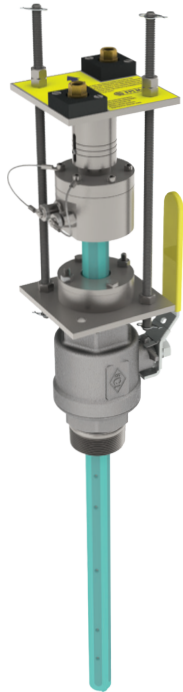


FPI Mag® Sensor



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



PART NUMBER MATRIX FOR FPI MAG WITH PROCOMM CONVERTER

39		5	S	-	S	N	Q 050	A	1	-	---	---
Single or Bidirectional Flow		4	5									
Bidirectional Flow		4	5									
Single Forward Flow		4	5									
Meter Type (Calculated)												
Standard Length Sensor			S									
Custom Length Sensor			C									
Nominal Line Size												
4 in	04											
6 in	06											
8 in	08											
10 in	10											
12 in	12											
14 in	14											
16 in	16											
18 in	18											
20 in	20											
24 in	24											
30 in	30											
36 in	36											
42 in	42											
48 in	48											
54 in	54											
60 in	60											
66 in	66											
72 in	72											
78 in	78											
84 in	84											
90 in	90											
96 in	96											
100 in	H0											
110 in	H1											
120 in	H2											
130 in	H3											

Continued on next page



PART NUMBER MATRIX FOR FPI MAG WITH PROCOMM CONVERTER (CONT.)

39	5	S	-	S	N	Q	050	A	1	-	---	-	---
Sensor Length Options (From Calc Sheet)													
20" Sensor Length		020											
21" Sensor Length		021											
22" Sensor Length		022											
Each nominal Inch Length		...											
175" Sensor Length		##											
Electrode Material Options													
→ S316 Stainless Steel (Standard)		S											
Hastelloy		H											
Ball Valve Options													
→ 2" NPT		N											
2" BSPT		B											
No Valve 2" NPT		X											
No Valve 2" BSPT		Y											
Remote Mount 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											
Converter Power Options													
→ A/C Power		A											
DC Power		D											
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*											
Smart Output Protocol Options (*7 or 8 output option required)													
→ No AMI Outputs		-											
Sensus Protocol (6ft cable, Nicor Connector hardwired only)		SEN											
Itron 6 digit Protocol (6ft cable, Nicor Connector hardwired only)		IT6											
Itron 9 digit [100W] Protocol (6ft cable, Nicor Connector hardwired only)		IT9											
Neptune Protocol (6ft cable, Nicor Connector hardwired only)		NEP											
Battery Power/ ATT wireless Telemetry System (RTU, Solar Panel, 7 Pin Cable)		ATT											
Battery Power/ Verizon wireless Telemetry System (RTU, Solar Panel, 7 Pin Cable)		VZW											
Hazardous Area Location													
Class 1, Division 2, Groups A-D, T5 - HL													

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"> • AC or DC power: $\pm 0.5\%$ of measured value ± 0.006 ft/s (± 0.0018 m/s) • Battery power: $\pm 1\%$ of measured value ± 0.006 ft/s (± 0.0018 m/s) • Reverse Flow: $\pm 1\%$ of measured value ± 0.006 ft/s (± 0.0018 m/s) <p>Note: See section "Flow Meter Pipe Sizes and Flow Ranges with ProComm Converter" for a table of velocities by pipe size.</p>
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.
Sensor Cable Lengths	
Standard	50' McCrometer supplied submersible cable with each remote mount unit.
Optional	Up to 500'/152.4 m, or 25'/7.6 m max for battery powered.
Quick Connect	Available in standard cable lengths: Feet: 25, 50, 75, 100, 125, 150, 175, 200, 500 Meters: 7.6, 15.25, 22.5, 30.5, 38.1, 45.75, 53.3, 61, 152.4 Custom cable lengths at additional cost.
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	<ul style="list-style-type: none"> • ISO 9001:2015 certified quality management system • Certified by MET to UL 61010-1 / CSA C22.2 No. 61010-1 • Certified to NSF / ANSI Standards*
HL Model	<ul style="list-style-type: none"> • ISO 9001:2015 certified quality management system • Certified by MET: Safety: UL61010-1 / CSA C22.2 No. 61010-1, Third Edition: Safety of Electrical Equipment For Measurement, Control, and Laboratory Use • Certified by MET: Standards: ANSI / ISA12.12.01 / CSA C22.2 No. 213, Nonincendive Electrical Equipment <ul style="list-style-type: none"> • Class I and II, Division 2 • Class III, Divisions 1 and 2 Hazardous (Classified) Locations • Certified to NSF / ANSI Standards*



* Certified by IAPMO R&T to NSF/ANSI 61 for material safety and NSF/ANSI 372 for low lead content.

Available 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

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.

FLOW METER PIPE SIZES AND FLOW RANGES WITH PROCOMM CONVERTER
IMPERIAL UNITS

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 (GPM)		
S = Standard (Available in 395 models Pipe Sizes 4" - 24" as shown in table below) C = Custom (Available in all 394 and 395 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"	3.74	4.99	12	1280	1280	51"	0.3 - 32
6"	5.00	7.24	26	2800	2800	51"	0.3 - 32
8"	7.25	9.24	47	5000	5000	55"	0.3 - 32
10"	9.25	11.24	80	8000	8000	55"	0.3 - 32
12"	11.25	12.99	110	11000	11000	59"	0.3 - 32
14"	13.00	14.99	150	15000	15000	59"	0.3 - 32
16"	15.00	16.75	190	20000	20000	59"	0.3 - 32
18"	16.76	18.80	240	26000	26000	63"	0.3 - 32
20"	18.81	22.74	300	28000	28000	63"	0.3 - 28
24"	22.75	24.99	410	33000	33000	67"	0.3 - 23
30"	25.00	33.99	600	44000	44000	71.25"	0.3 - 20
36"	34.00	39.99	1000	48000	48000	77.25"	0.3 - 15
42"	40.00	45.99	1300	56000	56000	83.25"	0.3 - 13
48"	46.00	51.99	1700	62000	62000	89.25"	0.3 - 11
54"	52.00	57.99	2200	79000	79000	95.25"	0.3 - 11
60"	58.00	63.99	2600	97000	97000	101.25"	0.3 - 11
66"	64.00	69.99	3200	106000	106000	107.25"	0.3 - 10
72"	70.00	75.99	3800	127000	127000	113.25"	0.3 - 10
78"-128"	76.00	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 SPECIFICATIONS

Physical Specifications

Electronic Housing	Diecast aluminum, powder coated enclosure w/ tamper resistant seal	
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)
Power	AC Power:	100-240 VAC / 45-66 Hz (10 W)
	DC Power:	12-48 VDC (10 W)
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 	
Galvanic Isolation	All inputs / outputs are galvanically isolated from power supply up to 500 V	
Conductivity	Minimum conductivity of 5µS/cm	

Note: AC or DC must be specified at time of ordering.

Performance and Operational Specifications

Accuracy	<ul style="list-style-type: none"> • ±0.5% from 1 f/s to max velocity, up to ±1% for 0.3 to 1 f/s • ±1% for reverse flow 		
Location	Indoor or outdoor use		
Operating and Storage Temperature	-4° to 140° F (-20° to 60° C)		
IP Rating	IP67 Die cast aluminum converter (only when connected using compression gland seals)		
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.		
Optional Outputs	<ul style="list-style-type: none"> • Volumetric Pulse • Flow Rate (Frequency) • Hardware Alarm • High/Low Flow Alarms • Empty Pipe • Directional Indication 	<ul style="list-style-type: none"> • Range Indication • Maximum switching voltage: 40 VDC • Maximum switching current: 100mA 	<ul style="list-style-type: none"> • Maximum switching frequency: 1250 Hz • Insulation from other secondary circuits: 500V
	<ul style="list-style-type: none"> • Modbus • HART 	<ul style="list-style-type: none"> • Smart Output™ (Sensus, Itron 6, Itron 9) 	<ul style="list-style-type: none"> • Datalogger • Built-in verification

Display and Measurement

Keyboard and Display	Can be used to access and change set-up parameters using six membrane keys and an LCD display		
Engineering Units	<ul style="list-style-type: none"> • Cubic Meter • Cubic Centimeter • Milliliter • Liter • Cubic Decimeter • Decaliter • Hectoliter • Cubic Inches 	<ul style="list-style-type: none"> • US Gallons • Imperial Gallons • Cubic Feet • Kilo Cubic Feet • Standard Barrel • Oil Barrel • US Kilogallon • Ten Thousands of Gallons 	<ul style="list-style-type: none"> • Imperial Kilogallon • Acre Feet • Megagallon • Imperial Megagallon • Hundred Cubic Feet • Megaliters

PROCOMM CONVERTER SPECIFICATIONS (CONT.)

Other Specifications

Standard Model

- ISO 9001:2015 certified quality management system
- Certified by MET to UL 61010-1 / CSA C22.2 No. 61010-1
- Certified to NSF / ANSI Standards*

HL Model

- ISO 9001:2015 certified quality management system
- Certified by MET: Safety: UL61010-1 / CSA C22.2 No. 61010-1, Third Edition: Safety of Electrical Equipment For Measurement, Control, and Laboratory Use
- Certified by MET: Standards: ANSI / ISA12.12.01 / CSA C22.2 No. 213, Nonincendive Electrical Equipment
 - Class I and II, Division 2
 - Class III, Divisions 1 and 2 Hazardous (Classified) Locations
- Certified to NSF / ANSI Standards*



IMPORTANT

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



IMPORTANT

Refer to certification requirements. Do not substitute components.



IMPORTANT

The ProComm converter, models PC-RA1-HL series and PC-MA1-HL series have no user serviceable parts.

PROCOMM CONVERTER DIMENSIONS

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

