

Rosemount™ 248 Temperature Transmitter



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1 About this guide

This guide provides basic guidelines to install the Rosemount 248 Head Mount Temperature Transmitter. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installations. Refer to the Rosemount 248 Temperature Transmitter [Reference Manual](#) for more instruction. The manual and this guide are also available electronically at Emerson.com/Rosemount.

1.1 Safety messages

▲ WARNING

Explosions

Explosions could result in death or serious injury.

Installation of device in an explosive environment must be in accordance with appropriate local, national, and international standards, codes, and practices.

Review the Hazardous Locations Certifications for any restrictions associated with a safe installation.

Process leaks

Process leaks could result in death or serious injury.

Install and tighten thermowells and sensors before applying pressure.

Do not remove the thermowell while in operation.

Electrical shock

Electrical shock could cause death or serious injury.

Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Unless marked, the conduit/cable entries in the housing use a ½–14 NPT thread form. Entries marked “M20” are M20 × 1.5 thread form. On devices with multiple conduit entries, all entries will have the same thread form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

When installing in a hazardous location, use only appropriately listed or Ex certified plugs, glands, or adapters in cable/conduit entries.

⚠ 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.

2 Configuration

2.1 Bench calibration

There are three ways to configure the transmitter:

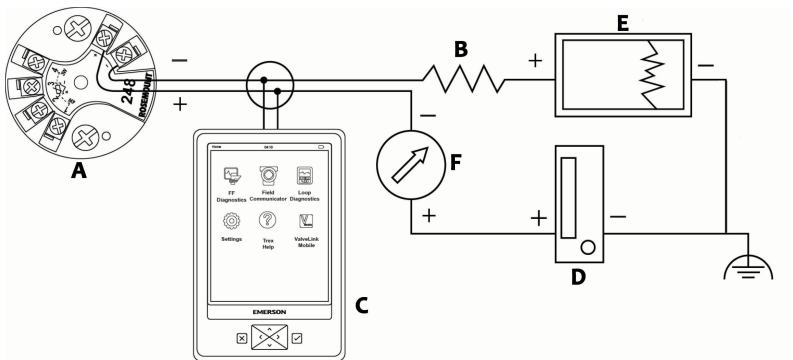
- Field Communicator
- Rosemount 248 PC Programming Kit
- Custom at the factory using the C1 option code

Refer to the Rosemount 248 [Reference Manual](#) and the Field Communicator [User Guide](#) for more information.

Connecting a field communicator

The Field Communicator Field Device Revision Dev v1, DD v1 or later is required for complete functionality.

Figure 2-1: Connecting a Field Communicator to a Bench Loop



- A. Rosemount 248 Transmitter
- B. $250 \Omega \leq RL \leq \Omega 1100$
- C. Field Communicator
- D. Power supply
- E. Recorder (optional)
- F. Ammeter (optional)

Note

Do not operate when power is below 12 Vdc at the transmitter terminal.

2.2 Verify transmitter configuration

To verify operation using a Field Communicator, refer to the Rosemount 248 [Reference Manual](#) for more detailed description.

2.3 Install PC programmer kit (HART® 5 only)

Procedure

1. Install all necessary software for PC configuration:
 - a) Install the Rosemount 248C software
 1. Place the CD-Rom in the drive.
 2. Run **setup.exe** from Windows™ 7, 8, 10, or XP.
 - b) Install the MACTek® HART modem drivers completely before beginning bench configuration with the Rosemount 248 PC Programming system.

Note

For USB modem: Upon first use, configure appropriate COM ports within the Rosemount 248 PC software by selecting **Port Settings** from the *Communicate* menu. The USB modem driver emulates a COM port and will add to available port selections in the software's drop-down box. Otherwise software defaults to first available COM port, which may not be correct.

2. Set up configuration system hardware:
 - a) Hook up the transmitter and load resistor (250-1100 ohms) wired in series with the power supply. The device will need an external power supply of 12-42.4 Vdc for configuration.
 - b) Attach the HART modem in parallel with the load resistor and connect it to the PC.

2.3.1 Spares kit and re-order numbers

Table 2-1: Programming Kit Spare Part Numbers

Product description	Part number
Programming software (CD)	00248-1603-0002
Rosemount 248 Programmer Kit - USB	00248-1603-0003
Rosemount 248 Programmer Kit - Serial	00248-1603-0004

For more information, refer to the Rosemount 248 [Reference Manual](#).

3 Mount the transmitter

3.1 Overview

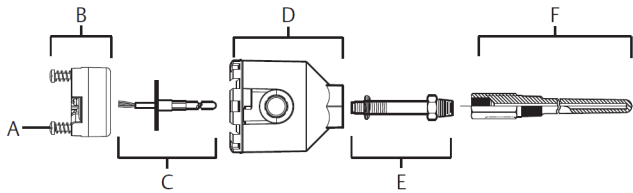
Mount the transmitter at a high point in the conduit run to prevent moisture from draining into the transmitter housing.

3.2 Typical European and Asia Pacific installation

Head mount transmitter with DIN plate style sensor

Procedure

1. Attach the thermowell to the pipe or process container wall. Install and tighten thermowells before applying process pressure.
2. Assemble the transmitter to the sensor.
 - a) Push the transmitter mounting screws through the sensor mounting plate.
3. Wire the sensor to the transmitter.
4. Insert the transmitter sensor assembly into the connection head.
 - a) Thread the transmitter mounting screw into the connection head mounting holes.
 - b) Assemble the extension to the connection head.
 - c) Insert the assembly into the thermowell.
5. Slip the shielded cable through the cable gland.
6. Attach a cable gland into the shielded cable.
7. Insert the shielded cable leads into the connection head through the cable entry. Connect and tighten the cable gland.
8. Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections.
9. Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

Figure 3-1: Typical European and Asia Pacific Installation

- A. Transmitter mounting screws
- B. Rosemount 248 Transmitter
- C. Integral mount sensor with flying leads
- D. Connection head
- E. Extension
- F. Thermowell

3.3 Typical North and South American installation

Head mount transmitter with threaded sensor

Procedure

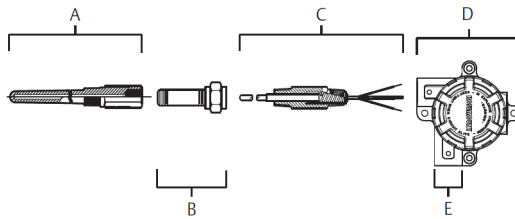
1. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying the process pressure.
2. Attach necessary extension nipples and adapters to the thermowell.
3. Seal the nipple and adapter threads with silicone tape.
4. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
5. Pull the sensor wiring leads through the universal head and transmitter.
6. Mount the transmitter in the universal head by threading the transmitter mounting screws into the universal head mounting holes.
7. Mount the transmitter sensor assembly into the thermowell. Seal adapter threads with silicone tape.
8. Install conduit for field wiring to the conduit entry of the universal head. Seal conduit threads with silicone tape.
9. Pull the field wiring leads through the conduit into the universal head.

10. Attach the sensor and power leads to the transmitter. Avoid contact with other terminals.
11. Install and tighten the universal head cover.

Note

Enclosure covers must be fully engaged to meet explosion-proof requirements.

Figure 3-2: Typical North and South American Installation

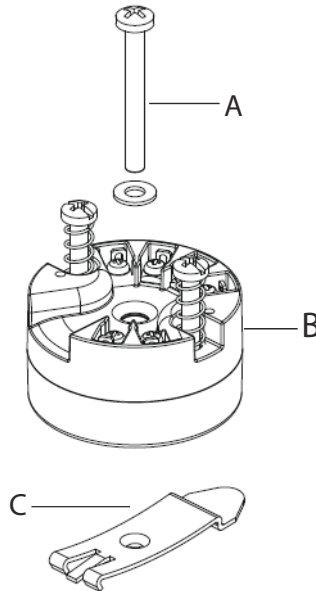


- A. Threaded thermowell
 - B. Standard extension
 - C. Threaded style sensor
 - D. Universal head
 - E. Conduit entry
-

3.4 Mounting to a DIN rail

Procedure

- To attach a head mount transmitter to a DIN rail, assemble the appropriate rail mounting kit (Part number 00248-1601-0001).

Figure 3-3: Assembling Rail Clip Hardware

- A. Mounting hardware*
B. Transmitter
C. Rail clip
-

3.4.1 Rail mount transmitter with remote mount sensor

The least complicated assembly uses:

- a remote mounted transmitter
- an integral mount sensor with terminal block
- an integral style connection head
- a standard extension
- a threaded thermowell

Refer to the Metric Sensor [Product Data Sheet](#) for complete sensor and mounting accessory information.

3.4.2 Rail mount transmitter with threaded sensor

The least complicated assembly uses:

- a threaded sensor with flying heads

- a threaded sensor connection head
- a union and nipple extension assembly
- a threaded thermowell

Refer to Rosemount Metric Sensor [Product Data Sheet](#) for complete sensor and mounting accessory information.

4 Connect the wiring

4.1 Diagrams and power

- Wiring diagrams are located on the top label of the transmitter.
- An external power supply is required to operate the transmitter.
- The power required across the transmitter power terminals is 12 to 42.4 Vdc (the power terminals are rated to 42.4 Vdc).

Note

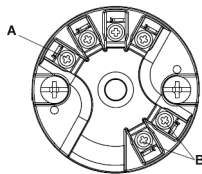
To prevent damaging the transmitter, do not allow terminal voltage to drop below 12.0 Vdc when changing the configuration parameters.

4.1.1 Power the transmitter

Procedure

1. Connect the positive power lead to the “+” terminal.
2. Connect the negative power lead to the “-” terminal.
3. Tighten the terminal screws.
4. Apply power (12–42 Vdc).

Figure 4-1: Power, Communication, and Sensor Terminals



A. *Sensor terminals*

B. *Power/communication terminals*

4.1.2 Ground the transmitter

Ungrounded thermocouple, mV, and RTD/Ohm inputs

Each process installation has different requirements for grounding. Use the grounding options recommended by the facility for the specific sensor type, or begin with grounding Option 1 (the most common).

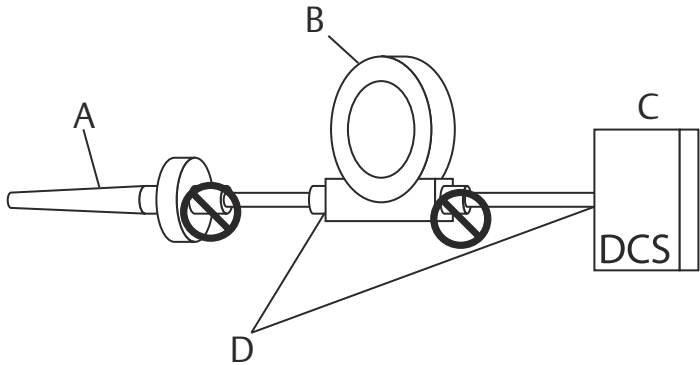
4.1.3 Ground the transmitter: Option 1

Use this method for grounded housing.

Procedure

1. Connect sensor wiring shield to the transmitter housing.
2. Ensure the sensor shield is electrically isolated from surrounding fixtures that may be grounded.
3. Ground signal wiring shield at the power supply end.

Figure 4-2: Option 1: Grounded Housing



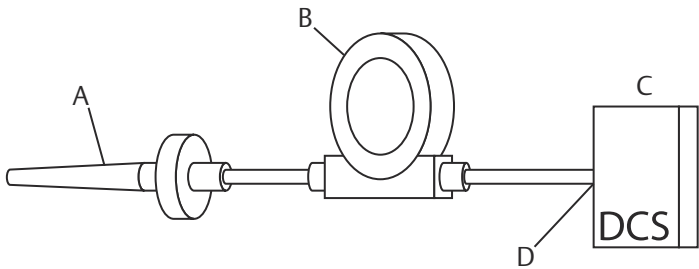
- A. Sensor wires
- B. Transmitters
- C. DCS host system
- D. Shield ground point

4.1.4 Ground the transmitter: Option 2

Use this method for grounded housing.

Procedure

1. Connect signal wiring shield to the sensor wiring shield.
2. Ensure the two shields are tied together and electrically isolated from the transmitter housing.
3. Ground shield at the power supply end only.
4. Ensure the sensor shield is electrically isolated from the surrounding grounded fixtures.

Figure 4-3: Option 2: Grounded Housing

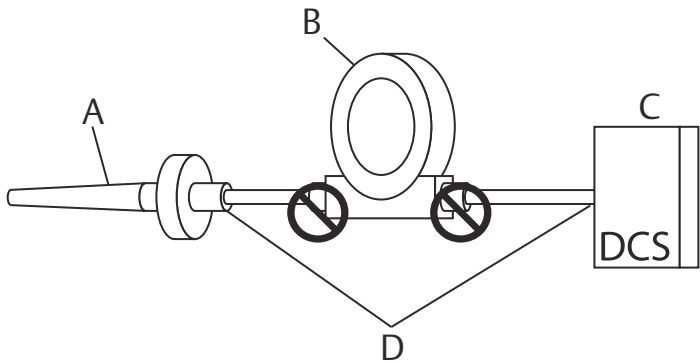
- A. *Sensor wires*
- B. *Transmitters*
- C. *DCS host system*
- D. *Shield ground point*

4.1.5 Ground the transmitter: Option 3

Use this method for grounded or ungrounded housing.

Procedure

1. Ground sensor wiring shield at the sensor, if possible.
2. Ensure that the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
Do not connect the signal wiring shield to the sensor wiring shield.
3. Ground signal wiring shield at the power supply end.

Figure 4-4: Option 3: Grounded or Ungrounded Housing

- A. Sensor wires
- B. Transmitters
- C. DCS host system
- D. Shield ground point

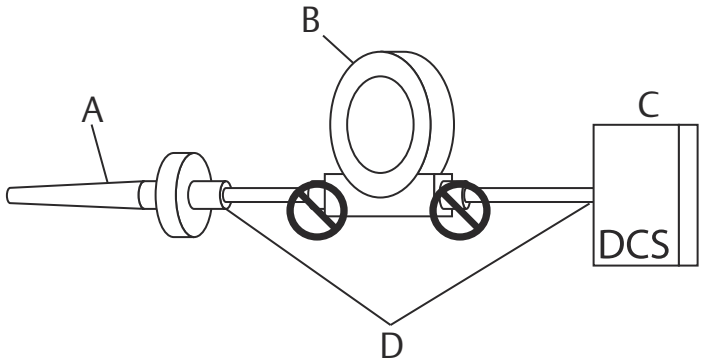
4.1.6 Ground the transmitter: Option 4

Use this method for grounded thermocouple inputs.

Procedure

1. Ground sensor wiring shield at the sensor.
2. Ensure that the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
Do not connect the signal wiring shield to the sensor wiring shield.
3. Ground signal wiring shield at the power supply end.

Figure 4-5: Option 4: Grounded Thermocouple Inputs



- A. Sensor wires
- B. Transmitters
- C. DCS host system
- D. Shield ground point

5 Perform a loop test

5.1 Overview

The loop test command verifies transmitter output, loop integrity, and operation of any recorders or similar devices installed in the loop.

Note

This is not available with the Rosemount 248C Configuration Interface.

5.2 Initiate loop test

Procedure

1. Connect an external ampere meter in series with the transmitter loop (so the power to the transmitter goes through the meter at some point in the loop).
2. From the **Home** screen, select: **1. Device Setup** → **2. Diag/Serv** → **1. Test Device** → **1. Loop Test**
3. Select a discrete milliampere level for the transmitter to output. At **Choose Analog Output**, select **1. 4 mA**, **2. 20 mA**, or **3. Other** to manually input a value between 4 and 20 mA.
4. Select **Enter** to show the fixed output.
5. Select **OK**.
6. In the test loop, check that the fixed mA input and the transmitter's mA output are the same value.

Note

If the readings do not match, either the transmitter requires an output trim or the current meter is malfunctioning.

After completing the test, the display returns to the loop test screen and allows you to choose another output value.

5.3 End the loop test

Procedure

1. Select **5. End**.
2. Select **Enter**.

6 Certified installations

For Safety Certified installations, refer to the Rosemount 248 [Reference Manual](#). You can access this manual electronically at [Emerson.com/Rosemount](https://emerson.com/Rosemount) or by contacting an Emerson representative.

7 Product certifications

Rev: 1.37

7.1 Directive information

A copy of the Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the Declaration of Conformity can be found at [Emerson.com/Rosemount](https://www.emerson.com/Rosemount).

7.2 Ordinary location certification

As standard, the power module 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).

7.3 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.

7.4 USA

7.4.1 E5 USA Explosionproof

Certificate 3016555

Standards FM Class 3600:2011, FM Class 3611:2004, FM Class 3615:2006, FM Class 3810:2005, ANSI/ISA 60079-0:2009, ANSI/ISA 60079-11:2009, IEC 60529: 2004, NEMA-250: 1991

Markings XP CL I, DIV 1, GP B, C, D; DIP CL II/III, DIV 1, GP E, F, G; NI CL1, DIV 2, GP A, B, C, D when installed per Rosemount drawing 00248-1065; Type 4X;

7.4.2 I5 USA Intrinsic Safety

Certificate 3016555

Standards FM Class 3600:2011, FM Class 3610:2010, FM Class 3611:2004, FM Class 3810:2005, ANSI/ISA 60079-0:2009, ANSI/ISA 60079-11:2009, IEC 60529: 2004, NEMA-250: 1991

Markings IS CL I/II/III, DIV 1, GP A, B, C, D, E, F, G; NI CL1, DIV 2, GP A, B, C, D when installed per Rosemount drawing 00248-1055; Type 4X; IP66/68

7.5 Canada

7.5.1 K6 Canada Intrinsically Safe, Explosionproof, and Class 1, Division 2

Certificate 1091070

Standards CAN/CSA C22.2 No. 0-10, CSA Std. C22.2 No. 25-1966, CSA Std. C22.2 No. 30-M1986, CAN/CSA C22.2 No. 94-M91, CSA Std. C22.2 No.142-M1987, CAN/CSA C22.2 No. 157-92, CSA C22.2 No. 213-M1987, C22.2 No 60529-05


Markings XP CL I/II/III, DIV 1, GP B, C, D, E, F, G when installed per Rosemount drawing 00248-1066; IS CL I, DIV 1 GP A, B, C, D when installed per Rosemount drawing 00248-1056; CL I DIV 2 GP A, B, C, D; Type 4X, IP66/68; Conduit Seal not required

7.6 Europe

7.6.1 E1 ATEX Flameproof

ATEX Certificate DEKRA 19ATEX0076X

Standards EN IEC 60079-0:2018, EN 60079-1:2014

Markings  II 2 G Ex db IIC T6...T1 Gb, T6(-60 °C ≤ T_a ≤ +70 °C), T5...T1(-60 °C ≤ T_a ≤ +80 °C)

Specific Conditions of Use (X):

1. Flameproof joints are not intended for repair.
2. Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, then contact the manufacturer for more information.


Additional Specific Condition of Use (X) when "XA" designation is ordered:

Guard DIN Style sensors against impacts greater than 4J.

Process Temperature Range at Sensor Connection ⁽¹⁾ (°C)	Ambient Temperature Range (°C)	Temperature Class
-60 °C to +70 °C	-60 °C to +70 °C	T6
-60 °C to +80 °C	-60 °C to +80 °C	T5...T1

(1) *Sensor Connection is where the sensor threads into the transmitter or junction box housing.*

7.6.2 I1 ATEX Intrinsic Safety

ATEX Certificate	Baseefa03ATEX0030X
Standards	EN 60079-0: 2012, EN 60079-11: 2012
Markings	 II 1 G Ex ia IIC T5/T6 Ga, T5(-60 °C ≤ T _a ≤ +80 °C), T6(-60 °C ≤ T _a ≤ +60 °C) See Table 7-1 for entity parameters.

Special Conditions for Safe Use (X):

The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20. Non-metallic enclosures must have a surface resistance of less than 1GΩ; light alloy or zirconium enclosures must be protected from impact and friction when installed

7.7 China

7.7.1 I3 China Intrinsic Safety

Certificate	GYJ21.1276X
Standards	GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings	Ex ia IIC T5/T6 Ga; T6(-60 °C ≤ T _a ≤ +60 °C) T5(-60 °C ≤ T _a ≤ +80 °C)

Special Conditions for Safe Use (X):



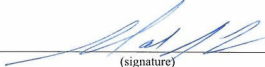
See certificate for special conditions.



7.8 Tables



Table 7-1: Entity Parameters

Parameters	Loop terminals + and -	Sensor terminals 1 to 4
Voltage U_i	30 V	45 V
Current I_i	130 mA	26 mA
Power P_i	1 W	290 mW
Capacitance C_i	3.6 nF	2.1 nF
Inductance L_i	0 mH	0 μ H

7.9 Declaration of Conformity

		EMERSON EU Declaration of Conformity			
No: RMD 1049 Rev. 0					
<p>We,</p>					
<p>Rosemount, Inc. 6021 Innovation Boulevard Shakopee, MN 55379-4676 USA</p>					
<p>declare under our sole responsibility that the product,</p>					
Rosemount™ 248 Temperature Transmitter					
<p>manufactured by,</p>					
<p>Rosemount, Inc. 6021 Innovation Boulevard Shakopee, MN 55379-4676 USA</p>					
<p>to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.</p>					
<p>Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.</p>					
 _____ (signature)			Vice President of Global Quality _____ (function)		
Mark Lee _____ (name)			<i>August 27, 2021</i> _____ (date of issue)		
Page 1 of 3					

 EMERSON EU Declaration of Conformity No: RMD 1049 Rev. O	
EMC Directive (2014/30/EU) Harmonized Standards: EN61326-1:2013, EN61326-2-3:2013	
ATEX Directive (2014/34/EU)	
Baseefa03ATEX0030X – Intrinsic Safety Certificate Equipment Group II, Category 1 G Ex ia IIC T5/T6 Ga Harmonized Standards: EN IEC 60079-0:2018, EN 60079-11:2012	
BAS00ATEX3145 – Type n Certificate Equipment Group II, Category 3 G Ex nA IIC T5 Gc Harmonized Standards: EN 60079-0:2012+A11:2013 (a review against EN IEC 60079-0:2018, which is harmonized, shows no significant changes relevant to this equipment so EN 60079-0:2012+A11:2013 continues to represent “State of the Art”), EN 60079-15:2010	
Baseefa13ATEX0045X – Type n Certificate; no enclosure option Equipment Group II, Category 3 G Ex nA IIC T5/T6 Gc Harmonized Standards: EN 60079-0:2012+A11:2013 (a review against EN IEC 60079-0:2018, which is harmonized, shows no significant changes relevant to this equipment so EN 60079-0:2012+A11:2013 continues to represent “State of the Art”), EN 60079-15:2010	
DEKRA 19ATEX0076 X – Flameproof Certificate Equipment Group II, Category 2 G Ex db IIC T6...T1 Gb Harmonized Standards: EN IEC 60079-0:2018, EN 60079-1:2014	
DEKRA 19ATEX0076 X – Dust Certificate Equipment Group II, Category 2 D Ex tb IIIC T130°C Db Harmonized Standards: EN IEC 60079-0:2018, EN 60079-31:2014	
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 **EMERSON EU Declaration of Conformity** 
No: RMD 1049 Rev. O

ATEX Notified Bodies

FM Approvals Europe Limited [Notified Body Number: 2809]
One Georges Quay Plaza
Dublin, Ireland. D02 E440

SGS FIMKO OY [Notified Body Number: 0598]
Takomotie 8
00380 HELSINKI
Finland

ATEX Notified Body for Quality Assurance

SGS FIMKO OY [Notified Body Number: 0598]
Takomotie 8
00380 HELSINKI
Finland

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7.10 China RoHS

含有 China RoHS 管控物质超过最大浓度限值的部件型号列表 248
List of 248 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)
电子组件 Electronics Assembly	X	○	○	○	○	○
壳体组件 Housing Assembly	○	○	○	X	○	○
传感器组件 Sensor Assembly	X	○	○	○	○	○

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.

○: 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.

部件名称 Part Name	组装备件说明 Spare Parts Descriptions for Assemblies
电子组件 Electronics Assembly	电子线路板组件 Electronic Board Assemblies 端子块组件 Terminal Block Assemblies
壳体组件 Housing Assembly	电子外壳 Electrical Housing



Quick Start Guide
00825-0100-4825, Rev. JC
February 2023

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