Quick Start Guide
MS-00825-0100-4224, Rev AA
September 2022

Rosemount Wireless Permasense ET310C Corrosion Transmitter™

ROSEMOUNT™

EMERSON

SafetyMessages

Failure to follow these installation guidelines could result in death or serious injury. Only qualified personnel should perform the installation.

⚠ WARNING

Explosion hazard that 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.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a CC21 to a sensor, ensure the correct low voltage permits have been obtained.

Heart failure hazard

The sensor contains magnets which can be harmful to pacemaker wearers.

Electrostatic hazard that can result in death or serious injury

The power module may be replaced in a hazardous area. The power module has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

The polymer enclosure has surface resistivity greater than one gigaohm. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

NOTICE

Shipping considerations for wireless products.

The unit was shipped to you without the power module installed. Remove the power module prior to any re-shipping.

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

Physical access

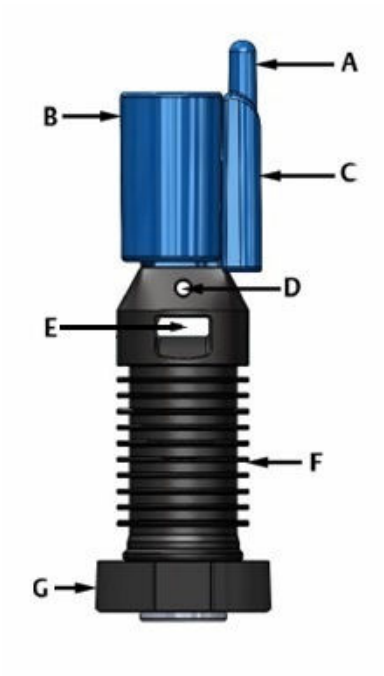
Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users’ equipment. This could be intentional or unintentional and needs to be protected against.

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

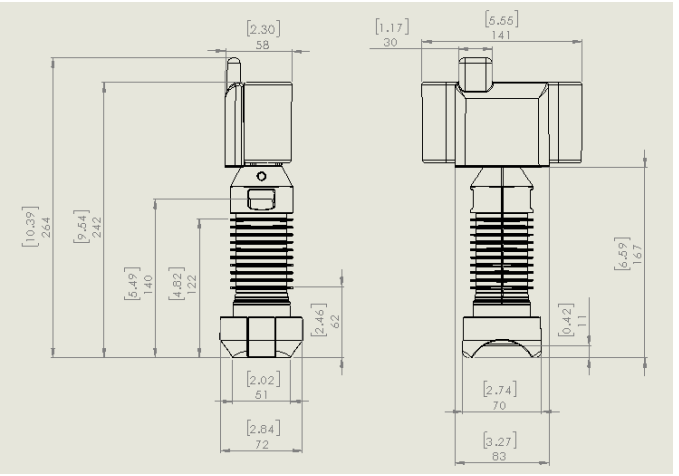
1 Product overview

Figure 1-1: E310C Sensor



A. Antenna
B. Power Module
C. Head
D. Lanyard Hole
E. Strap Slot
F. Foot
G. Shoe

Figure 1-2: Dimension Drawing



Dimensions are in inches (mm).

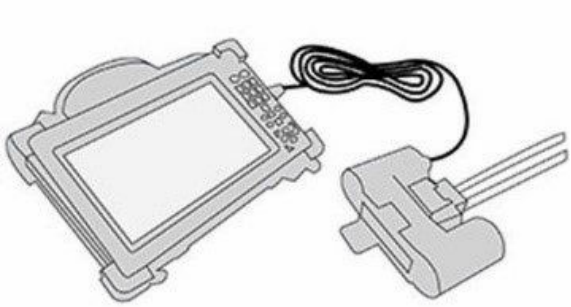
1.1 What's in the box?

- Permasense ET310C Sensor (with protective cap)
- Lanyard kit 6.6 ft (2 m) 316 stainless steel lanyard with looped end and cable lock
- 3.3 ft (1 m) strap for pipes up to 8 in diameter
- BP20E power module
- A silicone rubber shoe for installations on pipes size NPS 2 or 3
- A silicone rubber shoe for installations on pipes size 4 in to 8 in

1.2 Required equipment

In order to install a sensor, you need the following equipment from an IK220 installation kit:

- Tablet PC with installation application software
- CC21 interface



⚠ CAUTION

The tablet PC is not intrinsically safe

A site specific permit may be required for its use.

1.3 Required tooling

Tooling is supplied in the IK220 installation kit.

- Strap tightening tool – HCL SM-FT-2000
- 2.5 mm hex key (for power module retaining bolts)

2 Wireless considerations

Power up sequence

The Emerson Wireless Gateway should be installed and functioning properly before commissioning the Rosemount ET310C and powering it with a BP20E power module.

Note
Wireless devices should be powered up in order of proximity from the Gateway, beginning with the closest device, then working outward from the Gateway. This results in a simpler and faster network formation. Enable Active Advertising on the Gateway to ensure new devices are able to join the network faster. For more information, see the Emerson Wireless 1410S Gateway.

3 Physical installation

The sensor is mounted onto the pipe in the location of desired measurement.

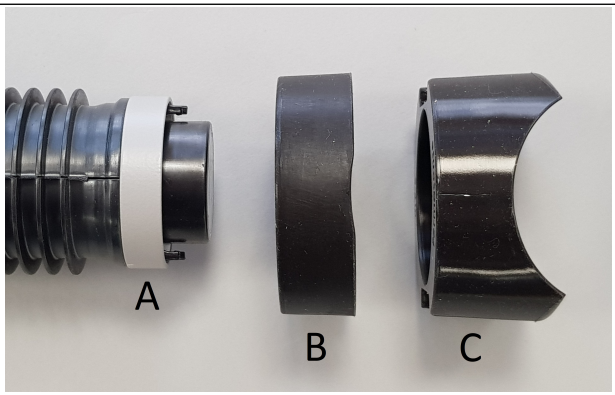
3.1 Preparation

Procedure

1. Identify the location where the sensor is to be installed.
2. Ensure all cladding and insulation is removed around the circumference of the pipe at the sensor location.

Note
Cladding or insulation can be replaced after the sensor installation is completed, provided that the head of the sensor remains outside of the insulation. Insulation materials can be installed around the sensor as desired and according to local procedures.

3. Clean the area where the sensor will touch the pipe to remove any particles that might keep the transducer away from the pipe surface or damage the face of the transducer. A permanent marker may be used to show exactly where each sensor is to be placed on the pipe.
4. A key pipe diameter consideration is determining the required shoe.



A. Ring
B. Standard (4-to 8-in) Shoe
C. Alternative (2-to 3-in) Shoe

For installation on pipes with diameter 4-to 8-in, shoe B should be selected.

For installation on pipes with a diameter less than 4 inches (e.g. NPS 2 or NPS 3 pipes) then shoe C should be selected.

3.2 Mounting the sensor

Procedure

1. Remove the strap from the packaging.

2. Remove the protective cap from the sensor.

⚠ CAUTION

Once the protective cap is removed, the strong magnetic field at the end of the sensor can suddenly attract other objects, such as tools.

Figure 3-1: Sensor with Protective Cap

⚠ CAUTION

This can cause injury as well as damage to the sensor.

Only remove the protective cap when necessary and then take great care. Ensure tools and fastenings are kept away from the sensor when the cap is removed.

3. If the rubber shoe needs to be refitted, ensure the ring is still in place, then fit the shoe onto the sensor by pushing the two pegs protruding from the foot of the sensor into the holes in the shoe.

   If the ring is missing, do not use the sensor.

4. Carefully place the sensor in the required location on the pipe.

NOTICE

The magnets used in the sensors have a high pull force. To avoid damage, and to get the precise location for each sensor, initially place the sensor at an angle to the pipe and then gently lower the shoe onto the pipe.

Tip
One person should hold the sensor until the strap is installed.

5. Slide the strap through the sensor, pass the strap through the buckle as in Figure 3-2. Where possible, position the buckle opposite the middle sensor to ensure both sides of the strap are tightened evenly.

Figure 3-2: Loose Strap on the Sensor

6. Tighten the strap by hand to gently hold the sensor in place. If necessary, adjust the position of the sensor to ensure correct alignment around the circumference of the pipe.
7. If there is an excessive length of spare strap, the excess may be cut off by using the cutter on the strap tightening tool.

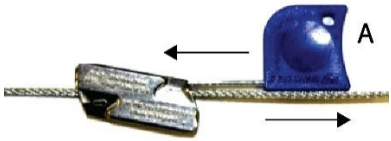
Figure 3-3: Cutting away excess strap

8. Prepare the lanyard kit and decide how it will be positioned.

   Wrap the lanyard around the circumference of the pipe. The 7 ft (2 m) length will accommodate a maximum diameter of 24 in (610 mm). When it is not possible to wrap the lanyard around a pipe, find an alternative attachment point for the lanyard.
9. Thread the bare end of the wire through the loop in the lanyard to secure it to the pipe.

10. Feed the bare end of the lanyard into the gripple and push the gripple 6 in (15 cm) up from the bare end.

Need help?
The lanyard wire can be released from the cable lock using the release key.



A. Release key

11. Feed the bare end through the lanyard hole in each sensor and then into the return hole of the gripple.
12. To complete sensor installation, first complete the commissioning task and then go to Completing sensor installation.

4 Commissioning the sensor

Commissioning allows the sensor to securely join a designated network and communicate with a gateway. The IK220 installation kit comes with a commissioning interface (CC21) and a tablet PC with the Permasense installation application installed. The CC21 provides an electronic interface between the ET310C sensor and the tablet PC during commissioning.

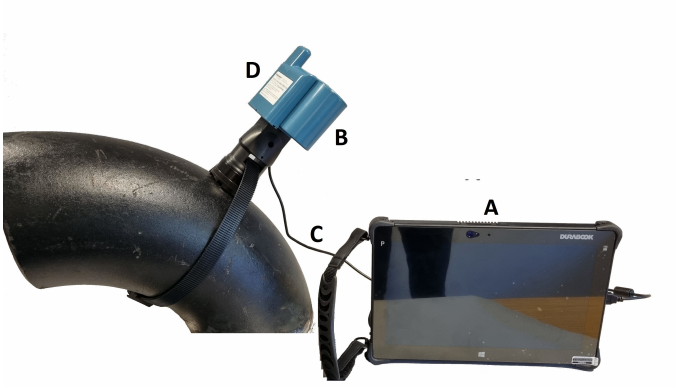
The CC21 commissioning cable is connected and removed from the transmitter in the same way as BP20E power module. The CC21 USB connector is plugged in to the tablet PC (see).

Note
All the sensors connected to the network and Gateway must have the same network ID and Join Key.

Procedure

1. Power up the rugged tablet PC and connect the CC21 commissioning interface to the tablet PC USB port.

Figure 4-1: Commissioning Kit



A. Tablet PC
B. CC21 interface
C. USB cable
D. Rosemount Wireless Permasense Sensor

2. Double-click the Permasense installation application desktop icon. Within approximately 10 seconds, the Permasense installation tool software should open.
3. Attach the CC21 to the sensor.
4. In the installation application software:

a) Verify that the sensor ID is displayed at the top of the screen within 10 seconds.

b) Select the **Provision** tab.

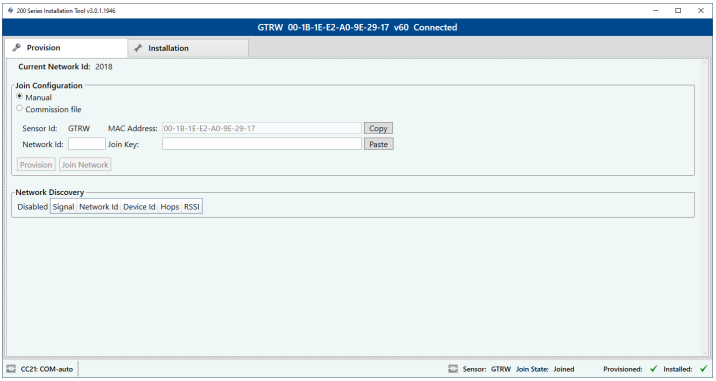
c) Enter the 5-digit network ID and the 32-hexadecimal (numbers 0-9 and letters A -F) join key.

d) Click the **Provision** button.
The system provides confirmation once provisioning is complete.

e) Ensure the network ID of the gateway is visible in the Network Discovery panel.

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

Figure 4-2: Install Tool



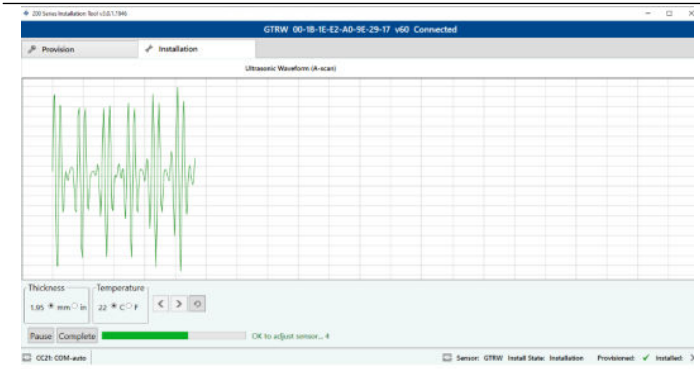
4.1 Completing sensor installation

Complete the following steps in the installation application software on the installation tab.

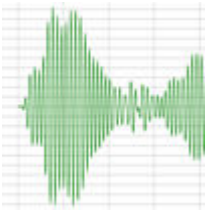
Procedure

1. Press the **Start** button and wait for an ultrasonic waveform to download from the sensor.

   Waveforms are automatically downloaded every 10 seconds. When a new waveform arrives, the lines briefly become thicker.



Note
The waveform for ET310C will not fill the entire screen due to the measurable thickness capability.

Good waveform	Bad waveform
	

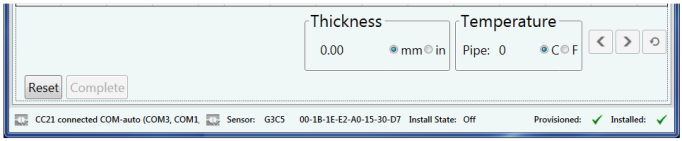
2. Check the quality of the waveform. The first one or two reflections must be well defined above the noise in the signal. Only one reflection is needed to calculate a thickness.

   If the signal is poor, move the sensor to a slightly different position.
3. Verify that the measured thickness displayed is in line with expectations.
4. Tighten the strap using the tensioning tool provided so that the rubber shoe is compressed slightly and the sensor is held in place securely.

   Note
   Overtightening the strap will deform the shoe and could damage the sensor.
5. Wait for a new waveform to display and check the ultrasonic waveform quality is still good after tightening the strap
6. Cut off any unnecessary strap.

7. Press the **Complete** button. Verify that the Install State is Off and Installed is ticked in the footer on the right side of the application.

Figure 4-3: Installation Tool Screen: Fully Provisioned



8. Remove the CC21 and fit the power module, tightening the two power module retaining bolts.
   When the power module is fitted, the sensor restarts and tries to join the *Wireless*HART® gateway. In a large network of 100 sensors, this join can often take 2 hours, and sometimes up to 6 hours.
9. Sensor installation is complete.

5 Maintenance

5.1 Service and maintenance

The sensor is a sealed unit with no user-serviceable parts.

Reference the Rosemount BP20E Power Module for Wireless Corrosion Transmitter Quick Start Guide if the power module requires changing.

6 Product certification

Rev 0.1

6.1 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.

6.2 Telecommunication compliance

All wireless devices require certification to ensure that 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.

6.3 FCC and ISED

FCC notice

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.

ISED notice

"This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme à la norme RSS-247 Industrie Canada exempt de licence. Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences et

2. Cet appareil doit accepter toute interférence, y compris les interférences pouvant causer un mauvais fonctionnement du dispositif.

6.4 Ordinary location certification

As standard, the transmitter 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).

6.5 Installing equipment in 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.

6.6 Dangerous goods regulation

The magnets in the sensor and magnetic fixture are shielded for transportation and meet the IATA Dangerous Goods Regulations for magnetic fields. The sensors are safe for air transportation.

6.7 USA

6.7.1 I5 USA Intrinsic Safety (IS)

Certificate: SGSNA/17/SUW/00281

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

Markings: CLASS I, DIV 1, GP ABCD, T4...T2, Tamb = –50 °C to +75 °C, IP67

6.8 Canada

6.8.1 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...T2, Tamb = –50 °C to +75 °C, IP67

6.9 Europe

6.9.1 I1 ATEX Intrinsic Safety

Certificate: Baseefa17ATEX062X

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

Markings: Ⓔx II 1 G, Ex ia IIC T4...T2 Ga, Tamb = –50 °C to +75 °C, IP67

Special Condition for Safe Use (X):

1. The plastic mounting foot may present a potential electrostatic ignition risk and must not the rubbed or cleaned with a dry cloth.
2. The equipment may be attached to process pipework at a temperature of up to 200 °C as follows:
   a. –50 °C ≤ Ta ≤ +120 °C for T4
   b. –50 °C ≤ Ta ≤ +190 °C for T3
   c. –50 °C ≤ Ta ≤ +200 °C for T2
3. The enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

6.10 International

6.10.1 I7 IECEx Intrinsic Safety (IS)

Certificate: IECEx BAS 17.0047X

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

Markings: Ex ia IIC T4...T2 Ga, T_{amb} = –50 °C to +75 °C, IP67

Special Condition for Safe Use (X):

1. The plastic mounting foot may present a potential electrostatic ignition risk and must not the rubbed or cleaned with a dry cloth.
2. The equipment may be attached to process pipework at a temperature of up to 200 °C as follows:
   a. –50 °C ≤ Ta ≤ +120 °C for T4
   b. –50 °C ≤ Ta ≤ +190 °C for T3
   c. –50 °C ≤ Ta ≤ +200 °C for T2
3. The enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

6.11 China

6.11.1 I4 China NEPSI Intrinsic Safety

Certificate: GYJ18.1090X

Standards: GB3836.1-2010, GB3836.4-2010,GB3836.20-2010

Markings: Ex ia IIC T4...T2 Ga

Special Condition for Safe Use (X):

See certificate for specific conditions of safe use.

6.12 EAC – Belarus, Kazakhstan, Russia

6.12.1 IM (EAC) Intrinsic Safety

Certificate: RU C-GB.AЖ58.B.01828/21

Standards: TP TC 0 12/2011

Markings: 0Ex ia IIC T4..T2 Ga X

Special Condition for Safe Use (X):

See certificate for specific conditions of safe use.

6.13 Brazil

6.13.1 I2 INMETRO Intrinsic Safety (IS)

Certificate UL-BR 21.1297X

Standards ABNT NBR IEC 60079-0:2020
ABNT NBR IEC 60079-11:2013

Markings Ex ia IIC T4...T2 Ga (-50 °C ≤ Tamb ≤ +75 °C)

Special Conditions for Safe Use(X)

See certificate for special conditions of safe use.

6.14 EU Declaration of Conformity

Figure 6-1: 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,

ET310C WiHART wireless mesh, corrosion monitoring sensor

is in conformity with the relevant Union harmonisation legislation:

Radio equipment directive (RED) 2014/53/EU
Electromagnetic compatibility directive (EMC) 2014/30/EU
Low Voltage Directive (LVD) 2014/35/EU
Equipment for explosive atmospheres directive (ATEX) 2014/34/EU

The following harmonised standards and reference standards have been applied:

RED: EN 300 328 v2.2.2

EMC: EN 61326-1:2013
EN 301 489-1 v2.2.3
EN 301 489-17 v3.2.4

LVD: EN 61010-1:2010
EN 62479:2010

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 Baseefa17ATEX0062X
with coding ⟨Ex⟩ II 1 G, Ex ia IIC T4…T2 Ga

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

Authorized Representative in Europe and Northern Ireland:
Emerson S.R.L., Company No. J12/88/2006, Emerson 4 Street, Parcul Industrial Tetarom II, Cluj-Napoca 400638, Romania
Regulatory Compliance Shared Services Department
Email: europeproductcompliance@emerson.com
Phone: +40 374 132 000

Signed for and on behalf of Permasense Ltd.

Dr Jonathan Allin – Chief Technical Officer
Crawley, UK – 26 September 2022

6.15 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™意识到于 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.*

Quick Start Guide
MS-00825-0100-4224, Rev. AA
September 2022

For more information: **Emerson.com**

ROSEMOUNT™

EMERSON™