

6888A O₂ Combustion Flue Gas Transmitter



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Essential Instructions

Read this page before proceeding

Emerson Process Management 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 Rosemount Analytical 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 Process Management 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 your 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.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson Process Management. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, and **VOID YOUR WARRANTY**. Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

The information contained in this document is subject to change without notice.

NOTES

The 375 Field Communicator must be upgraded to System Software 2.0 with Graphic License for operation with the 6888A O₂ Transmitter. The AMS software must be upgraded to AMS 8.0 or above. Contact Emerson Process Management's Global Service Center (GSC) at 1-800-833-8314 to upgrade the 375 Field Communicator software to System Software 2.0 with Graphic License.

About this document

This manual contains instructions for installation and operation of the 6888Xi Advanced Electronics. The following list provides notes concerning all revisions of this document.

Rev. Level	Date	Notes
A	8/2013	This is the initial release of the product manual. The manual has been reformatted to reflect the Emerson documentation style and updated to reflect any changes in the product offering.

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Section i: Introduction

Preface

The purpose of this manual is to provide information concerning components, functions, installation and maintenance of the 6888A O₂ Transmitter.

Some sections may describe equipment not used in your configuration. The user should become thoroughly familiar with the operation of this module before operating it. Read this instruction manual completely.

Definitions

The following definitions apply to WARNINGS, CAUTIONS, and NOTES found throughout this publication.

WARNING

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

NOTE

Highlights an essential operating procedure, condition, or statement.

Symbols

-  : EARTH (GROUND) TERMINAL
-  : PROTECTIVE CONDUCT OR TERMINAL
-  : RISK OF ELECTRICAL SHOCK
-  : WARNING: REFER TO INSTRUCTION MANUAL

NOTE

The number in the lower right corner of each illustration in this publication is a manual illustration number. It is not a part number, and is not related to the illustration in any technical manner.

Overview

The 6888A is Rosemount Analytical's latest in-situ probe offering intended for combustion flue gas service. Similar to our previous World Class and Oxymitter probes, there is no sampling system. The sensing cell is mounted to the end of a probe (18", 3', 6', 9', or 12' long) that is directly inserted into the flue gas stream.

The sensing cell is of similar design to the World Class and Oxymitter cells, utilizing the zirconium oxide sensing principle. The cell is heated and maintained at a 736°C (1357°F) setpoint, and generates a logarithmic MV signal proportional to the partial pressure difference of oxygen between the reference side of the cell (usually instrument air at 20.95% O₂), and the process side of the cell (usually combustion flue gasses). For more information on sensing cell operation, see the Overview of Operating Principles in Section 4: Troubleshooting.

Technical Support Hotline

For assistance with technical problems, please call the Customer Support Center (CSC).

Phone: 1-800-433-6076 1-440-914-1261

In addition to the CSC, you may also contact Field Watch. Field Watch coordinates Emerson Process Management's field service throughout the U.S. and abroad.

Phone: 1-800-654-RSMT (1-800-654-7768)

e-mail: GAS.CSC@emerson.com

web: www.raihome.com

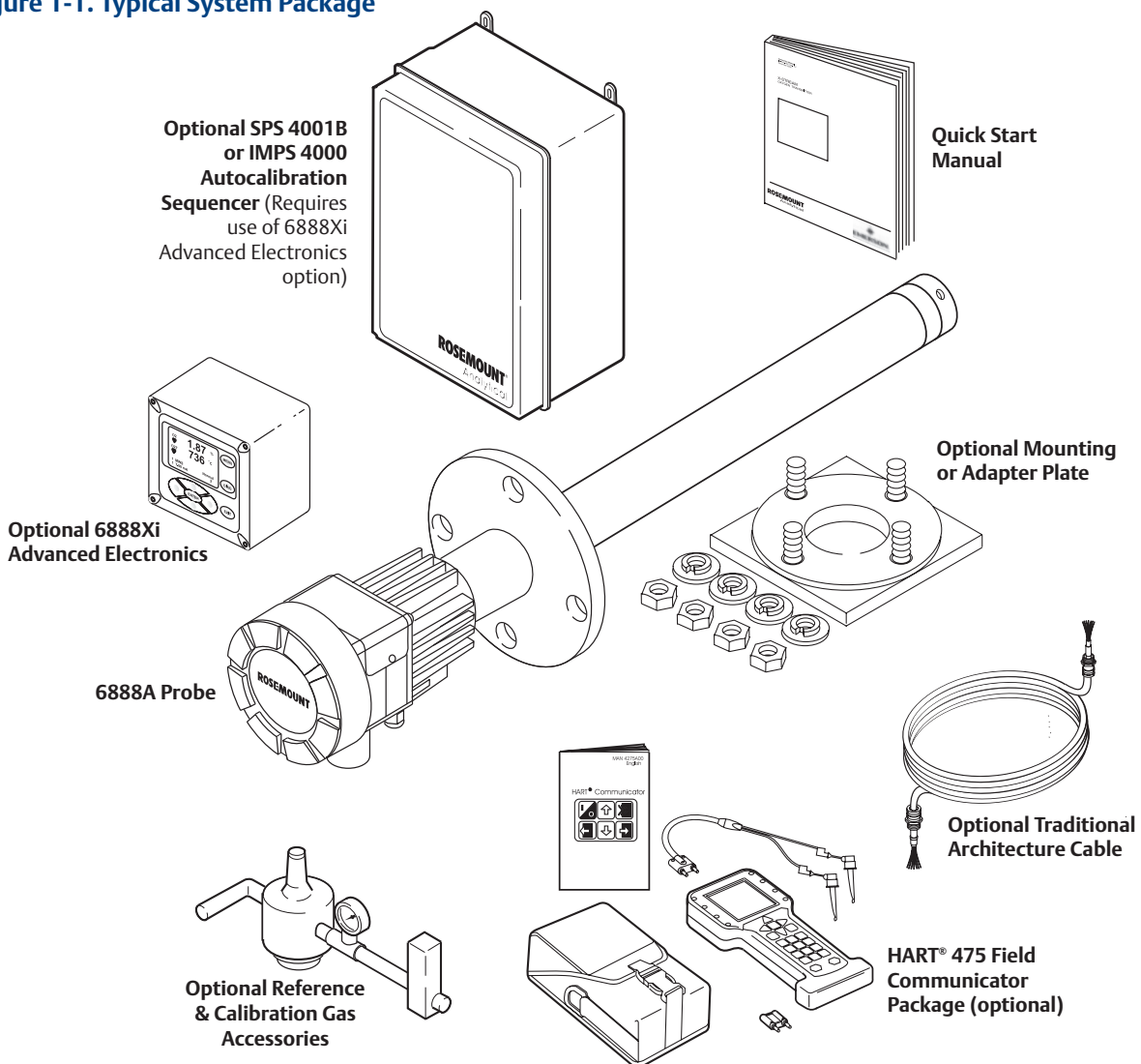
Section 1: Description and Specifications

1.1 Component Checklist

A typical Rosemount Analytical 6888A O₂ Combustion Flue Gas Transmitter should contain the items shown in Figure 1-1. A complete Oxygen Analyzer system will include some or all of the equipment shown. However, this manual describes the 6888A Transmitter only. Record the part number, serial number, and order number for the 6888A Transmitter in the table located on the back cover of this manual.

Also, use the product matrix (Table 1-1) at the end of this section to compare your order number against your unit. The first part of the matrix defines the model. The last part defines the various options and features of the 6888A. Ensure the features and options specified by your order number are on or included with the unit.

Figure 1-1. Typical System Package



1.2 System Overview

1.2.1 Scope

This Instruction Manual is designed to supply details needed to install, start up, operate, and maintain the 6888A O₂ Transmitter system. Signal conditioning electronics outputs a 4-20 mA signal representing an O₂ value. This information, plus additional details, can be accessed with the hand-held HART Model 475 Field Communicator or Asset Management Solutions (AMS) software. Also, a fully functional 6888Xi Advanced Electronics (optional) for setup, calibration, diagnostics, and enhanced features is available.

The 6888Xi communicates with the probe transmitter electronics via HART communications riding on the 4 to 20 mA signal coming from the transmitter. This communication will be disrupted if a 375 Field Communicator is connected to this circuit. Connect the field communicator only to the 4 to 20 mA signal loop between the 6888Xi Advanced Electronics and the control room or data acquisition system.

1.2.2 System Description

The 6888A O₂ Transmitter is designed to measure the net concentration of oxygen in an industrial combustion process; i.e., the oxygen remaining after all fuels have been burned. The probe utilizes an "in situ" zirconium oxide sensor placed on the end of a permanently mounted probe that is positioned within an exhaust duct or stack. There is no sampling system required.

The equipment measures oxygen percentage by reading the voltage developed across a heated electrochemical cell, which consists of a small yttria stabilized, zirconia disc. Both sides of the disc are coated with porous metal electrodes. When operated at an elevated temperature the millivolt output voltage of the cell is given by the following Nernst equation:

$$EMF = KT \log_{10}(P1/P2) + C$$

Where:

1. P2 is the partial pressure of the oxygen in the measured gas on one side of the cell.
2. P1 is the partial pressure of the oxygen in the reference air on the opposite side of the cell.
3. T is the absolute temperature.
4. C is the cell constant.
5. K is an arithmetic constant.

NOTE

Clean, dry, instrument air (20.95% oxygen) is required as reference air.

When the cell is at operating temperature and there are unequal oxygen concentrations across the cell, oxygen ions will travel from the high oxygen partial pressure side to the low oxygen partial pressure side of the cell. The resulting logarithmic output voltage is approximately 50 mV per decade. The output is proportional to the inverse logarithm of the oxygen concentration. Therefore, the output signal increases as the oxygen concentration of the sample gas decreases. This characteristic enables the 6888A O₂ Transmitter to provide exceptional sensitivity at low oxygen concentrations found in combustion flue gases.

NOTE

1 Since the sensing cell is heated, and utilizes platinum electrodes that have catalyzing properties, the 6888A O₂ Transmitter cell will burn any residual fuel remaining in the flue gases from incomplete combustion components (usually CO). This secondary combustion at the sensing cell will consume a portion of any remaining oxygen ($2\text{CO} + \text{O}_2 > 2\text{CO}_2$), and measures the net oxygen remaining after this secondary combustion inside the cell occurs.

If your combustion process contains significant CO, or other residual fuel components, the Oxygen reading may be depressed, or read zero.

The sensor cell will read the O₂ concentration as a percentage of the total volume of flue gases including water vapor. Therefore, it may be considered an analysis on a "wet" basis. In comparison with older methods such as the portable apparatus, which provides an analysis on a "dry" gas basis, the "wet" analysis will, in general, indicate a lower percentage of oxygen. The difference will be proportional to the water content of the sampled gas stream.

The transmitter electronics controls probe temperature and provides an isolated 4-20 mA output that is proportional to the measured oxygen concentration. The probe heater can accept voltages of 120/240 VAC \pm 10% and 50/60 Hz. Therefore, no setup procedures for power are required. The oxygen sensing cell is maintained at a constant temperature by modulating the duty cycle of the probe heater portion of the electronics. The electronics accepts millivolt signals generated by the sensing cell and the thermocouple produces the outputs to be used by the users computer or data acquisition system. The output is an isolated 4-20 mA linearized current.

1.2.3 System Features

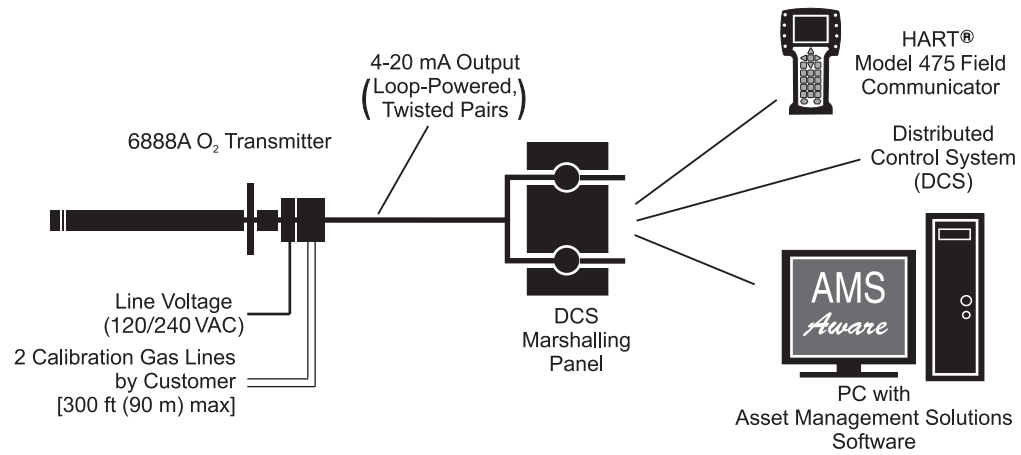
1. The cell output voltage and sensitivity increase as the oxygen concentration decreases.
2. HART communication is standard; to use the HART capability you must have either:
 - a. 375/475 Field Communicator.
 - b. Asset Management Solutions (AMS) software for the PC.
3. Optional 6888Xi Advanced Electronics allows continuous O₂ display and full interface capability.
4. Field replaceable cell, heater, thermocouple, and diffusion element.
5. The 6888A is constructed of rugged 316L or 304 stainless steel for all wetted parts.
6. The heater is adaptable for line voltages from 120/240 VAC \pm 10%; therefore, no configuration of heater voltage is necessary.

1.2.4 System Configurations

Integral Transmitter Electronics, HART Communications

6888A O₂ probes are available in lengths of 18", 3', 6', 9', and 12'. The blue electronics housing contains a signal conditioning electronics to control the cell heater, and to condition the raw cell signal into a linear 4-20 mA signal, with HART digital communications. This arrangement has no display or keypad, and depends on a HART 475 communicator or AMS for configuring the electronics, calibrating the probe, displaying O₂ information, and diagnosing probe problems. This 6888A configuration is represented in Figure 1-2.

Figure 1-2. 6888A with Integral Transmitter Electronics

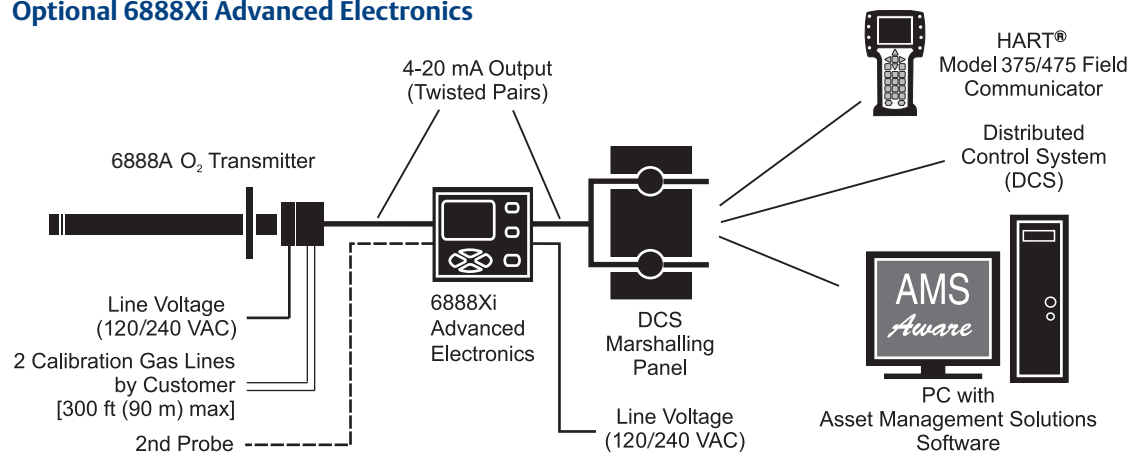


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Integral Transmitter Electronics, HART and 6888Xi Advanced Electronics

The optional 6888Xi (Figure 1-3) provides a local display/keypad for setting up, calibrating, and displaying O₂, and for diagnosing probe problems. The 6888Xi also offers additional features including a "Calibration Recommended" diagnostic, fully automatic calibration, optional flame safety interface (single probe version only), extended process temperature capability, stoichiometer, and programmable reference. These additional features will be discussed in other sections of this manual. The 6888Xi can be purchased to operate a single probe, or as a dual channel unit to run two probes.

Figure 1-3. 6888A with Integral Transmitter Electronics and Optional 6888Xi Advanced Electronics

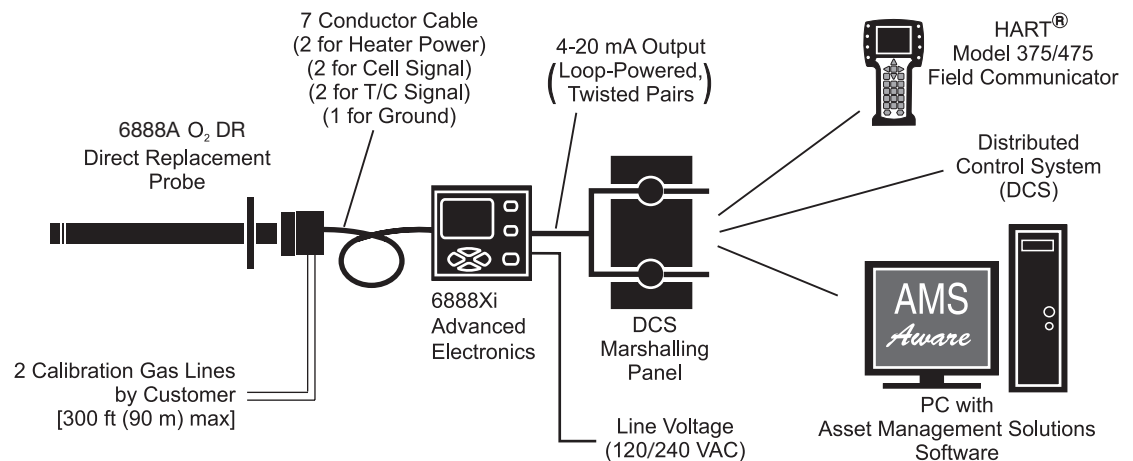


Traditional Architecture, HART and 6888Xi Communications

Some customers prefer not to mount electronics onto the probe, so a "traditional architecture" version is offered. This probe sends raw millivolt signals via a 7-conductor cable to a 6888Xi electronics (Figure 1-4) which does all heater control and signal conditioning in addition to its display/keypad functions. The optional 6888Xi Advanced Electronics is offered to support direct replacement probes with either 120 volt.

The 6888A Direct Replacement (DR) probe can be used with other legacy or current Rosemount Analytical/Westinghouse electronics or most other competitor's electronics. Contact Rosemount Analytical Customer Support Center at 1-800-433-6076 (US) or 1-440-914-1261 (International) for more information.

Figure 1-4. Direct Replacement Probe With Traditional Architecture Electronics



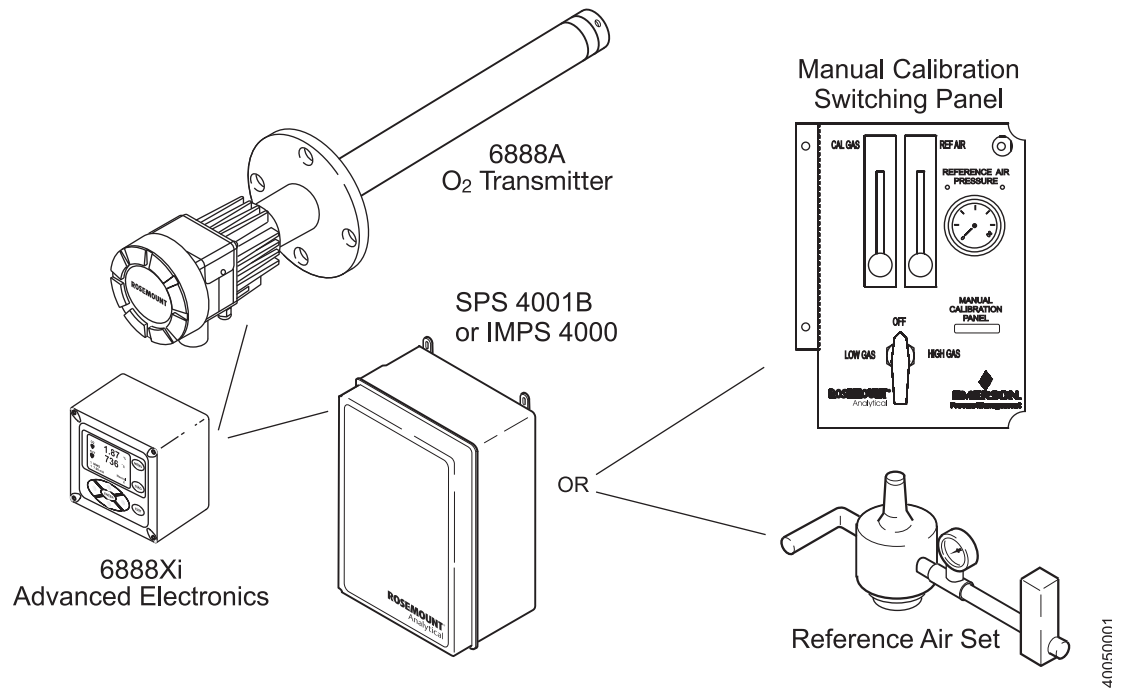
1.2.5 Automatic Calibration

Calibrations consist of introducing bottled gases of known value into the probe so the electronics can make automatic adjustments to the O₂ readings to match the bottled gas value. 0.4% O₂ and 8% O₂ (balance nitrogen) gases are recommended. Never use nitrogen or instrument air as calibration gases. Flowmeters (for calibration gases) and regulators and flowmeters (for reference air) are available as loose components, mounted into an optional manual calibration switching panel, or as a fully automatic calibration system (Figure 1-5) where calibration solenoids are switched from the 6888Xi Advanced Electronics. See IM-106-340AC, SPS 4000B Single Probe Autocalibration Sequencer or IM-106-400IMPS, IMPS 4000 Intelligent Multiprobe Test Gas Sequencer, for additional details.

1.2.6 Communication Options

6888A communications are accomplished by a customer-supplied 375/475 Field Communicator and/or the optional 6888Xi Advanced Electronics. Graphic displays are available via the optional OxyBalance Display and Averaging System.

Figure 1-5. 6888A with 6888Xi Advanced Electronics and Autocalibration Sequencer



Data Communications

An operator can configure and diagnostically troubleshoot the 6888A in one of two ways:

1. Using the optional 6888Xi Advanced Electronics allows local communication with the electronics. The 6888Xi also carries the following optional advanced features:
 - Fully automatic calibration
 - Optional flame safety interface (single probe version only)
 - High temperature operation [above 700°C (1292°F) standard temperature].
 - Stoichiometer feature provides the ability to indicate O₂ efficiency when the combustion process goes into reducing conditions (0% O₂).
 - Programmable reference provides enhanced accuracy when measuring at or near O₂ level (20.95% O₂).
 - Plugged diffuser diagnostic to detect fouled diffuser.
2. Using the HART Interface, the 6888A's 4-20 mA output line transmits an analog signal proportional to the oxygen level. The HART output is superimposed on the 4-20 mA output line. This information can be accessed through the following:
 - Rosemount Analytical 375/475 Field Communicator - The handheld communicator requires Device Description (DD) software specific to the 6888A. The DD software will be supplied with many 375/475 units but can also be programmed into existing units at most Emerson Process Management service offices. See Section 3, Startup and Operation, for additional information.
 - Personal Computer (PC) - The use of a personal computer requires AMS software available from Emerson Process Management.
 - Delta V and Ovation Distributed Control System (DCS) with AMS-inside capability.

- The 6888A can also transmit HART information wirelessly via a wireless THUM Adapter, The THUM Adapter threads into the 6888A conduit port and converts the 4-20 mA O₂ signal to a wireless protocol. All other HART information is also transmitted.

In addition to the wireless THUM Adapter, a hard-wire connection of the 4-20 mA signal to the DCS may be used at the same time. More detailed information regarding the application of the THUM Adapter is available in Product Data Sheet 00813-0100-4075.

NOTE

The 375 Field Communicator must be upgraded to System Software 2.0 with Graphic License for operation with the 6888A O₂ Transmitter. The AMS software must be upgraded to AMS 8.0 or above.

Contact Emerson Process Management’s Global Service Center (GSC) at 1-800-833-8314 to upgrade the 375 Field Communicator software to System Software 2.0 with Graphic License.

Optional OxyBalance Display and Averaging System

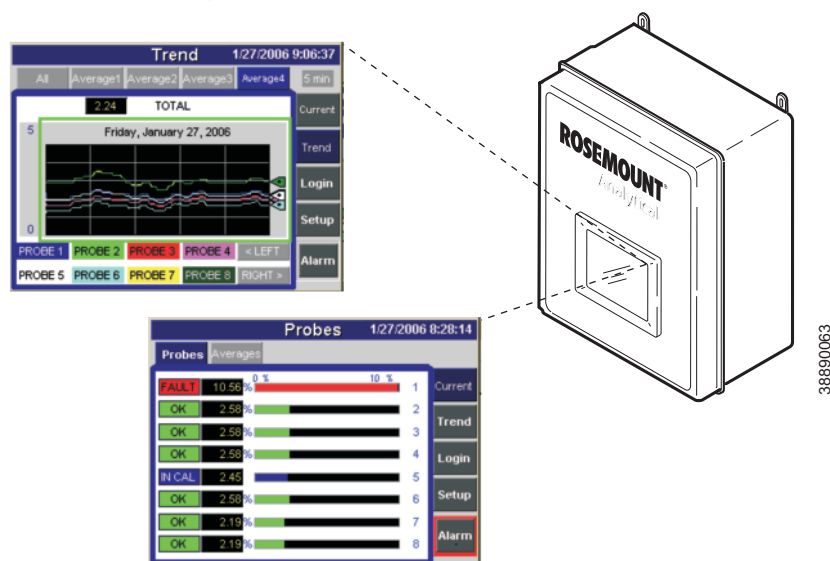
Receives up to eight 4-20 mA signals from individual probes. Trends individual outputs and calculates four programmable averages as additional 4-20 mA outputs. OxyBalance graphic displays are shown in Figure 1-6. See IM-106-4050, OxyBalance Oxygen Display and Averaging System, for additional details.

1.3 Probe Options

1.3.1 Diffusion Elements

The 6888A is available with one of three diffusion elements fitted to the process end. The basic diffusers provide for a constant outer probe tube diameter the full length of the probe. When the 6888A is used with an abrasive shield, the diffuser body has a larger diameter with grooves to

Figure 1-6. OxyBalance displays



accept packing material to seal out fly ash. The snubber and ceramic diffusers may also be fitted with a flash arrestor to reduce the possibility of the probe from igniting flammable gases within the process.

⚠ WARNING

The diffusers fitted with flash arrestors have been tested to provide a measure or protection in preventing ignition of flammable gases. They are not intended to provide flame proof or explosion proof protection for the 6888A.

Snubber Diffusion Assembly

The standard snubber diffusion assembly (Figure 1-7) is satisfactory for most applications, however the snubber diffuser should not be used in flue gas temperatures above 400°C (752°F).

Ceramic Diffusion Assembly

The ceramic diffusion assembly (Figure 1-8) is the traditional design for the probe. Used for over 25 years, the ceramic diffusion assembly provides a greater filter surface area.

Cup-Type Diffusion Assembly

The cup-type diffusion assembly (Figure 1-9) is typically used in high temperature applications where frequent diffusion element plugging is a problem. The cup-type diffusion assembly is available with a 40 micron, sintered, Hastelloy element.

Figure 1-7. Snubber Diffusion Assembly



Figure 1-8. Ceramic Diffusion Assembly

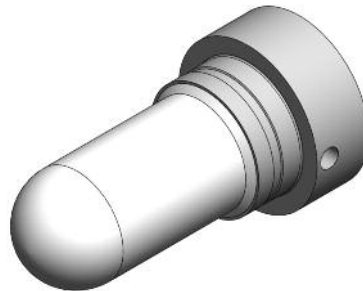


Figure 1-9. Hastelloy Cup-Type Diffusion Assembly

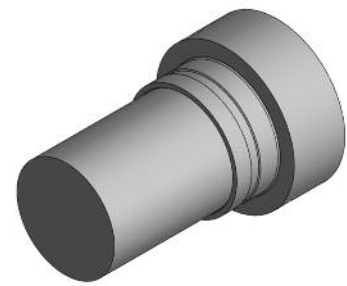


TABLE 1-1. Calibration Glass

Part Number	Description
1A99119G01	Two disposable calibration gas bottles - 0.4% and 8% O ₂ , balance nitrogen - 550 liters each*
1A99119G02	Two flow regulators for calibration gas bottles
1A99119G03	Bottle rack

* Calibration gas bottles cannot be shipped via airfreight.

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

Table 1-2. 6888A Product Matrix

6888A	O ₂ Transmitter
-------	----------------------------

Code	Measurement
1OXY	Oxygen, Standard Sensing Cell
2OXY	Oxygen, Acid Resistant Stoichiometric Sensing Cell

Code	Probe Length*
1	18" Probe, Standard Probe Tube
2	18" Probe, Standard Probe Tube with Abrasive Shield
3	18" Probe, Abrasion Resistant Probe Tube
4	3' Probe, Standard Probe Tube
5	3' Probe, Standard Probe Tube with Abrasive Shield
6	3' Probe, Abrasion Resistant Probe Tube
7	6' Probe, Standard Probe Tube
8	6' Probe, Standard Probe Tube with Abrasive Shield
9	6' Probe, Abrasion Resistant Probe Tube
A	9' Probe, Abrasion Resistant Probe Tube
B	12' Probe, Abrasion Resistant Probe Tube

Code	Diffuser
1	Snubber (500°C)
2	Ceramic (825°C)
3	Haselloy (700°C)

Code	Housing & Electronics
1HT	Standard Housing, Transmitter Electronics, HART
5DR	Standard Housing, Direct Replacement, No Electronics
6DRY	Standard Housing, Direct Replacement, YEW Electronics

Code	Mounting Plate
00	None
04	New Installation - Square Weld Plate with ANSI 2" - 150# Studs & Flange
05	New Installation - Square Weld Plate with DIN Studs & Flange
06	New Installation - Variable Insertion Mount; Abrasion Resistant Probe Only
07	New Installation - Variable Insertion Mount; Mounted to Existing OXT/WC Abrasive Shield Mounts; Abrasion Resistant Probe Only
08	Adapter to Existing ANSI 3", 150# Flange
09	Adapter to Existing ANSI 4", 150# Flange
10	Adapter to Existing ANSI 6", 150# Flange
11	Adapter to Existing ANSI 3", 300# Flange
12	Adapter to Existing ANSI 4", 300# Flange
99	Special Adapter

Code	Manual Calibration Accessories
00	None
01	Calibration & Reference Gas Flowmeters & Reference Regulator/Filter
02	Calibration/Reference Panel

* Probes supplied with flanges with dual ANSI/DIN hole pattern.

1.4 Transmitter Specifications

Measurement Specifications

Net O₂ Range: 0 to 50% O₂ user scalable, -2 to 50% O₂ user scalable with stoichiometer

Accuracy in Oxidizing Conditions: ±0.75% of reading or 0.05% O₂ whichever is greater

Lowest Detectable Limit: 0.01% O₂

Signal Stability: ±0.03% O₂

Process Temperature Effect: less than 0.05% O₂ from 100° to 700°C (212° to 1292°F)

System Speed of Response to Calibration Gas: Initial response in less than 3 seconds T_∞ in less than 8 seconds Response to process gas changes will vary depending on velocity and particulate loading of the diffuser

Calibration Validity: Presentation of calibration gases matches the normal process to within ±0.02% O₂

Accuracy in Reducing Conditions: ±10% of reading or 0.1% O₂

System Response in Reducing Conditions:

going from oxidizing to reducing -T90 in 120 seconds

going from reducing to oxidizing -T90 in 30 seconds

Ambient Temperature Effect on Transmitter 4-20 mA Signal: less than 0.005% O₂ per degree Celsius

Environmental Specifications

Transmitter Probe: Process-wetted materials are 316L or 304 Stainless

Process Temperature Limits: 0° to 800°C (32° to 1472°F), 0° to 705°C (32° to 1300°F) 550° to 825°C (1022° to 1517°F)* with 6888Xi “heaterless operation” feature

*Reduced cell life can be expected if operated continuously at temperatures above 705°C (1300°F) [optional bypass and jacket accessories permit operation to 1050°C (1922°F)]

Transmitter Electronics Housing: Low copper aluminum Type 4X/IP66, with reference air exhaust port piped to clean, dry area

Ambient Temperature Limits:

-40° to 70°C (-40° to 158°F), Transmitter

-40° to 85°C (-40° to 185°F) as measured by electronics -40° to 90°C (-40° to 194°F), DR Probe

Process Mounting Temperature: 200°C (392°F) Maximum

General Purpose Certifications:



Installation Specifications

Probe Mounting: Flanged, ANSI/DIN, Non-Pressure Rated Vertical or Horizontal

Probe Lengths and Approximate Shipping Weights:

18 in (457 mm)	25 lbs. (11,3 Kg)
3 ft (0,91 m)	27 lbs. (12,2 Kg)
6 ft (1,83 m)	38 lbs. (17,2 Kg)
9 ft (2,74 m)	70 lbs. (31,8 kg)
12 ft (3,66 m)	91 lbs. (41,3 kg)

Reference Air: 2 scfh (1 l/min), clean, dry, instrument-quality air (20.95% O₂), regulated to 5 psi (34 kPa) optional but recommended 9ft and longer

Calibration: Semi-automatic or automatic

Cal Gases: 0.4% O₂ and 8% O₂, balance N₂

Calibration Gas Line: 300ft. (91 m) maximum length

Calibration Gas Flow: 5 scfh (2.5l/min) @ 25 psi (172.4 kPa).

Heater Electrical Power: 120/240 VAC ±10%, 50/60 Hz, 260/1020 VA max, 1/2 in. - 14NPT conduit ports

4-20mA/HART Loop Power: 12-30 VDC (Loop power from control room or 6888Xi)

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Section 2: Installation

WARNING

Before installing this equipment read the "Safety instructions for the wiring and installation of this apparatus" at the front of this Instruction Manual. Failure to follow safety instructions could result in serious injury or death.

WARNING

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.

WARNING

The 6888A O₂ Transmitter can be installed in general purpose areas only. Do not install the 6888A Transmitter in hazardous areas or in the vicinity of flammable liquids.

CAUTION

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

2.1 System Considerations

NOTE

All unused ports on the 6888A probe housing should be plugged with suitable fittings.

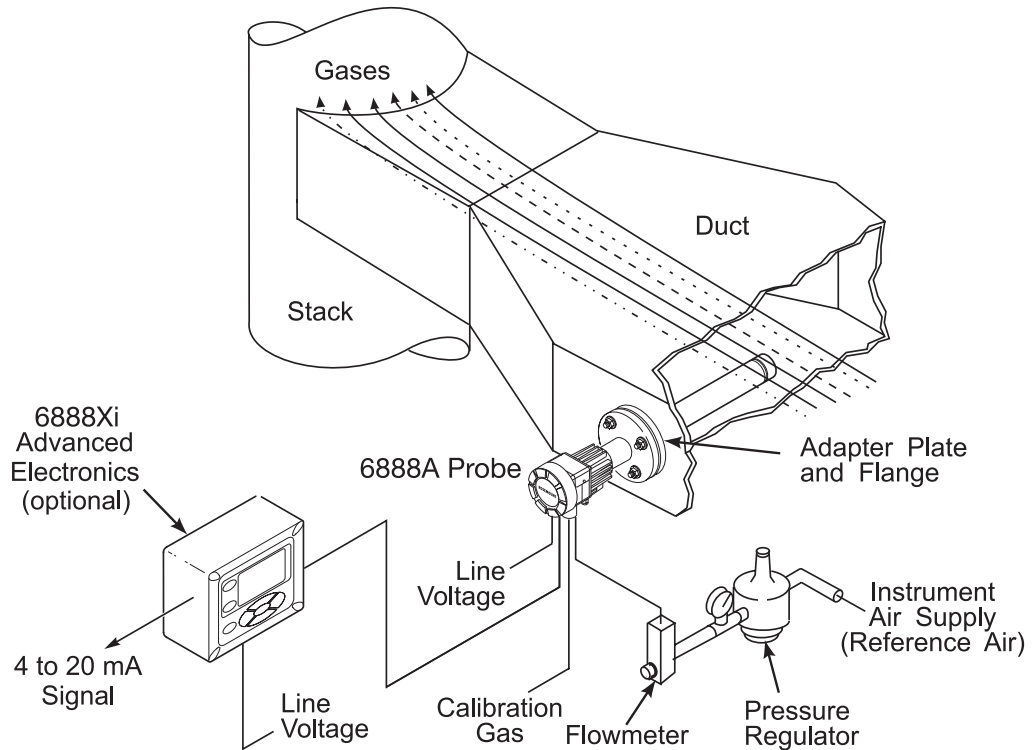
A typical system installation for a 6888A with integral electronics is shown in Figure 2-1.

A source of instrument air is required at the 6888A for reference air flow [2.0 scfh (1.0 l/min)]. Since the unit is equipped with an in place calibration feature, provisions can be made to permanently connect calibration gas bottles to the transmitter.

If the calibration gas bottles will be permanently connected a check valve is required next to the calibration fittings on the probe. This check valve is to prevent breathing of the calibration gas line and subsequent flue gas condensation and corrosion. The check valve is in addition to the stop valve on the calibration gas bottles or the solenoid valves in the SPS 4001B or IMPS 4000.

If the 6888Xi Advanced Electronics option is not used, the 4 to 20 mA signal from the probe will be loop-powered from the DCS. A 375/475 Field Communicator or AMS is required to set up and operate the probe.

FIGURE 2-1. Typical System installation



The optional 6888Xi Enhanced Interface communicates with the probe transmitter electronics via HART communications riding on the 4 to 20 mA signal coming from the transmitter. If using the 375/475 Field Communicator, it must be connected to the 4 to 20 mA signal loop between the 6888Xi and the control room or data acquisition system. Connecting the 375/475 Field Communicator between the transmitter and 6888Xi will cause communication errors and affect system operation.

NOTE

The transmitter electronics is rated Type 4X and IP66 and is capable of operation at temperatures from -40 to 85°C (-40 to 185°F). Retain the packaging in which the 6888A arrived from the factory in case any components are to be shipped to another site. This packaging has been designed to protect the product.

2.2 Mechanical Installation

Selecting Location

1. Figure 2-2 through Figure 2-8 provide reference illustrations for the mechanical installations of the equipment.
2. The location of the 6888A O₂ Transmitter in the stack or flue is most important for maximum accuracy in the oxygen analyzing process. The 6888A must be positioned so the gas it measures is representative of the process. Best results are normally obtained if the 6888A is positioned near the center of the duct (40-60% insertion).
3. Wider ducts may require several 6888A units since the O₂ can vary due to stratification. A point too near the wall of the duct, or the inside radius of a bend, may not provide a representative sample because of the very low flow conditions.

4. The sensing point should be selected so the process gas temperature falls within a range of 0 to 704°C (32 to 1300°F).

⚠ CAUTION

Do not allow the temperature of the 6888A electronics to exceed 85°C (185°F) or damage to the unit may result.

5. The 6888A probe can operate to 850°C (1562°F) with the optional 6888Xi Advanced Electronics, though continued operation at these temperatures will reduce cell and probe life. The temperature of the integral electronics transmitter must not exceed 85°C (185°F) as measured inside the electronics housing.
6. Check the flue or stack for holes and air leakage. The presence of this condition will substantially affect the accuracy of the oxygen reading. Therefore, either make the necessary repairs or install the 6888A probe upstream of any leakage.
7. Ensure the area is clear of internal and external obstructions that will interfere with installation and maintenance. Allow adequate clearance for removal of the 6888A probe.
8. The 6888A is available with optional adapters to allow the probe flange to mate with various existing flanges already in place. A summary of the standard adapters is shown in Table 2-1. All adapters are supplied with gaskets and mounting hardware. Custom adapters are also available for special order. Contact Rosemount Analytical at 1-800-433-6076 for more information.

Table 2-1. Standard Adapter Sizes

Mounting Option Code	Adapter PN	Adapts to:	Diameter In (mm)	Bolt Circle	Mounting Hardware
08	3535B30G04	ANSI 3", 150#	7.50 (191)	6.00 (152)	5/8-11 Flat Hd Screws
09	3535B30G01	ANSI 4", 150#	9.00 (229)	7.50 (191)	5/8-11 Flat Hd Screws
10	3535B30G05	ANSI 6", 150#	11.00 (279)	9.50 (241)	3/4-10 Flat Hd Screws
11	3535B30G10	ANSI 3", 300#	8.66 (219)	6.63 (168)	3/4-10 Flat Hd Screws
12	4851B78G21	ANSI 4", 300#	10.00 (254)	7.88 (200)	3/4-10 Studs

⚠ CAUTION

The probe was specially packaged to prevent breakage due to handling. Do not remove the probe until immediately before installation.

Probe Installation

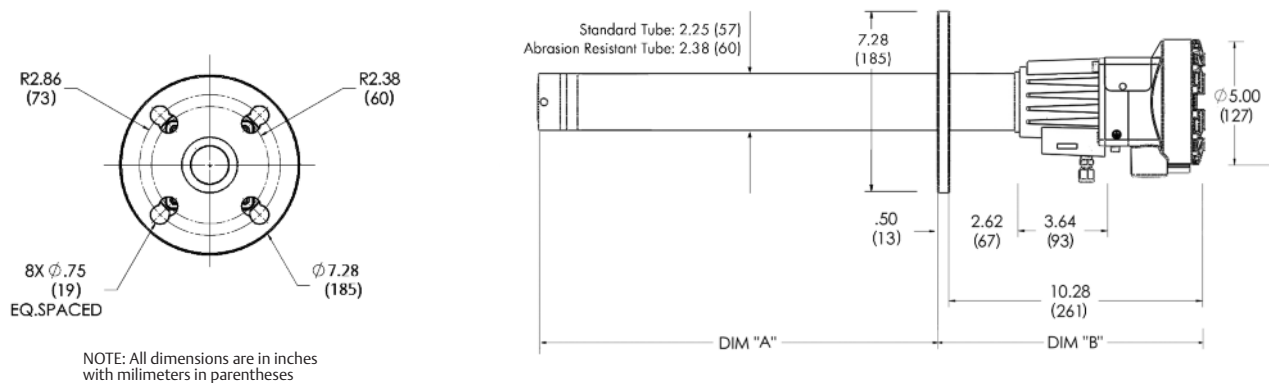
1. Ensure all components are available to install the 6888A O₂ probe. Refer to the probe installation details in Figure 2-2.
2. If using the optional ceramic or Hastelloy diffusion element, the vee deflector must be correctly oriented. Before inserting the 6888A probe, check the direction of gas flow in the duct. Orient the vee deflector so the apex points upstream toward the flow. See Figure 2-3.
3. If using the standard square weld plate or an optional flange mounting plate, weld or bolt the plate onto the duct. The through hole diameter in the stack or duct wall and refractory material must be at least 2-1/2 in. (64 mm).

NOTE

An abrasion-resistant probe tube or traditional abrasive shield is recommended for high velocity particulates in the flue stream (such as those in coal-fired boilers, kilns, and recovery boilers). Vertical and horizontal brace clamps are provided for 9 ft (2,75 m) through 12 ft (3,06 m) probes to provide mechanical support for the 6888A probe.

4. Insert probe through the opening in the mounting flange and bolt the unit to the flange.
5. Long probes installation details are shown in Figure 2-5. When selected probe lengths are 9 ft to 12 ft (2,74 m to 3,66 m), special brace clamps (Figure 2-6) are supplied for use with brace bars to provide additional support for the abrasive shield inside the flue or stack.

FIGURE 2-2. 6888A Probe Installation



Mounting Flange		
	ANSI	DIN
Flange Dia	7.28 (185)	
Hole Dia	.75 (20)	
(4) Holes Eq Sp on BC	4.75 (121)	5.71 (145)

Removal/ Installation*		
Probe Length	DIM "A" Insertion Depth	DIM "B" Removal Envelope
18 IN. (457 mm) Probe	16.10 (409)	15.77 (401)
3 FT. (0.91 m) Probe	32.52 (826)	46.6 (1182)
6 FT. (1.83 m) Probe	68.52 (1740)	82.6 (2097)
9 FT. (2.74 m) Probe	104.52 (2655)	118.6 (3011)
12 FT. (3.66 m) Probe	140.52 (3569)	154.6 (3926)

* Add 3.80 (96) to DIM "A" and DIM "B" for probe with ceramic or Hastelloy diffuser.

FIGURE 2-3. Orienting the Optional Vee Deflector

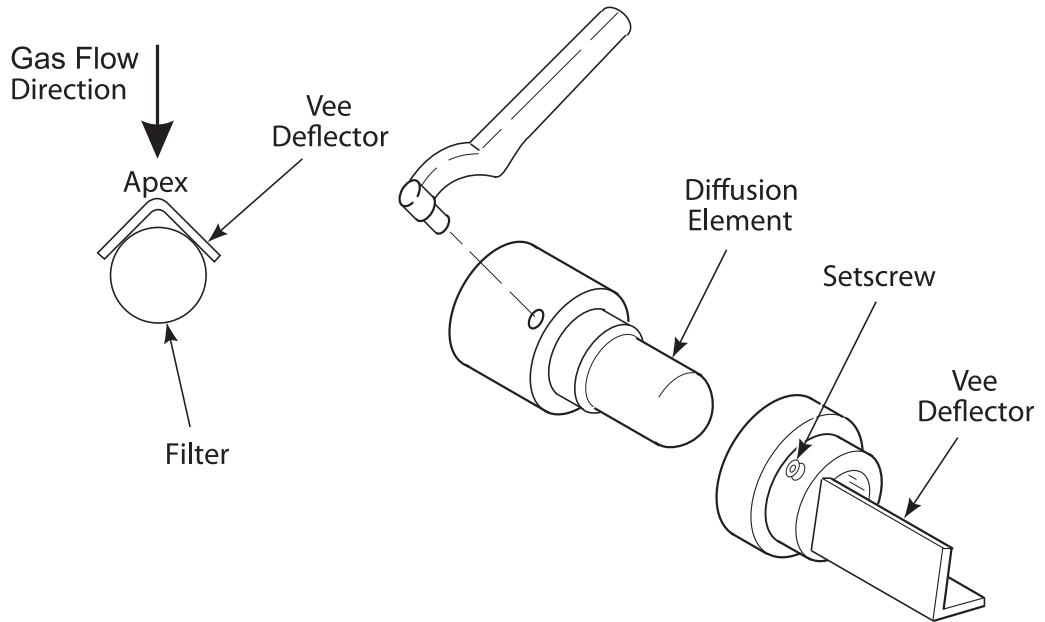


FIGURE 2-4. Optional Adapter Plate

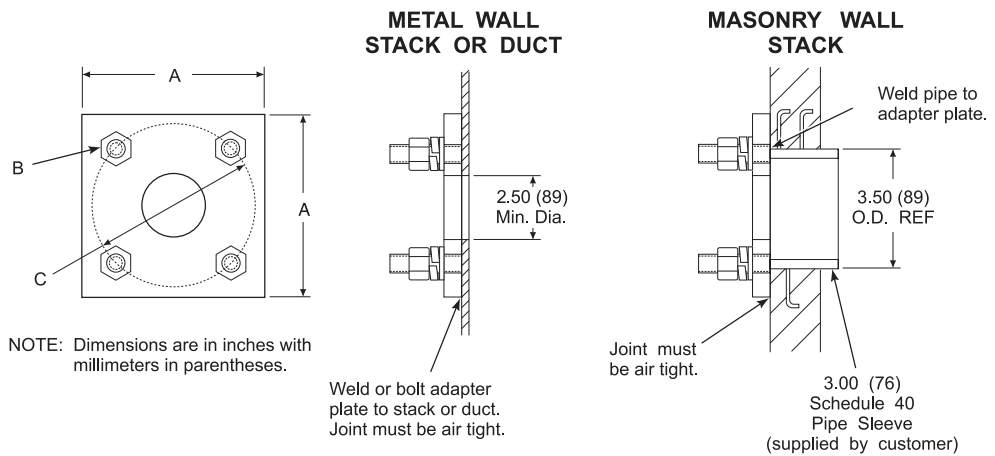


PLATE DIMENSIONS		
DIMENSION	ANSI	DIN
"A"	6.0 (152)	7.5 (191)
"B" THREAD	5/8-11	M16x2
"C" DIA.	4.75 (121)	5.71 (145)

38960006

FIGURE 2-5. Long Probes Installation

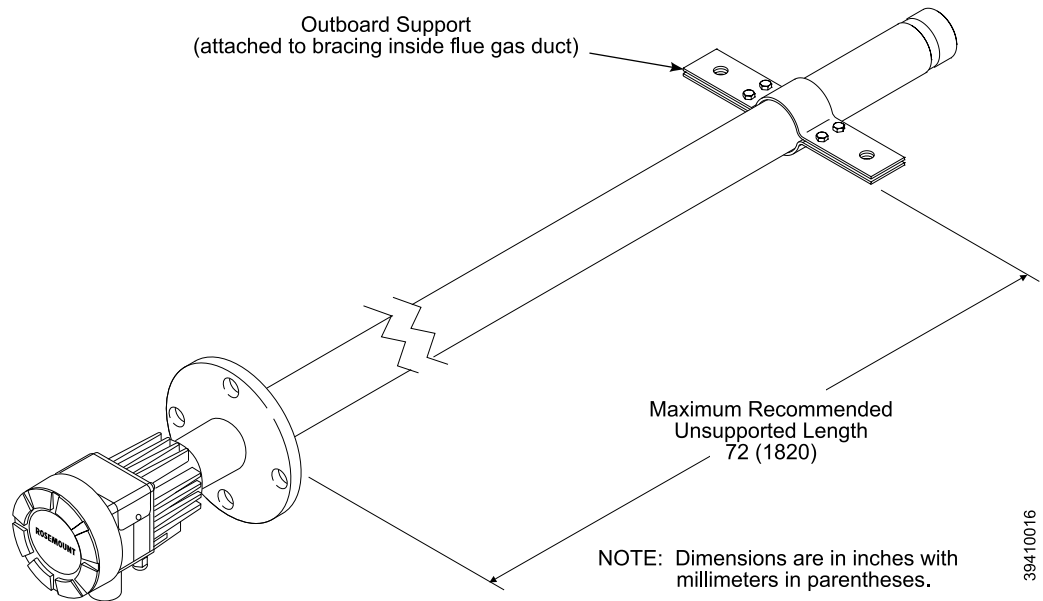


FIGURE 2-6. Bracing Installation for Abrasive Probe Tubes (9' and 12' Lengths)

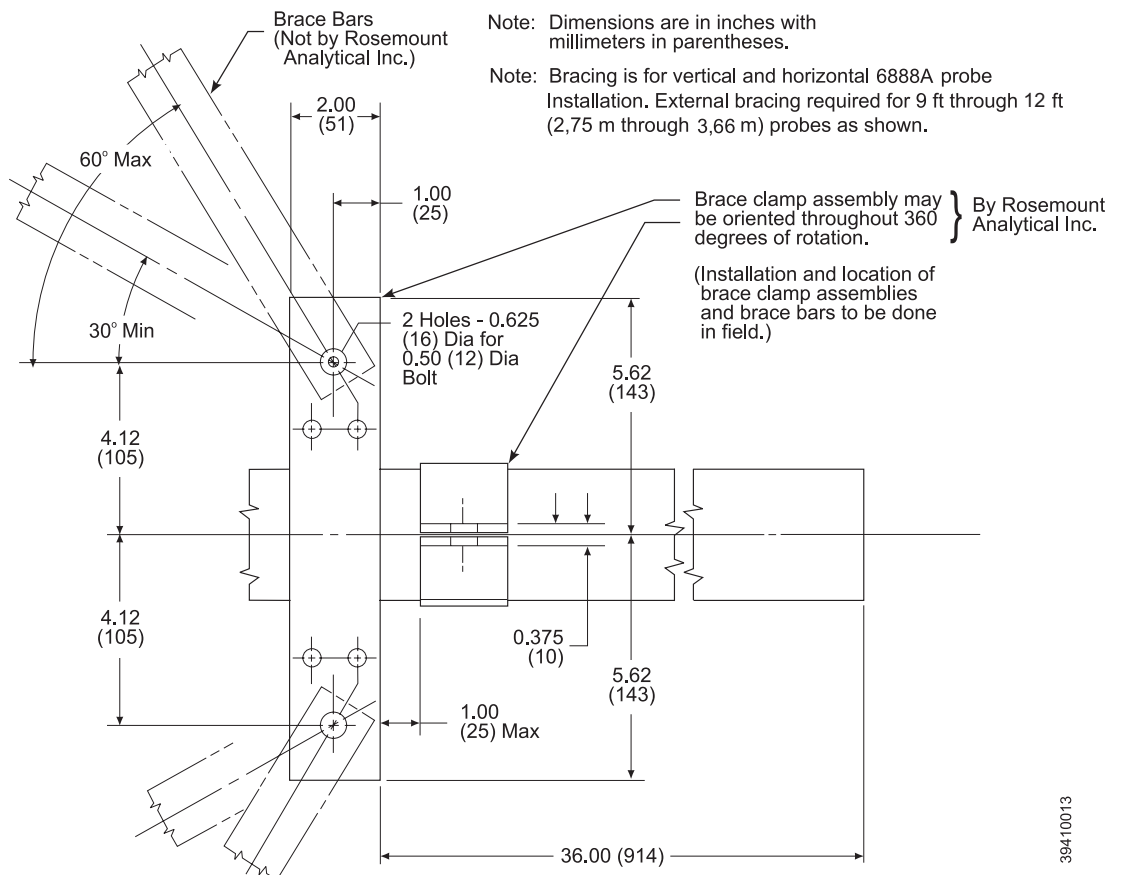
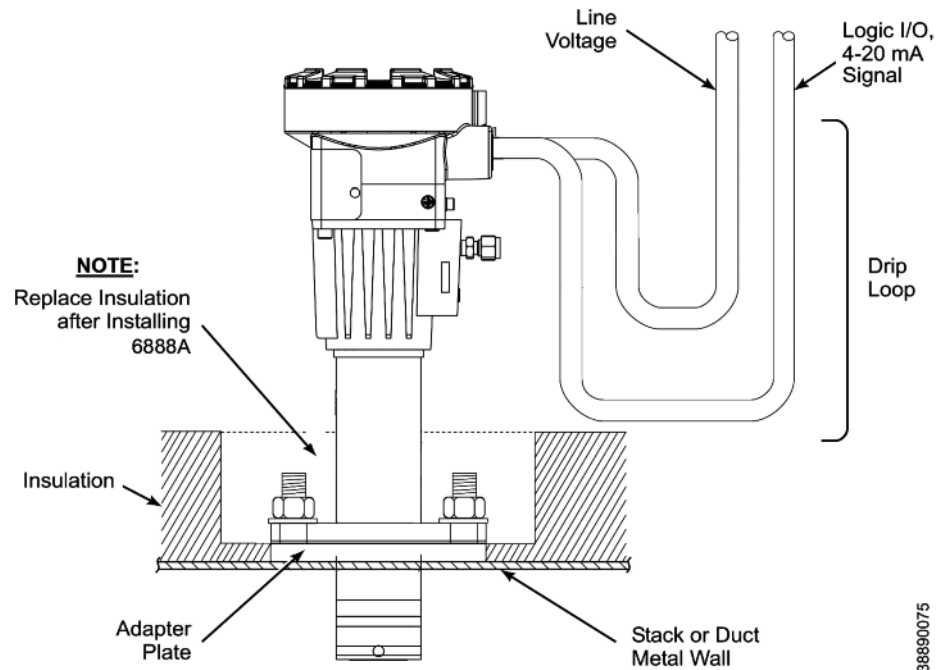


FIGURE 2-7. Installation with Drip Loop and Insulation Removal



6. The electrical conduit ports should be facing down for a horizontal probe installation. In vertical probe installations, orient the probe so the system cable drops vertically from the probe. Ensure the electrical conduit is routed below the level of the circuit card. See Figure 2-7. This drip loop minimizes the possibility that moisture will accumulate in the housing.
7. If insulation was removed to access the duct work for probe mounting, make sure the insulation is replaced afterward. See Figure 2-7.

CAUTION

If the ducts will be washed down during outage **MAKE SURE** to power down the probes and remove them from the wash area.

Variable Insertion

The ideal placement of O₂ probes is often difficult to determine, and the Variable Insertion option is intended to assist in optimizing the ideal probe location.

Variable Insertion Option

The Variable Insertion option (Figure 2-8) permits a probe to be slid into and out of a flue gas duct at infinitely variable depths. This has several advantages over traditional mountings that fix the probe length with a flange at the time of installation:

- One length of probe can be stocked for any length requirement.
- The flue gas duct where the probe is mounted can be profiled with a single long probe while the flue gas levels are trended within the control system. This information can be used to determine the installation "sweet spot" that is most representative of a particular burner column (in the case of wall-fired furnaces), furnace corner (in the case of tangential-fired furnaces), or firing zone (in the case of a fired process heater).

- Process upsets can be diagnosed by again profiling the duct stratification on-line by sliding probe in and out, and recording the O₂ levels at differing insertion depths. This provides a good diagnostic for balancing burners, and tracking down upset conditions caused by sticking burner sleeve dampers, roping in coal pipes, classifier problems, etc.
- A probe can be slid to the most convenient location for a technician to access for the purposes of conducting a calibration, or diagnosing a probe problem.

The variable insertion mount consists of a slip-tube that is mounted to the furnace via a flange or pipe thread. The O₂ probe is slid through this mounting, and the probe outside diameter is sealed to the slip-tube ID via valve packing material. A stop-collar is provided for safety to ensure that a probe in a vertical installation does not creep through the packing material due to gravity after installation. This stop-collar has separate holes where screws can be inserted to jack the probe out of the slip mount if debris builds up on the probe over time. The packing material can be withdrawn with the probe in situations where the buildup on the probe is heavy, and cannot pass through the packing material.

Installation

An installation permitting Variable Insertion requires some special considerations:

- Removal envelope: There must be enough room for the probe to slide in and out.
- Utilities: Since the probe will be operating continuously as it's position is adjusted, the electrical wires and pneumatic tubing must be able to travel with the probe.
- Duct Pressure: Balanced draft and natural draft furnaces typically run at a slightly negative pressure, so any small leaks in the packing material will draw air into the furnace. When the probe is removed for service, a flow of fresh air into the furnace also results. A positive pressure duct, however, will release hot flue gases when the probe is removed.
- Be mindful that the slip-support holding the end of the probe inside the furnace will likely be attached to the internal structure that may grow thermally more than the furnace wall where the probe flange is mounted. A probe that is perfectly aligned with the slip-support(s) during initial installation (with the furnace off) may be out of alignment once the furnace heats up.

CAUTION

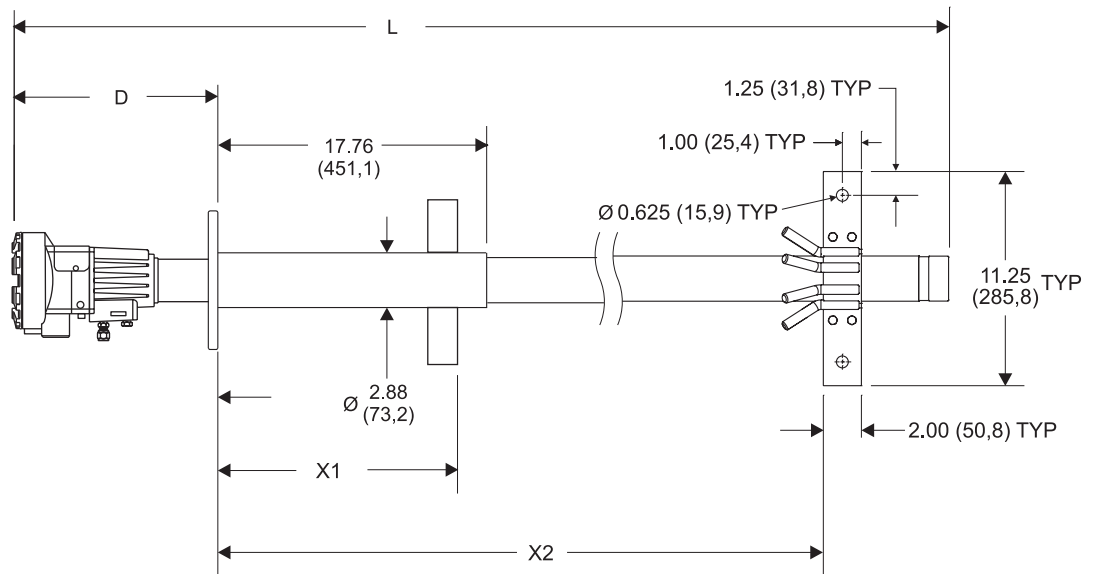
Some flue gas ducts operate under positive pressure. While the packing material will prevent most flue gases from escaping into the ambient environment, some leakage can be expected. Once the probe is fully extracted from the slip-tube, hot flue gases will freely exit the hole in the slip tube until a replacement probe or core plug is inserted. Observe safety precautions when removing or inserting a probe into a furnace operating at a positive pressure.

CAUTION

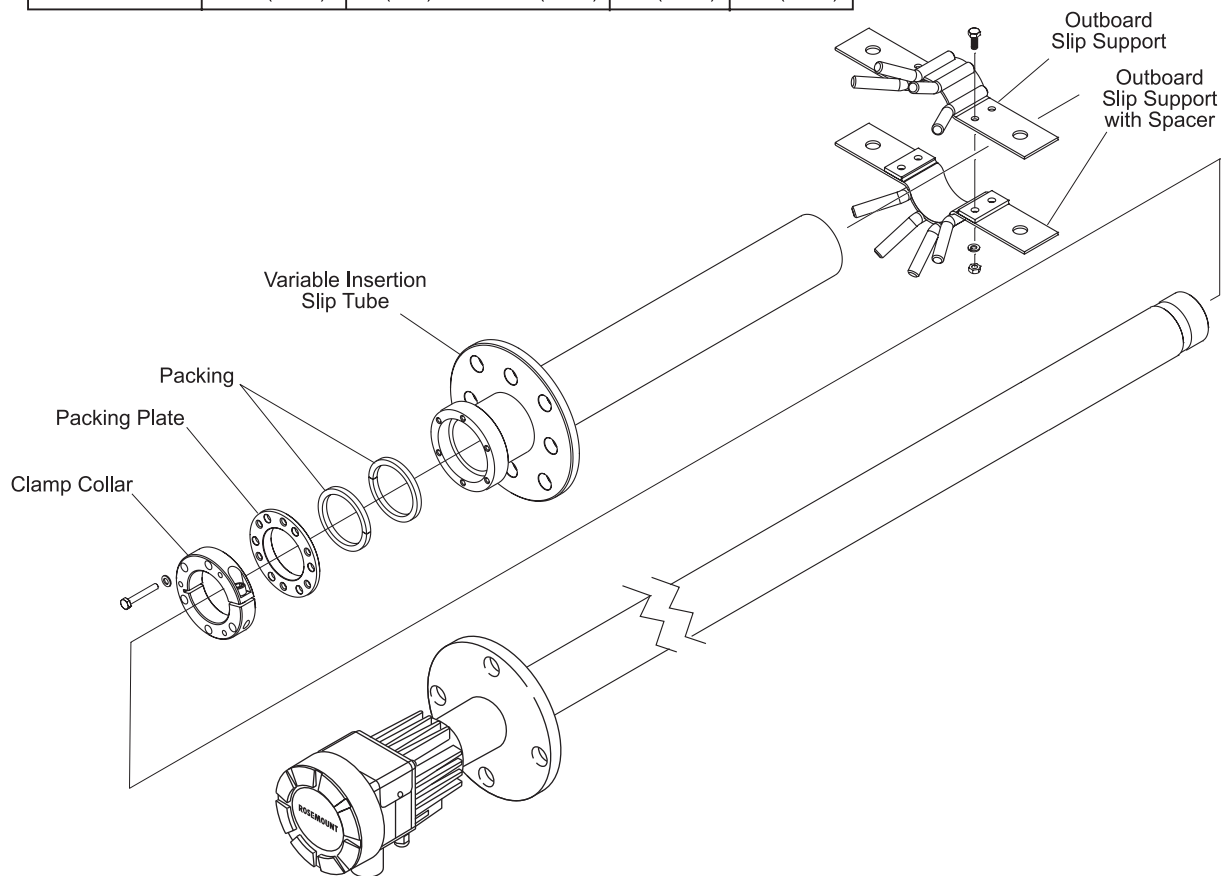
This variable insertion mount is intended for use in negative pressure ducts, and positive pressure ducts where the flue gas pressure is no more than 1 PSI. Emerson offers other systems with isolation valve and pressure balancing for applications where the pressure is up to 50 PSI.

The variable insertion arrangement is set up for 6888A probes with heavy-wall abrasion-resistant probe bodies only. Figure 2-8 shows how the probe inserts through the variable insertion slip tube. For probe lengths of 9 feet and longer, an outboard slip support must be mounted inside the flue gas duct. The support structure may include angle iron or tube bundles that will be at elevated temperatures during use. Plan for thermal expansion when installing the outboard slip support.

FIGURE 2-8. Long Probe Installation



PROBE	L	D	X1 ±2 (51)	X2 ±2 (51)
9 ft. (2,73 m)	118 (2997)	18 (457) < D < 103 (2616)	72 (1829)	—
12 ft. (3,64 m)	154 (3912)	18 (457) < D < 139 (3531)	60 (1524)	120 (3048)



2.3 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.

2.3.1 Transmitter Probe

WARNING

Disconnect and lock out power before connecting the power supply.

WARNING

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

WARNING

To meet the Safety Requirements of IEC 1010 (EC requirement), and ensure safe operation of this equipment, connection to the main electrical power supply must be made through a circuit breaker (min 10A) which will disconnect all current-carrying conductors during a fault situation. This circuit breaker should also include a mechanically operated isolating switch. If not, then another external means of disconnecting the supply from the equipment should be located close by. Circuit breakers or switches must comply with a recognized standard such as IEC 947.

NOTE

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. Refer to Figure 2-9.

NOTE

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

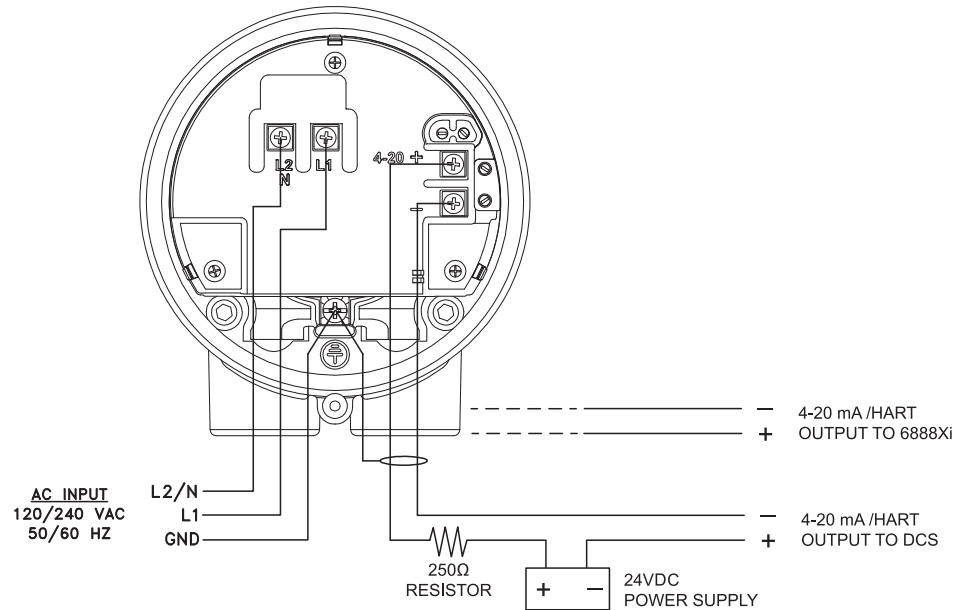
1. Remove the cover from transmitter.
2. Refer to Figure 2-9. Connect the line (L1 wire) to the L1 terminal, the neutral (L2 wire) to the L2/N terminal, and the ground wire to the ground lug. The 6888A accepts 120/240 VAC $\pm 10\%$ line voltage and 50/60 Hz. No setup is required.

NOTE

The 6888A requires external +24VDC for power loop. Loop power can be supplied by an optional 6888Xi, DCS or an external power supply.

3. Connect the 4-20 mA signal wires at the transmitter. Use a shielded twisted wire pair. Do not allow bare shield wires to contact the circuit boards. Insulate the shield wires prior to termination.

FIGURE 2-9. Electrical Installation - 6888A O₂ Transmitter



4. Terminate the shield only at the transmitter electronics housing unless using a 6888Xi. When using the 6888Xi Enhanced Interface, terminate the shield at both ends.

NOTE

The 4-20 mA signal represents the O₂ 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 cover on transmitter.

2.3.2 Direct Replacement (DR) Probe

A direct replacement probe is available for connection to an existing electronics package. Use the following procedure to connect a DR probe to the transmitter electronics.

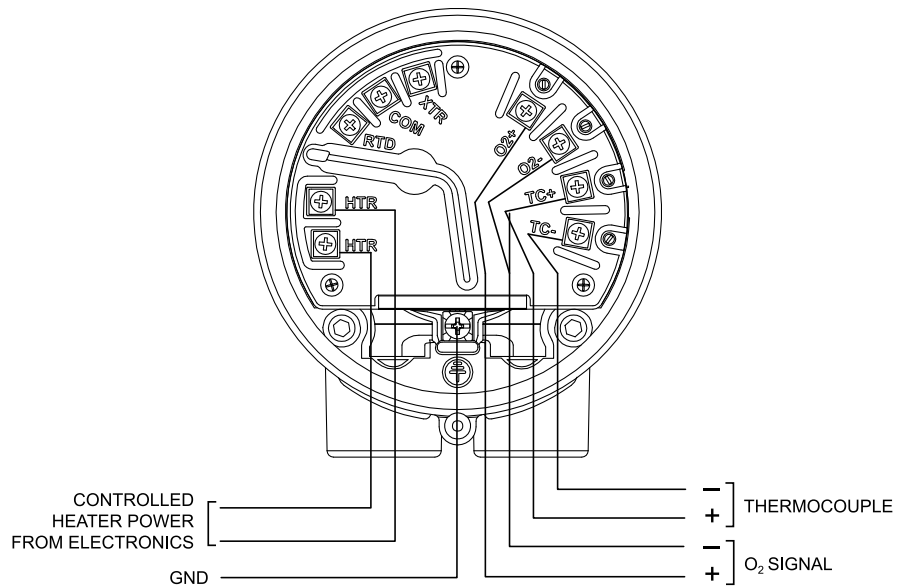
1. Remove covers from probe.
2. Feed all DR probe wiring through line power conduit of probe. Add new lead wire junction box and conduits as needed.

CAUTION

DR Probe heater power must be supplied from the controlling electronics. Do not connect AC line voltage to these terminals – damage to the equipment may result.

3. Connect DR probe heater power leads to DR probe terminals, Figure 2-10.
4. Connect O₂ signal and thermocouple wires to DR probe terminals.

FIGURE 2-10. Electrical installation – 6888A DR Probe



2.3.3 DR Probe to Yokogawa Electronics

The DR probe can be wired to work with Yokogawa electronics. Connect the cabling from the Yokogawa electronics terminal to the probe terminal as shown in Figure 2-11. Review the following information.

Yokogawa used two types of CJC devices in their probes. The older style used a transistor type device and the newer version used a resistance thermocouple device (RTD). Each device performs differently in providing a temperature feedback signal and cannot be interchanged.

The DR probe is provided with two Cold Junction Compensation (CJC) devices for use with Yokogawa electronics. The type of Yokogawa electronics used will dictate which connections should be used in the DR probe.

NOTE

These instructions are not all inclusive of the possible Yokogawa electronics currently in use. Other electronics or CJC devices may exist. Refer to the following instructions as an aid in selecting the proper CJC connections.

FIGURE 2-11. Electrical installation – 6888A DR Probe to YEW Electronics

- NOTES: 1. Heater temperature set to 1380°F (750°C)
2. The greater mass of the 6888 direct replacement probe requires longer time to heat up. Upon startup, the Yokogawa electronics may indicate an error because the probe has not reached temperature setpoint in the normal time. Remove power from the Yokogawa electronics or probe module to clear the error, and restore power. This procedure may have to be repeated a couple of times before probe operating temperature is reached.

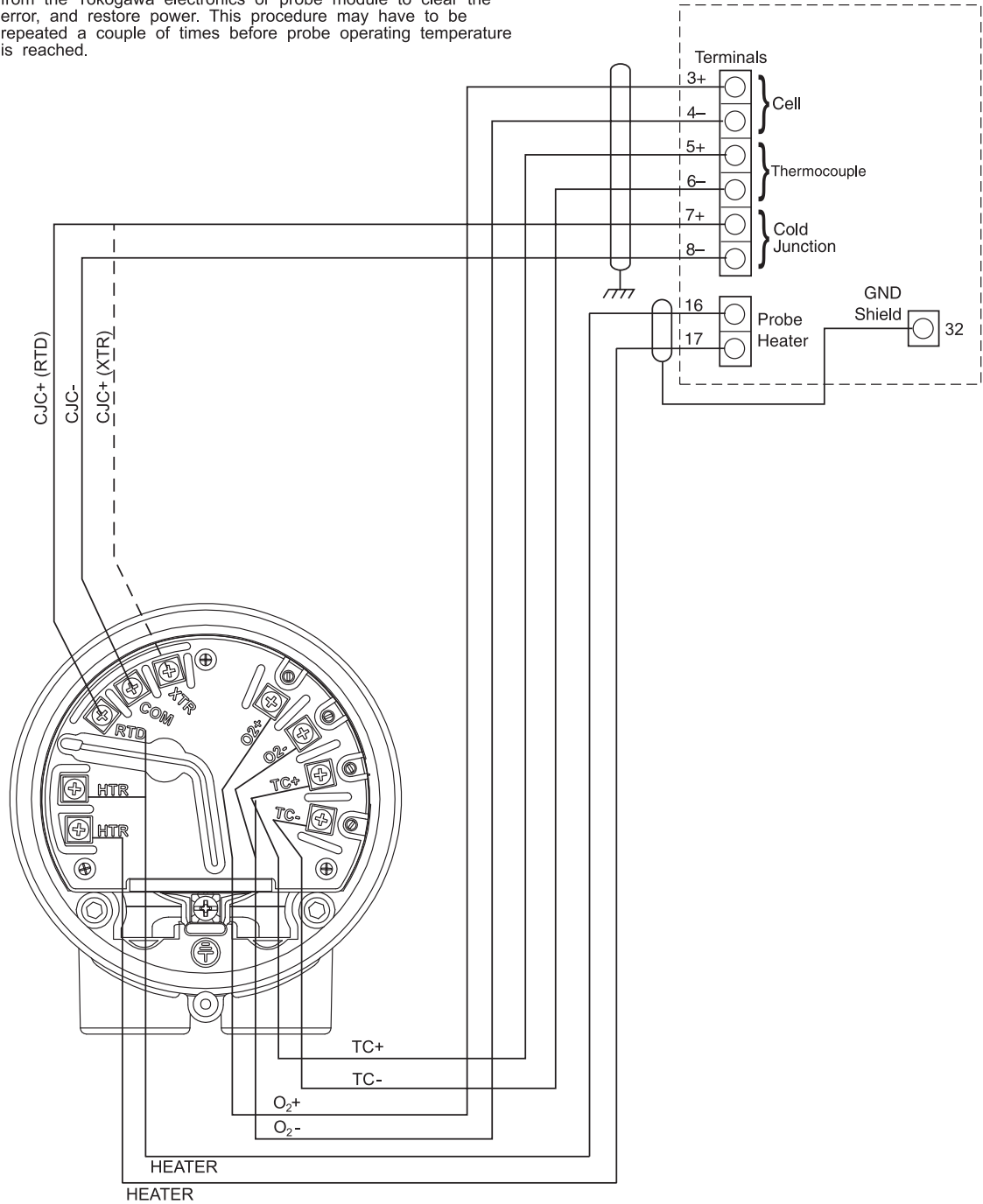


TABLE 2-1. YEW Electronics CJC Applications

Transistor Type CJC

Connections:	COM & XTR
YEW Probes:	Z021D (Suffix varies)
YEW Electronics:	Z8A Averager AV8C Averager AV550 Averager (properly programmed)
Misapplication:	Electronics will read near 25°C at ambient, but the reading will slowly decrease as the temperature rises.

RTD Type CJC

Connections:	COM & RTD
YEW Probes:	ZR22 (Suffix varies)
YEW Electronics:	AV550 Averager (properly programmed) ZR402 Analyzer
Misapplication:	Electronics will read near 200°C at ambient.

2.4 Pneumatic Installation

2.4.1 Reference Air Package

After the 6888A is installed, connect the reference air set to the 6888A unit. Refer to the schematic diagram in Figure 2-23 and the mounting dimensions in Figure 2-12 for a locally assembled reference air supply.

Instrument Air (Reference Air): 5 psi (34 kPa) minimum, 8 psi (54 kPa) maximum at 2.0 scfh (1.0 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 SPS 4001B or IMPS 4000.

FIGURE 2-12. Plant Air Schematic Diagram

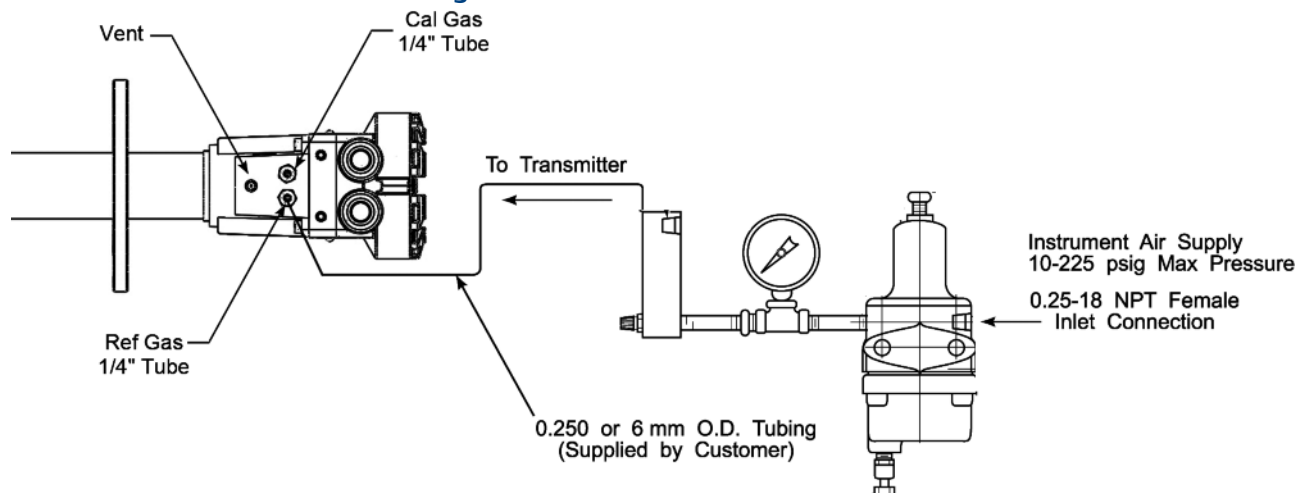
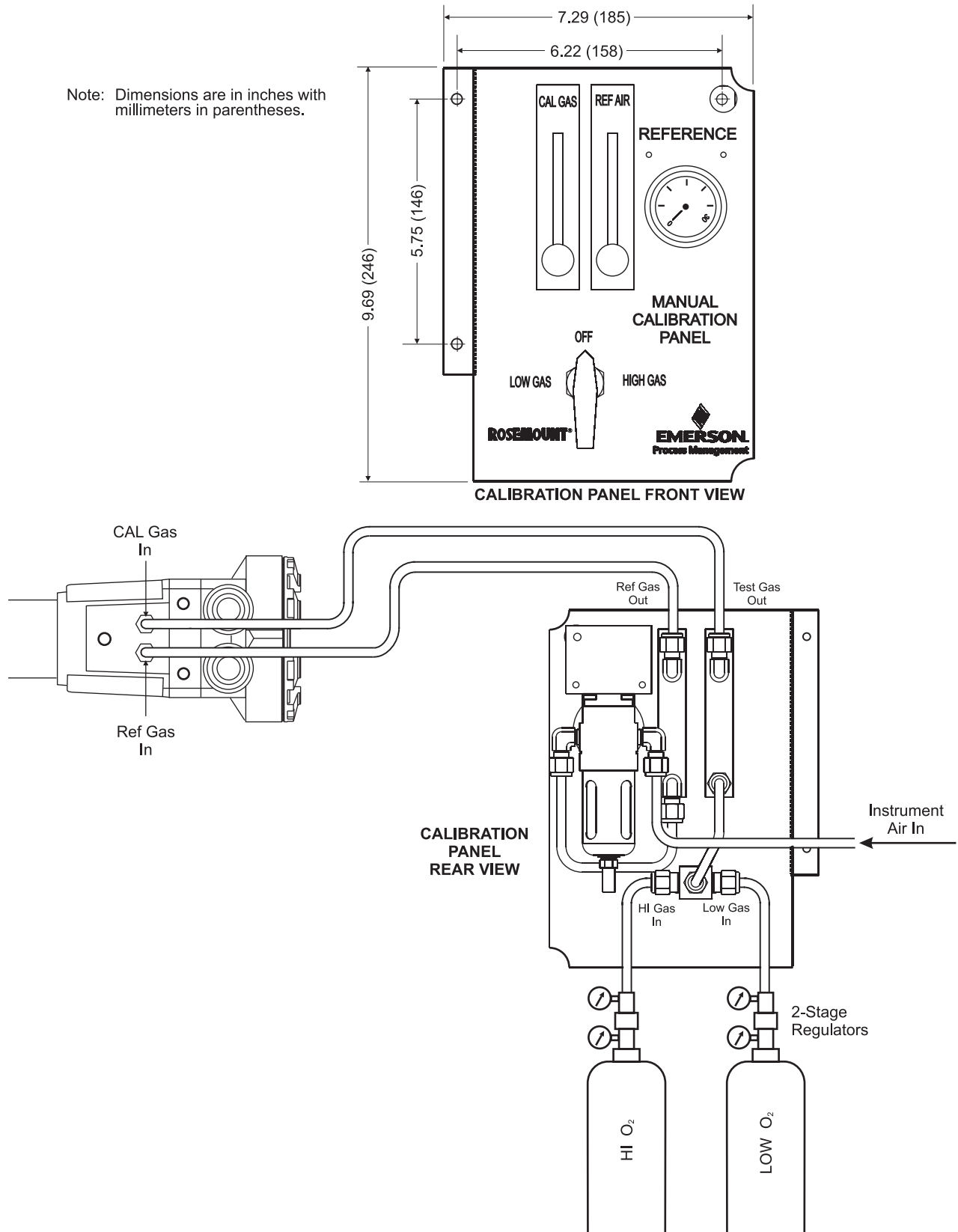


FIGURE 2-13. Manual Calibration Panel



Reference air components are included in the optional Manual Calibration Panel (Figure 2-13), the SPS 4001 Single Probe Autocalibration Sequencer, and the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer.

NOTE

The optional SPS 4001B or IMPS 4000 Sequencer can only be used when the 6888Xi Advanced Electronics option is selected. The 6888Xi must be properly configured for autocalibration. See Section 3: Configuration.

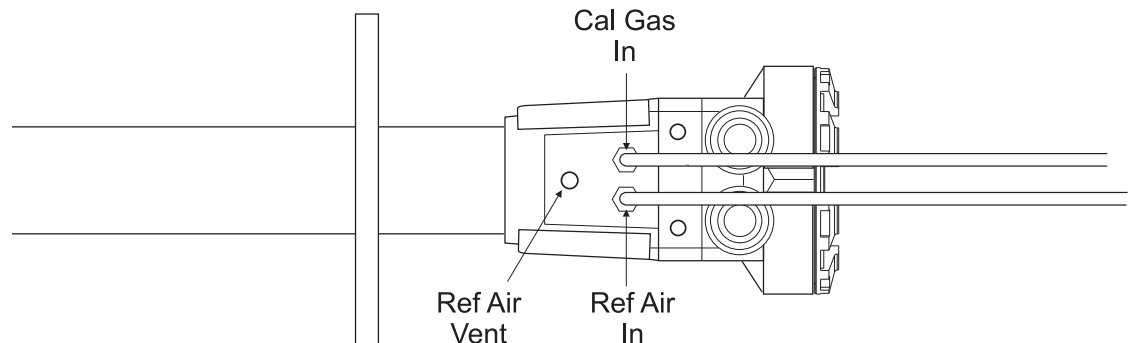
See the SPS 4001B Single Probe Autocalibration Sequencer Instruction Manual or the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer Instruction Manual for wiring and pneumatic connections.

2.4.2 Calibration Gas

Two calibration gas concentrations are used with the 6888A, Low Gas - 0.4% O₂, balance N₂, and High Gas - 8% O₂, balance N₂. An optional Manual Calibration Panel is shown in Figure 2-13. See Figure 2-14 for the 6888A probe calibration gas connection ports.

Calibration Gas: 15 psig (103 kPa gage) maximum, 5 SCFH (2,5 L/min). Establish the calibration gas flow only with a clean diffuser.

FIGURE 2-14. 6888A Calibration Gas Connections



CAUTION

Do not use 100% nitrogen as a low gas (zero gas). It is suggested that gas for the low (zero) be between 0.4% and 2.0% O₂. Do not use gases with hydrocarbon concentrations of more than 40 parts per million. Failure to use proper gases will result in erroneous readings.

CAUTION

If the ducts will be washed down during outage, MAKE SURE to power down the 6888A units and remove them from the wash areas.

NOTE

Upon completing installation, make sure that the 6888A is turned on and operating prior to firing up the combustion process. Damage can result from having a cold 6888A unit exposed to the process gases. During outages, if possible, leave all 6888A units running to prevent condensation and premature aging from thermal cycling.

Section 3: Configuration, Startup and Operation

WARNING

Install all protective equipment covers and safety ground leads before equipment startup. Failure to install covers and ground leads could result in serious injury or death.

CAUTION

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

3.1 Overview

Interface to the 6888A O₂ Transmitter for setup, calibration and diagnostics can be via a 375/475 Field Communicator or Asset Management System or with the optional 6888Xi Advanced Electronics.

Startup is common to all configurations of the 6888A O₂ Transmitter. Setup, calibration and diagnostic operations will differ depending on the selected interface for communications with the transmitter. The following covers operation via 375/475 Field Communicator. Refer to instruction manual 51-6888Xi for operation with the 6888Xi Advanced Electronics.

3.2 Startup

The 6888A O₂ Transmitter begins operation when the signal wiring is connected and heater power is supplied to the transmitter. AC line voltage to the heater should be powered first, followed by the 24 vdc power/signal loop for the transmitter electronics.

The transmitter probe will take approximately 45 minutes to warm up to the 736°C heater setpoint. The 4-20 mA signal will remain at a default value of 3.5 mA through this warm-up period. Once warm, the probe will be reading oxygen, and the 4-20 mA signal will be reading based on the default range of 0-10% O₂.

3.2.1 Error Conditions

If there is an error condition at startup, an alarm message will be displayed. Refer to Section 4: Troubleshooting, to determine the cause of the error. Clear the error and cycle power. The %O₂ and temperature display should return less the alarm message.

3.3 Operation via HART/AMS

The 375/475 Field Communicator is a handheld communications interface device. It provides a common communications link to all microprocessor-based instruments that are HART compatible. The handheld communicator contains a liquid crystal display (LCD) and 21 keys. A pocket-sized manual, included with the 375/475 Field Communicator, details the specific functions of all the keys.

The 375/475 Field Communicator accomplishes its task using a frequency shift keying (FSK) technique. With the use of FSK, high-frequency digital communication signals are superimposed on the 6888A unit's 4-20 mA current loop. The 375/475 Field Communicator does not disturb the 4-20 mA signal, since no net energy is added to the loop.

NOTE

The 375 Field Communicator must be upgraded to System Software 2.0 with Graphic License for operation with the X-STREAM O2 Transmitter. The AMS software must be upgraded to AMS 8.0 or above for operation with the X-STREAM O₂ Transmitter.

Contact Emerson Process Management's Global Service Center (GSC) at 1-800-833-8314 to upgrade the 375 Field Communicator software to System Software 2.0 with Graphic License.

3.3.1 Field Communicator Signal Line Connections

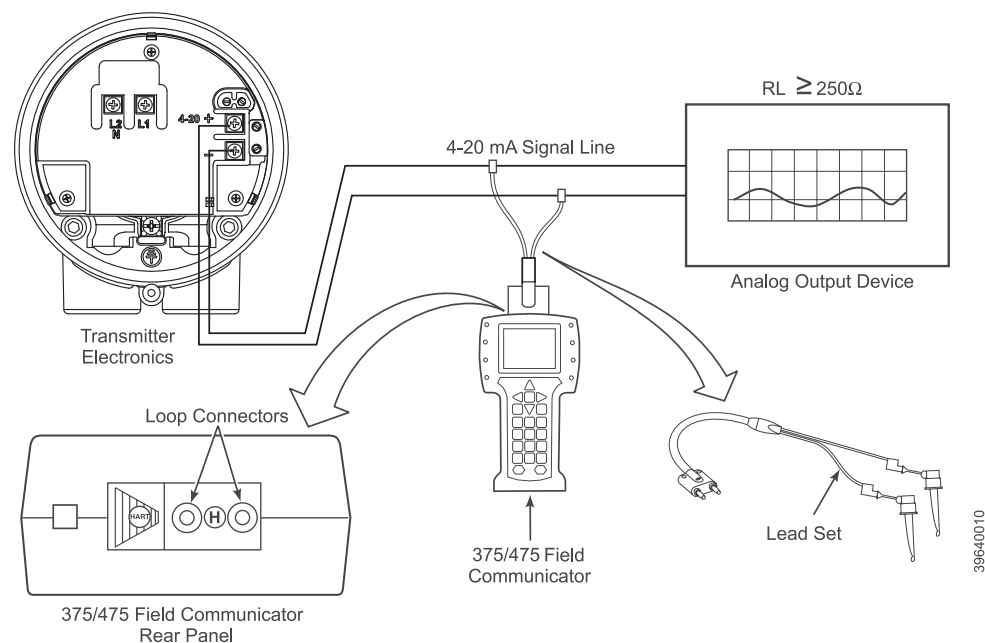
To interface with the 6888A, the 375/475 Field Communicator requires a termination point along the 4-20 mA current loop and a minimum load resistance of 250 ohms between the communicator and the power supply.

The 375/475 Field Communicator can connect to the 6888A unit's analog output signal line at any wiring termination in the 4-20 mA current loop. There are two methods of connecting the 375/475 Field Communicator to the signal line. For applications in which the signal line has a load resistance of 250 ohms or more, refer to method 1 shown in Figure 3-1. For applications in which the signal line load resistance is less than 250 ohms, refer to method 2 shown in Figure 3-3.

Method 1, For Load Resistance ≥ 250 Ohms

Refer to Figure 3-1 and the following instructions to connect the 375/475 Field Communicator to a signal line with a load resistance of 250 ohms or more.

FIGURE 3-1. Signal Line Connections, ≥ 250 Ohms Load Resistance



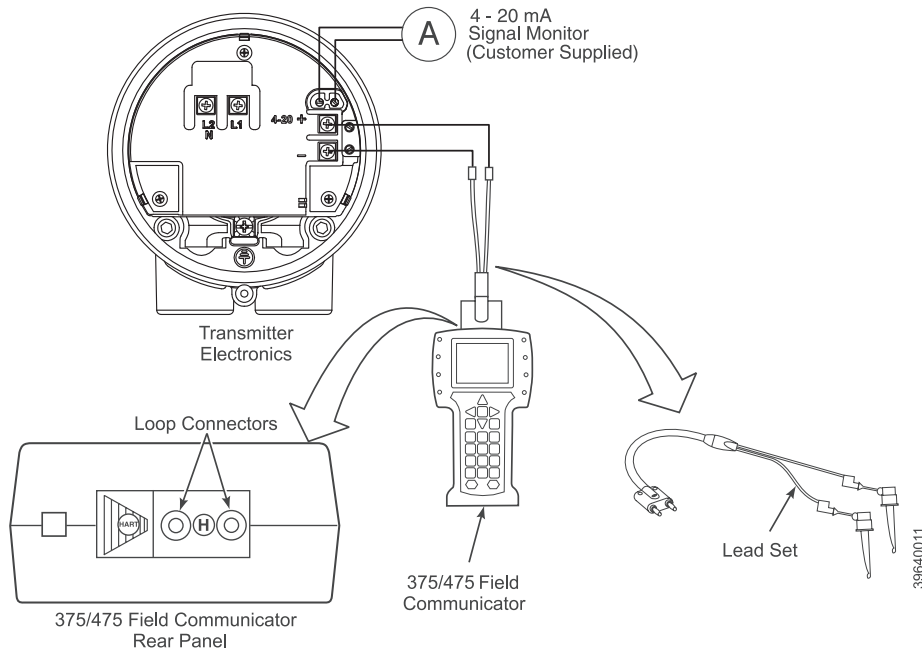
⚠ CAUTION

Signals are not intrinsically safe. In an explosive atmosphere do not make connections to the 375/475 Field Communicator's serial port, 4-20 mA signal line, or NiCad recharger jack.

Using the supplied lead set, connect the 375/475 Field Communicator in parallel with the 6888A. Use any wiring termination points in the analog output 4-20 mA signal line.

The 375/475 Field Communicator may also be connected directly to the transmitter electronics board. Refer to Figure 3-2 for connecting the 375/475 Field Communicator at the H1 and H2 terminals on the O₂ transmitter electronics board. The test points shown in Figure 3-2 are provided to monitor the 4-20 mA signal without breaking into the loop.

FIGURE 3-2. 375/475 Field Communicator Connection at the O₂ Transmitter



Method 2, For Load Resistance < 250 ohms

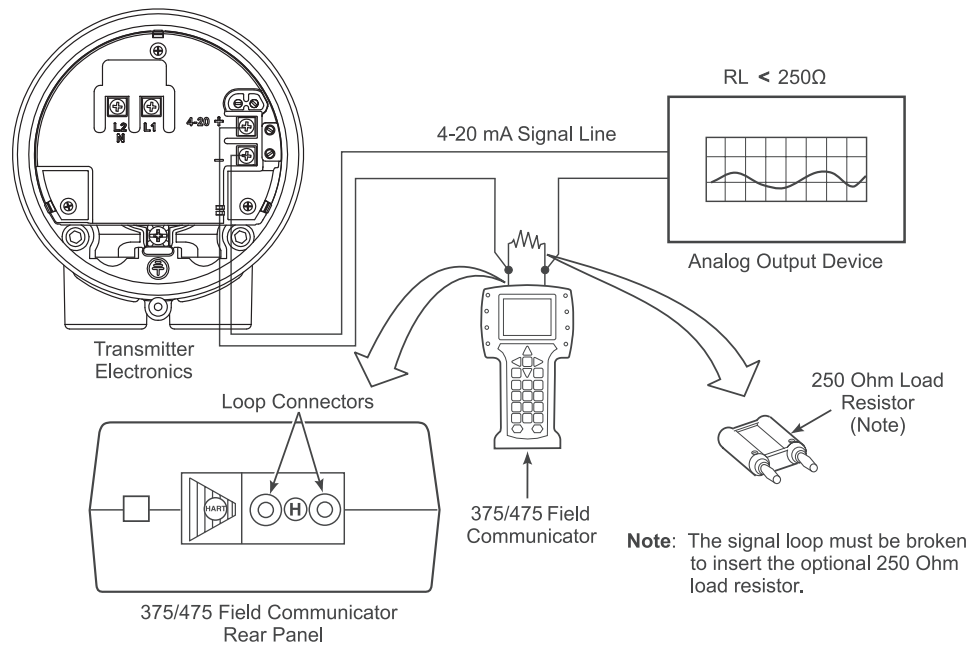
Refer to Figure 3-3 and the following steps to connect the 375/475 Field Communicator to a signal line with < 250 ohms load resistance.

⚠ CAUTION

Signals are not intrinsically safe. In an explosive atmosphere do not make connections to the 375/475 Field Communicator's serial port, 4-20 mA signal line, or NiCad recharger jack.

1. At a convenient point, break the analog output 4-20 mA signal line and install the optional 250 ohm load resistor.
2. Plug the load resistor into the loop connectors (located on the rear panel of the 375/475 Field Communicator).

FIGURE 3-3. Signal Line Connections, < 250 Ohms Load Resistance



3.3.2 Field Communicator Menu Trees

When the 375/475 Field Communicator is connected as shown in Figure 3-1, Figure 3-2, or Figure 3-3, refer to Figure 3-4 for the menu tree.

Figure 3-4. 6888A Menu (1 of 3)

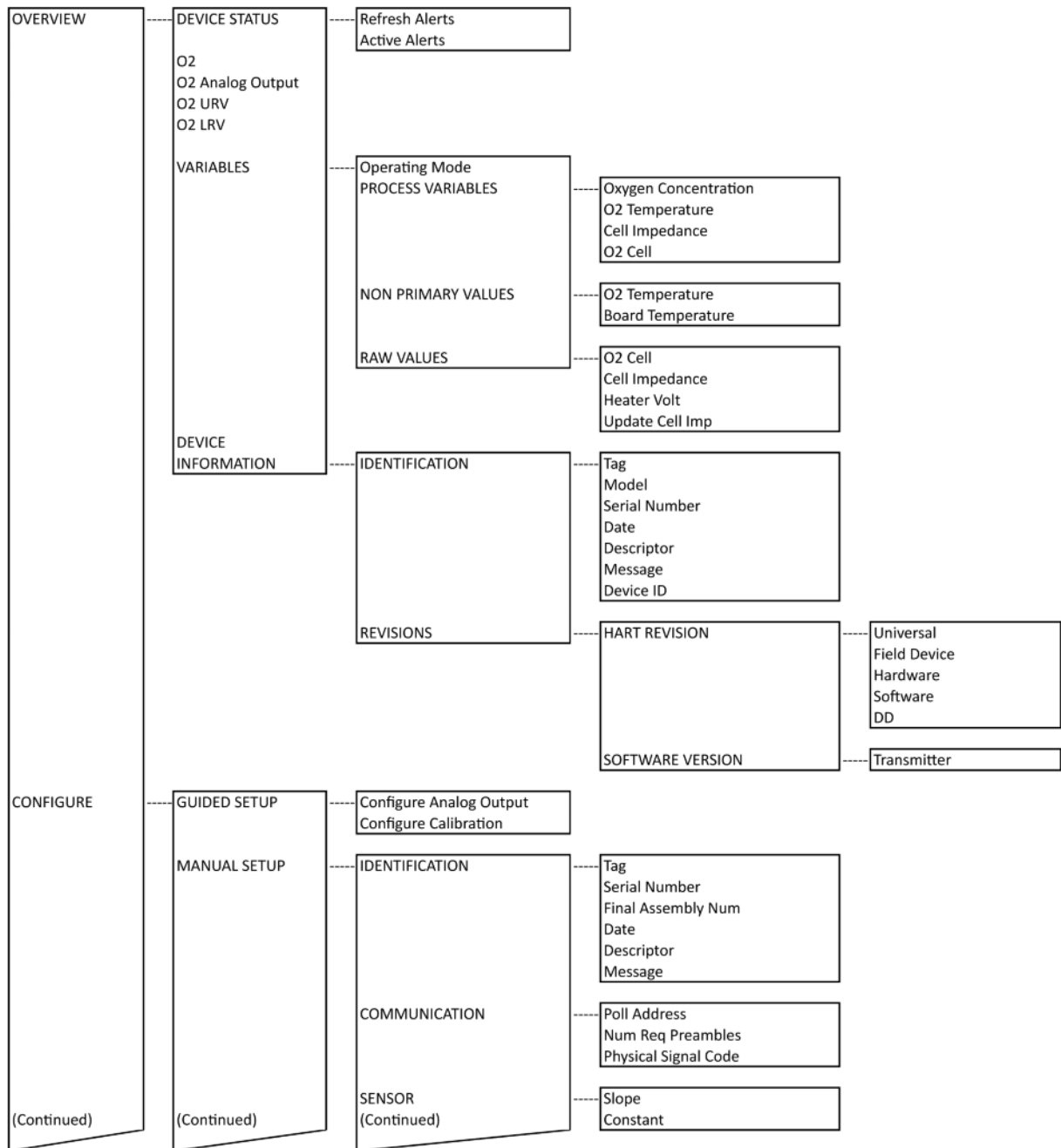


Figure 3-4. 6888A Menu (2 of 3)

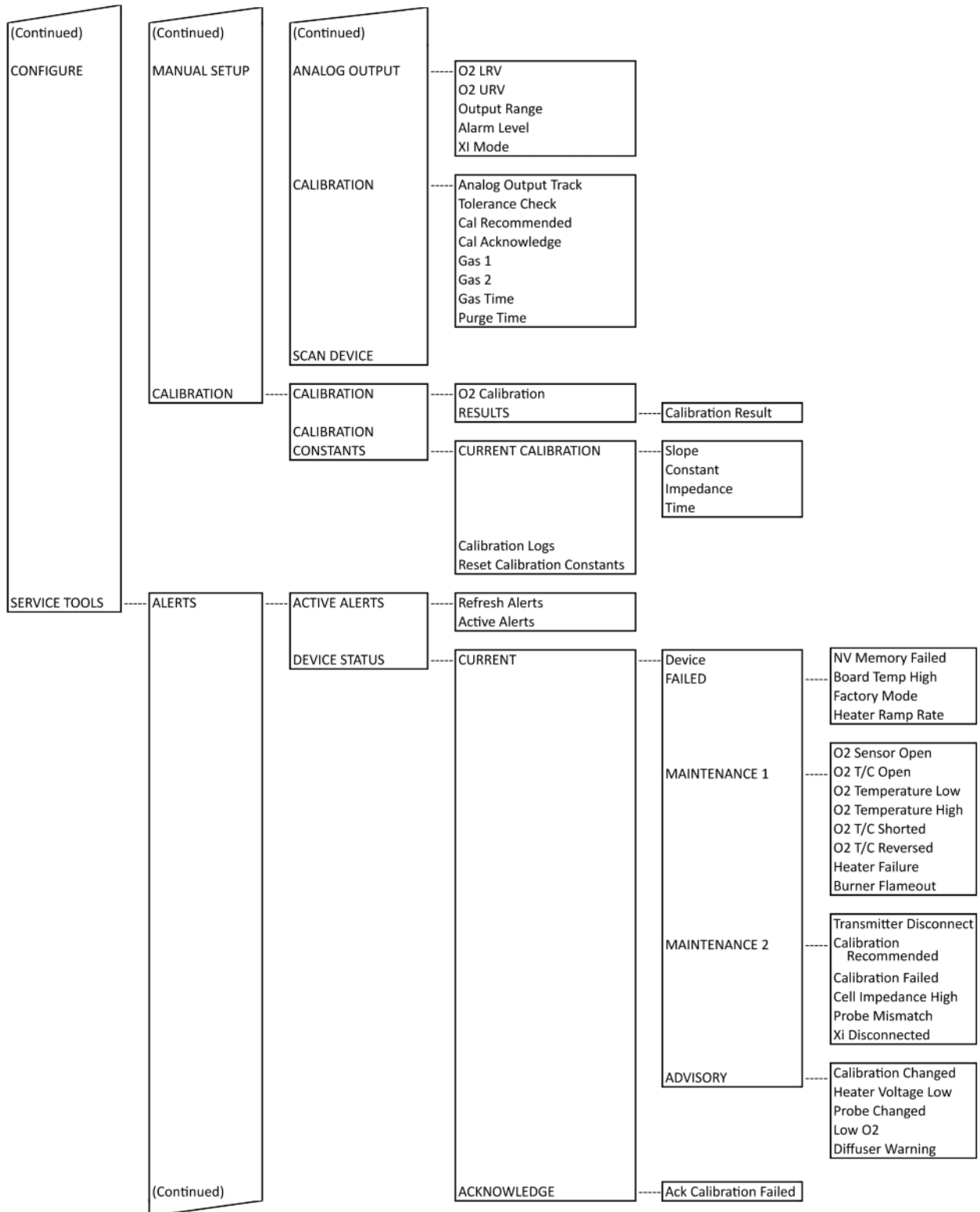
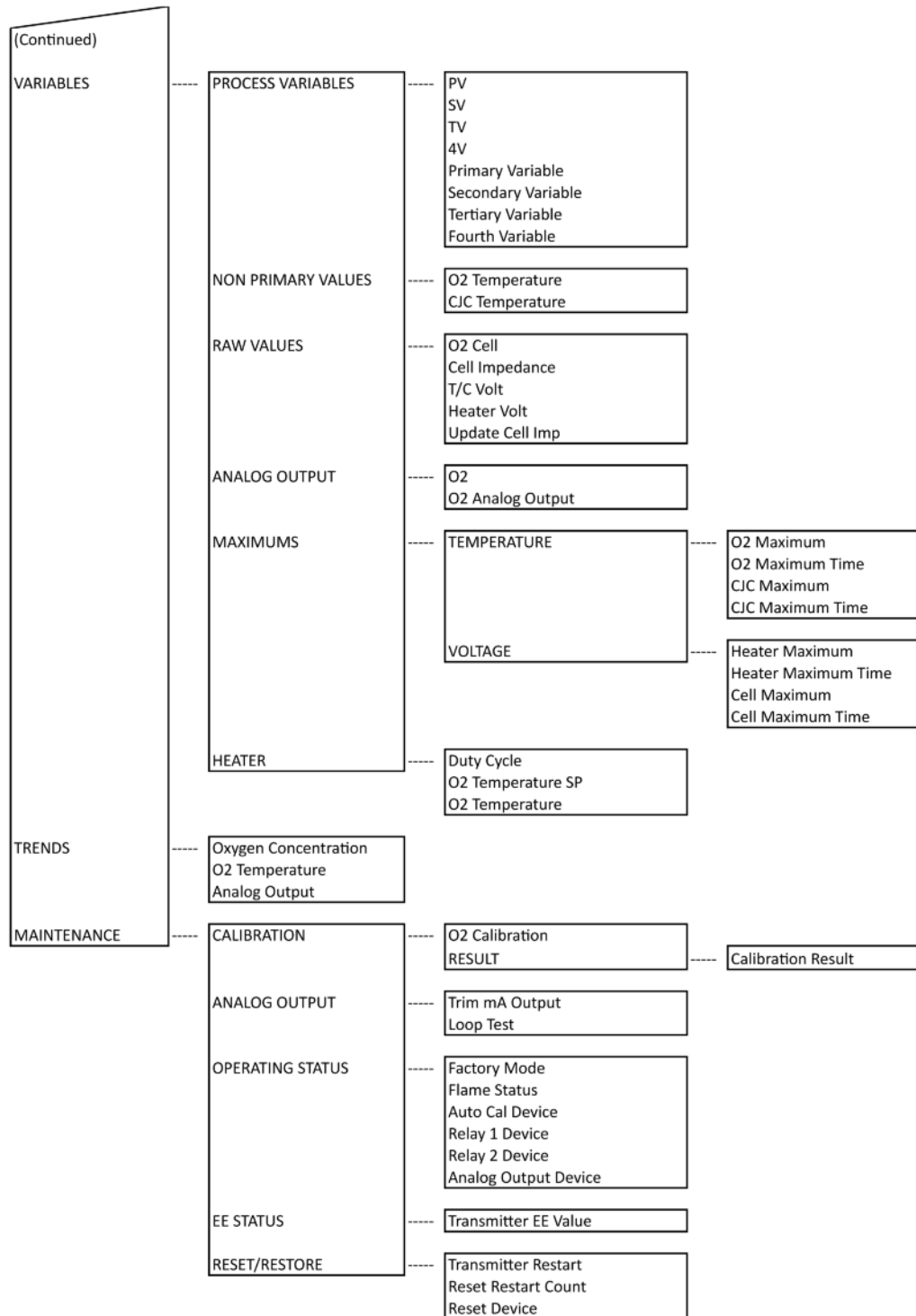


Figure 3-4. 6888A Menu (3 of 3)



3.4 System Parameter Descriptions

Among the parameters available through the 375/475 Communicator menus are a number of “System Parameters”. The system parameters define variables that configure a specific probe in the transmitter system. System parameters are described in the following table.

Parameter Name	Unit	Description
O ₂	%	Current oxygen concentration value (O ₂ %). The value should reflect the last good O ₂ value if it is in the “Lock” state during calibration.
O ₂ Temp	degC	Current O ₂ sensor temperature.
CJC Temp	degC	Current cold junction temperature.
O ₂ Cell	mV	Raw mV value for O ₂ sensor.
Cell Imp	ohm	Cell impedance/sensor resistance measured.
Heater	V	Heater voltage.
O ₂ AO	mA	Analog output value represents the O ₂ concentration measurement.
O ₂ Temp Max	degC	This is the highest O ₂ sensor temperature reached since last reset.
O ₂ Temp Max Time	Days ago	Time stamp of the highest O ₂ sensor temperature reached since last reset.
Temperature CJC Max	degC	This is the highest temperature reached at the cold junction since last reset.
Temperature CJC Max Time	Days ago	Time stamp of the highest temperature reached at the cold junction since last reset.
Voltage Heater Max	degC	This is the highest heater voltage reached since last reset.
Voltage Heater Max Time	Days ago	Time stamp of the highest heater voltage reached since last reset.
Voltage Cell Max	degC	This is the highest cell voltage reached since last reset.
Voltage Cell Max Time	Days ago	Time stamp of the highest cell voltage reached since last reset.
OP Mode	--	Device operating mode: PO=Power up; WU=Warm Up (analog output is railed); NM=Normal operation; CA=Calibrating (analog output can be tracking or locked at last good value based on "AO Tracks" configuration); AL=Alarm detected (recoverable); SF=Alarm detected (non-recoverable)
Active Alarms	--	Current Alarms (See Section 4, Troubleshooting)
Device	--	Alarm state
Failed	--	Alarm state: On/Off NV Memory Fail, Board Temp High, Factory Mode, Heater Ramp Rate
Maintenance 1	--	Alarm state: On/Off O ₂ Sensor Open, O ₂ T/C Open, O ₂ Temp Low, O ₂ Temp High, O ₂ T/C Shorted, O ₂ T/C Reversed, Heater Failure, Burner Flameout
Maintenance 2	--	Alarm state: On/Off Xmtr Disconnect, Cal Recommended, Cal Failed, Cell Imp High, Probe Mismatch
Advisory	--	Alarm state: Cal Changed, Htr Volt Low, Probe Changed, Low O ₂ , Diffuser Warning
Duty Cycle	--	O ₂ heater duty cycle. Value between 0 and 1.
O ₂ Temp SP	degC	PID temperature set point
Heater Ramp Rate	degC/s	Heater ramp rate calculated in degree C per second.
Operating Status		Device configuration: On/Off Factory Mode, Flame Status (IO Board DIP Switch setting), Auto Cal Device, Relay 1 Device, Relay 2 Device, AO Device

Parameter Name	Unit	Description
Xmtr EE Val	--	Transmitter board nonvolatile memory diagnostic.
Xmtr Restart	--	Software restarts count for the Transmitter.
HART Device Rev	--	HART Device Revision number.
Transmitter Version	--	Software version number for the Transmitter.
Tag	--	Device tag: Up to 8 characters long.
Serial Number	--	Probe serial number.
Device ID	--	Unique Device ID number. (HART)
PV	--	Primary variable assignment: O ₂ (HART)
SV	--	Secondary variable assignment: O ₂ Temp (HART)
TV	--	Third variable assignment: Cell Imp (HART)
4V	--	Fourth variable assignment: O ₂ Cell (HART)
Xmtr Address	--	Transmitter board polling address
O ₂ LRV	%	Primary variable (O ₂ %) lower range value.
O ₂ URV	%	Primary variable (O ₂ %) upper range value
Alarm Level	--	O ₂ alarm level: 0 = 3.5 mA, 1 = 21.1mA
Cal Gas 1	%	Test Gas 1 value. This is the actual value of the gas being applied during the Test Gas 1 phase of a calibration.
Cal Gas 2	%	Test Gas 2 value. This is the actual value of the gas being applied during the Test Gas 2 phase of a calibration.
Gas Time	sec	Test Gas application time. This is the length of time test gases are applied to the O ₂ probe during low or high Test Gas phase of a calibration.
Purge Time	sec	Test Gas purge time. This is the length of time before the output will be returned to the process reading after a calibration.
Slope	mV/Dec	Current calibration slope. This is the slope value that was calculated as a result of the last successful calibration.
Constant	mV	Current calibration constant. This is the constant value that was calculated as a result of the last successful calibration.
Impedance	ohm	Cell Impedance. This is the sensor resistance that was calculated as a result of the last successful calibration.
Time	Days ago	Time stamp of the last successful calibration.
Cal Logs Slope	mV/Dec	Previous calibration slope. There are ten calibration results. 1 is the most recent and 10 is the least recent calibration slope
Cal Logs Constant	mV	Previous calibration constant. There are ten calibration results. 1 is the most recent and 10 is the least recent calibration constant.
Cal Logs Impedance	ohm	Previous Cell Impedance. This is the sensor resistance that was calculated as a result of previous successful calibration. . There are ten calibration results. Index 1 is the most recent and Index 10 is the least recent sensor resistance measured.
Cal Logs Time	Days ago	Time stamp of the previous successful calibration. There are ten calibration time stamp. Index 1 is the most recent and Index 10 is the least recent time stamp.
Cal Result	--	Calibration result: 0 = None, 1 = Success, 2 = Failed Constant, 3 = Failed Slope, 4 = Failed Temperature, 5 = Gas 1 Tolerance Error, 6 = Gas 2 Tolerance Error, 7-10 (future), 11 = AutoCal No Resp, 12 = AutoCal OutofSync, 13 = AutoCal Abort, 14 = No Solenoid, 15 = WarmUp Abort, 16 Alarm Abort

3.5 Parameter Setup

3.5.1 Test Gas Values

Use a Field Communicator to set test gas values for calibration.

A 6888A shipped from the factory has test gas values for low and high set to 0.4% and 8.0% respectively. This same process must be performed any time a Transmitter Board is replaced.

Setting Test Gas Values Using Field Communicator in Manual Configure Mode

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select CONFIGURE.
3. From the CONFIGURE menu, select MANUAL SETUP.
4. From the MANUAL SETUP menu, select CALIBRATION.
5. From the CALIBRATION menu, select GAS 1.
6. Press the RIGHT arrow key to edit the gas value.
7. Use the stylus on the screen to enter the new gas value then press ENTER when finished.
8. Use the stylus on the screen to select SEND to update the 6888A.
9. Repeat steps 5 through 8 for GAS 2.

3.5.2 Test Gas Times

Use a Field Communicator to set test gas flow time and purge time for calibration.

A 6888A shipped from the factory has test gas flow time and purge time set to 300 seconds. This same process must be performed any time a Transmitter Board is replaced.

Setting Test Gas Times Using Field Communicator in Manual Configure Mode

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select CONFIGURE.
3. From the CONFIGURE menu, select MANUAL SETUP.
4. From the MANUAL SETUP menu, select CALIBRATION.
5. From the CALIBRATION menu, select GAS TIME.
6. Press the RIGHT arrow key to edit the gas value.
7. Use the stylus on the screen keypad to enter the new gas value then press ENTER when finished.
8. Use the stylus on the screen to select SEND to update the 6888A.
9. From the GAS TIME menu, select PURGE TIME.
10. Press the RIGHT arrow key to edit the gas value.
11. Use the stylus on the screen to enter the new gas value then press ENTER when finished.
12. Use the stylus on the screen to select SEND to update the 6888A.

3.5.3 Output Tracking During Calibration

Use a Field Communicator to set how the analog output value will function during calibration.

A 6888A shipped from the factory has the output tracking set to No, i.e. the analog output will hold the last value during the calibration cycle. This same process must be performed any time a Transmitter Board is replaced.

Setting Output Tracking Using Field Communicator in Manual Configure Mode

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select CONFIGURE.
3. From the CONFIGURE menu, select MANUAL SETUP.
4. From the MANUAL SETUP menu, select CALIBRATION.
5. From the CALIBRATION menu, select ANALOG OUTPUT TRACK.
6. Press the RIGHT arrow key to edit, then the UP or DOWN arrow keys to select YES or NO.
 - No** – The analog output will hold the last value during calibration
 - Yes** – The analog output will track the actual measurement during calibration
7. Use the stylus on the screen to press ENTER when finished.
8. Use the stylus on the screen to select SEND to update the 6888A.

3.5.4 Analog Output Configuration

The analog output signal from the 6888A can be configured for the 4-20 mA range and fault condition. A separate configuration is setup when the 6888A is used with the optional 6888XI Advanced Electronics. When the 6888A is used without the 6888XI, this parameter must be set to NO. If it is set to YES and a 6888Xi is not connected, the 6888A will trigger an alarm and force the analog output to the fault level. If the 6888A were later to be used with a 6888XI, this parameter will automatically be set to YES by the 6888XI.

A 6888A shipped from the factory has the analog outputs set to a 4 to 20 mA range with a 3.5 mA alarm level. This same process must be performed any time a Transmitter Board is replaced.

Configuring the Analog Output Using Field Communicator in Manual Configure Mode

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select CONFIGURE.
3. From the CONFIGURE menu, select MANUAL SETUP.
4. From the MANUAL SETUP menu, select ANALOG OUTPUT.
5. From the ANALOG OUTPUT menu, select from the following parameters then press ENTER:
 - O₂ LRV** – O₂ value at lower analog output value (0% @ 4 mA, non-configurable)
 - O₂ URV** – O₂ value at upper analog output value (50% max @ 20 mA)
 - Output Range** – Range of analog output (4-20 mA, non-configurable)
 - Alarm Level** – O₂ alarm level (3.5 mA or 21.1 mA)
 - Xi Mode** – Selects whether or not 6888A is used with a 6888XI (Yes or No, should always be set to NO for stand-alone 6888A)
6. Use the stylus on the screen keypad to enter the value then press ENTER when finished.
7. Use the stylus on the screen to select SEND to update the 6888A.

3.6 Calibration

New O₂ cells may operate for more than a year without requiring calibration, but older cells may require recalibration every few weeks as they near the end of their life.

A CALIBRATION RECOMMENDED alarm provides notice of when a calibration is required. This strategy ensures that the O₂ reading is always accurate and eliminates many unnecessary calibrations based on calendar days or weeks since previous calibration.

The 6888A O₂ Transmitter(s) can be calibrated manually through the handheld 375/475 Field Communicator or the optional 6888Xi. Fully automatic calibration can be performed automatically using the optional 6888Xi Advanced Electronics and the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Sequencer.

3.6.1 Calibration Procedure

This section covers manual calibration as shown in Figure 3-5. For automatic calibration details see the Instruction Manual for the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer.

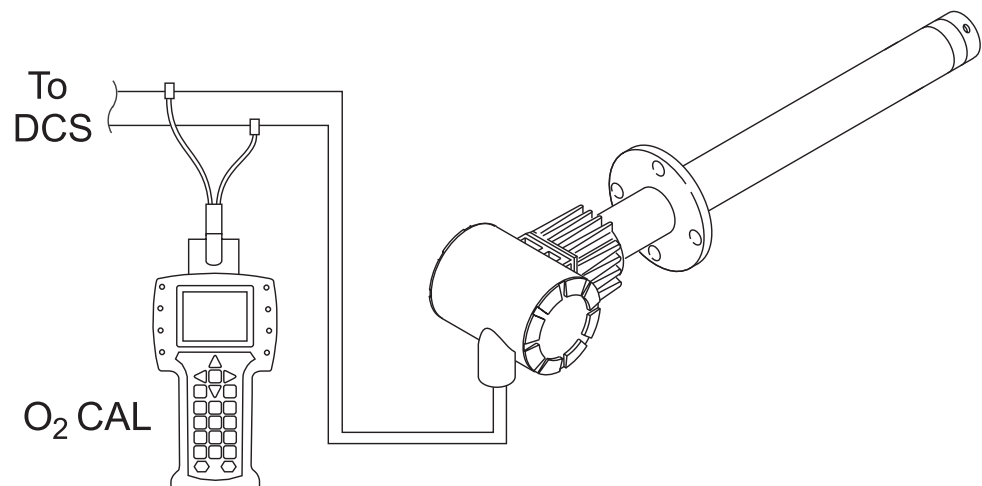
O₂ Calibration using the Field Communicator

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select CONFIGURE.
3. From the CONFIGURE menu, select CALIBRATION.
4. From the CALIBRATION menu, again select CALIBRATION.
5. From the CALIBRATION menu, select O₂ CALIBRATION.

WARNING

Failure to remove the 6888A from automatic control loops prior to performing this procedure may result in a dangerous operating condition.

FIGURE 3-5. Calibration Method - Simplified



When first entering the log, the screen will display calibration 1. This is the most recent previous calibration, not the current calibration. Calibration 0 displays the current calibration. Use the keypad or communicator keys to navigate through the logs. The factory default for log entries is a slope of 50.00 mV/Dec and constant of 0.00 mV. Any log entries with these values means there have not been at least 10 calibrations performed to fill the entire log.

3.8.4 Reset Calibration

The 6888A has the ability to reset the current calibration and replace it with the previous. A calibration may be reset in cases where calibration was known to contain invalid values. Resetting a calibration will transfer the slope and constant from calibration 1 in the log into the calibration 0 position. The cell impedance and days since calibration remain unchanged.

WARNING

Failure to remove the 6888A from automatic control loops prior to performing this procedure may result in a dangerous operating condition.

Reset the calibration as follows:

Using the Field Communicator:

Configure\Calibration\Calibration Constants\Reset Calibration Constants

Follow the instructions on the screen to complete the reset function.

3.9 D/A Trim

The D/A trim procedure is used to calibrate the 4-20 mA output signal to a precision mA measurement device. Only the signal to the DCS needs to be trimmed.

D/A Trim using the Field Communicator

1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select SERVICE TOOLS.
3. From the SERVICE TOOLS menu, select MAINTENANCE.
4. From the MAINTENANCE menu, select ANALOG OUTPUT.
5. From the ANALOG OUTPUT menu, select TRIM mA OUTPUT.
6. In the first screen, a “Loop should be removed from automatic control” warning occurs. Remove the 6888A from any automatic controls loops to avoid a potentially dangerous

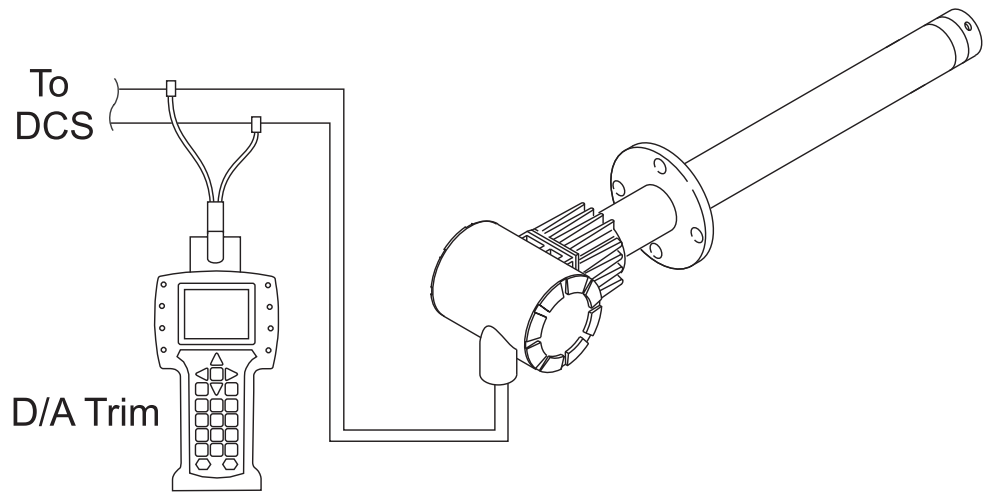
WARNING

Failure to remove the 6888A from automatic control loops prior to performing this procedure may result in a dangerous operating condition.

operating condition. Press OK when ready.

7. Follow the prompts on the 375/475 to perform the trim.
8. Use the stylus on the screen to enter the new measured analog output value then press ENTER to accept.
9. When trim is complete, press OK to return to the ANALOG OUTPUT menu.

FIGURE 3-6. D/A Trim Method - Simplified



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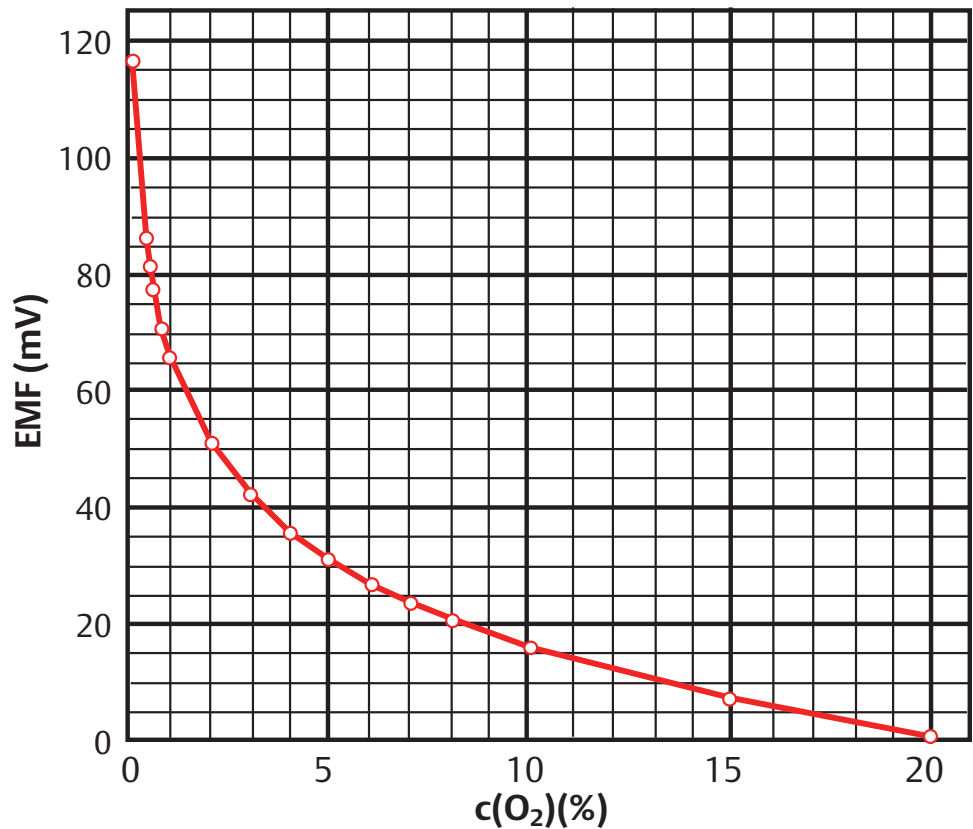
Section 4: Troubleshooting

4.1 Overview

When the Zirconium Oxide sensing cell is heated to its setpoint [736°C (1357°F)], the cell will generate a voltage that represents the difference between the process O₂% and the reference O₂% inside the probe (20.95% O₂ instrument or ambient air).

When flowing calibration gases, the raw cell millivolt value should represent the levels on the chart in Figure 4-1. Note that the raw cell millivolt value increases logarithmically as the O₂ concentration decreases.

FIGURE 4-1. O₂ Sensor mV Reading vs %O₂ at 736°C (1357°F) (Reference Air, 20.95% O₂)



O ₂ %	100	20	15	10	9	8	7	6	5	4
EMF (mV)	-34	1.0	7.25	16.1	18.4	21.1	23.8	27.2	31.2	36.0
O ₂ %	3	2	1	0.8	0.6	0.5	0.4	0.2	0.1	0.01
EMF (mV)	42.3	51.1	66.1	71.0	77.5	81.5	86.3	101.4	116.6	166.8

4.2 General

Consider the following equipment conditions, features, and requirements when troubleshooting a problem.

WARNING

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

4.2.1 Grounding

It is essential that adequate grounding precautions are taken when installing the system. Thoroughly check both the probe and electronics to ensure the grounding quality has not degraded during fault finding. The system provides facilities for 100% effective grounding and the total elimination of ground loops.

4.2.2 Electrical Noise

The 6888Xi has been designed to operate in the type of environment normally found in a boiler room or control room. Noise suppression circuits are employed on all field terminations and main inputs. When fault finding, evaluate the electrical noise being generated in the immediate circuitry of a faulty system. Ensure all cable shields are connected to earth.

4.2.3 Electrostatic Discharge

Electrostatic discharge can damage the ICs used in the electronics. Before removing or handling the circuit boards, ensure you are at ground potential.

4.3 Alarm Indications

The first indication of a problem at the O₂ measuring system usually comes from the operators running the process. Critical alarms that render the O₂ measurement unusable will force the 4-20 mA analog output signal representing O₂ to go to a default condition, as follows:

Table 4-1 - Alarm Indications

4-20 mA Signal Alarm Level	Transmitter Condition
0 mA	Transmitter unpowered, or completely failed
3.5 mA	Critical Alarm - transmitter reading unusable (factory default)
3.8 mA	Reading Under Range (Example - user sets range to 2-10%. Current reading is 1.9%)
4 to 20 mA	Normal Operation
20.5 mA	Reading Over Range (Example - range is 0-10%. Current reading is 12%)
>21 mA	Critical Alarm - transmitter reading is unusable (user can choose this alarm level instead of the factory default level of 3.5 to 3.6 mA)

NOTE

For correct operation, ensure the Distributed Control System is configured to interpret these signal levels correctly.

Once an alarm condition is identified, the 6888A offers a number of diagnostics to interpret the specific alarm.

Alarm indications are available via the optional 6888Xi or the 475 Field Communicator and Rosemount Analytical's Asset Management software. When the error is corrected and/or power is cycled, the diagnostic alarms will clear or the next error on the priority list will appear.

4.4 Identifying and Correcting Fault Indications

There are two types of alarms; recoverable and non recoverable. If an existing alarm is recoverable, the alarm-active indication will disappear when the alarm condition no longer exists. If an alarm is not recoverable, the alarm indication will continue to be displayed after the cause of the alarm condition is corrected. AC power to the 6888A must be cycled to clear a non-recoverable alarm.

Alarm messages are displayed on the optional 6888Xi or the 475 Field Communicator. A listing of the alarm/fault messages and the related fault status descriptions are shown in Table 4-2.

Fault conditions that give no fault indication and that allow the probe to pass calibration are listed and discussed after Table 4-2.

Table 4-2 - Diagnostic/Unit Alarm Fault Definitions (1 of 2)

Message	Status	Alert	Self Clearing	Rail A out
NV Memory Fail	A checksum error was detected in the nonvolatile memory configuration data when the unit was turned on. Default values have been loaded. Check to see that your configurations have not been changed. Cycle the power to clear alarm.	Failed	N	Y
Board Temp High	The electronics board temperature reading is above the threshold. The board may not function correctly. The predefined temperature threshold is 86°C for IO board or 126°C for Transmitter board.	Failed	N	Y
O2 Sensor Open	The cell impedance voltage is reading less than -1.0 VDC indicating the O2 sensor wires may be disconnected or the O2 sensor junction may be open. Check wiring.	Maint	Y	Y
O2 T/C Open	The O2 sensor heater thermocouple voltage is reading more than 0.065 volt indicating the thermocouple wires may be disconnected or the thermocouple junction may be open. Check wiring.	Maint	Y	Y
O2 Temp Low	The sensor heater temperature is below the low temperature threshold. If Extended Temperature feature is not enabled, the predefined low temperature threshold is the 726°C. If Extended Temperature feature is enabled, the predefined low temperature threshold is the 726°C if the "Heater SP" is set to "Normal" or 540°C for it is set to "Low".	Maint	Y	Y

Table 4-2 - Diagnostic/Unit Alarm Fault Definitions (2 of 2)

Message	Status	Alert	Self Clearing	Rail A out
O2 Temp High	The sensor heater temperature is above the high temperature threshold. If Extended Temperature feature is not enabled, the predefined high temperature threshold is 750°C. If Extended Temperature feature is enabled, the high temperature threshold is the defined by the "High Temp Alm SP" parameter.	Maint	Y	Y N
O2 T/C Shorted	This diagnostic is only intended to detect a copper short of the thermocouple connections at the electronics connector. The Cell Heater T/C voltage is reading close to zero indicating the thermocouple wires may be shorted.	Maint	Y	Y
O2 T/C Reversed	The O ₂ sensor heater temperature thermocouple voltage is reading a negative voltage and is decreasing indicating the thermocouple wire connections may be reversed. Check wiring.	Maint	N	Y
Cal Failed	A calibration error occurred during the last calibration. Check the Cal Result for more details. Acknowledge Calibration Failed or recalibrate to clear alarm.	Maint	Y	N
Cell Imp High	The cell impedance reading is above threshold (2000 Ohms) indicating the cell may be beyond its useful life.	Maint	Y	N
Xi Disconnect	It indicates using Transmitter's AO when connected to Xi and Xi is disconnected.	Maint	Y	Y
Heater Volt Low	The heater voltage for the O ₂ heater is below 30 volt. Check Heater Power.	Adv	Y	N

4.5 Calibration passes, but still reads incorrectly

There are a few fault conditions where no alarm indication is present and the probe passes calibration, but the O₂ reading may still be incorrect:

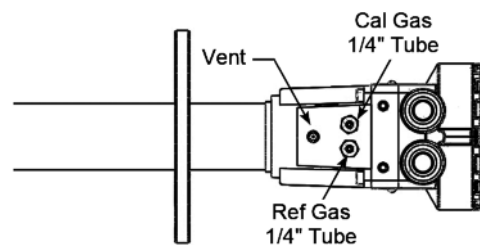
1. An incorrect flow rate of calibration gases can cause a shifted calibration. If the flow rate of calibration gases is too low, process gases can mix in with the calibration gases causing a mixture at the cell that is different than what is noted on the calibration gas bottles. Always set the calibration flow rate when a new diffuser is installed, and never readjust this flow rate until another new diffuser is installed. For applications with heavy particulate loading, see "Probe Passes Calibration, O₂ Still Reads Low". Always use a two stage pressure regulator for calibration gas.
2. No or improper reference air supplied.

4.5.1 Probe passes calibration, O₂ still reads high

External Reference Air Leak - There may be a leak that is permitting ambient air to mix with the process gases. Since many combustion processes are slightly negative in pressure, ambient air can be drawn into the cell area, biasing the O₂ reading upward.

1. Make sure that the calibration gas line is capped tightly between calibrations.
2. If autocal is used, make sure the check valve is seating properly.
3. If an abrasive shield is used, a small leak at the probe flange gasket can migrate down the annular space between the probe OD and shield ID to the sensing cell causing a false high O₂ reading.

FIGURE 4-2. Probe Leakage Paths



Internal Reference Air Leak - See Figure 4-2. There may be a leak inside the O₂ Probe itself, permitting the reference air (20.95% O₂) to mix with the process gases at the cell. To confirm this leak condition, pressurize the inside (reference side) of the probe by plugging the reference air exhaust port with your finger for 1 minute. (The conduit ports where the signal and power wires pass may also need to be sealed.) The O₂ reading should decrease slightly. If the O₂ reading increases during this test there is a leak inside the probe.

1. Acid condensation inside the probe can degrade the hose that carries the cal gas to the cell. Inspect this hose. Dislodging or improper installation of the cal gas or reference air hose can cause a leakage path.
2. The sensing cell is fastened to the end of the probe tube and uses a corrugated washer to separate the process gases from the ambient reference air. The corrugated washer may be damaged by corrosion. Discard used washer.

NOTE

Always install a new corrugated washer whenever the sensing cell is removed from the probe.

Bad Reference Side Cell Electrode - A bad reference side cell electrode can cause an elevated O₂ reading. This fault is usually indicated by a frequent "Calibration Recommended" alarm and increasing cell impedance readings. A high cell impedance can be calibrated out, but if the impedance continues to increase rapidly, the sensing cell must be replaced.

4.5.2 Probe passes calibration, O₂ still reads low

The diffusion element at the end of the probe is a passive filter. It plugs very slowly, since there is no active flow being drawn across it. In applications that have a heavy particulate loading (coal or wood fired boilers, cement and lime kilns, catalyst regeneration, recovery boilers, etc.), this diffusion element will eventually plug.

NOTE

It is important not to pressurize the sensing cell during calibrations by flowing excessive cal gas against a plugged diffuser. Always use a two-stage regulator for setting calibration gas pressure. Calibration flow rates should be set only when a new diffuser is installed. As the diffuser plugs, do not adjust the flow rates upward.

4.5.3 How do I detect a plugged diffuser?

The O₂ cell's speed of response will degrade. The O₂ trend in the control room will become smoother.

When calibrating, the calibration gas flow rate will be noted to be lower. Never readjust this flow upwards to correct for a plugged diffuser. Adjust this flow only when a new diffuser is installed.

Always note the time it takes for the cell to recover to the normal process value after the cal gas is removed. As the diffuser plugs, this recovery time will get longer and longer. Use the Calibration Record provided to record and track Calibration Response times.

The 6888Xi Advanced Electronics is available with enhanced software feature to automatically characterize the rate of diffuser pluggage during a calibration cycle.

4.5.4 Can I calibrate a badly plugged diffuser?

It may not be possible to immediately replace a plugged diffuser while the process is on line.

One can calibrate the probe without pressurizing the cell by adjusting the calibration gas flow rate downward before calibration. For instance, say the process is at 3%, and the first calibration gas is 8%. Adjust the flow of cal gas downward until the reading begins to migrate from 8% to lower values, indicating that process gases are now mixing in with the calibration gases.

Adjust the flow rate back up until this mixing is just eliminated. Calibrate at this flow rate. Replace the diffuser at the first opportunity.

WARNING

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

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Section 5: Maintenance and Service

5.1 Overview

This section identifies the calibration methods available and provides the procedures to maintain and service the 6888A O₂ Transmitter.

WARNING

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.

5.2 Maintenance Intervals

The maintenance interval required is quite variable, depending on the type of service the analyzer is placed into. The zirconium oxide sensing cell is non-depleting, and has no specific shelf life or a defined life in flue gas operation. The cell of a probe that is mounted inside a boiler that is burning natural gas may shift very little over several years. Acidic compounds are the main aggressors to the sensing cell, typically SO₂ 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 O₂ are very low (below 1% O₂).

A calibration check is generally recommended on a quarterly basis (every 3 months) by flowing bottled gas to the probe. (Make sure that the operations personnel are notified when doing this, and also make sure that the O₂ control loop is placed in manual mode). If the probe readings vary significantly from the bottle values, then a formal calibration should be conducted as noted in Section 3: Configuration, Startup and Operation.

The optional 6888Xi offers a "calibration recommended" diagnostic that will indicate 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 badly plugged diffuser will cause a slower speed of response to changing O₂ levels in the process. This can usually be seen on the recorded trends in the control room.

When performing a calibration check or actual calibration, the calibration flow meter may read lower if the diffuser is badly 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, as noted on the calibration record at the end of Section 4. Diffuser pluggage can be tracked through this record.

A visual inspection of the probe should be conducted 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.

5.3 Calibration

The 6888A O₂ Transmitter can be calibrated manually through the handheld 375/475 Field Communicator, or automatically through the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer and the 6888Xi Advanced Electronics.

5.3.1 Manual Calibration

Refer to the "Calibration - General" in Section 3: Configuration, Startup and Operation to perform a manual calibration.

5.3.2 Automatic Calibration

Contact from the 6888Xi Advanced Electronics to an SPS 4001B (one per probe) or IMPS 4000 (up to four probes) provides the ability to manually initiate a calibration at any time from the control room. The 6888Xi Interface must be used with the SPS 4001B or IMPS 4000 in order to perform an auto / semi-auto calibration. Refer to the SPS 4001B or IMPS 4000 Instruction Manual for further details on how to configure and perform an automatic calibration.

5.4 6888A Repair

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

WARNING

It is recommended that the 6888A be removed from the stack for all service activities. The unit should be allowed to cool and be taken to a clean work area. Failure to comply may cause severe burns.

WARNING

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

5.5 Removal and Replacement of Probe

1. Remove.
 - a. Turn off power to the system.
 - b. Shut off the calibration gases at the cylinders and the instrument air.
 - c. Disconnect the calibration gas and instrument air lines from the 6888A.
 - d. Remove housing cover.
 - e. Remove all signal and power wiring to the probe.
 - f. Remove insulation to access the mounting bolts.
 - g. Unbolt the 6888A from the stack and take it to a clean work area.
 - h. Allow the unit to cool to a comfortable working temperature.

2. Replace.
 - a. Bolt the 6888A to the stack and install the insulation.
 - b. Connect all signal and power leads at the probe. Refer to Section 2: Installation, for detailed wiring instructions.
 - c. Connect the calibration gas and instrument air lines to probe.
 - d. Install housing cover.
 - e. Turn on instrument air.
 - f. Restore power to the system; refer to "Start Up" in Section 4: Configuration, Startup and Operation. When the probe is at operating temperature, calibrate the probe per Section 4.

NOTE

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

5.6 Transmitter Board Replacement

The transmitter board is not repairable and must be replaced if any component fails. See Figure 5-1 for item number references. The transmitter board is available as a standalone kit or with the plastic cover and mounting plate.

WARNING

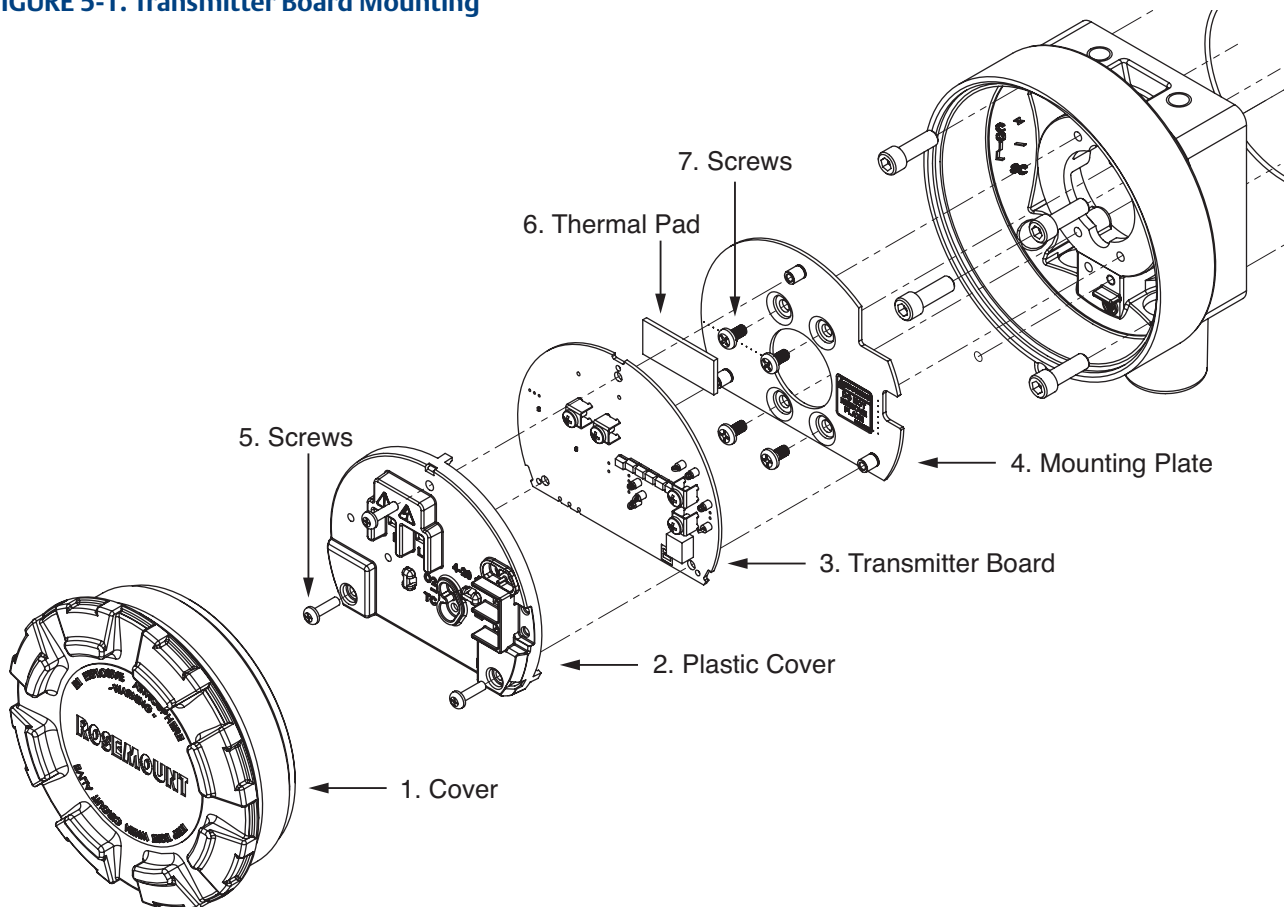
Disconnect and lock out power before working on any electrical components.

WARNING

Failure to synchronize the calibration parameters with a 6888Xi after replacing the transmitter board or recalibrating the instrument may cause an inaccurate O₂ Measurement. When the transmitter board is replaced and the calibration parameters are not synchronized with the 6888Xi, the parameters in the 6888Xi will be used as default to calculate the O₂ measurement.

1. Remove cover (1) from the Transmitter housing.
2. Disconnect the power and signal wires from the transmitter board (3).
3. Remove the three screws (5) securing plastic cover (2) and transmitter board (3) to mounting plate (4).
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 (6) 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.
6. 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.
7. If only the transmitter board is being replaced, carefully unsnap the plastic cover from the old transmitter board then snap it onto the new board. The cover will go on one way only with the screw terminals for the power and signal wiring fitting into the openings in the cover.
8. If the transmitter board, plastic cover and mounting plate are being replaced, the plastic cover should already be snapped onto the transmitter board.
9. Remove the old thermal pad from the mounting plate. Attach the new thermal pad to the

FIGURE 5-1. Transmitter Board Mounting



mounting plate 1.00" up from the flat edge of the plate. Do not reassembly 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.

10. If the mounting plate is being replaced, remove the four screws (7) securing the plate to the housing. Install the new mounting plate using four screws. Replacement screws are provided if any become lost or damaged.
11. Reconnect the two wire harness connectors to the back of the transmitter board. The connectors are different and individually keyed to prevent misconnection.
12. 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
13. Install the three screws to secure the board to the mounting plate. Replacement screws are provided if any become lost or damaged.
14. Reconnect the power and signal wires to the transmitter board.
15. Reinstall the cover to the Transmitter housing.
16. Reapply power to the Transmitter. Prior to using the Transmitter for measurement purposes, perform one of the following:
 - a. Transmitter without 6888XI: Recalibrate the Transmitter. See Section 3, "Configuration, Startup and Operation".

- b. Transmitter with 6888XI: When initialization is complete, the Transmitter will begin heating up, but an alarm condition will be shown on the 6888XI. Synchronize the calibration parameters via the 6888XI as follows:
 - i. Press the <DIAG> button once to view the alarms. A “Probe Changed” alarm will be shown.
 - ii. Press the <EXIT> button once to enter the “Diagnostic Menu”.
 - iii. Use the Up/Down keys to select “3-Acknowledge Alarms”. Press <ENTER>.
 - iv. Use the Up/Down keys to select “3-Ack Probe Changed”. Press <ENTER>.
 - v. Use the Up/Down keys to select “1-Send To Probe”. Press <ENTER> twice.
 - vi. When transfer is complete, press <EXIT> twice to return to the main menu.

5.7 DR Terminal Board Replacement

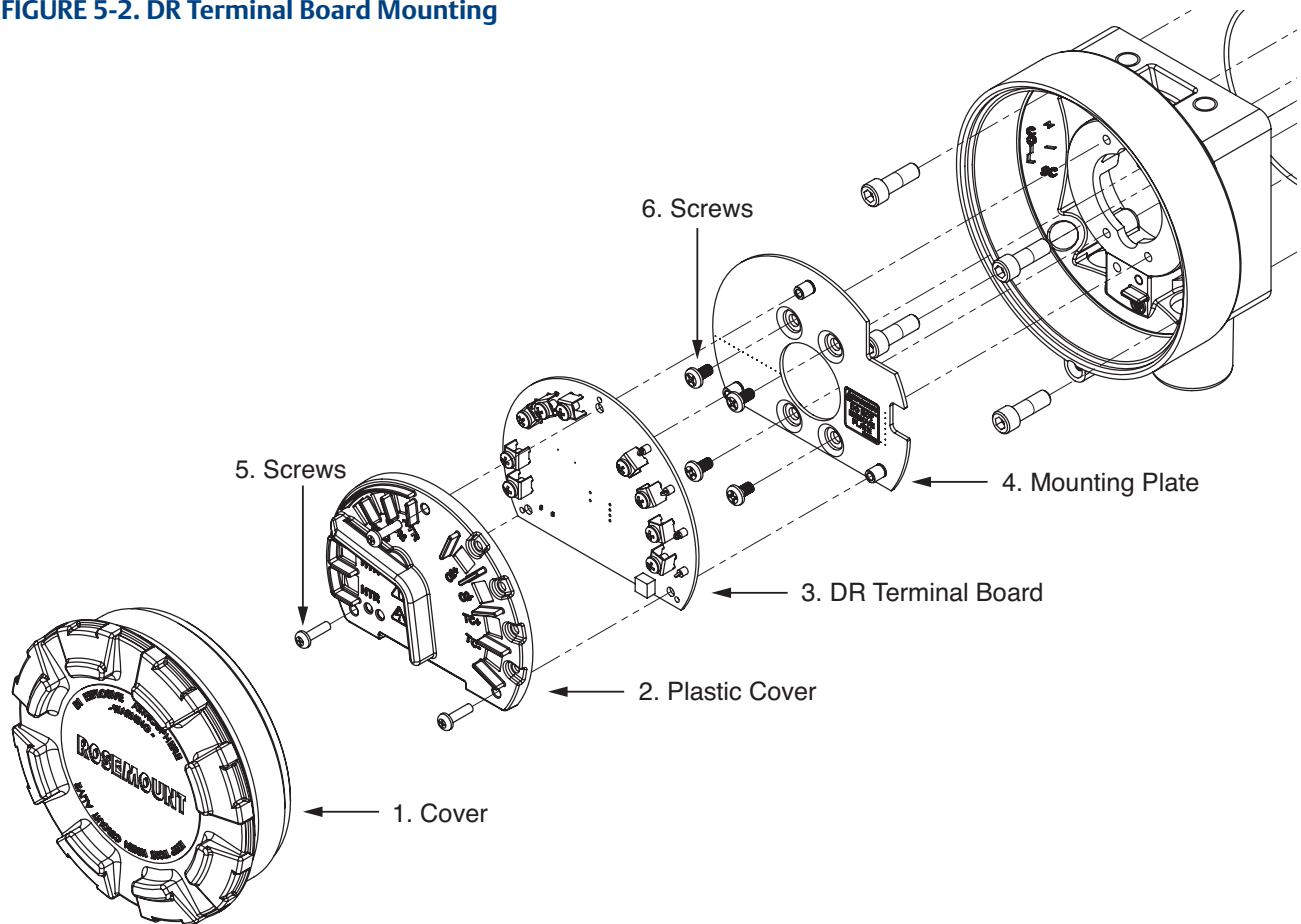
This paragraph covers replacement of the DR board. The board is not repairable and must be replaced if any component fails. See Figure 5-2 for item number references. The DR board is available as a standalone kit or with the plastic cover and mounting plate.

WARNING

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

1. Remove cover (1) from the DR Probe housing.
2. Disconnect the power and signal wires from the DR terminal board (3).
3. Remove the three screws (5) securing plastic cover (2) and DR terminal board (3) to mounting plate (4).
4. Disconnect the two wire harness connectors from the back of the DR terminal board.
5. Replacement DR terminal boards come in two configurations:
 - a. DR terminal board with thermal pad and mounting screws.
 - b. DR Terminal board, plastic cover, mounting plate and mounting screws.
6. If the mounting plate is being replaced, remove the four screws (7) securing the plate to the housing. Install the new mounting plate using four screws. Replacement screws are provided if any become lost or damaged.
7. Reconnect the two wire harness connectors to the back of the DR terminal board. The connectors are different and individually keyed to prevent misconnection.
8. Carefully push the wire harnesses through the hole in the mounting plate and align the DR terminal board and plastic cover over the three standoffs on the mounting plate
9. Install the three screws to secure the board to the mounting plate. Replacement screws are provided if any become lost or damaged.
10. Reconnect the power and signal wires to the DR terminal board.
11. Reinstall the cover to the DR Probe housing.
12. Reapply power to the DR Probe.

FIGURE 5-2. DR Terminal Board Mounting



5.8 Heater Strut Replacement

This paragraph 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 6-1). Refer to Figure 5-3 for item number references.

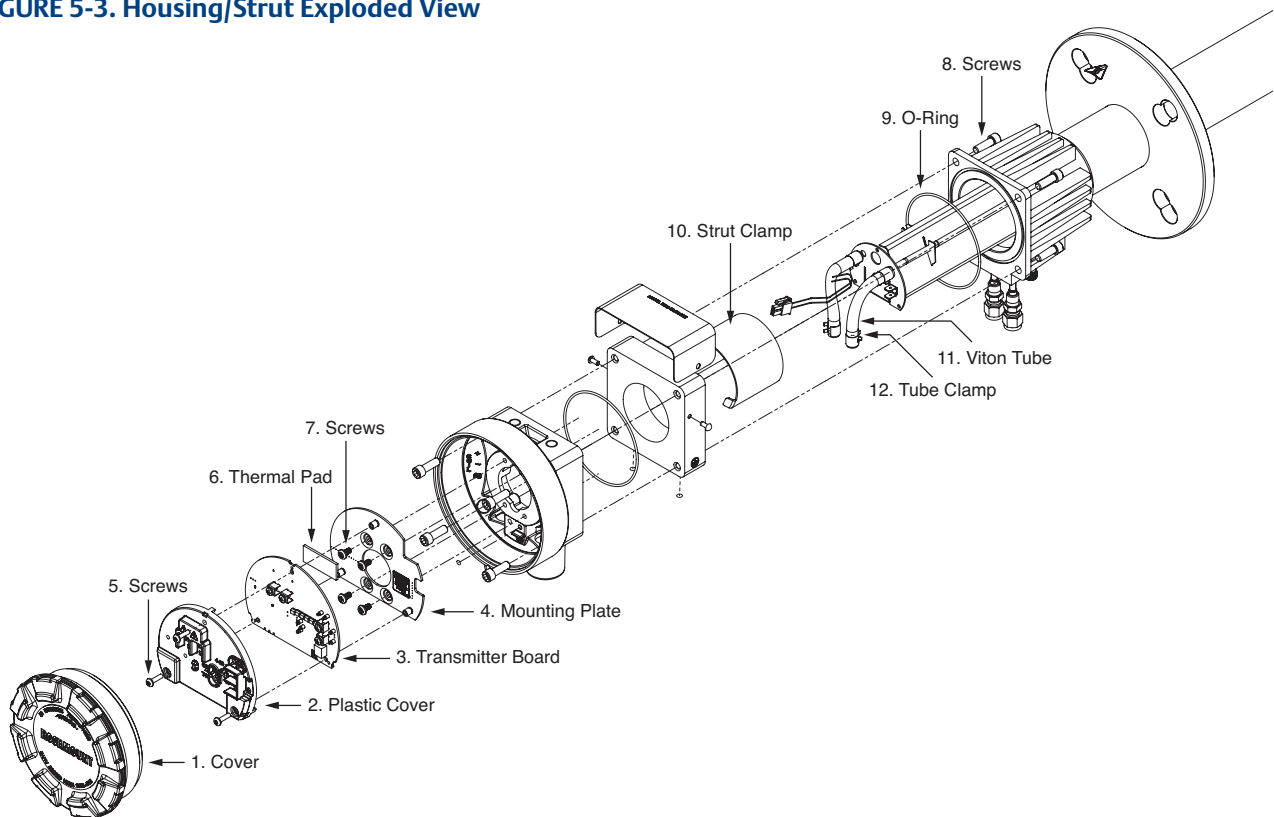
NOTE

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 800°F (427°C). This can cause severe burns.

1. Follow the instructions in "Removal and Replacement of Probe" to remove the 6888A from the stack or duct.
2. Follow the instructions in "Removal and Replacement of Transmitter Board" or "Removal and Replacement of DR Board" to remove the electronics from the housing.
3. Remove four screws (8). Remove housing from probe using care not to damage the strut wire harnesses or O-ring (9).

4. Remove the strut clamp (10) from inside the finned housing on the probe.
5. Remove tube clamps (12) and Viton tubes (11) 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 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 will turn to align the hole on the back plate of the strut with the calibration gas line. When the hole and the calibration gas line are aligned correctly, the strut will slide 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 (11).
10. Insert the strut clamp (10) 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 (9) 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 (8).

FIGURE 5-3. Housing/Strut Exploded View



15. Follow the instructions in "Removal and Replacement of Transmitter Board" to install the electronics into the housing.
16. Follow the instructions in "Removal and Replacement of Probe" to install the 6888A into the stack or duct.

5.9 Cell Replacement

This paragraph 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 6-1).

The cell replacement kit (Figure 5-4) 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 6-1).

WARNING

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 572°F (300°C). This can cause severe burns.

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

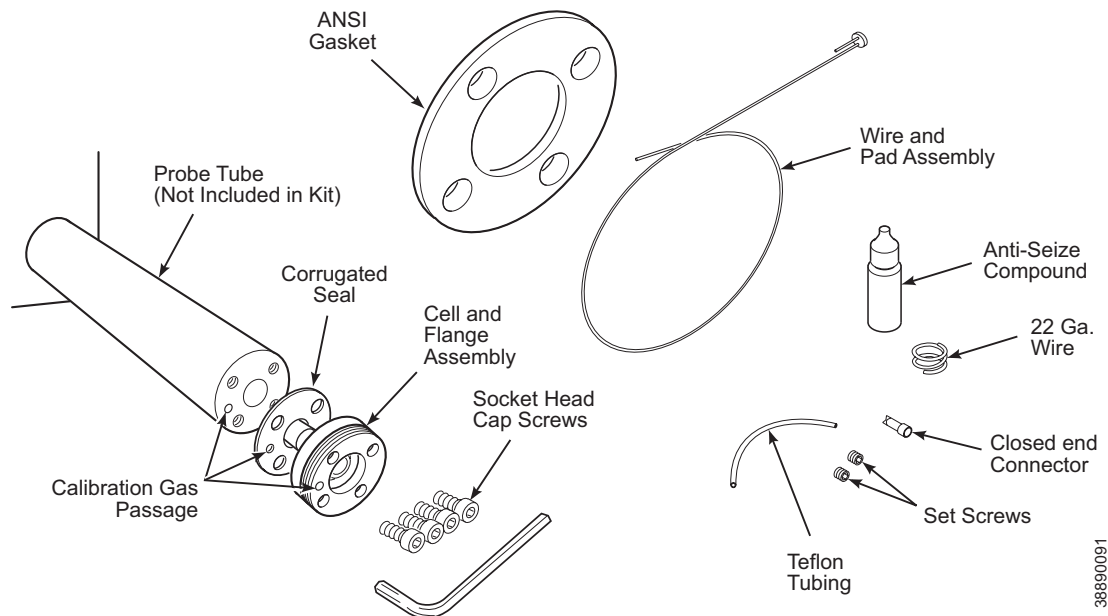
CAUTION

Do not remove the cell unless 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.

1. Follow the instructions in "Removal and Replacement of Probe" to remove the 6888A from the stack or duct.
2. If the probe uses the standard diffusion element, use a spanner 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 6-1), 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. Note that the contact pad inside of the probe will sometimes fuse 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 the contact pad. Follow the instructions in "Heater Strut Replacement", steps 2 through 4, to remove the electronics housing 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-lbs (6.8 N·m).
9. Follow the instructions in "Heater Strut Replacement", 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-lbs (14 N·m). If applicable, reinstall the vee deflector, orienting apex toward gas flow. Secure with the setscrews and anti-seize compound. Torque to 25 in-lbs (2.8 N·m).
11. On systems equipped with an abrasive shield, install the dust seal gaskets, with joints 180° apart.
12. Follow the instructions in "Removal and Replacement of Probe" to install the 6888A into 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 6888A stabilizes, calibrate the probe. If new components have been installed, repeat calibration after 24 hours of operation.

FIGURE 5-4. Cell Replacement Kit



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5.10 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.

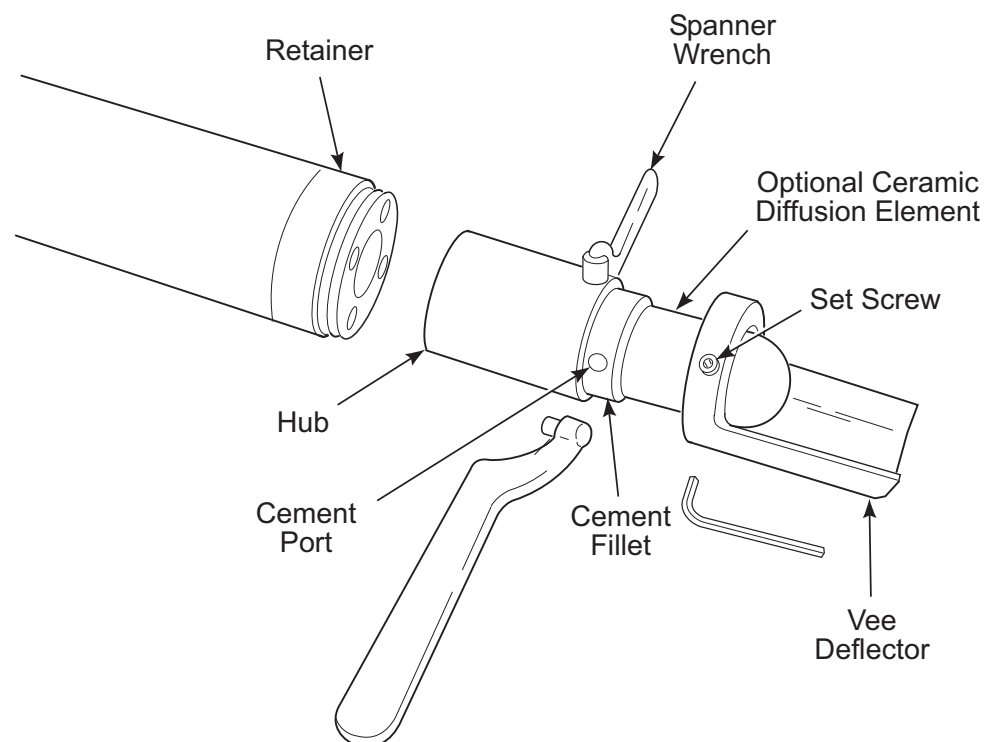
Damage to the diffusion element may become apparent during calibration. Compare probe response with previous response. A broken diffusion element will cause an inadequate response to calibration gas. Hex wrenches needed to remove setscrews and socket head screws in the following procedure are available as part of a Probe Disassembly Kit, Table 6-1.

NOTE

This refers to the ceramic diffusion element only.

1. Follow the instructions in "Removal and Replacement of Probe" to remove the 6888A from the stack or duct.
2. Loosen setscrews using hex wrench from Probe Disassembly Kit and remove vee deflector. Inspect setscrews. If damaged, replace with stainless setscrews coated with anti-seize compound.
3. Follow the instructions in "Removal and Replacement of Probe" to install the 6888A into the stack or duct.

FIGURE 5-5. Ceramic Diffuser Element Replacement



5.11 Blind Cover Replacement

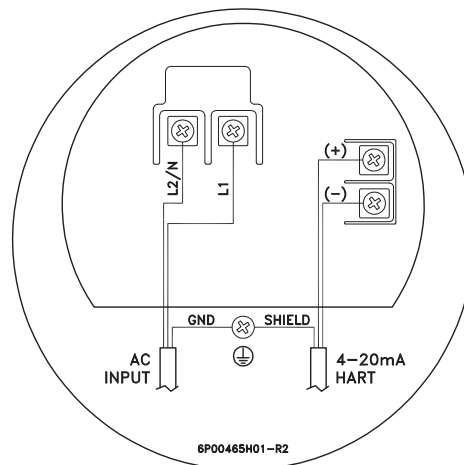
This paragraph covers the replacement of the main housing cover and the application of the correct field wiring label.

NOTE

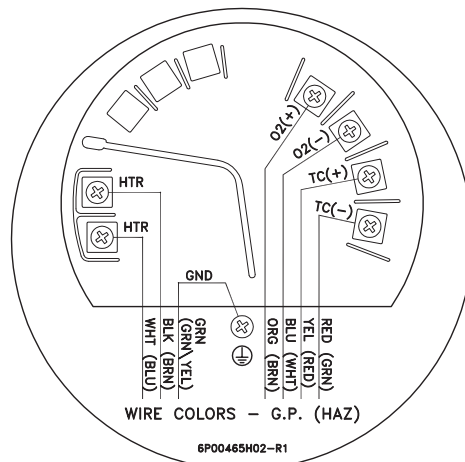
Field wiring labels are supplied for each product configuration. Ensure the correct label is applied to the inside of the cover that matches your configuration.

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 their application is shown in Figure 5-6.
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.

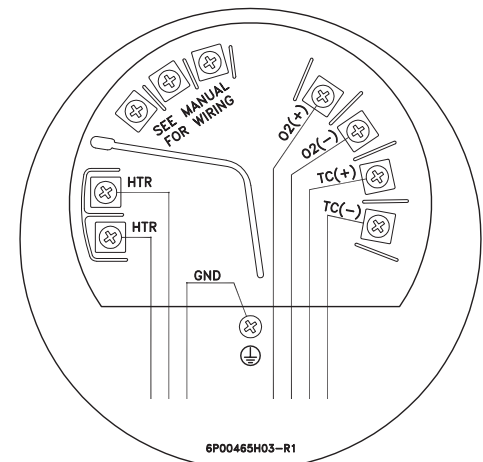
FIGURE 5-6. Field Wiring Labels



Label for Full Transmitter



Label for DR Probe



Label for DR/YEW Probe

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Section 6: Replacement Parts

6.1 6888A Transmitter

TABLE 6-1. Replacement Part Kits for O₂ Transmitter

Part Number	Description
6A00448G01	Kit, Transmitter Board
6A00448G02	Kit, Transmitter Board, w/Mounting Plate & Cover
6A00449G01	Kit, DR Terminal Board
6A00449G02	Kit, DR Terminal Board, w/Mounting Plate & Cover
6A00449G10	Kit, DR Terminal Board, YEW
6A00449G11	Kit, DR Terminal Board, YEW, w/Mounting Plate & Cover
6A00452G01	Kit, Blind Cover, Standard & Autocal Housing
6A00450G01	Kit, Cell Gaskets (Pack of 5)
6A00451G01	Kit, Cover O-Rings, Standard Hsg (Pack of 5)
6A00453G01	Kit, Snubber Diffuser
6A00453G02	Kit, Snubber Diffuser w/Dust Seal
6A00453G03	Kit, Ceramic Diffuser w/V-deflector
6A00453G04	Kit, Ceramic Diffuser w/Dust Seal w/V-deflector
6A00453G05	Kit, Hastelloy Diffuser w/V-deflector
6A00453G06	Kit, Hastelloy Diffuser w/Dust Seal w/V-deflector
6A00454G01	Kit, Strut, 18 Inch
6A00454G02	Kit, Strut, 3 Foot
6A00454G03	Kit, Strut, 6 Foot
6A00454G04	Kit, Strut, 9 Foot
6A00454G05	Kit, Strut, 12 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
6A00455G04	Kit, Cell Replacement, 9 Foot, Standard Cell
6A00455G05	Kit, Cell Replacement, 12 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
6A00455G14	Kit, Cell Replacement, 9 Foot, Acid Resistant Cell
6A00455G15	Kit, Cell Replacement, 12 Foot, Acid Resistant Cell
6A00456G01	Flange Gasket Kit, ANSI, General Purpose, (Pack of 5)
6A00456G03	Flange Gasket Kit, DIN, General Purpose, (Pack of 5)
6A00457G01	Spare transmitter board cover
6A00457G02	Spare DR term board cover
6A00475G01	Tool kit - 6888A

TABLE 6-1. Replacement Part Kits for O₂ Transmitter

Part Number	Description
1A99119G01	Calibration Gas Bottles - 0.4% and 8% O ₂ , balance nitrogen - 550 liters each*
1A99119G02	Two Flow Regulators (for calibration gas bottles)
1A99119G03	Bottle rack

*Calibration gas bottles cannot be shipped via air freight

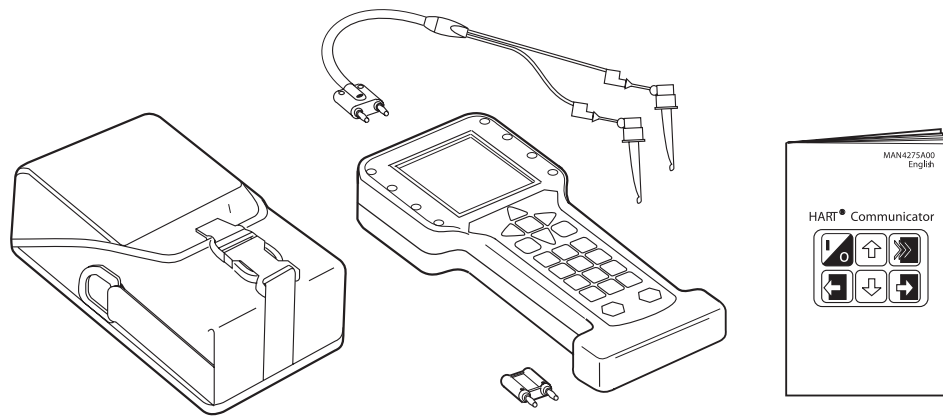
Section 7: Optional Accessories

7.1 HART® Handheld 475 Field Communicator

The 475 Field Communicator is an interface device that provides a common communication link to HART-compatible instruments, such as the 6888Xi. HART Communications Protocol permits all the information available from the 6888Xi's electronics to be transmitted over standard 4-20 mA signal wires. By attaching the 475 Field Communicator at a termination point along the 4-20 mA signal line, a technician can diagnose problems and configure and calibrate the 6888Xi as if he or she were standing in front of the instrument.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-1. 475 Field Communicator



7.2 Asset Management Solutions (AMS)

Asset Management Solutions (AMS) software works in conjunction with the HART Communication Protocol and offers the capability to communicate with all HART plant devices from a single computer terminal.

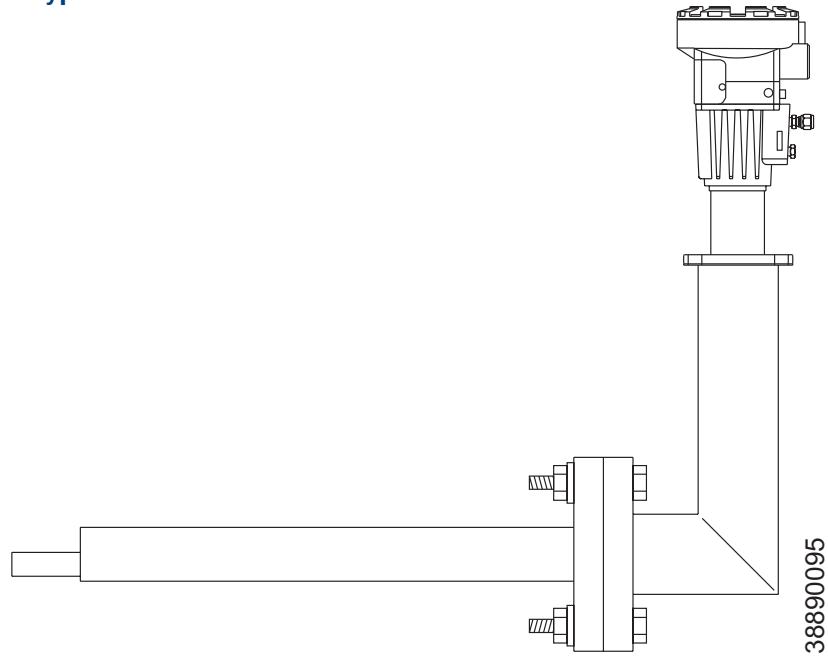
For more information, call Rosemount Analytical at 1-800-433-6076.

7.3 By-Pass Packages

The specially designed Rosemount Analytical By-Pass Package for oxygen analyzers has proven to withstand the high temperatures in process heaters while providing the same advantages offered by the in situ sensor. Inconel steel tubes provide effective resistance to corrosion, and the package uses no moving parts, air pumps, or other components common to other sampling systems.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-2. Bypass Packaes



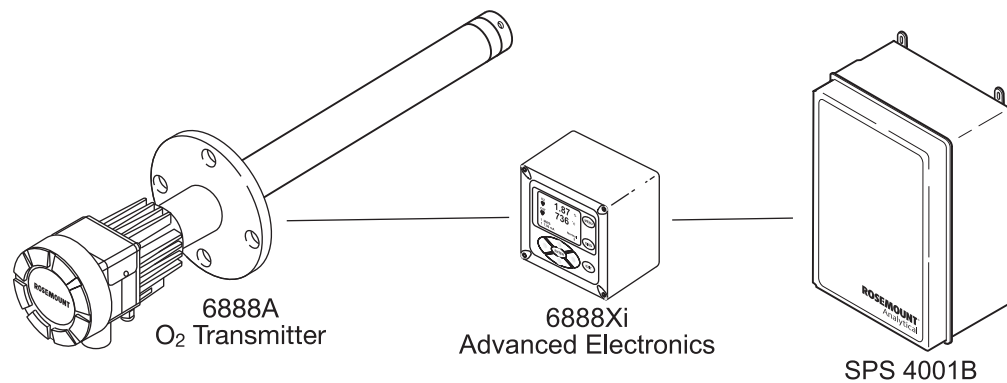
7.4 SPS 4001B Single Probe Autocalibration Sequencer

Rosemount Analytical Inc. specifically designed the SPS 4001B Single Probe Autocalibration Sequencer to provide the capability to perform automatic or on-demand calibrations. The SPS 4001B is fully enclosed in a NEMA cabinet suited for wall-mounting. This cabinet provides added protection against dust and minor impacts.

The SPS 4001B works in conjunction with the 6888Xi, eliminating out-of-calibration occurrences and the need to send a technician to the installation site.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-3. SPS 4001B



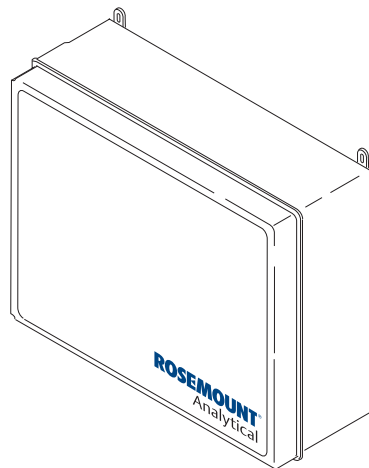
7.5 IMPS 4000 Intelligent Multiprobe Test Gas Sequencer

The IMPS 4000 Intelligent Multiprobe Test Gas Sequencer is housed within an IP56 (NEMA 4X) enclosure and has the intelligence to provide calibration gas sequencing of up to four 6888Xi's to accommodate automatic and semi-automatic calibration routines.

This sequencer works in conjunction with the CALIBRATION RECOMMENDED feature, eliminating out-of-calibration occurrences and the need to send a technician to the installation site. In addition, the IMPS 4000 provides a remote contact input to initiate a calibration from a remote location and relay outputs to alert when a calibration is in progress, an O₂ Probe is out of calibration, calibration gases are on, and calibration gas pressure is low.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-4. IMPS 4000 Intelligent Multiprobe Sequencer



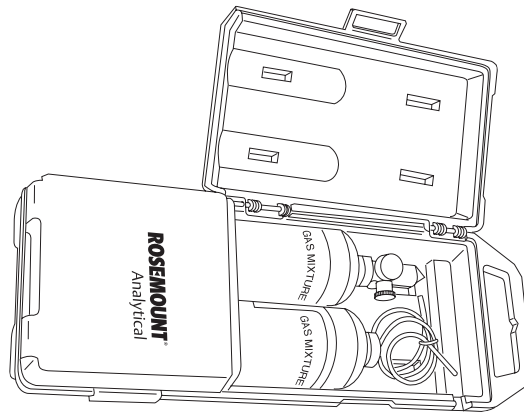
7.6 O₂ Calibration Gas

Rosemount Analytical's O₂ Calibration Gas and Service Kits have been carefully designed to provide a more convenient and fully portable means of testing, calibrating, and servicing.

Rosemount Analytical's oxygen analyzers. These lightweight, disposable gas cylinders eliminate the need to rent gas bottles.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-5. Calibration Gas Bottles

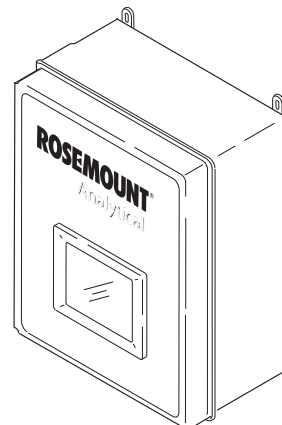


7.7 Oxybalance Display And Averaging System

Optional OxyBalance Display and Averaging System. Reviews up to eight 4-20 mA signals from individual probes. Trends individual outputs, calculates four programmable averages as additional 4-20 mA outputs.

For more information, call Rosemount Analytical at 1-800-433-6076.

FIGURE 7-6. OxyBalance System



Appendix A: Safety Data

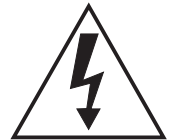


IMPORTANT

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 assure 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. Mains 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.
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.
7. 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.
8. Where equipment or covers are marked with the symbol to the right, there is a danger from 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.
9. Where equipment or covers are marked with the symbol to the right, refer to the Operator Manual for instructions.
10. All graphical symbols used in this product are from one or more of the following standards: EN61010-1, 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 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.



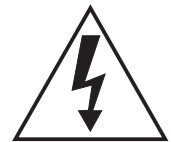


DŮLEŽITÉ

Bezpečnostní pokyny pro zapojení a instalaci zařízení

Následující bezpečnostní pokyny se speciálně vztahují na všechny členské státy EU. Pokyny by měly být přísně dodržovány, aby se zajistilo splnění Směrnice o nízkém napětí. Pokud nejsou pokyny nahrazeny místními či národními normami, měly by je dodržovat i nečlenské státy EU.

1. U všech zemnicích bodů, interních a externích, by mělo být vytvořeno odpovídající uzemnění.
2. Po instalaci nebo odstranění problémů musí být vyměněny všechny bezpečnostní kryty a uzemnění. Vždy musí být zajištěna integrita všech zemnicích svorek.
3. Síťové kabely by měly odpovídat požadavkům normy IEC227 nebo IEC245.
4. Všechna zapojení by měla být vhodná pro použití při vnějších teplotách nad 75 °C.
5. Všechna použitá kabelová hrdla by měla mít takové vnitřní rozměry, aby zajistila odpovídající zakotvení kabelu.
6. Správnou činnost zařízení zajistíte, vytvoříte-li připojení k napájecímu zdroji pouze přes jistič, který v případě poruchy odpojí všechny obvody s konduktory. Jistič může také obsahovat mechanický odpojovač. Pokud ho neobsahuje, musí být zajištěn a jasně označen jiný způsob odpojení zařízení od zdroje. Jističe nebo přepínače musí odpovídat uznávaným normám, např. IEC947. Všechna zapojení musí odpovídat místním normám.
7. Je-li zařízení nebo kryt označen symbolem na pravé straně, pravděpodobně se uvnitř nachází nebezpečné napětí. Tyto kryty by měly být sejmuty pouze po odpojení zařízení od zdroje - a to pouze kvalifikovaným zaměstnancem.
8. Je-li zařízení nebo kryt označen symbolem na pravé straně, povrch zařízení může být velmi horký. Tyto kryty by měly být sejmuty pouze kvalifikovaným zaměstnancem po odpojení zařízení od zdroje. Některé povrchy mohou být stále horké.
9. Je-li zařízení nebo kryt označen symbolem na pravé straně, přečtěte si nejprve instrukce v návodu k obsluze.
10. Všechny grafické symboly používané u výrobku pocházejí z následujících norem: EN61010-1, IEC417 a ISO3864.
11. Pokud je zařízení nebo štítky označeno varováním „Je-li zařízení pod napětím, neotvírejte jej“ či podobným, může dojít ve výbušném prostředí ke vznícení. Zařízení lze otevřít pouze po jeho odpojení od zdroje a ponechání dostatečného času na vychladnutí, jak je uvedeno na štítku nebo v návodu k obsluze - a to pouze kvalifikovaným zaměstnancem.



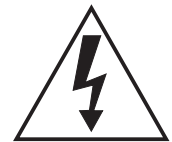


VIGTIGT

Sikkerhedsinstruktion for tilslutning og installering af dette udstyr.

Følgende sikkerhedsinstruktioner gælder specifikt i alle EU-medlemslande. Instruktionerne skal nøje følges for overholdelse af Lavsspændingsdirektivet og bør også følges i ikke EU-lande med mindre andet er specificeret af lokale eller nationale standarder.

1. Passende jordforbindelser skal tilsluttes alle jordklemmer, interne og eksterne, hvor disse forefindes.
2. Efter installation eller fejlfinding skal alle sikkerhedsdæksler og jordforbindelser reetableres.
3. Forsyningskabler skal opfylde krav specificeret i IEC227 eller IEC245.
4. Alle ledningstilslutninger skal være konstrueret til omgivelsestemperatur højere end 75°C.
5. Alle benyttede kabelforskrutninger skal have en intern dimension, så passende kabelafledning kan etableres.
6. For opnåelse af sikker drift og betjening skal der skabes beskyttelse mod indirekte berøring gennem afbryder (min. 10A), som vil afbryde alle kredsløb med elektriske ledere i fejlsituation. Afbryderen skal indholde en mekanisk betjent kontakt. Hvis ikke skal anden form for afbryder mellem forsyning og udstyr benyttes og mærkes som sådan. Afbrydere eller kontakter skal overholde en kendt standard som IEC947.
7. Hvor udstyr eller dæksler er mærket med dette symbol, er farlige spændinger normalt forekommende bagved. Disse dæksler bør kun afmonteres, når forsyningsspændingen er frakoblet - og da kun af instrueret servicepersonale.
8. Hvor udstyr eller dæksler er mærket med dette symbol, forefindes meget varme overflader bagved. Disse dæksler bør kun afmonteres af instrueret servicepersonale, når forsyningsspænding er frakoblet. Visse overflader vil stadig være for varme at berøre i op til 45 minutter efter frakobling.
9. Hvor udstyr eller dæksler er mærket med dette symbol, se da i betjeningsmanual for instruktion.
10. Alle benyttede grafiske symboler i dette udstyr findes i én eller flere af følgende standarder: EN61010-1, IEC417 & ISO3864.
11. Når udstyr eller etiketter er mærket "Må ikke åbnes, mens udstyret tilføres strøm" eller lignende, er der fare for antændelse i områder, hvor der er en eksplosiv atmosfære. Dette udstyr må kun åbnes, når strømkilden er fjernet, og der er gået tilstrækkelig tid til, at udstyret er kølet ned. Den nødvendige tid hertil er angivet på etiketten eller i brugervejledningen. Udstyret må kun åbnes af en faglært person.



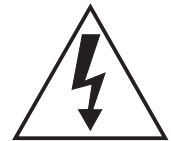


BELANGRIJK

Veiligheidsvoorschriften voor de aansluiting en installatie van dit toestel.

De hierna volgende veiligheidsvoorschriften zijn vooral bedoeld voor de EU lidstaten. Hier moet aan gehouden worden om de onderworpenheid aan de Laag Spannings Richtlijn (Low Voltage Directive) te verzekeren. Niet EU staten zouden deze richtlijnen moeten volgen tenzij zij reeds achterhaald zouden zijn door plaatselijke of nationale voorschriften.

1. Degelijke aardingsaansluitingen moeten gemaakt worden naar alle voorziene aardpunten, intern en extern.
2. Na installatie of controle moeten alle veiligheidsdeksels en -aarding terug geplaatst worden. Ten alle tijde moet de betrouwbaarheid van de aarding behouden blijven.
3. Voedingskabels moeten onderworpen zijn aan de IEC227 of de IEC245 voorschriften.
4. Alle bekabeling moet geschikt zijn voor het gebruik in omgevingstemperaturen, hoger dan 75°C.
5. Alle wartels moeten zo gedimensioneerd zijn dat een degelijke kabel bevestiging verzekerd is.
6. Om de veilige werking van dit toestel te verzekeren, moet de voeding door een stroomonderbreker gevoerd worden (min 10A) welke alle draden van de voeding moet onderbreken. De stroomonderbreker mag een mechanische schakelaar bevatten. Zoniet moet een andere mogelijkheid bestaan om de voedingsspanning van het toestel te halen en ook duidelijk zo zijn aangegeven. Stroomonderbrekers of schakelaars moeten onderworpen zijn aan een erkende standaard zoals IEC947.
7. Waar toestellen of deksels aangegeven staan met het symbool is er meestal hoogspanning aanwezig. Deze deksels mogen enkel verwijderd worden nadat de voedingsspanning werd afgelegd en enkel door getraind onderhoudspersoneel.
8. Waar toestellen of deksels aangegeven staan met het symbool is er gevaar voor hete oppervlakken. Deze deksels mogen enkel verwijderd worden door getraind onderhoudspersoneel nadat de voedingsspanning verwijderd werd. Sommige oppervlakken kunnen 45 minuten later nog steeds heet aanvoelen.
9. Waar toestellen of deksels aangegeven staan met het symbool gelieve het handboek te raadplegen.
10. Alle grafische symbolen gebruikt in dit produkt, zijn afkomstig uit een of meer van devolgende standaards: EN61010-1, IEC417 en ISO3864.
11. Op plaatsen waar uitrusting of etiketten zijn voorzien van een melding als "Niet openen bij aanwezigheid van spanning" bestaat er brandgevaar in omgevingen waar een explosieve atmosfeer aanwezig is. Deze uitrusting mag uitsluitend worden geopend wanneer het niet meer onder spanning staat en de uitrusting gedurende de voorgeschreven tijd op het etiket of in de handleiding is afgekoeld - en dan uitsluitend door voldoende opgeleid onderhoudspersoneel.



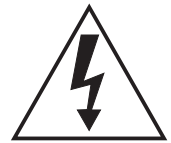


BELANGRIJK

Veiligheidsinstructies voor de bedrading en installatie van dit apparaat.

Voor alle EU lidstaten zijn de volgende veiligheidsinstructies van toepassing. Om aan de geldende richtlijnen voor laagspanning te voldoen dient men zich hieraan strikt te houden. Ook niet EU lidstaten dienen zich aan het volgende te houden, tenzij de lokale wetgeving anders voorschrijft.

1. Alle voorziene interne- en externe aardaansluitingen dienen op adequate wijze aangesloten te worden.
2. Na installatie, onderhouds- of reparatie werkzaamheden dienen alle beschermdeksels /kappen en aardingen om reden van veiligheid weer aangebracht te worden.
3. Voedingskabels dienen te voldoen aan de vereisten van de normen IEC 227 of IEC 245.
4. Alle bedrading dient geschikt te zijn voor gebruik bij een omgevings temperatuur boven 75°C.
5. Alle gebruikte kabelwartels dienen dusdanige inwendige afmetingen te hebben dat een adequate verankering van de kabel wordt verkregen.
6. Om een veilige werking van de apparatuur te waarborgen dient de voeding uitsluitend plaats te vinden via een meerpolige automatische zekering (min.10A) die alle spanningvoerende geleiders verbreekt indien een foutconditie optreedt. Deze automatische zekering mag ook voorzien zijn van een mechanisch bediende schakelaar. Bij het ontbreken van deze voorziening dient een andere als zodanig duidelijk aangegeven mogelijkheid aanwezig te zijn om de spanning van de apparatuur af te schakelen. Zekeringen en schakelaars dienen te voldoen aan een erkende standaard zoals IEC 947.
7. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder spanning voerende delen bevinden die gevaar op kunnen leveren. Deze beschermdeksels/ kappen mogen uitsluitend verwijderd worden door getraind personeel als de spanning is afgeschakeld.
8. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder hete oppervlakken of onderdelen bevinden. Bepaalde delen kunnen mogelijk na 45 min. nog te heet zijn om aan te raken.
9. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, dient men de bedieningshandleiding te raadplegen.
10. Alle grafische symbolen gebruikt bij dit produkt zijn volgens een of meer van de volgende standaarden: EN 61010-1, IEC 417 & ISO 3864.
11. Op plaatsen waar uitrusting of etiketten zijn voorzien van een melding als "Niet openen bij aanwezigheid van spanning" bestaat er brandgevaar in omgevingen waar een explosieve atmosfeer aanwezig is. Deze uitrusting mag uitsluitend worden geopend wanneer het niet meer onder spanning staat en de uitrusting gedurende de voorgeschreven tijd op het etiket of in de handleiding is afgekoeld - en dan uitsluitend door voldoende opgeleid onderhoudspersoneel.



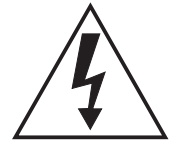


WICHTIG

Sicherheitshinweise für den Anschluß und die Installation dieser Geräte.

Die folgenden Sicherheitshinweise sind in allen Mitgliederstaaten der europäischen Gemeinschaft gültig. Sie müssen strikt eingehalten werden, um der Niederspannungsrichtlinie zu genügen. Nichtmitgliedstaaten der europäischen Gemeinschaft sollten die national gültigen Normen und Richtlinien einhalten.

1. Alle intern und extern vorgesehenen Erdungen der Geräte müssen ausgeführt werden.
2. Nach Installation, Reparatur oder sonstigen Eingriffen in das Gerät müssen alle Sicherheitsabdeckungen und Erdungen wieder installiert werden. Die Funktion aller Erdverbindungen darf zu keinem Zeitpunkt gestört sein.
3. Die Netzspannungsversorgung muß den Anforderungen der IEC227 oder IEC245 genügen.
4. Alle Verdrahtungen sollten mindestens bis 75°C ihre Funktion dauerhaft erfüllen.
5. Alle Kabeldurchführungen und Kabelverschraubungen sollten in Ihrer Dimensionierung so gewählt werden, daß diese eine sichere Verkabelung des Gerätes ermöglichen.
6. Um eine sichere Funktion des Gerätes zu gewährleisten, muß die Spannungsversorgung über mindestens 10 A abgesichert sein. Im Fehlerfall muß dadurch gewährleistet sein, daß die Spannungsversorgung zum Gerät bzw. zu den Geräten unterbrochen wird. Ein mechanischer Schutzschalter kann in dieses System integriert werden. Falls eine derartige Vorrichtung nicht vorhanden ist, muß eine andere Möglichkeit zur Unterbrechung der Spannungszufuhr gewährleistet werden mit Hinweisen deutlich gekennzeichnet werden. Ein solcher Mechanismus zur Spannungsunterbrechung muß mit den Normen und Richtlinien für die allgemeine Installation von Elektrogeräten, wie zum Beispiel der IEC947, übereinstimmen.
7. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, die eine gefährliche (Netzspannung) Spannung führen. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen.
8. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, in bzw. unter denen heiße Teile vorhanden sind. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen. Bis 45 Minuten nach dem Unterbrechen der Netzzufuhr können derartig Teile noch über eine erhöhte Temperatur verfügen.
9. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, bei denen vor dem Eingriff die entsprechenden Kapitel im Handbuch sorgfältig durchgelesen werden müssen.
10. Alle in diesem Gerät verwendeten graphischen Symbole entspringen einem oder mehreren der nachfolgend aufgeführten Standards: EN61010-1, IEC417 & ISO3864.
11. Wenn Geräte oder Etiketten mit dem Hinweis "Nicht unter Spannung öffnen" oder ähnlichen Hinweisen versehen sind, besteht in explosionsgefährdeten Umgebungen Entzündungsgefahr. Das Gerät darf nur geöffnet werden, wenn es nicht ans Stromnetz angeschlossen und entsprechend der Zeitangaben auf dem Etikett bzw. in der Betriebsanleitung ausreichend abgekühlt ist. Das Gerät darf nur von geschultem Service-Personal geöffnet werden.



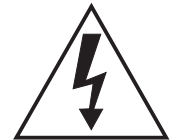


ΣΗΜΑΝΤΙΚΟ

Οδηγίες ασφαλείας για την καλωδίωση και εγκατάσταση της συσκευής

Οι ακόλουθες οδηγίες ασφαλείας εφαρμόζονται ειδικά για όλες τις χώρες μέλη της Ευρωπαϊκής Κοινότητας. Θα πρέπει να ακολουθούνται αυστηρά ώστε να εξασφαλιστεί η συμβατότητα με τις οδηγίες για τη Χαμηλή Τάση. Χώρες που δεν είναι μέλη της Ευρωπαϊκής Κοινότητας θα πρέπει επίσης να ακολουθούν τις οδηγίες, εκτός εάν αυτές αντικαθίστανται από τα Τοπικά ή Εθνικά πρότυπα.

1. Επαρκείς συνδέσεις γείωσης θα πρέπει να γίνονται σε όλα τα σημεία γείωσης, εσωτερικά και εξωτερικά, όπου υπάρχουν.
2. Μετά την εγκατάσταση ή την αντιμετώπιση σφαλμάτων, όλα τα καλύμματα ασφαλείας και οι γειώσεις ασφαλείας πρέπει να επανεγκαθίστανται. Η καλή κατάσταση όλων των ακροδεκτών γείωσης πρέπει να συντηρείται διαρκώς.
3. Τα καλώδια τροφοδοσίας πρέπει να πληρούν τις απαιτήσεις των IEC227 ή IEC245.
4. Όλες οι καλωδιώσεις θα πρέπει να είναι κατάλληλες για χρήση σε θερμοκρασία χώρου υψηλότερη από 75°C.
5. Όλοι οι στυπιοθλίπτες θα πρέπει να είναι τέτοιων εσωτερικών διαστάσεων, ώστε να παρέχουν επαρκή στερέωση των καλωδίων.
6. Για τη διασφάλιση ασφαλούς λειτουργίας αυτής της συσκευής, η σύνδεση τροφοδοσίας θα πρέπει να γίνεται μόνο μέσω ασφαλειοδιακόπτη, ο οποίος θα αποσυνδέει όλους τους ηλεκτροφόρους αγωγούς των κυκλωμάτων, στη διάρκεια κατάστασης σφάλματος. Ο ασφαλειοδιακόπτης μπορεί επίσης να περιλαμβάνει μηχανικό διακόπτη απομόνωσης. Εάν δεν περιλαμβάνει, τότε άλλα μέσα αποσύνδεσης της συσκευής από την τροφοδοσία πρέπει να παροχρηθούν και να σημανθούν σαφώς ως τέτοια. Οι ασφαλειοδιακόπτες ή διακόπτες πρέπει να συμμορφώνονται με αναγνωρισμένα πρότυπα όπως το IEC947. Όλες οι καλωδιώσεις πρέπει να συμμορφώνονται με τα τοπικά πρότυπα.
7. Όπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο που εικονίζεται δεξιά, επικίνδυνες τάσεις ενυπάρχουν κάτω από αυτά. Αυτά τα καλύμματα θα πρέπει να αφαιρούνται μόνο όταν έχει αφαιρεθεί η τροφοδοσία από τη συσκευή - και στην περίπτωση αυτή, μόνο από ειδικευμένο τεχνικό προσωπικό.
8. Όπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο που εικονίζεται δεξιά, υπάρχει κίνδυνος από καυτές επιφάνειες κάτω από αυτά. Τέτοια καλύμματα θα πρέπει να αφαιρούνται μόνο από ειδικευμένο τεχνικό προσωπικό, όταν έχει αφαιρεθεί η τροφοδοσία από τη συσκευή. Κάποιες επιφάνειες μπορούν να παραμένουν ζεστές στην αφή.
9. Όπου συσκευές ή καλύμματα είναι σημασμένα με το σύμβολο που εικονίζεται δεξιά, ανατρέξτε στις οδηγίες χρήσης της συσκευής.
10. Όλα τα γραφικά σύμβολα που χρησιμοποιούνται σε αυτό το προϊόν είναι από ένα ή περισσότερα από τα εξής πρότυπα: EN61010-1, IEC417 και ISO3864.
11. Όπου συσκευή ή ετικέτα είναι σημασμένη με την ένδειξη "Μην ανοίγετε ενώ βρίσκεται σε λειτουργία" ή άλλη παρόμοια, υπάρχει κίνδυνος ανάφλεξης σε περιοχές με εκρηκτική ατμόσφαιρα. Ο παρών εξοπλισμός πρέπει να ανοίγεται μόνο όταν είναι εκτός ρεύματος και αφού παρέλθει ο κατάλληλος χρόνος που αναγράφεται στην ετικέτα ή στο εγχειρίδιο οδηγιών ώστε να ψυχθεί και μόνο από εκπαιδευμένο προσωπικό συντήρησης.



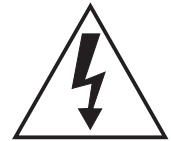


OLULINE TEAVE

Juhtmestiku ja seadme paigaldamisega seotud ohutusjuhised

Alljärgnevad ohutusjuhised rakenduvad eriti kõigi Euroopa Liidu liikmesriikide suhtes. Antud juhiseid tuleb täpselt järgida, et kindlustada vastavus madalpinge direktiiviga. Euroopa Liitu mittekuuluvad riigid peavad samuti alljärgnevaid juhiseid järgima, va juhul, kui on olemas vastavad kohalikud riiklikud standardid.

1. Ettenähtud maanduspunktide, nii sisemiste kui väliste jaoks tuleb tagada nõuetekohased maahendused.
2. Pärast paigaldamist või rikketuvastust tuleb kõik turvaumbrised ja turvamaandused uuesti oma kohale seada. Kõigis olukordades tuleb säilitada kõigi maandusklemmide terviklikkus.
3. Toitejuhtmed peavad vastama IEC227 või IEC245 nõuetele.
4. Kogu juhtmestik peab sobima kasutamiseks üle 75°C õhutemperatuuri juures.
5. Kõik juhtmetihendid peavad sisemõõtmete poolest tagama nõuetekohased kaabliühendused.
6. Seadme ohutu töötamise tagamiseks peab ühendus toiteallikaga toimuma vaid läbi automaatkorgi, mis veaolukorras lulitab välja kõik voolukandjad. Automaatkorgil võib olla ka mehhaaniliselt reguleeritav lahkluliti. Vastasel juhul peab seadme toiteallikast lahtiühendamiseks olema teine ja selgelt osutatud moodus. Automaatkorgid või -lulitid peavad vastama tunnustatud standarditele nagu nt IEC947. Kogu juhtmestik peab vastama kohalikele standarditele.
7. Seadmel või umbristel asuv paremale osutav sümbol tähistab selle all leiduvat ohtlikku pinget. Selliste sümbolitega umbriseid võib eemaldada vaid juhul, kui seade on toiteallikast lahti ühendatud ning ka siis ainult vastavate oskustega spetsialisti poolt.
8. Seadmele või umbristele märgitud paremale osutava sümboli all valitseb kuumadest pindadest tulenev oht. Nimetatud sümbolitega umbriseid võib eemaldada vaid vastavate oskustega spetsialist, kui seade on toiteallikast lahti ühendatud. Teatud pinnad võivad puudutamise jaoks liiga kuumad olla.
9. Seadmel või umbristel leiduva paremale osutava sümboli korral vt juhiste jaoks Toimimisjuhendit.
10. Kõik selle toote juures kasutatavad graafilised sümbolid lähtuvad uhest või enamast järgmistest standarditest: EN61010-1, IEC417 ja ISO3864.
11. Kui seadmele või siltidele on kirjutatud "Ärge avage voolutarbimine korral" vms, valitseb plahvatusohtlikus keskkonnas suttimise oht. Seadet võib avada ainult siis, kui toide on lahti ühendatud ning seadmel on võimaldatud sildil või kasutusjuhendis osutatud aja jooksul maha jahtuda -- ning ka sellisel juhul ainult vastavate oskustega spetsialisti poolt.



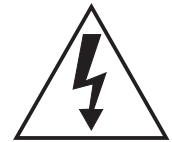


TÄRKEÄÄ

Turvallisuusohje, jota on noudatettava tämän laitteen asentamisessa ja kaapeloinnissa.

Seuraavat ohjeet pätevät erityisesti EU:n jäsenvaltioissa. Niitä täytyy ehdottomasti noudattaa jotta täytettäisiin EU:n matalajännitedirektiivin (Low Voltage Directive) yhteensopivuus. Myös EU:hun kuulumattomien valtioiden tulee noudattaa tätä ohjetta, elleivät kansalliset standardit estä sitä.

1. Riittävät maadoituskytkennät on tehtävä kaikkiin maadoituspisteisiin, sisäisiin ja ulkoisiin.
2. Asennuksen ja vianetsinnän jälkeen on kaikki suojat ja suojamaat asennettava takaisin paikoilleen. Maadoitusliittimen kunnollinen toiminta täytyy aina ylläpitää.
3. Jännitesyöttöjohtimien täytyy täyttää IEC227 ja IEC245 vaatimukset.
4. Kaikkien johdotuksien tulee toimia >75°C lämpötiloissa.
5. Kaikkien läpivientiholkkien sisähalkaisijan täytyy olla sellainen että kaapeli lukkiutuu kunnolla kiinni.
6. Turvallisen toiminnan varmistamiseksi täytyy jännitesyöttö varustaa turvakytkimellä (min 10A), joka kytkee irti kaikki jännitesyöttöjohtimet vikatilanteessa. Suojaan täytyy myös sisältyä mekaaninen erotuskytkin. Jos ei, niin jännitesyöttö on pystyttävä katkaisemaan muilla keinoilla ja merkittävä siten että se tunnistetaan sellaiseksi. Turvakytkimien tai katkaisimien täytyy täyttää IEC947 standardin vaatimukset näkyvyydestä.
7. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla hengenvaarallisen suuruinen jännite. Suojaa ei saa poistaa jänniteen ollessa kytkettynä laitteeseen ja poistamisen saa suorittaa vain alan asiantuntija.
8. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla kuuma pinta. Suojaa saa poistaa vain alan asiantuntija kun jännitesyöttö on katkaistu. Tällainen pinta voi säilyä kosketuskuumana jopa 45 minuuttia.
9. Mikäli laite tai kosketussuoja on merkitty tällä merkillä katso lisäohjeita käyttöohjekirjasta.
10. Kaikki tässä tuotteessa käytetyt graafiset symbolit ovat yhdestä tai useammasta seuraavista standardeista: EN61010-1, IEC417 & ISO3864.
11. Jos laitteessa tai tarrassa on merkintä "Älä avaa, kun virta on kytketty" tai vastaava, räjähdysvaarallisissa tiloissa on syttymisen vaara. Nämä laitteet voidaan avata vain silloin, kun virta ei ole kytkettynä ja laitteen on annettu jäähtyä tarrassa tai oppaassa määritetyn ajan. Tällöinkin laitteet saa avata vain koulutettu huoltohenkilökunta



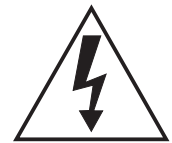


IMPORTANT

Consignes de sécurité concernant le raccordement et l'installation de cet appareil.

Les consignes de sécurité ci-dessous s'adressent particulièrement à tous les états membres de la communauté européenne. Elles doivent être strictement appliquées afin de satisfaire aux directives concernant la basse tension. Les états non membres de la communauté européenne doivent également appliquer ces consignes sauf si elles sont en contradiction avec les standards locaux ou nationaux.

1. Un raccordement adéquat à la terre doit être effectuée à chaque borne de mise à la terre, interne et externe.
2. Après installation ou dépannage, tous les capots de protection et toutes les prises de terre doivent être remis en place, toutes les prises de terre doivent être respectées en permanence.
3. Les câbles d'alimentation électrique doivent être conformes aux normes IEC227 ou IEC245.
4. Tous les raccordements doivent pouvoir supporter une température ambiante supérieure à 75°C.
5. Tous les presse-étoupes utilisés doivent avoir un diamètre interne en rapport avec les câbles afin d'assurer un serrage correct sur ces derniers.
6. Afin de garantir la sécurité du fonctionnement de cet appareil, le raccordement à l'alimentation électrique doit être réalisé exclusivement au travers d'un disjoncteur (minimum 10A.) isolant tous les conducteurs en cas d'anomalie. Ce disjoncteur doit également pouvoir être actionné manuellement, de façon mécanique. Dans le cas contraire, un autre système doit être mis en place afin de pouvoir isoler l'appareil et doit être signalisé comme tel. Disjoncteurs et interrupteurs doivent être conformes à une norme reconnue telle IEC947.
7. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des tensions dangereuses sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent.
8. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des surfaces dangereusement chaudes sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent. Certaines surfaces peuvent rester chaudes jusqu'à 45 mn.
9. Lorsque les équipements ou les capots affichent le symbole suivant, se reporter au manuel d'instructions.
10. Tous les symboles graphiques utilisés dans ce produit sont conformes à un ou plusieurs des standards suivants: EN61010-1, IEC417 & ISO3864.
11. Les équipements comportant une étiquette avec la mention " Ne pas ouvrir sous tension " ou toute autre mention similaire peuvent créer un risque d'incendie dans les environnements explosifs. Ces équipements ne doivent être ouverts que lorsqu'ils sont hors tension et que la durée de refroidissement requise indiquée sur l'étiquette ou dans le manuel d'instructions s'est écoulée. En outre ils ne doivent être ouverts que par un personnel qualifié.



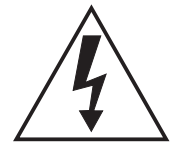


FONTOS

Biztonsági elírások a készülék vezetékéhez és üzembeállításához

A következő biztonsági elírások kifejezetten vonatkoznak az összes EU-tagállamra. Ezeket szigorúan be kell tartani a Kisfeszültség irányelvnek való megfelelés biztosításához. A nem EU-tagállamok szintén tartásuk be a következőket, kivéve ha a helyi és nemzeti szabványok azt másként nem írják elő.

1. A megfelelő földelést biztosítani kell az összes rendelkezésre álló földelési ponton, legyen az belső vagy külső.
2. Az üzembeállítás vagy hibaelhárítás után az összes biztonsági burkolatot és biztonsági földvezetékét ki kell cserélni. A földelőkábelek sértetlenségét mindig biztosítani kell.
3. A tápvezetékeknek eleget kell tenniük az IEC227 vagy IEC245 szabványokban megfogalmazott követelményeknek.
4. Az összes vezetéknek alkalmasnak kell lennie a 75 °C-nál magasabb környezeti hőmérséklet melletti használatra.
5. Az összes használt kábelvezetési tömszelencének olyan belső méretnek kell lennie, hogy biztosítsák a kábelek megfelelő lekötését.
6. A berendezés biztonságos működésének biztosításához az elektromos hálózathoz való csatlakozást csak megszakítón keresztül szabad megvalósítani, amely az összes áramot szállító vezeték bontja hibahelyzet esetén. A megszakító magában foglalhat egy mechanikusan működő áramtalanító kapcsolót is. Ellenkező esetben biztosítani kell a berendezés elektromos hálózatról történő lekapcsolásának más módját, és ezt világosan jelezni kell. A megszakítóknak vagy kapcsolóknak meg kell felelniük egy elismert szabványnak, például az IEC947 szabványnak. Az összes vezetéknek meg kell felelnie az összes helyi szabványnak.
7. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, alatta valószínűleg veszélyes feszültség van jelen. Az ilyen burkolatot csak a berendezés áramtalanítása után távolítható el - és csak képzett szervizszakember végezheti el.
8. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, fenn áll a veszélye, hogy alatta forró felületek találhatók. Az ilyen burkolatot csak képzett szervizszakember távolíthatja el a berendezés áramtalanítása után. Bizonyos felületek érintésre forróak maradhatnak.
9. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, tekintse meg az Üzemeltetési útmutató arra vonatkozó utasításait.
10. A terméken használt grafikus szimbólumok a következő szabványok legalább egyikéből származnak: EN61010-1, IEC417 és ISO3864.
11. Ha a berendezésen vagy a címkén a „Ne nyissa ki bekapcsolt állapotban” vagy hasonló felhívás szerepel, robbanásveszélyes környezetben fennáll a gyulladási veszély. Ez a berendezés csak áramtalanítás után nyitható ki, a címkén vagy a kezelési útmutatóban szereplő, a berendezés lehűlését biztosító megfelelő időelhagyás után - és csak képzett szervizszakember végezheti el.



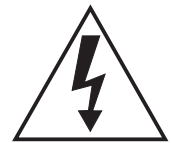


IMPORTANTE

Norme di sicurezza per il cablaggio e l'installazione dello strumento.

Le seguenti norme di sicurezza si applicano specificatamente agli stati membri dell'Unione Europea, la cui stretta osservanza è richiesta per garantire conformità alla Direttiva del Basso Voltaggio. Esse si applicano anche agli stati non appartenenti all'Unione Europea, salvo quanto disposto dalle vigenti normative locali o nazionali.

1. Collegamenti di terra idonei devono essere eseguiti per tutti i punti di messa a terra interni ed esterni, dove previsti.
2. Dopo l'installazione o la localizzazione dei guasti, assicurarsi che tutti i coperchi di protezione siano stati collocati e le messa a terra siano collegate. L'integrità di ciascun morsetto di terra deve essere costantemente garantita.
3. I cavi di alimentazione della rete devono essere secondo disposizioni IEC227 o IEC245.
4. L'intero impianto elettrico deve essere adatto per uso in ambiente con temperature superiore a 75°C.
5. Le dimensioni di tutti i connettori dei cavi utilizzati devono essere tali da consentire un adeguato ancoraggio al cavo.
6. Per garantire un sicuro funzionamento dello strumento il collegamento alla rete di alimentazione principale dovrà essere eseguita tramite interruttore automatico (min. 10A), in grado di disattivare tutti i conduttori di circuito in caso di guasto. Tale interruttore dovrà inoltre prevedere un sezionatore manuale o altro dispositivo di interruzione dell'alimentazione, chiaramente identificabile. Gli interruttori dovranno essere conformi agli standard riconosciuti, quali IEC947.
7. Il simbolo riportato sullo strumento o sui coperchi di protezione indica probabile presenza di elevati voltaggi. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento.
8. Il simbolo riportato sullo strumento o sui coperchi di protezione indica rischio di contatto con superfici ad alta temperatura. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento. Alcune superfici possono mantenere temperature elevate per oltre 45 minuti.
9. Se lo strumento o il coperchio di protezione riportano il simbolo, fare riferimento alle istruzioni del manuale Operatore.
10. Tutti i simboli grafici utilizzati in questo prodotto sono previsti da uno o più dei seguenti standard: EN61010-1, IEC417 e ISO3864.
11. L'indicazione "Non aprire sotto tensione" o simili sull'apparecchiatura o sulle etichette segnala il pericolo di accensione nelle aree in cui è presente un'atmosfera esplosiva. L'apparecchiatura può essere aperta solo quando l'alimentazione è scollegata ed è trascorso il tempo indicato sull'etichetta o nel manuale delle istruzioni per consentirne il raffreddamento. L'operazione può essere effettuata esclusivamente da personale dell'assistenza qualificato.



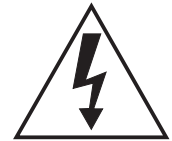


SVARBU

Šio prietaiso laidų prijungimo ir instaliacijos saugos instrukcijos

Toliau išvardinti saugumo reikalavimai taikomi konkrečiai visoms ES šalims narėms. Jų turi būti griežtai paisoma, kad būtų užtikrintai laikomasi Žemos įtampos direktyvos. Ne ES narės taip pat turi laikytis toliau pateikiamų reikalavimų nebent juos pakeičia vietiniai ar Nacionaliniai standartai.

1. Turi būti atliktas tinkamas įžeminimas visuose įžeminimo taškuose, vidiniuose ir išoriniuose, kur numatyta.
2. Visos apsauginės dangos ir įžemikliai po instaliacijos ar remonto turi būti pakeisti. Visų įžeminimo terminalų vientisumo priežiūra turi būti atliekama nuolat.
3. Maitinimo tinklo laidai turi atitikti IEC227 ar IEC245 reikalavimus.
4. Visi laidai turi būti tinkami naudojimui aplinkos temperatūroje, aukštesnėje nei 75°C.
5. Visi naudojamų kabelių riebokšliai turi būti tokių vidinių matmenų, kad būtų galimas tinkamas kabelio pritvirtinimas.
6. Saugaus šio prietaiso veikimo užtikrinimui, prijungimas prie maitinimo tinklo turi būti atliekamas tik per automatinį pertraukiklį, kuris atjungs visas grandines nešančius konduktorius linijos gedimo metu. Automatinis pertraukiklis taip pat gali turėti mechaniskai veikiantį izoliavimo jungiklį. Jeigu ne, tuomet turi būti nurodytos kitos įrenginio atjungimo priemonės, ir aiškiai pažymėtos, kad jos tokios yra. Automatiniai perjungikliai ar jungikliai turi atitikti pripažintus standartus, tokius kaip IEC947. Visi laidai turi atitikti visus vietinius standartus.
7. Kur įrenginys ar dangos yra pažymėti simboliu dešinėje, žemiau turi būti pavojinga įtampa. Šios dangos turi būti nuimamos tik tada, kai srovė yra pašalinta iš įrenginio - ir tik tuomet tai turi atlikti apmokytas personalas.
8. Ten kur įrenginys ar dangos yra pažymėti simboliu dešinėje, ten yra pavojus nuo karštų paviršių apačioje. Šios dangos gali būti nuimamos tik apmokyto personalo, kai srovė yra pašalinta iš įrenginio. Tam tikri paviršiai gali išlikti karšti liečiant.
9. Ten kur įrenginys ar dangos yra pažymėti simboliu dešinėje, žr. nurodymus Valdymo instrukcijose.
10. Visi grafiniai simboliai naudojami šiam produktui yra iš vieno ar daugiau toliau išvardintų standartų: EN61010-1, IEC417, ir ISO3864.
11. Ten, kur įrenginys ar etiketės yra pažymėti "Neatidaryti esant srovės tiekimui" ar panašiai, yra užsidegimo pavojus tose vietose, kur yra sprogstamoji atmosfera. Šis įrenginys gali būti atidarytas tuomet, kai yra pašalinta srovė, ir praėjęs atitinkamas laikas, nurodytas etiketėje ar valdymo instrukcijoje, pakankamas įrenginio ataušimui - ir tai tik apmokyto personalo.



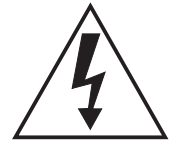


SVARĪGI

Drošības norādījumi šīs iekārtas pievienošanai un uzstādīšanai

Turpmākie drošības norādījumi attiecas uz visām ES dalībvalstīm. Tie ir stingri jāievēro, lai nodrošinātu atbilstību Zemsprieguma direktīvai. Turpmāk norādītais jāievēro arī valstīs, kas nav ES dalībvalstis, ja vien šos norādījumus neaizstāj vietējie vai valsts standarti.

1. Visi pieejamie iekšējie un ārējie zemējuma punkti ir atbilstoši jāiezemē.
2. Pēc uzstādīšanas vai problēmu risināšanas visi drošības pārsegi un drošības zemējuma savienojumi ir jāpievieno atpakaļ. Visiem zemējuma savienojumiem vienmēr jābūt iezemētiem.
3. Elektropadeves vadiem jāatbilst IEC227 vai IEC245 prasībām.
4. Visai elektroinstalācijai jābūt piemērotai lietošanai apkārtējā temperatūrā, kas pārsniedz 75°C.
5. Visu izmantoto kabeļu blīvju iekšējiem izmēriem jābūt tādiem, lai atbilstoši nostiprinātu kabeli.
6. Lai nodrošinātu šīs iekārtas drošu darbību, savienojums ar elektropadeves tīklu jāizveido, izmantojot slēdzi, kas kļūmes gadījumā atvienos visas ēdes, kurās ir vadītāji. Slēdzi var būt iestrādāts arī mehānisks pārtraucējslēdzis. Ja tāda nav, tad ir jāuzstāda cita veida ierīce iekārtas atvienošanai no strāvas padeves un tā atbilstoši un skaidri jāmarē. Slēdžiem jāatbilst kādam vispārztītam standartam, piemēram, IEC947. Visai elektroinstalācijai jāatbilst vietējiem standartiem.
7. Vietās, kur iekārta vai tās pārsegi ir marēti ar labajā pusē norādīto simbolu, visticamāk, zem tiem ir bīstams spriegums. Šos pārsegus drīkst noņemt tikai tad, ja iekārta ir atvienota no strāvas padeves, – un šos darbus drīkst veikt tikai atbilstoši apmācīti remontdarbu darbinieki.
8. Vietās, kur iekārta vai tās pārsegi ir marēti ar labajā pusē norādīto simbolu, apdraudējumu izraisa zem tiem esošās karstās virsmas. Šos pārsegus drīkst noņemt tikai atbilstoši apmācīti remontdarbu darbinieki, kad iekārta ir atvienota no strāvas padeves. Iespējams, dažas virsmas arī pēc iekārtas atvienošanas paliks karstas.
9. Ja iekārta vai pārsegi ir marēti ar labajā pusē esošo simbolu, skatiet operatora rokasgrāmatā ietvertos norādījumus.
10. Visi šajā izstrādājumā izmantotie grafiskie simboli atbilst vienam vai vairākiem no šiem standartiem: EN61010-1, IEC417 un ISO3864.
11. Ja iekārtai vai uzlīmēm ir marējums "Neatvērt, kamēr pieslēgta strāvai" vai tamlīdzīga norāde, tas nozīmē, ka sprādzienbīstamā vidē ir uzliesmošanas bīstamība. Šo iekārtu drīkst atvērt tikai tad, ja ir atvienota strāva un ir nogaidīts iekārtas atdzišanās nepieciešamais laiks, kas norādīts uzlīmē vai ekspluatācijas rokasgrāmatā, – un šos darbus drīkst veikt tikai atbilstoši apmācīti remontdarbu darbinieki.



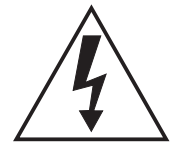


IMPORTANTI

STRUZZJONIJET TAS-SIGURTÀ GĦALL-WIRING U L-INSTALLAZZJONI TAT-TAGĦMIR

L-istruzzjonijiet tas-sigurtà japplikaw speċifikament għall-Istati Membri ta' l-UE. Dawn għandhom jiġu osservati b'mod strett biex tkun żgurata l-konformità mad-Direttiva dwar il-Vultaġġ Baxx. Stati li mhumiex membri ta' l-UE għandhom ukoll ikunu konformi ma' dan li ġej ħlief jekk dawn ikunu sostituti mill-Istandards lokali jew Nazzjonali.

1. Konnessjonijiet adegwati ta' l-ert għandhom isiru għall-punti kollha ta' l-ert, interni u esterni, fejn ikun ipprovdut.
2. Wara l-installazzjoni jew meta tipprova ssolvi 6888Xi problema, l-għatjien kollha tas-sigurtà u l-erts tas-sigurtà għandhom jitpoġġew lura f'posthom. L-integrità tat-terminali kollha ta' l-ert għandha tinżamm f'kull ħin.
3. Il-wajers tal-provvista tad-dawl għandhom ikunu konformi ml-ħtiġijiet ta' IEC227 jew IEC245.
4. Il-wiring kollu għandu jkun adattat għall-użu f'temperatura ta' l-ambjent ta' iktar minn 75°C.
5. Il-glands tal-kejbils kollha li jintużw iridu jkunu ta' daqs intern tali li jipprovdu ankoraġġ adegwat lill-kejbil.
6. Biex tiżgura t-ħaddim sigur ta' dan it-tagħmir, il-konnessjoni mal-provvistatad-dawl għandha ssir biss permezz ta' circuit breaker li jiskonnetta l-kondutturi kollha li jkunu jgħorru ċ-ċirkuwiti f'sitwazzjoni meta jkun hemm il-ħsara. Is-circuit breaker jista wkoll jinkludi swiċċ li jiżola li jaħdem b'mod mekkaniku. Jekk dan ma jkunx il-każ, mezz ieħor ta' kif it-tagħmir jiġi skonnettjat minn mal-provvista tad-dawl għandu jkun ipprovdut, u jkun immrkat b'mod ċar li hu hekk. Is-circuit breakers jew swiċċijiet iridu jkunu konformi ma' standard rikonoxxut bħal IEC947. Il-wiring kollu jrid ikun konformi ma' l-istandards lokali, jekk ikun hemm.
7. Meta t-tagħmir jew l-għatjien ikunu mmarkati bis-simbolu fuq il-lemin, x'aktarx li jkun hemm vultaġġi perikolużi taħthom. Dawn l-għatjien għandhom jitneħħew biss meta titneħħa l-provvista tad-dawl mit-tagħmir - u minn ħaddiema tal-manutenzjoni mħarrġa biss.
8. Meta t-tagħmir jew l-għatjien ikunu mmarkati bis-simbolu fuq il-lemin, ikun hemm periklu mill-uċuħ jaħarqu li jkun hemm taħthom. Dawn l-għatjien għandhom jitneħħew biss minn ħaddiema tal-manutenzjoni mħarrġa meta titneħħa l-provvista tad-dawl mit-tagħmir. Ċerti wċuħ jistgħu jibqgħu jaħarqu meta tmisshom.
9. Meta t-tagħmir jew l-għatjien ikunu mmarkati bis-simbolu fuq il-lemin, irreferi għall-Manwal ta' l-Operatur għall-istruzzjonijiet.
10. Is-simboli grafiċi kollha użati f'dan il-prodott huma minn wieħed jew iktar mill-istandards li ġejjin: EN61010-1, IEC417, u ISO3864.
11. Fejn it-tagħmir u t-tikketti huma mmarkati bil-kliem "Tiftaħ Meta Jkun Energizzat" jew kliem simili, hemm periklu ta' nar f'żoni fejn atmosfera esplosiva hi preżenti. It-tagħmir għandu jinfetaħ biss meta l-provvista tad-dawl tkun mitfija u jkun għadda ħin biżżejjed, kif speċifikat fuq it-tikketta jew fil-manwal ta' l-istruzzjonijiet, biex it-tagħmir ikun kesaħ – u t-tagħmir għandu jinfetaħ biss minn staff li jkun imħarrġ.



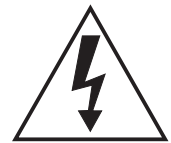


VIKTIG

Sikkerhetsinstruks for tilkobling og installasjon av dette utstyret.

Følgende sikkerhetsinstruksjoner gjelder spesifikt alle EU medlemsland og land med i EØS-avtalen. Instruksjonene skal følges nøye slik at installasjonen blir i henhold til lavspenningsdirektivet. Den bør også følges i andre land, med mindre annet er spesifisert av lokale- eller nasjonale standarder.

1. Passende jordforbindelser må tilkobles alle jordingspunkter, interne og eksterne hvor disse forefinnes.
2. Etter installasjon eller feilsøking skal alle sikkerhetsdeksler og jordforbindelser reetableres. Jordingsforbindelsene må alltid holdes i god stand.
3. Kabler fra spenningsforsyning skal oppfylle kravene spesifisert i IEC227 eller IEC245.
4. Alle ledningsforbindelser skal være konstruert for en omgivelsestemperatur høyere en 75°C.
5. Alle kabelforskrivninger som benyttes skal ha en indre dimensjon slik at tilstrekkelig avlastning oppnåes.
6. For å oppnå sikker drift og betjening skal forbindelsen tilspenningsforsyningen bare skje gjennom en strømbryter (minimum 10A) som vil bryte spenningsforsyningen til alle elektriske kretser ved en feilsituasjon. Strømbryteren kan også inneholde en mekanisk operert bryter for å isolere instrumentet fra spenningsforsyningen. Dersom det ikke er en mekanisk operert bryter installert, må det være en annen måte å isolere utstyret fra spenningsforsyningen, og denne måten må være tydelig merket. Kretsbytere eller kontakter skal oppfylle kravene i en annerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell.
8. Der hvor utstyr eller deksler er merket med symbol for meget varm overflate, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell. Noen overflater kan være for varme til å berøres i opp til 45 minutter etter spenningsforsyning frakoblet.
9. Der hvor utstyret eller deksler er merket med symbol, vennligst referer til instruksjonsmanualen for instruksjer.
10. Alle grafiske symboler brukt i dette produktet er fra en eller flere av følgende standarder: EN61010-1, IEC417 & ISO3864.
11. Når utstyr eller merkelapper bærer advarselen "Må ikke åpnes under spenning" eller lignende, innbærer det fare for eksplosjon i områder med en eksplosiv atmosfære. Utstyret skal bare åpnes når det ikke er noen strømtilførsel, og etter at det har hatt tilstrekkelig tid til å kjøle ned, som spesifisert på merkelappen eller i håndboken. Selv da skal utstyret bare åpnes av erfarne serviceteknikere.



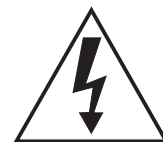


WAŚNE!

Zalecenia dotyczące bezpieczeństwa w zakresie podłączania i instalacji tego urządzenia

Następujące zalecenia dotyczą zwłaszcza stosowania urządzenia we wszystkich krajach Unii Europejskiej. Należy się ściśle do nich stosować w celu zapewnienia zgodności z dyrektywą niskonapięciową. W przypadku instalacji urządzenia w krajach nienależących do Unii Europejskiej należy również przestrzegać poniższych zaleceń, chyba że są one zastąpione lokalnymi lub ogólnokrajowymi standardami.

1. Urządzenie należy podłączyć kablem uziemiającym do wszystkich punktów uziemienia (wewnętrznych i zewnętrznych).
2. Po instalacji lub czynnościach serwisowych należy zamknąć wszystkie pokrywy zabezpieczające i ponownie podłączyć uziemienie. Należy pilnować, by nie doszło do przerwania uziemienia.
3. Przewody zasilające powinny być zgodne z wymaganiami normy IEC227 lub IEC245.
4. Wszystkie przewody powinny być odpowiednie do użyciu w środowisku o temperaturze wyższej niż 75°C.
5. Wszystkie dławnice powinny mieć wymiary wewnętrzne zapewniające pewne umocowanie przewodów.
6. W celu zapewnienia bezpiecznej pracy urządzenie należy podłączyć do sieci tylko za pośrednictwem wyłącznika automatycznego, który w razie awarii odłączy wszystkie obwody, w których przepływa prąd. Wyłącznik automatyczny może być również wyposażony w mechaniczny odłącznik napięcia. W przeciwnym razie należy zapewnić i jasno oznaczyć inną możliwość odłączenia urządzenia od zasilania. Wyłączniki automatyczne oraz odłączniki powinny być zgodne z uznawanymi standardami, takimi jak norma IEC947. Wszystkie przewody muszą być zgodne z lokalnymi przepisami.
7. Pod pokrywami lub elementami urządzenia oznaczonymi symbolem pokazanym na rysunku po prawej stronie może występować niebezpieczne napięcie elektryczne. Te pokrywy mogą być zdejmowane tylko po odłączeniu zasilania, wyłącznie przez odpowiednio przeszkolonych pracowników serwisu.
8. Pod pokrywami lub elementami urządzenia oznaczonymi symbolem pokazanym na rysunku po prawej stronie znajdują się gorące powierzchnie. Te pokrywy mogą być zdejmowane tylko po odłączeniu zasilania, wyłącznie przez odpowiednio przeszkolonych pracowników serwisu. Niektóre powierzchnie mogą pozostać nagrzane przez pewien czas po odłączeniu zasilania.
9. W przypadku sprzętu oraz pokryw oznaczonych symbolem pokazanym na rysunku po prawej stronie należy zapoznać się ze wskazówkami w Instrukcji operatora i stosować się do nich.
10. Wszystkie symbole graficzne zastosowane do oznaczenia produktu pochodzą z następujących norm: EN61010-1, IEC417 lub ISO3864.
11. Oznaczenie „Nie otwierać, gdy urządzenie jest pod napięciem” lub podobne oznaczenia informują o ryzyku zapłonu w miejscach, gdzie występuje zagrożenie wybuchem. Urządzenie należy otwierać tylko po odłączeniu zasilania i po upływie czasu na ostygnięcie urządzenia oznaczonego na etykiecie lub w instrukcji obsługi. Urządzenie mogą otwierać wyłącznie odpowiednio przeszkoleni pracownicy serwisu.



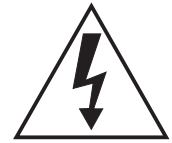


IMPORTANTE

Instruções de segurança para ligação e instalação deste aparelho.

As seguintes instruções de segurança aplicam-se especificamente a todos os estados membros da UE. Devem ser observadas rigidamente por forma a garantir o cumprimento da Directiva sobre Baixa Tensão. Relativamente aos estados que não pertençam à UE, deverão cumprir igualmente a referida directiva, exceptuando os casos em que a legislação local a tiver substituído.

1. Devem ser feitas ligações de terra apropriadas a todos os pontos de terra, internos ou externos.
2. Após a instalação ou eventual reparação, devem ser recolocadas todas as tampas de segurança e terras de protecção. Deve manter-se sempre a integridade de todos os terminais de terra.
3. Os cabos de alimentação eléctrica devem obedecer às exigências das normas IEC227 ou IEC245.
4. Os cabos e fios utilizados nas ligações eléctricas devem ser adequados para utilização a uma temperatura ambiente até 75°C.
5. As dimensões internas dos buçins dos cabos devem ser adequadas a uma boa fixação dos cabos.
6. Para assegurar um funcionamento seguro deste equipamento, a ligação ao cabo de alimentação eléctrica deve ser feita através de um disjuntor (min. 10A) que desligará todos os condutores de circuitos durante uma avaria. O disjuntor poderá também conter um interruptor de isolamento accionado manualmente. Caso contrário, deverá ser instalado qualquer outro meio para desligar o equipamento da energia eléctrica, devendo ser assinalado convenientemente. Os disjuntores ou interruptores devem obedecer a uma norma reconhecida, tipo IEC947.
7. Sempre que o equipamento ou as tampas contiverem o símbolo, é provável a existência de tensões perigosas. Estas tampas só devem ser retiradas quando a energia eléctrica tiver sido desligada e por Pessoal da Assistência devidamente treinado.
8. Sempre que o equipamento ou as tampas contiverem o símbolo, há perigo de existência de superfícies quentes. Estas tampas só devem ser retiradas por Pessoal da Assistência devidamente treinado e depois de a energia eléctrica ter sido desligada. Algumas superfícies permanecem quentes até 45 minutos depois.
9. Sempre que o equipamento ou as tampas contiverem o símbolo, o Manual de Funcionamento deve ser consultado para obtenção das necessárias instruções.
10. Todos os símbolos gráficos utilizados neste produto baseiam-se em uma ou mais das seguintes normas: EN61010-1, IEC417 e ISO3864.
11. Sempre que o equipamento ou as etiquetas apresentarem o aviso "Não abrir quando ligado à corrente" ou semelhante, existe um risco de ignição em atmosferas explosivas. Este equipamento só deve ser aberto depois de desligado da corrente eléctrica e o tempo de arrefecimento adequado especificado na etiqueta ou no manual de instruções ter decorrido. O equipamento só pode ser aberto por técnicos qualificados.



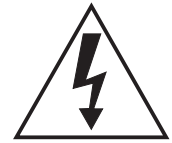


DÔLEŽITÉ

Bezpečnostné pokyny pre zapojenie káblov a inštaláciu tohto prístroja

Nasledovné bezpečnostné pokyny sa vzťahujú konkrétne na všetky členské štáty EÚ. Musia byť striktno dodržané, aby sa zaistila zhoda so Smernicou o nízkom napätí. Štáty, ktoré nie sú členskými štátmi EÚ by mali nasledovné pokyny taktiež dodržiavať, pokiaľ nie sú nahradené miestnymi alebo národnými normami.

1. Adekvátne uzemnenia musia byť vykonané na všetkých bodoch uzemnenia, interných aj externých, tam, kde sú poskytnuté.
2. Po inštalácii alebo riešení problémov musia byť všetky bezpečnostné kryty a bezpečnostné uzemnenia vymenené. Integrita všetkých uzemňovacích terminálov musí byť vždy zachovaná.
3. Káble siet'ového napájania musia byť v zhode s požiadavkami IEC227 alebo IEC245.
4. Všetky káblové pripojenia by mali byť vhodné pre používanie v teplote okolia vyššej, ako 75°C.
5. Všetky použité káblové priechodky musia mať také vnútorné rozmery, aby poskytovali adekvátne uchopenie kábla.
6. Pre zaistenie bezpečnej prevádzky tohto zariadenia musí byť pripojenie k siet'ovému napájaniu zapojené len cez prerušovač obvodu, ktorý počas poruchovej situácie odpojí všetky obvody elektrických vodičov. Prerušovač obvodu by mal obsahovať aj mechanicky ovládaný úsekový vypínač. Ak nie, musí byť poskytnutý iný spôsob odpojenia zariadenia od siet'ového napájania a tento spôsob musí byť zreteľne označený. Prerušovače obvodu alebo spínače musia byť v zhode s uznanou normou, ako napr. IEC947. Všetky káblové pripojenia musia vyhovovať akýmkoľvek miestnym normám.
7. Tam, kde je zariadenie alebo kryty označené symbolom na pravej strane, sa pravdepodobne nachádza nebezpečné napätie. Tieto kryty by sa mali odoberať len vtedy, keď je zariadenie odpojené od elektrickej energie a len vyškoleným servisným personálom.
8. Tam, kde je zariadenie alebo kryty označené symbolom na pravej strane, existuje nebezpečenstvo horúcich povrchov. Tieto kryty by mali byť odstraňované len vyškoleným servisným personálom, pričom je zariadenie odpojené od elektrickej energie. Určité povrchy môžu ostať horúce na dotyk.
9. V miestach, kde je zariadenie alebo kryty označené symbolom na pravej strane, si kvôli pokynom pozrite Operátorskú príručku.
10. Všetky obrázkové symboly použité pri tomto produkte zodpovedajú jednej alebo viacerým nasledujúcim normám: EN61010-1, IEC417 a ISO3864.
11. V miestach, kde je zariadenie alebo značky označené nápisom "Neotvárať pod elektrickým prúdom" alebo podobné, existuje nebezpečenstvo vznietenia v oblastiach s prítomnosťou výbušného ovzdušia. Toto zariadenie sa smie otvárať len v prípade odpojenia od elektrického napájania a ponechania zariadenia vychladnúť po dobu uplynutia dostatočného času tak, ako je to uvedené na štítku alebo v návode na použitie - a len vyškoleným servisným personálom.



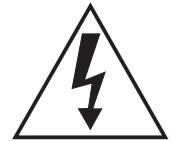


POMEMBNO

Varnostna navodila za povezavo in vgradnjo naprave

Naslednja varnostna navodila veljajo za vse države članice EU. Zaradi zagotovitve skladnosti z nizkonapetostno direktivo morate navodila strogo upoštevati. V državah, ki niso članice EU, je treba upoštevati tudi naslednje smernice, razen če jih ne zamenjujejo lokalni ali nacionalnimi standardi.

1. Do vseh ozemljitvenih točk, notranjih in zunanjih, ki so na voljo, morajo biti speljane ustrezne ozemljitvene povezave.
2. Po vgradnji ali odpravljanju težav je treba namestiti vse varnostne pokrove in zaščitne ozemljitve. Brezhibnost vseh ozemljitvenih priključkov je treba nenehno preverjati.
3. Omrežni napajalni kabli morajo biti skladni z zahtevami standarda IEC227 ali IEC245.
4. Vsa napeljava mora biti primerna za uporabi pri temperaturi okolja, višji od 75°C.
5. Notranje dimenzije kabelskih tesnilk morajo zagotavljati ustrezno pritrditev kablov.
6. Za zagotovitev varnega delovanja opreme mora biti povezava z omrežnim napajanjem vzpostavljena prek odklopnega stikala, ki v primeru napake izklopi vse tokokroge s prevodniki. Odklopno stikalo lahko vključuje tudi mehansko izolacijsko stikalo. V nasprotnem primeru morajo biti zagotovljeni in jasno označeni drugi načini za izklop opreme iz napajanja. Odklopna in druga stikala morajo biti skladna z uveljavljenimi standardi, kot je IEC947. Vsa napeljava mora biti skladna z lokalnimi standardi.
7. V opremi ali pod pokrovi, ki so označeni s simbolom na desni, je prisotna nevarna napetost. Te pokrove je dovoljeno odstraniti samo, če je napajanje opreme izklopljeno. To lahko izvaja samo usposobljeno servisno osebje.
8. Pri opremi ali pod pokrovi, ki so označeni s simbolom na desni, so prisotne nevarne vroče površine. Te pokrove lahko odstranjuje samo usposobljeno servisno osebje. Napajanje opreme mora biti izklopljeno. Določene površine so lahko vroče.
9. Pri opremi ali pokrovi, ki so označeni s simbolom na desni, si za navodila oglejte priročnik za upravljanje.
10. Vsi uporabljeni grafični simboli so iz enega ali več naslednjih standardov: EN61010-1, IEC417 in ISO3864.
11. Če je na opremi ali oznakah navedeno "Ne odpirajte, če je pod napetostjo" ali podobno opozorilo, je na območjih z eksplozivnim ozračjem prisotna nevarnost vžiga. To opremo je dovoljeno odpirati samo, če je napajanje izklopljeno in je poteklo dovolj časa, da se oprema ohladi, kot je navedeno na oznaki ali v priročniku z navodili. Opremo lahko odpira samo usposobljeno servisno osebje.



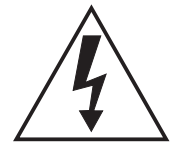


IMPORTANTE

Instrucciones de seguridad para el montaje y cableado de este aparato.

Las siguientes instrucciones de seguridad, son de aplicacion especifica a todos los miembros de la UE y se adjuntaran para cumplir la normativa europea de baja tension.

1. Se deben preveer conexiones a tierra del equipo, tanto externa como internamente, en aquellos terminales previstos al efecto.
2. Una vez finalizada las operaciones de mantenimiento del equipo, se deben volver a colocar las cubiertas de seguridad aasi como los terminales de tierra. Se debe comprobar la integridad de cada terminal.
3. Los cables de alimentacion electrica cumplan con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75°C.
5. Todos los prensaestopas seran adecuados para una fijacion adecuada de los cables.
6. Para un manejo seguro del equipo, la alimentacion electrica se realizara a traves de un interruptor magnetotermico (min 10 A), el cual desconectara la alimentacion electrica al equipo en todas sus fases durante un fallo. Los interruptores estaran de acuerdo a la norma IEC 947 u otra de reconocido prestigio.
7. Cuando las tapas o el equipo lleve impreso el simbolo de tension electrica peligrosa, dicho alojamiento solamente se abra una vez que se haya interrumpido la alimentacion electrica al equipo asimismo la intervencion sera llevada a cabo por personal entrenado para estas labores.
8. Cuando las tapas o el equipo lleve impreso el simbolo, hay superficies con alta temperatura, por tanto se abra una vez que se haya interrumpido la alimentacion electrica al equipo por personal entrenado para estas labores, y al menos se esperara unos 45 minutos para enfriar las superficies calientes.
9. Cuando el equipo o la tapa lleve impreso el simbolo, se consultara el manual de instrucciones.
10. Todos los simbolos graficos usados en esta hoja, estan de acuerdo a las siguientes normas EN61010-1, IEC417 & ISO 3864.
11. Cuando el equipo o las etiquetas tienen la indicación " No abrir mientras reciba energía" u otra similar, existe el peligro de ignición en zonas donde haya un ambiente explosivo. Este equipo sólo debe ser abierto por personal de servicio cualificado después de apagarlo y dejar pasar el intervalo de tiempo correspondiente indicado en la etiqueta o el manual de instrucciones para que el equipo se enfríe.



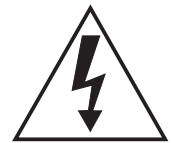


VIKTIGT

Säkerhetsföreskrifter för kablage och installation av denna apparat.

Följande säkerhetsföreskrifter är tillämpliga för samtliga EU-medlemsländer. De skall följas i varje avseende för att överensstämja med Lågspännings direktivet. Icke EU medlemsländer skall också följa nedanstående punkter, såvida de inte övergrips av lokala eller nationella föreskrifter.

1. Tillämplig jordkontakt skall utföras till alla jordade punkter, såväl internt som externt där så erfordras.
2. Efter installation eller felsökning skall samtliga säkerhetshöljen och säkerhetsjord återplaceras. Samtliga jordterminaler måste hållas obrutna hela tiden.
3. Matningsspänningens kabel måste överensstämja med föreskrifterna i IEC227 eller IEC245.
4. Allt kablage skall vara lämpligt för användning i en omgivningstemperatur högre än 75°C.
5. Alla kabelförskruvningar som används skall ha inre dimensioner som motsvarar adekvat kabelförankring.
6. För att säkerställa säker drift av denna utrustning skall anslutning till huvudströmmen endast göras genom en säkring (min 10A) som skall frångöras alla strömförande kretsar när något fel uppstår. Säkningen kan även ha en mekanisk frångörare. Om så inte är fallet, måste ett annat förfarande för att frångöra utrustningen från strömförsörjning tillhandahållas och klart framgå genom markering. Säkring eller omkopplare måste överensstämja med en gällande standard såsom t ex IEC947.
7. Där utrustning eller hölje är markerad med vidstående symbol föreligger risk för livsfarlig spänning i närheten. Dessa höljen får endast avlägsnas när strömmen ej är ansluten till utrustningen - och då endast av utbildad servicepersonal.
8. När utrustning eller hölje är markerad med vidstående symbol föreligger risk för brännskada vid kontakt med uppvärmd yta. Dessa höljen får endast avlägsnas av utbildad servicepersonal, när strömmen kopplats från utrustningen. Vissa ytor kan vara mycket varma att vidröra även upp till 45 minuter efter avstängning av strömmen.
9. När utrustning eller hölje markerats med vidstående symbol bör instruktionsmanualen studeras för information.
10. Samtliga grafiska symboler som förekommer i denna produkt finns angivna i en eller flera av följande föreskrifter:- EN61010-1, IEC417 & ISO3864.
11. För utrustning som markerats med föreskrifter som "Öppna inte när strömmen är på", eller liknande, råder explosionsrisk när det förekommer explosiva ångor. Utrustningen får endast öppnas efter att strömmen stängts av och efter att utrustningen fått svalna under så lång tid som anges i instruktionsboken. Öppnandet får endast utföras av utbildad servicepersonal.



Appendix B: Return of Material

B.1 Returning Material

If factory repair of defective equipment is required, proceed as follows:

1. Secure a return authorization number from a Emerson Process Management Sales Office or representative before returning the equipment. Equipment must be returned with complete identification in accordance with Emerson Process Management instructions or it will not be accepted. In no event will Emerson Process Management be responsible for equipment returned without proper authorization and identification.

CAUTION

Observe proper ESD handling and packaging precautions when returning individual circuit boards.

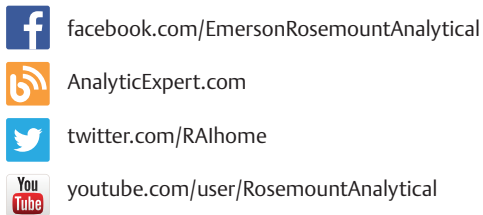
2. Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to ensure that no additional damage will occur during shipping. When returning individual circuit boards, observe proper ESD precautions.
3. In a cover letter, describe completely:
 - a. The symptoms from which it was determined that the equipment is faulty.
 - b. The environment in which the equipment has been operating (housing, weather, vibration, dust, etc.).
 - c. Site from which equipment was removed.
 - d. Whether warranty or nonwarranty service is requested.
 - e. Complete shipping instructions for return of equipment.
 - f. Reference the return authorization number.
4. Enclose a cover letter and purchase order and ship the defective equipment according to instructions provided in Emerson Process Management Return Authorization, prepaid.

If warranty service is requested, the defective unit will be carefully inspected and tested at the factory. If failure was due to conditions listed in the standard Rosemount Analytical warranty, the defective unit will be repaired or replaced at Emerson Process Management's option, and an operating unit will be returned to the customer in accordance with shipping instructions furnished in the cover letter.

For equipment no longer under warranty, the equipment will be repaired at the factory and returned as directed by the purchase order and shipping instructions.

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Credit Cards for U.S. Purchases Only.



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