

Model 394L Bidirectional and 395L Forward Flow with Converter

FPI Mag® Sensor



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 Lab 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
- Pumping Stations
- UV Dosing
- Filter Balancing and Backwash
- Wells & 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 | • Raw Water |
| • Fire Water | • Inlet to Surge Basin |
| • Feed Water | • 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

SPECIFICATION SHEET**Model 394L Bidirectional and 395L Forward Flow
with Converter****DESCRIPTION**

The full pipe averaging flow meter comes complete with Mounting Hardware, AC Converter with Single or 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: $\pm 0.5\%$ from 1 f/s to max velocity (on next page), up to $\pm 1\%$ for 0.3 to 1 f/s; $\pm 1\%$ for battery powered converter, $\pm 1\%$ for reverse flow
- **Linearity:** 0.3% of Range
- **Repeatability:** 0.2% of Reading
- **Direction Measurement:** 395L sensor - Forward flow measurement and reverse flow indication; 394L sensor - bidirectional flow measurement

POWER SOURCE

- **AC:** 90-265 VAC / 45-66 Hz (20 W/25 VA)
- **DC:** 10-35 VDC (21 W)
- **Battery:** (for forward flow only) Estimated five year life span. (Battery life dependent on application. Estimated life based on factory standard settings)
- Solar panel option available.

AC, DC, or battery must be specified at time of ordering.

MATERIALS

- Fusion bonded epoxy (NSF 61 approved) coated 316 stainless steel
- **Insertion Hardware:** 316 Stainless Steel
- **Compression Seal:** Silicone Rubber
- **Sensor Electrodes:** 316 Stainless Steel

STANDARD OUTPUTS:

Single¹ or Dual² 4-20mA Outputs: Galvanically isolated and fully programmable for zero and full scale (0-21mA rangeability)
Two¹ or Four² separate digital programmable outputs: open collector transistor usable for pulse, frequency, or alarm settings.

- Volumetric Pulse
- Flow Rate (Frequency)
- Hardware Alarm
- High/Low Flow Alarms
- Empty Pipe
- Directional Indication
- Range Indication

Maximum switching voltage: 40 VDC

Maximum switching current: 100mA

Maximum switching frequency: 1250 Hz

Insulation from other secondary circuits: 500V

OPTIONAL OUTPUTS:

- Profibus¹
- HART¹
- Modbus²
- Smart Output™ (Sensus or Itron)

¹ Available with Single 4-20mA only. Forward flow only.

² Available with Single or Dual 4-20mA.

Not available with battery powered

ISOLATION

All inputs / outputs are galvanically isolated from power supply up to 500 V

ENGINEERING UNITS

Cubic Meter; Cubic Centimeter; Milliliter; Liter; Cubic Decimeter; Decaliter; Hectoliter; Cubic Inches; US Gallons; Imperial Gallons; Cubic Feet; Kilo Cubic Feet; Standard Barrel; Oil Barrel; US Kilogallon; Ten Thousands of Gallons; Imperial Kilogallon; Acre Feet; Megagallon; Imperial Megagallon; Hundred Cubic Feet, Megaliters

CONDUCTIVITY

Minimum conductivity of 5µS/cm

CONVERTER ENCLOSURE

- IP67 Die Cast Aluminum
- 5.75" H x 5.75" W x 6.69" D (14.6 cm H x 14.6 cm W x 17 cm D)

ELECTRICAL CONNECTIONS

- **Sensor:** Quick-Connect (IP68)
- **Converter:** Compression gland seals for 0.125" to 0.375" diameter round cable.

RATINGS

- IP68 Submersible Sensor (details below)
- IP67 Die Cast Aluminum Converter
- IP65 Panel Mount Converter

CERTIFICATIONS AND APPROVALS

- **Safety:** Listed by CSA to 61010-1: Certified by CSA to UL 61010-1 and CSA C22.2 No.61010-1-04
- ISO 9001:2015 certified quality management system
- CE: compliant (converter only)

Note: Panel mount converter is not CSA approved.

ENVIRONMENTAL

- **Sensor:** Flow temperature range 14° to 170° F (-10° to 77° C) up to 250 PSI
- **Submersibility:** Remote sensor is continuously submersible (IP68), with a standard quick-connect cable to 6 ft, and optional strain relief at 30 ft; die cast aluminum converter is rated IP67
- **Electronics:** Operating and storage temperature: -4° to 140° F (-20° to 60° C)
- **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.

SYSTEM OPTIONS FORWARD AND BIDIRECTIONAL

- Hastelloy® Electrodes
- DC Power
- Sun Shield
- Additional sensor cable up to 480' (Max 500')
- Extended Warranties
- Extension to hardware clearance
- Annual Verification / Calibration
- Sensor Insertion Tool
- Stainless Steel ID Tag

KEYPAD AND DISPLAY

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



SPECIFICATION SHEET

Model 394L Bidirectional and 395L Forward Flow with Converter

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 395L models Pipe Sizes 4" - 24" as shown in table below) C = Custom (Available in all 394L 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					

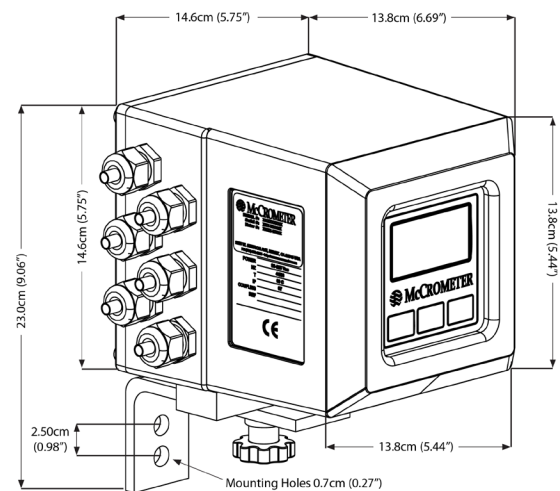
¹ Default totalizer units measured as KGAL.
² Hardware clearance after installation for all sizes is 28".
³ Temperature range is 14° - 170° F, max pressure is 250 psi.

! 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.



Converter Dimensions

Panel Mount Converter Also Available