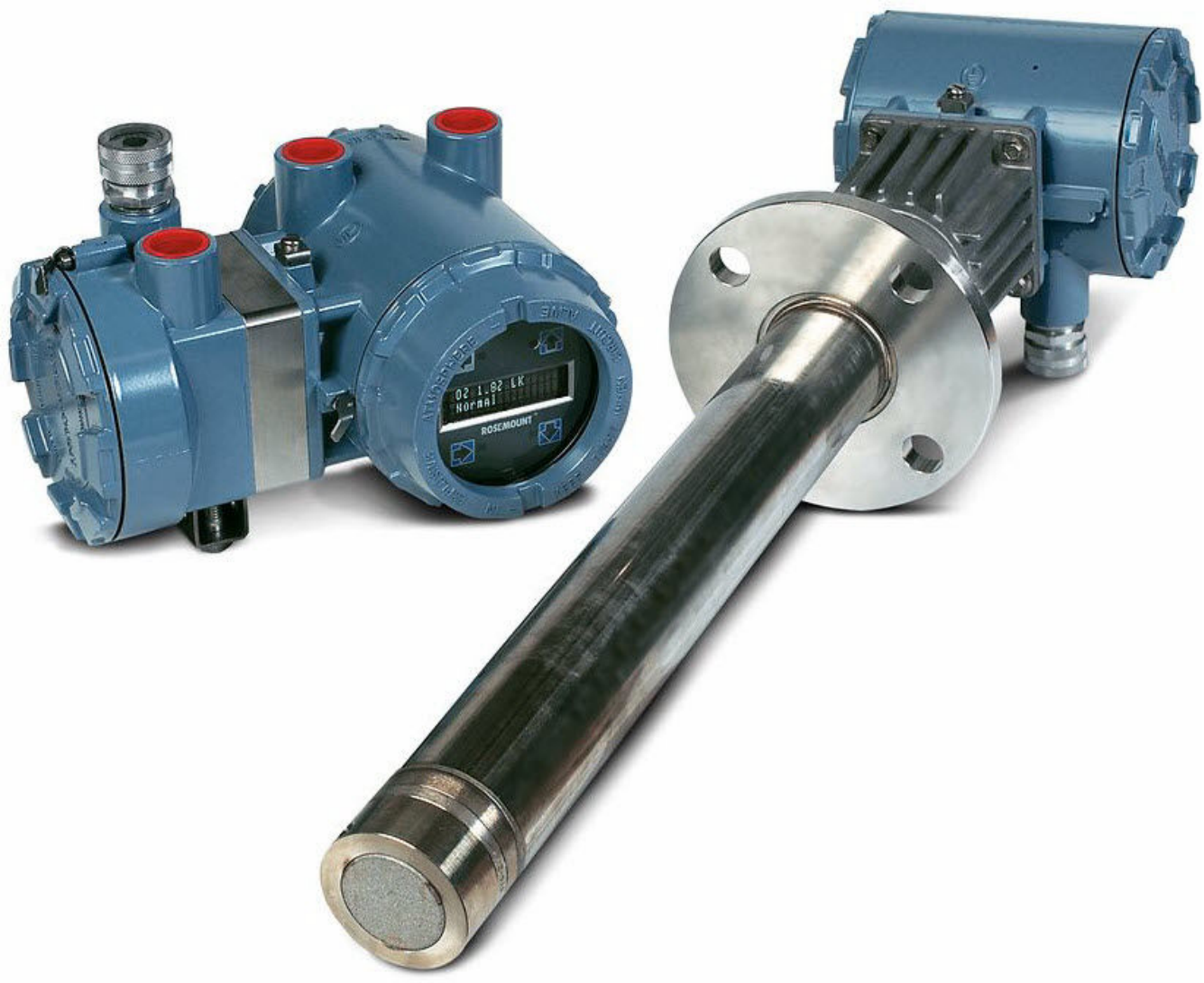
Reference Manual
00809-0100-4884, Rev AC
April 2022

Rosemount™ Oxymitter DR

In-Situ Oxygen Probe for General Purpose Locations



ROSEMOUNT™

EMERSON™

Warranty

Seller warrants that the firmware will execute the programming instructions provided by Seller and that the Goods manufactured or Services provided by Seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller, whichever period expires first. Consumables, such as glass electrodes, membranes, liquid junctions, electrolyte, O-rings, catalytic beads, etc., and Services are warranted for a period of 90 days from the date of shipment or provision.

Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products.

If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, promptly correct any errors that are found by Seller in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Seller to be defective, or refund the purchase price of the defective portion of the Goods/Services.

All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty and shall be at Buyer's expense. Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Seller representative. All costs of dismantling, re-installation and freight, and the time and expenses of Seller's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Seller.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES.

Safety instructions

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

⚠ WARNING

Adequate earth connections should be made to all earthing points, internal and external, where provided.

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.

Main supply cords should comply with the requirements of IEC227 or IEC245.

All wiring shall be suitable for use in an ambient temperature of greater than 221 °F (105 °C).

All cable glands used should be of such internal dimensions as to provide adequate cable anchorage.

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 it does not, then another means of disconnecting the equipment from the supply must be provided and clearly marked as such. Circuit breakers or switches must comply with a recognized standard, such as IEC947. All wiring must conform with any local standards.

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

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

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

All graphical symbols used in this product are from one or more of the following standards: EN61010, IEC417, and ISO3864.

Where equipment or labels are marked "Do Not Open While Energized" or similar, there is a danger of ignition in areas where an explosive atmosphere is present. This equipment should only be opened when the power is removed and adequate time as specified on the label or in the Reference Manual has been allowed for the equipment to cool down - and then only by trained service personnel.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

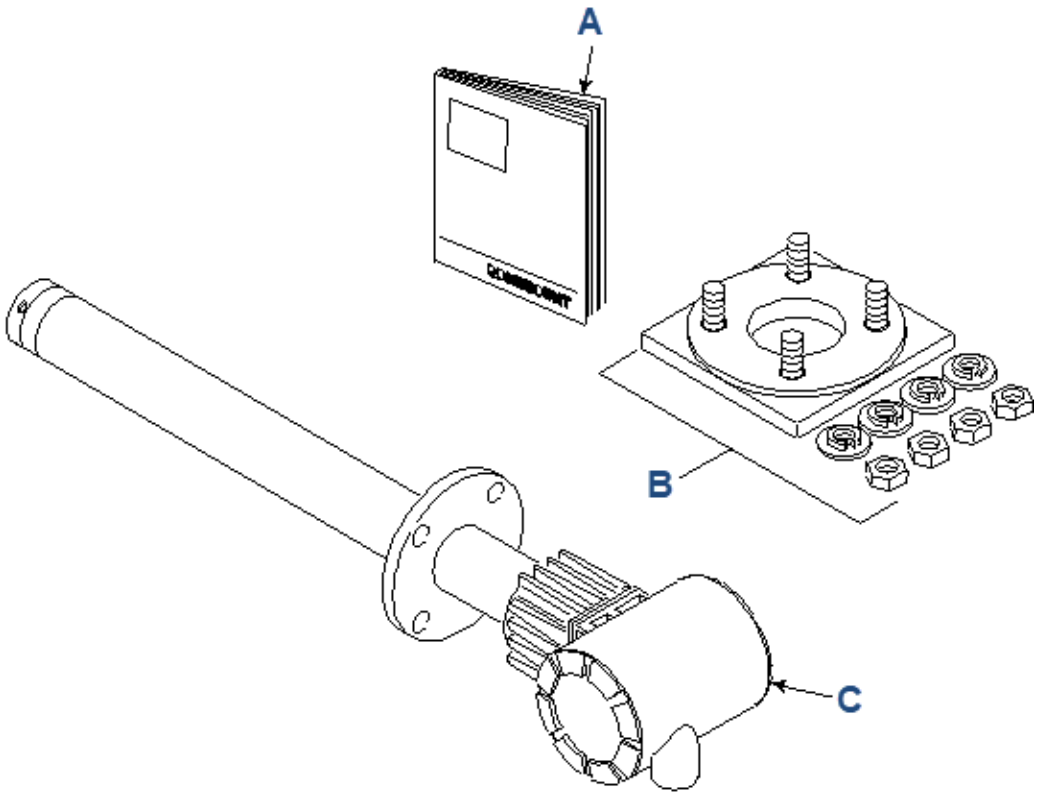
Contents

1 Description and specifications

1.1 Components checklist

Also use the following tables to compare your order number against your unit. The title of the table defines the model. The rest of the table defines the various options and features of the Rosemount Oxymitter DR. Ensure the features and options specified by your order number are on or included with the unit.A typical Rosemount™ Oxymitter DR should contain the items shown in Figure 1-1. Record the part number, serial number, and order number for each component of your system.

Figure 1-1: Typical System Package



A. *Quick Start Guide*
B. *Adapter plate with mounting hardware and gasket*
C. *Oxymitter DR*

Table 1-1: Rosemount Oxymitter DR Ordering Information

OXT4ADR	**Oxymitter DR In-Situ Oxygen Transmitter**
Code	**Sensing probe type**
1	ANSI (North American standard) probe with ceramic diffuser

Table 1-1: Rosemount Oxymitter DR Ordering Information *(continued)*

2	ANSI probe with flame arrestor and ceramic diffuser(1)
3	ANSI probe with snubber diffuser
4	DIN (European standard) probe with ceramic diffuser
5	DIN probe with flame arrestor and snubber diffuser(1)
6	DIN probe with snubber diffuser
7	JIS (Japanese standard) probe with ceramic diffuser
8	JIS probe with flame arrestor and ceramic diffuser(1)
9	JIS probe with snubber diffuser
Code	Probe assembly
0	18-in. (457 mm) probe
1	18-in. (457 mm) probe with abrasive shield(2)
2	3-ft. (0.91 m) probe
3	3-ft. (0.91 m) probe with abrasive shield(2)
4	6-ft. (1.83 m) probe
5	6-ft. (1.83 m) probe with abrasive shield(2)
6	9-ft. (2.74 m) probe
7	9-ft. (2.74 m) probe with abrasive shield(2)
8	12-ft. (3.66 m) probe
9	12-ft. (3.66 m) probe with abrasive shield(2)
A	15-ft. (4.57 m) probe with abrasive shield(2)
B	18-ft. (5.49 m) probe with abrasive shield(2)
Code	**Mounting hardware: stack side**
0	No mounting hardware (You must choose *0* under *Mounting Hardware - Probe Side* below.)
1	New installation: square weld plate with studs
2	Mounting to Model 218 mounting plate (with Model 218 shield removed)
3	Mounting to existing Model 218 support shield
4	Mounting to other mounting(3)
5	Mounting to Model 132 adapter plate
Code	**Mounting hardware: probe side**
0	No mounting hardware
1	Probe only (ANSI) (North American standard)
2	New bypass or abrasive shield (ANSI)
4	Probe only (DIN) (European standard)

Table 1-1: Rosemount Oxymitter DR Ordering Information *(continued)*

5	New bypass or abrasive shield (DIN)
7	Probe only (JIS) (Japanese standard)
8	New bypass or abrasive shield (JIS)
Code	**Housing and customer termination**
11	Standard filtered termination
12	Transient protected filtered termination
Code	**Arrangment: existing electronics**
03	For use with existing analog electronics (including Westinghouse/Rosemount 132/218/225)
04	Westinghouse/Rosemount digital (218A) or universal electronics
05	VeriTrim electronics
07	Model 132 digital electronics
08	For use with Yokogawa electronics (cold junction comp. in probe junction box)
09	For use with other competitive oxygen transmitter systems

(1) No agency approvals. See Rosemount Hazardous Area Oxymitter 4000 Reference Manual for hazardous area certified probes.

(2) Recommended usages: High velocity particulates in flue stream, installation within 11.5 ft. (3,5 m) of soot blowers or heavy salt cake buildup. Applications: pulverized coal, recovery boilers, lime kiln. Regardless or application, Emerson recommends abrasive shields with support brackets for 9 ft. (2,74 m), 12 ft. (3,66 m), 15 ft. (4,57 m), and 18 ft. (5,49 m) probe installations, particularly horizontal installations.

(3) Where possible, specify SPS number; otherwise, provide details of the existing mounting plate as follows. See #unique_6/unique_6_Connect_42_table_x2d_lkk_chb.

Note

1. High sulfur service: For high sulfur applications, please add an additional line item to your purchase order requesting high sulfur cell part number 4847B63G02 in lieu of the standard ZrO_2 cell.
   Cell replacement kits for high sulfur service are also available.
2. Where possible, specify ANSI or DIN designation; otherwise, provide details of existing mounting plate as follows:

Plate with studs	Bolt circle diameter, number and arrangement of studs, stud thread, and stud height above mounting plate
Plate without studs	Bolt circle diameter, number, and arrangement of holes, threads, and depth of stud mounting plate with accessories

Table 1-2: Calibration Components

Part number	Description
1A99119G01	Calibration gas kit: Contains 0.4% and 8.0% O_2 bottles, 145.3 gal. (550 L) each (requires two CGA-590 regulators)(1)
1A99119G02	Calibration gas regulators kit: Contains two CGA-590 regulators
1A99119G03	Bottle rack

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

1.2 Overview

1.2.1 Scope

This Reference Manual provides information needed to install, start up, operate, and maintain the Rosemount™ Oxymitter DR.

You can interface the Oxymitter DR to a number of different earlier model electronics packages. This manual does not cover these electronic packages. For specification information concerning calibration and operation of the system, refer to the Reference Manual applicable to your electronics.

1.2.2 Description

Emerson designed the Oxymitter DR to measure the net concentration of oxygen in an industrial combustion process (i.e., the oxygen remaining after all fuels have been oxidized).

The probe is permanently positioned within an exhaust duct or stack and performs its task without a sampling system.

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

$EM = KT \log_{10}(P_1/P_2) + C$

Where:

P_2 is the partial pressure of the oxygen in the measured gas on one side of the cell.

P_1 is the partial pressure of the oxygen in the reference air on the opposite side of the ce3ll.

T is the absolute temperature.

C is the cell constant.

K is an arithmetic constant.

When the cell is at an 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 transmitter to provide exceptional sensitivity at low oxygen concentrations.

The transmitter measures net oxygen concentration in the presence of all the products of combustion, including water vapor. Therefore, you can think of it as 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 is proportional to the water content of the sample stream.

1.2.3 Configuration

Rosemount™ Oxymitter DR Transmitters are available in seven length options, giving the operator flexibility to use an in situ penetration appropriate to the size of the stack or duct. The options are:

- 18 in. (457 mm)
- 3 ft. (0,91 m)
- 6 ft. (1,83 m)
- 9 ft. (2,7 m)
- 12 ft. (3,66 m)
- 15 ft. (4,57 m)
- 18 ft. (5,49 m)

Emerson offers abrasive shields for applications where abrasive particulates are present. Acid-resistant cells are available for SO_2 and HCl environments. Bypass and probe mounting jacket options are available for process temperatures above 1300 °F (705 °C).

1.2.4 Features

The cell output voltage and sensitivity increase as the oxygen concentration decreases.

The Rosemount™ Oxymitter DR includes:

- Field replaceable cell, heater, thermocouple, and diffusion element.
- Rugged 316L stainless steel wetted parts.
- Membrane keypad
- Local operator interface (LOI)
- Optional HART® interface

1.2.5 Handling

⚠ CAUTION

The Rosemount Oxymitter DR is designed for industrial applications. Some probe components are made from ceramics, which are susceptible to shock when mishandled.

Treat each component of the system with care to prevent physical damage.

1.2.6 System considerations

Prior to installing your transmitter, make sure you have all the components necessary to make the system installation. Ensure all components are properly integrated to make the system functional.

After verifying that you have all the components, select mounting locations and determine how each component will be placed in terms of available line voltage, ambient temperatures, environmental considerations, convenience, and serviceability.

Instrument air for reference air is optional for most applications. Ambient air passively diffuses into the inside of the probe in sufficient quantity for an accurate measurement. Instrument air is required for applications where the ambient air at the probe location may not contain the typical 20.95 percent O_2. An example would be an installation into a positive pressure flue gas duct which has many leaks into the surrounding air.

If the calibration gas bottles will be permanently connected, use a blocking valve or check valve next to the calibration fittings on the termination housing. This blocking valve or check valve is to prevent breathing of the calibration gas line and subsequent flue gas condensation and corrosion.

Note
Keep the packaging in which the transmitter arrived from the factory in case you need to ship any components to another site. Emerson has designed this packaging to protect the product.

1.2.7 Upgrading the Rosemount™ Oxymitter DR

You can easily upgrade the Rosemount Oxymitter DR to a full Oxymitter 4000 or 5000.

This provides an economical upgrade path for customers looking to preserve their probe investment upon the eventual failure of the signal conditioning electronics. To upgrade, add a small electronics package to the existing termination housing of the probe. The converted unit will be a full Rosemount Oxymitter 4000 or 5000 Oxygen Transmitter that can provide a 4-20 mA oxygen signal without an external signal conditioning electronics package. The Rosemount Oxymitter electronics comes with HART® or FOUNDATION™ Fieldbus communications. See Upgrade Rosemount™ Oxymitter DR to full Oxymitter for upgrade information.

1.3 Probe options

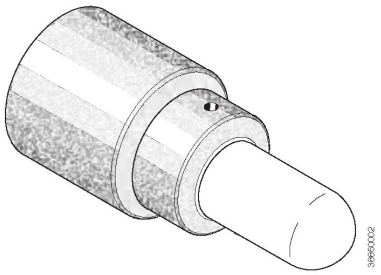
1.3.1 Diffusion elements

Ceramic diffusion assembly

The ceramic diffusion assembly is the traditional design for the probe.

Used for over 25 years, the ceramic diffusion assembly provides a greater filter surface area. This element is also available with a flame arrestor and with a dust shield to use with an abrasive shield.

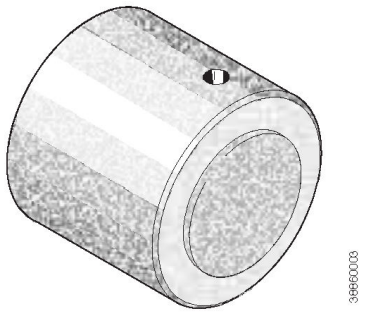
Figure 1-2: Ceramic Diffusion Assembly



Snubber diffusion assembly

The snubber diffusion assembly is satisfactory for most applications. This element is also available with a dust seal for use with an abrasive shield.

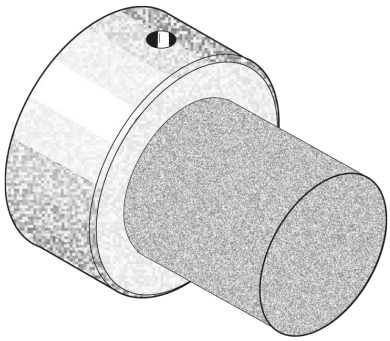
Figure 1-3: Snubber Diffusion Assembly



Cup type diffusion assembly

Use the cup type diffusion assembly in high temperature applications where frequent diffusion element plugging is an option.

Figure 1-4: Cup Type Diffusion Assembly

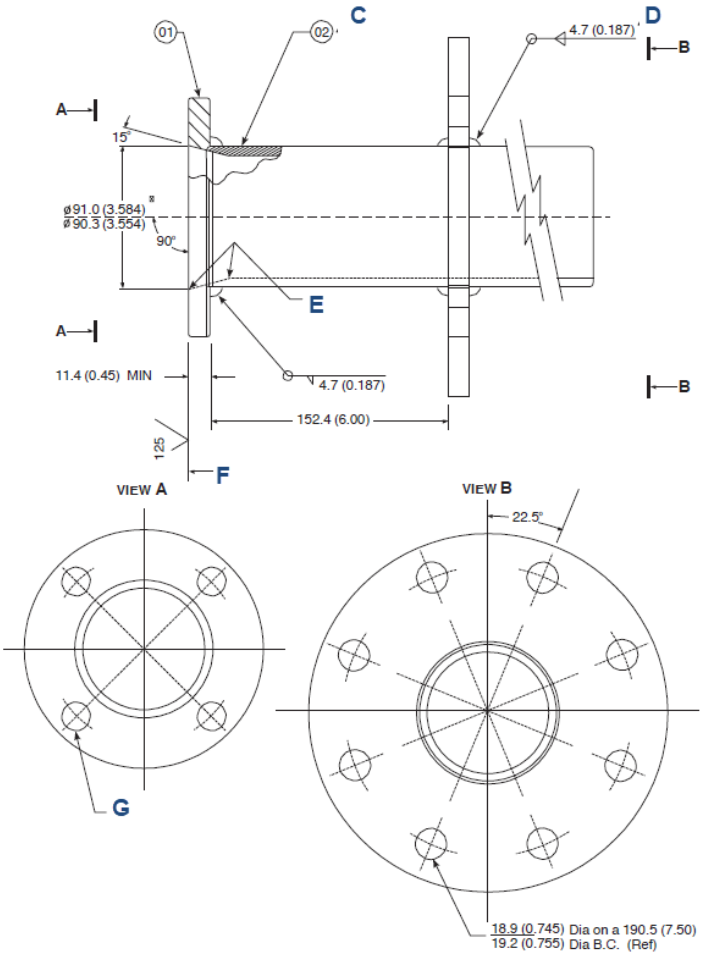


The assembly is available with either a 5 micron or 40 micron sintered Hastelloy element. This diffusion element offers the greater surface area of the ceramic element, but is much more rugged. This element is also available with a dust seal for use with an abrasive shield.

Abrasive shield assembly

The abrasive shield assembly is a stainless steel tube that surrounds the probe assembly. The shield protects against particle abrasion and condensations, provides a guide for ease of insertion, and acts as a positive support, especially for longer probes. The abrasive shield assembly uses a modified diffusor and vee deflector assembly, fitted with dual dust seal packing.

Figure 1-5: Abrasive Shield Assembly



Dimensions are millimeters with inches in parentheses.

A. *View A.*
B. *View B.*
C. *Before welding, butt item 02 with item 01 as shown.*
D. *Weld on both sides with expanding chill block.*
E. *On inside Ø break for smooth rounded edge on both ends of chamber.*
F. *Skin cut face for 90°.*
G. *Ø 0.75 in. (19 mm) through four places equally spaced on Ø 4.75 in. (120.65 mm) B.C.*

Note
In highly abrasive applications, rotate the shield 90 degrees at normal service intervals to present a new wear surface to the abrasive flow stream.

1.4 Specifications

1.4.1 Performance specifications

Temperature limits	Process: 32 to 1300 °F (0 to 705 °C), up to 2400 °F (1300 °C) with optional accessories
Resolution sensitivity	0.01% O_2 transmitted signal
Sensing cell repeatability	±0.75% of O_2 reading or 0.05% O_2[(1)]
Mounting and mounting position	Vertical or horizontal
Lowest detectable limit	0.02% O_2
System speed of response to calibration gas	T_{intial} < 3 seconds T90 < 8 seconds
Reference air	2 SCFH (1 L/min), clean, dry, instrument quality air (20.95% O_2), regulated to 2.5 psi (34 kPa)
Relative humidity	5 to 95% (non-condensing)
Power requirements	Normal operation: 175 W Maximum (warmup): 500 W
Ambient operating temperature (junction box)	200 °F (93 °C) 160 °F (71 °C) maximum for YEW replacement
CE	Rosemount has satisfied all obligations coming from the European legislation to harmonize the product requirements in Europe.

(1) When used with Rosemount Oxymitter signal conditioning electronics.

1.4.2 Physical specifications

Probe lengths

- 18 in. (457 mm)
- 3 ft. (0.91 m)
- 6 ft. (1.83 m)
- 9 ft. (2.74 m)
- 12 ft. (3.66 m)
- 15 ft. (4.57 m)
- 18 ft. (5.49 m)

Materials of construction

Transmitter probe: Process-wetted materials are 316L or 304 stainless steel.

Non-wetted parts: 304 stainless steel, low-copper aluminum

Termination housing: Low-copper aluminum

Process connections

2-in. 150# (4.75-in. [121 mm] bolt circle); DIN (5.71-in. [145 mm] bolt circle)

Note
Flanges are flat-faced and for mounting only. Flanges are not pressure-rated. Spool piece part numbers are available to offset electronics housing from hot ductwork. Many adapter flanges are available to mate to existing flanges.

Orientation Vertical or horizontal mount

Heater voltage 115 ±10 percent Vac, 50/60 Hz, 200 VA

Thermocouple Type K

Table 1-3: Probe Lengths and Approximate Shipping Weights

Length	Weight
18 in. (457 mm)	16 lb. (7.3 kg)
3 ft. (0.91 m)	21 lb. (9.5 kg)
6 ft. (1.83 m)	27 lb. (12.2 kg)
9 ft. (2.74 m)	33 lb. (15.0 kg)
12 ft. (3.66 m)	39 lb. (17.7 kg)
15 ft. (4.57 m)	45 lb. (20.5 kg)
18 ft. (5.49 m)	51 lb. (23 kg)

2 Install

⚠ WARNING

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

Before installing the equipment, read Safety instructions.

2.1 Mechanical installation

2.1.1 Select location

The location of the transmitter in the stack or flue is most important for maximum accuracy in the oxygen analyzing process.

If the probe will be installed into an existing location, proceed to Install probe.

Procedure

1. Position the transmitter so that the gas it measures is representative of the process.

   You will obtain best results by positioning the transmitter near the center of the duct (40 to 60 percent insertion). Longer ducts may require several transmitter units since the O_2 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. Select the sensing point so the process gas temperature falls within a range of 32 to 1300 °F (0 to 704 °C).

   The ambient temperature of the termination housing must not exceed 200 °F (93 °C).

2. Check the flue or stack holes for air leakage. Make any necessary repairs or install the transmitter upstream of any leakage.

   Ducts and stacks that operate under negative pressure will draw air in through any holes or torn seals, substantially affecting the oxygen reading.

3. Ensure that the area is clear of internal and external obstructions that will interfere with probe installation and access to the membrane keypad or LOI. Allow adequate clearance for removal of the transmitter.

Table 2-1: Calibration Gas and Reference Air

Calibration gas	Reference air
ANSI	6.34 (¼) tube
DIN	6.35 (¼) tube

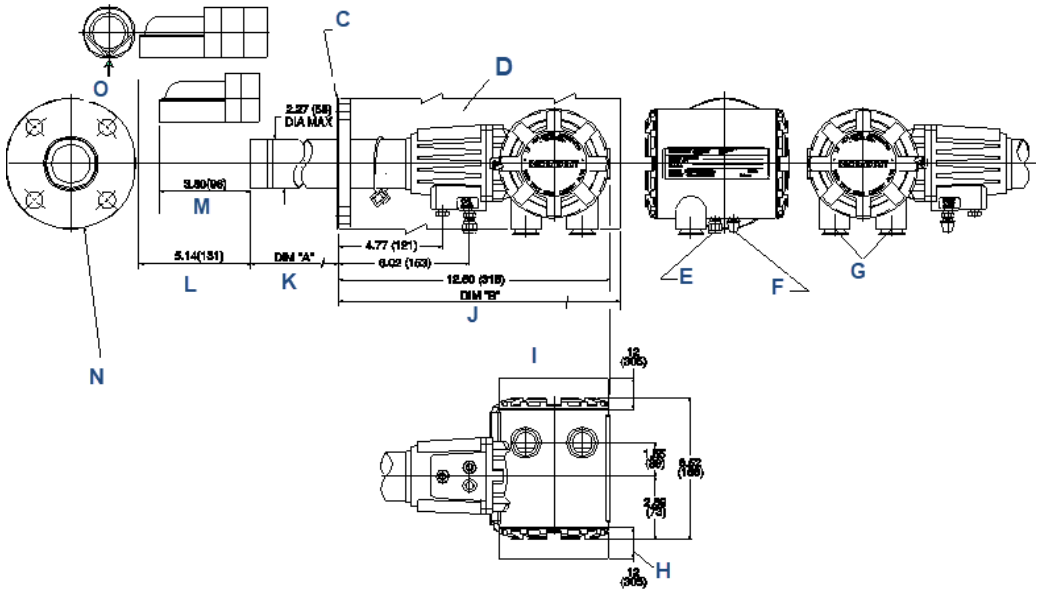
Table 2-2: Mounting Flange (Gasket Included)

	ANSI	DIN
Flange diameter	190 (7.5)	210 (8.25)

Table 2-2: Mounting Flange (Gasket Included) *(continued)*

	ANSI	DIN
Hole diameter	19 (0.75)	18 (0.71)
4 holes equally spaced on BC	152,4 (6.00)	170 (6.69)

Figure 2-1: Rosemount Oxymitter DR Installation



All dimensions are in inches with millimeters in parentheses.

A. *Dimension A*
B. *Dimension B*
C. *0.062 THK gasket*
   ANSI: 3535B18H02
   JIS: 3535B46H01
   DIN: 3535B45H01
D. *Insulate if exposed to ambient weather conditions.*
E. *Calibration gas*
F. *Reference air*
   ANSI: ¼ (6.35) tube
   DIN: 0.24 (6) tube
   JIS: 0.24 (6) tube
G. *Electrical connection ¾ NPT*
H. *Cover removal and access*
I. *Bottom view*
J. *Removal envelope*
K. *With standard snubber diffuser*
L. *Add to Dimension A for probe with ceramic diffuser and flame arrestor*
M. *Add to Dimension A for probe with ceramic diffuser*
N. *Process flow must be in this direction with respect to deflector 3534B48G01*

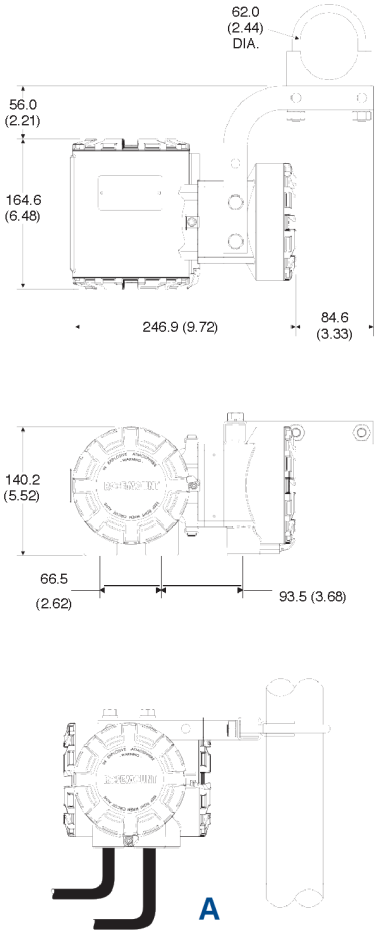
Table 2-3: Installation/Removal

Probe	Dimension A	Dimension B
18 in.	16 (405)	31.8 (808)
3 ft.	34 (864)	49.8 (1265)

Table 2-3: Installation/Removal *(continued)*

Probe	Dimension A	Dimension B
6 ft.	70 (1778)	65.8 (2179)
9 ft.	106 (2962)	121.8 (3094)
12 ft.	142 (3607)	157.8 (406)
15 ft.	178 (4521)	193.8 (4923)
18 ft.	214 (5436)	229.8 (5387)

Figure 2-2: Remote Electronics with Membrane Keypad and Blind Cover



Note
All dimensions are in millimeters with inches in parentheses.

A. Pipe mount configuration

Figure 2-3: Remote Electronics with LOI and Window Cover, Wall Mount Configuration

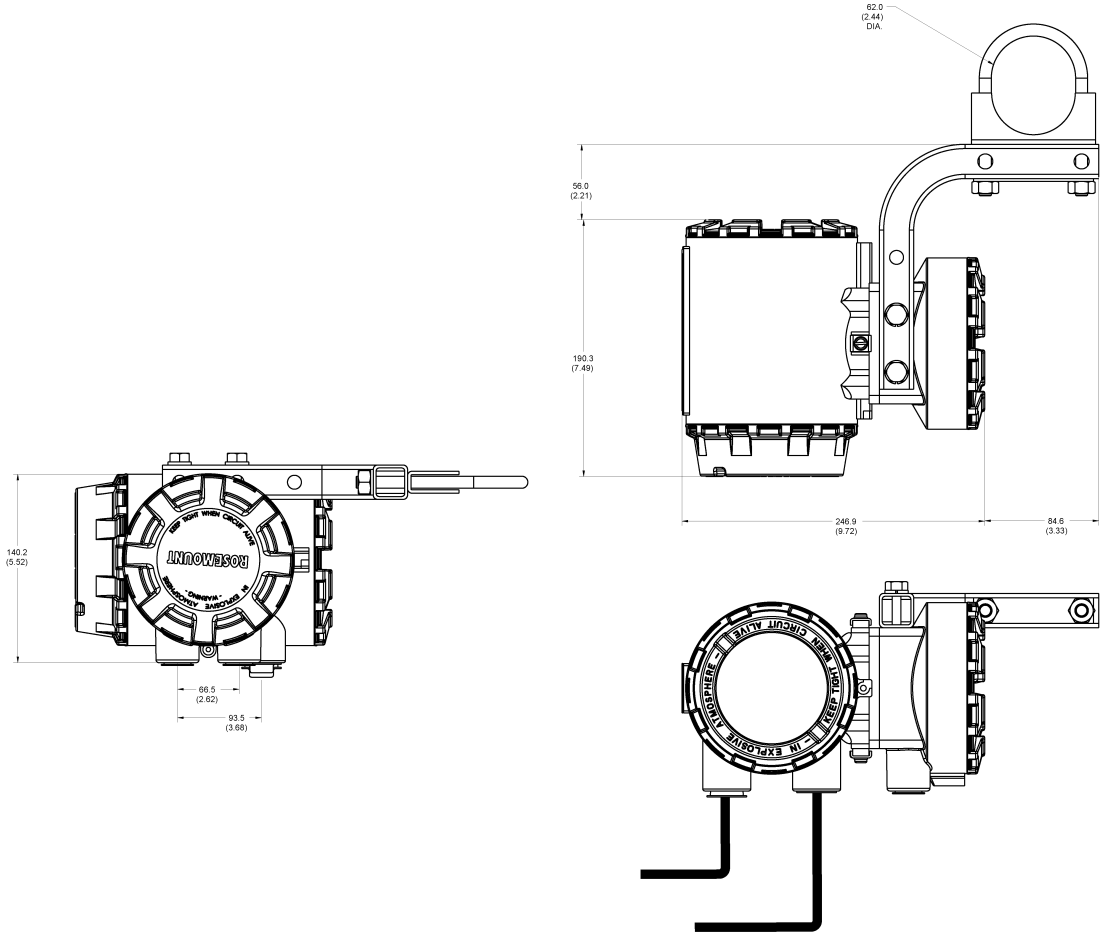
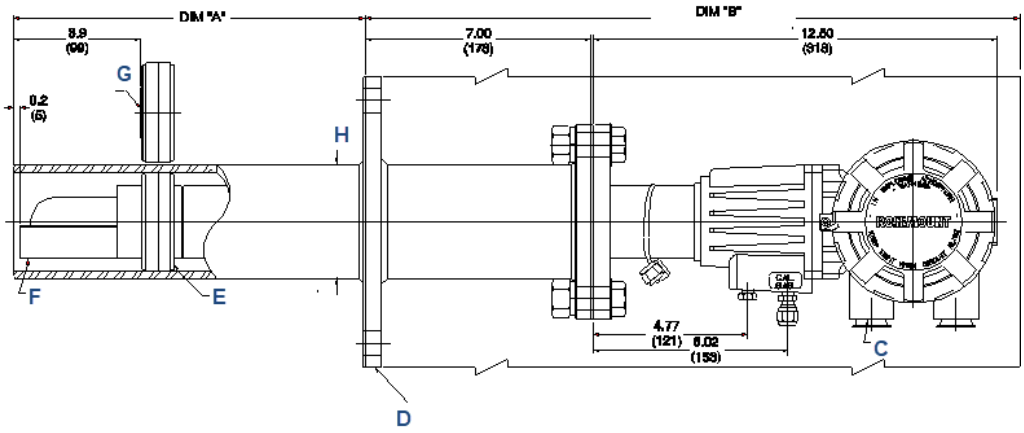


Figure 2-4: Rosemount Oxymitter DR with Abrasive Shield



These flat-faced flanges are manufactured to ANSI, DIN, and JIS bolt patterns and are not pressure rated. All dimensions are in inches with millimeters in parentheses.

A. *Dimension A*
B. *Dimension B: Removal envelope*
C. *¾ NPT electrical connection*
D. ***Table 2-4: Abrasive Shield - 3D98003***

Flange	*ANSI*	*JIS*	*DIN*
Flange diameter	*229 (9.00)*	*235 (9.25)*	*235 (9.25)*
Hole diameter	*19 (0.75)*	*19 (0.75)*	*24 (0.94)*
8 holes equal SP on BC	*191 (7.50)*	*190 (7.48)*	*190 (7.48)*

E. *Diffuser/dust assembly*
F. *Deflector assembly*
G. *Snubber/dust seal assembly*
H. *Diameter nominal*

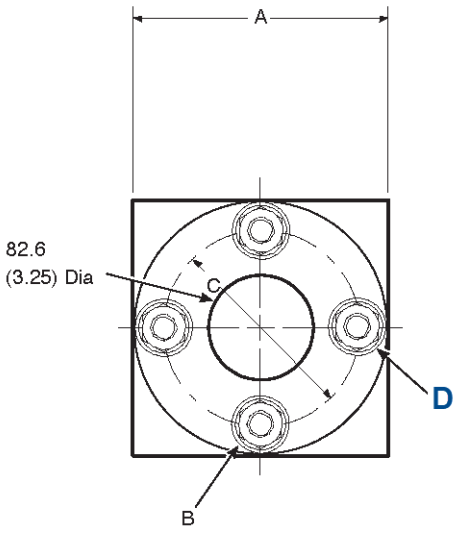
Table 2-5: Installation/Removal

Probe	Dimension A	Dimension B
18 in.	330 (18)	32.5 (826)
3 ft.	31 (787)	50.5 (1283)
6 ft.	67 (1702)	86.5 (2197)
9 ft.	103 (2616)	122.5 (3112)
12 ft.	139 (3531)	158.5 (4028)
15 ft.	175 (4445)	194.5 (4940)
18 ft.	211 (5959)	230.5 (5855)

Ref air	Cal gas(1)
ANSI	¼-in. tube
DIN	¼-in. tube

(1) Add check valve in cal gas line.

Figure 2-5: Mounting Plate for Rosemount Oxymitter DR



Note
Dimensions are in millimeters with inches in parentheses.

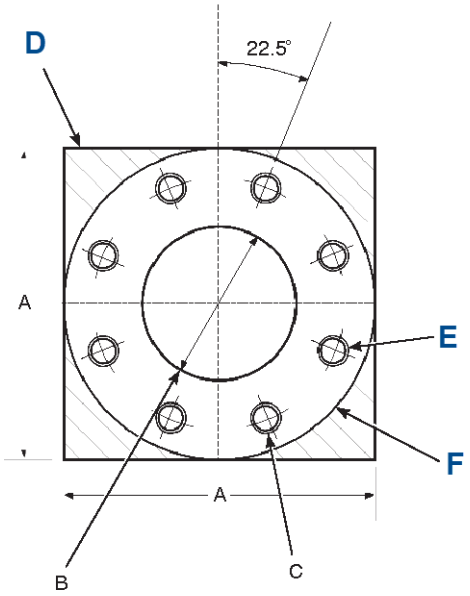
A. *Dimension A*
B. *Dimension B*
C. *Dimension C*
D. *Four studs, lockwashers, and nuts equally spaced on C diameter B.C.*

Table 2-6: Adapter Plate Dimensions for Rosemount Oxymitter DR

Part numbers for adapter plates include attaching hardware.

Dimensions: mm (in.)	ANSI (PN 4512C34G01)	DIN (PN 4512C36G01)	JIS (PN 451235G01)
A	153 (6.00)	191 (7.5)	165 (5.50)
B thread	0.625-11	(M-16 x 2)	(M-12 x 1.75)
C diameter	121 (4.75)	145 (5.708)	130 (4.118)

Figure 2-6: Mounting Plate for Rosemount Oxymitter DR with Abrasive Shield



Note
Dimensions are in inches with millimeters in parentheses.

A. *Dimension A.*
B. *Dimension B.*
C. *Dimension C.*
D. *Crosshatched area in four corners may be used to provide additional holes for field bolting of plate to outside wall service.*
E. *Eight threaded holes equally spaced on D diameter B.C.*
F. *Abrasive shield flange O.D.*

Table 2-7: Adapter Plate Dimensions for Rosemount Oxymitter DR with Abrasive Shield

Dimensions in in. (mm)	ANSI (PN 3536B58G02)	DIN (PN 3535B58G08)	JIS (PN 3535B58G04)
A	9.0 (229)	9.25 (235)	9.25 (235)
B: diameter	4.75 (121)	3.94 (100)	125 (4.92)
C: thread	0.625-11	(M-16 x 2)	(M-20 x 2.5)
D: diameter B.C.	7.50 (191)	7.48 (190)	7.894 (200)

2.1.2 Install probe

You may install the Rosemount™ Oxymitter DR intact, as you have received it.

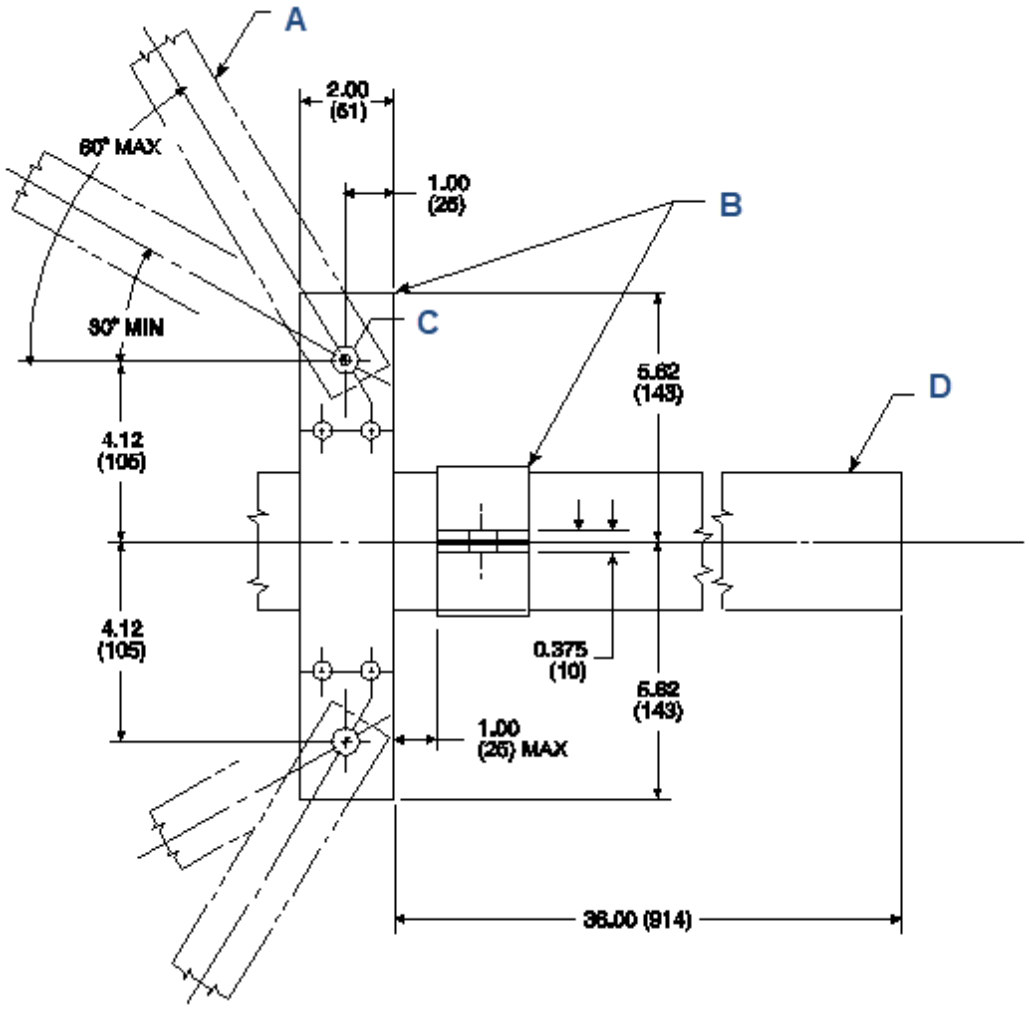
Prerequisites

Ensure all components are available to install the transmitter. If equipped with a ceramic diffuser, make sure the diffuser is not damaged.

Note

Emerson recommends an abrasive shield for high velocity particulates in the flue stream (such as those in coal-fired boilers, kilns, and recovery boilers). Emerson provides vertical and horizontal brace clamps for 9 ft. and 12 ft. (2.75 m and 3.66 m) probes to provide mechanical support for the transmitter. Refer to Figure 2-8.

Figure 2-7: Rosemount Oxymitter DR Bracing Installation



Bracing is for vertical and horizontal transmitter installation. External bracing is required for 9 ft. (2.74 m), 12 ft. (3.66 m), 15 ft. (4.57 m), and 18 ft. (5.49 m) probes as shown below.

Note
Dimensions are in inches with millimeters in parentheses.

A. Brace bars (not by Rosemount)
B. Brace clamp assembly by Rosemount. (Both brace clamp assemblies are the same. You must install and locate clamp assemblies and brace bars in the field).
C. Two holes: 0.625 (16) diameter for 0.50 (12) diameter bolt
D. Abrasive shield

Procedure

1. Weld or bolt adapter plate onto the duct.
2. If using the optional ceramic diffusion element, make sure to correctly orient the vee deflector. Before inserting the transmitter, check the direction of the flow of

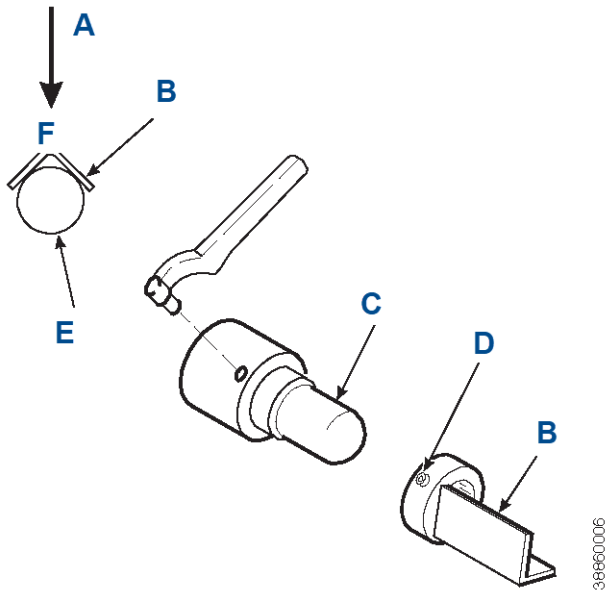
gas in the duct. Orient the vee deflector so the apex points upstream towards the flow.

a) Loosen the setscrews.

b) Rotate the vee deflector to the desired position.

c) Retighten the setscrews.

Figure 2-8: Orienting the Optional Vee Deflector

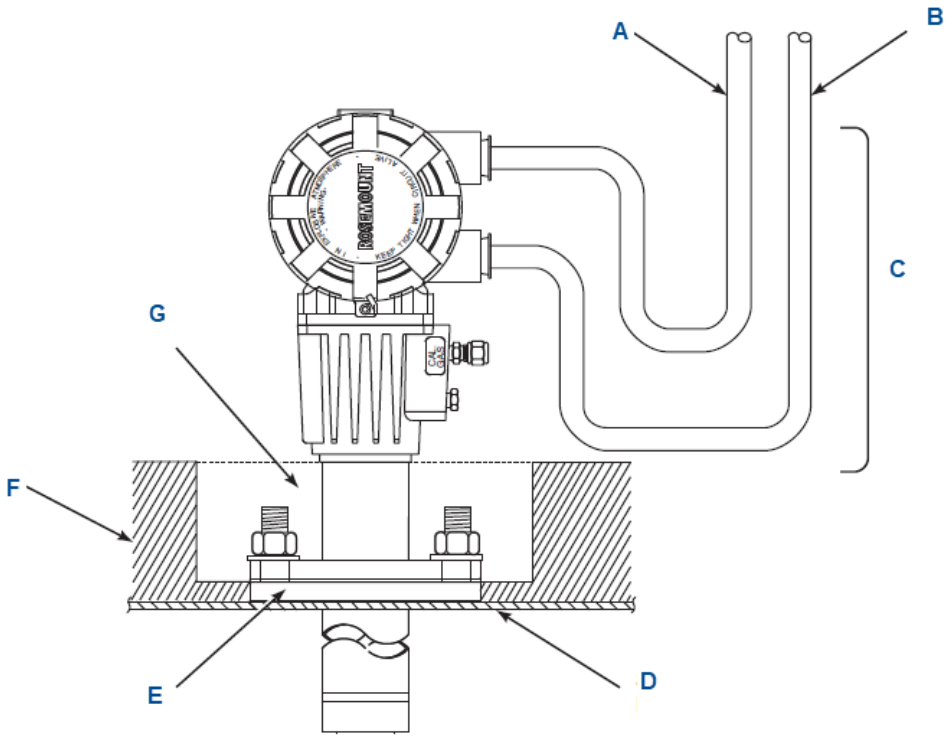


A. Gas flow direction
B. Vee deflector
C. Ceramic diffusion element
D. Setscrew
E. Filter
F. Apex

3. In vertical installations, ensure the system cable drops vertically from the transmitter and the conduit is routed below the level of the electronics housing.

   This drip loop minimizes the possibility that moisture will damage the electronics.

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



A. Line voltage.
B. Logic I/O 4-20 mA signal.
C. Drip loop.
D. Stack or duct metal wall.
E. Mounting plate.
F. Insulation.
G. Replace insulation after installing Rosemount Oxymitter DR.

4. If the system has an abrasive shield, check the dust seal gaskets. Make sure the joints in the two gaskets are staggered 180 degrees and that the gaskets are in the hub grooves as the transmitter slides into the 15 degree forcing cone in the abrasive shield.

Note
If process temperatures will exceed 392 °F (200 °C), use anti-seize compound on the stud threads to ease future removal of the transmitter.

5. Insert probe through the opening in the mounting plate and bolt the unit to the plate.

   When probe lengths selected are 9 to 18 ft. (2.74 to 5.49 m), Emerson provides special brackets to provide additional support for the probe inside the flue or stack.

6. If you removed insulation to access the duct work for mounting the transmitter, make sure to replace the insulation afterwards.

2.2 Electrical installation

All wiring must conform to local and national codes.

⚠ WARNING

Disconnect and lock out power before connecting the unit to the power supply.

⚠ WARNING

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

Install all protective equipment covers and safety ground leads after installation.

⚠ WARNING

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

Make sure this circuit breaker includes a mechanically operated isolating switch.

If there is no switch, locate another external means of disconnecting the power supply close by.

Circuit breakers or switches must comply with a recognized standard, such as IEC 60947.

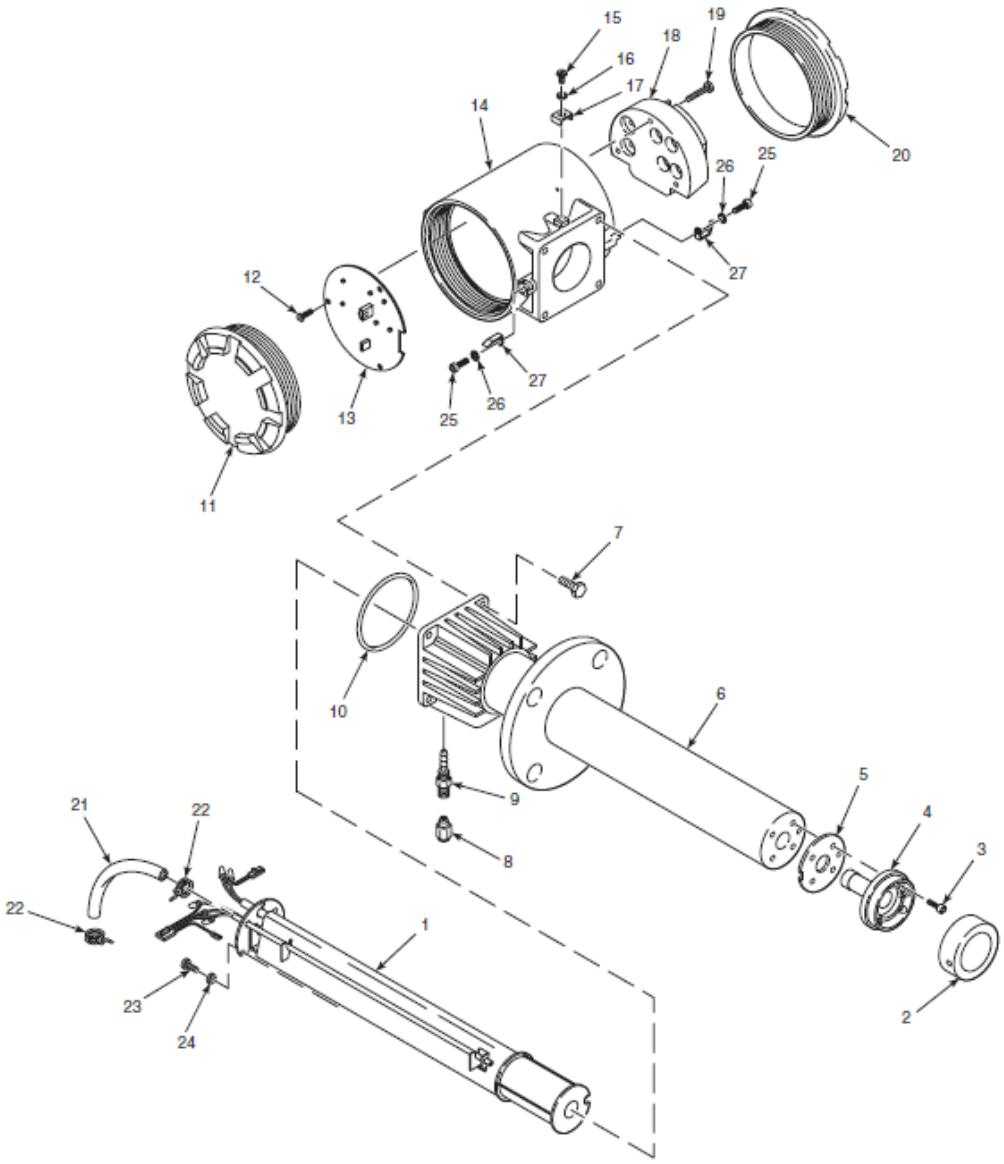
Note
To maintain CE compliance, ensure a good connection exists between the mounting flange bolt and earth.

2.2.1 Wire transmitter

⚠ WARNING

To maintain CE compliance, ensure a good connection exists between the mounting flange bolts and earth.

Figure 2-10: Rosemount™ Oxymitter DR Exploded View



Not all parts shown.

Not all parts shown are available for individual sale.

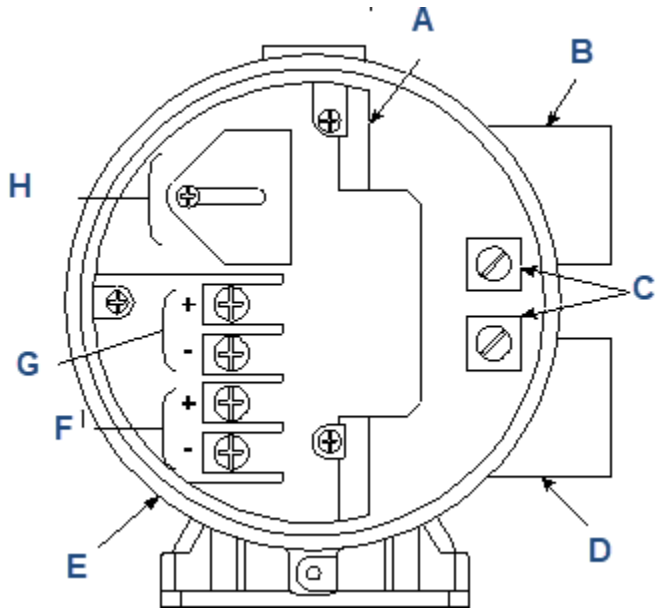
1	Heater strut assembly	15	Screw
2	Diffusion assembly (snubber)	16	Lock washer
3	Retainer screw	17	Cable clamp
4	Cell and flange assembly	18	Terminal block
5	Corrugated seal	19	Captive screw
6	Probe tube assembly	20	Left housing cover

7	Screw	21	Silcone tube
8	Tube connector	22	Tube clamp
9	Gas port	23	Screw
10	O-ring	24	Washer
11	Right housing cover	25	Screw
12	Screw	26	Gasket
13	OXT adapter board	27	Cover lock
14	Termination housing		

Procedure

1. Remove screw (25, Figure 2-10), gasket (26), and cover lock (27). Remove terminal block cover (20).
2. Connect the heater power lines to the two terminals indicated in Figure 2-11.

Figure 2-11: Terminal Block



A. Terminal block
B. Heater power port
C. Ground lugs
D. Signal port
E. Left side of Rosemount Oxymitter DR
F. Oxygen signal
G. Type K thermocouple
H. Heater power

3. Connect O_2 and heater thermocouple signals.

a) Connect the oxygen signal lines from the signal conditioning electronics to the terminals shown in Figure 2-11.

b) Connect the Type K thermocouple lines from the signal conditioning electronics to the terminals indicated in Figure 2-11.

4. Install terminal cover (20, Figure 2-10) and secure with cover lock (27), gasket (26), and screw (25).

2.3 Pneumatic installation

If instrument air will be used as reference air, connect the reference air set to the transmitter.

⚠ CAUTION

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

Upon completing installation, make sure the transmitter is turned on and operating before firing up the combustion process.

⚠ CAUTION

Thermal cycling can cause condensation and premature aging.

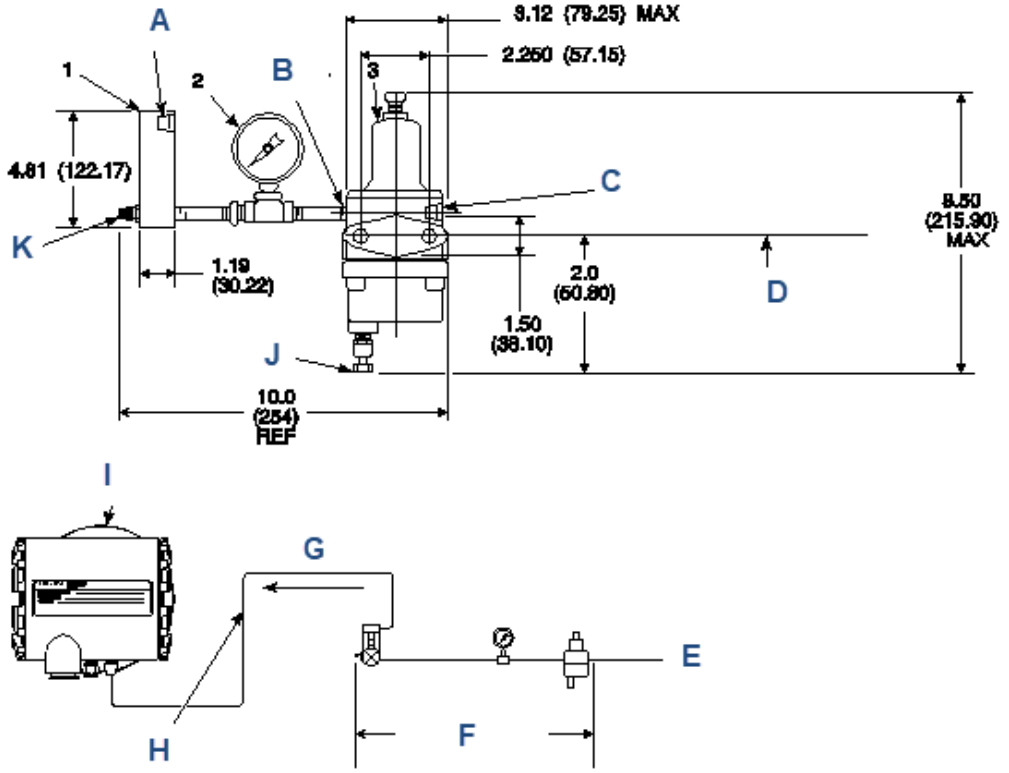
During outages, if possible, leave all transmitter units running.

⚠ CAUTION

If washing down the ducts during outage, make sure to power down the transmitter units and remove them from the wash area.

See System considerations. Install the reference air set in accordance with Figure 2-12.

Figure 2-12: Air Set, Plant Air Connection



Schematic hookup for reference air supply on Rosemount™ Oxymitter DR probe head.

Dimensions are in inches with millimeters in parentheses.

A. *0.125-27 NPT female outlet connection*
B. *Outlet*
C. *0.25-18 NPT female inlet connection*
D. *Two mounting holes 3.19 (81.03) LG through body for 0.312 (7.92) diameter bolts*
E. *Instrument air supply: 10-225 psig maximum pressure*
F. *Reference air set: 263C152G01*
G. *To electronics*
H. *0.250 or 6 mm O.D. tubing (supplied by customer)*
I. *0.250 or 6 mm O.D. tube compression fitting*
J. *Drain valve*
K. *Flow set point knob*

Table 2-8: Replacement Parts

Number in Figure 2-12	Part name	Pressure	Part number
1	Flowmeter	0.2-2.0 scfh	771B635H02
2	2-in. (50.8 mm) pressure gauge	0-15 psig	275431-006

Table 2-8: Replacement Parts *(continued)*

Number in Figure 2-12	Part name	Pressure	Part number
3	Combination filter-regulator	0-30 psig	4505C21G01

Instrument air (reference air): 10 psig (68.95 kPa) minimum, 225 psig (1551.38 kPa) maximum at 2 scfh (56.6 L/hour) maximum; less than 40 parts per million total hydrocarbons. Set regulator outlet pressure at 5 psa (35 kPa).

2.4 Set up probe with electronics package

You can use the Rosemount™ Oxymitter DR probe with several electronics packages, including: Models 218, 218A, 225, 132 (analog and digital), TC200, and ZA8C.

⚠ WARNING

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

Install all protective equipment covers and safety ground leads before starting the equipment.

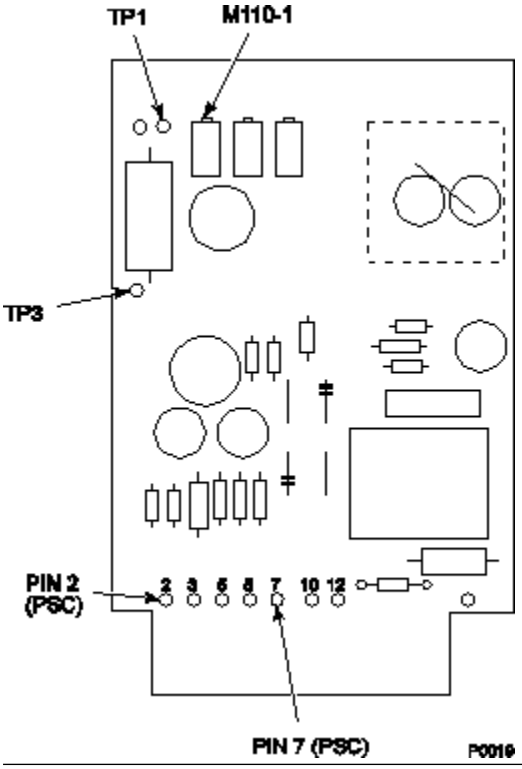
2.4.1 Set up Westinghouse Models 218, 225, and 132 (analog) electronics

Change the probe heater setpoint of the existing electronics to support the Rosemount™ Oxymitter DR probe.

Procedure

1. Open electronics enclosure.
2. On temperature controller card, connect jumper wire from TP3 to either Pin 2 or Pin 7.

Figure 2-13: Temperature Controller Card Calibration Points



3. Set voltmeter to read DC millivolts (mV).
4. Attach voltmeter with positive (+) lead on TP1 and negative (-) on either Pin 2 or 7.

Note
The voltage given above is for an ambient (machinery space) temperature of 77 °F (25 °C). For each degree of ambient temperature above or below 77 °F (25 °C), add or subract 0.242 mV from the nominal. Example: AT 87 °F (31 °C), the nominal voltage of -322.3 mV should be increased (made less negative) by 10 x 0.242 or 2.42 mV, making the adjusted nominal -319.9 mV.

5. Adjust potentiometer M110-1 to read 322.3 millivolts nominal.
6. Remove voltmeter leads.
7. Remove jumper wire.

2.4.2 Set up Westinghouse Model 218A electronics

Before beginning operation, it is important to change the probe heater setpoint of the existing electronics to support the Rosemount™ Oxymitter DR probe. To convert the

Model 218A digital electronics package for use with the Rosemount Oxymitter DR porbe, you need to change the EPROM.

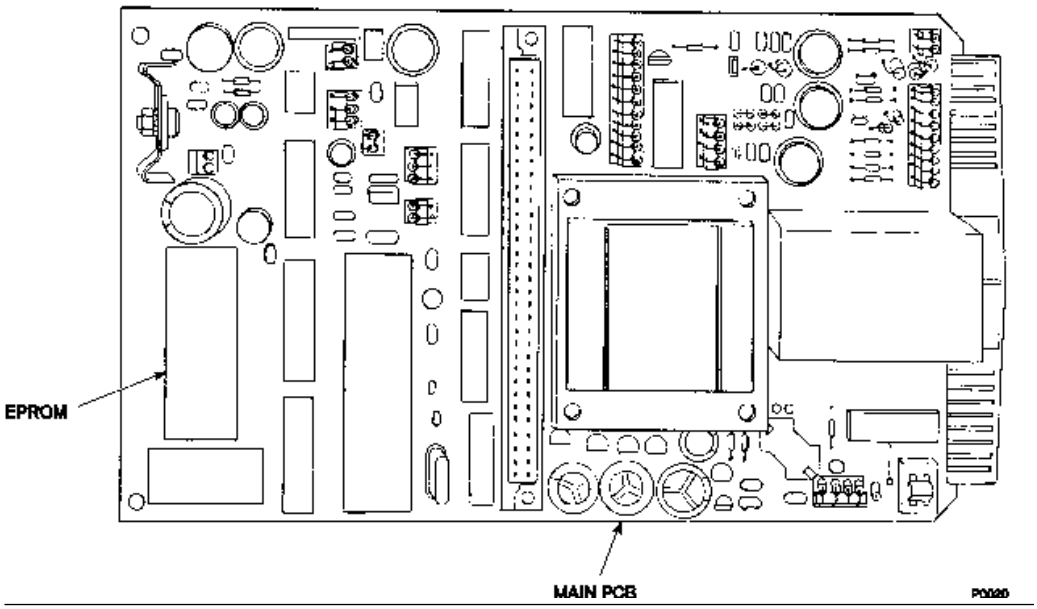
Prerequisites

Remove main PCB and check back of board to identify unit as G02 or G04. The replacement EPROM needed is identified below.

Country	G02	G04
United States	1M03192G01	1M02982G01
United Kingdom	1M03192G02	1M02982G02
Germany	1M03192G03	1M02982G03
France	1M03192G04	1M02982G04
Italy	1M03192G05	1M02982G05

Note
The replacement EPROM when using a multiprobe averager unit is 1M02982G10.

Figure 2-14: Main PCB (Model 218A EPROM Replacement)



Procedure

1. Shut off and lock out power to the electronics package.
2. Open electronics enclosure.
3. On the main PCB, locate and remove old EPROM.
   See Figure 2-14.
4. Replace with new EPROM.
5. Close electronics enclosure and power up system.

2.4.3 Set up Westinghouse Model TC200 veritrim electronics

Before beginning operation, it is important to change the probe heater setpoint of the existing electronics to support the Rosemount™ Oxymitter DR In-Situ Oxygen Probe.

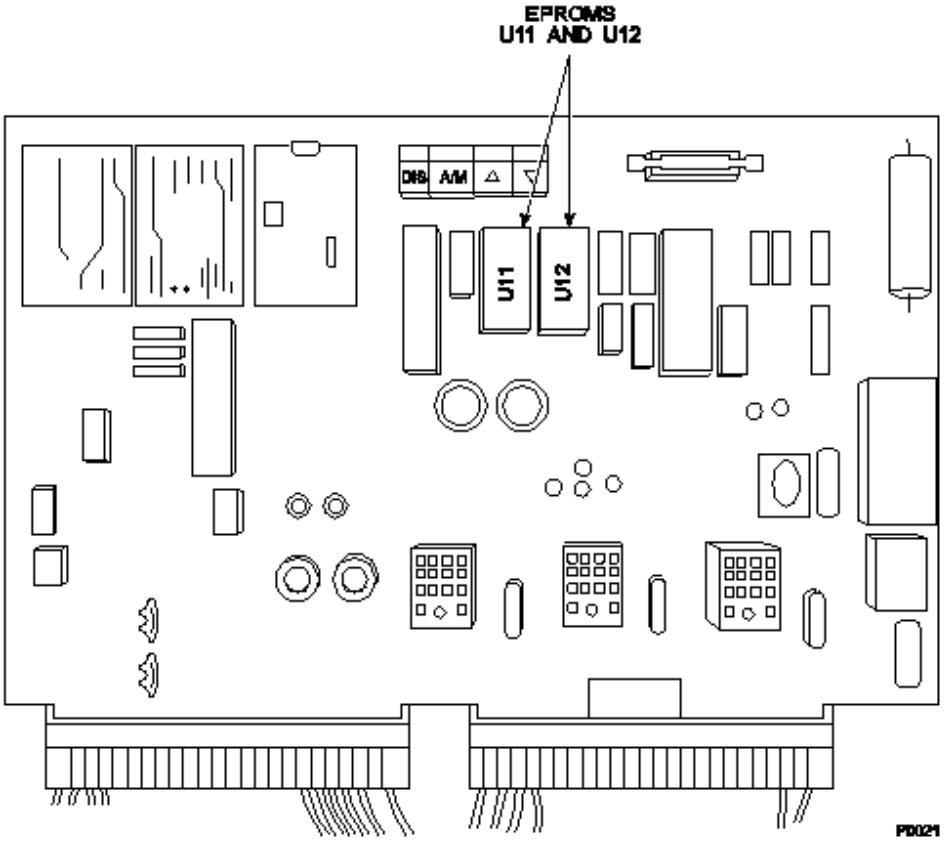
To convert the Model TC200 Electronics Package for use with the Rosemount Oxymitter DR probe, an EPROM change is necessary. The replacement EPROM needed is part number 1M0315G02.

Replace EPROM

Procedure

1. Shut off and lock out power to the electronics package.
2. Open electronics enclosure.
3. On the main PCB, locate and remove old EPROMs, U11 and U12.

Figure 2-15: Main PCB (Model TC200) EPROM Replacement



4. Replace with new EPROMs (part number 1M03154G02), being careful to install U11 and U12 in their proper locations.
5. Close electronics enclosure and power up system.

Adjust heater setpoint

Procedure

1. Open keylocked enclosure to access membrane keyboard.
2. Put controller in PAR (parameter) mode by pressing **LOCK** → **s** → **%O2** → **INC** → **ACK**
3. Press **ACK** to clear display.
4. Press **NUM**.
5. Using **INC** and **DEC**, display parameter `125`.
6. Press **VAL**.
7. Using **INC** and **DEC**, change parameter `125` value to `15.4`.
8. Press **ENT** to save new value.

2.4.4 Set up Westinghouse Model 132 digital electronics

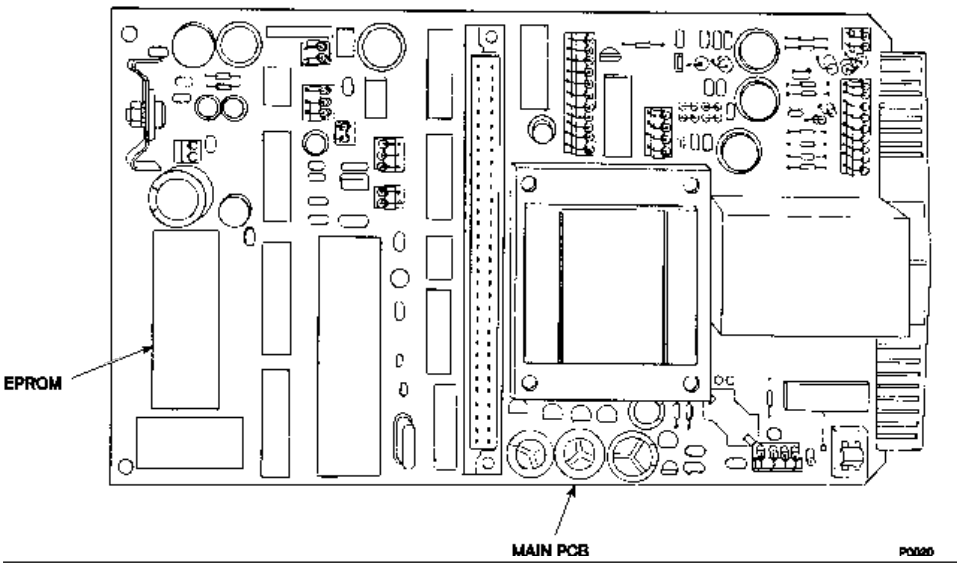
Before beginning operation, it is important to change the probe heater setpoint of the existing electronics to support the Rosemount™ Oxymitter DR In-Situ Oxygen Probe. To convert the Model 132 digital electronics package for use with the Rosemount Oxymitter DR probe, an EPROM change is necessary.

The replacement EPROM needed is IM0322G01.

Procedure

1. Shut off and lock out power to the electronics package.
2. Open electronics enclosure.
3. On the main PCB, locate and remove old EPROM.

Figure 2-16: Main PCB (Model 132) EPROM Replacement



4. Replace with new EPROM.
5. Close electronics enclosure and power up system.

2.4.5 Set up World Class 3000 intelligent field transmitter

The Rosemount™ Oxymitter DR probe operates with a 115 Vac heater. Ensure that the voltage selection jumpers in the IFT or HPS, if used, are set properly.

IFT 3000 power supply board jumper configuration

⚠ WARNING

Always disconnect line voltage from intelligent field transmitter before changing jumpers.

Line voltage selection	Jumper (install)
100 Vac	JM3, JM7, JM2
120 Vac	JM8, JM7, JM1
220 Vac	JM6, JM5, JM2
240 Vac	JM6, JM5, JM1

Probe heater voltage selection	Jumper (install)
World Class probe (44 V)	JM10
218 probe (115 V)	JM9
World Class Direct Replacement probe (115 V) or Rosemount Oxymitter Direct Replacement probe (115 V)	JM9

⚠ CAUTION

If incorrect heater voltage is selected, damage to the probe may occur.

Always update the relevant labeling to reflect the select voltage.

Heater power supply (HPS 3000) jumper configuration

⚠ WARNING

Always disconnect line voltage from heater power supply and analog electronics (if used) before changing jumpers.

Line voltage selection	Jumper (install)
100/120 Vac(1)	JM4, JM1
220/240 Vac	JM5

(1) 100 Vac operation requires transformer part number 1M03961G02.

Probe heater voltage selection	Jumper (install)
World Class probe (44 V)	JM7
218 probe (115 V)	JM8
Direct Replacement World Class or Rosemount Oxymitter DR	JM8

Heater power	Jumper
Remote	Remove JM2
On	Install JM2

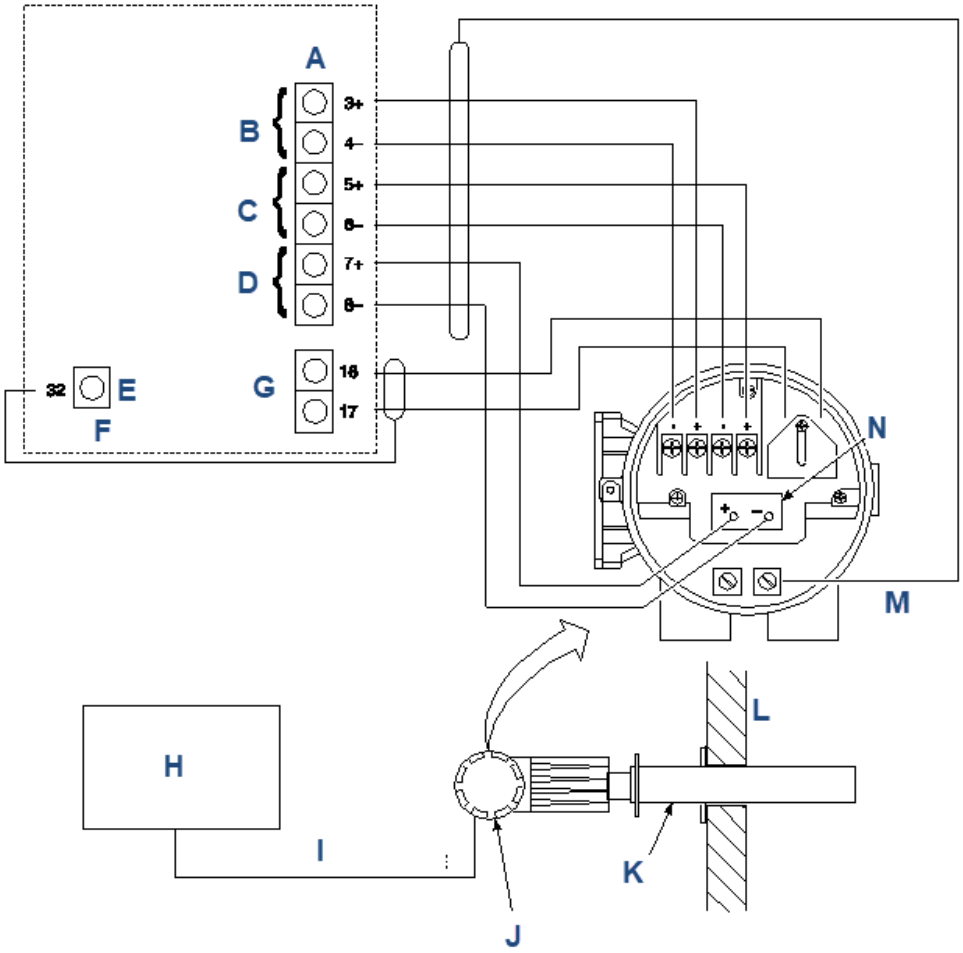
Electronics selection	Jumper
Analog (existing)	Install JM3, JM6
Digital (next generation)	Remove JM3, JM6

2.4.6 Set up Yokogawa® ZA8C and AV8C converter electronics

You can wire the Rosemount™ Oxymitter DR probe to work with the Yokogawa ZA8C and AV8C converters.

Connect the cabling from the ZA8C or AV8C terminal to the probe terminal in the junction box as shown in .

Figure 2-17: Rosemount Oxymitter DR probe wired to the ZA8C or AV8C converter



Heater temperature set to 1380 °F (750 °C).

The greater mass of the Rosemount Oxymittter DR probe requires a 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. You may have to repeat this procedure a couple of times before probe operating temperature is reached.

A. *ZA8C or AV8C terminal*
B. *Cell*
C. *Thermocouple*
D. *Cold junction*
E. *Ground shield*
F. *ZA8C or AV8C*
G. *Probe heater*
H. *ZA8C or AV8C converter*
I. *Heater and signal cable*
J. *Rosemount Oxymitter DR probe*
K. *Existing mounting*

L. Stack wall
M. Shield
N. Cold junction device

3 Startup and operate

For startup and operation instructions, refer to the Reference Manual provided with your electronics package.

⚠ WARNING

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

Install all protective covers and safety ground leads before equipment startup.

4 Maintenance and service

4.1 Overview

This section identifies the calibration methods available and provides the procedures to maintain and service the transmitter.

⚠ WARNING

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

Install all protective equipment covers and safety ground leads after installation.

4.2 Calibrate

Calibrate the Rosemount™ Oxymitter DR when you commission it.

⚠ WARNING

The probe may be hot and may cause severe burns.

Remove the probe from the stack for all service activities. Allow the unit to cool and take it to a clean work area.

⚠ WARNING

There is voltage up to 115 Vac.

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

Under normal circumstances, the probe will not require frequent calibration. When calibration is required, follow the procedure in the Reference Manual applicable to your electronics package. Use Calibration record to track probe performance.

4.2.1 Calibration record

Probe serial number:

Probe tag number:

Probe location:

Date placed into service:

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

4.3 Remove probe

Refer to Figure 2-10. The numbers in the steps below correspond to the numbers of the items in that figure.

Procedure

1. Turn off power to the system.
2. Shut off the calibration gases at the cylinders and instrument air.
3. Disconnect the calibration gas and instrument air lines from the transmitter.
4. While facing the probe and looking at the Rosemount label, remove screw (25), gasket (26), and cover lock (27) securing left housing cover (20). Remove the cover to expose the terminal block (Figure 2-11).

5. Loosen the screw on the heater terminal cover and slide the cover back to access the heater terminals.
6. Loosen the heater terminal screws and remove the leads.
7. Loosen the ground lug screws and remove the leads.
8. Slide the heater power leads out of the heater power port.
9. Loosen the oxygen and heater thermocouple signal terminal screws. Remove the leads form the terminals and slide the wires out of the signal port.
10. Remove insulation to access the mounting bolts.
11. Unbolt the transmitter from the stack and take it to a clean work area.
12. Allow the unit to cool to a comfortable working temperature.

4.4 Replace probe

Refer to Figure 2-10. The numbers in the steps below correspond to the numbers of the items in that figure.

Procedure

1. Bolt the transmitter to the stack and install the insulation.
2. Insert the oxygen and heater thermocouple signal leads in the signal port and connect the oxygen and heater thermocouple screw terminals (Figure 2-11).
3. Insert heater power leads in the heater power port and connect to the heater screw terminals. Slide the heater terminal cover over the terminal connection and tighten the terminal screw.
4. Install left housing cover (20) and ensure it is tight. Secure the cover using cover lock (27), gasket (26), and screw (25).
5. Connect the calibration gas and instrument air lines to the probe.
6. Turn on the calibration gases at the cylinders and turn on instrument air.
7. Restore power to the system.

4.5 Replace terminal block

Refer to Figure 2-11.

Procedure

1. Loosen the mounting screws on the terminal block and carefully lift the block out of the housing.
2. Carefully align the new terminal block on the pins so that it sits flat in the housing.

   The round end of the terminal block should be on the opposite side of the housing conduit ports and should not be able to rotate.
3. Tighten the three mounting screws and ensure the terminal block is secure in the housing.

4.6 Replace entire probe (excluding electronics)

Do not attempt to replace the probe until you have eliminated all other possibilities for poor performance.

If you need to replace the probe, see Replacement parts for part numbers.

Refer to Figure 2-10. The numbers in the steps below correspond to the numbers of the items in that figure.

Procedure

1. Follow the instructions in Remove probe to remove the transmitter from the stack or duct.
2. Remove the right housing cover (11) to uncover the probe connections.
3. Remove screws (12) and unplug adapter board (13) from termination housing (14).
4. Remove the four screws (7) from the probe finned housing.
   You can now separate the probe and termination housing.
5. Place the connectors from the probe through the hole in the flat side of the termination housing.

   Make sure that the O-ring (10) is in good condition and that the conduit port of the termination housing is on the same side as the CAL and REF gas ports.
6. Install the four screws (7) and tighten.
7. Align pins of adapter board (13) with mating connectors in termination housing (14). Plug adapter board into termination housing and secure with three screws.
8. Plug the two wire heater power connector from the probe into the mating connector on the adapter board (13).
9. Plug the four wire oxygen and thermocouple signal connector from the probe into the mating connector on adapter board.
10. Replace the housing cover (20) and ensure it is tight.
11. Follow the instructions in Replace probe to install the transmitter into the stack or duct.

4.7 Replace heater strut

Do not attempt to replace the heater strut until you have considered all other possibilities for poor performance.

If you need to replace the heater strut, order a replacement heater strut (see Replacement parts).

⚠ WARNING

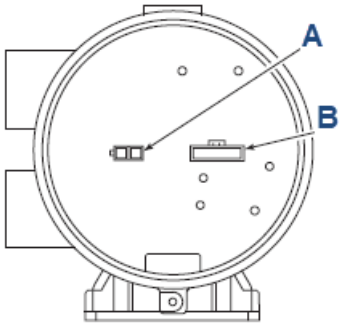
The probe can be as hot as 800 °F (427 °C). This can cause severe burns.

Wear heat resistant gloves and clothing when removing probe.
Do not attempt to work on the probe until it has cooled to room temperature.

Procedure

1. Follow the instructions in Remove probe to remove the probe from the stack or duct.
2. Remove the right housing cover (11, Figure 2-10) to uncover the probe connections.
3. Disconnect the heater and oxygen thermocouple connectors, Figure 4-1.

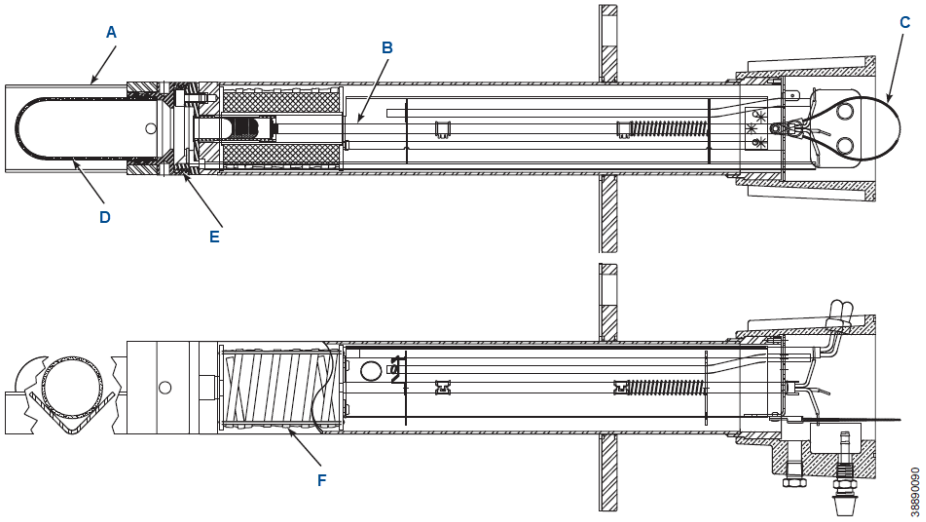
Figure 4-1: Termination Housing Connectors



A. Heater connector
B. Oxygen and thermocouple connector

4. Remove the four screws (7, Figure 2-10) from the probe finned housing. You can now separate the probe and termination housing.
5. Carefully remove the CAL and REF gas silicone tubes by pulling them off the CAL and REF gas ports. Pull the silicone tubes off the CAL and REF gas lines.
6. Loosen, but do not remove, the three screws (23) on the strut in the finned housing. The spring tension should release as the strut moves up.
7. Grasp the wire loop and carefully slide the strut out of the probe tube (Figure 4-2).

Figure 4-2: Heater Strut Assembly



A. V-deflector
B. Ceramic support rod
C. Wire loop
D. Ceramic diffuser assembly
E. Cell flange
F. Heater

8. When replacing the strut, orient the probe so that the small calibration gas tuble lays at the 6 o'clock position of the probe tube. Align the slot on the heater plate with the calibration gas line in the probe tube. Slide the strut into the probe tube. The strut turns to align the hole on the back plate of the strut with the calibration gas line. When the hole and the calibration gas line are aligned correctly, the strugt will slide in the rest of the way.
9. As the strut installation nears completion, install the guide rod into the calibration gas tube to assist in guiding the calibration gas tube through the hole in the end of the strut.
10. Push down the back plate of the strut to make sure you have spring tension and then tighten the three screws on the back plate.
11. Replace the CAL and REF gas silicone tubes.
12. Install the termination housing per Replace terminal block.
13. Follow the instructions in Replace probe to install the probe in the stack or duct.

4.8 Replace cell

Do not attempt to replace cell until you have eliminated all other possibilities for poor performance.

⚠ WARNING

The probe can be as hot as 800 °F (427 °C). This can cause severe burns.

Wear heat resistant gloves and clothing when removing probe.
Do not attempt to work on the probe until it has cooled to room temperature.

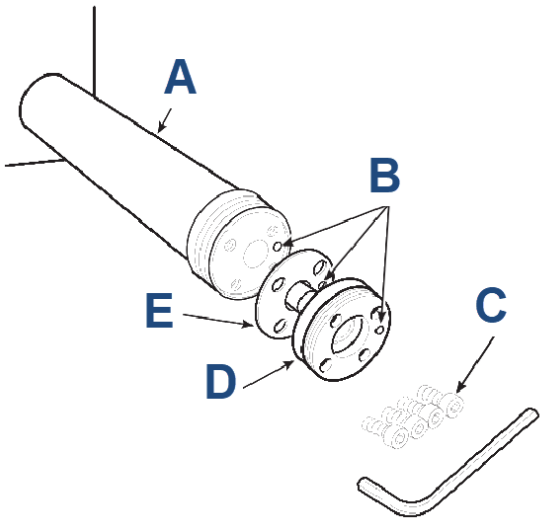
⚠ CAUTION

Removing the cell may damage the cell and platinum pad.

Do not remove the cell unless it needs to be replaced. Go through the complete troubleshooting procedure to eliminate other possible causes before removing the cell.

If you need to replace the cell, order the cell replacement kit. See Replacement parts. The cell replacement kit (Figure 4-3) contains a cell and flange assembly, corrugated seal, setscrews, socket head cap screws, and anti-seize compound. Emerson carefully packages the items to preserve precise surface finishes. Do not remove items from the packaging until you are ready to use them. A special tools kit contains spanner and hex wrenches.

Figure 4-3: Cell Replacement Kit



A. Probe tube (not included in kit)
B. Calibration gas passage
C. Socket head cap screws
D. Cell and flange assembly
E. Corrugated seal

Procedure

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

   The cell flange has a notch that you can use to gently pry the flange away from the probe. The contact pad inside the probe will sometimes fuse to the oxygen sensing cell.
6. If the cell is fused to the contact pad, push the cell assembly back into the probe (against spring pressure) and quickly twist the cell assembly.
   The cell and contact pad should separate. If the contact pad stays fused to the cell, you need to install a new contact/thermocouple assembly.
7. Disconnect the cell and thermocouple wires at the probe electronics and withdraw the cell with the wires still attached.
8. Remove the right housing cover (11, Figure 2-10) to uncover the probe connections.
9. Unplug the heater and the oxygen thermocouple connectors (Figure 4-1).
10. Remove the four screws (7, Figure 2-10) from the probe finned housing. Separate the probe and termination housing.
11. If the contact assembly is damaged, replace the strut or the contact pad.

    The cell replacement kit includes instructions for replacing the contact pad.
12. Remove and discard the corrugated seal.
13. Clean the mating faces of the probe tube and cell.
14. Remove burrs and raised surfaces with a block of wood and a crocus cloth.
15. Clean the threads on the retainer and hub.
16. Apply a light coating of anti-seize compound to both sides of the new corrugated seal.
17. Assemble the cell and flange assembly and corrugated seal to the probe tube. Make sure the calibration tube lines up with the calibration gas passage in each component. Apply a small amount of anti-seize compound to the screw threads and use the screws to secure the assembly. Torque to 35 in.-lb. (4 N-m).
18. Install the termination housing per Replace heater strut.
19. Apply anti-seize compound to the probe threads, flame arrestor hub, and setscrews.
20. Reinstall the hub on the cell assembly.
21. Using pin spanner wrenches, torque to 10 ft.-lb. (14 N-m).
22. If applicable, reinstall the vee deflector, orienting apex toward gas flow. Secure with the setscrew and anti-seize compound. Torque to 25 in.-lb. (2.8 N-m).

23. On systems equipped with an abrasive shield, install the dust seal gaskets with joints 180 °apart.
24. Follow the instructions in Install probe. Install the transmitter into the stack or duct.

    If there is an abrasive shield in the stack, make sure the dust seal gaskets are in place as they enter the 15 ° reducing cone.
25. Turn on power and monitor thermocouple output.
    It should stabilize at 2 scfh (56.6 L/hour).
26. After the probe stabilizes, calibrate the unit.

Postrequisites

If you have installed new components, repeat calibration after 24 hours of operation.

4.9 Replace ceramic diffusion element

The diffusion element protects the O2 cell from particles in process gases. The element does not normally need to be replaced, because the vee deflector protects it from particulate erosion. In severe environments, the filter may be broken or subject to excessive erosion. Examine the ceramic diffusion element whenever removing the probe for any purpose and replace it if damaged.

Note
This procedure applies to the ceramic diffusion element only.

Damage to the diffusion element may become apparent during calibration. Compare probe response with previous response. A broken diffusion element will cause a slower response to calibration gas.

Prerequisites

To remove set-screws and socket head screws, you will need hex wrenches. These wrenches are part of a probe assembly kit (Replacement parts).

Procedure

1. Follow the instructions given in Remove probe to remove the transmitter from the stack or duct.
2. Loosen set screws using the hex wrench from the probe assembly kit and remove vee deflector. Inspect set-screws. If damaged, replace with stainless steel set-screws coated with anti-seize compound.
3. On systems equipped with abrasive shield, remove dual dust seal gaskets.
4. Use spanner wrenches from the probe disassembly kit (Table 4) to turn hub free from retainer.
5. Put hub in vise. Break out old ceramic diffusion element with chisel along cement line and ⅜-in. (9.5 mm) pin punch through cement port.
6. Break out remaining ceramic diffusion element by tapping lightly around hub with hammer. Clean grooves with pointed tool if necessary.
7. Replace ceramic diffusion element using the ceramic diffusion element replacement kit in Replacement parts.

This consists of a diffusion element, cement, set-screws, anti-seize compound, and instructions.

8. Test fit replacement ceramic diffusion element to be sure seat is clean.
9. Thoroughly mix cement and insert tip of squeeze bottle into cement port. Tilt bottle and squeeze while simultaneously turning ceramic diffusion element into seat.

⚠ CAUTION

Any cement on ceramic diffusion element blocks airflow through the element. Wiping wet cement off of the ceramic element only forces cement into pores.

Do not get any cement on ceramic diffusion element except where it touches the hub. Also do not get any cement onto the flame arrestor element.

Do not get any cement on upper part of ceramic diffusion element. Ensure complete penetration of cement around three grooves in hub. Cement should extrude from opposite hole.

10. Wipe excess material back into holes and wipe top fillet of cement to form a uniform fillet.

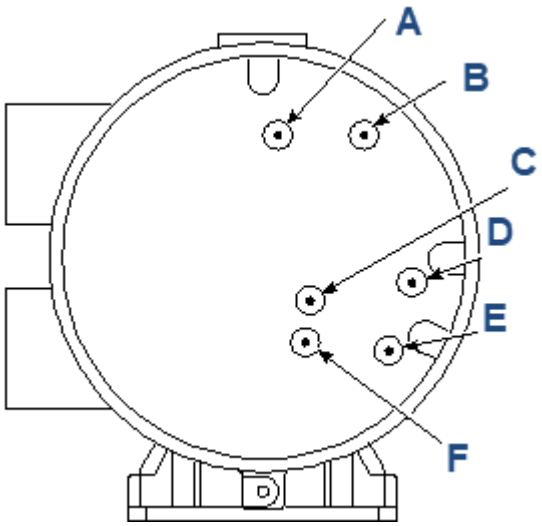
    A cotton swab is useful for this.
11. Clean any excess cement from hub with water.
12. Allow filter to dry at room temperature overnight or one to two hours at 200 °F (93 °C).
13. Wipe a heavy layer of anti-seize compound onto the threads and mating surfaces of the flame arrestor, diffusion hub, and probe tube.
14. On systems equipped with abrasive shield, install dust seal gaskets with joints 180 ° apart.
15. Reinstall vee deflector, orienting apex towards gas flow.
16. Apply anti-seize compound to set-screws and tighten with hex wrench.
17. Reinstall probe on stack flange.

4.10 Wire termination housing

If you remove the heater strut assembly during normal maintenance, you will need to remove the right side cover form the termination housing.

This side of the housing contains two connectors for hookup of wiring from the heater strut assembly to the termination housing. You do not need to disconnect the mating plugs from the housing unless the wiring, connectors, or mating components are damaged. Refer to Figure 4-4.

Figure 4-4: Termination Housing Connections



A. *Heater (black)*
B. *Heater (black)*
C. *Oxygen cell - (green)*
D. *Thermocouple - (yellow)*
E. *Thermocouple + (red)*
F. *Oxygen cell + (orange)*

5 Troubleshoot

⚠ WARNING

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

Install all protective equipment covers and safety ground leads after troubleshooting.

5.1 No response to oxygen concentration change when heater is cold and thermocouple mV output is less than setpoint

Potential cause

Thermocouple failure

Recommended actions

1. Check thermcouple continuity.
2. Replace thermocouple or return probe to Rosemount™.

Potential cause

Heater failure

Recommended actions

1. Check heater cold resistance.
   It should be 67 to 77 ohm.
2. Replace heater or return to Rosemount.

Potential cause

Electronics failure

Recommended actions

1. Triac O/P to heater.
2. Check electronics package.

5.2 No response to oxygen concentration change when heater is hot and thermocouple mV output is at setpoint ±0.2 mV

Potential cause

Recorder failure

Recommended actions

1. Check recorder chart.
2. See recorder manual.

Potential cause

No cell mV at probe when test gas applied

Recommended actions

1. Check cell mV input to electronics and cell mV at probe head.
2. Replace cell or return probe to Rosemount™.

Potential cause

Probe cell mV ok but no input to electronics

Recommended actions

1. Check cell mV input to electronics and cell mV at probe head.
2. Check cable connection.

Potential cause

Electronics failure: cell mV satisfactory at both junction box and input to electronics.

Recommended actions

1. Check cell mV input to electronics and cell mV at probe head.
2. Check electronics package.

5.3 Good response with incorrect indication

System responds to oxygen concentration changes, but does not give correct indication.

Potential cause

Calibration error

Recommended actions

1. Check recorder or remote indicator.
2. Recalibrate recorder or remote indicator. Reference recorder manual.
3. Check system calibration.
4. Recalibrate system.
5. Replace cell if necessary.

Potential cause

Air ingress into duct

Recommended actions

1. Check probe mounting and condition of duct.
2. Stop air leaks or resite probe.

Potential cause

Electronics failure

Recommended actions

1. Check cell mV input to electronics.
2. Check electronics package.

5.4 Probe does not give accurate indication of applied test gas

Potential cause

Blocked port

Recommended actions

1. Check test gas input port.
2. Clean port.
3. If the flue gas is condensing in the test gas line, insulate the back of the probe.
4. Make sure that the test gas line is capped between calibrations or a check valve is installed.

Potential cause

Diffusion element cracked, broken, or missing

Recommended actions

1. Check ceramic diffusion element.
2. Replace diffusion element.

5.5 Probe heater temperature unstable

Potential cause

Wrong heater

Recommended actions

1. Check to see if the proper voltage heater is installed.
2. Change heater to proper voltage.

5.6 Probe passes calibration, but still appears to read too high

Potential cause

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 caqn be sucked into the cell area, biasing the O_2 reading upward.

Recommended actions

1. Ensure that the calibration gas line is capped tightly between calibrations. If using Autocal, make sure to check the valve seating properly.
2. If an abrasive shield is installed to protect the entire probe from particulate erosion, a leak in the probe flange gasket can allow ambient air to migrate down the annular space between the probe and shield and then into the cell. Always install a new probe flange gasket when reinstalling a probe.
3. Check calibration gas hoses or tubing for leaks. Repair leaks in hose or tubing.
4. Check cell flange corrugated seal for leaks. Replace seal.

Potential cause

There may be a leak inside the probe itself, permitting the reference air (20.95 percent O_2) to mix with the process gases at the cell.

Recommended actions

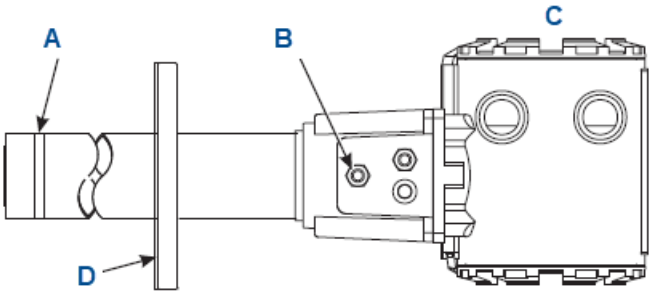
1. To confirm this leak condition, connect instrument air for reference. Pressurize the inside (reference side) of the probe by plugging the reference air exhaust port with your finger for one minute.
   The O_2 reading should decrease slightly. If the O_2 reading increases during this test, there is a leak inside the probe.

   Acid condensation inside the probe can degrade the red silcone tube that carries the cal gas to the cell.

2. Remove the housing to inspect this hose.

   See Maintenance and service.

Figure 5-1: Probe Leakage Paths, Bottom View



A. Corrugated seal
B. Reference air exhaust port
C. Probe head
D. Probe flange gasket

The sensing cell is bolted to the end of the probe and uses a corrugated metallic seal.

3. This seal can only be used one time, so always replace this seal when replacing a cell. Always apply anti-seize compound on both sides of the corrugations.

5.7 Probe passes calibration, but still appears to read too low

Potential cause

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, recover boilers, etc.) the diffusion element will eventually plug. This may cause a calibration shift.

Recommended actions

1. Flow calibration gas to the probe until reading stabilizes. Shut off calibration gas and note the time required to return to process gas values.

   The time should be less than 20 seconds (less than 30 seconds for hazardous area probes).

2. Replace plugged diffusion element.

6 Return material

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

You must return equipment with complete identification in accordance with Rosemount™ instructions or Rosemount will not accept it.

In no event will Rosemount be responsible for equipment returned without proper authorization and identification.

Procedure

1. Secure a return authorization number from a Rosemount Sales Office or representative.
2. Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to ensure that no additional damage will occur during shipping.
3. In a cover letter describe completely:
    a. The symptoms from which it was determined that the equipment was 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. Return authorization number.
4. Enclose a cover letter and purchase order and ship the defective equipment, prepaid, to:

    Emerson Automation Solutions

    Rosemount

    8200 Market Boulevard

    Chanhassen, MN 55317

    USA

Postrequisites

If you request warranty service, Rosemount will carefully inspect and test the defective unit at the factory. If the unit failed due to conditions listed in the standard Rosemount warranty, Rosemount will repair or replace the defective unit at its option and will return an operating unit to the customer in accordance with shipping instructions furnished in the cover letter.

For equipment no longer under warranty, Rosemount will repair the equipment at the factory and return it as directed by the purchase order and shipping instructions.

7 Replacement parts

Table 7-1: Replacement Parts for Probe

Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G01	3D39649G01	18-in. (457,2 mm) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G02	3D39649G02	3-ft. (0,9 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G03	3D39649G03	6-ft. (1,8 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G04	3D39649G04	9-ft. (2,7 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G05	3D39649G05	12-ft. (3,7 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G53	15-ft. (4,6 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G54	18-ft. (5,5 m) ANSI probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G06	3D39649G06	18-in. (457,2 mm) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G07	3D39649G07	3-ft. (0,9 m) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G08	3D39649G08	6-ft. (1,8 m) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G09	3D39649G09	9-ft. (2,7 m) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G10	3D39649G10	12-ft. (3,7 m) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G11	3D39649G11	18-ft. (5,5 m) JIS probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G12	3D39649G12	3-ft. (0,9 m) DIN probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G13	3D39649G13	6-ft. (1,8 m) DIN probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G14	3D39649G14	9-ft. (2,7 m) DIN probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G15	3D39649G15	12-ft. (3,7 m) DIN probe with ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G17	3D39649G17	18-in. (457,2 mm) ANSI probe with flame arrestor and ceramic diffuser

Table 7-1: Replacement Parts for Probe *(continued)*

Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G18	3D39649G18	3-ft. (0,9 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G19	3D39649G19	6-ft. (1,8 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G20	3D39649G20	9-ft. (2,7 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G21	3D39649G21	12-ft. (3,7 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G55	15 ft. (4,6 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G56	18-ft. (5,5 m) ANSI probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G22	3D39649G22	18-in. (457,2 mm) JIS probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G23	3D39649G23	3-ft. (0,9 m) JIS probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G24	3D39649G24	6-ft. (1,8 m) JIS probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G25	3D39649G25	9-ft. (2,7 m) JIS probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G26	3D39649G26	12-ft. (3,7 m) JIS probe with flame arrestor and ceramic diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G27	3D39649G27	18-in. (457,2 mm) DIN probe with flame arrestor and snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G28	3D39649G28	3-ft. (0,9 m) DIN probe with flame arrestor and snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G29	3D39649G29	6-ft. (1,8 m) DIN probe with flame arrestor and snubber diffuser

Table 7-1: Replacement Parts for Probe *(continued)*

Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G30	3D39649G30	9-ft. (2,7 m) DIN probe with flame arrestor and snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G31	3D39649G31	12-ft. (3,7 m) DIN probe with flame arrestor and snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G33	3D39649G33	18-in. (457,2 mm) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G34	3D39649G34	3-ft. (0,9 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G35	3D39649G35	6-ft. (1,8 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G36	3D39649G36	9-ft. (2,7 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G37	3D39649G37	12-ft. (3,7 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G49	15-ft. (4,6 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	N/A	3D39649G50	18-ft. (5,5 m) ANSI probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G38	3D39649G38	18-in. (457,2 mm) JIS probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G39	3D39649G39	3-ft. (0,9 m) JIS probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G40	3D39649G40	6-ft. (1,8 m) JIS probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G41	3D39649G41	9-ft. (2,7 m) JIS probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G42	3D39649G42	12-ft. (3,7 m) JIS probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G43	3D39649G43	18-in. (457,2 mm) DIN probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G44	3D39649G44	3-ft. (0,9 m) DIN probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G45	3D39649G45	6-ft. (1,8 m) DIN probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G46	3D39649G46	9-ft. (2,7 m) DIN probe with snubber diffuser
Figure 2-10, 1 through 6, 8, 9, 21 through 24	3D39648G47	3D39649G47	12-ft. (3,7 m) DIN probe with snubber diffuser

Table 7-1: Replacement Parts for Probe *(continued)*

Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 2-10, 6	3D39644G01		18-in. (457,2 mm) ANSI probe tube assembly
Figure 2-10, 6	3D39644G02		3-ft. (0,9 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G03		6-ft. (1,8 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G04		9-ft. (2,7 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G05		12-ft. (3,7 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G17		15-ft. (4,6 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G18		18-ft. (5,5 m) ANSI probe tube assembly
Figure 2-10, 6	3D39644G06		18-in. (457,2 mm) JIS probe tube assembly
Figure 2-10, 6	3D39644G07		3-ft. (0,9 m) JIS probe tube assembly
Figure 2-10, 6	3D39644G08		6-ft. (1,8 m) JIS probe tube assembly
Figure 2-10, 6	3D39644G09		9-ft. (2,7 m) JIS probe tube assembly
Figure 2-10, 6	3D39644G10		12-ft. (3,7 m) JIS probe tube assembly
Figure 2-10, 6	3D39644G11		18-in. (457,2 mm) DIN probe tube assembly
Figure 2-10, 6	3D39644G12		3-ft. (0,9 m) DIN probe tube assembly
Figure 2-10, 6	3D39644G13		6-ft. (1,8 m) DIN probe tube assembly
Figure 2-10, 6	3D39644G14		9-ft. (2,7 m) DIN probe tube assembly
Figure 2-10, 6	3D39644G15		12-ft. (3,7 m) DIN probe tube assembly
Figure 2-10, 1	3D39645G01		18-in. (457,2 mm) heater strut assembly
Figure 2-10, 1	3D39645G02		3-ft. (0,9 m) heater strut assembly
Figure 2-10, 1	3D39645G03		6-ft. (1,8 m) heater strut assembly

Table 7-1: Replacement Parts for Probe *(continued)*

Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 2-10, 1	3D39645G04		9-ft. (2,7 m) heater strut assembly
Figure 2-10, 1	3D39645G05		12-ft. (3,7 m) heater strut assembly
Figure 2-10, 1	3D39645G07		15-ft. (4,5 m) heater strut assembly
Figure 2-10, 1	3D39645G08		18-ft. (5,5 m) heater strut assembly
Figure 7-1	4847B61G02		ANSI 18-in. (457,2 mm) cell replacement kit(1)
Figure 7-1	4847B61G03		ANSI 3-ft. (0,9 m) cell replacement kit(1)
Figure 7-1	4847B61G04		ANSI 6-ft. (1,8 m) cell replacement kit(1)
Figure 7-1	4847B61G05		ANSI 9-ft. (2,7 m) cell replacement kit(1)
Figure 7-1	4847B61G06		ANSI 12-ft. (3,7 m) cell replacement kit(1)
Figure 7-1	4847B61G27		ANSI 15-ft. (4,5 m) cell replacement kit(1)
Figure 7-1	4847B61G28		ANSI 18-ft. (5,5 m) cell replacement kit(1)
Figure 7-1	4847B61G08		JIS 18-in. (457,2 mm) cell replacement kit(1)
Figure 7-1	4847B61G09		JIS 3-ft. (0,9 m) cell replacement kit(1)
Figure 7-1	4847B61G10		JIS 6-ft. (1,8 m) cell replacement kit(1)
Figure 7-1	4847B61G11		JIS 9-ft. (2,7 m) cell replacement kit(1)
Figure 7-1	4847B61G12		JIS 12-ft. (3,7 m) cell replacement kit(1)
Figure 7-1	4847B61G14		DIN 18-in. (457,2 mm) cell replacement kit(1)
Figure 7-1	4847B61G15		DIN 3-ft. (0,9 m) cell replacement kit(1)
Figure 7-1	4847B61G16		DIN 6-ft. (1,8 m) cell replacement kit(1)
Figure 7-1	4847B61G17		DIN 9-ft. (2,7 m) cell replacement kit(1)

Table 7-1: Replacement Parts for Probe *(continued)*

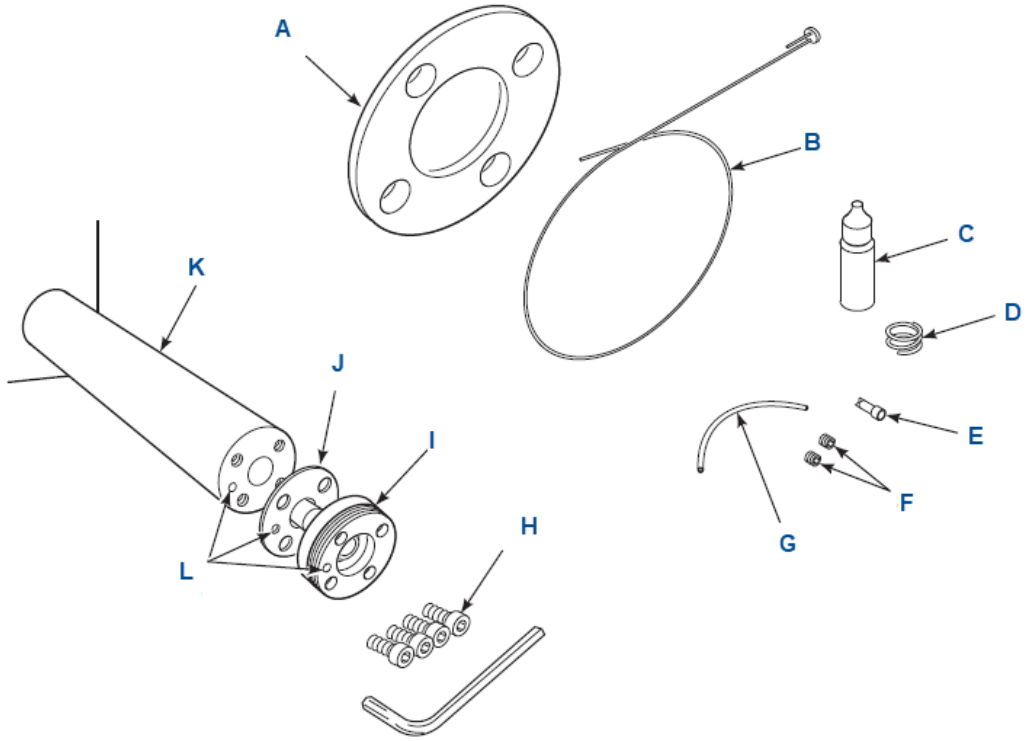
Figure and index number	Part number		Description
	No dust seal	Dust seal	
Figure 7-1	4847B61G18		DIN 12-ft. (3,7 m) cell replacement kit[1]
Figure 1-2	3D39003G03		JIS 3-ft. (0,9 m) abrasive shield assembly
Figure 1-2	3D39003G04		JIS 6-ft. (1,8 m) abrasive shield assembly
Figure 1-2	3D39003G05		DIN 3-ft. (0,9 m) abrasive shield assembly
Figure 1-2	3D39003G06		DIN 6-ft. (1,8 m) abrasive shield assembly
Figure 1-2	3D39003G07		ANSI 9-ft. (2,7 m) abrasive shield assembly
Figure 1-2	3D39003G08		ANSI 12-ft. (3,7 m) abrasive shield assembly
Figure 1-2	3D39003G09		JIS 9-ft. (2,7 m) abrasive shield assembly
Figure 1-2	3D39003G10		JIS 12-ft. (3,7 m) abrasive shield assembly
Figure 1-2	3D39003G11		DIN 9-ft. (1,8 m) abrasive shield assembly
Figure 1-2	3D39003G12		DIN 12-ft. (3,7 m) abrasive shield assembly
Figure 1-2	3D39003G13		ANSI 18-in. (457,2 mm) abrasive shield assembly
Figure 1-2	3D39003G14		JIS 18-in. (457,2 mm) abrasive shield assembly
Figure 1-2	3D39003G15		DIN 18-in. (457,2 mm) abrasive shield assembly
Figure 1-2	3D39003G25		ANSI 15 ft. (4,6 m) abrasive shield assembly
Figure 1-2	3D39003G28		ANSI 18-ft. (5,5 m) abrasive shield assembly
N/A	4513C61G03		18-in. (457,2 mm) contact and thermocouple replacement assembly
N/A	4513C61G04		3-ft. (0,9 m) contact and thermocouple replacement assembly
N/A	4513C61G05		6-ft. (1,8 m) contact and thermocouple replacement assembly

Table 7-1: Replacement Parts for Probe *(continued)*

Figure and index number	Part number		Description
	No dust seal	Dust seal	
N/A	4513C61G06		9-ft. (2,7 m) contact and thermocouple replacement assembly
N/A	4513C61G07		12-ft. (3,7 m) contact and thermocouple replacement assembly
N/A	4513C61G08		15-ft. (4,6 m) contact and thermocouple replacement assembly
N/A	4513C61G09		18-ft. (5,5 m) contact and thermocouple replacement assembly
Figure 2-1	3534B18G01		Ceramic diffuser hub assembly
Figure 2-1	3534B48G01		Vee deflector assembly
Figure 7-2	3535B42G02		Probe disassembly kit
Figure 1-3 and Figure 2-1	3535B60G01		Ceramic diffuser with dust seal
Figure 1-4 and Figure 2-1	3535B63G01		Flame arrest ceramic diffuser with dust seal
Figure 2-10 and Figure 2-11	4843B37G01		Snubber diffusion assembly
Figure 2-1	4843B38G02		Snubber diffuser with dust seal
Figure 1-4	4851B89G04		Cup type diffusion assembly, 5 microns
Figure 1-4	4851B89G05		Cup type diffusion assembly, 40 microns
Figure 1-4	4851B90G04		Cup type diffusion assembly/dust seal, 5 microns
Figure 1-4	4851B90G05		Cup type diffusion assembly/dust seal, 40 microns

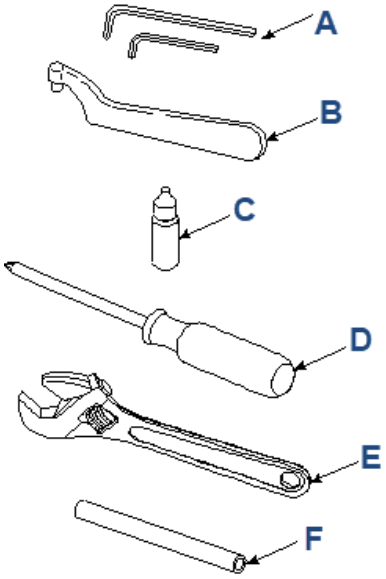
(1) Includes pad and wire.

Figure 7-1: Cell Replacement Kit



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

Figure 7-2: Probe Disassembly Kit



A. Hex keys
B. Spanner wrench
C. Anti-seize compound
D. Phillips screwdriver
E. Wrench
F. Tube insertion tube

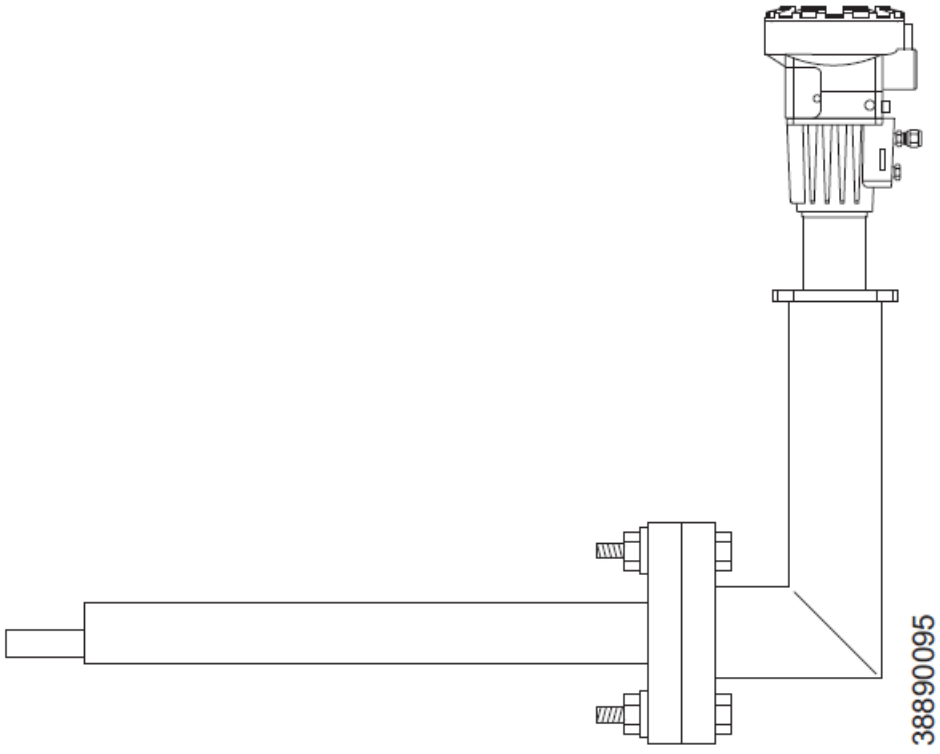
A Optional accessories

A.1 Rosemount™ By-Pass Package

The specially designed Rosemount By-Pass Package for oxygen transmitters has proven to withstand the high temperatures in process heaters while providing the same advantages offered by the in-situ sensor.

Alloy or protection steel tubes provide effective resistance to corrosion, and the package uses no moving parts, air pumps, or other components common to other sampling systems.

Figure A-1: By-pass Package Mounting



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

A.2 Rosemount™ O_2 calibration gas sequencer

Rosemount has carefully designed the O_2 calibration gas and service kits to provide a more convenient and fully portable means of testing, calibrating, and servicing Rosemount's oxygen transmitters.

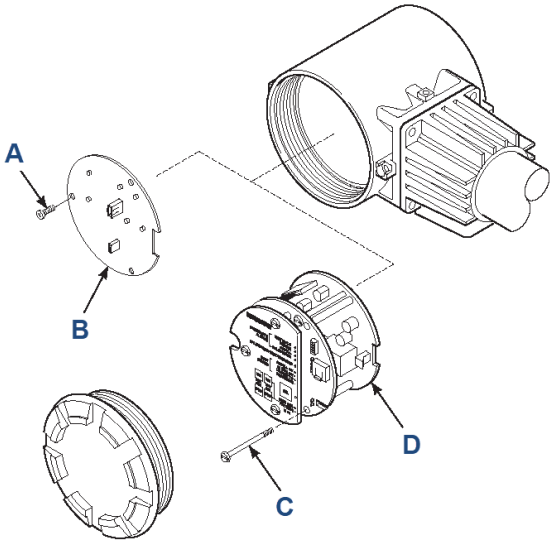
These lightweight, disposable gas cylinders eliminate the need to rent gas bottles.

Figure A-2: Rosemount O_2 Calibration Gas Sequencer

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

B Upgrade Rosemount™ Oxymitter DR to full Oxymitter

Figure B-1: Component Replacement



A. Screws
B. Rosemount OXT adapter board
C. Screws
D. Electronic assembly

Procedure

1. Remove power from the Rosemount Oxymitter DR.
2. Remove the left and right covers from the Rosemount Oxymitter termination housing.
3. Remove and discard screws and Rosemount OXT adapter board (A and B, Figure B-1) located at the right side of the termination housing.
4. Place the new Rosemount Oxymitter electronic assembly (D) near the right side of the termination housing.
5. Plug the white connector with the two black wires into the white socket on the bottom power supply card.
6. Insert the electronics assembly into the termination housing. Ensure the black four-wire connector remains outside the housing and in the slot provided in the top card of the electronics assembly.

   The electronics assembly should seat on the bulkhead pins easily. Do not force the assembly into place.

7. Plug the black four-wire connector into the black socket on the microprocessor card.
8. Tighten three screws (D) securing the electronics assembly into the termination housing.

C Rosemount Oxymitter™ product certifications

Rev 2.9

C.1 Directive information

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

C.2 Ordinary location certification

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

C.3 Installing equipment in North America

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

C.4 Rosemount OXT4A Oxymitter for general purpose locations and OXT4C general locations certification

Rosemount Oxymitter Oxygen Transmitters (Series 4000 & DR): OXT4A, OXT4ADR, OXT4C, OXT4CDR, OXT4CNF, and OXT4CDRNF and Rosemount Oxymitter 4000 series 6A00095G06 and 6A00094G08.

C.4.1 USA/Canada

CSA Certificate	1238566
Standards	CSA C22.2 No. 94.2-15, CAN/CSA-C22.2 No. 61010-1-12, UL 61010-1 (3rd ed.), UL 50E, 2nd ed.
Markings	Type 4X

D Declaration of Conformity

No: 1127 Rev. D

EMERSON

Declaration of Conformity

CE / UKCA

We,

Rosemount Inc.
6021 Innovation Blvd
Shakopee, MN 55379
USA

declare under our sole responsibility that the product,

Rosemount™ Oxygen Analyzers
Oxymitter™ 4000, Models OXT4A, OXT4C, OXT4CNF, 6A00094G02, 6A00094G06
Oxymitter™ DR, Models OXT4ADR, OXT4CDR & OXT4CDRNF

Authorized Representative in Europe:

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

Regulatory Compliance Shared Services Department
Email: europeproductcompliance@emerson.com Phone: +40 374 132 035

For product compliance destination sales questions in Great Britain, contact Authorized Representative:

Emerson Process Management Limited at ukproductcompliance@emerson.com or +44 11 6282 23 64, Regulatory Compliance Department.

Emerson Process Management Limited, company No 00671801, Meridian East, Leicester LE19 1UX, United Kingdom

to which this declaration relates, is in conformity with:

1) the relevant statutory requirements of Great Britain, including the latest amendments, as shown in the attached schedule.

2) the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.

March 28, 2022	Mark Lee	Vice President, Quality	Boulder, CO, USA
(signature & date of issue)	(name)	(function)	(place of issue)

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

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

UK Conformity Assessment Body for UK Type Examination Certificate:
CSA Group Testing UK Ltd [Notified Body Number: 0518]
Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US
United Kingdom

UK Notified Body for Quality Assurance:
SGS Baseefa Ltd. [Notified Body Number: 1180]
Rockhead Business Park, Staden Lane
Buxton, Derbyshire. SK17 9RZ
United Kingdom

No: 1127 Rev. D

EMERSON

Declaration of Conformity

CE / UK CA

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

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

PED Directive (2014/68/EU)
Sound Engineering Practice

ATEX Directive (2014/34/EU)

(Only valid for Models OXT4C, OXT4CNF, OXT4CDR, OXT4CDRNF, 6A00094G02 & 6A00094G06)
Sira14ATEX1201X – Flameproof
Integral Assembly or Remote Probe
Equipment Group II 2 G
Ex db IIB+H2 T4 Gb (-40°C ≤ Ta ≤ +70°C)

Integral Assembly or Remote Probe without flame arrestor
Equipment Group II 2/- G
Ex db IIB+H2 T4 Gb/- (-40°C ≤ Ta ≤ +70°C)

Split Architecture Remote Electronics
Equipment Group II 2 G
Ex db eb IIB+H2 T5 Gb (-40°C ≤ Ta ≤ +70°C)

Harmonized Standards:
EN IEC 60079-0:2018
EN 60079-1:2014
EN 60079-7:2015+A1:2018

Electromagnetic Compatibility Regulations 2016 (S.I. 2016/1091)
Designated Standards:
EN 61326-1:2013

Electrical Equipment (Safety) Regulations 2016 (S.I. 2016/1101)
Designated Standards:
EN 61010-1:2010

Pressure Equipment (Safety) Regulations 2016 (S.I. 2016/1105)
Sound Engineering Practice

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016/1107)
(Only valid for Models OXT4C, OXT4CNF, OXT4CDR, OXT4CDRNF, 6A00094G02 & 6A00094G06)
CSAE 21UKEX1214X – Flameproof
Integral Assembly or Remote Probe
Equipment Group II 2 G
Ex db IIB+H2 T4 Gb (-40°C ≤ Ta ≤ +70°C)

Integral Assembly or Remote Probe without flame arrestor
Equipment Group II 2/- G
Ex db IIB+H2 T4 Gb/- (-40°C ≤ Ta ≤ +70°C)

Split Architecture Remote Electronics
Equipment Group II 2 G
Ex db eb IIB+H2 T5 Gb (-40°C ≤ Ta ≤ +70°C)

Harmonized Standards:
EN IEC 60079-0:2018
EN 60079-1:2014
EN 60079-7:2015+A1:2018

E China RoHS table

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

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

本表格系依据 SJ/T11364 的规定而制作。
This table is proposed in accordance with the provision of SJ/T11364
O: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求。
O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求。
X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

00809-0100-4884
Rev. AC
2022

For more information: **Emerson.com**

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