maximum flow, the IR-100 hYflow excels at being a user-friendly control valve:

- Simple design with few parts guarantees easy in-line inspection and service.
- Adaptable on-site to a wide range of end connection types and sizes.
- Articulated flange connections isolate the valve from pipeline bending and pressure stresses.

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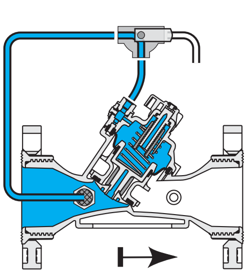
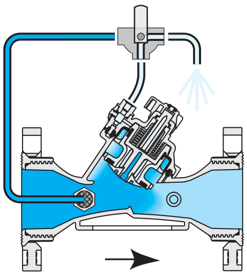
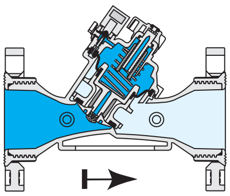
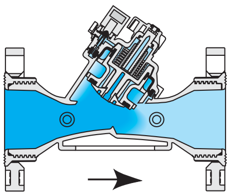
On-Off Modes

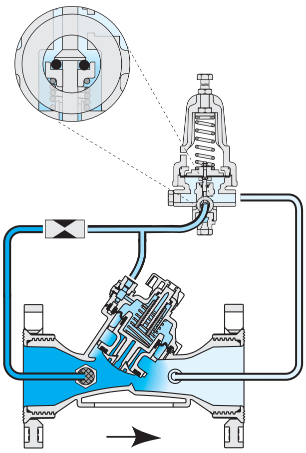
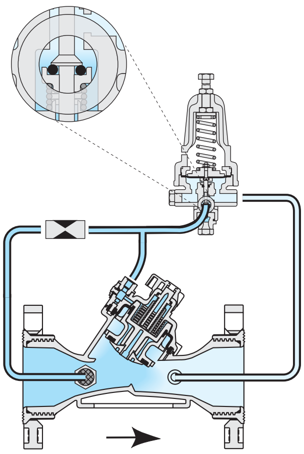
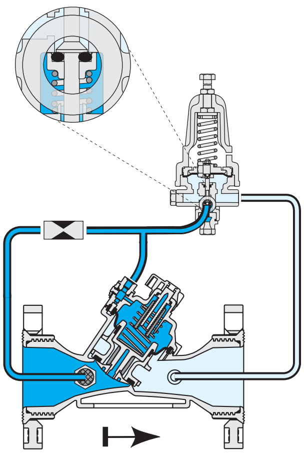
3-Way Control

Line pressure applied to the control chamber of the valve creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing. Discharging pressure from the control chamber to the atmosphere causes the line pressure under the plug to open the valve.

2-Way Internal Control

Line pressure enters the control chamber through the internal restriction. The closed solenoid causes pressure to accumulate in the control chamber, thereby shutting the valve. Opening the Solenoid releases more flow from the control chamber than the restriction can allow in. This causes pressure in the control chamber to drop, allowing the valve to open.

2-Way Modulating Modes, Pressure Reducing Pilot

Modulating to Close

Line pressure enters the control chamber through the internal restriction. The pilot controls outflow from the control chamber. Throttling when it senses a pressure rise, it causes pressure to accumulate in the control chamber, thereby forcing the valve to modulate closed.

Modulating to Open

The pilot modulates open when it senses a pressure drop, releasing more flow from the control chamber than the restriction can allow in. This causes the accumulated pressure in the control chamber to drop and the valve modulates open.

Zero Flow Position

When demand drops to zero, downstream pressure begins to rise as the flow enters a closed line. The pilot closes, initiating the valve's irreversible closing process, eventually causing it to seal drip tight.

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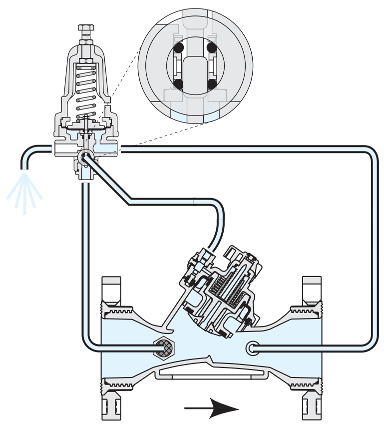
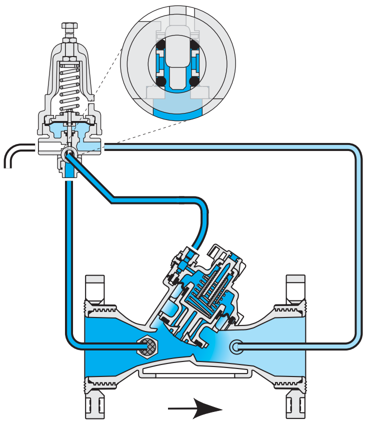
3-Way Control Modes, Pressure Reducing



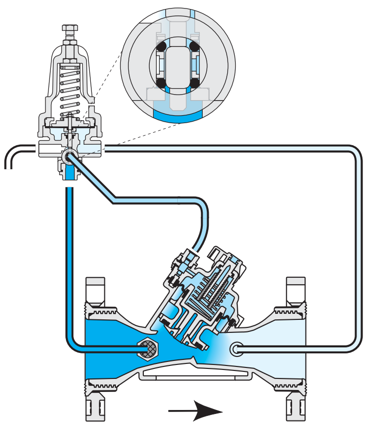
Fully Open Position

When upstream pressure drops, the pilot blocks the supply pressure port and opens the drain port, venting the control chamber to the atmosphere. This fully opens the valve, minimizing head loss.



Modulating to Close

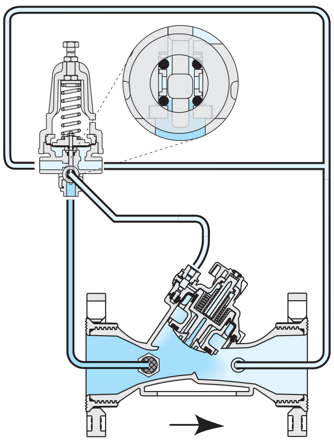
The pilot switches upon pressure rise, blocking the drain port and opening the supply pressure port. This pressurizes the control chamber, forcing the valve to modulate closed.



Locked Position

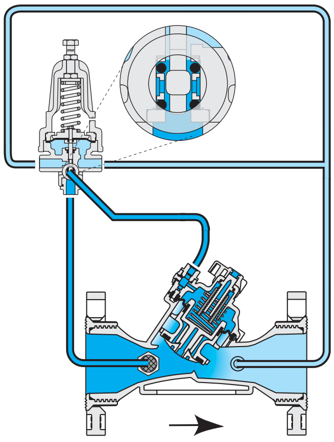
When sensed pressure is equal to setting, the pilot blocks both the drain and the supply pressure ports. This locks the pressure in the control chamber, freezing valve opening in its last position until conditions change.

3/2-Way Control Modes, Pressure Reducing



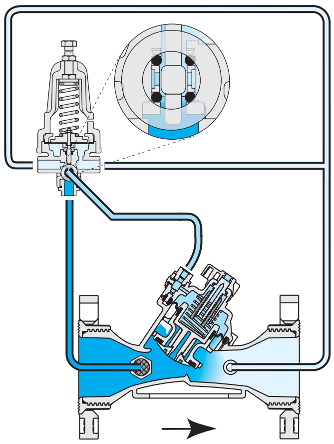
Modulating to Open

When pressure drops, the pilot restricts the flow path through the supply pressure port, and widens the flow path through the drain port. This releases more flow from the control chamber than can be allowed in, thereby causing the valve to modulate open.



Modulating to Close

Upon pressure rise, the pilot widens the flow path through the supply pressure port, and restricts the flow path through the drain port. This allows more flow into the control chamber than can be released, thereby pressurizing it and forcing the valve to modulate closed.



Stable Conditions

As long as flow and pressure conditions are constant, the pilot freezes the control chamber inlet and outlet flow ratio. This keeps the valve opening rate constant, allowing the valve to react "on-line" to any anticipated changes in supply and/or demand conditions.

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[1] Cover Ring

The cover ring fastens valve cover to body, stiffening and strengthening the valve body, enabling simple maintenance. A cover ring key is available.

[2] "Click-In" Bracket

For all BERMAD plastic accessories.

[3] Valve Cover

The cover's strong construction meets rough service conditions. Optional cover types (3"; DN80 and smaller valves) are capable of accepting a Flow Stem, a Flow Stem + Position Indicator, and a 2-Way Solenoid (2W-N1 Electric Type).

[4] Auxiliary Closing Spring

One single high grade stainless steel spring provides a wide operation range, ensuring low opening pressure and secured closing.

[5] Plug Assembly

The unitized Flexible Super Travel (FST) plug assembly combines a long travel guided valve plug, peripherally supported diaphragm, and replaceable diaphragm and valve seal. The diaphragm fully meets the valve's operating pressure range requirements.

- [5.1] Diaphragm Holder
- [5.2] Diaphragm
- [5.3] Plug
- [5.4] Plug Seal

[6] hYflow 'Y' Valve Body

Glass-filled nylon construction meets rough service conditions with high chemical and cavitation resistance.
End-to-end "look-through" design and full bore seat with unobstructed flow path, free of any in-line ribs, supporting cage, or shafts, enables ultra-high flow capacity with minimal pressure loss.

[7] End Connections

Adaptable on-site to a wide range of end connection types and sizes:

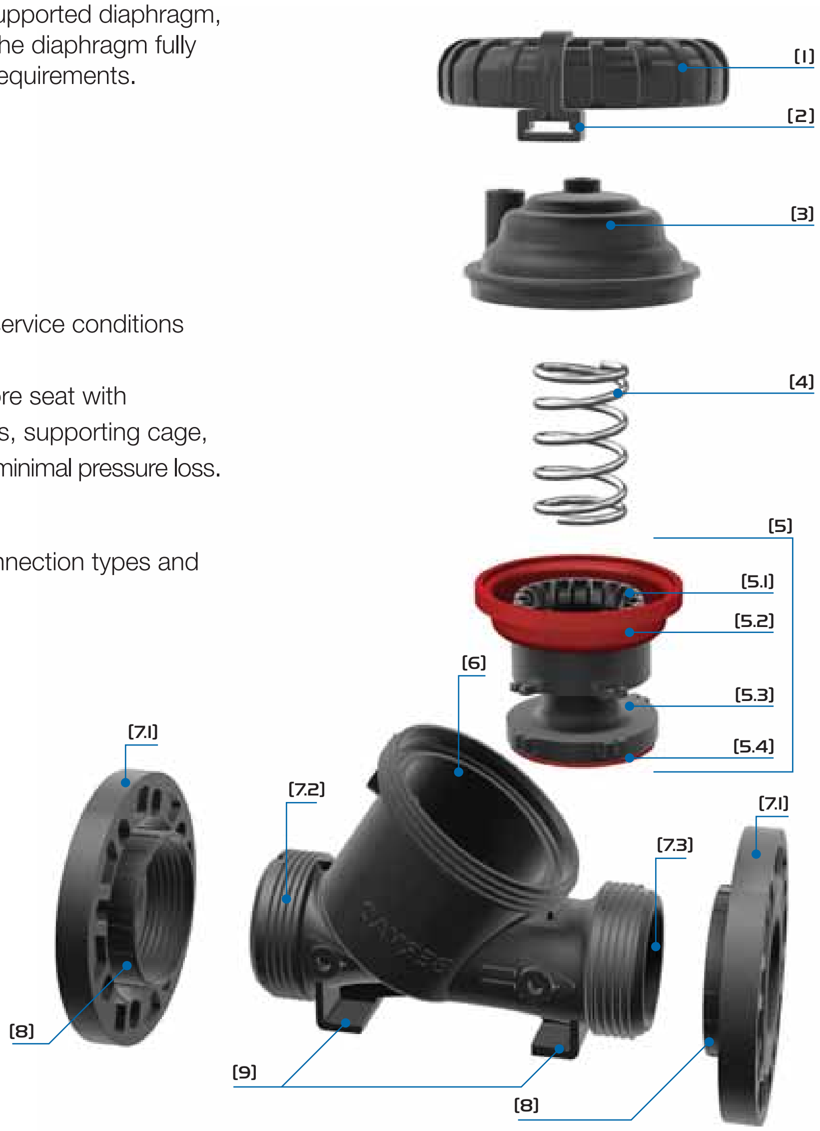
- [7.1] Flanges: Plastic or metal "Corona" with elongated slots enable meeting diverse flange standards ISO, ANSI and JIS.
- [7.2] Flange adaptor external thread
- [7.3] Internal threads

[8] Flange Adapter

Articulated flange connections isolate the valve from line bending and pressure stresses.

[9] Valve Legs

Stabilizing the valve and serve also as mounting brackets.



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Additional Valve Configurations


2"; DN50


$2^{1}/_{2}$"; DN65 - Male Thread (for PVC Adapters)


3"; DN80


3"; DN 80 Angle


6"; DN 150 "Y-Boxer" - Flanged


6"; DN 150 "Y-Boxer" - Grooved (Vic)

End Connection Options


BSP.T; NPT Female Thread
2"; DN50

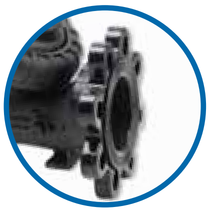

BSP.F Male Thread,
(for PVC Adapters)
$2^{1}/_{2}$"; DN65


BSP.T; NPT Female Thread
3"; DN80


Union PVC adaptor
$2^{1}/_{2}$"; DN65


Plastic Flange
3"; DN80


Plastic Flange
3"L & 4" ; DN: 80L & 100


Metal Flange
3"L & 4"; DN: 80L & 100


PVC Adaptor
3" & DN80

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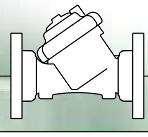
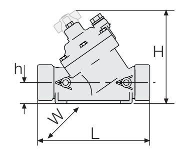
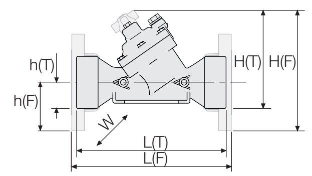
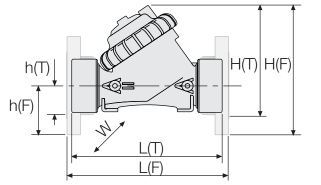


SI Metric

Dimensions & Weights

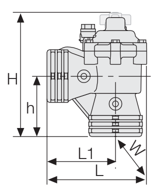




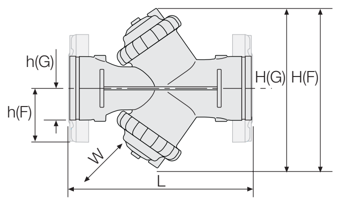


Size	DN50	DN65	DN 80			DN80L			DN 100	
End Connections	Rc 2 (BSP.T)	G 2¹/₂ (BSP.F)	Rc 3 (BSP.T)	Universal Flanges Metal	Universal Flanges Plastic	Rc 3 (BSP.T)	Universal Flanges Metal	Universal Flanges Plastic	Universal Flanges Metal	Universal Flanges Plastic
L (mm)	230	230	298	308	308	298	310	310	350	350
H (mm)	185	185	195	255	255	240	280	280	294	290
h (mm)	40	40	50	100	100	60	100	100	112	112
W (mm)	135	135	135	200	200	190	200	200	224	224
CCDV (lit)	0.2	0.2	0.2	0.2	0.2	0.7	0.7	0.7	0.7	0.7
Weight (kg)	1.35	1.4	1.6	4.4	2.5	3.0	5.9	4.0	7.6	4.9

CCDV = Control Chamber Displacement Volume



Size	DN80
Pattern	Angle
End Connections	Rc 3 (BSP.T)
L (mm)	187
L1 (mm)	130
H (mm)	245
h (mm)	117
W (mm)	135
CCDV (lit)	0.2
Weight (kg)	1.6

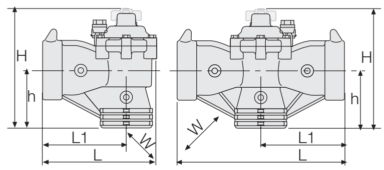


DN150	
Y "Boxer"	
Grooved (Vic)	Universal Flanges*
480	480
N/A	N/A
195	285
100	145
385	385
2 x 0.7	2 x 0.7
8.8	12.5

CCDV = Control Chamber Displacement Volume

*Reinforced Plastic Flanges

Quick "Horn" Outlet Connection



Size	DN 80	
Pattern	Angle	T
Inlet Connection	Rc 3 (BSP.T)	Rc 3 (BSP.T)
L (mm)	220	325
L1 (mm)	165	135
H (mm)	245	245
h (mm)	117	117
W (mm)	135	135
CCDV (lit)	0.2	0.2
Weight (kg)	1.7	2.1

Technical Specifications

Available Sizes:
DN: 50, 65, 80, 80L, 100 & 150

Connections Standard:
Threaded: Female BSP-T: DN: 50, 80 & 80L
Male BSP-F: DN65
Flanged: DN: 80, 80L, 100 & 150
Plastic or metal "Corona" with elongated slots enable meeting diverse flange standards ISO PN10, ANSI 125, JIS 10K

Pressure Rating: 10 bar
Operating Pressure Range: 0.35-10 bar
Temperature: Water up to 60℃
Standard Materials:
- Body, Cover and Plug: Glass-Filled Nylon
- Diaphragm: NR, Nylon Fabric Reinforced
- Seals: NR
- Spring: Stainless Steel
- Cover bolts (DN: 50, 65 & 80 valves): Stainless Steel

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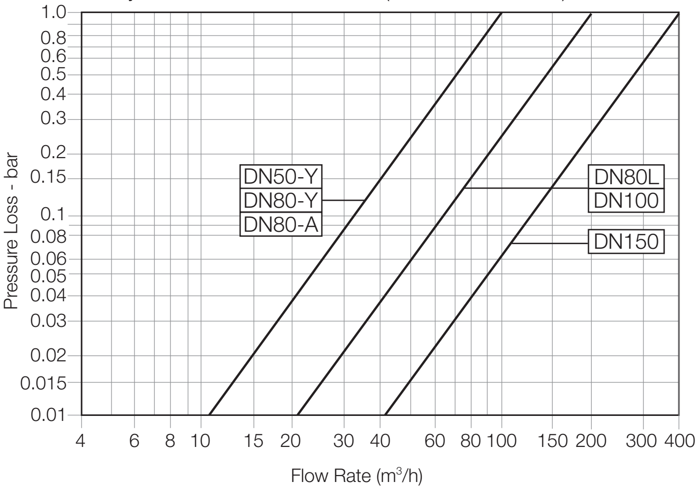
SI Metric

Flow Chart

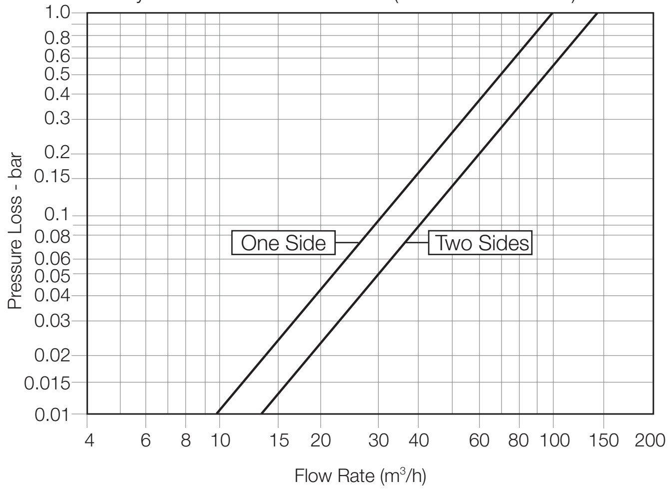
Y Pattern DN50-150, Angle Pattern DN80

2-Way circuit "Added Head Loss" (for "V" below 2 m/s): 0.3 bar



T Pattern DN80

2-Way circuit "Added Head Loss" (for "V" below 2 m/s): 0.3 bar



Flow Properties

Y Pattern

Size	DN50	DN65	DN80	DN80L	DN100	DN150
Kv	100	100	100	200	200	400
K	1.0	2.8	6.4	1.6	3.9	5.0
Leq (m)	2.4	9.1	25.7	6.4	19.6	37.2

A Pattern

DN80
100
6.4
25.7

T Pattern DN80

One Side	Two Sides
100	140
6.4	3.3
25.7	13.1

Valve flow coefficient, Kv or Cv $$Kv(Cv)=Q\sqrt{\frac{G_f}{\Delta P}}$$

Where:
Kv = Valve flow coefficient (flow in m³/h at 1bar Diff. Press.)
Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q = Flow rate (m³/h ; gpm)
ΔP = Differential pressure (bar ; psi)
G_f = Liquid specific gravity (Water = 1.0)

$\boxed{Kv = 0.865\ Cv}$

Flow resistance or Head loss coefficient, $$K = \Delta H\frac{2g}{V^2}$$

Where:
K = Flow resistance or Head loss coefficient (dimensionless)
ΔH = Head loss (m ; feet)
V = Nominal size flow velocity (m/sec ; feet/sec.)
g = Acceleration of gravity (9.81 m/sec² ; 32.18 feet/sec²)

Equivalent Pipe Length, L_{eq} $$L_{eq} = L_k\cdot D$$

Where:
L_{eq} = Equivalent nominal pipe length (m ; feet)
L_k = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

Note:
The L_{eq} values given are for general consideration only.

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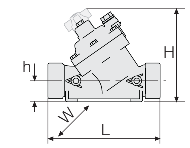
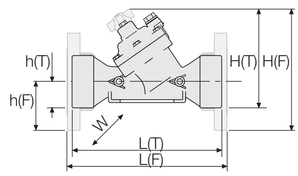
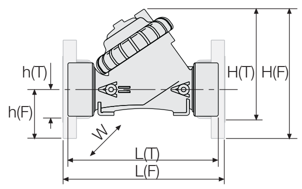
US English

Dimensions & Weights

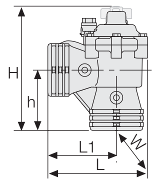




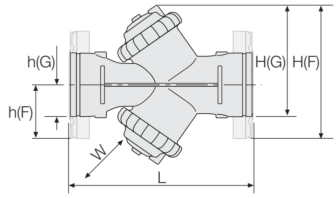


Size	2"	2 1/2"	3"			3"L			4"	
Connections	2" NPT	G 2 1/2 BSP.F	3" NPT	Universal Flanges Metal	Universal Flanges Plastic	3" NPT	Universal Flanges Metal	Universal Flanges Plastic	Universal Flanges Metal	Universal Flanges Plastic
L (inch)	9 1/16	9 1/16	11 3/4	12 1/8	12 1/8	11 3/4	12 3/16	12 3/16	13 3/4	13 3/4
H (inch)	7 5/16	7 5/16	7 11/16	10 1/16	10 1/16	9 7/16	11	11	11 9/16	11 7/16
h (inch)	1 9/16	1 9/16	1 15/16	3 15/16	3 15/16	2 3/8	3 15/16	3 15/16	4 7/16	4 7/16
W (inch)	5 5/16	5 5/16	5 5/16	7 7/8	7 7/8	7 1/2	7 7/8	7 7/8	8 13/16	8 13/16
CCDV (gal)	0.05	0.05	0.05	0.05	0.05	0.18	0.18	0.18	0.18	0.18
Weight (lb)	2.97	3.08	3.52	9.68	2.97	6.60	12.98	8.80	16.72	10.78

CCDV = Control Chamber Displacement Volume

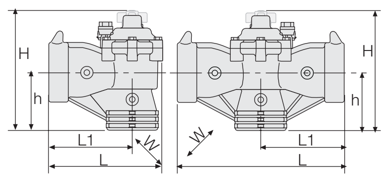


Size	3"
Pattern	Angle
End Connections	3" NPT
L (inch)	7 3/8
L1 (inch)	5 1/8
H (inch)	9 5/8
h (inch)	4 5/8
W (inch)	5 3/8
CCDV (gal)	0.05
Weight (lb)	3.52



6"	
Y "Boxer"	
Grooved (Vic)	Universal Flanges*
18 7/8	18 7/8
N/A	N/A
7 11/16	11 1/4
3 15/16	5 11/16
15 3/16	15 3/16
0.18	0.18
17.71	27.50

Quick "Horn" Outlet Connection



Size	3"	
Pattern	Angle	T
Inlet Connection	3" NPT	3" NPT
L (inch)	8 11/16	12 13/16
L1 (inch)	6 1/2	6 1/2
H (inch)	9 5/8	9 5/8
h (inch)	4 5/8	4 5/8
W (inch)	5 5/16	5 5/16
CCDV (gal)	0.05	0.05
Weight (lb)	3.37	4.62

CCDV = Control Chamber Displacement Volume
*Reinforced Plastic Flanges

Technical Specifications

Available Sizes:
2", 2 1/2", 3", 3"L, 4" & 6"

Connections Standard:
Threaded: Female NPT: 2", 3" & 3"L
Male BSP-F: 2 1/2"
Flanged: 3", 3"L, 4" & 6"
Plastic or metal "Corona" with elongated slots enable meeting diverse flange standards ISO PN10, ANSI 125, JIS 10K

Pressure Rating: 145 psi
Operating Pressure Range: 5-145 psi
Temperature: Water up to 140°F
Standard Materials:
- Body, Cover and Plug: Glass-Filled Nylon
- Diaphragm: NR], Nylon Fabric Reinforced
- Seals: NR
- Spring: Stainless Steel
- Cover bolts (2", 2 1/2" & 3" valves): Stainless Steel

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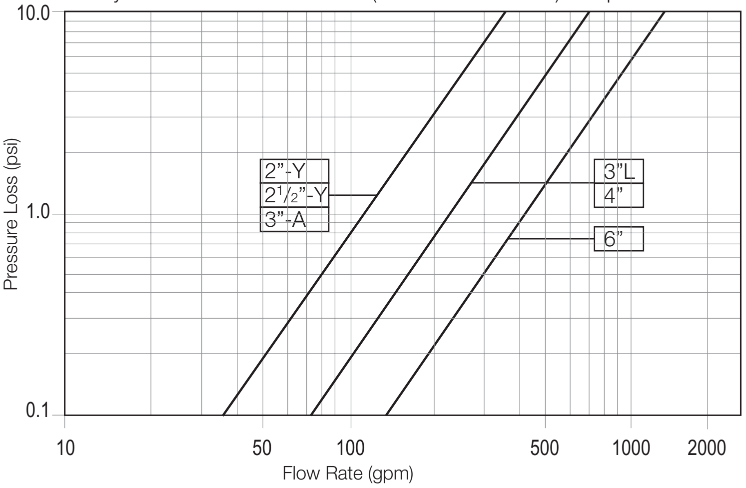
US English

Flow Chart

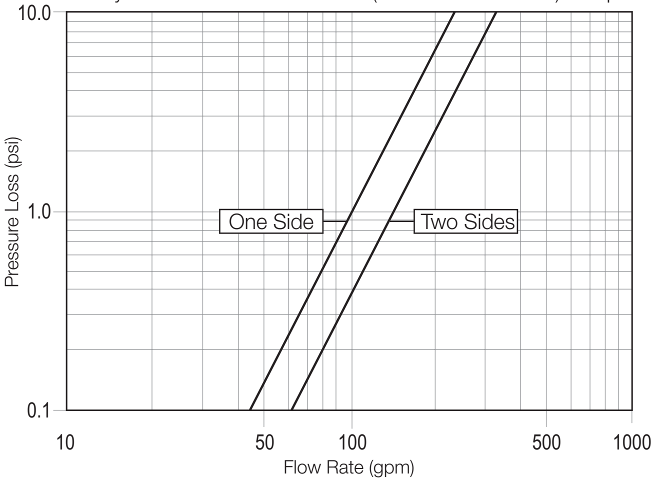
Y Pattern 2-6", Angle Pattern 3"

2-Way circuit "Added Head Loss" (for "V" below 6.5 f/s): 4.5 psi



T Pattern 3"

2-Way circuit "Added Head Loss" (for "V" below 6.5 f/s): 4.5 psi



Flow Properties

Y Pattern

Size	2"	2 1/2"	3"	3"L	4"	6"
Cv	115	115	115	230	230	460
K	1.0	2.8	6.4	1.6	3.9	5.0
Leq (ft)	8.0	29.8	84.2	21.1	64.3	122.0

A Pattern

3"
115
6.4
84.2

T Pattern 3"

One Side	Two Sides
115	160
6.4	3.3
84.2	43.0

Valve flow coefficient, Cv or Kv $$Cv(Kv)=Q\sqrt{\frac{G_f}{\Delta P}}$$

Where:
Kv = Valve flow coefficient (flow in m^3/h at 1bar Diff. Press.)
Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
Q = Flow rate (gpm ; m^3/h)
ΔP = Differential pressure (psi ; bar)
G_f = Liquid specific gravity (Water = 1.0)

Cv = 1.155 Kv

Flow resistance or Head loss coefficient, $$K = \Delta H \frac{2g}{V^2}$$

Where:
K = Flow resistance or Head loss coefficient (dimensionless)
ΔH = Head loss (feet ; m)
V = Nominal size flow velocity (feet/sec ; m/sec.)
g = Acceleration of gravity (32.18 feet/sec^2 ; 9.81 m/sec^2)

Equivalent Pipe Length, L_{eq} $$L_{eq} = L_k \cdot D$$

Where:
L_{eq} = Equivalent nominal pipe length (feet ; m)
L_k = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (feet ; m)

Note:
The L_{eq} values given are for general consideration only.

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