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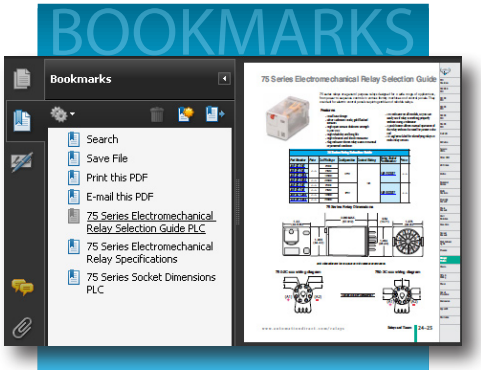
ProSense® Flow Sensors



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ProSense® Flow Switches, Transmitters and Meters

High Performance Magmeter at a Great Price

ProSense FMM Series Magmeters are designed to reliably detect the flow rate of conductive media up to 160 gallons per minute. The stainless steel, mechanically-robust design mounts directly in-line providing a compact, low-profile installation for process control.

A 4-digit numeric display with pushbutton setup simultaneously indicates flow rate, fluid temperature and total volume.

Simple to setup and easy to install, the ProSense FMM is a reliable alternative to traditional flow meters and mechanical flow switches.

These flow meters are the new benchmark for price and performance for your flow sensing applications.

Key features

- For water and water-based media
- Flow rates up to 160 gpm
- Pipe sizes up to 2″
- DC switching, pulse, frequency and analog outputs
- Monitor flow rate, total volume and temperature in one sensor

FSD and FSA Series Flow Switches and Transmitters

The FSA Series flow transmitters monitor liquid media and provide an analog output proportional to flow rate for various flow applications. The FSA series flow transmitter sensing principle is based on differential pressure which ensures extremely fast response time and allows for a precise flow measurement.

The ProSense FSD Series flow switch sensor utilizes a spring-supported piston that is lifted by the flowing medium. The piston position is detected via an inductive sensor and is output as a digital signal. The spring resets the piston to its initial position with decreasing flow.

Key features

- Ideal for applications such as machine tool coolant flow, HVAC water flow, and injection molding cooling water flow
- Immune to rapid temperature changes of media
- Fast response time
- Flow rates up to 27 gpm
- Pipe sizes up to 1″
- Integrated check valve design allows the sensor to be mounted horizontally or vertically

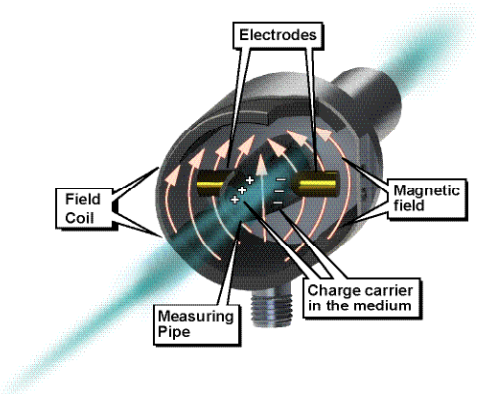
ProSense® FMM Series Magnetic-Inductive Flow Meters

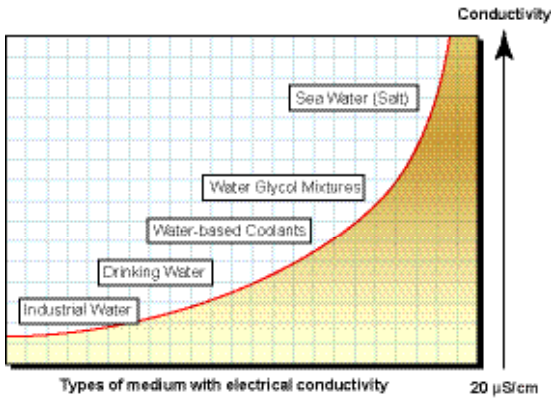
Magnetic-Inductive Flow Meter Application

Magnetic-inductive flow meters (Magmeters) are one of the most widely used technologies for liquid flow monitoring in industrial process markets such as wastewater, mining and minerals, utilities, food and beverage, and pharmaceuticals. To ensure reliable and accurate operation, some important application requirements should be considered. Meeting the minimum conductivity of the liquid and properly installing with a full pipe are required in order to avoid significant error or the meter not functioning at all. Additionally, the presences of air bubbles should be avoided as they will affect the accuracy of the meter's measurements. Installation location in the piping is important because disturbances in the flow caused by bends in the pipe, valves, reductions, etc. can cause inaccuracies. Refer to the magmeter's specifications and operating instruction documents for specific information regarding application and installation requirements.

Magnetic-Inductive Flow Meter Measuring Principle

Magmeters operate by using the magnetic-inductive measuring principle in which a magnetic field is generated in the specified measuring pipe by current-carrying coils. When the media flows through the pipe, the ions of the conductive media are diverted perpendicularly to the magnetic field with the positive and negative charge carriers flowing in opposite directions. The two electrodes that are in contact with the medium then measure the voltage that is induced. The measured signal voltage is proportional to the average flow velocity. By knowing the inside pipe diameter of the unit, the volumetric flow rate is determined. Magmeters are suitable for use with a variety of conductive liquids in industrial process applications such as those in the following graph:





ProSense FMM Series Magnetic Flow Meter Selection Guide

Model	Price	Process Connection	Flow Range	Temperature Range	Display Units	Output 1	Output 2	Empty Pipe Detection
FMM50-1001	$460.00	1/2" FNPT	0 to 6.6 GPM	-4 to 176°F [-20 to 80°C]	GPM, GPH, GAL, or °F	Switch or pulse (flow)	Switch, analog or reset input (flow or temperature)	No
FMM75-1001	$499.00	3/4" FNPT	0 to 13.2 GPM					
FMM100-1001	$550.00	1" FNPT	0 to 26.4 GPM					
FMM150-1001	$825.00	1-1/2" FNPT	0 to 80 GPM			Switch, pulse or frequency (flow)		Yes
FMM200-1001	$890.00	2" FNPT	0 to 160 GPM					
FMM50-1002	$460.00	1/2" FNPT	0 to 6.6 GPM		GPM, GPH, LPM, m³/h, °F, °C	Analog 4-20 mA (temperature)	Analog 4-20 mA (flow)	No
FMM75-1002	$499.00	3/4" FNPT	0 to 13.2 GPM					
FMM100-1002	$550.00	1" FNPT	0 to 26.4 GPM					
FMM150-1002	$825.00	1-1/2" FNPT	0 to 79.3 GPM					Yes
FMM200-1002	$890.00	2" FNPT	0 to 158.5 GPM					

ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

Part No.FMM75-1001

Part No. FMM200-1001

Overview

AutomationDirect's ProSense FMM Series (-1001) Magmeter is designed to reliably detect the flow rate of conductive media up to 160 gallons per minute. The stainless steel, mechanically-robust design mounts directly in-line providing a compact, low-profile installation for process control. A 4-digit numeric display with pushbutton setup indicates flow rate, fluid temperature and total flow volume with selectable engineering units. Two outputs are available to remotely monitor the binary or analog status of flow rate/volume and temperature parameters. Simple to setup, easy to install and with no moving parts, the FMM is a reliable alternative to traditional flow meters and mechanical flow switches.

Features

- 1/2 to 2" NPT female process connections
- Measure up to 160 GPM
- Measure fluid temperature in addition to flow and volume
- 4-digit numeric display with pushbutton setup
- Selectable engineering units: GPM, GPH, GAL, °F, °C
- Two outputs selectable for switch, pulse, frequency or analog signals
- 4-pin M12 quick disconnect
- 5-year warranty

#E320431

Output Function Selections

Output 1:
Flow rate switch
Volumetric flow totalizer pulse
Volumetric flow totalizer preset switch
Flow rate frequency (1-1/2 and 2 inch models only)
Empty pipe detection switch (1-1/2 and 2 inch models only)

Output 2:
Flow rate switch
Temperature switch
Analog flow rate
Analog temperature
Volumetric flow totalizer reset input
Empty pipe detection switch (1-1/2 and 2 inch models only)

ProSense FMM Series (-1001) Magnetic Flow Meters					
Model	**FMM50-1001**	**FMM75-1001**	**FMM100-1001**	**FMM150-1001**	**FMM200-1001**
Price	$460.00	$499.00	$550.00	$825.00	$890.00
Weight	1.09 lb	1.18 lb	1.30 lb	6.74 lb	6.75 lb
Range	0 to 6.6 GPM	0 to 13.2 GPM	0 to 26.4 GPM	0 to 80.0 GPM	0 to 160.0 GPM
Process Connection	1/2" FNPT	3/4" FNPT	1" FNPT	1-1/2" FNPT	2" FNPT
Application	Conductive liquids: ≥ 20 µS/cm (micro Siemens per centimeter) liquids / viscosity: < 70cSt (centiStoke) at 104°F				
Pressure Rating	232PSIG [16bar]				
Medium Temperature	14 to 158°F [-10 to 70°C]				
Operating Voltage	19 to 30VDC			18 to 32VDC	
Current Consumption	< 120mA			< 150mA	
Insulation Resistance	> 100MΩ (500VDC)				
Protection Class	III				
Reverse Polarity Protection	YES				
Output Functions					
Output Type / Function	OUT1: switch (N.O. or N.C. / PNP or NPN) / flow rate, volumetric flow totalizer preset, empty pipe detection (1-1/2 and 2") or pulse / volumetric flow totalizer or frequency / flow rate (1-1/2 and 2") OUT2: switch (N.O. or N.C. / PNP or NPN) / flow rate, temperature, empty pipe detection (1-1/2 and 2") or analog / flow rate, temperature or reset input / volumetric flow totalizer reset				
Switch/Pulse/ Frequency Outputs	PNP / NPN Selectable N.O. / N.C. Selectable Current Rating: 2 x 200mA Voltage Drop: < 2V Short-circuit protection: Yes (non-latching) Overload protection: Yes Switch hysteresis or window function			PNP / NPN Selectable N.O. / N.C. Selectable Current Rating: 2 x 250mA Voltage Drop: < 2V Short-circuit protection: Yes (non-latching) Overload protection: Yes Switch hysteresis or window function 0.1 to 10000 Hz frequency	
Analog Output	4-20 mA max 22mA or 0-10 VDC selectable Max. load: 500Ω (4-20 mA) Min. load: 2000Ω (0-10 VDC)				

ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

ProSense FMM Series (-1001) Magnetic Flow Meters					
Model	**FMM50-1001**	**FMM75-1001**	**FMM100-1001**	**FMM150-1001**	**FMM200-1001**
Flow Rate Monitoring					
Measuring Range	0.030 to 6.604 GPM	0.060 to 13.200 GPM	0.100 to 26.400 GPM	1.300 to 80.000 GPM	1.300 to 160.000 GPM
Display Range	-7.925 to 7.925 GPM	-15.840 to 15.840 GPM	-31.700 to 31.700 GPM	-96.000 to 96.000 GPM	-190.000 to 190.000 GPM
Resolution	0.010 GPM	0.020 GPM	0.050 GPM	0.100 GPM	0.100 GPM
Set Point, SP	0.060 to 6.600 GPM	0.120 to 13.200 GPM	0.250 to 26.400 GPM	1.700 to 80.000 GPM	2.100 to 160.000 GPM
Reset Point, rP	0.300 to 6.570 GPM	0.060 to 13.140 GPM	0.100 to 26.250 GPM	1.300 to 79.600 GPM	1.300 to 159.200 GPM
Analog Start Point, ASP	0.000 to 5.300 GPM	0.000 to 10.600 GPM	0.000 to 21.200 GPM	0.000 to 64.000 GPM	0.000 to 128.000 GPM
Analog End Point, AEP	1.300 to 6.600 GPM	2.600 to 13.200 GPM	5.200 to 26.400 GPM	16.000 to 80.000 GPM	32.000 to 160.000 GPM
In Steps Of	0.010 GPM	0.020 GPM	0.050 GPM	0.100 GPM	
Volumetric Flow Totalizer					
Pulse Value	0.010 to 30,300,000 GAL	0.010 to 99,990,000 GAL	0.010 to 100,000,000 GAL	0.020 to 80,000,000 GAL	0.020 to 160,000,000 GAL
Pulse Length	0.010 to 2s	0.005 to 2s	0.0025 to 2s	0.016 to 2s	0.008 to 2s
Temperature Monitoring					
Measuring Range	-4 to 176°F [-20 to 80°C]**				
Resolution	0.1°F	0.5°F			
Set Point, SP	-2.5 to 176°F			-2.0 to 176°F	
Reset Point, rP	-3.5 to 175.0°F			-3.0 to 175°F	
Analog Start Point, ASP	-4.0 to 140.5°F			-4.0 to 140°F	
Analog End Point, AEP	31.5 to 176.0°F			32.0 to 176°F	
In Steps Of	0.5°F				
Accuracy / Deviations					
Flow Monitoring					
Accuracy*	± (2% MW + 0.5% VMR)			± (0.8% MW + 0.5% VMR)	
Repeatability*	± 0.2% VMR				
Temperature Monitoring					
Accuracy	± 4.5°K (Q > 0.26 GPM)			± 1°K (Q > 4.0 GPM)	
Reaction Times					
Power-On Delay Time	5s				
Flow Monitoring					
Start-Up Delay	N/A			0 to 50s	
Response Time	< 0.150s (dAP = 0)			< 0.350s (dAP = 0)	
Display Damping, dAP	0.0 to 5.0s				
Temperature Monitoring					
Response Time	T09 = 3s (Q > 4.0 GPM)				
Environment					
Ambient Temperature	14 to 140°F [-10 to 60°C]				
Storage Temperature	-13 to 176°F [-25 to 80°C]				
Protection	IP 67			IP 65, IP 67	

** MW = Measured value*
VMR = Final value of the measuring range

*** Displays °F only*

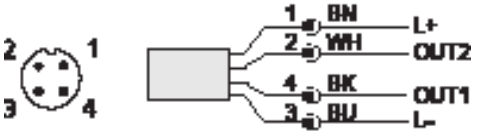
ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

ProSense FMM Series (-1001) Magnetic Flow Meters					
Model	**FMM50-1001**	**FMM75-1001**	**FMM100-1001**	**FMM150-1001**	**FMM200-1001**
Mechanical Data					
Process Connection	1/2" NPT female	3/4" NPT female	1" NPT female	1-1/2" NPT female	2" NPT female
Materials (wetted parts)	Stainless steel 316L / 1.4404; PEEK (polyether ether ketone); FKM			Stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEEK (polyether ether ketone); Hastelloy C-4 (2.4610); Cetellen: FKM	
Housing Materials	Stainless steel 316L / 1.4404; PBT-GF 20; PC; EPDM/X			Stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEI; FKM; PBT-GF 20; elastolan	
Displays / Operating Elements					
Display	Display unit: 6 x LED green (GPM, GPH, GAL, °F, 10^3, 10^6) Switching Status: 2 x LED yellow Measured values: 4-digit alphanumeric display (7.5 mm) Programming: 4-digit alphanumeric display (7.5 mm)			Display unit: 6 x LED green (GPM, GPH, GAL, °F, 10^3, 10^6) Switching Status: 2 x LED yellow Measured values: 4-digit alphanumeric display (7.5 mm) Programming: 4-digit alphanumeric display (7.5 mm)	
Electrical Connection					
Connection	M12 connector; gold-plated contacts				
Tests / Approvals					
EMC	EN 61000-4-2: 4kV CD / 8kV AD EN 61000-4-3 HF radiated: 10 V/m EN 61000-4-4 Burst: 2kV EN 61000-4-5 Surge: 0.5 kV EN61000-4-6 HF conducted: 10V				
Shock Resistance	DIN IEC 68-2-27: 20g (11ms)				
Vibration Resistance	DIN IEC 68-2-6: 5g (10 to 2,000Hz)				
Approvals*	UL (E320431), CE, RoHS				

** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.automationdirect.com*

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.

Wiring Diagram



Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

Colors to DIN EN 60947-5-2

For additional wiring details see individual product manuals.
Use FMM-GND1 if meter is installed in ungrounded pipe system.

Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

Output Function Selections

Models:
FMM50-1001, FMM75-1001, FMM100-1001

Output 1:
Flow rate switch
Volumetric flow totalizer pulse
Volumetric flow totalizer preset switch

Output 2:
Flow rate switch
Temperature switch
Analog flow rate
Analog temperature
Volumetric flow totalizer reset input

Models:
FMM150-1001, FMM200-1001

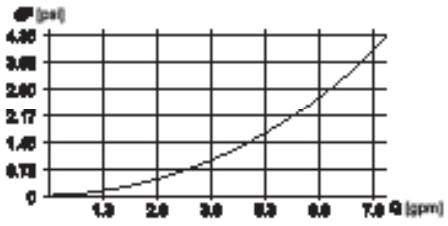
Output 1:
Flow rate switch
Volumetric flow totalizer pulse
Volumetric flow totalizer preset switch
Flow rate frequency
Empty pipe detection switch

Output 2:
Flow rate switch
Temperature switch
Analog flow rate
Analog temperature
Volumetric flow totalizer reset input
Empty pipe detection switch

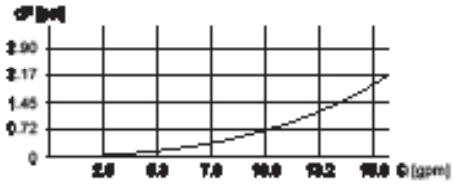
ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

Pressure Loss/Flow Rate*

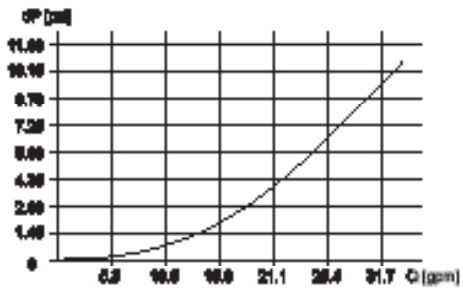
FMM50-1001



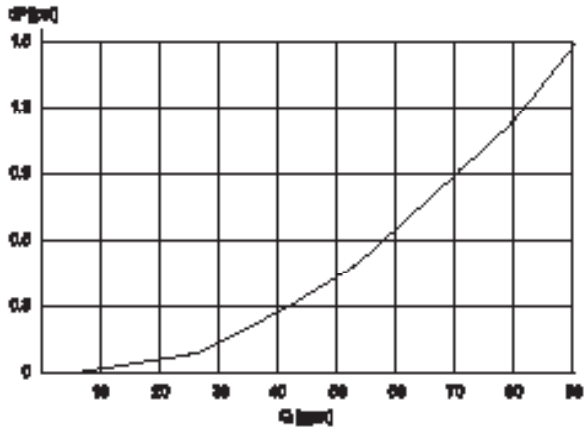
FMM75-1001



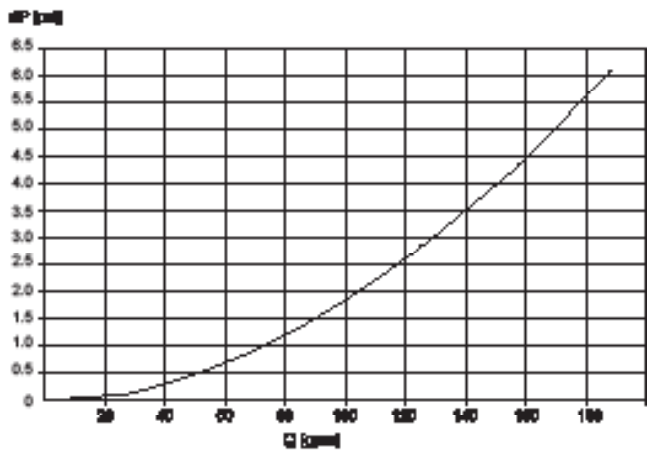
FMM100-1001



FMM150-1001



FMM200-1001

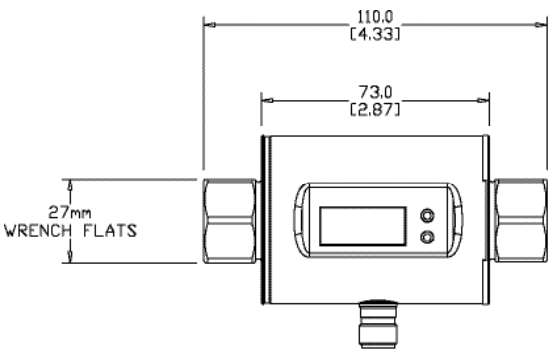


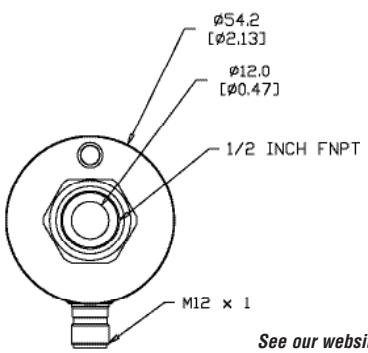
** when used with water @ 68˚F [20˚C]*

Dimensions

mm [inches]

Part No. FMM50-1001





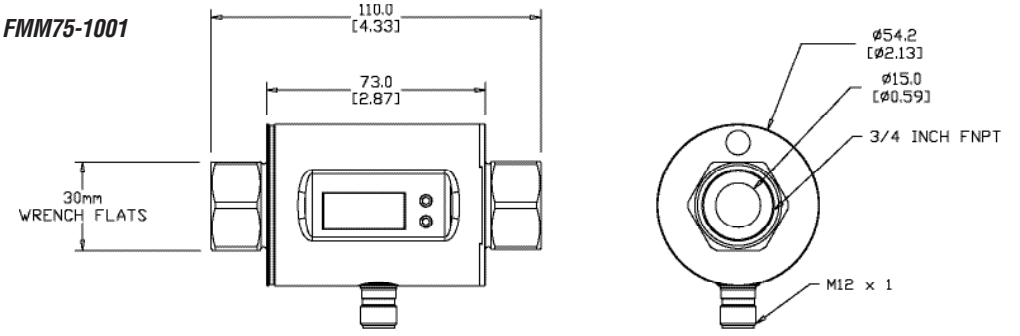
See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

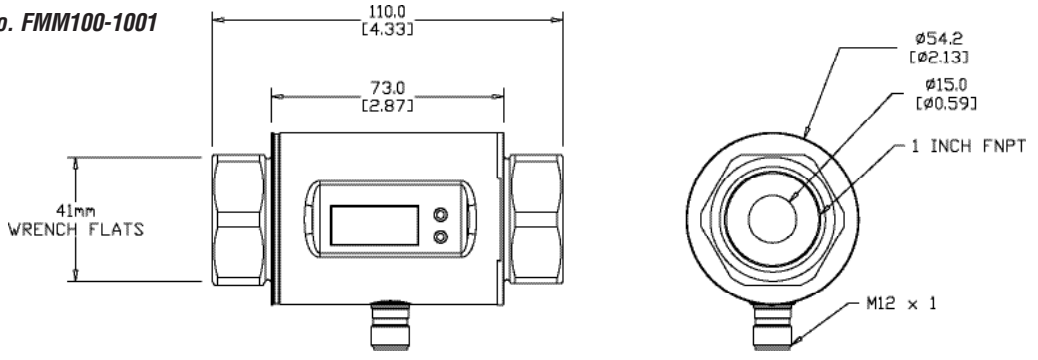
Dimensions

mm [inches]

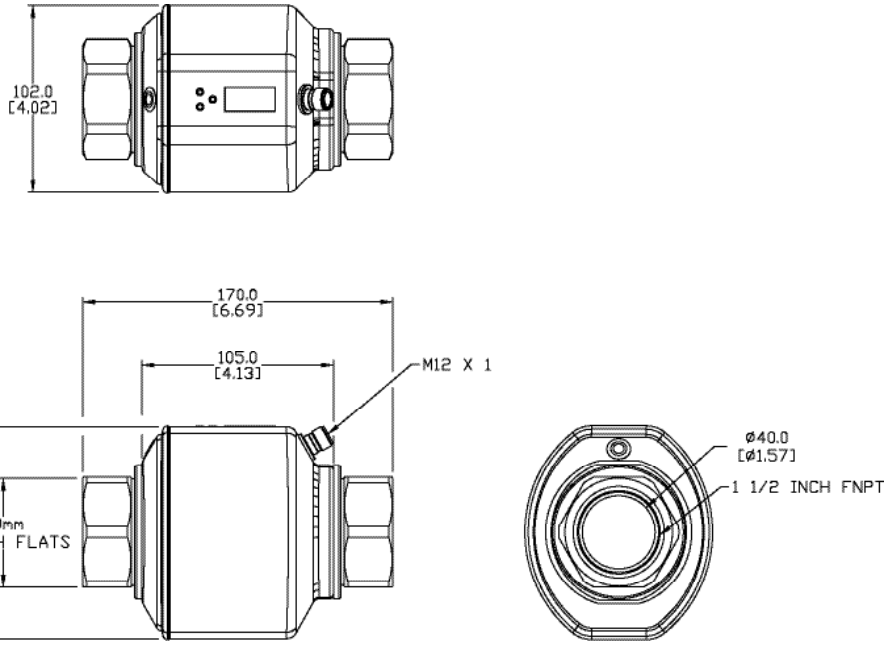
Part No. FMM75-1001



Part No. FMM100-1001



Part No. FMM150-1001



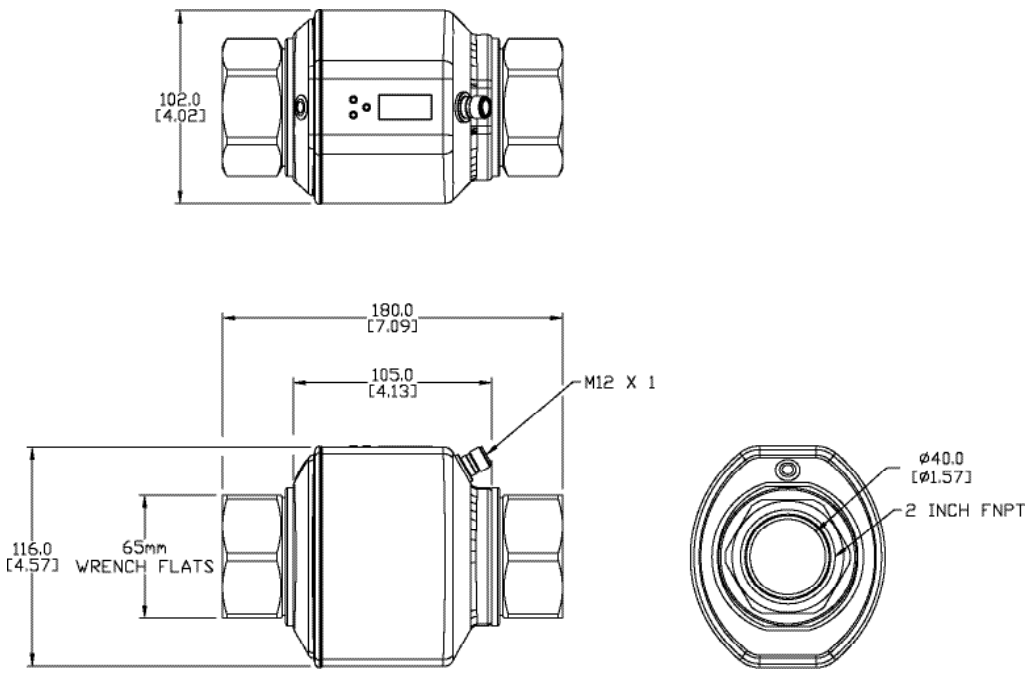
See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® FMM Series (-1001) Magnetic-Inductive Flow Meters

Dimensions

mm [inches]

Part No. FMM200-1001



See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® FMM Series (-1002) Magnetic-Inductive Flow Meters

Part No. FMM75-1002

Part No. FMM200-1002

Overview

AutomationDirect's ProSense FMM Series (-1002) Magmeters are designed to reliably detect the flow rate of conductive media up to 158.5 gallons per minute. The stainless steel, mechanically-robust design mounts directly in-line providing a compact, low-profile installation for process control. A 4-digit numeric display with pushbutton setup indicates flow rate and fluid temperature with selectable engineering units. Two outputs are available to remotely monitor the analog status of flow rate and temperature parameters. Simple to set up, easy to install and with no moving parts, the FMM series is a reliable alternative to traditional flow meters and mechanical flow switches.

Features

- 1/2 to 2" NPT female process connections
- Measure up to 158.5 GPM
- Measure fluid temperature in addition to flow
- 4-digit numeric display with pushbutton setup
- Selectable engineering units: GPM, GPH, LPM, m^3/h, °F, °C
- Two analog output signals
- 4-pin M12 quick disconnect
- 5-year warranty

#E320431

Output Function Selections

Output 1:
Analog temperature

Output 2:
Analog flow rate

ProSense FMM Series (-1002) Magnetic Flow Meters					
Model	**FMM50-1002**	**FMM75-1002**	**FMM100-1002**	**FMM150-1002**	**FMM200-1002**
Price	$460.00	$499.00	$550.00	$825.00	$890.00
Weight	1.14 lb	1.23 lb	1.36 lb	6.76 lb	6.76 lb
Range	0 to 6.6 GPM	0 to 13.2 GPM	0 to 26.4 GPM	0 to 79.3 GPM	0 to 158.5 GPM
Process Connection	1/2" FNPT	3/4" FNPT	1" FNPT	1-1/2" FNPT	2" FNPT
Application	Conductive liquids: ≥ 20 µS/cm (micro Siemens per centimeter) liquids / viscosity: < 70cSt (centiStoke) at 104°F				
Pressure Rating	232PSIG [16bar]				
Medium Temperature	14 to 158°F [-10 to 70°C]				
Operating Voltage	20 to 30VDC			18 to 32VDC	
Current Consumption	120mA			< 150mA	
Insulation Resistance	> 100MΩ (500VDC)				
Protection Class	III				
Reverse Polarity Protection	YES				
Output Functions					
Output Type / Function	OUT1: analog signal / temperature OUT2: analog signal / flow				
Analog Output	4-20 mA max 22mA Max. load: 500Ω (4-20 mA) Overload protection: Yes				
Flow Rate Monitoring					
Measuring Range	0.030 to 6.600 GPM	0.020 to 13.200 GPM	0.100 to 26.400 GPM	1.300 to 79.300 GPM	1.300 to 158.500 GPM
Display Range	-7.920 to 7.920 GPM	-15.860 to 15.860 GPM	-31.700 to 31.700 GPM	-95.100 to 95.100 GPM	-190.200 to 190.200 GPM
Resolution	0.010 GPM	0.020 GPM	0.050 GPM	0.100 GPM	0.100 GPM
Analog Start Point, ASP	0.000 to 5.280 GPM	0.000 to 10.580 GPM	0.000 to 21.100 GPM	0.000 to 63.400 GPM	0.000 to 126.800 GPM
Analog End Point, AEP	1.320 to 6.600 GPM	2.640 to 13.220 GPM	5.300 to 26.400 GPM	15.900 to 79.300 GPM	31.700 to 158.500 GPM
In Steps Of	0.010 GPM	0.020 GPM	0.050 GPM	0.100 GPM	0.100 GPM

ProSense® FMM Series (-1002) Magnetic-Inductive Flow Meters

ProSense FMM Series (-1002) Magnetic Flow Meters					
Model	**FMM50-1002**	**FMM75-1002**	**FMM100-1002**	**FMM150-1002**	**FMM200-1002**
Temperature Monitoring					
Measuring Range	-4 to 176°F [-20 to 80°C]				
Resolution	0.5°F [0.2°C]				
Analog Start Point, ASP	-4.0 to 140°F [-20 to 60°C]				
Analog End Point, AEP	32 to 176.0°F [0.0 to 80°C]				
In Steps Of	0.5°F [0.28°C]				
Accuracy / Deviations					
Flow Monitoring					
Accuracy[1]	± (2% MW + 0.5% VMR)			± (0.8% MW + 0.5% VMR)	
Repeatability[1]	± 0.2% VMR				
Temperature Monitoring					
Accuracy	± 2.5°K (Q > 0.26 GPM)			± 1°K (Q > 4.00 GPM)	
Reaction Times					
Power-On Delay Time	5s				
Flow Monitoring					
Response Time	< 0.150s (dAP = 0)			< 0.350s (dAP = 0)	
Display Damping, dAP	0.0 to 3.0s			0.0 to 5.0s	
Temperature Monitoring					
Response Time	T09 = 3s (Q > 4.00 GPM)				
Environment					
Ambient Temperature	14 to 140°F [-10 to 60°C]				
Storage Temperature	-13 to 176°F [-25 to 80°F]				
Protection	IP 67			IP 65, IP 67	
Mechanical Data					
Process Connection	1/2" NPT female	3/4" NPT female	1" NPT female	1-1/2" NPT female	2" NPT female
Materials (wetted parts)	Stainless steel 316L / 1.4404; PEEK (polyether ether ketone); FKM			Stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEEK (poly-ether ether ketone); Hastelloy C-4 (2.4610); Cetellen: FKM	
Housing Materials	Stainless steel 316L / 1.4404; PBT-GF 20; PC; EPDM/X			Stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEI; FKM; PBT-GF 20; elastolan	
Displays / Operating Elements					
Display	Display unit: 6 x LED green (l/min, m³/h, GPM, GPH, °C, °F) Measured values: 4-digit alphanumeric display (7.5 mm) Programming: 4-digit alphanumeric display (7.5 mm)			Display unit: 6 x LED green (l/min, m³/h, GPM, GPH, °C, °F) Function display: 1 x LED yellow (10³) Measured values: 4-digit alphanumeric display (7.5 mm) Programming: 4-digit alphanumeric display (7.5 mm	
Electrical Connection					
Connection	M12 connector; gold-plated contacts				
Tests / Approvals					
EMC	EN 61000-4-2: 4kV CD / 8kV AD EN 61000-4-3 HF radiated: 10 V/m EN 61000-4-4 Burst: 2kV EN 61000-4-5 Surge: 0.5 kV EN 61000-4-6 HF conducted: 10V				
Shock Resistance	DIN IEC 68-2-27: 20g (11ms)				
Vibration Resistance	DIN IEC 68-2-6: 5g (10 to 2,000Hz)				
Approvals*	UL (E320431), CE, RoHS				

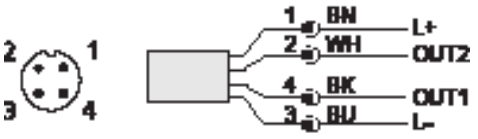
To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.automationdirect.com

[1] MW = Measured value; VMR = Final value of the measuring range

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.

ProSense® FMM Series (-1002) Magnetic-Inductive Flow Meters

Wiring Diagram



Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

Colors to DIN EN 60947-5-2

For additional wiring details see individual product manuals.
Use FMM-GND1 if meter is installed in ungrounded pipe system.

Output Function Selections

Models:
FMM50-1002, FMM75-1002, FMM100-1002, FMM150-1002, FMM200-1002

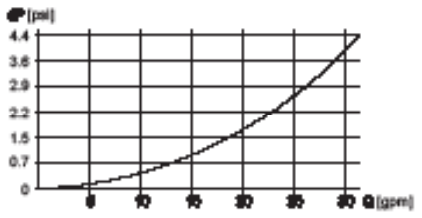
Output 1:
Analog temperature

Output 2:
Analog flow rate

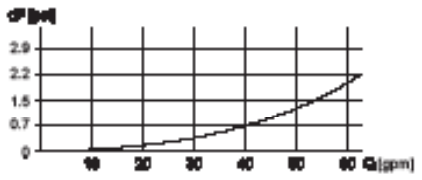
Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

Pressure Loss/Flow Rate*

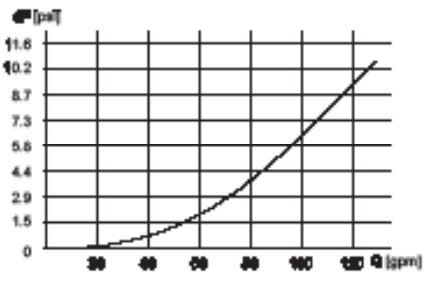
FMM50-1002



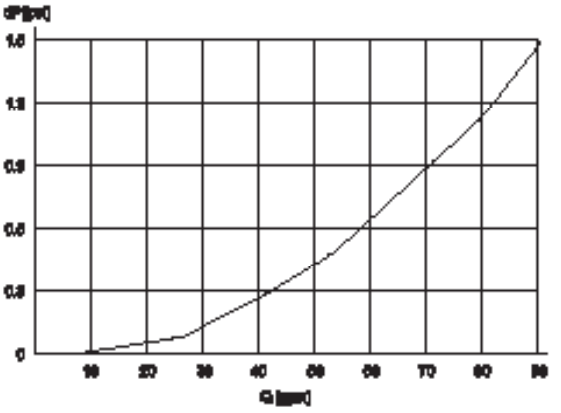
FMM75-1002



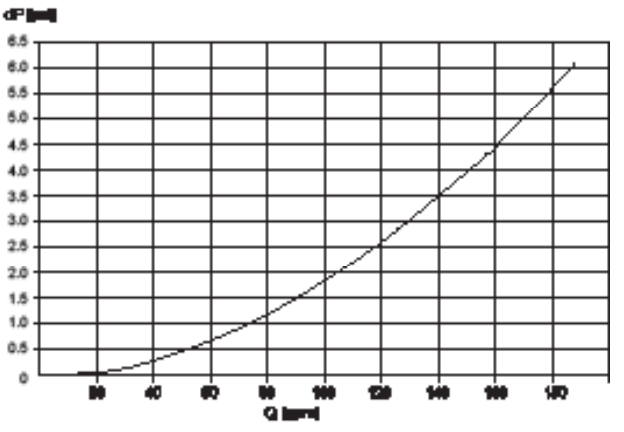
FMM100-1002



FMM150-1002



FMM200-1002



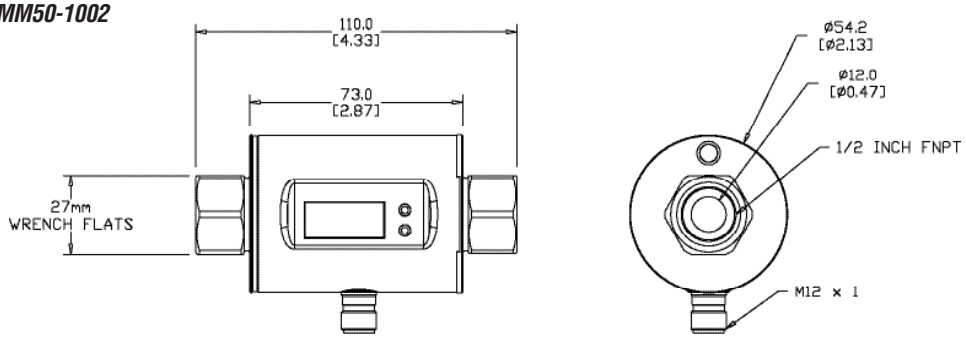
**** when used with water @ 68˚F [20˚C]***

ProSense® FMM Series (-1002) Magnetic-Inductive Flow Meters

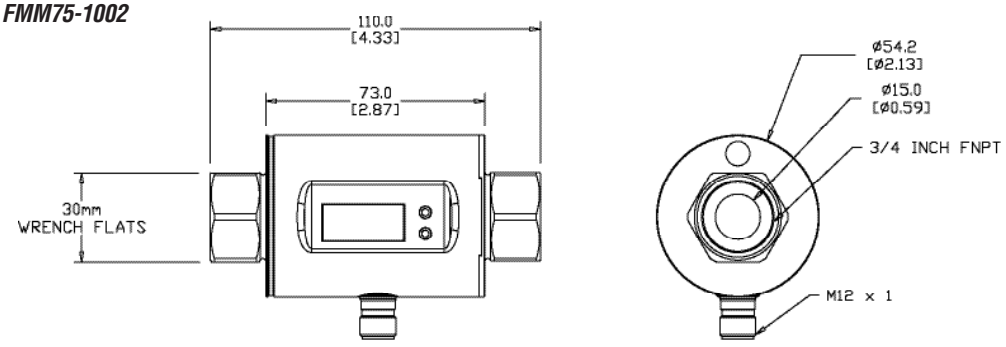
Dimensions

mm [inches]

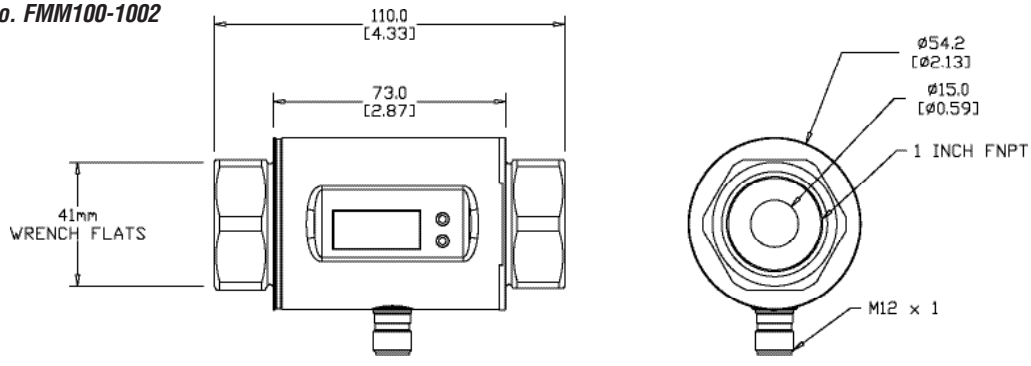
Part No. FMM50-1002



Part No. FMM75-1002



Part No. FMM100-1002



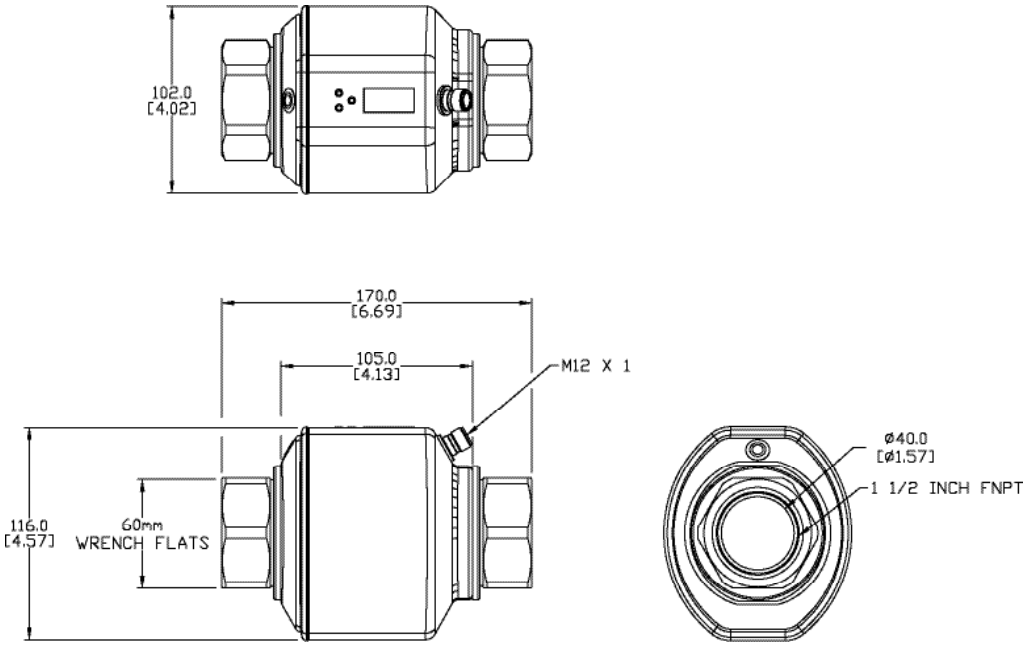
See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® FMM Series (-1002) Magnetic-Inductive Flow Meters

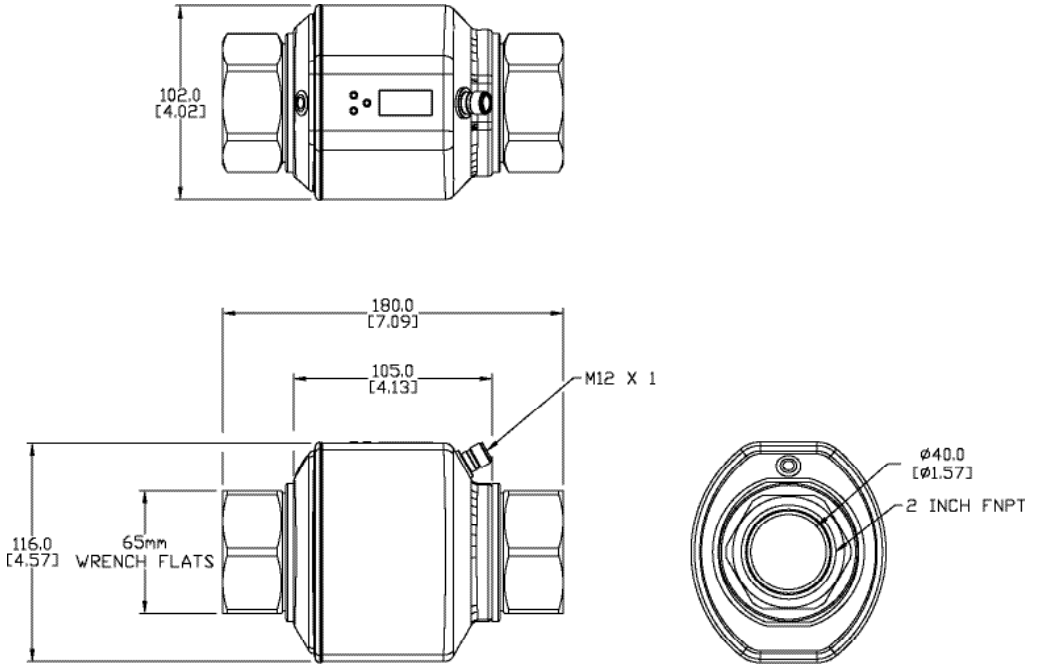
Dimensions

mm [inches]

Part No. FMM150-1002



Part No. FMM200-1002



See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® Magnetic-Inductive Flow Meter Accessories

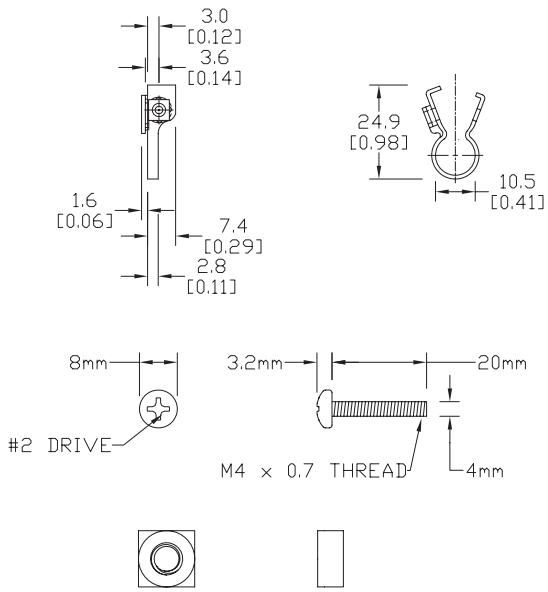
The FMM-GND1 Grounding Clamp is used when an FMM series Magnetic-Inductive Flow Meter is installed in an ungrounded pipe system (e.g. PVC pipe).
Simply place the FMM-GND1 Grounding Clamp around the base of the M12 connector and attach a grounded wire to FMM-GND1 Grounding Clamp with the supplied machine screw and nut.
Note: Improper grounding may cause inaccurate readings

ProSense Magnetic Flow Meter Accessories			
Part No.	***Description***	***Price***	***Weight***
FMM-GND1	ProSense 316 stainless steel grounding clamp for magnetic flow meters with an M12 connector.	$6.00	0.015 lb

Dimensions

mm [inches]

Part No. FMM-GND1



See our website www.AutomationDirect.com for complete Engineering drawings.

Grounding Clamp Installation

The ProSense magnetic flow meter grounding clamp is installed as shown above.
Note: the ground wire shown above is not included.

ProSense® FSD Series Flow Switches

Part No. FSD75-AP-6H

Part No. FSD1-AP-26H

Overview

The ProSense FSD Series flow switches monitor liquid media and provide reliable flow detection for various flow applications.

The ProSense FSD Series sensing principle ensures extremely fast response time and allows for a more precise setpoint setting. The setpoint can be easily set and locked with a setting screw.

The ProSense FSD Series flow switches are ideal for applications with rapid temperature changes or where fast response time is required, such as:

- Machine tool coolant flow
- HVAC cooling water flow
- Injection molding cooling water flow

Features

- Monitor 0.26 to 26.4 GPM (gallons per minute) in 2 models
- Immune to rapid temperature changes of media
- Fast response time of 10ms: great for cycling applications with a minimum of 10 million switching cycles
- Easy to set: turn dial to desired setpoint
- Able to be bench set outside the process
- 3/4" or 1" FNPT process connections
- Integrated check valve design allows the sensor to be mounted horizontally or vertically
- 4-pin M12 quick-disconnect
- IP65 / IP67
- LED output status indication
- 2-year warranty

#E320431

ProSense FSD Series Flow Switches				
Part No.	***Description***	***Quantity***	***Weight (lbs)***	***Price***
FSD75-AP-6H	24VDC, 0.26 to 6.6 GPM setpoint range, rotating dial adjustment with lock screw, 26.4 GPM max flow rate, nickel-plated brass housing with 3/4 in. FNPT process connections, N.O. DC PNP output. Cable sold separately.	1	1.0	$125.00
FSD1-AP-26H	24VDC, 1.32 to 26.4 GPM setpoint range, rotating dial adjustment with lock screw, 52.8 GPM max flow rate, nickel-plated brass housing with 1 in. FNPT process connections, N.O. DC PNP output. Cable sold separately.	1	1.6	$150.00

ProSense FSD Series Flow Switches Technical Specifications		
Model	***FSD75-AP-6H***	***FSD1-AP-26H***
Operating Voltage	20.4 to 26.4 VDC (must use a Class 2 power supply in order to comply with UL508 requirements)	
Electrical Connection	M12 (note: tightening torque < 0.6 Nm based on cable)	
Connection Pin Material	Gold-plated	
Output Function	Normally open (PNP)	
Output Maximum Load Current	100mA	
Current Consumption	< 15mA	
Voltage Drop	< 2.5 VDC	
Short-Circuit Protection	YES	
Reverse Polarity Protection	YES	
Overload Protection	YES	
Switching Cycles Minimum	10 million	
Response Time	10ms	
Accuracy*	± 5% of full range	
Repeatability	0.06 GPM	0.26 GPM
Process Connection	3/4" FNPT	1" FNPT
Medium	liquids (water, glycol solutions, oils)	
Maximum Flow Rate	< 26.4 GPM	< 52.8 GPM
Setpoint Range	0.26 - 6.6 GPM	1.32 - 26.4 GPM
Hysteresis	0.13 – 0.53 GPM	0.8 – 1.58 GPM
Pressure Rating	362PSI	

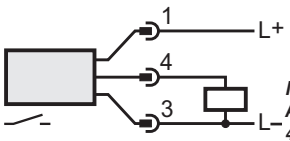
** when used with water*

ProSense® FSD Series Flow Switches

ProSense FSD Series Flow Switches Environmental Specifications		
Model	***FSD75-AP-6H***	***FSD1-AP-26H***
Housing Material	brass chemically nickel-plated; aluminum anodized; POM	
Materials (wetted parts)	Stainless steel (304S15); brass chemically nickel-plated; PP (Polypropylene); Pocan PBT (Polybutylene terephthalate); O-ring:FPM (Viton)	
Operating Temperature	32 to 140°F (0 to 60°C)	
Medium Temperature	32 to 185°F (0 to 85°C)	
Storage Temperature	–40 to 212°F (–40 to 100°C)	
Protection	IP65 / IP67	
Protection Class	III	
Agency Approvals	cULus (#E320431), CE, RoHs	

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MESURED.

Wiring Diagrams



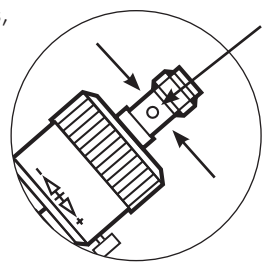
Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

LED Functions

The FSD units monitor the flow of liquid media such as: water, glycol solutions, and oils. The LED functions are as follows:

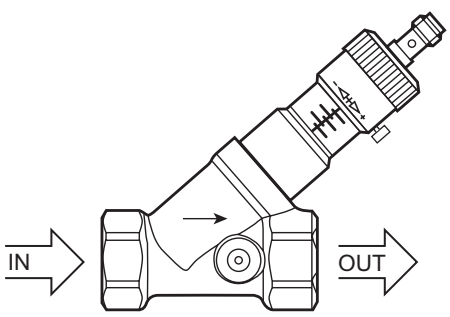
- Output closed (LED = ON), if volumetric flow quantity ≥ setpoint.
- Output open (LED = OFF), if volumetric flow quantity < setpoint.



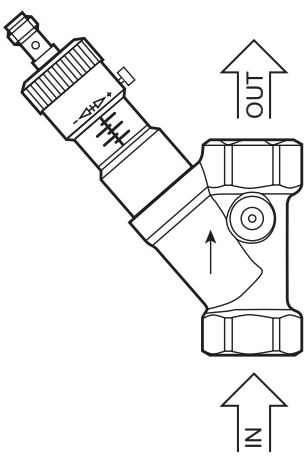
There are 4 LEDs (one on each side) on the top connector for easy visibility regardless of installation orientation.

Installation*:

For proper flow switch operation, the sensor should be installed as indicated in the Illustrations below (noting the flow direction arrow on the body of the sensor):



Horizontal Mounting



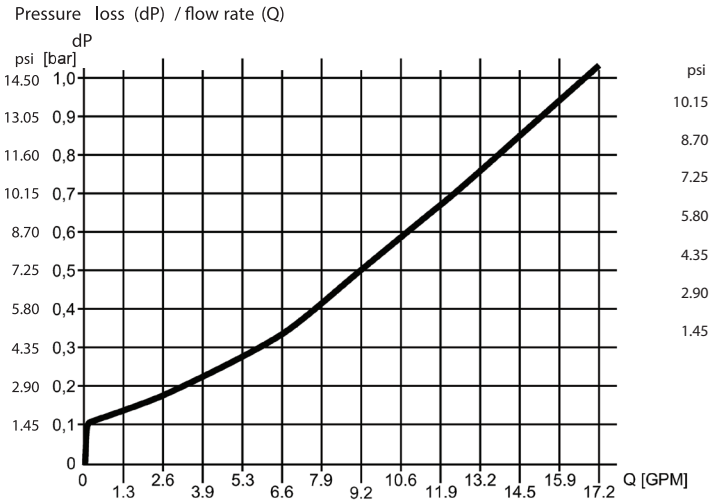
Vertical Mounting

**** Integral check valve design allows the sensor to be mounted in any position (horizontally or vertically).***

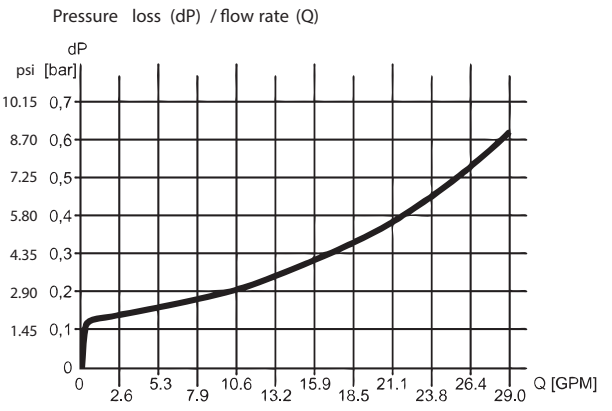
proSense® FSD Series Flow Switches

Pressure Loss/Flow Rate*

FSD75-AP-6H



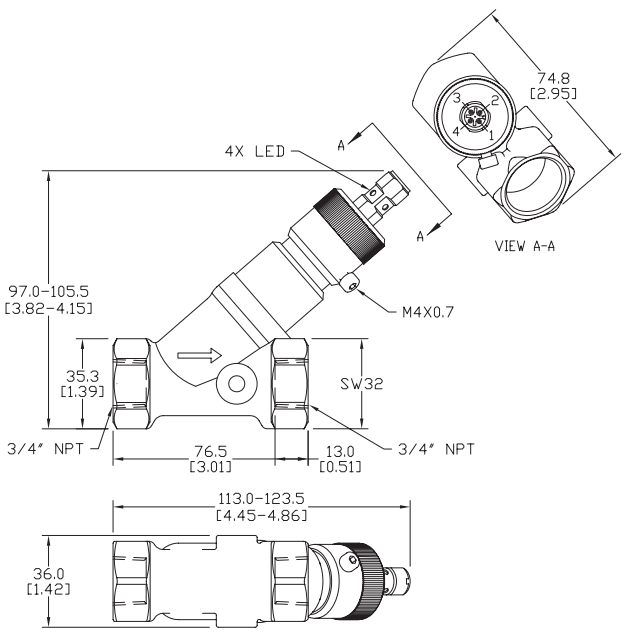
FSD1-AP-26H



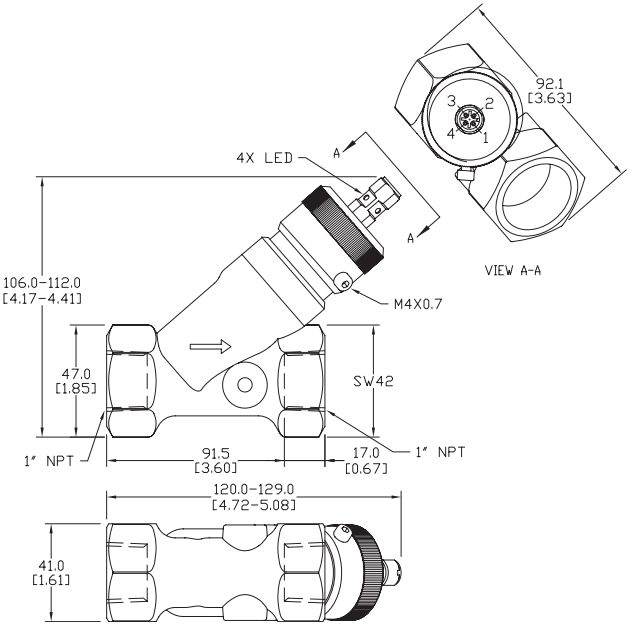
**** when used with water***

Dimensions

mm [inches]



Part No. FSD75-AP-6H

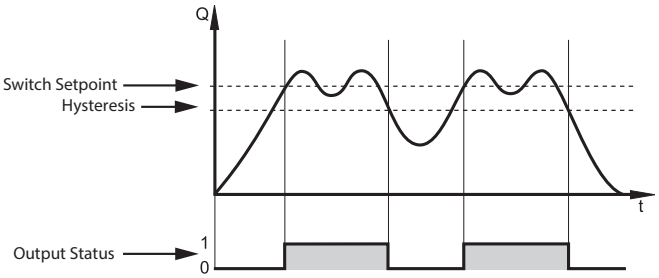


Part No. FSD1-AP-26H

ProSense® FSD Series Flow Switches

Operation & Setting

The flow sensor utilizes a spring-supported piston that is lifted by the flowing medium. The piston position is detected via an inductive sensor and is output as a binary signal. The spring resets the piston to its initial position with decreasing flow. This allows the sensor to be mounted in any position (horizontally or vertically) and function as a check valve.



Note: Hysteresis varies based on switch setpoint.

Cutaway View

Setting FSD Series flow switches is quick and easy. There are two ways to set the flow switches - using a desired flow value and adjustment to existing flow.

Setting the ProSense FSD using a desired flow value

1. Loosen the locking screw.
2. Set the switching point by rotating the Setpoint dial until the desired flow value just becomes visible on the setting scale.
3. Tighten the locking screw.

Example in Figure 1: desired value = 2 GPM

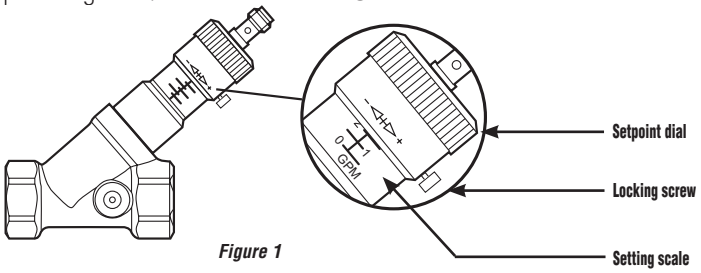


Figure 1

Adjustment to existing flow

1. Let the normal flow circulate in the installation.
2. Loosen the locking screw.
3. Set the switching point by rotating the Setpoint dial.
   - If the LED lights before setting: turn the Setpoint dial in the direction [+] until the LED goes out. Then turn in the opposite direction [-] until the LED lights.
   - If the LED does not light before setting: turn the Setpoint dial in the direction [-] until the LED lights.
4. Tighten the locking screw.

Correlation between the number of turns of the Setpoint dial and the switching point is that one complete turn of the Setpoint dial corresponds to an approximate gallons per minute rate. This is shown in the table below:

Part Number	*Gallons/Minute*	*Max. Gallons/Minute**
FSD75-AP-6H	0.8 GPM	6.6 GPM
FSD1-AP-26H	3.3 GPM	26.4 GPM

**Do not turn the setting screw beyond the maximum value of the setting range to avoid faulty switching.*

ProSense® FSA Series Flow Transmitters

Overview

The ProSense FSA Series flow transmitters monitor liquid media and provide an analog output proportional to flow rate for various flow applications.

The ProSense FSA Series sensing principle is based on differential pressure which ensures extremely fast response time and allows for a precise flow measurement. The ProSense flow transmitters are available in three flow ranges up to 27GPM.

The ProSense FSA Series flow transmitters are ideal for applications with rapid temperature changes or where fast response time is required, such as:

- Machine tool coolant flow
- HVAC cooling water flow
- Injection molding cooling water flow

Features

- Measure up to 27GPM (gallons per minute) in 3 models
- Immune to rapid temperature changes of media
- Fast response time of <10ms
- 3/4" or 1" FNPT process connections
- Integrated check valve design allows the sensor to be mounted horizontally or vertically
- 4-pin M12 quick-disconnect
- IP65 / IP67
- 2-year warranty

ProSense FSA Series Flow Transmitters				
Part No.	**Description**	**Quantity**	**Weight (lbs)**	**Price**
FSA75-42-6H	ProSense liquid flow transmitter, 0 to 6 GPM measuring range, 3/4 inch female NPT process connection, 4-20 mA analog output, 18 to 32 VDC operating voltage, 4-pin M12 quick-disconnect electrical connection. Purchase cable separately.	1	1.0	$140.00
FSA75-42-10H	ProSense liquid flow transmitter, 0 to 10 GPM measuring range, 3/4 inch female NPT process connection, 4-20 mA analog output, 18 to 32 VDC operating voltage, 4-pin M12 quick-disconnect electrical connection. Purchase cable separately.	1	1.0	$140.00
FSA1-42-27H	ProSense liquid flow transmitter, 0 to 27 GPM measuring range, 1 inch female NPT process connection, 4-20 mA analog output, 18 to 32 VDC operating voltage, 4-pin M12 quick-disconnect electrical connection. Purchase cable separately.	1	1.5	$165.00

ProSense FSA Series Flow Transmitters Technical Specifications			
Model	**FSA75-42-6H**	**FSA75-42-10H**	**FSA1-42-27H**
Operating Voltage	18 to 32 VDC (SELV/PELV)**		
Electrical Connection	M12 (note: tightening torque <0.6 Nm based on cable)		
Connection Pin Material	Gold-plated		
Output Function	Analog		
Analog Output	4-20 mA (sourcing)		
Maximum Load	500Ω		
Current Consumption	<35mA		
Short-Circuit Protection	YES		
Reverse Polarity Protection	YES		
Overload Protection	YES		
Cycles	10 million minimum		
Response Time	<10ms		
Accuracy*	± 5% of full range		
Repeatability*	± 1% of full range		
Process Connection	3/4" FNPT		1" FNPT
Medium	Liquids (water, glycol solutions, oils), use of 200 micron filter recommended		
Maximum Flow Rate	26.4 GPM		52.8 GPM
Maximum Viscosity	<68 centistokes		
Flow Measuring Range	0 - 6 GPM	0 - 10 GPM	0 - 27 GPM
Pressure Rating	362 psig max operating / 724 psig proof pressure		

** When used with water @ 20˚C [68˚F]*

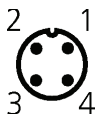
*** Voltage Supply According to EN50178 SELV (Safety Extra-Low Voltage) / PELV (Protected Extra-Low Voltage)*

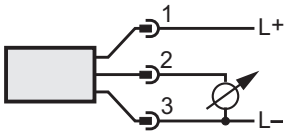
ProSense® FSA Series Flow Transmitters

ProSense FSA Series Flow Transmitters Environmental Specifications			
Model	***FSA75-42-6H***	***FSA75-42-10H***	***FSA1-42-27H***
Housing Material	Brass chemically nickel-plated; PP (Polypropylene); stainless steel (316L / 1.4404); aluminum anodized; PA (Polyamide)		
Materials (wetted parts)	Stainless steel (316 / 1.4401); brass chemically nickel-plated; PP (Polypropylene); PPS (Polyphenylene sulfide); O-ring:FKM (Viton)		
Operating Temperature	32 to 140°F (0 to 60°C)		
Medium Temperature	14 to 212°F (-10 to 100°C)		
Storage Temperature	5 to 176°F (–15 to 80°C)		
Protection	IP65 / IP67		
Protection Class	III		
Agency Approvals	cULus (#E320431), CE, RoHs		

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.

Wiring Diagrams



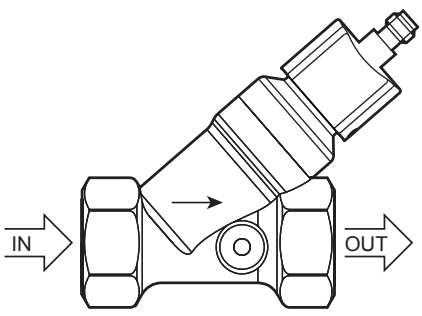


Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

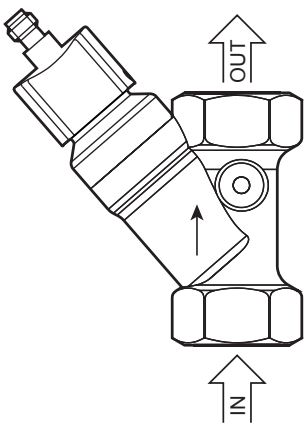
Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

Installation*:

For proper operation, please observe the flow direction arrows on the body of the sensor. The mounting orientation does not effect the operation of the unit.



Horizontal Mounting



Vertical Mounting

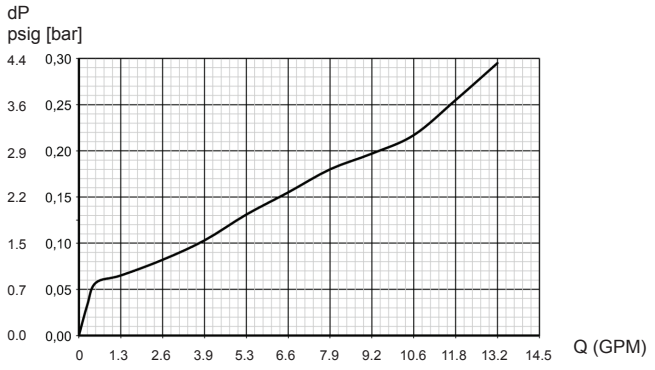
**** Integral check valve design allows the sensor to be mounted in any position.***

1. ***Ferromagnetic materials in the surrounding environment should be at least 50mm from the housing of the unit.***
2. ***Ferromagnetic piping may be used on the inlet and outlet connections.***
3. ***Do not operate the unit in the vicinity of magnetic constant and alternating fields (e.g. welding systems).***
4. ***If the sensors are installed side by side, observe a minimum distance of 50mm between the sensor axes.***

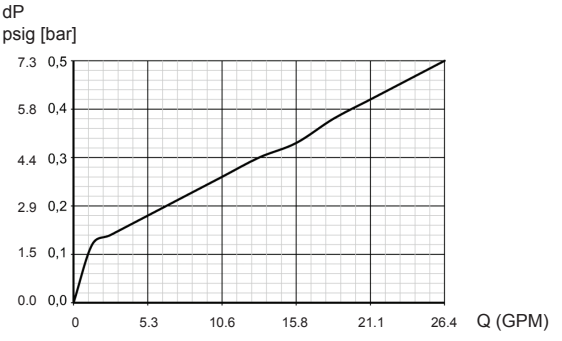
proSense® FSA Series Flow Transmitters

Pressure Loss/Flow Rate*

FSA75-42-6H
FSA75-42-10H



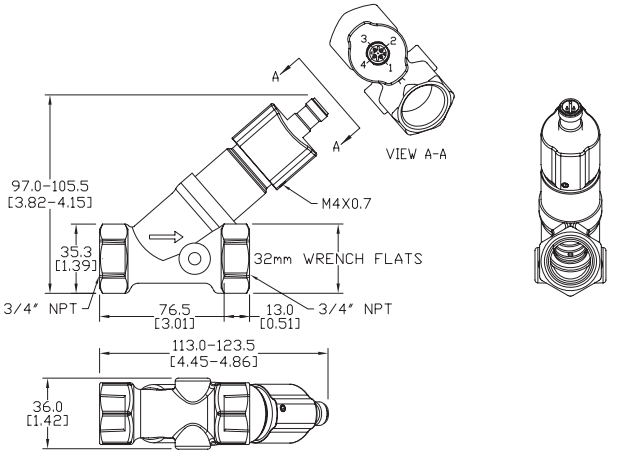
FSA1-42-27H



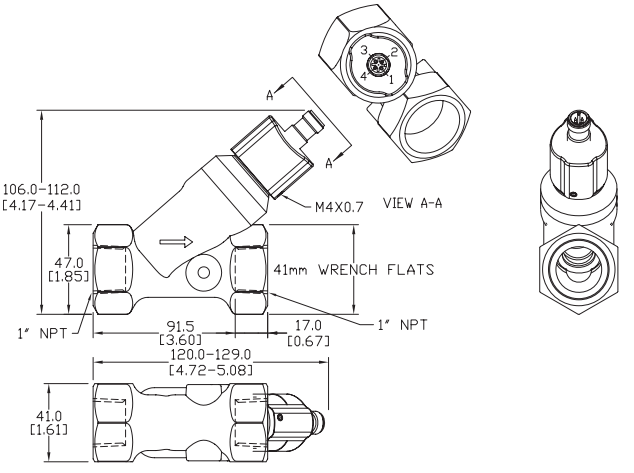
** when used with water @ 20˚C [68˚F]*

Dimensions

mm [inches]



Part No. FSA75-42-6H
FSA75-42-10H



Part No. FSA1-42-27H

ProSense® FSA Series Flow Transmitters

Operation

The flow sensor utilizes a spring-supported piston that is lifted by the flowing medium. By monitoring the piston position the flow rate is determined on the principle of differential pressure and is converted into an analog output signal (4 to 20 mA). The spring resets the piston to its initial position with decreasing flow. This allows the sensor to be mounted in any position (horizontally or vertically) and function as a check valve.

Cutaway View

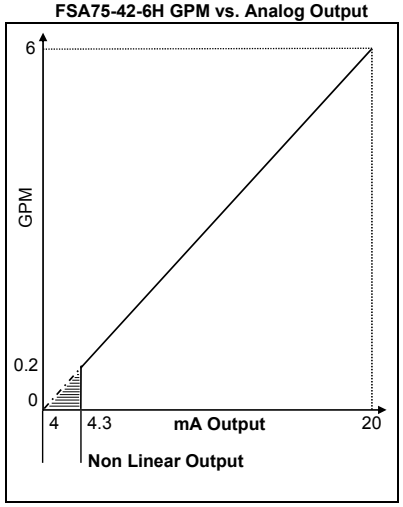
Function

The analog signal for water (20°C [68°F]) is linear from 4.3 mA to 20mA (4mA = no flow). For an output signal >20mA the flow rate is above the final value of the measuring range.

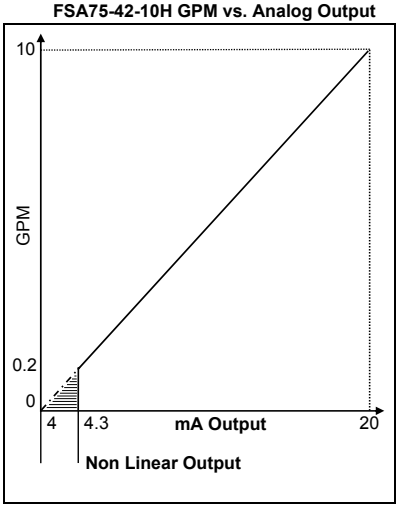
Part Number	*Flow Measuring Range (Gallons/Minute)*
FSA75-42-6H	0 to 6
FSA75-42-10H	0 to 10
FSA1-42-27H	0 to 27

Analog Output Charts

FSA75-42-6H GPM vs. Analog Output



FSA75-42-10H GPM vs. Analog Output



FSA1-42-27H GPM vs. Analog Output