CONTROL VALVES BERMAD

900 Series

BERMAD Hydrometers

c a t a l o g

Company Profile

CONTROL VALVES BERMAD

Experience and proven results have made BERMAD synonymous with water, and other fluid, control and management. Cutting-edge technology is one of the reasons BERMAD has retained its reputation for excellence over the past 30 years. Now, entering the 21st century, BERMAD–an ISO 9002 certified company–continues to be actively involved in fluid control and management systems encompassing a wide variety of applications, including:

- Municipal waterworks
- High-rise buildings
- Industrial systems
- Irrigation systems in:
  - Agriculture
  - Horticulture
  - Turf (golf courses)
  - Home gardening
- Cooling systems
- Fire protection systems
- Petroleum

BERMAD develops, manufactures and markets a wide range of fluid control and management products that are sought, sold and serviced in nearly every country and every language. These products include:

- Automatic control valves
- Water meters
- Automatic metering valves
- Hydrometers
- Multi–function valves
- Solenoid valves
- Air valves

Quality Assured Firm
SI
ISO 9001

BERMAD sells expertise together with products. Its team of international and local experts is available everywhere for consultation and for training–in seminars and in the field–of engineers, technicians, sales staff and end users. BERMAD products return results that are measured in yields, flow rate, water purity, water saved, person-hours, good will and in repeat orders.

Product Introduction

The BERMAD 900 Series is a unique product line that integrates a vertical turbine water meter and pilot-controlled, diaphragm-actuated hydraulic control valve in a single valve body. The 900 Series provides a full spectrum of metering functions–from simple visual readout, through dose control and pulse output for computerized data capture and control–while simultaneously allowing for numerous control valve operations such as remote control, pressure, level and flow control.

Ranging in size from 1½" through 8", the 900 Series is specifically designed for metering and control applications in agricultural and landscape irrigation and in municipal and industrial water supply systems.

BERMAD and the 900 Series–an innovative high quality water management product and expert technical support and service–provide for complete control of your system.

Contents

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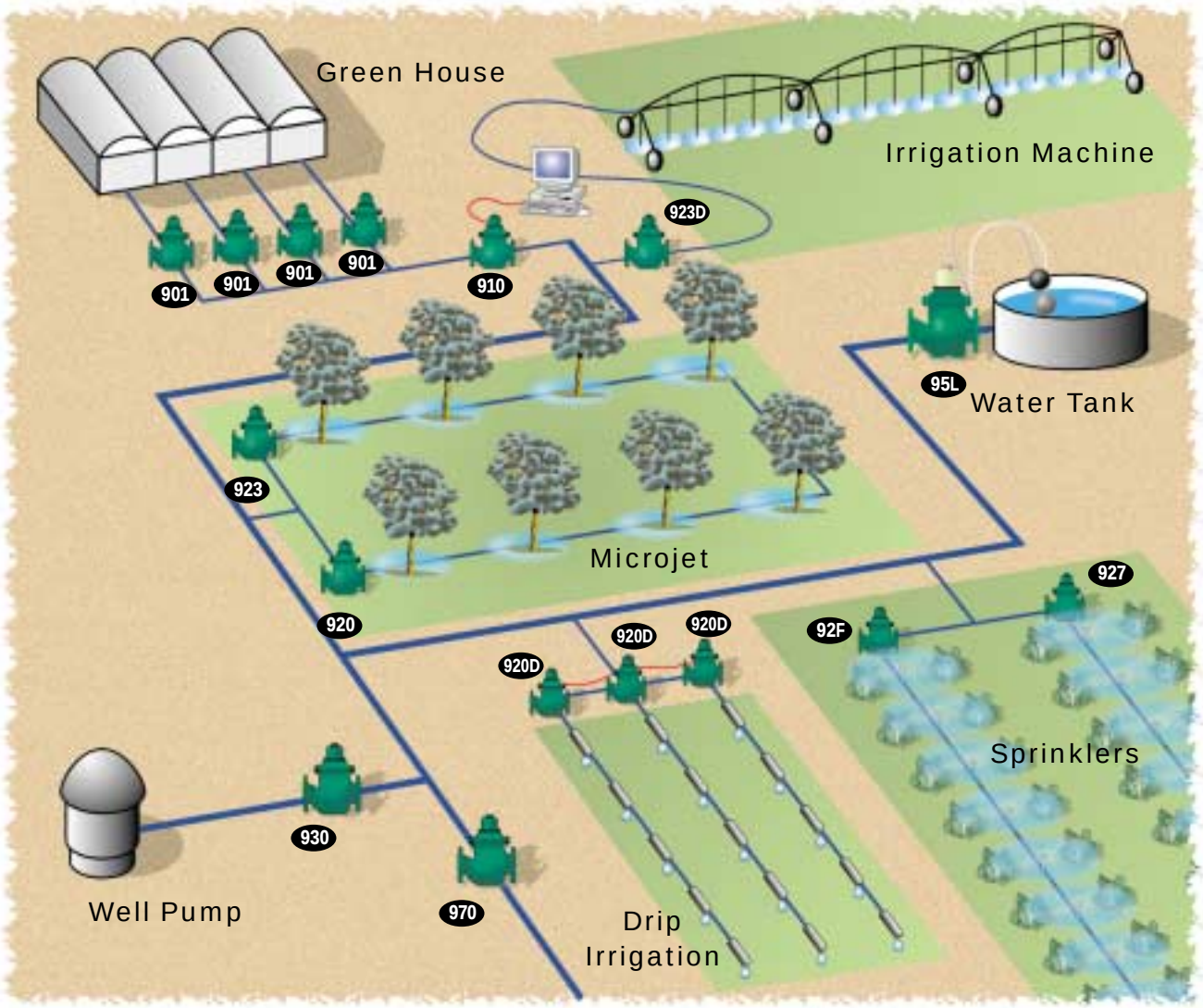
900 Series CATALOG

Typical Applications



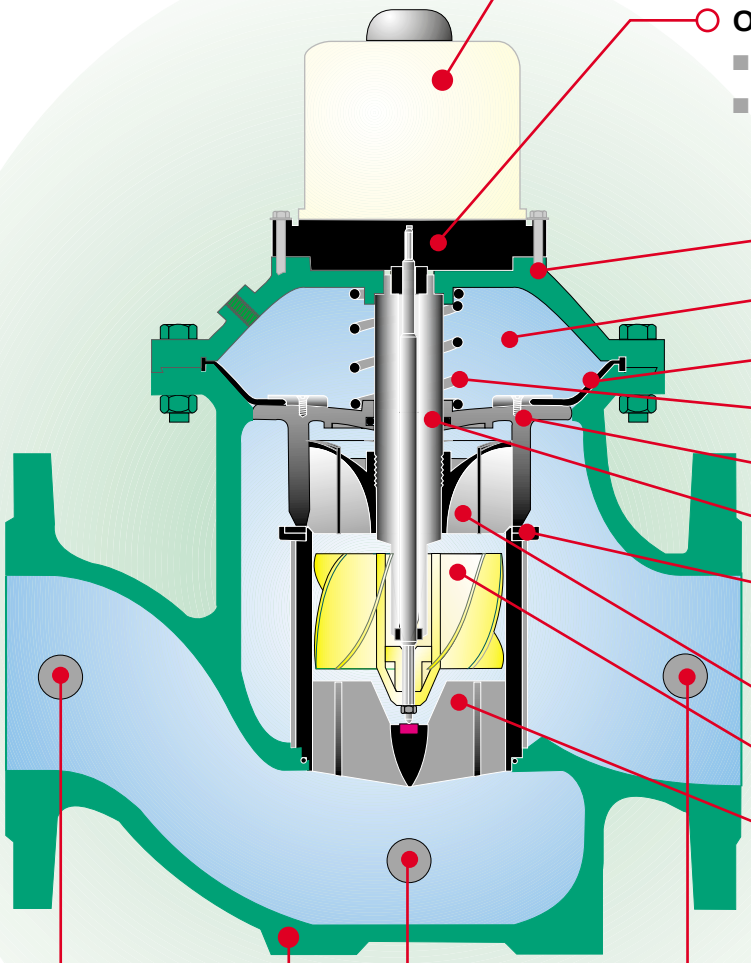
Product Description

Control Head Models:

- 900W - Mechanical Drive Hydrometer
- 900WM - Magnetic Drive Hydrometer
- 900D - Automatic Metering Valve (AMV)

Optional Control Head Drives:

- Mechanical Drive for Hydrometer and AMV
- Magnetic Drive for Hydrometers



- Valve Cover
- Control Chamber
- Diaphragm
- Spring
- Closure Assembly
- Guide
- Seal Seat
- Upper Flow Straightener
- Impeller Assembly (Turbine)
- Lower Flow Straightener
- Downstream Sensing Port
- Drain Plug Port
- Valve Body
- Upstream Sensing Port

Physical Specifications

Valve Patterns: Globe or Angle

Sizes:

Globe:	1½"	2"	3"	4"	6"	8"
Angle:		2"	3"	4"	6"	8"
(mm):	40	50	80	100	150	200

End Connections

- Threaded:
  - Globe: 1½", 2" NPT/BSP female threaded
  - Angle: 2" NPT/BSP female threaded
- Flanged:
  - Globe and Angle: 3", 4", 6" and 8" ANSI B16, ISO, DIN, BS and JIS

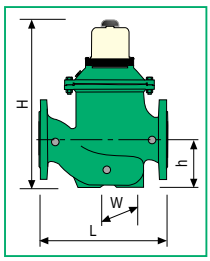
Materials:

- Body and Cover: Cast iron or ductile iron with fusion bonded coating
- Diaphragm: Reinforced natural rubber
- Spring: Stainless steel
- Impeller Housing: Reinforced plastic
- Impeller: Plastic
- Straighteners: Reinforced plastic
- Closure Assembly: Reinforced plastic
- Guided Shaft: Stainless steel
- Control Head: Plastic, brass, stainless steel

Other materials available on request.

Dimension and Weights:

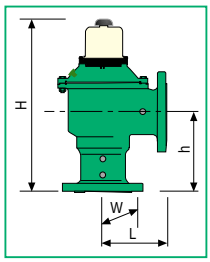
Globe Pattern



Nominal Sizes

	*1½"	*2"	3"	4"	6"	8"
L (mm)	210	225	290	360	550	600
W (mm)	135	137	210	250	380	380
H (mm)	293	300	405	470	625	640
h (mm)	98	95	125	137	215	220
Weight (Kg)	5.5	7	24	44	105	125

Angle Pattern



Nominal Sizes

	*2"	3"	4"	6"	8"
L (mm)	125	150	185	250	250
W (mm)	137	210	250	380	380
H (mm)	320	427	460	610	620
h (mm)	125	197	225	306	280
Weight (Kg)	9	18	35	80	90

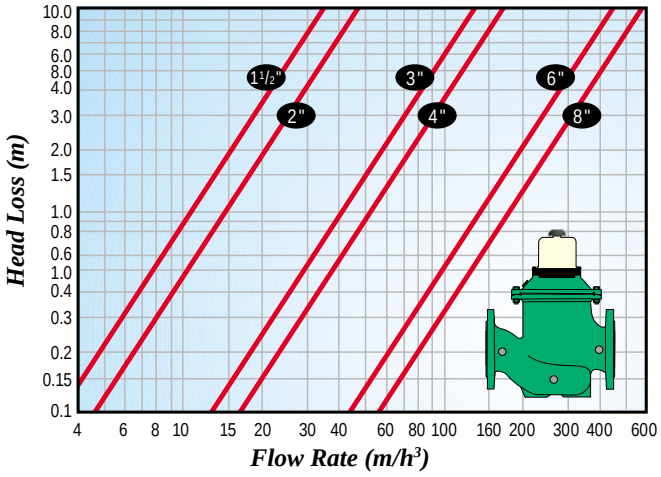
**1½" and 2" - Threaded*

Operating Specifications

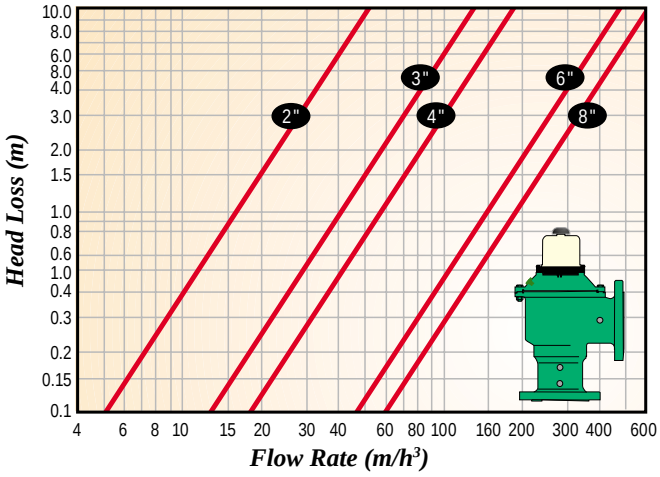
Operating Pressure: 0.7 – 10/16 bar (10 – 150/225 psi)

Working Temperature: Water up to 50°C

Flow Chart – Globe Pattern



Flow Chart – Angle Pattern

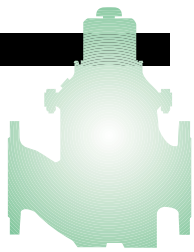


Accuracy and Flow Data:

Magnetic and Mechanical Drive Hydrometers

Nominal Sizes

Flow Data		Accuracy	1½"	2"	3"	4"	6"	8"
Qmax.	(Peak flow, short time)	±2%	30	35	130	180	350	550
Qn.	(Continues flow)	±2%	15	25	65	110	215	350
Qt.	(Transitional flow)	±2%	3.0	3.0	8.0	12.0	30.0	50.0
Qmin.	(Minimum flow)	±5%	1.2	1.2	3.2	4.8	4.5	7.5



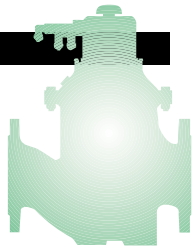
(1) Complies with EEC/ISO 4064 Class A and SII 63 for water meters

(2) Values in m^3/h

Automatic Metering Valves AMV:

Nominal Sizes

Flow Data		Accuracy	1½"	2"	3"	4"	6"	8"
Qmax.	(Peak flow, short time)	±2%	20	35	120	180	300	550
Qn.	(Continues flow)	±2%	15	25	65	110	215	350
Qt.	(Transitional flow)	±2%	3.0	4.5	12.0	18.0	45.0	75.0
Qmin.	(Minimum flow)	±5%	1.5	2.0	3.2	4.8	10.0	12.0



(1) Complies with ISO 7714 Type 1 or 2 and SII 1405 for metering valves

(2) Dosing accuracy: ±2% of dial capacity or better

(3) Accuracy: complies with ISO 4064 Class A

(4) Values in m^3/h

900W Mechanical Drive Hydrometer

The Model 900W integrates a vertical turbine Woltman-type water meter and a basic diaphragm-actuated control valve. The vertical turbine impeller-drive powers a wet primary gear assembly, which is mechanically connected to a dry non-pressurized secondary gear assembly in the control head. The control head provides visual water meter readout in either liters, cubic meters or US gallons. An optional electrical pulse generator is available.

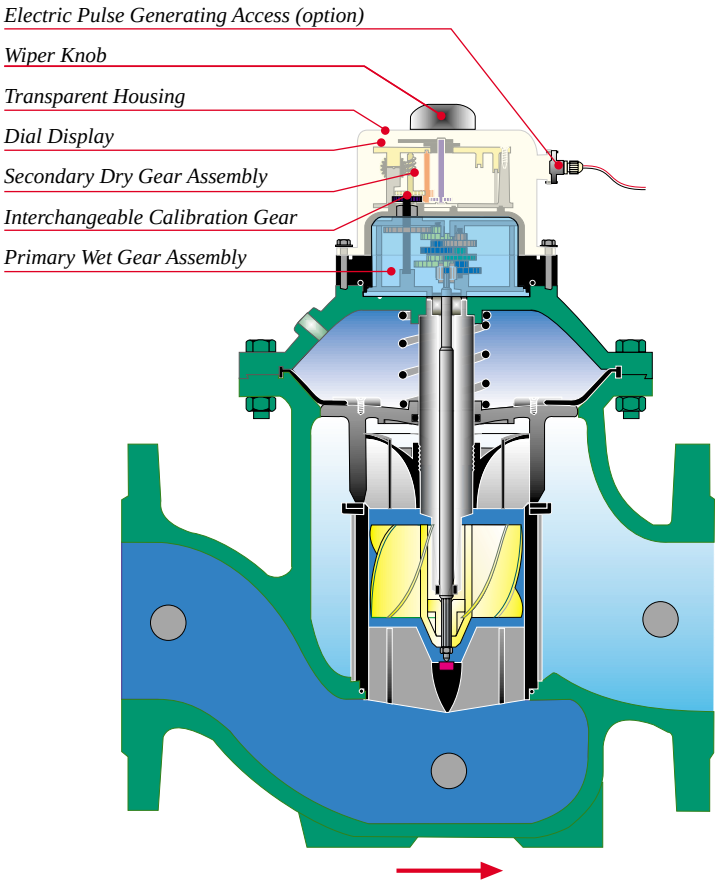
Accuracy:

- Complies with or exceeds ISO 4064 Class A standard requirements for water meters

Typical Applications:

- Computerized Irrigation Systems
- Municipal and Industrial Water Supply

Mechanical Drive Control Head



Optional Pulse Generating Table

Valve Sizes	Pulse Rate (1 pulse per:) 0.1 m^3	1 m^3	10 m^3	100 Gallons	1000 Gallons
1½" - 2"	•	•		•	
3"	•	•		•	•
4"		•	•	•	•
6" - 8"		•	•		•

Electrical Data:

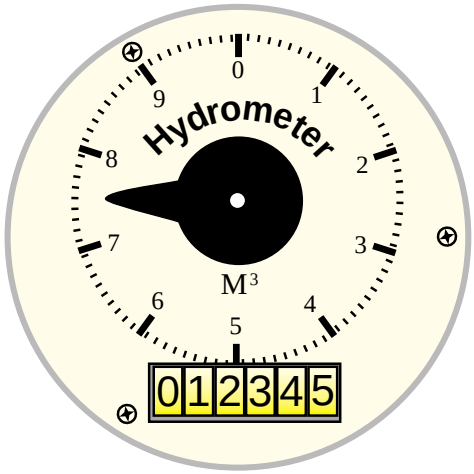
Switching Voltage: 48VAC/DC max
Switching Current: 0.2A max
Switching Power: 4W max

Optional Dial Displays

m^3
1½" -4": 1 Flow Indicator turn = 1m^3
6"-8" : 1 Flow Indicator turn = 10m^3

Gallons:
1½"-4": 1 Flow Indicator turn = 100 US Gallons
6"-8": 1 Flow Indicator turn = 1000 US Gallons

Mechanical Drive Dial Display



900WM Magnetic Drive Hydrometer

The Model 900WM integrates a Woltman-type vertical turbine water meter and a basic diaphragm-actuated control valve. The vertical turbine impeller drive is magnetically coupled to the vacuum-sealed meter register in the control head. Both the magnetic-drive control head and its register are sealed (completely dry) and are not affected by dirty water conditions. The highly sensitive magnetic-drive provides superior accuracy that exceeds all water meter standards. The available control head options provide increased metering data as well as greater flexibility in electrical pulse generation/transmission.

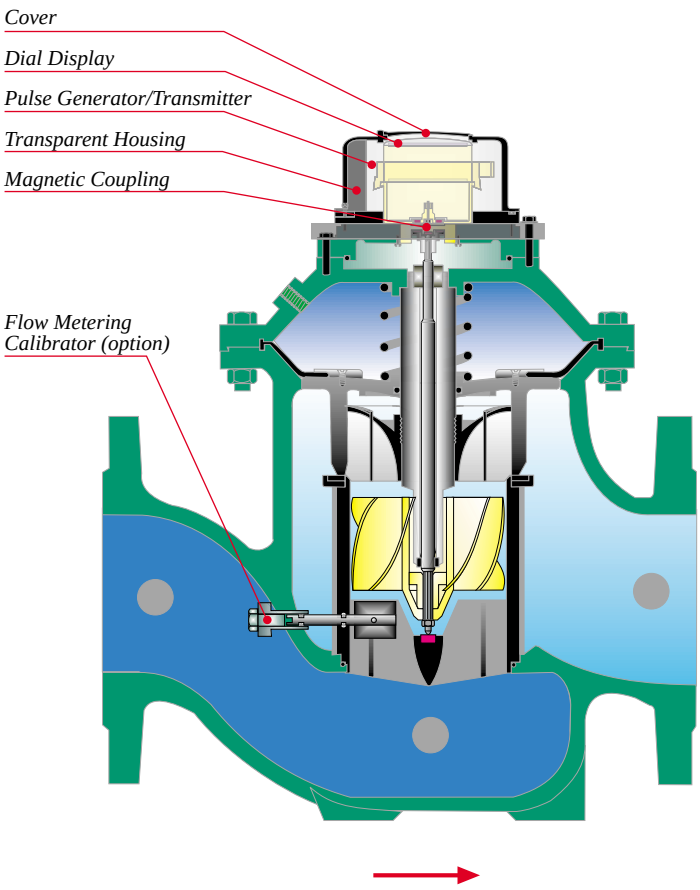
Features:

- Two modes for pulse generating: reed-switch and photoelectric sensor
- Vacuum-sealed register and fully-shielded control head ensure clear visual readout and water-free gear train mechanism
- The dial display includes a small rotating “Star” as an aid in leak detection

Typical Applications:

- Computerized irrigation systems
- Municipal and industrial water supply
- Remote flow data read-out
- Flow monitoring and leakage control
- Water metering

Magnetic Drive Control Head



900WM Magnetic Drive Hydrometer (cont.)

Pulse Generating Options:

- The reed-switch pulse transmitter is a magnetic on/off switch that produces an electric pulse per unit of flow.
- An obvious choice for high flow conditions, the highly accurate, infrared retro-reflective photocell (opto) pulse transmitter produces a very low electric current (mA) and has unlimited pulse rate capacity, The electric current is transmitted to a converter that enables flow rate readout or pulse counting.

Each hyrometer can generate up to 2 simultaneous outputs. The hydrometer can be factory configured as standard or optional. This table shows the possible combinations.

		Opto-switch		Reed-switch			
	DN	1 liter	10 liter	10 liter	100 liter	$1m^3$	$10m^3$
Standard	40, 50, 65	✓		✓	✓		
	80, 100	✓			✓	✓	
	150, 200		✓			✓	✓
Optional	40, 50, 65	✓			✓	✓	
	80,100	✓		✓	✓		
	150, 200		✓		✓	✓	

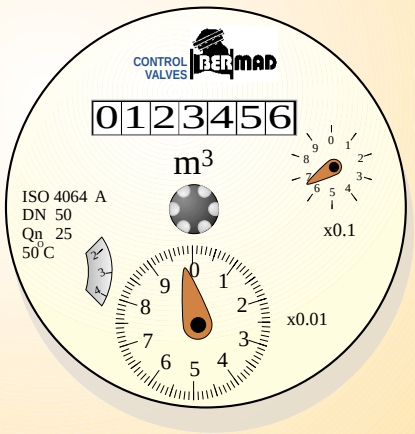
Reed-switch Electrical Data:

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

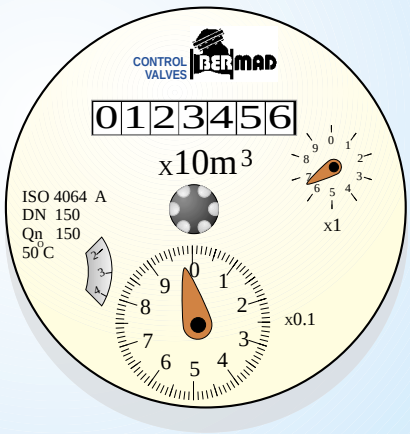
Opto-switch Electrical Data:

- Supply voltage: 5-12 VDC
- Output type: complementry
- Output current: 200 mA (source or sink)
- Cable length supplied 2m

Magnetic Dial Displays



For DN 40-100mm Dial



For DN 150-200mm Dial

900D Automatic Metering Valve (AMV)

The Automatic Metering Valve (AMV) Model 900D integrates a vertical turbine Woltman-type water meter and pilot-operated diaphragm-actuated control valve with a built-in auxiliary shut-off valve for batch applications. This unique assembly delivers a preset quantity of water, regardless of changing pressure or flow rate. Upon delivering the preset quantity of water, the AMV control head mechanism mechanically shifts the auxiliary shut-off valve, which automatically and smoothly closes the control valve, stopping the flow of water.

The AMV is in use throughout the world in agricultural, landscape and golf course irrigation systems and in numerous industrial batch control systems.

Features:

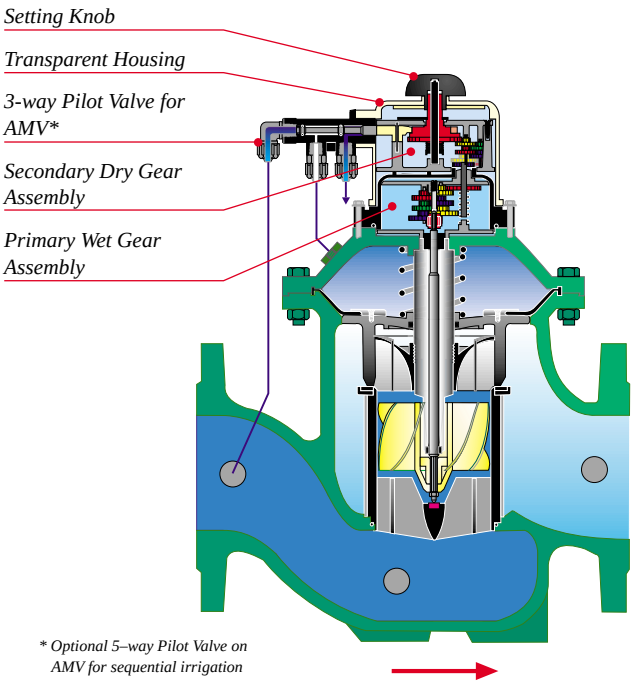
- Meters water volume, not time, to ensure delivery of the exact quantity of water desired
- Internal flow straighteners eliminate the need for straight pipe allowances before and after the meter
- Flow totalling counter and flow-rate indicators
- Completely independent operation–requires only line pressure to operate
- Can be installed either horizontally or vertically without loss of accuracy
- Integrated water meter and hydraulic valve requires minimum installation space
- User-friendly design allows easy in-line inspection and maintenance

Accuracy:

- Complies with ISO 7714 Class 1 or 2

To ensure dosing accuracy, select the maximum dial capacity closest to real needs.

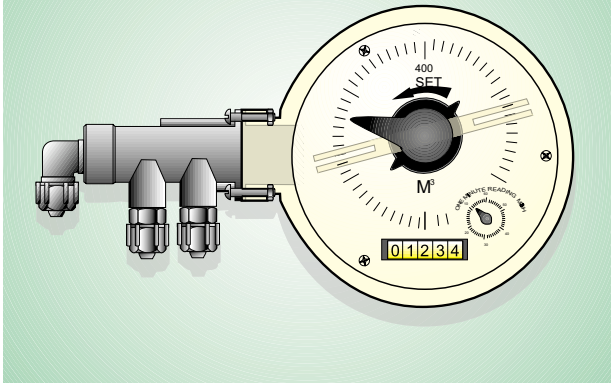
AMV Control Head



** Optional 5–way Pilot Valve on AMV for sequential irrigation*

AMV (900D) Dial Display

with 3-way Pilot Valve



900D Automatic Metering Valve (AMV) (Cont.)

Electrical Pulse (Option)

Valve Size	Pulse Rate (1 pulse per:) 1 m^3	10 m^3
1½" - 2"	•	
3"	•	
4"	•	
6"		•
8"		•

Electrical Data:

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

AMV Dial Capacity Selection

	Dial Capacity (m^3)	Graduation (m^3)	
4"	4	0.1	1½"
	12	0.2	
	40	1.0	
	80	1.0	
	120	2.0	2"
	200	5.0	
	350	10.0	
	600	10.0	
	800	10.0	
6"	1,200	20.0	3"
	2,100	50.0	
	3,500	100.0	
	6,000	100.0	
8"	8,000	100.0	
	12,000	200.0	

	Dial Capacity (US Gallons)	Graduation (US Gallons)	
4"	13,000	100	1½"
	50,000	1,000	
	130,000	2,500	2"
	200,000	5,000	3"
	500,000	10,000	
6"	870,000	20,000	
	1,300,000	25,000	
8"	2,000,000	25,000	

**Other graduations available on request.*

900DD Automatic Metering Valve (AMV) for Sequential Irrigation

The Automatic Metering Valve (AMV) Model 900DD is a variation of the AMV Model 900D. The principle use of the Model 900DD is for sequential irrigation applications.

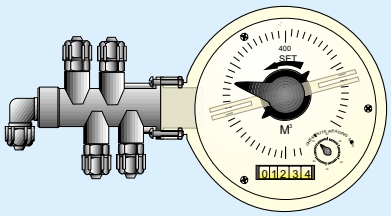
The AMV Model 900DD is used extensively in semi-automatic sequentially operated agricultural, landscape and golf course irrigation and industrial batch control systems throughout the world.

Typical Applications:

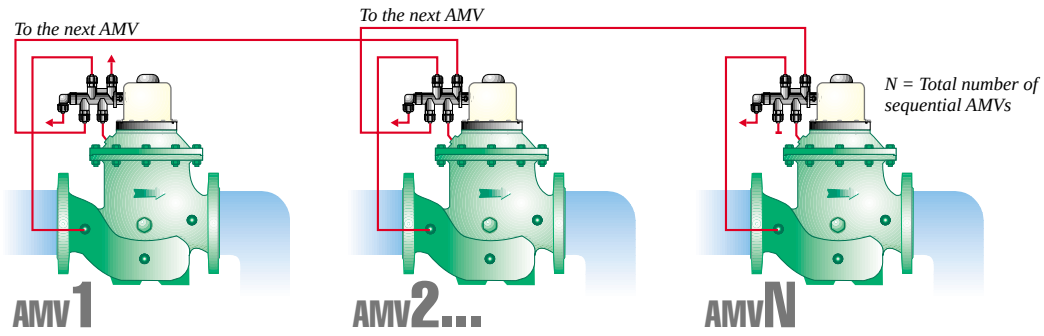
- Sequential irrigation in agriculture and rural applications
- AMV (900DD) Dial Display with 5-way Pilot Valve for Sequential Irrigation

AMV (900DD) Dial Display

with 5-way Pilot Valve for sequential irrigation



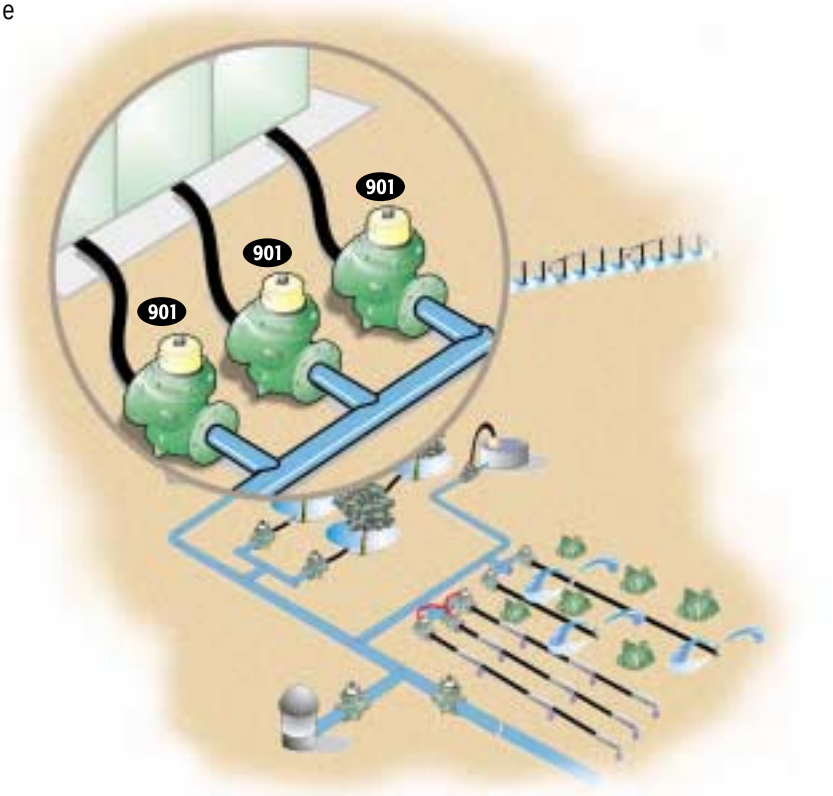
Typical Sequential AMV Control Loop



901 Water Meter Hydrometer

The Model 901 Woltman-type vertical water meter with hydrometer body shape enables metering any specific volume of water with a clear readout and all available electric pulse generating/transmitting options.

The Model 901 is not a control valve. Where future installation may be required, the Model 901 is easily and simply converted into any of the 900 Series Hydrometers. Pipe refitting is not required.



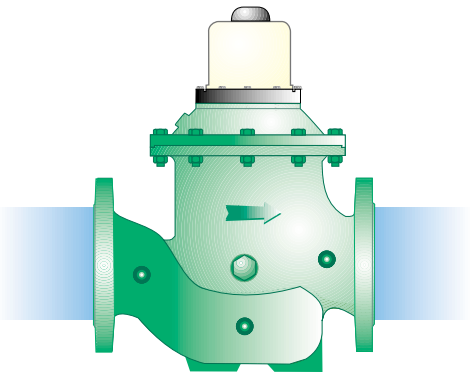
Optional Model 901 Control Heads:

- 901W - Mechanical Drive Hydrometer
- 901WM - Magnetic Drive Hydrometer

Any of these control heads can be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for data on generating electrical and optical pulses.

Typical Applications:

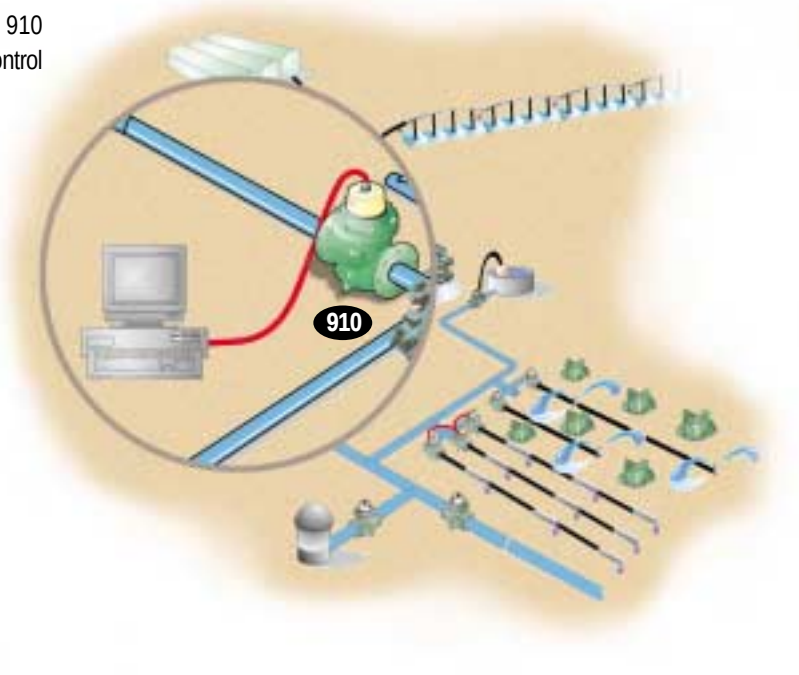
- Rural water metering with electric pulses generator
- Urban gardening
- Urban water meter logging and leakage detection



910 Electric Remote-Control Hydrometer

The Electric Remote-Control Hydrometer Model 910 integrates a vertical turbine Woltman-type water meter and a solenoid-controlled diaphragm-actuated control valve.

The Model 910 functions as a fully open or tightly closed valve in response to an electric signal. When fully open, the Model 910 provides the metering data and functions associated with the control head used.



Optional Model 910 Control Heads:

- 910W - Mechanical Drive Hydrometer
- 910WM - Magnetic Drive Hydrometer
- 910D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for data on generating electrical and optical pulses.

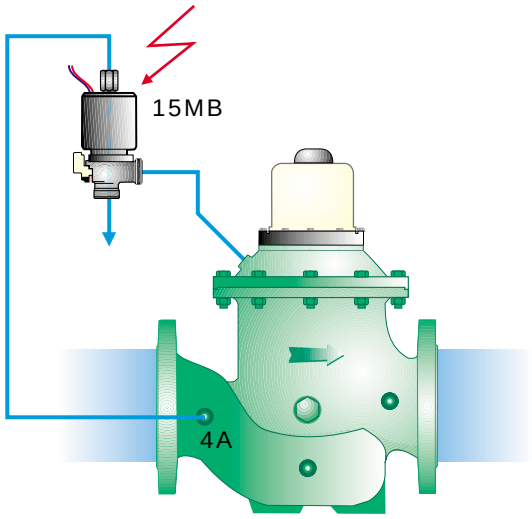
Typical Applications:

- Computerized irrigation systems
- Municipal and industrial water supply
- Remote flow data readout
- Flow monitoring and leakage control
- Water metering

Control List:

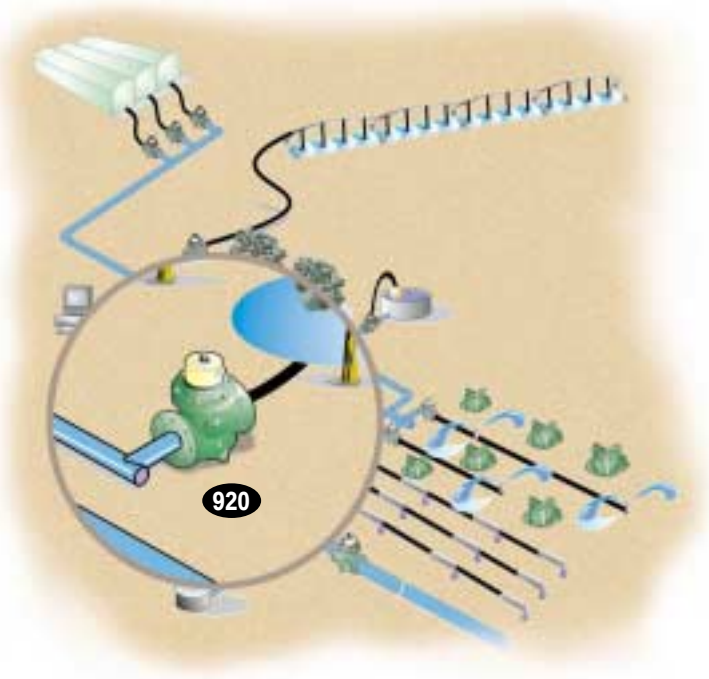
- **4A**: In-line filter
- **15MB**: 3-way, N.O., BERMAD solenoid pilot valve
  12 VAC or DC
  24 VAC or DC

Note:
1½"-4": BERMAD solenoid pilot valve
6"-8" : ASCO solenoid pilot valve (standard)



920 Pressure-Reducing Hydrometer

The Pressure Reducing Hydrometer Model 920 integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with a pressure-reducing pilot. The Model 920 reduces upstream pressure to a constant, settable, downstream pressure, regardless of changes in flow rate or upstream pressure. The 2-way or 3-way pressure-reducing pilot senses downstream pressure and modulates the main valve to the desired preset pressure, which is set using the pilot's adjusting screw. The meter accuracy is independent and not affected by the action of the pressure-reducing valve.



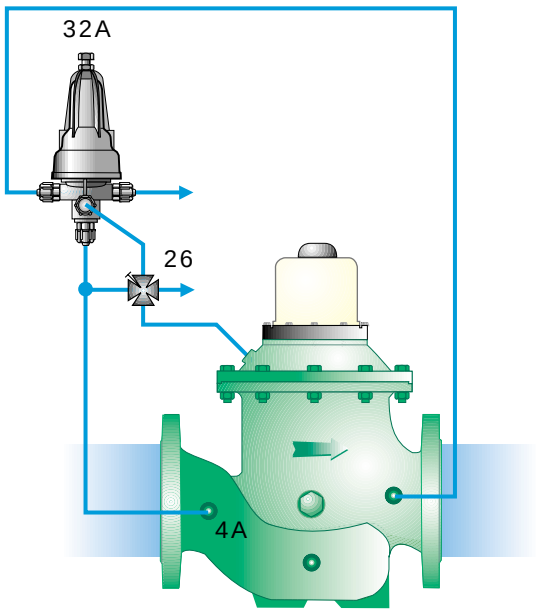
Optional Model 920 Control Heads:

- 920W - Mechanical Drive Hydrometer
- 920WM - Magnetic Drive Hydrometer
- 920D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for data on generating electrical and optical pulses.

Typical Applications:

- Computerized irrigation systems in uneven terrain
- Pressure-reducing applications in municipal and industrial water supply
- Water metering



Control List:

- **4A**: In-line filter
- **26**: 4-way cock valve
- **32A**: 3-way positioning pilot valve

Note:
For optional pilot valves, refer to the accessories section in this catalog.

920D Pressure-Reducing Automatic Metering Valve (AMV)

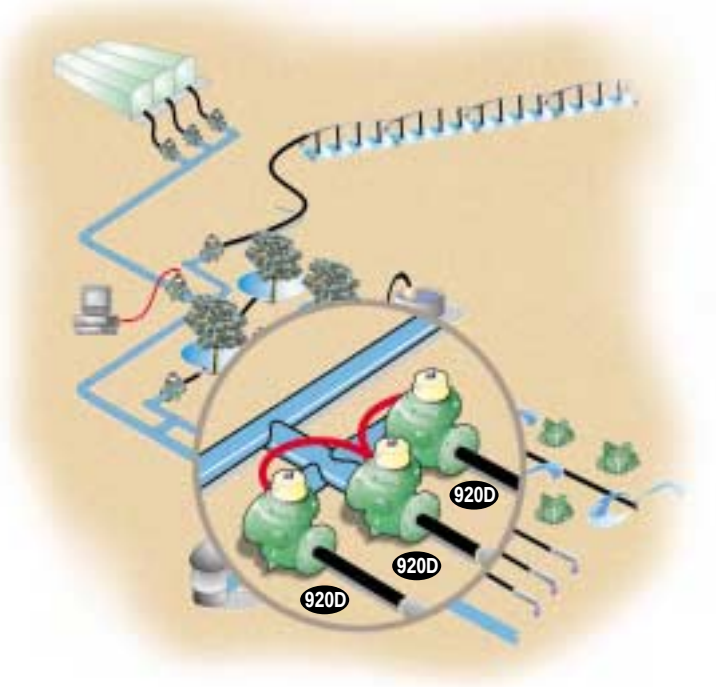
The Pressure-Reducing Automatic Metering Valve Model 920D integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with a pressure-reducing pilot dosing control loop.

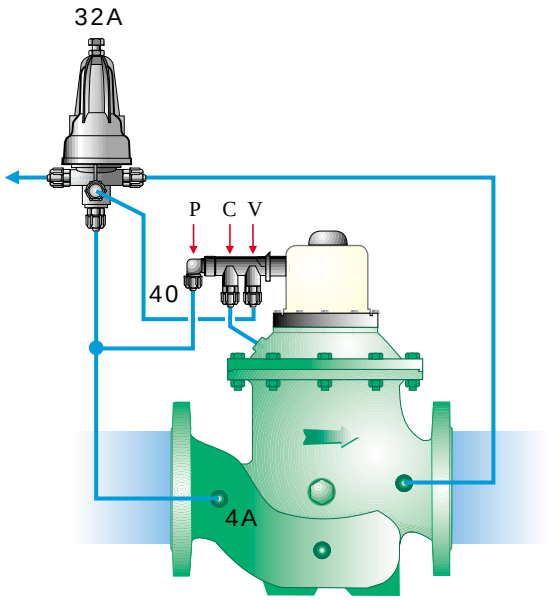
Independent Main Functions:

- Accurately meters water
- Delivers a preset quantity of water regardless of changing pressure or flow rate
- Maintains a constant preset downstream pressure regardless of changes in flow rate or upstream pressure

Typical Applications:

- Semi-automatic irrigation systems where topographical conditions dictate the need for pressure reduction
- Industrial dosing operations requiring constant pressure water supply





Control List:

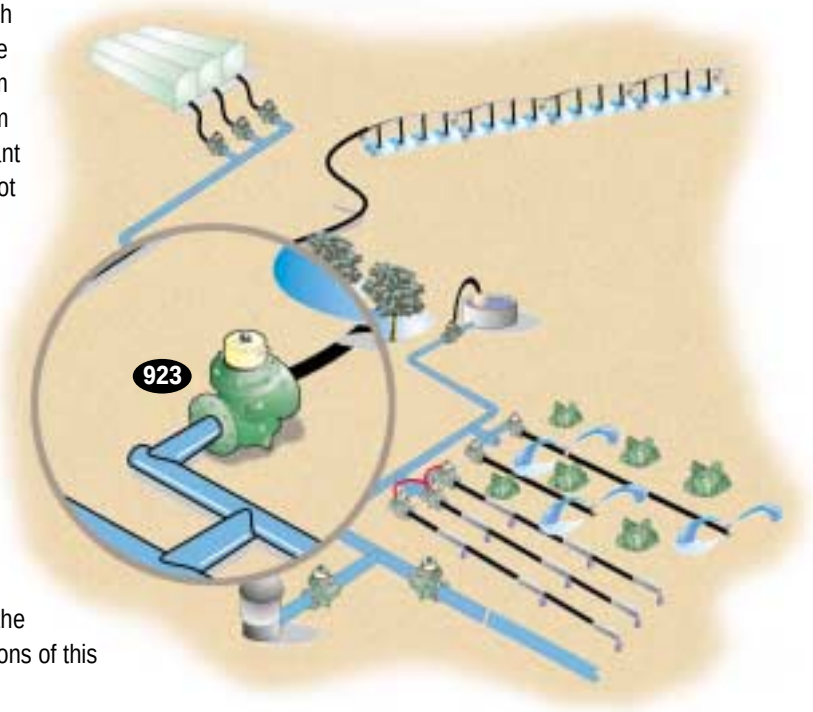
- **4A**: In-line filter
- **32A**: 3-way positioning pilot valve
- **40**: 3-way pilot valve (AMV)

Note:
For optional pilot valves, refer to the accessories section in this catalog.

923 Pressure Reducing and Pressure Sustaining Hydrometer

The Pressure Reducing and Pressure Sustaining Hydrometer Model 923 integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with two pilots. The Model 923 automatically performs three independent functions. It sustains the set minimum upstream pressure, regardless of changes in downstream use, while reducing downstream pressure to a constant preset level. The meter accuracy is independent and not affected by the action of the pressure-reducing valve.

The pressure-reducing pilot senses downstream pressure and the pressure sustaining pilot senses upstream pressure. An adjusting screw on each pilot allows setting of the desired set-point.



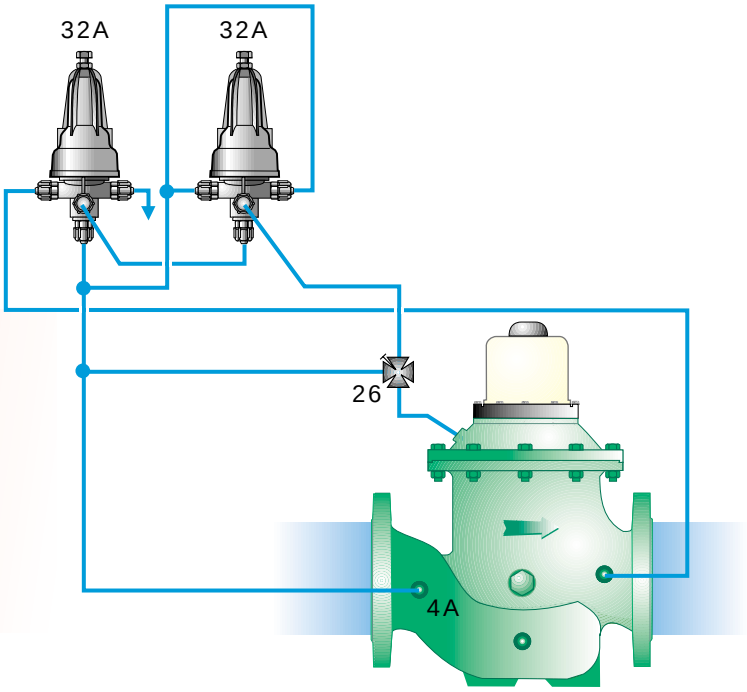
Optional Model 923 Control Heads:

- 923W - Mechanical Drive Hydrometer
- 923WM - Magnetic Drive Hydrometer
- 923D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for electrical and optical pulse generating data.

Typical Applications:

- Computerized irrigation systems in uneven terrain where inlet pressures must be sustained
- Pressure reducing / sustaining applications in municipal and industrial water supply
- Water metering



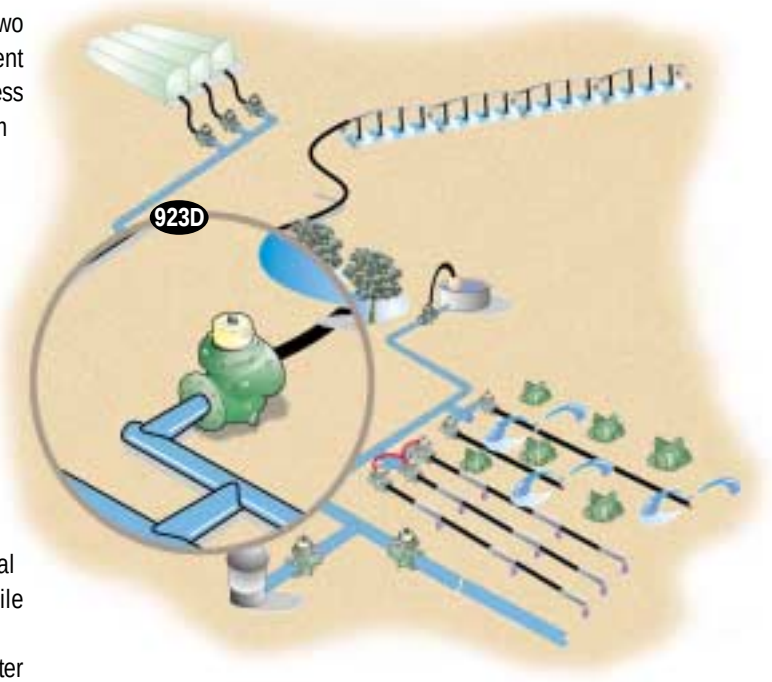
Control List:

- **4A**: In-line filter
- **26**: 4-way cock valve
- **32A**: 3-way positioning pilot valves

Note:
For optional pilot valves, refer to the accessories section in this catalog.

923D Pressure-Reducing and Pressure-Sustaining Automatic Metering Valve (AMV)

The Pressure Reducing and Pressure Sustaining Automatic Metering Valve Model 923D integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with two pilots. The Model 923D automatically performs two independent functions. It sustains the set minimum upstream pressure, regardless of changes in downstream use, while reducing downstream pressure to a constant preset level.

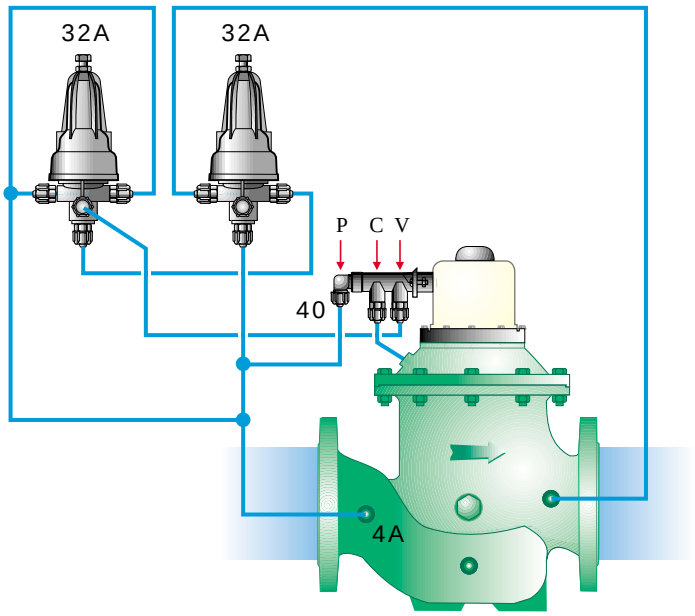


Independent Main Functions:

- Accurately meters water
- Delivers a preset quantity of water regardless of changing pressure or flow rate
- Maintains a constant preset downstream pressure and a minimum upstream pressure regardless of system changes

Typical Applications:

- Semi-automatic irrigation systems where topographical conditions dictate the need for pressure reduction while maintaining a minimum upstream pressure
- Industrial dosing operations requiring constant pressure water supply while maintaining a minimum upstream pressure



Control List:

- **4A**: In-line filter
- **32A**: 3-way positioning pilot valves
- **40**: 3-way pilot valve (AMV)

Note:
For optional pilot valves, refer to the accessories section in this catalog

927 Pressure Reducing and Flow Rate Control Hydrometer

The Pressure Reducing and Flow Rate Control Hydrometer Model 927 integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with both pressure-reducing and flow-rate pilots. The Model 927 accurately maintains a preset downstream pressure and controls the maximum flow rate, to a settable rate, regardless of system pressure or flow changes. The 2-way or 3-way pressure-reducing pilot senses downstream pressure and the flow-rate pilot senses upstream flow. Both pilots modulate the main valve to the desired preset pressure and rate of flow. An adjusting screw on each pilot determines the pressure and flow set-points. The meter accuracy is independent and not affected by the action of the valve.

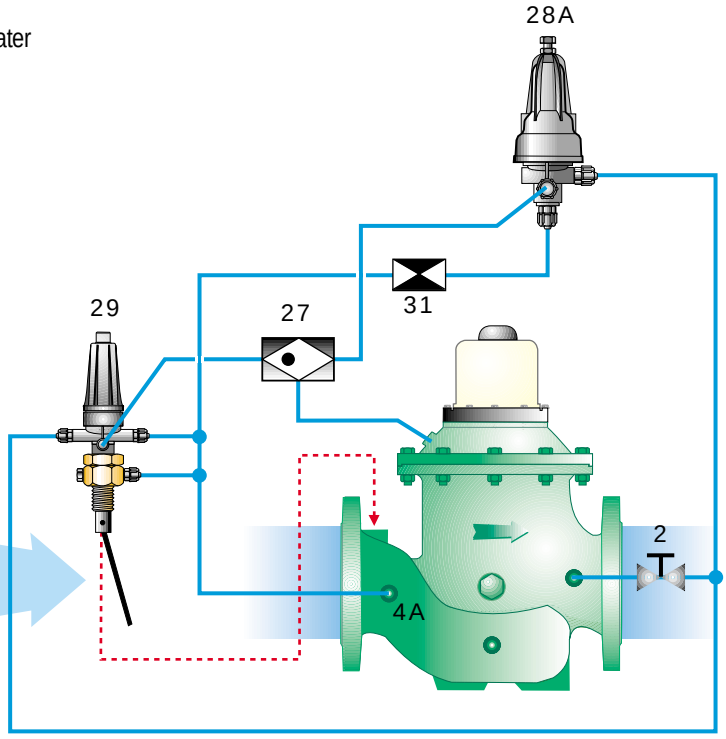
Optional Model 927 Control Heads:

- 927W - Mechanical Drive Hydrometer
- 927WM - Magnetic Drive Hydrometer
- 927D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for electrical and optical pulse generating data.

Typical Applications:

- Computerized irrigation systems in uneven terrain where maximum flow rate must be limited
- Pressure-reducing applications in municipal and industrial water supply where maximum flow rate must be limited
- Water metering



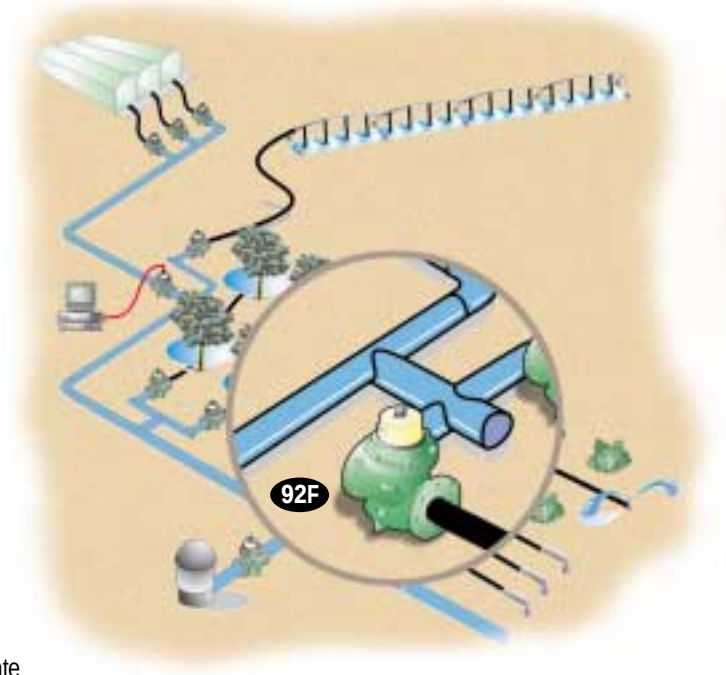
Control List:

- **2:** Cock valve
- **4A:** In-line filter
- **27:** Pressure shuttle valve
- **28A:** 2-way pressure reducing pilot valve
- **29:** Flow pilot valve (paddle type)
- **31:** Restriction orifice

Note:
For optional pilot valves, refer to the accessoriessection in this catalog.

92-F Pressure-Reducing and Flow-Limiter Control Hydrometer

The Pressure-Reducing and Flow Limiter Control Hydrometer Model 92-F integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with pressure-reducing and flow-control-limiting device. The valve is designed to accurately maintain a preset downstream pressure and limit the flow rate to a fixed value regardless of system pressure changes. The meter accuracy is not affected by the valve action. The pressure-reducing pilot valve (3-way or 2-way) senses downstream pressure and the flow control device is designed to maintain the desired flow according to line conditions and the user's needs. The flow control device maintains a constant volume output with varying inlet pressure using flow controls with a pressure sensitive orifice.



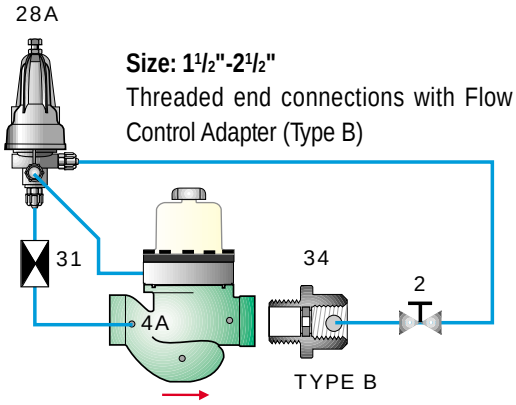
Optional Model 92-F Control Heads:

- 92-FW - Mechanical Drive Hydrometer
- 92-FWM - Magnetic Drive Hydrometer
- 92-FD - Automatic Metering Valve (AMV)

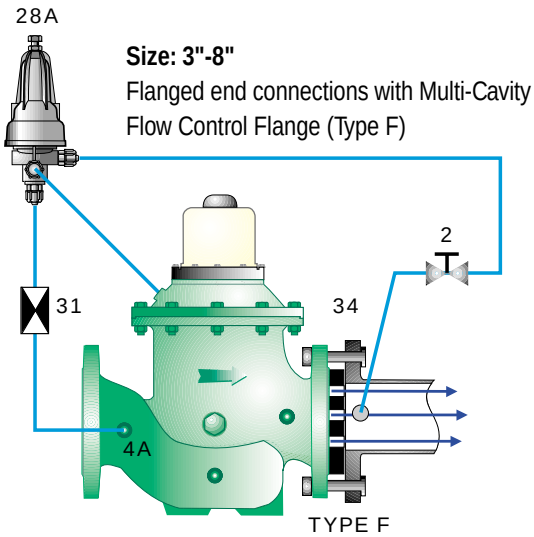
Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant section of this catalog for electrical and optical pulse generating data.

Typical Application:

- Irrigation control head
- Water distribution systems
- Water metering



Size: 1½"-2½"
Threaded end connections with Flow Control Adapter (Type B)



Size: 3"-8"
Flanged end connections with Multi-Cavity Flow Control Flange (Type F)

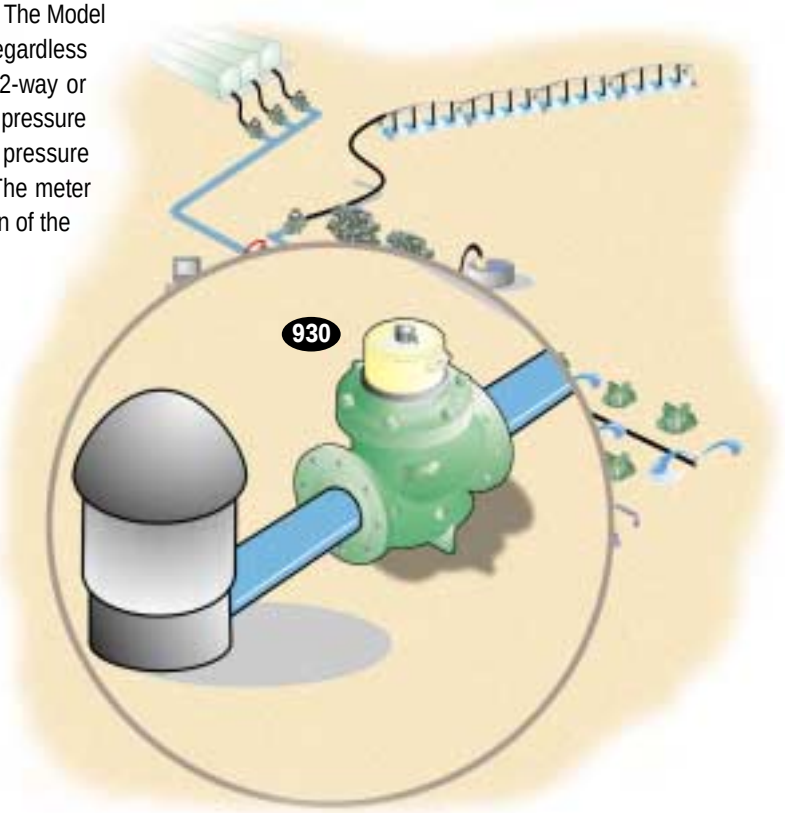
Control List:

- **2:** Cock valve
- **4A:** In-line filter
- **28A:** 2-way pressure reducing pilot valve
- **31:** Restriction orifice
- **34:** Flow control limiters (Type B or F)

Note:
For optional pilot valves, refer to the accessories section in this catalog.

930 Pressure-Sustaining Hydrometer

The Pressure-Sustaining Hydrometer Model 930 integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with a pressure-sustaining pilot. The Model 930 sustains a constant preset upstream pressure regardless of changes in flow rate or upstream pressure. The 2-way or 3-way pressure-sustaining pilot senses the upstream pressure and modulates the main valve to the desired preset pressure which is set using the adjusting screw on the pilot. The meter accuracy is independent and not affected by the action of the pressure-sustaining valve.



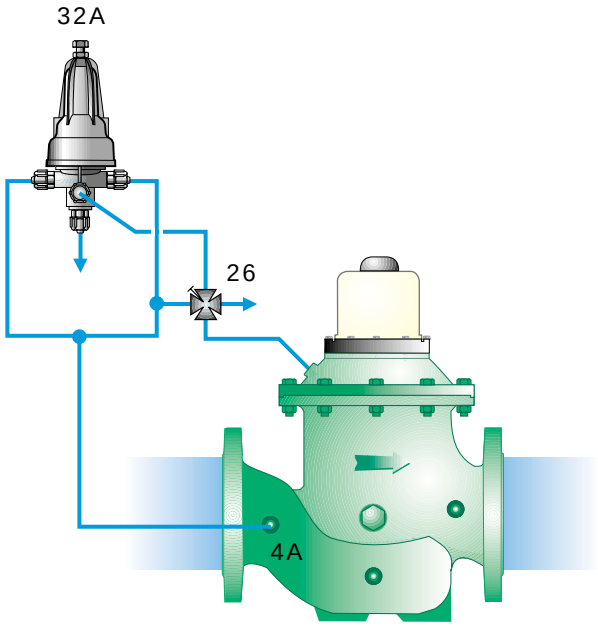
Optional Model 930 Control Heads:

- 930W - Mechanical Drive Hydrometer
- 930WM - Magnetic Drive Hydrometer
- 930D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for electrical and optical pulse generating data.

Typical Applications:

- Computerized irrigation systems
- Pump/system protection
- Water metering



Control List:

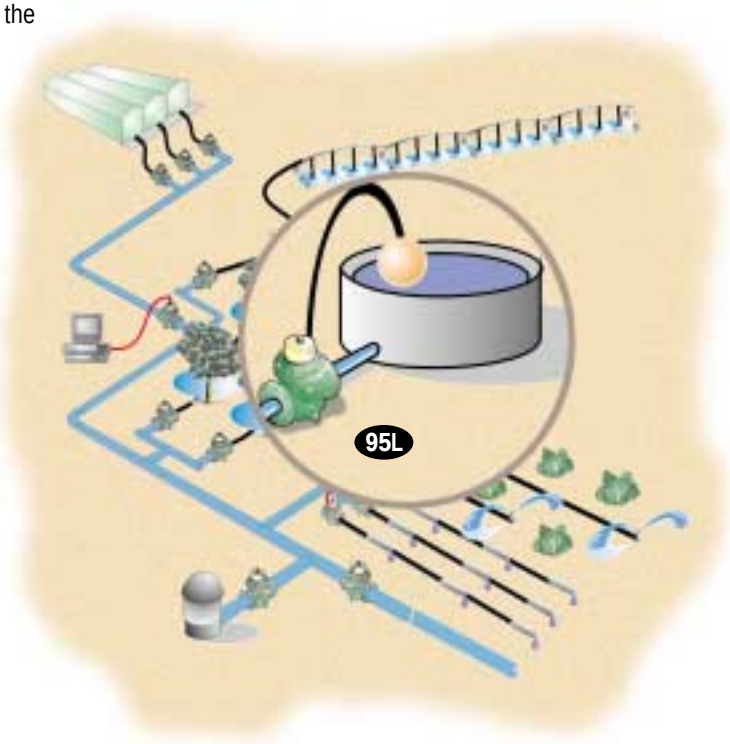
- **4A:** In-line filter
- **26:** 4-way cock valve
- **32A:** 3-way positioning pilot valve

Note:
For optional pilot valves, refer to the accessories section in this catalog.

95L Float and Level Control Hydrometer

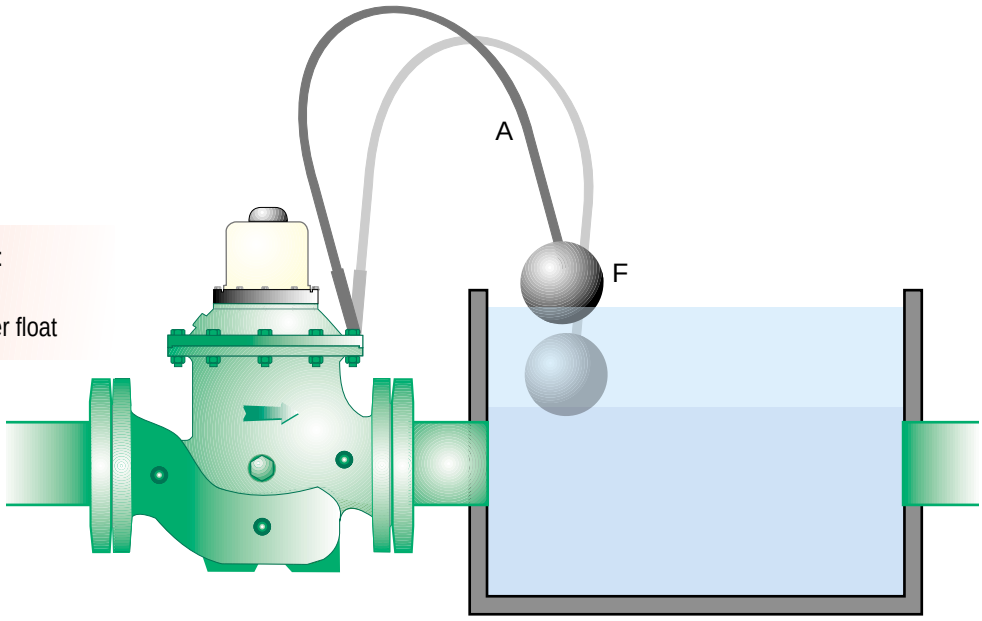
Internationally Patented

The Float and Level Control Hydrometer Model 95L integrates a vertical turbine Woltman-type water meter and a float/level control assembly which mechanically tightly shuts off or fully opens the Hydrometer according to the water level. The patent protected model 95L is designed for highly accurate control of the water level in tanks and reservoirs at low pressure rating (up to 0.5 bars). The control head simultaneously provides extremely accurate water metering data.



Typical Applications:

- Low-pressure distribution line control
- Water metering



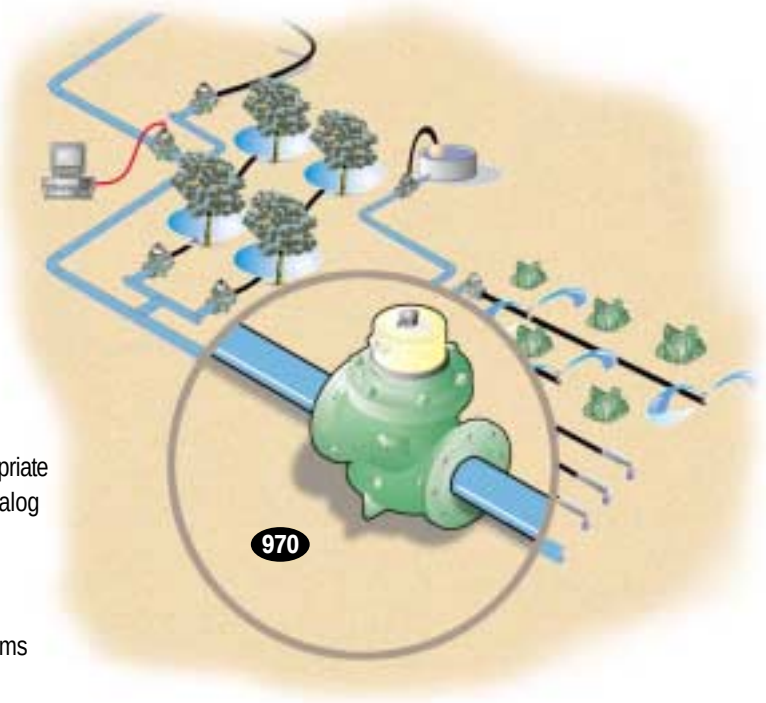
Control List:

A = Lift arm
F = Large diameter float

970 Flow Rate Control Hydrometer (Paddle Type)

The Flow Rate Control Hydrometer Model 970 integrates a vertical turbine Woltman-type water meter and a diaphragm-actuated control valve equipped with a flow-rate pilot. The Model 970 is designed to accurately maintain a preset rate-of-flow of system pressure changes. The 2-way flow control (paddle-type) pilot moves in relation to increased flow rate and hydraulically-modulates the main valve to close. When the flow rate decreases to the flow-rate-pilot set-point, the main valve is hydraulically commanded to open.

The meter accuracy is independent and not affected by the action of the valve.



Optional Model 970 Control Heads:

- 970W - Mechanical Drive Hydrometer
- 970WM - Magnetic Drive Hydrometer
- 970D - Automatic Metering Valve (AMV)

Any of these control heads may be equipped with the appropriate pulse generator. Refer to the relevant sections of this catalog for electrical and optical pulse generating data.

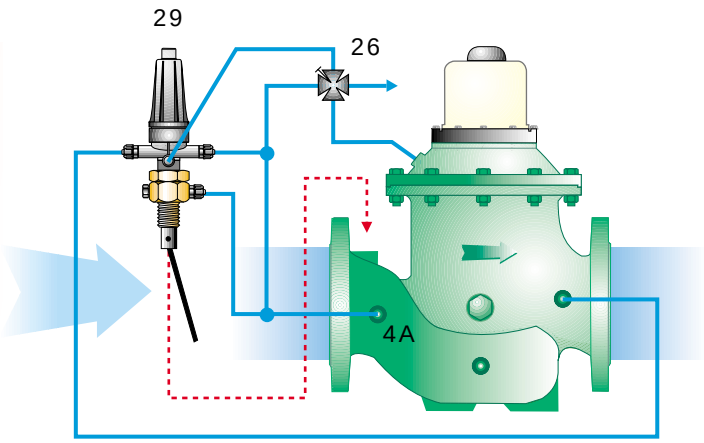
Typical Applications:

- Limit flow rate to prevent excessive flow in filtering systems and main lines
- Limit supply to sub-mains or distribution lines
- Water metering

Control List:

- **4A:** In-line filter
- **26:** 4-way cock valve
- **29:** 2-way flow control, mini pilot valve (Paddle Type)

Note:
For optional pilot valves, refer to the accessories section in this catalog.



Hydrometers, Water Meters & Automatic Metering Valves

IR 4” 920 W0 55 G I

SECTOR

Description	Code
Irrigation	IR
IR Aggressive Water	IA
Waterworks	WW
WW Drinking Water	WD
WW Aggressive Water	WA

SIZE

Description		
1 1/2”	40 mm	
2”	50 mm	
2 1/2”	65 mm	(pattern H only)
3”	80 mm	
4”	100 mm	(also pattern H)
6”	150 mm	
8”	200 mm	
3” R		(Globe only)
4” R		
5” R		(Globe only)
6” R		(Globe only)

PRIMARY FEATURE

Description	Code
Basic AMV/Hydrometer	900
Basic AMV/Hydrometer Low Pressure	90L
Water Meter Only	901
Basic AMV/Hydrometer with Flow Limiter	90F
Solenoid - Controlled Hydrometer	910
Multi-Step (Digital) Controll Hydrometer	918
Pressure - Reducing with Flow Limiter Hydrometer	92F
Pressure - Reducing Hydrometer	920
Pressure - Reducing & Sustaining Hydrometer	923
Flow Control Hydrometer - Constant Downstream Pressure	927
Pressure - Sustaining Hydrometer	930
Pressure - Sustaining Hydrometer with Flow Limiter	93F
Level Control Hydrometer	950
Level Control Hydrometer with Flow Limiter	95F
Level Control Hydrometer - Low Pressure, Mechanical	95L
Level Control Hydrometer - Pressure- Sustaining	953
Level Control Hydrometer - Flow Limiter	957
Flow Control Hydrometer	970
Flow Control & Pressure - Reducing Hydrometer	972
Flow Control & Pressure - Sustaining Hydrometer	973
Flow Control - Pressure - Reducing & Sustaining Hydrometer	975

Other primary features available on request.

CONTROL CATEGORIES

Description	Code
Without Control Command - PN 10	00
Without Control Command - PN 16	02
Automatic Metering Valve (AMV) - PN 10	D0
Automatic Metering Valve (AMV) - PN 16	D2
Sequential Automatic Metering Valve - PN 10	DD
Sequential Automatic Metering Valve - PN 16	E2
Hydrometer Control Valve - PN 10	W0
Hydrometer Control Valve - PN 16	W2
Hydrometer with Magnetic Drive Command - PN 16	MO

NOTE: *PN 16 models are required for working pressure above 10 bar and are standard for hydrometers with magnetic drive command.*

ADDITIONAL FEATURE

Description	Code
No Additional Feature	00
Closing Speed - Control	01
Closing and Opening Speed- Control	03
Hydraulic Regulation Override	09
Digital Control	18
Check Valve	20
Solenoid - Controlled & Check Valve	25
Two Stage opening	30
Multi- Setting Levels- Electrically Selected	45
Quick Closing at Downstream Pressure Rise	48
Closing Procedure Stoping at Upstream Pressure Rise	49
Hydraulic Remotely- Controlled	50
Hydraulic Relay- Control	54
Solenoid- Controlled	55
Electric Override	59
Modulating Horizontal Float	60
Electric Switch Controlled	65
Bi-Level Vertical Float	66
Modulating Vertical Float	67
Mechanical Float Type A	0A
Flow Control By Flow Limiter	0F

Other additional features available on request.

PATTERN

Description	Code
Globe	G
Angle (2”, 3”, 4”, 4”R, 6” & 8”)	A
Hydrant - Angle 120°	H (2 1/2” & 4” only)

CONSTRUCTION MATERIALS

Description	Code
Cast Iron	I
Ductile Iron	C

16 PG 4AC PP WAT M03 KX

END CONNECTIONS

Description	Code
ISO-16	16
ISO-10	10
IS4-10	14 (ISO 10/4 Holes)
ANSI-125	A1
ANSI-150	A5
BST-D	BD
JIS-7.5	J7
JIS-10	J1
JIS-16	J6
BSP.F	BP (1½", 2" & 3" R only)
BSP-U (Ex.Thred.)	BS (1½" & 2" only)
NPT	NP (1½", 2" & 3" R only)
Hydrant 2½" BSP.F	HP
ABNT-10	B1
ABNT-16	B6

Other end connections available on request.

COATING

Description	Code
Polyester Green RAL 6017	PG
Polyester Blue RAL 5010	PB
Epoxy FB Blue RAL 5005	EB

Other coatings available on request.

VOLTAGE-MAIN VALVE POSITION

(When Solenoid De-Energized)

Description	Code
24VAC/50HZ - Normally Closed	4AC
24VAC/50HZ - Normally Open	4AO
24VAC/50HZ - Last Position	4AP
24VAC/60HZ - Normally Closed	46C
24VAC/60HZ - Normally Open	46O
24VAC/60HZ - Last Position	46P
24VDC - Normally Closed	4DC
24VDC - Normally Open	4DO
24VDC - Last Position	4DP
24VDC - Latch Solenoid	4DS
12VDC - Normally Closed	1DC
12VDC - Normally Open	1DO
12VDC - Last Position	1DP
12VDC - Latch Solenoid	1DS
9VDC - Latch Solenoid	9DS
12VDC - Latch Solenoid + RTU Bracket	1TS
9VDC - Latch Solenoid + RTU Bracket	9TS
RTU Bracket without Solenoid	NTS

Other electrical ratings available on request.

TUBING & FITTING

Description	Code
Plastic Tubing & Fittings	PP
Copper Tubing & Brass Fittings	CB
Plastic (Reinforced) Tubing & Brass Fittings	PB

DIAL CAPASITY

Description	Code	
Hydrometer		
Select Pulse Rate	WAT	
AMV m³		
3.8 m³	004	1½", 2", 3"R, 3", 4"R
12 m³	012	
40 m³	040	
80 m³	080	4", 6", 8"
120 m³	120	
150 m³	150	
200 m³	200	
350 m³	350	
600 m³	600	
800 m³	800	
1,200 m³	1K0	
2,100 m³	2K0	
3,500 m³	3K0	1½", 2", 3"
6,000 m³	6K0	
8,000 m³	8K0	
12,000 m³	12K	
21,000 m³	21K	
AMV U.S. Gallon		
13,000 Gal	1G0	
50,000 Gal	5G0	
130,000 Gal	1KG	
210,000 Gal	2KG	4", 6", 8"
500,000 Gal	5KG	
875,000S Gal	8KG	
1,300,000 Gal	1MG	
2,100,000 Gal	2MG	

Gal = U.S. Gallon

AMV ELECTRICAL PULSE

	10m³ 100Gal	10m³ 1000Gal
1½", 2", 3"R	●	
3", 4"R	●	
4", 6"R	●	
6"		●
8"		●

Gal = U.S. Gallon

HYDROMETER PULSE RATE

Size \ One pulse per	1 Liter	10 Liter		100 Liter		1 m³		10 m³	
1½"-2"-3"R	■	●	▲	●	▲	●	▲		
3"	■	●	▲	●	▲	●	▲	●	
4"	■	●		●	▲	●	▲	●	
6"			■		●	●	▲	●	▲
8"			■		●	●	▲	●	▲

▲ Reed-switch (Mechanical drive)
● Reed-switch (Magnetic drive)
■ Opto-Electric (Magnetic drive only)

PULSE RATE

		Description	Code
Mechanic Transmission		Autometering Valve	
		No Pulse	NPS
		Automatic Pulse Selection	DAT
		Hydrometer	
	Reed Switch	No Pulse	NPS
		0.01 m³ Pulse	M01
		0.1 m³ Pulse	M02
		1 m³ Pulse	M03
		10 m³ Pulse	M04
		0.005 m³ Pulse	M07
		0.02 m³ Pulse	M08
		10 Gal Pulse	MG4
		100 Gal Pulse	MG5
		1000 Gal Pulse	MG6
		0.1 m³ Pulse + 0.01 m³ Pulse	M12
		1 m³ Pulse + 0.1 m³ Pulse	M23
Magnetic Transmission (Hydrometer only)		No Pulse	RNP
	Reed Switch	Reed 0.01 m³	R01
		Reed 0.1 m³	R02
		Reed 1 m³	R03
		No Pulse Gal	RNG
		Reed 1 Gal	RG3
		Reed 10 Gal	RG4
		Reed 100 Gal	RG5
		Reed 1000 Gal	RG6
		Reed 0.1 m³ + 0.01 m³	R12
		Reed 1 m³ + 0.1 m³	R23
		Reed 10 m³ + 1 m³	R34
		Reed 10 Gal + 1 Gal	G34
		Reed 100 Gal + 10 Gal	G45
		Reed 1000 Gal + 100 Gal	G56
	Opto 4-20mA	Opto 0.001 m³	P01
		Opto 0.01 m³	P10
		Opto 0.1 Gal	PG2
		Opto 1 Gal	PG3
	Opto + Reed	0.001 m³ Opto + 0.1 m³ Reed	PQ1
		0.01 m³ Opto + 1 m³ Reed	P13
		0.1 Gal Opto + 10 Gal Reed	P4G
		1 Gal Opto + 100 Gal Reed	P5G

Other pulse rate available on request.

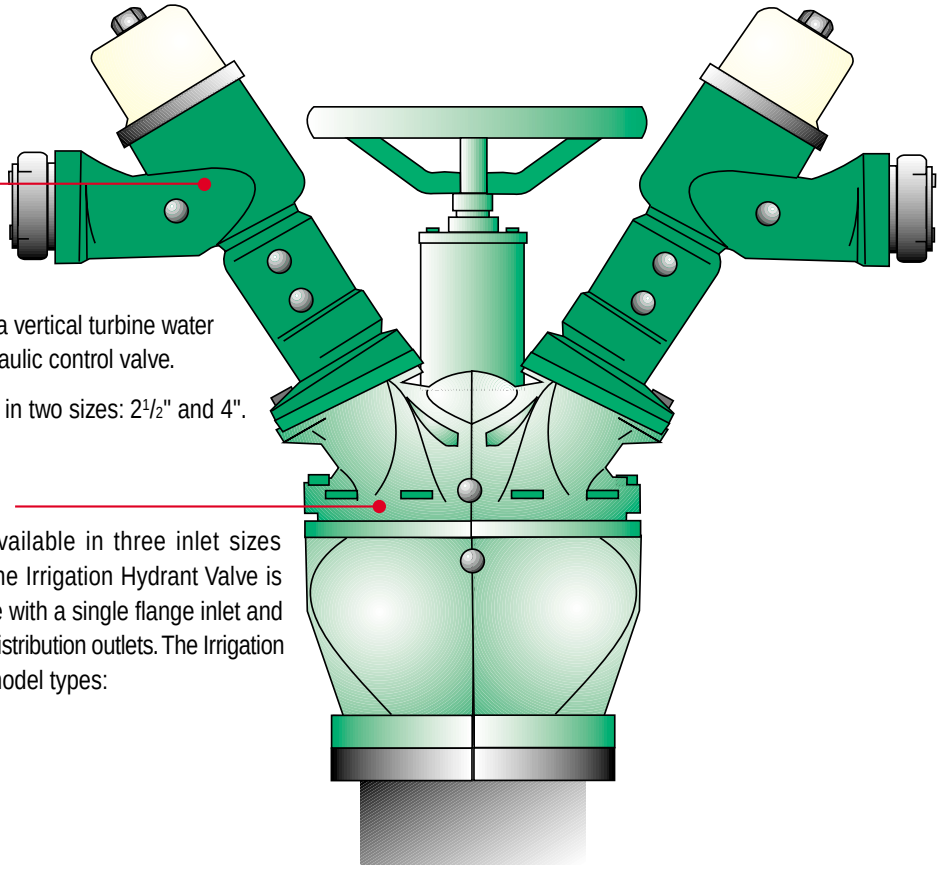
ADDITIONAL ATTRIBUTES

Description	Code
3-Way Control	X
Plastic Control Accessories	K
Metal Control Accessories	R
Low Preset Pressure (below 3 bar)	2
Paddle Flow Control Pilot	V
Plastic Gauge Test Point	5
Manual Selector	Z
Ceramic Bearing	B
Orifice Assembly	U
Y Control Strainer	Y
Large Control Filter	F
BSP-U Records Assembly	M
Re-Calibration Option	N
Homologation Approved	L
Pump Shut Off Assy	S

Other additional attributes are optional. Please consult our sales department for further information.

Irrigation Hydrant

The Irrigation Hydrant is a unique valve assembly unit designed for irrigation and water supply distribution for multiple farms units. The Irrigation Hydrant consists of two main parts: a Hydrometer Type H (Nozzle, Outlet) and Irrigation Hydrant Valve. The Hydrometer Type H is mounted on top of the Irrigation Hydrant Valve.



Hydrometer Type H

The Hydrometer Type H is a 120-degree elbow-shaped Hydrometer. As with other Hydrometers, the Type H integrates a vertical turbine water meter and diaphragm-actuated hydraulic control valve.

The Hydrometer Type H is available in two sizes: 2½" and 4".

Irrigation Hydrant Valve

The Irrigation Hydrant Valve is available in three inlet sizes (80 mm, 100 mm, and 150 mm). The Irrigation Hydrant Valve is an on/off hand-wheel operated valve with a single flange inlet and one (1), two (2), three (3) or four (4) distribution outlets. The Irrigation Hydrant Valve is available in three model types:

- Type F-82
- Type A-102
- Type A-104

Applications:

- Regional water supply distribution systems
- Agricultural water control systems
- Efficiency irrigation control heads

Irrigation Hydrant

Valve Types

The Irrigation Hydrant Valve, as a base, consists of a flange at the inlet side and one to four outlets, which can have either triangle or standard type flanges. The valve consists of a cover, stem-seal and mechanical shut-off mechanism. The valve components are designed, machined and assembled to provide a progressive variation of flow during closing or opening. The valves are designed to reduce water surge in the collective distribution system.

Type F-82

End connections:

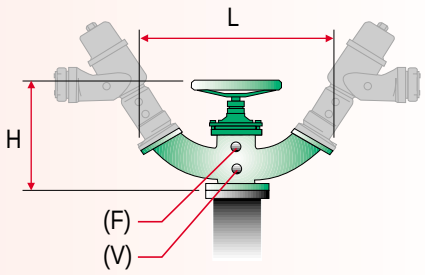
Inlet: 3" (80 mm) available conforming to major standards (option: 100 mm flange)

Outlets: 2½" triangle flange

Optional type: F-81 with single outlet

F - Optional port for automatic anti-freezing cock valve

V - Optional port for air venting cock valve



Type A-102

End connections:

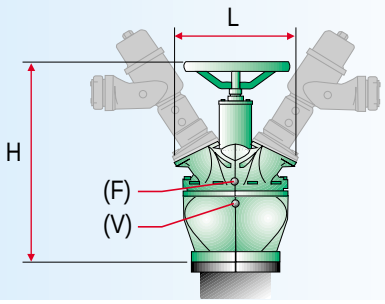
Inlet: 4" (100 mm) available conforming to major standards

Outlets: 4" (100 mm) round, available conforming to major standards

Optional type: A-152 with 6" (150 mm)-flange inlet

F - Optional port for Automatic Anti-Freezing Cock Valve

V - Optional port for Air Venting Cock Valve



Type A-104

End connections:

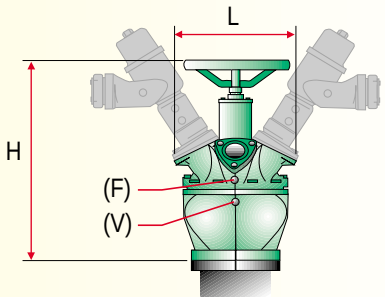
Inlet: 4" (100 mm) available conforming to major standards

Outlets: 2½" triangle flange

Optional type: A-154 with 6" (150 mm) flange inlet

F-Optional port for Automatic Anti-Freezing Cock Valve

V-Optional port for Air Venting Cock Valve

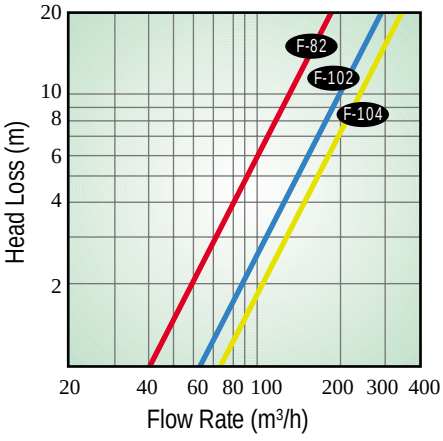


Dimensions and Weights

Type	F-82	A-102	A-104
L (mm)	490	520	360
H (mm)	360	680	640
Weight (Kg.)	27.0	65.0	51.5
No. of Outlets:	1-2	1-2	1-4

** Other types available on request.*

Flow Chart



Irrigation Hydrant

Hydrometer Type H (Outlet, Nozzle)

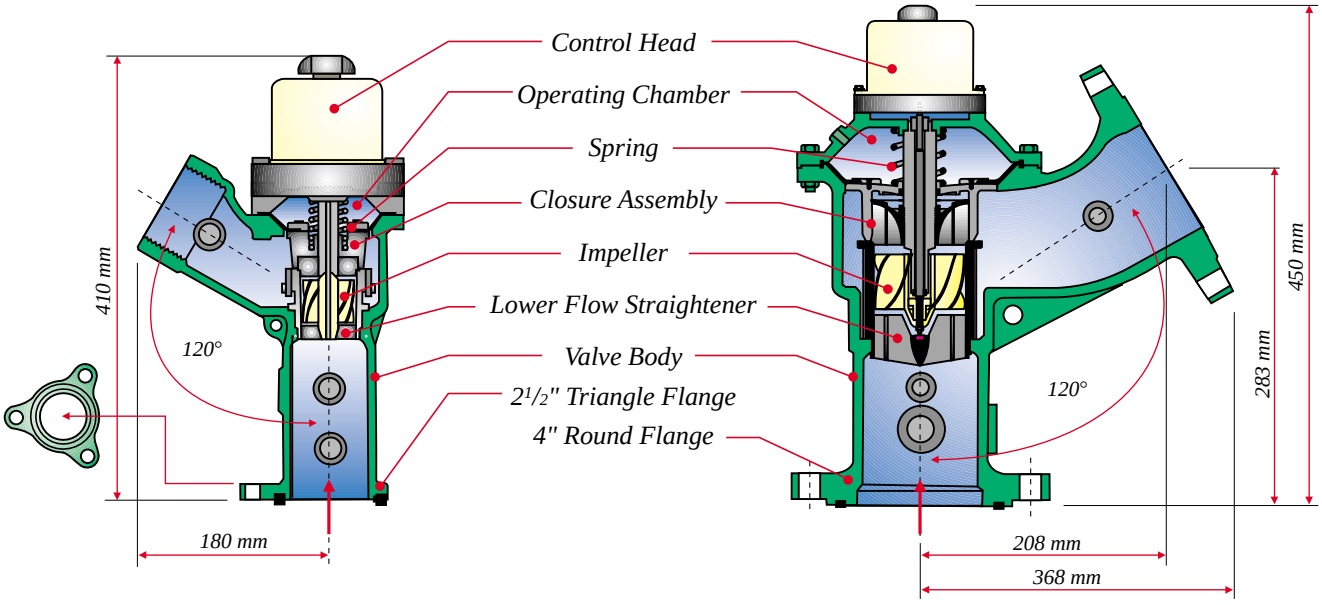
The Type H Hydrometer is a 120-degree elbow-shaped device consisting of a vertical turbine Woltman-type water meter and a pilot-operated diaphragm-actuated control valve. The product is designed to be mounted on top of an Irrigation Hydrant base-valve for irrigation and water supply network applications.

The Type H Hydrometer is unique in its body shape but similar to all other Hydrometers in its functions; on/off, modulating, water metering, dosing, and electric pulse generating options.

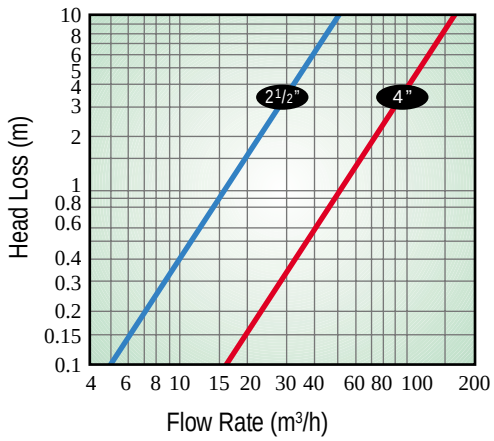
The 120-degree, elbow-shaped Type H Hydrometer, is designed to enable horizontal line connection when it is mounted on top of an Irrigation Hydrant Valve.

2½" Hydrometer Type H
(Basic Model)

4" Hydrometer Type H
(Basic Model)



Type H Flow Chart (for basic valve)



2½" Optional End Connections:

- 2½" Quick-connector with plug
- 2½" GB (BSP F) thread
- 3" (80mm) End connections complying to other standards available

Weight: 9.0 Kg.

4" Optional End Connections:

- 4" Quick-connector with plug
- 4" GB (BSP F) thread
- 4" (100mm) End connections complying to other standards available

Weight: 25.0 Kg

92-F Pressure Reducing and Flow Limiter Control 2½" Hydrometer Type H

The Pressure Reducing Flow Limiter Control 2½" Hydrometer Type H integrates a vertical turbine Woltman-type water meter and diaphragm-actuated control valve equipped with pressure reducer and flow limiter device. The 2½" Type H valve is designed to accurately maintain a preset downstream pressure and limit the flow rate to a fixed value regardless of system pressure changes. The meter accuracy is not affected by the valve action.

The pressure-reducing pilot valve (3-way or 2-way) senses downstream pressure and the flow control device designed to maintain desired flow according to the line conditions and user needs.

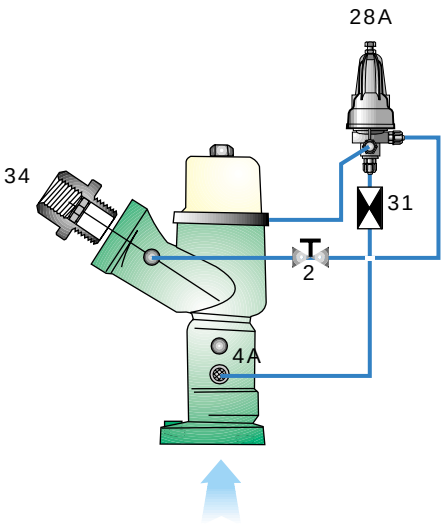
The Flow Control Device maintains a constant volume output with varying inlet pressure using flow controls with a pressure sensitive orifice.

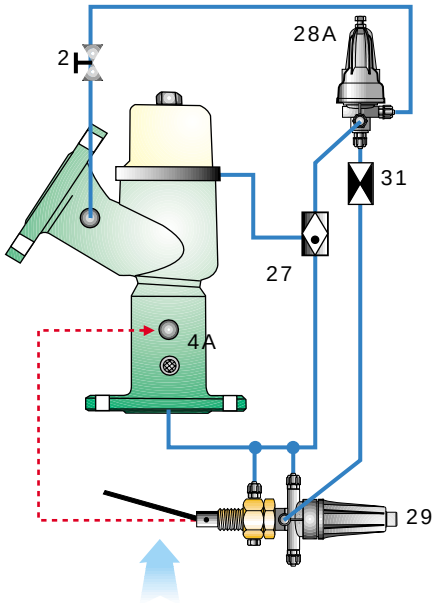
927 Pressure Reducing and Flow Rate Control 2½" and 4" Hydrometer Type H

The Pressure Reducing and Flow Rate Control 2½" and 4" Hydrometer Type H integrates a vertical turbine Woltman-type water meter and diaphragm-actuated control valve equipped with both pressure-reducing and flow rate control (paddle type) pilot valve. The 927 Type H is designed to accurately maintain a preset downstream pressure and limit the rate of flow to a preset value regardless of system pressure changes. The 3-way or 2-way pressure-reducing pilot valves senses upstream flow. Both pilots modulate the main valve to the desired preset pressure and rate of flow. Adjusting screws on each pilot determines the pressure and flow set-point. The meter accuracy is independent and not affected by the valve action.

Typical Applications:

- Irrigation head control
- Computerized irrigation systems in uneven terrain where maximum flow rate must be limited
- Pressure-reducing applications in rural water supply where maximum flow rate must be limited





Control List

2: Cock valve
4A: In-line filter
28A: 2-way pressure-reducing pilot valve
31: Restriction orifice
34: Flow control limiter (Type B)

Control List

2: Cock valve
4A: In-line filter
27: Pressure shuttle valve
28A: 2-way pressure reducing pilot valve
29: 2-way flow control valve (paddle-type)
31: Restriction orifice

Irrigation Hydrant

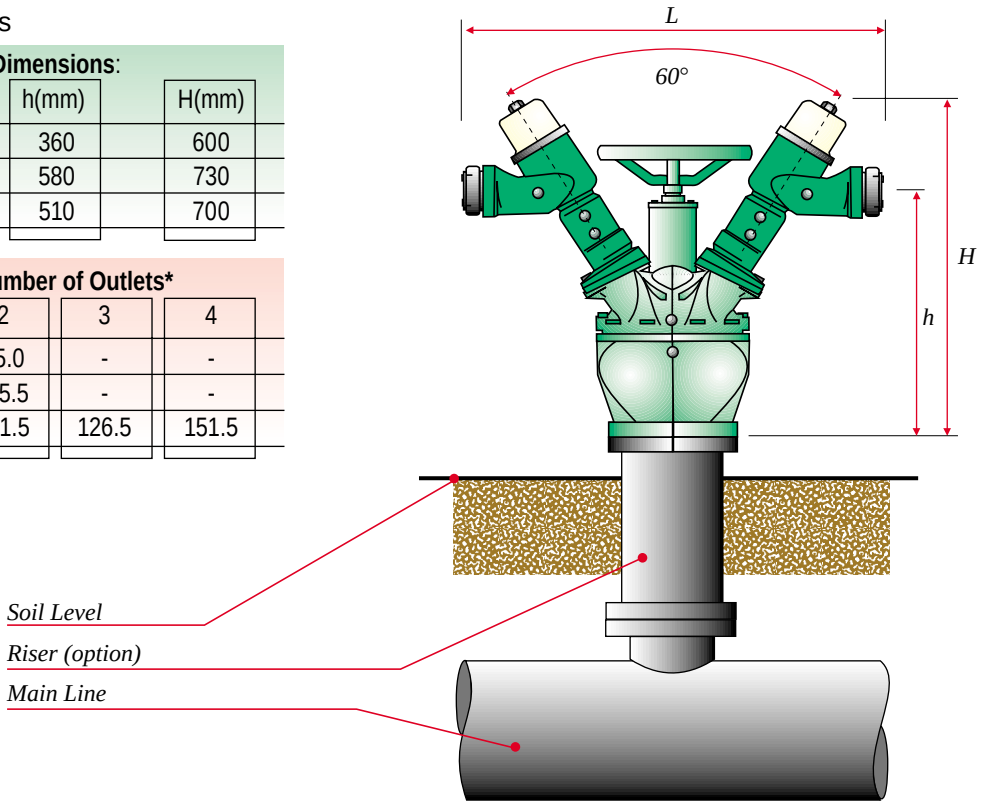
Total Assembly

Dimensions and Weights

Type	Dimensions: L(mm)	h(mm)	H(mm)
F-82	1040	360	600
F-102	1100	580	730
F-104	970	510	700

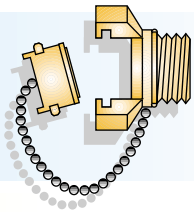
Weight (Kg.)	Number of Outlets* 1	2	3	4
F-82	36.0	45.0	-	-
F-102	90.5	115.5	-	-
F-104	76.5	101.5	126.5	151.5

* Hydrometer type H

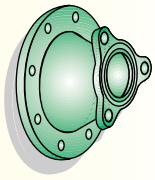


Irrigation Hydrant Accessories

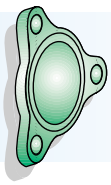
- **2½" (65 mm) and 4" (100 mm) quick-connector and plug**
  (Guillemin Coupling)
  For use on 2½" **(65 mm)** and 4" **(100 mm)** Hydrometer Type H with threaded end



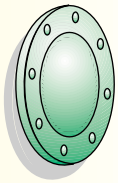
- **2½" (65 mm) triangle flange x 4" (100 mm) flange adapter**
  For use on type A-104 irrigation Hydrant Valve outlets to connect to **2½" (65 mm)** Hydrometer Type H
- **4" (100mm) flange x 2½" (65 mm) triangle flange**



- **2½" (65 mm) triangle cover**
  To block unused F-82 and F-104 Irrigation Hydrant valve outlets



- **4" (100mm) Cover**
  To block 4" (100mm) flange outlets



Irrigation Hydrant

Ordering Guide

Example

9H2 * 08 * 02 * 24 * P0 * VF

Irrigation Hydrant Valve

Number of Outlets

1 Outlet	9H1
2 Outlets	9H2
3 Outlets	9H3
4 Outlets	9H4

Inlet Size

80mm	08
100mm	10
150mm	15

Hydrometer Type H

Nominal Size

2½"	02
4"	04

Flange Adapters

2½" Triangle Flange x 4" Round Flange	24
4" Round Flange x 2½" Triangle Flange	42

Covers

Triangle 2½"	P0
Round 4"	P4

Options

Automatic Anti-Freezing Cock Valve	F
Automatic Air-Vent	V
None	0

Note:

- For Hydrometer Type H functions and categories, refer to the general Ordering Guide on Page 25
- Flanges complying to other standards available on request

Mini Pilots - Plastic Group (PCP)

For Hydrometers size: 1½" - 4"
Pressure rating: 10 bar

- PCP-X-A 3-way Multi-purpose Pilot Valve - upstream and downstream pressure-modulating
- PCP-20-A 2-way Pressure-Reducing Pilot Valve - downstream pressure-modulating.
- PCP-30-A 2-way Pressure-Sustaining Pilot Valve - upstream pressure-modulating.
- Two-stage Opening Pilot

Mini pilots - Metal Group (PCM)

For Hydrometers size: 1½" - 4"
Pressure rating: 16 bar

- PCM-X-A 3-way Multi-purpose Pilot valve - upstream and downstream pressure-modulating
- PCM-20-A 2-way Pressure-Reducing pilot valve - downstream pressure-modulating
- PCM-30-A 2-way Pressure-Sustaining pilot valve - upstream pressure-modulating

Pilots - Metal Group (PLT)

For Hydrometers size: 6" - 8"
Pressure rating: 16 bar

- PLT #X 3-way Positioning Pilot Valve - upstream or downstream pressure modulating
- PLT #2 2-way Pressure-Reducing pilot valve - downstream pressure modulating
- PLT #3 2-way Pressure-Sustaining Pilot Valve - upstream pressure modulating

Flow Control Pilot Valve (PC Paddle Type)

Preset flow limiter

- PC-70-P 2-way Flow Control Pilot Valve - paddle type-plastic, 10 bar pressure rating
- PC-70-M 2-way Flow Control Pilot Valve - paddle type-metal, 16 bar pressure rating

Bermad Solenoid Type

- **S-390-2** (2-way), N.C. Solenoid Valve
  Operating Voltage:
  AC: 24V
  DC: 12V or 24V
  Pressure Rating: 10 bar

- **S-390-3** (3-way) N.O. or N.C. Solenoid Valve
  Operating Voltage:
  AC: 24V
  DC: 12V or 24V
  Pressure Rating: 10 bar

Bermad Latch Solenoid Type

- **S-392-2** (2-way) N.C. latch (Pulsed) Solenoid Valve
  Operating Voltage: DC6 - 40V
  Pressure Rating: 10 bar

- **S-392-3** (3-way) N.O. latch (Pulsed) Solenoid Valve
  Operating Voltage: DC9 - 40V
  Pressure Rating: 10 bar

- **S-982** (2 Wires, 3-way) N.O. latch (Pulsed) Solenoid Valve
  Operating Voltage: DC 12 - 40V
  Pressure Rating: 10 bar

- **S-985** (3 Wires, 3-way) N.O. latch (Pulsed) Solenoid Valve
  Operating Voltage: DC 12 - 24V
  Pressure Rating: 10 bar

ASCO-type Solenoid Valve

For special applications - on request

Three-Position Selector

This three-position selector with four ports has been designed for selection of hydraulic control modes (open, close or automatic control). It enables manual override for opening or closing the main control valve.

Note: Other Selectors available on request

Control Filters

- **In-line Filters**
  For filtration of control loop water supply self-cleaning by water flow
  Size: 1/4", 3/8" NPT

- **Control Filter**
  For filtration of control loops

- **Large Control Filter**
  For filtration of highly contaminated water supply to control loops

Flow Limiters

These flow control devices maintain constant volume output with varying inlet pressures using flow controls with a pressure sensitive orifice.

- **Threaded Adapter Type B**
  Sizes: 1", 1½", and 2"

- **Multi-Cavity Flanged Type F**
  Sizes: 1½", 2", 3", 4", 6", and 8"

Other sizes available on request

CONTROL VALVES BERMAD

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English PC9AE01