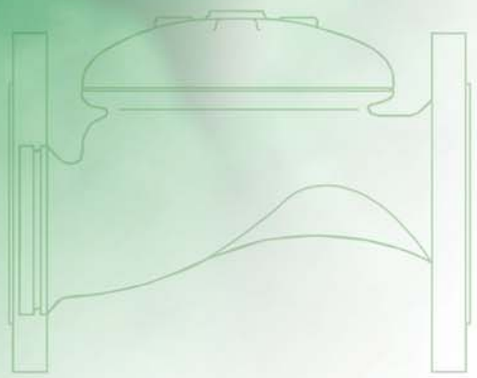
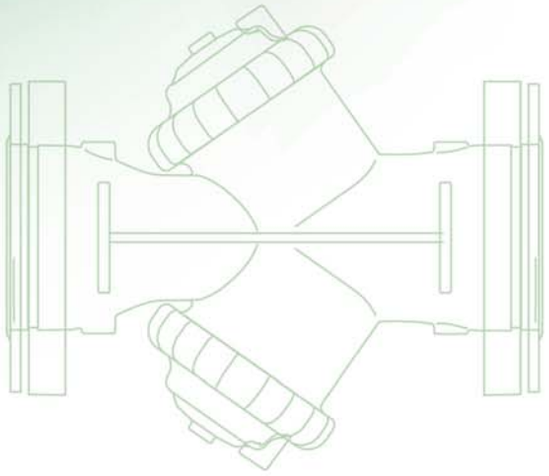
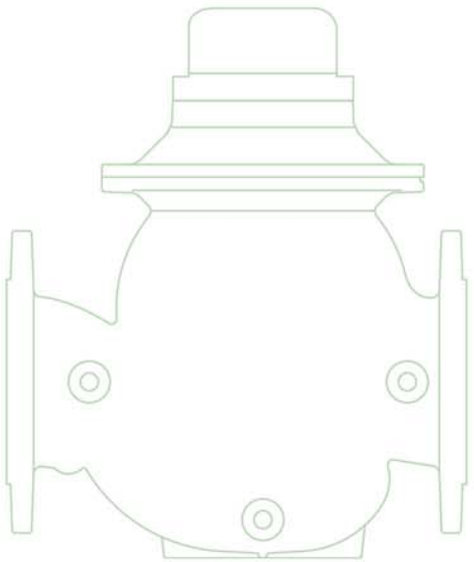
Irrigation for Agriculture

Engineering Data



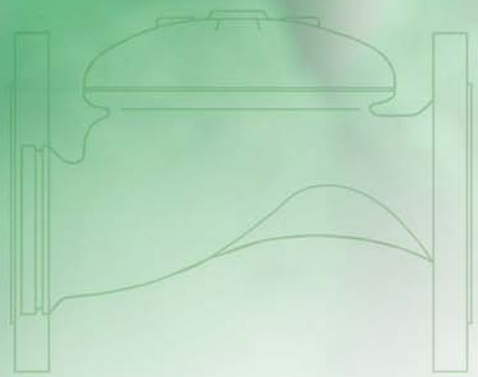


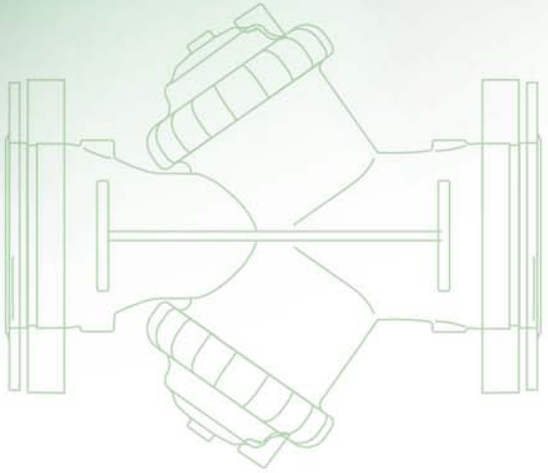


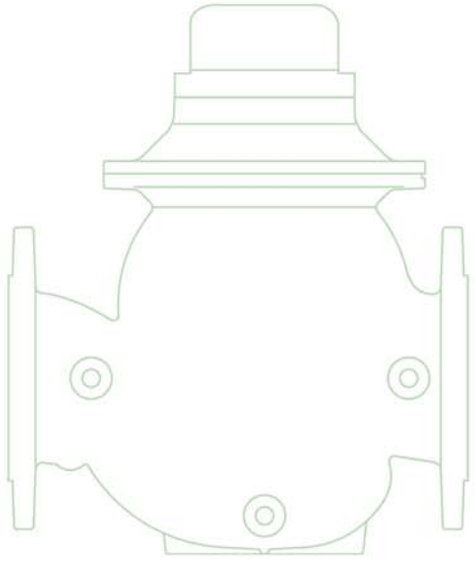
BERMAD

Irrigation for Agriculture

Engineering Data





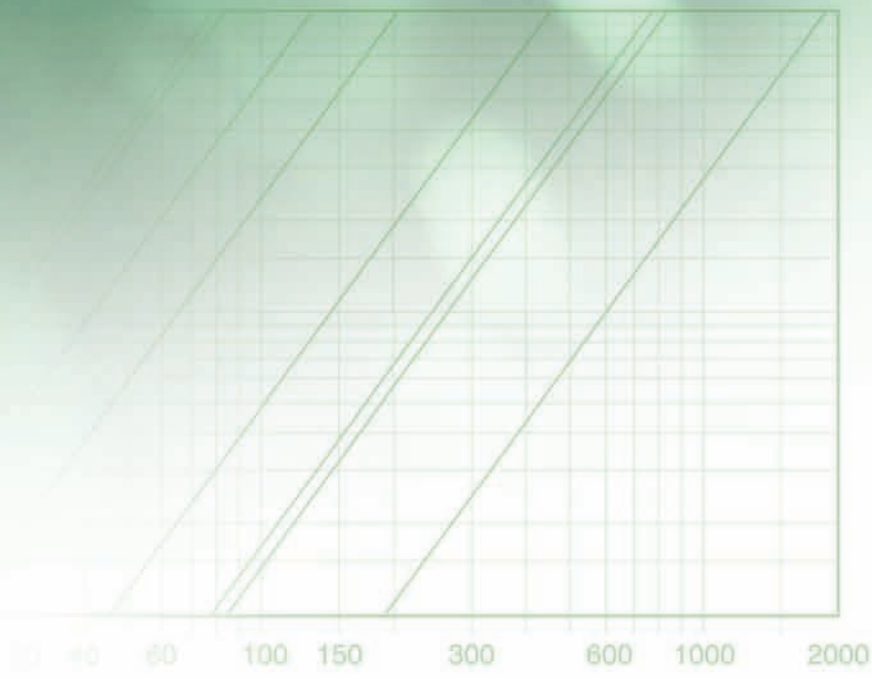


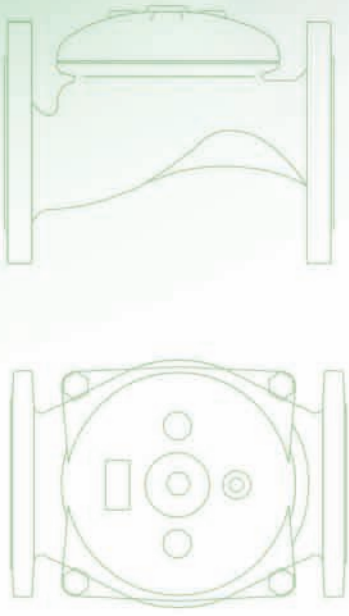
BERMAD™

Irrigation for Agriculture

Engineering Data

IR-400 Series





Product Parts Features

[1] Fastening Bolts

Only four bolts (up to 10"; DN250 valve) fasten valve cover to body, ensuring quick in-line inspection and service.

[2] Valve Cover

Locates, centralizes and fastens diaphragm and spring ensuring smooth and accurate performance. Simple construction enables quick in-line inspection and service.

[3] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

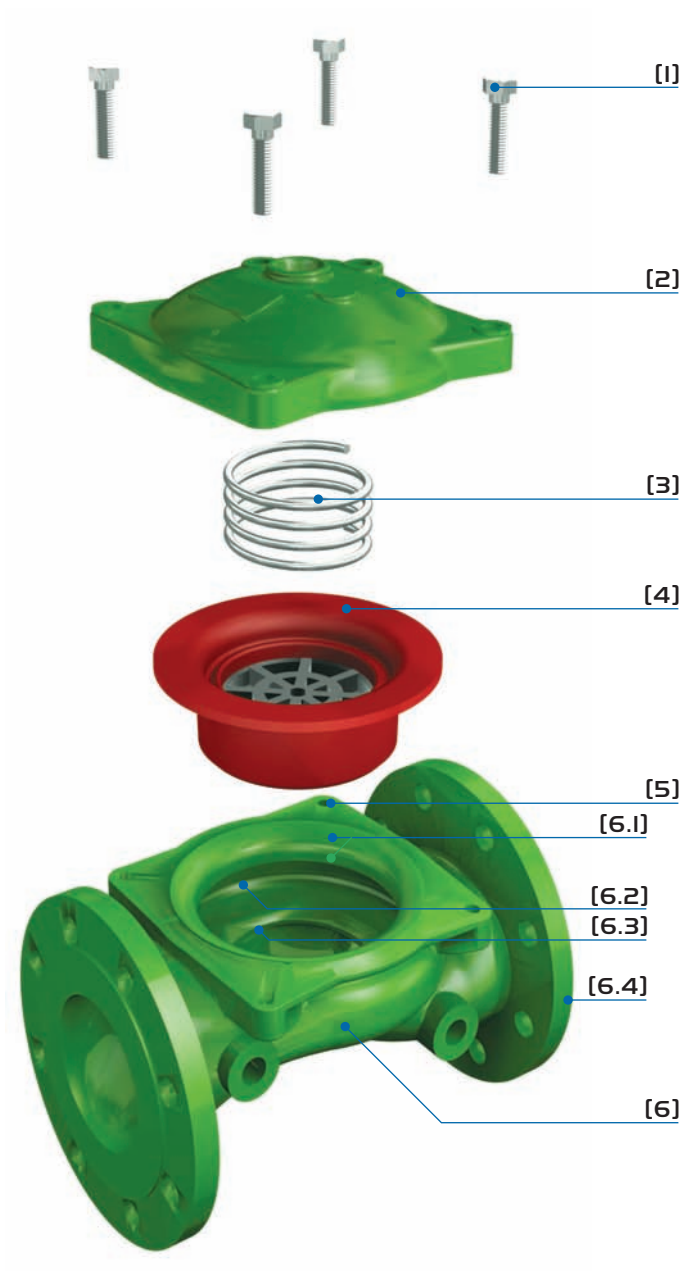
[4] Diaphragm Assembly

One piece elastomeric assembly that includes a peripherally supported flexible diaphragm, vulcanized with a rugged radial seal disk.

- No need for special types of diaphragms to meet different operating conditions.
- Progressive dynamic guidance, resulting in exceptionally stable action and restrained closing.
- Valve opens and closes drip tight even with very low pressure supply.
- Perfectly balanced diaphragm with no distortion caused by uneven hydraulic forces on shut-off or during regulation.
- Exceptionally stable and chatter-free action during shut-off and pressure regulation.

[5] Body Threads

No need for nuts, simplifying valve disassembling and assembling for maintenance.



[6] Wide Body Valve

Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation.

[6.1] Diaphragm Supporting & Guiding

[6.2] Diaphragm Balancing Chamber

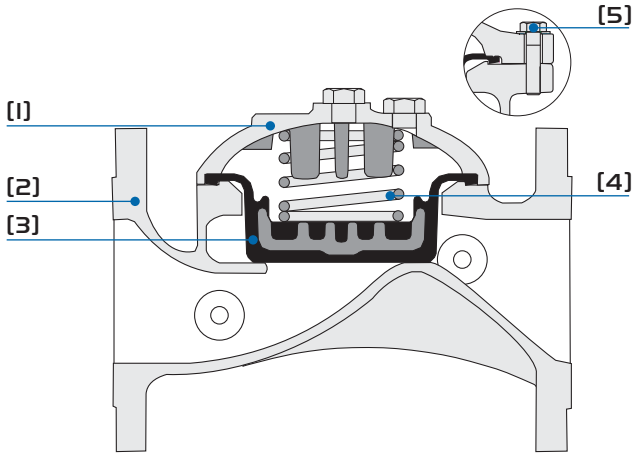
[6.3] Valve Seat: Full bore, valve port area clear of obstructions; no ribs or stem guides. Flow entrance is vertical to seal disk.

[6.4] End Connections: Conforms to pressure ratings and standards of: ISO, ANSI, JIS, BS, and others.

For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"

SI Metric

Construction Materials



Description		GR-400	IR-400			
Size		**DN20-50**	**DN40-150**	**DN200**	**DN250-400**	**DN50-100**
Pattern		Globe	Globe	Globe	Globe	Angle
Cover	[1]	Brass	Cast Iron	Cast Iron	Ductile Iron	Cast Iron
Valve Body	[2]	Brass	Cast Iron(1)	Cast Iron(1)	Ductile Iron	Cast Iron
Diaphragm Assembly	[3]	NR with Plastic VRSD(2)	NR with Plastic VRSD(2)	NR with Plastic VRSD(2)		NR with Plastic VRSD(2)
Spring	[4]	St. St. 302	Stainless Steel 302			
External Bolts	[5]	St. St. 304	Zinc-Cobalt Plated Steel			
Coating		Un-Coated	Polyester Green RAL 6017			
Pressure Rating		PN10	PN16			

(1) DN100 & 150 grooved valves are constructed of Ductile Iron
(2) Vulcanized Radial Seal Disk

Technical Specifications

Available Patterns, Size & End Connections

Connections	GR-400				IR-400			
	DN20	DN25	DN40	DN50	DN40	DN50	DN65	DN80R
Threaded	G	G	G	G	G	G & A	G & A	G & A
Flanged						G & A	G	G
Grooved						G		

Connections	IR-400							
	DN80	DN100	DN150	DN200	DN250	DN300	DN350	DN400
Threaded	G & A							
Flanged	G & A	G & A	G	G	G	G	G	G
Grooved	G & A	G & A	G					

G = Globe, A = Angle 90°

Connections Standard:
Flanged: ISO 7005-2 (PN10 & 16)
Threaded: Rp ISO 7/1 (BSP.P) or NPT
Grooved: ANSI C606

Operating Pressure Ranges:
IR-400: 0.5-16 bar
For lower pressure requirements, consult factory
GR-400: 0.5-10 bar

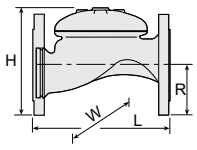
Temperature: Water up to 60°C

Standard Materials:
- Castings & Forgings:
  - Cast Iron to EN 1561
  - Ductile Iron to EN 1563
  - Brass
  - Plasti: Polyamid 6+30% GF
- Elastomers: NR to EN 681-1
- Coatings: Electrostatic Powder Coating Polyester

Dimensions & Weights

SI Metric

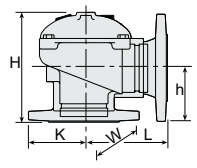
Globe Pattern



Size		Flanged										
		DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250	DN300	DN350	DN400
L	(mm)	205	205	210	250	320	415	500	605	725	742	742
H	(mm)	155	178	200	210	242	345	430	460	635	655	965
W	(mm)	155	178	200	200	223	306	365	405	580	587	600
R	(mm)	78	89	100	100	112	140	170	202	242	260	300
Weight	(kg)	9	10.5	12.1	19	28	68	125	140	290	358	377

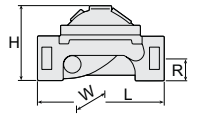
Size		Threaded					Grooved			
		DN40	DN50	DN65	DN80R	DN80	DN50	DN80	DN100	DN150
L	(mm)	153	180	210	210	255	205	250	320	415
H	(mm)	87	114	132	140	165	108	155	191	302
W	(mm)	98	119	129	129	170	119	170	204	306
R	(mm)	29	39	45	53	55	31	46	61	85
Weight	(kg)	2	4	5.7	5.8	13	5	10.6	16.2	49

Angle Pattern



Size		Threaded				Grooved		Flanged		
		DN50	DN65	DN80R	DN80	DN80	DN100	DN50	DN80	DN100
L	(mm)	86	110	110	110	120	160	121	153	160
H	(mm)	136	180	178	184	194	223	160	205	223
W	(mm)	119	131	131	170	170	204	155	200	223
h	(mm)	61	93	91	80	90	112	83	101	112
K	(mm)	56	66	66	55	45	58	78	100	112
Weight	(kg)	4.4	5.8	7	11	10	16	9	17	26

Globe Pattern GR-400



Size		DN20	DN25	DN40	DN50
L	(mm)	112	115	150	180
H	(mm)	68	70	89	103
W	(mm)	22	23	32	39
R	(mm)	72	72	94	118
Weight	(kg)	0.95	0.95	1.5	4

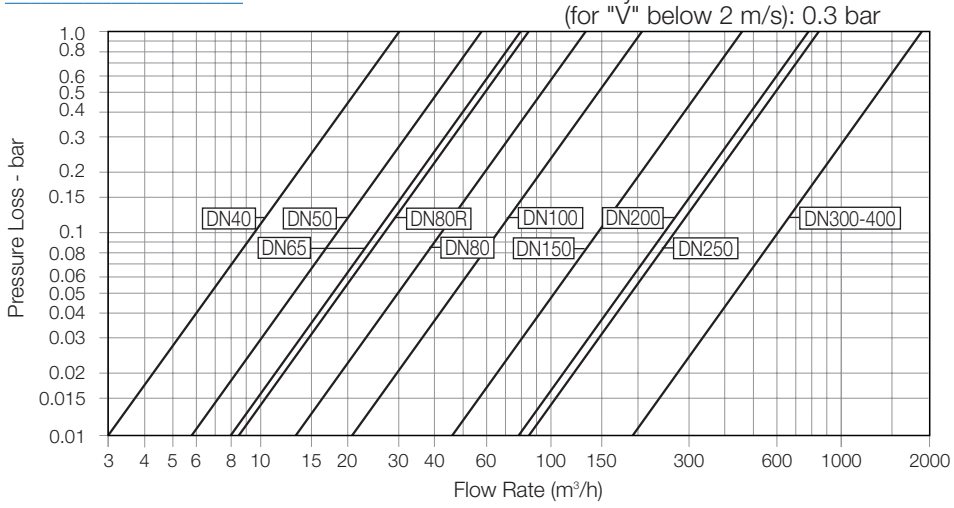
Control Chamber Displacement Volume (liter)

DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300-400
0.113	0.179	0.291	0.668	1.973	3.858	3.858	13.75

SI Metric

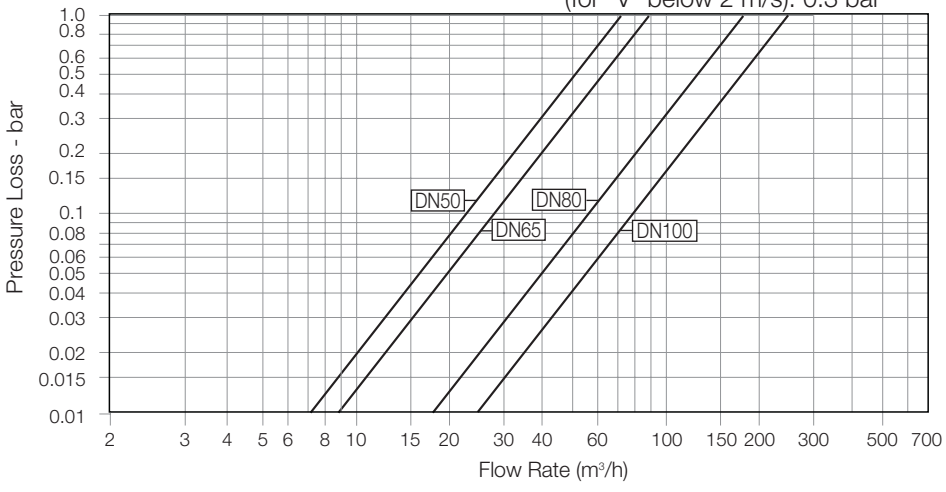
Globe Pattern

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



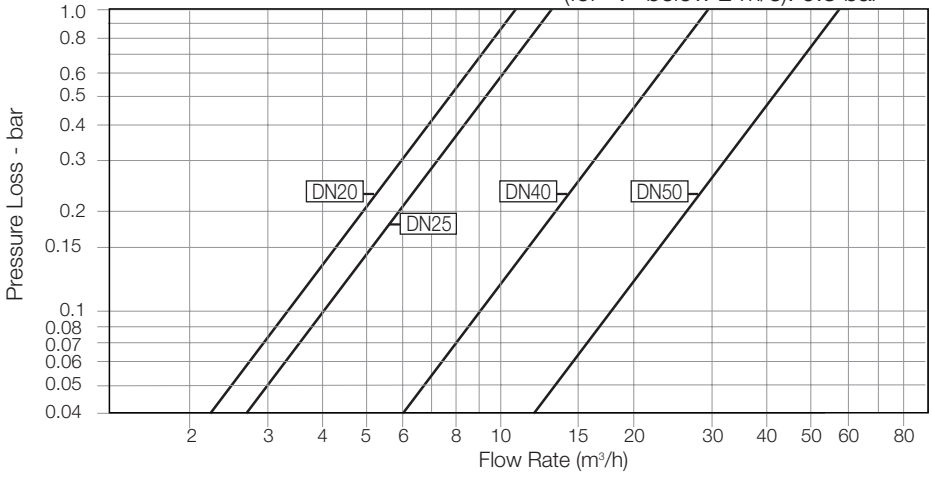
Angle Pattern

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



Globe Pattern GR-400

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



Flow Properties

SI Metric

	Size	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300-400
Globe Pattern 	Kv	57	78	136	204	458	781	829	1,932
	K	3.2	4.2	2.9	4.0	4.0	4.4	3.9	3.6
	Leq - m	9.1	12.1	13.7	14	27.4	45.8	108	57

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = 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 (m ; feet)
V = Nominal size flow velocity (m/sec ; feet/sec.)
g = Acceleration of gravity (9.81 m/sec^2 ; 32.18 $feet/sec^2$)

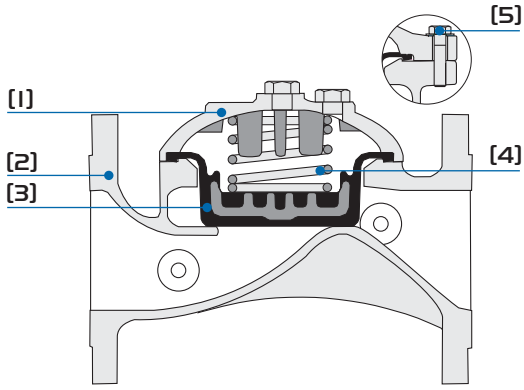
Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

Note:
The Leq values given are for general consideration only.

US English

Construction Materials



Description		GR-400	GR-400			
Size		**3/4-3"**	**1 1/2-6"**	**8"**	**10-16"**	**2-4"**
Pattern		Globe	Globe	Globe	Globe	Angle
Cover	[1]	Brass	Cast Iron	Cast Iron	Ductile Iron	Cast Iron
Valve Body	[2]	Brass	Cast Iron(1)	Cast Iron(1)	Ductile Iron	Cast Iron
Diaphragm Assembly	[3]	NR with Plastic VRSD(2)	NR with Plastic VRSD(2)	NR with Cast Iron VRSD(2)		NR with Plastic VRSD(2)
Spring	[4]	St. St. 302	Stainless Steel 302			
External Bolts	[5]	St. St. 304	Zinc-Cobalt Plated Steel			
Coating		Un-Coated	Polyester Green RAL 6017			
Pressure Rating		150 psi	230 psi			

(1) 4 & 6" grooved valves are constructed of Ductile Iron
(2) Vulcanized Radial Seal Disk

Technical Specifications

Available Patterns, Size & End Connections

Connections	GR-400				IR-400			
	3/4"	**1"**	**1 1/2"**	**2"**	**1 1/2"**	**2"**	**2 1/2"**	**3"R**
Threaded	G	G	G	G	G	G & A	G & A	G & A
Flanged						G & A	G	G
Grooved						G		

Connections	IR-400							
	3"	**4"**	**6"**	**8"**	**10"**	**12"**	**14"**	**16"**
Threaded	G & A							
Flanged	G & A	G & A	G	G	G	G	G	G
Grooved	G & A	G & A	G					

G = Globe, A = Angle 90°

Connections Standard:

Flanged

- ANSI B16.41 (Cast Iron)
- ANSI B16.42 (Ductile Iron)

Threaded: NPT or Rp ISO 7/1 (BSP.P)

Grooved: ANSI C606

Operating Pressure Ranges:

IR-400: 7-232 psi

For lower pressure requirements, consult factory

GR-400: 7-150 psi

Temperature: Water up to 140°F

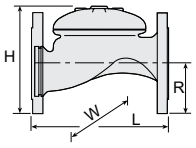
Standard Materials:

- Castings & Forgings:
  - Cast Iron to ASTM A-126 Class B
  - Ductile Iron to ASTM A-536
  - Brass
  - Plastic: Polyamid 6+30% GF
- Elastomers: NR to ASTM-D-2000
- Coatings: Electrostatic Powder Coating Polyester

Dimensions & Weights

US English

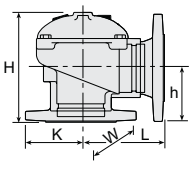
Globe Pattern



Size		Flanged										
		2"	2½"	3"R	3"	4"	6"	8"	10"	12"	14"	16"
L	(inch)	8 1/16	8 1/16	8 1/4	9 13/16	12 5/8	16 5/16	19 11/16	23 13/16	28 9/16	29 1/4	29 1/4
H	(inch)	6 1/8	7	7 7/8	8 1/4	9 1/2	13 9/16	16 15/16	18 1/8	25	25 13/16	38
W	(inch)	6 1/8	7	7 7/8	7 7/8	8 3/4	12	14 3/8	15 15/16	22 7/8	23 1/8	23 5/8
R	(inch)	3 1/16	3 1/2	3 15/16	3 15/16	4 1/2	5 1/2	6 11/16	7 15/16	9 1/2	10 1/4	11 13/16
Weight	(lb)	19.8	23.1	41.9	41.9	61.7	149.9	275.6	308.6	639.3	789.2	831.1

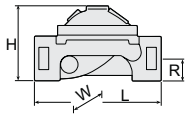
Size		Threaded					Grooved			
		1½"	2"	2½"	3"R	3"	2"	3"	4"	6"
L	(inch)	6	7 1/16	8 1/4	8 1/4	10	8 1/16	9 13/16	12 5/8	16 5/16
H	(inch)	3 3/8	4 16/16	5 3/16	5 1/2	6 1/2	4 1/4	6 1/16	7 1/2	15 7/8
W	(inch)	3 7/8	4 11/16	5 1/16	5 1/16	6 11/16	4 11/16	6 11/16	8	12 1/16
R	(inch)	1 1/8	1 1/2	1 13/16	2 1/16	2 3/16	1 3/16	1 6/8	2 3/8	3 3/8
Weight	(lb)	4.4	8.8	12.6	12.8	28.7	11.0	23.4	35.7	108.0

Angle Pattern



Size		Threaded				Grooved		Flanged		
		2"	2½"	3"R	3"	3"	4"	2"	3"	4"
L	(inch)	3 3/8	4 5/16	4 5/16	4 3/8	4 3/4	6 5/16	4 3/4	6	6 1/4
H	(inch)	5 3/8	7 1/16	7	7 1/4	7 5/8	8 3/4	6 5/16	8 1/16	8 3/4
W	(inch)	4 11/16	5 3/16	5 3/16	6 11/16	6 11/16	8	6 1/8	7 7/8	8 3/4
h	(inch)	2 3/8	3 11/16	3 9/16	3 1/8	3 9/16	4 1/2	3 1/4	4	4 7/16
K	(inch)	2 3/16	2 5/8	2 5/8	2 3/16	1 3/4	2 5/16	3 1/16	3 15/16	4 7/16
Weight	(lb)	9.7	12.8	15.4	24.3	22.0	35.3	19.8	37.5	57.3

Globe Pattern GR-400



Size		¾"	1"	1½"	2"
L	(inch)	4 7/16	4 1/2	5 7/8	7 1/8
H	(inch)	2 11/16	2 3/4	3 1/2	4 1/16
W	(inch)	7/8	15/16	1 1/4	1 9/16
R	(inch)	2 13/16	2 13/16	3 11/16	4 5/8
Weight	(lb)	2.1	2.1	3.3	8.8

Control Chamber Displacement Volume (gallons)

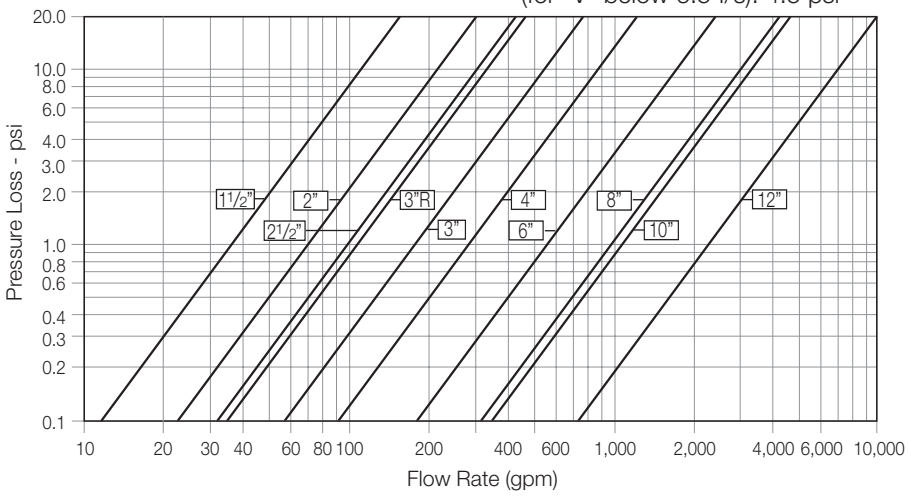
2"	2½"	3"	4"	6"	8	10"	12-16"
0.03	0.05	0.08	0.18	0.52	1.02	1.02	3.63

Flow Charts

US English

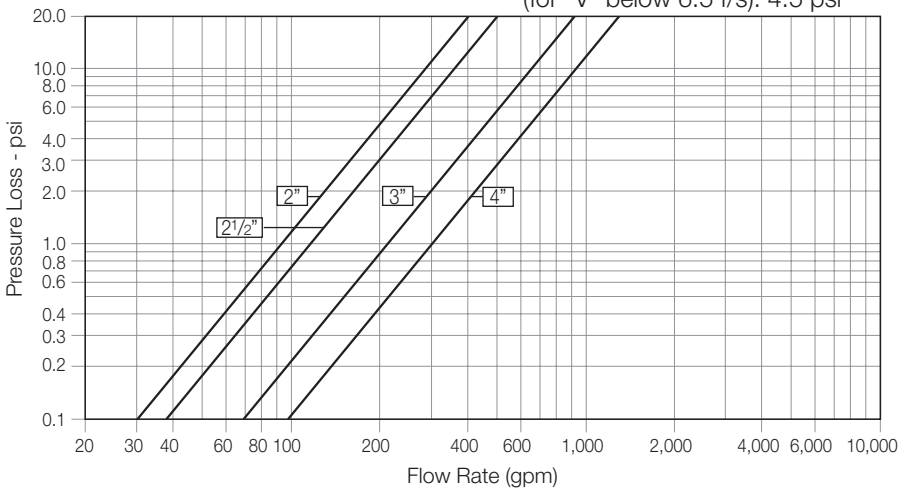
Globe Pattern

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



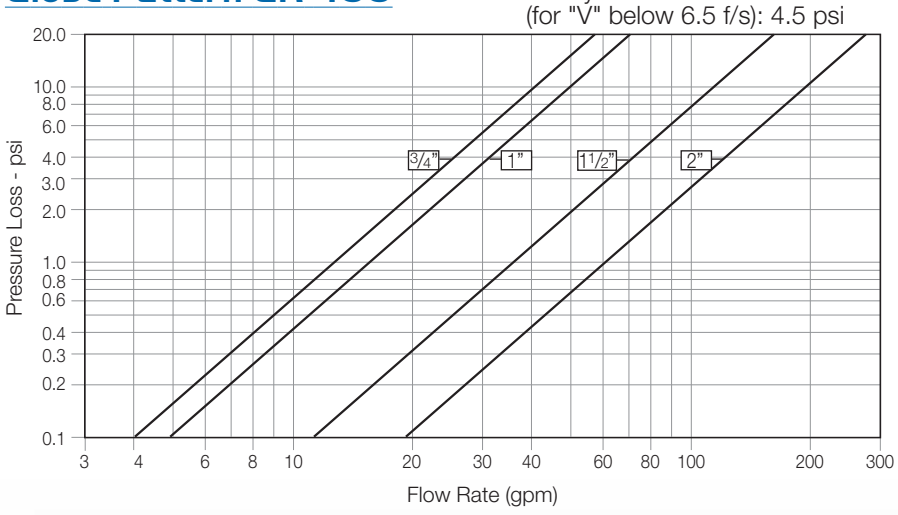
Angle Pattern

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



Globe Pattern GR-400

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



Flow Properties

US English

		2”	2½”	3”	4”	6”	8”	10”	12-16”
Globe Pattern	Cv	66	90	157	236	529	902	957	2,231
	K	3.2	4.2	2.9	4.0	4.0	4.4	3.9	3.6
	Leq - ft	30	40	45	46	90	150	354	187

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = 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 (m ; feet)
V = Nominal size flow velocity (m/sec ; feet/sec.)
g = Acceleration of gravity (9.81 m/sec^2 ; 32.18 $feet/sec^2$)

Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

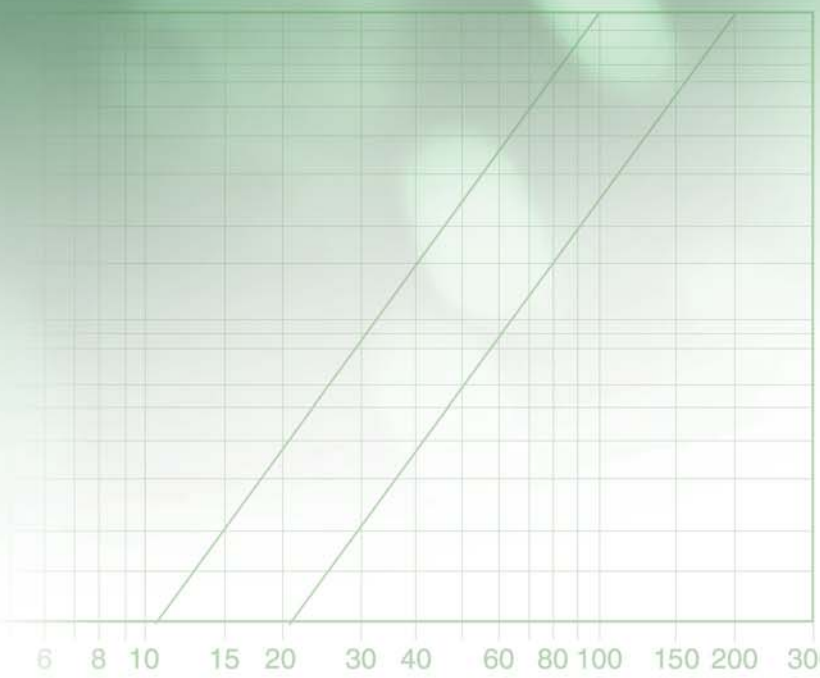
Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

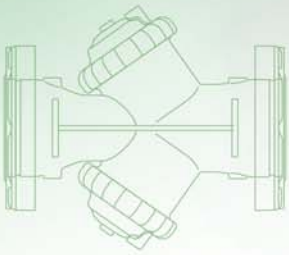
Note:
The Leq values given are for general consideration only.

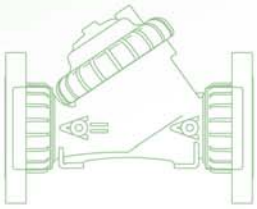
Irrigation for Agriculture

Engineering Data

IR-100 Series







BERMAD

Product Parts Features

[1] Cover Ring

The cover ring fastens valve cover to body, stiffening and strengthening the valve body, enabling simple maintenance. A cover ring wrench 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 Reinforced 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.

For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"

Configuration Options

Additional Valve Configurations

2"; DN50

2½"; 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)
2½"; DN65

Union PVC adaptor
2½"; DN65

BSP.T; NPT Female Thread
3"; DN80

Plastic Flange
3"; DN80

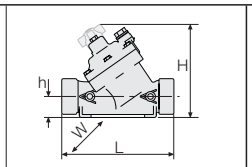
Plastic Flange
3"L & 4"; DN: 80L & 100

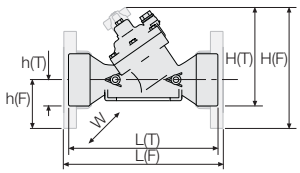
Metal Flange
3"L & 4"; DN: 80L & 100

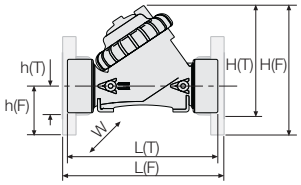
PVC Adaptor
3"; DN80

SI Metric

Dimensions & Weights

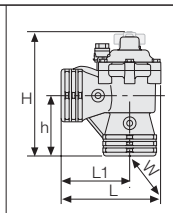


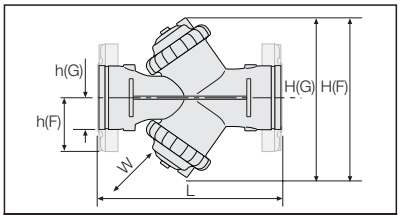




Size	DN50	DN65	DN 80			DN80L			DN 100	
End Connections	Rc 2 (BSP.T)	G 2½ (BSP.F)	Rc 3 (BSP.T)	Universal Flanges		Rc 3 (BSP.T)	Universal Flanges		Universal Flanges	
				Metal	Plastic		Metal	Plastic	Metal	Plastic
L (mm)	230	230	298	308	308	298	310	310	350	350
H (mm)	185	185	195	255	255	240	280	280	294	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

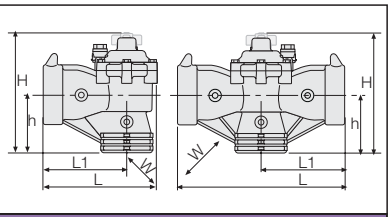




Size	DN80	DN150	
Pattern	Angle	Y "Boxer"	
End Connections	Rc 3 (BSP.T)	Grooved (Vic)	Universal Flanges*
L (mm)	187	480	480
L1 (mm)	130	N/A	N/A
H (mm)	245	195	285
h (mm)	117	100	145
W (mm)	135	385	385
CCDV (lit)	0.2	2 x 0.7	2 x 0.7
Weight (kg)	1.6	8.8	12.5

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

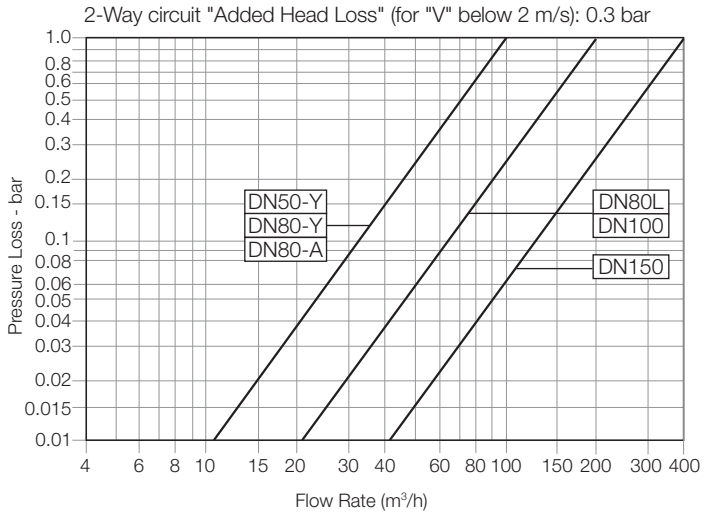
Connections Standard:
Threaded: Female BSP-T: DN: 50, 80 & 80L
Male BSP-F: DN65
Flanged: DN: 80, 80L, 100 & 150
Plastic or metal "Corona" with elongated slots enable meeting diverse flange standards
ISO PN10, ANSI 125, JIS 10K

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

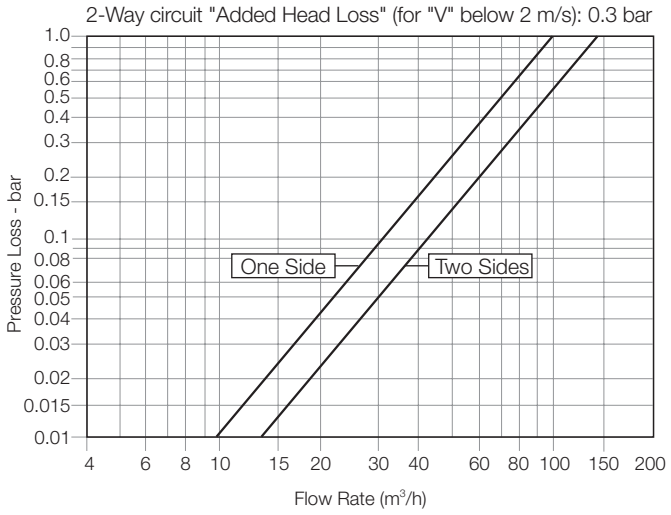
SI Metric

Flow Chart

Y Pattern DN50-150, Angle Pattern DN80



T Pattern DN80



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

$Kv = 0.865\ Cv$

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/sec^2 ; 32.18 $feet/sec^2$)

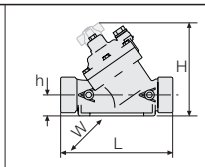
Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

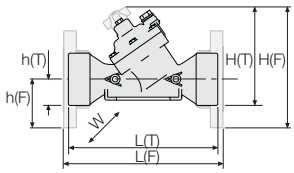
Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

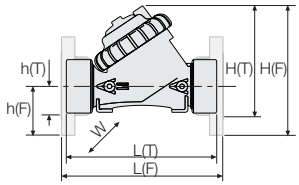
Note:
The Leq values given are for general consideration only.

US English

Dimensions & Weights



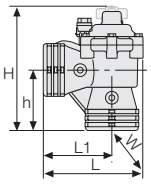


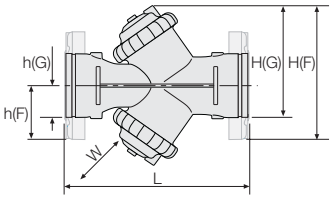


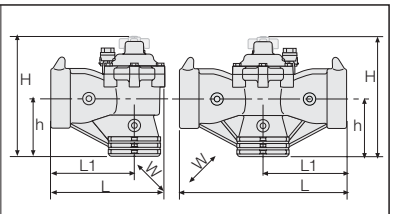
Size	2"	2½"	3"			3"L			4 "	
Connections	2" NPT	G 2½ BSP.F	3" NPT	Universal Flanges Metal	Universal Flanges Plastic	3" NPT	Universal Flanges Metal	Universal Flanges Plastic	Universal Flanges Metal	Universal Flanges Plastic
L (inch)	9 1/16	9 1/16	11 3/4	12 1/8	12 1/8	11 3/4	12 3/16	12 3/16	13 3/4	13 3/4
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

Quick "Horn" Outlet Connection







Size	3"	6"	
Pattern	Angle	Y "Boxer"	
End Connections	3" NPT	Grooved (Vic)	Universal Flanges*
L (inch)	7 3/8	18 7/8	18 7/8
L1 (inch)	5 1/8	N/A	N/A
H (inch)	9 5/8	7 11/16	11 1/4
h (inch)	4 5/8	3 15/16	5 11/16
W (inch)	5 3/8	15 3/16	15 3/16
CCDV (gal)	0.05	0.18	0.18
Weight (lb)	3.52	17.71	27.50

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", 2½", 3", 3"L, 4" & 6"

Connections Standard:
Threaded: Female NPT: 2", 3" & 3"L
Male BSP-F: 2½"
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 Reinforced Nylon
- Diaphragm: NR], Nylon Fabric Reinforced
- Seals: NR
- Spring: Stainless Steel
- Cover bolts (2", 2½" & 3" valves): Stainless Steel

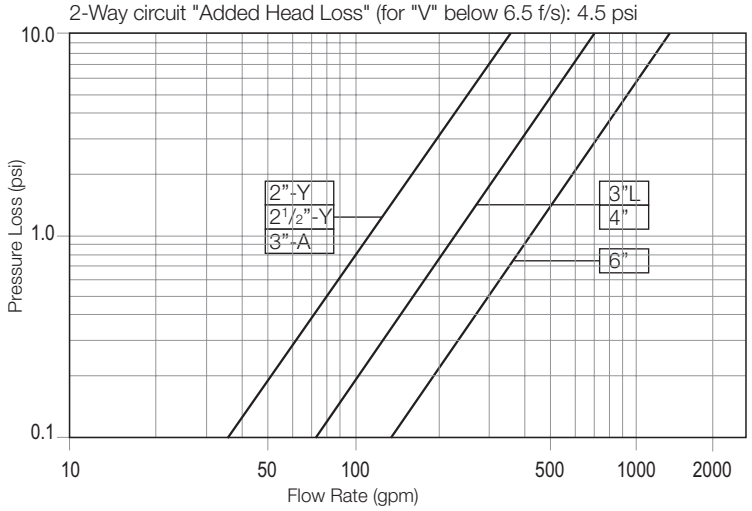
Flow Data

US English

Flow Chart

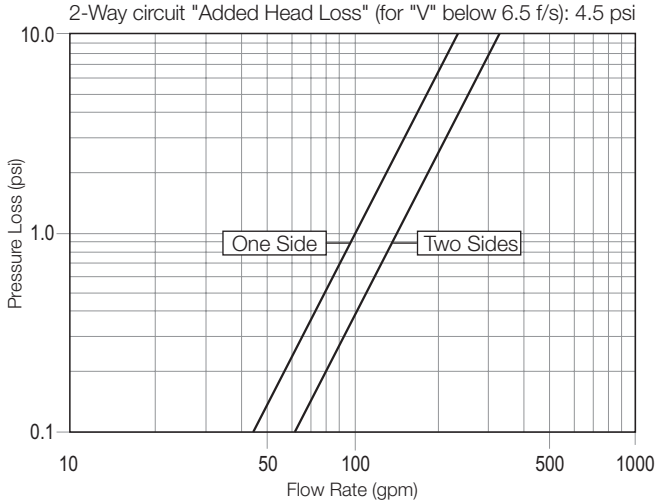
Y Pattern 2-6", Angle Pattern 3"

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"	2½"	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, Leq $Leq = Lk \cdot D$

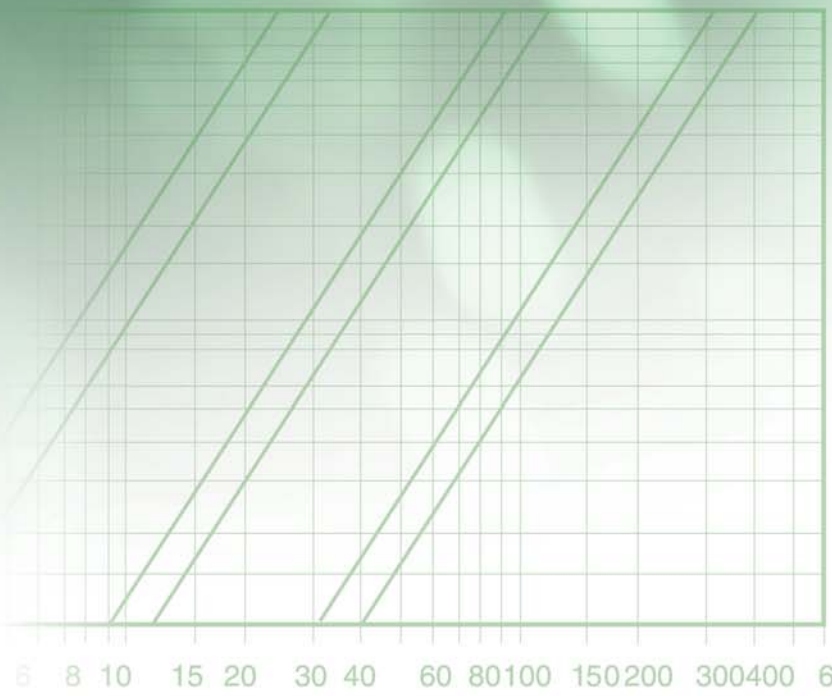
Where:
Leq = Equivalent nominal pipe length (feet ; m)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (feet ; m)

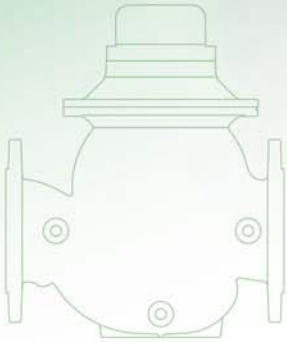
Note:
The Leq values given are for general consideration only.

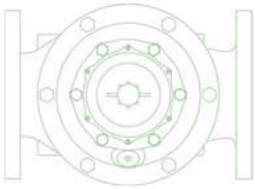
Irrigation for Agriculture

Engineering Data

IR-900-M Series







Product Parts Features

[1] Control Head

Includes: Vacuum-sealed meter register, magnetically coupled to the impeller drive. Hermetically sealed control head and its register(s). High sensitivity, providing superior accuracy that exceeds all water meter standards. Range of Reed Switch and Opto-Electric 4-20 mA transmitter options provide greater flexibility in electrical pulse generation.

[2] Valve Cover

Locates, centralizes and fastens diaphragm, spring, and impeller assembly ensuring smooth and accurate performance. Simple and light construction enables quick in-line inspection and service.

[3] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

[4] Closure Assembly

Combining a rugged radial disk harnessed to a flexible fiber reinforced diaphragm. The fully guided closure assembly and the carefully balanced and peripherally supported diaphragm prevent distortion and protect the elastomer, resulting in long-life and controlled actuation even under harsh conditions. One diaphragm and spring fully meet the valve's operating pressure range requirements.

[5] Impeller Assembly

[5.1] Guide – Carries the transmission shaft, guides the closure assembly, and centralizes and tightens all internal parts.

[5.2] Upper Flow Straightener – Tightens the seal seat in place, straightens outlet flow, and creates mushroom-shaped flow.

[5.3] Impeller – Woltman-type impeller with tungsten carbide shaft tips and bearings for high, long-term accuracy and negligible wear.

[6] Impeller Housing

[6.1] Lower Flow Straightener – Straightens inlet flow, eliminating the need for straight upstream pipe required in standard water meters.

[6.2] Seal Seat – Metal ring vulcanized with elastomeric seal, raised and remote from valve body to prevent cavitation damage.

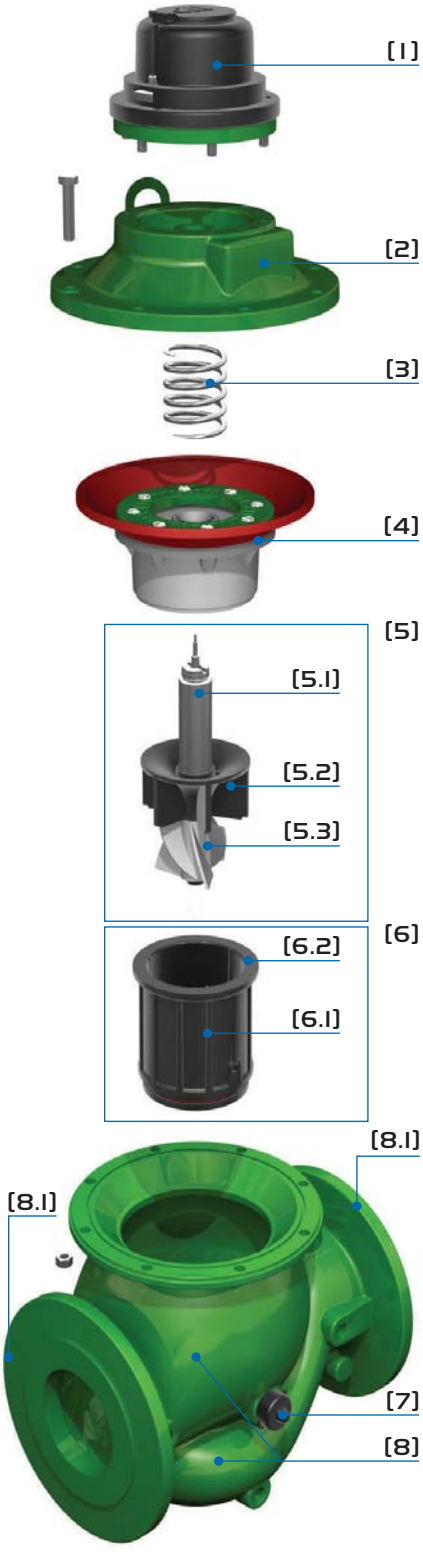
[7] Integrated Calibration Device

Enables recalibration instead of renovation when the recommended standard accuracy period has elapsed (The Calibration Device is stamped closed with a metal seal).

[8] Wide Body

Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation.

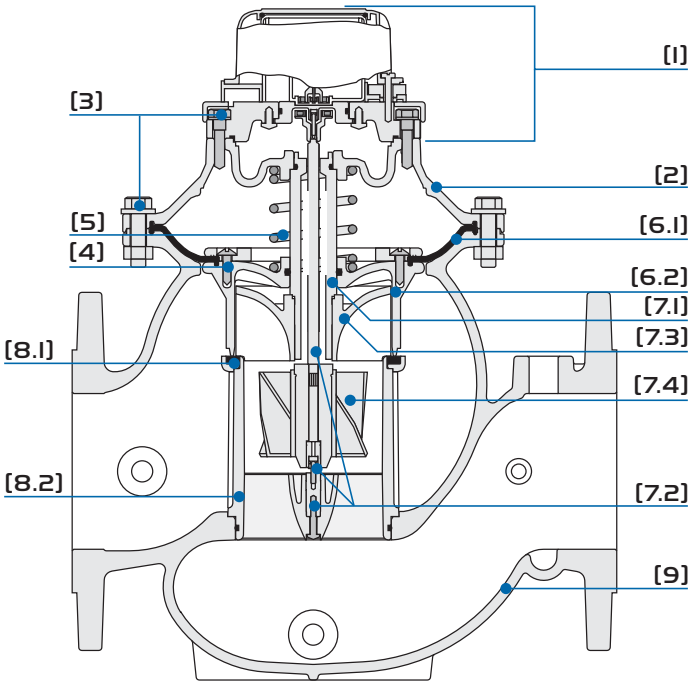
[8.1] End Connections conform to pressure ratings and standards: ISO, ANSI, JIS, BS, and others.



For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"

SI Metric

Construction Materials



[1] **Control Head:** Plastic, Stainless Steel and Brass

[2] **Cover:** Polyester Coated Ductile Iron to EN 1563

[3] **External Bolts / Nuts:** Zinc-Cobalt Plated Steel

[4] **Internal Bolts, Nuts and Washers:** Stainless Steel 304 and 316

[5] **Spring:** Stainless Steel 302

[6] **Closure Assembly:**
- [6.1] **Diaphragm:** Reinforced Natural Rubber (NR)
- [6.2] **Closure:** Glass Fiber Reinforced Nylon

[7] **Impeller Assembly:**
- [7.1] **Guide:** Stainless Steel 303
- [7.2] **Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- [7.3] **Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- [7.4] **Impeller:** Polypropylene

[8] **Impeller Housing Assembly:**
- [8.1] **Seal Seat:** NBR (Buna-N) Vulcanized Brass
- [8.2] **Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[9] **Valve Body:** Polyester Coated Ductile Iron to EN 1563 or Cast Iron

O-Rings: NBR (Buna-N)
Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

SI Metric

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H=Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:

Flanged: ISO 7005-2 (PN10 & 16)
Triangle Flange (DN65 inlet only)
Threaded: Rp ISO 7/1 (BSP.P) or NPT

Pressure Rating: PN16

Operating Pressure Ranges:

PN10: 0.7-10 bar
PN16: 0.7-16 bar
For lower pressure requirements, consult factory

Temperature: Water up to 50°C

Pulse Options:

Register Type	Reed Switch - Single				Reed Switch - Combined	
Size Range \ Pulse Per	10 liter	100 liter	1 m^3	10 m^3	10 liter + 100 liter	100 liter + 1 m^3
DN40-DN100	■	■	■		■	■
DN150-DN250			■	■		

Register Type	Opto-Electric		Opto-Electric + Reed Switch - Combined			
Size Range \ Pulse Per	1 liter	10 liter	1 liter (Opto) + 100 liter (Reed)	1 liter (Opto) + 1 m^3 (Reed)	10 liter (Opto) + 1 m^3 (Reed)	10 liter (Opto) + 10 m^3 (Reed)
DN40-DN100	■		■	■		
DN150-DN250		■			■	■

Pulse Electric Data:

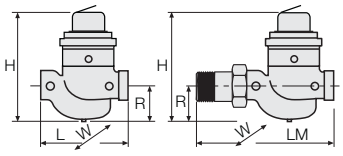
Reed-Switch: Switching voltage: 48 VAC/DC max
Switching current: 0.2A max
Switching power: 4W max

Opto-Electric: Supply voltage: 5-12 VDC
Output type: complementary
Output current: 200 mA

Dimensions & Weights

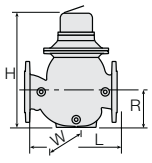
SI Metric

Globe Pattern



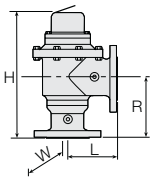
Connection Type	Threaded		
Size	DN40	DN50	DN80R
L (mm)	250	250	250
LM (mm)	317	327	N/A
W (mm)	137	137	137
H (mm)	270	277	277
R (mm)	95	95	79
Weight (kg)	7.2	7.3	7.3

Globe Pattern



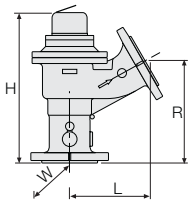
Connection Type	Flanged					
Size	DN80R	DN80	DN100	DN150	DN200	DN250
L (mm)	310	300	350	500	600	600
W (mm)	200	210	250	380	380	405
H (mm)	298	382	447	602	617	617
R (mm)	100	123	137	216	228	228
Weight (kg)	16.0	23.0	31.0	71.0	93.0	140.5

90° Angle Pattern

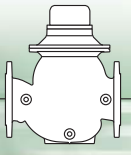


Connection Type	Threaded	Flanged			
Size	DN50	DN80	DN100	DN150	DN200
L (mm)	120	150	180	250	250
W (mm)	137	210	250	380	380
H (mm)	300	402	481	585	585
R (mm)	125	196	225	306	280
Weight (kg)	8.1	25.8	36.1	76.7	82.5

120° Angle Pattern



Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size	DN65	DN100	DN65	DN100
L (mm)	143	208	143	208
W (mm)	137	217	200	223
H (mm)	410	450	410	450
R (mm)	273	283	273	283
Weight (kg)	10.5	24.8	12.9	27.9

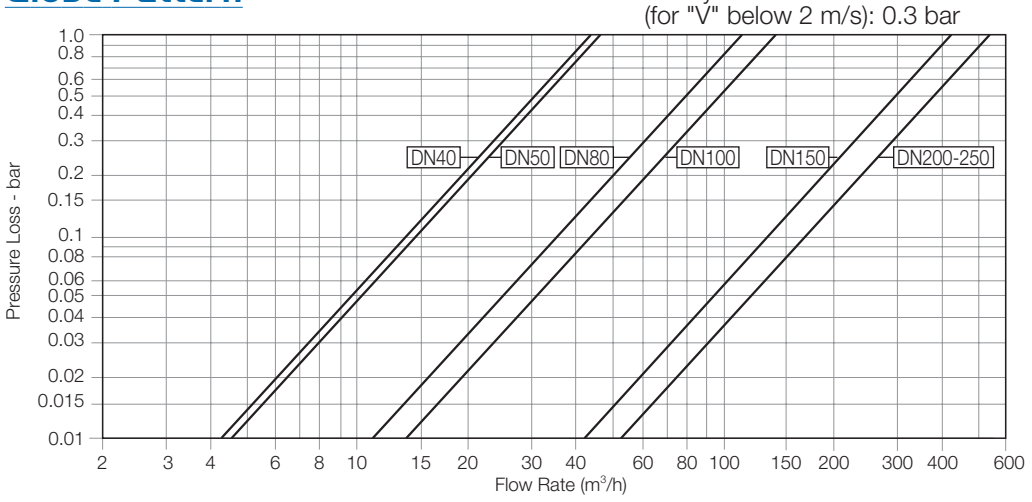


Flow Charts

SI Metric

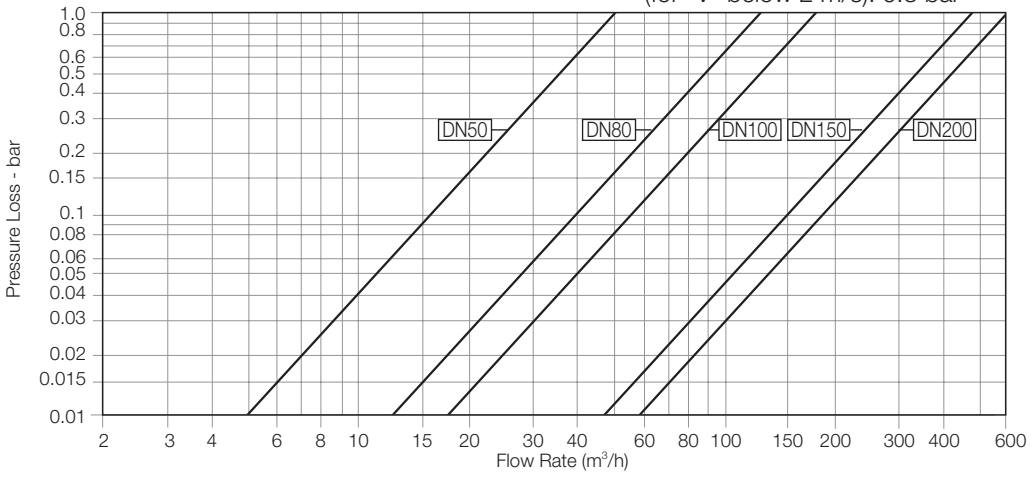
Globe Pattern

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



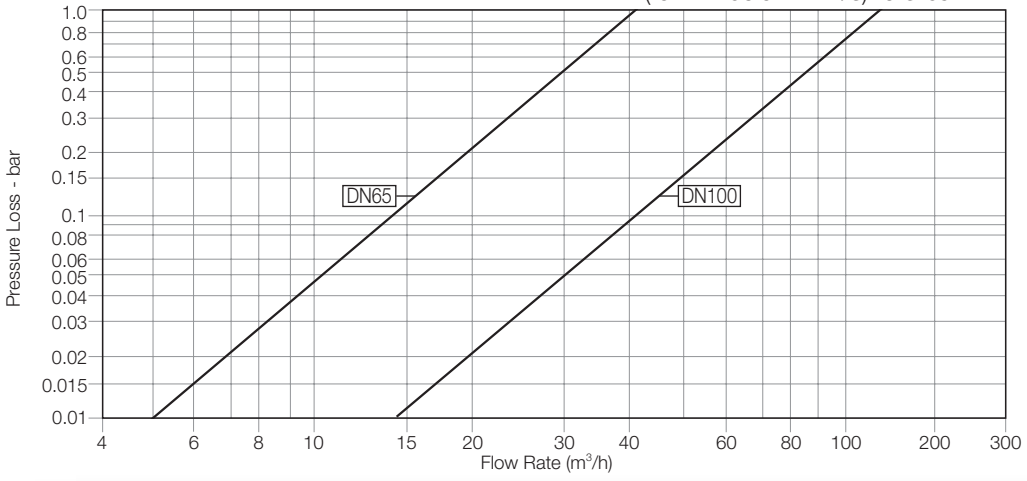
90° Angle Pattern

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



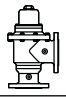
120° Angle Pattern

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



Flow Properties

SI Metric

		Size	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Globe Pattern		Kv	41	46	N/A	50	115	147	430	550	550
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - m	4.8	12.9	N/A	109.7	21.6	42.7	42.9	110.5	337.2
90°Angle Pattern		Kv	N/A	51	N/A	N/A	126	180	473	605	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - m	N/A	10.5	N/A	N/A	18.0	28.4	35.5	91.3	N/A
120°Angle Pattern		Kv	N/A	N/A	51	N/A	N/A	147	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - m	N/A	N/A	10.5	N/A	N/A	42.7	N/A	N/A	N/A

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = Liquid specific gravity (Water = 1.0)

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/sec^2 ; 32.18 $feet/sec^2$)

Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

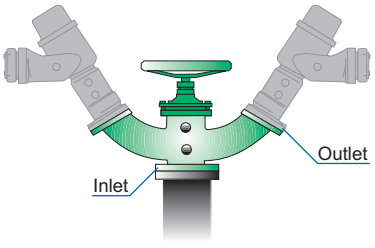
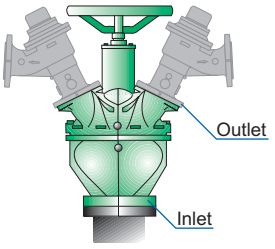
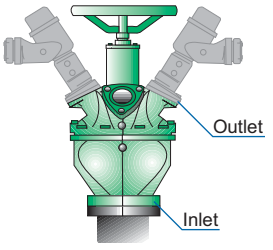
Note:
The Leq values given are for general consideration only.

Accuracy Table

	Accuracy	DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250
Q1 Minimum Flow	±5%	0.8	0.8	1.2	1.2	1.8	4	6.3	6.3
Q2 Transitional Flow	±2%	1.3	1.3	1.9	3	4.5	10	15.8	15.8
Qn Nominal Flow ISO 4064-1-1993	±2%	15	15	25	40	60	150	250	400
Q3 Permanent Flow	±2%	25	40	40	100	160	250	400	400
Q4 Maximum Flow (Short Time)	±2%	31	50	50	125	200	313	500	500
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	31	50	33	83	89	63	63	63
Class ISO 4064-1-1993	**-**	**A**	**A**	**A**	**B**	**B**	**B**	**B**	**B**

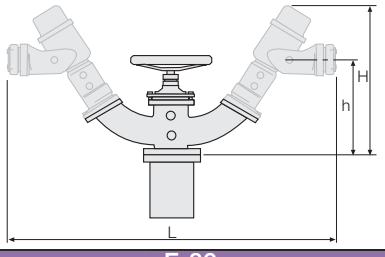
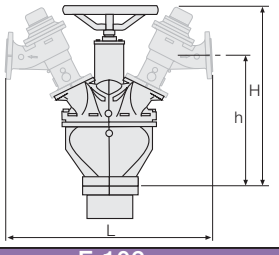
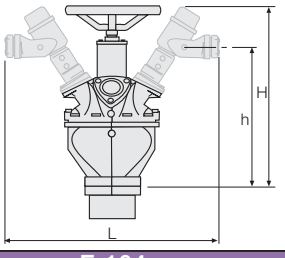
SI Metric

Available Models

			
Description	**Type F-82**	**Type A-102**	**Type A-104**
Inlet Diameter	DN80 (Optional DN100)(1)	DN100(1)	DN100(1)
Outlets	2	2	4
Outlet Diameter	DN65 (Triangle)	DN100(1)	DN65 (Triangle)
Optional Type	F-81 with single outlet	A-152 with DN150 inlet	A-154 with DN150 inlet

(1) Conforming to major standards

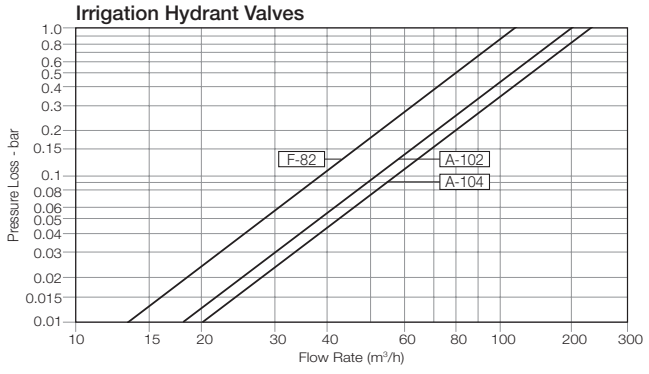
Dimensions & Weights

			
Type	**F-82**	**F-102**	**F-104**
L (mm)	1040	1100	970
H (mm)	600	730	700
h (mm)	360	580	510
Weight (kg)	27.0	65.5	51.5
Weight 1*(kg)	36.0	90.5	76.5
Weight 2*(kg)	45.0	115.5	101.5
Weight 3*(kg)	N/A	N/A	126.5
Weight 4*(kg)	N/A	N/A	151.5

* Number of Hydrometers installed.

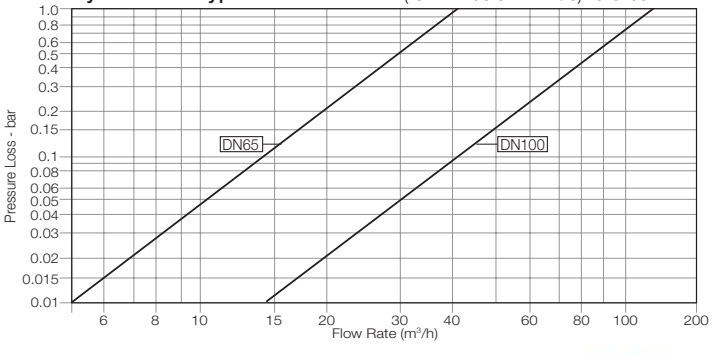
Flow Charts

Irrigation Hydrant Valves



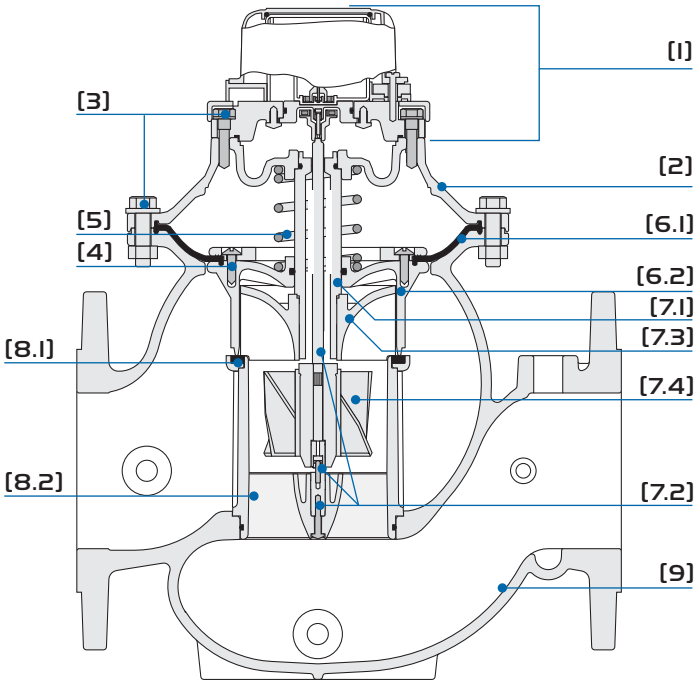
Hydrometers Type H

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



US English

Construction Materials



[1] **Control Head:** Plastic, Stainless Steel and Brass

[2] **Cover:** Polyester Coated Ductile Iron to ASTM A536

[3] **External Bolts / Nuts:** Zinc-Cobalt Plated Steel

[4] **Internal Bolts, Nuts and Washers:** Stainless Steel 304 and 316

[5] **Spring:** Stainless Steel 302

[6] **Closure Assembly:**
- [6.1] **Diaphragm:** Reinforced Natural Rubber (NR)
- [6.2] **Closure:** Glass Fiber Reinforced Nylon

[7] **Impeller Assembly:**
- [7.1] **Guide:** Stainless Steel 303
- [7.2] **Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- [7.3] **Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- [7.4] **Impeller:** Polypropylene

[8] **Impeller Housing Assembly:**
- [8.1] **Seal Seat:** NBR (Buna-N) Vulcanized Brass
- [8.2] **Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[9] **Valve Body:** Polyester Coated Ductile Iron to ASTM A-536 or Cast Iron to ASTM A-126 Class B

O-Rings: NBR (Buna-N)
Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

US English

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections	1 1/2"	2"	2 1/2"	3"R	3"	4"	6"	8"	10"
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H= Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:

Flanged: ANSI B16.41 (Cast Iron)
ANSI B16.42 (Ductile Iron)
Triangle Flange (2 1/2" inlet only)

Threaded: NPT or Rp ISO 7/1 (BSP.P)

Pressure Rating Classes: Cast Iron - #125; Ductile Iron - #150

Operating Pressure Ranges:

Class #125: 10-150 psi; Class #150: 10-250 psi
For lower pressure requirements, consult factory

Temperature: Water up to 122°F

Pulse Options:

Register Type	Reed Switch - Single				Reed Switch - Combined	
Pulse Per / Size Range	1 gallon	10 gallon	100 gallon	1000 gallon	1 galon + 10 gallon	10 galon + 100 gallon
1 1/2"-4"	■	■	■		■	■
6"-10"		■	■	■		

Register Type	Opto-Electric		Opto-Electric + Reed Switch - Combined			
Pulse Per / Size Range	0.1 gallon	1 gallon	0.1 gallon (Opto) + 1 gallon (Reed)	0.1 gallon (Opto) + 10 gallon (Reed)	1 gallon (Opto) + 100 (Reed)	1 gallon (Opto) + 1000 (Reed)
1 1/2"-4"	■		■	■		
6"-10"		■			■	■

Pulse Electric Data:

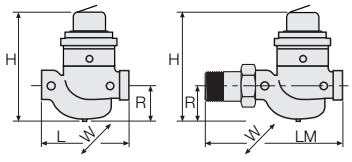
Reed-Switch: Switching voltage: 48 VAC/DC max
Switching current: 0.2A max
Switching power: 4W max

Opto-Electric: Supply voltage: 5-12 VDC
Output type: complementary
Output current: 200 mA

Dimensions & Weights

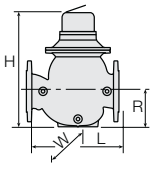
US English

Globe Pattern



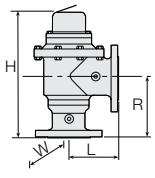
Connection Type	Threaded		
Size	1 1/2"	2"	3"R
L (inch)	9 13/16	9 13/16	9 13/16
LM (inch)	12 17/16	12 13/16	N/A
W (inch)	5 3/8	5 3/8	5 3/8
H (inch)	10 5/8	10 15/16	10 15/16
R (inch)	3.	3 3/4	3 1/8
Weight (lb)	15.9	16.1	16.1

Globe Pattern



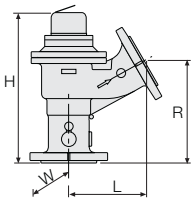
Connection Type	Flanged					
Size	3"R	3"	4"	6"	8"	10"
L (inch)	12 3/16	11 13/16	13 3/4	19 11/16	23 5/8	23 5/8
W (inch)	7 7/8	8 1/4	9 13/16	14 15/16	14 15/16	15 15/16
H (inch)	11 3/4	15 1/16	17 5/8	23 11/16	24 5/16	24 5/16
R (inch)	3 15/16	4 13/16	5 3/8	8 1/2	9	9
Weight (lb)	35.3	50.7	66.1	154.3	202.8	309.1

90° Angle Pattern



Connection Type	Threaded	Flanged			
Size	2"	3"	4"	6"	8"
L (inch)	4 3/4	5 15/16	7 1/16	9 13/16	9 13/16
W (inch)	5 3/8	8 1/4	9 13/16	14 15/16	14 15/16
H (inch)	11 13/16	15 13/16	18 15/16	23	23
R (inch)	4 15/16	7 3/4	8 7/8	12 1/16	11
Weight (lb)	17.4	56.2	78.9	168.4	181.2

120° Angle Pattern



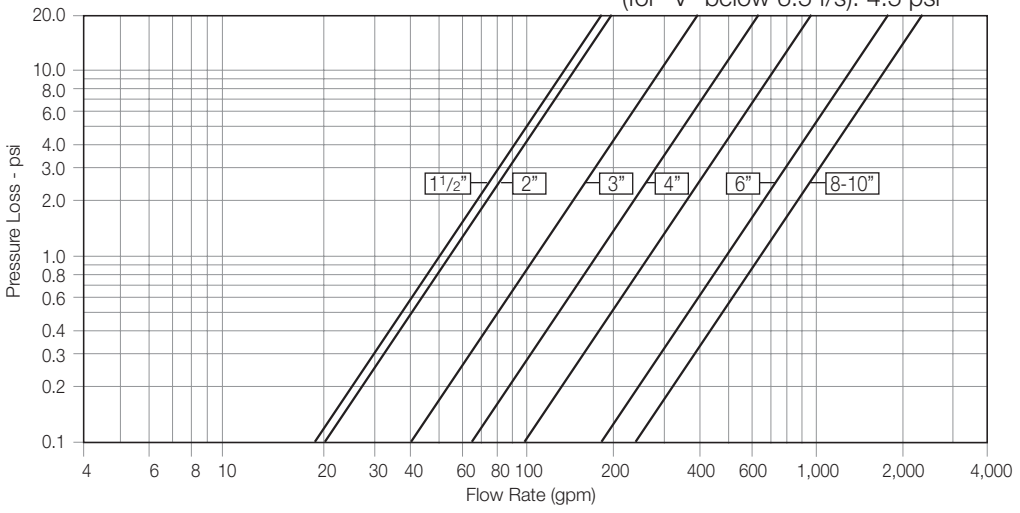
Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size	2 1/2"	4"	2 1/2"	4"
L (inch)	5 5/8	8 3/16	5 5/8	8 3/16
W (inch)	5 3/8	8 9/16	7 7/8	8 3/4
H (inch)	16 1/8	17 11/16	16 1/8	17 11/16
R (inch)	10 3/4	11 1/8	10 3/4	11 1/8
Weight (lb)	22.7	54.0	28.0	60.8

Flow Charts

US English

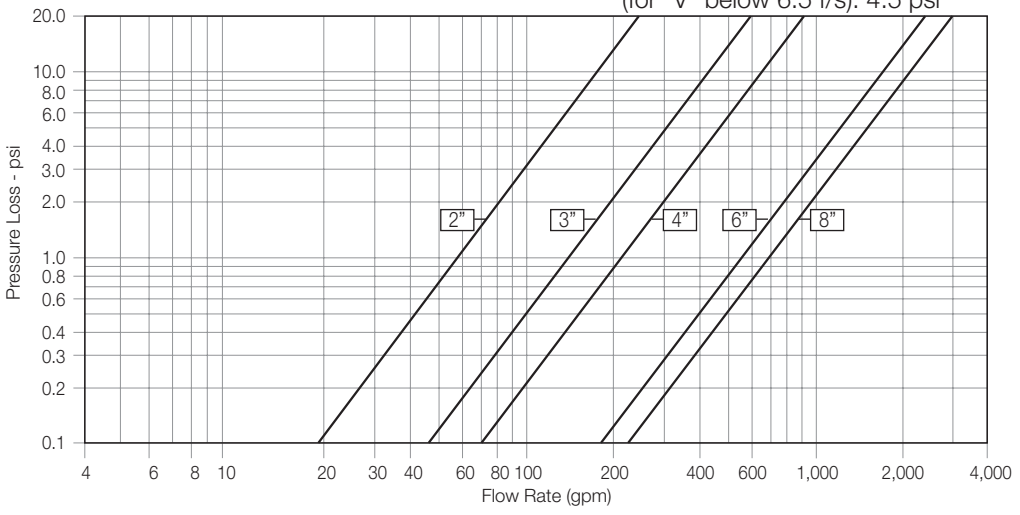
Globe Pattern

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



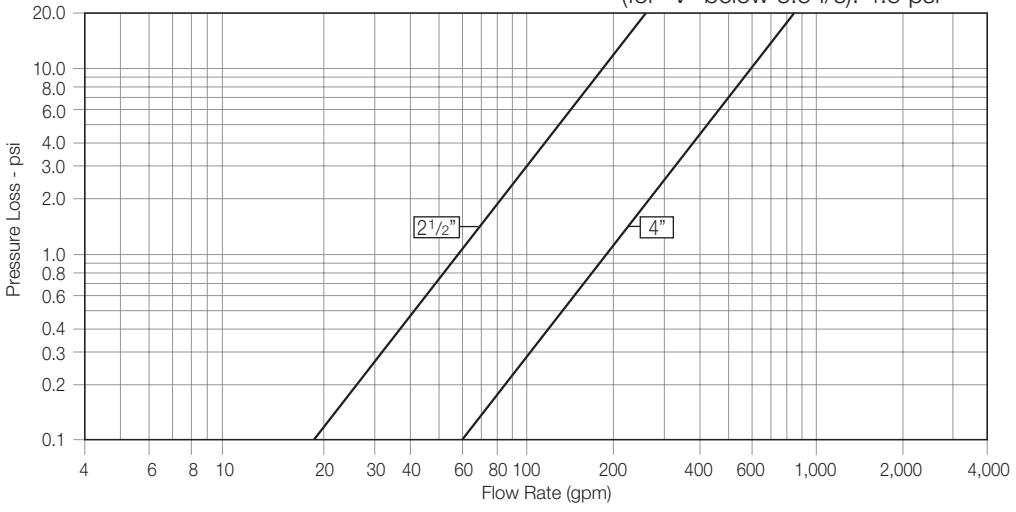
90° Angle Pattern

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



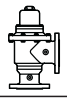
120° Angle Pattern

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



Flow Properties

US English

		Size	1 1/2"	2"	2 1/2"	3"R	3"	4"	6"	8"	10"
Globe Pattern		Cv	47	53	N/A	58	133	170	497	636	636
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - f	15.7	42.2	N/A	359.8	70.8	139.9	140.8	362.5	1106.4
90°Angle Pattern		Cv	N/A	59	N/A	N/A	146	208	547	699	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - f	N/A	34.3	N/A	N/A	58.9	93.3	116.3	299.6	N/A
120°Angle Pattern		Cv	N/A	N/A	59	N/A	N/A	170	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - f	N/A	N/A	34.3	N/A	N/A	139.9	N/A	N/A	N/A

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)

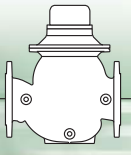
Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (feet ; m)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (feet ; m)

Note:
The Leq values given are for general consideration only.
Actual Leq may vary somewhat with each of the valve sizes.

Accuracy Table

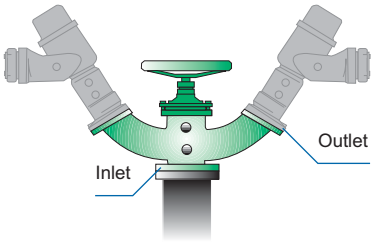
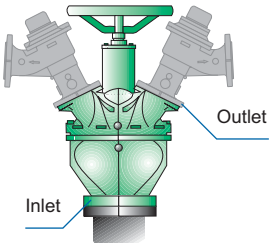
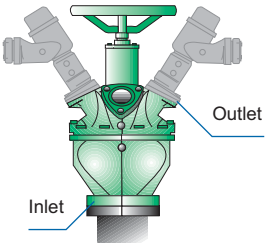
	Accuracy	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"
Q1 Minimum Flow	±5%	3.5	3.5	5.3	5.3	7.9	17.6	27.7	27.7
Q2 Transitional Flow	±2%	5.7	5.7	8.4	13.2	19.8	44	69.6	69.6
Nominal Flow ISO 4064-1-1993	±2%	66	66	110	176	264	660	1100	1761
Q3 Permanent Flow	±2%	110	176	176	440	704	1100	1761	1761
Q4 Flow Maximum (Short Time)	±2%	136	220	220	550	880	1378	2201	2201
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	31	50	33	83	89	63	63	63
Class ISO 4064-1-1993	**-**	**A**	**A**	**A**	**B**	**B**	**B**	**B**	**B**



Irrigation Hydrant Valve

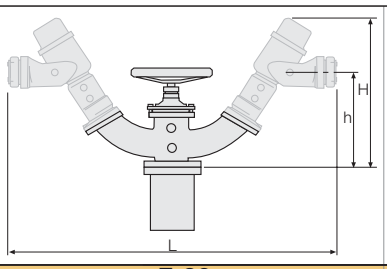
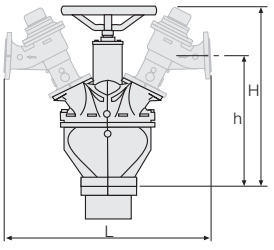
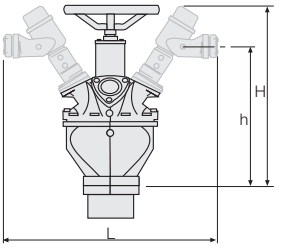
US English

Available Models

			
Description	**Type F-82**	**Type A-102**	**Type A-104**
Inlet Diameter	3" (Optional 4")(1)	4"(1)	4"(1)
Outlets	2	2	4
Outlet Diameter	$2^{1}/_{2}$" (Triangle)	4"(1)	$2^{1}/_{2}$" (Triangle)
Optional Type	F-81 with single outlet	A-152 with 6" inlet	A-154 with 6" inlet

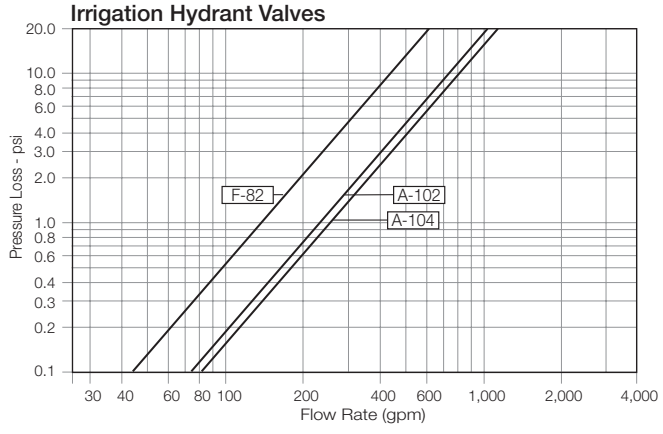
(1) Conforming to major standards

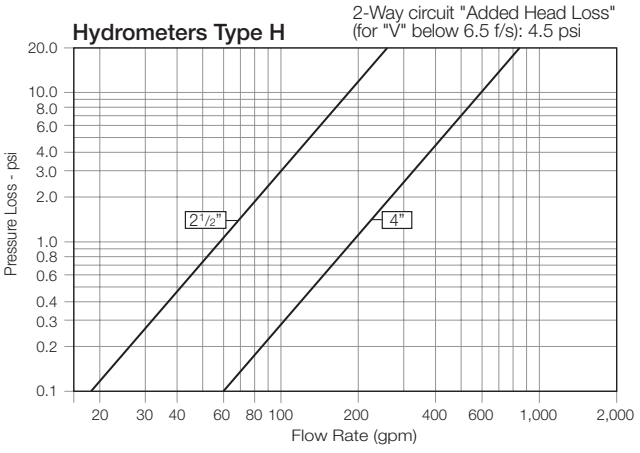
Dimensions & Weights

Dimensions Drawing			
Type	**F-82**	**F-102**	**F-104**
L (inch)	$40^{15}/_{16}$	$43^{5}/_{16}$	$38^{3}/_{16}$
H (inch)	$23^{5}/_{8}$	$28^{3}/_{4}$	$27^{9}/_{16}$
h (inch)	$14^{3}/_{16}$	$22^{13}/_{16}$	$20^{1}/_{16}$
Weight (lb)	59.6	144.4	113.6
Weight 1* (lb)	79.4	199.5	168.7
Weight 2* (lb)	99.2	254.6	223.8
Weight 3* (lb)	N/A	N/A	278.9
Weight 4* (lb)	N/A	N/A	334.0

* Number of Hydrometers installed.

Flow Charts

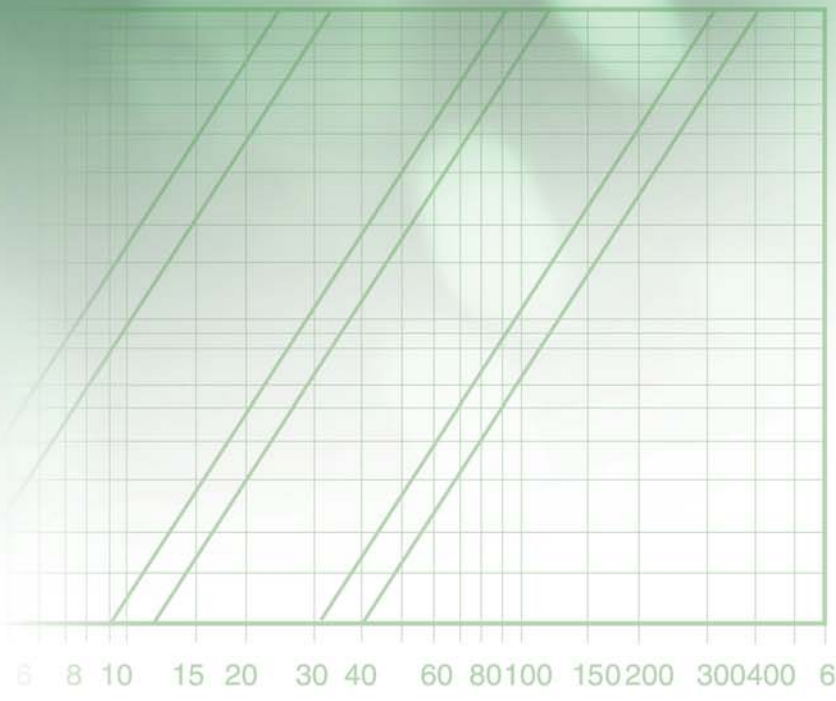


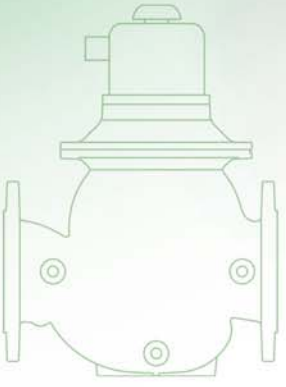


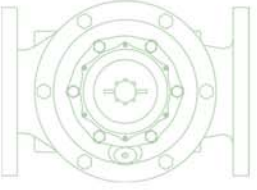
Irrigation for Agriculture

Engineering Data

IR-900-D Series







BERMAD

Product Parts Features

[1] Setting Knob

Easy "Push & Set" batch pre-setting

[2] Control Head

Includes: Flow totaling counter, visual flow rate indicator, non-computerized dose control and pulse output for computerized data capture and control.

[2.1] Shut-Off Pilot: Spring loaded pilot which is manually preset to divert line pressure into the AMV control chamber and automatically switches to drain pressure out of the control chamber.

Optional:
- Sequential Shut-Off Pilot
- Shut-Off Pilot with Pump Shut-Off Electrical Switch.

[3] Valve Cover

Locates, centralizes and fastens diaphragm, spring, and impeller assembly ensuring smooth and accurate performance. Simple and light construction enables quick in-line inspection and service.

[4] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

[5] Closure Assembly

Combining a rugged radial disk harnessed to a flexible fiber reinforced diaphragm. The fully guided closure assembly and the carefully balanced and peripherally supported diaphragm prevent distortion and protect the elastomer, resulting in long-life and controlled actuation even under harsh conditions. One diaphragm and spring fully meet the valve's operating pressure range requirements.

[6] Impeller Assembly

[6.1] Guide – Carries the transmission shaft, guides the closure assembly, and centralizes and tightens all internal parts.

[6.2] Upper Flow Straightener – Tightens the seal seat in place, straightens outlet flow, and creates mushroom-shaped flow.

[6.3] Impeller – Woltman-type impeller with tungsten carbide shaft tips and bearings for high, long-term accuracy and negligible wear

[7] Impeller Housing

[7.1] Lower Flow Straightener – Straightens inlet flow, eliminating the need for straight upstream pipe required in standard water meters

[7.2] Seal Seat – Metal ring vulcanized with elastomeric seal, raised and remote from valve body to prevent cavitation damage.

[8] Integrated Calibration Device

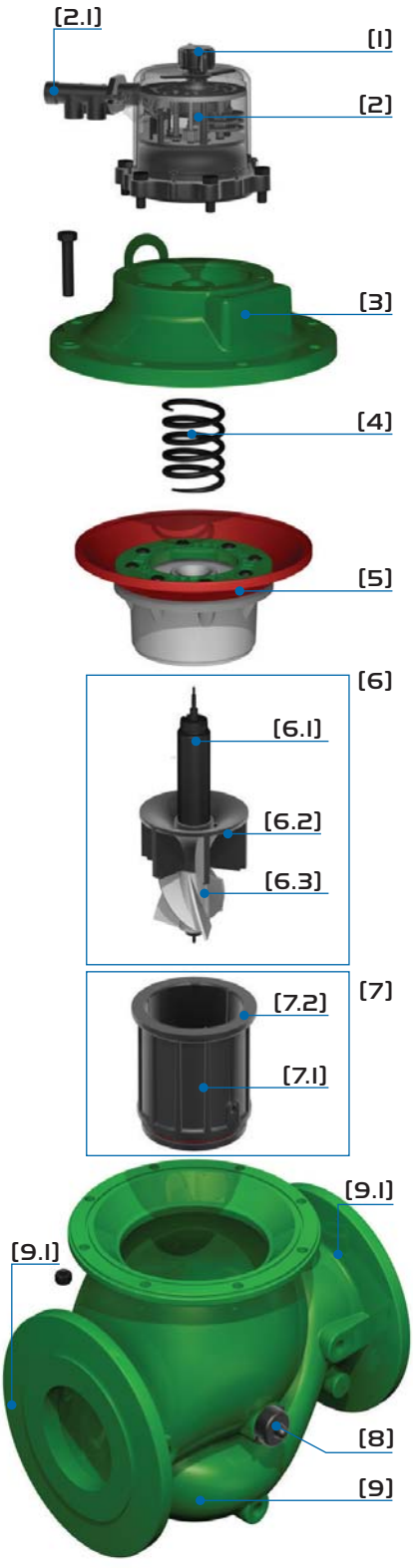
Enables recalibration instead of renovation when the recommended standard accuracy period has elapsed (The Calibration Device is stamped closed with a metal seal)

[9] Wide Body

Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation.

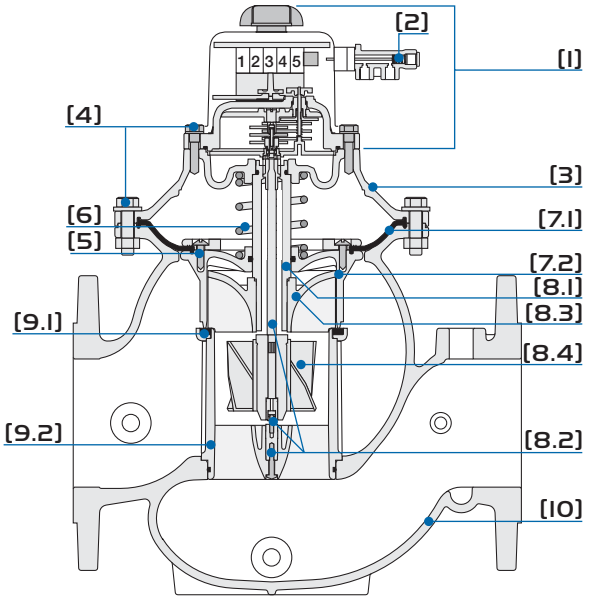
[9.1] End Connections conform to pressure ratings and standards: ISO, ANSI, JIS, BS, and others.

For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"



SI Metric

Construction Materials



[1] **Control Head:** Plastic, Stainless Steel and Brass

[2] **Shut-Off Pilot:** Nylon, Stainless Steel & NBR (Buna-N)

[3] **Cover:** Polyester Coated Ductile Iron to EN 1563

[4] **External Bolts / Nuts:** Zinc-Cobalt Plated Steel

[5] **Internal Bolts, Nuts and Washers:** Stainless Steel 304 and 316

[6] **Spring:** Stainless Steel 302

[7] **Closure Assembly:**

- **[7.1] Diaphragm:** Reinforced Natural Rubber (NR)
- **[7.2] Closure:** Glass Fiber Reinforced Nylon

[8] **Impeller Assembly:**

- **[8.1] Guide:** Stainless Steel 303
- **[8.2] Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- **[8.3] Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- **[8.4] Impeller:** Polypropylene

[9] **Impeller Housing Assembly:**

- **[9.1] Seal Seat:** NBR (Buna-N) Vulcanized Brass
- **[9.2] Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[10] **Valve Body:** Polyester Coated Ductile Iron to EN 1563 or Cast Iron

O-Rings: NBR (Buna-N)

Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H= Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:
Flanged: ISO 7005-2 (PN10 & 16)
Triangle Flange (DN65 inlet only)
Threaded: Rp ISO 7/1 (PSP.P) or NPT

Pressure Ratings:
PN10 (Plastic Primary Gear Cover)
PN16 (Metal Primary Gear Cover)

Operating Pressure Ranges:
PN10: 0.7-10 bar
PN16: 0.7-16 bar
For lower pressure requirements, consult factory

Temperature: Water up to 50°C

Dial Options

Dial Capacity (m^3)	3.8	12	40	80	120	150	200	350	600	800	1,200	2,100	3,500	6,000	8,000	12,000	21,000
Graduation (m^3)	0.1	0.2	1	1	2	2	5	10	10	10	20	50	100	100	100	200	500
DN40-DN80	■	■	■	■	■	■	■	■	■	■	■	■					
DN100-DN250				■	■	■	■	■	■	■	■	■	■	■	■	■	■

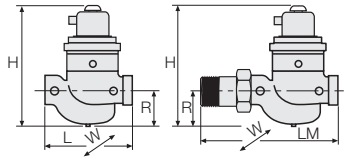
Pulse Options:
For Dials 3.8 through 2,100: 1 Pulse per 1 m^3
For Dials 3,500 through 21,000: 1 Pulse per 10 m^3

Pulse Electrical Data:
Switching Voltage: 48 VAC/DC max.
Switching Current: 0.2A max.
Switching Power: 4W max.

Dimensions & Weights

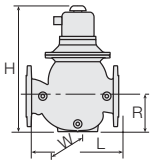
SI Metric

Globe Pattern



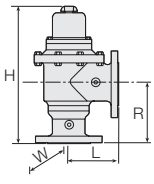
Connection Type		Threaded		
Size		DN40	DN50	DN80R
L	(mm)	250	250	250
LM	(mm)	67	77	N/A
W	(mm)	137	137	137
H	(mm)	293	300	300
R	(mm)	95	95	79
Weight (kg)		7.2	7.3	7.3

Globe Pattern



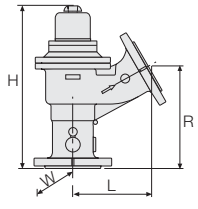
Connection Type		Flanged					
Size		DN80R	DN80	DN100	DN150	DN200	DN250
L	(mm)	310	300	350	500	600	600
W	(mm)	200	210	250	380	380	405
H	(mm)	321	405	470	625	640	640
R	(mm)	100	123	137	216	228	228
Weight (kg)		15.8	23	30	70	92	140

90° Angle Pattern



Connection Type		Threaded	Flanged			
Size		DN50	DN80	DN100	DN150	DN200
L	(mm)	120	150	180	250	250
W	(mm)	137	210	250	380	380
H	(mm)	322	425	500	610	610
R	(mm)	125	196	225	306	280
Weight (kg)		7.9	25.5	35.8	76.4	82.2

120° Angle Pattern



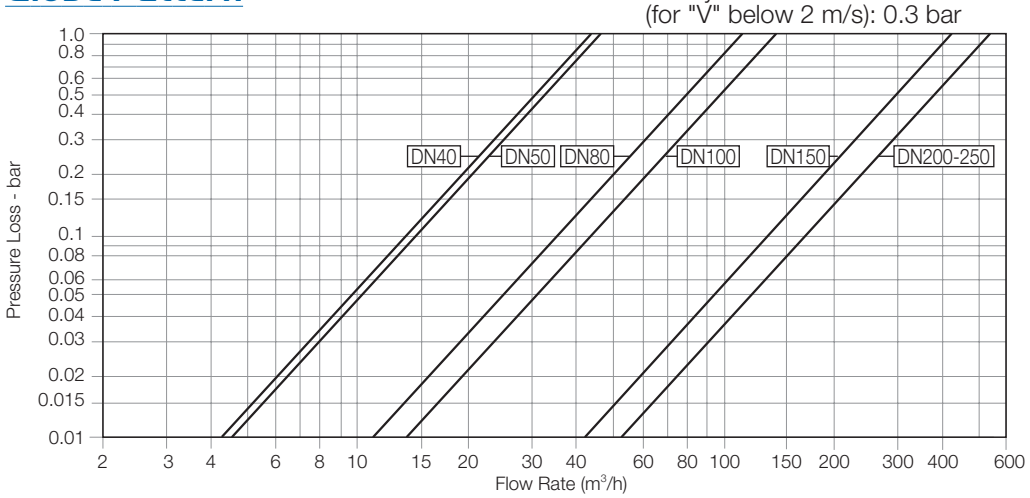
Connection Type		Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size		DN65	DN100	DN65	DN100
L	(mm)	143	208	143	208
W	(mm)	137	217	200	223
H	(mm)	432	472	432	472
R	(mm)	273	283	273	283
Weight (kg)		10.3	24.5	12.7	27.6

Flow Chart

SI Metric

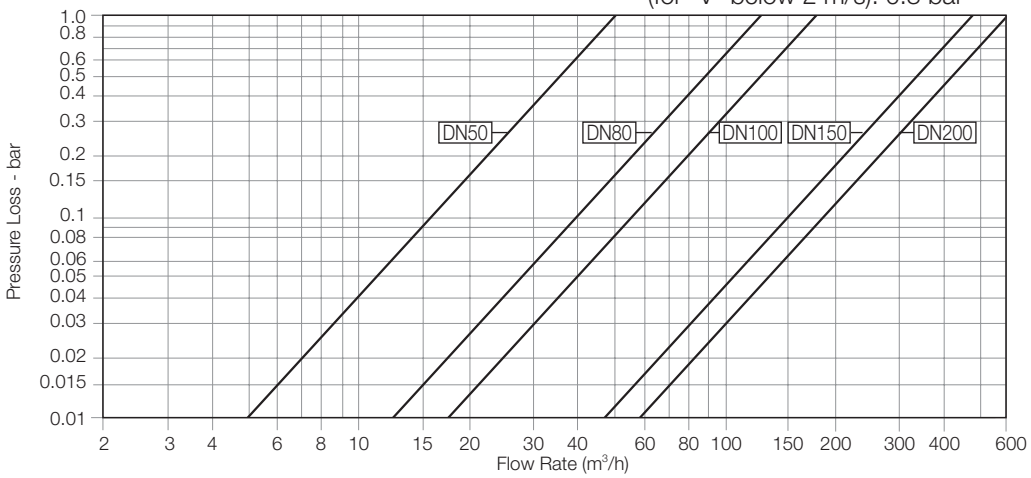
Globe Pattern

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



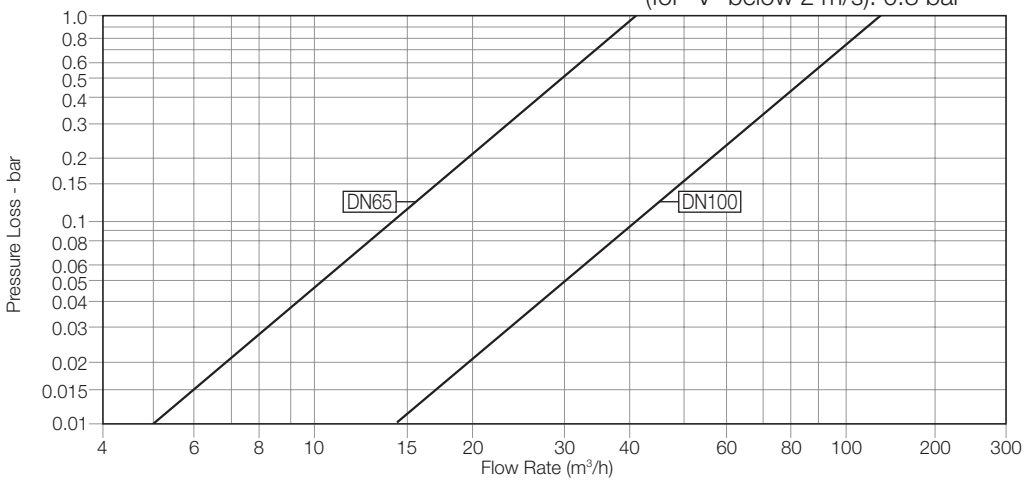
90° Angle Pattern

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



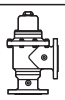
120° Angle Pattern

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



Flow Properties

SI Metric

		Size	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Globe Pattern		Kv	41	46	N/A	50	115	147	430	550	550
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - m	4.8	12.9	N/A	109.7	21.6	42.7	42.9	110.5	337.2
90°Angle Pattern		Kv	N/A	51	N/A	N/A	126	180	473	605	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - m	N/A	10.5	N/A	N/A	18	28.4	35.5	91.3	N/A
120°Angle Pattern		Kv	N/A	N/A	51	N/A	N/A	147	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - m	N/A	N/A	10.5	N/A	N/A	42.7	N/A	N/A	N/A

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
G_f = Liquid specific gravity (Water = 1.0)

$Kv = 0.865\ Cv$

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/sec^2 ; 32.18 $feet/sec^2$)

Equivalent Pipe Length, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

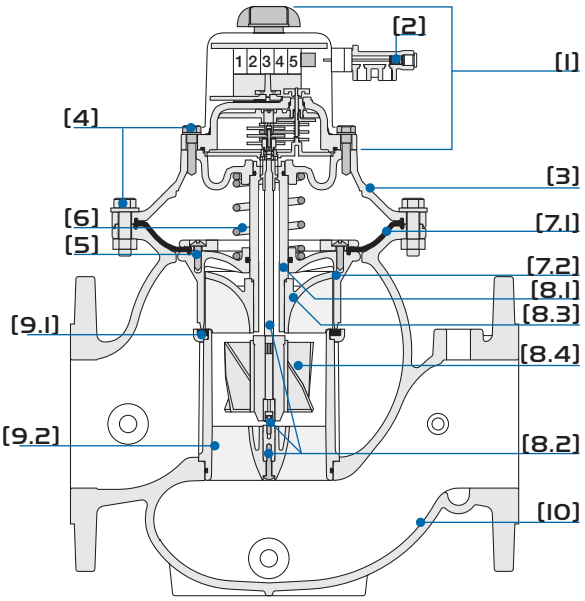
Note:
The Leq values given are for general consideration only.

Accuracy Table

	Accuracy	DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250
Q1 Minimum Flow	±5%	0.8	0.8	1.2	1.2	1.8	4	6.3	6.3
QD Safe Closing (AMV)	±5%	1.5	2	2	3.2	4.8	10	12	12
Q2 Transitional Flow	±2%	1.3	1.3	1.9	3	4.5	10	15.8	15.8
Qn Nominal Flow ISO 4064-1-1993	±2%	15	15	25	40	60	150	250	400
Q3 Permanent Flow	±2%	25	40	40	100	160	250	400	400
Q4 Maximum Flow (Short Time)	±2%	31	50	50	125	200	313	500	500
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	31	50	33	83	89	63	63	63
Class ISO 4064-1-1993	**-**	**A**	**A**	**A**	**B**	**B**	**B**	**B**	**B**

US English

Construction Materials



[1] **Control Head:** Plastic, Stainless Steel and Brass

[2] **Shut-Off Pilot:** Nylon, Stainless Steel & NBR (Buna-N)

[3] **Cover:** Polyester Coated Ductile Iron to ASTM A536

[4] **External Bolts / Nuts:** Zinc-Cobalt Plated Steel

[5] **Internal Bolts, Nuts and Washers:** Stainless Steel 304 and 316

[6] **Spring:** Stainless Steel 302

[7] **Closure Assembly:**

- **[7.1] Diaphragm:** Reinforced Natural Rubber (NR)
- **[7.2] Closure:** Glass Fiber Reinforced Nylon

[8] **Impeller Assembly:**

- **[8.1] Guide:** Stainless Steel 303
- **[8.2] Pivots, Bearings, and Thrust Bearings:** Tungsten Carbide
- **[8.3] Upper Flow Straightener:** Glass Fiber Reinforced Nylon
- **[8.4] Impeller:** Polypropylene

[9] **Impeller Housing Assembly:**

- **[9.1] Seal Seat:** NBR (Buna-N) Vulcanized Brass
- **[9.2] Impeller Housing and Lower Flow Straightener:** Glass Fiber Reinforced Nylon

[10] **Valve Body:** Polyester Coated Ductile Iron to ASTM A-536 or Cast Iron to ASTM A-126 Class B

O-Rings: NBR (Buna-N)

Coating: Electrostatic Powder Polyester Green RAL 6017, 150 mμ

Technical Specifications

Available Patterns, Sizes & End Connections:

Connections\Size	DN40	DN50	DN65	DN80R	DN80	DN100	DN150	DN200	DN250
Threaded	G	G & A		G					
Threaded (Male)	G	G							
Flanged			H*	G	G & A	G, A & H	G & A	G & A	G
Flange Inlet \ Thread Outlet		A	H*	G		H			

G = Globe, A = Angle 90°, H= Hydrant (Angle 120°) * Triangle Flange Inlet

Connections Standard:

Flanged: ANSI B16.41 (Cast Iron)
ANSI B16.42 (Ductile Iron)
Triangle Flange (2 1/2" inlet only)
Threaded: NPT or Rp ISO 7/1 (BSP.P)

Pressure Rating Classes:

150 psi (Plastic Primary Gear Cover)
Cast Iron - #125; Ductile Iron - #150 (Metal Primary Gear Cover)

Operating Pressure Ranges:

Class #125: 10-150 psi;
Class #150: 10-250 psi
For lower pressure requirements, consult factory

Temperature: Water up to 122°F

Dial Options

Dial Capacity (gallon)	13,000	50,000	130,000	210,000	500,000	875,000	1,300,000	2,100,000
Graduation (gallon)	0.1	0.2	1	1	2	2	5	10
1 1/2"-3"	■	■	■	■				
6"-10"		■	■	■	■	■	■	■

Pulse Options:

For Dials 13,000 through 210,000: 1 Pulse per 100 gallon
For Dials 500,000 through 2,100,000: 1 Pulse per 1000 gallon

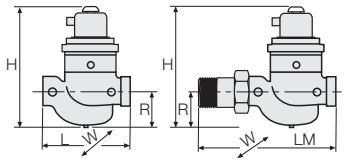
Pulse Electrical Data:

Switching Voltage: 48 VAC/DC max.
Switching Current: 0.2A max.
Switching Power: 4W max.

Dimensions & Weights

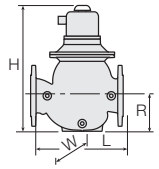
US English

Globe Pattern



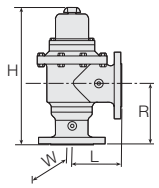
Connection Type	Threaded		
Size	1 1/2"	2"	3"R
L (inch)	9 13/16	9 13/16	9 13/16
LM (inch)	2 5/8	3	N/A
W (inch)	5 3/8	5 3/8	5 3/8
H (inch)	11 9/16	11 13/16	11 13/16
R (inch)	3 3/4	3 3/4	3 1/8
Weight (kg)	15.9	16.1	16.1

Globe Pattern



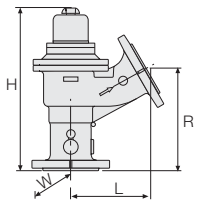
Connection Type	Flanged					
Size	3"R	3"	4"	6"	8"	10"
L (inch)	12 3/16	11 13/16	13 3/4	19 11/16	23 5/8	23 5/8
W (inch)	7 7/8	8 1/4	9 13/16	14 15/16	14 15/16	15 15/16
H (inch)	12 5/8	15 15/16	18 1/2	24 5/8	25 3/16	25 3/16
R (inch)	3 15/16	4 13/16	5 3/8	8 1/2	9	9
Weight (kg)	35.3	50.7	66.1	154.3	202.8	309.1

90° Angle Pattern



Connection Type	Threaded	Flanged			
Size	2"	3"	4"	6"	8"
L (inch)	4 3/4	5 15/16	7 1/16	9 13/16	9 13/16
W (inch)	5 3/8	8 1/4	9 13/16	14 15/16	14 15/16
H (inch)	12 11/16	16 3/4	19 11/16	24	24
R (inch)	4 15/16	7 3/4	8 7/8	12 1/16	11
Weight (kg)	17.4	56.2	78.9	168.4	181.2

120° Angle Pattern



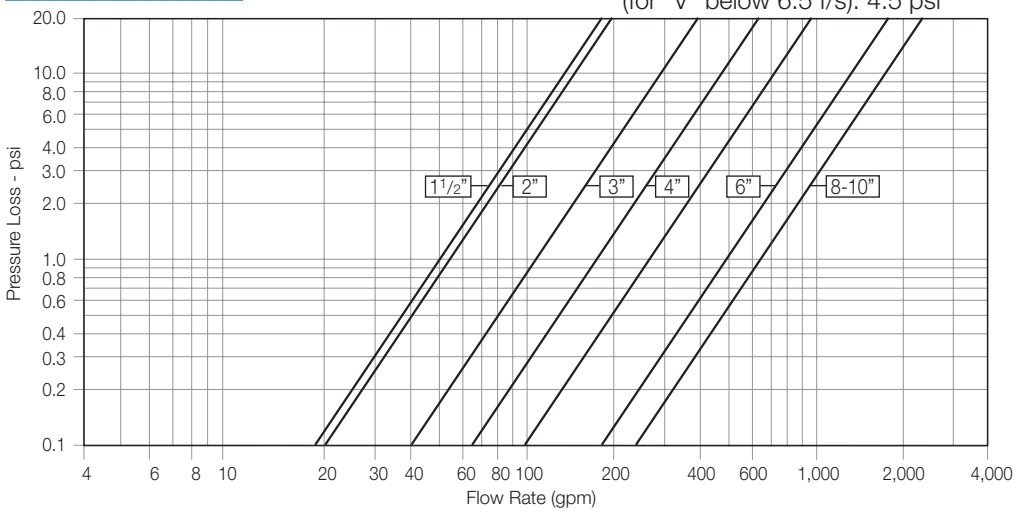
Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
Size	2 1/2"	4"	2 1/2"	4"
L (inch)	5 5/8	8 3/16	5 5/8	8 3/16
W (inch)	5 3/8	8 9/16	7 7/8	8 3/4
H (inch)	17	18 9/16	17	18 9/16
R (inch)	10 3/4	11 1/8	10 3/4	11 1/8
Weight (lb)	22.7	54.0	28.0	60.8

Flow Charts

US English

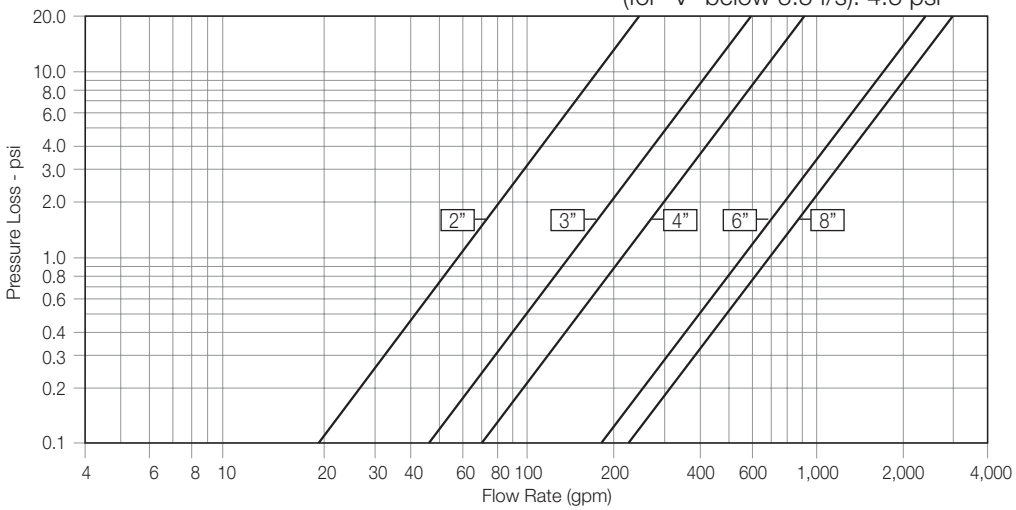
Globe Pattern

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



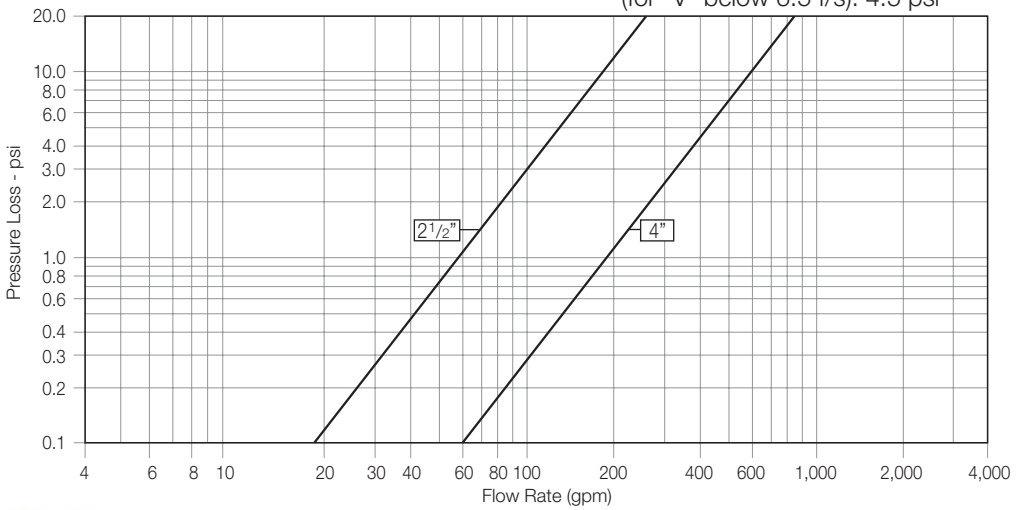
90° Angle Pattern

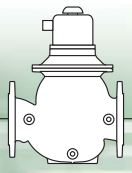
2-Way circuit "Added Head Loss"
(for "V" below 6.5 f/s): 4.5 psi



120° Angle Pattern

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





Flow Properties

US English

		Size	1 1/2"	2"	2 1/2"	3"R	3"	4"	6"	8"	10"
Globe Pattern		Cv	47	53	N/A	58	133	170	497	636	636
		K	2.4	4.6	N/A	24.7	4.9	7.3	4.3	8.3	20.2
		Leq - f	15.7	42.2	N/A	359.8	70.8	139.9	140.8	362.5	1106.4
90°Angle Pattern		Cv	N/A	59	N/A	N/A	146	208	547	699	N/A
		K	N/A	3.8	N/A	N/A	4.0	4.8	3.5	6.8	N/A
		Leq - f	N/A	34.3	N/A	N/A	58.9	93.3	116.3	299.6	N/A
120°Angle Pattern		Cv	N/A	N/A	59	N/A	N/A	170	N/A	N/A	N/A
		K	N/A	N/A	3.8	N/A	N/A	7.3	N/A	N/A	N/A
		Leq - f	N/A	N/A	34.3	N/A	N/A	139.9	N/A	N/A	N/A

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

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)
Gf = 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, Leq $Leq = Lk \cdot D$

Where:
Leq = Equivalent nominal pipe length (feet ; m)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (feet ; m)

Note:
The Leq values given are for general consideration only.

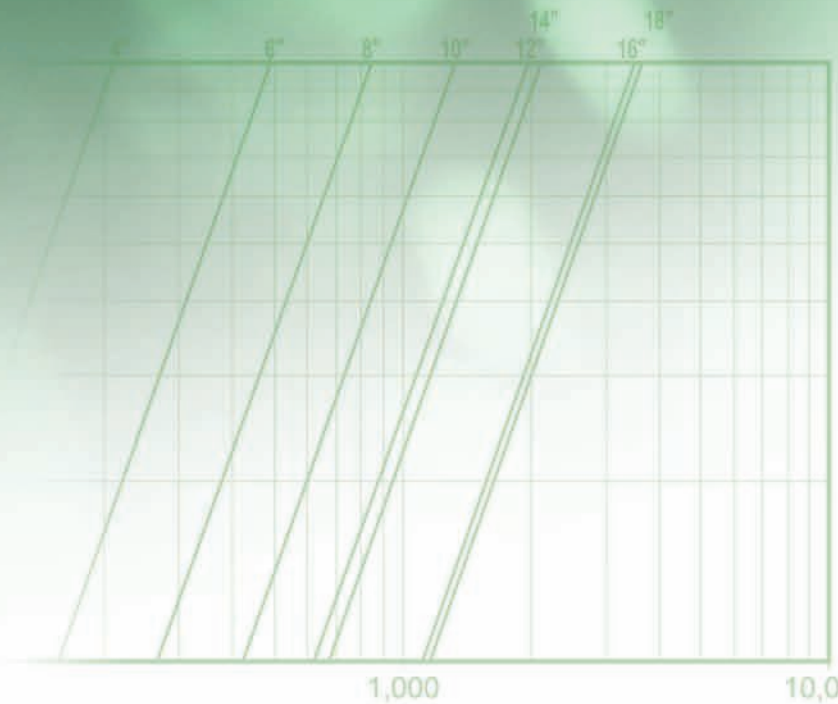
Accuracy Table

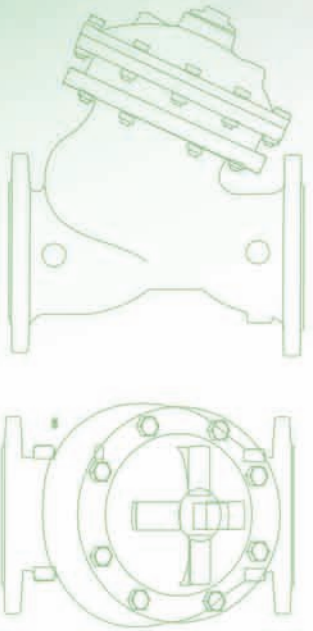
	Accuracy	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"
Q1 Minimum Flow	±5%	3.5	3.5	5.3	5.3	7.9	17.6	27.7	27.7
QD Safe Closing (AMV)	±5%	6.6	8.8	8.8	14.1	21.1	44	52.8	52.8
Q2 Transitional Flow	±2%	5.7	5.7	8.4	13.2	19.8	44	69.6	69.6
Qn Nominal Flow ISO 4064-1-1993	±2%	44	66	110	176	264	660	1100	1761
Q3 Permanent Flow	±2%	110	176	176	440	704	1100	1761	1761
Q4 Maximum Flow (Short Time)	±2%	136	220	220	550	880	1378	2201	2201
Q2/Q1	-	1.6	1.6	1.6	2.5	2.5	2.5	2.5	2.5
Q3/Q1	-	31	50	33	83	89	63	63	63
Class ISO 4064-1-1993	**-**	**A**	**A**	**A**	**B**	**B**	**B**	**B**	**B**

Irrigation for Agriculture

Engineering Data

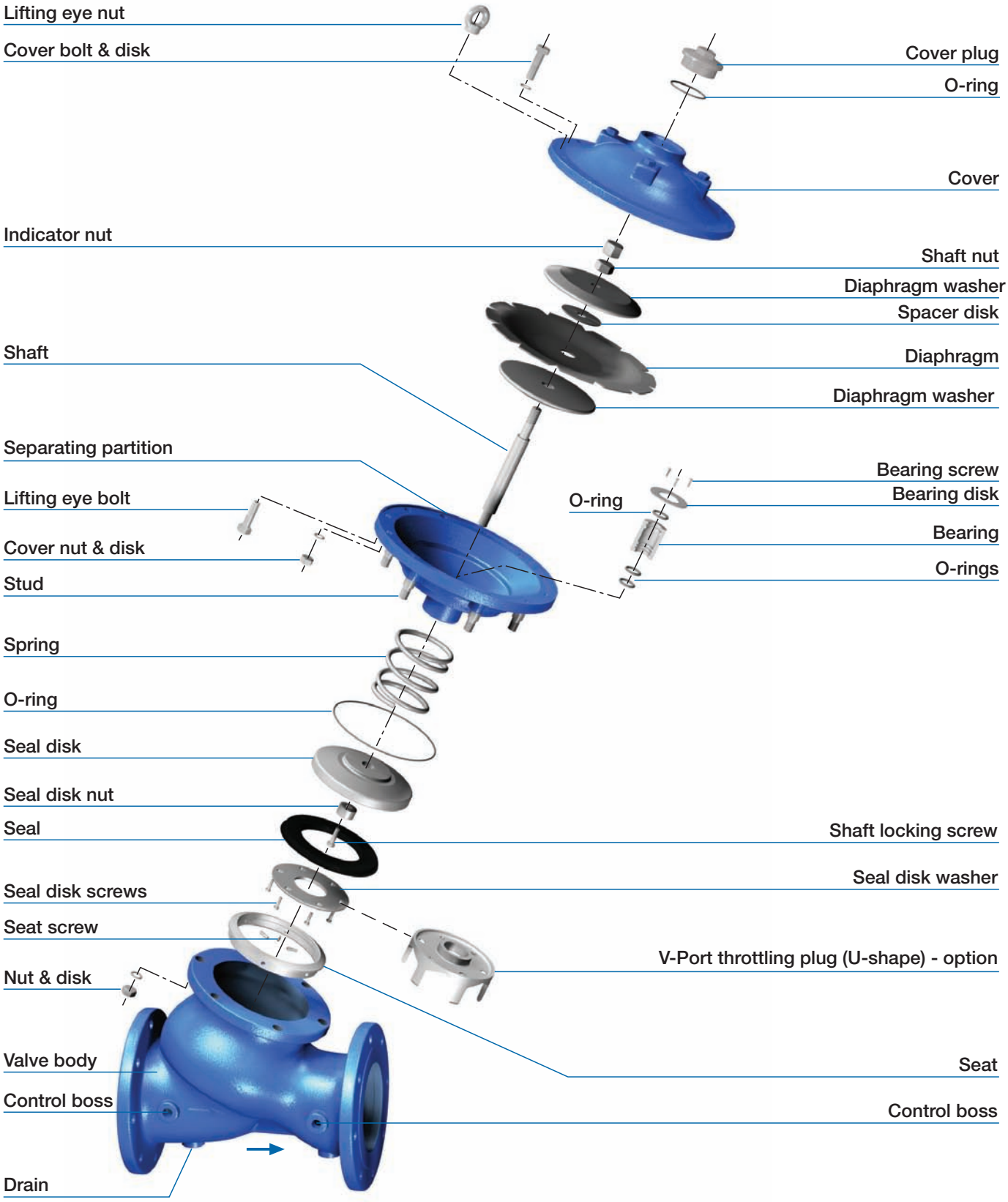
WW-700 Series



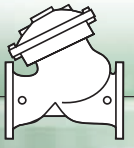


BERMAD

700 Valve - Exploded View



For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"



Technical Specifications

SI 700 Metric

Available Sizes & Patterns
- DN 40 - DN 500 - Y Pattern
- DN 40 - DN 450 - Angle
- DN 600 - DN 800 - Globe

Connection Standard
- Flanged: ISO 7005-2 (ISO 10, 16 & 25)
- Threaded: BSP (Rp ISO 7/1) or NPT (DN 40 - DN 80)

Water Temperature
- Up to 80ºC

Working pressure
- ISO PN 16: 16 bar
- ISO PN 25: 25 bar

Standard Materials
- **Main valve body and cover**
  Ductile Iron to EN 1563
- **Main valve internals**
  Stainless Steel, Bronze & Epoxy coated Steel
- **Control Trim**
  Brass, Bronze accessories
  Stainless Steel 316 fittings & tubing
  or forged Brass fittings & Copper tubing
- **Elastomers**
  NBR
- **Coating**
  Blue fusion bonded Epoxy

Optional Materials
- **Main valve body and cover**
  Carbon Steel to EN 10083-1
  Stainless Steel 316 to EN 10088-1
  Nickel Aluminum Bronze to BS-EN 1400 AB-2
  Other materials on request
- **Control Trim**
  Stainless Steel 316, Nickel Aluminum Bronze,
  Hastalloy C-276 accessories
  Monel fittings & tubing
- **Elastomers**
  EPDM
  FPM

US 700 English

Available Sizes & Patterns
- 1 1/2" - 20" - Y Pattern
- 1 1/2" - 18" - Angle
- 24" - 32" - Globe

Connection Standard
- Flanged: ANSI B16.42 (Ductile Iron)
- Threaded: NPT or BSP (1 1/2" -3")

Water Temperature
- Up to 180ºF

Working pressure
- Class #150: 250 psi
- Class #300: 400 psi

Standard Materials
- **Main valve body and cover**
  Ductile Iron to ASTM A-536
- **Main valve internals**
  Stainless Steel, Bronze & Epoxy coated Steel
- **Control Trim**
  Brass, Bronze accessories
  Stainless Steel 316 fittings & tubing
  or forged Brass fittings & Copper tubing
- **Elastomers**
  NBR
- **Coating**
  Blue fusion bonded Epoxy

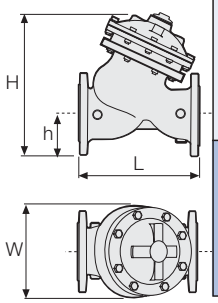
Optional Materials
- **Main valve body and cover**
  Carbon Steel to ASTM A-216-WCB
  Stainless Steel 316 to ASTM A-743 CF8M
  Nickel Aluminum Bronze to ASTM B-148 C 95800
  Other materials on request
- **Control Trim**
  Stainless Steel 316, Nickel Aluminum Bronze,
  Hastalloy C-276 accessories
  Monel fittings & tubing
- **Elastomers**
  EPDM
  FPM

Dimensions & Weights

SI 700 Metric

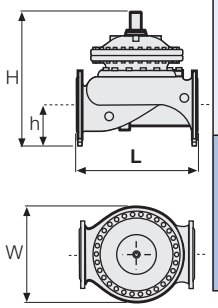
Flanged

Y Pattern



	mm	40	50	65	80	100	150	200	250	300	350	400	450	500
ISO PN 10; 16	L	205	210	222	250	320	415	500	605	725	733	990	1000	1100
	W	155	165	178	200	223	320	390	480	550	550	740	740	740
	h	78	83	95	100	115	143	172	204	242	268	300	319	358
	H	239	244	257	305	366	492	584	724	840	866	1108	1127	1167
	Weight (Kg)	9.1	10.6	13	22	37	75	125	217	370	381	846	945	962
ISO PN 20; 25	L	205	210	222	264	335	433	524	637	762	767	1024	1030	1136
	W	155	165	185	207	250	320	390	480	550	570	740	740	750
	h	78	83	95	105	127	159	191	223	261	295	325	357	389
	H	239	244	257	314	378	508	602	742	859	893	1133	1165	1197
	Weight (Kg)	10	12.2	15	25	43	85	146	245	410	434	900	967	986

Globe Pattern



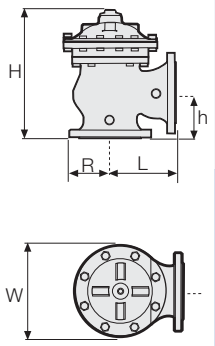
Length according to EN 558-1

	mm	600	700	750	800
ISO PN 10 ; 16	L	1450	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3250	3700	3900	4100
ISO PN 20 ; 25	L	1500	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3500	3700	3900	4100

Y Pattern - Length according to EN 558-1

DN	50	80	100	150	200	250	300
L	230	310	350	480	600	730	850
W	165	200	235	320	390	480	550
h	82.5	100	118	150	180	213	243
H	244	305	369	500	592	733	841
Weight (Kg)	9.7	21	31	70	115	198	337
L	230	310	350	480	600	730	850
W	165	200	235	320	390	480	550
h	82.5	100	118	150	180	213	243
H	244	305	369	500	592	733	841
Weight (Kg)	9.7	21	31	70	115	198	337

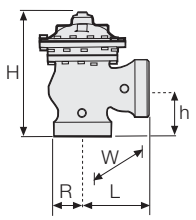
Angle Pattern



	mm	40	50	65	80	100	150	200	250	300	350	400	450
ISO PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
	W	155	155	178	200	222	320	390	480	550	550	740	740
	R	78	83	95	100	115	143	172	204	248	264	299	320
	h	85	85	109	102	127	152	203	219	273	279	369	370
	H	227	227	251	281	342	441	545	633	777	781	1082	1082
	Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
ISO PN 20 ; 25	L	124	124	149	159	200	234	277	336	415	419	467	467
	W	165	165	185	207	250	320	390	480	550	550	740	740
	R	78	85	95	105	127	159	191	223	261	293	325	358
	h	85	85	109	109	135	165	216	236	294	299	386	386
	H	227	227	251	287	350	454	558	649	796	801	1099	1099
	Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

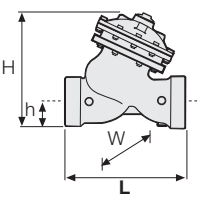
Threaded

Angle Pattern

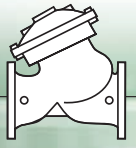


	mm	50	65	80
BSP ; NPT	L	121	140	159
	W	122	122	163
	R	40	48	55
	h	83	102	115
	H	225	242	294
	Weight (Kg)	5.5	7	15

Y Pattern



	mm	40	50	65	80
BSP ; NPT	L	155	155	212	250
	W	122	122	122	163
	h	40	40	48	56
	H	201	202	209	264
	Weight (Kg)	5.5	5.5	8	17



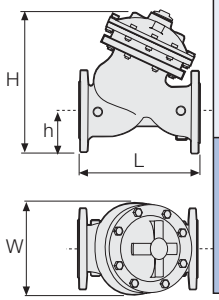
Dimensions & Weights

SI 700 Metric

European Standard (EN 558-I)

Flanged

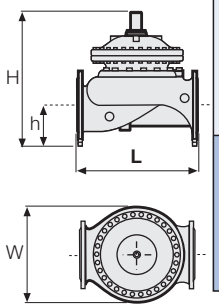
Y Pattern



	DN	50	80	100	150	200	250	300	350	400	450	500	40	65
PN 10 ; 16	L*	230	310	350	480	600	730	850	733	990	1000	1100	205	222
	W	165	200	235	320	390	480	550	550	740	740	740	155	190
	h	82.5	100	118	150	180	213	243	268	300	319	358	78	95
	H	244	305	369	500	592	733	841	866	1108	1127	1167	239	257
	Weight (Kg)	9.7	21	31	70	115	198	337	381	846	945	962	9.1	13
PN 25	L*	230	310	350	480	600	730	850	767	1024	1030	1136	205	222
	W	165	200	235	320	390	480	550	570	740	740	750	155	190
	h	82.5	100	118	150	180	213	243	295	325	357	389	78	95
	H	244	305	369	500	592	733	841	893	1133	1165	1197	239	257
	Weight (Kg)	9.7	21	31	70	115	198	337	434	900	967	986	10	15

* Length according to EN 558-1
for DN 50, 80, 100, 150, 200, 250 & 300.

G Pattern



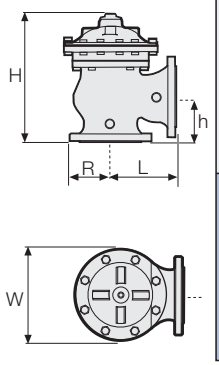
	DN	600	700	750	800
PN 10 ; 16	L*	1450	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3250	3700	3900	4100
PN 25	L	1500	1650	1750	1850
	W	1250	1250	1250	1250
	h	470	490	520	553
	H	1965	1985	2015	2048
	Weight (Kg)	3500	3700	3900	4100

* Length according to EN 558-1.

On request (Y Pattern)

DN	50	80	100	150	200	250	300
L	210	250	320	415	500	605	725
W	165	200	229	320	390	480	550
h	83	100	115	143	172	204	242
H	244	305	366	492	584	724	840
Weight (Kg)	10.6	22	37	75	125	217	370
L	210	264	335	433	524	637	762
W	165	210	254	320	390	480	550
h	83	105	127	159	191	223	261
H	244	314	378	508	602	742	859
Weight (Kg)	12.2	25	43	85	146	245	410

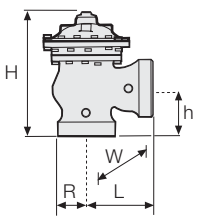
Angle Pattern



	DN	40	50	65	80	100	150	200	250	300	350	400	450
PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
	W	155	155	178	200	222	320	390	480	550	550	740	740
	R	78	83	95	100	115	143	172	204	248	264	299	320
	h	85	85	109	102	127	152	203	219	273	279	369	370
	H	227	227	251	281	342	441	545	633	777	781	1082	1082
	Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
PN 25	L	124	124	149	159	200	234	277	336	415	419	467	467
	W	165	165	185	207	250	320	390	480	550	550	740	740
	R	78	85	95	105	127	159	191	223	261	293	325	358
	h	85	85	109	109	135	165	216	236	294	299	386	386
	H	227	227	251	287	350	454	558	649	796	801	1099	1099
	Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

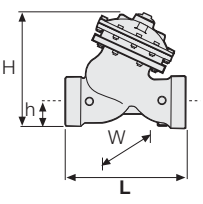
Threaded

Angle Pattern



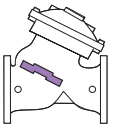
	DN	50	65	80
BSP ; NPT	L	121	140	159
	W	122	122	163
	R	40	48	55
	h	83	102	115
	H	225	242	294
	Weight (Kg)	5.5	7	15

Y Pattern



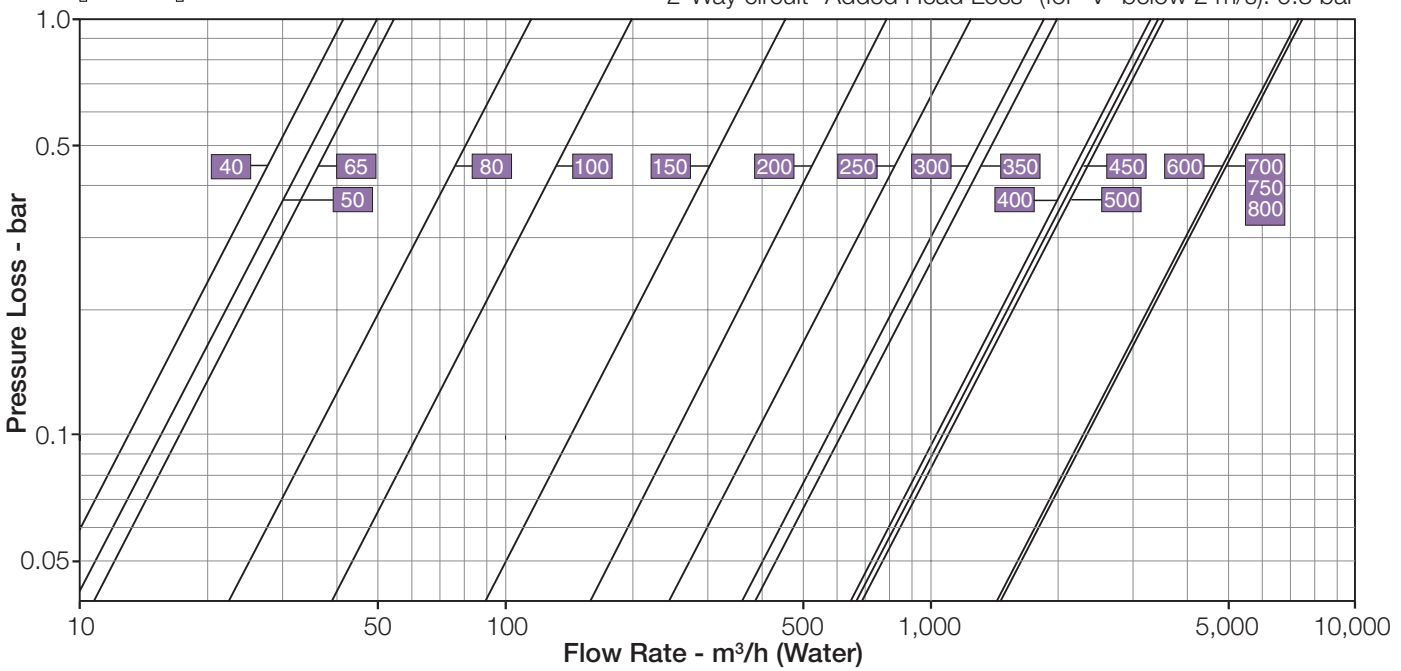
	DN	40	50	65	80
BSP ; NPT	L	155	155	212	250
	W	122	122	122	163
	h	40	40	48	56
	H	201	202	209	264
	Weight (Kg)	5.5	5.5	8	17

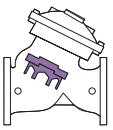
SI Metric



Y Pattern, Flat Disk

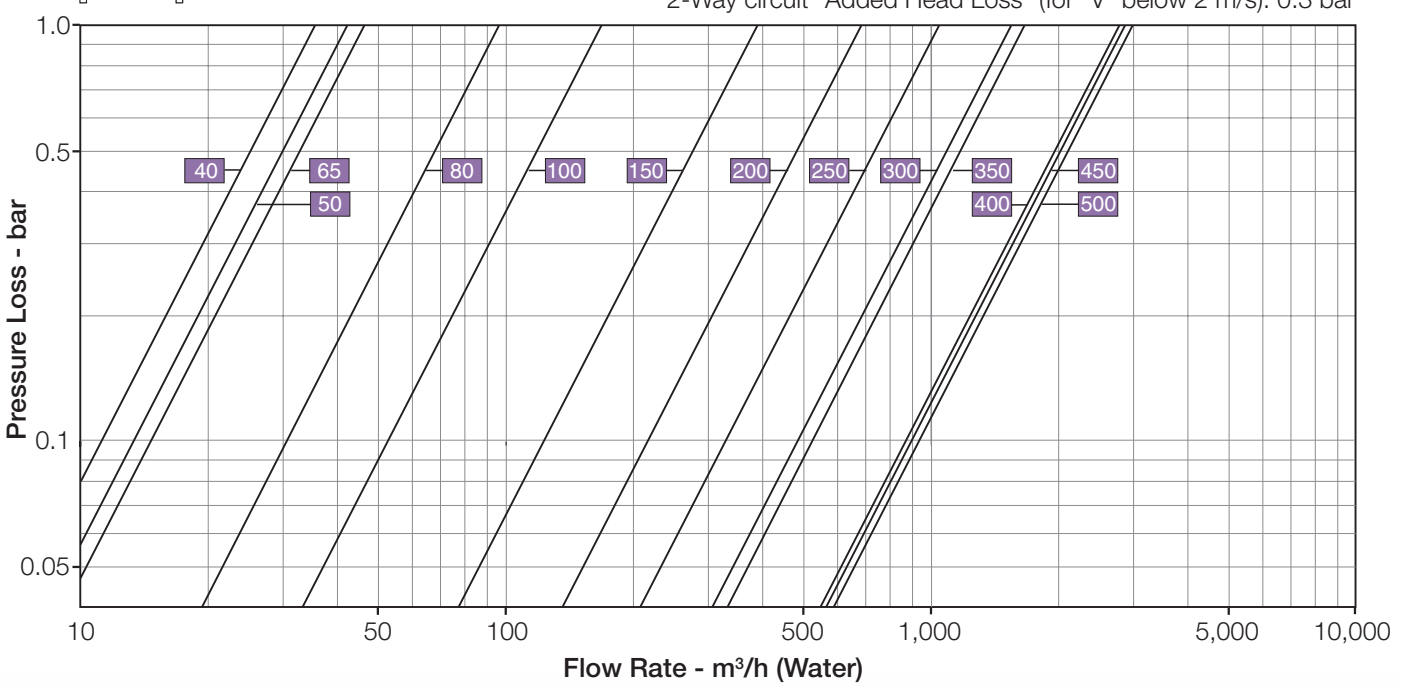
2-Way circuit "Added Head Loss" (for "V" below 2 m/s): 0.3 bar





Y Pattern, Throttling Plug (U-Type)

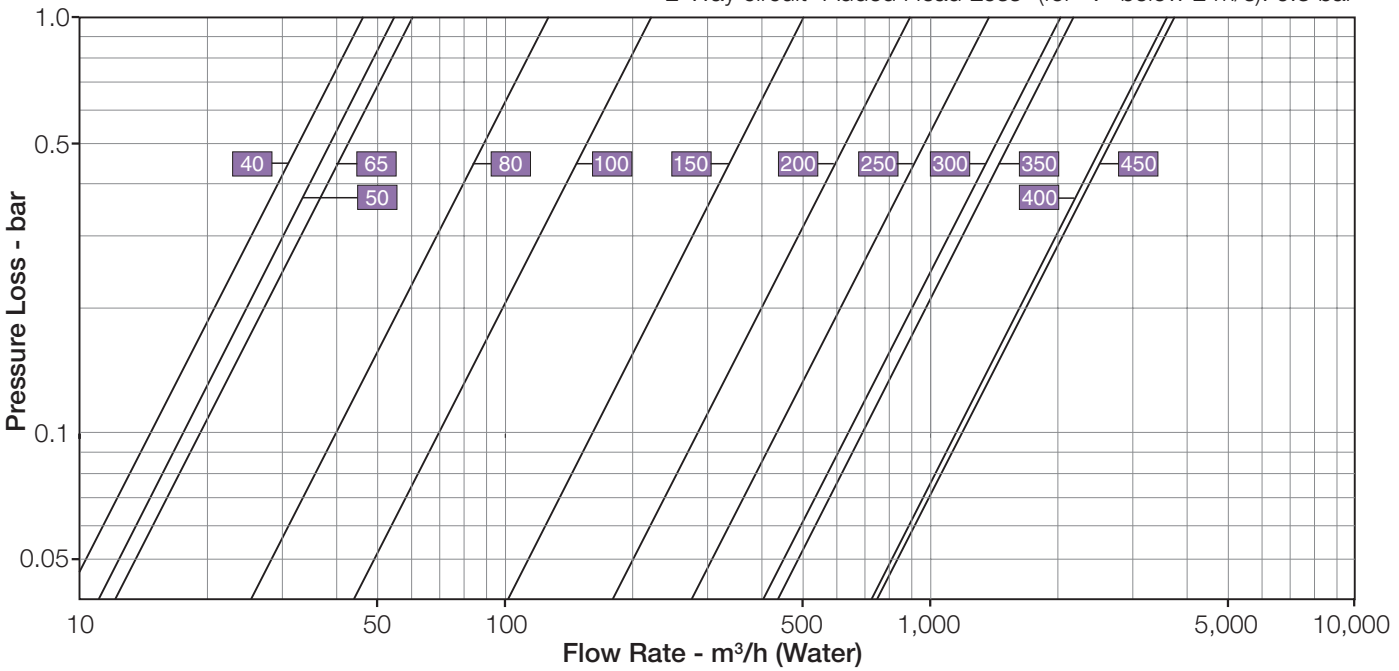
2-Way circuit "Added Head Loss" (for "V" below 2 m/s): 0.3 bar



SI Metric

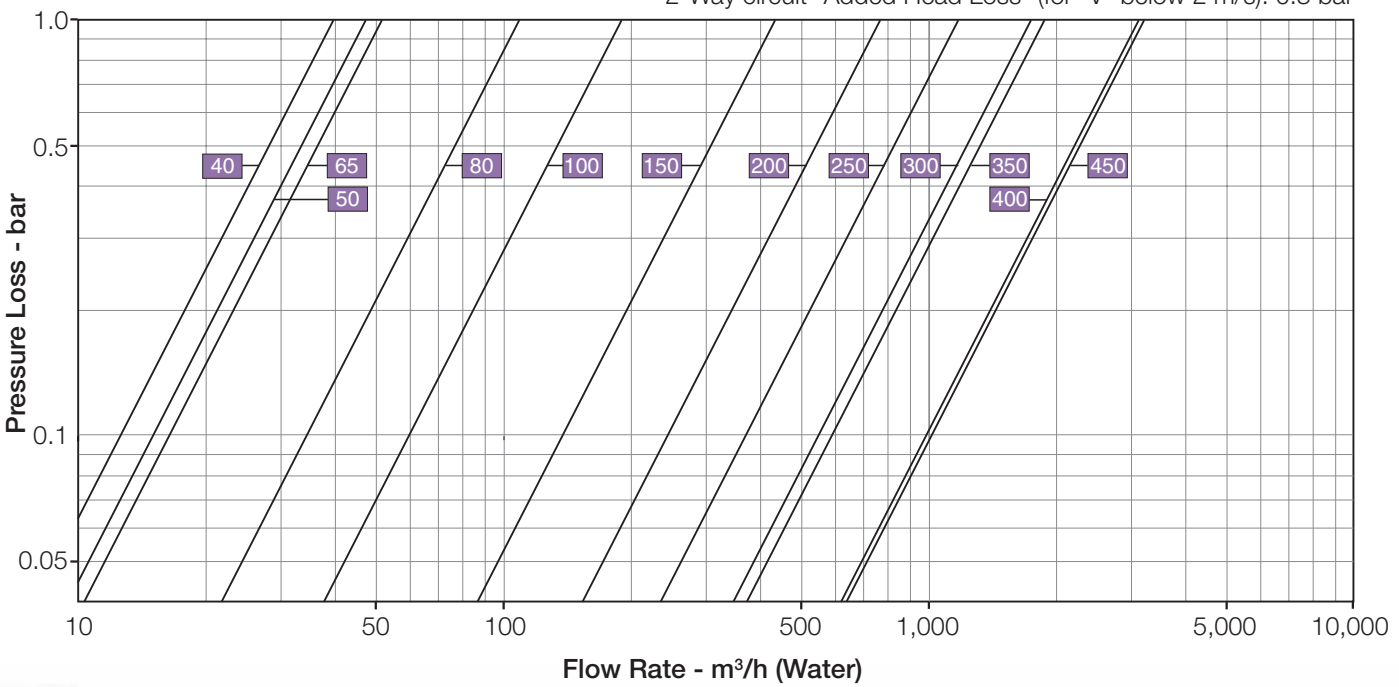
Angle Pattern, Flat Disk

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



Angle Pattern, Throttling Plug (U-Type)

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



Flow Properties

SI Metric

	mm	40	50	65	80	100	150	200	250	300	350	400	450	500
Y-Pattern Flat Disk 	Kv	42	50	55	115	200	460	815	1,250	1,850	1,990	3,310	3,430	3,550
	K	2.3	3.9	9.2	4.9	3.9	3.7	3.8	3.9	3.7	5.9	3.7	5.5	7.8
	Leq - m	4.3	10.3	33.4	21.6	23.0	37.5	53.9	70.0	85.6	159.9	112.7	204.8	323.8
Y-Pattern U-Plug 	Kv	36	43	47	98	170	391	693	1,063	1,573	1,692	2,814	2,916	3,018
	K	3.1	5.4	12.8	6.7	5.4	5.2	5.2	5.4	5.1	8.2	5.1	7.6	10.8
	Leq - m	6.0	14.3	46.2	29.9	31.9	51.9	74.6	96.8	118.4	221.3	155.9	283.5	448.1
Angle Pattern Flat Disk 	Kv	46	55	61	127	220	506	897	1,375	2,035	2,189	3,641	3,773	NA
	K	1.9	3.2	7.6	4.0	3.2	3.1	3.1	3.2	3.1	4.9	3.0	4.5	NA
	Leq - m	3.6	8.5	27.6	17.8	19.0	31.0	44.6	57.8	70.7	132.1	93.1	169.3	NA
Angle Pattern U-Plug 	Kv	39	47	51	108	187	430	762	1,169	1,730	1,861	3,095	3,207	NA
	K	2.6	4.5	10.6	5.6	4.5	4.3	4.3	4.5	4.2	6.8	4.2	6.2	NA
	Leq - m	5.0	11.8	38.2	24.7	26.4	42.9	61.7	80.0	97.9	182.9	128.9	234.3	NA

SI Metric

	mm	600	700	750	800
G-Pattern Flat Disk 	Kv	7,350	7,500	7,500	7,500
	K	3.8	6.7	8.8	11.4
	Leq - m	188.0	390.1	550.9	760.7

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = Liquid specific gravity (Water = 1.0)

Cv = 1.155 Kv

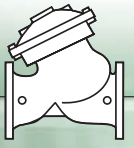
Flow resistance or Head loss coefficient, $K = \Delta H \frac{2g}{V^2}$

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

Equivalent Pipe Length, Leq **Leq = Lk·D**

Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

Note:
The Leq values given are for general consideration only.
Actual Leq may vary somewhat with each of the valve sizes.

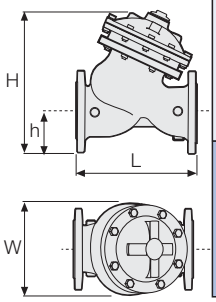


Dimensions & Weights

US 700 English

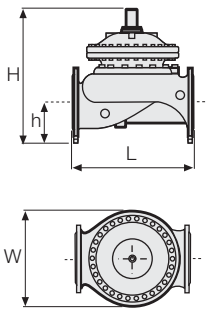
Flanged

Y Pattern



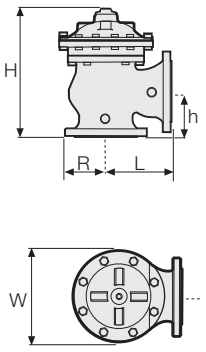
	inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
ANSI 125 ; 150	L	8.1	8.1	8.3	9.8	12.6	16.3	19.7	23.8	28.5	28.9	39.0	39.4	43.3
	W	6.1	6.1	7.0	7.9	8.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1	29.1
	h	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.5	10.6	11.8	12.6	14.1
	H	9.4	9.6	10.1	12.0	14.4	19.4	23.0	28.5	33.1	34.1	43.6	44.4	45.9
	Weight (lb)	20	23	29	49	82	165	276	478	816	840	1865	2083	2121
ANSI 250 ; 300	L	8.1	8.3	8.7	10.4	13.2	17.0	20.6	25.1	30.0	30.2	40.3	40.5	44.7
	W	6.1	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	22.4	29.1	29.1	29.5
	h	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.6	12.8	14.1	15.3
	H	9.4	9.6	10.1	12.4	14.9	20.0	23.7	29.2	33.8	35.2	44.6	45.9	47.1
	Weight (lb)	22	27	33	55	95	187	322	540	904	957	1984	2132	2174

Globe Pattern



	inch	24"	28"	30"	32"
ANSI 125 ; 150	L	57	65	70	73
	W	49	49	49	49
	h	18.5	19	20.5	21.8
	H	77	78	79.3	80.6
	Weight (lb)	7150	8140	8580	9020
ANSI 250 ; 300	L	59	65	70	73
	W	49	49	49	49
	h	18.5	19	20.5	21.8
	H	77	78	79.3	80.6
	Weight (lb)	7700	8140	8580	9020

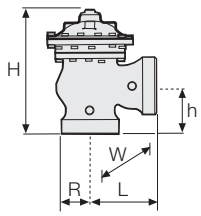
Angle Pattern



	inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 125 ; 150	L	4.9	4.9	5.9	6.0	7.5	8.9	10.4	12.6	15.6	15.7	17.7	17.7
	W	6.1	6.1	7.0	7.9	8.7	12.6	15.4	18.9	21.7	21.7	29.1	29.1
	R	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.8	10.4	11.8	12.6
	h	3.3	3.3	4.3	4.0	5.0	6.0	8.0	8.6	10.7	11.0	14.5	14.5
	H	8.9	8.9	9.9	11.1	13.5	17.4	21.5	24.9	30.6	30.7	42.6	42.6
	Weight (lb)	21	22	27	47	77	157	260	452	772	816	1764	1808
ANSI 250 ; 300	L	4.9	4.9	5.9	6.3	7.9	9.2	10.9	13.2	16.3	16.5	18.4	18.4
	W	6.5	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1
	R	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.5	12.8	14
	h	3.3	3.3	4.3	4.3	5.3	6.5	8.5	9.3	11.6	11.8	15.2	15.2
	H	8.9	8.9	9.9	11.3	13.8	17.9	22.0	25.6	31.3	31.5	43.3	43.3
	Weight (lb)	24	25	30	51	90	179	304	514	860	937	1885	1918

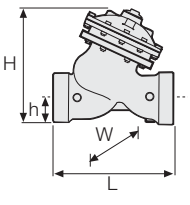
Threaded

Angle Pattern



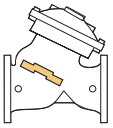
	inch	2"	2½"	3"
BSP ; NPT	L	4.8	5.5	6.3
	W	4.8	4.8	6.4
	R	1.6	1.9	2.2
	h	3.3	4.0	4.5
	H	8.9	9.5	11.6
	Weight (lb)	12	15	33

Y Pattern



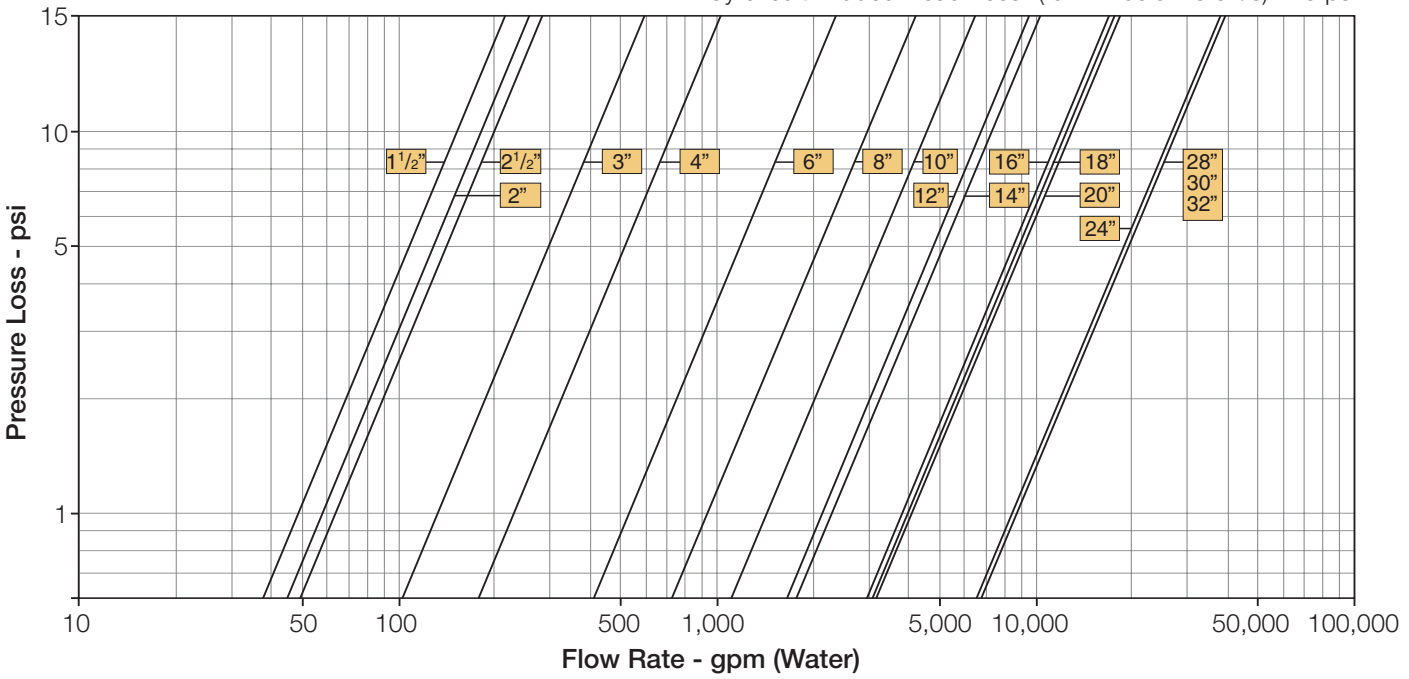
	inch	1½"	2"	2½"	3"
BSP ; NPT	L	6.1	6.1	8.3	9.8
	W	4.8	4.8	4.8	6.4
	h	1.6	1.6	8.2	2.2
	H	7.9	8.0	8.2	10.4
	Weight (lb)	12	12	18	37

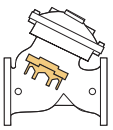
US English



Y Pattern, Flat Disk

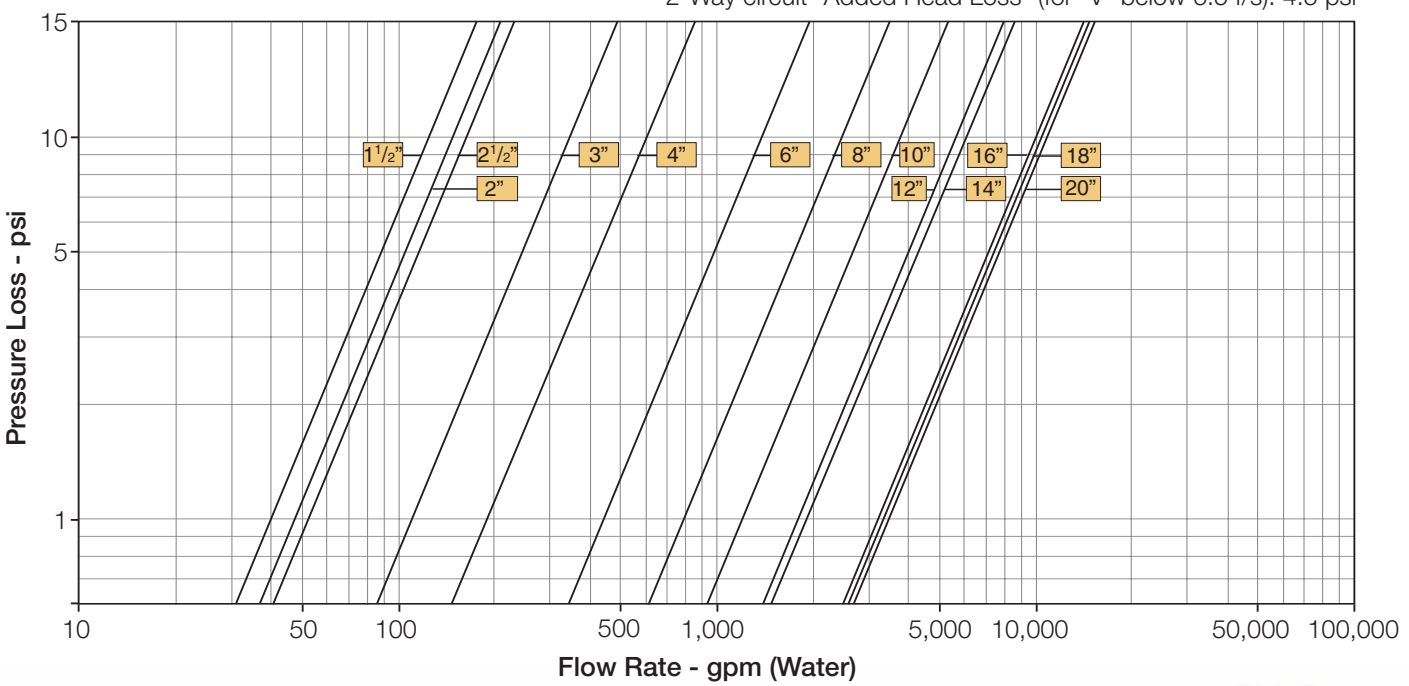
2-Way circuit "Added Head Loss" (for "V" below 6.5 f/s): 4.5 psi





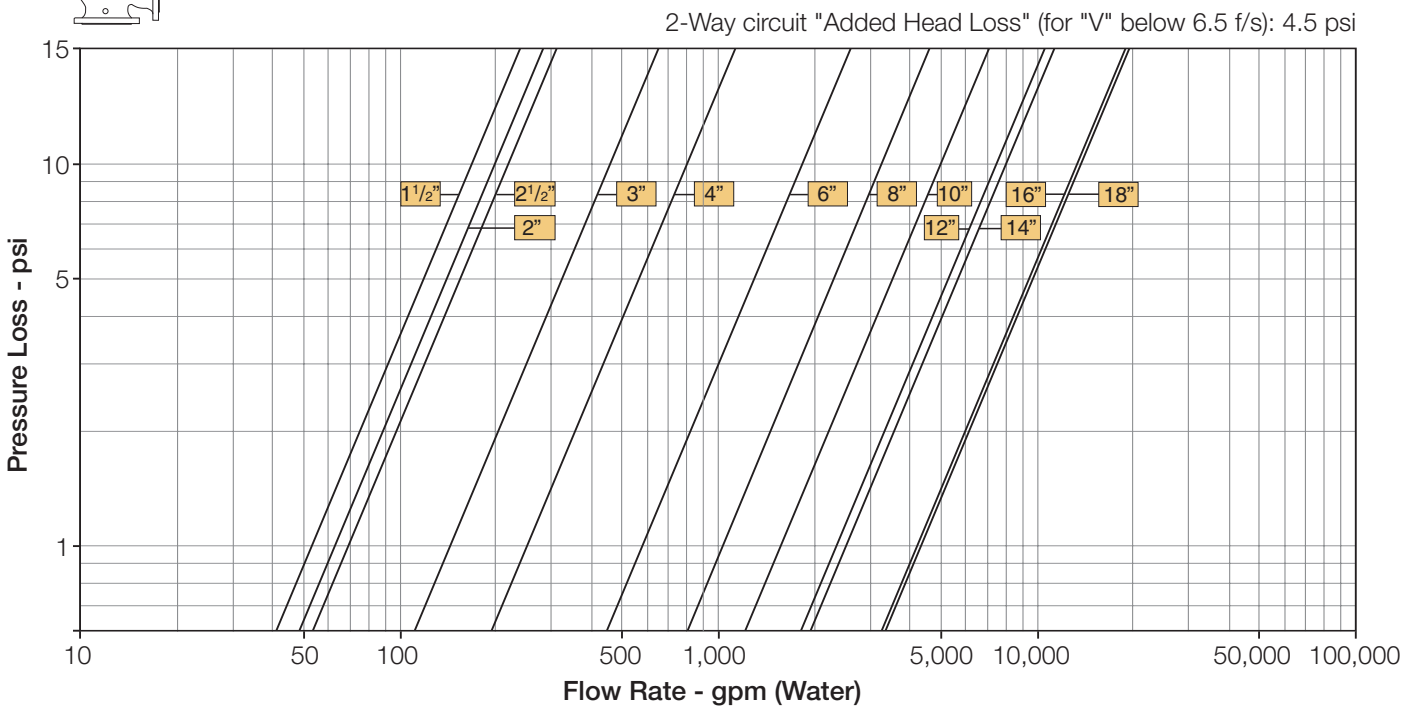
Y Pattern, Throttling Plug (U-Type)

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

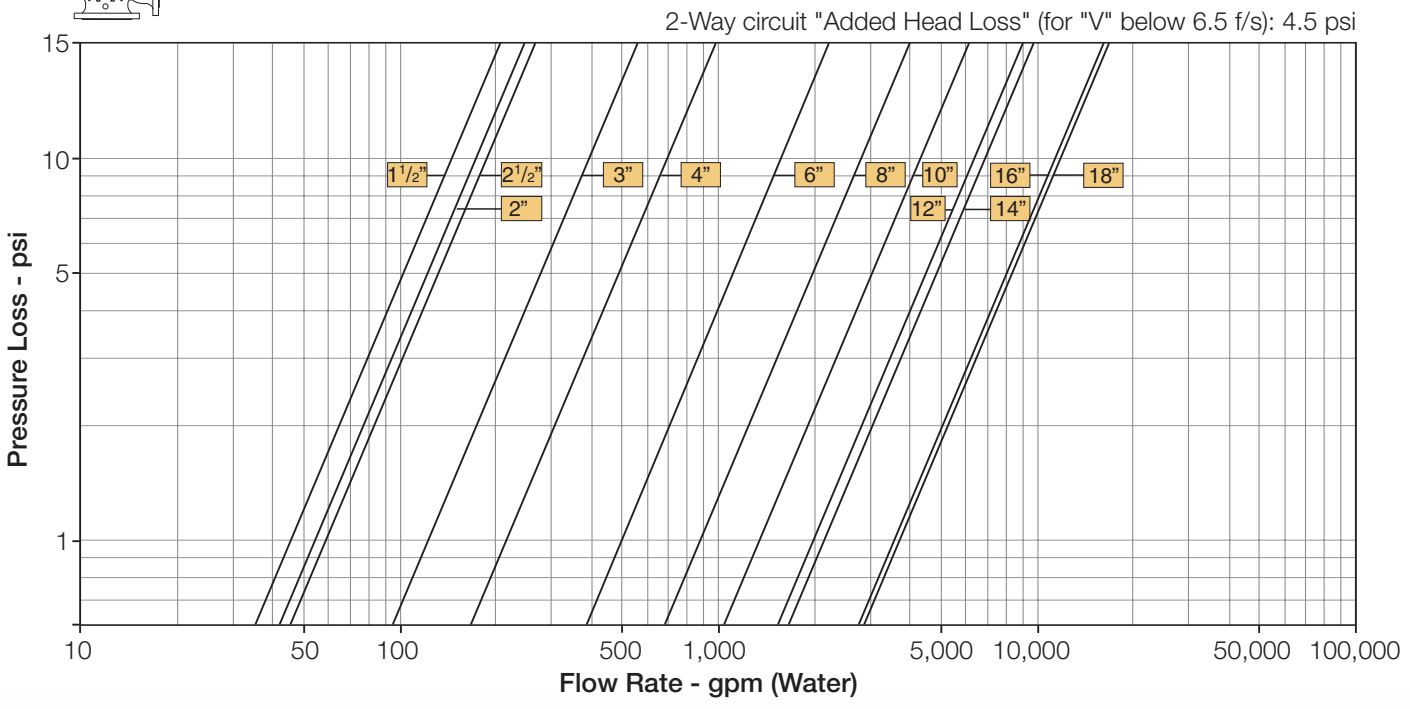


US English

Angle Pattern, Flat Disk



Angle Pattern, Throttling Plug (U-Type)



Flow Properties

US English

	inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
Y-Pattern Flat Disk 	Cv	49	58	64	133	230	530	940	1,440	2,140	2,300	3,820	3,960	4,100
	K	2.3	3.9	9.2	4.9	3.9	3.7	3.8	3.9	3.7	5.9	3.7	5.5	7.8
	Leq-feet	14.2	33.8	109.5	70.8	75.6	123.0	176.9	229.5	280.8	524.5	369.6	671.9	1,062.3
Y-Pattern U-Plug 	Cv	41	49	54	113	200	450	800	1,230	1,820	1,950	3,250	3,370	3,490
	K	3.1	5.4	12.8	6.7	5.4	5.2	5.2	5.4	5.1	8.2	5.1	7.6	10.8
	Leq-feet	19.7	46.8	151.6	97.9	104.6	170.2	244.8	317.6	388.6	725.9	511.6	930.0	1,470.3
Angle Pattern Flat Disk 	Cv	53	64	70	146	250	580	1,040	1,590	2,350	2,530	4,210	4,360	NA
	K	1.9	3.2	7.6	4.0	3.2	3.1	3.1	3.2	3.1	4.9	3.0	4.5	NA
	Leq-feet	11.7	28.0	90.5	58.5	62.5	101.6	146.2	189.7	232.0	433.4	305.5	555.3	NA
Angle Pattern U-Plug 	Cv	45	54	59	124	220	500	880	1,350	2,000	2,150	3,580	3,710	NA
	K	2.6	4.5	10.6	5.6	4.5	4.3	4.3	4.5	4.2	6.8	4.2	6.2	NA
	Leq-feet	16.3	38.7	125.3	80.9	86.5	140.7	202.4	262.5	321.2	599.9	422.8	768.6	NA

US English

	inch	24"	28"	30"	32"
G-Pattern Flat Disk 	Cv	8,490	8,670	8,670	8,670
	K	3.8	6.7	8.8	11.4
	Leq-feet	616.6	1,280.0	1,807.3	2,495.6

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

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 (m^3/h ; gpm)
ΔP = Differential pressure (bar ; psi)
Gf = 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 (m ; feet)
V = Nominal size flow velocity (m/sec ; feet/sec.)
g = Acceleration of gravity (9.81 m/sec^2 ; 32.18 $feet/sec^2$)

Equivalent Pipe Length, Leq **Leq = Lk·D**

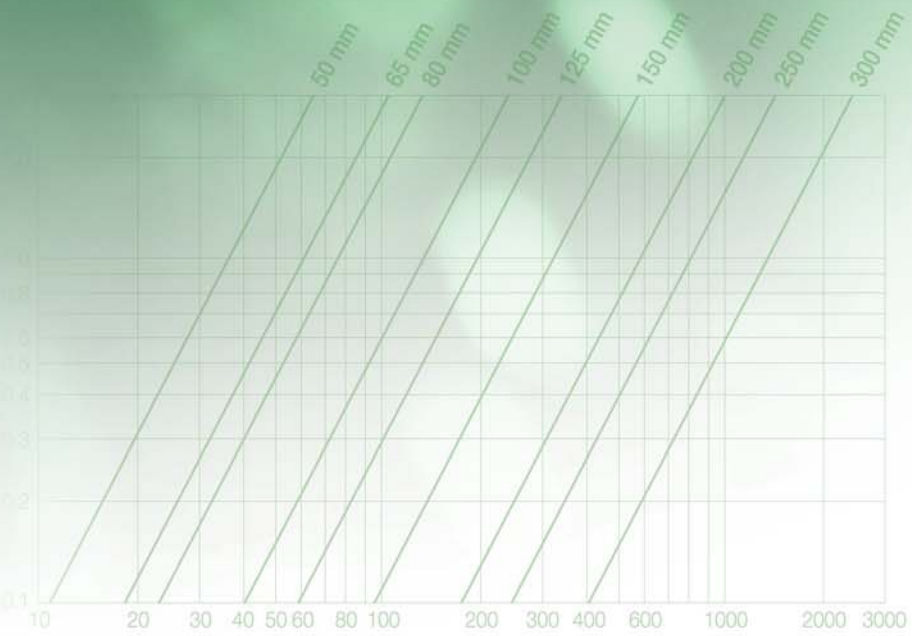
Where:
Leq = Equivalent nominal pipe length (m ; feet)
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
D = Nominal pipe diameter (m ; feet)

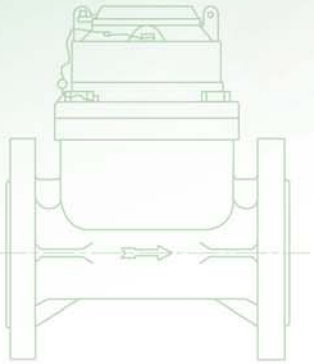
Note:
The Leq values given are for general consideration only.
Actual Leq may vary somewhat with each of the valve sizes.

Irrigation for Agriculture

Engineering Data

Water Meters





BERMAD

Water Meter

for Irrigation and Waste Water

Turbo-IR

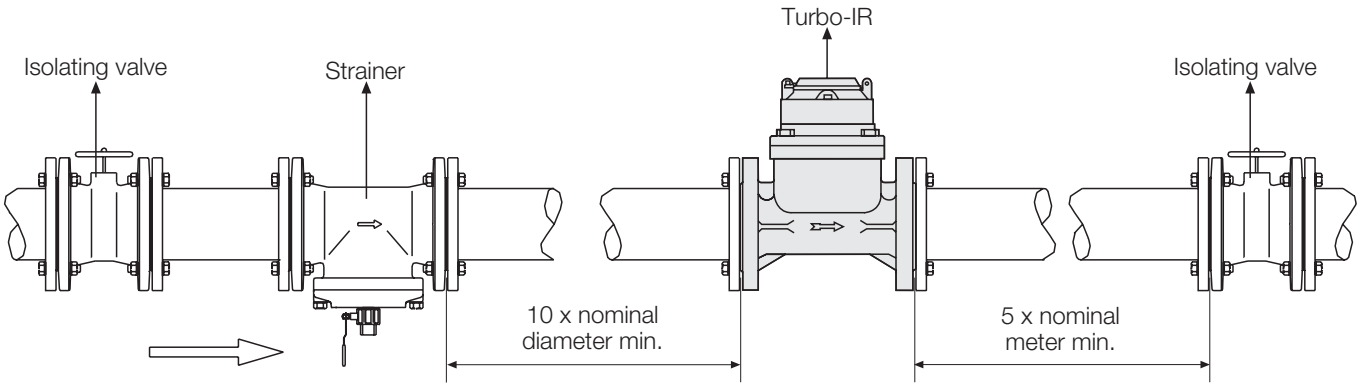
Features and Benefits

- Magnetic drive
- Dry, vacuum sealed register
- Option for “reed switch” sensor
- Register can rotate 360°
- Paddle wheel design prevents jamming and damage due to solid debris
- Measuring element suits range of water meter sizes
- Easy maintenance
- Can be installed in any orientation
- Low head loss.

The TURBO-IR uses a multi-blade plastic paddle mounted at the top of the water passage, where disturbance from solids suspended in the water is minimal, permitting accuracy of metering in water containing up to 30% solid debris.

Ideal for irrigation and waste water applications.

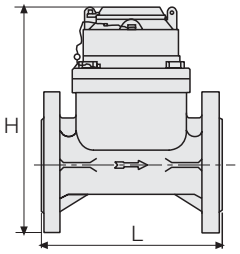
Installations Recommendation



Technical Specifications

Dimensions and Weights

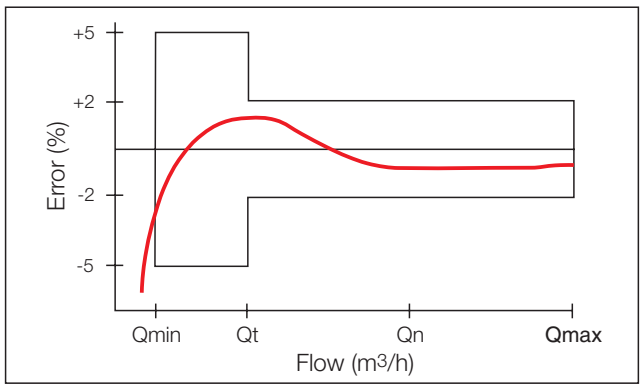
Size	in	2”	2½”	3”	4”	5”	6”	8”	10”	12”
	DN	50	65	80	100	125	150	200	250	300
L - Length (mm)		200	200	225	250	250	300	350	450	500
H - Height (mm)		252	262	279.5	289.5	303	332.5	386	441.5	493.5
Weight (kg)		10.5	11.8	15.5	17.5	19.5	30.5	42.5	60.0	82.5



Accuracy Table

Size	in	2”	2½”	3”	4”	5”	6”	8”	10”	12”
	DN	50	65	80	100	125	150	200	250	300
Qmax - max. Flow	(m³/h)	70	100	150	250	350	500	900	1200	1600
Qn - Nominal Flow	(m³/h)	35	50	75	125	175	250	450	600	800
Qt - Transition Flow	(m³/h)	10.5	15	22.5	37.5	52.5	75	135	180	240
Qmin - Min. Flow	(m³/h)	2.8	4	6	10	14	20	35	48	64
Maximum Reading	(m³)	9999999.99						99999999.9		
Minimum Reading	(m³)	0.01						0.1		

Accuracy Curve

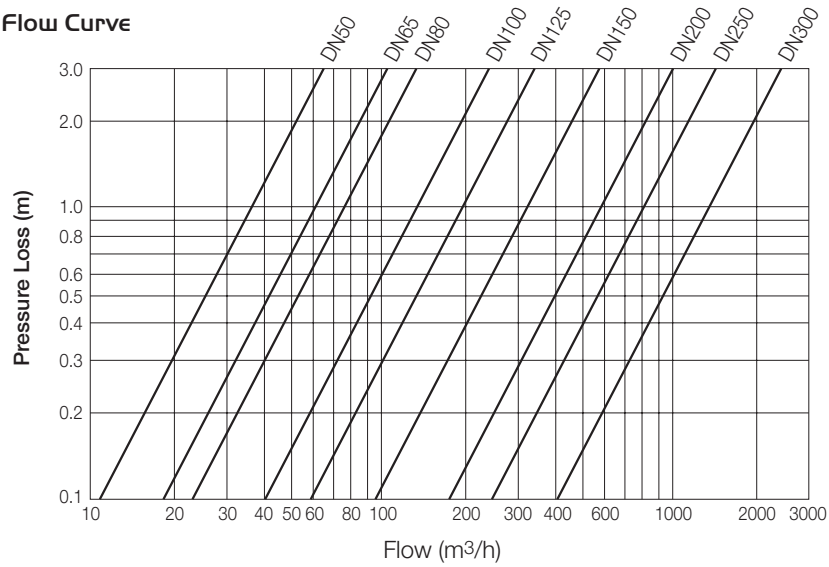


Pulse Options

DN	Reed Switch Pulse 1 Pulse Per 100 liter	1 m³	10 m³
2”-6” 50-150	X	X	
8”-12” 200-300		X	X
Order Codes	**S3**	**S2**	**S1**

For pulse preparation add Y/to code

Flow Curve



Operating Data

- **Pressure Raiting:** 16 bar 232 psi
- **Temperature:** Water up to 40˚C,; 105˚ F

Reed Switch Data

- Cable: 2 core, 1.5m length
- Reed Switch: single
- Electrical Data:
  Switching Volt.: 24 AV/DC max.
  Switching Current: 0.01A max.

Woltman Turbine Meter

Magnetic Drive Dry Type

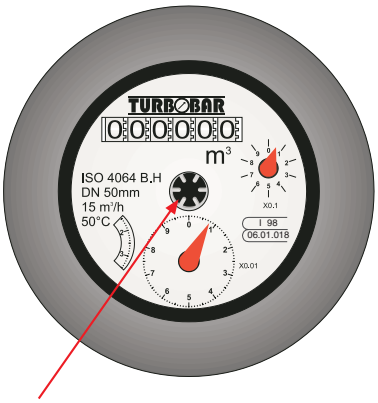
WPH

EEC CLASS B
PATTERN APPROVAL

Heavy duty and designed to handle high flow rates, the TURBOBAR WPH-Magnetic Drive water meter covers a very wide flow range, and is particularly suited to industrial, waterworks, water distribution, water monitoring, and agricultural applications.
Based on the Woltmann principle, the helical blades of the turbine rotate around the axis of flow.
TURBOBAR products are long-life, and easy to maintain at low cost.

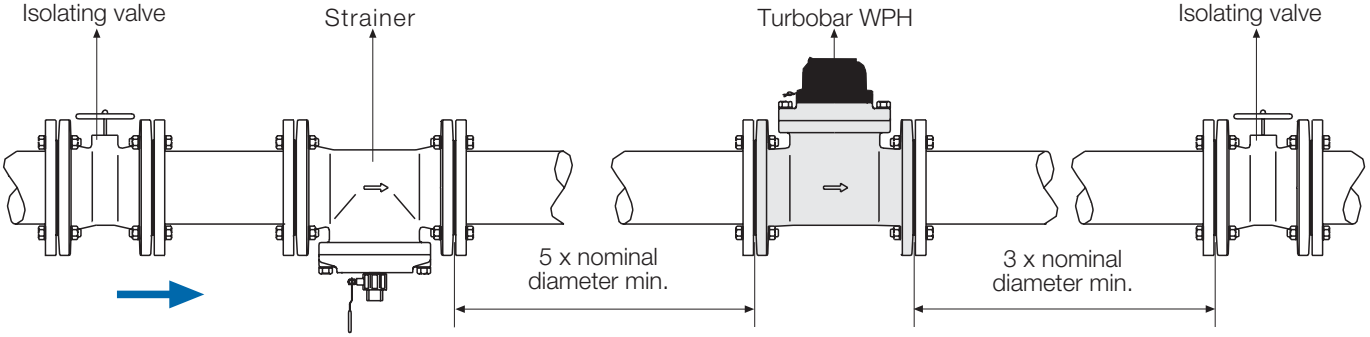
Features and Benefits

- Removable and interchangeable measuring element
- Dry type register
  - Hermetically sealed
- Includes output option by Dry Contact (Reed Switch) and Opto-Electronic sensor, as standard
  - Digital flow converter device and a digital counter are available on request
- Magnetic transmission keeps the register completely separate from water; only the impeller and transmission shaft contact water
- Meets or exceeds ISO 4064 class B-H
- US gallons registration available on request
- EEC Approval (50-300 mm)



Rotating star for leak detection and electronic calibration

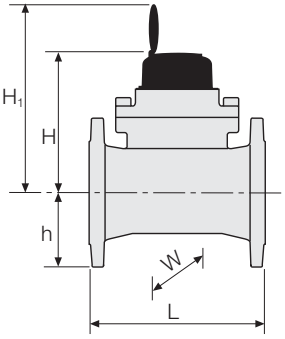
Installations Recommendation



Technical Specifications

Dimensions and Weights

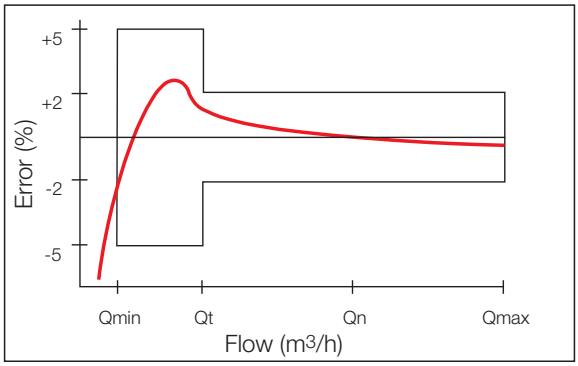
Size	in	1½"	2"		2½"	3"	4"	5"	6"	8"	10"	12"	16"	20"
	DN	40	50	50	65	80	100	125	150	200	250	300	400	500
			ISO	ANSI/BSTD										
L - Length (mm)		260	200	310	200	225	250	250	300	350	450	500	500	500
H - Height (mm)		200	200	200	200	200	200	200	230	230	318	318	365	410
H_1 - Height (mm)		370	270	270	270	270	270	270	300	300	388	388	435	480
h - Height (mm)		68	75	70	85	95	104	118	135	162	194	216	304	355
W - Width (mm)		160	170	160	190	200	230	250	285	340	395	445	600	700
Weight (kg)		13	12	15	14	16	19	20	39	52	105	120	187	256



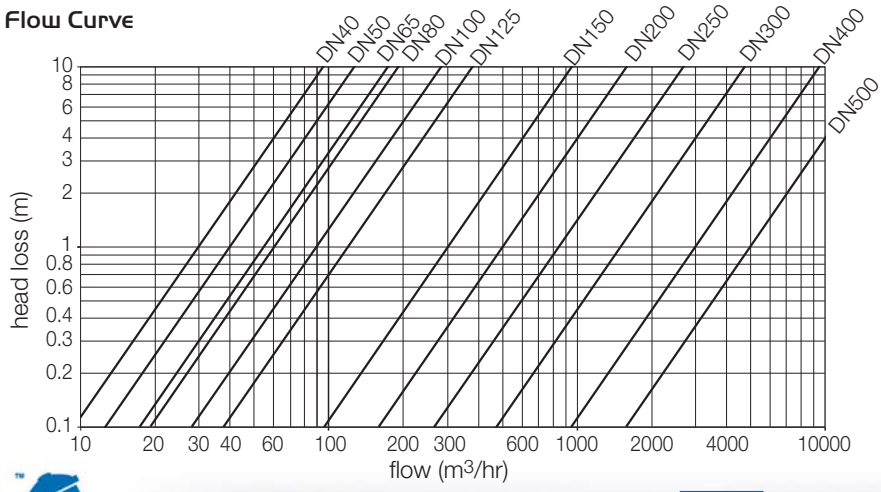
Accuracy Curve

	in	1½"	2"	2½"	3"	4"	5"	6"	8"	10"	12"	16"	20"
	DN	40	50	65	80	100	125	150	200	250	300	400	500
Qn - Nominal flow rate (ISO 4064)	(m³/h)	10	15	25	40	60	100	150	250	400	600	1,000	1,500
Qp - Max. Permanent flow	(m³/h)	20	30	30	60	100	160	180	300	600	1,000	1,500	3,000
Qmax - Max. flow rate (ISO 4064)	(m³/h)	20	30	50	80	120	200	300	500	800	1,200	2,000	3,000
Max. flow peak duty (m³/h)		30	50	80	120	200	250	300	500	800	1,500	2,500	4,000
Qt - Transmition flow rate (±2%)	(m³/h)	3	3	5	8	12	20	30	50	80	120	200	300
Qmin - Min. flow rate (±5%) (ISO 4064)	(m³/h)	0.7	0.45 0.7	0.75	1.2	1.8	3	4.5	7.5	12	18	30	40
Flow rate Δp = 0.1 bar	(m³/h)	30	40	55	60	90	120	300	500	850	1,500	3,000	5,000
Max. reading	m³	1,000,000						10,000,000		100,000,000			
Min. reading	(liter)	1						10		100			

Accuracy Curve



Flow Curve



Main Operating Characteristics

- **Pressure Rating:** PN 16
- **Temperature:** 50°C

Data Output Options

Water system management requires reliable data acquisition.The TURBOBAR WPH provides accurate data acquired directly from within the system.

Pulse Generating Options

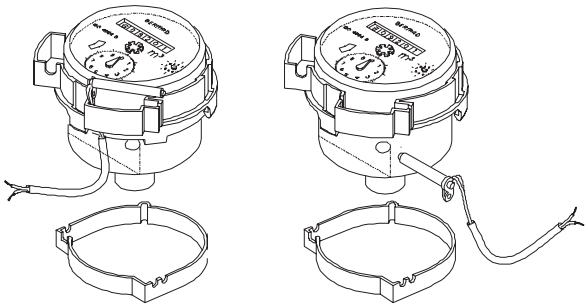
- The reed switch pulse transmitter is a magnetic on/off switch that makes and breaks electric pulse contact per each unit of flow.
- The Opto-Electronic Sensor (infrared retro-reflective photocell) produces an electric pulse with high pulse-rate capacity. The pulse is transmitted to a converter* that enables instant flow-rate readout, pulse counting, and/or 4-20 mA output.

*Converter available on request.

Data Output Options

Reed Switch

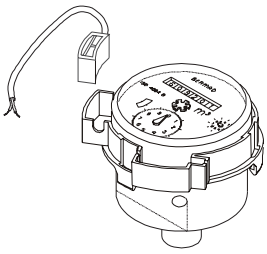
- Switching voltage: 48 VAC/DC max
- Switching current: 0.2 A max
- Switching power: 4 W max



Register with Reed Switch

Opto-Electronic Sensor

- Supply voltage: 5-10 VDC
- Output type: PNP
- Output signal
  - High state: • supply voltage
  - Low state: <0.5 VDC



Register with Opto-Electronic Sensor

Pulse Options

Size		1 Pulse for Each							
		Reed Switch					Opto-Electronic Sensor		
In	mm	10 liter	100 liter	1 m^3	10 m^3	100 m^3	1 liter	10 liter	100 liter
1 1/2"	40	•	X	X			X		
2"	50	•	X	X			X		
2 1/2"	65	•	X	X			X		
3"	80	•	X	X			X		
4"	100	•	X	X			X		
5"	125	•	X	X			X		
6"	150		•	X	X			X	
8"	200		•	X	X			X	
10"	250		•	•	X	X		•	X
12"	300			•	X	X			X
16"	400			•	X	X			X
20"	500			•	X	X			X
Order Codes		S4	S3	S2	S1	S8	SA	SB	SC

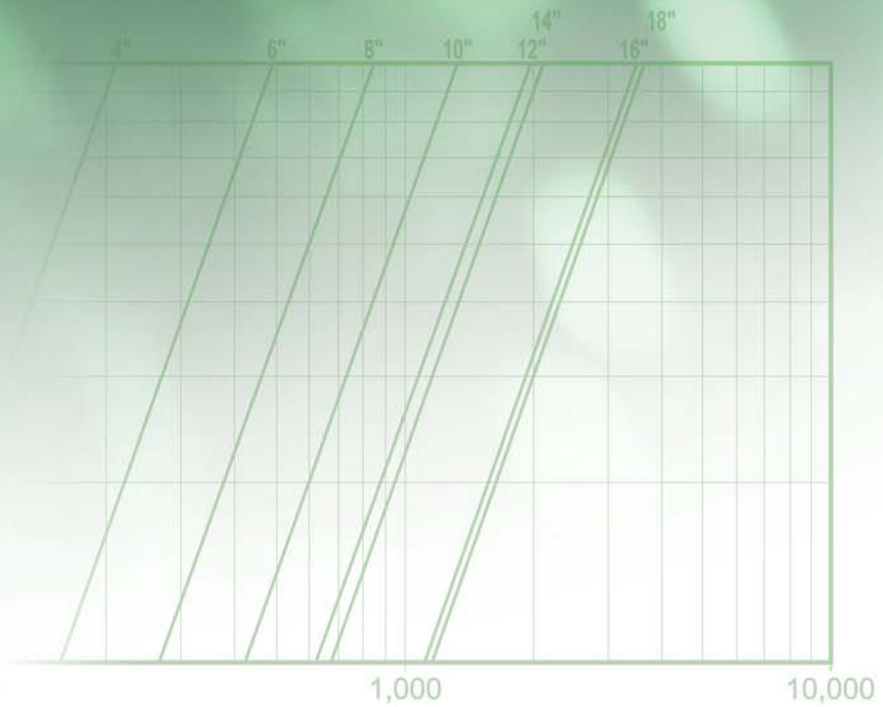
Pulse in US gallons available on request.
All factory configured options are field accessible.

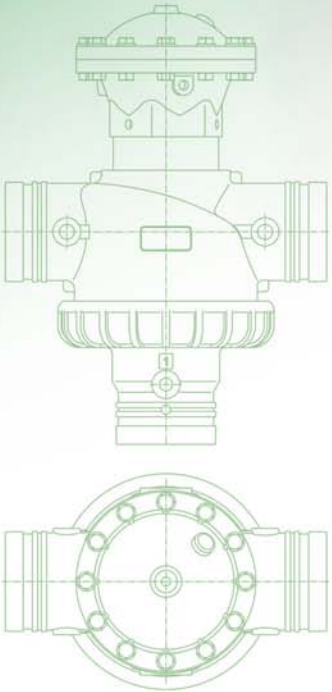
X Factory configured standard.
• Factory configured on request.

Irrigation for Agriculture

Engineering Data

IR-350 Series



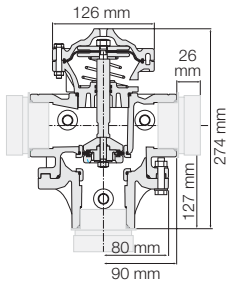


BERMAD

SI Metric

IR-2x2-350-P

Dimensions



Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Kv=52	Kv=48
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Kv=46	Kv=60

Weight: 2.8 Kg
Note: Groove adaptors add 0.5 Kg to valve weight.

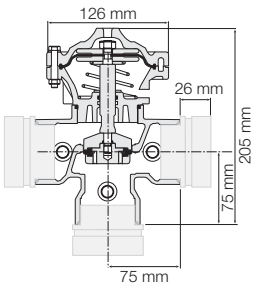
$\Delta P = \left(\frac{Q}{Kv}\right)^2$
Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

Technical Data

Control Chamber Displacment Volume: 0.13 liter
Operating Pressure: 0.7-10 bar
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 65°C
End Connections: Threaded, Grooved (with adaptors)
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-2x2-350-R

Dimensions



Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Kv=55	Kv=37
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Kv=36	Kv=58

Weight: 3.7 Kg
Note: Groove adaptors add 0.5 Kg to valve weight.

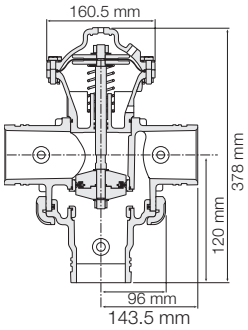
$\Delta P = \left(\frac{Q}{Kv}\right)^2$
Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

Technical Data

Control Chamber Displacment Volume: 0.13 liter
Operating Pressure: 0.7-10 bar
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 65°C
End Connections: Threaded, Grooved (with adaptors)
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-3x3-350-P

Dimensions



Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Kv=110	Kv=100
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Kv=93	Kv=122

Weight: 2.8 Kg

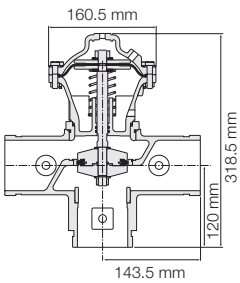
$\Delta P = \left(\frac{Q}{Kv}\right)^2$
Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

Technical Data

Control Chamber Displacment Volume: 0.34 liter
Operating Pressure: 0.7-10 bar
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 65°C
End Connections: Grooved
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-3x3-350-I

Dimensions



Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Kv=122	Kv=71
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Kv=80	Kv=83

Weight: 10.5 Kg

$\Delta P = \left(\frac{Q}{Kv}\right)^2$
Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

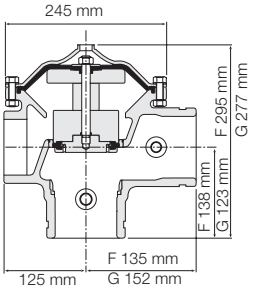
Technical Data

Control Chamber Displacment Volume: 0.34 liter
Operating Pressure: 0.7-10 bar
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 65°C
End Connections: Grooved
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

SI Metric

IR-4x3-350-A-I

Dimensions



Hydraulic Data

Angle Flow	Filtartion 1⇒C	Backwash C⇒2
	Kv=212	Kv=106

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

Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

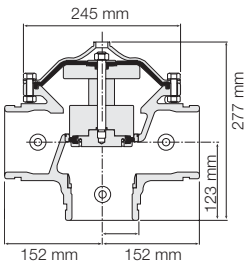
F= Flanged
G= Grooved
Weight:
Flanged 39.0 Kg
Grooved 21.0 Kg

Technical Data

Control Chamber Displacement Volume: 1.055 liter
Operating Pressure: 0.7-16 bar
External Operating Pressure: 100% of operating pressure
Maximum Temperature: 65°C
End Connections: Inlet & Outlet: Flanged, Grooved Drain: Threaded
Flow Pattern: Angled Flow

IR-4x4-350-A-I

Dimensions



Hydraulic Data

Angle Flow	Filtartion 1⇒C	Backwash C⇒2
	Kv=212	Kv=141

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

Kv = m^3/h @ ΔP of 1 bar
Q= m^3/h
ΔP = bar

Weight: Grooved 22.0 Kg

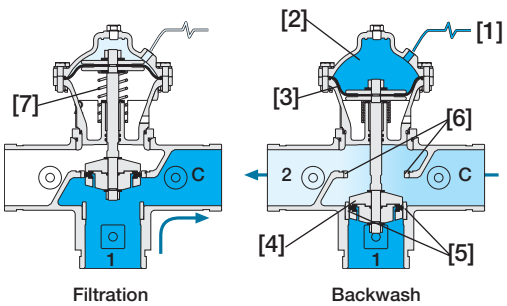
Technical Data

Control Chamber Displacement Volume: 1.055 liter
Operating Pressure: 0.7-16 bar
External Operating Pressure: 100% of operating pressure
Maximum Temperature: 65°C
End Connections: Inlet & Outlet: Flanged, Grooved Drain: Threaded
Flow Pattern: Angled Flow

Operation Double Chamber

Operation

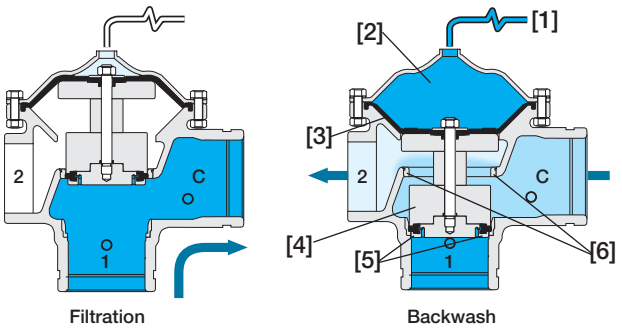
Angle Flow



A Hydraulic Command **[1]**, which pressurizes the Upper Control Chamber **[2]**, forces the Diaphragm **[3]** actuated Plug Assembly **[4]** to move towards the Supply Port Seat **[5]**, eventually sealing it drip tight. This allows flow from the filter through the Drain Port Seat **[6]**. Venting the upper control chamber causes the line pressure, together with the Spring **[7]** force, to move the Valve back to filtration mode.

Operation Single Chamber

Operation

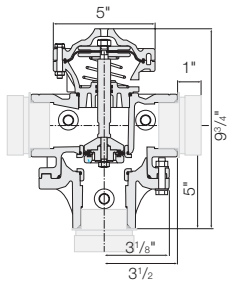


A Hydraulic Command **[1]**, which pressurizes the Control Chamber **[2]**, forces the Diaphragm **[3]** actuated Plug Assembly **[4]** to move towards the Supply Port Seat **[5]**, eventually sealing it drip tight. This allows flow from the filter through the Drain Port Seat **[6]**. During Valve closing, the Plug **[7]** blocks the drain port seat, preventing mixing of supply water with waste water. Venting the control chamber causes the line pressure to move the Valve back to filtration mode.

US English

IR-2x2-350-P

Dimensions



Weight: 6.2 lbs.
Note: Groove adaptors add 1.1 lbs. to valve weight.

Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Cv=60	Cv=56
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Cv=53	Cv=70

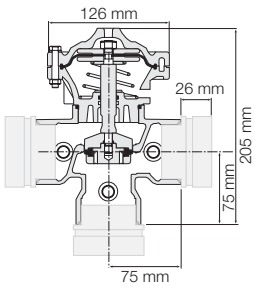
$\Delta P = \left(\frac{Q}{Cv}\right)^2$
Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

Technical Data

Control Chamber Displacment Volume: 0.04 gallon
Operating Pressure: 10-145 psi
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 150°F
End Connections: Threaded, Grooved (with adaptors)
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-2x2-350-R

Dimensions



Weight: 8.2 lbs.
Note: Groove adaptors add 1.1 lbs. to valve weight.

Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Cv=64	Cv=43
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Cv=42	Cv=67

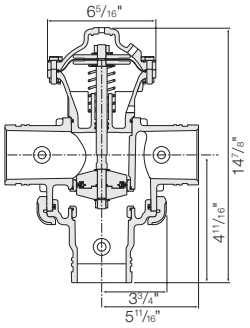
$\Delta P = \left(\frac{Q}{Cv}\right)^2$
Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

Technical Data

Control Chamber Displacment Volume: 0.04 gallon
Operating Pressure: 10-145 psi
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 150°F
End Connections: Threaded, Grooved (with adaptors)
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-3x3-350-P

Dimensions



Weight: 6.2 lbs.

Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Cv=127	Cv=115
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Cv=107	Cv=141

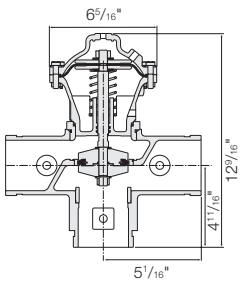
$\Delta P = \left(\frac{Q}{Cv}\right)^2$
Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

Technical Data

Control Chamber Displacment Volume: 0.09 gallon
Operating Pressure: 10-145 psi
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 150°F
End Connections: Grooved
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

IR-3x3-350-I

Dimensions



Weight: 23.1 lbs.

Hydraulic Data

	Filtartion 1⇒C	Backwash C⇒2
Angle Flow	Kv=141	Kv=82
	Filtartion 2⇒C	Backwash C⇒1
Straight Flow	Kv=92	Kv=96

$\Delta P = \left(\frac{Q}{Cv}\right)^2$
Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

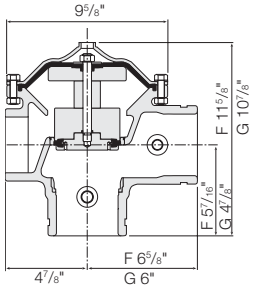
Technical Data

Control Chamber Displacment Volume: 0.09 gallon
Operating Pressure: 10-145 psi
External Operating Pressure: 85%-100% of operating pressure
Maximum Temperature: 150°F
End Connections: Grooved
Flow Patterns:
Angled Flow, Reverse Angled Flow, Straight Flow, Reverse Straight Flow

US English

IR-4x3-350-A-I

Dimensions



Hydraulic Data

Angle Flow	Filtartion 1⇒C	Backwash C⇒2
	Cv=245	Cv=122

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

Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

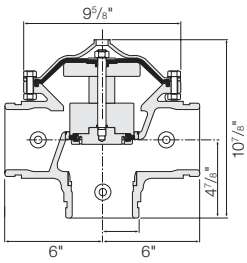
F= Flanged
G= Grooved
Weight:
Flanged 86.0 lbs.
Grooved 46.3 lbs

Technical Data

Control Chamber Displacement Volume: 0.29 gallon
Operating Pressure: 10-232 psi
External Operating Pressure: 100% of operating pressure
Maximum Temperature: 150°F
End Connections: Inlet & Outlet: Flanged, Grooved Drain: Threaded
Flow Pattern: Angled Flow

IR-4x4-350-A-I

Dimensions



Hydraulic Data

Angle Flow	Filtartion 1⇒C	Backwash C⇒2
	Cv=245	Cv=163

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

Cv = gpm @ ΔP of 1 psi
Q= gpm
ΔP = psi

Weight: Grooved 48.5 lbs.

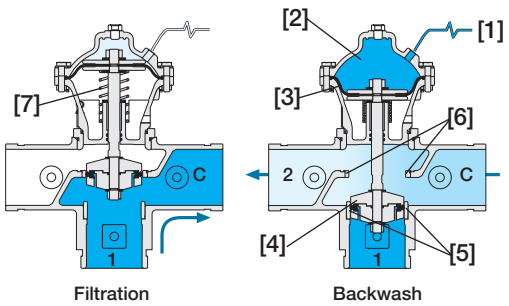
Technical Data

Control Chamber Displacement Volume: 0.29 gallon
Operating Pressure: 10-232 psi
External Operating Pressure: 100% of operating pressure
Maximum Temperature: 150°F
End Connections: Inlet & Outlet: Flanged, Grooved Drain: Threaded
Flow Pattern: Angled Flow

Operation Double Chamber

Operation

Angle Flow



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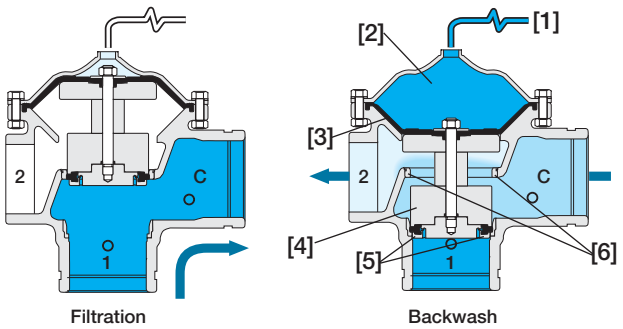
Operation Single Chamber

Operation

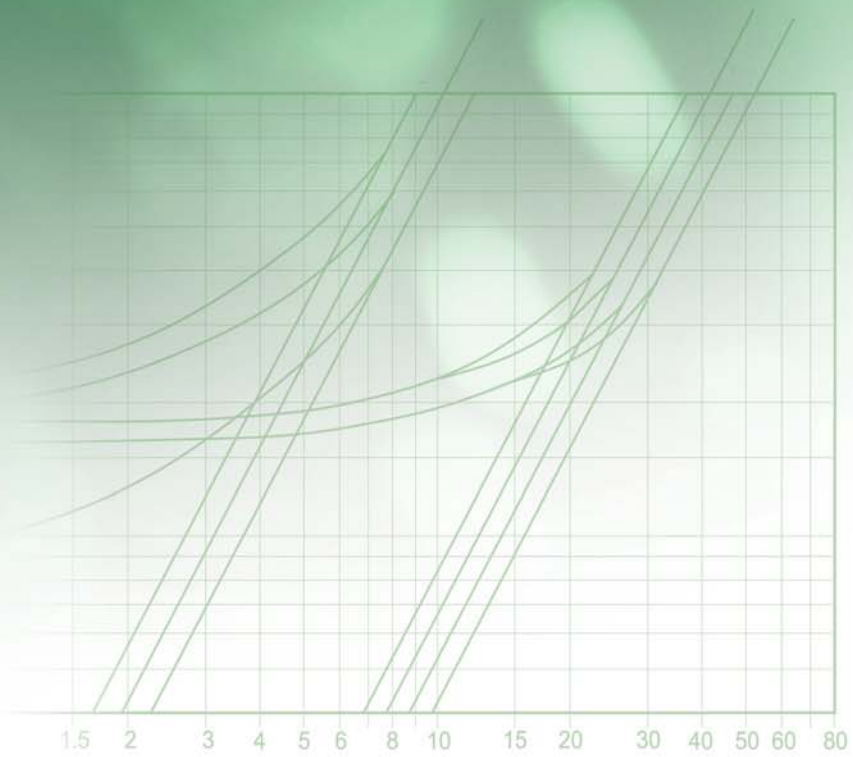


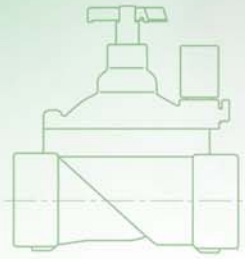
A Hydraulic Command **[1]**, which pressurizes the Control Chamber **[2]**, forces the Diaphragm **[3]** actuated Plug Assembly **[4]** to move towards the Supply Port Seat **[5]**, eventually sealing it drip tight. This allows flow from the filter through the Drain Port Seat **[6]**. During Valve closing, the Plug **[7]** blocks the drain port seat, preventing mixing of supply water with waste water. Venting the control chamber causes the line pressure to move the Valve back to filtration mode.

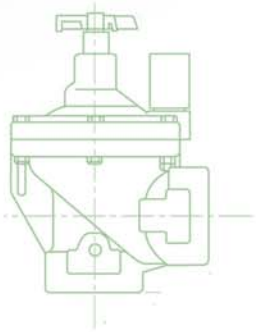
Irrigation for Agriculture

Engineering Data

IR-200 Series







BERMAD

Product Parts Features, Hydraulic Valve

[1] Fastening Bolts & Nuts

6 Stainless Steel bolts and nuts (1 1/2-2"; DN40-50 valves) fasten valve cover to body, ensuring quick in-line inspection and service.

[2] Valve Cover (Hydraulic Type)

Simple and light construction enables quick in-line inspection and service.

[2.1] Flow Stem (Optional)

[3] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

[4] Seal Disk Assembly (Hydraulic Type)

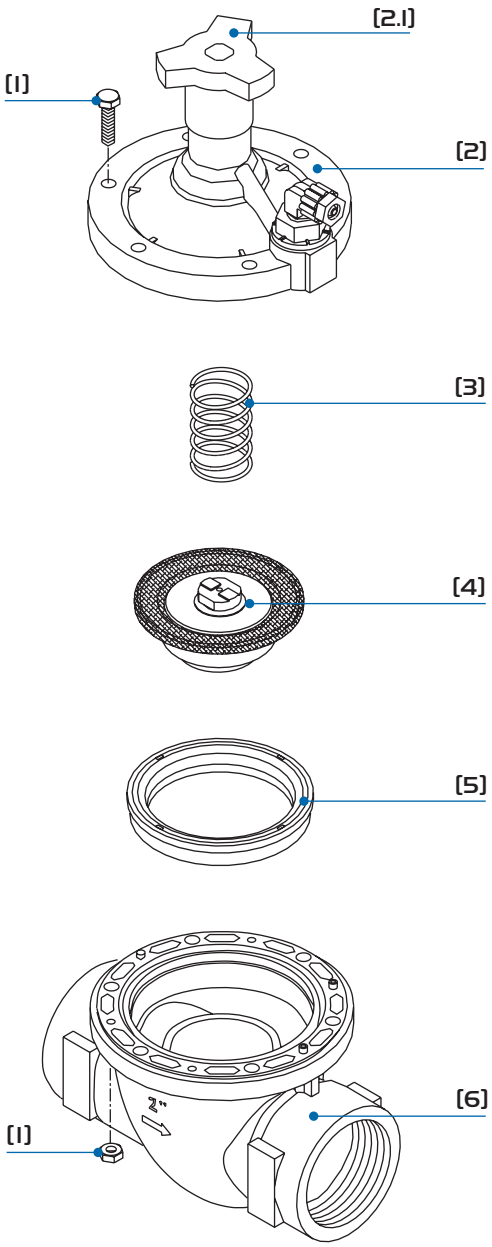
The seal disk assembly includes a flexible, carefully balanced, and peripherally supported diaphragm and a rugged guided plug with elastomeric sealing surface. This internal design enables:

- High flow rate with low head loss
- Smooth valve opening and closing
- Accurate and stable regulation
- Low opening and actuation pressure
- No diaphragm erosion and distortion
- Same diaphragm and spring fully meet the valve's operating pressure range requirements

[5] Diaphragm Supporting Ring

[6] Valve Body (Hydraulic Type)

Glass-Filled Nylon to meet rough service conditions obtaining high chemical and cavitation resistance. Full bore seat with unobstructed flow path, free of any in-line ribs, supporting cage, or shafts.



Product Parts Features, Electric Valve

[1] Fastening Bolts & Nuts

6 Stainless Steel bolts and nuts (1½-2"; DN40-50 valves) fasten valve cover to body, ensuring quick in-line inspection and service.

[2] Valve Cover (Electric Type)

Simple and light construction enables quick in-line inspection and service.

[2.1] 2-Way Solenoid Actuator

[2.2] Manuale Override Handle

[2.3] Needle - Restricts inlet flow & eliminates internal restriction clogging.

[2.4] Flow Stem (optional)

[3] Auxiliary Closing Spring

One single spring fully meets valve requirements for operating pressure range, ensuring low opening pressure and secured closing.

[4] Seal Disk Assembly (Electric Type)

The seal disk assembly includes a flexible, carefully balanced, and peripherally supported diaphragm and a rugged guided plug with elastomeric sealing surface. This internal design enables:

- High flow rate with low head loss
- Smooth valve opening and closing
- Accurate and stable regulation
- Low opening and actuation pressure
- No diaphragm erosion and distortion
- Same diaphragm and spring fully meet the valve's operating pressure range requirements

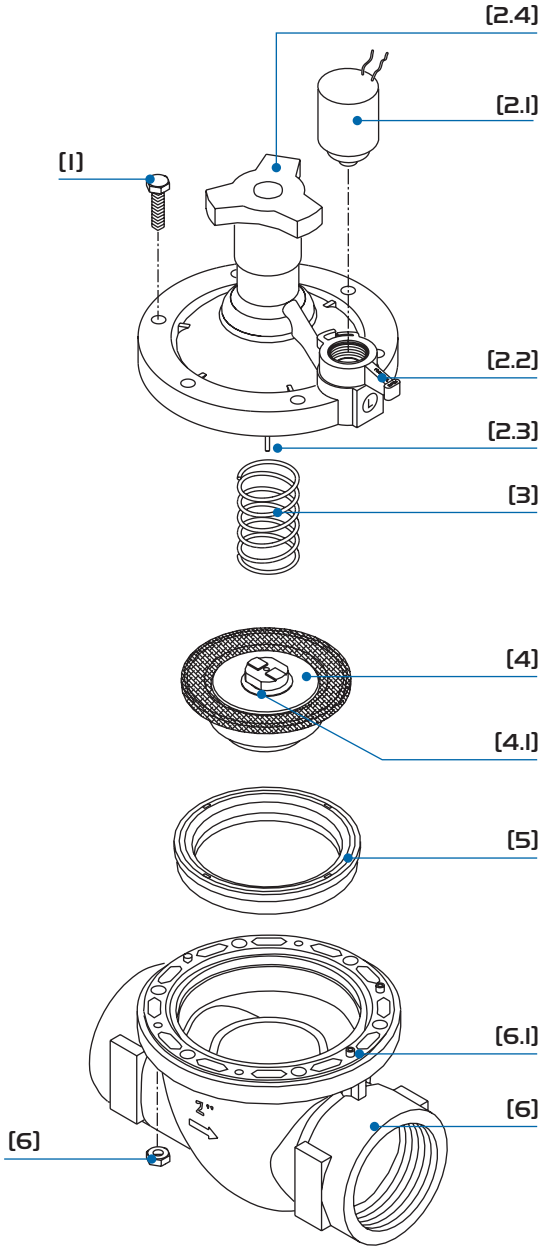
[4.1] Internal Restriction

[5] Diaphragm Supporting Ring

[6] Valve Body (Electric Type)

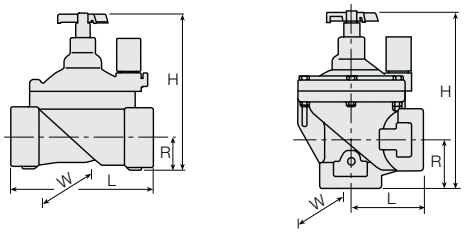
Glass-Filled Nylon to meet rough service conditions obtaining high chemical and cavitation resistance. Full bore seat with unobstructed flow path, free of any in-line ribs, supporting cage, or shafts.

[6.1] Internal Control Circuit Outlet



SI Metric

Dimensions & Weights



Pattern		Globe				Angle	
Size		DN20	DN25	DN40	DN50	DN40	DN50
L	(mm)	110	110	160	170	80	85
H	(mm)	115	115	180	190	190	210
R	(mm)	22	22	35	38	40	60
W	(mm)	78	78	125	125	125	125
Weight*(kg)		0.35	0.33	1.0	1.1	0.95	0.91
CCDV** (lit)		0.015	0.015	0.072	0.072	0.072	0.072

* Without flow control handle
**Control Chamber Displacement Volume (liter)

Technical Specifications

Available Patterns & Sizes:
Globe: DN: 20, 25, 40 & 50
Angle: DN: 40 & 50

Available End Connections:
BSP-T; NPT female threads

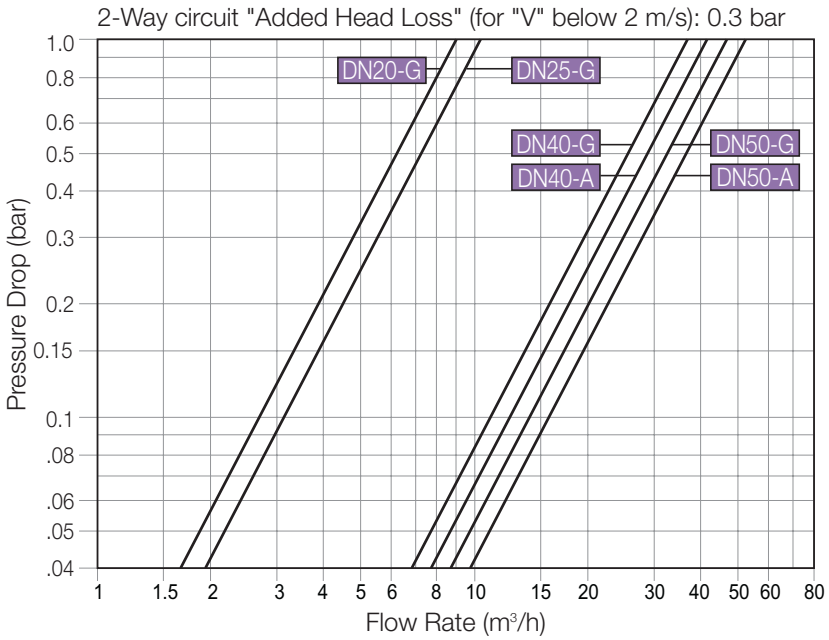
Pressure Rating:10 bar

Operating Pressure Range: 0.7-10 bar

Temperature: Water up to 60°C

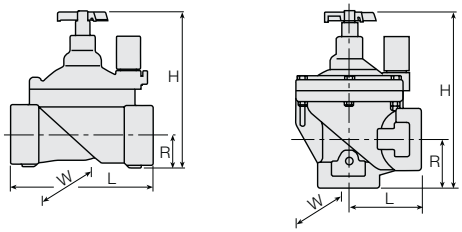
Standard Materials:
- Body & Cover: Nylon Reinforced
- Metal Parts: Stainless Steel
- Diaphragm: Natural Rubber
- Seals: NBR [Buna-N]
- Spring: Stainless Steel
- Cover bolts: Stainless Steel

Flow Chart



US English

Dimensions & Weights



Pattern	Globe				Angle	
Size	1/2"	1"	1 1/2"	2"	1 1/2"	2"
L (inch)	4 5/16	4 5/16	6 5/16	6 11/16	3 3/16	3 3/8
H (inch)	4 1/2	4 1/2	7 1/8	7 1/2	7 1/2	8 1/4
R (inch)	7/8	7/8	1 3/8	1 1/2	1 9/16	2 3/8
W (inch)	3 1/16	3 1/16	4 15/16	4 15/16	4 5/16	4 15/16
Weight* (lb)	0.77	0.73	2.2	2.4	2.1	2.0
CCDV** (gal)	0.004	0.004	0.02	0.02	0.02	0.02

* Without flow control handle
**Control Chamber Displacement Volume (gallons)

Technical Specifications

Available Patterns & Sizes:
Globe: 3/4", 1", 1 1/2", 2"
Angle: 1 1/2", 2"

Available End Connections:
BSP-T; NPT female threads

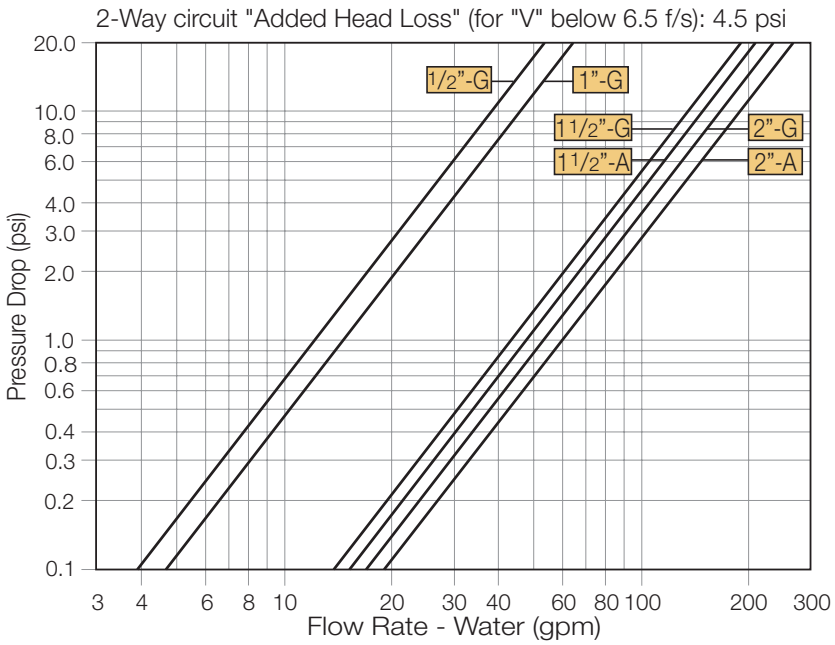
Pressure Rating: 150 psi

Operating Pressure Range: 10-150 psi

Temperature: Water up to 140°F

Standard Materials:
- Body & Cover: Nylon Reinforced
- Metal Parts: Stainless Steel
- Diaphragm: Natural Rubber
- Seals: NBR [Buna-N]
- Spring: Stainless Steel
- Cover bolts: Stainless Steel

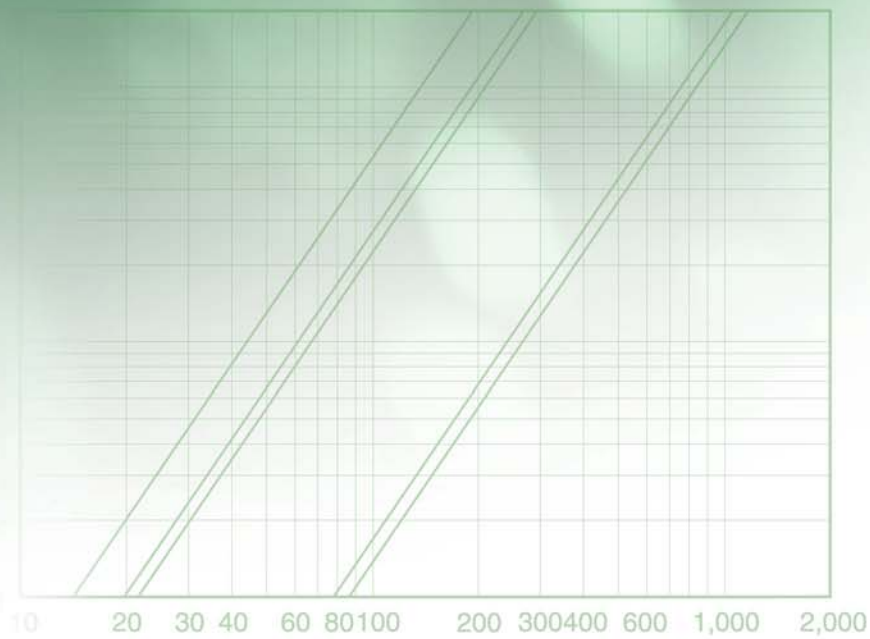
Flow Chart

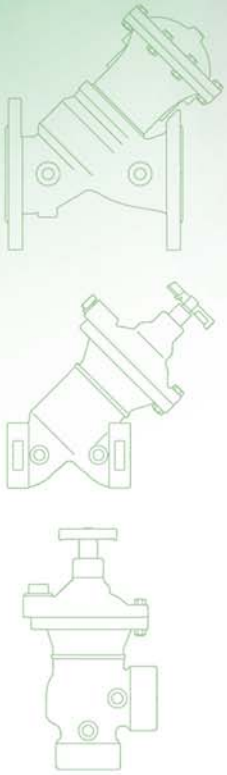


Irrigation for Agriculture

Engineering Data

IR-300 Series





BERMAD

[1] Double Chambered Actuator

- Actuator assembly can be removed as one integral unit
- Simple on-site conversion to single chambered

[2] Cover Assembly

[2.1] Optional cover type is capable of accepting a Flow Stem

[3] Diaphragm Assembly

The flexible nylon reinforced diaphragm is supported over the majority of its surface. Diaphragm load is limited to only the stretching forces applied to the active area.

[4] Inherent Separation Partition

The inherent separation provides complete central guiding for the valve moving assembly. The separation partition separates the lower control chamber from the flow in both the single chambered, and the double chambered configurations.

[5] Springs

Due to its superior hydraulic closing force, the double chambered actuator does not require an auxiliary closing spring, which is required for single chambered configurations.

An auxiliary opening spring can be applied for near zero-pressure applications with external control pressure.

[5.1] Lifting Spring (for zero or near zero pressure applications)

[5.2] Auxiliary Closing Spring (for single chambred valves only)

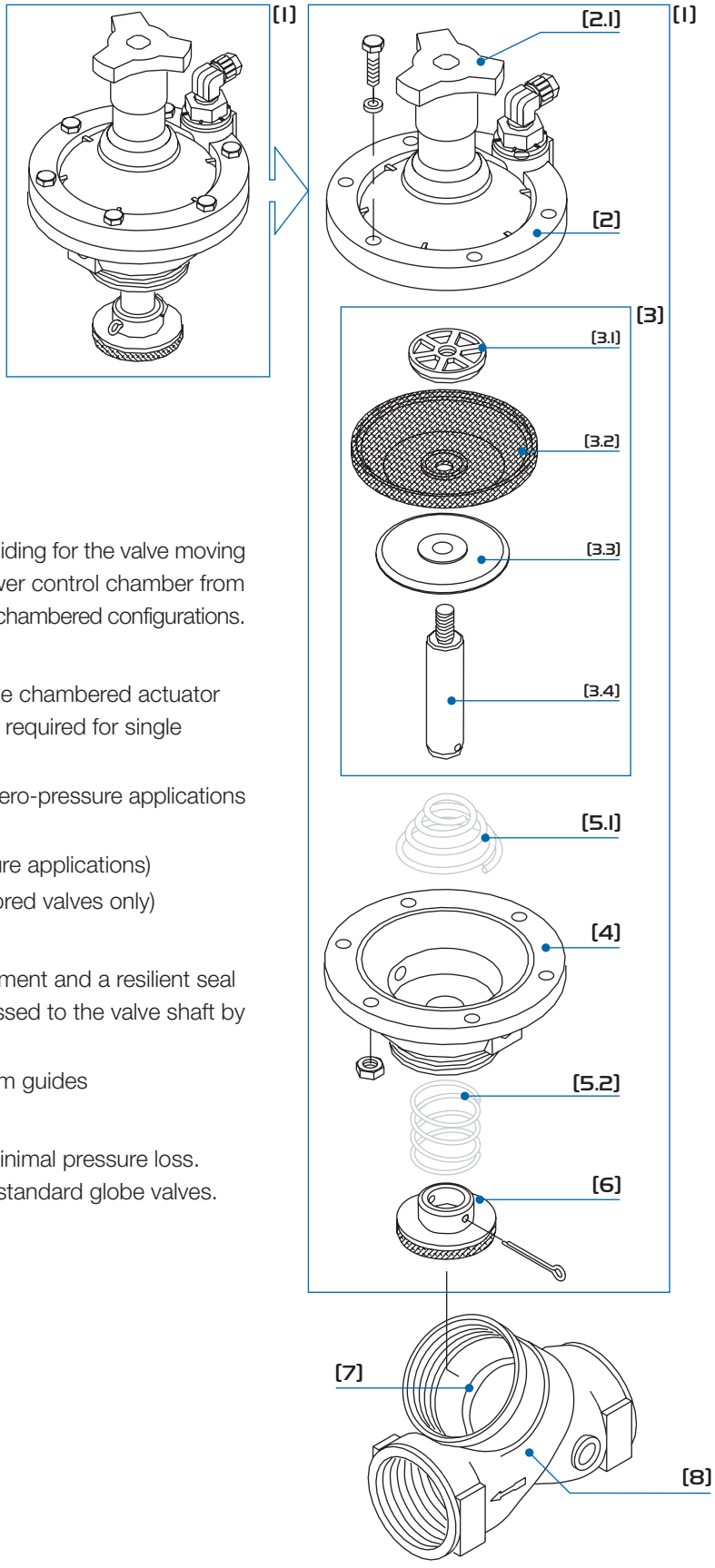
[6] Vulcanized Seal Disk

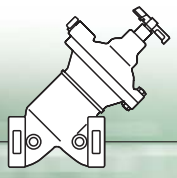
Self-aligning seal disk provides balanced, free movement and a resilient seal for perfect, drip tight sealing. The Seal disk is harnessed to the valve shaft by a stainless steel split pin.

Raised,full bore, clear of obstructions; no ribs or stem guides

[8] Valve Body ("Y" or Angle pattern)

Hydro-dynamically designed for efficient flow with minimal pressure loss. Semi-Straight flow increases capacity by 25% over standard globe valves.



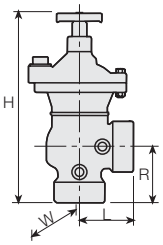


Technical Data

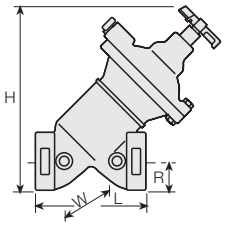
SI Metric

Dimensions & Weights

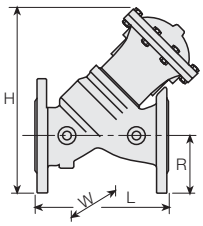
A-Treaded



"Y"-Threaded



"Y"-Flanged



Connections	Threaded				Flanged
Size	40	50	50 Angle	80	80
L (mm)	112	124	71	210	235
H (mm)	175	215	256	275	325
R (mm)	105	125	135	160	200
W (mm)	30	40	75	58	98
Weight (kg)	1.25	2.0	2.25	7.4	14.7
CCDV* (lit)	0.045	0.092	0.092	0.246	0.246

*Control Chamber Displacement Volume

Temperature Range:
Water up to 60°F

Standard Materials:

- Body: DN40 & 50 - Brass
  DN80 - Polyester Coated Cast Iron
- Actuator: Plastic, Brass & Stainless Steel
- Diaphragm: Nylon Fabric Reinforced Natural Rubber
- Seals: NBR [Buna-N] & NR
- Spring: Stainless Steel
- Cover Bolts: Stainless Steel

Technical Specifications

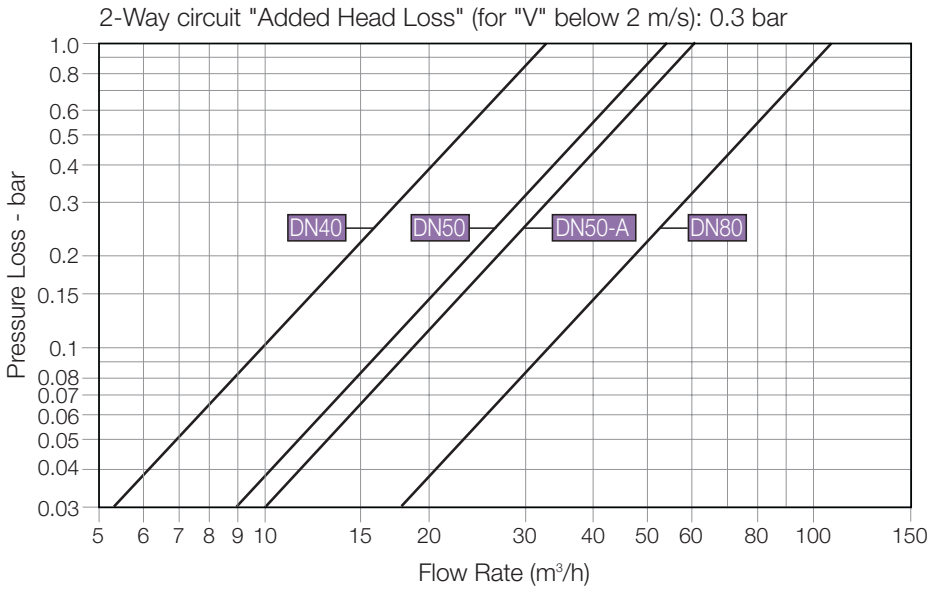
Available Patterns & Sizes:
"Y": DN: 40, 50 & 80
Angle: DN50

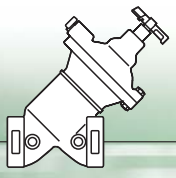
End Connections:
Threaded: DN: 40, 50 & 80
Flanged: DN80

Pressure Rating: 10 bar

Operating Pressure Range: 0.7-10 bar

Flow Chart

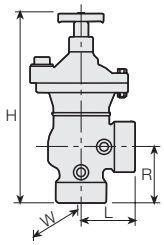




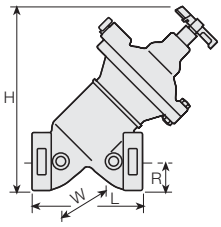
US English

Dimensions & Weights

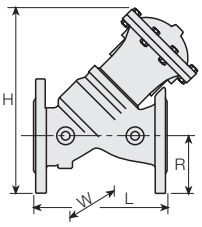
A-Treaded



"Y"-Threaded



"Y"-Flanged



Pattern	Threaded				Flanged
Size	1 1/2"	2"	2" Angle	3"	3"
L (mm)	4 7/16	4 7/8	2 13/16	8 1/4	9 1/4
H (mm)	6 7/8	8 7/16	10 1/16	10 13/16	12 13/16
R (mm)	4 1/8	4 15/16	5 5/16	6 5/16	7 7/8
W (mm)	1 3/16	1 9/16	2 15/16	2 5/16	3 7/8
Weight (lb)	2.75	4.4	5.0	16.3	32.4
CCDV* (gal)	0.012	0.024	0.024	0.065	0.065

*Control Chamber Displacement Volume

Temperature Range:
Water up to 140°F

Standard Materials:
- Body: 1 1/2" & 2" - Brass
  3" - Polyester Coated Cast Iron
- Actuator: Plastic, Brass & Stainless Steel
- Diaphragm: Nylon Fabric Reinforced Natural Rubber
- Seals: NBR [Buna-N] & NR
- Spring: Stainless Steel
- Cover Bolts: Stainless Steel

Technical Specifications

Available Patterns & Sizes:
"Y": 1 1/2", 2" & 3"
Angle: 2"

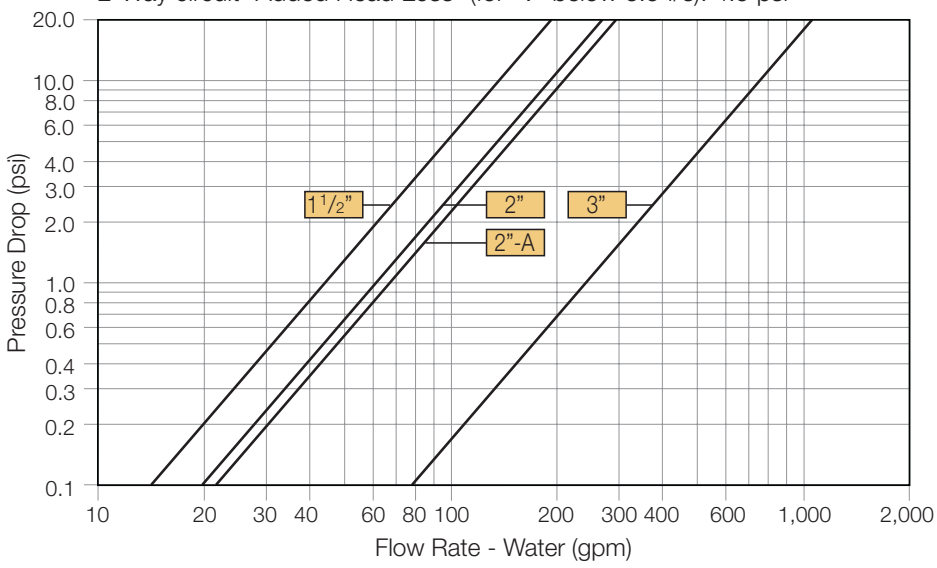
End Connections:
Threaded: 1 1/2", 2" & 3"
Flanged: 3"

Pressure Rating:
145 psi

Operating Pressure Range:
10-145 psi

Flow Chart

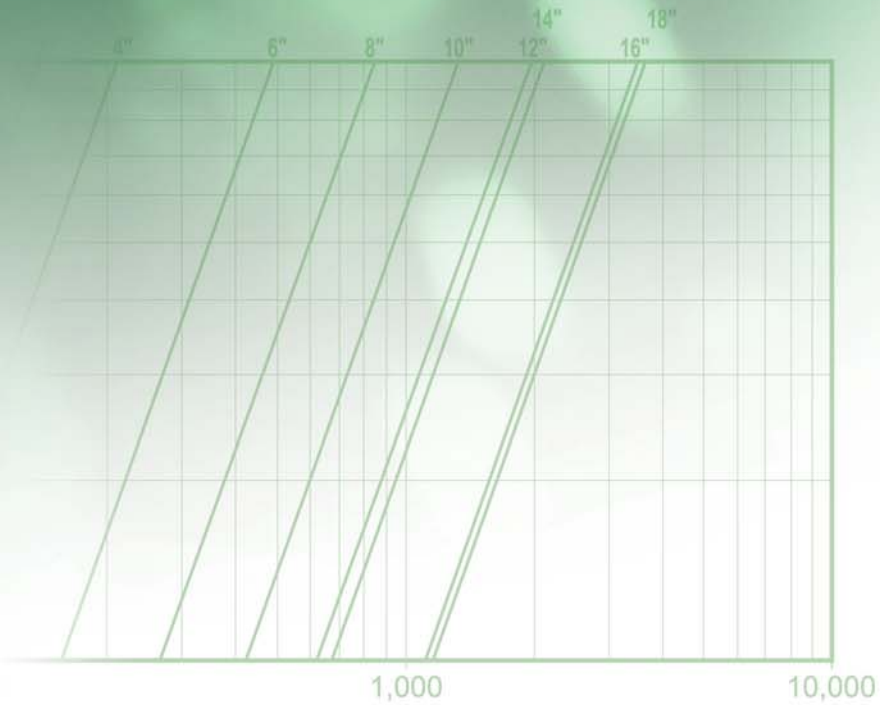
2-Way circuit "Added Head Loss" (for "V" below 6.5 f/s): 4.5 psi

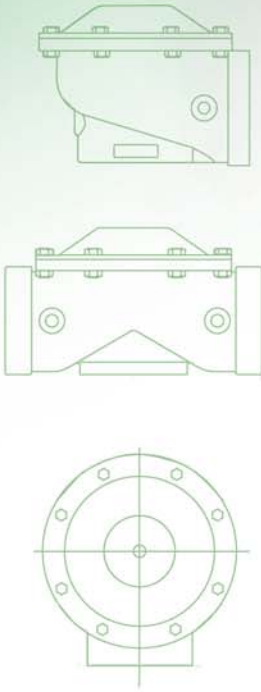


Irrigation for Agriculture

Engineering Data

IR-ROO Series





Product Parts Features

[1] Fastening Bolts

Quick in-line inspection and service

[2] Valve Cover

Locates, centralizes and fastens diaphragm and spring ensuring smooth and accurate performance.

[3] Spring Assembly

Three auxiliary closing springs are available

Standard Spring - To open by Line Pressure of 0.9 bar; 13 psi

Light Spring - To open by 0.2 bar; 3 psi (for 2W & 2W/3W Control Circuits)

Strong Spring - To open by 1.9 bar; 28 psi (for Anti-Drain Applications)

[4] Diaphragm

One piece flexible fiber reinforced diaphragm with a rugged seal disk.

The cone-shaped seal disk penetrates the seat as the valve modulates closed, providing:

- Guidance as conditions get rough
- No chattering and slamming closed
- Accurate and stable low flow regulation

[5] Integrated Fastening Threads

No need for nuts, simplifying valve disassembling and assembling

[6] Valve Body

All patterns consist of hydro-dynamic globe design, which provides high flow capabilities with minimum head loss.

Full bore raised seat with unobstructed flow path, free of any in-line ribs, supporting cage, or shafts.

[6.1] Dual-Actuator-Tee Valve Body: Two valves in one component. Common inlet with two separately controlled outlets. Saves place, cost and maintenance.

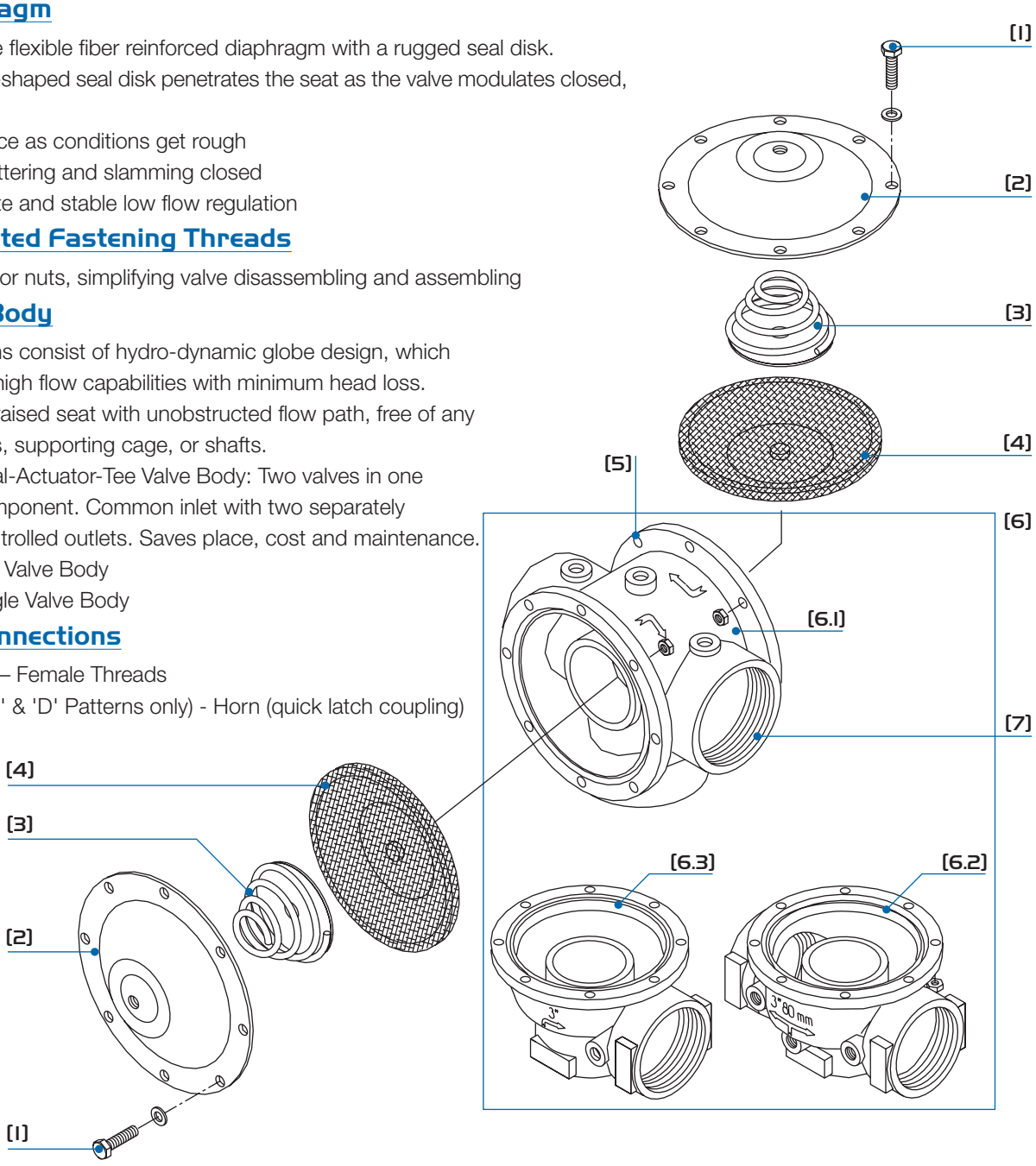
[6.2] Tee Valve Body

[6.3] Angle Valve Body

[7] End Connections

Standard – Female Threads

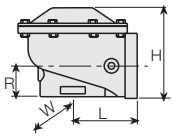
Option ('T' & 'D' Patterns only) - Horn (quick latch coupling)



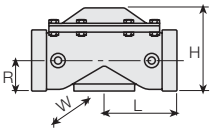
SI Metric

Dimensions & Weights

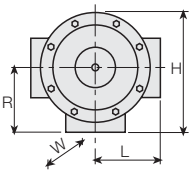
Angle



Tee



Dual Actuator



Pattern	Angle		Tee		Dual
Size	Aluminum	Iron	Aluminum	Iron	Aluminum
L* (mm)	107	107	107	107	111
W (mm)	183	183	183	183	200
H (mm)	148	151	148	151	190
R (mm)	50	53	50	53	100
Weight*(kg)	3.0	6.0	3.2	7.2	5.7

* For models with "quick" couplings, add 35 mm to length and approx. 25% to weight.

Technical Specifications

Available Patterns:
Angle, Tee & Dual Actuator Tee

End Connections:
Female threaded
Option ('T' & 'D' Patterns only): Horn (quick latch coupling with rubber ring joint)

Pressure Rating: 10 bar

Operating Pressure Range:
0.9-10 bar, with standard spring

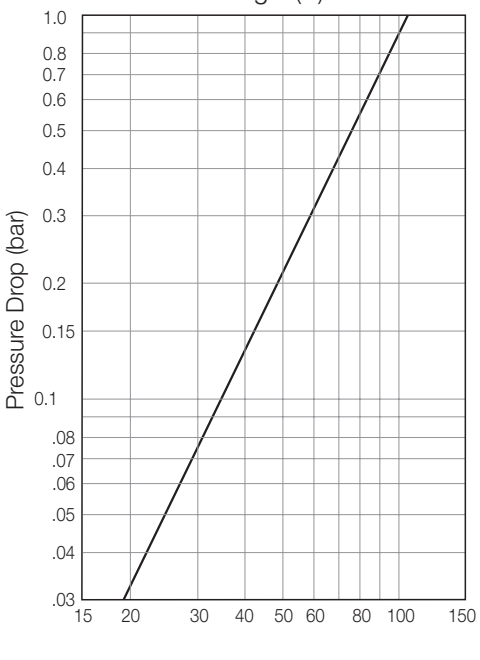
Temperature Range:
Water up to 60°C

Standard Materials:
- Body: Cast iron or Aluminum Alloy super hard Anodized
- Cover: Polyester coated Steel
- Diaphragm: Nylon fabric, reinforced natural Rubber
- Seals: NBR [Buna-N]
- Spring: Stainless Steel 302
- Cover Bolts: Stainless Steel

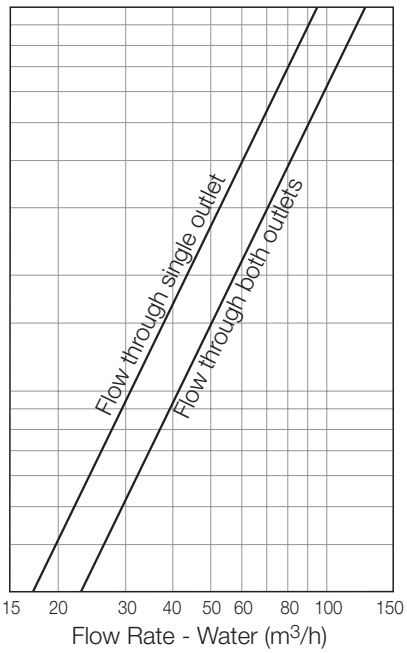
Flow Charts

The Flow Charts are for Valves with Standard Closing Spring.

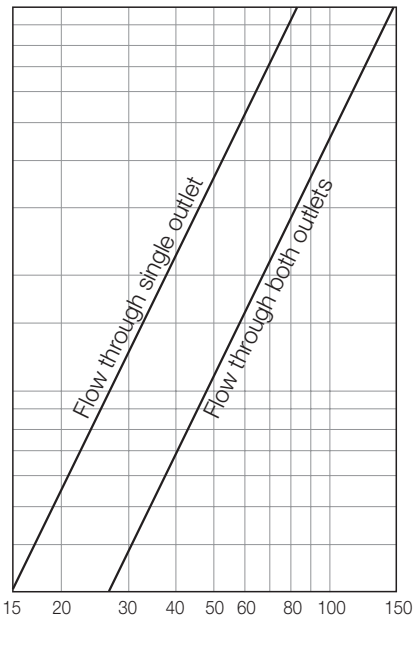
Angle (A)



Tee (T)



Dual Actuator Tee (D)

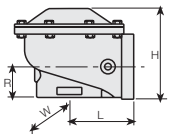


Flow Rate - Water (m^3/h)

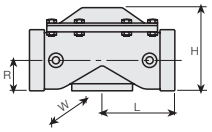
US English

Dimensions & Weights

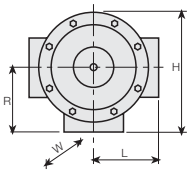
Angle



Tee



Dual Actuator



Pattern	Angle		Tee		Dual
Size	Aluminum	Iron	Aluminum	Iron	Aluminum
L* (inch)	4 7/32	4 7/32	4 7/32	4 7/32	4 3/8
W (inch)	7 13/64	7 13/64	7 13/64	7 13/64	7 7/8
H (inch)	5 13/16	5 15/16	5 13/16	5 15/16	7 1/2
R (inch)	2	2 1/16	2	2 1/16	3 15/16
Weight* (lb)	6.6	13.2	7.1	15.9	12.6

* For models with "quick" couplings, add 1 3/8" to length and approx. 25% to weight.

Technical Specifications

vailable Patterns:
Angle, Tee & Dual Actuator Tee

End Connections:
Female threaded
Option ('T' & 'D' Patterns only): Horn (quick latch coupling with rubber ring joint)

Pressure Rating: 145 psi

Operating Pressure Range:
13-145 psi, with standard spring

Temperature Range:
Water up to 140°F

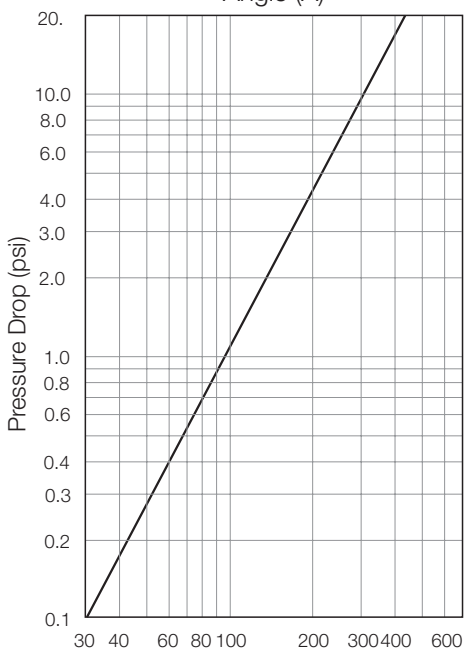
Standard Materials:

- Body: Cast iron or Aluminum Alloy super hard Anodized
- Cover: Polyester coated Steel
- Diaphragm: Nylon fabric, reinforced natural Rubber
- Seals: NBR [Buna-N]
- Spring: Stainless Steel
- Cover Bolts: Stainless Steel

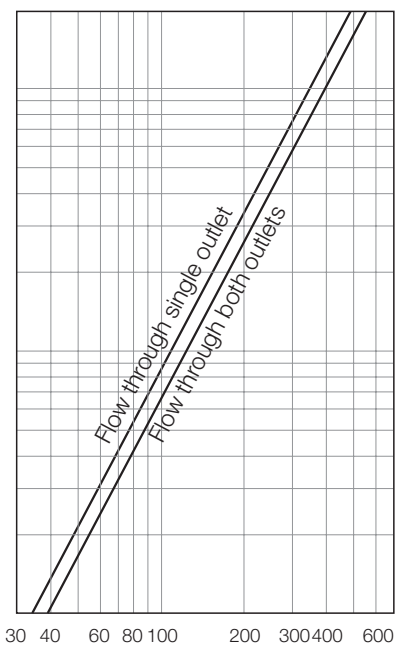
Flow Charts

The Flow Charts are for Valves with Standard Closing Spring.

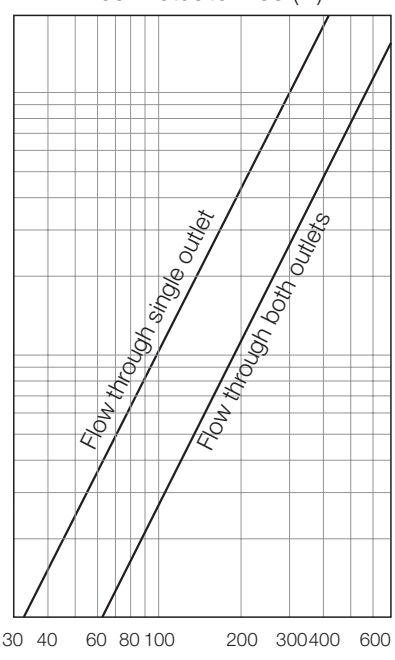
Angle (A)



Tee T



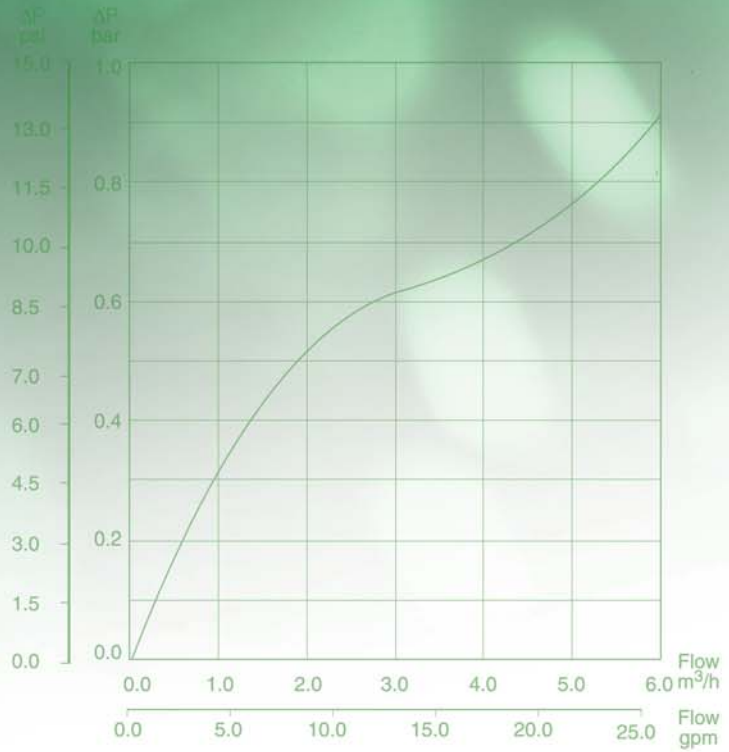
Dual Actuator Tee (D)

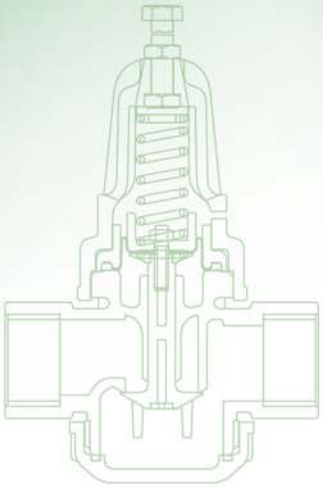


Flow Rate - Water (gpm)

Engineering Data

PRV Series

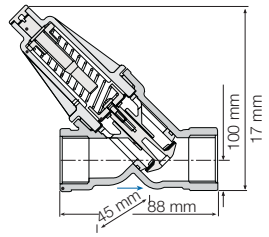




SI Metric

¾"-PRV & ¾"-PRV-05

Dimensions



Weight: 0.13 Kg

Technical Data

Size: ¾"; DN20
End Connections: Threaded
Inlet: Female BSP; NPT
Outlet: Female BSP; NPT or Male BSPT; NPT
Flow Range Model ¾"-PRV: 0.2-5 m3/h
Flow Range Model ¾"-PRV-05: 0.01-3 m3/h
Pressure Ratings: 9 bar
Operating Pressure Range: 0.7-9 bar

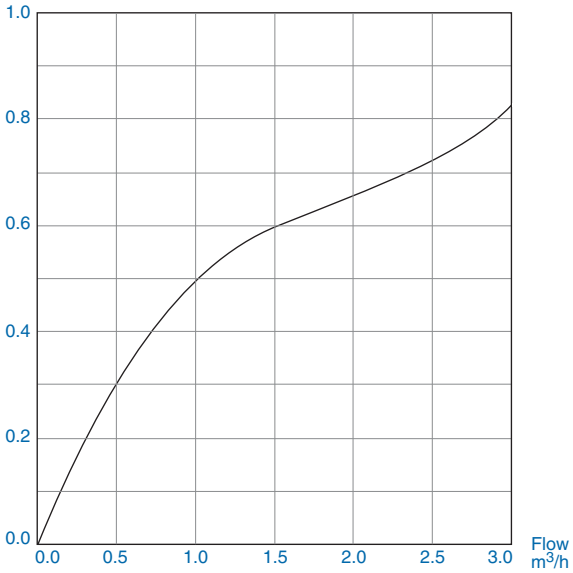
Setting Springs Selection Table

Setting Range bar	Spring Color	Spring Name
0.5-1.2	Yellow	A
0.8-2.5	White	B
2.0-4.0	Red	C
3.5-6.0	Black	D

Flow Chart

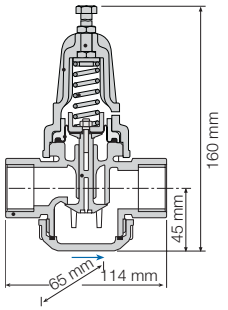
Required supply pressure above setting

ΔP bar To calculate the minimum required supply pressure, add the ΔP in the Flow Chart to PRV desired set point.



1"-PRV & 1"-PRV-05

Dimensions



Weight: 0.36 Kg

Technical Data

Size: 1"; DN25
End Connections: Female Threads BSP; NPT
Flow Range Model 1"-PRV: 0.45-7 m3/h
Flow Range Model 1"-PRV-05: 0.1-7 m3/h
Pressure Ratings: 9 bar
Operating Pressure Range: 0.7-9 bar

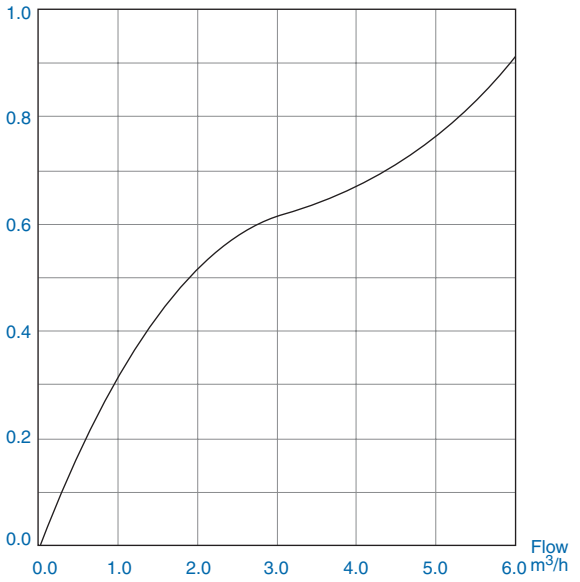
Setting Springs Selection Table

Setting Range bar	Spring Color	Spring Name
0.5-1.2	White	B
1.0-2.0	Red	C
1.5-3.5	Black	D
3.0-5.5	Brown	Q

Flow Chart

Required supply pressure above setting

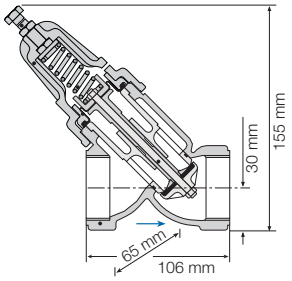
ΔP bar To calculate the minimum required supply pressure, add the ΔP in the Flow Chart to PRV desired set point.



SI Metric

1 ½"-PRV

Dimensions



Weight: 1.07 Kg

Technical Data

Size: 1½"; DN40
End Connections: Female Threads BSP; NPT
Flow Range: 0.45-18 m3/h
Pressure Ratings: 9 bar
Operating Pressure Range: 0.7-9 bar

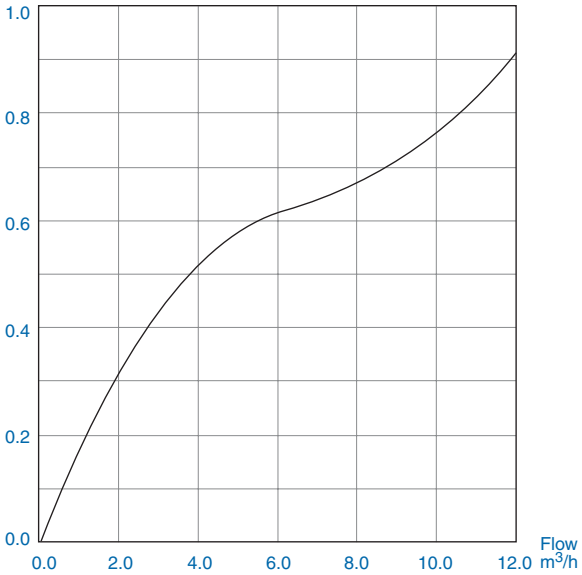
Setting Springs Selection Table

Setting Range bar	Spring Color	Spring Name
0.5-1.2	White	B
1.0-2.0	Red	C
1.5-3.5	Black	D
3.0-5.5	Brown	Q

Flow Chart

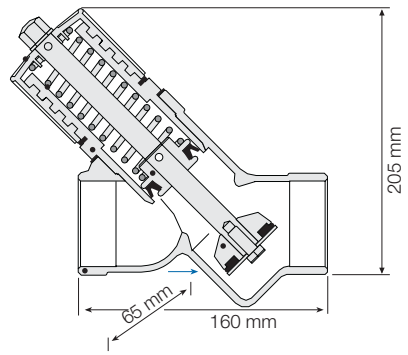
Required supply pressure above setting

ΔP bar To calculate the minimum required supply pressure, add the ΔP in the Flow Chart to PRV desired set point.



2"-PRV

Dimensions



Weight: 2.5 Kg

Technical Data

Size: 2"; DN50
End Connections: Female Threads BSP; NPT
Flow Range: 4-25 m3/h
Pressure Ratings: 8 bar
Operating Pressure Range: 2-8 bar

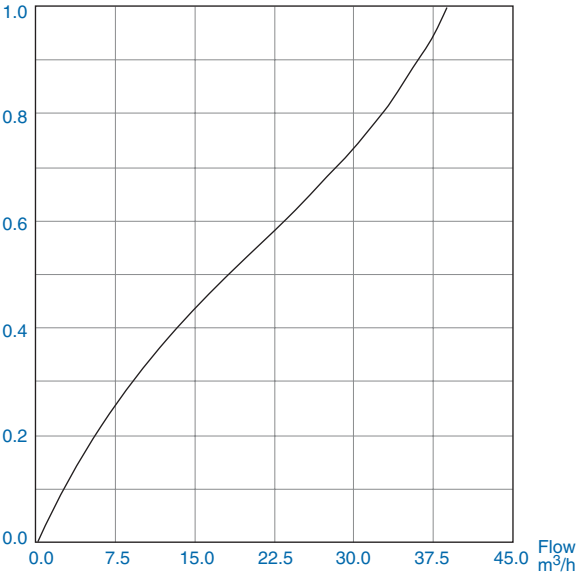
Setting Springs Selection Table

Spring Color	Downstream Pressure bar		
	Nominal	Minimum	Maximum
Red	2.0	2.0	2.6
Yellow	4.0	3.8	4.6
Green	6.0	5.8	6.6

Flow Chart

Required supply pressure above setting

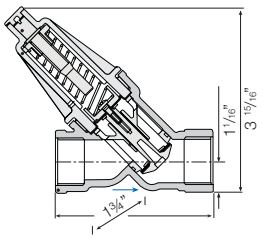
ΔP bar To calculate the minimum required supply pressure, add the ΔP in the Flow Chart to PRV desired set point.



US English

¾"-PRV & ¾"-PRV-05

Dimensions



Weight: 0.29 lbs.

Technical Data

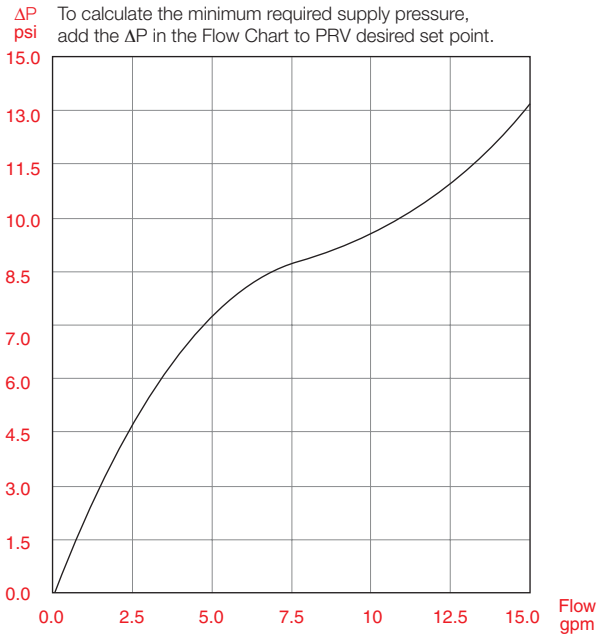
Size: ¾"
End Connections: Threaded
Inlet: Female BSP; NPT
Outlet: Female BSP; NPT or Male BSPT; NPT
Flow Range Model 3/4"-PRV: 0.9-22 gpm
Flow Range Model 3/4"-PRV-05: 0.04-13 gpm
Pressure Ratings: 130 psi
Operating Pressure Range: 10-130 psi

Setting Springs Selection Table

Setting Range psi	Spring Color	Spring Name
7-18	Yellow	A
12-36	White	B
29-58	Red	C
50-87	Black	D

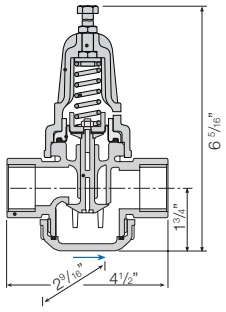
Flow Chart

Required supply pressure above setting



1"-PRV & 1"-PRV-05

Dimensions



Weight: 0.79 lbs.

Technical Data

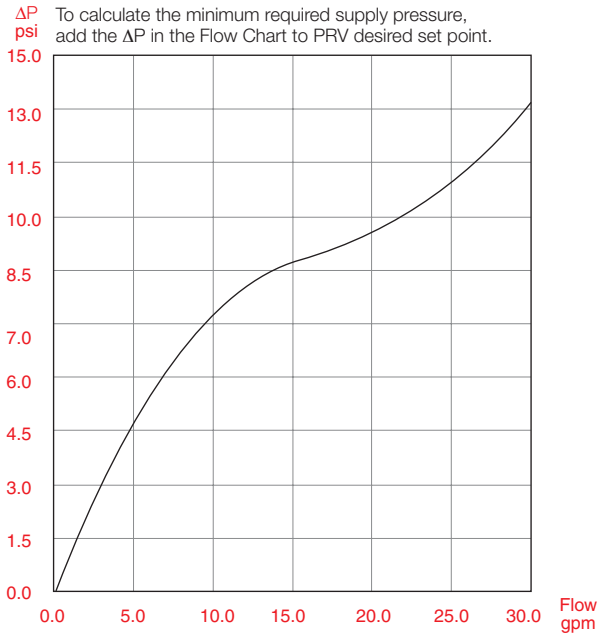
Size: 1"
End Connections: Female Threads BSP; NPT
Flow Range Model 1"-PRV: 2-31 gpm
Flow Range Model 1"-PRV-05: 0.4-31 gpm
Pressure Ratings: 130 psi
Operating Pressure Range: 10-130 psi

Setting Springs Selection Table

Setting Range psi	Spring Color	Spring Name
7-18	White	B
14-29	Red	C
22-51	Black	D
44-80	Brown	Q

Flow Chart

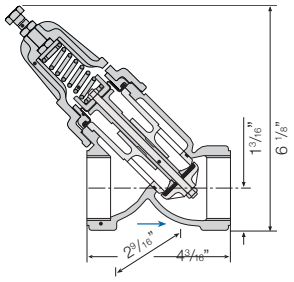
Required supply pressure above setting



US English

1½"-PRV

Dimensions



Weight: 2.36 lbs.

Technical Data

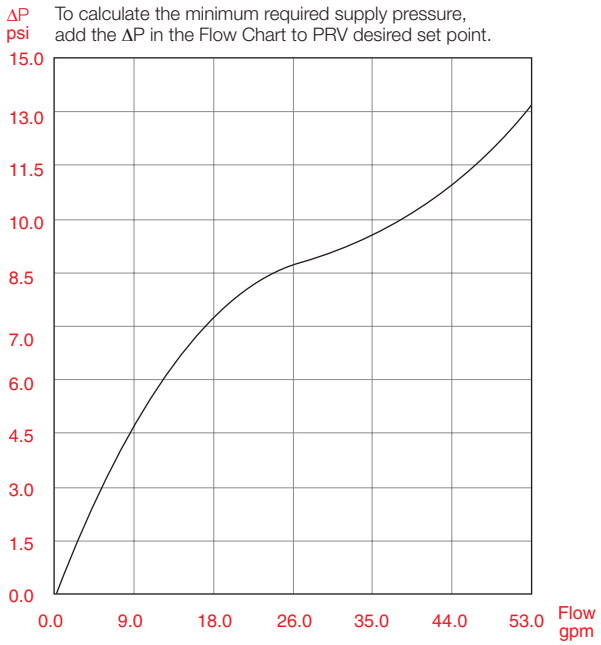
Size: 1½"
End Connections: Female Threads BSP; NPT
Flow Range: 2-80 gpm
Pressure Ratings: 130 psi
Operating Pressure Range: 10-130 psi

Setting Springs Selection Table

Setting Range psi	Spring Color	Spring Name
7-18	White	B
14-29	Red	C
22-51	Black	D
44-80	Brown	Q

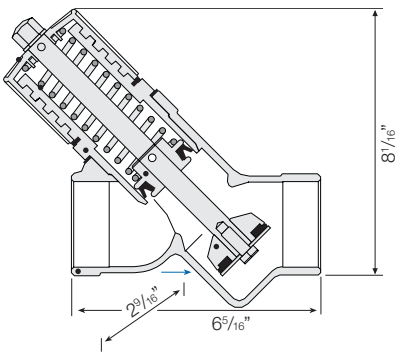
Flow Chart

Required supply pressure above setting



2"-PRV

Dimensions



Weight: 5.5 lbs.

Technical Data

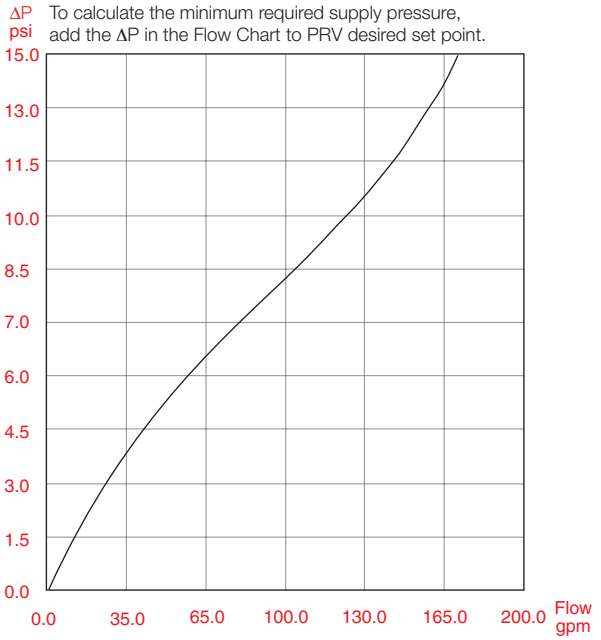
Size: 2"
End Connections: Female Threads BSP; NPT
Flow Range: 18-110 gpm
Pressure Ratings: 115 psi
Operating Pressure Range: 30-115 psi

Setting Springs Selection Table

Spring Color	Downstream Pressure psi		
	Nominal	Minimum	Maximum
Red	29	29	38
Yellow	58	55	67
Green	87	84	96

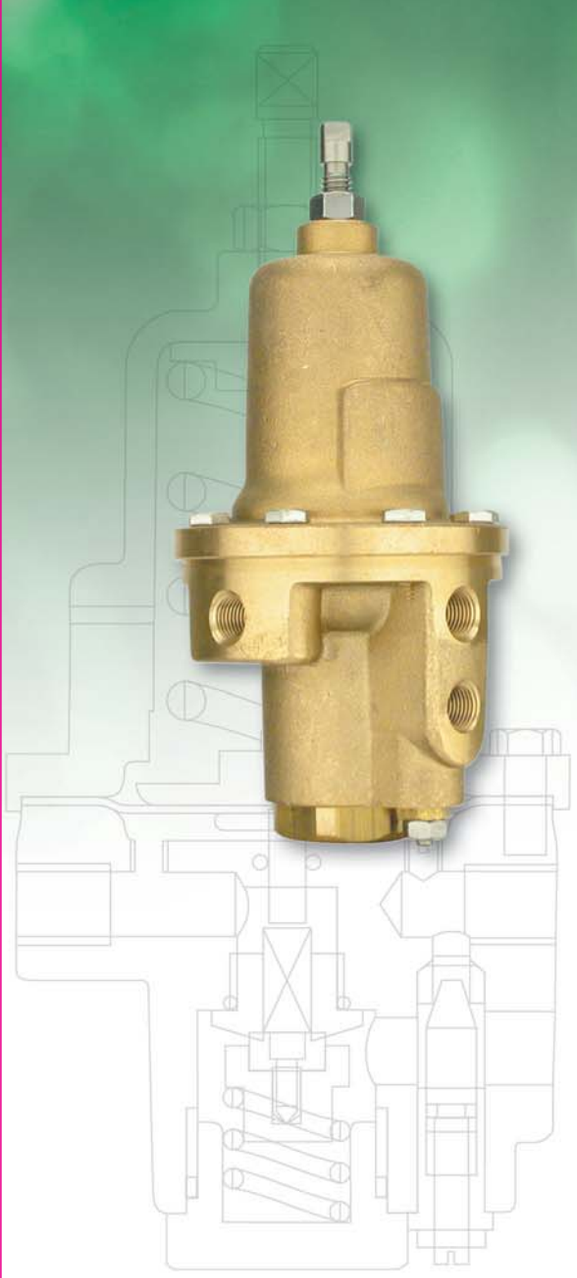
Flow Chart

Required supply pressure above setting



Irrigation for Agriculture

Accessories



BERMAD

Positioning 3-Way Pilot Valve

PC-X-P, Plastic | **PC-X-M, Metal**

This multi-purpose, direct acting 3-way positioning pilot valve is actuated by a pressure responsive diaphragm, which seeks to reach equilibrium between hydraulic and set spring forces. The pilot directs flow and pressure between its ports:

- When sensed pressure is above set point, it connects port 0 to port 3.
- When sensed pressure is equal to set point, it blocks connections between all ports.
- When sensed pressure is below set point, it connects port 3 with port 2.

Relevant pressure is continuously sensed through port 1.

Setting Range Table

Spring	Pressure	
	bar	psi
G-Blue	**1-10**	**15-145**
H-Orange	1-7	15-100
N-Natural	0.8-6.5	11-95
K-Gray	0.5-3	7-40

Connections

0 - Upstream for reducing, Vent for sustaining
3 - Valve control chamber
2 - Vent for reducing, Upstream for sustaining
1 - Pressure Sensing

Pressure Reducing Pilot Valve

PC-20-P, Plastic | **PC-20-M, Metal**

This pilot integrates all principal functions of a 2-way control circuit into a single assembly. It is a direct acting pilot valve, actuated by a pressure responsive diaphragm, which seeks to reach equilibrium between hydraulic and set spring forces. When used in a pressure reducing circuit, the pilot modulates closed as downstream pressure rises above set point. An internal restriction acts as an upstream flow restrictor.

Setting Range Table

Spring	Pressure	
	bar	psi
G-Blue	**1-10**	**15-145**
H-Orange	1-7	15-100
N-Natural	0.8-6.5	11-95
K-Gray	0.5-3	7-40

Connections

1 or **2** - Downstream / Remote sensing
3 - Valve control chamber
4 - Upstream

Pressure Sustaining Pilot Valve

PC-30-P, Plastic | **PC-30-M, Metal**

This is a 2-way direct acting pilot valve, actuated by a pressure responsive diaphragm, which seeks to reach equilibrium between hydraulic and set spring forces. When used in a pressure relief/sustaining circuit, the pilot modulates open as upstream pressure rises above set point.

Setting Range Table

Spring	Pressure	
	bar	psi
G-Blue	**1-12**	**15-175**
H-Orange	1-7	15-100
N-Natural	0.8-6.5	11-95

Connections

0 - Downstream
1 - Sensing/pressure gauge
2 - Sensing/Pressure gauge
3 - Valve control chamber
4 - Upstream (through internal restriction)

Quick Pressure Relief Pilot Valve

PC-3Q-P, Plastic | **PC-3Q-M, Metal**

This pilot integrates all principal functions of a 2-Way control circuit in a single assembly. It is a direct acting pilots valve, actuated by a pressure responsive diaphragm, which seeks to reach equilibrium between hydraulic and set spring forces.The pilot opens at upstream pressure rise above set point. An integral restriction acts as an upstream flow restrictor smoothing valve closing and simplifying the control circuit.

Setting Range Table

Spring	Pressure	
	bar	psi
G-Blue	**1-12**	**15-175**
H-Orange	1-7	15-100

Connections

1 - Upstream
2 - Pluged
3 - Valve control chamber
0 - Downstream

Pressure Reducing Servo Pilot Valve

PC-S-P, Plastic | **PC-S-M, Metal**

This pilot combines all principal functions of a 2-way control circuit with elements of a 3-way control circuit. It is a direct acting pilot valve, actuated by a pressure responsive diaphragm, which seeks to reach equilibrium between hydraulic and set spring forces. A fully balanced trim ensures high accuracy and stability.

Setting Range Table

Spring	Pressure	
	bar	psi
K-Grey	**0.5-3**	**7-40**
J-Green	0.2-1.7	3-25

Connections

0 - Upstream for reducing
1 - Sensing
2 - Downstream for reducing
3 - Valve control chamber

Paddle Flow Rate Servo Pilot

PC-7O-M, Metal | **PC-7O-P, Plastic**

This flow rate pilot combines all principal functions of a 2-way control circuit with elements of a 3-way control circuit. It is a direct acting pilot valve, actuated by a paddle that is positioned within the flow stream. Should demand rise above setting, the dynamic force of the increasing flow moves the paddle, which thereby pushes the pilot trim against the spring force. This causes the main valve to throttle closed, limiting system flow to pilot setting.

Setting Range Table

Spring	Flow Velocity	
	m/s	f/s
E-Purple	1-5	3.3-16.4

Connections

1 - Upstream
2 - Downstream
3 - Valve control chamber

Paddle Length Table

Valve size		Paddle Length (mm)	Paddle Length (inch)	Number Leaves
inch	DN			
1 1/2	40	35	1 3/8	1
2	50	35	1 3/8	1
2 1/2	65	45	1 3/4	2
3R	80R	35	1 3/8	1
3	80	50	2	2

Valve size		Paddle Length (mm)	Paddle Length (inch)	Number Leaves
inch	DN			
4R	100R	50	2	2
4	100	65	2 1/2	3
6	150	80	3 1/8	4
8	200	95	3 3/4	5
10	250	110	4 5/16	6

Pressure Reducing Pilot Valves

BERMAD Pressure Reducing Pilot Valves are direct acting pilot valves, actuated by a pressure responsive diaphragm, which tends to reach equilibrium with the set spring force. They continuously sense downstream or other pressure, which serves as an operating parameter, and throttle closed as sensed pressure rises above set point, controlling the main valve accordingly.

Pressure Reducing Pilot Valve

#2PB

Fully balanced trim ensures high accuracy and stability. When used in a pressure reducing circuit, the pilot throttles closed as downstream pressure rises above set point.

Setting Range Table

Spring	Pressure	
	bar	psi
M	**1-16**	**15-230**
N	0.8-6.5	11-95
J*	0.2-1.7	3-25

* For #2PB-D, differential sensing

Connections

Z - Upstream
A - Valve control chamber
C - Downstream
F/D - External sensing/pressure gauge

Pressure Reducing Pilot Valve
with integral needle valve

#2

This pilot integrates all principal functions of a 2-way control circuit in a single assembly. An integral needle valve acts as an upstream flow restrictor as well as a closing speed control.

Setting Range Table

Spring	Pressure	
	bar	psi
16	**1-16**	**15-230**
10	0.8-10	11-150
16*	2-30	30-430
16*	2-45	30-650

* With high pressure setting kit

Connections

Z - Upstream
A - Valve control chamber
C - Downstream
F/D - External sensing/pressure gauge

High Sensitivity Pressure Reducing Pilot Valve
with integral needle valve

#82

This high sensitivity direct acting pilot specially suits very low set pressures or level control applications. It integrates all principal functions of a 2-way control circuit in a single assembly. An integral needle valve acts as an upstream flow restrictor as well as a closing speed control.

Setting Range Table

Code	Pilot	
	Meter	Feet
M6	**2-14**	**7-46**
M5	5-22	17-72
M4	15-35	49-115
M8	25-70	82-230

Connections

Z - Upstream
A - Valve control chamber
C - Downstream
Sensing -
For altitude control – still point at reservoir bottom
For pressure reducing – to valve downstream

Pressure Sustaining Pilot Valves

BERMAD Pressure Sustaining Pilot Valves are direct acting pilot valves, actuated by a pressure responsive diaphragm, which tends to reach equilibrium with the set spring force. They continuously sense upstream or other pressure, which serves as an operating parameter, and modulate open as sensed pressure rises above set point, controlling the main valve accordingly.

Pressure Sustaining Pilot Valve

#3PB

When used in a pressure sustaining circuit, the pilot modulates open as upstream pressure rises above set point.

Setting Range Table

Spring	Pressure	
	bar	psi
M	**1-16**	**15-230**
N	0.8-6.5	11-95
J*	0.2-1.7	3-25

* For #3PB-D, differential sensing

Connections

1 - Remote sensing or pressure gauge
2 - Valve control chamber
3 - Remote sensing or pressure gauge
4 - Downstream
Note: Upstream pressure is connected to valve control chamber via a restriction.

Pressure Sustaining Pilot Valve
with integral needle valve

#3

This pilot integrates all principal functions of a 2-way control circuit in a single assembly. An integral needle valve acts as an upstream flow restrictor as well as a closing speed control.

Setting Range Table

Spring	Pressure	
	bar	psi
16	**1-16**	**15-230**
10	0.8-10	11-150
16*	2-30	30-430
16*	2-45	30-650

* With high pressure setting kit

Connections

Z - Upstream
A - Valve control chamber
C - Downstream
F/D - External sensing/pressure gauge

High Sensitivity Pressure Sustaining Pilot Valve
with integral needle valve

#83

This high sensitivity direct acting pilot specially suits very low set pressures or level sustaining applications. It integrates all principal functions of a 2-way control circuit in a single assembly. An integral needle valve acts as an upstream flow restrictor as well as a closing speed control.

Setting Range Table

Code	Pilot	
	Meter	Feet
M6	**2-14**	**7-46**
M5	5-22	17-72
M4	15-35	49-115
M8	25-70	82-230

Connections

Z - Upstream
A - Valve control chamber
C - Downstream
Sensing -
For level sustaining - still point at reservoir bottom
For pressure sustaining - valve upstream

Positioning Pilot Valves

BERMAD multi-purpose, direct acting, 3-way positioning pilot valves are actuated by a pressure responsive diaphragm, which tends to reach equilibrium with the set spring force.
The pilot directs flow and pressure between its ports:

- When sensed pressure is above set point, it connects port C to port 0.
- When sensed pressure is equal to set point, it blocks connections between all ports.
- When sensed pressure is below set point, it connects port C with ports A and Z.

An integral needle valve restricts flow through port Z.

Positioning Pilot Valve

#X

Suitable for Pressure Reducing Valves, Pressure Sustaining Valves, and Pressure Reducing & Sustaining Valves, the Positioning Pilot provides accurate and stable regulation, fully opening or closing the valve upon sensed pressure discrepancy from setting.
The pilot can also serve as an Adjustable Hydraulic Relay (N.O. or N.C.) or Automatic Regulation Override (feature 09).

Setting Range Table

Spring	Pressure	
	bar	psi
16	**1-16**	**15-230**
10	0.8-10	11-150

Connections

0 - Upstream for reducing, vent for sustaining
C - Valve control chamber
A/Z - Vent for reducing, upstream for sustaining
F/D - Sensing/pressure gauge

Altitude Pilots and Level control Float Valves

Altitude pilots and Level control float Valves enable external installation of the main valve, eliminating installation and maintenance problems associated with mechanical float valves installed in the reservoir. A wide selection of altitude and float pilots makes BERMAD Float Control Valves the right solution wherever level control is required.

Altitude (High Sensitivity) Positioning Pilot Valve

#8

This Altitude (High Sensitivity) Positioning Pilot senses reservoir level and controls the valve to shut at the preset reservoir high level, and to fully open in response to an approximately one-meter (three-foot) level drop. The pilot is also suitable for Pressure Reducing Valves with very low setting requirements.

Setting Range Table

Code	Pilot	
	Meter	Feet
M6	**2-14**	**7-46**
M5	5-22	17-72
M4	15-35	49-115
M8	25-70	82-230

Connections

0 - Upstream
C - Valve control chamber
A - Vent (Z plugged)
Z - Vent through needle valve (A plugged)
Sensing - Still point at reservoir bottom

4-Way Bi-Level Vertical Float

Float #66

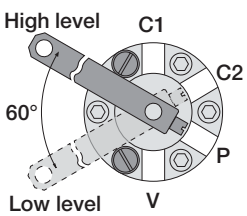
This 4-Way, adjustable, last position Bi-Level Vertical Float, is actuated by the float's sliding along the rod assembly either pulling it down or pushing it up, switching the float pilot position. When the float is between the adjustable high and low level stoppers, the main valve remains in its last position. The float pilot directs flow and pressure between its ports:

- When the float pushes the upper stopper up, it connects port P to C1 and port C2 to V.
- When the float pulls the lower stopper down, it connects port P to C2 and port C1 to V.

The extendable rod is to be balanced by counterweights installed on the lever system according to rod length and system pressure.

Notes:

- Minimum level differential: 15 cm (6")
- Maximum level differential: 54 cm (21")
- Each extension rod adds 56 cm (22"), one extension rod supplied
- Extra counterweight required if second extension rod used
- Float hydraulic connections: 3 tubes size 3/8"



Connections

Port	Reservoir inlet	Reservoir outlet
C1	Upper control chamber	Lower control chamber
C2*	Lower control chamber (or plugged)	Upper control chamber
P	Upstream pressure	Upstream pressure
V	Vent	Vent

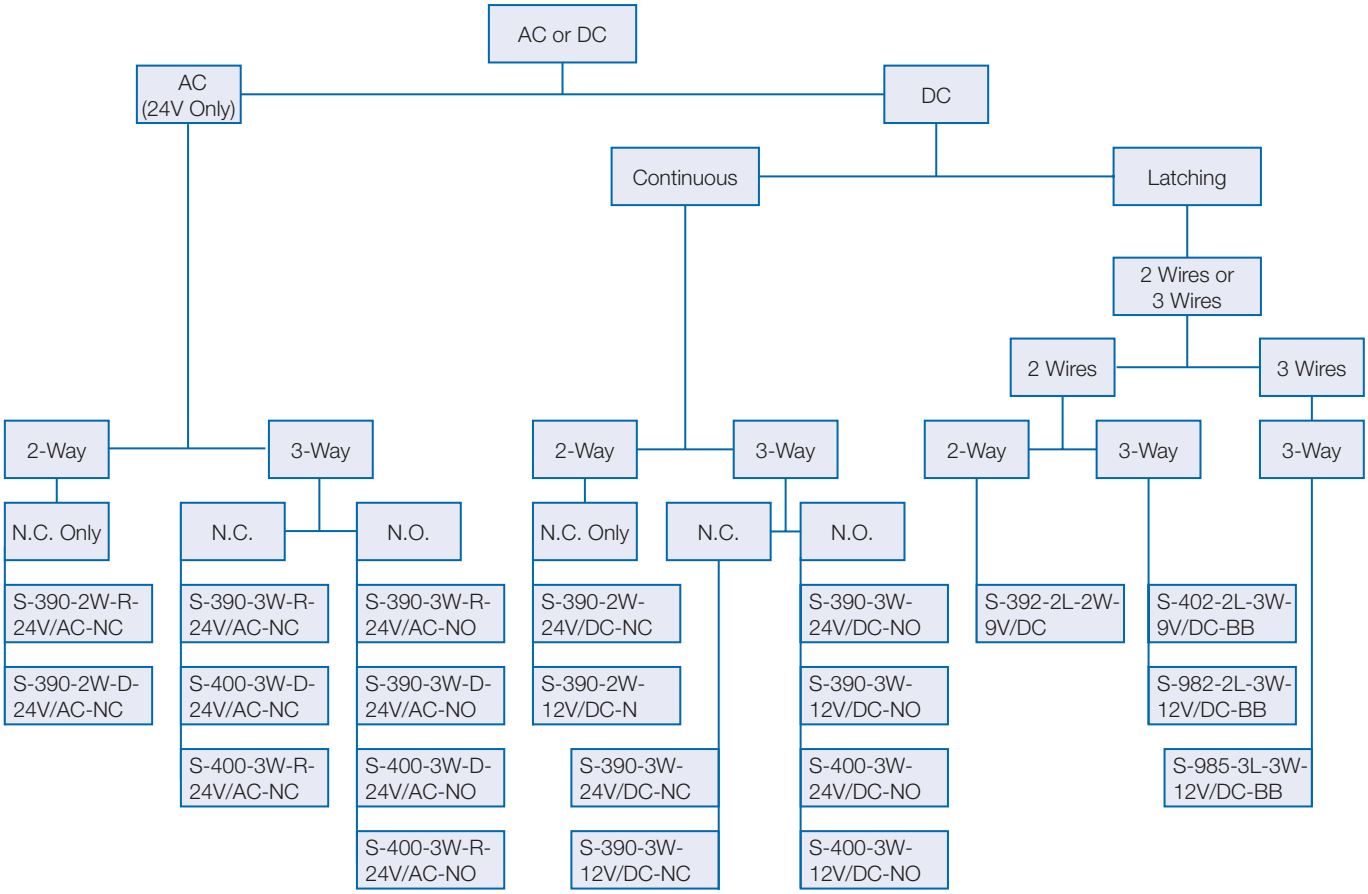
* For double chambered valve only, plugged in single chamber applications

Solenoid Selection Guide

The automation design is an integral part of the irrigation project design file. In order to help in the selection process of the most suitable solenoids for a given project, several questions need to be answered. Following the chart below, will guide you to the desired solenoid model. Please check selected solenoid specifications in the following pages, to confirm its suitability to the project conditions.

Please refer to the following questions for best navigation:

- **Operating Current:** Alternating Current (AC) or Direct Current (DC)
- **Solenoid Logic:** 2-Way or 3-Way
- **Actuator Type:** Continuous Current or Latching
- **Solenoid Normal Position:** Normally Open or Normally Closed
- **Controller Requirements:** Two Wires or Three Wires



Notes:

- To get a 3-way controlled N.C. main valve, use a N.O. 3-way solenoid and vice versa.
- S-400 models include bigger orifice diameter than S-390, which means quicker action.
- The S-982 and S-985 actuators are isolated from the water.
- Actuators with the suffix 'R' are suitable to areas with high lightning's probability
- Calculate wires cross section in accordance to:
  - System pressure conditions
  - Solenoids consumption, quantity & distance

Solenoids

BERMAD Continuous Current Solenoids are specially designed for reliable long life service in irrigation systems. They excel in their low power consumption and low sensitivity to dirt and voltage variations and are compliant with all Continuous Current Controllers on the market.

2-Way Solenoid Actuator

S-390-2W

The BERMAD S-390-2W is a compact 2-Way, Normally Closed, Solenoid Actuator. It is applicable directly to the valve cover or with a 2-way base that enables combining the S-390-2W in a variety of 2-way control circuits.

Electrical Data

Actuator Type	Cable Color	Power (Watt)	Current (Amp)		Coil Resistance ohm@20°C; 68°F
			Inrush	Hold	
S390-2W-24VAC-R	Red/Red	1.7	0.25	0.125	37.5
S390-2W-24VAC-D	Red/Orange	2.2	0.13	0.13	*
S390-2W-24VDC	Black/Black	3.6	0.18	0.18	156
S390-2W-12VDC	Blue/Blue	4.0	0.33	0.33	36

* Coil resistance in this coil can not be measured

3-Way Solenoid

S-390-3W

The BERMAD S-390-3W is a compact 3-Way Solenoid. It can control valves independently or in combination with other control circuit accessories. The hydraulic base features a manual override and consists of a bracket for attaching to the valve or to a solenoid manifold.

Electrical Data

Actuator Type	Cable Color	Power (Watt)	Current (Amp)		Coil Resistance ohm@20°C; 68°F
			Inrush	Hold	
S-390-3W-24VAC-D NO	Red/Orange	2.2	0.13	0.13	37.5
S-390-3W-24VAC-D NC	Orange/Blue	3.5	0.20	0.20	*
S-390-3W-24VAC-R NO	Red/Red	2.9	0.46	0.24	21
S-390-3W-24VDC NO & NC	Black/Black	4.2	0.17	0.17	135
S-390-3W-12VDC NO & NC	Blue/Blue	4.0	0.33	0.33	36

* Coil resistance in this coil can not be measured

Connections:
N.O.: Actuactor Port - Pressure
1- Vent
2- Valve Control Chamber
N.C.: Actuactor Port - Vent
1- Pressure
2- Valve Control Chamber

3-Way Solenoid with Hydraulic Base

S-400-3W

The BERMAD S-400-D-3W-BB is a compact 3-Way Solenoid Pilot Valve that can control valves independently or in combination with other control circuit accessories. The hydraulic base features a manual override and consists of a bracket for attaching to the valve or to a solenoid manifold.

Electrical Data

Actuator Type	Cable Color	Power (Watt)	Current (Amp)		Coil Resistance ohm@20°C; 68°F
			Inrush	Hold	
S400-24VAC-D-NO	Red/Blue	3.5	0.20	0.20	*
S400-24VAC-D-NC	Red/Blue	3.5	0.20	0.20	*
S400-24VDC-NO	Black/Black	4.2	0.17	0.17	135
S400-12VDC-NO	Blue/Blue	4.0	0.33	0.33	36

* Coil resistance in this coil can not be measured

Connections:
N.O.: 1- Vent
2- Valve Control Chamber
3- Pressure
N.C.: 1- Pressure
2- Valve Control Chamber
3- Vent

3-Way Solenoid Valve, Direct Acting
with Isolating Membrane

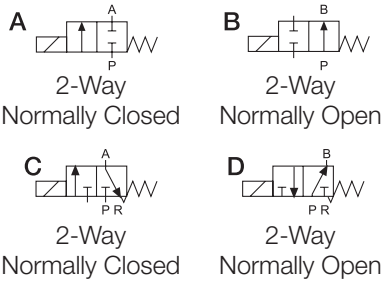
Burkert 330

This direct acting 3-Way Solenoid Valve is actuated by a pivoted armature. Its design includes a membrane that hermetically isolates the solenoid actuator from the fluid, making it less sensitive to abrasive or contaminated fluid than a plunger actuated solenoid. This solenoid valve provides best performance with maximum reliability and a long service life, even in seawater applications. The epoxy encapsulation efficiently dissipates heat, to suit continuous duty applications.
The Burkert Model 330 can also be used as a 2-Way Solenoid.

Electrical data:

Power consumption:
(ac): 30 VA, inrush; 15 VA (8W), holding
(dc): 8W

Circuit functions



3-Way Solenoid Valve, Direct Acting – Plunger Actuated

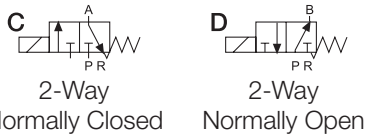
Burkert 6014

This direct acting, compact 3-Way Solenoid Valve is plunger actuated. It does not require a minimum operating pressure and is not affected by the mounting position. Its structure ensures long life and durability. The epoxy encapsulation efficiently dissipates heat, to suit continuous duty applications. The Burkert Model 6014 can also be used as a 2-Way Solenoid.

Electrical data:

Power consumption:
(ac): 24 VA, inrush; 17 VA (8W), holding
(dc): 8W

Circuit functions



2-Way Solenoid Valve, Servo-Assisted Diaphragm Actuated

Burkert 281

This is a diaphragm actuated, servo-assisted, pilot operated 2-Way Solenoid Valve.
It is available in two versions:

- Normally Closed (Model: 5281A)
- Normally Open (Model: 0281B)

Electrical data:

Power consumption:
(ac): 21 VA, inrush; 12 VA (8W), holding
(dc): 8W

Circuit functions

Latching Solenoids

BERMAD Latching Solenoids are specially designed for reliable long life service in irrigation systems controlled by Battery Operated Controllers. The Latching Solenoids consume power only when switching positions, using a very short electric impulse. This prolongs life of batteries and enables solar recharging.

Magnetic Latch Solenoid Actuator, 2-Way, 9VDC Latch, 2- Leads

S-392-2W

The BERMAD Model S-392-2W is a compact 2-Way Latching Solenoid Actuator. It is applicable directly to the valve cover or with a 2-way base that enables combining it in variety of 2-way control circuits.

Electrical Data:

Voltage Range: 6-20 VDC
Coil Resistance: 6Ω
Coil Inductance: 90 mH
Pulse Width: 20-100 mSec.
Required Capacitor: 4700µF
Operation Modes (electrical connections):
+Red & -Black: Latch Position
+Black & -Red: Released Position

Magnetic Latch Solenoid
with Hydraulic Base
3-Way, 9VDC Latch, 2- Leads

S-402-3W

The BERMAD Model S-402-3W can control valves independently or in combination with other control circuit accessories. The hydraulic base features a manual override and consists of a bracket for attaching to the valve or to a solenoid manifold.

Electrical Data:

Voltage Range: 9-40 VDC
Coil Resistance: 6Ω
Coil Inductance: 90 mH
Pulse Width: 20-100 mSec
Required Capacitor: 4700µF
Operation Modes (electrical connentions):
+Red & -Black: Solenoid vents
+Black & - Red: Solenoid pressurizes

Connections:

1- Vent
2- Valve Control Chamber
3- Pressure

Pressure & Flow Data:

Operating Pressure Range: 0-10 bar
Base Orifice Diameter: 2.2 mm
Base Flow Factor: Kv = 0.12 m3/h @ 1 bar ΔP; Cv= 0.14 GPM @1 psi ΔP

Dry Magnetic Latch Solenoid with Isolating Membrane & Hydraulic Base 3-Way, 12VDC Latch, 2- Leads

S-982-3W

The BERMAD Model S-982-3W actuator is neutralized from water damage by a membrane, which hermetically isolates it from the water. It can control valves independently or in combination with other control circuit accessories. The hydraulic base features a manual override and consists of a bracket for attaching to the valve or to a solenoid manifold.

Electrical Data:

Voltage Range: 12-50 VDC
Coil Resistance: 4.2Ω
Pulse Width: 20-100 mSec.
Required Capacitor: 4700µF
Operation Modes (electrical connections):
+ Red & - Black: Solenoid vents
+ Black & - Red: Solenoid pressurizes

Pressure & Flow Data:

Operating Pressure Range: 0-10 bar
Base Orifice Diameter: 2.2 mm
Base Flow Factor:
Pressure port Kv = 0.12 m^3/h @ 1 bar ΔP
Cv = 0.14 GPM @1 psi ΔP
Exhaust port Kv = 0.14 m^3/h @ 1 bar ΔP
Cv = 0.16 GPM @1 psi ΔP

Connections:
1- Vent **2-** Valve Control Chamber **3-** Pressure

Dry Magnetic Latch Solenoid with Isolating Membrane & Hydraulic Base 3-Way, 12VDC Latch, 3- Leads

S-985-3W

The BERMAD Model S-985-3W actuator is neutralized from water damage by a membrane, which hermetically isolates it from the water. It can control valves independently or in combination with other control circuit accessories. The hydraulic base features a manual override and consists of a bracket for attaching to the valve or to a solenoid manifold.

Electrical Data:

Voltage Range: 12-50 VDC
Coil Resistance: 2 Coils - 4.2Ω On; 7.5Ω Off
Pulse Width: 20-100 mSec.
Required Capacitor: 4700µF
Operation Modes (electrical connections):
+ White: Fixed Common
- Red: Solenoid vents
- Black: Solenoid pressurizes

Pressure & Flow Data:

Operating Pressure Range: 0-10 bar
Base Orifice Diameter: 2.2 mm
Base Flow Factor:
Pressure port Kv = 0.12 m^3/h @ 1 bar ΔP
Cv = 0.14 GPM @1 psi ΔP
Exhaust port Kv = 0.14 m^3/h @ 1 bar ΔP
Cv = 0.16 GPM @1 psi ΔP

Connections:
1- Vent **2-** Valve Control Chamber **3-** Pressure

Solenoid Valve for Remote Terminal Unit (RTU)

BERMAD's Solenoid Valve for Remote Terminal Unit (RTU) is a solenoid pilot valve controller used in remote control irrigation via radio or cable. It is a battery operated, self-contained unit, suitable for use in irrigation applications with a master radio control system.

Note: RTU units can be purchased only through Motorola® irrigation control department.
For further details please contact: IRRInet.marketing@motorola.com

Hydraulic Relay Valve (HRV)

50-P, Plastic | **50-M, Metal**

This 2-way, single chamber, Hydraulic Relay Valve is a hydraulically operated, diaphragm actuated control valve that shuts off in response to pressure applied to its control chamber, or opens fully upon venting of that pressure.

Technical Data

Pressure rating: Metal - 25bar; 350 psi
Plastic -10 bar; 145 psi

Flow factor: Metal - Kv=1.3; Cv=1.5

Connections

Metal - 2- Inlet; 1- Outlet
Plastic - 1- Inlet; 2- Outlet

Shuttle Valve

50-X-P, Plastic | **50-X-M, Metal**

These pressure selector Shuttle Valves have been designed to automatically direct the higher of two pressure sources into a control or sensing chamber. Each source is connected to its own port. The higher pressure creates a superior force that moves the inner plug to seal the counter port, allowing water from the higher pressure source to flow through the common port.

Technical Data

Pressure rating: Metal - 25bar; 350 psi
Plastic -10 bar; 145 psi

3-Way Hydraulic Relay Valve (3W-HRV)

54-PZ, Galit | **54-M - Metal**

The 3-Way, single chamber, Hydraulic Relay is a hydraulically operated, diaphragm actuated pilot valve that in response to pressure applied to its control chamber, directs flow and pressure between its ports. It can be used either to relay and accelerate a signal (N.O.), or to reverse and accelerate a signal (N.C.). The Model 54-PZ, Galit also features Manual Override.

Connections

Port	54-M, N.O.*	54-M, N.C.**
1	Upstream pressure	Vent
2	Control chamber	Control chamber
0	Vent	Upstream pressure
U	Command	Command

* With top spring - special order.
** With bottom spring - standard.

Technical Data

Pressure rating: 25 bar; 350 psi
Min. operating pressure: 0.8 bar; 12 psi
Flow factor:
Closing: 0 to 2 & 1 to 2: Kv=1.2; Cv=1.4
Opening: 2 to 1 & 2 to 0: Kv=1.0; Cv=1.2

Connections

Port	54-PZ, N.C.	54-PZ, N.C
1	Command	Command
2	Vent	Upstream pressure
3	Upstream pressure	Vent
4	Control chamber	Control chamber

Technical Data

Pressure rating: 10 bar; 145 psi
Minimum operating pressure: 0.5 bar; 7 psi
Orifice: 5.8 mm; 1/4"
Ports: 1/8" BSP Female Thread

Anti-Topographic Springs

Spring Color	54-PZ, N.C.	54-PZ, N.C.
Yellow	5-10 m	5-10 m
Green	10-14 m	10-15 m
White	14-17 m	5-20 m
Red	17-22 m	20-25 m

Data refers to elevation differential along the control tube

AMV Shut-Off Pilot

3W-SOP

This 3-Way Shut-Off Pilot Valve is a spring-return, flap actuated pilot valve that in response to pushing a spool against a spring, directs pressure and flow between its ports:

- In Set Position the 3W-SOP spool is pushed closed, thereby hydraulically connecting ports C and V.
- In Normal Position the 3W SOP spool is returned by the spring action, hydraulically connecting ports P and C.

By manually turning the AMV setting knob, the flap is actuated to push the spool. After delivering the preset quantity of water, the flap slips into a groove in the turning control head mechanism, allowing the spool to return to Normal Position.

Connections:

P - Upstream
C - AMV Control Chamber
V - Vent

AMV Sequential Shut-Off Pilot

5W-SOP

This 5-Way Shut-Off Pilot Valve directs pressure and flow between its ports:

- In Set Position the 5W-SOP spool is pushed closed, thereby hydraulically connecting ports P to C2 and C1 to V1.
- In Normal Position the 5W-SOP spool is returned by the spring action, hydraulically connecting ports P to C1 and C2 to V2.

Connections:

P - Upstream
C_1 - AMV Control Chamber
V_1 - Previous AMV (Vent for first AMV)
C_2 - Next AMV (Plugged for last AMV)
V_2 - Vent

AMV Shut-Off Pilot
with Pump Shut-Off Electrical Switch

3W-SOP-S

This 3-Way Shut-off Pilot Valve directs pressure and flow between its ports:

- In Set Position the 3W-SOP-S spool is pushed closed, thereby hydraulically connecting ports C1 to V1.
- In Normal Position the 3W-SOP-S spool is returned by the spring action, hydraulically connecting port P to C1.

The spool activates the electric Change-Over Switch, which turns off the system's pump after delivery of the preset quantity of water.

Connections:

P - Upstream
C_1 - AMV Control Chamber
V_1 -Vent
C_2 -Plugged

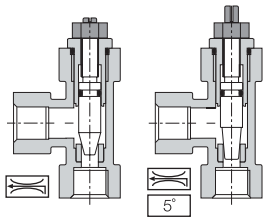
Switch Data:

Change Over 5-250V
Electrical Connections N.O. or N.C.

Needle Valve

This adjustable restriction Needle Valve is used for controlling opening or closing speed on various control loops.

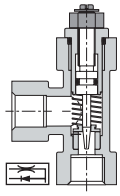
Needle valve types:
5° - for up to 4"; DN100 valves
15° - for 6"; DN150 and larger valves



One-Way Flow Control

This device combines an adjustable restriction needle valve one way, and free flow the opposite way. It is used for controlling opening or closing speeds and stabilizing main valve operation.

Technical Data
Pressure rating: 40 bar; 600 psi
Flow factor: Kv=0.85; Cv=1.0
(in unrestricted flow direction)



In-Line Filter

These self-flushing In-Line Filters are used for filtration of control fluid of medium and potable water quality. The flowing fluid continuously flushes the filter element.

Technical Data
Filter element: 400 micron; 40 mesh
Threads: Metal - 1/4", 3/8" & 1/2" NPT; Plastic - 1/4" NPT Male X 1/8" NPT Female

"Y" Strainer

The "Y" Strainer is used for filtration of control fluid with standard potable water quality and standard maintenance.

Technical Data
Filter element: 500 micron; 35 mesh
Ports: 1/4", 3/8" & 1/2" NPT, 1" BSP

Large Control Filter

The Large Control Filter is used for filtration of dirty control fluid that would quickly block a normal filter element. This larger filter increases both the reliability of the control valve system and the time required between maintenance, while minimizing faulty operation.

Technical Data
Filter element: Disks 250 micron; 60 mesh
Ports: 3/8" NPT

2-Way Ball Valve

This Ball Valve provides quick and easy on/off manual control for isolating, manual release, and draining.

Technical Data

Pressure rating:
40 bar; 600 psi - 1/4" to 3/4"
35 bar; 500 psi - 1" to 2"

Ports:
1/4", 3/8" & 1/2" NPT
3/4", 1", 1 1/2" & 2" BSP

3-Way Ball Valve

This 3-Way Ball Valve is used as a pilot providing quick and easy, 2-position on/off manual control.

Technical Data

Pressure rating: 27.5 bar; 400 psi
Ports: 1/4", 3/8" & 1/2" NPT

Manometer Ball Valve

This vented 2-Way Ball Valve provides quick and easy manual isolating and venting of either pressure gauges or any other pressurized control loop components.

Technical Data

Pressure rating: 16 bar; 230 psi
Ports: 1/8", 1/4" & 3/8" NPT

Check Valve

These spring loaded, non-return valves provide free flow in one direction and prevent flow in the opposite direction. They can be installed in any orientation.

Technical Data

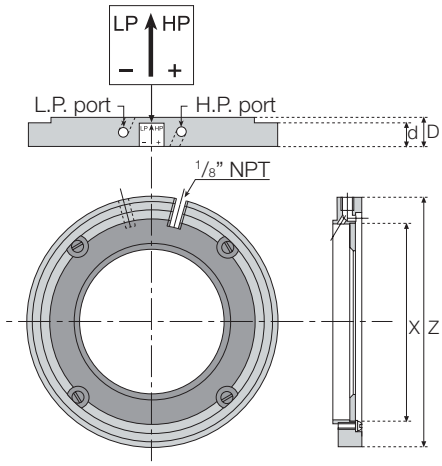
Pressure rating: 20.5 bar; 300 psi
Ports:
1/4", 3/8" & 1/2" NPT
3/4", 1" & 1 1/2" BSP

Orifice Plate Assembly

When an Orifice Plate Assembly is used as an integral part of a flow control valve control circuit, it provides the differential pressure (P) to power the flow control pilot. The opening and closing of the pilot causes the flow control valve to throttle accordingly. Total head loss across the valve is reduced by locating sensing ports close to the orifice plate, to sense downstream pressure before it recovers. The orifice plate's internal diameter is calculated and machined according to valve size and required flow limitation.

Dimensions

Size		Z		X		d		D	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50	2	94	3 11/16	53	2 1/16	20	3/4	25	1
65	2 1/2	106	4 3/16	61	2 3/8	20	3/4	25	1
80	3	126	4 15/16	73	2 7/8	20	3/4	25	1
100	4	155	6 1/8	96	3 3/4	20	3/4	25	1
150	6	210	8 1/4	150	5 15/16	20	3/4	25	1
200	8	265	10 3/8	195	7 11/16	20	3/4	25	1
250	10	320	12 5/8	245	9 5/8	20	3/4	25	1
300	12	372	14 5/8	295	11 5/8	20	3/4	25	1
350	14	418	16 7/16	345	13 5/8	24	15/16	30	1 3/16
400	16	482	19	395	15 9/16	20	3/4	25	1
450	18	535	21 1/16	443	17 7/16	20	3/4	28	1 1/8
500	20	590	23 1/4	501	19 3/4	22	7/8	31	1 3/16

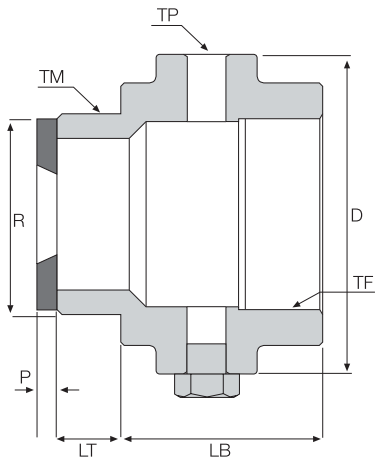


Orifice Assembly

When an Orifice Assembly is used as an integral part of a flow control valve control circuit, it provides a Pressure Differential (P) in direct proportion to the flow rate.This P is sensed by the flow control pilot, powering it to open or close. The opening and closing of the pilot causes the flow control valve to throttle accordingly. The orifice's internal diameter is calculated and machined according to valve size and required flow limitation.

Dimensions

Size / Dimensions	DN50	2"	DN80	2"
D	95 mm	3 3/4"	91 mm	3 9/16"
LB	60 mm	2 3/8"	70 mm	2 3/4"
LT	19 mm	3/4"	30 mm	1 3/16"
P	5 mm	3/16"	5 mm	3/16"
R	44.9mm	1 3/4"	84mm	3 5/16"
TF	G2	2" BSP-F	R3	3" BSP-F
TM	R2	2" BSP-T	R3	3" BSP-T
TP	1/4" NPT			



Pressure Gauge

This robust, liquid filled Pressure Gauge is used for heavy duty service where vibration or pulsation of the pressure is liable to cause excessive wear of a dry gauge, or where corrosive ambient conditions or fluid prevail.

Technical Data

Dial size: 2½"; 63 mm
Connection: ¼" NPT, back or bottom
Scales:
0-6, 10, 16, 25 and 40 bar
0-90, 140, 230, 350 and 600 psi
Accuracy: ± 1.6% of full scale dial

Pressure Sensing Separation Diaphragm

Model 35d

This device is used to isolate and protect the pressure sensing chambers of pilots (and pressure gauges) from highly corrosive fluids, high viscosity fluids, or fluids with suspended solids. It has two chambers separated by a diaphragm. The sensed system pressure is introduced into one chamber, applying force to the diaphragm that transmits it to the second chamber. The second chamber and the pilot sensing chamber are connected and are both filled with a non-aggressive, stable fluid.

Technical Data

Pressure rating: 25 bar; 350 psi
Ports: ¼" NPT
Air venting ports: ⅛" NPT

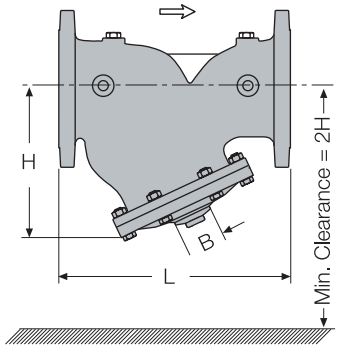
Strainer

Model 70F

The BERMAD 70F Strainer is designed to remove foreign matter such as stones, sticks, etc. from the pipeline. It is recommended to install the Strainer upstream from control valves, flow meters and other system appliances. High Pressure Strainer Model 80F is also available.
close to the orifice plate, to sense downstream pressure before it recovers. The orifice plate's internal diameter is calculated and machined according to valve size and required flow limitation.

Dimensions & Weight

Size		L		H		W		B
mm	inch	mm	inch	mm	inch	kg	lbs	mm
40	1½"	205	8.1	125	4.9	6.5	14.3	¾"
50	2	210	8.3	125	4.9	8.0	17.6	
65	2½"	222	8.7	125	4.9	10.4	22.9	
80	3"	250	9.8	170	6.7	17	37.5	1½"
100	4"	320	12.6	210	8.3	28	61.7	
150	6"	415	16.3	270	10.6	48	106	2"
200	8"	500	19.7	330	13.0	75	165	
250	10"	605	23.8	420	16.5	125	276	
300	12"	725	28.5	480	18.9	225	496	
350	14"	733	28.9	480	18.9	235	518	
400	16"	990	39.0	620	24.4	535	1180	3"
450	18"	1000	39.4	620	24.4	670	1477	
500	20"	1100	43.3	620	24.4	760	1675	



Technical Data

Patterns: "Y" (globe) & angle
Size Range: 40-500 mm; 1½ - 20"
End Connections (Pressure Ratings):
Flanged: ISO PN16, PN25; ANSI Class 150, 300
Threaded: BSP or NPT
Others: Available on request
Standard Materials:
Body: Ductile Iron
Cover: Steel
Seals: NBR
Coating: Polyester Powder, RAL 6017 (Green)

Basket Hole Diameter (mm)

Stainless Steel 304 (Standard)

2"	3-4"	6-20"
1.5	3.0	5.0

Stainless Steel 316 (Optional)

2-6"	8-20"
2.0	3.0

Flow Chart