Instruction Manual
00809-0100-4891, Rev AA
July 2018

Rosemount™ 6888C In-Situ Combustion Oxygen Analyzer

For use in Hazardous Areas

ROSEMOUNT™

EMERSON™

Essential instructions

Read this page before proceeding!

Emerson™ designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Emerson products. Failure to follow the proper instructions may cause any one of the following situations to occur: loss of life, personal injury, property damage, damage to this instrument, and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, contact your Emerson representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- Use only factory documented components for repair. Tampering and unauthorized substitution and parts can affect product 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 O_2 Transmitter. The AMS software must be upgraded to AMS 8.0 or above. Contact Emerson's Global Service Center (GSC) at +1-800-833-8314 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


Hot surface


Refer to reference manual.

The following definitions apply to Warnings, Cautions, and Notices found throughout this publication.

⚠ WARNING

Highlights an operation or maintenance procedure, practice, condition, statement, etc., which if not strictly observed, could result in injury, death, or long-term health hazards of personnel.

⚠ CAUTION

Highlights an operation or maintenance procedure, practice, condition, statement, etc., which if not strictly observed, could result in damage to or destruction of equipment or loss of effectiveness.

NOTICE

Highlights an essential operating procedure, condition, or statement.

⚠ WARNING

EXPLOSION
Do not open when an explosive atmosphere may be present.

⚠ WARNING

ELECTRIC SHOCK
Do not open while energized.

⚠ CAUTION

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

⚠ CAUTION

EQUIPMENT DAMAGE
For the autocal housing, only use supply cables and certified cable glands rated > 85 °C (185 °F).

Special conditions for safe use (ATEX) and conditions of acceptability (CSA)

1. The unit is to be connected to the supply mains by qualified personnel in accordance with local and national codes.
2. Mounting flange temperature shall not exceed 190 °C during combustion process.
3. The 6888C O_2 Analyzers are used with the 6888 Xi Advanced Electronics (associated equipment not part of this certification) which must be installed in a safe area.
4. 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.
5. 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.
6. Fasteners property class must be A2-70 Stainless Steel
7. Flameproof joints are not intended to be repaired.

Safety instructions

IMPORTANT

SAFETY INSTRUCTIONS FOR THE WIRING AND INSTALLATION OF THIS APPARATUS

The following safety instructions apply specifically to all EU member states. They should be strictly adhered to in order to ensure compliance with the Low Voltage Directive. Non-EU states should also comply with the following unless superseded by local or national standards.

1. Adequate earth connections should be made to all earthing points, internal and external, where provided.
2. After installation or troubleshooting, all safety covers and safety grounds must be replaced. The integrity of all earth terminals must be maintained at all times.
3. Main supply cords should comply with the requirements of IEC227 or IEC245.
4. All wiring shall be suitable for use in an ambient temperature of greater than 75 °C (167 °F).
5. All cable glands used should be of such internal dimensions as to provide adequate cable anchorage.
6. To ensure safe operation of this equipment, connection to the mains supply should only be made through a circuit breaker which will disconnect all circuits carrying conductors during a fault situation. The circuit breaker may also include a mechanically operated isolating switch. If not, then another means of disconnecting the equipment from the supply must be provided and clearly marked as such. Circuit breakers or switches must comply with a recognized standard, such as IEC947. All wiring must conform with any local standards.

Where equipment or covers are marked with the symbol to the right, hazardous voltages are likely to be present beneath. These covers should only be removed when power is removed from the equipment - and then only by trained service personnel.

Where equipment or covers are marked with the symbol to the right, there is a danger of hot surfaces beneath. These covers should only be removed by trained service personnel when power is removed from the equipment. Certain surfaces may remain hot to the touch.

Where equipment or covers are marked with the symbol to the right, refer to the instruction manual for instructions.

10. All graphical symbols used in this product are from one or more of the following standards: EN61010, IEC417, and ISO3864.
11. Where equipment or labels are marked "Do Not Open While Energized" or similar, there is a danger of ignition in areas where an explosive atmosphere is present. This equipment should only be opened when the power is removed and adequate time as specified on the label or in the instruction manual has been allowed for the equipment to cool down - and then only by trained service personnel.

Contents

1 General information

1.1 Overview

The 6888 is Rosemount's latest combustion flue gas oxygen analyzer. This product is intended for measuring the flue gases resulting from any combustion process.

This product uses an *in situ* sensor, i.e., the sensor is placed at the end of the probe, and the probe extends directly into the flue gas duct or stack at a given length. The sensor is like a thermocouple, generating its own millivolt signal based on the difference between a reference gas (ambient or instrument air - always 20.95% O_2) and the flue gases being measured. This manual covers the Rosemount 6888C, which is the hazardous area probe version.

This probe can be configured as a blind stand-alone transmitter where HART® or FOUNDATION Fieldbus™ communications can be used as a method of accessing the electronics for setup, operation, and diagnostics or with one of several remote electronics options, as noted below in System configurations on page 7. Wiring diagrams for each of these configurations follow in Electrical installation on page 25.

There are several different arrangements of probes, electronics, and features that are explained below and in the wiring diagrams.

1.2 System configurations

1.2.1 Hazardous Area Transmitter probe only

The Rosemount 6888 probe has the electronics in the blue housing that controls the heater temperature and also amplifies the raw O_2 millivolt signal to a linear 4-20 mA. The 4-20 mA signal lines can be run directly to the control room and also power the transmitter electronics. As with most other Rosemount transmitters measuring pressure, temperature, and flow, setup is conducted through HART communications via a Field Communicator or Asset Management Solutions (AMS).

1.2.2 Standard housing Hazardous Area Transmitter probe with General Purpose Rosemount 6888 Xi Electronics

The Rosemount 6888 Xi Electronics serve as a local operator interface unit, with a back-lit display and keypad. It is capable of two channels, serving two Rosemount 6888 probes. The Rosemount 6888 Xi also carries these optional advanced features:

- Fully automatic calibration. Requires Rosemount 6888 Xi O_2 Cal Auto calibration system
- Loss of flame contact for powering down the heater in the event of a flame-out condition in a furnace.
- Heaterless operation at process temperatures above 550 °C (1022 °F). This feature will also permit operation above the heater setpoint of 736 °C (1357 °F). Sensing cell life will be shortened by operation above 800 °C (1472 °F), however.

- Plugged diffuser diagnostic operates by measuring the return-to-process rate after calibration gas has been stopped. This feature also includes auto gas switching when the reading settles out versus waiting for configured gas flow time to expire.
- Stoichiometer - If a furnace goes into a reducing condition (0% O_2), this feature will determine how far.
- Programmable reference - Permits more accurate readings at near-ambient O_2 levels (20.95% O_2).
- A *cal check* capability. New calibration values are not automatically stored after a calibration. An accept/reject calibration feature can be enabled or disabled so that the technician or operator can decide to accept or reject a potentially large change in calibration values.
- Tolerance check that will alarm if the wrong test gases are being used or if a bottle runs out in the middle of a calibration. Care must be taken to ensure gas 1 and gas 2 calibration gases are properly configured if the tolerance check feature is enabled.

1.2.3 Hazardous Area Rosemount 6888C probe with General Purpose Rosemount Xi Electronics with flame safety interlock

A flame safety interlock by Emerson™ is available for heater power disconnect whenever there is a loss of the process flame or a heater runaway condition (heater over-temperature) in the O_2 probe. This input is internally powered by the Rosemount 6888 Xi and is actuated via a dry contact input from the user's flame scanner. A closed contact indicates a flame is present. An open contact indicates a loss of flame. This feature is also available with the Integral autocal housing.

1.2.4 Hazardous Area Rosemount 6888C probe with Integral Autocal General Purpose Rosemount 6888 Xi Electronics

This probe contains gas-switching solenoids so that the Rosemount 6888 Xi Electronics can control the introduction of calibration gases. Calibrations can be intiated via a calibration recommended diagnostic, time since last calibration, manually via external dry contact, HART communications, or from the Rosemount 6888 Xi local operator interface keypad. The integral autocal feature can only be implemented when the probe is used with a Rosemount 6888 Xi.

1.2.5 Hazardous Area Rosemount 6888C probe with Integral Autocal and Foundation Fieldbus (FF) communications

This probe contains gas-switching solenoids that can control the introduction of calibration gases for calibration. Calibrations can be initiated automatically via a calibration recommended diagnostic, time since last calibration, or manually via optional Xi keypad, FF communications via the Field Communicator, or AMS console. Unlike the HART transmitter electronics, the FF version can execute automatic calibrations either with or without the optional Rosemount 6888 Xi Electronics. Likewise, advanced features can be implemented either with or without the optional Xi.

1.2.6 Hazardous Area Rosemount 6888C direct replacement (DR) probe with General Purpose Traditional Architecture Rosemount 6888 Xi Electronics

Here there are no electronics inside the probe head, so the raw sensor signals for the heater thermocouple and zirconium oxide O_2 sensor are sent to a remote Rosemount 6888 Xi Electronics. The Rosemount 6888 Traditional Architecture Electronics will also directly apply power to the probe heater in order to maintain the correct sensor temperature. This arrangement calls for a 7-conductor cable to carry this power and the sensor signals. Maximum length for this cable is 200 feet. This probe will also operate on previous Westinghouse/Rosemount electronics (World Class and Oxymitter), as well as many competitive electronics.

⚠ WARNING

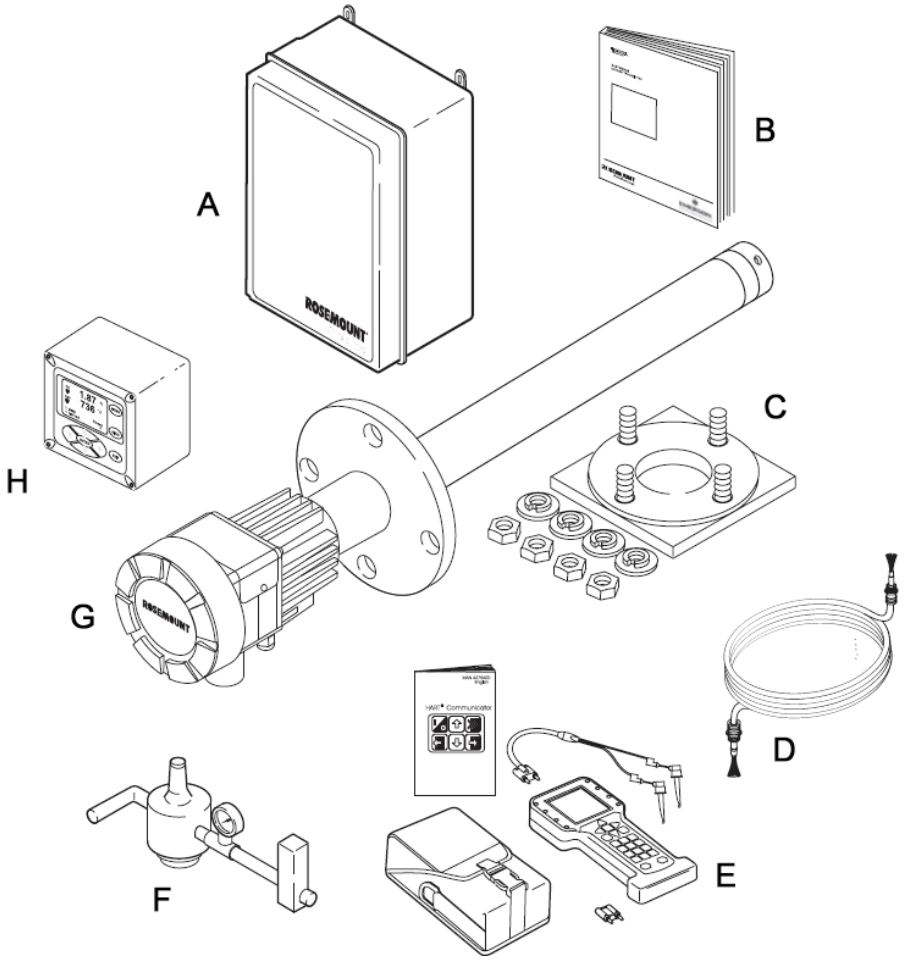
HAZARDOUS AREAS
Cables are supplied with Exd Rated Glands; the cable is not ExD rated, and installation in a hazardous area is the responsibility of the installer/customer. Cables must be installed in accordance with national and local electrical codes.

1.2.7 Wireless capability

Both the transmitter electronics in the head of the probe and the Rosemount 6888Xi Electronics communicate over HART communications and can implement wireless communications via Emerson Wireless 775 THUM™ Adapter.

2 Typical system package

Figure 2-1: Typical System Package



A. Optional Rosemount SPS 4001B or Rosemount IMPS Autocalibration Sequencer (Requires use of Rosemount 6888 Xi Advanced Electronics option)
B. Quick Start Guide
C. Optional mounting or adapter plate
D. Optional traditional architecture cable
E. HART® Field Communicator package (optional)
F. Optional reference & calibration gas accessories
G. Rosemount 6888C probe
H. Optional Rosemount 6888 XI Advanced Electronics

2.1 Rosemount 6888C Hazardous Area Probe product matrix

Table 2-1: Rosemount 6888C Product Matrix

Model	Description
Rosemount 6888C	O_2 Transmitter approved for hazardous locations
Measurement	
1OXY	Oxygen, standard sensing cell
2OXY	Oxygen, high sulfur resistant sensing cell
Probe length(1)	
1A	18-in. probe, 3-in. ANSI Class 150 flange
1D	18-in. probe, DIN flange
2A	3-ft probe, 3-in. ANSI Class 150 flange
2D	3-ft probe, DIN flange
3A	6-ft probe, 3-in. ANSI Class 150 flange
3D	6-ft probe, DIN flange
Diffuser	
1	Snubber diffuser, 400 °C (572 °F) with process flame arrestors
2	Ceramic diffuser, 825 °C (1517 °F) with process flame arrestors
3	Alloy diffuser 705 °C (1301 °F) with both ambient and process flame arrestors
Housing and electronics	
1HT	Standard housing, transmitter electronics, HART communications
2HT	Integral autocal, transmitter electronics, HART communications
4FF	Integral autocal, transmitter electronics, FOUNDATION Fieldbus™ communications
5DR	Standard housing, direct replacement, requires remote electronics
6DRY	Standard housing, direct replacement, for use with YEW Electronics
Certifications	
A	ATEX/IECEx
C	CSA
Mounting Plate	
00	None
04	New installation - square weld plate with ANSI 2 in.(50.8 mm)- 150# studs and flange (2.5 in. (63.5 mm) process hole required)
05	New installation - square weld plate with DIN studs and flange (2.5 in. (63.5 mm) process hole required)
08	Adapter to existing ANSI 3 in. (76.2 mm), 150# flange

09	Adapter to existing ANSI 4 in. (101.6 mm), 150# flange
10	Adapter to existing ANSI 6 in. (152.4 mm), 150# flange
11	Adapter to existing ANSI 3 in. (76.2 mm), 300# flange
12	Adapter to existing ANSI 4 in. (101.6 mm), 300# flange
99	Special adapter - provide existing flange dimensions, including thru-hole diameter
Manual calibration accessories	
00	None
01	Calibration and reference gas flowmeters and reference regulator/filter diffuser
02	Calibration/reference panel
Stoichiometer function(2)	
0	No
1	Yes
Programmable reference function(2)	
0	No
1	Yes
Extended temperature reference function(2)	
0	No
1	Yes
Diffuser warning function(2)	
0	No
1	Yes

(1) Flanges are flat-faced and for mounting only. Flanges are not pressure-rated.
(2) FOUNDATION Fieldbus only (for HART versions, order this feature with Rosemount 6888 Xi Electronics)

3 Specifications

3.1 Measurement specifications

3.1.1 Net O_2 range

Variable 0 - 10% to 0-50% (Xi electronics of 0-50% range)

3.1.2 Accuracy in oxidizing condition

±0.75% of reading at 0.05% O_2, whichever is greater. ±1% of full scale for 0-10% ranges and above.

3.1.3 Lowest detectable limit

0.02% O_2

3.1.4 Process temperature effect

Less than 0.05% O_2 from 100 to 700 °C (212 to 1292 °F)

3.1.5 System speed of response to calibration gas

Initial response in less than 3 seconds; T90 in less than 8 seconds. Response to process gas changes varies depending on process gas velocity and particulate loading of the diffuser.

3.1.6 Calibration validity

Presentation of calibration gases matches the bottle value to within 0.02% O_2

3.1.7 Accuracy in reducing conditions (requires stoichiometer feature)

±10% of reading or 0.1% O_2, whichever is different size

3.1.8 System response in reducing conditions (requires stoichiometer feature)

Going from oxidizing to reducing - T90 in 120 seconds

Going from reducing to oxidizing - T90 in 30 seconds

3.2 Environmental specifications

3.2.1 Transmitter probe

Process-wetted materials are 316L stainless steel.

3.2.2 Transmitter probe process temperature limits

0 to 705 °C (32 to 1300 °F)

550 to 825 °C (1022 to 1517 °F) with *Xi heaterless operation* feature[1]

Optional bypass and jacket accessories permit operation to 1050 °C (1922 °F).

3.2.3 Probe electronics ambient temperature limits

-40 to 70 °C (-40 to 158 °F)

3.2.4 Temperature limit as measured inside probe electronics

-40 to 85 °C (-40 to 185 °F)

3.2.5 DR probe, no electronics inside, ambient temperature limits

-40 to 90 °C (-40 to 194 °F)

3.3 Optional General Purpose 6888 Xi Electronics

3.3.1 Material

NEMA® 4X, polycarbonate material

3.3.2 Rosemount 6888 Xi ambient temperature limits

-20 to -50 °C (-4 to 122 °F)

3.3.3 Rosemount 6888 Xi temperature limits as measured inside the electronics housing

-20 to 70 °C (-4 to 158 °F)

1. *Reduced cell life can be expected if operated continuously at temperatures above 705 °C (1300 °F).*

3.4 Installation specifications - probe

3.4.1 Probe mounting flange

Vertical or horizontal-3 in. 150 6 in. (152.4 mm) bolt circle

⚠ CAUTION

Flanges are flat-faced and for mounting only. Flanges are not pressure-rated. A 2.5 in. (63.55 mm) diameter hole in the process is required.

Spool piece P/N 3D39761G02 is available to offset probe electronics housing from hot ductwork.

Many adapter flanges are available to mate to existing flanges.

3.4.2 Probe lengths and approximate shipping weights

18 in. (457 mm) package: 16 lb (7.3 kg)

3 ft (0.91 m) package: 21 lb (9.5 kg)

6 ft (1.83 m) package: 27 lb (12.2 kg)

9 ft (2.74 m) package: 33 lb (15.0 kg)

12 ft (3.66 m) package: 39 lb (17.7 kg)

3.4.3 Reference air (optional)

Maximum 2 scfh (1 L/min), clean, dry, instrument-quality air (20.95% O_2) regulated to 5 psi (34 kPa)

3.4.4 Calibration

Semi-automatic or automatic

3.4.5 Cal gases

0.4% O_2 and 8% O_2 balance N_2 recommended. Instrument air may be used as a high cal gas but is not recommended. 100% nitrogen cannot be used as the low cal gas. No explosive gases or gases with % O_2 greater than that found in ambient air (i.e., 20.95% O_2) can be used.

3.4.6 Calibration gas flow

5 scfh (2.3 L/min) at 15 psi, maximum

3.4.7 Heater electrical power

120/240 V ±10%, 50/60 Hz, 1/2 in. - 14 NPT conduit ports

3.4.8 Traditional architecture cable

200 ft (61 m) maximum length

3.4.9 Power consumption of transmitter probe/integral autocal probe

776 W maximum during warm-up

3.5 Installation specifications - Rosemount 6888 Xi with Rosemount 6888C Transmitter probe

3.5.1 Electrical power of optional Rosemount 6888 Xi Electronics

120/240 V ±10%, 50/60 Hz

3.5.2 Power consumption of Rosemount 6888 Xi

10 W maximum

3.5.3 Rosemount 6888 Xi alarm relays

2 provided- 2 amps, 20 Vdc

3.5.4 Rosemount 6888 Xi optional loss of flame contact

Removes heater power

3.5.5 Electrical noise

Meets EN 61326, Class A

3.5.6 Traditional architecture cable

200 ft (61 m) maximum length

3.5.7 Transmitter electrical 4-20 mA power

12 - 42 Vdc (looped-powered from the control room or from the Rosemount 6888 Xi box)

3.6 Installation specifications for traditional architechture Rosemount 6888 Xi for use with DR or other probe

3.6.1 Power consumption of Rosemount 6888 Xi

120/240 V ±10%, 50/60 Hz, 260/1020 VA max for 120 V probes

120 V ±10%, 50/60 Hz, 450 VA max for 44 V probes

3.6.2 Alarm relay outputs

2 provided - 2 Amperes, 30 Vdc, Form-C

3.6.3 Optional loss of flame input

Internally powered input to remove heater power actuated via dry contact output form proof of flame device.

Emerson has satisfied all obligations coming from the European legislation to harmonize the product requirements in Europe.

4 Install

⚠ WARNING

Before installing this equipment, read the Essential Instructions at the front of this Reference Manual. Failure to follow safety instructions could result in serious injury or death.

⚠ WARNING

ELECTRIC SHOCK
Install all protective equipment covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

4.1 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, a *weld plate* for welding to the flue gas duct can be supplied.

⚠ WARNING

ELECTRIC SHOCK
Install all protective equipment covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

4.2 Mounting the Rosemount 6888 Xi General Purpose Advanced Electronics

Follow the steps below to mount the Rosemount 6888 Xi.

The Rosemount 6888 Xi Advanced Electronics is available in a panel mounting or wall/pipe mounting configuration. Refer to Figure 4-1 or Figure 4-2 for the panel, wall, or pipe mounting details. The Rosemount 6888 Xi is rated for use in general purpose locations only.

Ensure all components are available to install the Rosemount 6888 Xi.

1. Select a mounting location near or removed from the O_2 Probe.

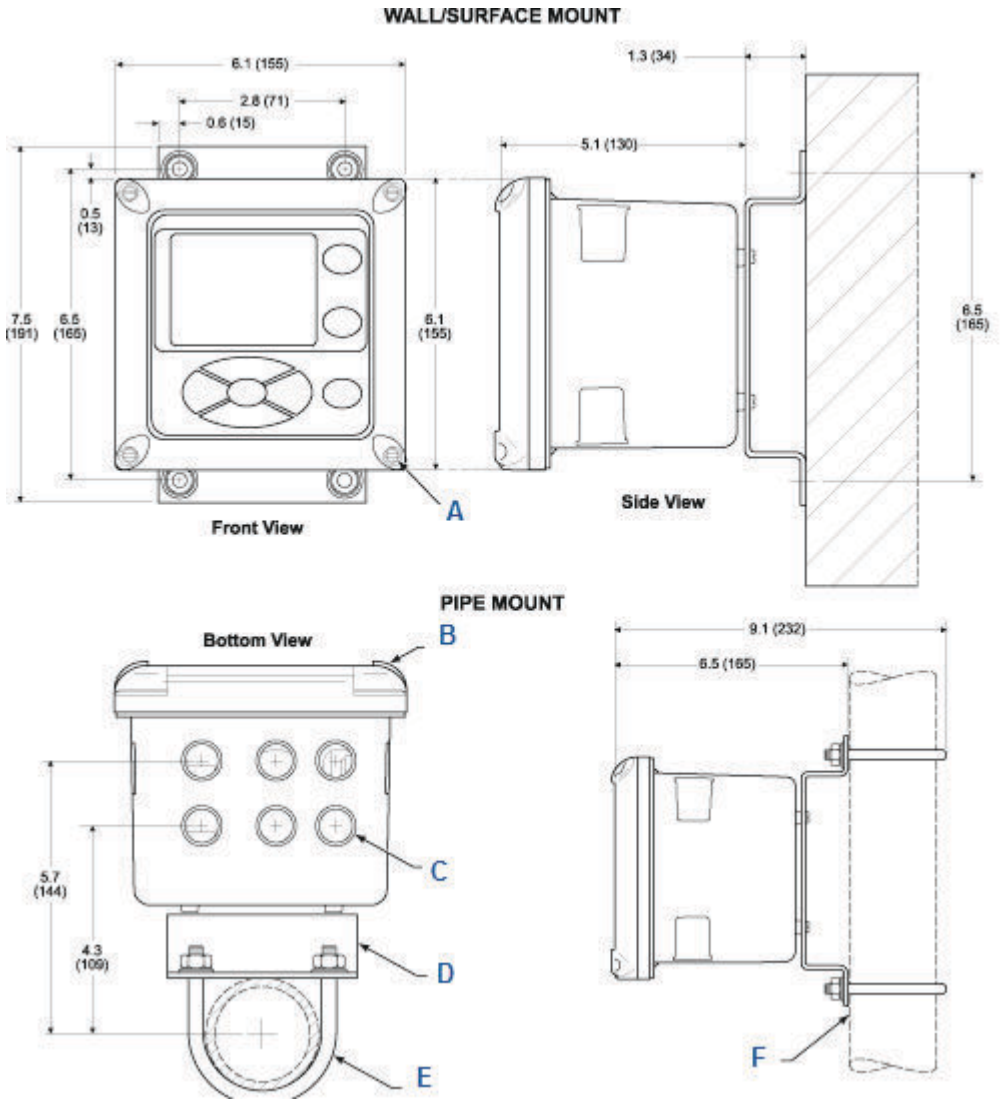
   Consider the temperature limitations of the Rosemount 6888 Xi (see Rosemount 6888 Xi ambient temperature limits) when selecting the mounting location.
2. Mount the Roseount 6888 Xi at a height convenient for viewing and operating the interface.

   Approximately 5 ft (1.5 m) is recommended.
3. The keypad window on the Rosemount 6888 Xi may have interior and exterior protective membranes. Remove the protective membranes prior to use of the Rosemount 6888 Xi enclosure.

⚠ CAUTION

EQUIPMENT DAMAGE
Failure to remove the protective membranes may cause the display to appear distorted. The membrane may be difficult or impossible to remove after extended use at elevated temperatures.

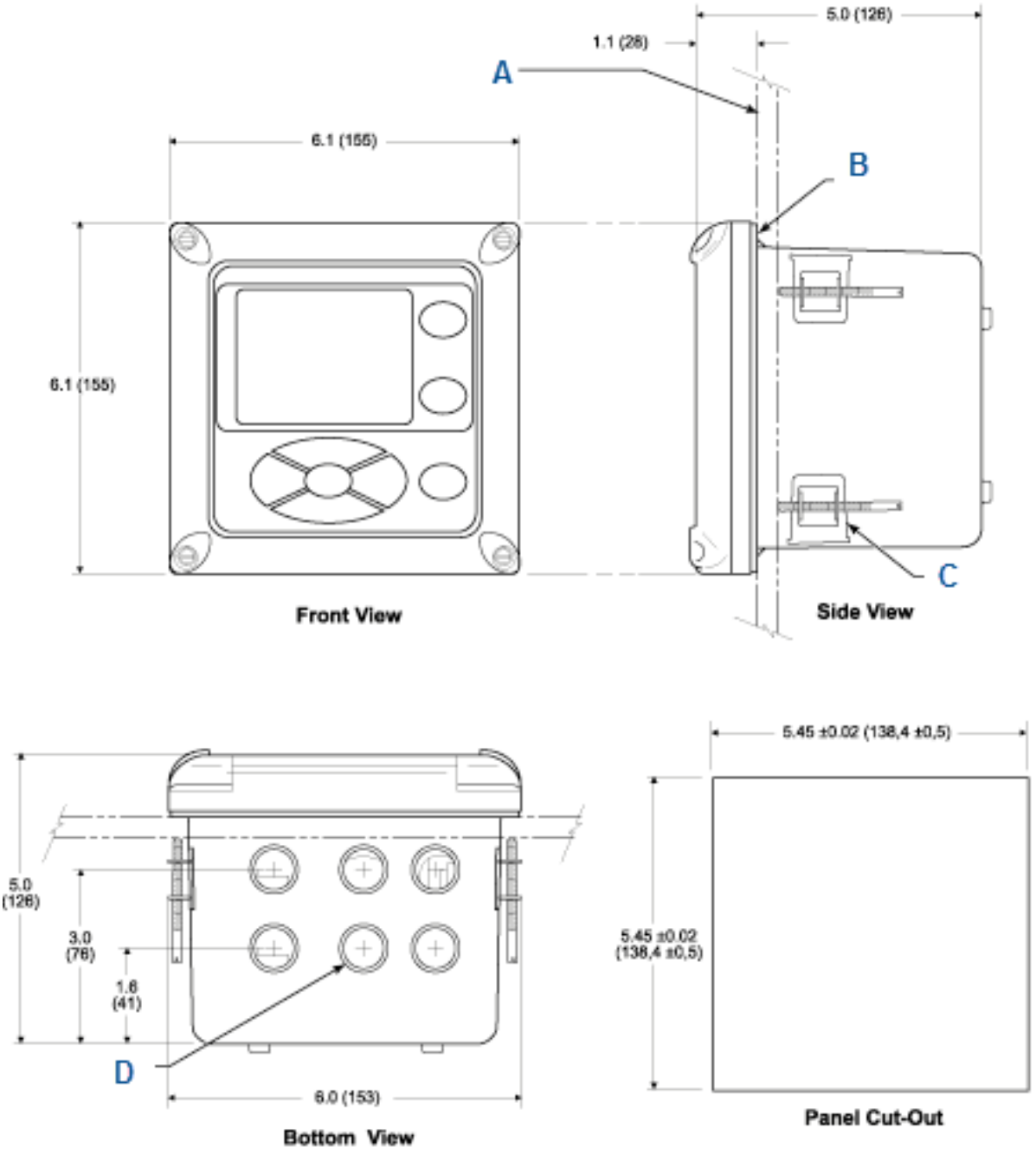
Figure 4-1: Wall/surface mount and pipe mount



A. 4X cover screw
B. Front panel
C. 6X 1/2-in. NPT conduit openings
D. Mounting bracket
E. U-bolts
F. 2-in. pipe supplied by customer

Dimensions are in inches with millimeters in parentheses.

Figure 4-2: Panel mount



A. Maximum panel thickness 0.375 (9.52)
B. Panel mount gasket
C. 4X mounting brackets and screws provided
D. 6X 1/2 in. NPT conduit openings

NOTICE

Dimensions are in inches with millimeters in parentheses.

NOTICE

The front panel is hinged at the bottom. The panel swings down for easy access to wiring locations.

4.3 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 transmitter configuration and disregard all other wiring diagrams.

⚠ WARNING

ELECTRIC SHOCK
Disconnect and lock out power before connecting the power supply.

Install all protective covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

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 (min 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 not, keep another external means of disconnecting the supply from the equipment located close by. Circuit breakers or switches must comply with a recognized standard such as IEC 947.

⚠ WARNING

Before installing this equipment, read the Essential instructions at the front of this instruction manual. Failure to follow safety instructions could result in serious injury or death.

⚠ CAUTION

EQUIIPMENT DAMAGE
If external loop power is used, the power supply must be a safety extra low voltage (SELV) type.

NOTICE

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

NOTICE

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

NOTICE

If metal conduit is used with the Rosemount 6888 Xi, the conduit should be reliably bonded to protective earth (PE). The grounding plate inside the Rosemount 6888 Xi is not bonded to PE and does not provide adequate grounding.

4.4 Connecting the Hazardous Area Transmitter Probe to the Rosemount General Purpose 6888 Xi Electronics

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

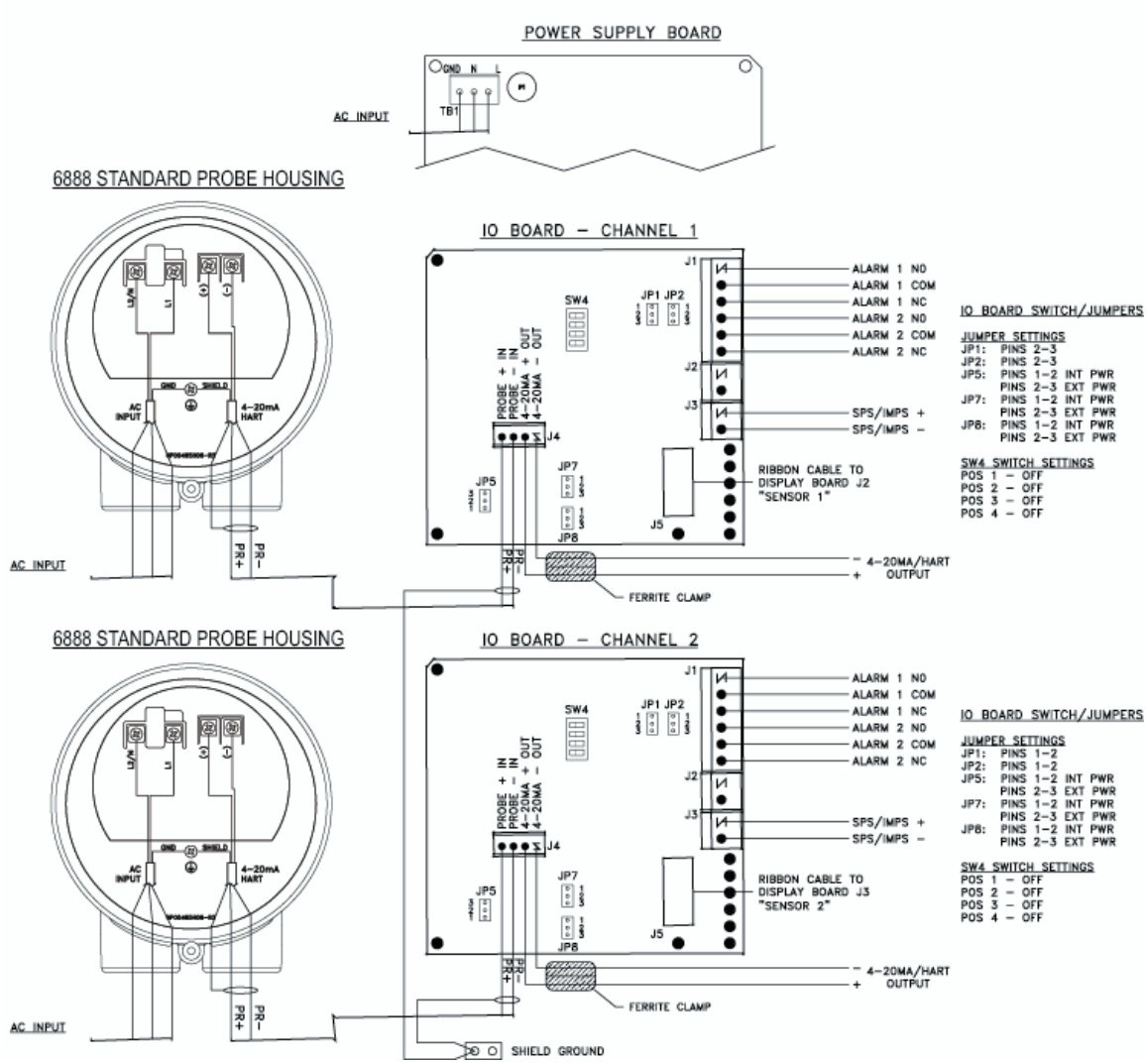
1. Remove cover screws from the front cover of the Rosemount 6888 Xi. Swing down the front cover of the interface box.
2. Pull out the I/O board on the right side of the card rack inside the Rosemount 6888Xi.

   If your system is configured to operate two transmitter probes, there are two I/O interface boards.
3. See Figure 4-3. 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.
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 SPS or IMPS (if used) to the applicable terminals of J3. Refer to the SPS or IMPS instruction manual for wiring details.
6. Reinstall the I/O board at the card rack of the Rosemount 6888 Xi.
7. If your system is configured for two channel operation, repeat steps 2 through 6 to connect the other probe's signal wires.
8. Remove the probe's connector from the power supply board located on the left-hand 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 in the power supply board.

Figure 4-3: Single/dual channel wiring diagram



NOTICE

1. Except for JP5, JP7, and JP8 on IO board, jumper and switch settings are factory set and are shown for reference only.
2. IO board 4-20 mA/HART® loop power settings
   - JP5
     - Pins 1-2: internal loop power Rosemount 6888 Xi to Rosemount 6888 Transmitter
     - Pins 2-3: external power Rosemount 6888 Xi to Rosemount 6888 Transmitter (requires 2,500 resistor across J4 PR+ to PR-)
   - JP7/JP8
     - Pins 1-2: internal power from Rosemount 6888 Xi to DCS
     - Pins 2-3: external power Rosemount 6888 Xi to DCS

4.5 Connecting the Transmitter probe to the single-channel safe area Xi and flame safety interlock

A flame safety interlock by Emerson™ is available for the heater power disconnect whenever there is a loss of the process flame or a heater runaway condition (heater over-temperature) in the O_2 probe. This input is internally powered by the Rosemount 6888 Xi and is actuated via a dry contact output from the user's flame scanner. A closed contact indicates a flame is present. An open contract indicates a loss of flame.

1. Refer to Figure 4-4. Connect the signal wires from the burner management system flame status output to the flame status input terminals of J2.

   You must supply the flame status sensing device. Refer to the applicable OEM documents for signal wiring details.
2. Remove the J1 and J2 connectors from the AC relay board.
3. Connect the AC line input to the J1 connector.
4. Connect the AC power to the Rosemount 6888C probe to the J2 connector.
5. Reinstall connector J1 and J2 to the AC relay board.

Rosemount 6888C product matrix

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-1: Housing and Electronics

1HT	Standard housing, transmitter electronics, HART communications
2HT	Integral autocal, transmitter electronics, HART communications
4FF	Integral autocal, transmitter electronics, Fieldbus communications
5DR	Standard housing, direct replacement, no electronics
6DRY	Standard housing, direct replacement, YEW electronics

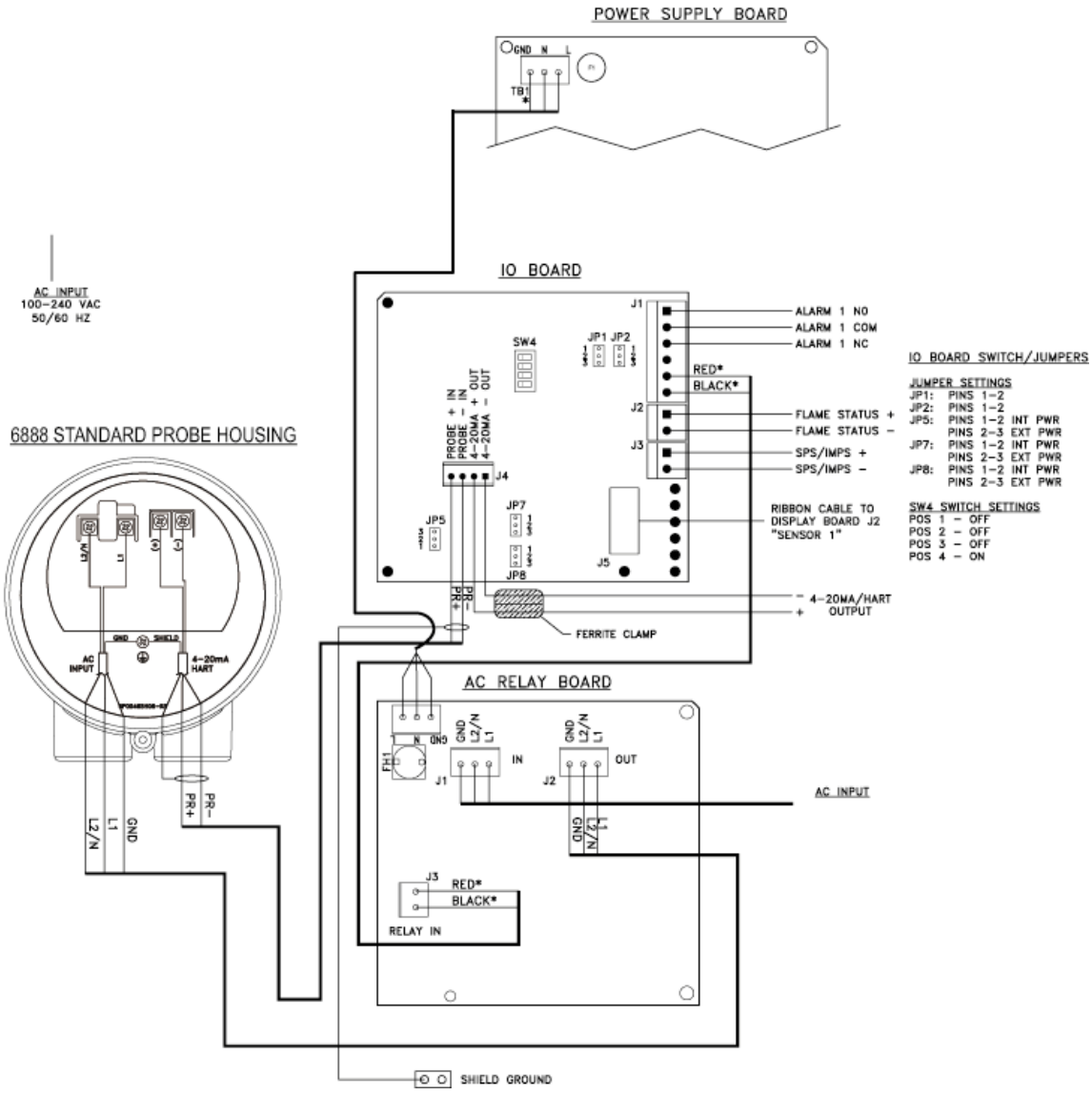
Rosemount 6888 Xi product matrix - safe area only

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-2: Remote Type

1OXY	Single channel O_2
2OXY	Single channel O_2 with flame safety interlock for heater
3OXY	Dual channel O_2
4OXY	Single channel O_2 traditional architecture for 120 V probes

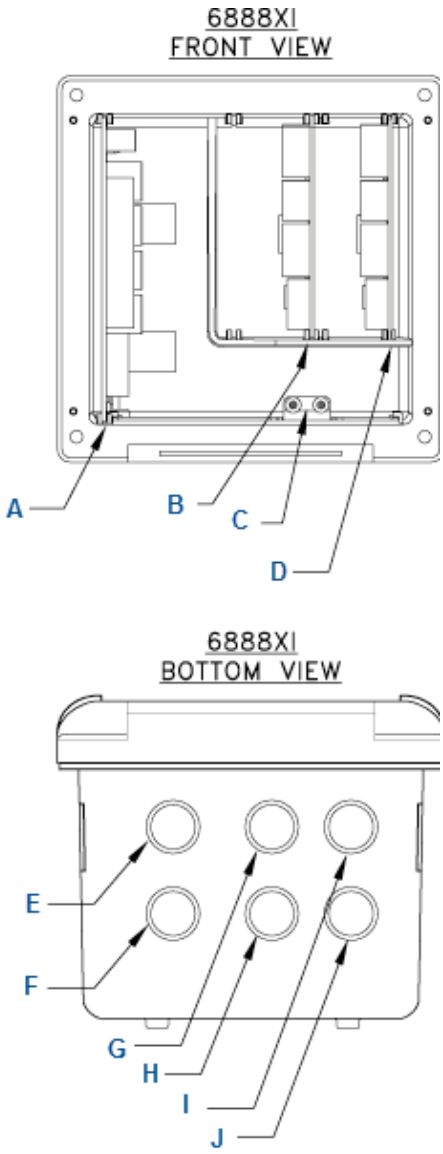
Figure 4-4: Single channel with flame safety wiring diagram



NOTICE

A. See Rosemount 6888 Xi Instruction 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 JP5, JP7, and JP8 on IO board, jumper and switch settings are factory set and are shown for reference only.
D. IO board: 4-20 mA/HART loop power settings
   - JP5
     - Pins 1-2: internal power Rosemount 6888 Xi to Rosemount 6888 transmitter
     - Pins 2-5: external power Rosemount 6888 Xi to Rosemount 6888 transmitter (requires 2,500 resistor across J4, PR+ to PR-)
   - JP7/JP8
     - Pins 1-2: internal power to DCS
     - Pins 2-3: external power Rosemount 6888 Xi to DCS

Figure 4-5: Rosemount 6888 Xi front and bottom views



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, SPS/IMPS
H. Channel #2 4-20 mA/HART output
I. Channel #1 Alarm relay, SPS/IMPS
J. Channel #1 4-20 mA HART output

4.6 Connecting the Transmitter probe with integral autocal to HART communications

This probe contains gas-switching solenoids so that the Rosemount 6888 Xi Electronics, Field Communicator, or AMS software can control the introduction of calibration gases. Calibrations can be initiated via a calibration recommended diagnostic, time since last calibration, manually via external dry contact, HART communications, or from the Rosemount 6888 Xi local operator interface keypad. The integral autocal feature can only be implemented when the probe is used with a Rosemount 6888 Xi.

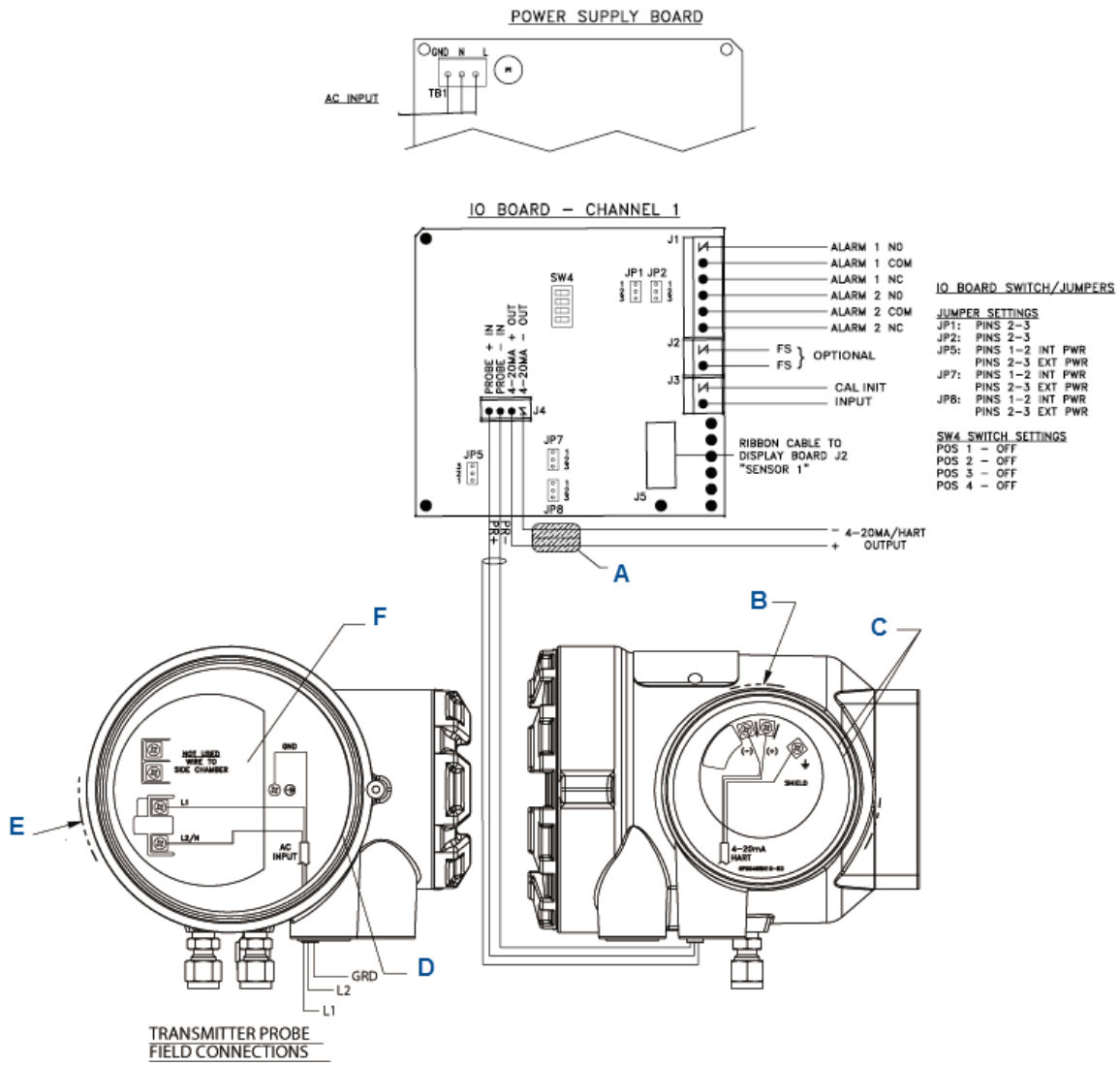
1. Remove the two covers from the transmitter.
2. Refer to Figure 4-6. Connect the line (L1 wire) to the L1 terminal, the neutral (L2 wire) to the L2/N terminal, and the ground wire to the ground lug.

   The Rosemount 6888C accepts line voltage at 120/240 Vac ±10%, 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 transmitter.

   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 Advanced Electronics.

   Note
   The 4-20 mA signal represents the O_2 value and also powers the probe-mounted electronics. Superimposed on the 4-20 mA signal is HART information accessible through a Field Communicator or AMS software.
5. Reinstall both covers on transmitter.
6. Follow the remaining electrical installation instructions for the Rosemount 6888 Xi included with your system configuration.

Figure 4-6: Integral autocal and HART communications



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

NOTICE

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/HART loop power settings
   - JP5
     - Pins 1-2: internal power Rosemount 6888 Xi to Rosemount 6888 transmitter
     - Pins 2-5: external power Rosemount 6888 Xi to Rosemount 6888 transmitter (requires 2,500 resistor across J4, PR+ to PR-)
   - JP7/JP8
     - Pins 1-2: internal power to DCS
     - Pins 2-3: external power Rosemount 6888 Xi to DCS

NOTICE

I/O board - Channel 2 is a duplicate of Channel 1.

4.7 Connecting the Transmitter probe with integral autocal to FOUNDATION Fieldbus™ communications

This probe contains gas-switching solenoids so that the Rosemount 6888 Xi Electronics, Field Communicator, or AMS can control the introduction of calibration gases. Calibrations can be initiated via a calibration recommended diagnostic, time since last calibration, manually via external dry contact, HART communications, or from the Rosemount 6888 Xi local operator interface keypad. The integral autocal feature can only be implemented when the probe is used with a Rosemount 6888 Xi.

1. Remove the two covers from the transmitter.
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 Rosemount 6888C accepts line voltage at 120/240 Vac ±10%, 50/60 Hz. No setup is required.
3. Connect the FOUNDATION Fieldbus wires from the Rosemount 6888 side housing to the FF segment.

   Note that the Rosemount 6888 probe is not rated as intrinsically safe 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.

NOTICE

The FOUNDATION Fieldbus signal represents the O_2 value and also powers the probe-mounted electronics.

5. Reinstall both covers on transmitter.
6. Follow the remaining electrical installation instructions for the Rosemount 6888 Xi included with your system configuration.

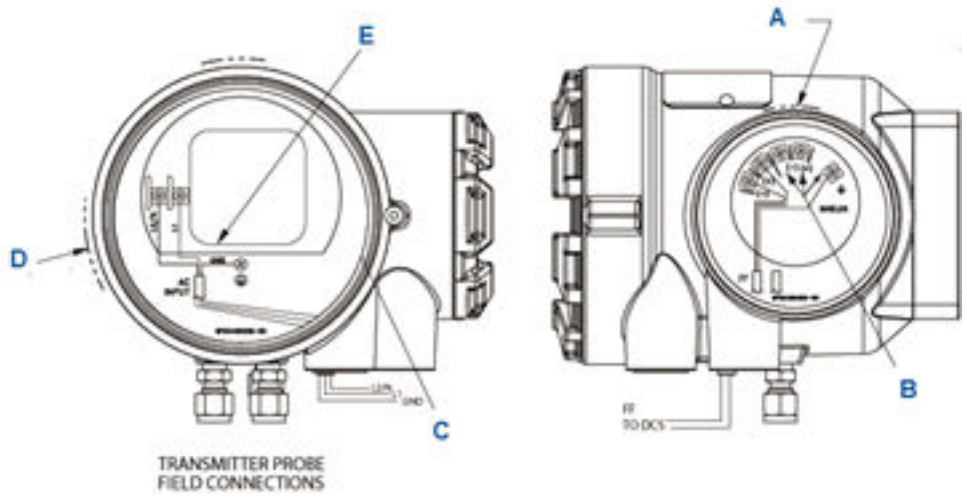
Rosemount 6888C product matrix

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-3: Housing and Electronics

1HT	Standard housing, transmitter electronics, HART communications
2HT	Integral autocal, transmitter electronics, HART communications
4FF	Integral autocal, transmitter electronics, Fieldbus communications
5DR	Standard housing, direct replacement, no electronics
6DRY	Standard housing, direct replacement, YEW electronics

Figure 4-7: Integral Autocal and FOUNDATION Fieldbus Communications without Optional Rosemount 6888 Xi



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

NOTICE

A. All wiring marked with an asterisk (*) is factory wiring inside the Rosemount 6888 Xi.
B. Except for JP5, JP7, and JP8 on IO board, jumper and switch settings are factory set and are shown for reference only.
C. IO board: 4-20 mA/HART loop power settings
   - JP5
     - Pins 1-2: internal power Rosemount 6888 Xi to Rosemount 6888 transmitter
     - Pins 2-5: external power Rosemount 6888 Xi to Rosemount 6888 transmitter (requires 2,500 resistor across J4, PR+ to PR-)
   - JP7/JP8
     - Pins 1-2: internal power to DCS
     - Pins 2-3: external power Rosemount 6888 Xi to DCS

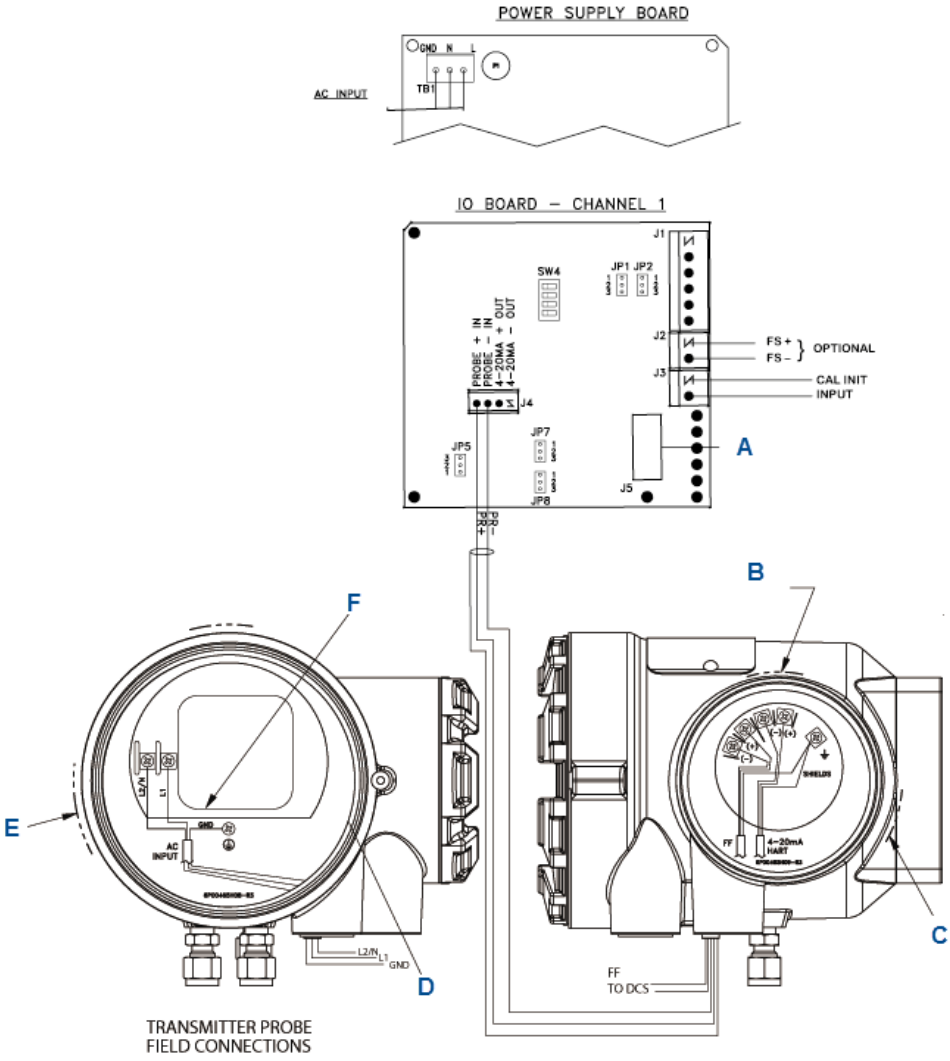
Rosemount 6888Xi product matrix - safe area only

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-4: Remote Type

1OXY	Single channel O_2
2OXY	Single channel O_2 with flame safety interlock for heater
3OXY	Dual channel O_2
4OXY	Single channel O_2 traditional architecture for 120 V probes

Figure 4-8: Integral autocal and FOUNDATION Fieldbus Communications and Optional Rosemount 6888Xi



A. Ribbon cable to display board J2 *Sensor 1*
B. Signal
C. HART connection (Used as a communication bus from probe transmitter electronics to optional Rosemount 6888 Xi. Not accessible to 475 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
- JP2: Pins 2-3
- JP5

  - Pins 1-2 internal power
  - Pins 2-3 external power
- JP7
  - Pins 1-2 internal power
  - Pins 2-3 external power
- JP8
  - Pins 1-2 internal power
  - Pins 2-3 external power

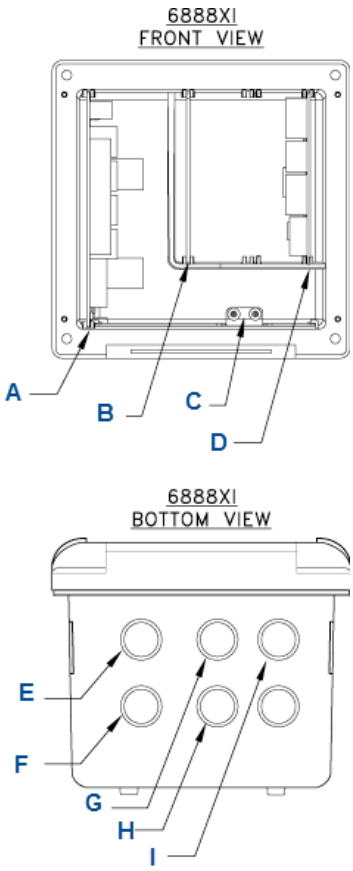
SW4 switch settings

- Position 1 - Off
- Postion 2 - Off
- Position 3 - Off
- Position 4 - Off

NOTICE

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/HART loop power settings
   JP5
   - Pins 1-2 internal power Rosemount 6888 Xi to Rosemount 6888 Transmitter
   - Pins 2-3 external power Rosemount 6888 Xi to Rosemount 6888 Transmitter (requires 2,500 resistor across J4, PR+ to PR-)

Figure 4-9: Rosemount 6888 Xi Front and Bottom View



A. Power supply board
B. AC relay board
C. Shield ground
D. IO board
E. AC input to P/S
F. Plug
G. AC input to relay BO
H. AC output to transmitter
I. Alarm relay, SPS/IMPS

4.8 Connecting the traditional architecture to the direct replacement hazardous area replacement probe (no electronics inside)

Here there are no electronics inside the probe head, so the raw sensor signals for the heater thermocouple and zirconium O_2 sensor are sent to a remote Rosemount 6888 Xi Electronics. The Rosemount 6888 Xi electronics will also directly apply power to the probe heater in order to maintain the correct sensor temperature. This arrangement calls for a 7-

conductor cable to carry this power and the sensor signals. Maximum length for this cable is 200 feet.

1. Remove cover from probe.
2. Feed all DR probe wiring through the conduit port of probe.
3. Refer to Figure 4-10. Connect DR probe heater power leads to DR probe connector.
4. Connect O_2 signal and thermocouple wires to DR probe connector.

Model 6888C product matrix

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-5: Housing and Electronics

1HT	Standard housing, transmitter electronics, HART communications
2HT	Integral autocal, transmitter electronics, HART communications
4FF	Integral autocal, transmitter electronics, Fieldbus communications
5DR	Standard housing, direct replacement, no electronics
6DRY	Standard housing, direct replacement, YEW electronics

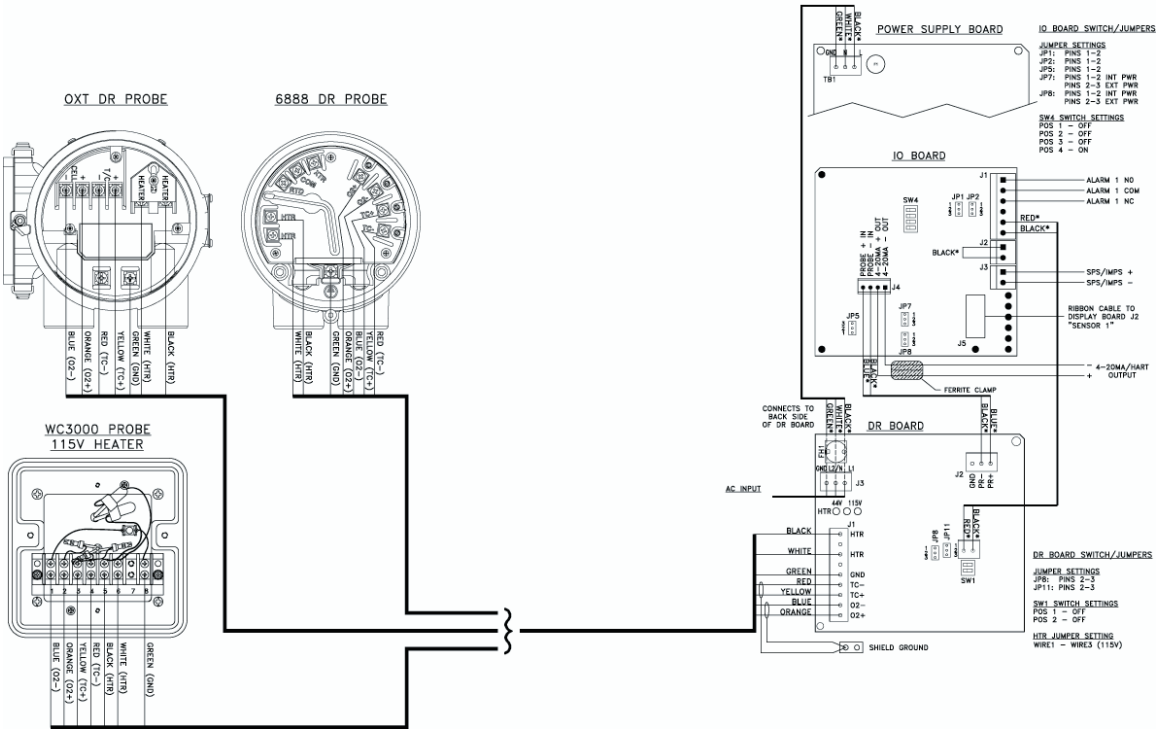
Model 6888Xi product matrix - safe area only

Compare the configuration matrix below to the model number on the probe tag to confirm the features present in this specific probe.

Table 4-6: Remote Type

1OXY	Single channel O_2
2OXY	Single channel O_2 with flame safety interlock for heater
3OXY	Dual channel O_2
4OXY	Single channel O_2 traditional architecture for 120 V probes

Figure 4-10: Traditional architecture with direct replacement hazardous area replacement probe (no electronics inside)



NOTICE

A. See Rosemount 6888 Xi Instruction 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 JP5, JP7, and JP8 on IO board, jumper and switch settings are factory set and are shown for reference only.

4.9 Connecting the traditional architecture cable connections system to the direct replacement probe

A traditional architecture configuration is used to provide for remote location of the transmitter electronics. All electronics are housed inside the Rosemount 6888Xi. A multi-conductor power/signal cable connnects between the probe and the Rosemount 6888Xi. Use the following procedure to connect the traditional architecture probe to the Rosemount 6888Xi.

NOTICE

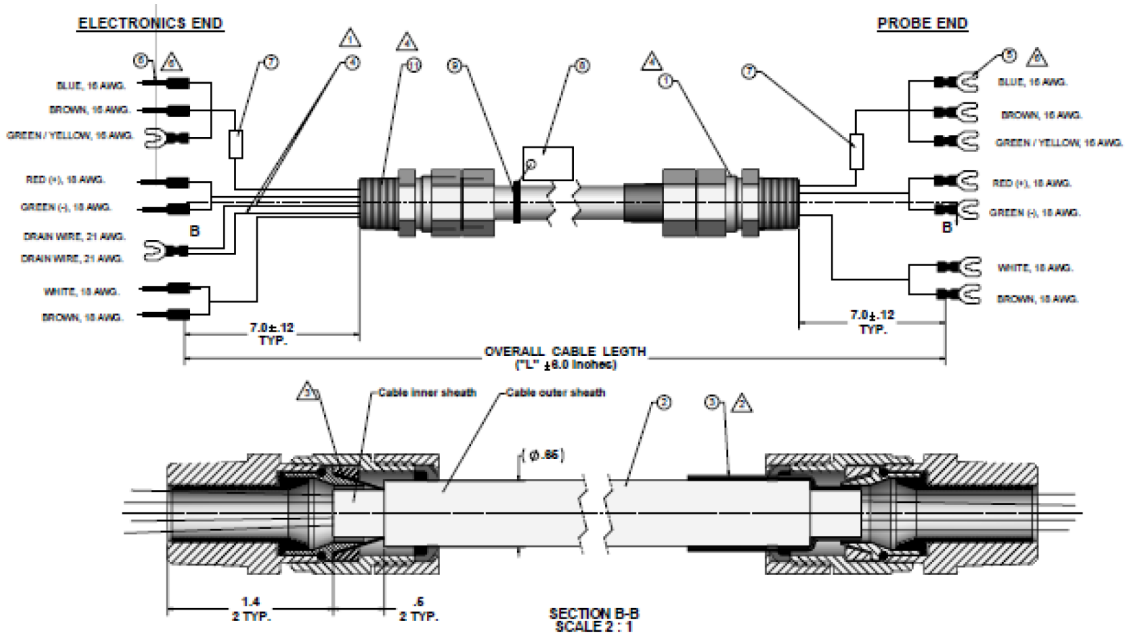
The traditional architecture cable is provided at the specified length and is ready for installation. The cable glands must be properly terminated to maintain EMC/EMI noise protection.

1. Run the 7-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 6888Xi enclosure according to the following procedure:
   a) Unscrew locking nut from gland assembly and slide locking nut back along cable.
   b) Pull the gland body away from the plastic insert. Use 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 Teflon 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 transmitter I/O board as indicated in Figure 4-11.

Figure 4-11: 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.

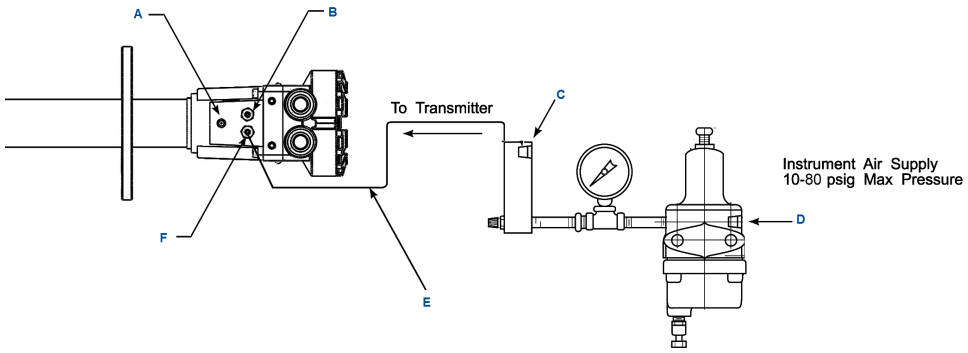
4.10 Pneumatic installation

4.10.1 Reference air package

After the Rosemount 6888C is installed, connect the reference air set to the transmitter unit.

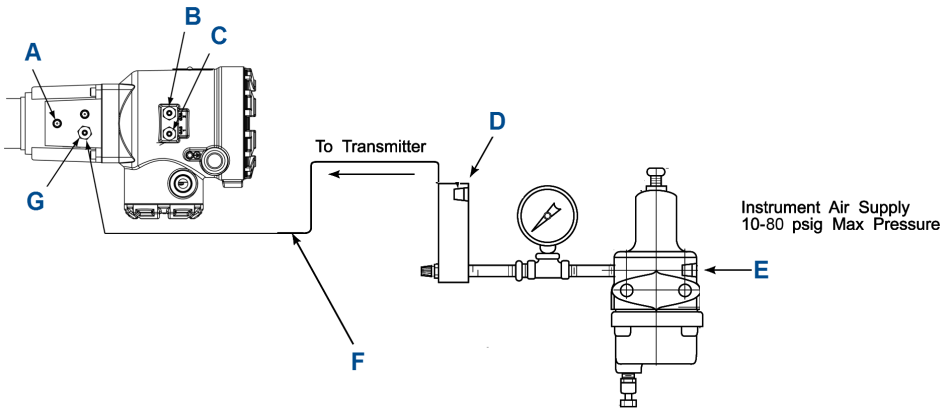
Instrument air (reference air): 5 psi (34 kPa) minimum, 8 psi (54 kPa) maximum at 2.0 scfh (1.01 L/min) maximum; less than 40 parts per million total hydrocarbons. Regulator outlet pressure should be set at 5 psi (34 kPa). Reference air can be supplied by the reference air set or the optional Rosemount SPS 4001B or Rosemount IMPS 4000.Reference air is recommended, or the reference air fittings can be left open to atmosphere. Rosemount SPS 4001B or Rosemount IMPS 4000 autocal boxes contain reference air sets.

Figure 4-12: Plant Schematic Diagram, Standard Housing



A. Vent
B. Calibration gas: 1/4 in. tube
C. Reference air flowmeter
D. 0.25-18 NPT female inlet connection
E. 0.25 or 6 mm O.D. tubing (supplied by customer)
F. Reference gas: 1/4 in. tube

Figure 4-13: Plant Air Schematic Diagram, Accessory Housing



A. Vent
B. Calibration gas 1: 1/4 in. tube
C. Calibration gas 2: 1/4 in. tube
D. Reference air flowmeter
E. 0.25-18 NPT female inlet connection
F. 0.25 or 6 mm O.D. tubing (supplied by customer)
G. Reference gas: 1/4 in. tube

5 Power up

5.1 Powering up the standalone Rosemount 6888 Transmitter probe (without Rosemount 6888 Xi)

Complete the following steps to power up the Rosemount 6888C Transmitter probe.

1. Apply AC line power to the transmitter.
2. Apply 24 Vdc loop power to the transmitter.
3. Using either the DCS control or a field communicator, verify communications to the transmitter.

The transmitter probe takes approximately 45 minutes to warm up to the 736 °C (1357 °F) heater setpoint. The 4-20 mA signal remains at a default value of 3.5 mA, and the O_2 reading remains at 0% 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 0-10% O_2.

If there is an error condition at startup, an alarm message is displayed on the Rosemount 6888Xi.

5.2 Power up the Rosemount 6888 Transmitter with single/dual channel or single channel and flame safety interlock Rosemount 6888Xi

Complete the following steps to power up the Rosemount 6888 Transmitter with single/dual channel or single channel and flame safety interlock Rosemount 6888Xi.

1. Appy AC line power to the transmitter.
2. Apply AC line power to the Rosemount 6888Xi. Run the Quick Start Wizard as described in Rosemount 6888Xi Quick Start Wizard on page 49. At the **Auto Cal Device** screen, select the calibration method based on the Rosemount 6888 Transmitter as follows:
   a. Standard probe housing configuration - Select None, SPS, or IMPS as appropriate. Do not select Integral or calibration will not be possible.
   b. Integral autocal probe housing - Select Integral only. If Integral is not selected, calibration will not be possible.
3. Verify communications between the transmitter and the Rosemount 6888Xi.

   The Rosemount 6888Xi display is preconfigured to display O_2 and cell temperature for single channel configurations and both O_2 readings for dual channel configurations.

The transmitter probe takes approximately 45 minutes to warm up to the 736 °C (1357 °F) heater setpoint. The 4-20 mA signal remains at a default value of 3.5 mA, and the O_2 reading remains at 0% 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 0-10% O_2.

If there is an error condition at startup, an alarm message is displayed on the Rosemount 6888Xi.

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

Complete the following steps to power up the Rosemount 6888 direct replacement probe with the Rosemount 6888Xi Electronics.

1. Apply AC line power to the Rosemount 6888Xi.
2. Run the Quick Start Wizard as described in Rosemount 6888Xi Quick Start Wizard on page 49.
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 transmitter probe takes approximately 45 minutes to warm up to the 736 °C (1357 °F) heater setpoint. The 4-20 mA signal remains at a default value of 3.5 mA, and the O_2 reading remains at 0% 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 0-10% O_2.

If there is an error condition at startup, an alarm message is displayed on the Rosemount 6888Xi.

5.4 Rosemount 6888Xi Quick Start Wizard

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

1. Apply power to the Rosemount 6888Xi.
   Once boot-up is complete, 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. At the **Sensor Type** screen, use the **Up** and **Down** keys to select O_2.
   Do not select CO as this option is reserved for future use.
4. Press **Enter** to continue.
5. At 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.

NOTICE

If SPS, IMPS, or Integral is selected, you must still configure automatic calibration as On. Other parameters, such as test gas values and gas times, should be verified 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.

5.5 Re-initiating Rosemount 6888Xi wizard

To re-initiate the wizard setup, you must reset the I/O board to default factory conditions.

1. Apply power to the Rosemount 6888Xi.
2. When the main screen appears, press **Menu** several times until the **System** menu appears. Use the **Up** and **Down** keys to select Configure IOB. Press **Enter** to continue.
3. When the **Configure IOB** screen appears, use the **Up** and **Down** keys to select I/O Board 1. With a dual channel Rosemount 6888Xi, you can reset and reconfigure either or both I/O boards. Press **Enter** to continue.

4. When the **I/O board 1** menu appears, use the **Up** and **Down** keys to select Reset I/O Board. Press **Enter** to continue.
5. When the **Reset** menu appears, use the **Up** and **Down** keys to select Factory Defaults. Press **Enter** to continue.
6. When prompted, use the **Up** and **Down** keys to select Yes. Press **Enter** to continue.

The Rosemount 6888Xi displays several screens while saving the configuration, resets itself, and then displays the **Wizard** screen.

6 Calibration

The Rosemount 6888 O_2 analyzer system can be calibrated in the installed condition without removing the instrument from the process duct and also while the combustion process is online.A stainless steel tube runs the length of the probe and delivers the calibration gases into the cell area. Factory calibration is usually satisfactory for initial startup and operation, but most accurate measurement is gained by executing a calibration under normal operating conditions.

Emerson recommends using 0.4% O_2 and 8% O_2 as calibration gases, with the balance of nitrogen in the gas bottles, but you can use other values as long as the electronics are configured identically. Emerson does not recommend instrument air or pure nitrogen as calibration gas values. Use a two-stage pressure regulator to establish a pressure of 15 psi from the bottles and set the flowmeter to 5 scfh flow rateor less.

⚠ WARNING

EXPLOSION
Do not use explosive gases or gases with % O_2 greater than that found in ambient air (i.e., 20.95% O_2).

6.1 Manual/semi-automatic calibration

The Rosemount 6888 probe with the standard housing can be calibrated in a semi-automatic fashion with a technician following prompts via the display of the Rosemount 6888Xi Electronics or via HART communications to a Field Communicator or AMS console. The technician needs to manually switch the gases based upon these prompts. Emerson recommends using 0.4% O_2 and 8% O_2, balance nitrogen as calibration gases. Always use a two-stage pressure regulator set to 20 psi. Set the calibration gas flowmeter for a maximum of 5 scfh with the cal gas fitting removed from the probe. Do not use explosive gases or gases with % O_2 greater than that found in ambient air (i.e., 20.95% O_2). A diffuser/filter that is plugged over time may cause the flowmeter to deliver less flow to the sensing cell, but never readjust the flow rate until a new diffuser is installed. Readjusting the flowmeter back up to the 5 scfh level could pressurize the cell during calibration and cause the O_2 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. The technician has the opportunity to accept or reject the new values. (A significant calibration change may cause a bump in the O_2 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 10 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_2 reading. The same phenomenon is possible if the calibration gas hoses are permitted to become degraded or loose.

6.2 Fully automatic calibration

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

6.2.1 Rosemount 6888 Probes 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:

- Via a *calibration recommended* diagnostic that is periodically checking cell impedance
- Via push button on the Rosemount 6888 Xi Electronics
- Via HART communications from a 475 handheld communicator or AMS
- Via an external contact closure
- Via time since the last successful calibration

NOTICE

To manually initiate an automatic calibration, select `9999` for CAL INTERVAL in the setup menu.

If the O_2 measurement is being used for automatic control, always place the O_2 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. An *initiate cal* contact is also provided.

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_2 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.

6.2.2 Rosemount 6888 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.

NOTICE

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.

6.2.3 Other features associated with calibration

1. *Cal Check* capability - You can choose to look at new calibration values prior to having them load in and become active. If this feature is selected, a `calibration changed` alarm comes up after the calibration is complete. Push **Diagnostics** button on the Rosemount Xi to require an *Accept Cal* stepso that the technician and operator can decide if they are ready to accept a potentially large change in calibration values.
2. Plugged diffuser diagnostic - this feature measures the return-to-process rate after calibration gases are removed and will alarm when this time exceeds 75% of the purge time configured. A `purge time too short` alarm is an indication that the diagnostic could not work because of a short purge time and is another indication that the diffuser is plugged. Increase purge time in this case.

   Another feature that comes with the plugged diffuser diagnostic is auto gas switching. This feature switches cal gases and also ends the purge sequence when the readings settle out vs. waiting for a configured flow time. This saves time and gas.
3. Tolerance check - alarms if the cell mV signal is significantly different from the expected signal of the bottles noted in the setup. This indicates if the wrong bottles are being used or if a bottle runs out in the middle of a calibration.

Calibration setup is under the **Detailed Setup** menu on the Rosemount Xi menu. See Figure 6-1.

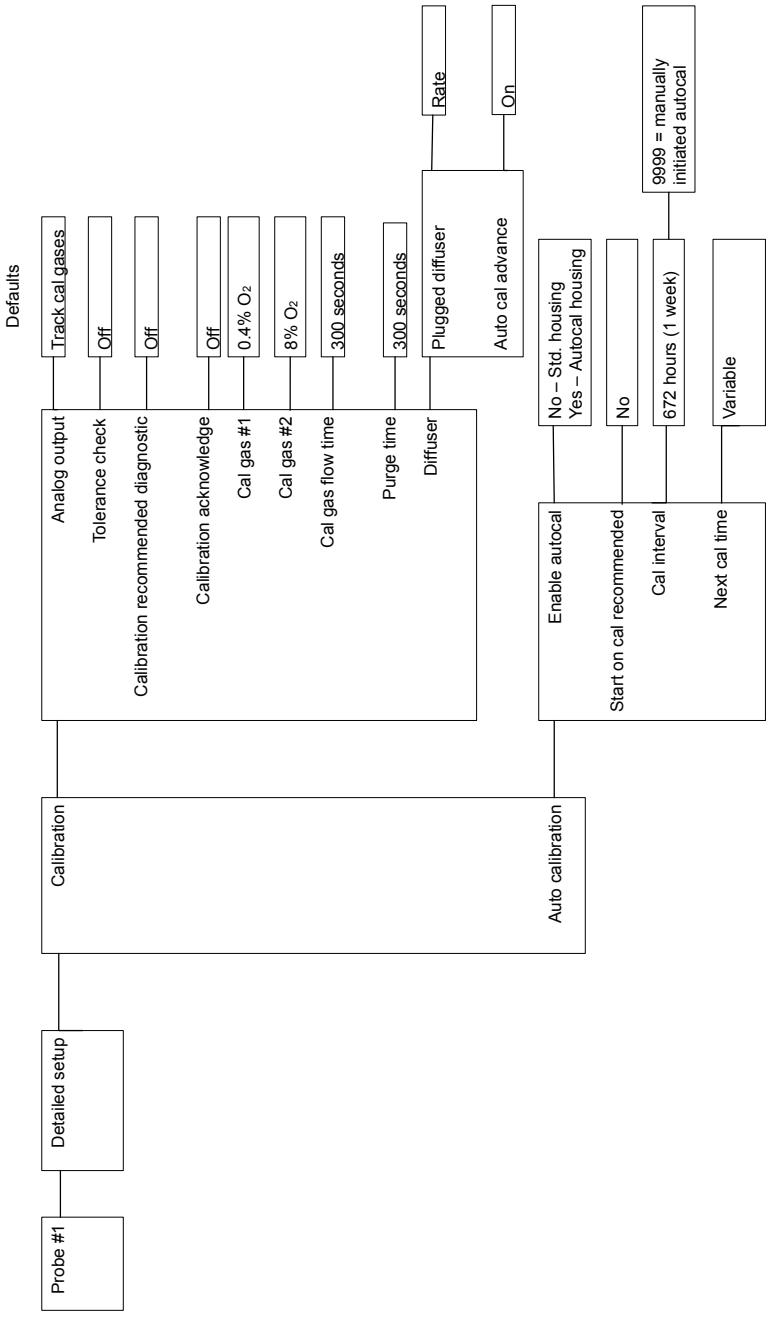


Figure 6-1: Calibration Defaults

7 HART® menu trees

Figure 7-1: Rosemount 6888 Xi (page 1)

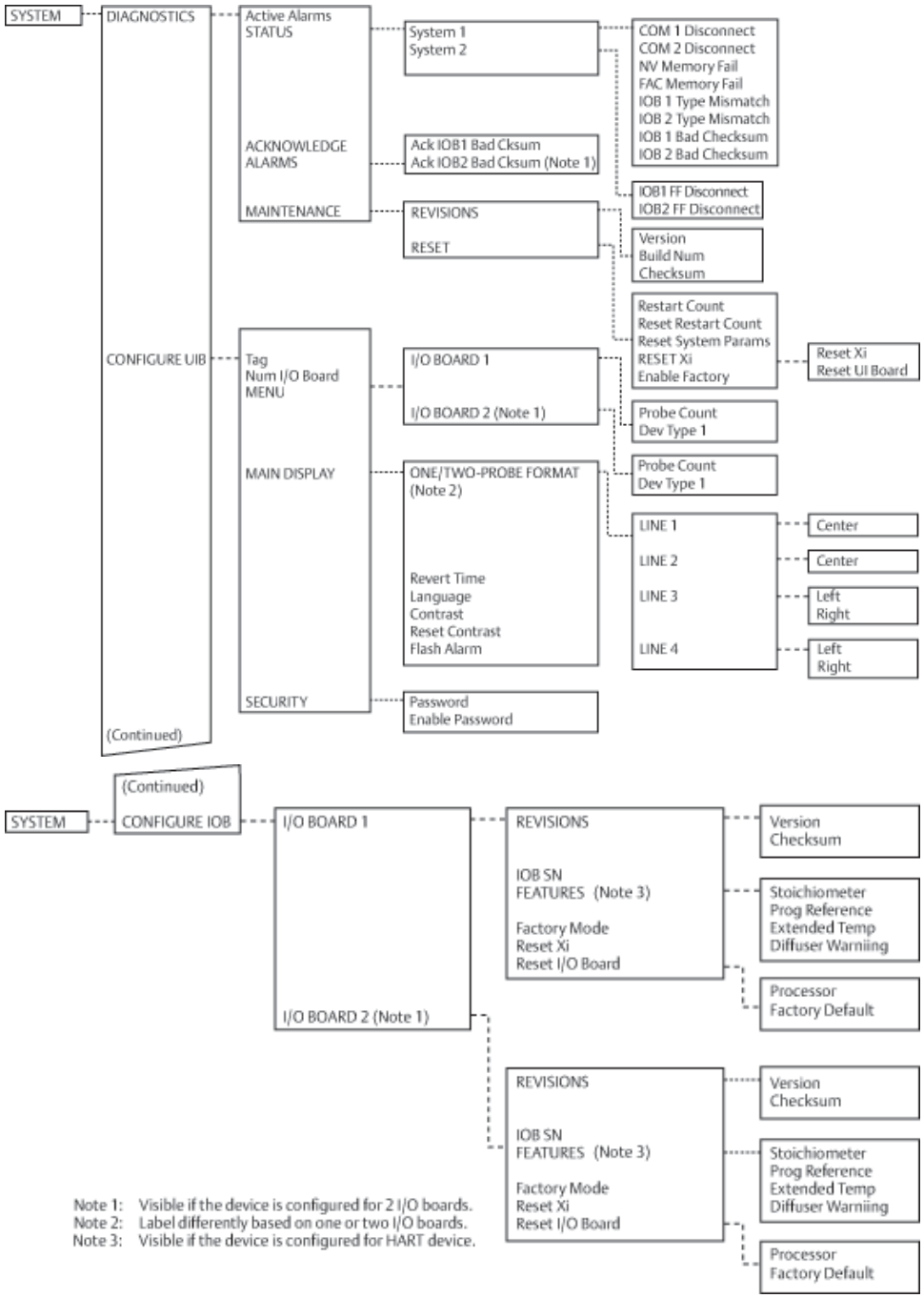


Figure 7-2: Rosemount 6888 Xi (continued)

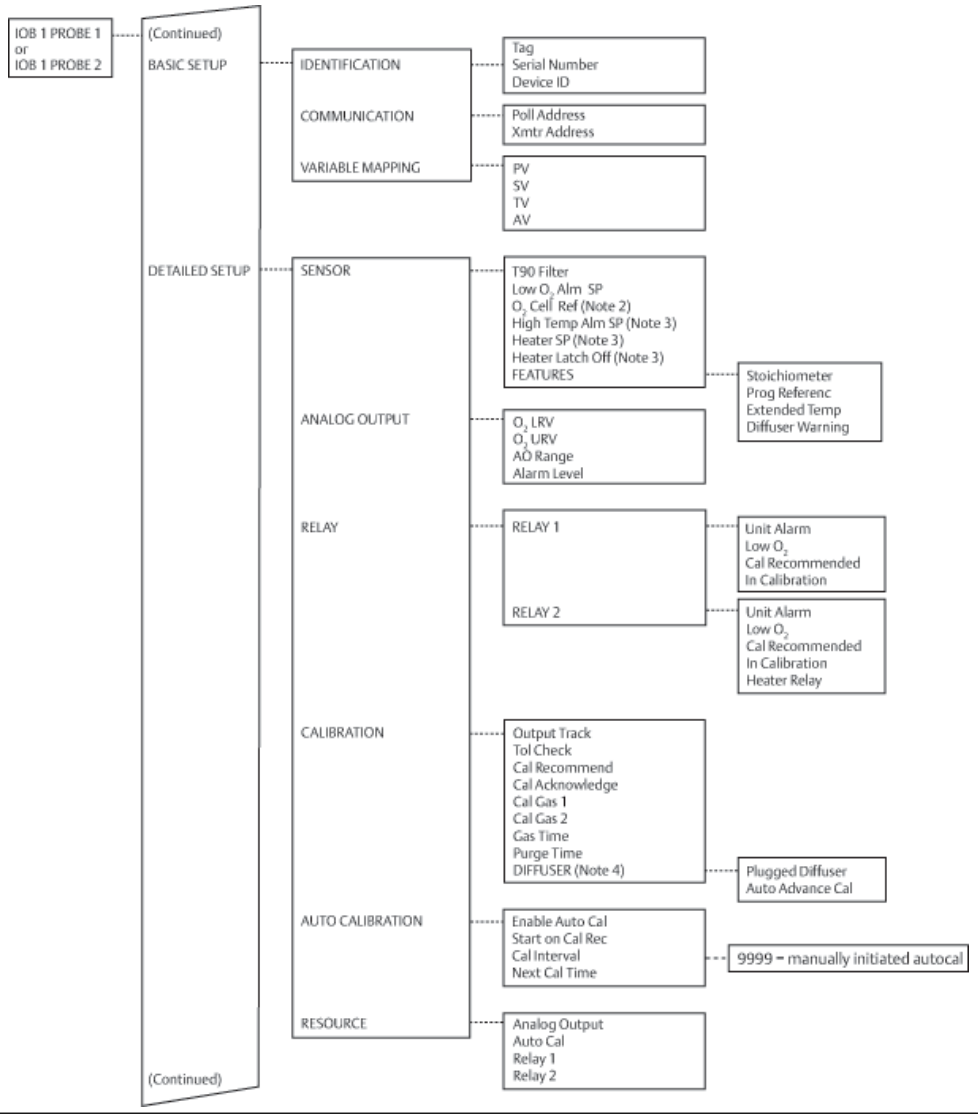
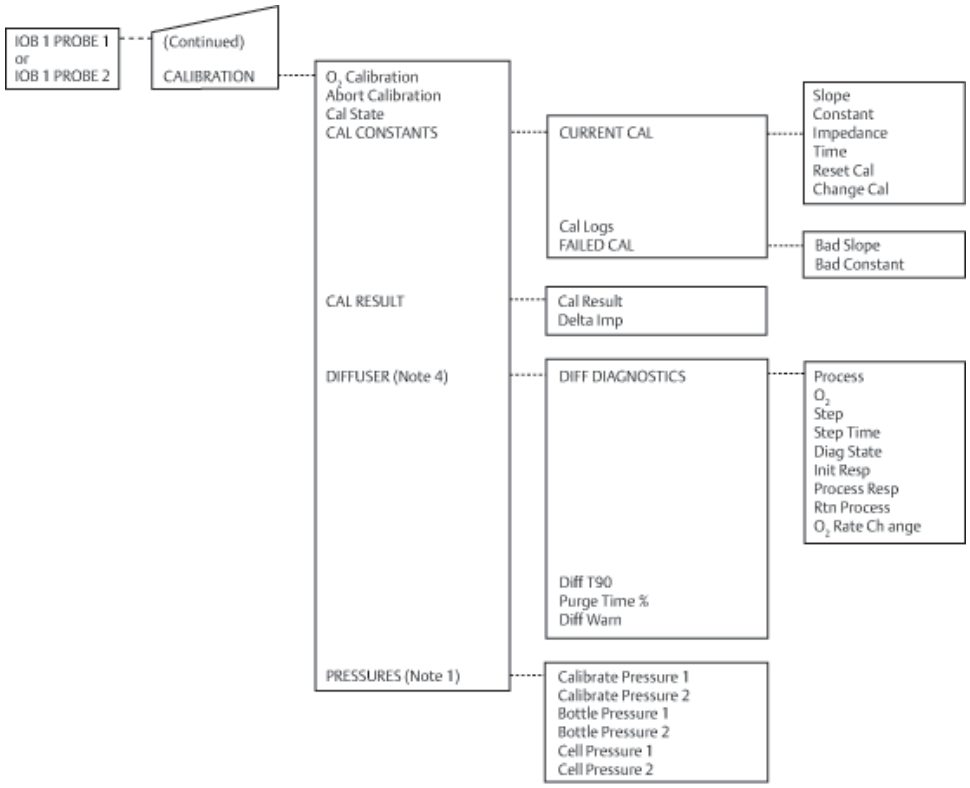
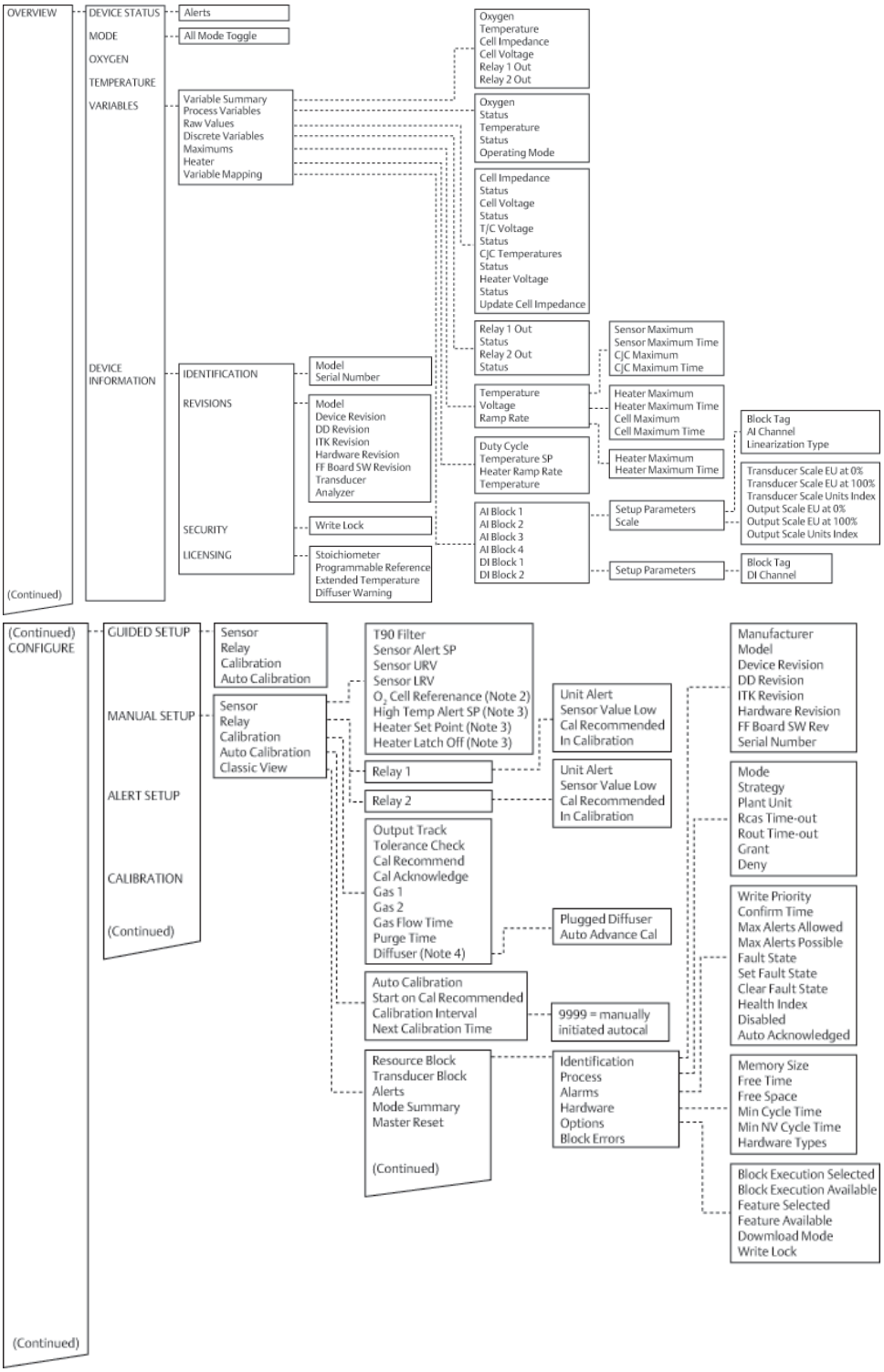


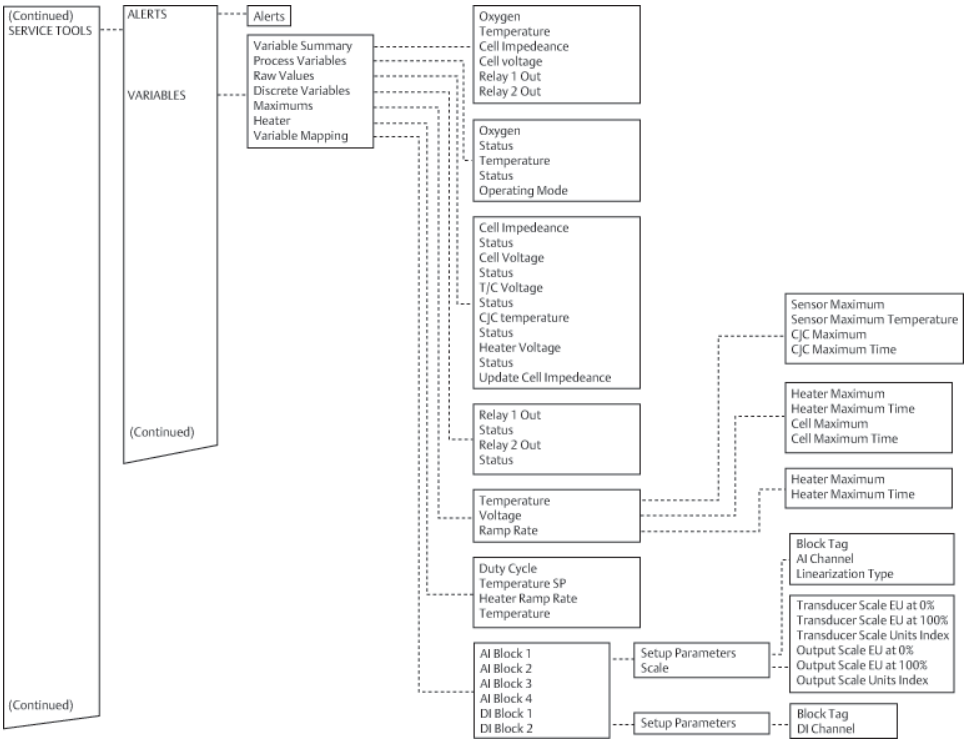
Figure 7-3: Rosemount 6888 Xi (continued)

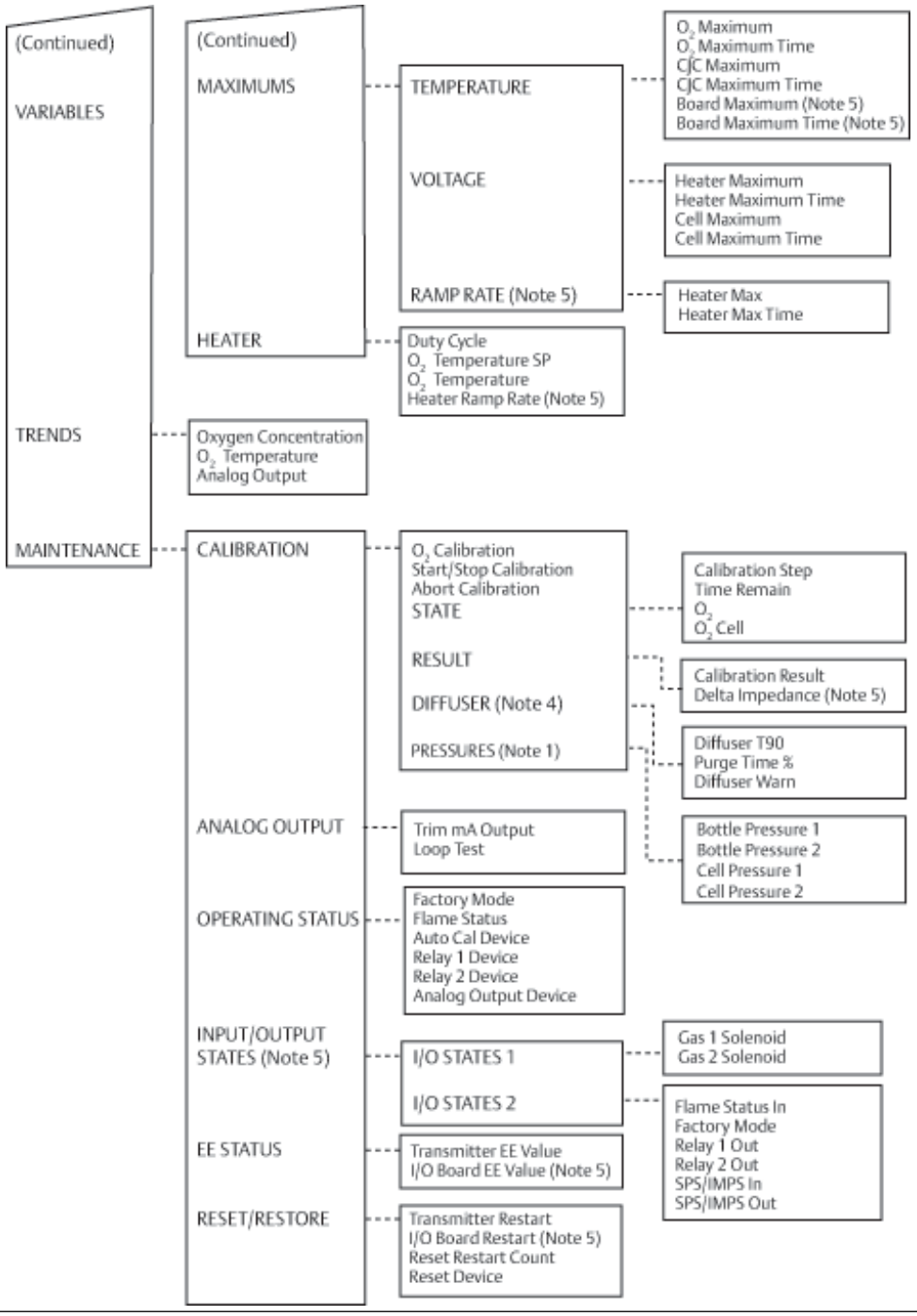


Note 1: Visible if the device is configured for HSPS Autocal.
Note 2: Visible if the Programmable Reference software feature is enabled.
Note 3: Visible if the Extended Temperature software feature is enabled.
Note 4: Visible if the Diffuser Warning software feature is enabled.

Figure 7-4: Field Communicator




(Continued)
SERVICE TOOLS
ALERTS
Alerts
VARIABLES
Variable Summary
Process Variables
Raw Values
Discrete Variables
Maximums
Heater
Variable Mapping
(Continued)
(Continued)
Oxygen
Temperature
Cell Impedeance
Cell voltage
Relay 1 Out
Relay 2 Out
Oxygen
Status
Temperature
Status
Operating Mode
Cell Impedeance
Status
Cell Voltage
Status
T/C Voltage
Status
CJC temperature
Status
Heater Voltage
Status
Update Cell Impedeance
Relay 1 Out
Status
Relay 2 Out
Status
Temperature
Voltage
Ramp Rate
Duty Cycle
Temperature SP
Heater Ramp Rate
Temperature
AI Block 1
AI Block 2
AI Block 3
AI Block 4
DI Block 1
DI Block 2
Setup Parameters
Scale
Setup Parameters
Sensor Maximum
Sensor Maximum Temperature
CJC Maximum
CJC Maximum Time
Heater Maximum
Heater Maximum Time
Cell Maximum
Cell Maximum Time
Heater Maximum
Heater Maximum Time
Block Tag
AI Channel
Linearization Type
Transducer Scale EU at 0%
Transducer Scale EU at 100%
Transducer Scale Units Index
Output Scale EU at 0%
Output Scale EU at 100%
Output Scale Units Index
Block Tag
DI Channel


(Continued)
VARIABLES
TRENDS
MAINTENANCE
(Continued)
MAXIMUMS
HEATER
TEMPERATURE
VOLTAGE
RAMP RATE (Note 5)
O_2 Maximum
O_2 Maximum Time
CJC Maximum
CJC Maximum Time
Board Maximum (Note 5)
Board Maximum Time (Note 5)
Heater Maximum
Heater Maximum Time
Cell Maximum
Cell Maximum Time
Heater Max
Heater Max Time
Duty Cycle
O_2 Temperature SP
O_2 Temperature
Heater Ramp Rate (Note 5)
Oxygen Concentration
O_2 Temperature
Analog Output
CALIBRATION
ANALOG OUTPUT
OPERATING STATUS
INPUT/OUTPUT STATES (Note 5)
EE STATUS
RESET/RESTORE
O_2 Calibration
Start/Stop Calibration
Abort Calibration
STATE
RESULT
DIFFUSER (Note 4)
PRESSURES (Note 1)
Calibration Step
Time Remain
O_2
O_2 Cell
Calibration Result
Delta Impedance (Note 5)
Diffuser T90
Purge Time %
Diffuser Warn
Bottle Pressure 1
Bottle Pressure 2
Cell Pressure 1
Cell Pressure 2
Trim mA Output
Loop Test
Factory Mode
Flame Status
Auto Cal Device
Relay 1 Device
Relay 2 Device
Analog Output Device
I/O STATES 1
I/O STATES 2
Gas 1 Solenoid
Gas 2 Solenoid
Flame Status In
Factory Mode
Relay 1 Out
Relay 2 Out
SPS/IMPS In
SPS/IMPS Out
Transmitter EE Value
I/O Board EE Value (Note 5)
Transmitter Restart
I/O Board Restart (Note 5)
Reset Restart Count
Reset Device

8 Maintenance and service

8.1 Overview

This section identifies the calibration methods available and provides the procedures to maintain and service the Rosemount 6888C O_2 transmitter.

⚠ WARNING

ELECTRIC SHOCK
Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

8.2 Maintenance intervals

The maintenance interval required is variable, depending on the ambient and process conditions the analyzer is exposed to. The zirconium oxide sensing cell is non-depleting and has no specific shelf life or a defined life in flue gas operation. The sensitivity of a sensing cell that is mounted inside a boiler that is burning natural gas may shift slightly over several years. Acidic compounds are the main aggressors to the sensing cell, typically SO_2, resulting from sulfur contained in coal and heavy oil fuels, and also HCl from the combustion of plastics in municipal incinerators and in industrial thermal oxidizers. Sensing cells may experience significant degradation and signal shift in this type of service, particularly if the operating levels of O_2 are very low (below 1% O_2).

A calibration check is generally recommended on a quarterly basis (every three months) by flowing bottled gas to the probe. (Make sure the operations personnel are notified when doing this and also make sure that the O_2 control loop is placed in manual mode). If the probe readings vary significantly from the bottle values, then conduct a formal calibration.

The optional Rosemount 6888Xi offers a `calibration recommended` diagnostic that indicates when the probe needs to be calibrated.

Combustion processes that have a high level of ash or other particulate content will cause the diffusion element on the end of the probe to plug off. A significantly plugged diffuser causes a slower speed of response to changing O_2 levels in the process. This can usually be seen on the recorded trends in the control room. In addition, a significantly plugged diffuser can introduce error during a calibration and negatively affect accuracy.

When performing a calibration check or actual calibration, the calibration flow meter may read lower if the diffuser is significantly plugged. Never increase the flow rate back-up, however, as this can cause a shifted calibration. Adjust the calibration flow rate only when a new diffuser is installed. Always record the response time back to the process after the calibration gases are removed. Diffuser plugging can be tracked through the calibration record.

Visually inspect the probe during plant outages, paying particular attention to condensed components. Condensation can be reduced or eliminated by insulating the probe installation, including the probe mount, flange, and blue housing.

8.3 Repair

Each of the following procedures details how to remove and replace a specific component of the Rosemount 6888C.

⚠ WARNING

BURNS
Remove the transmitter from the stack for all service activities. Allow the unit to cool and take it to a clean work area. Failure to comply may cause severe burns.

⚠ WARNING

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

8.3.1 Remove and replace probe

Remove probe

Complete the following steps to remove the probe from the stack.

1. Turn off power to the system.
2. Shut off the calibration gases at the cylinder and the instrument air.
3. Disconnect the calibration gas and instrument air lines from the transmitter.
4. Remove housing cover.
5. Remove all signal and power wiring to the probe.
6. Remove insulation to access the mounting probe.
7. Unbolt the transmitter from the stack and take it to a clean work area.
8. Allow the unit to cool to a comfortable working temperature.

Replace probe

Complete the following steps to replace the probe in the stack.

1. Bolt the transmitter to the stack and install the insulation.
2. Connect all signal and power leads at the probe.
   Refer to Install on page 21 for detailed wiring instructions.
3. Connect the calibration gas and instrument air lines to the probe.
4. Install the housing cover.
5. Turn on instrument air.
6. Restore power to the system.
   Refer to Power up on page 47.

NOTICE

Recalibration is required whenever the electronic cards or sensing cell are replaced.

8.3.2 Replace transmitter board

The transmitter board is not repairable and must be replaced if any component fails.

See Figure 8-1 on page 66 for item number references. The transmitter board is available as a standalone kit or with the plastic cover and mounting plate.

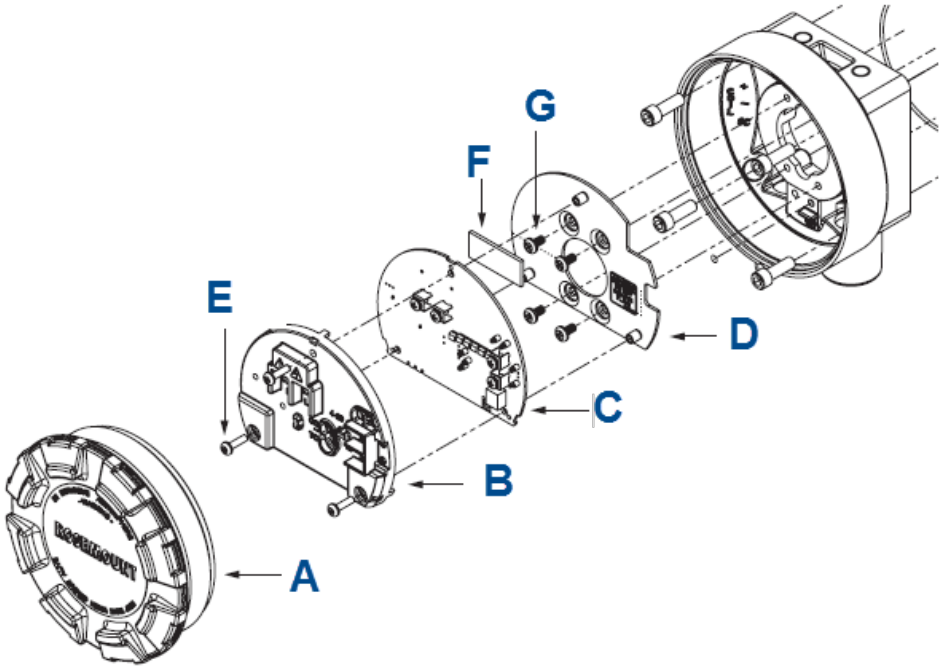
⚠ WARNING

ELECTRIC SHOCK
Disconnect and lock out power before working on any electrical components.

⚠ CAUTION

MEASUREMENT ERRORS
Failure to resynchronize the calibration parameters with a Rosemount 6888Xi after replacing the transmitter board or recalibrating the instrument may cause an inaccurate O_2 measurement. When the transmitter board is replaced and the calibration parameters are not synchronized with the Rosemount 6888Xi, the parameters in the Rosemount 6888Xi will be used as default to calculate the O_2 measurement.

Figure 8-1: Transmitter board mounting



A. Cover
B. Plastic cover
C. Transmitter board
D. Mounting plate
E. Screws
F. Thermal pad
G. Screws

1. Remove cover (A) from the transmitter housing.
2. Disconnect the power and signals from the transmitter board (C).
3. Remove the three screws (E) securing the plastic cover (B) and transmitter board (C) to mounting plate (D).
4. The plastic cover snaps onto the transmitter board with three tabs. Pull the cover and board away from the mounting plate.

   The thermal pad (F) will most likely remain attached to the mounting plate.
5. Disconnect the two wire harness connectors from the back of the transmitter board and remove the plastic cover and transmitter board.

   Replacement transmitter boards come in two configurations:

   a. Transmitter board with thermal pad and mounting screws
   b. Transmitter board, thermal pad, plastic cover, mounting plate, and mounting screws
6. If only the transmitter board is being replaced, carefully unsnap the plastic cover from the old transmitter board and then snap it onto the new board.

The cover goes in one way only with the screw terminals for the power and signal wiring fitting into the openings in the cover.

If the transmitter board, plastic cover, and mounting plate are being replaced, the plastic cover should already be snapped onto the transmitter board.

7. Remove the old thermal pad from the mounting plate. Attach the new thermal pad to the mounting plate 1 in. up from the flat edge of the pad.

   Do not reassemble without the thermal pad in place. If the transmitter board, plastic cover, and mounting plate are being replaced, the thermal pad should already be in place on the mounting plate.
8. If the mounting pad is being replaced, remove the four screws (H) securing the plate to the housing. Install the new mounting plate using four screws.

   Replacement screws are provided if any become lost or damaged.
9. Reconnect the two wire harness connectors to the back of the transmitter board.

   The connectors are different and individually keyed to prevent misconnection.
10. Carefully push the wire harnesses through the hole in the mounting plate and align the transmitter board with plastic cover over the three standoffs on the mounting plate.
11. Install the three screws to secure the board to the mounting plate.

    Replacement screws are provided if any become lost or damaged.
12. Reconnect the power and signal wires to the transmitter board.
13. Reinstall the cover to the transmitter housing.
14. Reapply power to the transmitter. Prior to using the transmitter for measurement purposes, perform one of the following:
    - Transmitter without Rosemount 6888Xi: Recalibrate the transmitter. See Power up on page 47.
    - Transmitter with Rosemount 6888Xi: When initialization is complete, the transmitter begins to heat up, but an alarm condition is shown on the Rosemount 6888Xi. Synchronize the calibration parameters via the Rosemount 6888Xi as follows:
      a. Press **DIAG** once to view the alarms. A `Probe Changed` alarm appears.
      b. Press **EXIT** once to enter the **Diagnostic** menu.
      c. Use the **Up** and **Down** keys to select 3-Acknowledge Alarms. Press **ENTER**.
      d. Use the **Up** and **Down** keys to select 3-Ack Probe Changed. Press **ENTER**.
      e. Use the **Up** and **Down** keys to select 1-Send To Probe. Press **ENTER**.
      f. When transfer is complete, press **EXIT** twice to return to the main menu.

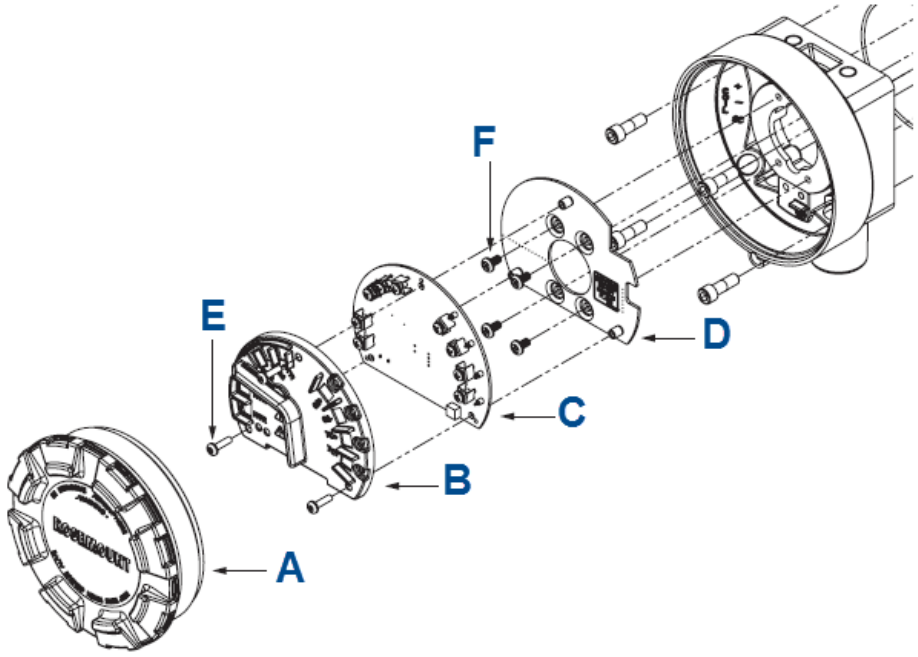
8.3.3 Replace DR terminal board

This section covers replacement of the DR board. The board is not repairable and must be replaced if any component fails. See Figure 8-2 on page 68 for letter references. The DR board is available as a standalone kit or with the plastic cover and mounting plate.

⚠ WARNING

ELECTRIC SHOCK
Disconnect and lock out power before working on any electrical components.

Figure 8-2: DR terminal board mounting



A. Cover
B. Plastic cover
C. DR terminal board
D. Mounting plate
E. Screws
F. Screws

1. Remove cover (A) from the DR probe housing.
2. Disconnect the power and signal wires from the DR terminal board (C).
3. Remove the three screws (E) securing the plastic cover (B) and DR terminal board (C) to mounting plate (D).
4. Disconnect the two wire harness connectors from the back of the transmitter board and remove the plastic cover and transmitter board.

   Replacement DR terminal boards come in two configurations:

   a. DR terminal board with thermal pad and mounting screws
   b. DR terminal board, thermal pad, plastic cover, mounting plate, and mounting screws
5. If the mounting pad is being replaced, remove the four screws (F) securing the plate to the housing. Install the new mounting plate using four screws.

   Replacement screws are provided if any become lost or damaged.
6. Reconnect the two wire harness connectors to the back of the DR terminal board.

   The connectors are different and individually keyed to prevent misconnection.
7. Carefully push the wire harnesses through the hole in the mounting plate and align the DR terminal board with plastic cover over the three standoffs on the mounting plate.
8. Install the three screws to secure the board to the mounting plate.

Replacement screws are provided if any become lost or damaged.

9. Reconnect the power and signal wires to the transmitter board.
10. Reinstall the cover to the DR probe housing.
11. Reapply power to the DR probe.

8.3.4 Heater strut replacement

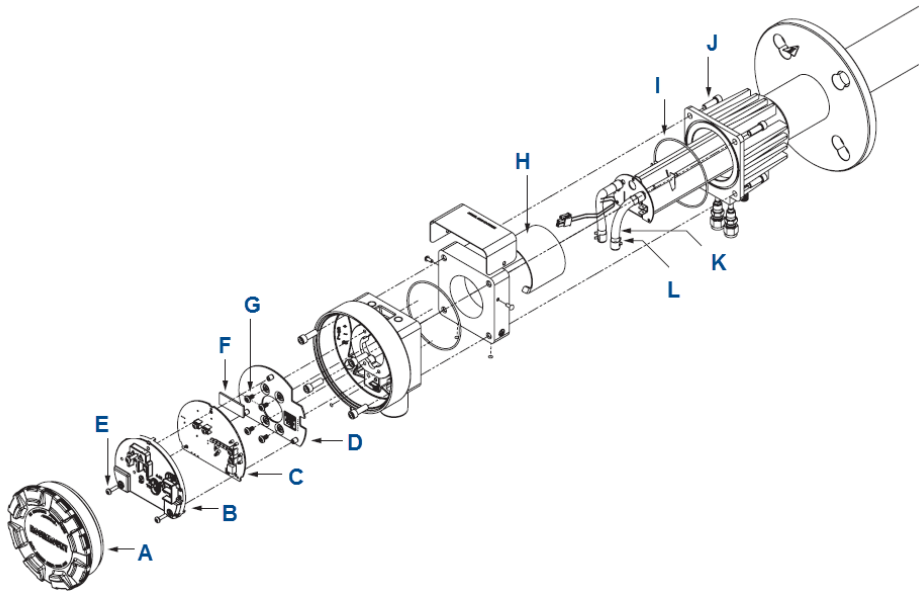
This section covers heater strut replacement. Do not attempt to replace the heater strut until all other possibilities for poor performance have been considered.

If heater strut replacement is needed, order a replacement heater strut kit (Table 9-1 on page 79). Refer to Figure 8-3 on page 70 for item letter references.

⚠ WARNING

BURNS
Use heat resistant gloves and clothing when removing probe. Do not attempt to work on the probe until it has cooled to room temperature. The probe can be as hot as 427 °C (800 °F). This can cause severe burns.

Figure 8-3: Housing/Strut Exploded View



A. Cover
B. Plastic cover
C. Transmitter board
D. Mounting plate
E. Screws
F. Thermal pad
G. Screws
H. Strut clamp
I. O-ring
J. Screws
K. Viton tube
L. Tube clamp

1. Follow the instructions in Remove and replace probe on page 64 to remove the transmitter from the stack or duct.
2. Follow the instructions in Replace transmitter board on page 65 or Replace DR terminal board on page 67 to remove the electronics from the housing.
3. Remove four screws (E). Remove housing from probe using care not to damage the strut wire harnesses or O-ring (I).
4. Remove the strut clamp (H) from inside the finned housing on the probe.
5. Remove tube clamps (L) and Viton tubes (K) from the CAL and REF gas ports and the CAL and REF gas lines. Leave the clamps in place on the hoses for later reassembly.
6. Grasp the wire loop and carefully slide the heater strut assembly out of the probe tube.
7. When replacing the strut, orient the probe so that the small calibration gas tube is at the 6 o'clock position of the probe tube. Align the slot on the heater plate with the calibration gas line in the probe tube. Slide the strut into the probe tube.

It turns to align the hole on the back plate of the strut with the calibration gas line. When the hole and calibration gas line are aligned correctly, the strut slides in the rest of the way.

8. As the strut insertion nears completion, install the guide rod into the calibration gas tube to assist in guiding the calibration gas tube through the hole in the end of the strut.
9. Replace the CAL and REF gas Viton tubes (K).
10. Insert the strut clamp (H) back into the finned housing on the probe.

    The opening should be down to allow for clearance for the gas tubes.
11. Carefully install the O-ring (I) back into the groove between the two housings.

    A small amount of silicone grease may be used to hold the O-ring in place. Do not use petroleum based grease.
12. Insert the strut wire harnesses into the housing.
13. Turn the conduit ports of the housing to the CAL and REF gas ports side of the probe and position the housing on the probe.
14. Install and tighten the four screws (J).
15. Follow the instructions in Replace transmitter board on page 65 to install the electronics into the housing.
16. Follow the instructions in Remove and replace probe on page 64 to install the transmitter into the stack or duct.

8.3.5 Cell replacement

This section covers oxygen sensing cell replacement. Do not attempt to replace the cell until all other possibilities for poor performance have been considered.

If cell replacement is needed, order the cell replacement kit (Table 9-1 on page 79).

The cell replacement kit (Figure 8-4 on page 72) contains a cell and flange assembly, corrugated seal, setscrews, socket head cap screws, and anti-seize compound. The items are carefully packaged to preserve precise surface finishes. Do not remove items from the packaging until they are ready to be used. Spanner wrenches and hex wrenches needed for this procedure are part of an available special tools kit (Table 9-1 on page 79).

⚠ WARNING

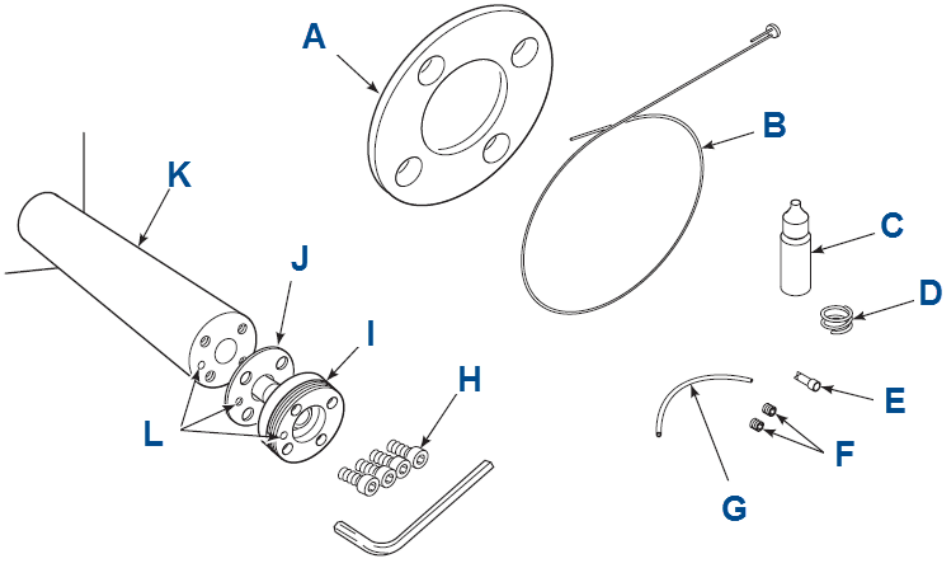
BURNS
Use heat-resistant gloves and clothing when removing the probe. Do not attempt to work on these components until they have cooled to room temperature. Probe components can be as hot as 300 °C (572 °F). This can cause severe burns.

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

⚠ CAUTION

EQUIPMENT DAMAGE
Do not remove the cell unless you are certain it needs to be replaced. Removal may damage the cell and platinum pad. Follow the complete troubleshooting procedure to make sure the cell needs to be replaced before removing it.

Figure 8-4: Cell Replacement Kit



A. ANSI gasket
B. Wire and pad assembly
C. Anti-seize compound
D. 22 gauge wire
E. Closed end connector
F. Set screws
G. Teflon tubing
H. Socket head cap screws
I. Cell and flange assembly
J. Corrugated seal
K. Probe (not included in kit)
L. Calibration gas passage

1. Follow the instructions in Remove and replace probe on page 64 to remove the transmitter from the stack or duct.
2. If the probe uses the standard diffusion element, use a wrench to remove the diffuser assembly.
3. If equipped with the optional ceramic diffusion assembly, remove and discard the setscrews and remove the vee deflector. Use spanner wrenches from the probe disassembly kit (Table 9-1 on page 79) to turn the hub free from the retainer. Inspect the diffusion element. If damaged, replace the element.
4. Loosen the four socket head cap screws from the cell and flange assembly and remove the assembly and the corrugated seal.

   The cell flange has a notch that may be used to gently pry the flange away from the probe. The contact pad inside of the probe sometimes fuses to the oxygen sensing cell. If the cell is fused to the contact pad, push the cell assembly back into the probe (against spring pressure) and quickly twist the cell assembly. The cell and contact pad should separate. If the contact pad stays fused to the cell, a new contact/thermocouple assembly must be installed. Disconnect the cell and the thermocouple wires at the crimp connections and withdraw the cell with the wires still attached.
5. If the contact assembly is damaged, replace the strut or contact pad. Follow the instructions in Heater strut replacement on page 69, steps 2 through 4, to remove the electronics housing and then follow the instructions for replacing the contact pad provided in the cell replacement kit.
6. Remove and discard the corrugated seal. Clean the mating faces of the probe tube and retainer. Remove burrs and raised surfaces with a block of wood and crocus cloth. Clean the threads on the retainer and hub.
7. Rub a small amount of anti-seize compound on both sides of the new corrugated seal.
8. Assemble the cell and flange assembly, corrugated seal, and probe tube. Make sure the calibration tube lines up with the calibration gas passage in each component. Apply a small amount of anti-seize compound to the screw threads and use the screws to secure assembly. Torque to 60 in.-lb (6.8 N m).
9. Follow the instructions in Heater strut replacement on page 69, steps 9 through 15, to reassemble the electronics housing.
10. Apply anti-seize compound to the threads of the cell assembly, hub, and setscrews. Reinstall the hub on the cell assembly. Using pin spanner wrenches, torque to 10 ft-lb (14 N m). If applicable, reinstall the vee deflector, orienting apex toward gas flow. Secure with setscrews and anti-seize compound. Torque to 25 in-lb (2.8 N m).
11. On systems equipped with an abrasive shield, install the dust gaskets with joints 180 ° apart.
12. Follow the instructions in Remove and replace probe on page 64 to install the transmitter to the stack or duct.
13. Turn on power and monitor thermocouple output.

    It should stabilize at 29.3 ±0.2 mV. Set reference air flow at 1 l/min (2 scfh). After the transmitter stabilizes, calibrate the probe. If new components have been installed, repeat calibration after 24 hours of operation.

8.3.6 Diffusion element replacement

The diffusion element protects the cell from particles in process gases. Normally, it does not need to be replaced, because the vee deflector protects it from particulate erosion.

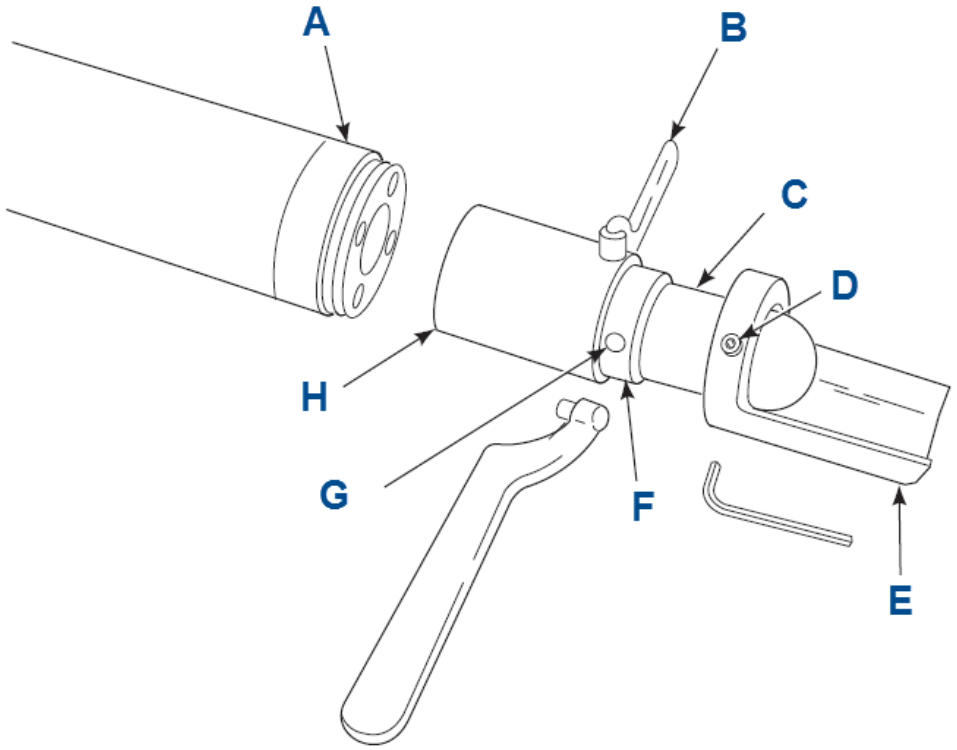
In severe environments, the diffusion element may be broken or subject to excessive erosion. Examine the element whenever removing the probe for any purpose. Replace if damaged.

Damage to the diffusion element may become apparent during calibration. Compare probe response with previous response. A broken diffusion element will cause an inadequate response to calibration gas. Hex wrenches needed to remove setscrews and socket head screws in the following procedure are available as part of a probe disassembly kit, Table 9-1 on page 79.

NOTICE

This refers to the ceramic diffusion element only.

Figure 8-5: Ceramic diffuser element replacement



A. Retainer
B. Spanner wrench
C. Optional ceramic diffusion element
D. Set screw
E. Vee deflector
F. Cement fillet
G. Cement port
H. Hub

1. Follow the instructions in Remove and replace probe on page 64 to remove the probe from the stack or duct.
2. Loosen set screws (D) using the hex wrench from the probe disassembly kit and remove the vee deflector (E). Inspect sets crews. If damaged, replace with stainless sets crews coated with anti-seize compound.
3. Follow the instructions in Remove and replace probe on page 64 to install the probe into the stack or duct.

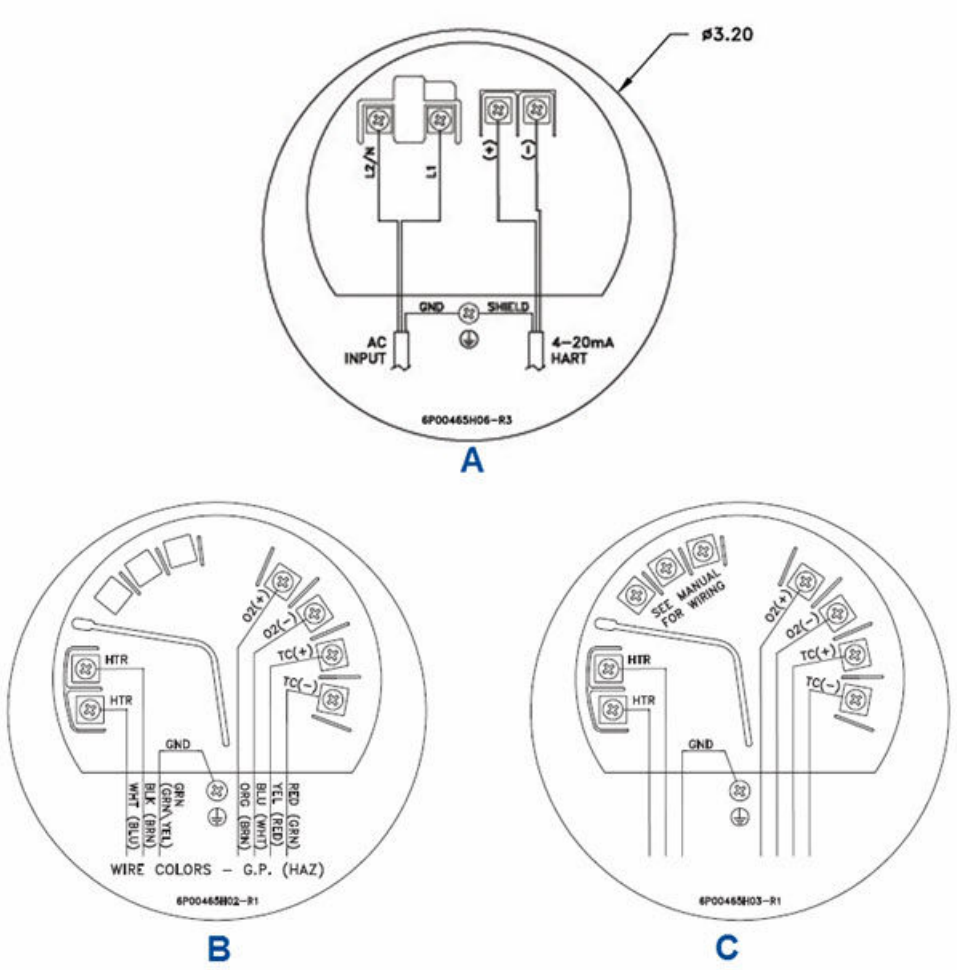
8.3.7 Replace blind cover

This section covers the replacement of the main housing cover and the application of the correct field wiring label.

NOTICE

Field wiring labels are supplied for each product configuration. Ensure the correct label is applied to the inside of the cover that matches your configuration.

Figure 8-6: Field wiring labels



A. Label for full transmitter
B. Label for DR probe
C. Label for DR/YEW probe

1. Remove existing cover from the transmitter housing.
2. Select the new field wiring label that matches the existing label on the inside of the old cover.

   A graphic of each label and its application is shown in Figure 8-6 on page 76.
3. Peel off the backing and attach the new label to the inside of the new cover.
4. Install the new cover onto the housing.

9 Replacement parts

Table 9-1: Replacement Part Kits for O_2 Transmitter

Part Number	Description
6A00448G01	Kit, transmitter board
6A00448G02	Kit, transmitter board with mounting plate and cover
6A00449G01	Kit, DR terminal board
6A00449G02	Kit, DR terminal board with mounting plate and cover
6A00449G10	Kit, DR terminal board, YEW
6A00449G11	Kit, DR terminal board, YEW with mounting plate and cover
6A00452G01	Kit, blind cover, standard, and autocal housing
6A00450G01	Kit, Cell gaskets (pack of five)
6A00451G01	Kit, cover O-rings, standard housing (pack of five)
6A00453G01	Kit, snubber diffuser
6A00453G02	Kit, snubber diffuser with dust seal
6A00453G03	Kit, ceramic diffuser with V-deflector
6A00453G04	Kit, ceramic diffuser with dust seal with V-deflector
6A00453G05	Kit, Hastelloy diffuser with V-deflector
6A00453G06	Kit, Hastelloy diffuser with dust seal with V-deflector
6A00454G01	Kit, strut, 18 inch
6A00454G02	Kit, strut, 3 foot
6A00454G03	Kit, strut, 6 foot
6A00455G01	Kit, cell replacement, 18 inch, standard cell
6A00455G02	Kit, cell replacement, 3 foot, standard cell
6A00455G03	Kit, cell replacement, 6 foot, standard cell
6A00455G11	Kit, cell replacement, 18 inch, acid resistant cell
6A00455G12	Kit, cell replacement, 3 foot, acid resistant cell
6A00455G13	Kit, cell replacement, 6 foot, acid resistant cell
6A00456G01	Flange gasket kit, ANSI, general purpose, (pack of five)
6A00456G03	Flange gasket kit, DIN, general purpose (pack of five)
6A00457G01	Spare transmitter board cover
6A00457G02	Spare DR term board cover
6A00475G01	Tool kit - 6888
1A99119G01	Calibration gas bottles - 0.4% and 8% O_2, balance nitrogen - 550 liters each[1]
1A99119G02	Two flow regulators (for calibration gas bottles)

1A99119G03	Bottle rack

(1) Calibration gas bottles cannot be shipped via air freight.

10 Service support

To expedite the return process outside of the United States, contact the nearest Rosemount™ representative.

Within the United States, call the Emerson™ Instrument and Valves Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers and will provide a Return of Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

A Rosemount™ 6888 product certifications

Rev 1.9

A.1 European Directive information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at Emerson.com/Rosemount.

A.2 Ordinary location certification

As standard, the transmitter 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 marking must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

A.4 Rosemount™ 6888A In-Situ Oxygen Transmitter for General Purpose Locations

A.4.1 USA

FM Certificate	FM17NUS0009X
Standards	FM 3810:2005, ANSI/IEC-250:2003, ANSI/EC 60529:2004
Markings	FM APPROVED Type 4X, IP66

Special conditions for use

1. Type 4X and IP66 applies to the transmitter portion that is mounted externally to the flue duct.

A.4.2 Canada

CSA Certificate 1913435

Standards	CAN/CSA C22.2 No. 61010-1-04, UL 61010-1:2004 (2nd Edition), UL 50 (11th Ed.), IEC 60529 (Edition 2.1-2001-02), NEMA 250-2003
Markings	Type 4X, IP66

A.4.3 Europe

TUVRheinland QAL1 Certificate	0000038506
Standards	EN15267-1:2009, EN15627-2:2009, EN15627-3:2007, EN14181:2004
MCERTS Certificate	Sira MC140270/00
Standards	EN15267-1:2009, EN15627-2:2009, EN15627-3:2007, EN14181:2004

A.5 Rosemount™ 6888C In-Situ Oxygen Transmitter for Hazardous Locations

A.5.1 USA/Canada

Model String Option Code	C
CSA Certificate	70100758
Standards	CAN/CSA Standard C22.2 No.0-10:2015, CAN/CSA C22.2 No.61010-1-12 Harmonized UL 61010-1:2012 (3rd Edition), CAN/CSA Standard C22.2 No. 94.1-15 Harmonized ANSI/UL Standard 50 (2nd Edition), CAN/CSA Standard C22.2 No. 94.2-15 Harmonized ANSI/UL Standard 50 (2nd Edition), CAN/CSA C22.2 No. 60529:16 and ANSI/ISA 60529:04, CAN/CSA Standard C22.2 No. 30-M1986: 2016, CAN/CSA-C22.2 No. 60079-0: 2015, CAN/CSA-C22.2 No. 60079-1:2016, FM 3600:2011, FM 3615:2006, ANSI/UL-60079-0:2013 (6th Edition), ANSI/UL-60079-1:2015 (7th Edition)
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 °C ≤ Ta ≤ +70 °C (Autocal Housing and Probe assembly); -40 °C ≤ Ta ≤ +90 °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 Transmitter.
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_2 Analyzers are used with the 6888 Xi Advanced Electronics, which must be installed in a Non-Hazardous Location, per wiring diagram 6R00131.
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.

A.5.2 Europe

Model String Option Code	A
ATEX Certificate	Sira 14ATEX1031X
Standards	EN 60079-0:2012/A11:2013, EN 60079-1:2014
Markings	Ⓔx II 2 G Ex db IIB+H2 T3 Gb; IP66; -40 °C ≤ Ta ≤ +70°C (Autocal Housing and Probe assembly); -40 °C ≤ Ta ≤ +90°C (Standard Housing and Probe assembly eq. “DR Probe”)

Special conditions for safe use (X):

1. Mounting flange temperatures shall not exceed 190 °C during combustion process.
2. The 6888C O_2 Analyzers are used with the 6888 Xi Advanced Electronics (associated equipment not part of this certification) which must be installed in a Safe Area.
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
Standards	IEC 60079-0:2012/A11:2013, IEC 60079-1:2014

Markings	Ex db IIB+H2 T3 Gb; IP66; -40°C ≤ Ta ≤ +70°C (Autocal Housing and Probe assembly); -40 °C ≤ Ta ≤ +90°C (Standard Housing and Probe assembly eq. “DR Probe”)

Special conditions for safe use (X):

1. Mounting Flange temperature shall not exceed 190 °C during combustion process.
2. The 6888C O_2 Analyzers are used with the 6888 XI Advanced Electronics (associated equipment not part of this certification) which must be installed in a safe area.
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.

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