Rosemount™ Wireless Permasense WT210 Corrosion Transmitter

ROSEMOUNT™

EMERSON.

NOTICE

This guide provides basic guidelines for the installation of the Rosemount Wireless Permasense Corrosion Transmitter. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting or intrinsically safe (I.S.) installations. Refer to the Rosemount Wireless Permasense Corrosion Transmitter Reference Manual for more instruction. The manual and this guide are also available electronically on Emerson.com\Rosemount.

Shipping considerations

Each device contains two "D" size primary lithium-thionyl chloride battery cells. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

⚠ WARNING

Explosions could result in death or serious injury.

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Review the approvals section of this manual for any restrictions associated with a safe installation.

Before connecting a CC21 in an explosive atmosphere, make sure the instruments in the segment are installed in accordance with intrinsically safe or non-incendive field wiring practices.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 8-in. (20 cm) from all persons.

The power module may be replaced in a hazardous area.

The power module has surface resistivity greater than one gigaohm and must be properly installed on the wireless device. Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

Polymer enclosure has surface resistivity greater than one gigaohm.

Care must be taken during transportation to and from the point of installation to prevent a potential electrostatic charging hazard.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

Contents

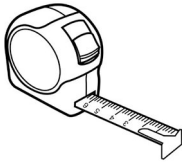# 1   Overview

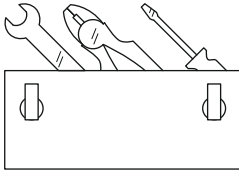## Figure 1-1: Rosemount Wireless Permasense WT210 Corrosion Transmitter
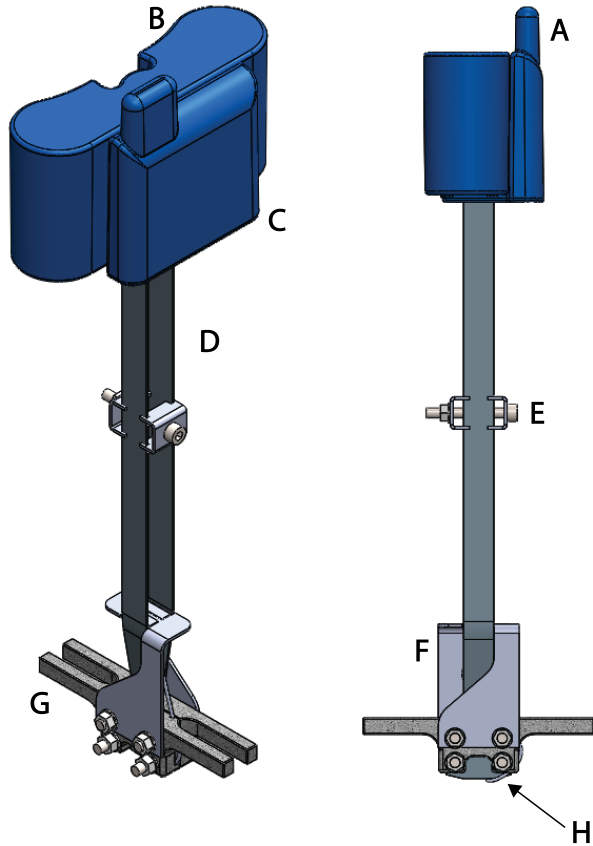
A. Antenna
B. Power module
C. Head
D. Waveguide
E. Waveguide spacer
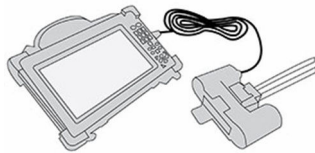F. Stabilizer
G. Foot
H. Thermocouple

1.1   Required equipment

Measuring tape

Standard tools (e.g., screwdriver, wrench, pliers)

IK220

1.2   Hardware not supplied

- Full plain nuts, to suit welded stud thread and metallurgy:
  - — Thread: M8 or 5/16-in.
  - — Material: Stainless steel — or suitable other corrosion resistant steel
- Socket for 5/16-in. nuts

1.3   What's in the box

- Rosemount Wireless Permasense WT210 transmitter
- Rosemount Permasense BP20E power module, including two M3 x 16 mm stainless steel retaining bolts
- Stainless steel circular heat shield
- M8 (compatible with 5/16-in. studs) Nord-Lock anti vibration washers, two per sensor
- Lanyard kit, 316 stainless steel lanyard 6.5 ft. (2 m) in length, gripple No.2, release key

2   Wireless considerations

Power up sequence

The Emerson Wireless Gateway should be installed and functioning properly before any wireless devices are powered. Commission the Rosemount Wireless Permasense WT210 and install the BP20E power module to power the device only after the gateway has been installed and functioning. This results in a simpler and faster network installation. Enabling active advertising on the Gateway ensures new devices are able to join the network faster. For more information see the Emerson Wireless 1420 Gateway Reference Manual.

Antenna position

The antenna is internal to the Rosemount Wireless Permasense WT210 transmitter. The antenna should also be approximately 3 ft. (1 m) from any large structure, building, or conductive surface to allow for clear communication to other devices.

3   Field communicator connections

The CC21 commissioning cable is connected and removed from the transmitter in the same way as the Rosemount BP20E power module. The USB connector is plugged in to the tablet PC as shown in Figure 3-1.

Figure 3-1: IK220 Commissioning Kit
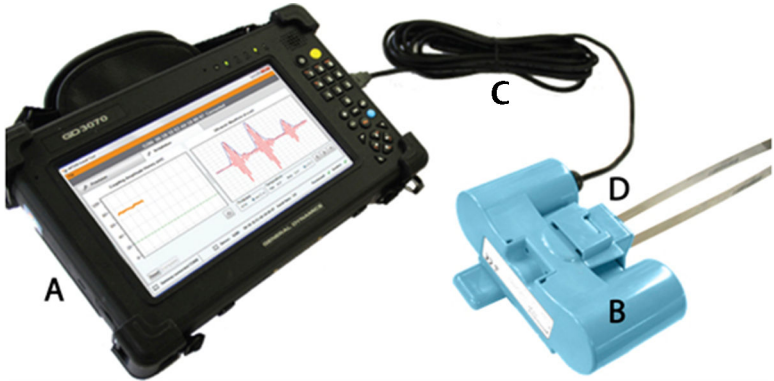
A. Tablet PC
B. CC21
C. USB cable plugged into USB port
D. Rosemount Wireless Permasense WT210/ET210 sensor

4   Physical installation

The corrosion transmitter is connected directly to the piping being measured.

Mounting considerations

Procedure

1. When mounting sensors on pipe bends and elbows, studs must be aligned as follows

    a) Fit two nuts to the stud, the first at the top of the thread and the second 15-20 mm down the thread as shown in Figure 4-1.

    b) Use M13 deep hex socket with extension bar to bring the studs parallel to each other and perpendicular to the pipe surface at the center point between the two studs.

    c) Correct stud alignment will ensure the correct orientation of the nut and washer with respect to the sensor foot.

Figure 4-1: Orientation
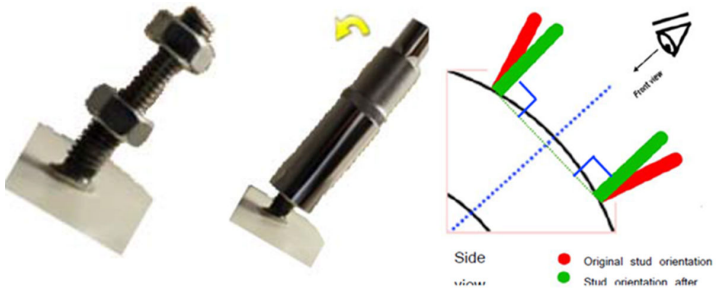
2. Observe the sensor contact from the side. As shown in the following illustrations, check that:

    a) Sensor feet are parallel to the pipe surface.

    b) Studs are perpendicular to the pipe surface.

    c) Sensor tip is in the middle of the two studs.

Figure 4-2: Improper Installations of the Metal Standoffs
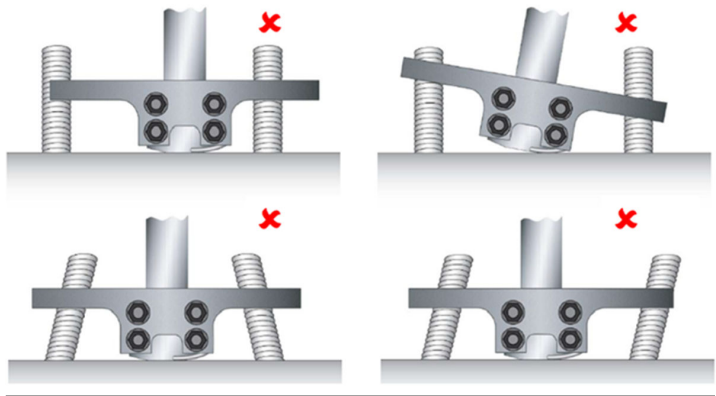

4.1   Mounting

For pipe clamp mounting, see clamp installation guide.

Procedure

1. On painted pipe-work, remove a singular patch of the coating about 1-in. (25 mm) diameter midway between the studs to allow waveguides to contact pipe directly.

2. On straight pipes, ensure the studs are perpendicular to the sensor contact point.

3. Apply Loctite® 8009 anti-seize compound to the threads.

4. Record the installation location, sensor ID, MAC address of the sensor, and power module serial number.

5. Examine the thermocouple and make sure it is protruding past the end of the waveguide by about ⅛-in. (3 mm) so that it will press onto the pipe when the sensor is tightened as shown in Figure 4-3.

Figure 4-3: Thermocouple Guidelines
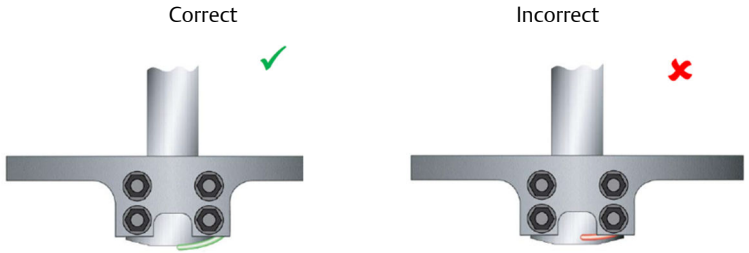
6. Locate and place the WT210 sensor over the studs, ensuring the waveguides are positioned centrally to ±-0.2-in. (5 mm).

7. Place washers over the studs.

8. Thread nut onto the studs and run them down several threads.

9. Carefully secure the sensor in this position by finger tightening each nut after observing the sensor in Figure 4-4.

Figure 4-4: Equal Spacing Guidelines
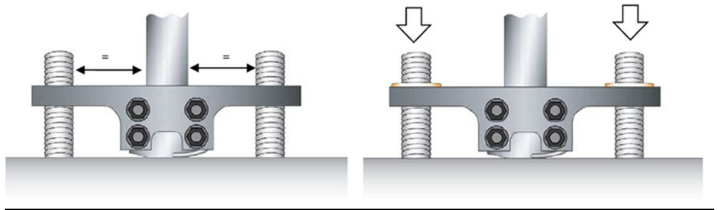
5   Commissioning device

**Mechanical installation and validation procedure**

Procedure

1. Power up the rugged tablet PC and connect the CC21.
2. Attach the CC21 to the sensor.
3. Double-click the Rosemount Wireless Permasense WT210 installation app desktop icon. Within approximately 10 seconds, the installation tool software should open.
4. In the Rosemount WT210 in installation app software, as seen in Figure 5-1:
   a) Select the **Provision** tab.
   b) Enter the four- or five-digit network ID and the 32 hexadecimal (numbers 0-9 and letters A-F) join key.
   c) Click the **Provision** button. Confirmation is given when provisioning is complete.
   d) Check the network ID of the gateway is visible in the network discovery list.

Note
Joining the device to the network could take several minutes.

Figure 5-1: Rosemount WT210 Install Tool
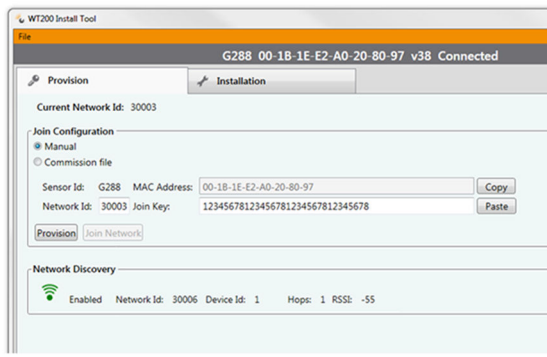
5. In the Rosemount WT210 installation app software, select the **Installation** tab.

⚠ CAUTION

Overtightening

Overtightening the nuts can damage the waveguides.

Torque wrench setting value of 5 Nm (3.7 ft-lb) and ensure nuts are ONLY tightened incrementally as described below.

6. Tighten nuts ¼ turn at a time.
   a) Check the quality of the waveform with each turn as shown in Figure 5-2.
   b) If the amplitude stops increasing with each turn, stop tightening. The sensor could be misaligned. Loosen the nuts and realign sensor, starting again.

7. Continue tightening the nuts to 5 Nm. Once 5 Nm has been reached:
   a) Check that the surface wave is not distorted. If it is, the sensor could be misaligned. Loosen the nuts and realign sensor, starting again from Step 6 .
   b) Check that the surface wave is not significantly bigger or smaller than the back wall reflection*. If it is, loosen the sensor, reposition and go back to the start. The sensor could either be too tight, or the inner surface of the pipe is too rough to achieve a strong reflection.

8. If the above conditions have been met, and the waveform amplitude is above 40 mV, this is a good installation as shown in Figure 5-3. The waveform is good quality and there is sufficient torque to secure the sensor to the pipe.

9. If 5 Nm has been reached but the waveform amplitude is only between 20 and 40 mV, set the torque wrench to 8 Nm and continue turning the nuts. With each ¼ turn, check that the surface wave does not become distorted or is not significantly bigger or smaller than the back wall reflection*.
   a) If the amplitude does not increase with successive turning of the nuts, finish here. The sensor should not be tightened further, to avoid overtightening and damaging the waveguide tips. This is a good installation.
   b) If 8 Nm has been reached, finish here. Maximum torque has been reached. This is a good installation.

10. If the amplitude remains below 20 mV as shown in Figure 5-4, loosen the nuts and realign sensor, starting again from step Step 6.

Note
If the amplitude of one peak is less than 15 percent the amplitude of another peak, it will not be identified by the software.

Figure 5-2: Rosemount W210 Installation Tab
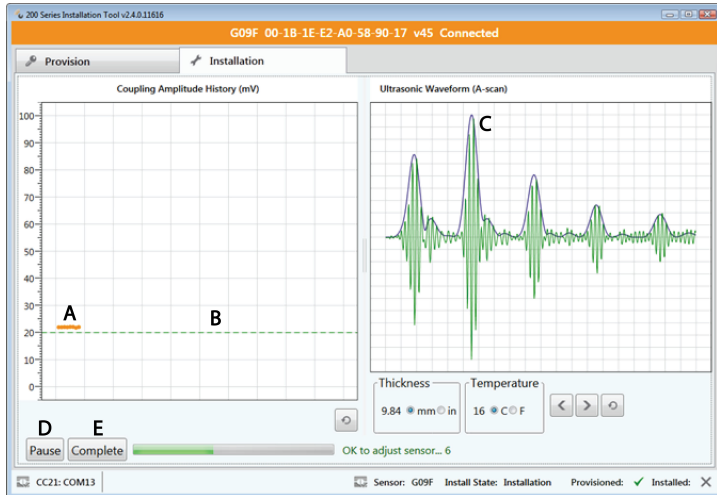
A. *Ultrasonic signal strength varying with time. Updated every one second.*

B. *Minimum installation amplitude. At the end of installation, the graph must be ABOVE this line.*

C. *Plot of ultrasonic waveform (green) and the "envelope" of the signal (blue). Updated every 10 seconds. Click to pause the install; re-click to continue.*

D. *Click to pause the sensor installation.*

E. *Click to complete the sensor installation. It will then try to join its network.*

Figure 5-3: Good Quality Waveform
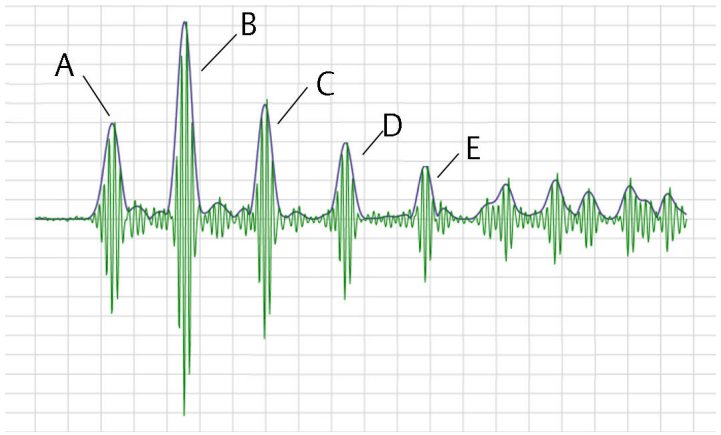
A. Surface wave
B. 1st
C. 2nd
D. 3rd
E. 4th

Figure 5-4: Bad Quality Waveform
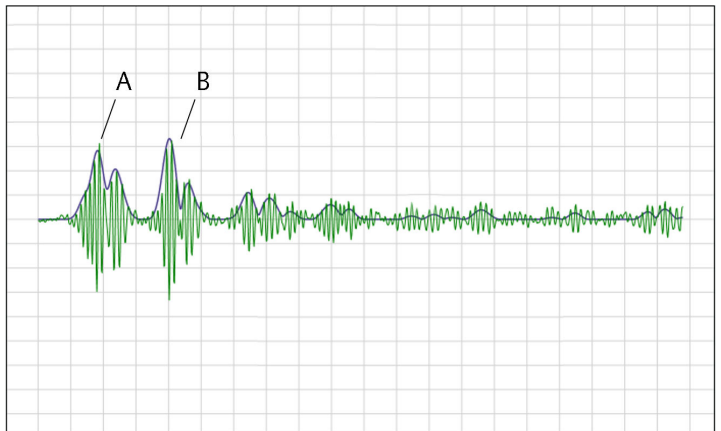
A. Distorted surface wave
B. Low amplitude

5.1   Complete the sensor installation

Procedure

1. When all of the above criteria are satisfactorily met, press the *Complete* button.

2. Ensure all required sensor information is accurately logged (e.g. sensor ID and location).

3. Remove the CC21 and fit the power module.

   Note
   When the power module is fitted, the sensor will restart and try to join the *Wireless*HART® gateway. In a large network of 100 sensors, this can often take two hours and sometimes up to six hours.

6   Additional hardware

6.1   Lanyard installation

Procedure

1. Wrap the lanyard around the circumference of the pipe. The 6.6 ft. (2 m) length of lanyard will accommodate a maximum diameter of 20-in. (51 cm). When it is not possible to wrap the lanyard around a pipe, find an alternative attachment point for the lanyard.

Figure 6-1: Lanyard Installation to Pipe/Fixed Attachment Point
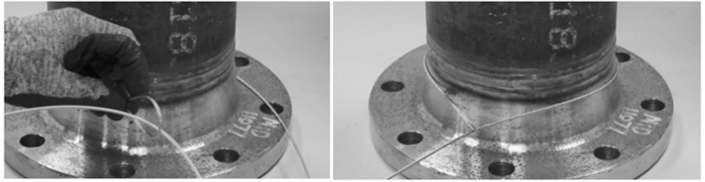
2. Thread the bare end of the lanyard through the lanyard loop to secure it to the pipe as shown in Figure 6-1.

Figure 6-2: Gripple Installation
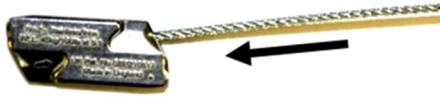
3. Feed the bare end of the lanyard into the gripple as shown in Figure 6-3 and push the gripple 18-in. (45 cm) in from the bare end.

Figure 6-3: Lanyard Installation
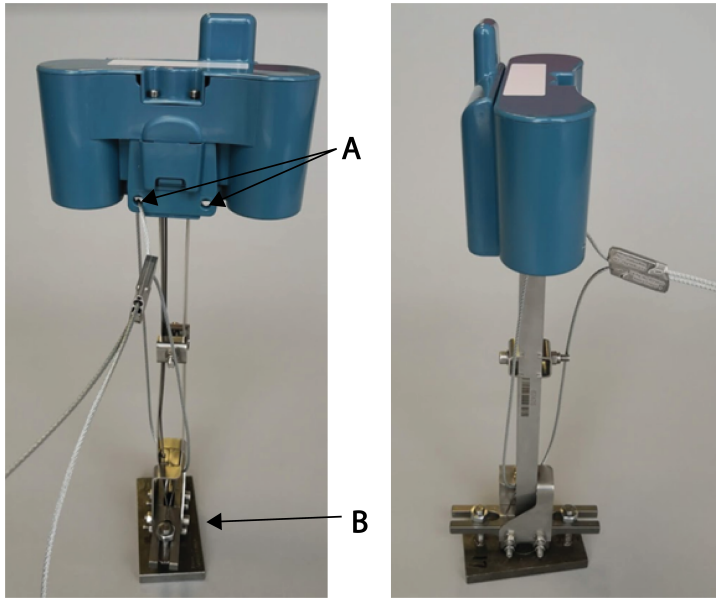
A. Lanyard hole in sensor housing
B. Stabilizer

4. Feed the bare end of the lanyard through either lanyard hole in the sensor housing, then through the stabilizer (between the waveguides) as shown in Figure 6-1

5. Feed the bare end of the lanyard into the return hole of the gripple. Adjust the gripple to minimize the slack in the lanyard cable between the attachment point and the sensor.

Figure 6-4: Gripple Installation Complete
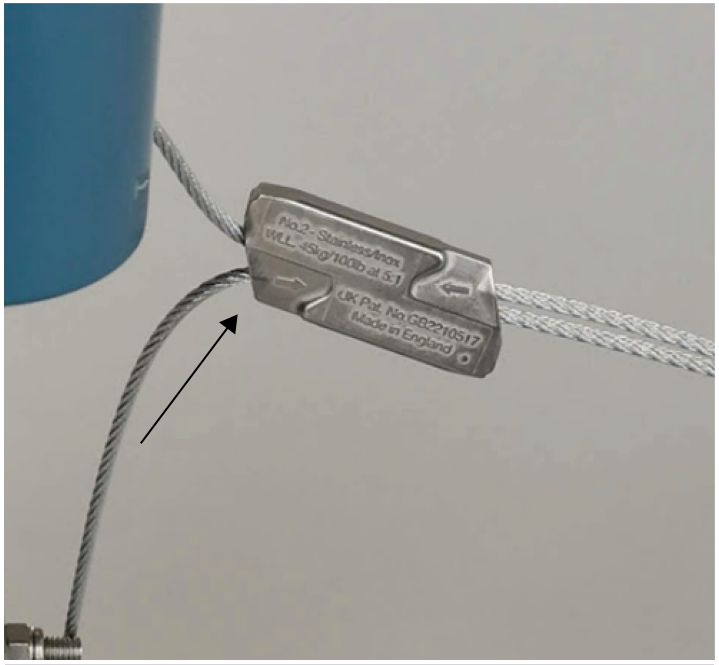
Note
The wire can be released from the gripple using the release key.

Figure 6-5: Wire Release

A.   Release key

7 Product certifications

Rev 0.1

7.1 European Directive information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/Rosemount.

7.2 Telecommunications compliance

All wireless devices require certification to ensure they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification.

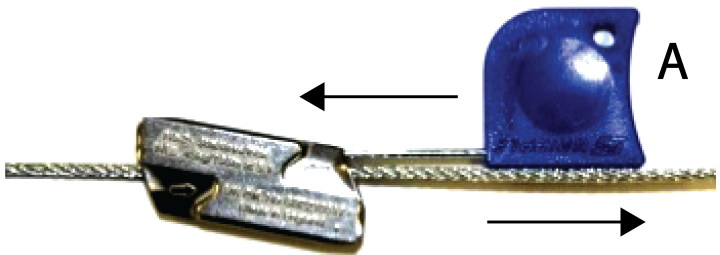Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

7.3 FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference; this device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

7.4 Ordinary location certification

As standard, the device has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

7.5 North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

7.6 USA

7.6.1 I5 U.S.A. Intrinsically Safe (IS)

Certificate: SGSNA/17/SUW/00281

Standards: UL 913 - 8th Edition, Revision Dec 6 2013

Markings: CLASS I, DIV 1, GP ABCD, T4, T_{amb} = -50 °C to +75 °C, IP67

7.7   Canada

7.7.1   I6 Canada Intrinsically Safe (IS)

Certificate: SGSNA/17/SUW/00281

Standards: CAN/CSA C22.2 No. 157-92 (R2012) +UPD1 +UPD2

Markings: CLASS I, DIV 1, GP ABCD, T4, T_{amb} = -50 °C to +75 °C, IP67

7.8   Europe

7.8.1   I1 ATEX Intrinsically Safe (IS)

Certificate: Baseefa 14ATEX0053X

Standards: EN IEC 60079-0:2018
EN 60079-11: 2012

Markings: ⓔII 1 G, Ex ia IIC T4 Ga, T_{amb} = -50 ºC to +75 ºC, IP67

Specific Conditons For Safe Use (X):

1. The optional silicone rubber boot may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

2. The polymer enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

7.9   International

7.9.1   I7 IECEx Intrinsically Safe (IS)

Certificate: BAS 14.0022X

Standards: IEC 60079-0:2017 Edition 7.0, IEC 60079-11: 2011 Edition 6.0

Markings: Ex ia IIC T4 Ga, T_{amb} = -50 ºC to +75 ºC, IP67

Specific Conditons For Safe Use (X):

1. The optional silicone rubber boot may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

2. The polymer enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

7.10   Brazil

7.10.1   I2 INMETRO Intrinsic Safety

Certificate:	UL-BR 19.0657X
Standards:	ABNT NBR IEC 60079-0:2016
	ABNT NBR IEC 60079-11:2013
Markings:	Ex ia IIC T4 Ga -50 °C ≤ T_a ≤ +75 °C

Specific Condition for Safe Use (X):

See certificate for specific conditions of safe use.

7.11   China

7.11.1   I3 China (NEPSI) Instrinsic Safety

Certificate:	GYJ17.1296X
Standards:	GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings:	Ex ia IIC T4 Ga

Specific Condition For Safe Use (X):

See certificate for specific conditions of safe use.

7.12   EAC - Kazakhstan and Russia

7.12.1   IM EAC Intrinsic Safety

Certificate:	C-GB.MЮ62.B.05219
Standards:	TP TC 012/2011
Markings:	0Ex ia IIC T4 Ga X

Specific Condition For Safe Use (X):

See certificate for specific conditions of safe use.

7.13   India

7.13.1   India (PESO) Intrinsic Safety

Certificate:	A/P/HQ/MH/104/6454 (P474306)
Markings:	Ex ia IIC T4 Ga

Specific Conditions For Safe Use (X):

See certificate for specific conditions of safe use.

7.14   Japan

7.14.1 I4 CML Intrinsically Safe (IS)

Certificate:	CML 17JPN2097X
Standards:	JNIOSH-TR-46-1:2015
	JNIOSH-TR-46-6:2015
Markings:	Ex ia IIC T4 Ga (-50 °C ≤ T_a ≤ +75 °C)

Specific Conditions for Safe Use (X):

1. The optional silicone rubber boot may present a potential electrostatic charging ignition hazard and must not be rubbed or cleaned with a dry cloth.

2. Enclosures may present a potential electrostatic charging ignition hazard and must not be rubbed or cleaned with a dry cloth.

7.15   Korea

7.15.1 IP Korea (KCS) Intrinsic Safety

Certificate:	17-KA4BO-0662X (when supplied from UK)
	20-KA4BO-0504X (when supplied from Singapore)
Markings:	Ex ia IIC T4

Specific Condition For Safe Use (X):

See certificate for specific conditions of safe use.

7.16   Declaration of Conformity

Figure 7-1: Declaration of Conformity

EU Declaration of Conformity

We,

Permasense Ltd
Alexandra House
Newton Road
Manor Royal
Crawley
RH10 9TT
UK

declare under our sole responsibility that the product,

WT210 wireless corrosion transmitter

is in conformity with the relevant Union harmonisation legislation:

Electromagnetic compatibility directive (EMC) 2014/30/EU
Radio equipment directive (RED) 2014/53/EU
Equipment for explosive atmospheres directive (ATEX) 2014/34/EU

The following harmonised standards and reference standards have been applied:

EMC: EN 61326-1: 2013 including radiated emissions to EN 55022 Class B

RED: EN 300 328 v2.1.1
          EN 301 489-1 v1.9.2: 2011 in accordance with EN 301 489-17 v2.2.1:2012
              with reference to:
                  EN 61000-4-2: 2009
                  EN 61000-4-3: 2006 + A2: 2010
                  EN 61000-4-8: 1993 + A1: 2001
          EN 61010-1:2010

ATEX: EN IEC 60079-0: 2018
          EN 60079-11: 2012

ATEX notified body:
          SGS Fimko Oy (Notified Body number 0598) performed an EU-type examination
          and issued certificate number Baseefa14ATEX0053X
          with coding ⓔ II 1 G, Ex ia IIC T4 Ga

ATEX notified body for quality assurance:
          SGS Fimko Oy (Notified Body number 0598)

Signed for and on behalf of Permasense Ltd.

Dr Jonathan Allin – Chief Technical Officer
Crawley, UK – 11 November 2020

7.17   China RoHS

中国 RoHS 2 - 中国《电器电子产品有害物质限制使用管理办法》，2016 年第 32 号令

China RoHS 2 - Chinese order No. 32, 2016; administrative measures for the restriction of hazardous substances in electrical and electronic equipment

作为总部位于美国密苏里州圣路易斯市艾默生电气公司的一个战略性业务单位及艾默生过程管理的一部分（以下简称"艾默生"），永威™意识到 2016 年 7 月 1 日生效的中国第 32 号令，即《电器电子产品有害物质限制使用管理办法》（"中国 RoHS 2"），并已设立符合规体系以履行艾默生在第 32 号令项下的相关义务。

Permasense, a strategic business unit of Emerson Electric Co, St. Louis, Missouri and part of Emerson Process Management ("Emerson"), is aware of and has a program to meet its relevant obligations of the Chinese Order No. 32, 2016; Administrative Measures for the Restriction of Hazardous Substances in Electrical and Electronic Equipment (China RoHS 2), which entered into force on 1 July 2016.

艾默生理解中国 RoHS 2 实施的第一阶段须遵守的与产品标识和信息披露等相关的各项要求。作为一个电器电子设备供应商，艾默生确定供应给贵公司的前述型号产品属于中国 RoHS 2 的管理范围。

Emerson understands there are numerous requirements with the regulation regarding, among others, marking of product and communications for purpose of the Phase I implementation of China RoHS 2. As a supplier of electrical and electronic equipment, Emerson has determined that the captioned product supplied to your company is within scope of China RoHS 2.

迄今为止，基于供应商所提供的信息，就艾默生所知，下面表格中列明的部件里存在超过最大浓度限值的中国 RoHS 管控物质，且该产品上已做相应标识。

To date, based on information provided by suppliers and to Emerson's best knowledge, the following China RoHS substances are present at a concentration above the Maximum Concentration Values ("MCVs"), have been identified in the following parts, and the product is marked to reflect this.

含有 China RoHS 管控物质超过最大浓度限值的部件型号列
List of Model Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)
传感器组件 Sensor assembly	X	O	O	O	O	O

本表格系依据 SJ/T11364 的规定而制作。

This table is proposed in accordance with the provision of SJ/T11364

O: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求。

O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求。

X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

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