

Rosemount™ 628 Universal Gas Sensor

Integrated Wireless Gas Monitoring



Safety information

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 628. 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.

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.

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.

⚠ WARNING

Electrical shock

Electrical shock could cause death or serious injury.

Substitution of components may impair intrinsic safety.

⚠ 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.

⚠ 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.

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1 Overview

The Rosemount™ 628 is compatible with the Rosemount 928 Wireless Gas Monitor.

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.

Note

Use Rosemount 628 only with the Rosemount 928 Transmitter.

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.

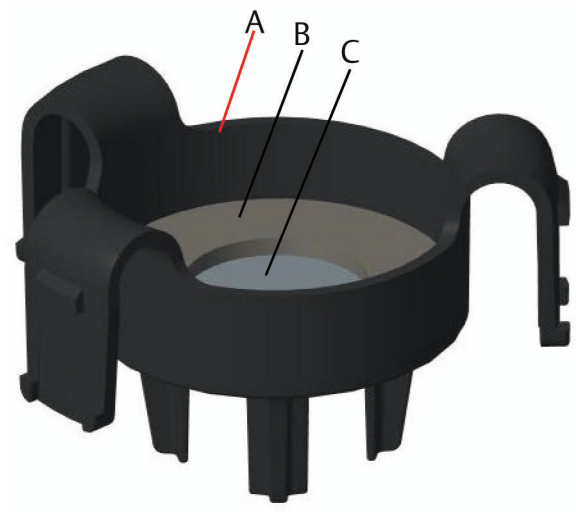
Avoid getting water inside the IP filter.

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.

Figure 1-1: IP Filter



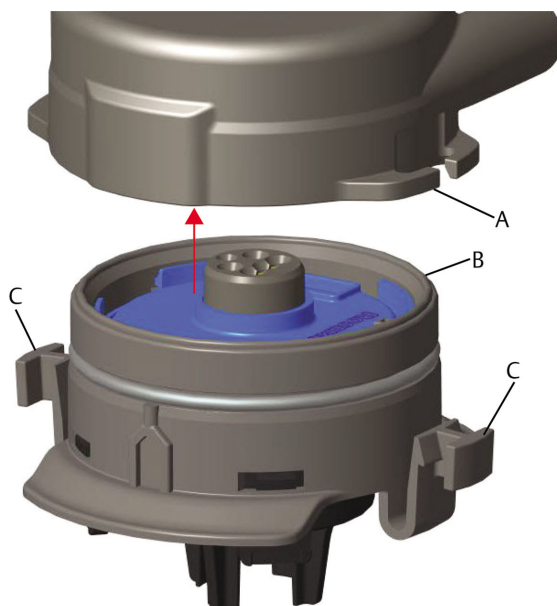
- A. *IP filter housing*
- B. *IP filter gasket*
- C. *Filter media*

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 ₂ S)	One minute
Oxygen (O ₂)	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 Bench configuration

To configure, you must install the sensor in a functional transmitter. 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.

3.1 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 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 the *Manual Setup* section in the Rosemount 928 Wireless Gas Monitor [Reference Manual](#). 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.

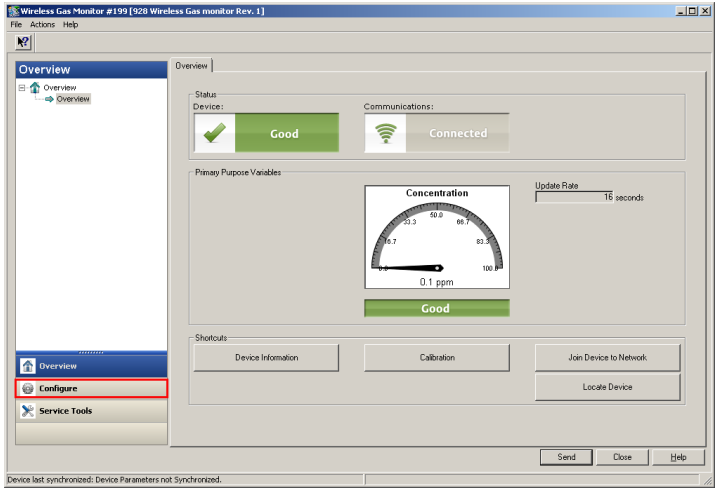
3.2 Bench configure AMS Wireless Configurator

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 Manager** pane, select the HART modem.
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 the *Manual Setup* section in the Rosemount 928 Wireless Gas Monitor [Reference Manual](#). Refer to the AMS Wireless Configurator subsections for each configuration task.
5. When finished, select **Send** to implement configuration changes.

4 Guided setup

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

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.

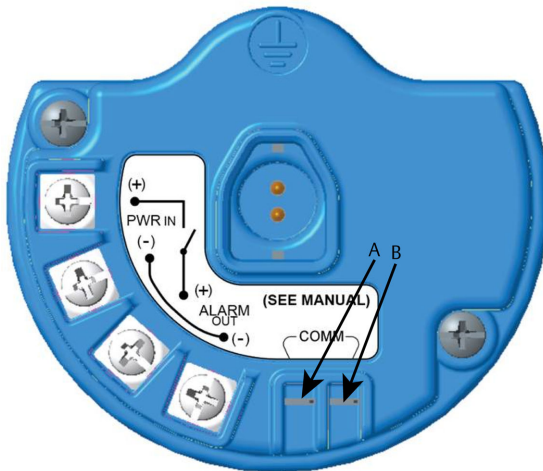
⚠ WARNING

Explosions

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

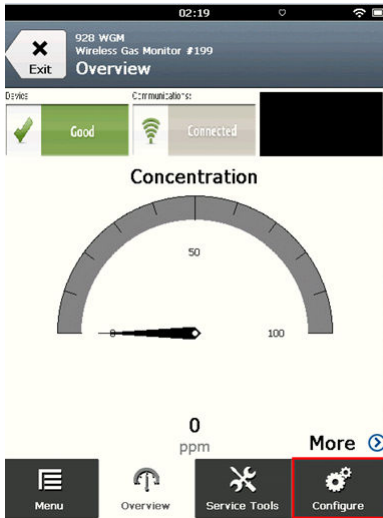
Procedure

1. Connect the HART® communication leads to the HART terminals on the handheld communicator.
2. Connect the HART communication leads to the COMM terminals on the transmitter terminal block.

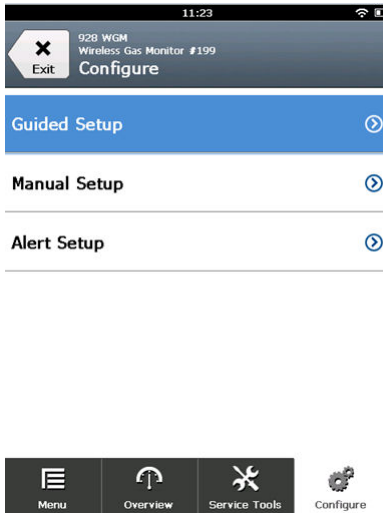


- A. +Comm terminal
B. -Comm terminal

3. 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.
4. On the **Overview** screen, select **Configure**.



5. On the **Configure** screen, select **Guided Setup**.



Postrequisites

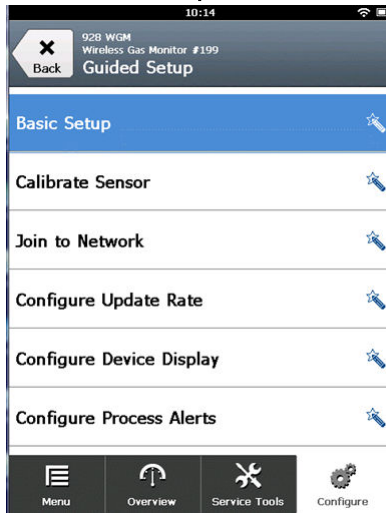
Refer to [Basic setup](#) through [Configuring process alerts](#).

4.1 Basic setup

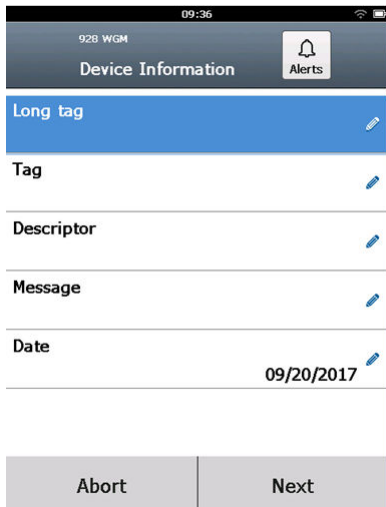
4.1.1 Basic setup using Field Communicator

Procedure

1. On the **Guided Setup** screen, select **Basic Setup**.



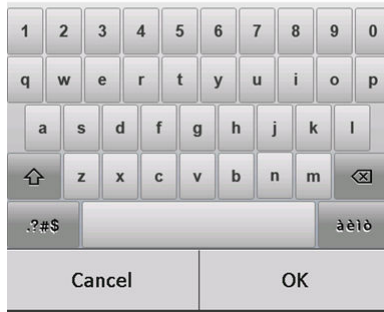
2. On the **Device Information** screen, select any of the following and configure as needed. Otherwise, continue with [Step 3](#).



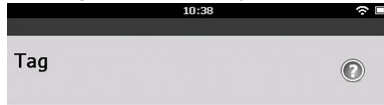
- Long tag: Enter an identifier for the device up to 32 characters long using the virtual keypad. The Long tag field is blank by default and does not display if left blank.



Wireless Gas Monitor #199



- 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.



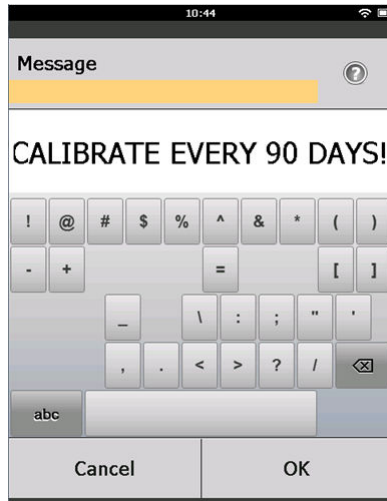
WGM#199



- 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.



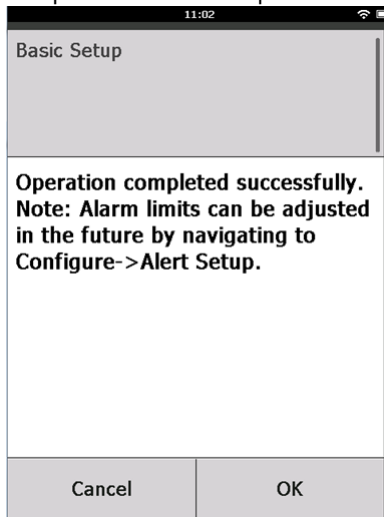
- Message: Enter a message up to 32 alphabetic, numeric, and special characters long. The Message field is blank by default, does not display if left blank, and may be used for any purpose.



- 3. On the **Device Information** screen, select **Next**.



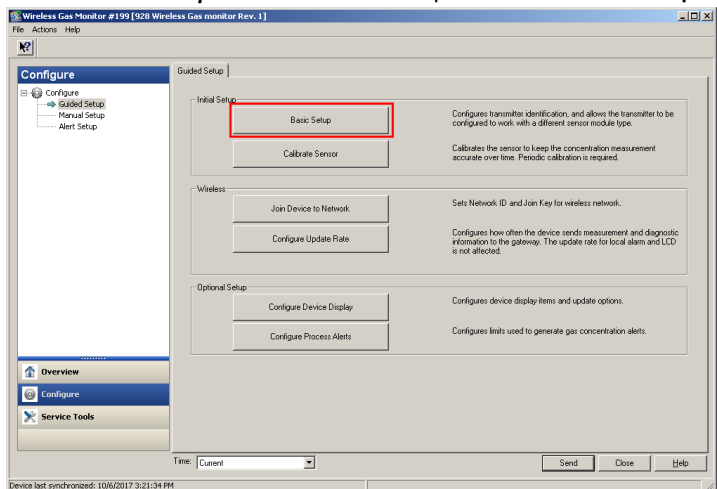
- 4. On the **Basic Setup** screen, select **OK** to confirm successful completion of basic setup.



4.1.2 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](#).

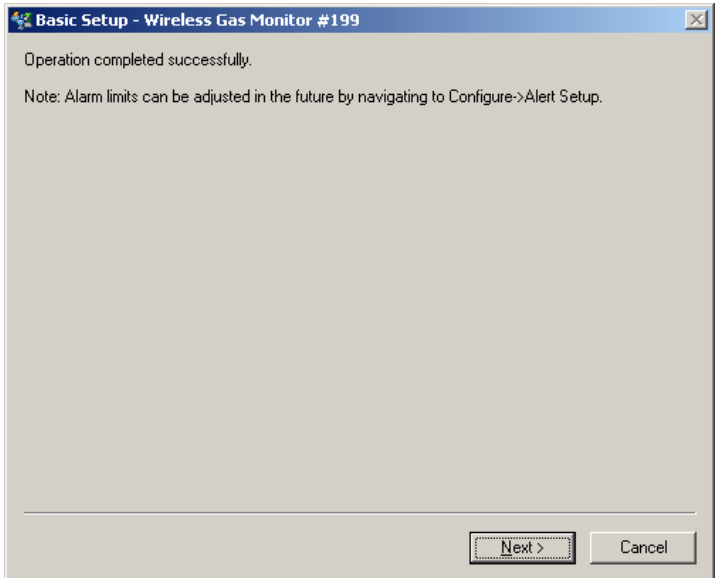
The screenshot shows a dialog box titled "Identification" with a tab labeled "Identification". The dialog contains the following fields and descriptions:

- Long tag:** Input field containing "Wireless Gas Monitor #199". Description: "Long Tag can have up to 32 characters.*"
- Tag:** Input field containing "WGM#199". Description: "Tag can have up to 8 uppercase characters.*"
- Descriptor:** Input field containing "TEST WGM". Description: "Descriptor is a free form field with up to 16 uppercase characters."
- Message:** Input field containing "CALIBRATE EVERY 90 DAYS!". Description: "Message is a free form field with up to 32 uppercase characters."
- Date:** Input field containing "10/31/2017". Description: "Date can be used for any purpose such as the last calibration date."

A note at the bottom of the dialog states: "*A long tag and short tag are recommended for best performance." At the bottom right, there are three buttons: "Next", "Cancel", and "Help".

- **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 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 180 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.

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).

5.1 Calibrate using Field Communicator

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.

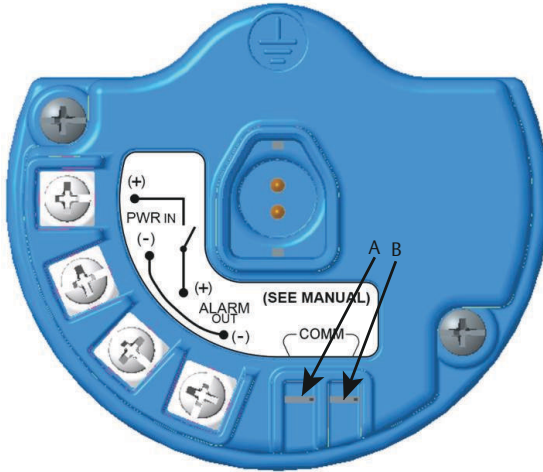
WARNING

Explosions

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

Procedure

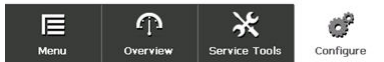
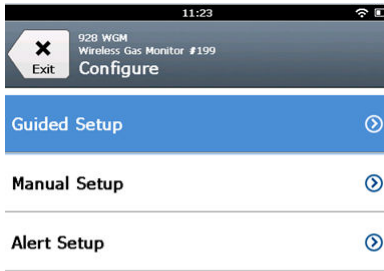
1. Connect the HART® communication leads from the Field Communicator HART terminals to the COMM terminals on the terminal block of the transmitter.
-



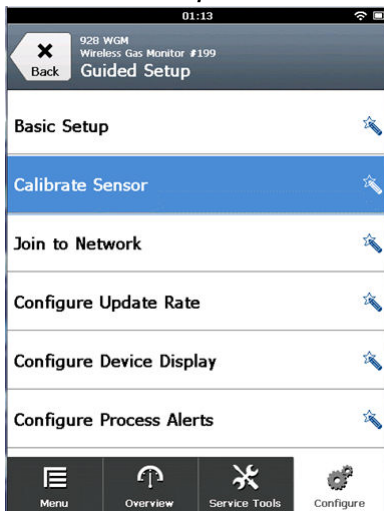
- A. +COMM terminal
 - B. -COMM terminal
-

2. Establish communication between the transmitter and the Field Communicator.
3. On the **Home** screen, select **Configure**.

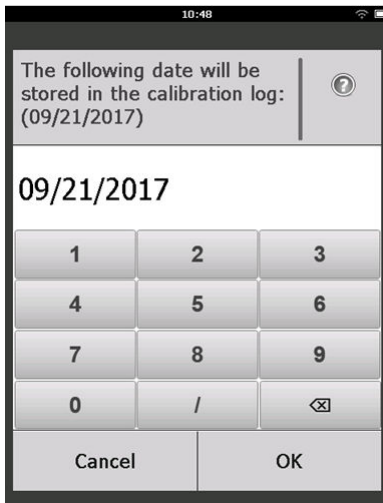
4. On the **Configure** screen, select **Guided Setup**.



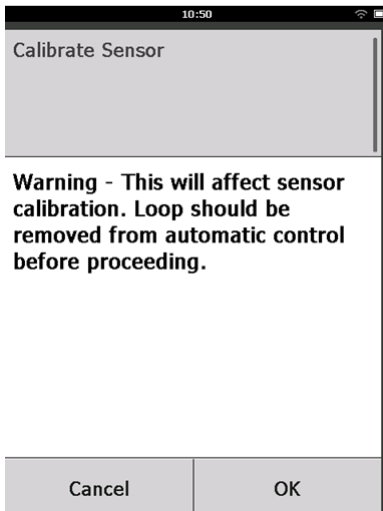
5. On the **Guided Setup** screen, select **Calibrate Sensor**.



- 6. Select **OK** to accept the current date as the calibration date and continue.



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



Note

Calibration of an O₂ 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.

8. When calibrating for H₂S and CO, expose the sensor to clean air to zero the reading. When calibrating for O₂, 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 (H₂S and CO) or a cylinder of verified percent oxygen content calibration gas (O₂) 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.



- 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.

Note

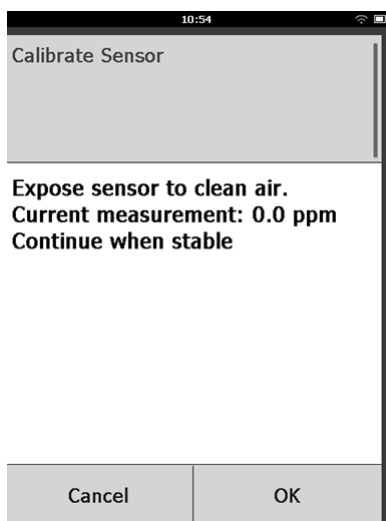
If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the clean air travels the length of the calibration tubing.

- e) Complete [Step 9](#) through [Step 12](#).
- 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.

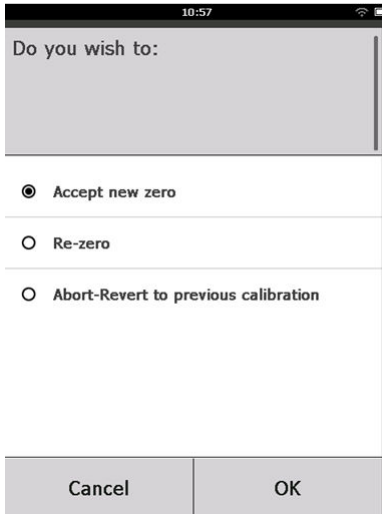
Note

Negative measurement readings may occur and are normal during zeroing.



10. Wait while the Field Communicator performs zero adjustment.
11. Select **OK** to accept the new zero measurement.

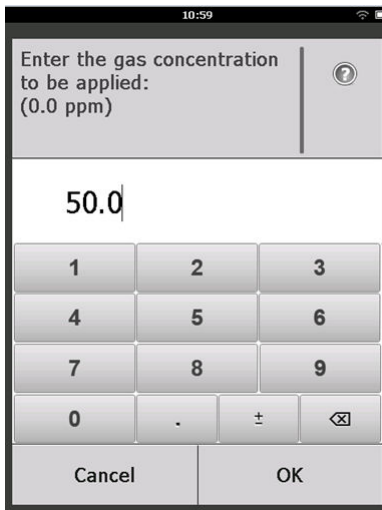
- 12. Select **OK** to accept the new zero.



- 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.

The value must be between 5 ppm and 100 ppm.

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. Install a regulator on the target gas source.

⚠ WARNING

Toxic gas

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



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.

Note

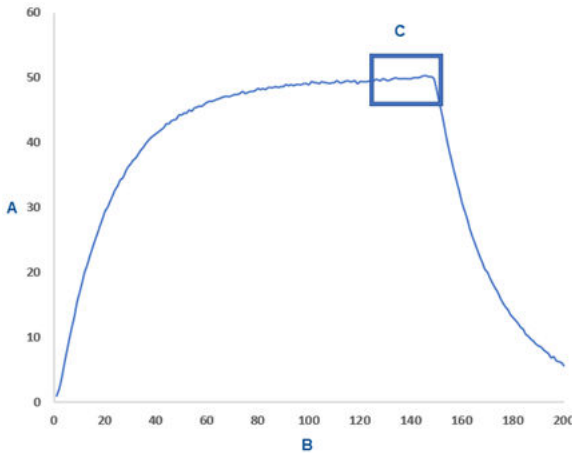
If you need a long length of tubing to reach the device, make allowances for a delay in response time from the sensor while the target gas travels the length of the calibration tubing.

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.



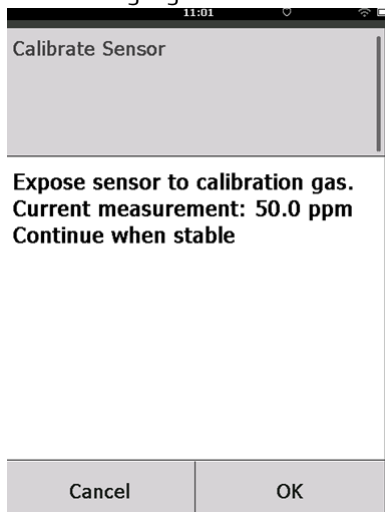
- 18. Wait while the gas concentration measurement stabilizes.
Refer to [Figure 5-1](#).

Figure 5-1: Typical Calibration Profile

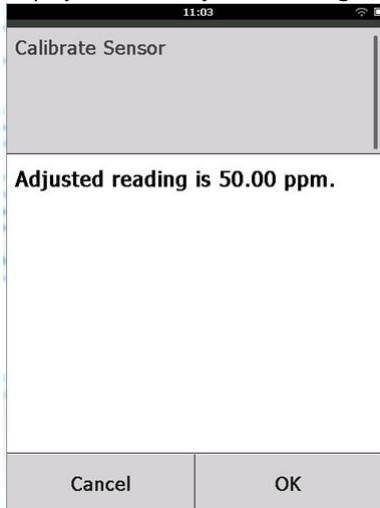


- A. Gas concentration ppm
- B. Time (in seconds)
- C. Gas concentration measurement has stabilized

- 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.

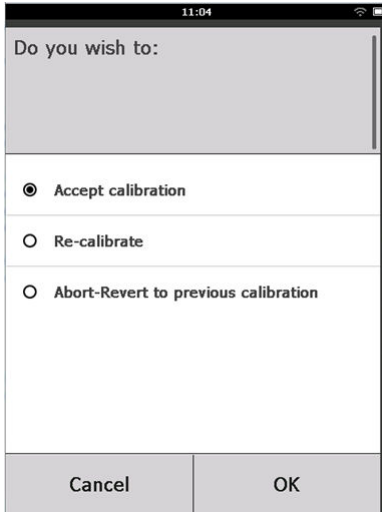


21. Select **OK**.

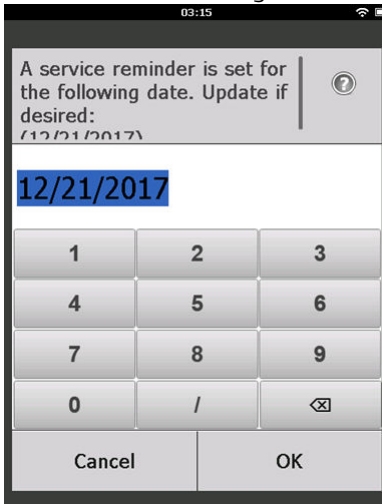
Note

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.

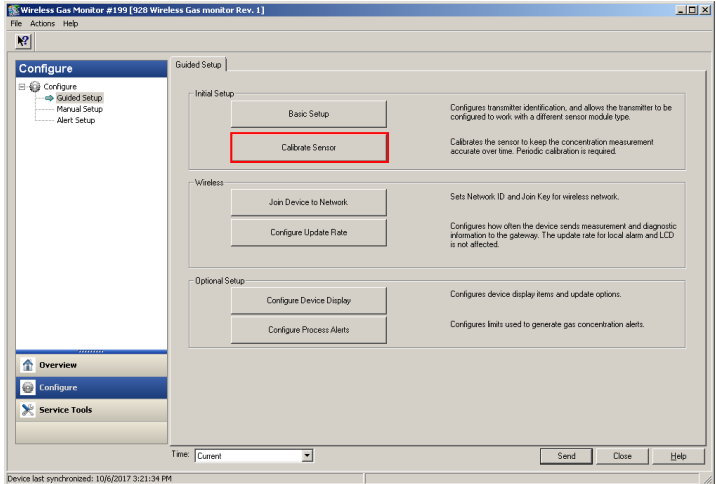


- 23. Select **OK** to accept the service reminder date or enter another date. Refer to the *Service Reminders* section of the Rosemount 928 Wireless Gas Monitor [Reference Manual](#) for more information.
- 24. Shut off the target gas flow at the regulator.
- 25. Detach the calibration tubing from the regulator on the target gas source and from the IP filter inlet on the bottom of the sensor.

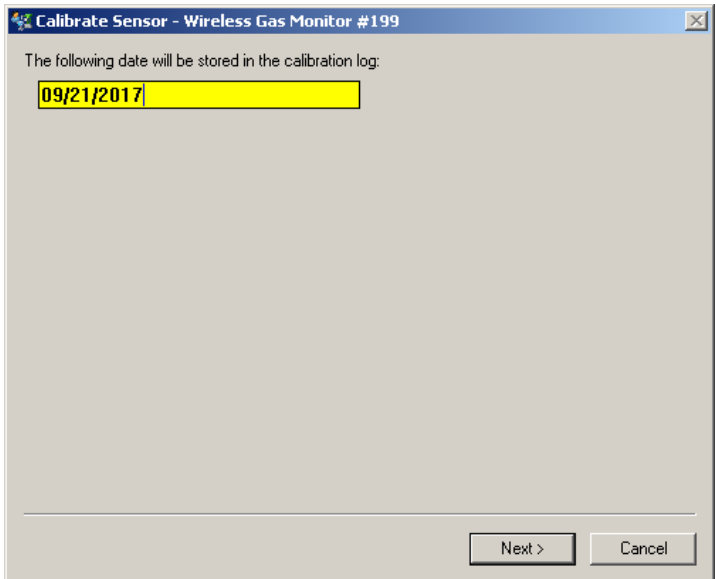
5.2 Calibrate using AMS Wireless Configurator

Procedure

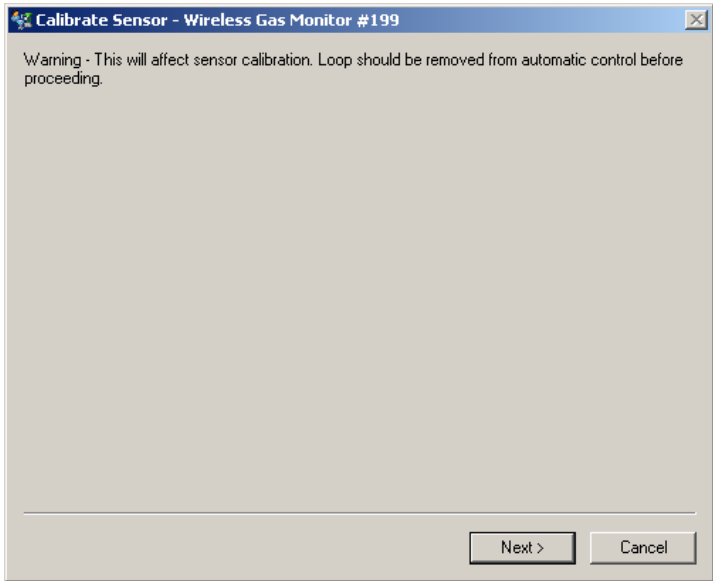
1. On the **Guided Setup** tab, in the Initial Setup field, select **Calibrate Sensor**.



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 H₂S, and CO, expose the sensor to clean air to zero the reading. When calibrating for O₂, 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 (H₂S and CO) or a cylinder of verified percent oxygen content calibration gas (O₂) 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.

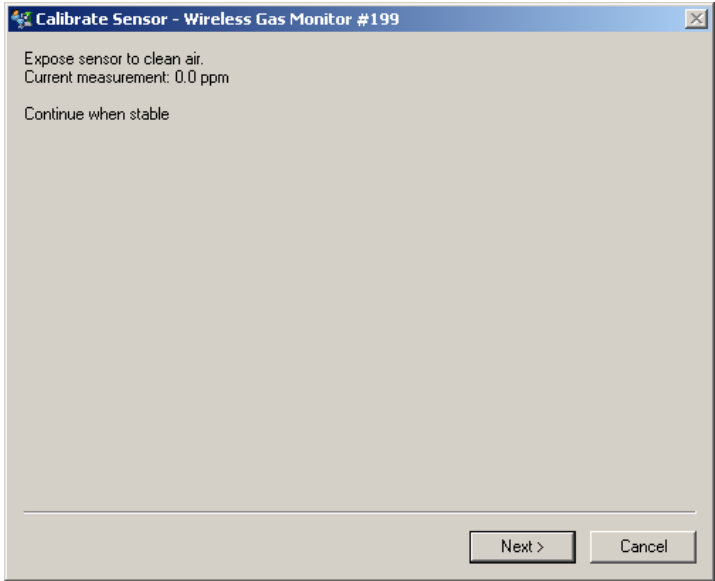


- d) Release the clean air/known percent oxygen specified calibration gas to the sensor.

Note

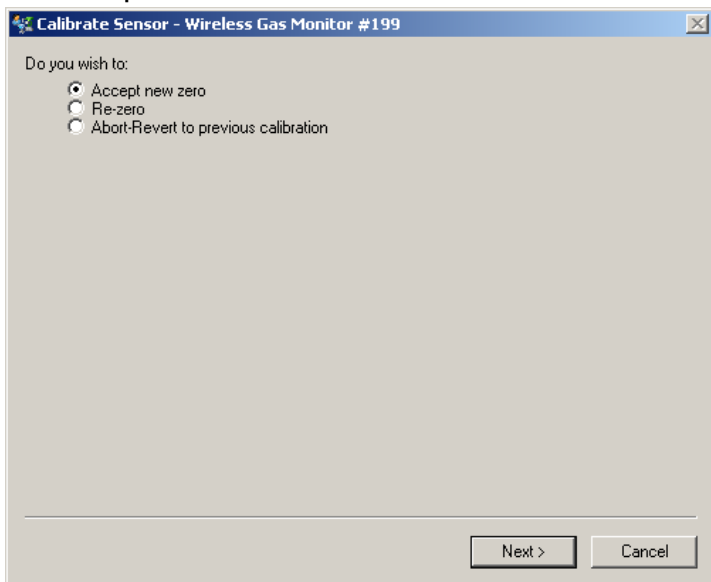
If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the clean air travels the length of the calibration tubing.

- 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.

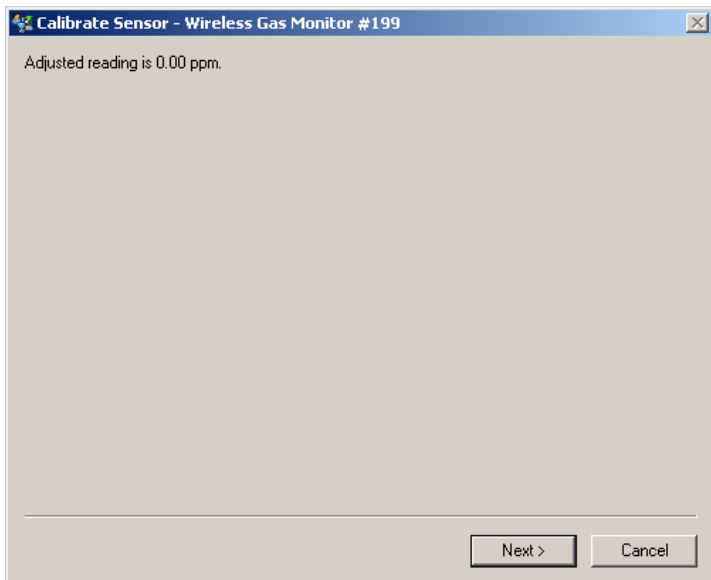


6. Select **Next**.

7. Select **Accept New Zero**.



8. Select **Next**.



9. 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.

10. Install a regulator on the target gas source.



11. 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.



12. 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

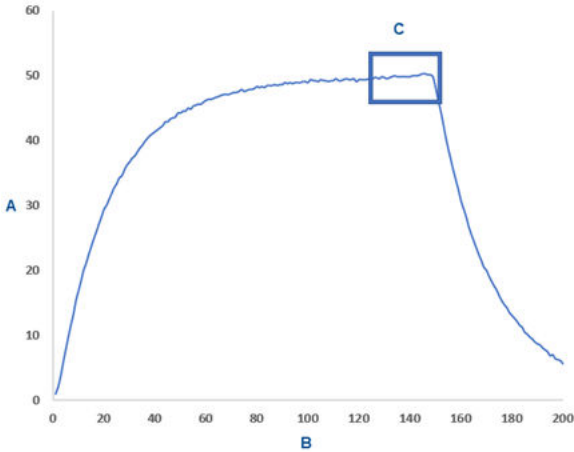
If you need a long length of calibration tubing to reach the device, make allowances for a delay in response time from the sensor while the target gas travels the length of the calibration tubing.

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.



13. Wait while the gas concentration measurement stabilizes.
Refer to [Figure 5-2](#).

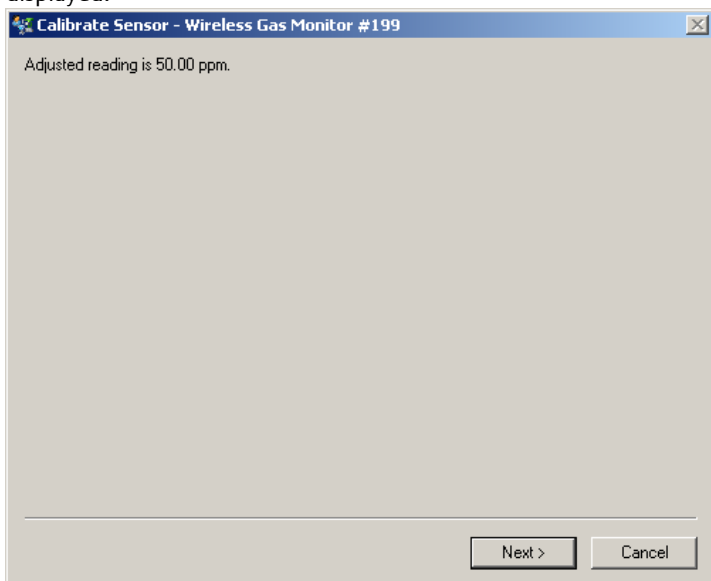
Figure 5-2: Typical Calibration Profile



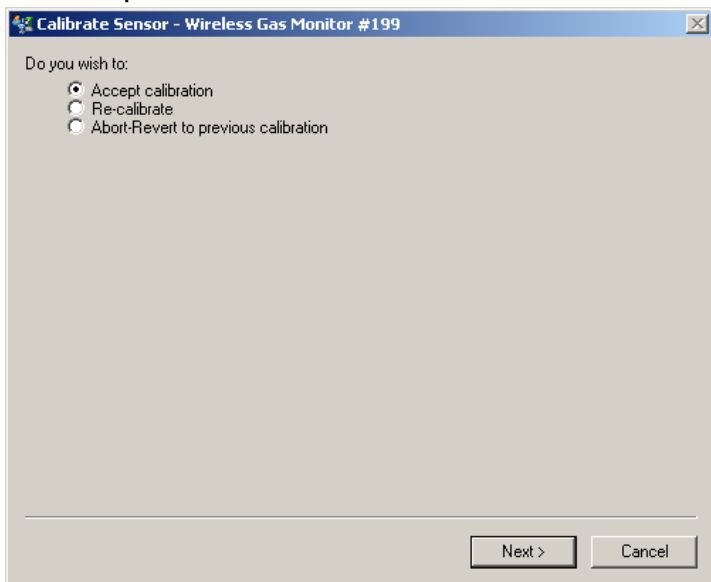
- A. Gas concentration ppm
- B. Time (in seconds)
- C. Gas concentration measurement has stabilized

14. Select **Next** when the gas concentration measurement stabilizes at or near the target gas concentration level.

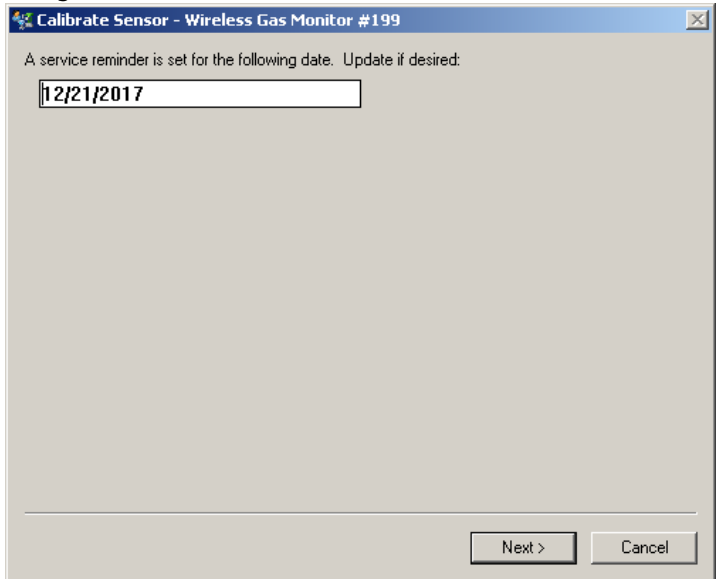
15. Wait while the AMS Wireless Configurator calibrates. When the calibration process finishes, the new adjusted reading is displayed.



16. Select **Next**.
17. Select **Accept calibration**.



- 18. Select **Next**.
The **Service Reminder** screen is displayed if a service reminder is configured and enabled.



- 19. 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.
- 20. Shut off the target gas flow at the regulator.
- 21. 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 Verify operating atmosphere

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

Table 6-1: Temperature Guidelines

Operating limit	Transmitter storage limit	Sensor storage recommendation
-40 to 140 °F -40 to 60 °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 long periods may shorten their useful service life.




Quick Start Guide
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