

# Rosemount™ 6888C In Situ Combustion Oxygen Analyzer

For Hazardous Areas



**Safety messages**

**⚠ WARNING**

**Follow installation guidelines.**

Failure to follow these installation guidelines could result in death or serious injury. If this equipment is used in a manner not specified by the manufacturer, the protection it provides against hazards may be impaired.

Follow all warnings, cautions, and instructions marked on and supplied with the product.

Install equipment as specified in this document.

Ensure that only qualified personnel perform the installation, operation, and maintenance of the product.

Inform and educate your personnel in the proper installation, operation, and maintenance of the product.

Follow appropriate local and national codes.

If you do not understand any of the instructions, contact your Emerson representative for clarification.

**⚠ WARNING**

**Explosions**

Do not open when an explosive atmosphere may be present.

**⚠ WARNING**

**Electrical shock**

Do not open while energized.

**⚠ WARNING**

Connect all devices to the proper electrical and pressure sources.

**⚠ 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 in 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**

For the standard housing probe and direct replacement probe, only use supply cables and certified cable glands rated >221 °F (>105 °C).  
For the autocalibration housing, only use supply cables and certified cable glands rated >29 °F (>85 °C).





**NOTICE**

Use only factory documented components for repair. Tampering or unauthorized substitution of parts and procedures can affect the performance and cause unsafe operation of your process.

**NOTICE**

The Field Communicator must be upgraded to System Software 2.0 with graphic license for operation with the Rosemount 6888C Analyzer. The AMS software must be upgraded to AMS 8.0 or above. Contact [Emerson.com/global](https://emerson.com/global) to upgrade the Field Communicator software to System Software 2.0 with graphic license.

**Symbols**

-  Earth (ground) terminal
-  Protective conductor terminal
-  Risk of electrical shock
-  Refer to reference manual.

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# 1 Installation

## ⚠ WARNING

Failure to follow safety instructions could result in serious injury or death.

Before installing this device, read [Safety messages](#).

## ⚠ WARNING

### Electrical shock

Failure to install covers and ground leads could result in serious injury or death.

Install all protective covers and ground leads after installation.

## 1.1 Mechanical installation

Most combustion processes run only slightly negative or positive in pressure, so that the probe flange is for mechanical mounting only.

The probe is not rated for high pressures. If this is a new installation, Emerson can supply a weld plate for welding to the flue gas duct.

### 1.1.1 Installing probe

#### Prerequisites

Ensure all components are available to install the probe.

#### Procedure

1. If using the optional ceramic diffusion element, the vee-deflector must be correctly oriented. Before inserting the probe, check the direction of gas flow in the duct. Orient the vee-deflector so the apex points upstream towards the flow.
2. If using the standard square weld plate or an optional flange mounting plate, weld or bolt the plate onto the duct.

#### Note

The through hole diameter in the stack or duct wall and refractory material must be at least 2.5 in. (64 mm).

3. Insert probe through the opening in the mounting flange and bolt the unit to the flange.

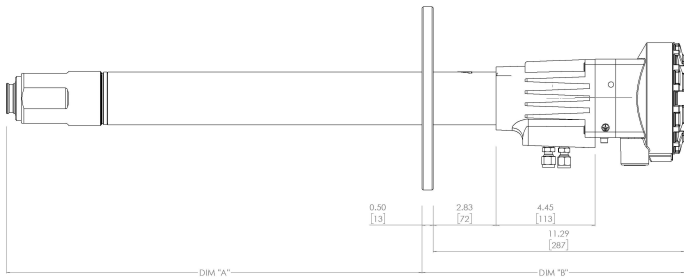
**⚠ WARNING**

Do not allow the temperature of the electronics to exceed +185 °F (+85 °C).

**⚠ CAUTION**

If washing the ducts down during an outage, make sure to first power down the probes and remove them from the wash area.

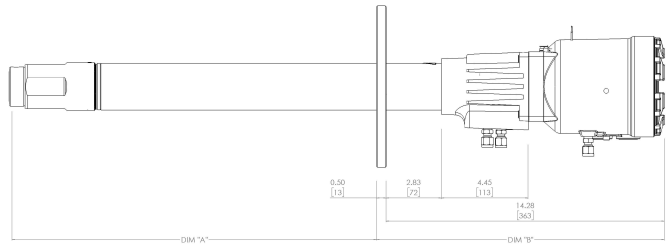
**Figure 1-1: Rosemount 6888C Probe with standard terminations and electronics housing**



**Note**

All dimensions are in inches (millimeters).

**Figure 1-2: Rosemount 6888C Probe with integral autocalibration housing**



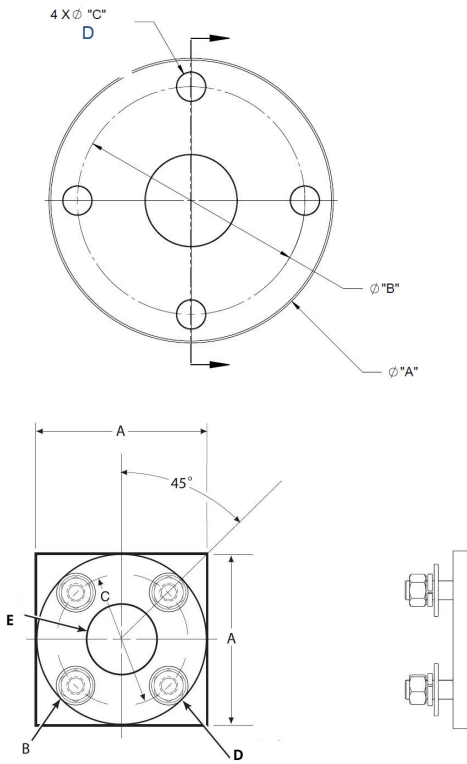
**Note**

All dimensions are in inches (millimeters).

**Table 1-1: Removal/installation dimensions**

Probe length	Dimension A insertion depth	Dimension B removal envelope standard housing	Removal envelope accessory housing
18 in. (457 mm) probe	16.1 in. (409 mm)	15.77 in. (400.6 mm)	19.26 in. (489.2 mm)
36 in. (914 mm) probe	32.52 in. (826.0 mm)	46.6 in. (1,184 mm)	50.1 in. (1,273 mm)
6 ft. (2 m)	68.52 in. (1,740.4 mm)	82.6 in. (2,098 mm)	86.1 in. (2,187 mm)

**Figure 1-3: Installation weld plates**



- A. Dimension (See .)
- B. Thread dimension
- C. Diameter
- D. Equally spaced
- E. Four studs, lockwashers, and nuts equally spaced on C, diameter BC

**Note**

All dimensions are in inches (millimeters).

**Table 1-2: Installation weld plate dimensions**

	ANSI	DIN
A	7.75 in. (196.8 mm) probe	8.5 in. (216 mm) probe

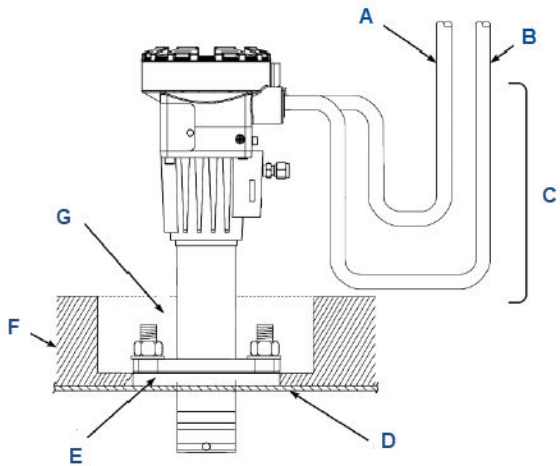


**Table 1-2: Installation weld plate dimensions (continued)**

	<b>ANSI</b>	<b>DIN</b>
B thread	0.625 in. (15.88 mm) probe	(M-16x2)
C diameter	6 in. (152 mm) probe	6.7 in. (170 mm) probe

**Table 1-3: Mounting flange dimensions**

	<b>ANSI</b>	<b>DIN</b>
Flange diameter	8.25 in. (209.5 mm)	
Hold diameter	0.75 in. (19.0 mm)	
4 holes equally spaced on BC	6 in. (152 mm)	6.7 in. (170 mm)

**Figure 1-4: Drip loop and insulation removal**

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- A. Line voltage
- B. Logic input/output, 4-20 mA signal
- C. Drip loop
- D. Stack or duct metal wall
- E. Adapter plate
- F. Insulation
- G. Replace insulation after installing analyzer.  
Standard housing probe shown. Accessory housing is similar. Probe may be vertical or horizontal.

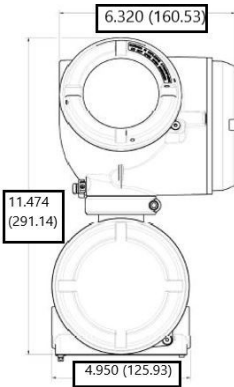
**Related information****Figure 1-3****1.1.2 Installing CX2100TR Remote Electronics****Procedure**

Install the remote electronics unit using the mounting bracket kit on a wall, standpipe, or similar structure.

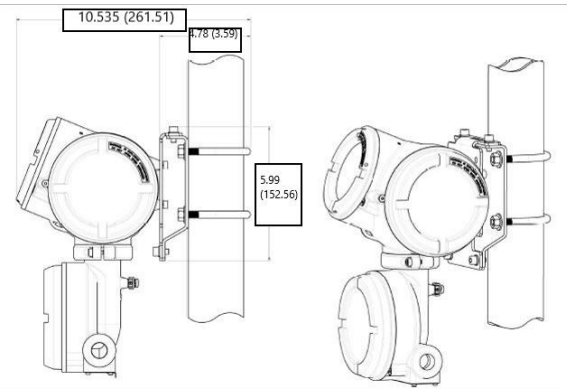
**Note**

Only use bolts supplied with the electronics analyzer or sold by Emerson as spare parts.

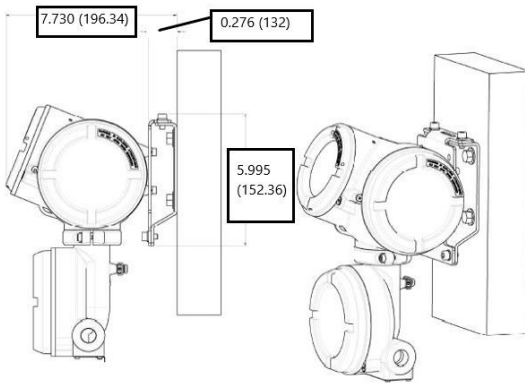
**Figure 1-5: Remote electronics**



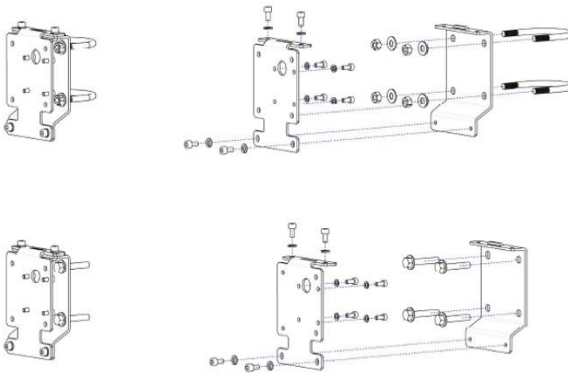
**Figure 1-6: Remote electronics mounted on a pole**



**Figure 1-7: Remote electronics mounted on a wall**



**Figure 1-8: Pole/wall mounting kit expanded**



**Note**

Dimensions are in inches (mm).

## 1.2 Electrical installation

All wiring must conform to local and national codes. Multiple wiring diagrams are shown in this section. Always refer to the diagrams that apply to your configuration and disregard all other wiring diagrams.

### **⚠ WARNING**

#### **Electrical shock**

Failure to install covers and ground leads could result in serious injury or death.

Disconnect and lock out power before connecting the power supply.

Install all protective covers and ground leads after installation.

To meet the safety requirements of IEC 61010-1 (EC requirement) and ensure safe operation of this equipment, connect the main electrical power supply through a circuit breaker (minimum 10 A) which will disconnect all current-carrying conductors during a fault situation.

This circuit breaker should also include a mechanically operated isolating switch. If it does not, keep another external means of disconnecting the power supply from the equipment located close by. Circuit breakers or switches must comply with a recognized standard such as IEC 947.

To maintain proper earth grounding, ensure a positive connection exists between the analyzer housing and earth. The connecting ground wire must be 14 AWG minimum.

Line voltage, signal, and relay wiring should be rated for at least 221 °F (105 °C).

For CX2100TR wiring instructions, refer to CX2100TR QSG.

### 1.2.1 Wiring Rosemount 6888C Analyzer Probe only (no Rosemount 6888Xi Electronics)

The Rosemount 6888 Analyzer Probe has built-in electronics that control the heater temperature and amplify the raw O<sub>2</sub> milli-volt signal to a linear 4-20 mA.

You can run the 4-20 mA signal lines can be run directly to the control room and also power the analyzer electronics. There is no O<sub>2</sub> display or keypad on the probe, so you must set up the analyzer through HART® communications via a Field Communicator or AMS.

#### **Procedure**

1. Remove the cover from the probe.

2. Connect the line (**L1** wire) to the **L1** terminal, the neutral (**L2** wire) to the **L2/N** terminal, and the ground wire to the ground lug.

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**Note**

The analyzer accepts line voltage at 120/240 VAC  $\pm 10\%$ , 50/60 Hz. No setup is required.

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3. Connect the 4-20 mA signal wires at the analyzer. Use a shielded twisted wire pair. Do not allow bare shield wires to contact the circuit boards. Insulate the shield wires prior to termination.  
The analyzer electronics are loop-powered (i.e., the 4-20 mA signal wires supply 24 VDC from the DCS or an external power supply).
4. Terminate the shield only at the analyzer electronics housing unless using a Rosemount 6888Xi. When using the Rosemount 6888Xi Advanced Electronics, terminate the shield at both ends.
5. Reinstall cover on analyzer.

### 1.2.2 Wire standard housing analyzer probe with Rosemount 6888 Xi Electronics

The Rosemount 6888 Xi Electronics serves as an operator interface unit with a back-lit display and keypad. It is capable of two channels, serving up to two Rosemount 6888 probes.

#### Procedure

1. Remove cover screws from the front cover of the Rosemount 6888 Xi. Swing down the front cover of the interface box.
2. Pull out the input/output (I/O) board on the right side of the card rack inside the Rosemount 6888 Xi.  
If your system is configured to operate two analyzer probes, there are two I/O interface boards.
3. Connect the 4-20 mA signal wires at **J4** of the I/O board. Attach the supplied ferrite clamp over the 4-20 mA **OUT** wires that extend past the shield.

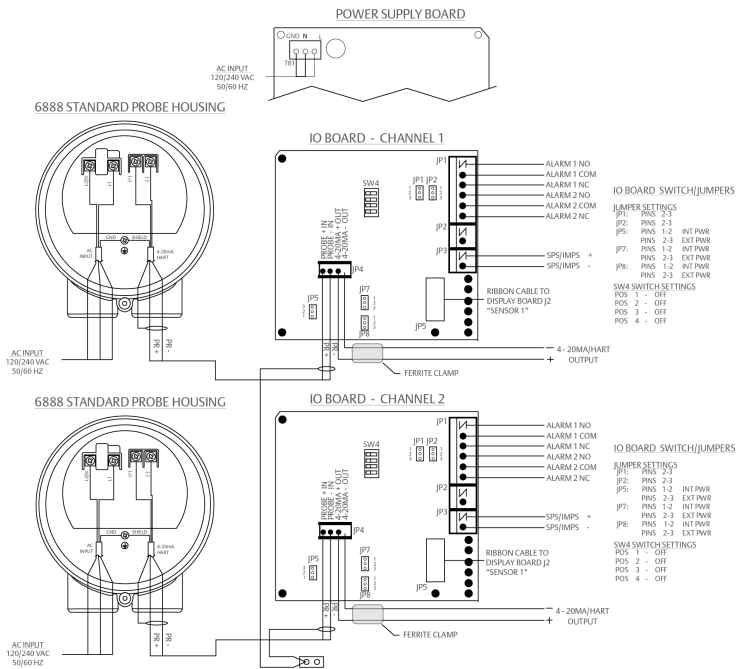
#### NOTICE

Installation of the ferrite clamp over the 4-20 mA **OUT** wires is required for compliance with the European EMC directive.

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4. Terminate the shield of the 4-20 mA signal wires at the designated ground terminal of the Rosemount 6888 Xi. Do not allow bare shield wires to contact the circuit boards. Insulate the shield wires prior to termination.
5. Connect the signal wires from the Rosemount SPS (if used) to the applicable terminals of **J3**.  
Refer to the [Rosemount SPS 4001B Manual](#) for wiring details.
6. Reinstall the I/O board in the card rack of the Rosemount 6888 Xi.
7. If your system is configured for two channel operation, repeat [Step 2](#) through [Step 6](#) to connect the other probe's signal wires.
8. Remove the probe's connector from the power supply board located on the left side of the card rack inside the Rosemount 6888 Xi.
9. Connect the line, or **L1**, wire to the **L1** terminal and the neutral, or **L2**, wire to the **N** terminal.
10. Reinstall the power supply connector to the power supply board.

Figure 1-9: Single/dual channel wiring diagrams



**Note**

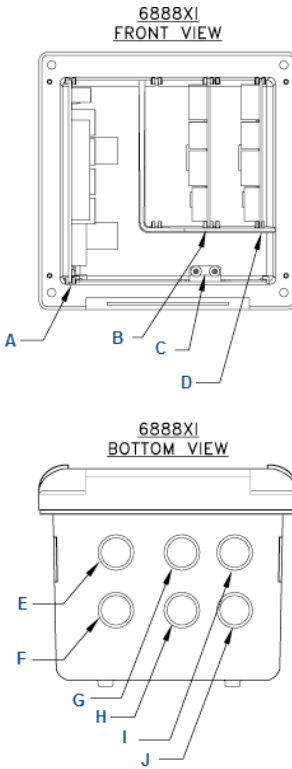
- A. Except for **JP5**, **JP7**, and **JP8** on IO board, jumper and switch settings are factory set and are shown for reference only.
- B. IO board 4-20 mA loop power settings.

**JP5** Pins 1-2: internal power Rosemount 6888 Xi to Rosemount 6888 analyzer.  
 Pins 2-3: external power Rosemount 6888 Xi to Rosemount 6888 analyzer (requires 250 Ω resistor across **J4**, PR+ to PR-).

**JP7/JP8** Pins 1-2: internal power Rosemount 6888 Xi to DCS.  
 Pins 2-3: external power Rosemount 6888 Xi to DCS.



**Figure 1-10: Single/dual channel wiring diagram**



- A. Power supply board
- B. Channel #2 IO board
- C. Shield ground
- D. Channel #1 IO board
- E. AC input to P/S
- F. Plug
- G. Channel #2 alarm relay (Rosemount SPS)
- H. Channel #2 4-20 mA/HART<sup>®</sup> output
- I. Channel #1 alarm relay (Rosemount SPS)
- J. Channel #1 4-20 mA/HART output

### 1.2.3 Connect the analyzer probe with integral autocalibration to HART® communications

This probe contains gas-switching solenoids so that the Rosemount 6888 Xi Electronics can control the introduction of calibration gases.

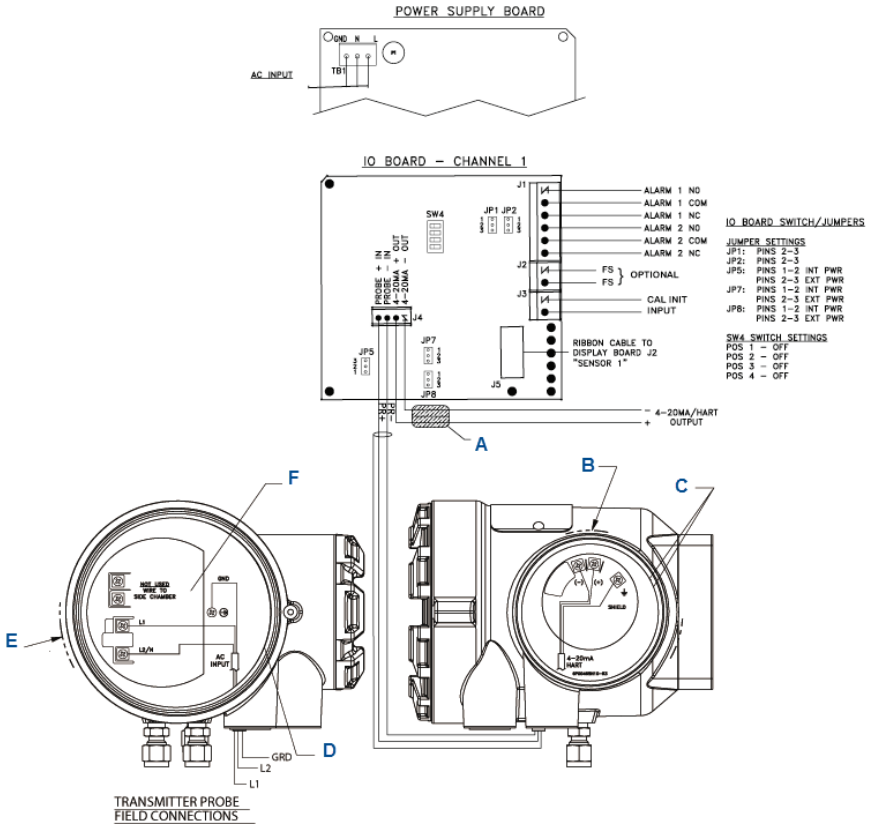
You can initiate calibrations in the following ways:

- Automatically with a calibration recommended diagnostic
- Automatically with time since last calibration
- Manually with external dry contact
- Manually with HART communications
- With the Rosemount 6888 Xi Local Operator Interface (LOI). You can only use integral autocalibration with a Rosemount 6888 Xi.

#### Procedure

1. Remove the two covers from the analyzer.
2. Connect the line (**L1** wire) to the **L1** terminal, the neutral (**L2** wire) to the **L2/N** terminal, and the ground wire to the ground lug.  
The analyzer accepts line voltage at 120/240 Vac  $\pm$ 10 percent, 50/60 Hz. No setup is required.
3. Connect the 4-20 mA signal wires from the Rosemount 6888 Xi to the connections in the side chamber of the analyzer.  
Do not connect the signal wires to the terminals in the main chamber where the AC input wires are connected. Use a shielded twisted wire pair. Do not allow bare shield wires to contact the circuit boards. Insulate the shield wires prior to termination. The 24 VDC loop power is sourced from the Rosemount 6888 Xi.
4. Terminate the shield at both the probe and the Rosemount 6888 Xi.
5. Reinstall both covers on analyzer.

**Figure 1-11: Integral autocalibration and HART communications**



- A. Ferrite clamp
- B. Signal
- C. Test points
- D. #8 pan htd scr (internal ground)
- E. Power
- F. Test point group

**Note**

- A. Except for **JP5, JP7, and JP8** on the input/output (IO) board, jumper and switch settings are factory set and are shown for reference only.
- B. IO board: 4-20 mA/HART loop power settings
  - JP5

- Pins 1-2: internal power Rosemount 6888Xi to Rosemount 6888 analyzer
- Pins 2-5: external power Rosemount 6888Xi to Rosemount 6888 analyzer (requires 2,500 resistor across **J4**, PR+ to PR-)
- JP7/JP8
  - Pins 1-2: internal power to DCS
  - Pins 2-3: external power Rosemount 6888Xi to DCS

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**Note**

IO board Channel 2 is a duplicate of Channel 1.

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### 1.2.4 Connect the analyzer probe with integral auto-calibration to FOUNDATION™ Fieldbus communications

This probe contains gas-switching solenoids enabling the Rosemount 6888 Xi Electronics, Field Communicator, or AMS software to control the introduction of calibration gases.

You can initiate calibrations in the following ways:

- Automatically with a calibration recommended diagnostic
- Automatically with time since last calibration
- Manually with external dry contact
- With the Rosemount 6888 Xi Local Operator Interface (LOI). You can only use integral autocalibration with a Rosemount 6888 Xi.

#### Procedure

1. Remove the two covers from the analyzer.
2. Connect the line (**L1** wire) to the **L1** terminal, the neutral (**L2**) wire to the **L2/N** terminal, and the ground wire to the ground lug.

The analyzer accepts line voltage at 120/240 VAC ±10 percent, 50/60 Hz. No setup is required.

3. Connect the FOUNDATION Fieldbus wires from the analyzer side housing to the segment.

**⚠ WARNING**

The Rosemount 6888 probe is not rated as Intrinsically Safe (IS) and will render any IS or FISCO segment it is wired to as non-IS.

Use a shielded twisted wire pair.

Do not allow bare shield wires to contact the circuit boards.

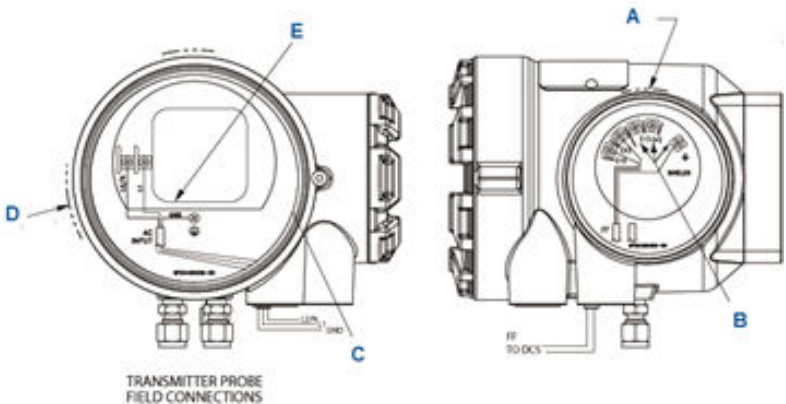
4. Terminate the shield at both the probe and the Rosemount 6888 Xi Advanced Electronics.

**Note**

The FOUNDATION Fieldbus signal represents the O<sub>2</sub> value and also powers the probe-mounted electronics.

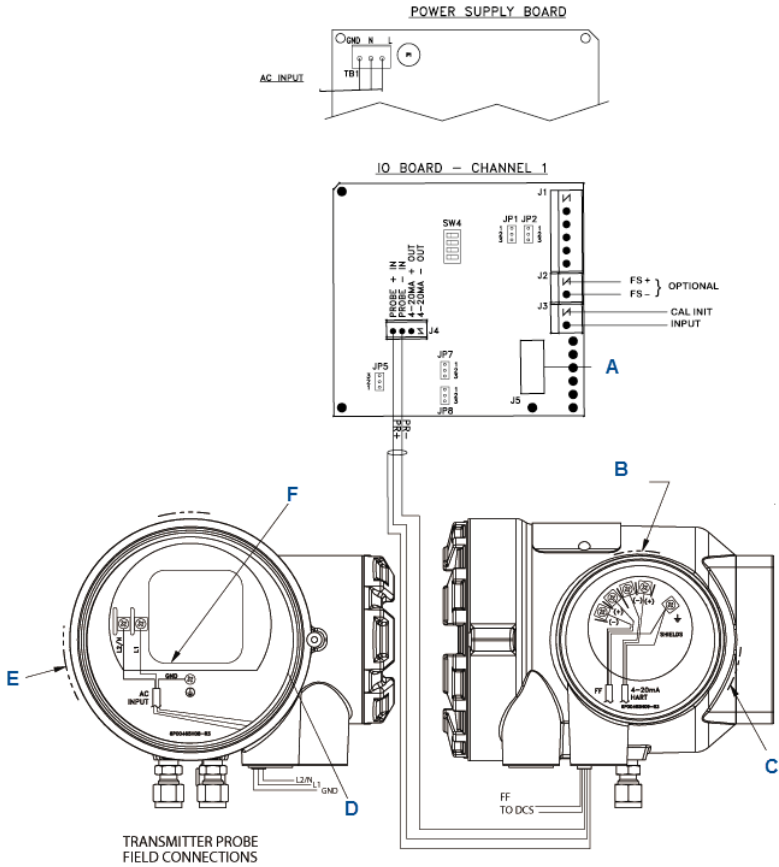
5. Reinstall both covers on analyzer.

**Figure 1-12: Integral autocalibration and FOUNDATION Fieldbus communication without optional Rosemount 6888 Xi**



- A. Signal
- B. Not used
- C. #8 pan htr scr (internal ground)
- D. Power
- E. Probe test point group

**Figure 1-13: Integral autocalibration and FOUNDATION Fieldbus communication with optional Rosemount 6888 Xi**



- A. Ribbon cable to display board **J2** Sensor 1
- B. Signal
- C. HART® connection (Used as a communication bus from probe analyzer electronics to optional Rosemount 6888 Xi. Not accessible to Field Communicator or AMS)
- D. #8 pan htr scr (internal ground)
- E. Power
- F. Probe test point group

**IO board switch/jumpers**

**Jumper settings**

**JP1**      Pins 2-3

<b>JP2</b>	Pins 2-3
<b>JP5</b>	Pins 1-2: internal power Pins 2-3: external power
<b>JP7</b>	Pins 1-2: internal power Pins 2-3: external power
<b>JP8</b>	Pins 1-2: internal power Pins 2-3: external power

### **SW4 switch settings**

- Position 1: **Off**
- Position 2: **Off**
- Position 3: **Off**
- Position 4: **Off**

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### **Note**

A. Except for **JP5**, **JP7**, and **JP8** on the input/output (IO) board, jumper and switch settings are factory set and are shown for reference only.

B. IO board 4-20 mA/HART loop power settings

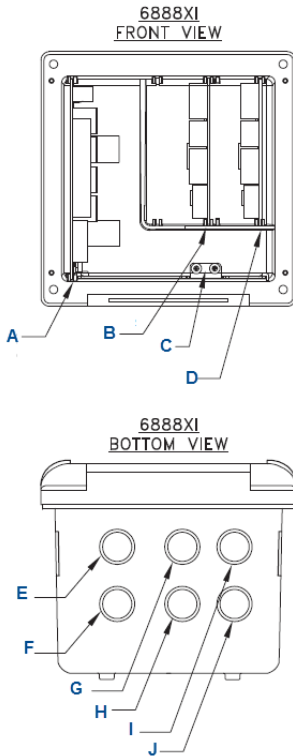
#### **JP5**

- Pins 1-2: internal power Rosemount 6888 Xi to Rosemount 6888 Analyzer.
- Pins 2-3: external power Rosemount 6888 Xi to Rosemount 6888 Analyzer (requires 2,500 resistor across **J4**, PR+ to PR-).

#### **JP7/JP8**

- Pins 1-2: internal power Rosemount 6888 Xi to DCS.
  - Pins 2-3: external power Rosemount 6888 Xi to DCS.
-

**Figure 1-14: Wiring Diagrams: integral autocalibration and FOUNDATION Fieldbus communication with Rosemount 6888 Xi**



- A. Power supply board
- B. Channel #2 IO board
- C. Shield ground
- D. Channel #1 IO board
- E. AC input to power supply
- F. Plug
- G. Channel #2 alarm relay, Rosemount SPS
- H. Channel #2 4-20 mA/HART output
- I. Channel #1 alarm relay, Rosemount SPS
- J. Channel #1 4-20 mA/HART output

### 1.2.5 Connect traditional architecture system to the direct replacement probe

Use a traditional architecture configuration to provide for remote location of the analyzer electronics. All electronics are housed



inside the Rosemount 6888 Xi. A multi-conductor power/signal cable connects the probe to the Rosemount 6888 Xi. Use the following procedure to connect the traditional architecture probe to the Rosemount 6888 Xi.

## NOTICE

The traditional architecture cable is provided at the specified length and is ready for installation. The cable glands must be properly terminated to maintain EMC/Electromagnetic Interference (EMI) noise protection.

### Procedure

1. Run the seven-conductor cable between the traditional architecture probe and the installation site for the Rosemount 6888 Xi.  
Use new cable conduit or trough as needed.
2. Install the cable and lead wires to the probe per manufacturer's instructions.
3. Install the cable at the probe housing and at the Rosemount 6888 Xi enclosure.
  - a) Unscrew locking nut from gland assembly and slide locking nut back along cable.
  - b) Pull the gland body away from the plastic insert.

## NOTICE

Take care not to damage the cable shield braid.

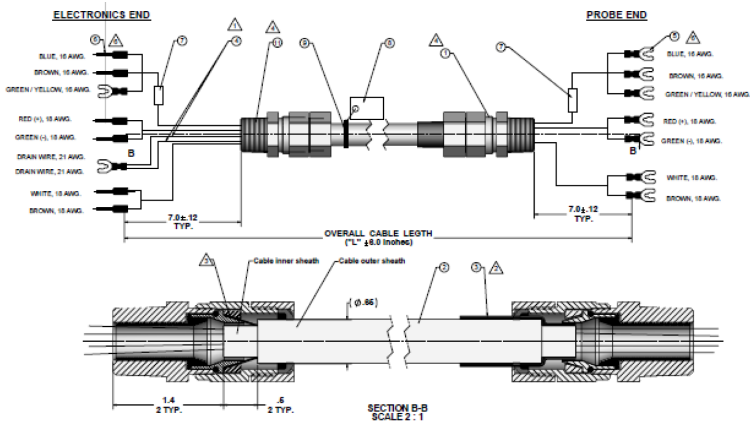
- c) Insert the cable wires into the proper entry port in either the probe housing or the Rosemount 6888 Xi enclosure.
- d) At the probe housing, apply PTFE tape or similar sealing compound to the tapered pipe threads. Thread the gland body into the probe housing until properly seated.
- e) At the Rosemount 6888 Xi enclosure, insert the gland body into the left front cable port from the inside of the enclosure. Use the rubber O-ring provided to seal the cable port.
- f) Ensure the cable shield braid is evenly formed over the gray insert.

When properly formed, the braid should be evenly spaced around the circumference of the insert and not extend beyond the narrow diameter portion.

- g) Carefully press the gray insert into the gland body. The grooves on the insert should align with similar grooves inside the gland body. Press the insert in until it bottoms out in the gland body.
- h) Slide the locking nut up and thread it onto the gland body. Tighten the locking nut so the rubber grommet inside the plastic insert compresses against the cable wall to provide an environmental seal.

4. At the Rosemount 6888 Xi, connect the cable leads to the connectors on the analyzer input/output (IO) board.

**Figure 1-15: Traditional architecture general purpose cable gland assembly**

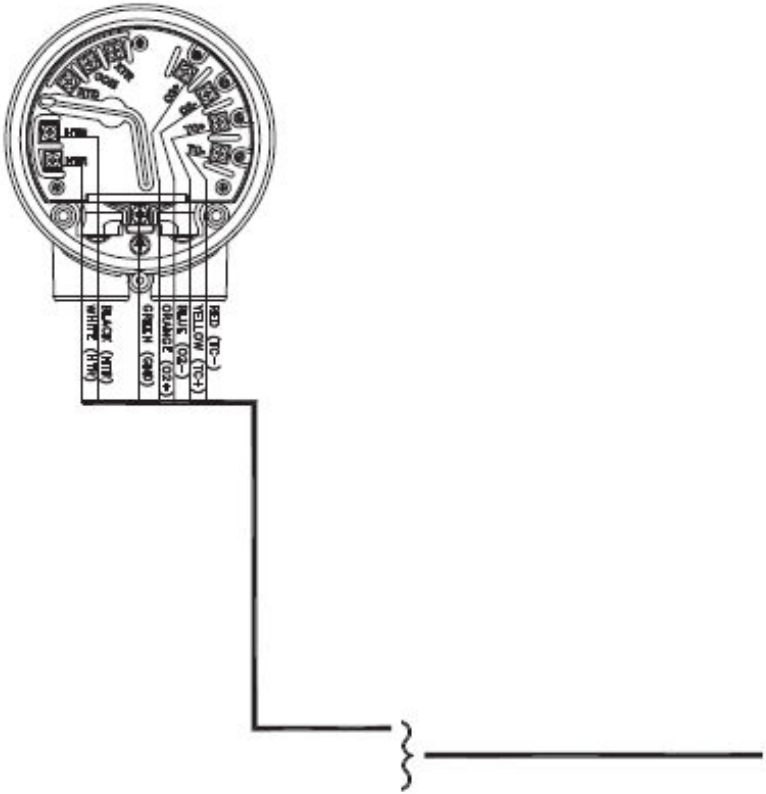


**⚠ WARNING**

**ELECTRIC SHOCK**  
 Disconnect and lock out power before working on any electrical components. There is voltage up to 240 Vac.

**Figure 1-16: Traditional architecture with Direct Replacement (DR) probe (no electronics inside)**

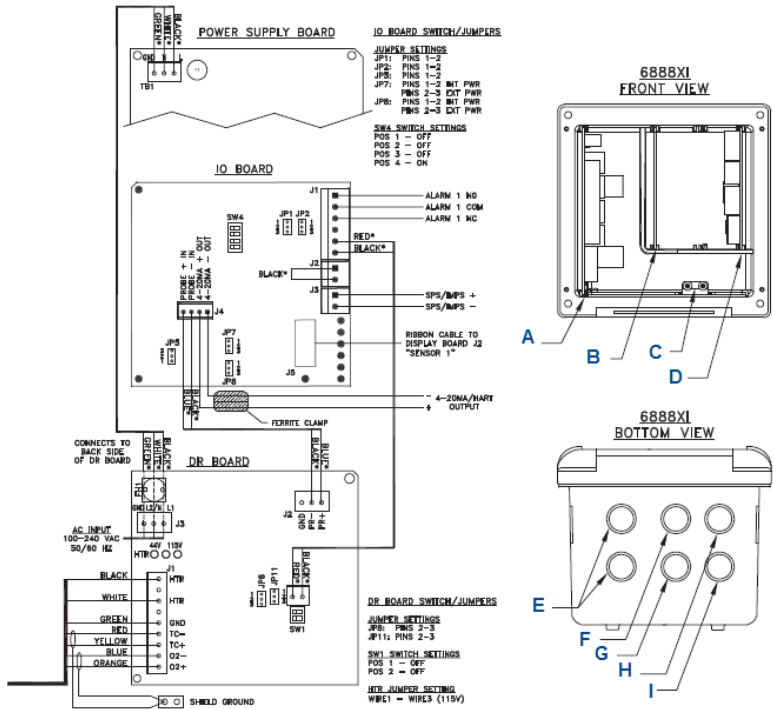
6888 DR PROBE



**Note**

- A. See the [Rosemount 6888 Xi Reference Manual](#) for additional installation and operating instructions.
- B. All wiring marked with an asterisk (\*) is factory wiring inside the Rosemount 6888 Xi.
- C. Except for JP7 and JP8 on IO board, jumper and switch settings are factory set and are shown for reference only.

**Figure 1-17: Traditional architecture with direct replacement probe (no electronics inside)**



- A. Power supply board
- B. DR board
- C. Shield ground
- D. IO board
- E. Plug
- F. Probe cable
- G. AC input
- H. Alarm relay, Rosemount SPS
- I. 4-20 mA/HART® output

### 1.2.6 Connect CX2100TR Remote Electronics to 6888C direct replacement probe

Use a traditional architecture configuration to provide for remote location of the analyzer electronics. All electronics are housed inside the Rosemount CX2100TR Remote Electronics. A multi-conductor

power/signal cable connects the probe to the Rosemount CX2100TR. Use the following procedure to connect the traditional architecture probe to the Rosemount CX2100TR.

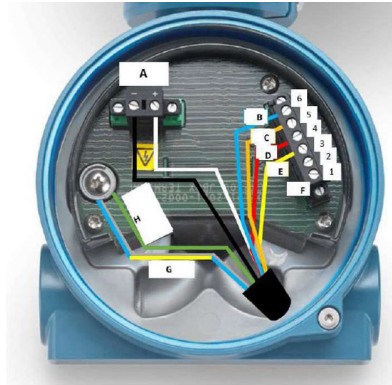
## NOTICE

The traditional architecture cable is provided at the specified length and is ready for installation. The cable glands must be properly terminated to maintain EMC/Electromagnetic Interference (EMI) noise protection.

### Procedure

1. Run the seven-conductor cable between the traditional architecture probe and the installation site for the Rosemount C2100TR. Use new cable conduit or trough as needed.
2. Install the cable and lead wires to the probe per manufacturer's instructions.
3. Install the seven-conductor cable at the remote electronics junction box.

**Figure 1-18: Wiring for CX2100 junction box on the remote electronics side**



- A. Heater (HTR)
- B. Oxygen (O2)
- C. O2+
- D. Thermocouple (TC)-
- E. TC+
- F. RTD
- G. Shields
- H. Safety ground

4. Use either of the two conduit entries to route the power cable into the remote electronics junction box housing.
5. Connect the heater power lines to the two HTR terminals shown in [Figure 1-14](#).
6. Connect the oxygen signal lines to the O2- and O2+ terminals shown in [Figure 1-14](#).
7. Connect the safety ground wire to the ground lug as shown in [Figure 1-14](#).
8. Terminate the shield at the remote electronics junction box housing.
9. Reinstall cover on junction box.

### 1.2.7 Connect line voltage

#### Procedure

1. Remove screw, cover lock, captive washer, and left side blind cover from the remote electronics.

2. Connect the line (or L1) wire to the L1 terminal and the neutral (or L2) wire to the N terminal. The transmitter will automatically configure itself for 90-250 Vac line voltage and 50/60 Hz.

## 1.2.8 Install interconnecting cable

### Procedure

1. Remove cover from the junction box. Connect the electronics end of the interconnecting cable to the **FROM PROBE** side of the terminal block.

#### **⚠ WARNING**

If using a Rosemount SPS 4001B, install it in a non-hazardous, explosive free environment.

2. Loosen screw, cover lock, and washer at the probe head. Remove cover.
3. Connect the heater power leads, the thermocouple leads, and the oxygen signal leads of the interconnecting cable to the terminal block. The cable leads are tagged for polarity.

#### **⚠ WARNING**

Electrical shock. Install the heater power terminal cover.

4. Install covers and secure with captive washers, cover locks, and screws.

## 1.2.9 4-20 mA signal

The 4-20 mA signal represents the O<sub>2</sub> value and can also operate loop powered display. Superimposed on the 4-20 mA signal is HART® information that is accessible through a handheld communicator or AMS software.

## 1.3 Pneumatic installation

### 1.3.1 Calibration gas

The analyzer uses two calibration gas concentrations: low gas (0.4 percent O<sub>2</sub>, balance N<sub>2</sub>) and high gas (8 percent O<sub>2</sub>, balance N<sub>2</sub>).

For higher O<sub>2</sub> applications, like winbox O<sub>2</sub>, Emerson recommends:

- Low gas
- High gas (21 percent O<sub>2</sub>, balance N<sub>2</sub> or dry bottle air)

**⚠ CAUTION**

Failure to use proper gases will result in erroneous readings.

Do not use 100 percent nitrogen as a low gas (zero gas). Emerson recommends using between 0.4 percent and 2.0 percent O<sub>2</sub> for the zero gas. Do not use gases with hydrocarbon concentrations of more than 40 parts per million.

**⚠ CAUTION**

Before washing down the ducts, verify that the Rosemount 6888C analyzers have been powered down and removed from the wash areas.

**⚠ CAUTION**

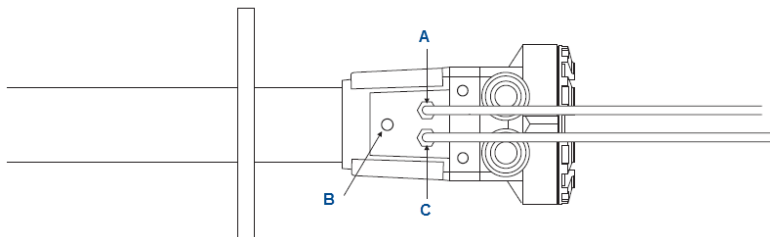
Damage can result from having a cold analyzer exposed to process gases.

Upon completing installation, ensure that the analyzer is turned on and operating before firing up the combustion process.

During outages, if possible, leave all analyzers running to prevent condensation and premature aging from thermal cycling.

See [Figure 1-19](#) for the calibration gas connections.

**Figure 1-19: Calibration gas connections**



- A. Calibration gas in
- B. Reference air vent
- C. Reference air in



## 2 Configuration, start-up, and operation

### ⚠ WARNING

#### Electrical shock

Failure to install covers and ground leads could result in serious injury or death.

Install all protective covers and ground leads after installation.

### ⚠ CAUTION

If external loop power is used, the power supply must be a Safety Extra Low Voltage (SELV) type.

### 2.1 Power up analyzer without Rosemount 6888Xi

#### Procedure

1. Apply AC line power to the analyzer.
2. Apply 24 VDC loop power to the analyzer.
3. Using either the DCS control or a Field Communicator, verify communications to the analyzer.

The analyzer probe takes approximately 45 minutes to warm up to the 1,357 °F (736 °C) heater set point. The 4-20 mA signal remains at a default value of 3.5 mA, and the O<sub>2</sub> reading remains at 0 percent through this warm-up period. After warm-up, the probe begins reading oxygen, and the 4-20 mA output is based on the default range of 0 to 10 percent O<sub>2</sub>.

If there is an error condition at start-up, an alarm message is displayed.

### 2.2 Power up analyzer with single/dual channel or single channel

Complete the following steps to power up the analyzer using the Rosemount 6888 Xi Electronics.

#### Procedure

1. Apply AC line power to the analyzer.
2. Apply AC line power to the Rosemount 6888 Xi. Run the Quick Start Wizard as described below. At the **Auto Cal Device**

screen, select the calibration method based on the Rosemount 6888 analyzer as follows:

- **Standard Probe Housing Configuration:** Select **None**, **SPS**, or **IMPS** as appropriate. Do not select **Integral** or calibration will not be possible.
- **Integral Autocalibration Probe housing:** Select **Integral** only. If you don't select **Integral**, calibration will not be possible.

3. Verify communications between the analyzer and the Rosemount 6888Xi.

The Rosemount 6888 Xi display is pre-configured to display O<sub>2</sub> and cell temperature for single channel configurations and both O<sub>2</sub> readings for dual channel configurations.

The analyzer probe takes approximately 45 minutes to warm up to the 1,357 °F (736 °C) heater set point. The 4-20 mA signal remains at a default value of 3.5 mA, and the O<sub>2</sub> reading remains at 0 percent through this warm-up period. After warm-up, the probe begins reading oxygen, and the 4-20 mA output is based on the default range of 0 to 10 percent O<sub>2</sub>.

If there is an error condition at start-up, an alarm message is displayed.

## 2.3 Power up the Rosemount 6888C direct replacement probe (no electronics inside) with traditional architecture Rosemount 6888Xi

### Procedure

1. Apply AC line power to the Rosemount 6888Xi.
2. Run the Quick Start Wizard as described in [Run Rosemount 6888Xi Quick Start Wizard](#).
3. At the **Auto Cal Device** screen, select **None**, **SPS**, or **IMPS** as appropriate.

Do not select **Integral** or calibration will not be possible.

The analyzer probe takes approximately 45 minutes to warm up to the 1,357 °F (736 °C) heater set point. The 4-20 mA signal remains at a default value of 3.5 mA, and the O<sub>2</sub> reading remains at 0 percent through this warm-up period. After warm-up, the probe begins reading oxygen, and the 4-20 mA output is based on the default range of 0 to 10 percent O<sub>2</sub>.

If there is an error condition at start-up, the Rosemount 6888Xi displays an alarm message.

## 2.4 Run Rosemount 6888Xi Quick Start Wizard

When you first power up the Rosemount 6888Xi, a short wizard program guides you through the basic setup. Once configured, the Rosemount 6888Xi retains the setup, and the wizard will not repeat.

### Procedure

1. Apply power to the Rosemount 6888Xi.  
Once the device powers on, the **Quick Start Wizard** screen appears. With a dual channel Rosemount 6888Xi, the wizard runs for both channels in succession.
2. Press **Enter** to continue.
3. On the **Sensor Type** screen, use the **Up** and **Down** keys to select O<sub>2</sub>.  
Do not select CO, as this option is reserved for future use.
4. Press **Enter** to continue.
5. On the **Device Type** screen use the **Up** and **Down** keys to select HART® or FF (FOUNDATION™ Fieldbus), whichever applies.
6. At the **Auto Cal Device** screen, use the **Up** and **Down** keys to select the calibration method to be used.

The methods are defined as follows:

- **None:** Manual calibration with the standard probe housing configuration.
- **SPS:** Automatic calibration with the standard probe housing configuration using the Rosemount SPS 4001B.
- **IMPS:** Automatic calibration with the standard probe housing configuration using the Rosemount IMPS.
- **Integral:** Automatic calibration with the integral autocal probe housing configuration.

7. Press **Enter** to continue.

---

### Note

If you select SPS, IMPS, or Integral, you must still configure automatic calibration as On. Verify other parameters, such as test gas values and gas times, as well. Refer to the [Rosemount 6888Xi Reference Manual](#) for calibration setup details.

---

8. When prompted by Setup Correct?, use the **Up** and **Down** keys to select Yes.  
If you select **No**, the wizard restarts.
9. Press **Enter** to continue.

The Rosemount 6888Xi displays several screens while saving the configuration, resets itself, and then returns to the main screen.

## 2.5 Power up the Rosemount 6888C direct replacement probe (no electronics inside) with CX2100TR Remote Electronics

### Prerequisites

Verify that the cables are connected to the analyzer and junction boxes. Verify that all analyzer and junction box covers and seals are closed.

### Procedure

1. Apply AC line power to the analyzer.
2. Using either the Distributed Control System (DCS) or a communication device, verify communication to the analyzer.

The probe takes approximately 25 minutes to warm up to the +1357 F (+736 C) heater set point. The 4-20 mA signal remains at a default alarm level, and the O<sub>2</sub> reading displays NaN during the warm-up period. After warm-up, the probe begins reading oxygen, and the 4-20 mA output is based on the default range of 0 to 10 percent O<sub>2</sub>.

If there is an error condition on start-up, then an alarm message is displayed.

### Postrequisites

Emerson recommends waiting at least two hours after powering up the 6888C Direct Replacement before calibrating.

## 2.6 Guided Setup with CX2100TR Remote Electronics

When you first power up the analyzer, a Guided Setup program will guide you through the basic setup procedure. Once configured, the analyzer retains the set parameters. At the end of the Guided Setup program the analyzer prompts you to choose if Guided Setup will repeat at each start-up.

### Prerequisites

If setting up the analyzer on a 6888C Direct Replacement (DR) Probe with remote electronics, ensure that the probe has been powered up according to [Power up the Rosemount 6888C direct replacement probe \(no electronics inside\) with CX2100TR Remote Electronics](#).

## Procedure

1. When the analyzer turns on, the **Guided Setup** screen appears. The first screen reads ***Do you want Help configuring this device?***
  - Select **Yes** to continue with **Guided Setup**.
  - Select **No** to exit **Guided Setup**.

The Guided Setup program guides you through several screens that allow you to configure a range of instrument settings. The following is a list of Guided Setup program screens and configurable options:

- a. Display settings
  1. **Language**
  2. **Screen Rotation**
- b. Time/Date Settings
  1. **Time**
  2. **Date**
- c. O2 Alarms
  1. **Low Alarm**
  2. **Alarm Setpoint**
- d. Calibration
  1. **Calibration Options**
  2. **Purge Settings**
  3. **Diffuser Options**
- e. Terminal Settings
  1. **Channel A**
  2. **Channel B**
  3. **Channel C**
- f. Security Settings
  1. **Write Protection**
  2. **Password**

The **Guided Setup Complete** screen reads: ***Guided setup is complete. Do you want this device to prompt guided setup at each start-up?***

2. Select **Yes** or **No**.

Once the Guided Setup is complete, the display returns to the main screen.

## 2.7 Power up the Rosemount 6888C direct replacement probe (no electronics inside) with CX2100TR Remote Electronics

### Prerequisites

Verify that the cables are connected to the analyzer and junction boxes. Verify that all analyzer and junction box covers and seals are closed.

### Procedure

1. Apply AC line power to the analyzer.
2. Using either the Distributed Control System (DCS) or a communication device, verify communication to the analyzer.

The probe takes approximately 25 minutes to warm up to the +1357 F (+736 C) heater set point. The 4-20 mA signal remains at a default alarm level, and the O<sub>2</sub> reading displays NaN during the warm-up period. After warm-up, the probe begins reading oxygen, and the 4-20 mA output is based on the default range of 0 to 10 percent O<sub>2</sub>.

If there is an error condition on start-up, then an alarm message is displayed.

### Postrequisites

Emerson recommends waiting at least two hours after powering up the 6888C Direct Replacement before calibrating.

### 2.7.1 Manual/semi-automatic calibration

A technician can calibrate the Rosemount 6888C probe with standard housing by following prompts via the display of the Rosemount 6888Xi Electronics or via HART® communications to a Field Communicator or AMS console.

Manually switch the gases based upon these prompts. We recommend using 0.4 percent O<sub>2</sub> and 8 percent O<sub>2</sub>, balance nitrogen as calibration gases. Always use a two-stage pressure regulator set to 20 psig (1.38 barg). Set the calibration gas flow meter for a maximum of 5 scfh with the cal gas fitting removed from the probe. A diffuser/

filter that is plugged over time may cause the flow meter to deliver less flow to the sensing cell, but never readjust the flow rate until a new diffuser is installed. Readjusting the flow meter back up to the 5 scfh level could pressurize the cell during calibration and cause the O<sub>2</sub> reading to shift downwards.

The electronics determine if the calibration was successful and calculate new calibration values. New calibration values are not automatically loaded into the electronics after a successful calibration, however. You have the choice to accept or reject the new values.

A significant calibration change may cause a bump in the O<sub>2</sub> readings at the DCS console, causing operator concern. Record the calibration data on a log (cell slope, constant, and impedance, as well as the speed of response data). If the electronics is used, it stores calibration data for the past ten successful calibrations.

## **⚠ CAUTION**

### **Reading errors**

Make sure the calibration gas cap is replaced tightly after calibration is complete. Many combustion processes operate at a slight negative pressure (draft pressure) and can draw ambient air down the cal gas lines and into the sensing cell, causing a falsely elevated O<sub>2</sub> reading. The same phenomenon is possible if the calibration gas hoses are permitted to become degraded or loose.

### 2.7.2 Fully automatic calibration

For fully automatic calibration, the Rosemount 6888Xi Electronics must manage the actuation of solenoids to introduce gases into the probe.

#### Probe with standard electronics housing

In addition to the Rosemount 6888 Xi, this arrangement requires a separate Single Probe Sequencer (SPS), which is a solenoid box for switching calibration gases or a larger Intelligent Multiprobe Sequencer (IMPS) which can handle the autocal for up to four probes in one box.

The automatic calibrations can be initiated in several ways:

- Calibration recommended diagnostic that is periodically checking cell impedance.
- Push button on the Rosemount 6888 Xi Electronics.
- HART<sup>®</sup> communications from a Field Communicator or AMS.

- External contact closure.
- Time since the last successful calibration.

If using the O<sub>2</sub> measurement for automatic control, always place the O<sub>2</sub> control loop into manual prior to calibrating. Always inform the operator prior to calibrating. The Rosemount 6888 Xi Electronics provides an in cal contact closure for this purpose as well as an initiate cal contact.

The Rosemount 6888 Xi Electronics sequences the calibration gases in turn into the sensing cell. A 300 second flow time is the factory default for both gases and also for the purge cycle, which lets the probe signal come back to the normal flue gas readings. The 4-20 mA signal representing O<sub>2</sub> can be held during the calibration cycle or permitted to vary with the bottled gases, in which case a record of the calibration can be trended at the DCS.

Calibration setup is found under the detailed setup menu.

### Probe with integral autocal housing

This probe contains the autocal solenoids within the blue electronics housing, eliminating the need and cost for an SPS or IMPS solenoid enclosure. Both calibration gases are permanently piped into two ports on the probe. It's important to confirm that there are no piping leaks or the calibration bottles will leak down permanently.

---

#### Note

The calibration sequence from the Rosemount™ 6888 Xi Electronics is identical to that for the manual/semiautomatic calibration, but note that with the integral autocal version of this probe it is not possible to conduct a manual calibration. The factory offers a probe rebuild capability if solenoid or other failures occur.

---

### CAUTION

#### Leaks

Calibration gas bottles are piped and under pressure at all times, so be sure to leak-check all fittings, tubing, and connections. Always use dual-stage pressure regulators.

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## A Product certifications

### A.1 Directive information

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

### A.2 Ordinary location certification

As standard, the device has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a Nationally Recognized Test Laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).


### A.3 Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

### A.4 USA/Canada

Model string option code: C

**CSA  
Certificate** 70162130

**Markings**  Type 4X, IP66, Class 1, Division 1, Groups B, C and D; T3, Class 1, Zone 1, AEx db IIB+H2 T3 Gb, Ex db IIB+H2 T3 Gb:  $-40\text{ °C} \leq T_a \leq +70\text{ °C}$  ( Autocal Housing and Probe assembly);  $-40\text{ °C} \leq T_a \leq +90\text{ °C}$  (Standard Housing and Probe assembly eq. "DR Probe")

#### Conditions of acceptability

1. The unit is intended to be connected to supply mains by qualified personnel in accordance with national (e.g. CEC, NEC, etc) and local codes.
2. Suitable APPROVED switch and fuse or a circuit breaker shall be provided to facilitate the disconnection of mains power.
3. The maximum operating ambient is considered as follows: 90 °C for 6888C DR Probe, 70 °C for 6888C Analyzer.

4. Mounting Flange temperature shall not exceed 190 °C during combustion process.
5. Calibration air lines and reference air lines shall not contain pure oxygen or combustible gas other than inert/oxygen gas mixture of which oxygen represents no more than that normally present in air.
6. The pressure within the enclosure and gas lines shall not be higher than 1.1 times the atmospheric pressure during the normal operations of the equipment.
7. The 6888C O<sub>2</sub> Analyzers may be used with model CX2100TR or Oxymitter remote electronics or with 6888 Xi Advanced Electronics. The 6888 Xi must be installed in a Non-Hazardous Location.
8. Meets Enclosure Type 4X & IP66 ratings when the reference air vent is routed to a dry area.
9. Units installed with conduit runs must have suitably certified conduit seals installed at the enclosure.
10. Units installed with other than conduit runs and conduit seals, must be fitted with certified or listed cable glands for use in "Class I, Zone 1, Ex/AEx d IIB+H2" and "Class I, Division 1, Group B, C and D" or better, suitable for the ambient temperature range.
11. Flameproof joints are not intended to be repaired.
12. If the unit is operated in a manner not recommended by the manufacturer, the overall safety could be impaired.

## A.5 Europe

Model string option code: A

**ATEX Certificate**      Sira 14ATEX1031X

**Markings**       $\text{Ex}$  II 2 G Ex db IIB+H2 T3 Gb; IP66;  $-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$  ( Autocal Housing and Probe assembly);  $-40\text{ }^{\circ}\text{C} \leq T_a \leq +90\text{ }^{\circ}\text{C}$  (Standard Housing and Probe assembly eq. "DR Probe")

### Specific conditions of use (X):

1. Mounting flange temperatures shall not exceed 190 °C.
2. The 6888C O<sub>2</sub> Analyzers are used with the 6888Xi Advanced Electronics (associated equipment not part of this certification) which must be installed in a safe area. Alternatively, the

6888C DR probes may be used with model CX2100TR installed remotely per the CX2100TR installation instructions or with Oxymitter remote electronics.

3. Calibration air lines and reference air lines shall not contain pure oxygen or combustible gas other than inert/oxygen gas mixture of which oxygen represents no more than that normally present in air.
4. The pressure within the enclosure and gas lines shall not be higher than 1.1 times the atmospheric pressure during the normal operations of the equipment.
5. Fasteners property class must be A2-70 Stainless Steel.
6. Flameproof joints are not intended to be repaired.

Model string option code: A

**IECEX Certificate**            IECEX CSA 14.0044X

**Markings**            Ex db IIB+H2 T3 Gb; IP66;  $-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$   
 ( Autocal Housing and Probe assembly );  $-40\text{ }^{\circ}\text{C} \leq T_a \leq +90\text{ }^{\circ}\text{C}$  (Standard Housing and Probe assembly eq. "DR Probe")

### Specific conditions of use (X):

1. Mounting Flange temperature shall not exceed 190 °C.
2. The 6888C O<sub>2</sub> Analyzers are used with the 6888 Xi Advanced Electronics (associated equipment not part of this certification) which must be installed in a safe area. Alternatively, the 6888C DR probes may be used with model CX2100TR installed remotely per the CX2100TR installation instructions or with Oxymitter remote electronics.
3. Calibration air lines and reference air lines shall not contain pure oxygen or combustible gases other than inert/oxygen gas mixture of which oxygen represents no more than that normally present in air.
4. The pressure within the enclosure and gas lines shall not be higher than 1.1 times the atmospheric pressure during the normal operations of the equipment.
5. Fasteners property class must be A2-70 Stainless Steel.
6. Flameproof joints are not intended to be repaired.



# B Declaration of Conformity



## EU DECLARATION OF CONFORMITY



This declaration of conformity is issued under the sole responsibility of

**Rosemount Inc.**  
6021 Innovation Blvd  
Shakopee, MN 55379  
USA

that the following products,

**Rosemount™ Oxygen Analyzers, Models 6888A & 6888C**

comply with the provisions of the European Union Directives, including the latest amendments, valid at the time this declaration was signed.

	June 13, 2024	Mark Lee	Vice President, Quality	Boulder, CO, USA
(signature & date of issue)		(name)	(function)	(place of issue)

Authorized Representative in Europe:  
Emerson S.R.L., company No. J12/88/2006  
Emerson 4 street, Parcul Industrial  
Tetarom II, Cluj-Napoca 400638, Romania

Regulatory Compliance Shared Services Department  
Email: [europaeproductscompliance@emerson.com](mailto:europaeproductscompliance@emerson.com) Phone: +40 374 132 035

**ATEX Notified Body for EU Type Examination Certificate:**  
**CSA Group Netherlands B.V.** [Notified Body Number: 2813]  
Utrechtseweg 310  
6812 AR ARNHEM  
Netherlands

**ATEX Notified Body for Quality Assurance:**  
**SGS Fimko Oy** [Notified Body Number: 0598]  
Takomotie 8  
FI-00380 Helsinki  
Finland

**EMC Directive (2014/30/EU)**  
Harmonized Standards:  
EN 61326-1:2013

**Low Voltage Directive (2014/35/EU)**  
Harmonized Standards:  
EN 61010-1:2010

**ATEX Directive (2014/34/EU)**  
(Only valid for Model 6888C)

**Sira14ATEX1031X – Flameproof**  
Equipment Group II 2 G  
Ex db IIB+H2 T3 Gb; IP66  
-40°C ≤ Ta ≤ +70°C Autocal Enclosure and Probe Assembly  
-40°C ≤ Ta ≤ +90°C Standard Enclosure and Probe Assembly  
eq. "DR Probe"  
Harmonized Standards:  
EN IEC 60079-0:2018  
EN 60079-1:2014



## C China RoHS table

表格 1: 含有 China RoHS 管控物质超过最大浓度限值的部件型号列  
 Table 1: List of Model Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)
电子组件 Electronics Assembly	X	○	○	○	○	○
壳体组件 Housing Assembly	○	○	○	X	○	○
传感器组件 Sensor Assembly	○	○	○	X	○	○

本表格系依据 SJ/T11364 的规定而制作。

This table is proposed in accordance with the provision of SJ/T11364

○: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求。

○: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 意为在该部件所使用的的所有均质材料里, 至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求。

X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.



**Quick Start Guide**  
**00825-0100-4891, Rev. AD**  
**August 2024**

For more information: [Emerson.com/global](https://www.emerson.com/global)

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**ROSEMOUNT™**

