Instruction Manual
CMB-MAN-6888A
June 2017

Rosemount™ 6888A O_2 Combustion Flue Gas Transmitter

EMERSON

Essential Instructions

Read this page before proceeding

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

- Read all instructions prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, contact your Emerson representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install 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. 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 O_2 Transmitter. The AMS software must be upgraded to AMS 8.0 or above. Contact Emerson's Global Service Center (GSC) at 1-800-833-8314 to upgrade the 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 6888A O2 Combustion Flue Gas Transmitter. 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.
B	4/2017	Updated Rosemount and Emerson logos, URLs, and address on back page.
C	6/2017	Added Appendix C - Product Certifications.

Contents

Section i: Introduction

Preface

The purpose of this manual is to provide information concerning components, functions, installation and maintenance of the 6888A O_2 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'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% O_2), 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'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.Emerson.com/RosemountGasAnalysis

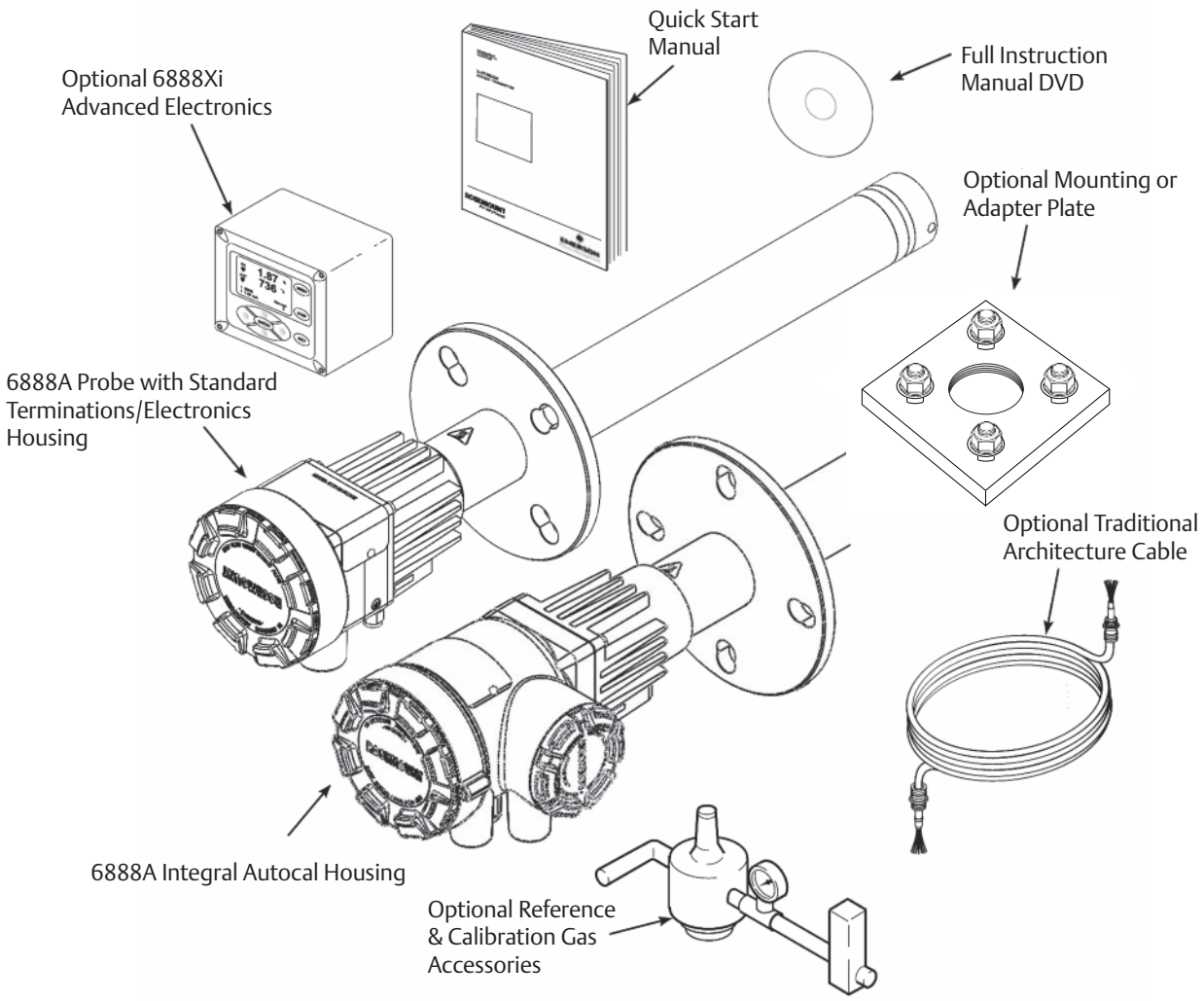
Section 1: Description and Specifications

1.1 Component Checklist

A typical Rosemount 6888A O_2 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 Technical Support Hotline

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

- 1-RAI-AND-U (1-855-724-2638)
- 1-440-914-1261

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

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

Emerson may also be reached via the Internet through e-mail and the World Wide Web

- e-mail: GAS.CSC@emerson.com
- World Wide Web: www.Emerson.com/RosemountGasAnalysis

1.3 System Overview

The 6888 is Rosemount's latest combustion flue gas oxygen analyzer. This product is intended for measuring the flue gases resulting from any combustion process. It utilizes the same heated sensing technology as the O_2 sensors found in most automobiles. Contact Rosemount Analytical's technical support group at 800-433-6076 for any applications other than measuring combustion flue (exhaust) gases.

This product utilizes an "in situ" sensor, i.e. the sensor is placed at the end of a probe, and the probe extends directly into the flue gas duct or stack at a given length. The sensor is like a thermocouple, generating it's own millivolt signal based on the difference between a reference gas (ambient or instrument air – always 20.95% O_2), and the flue gases being measured. There are several different arrangements of probes, electronics, and features that are explained below, and in the wiring diagrams.

An optional 6888 Xi with HART communications provides convenient operator interface for set-up, calibration, and diagnostics. HART communications is still present when using the 6888Xi.

1.4 System Configurations

1.4.1 Transmitter Probe, Only

The 6888 probe has the electronics in the blue housing that controls the heater temperature, and also amplifies the raw O_2 millivolt signal to a linear 4-20 mA. The 4-20 mA signal lines can be run directly to the control room, and also powers the transmitter electronics. As with most other Rosemount transmitters measuring pressure, temperature, and flow, set-up is conducted through HART communications via a 475 handheld communicator, or via Asset Management Solutions (AMS).

1.4.2 Standard Housing Transmitter Probe plus 6888Xi Electronics

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

- Fully automatic calibration. Requires Xi 0_2 Cal Auto calibration system.

- Loss-of flame contact for powering down the heater in the event of a flame-out condition in a furnace.
- Heaterless operation at process temperatures above 550°C. This feature will also permit operation above the heater set point of 736°C. Sensing cell life will be shortened by operation above 800°C, however.
- Plugged diffuser diagnostic operates by measuring the return-to-process rate after calibration gas has been stopped. This feature also includes auto gas switching when the reading settles out versus waiting for configured gas flow time to expire.
- Stoichiometer – If a furnace goes into a reducing condition (zero % O_2), this feature will determine how far.
- Programmable reference – Permits more accurate readings at near-ambient O_2 levels (20.95% O_2).
- A “cal check” capability. New calibration values are not automatically stored after a calibration. An accept/reject calibration feature can be enabled or disabled so that the technician or operator can decide to accept or reject a potentially large change in calibration values.
- Tolerance Check that will alarm if the wrong test gases are being used, or if a bottle runs out in the middle of a calibration. Care must be taken to ensure gas 1 and gas 2 calibration gases are properly configured if the tolerance check feature is enabled.

1.4.3 Transmitter Probe and 6888Xi with Flame safety interlock

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

1.4.4 Transmitter Probe with Integral Autocal, 6888Xi, and HART communications

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

1.4.5 Transmitter Probe with Integral Autocal and FOUNDATION Fieldbus (FF) communications

This probe contains gas-switching solenoids that can control the introduction of calibration gases for calibration. Calibrations can be initiated automatically via a calibration recommended diagnostic, time since last calibration, or manually via optional Xi keypad, FF communications via the 475 communicator, or AMS console. Unlike the HART transmitter electronics, the FF version can execute automatic calibrations either with or without the optional 6888 Xi electronics. Likewise, advanced features can be implemented either with or without the optional Xi.

1.4.6 Direct Replacement (DR) Probe, with Traditional Architecture 6888Xi electronics

Here there are no electronics inside the probe head, so the raw sensor signals for the heater

thermocouple and zirconium oxide O_2 sensor are sent to a remote 6888Xi Electronics. The 6888 Traditional Architecture electronics will also directly apply power to the probe heater in order to maintain the correct sensor temperature. This arrangement calls for a 7- conductor cable to carry this power and the sensor signals. Maximum length for this cable is 200 feet. This probe will also operate on previous Westinghouse/Rosemount electronics (World Class and Oxymitter), as well as many competitive electronics.

1.4.7 Wireless Capability

It should be noted that both the transmitter electronics in the head of the probe and the 6888Xi electronics communicate over HART communications, and can implement wireless communications via our Smart Wireless THUM adapter.

1.4.8 Automatic Calibration

Calibrations consist of introducing bottled gases of known value into the probe so the electronics can make automatic adjustments to the O_2 readings to match the bottled gas value. 0.4% O_2 and 8% O_2 (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.

1.4.9 Communication Options

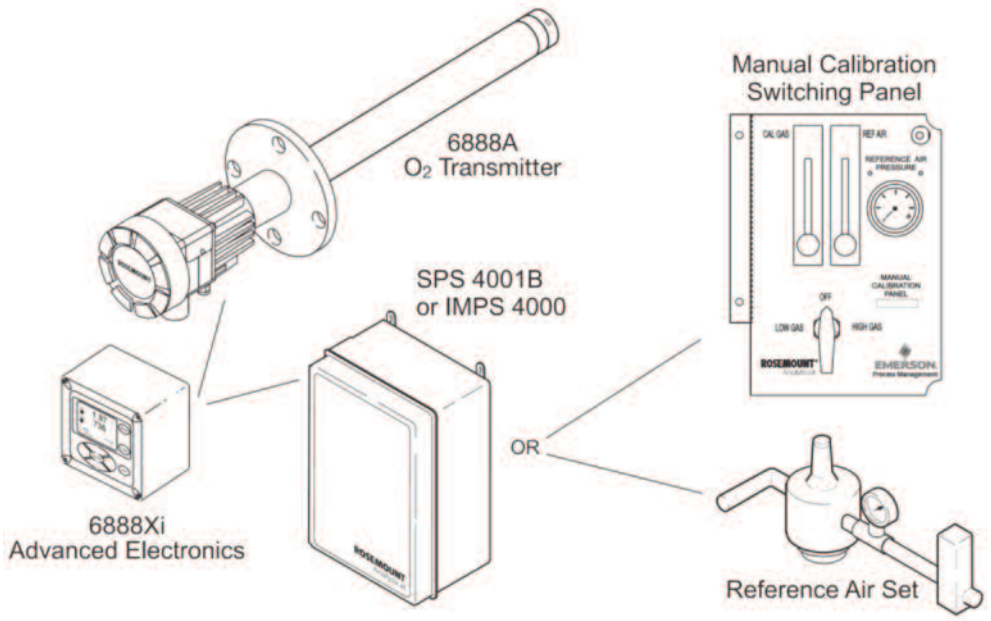
6888A communications are accomplished by a customer-supplied 375/475 Field Communicator and/or the optional 6888Xi Advanced Electronics. Graphic displays are available via the optional OxyBalance Display and Averaging System.

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 O_2 efficiency when the combustion process goes into reducing conditions (0% O_2).
   - Programmable reference provides enhanced accuracy when measuring at or near O_2 level (20.95% O_2).
   - 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:

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



- Rosemount 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 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.
- Delta V and Ovation Distributed Control System (DCS) with AMS-inside capability.

3. 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 O_2 signal to a wireless protocol. All other HART information is also transmitted.

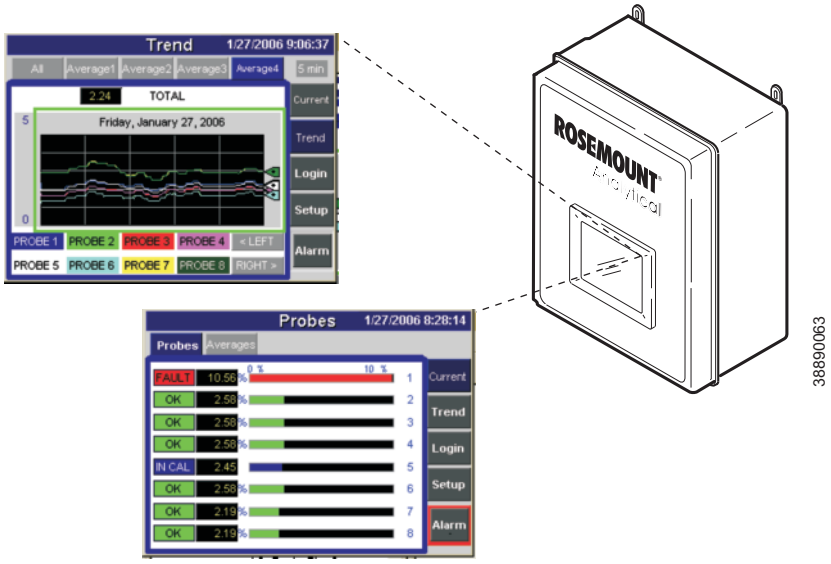
   In addition to the wireless THUM Adapter, a hard-wire connection of the 4-20 mA signal to the DCS may be used at the same time. More detailed information regarding the application of the THUM Adapter is available in Product Data Sheet 00813-0100-4075.

NOTE

The 375 Field Communicator must be upgraded to System Software 2.0 with Graphic License for operation with the 6888A O_2 Transmitter. The AMS software must be upgraded to AMS 8.0 or above.

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

Figure 1-6. OxyBalance displays



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.

1.5 Probe Options

1.5.1 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 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

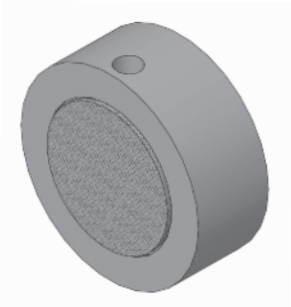


Figure 1-8. Ceramic Diffusion Assembly

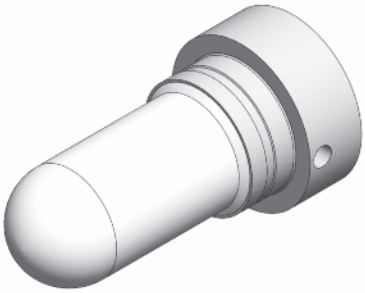


Figure 1-9. Hastelloy Cup-Type Diffusion Assembly

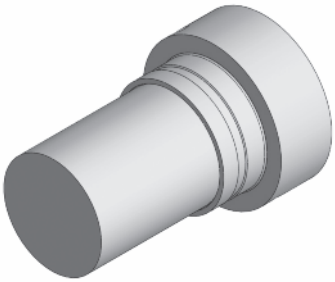
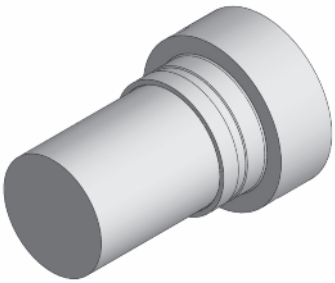


TABLE 1-1. Calibration Glass

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.

Figure 1-10. A separate Vee deflector is available with both the ceramic and hastelloy diffusers.



1.6 6888A Product Matrix

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

Model	Description
6888A	O_2 Transmitter
Measurement	
1OXY	Oxygen, Standard Sensing Cell
2OXY	Oxygen, Acid Resistant Stoichiometric Sensing Cell
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
AA	9' Probe, Abrasion Resistant Probe Tube with Abrasive Shield
B	12' Probe, Abrasion Resistant Probe Tube
BA	12' Probe, Abrasion Resistant Probe Tube with Abrasive Shield
Diffuser	
1	Snubber 400°C (752°F)
1A	Snubber with dust shield 400°C (752°F) (Used with Abrasive Shield)
1F	Snubber with Flashback Arrestor 400°C (752°F)
2	Ceramic 825°C (1517°F)
2A	Ceramic with dust shield 825°C (1517°F) (Used with Abrasive Shield)
2F	Ceramic (825°C) with Flashback Arrestor 825°C (1517°F)
3	Hastelloy 40 um 705°C (1292°F)
3A	Hastelloy with dust seal 40 um 705°C (1292°F) (Used with Abrasive Shields)
Housing & Electronics	
1HT	Standard Housing, Transmitter Electronics, HART Communications
2HT	Integral Autocal, Transmitter Electronics, HART Communications
4FF	Integral Autocal, Transmitter Electronics, Fieldbus Communications
5DR	Standard Housing, Direct Replacement, No Electronics
6DRY	Standard Housing, Direct Replacement, YEW Electronics

** Probes supplied with flanges with dual ANSI/DIN hole pattern. See Figure 3 for details.*

Mounting Plate	
00	None
04	New Installation - Square Weld Plate with ANSI 2" - 150# Studs & Flange (2.5" process hole required)
05	New Installation - Square Weld Plate with DIN Studs & Flange (2.5" process hole required)
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 - provide existing flange dimensions, including thru-hole diameter
Manual Calibration Accessories	
00	None
01	Calibration & Reference Gas Flowmeters & Reference Regulator/Filter Diffuser
02	Calibration/Reference Panel
Stoichiometer Function - FOUNDATION Fieldbus only (For HART versions, order this feature with 6888 Xi electronics)	
0	No
1	Yes
Programmable Reference Function - FOUNDATION Fieldbus only (For HART versions, order this feature with 6888 Xi electronics)	
0	No
1	Yes
Extended Temperature Reference Function - FOUNDATION Fieldbus only (For HART versions, order this feature with 6888 Xi electronics)	
0	No
1	Yes
Diffuser Warning Function - FOUNDATION Fieldbus only (For HART versions, order this feature with 6888 Xi electronics)	
0	No
1	Yes

1.7 6888Xi Product Matrix

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

Model	Product Description
6888Xi	Advanced Electronics
Remote Type	
1OXY	Single Channel O_2
2OXY	Single Channel O_2 with Flame Safety Interlock for Heater
30XY	Dual Channel O_2
40XY	Single Channel O_2, Traditional Architecture for 120V Probes*
Mounting	
00	No Hardware
01	Panel Mount Kit with Gasket
02	2" Pipe / Wall Mount Kit
Cable	
00	No Cable
10	20' (6m) Cable, use with Traditional Architecture Probe only
11	40' (12m) Cable use with Traditional Architecture Probe only
12	60' (18m) Cable use with Traditional Architecture Probe only
13	80' (24m) Cable use with Traditional Architecture Probe only
14	100' (30m) Cable use with Traditional Architecture Probe only
15	150' (45m) Cable use with Traditional Architecture Probe only
16	200' (60m) Cable use with Traditional Architecture Probe only
Stoichiometer Function for O_2	
00	No
01	Single Channel
02	Dual Channel
Programmable Reference Function for O_2	
00	None
01	Single Channel
02	Dual Channel
Extended Temperature Function for O_2	
00	None
01	Single Channel
02	Dual Channel
Plugged Diffuser Diagnostics	
00	None
01	Single Channel
02	Dual Channel

*Note: *The 6888 Xi does not support World Class 44v probes.*
The X-STREAM Xi will support World Class 44v probes.

1.8 Transmitter/DR Probe Specifications

1.8.1 Measurement Specifications

Net O_2 Range
Variable 0-10% to 0-50%
(Xi electronics off 0-50% O_2 range)

Accuracy in Oxidizing Conditions
±0.75% of reading or 0.05%$_2$ whichever is greater

Lowest Detectable Limit
0.02% O_2

Process Temperature Effect
Less than 0.05% O_2 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 process gas velocity and particulate loading of the diffuser

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

Accuracy in Reducing Conditions (requires stoichiometer feature)
±10% of reading or 0.1% O_2, whichever is greater

System Response in Reducing Conditions (requires stoichiometer feature)
Going from oxidizing to reducing -T90 in 120 seconds
Going from reducing to oxidizing -T90 in 30 seconds

1.8.2 Environmental Specifications

Transmitter Probe

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

Process Temperature Limits
0° to 705°C (32° to 1300°F)
550° to 825°C (1022° to 1517°F)* with Xi "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)

Probe electronics

Probe electronics ambient temperature limits
-40° to 70°C (-40° to 158°F)

Temperature limit as measured inside probe electronics
-40° to 85°C (-40° to 185°F)

DR probe, no electronics inside, ambient temperature limits
-40° to 90°C (-40° to 194°F)

Optional Xi electronics

NEMA 4X, Polycarbonate Material

General Purpose Certifications

Xi Ambient temperature limits
-20°C to 50°C (-4°F to 122°F)

Xi Temperature Limits as Measured Inside the Electronics Housing
-20°C to 70°C (-4°F to 158°F)

1.8.3 Installation Specifications - Probe

Probe Mounting Flange
Vertical or horizontal–2" 150# (4.75" (121mm) bolt circle)

Note: Flanges are flat-faced and for mounting only. Flanges are not pressure-rated. A 2.5" diameter hole in the process is required.

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

Many adapter flanges are available to mate to existing flanges.

Probe Lengths and Approximate Shipping Weights

18 in (457 mm) package	16 pounds (7.3 Kg)
3 foot (0.91 m) package	21 pounds (9.5 Kg)
6 foot (1.83 m) package	27 pounds (12.2 Kg)
9 foot (2.74 m) package	33 pounds (15.0 kg)
12 foot (3.66 m) package	39 pounds (17.7 kg)

Reference Air (optional)
2 scfh (1 l/min), clean, dry, instrument-quality air (20.95% O_2) regulated to 5 psi (34 kPa)

Calibration
Semi-automatic or automatic

Cal Gases
0.4% O_2 and 8% O_2, balance N_2 recommended. Instrument air may be used as a high cal gas but is not recommended.

100% nitrogen cannot be used as the low cal gas.

Calibration Gas Flow
5 scfh (2.5l/min)

Heater Electrical Power
120/240V ±10%, 50/60 Hz, 1/2 in.–14NPT conduit ports

Traditional Architecture Cable
200 foot (61m) maximum length

Power Consumption of Probe Heater
776 VA maximum during warm-up

1.8.4 Installation Specifications Xi with Transmitter Probe

Electrical Power of Optional Xi Electronics
120/240V ±10%, 50/60 Hz,

Power Consumption of Xi
10 watts maximum

Xi Alarms Relays
2 provided - 2 amps, 30 VDC

Xi Optional Loss of Flame Contact
Removes heater power

Electrical Noise
Meets EN 61326, Class A

Traditional Architecture Cable
200 ft (61m) maximum length

Transmitter Electrical 4-20 mA Power
12 - 42VDC, (looped-powered from the control room or from the Xi box)

1.8.5 Installation Specifications for Traditional Architecture Xi for use with DR or other Probe

Electrical Power for Xi
120/240V ±10%, 50/60 Hz

Power Consumption of Xi
12 VA maximum or 1020 VA maximum with Traditional Architecture, 120V Probes.
450 VA maximum with Traditional Architecture 44V Probes

Alarm Relay Outputs
Two provided - 2 Amperes, 30 VDC, Form-C

Optional Loss of Flame Input
Internally powered input to remove heater power actuated via dry contact output from prove of flame device.

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

C US

1.9 Transmitter Specifications

1.9.1 Measurement Specifications

Net O_2 Range: 0 to 50% O_2 user scalable, -2 to 50% O_2 user scalable with stoichiometer

Accuracy in Oxidizing Conditions: ±0.75% of reading or 0.05% O_2 whichever is greater

Lowest Detectable Limit: 0.01% O_2

Signal Stability: ±0.03% O_2

Process Temperature Effect: less than 0.05% O_2 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% O_2

Accuracy in Reducing Conditions: ±10% of reading or 0.1% O_2

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

1.9.2 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:

1.9.3 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% O_2 and 8% O_2, balance N_2

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)

Section 2: Installation

WARNING

Before installing this equipment read the "Safety instructions for the wiring and installation ofthis 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 O_2 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.

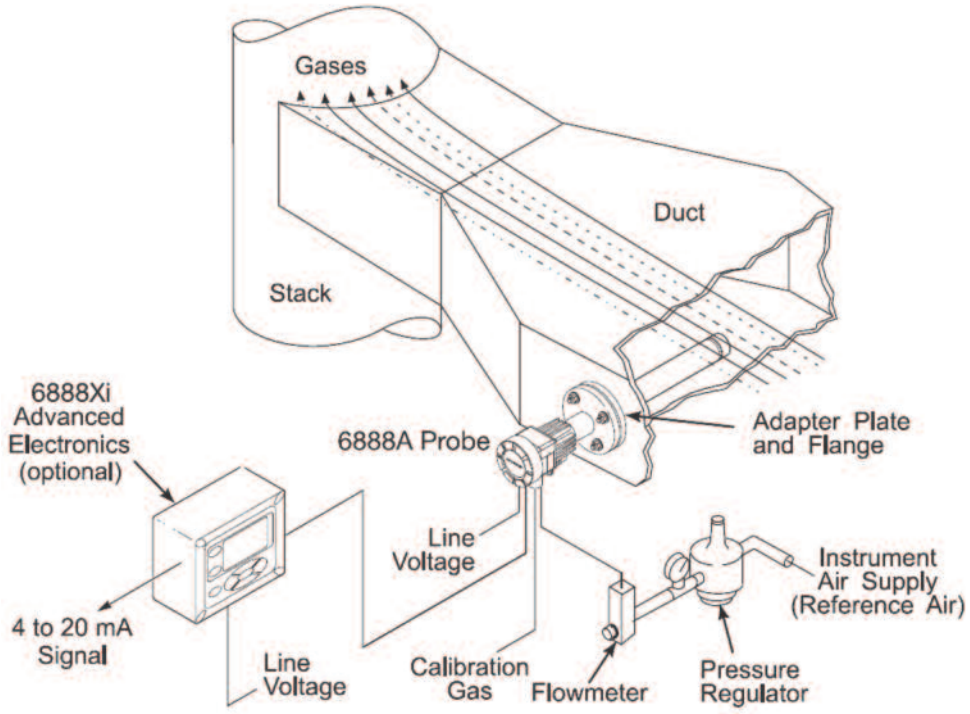
A typical system installation for a 6888A with integral electronics is shown in Figure 2-1.

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

Note that most combustion processes run only slightly negative or positive in pressure, so the probe flange is for mechanical mounting, only. The probe is not rated for high pressures. If this is a new installation, a “weld plate” for welding to the flue gas duct can be supplied.

WARNING

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. The 6888A O_2 Transmitter can be installed in general purpose areas only. Do not install the transmitter or 6888Xi in hazardous areas or in the vicinity of flammable liquids.

2.2.1 6888A Probe Installation

1. Ensure all components are available to install the 6888A O_2 probe. Refer to Figure 2-1.
2. If using the optional ceramic 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 2-2.
3. If using the standard square weld plate or an optional flange mounting plate (Figure 2-3) 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. (63.5 mm).
4. Insert probe through the opening in the mounting flange and bolt the unit to the flange.

FIGURE 2-2. Orienting the Optional Vee Deflector

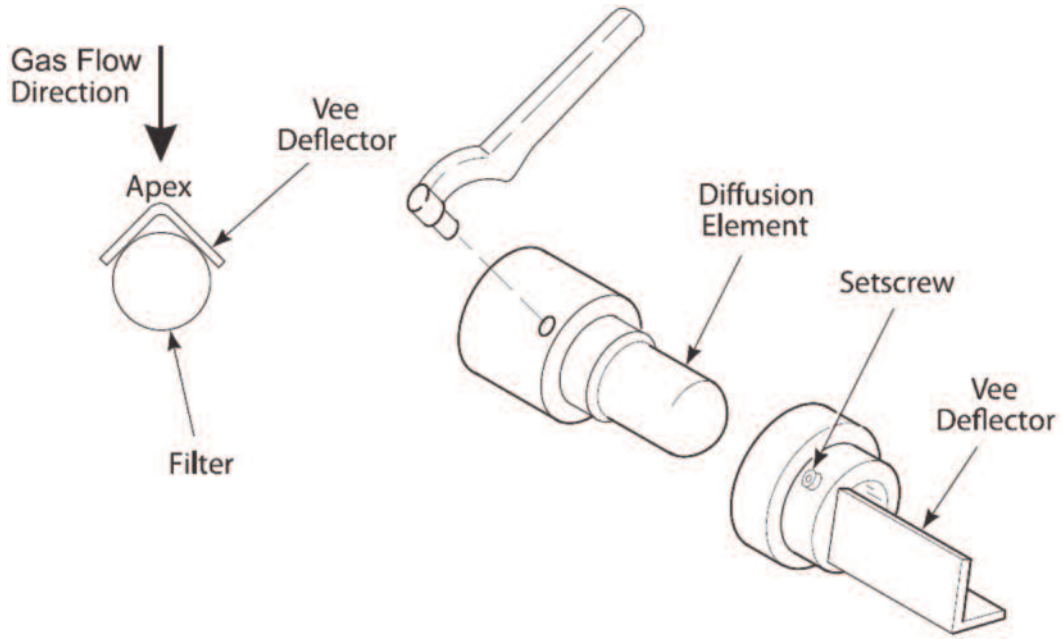
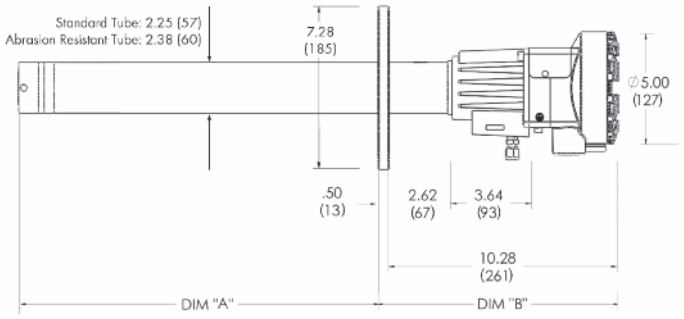


FIGURE 2-3. Probe installation

NOTE: ALL DIMENSIONS ARE IN INCHES
WITH MILLIMETERS IN PARENTHESES

6888A Probe with Standard Terminations/ Electronics Housing



6888A Integral Autocal Housing

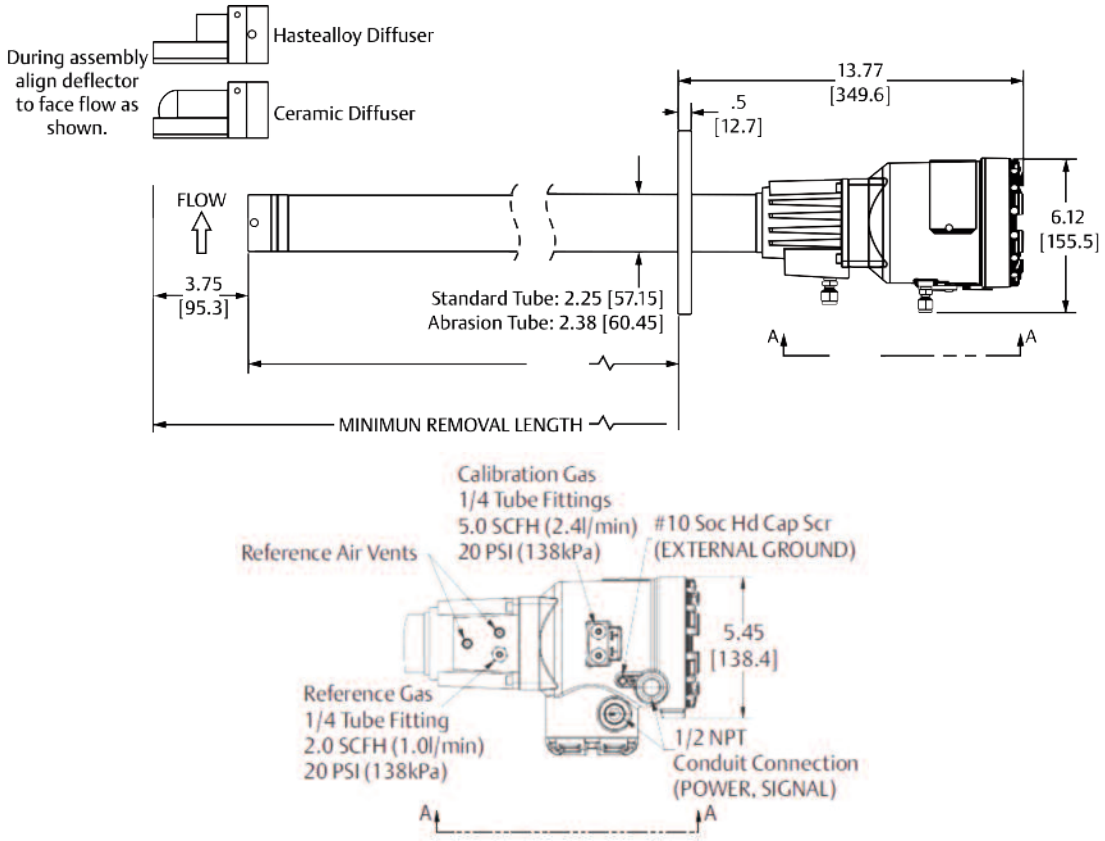


Table 2-1. Removal/ Installation*			
Probe Length	DIM "A" Insertion Depth	DIM "B" Removal Envelope Standard Housing	DIM "B" Removal Envelope Accessory Housing
18 IN. (457 mm) Probe	16.10 (409)	15.77 (401)	19.26 (490)
3 FT. (0.91 m) Probe	32.52 (826)	46.6 (1182)	50.1 (1271)
6 FT. (1.83 m) Probe	68.52 (1740)	82.6 (2097)	86.1 (2186)
9 FT. (2.74 m) Probe	104.52 (2655)	118.6 (3011)	122.1 (3100)
12 FT. (3.66 m) Probe	140.52 (3569)	154.6 (3926)	158.1 (4015)

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

FIGURE 2-4. Probe installation

NOTE: ALL DIMENSIONS ARE IN INCHES
WITH MILLIMETERS IN PARENTHESES

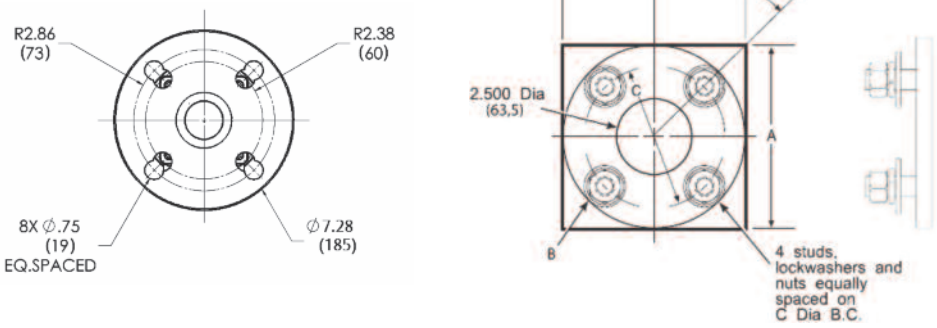
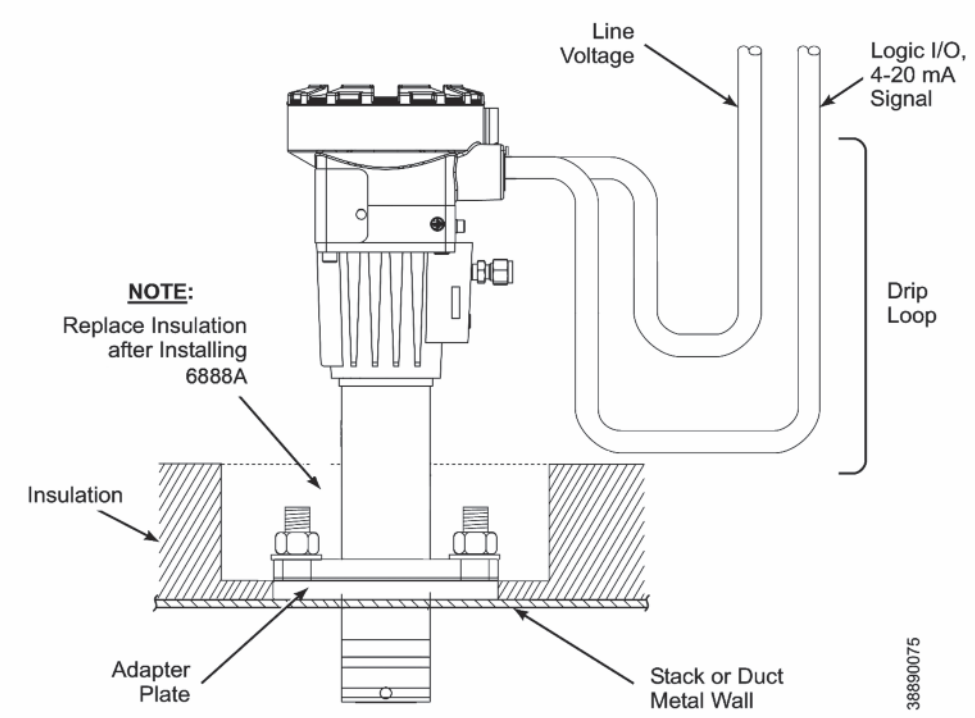


Table 2-2. Mounting Flange		
	ANSI	DIN
Flange Dia	7.28 (185)	
Hold Dia	.75 (20)	
(4) Holes Eq Sp on BC	4.75 (121)	5.71 (145)

Table 2-3. Installation Weld Plate Outline		
	ANSI	DIN
"A"	6.00(153)	7.5(191)
"B" Thread	.625(11)	(M-16x2)
"C" Dia	4.75(121)	5.708(145)

FIGURE 2-5. Drip loop and insulation removal



Note: Standard housing probe shown. Accessory housing is similar. Probe installation may be vertical or horizontal.

2.2.2 Variable Insertion

The ideal placement of O_2 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 O_2 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 O_2 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.

he 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.

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.

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.

WARNING

Disconnect and lock out power before connecting the power supply.

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

To meet the Safety Requirements of IEC 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.

NOTE

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

NOTE

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

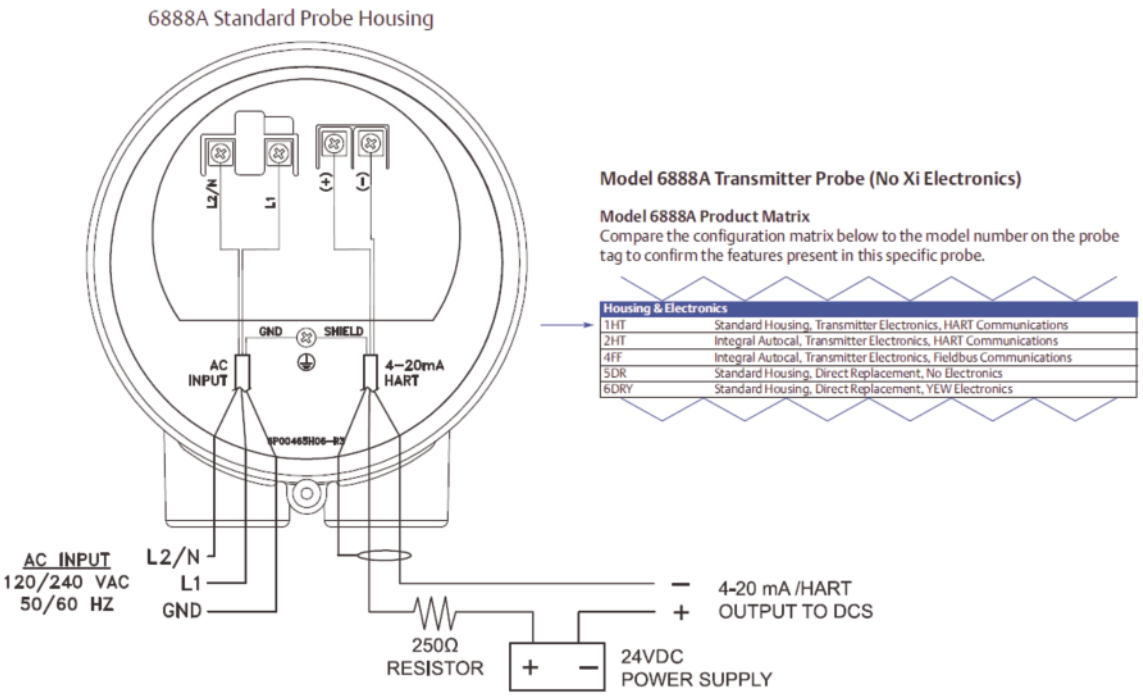
2.3.1 Wiring for 6888 transmitter probe only (no 6888 Xi electronics)

The 6888 transmitter probe has the electronics in the blue housing that controls the heater temperature, and also amplifies the raw O_2 millivolt signal to a linear 4-20 mA. The 4-20 mA signal lines can be run directly to the control room, and also power the transmitter electronics. There is no O_2 display or keypad on the probe, so set-up must be conducted through HART communications via a 475 handheld communicator, or via Asset Management Solutions (AMS).

1. Remove the cover from probe.
2. Refer to Figure 7. 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 ±10% line voltage and 50/60 Hz. No setup is required.
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. The transmitter electronics are loop-powered, ie, the 4-20mA signal wires supply 24 VDC from the DCS, or an external power supply.

FIGURE 2-12

6888A Standard Probe Housing



4. Terminate the shield only at the transmitter electronics housing unless using a 6888Xi. When using the 6888Xi Advanced Electronics, 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 475 Field Communicator or AMS software.

5. Reinstall cover on transmitter.
6. Follow the remaining electrical installation instructions only if the 6888Xi is included with your system configuration.

2.3.2 Standard Housing Transmitter Probe plus 6888Xi Electronics

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

1. Remove cover screws from the front cover of the 6888Xi. Swing down the front cover of the interface box.
2. Pull out the I/O board on the right-hand side of the card rack inside the 6888Xi. If your system is configured to operate two transmitter probes there are two I/O interface boards.
3. See Figure 8. Connect the 4-20 mA signal wires at J4 of the I/O board. Attach the supplied ferrite clamp over the 4-20 mA OUT wires that extend past the shield.

NOTE

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

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

2.3.3 Standard Housing Transmitter Probe plus 6888Xi Electronics

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

1. Remove cover screws from the front cover of the 6888Xi. Swing down the front cover of the interface box.
2. Pull out the I/O board on the right-hand side of the card rack inside the 6888Xi. If your system is configured to operate two transmitter probes there are two I/O interface boards.
3. See Figure 8. Connect the 4-20 mA signal wires at J4 of the I/O board. Attach the supplied ferrite clamp over the 4-20 mA OUT wires that extend past the shield.

NOTE

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

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

Figure 2-13. Wiring Diagrams – Single/Dual Channel Wiring Diagram

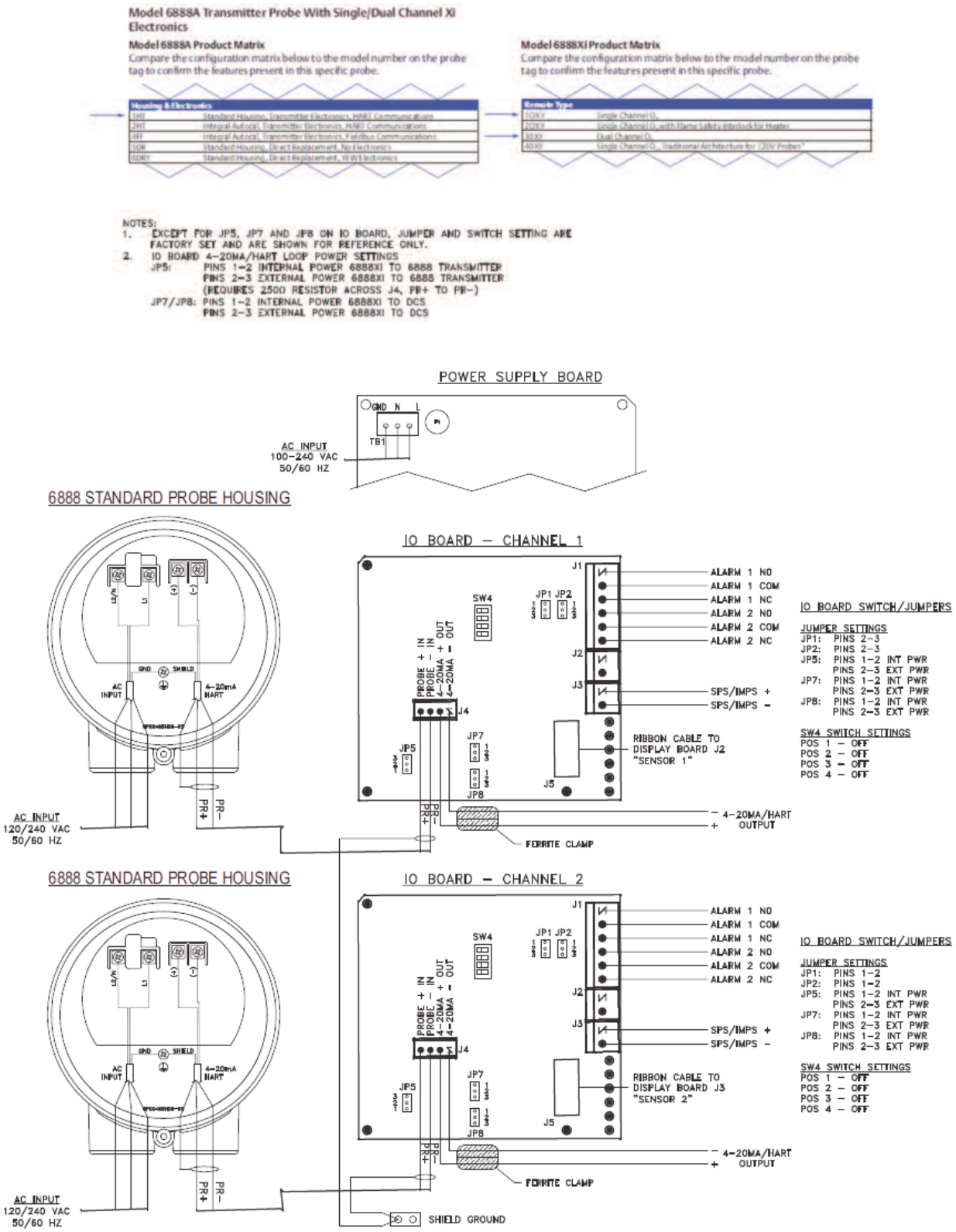
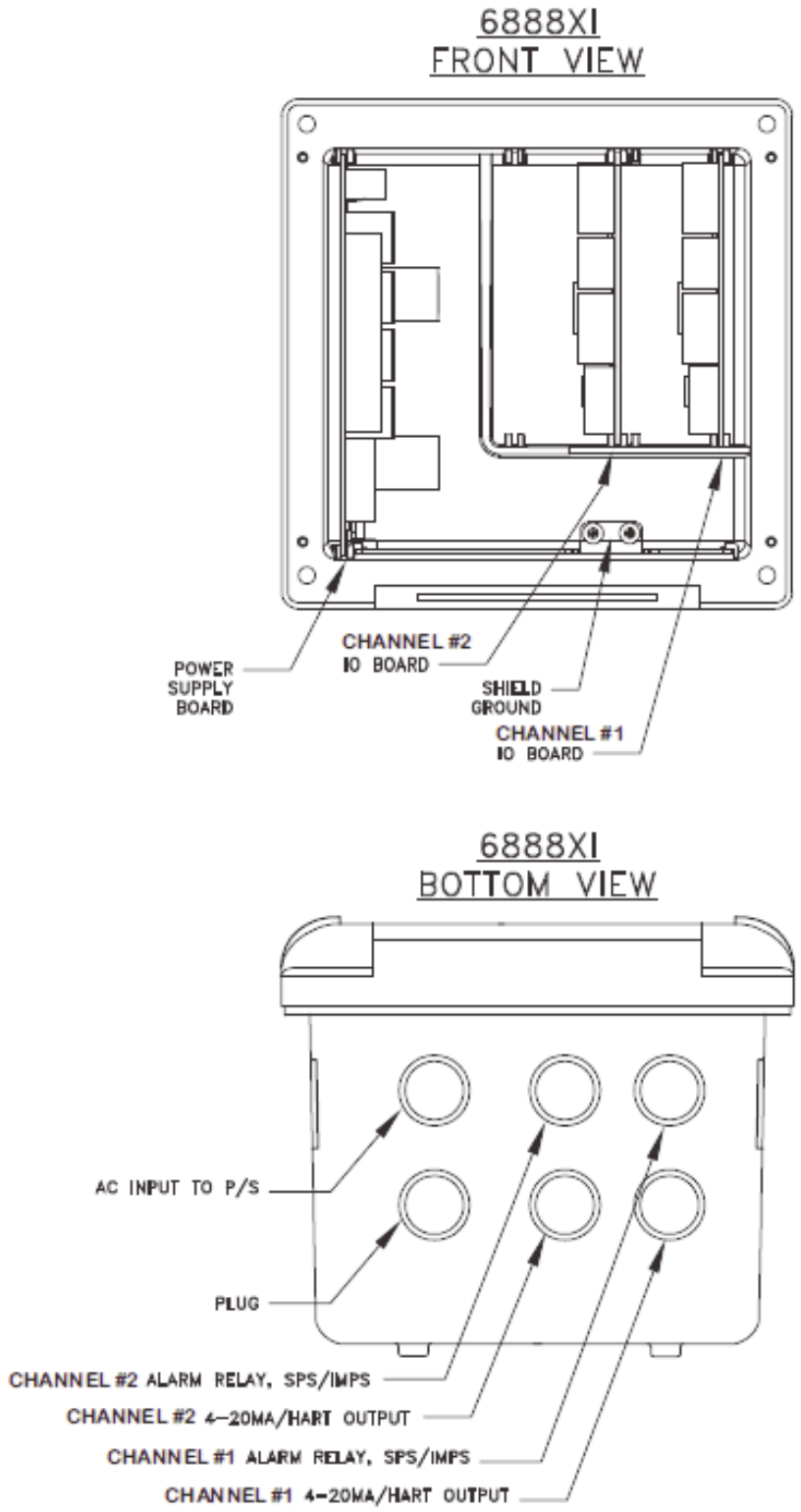


Figure 2-14. Wiring Diagrams – Single/Dual Channel Wiring Diagram



2.3.4 Transmitter probe with single-channel Xi and Flame Safety Interlock

A flame safety interlock by Emerson is available for heater power disconnect whenever there is a loss of the process flame or a heater runaway condition (heater over-temperature) in the O2 Probe. This input is internally powered by the 6888Xi and is actuated via a dry contact output from the user's flame scanner. A closed contact indicates a flame is present. An open contact indicates a loss of flame.

1. Refer to Figures 13 and 14. Connect the signal wires from the burner management system flame status output to the flame status input terminals of J2. The flame status sensing device is supplied by the customer. Refer to the applicable OEM documents for signal wiring details.
2. Remove the J1 and J2 connectors from the AC relay board.
3. Connect the AC line input to the J1 connector.
4. Connect the AC power to the 6888A probe to the J2 connector.
5. Reinstall connector J1 and J2 to the AC relay board.

2.3.5 Transmitter Probe with Integral Autocal and HART communications

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

1. Remove the two covers from the transmitter.
2. Refer to Figures 15 and 16. 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 ± 10% line voltage and 50/60 Hz. No setup is required.
3. Connect the 4-20mA signal wires from the 6888XI to the connections in the side chamber of the transmitter. DO NOT connect the signal wires to the terminals in the main chamber were the AC input wires are connected. Use a shielded twisted wire pair. Do not allow bare shield wires to contact the circuit boards. Insulate the shield wires prior to termination. The 24 VDC loop power is sourced from the 6888XI.
4. Terminate the shield at both the probe and the 6888Xi Advanced Electronics.

NOTE

The 4-20 mA signal represents the O_2 value and also powers the probe-mounted electronics. Superimposed on the 4-20 mA signal is HART information accessible through a Field Communicator or AMS software.

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

Figure 2-15. Wiring Diagrams – Single Channel with Flame Safety, Wiring Diagram

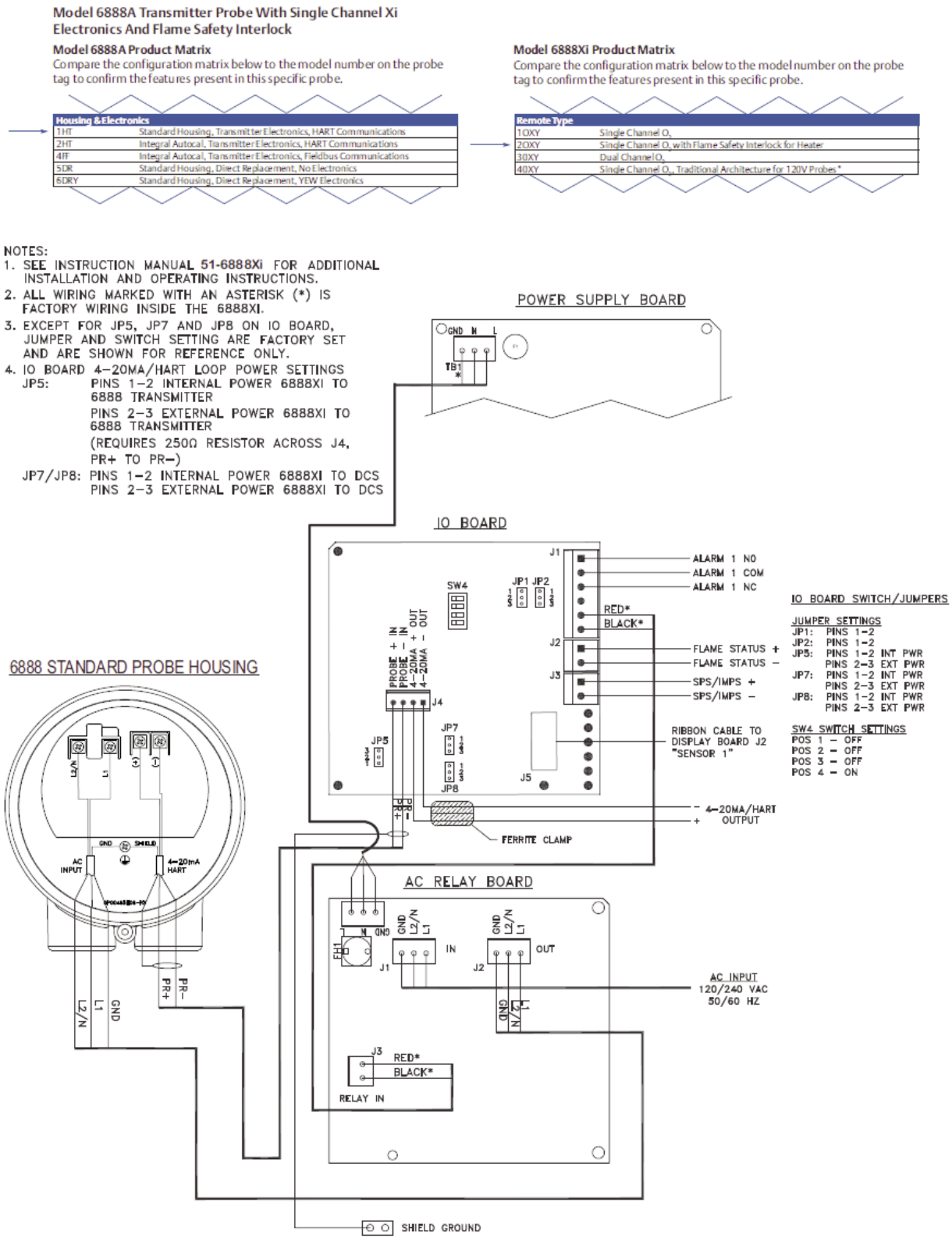
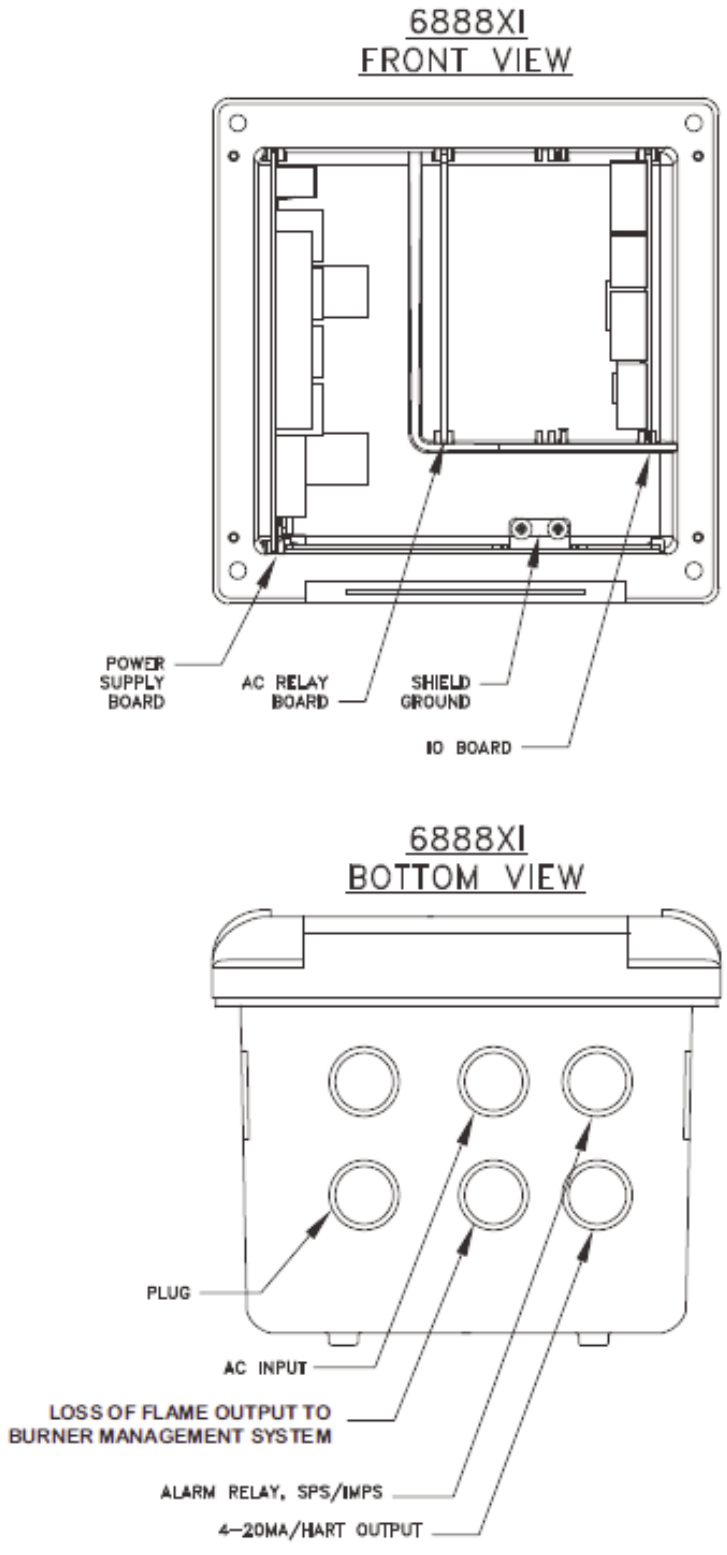


Figure 2-16. Wiring Diagrams – Single Channel with Flame Safety, Wiring Diagram



2.3.6 Transmitter Probe with Integral Autocal and FOUNDATION Fieldbus communications

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

1. Remove the two covers from the transmitter.
2. Connect the line (L1 wire) to the L1 terminal, the neutral (L2 wire) to the L2/N terminal, and the ground wire to the ground lug. The 6888A accepts 120/240 VAC ± 10% line voltage and 50/60 Hz. No setup is required.
3. Connect the FOUNDATION Fieldbus wires from the 6888 side housing to the FF segment. Note that the 6888 probe is not rated as intrinsically safe, and will render any IS or FISCO segment it is wired to as non-IS. Use a shielded twisted wire pair. Do not allow bare shield wires to contact the circuit boards.
4. Terminate the shield at both the probe and the 6888Xi Advanced Electronics.

NOTE

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

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

2.3.7 Traditional Architecture System with Direct Replacement Probe (no electronics inside)

Here there are no electronics inside the probe head, so the raw sensor signals for the heater thermocouple and zirconium oxide O_2 sensor are sent to a remote 6888Xi Electronics. The 6888Xi electronics will also directly apply power to the probe heater in order to maintain the correct sensor temperature. This arrangement calls for a 7- conductor cable to carry this power and the sensor signals. Maximum length for this cable is 200 feet.

1. Remove cover from probe.
2. Feed all DR probe wiring through the conduit port of probe.
3. Refer to Figures 20 and 21. Connect DR probe heater power leads to DR probe connector.
4. Connect O_2 signal and thermocouple wires to DR probe connector.

Figure 2-17. Wiring Diagrams – Integral Autocal and FOUNDATION Fieldbus, Communications without Optional Xi

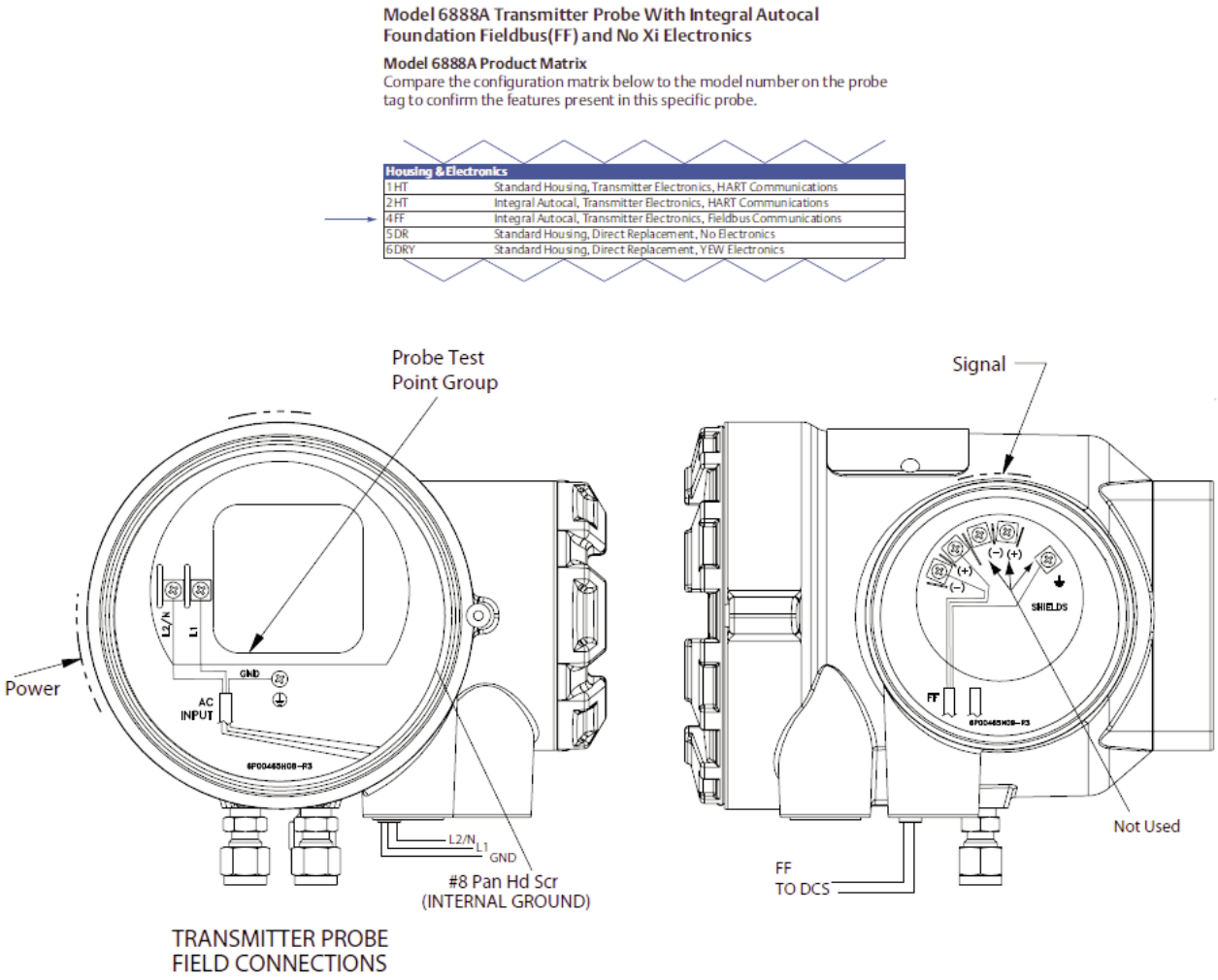


Figure 2-18. Wiring Diagrams –Integral Autocal and FOUNDATION Fieldbus, Communications and Optional Xi

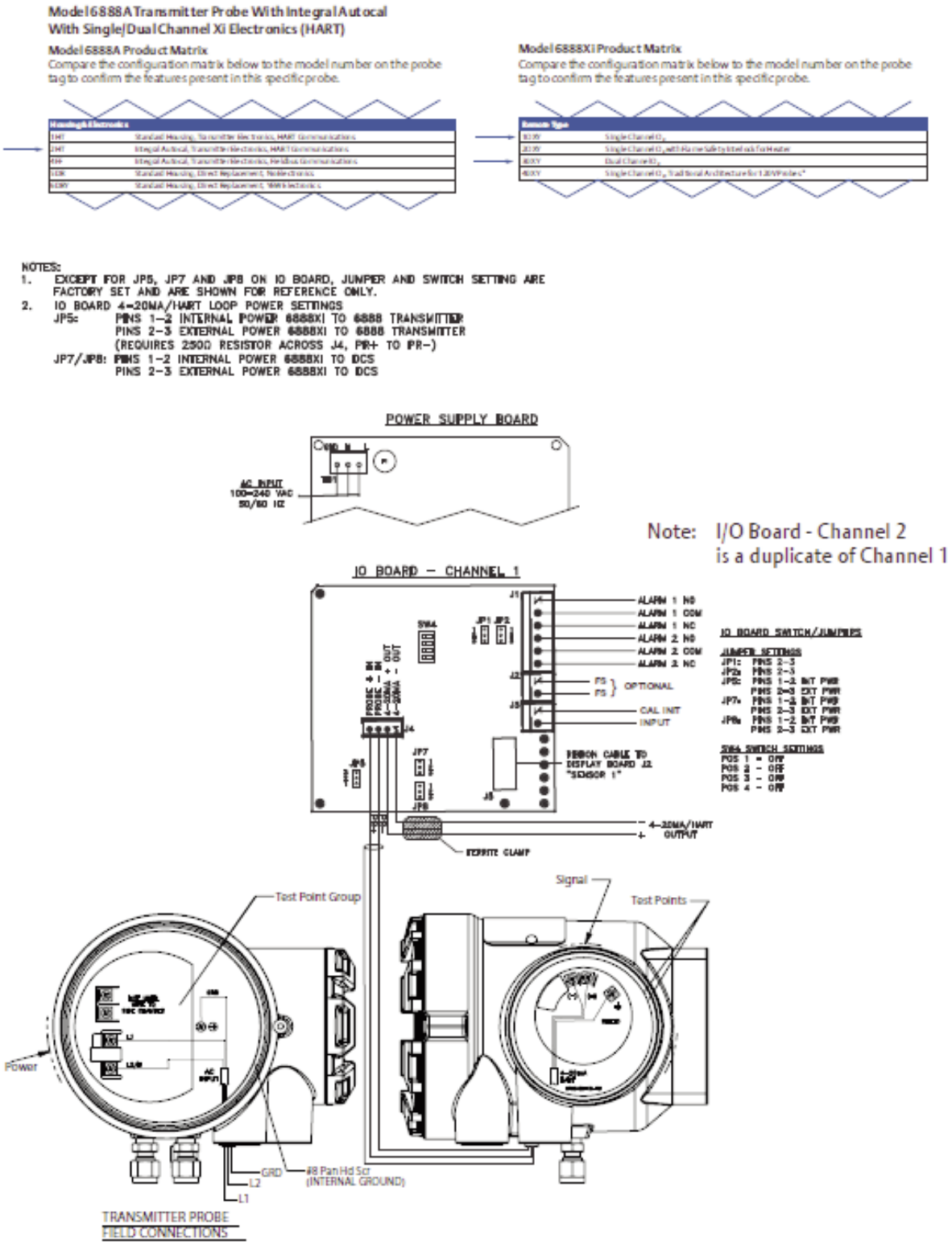


Figure 2-19. Wiring Diagrams – Integral Autocal and FOUNDATION Fieldbus, Communications and Optional Xi

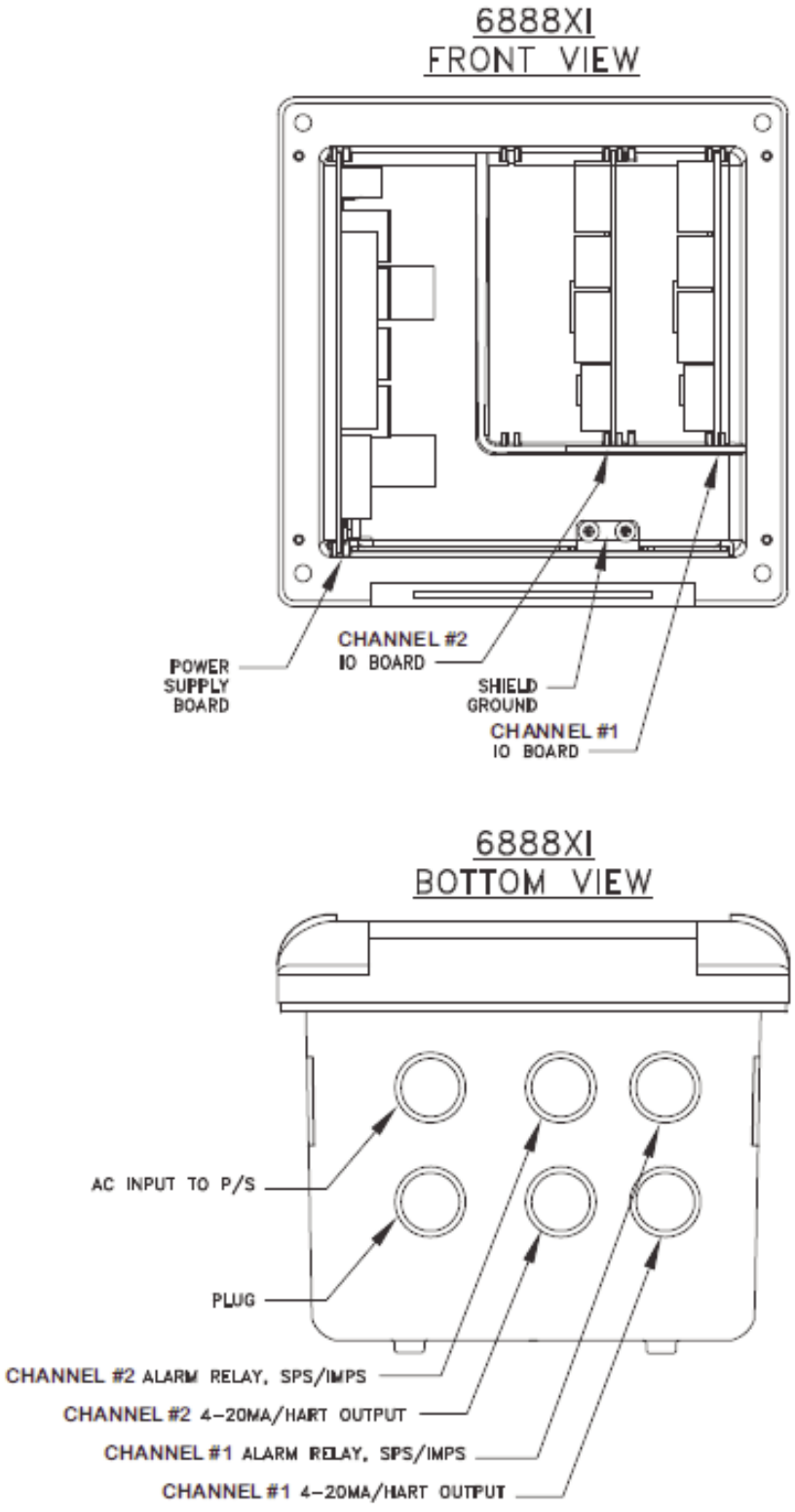
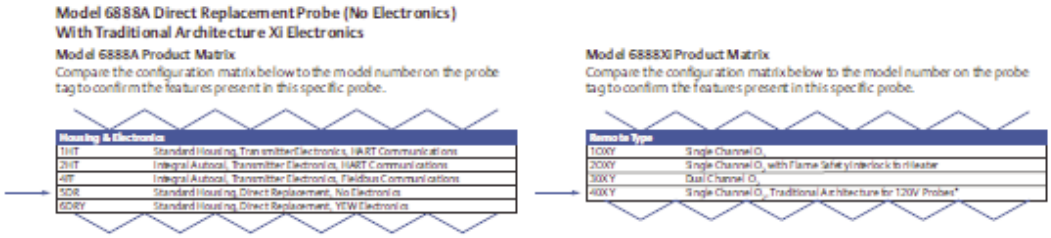


Figure 2-20. Wiring Diagrams – Traditional Architecture with Direct, Replacement Probe (no electronics inside)



NOTES:
1. SEE INSTRUCTION MANUAL 51-6888XI FOR ADDITIONAL INSTALLATION AND OPERATING INSTRUCTIONS.
2. ALL WIRING MARKED WITH AN ASTERISK (*) IS FACTORY WIRING INSIDE THE 6888XI.
3. EXCEPT FOR JP7 AND JP8 ON IO BOARD, JUMPER AND SWITCH SETTING ARE FACTORY SET AND ARE SHOWN FOR REFERENCE ONLY.

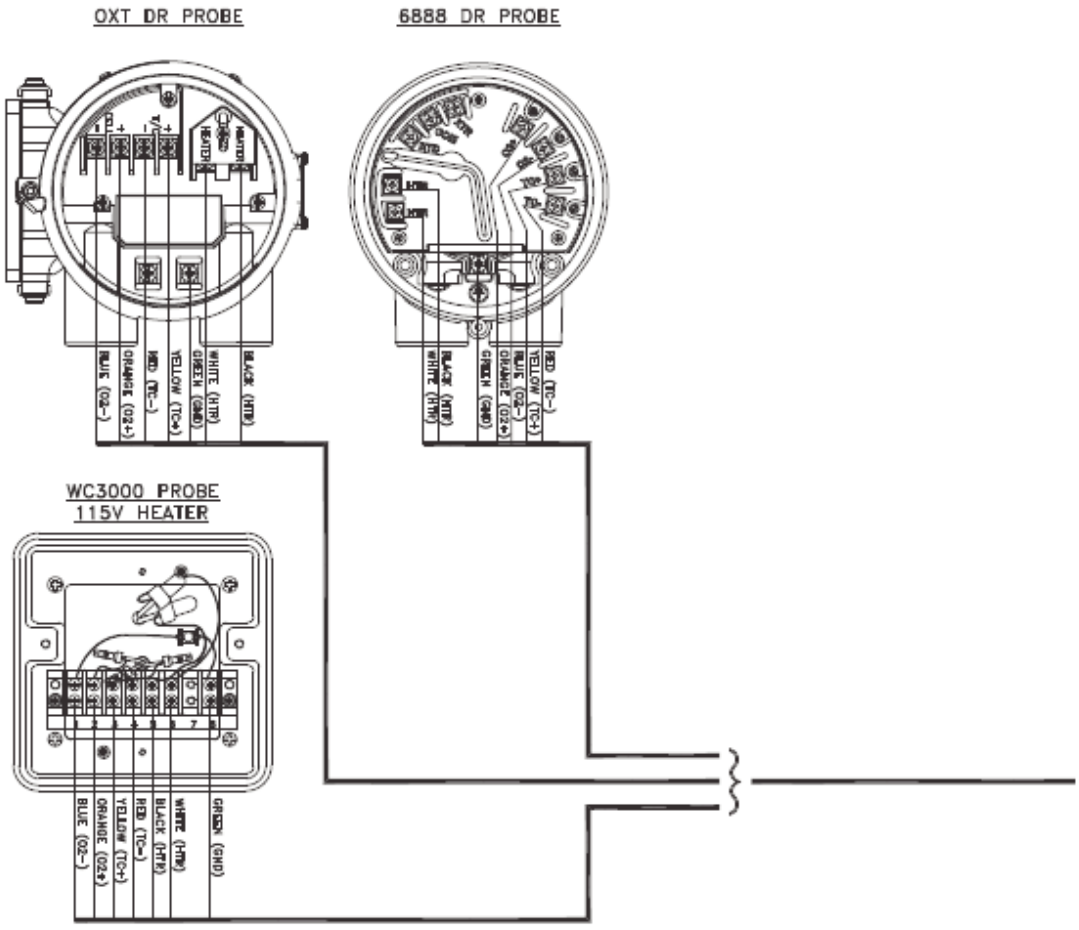


Figure 2-21. Wiring Diagrams – Traditional Architecture with Direct, Replacement Probe (no electronics inside)

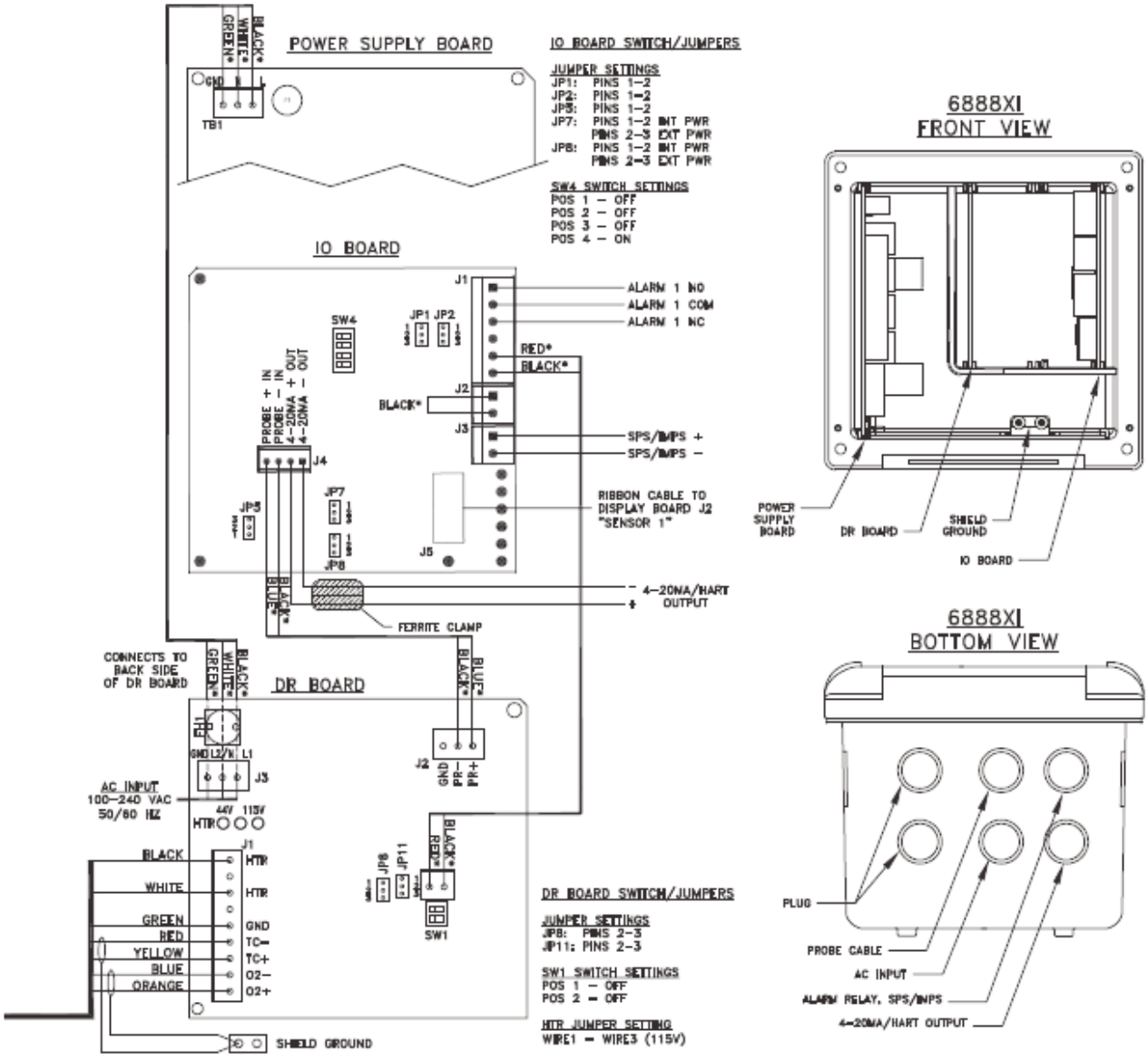
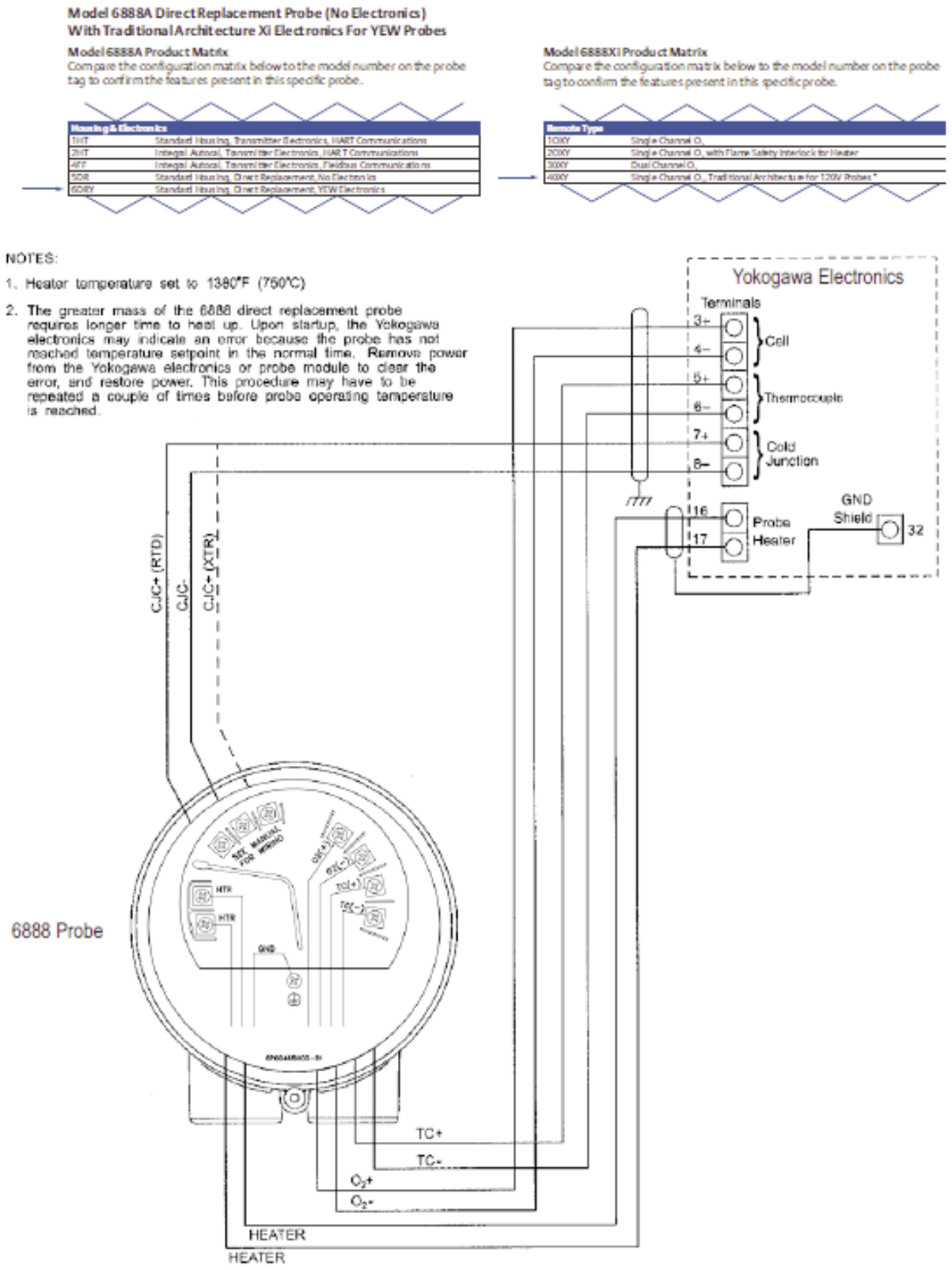


Figure 2-22. Wiring Diagrams – Existing Yokogawa Electronics (must have YEW 6888 probe with cold junction device in the probe terminations.)



2.3.8 Traditional Architecture Cable Connections

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

NOTE

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

1. Run the 7-conductor cable between the traditional architecture probe and the installation site for 6888Xi. Use new cable conduit or trough as needed.
2. Install the cable and lead wires to the probe per manufacturer's instructions.
3. Install the cable at the probe housing and at the 6888Xi enclosure according to the following procedure:
   a. Unscrew locking nut from gland assembly, Figure 8, and slide locking nut back along cable.
   b. Pull the gland body away from the plastic insert. Use care not to damage the cable shield braid.
   c. Insert the cable wires into the proper entry port in either the probe housing or the 6888Xi enclosure.
   d. At the probe housing, apply Teflon tape or similar sealing compound to the tapered pipe threads. Thread the gland body into the probe housing until properly seated.
   e. At the 6888Xi enclosure, insert the gland body into the left front cable port from the inside of the enclosure. Use the rubber O-ring provided to seal the cable port.
   f. Ensure the cable shield braid is evenly formed over the gray insert. When properly formed, the braid should be evenly spaced around the circumference of the insert and not extend beyond the narrow diameter portion.
   g. Carefully press the gray insert into the gland body. The grooves on the insert should align with similar grooves inside the gland body. Press the insert in until it bottoms out in the gland body.
   h. Slide the locking nut up and thread it onto the gland body. Tighten the locking nut so the rubber grommet inside the plastic insert compresses against the cable wall to provide an environmental seal.
4. At the 6888Xi, connect the cable leads to the connectors on the transmitter I/O board as indicated in Figures 20 1nd 21.

NOTE

For electrical installation instructions for connecting to a Xi or Oxymitter electronics, see the Quick Start manual.

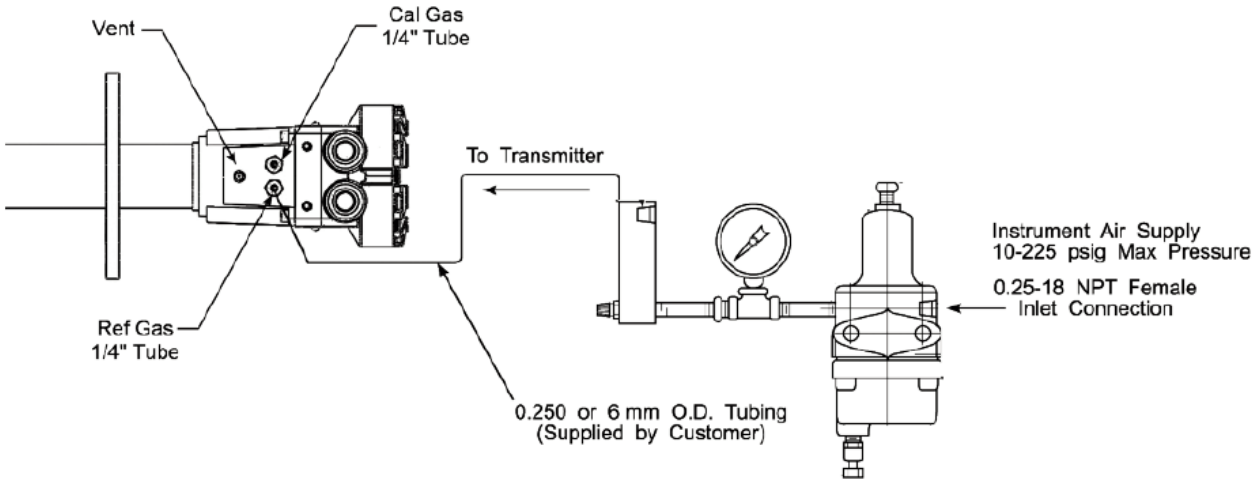
2.4 Pneumatic Installation

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 2-24 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 2-23. Plant Air Schematic Diagram



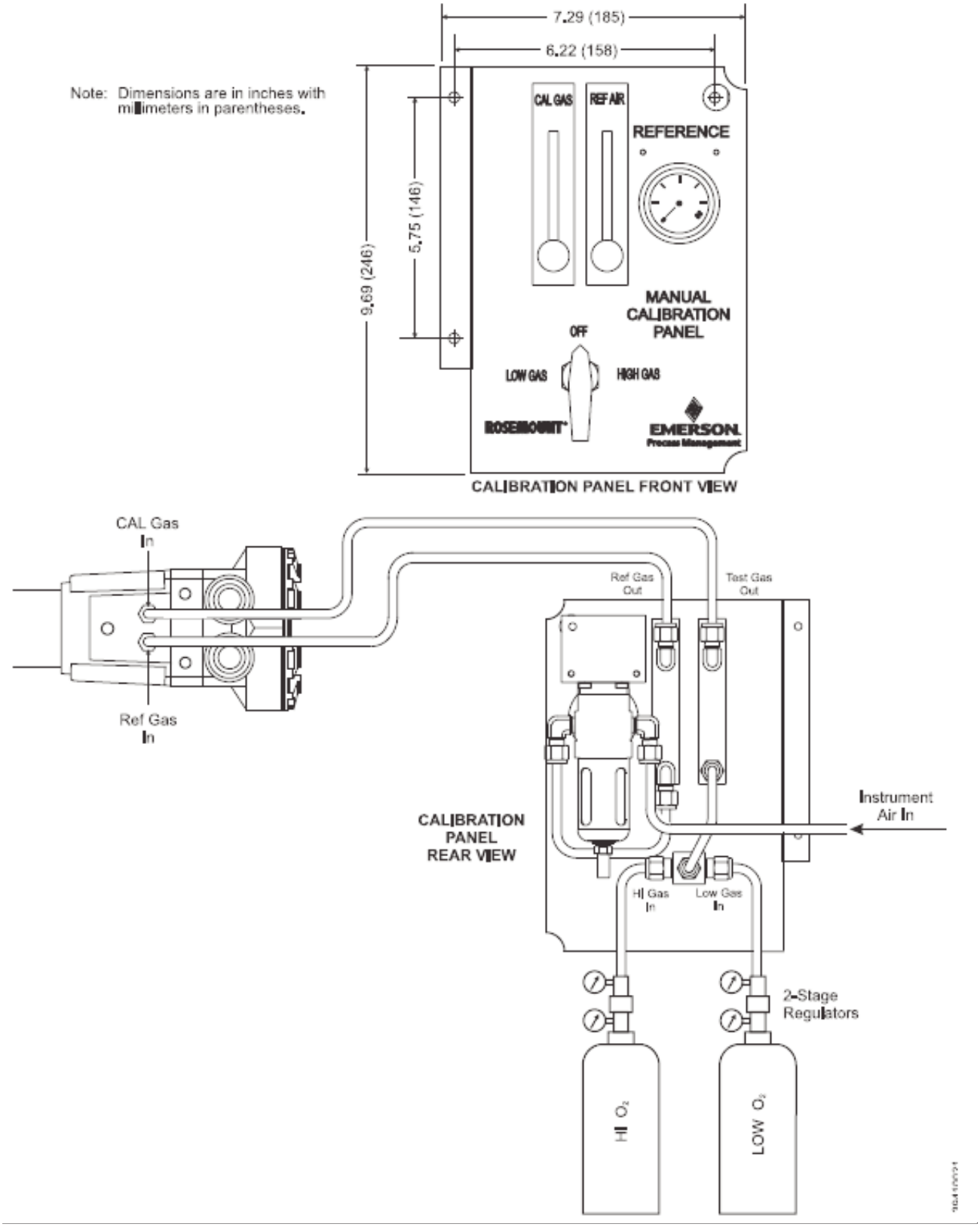
Reference air components are included in the optional Manual Calibration Panel (Figure 2-24), the SPS 4001 Single Probe Autocalibration Sequencer, and the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer.

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.

FIGURE 2-24. Manual Calibration Panel

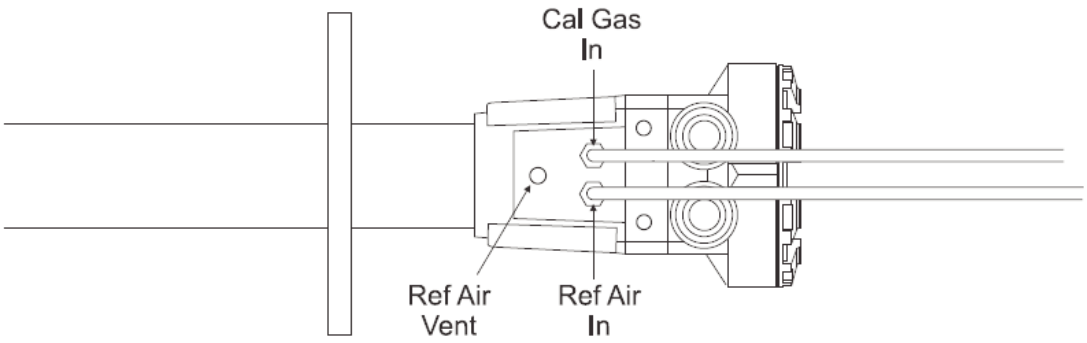


2.4.2 Calibration Gas

Two calibration gas concentrations are used with the 6888A, Low Gas - 0.4% O_2, balance N_2, and High Gas - 8% O_2, balance N_2. 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 2-25. 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% O_2. 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.

FIGURE 2-26. Traditional Architecture Cable Gland Assembly

2.5 Pneumatic Installation

2.5.1 Reference Air Package

After the 6888 is installed, connect the reference air set to the 6888 unit. Refer to the schematic diagram and the mounting dimensions in Figure 16 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 is recommended, or the reference air fittings can be left open to atomsphere. SPS 4001B or IMPS 4000 autocal boxes contain reference air sets.

Figure 27. Plant Air Schematic Diagram, Standard Housing

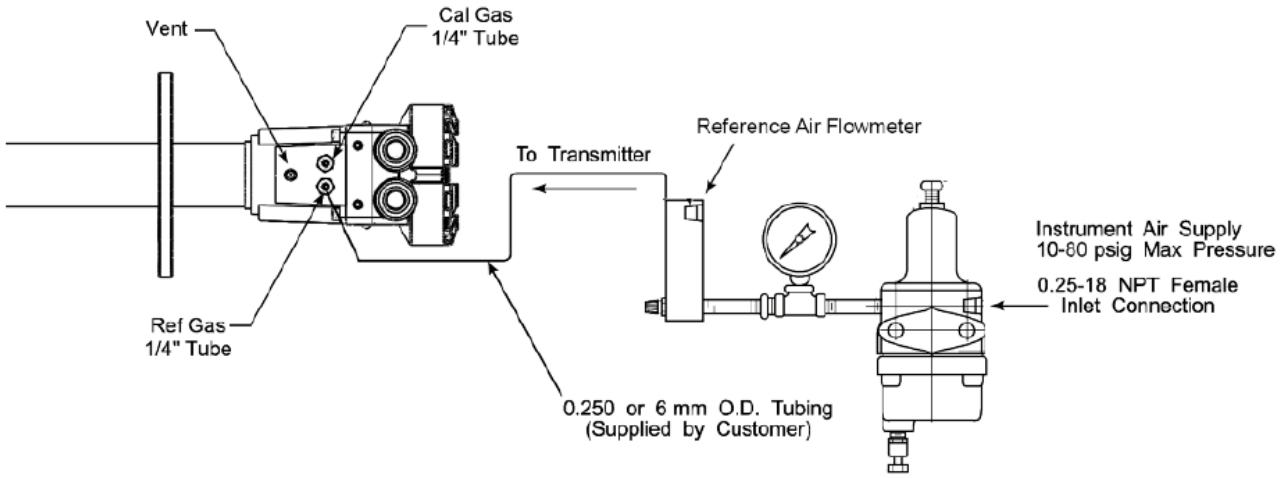
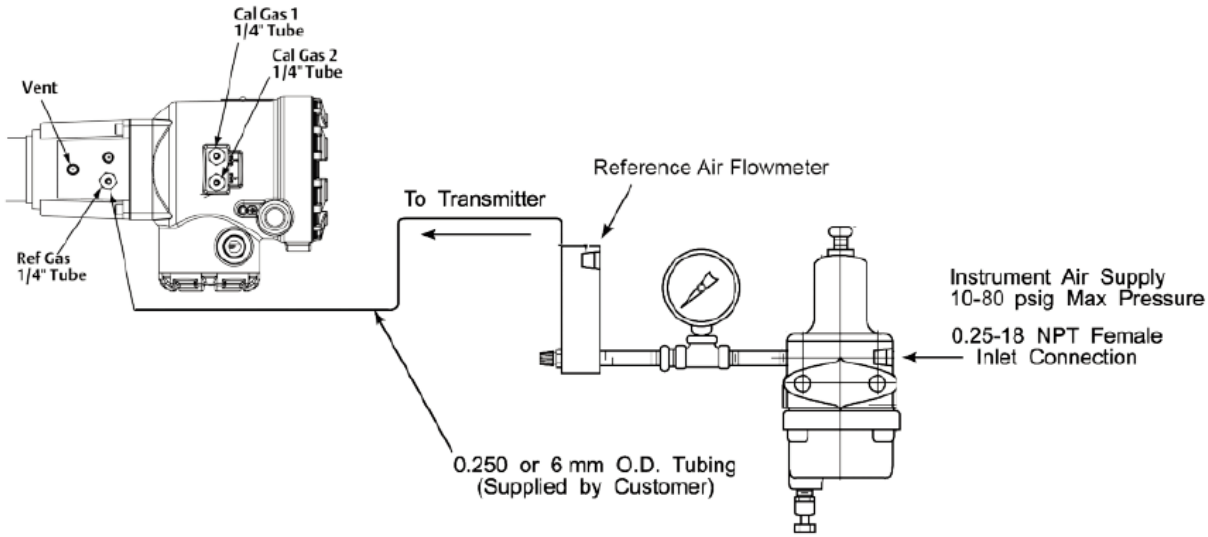


Figure 28. Plant Air Schematic Diagram, Accessory Housing



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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 Powering Up 6888 Transmitter without 6888Xi

1 Apply AC line power to the Transmitter.

2. Apply 24 VDC loop power to the Transmitter.
3. Using either the DCS control or a Field Communicator, verify communications to the Transmitter.
4. 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 and the O_2 reading will remain at 0% through this warm-up period. After warm up, the probe will begin reading oxygen and the 4-20 mA output will be based on the default range of 0-10% O_2.
5. If there is an error condition at startup, an alarm message will be displayed. Refer to full instruction manual for troubleshooting alarms.

3.2 Powering Up 6888 Transmitter With Single/Dual Channel or Single Channel & Flame Safety Interlock 6888Xi

1. Apply AC line power to the Transmitter.
2. Apply AC line power to 6888Xi. Run the Quick Start Wizard as described below. At the “Auto Cal Device” screen select the calibration method based on the 6888 Transmitter as follows:
   a. Standard Probe Housing Configuration – Select None, SPS or IMPS as appropriate. Do not select Integral or calibration will not be possible.
   b. Integral Autocal Probe housing – Select Integral only. If Integral is not selected, calibration will not be possible.
3. Verify communications between the Transmitter and the 6888Xi. The 6888Xi display is pre-configured to display O_2 & cell temperature for single channel configurations and both O_2 readings for dual channel configurations.
4. The transmitter probes 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 and the O_2 reading will remain at 0% through this warm-up period. After warm up, the probe will begin reading oxygen and the 4-20 mA output will be based on the default range of 0-10% O_2.

5. If there is an error condition at startup, an alarm message will be displayed on the 6888Xi. Refer to full instruction manual for troubleshooting alarms. 6888 Direct Replacement Probe (no electronics).

3.3 6888 Direct Replacement Probe (no electronics inside) with Traditional Architecture 6888Xi

1. Apply AC line power to 6888XI. Run the Quick Start Wizard as described below. At the “Auto Cal Device” screen select None, SPS or IMPS as appropriate. Do not select Integral or calibration will not be possible.
2. The direct replacement 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 and the O2 reading will remain at 0% through this warm-up period. After warm up, the probe will begin reading oxygen and the 4-20 mA output will be based on the default range of 0-10% O2.
3. If there is an error condition at startup, an alarm message will be displayed on the 6888Xi. Refer to full instruction manual for troubleshooting alarms.

3.4 6888Xi Quick Start Wizard

When the 6888Xi is first powered, a short wizard program will guide the user through the basic setup. Once configured, the 6888XI will retain the setup and the wizard will not repeat.

1. Apply power to 6888XI. Once boot-up is complete, the “Quick Start” wizard screen will appear. With a dual channel 6888XI, the wizard will run for both channels in succession. Press the <Enter> key to continue.
2. At the “Sensor Type” screen, use the Up/Down keys to select “O2”. Do not select “CO” as this option is reserved for future use. Press the <Enter> key to continue.
3. At the “Device Type” screen, use the Up/Down keys to select HART or FF (FOUNDATION Fieldbus), whichever applies.
4. At the “Auto Cal Device” screen, use the Up/Down keys to select the calibration method to be used. The methods are defined as follows:

   None – Manual calibration with the standard probe housing configuration

   SPS – Automatic calibration with the standard probe housing configuration using the SPS4001B

   IMPS – Automatic calibration with the standard probe housing configuration using the IMPS

   Integral – Automatic calibration with the integral autocal probe housing configuration

   Press the <Enter> key to continue.

NOTE

If SPS, IMPS or Integral is selected, the user must still configure automatic calibration as “On”. Other parameter such as test gas values and gas times should be verified as well. Refer to 6888Xi full instruction manual for calibration setup details.

5. When prompted if “Setup Correct?”, use the Up/Down keys to select “Yes”. If “No” is selected, the wizard will restart. Press the <Enter> key to continue.
6. The 6888Xi will display several screens while saving the configuration, reset itself then return to the main screen.

3.5 Re-initiating 6888Xi Wizard

To re-initiate the wizard setup, the IO board must be reset to factory default conditions.

1. Apply power to 6888XI.
2. When the main screen appears, press the <Menu> key several times until the “System” menu appears. Use the Up/Down keys to select “Configure IOB”. Press the <Enter> key to continue.
3. When the configure IOB screen appears, use the Up/Down keys to select “I/O Board 1”. With a dual channel 6888XI, either or both I/O boards may be reset and reconfigured. Press the <Enter> key to continue.
4. When the I/O board 1 menu appears, use the Up/Down keys to select “Reset I/O Board”. Press the <Enter> key to continue.
5. When the reset menu appears, use the Up/Down keys to select “Factory Defaults”. Press the <Enter> key to continue.
6. When prompted, use the Up/Down keys to select “Yes”. Press the <Enter> key to continue.
7. The 6888Xi will display several screens while saving the configuration, reset itself then display the wizard screen.

3.6 Calibration

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

Recommended calibration gases are 0.4% O_2 and 8% O_2, with the balance of nitrogen in the gas bottles, but other values can be used as long as the electronics are configured identically. Instrument air or pure nitrogen are not recommended as calibration gas values. A two-stage pressure regulator should be used to establish a pressure of 20 PSI, from the bottles, and the flowmeter should be set to 5 SCFH flow rate.

3.6.1 Manual/Semi-automatic Calibration

The 6888 probe with the standard housing can be calibrated in a semi-automatic fashion, with a technician following prompts via the display of the Xi electronics or via HART communications to a 475 handheld communicator or AMS console. The technician will need to manually switch the gases based upon these prompts. Recommended calibration gases are 0.4% O_2 and 8% O_2, balance nitrogen. A two-stage pressure regulator should always be used, set to 20 PSI. The calibration gas flowmeter should be set for 5 SCFH, with the cal gas fitting removed from the probe. A diffuser/filter that is plugged over time may cause the flowmeter to deliver less flow to the sensing cell, but the flow rate should never be readjusted until a new diffuser is installed. Readjusting the flowmeter back up to the 5 SCFH level could pressurize the cell during calibration, and cause the O_2 reading to shift downwards.

The electronics will determine if the calibration was successful, and calculate new calibration values. New calibration values are not automatically loaded into the electronics after a successful calibration, however. The technician has the opportunity of accepting the new values or not. (A significant calibration change may cause a bump in the O_2 readings at the DCS console, causing the operator concern). Record the calibration data on the log provided (cell slope, constant, and

impedance, as well as the speed of response data). If the electronics ps used, it will store calibration data for the past 10 successful calibrations.

Make sure that the calibration gas port is capped tightly between calibrations. A loose or missing cap can permit fresh air to bias the O_2 readings high in processes that run at negative pressure.

3.6.2 Fully Automatic Calibration

Fully automatic calibration requires the Xi electronics to manage the actuation of solenoids to introduce gases into the probe.

6888 Probes with Standard Electronics Housing

In addition to the Xi, this arrangement requires a separate Single Probe Sequencer (SPS), which is a solenoid box for switching calibration gases, or a larger Intelligent Multiprobe Sequencer (IMPS), which can handle the autocal for up to 4 probes in one box.

The automatic calibrations can be initiated in several ways:

- Via a "calibration recommended" diagnostic that is periodically checking cell impedance
- Via pushbutton on the Xi electronics
- Via HART communications from a 475 handheld communicator, or AMS
- Via an external contact closure
- Via time since the last successful calibration

If the O_2 measurement is being used for automatic control, always place the O_2 control loop into manual prior to calibrating. Always inform the operator prior to calibrating. The Xi electronics provides an "in cal" contact closure for this purpose. An "intiate cal" contact is also provided.

The Xi electronics will sequence the calibration gases in turn into the sensing cell. A 300 second flow time is the factory default for both gases, and also for the purge cycle, which lets the probe signal come back to the normal flue gas readings. The 4-20 Ma signal representing O_2 can be held during the calibration cycle, or permitted to vary with the bottled gases, in which case a record of the calibration can be trended at the DCS.

Calibration setup is found under the detailed setup menu.

6888 Probe with Integral Autocal Housing

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

Note 1: The calibration sequence from the Xi electronics will be identical to that for the manual/semiautomatic calibration , but note that with the integral autocal version of this probe it is not possible to conduct a manual calibration. The factory offers a probe rebuild capability if solenoid or other failures occur.

Note 2: Calibration gas bottle will be piped and under pressure at all times, so be sure to leak-check all fittings, tubing and connections. Always use dual-stage pressure regulators.

3.6.3 Other Features Associated with Calibration

1. "Cal Check" capability. A user can choose to look at new calibration values prior to having them load in and become active. If this feature is selected, a "calibration changed" alarm will come up after the calibration is complete. By pushing the "Diagnostics" button on the Xi, an "Accept Cal" step can be required so that the technician and operator can decide if

they are ready to accept a potentially large change in calibration values.

2. Plugged Diffuser Diagnostic- this feature measures the return-to-process rate after calibration gases are removed, and will alarm when this time exceeds 75% of the purge time configured. A “purge time too short” alarm is an indication that the diagnostic could not work because of a short purge time, and is another indication that the diffuser is plugged. Purge time should be increased in this case.

   Another feature that comes with the Plugged Diffuser Diagnostic is Auto Gas Switching. This feature switches cal gases, and also ends the purge sequence when the readings settle out, vs. waiting for a configured flow time. This saves time and gas.

3. Tolerance Check that will alarm if the cell MV signal is significantly different than the expected signal of the bottles noted in the setup. This will indicate if the wrong bottles are being used, or if a bottle runs out in the middle of a calibration.

Calibration Setup is under the Detailed Setup menu.

Calibration set-up can be found in the Xi menu :

Factory default menu see figure 18.

Figure 3-1. Calibration Defaults

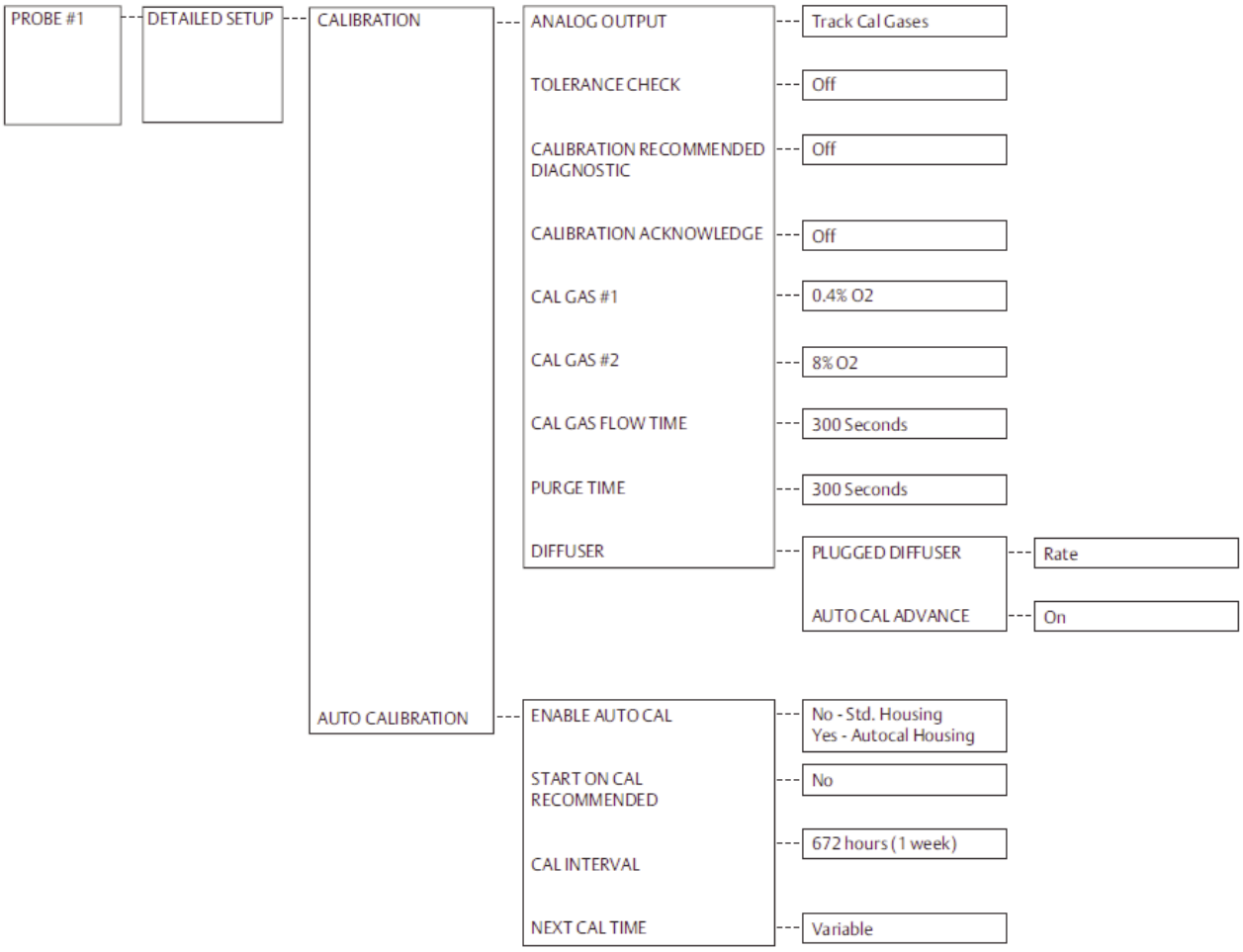


Figure 3-2. HART Menu Trees – 6888 Xi

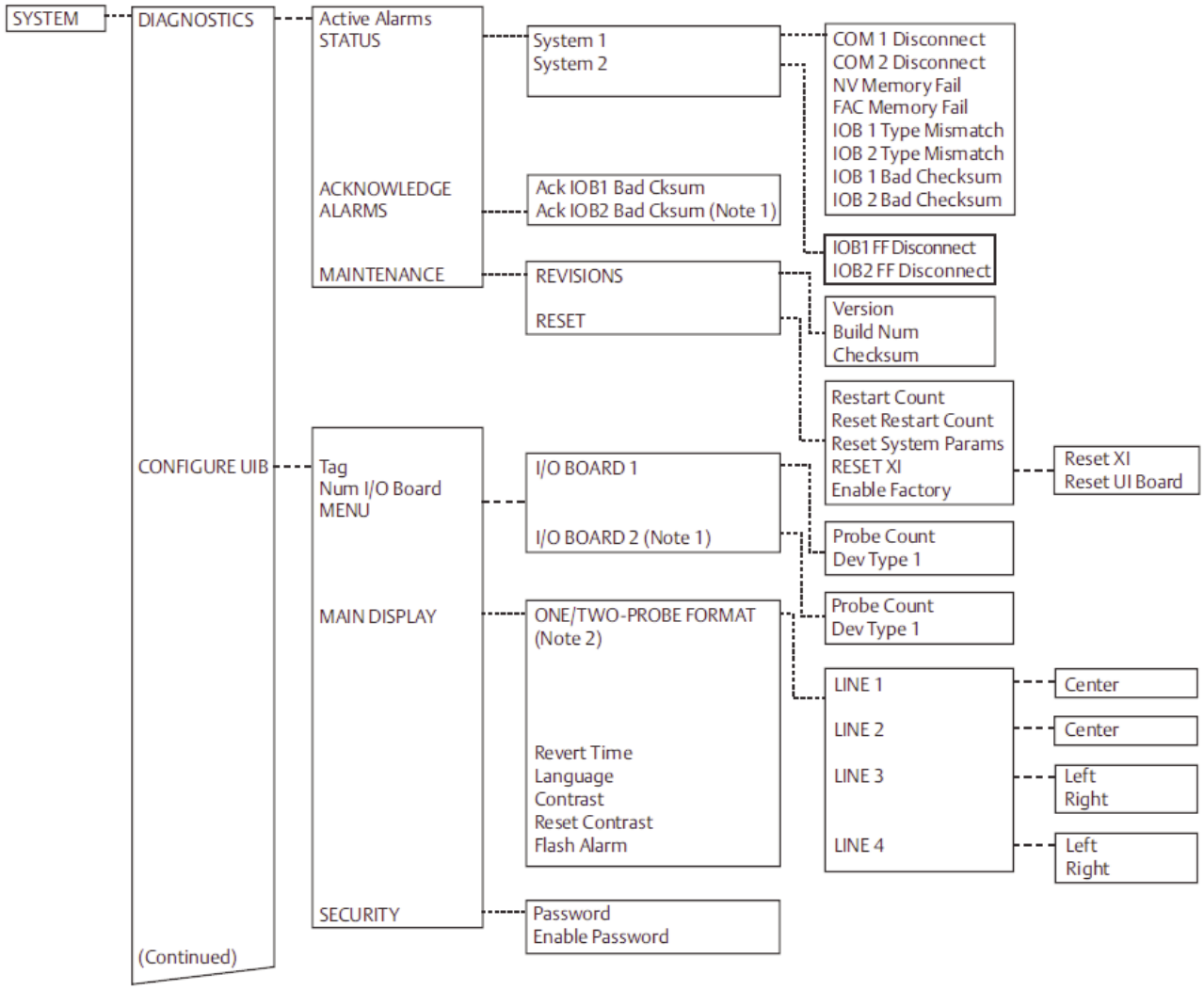


Figure 3-3. HART Menu Trees – 6888 Xi

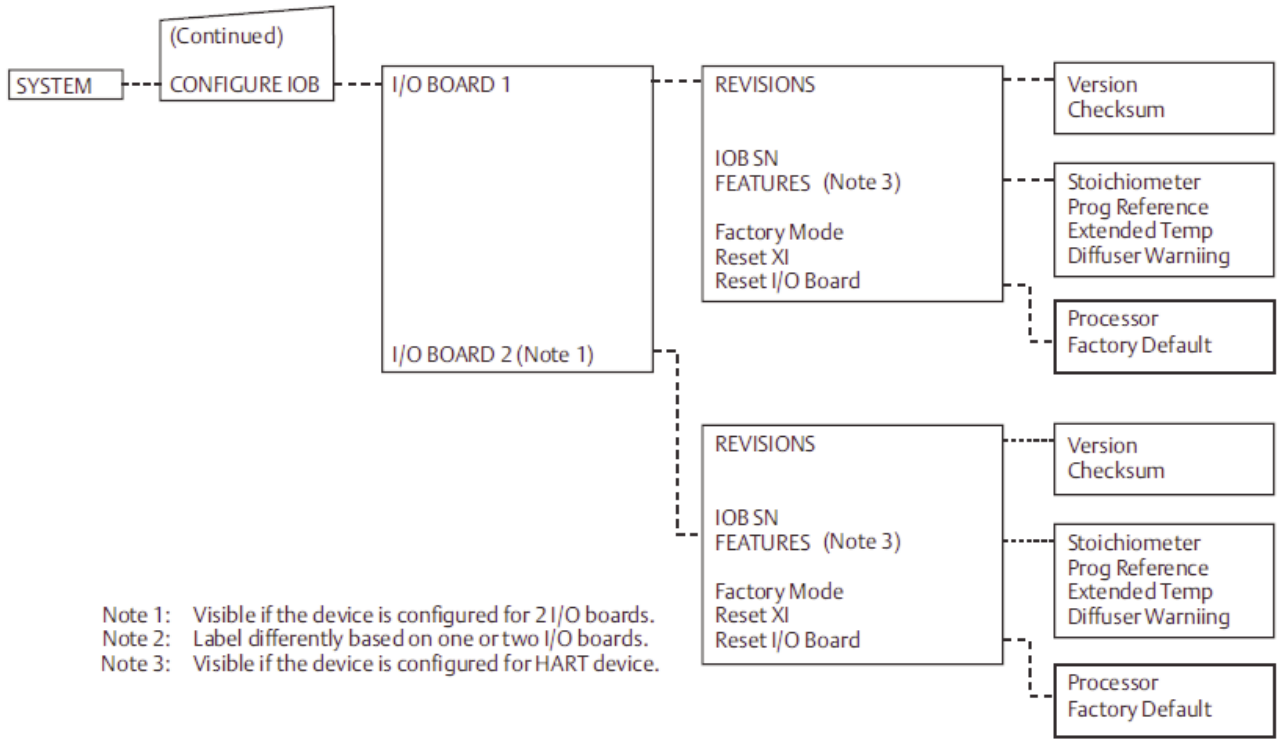


Figure 3-4. HART Menu Trees – 6888 Xi

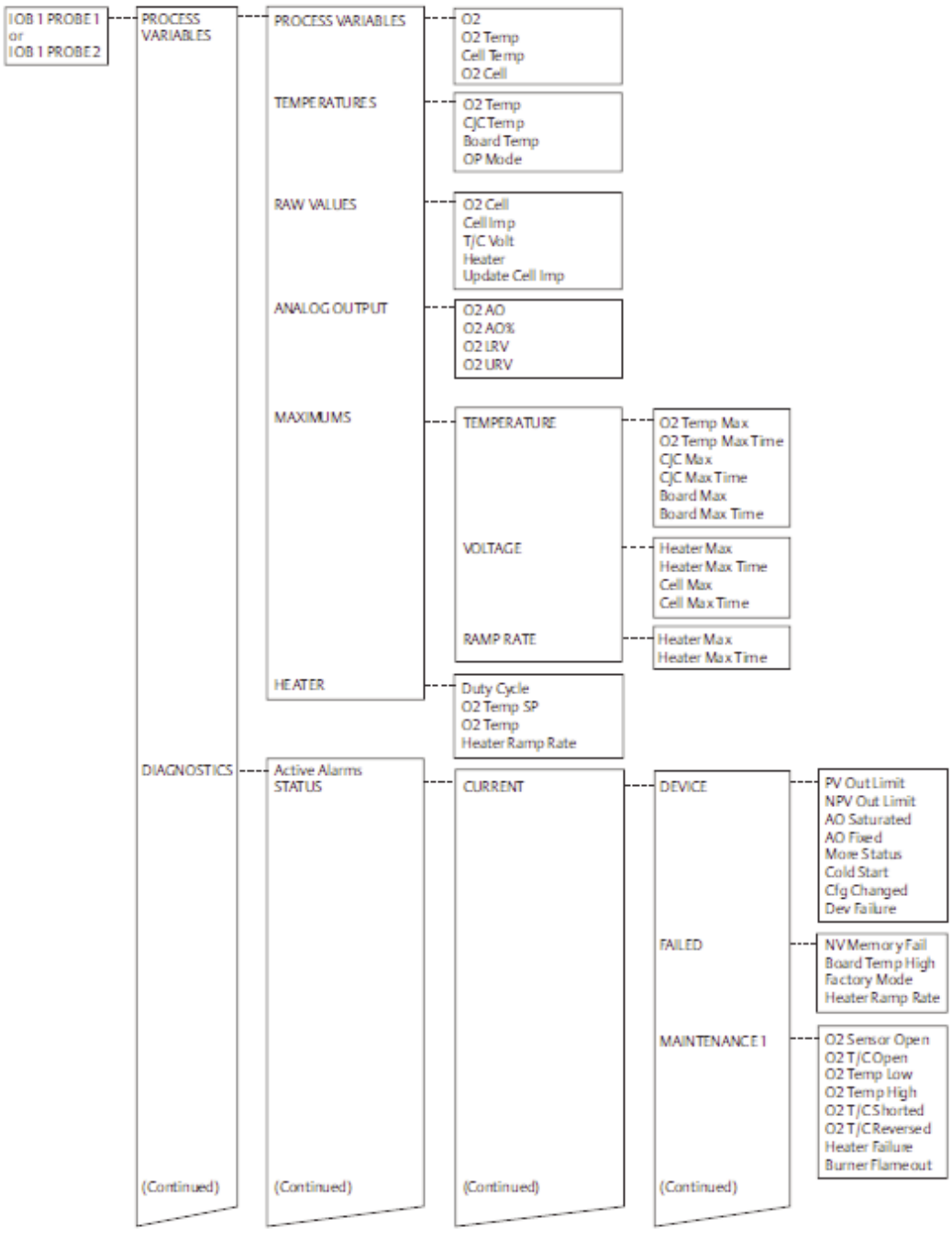


Figure 3-5. HART Menu Trees – 6888 Xi

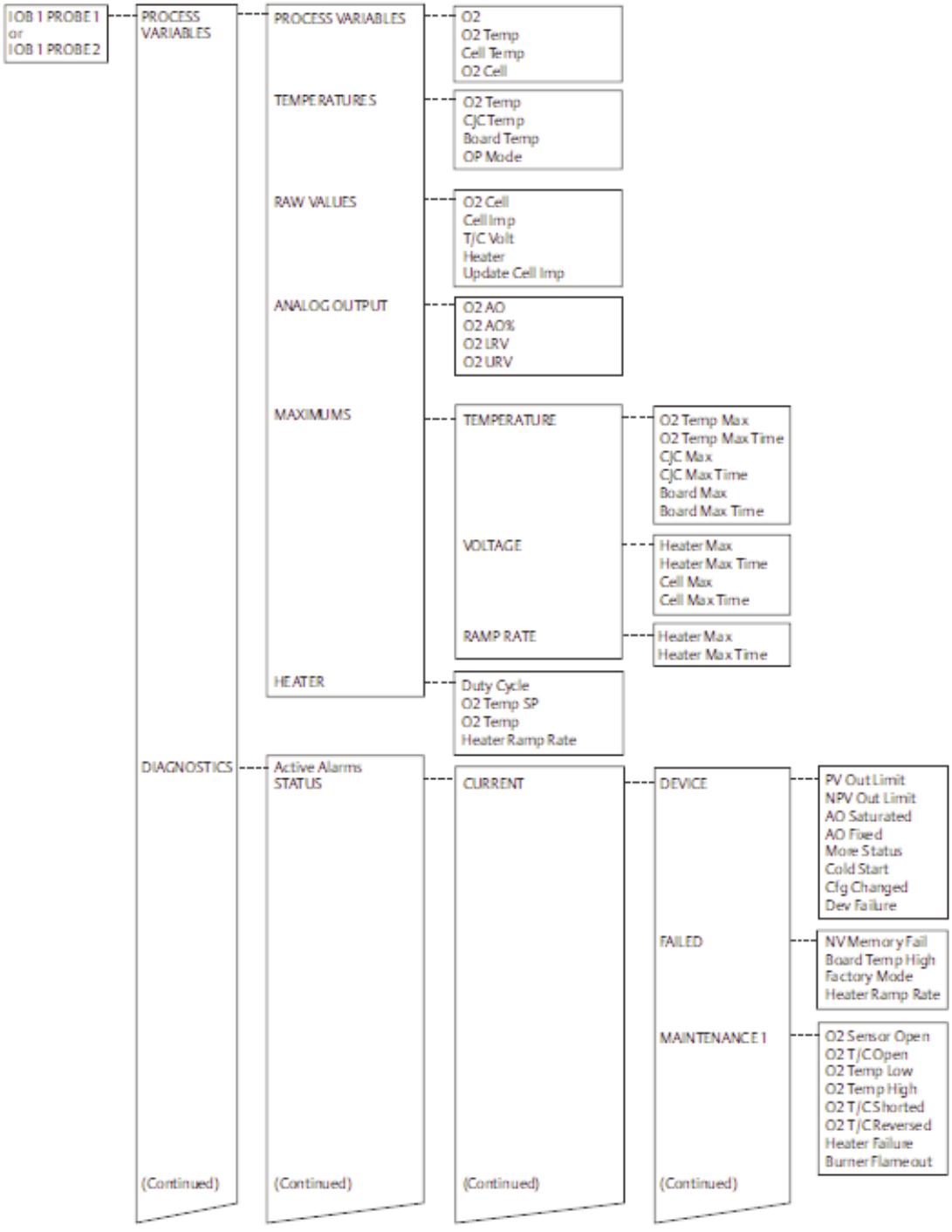


Figure 3-6. HART Menu Trees – 6888 Xi

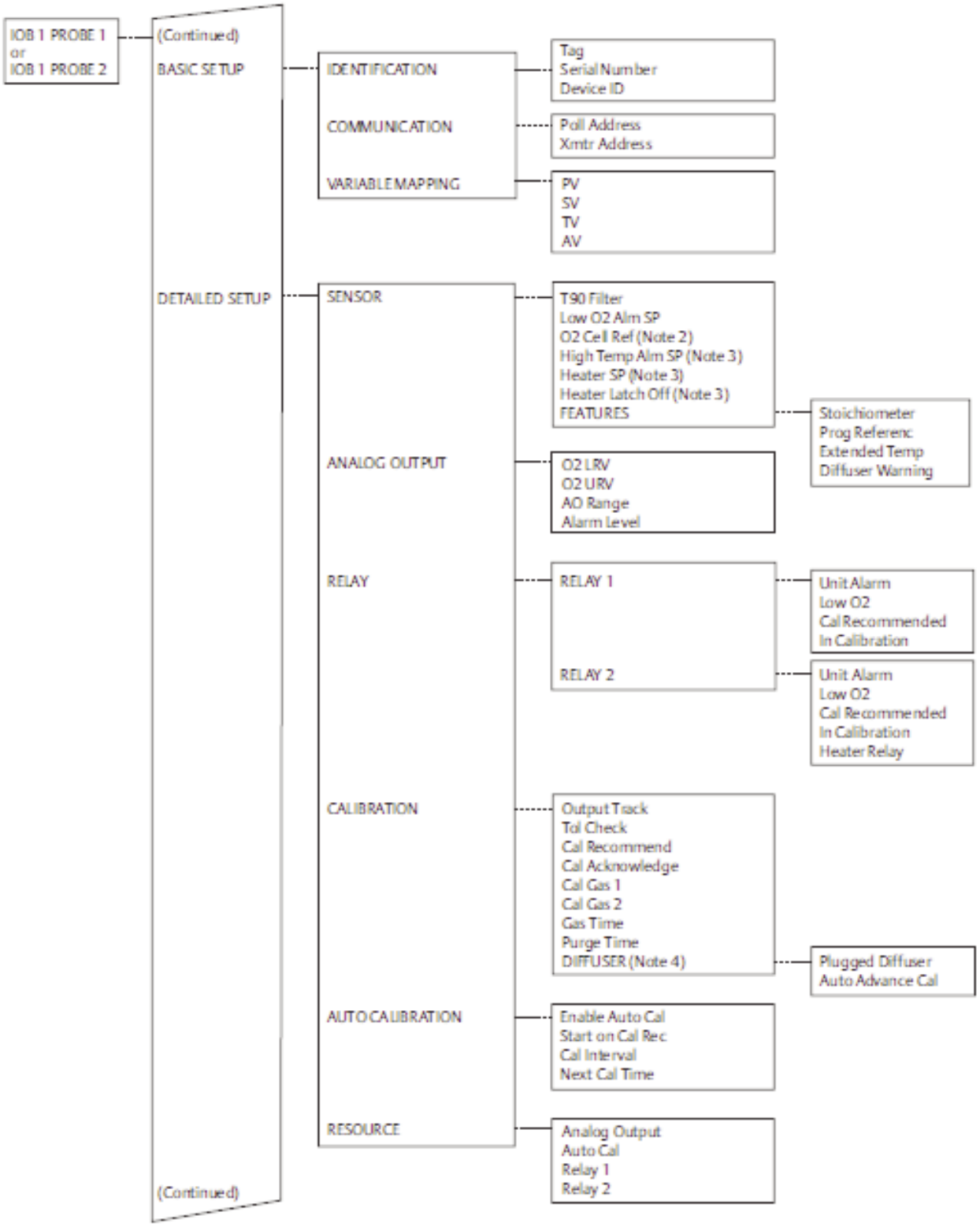
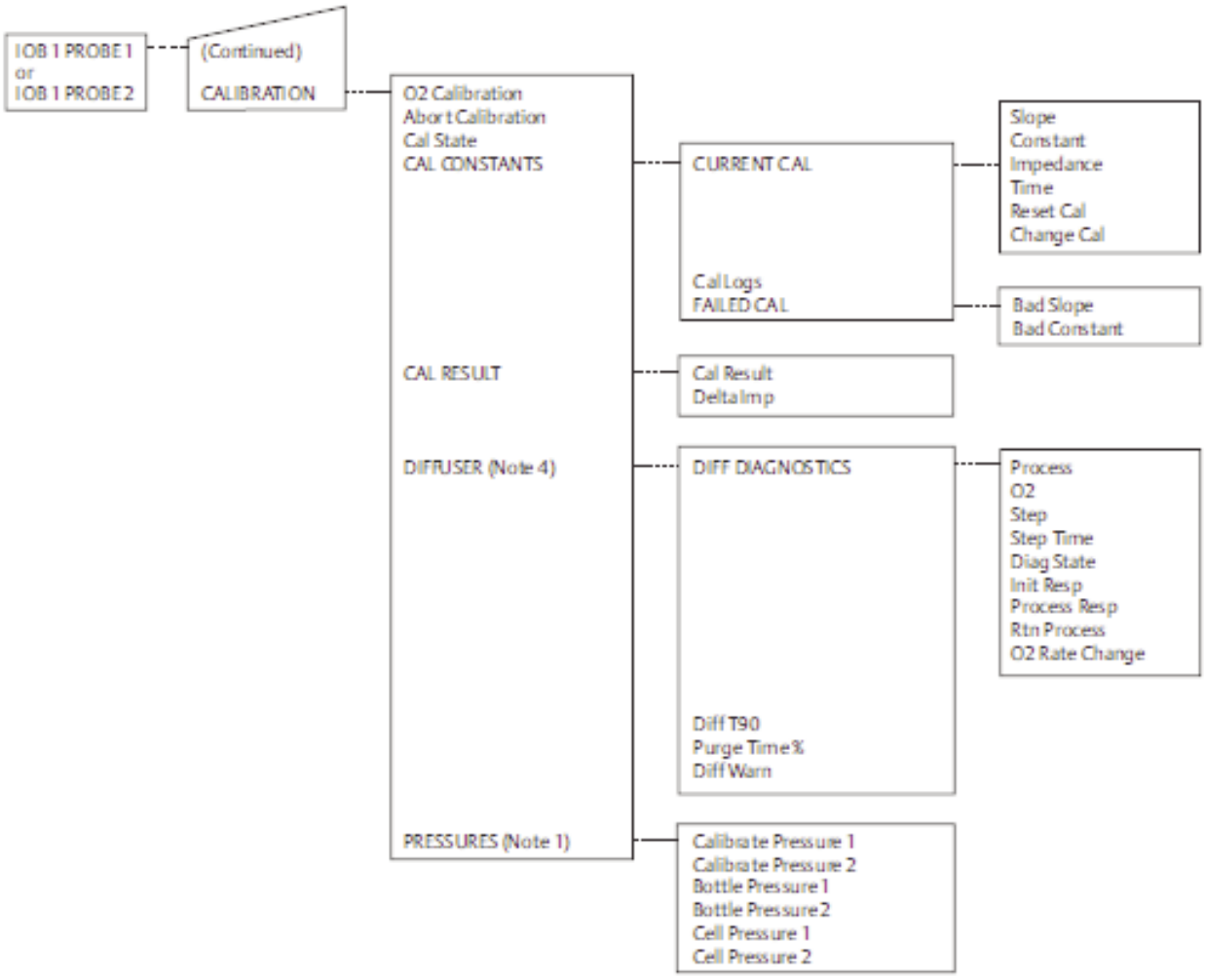


Figure 3-7. HART Menu Trees – 6888 Xi



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

Figure 3-8. HART Menu Trees – 375/475 Field Communicator

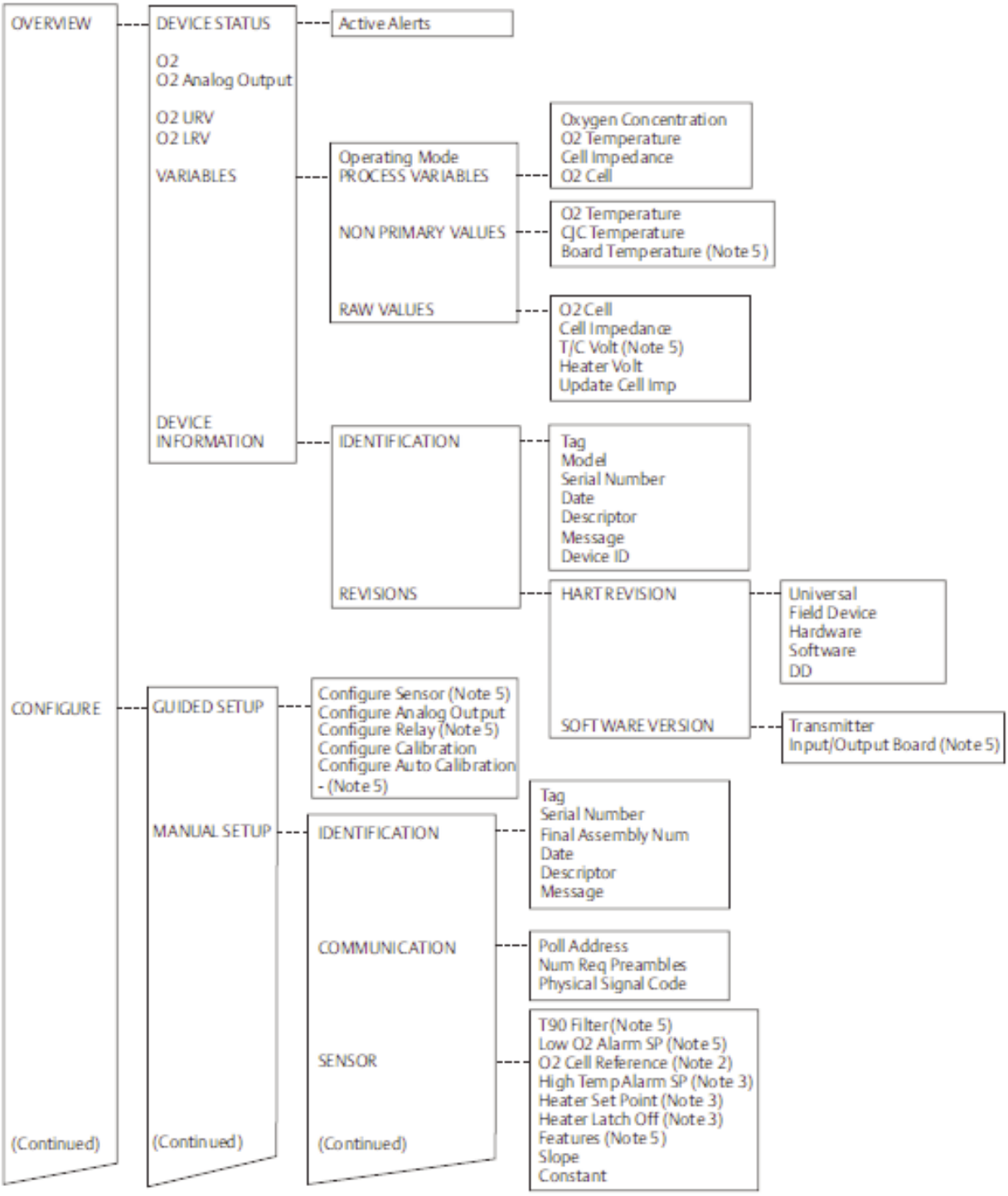


Figure 3-9. HART Menu Trees – 375/475 Field Communicator

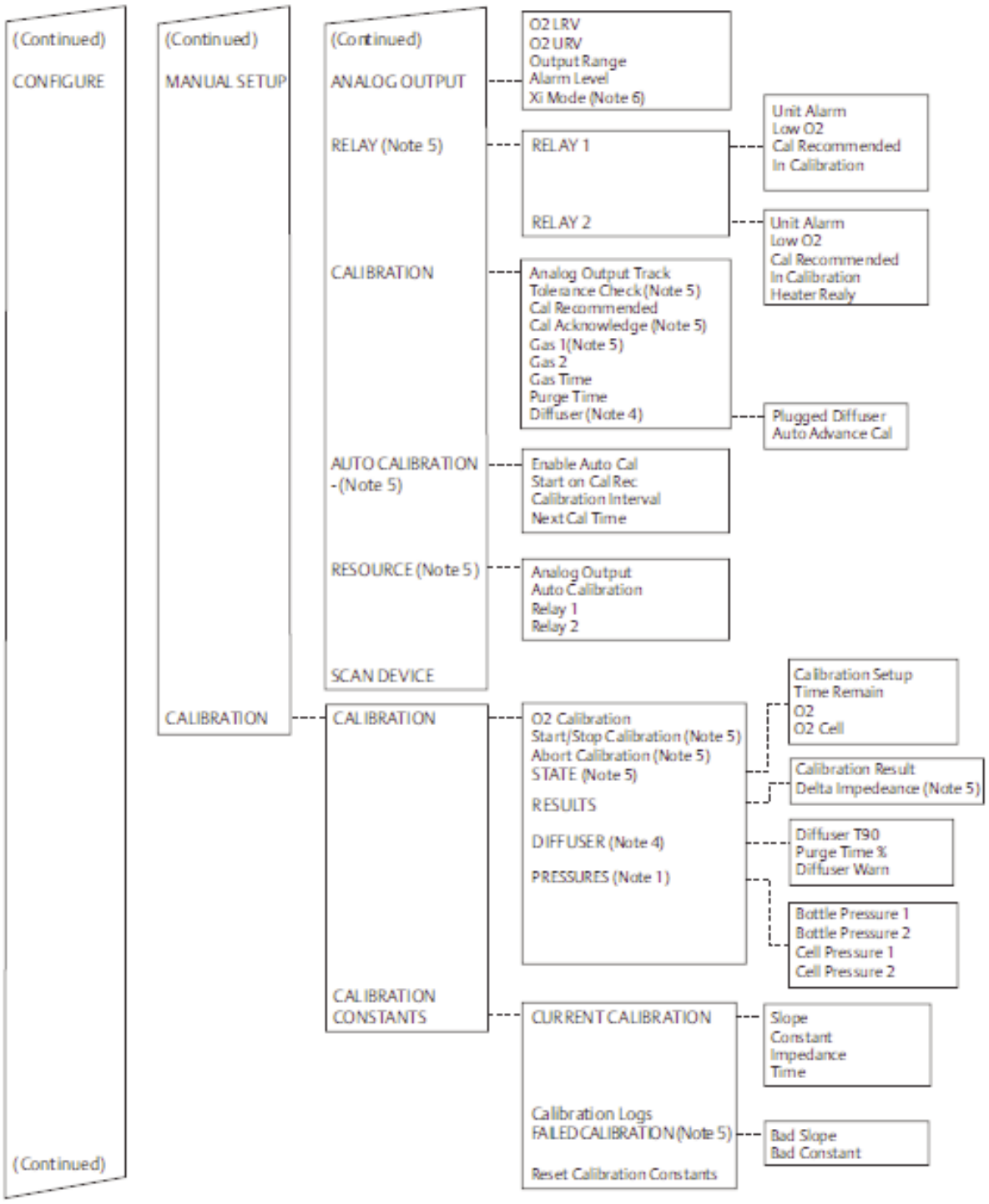


Figure 3-10. HART Menu Trees – 375/475 Field Communicator

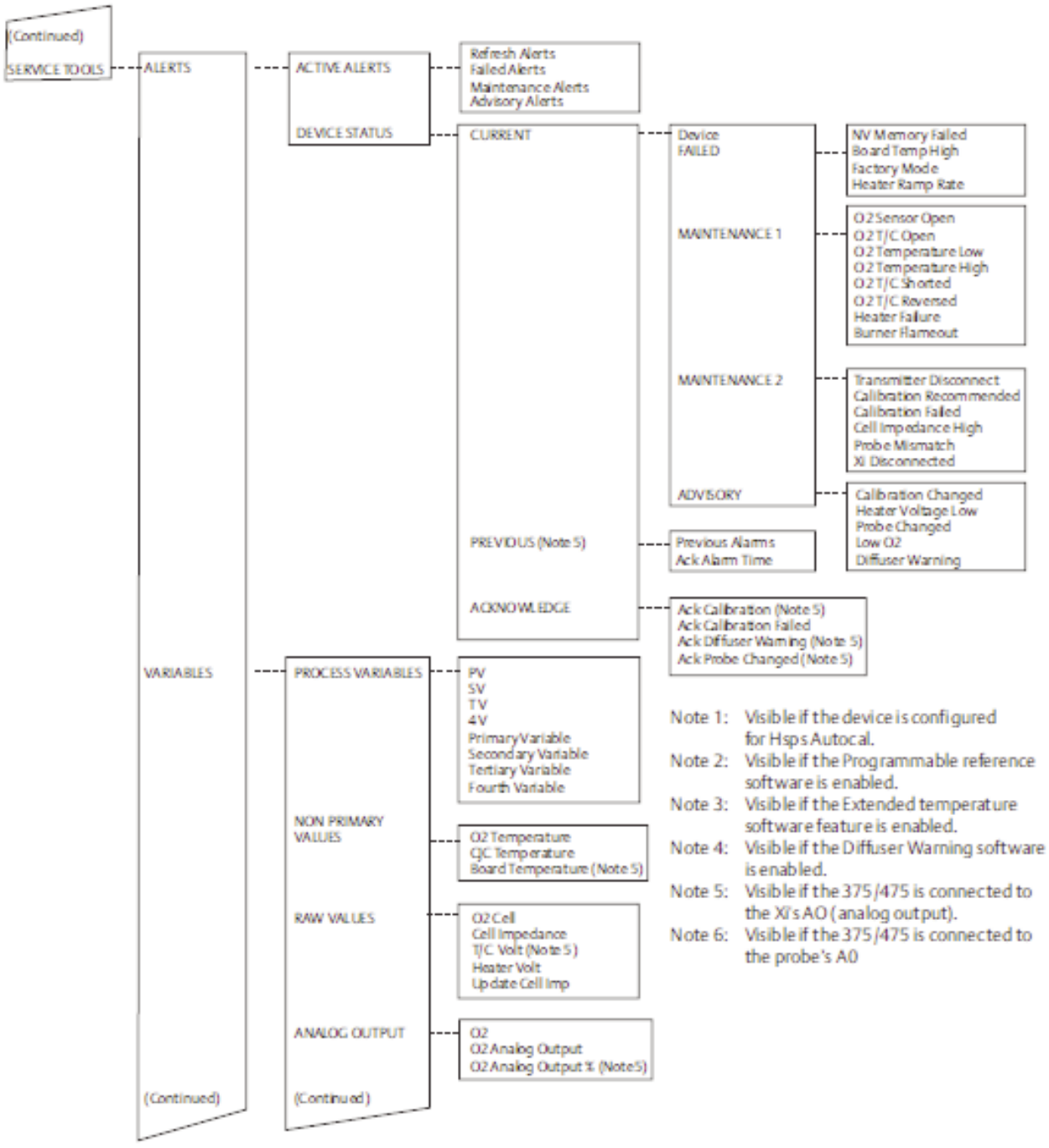


Figure 3-11. HART Menu Trees – 375/475 Field Communicator

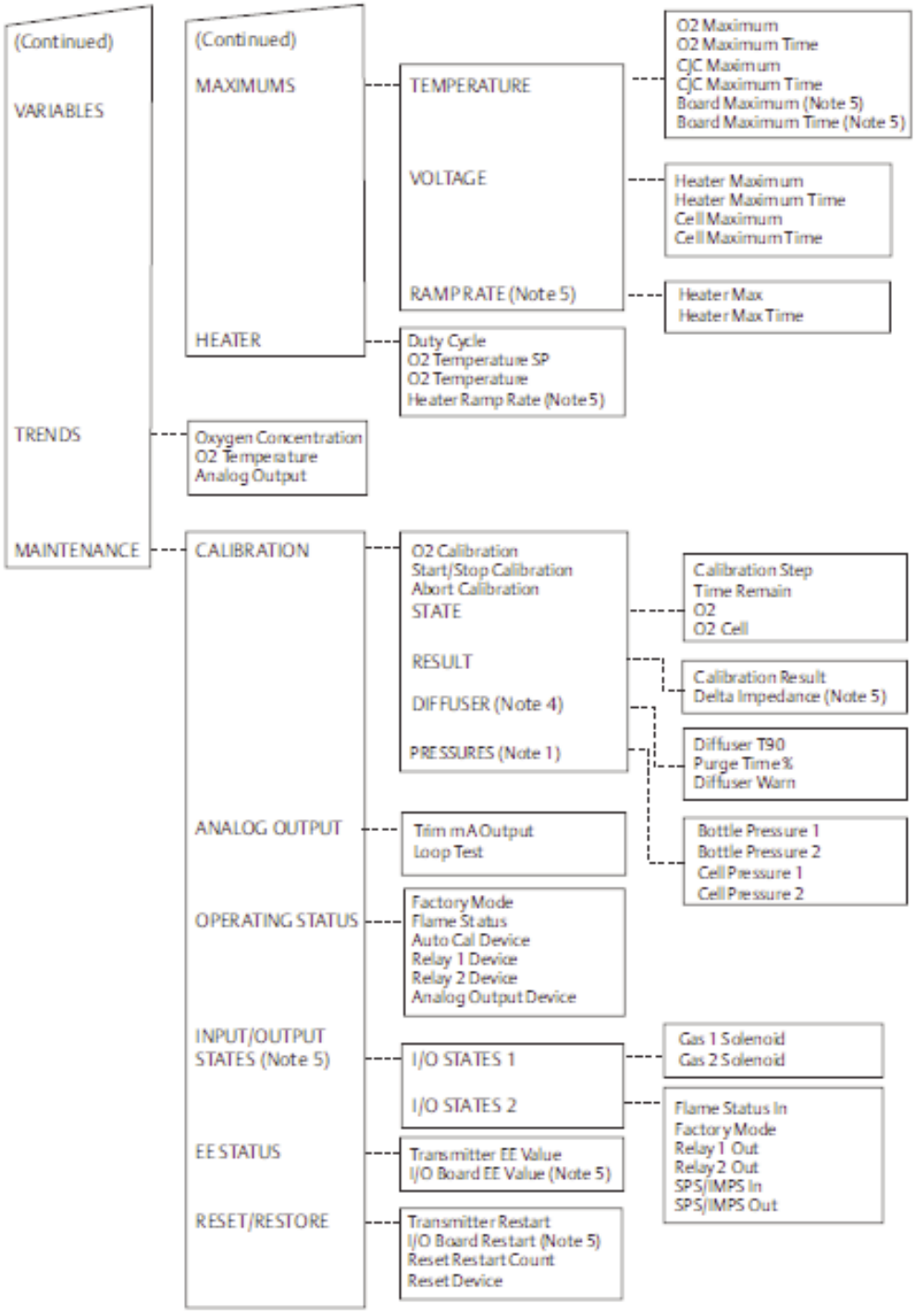


Figure 3-12. FOUNDATION Fieldbus Menu Trees – 6888 Xi

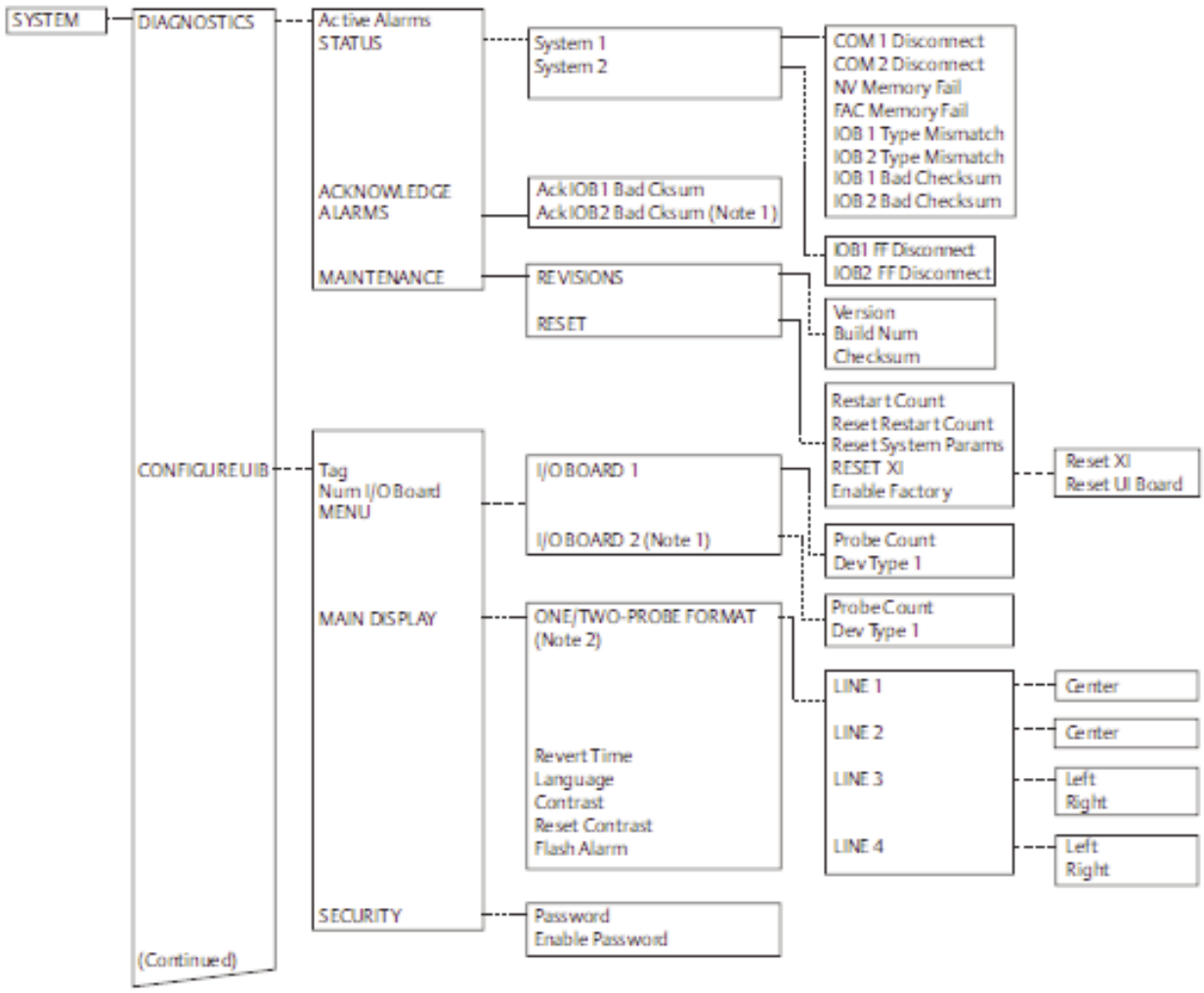


Figure 3-13. FOUNDATION Fieldbus Menu Trees – 6888 Xi

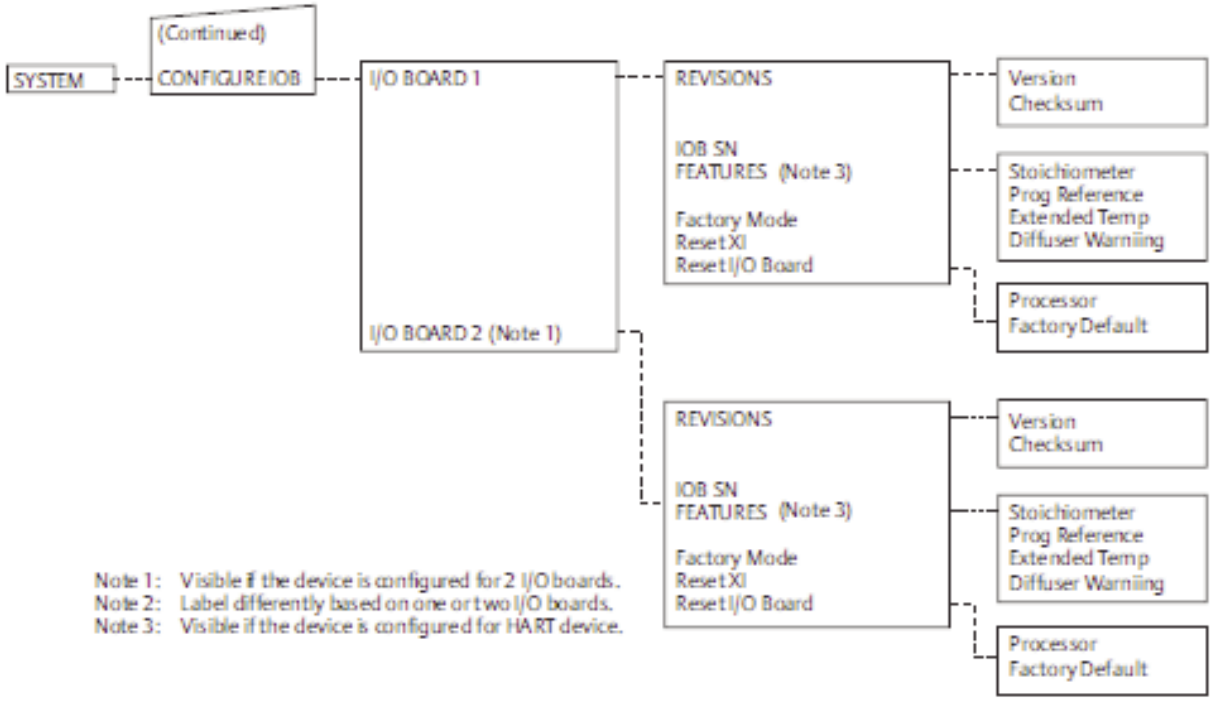


Figure 3-14. FOUNDATION Fieldbus Menu Trees – 6888 Xi

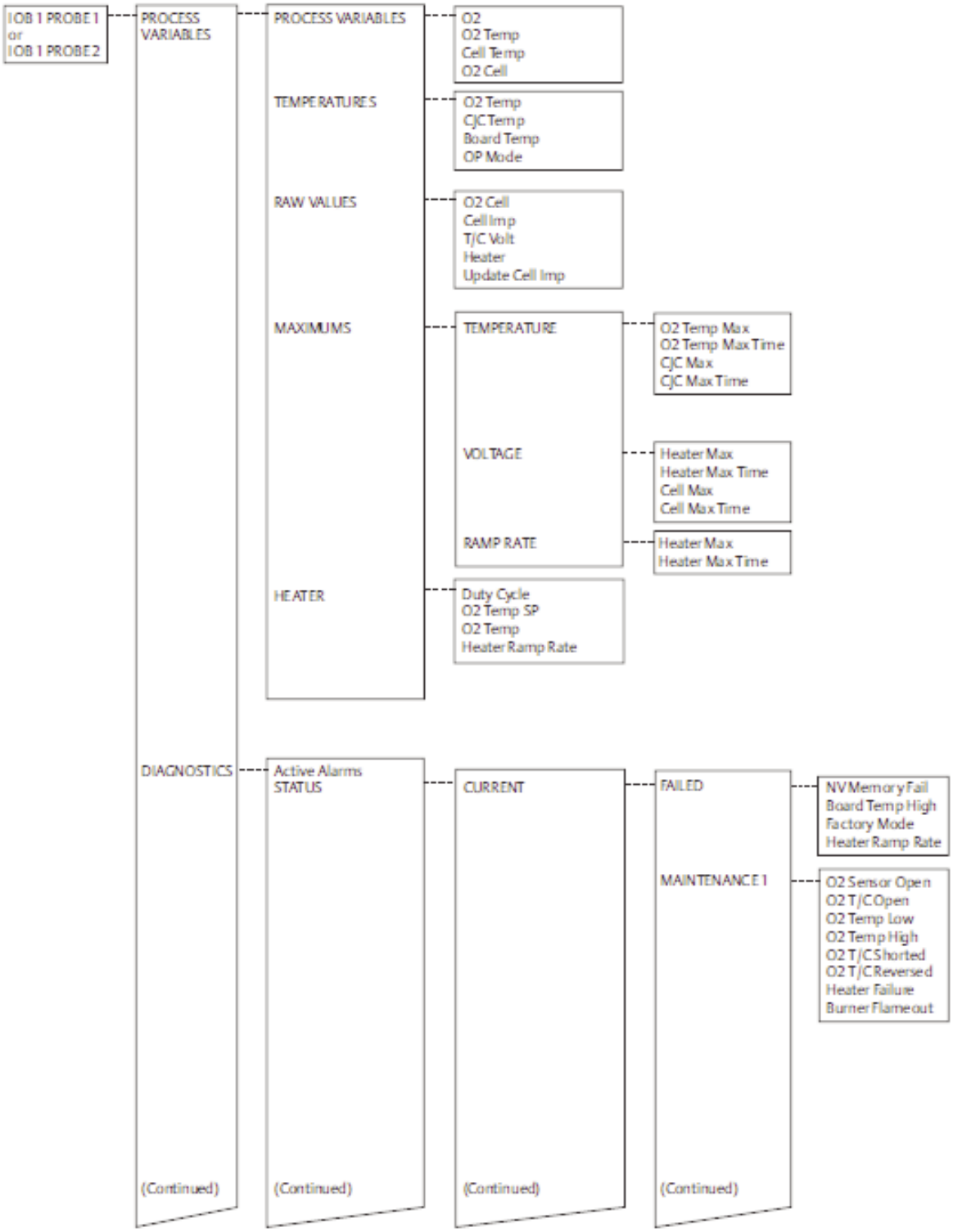


Figure 3-15. FOUNDATION Fieldbus Menu Trees – 6888 Xi

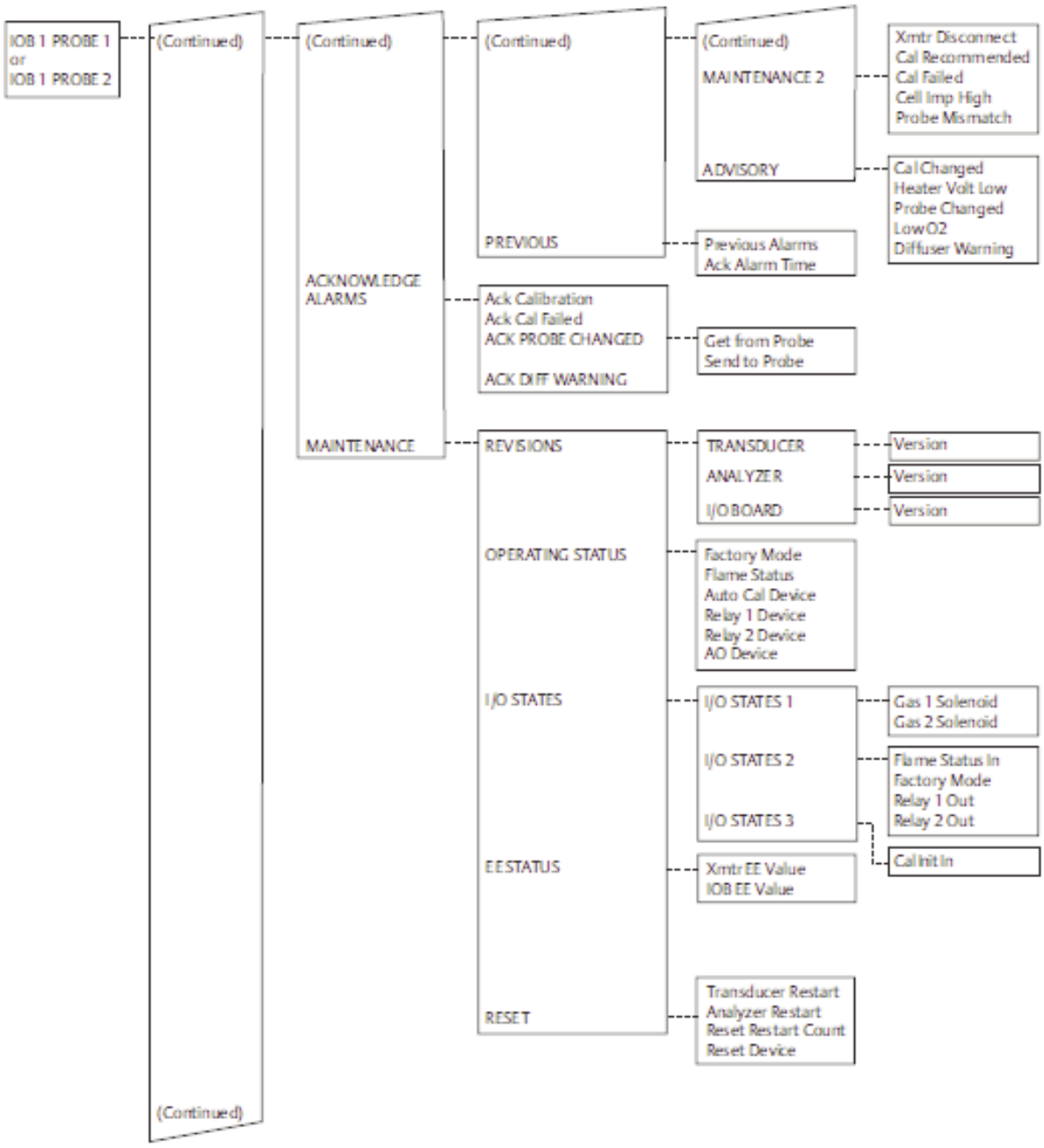


Figure 3-16. FOUNDATION Fieldbus Menu Trees – 6888 Xi

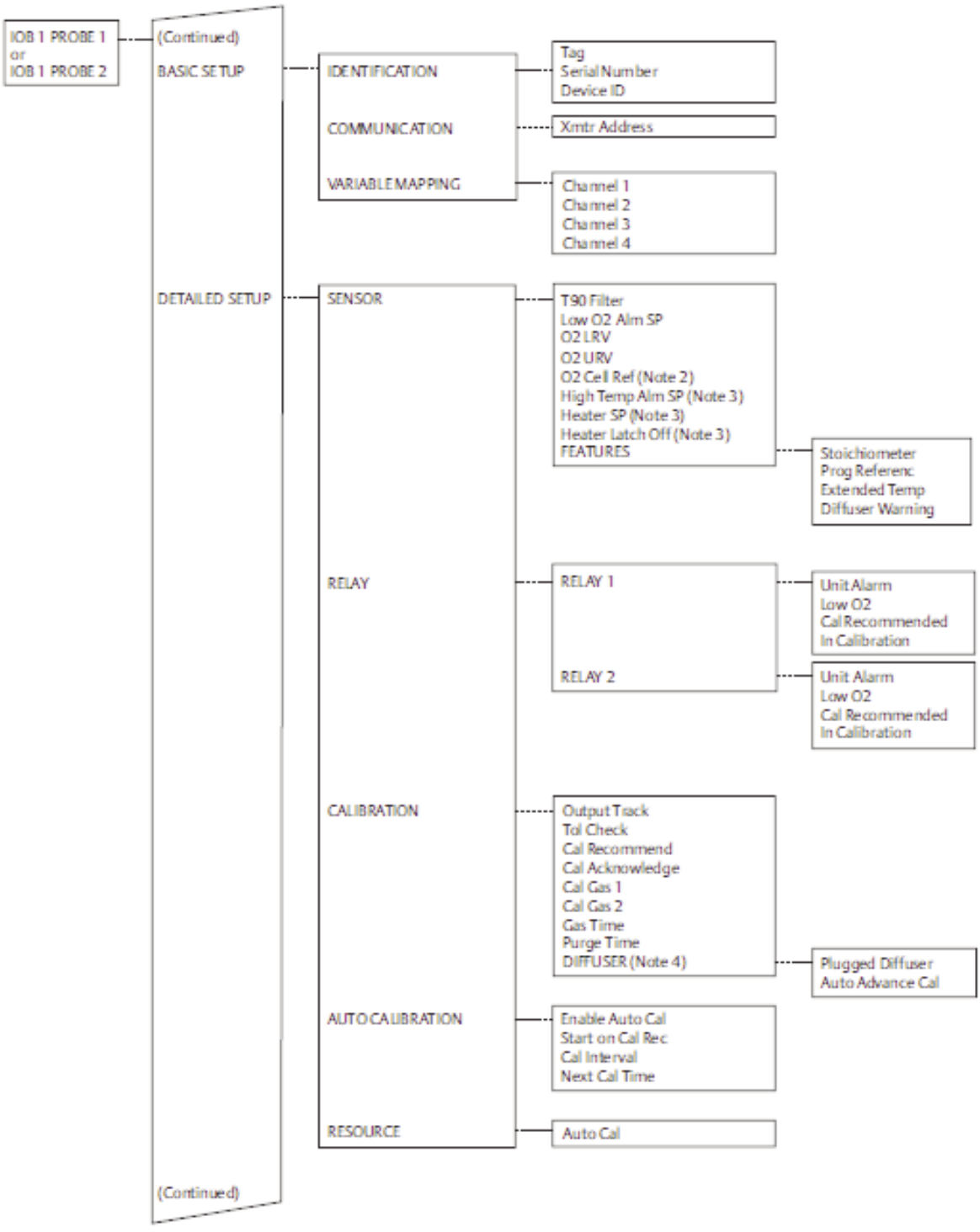
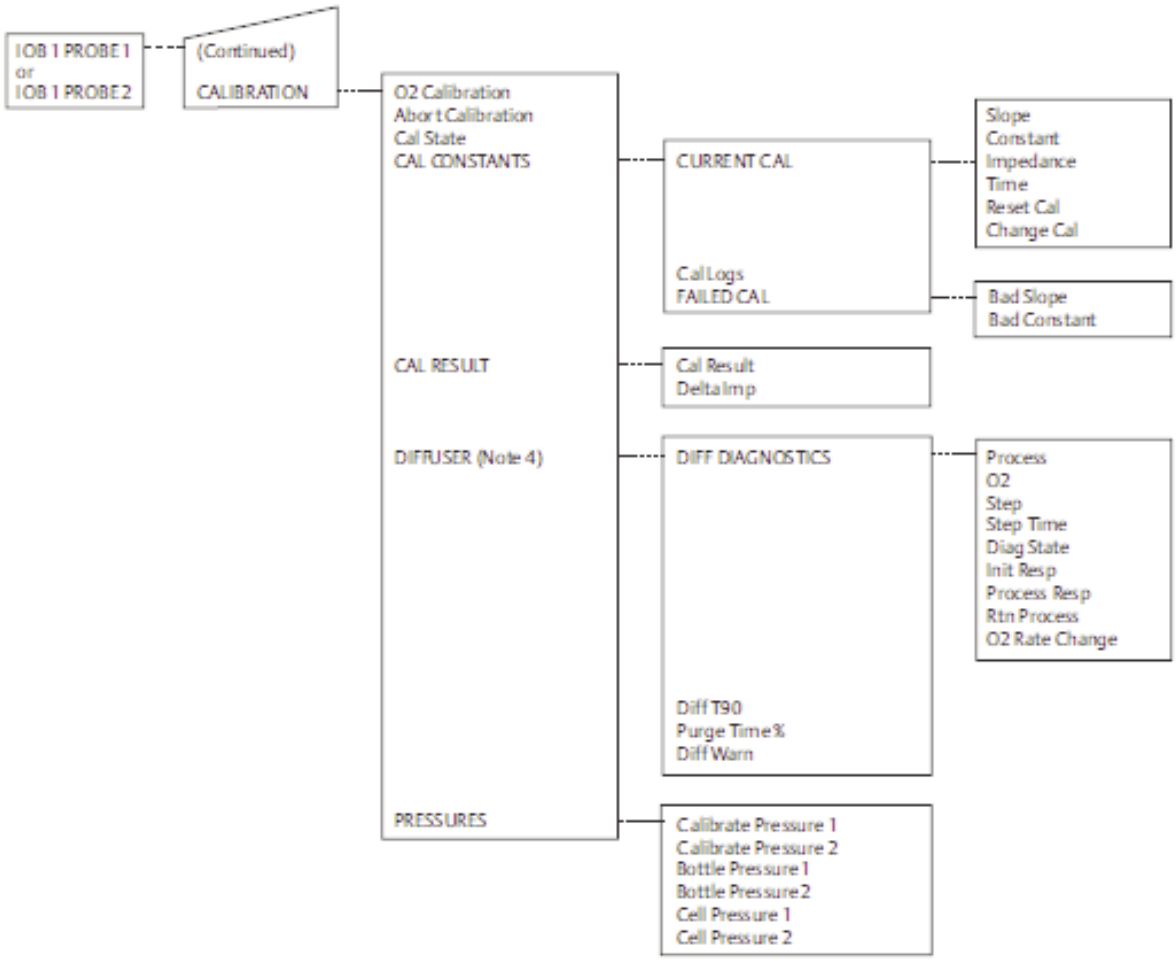
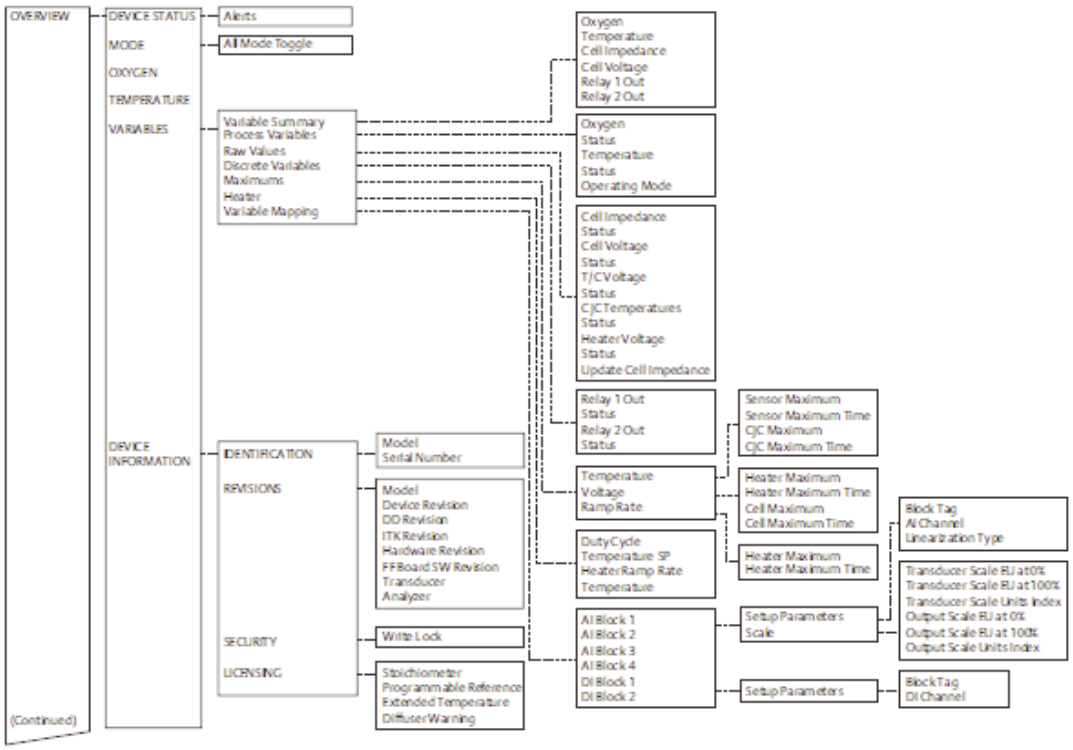


Figure 3-17. FOUNDATION Fieldbus Menu Trees – 6888 Xi



Note 1: N/A
Note 2: Visible if the Programmable Reference software feature is enabled.
Note 3: Visible if the Extended Temperature software feature is enabled.
Note 4: Visible if the Diffuser Warning software feature is enabled.
Note 5: Visible if the Factory Mode switch is on.

Figure 3-18. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator



Note1: N/A
Note 2: Visible if the Programmable Reference software feature is enabled.
Note 3: Visible if the Extended Temperature software is enabled.
Note 4: Visible if the Diffuser Warning software feature is enabled.

Figure 3-19. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

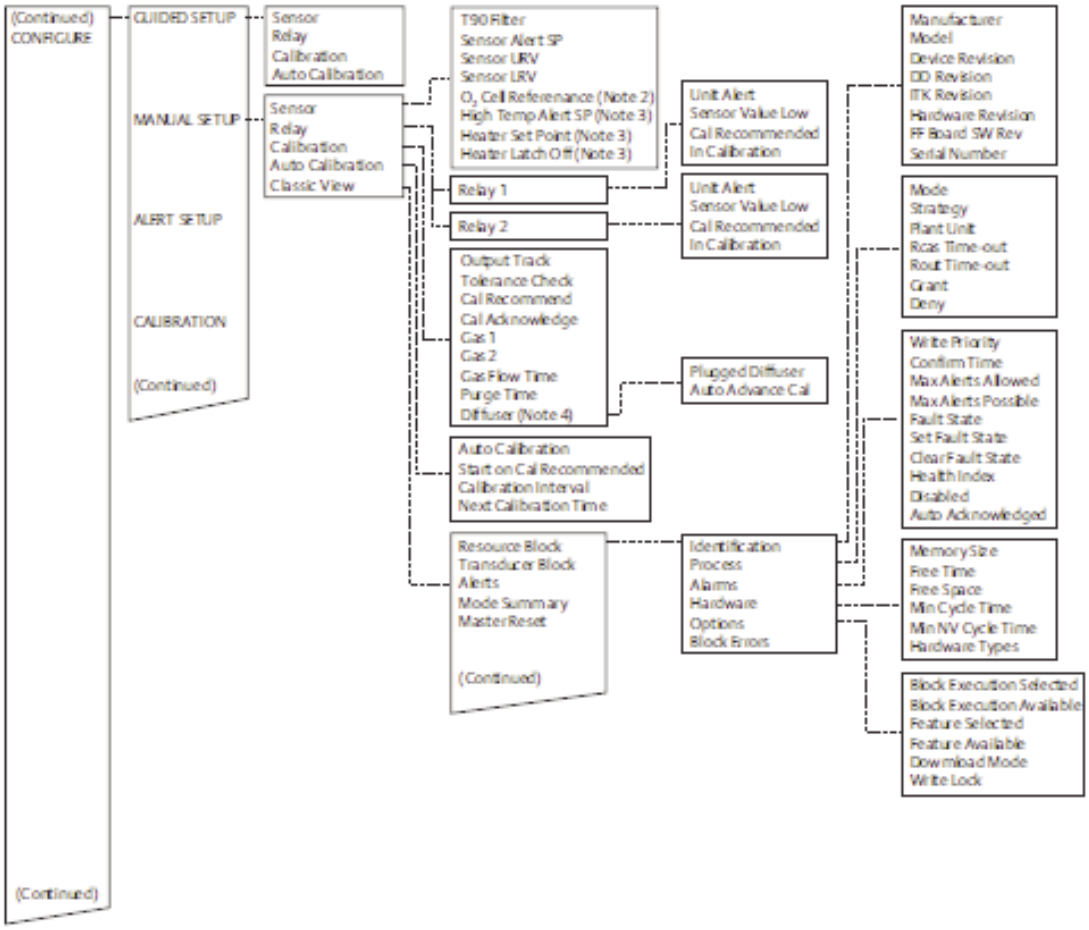


Figure 3-20. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

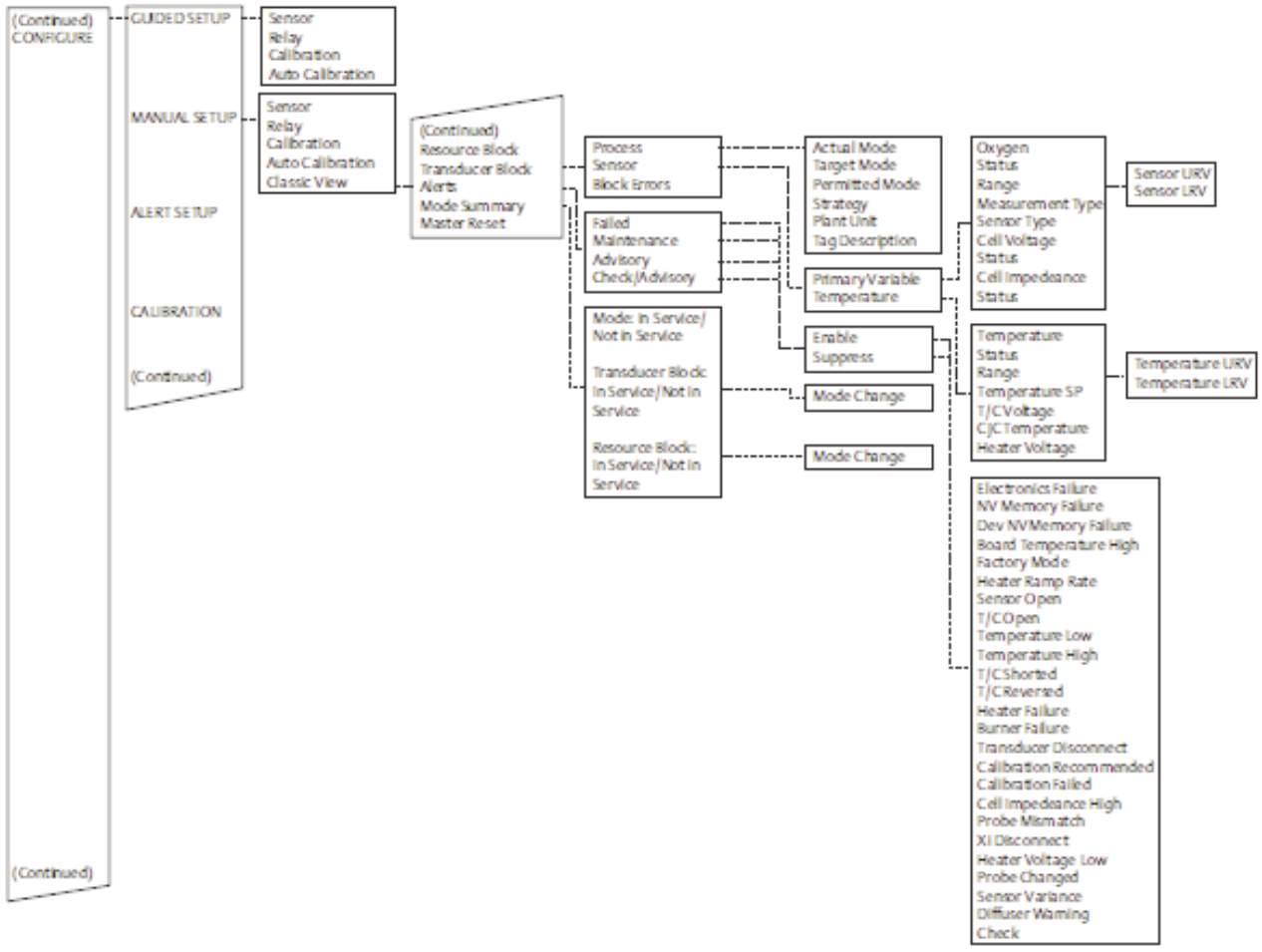


Figure 3-21. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

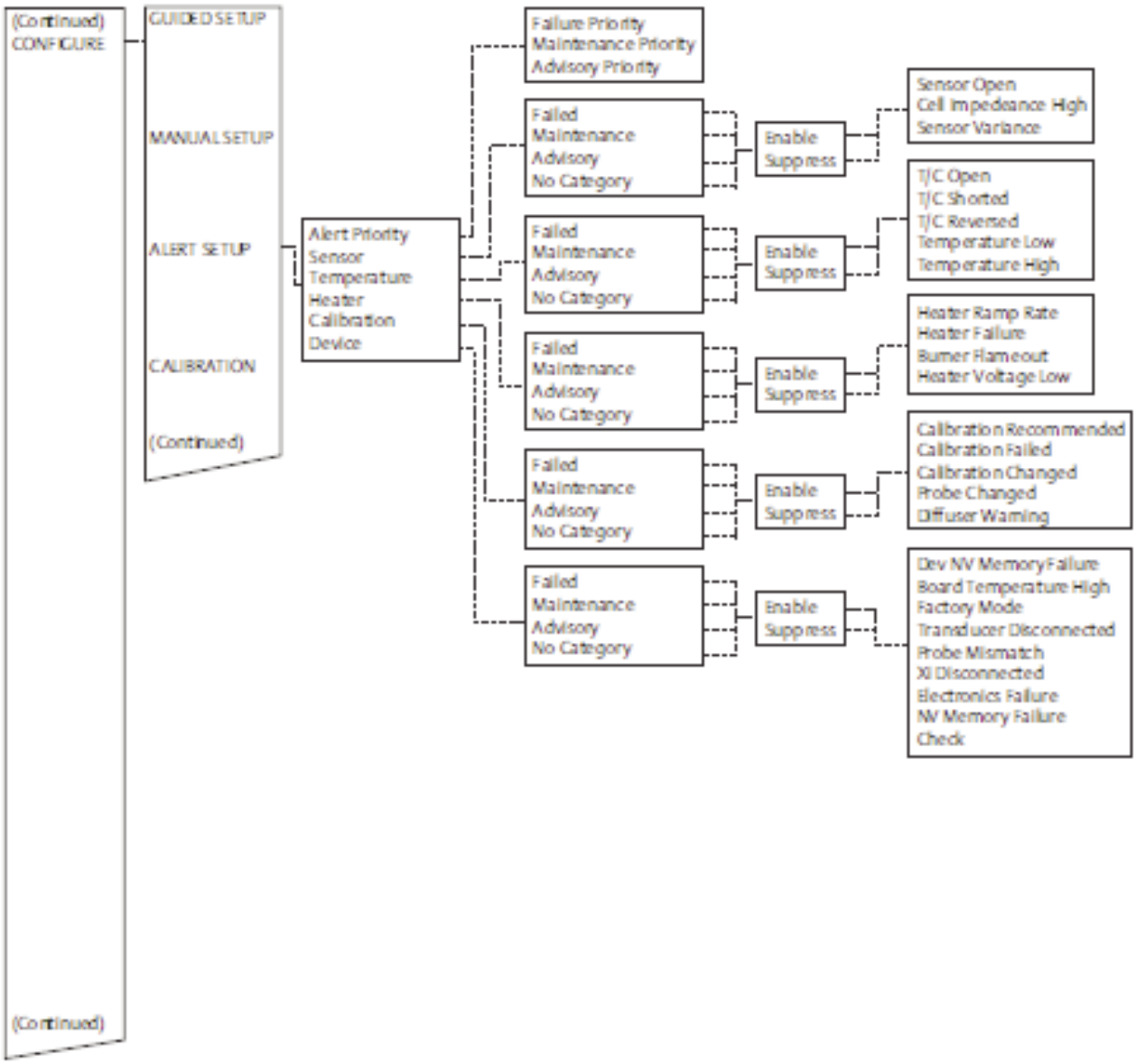


Figure 3-22. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

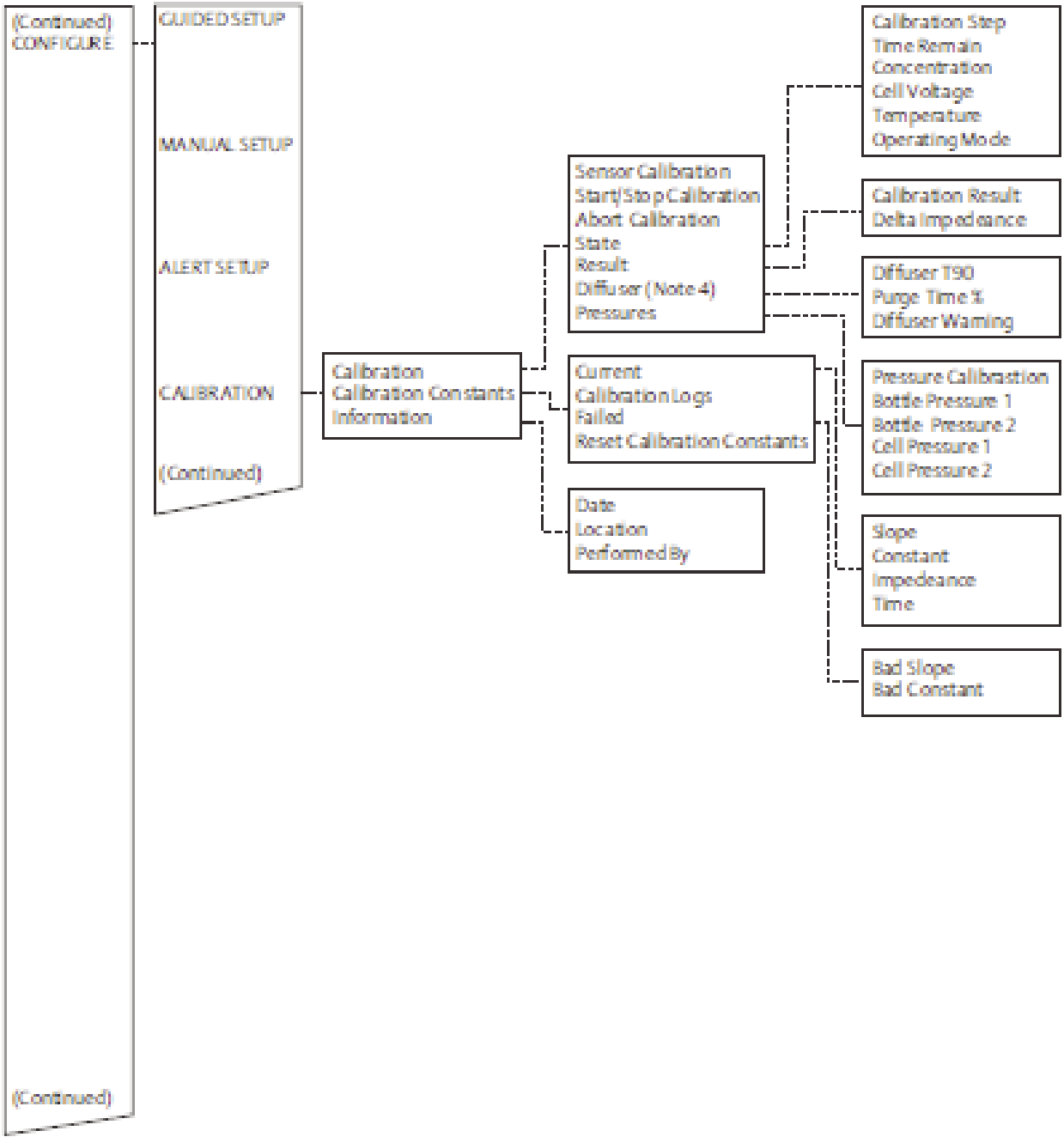


Figure 3-23. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

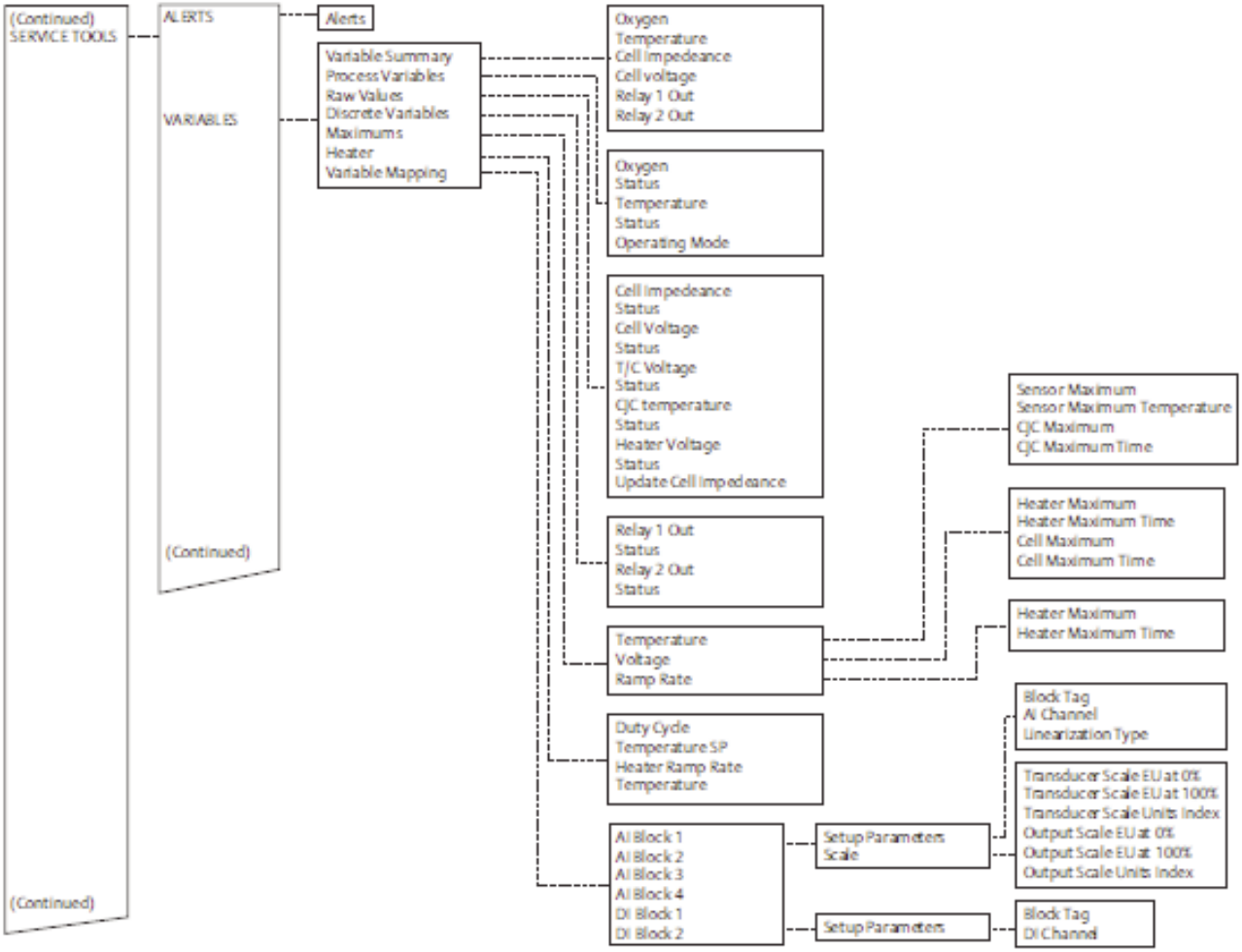


Figure 3-24. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator

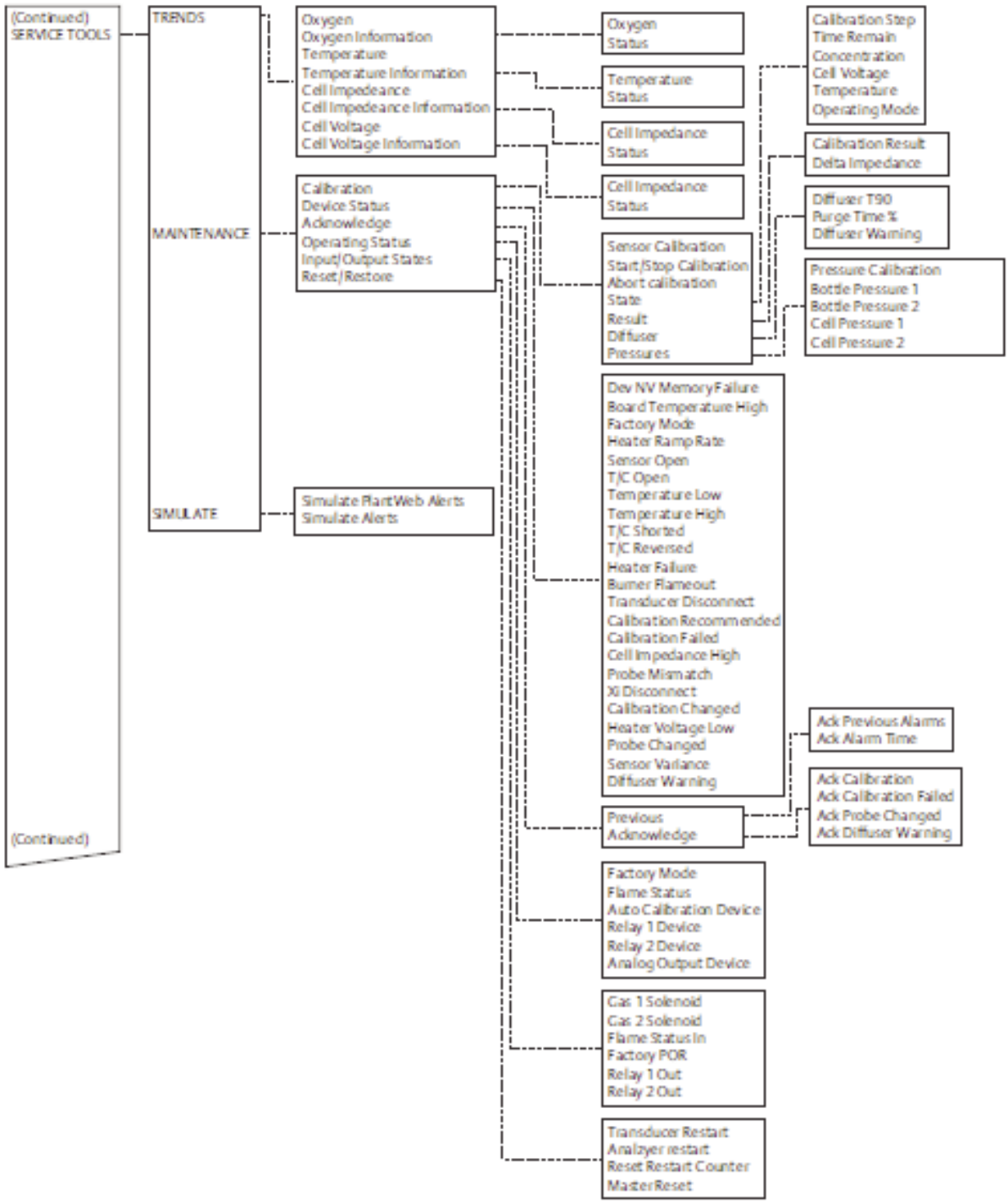
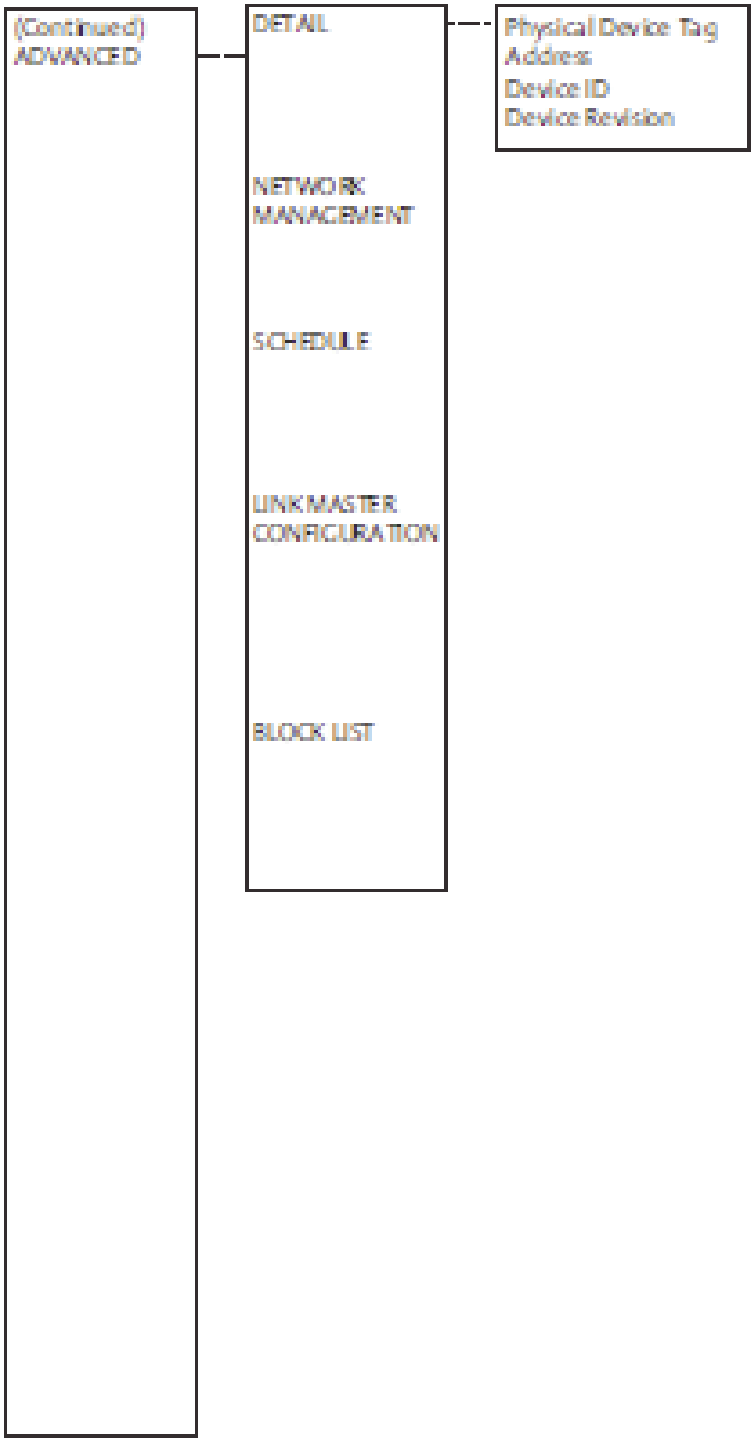


Figure 3-25. FOUNDATION Fieldbus Menu Trees – 375/475 Field Communicator



3.7 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	decC	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	--	O2 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 O2 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

3.8 Parameter Setup

3.7.1 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.

3.8.2 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.

3.8.3 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.

3.8.4 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:

   O_2 LRV – O_2 value at lower analog output value (0% @ 4 mA, non-configurable)

   O_2 URV – O_2 value at upper analog output value (50% max @ 20 mA)

   Output Range – Range of analog output (4-20 mA, non-configurable)

   Alarm Level – O_2 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.

3.9 Calibration

New O_2 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 O_2 reading is always accurate and eliminates many unnecessary calibrations based on calendar days or weeks since previous calibration.

The 6888A O_2 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.

3.9.1 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.

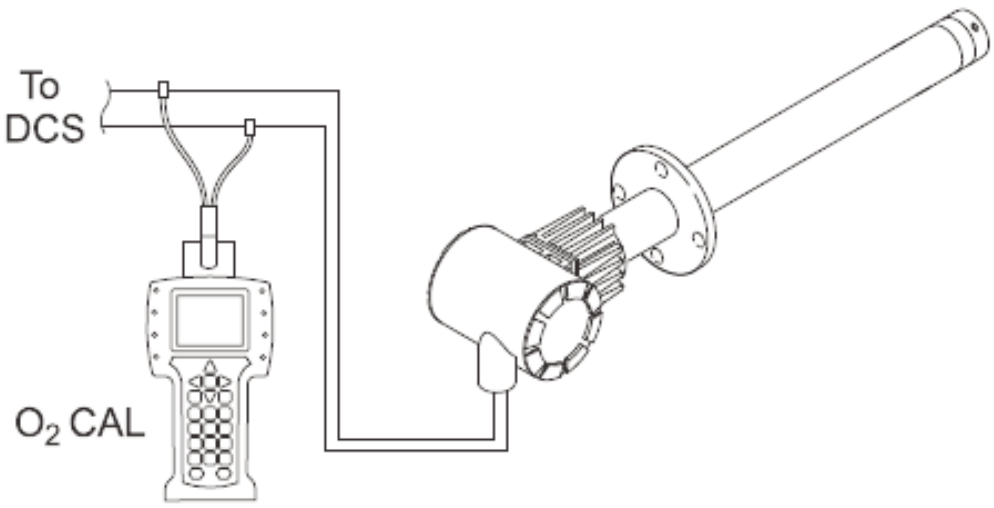
O_2 Calibration using the Field Communicator

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 O_2 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



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 operating condition. Press OK when ready.
7. At the next screen when step shows APPLY GAS 1, press OK to continue.
8. When Flow Gas 1 and Read Gas 1 are complete and the step shows APPLY GAS 2, press OK to continue.
9. When Flow Gas 2 and Read Gas 2 are complete and the step shows STOP GAS, press OK to continue the calibration with Purge.
10. When the screen shows “Loop may be returned to automatic control”, press OK to return to the CALIBRATION screen.
11. At the CALIBRATION menu, select RESULT.
12. At the RESULT menu, the results of the calibration will be displayed. In the event the calibration cycle fails, the reason will be displayed here as well. The calibration results are described as follows:
    Success – Calibration completed successfully.
    Failed Constant – The calculated calibration constant is outside the range of ±20.00.
    Failed Slope – The calculated calibration slope is outside the range of 34.5 to 57.5.
    WarmUp Abort – Attempted to perform a calibration during warmup.
    Alarm Abort – Another alarm occurred and caused the calibration cycle to abort.In the event of a calibration failure, perform the following steps. Otherwise, proceed to the next step.
    a. From the RESULT menu, press HOME to return to the main menu.
    b. From the main menu, select SERVICE TOOLS.
    c. From the OVERVIEW menu, select ALERTS.
    d. From the ALERTS menu, select ACTIVE ALERTS.
    e. The ACTIVE ALERTS menu should contain an A: CALIBRATION FAILED alarm. Press the left arrow key to return to the ALERTS menu.
    f. From the ALERTS menu, select DEVICE STATUS.
    g. From the DEVICE STATUS menu, select ACKNOWLEDGE.
    h. From the ACKNOWLEDGE menu, select ACK CALIBRATION FAILED. When the process is complete, the screen will return to the ACKNOWLEDGE menu.

Aborting O_2 Calibration with 6888Xi and Field Communicator

1. From the calibration prompt screen, press the OK button to return to the SELECT ACTION menu.
2. From the SELECT ACTION menu, select ABORT CALIBRATION then press ENTER.
3. The cycle will halt in approximately 10 seconds. When the step shows STOP GAS, press OK to return to the SELECT ACTION menu.
4. From the CALIBRATION menu, select STEP CALIBRATION then ENTER.
5. The abort will continue with a purge delay according to the time programmed in the calibration setup. When the step shows IDLE, press OK to return to the SELECT ACTION menu.
6. From the SELECT ACTION menu, select EXIT CALIBRATION then ENTER, the OK to return to return to the CALIBRATION menu.

3.9.2 Calibration Log

The 6888A stores the current and 10 previous calibrations. The stored data includes the slope, constant, cell impedance and time (in days) since that calibration. The log can be accessed as follows:

Using the Field Communicator: Configure\Calibration\Calibration Constants\Calibration Logs

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.

3.9.4 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.

Reset the calibration as follows:

Using the Field Communicator:

WARNING

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

Configure\Calibration\Calibration Constants\Reset Calibration Constants

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

3.10 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

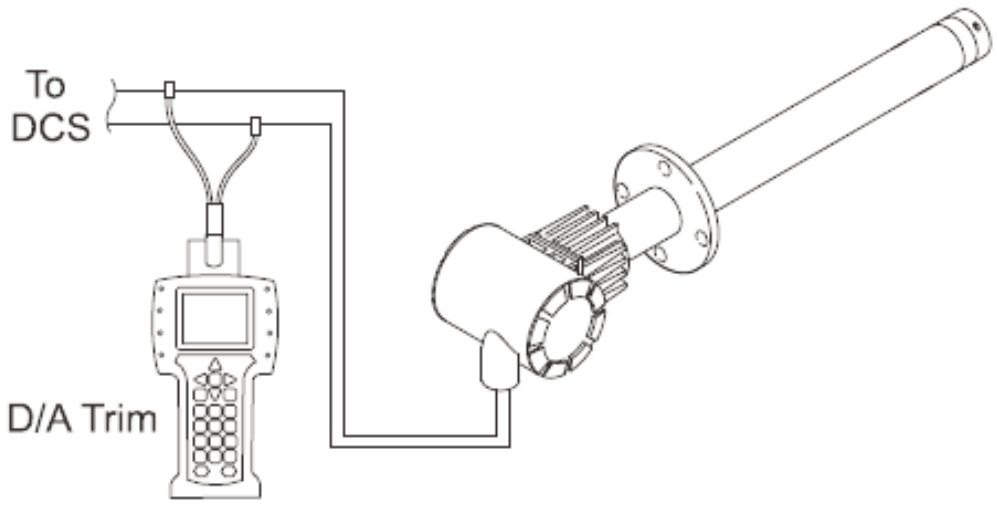
1. Use the 375/475 Field Communicator to access the main HART menu.
2. From the main menu, select SERVICE TOOLS.
3. From the SERVICE TOOLS menu, select MAINTENANCE.
4. From the MAINTENANCE menu, select ANALOG OUTPUT.
5. From the ANALOG OUTPUT menu, select TRIM mA OUTPUT.
6. In the first screen, a “Loop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

WARNING

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

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 3-26. D/A Trim Method - Simplified



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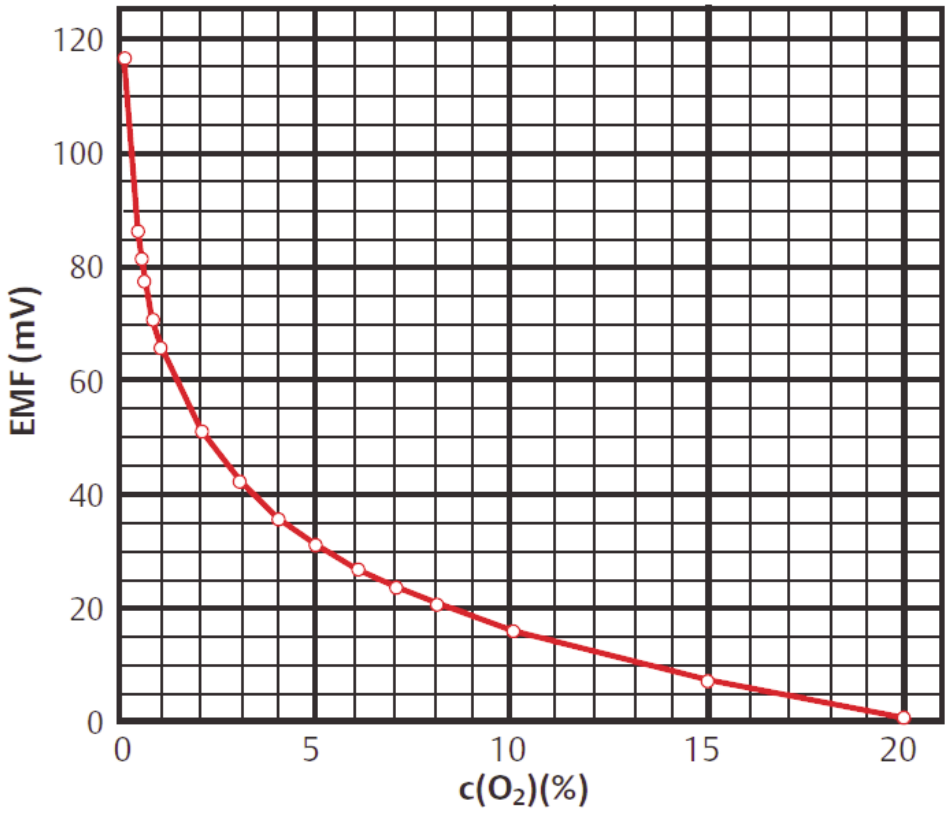
Section 4: Troubleshooting

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 O_2% and the reference O_2% inside the probe (20.95% O_2 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 logrithmically as the O_2 concentration decreases.

FIGURE 4-1. O_2 Sensor mV Reading vs %O_2 at 736°C (1357°F) (Reference Air, 20.95% O_2)



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 O_2 measuring system usually comes from the operators running the process. Critical alarms that render the O_2 measurement unusable will force the 4-20 mA analog output signal representing O_2 to go to a default condition, as follows:

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

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, ensue the Distributed Control System is configured to interpret these signal levels correctly.

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.

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 O_2 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 mix-

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

ture 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, O_2 Still Reads Low". Always use a two stage pressure regulator for calibration gas.

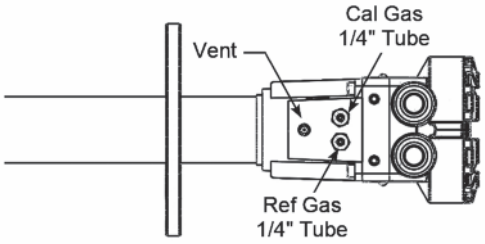
2. No or improper reference air supplied.

4.5.1 Probe passes calibration, O_2 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 O_2 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 O_2 reading.

FIGURE 4-2. Probe Leakage Paths



Internal Reference Air Leak - See Figure 4-2. There may be a leak inside the O_2 Probe itself, permitting the reference air (20.95% O_2) 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 O_2 reading should decrease slightly. If the O_2 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

Aways 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 O_2 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, O_2 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 O_2 cell's speed of response will degrade. The O_2 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.

Calibration Record For Rosemount In Situ O_2 Probe

Probe Serial Number: _____

Probe Tag Number: _____

Probe Location: _____

Date Placed Into Service: _____

Date	Slope	Constant	Impedance	$Reponse_{initial}$	$Response_{final}$

Notes: $Response_{initial}$ When the second calibration gas is turned off, note the number of seconds required for the O_2 value to begin migrating back to the process value.

$Response_{final}$ When the second calibration gas is turned off, note the number of seconds required for the O_2 value to settle out at the process value.

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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 O_2 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 SO_2 resulting from sulfur contained in coal and heavy oil fuels, and also HCl from the combustion of plastics in municipal incinerators and in industrial thermal oxidizers. Sensing cells may experience significant degradation and signal shift in this type of service, particularly if the operating levels of O_2 are very low (below 1% O_2).

A calibration check is generally recommended on a quarterly basis (every 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 O_2 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 O_2 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 O_2 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

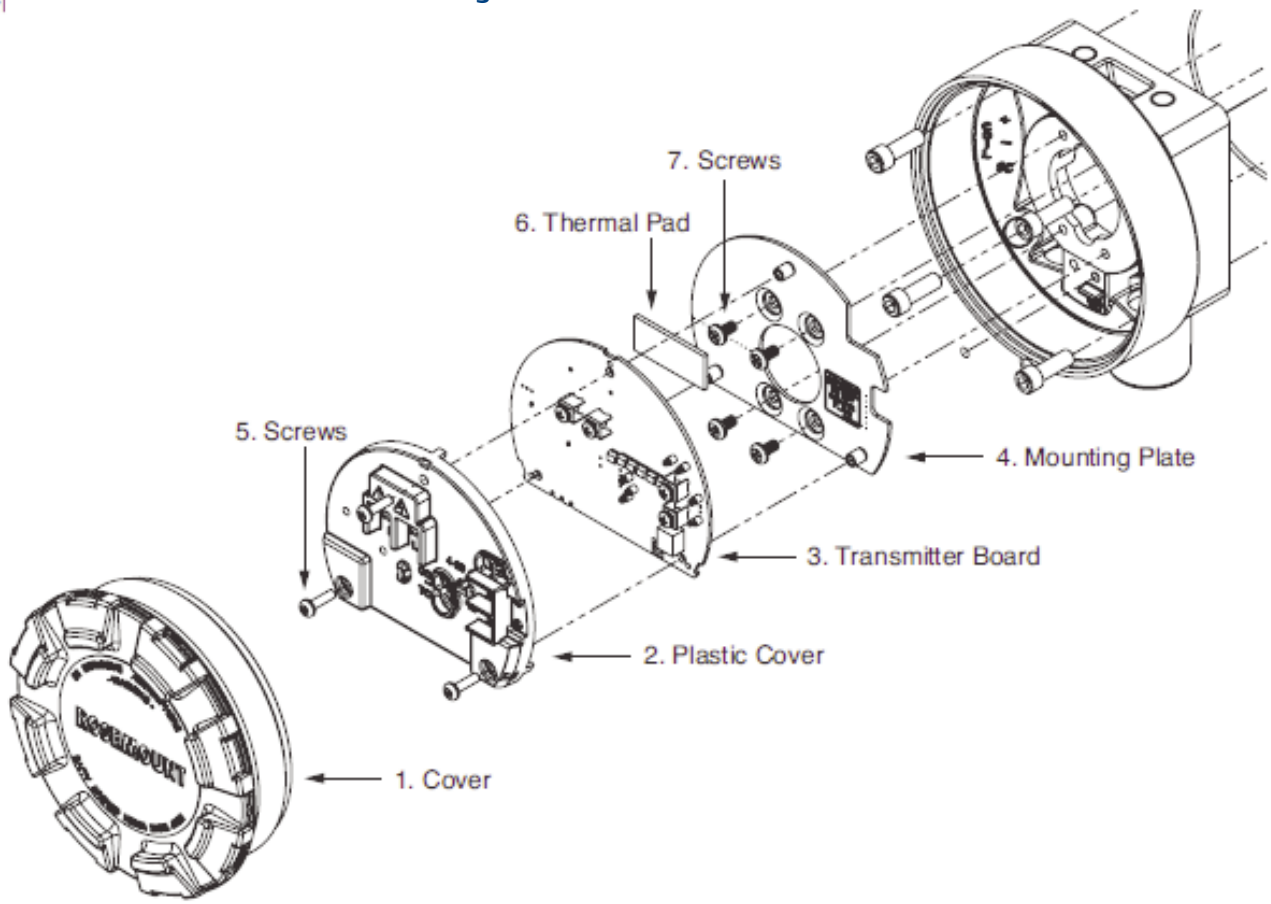
Disconnect and lock out power before working on any electrical components.

WARNING

Failure to synchronize the calibration parameters with a 6888Xi after replacing the transmitter board or recalibrating the instrument may cause an inaccurate O_2 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 O_2 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 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.

FIGURE 5-1. Transmitter Board Mounting



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.

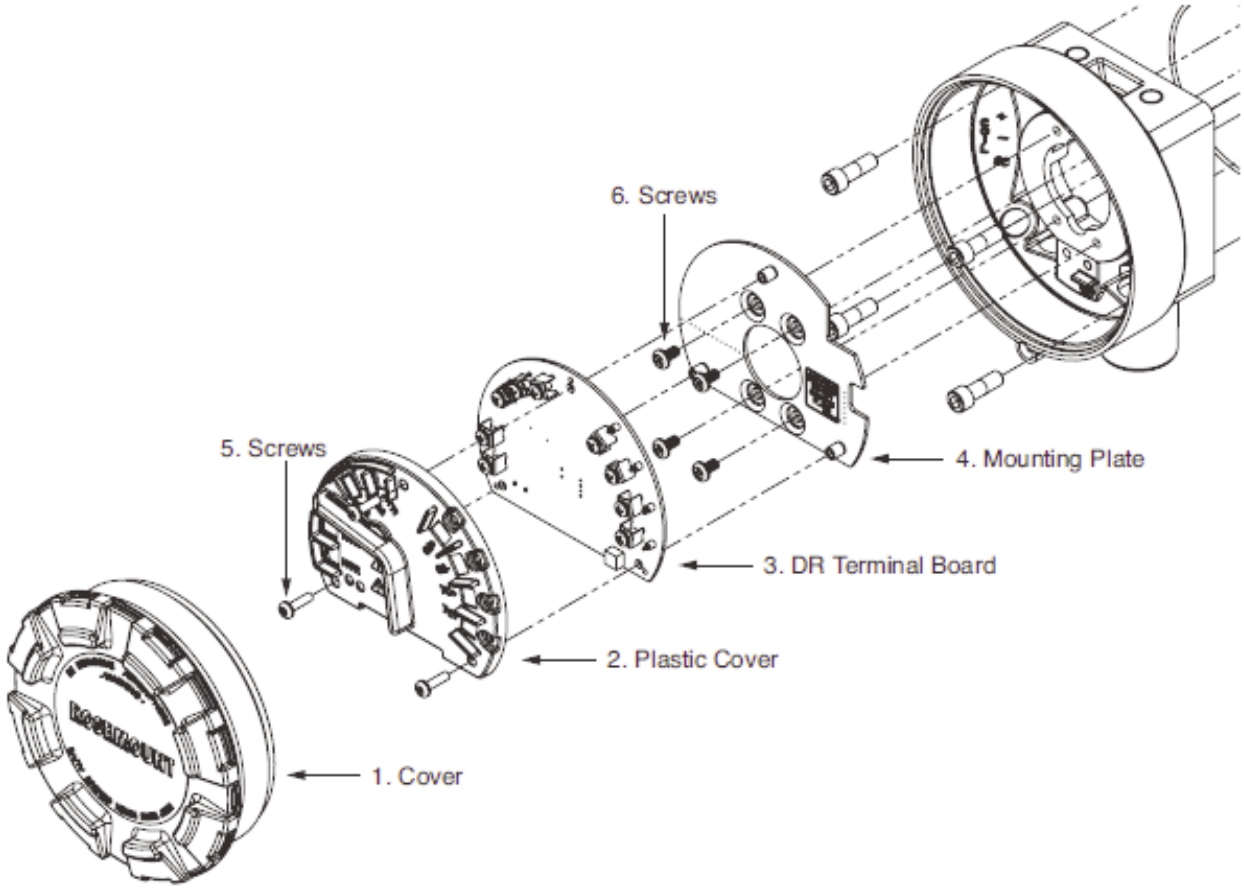
1. Remove cover (1) from the DR Probe housing.
2. Disconnect the power and signal wires from the DR terminal board (3).
3. Remove the three screws (5) securing plastic cover (2) and DR terminal board (3) to mounting plate (4).
4. Disconnect the two wire harness connectors from the back of the DR terminal 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.

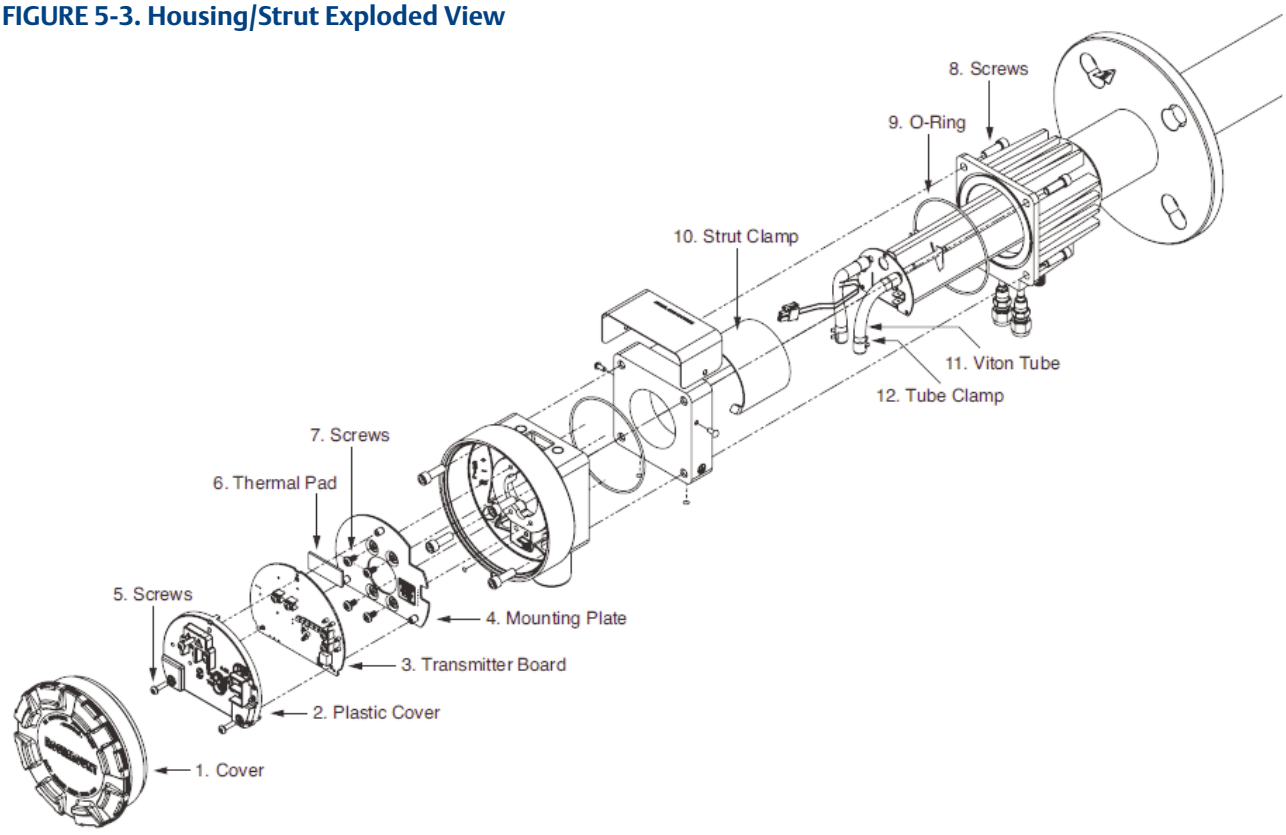
NOTE

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.

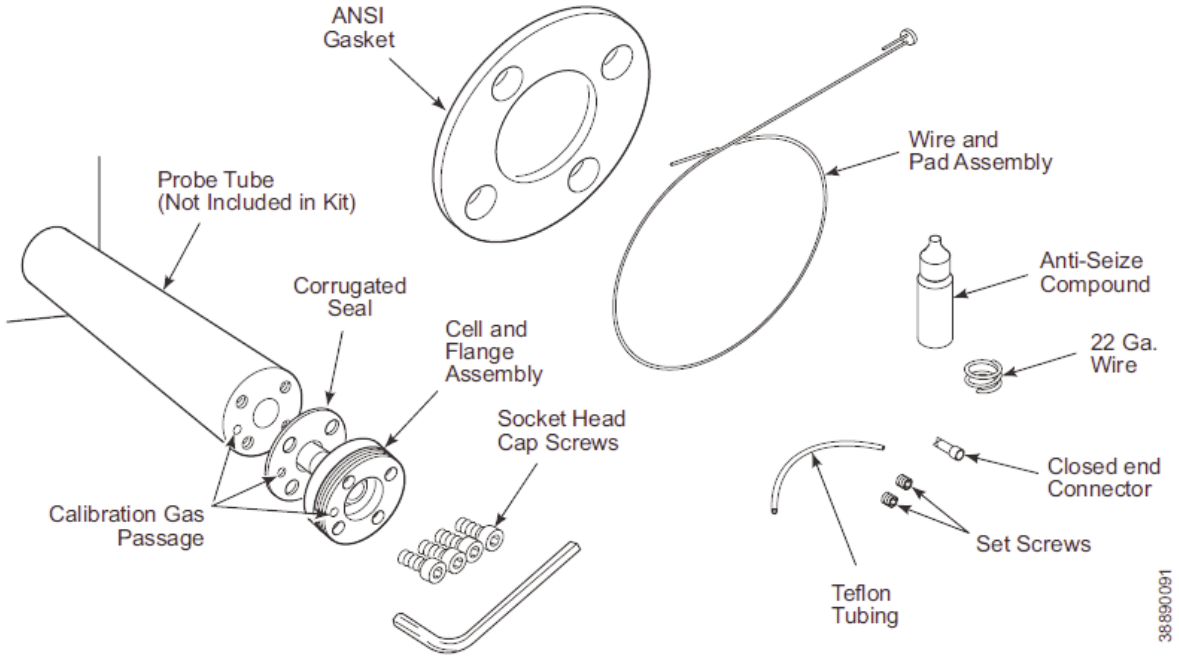
CAUTION

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 reassembly 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



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.

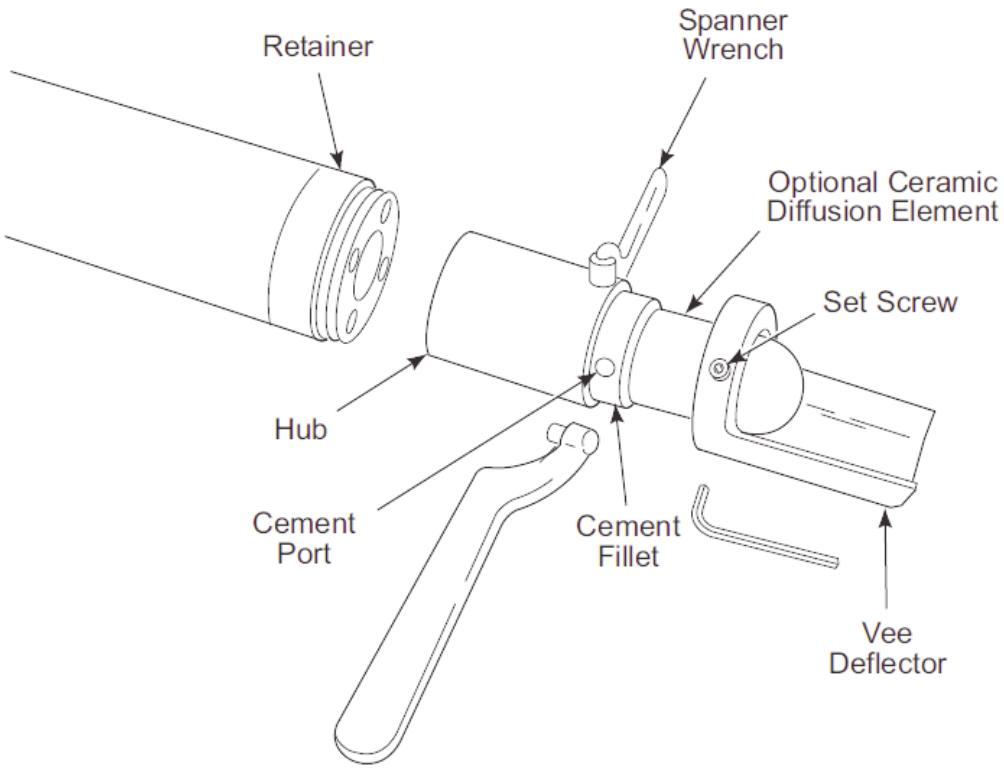
Damage to the diffusion element may become apparent during calibration. Compare probe response with previous response. A broken diffusion element will cause an inadequate response to calibration gas. Hex wrenches needed to remove setscrews and socket head screws in the following procedure are available 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

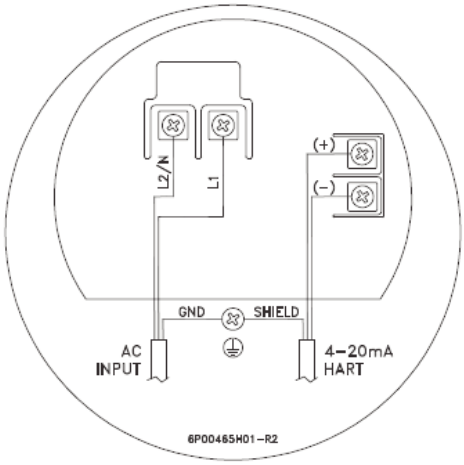
This paragraph covers the replacement of the main housing cover and the application of the correct field wiring label.

NOTE

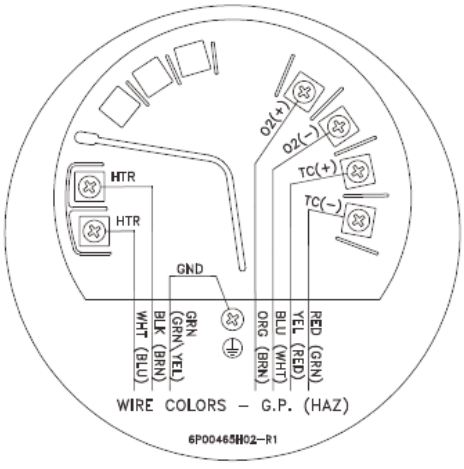
Field wiring labels are supplied for each product configuration. Ensure the correct label is applied to the inside of the cover that matches your configuration.

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.

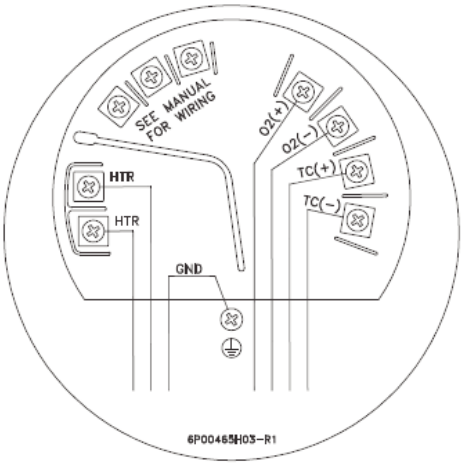
FIGURE 5-6. Field Wiring Labels



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 O_2 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 O_2 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 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.

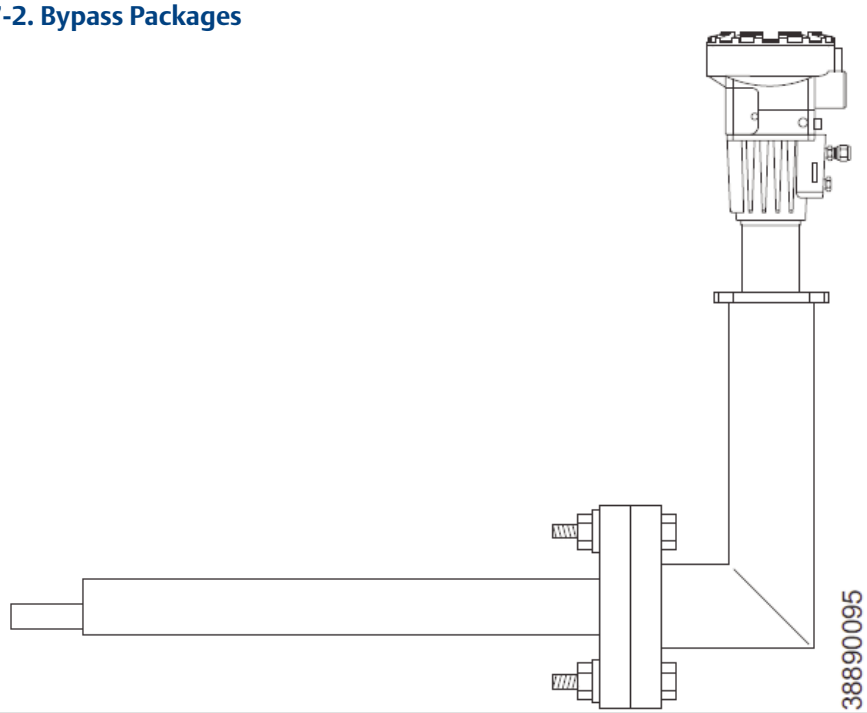
For more information, call Rosemount at 1-800-433-6076.

7.2 By-Pass Packages

The specially designed Rosemount 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 at 1-800-433-6076.

FIGURE 7-2. Bypass Packages



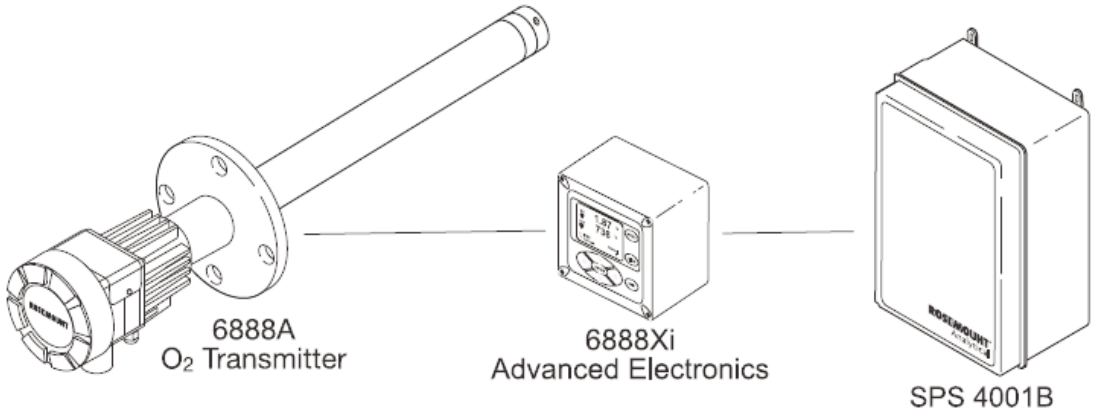
7.3 SPS 4001B Single Probe Autocalibration Sequencer

Rosemount 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



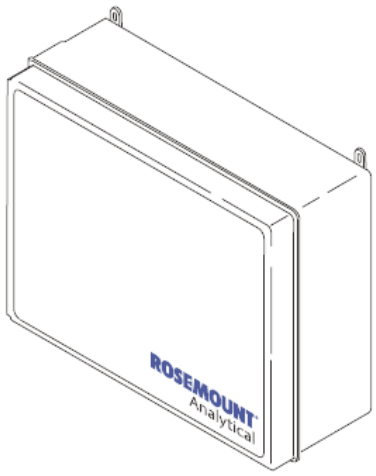
7.4 IMPS 4000 Intelligent Multiprobe Test Gas Sequencer

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 O_2 Probe is out of calibration, calibration gases are on, and calibration gas pressure is low.

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

FIGURE 7-4. IMPS 4000 Intelligent Multiprobe Sequencer



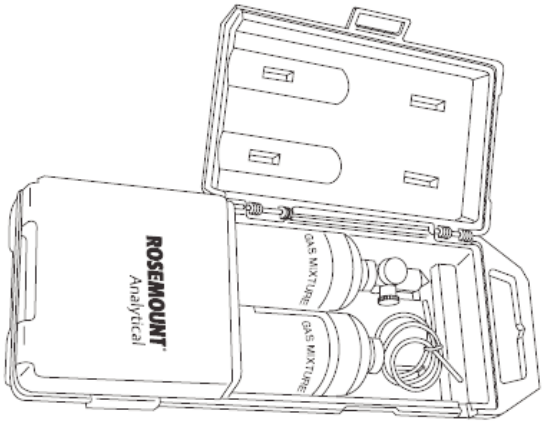
7.5 O_2 Calibration Gas

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

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

FIGURE 7-5. Calibration Gas Bottles



7.6 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 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. Sí ' ové 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 medmindre 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 kabelforskruninger skal have en intern dimension, så passende kabelaflastning 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 fejlsitua-tion. 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 forekom-mende 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 -aardingen 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 oppper-vlakken 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 strickt eingehalten werden, um der Niederspannungsrichtlinie zu genügen. Nichtmitgliedsstaaten 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 ih re 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

ΣΗΜΑΝΤΙΚΟ

Οδηγιεσ ασφαλειασ για την καλωδιωση και εγκαταστασηση τησ συσκευησ

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 παροχηθούν 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 maaühendused.
2. Pärast paigaldamist või rikketuvastust tuleb kõik turvaümbrised 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 lülitab välja kõik voolukandjad. Automaatkorgil võib olla ka mehhaaniliselt reguleeritav lahklüliti. Vastasel juhul peab seadme toiteallikast lahtiühendamiseks olema teine ja selgelt osutatud moodus. Automaatkorgid või -lülitid peavad vastama tunnustatud standarditele nagu nt IEC947. Kogu juhtmestik peab vastama kohalikele standarditele.

7. Seadmel või ümbristel asuv paremale osutav sümbol tähistab selle all leiduvat ohtlikku pinget. Selliste sümbolitega ümbriseid võib eemaldada vaid juhul, kui seade on toiteallikast lahti ühendatud ning ka siis ainult vastavate oskustega spetsialisti poolt.

8. Seadmele või ümbristele märgitud paremale osutava sümboli all valitseb kuumadest pindadest tulenev oht. Nimetatud sümbolitega ümbriseid võib eemaldada vaid vastavate oskustega spetsialist, kui seade on toiteallikast lahti ühendatud. Teatud pinnad võivad puudutamise jaoks liiga kuumad olla.

9. Seadmel või ümbristel leiduva paremale osutava sümboli korral vt juhiste jaoks Toimimisjuhendit.
10. Kõik selle toote juures kasutatavad graafilised sümbolid lähtuvad ühest või enamast järgmistest standarditest: EN61010-1, IEC417 ja ISO3864.
11. Kui seadmele või siltidele on kirjutatud "Ärge avage voolutarbimine korral" vms, valitseb plahvatusohtlikus keskkonnas süttimise 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 nou-dattaa 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 lämpötil oissa.
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 asian-tuntija.

8. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla kuuma pinta. Suojan saa poistaa vain alan asiantuntija kun jännite-syöttö on katkaistu. Tällainen pinta voi säilyä kosketuskuumana jopa 45 mi-nuuttia.

9. Mikäli laite tai kosketussuoja on merkitty tällä merkillä katso lisäohjeita käyt-töohjekirjasta.
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 elıírások a készülék vezetékeléséhez és üzembeállításához

A következı biztonsági elıírások kifejezetten vonatkoznak az összes EU-tagállamra. Ezeket szigorúan be kell tartani a Kisfeszültség□ irányelvnek való megfelelés biztosításához. A nem EU-tagállamok szintén tartsák be a következıket, kivéve ha a helyi és nemzeti szabványok azt másként nem írják elı.

1. A megfelelı földelést biztosítani kell az összes rendelkezésre álló földelési ponton, legyen az belsı vagy külsı.
2. Az üzembeállítás vagy hibaelhárítás után az összes biztonsági burkolatot és biztonsági földvezetéket ki kell cserélni. A földelıkapcsok 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 hımérséklet melletti használatra.
5. Az összes használt kábelvezetı tömszelencének olyan belsı méret□nek kell lennie, hogy biztosítsák a kábelek megfelelı lekötését.
6. A berendezés biztonságos m□ködésének biztosításához az elektromos hálózathoz való csatlakozást csak megszakítón keresztül szabad megvalósítani, amely az összes áramot szállító vezetéket bontja hibahelyzet esetén. A megszakító magában foglalhat egy mechanikusan m□ködtethetı áramtalanító kapcsolót is. Ellenkezı esetben biztosítani kell a berendezés elektromos hálózatról történı 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 valószín□leg veszélyes feszültség van jelen. Az ilyen burkolat csak a berendezés áramtalanítása után távolítható el - és csak képzett szervizszakember végezheti el.
8. Ha a berendezés vagy a burkolata a jobb oldalonlátható szimbólummal jelzett, fenn áll a veszélye, hogy alatta forró felületek találhatóak. 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 következı szabványok legalább egyikébıl származnak: EN61010-1, IEC417 és ISO3864.
11. Ha a berendezésen vagy a címkéken a „Ne nyissa ki bekapcsolt állapotban” vagy hasonló felhívás szerepel, robbanásveszélyes környezetben fennáll a gyulladás veszélye. Ez a berendezés csak áramtalanítás után nyitható ki, a címkén vagy a kezelési útmutatóbanszereplı, a berendezés leh□lését biztosító megfelelı idıi ráhagyás 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 ciscun 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 nar÷ms. Jų turi būti griežtai paisoma, kad būtų užtikrintai laikomasi Žemos įtampos direktyvos. Ne ES nar÷s 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 apsaugin÷s dangos ir įžemikliai po instaliacijos ar remonto turi būti pakeisti. Visų įžeminimo terminalų vientisumo priežiūra turi būti atliekama nuolat.
3. Matinimo tinklo laidai turi atitikti IEC227 ar IEC245 reikalavimus.
4. Visi laidai turi būti tinkami naudojimui aplinkos temperatūtoje, aukštesn÷je 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 tur÷ti mechaniškai veikiantį įzoliavimo jungiklį. Jeigu ne, tuomet turi būti nurodytos kitos įrenginio atjungimo priemon÷s, ir aiškai pažym÷tos, 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 pažym÷ti simboliu dešin÷je, žemiau turi būti pavojinga įtampa. Šios dangos turi būti nuimamos tik tada, kai srov÷ yra pašalinta iš įrenginio - ir tik tuomet tai turi atlikti apmokytas personalas.

8. Ten kur įrenginys ar dangos yra pažym÷ti simboliu dešin÷je, ten yra pavojus nuo karštų paviršių apačioje. Šios dangos gali būti nuimamos tik apmokyto personalo, kai srov÷ yra pašalinta iš įrenginio. Tam tikri paviršiai gali išlikti karšti liečiant.
9. Ten kur įrenginys ar dangos yra pažym÷ti simboliu d÷šin÷je, 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 etiket÷s yra pažym÷ti "Neatidaryti esant srov÷s tiekimui" ar panašiai, yra užsidegimo pavojus tose vietose, kur yra sprogstamoji atmosfera. Šis įrenginys gali būti atidarytas tuomet, kai yra pašalinta srov÷, ir pra÷jęs atitinkamas laikas, nurodytas etiket÷je 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 atpakaĜ. 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 kabeĜu blīvju iekšējiem izmēriem jābūt tādiem, lai atbilstoši nostiprinātu kabeli.
6. Lai nodrošinātu šīs iekārtas drošu darbību, savienojums ar elektropadeves tīklu jāizveido, izmantojot slēdzi, kas kĜūmes gadījumā atvienos visas ėēdes, kurās ir vadītāji. Slēdzī 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 jāmarėē. Slēdžiem jāatbilst kādam vispāratzītam standartam, piemēram, IEC947. Visai elektroinstalācijai jāatbilst vietējiem standartiem.

7. Vietās, kur iekārta vai tās pārsegi ir marėēti ar labajā pusē norādīto simbolu, visticamāk, zem tiem ir bīstams spriegums. Šos pārsegus drīkst noĦemt 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 marėēti ar labajā pusē norādīto simbolu, apdraudējumu izraisa zem tiem esošās karstās virsmas. Šos pārsegus drīkst noĦemt 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 marėēti 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 marėējums "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 atdzišanai nepieciešamais laiks, kas norādīts uzlīmē vai ekspluatācijas rokasgrāmatā, – un šos darbus drīkst veikt tikai atbilstoši apmācīti remontdarbu darbinieki.

⚠ IMPORTANTI

STRUZZJONIJIET 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-tħaddim sigur ta' dan it-tagħmir, il-konnessjoni mal-provvistatad-dawl għandha ssir biss permezz ta' circuit breaker li jiskonnetta l-kondutturi kollha li jkunu jġorru 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 perikoluži 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 "Tiftaħx Meta Jkun Enerġizzat" jew kliem simili, hemm periklu ta' nar f'żoni fejn atmosfera esplossiva 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 imħarreġ.

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 kabelforskruvninger 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. Kretsbrytere 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 fjærnes 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 fjærnes 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 instrukser.
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. NaleŜy się ściśle do nich stosować w celu zapewnienia zgodności z dyrektywą niskonapięciową. W przypadku instalacji urządzenia w krajach nienaleŜących do Unii Europejskiej naleŜy równieŜ przestrzegać poniŜszych zaleceń, chyba Że są one zastąpione lokalnymi lub ogólnokrajowymi standardami.

1. Urządzenie naleŜy podłączyć kablem uziemiającym do wszystkich punktów uziemienia (wewnętrznych i zewnętrznych).
2. Po instalacji lub czynnościach serwisowych naleŜy zamknąć wszystkie pokrywy zabezpieczające i ponownie podłączyć uziemienie. NaleŜy pilnować, by nie doszło do przerwania uziemienia.
3. Przewody zasilające powinny być zgodne z wymaganiami normyIEC227 lub IEC245.
4. Wszystkie przewody powinny być odpowiednie do uŜytku w środowisku o temperaturze wyŜszej niŜ 75°C.
5. Wszystkie dławnice powinny mieć wymiary wewnętrzne zapewniające pewne umocowanie przewodów.
6. W celu zapewnienia bezpiecznej pracy urządzenie naleŜy podłączyć do sieci tylko za pośrednictwem wyłącznika automatycznego, który w razie awarii odłączy wszystkie obwody, w których przepływa prąd. Wyłącznik automatyczny moŜe być równieŜ wyposaŜony w mechaniczny odłącznik napięcia. W przeciwnym razie naleŜy zapewnić i jasno oznaczyć inną moŜliwość 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 moŜe 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 naleŜy 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 zagroŜenie wybuchem. Urządzenie naleŜy 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 75ºC.
5. As dimensões internas dos bucins 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 striktne 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 sieťového 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 sieťovému 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 sieťového 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 pokrovih, 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 cumpliran con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75ºC.
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 abrira 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 abrira 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 överensstämma 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 överensstämma 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 frånkoppla alla strömförande kretsar när något fel uppstår. Säkringen kan även ha en mekanisk frånskiljare. Om så inte är fallet, måste ett annat förfarande för att frånskilja utrustningen från strömförsörjning tillhandahållas och klart framgå genom markering. Säkring eller omkopplare måste överensstämma med en gällande standard såsom t ex IEC947.

7. Där utrustning eller hölje är markerad med vidstående symbol föreliggerisk 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

SERVICE SUPPORT - To expedite the return process outside of the United States, contact the nearest Emerson representative. Within the United States, call the Emerson Instrument and Valves Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials. The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed. Emerson Instrument and Valves Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

Appendix C: Product Certifications

C.1 European Directive Information

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

C.2 Ordinary Location Certification

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

C.3 Installing Equipment in North America

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

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

C.4.1 USA

FM

Certificate: 3042889

Standards: FM 3810: 2005, ANSI/EC 250: 2003, ANSI/EC 60529: 2004

Markings: Type 4X, IP66

Special Conditions for Use: Type 4X and IP66 applies to the transmitter portion that is mounted externally to the flue duct.

C.4.1 Canada

CSA

Certificate: 1913435

Standards: CAN//CSA C22.2 No. 61010-1-04, UL 61010-1:2004 (2nd Edition), CAN/CSA-E60079-0:07, CAN/CSA-E60079-1:07, CAN/CSA-C22.2 No.94-M91 (R2001), CAN/CSA C22.2 No. 60529:05, ANSI/ISA-12.00.01-2005 (IEC 60079-0 Mod), ANSI/ISA-12.22.01-2005 (IEC 60079-1 Mod), UL 50 (11th Ed.), IEC 60529 (Edition 2.1-2001-02), NEMA 250-2003

Markings: Type 4X, IP66

C US

C.4.1 Europe

TUVRheinland QAL1

Certificate: 0000038506

Standards: EN15267-1:2009, EN15627-2:2009, EN15627-3:2007, EN14181:2004

MCERTS

Certificate: Sira MC140270/00

Standards: EN15267-1:2009, EN15627-2:2009, EN15627-3:2007, EN14181:2004

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www.Emerson.com/RosemountGasAnalysis

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