SPI Mag™

SPI Mag Flow Meter Specification Sheet

Applies to the following models:

SPI Mag 3000

SPI Mag 5000

Applications

SPI Mag Series flow meters are available in 1" and 2" sizes can be used for waste water and clean water.

Wastewater

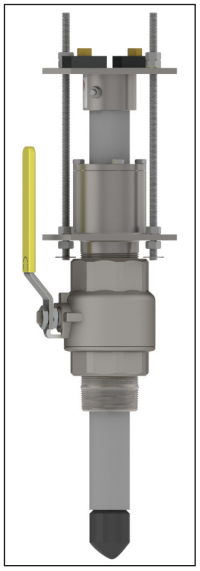
- Effluent
- Waste Activated Sludge (WAS)
- Return Activated Sludge (RAS)
- Reclaim / Recycle

Clean Water

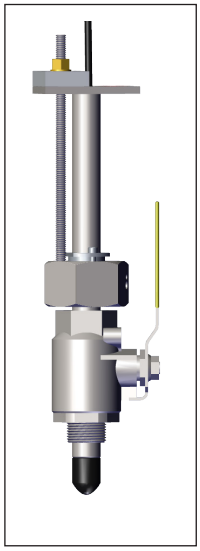
- Raw Water Intake
- Clear Wells

SPI Mag® Sensor

2" Model



1" Model



ProComm Go Transmitter

ProComm Max Transmitter

Benefits

- Easy to relocate to various line sizes
- Ease of hot-tap installation
- Installs without service interruption
- Insertion design for total accessibility
- Price is independent of line size
- No moving parts
- Does not require recalibration in the field

No Service Interruption for Installation

The SPI Mag™ (Single Point Insertion) Electromagnetic Flow Meter is a hot tappable single point insertion flow meter for measuring forward flow. The sensor is available for one-inch or two-inch taps, depending upon line size and application.

The SPI Mag's hot tap installation allows for uninterrupted service as it installs without system shut-down, de-watering lines, cutting pipe or welding flanges. Installation costs are reduced by eliminating the need for heavy equipment or extensive manpower.

Easy Installation

The SPI Mag is easily installed without interruption of the flow process. Sensor insertion hardware is utilized to insert the sensor through a ball valve or corporation stop in the flow conduit. Measurements are taken at the nearest pipe wall with negligible pressure drop in the pipe. The SPI can be easily re-located to various line sizes.

Cost-Effective Measurement

The SPI Mag is a cost effective flow meter solution with a purchase price that is independent of line size making the cost to meter a sixty-inch line the same as a two-inch.

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. It is particularly cost-effective for retrofit applications replacing flow meters or in sites never metered before.

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McCROMETER

Wide range of sizes

The SPI Mag flow meter is available for line sizes from 2 to 96 inches. The flow sensor 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 SPI Mag's sensor contains nothing to wear or break, and it is generally immune to clogging by sand, grit or other debris.

The SPI Mag allows profiling of the pipe inside diameter, further enhancing its measurement accuracy by allowing precise determination of mean velocities.

ProComm Go Transmitter

The SPI Mag 3000 flow meter is accompanied by the ProComm GO transmitter and can be battery powered, ideal for remote installations and locations with unreliable power sources.

- Output options include pulse, 4-20mA, Modbus, and telemetry
- Battery powered with optional solar, AC or DC power with battery backup
- Offering ±2% accuracy
- DIY battery replacement and in-field programming available via USB cable and laptop
- UL, CSA certifications

ProComm Max Transmitter

The SPI Mag Plus 5000 is offered with the ProComm Max transmitter, offering greater accuracy and more sophisticated output options for users needing superior system integration and data collection.

- Output options include Digital Pulse, 4-20mA, Hart, Modbus, and Ethernet IP
- Datalogger and optional AMI/AMR
- Optional Class 1 Div 2
- AC/DC powered
- ±2% standard accuracy
- Bi-directional flow standard
- Rated to 140F for high temperatures
- CE, UL, CSA certification

Installation

- **Hot Tap Installation** - No service interruption.

FLOW METER SPECIFICATIONS

Measurement

- Volumetric flow in filled flow conduits 2" (50mm) to 96" (2,440 mm) diameter utilizing insertable velocity sensor. 1" meter = 2" to 30" pipe I.D.; 2" meter = 6" to 96" 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 freeze in the pipe is not covered by the warranty.

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

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

Flow Meter Specifications (cont.)

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 3000 Part Number Matrix

SP328			-									-		-	
Small or Large Body Sensor															
Small 1" Body Sensor	1														
Meter Type															
Meter (Sensor, Tube, & Converter)		L													
Sensor Only		S													
Tube Length Options															
12" Sensor Length				012											
18" Sensor Length				018											
24" Sensor Length				024											
30" Sensor Length				030											
36" Sensor Length				036											
Non Standard Tube Length				XXX											
Tube Material Options															
S316 Stainless Steel					S										
PVC Plastic					P										
Ball Valve Options															
Stainless Steel Valve (1" NPT 281, 2" NPT 282 Sensor)						N									
No Valve, hardware only (1" NPT 281, 2" NPT 282 Sensor)						X									
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						

SPI Mag 3000 Part Number Matrix (cont.)

SP328			-									-		-	
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)															NB

SPI Mag 5000 Part Number Matrix

SP528			-								-		-	
Small or Large Body Sensor														
Small 1" Body Sensor	1													
Large 2" Body Sensor	2													
Meter Type														
Meter (Sensor, Tube, & Converter)		L												
Sensor Only		S												
Tube Length Options														
12" Tube Length				012										
18" Tube Length				018										
24" Tube Length				024										
30" Tube Length				030										
36" Tube Length				036										
Non Standard Tube Length				XXX										
Tube Material Options														
S316 Stainless Steel					S									
PVC Plastic					P									
Ball Valve Options														
Stainless Steel Valve (1" NPT 281, 2" NPT 282 Sensor)						N								
No Valve, hardware only (1" NPT 281, 2" NPT 282 Sensor)						X								
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							
Transmitter Power Options														
A/C Power								A						
DC Power								D						

SP528			-								-		-	
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 Digital Output 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														
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

ProComm Go 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		

ProComm Go Transmitter Specifications (cont.)

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.

ProComm Max 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 500V
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)

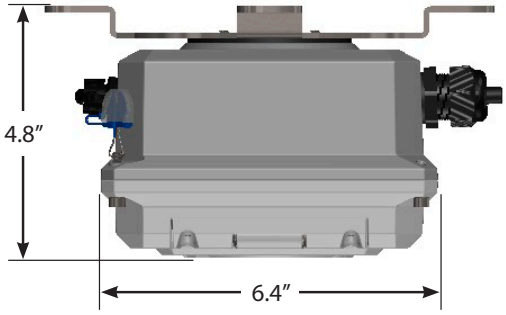
Display and Measurement

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

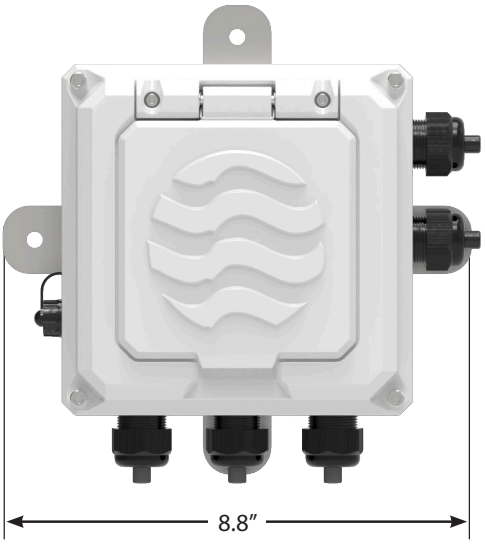
Other Specifications

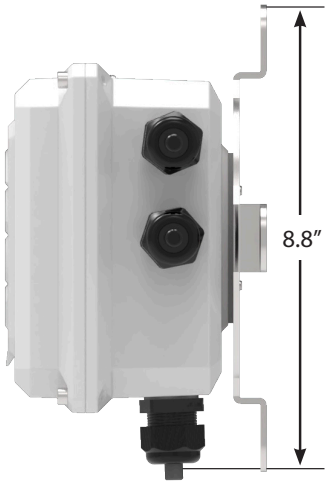
• ISO 9001:2015 certified quality management system • CE	

ProComm Go Transmitter Dimensions



Remote mount converter

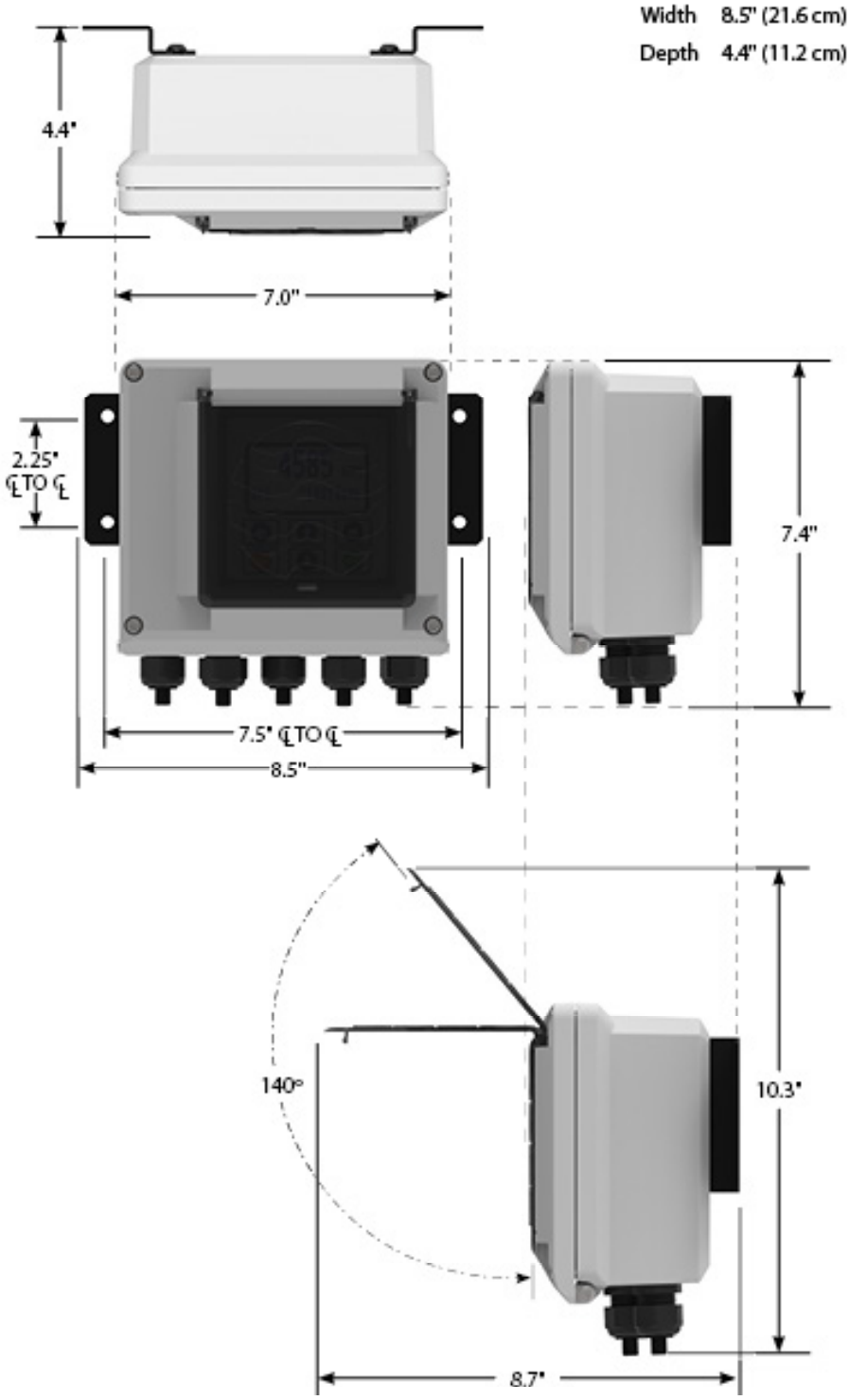




ProComm Max Transmitter Dimensions

Remote Mount Transmitter Dimensions

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



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