

# Rosemount™ 928 Wireless Gas Monitor

Integrated Wireless Gas Monitoring



## Safety information

Read this Quick Start Guide before working with 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. Central Time)

National Reponse Center: 1 800 654 7768 (24 hours a day) for equipment service needs

International: 1 952 906 8888

## NOTICE

This guide provides configuration and basic installation information for the Rosemount™ 928. It does not provide diagnostic, maintenance, service, troubleshooting, Intrinsically Safe (I.S.) installation, or ordering information. Refer to the Rosemount 928 Wireless Gas Monitor [Reference Manual](#) for more information.

The manual and this guide are also available electronically on [Emerson.com/Rosemount](http://Emerson.com/Rosemount).

## NOTICE

Read this document before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product. For technical assistance, contacts are listed below:

### Customer Central

Technical support, quoting, and order-related questions.

United States - 1-800-999-9307 (7:00 am to 7:00 pm Central Time)

Asia Pacific- 65 777 8211

Europe/Middle East/Africa - 49 (8153) 9390

### North American Response Center

Equipment service needs.

1-800-654-7768 (24 hours—including Canada)

Outside of these areas, contact your local Emerson representative.

## ⚠ WARNING

### Explosions

Explosions could result in death or serious injury.

Ensure that only qualified personnel perform the installation.

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

Before connecting a handheld communication device in an explosive atmosphere, ensure the instruments are installed in accordance with Intrinsically Safe or non-incendive field wiring practices.

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

When connecting an external device to the Rosemount 928's discrete output in a hazardous area, ensure that the external device is installed in accordance with Intrinsically Safe or non-incendive field wiring practices.

**⚠ WARNING****Electrical shock**

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

**⚠ CAUTION****Nuclear applications**

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.

**⚠ CAUTION****Installation problems**

Only install the Rosemount 928 and all other wireless devices after the Wireless Gateway has been installed and is functioning properly. Power up wireless devices in order of proximity from the Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

**⚠ CAUTION****Shipping considerations for wireless products**

Battery hazards remain when cells are discharged.

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

Each power module contains two "C" size primary lithium batteries. Primary lithium batteries are regulated in transportation by the US 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 shipper's responsibility to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

The power module with the wireless unit contains two "C" size primary lithium/thionyl chloride batteries. Each battery contains approximately 2.5 grams of lithium, for a total of 5 grams in each pack. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the pack integrity are maintained. Take care to prevent thermal, electrical, or mechanical damage. Protect contacts to prevent premature discharge.

Power modules should be stored in a clean and dry area. For maximum battery life, storage temperature should not exceed 86 °F (30 °C).

The power module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Take care during transportation to and from the point of installation to prevent electrostatic charge buildup.

**⚠ 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.

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# 1 Overview

The Rosemount™ 928 Wireless Gas Monitor is used with the Rosemount 628 Series of sensor modules.

The sensor fits integrally into the transmitter without the use of tools. Make electrical connections when the sensor module is fully seated in the transmitter sensor housing.

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## Note

Use Rosemount 928 only with the Rosemount 928 Transmitter.

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## CAUTION

### **The Ingress Protection (IP) filter must be installed.**

If the IP filter is not installed, damage may occur to the sensor inside the Rosemount 628.

Do not operate the transmitter without the correct IP filter installed in the sensor module.

When installing the IP filter, verify that the IP filter gasket is in place, is properly aligned, and that it does not block the white filter media. Refer to [Figure 1-1](#).

When handling the IP filter, avoid contact with the filter media.

Verify that all three legs are fully latched by pushing upward on each leg of the IP filter.

Avoid getting water inside the IP filter.

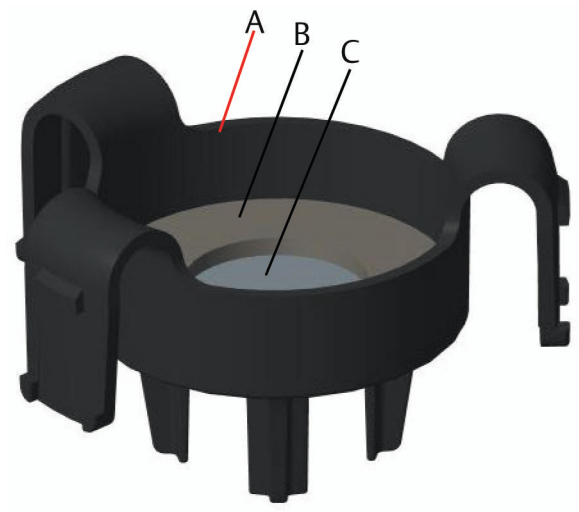
Do not attempt to clean the IP filter.

Do not rinse or spray the IP filter with water.

Do not immerse the IP filter in water.

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**Figure 1-1: IP Filter**



- A. *IP filter housing*
- B. *IP filter gasket*
- C. *Filter media*

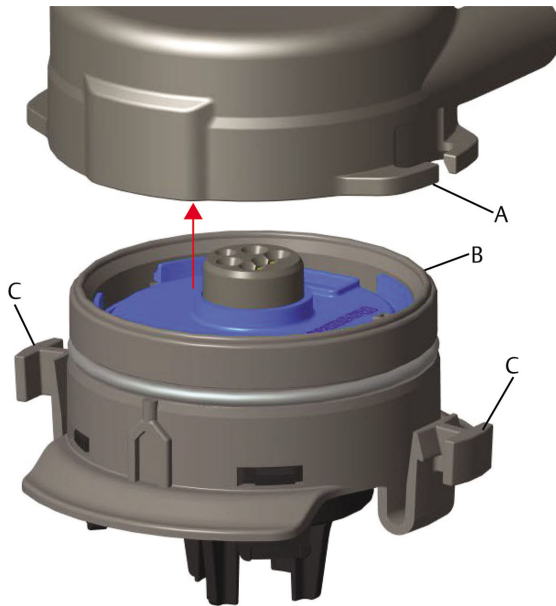
## 2 Install the sensor

The sensor is held in place using a tight-fitting seal and snap connections. The sensor is connected to the transmitter by two latching tabs that fit into the bottom portion of the housing as shown in the figure below. The seal between the transmitter housing and the sensor assembly is designed so that a snug, airtight fit is achieved between the two assemblies when properly installed.

### Procedure

1. Remove the sensor from its packaging.
2. If installing a sensor on the transmitter for the first time, remove the protective plastic cap from the sensor housing at the bottom of the transmitter.
3. The sensor contains a keying feature that ensures that it cannot be forced into the transmitter housing in an incorrect alignment. Confirm that the keying feature is aligned by rotating it into position before installing the module into the transmitter.
4. Slide the sensor assembly up into the transmitter housing until it is completely seated.

**Figure 2-1: Inserting the Sensor into the Transmitter**



- A. Rosemount 928 Transmitter housing
- B. Rosemount 628 Universal Gas Sensor
- C. Latching tabs

5. To ensure a firm latch and seal, push the module upward until the two latching tabs are fully engaged. Push up on the bottoms of the latching tabs after they are seated.
6. Allow the transmitter to warm up before continuing.

Refer to the following table for maximum warm up times based on gas type. During the warm up period, the displayed values, alerts, and gas concentrations will not reflect actual measurements; readings will not be transmitted.

Gas type	Maximum warm up period
Hydrogen sulfide (H <sub>2</sub> S)	One minute
Oxygen (O <sub>2</sub> )	Seven minutes
Carbon monoxide (CO)	One minute



**Postrequisites**

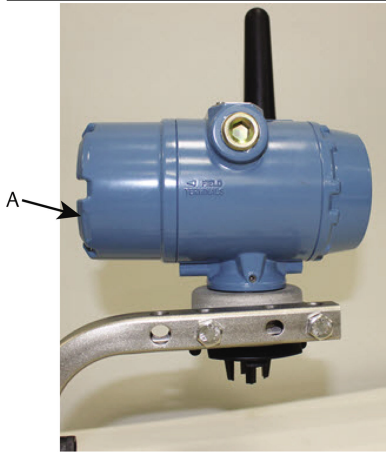
To remove the sensor, compress the latching tabs and pull downward until it is released from the transmitter housing.

### 3 Install the power module

To perform configuration, the sensor must be installed in a functional transmitter. The transmitter is powered by the Emerson 701 SmartPower™ Module - Black.

#### Procedure

1. Remove the rear housing cover.



A. Rear housing cover

2. Connect the Emerson 701 SmartPower Module - Black.



3. Verify the connection by viewing the LCD display.

4. Replace the rear housing cover and completely tighten.
5. Allow the transmitter to warm up before continuing.

Refer to [Table 3-1](#) for maximum warm up times based on gas type. During the warm up period, the displayed values, alerts, and gas concentrations do not reflect actual measurements; readings are not transmitted.

**Table 3-1: Maximum Warm up Periods**

<b>Gas type</b>	<b>Maximum warm up period</b>
Hydrogen sulfide (H <sub>2</sub> S)	One minute
Oxygen (O <sub>2</sub> )	Seven minutes
Carbon monoxide (CO)	One minute

## 4 Bench configuration

The transmitter receives any HART® communication from a handheld Field Communicator or from an AMS Wireless Configurator.

Remove the rear housing cover to expose the terminal block and HART communication terminals; then connect the power module to power the device for configuration.

### 4.1 Bench configure using a Field Communicator

A transmitter Device Description (DD) is required for HART® communication.

To connect to the transmitter using a handheld communication device, refer to [Guided setup](#). To obtain the latest DD, go to [EmersonProcess.com/DeviceFiles](https://EmersonProcess.com/DeviceFiles) and then visit the Emerson web page for your handheld device.

#### Procedure

1. On the **Home** screen, select **Configure**.
2. Do one of the following:
  - On the **Configure** screen, select **Guided Setup** to verify or change initial configuration settings. Refer to [Guided setup](#). Refer to the Field Communicator subsections for each configuration task.
  - On the **Configure** screen, select **Manual Setup** to verify or change all configuration settings, including optional advanced settings. Refer to [Manual setup](#). Refer to the Field Communicator subsections for each configuration task.
3. When finished, select **Send** to implement configuration changes.
4. When configuration is completed, remove the HART communications leads from the COMM terminals on the terminal block and replace the rear housing cover.

### 4.2 Bench configure AMS Wireless Configurator

AMS Wireless Configurator is capable of connecting to devices directly, using a HART® modem, or through a Wireless Gateway.

#### Procedure

1. In the **AMS Device Explorer** pane, select the HART Modem 1.
2. In the device pane, double-click the device icon.
3. Select **Configure**.
4. In the **Configure** pane, do one of the following:

- Select Guided Setup to verify or change initial configuration settings. Refer to [Guided setup](#). Refer to the AMS Wireless Configurator subsections for each configuration task.
  - Select Manual Setup to verify or change all configuration settings, including optional advanced settings. Refer to [Manual setup](#). Refer to the AMS Wireless Configurator subsections for each configuration task.
5. When finished, select **Send** to implement configuration changes.

## 5 Guided setup

Guided setup contains basic configurations settings. The **Guided Setup** menus are useful during initial configuration.

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### Note

Emerson developed the Field Communicator Guided Setup configuration procedures using Emerson AMS Trex™ Device Communicator. The menus are identical to those found in other Field Communicators, but are navigated using touch screens rather than fast keys. Refer to the manual for your handheld communicator device for more information.

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### Procedure

1. Remove the rear housing.

2. **⚠ WARNING**

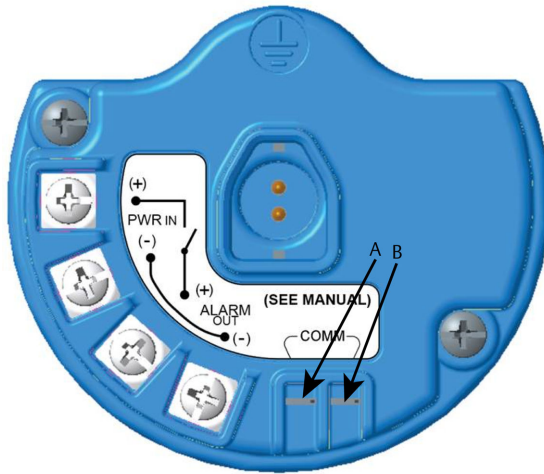
### Explosions

Do not connect to the COMM terminals when an explosive atmosphere is present.

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Connect the HART® communication leads to the HART terminals on the handheld communicator.

3. Connect the HART communication leads to the COMM terminals on the transmitter terminal block (A and B).



- A. +Comm terminal
- B. -Comm terminal

4. Start your handheld communicator device. If necessary, open the HART Field Communicator application on your handheld device to establish HART communication.  
Refer to the manual for your handheld communicator device for more information.
5. On the **Overview** screen, select **Configure**.
6. On the **Configure** screen, select **Guided Setup**.
7. Perform each of the configuration tasks in the following subsections.

## 5.1 Basic setup

### 5.1.1 Basic setup using Field Communicator

#### Procedure

1. On the **Guided Setup** screen, select **Basic Setup**.
2. On the **Device Information** screen, select any of the following and configure as needed. Otherwise, continue with [Step 3](#).
  - **Long tag:** Enter an identifier for the device up to 32 characters long using the virtual keypad. The Long tag field is blank by default and does not display if left blank.

- **Tag:** Enter an identifier for the device up to eight uppercase alphabetic and numeric characters long using the virtual keypad. The Tag field is blank by default and does not display if left blank.
  - **Descriptor:** Enter a description of the device up to 16 alphabetic, numeric, and special characters long. The Descriptor field is blank by default and does not display if left blank.
  - **Message:** Enter a message up to 32 alphabetic, numeric, and special characters long. The Message field is blank by default, does not display if left blank, and may be used for any purpose.
3. On the **Device Information** screen, select **Next**.
  4. On the **Basic Setup** screen, select **OK** to confirm successful completion of basic setup.

### 5.1.2 Basic setup using AMS Wireless Configurator

#### Procedure

1. On the **Guided Setup** tab, in the Initial Setup field, select **Basic Setup**.
2. On the **Device Information** tab, configure any of the following as needed. Otherwise, continue with [Step 3](#).
  - **Long tag:** Enter an identifier for the device up to 32 characters long using the virtual keypad. The Long tag field is left blank by default and does not display if left blank.
  - **Tag:** Enter an identifier for the device up to eight uppercase alphabetic and numeric characters long using the virtual keypad. The Tag field is blank by default and does not display if left blank.
  - **Descriptor:** Enter a descriptor of the device up to 16 alphabetic, numeric, and special characters long. The Descriptor field is blank by default and does not display if left blank.
  - **Message:** Enter a message up to 32 alphabetic, numeric, and special characters long. The Message field is left blank by default, does not display if left blank, and may be used for any purpose.
3. On the **Basic Setup** screen, select **Next**.
4. Select **Finish**.

## 5.2 Joining the transmitter to a wireless network

To communicate with the Wireless Gateway and the host system, you must use the wireless network to configure the transmitter.

This procedure is the wireless equivalent of connecting wires from a transmitter to the host system. Using Field Communicator or AMS Wireless Configurator, enter the network ID and join key so that they match the



network ID and join key of the Wireless Gateway and other devices in the network. If the network ID and join key are not identical, the transmitter will not communicate with the network. You can obtain the network ID and join key from the Wireless Gateway on the **Setup** → **Network** → **Settings** page on the web server.

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**Note**

The amount of time required to join the new device or devices to the network is dependent on the number of devices being joined and the number of devices in the current network. One new device joining an existing network with multiple devices may take up to five minutes. Multiple new devices joining an existing network may take up to 60 minutes.

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### 5.2.1 Join a wireless network using Field Communicator

**Procedure**

1. On the **Guided Setup** screen, select **Join to Network**.
2. On the **Join to Network** screen, use the numeric keypad to enter the *WirelessHART*<sup>®</sup> network ID.  
The network ID must match the Wireless Gateway network ID. Refer to the **System Settings** → **Network** → **Network Settings** page in the Wireless Gateway web-based user interface for the network ID.
3. Select **OK**.
4. On the **Join Key** screen, use the hexadecimal keypad to enter the first part of the join key.  
The join key must match the Wireless Gateway join key. Refer to the **System Settings** → **Network** → **Network Settings** page in the Wireless Gateway web-based user interface for the join key.
5. Select **OK**.
6. Repeat [Step 4](#) and [Step 5](#) to configure the remaining keys to join the Wireless Gateway.

### 5.2.2 Join a wireless network using AMS Wireless Configurator

**Procedure**

1. On the **Guided Setup** tab, in the Wireless field, select **Join Device to Network**.
2. On the **Join Device to Network** tab, enter the network ID and join key.
3. Select **Next**.
4. Follow the steps in the wizard to complete the network configuration.

## 5.3 Update rate considerations

Before configuring the wireless update rate for your wireless devices, evaluate the safety concerns, conditions, and wireless network in your facility to select the current update rate to meet your needs.

When specifying the update rate, consider the potential for toxic gas release, the severity of potential gas concentration that may be released, and whether the device is located in a populated area. The default update rate is eight seconds and is appropriate for most applications. You may use a more frequent update rate if desired. A less frequent update rate extends transmitter power module life and optimizes Wireless Gateway device capacity.

Consider the speed with which you want to be alerted to a dangerous condition of toxic gas. Emerson does not recommend reporting by exception for the Rosemount 928 Wireless Gas Monitors or Emerson Wireless Gateways due to its potential adverse effect on Wireless Gateway capacity and network integrity. Therefore, select an update rate for all wireless gas monitors that corresponds to the safety needs of your facility but does not exceed the capacity of the Wireless Gateway or your wireless network.

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### Note

The configured wireless update rate does not affect the LCD display and the optional alarm output (if installed) update rates.

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### 5.3.1 Configure the update rate using Field Communicator

#### Procedure

1. On the **Guided Setup** screen, select **Configure Update Rate**.
2. On the **Configure Update Rate** screen, do one of the following:
  - a. For an update rate from 1 to 60 seconds, select an update rate from the list.
  - b. Select **OK**.
  - a. For update rates greater than 60 seconds, select 61-3600 seconds from the list.
  - b. Enter the update rate in number of seconds. For example, enter 1800 seconds for 30 minutes.
  - c. Select **OK**.

3. On the Emerson **Wireless Gateway Optimizations** screen, select Yes - Enable Optimizations to save and use wireless optimizations or select No - Disable Optimizations to reject wireless optimizations.

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**Note**

Wireless gateway optimizations combine process measurement and device diagnostic messages from field devices to the wireless gateway, saving network bandwidth. If you don't use optimizations, you will need more message packets to receive the same amount of information. Emerson recommends enabling wireless gateway optimizations unless they are incompatible with the wireless gateway.

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4. Select **OK**.
5. On the **Configure Update Rate** screen, select **OK** to confirm successful update rate configuration.

### 5.3.2 Configure the update rate using AMS Wireless Configurator

#### Procedure

1. On the **Guided Setup** tab, in the Wireless field, select **Configure Update Rate** to configure the frequency at which the device reports measurement and diagnostic information.
2. On the **Configure Update Rate** screen, do one of the following:
  - a. Select an update rate from 1 to 60 seconds from the list.
  - b. Select **Next**.
  - a. Select 61-3600 from the list.
  - b. Type the number of seconds for an update rate from 61 seconds to 60 minutes. For example, enter 1800 seconds for 30 minutes.
  - c. Select **Next**.
3. On the **Wireless Gateway Optimization** screen, select Yes - Enable Optimizations to save and use wireless optimizations or select No - Disable Optimizations to reject wireless optimizations.

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**Note**

Wireless gateway optimizations combine process measurement and device diagnostic messages from field devices to the wireless gateway, saving network bandwidth. If you don't use optimizations, you will need more message packets to receive the same amount of information. Emerson recommends enabling wireless gateway

optimizations unless they are incompatible with the wireless gateway.

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4. Select **Next**.
5. Select **Next** and then select **Finish** to save the update rate configuration.

## 5.4 Configuring the device display mode

The device display mode defines whether or how frequently the LCD display is turned on to display selected dynamic variables screens. Disabling the display mode or selecting a less frequent display mode extends power module life.

### 5.4.1 Configure the device display mode using Field Communicator

#### Procedure

1. On the **Guided Setup** screen, select **Configure Device Display**.
2. On the **Device Display Options** screen, select one of the following display mode options.
  - **Disabled:** The display is turned off. This is useful if the display will never be viewed locally.
  - **On Demand:** The display is on when the gas monitor is connected to a handheld communication device or when it receives a signal from its wireless gateway.
  - **Periodic:** The display is on only during updates at the configured update rate.
  - **High Availability:** The display is always on regardless of the configured update rate. This is the default display mode option.
3. Select **OK** to save the selected device display options.

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#### Note

When a handheld communication device is connected to the transmitter, the LCD display is in High Availability mode. Selecting and accepting the On Demand or Periodic options does not take effect until approximately five minutes after the handheld communicator device is disconnected. Selecting and displaying Disabled takes effect immediately.

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## 5.4.2 Configure the device display mode using AMS Wireless Configurator

### Procedure

1. On the **Guided Setup** tab, in the Optional Setup field, select **Configure Device Display**.
2. Select one of the following display mode options:
  - **Disabled:** The display is turned off. This is useful if the display will never be viewed locally.
  - **On Demand:** The display is on when the gas monitor is connected to a handheld communication device or when it receives a signal from its wireless gateway.
  - **Periodic:** The display is on only during updates at the configured update rate.
  - **High Availability:** The display is always on regardless of the configured update rate. This is the default display mode option.
3. Follow the steps in the wizard to configure the device display mode.

## 5.5 Configuring process alerts

Process alerts allow you to configure the device to send a HART® message when the configured data point is exceeded. Alerts remain active if the set points are exceeded and the alert mode is ON. Process alerts are displayed on a handheld communication device, on the AMS Device Manager status screen, on the Wireless Gateway web interface, on host systems with which the Wireless Gateway communicates, and in the error section of the LCD display (if so configured).

The gas concentration may be latched. If you select Latch Concentration Alarms, the alarm output is latched until the alert is manually cleared. You can manually reset a latched gas concentration alarm by removing and reinstalling the power module. Refer to the *Removing the power module* section in the Rosemount 928 Wireless Gas Monitor [Reference Manual](#) and [Install the power module](#). Latched alarms do not remain latched following a device reset or power model failure.

You can reset a latched gas concentration alarm by using Field Communicator or AMS Wireless Configurator. Refer to the *Clearing latched alarms* section in the [Reference Manual](#) for information about clearing latched alarms. If you select Not Latched, the gas concentration alarm clears automatically when the gas concentration level dissipates below the specified High Concentration Threshold.

Clearing alert history clears process alert history for other alerts, but does not clear latched gas concentration alerts. Refer to the *Clearing process alarm*

*history* section in the [Reference Manual](#). You may query alert history for other process alerts to determine whether they have been active.

### 5.5.1 Configure process alerts using Field Communicator

#### Procedure

1. On the **Guided Setup** screen, select **Configure Process Alerts**.
2. On the **Process Alerts** screen, select a process alert to configure.
3. On the selected process alert screen, select **Mode**.
4. On the **Mode** screen, select **Enabled**.
5. Select **OK**.
6. On the **Alert Limit** screen, use the numeric keypad to enter an alert limit for the selected process alert based on your needs and local regulations.
7. Select **OK**.
8. On the selected process alert screen, select **Next**.
9. On the **Configure Process Alerts** screen, select **OK** to confirm successful process alert configurations.
10. Repeat [Step 2](#) through [Step 9](#) as necessary to configure additional process alerts.

### 5.5.2 Configure process alerts using AMS Wireless Configurator

#### Procedure

1. On the **Guided Setup** tab, in the Optional Setup field, select **Configure Process Alerts**.  
The **Process Alerts** window is displayed.
2. In the **Mode** list, in the HI-HI Alarm field, select **Enabled** to enable the alarm.
3. In the **Alert Limit** box, enter an alert limit for the selected process alert based on your needs and local regulations.
4. Repeat [Step 2](#) and [Step 3](#) if necessary to configure the Hi Alarm process alert.
5. Select **Next**.
6. Select **Next** to confirm successful process alert configuration.
7. Select **Finish**.

## 6 Calibrating the sensor

Calibrating the sensor ensures that the analog, digital, and discrete outputs accurately transmit the target gas concentrations registered by the module. Although Emerson calibrated the device at the factory, you must calibrate it at the following times to ensure accuracy and correct operation:

- During installation.
- At least every 90 days throughout the device's service life.
- When replacing the sensor.

The Rosemount 628 Universal Gas Sensor is a smart sensor. As such, it retains its own calibration information. It must be connected to a transmitter to calibrate, but the calibration settings are stored in the sensor itself rather than in the transmitter. You may uninstall the sensor from a transmitter and reinstall it in another transmitter without affecting its calibration.

### **▲ CAUTION**

If you are calibrating in a windy environment (over five mph), a calibration cup must be used to ensure calibration accuracy.

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#### **Note**

You do not need a conventional calibration cup to calibrate the sensor. Connect calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD) directly to the fitting on the IP filter assembly (part number 00628-9000-0001).

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### 6.1 Calibrate using Field Communicator

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#### **Note**

Emerson developed the Field Communicator guided setup configuration procedures in this manual using Emerson AMS Trex Device Communicator. The menus are identical to those found in other Field Communicators, but you navigate using touch screens rather than fast keys. Refer to the manual for your handheld communication device for more information.

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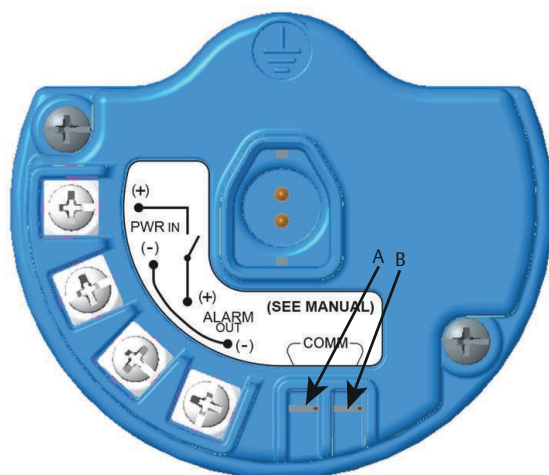
## Procedure

### 1. **⚠ WARNING**

#### Explosions

Do not connect to the COMM terminals when an explosive atmosphere is present.

Connect the HART® communication leads from the Field Communicator HART terminals to the COMM terminals on the terminal block of the transmitter.



- A. +COMM terminal
- B. -COMM terminal

2. Establish communication between the transmitter and the Field Communicator.
3. On the **Home** screen, select **Configure**.
4. On the **Configure** screen, select **Guided Setup**.
5. On the **Guided Setup** screen, select **Calibrate Sensor**.
6. Select **OK** to accept the current date as the calibration date and continue.



- Acknowledge the warning. If necessary, remove the loop from automatic control.

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**Note**

Calibration of an O<sub>2</sub> sensor is unlikely to use a true zero value for its lower limit; one must calibrate the sensor to a known lower percent oxygen value (such as 15 percent oxygen level by volume) in order to "zero" the sensor as outlined in the remainder of the calibration steps below.

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- When calibrating for H<sub>2</sub>S and CO, expose the sensor to clean air to zero the reading. When calibrating for O<sub>2</sub>, expose the sensor to a known percent of oxygen content calibration gas (recommended 15 percent oxygen by volume) to be used as the "zero" calibration value. If the ambient air may contain trace amounts of target gas or other gases (for example, carbon monoxide from engine exhaust) that may interfere with zeroing the device, do the following:
  - Obtain a cylinder of verified clean air (H<sub>2</sub>S and CO) or a cylinder of verified percent oxygen content calibration gas (O<sub>2</sub>) and a length of calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD).
  - Install a regulator on the clean air/percent known oxygen content gas cylinder.



- c) Attach a length of calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD) from the regulator on the cylinder to the fitting on the IP filter assembly (part number 00628-9000-0001).



- d) Release the clean air/known percent oxygen specified calibration gas to the sensor.

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**Note**

If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the clean air travels the length of the calibration tubing.

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- e) Complete [Step 13](#) through [Step 14](#)
- f) Turn off the clean air (or percent oxygen specified calibration gas) when the sensor is correctly zeroed.

9. Select **OK** when the zero measurement reading stabilizes.

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**Note**

Negative measurement readings may occur and are normal during zeroing.

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10. Wait while the Field Communicator performs zero adjustment.
11. Select **OK** to accept the new zero measurement.
12. Select **OK** to accept the new zero.
13. On the **Calibrate Sensor** screen, enter a gas concentration level that corresponds to the concentration of calibration gas that will be applied during calibration.  
For oxygen, use 20.9 percent oxygen from clean air. This step may be performed with surrounding air if no contaminants are present.
14. Select **OK**.

15. **⚠ WARNING**

**Toxic gas**

Before performing the next step, verify that the regulator is closed to avoid releasing target gas into the air during calibration.

Install a regulator on the target gas source.



16. Attach a length of calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD) from the regulator on the target gas source to the fitting on the IP filter assembly (part number 00628-9000-0001).



17. Release the target gas from the target gas source.

Emerson recommends a flow rate of 1.0 liters per minute to ensure a consistent sensor reading.

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**Note**

If you need a long length of tubing to reach the device, make allowances for a delay in response time from the sensor while the target gas travels the length of the calibration tubing.

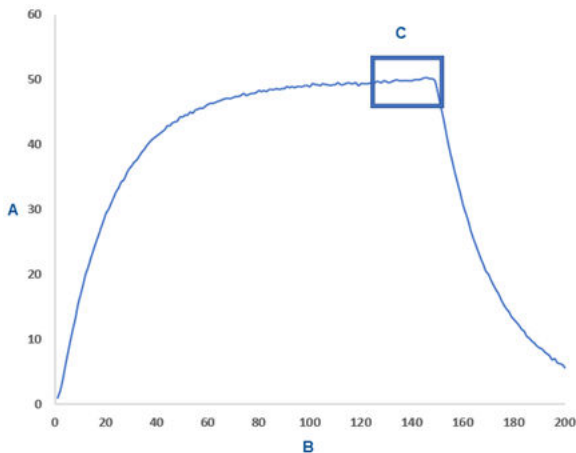
---

A gas concentration should begin to register on the LCD display and gradually increase to the calibration gas concentration level. The gas concentration level shown on the device display may not exactly match that shown on the label of the target gas source.



18. Wait while the gas concentration measurement stabilizes.  
Refer to [Figure 6-1](#).

**Figure 6-1: Typical Calibration Profile**



- A. Gas concentration ppm  
B. Time (in seconds)  
C. Gas concentration measurement has stabilized

19. Select **OK** when the gas concentration measurement stabilizes at or near the target gas concentration level.
20. Wait while the Field Communicator calibrates.  
When the calibration process finishes, the Field Communicator displays the new adjusted reading.
21. Select **OK**.

**Note**

If you can't calibrate the sensor, verify that the correct sensor is installed, the correct target gas is being applied, and the IP filter is not clogged or obstructed. A sensor that cannot accept a new calibration may have reached the end of its service life. Replace the sensor and repeat this procedure. Refer to the *Replace the gas sensor* section in the Rosemount 928 Wireless Gas Monitor [Reference Manual](#).

22. Select **Accept calibration** and then select **OK**.  
The Field Communicator displays the **Service Reminder** screen if a service reminder is configured and enabled.
23. Select **OK** to accept the service reminder date or enter another date.

Refer to the *Service Reminders* section of the Rosemount 928 Wireless Gas Monitor [Reference Manual](#) for more information.

24. Shut off the target gas flow at the regulator.
25. Detach the calibration tubing from the regulator on the target gas source and from the IP filter inlet on the bottom of the sensor.

## 6.2 Calibrate using AMS Wireless Configurator

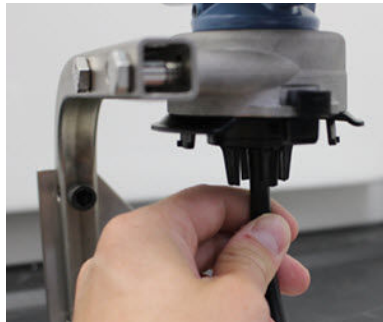
### Procedure

1. On the **Guided Setup** tab, in the Initial Setup field, select **Calibrate Sensor**.
2. On the **Calibrate Sensor** screen, select **Next** to accept the current date as the calibration date and continue.
3. On the **Warning** screen, select **Next**.
4. When calibrating for H<sub>2</sub>S, and CO, expose the sensor to clean air to zero the reading. When calibrating for O<sub>2</sub>, expose the sensor to a known percent oxygen content calibration gas (recommended 15 percent oxygen by volume) to be used as the "zero" calibration value. If the ambient air may contain trace amounts of target gas or other gases (for example, carbon monoxide from engine exhaust) that may interfere with zeroing the device, do the following:
  - a) Obtain a cylinder of verified clean air (H<sub>2</sub>S and CO) or a cylinder of verified percent oxygen content calibration gas (O<sub>2</sub>) and a length of calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD).

- b) Install a regulator on the clean air/known percent oxygen content gas cylinder.



- c) Attach a length of calibration tubing (PVC tubing, 3/16-in. OD, 5/16-in. OD) from the regulator on the cylinder to the IP filter on the bottom of the sensor.



- d) Release the clean air/known percent oxygen specified calibration gas to the sensor.

---

**Note**

If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the clean air travels the length of the calibration tubing.

---

- e) Perform [Step 5](#) through [Step 7](#).
  - f) Turn off the clean air/known percent oxygen specified calibration gas when the sensor is correctly zeroed.
5. Select **Next** when the zero measurement reading stabilizes.
  6. Select **Next**.
  7. Select **Accept New Zero**.
  8. Select **Next**.
  9. On the **Calibrate Sensor** screen, enter a gas concentration level that corresponds to the concentration of the calibration gas that will be applied during calibration.  
The value must be between 5 ppm and 100 ppm.
  10. Select **Next**.

### **⚠ WARNING**

#### **Toxic gas**

The regulator may release gas into the air during calibration.

Before starting the next step, verify that the regulator is closed.

---

11. Install a regulator on the target gas source.





12. Attach a length of calibration tubing (PVC tubing, 3/16-in. ID, 5/16-in. OD) from the regulator on the target gas source to the IP filter inlet on the bottom of the sensor.



13. Release the target gas from the target gas source.  
Emerson recommends a flow rate of 1.0 liters per minute to ensure a consistent sensor reading.

---

**Note**

If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the target gas travels the length of the calibration tubing.

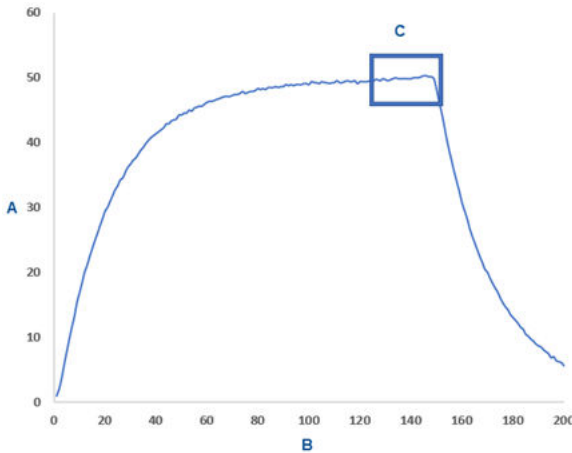
---

A gas concentration should begin to register on the device display and gradually increase to the calibration gas concentration level. The gas concentration level shown on the device display may not exactly match that shown on the label attached to the target gas source.



14. Wait while the gas concentration measurement stabilizes.  
Refer to [Figure 6-2](#).

**Figure 6-2: Typical Calibration Profile**



- A. Gas concentration ppm
- B. Time (in seconds)
- C. Gas concentration measurement has stabilized

15. Select **Next** when the gas concentration measurement stabilizes at or near the target gas concentration level.
16. Wait while the AMS Wireless Configurator calibrates.  
When the calibration process finishes, the new adjusted reading is displayed.
17. Select **Next**.
18. Select **Accept calibration**.
19. Select **Next**.  
The **Service Reminder** screen is displayed if a service reminder is configured and enabled.
20. Select **Next** to accept the service reminder date or enter another date.  
Refer to the *Service Reminders* section of the Rosemount 928 Wireless Gas Monitor [Reference Manual](#) for more information.
21. Shut off the target gas flow at the regulator.
22. Detach the calibration tubing from the regulator on the target gas source and from the IP filter inlet on the bottom of the sensor.

## 7 Manual setup

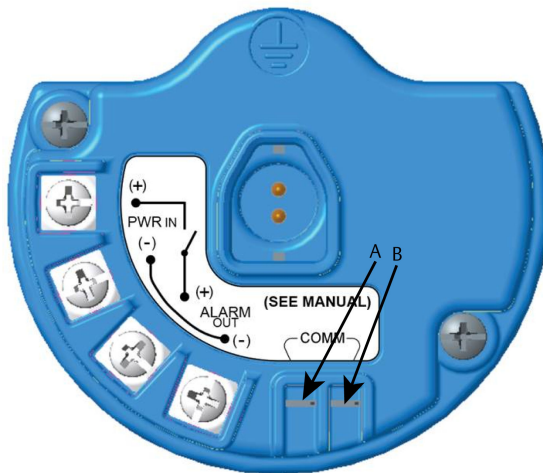
Manual setup includes all available configuration settings. You may use it to change specific settings configured during initial setup without using the **Guided Setup** menus. You may also use it to configure advanced optional settings.

### Note

Emerson developed the Field Communicator manual setup configuration procedures in this manual using Emerson AMS Trex Device Communicator. The menus are identical to those found in other Field Communicators, but are navigated using touch screens rather than fast keys. Refer to the manual for your handheld communicator device for more information.

### Procedure

1. Connect the HART® communications leads to the HART terminals on the handheld communicator.



- A. +COMM terminal
- B. -COMM terminal

2. **⚠ WARNING**

### Explosions

Do not connect to the COMM terminals when an explosive atmosphere is present.

Connect the HART communication leads to the COMM terminals on the terminal block.

3. Start your handheld communicator device. If necessary, open the HART Field Communicator on your handheld device to establish HART communication.

Refer to the manual for your handheld communicator device for more information.

4. On the **Overview** screen, select **Configure**.
5. On the **Configure** screen, select **Manual Setup**.

### Postrequisites

Perform the configuration tasks in the following subsections as needed.

## 7.1 Configuring display options

The primary variable (gas concentration) is displayed by default on the LCD display.

To configure the display of additional dynamic variable items, do the following:

### 7.1.1 Configure display options using Field Communicator

#### Procedure

1. On the **Manual Setup** screen, select **Display**.
2. On the **Display** screen, select **Display Options**.
3. Select a display option or options to alternate displaying with the primary variable (gas concentration):
  - Concentration
  - Percent of Range
  - Sensor Temp (gas sensor module temperature)
  - Electronics Temp (electronics temperature)
  - Supply Voltage
4. Select **On**.
5. Select **OK**.
6. Repeat [Step 3](#) through [Step 5](#) for additional display options.
7. On the **Display Options** screen, select **Send**.

8. On the **Send** screen, do one or more of the following:
  - Select **Display Options** if you want to review the selected display options.
  - Select **Cancel** to return to the **Display Options** screen. Pending changes to display options are preserved.
  - Select **Discard** to return to the **Display Options** screen and discard pending changes. Select **OK** to confirm or **Cancel** to return to the previous screen.
  - Select **Send** to send display option changes to the device.
9. Select **Back** to return to the **Manual Setup** screen.

### 7.1.2 Configure display options using AMS Wireless Configurator

#### Procedure

1. On the **Manual Setup** page, select the **Display** tab.
2. On the **Display** tab, select a display option or options to alternate displaying with the primary variable (gas concentrations).
  - Concentration
  - Percent of Range
  - Sensor Temperature (gas sensor module temperature)
  - Electronics Temperature
  - Supply Voltage
3. Select **Send**.
4. In the **Confirm Device Configuration Change** dialog box, select a reason for the change from the Service Reason list. Select **Details** if you want to view additional information.
5. Select **Yes**.

## 7.2 Configuring security settings

You have the option to configure security settings to protect the device from unauthorized configuration changes.

### 7.2.1 Configure security settings using a Field Communicator

#### Procedure

1. On the **Manual Setup** screen, select **Security**.
2. Configure the following security settings as required.

- **Write Protect:** If you select No (the default option), you may view and edit device configuration settings. If you select Yes, you may view device configuration settings but not edit them.
- **Lock Device:** If you select Unlock, you may access the device with any host to view and edit configuration settings. If you select Lock (the default option), you cannot access the device with any host to view and edit configuration settings until a host unlocks the device. To change this option, do the following:
  - a. On the **Security** screen, select **Lock/Unlock**.
  - b. On the **Select HART Lock option** screen, select **Lock or Unlock** to change the setting.
  - c. Select **OK**.

On the **Security** screen, the Device is Locked field displays On when the device is locked and Off when the device is unlocked.

- **Over the Air Upgrade:** If you select Unlock (the default option), you can upgrade the transmitter radio with programming sent over the air. If you select Lock, the transmitter prevents over-the-air radio upgrades.

## 7.2.2 Configure security settings using AMS Wireless Configurator

### Procedure

1. On the **Manual Setup** page, select the **Security** tab.
2. Configure the following security settings as needed:
  - **Write Protection:** If you select No (the default option) you can view and edit device configuration settings. If you select Yes, you will not be able to view and edit the configuration settings.
  - **Radio Upgrade:** If you select Unlock (the default option), you can upgrade the transmitter radio with programming sent over the air. If you select Lock, you will not be able to upgrade the radio over the air.
  - **Lock Device:** If you select Unlock (the default option), you can access the device with any host to view and edit configuration settings. If you select Lock, you will not be able to access the device with any host to view and edit configuration settings until a host unlocks the device. To change this option, do the following:
    - a. Select **Lock/Unlock**.
    - b. In the **HART Lock list**, select **Lock or Unlock** to change the setting.

c. Select **Finish**.

In the **HART Lock** field, the Device is Locked check box is selected when the device is locked.

3. When you are finished making changes, select **Send** to update the device configuration.

## 7.3 Configuring device information

### 7.3.1 Configure device information using Field Communicator

#### Procedure

1. On the **Manual Setup** screen, select **Device Information**.
2. On the **Device Information** screen, select any of the following and configure as needed.
  - **Long tag:** Enter an identifier for the device up to 32 characters long using the virtual keypad. The Long tag field is blank by default and does not display if left blank.
  - **Tag:** Enter an identifier for the device up to eight uppercase alphabetic and numeric characters long using the virtual keypad. The Tag field is left blank by default and does not display if left blank.
  - **Descriptor:** Enter a description of the device up to 16 alphabetic, numeric, and special characters long. The Descriptor field is blank by default and does not display if left blank.
  - **Message:** Enter a message up to 32 alphabetic, numeric, and special characters long. The Message field is blank by default, does not display if left blank, and may be used for any purpose.
  - **Date:** Enter a date in mm/dd/yyyy format using the virtual keypad. The date may be used for any purpose, such as recording the date of the most recent calibration.
3. When you have finished making changes, select **Send**.
4. On the **Send** screen, do one of the following:
  - Select **Cancel** to return to the **Device Information** screen. Pending changes are preserved.
  - Select **Discard** to return to the **Device Information** screen and discard pending changes. Select **OK** to confirm or **Cancel** to return to the previous screen.
  - Select **Send** to send display option changes to the device.

5. Select **Back** to return to the **Manual Setup** screen.

### 7.3.2 Configure device information using AMS Wireless Configurator

#### Procedure

1. On the **Manual Setup** page, select the **Device Information** tab.
2. Enter any of the following as needed:
  - **Long tag:** Enter an identifier for the device up to 32 characters long. The Long Tag field is blank by default and does not display if left blank.
  - **Tag:** Enter an identifier for the device up to eight uppercase alphabetic and numeric characters long. The Tag field is blank by default and does not display if left blank.
  - **Descriptor:** Enter a description of the device up to 16 characters long. The Descriptor field is blank by default and does not display if left blank.
  - **Message:** Enter text up to 32 characters long. The Message field is blank by default, does not display if left blank, and may be used for any purpose.
  - **Date:** Enter a date in mm/dd/yyyy format. The date may be used for any purpose, such as recording the date of the most recent calibration.
3. When you have finished making changes, select **Send** to update the device configuration.



## 8 Wireless considerations

### 8.1 Power up sequence

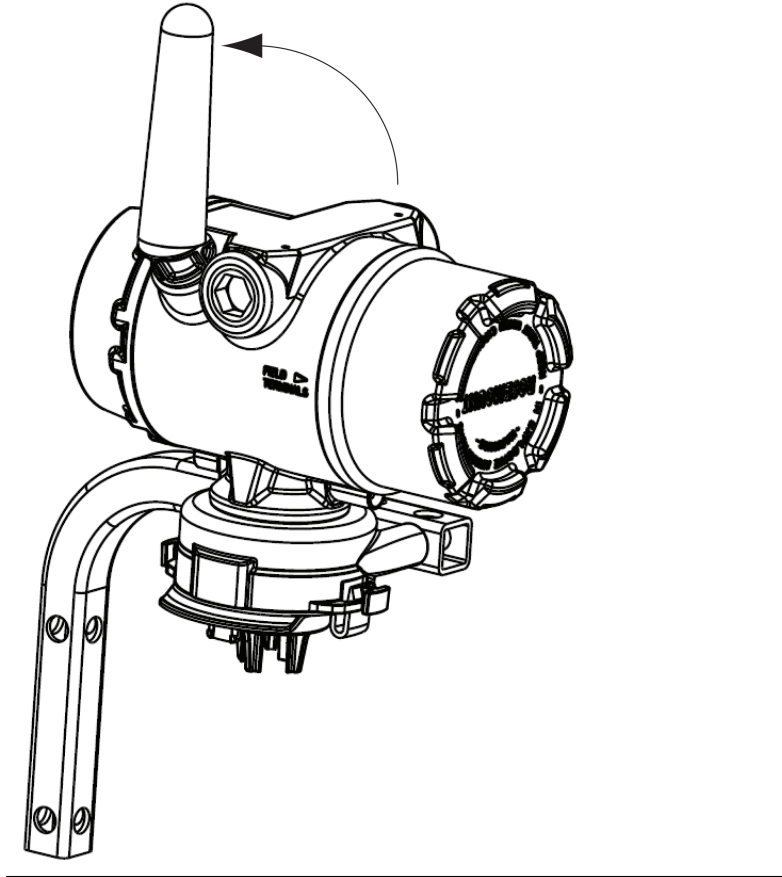
Only install the transmitter and all other wireless devices after you have installed the wireless gateway and the gateway is functioning properly. Install the Emerson 701 SmartPower™ Module - Black into the transmitter to power the device. Power up wireless devices in order of proximity from the gateway, beginning with the closest. This results in a simpler and faster network installation. Enable active advertising on the gateway to ensure that new devices join the network faster. Refer to the reference manual for your wireless gateway for more information.

### 8.2 Antenna position

Position the antenna vertically straight up and, if the application requirements allow, approximately three feet (one meter) from any large

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

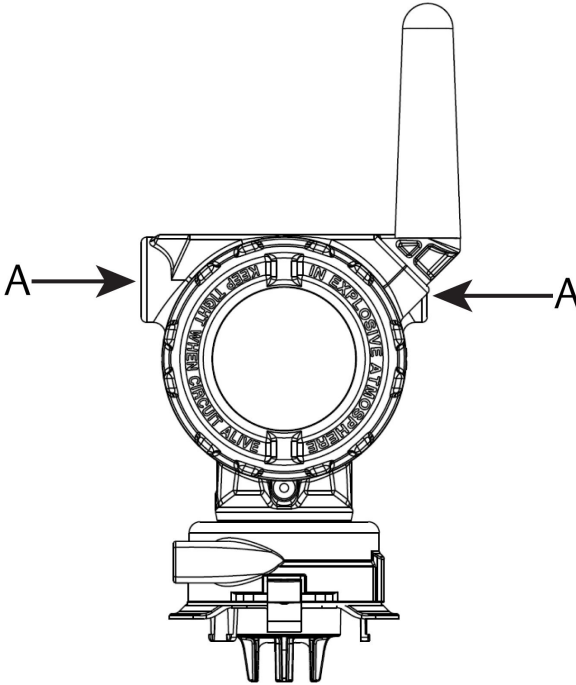
**Figure 8-1: Antenna Position**



### 8.3 Conduit entries

Upon installation, ensure that each conduit entry is either sealed with a conduit plug using appropriate thread sealant or has a conduit fitting or cable gland installed with appropriate thread sealant.

**Figure 8-2: Conduit Entries**



*A. Conduit entries*

### 8.4 Choosing an installation location and position

When choosing an installation location and position, take into account access to the transmitter for ease of power module and sensor replacement. For best performance, install the antenna vertically with space between objects in a parallel metal plane, such as a pipe or metal framework, as the pipes or framework may adversely affect the antenna's performance.

The Rosemount 928 is a diffusion-based gas monitor. This means that the target gas must actually come into contact with the electrochemical sensor for the device to register a signal. Each target gas has a unique density and behaves differently depending on the density of the surrounding

atmosphere. For example, hydrogen sulfide is considered a heavier-than-air gas and tends to settle in low-lying areas when released into the air.

Install all transmitters with the sensor module facing downwards. Install devices with sensors for heavier-than-air gases close to ground level, ideally between 12 in. (30.5 cm) above the ground and a breathing zone of a worker (3- 6 ft. [9 - 1.8 m] above grade level).

## 9 Electrical

### 9.1 Handling the power module

The Rosemount 928 is self-powered. The included Emerson 701 SmartPower Module-Black contains two "C" size primary lithium/thionyl chloride batteries. Each battery contains approximately .1 oz. (2.5 grams) of lithium, for a total of .2 oz. (5 grams) in each pack. Under normal conditions, the battery materials are self-contained and are not reactive as long as the batteries and the power module are maintained. Take care to prevent thermal, electrical, or mechanical damage. Protect contacts to prevent premature discharge.

#### **⚠ CAUTION**

##### **Equipment damage**

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

Use caution when handling the power module.

### 9.2 Making electrical connections (Rosemount 928XSS01 and 928XUT01 only)

Make electrical connections through the cable entry in the side of the connection head. Be sure to provide adequate clearance for cover removal.

See [Conduit entries](#)

## 10 Verify operating atmosphere

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

**Table 10-1: Temperature Guidelines**

Operating limit	Transmitter storage limit	Sensor storage recommendation
-40 to 122 °F -40 to 50 °C	-40 to 185 °F -40 to 85 °C	34 to 45 °F 1 to 7 °C

### Note

The electrochemical cells in the sensor have a limited shelf life. Store sensor modules in a cool location that is not excessively humid or dry. Storing sensors for periods longer than three months may shorten their useful service life.

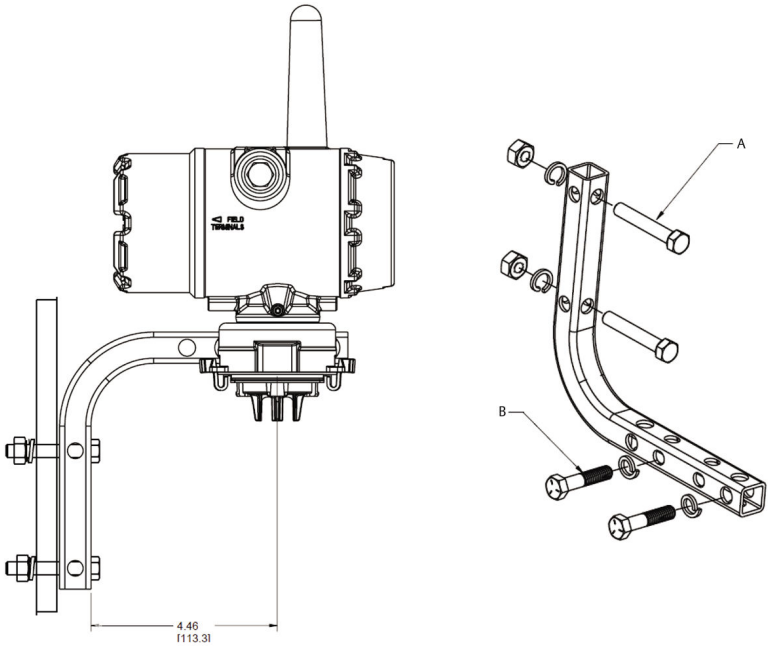
# 11 Install the transmitter

The transmitter is designed to use the B4 Universal Mounting Bracket. This curved, stainless steel bracket includes a U-bolt and fasteners for mounting the transmitter to a 2-in. (50.8 mm) pipe or pole. The B4 bracket attaches directly to the transmitter. You can also use the B4 bracket in other mounting configurations, such as mounting the transmitter to a wall or a panel.

## 11.1 Pipe mount

### Required equipment

- Mounting kit (part number 03151-9270-0004)
  - One 2-in. (50.8 mm) U-bolt assembly
  - One B4 mounting bracket
  - Two 5/16-18 x 1¼-in. bolts
  - Two washers
- A ¼-in. combination wrench and adjustable wrench

**Figure 11-1: Pipe Mounting**

Dimensions are in inches [millimeters].

- A. 2-in. bolt for pipe mounting (clamp shown)
- B. 5/16-18 x 1 1/4-in. bolts for transmitter mounting

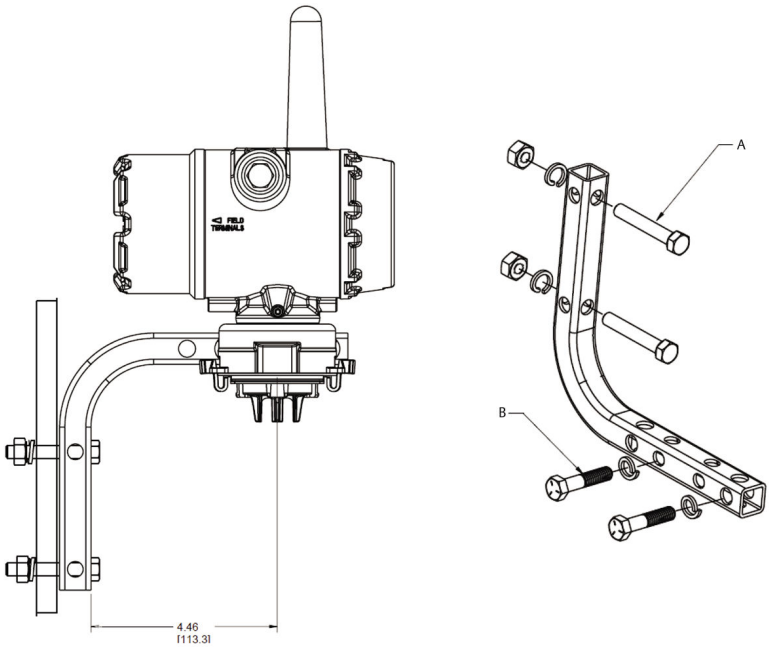
## 11.2 Panel mount

### Required equipment

- Mounting kit (part number 03151-9270-0004)
  - One B4 mounting bracket
  - Two 1/4-in. x 1 1/4-in. bolts
- A 5/16-in. combination wrench or adjustable wrench
- A 1/4-in. combination wrench or adjustable wrench
- Two 5/16-18 bolts with nuts and washers (not included)



**Figure 11-2: Panel Mounting**



- A. 5/16-18 bolts for panel mounting (not supplied)
- B. 5/16-18 x 1¼-in. bolts for transmitter mounting

Dimensions are in inches [millimeters].

### 11.3 Rotate LCD display

You can rotate the LCD display in 90 degree increments by squeezing the two tabs, pulling the LCD display out, rotating it, and snapping it back into place.

**Note**

Although you can rotate the LCD display, always install the transmitter with the sensor facing downwards.

If the LCD display pins are inadvertently removed from the interface board, carefully reinsert the pins before snapping the LCD display back into place.

**Note**

Use only Rosemount Wireless LCD Display part number 00753-9004-0002.

## 11.4 Ground the transmitter

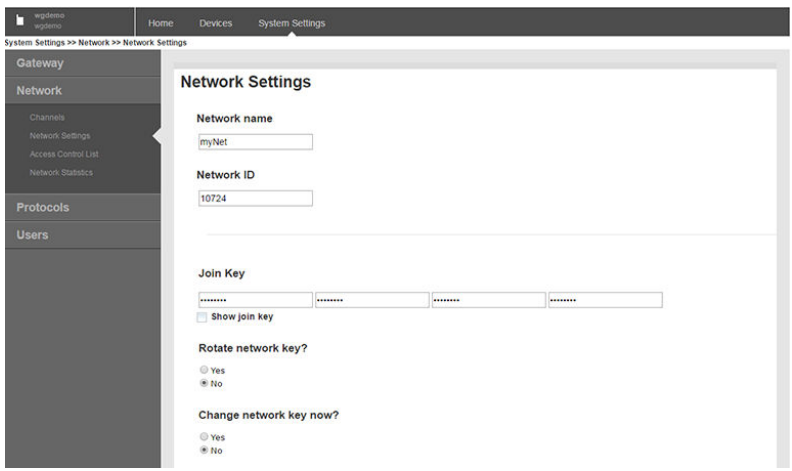
The transmitter operates with the housing grounded or floating. Floating systems, however, can cause extra noise that may affect many types of readout devices. If the signal appears noisy or erratic, grounding at a single point may solve the problem. Ground the electronics enclosure in accordance with local and national installation codes. Ground the electronics using the internal or external case grounding terminal.

## 12 Verify wireless network communication

In order for the transmitter to communicate with the wireless gateway, and ultimately the host system, you must configure the transmitter to communicate with the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the host system. If the network ID and join key are not identical, the transmitter will not communicate with the network.

You may obtain the network ID and join key from the Wireless Gateway on the **Setup** → **Network** → **Settings** page on the web server, shown in [Figure 12-1](#).

**Figure 12-1: Wireless Gateway Network Settings**



Refer to [Joining the transmitter to a wireless network](#).

### 12.1 Verify network join status

The chevron-shaped status bar at the top of the LCD screen indicates the progress of the network join process. When the status bar is filled, the device is successfully connected to the wireless network.

Refer to [Figure 12-2](#).

---

**Figure 12-2: Network Status Bar**

---

## 12.2 Verify communication using Field Communicator

### Procedure

1. On the **Overview** screen, select **Service Tools**.
2. On the **Service Tools** screen, select **Communications**.
3. Verify the following communications information.
  - **Communication status:** Displays whether the device is connected to the wireless network.
  - **Join Mode:** Displays the current join mode. Select Join Mode to change the way that the device joins the wireless network. The default option is Attempt to join immediately on powerup or reset. Select **Send** twice to update the join mode.
  - **Neighbor Count:** Displays the number of available neighboring devices.
  - **Advertisement Count:** Displays the number of advertisement packets received.
4. When finished, select **Back** to return to the **Communications** screen.

## 12.3 Verify communication using AMS Wireless Configurator

Complete the following steps to verify communications on the device using the AMS Wireless Configurator.

### Procedure

1. Open AMS Wireless Configurator.
2. In the **Device Manager** pane, expand the wireless network menu.
3. Expand the wireless gateway menu.
4. Select the device list.
5. In the device panel, double-click the device icon.
6. Select Service Tools.
7. In the **Service Tools** pane, select Communications.

- On the **Communications** tab, in the **Join Status** field, verify that all four network join steps are completed.

## 12.4 Verify communication using the Wireless Gateway

Open the Wireless Gateway web interface. This page shows whether the device has joined the network and is communicating properly.

The screenshot shows the 'Smart Wireless Gateway' web interface. The top navigation bar includes 'Home', 'Devices', and 'System Settings'. The left sidebar contains several status indicators: 'All Devices: 6', 'Live: 6', 'Unreachable: 0', 'Power Module Low: 0', 'Gateway Load: 24%', and 'Network Best Practices: 5 devices within range of gateway (100%)'. The main content area is titled 'Notifications' and is divided into 'Tasks' and 'Changes' sections.

**Tasks**

- Join Failure Devices List**  
00-1B-1E-26-81-00-00-BB
- Unreachable**  
No results found.

**Recently Added (last 5 devices)**

Device	Date Added	Current PV
WGM #104	07/12/17 15:36:26	
WGM #114	07/12/17 10:37:44	0
Wireless Gas Monitor #187	07/12/17 09:21:13	0
WGM #186	06/29/17 11:09:30	0
WGM #185	06/29/17 15:45:45	0

**Changes**

Description	From	To	Requested	Status
Deleting device WGM #185			06/29/17 15:34:19	✓
Deleting device Wireless Gas Monitor #187			06/29/17 15:34:07	✓
Deleting device WGM #186			06/29/17 15:33:58	✓
Deleting device WGM #183			06/29/17 15:33:45	✓
Deleting device WGM #184			06/29/17 15:33:25	✓
Deleting device 00-1B-1E-26-81-00-00-A1			06/29/17 15:33:16	✓

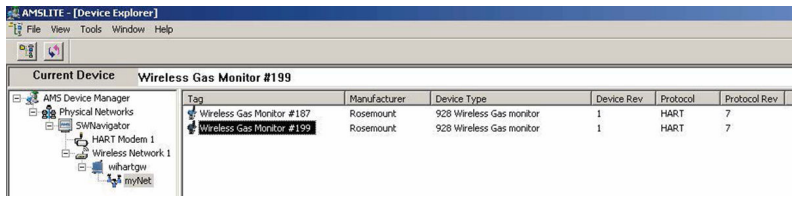
## 13 Verify operation

There are four ways to verify operation:

- Transmitter LCD display
- Handheld communication device
- Wireless Gateway's integrated web interface
- AMS Device Manager

If you have configured the transmitter with the network ID and join key and sufficient time has passed, the transmitter will be connected to the network. When the device has joined the network, it will be displayed in AMS Device Explorer.

**Figure 13-1: AMS Device Explorer**



### 13.1 Verify LCD display operation

#### Procedure

1. Verify that the display items are correct.

The LCD displays the primary variable (Gas Concentration) by default. The other variables are:

- Secondary variable (Gas Sensor Module Temperature)
- Tertiary variable (Electronics Temperature)
- Quaternary variable (Supply Voltage)

You may configure these variables to alternate displaying with the primary variable at the configured update rate. Refer to [Configuring display options](#) if you need to change the display items.

2. Verify that the display mode is correct.

Refer to [Configuring the device display mode](#) if you need to change the display mode.

- Disabled: The display is turned off. This is useful if the display will never be viewed locally.

- On Demand: The display is on when the transmitter is connected to a handheld communication device or when it receives a signal from its Wireless Gateway.
  - Periodic: The display is on only during updates at the configured update rate.
  - High Availability: The display is always on regardless of the configured update rate. This is the default display mode option.
3. Press the **Diagnostic** button to display the **TAG**, **Device ID**, **Network ID**, **Network Join Status**, and **Device Status** screens.

### 13.2 If there is an immediate alarm

**⚠ WARNING**

#### Alarm

If the device joins the network and immediately issues an alarm, respond as though the alarm is real until it is proven false.

If the alarm is false, it is likely due to sensor configuration. Verify the sensor configuration, alert set points, and alarm set points.

The screenshot shows the 'Smart Wireless Gateway' Explorer interface. On the left is a navigation menu with options: 192.168.1.10, Diagnostics, Monitor, **Home**, and Setup. The main area displays a table of HART tags with columns for HART Tag, HART status, Last update, PV, SV, TV, QV, and Burst rate. The table contains 13 rows of data, with some tags showing warning icons (yellow triangles) next to their status or values.

HART Tag	HART status	Last update	PV	SV	TV	QV	Burst rate
<a href="#">2160_Level</a>	●	04/20/11 18:09:53	0.000 ●	1394.483 Hz ●	23.000 DegC ●	7.502 V ●	8
<a href="#">3051S_Pressure</a>	●	04/20/11 18:09:55	-0.027 InH2O 68F ●	22.750 DegC ●	22.750 DegC ●	7.115 V ●	8
<a href="#">6081_Conductivity</a>	●	04/20/11 18:09:42	9.795 pH ●	23.322 DegC ●		7.283 V ●	16
<a href="#">6081_pH</a>	●	04/20/11 18:09:50	9.803 pH ●	22.822 DegC ●	-165.002 mV ●	7.287 V ●	16
<a href="#">648_Temperature</a>	●	04/20/11 18:09:55	22.859 DegC ●	NaN DegC ⚠	22.500 DegC ●	7.116 V ●	8
<a href="#">4320_Position</a>	●	04/20/11 18:09:57	1.000 % ●	1.000 ●	0.000 ●	23.000 DegC ●	4
<a href="#">702_Discrete</a>	●	04/20/11 18:09:53	1.000 ●	0.000 ●	23.250 DegC ●	7.063 V ●	8
<a href="#">848_Temperature</a>	●	04/20/11 18:09:35	22.850 DegC ●	22.822 DegC ●	22.822 DegC ●	24.861 DegC ●	32
<a href="#">9420_Vibration</a>	●	04/20/11 17:25:22	0.023 in/s ●	0.022 g/s ●	2.501 V ●	7.143 V ●	01:00:00
<a href="#">248_Temperature</a>	●	04/20/11 18:09:55	22.959 DegC ●	NaN DegC ⚠	22.550 DegC ●	7.116 V ●	16
<a href="#">708_Acoustic</a>	●	04/20/11 18:09:54	6.378 Counts ●	24.559 DegC ●	22.550 DegC ●	3.391 V ●	16

### 13.3 Troubleshoot communication

If the device is not joined to the network after power up, verify the correct configuration of the network ID and join key and verify that active advertising has been enabled on the wireless gateway. The network ID and

join key in the device must match the network ID and join key of the wireless gateway.

You may obtain the network ID and join key from the wireless gateway on the **Setup** → **Network** → **Settings** page on the web interface. You may change the Network ID and Join Key if necessary. Refer to [Joining the transmitter to a wireless network](#).



## 14 External alarm device electrical connections

The discrete output of the transmitter (Models 928XSS01 and 928UTX01) can trigger an optional, customer-supplied external alarm device.

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### Note

The transmitter cannot power external devices. It acts as a switch that closes the power circuit of a connected external device activated by a HI-HI alarm if configured to do so.

---

You can configure an external power supply and alert device to issue a local alarm when the detected gas concentration level exceeds the specified high concentration threshold. You can configure the local alarm to latch the alarm output until the alarm is manually cleared or query the device to detect whether this option is installed. Examples of alarm mechanism options include:

- Audible alarm
- Visual alarm (for example, a flashing light)
- Initiate action (for example, close valves, initiate facility evacuation, call emergency services)

### WARNING

#### Alarm

If installing an optional, customer-supplied external alarm device, verify proper function.

Verify that gas concentrations in the area have dissipated to a safe level before clearing local or digital alarms.

When connecting an external device to the monitor's discrete output in a hazardous area, ensure that the external device is installed in accordance with Intrinsically Safe or non-incendive field wiring practices.

The transmitter does not need to be connected to a wireless network for the external alarm device to function. However, the low battery, no measurement, or sensor failure alerts will not be available.

---

There are two possible connection methods for the external alarm device:

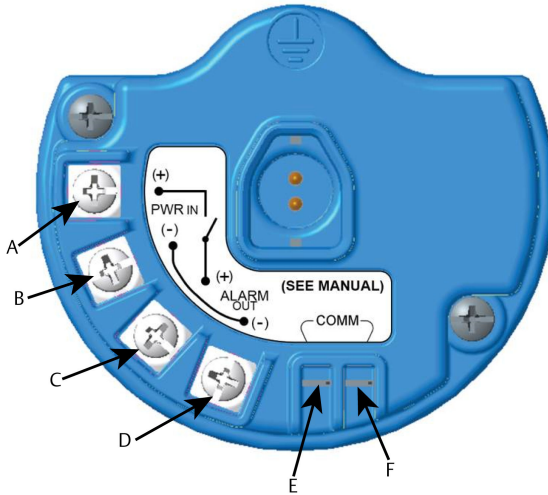
- Four-wire: This connection method (most common) uses a set of two wires for an IS input power supply. Another set of two input wires is used for a separate IS alarm mechanism.
- Two-wire: This connection method combines an IS power source, such as an internal battery, and alarm device into one package.

You may also add an optional, customer-supplied alarm suppression button.

## 14.1 Connect an external alarm device

### Procedure

1. On the transmitter's main housing, remove the rear housing cover to expose the terminal block.



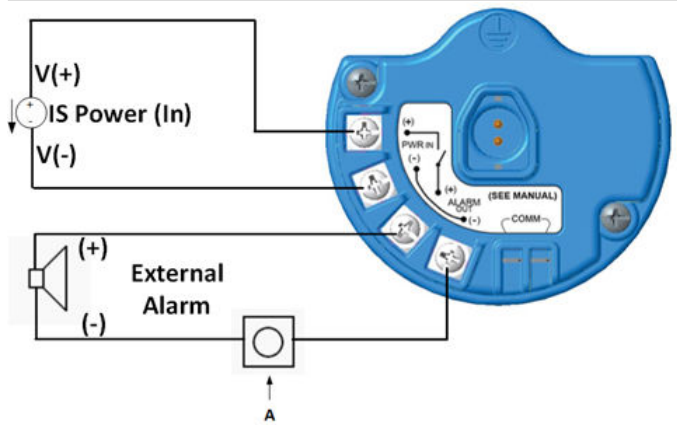
- A. +Barrier power
- B. -Barrier power
- C. +Output to alarm
- D. -Output to alarm
- E. +Comm terminal
- F. -Comm terminal

2. On the main housing, remove one of the conduit plugs.
3. Route the barrier power and alarm output wiring into the main housing.
4. Connect the wiring to the external device on the terminal block according to the terminal labels. Do one of the following:

### Note

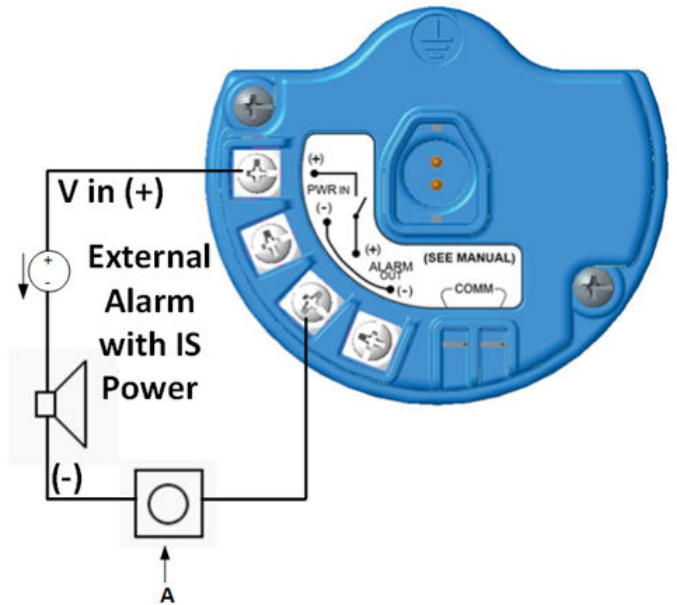
Shield alarm wiring for noise immunity.

- Perform four wire installation. This is the most common configuration. Refer to the following diagram.



A. External alarm suppression button (optional)

- Perform two wire installation. Refer to the following diagram.



A. External alarm suppression button (optional)

5. Connect the wiring to the external device according to the manufacturer's instructions.
6. Verify that the external device functions properly.

- a) Perform a bump test.  
Refer to the *Bump Testing* section in the Rosemount 928 Wireless Gas Monitor [Reference Manual](#).
  
- b) If available, use the external device's manual test function to verify proper function.  
Refer to the external device documentation for more information.

## 15 Product certifications

Rev 3.3

### 15.1 European Directive information

The most recent revision of the EC Declaration of Conformity can be found at [www.Emerson.com/Rosemount](http://www.Emerson.com/Rosemount) under *Documentation*.

### 15.2 Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

### 15.3 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 7.81 in. (20 cm) from all persons.

### 15.4 Ordinary location certification

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

### 15.5 Installing in North America

The U.S. National Electrical Code® (NEC) and 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 their respective codes.

### 15.6 Hazardous location certificates

#### 15.6.1 USA

##### **15 U.S.A. Intrinsically Safe (IS)**

**Certificate** CSA 70138122

**Standards** FM 3600–2011, FM 3610–2010, UL Standard 50—Eleventh edition, UL 61010–1—3rd edition, ANSI/ISA–60079–0 (12.00.01)–2013, ANSI/ISA–60079–11 (12.02.01)–2014

**Markings** IS CL I, DIV 1, GP A, B, C, D T4 Ex ia IIC T4 Ga;  
T4 ( $-40\text{ }^{\circ}\text{C} \leq T_a \leq +50\text{ }^{\circ}\text{C}$ ) when installed according to Rosemount™ drawing 00928-1010;  
Class 1, Zone 0, AEx ia IIC T4 Ga;  
Type 4X

**Table 15-1: Entity Parameters**

Input (power) parameters	Output (alarm) parameters
U <sub>i</sub> - 28 Vdc	U <sub>o</sub> - 28 Vdc
I <sub>i</sub> - 93.3 mA	I <sub>o</sub> - 93.3 mA
P <sub>i</sub> - 653 mW	P <sub>o</sub> - 653 mW
C <sub>i</sub> - 5.72 nF	C <sub>o</sub> - 77 nF
L <sub>i</sub> - 0	L <sub>o</sub> - 2 mH

**Table 15-2: HART® Comm Parameters**

U <sub>o</sub> - 1.9 Vdc
I <sub>o</sub> - 32 μA

### Special Conditions for Safe Use (X):

1. For use only with the Emerson Model 701PBKKF, the Computation Systems, Inc. MHM-89004, or the Perpetuum Ltd. IPM71008/IPM74001.
2. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic discharge buildup, it must not be rubbed or cleaned with solvents or dry cloth.
3. Substitution of components may impair Intrinsic Safety.

## 15.6.2 Canada

### 16 Canada Intrinsically Safe (IS)

**Certificate** CSA 70138122

**Standards** CAN/CSA C22 No. 0–10, CAN/CSA C22.2 No. 94.2-15, CAN/CSA-60079-0–2015, CAN/CSA-60079-11–2014, CAN/CSA-C22.2 61010-1–2012

**Markings** IS CL I, DIV 1, GP A, B, C, D T4;  
 Ex ia IIC T4 Ga;  
 T4 (-40 °C ≤ Ta ≤ +50 °C) when installed according to  
 Rosemount drawing 00928-1010;  
 Type 4X


Refer to [Table 15-1](#).

### Special Conditions for Safe Use (X):

1. For use only with the Emerson Model 701PBKKF, the Computations Systems, Inc. MHM-89004, or the Perpetuum Ltd. IPM71008/ IPM74001.  
*Pour utilisation uniquement avec Emerson Model 701PBKKF, Computation Systems, Inc MHM-89004, ou Perpetuum Ltd. IPM71008/ IPM74001.*
2. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic discharge buildup, it must not be rubbed or cleaned with solvents or a dry cloth.  
*La résistivité de surface du boîtier est supérieure à un gigaohm. Pour éviter l'accumulation de charge électrostatique, ne pas frotter ou nettoyer avec des produits solvants ou un chiffon sec.*
3. Substitution of components may impair Intrinsic Safety.  
*La substitution de composants peut compromettre la sécurité intrinsèque.*

## 15.6.3 Europe

### I1 ATEX Intrinsically Safe (IS)

**Certificate** Sira17ATEX2371X  
**Standards** EN 60079-0:2012 + A11:2013, EN 60079-11:2012  
**Markings**  I1 G  
 Ex ia IIC T4 Ga;  
 T4 (-40 °C ≤ Ta ≤ +50 °C)  
 Type IP66

Refer to [Table 15-1](#) and [Table 15-2](#).

### Special Conditions for Safe Use (X):

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition capable of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are

conductive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

2. The transmitter may contain more than 10 percent aluminum and is considered a potential risk ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. The equipment shall be powered by Emerson 701PBKKF. An alternative power source shall be the CSI MHM-89004, as these devices have output parameters that are equal or less onerous than the parameters of the 701PBKKF.
4. Only the 375, 475, or AMS Trex Communicators may be used with the Rosemount 928.

#### 15.6.4 International

##### 17 IECEx Intrinsically Safe (IS)

<b>Certificate</b>	IECEx SIR 17.0091X
<b>Standards</b>	IEC 60079-0:2011, IEC 60079-11:2011
<b>Markings</b>	Ex ia IIC T4 Ga; T4 (-40 °C ≤ Ta ≤ +50 °C) Type IP66

Refer to [Table 15-1](#) and [Table 15-2](#).

##### Special Conditions for Safe Use (X):

1. Under extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.
2. The transmitter may contain more than 10 percent aluminum and is considered a potential risk ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. The equipment shall be powered by Emerson 701PBKKF. An alternative power source shall be the the CSI MHM-89004, as these devices have output parameters that are equal or less onerous than the parameters of the 701PBKKF.
4. Only the 375, 475, or AMS Trex Communicators may be used with the Rosemount 928.



### 15.6.5 China

#### I3 NEPSI Intrinsically Safe (IS)

**Certificate** GYJ18.1438X

**Standards** GB 3836.1-2010, GB 3836.4-2010, GB 3836.20-2010

**Markings** Ex ia IIC T4 Ga (Ta= -40 °C to +50 °C)

#### Special Conditions for Safe Use (X):

See certificate.

### 15.6.6 Japan

#### CML Intrinsically Safe (IS)

**Certificate** CML 18JPN2345X




**Standards** IEC 60079-0:2011, IEC 60079-11:2011



**Markings** Ex ia IIC T4 Ga;  
T4 (-40 °C ≤ Ta ≤ +50 °C)

#### Special Conditions for Safe Use (X):

See certificate.

# 16 Declaration of Conformity

 <b>EMERSON</b>	<b>EU Declaration of Conformity</b> No: RMD 1112 Rev. D	
<p>We,</p> <p style="margin-left: 40px;"><b>Rosemount, Inc.</b>          8200 Market Boulevard          Chanhassen, MN 55317-9685          USA</p> <p>declare under our sole responsibility that the product,</p> <p style="text-align: center;"><b>Rosemount™ 928 Wireless Gas Monitor</b></p> <p>manufactured by,</p> <p style="margin-left: 40px;"><b>Rosemount, Inc.</b>          8200 Market Boulevard          Chanhassen, MN 55317-9685          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>		
 <hr style="width: 100%;"/> (signature)	Vice President of Global Quality (function)	
Chris LaPoint (name)	29-Aug-19; Shakopee, MN USA (date of issue & place)	
Page 1 of 2		

 <b>EU Declaration of Conformity</b> No: RMD 1112 Rev. D	
<b>EMC Directive (2014/30/EU)</b>	
Harmonized Standards: EN 61326-1:2013	
<b>Radio Equipment Directive (RED) (2014/53/EU)</b>	
Harmonized Standards: EN 300 328 V2.1.1 EN 301 489-17 V3.2.0 EN 61010-1:2010 EN 62311: 2008	
<b>ATEX Directive (2014/34/EU)</b>	
<b>SIRA17ATEX2371X – Intrinsic Safety Certificate</b> Equipment Group II, Category I G (Ex ia IIC T4 Ga) Harmonized Standards: EN 60079-0:2012/A11:2013, EN 60079-11:2012	
<b>ATEX Notified Body</b>	
<b>CSA Group Netherlands B.V.</b> [Notified Body Number: 2813] Utrechtseweg 310 (B42) 6812AR ARNHEM Netherlands	
<b>ATEX Notified Body for Quality Assurance</b>	
<b>SGS FIMKO OY</b> [Notified Body Number: 0598] P.O. Box 30 (Särkiniementie 3) 00211 HELSINKI Finland	
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