

### IR-900-M Hydrometer with Magnetic Drive

The BERMAD Model IR-900-M is a unique product integrating both a vertical turbine Woltman-type water meter and a diaphragm actuated hydraulic control valve. The vertical turbine impeller drive is magnetically coupled to a vacuum-sealed meter register in the control head. Both the magnetic drive control head and its register(s) are hermetically sealed and are not affected by dirty water nor environmental humidity.

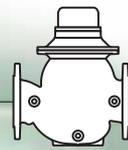
The highly sensitive magnetic drive provides superior accuracy that exceeds all water meter standards. The available Reed Switch and Opto-Electric 4-20 mA transmitter options provide greater flexibility in electrical pulse generation. Serving as Flow Meter and Main Valve, the BERMAD Model IR-900-M controls irrigation together with the irrigation controller.

The IR-900-M provides the full spectrum of metering functions – from simple visual readout, to pulse output for computerized data capture and control – while simultaneously allowing for numerous control valve features such as pressure, level and flow control.

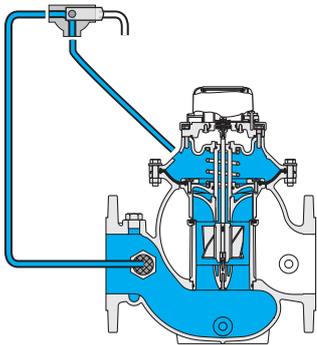
Ranging in size from 1 1/2"; DN40 through 10"; DN250, the 900-M Series is specifically designed for metering and control applications in agricultural and landscape irrigation as well as in municipal & industrial water supply systems. The flow metering unit is vertical to the pipeline and includes an impeller with integrated inlet and outlet flow straighteners. This internal design eliminates the need for straightening distances, enables vertical or horizontal installation, and ensures accuracy even when the valve is partially open during pressure or flow control tasks. The impeller assembly shaft serves as the closure assembly guide, while also centralizing and tightening all internal parts both in their position and to one another.

The basic Model IR-900-M combines simple and reliable construction with superior performance, while at the same time being virtually free of the typical limitations associated with other single chambered valves. The relatively high impeller housing raises the location of the vulcanized seal seat above the valve body. This results in remarkable cavitation resistance and a smooth mushroom-shaped flow where the valve body is distanced from the flow. The closure assembly, combining a rugged radial disk harnessed to a flexible fiber reinforced diaphragm, slides on the guide along the full valve travel. The diaphragm is carefully balanced and peripherally supported to avoid distortion, resulting in long-life and controlled actuation even under harsh conditions. One diaphragm and spring fully meets the valve's operating pressure range requirements. The cover is removable via fastening bolts for quick in-line inspection and service. All the internal assemblies can be easily removed from the valve body with no need for disassembling the valve from the line.

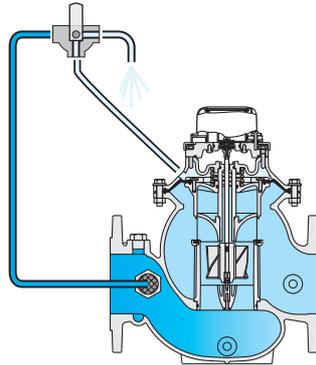




### On-Off Modes, Local Manual Control



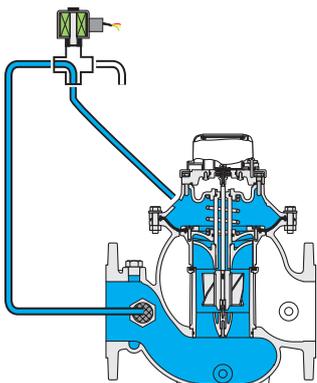
Hydrometer Closed



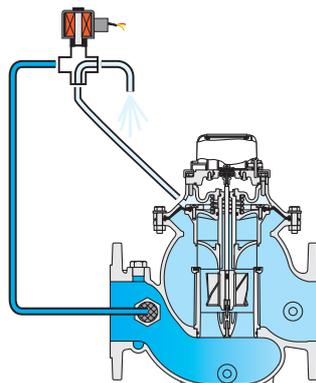
Hydrometer Open

Line pressure is applied to the control chamber of the hydrometer, through the override Cock-Valve. This creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing. Discharging pressure from the control chamber to the atmosphere causes the line pressure under the plug to open the hydrometer, measuring the flow rate.

### On-Off Modes, Solenoid Controlled



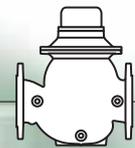
Solenoid Open  
Hydrometer Closed



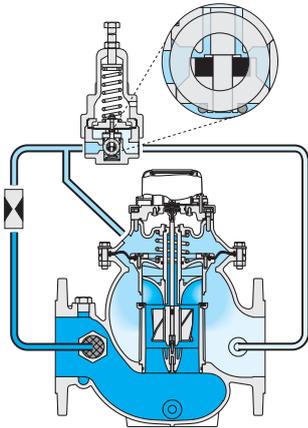
Solenoid Closed  
Hydrometer Open

Line pressure is applied to the control chamber of the hydrometer, through the opened 3-way solenoid. This creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing. Closing the Solenoid causes it to switch, discharging pressure from the control chamber.

This in turn causes the line pressure under the plug to open the hydrometer, measuring the flow.

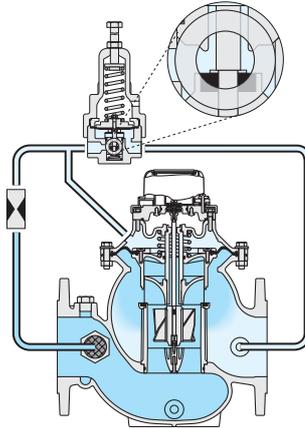


### 2-Way Modulating Modes, Pressure Reducing Pilot



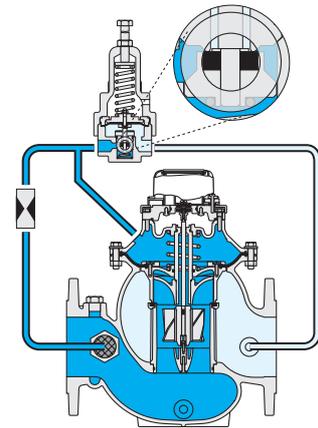
#### Modulating to Close

The restrictor continuously allows line pressure into the control chamber, while the pilot controls outflow from the control chamber. Throttling when it senses a pressure rise, the pilot causes pressure to accumulate in the control chamber, forcing the valve to modulate closed.



#### Modulating to Open

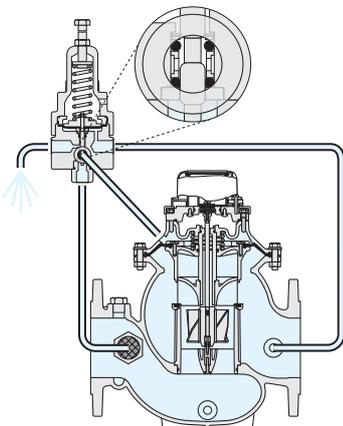
The pilot modulates open when it senses a pressure drop, releasing greater flow from the control chamber than the restrictor can allow in. This causes the accumulated pressure in the control chamber to drop, and the valve to modulate open.



#### Zero Flow Position

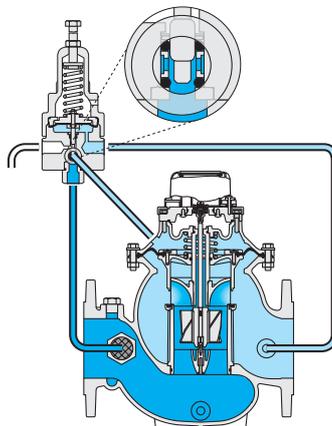
When demand drops to zero, downstream pressure begins to rise as the flow enters a closed line. The pilot closes, initiating the valve's irreversible closing process, eventually causing it to seal drip tight.

### 3-Way Control Modes, Pressure Reducing



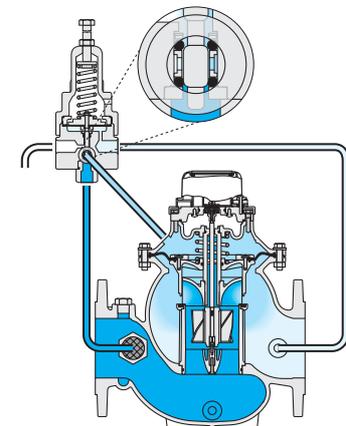
#### Fully Open Position

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



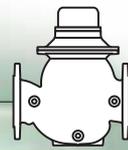
#### Modulating to Close

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

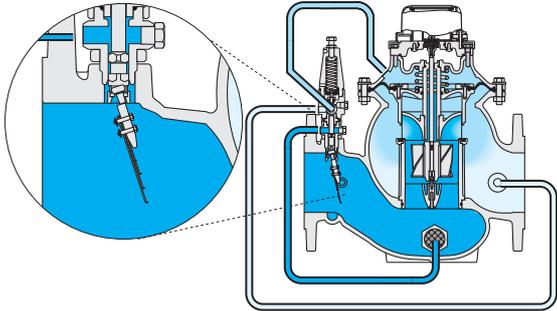


#### Locked Position

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

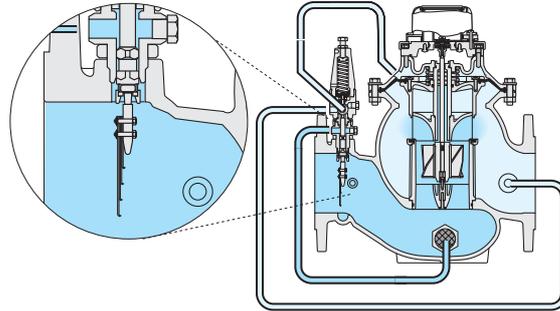


### 2/3-Way Modulating Modes, Flow Control



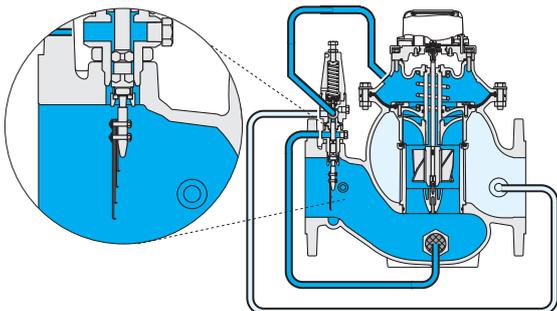
#### Modulating to Close

Should demand rise above setting, the increasing flow dynamic-force moves the paddle, which thereby pushes up the pilot trim, causing a negative ratio between water flow into and out of the control chamber. Pressure then accumulates in the control chamber, forcing the hydrometer to throttle closed.



#### Modulating to Open

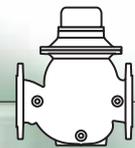
When demand is below setting, the pilot's spring force pushes the pilot trim down, thereby causing a negative ratio between water flow into and out of the control chamber. Pressure is then released from the control chamber, enabling the hydrometer to modulate open.



#### Stable Conditions

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

# BERMAD Irrigation



## Principle of Operation

## 900-M Series

### [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.

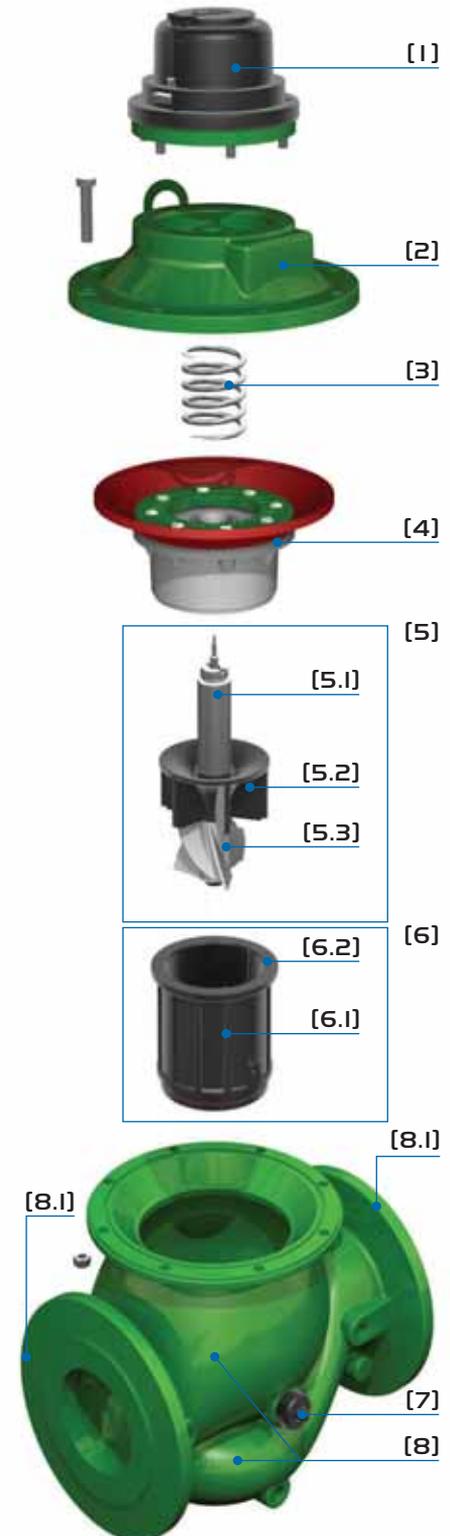
### [7] Integrated Calibration Device

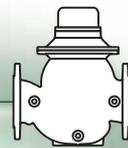
Enables recalibration instead of renovation when the recommended standard accuracy period has elapsed (The Calibration Device is stamped closed with a metal seal).

### [8] Wide Body

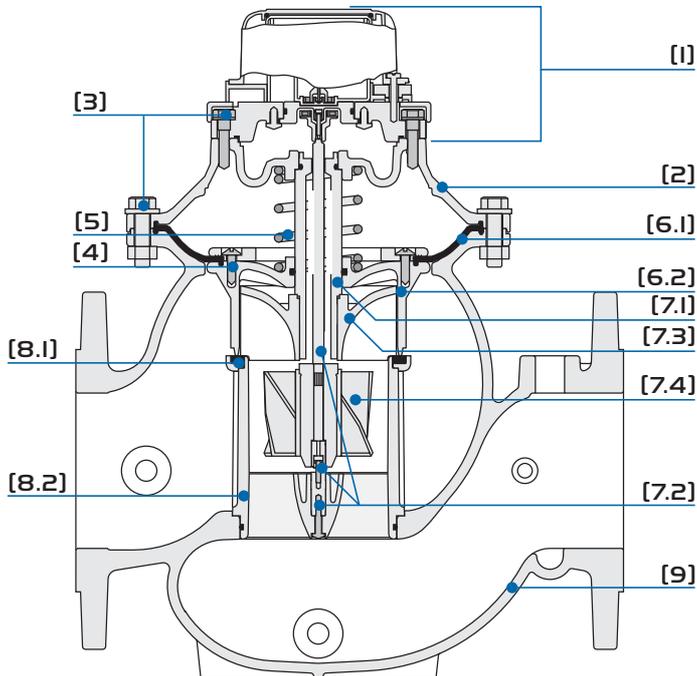
Hydro-dynamically designed for efficient flow with minimal pressure loss and excellent resistance to cavitation.

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

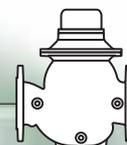




### Construction Materials



- [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 m



### 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: 0.5-10 bar

PN16: 0.5-16 bar

For lower pressure requirements, consult factory

**Temperature:** Water up to 50°C

#### Pulse Options:

Register Type Pulse Per Size Range	Reed Switch - Single				Reed Switch - Combined	
	10 liter	100 liter	1 m <sup>3</sup>	10 m <sup>3</sup>	10 liter + 100 liter	100 liter + 1 m <sup>3</sup>
DN40-DN100	■	■	■		■	■
DN150-DN250			■	■		

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

#### Pulse Electric Data:

**Reed-Switch:** Switching voltage: 48 VAC/DC max

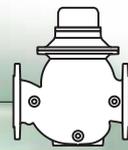
Switching current: 0.2A max

Switching power: 4W max

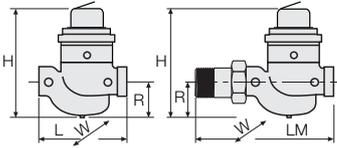
**Opto-Electric:** Supply voltage: 5-12 VDC

Output type: complementary

Output current: 200 mA

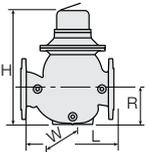


### Globe Pattern



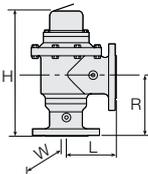
Connection Type Size	Threaded		
	DN40	DN50	DN80R
L (mm)	250	250	250
LM (mm)	317	327	N/A
W (mm)	137	137	137
H (mm)	270	277	277
R (mm)	95	95	79
Weight (kg)	7.2	7.3	7.3

### Globe Pattern



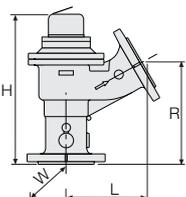
Connection Type Size	Flanged					
	DN80R	DN80	DN100	DN150	DN200	DN250
L (mm)	310	300	350	500	600	600
W (mm)	200	210	250	380	380	405
H (mm)	298	382	447	602	617	617
R (mm)	100	123	137	216	228	228
Weight (kg)	16.0	23.0	31.0	71.0	93.0	140.5

### 90° Angle Pattern



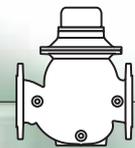
Connection Type Size	Threaded	Flanged			
	DN50	DN80	DN100	DN150	DN200
L (mm)	120	150	180	250	250
W (mm)	137	210	250	380	380
H (mm)	300	402	481	585	585
R (mm)	125	196	225	306	280
Weight (kg)	8.1	25.8	36.1	76.7	82.5

### 120° Angle Pattern



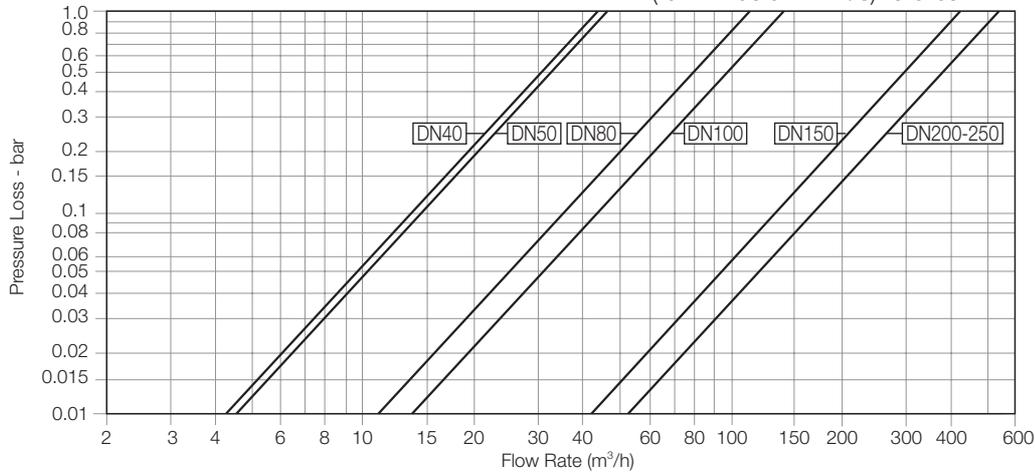
Connection Type Size	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
	DN65	DN100	DN65	DN100
L (mm)	143	208	143	208
W (mm)	137	217	200	223
H (mm)	410	450	410	450
R (mm)	273	283	273	283
Weight (kg)	10.5	24.8	12.9	27.9





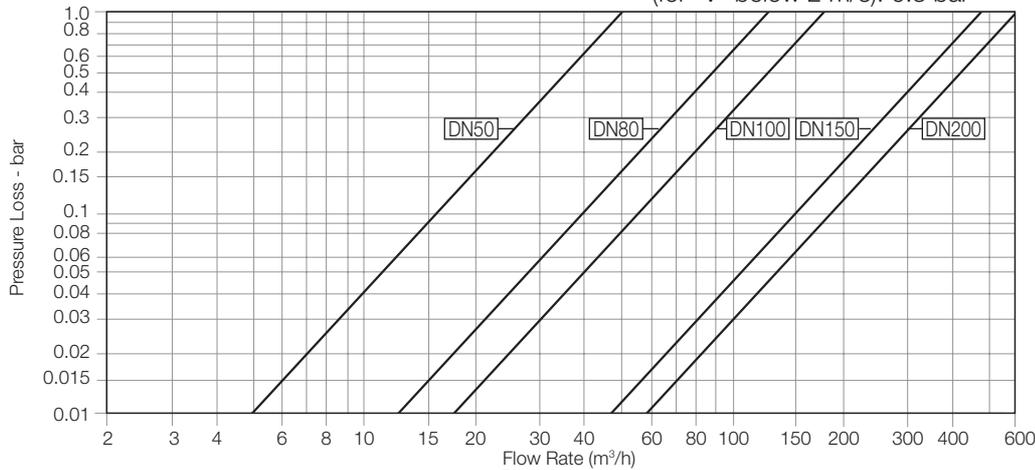
### Globe Pattern

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



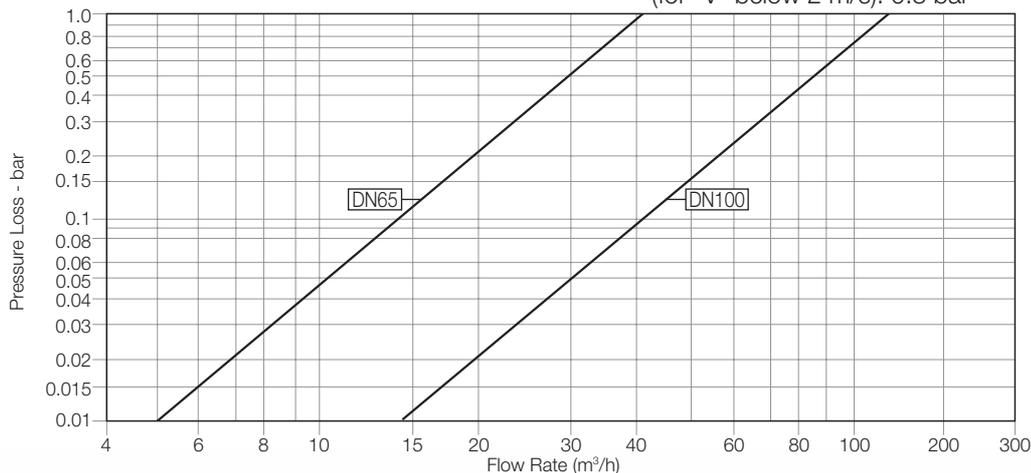
### 90° Angle Pattern

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

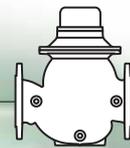


### 120° Angle Pattern

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



# BERMAD Irrigation



## Flow Properties

## 900-M Series

**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

$$Kv(Cv) = Q \sqrt{\frac{Gf}{\Delta P}}$$

Equivalent Pipe Length, Leq

$$Leq = Lk \cdot D$$

Where:

Kv = Valve flow coefficient (flow in m<sup>3</sup>/h at 1bar Diff. Press.)

Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)

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

ΔP = Differential pressure (bar ; psi)

Gf = Liquid specific gravity (Water = 1.0)

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.

$$Kv = 0.865 Cv$$

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<sup>2</sup> ; 32.18 feet/sec<sup>2</sup>)

## Accuracy Table

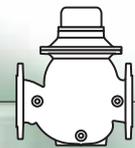
	Accuracy	DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250
Q1 Minimum Flow	±5%	0.8	0.8	1.2	1.2	1.8	4	6.3	6.3
Q2 Transitional Flow	±2%	1.3	1.3	1.9	3	4.5	10	15.8	15.8
Qn Nominal Flow ISO 4064-1-1993	±2%	15	15	25	40	60	150	250	400
Q3 Permanent Flow	±2%	25	40	40	100	160	250	400	400
Q4 Maximum Flow (Short Time)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



info@bermad.com • www.bermad.com

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# BERMAD Irrigation



## Irrigation Hydrant Valve

900-M Series



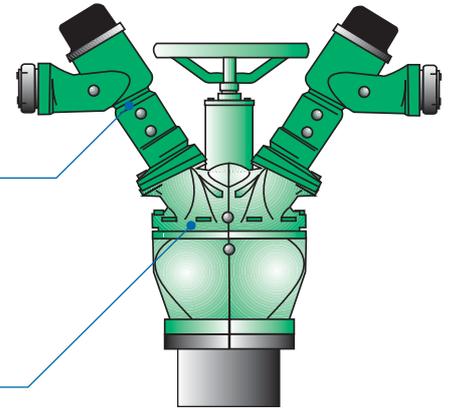
The Irrigation Hydrant is a unique valve assembly unit designed for irrigation and water supply distribution for multiple farm units.

The Irrigation Hydrant consists of two main parts: an Irrigation Hydrant Valve and Hydrometers Type H mounted on top of the Irrigation Hydrant Valve.

### Hydrometer Type H

The Hydrometer Type H is a 120-degree elbow-shaped Hydrometer that integrates both a vertical turbine Woltman-type water meter, with a diaphragm actuated hydraulic control valve. It meets the full range of applications of the BERMAD 900-M Series.

The Hydrometer Type H is available in two sizes: DN: 65 & 100.



### Irrigation Hydrant Valve

The Irrigation Hydrant Valve is available in three inlet sizes: DN: 80, 100 & 150.

It is an on/off hand-wheel operated valve with a single flange inlet and one, two, three or four distribution outlets.

### The Irrigation Hydrant Valve is available in three Model Types:

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

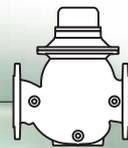
(1) Conforming to major standards

(F) Optional port for Automatic Anti-Freezing Cock Valve

(V) Optional port for Air Venting Cock Valve

Description	Quick Coupling & Plug (Guillemin Coupling)	Flange Adapter	Cover (Blind Triangle Flange)	Cover (Blind Flange)
Size	DN65	DN100 X DN65	DN65	DN100
Note	For use on DN65 Hydrometer with threaded outlet	For installing DN65 Hydrometer on A-102 irrigation Hydrant Valve	For blocking unused F-82 and F-104 Irrigation Hydrant Valve outlets	For blocking unused DN100 flange outlets



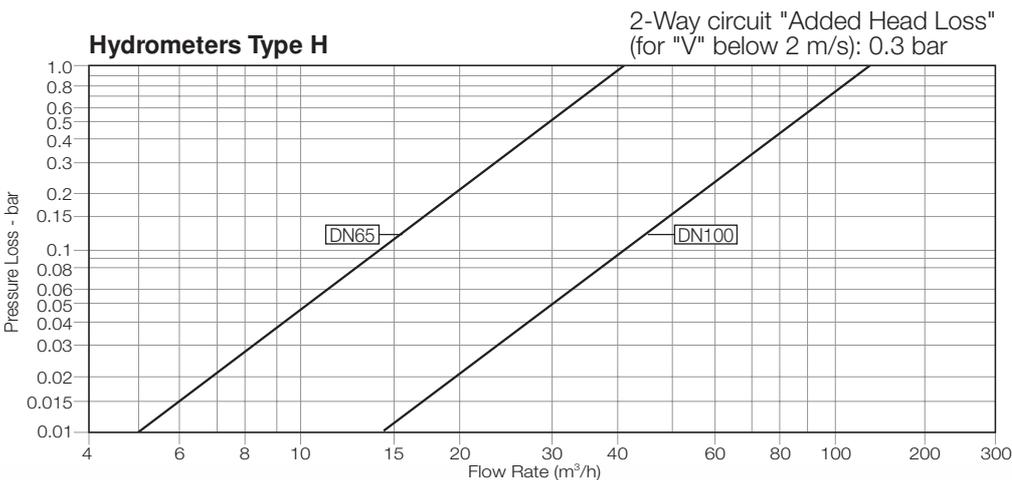
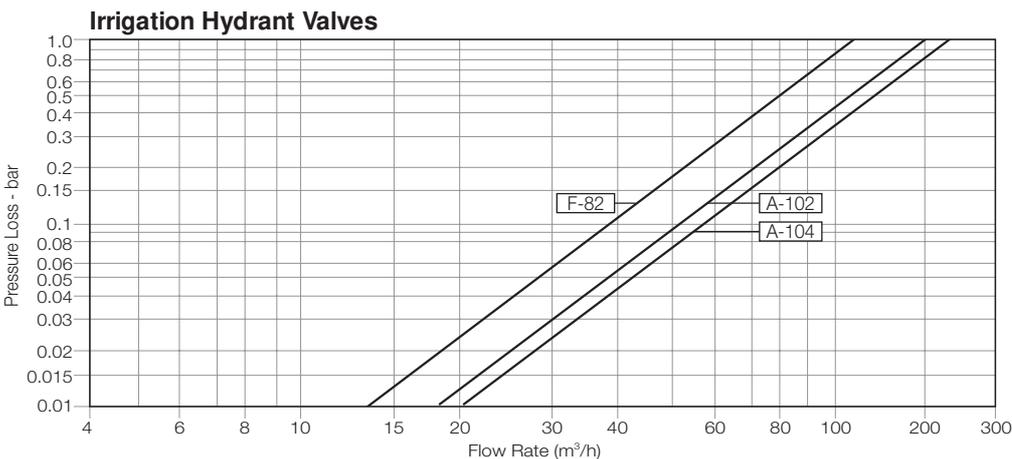


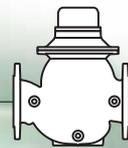
### Dimensions & Weights

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

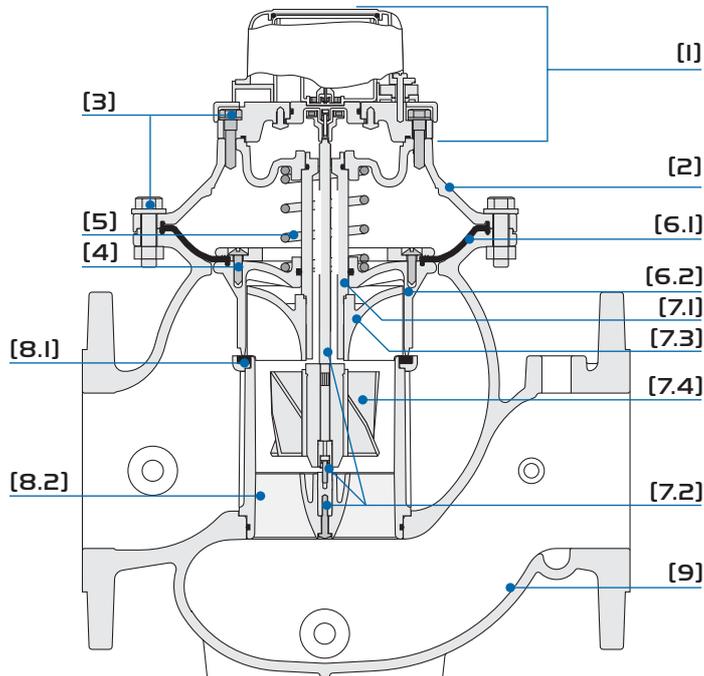
\* Number of Hydrometers installed.

### Flow Charts



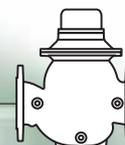


### Construction Materials



- [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 m





### 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: 7-150 psi; Class #150: 7-250 psi

For lower pressure requirements, consult factory

**Temperature:** Water up to 122°F

#### Pulse Options:

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

Register Type Pulse Per Size Range	Opto-Electric		Opto-Electric + Reed Switch - Combined			
	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

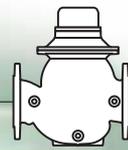
Switching power: 4W max

**Opto-Electric:** Supply voltage: 5-12 VDC

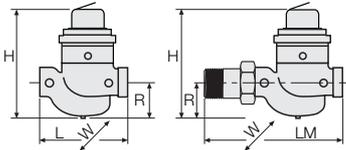
Output type: complementary

Output current: 200 mA



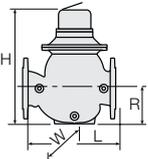


### Globe Pattern



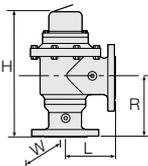
Connection Type	Threaded		
	1 1/2"	2"	3"R
L (inch)	9 <sup>13</sup> / <sub>16</sub>	9 <sup>13</sup> / <sub>16</sub>	9 <sup>13</sup> / <sub>16</sub>
LM (inch)	12 <sup>17</sup> / <sub>16</sub>	12 <sup>13</sup> / <sub>16</sub>	N/A
W (inch)	5 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>8</sub>	5 <sup>3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

### Globe Pattern



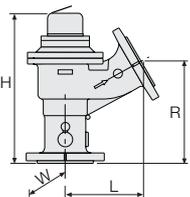
Connection Type	Flanged					
	3"R	3"	4"	6"	8"	10"
L (inch)	12 <sup>3</sup> / <sub>16</sub>	11 <sup>13</sup> / <sub>16</sub>	13 <sup>3</sup> / <sub>4</sub>	19 <sup>11</sup> / <sub>16</sub>	23 <sup>5</sup> / <sub>8</sub>	23 <sup>5</sup> / <sub>8</sub>
W (inch)	7 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup>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

### 90° Angle Pattern



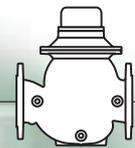
Connection Type	Threaded	Flanged			
	2"	3"	4"	6"	8"
L (inch)	4 <sup>3</sup> / <sub>4</sub>	5 <sup>15</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	9 <sup>13</sup> / <sub>16</sub>	9 <sup>13</sup> / <sub>16</sub>
W (inch)	5 <sup>3</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	9 <sup>13</sup>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

### 120° Angle Pattern



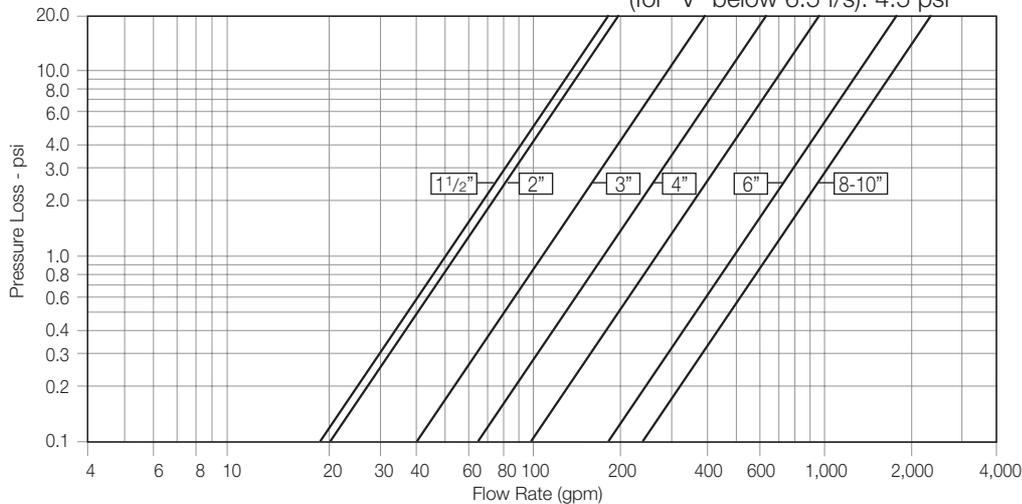
Connection Type	Flanged Inlet / Threaded Outlet		Flanged Inlet and Outlet	
	2 1/2"	4"	2 1/2"	4"
L (inch)	5 <sup>5</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>16</sub>
W (inch)	5 <sup>3</sup> / <sub>8</sub>	8 <sup>9</sup> / <sub>16</sub>	7 <sup>7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





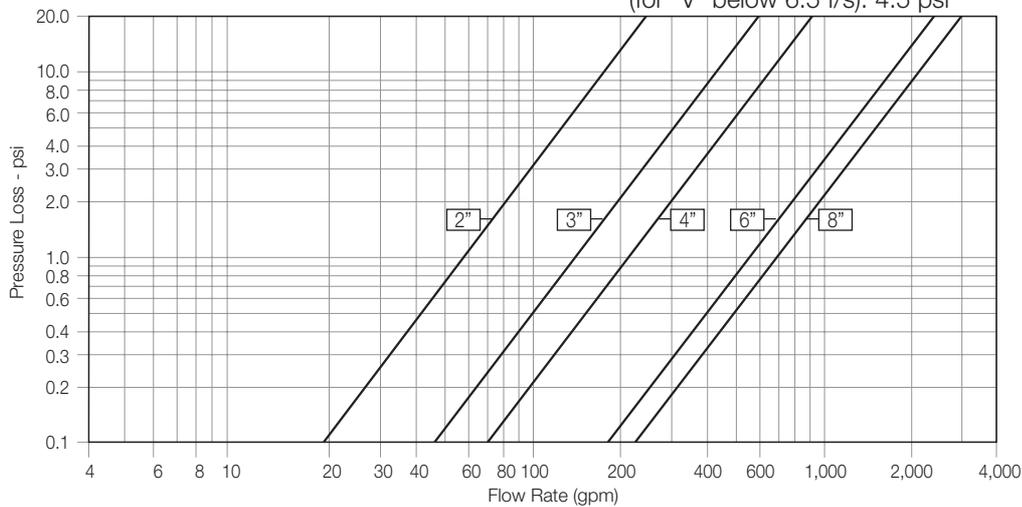
### Globe Pattern

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



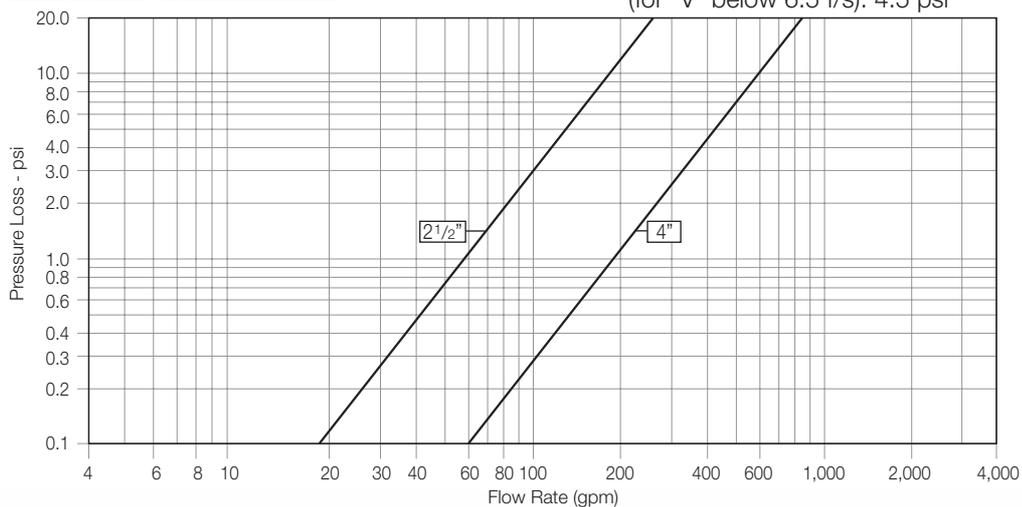
### 90° Angle Pattern

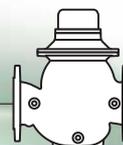
2-Way circuit "Added Head Loss"  
(for "V" below 6.5 f/s): 4.5 psi



### 120° Angle Pattern

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





**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<sup>3</sup>/h at 1bar Diff. Press.)

Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)

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

ΔP = Differential pressure (psi ; bar)

Gf = Liquid specific gravity (Water = 1.0)

$$Cv = 1.155 Kv$$

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.

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.)

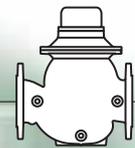
g = Acceleration of gravity (32.18 feet/sec<sup>2</sup> ; 9.81 m/sec<sup>2</sup>)

## 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	-	50	50	33	83	89	63	63	63
<b>Class ISO 4064-1-1993</b>	-	<b>A</b>	<b>A</b>	<b>A</b>	<b>B</b>	<b>B</b>	<b>B</b>	<b>B</b>	<b>B</b>



# BERMAD Irrigation



## Irrigation Hydrant Valve

900-M Series

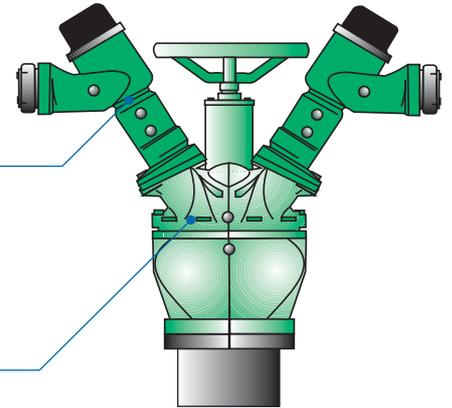
**US** English

The Irrigation Hydrant is a unique valve assembly unit designed for irrigation and water supply distribution for multiple farm units.

The Irrigation Hydrant consists of two main parts: an Irrigation Hydrant Valve and Hydrometers Type H mounted on top of the Irrigation Hydrant Valve.

### Hydrometer Type H

The Hydrometer Type H is a 120-degree elbow-shaped Hydrometer that integrates both a vertical turbine Woltman-type water meter, with a diaphragm actuated hydraulic control valve. It meets the full range of applications of the BERMAD 900-M Series. The Hydrometer Type H is available in two sizes: 2 1/2" & 4".

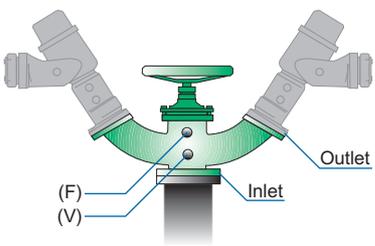
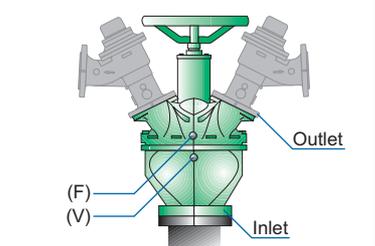
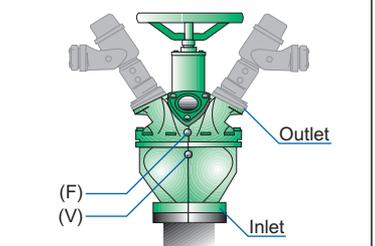


### Irrigation Hydrant Valve

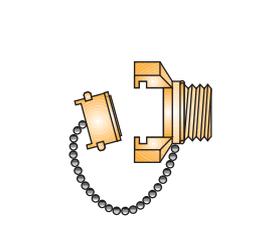
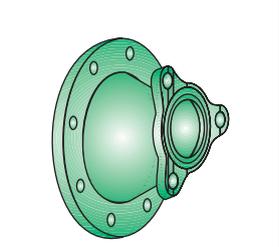
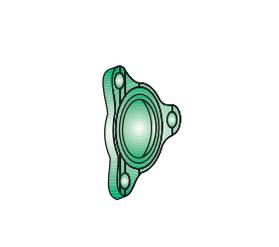
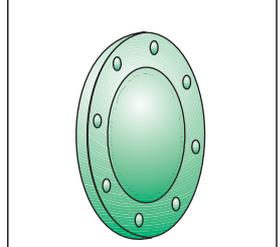
The Irrigation Hydrant Valve is available in three inlet sizes: 3", 4" & 6".

It is an on/off hand-wheel operated valve with a single flange inlet and one, two, three or four distribution outlets.

**The Irrigation Hydrant Valve is available in three Model Types:**

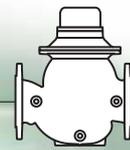
			
<b>Description</b>	<b>Type F-82</b>	<b>Type A-102</b>	<b>Type A-104</b>
Inlet Diameter	3" (Optional 4") <sup>(1)</sup>	4" <sup>(1)</sup>	4" <sup>(1)</sup>
Outlets	2	2	4
Outlet Diameter	2 1/2" (Triangle)	4" <sup>(1)</sup>	2 1/2" (Triangle)
Optional Type	F-81 with single outlet	A-152 with 6" inlet	A-154 with 6" inlet

(1) Conforming to major standards  
 (F) Optional port for Automatic Anti-Freezing Cock Valve  
 (V) Optional port for Air Venting Cock Valve

				
<b>Description</b>	<b>Quick Coupling &amp; Plug (Guillemin Coupling)</b>	<b>Flange Adapter</b>	<b>Cover (Blind Triangle Flange)</b>	<b>Cover (Blind Flange)</b>
Size	2 1/2"	4" X 2 1/2"	2 1/2"	4"
Note	For use on 2 1/2" Hydrometer with threaded outlet	For installing 2 1/2" Hydrometer on A-102 irrigation Hydrant Valve	For blocking unused F-82 and F-104 Irrigation Hydrant Valve outlets	For blocking unused 4" flange outlets



# BERMAD Irrigation



## Irrigation Hydrant Valve

900-M Series



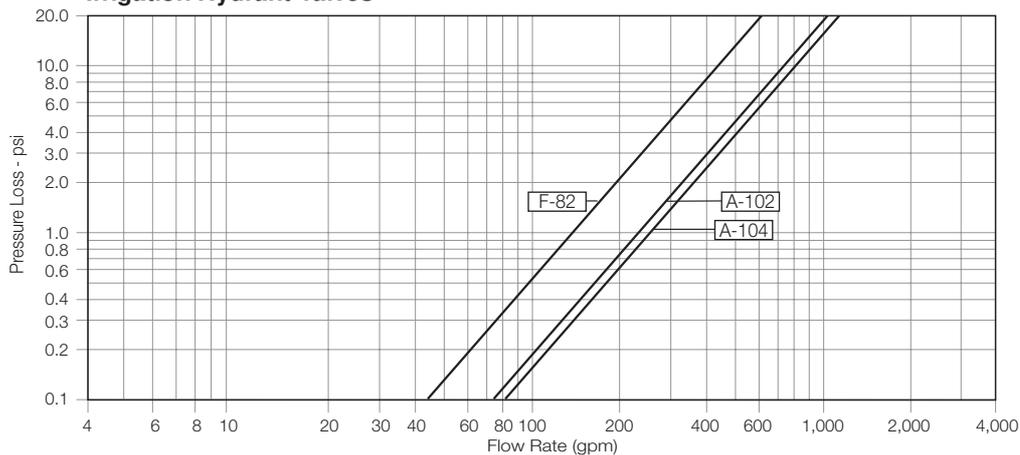
### Dimensions & Weights

Dimensions Drawing	F-82	F-102	F-104
Type	F-82	F-102	F-104
L (inch)	40 <sup>15</sup> / <sub>16</sub>	43 <sup>5</sup> / <sub>16</sub>	38 <sup>3</sup> / <sub>16</sub>
H (inch)	23 <sup>5</sup> / <sub>8</sub>	28 <sup>3</sup> / <sub>4</sub>	27 <sup>9</sup> / <sub>16</sub>
h (inch)	14 <sup>3</sup> / <sub>16</sub>	22 <sup>13</sup> / <sub>16</sub>	20 <sup>1</sup> / <sub>16</sub>
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

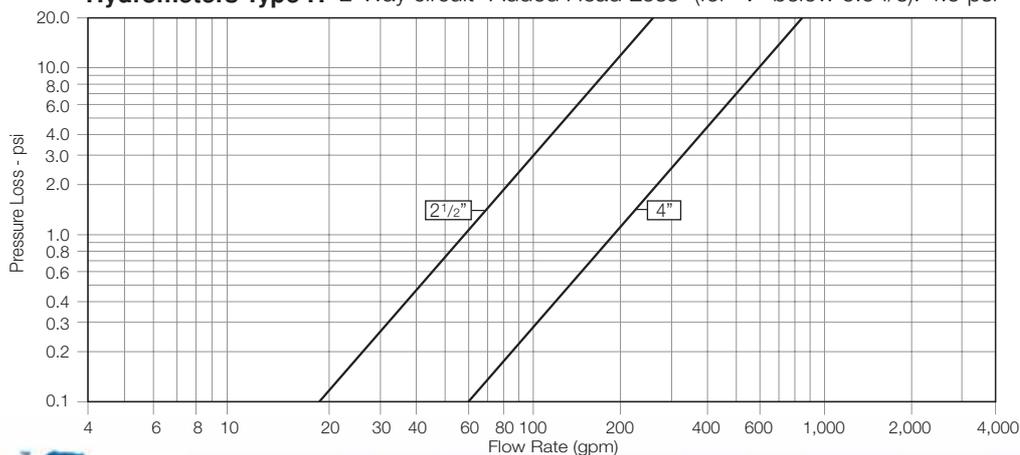
\* Number of Hydrometers installed.

### Flow Charts

Irrigation Hydrant Valves



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



info@bermad.com • www.bermad.com

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