

Rosemount[™] 3051S Submersible Level Transmitter



Robust Level Measurement Solution Using Proven Rosemount Technology

New submersible pressure sensing technology allows for remote level measurements using the industry-leading Rosemount 3051S Wireless Pressure Transmitter. This new fully-integrated solution enables quick and easy instrument deployment for remote level measurement applications, with best-in-class accuracy and reliability.

Overview

Rosemount 3051S Submersible Level Transmitter

The most advanced fully integrated submersible level measurement:



- An installation-ready solution for level and process temperature measurements in remote applications.
- Wireless technology for quick deployment eliminates wiring design and construction complexities.
- Selectable measurement ranges from 0 to 30 PSI (0 to 69 ft. H₂O [0 to 21 m. H₂O]) or 0 to 150 PSI (0 to 346 ft. H₂O [0 to 105 m. H₂O]).
- Classic performance for Level and Temperature performance provides up to $\pm 0.075\%$ of span and Process temperature accuracy $\pm 5^\circ\text{F}$ from 14°F to 122°F ($\pm 2.8^\circ\text{C}$ from -10°C to 50°C).
- Compatible with existing Emerson wireless gateway configuration and commissioning tools.
- Optional LCD display provides local readouts of level measurement and process temperature measurement values.

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Rosemount Submersible Sensor

Submersible remote sensor for fast and reliable level measurements:



- 316L SST sensor-wetted materials and XLPE cable material provide confidence in a variety of measurement applications.
- Streamlined submersible sensor enables easy deployment with a diameter of 0.75 in. (20 mm).
- Cable markings facilitate easy installation of submersible sensor to desired depth.
- Proven Rosemount Piezoresistive sensor technology, communicates digitally with the transmitter.
- Sensor reference accuracy of $\pm 0.075\%$ of span.
- Cable lengths by option code from 100 ft. to 500 ft. (30 m to 152 m); can be easily modified on-site to specific length as desired.

Access information when you need it with asset tags

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account.
- Improve mean time to repair and maintain efficiency.
- Ensure confidence that you have located the correct device.
- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information.

Advanced functionality

WirelessHART® (IEC 62591) capabilities

The following functionality is available on coplanar, in-line, multivariable, DP flow meters and level transmitters:



- Quickly deploy new pressure, level and flow measurements in 70 percent less time.
- Eliminate wiring design and construction complexities to lower costs by 40 - 60 percent.
- Reduce pipe penetrations and impulse piping with industry-leading multivariable technology.
- Extended range antenna capabilities provide access to remote locations.
- Delivering more than a decade of maintenance free performance with 10-year power module life.

Rosemount 3051S Submersible Level Transmitter

Rosemount 3051S Submersible Level Transmitters provides an installation ready solution for level and process temperature measurements in remote applications. This product leverages the industry leading in-line gauge pressure transmitter paired with Rosemount's new submersible pressure sensor. The fully integrated and compact design allows the transmitter to be deployed for quick, easy and cost effective installations.

Capabilities include:



- Classic Performance
- *WirelessHART*®
- Various sensor cable lengths (Option codes S10, S20, S30, S40, or S50)
- LCD display (Option code M5)

Online product configurator

Many products are configurable online using our Product Configurator. Select the Configure button or visit our [website](#) to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

Specifications and options

See the Specifications and options section for more details on each configuration. Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See the Material selection section for more information.

Model codes

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in [Figure 1](#).

Figure 1: Model code example

3051S2TG2A2S10X5AWA3WK WR5 M5

1

2

A. Required model components (choices available on most)

B. Additional options (variety of features and functions that may be added to products)

Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
3051S	Scalable pressure transmitter	★

Performance class

Code	Description	
2	Classic: +/-0.075% of span pressure accuracy. +/- 2.8 °C temperature accuracy (from -10 to 50 °C)	★

Connection type

Code	Description	
T	In-line	★

Measurement type

Code	Description	
G	Gauge	★

Pressure range (Gauge only)

Code	Description	
1A	-14.7 to 30 PSI (0 to 69 Ft. H ₂ O)	★
2A	-14.7 to 150 PSI (0 to 346 Ft. H ₂ O)	

Submersible Sensor Material

Code	Description	
2	316L SST	★

Sensor & Cable Configuration/Process connection

Code ⁽¹⁾⁽²⁾	Description	
S10	Submersible Level Sensor with 100 ft. (30 m) cable	★
S20	Submersible Level Sensor with 200 ft. (60 m) cable	★
S30	Submersible Level Sensor with 300 ft. (91 m) cable	★
S40	Submersible Level Sensor with 400 ft. (121 m) cable	★
S50	Submersible Level Sensor with 500 ft. (152 m) cable	

(1) Sensor cable is marked in 1-ft. (0.3 m) increments.

(2) Sensor cable can be modified to specific length on-site.

Transmitter output

Code	Description	
X	Wireless (requires wireless options and wireless Plantweb™ housing)	★

Code	Description	Material	Conduit entry size	
5A	Wireless Plantweb™ housing	Aluminum	½–14 NPT	★

Wireless options**Update rate**

Code	Description	
WA	User configurable update rate	★

Operating frequency and protocol

Code	Description	
3	2.4 GHz DSSS, IEC 62591 (WirelessHART®)	★

Omni-directional wireless antenna

Code	Description	
WK	External antenna	★
WM	Extended range, external antenna	★
WJ	Remote antenna	★
WN	High-gain, remote antenna	★

SmartPower™ Housing Cover

Power Modules are ordered as separate items. Please refer to Power Module section for additional details.

Code	Description	
1	Housing cover compatible with Standard Life Black Power Module ⁽¹⁾	★
2	Housing cover compatible with Extended Life Blue Power Module ⁽²⁾	★

(1) Black power module must be ordered separately; order Model 701PBKKF.

(2) Blue power module must be ordered separately; order part number A0701PBU.

Additional options

Extended product warranty

Code	Description	
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Mounting bracket

Code	Description	
B4	Bracket, all SST, 2-in. pipe and panel	★

Software configuration

Code	Description	
C1	Custom software configuration (requires Configuration Data Sheet)	★

Display type

Code	Description	
M5	Plantweb™ LCD display	★

Calibration certification

Code	Description	
Q4	Calibration certificate	★

Specifications

Performance specifications

This Product Data Sheet covers *WirelessHART*®, and the 3051S Submersible Level Transmitter. For zero-based spans, reference conditions, S10, S20, S30, S40, S50 process connections, digital trim values set to equal range points.

Conformance to specifications ($\pm 3\sigma$ [Sigma])

Technology leadership, advanced manufacturing techniques, and statistical process control ensure specification conformance to at least $\pm 3\sigma$.

Reference accuracy

Stated reference accuracy equations include terminal based linearity, hysteresis, and repeatability. For wireless, use calibrated range in place of span.

Table 1: Process Pressure

Models	Reference Accuracy
Rosemount 3051S Submersible Level Transmitter	
Ranges 1 & 2	$\pm 0.075\%$ of Span; For Span less than 10:1, $\pm (0.0075[\text{URL}/\text{Span}])\%$ of Span

Table 2: Process Temperature

Models	Accuracy
Rosemount 3051S Submersible Level Transmitter	
Ranges 1 & 2	± 5 °F (2.8 °C) from 14 to 122 °F (-10 to 50 °C)

Table 3: Ambient temperature effect per 50 °F (28 °C)

Models	
Rosemount 3051S Submersible Level Transmitter	
Ranges 1 & 2	± (0.05% of URL + 0.05% Span)

Table 4: Long term stability

Models	
Rosemount 3051S Submersible Level Transmitter	
Ranges 1 & 2	± 0.125% URL for 5 years

Electromagnetic compatibility

Meets all industrial environment requirements of EN61326 with maximum deviation <1 percent Span during EMC disturbance.

Functional specifications

This Product Data Sheet covers *WirelessHART*®, and the 3051S Submersible Level Transmitter. For zero-based spans, reference conditions, S10, S20, S30, S40, S50 process connections, digital trim values set to equal range points.

Ambient Temperature limits (Transmitter)

-40 to 185 °F (-40 to 85 °C) (-40 to 176 °F [-40 to 80 °C] with option LCD option code M5)

Ambient/process Temperature limits (sensor & cable)

14 to 122 °F (-10 to 50 °C) (non-freezing liquids)

Storage Temperature limits

-40 to 185 °F (-40 to 85 °C)

Range and sensor limits

Range	Range and sensor limits				
	Upper Range Limit (URL)	Lower Range Limit (LRL)	Minimum Span / Maximum Rangedown	Maximum Working Pressure (MWP)	Over Pressure Limit
1	30 psig (69 ft. H ₂ O)	-14.70 psig (-34 ft. H ₂ O)	0.3 psi (8.3 inH ₂ O) / 100:1	Equal to URL	225 psi
2	150 psig (346 ft. H ₂ O)	-14.70 psig (-34 ft. H ₂ O)	1.0 psi (27.7 inH ₂ O) / 150:1	Equal to URL	225 psi

Vibration effect

Product maintains structural integrity, and performs within reference accuracy after exposure vibrations per IEC 60068-2-6 when tested per the requirements of IEC60068-2-6: Environmental Testing: Vibration (10–60 Hz 0.21 mm displacement peak amplitude/60–2000 Hz 3g).

Sensor mounting position effects

Zero shifts up to ± 2.5 in H₂O (6.22 mbar), which can be calibrated out. No span effect. No mounting position effect on transmitter head orientation.

Wireless (output code X)

Output

IEC 62591 (*WirelessHART*®), 2.4 GHz DSSS

Radio frequency power output from antenna

- External antenna (WK option): Maximum of 10 mW (10 dBm) EIRP
- Extended range, external antenna (WM option): Maximum of 18 mW (12.5 dBm) EIRP
- Remote (WJ option) antenna: Maximum of 17 mW (12.3 dBm) EIRP
- High-gain, remote antenna (WN option): Maximum of 40 mW (16 dBm) EIRP

Local display

The optional three-line, seven-digit LCD display can display user-selectable information, such as primary variable in engineering units, scaled variable, percent of range, sensor module temperature, and electronics temperature. The display updates based on the wireless update rate.

Update rate

User selectable 1 second to 60 minute.

Power module

The Rosemount 3051S Submersible level transmitter is powered by a Emerson Wireless SmartPower™ power module, which are sold and shipped separately. The 3051S Submersible level transmitter can accommodate both the Black Power Module and Blue Power module. Black Power Module (701PBKKF) is the standard power module compatible with SmartPower™ housing cover option codes 1 & 2. Details for the Black Power Module can be found within [Emerson Wireless SmartPower™ Solutions PDS 00813-0100-4701](#). Blue Power Module (A0701PBU) is the extended life Power Module compatible only with SmartPower™ housing cover option code 2. Details for the Blue Power Module can be found within [Emerson Wireless SmartPower™ Solutions PDS 00813-0200-4701](#). Field replaceable, keyed connection eliminates the risk of incorrect installation, Lithium-thionyl chloride Power Module with PBT/ PC enclosure. Ten-year life at one minute update rate.

Note

Continuous exposure to ambient temperature limits of -40 °F or 185 °F (-40 °C or 85 °C) may reduce specified life by less than 20 percent.

Failure mode alarm

Output code X

If self-diagnostics detect a gross transmitter failure, that information gets passed as an alert and a status along with the process variable.

Physical specifications

Material selection

Emerson provides a variety of Rosemount products with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product materials, options, and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product options, configuration, or materials of construction selected.

Electrical connections

Emerson Wireless SmartPower™ Power modules are required for output code X.

Process connections / Cable Configurations

Process connection code	Cable length ⁽¹⁾
S10	100 ft. (30 m)
S20	200 ft. (60 m)
S30	300 ft. (91 m)
S40	400 ft. (121 m)
S50	500 ft. (152 m)

(1) The sensor cable includes an integral vent tube and has a minimum bend radius of 3 in. (76 mm).

Process-wetted parts**Cable**

Cross-linked polyethylene (XLPE) cable jacket

Polyolefin tubing with polyamide adhesive lining for cable to sensor interface

Sensor

316L SST

Sensor Weight Retention O-ring

Buna-N

Non-wetted parts**Electronics housing**

Low-copper aluminum

Enclosure type IP66/67

Sensor fill fluid

Silicone

Paint for aluminum housing

Polyurethane

Cover O-rings

Buna-N

Wireless Antenna

- External antenna (WK/WM): PBT/PC integrated omni-directional antenna
- Remote antenna (WN/WJ): Fiberglass omni-directional antenna

Volumetric displacement

Sensor: 3.35-in.³ (54,9 cm³)

Cable: 1.0-in.³ (16,4 cm³) per foot of cable

Shipping weights

Table 5: Transmitter weights

Base transmitter housing configuration	Weight in lb. (kg)
3051S housing	3.8 (1.7)

Table 5: Transmitter weights (continued)

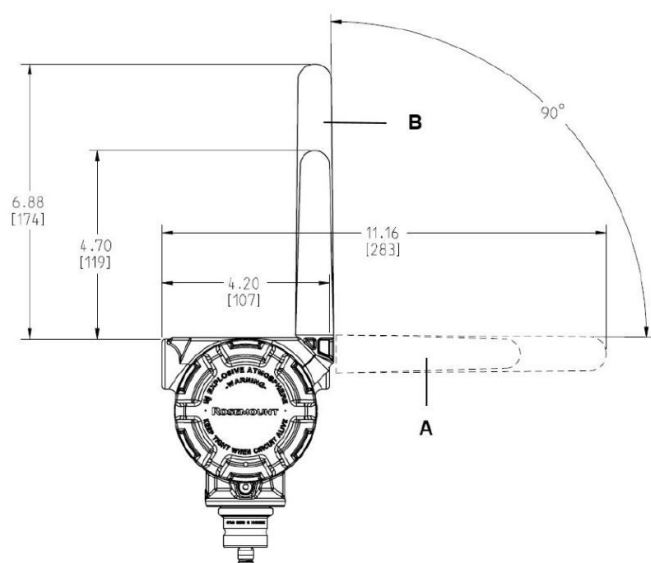
Base transmitter housing configuration	Weight in lb. (kg)
3051S housing with LCD meter	4.1 (1.9)
Additional option weights	Table 6

Table 6: Transmitter Option Weights

Code	Option	Add lb. (kg)
WK	External antenna	0.1 (0.05)
WM	Extended range, external antenna	0.1 (0.05)
WJ	Remote antenna	0.1 (0.05)
WN	High-gain, remote antenna	2.7 (1.2)
B4	SST mounting bracket	1.0 (0.5)
S10	Submersible Sensor w/100' cable + spool	7.2 (3.3)
S20	Submersible Sensor w/200' cable + spool	11.8 (5.4)
S30	Submersible Sensor w/300' cable + spool	16.4 (7.5)
S40	Submersible Sensor w/400' cable + spool	21.0 (9.5)
S50	Submersible Sensor w/500' cable + spool	25.6 (11.6)
2	Extended life power module cover	0.7 (0.3)
N/A	Power module (701PGNKF)	0.5 (0.18)

Dimensional drawings

Transmitter with 2.4 GHz Standard & Extended Range Antenna

Figure 2: Rosemount 3051S Submersible Level Transmitter (Front View)

A. 2.4 GHz standard range antenna

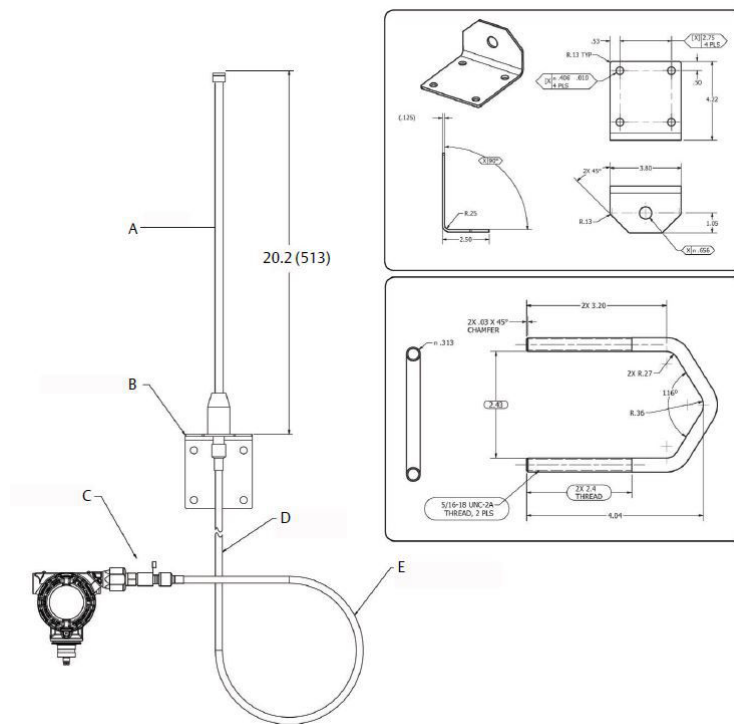
B. 2.4 GHz extended range antenna

Note

Dimensions are in inches [mm].

Remote mount antenna

Figure 3: High Gain, Remote Mount Antenna (WN Option)



- A. Antenna
- B. Mounting bracket
- C. Lightning arrester
- D. 25 ft. (7.6 m) cable
- E. Min drip loop Ø12-in. (0.3 m)

Note

Dimensions are in inches (mm).

Mounting configurations

Figure 4: Rosemount 3051S Submersible Level Transmitter with Pipe mount Configurations (Front view)

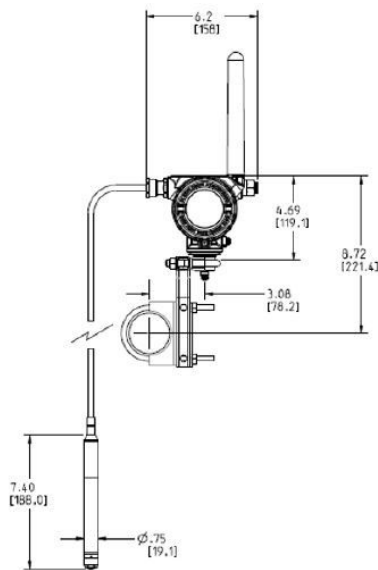


Figure 5: Rosemount 3051S Submersible Level Transmitter with Pipe Mount Configurations (Side view)

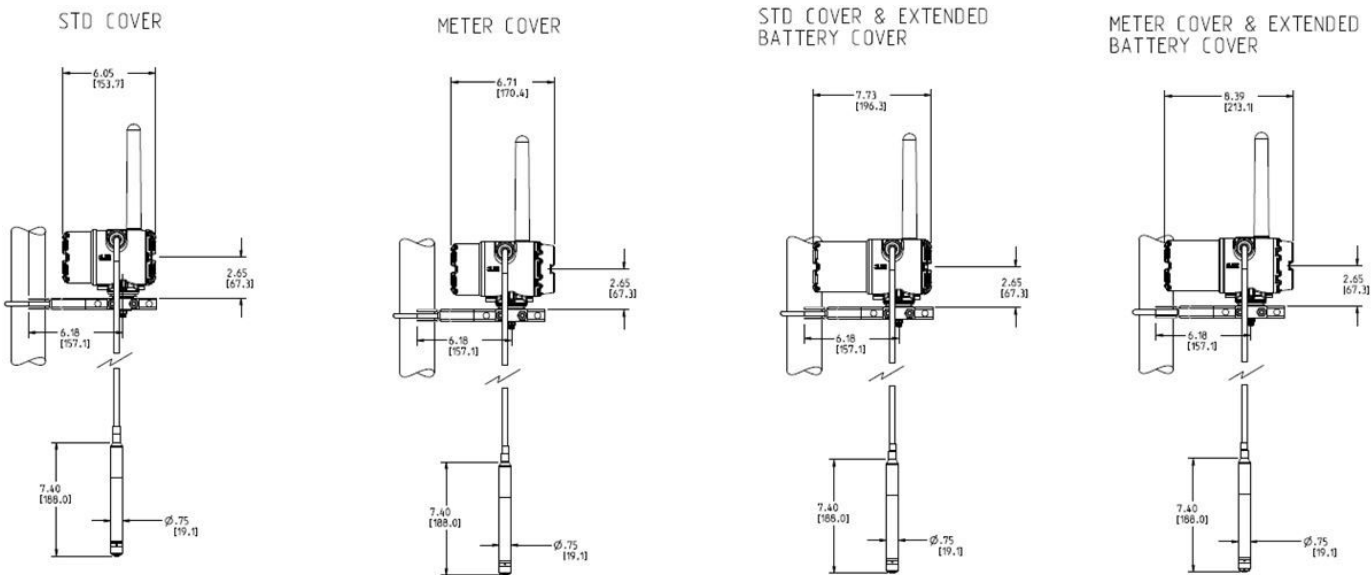


Figure 6: Rosemount 3051S Submersible Level Transmitter with Panel Mount Configurations (Front view)

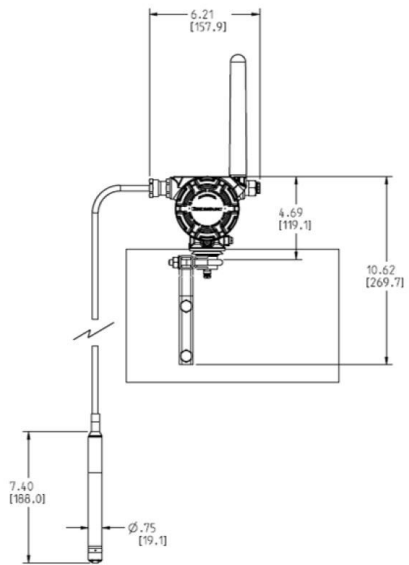
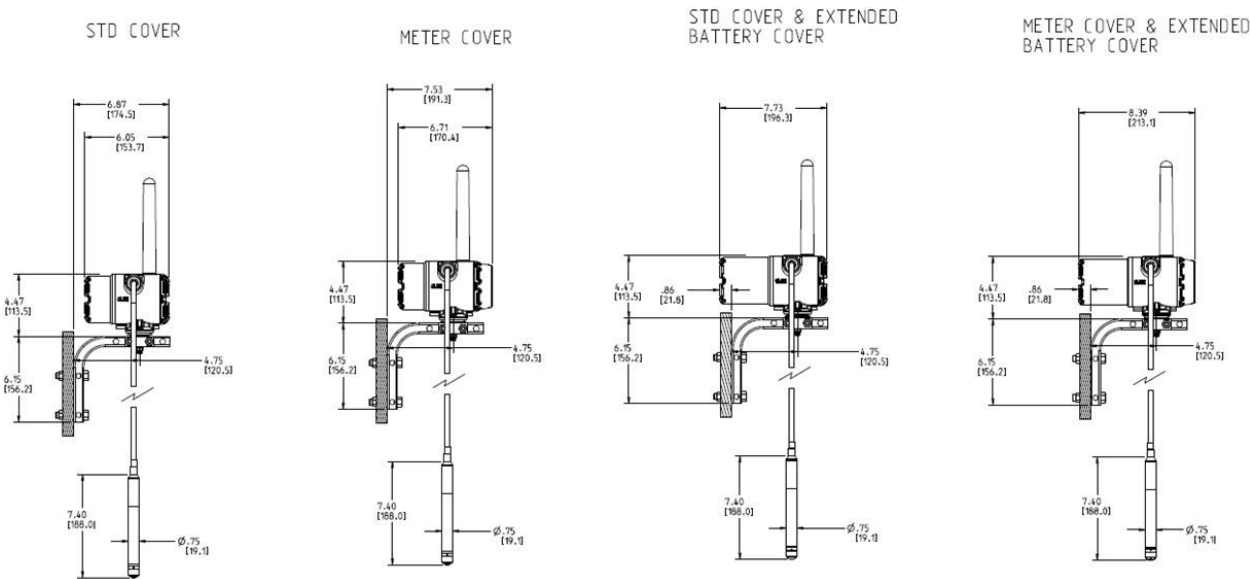


Figure 7: Rosemount 3051S Submersible Level Transmitter with Panel Mount Configurations (Side view)



Note

Dimensions are in inches [mm].

Rosemount 3051S Wireless Submersible Level Transmitter product certifications

See the Rosemount 3051S Submersible Level Transmitter Quick Start Guides for detailed information on the existing approvals and certifications.

Product approval information	Links
Rosemount 3051 Submersible Level Transmitter with <i>WirelessHART</i> ® Protocol	Rosemount 3051S Submersible Level Transmitter with WirelessHART® protocol QSG (00825-0100-6200)

For more information: [Emerson.com/global](https://emerson.com/global)

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