

X-STREAM O₂ Combustion Flue Gas Transmitter



HIGHLIGHTS OF CHANGES

Effective August 1, 2008 Rev 2.0

Page	Summary
Throughout IM	Changed header data to reflect Rev. 2.0 and new release date.
Page iv	Added new para. 2 to "Use this Quick Start Guide If..." instructions.
Page v	Revised reference air requirements data for Installation Summary.
Page vi	Revised para. reference to read "page 5-10"; revised Figure 1.
Page 1-1	Updated Section 1 table of contents to reflect section changes.
Page 1-2	Added cable (new item 4) to Figure 1-1.
Page 1-4	Relocated final para. of "System Description" from "System Configuration."
Page 1-4 and 1-5	Revised all text and illustrations of "System Configurations." Added Traditional Architecture discussion.
Pages 1-6 thru 1-8	Revised all text and illustrations of "Automatic Calibration" and "Communication Options."
Page 1-10	Added 9, 12, 15 and 18' probes data and revised reference air requirements in "Specifications" table.
Page 1-11	Added Traditional Architecture Cable to specifications table.
Page 1-12	Added 9, 12, 15 and 18' probes data and Variable Insertion Mount to Table 1-1.
Page 1-12	Added Traditional Architecture option and Traditional Architecture Cable to Table 1-2.
Page 2-1	Updated Section 2 table of contents to reflect section changes.
Page 2-2	Relocated "System Considerations" and related figure from Section 1 to this section.
Page 2-3	Revised figure references in para. 1 of "Selecting Location." Added new para. 3 to "Probe Installation."
Page 2-4	Revised Figure 2-2, Probe Installation Details.
Page 2-5	Revised titles of Figures 2-4 and 2-5 and revised Figure 2-5.
Page 2-7	Added long probes installation text and illustration.
Page 2-8 thru 2-11	Added "Variable Insertion" probe discussion and illustrations.
Page 2-12	Revised Figure 2-10, Installation with Drip Loop and Insulation Removal.
Page 2-14	Revised Figure 2-12, Xi Enhanced Interface - Wall/Surface and Pipe Mounting Details.
Page 2-15	Revised "Electrical Installation" para.
Page 2-16	Added new heading "Optional Xi Enhanced Interface" to previous paras. 7 through 9; renumbered paras. 7 through 9.
Page 2-17	Revised Figure 2-10; renumbered previous paras. 10 through 19 to read 4 through 13.
Page 2-18	Revised Figures 2-14 and 2-15.
Pages 2-19 and 2-20	Added "Traditional Architecture Probe Connections" text and illustrations.
Page 2-20 thru 2-22	Added "DR Probe to Yokogawa AV8C or AV550 Averaging Electronics Connections" text and illustration.
Pages 2-23 and 2-24	Revised "Reference Air Package" text and illustrations.
Pages 2-24 and 2-25	Revised "Calibration Gas" text and illustrations.

HIGHLIGHTS OF CHANGES (CONTINUED)

Effective August 1, 2008 Rev 2.0 (Continued)

Page	Summary
Page 3-1	Updated Section 3 table of contents to reflect section changes. Added "Transmitter", para. 4.
Page 3-2	Revised Figure 3-1. Deleted "O ₂ Concentration" discussion.
Page 3-3	Revised para. 2. and "Optional Advanced Features Inside the Xi."
Page 4-1	Updated Section 4 table of contents to reflect section changes.
Page 4-2	Revised 3rd para. of "Startup." Revised Figure 4-1.
Page 4-4	Revised Figure 4-2, Sheet 1 of 3.
Page 4-7	Revised "System Parameter Descriptions" list.
Pages 4-12 and 4-14	Revised Warning.
Page 4-16	Deleted "Field Communicator to PC Connection" discussion.
Page 5-1	Updated Section 5 table of contents to reflect section changes.
Page 5-4	Added fault finding instructions for a DR probe and a reference to the fault finding procedures that follow Tables 5-1 and 5-2.
Page 5-7	Revised "Calibration Passes, but Still Reads Incorrectly" text and illustrations.
Page 6-1 and 6-2	Updated Section 6 table of contents to reflect section changes. Added "Maintenance Intervals" discussion. Revised "Replacement Parts" discussion.
Page 6-3	Added "Removal and Installation of Probe" instructions.
Page 6-4 thru 6-31	Extensively revised balance of section. Added several new repair procedures.
Page 6-9	Revised Figure 6-5.
Page 7-1 and 7-2	Added Sensor Contact and Thermocouple and Cell repair kits for 9', 12', 15' and 18' probes.
Page 7-2	Added Switching Power Supply Board replacement parts kit to Table 7-2. Revised Figure 7-1.
Page -73	Revised Figure 7-2.
Page 8-4	Revised MPS 4000 Intelligent Multiprobe Test Gas Sequencer discussion.
Page A-24 thru A-30	Replaced MSDS.
Index	Updated Index.

HIGHLIGHTS OF CHANGES

Effective January 31, 2009 Rev 2.1

Page	Summary
Page v	Updated voltage specifications of Installation Summary.
Page vi	Revised text of step 6 for clarity.
Page vii	Revised Note and text of step 2 for clarity.
Page 1-4	Updated line voltage specification in Figure 1-2.
Page 1-5	Updated line voltage specifications in Figures 1-3 and 1-4.
Page 1-10	Updated Environmental Specifications.
Page 1-11	Updated Installation Specifications.
Page 2-3	Changed NEMA 4x to read Type 4x in Notes.
Page 2-16	Revised Figure 2-13.
Page 2-18	Revised Figure 2-15 to show new Xi power supply board.
Page 4-4	Added discussion of Alarm Relay Output Configuration and new Table 4-1.
Page 4-7	Revised Figure 4-2 to include alarm relay 1 and alarm relay 2 options.
Page 4-10	Revised listing of Alarm Relay 1 and Alarm Relay 2 options.
Pages 4-12 thru 4-14	Revised Figures 4-3, 4-4, and 4-5.
Page 4-20	Revised Figure 4-8 to include alarm relay 1 and alarm relay 2 options.
Page 5-4	Revised paragraph 4 text.
Page 5-5	Revised Cal Recommended status description of Table 5-2.
Page 5-6	Revised paragraph 1 text.
Page 5-7	Revised discussion text of "How do I detect a plugged diffuser?".
Page 6-6	Revised Figure 6-3 to reflect cal gas and reference air hose changes.
Pages 6-9	Revised Figure 6-5 to reflect cal gas and reference air hose attachment hardware changes.
Page 6-10	Revised Note and step 7 texts.
Page 6-11	Revised step 15 text to reflect cal gas and reference air hose changes.
Page 6-12	Revised Note text to reflect original and changed configurations of cal gas and reference air hose attachment hardware.
Page 6-15	Added Note to Figure 6-11 to reflect original and changed configurations of cal gas and reference air hose attachment hardware.
Page 6-17	Updated Figure 6-13 to reflect Core Information Label change.
Page 6-19	Updated Figure 6-15 to reflect Xi power supply board change.
Page 6-28	Updated Figure 6-23 to reflect Xi power supply board change.
Pages 6-31 thru 6-33	Added DR Board Replacement procedure and new Figure 6-24 and 6-25.
Page 7-1	Updated Table 7-1.

HIGHLIGHTS OF CHANGES

Effective November 30, 2009 Rev 2.2

Page	Summary
General Updates	Updated master Table of Contents, Section Tables of Content, and Index. Updated IM page header revision level and release date throughout manual.
Page v	Revised text of 2nd step 3 and Xi Mounting description of Installation Summary.
Page 1-5	Added new description onto end of last paragraph.
Page 1-6	Revised view in Figure 1-5.
Page 1-10	Updated Environment Specifications - Transmitter Probe Process Temperature Limits
Page 1-11	Revised final three Specification table entries.
Page 1-13	Added Remote Type code 05 to Table 1-2 Product Matrix; Changed 850 Deg to read 800 Deg in final code description.
Page 2-3	Changed Note text to read 'Type 4X and IP66.'
Page 2-18	Added more descriptive text to end of Optional Flame Safety Interlock topic. Added previously omitted steps 1 thru 4 to Traditional Architecture Cable Connections topic.
Page 2-24	Changed 'Yew' to all upper case 'YEW'.
Page 2-26	Revised view in Figure 2-25.
Page 2-27	Added 2nd sentence to 1st NOTE.
Page 3-1	Changed 850 Deg to read 800 Deg in section Table of Contents. Corrected erroneous item numbers cited in steps 1 thru 4.
Page 3-2	Revised Figure 3-1 view. Added Set Test Gas Values topic. Moved 'Calibration' discussion to Section 4 of this manual.
Pages 3-3 thru 3-5	Added Alarm Relay Output Configuration from Section 4 and Analog Output Configuration and Autocalibration Setup topics.
Page 3-6	Added 2nd paragraph, 2 warnings and note taken from page 4-4 of previous manual revision. Changed 850 Deg to read 800 Deg.
Page 4-2	Changed 850 Deg to read 800 Deg in Note. Changed 'SPS or IMPS' to read 'SPS 4001B or IMPS 4000.'
Page 4-5	Revised Figure 4-2, sheet 2.
Page 4-16	Revised Figure 4-7, sheet 1.
Page 4-19	Revised Figure 4-8, sheet 2.
Page 4-20	Added Calibration - General topic from page 3-2 of previous revision. Added new text to end of O ₂ Calibration discussion.
Page 6-17	Revised Figure 6-13 to match view on subject core information label.
Page 6-21	Revised view in Figure 6-17.
Page 7-2	Added 10 replacement parts to end of Table 7-1. Revised Table 7-2 listing.

Table of Contents

	Essential Instructions	i
SECTION i		
Introduction		
	Preface	iii
	Definitions	iii
	Symbols	iv
	Can You Use the Quick Start Guide?	iv
	Overview	iv
	Probe Arrangement	iv
	Installation Summary	v
	Quick Start Guide for X-STREAM Systems	vi
	Quick Reference Guide Manual Calibration Instructions	vii
	375 Field Communicator Fast Key Sequences	vii
	Technical Support Hotline:	viii
SECTION 1		
Description and Specifications		
	Component Checklist	1-1
	System Overview	1-1
	Scope	1-1
	System Description	1-3
	System Features	1-4
	System Configurations	1-4
	Automatic Calibration	1-6
	Communication Options	1-6
	Probe Options	1-9
	Diffusion Elements	1-9
	Specifications	1-10
SECTION 2		
Installation		
	System Considerations	2-2
	Mechanical Installation	2-3
	Selecting Location	2-3
	Probe Installation	2-4
	Variable Insertion	2-9
	Optional Xi Enhanced Interface Installation	2-12
	Electrical Installation	2-15
	X-STREAM Transmitter	2-15
	Optional Xi Enhanced Interface	2-16
	Optional Flame Safety Interlock	2-18
	Traditional Architecture Cable Connections	2-18
	Direct Replacement (DR) Probe Connections	2-22
	DR Probe to Yokogawa Electronics Connections	2-22
	Pneumatic Installation	2-24
	Reference Air Package	2-24
	Calibration Gas	2-27

X-STREAM O₂ Transmitter

SECTION 3		
Configuration of X-STREAM O₂ Transmitter	Verify Installation	3-1
	Transmitter	3-1
	Xi Configuration (if equipped)	3-2
	Set Test Gas Values	3-2
	Alarm Relay Output Configuration	3-3
	Analog Output Configuration	3-4
	Autocalibration Setup	3-5
	Optional Advanced Features Inside the Xi	3-6
	Extended Process Temperature Range to 800°C (1472°F)	3-6
	Stoichiometer	3-7
	Programmable Reference	3-7
SECTION 4		
Startup and Operation	Overview	4-1
	Startup	4-1
	Operation Via Xi Enhanced Interface	4-2
	Startup Display	4-2
	Error Conditions	4-3
	Xi Enhanced Interface Controls	4-3
	Password Protection	4-3
	System Parameter Descriptions	4-7
	Probe Parameter Descriptions	4-8
	Operation Via HART/AMS	4-11
	Field Communicator Signal Line Connections (No Xi)	4-11
	Field Communicator Signal Line Connections (with Xi)	4-15
	Field Communicator Menu Trees	4-16
	Off-line and On-line Operations	4-16
	Calibration - General	4-21
	O ₂ Calibration	4-21
	O ₂ Calibration without Xi	4-22
	O ₂ Calibration with Xi	4-22
	O ₂ Calibration with Xi and Field Communicator	4-23
	D/A Trim	4-24
	D/A Trim without Xi	4-24
	D/A Trim with Xi	4-25
SECTION 5		
Troubleshooting	Overview of Operating Principles	5-1
	General	5-2
	Grounding	5-2
	Electrical Noise	5-3
	Electrostatic Discharge	5-3
	Alarm Indications	5-3
	Identifying and Correcting Fault Indications	5-4
	Calibration Passes, but Still Reads Incorrectly	5-5
	Probe Passes Calibration, O ₂ Still Reads High	5-5
	Probe Passes Calibration, O ₂ Still Reads Low	5-7
	How do I detect a plugged diffuser?	5-7
	Can I calibrate a badly plugged diffuser?	5-7

SECTION 6	Overview	6-1
Maintenance and Service	Maintenance Intervals	6-2
	Calibration	6-2
	Automatic Calibration	6-2
	Manual Calibration	6-2
	Replacement Parts	6-3
	Removal and Installation of Probe	6-3
	X-STREAM O ₂ Transmitter Probe Repair	6-5
	Sensor Core or Diffuser Replacement	6-5
	Cell Removal	6-8
	Replace Contact Pad	6-8
	Cell Installation	6-12
	Replace Contact & Thermocouple Assembly	6-13
	Replacing Gas/Air Hoses, O-rings and Spacers	6-14
	Electronics Board Replacement	6-15
	Blind Cover(s) Replacement	6-16
	Xi Components Replacement	6-19
	I/O Board Replacement	6-20
	AC Relay Board Replacement	6-25
	Power Supply Board Replacement	6-28
	Xi Front Panel Replacement	6-29
	DR Board Replacement	6-31
SECTION 7	O ₂ Transmitter	7-1
Replacement Parts	Xi Enhanced Interface	7-2
	Calibration Components	7-2
SECTION 8	HART Handheld 375 Field Communicator	8-1
Optional Accessories	Asset Management Solutions (AMS)	8-2
	By-Pass Packages	8-2
	SPS 4001B Single Probe Autocalibration Sequencer	8-3
	IMPS 4000 Intelligent Multiprobe Test Gas Sequencer	8-4
	O ₂ Calibration Gas	8-5
	OxyBalance Display and Averaging System	8-6
APPENDIX A	Safety Instructions	A-2
Safety Data	MSDS - Refractory in Items 1 and 2, Figure 6-1	A-24
APPENDIX B	Returning Material	B-1
Return of Material		

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

X-STREAM Oxygen Transmitters

READ THIS PAGE BEFORE PROCEEDING!

ESSENTIAL INSTRUCTIONS

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

- **Read all instructions** prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, **contact your Emerson Process Management representative** for clarification.
- **Follow all warnings, cautions, and instructions** marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- **Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes.** Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, **use qualified personnel** to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson Process Management. Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, **and VOID YOUR WARRANTY.** Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- **Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.**

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

NOTES:

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

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

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Section i Introduction

Preface	page iii
Definitions	page iii
Symbols	page iv
Can You Use the Quick Start Guide?	page iv
Overview	page iv
Probe Arrangement	page iv
Installation Summary	page v
Quick Start Guide for X-STREAM Systems	page vi
Quick Reference Guide Manual Calibration Instructions	page vii
375 Field Communicator Fast Key Sequences	page vii

PREFACE

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

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

DEFINITIONS

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

WARNING

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





CAUTION

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

NOTE

Highlights an essential operating procedure, condition, or statement.

SYMBOLS

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

NOTE TO USERS

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.

CAN YOU USE THE QUICK START GUIDE?

Use this Quick Start Guide if...

1. Your system uses an X-STREAM O₂ Transmitter without the SPS 4001B or IMPS 4000 autocalibration options.
2. Your system does not use traditional architecture or remote electronics. (Refer to Section 1: Description and Specifications for a description of "traditional architecture").
3. You are familiar with the installation requirements for the X-STREAM O₂ Transmitter.

If you cannot use the Quick Start Guide, turn to Section 2: Installation, in this Instruction Manual.

If this equipment is a direct replacement (DR) version of the X-STREAM O₂ Transmitter, refer to the manual for your Legacy electronics.

OVERVIEW

The X-STREAM is Rosemount Analytical's latest in-situ probe offering intended for combustion flue gas service. Similar to our previous World Class and Oxymitter probes, there is no sampling system. The sensing cell is mounted to the end of a probe (18", 3', 6', 9', 12', 15' or 18' long) that is directly inserted into the flue gas stream.

The sensing cell is of similar design to the World Class and Oxymitter cells, utilizing the zirconium oxide sensing principle. The cell is heated and maintained at a 736°C (1357°F) setpoint, and generates a logarithmic MV signal proportional to the partial pressure difference of oxygen between the reference side of the cell (usually instrument air at 20.95% O₂), and the process side of the cell (usually combustion flue gasses). For more information on sensing cell operation, see the Overview of Operating Principles in Section 5: Troubleshooting.

PROBE ARRANGEMENT

The probe consists of a "probe tube" and a "sensor core". The probe tube is basically an empty stainless steel tube that mounts to the flue gas duct via a 2½" NPT male pipe thread, or a 2" 150# ANSI flange mount. Two housings with covers contain the transmitter electronics and the sensing core. A conduit port is provided for bringing in AC line voltage for the heater, and for the 4-20 mA O₂ sensing signal loop wires. Ports for cal gas and reference gas are also provided.

The sensor core contains all the active components of the analyzer. They include:

1. the diffusion element filter at the end of the probe
2. the ZrO₂ sensing cell
3. the heater to heat the cell
4. a type K thermocouple
5. ceramic insulated wires for carrying the T/C and Cell signals,
6. transmitter electronics to control the heater and condition the raw mV probe signals to a linear 4-20 mA O₂ signal for use in the user's control or data acquisition system.

Operator interface for setup, calibration, indication, and diagnostics is available by several means:

1. HART communications through a 375 Field Communicator
2. HART communications through Emerson's AMS
3. An optional Xi Enhanced Interface. The Xi can act as interface to one or two X-STREAM probes. The Xi also carries advanced features such as elevated process temperature capability, autocalibration via an SPS solenoid box, a stoichiometer feature for indicating the level of oxygen deficiency in reducing conditions, and programmable reference to enhance accuracy at near ambient levels of O₂.

INSTALLATION SUMMARY

Probe Mounting - A standard 6-inch square weld plate with a 2-½ inch NPT probe port must be welded to the duct wall. Optionally, a traditional stud plate to accept a 150# ANSI flange must be welded to the duct wall. See the drawings in Section 2: Installation.

Xi Mounting - Pipe, wall or panel mount.

Reference Air - Ferrule fittings for ¼" tubing. Reference air should be clean, dry instrument air regulated to 5 psi (34 kPa) minimum, 8 psi (54 kPa) maximum, and a flow of 0.5 scfh (0,25 ℓ/hr) maximum.

Calibration Gas - Ferrule fittings for ¼" tubing. If cal gas lines are permanently connected, a check or blocking valve should be used at the probe to ensure that flue gases do not flow back through the lines.

Heater Power - 100-240 VAC 50/60 Hz ±10% via ½-inch NPT conduit port.

Transmitter Electronics (without Xi) - "Loop powered" from the control room by the 4-20 mA signal.

Transmitter Electronics with Optional Xi - 100-240 VAC, 50/60 Hz ±10% via ½-inch bulkhead fitting.

A 4-20mA signal from transmitter is powered from the Xi.

A 4-20 mA signal to the control room can be loop-powered from the control room or from the Xi.

X-STREAM O₂ Transmitter

QUICK START GUIDE FOR X-STREAM SYSTEMS

1. Install the probe with transmitter electronics in an appropriate location on the stack or duct. Refer to Section 2: Installation for additional information on selecting a location for the X-STREAM O₂ Transmitter.
2. Connect reference air to the X-STREAM O₂ Transmitter.
3. Connect HART communications, either through a handheld communicator like the Rosemount 375 Field Communicator, or through Emerson's AMS Suite PC software, or on an AMS-aware DCS.

NOTE

For a transmitter with optional Xi Enhanced Interface, the 375 Field Communicator must be connected only to the 4 to 20 mA signal loop between the Xi and the control room or data acquisition system. Connecting the 375 Field Communicator between the transmitter and Xi will cause communication errors and affect system operation.

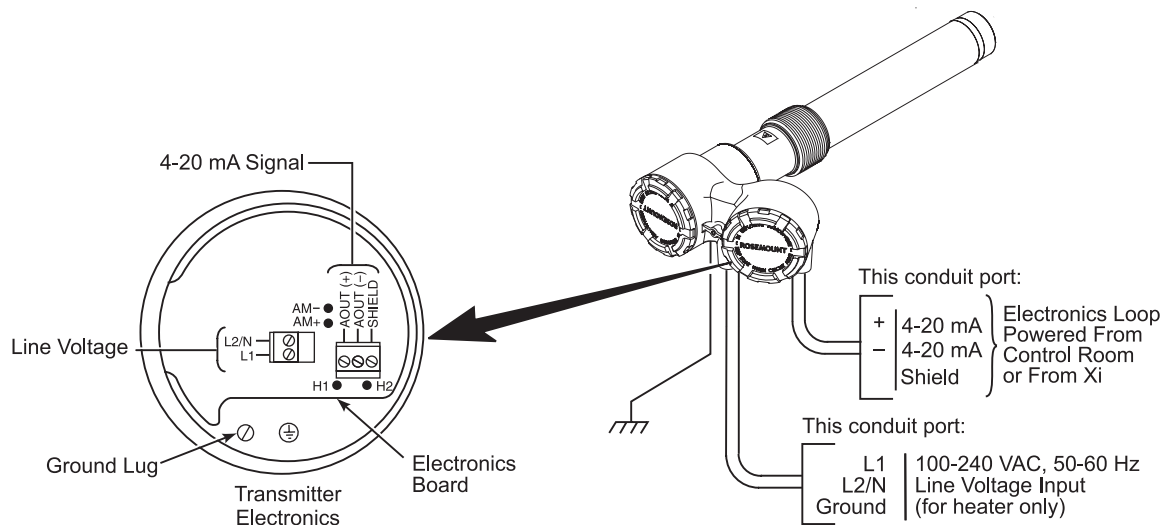
4. Apply AC power to the cell heater followed by the loop-power for the transmitter electronics.

NOTE

Although the transmitter electronics are loop-powered, they are not intrinsically safe.

5. Allow approximately 45 minutes for the cell heater to warm up to the 736°C (1357°F) heater setpoint. The 4-20 mA signal will remain at a default value of 3.5 mA throughout this warm-up period. Once warm, the probe will be reading oxygen, and the 4-20 mA signal will be a reading based on the default range of 0-10% O₂.
6. Perform a manual calibration. Refer to "Quick Reference Guide Manual Calibration Instructions" that follow. Proceed through all setup menus, including calibration setup. Calibrate the probe with cal gas and record the slope, impedance, and cell constant on a copy of the Calibration Record shown on page 5-8 of this manual.

Figure 1. X-STREAM Integral Electronics Wiring Diagram



**QUICK REFERENCE
 GUIDE MANUAL
 CALIBRATION
 INSTRUCTIONS**

Performing a Manual Calibration with a 375 Field Communicator

Use the following procedure to perform a calibration using the 375 Field Communicator. If necessary, use the menu tree in Figure 4-7 or Figure 4-8 (sheet 2 of 2) for reference.

NOTE

To select a menu item: 1) use the up and down arrow keys to scroll to the menu item and press the right arrow key or 2) use the number keypad to select the menu item number. To return to a preceding menu, press the left arrow key.

1. From the O₂ CALIBRATION screen, select menu item 1, O₂ CAL, to access the O₂ calibration procedure.

⚠ WARNING
Failure to remove the X-STREAM from automatic control loops prior to performing this procedure may result in a dangerous operating condition.

2. In the first O₂ CAL screen, a "Loop should be removed from automatic control" warning appears. To avoid a potentially dangerous operating condition remove the X-STREAM O₂ Transmitter from any automatic control loops and press OK.
3. Follow the 375 Field Communicator display prompts to perform the O₂ cal procedure.

**375 FIELD
 COMMUNICATOR
 FAST KEY SEQUENCES**

Perform Calibration

1	2	3	1	1
---	---	---	---	---

View O₂ Upper Range Value

1	4	2	2
---	---	---	---

Trim Analog Output

1	2	3	3	1
---	---	---	---	---

View O₂ Lower Range Value

1	4	2	1
---	---	---	---

Toggle Analog Output Tracking

1	4	3	1
---	---	---	---

38960016

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Technical Support Hotline:

For assistance with technical problems, please call the Customer Support Center (CSC). The CSC is staffed 24 hours a day, 7 days a week.

Phone: 1-800-433-6076

1-440-914-1261

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

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

Emerson Process Management 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.rainhome.com

Section 1 Description and Specifications

Component Checklist	page 1-1
System Overview	page 1-1
Scope	page 1-1
System Description	page 1-3
System Features	page 1-4
System Configurations	page 1-4
Automatic Calibration	page 1-6
Communication Options	page 1-6
Probe Options	page 1-9
Diffusion Elements	page 1-9
Specifications	page 1-10

COMPONENT CHECKLIST

A typical Rosemount Analytical X-STREAM O₂ Combustion Flue Gas Transmitter should contain the items shown in Figure 1-1. Record the part number, serial number, and order number for each component of your system 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 X-STREAM O₂ Transmitter. Ensure the features and options specified by your order number are on or included with the unit.

SYSTEM OVERVIEW

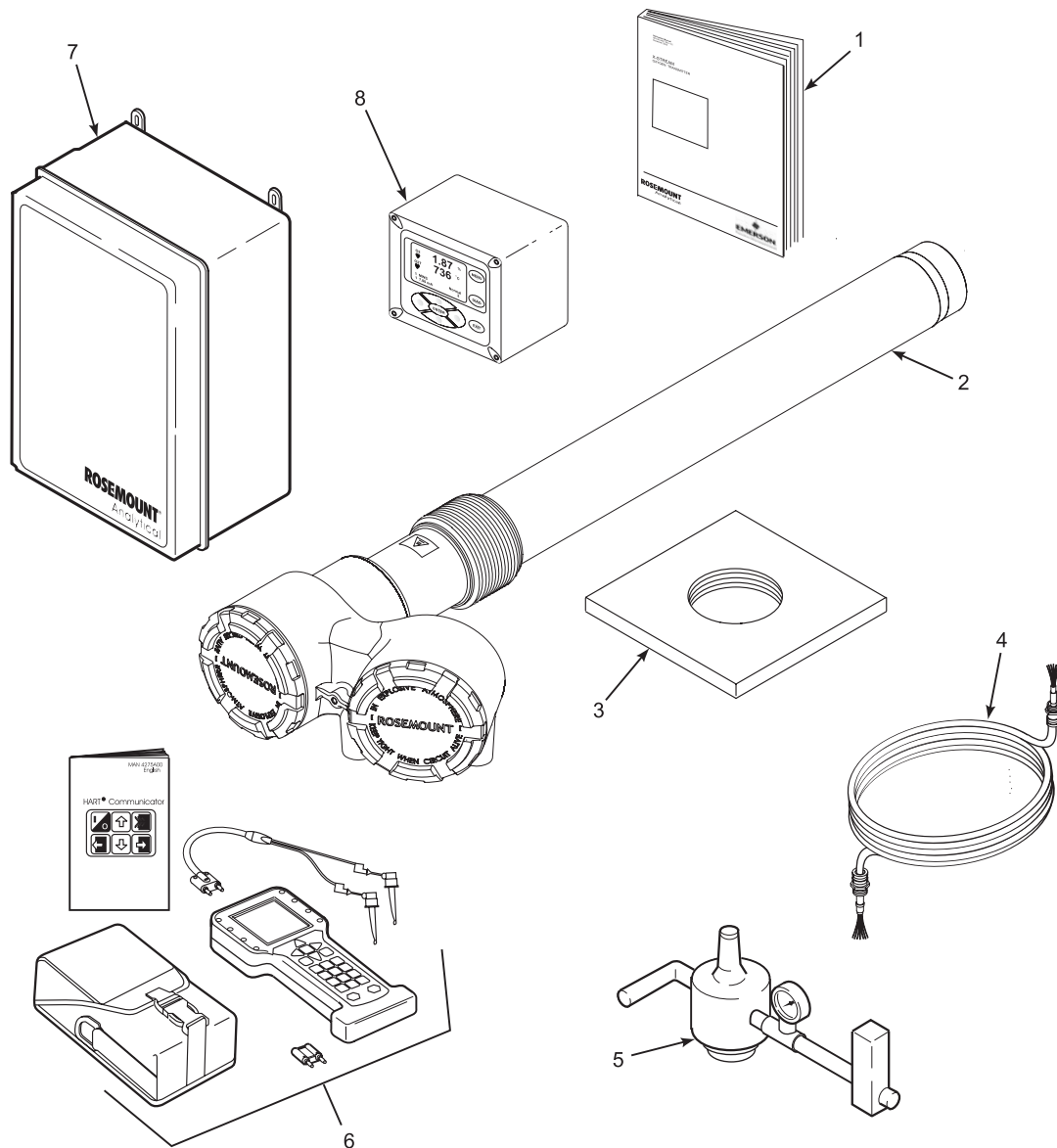
Scope

This Instruction Manual is designed to supply details needed to install, start up, operate, and maintain the X-STREAM O₂ Transmitter system. Signal conditioning electronics outputs a 4-20 mA signal representing an O₂ value. This information, plus additional details, can be accessed with the handheld HART Model 375 Field Communicator or Asset Management Solutions (AMS) software. Also, a fully functional Xi Enhanced Interface (optional) for setup, calibration, diagnostics, and enhanced features is available.

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

X-STREAM O₂ Transmitter

Figure 1-1. Typical System Package



1. Instruction Manual
2. X-STREAM O₂ Transmitter with Integral Electronics (or optional DR Probe)
3. Weld Plate
4. Traditional Architecture Cable (Optional)
5. Reference Air Set (not used if SPS 4001B or IMPS 4000 is used)
6. HART® 375 Field Communicator Package (Optional)
7. Optional SPS 4001B or IMPS 4000 Autocalibration Sequencer (Requires use of Xi Enhanced Interface option)
8. Xi Enhanced Interface (Optional)

39410002

System Description

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

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

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

Where:

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

NOTE

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

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

NOTE

Since the sensing cell is heated, and utilizes platinum electrodes that have catalyzing properties, the X-STREAM O₂ Transmitter cell will burn any residual fuel remaining in the flue gases from incomplete combustion components (usually CO). This secondary combustion at the sensing cell will consume a portion of any remaining oxygen ($2CO + O_2 > 2CO_2$), and measures the net oxygen remaining after this secondary combustion inside the cell occurs.

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

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

The transmitter electronics controls probe temperature and provides an isolated 4-20 mA output that is proportional to the measured oxygen concentration. The probe heater can accept voltages of 100-240 VAC \pm 10% and 50/60 Hz. Therefore, no setup procedures for power are required. The oxygen sensing cell is maintained at a constant temperature by modulating the duty cycle of the probe heater portion of the electronics. The electronics accepts millivolt signals generated by the sensing cell and the thermocouple produces the outputs to be used by the users computer or data acquisition system. The output is an isolated 4-20 mA linearized current.

System Features

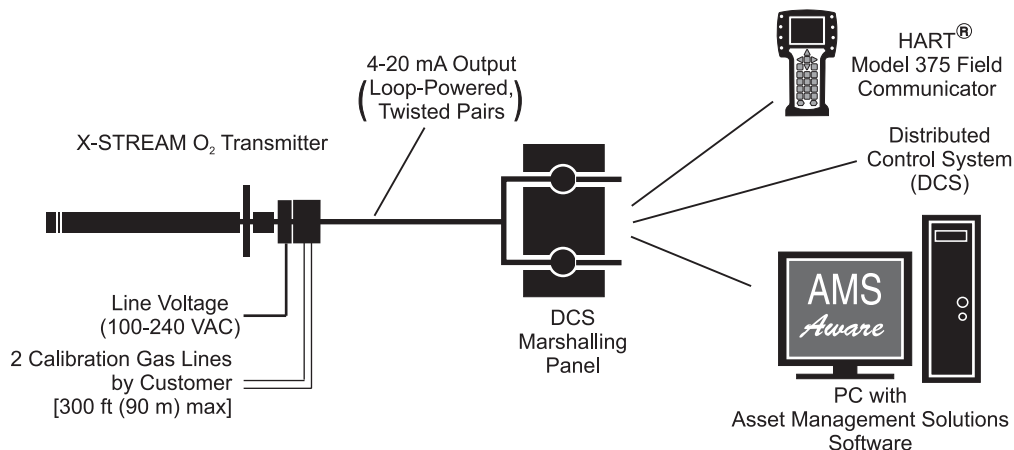
1. The cell output voltage and sensitivity increase as the oxygen concentration decreases.
2. HART communication is standard; to use the HART capability you must have either:
 - a. 375 Field Communicator.
 - b. Asset Management Solutions (AMS) software for the PC.
3. An optional Xi Enhanced Interface allows continuous O₂ display and full interface capability.
4. Field replaceable cell, heater, thermocouple, and diffusion element.
5. The X-STREAM is constructed of rugged 316L or 304 stainless steel for all wetted parts.
6. The heater is adaptable for line voltages from 100-240 VAC \pm 10%; therefore, no configuration of heater voltage is necessary.

System Configurations

Integral Transmitter Electronics, HART Communications

X-STREAM O₂ probes are available in lengths of 18", 3', 6', 9', 12', 15', and 18'. The blue electronics housing contains a signal conditioning electronics to control the cell heater, and to condition the raw cell signal into a linear 4-20 mA signal, with HART digital communications. This arrangement has no display or keypad, and depends on a HART 375 communicator or AMS for configuring the electronics, calibrating the probe, displaying O₂ information, and diagnosing probe problems. This X-STREAM configuration is represented in Figure 1-2.

Figure 1-2. X-STREAM with Integral Transmitter Electronics

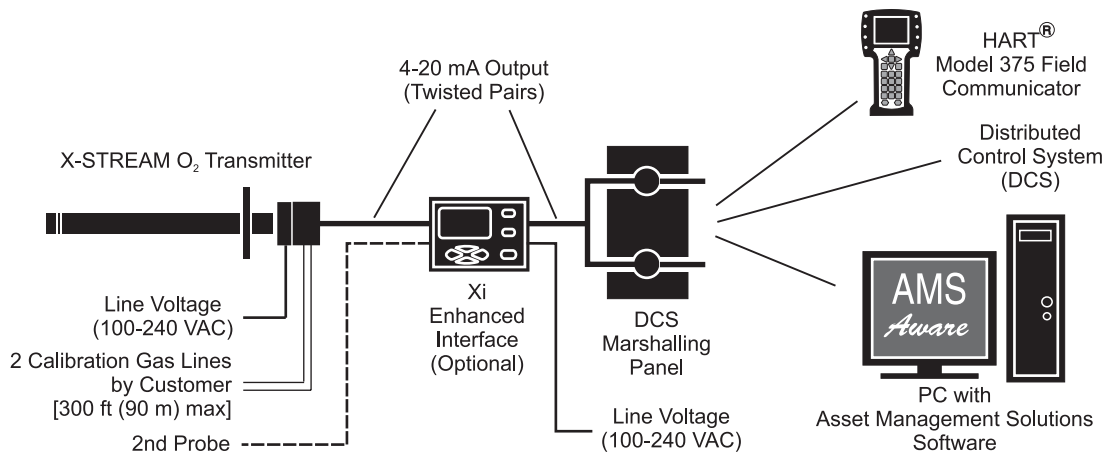


39410023

Integral Transmitter Electronics, HART and Xi Communications

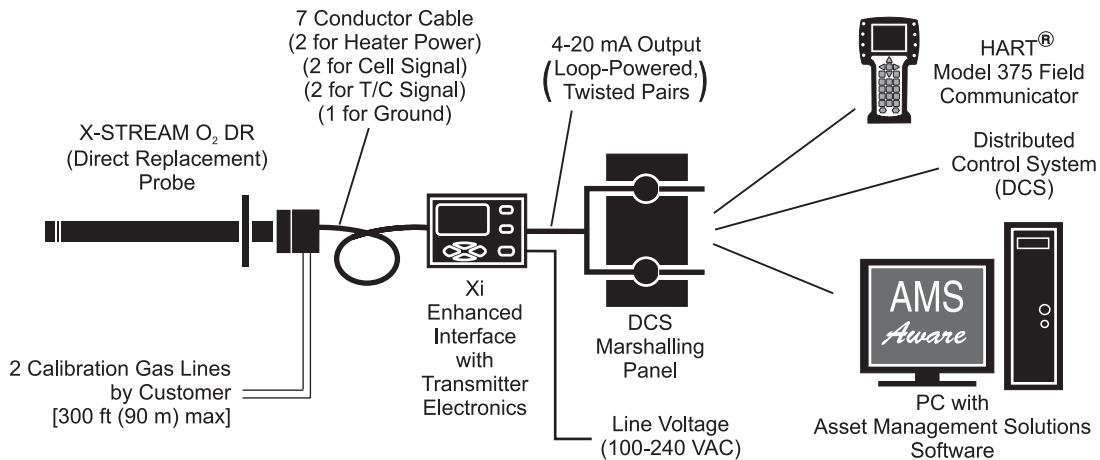
The optional Xi enhanced interface (Figure 1-3) provides a local display/key-pad for setting up, calibrating, and displaying O₂, and for diagnosing probe problems. The Xi also offers additional features including a "Calibration Recommended" diagnostic, fully automatic calibration, optional flame safety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

Figure 1-3. X-STREAM with Integral Transmitter Electronics and Optional Xi Enhanced Interface



39410022

Figure 1-4. X-STREAM with Traditional Architecture Electronics



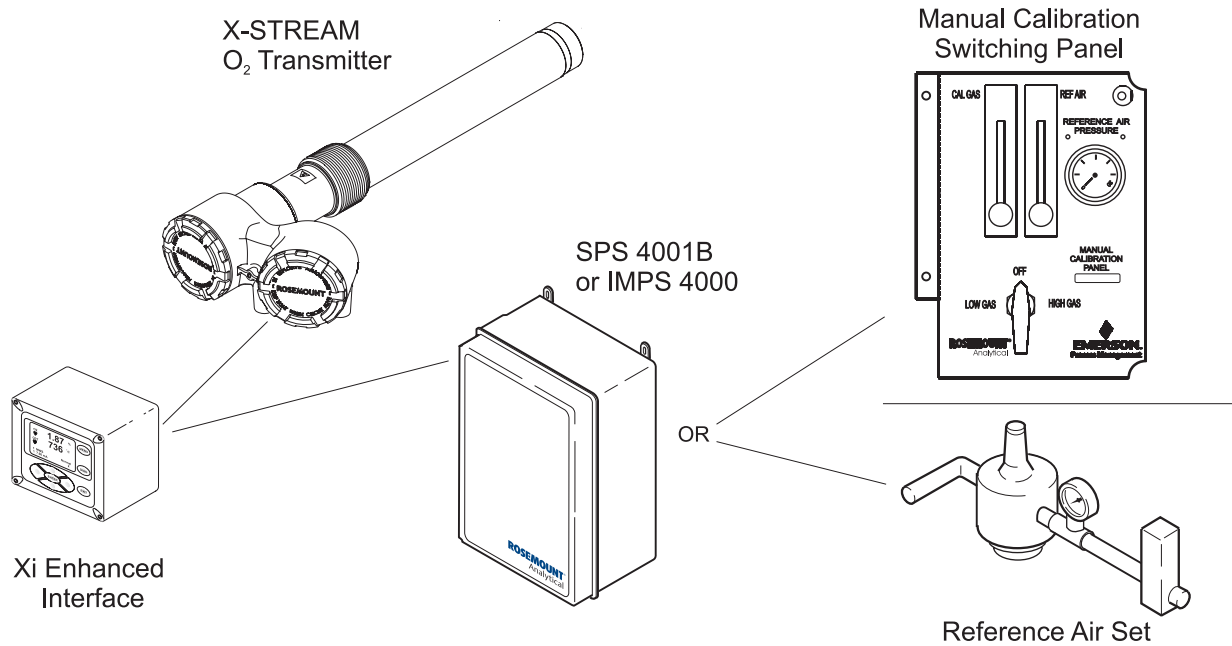
39410008

Traditional Architecture, HART and Xi Communications

Some customers prefer not to mount electronics onto the probe, so a "traditional architecture" version is offered. This probe sends raw millivolt signals via a 7-conductor cable to an Xi electronics (Figure 1-4) which does all heater control and signal conditioning in addition to its display/keypad functions. The optional Xi Enhanced Interface is offered to support direct replacement probes with either 120 volt or 44 volt heaters.

X-STREAM O₂ Transmitter

Figure 1-5. X-STREAM with Xi Enhanced Interface and Autocalibration Sequencer



Automatic Calibration

Calibrations consist of introducing bottled gases of known value into the probe so the electronics can make automatic adjustments to the O₂ readings to match the bottled gas value. 0.4% O₂ and 8% O₂ (balance nitrogen) gases are recommended. Never use nitrogen or instrument air as calibration gases.

Flowmeters (for calibration gases) and regulators and flowmeters (for reference air) are available as loose components, mounted into an optional manual calibration switching panel, or as a fully automatic calibration system (Figure 1-5) where calibration solenoids are switched from the Xi enhanced interface. See IM-106-340AC, SPS 4000B Single Probe Autocalibration Sequencer or IM-106-400IMPS, IMPS 4000 Intelligent Multiprobe Test Gas Sequencer, for additional details.

Communication Options

X-STREAM communications are accomplished by a customer-supplied 375 Field Communicator and/or the optional Xi Enhanced interface. Graphic displays are available via the optional OxyBalance Display and Averaging System.

Data Communications

An operator can configure and diagnostically troubleshoot the X-STREAM in one of two ways:

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

NOTES:

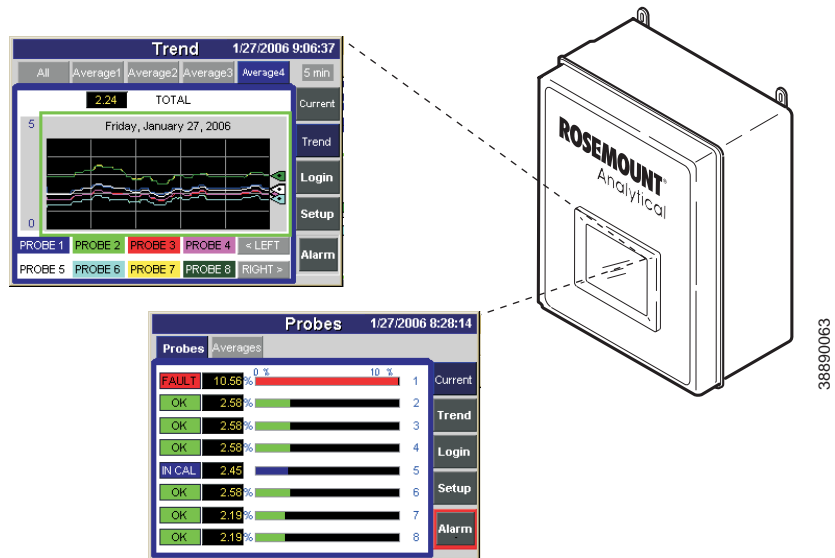
The 375 Field Communicator must be upgraded to System Software 2.0 with Graphic License for operation with the X-STREAM O₂ Transmitter. The AMS software must be upgraded to AMS 8.0 or above.

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

Optional OxyBalance Display and Averaging System

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

Figure 1-6. OxyBalance Displays



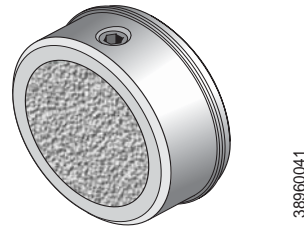
PROBE OPTIONS

Diffusion Elements

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 500°C (932°F).

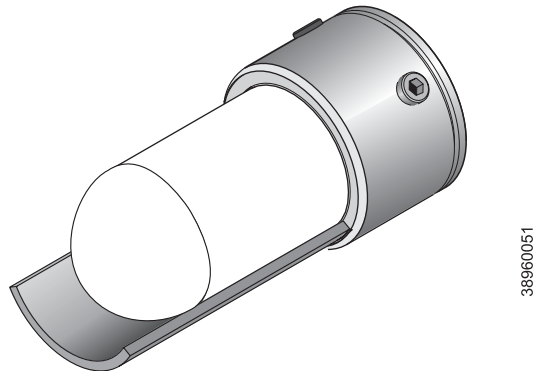
Figure 1-7. Snubber Diffusion Assembly



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.

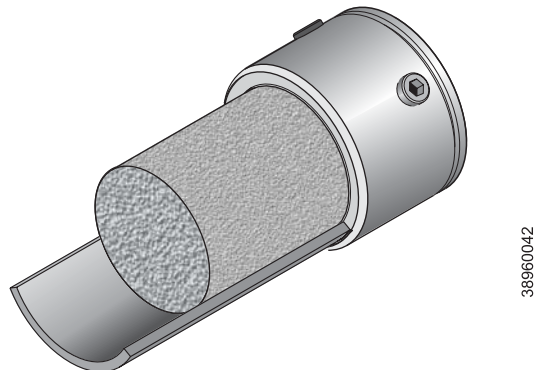
Figure 1-8. Ceramic Diffusion Assembly





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 1-9. Hastelloy Cup-Type Diffusion Assembly



SPECIFICATIONS

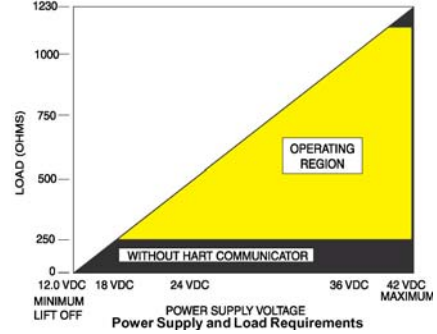
Measurement Specifications																	
Net O ₂ Range:	0 to 50% O ₂ user scalable -2 to 50% O ₂ user scalable with stoichiometer																
Accuracy in Oxidizing Conditions:	±0.75% of reading or 0.05% O ₂ , whichever is greater																
Lowest Detectable Limit:	0.01% O ₂																
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 -T ₉₀ in 120 seconds going from reducing to oxidizing -T ₉₀ in 30 seconds																
Ambient Temperature Effect on Transmitter 4-20 mA Signal:	less than 0.005% O ₂ per degree Celsius																
Ambient Temperature Effect on Xi 4-20 mA Signal:	less than 0.0025% O ₂ per degree Celsius																
Environmental Specifications																	
Transmitter Probe:	Process-wetted materials are 316L or 304 Stainless																
Process Temperature Limits:	0° to 800°C (32° to 1472°F)* *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 80°C (-40° to 176°F), Transmitter -40° to 85°C (-40° to 185°F) as measured by electronics -40° to 100°C (-40° to 212°F), DR Probe																
Process Mounting Temperature:	200°C (392°F) Maximum																
General Purpose Certifications:																	
Xi Enhanced Interface:	Type 4X/IP66, Polycarbonate Material																
Ambient Temperature Limits:	-20° to 50°C (-4° to 122°F) -20° to 70°C (-4° to 158°F) as measured by electronics																
Xi LCD display:																	
Ambient Temperature Limits:	-20° to 55°C (-4° to 131°F)																
General Purpose Certifications:																	
Installation Specifications																	
Probe Mounting: Vertical or Horizontal	2½" NPT or flanged spool pieces are available, P/N 3D39761G02, to offset transmitter housing from hot ductwork.																
Probe Lengths and Approximate Shipping Weights	<table border="0"> <tr> <td>18 in (457 mm)</td> <td>25 lbs. (11,3 Kg)</td> </tr> <tr> <td>3 ft (0,91 m)</td> <td>27 lbs. (12,2 Kg)</td> </tr> <tr> <td>6 ft (1,83 m)</td> <td>38 lbs. (17,2 Kg)</td> </tr> <tr> <td>9 ft (2,74 m)</td> <td>70 lbs. (31,8 kg)</td> </tr> <tr> <td>12 ft (3,66 m)</td> <td>91 lbs. (41,3 kg)</td> </tr> <tr> <td>15 ft (4,57 m)</td> <td>111 lbs. (50,3 kg)</td> </tr> <tr> <td>18 ft (5,49 m)</td> <td>132 lbs. (59,9 kg)</td> </tr> <tr> <td>Optional ANSI/DIN Flange</td> <td>10 lbs. (4,5 Kg)</td> </tr> </table>	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)	15 ft (4,57 m)	111 lbs. (50,3 kg)	18 ft (5,49 m)	132 lbs. (59,9 kg)	Optional ANSI/DIN Flange	10 lbs. (4,5 Kg)
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)																
15 ft (4,57 m)	111 lbs. (50,3 kg)																
18 ft (5,49 m)	132 lbs. (59,9 kg)																
Optional ANSI/DIN Flange	10 lbs. (4,5 Kg)																
Reference Air: (required)	0.5 scfh (0,25 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																

Measurement Specifications

Calibration Gas Line	300 ft (91 m) maximum length
Calibration Gas Flow:	5 scfh (2,5 l/min) @ 25 psi (172,4 kPa)
Heater Electrical Power:	100-240 VAC ±10%, 50/60 Hz, 1/2 in. -14 NPT conduit ports

Installation Specifications (cont'd)

Traditional Architecture Cable	200 ft (61 m) maximum length
Power Consumption of Probe Heater:	776 VA maximum during warm-up
Transmitter Electrical Power:	12 - 24 VDC (loop-powered from control room or Xi)



Electrical Power for Xi:	100-240VAC ±10%, 50/60 Hz
Power Consumption of Xi:	12 VA maximum or 776 VA maximum with Traditional Architecture, 120V Probes 450VA 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 user's flame scanner



Emerson Process Management has satisfied all obligations coming from the European legislation to harmonize the product requirements in Europe. ¹All static performance characteristics are with operating variables constant. Specifications subject to change without notice.

X-STREAM O₂ Transmitter

Table 1-1. Product Matrix, O₂ Transmitter

XS-O2	X-STREAM O ₂ Transmitter					
	Code	Probe Type				
	1	Snubber Diffuser for process gas temperatures to 500°C (932°F), Standard Sensing Cell				
	2	Snubber Diffuser for process gas temperatures to 500°C (932°F), Acid-Resistant Stoichiometer Sensing Cell for SO ₂ /HCl service. Includes Hastelloy calibration gas lines. Requires Xi with Stoichiometer software option.				
	3	Ceramic Diffuser for process gas temperatures to 850°C (1562°F)*, Standard Sensing Cell				
	4	Ceramic Diffuser for process gas temperatures to 1850°C (1562°F)*, Acid-Resistant Stoichiometer Sensing Cell for SO ₂ /HCl service. Includes Hastelloy calibration gas lines. Requires Xi with Stoichiometer software option.				
	5	Hastelloy Diffuser for process gas temperatures to 850°C (1562°F)*, Standard Sensing Cell				
	6	Hastelloy Diffuser for process gas temperatures to 850°C (1562°F)*, Acid-Resistant Sensing Cell for SO ₂ /HCl service. Includes Hastelloy calibration gas lines. Requires Xi with Stoichiometer software option.				
	* Operation above normal cell temperature control point of 736°C (1357°F) will reduce cell life to 1-2 years.					
	Code	Probe Length				
	1	18" Probe, Normal Probe Tube				
	2	18" Probe, Abrasion Resistant Probe Tube				
	3	3' Probe, Normal Probe Tube				
	4	3' Probe, Abrasion Resistant Probe Tube				
	5	6' Probe, Normal Probe Tube				
	6	6' Probe, Abrasion Resistant Probe Tube				
	7	9' Probe, Abrasion Resistant Probe Tube				
	8	12' Probe, Abrasion Resistant Probe Tube				
	9	15' Probe, Abrasion Resistant Probe Tube				
	A	18' Probe, Abrasion Resistant Probe Tube				
	Code	Mounting Plate				
	00	None				
	02	New Installation - Square Weld Plate with 2-1/2 inch NPT Threaded Hole				
	03	Flange for OXT/WC General Purpose Mounting (ANSI/DIN)				
	04	New Installation - Square Weld Plate with 2-150# Studs and Flange				
	05	New Installation - Square Weld Plate with DIN Studs and Flange				
	06	New Installation - Variable Insertion Mount, Abrasion Resistant Probe Only				
	07	Variable Insertion option, mounted to existing Rosemount abrasive shield mounting plate (abrasion resistant probes only)				
	08	Adapter for existing 3" ANSI 150# flange - 6" Bolt Circle				
	09	Adapter for existing 4" ANSI 150# flange - 7.5" Bolt Circle				
	10	Adapter for existing 6" ANSI 150# flange - 9" Bolt Circle				
	11	Adapter for existing 3" ANSI 300# flange - 6.625" Bolt Circle				
	12	Adapter for existing 4" ANSI 300# flange - 7.875" Bolt Circle				
	13	Adapter for existing DIN 100 flange - 210 mm Bolt Circle				
	99	Special Adapter				
	Code	Electronics				
	01	Transmitter Electronics - HART				
	02	Direct Replacement Probe, No Electronics				
	03	Direct Replacement Probe for use with YEW Electronics				
	Code	Manual Calibration Accessories				
	00	None				
	01	Calibration and Reference Air Flowmeters with Reference Air Regulator/Filter				
	02	Panel Mounted Reference Air Flowmeters with Reference Air Regulator/Filter				
XS-O2	5	4	02	01	00	Example

Table 1-2. Product Matrix, Xi Interface and Advanced Feature Electronics

Xi	X-STREAM O ₂ Remote						
	Code	Remote Type					
	01	Single Channel X-STREAM Interface					
	02	Single Channel X-STREAM Interface, accepting a loss-of-flame input to remove heater power with flame status relay					
	03	Dual Channel X-STREAM Interface					
	04	Single Channel X-STREAM Traditional Architecture for 120V probes					
	05	Single Channel X-STREAM Traditional Architecture for 44V probes					
		Code	Mounting				
		00	No Hardware				
		01	Panel Mount Kit with Gasket				
		02	2" Pipe/Wall Mount Kit				
		Code	Cable				
		00	No Cable				
		10	20' (6 m) Cable				
		11	40' (12 m) Cable				
		12	60' (18 m) Cable				
		13	80' (24 m) Cable				
		14	100' (30 m) Cable				
		15	150' (45 m) Cable				
		16	200' (60 m) Cable				
		Code	Stoichiometer Function				
		00	None				
		01	Single Channel (Stoichiometer cell also required in probe)				
		02	Dual Channel (Stoichiometer cell also required in probe)				
		Code	Programmable Reference Function				
		00	None				
		01	Single Channel				
		02	Dual Channel				
		Code	800 Deg C Process Function				
		00	None				
		01	Single Channel				
		02	Dual Channel				
Xi	01	01	00	01	01	01	Example

X-STREAM O₂ Transmitter

Table 1-3. Product Matrix, X-STREAM O₂ Autocalibration Accessories

XSO2CAL		X-STREAM O ₂ Autocalibration Accessories	
		Code	Single Probe Sequencers Autocalibration Options
		00	None
		01	SPS 4001B Single Probe Sequencer, general purpose NEMA 4X, includes check valve for probe
		Code	Intelligent Multiprobe Sequencers (IMPS)
		00	None
		01	IMPS single-probe, general purpose NEMA 4X, includes check valve for probe
		02	IMPS two-probe, general purpose NEMA 4X, includes check valve for probe
		03	IMPS three-probe, general purpose NEMA 4X, includes check valve for probe
		04	IMPS four-probe, general purpose NEMA 4X, includes check valve for probe
		05	IMPS single-probe, 115V heated general purpose NEMA 4X, includes check valve for probe
		06	IMPS two-probe, 115V heated general purpose NEMA 4X, includes check valve for probe
		07	IMPS three-probe, 115V heated general purpose NEMA 4X, includes check valve for probe
		08	IMPS four-probe, 115V heated general purpose NEMA 4X, includes check valve for probe
		09	IMPS single-probe, 220V heated general purpose NEMA 4X, includes check valve for probe
		10	IMPS two-probe, 220V heated general purpose NEMA 4X, includes check valve for probe
		11	IMPS three-probe, 220V heated general purpose NEMA 4X, includes check valve for probe
		12	IMPS four-probe, 220V heated general purpose NEMA 4X, includes check valve for probe
XSO2CAL	00	04	Example

Table 1-4. Calibration Gases

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

Note:

*Calibration gas bottles cannot be shipped via airfreight.

Section 2 Installation

System Considerations	page 2-2
Mechanical Installation	page 2-3
Selecting Location	page 2-3
Probe Installation	page 2-4
Variable Insertion	page 2-9
Optional Xi Enhanced Interface Installation	page 2-12
Electrical Installation	page 2-15
X-STREAM Transmitter	page 2-15
Optional Xi Enhanced Interface	page 2-16
Optional Flame Safety Interlock	page 2-18
Traditional Architecture Cable Connections	page 2-18
Direct Replacement (DR) Probe Connections	page 2-22
DR Probe to Yokogawa Electronics Connections	page 2-22
Pneumatic Installation	page 2-24
Reference Air Package	page 2-24
Calibration Gas	page 2-27

WARNING

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

WARNING

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

WARNING

The X-STREAM O₂ Transmitter can be installed in general purpose areas only. Do not install the transmitter or Xi 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.

NOTE

All unused ports on the probe housing and Xi enclosure should be plugged with a suitable fitting.

SYSTEM CONSIDERATIONS

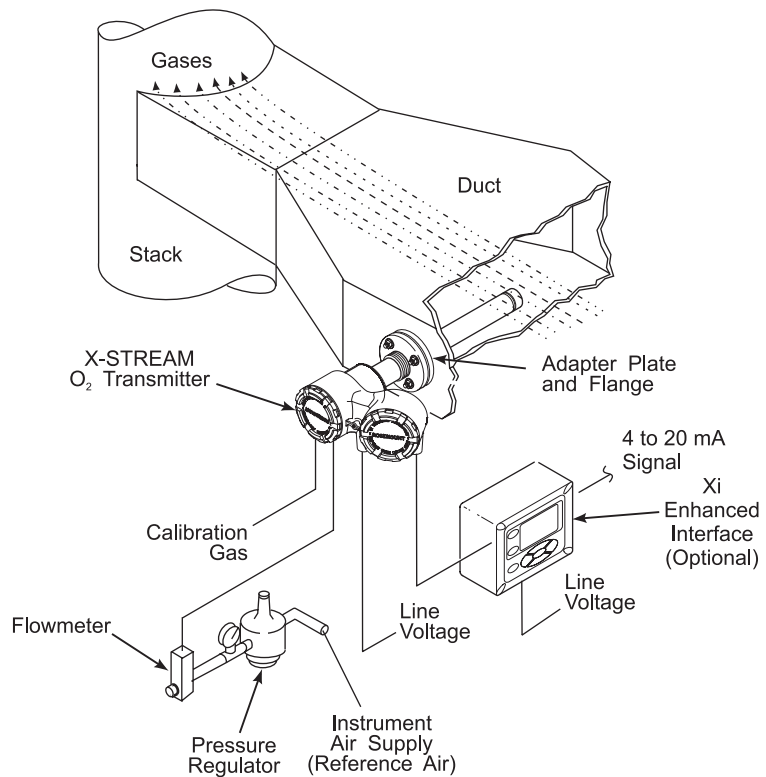
A typical system installation for an X-STREAM with integral electronics is shown in Figure 2-1.

A source of instrument air is required at the X-STREAM for reference air flow [0.5 scfh (0,25 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 Xi Enhanced Interface option is not used, the 4 to 20 mA signal from the probe will be loop-powered from the DCS. A 375 Field Communicator or AMS is required to set up and operate the probe.

Figure 2-1. Typical System Installation



39410024

The optional Xi 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 Field Communicator, it must be connected to the 4 to 20 mA signal loop between the Xi and the control room or data acquisition system. Connecting the 375 Field Communicator between the transmitter and Xi will cause communication errors and affect system operation.

NOTES:

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 X-STREAM arrived from the factory in case any components are to be shipped to another site. This packaging has been designed to protect the product.

MECHANICAL INSTALLATION

Selecting Location

1. Figure 2-2 through Figure 2-12 provide reference illustrations for the mechanical installations of the equipment.
2. The location of the X-STREAM O₂ Transmitter in the stack or flue is most important for maximum accuracy in the oxygen analyzing process. The X-STREAM must be positioned so the gas it measures is representative of the process. Best results are normally obtained if the X-STREAM is positioned near the center of the duct (40-60% insertion).
3. Wider ducts may require several X-STREAM units since the O₂ can vary due to stratification. A point too near the wall of the duct, or the inside radius of a bend, may not provide a representative sample because of the very low flow conditions.
4. The sensing point should be selected so the process gas temperature falls within a range of 0 to 704°C (32 to 1300°F).

CAUTION

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

5. The X-STREAM probe can operate to 850°C (1562°F) with an optional Xi Enhanced Interface, though continued operation at these temperatures will reduce cell and probe life. The temperature of the integral electronics transmitter must not exceed 85°C (185°F) as measured inside the electronics housing.
6. Check the flue or stack for holes and air leakage. The presence of this condition will substantially affect the accuracy of the oxygen reading. Therefore, either make the necessary repairs or install the X-STREAM probe upstream of any leakage.
7. Ensure the area is clear of internal and external obstructions that will interfere with installation and maintenance. Allow adequate clearance for removal of the X-STREAM probe.

X-STREAM O₂ Transmitter

Figure 2-2. Probe Installation Details

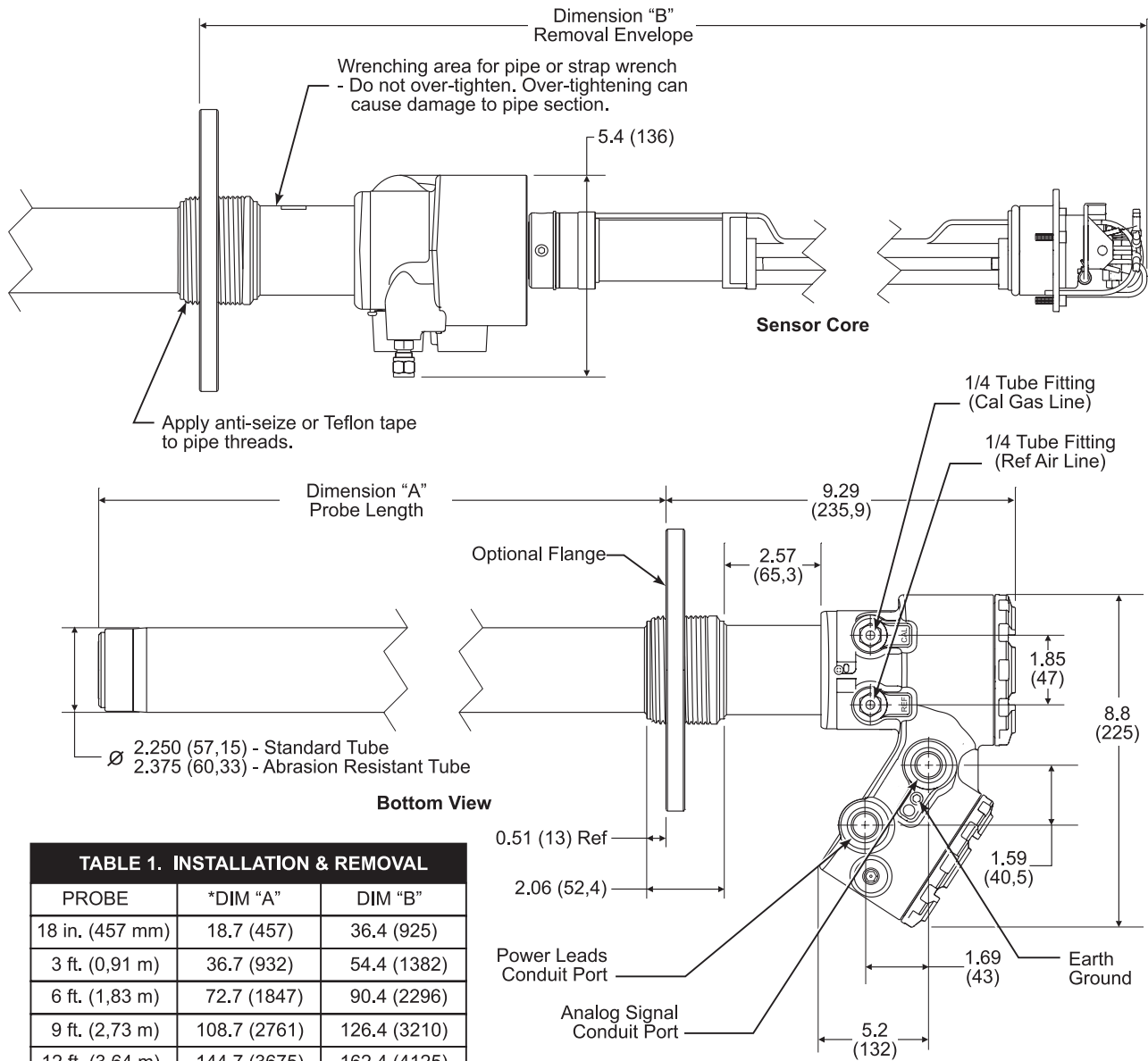


TABLE 1. INSTALLATION & REMOVAL		
PROBE	*DIM "A"	DIM "B"
18 in. (457 mm)	18.7 (457)	36.4 (925)
3 ft. (0,91 m)	36.7 (932)	54.4 (1382)
6 ft. (1,83 m)	72.7 (1847)	90.4 (2296)
9 ft. (2,73 m)	108.7 (2761)	126.4 (3210)
12 ft. (3,64 m)	144.7 (3675)	162.4 (4125)
15 ft. (4,55 m)	180.7 (4590)	198.4 (5039)
18 ft. (5,45 m)	216.7 (5504)	234.4 (5954)

*NOTE: Add 3.61 in. (91,7 mm) to Dimension A for ceramic or Hastelloy diffuser.

NOTE: Dimensions are in inches with millimeters in parentheses.

39640004

Probe Installation

CAUTION

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

1. Ensure all components are available to install the X-STREAM O₂ probe. Refer to the probe installation details in Figure 2-2.
2. Standard mounting uses a 6-inch square weld plate with a 2-½ inch NPT probe port welded to the stack or duct wall.
3. If using the optional ceramic diffusion element, the vee deflector must be correctly oriented. Before inserting the X-STREAM probe, check the direction of gas flow in the duct. Orient the vee deflector so the apex points upstream toward the flow (Figure 2-3).
4. If using the standard 6-in. square weld plate with a 2-½ in. NPT probe port (Figure 2-4) or an optional flange mounting plate (Figure 2-5) 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 3-1/2 in. (89 mm).

Figure 2-3. Vee Deflector Orientation with Ceramic and Hastelloy Diffuser

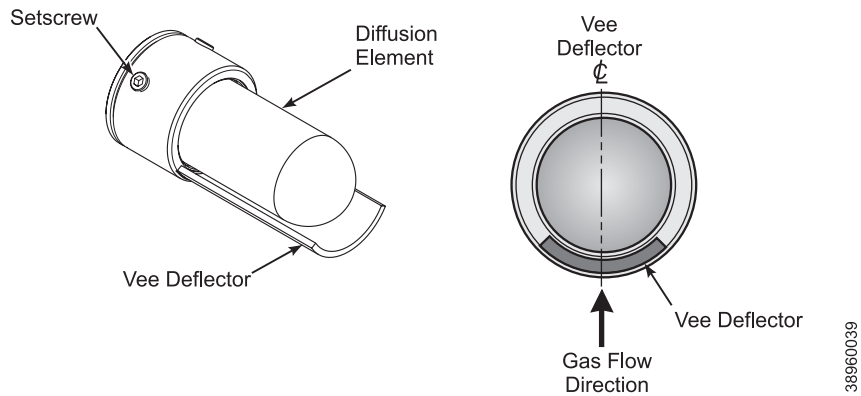
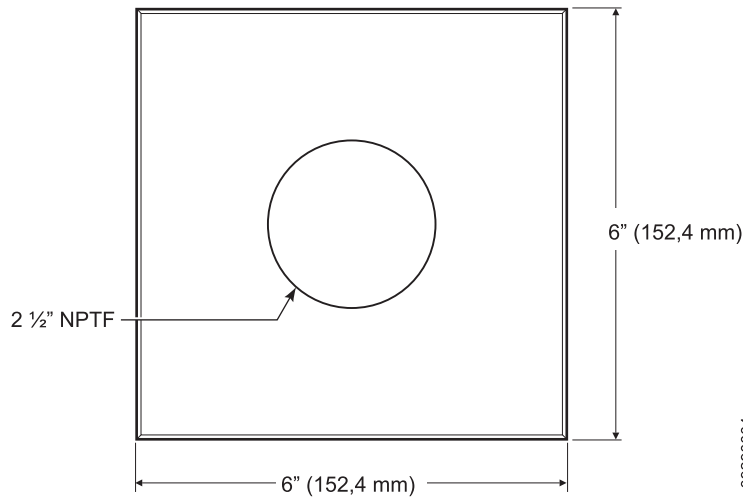


Figure 2-4. Square Weld Plate



X-STREAM O₂ Transmitter

Figure 2-5. OXT/WC Retrofit Mounting Flange (threads onto probe)

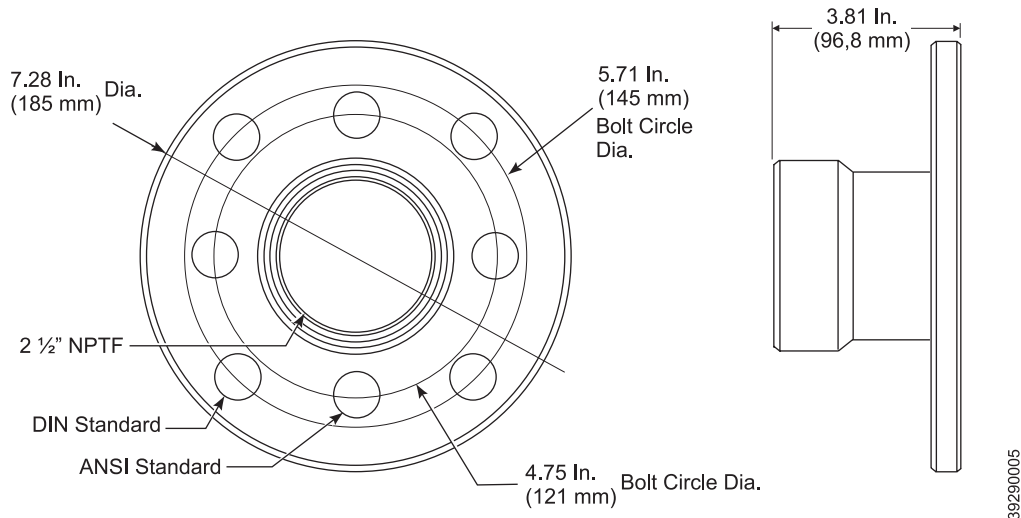


Figure 2-6. Optional Adapter Plate

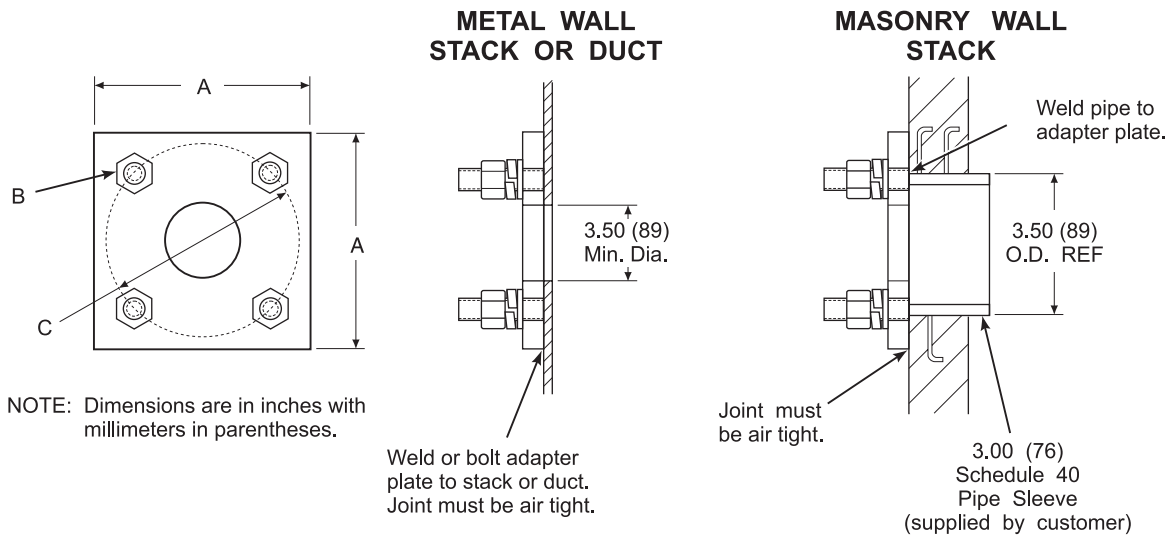


PLATE DIMENSIONS		
DIMENSION	ANSI	DIN
"A"	7.5 (191)	7.5 (191)
"B" THREAD	5/8-11	M16x2
"C" DIA.	4.75 (121)	5.71 (145)

38960006

NOTE

An abrasive shield is recommended for high velocity particulates in the flue stream (such as those in coal-fired boilers, kilns, and recovery boilers). Vertical and horizontal brace clamps are provided for 9 ft (2,75 m) through 18 ft (5,49 m) probes to provide mechanical support for the X-STREAM probe.

5. Insert probe through the opening in the mounting flange and bolt the unit to the flange.
6. Long probes installation details are shown in Figure 2-7. When selected probe lengths are 9 ft to 18 ft (2,74 m to 5,49 m), special brace clamps (Figure 2-8) are supplied for use with brace bars to provide additional support for the abrasives-resistant probe tube inside the flue or stack.

CAUTION

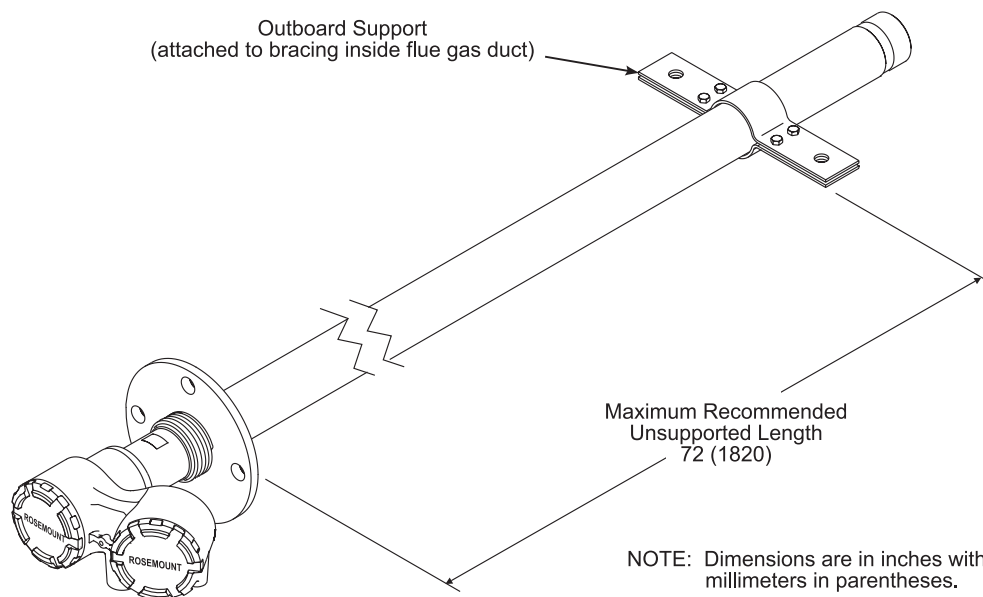
Do not thread the probe by turning the blue electronics housing. Use a pipe wrench on the probe tube between the housing and threaded fitting. **Do not overtighten.**

CAUTION

Failure to use anti-seize compound or Teflon tape on threads could result in thread galling, probe damage, and excessive difficulty in removal of probe. Do not overtighten the probe.

7. Install anti-seize compound on the pipe threads and screw the probe into the adapter. Remember, this is a low-pressure seal that requires very little torque; do not overtighten the probe tube.

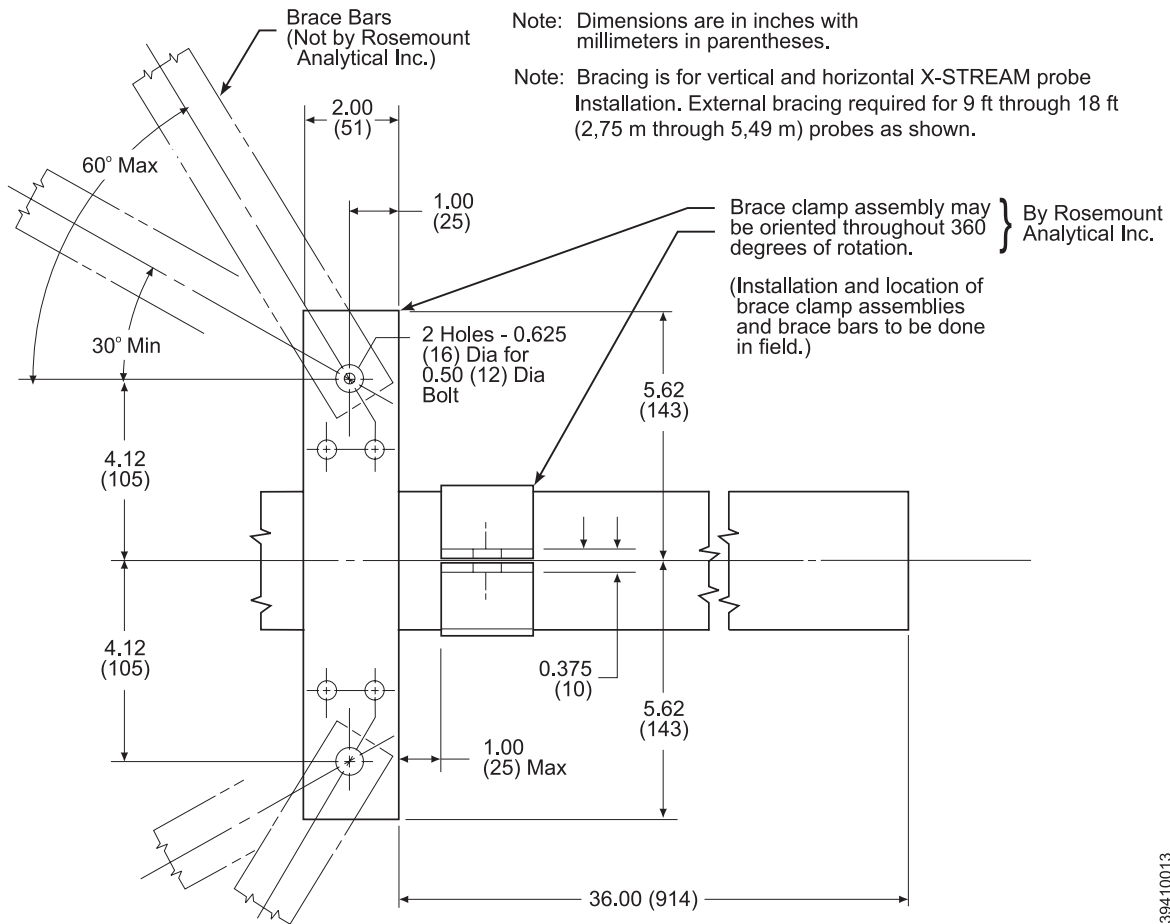
Figure 2-7. Long Probes Installation



NOTE: Dimensions are in inches with millimeters in parentheses.

39410016

Figure 2-8. Bracing Installation for Abrasive Probe Tubes (9' to 18' Lengths)

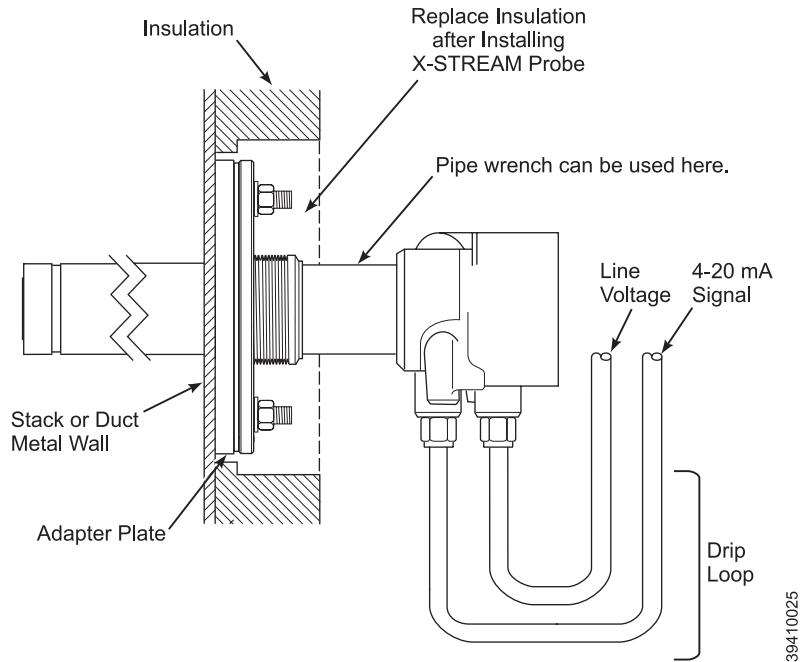


8. The electrical conduit ports should be facing down for a horizontal probe installation. In vertical probe installations, orient the probe so the system cable drops vertically from the probe. Ensure the electrical conduit is routed below the level of the circuit card. See Figure 2-9. This drip loop minimizes the possibility that moisture will accumulate in the housing.
9. If insulation was removed to access the duct work for probe mounting, make sure the insulation is replaced afterward. See Figure 2-9.

CAUTION

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

Figure 2-9. Installation with Drip Loop and Insulation Removal



Variable Insertion

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

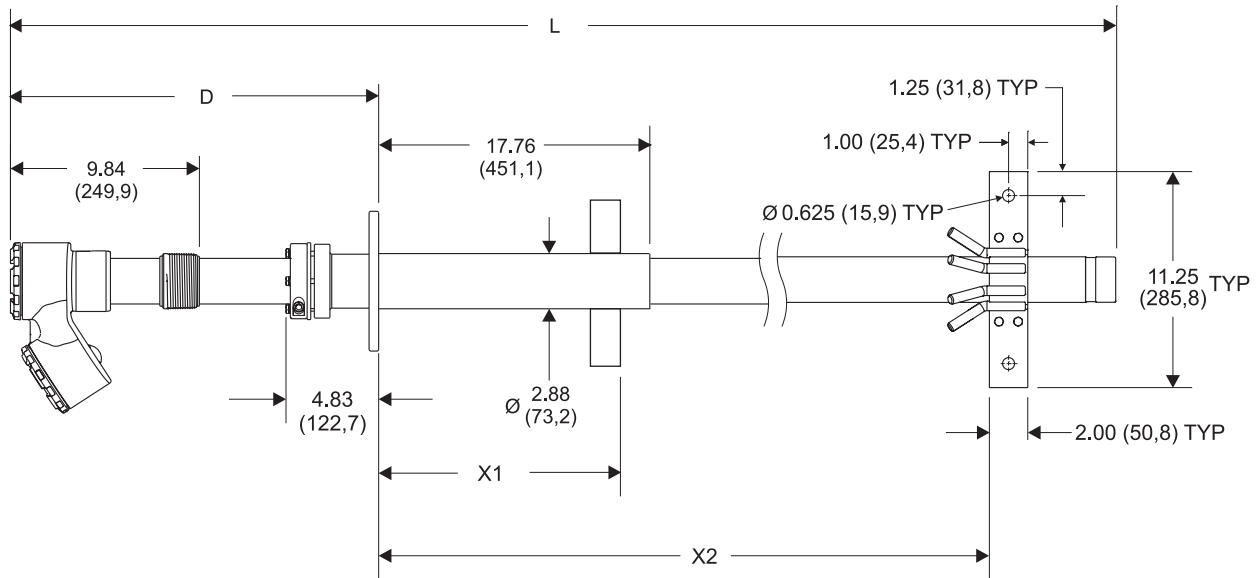
Variable Insertion Option

The Variable Insertion option (Figure 2-10) 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:

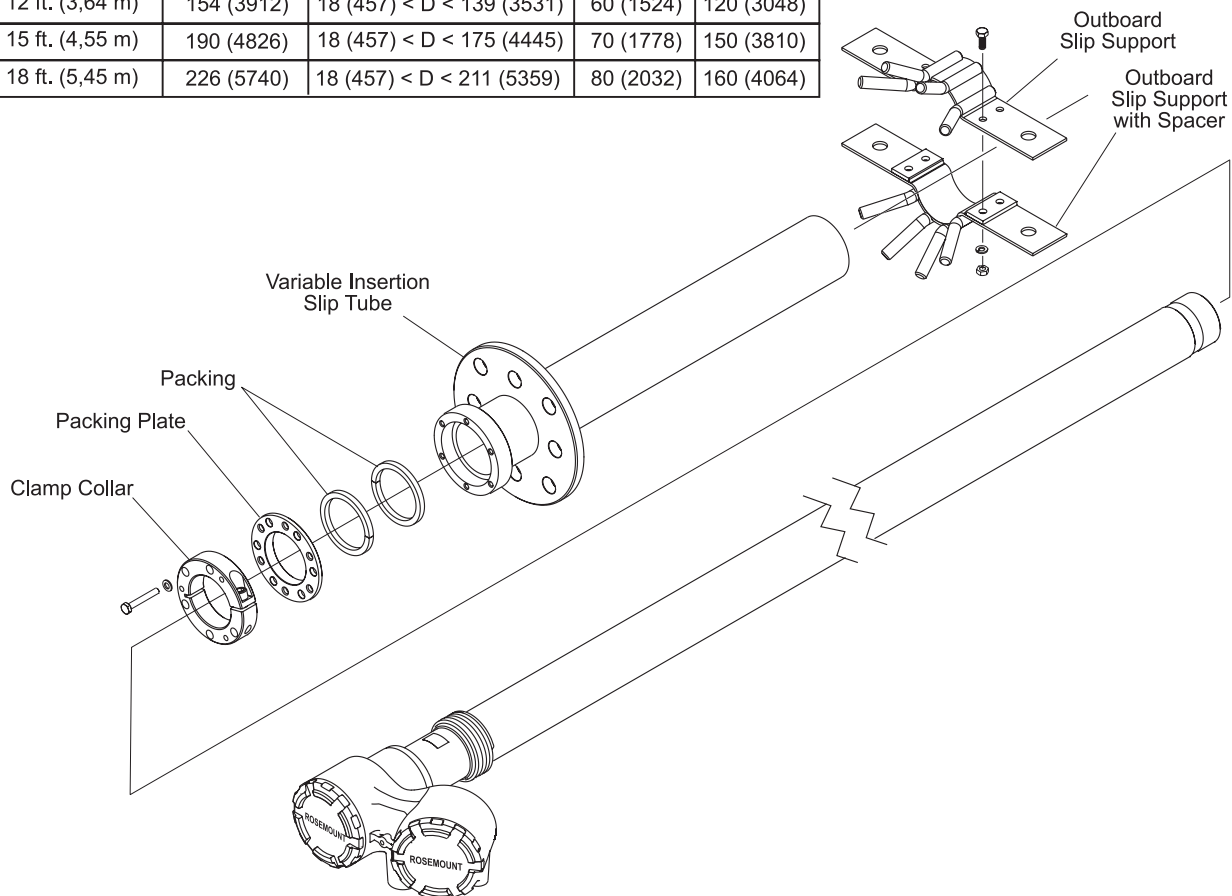
- One length of probe can be stocked for any length requirement.
- The flue gas duct where the probe is mounted can be profiled with a single long probe while the flue gas levels are trended within the control system. This information can be used to determine the installation "sweet spot" that is most 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).

X-STREAM O₂ Transmitter

Figure 2-10. Variable Insertion Mounting



PROBE	L	D	X1 ±2 (51)	X2 ±2 (51)
9 ft. (2,73 m)	118 (2997)	18 (457) < D < 103 (2616)	72 (1829)	—
12 ft. (3,64 m)	154 (3912)	18 (457) < D < 139 (3531)	60 (1524)	120 (3048)
15 ft. (4,55 m)	190 (4826)	18 (457) < D < 175 (4445)	70 (1778)	150 (3810)
18 ft. (5,45 m)	226 (5740)	18 (457) < D < 211 (5359)	80 (2032)	160 (4064)



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

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

Installation

An installation permitting Variable Insertion requires some special considerations:

- Removal envelope: There must be enough room for the probe to slide in and out.
- Utilities: Since the probe will be operating continuously as it's position is adjusted, the electrical wires and pneumatic tubing must be able to travel with the probe.
- Duct Pressure: Balanced draft and natural draft furnaces typically run at a slightly negative pressure, so any small leaks in the packing material will draw air into the furnace. When the probe is removed for service, a flow of fresh air into the furnace also results. A positive pressure duct, however, will release hot flue gases when the probe is removed.

WARNING

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.

WARNING

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. Rosemount Analytical offers other systems with isolation valve and pressure balancing for applications where the pressure is up to 50 PSI.

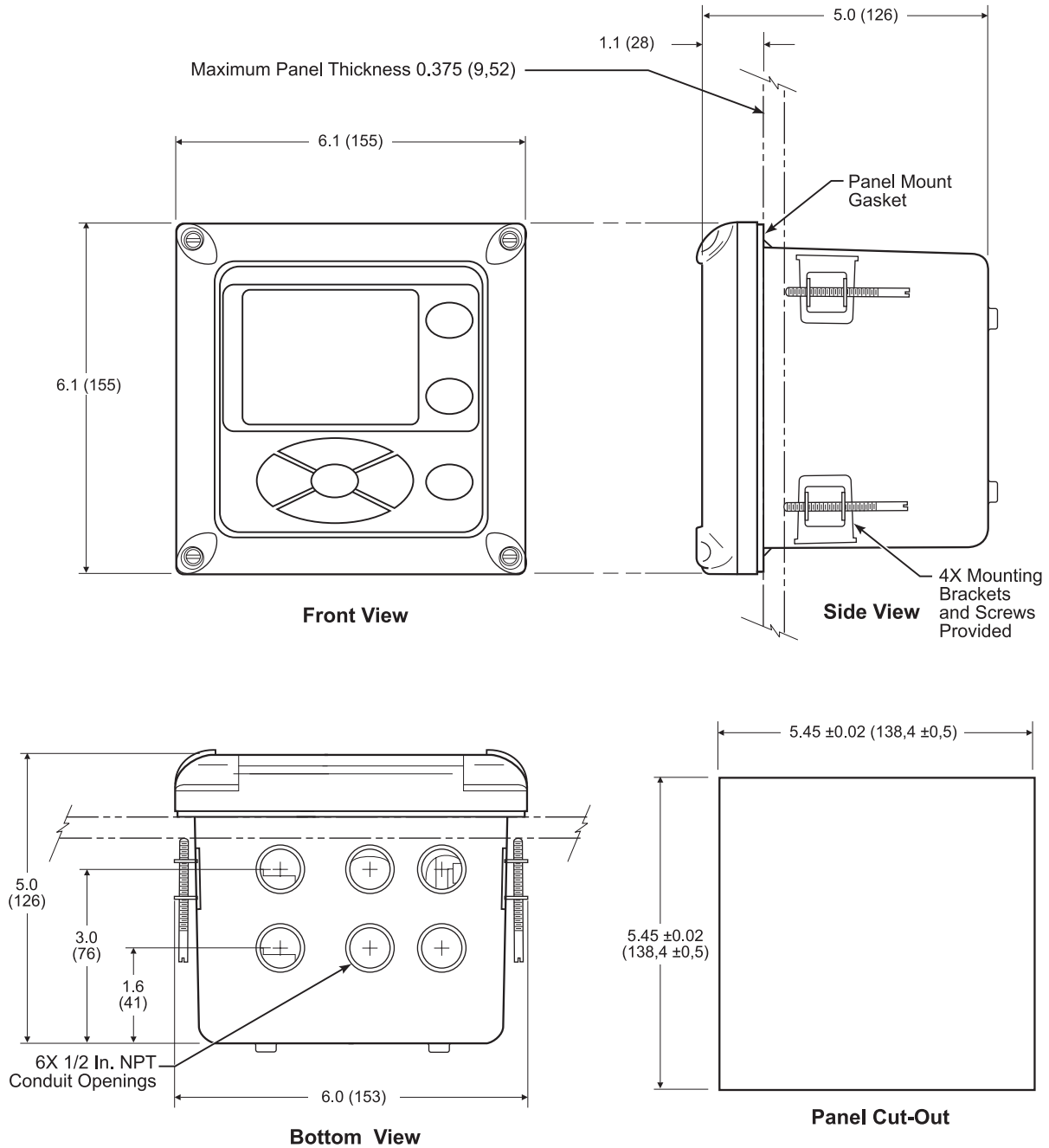
The variable insertion arrangement is set up for X-STREAM probes with heavy-wall abrasion-resistant probe bodies only. Figure 2-10 shows how the probe inserts through the variable insertion slip tube. For probe lengths of 9 feet and longer, an outboard slip support must be mounted inside the flue gas 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.

Optional Xi Enhanced Interface Installation

The optional Xi Enhanced Interface is available in a panel mounting, wall mounting, or pipe mounting configuration. Refer to Figure 2-11 or Figure 2-12 for the panel, wall, or pipe mounting details.

1. Ensure all components are available to install the Xi.
2. Select a mounting location near or removed from the transmitter. Consider the temperature limitations of the Xi (see "Specifications") when selecting the mounting location.
3. Mount the Xi at a height convenient for viewing and operating the interface. Approximately 5 ft (1,5 m) is recommended.
4. The keypad window on the Xi Enhanced Interface may have interior and exterior protective membranes. Remove the protective membranes prior to use of the Xi enclosure. Failure to remove the protective membranes may cause the display to appear distorted. The membrane may be difficult or impossible to remove after extended use at elevated temperatures.

Figure 2-11. Xi Enhanced Interface - Panel Mounting Details

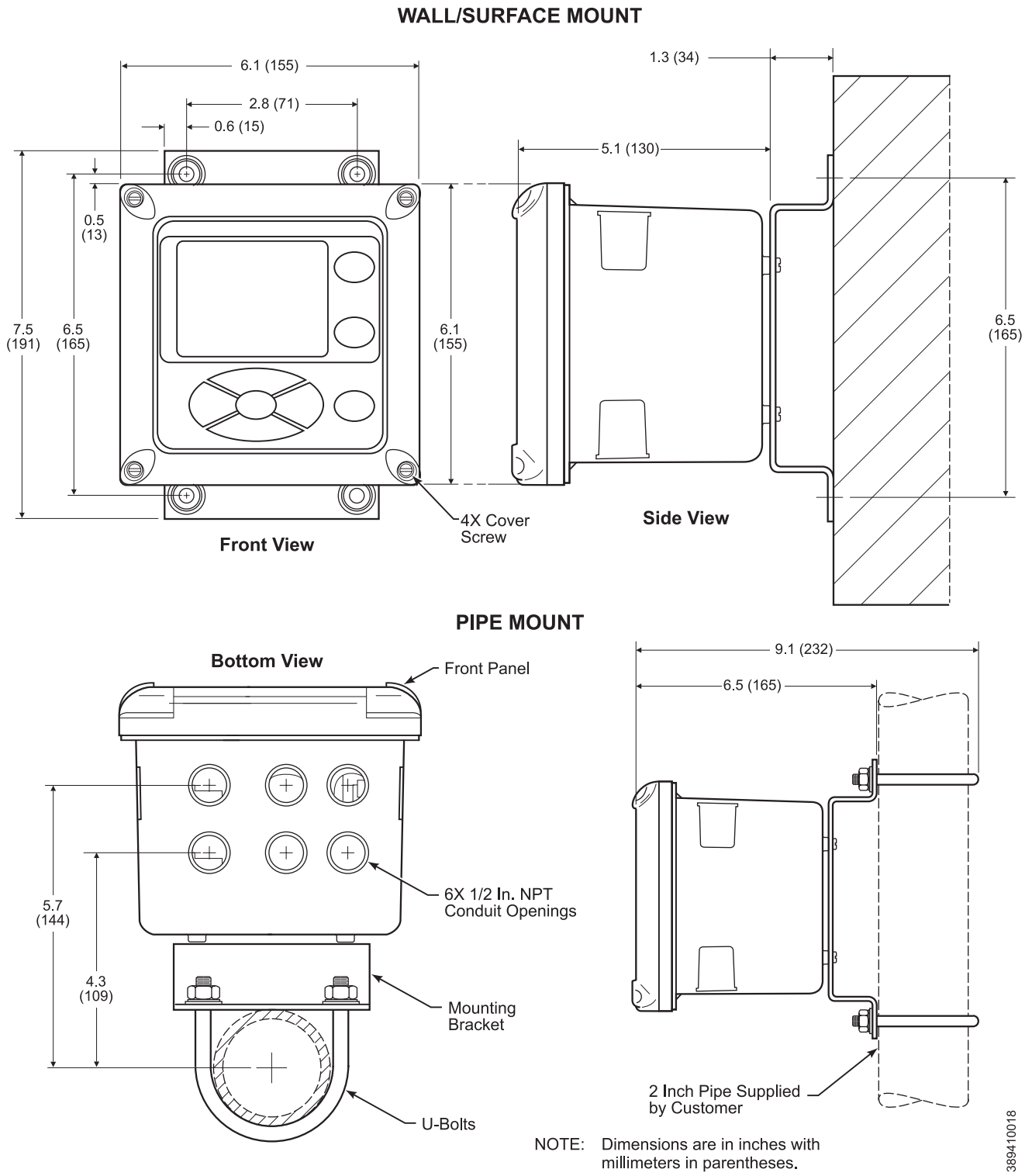


- NOTES: 1. Dimensions are in inches with millimeters in parentheses.
 2. The front panel is hinged at the bottom. The panel swings down for easy access to the wiring locations.

39410019

X-STREAM O₂ Transmitter

Figure 2-12. Xi Enhanced Interface - Wall/Surface and Pipe Mounting Details



389410018

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.

X-STREAM Transmitter

⚠ WARNING

Disconnect and lock out power before connecting the power supply.

⚠ WARNING

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

⚠ WARNING

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

NOTE

To maintain proper earth grounding ensure a positive connection exists between the transmitter housing and earth. The connecting ground wire must be 14 AWG minimum. Refer to Figure 2-13.

NOTE

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

NOTE

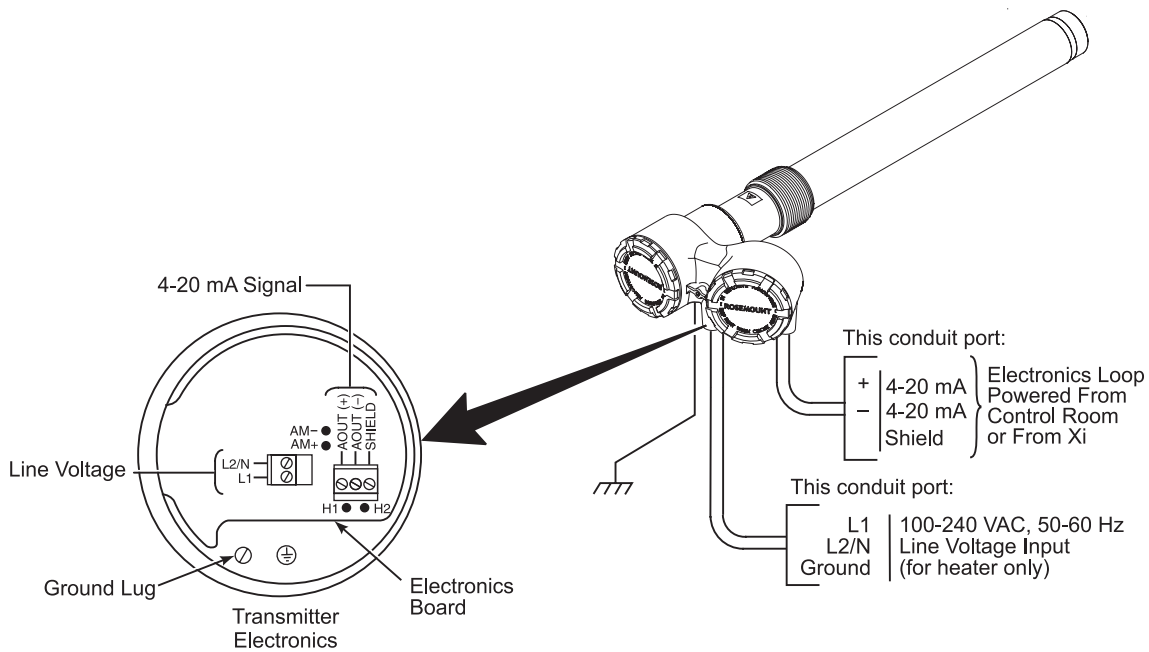
If metal conduit is used with the Xi Enhanced Interface the conduit should be reliably bonded to protective earth. The grounding plate inside the Xi is not bonded to PE and does not provide adequate grounding.

1. Refer to Figure 6-1 for all equipment item numbers in parentheses. Remove right cover (11) from 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 (Figure 2-13). The X-STREAM automatically accepts 100-240 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.

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Figure 2-13. Electrical Installation - X-STREAM O₂ Transmitter



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

NOTE

The 4-20 mA signal represents the O₂ value and also powers the probe-mounted electronics. Superimposed on the 4-20 mA signal is HART information accessible through a 375 Field Communicator or AMS software.

Optional Xi Enhanced Interface

5. Install right cover (11) on transmitter.
6. Follow the remaining electrical installation instructions only if the Xi Enhanced Interface is included with your system configuration.
1. Remove cover screws from the front cover of the Xi Enhanced Interface. 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 Xi Enhanced Interface. If your system is configured to operate two transmitter probes there are two I/O interface boards.
3. See Figure 2-15. 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.

Figure 2-14. Signal Connections Xi Enhanced Interface

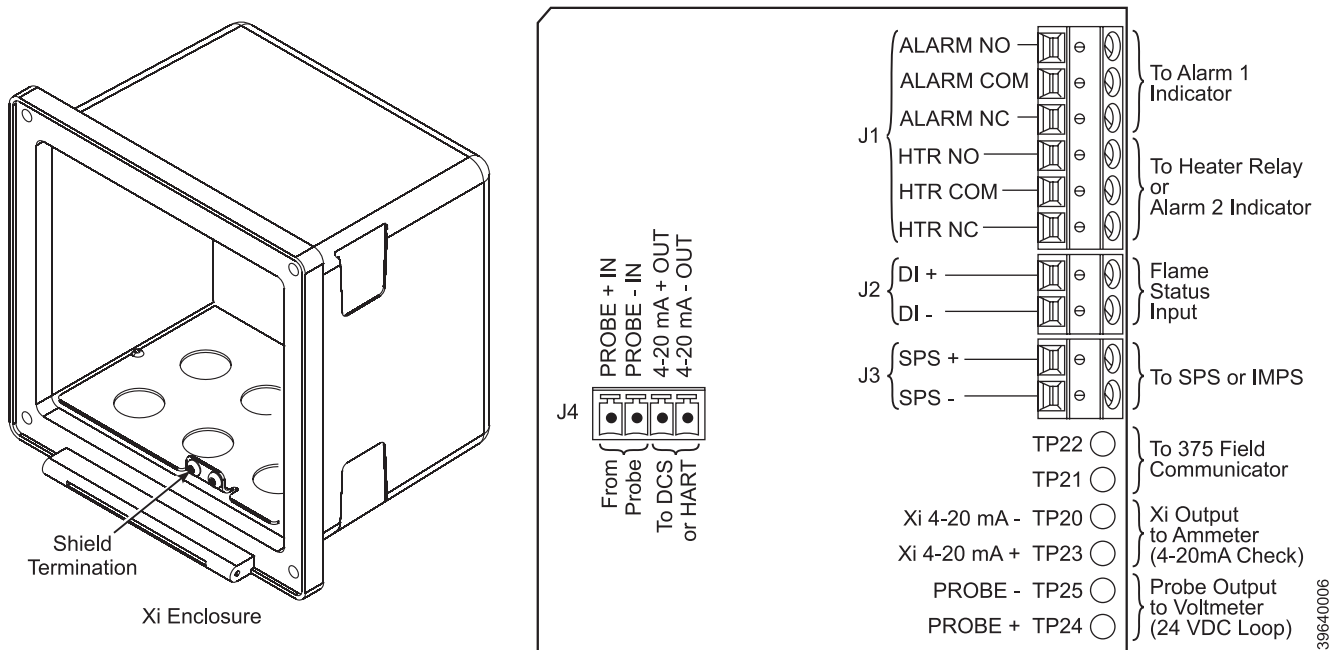
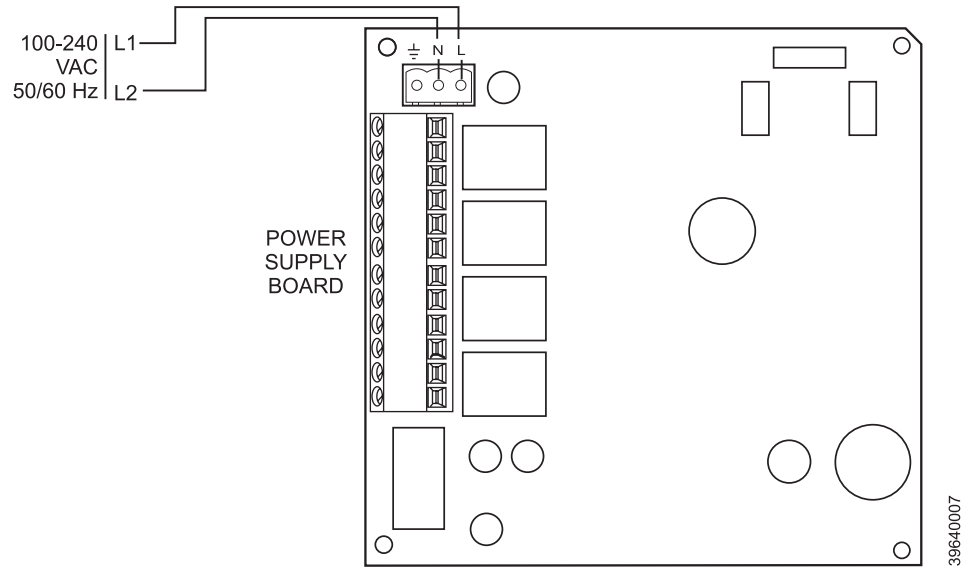


Figure 2-15. Alarm Indicator Relay Terminals



4. Terminate the shield of the 4-20 mA signal wires at the designated ground terminal of the Xi Enhanced Interface. 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. Connect the signal wires for the flame status input (if used) to the applicable terminals of J2. The flame status sensing device is supplied by the customer. Refer to the applicable OEM documents for signal wiring details.
7. Connect the customer's alarm indicator devices to the alarm indicator relay terminals. See Figure 2-15 for the alarm indicator relay terminals.
8. Reinstall the I/O board in the card rack of the Xi Enhanced Interface.
9. If your system is configured to operate two transmitter probes, repeat steps 2 through 7 to connect the other probe signal wires.

Figure 2-16. Power Connections
- Xi Enhanced Interface



10. Remove the connector from the power supply board located on the left-hand side of the card rack inside the Xi Enhanced Interface.
11. See Figure 2-16. Connect the line, or L1 wire to the L1 terminal and the neutral, or L2 wire, to the N terminal.
12. Reinstall the power supply connector in the power supply board.
13. Close and fasten the cover of the Xi Enhanced Interface.

Optional Flame Safety Interlock

A flame safety interlock by Emerson Process Management 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 X-STREAM O₂ Transmitter. A simplified wiring diagram for the flame safety interlock is shown in Figure 2-17. This input is internally powered by the Xi Enhanced Interface 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.

Traditional Architecture Cable Connections

A traditional architecture X-STREAM O₂ Transmitter configuration is used to provide for remote location of the transmitter electronics. All electronics are housed inside the Xi Enhanced Interface. A multi-conductor power/signal cable connects between the probe and the Xi. Use the following procedure to connect the traditional architecture probe to the Xi Enhanced Interface.

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 X-STREAM traditional architecture probe and the installation site for Xi Enhanced Interface. Use new cable conduit or trough as needed.
2. Remove covers from the probe.

Figure 2-17. Flame Safety Interlock - Wiring Diagram

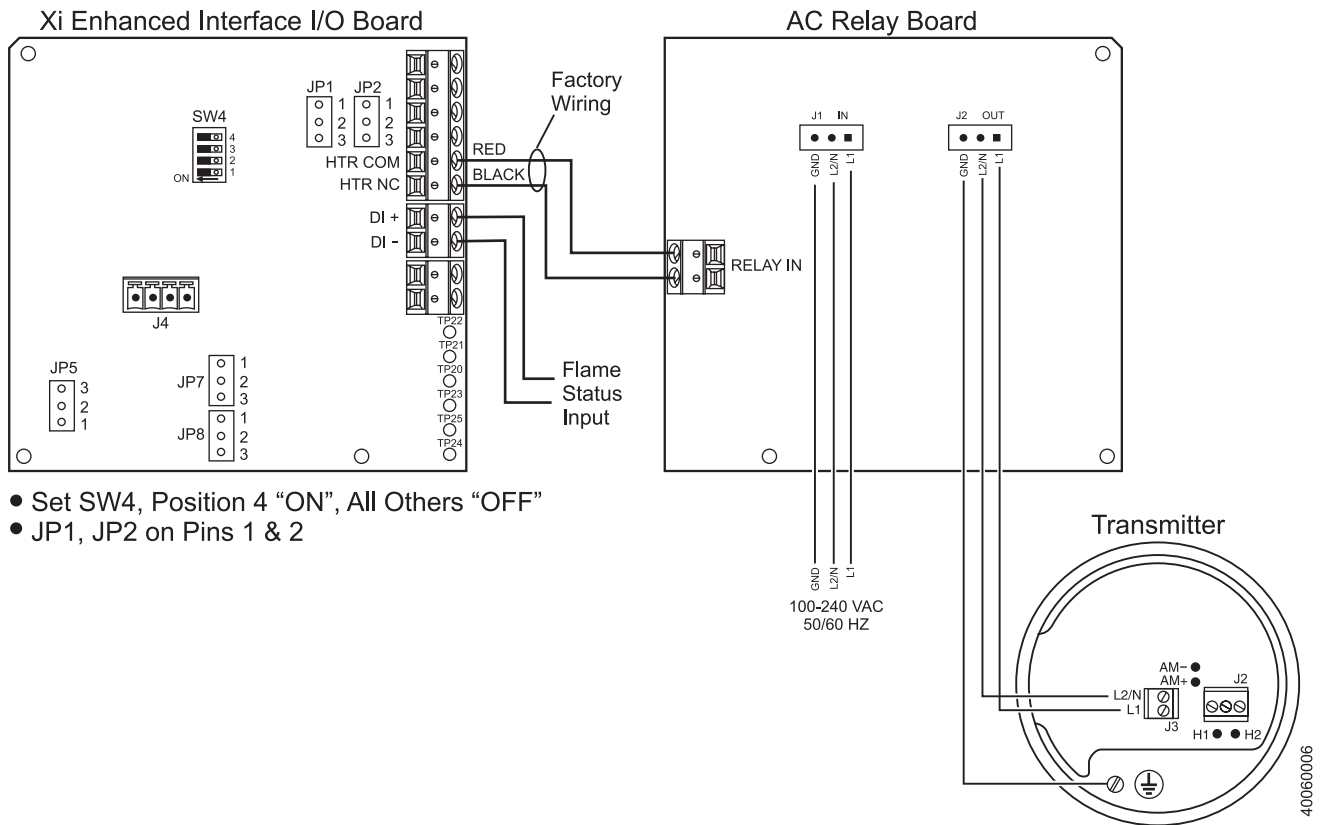
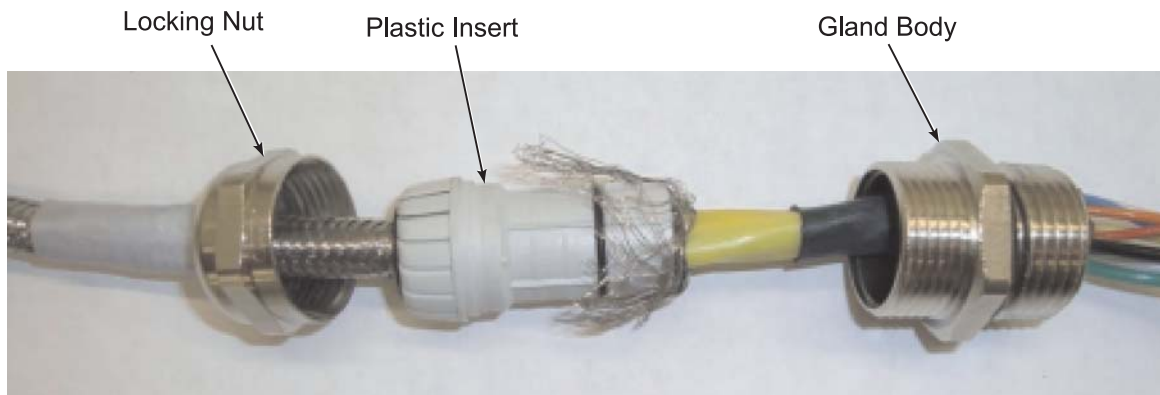


Figure 2-18. Traditional Architecture Cable Gland Assembly



3. Install the cable and lead wires in the left-hand conduit port in the bottom of the probe housing.
4. Install the cable at the probe housing and at the Xi enclosure according to the following procedure:
 - a. Unscrew locking nut from gland assembly (Figure 2-18) 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 Xi enclosure.
 - d. At the probe housing, apply Teflon tape or similar sealing compound to the tapered pipe threads. Thread the gland body into the probe housing until properly seated.
 - e. At the Xi enclosure, insert the gland body into the left front cable port from the inside of the enclosure. Use the rubber O-ring provided to seal the cable port.
 - f. Ensure the cable shield braid is evenly formed over the gray insert. When properly formed, the braid should be evenly spaced around the circumference of the insert and not extend beyond the narrow diameter portion.
 - g. Carefully press the gray insert into the gland body. The grooves on the insert should align with similar grooves inside the gland body. Press the insert in until it bottoms out in the gland body.
 - h. Slide the locking nut up and thread it onto the gland body. Tighten the locking nut so the rubber grommet inside the plastic insert compresses against the cable wall to provide an environmental seal.
5. Connect the cable lead wires to the probe connector, Figure 2-19.
 6. At the Xi Enhanced Interface, connect the cable leads to the connectors on the transmitter I/O board as indicated in Figure 2-20.

Figure 2-19. X-STREAM Probe Wiring - Traditional Architecture

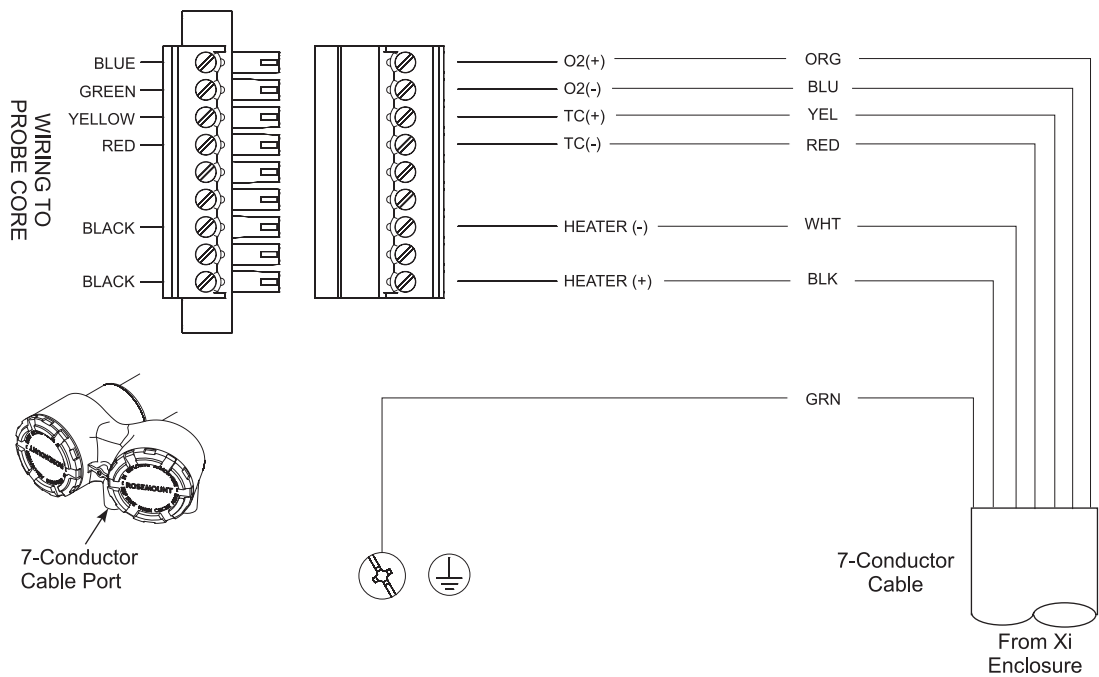
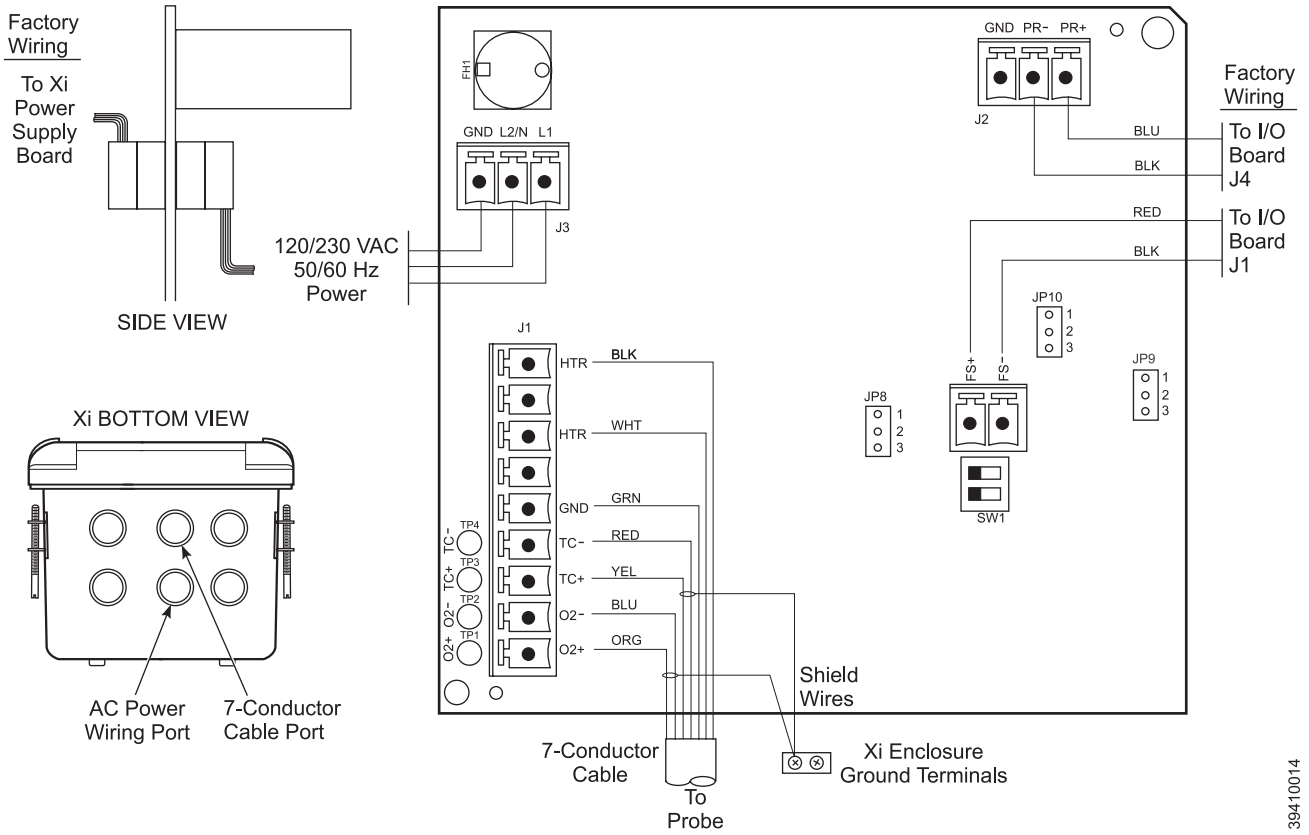


Figure 2-20. Transmitter Board Connections at Xi - Traditional Architecture



39410014

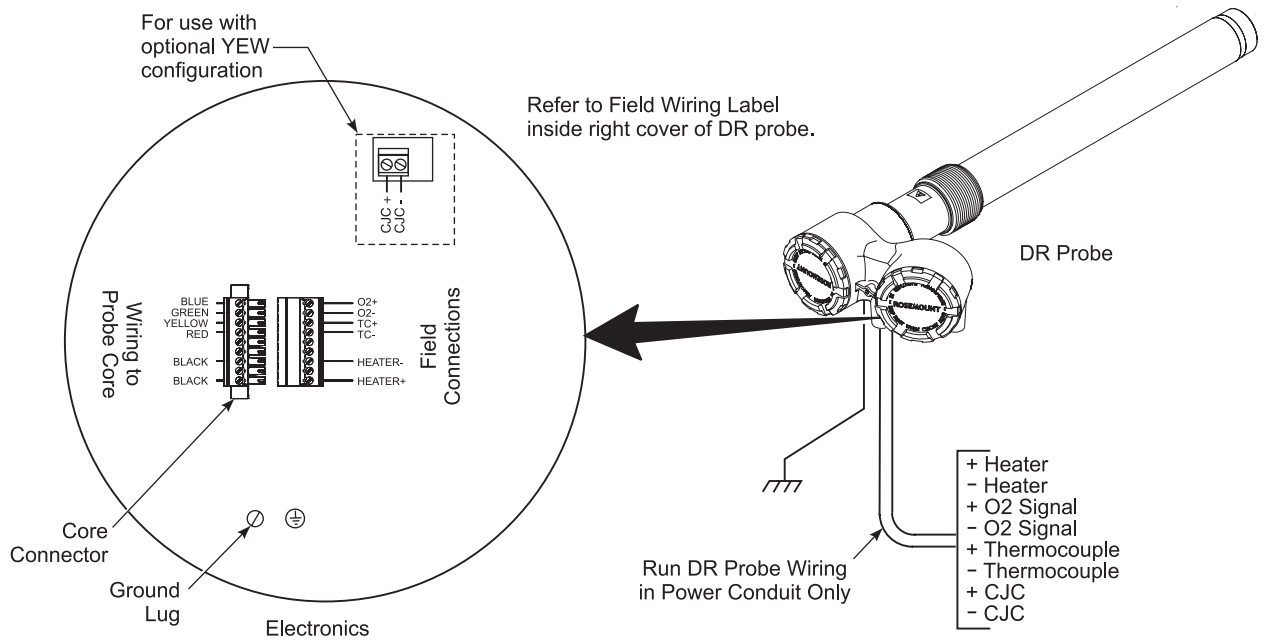
X-STREAM O₂ Transmitter

Direct Replacement (DR) Probe Connections

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

1. Remove covers from probe.
2. Feed all DR probe wiring through line power conduit of probe. Add new lead wire junction box and conduits as needed.
3. Connect DR probe heater power leads to DR probe connector, Figure 2-21.
4. Connect O₂ signal and thermocouple wires to DR probe connector.

Figure 2-21. DR Probe -Wiring Diagram



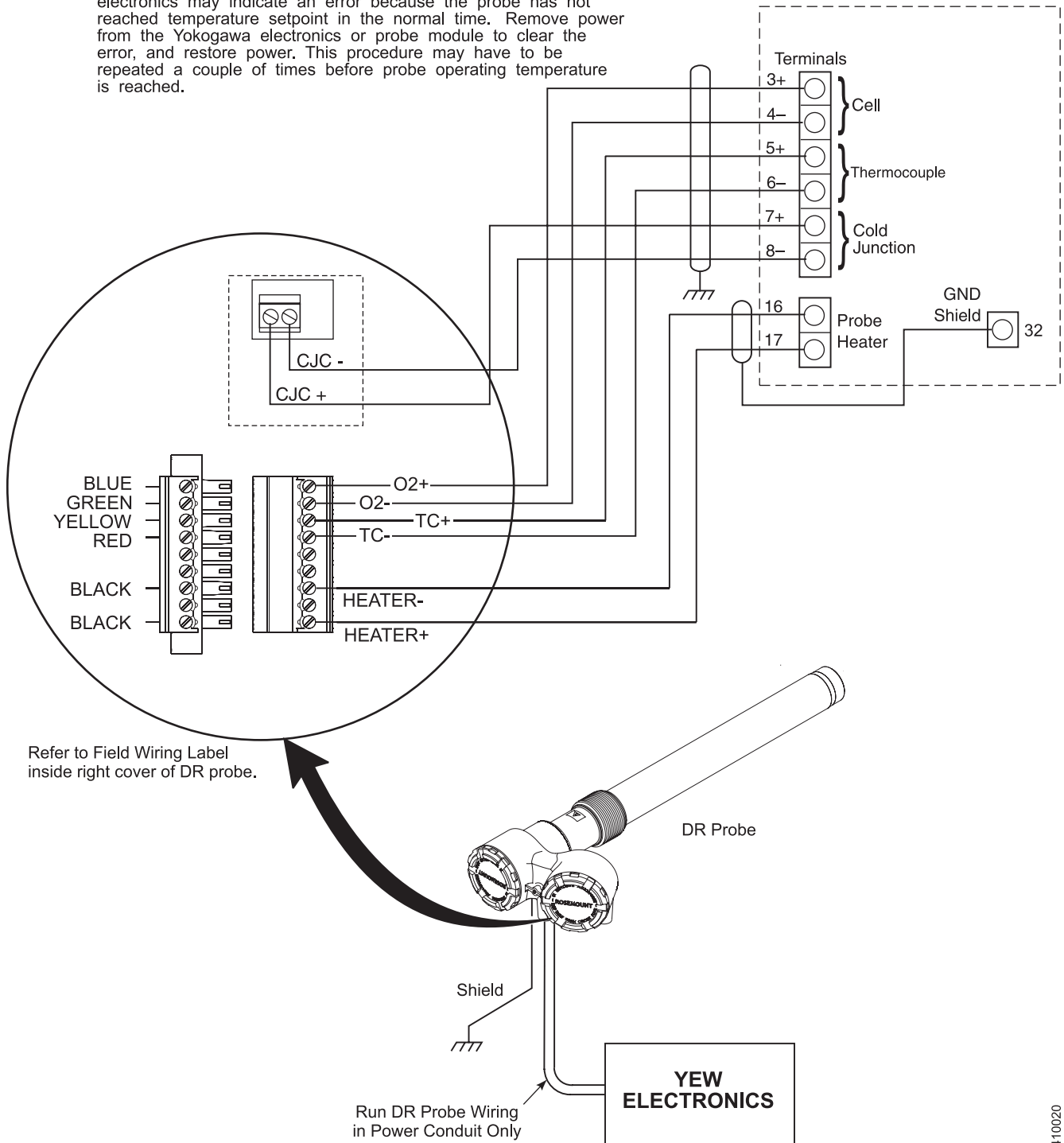
DR Probe to Yokogawa Electronics Connections

The DR probe can be wired to work with Yokogawa electronics. Connect the cabling from the Yokogawa electronics terminal to the probe terminal as shown in Figure 2-22. Review the following information. If needed, replace the CJC board mounted inside the RD probe.

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

Figure 2-22. DR Probe Wired to the YEW Electronics

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



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

NOTE

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

Transistor Type CJC Board (P/N 3D39505G01)

Identification: Metal can or potted device at Q1

YEW Probes: Z021D (Suffix varies)

YEW Electronics: Z8A Averager
AV8C Averager
AV550 Averager
(properly programmed)

Misapplication: Electronics will read near 25°C at ambient, but the reading will slowly decrease as the temperature rises.

RTD Type CJC Board (P/N 3D39505G02)

Identification: 2-lead resistive (RTD) device at Q1
(bent over and bonded to board)

YEW Probes: ZR22 (Suffix varies)

YEW Electronics: AV550 Averager (properly programmed)
ZR402 Analyzer

Misapplication: Electronics will read near 200°C at ambient.

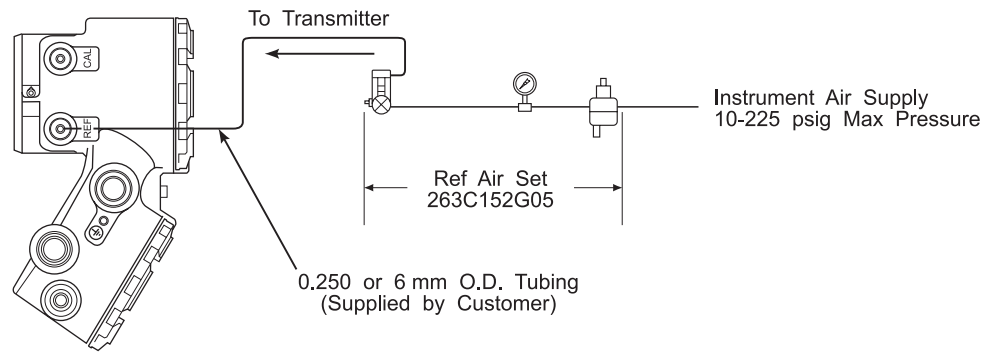
PNEUMATIC INSTALLATION

Reference Air Package

After the X-STREAM is installed, connect the reference air set to the X-STREAM 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 0.5 scfh (0,25 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.

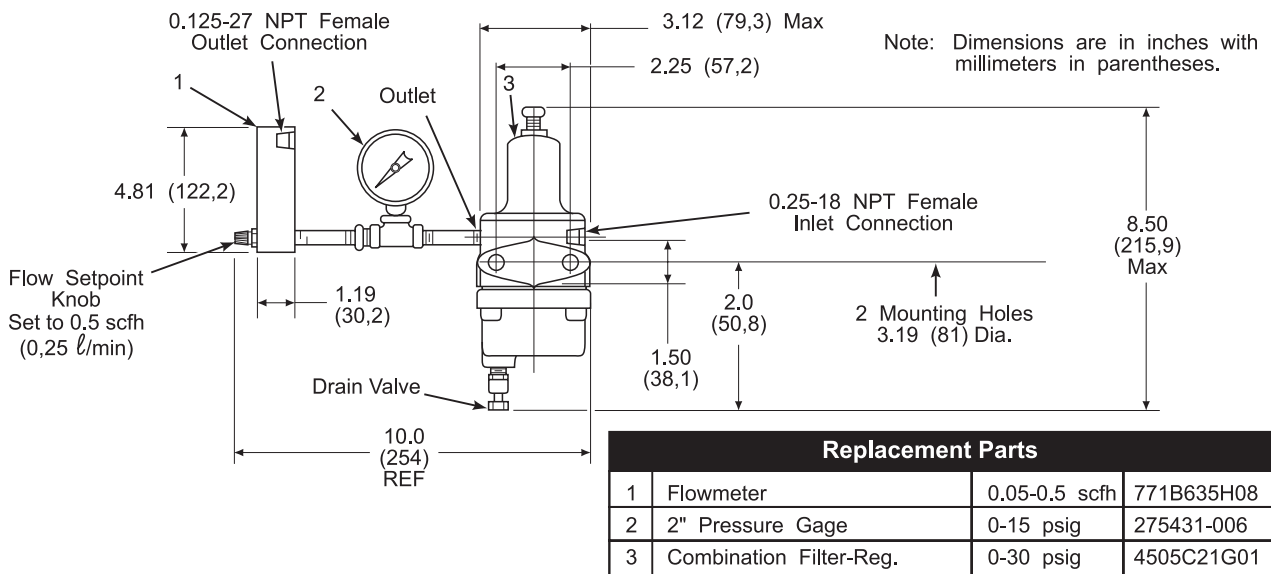
Figure 2-23. Plant Air Schematic Diagram



Schematic for Reference Air Supply to X-STREAM O₂ Transmitter

39410006

Figure 2-24. Air Set, Plant Air Connection

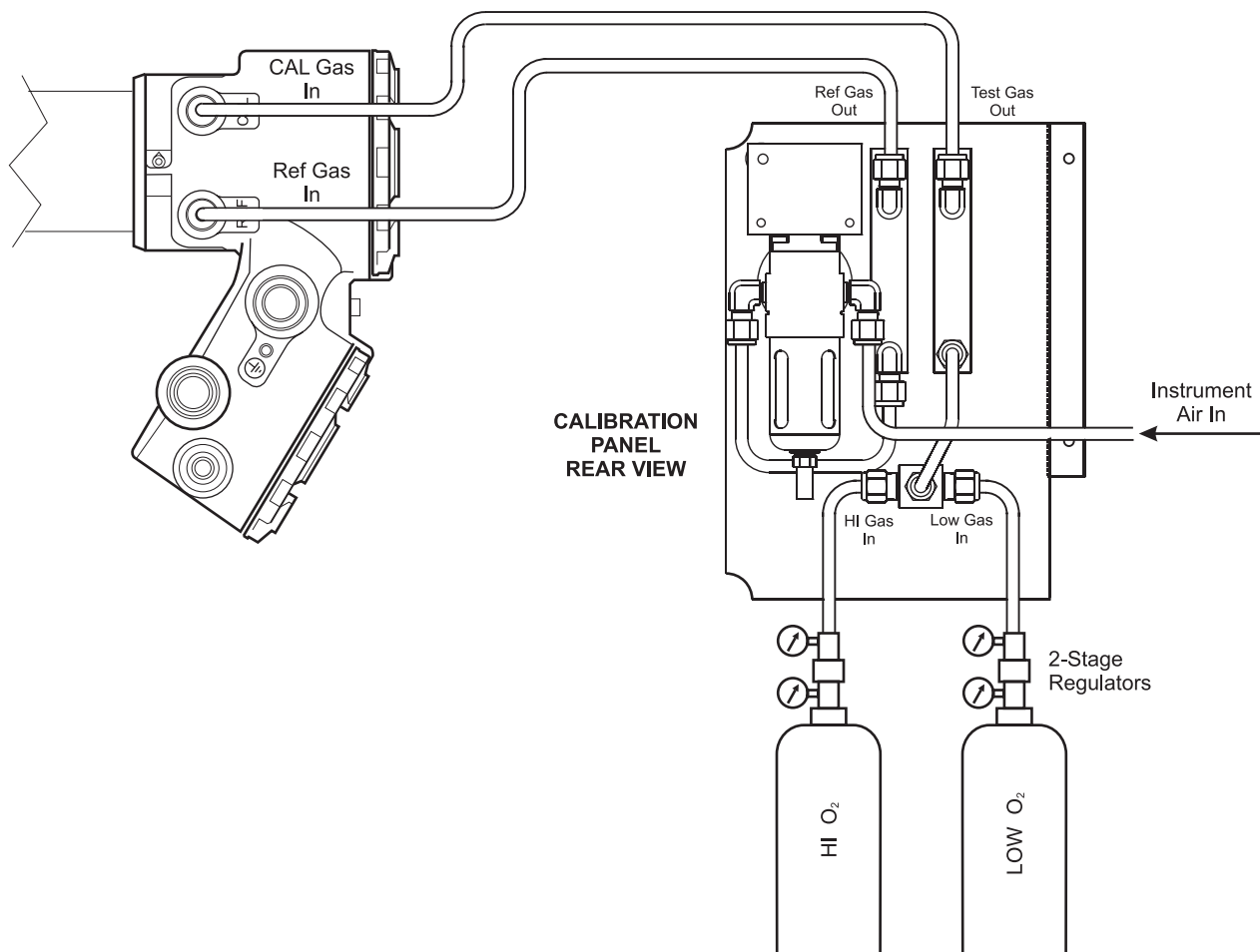
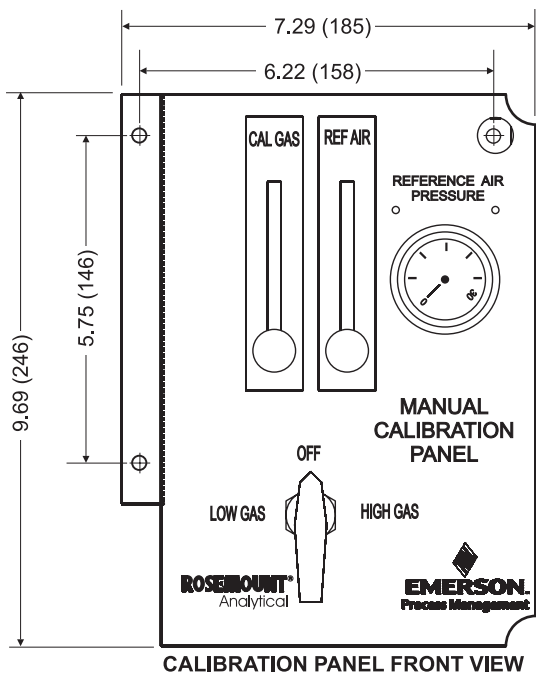


39410027

X-STREAM O₂ Transmitter

Figure 2-25. Manual Calibration Panel

Note: Dimensions are in inches with millimeters in parentheses.



40050002

Reference air components are included in the optional Manual Calibration Panel (Figure 2-25), the SPS 4001 Single Probe Autocalibration Sequencer, and the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer.

NOTES

The optional SPS 4001B or IMPS 4000 Sequencer can only be used when the Xi Enhanced Interface option is selected. The Xi Enhanced Interface must be properly configured for autocalibration. See Section 3: Configuration of X-STREAM O₂ Transmitter.

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.

Calibration Gas

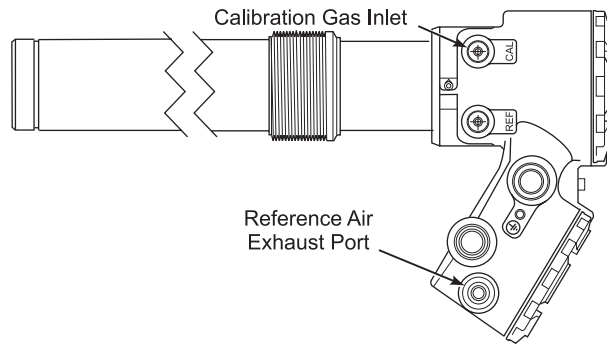
Two calibration gas concentrations are used with the X-STREAM, Low Gas - 0.4% O₂, balance N₂, and High Gas - 8% O₂, balance N₂. An optional Manual Calibration Panel is shown in Figure 2-25. See Figure 2-26 for the X-STREAM probe calibration gas connection ports.

CAUTION

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

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 2-26. X-STREAM Calibration Gas Connections



NOTE

Upon completing installation, make sure that the X-STREAM is turned on and operating prior to firing up the combustion process. Damage can result from having a cold X-STREAM unit exposed to the process gases.

During outages, if possible, leave all X-STREAM units running to prevent condensation and premature aging from thermal cycling.

CAUTION

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

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Section 3 Configuration of X-STREAM O₂ Transmitter

Verify Installation	page 3-1
Transmitter	page 3-1
Xi Configuration (if equipped)	page 3-2
Set Test Gas Values	page 3-2
Alarm Relay Output Configuration	page 3-3
Analog Output Configuration	page 3-4
Autocalibration Setup	page 3-5
Optional Advanced Features Inside the Xi	page 3-6
Extended Process Temperature Range to 800°C	page 3-6
Stoichiometer	page 3-7
Programmable Reference	page 3-7

VERIFY INSTALLATION

⚠ 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.

Ensure the X-STREAM O₂ Transmitter and Xi are installed and wired correctly according to Section 2: Installation.

Transmitter

1. Refer to Figure 6-1. Remove right cover (12) to expose the transmitter electronics board (8).
2. Check the electronics board wiring (Figure 2-13). Be sure the power and 4-20 mA signal are properly connected and secure. To avoid a shock hazard, the power terminal cover must be installed.
3. Install right cover (12).
4. Remove the left cover (18). Verify that the reference air and calibration gas hoses (Figure 6-3) are properly connected. Then, reinstall the left cover (18).

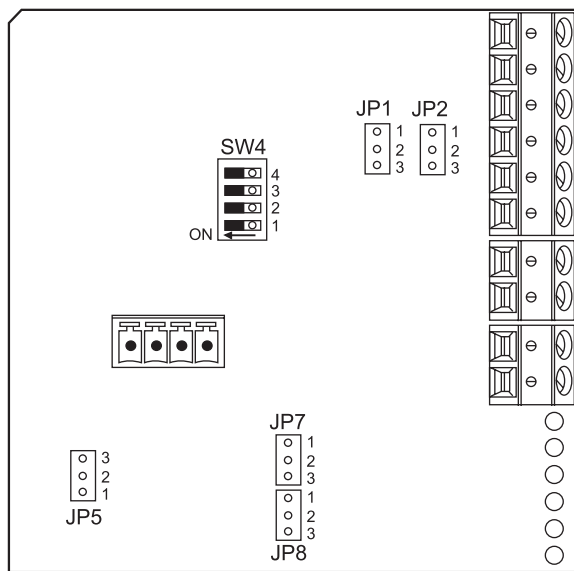
X-STREAM O₂ Transmitter

Xi Configuration (if equipped)

Refer to Figure 3-1 for the configuration of jumpers JP1 through JP8. The jumper configuration for your I/O board depends on the X-STREAM system design and system components used in your installation.

The setting of switch SW4 and the configuration of jumpers JP1 through JP8 must be verified on the I/O board in the Xi Enhanced Interface box. All four dip switches on switch SW4 must be set to the OFF position, as shown.

Figure 3-1. I/O Board Jumper Configuration



Configuration	Desired Selection	Jumper	Jumper Setting
Flame Safety Function or Extra Alarm Output	Flame Safety Function (Factory configured when ordered with Flame Safety Interlock Feature)	JP1 & JP2 (both must be set the same)	Pins 1 & 2
	Extra Alarm Output		Pins 2 & 3
Loop Power for 4-20 mA/HART Signal from Xi Enhanced Interface to Transmitter Probe	Powered from Xi Enhanced Interface (most common method)	JP5	Pins 1 & 2
	Powered from External DC Supply		Pins 2 & 3
Loop Power for 4-20 mA/HART Signal from Xi Enhanced Interface to DCS	Powered from Xi Enhanced Interface	JP7 & JP8 (both must be set the same)	Pins 1 & 2
	Powered from DCS		Pins 2 & 3

Sw4 Switch Settings: (Default = OFF)

- 1: Reserved; must remain OFF.
- 2: Not used.
- 3: Not used.
- 4: Flame safety function enable.

40050003

SET TEST GAS VALUES

Use a Field Communicator or the optional Xi Enhanced Interface to set test gas values for calibration.

An X-STREAM Transmitter and Xi Enhanced Interface shipped from the factory have test gas values for low and high set to 0.4% and 8.0% respectively. This same process must be performed any time a replacement Transmitter Board, IO Board or DR Board is installed.

Setting Test Gas Values Using Field Communicator - Transmitter Only or Xi Enhanced Interface

1. Use the 375 Field Communicator software to access the HART menu.
2. From the DEVICE SETUP menu, select DETAILED SETUP.
3. From the DETAILED SETUP menu, select CAL SETUP.
4. From CAL SETUP, select Cal Gas 1. Enter the percent O₂ used for the low O₂ test gas.
5. From CAL SETUP, select Cal Gas 2. Enter the percent O₂ used for the high O₂ test gas.

Setting Test Gas Values Using Xi Enhanced Interface Keypad/Display

1. Press the MENU button once.
2. From the main menu, select PROBE 1.
3. From PROBE 1, select DETAILED SETUP.
4. From the DETAILED SETUP menu, select CAL SETUP.
5. From CAL SETUP, select Cal Gas 1. Enter the percent O₂ used for the low O₂ test gas.
6. From CAL SETUP, select Cal Gas 2. Enter the percent O₂ used for the high O₂ test gas.
7. Press the LEFT arrow key several times to return to the main menu.
8. Repeat steps 2 through 6 for PROBE 2 if configured for dual channel.

ALARM RELAY OUTPUT CONFIGURATION

The Xi Enhanced Interface has two dry contact Form-C alarm relay output signals that can be configured in eight different modes through the Xi keypad display or the 375 Communicator. A list of possible configurations is shown in Table 3-1. Each alarm relay output can be configured separately.

If the Xi Enhanced Interface is configured with the optional Flame Safety Interlock, Alarm 2 is configured with "Heater Relay" and prewired to the AC Relay Board. In this condition the relay configuration cannot be changed to any other setting. If the Xi Enhanced Interface is not configured with the optional Flame Safety Interlock, "Heater Relay" is not valid and cannot be chosen for Alarm 2.

Table 3-1. Alarm Relay Output Configurations

Mode	Configuration
No Alarm*	The output is not configured for any alarm condition.
Unit Alarm	The output is configured for a Unit Alarm.
Low O ₂ Alarm	The output is configured for a Low O ₂ alarm.
Low O ₂ /Unit Alm	The output is configured for a Unit alarm and a Low O ₂ alarm.
Cal Recommended	The output is configured for a Calibration Recommended display.
Cal Rec/Unit Alm**	The output is configured for a Unit alarm and a Calibration Recommended display.
Low O ₂ /Cal Rec	The output is configured for a Low O ₂ alarm and a Calibration Recommended display.
Low O ₂ /Unit/Cal Rec	The output is configured for a Low O ₂ alarm, a Unit alarm, and a Calibration Recommended display.
Heater Relay	The output is configured for Flame Safety Interlock.

* The default configuration for Alarm 2

** The default configuration for Alarm 1

Configuring Alarm Relays with the Field Communicator

1. Use the 375 Field Communicator software to access the HART menu.
2. From the DEVICE SETUP menu, select DETAILED SETUP.
3. From the DETAILED SETUP menu, select ALARM RELAY.

4. From ALARM RELAY, select as follows:
Alm Relay1 - Alarm 1 mode
Alm Relay2 - Alarm 2 mode
Low O2 Alm SP - Low O2 alarm setpoint
High Temp Alm SP - High temperature alarm setpoint
5. From CAL SETUP, select Cal Gas 2. Enter the percent O₂ used for the high O₂ test gas.

Configuring Alarm Relays with the Xi Enhanced Interface Keypad/Display

1. Press the MENU button once.
2. From the main menu, select PROBE 1.
3. From PROBE 1, select DETAILED SETUP.
4. From the DETAILED SETUP menu, select ALARM RELAY.
5. From ALARM RELAY, select as follows:
Alm Relay1 - Alarm 1 mode
Alm Relay2 - Alarm 2 mode
Low O2 Alm SP - Low O₂ alarm setpoint
High Temp Alm SP - High temperature alarm setpoint
6. Press the LEFT arrow key several times to return to the main menu.
7. Repeat steps 2 through 6 for PROBE 2 if configured for dual channel.

ANALOG OUTPUT CONFIGURATION

The analog output signal from either the X-STREAM Transmitter or Xi Enhanced Interface can be configured for the 4-20 mA range and fault condition.

An X-STREAM Transmitter and Xi Enhanced Interface shipped from the factory have 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 replacement Transmitter Board or IO Board is installed.

Configuring the Analog Output with the Field Communicator - Transmitter Only or Xi Enhanced Interface

1. Use the 375 Field Communicator software to access the HART menu.
2. From the DEVICE SETUP menu, select DETAILED SETUP.
3. From the DETAILED SETUP menu, select ANALOG OUTPUT.
4. From ANALOG OUTPUT, set the following parameters:

Transmitter

O2 LRV - O₂ value at the lower analog output value (0 mA or 4 mA)

O2 URV - O₂ value at the upper analog output value (20 mA)

O2 AO Range - Range of the analog output (0-20 mA or 4-20 mA)

Xi Enhanced Interface

O2 LRV - O₂ value at the lower analog output value (0 mA or 4 mA)

O2 URV - O₂ value at the upper analog output value (20 mA)

O2 AO Range - Range of the analog output (0-20 mA or 4-20 mA)

Signal Alarm Level - O₂ alarm level (3.5 mA or 21.1 mA)

Configuring the Analog Output with the Xi Enhanced Interface Keypad/Display

1. Press the MENU button once.
2. From the main menu, select PROBE 1.
3. From PROBE 1, select DETAILED SETUP.
4. From the DETAILED SETUP menu, select ANALOG OUTPUT.
5. From ANALOG OUTPUT, set the following parameters:

O2 LRV - O₂ value at the lower analog output value (0 mA or 4 mA)

O2 URV - O₂ value at the upper analog output value (20 mA)

AO Range - Range of the analog output (0-20 mA or 4-20 mA)

Signal Alarm Level - O₂ alarm level (3.5 mA or 21.1 mA)

AUTOCALIBRATION SETUP

If autocalibration is desired, the Xi Enhanced Interface must be used with either an SPS 4001B or IMPS 4000. The Xi Enhanced Interface must be properly configured before autocalibration can take place. Refer to the applicable SPS 4001B or IMPS 4000 instruction manual for details on performing autocalibration. Refer to Section 4, Startup and Operation for details on manual calibration procedures.

A Xi Enhanced Interface is shipped from the factory without autocalibration configured. This same process must be performed any time a replacement IO Board is installed.

Configuring Autocalibration with the Field Communicator

1. Use the 375 Field Communicator software to access the HART menu.
2. From the DEVICE SETUP menu, select DETAILED SETUP.
3. From the DETAILED SETUP menu, select CAL SETUP.
4. From CAL SETUP, select Auto Cal.
5. Press the RIGHT arrow key to change the state from NO to YES.

Configuring Autocalibration with the Xi Enhanced Interface Keypad/Display

1. Press the MENU button once.
2. From the main menu, select PROBE 1.
3. From PROBE 1, select DETAILED SETUP.
4. From the DETAILED SETUP menu, select CAL SETUP.
5. From CAL SETUP, select Auto Cal.
6. Press the RIGHT arrow key to change the state from NO to YES.

X-STREAM O₂ Transmitter

OPTIONAL ADVANCED FEATURES INSIDE THE XI

Advanced features available inside the Xi Enhanced Interface are typically purchased with the X-STREAM Transmitter. However, these advanced features are also available for field retrofit.

A Xi Enhanced Interface is shipped from the factory with the optional enhanced software features enabled based on the configuration.

⚠ WARNING

The IO Board is shipped from the factory without any of the enhanced software features activated. These features must be activated once the new board has been installed and before the Remote Interface is put into service.

⚠ WARNING

If the existing IO Board has been operated with the Stoichiometric enhanced software feature, this feature must be activated in the new board before the Remote Interface is put back into service. Failure to do so will cause a false analog output signal to the DCS.

NOTE

For enhanced software feature option upgrades or to enable the feature to duplicate the existing configuration, contact Emerson Process Management at 1-800-433-6076. Reference the following:

6A00269G01	Enhanced Software Option Upgrade, Stoichiometric Function
6A00269G02	Enhanced Software Option Upgrade, Programmable Reference Function
6A00269G03	Enhanced Software Option Upgrade, 800°C Process Function

Extended Process Temperature Range to 800°C (1472°F)

The X-STREAM Oxygen Analyzer employs a heater and thermocouple to maintain a temperature setpoint at 736°C (1357°F). Temperature control is maintained within ±1°C to process temperatures of about 705°C (1300°F). This is satisfactory for most applications, but excursions to higher temperatures can occur in some processes. In these instances, the heater is turned off and the process temperature is used to heat the sensing cell.

The oxygen reading is adjusted immediately to compensate for the varying process temperatures. It should be noted that cell life will be reduced by continuous operation at temperatures above 705°C (1300°F). If process temperatures are expected to be continuously above 705°C, we recommend the use of an optional bypass or probe mounting jacket accessory. The extended temperature range feature is selected in the Xi product matrix, but may also be purchased as a field retrofit.

Stoichiometer

Process upsets can sometimes cause a combustion process to go into sub-stoichiometric or reducing conditions. The oxygen readings from one or more probes may decline all the way to zero. The stoichiometer cell will measure the amount of oxygen deficiency during these reducing conditions. The trends in your DCS can be set up for a lower range limit of -1 or -2% oxygen to depict the level of oxygen deficiency.

The operator can see if his control recovery actions are having the desired effect. These types of events do not occur frequently, but knowing the parameters of the situation prevents over-correcting while coming out of the reducing condition. The stoichiometer feature requires purchasing the acid resistant stoichiometer cell and the stoichiometer feature inside the Xi.

NOTE

Make sure the DCS is configured for the same range as the Xi. For instance: -1% O₂ to 10% O₂.

Programmable Reference

The zirconium oxide sensing technology has historically measured process oxygen by using ambient or instrument air as a reference (20.95% oxygen). The sensor develops most of its signal at the low oxygen levels typically found in combustion flue gasses (2-4% oxygen), and is most accurate at these levels. When measuring near 20.95% O₂, the sensor develops only a few millivolts of signal, and accuracy degrades.

The programmable reference feature permits the user to use a bottled reference gas of low oxygen value (0.4% oxygen recommended). When measuring at or near 21% oxygen, a strong negative oxygen signal results, with much improved accuracy. A bottle of reference gas typically lasts about a month at the low flows required. Typical applications would be:

Flue gas recirculation - controlling the mixing of flue gasses into the burner windbox prior ahead of the burner to reduce NOx emissions.

Moisture monitoring - measuring the amount of moisture coming off of industrial dryers by noting the dilution effect water vapor has on the normal 20.95% ambient drying air. (Non-combustion drying processes only.)

Enriched oxygen concentration - pure oxygen is sometimes mixed in with the combustion air to increase heat at the flame. This is used in steel and other metals reduction processes and in some catalyst regenerators.

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Section 4 Startup and Operation

Overview	page 4-1
Startup	page 4-1
Operation Via Xi Enhanced Interface	page 4-2
Startup Display	page 4-2
Error Conditions	page 4-3
Xi Enhanced Interface Controls	page 4-3
Password Protection	page 4-3
Xi Menu, Sheet 1 of 3	page 4-4
System Parameter Descriptions	page 4-7
Probe Parameter Descriptions	page 4-8
Operation Via HART/AMS	page 4-10
Field Communicator Signal Line Connections (No Xi) ..	page 4-10
Field Communicator Signal Line Connections (with Xi) ..	page 4-14
Field Communicator Menu Trees	page 4-15
Off-line and On-line Operations	page 4-15
Calibration - General	page 4-20
O ₂ Calibration	page 4-20
O ₂ Calibration without Xi	page 4-21
O ₂ Calibration with Xi	page 4-21
O ₂ Calibration with Xi and Field Communicator	page 4-22
D/A Trim	page 4-23
D/A Trim without Xi	page 4-23
D/A Trim with Xi	page 4-24

OVERVIEW

Interface to the X-STREAM O₂ Transmitter for setup, calibration and diagnostics can be via a 375 Field Communicator or Asset Management System or with the optional Xi Enhanced Interface.

Startup is common to all configurations of the X-STREAM O₂ Transmitter. Setup, calibration and diagnostic operations will differ depending on the selected interface for communications with the transmitter. The following covers operation via 375 Field Communicator with and without the Xi Enhanced Interface and operation via the Xi Enhanced Interface without HART.

STARTUP

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

X-STREAM O₂ Transmitter

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

For the X-STREAM O₂ Transmitter with the Xi Enhanced Interface, the system will begin operation after heater power is connected to the transmitter and 24 vdc loop-power/signal wiring is connected between the transmitter and the Xi Enhanced Interface.

NOTE

The Xi Enhanced Interface can operate one or two X-STREAM O₂ Transmitters. The Xi Enhanced Interface also carries advanced features such as elevated process temperature capability to 800°C, autocalibration via an SPS solenoid box, a stoichiometer feature for indicating the level of oxygen deficiency in reducing conditions, and programmable reference to enhance accuracy at near ambient levels of O₂.

Operation Via Xi Enhanced Interface

The following procedures describe operations using the Xi Enhanced Interface to set up and calibrate the system. Additional operating instructions are included in the SPS 4001B or IMPS 4000 instruction manual, if applicable to your system.

Startup Display

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

Figure 4-1. Xi Enhanced Interface Display (Typical)



Display can be customized via Xi menu. Use SYSTEM, CONFIGURE, MAIN DISPLAY path.

39410007

Error Conditions

If there is an error condition at startup, an alarm message will be displayed. Refer to Section 5: Troubleshooting, to determine the cause of the error. Clear the error and cycle power. The %O₂ and temperature display should return less the alarm message.

Xi Enhanced Interface Controls

The Xi Enhanced Interface can be used to change the software and alarm settings, to adjust the high and low gas settings, and to initiate the calibration sequence. Refer to the following control descriptions. Use the control keys on the front panel of the Xi (Figure 4-1) to navigate and edit the Xi menu (Figure 4-2).

MENU toggles between three Main menu options: System, Probe1, and Probe2 (if available). The top level of the selected main menu is displayed.

DIAG toggles between the Alarms list of the three main menus. All faults and warnings related to the selected main menu device are displayed.

ENTER saves newly entered data and returns you to previous menu level.

EXIT returns you to the previous menu level without saving newly entered data. When navigating the menu tree, pressing EXIT returns you to the Main menu.

UP/DOWN keys scroll up and down through menu items. During data entry the Up/Down keys increment and decrement the data values.

LEFT arrow key returns you to the previous menu level. During data entry, the left arrow key moves the cursor one digit to the left.

RIGHT arrow key advances you to the next menu level and, when a menu item is highlighted, selects the item from a list of menu options. During data entry, the right arrow key moves the cursor one digit to the right.

Password Protection

Beginning with Xi system software version 1.05 or higher the main display and diagnostic screens of the Xi can be viewed at any time, but further access and unauthorized configuration changes can be prevented by enabling a password protection feature. However, the Xi is shipped with password protection disabled.

Password protection can be enabled by selecting: System Main Menu> Configure> LCD>Enable Password (see the Xi Menu, Figure 4-2).

The factory default upon enabling the password protection is ROSE, but the password can consist of any 4 alpha/numeric characters.

If the user forgets the password, call Rosemount Analytical technical support at 800-433-6076 to gain access to a master password.

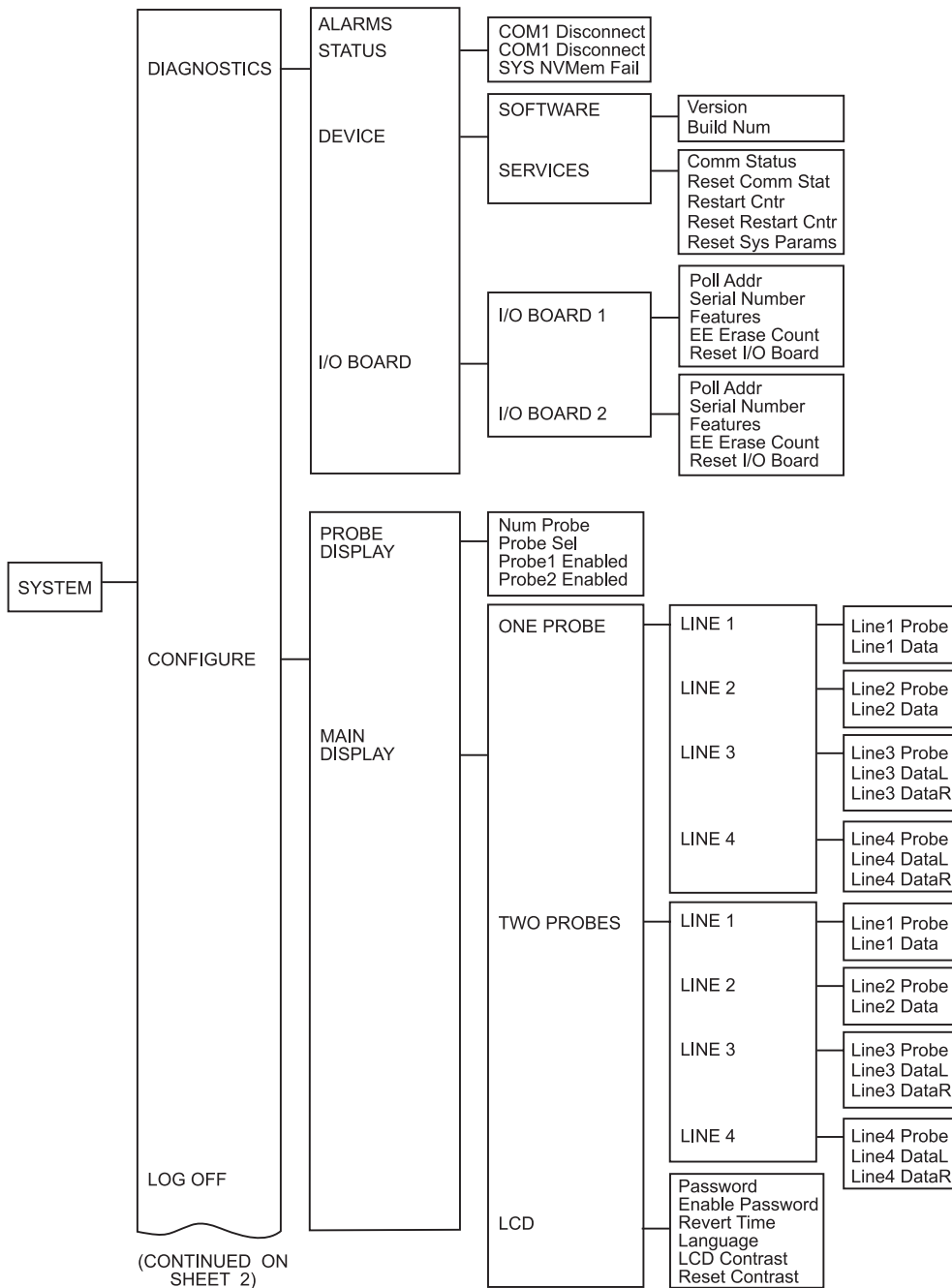
A "Lock" icon will be displayed at the top right corner of the main display when password protection is in effect.

The password protection will relock itself after a certain number of seconds with no button pushes (defined as "revert time" in the same "LCD setup" menu). Users can also force the front panel to be locked by selecting System Main Menu >Log Off. The Log Off selection will perform no function if the password feature is disabled.

The Xi has a "Reset" function that reestablishes all factory default conditions, including the password protection feature, i.e. the password protection will fall back to a disabled condition after a reset.

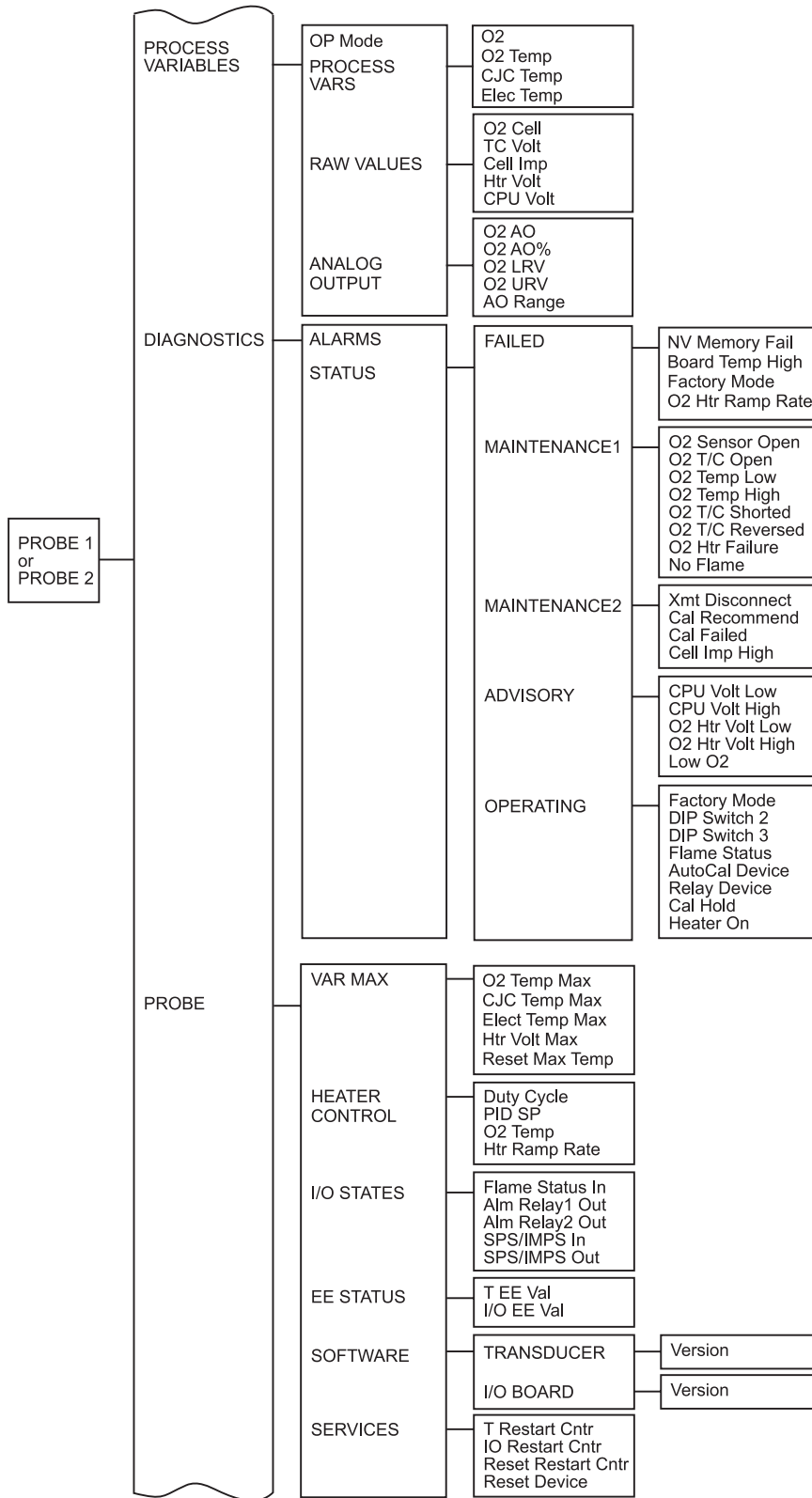
X-STREAM O₂ Transmitter

Figure 4-2. Xi Menu, Sheet 1 of 3



39410039

Figure 4-2. Xi Menu, Sheet 2 of 3

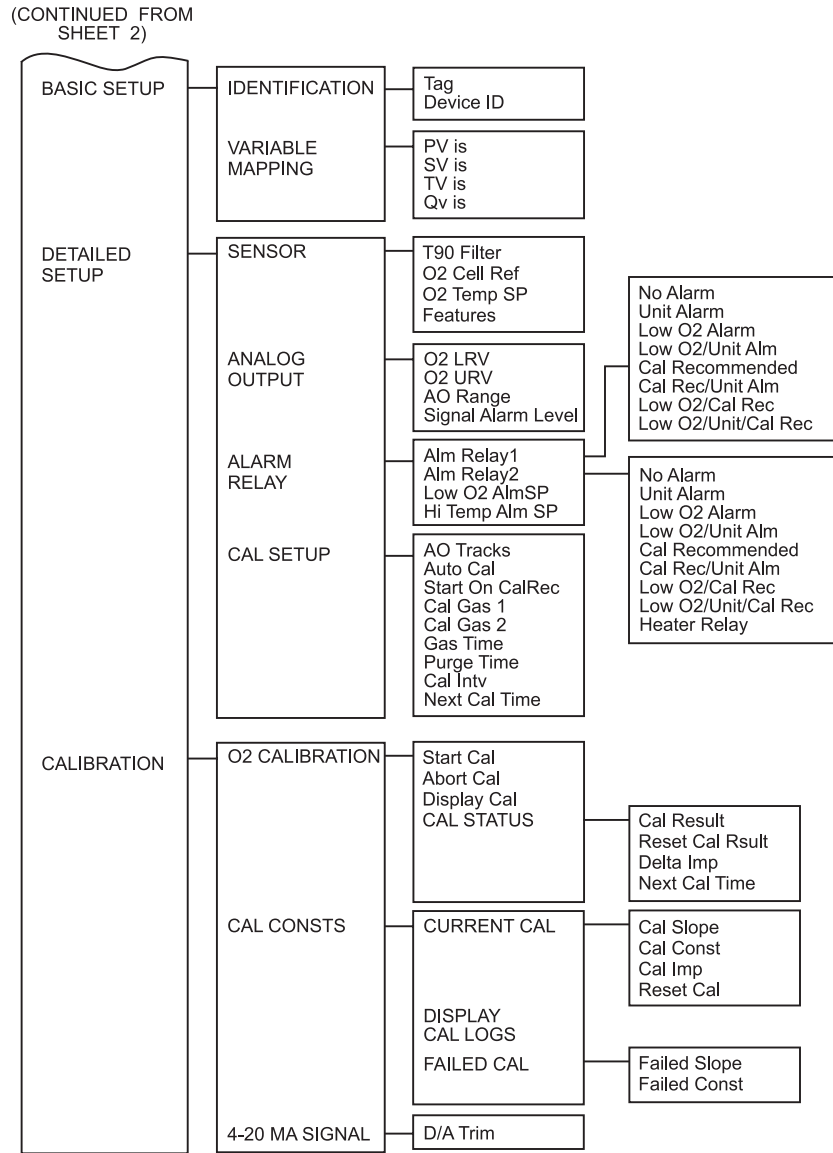


(CONTINUED ON SHEET 3)

40050004

X-STREAM O₂ Transmitter

Figure 4-2. Xi Menu, Sheet 3 of 3



39640008

X-STREAM O₂ Transmitter

PROBE PARAMETER DESCRIPTIONS

Among the parameters available through the Xi and 375 Communicator menus are a number of "Probe Parameters". The probe parameters define variables that configure a specific probe in the transmitter system. Probe parameters are described in the following table.

TX	I/O	PARAMETER NAME	UNITS	PARAMETER DESCRIPTION
Y	Y	O2	%	Current oxygen concentration value (O2%). The value should reflect the last good O2 value if it is in the "Lock" state during calibration.
Y	Y	O2 Temp	degC	Current O2 sensor temperature.
Y	Y	CJC Temp	degC	Current cold junction temperature.
N	Y	Elec Temp	degC	Current electronic temperature measured at the I/O board.
Y	Y	O2 Cell	mV	Raw mV value for ZrO ₂ sensor.
N	Y	TC Volt	mV	O2 T/C voltage.
Y	Y	Cell Imp	Ohm	Cell impedance/sensor resistance measured.
Y	Y	Htr Volt	Volt	Heater voltage.
Y	Y	CPU Volt	Volt	Transmitter CPU voltage.
Y	Y	O2 AO	mA	Analog output value represents the O2 concentration measurement.
N	Y	O2 AO%	%	O2 analog output percentage for O2 AO.
Y	Y	O2 Temp Max	degC	This is the highest O2 sensor temperature reached since last reset.
Y	Y	CJC Temp Max	degC	This is the highest temperature reached at the cold junction since last reset.
N	Y	Elec Temp Max	degC	This is the highest temperature reached at the IO board since last reset.
Y	Y	Htr Volt Max	degC	This is the highest heater voltage reached since last reset.
Y	Y	Htr Duty Cycle	--	O2 heater duty cycle. Value between 0 and 1.
Y	Y	PID SP	degC	PID temperature set point.
Y	Y	Htr Ramp Rate	degC/s	Heater ramp rate calculated in degree C per second.
N	Y	Flame Stat In	--	Flame status input state. (OFF/ON)
N	Y	SPS/IMPS In	--	SPS/IMPS input state. (OFF/ON)
N	Y	SPS/IMPS Out	--	SPS/IMPS output state. (OFF/ON)
N	Y	Alm Relay 1 Out	--	Alarm Relay 1 output state. (OFF/ON)
N	Y	Alm Relay 2 Out	--	Alarm Relay 2 output state. (OFF/ON)
Y	Y	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)
Y	Y	Tag	--	Device tag.
Y	Y	Device ID	--	Unique Device ID number. (HART)
Y	Y	PV is	--	Primary variable assignment. (HART)
Y	Y	SY is	--	Secondary variable assignment. (HART)
Y	Y	TY is	--	Third variable assignment. (HART)
Y	Y	QV is	--	Fourth variable assignment. (HART)
Y	Y	Cal Slope	mV/Dec	Current calibration slope. This is the slope value that was calculated as a result of the last successful calibration.
Y	Y	Cal Const	mV	Current calibration constant. This is the constant value that was calculated as a result of the last successful calibration. It is valid between -4mV and +10mV.
Y	Y	Cal Imp	Ohm	Cell Impedance. This is the sensor resistance that was calculated as a result of the last successful calibration.
N	Y	Prev Slope	mV/Dec	Previous calibration slope. There are ten calibration results. 1 is the most recent and 10 is the least recent calibration slope.
N	Y	Prev Const	mV	Previous calibration constant. There are ten calibration results. 1 is the most recent and 10 is the least recent calibration constant.

TX	I/O	PARAMETER NAME	UNITS	PARAMETER DESCRIPTION
N	Y	Prev Cal Imp	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.
N	Y	Failed Slope	mV/Dec	Failed calibration slope.
N	Y	Failed Const	mV	Failed calibration constant.
Y	Y	Cal Result	mV	Calibration result.
N	Y	Delta Imp	--	Delta impedance since last calibration.
N	Y	Cal Step	--	This represents the step of the calibration cycle is in.
N	Y	Time Remain	sec	Time remaining in the present calibration cycle state.
Y	Y	O2 Slope	mV/Dec	O2 slope. This is the slope value that will be used to calculate O2.
Y	Y	O2 Const	mV	O2 constant. This is the constant value that will be used to calculate O2.
N	Y	T90 Filter	sec	Analog output T90 time. It represents the time to take a step change in oxygen to reach 90% of the final value at the filter output.
N	Y	O2 Cell Ref	%	O2 sensor reference gas percentage. It allows using a sensor reference gas other than air.
N	Y	O2 Temp SP	degC	O2 sensor temperature set point. It allows measurement of oxygen with an elevated sensor temperature. (0=736 degC set point; 1=834 degC set point)
N	Y	Features	--	Advanced software features. (0=Stoichiometer; 1=Programmable Reference; 2=Elevated Temperature)
Y	Y	O2 URV	%	Primary variable (O2%) upper range value.
Y	Y	O2 LRV	%	Primary variable (O2%) lower range value.
N	Y	O2 AO Range	--	Analog output polarity. (0=4-20 mA; 1=20-4 mA)
Y	Y	O2 Alarm Level	--	O2 alarm level. (0=3.5 mA; 1=21.1 mA)
N	Y	Alarm Relay 1	--	Alarm Relay 1 mode. (no alarm; unit alarm; low O2 alarm; low O2/unit alarm; Cal recommended; Cal recommended/unit alarm; low O2/Cal recommended; low O2/unit alarm/Cal recommended)
N	Y	Alarm Relay 2	--	Alarm Relay 2 mode. (no alarm; unit alarm; low O2 alarm; low O2/unit alarm Cal recommended; Cal recommended/unit alarm; low O2/Cal recommended; low O2/unit alarm/Cal recommended; Heater relay)
N	Y	Low O2 Alm	%	Low O2 alarm threshold.
N	Y	Hi Temp Alm	%	High temperature alarm threshold.
N	Y	AO Tracks	--	Analog output track O2 sensor measurement during a calibration. (No, Yes).
N	Y	Auto Cal	--	Enable/disable automatic calibration. No = Set to Manual calibration mode. Yes = Set to Automatic calibration mode.
N	Y	Start On CalRec	--	Start automatic calibration on Cal Recommended state. (No, Yes)
Y	Y	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.
Y	Y	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.
Y	Y	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.
Y	Y	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.
N	Y	Cal Interval	hr	Automatic calibration interval. The number 9999 disables the automatic timed calibration.
N	Y	Next Cal Time	hr	Time remaining until the next automatic periodic calibration. The number 9999 disables the next automatic timed calibration.
Y	Y	T EE Val	--	Transmitter board nonvolatile memory diagnostic.
N	Y	IO EE Val	--	I/O board nonvolatile memory diagnostic.
Y	Y	Version	--	Software version number for the Transmitter.
N	Y	Version	--	Software version number for the I/O board.
Y	Y	T Restart Cntr	--	Software restarts count for the Transmitter.
N	Y	IO Restart Cntr	--	Software restarts count for the IO board.
Y	Y	Alarms	--	Current Alarms (See section 5, Troubleshooting, "Alarm Indications".)

X-STREAM O₂ Transmitter

OPERATION VIA HART/AMS

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

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

NOTES

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

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

Field Communicator Signal Line Connections (No Xi)

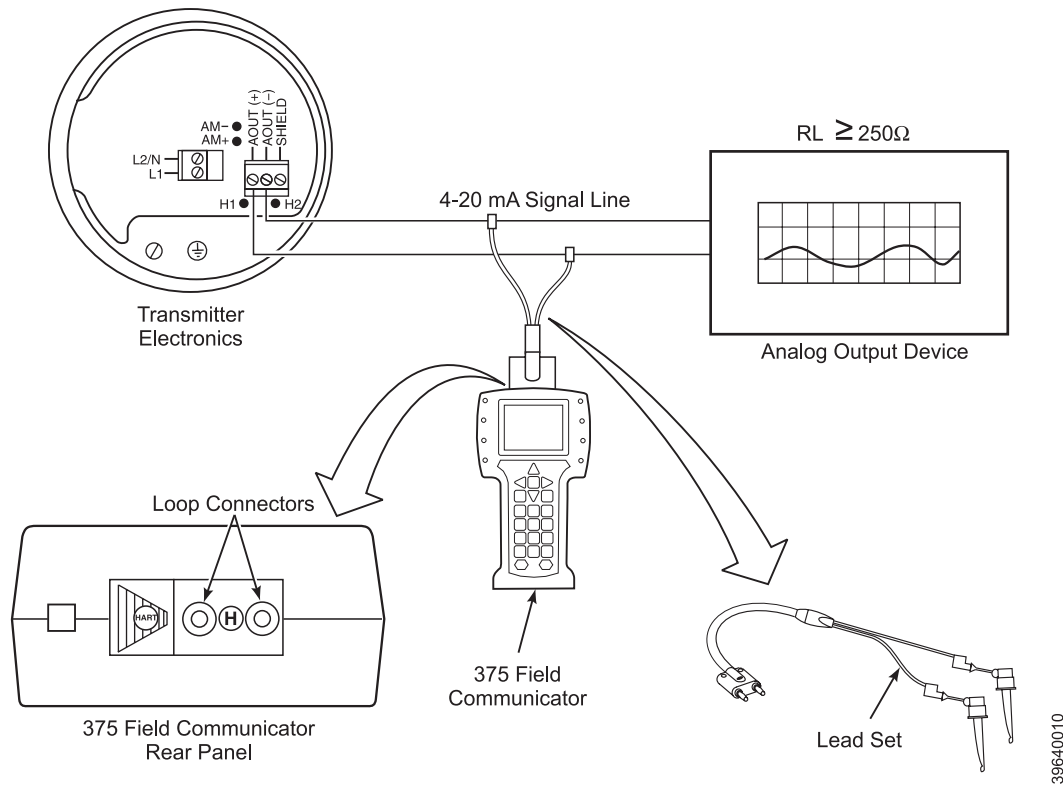
To interface with the X-STREAM, the 375 Field Communicator requires a termination point along the 4-20 mA current loop and a minimum load resistance of 250 ohms between the communicator and the power supply.

The 375 Field Communicator can connect to the X-STREAM unit's analog output signal line at any wiring termination in the 4-20 mA current loop. There are two methods of connecting the 375 Field Communicator to the signal line. For applications in which the signal line has a load resistance of 250 ohms or more, refer to method 1 shown in Figure 4-3. For applications in which the signal line load resistance is less than 250 ohms, refer to method 2 shown in Figure 4-5.

Method 1, For Load Resistance \geq 250 Ohms

Refer to Figure 4-3 and the following instructions to connect the 375 Field Communicator to a signal line with a load resistance of 250 ohms or more.

Figure 4-3. Signal Line Connections, ≥ 250 Ohms Load Resistance



⚠ WARNING

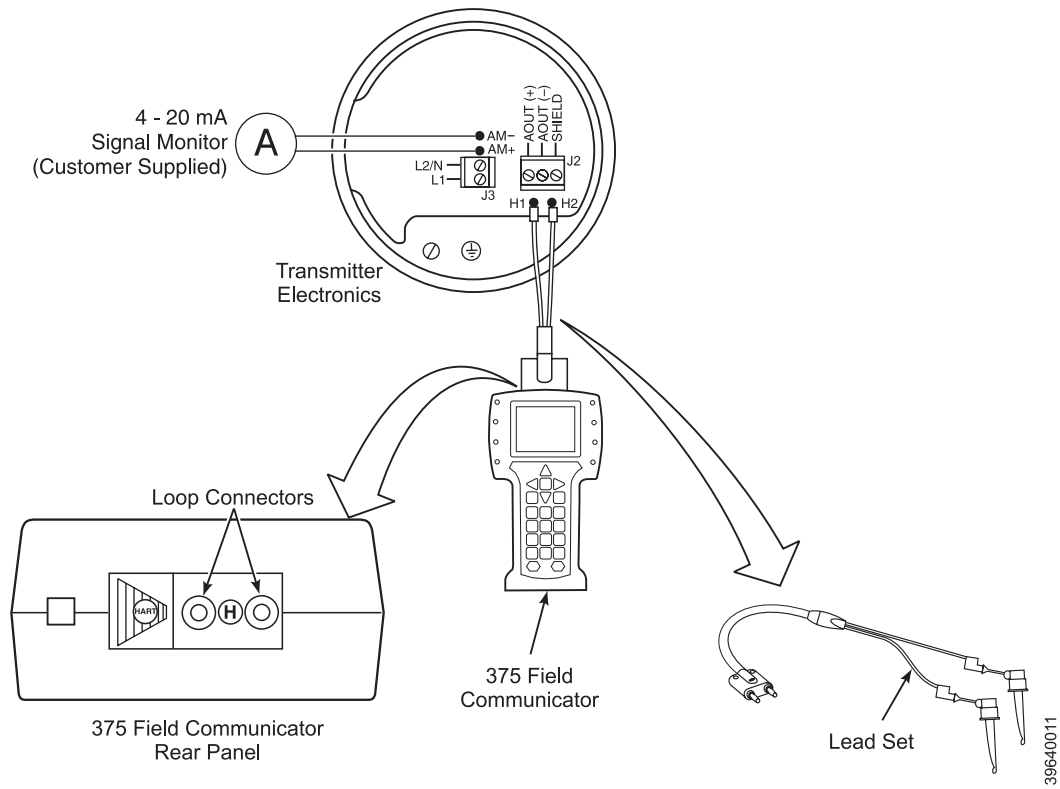
Signals are not intrinsically safe. In an explosive atmosphere do not make connections to the 375 Field Communicator's serial port, 4-20 mA signal line, or NiCad recharger jack.

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

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

X-STREAM O₂ Transmitter

Figure 4-4. 375 Field Communicator Connection at the O₂ Transmitter



Method 2, For Load Resistance < 250 ohms

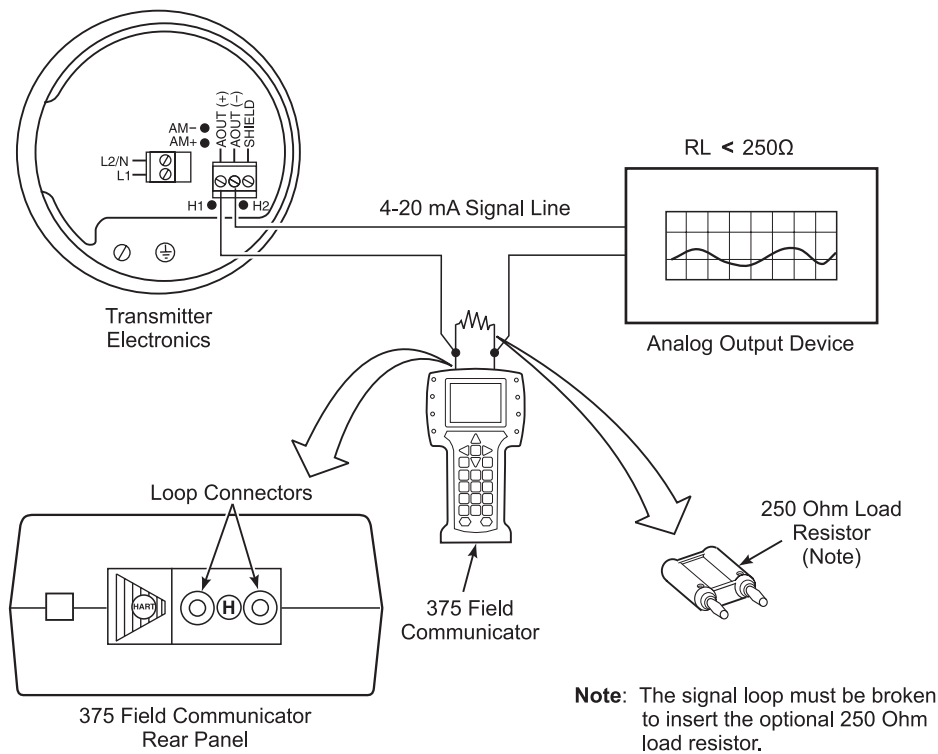
Refer to Figure 4-5 and the following steps to connect the 375 Field Communicator to a signal line with < 250 ohms load resistance.

⚠ WARNING

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

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

Figure 4-5. Signal Line Connections, < 250 Ohms Load Resistance



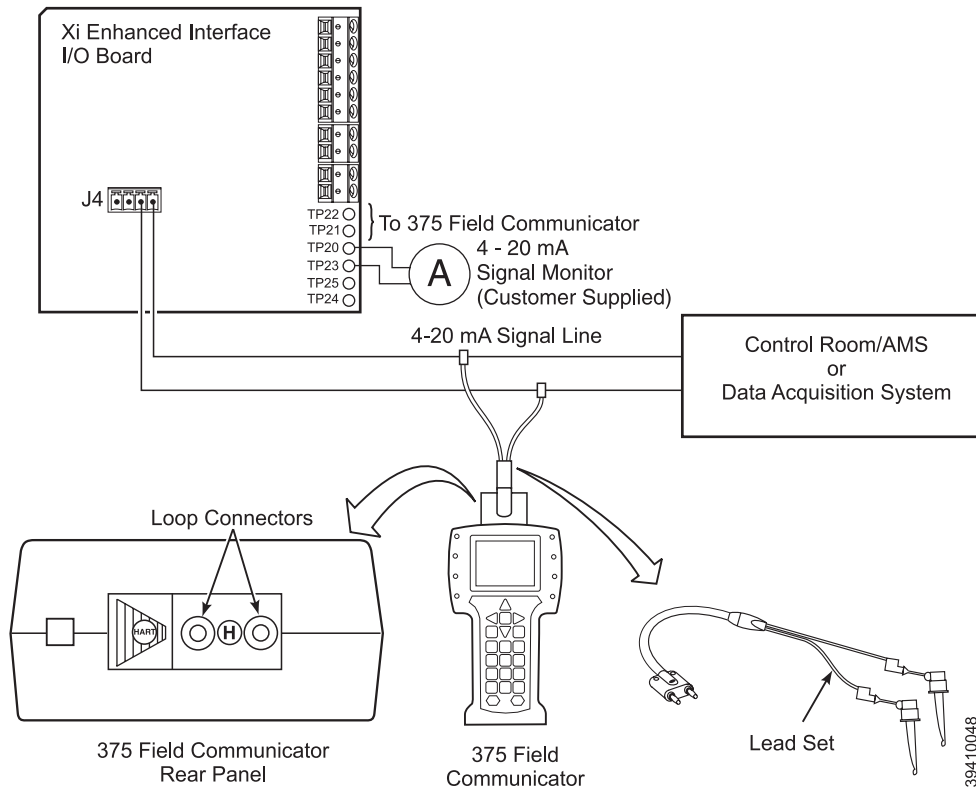
39640012

X-STREAM O₂ Transmitter

Field Communicator Signal Line Connections (with Xi)

Whenever the X-STREAM O₂ Transmitter includes the Xi Enhanced Interface option, be sure to connect the 375 Field Communicator only to the 4 to 20 mA signal loop wiring between the Xi Enhanced Interface and the control room or data acquisition system as shown in Figure 4-6. When working at the Xi, the 375 Field Communicator can be connected directly to test points TP21 and TP22 on the Xi Enhanced Interface I/O Board. The AM+ and AM- test points are provided to monitor the 4-20 mA signal without breaking into the loop.

Figure 4-6. 375 Field Communicator Connection at the Xi Enhanced Interface



CAUTION

Do not use the H1 and H2 terminals or connect the HART in the probe (transmitter-to-Xi) 4-20 mA signal loop if your system includes the Xi Enhanced Interface. Xi communication with the transmitter will be disrupted if a 375 Field Communicator is connected to the H1 and H2 terminals or to the transmitter-to-Xi signal loop.

The Xi Enhanced Interface communicates with the transmitter via HART communications riding on the 4 to 20 mA signal coming from the transmitter. Xi communication with the transmitter will be disrupted if a 375 Field Communicator is connected to the signal loop between the transmitter and the Xi Enhanced Interface.

Field Communicator Menu Trees

When the 375 Field Communicator is connected as shown in Figure 4-3, Figure 4-4, or Figure 4-5, refer to Figure 4-7 for the 375 Field Communicator Transmitter menu tree.

If the Xi Enhanced Interface is used, connect the 375 Field Communicator in the Xi (Xi-to-DCS) 4-20 mA signal loop or to the Xi Enhanced Interface terminals as shown in Figure 4-6 and refer to Figure 4-8 for the 375 Field Communicator Xi menu tree.

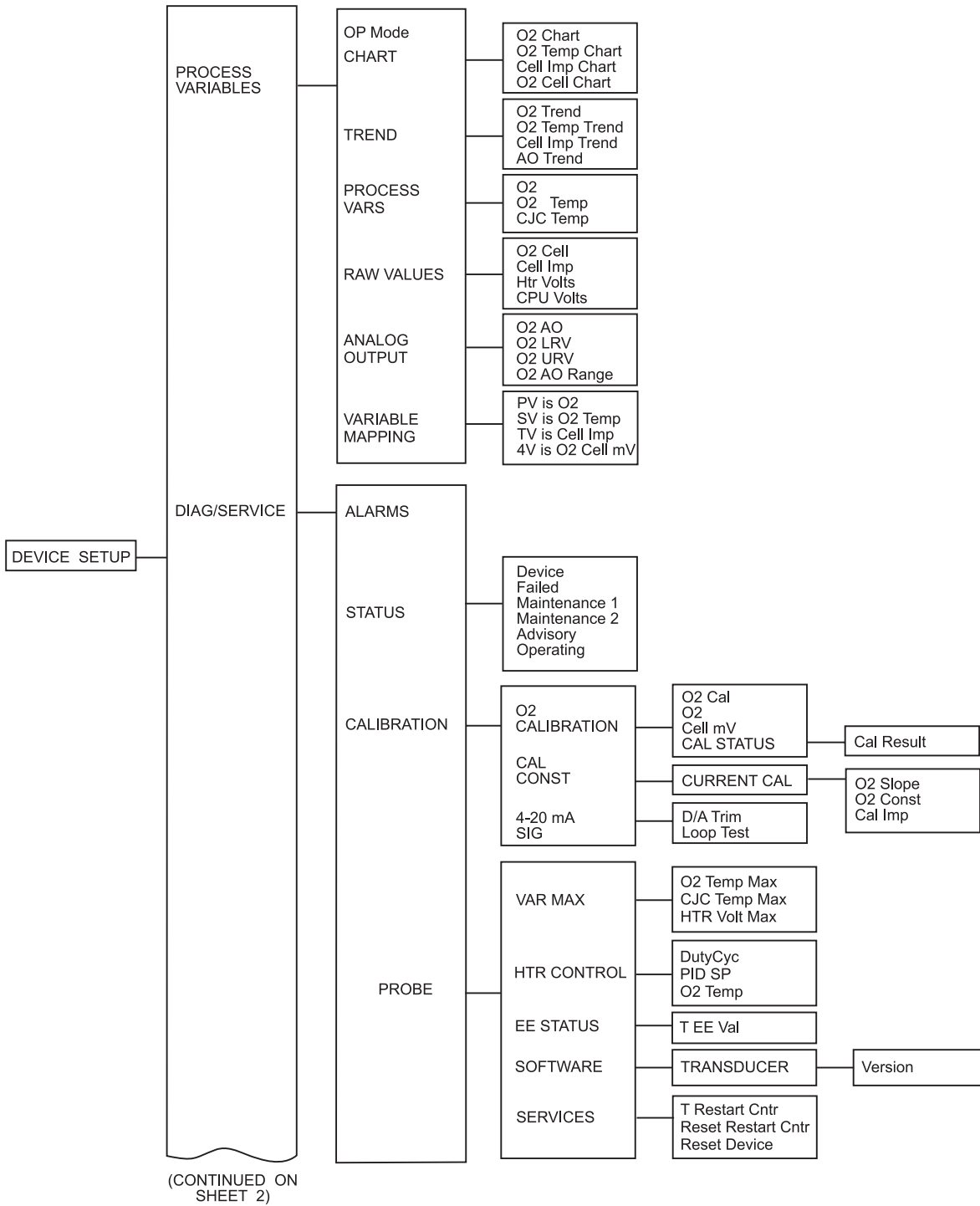
OFF-LINE AND ON-LINE OPERATIONS

The 375 Field Communicator can be operated both off-line and on-line.

Off-line operations are those in which the communicator is not connected to the X-STREAM. Off-line operations can include interfacing the 375 Field Communicator with a PC (refer to applicable HART documentation regarding HART/PC applications.)

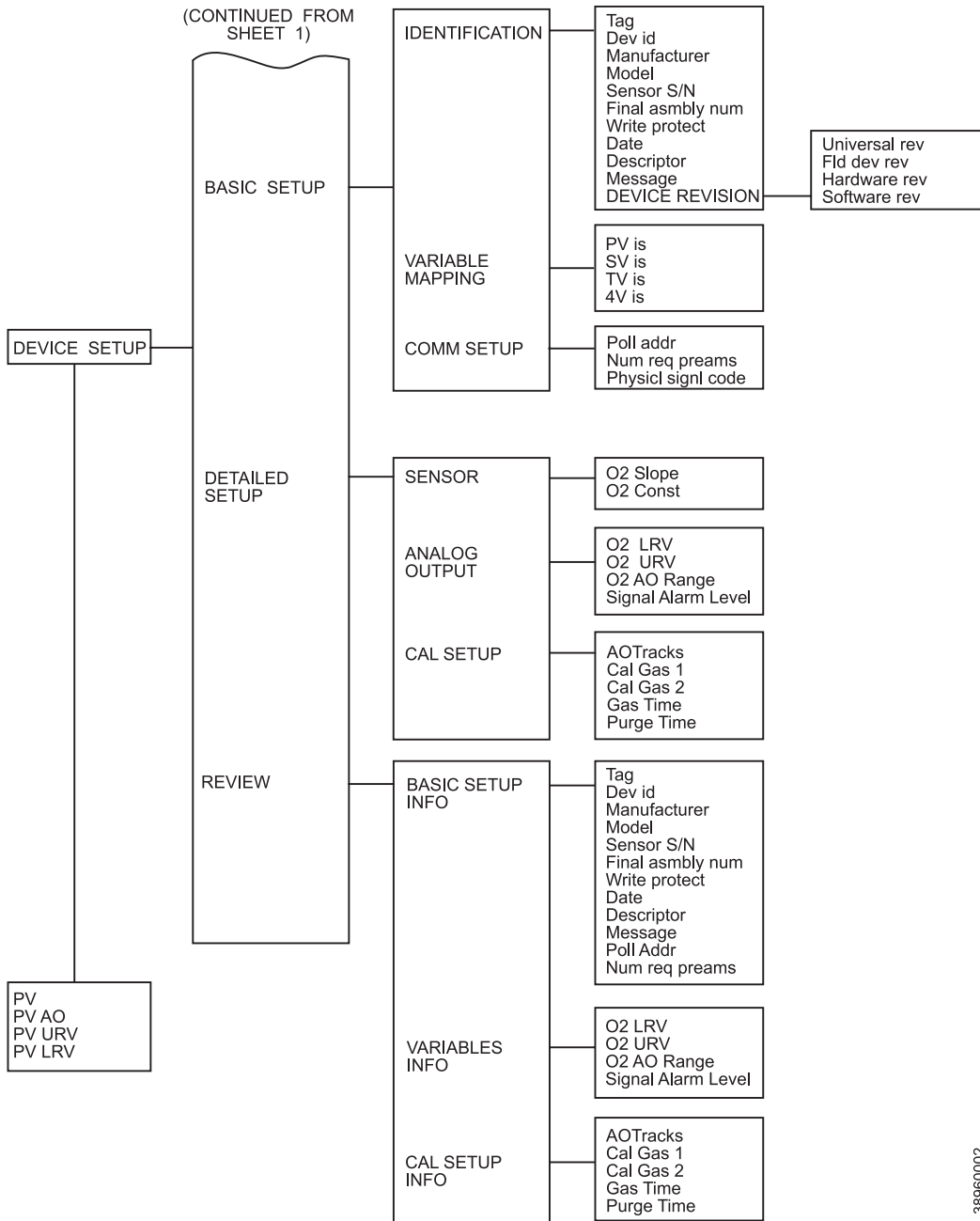
In the on-line mode, the 375 Field Communicator is connected to the 4-20 mA analog output signal line. The communicator is connected in parallel to the X-STREAM or in parallel to the 250 ohm load resistor.

Figure 4-7. 375 Field Communicator Transmitter Menu Tree (Sheet 1 of 2)



40050005

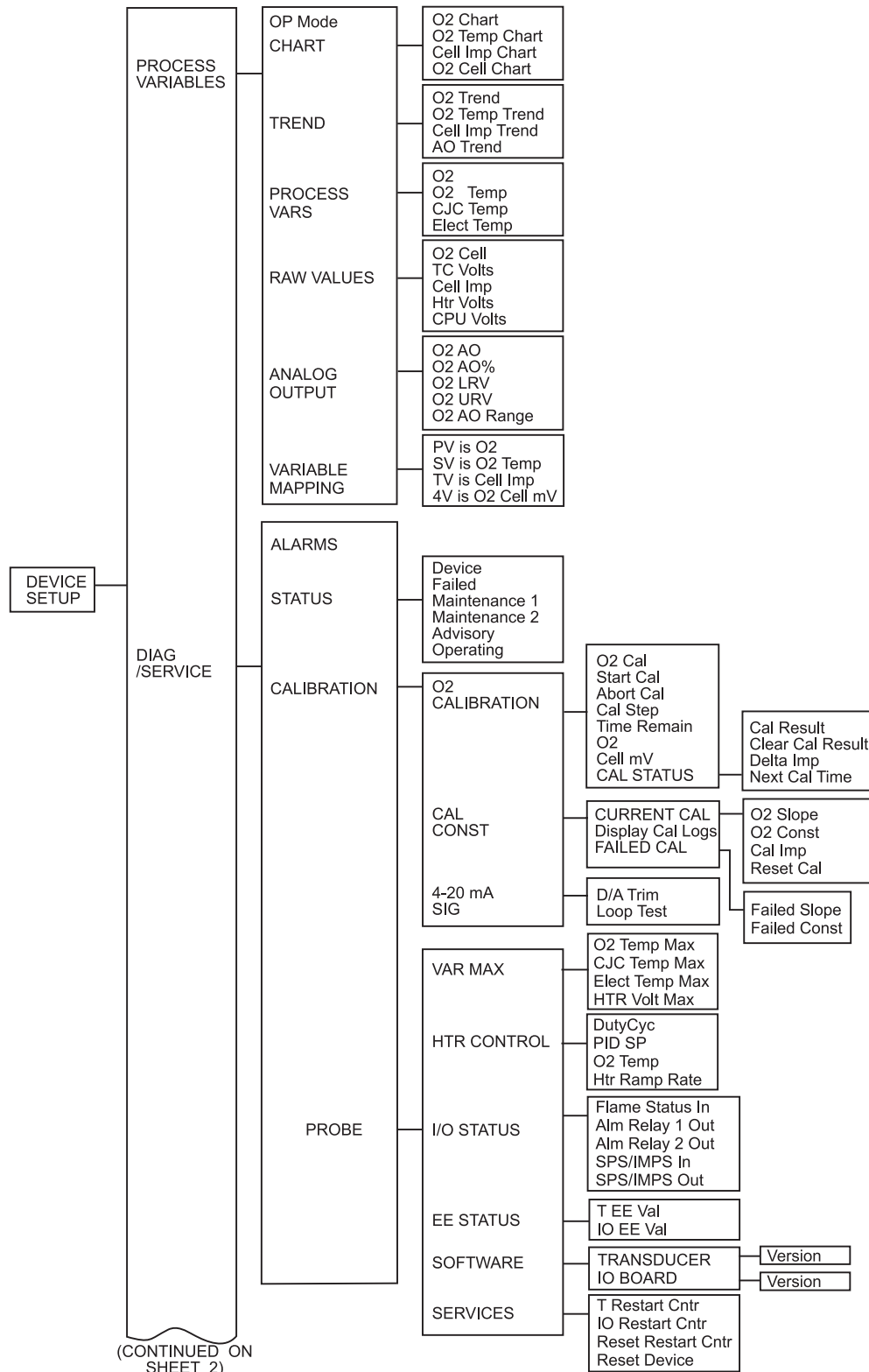
Figure 4-7. 375 Field Communicator Transmitter Menu Tree (Sheet 2 of 2)



38960002

X-STREAM O₂ Transmitter

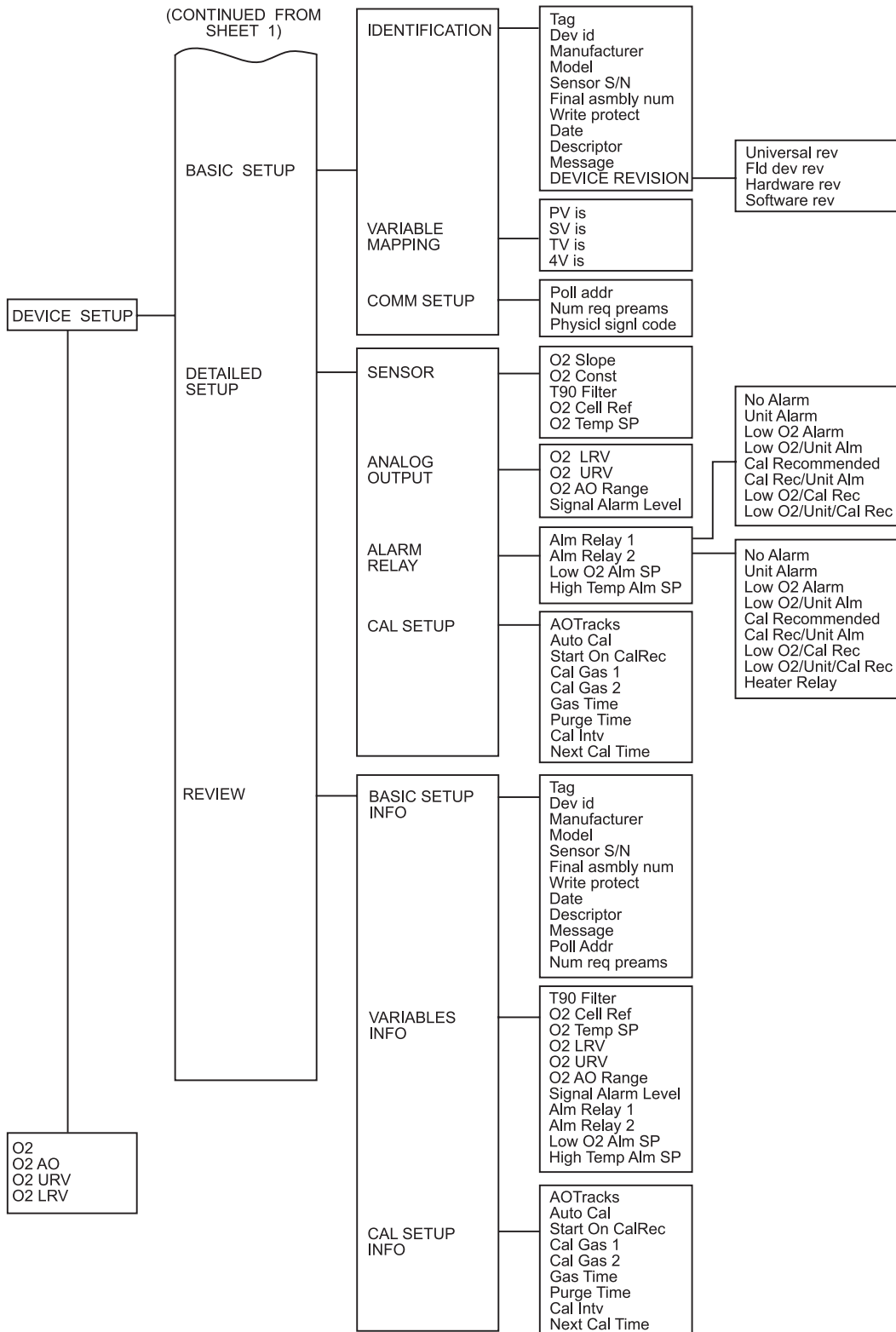
Figure 4-8. 375 Field Communicator Xi Menu Tree (Sheet 1 of 2)



(CONTINUED ON SHEET 2)

38960020

Figure 4-8. 375 Field Communicator Xi Menu Tree (Sheet 2 of 2)



39640009

X-STREAM O₂ Transmitter

CALIBRATION - GENERAL

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

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

The X-STREAM O₂ Transmitter(s) can be calibrated manually through the handheld 375 Field Communicator or the Xi. Fully automatic calibration can be performed automatically using the Xi Enhanced Interface and the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Sequencer.

O₂ CALIBRATION

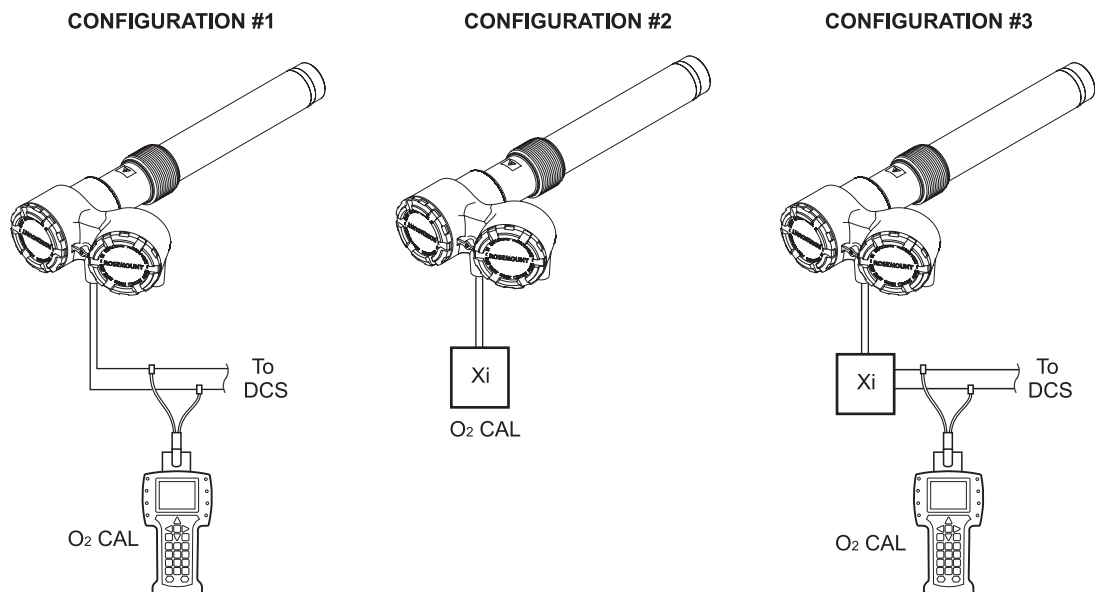
This section covers manual calibration. For automatic calibration details see the Instruction Manual for the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer.

X-STREAM O₂ calibration can be performed using three basic calibration methods. The methods available to you for use depend on the configuration of your system. The paragraphs that follow describe how to perform a calibration for three basic system configurations shown in Figure 4-9.

Included in the calibration procedures are instructions for setting up the calibration parameters. Setup of the calibration parameters should be performed before the first O₂ calibration. Thereafter, perform calibration setup only as needed to change the calibration parameters or to reset the parameters following the replacement of primary system components.

Before calibrating verify that the configuration gas parameters are correct. Refer to Section 3: Configuration of X-STREAM O₂ Transmitter.

Figure 4-9. Calibration Methods - Simplified



39290013

O₂ Calibration without Xi

For systems with configuration 1, shown in Figure 4-9, use the following procedure to perform a calibration using the 375 Field Communicator. If necessary, use the menu tree in Figure 4-7 for reference.

NOTE

To select a menu item, either use the up and down arrow keys to scroll to the menu item and press the right arrow key or use the number keypad to select the menu item number. To return to a preceding menu press the left arrow key.

1. Select DEVICE SETUP.
2. From the DEVICE SETUP screen select menu item 4, DETAILED SETUP.
3. Select menu item 3, CAL SETUP, to input the cal gas and gas flow times.
4. Return to the DEVICE SETUP screen and select menu item 2, DIAG/SERVICE.
5. From the DIAG/SERVICE screen, select menu item 3, CALIBRATION, to access the O₂ CALIBRATION screen.
6. From the O₂ CALIBRATION screen, select menu item 1, O₂ CAL, to access the O₂ calibration procedure.

WARNING

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

7. In the first O₂ CAL screen, a "Loop should be removed from automatic control" warning appears. Remove the X-STREAM O₂ Transmitter from any automatic control loops to avoid a potentially dangerous operating condition and press OK.
8. Follow the handheld 375 Field Communicator display prompts to perform the O₂ cal procedure.

O₂ Calibration with Xi

For systems with configuration 2, shown in Figure 4-9, use the following procedure to perform a calibration using the Xi Enhanced Interface. If necessary, use the Xi menu tree in Figure 4-2 for reference.

NOTE

To select a menu item, either use the up and down arrow keys to scroll to the menu item and press the right arrow key to select the menu item. To return to a preceding menu press the left arrow key.

1. From the Main Menu, select SYSTEM, to access the Xi System menu.
2. From the Xi SYSTEM menu, scroll down and select DETAILED SETUP.
3. Select menu item 4, CAL SETUP, to input the cal gas and gas flow times.

4. Return to the SYSTEM menu and select the last menu item, CALIBRATION, to access the CALIBRATION menu.
5. From the O₂ CALIBRATION options, select Start Cal to start the O₂ calibration procedure.

WARNING

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

6. In the first Start Cal screen, a "Loop should be removed from automatic control" warning appears. Remove the X-STREAM O₂ Transmitter from any automatic control loops to avoid a potentially dangerous operating condition and press OK.
7. Follow the Xi Enhanced Interface display prompts to perform the O₂ cal procedure.

O₂ Calibration with Xi and Field Communicator

For systems with configuration 3, shown in Figure 4-9, use the following procedure to perform a calibration of the system using the 375 Field Communicator. If necessary use the menu tree in Figure 4-8 for reference.

NOTE

To select a menu item, either use the up and down arrow keys to scroll to the menu item and press the right arrow key or use the number keypad to select the menu item number. To return to a preceding menu, press the left arrow key.

1. Select DEVICE SETUP.
2. From the DEVICE SETUP screen select menu item 4, DETAILED SETUP.
3. Select menu item 3, CAL SETUP, to input the cal gas and gas flow times.
4. Return to the DEVICE SETUP screen and select menu item 2, DIAG/SERVICE.
5. From the DIAG/SERVICE screen, select menu item 3, CALIBRATION, to access the O₂ CALIBRATION screen.
6. From the O₂ CALIBRATION screen, select menu item 1, O₂ CAL, to access the O₂ calibration procedure.

WARNING

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

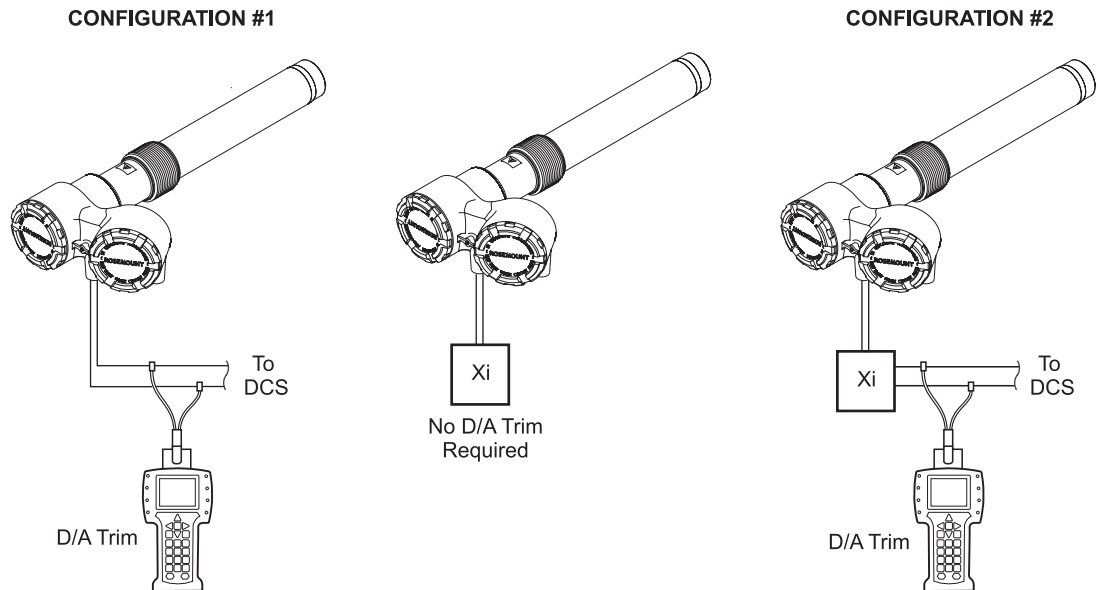
7. In the first O₂ CAL screen, a "Loop should be removed from automatic control" warning appears. Remove the X-STREAM O₂ Transmitter from any automatic control loops to avoid a potentially dangerous operating condition and press OK.
8. Follow the handheld 375 Field Communicator display prompts to perform the O₂ cal procedure.

D/A TRIM

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

The two paragraphs that follow describe how to perform a D/A trim for two of the three basic system configurations shown in Figure 4-10. Only the signal to the DCS needs to be trimmed.

Figure 4-10. D/A Trim Methods - Simplified



39290014

D/A Trim without Xi

For systems with configuration 1, shown in Figure 4-10, use the handheld 375 Field Communicator to access the D/A trim procedure according to the instructions that follow. Refer to the 375 Field Communicator Transmitter Menu Tree in Figure 4-7.

1. From the DEVICE SETUP screen select menu item 2, DIAG/SERVICE, to access the diagnostics and service menu options.
2. Select menu item 3, CALIBRATION, to access the calibration menu options.
3. Select menu item 3, 4-20 mA SIG, to access the 4-20 mA SIGNAL screen.
4. Select menu item 1, D/A Trim, to start the trim procedure.

X-STREAM O₂ Transmitter

D/A Trim with Xi

For systems with configuration 2, shown in Figure 4-10, use the handheld 375 Field Communicator to access the D/A trim procedure according to the instructions that follow. Refer to the 375 Field Communicator Xi Menu Tree in Figure 4-8.

1. From the DEVICE SETUP screen select menu item 2, DIAG/SERVICE, to access the diagnostics and service menu options.
2. Select menu item 3, CALIBRATION, to access the calibration menu options.
3. Select menu item 3, 4-20 mA SIG, to access the 4-20 mA SIGNAL screen.
4. Select menu item 1, D/A Trim, to start the trim procedure.

Section 5 Troubleshooting

Overview of Operating Principles	page 5-1
General	page 5-2
Grounding	page 5-2
Electrical Noise	page 5-3
Electrostatic Discharge	page 5-3
Alarm Indications	page 5-3
Identifying and Correcting Fault Indications	page 5-4
Calibration Passes, but Still Reads Incorrectly	page 5-5
Probe Passes Calibration, O ₂ Still Reads High	page 5-5
Probe Passes Calibration, O ₂ Still Reads Low	page 5-7
How do I detect a plugged diffuser?	page 5-7
Can I calibrate a badly plugged diffuser?	page 5-7

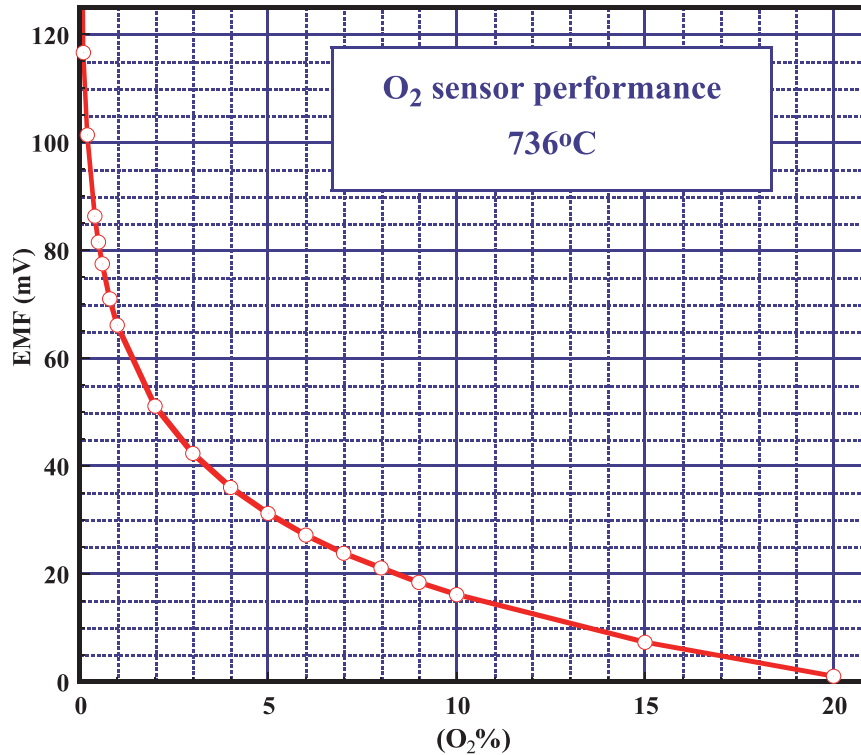
OVERVIEW OF OPERATING PRINCIPLES

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

When flowing calibration gases, the raw cell millivolt value should represent the levels on the chart in Figure 5-1. Note that the raw cell millivolt value increases logarithmically as the O₂ concentration decreases.

X-STREAM O₂ Transmitter

Figure 5-1. O₂ Sensor mV Reading vs. %O₂ at 736°C (1357°F) (Reference Air, 20.95% O₂)



38960049

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

GENERAL

⚠ 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.

Consider the following equipment conditions, features, and requirements when troubleshooting a problem with the X-STREAM O₂ Transmitter.

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.

Electrical Noise

The X-STREAM O₂ Transmitter 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.

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.

ALARM INDICATIONS

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

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

Make sure that the Control System is configured to interpret these signal levels correctly!

Once an alarm condition is identified, the X-STREAM O₂ Transmitter electronics offers a number of diagnostics to interpret the specific alarm.

Alarm indications are available via the Xi Enhanced Interface or the 375 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.

X-STREAM O₂ Transmitter

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. Loop power to the transmitter must be cycled to clear a non-recoverable alarm.

For an X-STREAM O₂ Transmitter without an optional Xi Enhanced Interface, alarm messages are accessed via the HART/AMS communication menu. A listing of the alarm/fault messages and the related fault status descriptions are shown in Table 5-1.

For an X-STREAM O₂ Transmitter with the optional Xi Enhanced Interface, alarm messages are displayed on the Xi interface display window when the alarm status display is accessed via the Xi interface menu. A listing of the alarm/fault messages and the related fault status descriptions are shown in Table 5-2.

The following are five general fault symptoms:

1. The system does not respond to changes in the oxygen concentration.
2. The system responds to oxygen changes but does not give the correct indication.
3. The system does not give an acceptable indication of the value of the oxygen test gas being applied during calibration.
4. The probe takes longer than normal to return to flue gas value after the calibration gas is turned off.
5. The probe heater temperature is unstable.

Fault conditions that give no fault indication and that allow the probe to pass calibration are listed and discussed after Tables 5-1 and 5-2.

Table 5-1. Diagnostic/Unit Alarm Fault Definitions - Transmitter without Xi Enhanced Interface

Message	Status	Self Clearing
NV Mem Fail	A checksum error was detected in the nonvolatile memory configuration data when the unit was turned on.	No
Factory Mode	On transmitter board, SW1, position 1 is set to "ON". This setting should only be used in the factory.	No
Board Temp Hi	The transmitter electronic board temperature reading is above 126°C.	No
O2 Sensor Open	The cell impedance voltage is reading less than -1.1 VDC indicating the O2 sensor wires may be disconnected or the O2 sensor junction may be open.	Yes
O2 TC Open	The O ₂ cell heater thermocouple voltage is reading more than the hardware configured threshold voltage. This indicates the thermocouple wires may be disconnected or the thermocouple junction may be open.	Yes
O2 Temp Low	The heater temperature is below the minimum temperature. The predefined low temperature threshold is the 726°C.	Yes
O2 Temp High	The heater temperature is above the predefined temperature threshold of 750°C.	Yes
O2 T/C Shorted	The O ₂ sensor heater temperature thermocouple voltage is shorted.	Yes
O2 T/C Reversed	The O ₂ sensor heater temperature thermocouple voltage is reading a negative voltage indicating the thermocouple wire connections may be reversed.	Yes
CPU Voltage Low	The transmitter CPU voltage is less than 2.7 V indicating the CPU voltage is too low.	Yes
CPU Voltage High	The transmitter CPU voltage is more than 3.3 V indicating the CPU voltage is too high.	Yes
Htr Voltage Low	The heater voltage for the O ₂ cell heater is below 35 volts.	Yes
Htr Voltage High	The heater voltage for the O ₂ cell heater is above 264 volts.	Yes

Table 5-2. Diagnostic/Unit Alarm Fault Definitions - Transmitter with Xi Enhanced Interface

Message	Status	Self Clearing
NV Mem Fail	A checksum error was detected in the nonvolatile memory configuration data when the unit was turned on.	No
Factory Mode	On Xi box IO board, SW4, position 1 is set on "ON". On transmitter electronics board, SW1, position 1 is set to "ON". This setting should only be used in the factory.	No
Board Temp Hi	The transmitter electronic board temperature reading is above 126°C or the Xi unit IO board temperature reading is above 86°C.	No
O2 Htr Ramp Rate	The O ₂ sensor heater ramp rate is greater than max allowed ramp rate indicating a run away heater condition.	No
O2 Sensor Open	The cell impedance voltage is reading less than -1.1 VDC indicating the O ₂ sensor wires may be disconnected or the O ₂ sensor junction may be open.	Yes
O2 TC Open	The O ₂ cell heater thermocouple voltage is reading more than the hardware configured threshold voltage. This indicates the thermocouple wires may be disconnected or the thermocouple junction may be open.	Yes
O2 Temp Low	The heater temperature is below the minimum temperature. The predefined low temperature threshold is the 726°C.	Yes
O2 Temp High	The heater temperature is above the defined temperature threshold. The high temperature threshold is the defined by the "High Temp Alm SP" parameter. The default value is 750°C.	Yes
O2 T/C Shorted	The O ₂ sensor heater temperature thermocouple voltage is shorted.	Yes
O2 T/C Reversed	The O ₂ sensor heater temperature thermocouple voltage is reading a negative voltage indicating the thermocouple wire connections may be reversed.	Yes
O2 Htr Failure	The O ₂ sensor heater temperature is not responding to the controller and can't reach final temperature set by the device, indicating the O ₂ heater may have failed.	Yes
No Flame	The Flame Status Relay Input is set to the OFF state indicating it is not safe to operate the O ₂ heater and the heater should be turned off.	Yes
Xmtr Disconnect	Communication failures detected between transmitter and the IO board indicating the transmitter has been disconnected from the IO board.	Yes
Cal Recommended	Probe calibration is recommended. The cell impedance is above 100 ohms and has shifted 50 ohms since the last calibration; the accuracy of the O ₂ reading may be compromised.	Yes
Cal Failed	A calibration error occurred during the last calibration. The measured slope or constant is outside the acceptable range. (Slope: 34.5 to 57.5 mv/decade) (Constant: ±20 mv)	Yes
Cell Imp High	The O ₂ sensor impedance/cell resistance value measurement is greater than 2000 Ohms indicates the cell may be beyond its useful life.	Yes
CPU Voltage Low	The transmitter CPU voltage is less than 2.7 V indicating the CPU voltage is too low.	Yes
CPU Voltage High	The transmitter CPU voltage is more than 3.3 V indicating the CPU voltage is too high.	Yes
Htr Voltage Low	The heater voltage for the O ₂ cell heater is below 35 volts.	Yes
Htr Voltage High	The heater voltage for the O ₂ cell heater is above 264 volts.	Yes
Low O2	The O ₂ reading is below the "Low O2 Alm SP".	Yes

CALIBRATION PASSES, BUT STILL READS INCORRECTLY

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

An incorrect flow rate of calibration gases can cause a shifted calibration. If the flow rate of calibration gases is too low, process gases can mix in with the calibration gases causing a mixture at the cell that is different than what is noted on the calibration gas bottles. Always set the calibration flow rate when a new diffuser is installed, and never readjust this flow rate until another new diffuser is installed. For applications with heavy particulate loading, see "Probe Passes Calibration, But O₂ Still Appears To Read Low".

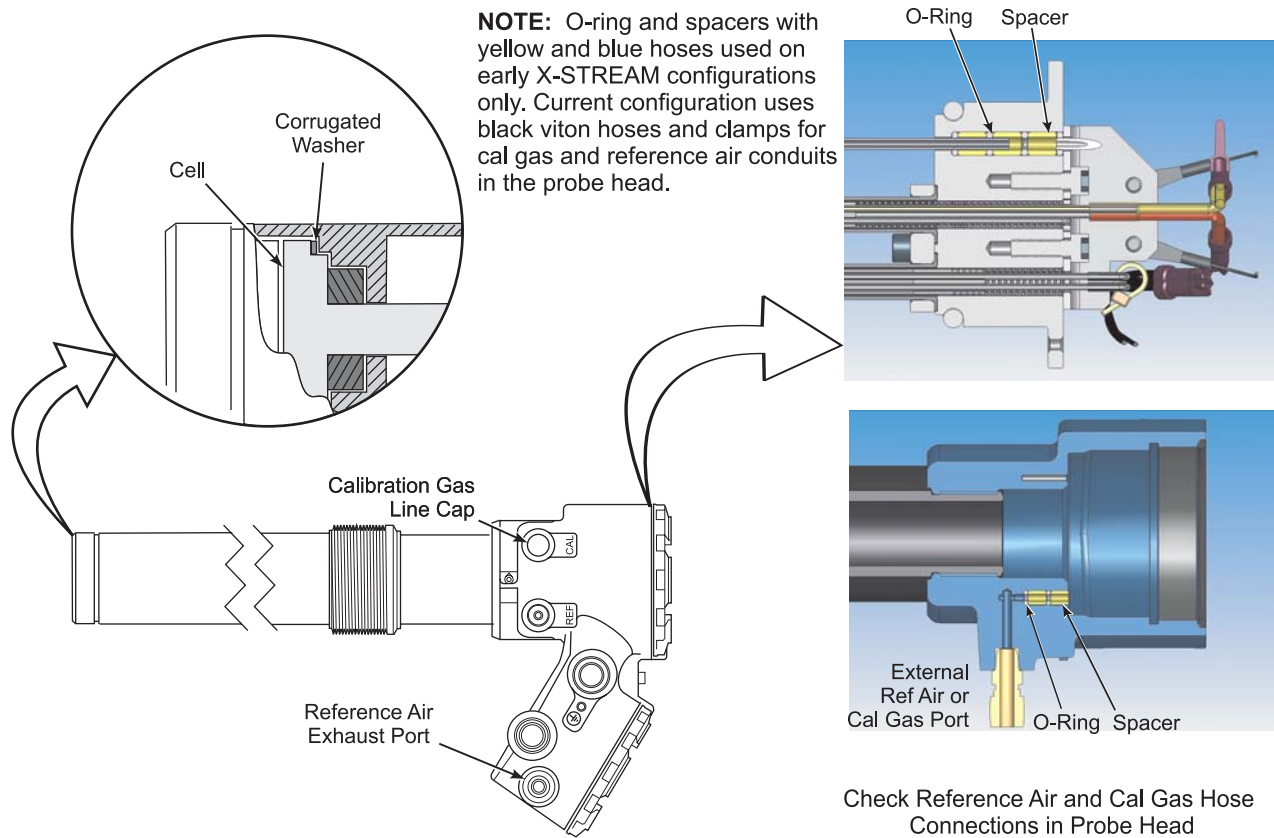
No or improper reference air supplied.

Probe Passes Calibration, O₂ Still Reads High

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

1. Make sure that the calibration gas line is capped tightly between calibrations. If autocal is used, make sure the check valve is seating properly.
2. A leak in the Oxycore viton o-ring seal can allow ambient air to migrate down the annular space between the sensor core and probe tube, and then into the cell. Always inspect the viton o-ring when removing and reinstalling the Oxycore sensor core.

Figure 5-2. Probe Leakage Paths



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

1. Acid condensation inside the probe can degrade the cal gas hose (25, Figure 6-5) that carries the cal gas to the cell. Inspect this hose. See Figure 5-2. Dislodging or improper installation of the cal gas or reference air hose can cause a leakage path.
2. The sensing cell (4, Figure 6-1) is fastened to the end of the probe tube and uses a corrugated washer (3, Figure 6-1) to separate the process gases from the ambient reference air. The corrugated washer may be damaged by corrosion. Discard used washer.

NOTE

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

**Probe Passes
Calibration, O₂ Still
Reads Low**

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

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. Calibration flow rates should be set only when a new diffuser is installed. As the diffuser plugs, do not adjust the flow rates upward.

**How do I detect a
plugged diffuser?**

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

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

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

**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.

Section 6 Maintenance and Service

Overview	page 6-1
Maintenance Intervals	page 6-2
Calibration	page 6-2
Automatic Calibration	page 6-2
Manual Calibration	page 6-2
Replacement Parts	page 6-3
Removal and Installation of Probe	page 6-3
Sensor Core or Diffuser Replacement	page 6-5
Cell Removal	page 6-8
Replace Contact Pad	page 6-8
Cell Installation	page 6-12
Replace Contact & Thermocouple Assembly	page 6-13
Replacing Gas/Air Hoses, O-rings and Spacers	page 6-14
Electronics Board Replacement	page 6-15
Blind Cover(s) Replacement	page 6-16
Xi Components Replacement	page 6-19
I/O Board Replacement	page 6-20
AC Relay Board Replacement	page 6-25
Power Supply Board Replacement	page 6-28
Power Supply Board Wiring	page 6-28
Xi Front Panel Replacement	page 6-29
DR Board Replacement	page 6-31

OVERVIEW

This section identifies the calibration methods available and provides the procedures to maintain and service the X-STREAM O₂ Transmitter.

WARNING

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

X-STREAM O₂ Transmitter

MAINTENANCE INTERVALS

The maintenance interval required is quite variable, depending on the type of service the analyzer is placed into. The zirconium oxide sensing cell is non-depleting, and has no specific shelf life or a defined life in flue gas operation. The cell of a probe that is mounted inside a boiler that is burning natural gas may shift very little over several years. Acidic compounds are the main aggressors to the sensing cell, typically SO₂ resulting from sulfur contained in coal and heavy oil fuels, and also HCl from the combustion of plastics in municipal incinerators and in industrial thermal oxidizers. Sensing cells may experience significant degradation and signal shift in this type of service, particularly if the operating levels of O₂ are very low (below 1% O₂).

A calibration check is generally recommended on a quarterly basis (every 3 months) by flowing bottled gas to the probe. (Make sure that the operations personnel are notified when doing this, and also make sure that the O₂ control loop is placed in manual mode). If the probe readings vary significantly from the bottle values, then a formal calibration should be conducted as noted in Section 4: Startup and Operation.

The Xi enhanced electronics offers a "calibration recommended" diagnostic that will indicate when the probe needs to be calibrated.

Combustion processes that have a high level of ash or other particulate content will cause the diffusion element on the end of the probe to plug off. A badly plugged diffuser will cause a slower speed of response to changing O₂ levels in the process. This can usually be seen on the recorded trends in the control room.

When performing a calibration check or actual calibration, the calibration flow meter may read lower if the diffuser is badly plugged. (Never increase the flow rate back up, however, as this can cause a shifted calibration. Adjust the calibration flow rate only when a new diffuser is installed). Always record the response time back to the process after the calibration gases are removed, as noted on the calibration record at the end of this section. Diffuser pluggage can be tracked through this record.

A visual inspection of the probe sensor core 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 dual blue housings.

CALIBRATION

The X-STREAM O₂ Transmitter can be calibrated manually through the handheld 375 Field Communicator, or automatically through the SPS 4001B Single Probe Autocalibration Sequencer or the IMPS 4000 Intelligent Multiprobe Test Gas Sequencer and the Xi Enhanced Interface.

Automatic Calibration

Contact from the Xi Enhanced Interface 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 Xi Enhanced 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.

Manual Calibration

Refer to the "Calibration - General" in Section 4: Startup and Operation to perform a manual calibration.

Replacement Parts

Refer to Section 7: Replacement Parts for individual replacement parts and part replacement kits. Part replacement kits are available for each of the components discussed in this section.

REMOVAL AND INSTALLATION OF PROBE

Remove Probe

1. Turn off power to the system. Lock out and tag out power to the X-STREAM probe.
2. Shut off instrument air and calibration gases at the cylinders.
3. Disconnect calibration gas and instrument air lines from the probe.
4. See Figure 6-1. Remove right housing cover (12).
5. Disconnect all signal and power wiring to the probe.
6. Remove insulation at probe head to access the mounting bolts or threaded adapter.
7. Unbolt or unscrew the X-STREAM probe assembly from the stack and take it to a clean work area.
8. Allow the X-STREAM probe to cool to a comfortable working temperature.

Install Probe

CAUTION

Failure to use anti-seize compound or Teflon tape on threads could result in thread galling, probe damage, and excessive difficulty in removal of probe.

1. Bolt or thread the X-STREAM probe assembly to the stack. Use anti-seize compound or Teflon tape on mounting threads.
2. Install the insulation at the probe head.
3. Connect all signal and power leads at the probe. Refer to Section 2: Installation, for detailed wiring instructions.
4. Connect the calibration gas and instrument air lines to the probe.
5. Install right housing cover (12, Figure 6-1).
6. Turn on calibration gas and instrument air.
7. Restore power to the system; refer to Section 4: Startup and Operation. When the probe is at operating temperature, calibrate the probe per "Set Test Gas Values" in Section 3 of this instruction manual.

NOTE

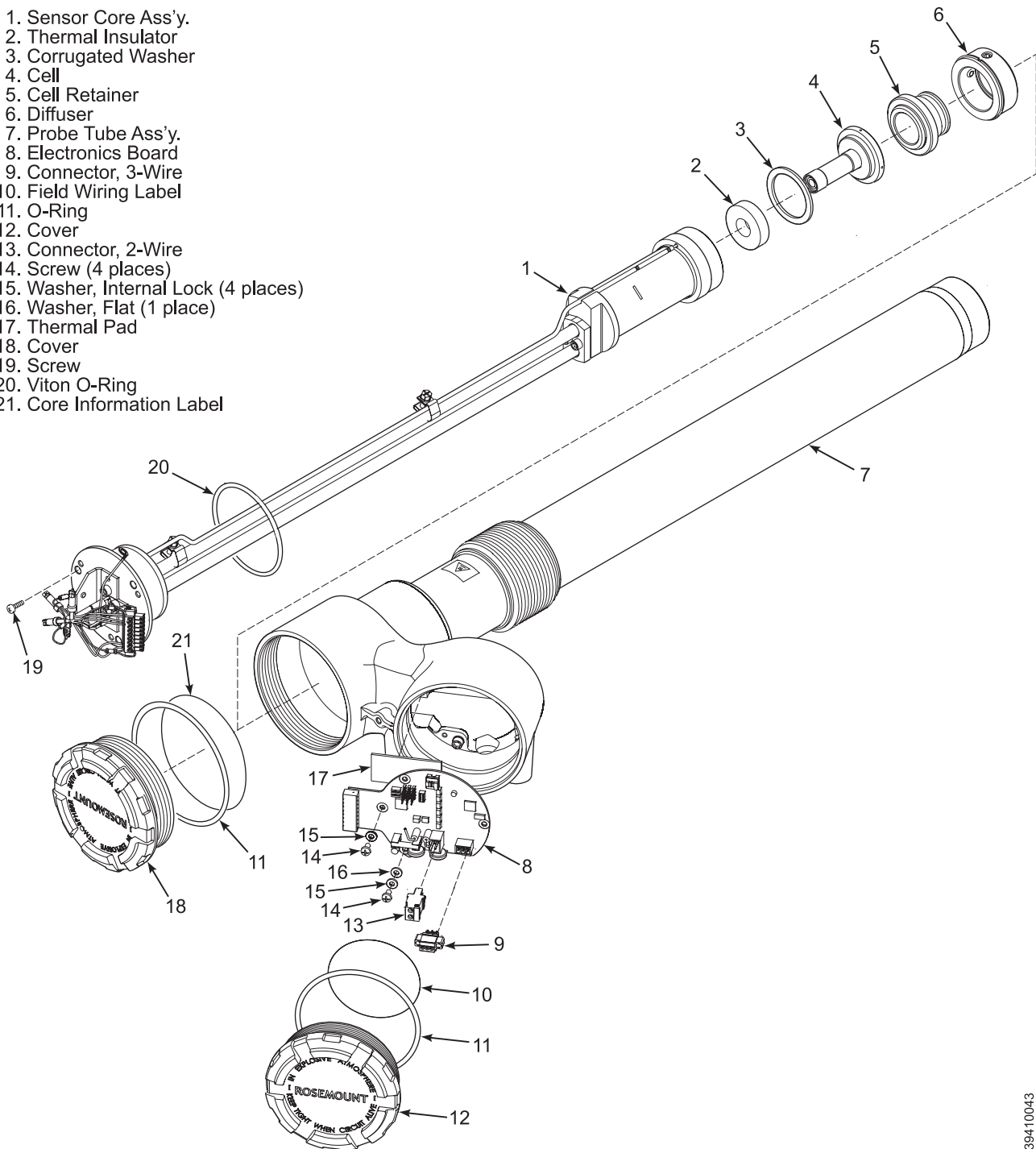
Recalibration is required whenever an electronic board or sensing cell is replaced.

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Figure 6-1. X-STREAM O₂ Transmitter - Exploded View

1. Sensor Core Ass'y.
2. Thermal Insulator
3. Corrugated Washer
4. Cell
5. Cell Retainer
6. Diffuser
7. Probe Tube Ass'y.
8. Electronics Board
9. Connector, 3-Wire
10. Field Wiring Label
11. O-Ring
12. Cover
13. Connector, 2-Wire
14. Screw (4 places)
15. Washer, Internal Lock (4 places)
16. Washer, Flat (1 place)
17. Thermal Pad
18. Cover
19. Screw
20. Viton O-Ring
21. Core Information Label



39410043

X-STREAM O₂ TRANSMITTER PROBE REPAIR

Each of the procedures that follow details how to remove and replace a specific component of the X-STREAM O₂ Transmitter. Part replacement kits are available for each of the transmitter components replaced in this repair section. Refer to Section 7: Replacement Parts for kit part numbers.

⚠ WARNING

It is recommended that the X-STREAM 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.

Sensor Core or Diffuser Replacement

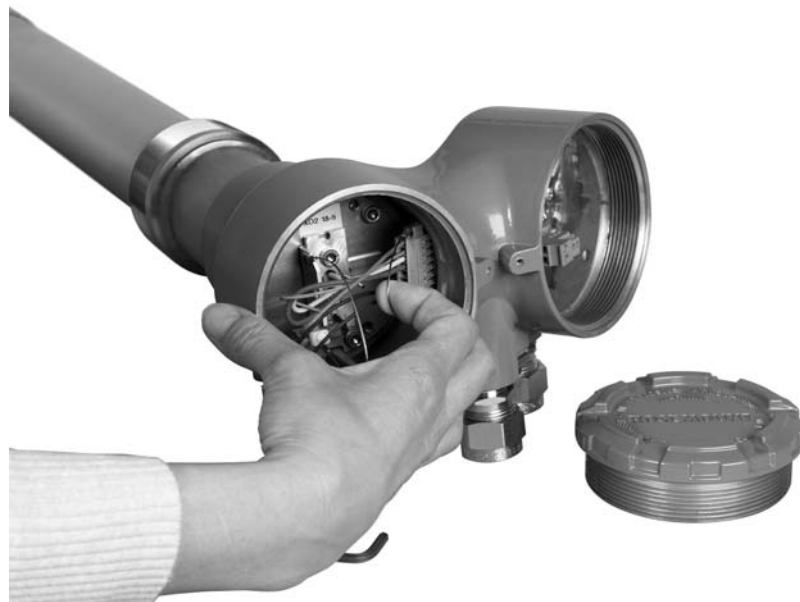
1. See Figure 6-1. Remove left housing cover (18) to access the core.
2. Remove three screws (19).
3. Disconnect the sensor connector plug from electronics board (8). Pull on the connector lanyard as shown in Figure 6-2.

NOTE

A connector plug with lanyard replacement kit is available in case the sensor connector plug is worn or damaged. Refer to Section 7: Replacement Parts for the replacement kit part number.

4. Disconnect cal gas and reference air hoses (Figure 6-3) from lower left and lower right ports in core assembly front plate.

Figure 6-2. Disconnecting
Connector Plug



38960018

Figure 6-3. Cal Gas and Reference Air Hoses

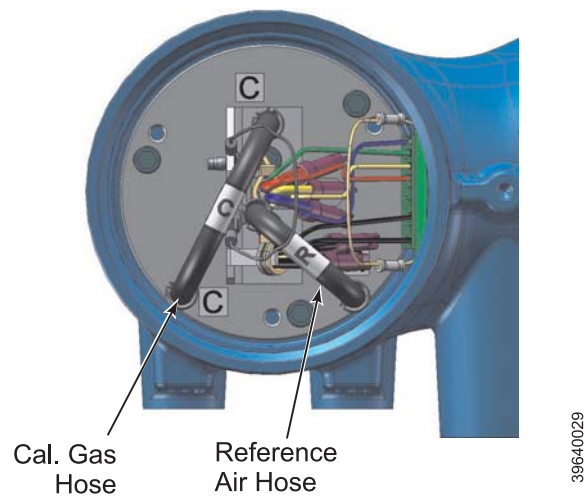
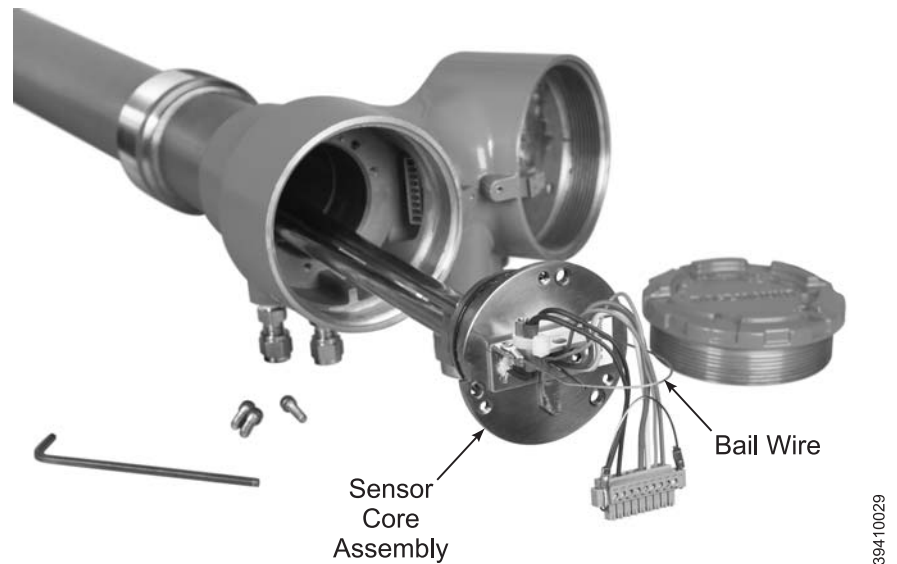


Figure 6-4. Sensor Core Removal



5. See Figure 6-4. Use the bail wire at the front of sensor core assembly to pull the assembly from probe tube.

NOTE

If pulling of the core assembly is difficult, screws (19, Figure 6-1) may be inserted into the threaded holes in the front plate and evenly tightened to "jack" the core assembly out. Longer screws (5/8 inch long) are provided in the part replacement kit.

6. Loosen the setscrews in diffuser (6, Figure 6-1). The snubber diffuser is shown but the ceramic and Hastelloy diffusers are attached similarly.

NOTE

If removing a ceramic or Hastelloy diffuser be sure to note the orientation of the rounded deflector so the diffuser can be reinstalled the same way.

7. Remove diffuser (6) from sensor core assembly (1). Replace damaged diffuser or sensor core assembly with a new replacement part.
 8. Remove the setscrews from the diffuser. Apply anti-seize compound to threads of setscrews and thread setscrews three turns into the diffuser.
-

NOTE

If installing a ceramic or Hastelloy diffuser be sure to orient the rounded deflector so it points upstream relative to the flue gas air flow.

9. Install diffuser (6) onto sensor core assembly (1) using the same orientation as noted in step 6. Tighten the diffuser setscrews.
 10. Apply a light coating of silicone grease onto the o-ring of sensor core assembly (1).
 11. Install sensor core assembly (1) in probe tube (7).
 12. Install and tighten three screws (19) to secure sensor core assembly (1) inside probe tube (7).
 13. Connect the sensor core plug to electronics board (8).
-

⚠ CAUTION

Do not use excessive force when installing the reference air or cal gas hose onto the connecting tube. Using excessive force can buckle the stainless steel tubing

Failure to correctly install the hoses may allow gas leakage and result in erroneous O₂ readings. Be sure to correctly install the calibration gas and reference air hoses.

14. Re-connect the cal gas and reference air hoses as shown in Figure 6-3. The cal gas hose connects between the hose ports marked "C". The reference air hose connects between the the hose ports marked "R".
-

NOTE

For the original X-STREAM configuration, each hose must pass through two o-rings in the related hose port. When inserting a hose into a hose port, feel for two "bumps" to be sure that the hose passes through both o-rings. When properly installed, no clear Teflon tubing should be visible at the hose ports.

If a hose or o-rings are worn or damaged, refer to "Replacing Gas/Air Hoses, O-rings and Spacers" for replacement instructions.

The current X-STREAM configuration uses black viton hoses and hose clamps for the refernce air and cal gas couduits inside the probe housing.

15. Recalibrate the probe per "Set Test Gas Values" in Section 3: Configuration of X-STREAM O₂ Transmitter.

X-STREAM O₂ Transmitter

Cell Removal

Use the following instructions to remove the O₂ sensing cell. Removal of the cell requires the special tools contained in tool kit PN 6A00290G01.

1. Follow the instructions in "Sensor Core or Diffuser Replacement", steps 1 through 5, to remove the sensor core assembly from the X-STREAM O₂ Transmitter.
2. See Figure 6-1. Loosen and remove the setscrews in diffuser (6).
3. At the front of the sensor core assembly, loosen the center-most screw about 6 turns to relieve the spring tension on the contact and thermocouple assembly.

NOTE

If removing a ceramic or Hastelloy diffuser be sure to note the orientation of the rounded deflector so the diffuser can be reinstalled the same way.

4. Remove diffuser (6).
5. Using the cell removal tool and 1/4 inch diameter pin from tool kit 6A00290G01, unscrew cell retainer (5) from core (1).
6. Remove cell (4), corrugated washer (3), and thermal insulator (2).
7. Use compressed air, 30 psig maximum, to blow out any loose pieces of insulation.
8. Look inside the heater housing and inspect the end of the contact pad for damage. The pad should be uniform disk shaped with a flat surface that mates against the surface of the sensing cell.
9. If any of the following damage conditions are found, replace the contact pad in the contact and thermocouple assembly according to the procedure that follows. If no damage is found, continue to "Cell Installation".
 - Contact pad missing (still bonded to cell)
 - Part of the contact pad missing (still bonded to cell)
 - Contact pad mesh unraveled

Replace Contact Pad

Replace the contact pad in the contact and thermocouple assembly according to the following procedure. See Figure 6-5.

1. Disconnect black heater wires (4) from the sensor core connector plug.
2. Remove screw (24) that secures the contact and thermocouple assembly to the sensor core base (7).
3. Slide contact and thermocouple assembly (5) out of core base (7). If resistance is felt, gently rotate the assembly in either direction to ease removal.
4. At the spring end of the ceramic insulator, locate the crimp on the conductor with blue sleeving. Cut both wires at the crimp to retain maximum wire length.
5. At the process end of the assembly, pull the wire partially out of the ceramic insulator and cut the pad from both wires. One of the wires is short and should be removed from this end.
6. On the spring end of the 4-bore ceramic insulator, pull the remaining blue-sleeved wire out of the insulator. Make sure both contact and thermocouple wires are completely removed.

Instruction Manual

IM-106-910, Revision 2.2

November 2009

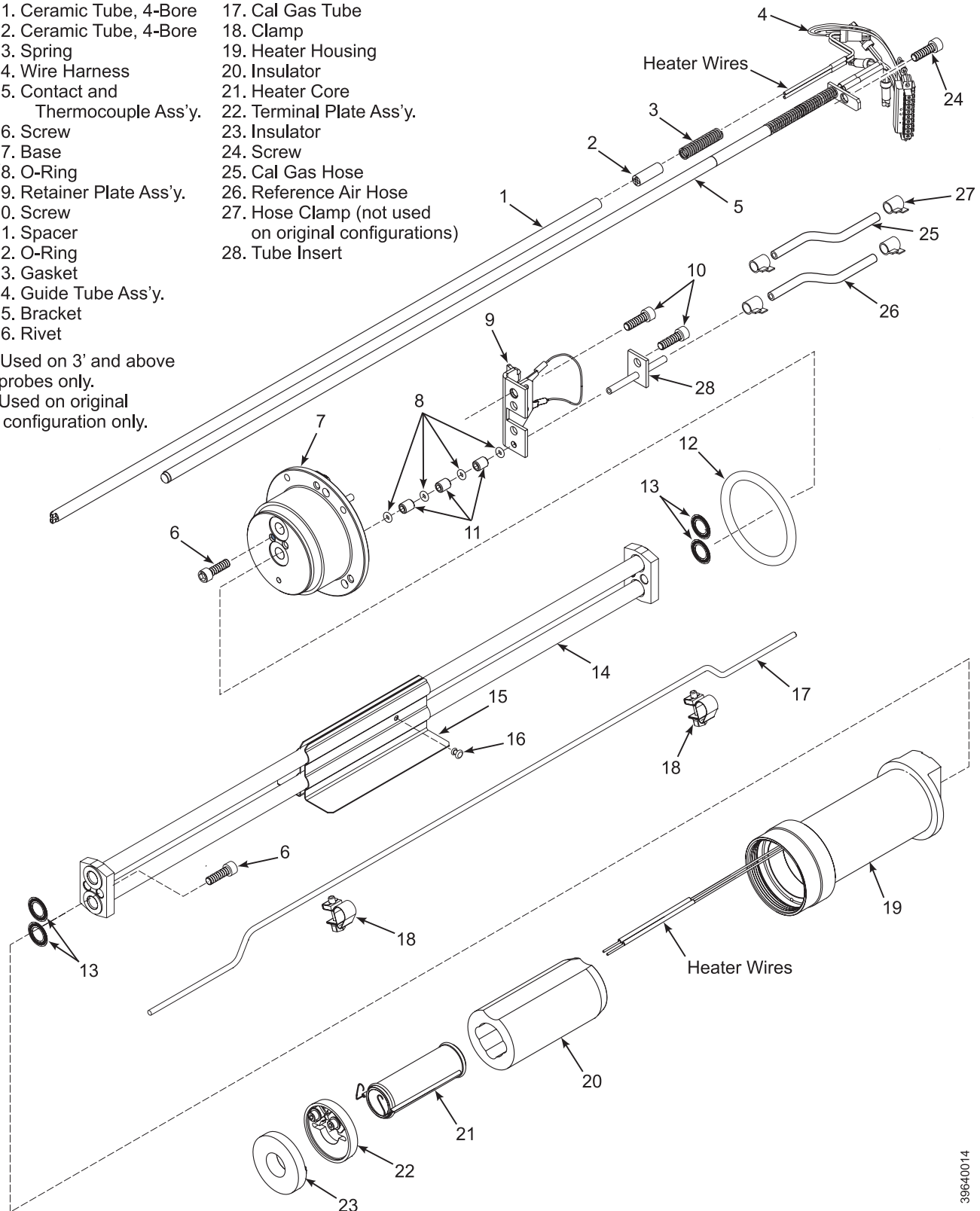
X-STREAM O₂ Transmitter

Figure 6-5. Sensor Core Assembly - Exploded View

- 1. Ceramic Tube, 4-Bore
- 2. Ceramic Tube, 4-Bore
- 3. Spring
- 4. Wire Harness
- 5. Contact and Thermocouple Ass'y.
- 6. Screw
- 7. Base
- †8. O-Ring
- 9. Retainer Plate Ass'y.
- 10. Screw
- †11. Spacer
- 12. O-Ring
- 13. Gasket
- 14. Guide Tube Ass'y.
- *15. Bracket
- *16. Rivet
- 17. Cal Gas Tube
- 18. Clamp
- 19. Heater Housing
- 20. Insulator
- 21. Heater Core
- 22. Terminal Plate Ass'y.
- 23. Insulator
- 24. Screw
- 25. Cal Gas Hose
- 26. Reference Air Hose
- 27. Hose Clamp (not used on original configurations)
- 28. Tube Insert

* Used on 3' and above probes only.

† Used on original configuration only.



39640014

NOTE

Handle the new contact with care to avoid bending the wires. The wires must remain straight for proper installation.

7. Uncoil the new contact assembly. Install the assembly into the ceramic insulator from the process end. See Figure 6-6 for correct insertion orientation. A gentle twisting motion will aid wire insertion. When the end of the wire reaches the spring, guide the wire through the center of the spring coils.
8. When properly installed, the pad diameter will be concentric with the end of the ceramic insulator. See Figure 6-7 for correct placement.
9. Locate the clear Teflon sleeve in the replacement kit. If the end of the Teflon sleeve is not cut cleanly, use a new razor knife to cut off a small portion. Cut no more than 1/16 inch (1,6 mm) from the sleeve end.

Figure 6-6. Contact Insertion in Ceramic Insulator



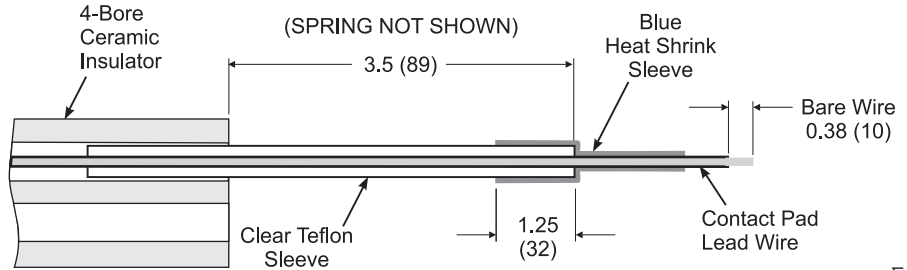
39410031

Figure 6-7. Contact Installed



39410032

Figure 6-8. Positioning Contact Pad Lead Insulation



NOTE: All dimensions are in inches with millimeters in parentheses.

39410041

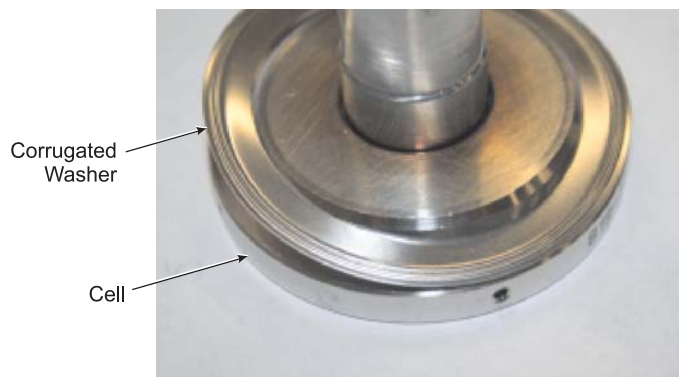
10. See Figure 6-8. Slide the clear Teflon sleeve over the end of the contact pad lead wire and into the 4-bore ceramic insulator. Use a twisting motion to ease sleeve installation. When properly installed the clear Teflon sleeve should extend 3.5 inch (89 mm) from the ceramic insulator.
11. Locate the blue heat shrink sleeve in the replacement kit. Slide the heat shrink sleeve over the Teflon sleeve. When properly installed, the heat shrink sleeve should overlap the Teflon sleeve by 1.25 inch (32 mm).

NOTE

Be careful not to push the clear Teflon sleeve further into the ceramic insulator when installing the blue heat shrink.

12. Use a heat gun or equivalent to shrink the blue heat shrink sleeve in place.
13. Trim the exposed bare wire to 0.38 inch (10 mm).
14. Strip the blue wire from the 9-position connector to 0.25 inch (6 mm).
15. Crimp the two wire ends together using a suitable crimp tool.
16. See Figure 6-5. Insert the contact and thermocouple assembly (5) into the sensor core base (7). A twisting motion can be used to ease installation.
17. Loosely thread screw (24) through the ground lead terminal and retaining plate into the core base (7). Do not put tension on the spring.

Figure 6-9. Sensing Cell and Gasket



39410033

Cell Installation

Use the following instructions to install a new O₂ sensing cell.

1. Apply anti-seize compound to flange of new cell, Figure 6-9.
2. Place new corrugated washer onto cell flange with the ridges pointing up as shown in Figure 6-9. Fit is tight. Hold gasket in place with one finger then "walk" the gasket in place using another finger. Use care not to bend or kink the washer.
3. Apply anti-seize compound to exposed surface of corrugated washer.
4. Install the new cell (4, Figure 6-1) with corrugated washer (3) into the end of sensor core assembly (1).
5. Apply anti-seize compound to threads of cell retainer (5) and mating threads in heater housing.
6. Thread cell retainer (5) into the heater housing. Use cell removal tool and 1/4 inch diameter pin to tighten cell retainer to 30 ft-lbs (40,67 N·m).
7. Tighten screw (24, Figure 6-5) to secure contact and thermocouple assembly (5).
8. Remove the setscrews from diffuser (6, Figure 6-1).
9. Apply anti-seize compound to threads of setscrews and thread setscrews three turns into diffuser.

CAUTION

If installing a ceramic or Hastelloy diffuser be sure to orient the rounded deflector so it points upstream relative to the flue gas air flow.

10. Install diffuser (6) in the same orientation as the old diffuser. Install and tighten the diffuser setscrews.
11. Apply a light coating of silicone grease onto the o-ring of sensor core assembly (1).
12. Install sensor core assembly (1) in probe tube (7).
13. Install and tighten three screws (20) to secure sensor core assembly (1) inside probe tube (7).
14. Connect the sensor core plug to electronics board (8).

CAUTION

Do not use excessive force when installing the reference air or cal gas hose onto the connecting tube. Using excessive force can buckle the stainless steel tubing.

Failure to correctly install the hoses may allow gas leakage and result in erroneous O₂ readings. Be sure to correctly install the calibration gas and reference air hoses.

15. Re-connect the cal gas and reference air hoses as shown in Figure 6-3. The cal gas hose connects between the hose ports marked "C". The reference air hose connects between the the hose ports marked "R".

NOTE

For the original X-STREAM configuration, each hose must pass through two o-rings in the related hose port. When inserting a hose into a hose port, feel for two "bumps" to be sure that the hose passes through both o-rings. When properly installed, no clear Teflon tubing should be visible at the hose ports.

If a hose or o-rings are worn or damaged, refer to "Replacing Gas/Air Hoses, O-rings and Spacers" for replacement instructions.

The current X-STREAM configuration uses black viton hoses and hose clamps for the reference air and cal gas conduits inside the probe housing.

Replace Contact & Thermocouple Assembly

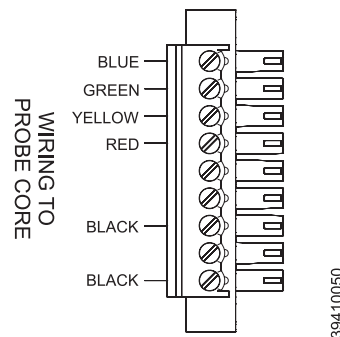
16. Recalibrate the probe per "Set Test Gas Values" in Section 3 of this instruction manual.
 1. See Figure 6-1. Remove left housing cover (18) to access the core.
 2. Remove three screws (19).
 3. Disconnect the sensor connector plug from electronics board (8). Pull on the connector lanyard as shown in Figure 6-2.
 4. Disconnect black heater wires from the connector plug.
 5. Remove screw (24, Figure 6-5).

CAUTION

If the contact and thermocouple assembly does not come free with a light pull, do not pull harder. Failure to correctly free the contact pad from the cell may result in damage to the contact and thermocouple assembly.

6. Pull lightly on contact pad assembly (5). If it does not slide free from guide tube assembly (14), twist the assembly to break the temporary "weld" between the contact pad and cell (4).
7. Remove contact and thermocouple assembly (5) from sensor core assembly.
8. Slide the new contact and thermocouple assembly (5) into the sensor core base (7). A twisting motion can be used to ease installation.

Figure 6-10. Contact and Thermocouple Wiring



X-STREAM O₂ Transmitter

9. Install screw (24) through the ground lead terminal and retaining plate into the core base (7). Tighten the screw.
10. Reconnect black heater wires at the connector plug. Refer to Figure 6-10. Polarity on the two black wires is not specified.
11. Re-connect sensor core plug to the electronics board (8, Figure 6-1).
12. Recalibrate the probe per "Set Test Gas Values" in Section 3 of this manual.

Replacing Gas/Air Hoses, O-rings and Spacers

The hose connection design for the cal gas and reference air hoses within the probe housing was changed. In the initial release of the X-STREAM, a blue colored cal gas hose and a yellow colored reference air hose passed through o-rings and spacers seated in three of the four female hose ports. The current X-STREAM design uses male pipe nipples at all four hose attachment locations. Black viton hoses and clamps (25, 26, and 27, Figure 6-5) attach to the pipe nipples.

Use the procedure that follows to replace the gas and reference air hoses.

1. See Figure 6-1. Remove left housing cover (18) to access the core.
2. Remove three screws (19).
3. Disconnect the sensor connector plug from electronics board (8). Pull on the connector lanyard as shown in Figure 6-2.

NOTE

A connector plug with lanyard replacement kit is available in case the sensor connector plug is worn or damaged. Refer to Section 7: Replacement Parts for the replacement kit part number.

4. Disconnect cal gas and reference air hoses (Figure 6-3) from lower left and lower right ports in core assembly front plate.
5. See Figure 6-4. Use the bail wire at the front of sensor core assembly to pull the assembly from probe tube.

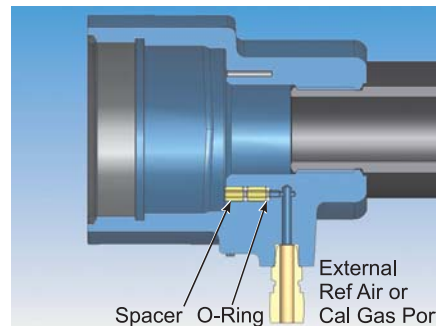
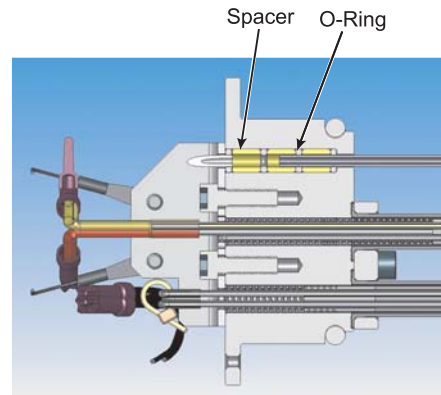
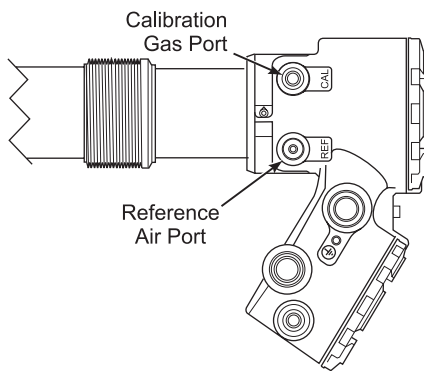
NOTE

If pulling of the core assembly is difficult, screws (19, Figure 6-1) may be inserted into the threaded holes in the front plate and evenly tightened to "jack" the core assembly out. Longer screws (5/8 inch long) are provided in the part replacement kit. It is possible to replace the gas and air hoses, spacers and O-rings without having to remove the core from the probe tube.

6. See Figure 6-11. In the initial release X-STREAM, one port in the core base and the two ports in the probe housing were fitted with spacers and o-rings. The sensor core port had three spacers and four o-rings. If the transmitter you are servicing is an initial release X-STREAM, replace the o-rings and spacers with the components provided in the calibration and reference tubing retrofit kit, part number 6A00355G01. Refer to the retrofit instructions included with the kit.
7. If replacing the cal gas and reference air hoses in the current X-STREAM configuration, remove and replace hoses and clamps (25, 26, and 27, Figure 6-5).

Figure 6-11. Spacers and O-Rings

NOTE: O-ring and spacers with yellow and blue hoses used on early X-STREAM configurations only. Current configuration uses black viton hoses and clamps for cal gas and reference air conduits in the probe head.

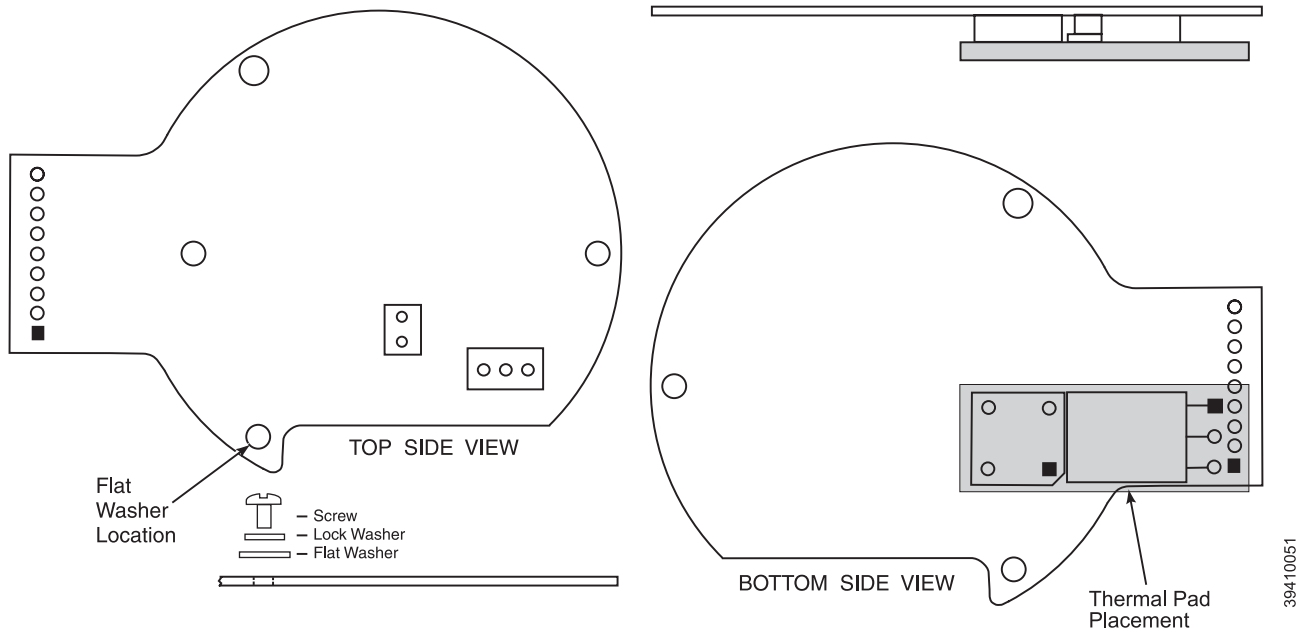


39640019

Electronics Board Replacement

1. See Figure 6-1. Remove right cover (12) to uncover the electronics assembly.
2. Disconnect the power and signal wires from electronics board (8).
3. Remove left cover (18) to access the heater and cell connectors.
4. Disconnect the sensor core connector plug from electronics board (8).
5. Remove four mounting screws (14), lock washer (15), and flat washers (16). Carefully remove electronics board (8) from the electronics housing. Thermal pad (17) should be removed with the electronics board.
6. Carefully align new electronics board (8) in the right side of the electronics housing.
7. Make sure thermal pad (17) is correctly positioned on the back side of the electronics board. Refer to Figure 6-12.
8. Install single flat washer (16, Figure 6-1), four lock washers (15), and mounting screws (14). Tighten mounting screws.

Figure 6-12. Thermal Pad Placement



NOTE

The single flat washer (16) must be installed in the specified location to maintain EMC/EMI noise protection.

9. Connect the sensor core connector plug to electronics board (8).
10. Connect the power and signal wires to electronics board (8).
11. Install left cover (18) and right cover (12).
12. Recalibrate the probe per "Set Test Gas Values" in Section 3: Configuration of X-STREAM O₂ Transmitter.

Blind Cover(s) Replacement

Use the procedure that follows to replace the blind cover(s) on the transmitter.

⚠ WARNING

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

Replacing Left Housing Cover

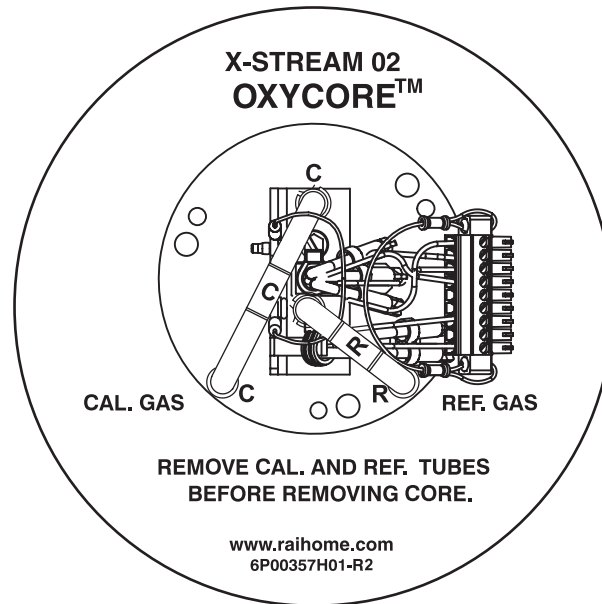
1. Remove existing housing cover from the left hand side of the probe housing.

NOTE

A Core Information Label (21, Figure 6-1) is required for the inside surface of the left housing cover.

2. Peel off the backing from the Core Information Label (21, Figure 6-1). Attach the new label to the inside of the new cover (18). The graphic image on this label is shown in Figure 6-13.
3. Install the new housing cover (18, Figure 6-1) onto the probe housing.

Figure 6-13. Core Information Label



Replacing Right Housing Cover

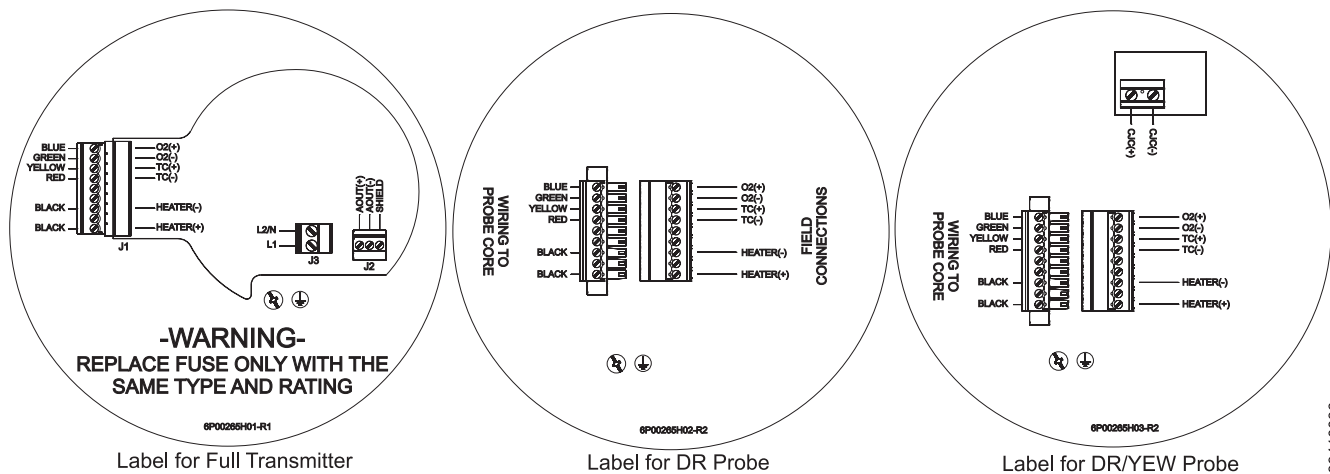
1. Remove existing housing cover (12, Figure 6-1) from the right hand side of the probe housing.

NOTE

A field wiring label is required for the inside surface of the right housing cover.

2. Select the new field wiring label (10) that matches the existing label on the inside of the old cover.
3. Peel off the backing from the field wiring label and attach the new label to the inside of the new cover. The graphic image that appears on this label is shown in Figure 6-14.
4. Install the new housing cover (12, Figure 6-1) onto the probe housing.

Figure 6-14. Field Wiring Label



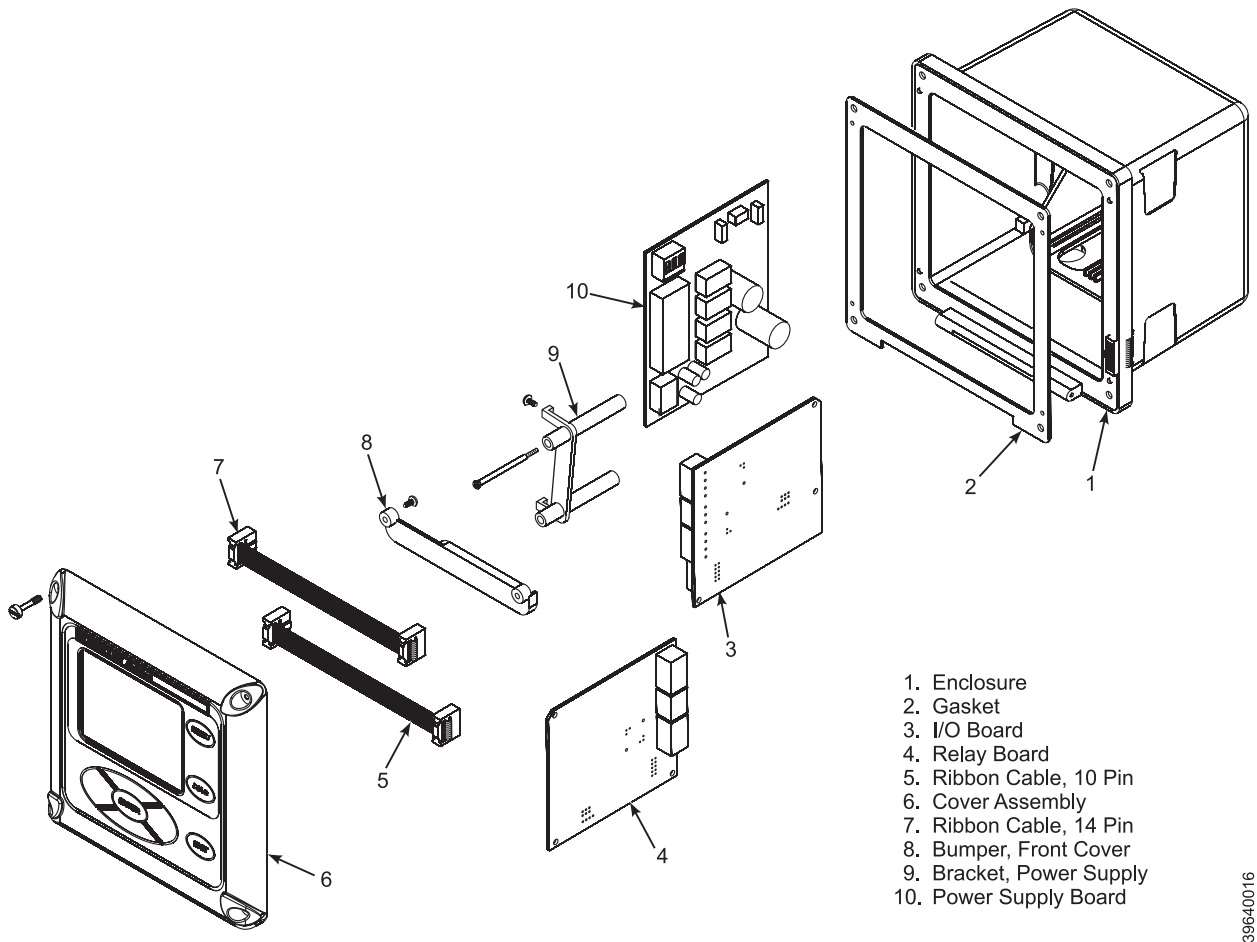
39410036

XI COMPONENTS REPLACEMENT

Each of the following procedures details how to replace a specific component of the Xi Enhanced Interface. Most of these procedures include component setup instructions that must be performed before returning the related X-STREAM O₂ Transmitter to service. Refer to Figure 6-15 and Figure 6-16 for illustrations of the Xi components.

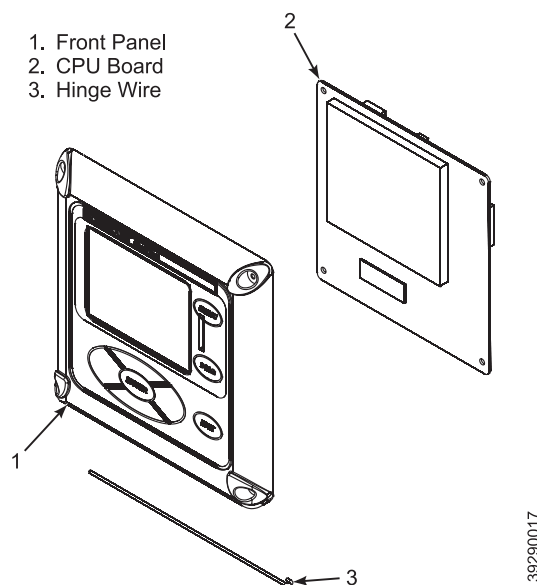
Component replacement kits are available for each of the components replaced in this repair section. Refer to Section 7: Replacement Parts for kit part numbers.

Figure 6-15. Xi Components



39640016

Figure 6-16. Xi Front Panel Components



I/O Board Replacement

Use the procedure that follows to replace and set up the I/O board in the Xi Enhanced Interface.

⚠ WARNING

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

⚠ CAUTION

The I/O Board is shipped from the factory without any of the enhanced software features activated. These features must be activated once the new board has been installed and before the Remote Interface is put into service.

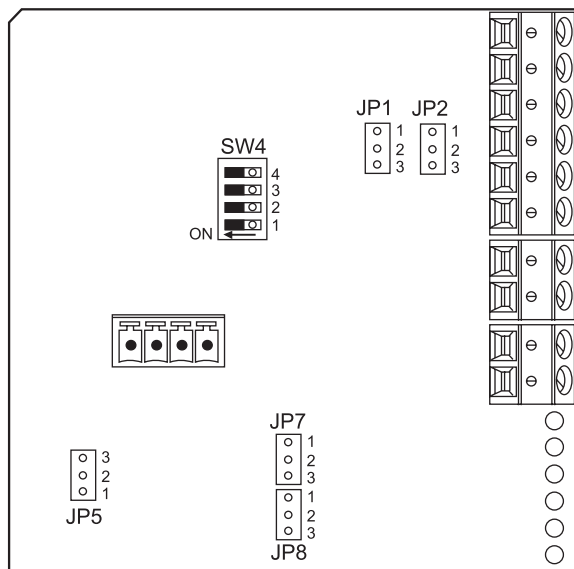
⚠ CAUTION

If the existing I/O Board has been operated with the Stoichiometric enhanced software feature, this feature must be activated in the new board before the Xi Enhanced Interface is put back into service. Failure to do so will cause a false analog output signal to the DCS.

Replacing an Existing I/O Board

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Disconnect the 10-pin ribbon cable from the I/O Board. A new cable is supplied in the replacement kit and should be used if the old one is damaged.
4. Tag and disconnect wiring for Alarm Outputs, Flame Status Input and/or SPS/IMPS as applicable.
5. Slide the I/O Board part way out of the Xi enclosure.
6. Disconnect the 4-position plug for the transmitter probe and output wiring. Remove the I/O Board completely from the Xi enclosure.
7. Set jumpers JP1, JP2, JP5, JP7 and JP8 to their proper positions using the old I/O Board as a guide. See Figure 6-17.
8. Set switch SW4 to their proper positions using the old I/O Board as a guide. See Figure 6-17.
9. Partially slide the new I/O Board into the Xi enclosure. Ensure the board is correctly aligned within the slots in the enclosure.
10. Connect the 4-position plug for the transmitter probe and output wiring. Slide the I/O Board completely into the Xi enclosure.

Figure 6-17. I/O Board Jumper & Switch Settings



Configuration	Desired Selection	Jumper	Jumper Setting
Flame Safety Function or Extra Alarm Output	Flame Safety Function (Factory configured when ordered with Flame Safety Interlock Feature)	JP1 & JP2 (both must be set the same)	Pins 1 & 2
	Extra Alarm Output		Pins 2 & 3
Loop Power for 4-20 mA/HART Signal from Xi Enhanced Interface to Transmitter Probe	Powered from Xi Enhanced Interface (most common method)	JP5	Pins 1 & 2
	Powered from External DC Supply		Pins 2 & 3
Loop Power for 4-20 mA/HART Signal from Xi Enhanced Interface to DCS	Powered from Xi Enhanced Interface	JP7 & JP8 (both must be set the same)	Pins 1 & 2
	Powered from DCS		Pins 2 & 3

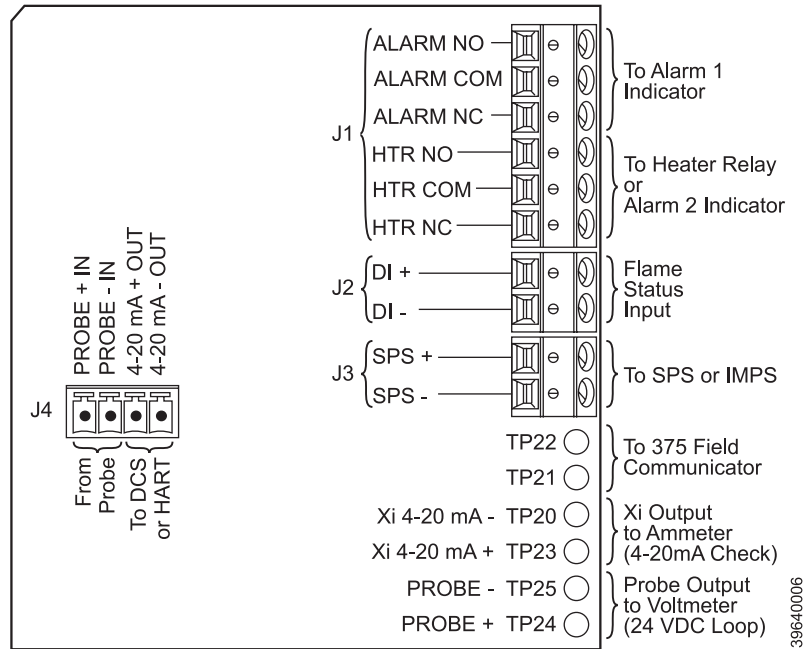
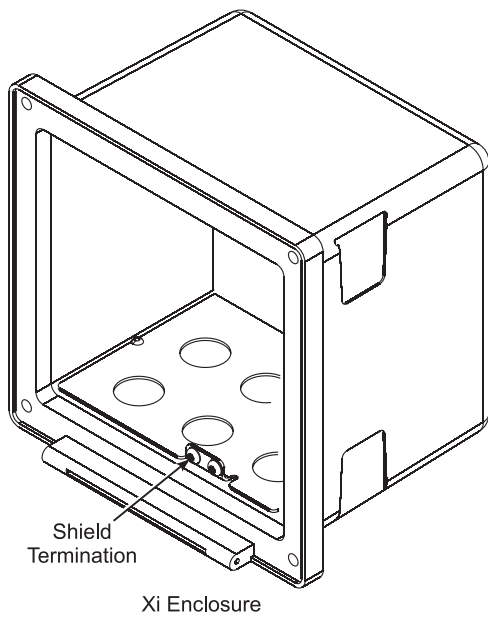
Sw4 Switch Settings: (Default = OFF)

- 1: Reserved; must remain OFF.
- 2: Not used.
- 3: Not used.
- 4: Flame safety function enable.

40050003

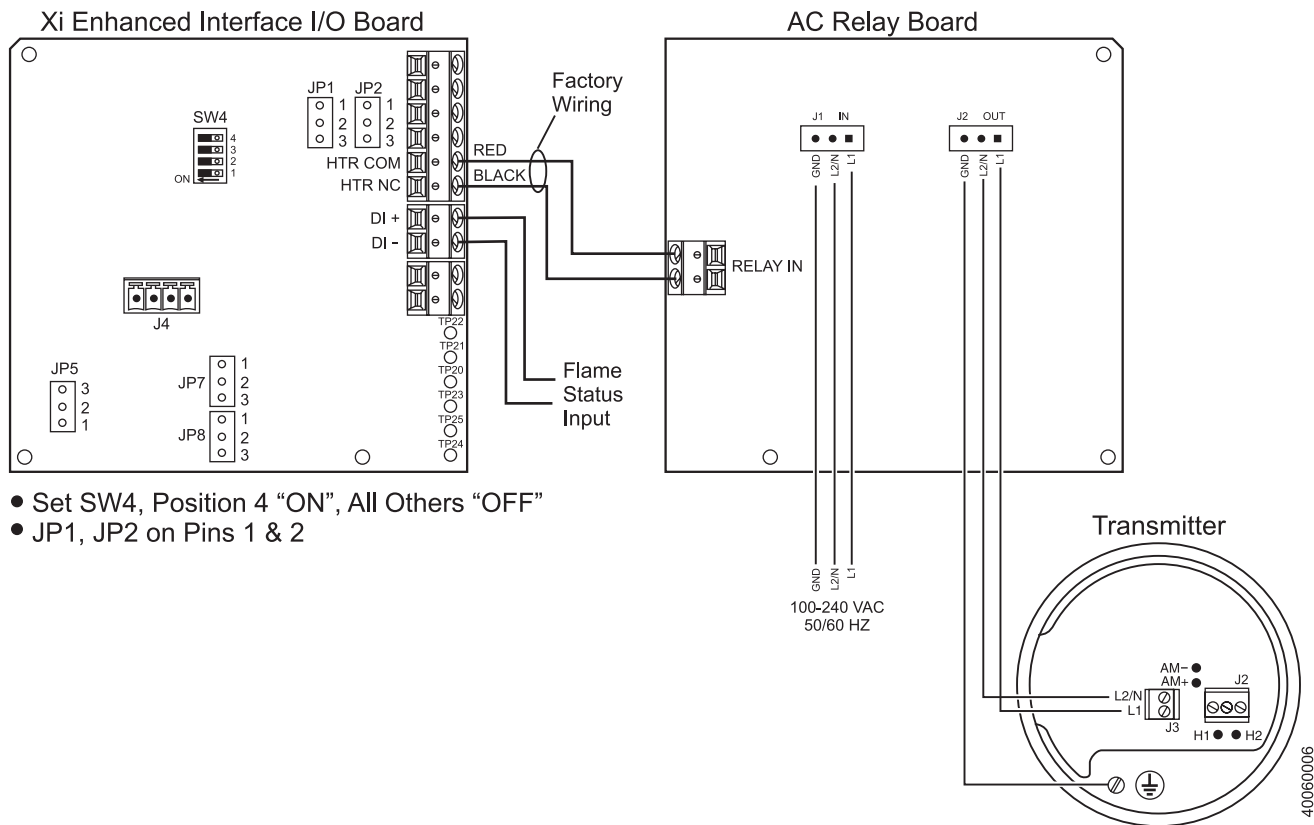
X-STREAM O₂ Transmitter

Figure 6-18. I/O Board Wiring Connections



39640006

Figure 6-19. /O Board Flame Safety Interlock Wiring



11. Reinstall wiring for Alarm Outputs, Flame Status Input and/or SPS/IMPS as applicable. See Figure 6-18 and Figure 6-19 for wiring diagrams.
12. Connect the ribbon cable to the I/O Board. A new cable is supplied and should be used if the old one is damaged.
13. Swing the Xi cover up in place and tighten the four screws.
14. Prior to operating the X-STREAM and the Xi Enhanced Interface, all optional software enhancements (previously enabled or not) must be enabled. Notify Rosemount Analytical Inc. and reference the following part numbers to enable the related software options:

Part Number	Software Option
6A00269G01	Enhanced Software Option Upgrade, Stoichiometric Function
6A00269G02	Enhanced Software Option Upgrade, Programmable Reference Function
6A00269G03	Enhanced Software Option Upgrade, 850°C Process Function

NOTE

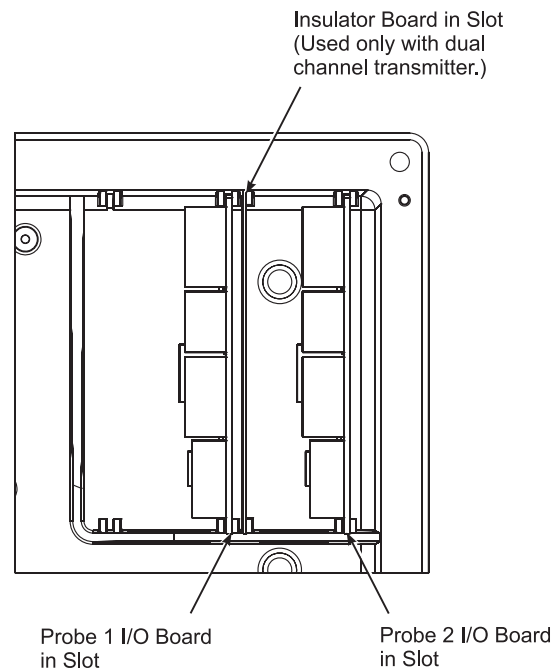
For enhanced software upgrades or to enable optional software features previously used in your X-STREAM O₂ Transmitter configuration, contact Rosemount Analytical Inc. at 1-800-433-6076.

15. Recalibrate the O₂ Transmitter according to the applicable calibration instructions in Section 4: Startup and Operation.

Adding a Second I/O Board

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. On the new I/O Board, set jumpers JP1, JP2, JP5, JP7 and JP8 to their proper positions. Refer to Figure 6-17.
4. Set switch SW4 selectors to their proper positions. See Figure 6-17.
5. Slide the insulator into the slot adjacent to the I/O Board for Probe 1. Ensure the insulator is correctly aligned within the slots in the Xi enclosure. See Figure 6-20 for the correct location of the insulator.
6. Partially slide the new I/O Board into the right-most slot in the Remote Interface. Ensure the board is correctly aligned within the slots in the enclosure. See Figure 6-20 for the correct location of the I/O Boards.
7. Install wiring for Alarm Outputs, Flame Status Input and/or SPS/IMPS as applicable. A wiring diagram is provided in Figure 1 for installation of the wires. Slide the I/O Board completely into the Xi enclosure.
8. Connect the ribbon cable to the I/O Board and to the "SENSOR 2" connector on the CPU board.
9. Swing the cover up in place and tighten the four screws.
10. Configure the O₂ Transmitter according to the applicable instructions in Section 3: Configuration of X-STREAM O₂ Transmitter.
11. Recalibrate the O₂ Transmitter according to the applicable calibration instructions in Section 4: Startup and Operation.

Figure 6-20. I/O Board Positions in the Xi Enclosure



39410035

AC Relay Board Replacement

Use the procedure that follows to replace and set up the AC Relay board in the Xi Enhanced Interface.

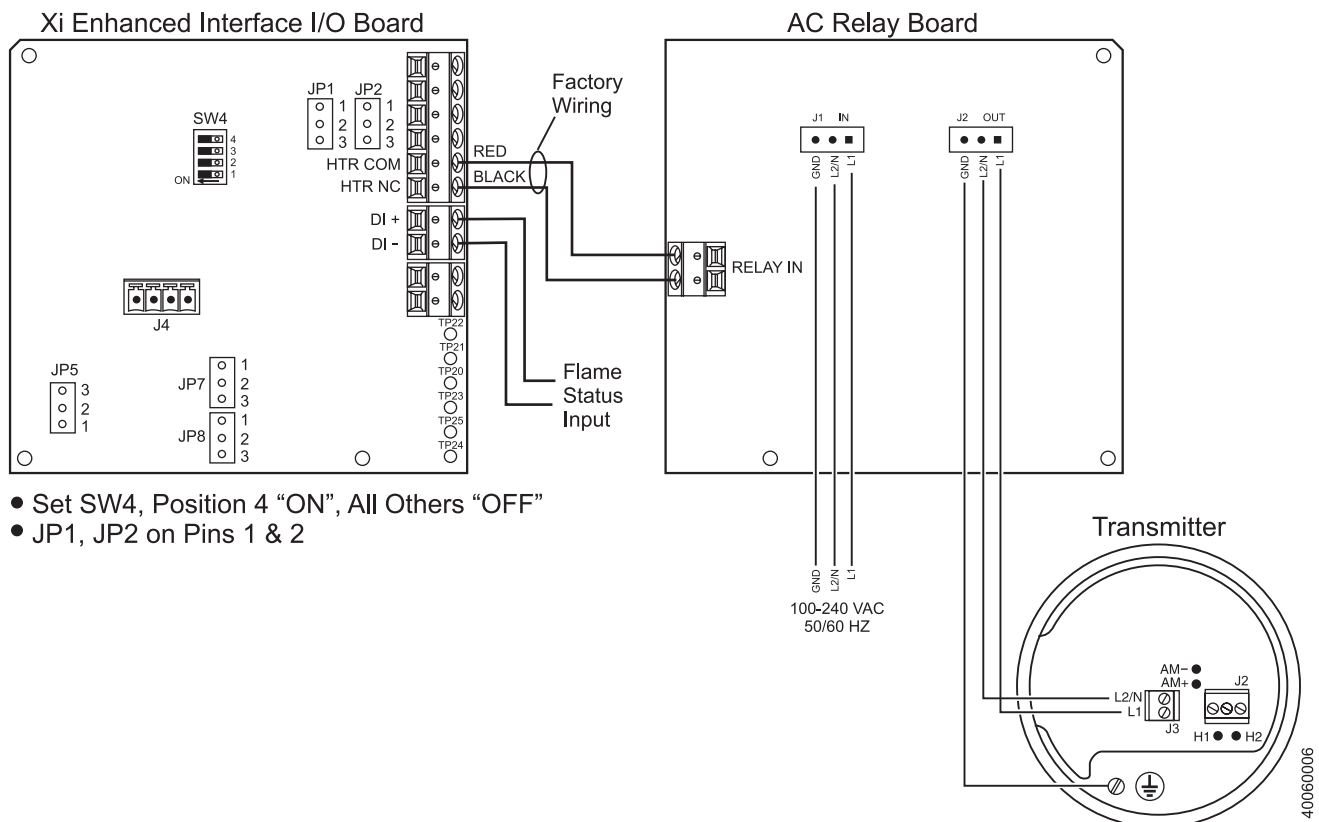
⚠ WARNING

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

Replacing an Existing AC Relay Board

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Tag and disconnect wiring for the Relay In.
4. Slide the AC Relay Board part way out of the Xi enclosure.
5. Tag and disconnect the two 3-position plugs for the AC input and transmitter probe heater wiring. Remove the AC Relay Board completely from the Xi enclosure.
6. Partially slide the new AC Relay Board into the Xi enclosure. Ensure the board is correctly aligned within the slots in the enclosure.
7. Connect the two 3-position plugs for the AC input and transmitter probe heater wiring. Slide the AC Relay Board fully into the Xi enclosure.

Figure 6-21. I/O & AC Relay Board Flame Safety Interlock Wiring



8. Reinstall wiring for Relay In. See Figure 6-21 for wiring diagram.
9. Swing the cover up in place and tighten the four screws.

⚠ CAUTION

Installing and configuring an AC Relay Board for the Flame Status Interlock function will dedicate alarm output 2 for this function. Once configured for Flame Status Interlock, the software will override any previous alarm assignments for alarm output 2 and not allow it to be used for any other function.

Adding an AC Relay Board to the Xi Enhanced Interface

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Slide the I/O Board part way out of the Xi enclosure.
4. Make the following jumper and switch settings:
 - a. Set SW4, Position 4 "ON" and all other positions "OFF".
 - b. Move the jumpers for both JP1 and JP2 to pins 1 and 2.
5. The I/O Board must be relocated to the right-most slot inside the Xi enclosure. If there is enough service loop on the existing wiring, slide the I/O Board completely out of the enclosure and re-install it in the right-most slot. Ensure the board is correctly aligned within the slots. See Figure 6-22 for the correct location of the I/O Board.

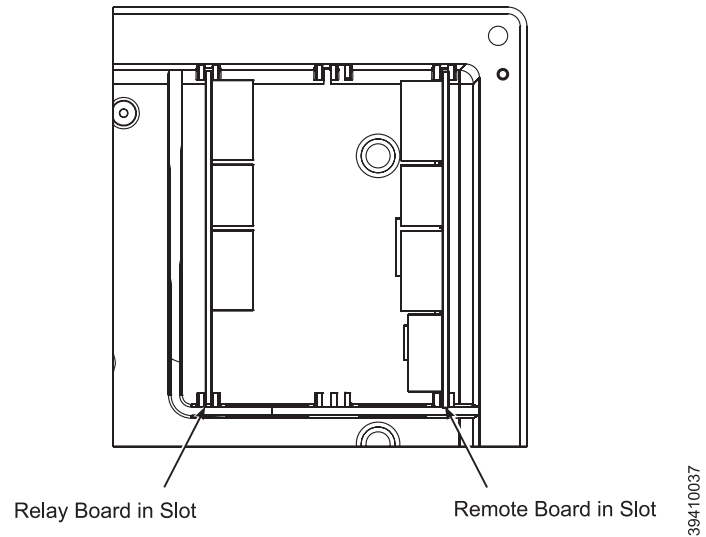
NOTES

An AC Relay Board can only be added to single channel Xi Enhanced Interface, i.e. only one I/O Board controlling one X-STREAM O₂ Transmitter.

The Flame Status Interlock function requires a contact closure on the digital input of the I/O Board to indicate a flame is present. When properly connected and configured, AC power will be applied to the transmitter only when the flame is present.

6. If there is not sufficient wiring, tag and disconnect all wiring, and relocate the board. Then reinstall the wiring.
7. Partially slide the AC Relay Board into the left-most slot of the Xi enclosure. The component side of the AC Relay board will be to the right with the fuse holder at the top. Ensure the board is correctly aligned within the slots in the enclosure. See Figure 6-22 for the correct location of the AC Relay Board.

Figure 6-22. I/O and AC Relay Board Position in Xi Enclosure



8. Connect two wires approximately 6" long each between the "HTR COM" and the "HTR NC" connections on the I/O Board and the "RELAY IN" connections on the AC Relay Board; observe polarity. See Figure 6-21 for wiring details.
9. Connect the flame status indicator contact to the "DI+" and "DI-" on the AC Relay Board. See Figure 6-21 for wiring details.
10. Connect the AC input and output wiring to the Transmitter. See Figure 6-21 for wiring details.
11. Slide the AC Relay Board completely into the Xi enclosure.
12. Swing the cover up in place and tighten the four screws.

Power Supply Board Replacement

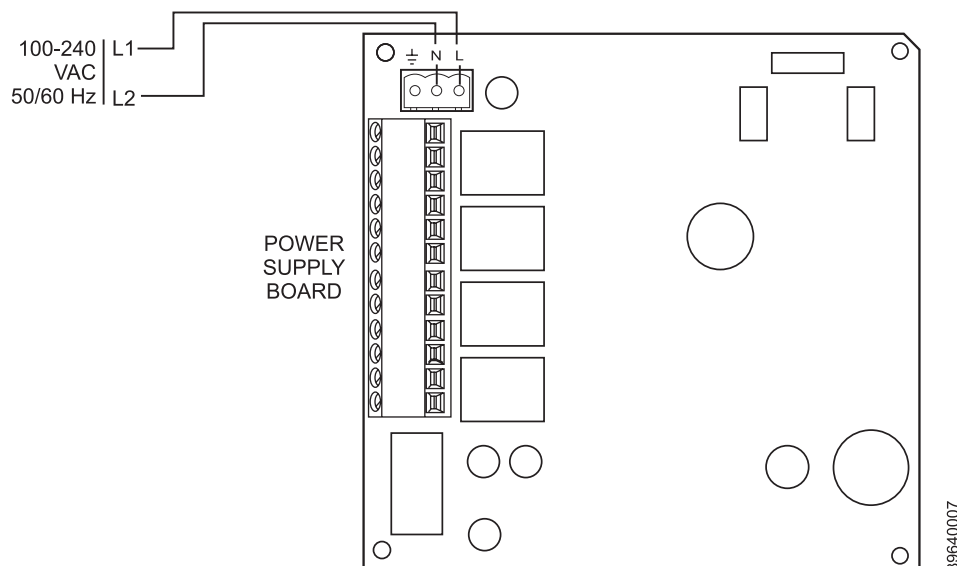
Use the procedure that follows to replace the Power Supply board in the Xi Enhanced Interface. Use this procedure to replace an original Linear Power Supply board or the current configuration Switching Power Supply board.

⚠ WARNING

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

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Refer to the wiring diagram in Figure 6-23. Unplug the AC input wiring plug from the Power Supply board. A new plug is supplied in the replacement kit and should be used if the existing plug is damaged.
4. Disconnect the 14-pin ribbon cable from the Power Supply board.
5. Remove the two long screws that secure the bracket (9, Figure 6-15) to the Xi enclosure.
6. Hold the AC input wiring to the right and slide the Power Supply board out of the Xi enclosure.
7. Install the new mounting bracket (9, Figure 6-15) on the new Power Supply board (10, Figure 6-15). A new bracket and mounting screws are provided in the replacement kit.
8. Slide the Power Supply board into the mating slots in the Xi Enclosure. Make sure the board is correctly aligned in the slots.
9. Install and tighten the bracket mounting screws. Two new screws are provided in the replacement kit and should be used if the existing screws are damaged.

Figure 6-23. Power Supply Board Wiring



Xi Front Panel Replacement

10. Connect the ribbon cable to the Power Supply board. A new ribbon cable (7, Figure 6-15) is provided in the replacement kit and should be used if the existing cable is damaged.
11. Connect the AC power plug to the Power Supply board.
12. Swing the Xi cover up and tighten the four mounting screws.

Use the procedure that follows to replace the front panel on the Xi Enhanced Interface. Replacement kits with and without the CPU board are available. Use the instructions that apply to the replacement kit you have.

WARNING

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

Replacing Front Panel Assembly without CPU Board

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Disconnect the 14-pin ribbon cable going to the Power Supply board. A new cable is supplied in the replacement kit and should be used if the old one is damaged.
4. Disconnect the 10-pin ribbon cable(s) going to the I/O Board(s). One new cable is supplied in the replacement kit and should be used if either of the ribbon cables are damaged.
5. Remove the wire hinge from the right side of the Xi cover. A paper clip or similar device can be inserted into the hole on the left side of the cover to push the hinge out of the cover. A new hinge pin is supplied in the replacement kit and should be used if the old one is damaged.
6. Position the new front panel assembly in place and reinstall the hinge pin. Ensure the hinge pin is fully seated into the Xi cover.

CAUTION

The new front panel assembly may be supplied with protective clear membranes over the interior and exterior of the window. Failure to remove the exterior protective membrane may cause the display to appear distorted. The membrane may be difficult or impossible to remove after extended use at elevated temperatures.

7. The keypad window on the new front panel may be supplied with interior and exterior protective membranes. Remove the protective membranes prior to final assembly and use of the Xi enclosure.
8. Reconnect the 10-pin ribbon cable from the I/O Board.
9. Reconnect the 14-pin ribbon cable from the Power Supply Board.
10. Swing the Xi cover up in place and tighten the four screws.
11. If necessary, reconfigure the appearance of the main display. Refer to Section 3: Configuration of X-STREAM O₂ Transmitter.

Replacing Front Panel Assembly without CPU Board

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Disconnect the 14-pin ribbon cable going to the Power Supply board. A new cable is supplied in the replacement kit and should be used if the old one is damaged.
4. Disconnect the 10-pin ribbon cable(s) going to the I/O Board(s). One new cable is supplied in the replacement kit and should be used if either of the ribbon cables are damaged.
5. Remove the wire hinge from the right side of the Xi cover. A paper clip or similar device can be inserted into the hole on the left side of the cover to push the hinge out of the cover. A new hinge pin is supplied in the replacement kit and should be used if the old one is damaged.
6. Place the front panel assembly on the bench. Remove the 4 screws securing the CPU board to the front cover.

NOTE

Prior to disassembly, observe the position of the plastic bumper with rubber insert as it is installed over the CPU board. The two longer screws are used on the top edge of the CPU board passing through the bumper.

7. Lift the CPU board off of the front cover using care not to damage the board.
8. Disconnect the keypad overlay ribbon cable from the CPU board. Discard the used front cover with the keypad overlay attached.

CAUTION

The new front panel assembly may be supplied with protective clear membranes over the interior and exterior of the window. Failure to remove the exterior protective membrane may cause the display to appear distorted. The membrane may be difficult or impossible to remove after extended use at elevated temperatures.

9. The keypad window on the new front panel may be supplied with interior and exterior protective membranes. Remove the protective membranes prior to final assembly and use of the Xi enclosure.

NOTE

Prior to assembly, it is recommended that the inside of the keypad overlay window and LCD display window be gently cleaned to remove fingerprints and accumulated dust.

10. Clean the inside of the keypad overlay window and LCD display window to remove fingerprints and accumulated dust. Use only a soft cloth; do not use any detergents or chemicals.
11. Connect the keypad overlay ribbon cable on the new front panel assembly to the CPU board. Use care not to damage the board.
12. Position the CPU board in place in the front panel assembly.

13. Reinstall the bumper and 4 screws to secure the CPU board in place. The two longer screws are used with the plastic bumper on the top edge of the CPU board.
14. Position the front panel assembly and reinstall the hinge pin. Ensure the hinge pin is fully seated into the Xi cover.
15. Reconnect the 10-pin ribbon cable from the I/O Board.
16. Reconnect the 14-pin ribbon cable from the Power Supply Board.
17. Swing the Xi cover up in place and tighten the four screws.
18. If necessary, reconfigure the appearance of the main display. Refer to Section 3: Configuration of X-STREAM O₂ Transmitter.

DR Board Replacement

Use the procedure that follows to replace the DR board in the Xi Enhanced Interface that is connected to a Direct Replacement X-STREAM probe.

WARNING

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

1. Loosen the four screws securing the Xi cover. The screws are captive and do not need to be completely removed.
2. Swing the Xi cover down to expose the inner components.
3. Slide the DR board part way out of the Xi enclosure.
4. Unplug the wiring harness plug from the connector J8 located on the bottom, left-hand side of the board. Refer to Figure 6-24.
5. Unplug the wiring harness plugs from the connectors J1, J2, and J3 located on the top, right-hand side of the board. Refer to Figure 6-25.
6. Tag and disconnect the wiring to connector J4.
7. Remove the DR board from the Xi enclosure.
8. Partially slide the new DR board into the mating slots in the Xi Enclosure. Make sure the board is correctly aligned in the slots.
9. Refer to the wiring diagram in Figure 6-24. Reconnect the wiring to connector J4.
10. Connect the wiring harness plugs to connectors J1, J2, J3, and J8.
11. Slide the DR board completely into the Xi enclosure.
12. Swing the Xi cover up and tighten the four mounting screws.

X-STREAM O₂ Transmitter

Figure 6-24. DR Board Wiring,
Right-Hand Side

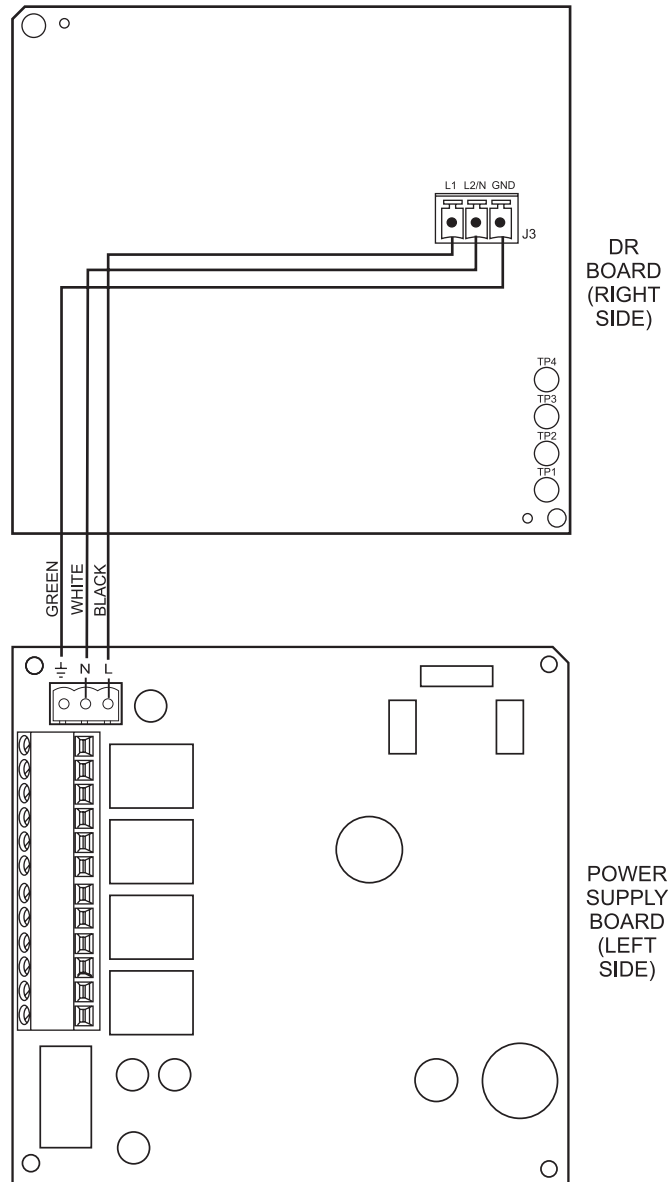
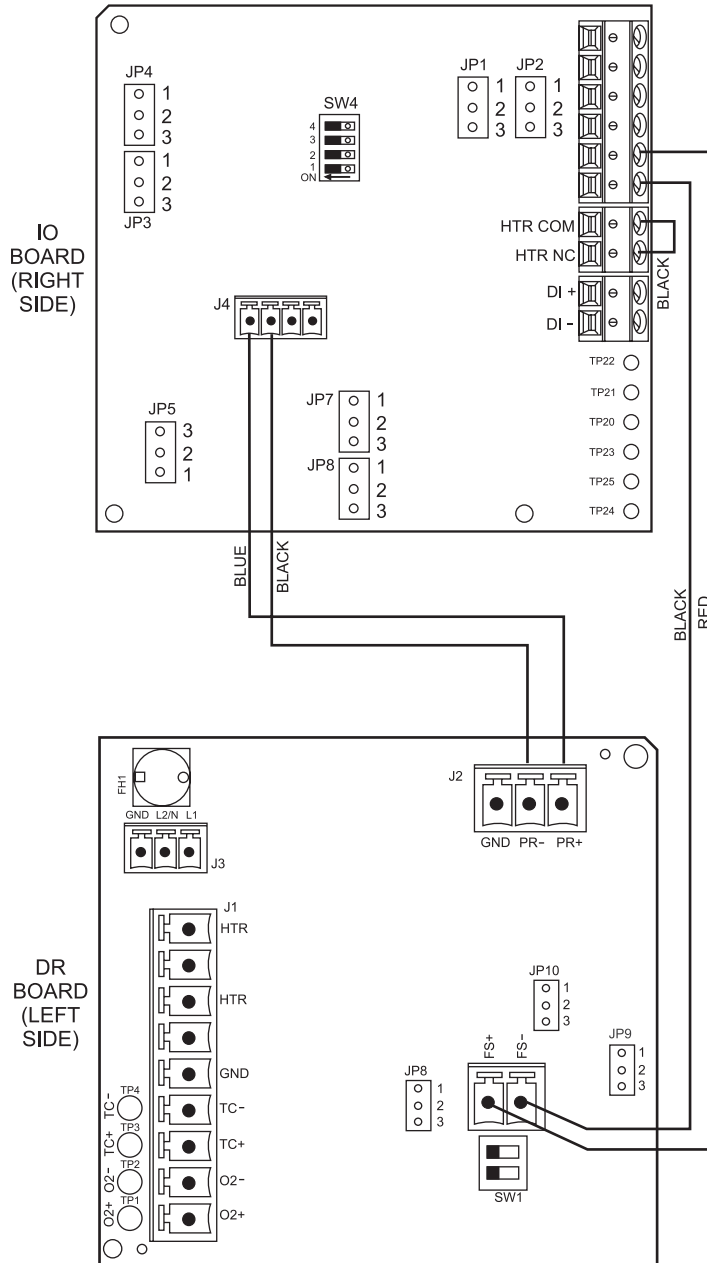


Figure 6-25. DR Board Wiring,
 Left-Hand Side



40060007

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

Section 7 Replacement Parts

O₂ Transmitter	page 7-1
Xi Enhanced Interface	page 7-2
Calibration Components	page 7-3

O₂ Transmitter

Table 7-1. Replacement Part Kits for O₂ Transmitter

Part Number	Description
6A00270G01	Kit, Transmitter Board
6A00271G01	Kit, Blind Cover
6A00272G01	Kit, Cell Gaskets (Pack of 5)
6A00273G01	Kit, Core O-Rings (Pack of 5)
6A00283G01	Kit, Cover O-Rings (Pack of 5)
6A00274G01	Kit, Calibration & Reference Tubing w/O-Rings (Obsolete - Replaced by 6A00355G01)
6A00275G01	Kit, Snubber Diffuser
6A00275G02	Kit, Hastelloy Diffuser
6A00275G03	Kit, Ceramic Diffuser
6A00276G01	Kit, Sensor Contact & Thermocouple, 18"
6A00276G02	Kit, Sensor Contact & Thermocouple, 3'
6A00276G03	Kit, Sensor Contact & Thermocouple, 6'
6A00276G04	Kit, Sensor Contact & Thermocouple, 9'
6A00276G05	Kit, Sensor Contact & Thermocouple, 12'
6A00276G06	Kit, Sensor Contact & Thermocouple, 15'
6A00276G07	Kit, Sensor Contact & Thermocouple, 18'
6A00277G01	Kit, Core Connector with Lanyard, 3.81 mm Pitch
6A00278G01	Kit, Core Retainer Plate
6A00281G01	Kit, Blank Core Plug
6A00301G01	Kit, Cell Replacement, 18" Standard Cell
6A00301G02	Kit, Cell Replacement, 18" Acid Resistant Cell
6A00301G03	Kit, Cell Replacement, 3' Standard Cell
6A00301G04	Kit, Cell Replacement, 3' Acid Resistant Cell
6A00301G05	Kit, Cell Replacement, 6' Standard Cell
6A00301G06	Kit, Cell Replacement, 6' Acid Resistant Cell
6A00301G07	Kit, Cell Replacement, 9' Standard Cell
6A00301G08	Kit, Cell Replacement, 9' Acid Resistant Cell
6A00301G09	Kit, Cell Replacement, 12' Standard Cell
6A00301G10	Kit, Cell Replacement, 12' Acid Resistant Cell
6A00301G11	Kit, Cell Replacement, 15' Standard Cell
6A00301G12	Kit, Cell Replacement, 15' Acid Resistant Cell
6A00301G13	Kit, Cell Replacement, 18' Standard Cell
6A00301G14	Kit, Cell Replacement, 18' Acid Resistant Cell
6A00259G01	Kit, Oxycore, 18", Standard Cell
6A00259G02	Kit, Oxycore, 3', Standard Cell
6A00259G03	Kit, Oxycore, 6', Standard Cell

Part Number	Description
6A00259G04	Kit, Oxycore, 18", Acid Resistant Cell
6A00259G05	Kit, Oxycore, 3', Acid Resistant Cell
6A00259G06	Kit, Oxycore, 6', Acid Resistant Cell
6A00259G07	Kit, Oxycore, 9', Standard Cell
6A00259G08	Kit, Oxycore, 12', Standard Cell
6A00259G09	Kit, Oxycore, 15', Standard Cell
6A00259G10	Kit, Oxycore, 18', Standard Cell
6A00259G11	Kit, Oxycore, 9', Acid Resistant Cell
6A00259G12	Kit, Oxycore, 12', Acid Resistant Cell
6A00259G13	Kit, Oxycore, 15', Acid Resistant Cell
6A00259G14	Kit, Oxycore, 18', Acid Resistant Cell
6A00282G01	Kit, YEW Cold Junction
6A00290G01	Kit, Tool (special tools required to replace sensing cell)
6A00353G01	Kit, Refractory Filler (Pack of 3)
6A00355G01	Kit, Calibration & Reference Hose, Retrofit
6A00355G02	Kit, Calibration & Reference Hose, Replacement
6A00392G01	18" Standard Probe Tube & Housing
6A00392G02	3' Standard Probe Tube & Housing
6A00392G03	6' Standard Probe Tube & Housing
6A00393G01	18" Abrasion Resistant Probe Tube & Housing
6A00393G02	3' Abrasion Resistant Probe Tube & Housing
6A00393G03	6' Abrasion Resistant Probe Tube & Housing
6A00393G04	9' Abrasion Resistant Probe Tube & Housing
6A00393G05	12' Abrasion Resistant Probe Tube & Housing
6A00393G06	15' Abrasion Resistant Probe Tube & Housing
6A00393G07	18' Abrasion Resistant Probe Tube & Housing

Xi Enhanced Interface

Table 7-2. Replacement Parts for Xi Enhanced Interface

Part Number	Description
6A00265G01	Kit, Power Supply Board (Obsolete - Replaced by 6A00329G01)
6A00329G01	Kit, Switching Power Supply Board
6A00266G01	Kit, I/O Board*
6A00267G01	Kit, AC Relay Board
6A00328G01	Kit, DR Board
6A00268G01	Kit, Front Panel with Overlay & CPU Board
6A00268G02	Kit, Front Panel with Overlay
6A00269G01	Enhanced Software Option Upgrade, Stoichiometric Function
6A00269G02	Enhanced Software Option Upgrade, Programmable Reference Function
6A00269G03	Enhanced Software Option Upgrade, 800°C Process Function
6A00237H24	Kit, Pipe & Wall Mount
6A00237H33	Kit, Panel Mount
6A00243G01	Ribbon Cable, 10 Pin (CPU Board to I/O Board)
6A00242G01	Ribbon Cable, 14 Pin (CPU Board to Power Supply Board)
6A00291H01	Insulator
6A00381G01	Kit, Hole Plug & Gland
6A00285H01	Gasket, Panel
6A00287H01	Gasket, Cover

*NOTE If the existing I/O Board has been operated with the Stoichiometric enhanced software feature, this feature must be activated in the new board before the Xi Enhanced Interface is put back into service. Failure to do so will cause a false analog output signal to the DCS.

Calibration Components

Table 7-3. Replacement Parts
for Calibration Components

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 airfreight

X-STREAM O₂ Transmitter

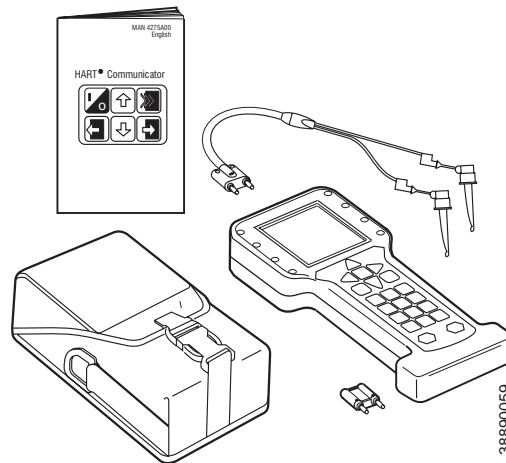
Instruction Manual
IM-106-910, Revision 2.2
November 2009

Section 8 Optional Accessories

HART Handheld 375 Field Communicator	page 8-1
Asset Management Solutions (AMS)	page 8-2
By-Pass Packages	page 8-2
SPS 4001B Single Probe Autocalibration Sequencer ...	page 8-3
IMPS 4000 Intelligent Multiprobe Test Gas Sequencer ..	page 8-4
O ₂ Calibration Gas	page 8-5
OxyBalance Display and Averaging System	page 8-6

HART HANDHELD 375 FIELD COMMUNICATOR

Figure 8-1. 375 Field
Communicator



The 375 Field Communicator is an interface device that provides a common communication link to HART-compatible instruments, such as the X-STREAM. HART Communications Protocol permits all the information available from the X-STREAM unit's electronics to be transmitted over standard 4-20 mA signal wires. By attaching the 375 Field Communicator at a termination point along the 4-20 mA signal line, a technician can diagnose problems and configure and calibrate the X-STREAM as if he or she were standing in front of the instrument.

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

X-STREAM O₂ Transmitter

ASSET MANAGEMENT SOLUTIONS (AMS)

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

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

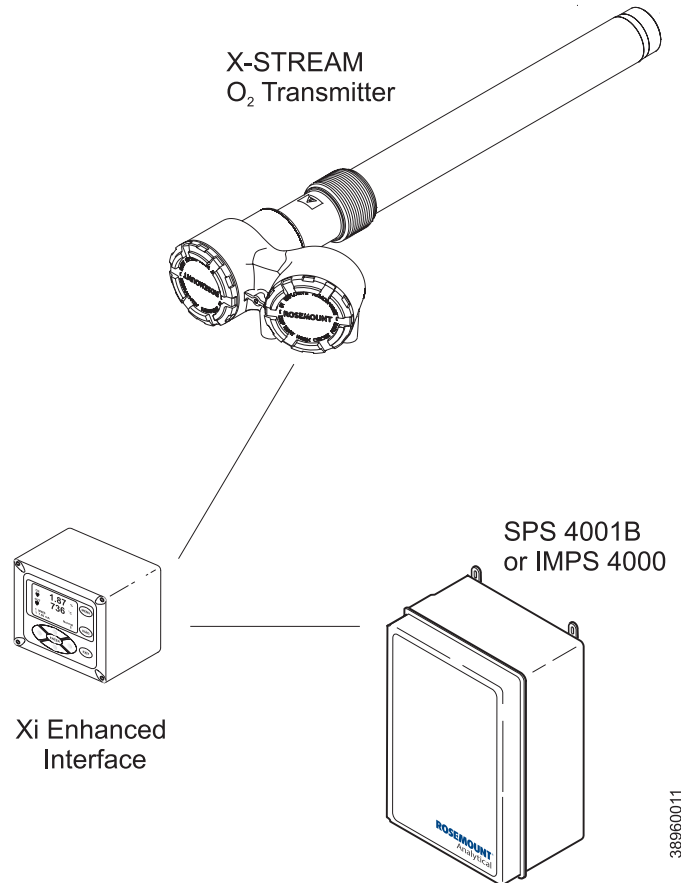
BY-PASS PACKAGES

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

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

**SPS 4001B
SINGLE PROBE
AUTO CALIBRATION
SEQUENCER**

Figure 8-2. SPS 4001B



Rosemount Analytical Inc. specifically designed the SPS 4001B Single Probe Autocalibration Sequencer to provide the capability to perform automatic or on-demand X-STREAM 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.

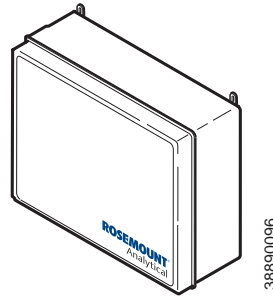
The SPS 4001B works in conjunction with the Xi Enhanced Interface, eliminating out-of-calibration occurrences and the need to send a technician to the installation site. To operate the SPS 4001B use the (optional) Xi Enhanced Interface.

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

X-STREAM O₂ Transmitter

IMPS 4000 INTELLIGENT MULTIPROBE TEST GAS SEQUENCER

Figure 8-3. IMPS 4000



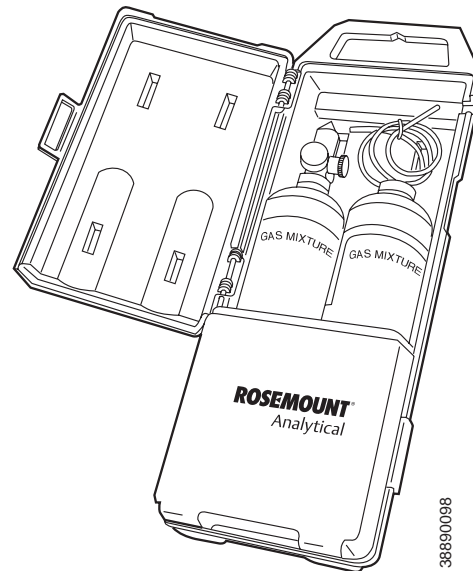
The IMPS 4000 Intelligent Multiprobe Test Gas Sequencer is housed within an IP56 (NEMA 4X) enclosure and has the intelligence to provide calibration gas sequencing of up to four X-STREAM units to accommodate automatic and semi-automatic calibration routines.

This sequencer works in conjunction with the X-STREAM 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 X-STREAM transmitter is out of calibration, calibration gases are on, and calibration gas pressure is low.

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

O₂ CALIBRATION GAS

Figure 8-4. Calibration Gas Bottles



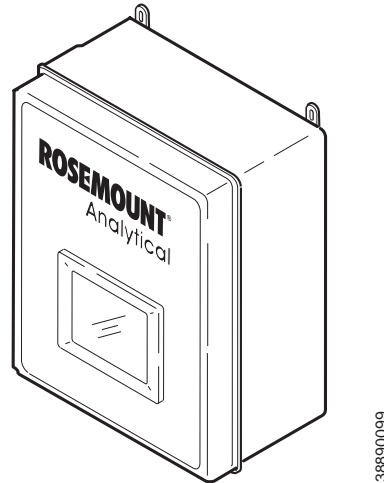
Rosemount Analytical's O₂ Calibration Gas and Service Kits have been carefully designed to provide a more convenient and fully portable means of testing, calibrating, and servicing.

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

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

OXYBALANCE DISPLAY AND AVERAGING SYSTEM

Figure 8-5. OxyBalance



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

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

Appendix A Safety Data




Safety Instructions	page A-2
MSDS - Refractory in Items 1 and 2, Figure 6-1	page A-24

SAFETY INSTRUCTIONS

IMPORTANT

SAFETY INSTRUCTIONS FOR THE WIRING AND INSTALLATION OF THIS APPARATUS




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

1. Adequate earth connections should be made to all earthing points, internal and external, where provided.
2. After installation or troubleshooting, all safety covers and safety grounds must be replaced. The integrity of all earth terminals must be maintained at all times.
3. Mains supply cords should comply with the requirements of IEC227 or IEC245.
4. All wiring shall be suitable for use in an ambient temperature of greater than 75°C.
5. All cable glands used should be of such internal dimensions as to provide adequate cable anchorage.
6. To ensure safe operation of this equipment, connection to the mains supply should only be made through a circuit breaker which will disconnect all circuits carrying conductors during a fault situation. The circuit breaker may also include a mechanically operated isolating switch. If not, then another means of disconnecting the equipment from the supply must be provided and clearly marked as such. Circuit breakers or switches must comply with a recognized standard such as IEC947. All wiring must conform with any local standards.
7. Where equipment or covers are marked with the symbol to the right, hazardous voltages are likely to be present beneath. These covers should only be removed when power is removed from the equipment - and then only by trained service personnel. 
8. Where equipment or covers are marked with the symbol to the right, there is a danger from hot surfaces beneath. These covers should only be removed by trained service personnel when power is removed from the equipment. Certain surfaces may remain hot to the touch. 
9. Where equipment or covers are marked with the symbol to the right, refer to the Operator Manual for instructions. 
10. All graphical symbols used in this product are from one or more of the following standards: EN61010-1, IEC417, and ISO3864.
11. Where equipment or labels are marked "Do Not Open While Energized" or similar, there is a danger of ignition in areas where an explosive atmosphere is present. This equipment should only be opened when power is removed and adequate time as specified on the label or in the instruction manual has been allowed for the equipment to cool down - and then only by trained service personnel.

DŮLEŽITÉ

Bezpečnostní pokyny pro zapojení a instalaci zařízení




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

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

VIGTIGT

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

BELANGRIJK

Veiligheidsvoorschriften voor de aansluiting en installatie van dit toestel.

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

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

BELANGRIJK

Veiligheidsinstructies voor de bedrading en installatie van dit apparaat.

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

1. Alle voorziene interne- en externe aardaansluitingen dienen op adequate wijze aangesloten te worden.
2. Na installatie, onderhouds- of reparatie werkzaamheden dienen alle beschermdeksels /kappen en aardingens 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 meerpole automatische zekering (min.10A) die alle spanningvoerende geleiders verbreekt indien een foutconditie optreedt. Deze automatische zekering mag ook voorzien zijn van een mechanisch bediende schakelaar. Bij het ontbreken van deze voorziening dient een andere als zodanig duidelijk aangegeven mogelijkheid aanwezig te zijn om de spanning van de apparatuur af te schakelen. Zekeringen en schakelaars dienen te voldoen aan een erkende standaard zoals IEC 947.
7. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder spanning voerende delen bevinden die gevaar op kunnen leveren. Deze beschermdeksels/kappen mogen uitsluitend verwijderd worden door getraind personeel als de spanning is afgeschakeld. 
8. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder hete oppervlakken of onderdelen bevinden. Bepaalde delen kunnen mogelijk na 45 min. nog te heet zijn om aan te raken. 
9. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, dient men de bedieningshandleiding te raadplegen. 
10. Alle grafische symbolen gebruikt bij dit produkt zijn volgens een of meer van de volgende standaarden: EN 61010-1, IEC 417 & ISO 3864.
11. Op plaatsen waar uitrusting of etiketten zijn voorzien van een melding als "Niet openen bij aanwezigheid van spanning" bestaat er brandgevaar in omgevingen waar een explosieve atmosfeer aanwezig is. Deze uitrusting mag uitsluitend worden geopend wanneer het niet meer onder spanning staat en de uitrusting gedurende de voorgeschreven tijd op het etiket of in de handleiding is afgekoeld - en dan uitsluitend door voldoende opgeleid onderhoudspersoneel.

WICHTIG

Sicherheitshinweise für den Anschluß und die Installation dieser Geräte.

Die folgenden Sicherheitshinweise sind in allen Mitgliederstaaten der europäischen Gemeinschaft gültig. Sie müssen strikt eingehalten werden, um der Niederspannungsrichtlinie zu genügen.

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



ΣΗΜΑΝΤΙΚΟ

Οδηγισ ασφαλειασ για την καλωδιωση και εγκατασταση 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 lahkliüliti. 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 matalajännittdirektiivin (Low Voltage Directive) yhteensopivuus. Myös EU:hun kuulumattomien valtioiden tulee noudattaa tätä ohjetta, elleivät kansalliset standardit estä sitä.

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

IMPORTANT

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

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




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



FONTOS

Biztonsági előírások a készülék vezetékéhez és üzembeállításához




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

1. A megfelelő földelést biztosítani kell az összes rendelkezésre álló földelési ponton, legyen az belső vagy külső.
2. Az üzembeállítás vagy hibaelhárítás után az összes biztonsági burkolatot és biztonsági földvezetékét ki kell cserélni. A földelőkapcsok sértetlenségét mindig biztosítani kell.
3. A tápvezetékeknek eleget kell tenniük az IEC227 vagy IEC245 szabványokban megfogalmazott követelményeknek.
4. Az összes vezetéknek alkalmasnak kell lennie a 75 °C-nál magasabb környezeti hőmérséklet melletti használatra.
5. Az összes használt kábelvezető tömszelencének olyan belső méretűnek kell lennie, hogy biztosítsák a kábelek megfelelő lekötését.
6. A berendezés biztonságos működésének biztosításához az elektromos hálózathoz való csatlakozást csak megszakítón keresztül szabad megvalósítani, amely az összes áramot szállító vezeték bontja hibahelyzet esetén. A megszakító magában foglalhat egy mechanikusan működtethető áramtalanító kapcsolót is. Ellenkező esetben biztosítani kell a berendezés elektromos hálózatról történő lekapcsolásának más módját, és ezt világosan jelezni kell. A megszakítóknak vagy kapcsolóknak meg kell felelniük egy elismert szabványnak, például az IEC947 szabványnak. Az összes vezetéknek meg kell felelnie az összes helyi szabványnak.
7. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, alatta valószínűleg veszélyes feszültség van jelen. Az ilyen burkolat csak a berendezés áramtalanítása után távolítható el - és csak képzett szervizszakember végezheti el. 
8. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, fenn áll a veszélye, hogy alatta forró felületek találhatók. Az ilyen burkolatot csak képzett szervizszakember távolíthatja el a berendezés áramtalanítása után. Bizonyos felületek érintésre forróak maradhatnak. 
9. Ha a berendezés vagy a burkolata a jobb oldalon látható szimbólummal jelzett, tekintse meg az Üzemeltetési útmutató arra vonatkozó utasításait. 
10. A terméken használt grafikus szimbólumok a következő szabványok legalább egyikéből származnak: EN61010-1, IEC417 és ISO3864.
11. Ha a berendezésen vagy a 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 útmutatóban szereplő, a berendezés lehűlését biztosító megfelelő idői 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 ciascun morsetto di terra deve essere costantemente garantita.
3. I cavi di alimentazione della rete devono essere secondo disposizioni IEC227 o IEC245.
4. L'intero impianto elettrico deve essere adatto per uso in ambiente con temperature superiore a 75°C.
5. Le dimensioni di tutti i connettori dei cavi utilizzati devono essere tali da consentire un adeguato ancoraggio al cavo.
6. Per garantire un sicuro funzionamento dello strumento il collegamento alla rete di alimentazione principale dovrà essere eseguita tramite interruttore automatico (min.10A), in grado di disattivare tutti i conduttori di circuito in caso di guasto. Tale interruttore dovrà inoltre prevedere un sezionatore manuale o altro dispositivo di interruzione dell'alimentazione, chiaramente identificabile. Gli interruttori dovranno essere conformi agli standard riconosciuti, quali IEC947.
7. Il simbolo riportato sullo strumento o sui coperchi di protezione indica probabile presenza di elevati voltaggi. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento. 
8. Il simbolo riportato sullo strumento o sui coperchi di protezione indica rischio di contatto con superfici ad alta temperatura. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento. Alcune superfici possono mantenere temperature elevate per oltre 45 minuti. 
9. Se lo strumento o il coperchio di protezione riportano il simbolo, fare riferimento alle istruzioni del manuale Operatore. 
10. Tutti i simboli grafici utilizzati in questo prodotto sono previsti da uno o più dei seguenti standard: EN61010-1, IEC417 e ISO3864.
11. L'indicazione "Non aprire sotto tensione" o simili sull'apparecchiatura o sulle etichette segnala il pericolo di accensione nelle aree in cui è presente un'atmosfera esplosiva. L'apparecchiatura può essere aperta solo quando l'alimentazione è scollegata ed è trascorso il tempo indicato sull'etichetta o nel manuale delle istruzioni per consentirne il raffreddamento. L'operazione può essere effettuata esclusivamente da personale dell'assistenza qualificato.

SVARBU

Šio prietaiso laidų prijungimo ir instaliacijos saugos instrukcijos




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

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

SVARĪGI

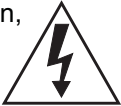


Drošības norādījumi šīs iekārtas pievienošanai un uzstādīšanai

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

1. Visi pieejamie iekšējie un ārējie zemējuma punkti ir atbilstoši jāiezemē.
2. Pēc uzstādīšanas vai problēmu risināšanas visi drošības pārsegi un drošības zemējuma savienojumi ir jāpievieno atpakaļ. Visiem zemējuma savienojumiem vienmēr jābūt iezemētiem.
3. Elektropadeves vadiem jāatbilst IEC227 vai IEC245 prasībām.
4. Visai elektroinstalācijai jābūt piemērotai lietošanai apkārtējā temperatūrā, kas pārsniedz 75°C.
5. Visu izmantoto kabeļu blīvju iekšējiem izmēriem jābūt tādiem, lai atbilstoši nostiprinātu kabeli.
6. Lai nodrošinātu šīs iekārtas drošu darbību, savienojums ar elektropadeves tīklu jāizveido, izmantojot slēdzi, kas kļūmes gadījumā atvienos visas ķēdes, 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 jāmarķē. Slēdzīem jāatbilst kādam vispārāzītam standartam, piemēram, IEC947. Visai elektroinstalācijai jāatbilst vietējiem standartiem.
7. Vietās, kur iekārta vai tās pārsegi ir marķēti ar labajā pusē norādīto simbolu, visticamāk, zem tiem ir bīstams spriegums. Šos pārsegus drīkst noņemt tikai tad, ja iekārta ir atvienota no strāvas padeves, – un šos darbus drīkst veikt tikai atbilstoši apmācīti remontdarbu darbinieki. 
8. Vietās, kur iekārta vai tās pārsegi ir marķēti ar labajā pusē norādīto simbolu, apdraudējumu izraisa zem tiem esošās karstās virsmas. Šos pārsegus drīkst noņemt tikai atbilstoši apmācīti remontdarbu darbinieki, kad iekārta ir atvienota no strāvas padeves. Iespējams, dažas virsmas arī pēc iekārtas atvienošanas paliks karstas. 
9. Ja iekārta vai pārsegi ir marķēti 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 marķējums "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' I-UE. Dawn għandhom jiġu osservati b'mod strett biex tkun żgurata l-konformità mad-Direttiva dwar il-Vultaġġ Baxx. Stati li mhumiex membri ta' I-UE għandhom ukoll ikunu konformi ma' dan li ġej hliet 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 tipprowva ssolvi xi problema, l-għatjien kollha tas-sigurtà u l-erts tas-sigurtà għandhom jitpoġġew lura f'pothom. L-integrità tat-terminali kollha ta' l-ert għandha tinzamm 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 jipprovdut ankoragġ adegwat lill-kejbil.
6. Biex tiżgura t-ħaddim sigur ta' dan it-tagħmir, il-konnessjoni mal-provvista tad-dawl għandha ssir biss permezz ta' *circuit breaker* li jiskonnetta l-kondutturi kollha li jkunu jgħorru ċ-ċirkuwiti f'sitwazzjoni meta jkun hemm il-ħsara. Is-*circuit breaker* jista wkoll jinkludi swiċċ li jiżola li jaħdem b'mod mekkaniku. Jekk dan ma jkunx il-każ, mezz ieħor ta' kif it-tagħmir jiġi skonnettjat minn mal-provvista tad-dawl għandu jkun ipprovdut, u jkun immrkat b'mod ċar li hu hekk. Is-*circuit breakers* jew swiċċijiet iridu jkunu konformi ma' standard rikonoxxut bħal IEC947. Il-wiring kollu jrid ikun konformi ma' l-istandards lokali, jekk ikun hemm.
7. Meta t-tagħmir jew l-għatjien ikunu mmarkati bis-simbolu fuq il-lemin, x'aktarx li jkun hemm vultaġġi perikolużi taħthom. Dawn l-għatjien għandhom jitneħħew biss meta titneħħa l-provvista tad-dawl mit-tagħmir - u minn ħaddiema tal-manutenzjoni mharrġa 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 mharrġa 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 Energizzat" jew kliem simili, hemm periklu ta' nar f'żoni fejn atmosfera esplosiva hi preżenti. It-tagħmir għandu jinfetaħ biss meta l-provvista tad-dawl tkun mitfija u jkun għadda ħin biżżejjed, kif speċifikat fuq it-tikketta jew fil-manwal ta' l-istruzzjonijiet, biex it-tagħmir ikun kesah – u t-tagħmir għandu jinfetaħ biss minn staff li jkun imħarreg.

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 til spenningsforsyningen bare skje gjennom en strømbryter (minimum 10A) som vil bryte spenningsforsyningen til alle elektriske kretser ved en feilsituasjon. Strømbryteren kan også inneholde en mekanisk operert bryter for å isolere instrumentet fra spenningsforsyningen. Dersom det ikke er en mekanisk operert bryter installert, må det være en annen måte å isolere utstyret fra spenningsforsyningen, og denne måten må være tydelig merket. Kretsbytere eller kontakter skal oppfylle kravene i en anerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trent servicepersonell. 
8. Der hvor utstyr eller deksler er merket med symbol for meget varm overflate, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trent servicepersonell. Noen overflater kan være for varme til å berøres i opp til 45 minutter etter spenningsforsyning frakoblet. 
9. Der hvor utstyret eller deksler er merket med symbol, vennligst referer til instruksjonsmanualen for instruksjer. 
10. Alle grafiske symboler brukt i dette produktet er fra en eller flere av følgende standarder: EN61010-1, IEC417 & ISO3864.
11. Når utstyr eller merkelapper bærer advarselen "Må ikke åpnes under spenning" eller lignende, innebærer 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.

WAŻNE!

Zalecenia dotyczące bezpieczeństwa w zakresie podłączania i instalacji tego urządzenia




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

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

IMPORTANTE

Instruções de segurança para ligação e instalação deste aparelho.




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

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

DÔLEŽITÉ

Bezpečnostné pokyny pre zapojenie káblov a inštaláciu tohto prístroja




Nasledovné bezpečnostné pokyny sa vzťahujú konkrétne na všetky členské štáty EÚ. Musia byť striktné 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 priedochodky 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 kablskih 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 cumplan con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75°C.
5. Todos los prensaestopas seran adecuados para una fijacion adecuada de los cables.
6. Para un manejo seguro del equipo, la alimentacion electrica se realizara a traves de un interruptor magnetotermico (min 10 A), el cual desconectara la alimentacion electrica al equipo en todas sus fases durante un fallo. Los interruptores estaran de acuerdo a la norma IEC 947 u otra de reconocido prestigio.
7. Cuando las tapas o el equipo lleve impreso el simbolo de tension electrica peligrosa, dicho alojamiento solamente se abra una vez que se haya interrumpido la alimentacion electrica al equipo asimismo la intervencion sera llevada a cabo por personal entrenado para estas labores. 
8. Cuando las tapas o el equipo lleve impreso el simbolo, hay superficies con alta temperatura, por tanto se abra una vez que se haya interrumpido la alimentacion electrica al equipo por personal entrenado para estas labores, y al menos se esperara unos 45 minutos para enfriar las superficies calientes. 
9. Cuando el equipo o la tapa lleve impreso el simbolo, se consultara el manual de instrucciones. 
10. Todos los simbolos graficos usados en esta hoja, estan de acuerdo a las siguientes normas EN61010-1, IEC417 & ISO 3864.
11. Cuando el equipo o las etiquetas tienen la indicación " No abrir mientras reciba energía" u otra similar, existe el peligro de ignición en zonas donde haya un ambiente explosivo. Este equipo sólo debe ser abierto por personal de servicio cualificado después de apagarlo y dejar pasar el intervalo de tiempo correspondiente indicado en la etiqueta o el manual de instrucciones para que el equipo se enfríe.

VIKTIGT

Säkerhetsföreskrifter för kablage och installation av denna apparat.

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

1. Tillämplig jordkontakt skall utföras till alla jordade punkter, såväl internt som externt där så erfordras.
2. Efter installation eller felsökning skall samtliga säkerhetshöljen och säkerhetsjord återplaceras. Samtliga jordterminaler måste hållas obrutna hela tiden.
3. Matningsspänningens kabel måste överensstämja med föreskrifterna i IEC227 eller IEC245.
4. Allt kablage skall vara lämpligt för användning i en omgivningstemperatur högre än 75°C.
5. Alla kabelförskruvningar som används skall ha inre dimensioner som motsvarar adekvat kabelförankring.
7. Där utrustning eller hölje är markerad med vidstående symbol föreligger risk för livsfarlig spänning i närheten. Dessa höljen får endast avlägsnas när strömmen ej är ansluten till utrustningen - och då endast av utbildad servicepersonal. 
8. När utrustning eller hölje är markerad med vidstående symbol föreligger risk för brännskada vid kontakt med uppvärmd yta. Dessa höljen får endast avlägsnas av utbildad servicepersonal, när strömmen kopplats från utrustningen. Vissa ytor kan vara mycket varma att vidröra även upp till 45 minuter efter avstängning av strömmen. 
9. När utrustning eller hölje markerats med vidstående symbol bör instruktionsmanualen studeras för information. 
10. Samtliga grafiska symboler som förekommer i denna produkt finns angivna i en eller flera av följande föreskrifter:- EN61010-1, IEC417 & ISO3864.
11. För utrustning som markerats med föreskrifter som "Öppna inte när strömmen är på", eller liknande, råder explosionsrisk när det förekommer explosiva ångor. Utrustningen får endast öppnas efter att strömmen stängts av och efter att utrustningen fått svalna under så lång tid som anges i instruktionsboken. Öppnandet får endast utföras av utbildad servicepersonal.

MSDS - Refractory in Items 1 and 2, Figure 6-1

Refractory Specialties, Inc. MATERIAL SAFETY DATA SHEET

Effective Date: 03/15/2007

Supersedes: 10/25/2001

Print Date: 3/29/2007

1. IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

IDENTIFICATION OF THE PRODUCT

Solulite™ THERMAL INSULATION PRODUCTS
contain alkaline-earth-silicate fibers (magnesium silicate)

IDENTIFICATION OF THE COMPANY

Refractory Specialties, Inc.
POB 189
230 West California Avenue
Sebring, OH USA 44672
Phone 330-938-2101 Monday-Friday 7AM – 5PM EST
Emergency After Hours call: 330-821-4051 or 330-692-3249 or 330-692-0247

Additional health and safety information beyond the scope of this MSDS is available through Unifrax Product Stewardship Information Hotline 1-800-322-2293 (Monday - Friday 8:00 a.m. - 4:30 p.m. EST).

2. COMPOSITION / INFORMATION ON INGREDIENTS

DESCRIPTION

White, odorless board.

COMPOSITION

CAS Number % by Weight

Amorphous magnesium silicate (alkaline-earth-silicate) MIXTURE 80-90%

(SiO₂ 60-80 %, MgO 18-27 %, trace elements 0-4 %)

Silica (amorphous) 7631-86-9 10-15%

Starch 56780-58-6 3-7%

3. HAZARDS IDENTIFICATION

MAY IRRITATE EYES, SKIN and RESPIRATORY TRACT

May cause temporary mechanical irritation to eyes, skin, and respiratory tract (nose, throat & lungs).

Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease may be aggravated by exposure; individuals who are atopic (with a history of allergies) may experience greater amounts of skin and respiratory irritation.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

EYE IRRITATION

If eyes become irritated, wash immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes. Get medical attention if irritation persists.

SKIN IRRITATION

If skin becomes irritated, do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful. Change into clean clothing.

RESPIRATORY TRACT IRRITATION

If respiratory tract (nose, throat, lungs) irritation occurs, relocate individual to a dust free environment. Get medical attention, if irritation continues. See Section 8 for additional measures to reduce or eliminate exposure.

5. FIRE FIGHTING MEASURES

Non-combustible (does not burn) product.

Packaging and surrounding materials may be combustible.

Use extinguishing agent suitable for surrounding combustible materials.

6. ACCIDENTAL RELEASE MEASURES

SPILL PROCEDURES

Provide workers with respirators, if needed. [See Section 8]

Limit airborne dust dispersion by wetting the materials with water.

CLEAN UP

Use high efficiency vacuum to clean up spilled material. Use wet sweeping or a dust suppressant where sweeping is necessary. Do not use compressed air for clean up.

ENVIRONMENTAL PROTECTION

Clean up spilled material to the extent possible. Package spilled material properly for disposal. Do not allow to be wind blown. Do not flush spilled material into drains. Prevent spilled materials from entering natural water courses. Check with your employer to identify all regulations which may apply.

7. HANDLING AND STORAGE

HANDLING AND STORAGE

Minimize airborne dusts by avoiding the unnecessary disturbance of materials.

X-STREAM O₂ Transmitter

CLEAN-UP

Clean up dust carefully. Use wet sweeping or high efficiency vacuum to remove dust. Do not use compressed air.

During after-service removal activities, wet exposed material frequently to minimize airborne dust. A surfactant may be added to the water to improve the wetting process. Use only enough water to wet the insulation. Do not allow water to accumulate on floors. [See Section 16 - After-Service Removal]

EMPTY CONTAINERS

Product packaging may contain residue. Do not reuse.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

INDUSTRIAL HYGIENE STANDARDS AND OCCUPATIONAL EXPOSURE LIMITS

Components OSHA SUPPLIER

Magnesium silicate fiber None established* See below**

Silica (amorphous) 6 mg/m³ (< 1% None Established crystalline silica)

Starch 5 mg/m³ PEL (resp. None Established dust) 15 mg/m³ PEL (total dust)

ACGIH TLV'S: Magnesium silicate fiber -- None established. Silica (amorphous) -- 10 mg/m³ (total Dust, containing < 1% crystalline silica), 3 mg/m³ (respirable dust, containing < 1% crystalline silica). Starch -- 10 mg/m³ TLV (total dust)

*For magnesium silicate fiber, refer to OSHA guidance regarding "Particulates Not Otherwise Regulated" (PNOR). Control airborne dust levels as follows:

Components Particle Size OSHA

PNOR Total Dust 15 mg/m³

Respirable Dust 5 mg/m³

ACGIH Particulates Not Otherwise Classified (PNOC) -- Inhalable particulate: 10 mg/m³. Respirable particulate: 3 mg/m³.

** As with most industrial materials, it is prudent to minimize unnecessary exposure to respirable dusts. Note that Industrial hygiene standards and occupational exposure limits differ between countries and local jurisdictions. Check with your employer to identify any "respirable dust", "total dust" or "fiber" exposure standards to follow in your area. If no regulatory dust or fiber control standard apply, a qualified industrial hygiene professional can assist with a specific evaluation of workplace conditions and the identification of appropriate respiratory protection practices. In the absence of other guidance, the supplier has found that it is generally feasible to control occupational fiber exposure to 1 f/cc or less.

ENGINEERING CONTROLS:

Dust suppressing control technologies such as local exhaust ventilation, point of generation dust collection, down draft work stations, emission controlling tool designs, and materials handling equipment are effective means of minimizing airborne fiber emissions. For additional information, contact the Product Stewardship Information Line at 1-800-322-2293 (See Section 16).

PERSONAL PROTECTION EQUIPMENT

Eye Protection:

In case of overhead work, wear goggles or safety glasses with side shields to prevent eye contact.

Skin Protection:

Wear gloves, head coverings and full body clothing as necessary to prevent skin irritation.

Respiratory Protection:

When effective engineering and/or administrative controls are insufficient, the use of appropriate respiratory protection, pursuant to the requirements of OSHA 1910.134, is recommended. For dust concentrations below applicable exposure limit value, PPE is not required. The evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed on a case by case basis, by a qualified Industrial Hygienist.

9. PHYSICAL AND CHEMICAL PROPERTIES

Oxidizing properties None

Odor None

Melting point 1500-1550°C (2730-2820°F)

Flammability None

Explosive properties None

10. STABILITY AND REACTIVITY

CONDITIONS OR MATERIALS TO AVOID

Avoid direct contact with strong acid environments.

11. TOXICOLOGICAL INFORMATION

EPIDEMIOLOGY

This product has not been the subject of epidemiological study. Epidemiological studies related to other fiber chemistries of similar solubility have not identified a statistically significant incidence of exposure-related respiratory disease.

TOXICOLOGY

This product has been the subject of limited testing.

A review of available scientific literature suggests an inverse relationship between dissolution rate and potential health effects; i.e. the higher the dissolution rate of a fiber the lower its potential to produce health effects. The dissolution rate of Solulite™ fiber has been determined through standardized *in vitro* testing. The dissolution rate of Solulite™ fibers is higher than that of other fiber types that have been tested in chronic animal studies and did not produce respiratory disease.

This product possesses a fiber chemistry within the regulatory (European Commission Directive 97/69/EC) definition as a "man-made vitreous (silicate) fiber with random orientation with alkaline oxide and alkaline earth oxide (Na₂O + K₂O + CaO + MgO + BaO) content greater than 18% by weight". Solulite™ fibers have been tested

X-STREAM O₂ Transmitter

pursuant to EU protocol ECB/TM/26, rev. 7, Nota Q, Directive 97/69/EC. The results for the short term biopersistence test by inhalation (IH test) was 6 days; well below the regulatory threshold of 10 days cited in Directive 97/69/EC. Based on testing results, Solulite™ based products are not regarded as potential carcinogens and they ARE EXEMPT from European classification as such. By virtue of these test results, these products ARE EXEMPT from European regulatory guidelines that require hazard warning labels with specific risk phrases citing respiratory disease potential. In addition, Solulite™ fibers have been tested in an independent laboratory, by intratracheal (IT test) instillation, under a protocol that was consistent with the requirements of the German Hazardous Substances Ordinance (BGBI. I pp. 1782, 2049, Third Amendment, Appendix V, No. 7). The half-life clearance of Solulite™ fibers was 32.7 days; well below the applicable regulatory thresholds. Based on the IT test results, Solulite™ products ARE EXEMPT from the requirements of the German Ordinance.

The definition of "irritant" contained in the hazard communication standard, 29 CFR 1900.1200, Appendix A, is "...a reversible inflammatory effect on living tissue by chemical action...". Solulite™ fiber is an inert material which doesn't interact chemically with exposed skin. However, there is a possibility that exposure to this product may cause temporary mechanical irritation to the eyes, skin or respiratory tract (nose, throat, lungs). This temporary irritation can be mitigated with proper handling practices designed to limit exposure and the use of protective clothing (glasses, gloves, clothing).

This product has not been specifically evaluated by any regulatory authority or other classification entity, such as the International Agency for Research on Cancer (IARC) or the National Toxicology Program (NTP). Other types of man-made vitreous fibers (MMVF) have been evaluated and subsequently classified as potential carcinogens. Various classifications, such as "possible carcinogen", "probable carcinogen", and "reasonably anticipated to be a carcinogen" have been given to other MMVF's.

12. ECOLOGICAL INFORMATION

No ecological concerns have been identified.

13. DISPOSAL CONSIDERATIONS

As produced, this product is usually accepted for disposal at most sites licensed for the disposal of industrial waste. Check applicable regulations and waste site policies prior to disposal. Waste should be placed in sealed containers for disposal.

In case of contamination, by other materials classified as hazardous waste, expert guidance should be sought.

14. TRANSPORT INFORMATION

Product should remain in sealed containers during transportation.

15. REGULATORY INFORMATION

Key statutory and regulatory classification or listings for the product, as manufactured, which may impact product storage, use, handling or disposal:

U.S. FEDERAL REGULATIONS

SARA TITLE III: This product is not regulated under SARA Sections 302, 304, 311/312 and 313.

**Comprehensive Environmental Response
Compensation and Liability Act of 1980 (CERCLA):**

Solulite™ THERMAL INSULATION fibers are composed of fiber with an average diameter greater than 1 micron, and therefore are not considered CERCLA hazardous substances. See 60 FR 30934 (June 12, 1995).

Clean Air Act (CAA):

Solulite™ THERMAL INSULATION fibers are composed of fiber with an average diameter greater than 1 micron, and therefore are not considered hazardous air pollutants. See 60 FR 30934 (June 12, 1995).

Toxic Substances Control Act (TSCA):

All substances in this product are listed, as required, on the TSCA inventory.

STATE REGULATIONS

California: Magnesium silicate fiber has not been listed by the State of California on Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986.

New Jersey: Magnesium silicate fiber is not listed as a special health hazard substance as defined in New Jersey Worker and Community Right to Know Act, New Jersey Administrative Code, Title 8, Department of Health, Chapter 59, Subchapter 10.

Pennsylvania: Magnesium silicate fiber is not listed as a special health hazard substance as defined in Pennsylvania Right-to-Know Law, Section 3800.

INTERNATIONAL REGULATIONS

Canadian Workplace Hazardous Materials Information System (WHMIS):

No Canadian Workplace Hazardous Materials Information System (WHMIS) categories apply to this product.

Canadian Environmental Protection Act (CEPA):

All substances in this product are listed, as required, on the Domestic Substances List (DSL).

No chemicals in this product are listed on the Non-Domestic Substances List.

European Directive 97/69/EC

By virtue of testing results, Solulite™ fiber has been exempted from classification and labeling as a potential carcinogen.

German Hazardous Substances Ordinance

By virtue of testing results, Solulite™ fiber may be used without the limitations or concern for requirements imposed on other man-made mineral fibers by the Ordinance.

16. OTHER INFORMATION

After-Service Solulite™ Thermal Insulation: Removal

As produced, Solulite™ fibers are vitreous (glassy) materials which do not contain crystalline silica. Continued exposure to elevated temperatures can cause the vitreous magnesium-silicate (alkaline-earth-silicate) fibers to devitrify (become crystalline). Clinoenstatite is the first crystalline formation to occur at approximately 1472° F. (800° C). Clinoenstatite formation peaks at approximately 1832° F. (1000° C), after which Protoenstatite (compositionally the same as Clinoenstatite) begins to form. Crystalline phase silica (Cristobalite) formation is

X-STREAM O₂ Transmitter

possible at temperatures of approximately 2192° F. (1200° C), however, the formation of crystalline silica is highly dependent on temperature, the duration of time that the fibers are exposed to high temperatures, fiber chemistry and/or the presence of fluxing agents. The formation of crystalline silica can only be confirmed through laboratory analysis of the "hot face" fiber.

IARC's evaluation of crystalline silica states "Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)" and additionally notes "carcinogenicity in humans was not detected in all industrial circumstances studied" (IARC Monograph Vol. 68, 1997). NTP lists all polymorphs of crystalline silica amongst substances which may "reasonably be anticipated to be carcinogens".

During removal operations, the use of a full face respirator is recommended to reduce inhalation exposure along with eye & respiratory tract irritation. A specific evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed, on a case by case basis, by a qualified industrial hygiene professional. For more detailed information regarding respirable crystalline silica, call the Product Stewardship Information Hotline (see below).

Product Stewardship Program

The Unifrax Corporation has established a program to provide customers with up-to-date information regarding the proper use and handling of fiber-based products, including Solulite™ THERMAL INSULATION. In addition, Unifrax Corporation has also established a program to monitor airborne fiber concentrations at customer facilities. If you would like more information about this program, please call the Unifrax Corporation Product Stewardship Information Line at 1-800-322-2293.

Revision Summary: This revision constitutes a complete revision of form and format.
Replaces 10-25-2001 MSDS.

This product matches all Physical & Chemical Characteristics of Unifrax® Thermal Insulation Products.

MSDS Prepared By: Refractory Specialties, Inc. Chemical Engineering and Risk Management Departments

DISCLAIMER

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

Appendix B Return of Material

RETURNING MATERIAL

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

1. Secure a return authorization number from a Emerson Process Management Sales Office or representative before returning the equipment. Equipment must be returned with complete identification in accordance with Emerson Process Management instructions or it will not be accepted.

In no event will Emerson Process Management be responsible for equipment returned without proper authorization and identification.

CAUTION

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

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

Emerson Process Management
RMR Department
Daniel Headquarters
11100 Britmore Park Drive
Houston, TX 77041

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

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

Index

A

- AC Relay Board
 - Replacement 6-25
- Alarm Relay Output
 - Configuration 3-3
- Alarm Relay Output
 - Configuration 3-3
- Alarms, Corrective Actions 5-4
- Analog Output Configuration 3-4
- Asset Management Solutions 8-2
- Autocalibration setup 3-5
- Automatic Calibration 6-2

B

- Blind Cover(s) Replacement 6-16
- Bracing 2-8
- Bracing Installation for
 - Abrasive Probe Tubes 2-8
- By-Pass Package 8-2

C

- Cal Gas and Reference
 - Air Hoses 6-6
- Calibration 4-21, 6-2
- Calibration Gas Bottles 1-14, 8-5
- Calibration Gases 1-14
- Calibration Methods 4-21
- Calibration Record Sheet 5-8
- Cell Installation 6-12
- Cell Removal 6-8
- Contact & Thermocouple
 - Assembly, Replacement 6-13
- Contact and Thermocouple
 - Wiring, Replacement 6-13
- Contact Pad, Replacement 6-8
- Core Information Label 6-17

D

- D/A Trim Methods - Simplified 4-24
- D/A Trim Procedure 4-24
- D/A Trim with Xi 4-25
- D/A Trim without Xi 4-24
- Diffuser Replacement 6-5
- Diffusion Elements 1-9
- DR Board Replacement 6-31

- DR Board Wiring,
 - Left-Hand Side 6-33
- DR Board Wiring,
 - Right-Hand Side 6-32

E

- Electrical Noise 5-3
- Electronics Board Replacement 6-15
- Electrostatic Discharge 5-3
- Error Conditions, Display 4-3
- Essential Instructions i

F

- Field 4-11
- Field Communicator Signal
 - Line Connections 4-11
- Field Wiring Label 6-18
- Flame Safety Interlock 2-18

G

- Grounding 5-2

H

- HART Communicator 8-1

I

- I 3-2
- I/O & AC Relay Board Flame
 - Safety Interlock Wiring 6-25
- I/O and AC Relay Board
 - Position 6-27
- I/O Board Positions 6-24
- I/O Board Jumpers 3-2
- IMPS 4000 8-4
- Installation
 - Electrical 2-15
 - Pneumatic 2-24
 - Probe 2-5
 - Xi 2-12

L

- Long Probes Installation 2-7

M

- Maintenance Intervals 6-2
- Manual Calibration 6-2

O

- O₂ Calibration 4-21
- O₂ Calibration with Xi 4-22
- O₂ Calibration with Xi and
 - Field Communicator 4-23
- O₂ Calibration without Xi 4-22
- O₂ Sensor mV Reading
 - vs. %O₂ at 736°C 5-2
- Operation Via HART/AMS 4-7, 4-11
- Operation via HART/AMS 4-11
- Optional Adapter Plate 2-6
- O-rings and Spacers,
 - Replacement 6-14
- Overview of Operating
 - Principles 5-1
- OXT 2-6
- OXT/WC Retrofit Mounting
 - Flange 2-6
- OxyBalance Display 1-8

P

- Power Supply Board
 - Replacement 6-28
- Power Supply Board Wiring 6-28
- Probe Parameter Descriptions 4-8

Q

- Quick Start Guide iv

R

- Reference Air Package 2-24
- Removal and Installation
 - of Probe 6-3
- Replacement Part Kits,
 - Transmitter 7-1
- Replacement Parts 7-1
- Replacement Parts,
 - Calibration Components 7-3
- Replacement Parts,
 - Xi Enhanced Interface 7-2
- Returning Material B-1

X-STREAM O₂ Transmitter

S

Sensing Cell and Gasket	6-11
Sensor Core Assembly	
- Exploded View	6-9
Sensor Core Removal	6-6
Sensor Core Replacement	6-5
Service	6-1
Set Test Gas Values	3-2
Signal Line Connections	4-11
Spacers and O-Rings	6-15
Specifications	1-10
SPS 4001B	8-3
Square Weld Plate	2-5
Startup and Operation	4-1
Startup Display	4-2
Support Hotline	viii
System Configuration	1-4
System Description	1-3
System Features	1-4
System Parameter	
Descriptions	4-7

T

Thermal Pad Placement	6-16
Traditional Architecture	
Probe Connections	2-18
Transmitter - Exploded View	6-4
Transmitter Probe Repair	6-5
Transmitter, Verify Installation	3-1
Troubleshooting	
General	5-2
Operating Principles	5-1
Typical System Installation	2-2
Typical System Package	1-2

V

Variable Insertion	2-9
Variable Insertion Mounting	2-10
Vee Deflector Orientation with	
Ceramic and Hastelloy Diffuser	2-5

X

Xi Components Exploded View	6-19
Xi Components Replacement	6-19
Xi Configuration	3-2
Xi Controls	4-3
Xi Front Panel Components	6-20
Xi Front Panel Replacement	6-29
Xi Menu	4-4
Xi Mounting Details	2-13
Xi Power Connections	2-18
Xi Signal Connections	2-17

WARRANTY

Rosemount Analytical warrants that the equipment manufactured and sold by it will, upon shipment, be free of defects in workmanship or material. Should any failure to conform to this warranty become apparent during a period of one year after the date of shipment, Rosemount Analytical shall, upon prompt written notice from the purchaser, correct such nonconformity by repair or replacement, F.O.B. factory of the defective part or parts. Correction in the manner provided above shall constitute a fulfillment of all liabilities of Rosemount Analytical with respect to the quality of the equipment.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY WHETHER WRITTEN, ORAL, OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR PURPOSE).

The remedy(ies) provided above shall be purchaser's sole remedy(ies) for any failure of Rosemount Analytical to comply with the warranty provisions, whether claims by the purchaser are based in contract or in tort (including negligence).

Rosemount Analytical does not warrant equipment against normal deterioration due to environment. Factors such as corrosive gases and solid particulates can be detrimental and can create the need for repair or replacement as part of normal wear and tear during the warranty period.

Equipment supplied by Rosemount Analytical Inc. but not manufactured by it will be subject to the same warranty as is extended to Rosemount Analytical by the original manufacturer.

At the time of installation it is important that the required services are supplied to the system and that the electronic controller is set up at least to the point where it is controlling the sensor heater. This will ensure, that should there be a delay between installation and full commissioning that the sensor being supplied with ac power and reference air will not be subjected to component deterioration.

X-STREAM O₂ Transmitter

Instruction Manual
IM-106-910, Revision 2.2
November 2009

X-STREAM O₂ Transmitter
Part no. _____
Serial no. _____
Order no. _____

*Rosemount Analytical and the Rosemount Analytical logotype are registered trademarks of Rosemount Analytical Inc.
HART is a registered trademark of the HART Communications Foundation.
All other marks are the property of their respective owners.*

WORLD HEADQUARTERS
Emerson Process Management
Rosemount Analytical Inc.
6565P Davis Industrial Parkway
Solon, OH 44139
T 440 914 1261
T 800 433 6076
F 440 914 1262
E gas.csc@emerson.com

ROSEMOUNT ANALYTICAL EUROPE
Emerson Process Management
GmbH & co. OHG
Industriestrasse 1
63594 Hasselroth
Germany
T 49 6055 884 0
F 49 6055 884 209

EUROPE, MIDDLE EAST, AFRICA
Emerson Process Management
Shared Services Limited
Heath Place
Bognor Regis
West Sussex PO22 9SH
England
T 44 1243 863121
F 44 1243 845354

GAS CHROMATOGRAPHY
CENTER AND LATIN AMERICA
Emerson Process Management
Rosemount Analytical Inc.
11100 Brittmoore Park Drive
Houston, TX 77041
T 713 467 6000
F 713 827 3329

ASIA-PACIFIC
Emerson Process Management
Asia Pacific Private Limited
1 Pandan Crescent
Singapore 128461
Republic of Singapore
T 65 6 777 8211
F 65 6 777 0947
E analytical@ap.emerson.com

<http://www.raihome.com>