Rosemount™ Wireless ET310 Corrosion Transmitter

with Rosemount Permasense™ Technology

Rosemount Wireless Corrosion Transmitters provide direct measurement of wall thickness, the most accurate indication of asset integrity. The transmitter utilizes patented signal processing to handle internal surface roughness caused by some corrosion mechanisms and best-in-class material and temperature compensation. These features combine to offer industry-leading measurement repeatability and sensitivity in field conditions.

- Simple to deploy and maintain, being non-intrusive with wireless data delivery

- Provides facilities with continuous corrosion and erosion monitoring for improved decision making

- Uses unique ultrasonic technology enabling ultra-fast installation and measurement through external coatings

- *Wireless*HART® technology ensures reliable, robust, and secure data retrieval from the plant devices to a remote office location

ROSEMOUNT™

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Emerson wireless solution

**IEC 62591 (*Wireless*HART®) ... the industry standard**

Self-organizing, adaptive mesh routing

- Backed by Emerson's proven experience in wireless field instrumentation and expert technical support.

- The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, then data will continue to flow because the device has other established paths.

Reliable wireless architecture

- Standard Institute of Electrical and Electronics Engineers (IEEE) 802.15.4 radios

- 2.4 GHz Industrial, Scientific, and Medical (ISM) band sliced into 15 radio channels

- Time-synchronized channel hopping

- Direct Sequence Spread Spectrum (DSSS) technology delivers high reliability in challenging radio environment

Figure 1: Web plant network
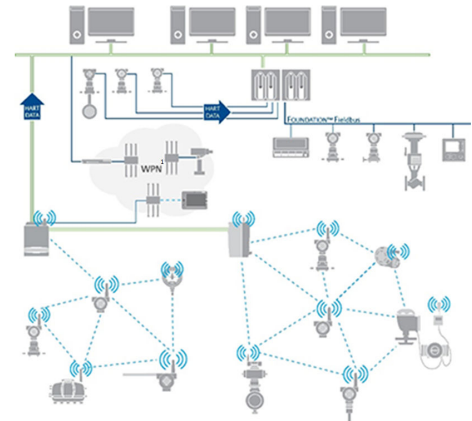
Emerson's wireless

- Seamless integration to all existing host systems

- Native integration into DeltaV™ and Ovation™ is transparent and seamless

- Gateways interface with existing host systems using industry standard protocols including OPC, Modbus® transmission control protocol/Internet protocol (TCP/IP), Modbus remote terminal unit (RTU), and EtherNet/IP™

Layered security keeps your network safe

- Ensures data transmissions are received only by the Wireless Gateway.

- Network devices implement industry standard encryption, authentication, verification, anti-jamming, and key management.

- Third party security verification including Achilles and FIPS197, with password strength monitoring, user-based login, password reset requirements, automatic lockout, and password expiration requirements.

Contents

Rosemount Wireless ET310 Corrosion Transmitter

Corrosion and erosion monitoring

- Reliably detects thinning wall thickness in piping through external coatings using patented ultrasonic measurement technology
- Sends measurements using *Wireless*HART® for visualization and analysis at a remote office location

**Figure 2: Basic Transmitter Components**
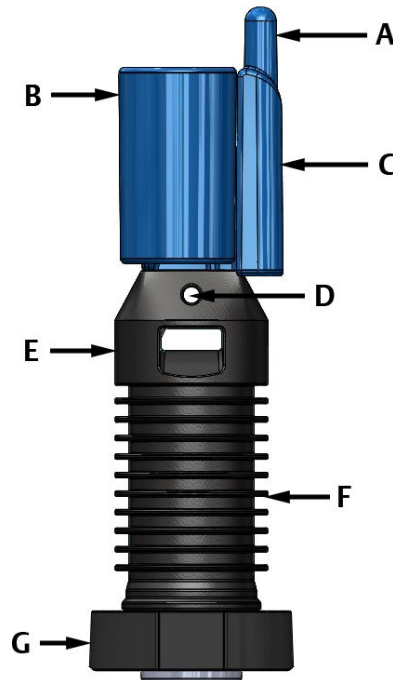
A. *Antenna*
B. *Power module*
C. *Head*
D. *Lanyard hole*
E. *Strap slot*
F. *Foot*
G. *Shoe*

Reliable data in challenging environments

- Built-in thermocouple monitors pipe surface temperature providing thickness measurements that are automatically compensated for the effect of ultrasonic velocity change with temperature
- May be used on metal with continuous service temperatures up to 320 °F (160 °C)
- Rugged and robust design of the transmitter ensures reliable performance in harsh environments
- *Wireless*HART® protocol creates a self-forming and self-managing wireless mesh, delivering continuous wall thickness measurements of the highest integrity and accuracy

Mounting flexibility
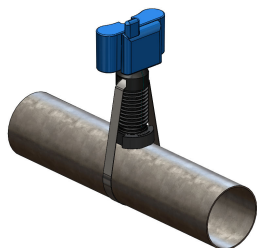
- Sensor can be mounted on pipes up to 40-in. diameter with a metal strap and tensioner, and above 40-in. diameter using a magnetic mounting option

- Directly mount to process piping without cutting pipes or changing pipe configurations — allows for a flexible installation

- Sensor attaches magnetically to carbon steel pipes, secured with a metal strap — deployment is safe, quick, and easy in challenging locations
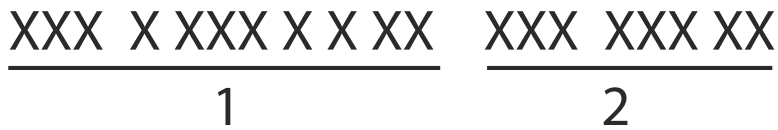
Ordering information

Specifications and options

The purchaser of the equipment must specify and select the product materials, options, or components.

Model code

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 3.

Figure 3: Model code example

$$\underline{\text{XXX X XXX X X XX}} \quad \underline{\text{XXX XXX XX}}$$
$$\quad\quad\quad 1 \quad\quad\quad\quad\quad\quad\quad 2$$

1. Required model components (choices available on most)

2. 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 the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
ET310	Corrosion Transmitter	★

Output

Code	Description	
X	Wireless	★

Measurement type

Code	Description	
1	Insight	★

Product certifications

Code	Description	
NA	No approvals	★
I1	ATEX Intrinsic Safety	★
I2	Brazil Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	USA Intrinsically Safe	★
I6	Canada Intrinsically Safe	★
I7	IECEx Intrinsic Safety	★
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	★
IP	Korea Intrinsic Safety	★
IW	India Intrinsic Safety	★

Wireless update rate, operating frequency, and protocol

Code	Description	
WA3	User configurable update rate, 2.4 GHz DSSS, IEC 62591 (*Wireless*HART® protocol)	★

Omni-directional wireless antenna and SmartPower™ solutions

Code	Description	
WP6	Internal antenna, compatible with corrosion power module (standard power module included)	★

Mounting hardware

Code	Description	
T01	Pipe strap up to 40-in. pipe diameter, one strap tensioner	★
B01	Magnetic fixture, vessel mount	★

Spare parts and accessories

Part number	Description	
BP20E-5100-0001	BP20E power module (SGSus-c)	★
BP20E-5100-0002	BP20E power module (ATEX, IECEx)	★
BP20E-5100-0003	BP20E power module (EAC EX)	
BP20E-5100-0004	BP20E power module (Japan)	
BP20E-5100-0005	BP20E power module (Brazil)	
BP20E-5100-0006	BP20E power module (Korea)	
BP20E-5100-0007	BP20E power module (China)	
IK220-2000-0101	Installation kit IK2201US (for use with SGSus-c approved sensors)	
IK220-2000-0102	Installation kit IK220EU (for use with ATEX, IECEx, IA approved sensors)	
IK220-2000-0103	Installation kit IK220RU (for use with EAC Ex approved sensors)	

Part number	Description	
IK220-2000-0104	Installation kit IK220JP (for use with Japan intrinsic safety approved sensors)	
IK220-2000-0105	Installation kit IK220BR (for use with Brazil intrinsic safety approved sensors)	
IK220-2000-0106	Installation kit IK220KR (for use with Korea intrinsic safety approved sensors)	
IK220-2000-0107	Installation kit IK220CN (for use with China intrinsic safety approved sensors)	
PERMA-2007-0001	Rosemount ET310 strap tensioner	
PERMA-2006-0001	Rosemount ET310/ET410 strap (per meter)	
PERMA-2006-0002	Rosemount ET310/ET410 strap, 137.8 inches (3.5 m)	
PERMA-2005-0003	Rosemount ET310 magnetic fixture	
PERMA-2000-0001	Rosemount stainless steel lanyard, 78.7 inches (2 m)	

In the box

Mounting hardware option T01[1]	Mounting hardware option B01[2]
■ Rosemount ET310 Transmitter	■ Rosemount ET310 Transmitter
■ BP20E power module	■ BP20E power module
■ 137.8-in. (3.5 m) stainless steel 316 retaining strap	■ Magnetic mount
■ Strap tensioner	■ 4x lanyards (for safely securing sensor)
■ Lanyard (for safely securing sensor)	■ Brackets and fixings

(1) *Pipe strap up to 40-in. diameter pipe and one strap tensioner.*
(2) *Magnetic fixture, vessel mount.*

Specifications

Wireless specifications

Output

IEC 62591 (*Wireless*HART®) 2.4 GHz

Transmit rate

Every 12 hours by default

Radio frequency power output from antenna

Internal (WP option) antenna: Less than 10 mW (10 dBm) EIRP

Performance specifications

Thickness measurement

Measurement repeatability: ±0.0001-in. (2.5 μm)[1]

Resolution: 0.00004-in. (1μm)[2]

Surface temperature

Accuracy: 18 °F (10 °C)

Repeatability: within 4 °F (2 °C)

Power module service life

Nine years at reference conditions with supplied BP20E module[3]

Power module is replaceable in hazardous area.

Humidity limits

0 to 100 percent relative humidity

Temperature limits

Ambient limit for operation: –40 to 185 °F (–40 to 75 °C)[4]

Storage limit: –58 to 185 °F (–50 to 75 °C)

Measurement location continuous temperature: Up to 320 °F (160 °C)

Pipe diameter

Minimum NPS 2 (nominal 2-in. pipe) on straight pipe or outside of an elbow[5]

Wall thickness

Minimum: 0.16 in. (4 mm)

Maximum: 3.94 in. (100mm)[6]

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(1) Repeatability is defined as the standard deviation of repeated thickness measurements at a location experiencing no metal loss and at constant temperature over the measurements.
(2) Resolution is defined as the resolution of the thickness measurement stored in the software.
(3) Reference conditions are 68 °F (20 °C), transmit rate of 12 hours, and routing data for three additional network devices.
(4) See Product certification section for temperature limits of intrinsic safety.
(5) Contact your Emerson representative for special order options.
(6) For wall thickness greater than 2 inches (50 mm), parameter adjustment at installation is required.

Compatible pipe materials

Carbon steels including chrome steels

Duplex stainless steel

Super duplex stainless steel

External coating thickness

Maximum: 0.040 in. (1 mm)

Compatible external coating materials

Common coatings, including zinc coatings, etc.[7]

Mounting

Transmitters are directly attached to process piping with a choice of mounting solutions (see Ordering information).

- For pipes up to 40-in. diameter by using a 138-in. (3.5 m) stainless steel 316 strap

- For pipes, vessels, columns, etc. over 80-in. diameter by using a magnetic mount

- For pipes less than 4-in. diameter, an alternative shoe must be used

- For other sizes, contact your Emerson representative

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/power module

Replaceable, non-rechargeable, Intrinsically Safe lithium-thionyl chloride power module

Commissioning

Commission the device using IK220 installation kit with BP20E not installed.

Materials of construction

Transmitter housing: PBT/PC

Transmitter foot: PPS

Transmitter shoe: Silicone

Power module housing: PBT/PC

Retaining strap and tensioner: Stainless steel 316

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(7)   Contact your Emerson representative for compatibility of other coatings.

Sensor type

Single electromagnetic acoustic transducer (no couplant required).

Weight

Rosemount ET310 without BP20E power module: 1.3 lb. (0.6 kg)

Rosemount ET310 with BP20E power module: 2.1 lb. (1.0 kg)

Boxed Rosemount ET310 with all accessories: 4.8 lb. (2.2 kg)

Enclosure ratings

IP67[8]

Electromagnetic compatibility (EMC)

Meets all relevant requirements of EN 61326-1: 2013.

Software compatibility

The device is compatible with Data Manager 8.1.1 and later, Plantweb Insight™ Non-Intrusive Corrosion application 1.1 and later, and Installation Tool 2.4.5.14119 and later (included in the IK220 installation kit).

Contact your Emerson representative to upgrade from earlier software versions.

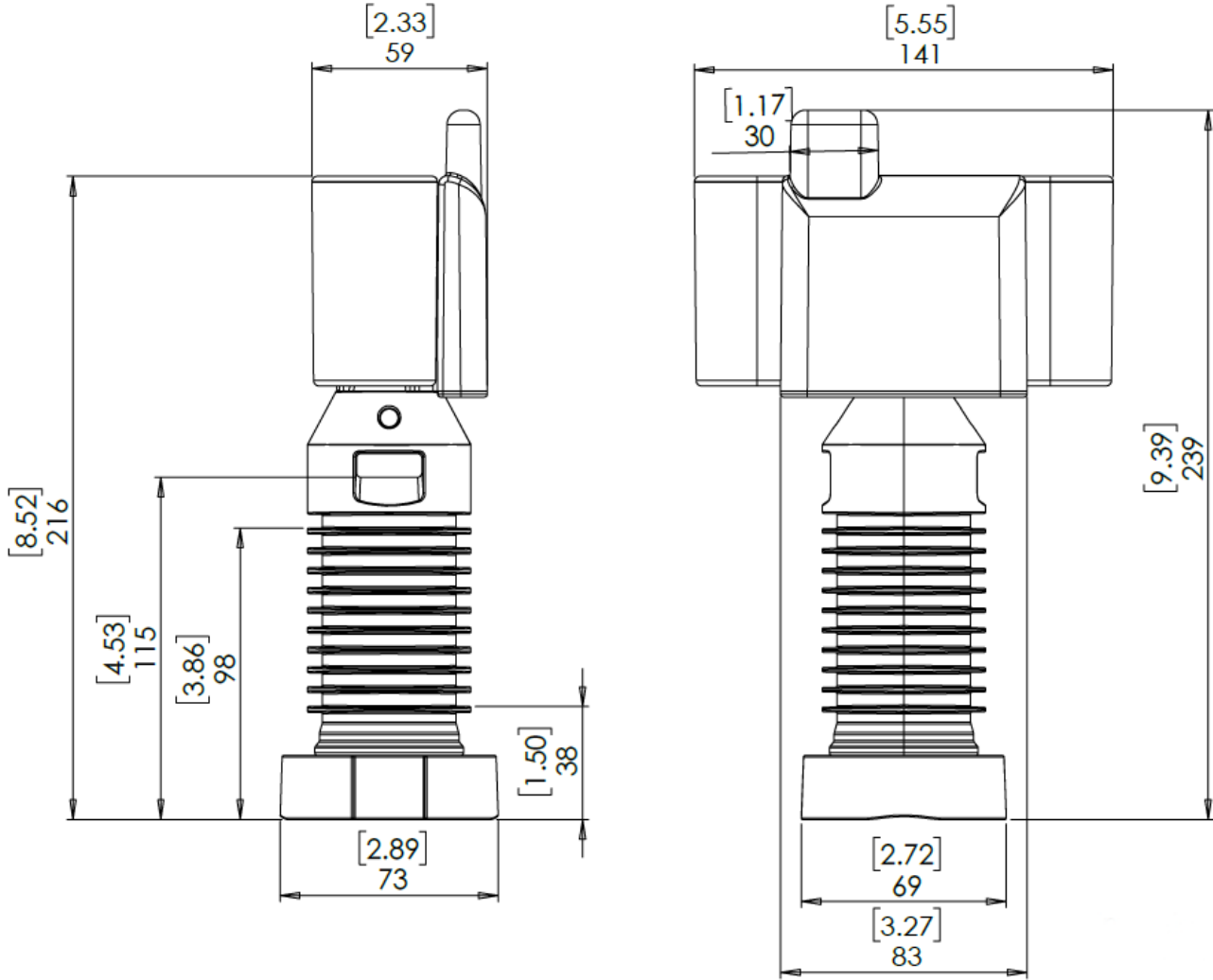
(8)   When transmitter is mated to the power module.

Product certification

Rev 0.1

For Rosemount Wireless ET310 Corrosion Transmitter with Rosemount Permasense™ Technology product certifications, see Rosemount Wireless Permasense ET310 Corrosion Transmitter Quick Start Guide.

Dimensional drawings

Dimensions are in inches (mm).

For more information: **Emerson.com/global**

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