

Rosemount™ 4390 Series of Corrosion and Erosion Wireless Transmitters



WirelessHART™

ROSEMOUNT™


EMERSON

NOTICE

Read this guide before working with the product. For personal and system safety, and for optimum product performance, make sure to thoroughly understand the contents before installing, using, or maintaining this product.

The United States has two toll-free assistance numbers and one international number:

Customer Central: 1 800 999 9307 (7:00 a.m. to 7:00 p.m. CST)

National Response Center: 1 800 654 7768 (24 hours a day) Equipment service needs

International: 1 952 906 8888

Shipping considerations for wireless products: (Lithium battery: Black Power Module, model number 701PBKKF). The unit was shipped to you without the Black Power Module installed. Remove the Black Power Module prior to shipping the unit. Each Black Power Module contains two "C" size primary lithium batteries. 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

Failure to follow these installation guidelines could result in death or serious injury. 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.

⚠ CAUTION

The products described in this document are not designed for nuclear-qualified applications.

Using non-nuclear-qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact an Emerson sales representative.

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1 Overview

This guide provides basic guidelines for the installation, configuration, commissioning, operation and maintenance of the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters. This guide is also available electronically at [Emerson.com/Rosemount](https://www.emerson.com/Rosemount).

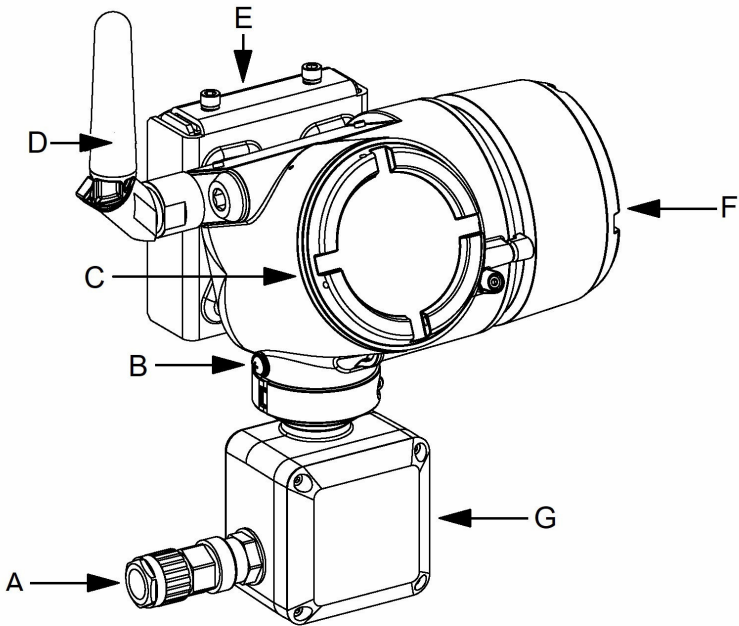
The Rosemount 4390 Wireless is a family of transmitters, used with intrusive monitoring probes for corrosion and erosion monitoring applications.

The transmitters are divided in two base models:

1. The 4391 Corrosion Wireless Transmitter is designed to measure and process electrical signals from an intrusive corrosion probe to provide input on fluid corrosivity, given in metal loss and metal loss over time, also known as corrosion rate.
2. The 4392 Erosion Wireless Transmitter is designed to measure and process electrical signals from an intrusive sand/erosion probe to provide input on fluid erosion in metal loss and metal loss over time. The device can also be used with the Emerson's unique multiple elements combined intrusive probes to provide both corrosion and erosion measurements.

The device uses *WirelessHART*[®] communication protocol, and is battery powered. It contains printed circuit boards, including a radio module molded into an electronics module that is housed within a metallic housing suited with a dedicated junction box for probe connections.

Figure 1-1: Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters



- A. Probe cable gland (optional)
- B. Grounding lug
- C. Electronics cover
- D. 2.4 GHz external antenna
- E. Mounting bracket kit
- F. Power module extended cover
- G. Junction box for probe connection

Related information

[What's in the box?](#)

[Required tools and equipment for installation](#)

1.1 What's in the box?

The device is delivered in a cardboard box containing:

- 1x Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitter
- 1x mounting bracket kit

- 1x paper copy of this guide
- 1x probe cable gland (when the gland option is selected on the device model code.)

Note

The device is shipped without batteries. The Rosemount 4390 Wireless Transmitter requires the Black Power Module model 701BKKF that must be ordered as a separate item. For more information, refer to the 701P SmartPower™ website [Emerson.com/SmartPower](https://www.emerson.com/SmartPower).

1.2 Required tools and equipment for installation

This section lists the required tools and equipment for physical installation, configuration, and commissioning of the Rosemount 4390 Wireless Transmitter.

1.2.1 Configuration and commissioning

The Rosemount 4390 Wireless Transmitter must be configured before physical installation. Direct configuration can be performed using either a Field Communicator or an AMS Device Manager.

- AMS Trex Device Communicator. For more information, see [Emerson.com/AMS-Trex](https://www.emerson.com/AMS-Trex).
- AMS Device Manager. For more information, see [Emerson.com/AMS-Device-Manager](https://www.emerson.com/AMS-Device-Manager).
- HART Modem and Cable (when using AMS Device Manager)

1.2.2 Physical installation

The tools listed below are required for mounting the device on the plant.

- Hex key 3 mm for opening the junction box lid and the cover's locking screws
- Hex key 5 mm and 13 mm for assembling the mounting bracket
- Slotted screwdriver 3 mm, for probe wiring terminals
- Adjustable spanners (0-40 mm) for probe cable gland mounting

Note

The equipment and tools listed on this section are not included.

2 Wireless considerations

Related information

[Conduit connection](#)

2.1 Power up sequence

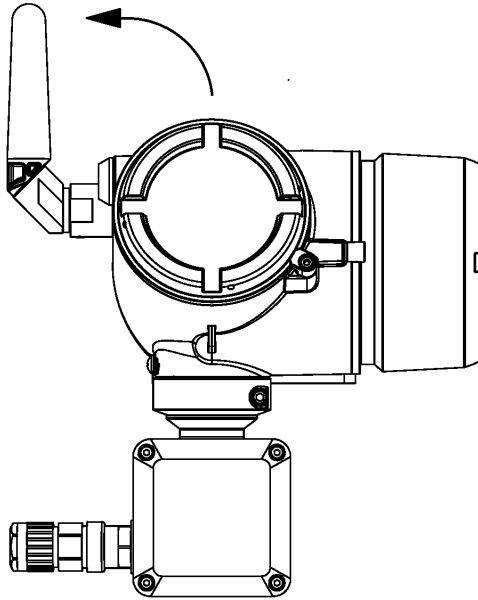
The Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters and all other wireless devices should be installed only after the Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the gateway, beginning with the closest. This results in a simpler and faster network installation. Enable active advertising on the gateway to ensure new devices join the network faster. For more information, see the [Emerson Wireless 1410 Gateway and 7815 Smart Antenna Reference Manual](#).

2.2 Antenna position

The antenna should be positioned vertically, either straight up or straight down, and it should be approximately 3 ft. (1 m) from any

large structure, building, or conductive surface to allow for clear communication to other devices.

Figure 2-1: Antenna position

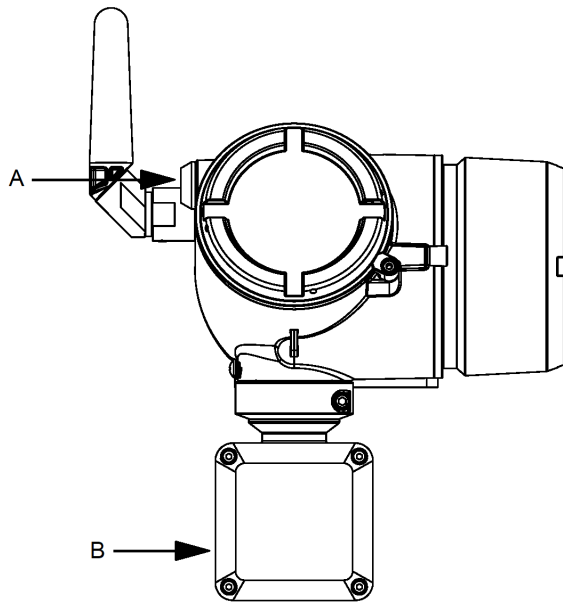


2.3 Conduit connection

Upon installation, ensure that the extra conduit entry on the housing is sealed with a conduit plug, and that the probe cable conduit entry on the junction box has an installed conduit fitting or cable gland.

The device is delivered with a conduit plug for sealing the extra conduit entry on the housing and can be delivered with an optional cable gland for installation of the probe cable.

Figure 2-2: Conduit connection



- A. Extra conduit entry (not used)
- B. Probe cable conduit entry

3 Configuration and commissioning

This chapter contains information on configuration and verification that must be performed prior to physical installation.

To start operation, the user is required to perform the setup of the Rosemount 4390 Wireless Transmitter, which includes joining a Wireless Network, selecting the probe type and alarm settings.

NOTICE

The Black Power Module needs to be installed into the Rosemount 4390 Wireless Transmitter during configuration and commissioning

For HART communication a Device Description (DD) file is required.

The latest DD file version is available at Rosemount 4390 Wireless Transmitter website [Emerson.com/4390](https://www.emerson.com/4390).

⚠ WARNING

Electrical shock could cause death or serious injury. Use extreme caution when contacting the leads and terminals.

Wait **5 minutes** after installing the Black Power Module before any wire connection. This time is required for the instrument electronics to be fully charged. Setting up the device is only possible when the electronics are fully charged.

Related information

[Engineering units](#)

[Default factory configuration](#)

[HART terminal connections](#)

[Connection with AMS Trex Device Communicator](#)

[Connection with HART Modem and AMS Device Manager](#)

[Joining to a wireless network](#)

[Device identification](#)

[Configure sensor type and parameters](#)

[Configure update rate](#)

[Configure alerts](#)

3.1 Engineering units

The Rosemount 4390 Wireless Transmitter supports only engineering units according to the International System of Units (SI).

The following engineering units are used during configuration and commissioning:

Table 3-1: Supported engineering units

Variable	Unit
Electrical resistance	mΩ (milliohms)
Electrical current	mA (milliamperes)
Voltage	V and mV (Volts and millivolts)
Length / thickness	μm (micrometers)
Battery life	days
Probe life	% (percentage)
Corrosion rate	mm/year (millimeters per year)
Temperature	°C (degrees Celsius)

3.2 Default factory configuration

The Rosemount 4390 Wireless Transmitter is delivered with a default factory configuration, that consist of default values for each parameter that may be changed to match with the application intended for the device.

The default factory configuration values are presented in the table below:

Table 3-2: Default factory configuration

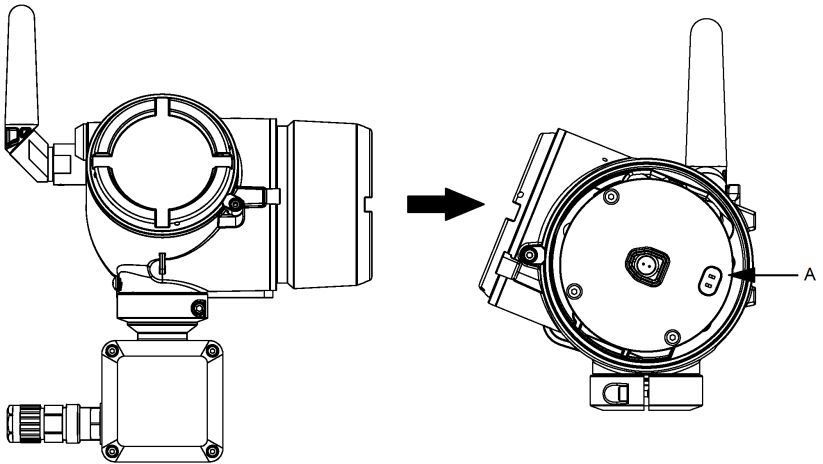
Variable	Unit
Tag and long tag	none
Network ID	1229
Join key	44555354, 4e455457, 4f524b53, 524f434b
Update rate	Burst messages 1, 2 and 3: 60 seconds
Probe type	- 4391: ER corrosion probe - 4392: 4 elements ER sand/erosion probe
Acquisition rate	10 minutes
Input parameters	Element Thickness 250 μm

Table 3-2: Default factory configuration (continued)

Variable	Unit
Alerts	See Configure alerts .

3.3 HART terminal connections

To configure and commission the Rosemount 4390 Wireless Transmitter, the user is required to connect wires from a Field Communicator or HART modem to the dedicated COMM terminals located under the extended cover.



A. COMM terminal connections

3.4 Connection with AMS Trex Device Communicator

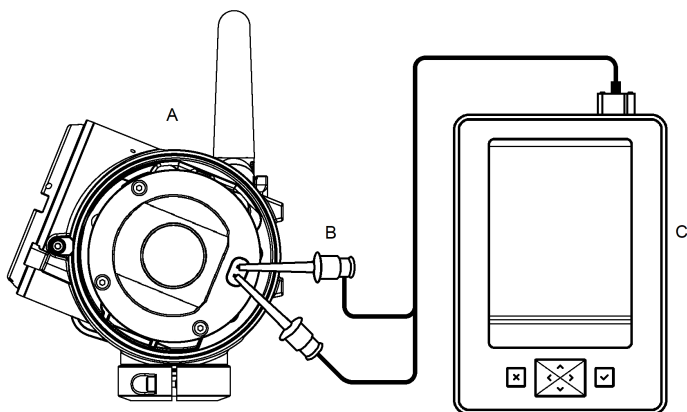
When using AMS Trex Device Communicator, follow the steps below:

Procedure

1. Connect the two clip connectors from the AMS Trex Device Communicator kit to the Rosemount 4390 Wireless COMM Terminals. The COMM terminal connections are not polarity sensitive.
2. Use the AMS Trex port HART to connect the wires. Do not use AMS Trex to power the Rosemount 4390 Wireless Transmitter.
3. Make sure the latest DD files are installed in the AMS Trex Device Communicator.
4. Power-up the AMS Trex Device Communicator.

5. Start configuring the device following the steps beginning from [Joining to a wireless network](#) of this guide. Any configuration changes must be sent to the transmitter by using the **Send** key. Refer to [Figure 3-1](#).

Figure 3-1: Connection with AMS Trex Device Communicator



- A. Rosemount 4390 Wireless
- B. Lead and clip connector kit
- C. AMS Trex Device Communicator

⚠ WARNING

Providing power to a *WirelessHART* device from AMS Trex can damage the device.

Do not use the AMS Trex unit to power the Rosemount 4390 Wireless Transmitter.

3.5 Connection with HART Modem and AMS Device Manager

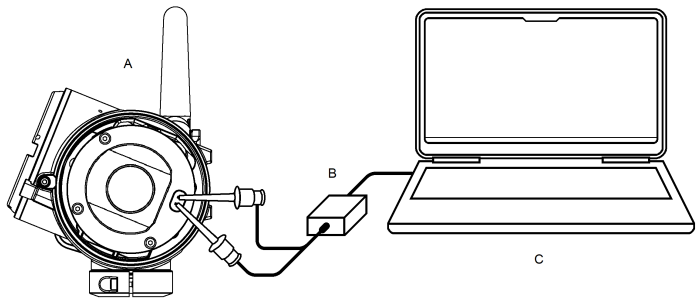
When using a HART Modem and a PC with AMS Device Manager installed, follow the steps below.

Procedure

1. Connect the two clip connectors from the HART Modem to the Rosemount 4390 Wireless COMM Terminals. The COMM terminal connections are not polarity sensitive.
2. Make sure all necessary drivers for the HART Modem are installed and updated.
3. Make sure the latest DD files are installed in the AMS Device Manager.
4. Start AMS Device Manager.
5. Double click on the **Device** icon under the **HART Modem** tab, then select the **Configure/Setup** tab. Use the **Direct Connection** menu.
6. Start configuring the device following the steps beginning from [Joining to a wireless network](#) of this guide.

AMS Device Manager configuration changes are implemented when the **Apply** button is selected.

Figure 3-2: Connection with HART Modem and AMS Device Manager



- A. Rosemount 4390 Wireless Transmitter
- B. HART Modem with lead and clip connector kit
- C. Computer with AMS Device Manager installed

3.6 Joining to a wireless network

To communicate with the Wireless Gateway, and ultimately the host system, the transmitter must be configured to communicate over the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the host system.

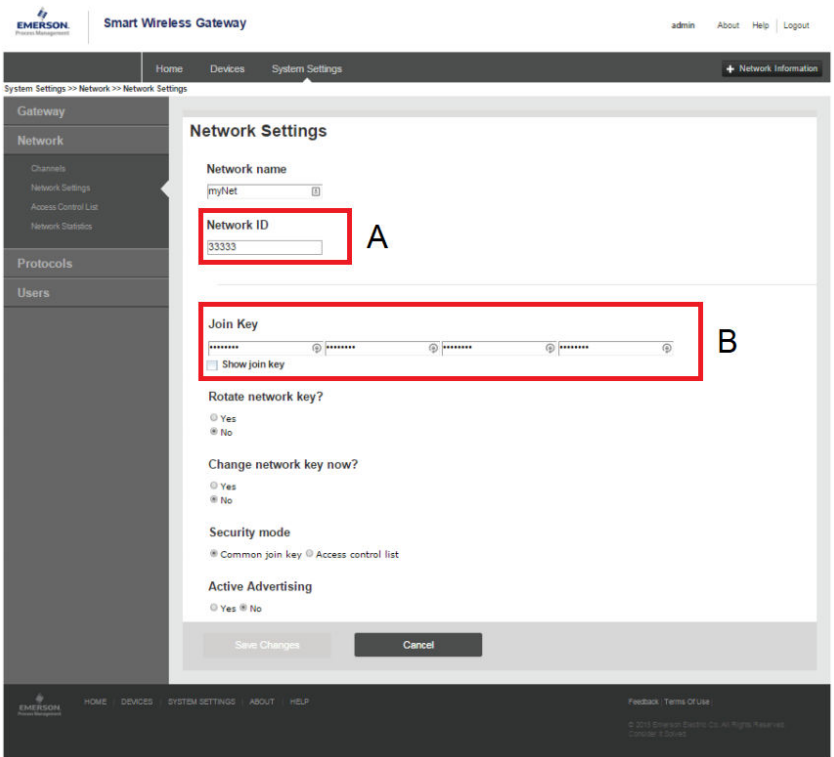
Procedure

Using the AMS Trex or AMS Device Manager, enter the Network ID and Join Key so they match with the Network ID and Join Key of the Gateway and the other devices in the network.

Note

If the Network ID and Join Key are not identical, the transmitter will not communicate with the network. The Network ID and Join Key can be obtained from the Gateway on the **System Settings** → **Network** → **Network Settings** page of the Wireless Gateway web-based user interface.

Figure 3-3: Joining a Wireless Network



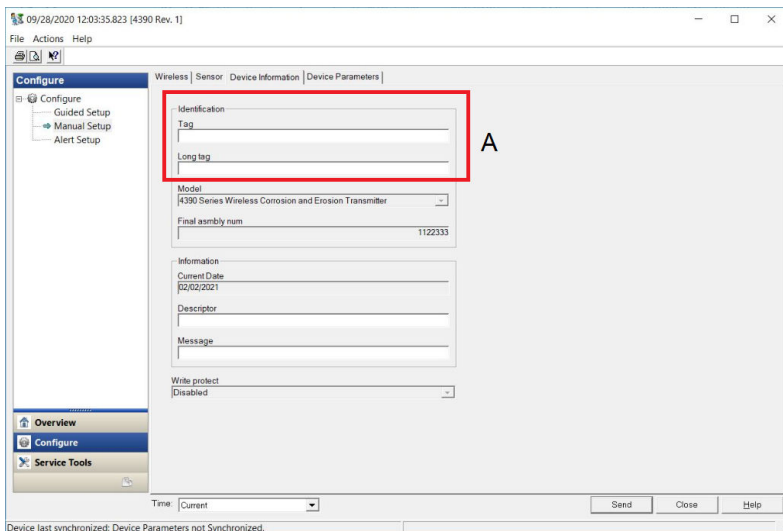
- A. Network ID
- B. Join Key

3.7 Device identification

The user must configure the basic identification parameters for the device being commissioned.

The Rosemount 4390 Wireless Transmitter supports both **Tag** (8 characters) and **Long Tag** (32 characters), that can be set in the **Device Information** tab. The user can also view non-configurable identification information such as **Device ID**, **Distributor**, and **Model**. Refer to [Figure 3-4](#).

Figure 3-4: Device identification – AMS Device Manager



A. Tag and Long Tag fields

3.8 Configure sensor type and parameters

The Rosemount 4390 Wireless Transmitter supports different types of inline monitoring probes depending on the model selected.

During configuration, the user is required to setup the probe parameters such as probe type, element thickness or exposed surface area (depending on the probe type), metal loss offset (when applicable) and the acquisition rate. To configure the sensor, follow the steps below:

Procedure

1. Select the **Probe Type** compatible with the transmitter model being configured.

Table 3-3: Supported probe types

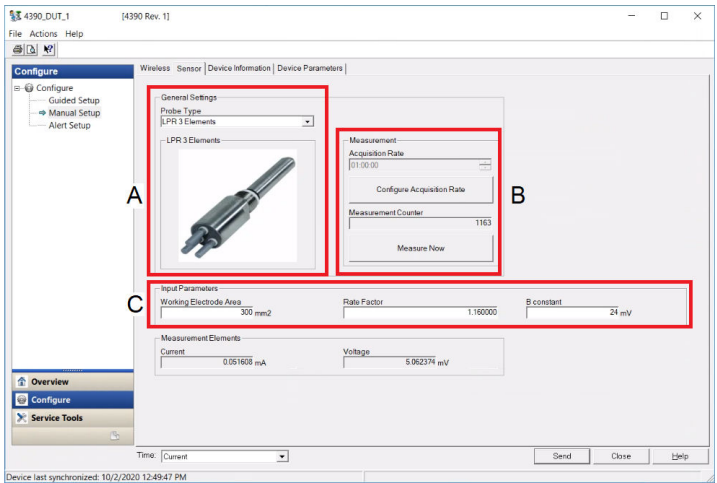
Transmitter model	Supported probe types
4391 Corrosion Wireless Transmitter	<ul style="list-style-type: none">• Single element ER probe• Double or triple electrode LPR probe• Galvanic probe

Table 3-3: Supported probe types (continued)

Transmitter model	Supported probe types
4392 Erosion Wireless Transmitter	<ul style="list-style-type: none"> Multiple element ER sand erosion probe Multiple element ER combined probe

- Set the **Acquisition Rate**. The acquisition rate is the time interval between each sensor data point measurement and can be selected from 1 minute up to 24 hours.
- Add the **Input Parameters** for the probe you are using. The probe parameters depend on the probe type:
 - For ER probes, the parameters are **Element Thickness** and **Metal Loss Offset**
 - For LPR probes, the parameters are **Working Electrode Area**, **Rate Factor**, and **B Constant**.
 - Galvanic probes do not require input

Figure 3-5: Configure sensor tab - AMS Device Manager



- Probe type selection list
- Acquisition rate configuration field
- Input parameters configuration field

3.9 Configure update rate

The **Update Rate** is the frequency at which a set of data is transmitted over the wireless network.

The user can select the **Update Rate** from a range of one second to 60 minutes.

By default, the update rate is set to 1 minute. This rate can be changed at any time through either the AMS Device Manager, the Wireless Gateway web-based user interface, or the AMS Trex Device Communicator.

3.9.1 Burst messages

The Rosemount 4390 Wireless Transmitter has 3 configurable burst messages. Each burst message has its own independent update rate and can contain up to 8 device variables, depending on the HART command configured by the user during the Update rate configuration process. Depending on the number of variables to transmit, all 3 burst messages might not be needed. Emerson recommends that you disable unused messages.

Note

The Burst messages have a default update rate set to 60 seconds (1 minute). It is recommended to change the update rate after the first successful connection to a wireless network to save battery power. The update rates should be identical to the acquisition rate. Set the update rates to 60 minutes, if the acquisition rate is above 60 minutes.

3.10 Configure alerts

The Rosemount 4390 Wireless Transmitter has factory defined alerts and supports user configurable alerts. Device specific status bytes are used to identify the device specific alerts.

The alerts are classified as either Maintenance, Advisory, or Failure alerts and are listed in the tables below:

1. Maintenance alerts: [Table 3-4](#)
2. Advisory alerts: [Table 3-5](#)
3. Failure alerts: [Table 3-6](#)

Table 3-4: Maintenance alerts

Alert message	Device status (Byte :: Bit)	Description
Probe life reached 0%	0 :: 1	The probe has reached end of life and needs to be replaced.

Note

The alert "Probe life" is available only for ER probes.

Table 3-5: Advisory alerts

Advisory alerts	Device status (Byte :: Bit)	Description
Measurement disabled	0 :: 6	Measurements are disabled.
Instrument board always ON	0 :: 7	The instrument board is set to ignore power saving. The setting is only intended for software updates.
User alerts 1 to 8	1 :: 0 to 7	User configurable alerts
Configuration items updated	3 :: 0	The configuration items were updated as a result of a software update, probe type change, or a reset to factory defaults
Device variable simulation active	8 :: 0	One or more of the device variables are being forced to a simulated value and status.
Power supply conditions out of range	8 :: 4	The supply voltage is out of the specified range.
Environmental conditions out of range	8 :: 5	Device temperature is above or below the operational limit.
Device configuration locked	8 :: 7	The device is in write protect mode.
Event notification overflow	9 :: 2	Event queue overflow resulting in event not being recorded
Capacity denied	12 :: 0	The device was unable to acquire the communication bandwidth required to support the Burst Messaging specified.
Bandwidth allocation pending	12 :: 2	The device has asked for bandwidth from the Network Manager, and is awaiting Network Manager response.

Table 3-6: Failure alerts

Alert message	Device status (Byte :: Bit)	Description
Probe malfunction	0 :: 0	Due to an internal error, a measurement was not performed correctly.
Instrument board measurement failure	0 :: 2	Due to an internal error, a measurement was not performed correctly.
Instrument board software error	6 :: 3	Unable to read the software version on the Instrument Board
Non-volatile memory defect	8 :: 1	The device has failed to access the non-volatile memory.
Watchdog reset executed	8 :: 3	A watchdog reset has been performed.
Radio failure	12 :: 4	The radio module has failed; the device needs to be serviced or replaced.

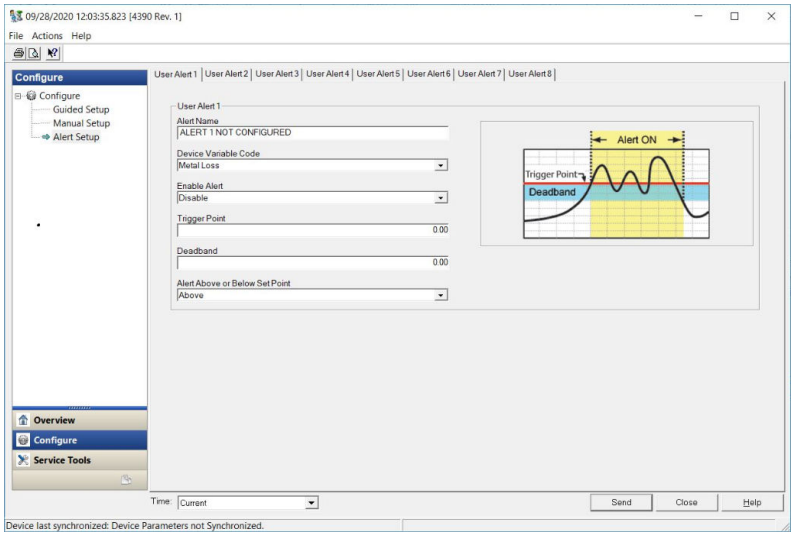
The Rosemount 4390 Wireless Transmitter supports up to 8 user configurable alerts that can be set based on any supported device variables.

The following parameters are required for each user alerts:

- **Device variable** to be monitored by the user alert
- **Alert name**, used as a message to identify the alert
- Users can choose to **Enable** or **Disable** the alert at any time
- The **Trigger point** is the value that starts the alert (see Appendix C [Limits for user defined alerts](#))
- **Deadband** allows the user to add a tolerance range for the trigger value
- The user must select if the alert is activated when the measurement is either **Below** or **Above** the selected trigger point

Refer to [Figure 3-6](#).

Figure 3-6: Alert setup tab – AMS Device Manager



4 Physical installation

This chapter contains information on physical installation of the Rosemount 4390 Wireless Transmitter, which includes wiring connection of a probe cable assembly, field mounting of the instrument and power module installation.

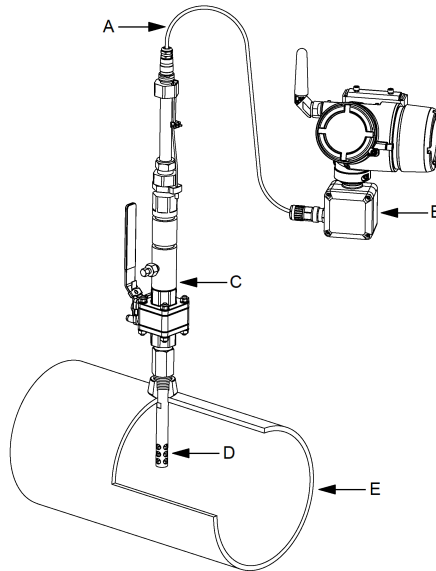
The Rosemount 4390 Wireless Transmitter is designed for remote mounting which provides flexible, convenient positioning for maintenance, operation and radio signals routing, and it is delivered with a specific mounting bracket kit that allows the installation of the instrument on a wall/rack or on a 2-in. mounting pole.

The Rosemount 4390 Wireless Transmitter supports up to 66 ft. (20 m) of probe cable length.

Note

The length of the cable must be selected in accordance with the intrinsically safe electrical parameters of the system.

Figure 4-1: Typical remote mounting corrosion monitoring system



- A. Probe cable assembly*
- B. Rosemount 4390 Wireless Transmitter*
- C. Access system*
- D. Intrusive corrosion probe*
- E. Monitored pipe / equipment*

Related information

[Field mounting](#)

[Grounding the transmitter](#)

[Installing the power module](#)

4.1 Probe cable wiring connection

The Rosemount 4390 Wireless Transmitter has 3 field terminals for probe cable connection inside of its junction box.

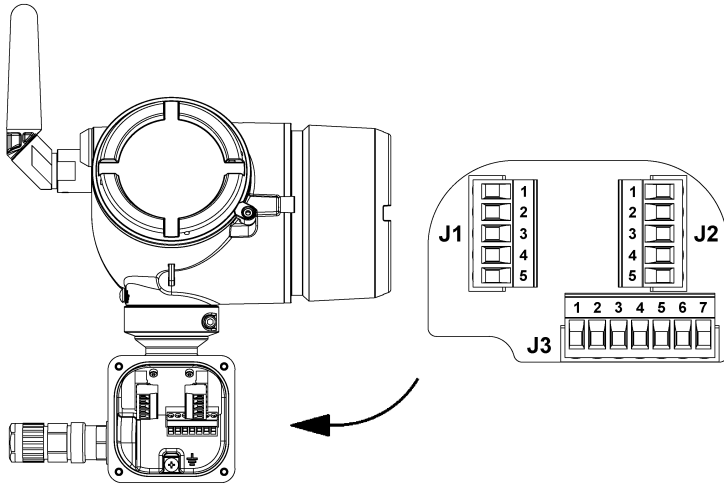
The terminals are identified as J1, J2 and J3, and each probe type requires a different wiring scheme. When connecting a probe to the instrument terminals, the user should follow the tables in this section to ensure proper wiring connection of the probe cable. Refer to [Figure 4-2](#).

⚠ WARNING

Electrical shock could cause death or serious injury.

Use extreme caution when connecting the leads and terminals.

Figure 4-2: Field terminals for probe cable connection



The terminals of the models 4391 and 4392 may look physically the same; however, they are different in design, and only support the probe types indicated in [Configure sensor type and parameters](#).

The wiring color schemes presented in the tables below considers the two probe cable types offered by Emerson, Standard cable Multicable and Heavy-duty cable BFOU(c). Different cable models may vary its wires colors. Contact your Emerson representative for assistance when using different cable models.

Table 4-1: Wiring scheme - single element ER probe

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J1 :: 1	IE+ / ERE1+	Pink	Black1
J1 :: 2	IE- / ERE1-	Brown	Brown2
J2 :: 1	RefA / ERR1+	Grey	Black2
J2 :: 2	RefB / ERR1-	Green	Blue2

Table 4-1: Wiring scheme - single element ER probe (continued)

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J3 :: 1	E1A / ERM1+	White	Blue1
J3 :: 2	E1B / ERM1-	Yellow	Brown1

Table 4-2: Wiring scheme - LPR probe

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J3 :: 3	Counter / LPR-C	Pink	Black1
J3 :: 4	Ref / LPR-R	White	Blue1
J3 :: 5	Working-I / LPR-WI	Yellow	Brown1
J3 :: 6	Working-V / LPR-WV	Brown	Brown2
Not connected	None	Grey	Black2
Not connected	None	Green	Blue2

Table 4-3: Wiring scheme - Galvanic probe

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J2 :: 4	GALV+	Yellow	Brown1
J2 :: 5	GALV-	White	Blue1
Not connected	None	Pink	Black1
Not connected	None	Brown	Brown2
Not connected	None	Grey	Black2
Not connected	None	Green	Blue2

Table 4-4: Wiring scheme - Multiple element ER sand/erosion probe

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J1 :: 1	Iret / ERE+	Black	Black1
J1 :: 2	I1 / ERE1-	Orange/yellow	Black2
J1 :: 3	I2 / ERE2-	Orange/white	Blue2
J1 :: 4	I3 / ERE3-	Orange/red	Black3
J1 :: 5	I4 / ERE4-	Orange/black	Blue3
J2 :: 1	RefA / ERR1+	White	Black8
J2 :: 2	RefB / ERR1-	Lilac	Blue8
J2 :: 5	E4B / ERM4-	Pink	Blue7
J3 :: 1	E1A / ERM1+	Grey	Black4
J3 :: 2	E1B / ERM1-	Yellow	Blue4
J3 :: 3	E2A / ERM2+	Green	Black5
J3 :: 4	E2B / ERM2-	Brown	Blue5
J3 :: 5	E3A / ERM3+	Blue	Black6
J3 :: 6	E3B / ERM3-	Red	Blue6
J3 :: 7	E4A / ERM4+	Orange	Black7

Table 4-5: Wiring scheme - Multiple element ER combined probe

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J2 :: 1	RefA / ERR1+	White	Black8
J2 :: 2	RefB / ERR1-	Lilac	Blue8
J2 :: 3	RefC / ERR2+	Orange	Black7
J2 :: 4	RefD / ERR2-	Pink	Blue7
J2 :: 5	E4B / ERM4-	Red	Blue6
J1 :: 1	Iret / ERE+	Black	Black1
J1 :: 2	I1 / ERE1-	Orange/yellow	Black2
J1 :: 3	I2 / ERE2-	Orange/white	Blue2
J1 :: 4	I3 / ERE3-	Orange/red	Black3

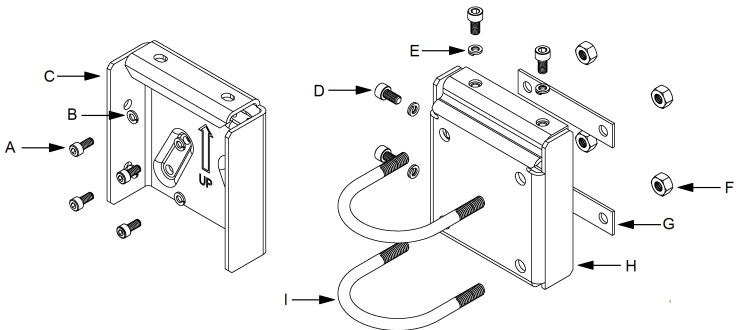
Table 4-5: Wiring scheme - Multiple element ER combined probe (continued)

Junction box (Terminal :: Pin)	Signal name	Standard cable Multicable	Heavy-duty cable BFOU(c)
J1 :: 5	I4 / ERE4-	Orange/black	Blue3
J3 :: 1	E1A / ERM1+	Grey	Black4
J3 :: 2	E1B / ERM1-	Yellow	Blue4
J3 :: 3	E2A / ERM2+	Green	Black5
J3 :: 4	E2B / ERM2-	Brown	Blue5
J3 :: 7	E4A / ERM4+	Blue	Black6

4.2 Field mounting

The Rosemount 4390 Wireless Transmitter mounting bracket kit is designed to allow simple and ergonomic installation of the instrument.

Figure 4-3: Mounting bracket kit components



- A. Screw M5x12 (4x)
- B. Split lock M5 washer (4x)
- C. Instrument bracket (1x)
- D. Screw M6x12 (4x)
- E. Split lock M6 washer (4x)
- F. Hex nut UNC 5/16-18 (4x)
- G. Rectangular flat washer (2x)
- H. Back plate (1x)
- I. U-bolt 2-in. UNC 5/16-18 (2x)

The mounting bracket kit supports two options for installing the instrument:

1. Mount the instrument on a wall, rack, or flat surface.
2. Mount the instrument on a 2-in. mounting pole.

Related information

[Assembling the instrument bracket](#)

[Wall and rack mounting](#)

[2-inch pole mounting](#)

[Attaching the instrument bracket and the back plate](#)

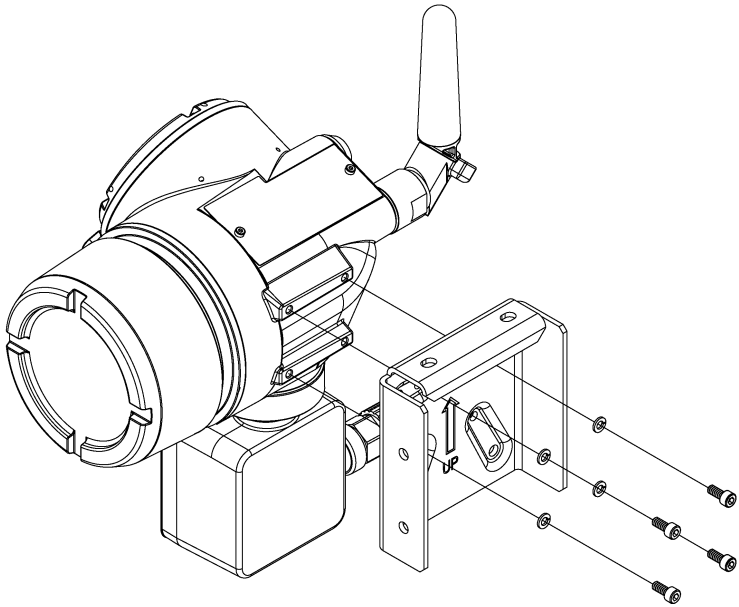
4.2.1 Assembling the instrument bracket

Procedure

Attach the instrument bracket on the Rosemount 4390 Wireless Transmitter back and tighten 4x M5x12 screws. Use the Split lock M5 washers to ensure proper assembly.

Note

Mount the instrument bracket with the stamped arrow sign pointing up. Not following this instruction results in an inadequate mounting of the instrument.

Figure 4-4: Assembling the instrument bracket

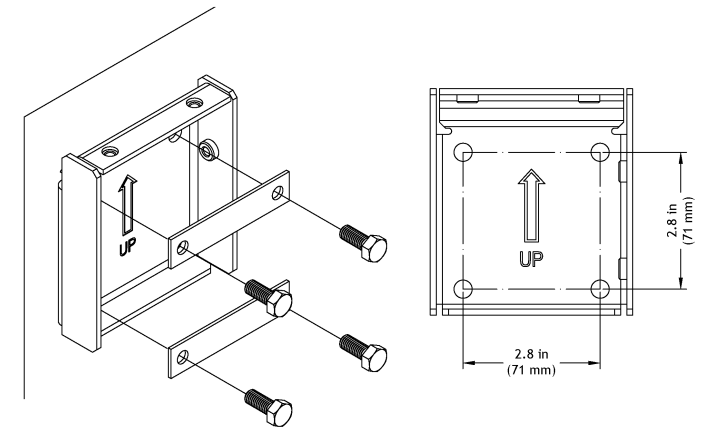
4.2.2 Wall and rack mounting

Procedure

1. Ensure that the surface is flat, rigid, and neither vibrates nor moves excessively.
2. Use 4x UNC 5/16-18 (or M8x1.25) bolts to mount the back plate on the flat surface.

Note

Mount the instrument bracket with the stamped arrow sign pointing up. Not following this instruction results in an inadequate mounting of the instrument. Emerson recommends using fasteners that can withstand the process environment. The required bolts for both wall and rack mounting are not included as part of the mounting bracket kit.

Figure 4-5: Wall and rack mounting

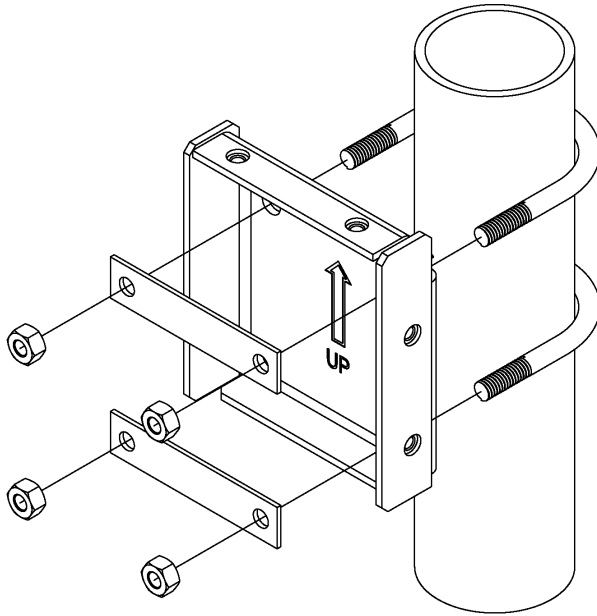
4.2.3 2-inch pole mounting

Procedure

1. Ensure that the instrument pole extends at least NaN in. (NaN mm) from a rigid base and is no more than NPS 2-in. (60.3 mm) in diameter.
2. Use 2x 2-in. UNC 5/16-18 U-bolts to mount the back plate on the pole surface. Tighten the hex nuts to ensure the back plate does not move on the pole surface. If required, use U-bolt rubber or plastic protections to increase the adhesion to the pole surface. Refer to [Figure 4-6](#).

Note

Mount the instrument bracket with the stamped arrow sign pointing up. Not following this instruction results in an inadequate mounting of the instrument.

Figure 4-6: 2-inch pole mounting


4.2.4 Attaching the instrument bracket and the back plate

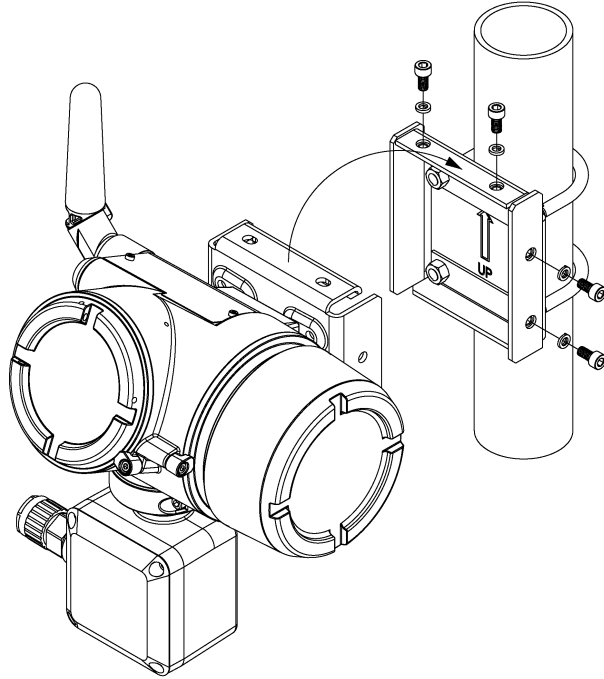
Procedure

1. Position the instrument bracket on the mounted back plate. The instrument bracket and back plate are designed to easily connect to each other. If the assembly is correct, the top and right-side holes from each plate are concentric.
2. Use 4x M6x12 screws to lock the instrument bracket to the back plate. To ensure the holes are aligned, insert all attachment bolts into place before tightening. Use the Split lock M6 washers to ensure proper assembly. Refer to [Figure 4-7](#).

Note

Mount the instrument bracket with the stamped arrow sign pointing up. Not following this instruction results in an inadequate mounting of the instrument.

Figure 4-7: Attaching the instrument bracket and back plate



4.3 Grounding the transmitter

The transmitter operates with the housing either floating or grounded; however, the extra noise in floating systems affects many types of readout devices.

If the signal appears either noisy or erratic, grounding the transmitter at a single point may solve the problem. Grounding of the electronics enclosure should be done in accordance with both local and national installation codes.

4.4 Installing the power module

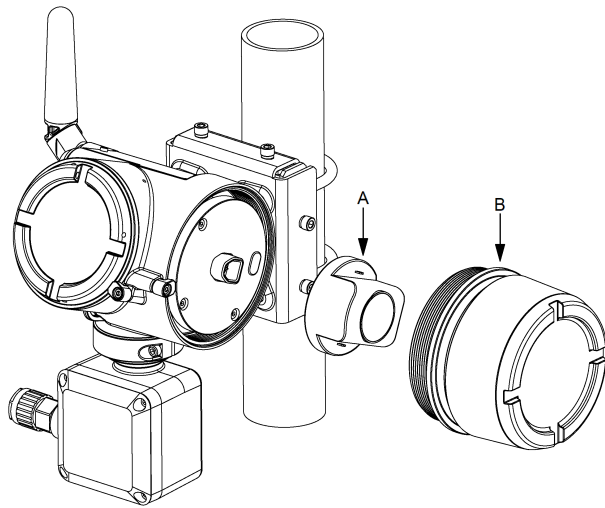
Once the Rosemount 4390 Wireless Transmitter is installed, follow the steps to install the power module.

Procedure

1. Unlock the extended cover by loosening the locking screw and remove the cover by unscrewing the cover to remove it.

2. Attach the Black Power Module to the instrument power plug. Only the Black Power Module 701PBKKF is supported by the Rosemount 4390 WirelessTransmitter. Once power module is in place, the instrument will turn on and will automatically connect to the network previously configured in [Joining to a wireless network](#).
3. Close the housing cover and tighten to safety specification. Always ensure a proper seal by installing the electronics housing covers so metal touches metal, but do not over tighten. The extended cover has an internal spring system to ensure the power module is pressed against the power plug.

Figure 4-8: Installing the power module



- A. Emerson 701P SmartPower Module – Black, model 701PBKKF
- B. Extended cover

Note

The power module can be replaced in a hazardous area.

⚠ CAUTION

The Black Power Module can be damaged if dropped from heights in excess of 20 ft. (6 m).

Use caution when handling the Black Power Module.

⚠ WARNING

Battery hazards remain when the battery is discharged.

Use care in handling batteries that are being replaced.

5 Operation and maintenance

5.1 Normal operation

Once installed and configured, the Rosemount 4390 Wireless Transmitter does not require special operating instructions or calibration. There is no need for manual calibration of the instrument. The electronics has built in on-line calibration algorithm.

Related information

[Troubleshooting](#)

[Spare parts](#)

5.2 Replacing the power module

The power module life is directly linked to the application, probe type, sampling rate and environmental and network condition.

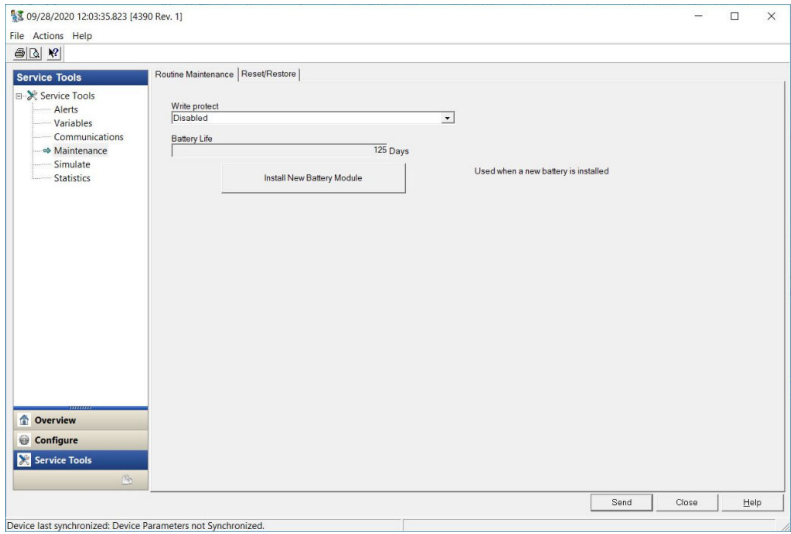
The Black Power Module life can be extended to up to 10 years with the proper configuration. For more details, see [Emerson.com/Power-Module-Life-Estimator](https://www.emerson.com/power-module-life-estimator).

Emerson recommends that you replace the power module if the battery voltage is below 5.5 volts.

When power module replacement is required, follow the instructions from [Installing the power module](#).

After the power module has been replaced, reset the power module life estimation using AMS Device Manager or AMS Trex Device Communicator.

Figure 5-1: Power module life estimation reset – AMS Device Manager



Note

As with any battery, local environmental rules and regulations should be consulted for proper management of spent batteries. If no specific requirements exist, recycling through a qualified recycler is encouraged. Consult the materials safety data sheet for battery specific information.

5.3 Troubleshooting

The following section provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, follow the procedures described here to verify transmitter hardware and process connections are in good working order. Always deal with the most likely checkpoints first.

If any condition persists after applying the recommended actions, please contact the service center.

5.3.1 Troubleshooting – device variables

- Measurement disabled
- The instrument board is always ON

- Device variable simulation active
- Power supply conditions out of range
- Environmental conditions out of range
- Device configuration locked
- Radio failure
- Probe malfunction
- Instrument board measurement failure
- Instrument board software error
- Non-volatile memory defect
- Probe life reached 0%

Measurement disabled

Alert

Measurement disabled

Recommended actions

1. Verify the software version on the instrument and power boards.
2. Reset the device.

The instrument board is always ON

Alert

Instrument board always ON

Cause

The instrument board is set to ignore power saving. The setting is only intended for software updates.

Recommended actions

Reset the device. The instrument board should never be set as "always-on" during normal operation.

Device variable simulation active

Alert

Device variable simulation active

Cause

One or more of the device variables are being forced to a simulated value and status.

Recommended actions

1. Verify simulation is no longer required.
2. Disable all simulated values.
3. Reset the device.

Power supply conditions out of range**Alert**

Power supply conditions out of range

Cause

The supply voltage is out of the specified range.

Recommended actions

Check the power module and replace it, if necessary.

Environmental conditions out of range**Alert**

Environmental conditions out of range

Cause

The device temperature is either above or below the operational limit.

Recommended actions

1. Verify environmental temperature is within the transmitter's range.
2. Protect the device from excess heat or cold beyond the allowable limits.
3. Reset the device.

Device configuration locked**Alert**

Device configuration locked

Cause

The device is in write protect mode.

Recommended actions

Verify write protect check box in **Service Tools** → **Maintenance**.

Radio failure

Alert

Radio failure

Cause

The wireless radio has detected a failure or stopped communicating.

Recommended actions

Reset the device.

Probe malfunction

Alert

Probe malfunction

Cause

Measurement values are not consistent with the selected probe type.

Recommended actions

1. Check that the correct probe type is set and perform a measurement.
2. Check the probe wiring and connections and perform a measurement.
3. Reset the device.
4. Inspect the probe and probe cable for defects and replace it, if necessary.

Instrument board measurement failure

Alert

Instrument board measurement failure

Cause

Due to an internal error, a measurement was not performed correctly.

Recommended actions

Reset the device.

Instrument board software error

Alert

Instrument board software error

Cause

Unable to read the software version on the instrument board.

Recommended actions

1. Check that the firmware version on the instrument board is correct.
2. Reset the device and perform a new measurement.

Non-volatile memory defect

Alert

Non-volatile memory defect

Cause

The device has failed to access the non-volatile memory.

Recommended actions

1. Acknowledge the alert.
2. Reset the device.
3. Reconfirm all configuration items in the device.

Probe life reached 0%

Alert

Probe life reached 0%

Cause

The probe has reached end of life and needs to be replaced.

Recommended actions

1. Check the probe wiring and connections and perform a measurement.
2. Inspect the probe and replace it, if necessary.

5.3.2 Troubleshooting – wireless network

- [Device not joining the network](#)
- [Event notification overflow](#)
- [Capacity denied](#)

- **Bandwidth allocation pending**

Device not joining the network

Alert

Device not joining the network

Cause

Measurements are disabled.

Recommended actions

1. Verify network ID and join key.
2. Verify network is in active network advertise.
3. Wait longer (30 minutes).
4. Check power module.
5. Verify the device is within range of at least one other device.
6. Power cycle device to try again.

Event notification overflow

Alert

Event notification overflow

Cause

Event queue overflow resulting in event not being recorded.

Recommended actions

Acknowledge active events.

Capacity denied

Alert

Capacity denied

Cause

The device was unable to acquire the communication bandwidth required to support the burst messaging specified.

Recommended actions

1. Reduce the update rate on the transmitter.
2. Increase communication paths by adding more wireless points.
3. Check that the device has been online for at least an hour.

4. Check that the device is not routing through a "limited" routing node.
5. Create a new network with an additional wireless gateway.

Bandwidth allocation pending

Alert

Bandwidth allocation pending

Cause

The device has asked for bandwidth from the Network Manager and is awaiting Network Manager response.

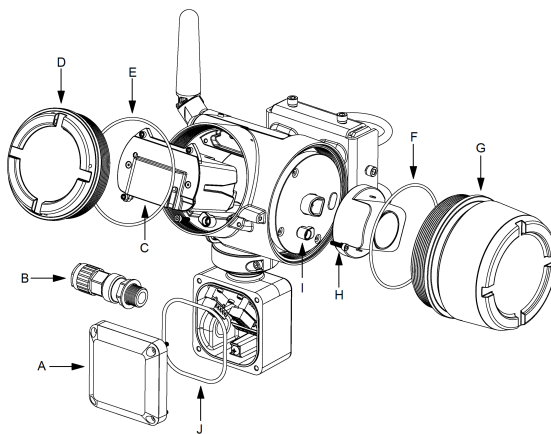
Recommended actions

1. Reduce the update rate on the transmitter.
2. Increase communication paths by adding more wireless points.
3. Check that the device has been online for at least an hour.
4. Check that the device is not routing through a "limited" routing node.
5. Create a new network with an additional wireless gateway.

5.4 Spare parts

This section lists all spare parts available for the Rosemount 4390 Wireless Transmitter.

Figure 5-2: Spare parts overview



Note

For spare parts numbers, refer to [Table 5-1](#).

Table 5-1: Spare parts list

Spare part	Pos	Qty	Description
ROXA20085693	A	1	Junction box cover ⁽¹⁾
ROXA20064359	B	1	Cable gland kit, M20x1.5, Nickel-plated brass – Option 2 (12.5-20.5mm OD / 8.4-14.3mm ID)
ROXA20064360	B	1	Cable gland kit, M25x1.5, Nickel-plated brass – Option 3 (16.9-26mm OD / 11.1-19.7mm ID)
ROXA20064367	B	1	Cable gland kit, ½"-14 NPT, Nickel-plated brass – Option 1 (5.5-12mm OD / 3.5-8.1mm ID)
ROXA20064368	B	1	Cable gland kit, ½"-14 NPT, Nickel-plated brass – Option 2 (12.5-20.5mm OD / 8.4-14.3mm ID)
ROXA20064371	B	1	Cable gland kit, ¾"-14 NPT, Nickel-plated brass – Option 3 (16.9-26mm OD / 11.1-19.7mm ID)
ROXA20064364	B	1	Cable gland kit, M20x1.5, Stainless-steel – Option 1 (5.5-12mm OD / 3.5-8.1mm ID)
ROXA20064365	B	1	Cable gland kit, M20x1.5, Stainless-steel – Option 2 (12.5-20.5mm OD / 8.4-14.3mm ID)
ROXA20064363	B	1	Cable gland kit, M25x1.5, Stainless-steel – Option 3 (16.9-26mm OD / 11.1-19.7mm ID)
ROXA20064369	B	1	Cable gland kit, ½"-14 NPT, Stainless-steel – Option 1 (5.5-12mm OD / 3.5-8.1mm ID)
ROXA20064370	B	1	Cable gland kit, ½"-14 NPT, Stainless-steel – Option 2 (12.5-20.5mm OD / 8.4-14.3mm ID)
ROXA20064372	B	1	Cable gland kit, ¾"-14 NPT, Stainless-steel – Option 3 (16.9-26mm OD / 11.1-19.7mm ID)
ROXA20066001	C	1	Electronics stack assembly

Table 5-1: Spare parts list (continued)

Spare part	Pos	Qty	Description
ROXA20085692	D	1	Electronics cover
	E	1	O-ring 100 x 2.65 mm, Buna-N 70
ROXA20085669	E	1	O-ring 100 x 2.65 mm, Buna-N 70
	F	1	O-ring 112 x 2.65 mm, Buna-N 70
	J	1	O-ring 3¼" x ⅛", Buna-N 70
ROXA20085691	F	1	O-ring 112 x 2.65 mm, Buna-N 70
	G	1	Power module extended cover assembly
ROXA20085683	H	2	Cover retainer clamp
	I	2	Screw M4x16
ROXA20085693	J	1	O-ring 3¼" x ⅛", Buna-N 70

(1) The junction box cover is delivered with locking screws.

6 Reference data

6.1 Ordering information

Visit the product website to view the current Rosemount 4390 Wireless Transmitter ordering information and documentation. The product data sheet, general arrangement drawing, and other relevant documents are available in the **Documents & Drawings** section at [Emerson.com/4390](https://emerson.com/4390).

Related information

[Physical specifications](#)

[Performance specifications](#)

[Transmitter dimensions](#)

6.2 Functional specifications

6.2.1 Input

The Rosemount 4390 Wireless Transmitter supports Electrical Resistance (ER), Linear Polarization Resistance (LPR) and Galvanic probes. For more information, see [Configure sensor type and parameters](#).

6.2.2 Wireless output

IEC 62591 (*WirelessHART*) 2.4 GHz DSSS

6.2.3 Radio frequency power output from antenna

External antenna: Maximum of 16 mW (12 dBm) EIRP.

Extended range, external antenna: Maximum of 28 mW (14.5 dBm) EIRP.

6.2.4 Humidity limits

0–95 percent relative humidity

6.2.5 Wireless update rate

User selectable, from 1 second to 60 minutes.

6.3 Physical specifications

6.3.1 Power module

The Emerson SmartPower Module - Black is field-replaceable, featuring keyed connections that eliminate the risk of incorrect installation.

The power module is an Intrinsically Safe solution, containing Lithium-thionyl chloride with a polybutadine terephthalate (PBT) enclosure.

6.3.2 Probe terminal connections

The probe terminals block is permanently fixed to the probe connection board. The terminals contain plug-in type connectors.

6.3.3 Field Communicator terminal connections

Clips permanently fixed to terminal block, designated as COMM.

6.3.4 Junction box conduit entry

M20x1.5, ½-in. -14 NPT or ¾-in. -14 NPT.

6.3.5 Material of construction

- Housing: low-copper aluminum alloy
- Painting: Polyurethane (Rosemount blue color)
- Cover o-rings: Buna-N 70
- Conduit plug: stainless steel
- Terminals: polybutadine terephthalate (PTB) and polycarbonates (PC)
- Antenna: PBT/PC integrated omni-directional antenna
- Mounting bracket kit: stainless steel

6.3.6 Weight

Estimated weight 10.14 lb. (5 kg)

6.3.7 Enclosure ratings

IP66

6.3.8 Mounting

The Rosemount 4390 Wireless Transmitter is designed for remote mounting and can be installed on wall, rack, or pipe mounting configuration. For more information, see [Field mounting](#).

6.4 Performance specifications

6.4.1 Electromagnetic compatibility (EMC)

All models of the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters meet all industrial environment requirements of EN61326-1:2013.

6.4.2 Vibration effect

Wireless output unaffected when tested per the requirements of IEC 60068-2-6 (Endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g).

Temperature limits

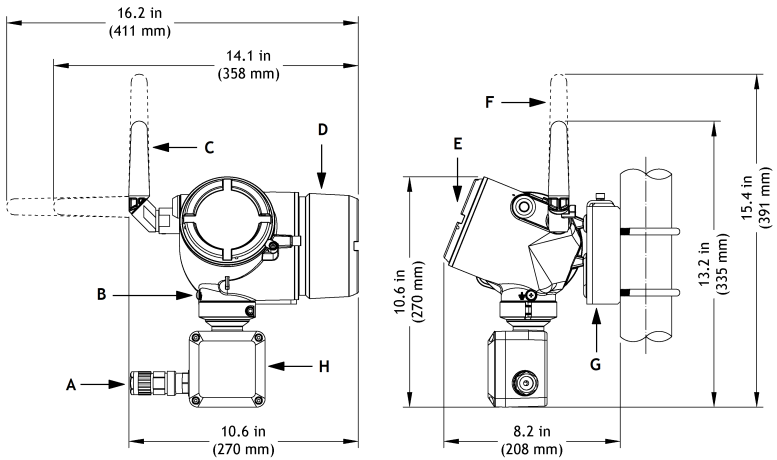
Operating limit	Storage limit
-40 °F (-40 °C) to 158 °F (70 °C)	-40 °F (-40 °C) to 158 °F (70 °C)
-40 °F (-40 °C) to 158 °F (70 °C)	-40 °F (-40 °C) to 158 °F (70 °C)

6.4.3 Instrument resolution

24-bit (0.06 ppm of probe element thickness)

6.5 Transmitter dimensions

Figure 6-1: Dimensions for the Rosemount 4390 Wireless Transmitter



- A. Probe cable gland (optional)
- B. Grounding lug
- C. 2.4 GHz external antenna
- D. Power module extended cover
- E. Electronics cover
- F. 2.4 GHz extended range, external antenna
- G. Mounting bracket kit
- H. Junction box for probe connection

7 Product certifications

Rosemount 4390 Wireless Transmitter hardware revision: Rev 0.1

Related information

[Ex approvals – Safety Parameters](#)

[Europe](#)

[International](#)

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://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.

Changes or modification to the equipment not expressly approved by Rosemount, Inc. could void the user's authority to operate the equipment.

ISED Notice

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: This device may not cause interference. This device must accept any interference, including interference that may cause undesired operation of the device.

7.4 Ex approvals – Safety Parameters

The following tables provide the safety parameters for the ER port (Table 7-1), the LPR port (Table 7-2), the Galvanic port (Table 7-3), and the HART service port (Table 7-4).

Table 7-1: Ex safety parameters - ER port

Safety parameters	Group IIB	Group IIC
Maximum output voltage	Uo: 5.9V	Uo: 5.9V
Maximum output current	Io: 1.697A	Io: 1.697A
Maximum output power	Po: 0.83W	Po: 0.83W
Maximum external capacitance	Co: 9 μ F	Co: 82nF
Maximum external inductance	Lo: 49.36 μ H	Lo: 12.34 μ H
Maximum ratio Lo/Ro for cable	56.80 μ H/ Ω	Max. 14.20 μ H/ Ω

Table 7-2: Ex safety parameters - LPR port

Safety parameters	Group IIB	Group IIC
Maximum output voltage	Uo: 5.9V	Uo: 5.9V
Maximum output current	Io: 0.235A	Io: 0.235A
Maximum output power	Po: 0.309W	Po: 0.309W
Maximum external capacitance	Co: 9 μ F	Co: 210nF
Maximum external inductance	Lo: 2.56mH	Lo: 0.64mH
Maximum ratio Lo/Ro for cable	Max. 408 μ H/ Ω	Max. 102 μ H/ Ω

Table 7-3: Ex safety parameters - Galvanic port

Safety parameters	Group IIB	Group IIC
Maximum output voltage	Uo: 5.9V	Uo: 5.9V
Maximum output current	Io: 0.180A	Io: 0.180A
Maximum output power	Po: 0.244W	Po: 0.244W
Maximum external capacitance	Co: 9 μ F	Co: 230nF

Table 7-3: Ex safety parameters - Galvanic port (continued)

Safety parameters	Group IIB	Group IIC
Maximum external inductance	LO: 4.36mH	Lo: 1.09mH
Maximum ratio Lo/Ro for cable	Max. 532μH/Ω	Max. 133μH/Ω

Table 7-4: Ex safety parameters - HART service port

Safety parameters	Group IIC
Maximum output voltage	Uo: 5.9V
Maximum output current	Io: 12.64mA
Maximum output power	Po: 18.65mW
Maximum external capacitance	Co: 420nF
Maximum external inductance	Lo: 223mH
Maximum ratio Lo/Ro for cable	Max. 1.9mH/Ω
Maximum input voltage	Ui: 1.9V
Maximum input current	Ii: 32μA
Maximum input power	Pi: 61μW
Maximum internal capacitance	Ci: 1μF
Maximum internal inductance	Li: Negligible

Note

The transmitter can only be powered with 701PBKKF SmartPower Module - Black. The whole electronics are isolated from the enclosure (boards, battery, antenna, etc.). It should withstand a 500V test between the metal body and circuits.


7.5 Europe

7.5.1 I1 ATEX Intrinsic safe

Table 7-5: I1 – ATEX Intrinsic Safety

Standards		EN IEC 60079-0:2018 and EN 60079-11:2012
Markings	The manufacturer's type identification	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters
	The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway

Table 7-5: I1 – ATEX Intrinsic Safety (continued)

Certificate	Presafe 20 ATEX 79679X
Ex marking	 II 1 G Ex ia IIC T4 Ga
Ambient temperature	-40°C ≤ Ta ≤ 70°C
Warnings	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>See the manual for battery change, for use with 701PBKKF SmartPower Module - Black.</p> <p>Use electrostatic discharge to protect against possible electrical shock.</p>
<p>Specific conditions for safe use (x):</p> <ul style="list-style-type: none"> - The external connections must be connected to intrinsically safe circuits with parameters complying with the parameters specified in this certificate and the manufacturer's installation manual. - This product – the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters – is approved with following battery pack model 701PBKKF SmartPower Module - Black. - The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled. - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - Instrument enclosure made of 100% aluminum is used, impact and friction must be avoided due to ignition hazard. - The probe outputs only connected to simple apparatus (passive circuits). All other terminals will only be connected to IS rated apparatus complying with the IS input parameters. - Separate IECEx / ATEX certified IP66 cable gland or plugs must be used. 	

7.6 International

7.6.1 I7 IECEx Intrinsic safe

Table 7-6: ATEX Intrinsic Safety

Standards	IEC 60079-0:2017 Edition 7.0 and IEC 60079-11: 2011 Edition 6.0
Markings	The manufacturer's type identification
	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters

Table 7-6: ATEX Intrinsic Safety (continued)

The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
Certificate	IECEX PRE 20.0096X
Ex marking	Ex ia IIC T4 Ga,
Ambient temperature	-40°C ≤ Ta ≤ 70°C
Warnings	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>See the manual for battery change, for use with 701PBKKF SmartPower Module - Black.</p> <p>Use electrostatic discharge to protect against possible electrical shock.</p>
<p>Specific conditions for safe use (x):</p> <ul style="list-style-type: none"> - The external connections must be connected to intrinsically safe circuits with parameters complying with the parameters specified in this certificate and the manufacturer’s installation manual. - This product – the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters – is approved with following battery pack model 701PBKKF SmartPower Module - Black. - The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled. - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - Instrument enclosure made of 100% aluminum is used, impact and friction must be avoided due to ignition hazard. - The probe outputs only connected to simple apparatus (passive circuits). All other terminals will only be connected to IS rated apparatus complying with the IS input parameters. - Separate IECEX / ATEX certified IP66 cable gland or plugs must be used. 	

7.7 Japan

7.7.1 I4 CML Intrinsic safe

Table 7-7: CML Intrinsic Safety

Standards		JNIOOSH-TR-46-1:2015, JNIOOSH-TR-46-6:2015
Markings	The manufacturer’s type identification	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters

Table 7-7: CML Intrinsic Safety (continued)

The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
Certificate	CML 21JPN2636X
Ex marking	Ex ia IIC T4 Ga
Ambient temperature	-40°C ≤ Ta ≤ 70°C
Warnings	<div style="background-color: #FF8C00; padding: 5px;">⚠ WARNING</div> <p>See the manual for battery change, for use with 701PBKKF SmartPower Module - Black.</p> <p>Use electrostatic discharge to protect against possible electrical shock.</p>
<p>Specific conditions for safe use (x):</p> <ul style="list-style-type: none"> - The external connections must be connected to intrinsically safe circuits with parameters complying with the parameters specified in this certificate and the manufacturer's installation manual. - This product – the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters – is approved with following battery pack model 701PBKKF SmartPower Module - Black. - The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled. - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - Instrument enclosure made of 100% aluminum is used, impact and friction must be avoided due to ignition hazard. - The probe outputs only connected to simple apparatus (passive circuits). All other terminals will only be connected to IS rated apparatus complying with the IS input parameters. - IP66 cable gland or plugs must be used. 	


7.8 North America

7.8.1 IS CSA USA Intrinsic safe

Table 7-8: CSA USA Intrinsic Safety

Standards	ANSI/IEC 60529-2016, UL 61010-1 Third Edition, UL 60079-0-2019 Seventh Edition, UL 60079-11 Sixth Edition
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Table 7-8: CSA USA Intrinsic Safety (continued)

Markings	The manufacturer's type identification	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters
	The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
	Certificate	CSA 21.80088656
	Ex marking	Class I, Zone 0, AEx ia IIC T4 Ga Class I, Division 1, Groups A, B, C & D T4
	Ambient temperature	-40°C ≤ Ta ≤ 70°C
	Warnings	<div style="background-color: #f4a460; padding: 5px; display: inline-block;">  WARNING </div> <p>Substitution of components may impair Intrinsic Safety</p> <p>Battery pack model 701PBKKF SmartPower module should only be used.</p>

Conditions of certification:

- The plastic enclosure of the battery pack may constitute a potential electrostatic ignition risk and caution should be used when being handled.

Note

This condition of use does not apply after a battery pack module is installed in the enclosure.

- The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.
- The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled.
- The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.
- The instrument enclosure made of 100% aluminum; impact and friction must be avoided to prevent ignition hazard.
- Certified cable gland or plugs shall be used providing IP66 or better suitable for working ambient temperature range.

7.8.2 I6 CSA Canada Intrinsic safe

Table 7-9: CSA Canada Intrinsic Safety

Standards		CAN/CSA-C22.2 No. 60529:16, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSA-C22.2 No. 60079-0:19 and CAN/CSA-C22.2 No. 60079-11:14
Markings	The manufacturer's type identification	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters
	The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
	Certificate	CSA 21.80088656
	Ex marking	Ex ia IIC T4 Ga Class I, Division 1, Groups A, B, C & D T4
	Ambient temperature	-40°C ≤ Ta ≤ 70°C
	Warnings	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>Substitution of components may impair Intrinsic Safety</p> <p>Battery pack model 701PBKKF SmartPower module should only be used.</p> <p>La Substitution de composants peut nuire à la Sécurité Intrinsèque</p> <p>Le module de batterie modèle 701PBKKF SmartPower doit être utilisé uniquement.</p>
<p>Conditions of certification:</p> <ul style="list-style-type: none"> - The plastic enclosure of the battery pack may constitute a potential electrostatic ignition risk and caution should be used when being handled. <p>Note</p> <p>This condition of use does not apply after a battery pack module is installed in the enclosure.</p> <ul style="list-style-type: none"> - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - The instrument enclosure made of 100% aluminum; impact and friction must be avoided to prevent ignition hazard. - Certified cable gland or plugs shall be used providing IP66 or better suitable for working ambient temperature range. 		

7.9 Brazil

7.9.1 I2 INMETRO Intrinsic safe

Table 7-10: INMETRO Intrinsic Safety

Standards		ABNT NBR IEC 60079-0:2020, ABNT NBR IEC 60079-11:2017
Markings	The manufacturer's type identification	Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters
	The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
	Certificate	DNV 21.0269X
	Ex marking	Ex ia IIC/IIB/IIA T4 Ga
	Ambient temperature	-40°C ≤ Ta ≤ 70°C
	Warnings	 Attention Consulte as instruções do manual para troca de bateria. Apenas para uso com o modulo de energia 701PBKKF SmartPower Module - Black.
<p>Specific conditions for safe use (x):</p> <ul style="list-style-type: none"> - The external connections must be connected to intrinsically safe circuits with parameters complying with the parameters specified in this certificate and the manufacturer's installation manual. - Transmitters – is approved with following battery pack model 701PBKKF SmartPower Module - Black. - The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled. - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - Instrument enclosure made of 100% aluminum is used, impact and friction must be avoided due to ignition hazard. - The probe outputs only connected to simple apparatus (passive circuits). All other terminals will only be connected to IS rated apparatus complying with the IS input parameters. - IP66 cable gland or plugs must be used. 		

7.10 Eurasian Economic Union

7.10.1 IM EAC Intrinsic safe

Table 7-11: EAC Intrinsic Safety

Standards		ГОСТ 31610.0-2019 and ГОСТ 31610.11-2014
Markings	The manufacturer's type identification	Rosemount4390 Series of Corrosion and Erosion Wireless Transmitters
	The name of the manufacturer and the address	Roxar Flow Measurements AS Gamle Forusveien 17, Stavanger, Norway
	Certificate	EAЭC KZ 7500525.01.01.00624
	Ex marking	Ex ia IIC T4 Ga
	Ambient temperature	-40°C ≤ Ta ≤ 70°C
	Warnings	<div style="background-color: #ff8c00; padding: 5px; display: inline-block;">⚠ WARNING</div> See the manual for battery change, for use with 701PBKKF SmartPower Module - Black. Use electrostatic discharge to protect against possible electrical shock.
<p>Specific conditions for safe use (x):</p> <ul style="list-style-type: none"> - The external connections must be connected to intrinsically safe circuits with parameters complying with the parameters specified in this certificate and the manufacturer's installation manual. - This product – the Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters – is approved with following battery pack model 701PBKKF SmartPower Module - Black. - The plastic enclosure of the battery pack model mentioned above may constitute a potential electrostatic ignition risk and caution should be used when being handled. - The plastic antenna and the painted enclosure may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth. - Instrument enclosure made of 100% aluminum is used, impact and friction must be avoided due to ignition hazard. - The probe outputs only connected to simple apparatus (passive circuits). All other terminals will only be connected to IS rated apparatus complying with the IS input parameters. - IP66 cable gland or plugs must be used. 		

A Declaration of conformity



EU Declaration of Conformity

ROXA20082507/AB

We **Roxar Flow Measurement AS**
 Gamle Forusveien 17
 4031 Stavanger
 Norway

declare under our sole responsibility that the product,

4390 Series Wireless Corrosion and Erosion transmitter

Manufactured by: **Roxar Flow Measurement AS**
 Gamle Forusveien 17
 4031 Stavanger
 Norway

to which this declaration relates, is in conformity with the provisions of the European Community Directives including the latest amendments, as shown in the attached schedule.

Presumption of conformity is based on the application of the harmonized standards, normative documents or other documents and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.



Digitally signed by Stig Sigdestad
 DN: cn=Stig Sigdestad, o=Roxar Flow
 Measurement AS, ou=ROXA,
 email=stig.sigdestad@emerson.com, c=NO
 Date: 2022.03.04 14:21:22 +01'00'

(signature)

Stig Sigdestad

(name printed)

Director Quality & HSE

(function name – printed)

4th March 2022

(date of issue)

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Schedule

EU Declaration of Conformity No: ROXA20082507/AB

<p>Directive 2014/30/EU Harmonized Standards: EN 61326-1: 2013</p>	<p>Electromagnetic compatibility (EMC)</p>
<p>Directive 2014/53/EU Harmonized Standards: EN 300 328 V2.2.2</p> <p>Other standards: EN 301 489-1 V2.2.3 EN 301 489-17: V3.2.4 EN 62311 EN 61010-1:2010/A1:2019</p>	<p>Radio Equipment Directive (RED)</p>
<p>Directive 2011/65/EU Harmonized Standards: EN IEC 63000:2018</p>	<p>Restriction of the use of certain hazardous substances (ROHS 2)</p>
<p>Directive 2014/34/EU Harmonized Standards: EN IEC 60079-0:2018, EN 60079-11:2012 Certificate no.:</p>	<p>Equipment for explosive atmospheres (ATEX)</p> <p>Presafe 20 ATEX 79679X</p>
<p>Ex marking:</p>	<p>Equipment Group II Category 1 G Ex ia IIC T4 Ga</p>

Additional information:

Notified Body for

ATEX EU type Examination Certificate (Presafe 20 ATEX 79679X)

DNV Product Assurance AS
 Veritasveien 3
 1363 Hovik, Norway

ATEX Production Quality Assurance Notification (Presafe 16 ATEX 8258Q)

DNV Product Assurance AS
 Veritasveien 3
 1363 Hovik, Norway

B Mapping of device variable index numbers

To integrate a device into the host system, it may be necessary to know what each device variable represents, and what index number it has been assigned to. The variable index number is an arbitrary number used to uniquely identify each variable supported in the field device.

[Table B-1](#) and [Table B-2](#) displays the device variable and variable mapping indexes for the Rosemount 4390 Wireless Transmitter.

Table B-1: Device variables index

Device variable	Index	Notes
0	Metal loss 1	Used for Multiple ER probes
1	Metal loss 2	
2	Metal loss 3	
3	Metal loss 4	
4	Element 1	
5	Reference for Element 1	
6	Element 2	
7	Reference for Element 2	
8	Element 3	
9	Reference for Element 3	
10	Element 4	
11	Reference for Element 4	
12	Board temperature	Electronics temperature
13	Probe life	Only applicable for ER probes
14	Galvanic current	Used for Galvanic probes
15	Metal loss average	Used for Multiple ER probes
16	Corrosion rate	Used for LPR probes
17	LPR current	
18	LPR voltage	
19	Metal loss ER	Used for Multiple ER probes and Single ER probes
20	ER element	

Table B-1: Device variables index (continued)

Device variable	Index	Notes
21	Reference for ER element	
242	Battery voltage	None
243	Battery life	None

Table B-2: Device variable mapping index

Device variable	Index
PV	Metal loss average for Multiple ER probe Metal loss for Single ER probe Corrosion rate for LPR probe Galvanic current for Galvanic probe
SV	Board temperature
TV	Battery voltage
QV	Probe life for ER probes only

C Limits for user defined alerts

Variable	Lower Sensor Limit	Upper Sensor Limit
Metal Loss	0	90% from probe thickness
Element Resistance	1	100
Reference Resistance	1	100
Board Temperature	-40	125
Probe Life	0	100
Galvanic Current	0.000005	1
LPR Corrosion Rate	0.00000147	97.2
LPR Current	0.00002	0.135
LPR Voltage	0.5	30
Battery Voltage	4.8	10
Battery Life	NaN	NaN

Note

1. Trigger point is between LSL and USL and dead band is a fractional value between 0 and 1;
2. If the alert is rising, then $(\text{set point} - \text{dead band}) < \text{LSL}$ or $\text{set point} > \text{USL}$;
3. If the alert is falling, then $(\text{set point} + \text{dead band}) > \text{USL}$ or $\text{set point} < \text{LSL}$.



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