Clear Form

HACH® FPI MAG™

FPI MAG 3000 AND
FPI MAG 5000

FULL PROFILE INSERTION
ELECTROMAGNETIC FLOW METER
MODELS 394 AND 395 MAG METER SUBMITTAL

From

McCROMETER
3255 WEST STETSON AVENUE
HEMET, CA 92545

Phone (951) 652-6811
Toll Free (800) 220-2279
Fax (951) 652-3078

www.mccrometer.com

Date:

Hach's Flow Solutions by McCROMETER

Project Description

Project Name:	
Purchase Order No.:	
Date:	
Customer Name:	
Submitted By:	
Other Project Information:	

When completing this submittal package, it must also include the Mag Meter Part and Price Configurator, which is also an electronic document. A version without pricing can be downloaded from the McCrometer web site with the following link.

Muni FPI Mag Part and Price Configurator

The Mag Meter Part and Price Configurator is a macro-enabled Excel spreadsheet that contains multiple drop down fields for multiple product configurations. After it is filled out, save the spreadsheet under a different name and submit the file with the submittal package.

You can request a version of the Configurator with pricing by contacting McCrometer Customer Service or Inside Sales. Their contact information is on the McCrometer Web site.

Equipment Selection for FPI Mag 3000

PART NUMBER	DESCRIPTION		METER 1 QTY.	METER 2 QTY.	METER 3 QTY.
Standard Equipment					
Model 395	FPI Mag™ Meter Forward Flow				
	Standard meter				
	Hazardous location meter				
Model 394	FPI Mag™ Meter Bidirectional Flow				
	Standard meter				
	Hazardous location meter				
	ProComm Go Transmitter • Battery power standard • Two digital pulse outputs • Data logger				
	Notes on standard equipment on FPI Mag flow meters: • Nominal pipe size in inches (4" to 138") • 2" stainless steel full port ball valve with 2 x close stainless steel nipple • Quick Connect Cable Connector (IP68) • Submersible sensor cable, 25 feet • Compression seal • Set of installation rods • Set of retaining rods • Instruction manual • 3M fusion bonded epoxy protective coating on probe				
Sensor Options					
	Additional sensor cable: Specified total length in feet (leave blank for none)				
Special	Compression Gland Seals (instead of Quick Connects at sensor)				
75031/75032	Insertion Tool				
170007101	Stainless Steel Tag				
Transmitter Options					
	Power Options	10 to 35 VDC			
		100 to 240 VAC			
	Communications Options (select all that apply)	SmartTrax			
		AMI Smart Output (Sensus, Itron 6, Itron 9)			
	Output Option	4-20mA (passive)			

IMPORTANT: The MINIMUM port inside diameter for all installation valves is 1-7/8" (48mm).

Equipment Selection for FPI Mag 5000

PART NUMBER	DESCRIPTION		METER 1 QTY.	METER 2 QTY.	METER 3 QTY.
Standard Equipment					
Model 395	FPI Mag™ Meter Forward Flow				
	Standard meter				
	Hazardous location meter				
Model 394	FPI Mag™ Meter Bidirectional Flow				
	Standard meter				
	Hazardous location meter				
	ProComm Max Transmitter • IP67 Enclosure • Six-Button Key Pad • 100-240 VAC (10W) • Back-Lit Graphical LCD Display • Two programmable opto-isolated digital outputs • 4-20mA (active or passive, selected via menu)				
	Notes on standard equipment on FPI Mag flow meters: • Nominal pipe size in inches (4" to 138") • 2" stainless steel full port ball valve with 2 x close stainless steel nipple • Quick connect cable connector (IP68) • Submersible sensor cable, 25 feet • Compression seal • Set of installation rods • Set of retaining rods • Instruction manual • 3M fusion bonded epoxy protective coating on probe				
Sensor Options					
	Additional sensor cable: Specified total length in feet (leave blank for none)				
75031/75032	Insertion Tool				
170007101	Stainless Steel Tag				
Transmitter Options					
	Power Option	10-35 VDC			
	Communications Options (select all that apply)	HART			
		Modbus RTU (RS485)			
		Ethernet IP			
		SmartTrax			
		AMI Smart Output (Sensus, Itron 6, Itron 9)			
	Output Option	4-20mA (active or passive)			

IMPORTANT: The MINIMUM port inside diameter for all installation valves is 1-7/8" (48mm).

Project Notes

Meter 1:

Meter 2:

Meter 3:

FPI Mag 3000 Suggested Specifications

PART 1 - GENERAL

1.1 SCOPE

This section describes the requirements for an electromagnetic insertion flow meter and microprocessor-based signal transmitter. Under this item, the contractor shall furnish and install the insertion mag meter equipment and accessories as indicated on the plans and as herein specified.

1.1 SUBMITTALS

The following information shall be included in the submittal for this section:

1. Data sheets and catalog literature for the 395 or 394 Insertion Mag meter and the microprocessor-based signal transmitter
2. Connection diagrams for equipment wiring.
3. List of spare parts and optional equipment.

PART 2 - PRODUCTS

2.1 ELECTROMAGNETIC INSERTION FLOWMETER (FPI MAGMETER)

The electromagnetic insertion flow meter shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction and microprocessor-based signal transmitter.

A. Sensor:

1. Operating principle: Utilizing Faraday's Law of Electromagnetic Induction, the flow of a conductive liquid around the sensor induces an electrical voltage that is proportional to the velocity of the flow.
2. Construction: The sensor material shall be constructed of 316 Stainless Steel and coated with NSF 61 certified approved epoxy coating.
3. Hastelloy Electrodes (Optional) shall be used when corrosive fluid is present.
4. Sensor operating Temp: +14° to +140° F @ 250 PSI
5. Electronics operating temperature (Transmitter): -4° to +140° F
6. Size: 4" to 138" diameter (see instrument schedule)
7. Installation hardware shall include a Stainless Steel 2" full ported valve with a stainless-steel nipple.
8. Submergence:
    a. The sensor shall be NEMA 6P or IP68 rated to be permanently submerged up to 6 feet.
    b. The sensor shall be NEMA 6P or IP68 rated to be permanently submerged up to 30 feet (option with IP68 rated strain relief connection only).

B. Transmitter:

1. Electronic Enclosure: Shall be a NEMA 4X, IP67 rated enclosure.
2. Transmitter/display: Background illumination with alphanumeric 8-line graphical backlit LCD display with 6-keyouch programming to indicate flow rate, totalized values, settings, and faults.
3. Power supply:
    a. 100/240 VAC
    b. 10-35 VDC (option)
    c. Battery (option)

4. Operating temperature: -4 to +140 degrees F.
5. Outputs:
   a. 4-20 mA (0-21mA).
   b. Two separate digital programmable outputs:
      1) Open collector transistor usable for pulse
      2) Frequency and alarm settings
6. Communications-Optional:
   a. SmartTrax
   b. AMI Smart Output (Sensus, Itron 6, Itron 9).
      1) Sensus
      2) Itron 6 digit
      3) Itron 9 digit
      4) Neptune
7. Transmitter Self Diagnostics
8. Manufacturer shall provide an optional Hazardous Location certified model. Certified by MET to UL 6100-1 and MET C22.2 No. 61010-1-04
   a. Class I, Division 2, Groups A-D, T5
   b. Class I, Zone 2, IIC T5
9. Sensor and signal transmitter performance:
   a. Flow Range: .2 FPS to 32 FPS for accuracies stated below.
   b. Accuracy:
      1) ProComm Go Electronics : ±1% of measured value ±0.006 ft/s (±0.0018 m/s)
      2) Reverse Flow: ±1% of measured value ±0.006 ft/s (±0.0018 m/s)
   c. Cable Length: Remote Mount
      1) AC or DC Power: Up to 500'/152.4m
   d. Manufacturer shall offer optional Quick Connect cabling for remote mounted installations.
   e. Repeatability: ±0.05% or ±.0008ft/s (±0.25mm/s), whichever is greater
   f. Conductivity: Minimum 5 µs/cm
   g. Optional meter mounted transmitter.
   h. Bi-directional flow capabilities (optional)
   i. Power & Signal Cabling: The power and signal between the transmitter and sensor are combined in a single cable.
   j. Flow Direction Measurement: Forward and reverse flow indication and forward, reverse, net totalization is available.

2.2 THE ELECTROMAGNETIC INSERTION FLOW METER SHALL BE FPI MAG 3000 395 FOR FORWARD FLOW, OR 394 BI-DIRECTIONAL FULL PROFILE INSERTION MAG METER OR EQUAL.

2.3 SPARE PARTS

A. Spare parts for the equipment shall include the following, unless otherwise noted:

1. Extra operation manuals as required.

2.4 OPERATOR FUNCTIONS

A. Calibration

1. Each flow sensor shall have wet flow calibration of the complete meter flow element and its signal transmitter. The calibration facilities must be traceable to the National Institute of Standards and Technology (N.I.S.T). All the calibration information and factory settings matching the sensor shall be stored in an integrally mounted memory unit. The memory unit shall store sensor calibration data and signal transmitter settings for the lifetime of the product. At initial commissioning, the flow meter commences measurement without any initial programming. Any customer specified settings are downloaded to the memory unit. Should the signal transmitter need to be replaced, the new signal transmitter will upload all previous settings and resume measurement without any need for reprogramming or rewiring.
2. Manufacturer shall provide a calibrated meter set which includes the sensor element, the cabling and the transmitter.
3. An N.I.S.T. certificate of calibration shall accompany each flow element.

PART 3 - PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's recommendation for the minimum upstream and downstream installation requirements for the flow element.

B. Wiring between flow element and remote mounted signal transmitters shall use cable type and procedures as per the manufacturers' recommendations.

3.2 MANUFACTURER'S ASSISTANCE

A. Warranty

1. The manufacturer of the electromagnetic flow meter shall provide a two-year warranty that the equipment shall be free from defects in design, workmanship, or materials. Extended warranties up to five years shall be available for additional cost.
2. The manufacturer of the electromagnetic flow meter shall provide a Lifetime Guarantee on the flow element Ultra Liner fusion bonded epoxy liner.
3. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall promptly repair or replace the defective part at no cost to the owner.

FPI Mag 3000 Product 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.

Physical Specifications

Measurement	Electromagnetic
Directionality	Forward and reverse
Pipe Sizes	Up to 138"
Body Style	Full profile insertion
Materials	• 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
Coating	Fusion bonded epoxy (NSF 61 approved) coated 316 stainless steel
Electrodes	316 Stainless Steel, Hastelloy optional
Electrical Connections	Quick Connect
Electronics	ProComm GO electronics
Electronics Mount	Remote mount only
Sensor Cable Lengths	• Standard: 25'/7.6 m 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 quick connect cable lengths at additional cost.
Insertion Hardware	316 Stainless Steel
Compression Seal	Silicone Rubber

Performance and Operational Specifications

Measurement Method	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.
Direction Measurement	• 395 sensor: Forward flow measurement and reverse flow indication • 394 sensor: Bidirectional flow measurement
Operating Temperature	-10 to 60°C (14 to 140°F) up to 250 PSI
Storage Temperature	-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.**
IP Rating	• Standard model: Quick Connect (IP68) • HL model: Quick Connect (IP67)
Sensor Submersibility Depth	With standard quick connect: 9 m (30 ft.)

FPI Mag 3000 Product Specifications

Velocity Range	See following pages flow velocity ranges by line size for each type of electronics.
Calibrated accuracy for forward and bidirectional sensors	• ProComm Go Electronics : ±1% of measured value ±0.006 ft/s (±0.0018 m/s) • Reverse Flow: ±1% of measured value ±0.006 ft/s (±0.0018 m/s)
Linearity	0.3% of Range
Repeatability	0.2% of Reading
Pipe Run Requirements	Pipe run requirements for the FPI Mag sensor can vary, depending on the disturbances in the pipe run. See FPI Mag flow meter manual 30127-05, step 3 of the installation procedure for a table of upstream and downstream straight-pipe run recommendations.

Other Specifications

Certifications and Approvals	**Standard model:**
	• ISO 9001:2015 certified quality management system
	• Certified by MET to UL 61010-1
	• Certified to NSF / ANSI Standards*
	HL Model:
	• ISO 9001:2015 certified quality management system
	• 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
	• Certified to NSF / ANSI Standards*

System Options	• Hastelloy electrodes • Annual verification / calibration • Stainless steel ID tag
Meter Options and Accessories	• Sensor insertion tool • Extension to hardware clearance • Additional sensor cable up to 475' (500' max for model 395 and 200' max for model 394)
Warranty	2 years

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

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 transmitter as close as possible to the metering location.

FPI Mag 3000 Product Specifications

Flow Meter Pipe Sizes and Flow Ranges with ProComm Max Transmitter

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.

FPI Mag 3000 Part Number Matrix

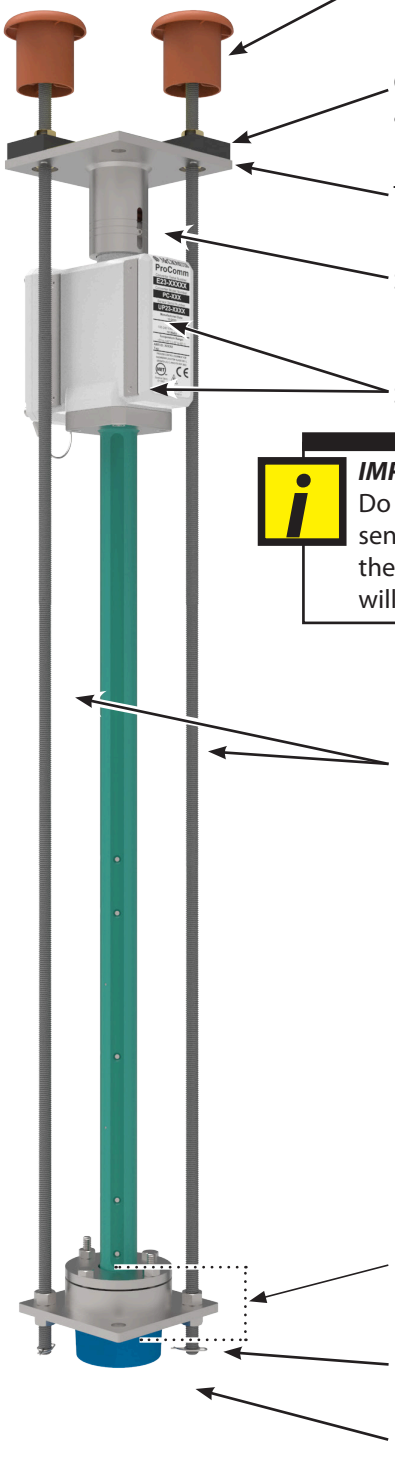
FP339			-										-		-		-	
Single or Bidirectional Flow																		
Bidirectional Flow	4																	
Single Forward Flow	5																	
Standard or Customer Length Sensor																		
Standard Length Sensor		S																
Custom Length Sensor		C																
Nominal Line Size																		
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																
Sensor Length Options																		
20" Sensor Length			**020**															
21" Sensor Length			**021**															
Each nominal Inch Length			**XXX**															
175" Sensor Length			**175**															
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																		
25 ft. Quick Connect						**Q**												

FPI Mag 3000 Part Number Matrix

FP339 -						-		-		-	
Converter Power Options											
Battery Power *(Standard)*	B										
Solar Power, Battery Backup	S										
A/C Power, Battery Backup	E										
DC Power, Battery Backup	F										
Converter Output Options											
No Outputs *(Standard)*											
No Outputs, DC cable only		0									
Two Digital Out		1									
4-20mA Analog only		2									
4-20mA Analog + Two Dig Out		3									
DC Power/ Analog Out Cable Options											
No DC Power or Outputs *(Standard)*											
No Cable - Output Configured (Quick Conn)			0								
6 ft (Open Leads)			1								
25 ft (Open Leads)			2								
50 ft (Open Leads)			3								
Pulse Cable Length Options											
No Outputs *(Standard)*											
No Cable - Output Configured (Quick Conn)				0							
6 ft (Open Leads)				1							
25 ft (Open Leads)				2							
50 ft (Open Leads)				3							
Output Cable Terminal Options											
No Output Cables											
Strain Relief					1						
Quick Connect Cable Terminals					2						
Smart Output Protocol / SmartTrax Options											
No AMI Outputs/SmartTrax Options											
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				
6 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)							S06				
25 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)							S25				
50 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)							S50				
No Batteries, Battery Tray Options											
Includes Batteries (*Standard*)											
No Batteries (Alkaline Tray)									NBA		
No Batteries (Lithium Tray)									NBL		
Hazardous Area Location											
No Hazardous Location Needed											
Class 1, Division 2, Groups A-D, T5											HL

FPI Mag 3000 Sensor Parts

Sensor electrode pairs and fluid column grounds (all combined as a functioning set) are located along the sensor probe. There are two sets located at the top of the probe, two sets at the bottom of the probe, and one set in the center, for a total of five sets.



IMPORTANT!
Do not disassemble the sensor body. Removal of the sensor body screws will VOID the warranty.

Top view of top plate

INSTALLATION TOOL (OPTIONAL)
Specialized sensor insertion tool used for installation, profiling, and maintenance of the sensor.

Transmitter Specifications

Physical Specifications

Electronic Housing	Diecast aluminum, powder coated enclosure w/ tamper resistant seal, 6½" x 6½" x 43/8" tall
Transmitter Dimensions	See "Dimensions" section for meter mount and remote mount transmitter dimensions.
Power	**Battery:** Standard: three 3.6V lithium-thionyl chloride (Li-SOCI2) D size batteries with two AA backup batteries **AC Power:** 100-240VAC/45-66Hz (4W) **DC Power:** Linear power supply 10-35VDC (4 W)
Electrical Connections	• Optional shielded cable for 10-32VDC/4-20 mA output • Optional shielded cable for pulse out

Performance and Operational Specifications

Battery Life	Five-year expected battery life, five-year battery warranty
Location	Indoor or outdoor use
Altitude	Operating: 2000 meters Storage: 12,000 meters
Operating Temperature	-4° to 140° F (-20° to 60° C)
Storage Temperature	-4° to 140° F (-20° to 60° C)
Relative Humidity	0% to 100%
IP Rating	IP67 Die cast aluminum transmitter
Outputs	**Digital output:** Digital pulse (open collector) output for volumetric - Two isolated digital pulse (open collector) outputs for volumetric - AMI output **Analog output:** 4-20mA: Galvanically Isolated, 16 Bit resolution. All power configurations (including battery). Note: 9-30 VDC loop power required (not supplied via transmitter)

Display and Measurement

Display	• 2-Line LCD display (no backlight) • Non-volatile memory • Anti-reverse totalizer (standard) • Total (to 9 digits of precision)	• Flow rate and velocity (to 5 digits of precision) • Two alarms: low battery and empty pipe (optional) • Opening lid activates display
Digits	5 Rate, 9 Total	

Units

GPM	Gallons per minute	IGM	Imperial gal per minute	CFM	Cubic feet per minute
MGD	Mega gal per day	MI9	Miners inch (9G)	B5M	Barrels per minute (55G)
CFS	Cubic feet per second	MI1	Miners inch (11.22G)	B5H	Barrels per hour (55G)
MLD	Megaliters per day	APD	Acre feet per day	B5D	Barrels per day (55G)
LPS	Liters per second	KLH	Kiloliters per hour	B4M	Barrels per minute (42G)
CMH	Cubic meters per hour	LPH	Liters per hour	B4H	Barrels per hour (42G)
LPM	Liters per minute	CMM	Cubic meters per minute	B4D	Barrels per day (42G)
GPH	Gallons per hour	CFM	Cubic feet per minute		

Transmitter Specifications

Display and Measurement (cont.)

Totalizer Units

GAL	Gallons	B42	Barrel (42G)	MH1	Miners Inch Hour (11.22G)
CUF	Cubic Feet	B46	Barrel (46G)	MD1	Miners Inch Day (11.22G)
AFT	Acre Feet	B55	Barrel (55G)	MH9	Miners Inch Hour (9G)
CUM	Cubic Meters	IMG	Imperial Gallon	MD9	Miners Inch Day (9G)
LIT	Liters	AIN	Acre Inch	KGL	Kilo Gallons
MML	Megaliter	TON	Ton (Short)	MGL	Mega Gallons
MTT	Metric Ton (KL)	MM1	Miners Inch Minute (11.22G)	IN3	Cubic Inch
B31	Barrel (31G)	MM9	Miners Inch Minute (9G)		

Data Logger

Standard with all models, minimum of five years of data stored

Other Specifications

Options and Accessories

- Data Logger - included as standard with five years of data storage at default (12hr) interval. (Cable sold separately)
- AC, DC, and battery powered with battery backup powered available

Safety

- IEC 61010-1, Pollution Degree II
- Overvoltage protection Category III

Certifications

Standard Model

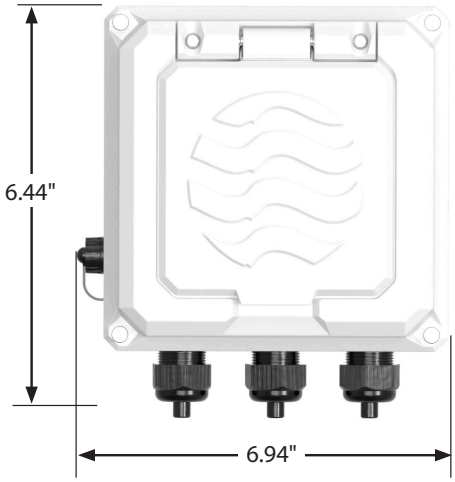
- ISO 9001:2015 certified quality management system
- CE
- Certified by MET to UL 61010-1

HL Model

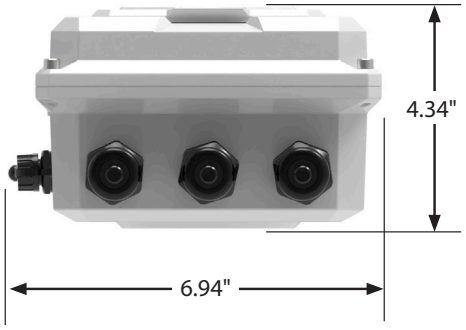
- ISO 9001:2015 certified quality management system
- CE
- Certified by MET to UL 61010-1 and MET C22.2 No. 61010-1-04
  - Class I, Division 2, Groups A B C D, T4
  - Class I, Zone 2, IIC T4

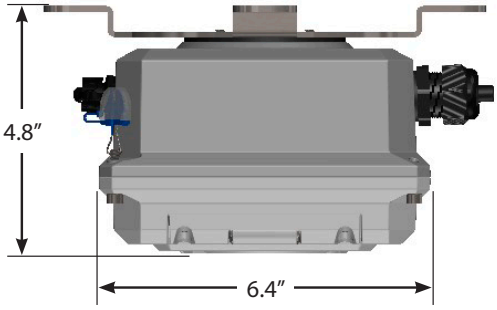
Note: ProComm GO with SmartTrax On Board is not available for hazardous locations.

Transmitter Dimensions

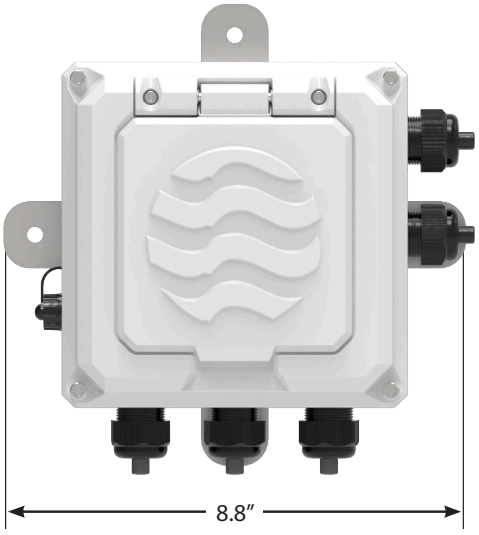


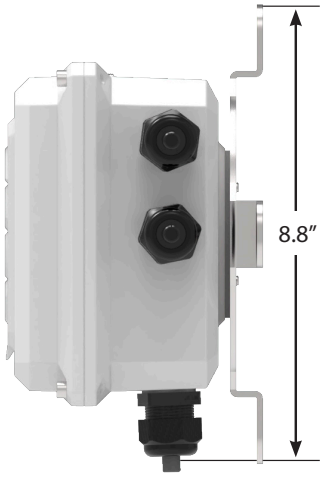
Meter mount converter





Remote mount converter



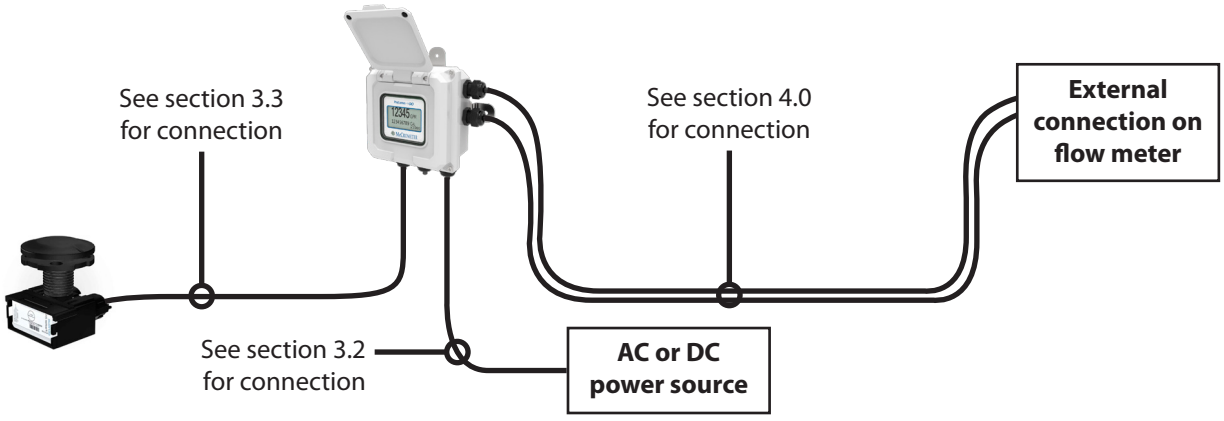


Cable Connections from Sensor

Example Remote Mount Configuration

After installing the sensor, mount the converter and connect the cable to the meter's junction box and the converter's external connection. Figure 4 below shows an example of a remote mount installation with an optional Smart Output connection.

You will need to prepare the location where you will install the remote converter. The location cannot be further from the flow meter than the length of the 25' cable. This must be planned in advance because ***the cable cannot be lengthened.*** Doing so will alter the calibration accuracy between the meter and the converter and void the warranty.



IMPORTANT: The example shown above does not include grounding installation. The meter will need to be grounded according to each meter's requirements.

Cable Connections from Sensor

3.1 Terminal Block Diagram and Grounding Lug

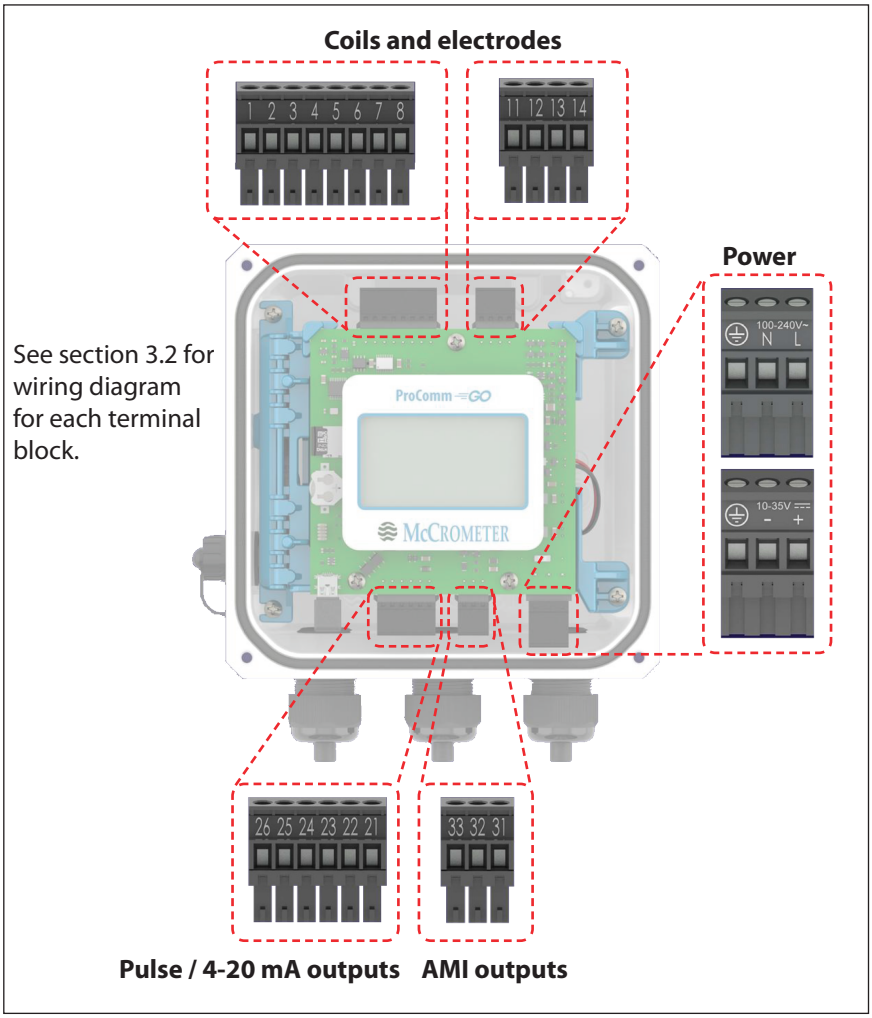


Figure 12. Terminal blocks

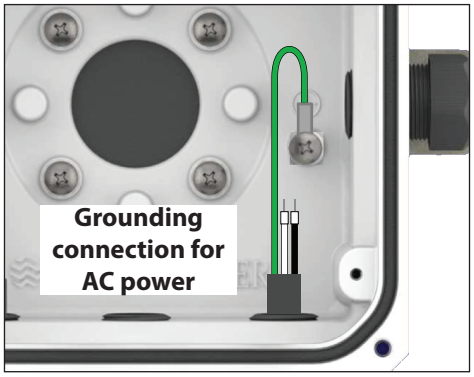
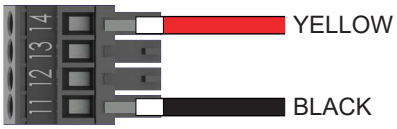


Figure 13. Grounding lug

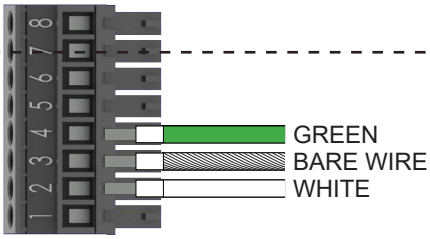
Cable Connections from Sensor

TERMINAL BLOCK ASSIGNMENTS



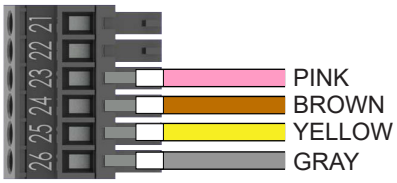
Coils Harness

Terminal	Port	Wire Color
11	4	Black
14	4	Red



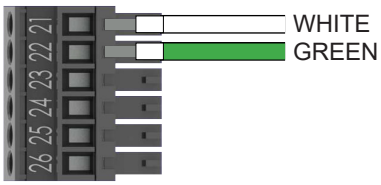
Electrodes Harness

Terminal	Port	Wire Color
2	5	White
3	5	Bare wire
4	5	Green



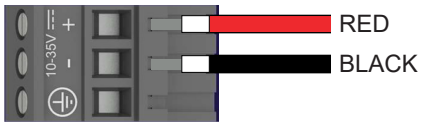
Pulse Output Harness

Terminal	Port	Wire Color
23	1	Pink
24	1	Brown
25	1	Yellow
26	1	Gray



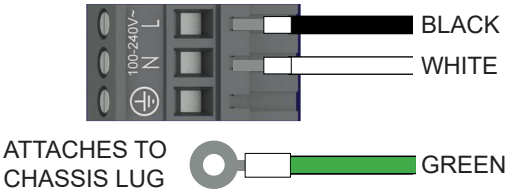
4-20 mA Output Harness

Terminal	Port	Wire Color
21	1	White
22	1	Green



DC Power Harness

Terminal	Port	Wire Color
Positive	3	Red
Negative	3	Black

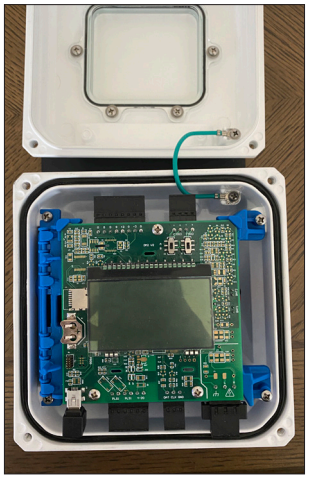


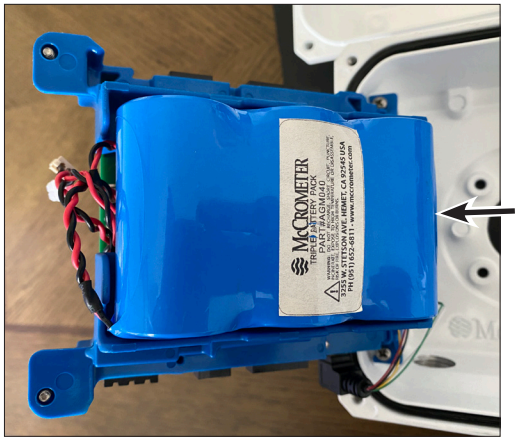
AC Power Harness

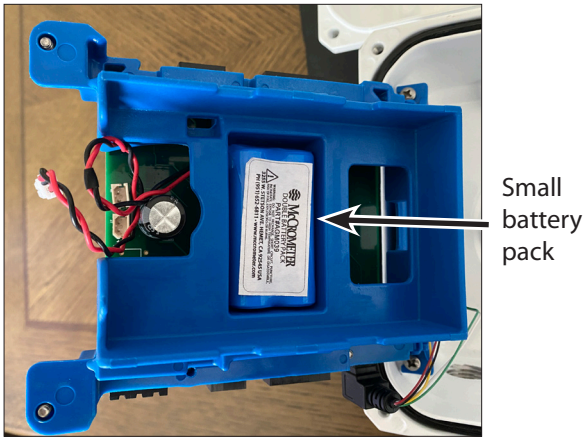
Terminal	Port	Wire Color
Load	3	Black
Neutral	3	White
Chassis lug	3	Green

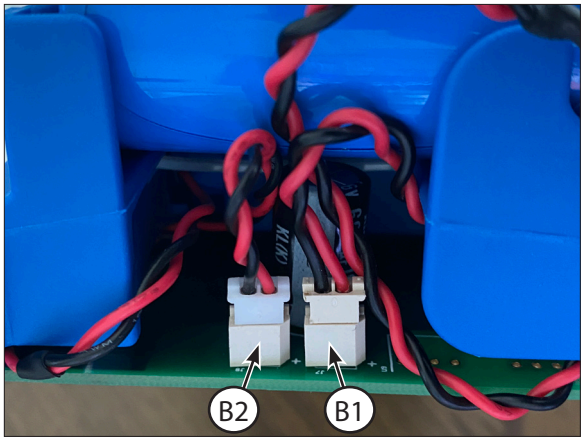
To complete AC power connection, connect green grounding lug to chassis as shown on previous page.

Battery Installation and Connection









FPI Mag 5000 Flow Meter Suggested Specifications

PART 1 - GENERAL

1.1 SCOPE

This section describes the requirements for an electromagnetic insertion flow meter and microprocessor-based signal transmitter. Under this item, the contractor shall furnish and install the insertion mag meter equipment and accessories as indicated on the plans and as herein specified.

1.1 SUBMITTALS

The following information shall be included in the submittal for this section:

1. Data sheets and catalog literature for the 395 or 394 Insertion Mag meter and the microprocessor-based signal transmitter
2. Connection diagrams for equipment wiring.
3. List of spare parts and optional equipment.

PART 2 - PRODUCTS

2.1 ELECTROMAGNETIC INSERTION FLOWMETER (FPI MAGMETER)

The electromagnetic insertion flow meter shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction and microprocessor-based signal transmitter.

A. Sensor:

1. Operating principle: Utilizing Faraday's Law of Electromagnetic Induction, the flow of a conductive liquid around the sensor induces an electrical voltage that is proportional to the velocity of the flow.
2. Construction: The sensor material shall be constructed of 316 Stainless Steel and coated with NSF 61 certified approved epoxy coating.
3. Hastelloy Electrodes (Optional) shall be used when corrosive fluid is present.
4. Sensor operating Temp: +14° to +140° F @ 250 PSI
5. Electronics operating temperature (Transmitter): -4° to +140° F
6. Size: 4" to 138" diameter (see instrument schedule)
7. Installation hardware shall include a Stainless Steel 2" full ported valve with a stainless-steel nipple.
8. Submergence:
    a. The sensor shall be NEMA 6P or IP68 rated to be permanently submerged up to 30 feet.

B. Transmitter:

1. Electronic Enclosure: Shall be a NEMA 4X, IP67 rated enclosure.
2. Transmitter/display: Background illumination with alphanumeric 8-line graphical backlit LCD display with 6-keyouch programming to indicate flow rate, totalized values, settings, and faults.
3. Power supply:
    a. 90/265 VAC
    b. 10-35 VDC (option)
4. Operating temperature: -4 to +140 degrees F.

5. Outputs:
   a. 4-20 mA (0-21mA).
   b. Two separate digital programmable outputs:
      1) Open collector transistor usable for pulse
      2) Frequency and alarm settings
6. Communications-Optional:
   a. HART
   b. Modbus RTU (RS485)
   c. Ethernet IP
   d. AMI Smart Output (Sensus, Itron 6, Itron 9).
      1) Sensus
      2) Itron 6 digit
      3) Itron 9 digit
      4) Neptune
7. Transmitter Self Diagnostics – Optional Data logger and Built In-Verification.
8. Sensor and signal transmitter performance:
   a. Flow Range: .2 FPS to 32 FPS for accuracies stated below.
   b. Accuracy:
      1) AC or DC Power: Plus, or minus 0.5% of actual flow.
      2) Optional 0.2% of actual flow.
   c. Cable Length: Remote Mount
      1) AC or DC Power: Up to 500'/152.4m
   d. Manufacturer shall offer optional Quick Connect cabling for remote mounted installations.
   e. Repeatability: ±0.05% or ±.0008ft/s (±0.25mm/s), whichever is greater
   f. Conductivity: Minimum 5 µs/cm
   g. Optional meter mounted transmitter.
   h. Bi-directional flow capabilities (optional)
   i. Power & Signal Cabling: The power and signal between the transmitter and sensor are isolated and placed in separate cables.
   j. Flow Direction Measurement: Forward and reverse flow indication and forward, reverse, net totalization is available.

2.2 THE ELECTROMAGNETIC INSERTION FLOW METER SHALL BE FPI MAG 5000 395 FOR FORWARD FLOW, OR 394 BI-DIRECTIONAL FULL PROFILE INSERTION MAG METER OR EQUAL.

2.3 SPARE PARTS

A. Spare parts for the equipment shall include the following, unless otherwise noted:

1. Extra operation manuals as required.

2.4 OPERATOR FUNCTIONS

A. Calibration

1. Each flow sensor shall have wet flow calibration of the complete meter flow element and its signal transmitter. The calibration facilities must be traceable to the National Institute of Standards and Technology (N.I.S.T). All the calibration information and factory settings matching the sensor shall be stored in an integrally mounted memory unit. The memory unit shall store sensor calibration data and signal transmitter settings for the lifetime of the product. At initial commissioning, the flow meter commences measurement without any initial programming. Any customer specified settings are downloaded to the memory unit. Should the signal transmitter need to be replaced, the new signal transmitter will upload all previous settings and resume measurement without any need for reprogramming or rewiring.
2. Manufacturer shall provide a calibrated meter set which includes the sensor element, the cabling and the transmitter.
3. An N.I.S.T. certificate of calibration shall accompany each flow element.

PART 3 - PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's recommendation for the minimum upstream and downstream installation requirements for the flow element.

B. Wiring between flow element and remote mounted signal transmitters shall use cable type and procedures as per the manufacturers' recommendations.

3.2 MANUFACTURER'S ASSISTANCE

A. Warranty

1. The manufacturer of the electromagnetic flow meter shall provide a two-year warranty that the equipment shall be free from defects in design, workmanship, or materials. Extended warranties up to five years shall be available for additional cost.
2. The manufacturer of the electromagnetic flow meter shall provide a Lifetime Guarantee on the flow element Ultra Liner fusion bonded epoxy liner.
3. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall promptly repair or replace the defective part at no cost to the owner.

FPI Mag 5000 Product 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.

Physical Specifications

Measurement	Electromagnetic
Directionality	Forward and reverse
Pipe Sizes	Up to 138"
Body Style	Full profile insertion
Materials	• 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
Coating	Fusion bonded epoxy (NSF 61 approved) coated 316 stainless steel
Electrodes	316 Stainless Steel, Hastelloy optional
Electrical Connections	Quick Connect
Electronics	ProComm Max transmitter
Electronics Mount	Remote mount only
Sensor Cable Lengths	• Standard: 25'/7.6 m 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 quick connect cable lengths at additional cost.
Insertion Hardware	316 Stainless Steel
Compression Seal	Silicone Rubber

Performance and Operational Specifications

Measurement Method	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.
Direction Measurement	• 395 sensor: Forward flow measurement and reverse flow indication • 394 sensor: Bidirectional flow measurement
Operating Temperature	-10 to 60°C (14 to 140°F) up to 250 PSI
Storage Temperature	-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.**
IP Rating	Quick Connect (IP68)
Sensor Submersibility Depth	With standard quick connect: 9 m (30 ft.)

FPI Mag 5000 Product Specifications

Velocity Range	See following pages flow velocity ranges by line size for each type of electronics.
Calibrated accuracy for forward and bidirectional sensors	• ProComm Go Electronics : ±1% of measured value ±0.006 ft/s (±0.0018 m/s) • Reverse Flow: ±1% of measured value ±0.006 ft/s (±0.0018 m/s)
Linearity	0.3% of Range
Repeatability	0.2% of Reading
Pipe Run Requirements	Pipe run requirements for the FPI Mag sensor can vary, depending on the disturbances in the pipe run. See FPI Mag flow meter manual 30127-06, step 3 of the installation procedure for a table of upstream and downstream straight-pipe run recommendations.

Other Specifications

Certifications and Approvals	• ISO 9001:2015 certified quality management system • Certified to NSF / ANSI Standards*
System Options	• Hastelloy electrodes • Annual verification / calibration • Stainless steel ID tag
Meter Options and Accessories	• Sensor insertion tool • Extension to hardware clearance • Additional sensor cable up to 475' (500' max for model 395 and 200' max for model 394)
Warranty	2 years

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

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 transmitter as close as possible to the metering location.

FPI Mag 5000 Product Specifications

Flow Meter Pipe Sizes and Flow Ranges with ProComm Max Transmitter

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.

FPI Mag 5000 Part Number Matrix

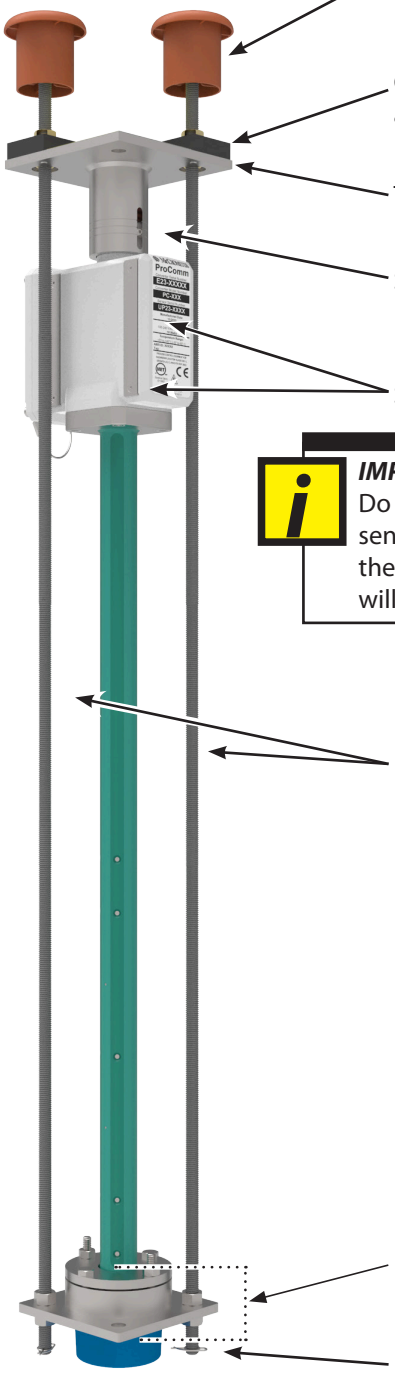
FP539				-										-		-		-	
Single or Bidirectional Flow																			
Bidirectional Flow	4																		
Single Forward Flow	5																		
Standard or Customer Length Sensor																			
Standard Length Sensor		S																	
Custom Length Sensor		C																	
Nominal Line Size																			
4 in [100 mm]			04																
6 in [150 mm]			06																
8 in [200 mm]			08																
10 in [250 mm]			10																
12 in [300 mm]			12																
14 in [350 mm]			14																
16 in [400 mm]			16																
18 in [450 mm]			18																
20 in [500 mm]			20																
24 in [600 mm]			24																
30 in [750 mm]			30																
36 in [900 mm]			36																
42 in [1050 mm]			42																
48 in [1200 mm]			48																
54 in [1350 mm]			54																
60 in [1500 mm]			60																
66 in [1650 mm]			66																
72 in [1800 mm]			72																
78 in [1950 mm]			78																
84 in [2100 mm]			84																
90 in [2250 mm]			90																
96 in [2400 mm]			96																
100 in [2500 mm]			H0																
110 in [2750 mm]			H1																
120 in [3000 mm]			H2																
130 in [3250 mm]			H3																
Sensor Length Options																			
20" Sensor Length					020														
21" Sensor Length					021														
Each nominal Inch Length					XXX														
175" Sensor Length					175														
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												
Cable Connector Options																			
Quick Connect								Q											

FPI Mag 5000 Part Number Matrix

FP539	-				-		-		-	
Remote Cable 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								
Transmitter Analog/Hart Output Options										
Single 4-20mA Analog, Dual Digital *(Standard)*			1							
Dual 4-20mA Analog, Dual Digital			2							
1 Hart 4-20mA Analog, 1 Standard 4-20mA Analog, Dual Digital			3							
Transmitter Output Protocol Options										
No Digital Protocol Outputs										
Modbus Protocol				MOD						
Ethernet IP Protocol *Future Option				EIP						
Output Protocol Types										
No Digital outputs										
RTU (RS485) Output (Modbus)						R				
TCP/IP Output (Modbus, Ethernet IP)						E				
Smart Output Protocol / SmartTrax Options										
No AMI Outputs/SmartTrax Options										
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		
6 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)								S06		
25 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)								S25		
50 ft SmartTrax Standalone Unit ExactRead Cable (Strain Relief Only)								S50		
Hazardous Area Location										
No Hazardous Location Needed										
Class 1, Division 2, Groups A-D, T5										HL

FPI Mag 5000 Sensor Parts

Sensor electrode pairs and fluid column grounds (all combined as a functioning set) are located along the sensor probe. There are two sets located at the top of the probe, two sets at the bottom of the probe, and one set in the center, for a total of five sets.



IMPORTANT!
Do not disassemble the sensor body. Removal of the sensor body screws will VOID the warranty.

Top view of top plate

INSTALLATION TOOL (OPTIONAL)
Specialized sensor insertion tool used for installation, profiling, and maintenance of the sensor.

Transmitter Specifications

Physical Specifications

Electronic Housing	Diecast aluminum, powder coated enclosure w/ tamper resistant seal
Transmitter 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 / 47-66 Hz (10 W) DC Power: 10-35 VDC (10 W) Note: AC or DC must be specified at time of ordering.
Connection Options	Conduit option: 1/2" NPT threaded connections
Galvanic Isolation	All outputs are galvanically isolated from power supply up to 500 V
Conductivity	Minimum conductivity of 5µS/cm

Performance and Operational Specifications

Location	Indoor or outdoor use
Operating and Storage Temperature	-4° to 140° F (-20° to 60° C)
IP Rating	IP67 Die cast aluminum transmitter
Standard Outputs	Single 4-20mA (standard). Galvanically isolated and fully programmable for zero and full scale. A second 4-20mA is available. Two separate digital programmable outputs: open collector transistor usable for pulse, frequency, or alarm settings. • Volumetric Pulse • Range Indication • Maximum switching voltage: 35 VDC • Maximum switching current: 100mA • Insulation from other secondary circuits: 500V
Optional Outputs	• Modbus • HART • Ethernet IP • Datalogger • Smart Output™ (Sensus, Itron 6, Itron 9)

Display and Measurement

Keyboard and Display	Can be used to access and change set-up parameters using six membrane keys and an LCD display
Units	GAL Gallons, CUF Cubic Feet, AFT Acre Feet, CUM Cubic Meters, LIT Liters, MML Megaliter, MTT Metric Ton (KL), B31 Barrel (31G), B42 Barrel (42G), B46 Barrel (46G), B55 Barrel (55G), IMG Imperial Gallon, AIN Acre Inch, TON Ton (Short), MM1 Miners Inch Minute (11.22G), MM9 Miners Inch Minute (9G), MH1 Miners Inch Hour (11.22G), MD1 Miners Inch Day (11.22G), MH9 Miners Inch Hour (9G), MD9 Miners Inch Day (9G), KGL Kilo Gallons, MGL Mega Gallons, IN3 Cubic Inch

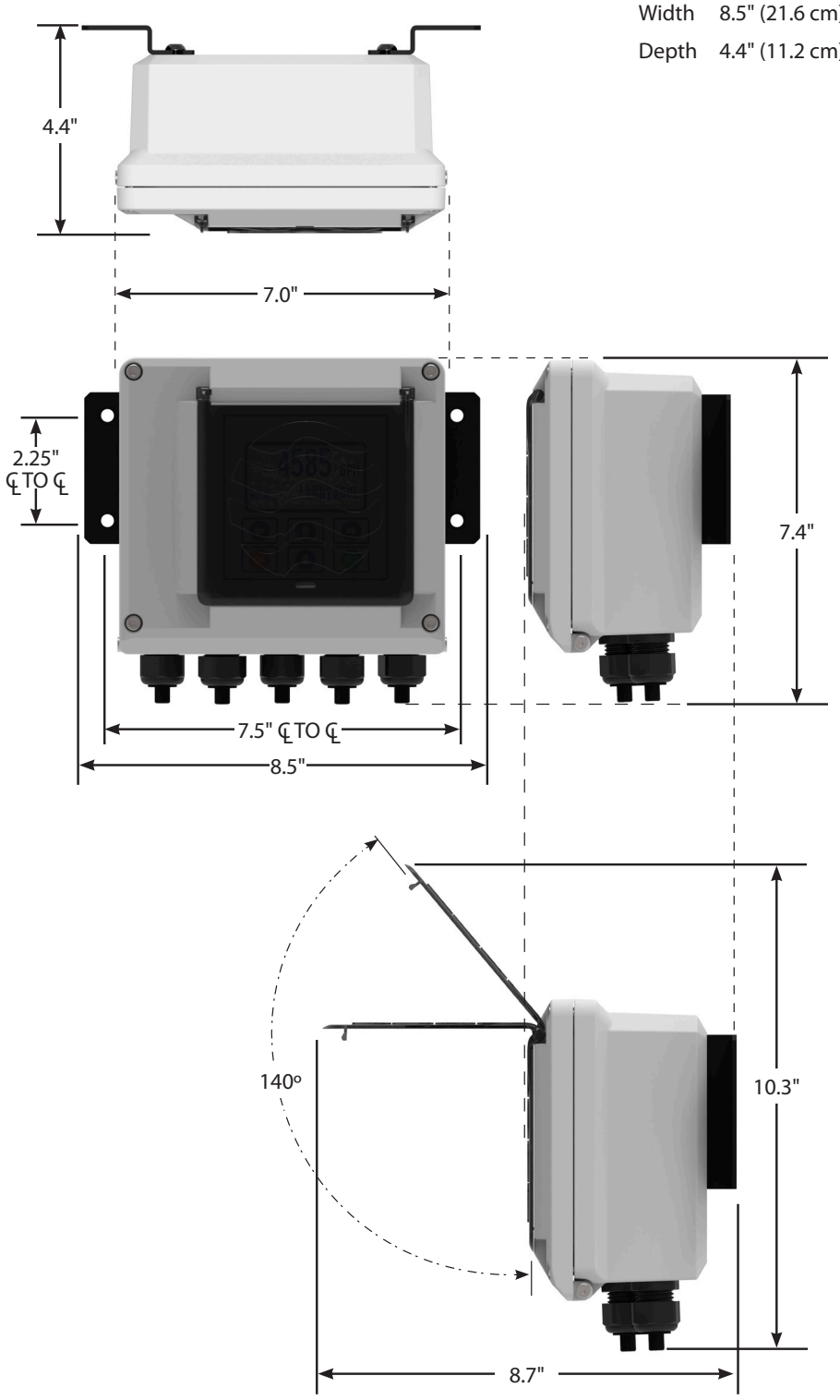
Other Specifications

• ISO 9001:2015 certified quality management system • CE	

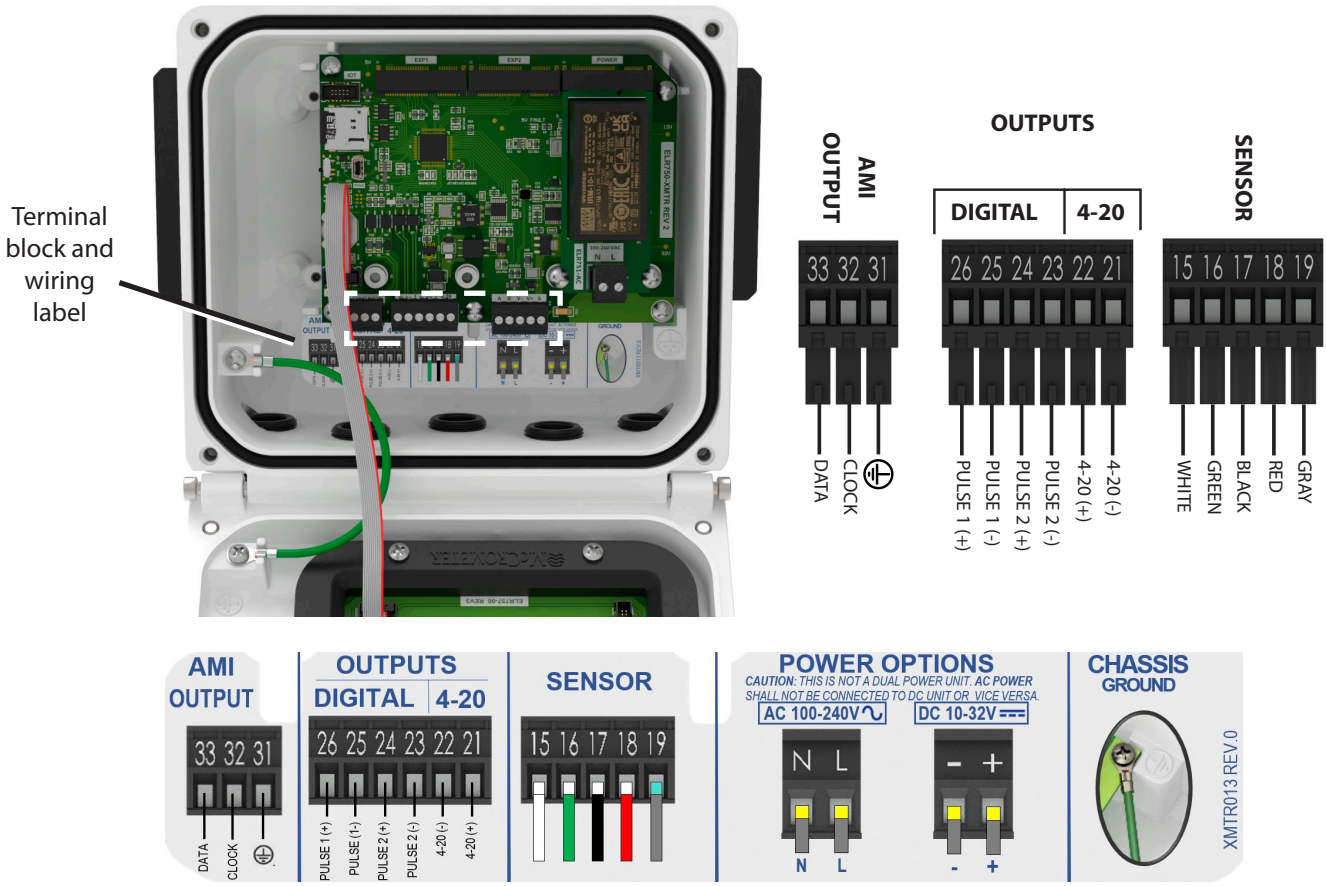
Transmitter Specifications

Remote Mount Transmitter Dimensions

Height 7.4" (18.9 cm)
Width 8.5" (21.6 cm)
Depth 4.4" (11.2 cm)



Transmitter Wiring Connection



Terminal Block Assignments

Terminal	Cable	Wire Color
COILS		
11	COIL 1 (+)	
12	COIL 1 (-)	
13	COIL 2 (+)	
14	COIL 2 (-)	

Terminal	Cable	Wire Color
ELECTRODES		
1	SHIELD	
2	ELECTRODE (+)	
3	SHIELD	
4	ELECTRODE (-)	
5	SHIELD	
6	ELECTRODE REF	

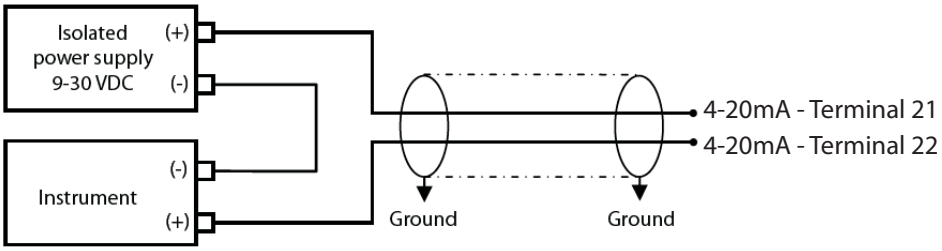
Terminal	Cable	Wire Color
OUTPUTS		
26	PULSE 1 (+)	
25	PULSE 1 (-)	
24	PULSE 2 (+)	
23	PULSE 2 (-)	
22	4-20 (+)	
21	4-20 (-)	

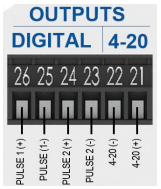
Terminal	Cable	Wire Color
SENSOR		
15	A	White
16	B	Green
17	(-) DC	Black
18	(+) DC	Red
19	SHIELD	Gray/Bare

Terminal	Cable	Wire Color
AMI		
33	DATA	Varies. See section 3.8
32	CLOCK	
31	GROUND	

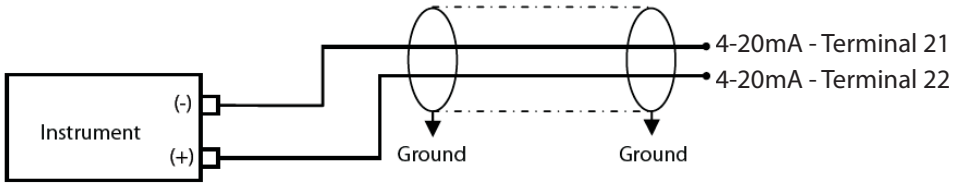
4-20mA Hook-Up

Output type: 4-20mA current loop, sink powered (passive)





Output type: 4-20mA current loop, source powered (active)



If the external device requires a voltage input, a precision resistor placed across the input terminals of the external device will change the current to voltage. Calculate the required resistor using Ohm's law (V = I x R). For example, a 250Ω resistor will provide an input voltage of one to five volts with the transmitter range being set from 4mA to 20mA. An additional 4-20mA loop output is available.

Meter source power is 12V for loop power. Max resistance with source power is 300 ohms. Sink power supplied for loop from external device range is 12 – 30 V DC. Max resistance with external sink power is Rmax = 50 * (V in – 5)

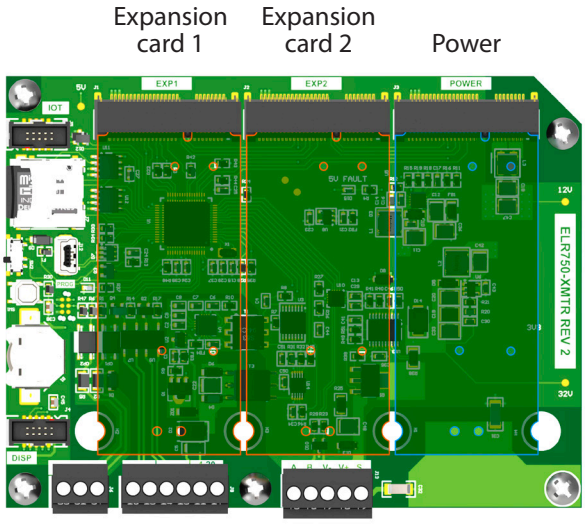
IMPORTANT
The 4-20mA output can be sink or source powered which is selectable in the menus. Default setting is source powered to avoid damage to the circuit. Do not select source powered if the 4-20 loop has sink power from the 4-20 instrument.

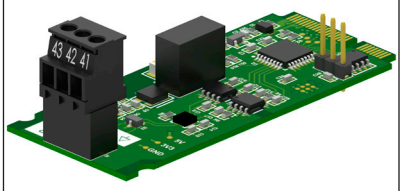
3.7 Opto-Isolated Pulse Output Hook-Up

The outputs are open collector solid state relay outputs used to communicate with or activate external devices.

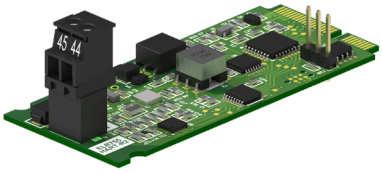
- Opto-isolated solid state relay open collector
- Maximum switching voltage: 80 VDC
- Maximum switching current: 8 ohms
- Isolation from other secondary circuits: 500 V
- Pulse width range 5ms – 1 second

Expansion Cards

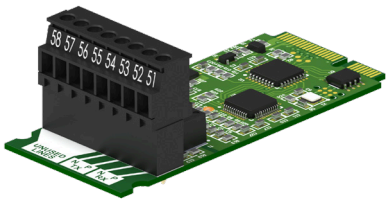




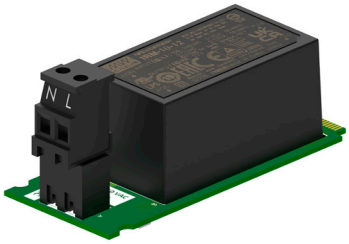
Modbus (RTU) expansion card



HART expansion card



Ethernet expansion card



AC power card

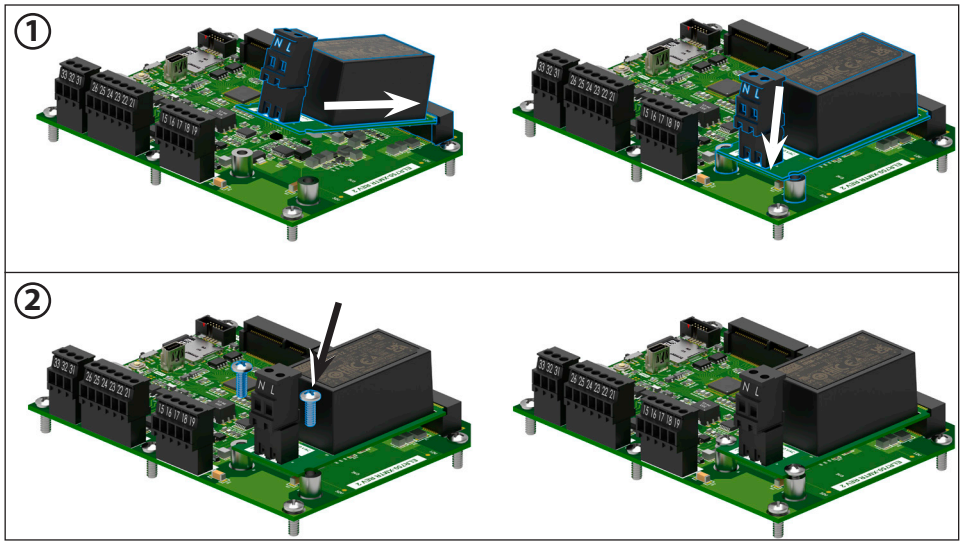
DC power card

Inserting the expansion card

Refer to the images that accompany each step. The AC power card is shown as an example. See section 3.5 for wiring diagrams for both AC and DC power.

1. Slide the card into the connection slot. Set the card flat on the two support posts.

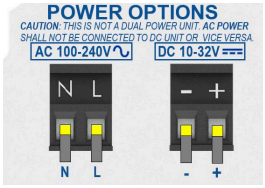
2. Insert and tighten two screws to secure the card in place.



Transmitter Power Hook-Up

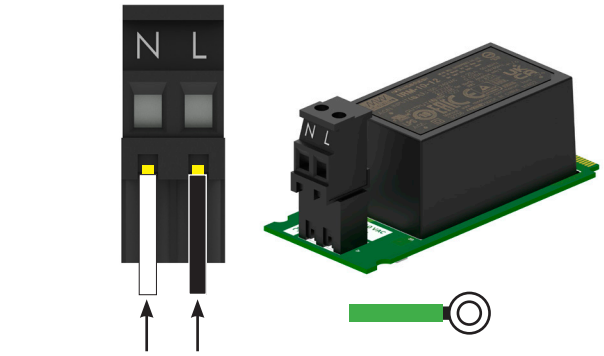
WARNING!
Hazardous supply voltage can shock, burn, or cause death.

These instructions are for connecting either the AC or DC power option. The connections are shown below above the appropriate power card.



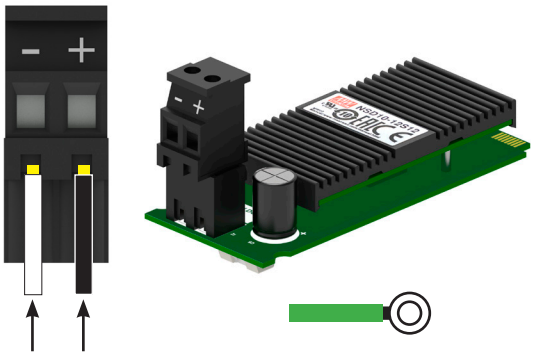
Install the power card as described in section 3.4. Connect power as shown below in Figure 14 and Figure 15.

The power supply line must be equipped with external surge protection for current overload (fuse or circuit breaker with limiting capacity not greater than 10A). It must be easily accessible for the operator and clearly identified.



Neutral Wire (typically a white wire)
Line Wire (typically a black wire)
Ground Wire (typically a green wire)

Figure 14. AC Power Supply Terminal Block

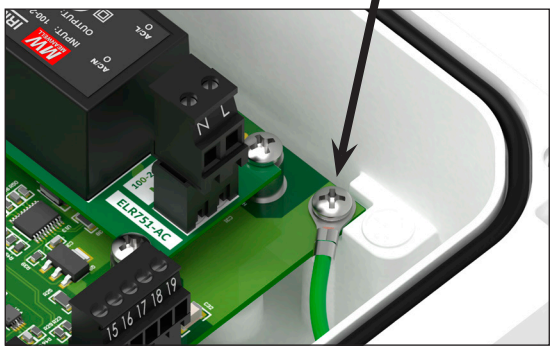


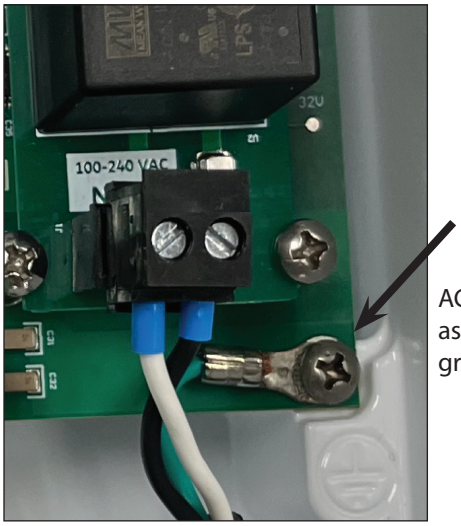
Power Supply (typically a white wire)
Power Supply + (typically a red wire)
Ground Wire (typically a green wire)

Figure 15. Optional DC Power Supply Terminal Block

Chassis Ground Connection

Location of Chassis Ground Lug





AC power card at left as an example of the ground connection.

McCrometer, Inc.
3255 West Stetson Avenue
Hemet, CA 92545 USA
Tel: 951-652-6811
800-220-2279
Fax: 951-652-3078
customerservice@mccrometer.com
www.mccrometer.com