



SPI Mag®
MODEL 282 SINGLE POINT INSERTION
ELECTROMAGNETIC FLOW METER
1" AND 2" SENSOR
SUBMITTAL PACKAGE

From

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Date:

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

When completing this submittal package, it must also include the FPI Mag Specification Data Sheet, which is also an electronic document. A copy can be downloaded from the McCrometer web site with the following link.

[Lit. No. 30124-74](#)

The Specification Data Sheet 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.



Equipment to be Supplied to McCrometer, Inc.

PART NUMBER	DESCRIPTION	METER 1 QTY.	METER 2 QTY.	METER 3 QTY.
Model 282L1"	SPI Mag™ Single Point Sensor			
Model 282L2"	SPI Mag™ Single Point Sensor			
(1) ProComm Converter Electronic Unit, including: (1) IP67 Enclosure (1) Six-Button Key Pad (1) Back-Lit Graphical LCD Display (4) Programmable Opto-Isolated Digital Outputs (2) 4-20mA Programmable Output for Forward Flow (1) 90-265 VAC Powered				
(1) Electromagnetic Single Point Sensor, including: (25) Feet of Submersible Sensor Cable (1) Compression Seal (1) Set of Retaining/Installation Rods (1) Top Plate (2" only) (1) SPI Mag Sensor Instruction Manual (1) M-Series Converter IOM				
(1) Instruction Manual				
BUILT-IN OPTIONS				
Additional Sensor Cable: Specified Total Length In Feet (Leave Blank For None)				
Special	10 to 35 VDC Powered			
OUTPUT OPTIONS Select one output for each meter ordered				
		HART		
		Modbus RS-485		
		ETP		
		AMR		
		Built-In Verification		
		Data Logger		
ACCESSORIES				
43059-1	2" 2 x Close Stainless Steel Valve/2 x Close Stainless Steel Nipple			
75031/75032	Insertion Tool			
170007101	Stainless Steel Tag			



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

Project Notes

Meter 1:

Meter 2:

Meter 3:

SPI Mag Model 282L Suggested Specifications

GENERAL

The flow meter shall consist of two components: an electromagnetic sensor and a converter for clean and wastewater. The 1" electromagnetic sensor shall be capable of operating in pipe diameters from 2 to 30 inches in clean water applications. The 2" electromagnetic sensor shall be capable of operating in pipe diameters from 6 to 96 inches in clean or wastewater applications. The flow meter shall determine the volumetric flow rate by means of the Continuity Equation where flow rate "Q" equals mean velocity "V" times cross sectional area "A" ($Q = V \times A$). The velocity measurement must be taken at a known location, then, through empirically established equations, the sensed velocity will be converted to a mean velocity. The meter shall be equivalent to the SPI Mag Model 282L Single Point Insertion Electromagnetic Flow Meter as manufactured by McCrometer, Inc., in Hemet, California.

CONVERTER

The flow meter converter shall be microprocessor based with a keypad for instrument set up and LCD displays for totalized flow, flow rate engineering units and velocity. The converter shall power the flow-sensing element and provide a galvanically isolated Dual 4-20mA output. It shall be possible, in the test mode; to easily set the converter outputs to any desired value within the range. The 4-20mA scaling, time constants, pipe size, flow proportional output, engineering units and test mode values shall be easily set via the keypad and display. Four separate fully programmable alarm outputs shall be provided to indicate empty pipe, forward/reverse, polarity (normally open/close), analog over-range, fault conditions, high/low flow rates, % of range, and pulse cutoff. The converter shall periodically perform self-diagnostics and display any resulting error messages. All set up data and totalizer values may be protected by a password.

SENSOR

The flow-sensing element shall be of an electromagnetic single point type design and factory calibrated to traceable standards, such as NIST. The sensor shall be made of a polyurethane with pure carbon electrodes exposed to flow. Installation of the sensor shall be accomplished under flowing conditions through a 2-inch valve, with final location being located near the inside wall of the flow conduit or 1/8 pipe ID. To eliminate erroneous readings due to pipe wall effects, the sensor must have its electrodes located at least 3/16" from pipe wall and be designed with a curved tip shape, so as not to collect debris while in the operating position. Flat tipped or Doppler sensors shall not be acceptable.

SENSOR CABLE

The sensor cable is 20 feet of multi-conductor, abrasive resistant, PVC jacketed submersible cable flexible to -40°F. The sensor cable shall be permanently bonded to the sensor. Additional sensor cable, up to 200 feet, shall be available as an option.

MOUNTING HARDWARE

The insertion tube and restraining rods assembly shall be provided for the smooth installation and operation of the velocity sensor and shall be of sufficient length to allow a full profile of the flow conduit. The optional stainless steel insertion tube shall be rated for 250 PSI @ 160° F and the PVC insertion tube shall be rated for 150 PSI @ 105° F. Hardware must allow sensor to be secured by bolts when sensor is being inserted and retracted. A stainless steel compression seal assembly shall also be supplied.



SPI Mag Model 282L Technical Specifications

Measurement

- Volumetric flow in filled flow conduits 2" (50mm) to 240" (6,096 mm) diameter utilizing insertable velocity sensor. 1" meter = 2" to 30" pipe I.D.; 2" meter = 6" to 240" pipe I.D.
- Flow indication in English Standard or Metric units

Flow Measurement

Method	Electromagnetic
Accuracy	+/- 2% of measured value ± 0.03 ft/s (± 0.009 m/s)
Velocity range	+0.3 to +32 ft/s (+0.09 to +10 m/s)
Direction measurement	Has reverse flow indication

Materials

Sensor	Polyurethane exposed to flow
2" sensor mounting	PVC and Stainless Steel exposed to flow. (Stainless Steel Insertion Tube Optional)
Compression seal	Buna "N" O-Ring seal exposed to flow

Environmental Ranges

Pressure/temperature limits	• PVC Insertion Tube: Up to 105°F (41°C) at 150 PSI • Stainless Steel Insertion Tube: Up to 160°F (71°C) at 250 PSI (McCrometer recommends the use of Stainless Steel) 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 to freeze in the pipe is not covered by the warranty.
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Electrical Connections

Compression gland seals for 0.125" to 0.375" dia. round cable

Sensor Cable Lengths

Standard	25' McCrometer supplied submersible cable with each remote mount unit.
Optional	Up to 200 feet, or 25 feet max for battery powered.

IP Rating

IP68 submersible sensor

SPI Mag Model 282L Technical Specifications

Insertion Tube

To determine insertion tube length for typical near wall installations, divide the pipe I.D. by 8 and add 18".

For full profiles, add 18" to the pipe I.D.

Tube assemblies include rods and mounting hardware

1" tube

- Stainless steel tube, 12" length. Will profile 4" pipe I.D.
- Stainless steel tube, 24" length. Will profile 16" pipe I.D.
- Stainless steel tube, 36" length. Will profile 28" pipe I.D.

2" tube

- PVC tube, 18" length. Will profile a 10" pipe I.D.
- PVC tube, 24" length. Will profile a 16" pipe I.D.
- PVC tube, 30" length. Will profile a 22" pipe I.D.
- Opt.: stainless steel tube. Specify length - 240" maximum

System Options

- Stainless Steel ID Tag
- Sensor Insertion Tool
- Additional Sensor Cable up to 200' (for longer lengths consult factory)
- Valves

Ordering Requirements

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

- Model and tap size
- Insertion tube length
- Pressure
- Minimum flow
- Maximum flow
- Typical flow
- Fluid
- Pipe I.D.
- Cable length
- Temperature
- Any other chemicals in use
- Indicator and totalizer units

SPI Mag Model 282L Technical Specifications

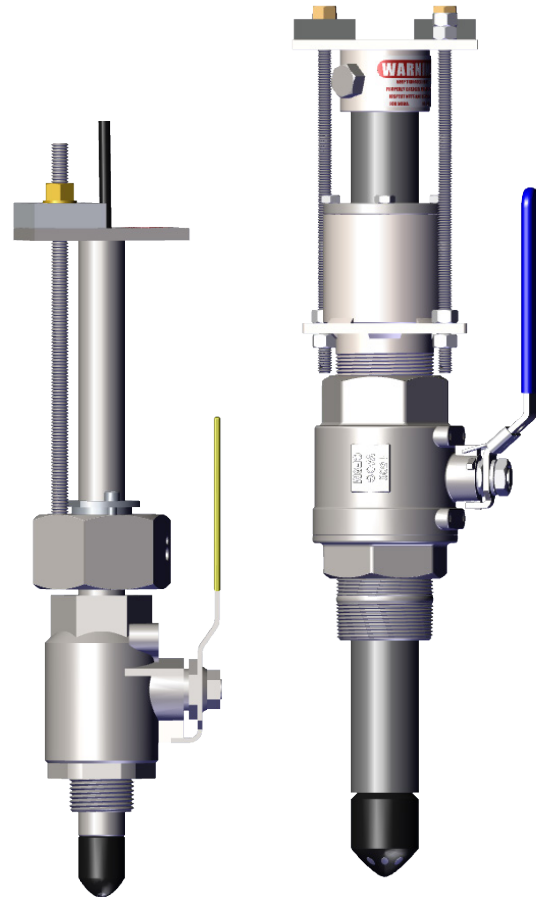


NOTE

The converter and sensor are supplied as a matched system. (Figure 1 and Figure 2) Verify the system serial numbers on both the converter and sensor match. This will ensure a properly calibrated system. The System Serial Numbers begin with MM20#### and are located on the side of the converter and on a tag near the end of the sensor cable.



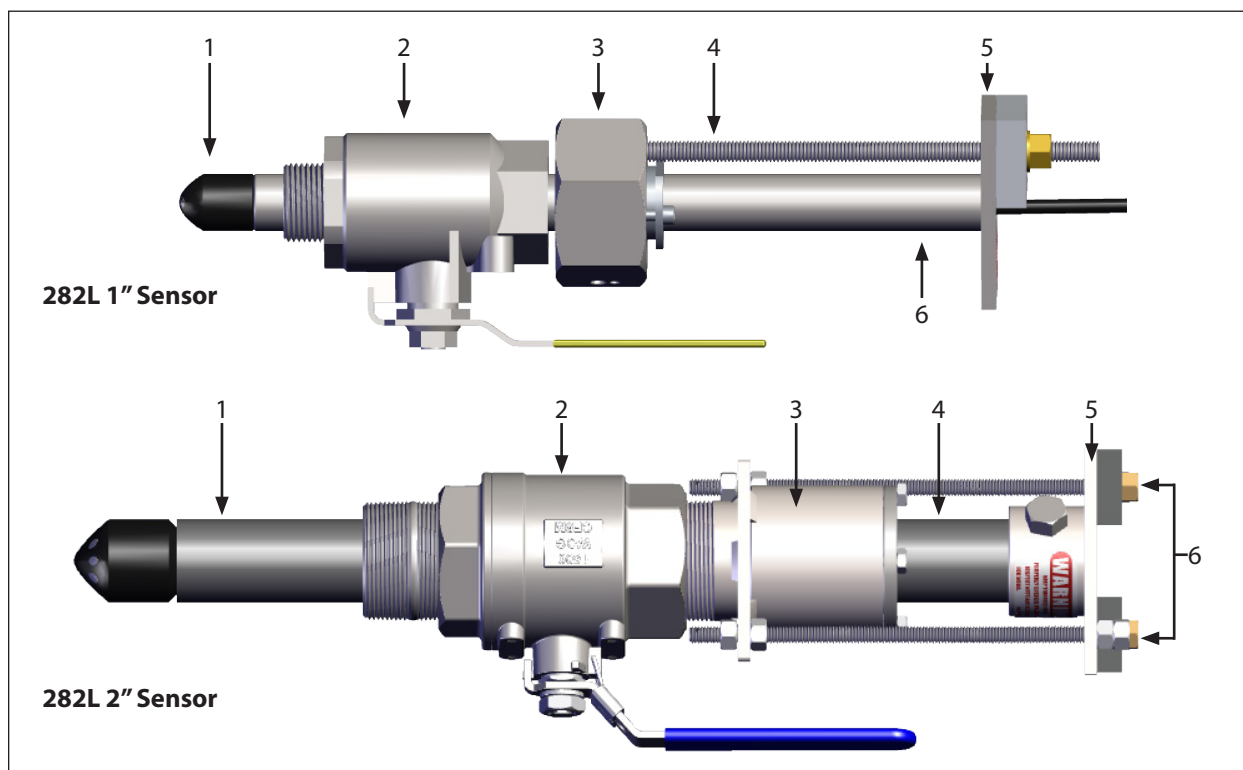
**Procomm Series remote
mount converter**



1" and 2" Sensor with Insertion Hardware

The valves are optional or supplied by the customer, and are shown for illustration only.

SPI Mag Model 282L Technical Specifications

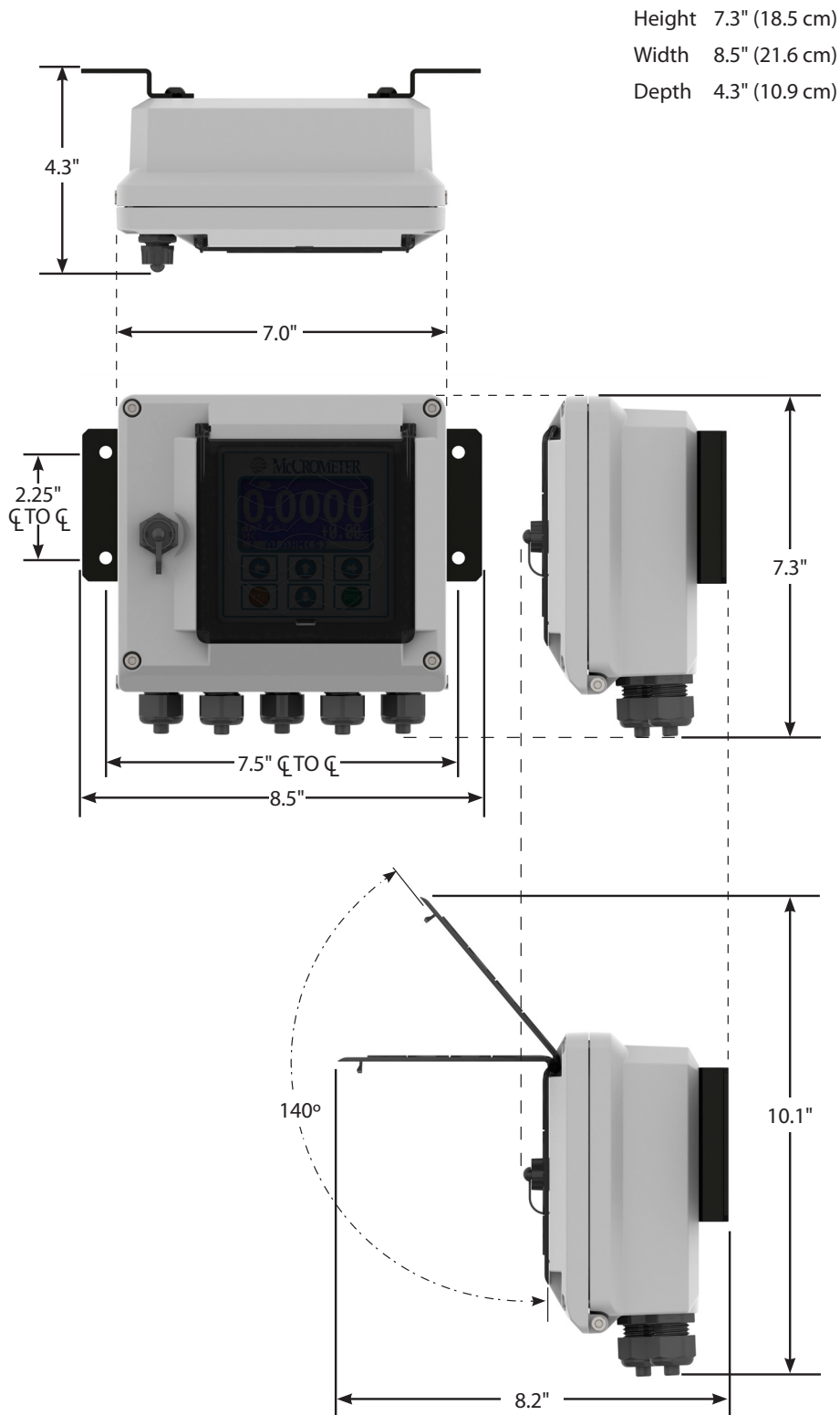


Item Number	Part Name and Part Number
1	Sensor Assembly 1" 60080X001
	Sensor Assembly 2" 600028X001
2	Ball Valve 1" Bronze 43801
	Ball Valve 2" Bronze 43055
3	Compression Seal Assembly 1" 800003801
	Compression Seal Assembly 2" 42205
4	1" Insertion Tube with Cap
	12" 42292
	24" 42292-1
	36" 42292-2
	2" Insertion Tube without Cap
	18" 42198
	24" 42198-1
	30" 42198-2
5	Over 30" use SS tube 42204-xx
	Insertion Tube Cap 1" Consult Factory
6	Insertion Tube Cap 2" 55042
	3/8" SS Long Threaded Rod 42199

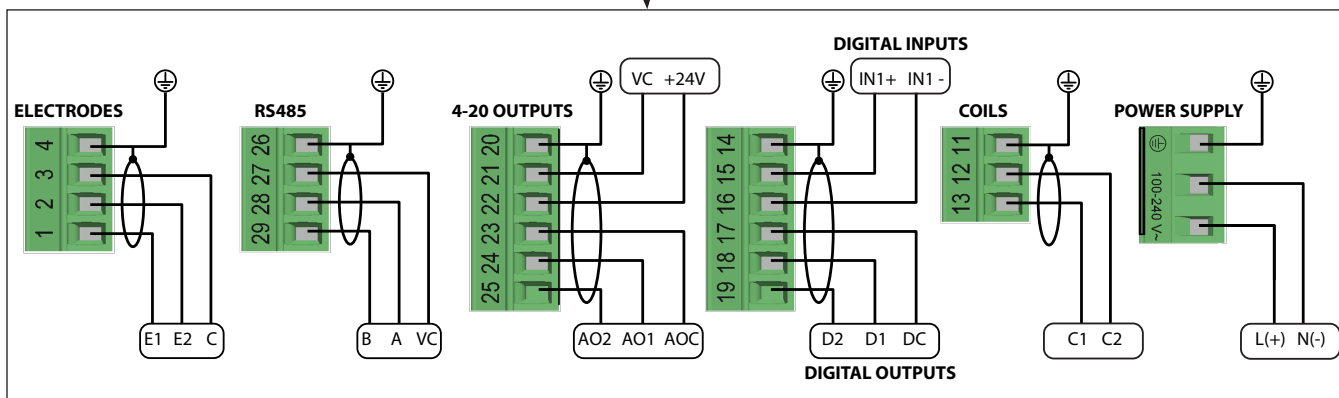
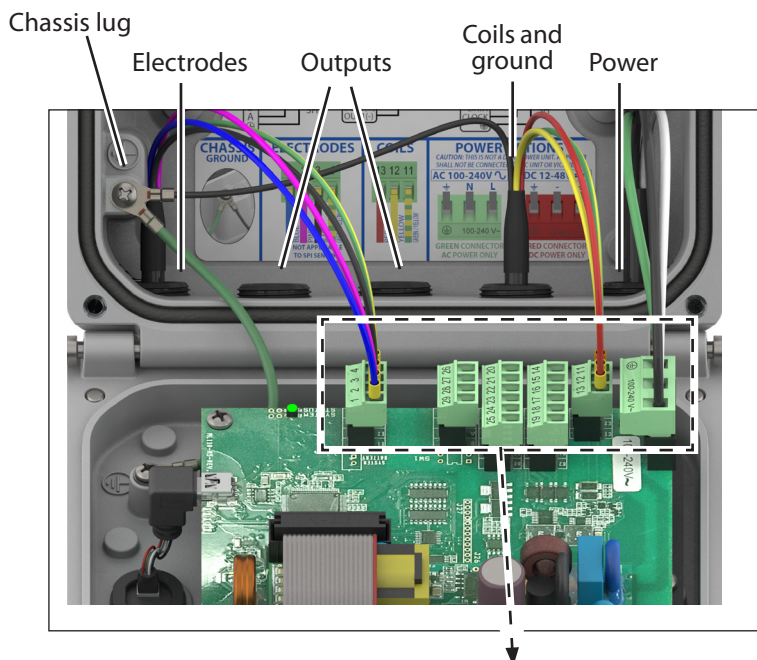
NOTE: Valves are optional or supplied by user.

SPI Mag Meter Model 282L Technical Information

Remote Mount Converter Dimensions

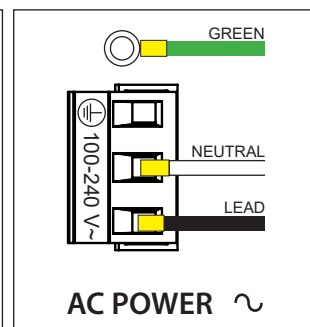
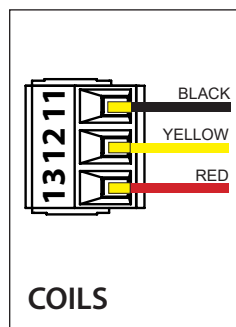
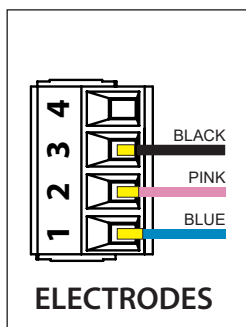


SPI Mag Electrical Cable Connections

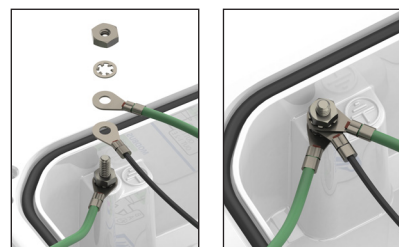


Terminal Block Assignments

Terminal	Cable	Wire Color
#1 (E1)	A	Blue
#2 (E2)	A	Pink
#3 (C)	A	Black
#11 (SH)	B	Black
#12 (C2)	B	Yellow
#13 (C1)	B	Red

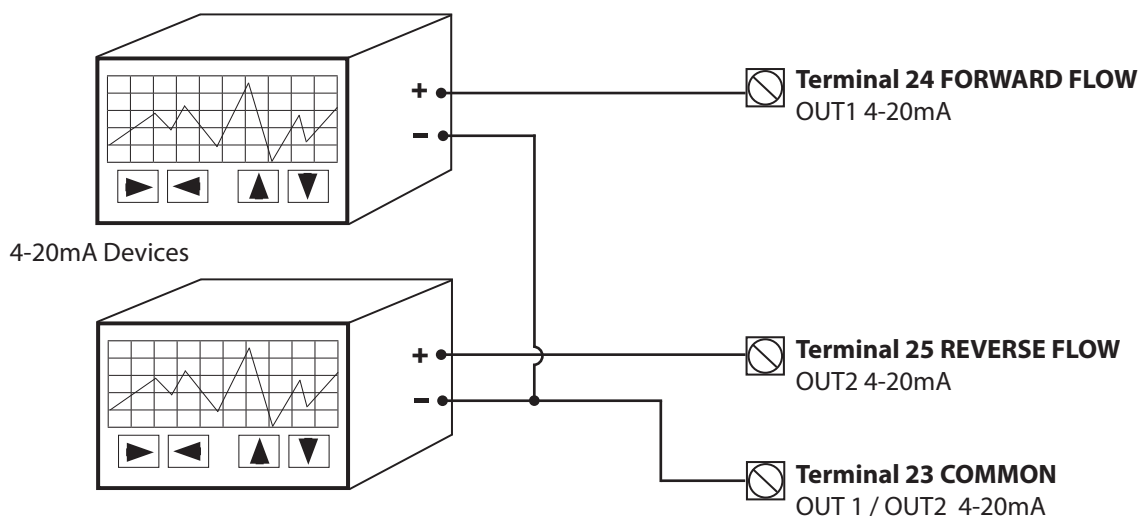


Chassis Ground Connection



4-20mA Hook-Up

Isolated 4-20mA current loops are used to output flow data to external devices. Maximum load impedance is 1,000Ω, and the maximum voltage without load is 27VDC. The converter has the capability to detect a loss of load on this output. To disable this function set the value “mA Val. Fault” under the ALARMS menu to zero (see section 5.4). A graphical example of the usage of the current loop with external device is shown below:



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 ($V = I \times R$). 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 to 20mA loop output is available.



IMPORTANT

The converter powers the 4-20mA loops. Do not use external power for the 4-20mA loop as it may cause permanent damage to the converter.

Opto-Isolated Pulse Output and Opto-Isolated Input Hook-Up

Opto-Isolated Pulse Output Hook-Up

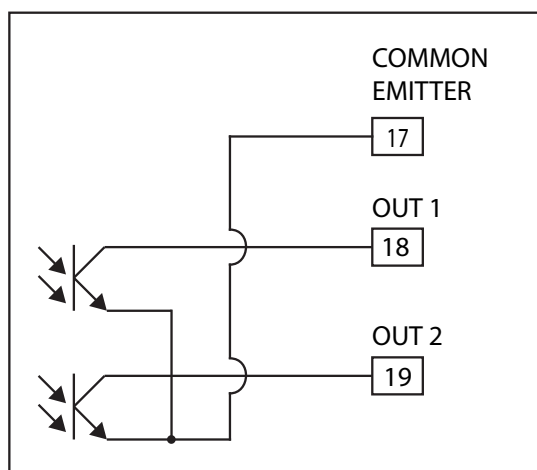
The outputs are open collector transistor outputs used to communicate with or activate external devices.

- Opto-isolated output with collector and emitter terminals floating and freely connectable
- Maximum switching voltage: 40 VDC
- Maximum switching current: 100mA
- Maximum saturation voltage between collector and emitter 1.2V@100mA
- Maximum switching frequency (load on the collector or emitter, $R_L=470\Omega$, $V_{OUT}=24VDC$): 1250Hz
- Maximum reverse current bearable on the input during an accidental polarity reversion (VEC): 100mA
- Isolation from other secondary circuits: 500 V



IMPORTANT

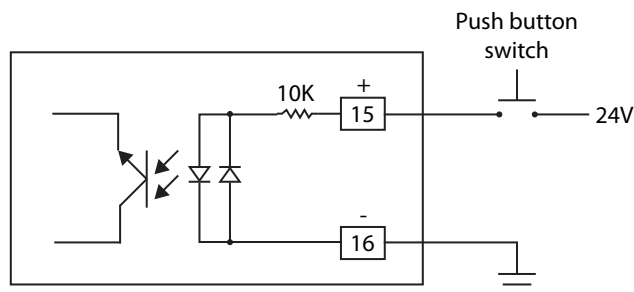
Digital outputs are not isolated from each other. All digital outputs MUST use the same power source.



Opto-Isolated Input

- Opto-isolated input
- 500 V isolation
- 2-40 VDC on voltage
- Input programming per input menu, will perform functions set to ON.

Input example:



Converter Power Hook-Up

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.

Power connection is made using the power terminal block on the upper right side of the terminal board.

NOTE: The terminal block unplugs from the circuit board for easy connection. Connect earth ground to the protective grounding terminal before making other connections. The power supply of a standard converter is 100-240VAC, 45-66Hz at maximum 20W. DC converter is available as an option.

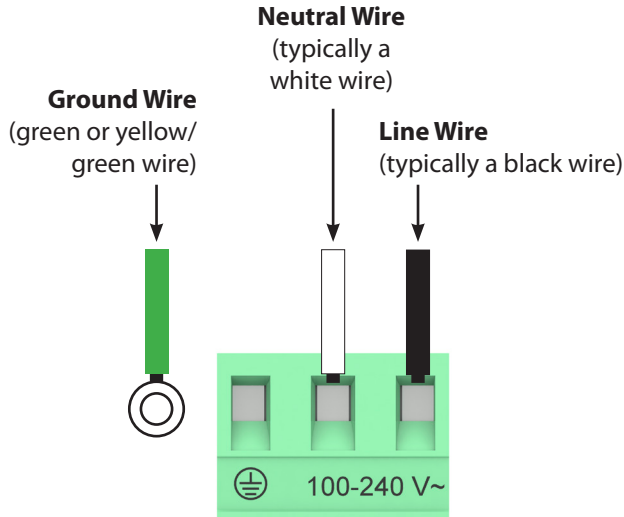


Figure 15. AC Power Supply Terminal Block

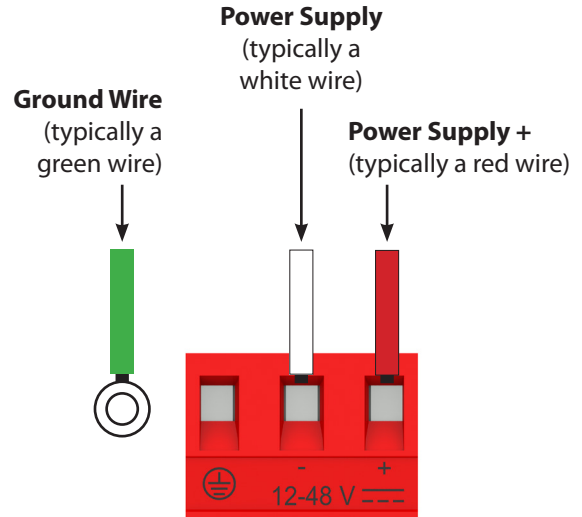


Figure 16. Optional DC Power Supply Terminal Block