

FPI Mag® Sensor



ProComm® Converter



The FPI Mag® (Full Profile Insertion) electromagnetic flow meter is the only hot tap full profile insertion flow meter available on the market. The FPI Mag installs without service interruption making it ideal for retrofits, upgrades and maintenance projects and sites never metered before. The hot tap installation significantly reduces installation time eliminating the need to de-water lines or cut pipe.

The multi-electrode sensor delivers an accurate measurement of the full pipe profile rivaling the performance of a full-bore mag meter. The repeatable, stable measurement across the entire flow profile compensates for variable flow profiles, including swirl and turbulent conditions.

The FPI Mag is the industry's most economical flow metering solution offering unbeatable value in the cost of installation and ownership reducing installed costs by more than 45 percent in medium and large line sizes. The compact insertion design fits in confined spaces and offers complete accessibility. The flow meter can be removed in pipes under pressure for easy inspection, cleaning, calibrating, or verification. Installation costs are reduced by eliminating the need for heavy equipment and extensive manpower.

The innovative flow meter comes pre-calibrated from McCrometer's NIST traceable calibration labs and requires no recalibration in the field. With no moving parts and a single-piece design, the FPI Mag's sensor contains nothing to wear or break and is generally immune to clogging by sand, grit, or other debris. The electrodes are encased in a heavy-duty 316 stainless steel sensor body for maximum structural integrity and coated with a NSF certified 3M™ fusion-bonded epoxy coating for operational longevity.

MUNICIPAL WATER AND WASTEWATER

The FPI Mag Full Profile Insertion mag meter supports the following water and wastewater treatment applications:

Water

- Distribution
- Effluent
- Filter balancing and backwash
- Pumping stations
- UV dosing
- Wells and booster stations

Wastewater

- Effluent
- Recycle / reclaim

The FPI Mag is ideal for chilled water in campus style facilities, hospitals, airports, hotels, casinos, etc.

INDUSTRIAL FACILITIES

The FPI Mag is also suitable for a variety of industrial facilities: power plants (including cogeneration), paper mills, chemical & petrochemical plants, metals & mining, and food & beverage.

Applications Include

- Cooling water
- Fire water
- Feed water
- Raw water
- Inlet to surge basin
- Effluent wastewater

Benefits:

- **Hot Tap Installation** - No service interruption
- **Accurate** – Measures the full flow profile
- **Lower Cost** – Installed savings more than 45%
- **Robust** – No moving parts to wear or break
- **Versatile** – Great for plant maintenance, upgrades and retrofits
- **Accessible** – Insertion design provides easy access
- **Virtually No Maintenance** – No field calibration required



FPI MAG PART NUMBER MATRIX

39	-	-	-	-	-	-	-	-	-	-	-
SINGLE DIRECTION / BIDIRECTIONAL											
394 - Bidirectional	4										
395 - Single Direction	5										
STOCK BODY OR CUSTOM LENGTH											
Stock Body Length (4-24")	S										
Custom Body Length	C										
NOMINAL LINE SIZE											
4 in	004										
6 in	006										
8 in	008										
10 in	010										
12 in	012										
14 in	014										
16 in	016										
18 in	018										
20 in	020										
22 in	022										
24 in	024										
30 in	030										
36 in	036										
42 in	042										
48 in	048										
54 in	054										
60 in	060										
66 in	066										
72 in	072										
Contact Factory for Larger Line Sized	Larger										
ELECTRODE MATERIAL OPTIONS											
S316 Stainless Steel (Standard)	S										
Hastelloy	H										
CABLE CONNECTOR OPTIONS											
Quick Connect (Standard)	Q										
Strain Relief	R										
REMOTE CABLE LENGTH OPTIONS											
25 feet (Standard) *	025										
50 feet	050										
75 feet	075										
100 feet	100										
125 feet	125										
150 feet	150										
175 feet	175										
200 feet *	200										
500 feet *	500										
Custom Length Cable [User Specified]	CST										

* Maximum cable lengths:
 Battery powered converter cable: 25 feet
 Model 394: 200 feet
 Model 395: 500 feet

continued next page





Specification Sheet

FPI Mag Flow Meter with ProComm Converter

CONVERTER POWER OPTIONS					
AC Power	A				
DC Power	D				
Battery Power [25ft remote cable max]	B				
Solar Power, Battery Backup [25ft remote cable max]	S				
CONVERTER OUTPUT OPTIONS					
Dual 4-20mA Analog, Dual Digital (Standard)	1				
Modbus + STD (Two 4-20, two Dig)	2				
Hart + STD (Two 4-20, two Dig)	3				
Datalogger/BIV + STD (Two 4-20, two Dig)	4				
Datalogger/BIV + Modbus + STD (Two 4-20, two Dig)	5				
Datalogger/BIV + Hart + STD (Two 4-20, two Dig)	6				
AMI Smart Output + STD (Two 4-20, two Dig)	7				
Datalogger/BIV + AMI Smart Output + STD (Two 4-20, two Dig)	8				
AMI Smart Output + Dig Out + Datalogger (Battery power only)	9				
Digital Out + Datalogger (Standard Battery Power only)	0				
BALL VALVE OPTIONS					
2" NPT SS Ball Valve	N				
2" BSP Brass Ball Valve	B				
No Valve, NPT Hardware	X				
No Valve, BSP Hardware	Y				
SMART OUTPUT PROTOCOL OPTIONS *					
No AMI Outputs	-				
Sensus Protocol (6ft cable, Nicor Connector hardwired only)	SEN				
Itron 6 digit Protocol (6ft cable, Nicor Connector hardwired only)	ITR6				
Itron 9 digit Protocol (6ft cable, Nicor Connector hardwired only)	ITR9				
HAZARDOUS LOCATION					
Class I, Division 2, Groups A-D, T5	HL				

* Smart Output protocol options require selection of converter output option 7, 8, or 9.



FLOW METER SPECIFICATIONS

The full pipe averaging flow meter comes complete with Mounting Hardware, AC Converter with Dual 4-20mA output, 25 Feet of Dual Submersible Cables with quick connects at sensor, Stainless Steel Body, 316 Stainless Steel Electrodes, NSF Approved Fusion Bonded Epoxy Coating, 2" Stainless Steel Ball Valve (minimum of 1-7/8" port I.D.), 2" x Close Stainless Steel Nipple, 2-Year Warranty.

Measurement	
	Volumetric flow in filled flow conduits 4" (100 mm) to 138" (3,500 mm) utilizing insertable electromagnetic averaging sensor. Flow indication in English Standard or Metric units.
Flow Measurement	
Method	Electromagnetic
Calibrated accuracy for forward and bidirectional sensors	<ul style="list-style-type: none"> ±0.5% from 1 f/s to max velocity (on next page), up to ±1% for 0.3 to 1 f/s ±1% for reverse flow
Linearity	0.3% of Range
Repeatability	0.2% of Reading
Direction measurement	<ul style="list-style-type: none"> 395 sensor - Forward flow measurement and reverse flow indication 394 sensor - bidirectional flow measurement
Materials	
Coating	Fusion bonded epoxy (NSF 61 approved) coated 316 stainless steel
Insertion hardware	316 Stainless Steel
Compression seal	Silicone Rubber
Sensor electrodes	316 Stainless Steel
Temperature Range	
Operation	-10 to 60°C (14 to 140°F) up to 250 PSI
Storage	-15 to 60°C (5 to 140° F)
	Note regarding storage: During freezing conditions and when meter is not in use, sensor must be removed from pipe and stored in dry conditions.
	NOTE: Damage to the sensor caused by allowing the sensor freeze in the pipe is not covered by the warranty.
Electrical Connections	
	<ul style="list-style-type: none"> Quick Connect Compression gland seals
IP Rating	
Standard model	<ul style="list-style-type: none"> Quick Connect (IP68) Compression gland seals (IP68)
HL model	<ul style="list-style-type: none"> Quick Connect (IP67) Compression gland seals (IP67)
Sensor Submersibility Depth	
With standard quick connect	1.8 m (6 ft.)
With optional strain relief cable	9 m (30 ft.)

Certifications and Approvals

Standard Model

- ISO 9001:2015 certified quality management system
- NSF/ANSI/CAN 61 & NSF/ANSI 372
- Certified by MET to UL 61010-1

HL Model

- ISO 9001:2015 certified quality management system
- NSF/ANSI/CAN 61 & NSF/ANSI 372
- Certified by MET to UL 61010-1 and MET C22.2 No. 61010-1-04
 - Class I, Division 2, Groups A-D, T5
 - Class I, Zone 2, IIC T5



System Options

- Hastelloy® electrodes
- Additional sensor cable up to 475' (500' max for model 395 and 200' max for model 394)
- Extension to hardware clearance
- Annual verification / calibration
- Sensor insertion tool
- Stainless steel ID tag



FLOW METER PIPE SIZES AND FLOW RANGES

Pipe Size (Nominal)	Pipe ID Range		Flow Ranges (GPM Standard)		Standard Program Defaults ¹	Minimum Clearance Required During Installation ²	Velocity Range ³ (f/s)	
	Min Pipe ID	Max Pipe ID	Min (GPM) ¹	Max (GPM) ¹	20mA			
S = Standard (Available in 395 models Pipe Sizes 4" - 24" as shown in table below) C = Custom (Available in all 394 and 395L models Pipe Sizes 4" - 138") Standard Length Hardware and Installation Clearance Dimensions are based on a 4" Maximum Height Coupling and Pipe Schedule Standard								
4"	3.63	4.99	12	1280	600 GPM	51"	0.3 - 32	
6"	5.00	6.99	26	2800	1300 GPM	51"	0.3 - 32	
8"	7.00	8.99	47	5000	2350 GPM	55"	0.3 - 32	
10"	9.00	10.99	80	8000	4000 GPM	55"	0.3 - 32	
12"	11.00	12.99	110	11000	5500 GPM	59"	0.3 - 32	
14"	13.00	14.99	150	15000	7500 GPM	59"	0.3 - 32	
16"	15.00	16.75	190	20000	9500 GPM	59"	0.3 - 32	
18"	16.76	18.80	240	26000	12000 GPM	63"	0.3 - 32	
20"	18.81	20.99	300	28000	15000 GPM	63"	0.3 - 28	
22"	21.00	22.49	400	30000	20000 GPM	67"	0.3 - 25	
24"	22.50	25.99	410	33000	20500 GPM	67"	0.3 - 23	
30"	26.00	31.99	600	44000	30000 GPM	71.25"	0.3 - 20	
36"	32.00	37.99	1000	48000	50 KGPM	77.25"	0.3 - 15	
42"	38.00	43.99	1300	56000	65 KGPM	83.25"	0.3 - 13	
48"	44.00	49.99	1700	62000	85 KGPM	89.25"	0.3 - 11	
54"	50.00	55.99	2200	79000	110 KGPM	95.25"	0.3 - 11	
60"	56.00	61.99	2600	97000	130 KGPM	101.25"	0.3 - 11	
66"	62.00	67.99	3200	106000	160 KGPM	107.25"	0.3 - 10	
72"	68.00	73.99	3800	127000	190 KGPM	113.25"	0.3 - 10	
78"-138"	74.00	138.00	Available - Call Factory at 1-800-220-2279					

¹ Default totalizer units measured as KGAL.

² Hardware clearance after installation for all sizes is 28".

³ Flow temperature range -10° to 60° C (14° to 140° F) up to 250 PSI, max pressure is 250 psi.

! Required Information

At the time of ordering, please be prepared to provide the following information:

1. Pipe ID and Pipe OD
2. Unit of Measure (US Gallons is Default)
3. Maximum pressure
4. FPI Specification Data Sheet for custom length sensors

Consult factory if any chemicals are in use.



PROCOMM CONVERTER PART NUMBER MATRIX

PC	-	-	-	-	-	-
CONVERTER MOUNTING OPTIONS						
Meter Mount	M					
Remote Mount	R					
CONVERTER POWER OPTIONS						
AC Power	A					
DC Power	D					
Battery Power [25ft remote cable max]	B					
Solar Power, Battery Backup [25ft remote cable max]	S					
CONVERTER OUTPUT OPTIONS						
Dual 4-20mA Analog, Dual Digital (Standard)	1					
Modbus + STD (Two 4-20, two Dig)	2					
Hart + STD (Two 4-20, two Dig)	3					
Datalogger/BIV + STD (Two 4-20, two Dig)	4					
Datalogger/BIV + Modbus + STD (Two 4-20, two Dig)	5					
Datalogger/BIV + Hart + STD (Two 4-20, two Dig)	6					
AMI Smart Output + STD (Two 4-20, two Dig)	7					
Datalogger/BIV + AMI Smart Output + STD (Two 4-20, two Dig)	8					
AMI Smart Output + Dig Out + Datalogger (Battery power only)	9					
Digital Out + Datalogger (Standard Battery Power only)	0					
SMART OUTPUT PROTOCOL OPTIONS *						
No AMI Outputs	-					
Sensus Protocol (6ft cable, Nicor Connector hardwired only)	SEN					
Itron 6 digit Protocol (6ft cable, Nicor Connector hardwired only)	ITR6					
Itron 9 digit Protocol (6ft cable, Nicor Connector hardwired only)	ITR9					
HAZARDOUS LOCATION						
Class I, Division 2, Groups A-D, T5	HL					

* Smart Output protocol options require selection of converter output option 7, 8, or 9.



PROCOMM CONVERTER SPECIFICATIONS

Power Source		
AC	100-240 VAC / 45-66 Hz (10 W)	Note: AC or DC must be specified at time of ordering.
DC	10-35 VDC (10 W)	
Standard Outputs		
Dual 4-20mA Outputs: Galvanically isolated and fully programmable for zero and full scale (0-21mA rangeability)		
Two separate digital programmable outputs: open collector transistor usable for pulse, frequency, or alarm settings.		
<ul style="list-style-type: none"> <li style="width: 33%;">• Volumetric Pulse <li style="width: 33%;">• Range Indication <li style="width: 33%;">• Maximum switching frequency: 1250 Hz <li style="width: 33%;">• Flow Rate (Frequency) <li style="width: 33%;">• Maximum switching voltage: 40 VDC <li style="width: 33%;">• Insulation from other secondary circuits: 500V <li style="width: 33%;">• Hardware Alarm <li style="width: 33%;">• Maximum switching current: 100mA <li style="width: 33%;">• High/Low Flow Alarms <li style="width: 33%;">• Empty Pipe <li style="width: 33%;">• Directional Indication 		
Optional Outputs		
<ul style="list-style-type: none"> <li style="width: 33%;">• Modbus <li style="width: 33%;">• Smart Output™ (Sensus, Itron 6, Itron 9) <li style="width: 33%;">• Datalogger <li style="width: 33%;">• HART <li style="width: 33%;">• Built-in verification 		
Galvanic Isolation		
All inputs / outputs are galvanically isolated from power supply up to 500 V		
Engineering Units		
<ul style="list-style-type: none"> <li style="width: 33%;">• Cubic Meter <li style="width: 33%;">• US Gallons <li style="width: 33%;">• Imperial Kilogallon <li style="width: 33%;">• Cubic Centimeter <li style="width: 33%;">• Imperial Gallons <li style="width: 33%;">• Acre Feet <li style="width: 33%;">• Milliliter <li style="width: 33%;">• Cubic Feet <li style="width: 33%;">• Megagallon <li style="width: 33%;">• Liter <li style="width: 33%;">• Kilo Cubic Feet <li style="width: 33%;">• Imperial Megagallon <li style="width: 33%;">• Cubic Decimeter <li style="width: 33%;">• Standard Barrel <li style="width: 33%;">• Hundred Cubic Feet <li style="width: 33%;">• Decaliter <li style="width: 33%;">• Oil Barrel <li style="width: 33%;">• Megaliters <li style="width: 33%;">• Hectoliter <li style="width: 33%;">• US Kilogallon <li style="width: 33%;">• Cubic Inches <li style="width: 33%;">• Ten Thousands of Gallons 		
Conductivity		
Minimum conductivity of 5µS/cm		
Electrical Connections		
Connection options	<ul style="list-style-type: none"> • Compression gland seals for 0.24" to 0.47" diameter round cable • Conduit option: 1/2" NPT threaded connections 	
Sensor Cable Lengths		
Standard	25' McCrometer supplied submersible cable with each remote mount unit.	
Optional	Up to 500 feet, or 25 feet max for battery powered.	
Quick Connect *	Available in standard cable lengths: 25', 50', 75', 100', 125', 150', 175, 200', and 500'. Custom cable lengths at additional cost.	
IP Rating		
IP67 Die cast aluminum converter (only when connected using compression gland seals)		

* Not available with SPI Mag

Certifications and Approvals

Standard Model

- ISO 9001:2015 certified quality management system
- CE
- Certified by MET to UL 61010-1

HL Model

- ISO 9001:2015 certified quality management system
- CE
- Certified by MET to UL 61010-1 and MET C22.2 No. 61010-1-04
 - Class I, Division 2, Groups A-D, T5
 - Class I, Zone 2 IIC T5


IMPORTANT:

Electrical safety certifications above do not apply to model 282L Single Point Insertion (SPI Mag) Electromagnetic Flow Meter.

System Options

- Hastelloy® electrodes*
- DC power
- Additional sensor cable up to 475' (500' max for FPI Mag)
- Extension to hardware clearance
- Annual verification / calibration
- Sensor insertion tool*
- Stainless steel ID tag

Temperature Range

Operating and storage

-20° to 60° C (-4° to 140° F)

Converter Dimensions

Remote mount*

- Height: 7.3" (18.5 cm)
- Width: 8.5" (21.6 cm)
- Depth: 4.3" (10.9 cm)

Meter mount

- Height: 6.9" (17.5 cm)
- Width: 7.2" (18.25 cm)
- Depth: 6.2" (15.7 cm)

Keypad and Display

Can be used to access and change set-up parameters using six membrane keys and an LCD display

* Not available with SPI Mag

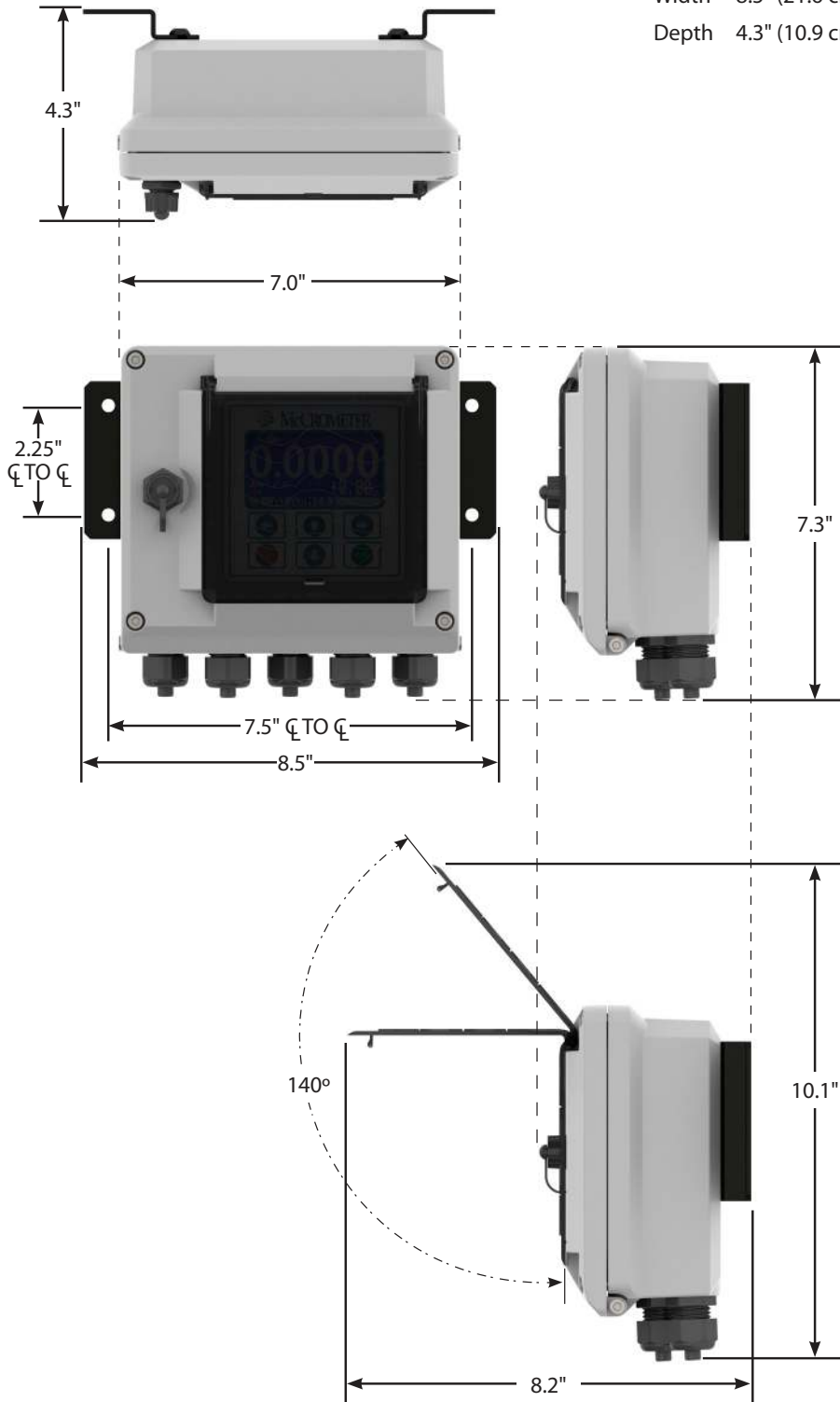
Note regarding cable length: McCrometer recommends minimizing cable length. Electromagnetic flow meters may have unfavorable signal strength to noise ratio in electrically noisy environments. Longer lengths of cable increase the likelihood of interference. In those cases where the meter's signal must be transmitted a long distance, or where the environment may be particularly noisy, we suggest using the converter's analog output(s). That allows locating the converter as close as possible to the metering location.

Specification Sheet

FPI Mag Flow Meter with ProComm Converter

CONVERTER DIMENSIONS

Height 7.3" (18.5 cm)
Width 8.5" (21.6 cm)
Depth 4.3" (10.9 cm)



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