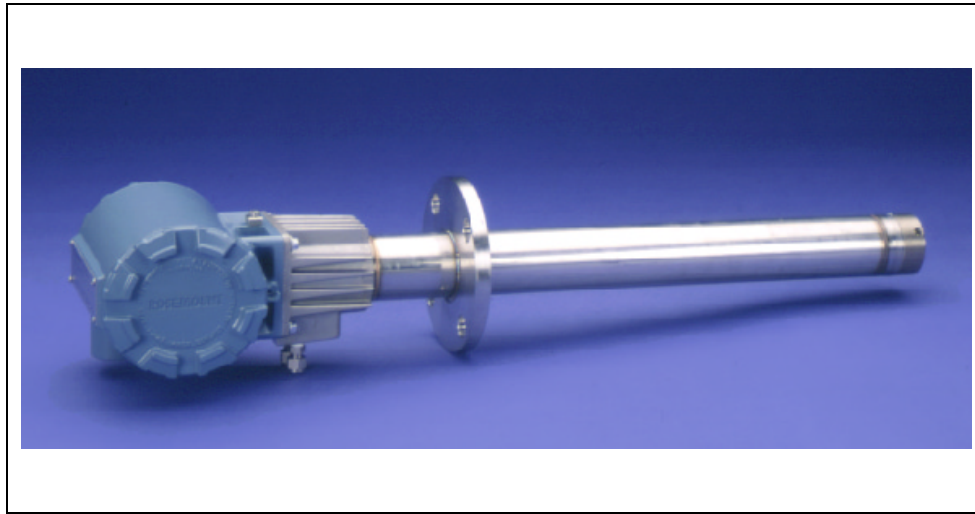


Oxymitter DR

In Situ Oxygen Probe



ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

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

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

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

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HIGHLIGHTS OF CHANGES

Effective July, 2002 Rev. 1.0

Page	Summary
Page 4-1	Added reference to calibration record sheet.
Page 4-10	Added calibration record sheet.
Page 5-3	Added steps 6 and 7 to Table 5-1.

Effective January, 2003 Rev. 1.1

Page	Summary
Page 1-3	Added 15 and 18 foot probe options to paragraph 1-2c.
Page 1-7	Added 15 and 18 foot probe options to paragraph 1-4, Specifications.
Page 1-8	Added 15 and 18 foot probe options to Table 1-1, Product Matrix.
Page 1-9	Added 15 and 18 foot probe options to Notes.
Page 2-2	Added 15 and 18 foot probe options to Figure 2-1, Table 2.
Page 2-3	Added 15 and 18 foot probe options to Figure 2-2, Table 3.
Page 2-6	Added 15 and 18 foot probe options to Figure 2-5 Note.
Page 2-8	Added 15 and 18 foot probe options to paragraph 2-1b.7.
Page 4-4	Revised Figure 4-3 to correct wiring callout discrepancy.
Page 4-5	Revised heater strut replacement procedure, paragraph 4-6h and added new paragraph 4-6i.
Page 4-9	Revised Figure 4-7 to correct wiring callout discrepancy.
Page 7-1 thru 7-5	Added 15 foot and 18 foot ANSI probe components and high sulfur/HCL-resistant cell components to parts list, Table 7-1.

Effective September, 2004 Rev. 1.2

Page	Summary
Pages P-3 thru P-14	Added foreign language safety instructions.
Page 4-3, 4-4	Revised para. 4-5, steps c., g. and h. and added new step i. for use of OXT adaptor board. Revised Figure 4-3 to show OXT adaptor board. Revised para. 4-6, step c. for use of OXT adaptor board.
Page 4-6	Revised para. 4-7, steps e., f., and g. for use of OXT adaptor board.
Page 4-9	Revised para. 4-9 for use of OXT adaptor board. Revised Figure 4-3 to show OXT adaptor board.
A-1	Revised para. A-1, step c. for removal of OXT adaptor board. Revised Figure A-1 to show OXT adaptor board.

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PREFACE

The purpose of this manual is to provide information concerning the components, functions, installation and maintenance of the Oxymitter DR.

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

DEFINITIONS

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

WARNING

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

CAUTION

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

NOTE

Highlights an essential operating procedure, condition, or statement.

⊕ : EARTH (GROUND) TERMINAL

⊕ : PROTECTIVE CONDUCTOR TERMINAL

⚠ : RISK OF ELECTRICAL SHOCK

⚠ : WARNING: REFER TO INSTRUCTION BULLETIN

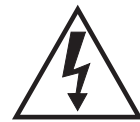
NOTE TO USERS

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

IMPORTANT
**SAFETY INSTRUCTIONS
FOR THE WIRING AND INSTALLATION
OF THIS APPARATUS**

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




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



BELANGRIJK

Veiligheidsvoorschriften voor de aansluiting en installatie van dit toestel.




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

1. Degelijke aardingsaansluitingen moeten gemaakt worden naar alle voorziene aardpunten, intern en extern.
2. Na installatie of controle moeten alle veiligheidsdeksels en -aardingen terug geplaatst worden. Ten alle tijde moet de betrouwbaarheid van de aarding behouden blijven.
3. Voedingskabels moeten onderworpen zijn aan de IEC227 of de IEC245 voorschriften.
4. Alle bekabeling moet geschikt zijn voor het gebruik in omgevingstemperaturen, hoger dan 75°C.
5. Alle wartels moeten zo gedimensioneerd zijn dat een degelijke kabel bevestiging verzekerd is.
6. Om de veilige werking van dit toestel te verzekeren, moet de voeding door een stroomonderbreker gevoerd worden (min 10A) welke alle draden van de voeding moet onderbreken. De stroomonderbreker mag een mechanische schakelaar bevatten. Zoniet moet een andere mogelijkheid bestaan om de voedingsspanning van het toestel te halen en ook duidelijk zo zijn aangegeven. Stroomonderbrekers of schakelaars moeten onderworpen zijn aan een erkende standaard zoals IEC947.
7. Waar toestellen of deksels aangegeven staan met het symbool is er meestal hoogspanning aanwezig. Deze deksels mogen enkel verwijderd worden nadat de voedingsspanning werd afgelegd en enkel door getraind onderhoudspersoneel.

8. Waar toestellen of deksels aangegeven staan met het symbool is er gevaar voor hete oppervlakken. Deze deksels mogen enkel verwijderd worden door getraind onderhoudspersoneel nadat de voedingsspanning verwijderd werd. Sommige oppervlakken kunnen 45 minuten later nog steeds heet aanvoelen.

9. Waar toestellen of deksels aangegeven staan met het symbool gelieve het handboek te raadplegen.

10. Alle grafische symbolen gebruikt in dit produkt, zijn afkomstig uit een of meer van devolgende standards: EN61010-1, IEC417 en ISO3864.

VIGTIGT

Sikkerhedsinstruktion for tilslutning og installering af dette udstyr.




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

1. Passende jordforbindelser skal tilsluttes alle jordklemmer, interne og eksterne, hvor disse forefindes.
2. Efter installation eller fejlfinding skal alle sikkerhedsdæksler og jordforbindelser reetableres.
3. Forsyningskabler skal opfylde krav specificeret i IEC227 eller IEC245.
4. Alle ledningstilslutninger skal være konstrueret til omgivelsestemperatur højere end 75° C.
5. Alle benyttede kabelforskruninger skal have en intern dimension, så passende kabelaflastning kan etableres.
6. For opnåelse af sikker drift og betjening skal der skabes beskyttelse mod indirekte berøring gennem afbryder (min. 10A), som vil afbryde alle kredsløb med elektriske ledere i fejlsituation. Afbryderen skal indholde en mekanisk betjent kontakt. Hvis ikke skal anden form for afbryder mellem forsyning og udstyr benyttes og mærkes som sådan. Afbrydere eller kontakter skal overholde en kendt standard som IEC947.
7. Hvor udstyr eller dæksler er mærket med dette symbol, er farlige spændinger normalt forekommende bagved. Disse dæksler bør kun afmonteres, når forsyningsspændingen er frakoblet - og da kun af instrueret servicepersonale. 
8. Hvor udstyr eller dæksler er mærket med dette symbol, forefindes meget varme overflader bagved. Disse dæksler bør kun afmonteres af instrueret servicepersonale, når forsyningsspænding er frakoblet. Visse overflader vil stadig være for varme at berøre i op til 45 minutter efter frakobling. 
9. Hvor udstyr eller dæksler er mærket med dette symbol, se da i betjeningsmanual for instruktion. 
10. Alle benyttede grafiske symboler i dette udstyr findes i én eller flere af følgende standarder:- EN61010-1, IEC417 & ISO3864.

BELANGRIJK

Veiligheidsinstructies voor de bedrading en installatie van dit apparaat.




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

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

TÄRKEÄÄ

Turvallisuusohje, jota on noudatettava tämän laitteen asentamisessa ja kaapeloinnissa.




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

1. Riittävät maadoituskytkennät on tehtävä kaikkiin maadoituspisteisiin, sisäisiin ja ulkoisiin.
2. Asennuksen ja vianetsinnän jälkeen on kaikki suojat ja suojamaat asennettava takaisin paikoilleen. Maadoitusliittimen kunnollinen toiminta täytyy aina ylläpitää.
3. Jännitesyöttöjohtimien täytyy täyttää IEC227 ja IEC245 vaatimukset.
4. Kaikkien johdotuksien tulee toimia >75°C lämpötiloissa.
5. Kaikkien läpivientiholkkien sisähalkaisijan täytyy olla sellainen että kaapeli lukkiutuu kun nolla kiinni.
6. Turvallisen toiminnan varmistamiseksi täytyy jännitesyöttö varustaa turvakatkimella (min 10A), joka kytkee irti kaikki jännitesyöttöjohtimet vikatilanteessa. Suojaan täytyy myös sisältyä mekaaninen erotuskytkin. Jos ei, niin jännitesyöttö on pystyttävä katkaisemaan muilla keinoilla ja merkittävä siten että se tunnustetaan sellaiseksi. Turvakatkimien tai katkaisimien täytyy täyttää IEC947 standardin vaatimukset näkyvyydestä.
7. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla hengenvaarallisen suuruinen jännite. Suojaa ei saa poistaa jänniteen ollessa kytkettynä laitteeseen ja poistamisen saa suorittaa vain alan asiantuntija. 
8. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla kuuma pinta. Suojaa saa poistaa vain alan asiantuntija kun jännite-syöttö on katkaistu. Tällainen pinta voi säilyä kosketuskuumana jopa 45 minuuttia. 
9. Mikäli laite tai kosketussuoja on merkitty tällä merkillä katso lisäohjeita käyttöohjekirjasta 
10. Kaikki tässä tuotteessa käytetyt graafiset symbolit ovat yhdestä tai useammasta seuraavista standardeista: EN61010-1, IEC417 & ISO3864.

IMPORTANT

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




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

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

Wichtig

Sicherheitshinweise für den Anschluß und die Installation dieser Geräte.




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

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

IMPORTANTE

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




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

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

VIKTIG

Sikkerhetsinstruks for tilkobling og installasjon av dette utstyret.




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

1. Passende jordforbindelser må tilkobles alle jordingspunkter, interne og eksterne hvor disse forefinnes.
2. Etter installasjon eller feilsøking skal alle sikkerhetsdeksler og jordforbindelser reetableres. Jordingsforbindelsene må alltid holdes i god stand.
3. Kabler fra spenningsforsyning skal oppfylle kravene spesifisert i IEC227 eller IEC245.
4. Alle ledningsforbindelser skal være konstruert for en omgivelsestemperatur høyere en 750C.
5. Alle kabelforskruvninger som benyttes skal ha en indre dimensjon slik at tilstrekkelig avlastning oppnåes.
6. For å oppnå sikker drift og betjening skal forbindelsen til spenningsforsyningen bare skje gjennom en strømbryter (minimum 10A) som vil bryte spenningsforsyningen til alle elektriske kretser ved en feilsituasjon. Strømbryteren kan også inneholde en mekanisk operert bryter for å isolere instrumentet fra spenningsforsyningen. Dersom det ikke er en mekanisk operert bryter installert, må det være en annen måte å isolere utstyret fra spenningsforsyningen, og denne måten må være tydelig merket. Kretsbytere eller kontakter skal oppfylle kravene i en annerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell. 
8. Der hvor utstyr eller deksler er merket med symbol for meget varm overflate, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell. Noen overflater kan være for varme til å berøres i opp til 45 minutter etter spenningsforsyning frakoblet. 
9. Der hvor utstyret eller deksler er merket med symbol, vennligst referer til instruksjonsmanualen for instruksjer. 
10. Alle grafiske symboler brukt i dette produktet er fra en eller flere av følgende standarder: EN61010-1, IEC417 & ISO3864.

IMPORTANTE

Instruções de segurança para ligação e instalação deste aparelho.




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

1. Devem ser feitas ligações de terra apropriadas a todos os pontos de terra, internos ou externos.
2. Após a instalação ou eventual reparação, devem ser recolocadas todas as tampas de segurança e terras de protecção. Deve manter-se sempre a integridade de todos os terminais de terra.
3. Os cabos de alimentação eléctrica devem obedecer às exigências das normas IEC227 ou IEC245.
4. Os cabos e fios utilizados nas ligações eléctricas devem ser adequados para utilização a uma temperatura ambiente até 75° C.
5. As dimensões internas dos buçins dos cabos devem ser adequadas a uma boa fixação dos cabos.
6. Para assegurar um funcionamento seguro deste equipamento, a ligação ao cabo de alimentação eléctrica deve ser feita através de um disjuntor (min. 10A) que desligará todos os condutores de circuitos durante uma avaria. O disjuntor poderá também conter um interruptor de isolamento accionado manualmente. Caso contrário, deverá ser instalado qualquer outro meio para desligar o equipamento da energia eléctrica, devendo ser assinalado convenientemente. Os disjuntores ou interruptores devem obedecer a uma norma reconhecida, tipo IEC947.
7. Sempre que o equipamento ou as tampas contiverem o símbolo, é provável a existência de tensões perigosas. Estas tampas só devem ser retiradas quando a energia eléctrica tiver sido desligada e por Pessoal da Assistência devidamente treinado. 
8. Sempre que o equipamento ou as tampas contiverem o símbolo, há perigo de existência de superfícies quentes. Estas tampas só devem ser retiradas por Pessoal da Assistência devidamente treinado e depois de a energia eléctrica ter sido desligada. Algumas superfícies permanecem quentes até 45 minutos depois. 
9. Sempre que o equipamento ou as tampas contiverem o símbolo, o Manual de Funcionamento deve ser consultado para obtenção das necessárias instruções. 
10. Todos os símbolos gráficos utilizados neste produto baseiam-se em uma ou mais das seguintes normas: EN61010-1, IEC417 e ISO3864.

IMPORTANTE

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




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

1. Se deben preveer conexiones a tierra del equipo, tanto externa como internamente, en aquellos terminales previstos al efecto.
2. Una vez finalizada las operaciones de mantenimiento del equipo, se deben volver a colocar las cubiertas de seguridad aasi como los terminales de tierra. Se debe comprobar la integridad de cada terminal.
3. Los cables de alimentacion electrica cumpliran con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75°C.
5. Todos los prensaestopas seran adecuados para una fijacion adecuada de los cables.
6. Para un manejo seguro del equipo, la alimentacion electrica se realizara a traves de un interruptor magnetotermico (min 10 A), el cual desconectara la alimentacion electrica al equipo en todas sus fases durante un fallo. Los interruptores estaran de acuerdo a la norma IEC 947 u otra de reconocido prestigio.
7. Cuando las tapas o el equipo lleve impreso el simbolo de tension electrica peligrosa, dicho alojamiento solamente se abra una vez que se haya interrumpido la alimentacion electrica al equipo asimismo la intervencion sera llevada a cabo por personal entrenado para estas labores. 
8. Cuando las tapas o el equipo lleve impreso el simbolo, hay superficies con alta temperatura, por tanto se abra una vez que se haya interrumpido la alimentacion electrica al equipo por personal entrenado para estas labores, y al menos se esperara unos 45 minutos para enfriar las superficies calientes. 
9. Cuando el equipo o la tapa lleve impreso el simbolo, se consultara el manual de instrucciones. 
10. Todos los simbolos graficos usados en esta hoja, estan de acuerdo a las siguientes normas EN61010-1, IEC417 & ISO 3864.

VIKTIGT

Säkerhetsföreskrifter för kablage och installation av denna apparat.

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

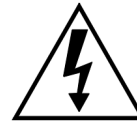
1. Tillämplig jordkontakt skall utföras till alla jordade punkter, såväl internt som externt där så erfordras.
2. Efter installation eller felsökning skall samtliga säkerhetshöljen och säkerhetsjord återplaceras. Samtliga jordterminaler måste hållas obrutna hela tiden.
3. Matningsspänningens kabel måste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

ΠΡΟΣΟΧΗ

Οδηγίες ασφαλείας για την καλωδίωση και εγκατάσταση της συσκευής.

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

1. Επαρκείς συνδέσεις γείωσης θα πρέπει να γίνονται σε όλα τα σημεία γείωσης, εσωτερικά και εξωτερικά όπου υπάρχουν.
2. Μετά την εγκατάσταση ή την εκοφαλάτωση όλα τα καλύματα ασφαλείας και οι γειώσεις ασφαλείας πρέπει να επανεγκαθίστανται. Η καλή κατάσταση όλων των ακροδεκτών γείωσης πρέπει να ελέγχεται και να συντηρείται διαρκώς.
3. Τα καλώδια τροφοδοσίας πρέπει να πληρούν τις απαιτήσεις των IEC227 ή IEC245.
4. Όλες οι καλωδιώσεις θα πρέπει να είναι κατάλληλες για χρήση σε ατμοσφαιρική θερμοκρασία χώρου υψηλότερη από 75°C.
5. Όλοι οι στυπιοθλίπτες θα πρέπει να είναι τέτοιων εσωτερικών διαστάσεων ώστε να παρέχουν επαρκή στερέωση των καλωδίων.
6. Για τη διασφάλιση ασφαλούς λειτουργίας της σύνδεσης τροφοδοσίας αυτής της συσκευής θα πρέπει να γίνεται μόνο μέσω ασφαλειοδιακόπτη (ελάχιστο 10A) ο οποίος θα αποσυνδέει όλους του ηλεκτροφόρους αγωγούς στη διάρκεια κατάστασης σφάλματος.
Ο ασφαλειοδιακόπτης μπορεί επίσης να περιλαμβάνει μηχανικό διακόπτη απομόνωσης. Εάν δεν περιλαμβάνει, τότε άλλα μέσα αποσύνδεσης της συσκευής από την τροφοδοσία πρέπει να παροχρηθούν και σαφώς να σημειθούν σαν τέτοια. Οι ασφαλειοδιακόπτες ή διακόπτες πρέπει να συμφωνούν με αναγνωρισμένα πρότυπα όπως το IEC947.
7. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο επικίνδυνες τάσεις ενυπάρχουν κάτω από αυτά.
Αυτά τα καλύματα θα πρέπει να αφαιρούνται μόνο όταν έχει αφαιρεθεί η τροφοδοσία από τη συσκευή και τότε μόνο από ειδικευμένο τεχνικό προσωπικό.
8. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο υπάρχει κίνδυνος από καυτές επιφάνειες κάτω από αυτά.
Αυτά τα καλύματα θα πρέπει να αφαιρούνται μόνο από ειδικευμένο τεχνικό προσωπικό, όταν η τροφοδοσία έχει αφαιρεθεί από τη συσκευή. Τέτοιες επιφάνειες μπορούν να παραμείνουν ζεστές στην αφή έως και 45 λεπτά αργότερα.
9. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο αναφερθείται στις οδηγίες χρήσης της συσκευής.
10. Όλα τα γραφικά σύμβολα που χρησιμοποιούνται σε αυτό το προϊόν είναι από ένα ή περισσότερα από τα έξης πρότυπα: EN61010-1, IEC417 και ISO3864.



**CERAMIC FIBER PRODUCTS
MATERIAL SAFETY DATA SHEET
JULY 1, 1996**

SECTION I. IDENTIFICATION

PRODUCT NAME

Ceramic Fiber Heaters, Molded Insulation Modules and Ceramic Fiber Radiant Heater Panels.

CHEMICAL FAMILY

Vitreous Aluminosilicate Fibers with Silicon Dioxide.

CHEMICAL NAME

N.A.

CHEMICAL FORMULA

N.A.

MANUFACTURER'S NAME AND ADDRESS

Watlow Columbia
2101 Pennsylvania Drive
Columbia, MO 65202

573-474-9402
573-814-1300, ext. 5170

**HEALTH HAZARD SUMMARY
WARNING**

- Possible cancer hazard based on tests with laboratory animals.
- May be irritating to skin, eyes and respiratory tract.
- May be harmful if inhaled.
- Cristobalite (crystalline silica) formed at high temperatures (above 1800°F) can cause severe respiratory disease.

SECTION II. PHYSICAL DATA

APPEARANCE AND ODOR

Cream to white colored fiber shapes. With or without optional white to gray granular surface coating and/or optional black surface coating.

SPECIFIC WEIGHT: 12-25 LB./CUBIC FOOT

BOILING POINT: N.A.

VOLATILES (% BY WT.): N.A.

WATER SOLUBILITY: N.A.

SECTION III. HAZARDOUS INGREDIENTS

MATERIAL, QUANTITY, AND THRESHOLD/EXPOSURE LIMIT VALUES

Aluminosilicate (vitreous) 99+ %	1 fiber/cc TWA
CAS. No. 142844-00-06	10 fibers/cc CL
Zirconium Silicate	0-10% 5 mg/cubic meter (TLV)
Black Surface Coating**	0 - 1% 5 mg/cubic meter (TLV)
Armorphous Silica/Silicon Dioxide	0-10% 20 mppcf (6 mg/cubic meter)
	PEL (OSHA 1978) 3 gm cubic meter
	(Respirable dust): 10 mg/cubic meter,
	Intended TLV (ACGIH 1984-85)

**Composition is a trade secret.

SECTION IV. FIRE AND EXPLOSION DATA

FLASH POINT: NONE

FLAMMABILITY LIMITS: N.A.

EXTINGUISHING MEDIA

Use extinguishing agent suitable for type of surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS / SPECIAL FIRE FIGHTING PROCEDURES

N.A.

SECTION V. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

(See Section III)

EFFECTS OF OVER EXPOSURE

EYE

Avoid contact with eyes. Slightly to moderately irritating. Abrasive action may cause damage to outer surface of eye.

INHALATION

May cause respiratory tract irritation. Repeated or prolonged breathing of particles of respirable size may cause inflammation of the lung leading to chest pain, difficult breathing, coughing and possible fibrotic change in the lung (Pneumoconiosis). Pre-existing medical conditions may be aggravated by exposure: specifically, bronchial hyper-reactivity and chronic bronchial or lung disease.

INGESTION

May cause gastrointestinal disturbances. Symptoms may include irritation and nausea, vomiting and diarrhea.

SKIN

Slightly to moderate irritating. May cause irritation and inflammation due to mechanical reaction to sharp, broken ends of fibers.

EXPOSURE TO USED CERAMIC FIBER PRODUCT

Product which has been in service at elevated temperatures (greater than 1800°F/982°C) may undergo partial conversion to cristobalite, a form of crystalline silica which can cause severe respiratory disease (Pneumoconiosis). The amount of cristobalite present will depend on the temperature and length of time in service. (See Section IX for permissible exposure levels).

SPECIAL TOXIC EFFECTS

The existing toxicology and epidemiology data bases for RCF's are still preliminary. Information will be updated as studies are completed and reviewed. The following is a review of the results to date:

EPIDEMIOLOGY

At this time there are no known published reports demonstrating negative health outcomes of workers exposed to refractory ceramic fiber (RCF). Epidemiologic investigations of RCF production workers are ongoing.

- 1) There is no evidence of any fibrotic lung disease (interstitial fibrosis) whatsoever on x-ray.
- 2) There is no evidence of any lung disease among those employees exposed to RCF that had never smoked.
- 3) A statistical "trend" was observed in the exposed population between the duration of exposure to RCF and a decrease in some measures of pulmonary function. These observations are clinically insignificant. In other words, if these observations were made on an individual employee, the results would be interpreted as being within the normal range.

- 4) Pleural plaques (thickening along the chest wall) have been observed in a small number of employees who had a long duration of employment. There are several occupational and non-occupational causes for pleural plaque. It should be noted that plaques are not “pre-cancer” nor are they associated with any measurable effect on lung function.

TOXICOLOGY

A number of studies on the health effects of inhalation exposure of rats and hamsters are available. Rats were exposed to RCF in a series of life-time nose-only inhalation studies. The animals were exposed to 30, 16, 9, and 3 mg/m³, which corresponds with approximately 200, 150, 75, and 25 fibers/cc.

Animals exposed to 30 and 16 mg/m³ were observed to have developed a pleural and parenchymal fibroses; animals exposed to 9 mg/m³ had developed a mild parenchymal fibrosis; animals exposed to the lowest dose were found to have the response typically observed any time a material is inhaled into the deep lung. While a statistically significant increase in lung tumors was observed following exposure to the highest dose, there was no excess lung cancers at the other doses. Two rats exposed to 30 mg/m³ and one rat exposed to 9 mg/m³ developed mesotheliomas.

The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool) in 1987. IARC classified ceramic fiber, fibrous glasswool and mineral wool (rockwool and slagwool) as possible human carcinogens (Group 2B).

EMERGENCY FIRST AID PROCEDURES

EYE CONTACT

Flush eyes immediately with large amounts of water for approximately 15 minutes. Eye lids should be held away from the eyeball to insure thorough rinsing. Do not rub eyes. Get medical attention if irritation persists.

INHALATION

Remove person from source of exposure and move to fresh air. Some people may be sensitive to fiber induced irritation of the respiratory tract. If symptoms such as shortness of breath, coughing, wheezing or chest pain develop, seek medical attention. If person experiences continued breathing difficulties, administer oxygen until medical assistance can be rendered.

INGESTION

Do not induce vomiting. Get medical attention if irritation persists.

SKIN CONTACT

Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful. Get medical attention if irritation persists.

SECTION VI. REACTIVITY DATA

STABILITY/CONDITIONS TO AVOID

Stable under normal conditions of use.

HAZARDOUS POLYMERIZATION/CONDITIONS TO AVOID

N.A.

INCOMPATIBILITY/MATERIALS TO AVOID

Incompatible with hydrofluoric acid and concentrated alkali.

HAZARDOUS DECOMPOSITION PRODUCTS

N.A.

SECTION VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Where possible, use vacuum suction with HEPA filters to clean up spilled material. Use dust suppressant where sweeping if necessary. Avoid clean up procedure which may result in water pollution. (Observe Special Protection Information Section VIII.)

WASTE DISPOSAL METHODS

The transportation, treatment, and disposal of this waste material must be conducted in compliance with all applicable Federal, State, and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

Use NIOSH or MSHA approved equipment when airborne exposure limits may be exceeded. NIOSH/MSHA approved breathing equipment may be required for non-routine and emergency use. (See Section IX for suitable equipment).

Pending the results of long term health effects studies, engineering control of airborne fibers to the lowest levels attainable is advised.

VENTILATION

Ventilation should be used whenever possible to control or reduce airborne concentrations of fiber and dust. Carbon monoxide, carbon dioxide, oxides of nitrogen, reactive hydrocarbons and a small amount of formaldehyde may accompany binder burn-off during first heat. Use adequate ventilation or other precautions to eliminate vapors resulting from binder burn-off. Exposure to burn-off fumes may cause respiratory tract irritation, bronchial hyper-reactivity and asthmatic response.

SKIN PROTECTION

Wear gloves, hats and full body clothing to prevent skin contact. Use separate lockers for work clothes to prevent fiber transfer to street clothes. Wash work clothes separately from other clothing and rinse washing machine thoroughly after use.

EYE PROTECTION

Wear safety glasses or chemical worker's goggles to prevent eye contact. Do not wear contact lenses when working with this substance. Have eye baths readily available where eye contact can occur.

SECTION IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

General cleanliness should be followed.

The Toxicology data indicate that ceramic fiber should be handled with caution. The handling practices described in this MSDS must be strictly followed. In particular, when handling refractory ceramic fiber in any application, special caution should be taken to avoid unnecessary cutting and tearing of the material to minimize generation of airborne dust.

It is recommended that full body clothing be worn to reduce the potential for skin irritation. Washable or disposable clothing may be used. Do not take unwashed work clothing home. Work clothes should be washed separately from other clothing. Rinse washing machine thoroughly after use. If clothing is to be laundered by someone else, inform launderer of proper procedure. Work clothes and street clothes should be kept separate to prevent contamination.

Product which has been in service at elevated temperatures (greater than 1800°F/982°C) may undergo partial conversion to cristobalite, a form of crystalline silica. This reaction occurs at the furnace lining hot face. As a consequence, this material becomes more friable; special caution must be taken to minimize generation of airborne dust. The amount of cristobalite present will depend on the temperature and length in service.

IARC has recently reviewed the animal, human, and other relevant experimental data on silica in order to critically evaluate and classify the cancer causing potential. Based on its review, IARC classified crystalline silica as a group 2A carcinogen (probable human carcinogen).

The OSHA permissible exposure limit (PEL for cristobalite is 0.05 mg/m³ (respirable dust). The ACGIH threshold limit value (TLV) for cristobalite is 0.05 mg/m³ (respirable dust) (ACGIH 1991-92). Use NIOSH or MSHA approved equipment when airborne exposure limits may be exceeded. The minimum respiratory protection recommended for given airborne fiber or cristobalite concentrations are:

CONCENTRATION

0-1 fiber/cc or 0-0.05 mg/m³ cristobalite (the OSHA PEL)

Optional disposable dust respirator (e.g. 3M 9970 or equivalent).

Up to 5 fibers/cc or up to 10 times the OSHA PEL for cristobalite

Half face, air-purifying respirator equipped with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 series with 2040 filter or equivalent).

Up to 25 fibers/cc or 50 times the OSHA PEL for cristobalite (2.5 mg/m³)

Full face, air-purifying respirator with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 7800S with 7255 filters or equivalent) or powered air-purifying respirator (PARR) equipped with HEPA filter cartridges (e.g. 3M W3265S with W3267 filters or equivalent).

Greater than 25 fibers/cc or 50 times the OSHA PEL for cristobalite (2.5 mg/m³)

Full face, positive pressure supplied air respirator (e.g. 3M 7800S with W9435 hose & W3196 low pressure regulator kit connected to clean air supply or equivalent).

If airborne fiber or cristobalite concentrations are not known, as minimum protection, use NIOSH/MSHA approved half face, air-purifying respirator with HEPA filter cartridges.

Insulation surface should be lightly sprayed with water before removal to suppress airborne dust. As water evaporates during removal, additional water should be sprayed on surfaces as needed. Only enough water should be sprayed to suppress dust so that water does not run onto the floor of the work area. To aid the wetting process, a surfactant can be used.

After RCF removal is completed, dust-suppressing cleaning methods, such as wet sweeping or vacuuming, should be used to clean the work area. If dry vacuuming is used, the vacuum must be equipped with HEPA filter. Air blowing or dry sweeping should not be used. Dust-suppressing components can be used to clean up light dust.

Product packaging may contain product residue. Do not reuse except to reship or return Ceramic Fiber products to the factory.

QUICK START GUIDE FOR OXYMITTER DR SYSTEMS

Use this quick start guide only if you are familiar with the installation requirements for the Oxymitter DR. If not, turn to Section 2, Installation, in this Instruction Bulletin.

1. Install the Oxymitter DR in an appropriate location on the stack or duct. Refer to Section 2, paragraph 2-1.a for information on selecting a location for the Oxymitter DR.
2. Optional: connect reference air to the Oxymitter DR per paragraph 2-3.
3. Make the wire connections as shown in Figure 1.
4. Apply power to the signal conditioning electronics; the cell heater will turn on. Allow approximately one half hour for the cell to heat to operating temperature. Once the ramp cycle has completed and the Oxymitter DR is at normal operation, proceed with step 5.
5. Perform a calibration. Refer to the instructions provided with your signal conditioning electronics

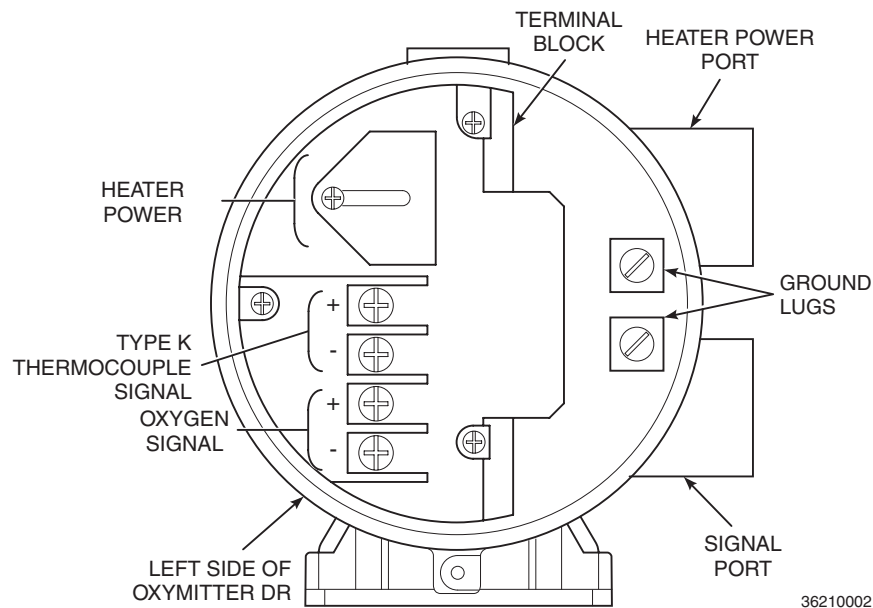


Figure 1. Oxymitter DR Wiring Diagram

Technical Support Hotline:

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

Phone: 1-800-433-6076

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

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

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

e-mail: GAS.CSC@frco.com
World Wide Web: www.processanalytic.com

SECTION 1

DESCRIPTION AND SPECIFICATIONS

1-1 COMPONENT CHECKLIST OF TYPICAL SYSTEM (PACKAGE CONTENTS)

A typical Rosemount Oxymitter DR In-Situ Oxygen Probe should contain the items shown in Figure 1-1. Record the part number, serial number, and order number for each component of your system in the table located on the back cover of this manual.

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

1-2 SYSTEM OVERVIEW

a. Scope

This Instruction Bulletin is designed to supply details needed to install, start up, operate, and maintain the Oxymitter DR. The Direct Replacement Oxymitter can be interfaced to a number of different earlier model electronics packages. These electronic packages are not covered in this manual. For specification information concerning calibration and operation of the system, refer to the Instruction Bulletin applicable to your electronics.

b. System Description

The Oxymitter DR is designed 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 the use of 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, zirconia 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:

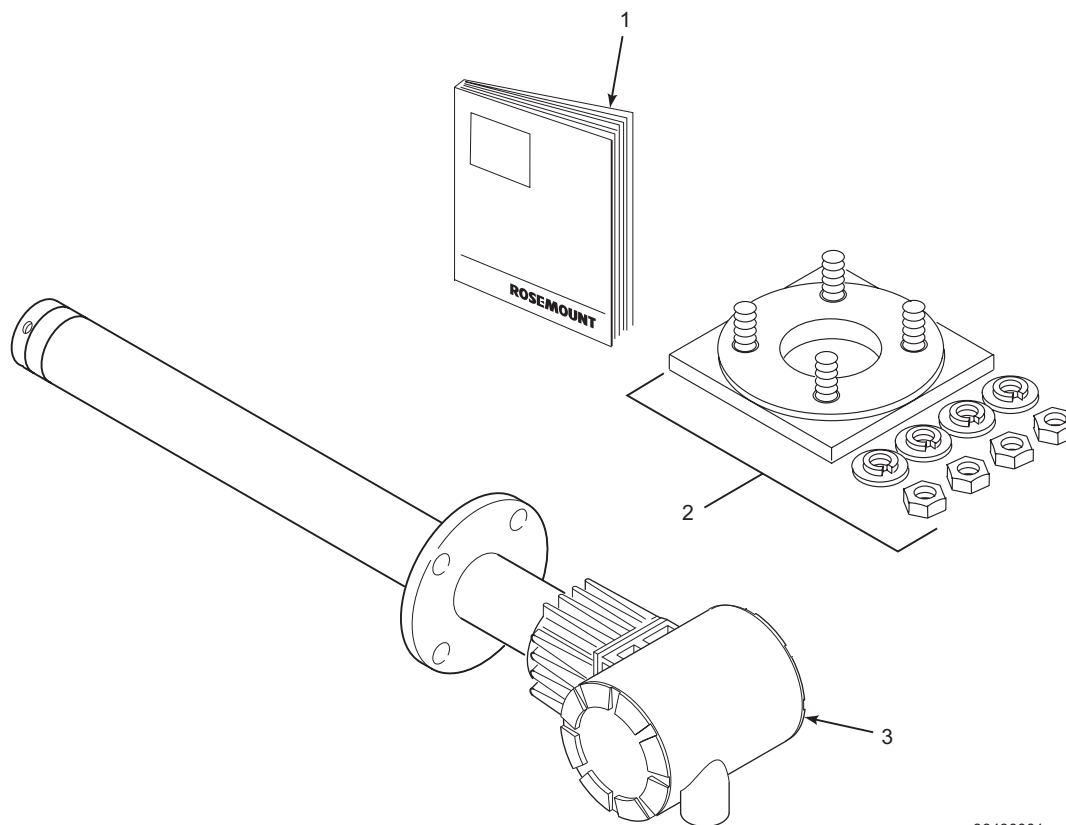
$$EMF = KT \log_{10}(P_1/P_2) + C$$

Where:

1. P_2 is the partial pressure of the oxygen in the measured gas on one side of the cell.
2. P_1 is the partial pressure of the oxygen in the reference air on the opposite side of the cell.
3. T is the absolute temperature.
4. C is the cell constant.
5. K is an arithmetic constant.

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

The Oxymitter DR measures net oxygen concentration in the presence of all the products of combustion, including water vapor. Therefore, it may be considered an analysis on a "wet" basis. In comparison with older methods, such as the portable apparatus, which provides an analysis on a "dry" gas basis, the "wet" analysis will, in general, indicate a lower percentage of oxygen. The difference will be proportional to the water content of the sampled gas stream.



36430001

1. Instruction Bulletin
2. Adapter Plate with Mounting Hardware and Gasket
3. Oxymitter DR

Figure 1-1. Typical System Package

c. System Configuration

Oxymitter DR units are available in five length options, giving the user the flexibility to use an in situ penetration appropriate to the size of the stack or duct. The options on length 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), or 18 ft (5.49 m).

Abrasive shields are offered for applications where abrasive particulates are present. Acid resistant cells are available for SO₂ and HCl environments. Bypass and probe mounting jacket options are available for process temperatures above 1300°F (705°C).

d. System Features

1. The cell output voltage and sensitivity increase as the oxygen concentration decreases.
2. Field replaceable cell, heater, thermocouple, and diffusion element.
3. The Oxymitter DR is constructed of rugged 316 L stainless steel for all wetted parts.

e. Handling the Oxymitter DR

CAUTION

The Oxymitter DR is designed for industrial applications. Treat each component of the system with care to avoid physical damage. Some probe components are made from ceramics, which are susceptible to shock when mishandled.

f. System Considerations

Prior to installing your Oxymitter DR, make sure you have all the components necessary to make the system installation. Ensure all the 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. A typical system installation is illustrated in Figure 1-2.

Instrument air for reference air is optional for most applications. Ambient air will passively diffuse 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% O₂. 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, a blocking valve or check valve is required next to the calibration fittings on the termination housing.

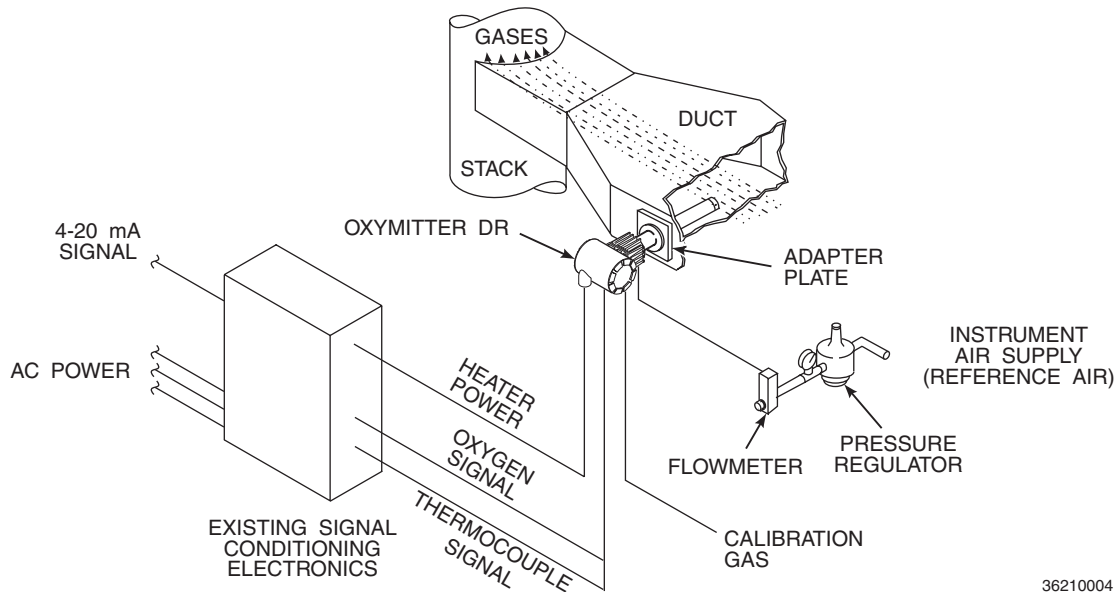
This blocking valve or check valve is to prevent breathing of the calibration gas line and subsequent flue gas condensation and corrosion.

NOTE

Retain the packaging in which the Oxymitter DR arrived from the factory in case any components are to be shipped to another site. This packaging has been designed to protect the product.

g. Upgrading the Oxymitter DR

The Oxymitter DR can be easily upgraded to a full Oxymitter 4000 or 5000. This provides an economical upgrade path for users looking to preserve their probe investment upon the eventual failure of the signal conditioning electronics. Upgrading the Oxymitter DR to a full Oxymitter 4000 or 5000 requires only the addition of a small electronics package to the existing termination housing of the Oxymitter DR probe. The converted unit will be a full Oxymitter 4000 or 5000 Oxygen Transmitter with the capability of providing a 4-20 mA oxygen signal without the need for an external signal conditioning electronics package. HART or Fieldbus communications are provided with the Oxymitter electronics. See Appendix A for upgrade information.



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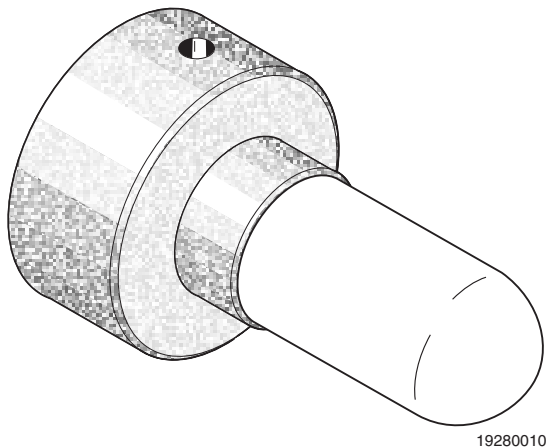
Figure 1-2. Typical System Installation

1-3 PROBE OPTIONS

a. Diffusion Elements

1. Ceramic Diffusion Assembly

The ceramic diffusion assembly, Figure 1-3, 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 seal for use with an abrasive shield.



19280010

Figure 1-3. Ceramic Diffusion Assembly

2. Snubber Diffusion Assembly

The snubber diffusion assembly, Figure 1-4, is satisfactory for most applications. This element is also available with a flame arrestor, and with a dust seal for use with an abrasive shield.



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Figure 1-4. Snubber Diffusion Assembly

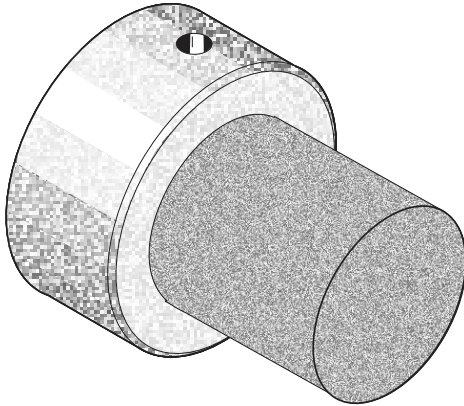


Figure 1-5. Cup-Type Diffusion Assembly

3. Cup-Type Diffusion Assembly

The cup-type diffusion assembly, Figure 1-5, is used in high-temperature applications where frequent diffusion

element plugging is a problem. It 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.

b. Abrasive Shield Assembly

The abrasive shield assembly, Figure 1-6, is a stainless-steel tube that surrounds the probe assembly. The shield protects against particle abrasion, provides a guide for ease of insertion, and acts as a position support, especially for longer probes. The abrasive shield assembly uses a modified diffusor and vee deflector assembly, fitted with dual dust seal packing.

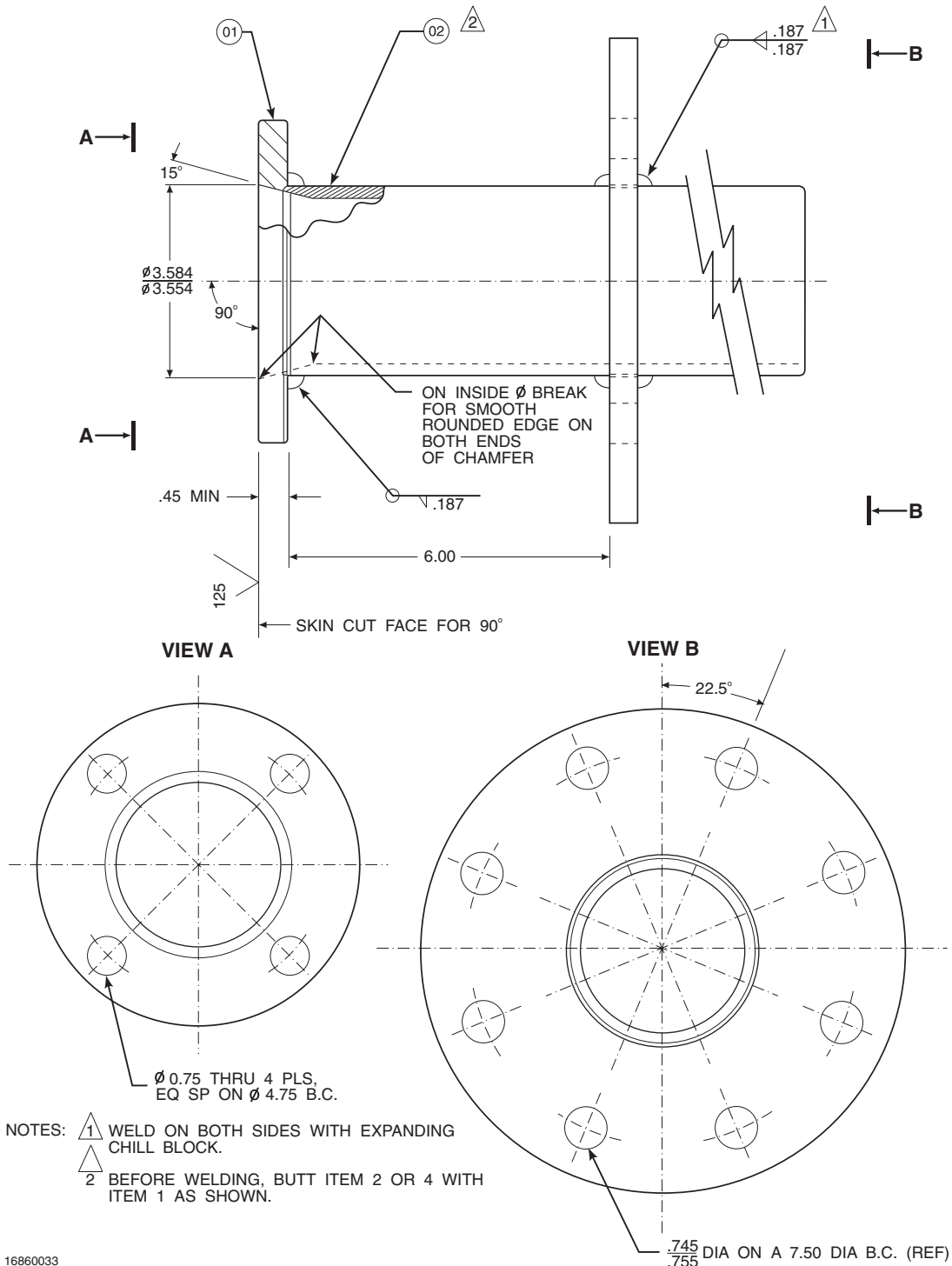


Figure 1-6. Abrasive Shield Assembly

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

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)
Temperature Limits in Process Measurement Area	32° to 1300°F (0° to 704°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 *
System Response to Calibration Gas	Initial response in less than 3 seconds T90 in less than 8 seconds
Resolution Sensitivity	0.01% of O ₂ value
Mounting and Mounting Position	Vertical or horizontal
Materials:	
Probe	Wetted or welded parts - 316L stainless steel Non-wetted parts - 304 stainless steel, low-copper aluminum
Termination Housing	Low-copper aluminum
Calibration Gas Mixtures Recommended	0.4% O ₂ , Balance N ₂ 8% O ₂ , Balance N ₂
Calibration Gas Flow	5 scfh (2.5 l/m)
Optional Reference Air	2 scfh (1 l/m), clean, dry, instrument-quality air (20.95% O ₂), regulated to 5 psi (34 kPa)
Heater Voltage	115 ±10% VAC, 50/60 Hz., 200VA
Thermocouple	Type K
Power Requirements:	
Normal Operation	175 W
Maximum (Warmup)	500 W
Ambient Operating Temperature (Junction Box)	200°F (93°C) [160°F (71°C) max for YEW replacement]

*When used with Rosemount Oxymitter signal conditioning electronics.


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

Table 1-1. Product Matrix

OXT4ADR	Oxymitter DR In Situ Oxygen Transmitter						
	Exchange Probe - Instruction Book						
	Code	Sensing Probe Type					
	1	ANSI (N. American Std.) Probe with Ceramic Diffuser					
	2	ANSI Probe with Flame Arrestor and Ceramic Diffuser ⁽¹⁾					
	3	ANSI Probe with Snubber Diffuser					
	4	DIN (European Std.) Probe with Ceramic Diffuser					
	5	DIN Probe with Flame Arrestor and Snubber Diffuser ⁽¹⁾					
	6	DIN Probe with Snubber Diffuser					
	7	JIS (Japanese Std.) 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 ⁽¹⁾					
	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 ("0" must be chosen 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) (N. American Std.)					
	2	New Bypass or Abrasive Shield (ANSI)					
	4	Probe Only (DIN) (European Std.)					
	5	New Bypass or Abrasive Shield (DIN)					
	7	Probe Only (JIS) (Japanese Std.)					
	8	New Bypass or Abrasive Shield (JIS)					
	Code	Housing and Customer Termination					
	11	Standard Filtered Termination					
	12	Transient Protected Filtered Termination					
OXT4ADR	3	2	1	1	11	03	Example (Cont'd)

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 ZrO₂ cell.

Cell replacement kits for high sulfur service are also available.

Cont'd	Code	Arrangement - 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 analyzer systems

OXT4ADR	3	2	1	1	11	03	Example
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NOTES:

- ⁽¹⁾No agency approvals - See Instruction Bulletin IB-106-340CDR 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 of application, abrasive shields with support brackets are recommended 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:

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

Table 1-2. Calibration Components

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

*Calibration gas bottles cannot be shipped via airfreight.

SECTION 2 INSTALLATION

WARNING

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

2-1 MECHANICAL INSTALLATION

a. Selecting Location

If the probe will be installed into an existing location, proceed to paragraph 2-1b.

1. The location of the Oxymitter DR in the stack or flue is most important for maximum accuracy in the oxygen analyzing process. The Oxymitter DR must be positioned so the gas it measures is representative of the process. Best results are normally obtained if the Oxymitter DR is positioned near the center of the duct (40-60% insertion). Longer ducts may require several Oxymitter DR units since the O₂ can vary due to stratification. A point too near the wall of the duct, or the inside radius of a bend, may not provide a representative sample because of the very low flow conditions. The sensing point should be selected so the process gas temperature falls within a range of 32° to 1300°F (0° to 704°C). Figure 2-1 through Figure 2-5 provide mechanical installation references. The ambient temperature of the termination housing must not exceed 200°F (93°C).

2. Ducts and stacks that operate under negative pressure will draw air in through any holes or torn seals, substantially affecting the oxygen reading. Therefore, either make the necessary repairs or install the Oxymitter DR upstream of any leakage.
3. Ensure the area is clear of internal and external obstructions that will interfere with installation and maintenance. Allow adequate clearance for removal of the Oxymitter DR (Figure 2-1).

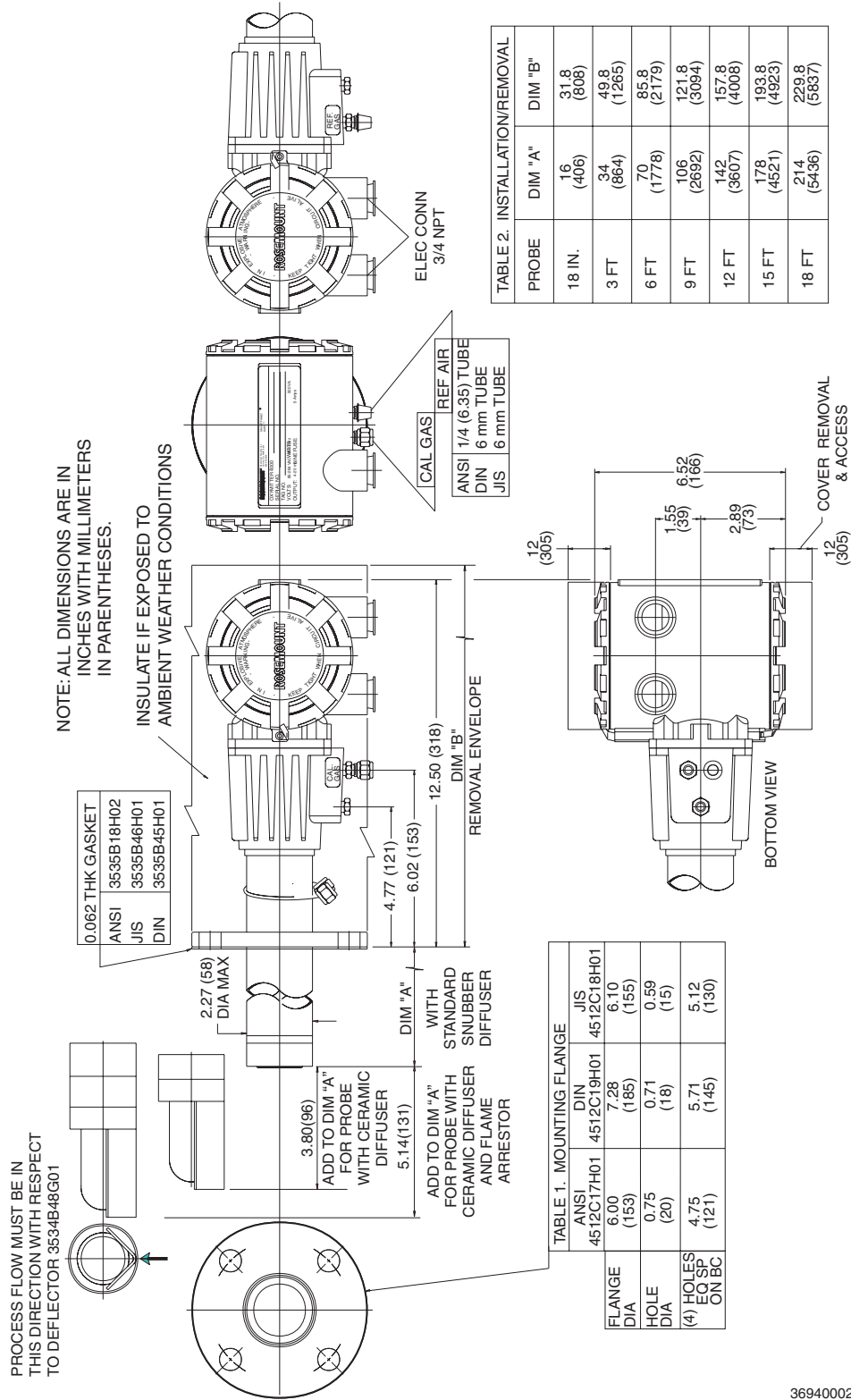
b. Installation

1. Ensure all components are available to install the Oxymitter DR. If equipped with the optional ceramic diffusion element, ensure it is not damaged.
2. The Oxymitter DR may be installed intact as it is received.

NOTE

An abrasive shield is recommended for high velocity particulates in the flue stream (such as those in coal-fired boilers, kilns, and recovery boilers). Vertical and horizontal brace clamps are provided for 9 ft and 12 ft (2.75 m and 3.66 m) probes to provide mechanical support for the Oxymitter DR. Refer to Figure 2-6.

3. Weld or bolt adapter plate (Figure 2-4) onto the duct.



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Figure 2-1. Oxymitter DR Installation

- NOTES:
 1. THESE FLAT-FACED FLANGES ARE MANUFACTURED TO ANSI, DIN, AND JIS BOLT PATTERNS AND ARE NOT PRESSURE RATED.
 2. ALL DIMENSIONS ARE IN INCHES WITH MILLIMETERS IN PARENTHESES.

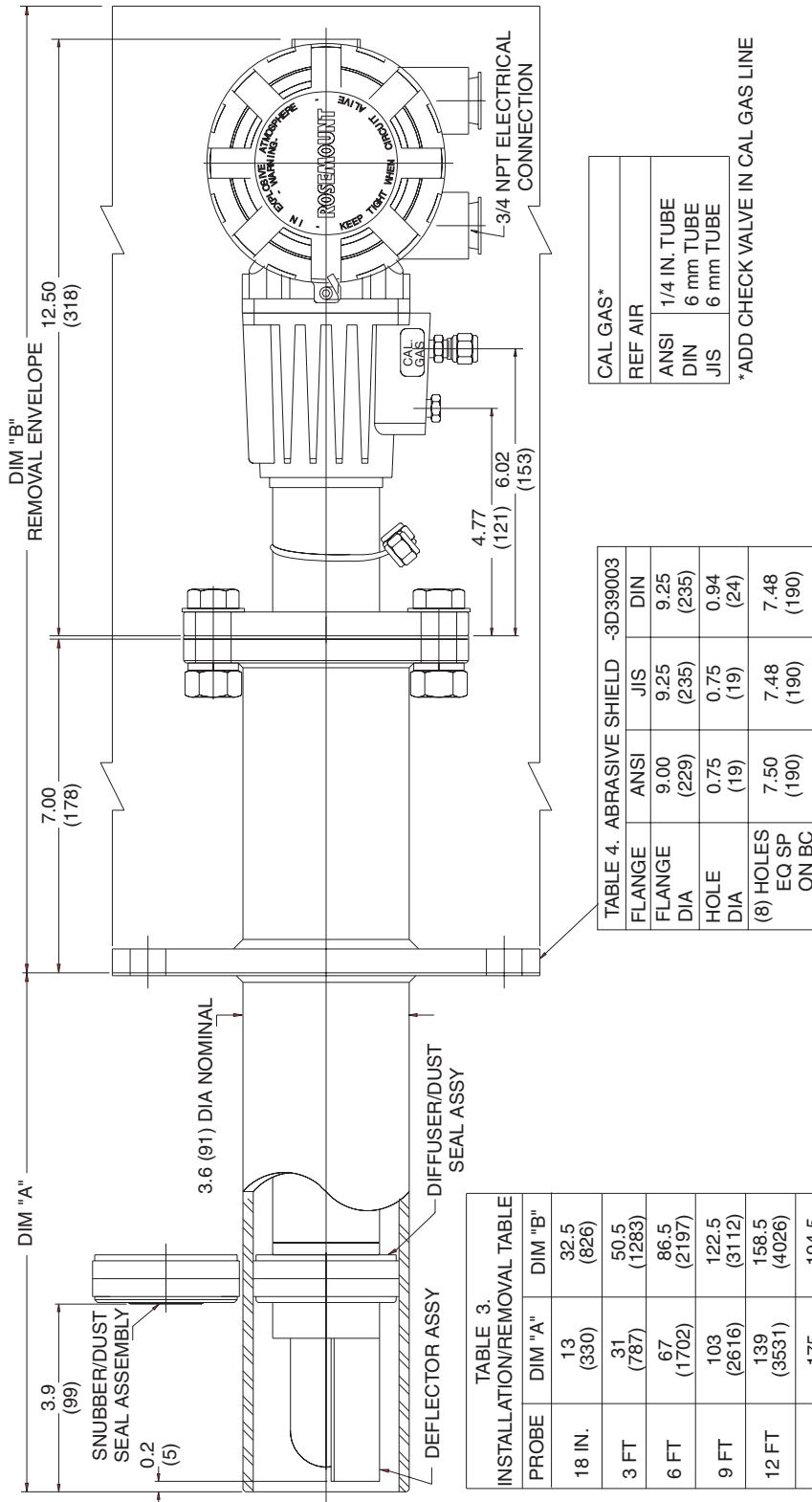


TABLE 4. ABRASIVE SHIELD -3D39003

FLANGE	ANSI	JIS	DIN
FLANGE D/A	9.00 (229)	9.25 (235)	9.25 (235)
HOLE D/A	0.75 (19)	0.75 (19)	0.94 (24)
(8) HOLES EQ SP ON BC	7.50 (190)	7.48 (190)	7.48 (190)

CAL GAS*

REF AIR	ANSI	DIN	JIS
1/4 IN. TUBE	1/4 IN. TUBE	6 mm TUBE	6 mm TUBE

*ADD CHECK VALVE IN CAL GAS LINE

TABLE 3. INSTALLATION/REMOVAL TABLE

PROBE	DIM "A"	DIM "B"
18 IN.	13 (330)	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 (4026)
15 FT	175 (4445)	194.5 (4940)
18 FT	211 (5359)	230.5 (5855)

36940003

Figure 2-2. Oxymitter DR with Abrasive Shield

ADAPTER PLATE OUTLINE

TABLE 6. ADAPTER PLATE* DIMENSIONS FOR OXYMITTER DR WITH ABRASIVE SHIELD

DIMENSIONS IN. (mm)	ANSI (P/N 3535B58G02)	DIN (P/N 3535B58G06)	JIS (P/N 3535B58G04)
"A"	9.00 (229)	9.25 (235)	9.25 (235)
"B" DIA	4.75 (121)	3.94 (100)	4.92 (125)
"C" THREAD	0.625-11	(M-16 x 2)	(M-20 x 2.5)
"D" DIA	7.50 (191)	7.48 (190)	7.894 (200)

TABLE 5. ADAPTER PLATE* DIMENSIONS FOR OXYMITTER DR

DIMENSIONS IN. (mm)	ANSI (P/N 4512C34G01)	DIN (P/N 4512C36G01)	JIS (P/N 4512C35G01)
"A"	6.00 (153)	7.5 (191)	6.50 (165)
"B" THREAD	0.625-11	(M-16 x 2)	(M-12 x 1.75)
"C" DIA	4.75 (121)	5.708 (145)	5.118 (130)

*PART NUMBERS FOR ADAPTER PLATES INCLUDE ATTACHING HARDWARE.

*PART NUMBERS FOR ADAPTER PLATES INCLUDE ATTACHING HARDWARE.

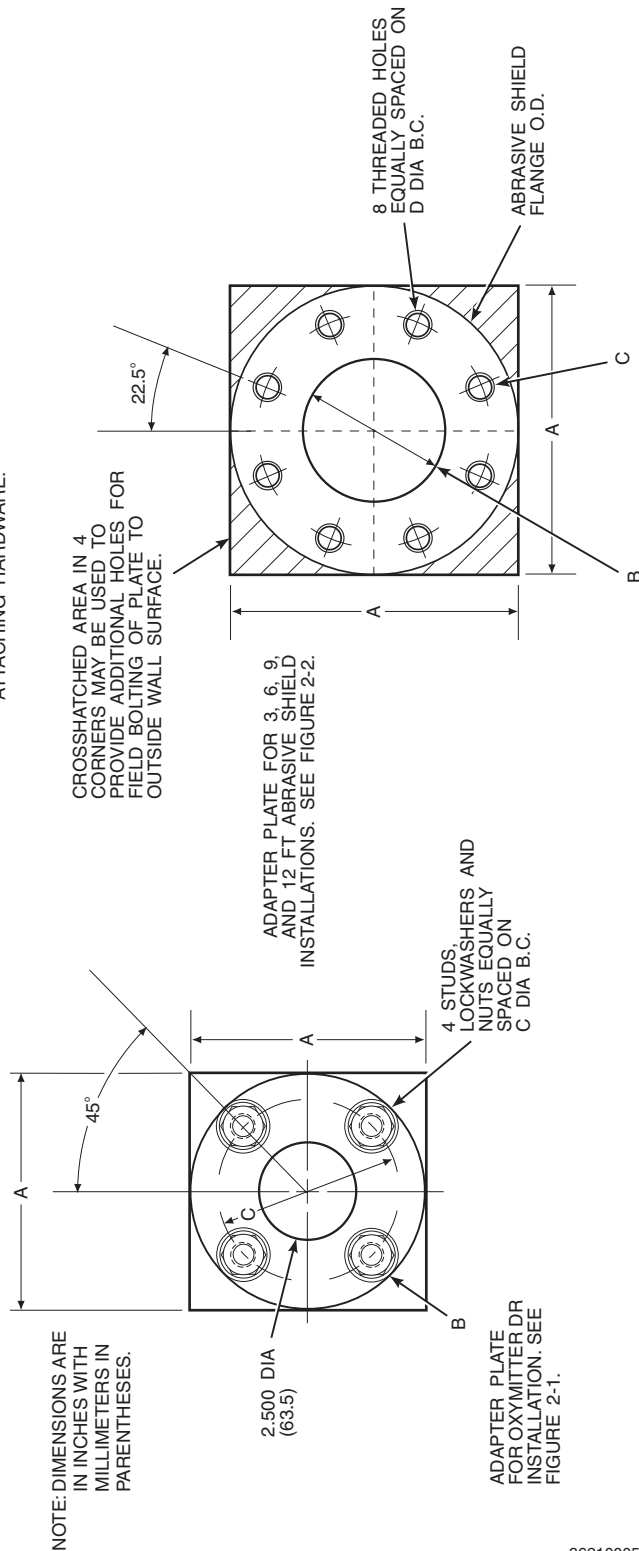


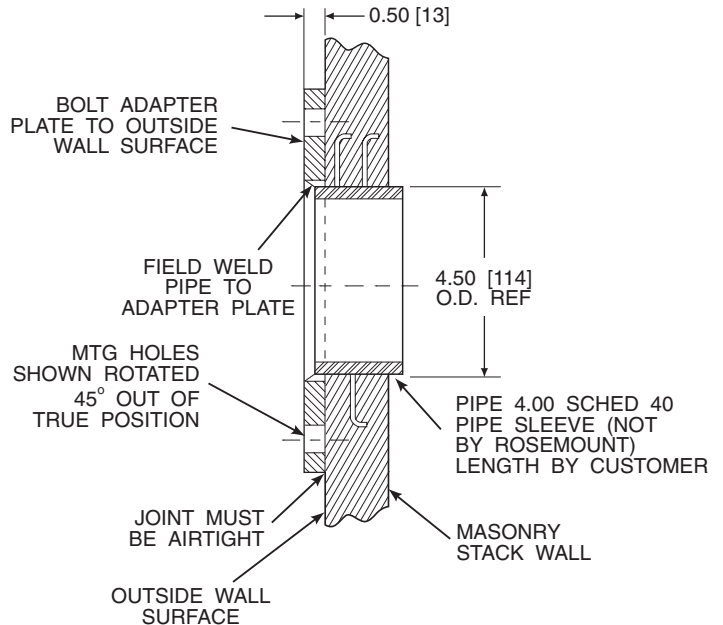
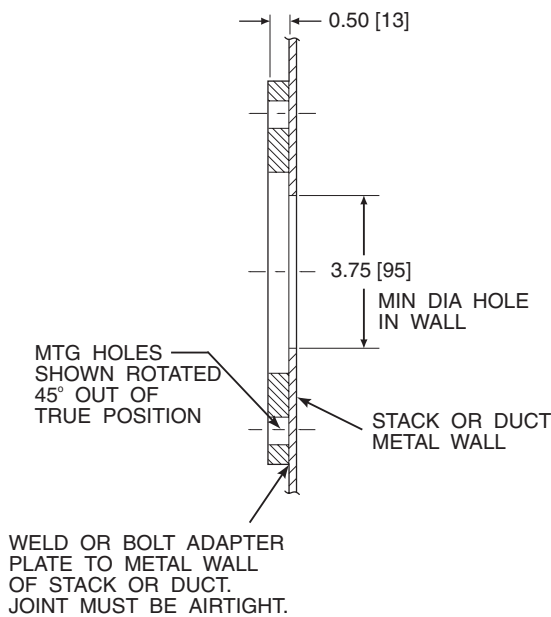
Figure 2-3. Oxymitter DR Adapter Plate Dimensions

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**INSTALLATION FOR METAL
 WALL STACK OR DUCT
 CONSTRUCTION**

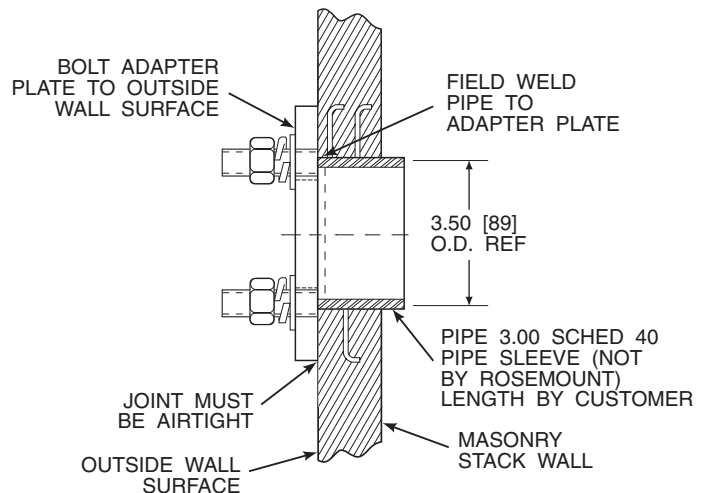
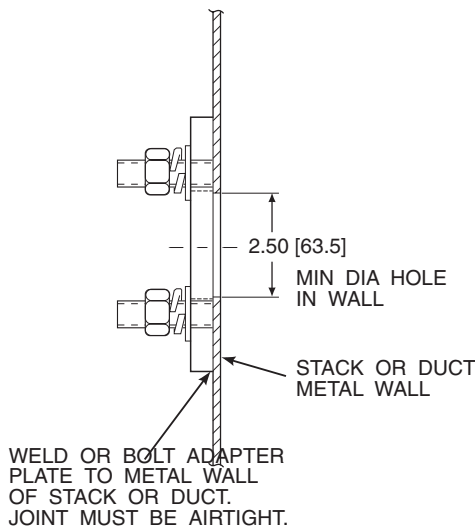
**INSTALLATION FOR MASONRY
 WALL STACK CONSTRUCTION**

WITH ABRASIVE SHIELD



NOTE: ALL MASONRY STACK WORK AND JOINTS EXCEPT ADAPTER PLATE NOT FURNISHED BY ROSEMOUNT.

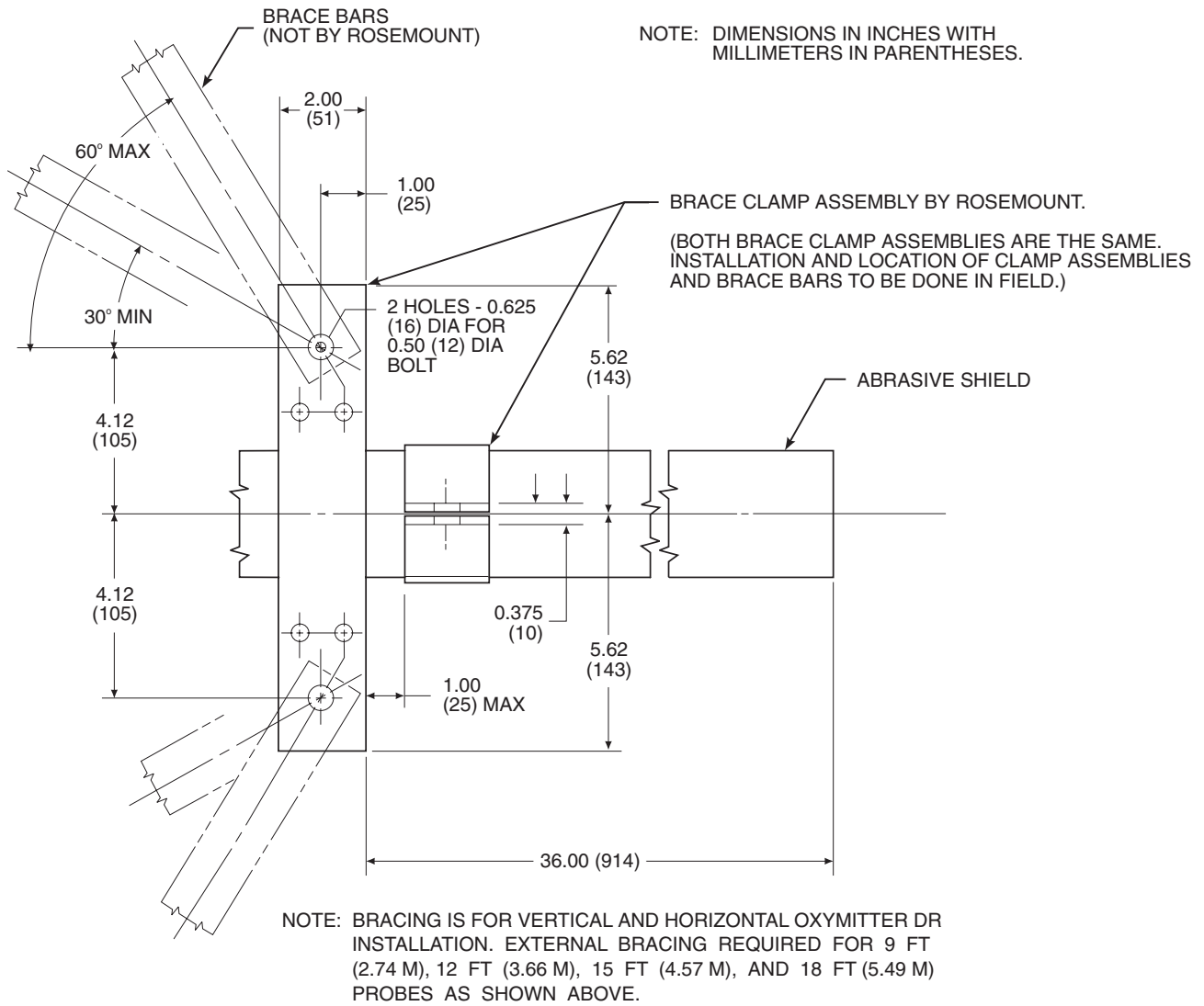
WITHOUT ABRASIVE SHIELD



NOTE: DIMENSIONS IN INCHES WITH MILLIMETERS IN PARENTHESES.

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Figure 2-4. Oxymitter DR Adapter Plate Installation



36940004

Figure 2-5. Oxymitter DR Bracing Installation

4. If using the optional ceramic diffusion element, the vee deflector must be correctly oriented. Before inserting the Oxymitter DR, check the direction of gas flow in the duct. Orient the vee deflector so the apex points upstream toward the flow (Figure 2-6). This may be done by loosening the setscrews and rotating the vee deflector to the desired position. Retighten the setscrews.
5. In vertical installations, ensure the system cable drops vertically from the Oxymitter DR and the conduit is routed below the level of the termination housing. This drip loop minimizes the possibility that moisture will damage the electrical connections (Figure 2-7).

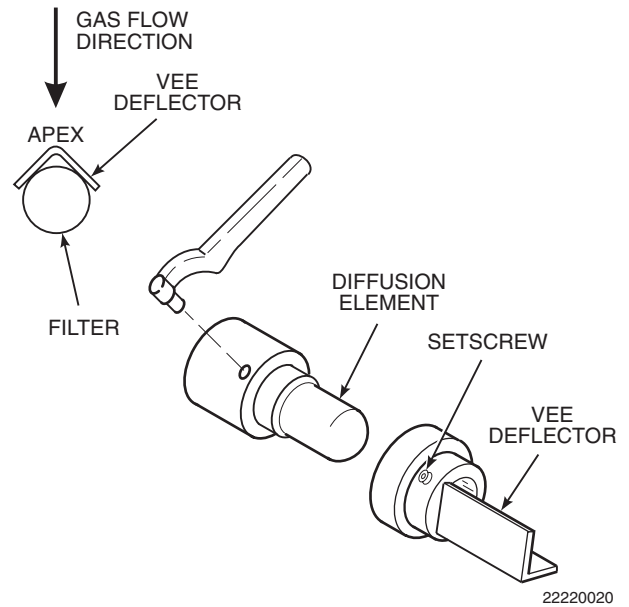


Figure 2-6. Orienting the Optional Vee Deflector

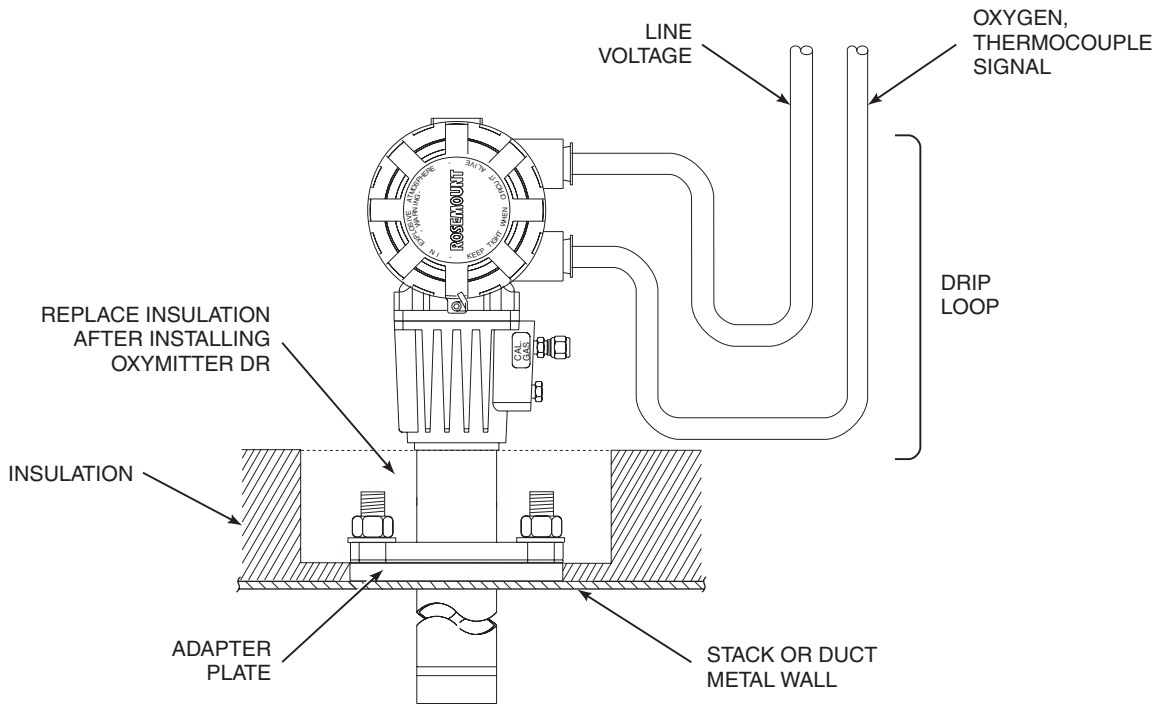


Figure 2-7. Installation with Drip Loop and Insulation Removal

6. If the system has an abrasive shield, check the dust seal gaskets. The joints in the two gaskets must be staggered 180°. Also, make sure the gaskets are in the hub grooves as the Oxymitter DR slides into the 15° chamfer in the abrasive shield.

NOTE

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

7. Insert probe through the opening in the mounting flange and bolt the unit to the flange. When probe lengths selected are 9 to 18 ft (2.74 to 5.49 m), special brackets are supplied to provide additional support for the probe inside the flue or stack (Figure 2-5).
8. If insulation is being removed to access the duct work for Oxymitter DR mounting, make sure the insulation is replaced afterward (Figure 2-7).

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

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

WARNING

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

NOTE

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

- a. Remove screw (25, Figure 4-1), gasket (26), and cover lock (27). Remove terminal block cover (20).
- b. **Connect Heater Power**

Connect the heater power lines to the two terminals indicated in (Figure 2-8).
- c. **Connect O₂ and Heater Thermocouple signals**
 1. Oxygen Signal. Connect the oxygen signal lines from the signal conditioning electronics to the terminals shown in Figure 2-8.
 2. Heater Thermocouple Signal. Connect the Type K thermocouple lines from the signal conditioning electronics to the terminals indicated in Figure 2-8.
- d. Install terminal block cover (20, Figure 4-1) and secure with cover lock (27), gasket (26), and screw (25).

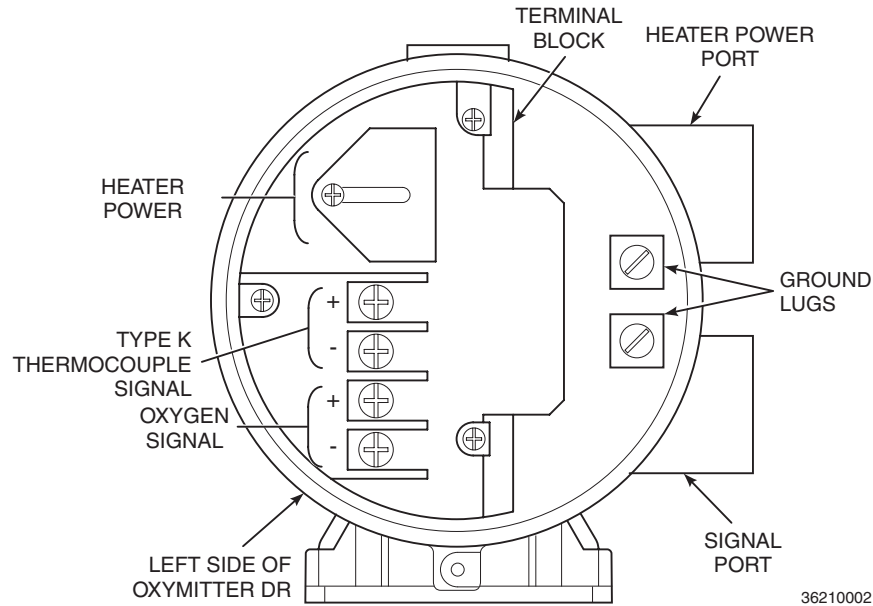
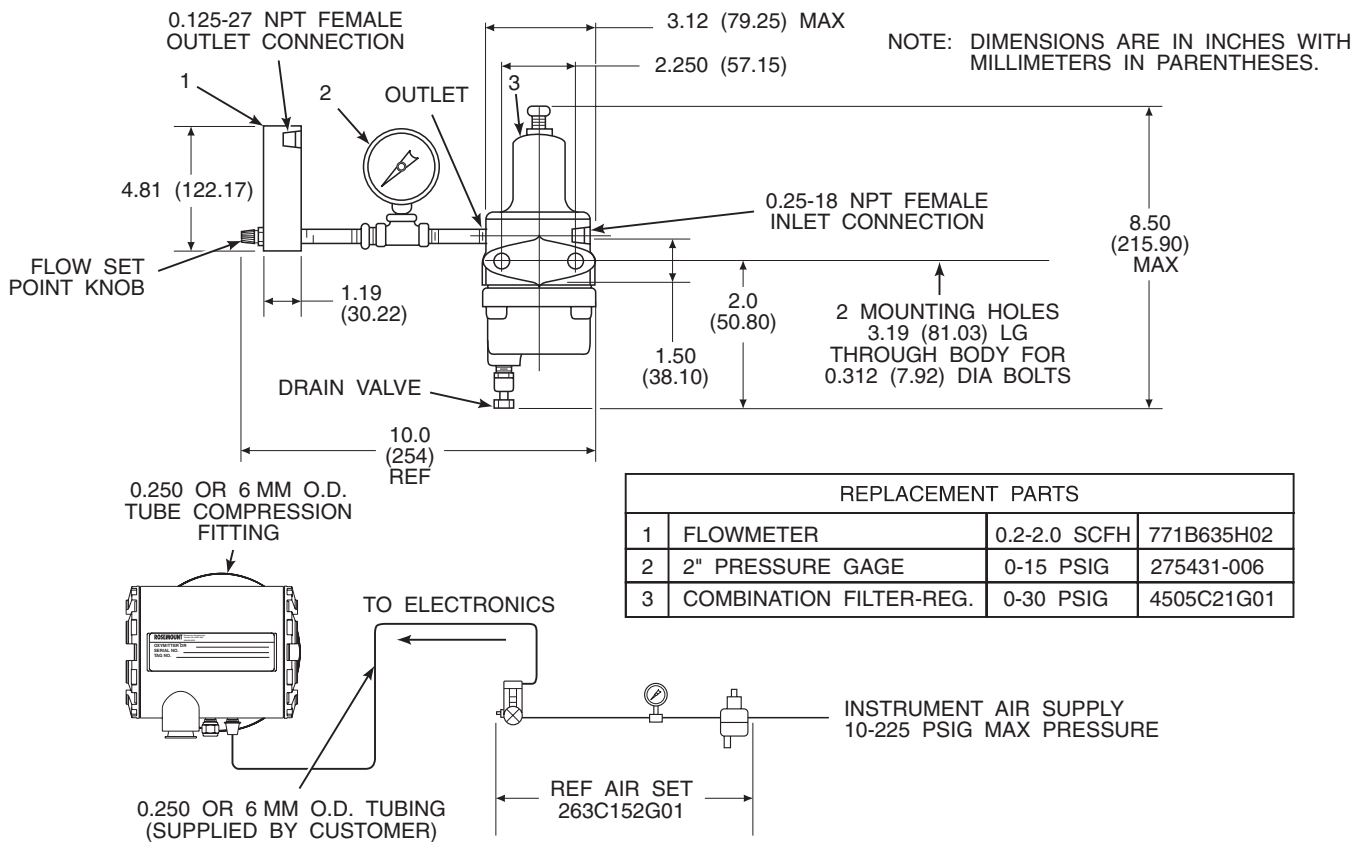


Figure 2-8. Terminal Block



SCHMATIC HOOKUP FOR REFERENCE AIR SUPPLY ON OXYMITTER DR PROBE HEAD.

Figure 2-9. Air Set, Plant Air Connection

2-3 PNEUMATIC INSTALLATION

If instrument air will be used as reference air (see System Considerations, paragraph 1-2f) connect the reference air set to the Oxymitter DR. The reference air set should be installed in accordance with Figure 2-9.

Instrument Air (Reference Air): 10 psig (68.95 kPag) minimum, 225 psig (1551.38 kPag) maximum at 2 scfh (56.6 L/hr) maximum; less than 40 parts-per-million total hydrocarbons. Regulator outlet pressure should be set at 5 psi (35 kPa).



NOTE

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

During outages, and if possible, leave all Oxymitter DR units running to prevent condensation and premature aging from thermal cycling.

CAUTION

If the ducts will be washed down during outage, MAKE SURE to power down the Oxymitter DR units and remove them from the wash area.

2-4 SYSTEM SETUP

a. Overview

This section covers the setup procedures for the Oxymitter DR In-Situ Oxygen Probe. The DR probe can be used with several electronics packages including: Models 218, 218A, 225, 132 (analog and digital), TC200, and ZA8C.

WARNING

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

For Westinghouse Models 218, 225, and 132 (analog), refer to paragraph 2-4b. Additional information can be found in IB-106-101.

For Westinghouse Model 218A, refer to paragraph 2-4c. Additional information can be found in IB-106-101A.

For Westinghouse Model TC200, refer to paragraph 2-4d. Additional information can be found in IB-107-020.

For Westinghouse Model 132 (digital), refer to paragraph 2-4e. Additional information can be found in IB-106-106A.

For Rosemount World Class 3000, refer to paragraph 2-4f. Additional information can be found in IB-106-300NF or IB-106-300NH.

For Yokogawa Model ZA8C, refer to paragraph 2-4g.

b. WESTINGHOUSE MODELS 218, 225, AND 132 (ANALOG) ELECTRONICS SETUP

Before beginning operation, it is important that the probe heater setpoint of the existing electronics be changed to support the Oxymitter DR In-Situ Oxygen Probe. The setpoint adjustment procedure required for Models 218, 225, and 132 analog electronics is as follows:

1. Open electronics enclosure.
2. On temperature controller card, Figure 2-10, connect jumper wire from TP3 to either Pin 2 or Pin 7.
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 subtract 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.

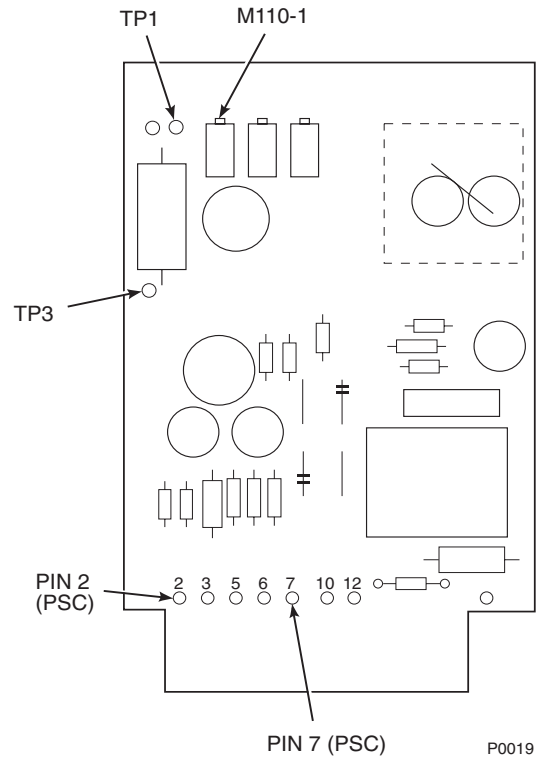


Figure 2-10. Temperature Controller Card Calibration Points

c. WESTINGHOUSE MODEL 218A ELECTRONICS SETUP

Before beginning operation, it is important that the probe heater setpoint of the existing electronics be changed to support the Oxymitter DR probe. To convert the Model 218A Digital Electronics Package for use with the DR probe, an EPROM change is necessary. Remove Main PCB and check back of board to identify unit as G02 or G04. The replacement EPROM needed is as identified below:

	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.

To replace the EPROM, proceed as follows:

1. Shut off and lock out power to the electronics package.
2. Open electronics enclosure.
3. On the Main PCB, Figure 2-11, locate and remove old EPROM.
4. Replace with new EPROM.
5. Close electronics enclosure and power up system.

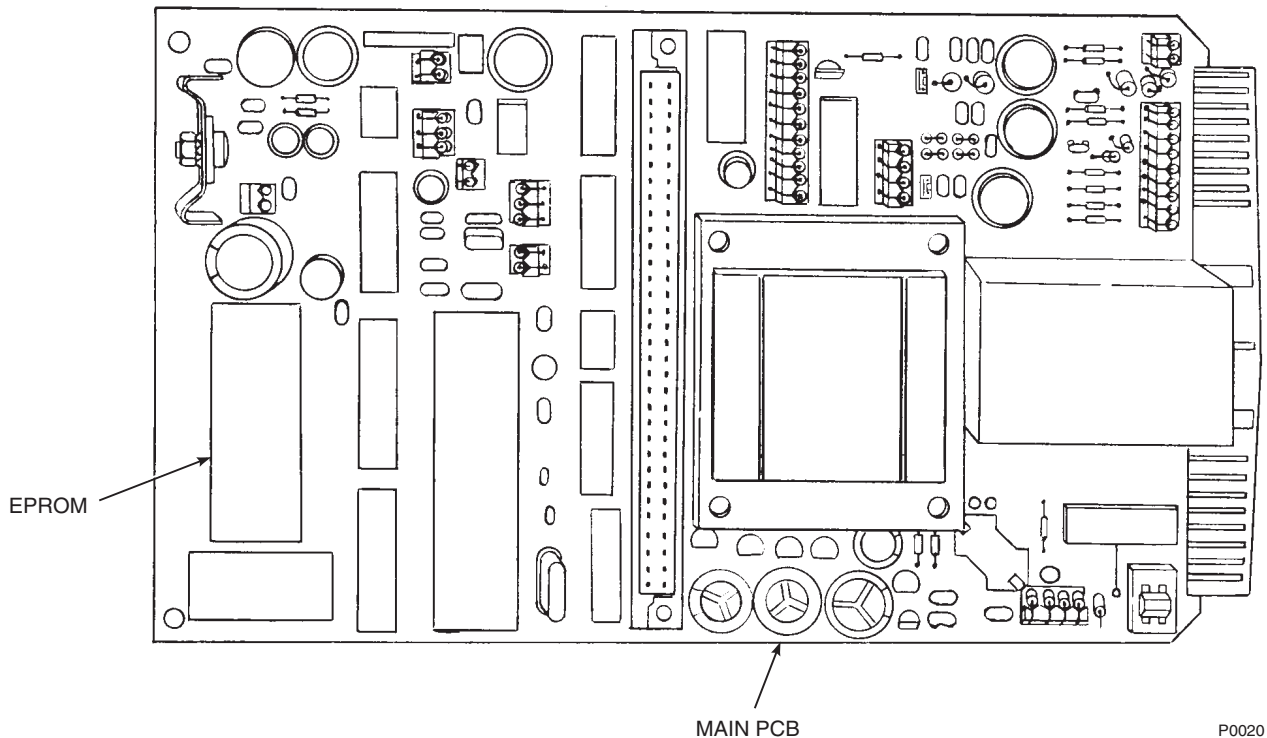


Figure 2-11. Main PCB (Model 218A) EPROM Replacement

P0020

d. WESTINGHOUSE MODEL TC200 VERI-TRIM ELECTRONICS SETUP

Before beginning operation, it is important that the probe heater setpoint of the existing electronics be changed to support the Oxymitter DR In-Situ Oxygen Probe. To convert the Model TC200 Electronics Package for use with the DR probe, an EPROM change is necessary. The replacement EPROM needed is part number 1M03154G02.

1. EPROM replacement. To replace the EPROM, proceed as follows:
 - (a) Shut off and lock out power to the electronics package.
 - (b) Open electronics enclosure.
 - (c) On the main PCB, Figure 2-12, locate and remove old EPROMs U11 and U12.
 - (d) Replace with new EPROMs (part number 1M03154G02) being careful to install U11 and U12 in their proper locations.
 - (e) Close electronics enclosure and power up system.
2. Heater Setpoint Adjustment. The adjustment procedure required for the Model TC200 Electronics Package is as follows:
 - (a) Open keylocked enclosure to access membrane keyboard.
 - (b) Put controller in PAR (parameter) mode by depressing "LOCK" "▲" "%O2" "INC" "ACK" in sequence.
 - (c) Depress "ACK" pushbutton to clear display.
 - (d) Press "NUM" pushbutton.
 - (e) Using "INC", "DEC" buttons, display parameter 125.
 - (f) Press "VAL" button.
 - (g) Using "INC", "DEC" buttons, change parameter 125 value to 15.4.
 - (h) Press "ENT" to save new value.

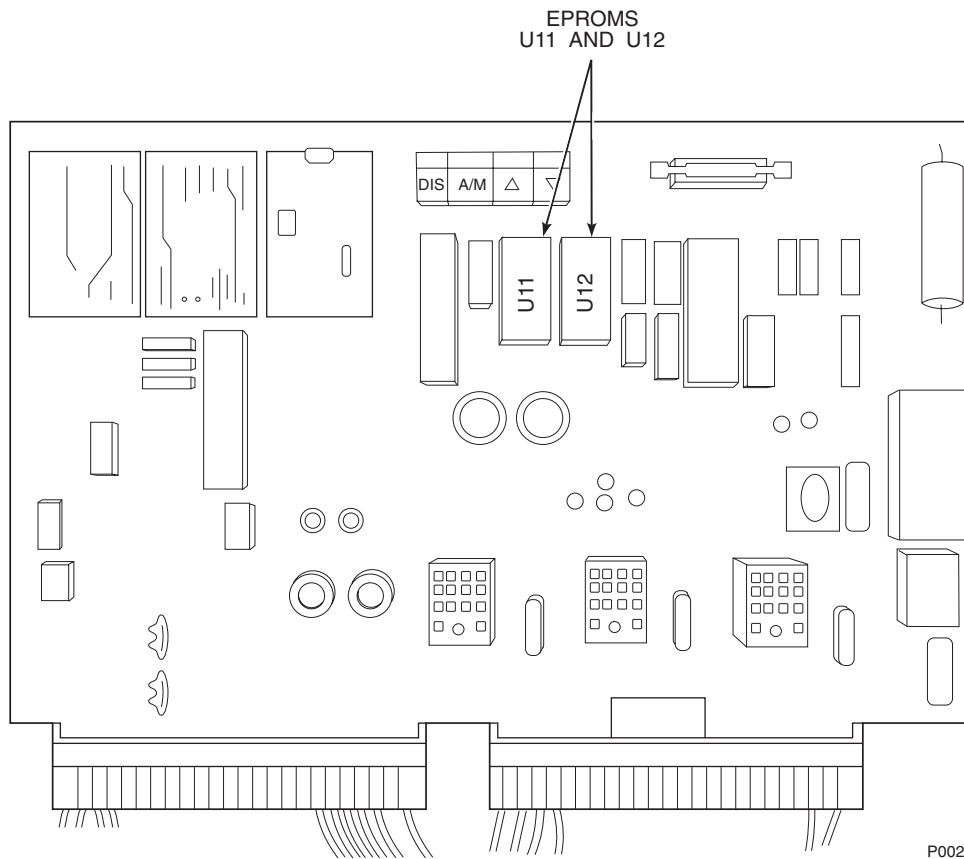


Figure 2-12. Main PCB (Model TC200) EPROM Replacement

e. WESTINGHOUSE MODEL 132 DIGITAL ELECTRONICS SETUP

Before beginning operation, it is important that the probe heater setpoint of the existing electronics be changed to support the Oxymitter DR In-Situ Oxygen Probe. To convert the Model 132 Digital Electronics Package for use with the DR probe, an EPROM change is necessary. The replacement EPROM needed is as identified below:

United States	IM03222G01
---------------	------------

To replace the EPROM, proceed as follows:

1. Shut off and lock out power to the electronics package.
2. Open electronics enclosure.
3. On the Main PCB, Figure 2-13, locate and remove old EPROM.
4. Replace with new EPROM.
5. Close electronics enclosure and power up system.




Figure 2-13. Main PCB (Model 132) EPROM Replacement

f. WORLD CLASS 3000 INTELLIGENT FIELD TRANSMITTER SETUP

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

properly. Refer to Figure 2-14 for IFT jumper selection, and Figure 2-15 for HPS jumper selection. For additional setup and configuration information, refer to IB-106-300NF or IB-106-300NH.


		JUMPER CONFIGURATION		ALWAYS DISCONNECT LINE VOLTAGE FROM INTELLIGENT FIELD TRANSMITTER BEFORE CHANGING JUMPERS.	
LINE VOLTAGE SELECTION	JUMPER (INSTALL)	PROBE HEATER VOLTAGE SELECTION	JUMPER (INSTALL)		
100 V.A.C.	JM3, JM7, JM2	WORLD CLASS PROBE (44V)	JM10		
120 V.A.C.	JM8, JM7, JM1	218 PROBE (115V)	JM9		
220 V.A.C.	JM6, JM5, JM2	WORLD CLASS "DIRECT REPLACEMENT" PROBE (115V) OR OXYMITTER DIRECT REPLACEMENT PROBE (115V)	JM9		
240 V.A.C.	JM6, JM5, JM1				

36210015

Figure 2-14. IFT 3000 Power Supply Board Jumper Configuration

CAUTION

If incorrect heater voltage is selected, damage to the Oxymitter DR may occur. Refer to IB-106-300NH or IB-106-300NF for additional configuration information. Always update the relevant labeling to reflect the set voltage.

		JUMPER CONFIGURATIONS		ALWAYS DISCONNECT LINE VOLTAGE FROM HEATER POWER SUPPLY AND ANALOG ELECTRONICS (IF USED) BEFORE CHANGING JUMPERS.	
LINE VOLTAGE SELECTION	JUMPER (INSTALL)	HEATER POWER	JUMPER	PROBE HEATER VOLTAGE SELECTION	JUMPER (INSTALL)
100/120 V.A.C.	JM4, JM1	REMOTE	REMOVE JM2	WORLD CLASS PROBE (44V)	JM7
220/240 V.A.C.	JM5	ON	*INSTALL JM2	218 PROBE (115V)	JM8
		ELECTRONICS SELECTION	JUMPER	DIRECT REPLACEMENT WORLD CLASS OR DR OXYMITTER	JM8
		*ANALOG (EXISTING)	INSTALL JM3, JM6		
		DIGITAL (NEXT GENERATION)	REMOVE JM3, JM6		

NOTES:

 100 V.A.C. OPERATION REQUIRES TRANSFORMER PART NUMBER 1M02961G02.

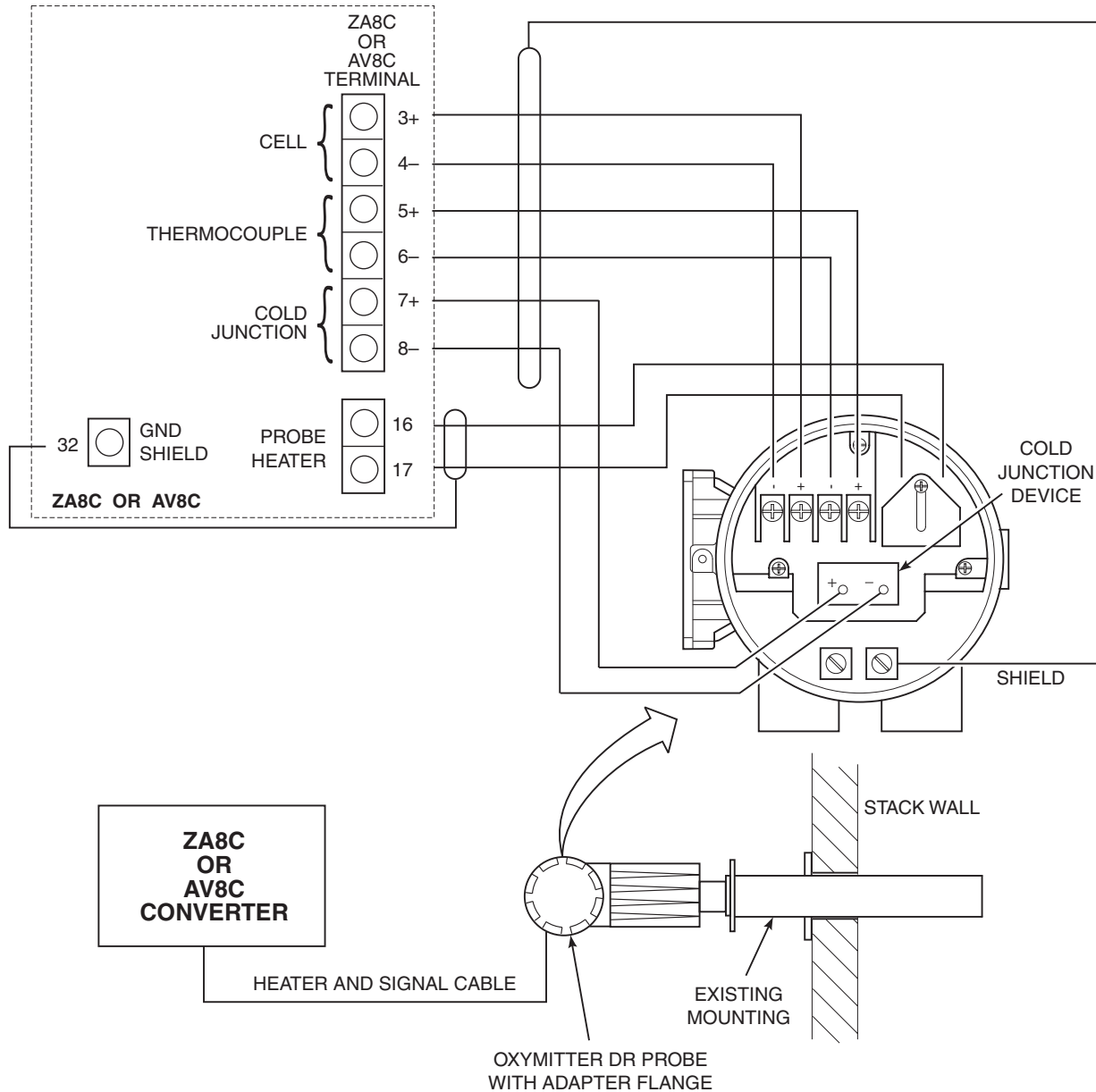
36210014

Figure 2-15. Heater Power Supply (HPS 3000) Jumper Configuration

g. THE YOKOGAWA ZA8C AND AV8C CONVERTER ELECTRONICS SETUP

The DR probe can be wired 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 2-16.



- NOTES: 1. HEATER TEMPERATURE SET TO 1380°F (750°C)
2. THE GREATER MASS OF THE OXYMITTER DIRECT REPLACEMENT PROBE REQUIRES LONGER TIME TO HEAT UP. UPON STARTUP, THE YOKOGAWA ELECTRONICS MAY INDICATE AN ERROR BECAUSE THE PROBE HAS NOT REACHED TEMPERATURE SETPOINT IN THE NORMAL TIME. REMOVE POWER FROM THE YOKOGAWA ELECTRONICS OR PROBE MODULE TO CLEAR THE ERROR, AND RESTORE POWER. THIS PROCEDURE MAY HAVE TO BE REPEATED A COUPLE OF TIMES BEFORE PROBE OPERATING TEMPERATURE IS REACHED.

36430002

Figure 2-16. DR Probe Wired to the ZA8C or A V8C Converter

SECTION 3 STARTUP AND OPERATION

WARNING

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

3-1 GENERAL

For startup and operation instructions, refer to the Instruction Bulletin provided with your electronics package.

SECTION 4 MAINTENANCE AND SERVICE

4-1 OVERVIEW

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

WARNING

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

4-2 CALIBRATION

The Oxymitter DR should be calibrated when commissioned. Under normal circumstances the probe will not require frequent calibration. When calibration is required, follow the procedure described in the Instruction Bulletin applicable to your electronics package. A calibration record sheet is provided at the end of this section to track probe performance.

WARNING

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

WARNING

Disconnect and lock out power before working on any electrical components. There is voltage up to 115 VAC.

4-3 OXYMITTER DR REMOVAL/REPLACEMENT

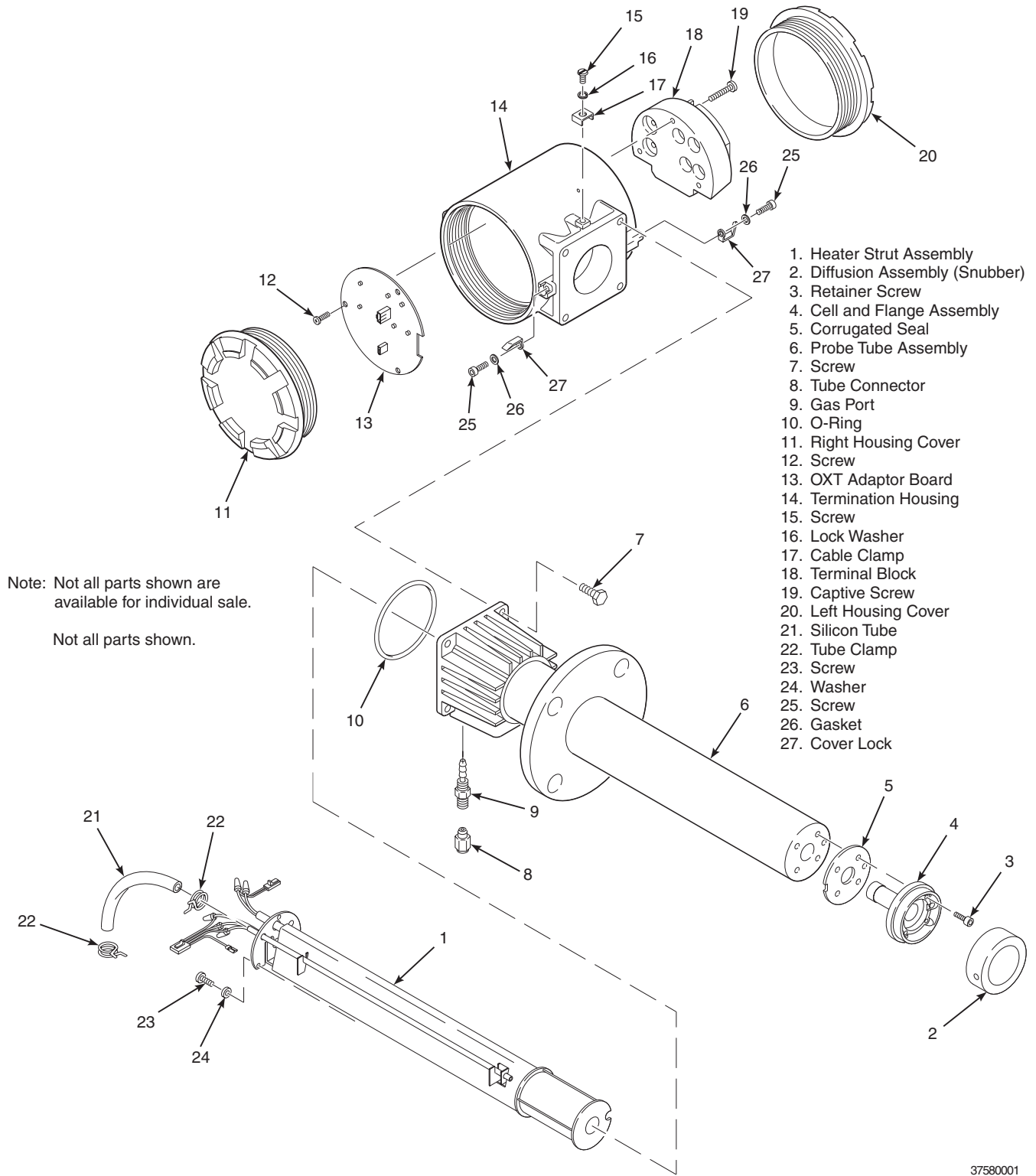
a. Remove.

1. Turn off power to the system.
2. Shut off the calibration gases at the cylinders and the instrument air.

3. Disconnect the cal gas and instrument air lines from the Oxymitter DR.
4. While facing the Oxymitter DR and looking at the Rosemount label, remove screw (25, Figure 4-1), gasket (26) and cover lock (27) securing left housing cover (20). Remove the cover to expose the terminal block (Figure 4-2).
5. Loosen the screw on the heater terminal cover and slide the cover back to access the heater terminals. Loosen the heater terminal screws and remove the leads. Loosen the ground lug screws and remove the leads. Slide the heater power leads out of the heater power port.
6. Loosen the oxygen and heater thermocouple signal terminal screws. Remove the leads from the terminals and slide the wires out of the signal port.
7. Remove insulation to access the mounting bolts. Unbolt the Oxymitter DR from the stack and take it to a clean work area.
8. Allow the unit to cool to a comfortable working temperature.

b. Replace.

1. Bolt the Oxymitter DR to the stack and install insulation.
2. Insert the oxygen and heater thermocouple signal leads in the signal port and connect to the oxygen and heater thermocouple screw terminals (Figure 4-2).
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 cover screw.



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Figure 4-1. Oxymitter DR Exploded View

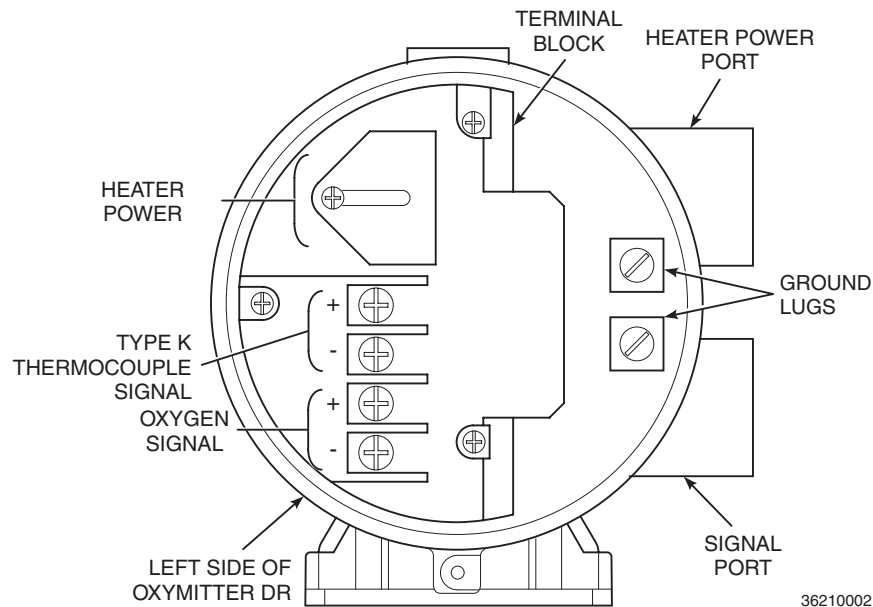


Figure 4-2. Terminal Block

4. Install left housing cover (20, Figure 4-1) 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 Oxymitter DR.
6. Turn on the calibration gases at the cylinders and turn on instrument air.
7. Restore power to the system.

4-4 TERMINAL BLOCK REPLACEMENT

Refer to Figure 4-2 and perform the following procedure to replace the terminal block.

- a. Loosen the mounting screws on the terminal block and carefully lift the block out of the housing.
- b. 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.

- c. Tighten the three mounting screws and ensure the terminal block is secure in the housing.

4-5 ENTIRE PROBE REPLACEMENT

Do not attempt to replace the probe until all other possibilities for poor performance have been considered. If probe replacement is needed, see Table 8-1 for part numbers.

- a. Follow the instructions in paragraph 4-3a to remove the Oxymitter DR from the stack or duct.
- b. Remove the right housing cover (11, Figure 4-1) to uncover the probe connections.
- c. Remove screws (12) and unplug adaptor board (13) from termination housing (14).
- d. Remove the four screws (7) from the probe finned housing. The probe and termination housing can now be separated.
- e. When installing the new probe, make sure that o-ring (10) is in good condition. Place the connectors from the probe through the

hole in the flat side of the termination housing. Make sure the conduit port of the termination housing is on the same side as the CAL and REF gas ports.

- f. Install the four screws (7) and tighten.
- g. Align pins of adaptor board (13) with mating connectors in termination housing (14). Plug adaptor board into termination housing and secure with three screws (12).
- h. Plug the two wire heater power connector from the probe into the mating connector on adaptor board (13).
- i. Plug the four wire oxygen and thermocouple signal connector from the probe into the mating connector on adaptor board (13).
- j. Replace the housing cover (20) and ensure it is tight.
- k. Follow the instructions in paragraph 4-3b to install the Oxymitter DR into the stack or duct.

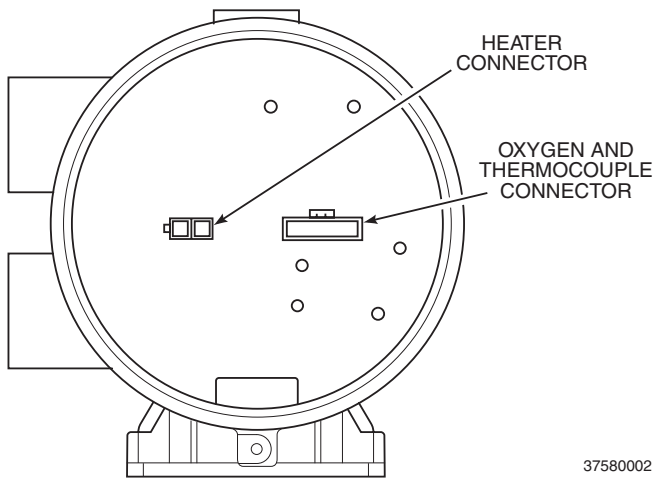


Figure 4-3. Termination Housing Connectors

4-6 HEATER STRUT REPLACEMENT

This paragraph covers heater strut replacement. Do not attempt to replace the heater strut until all other possibilities for poor performance have been considered. If heater strut replacement is needed, order a replacement heater strut. (Table 7-1).

WARNING

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

- a. Follow the instructions in paragraph 4-3a to remove the Oxymitter DR from the stack or duct.
- b. Remove the right housing cover (11, Figure 4-1) to uncover the probe connections.
- c. Disconnect the heater and oxygen and thermocouple connectors, Figure 4-3.
- d. Remove the four screws (7, Figure 4-1) from the probe finned housing. The probe and termination housing can now be separated.
- e. Carefully remove the CAL and REF gas silicon tubes by pulling them off the CAL and REF gas ports. Pull the silicon tubes off the CAL and REF gas lines.
- f. Loosen, but do not remove, the three screws (23, Figure 4-1) on the strut in the finned housing. The spring tension should release and the strut moves up.
- g. Grasp the wire loop and carefully slide the strut out of the probe tube (Figure 4-4).

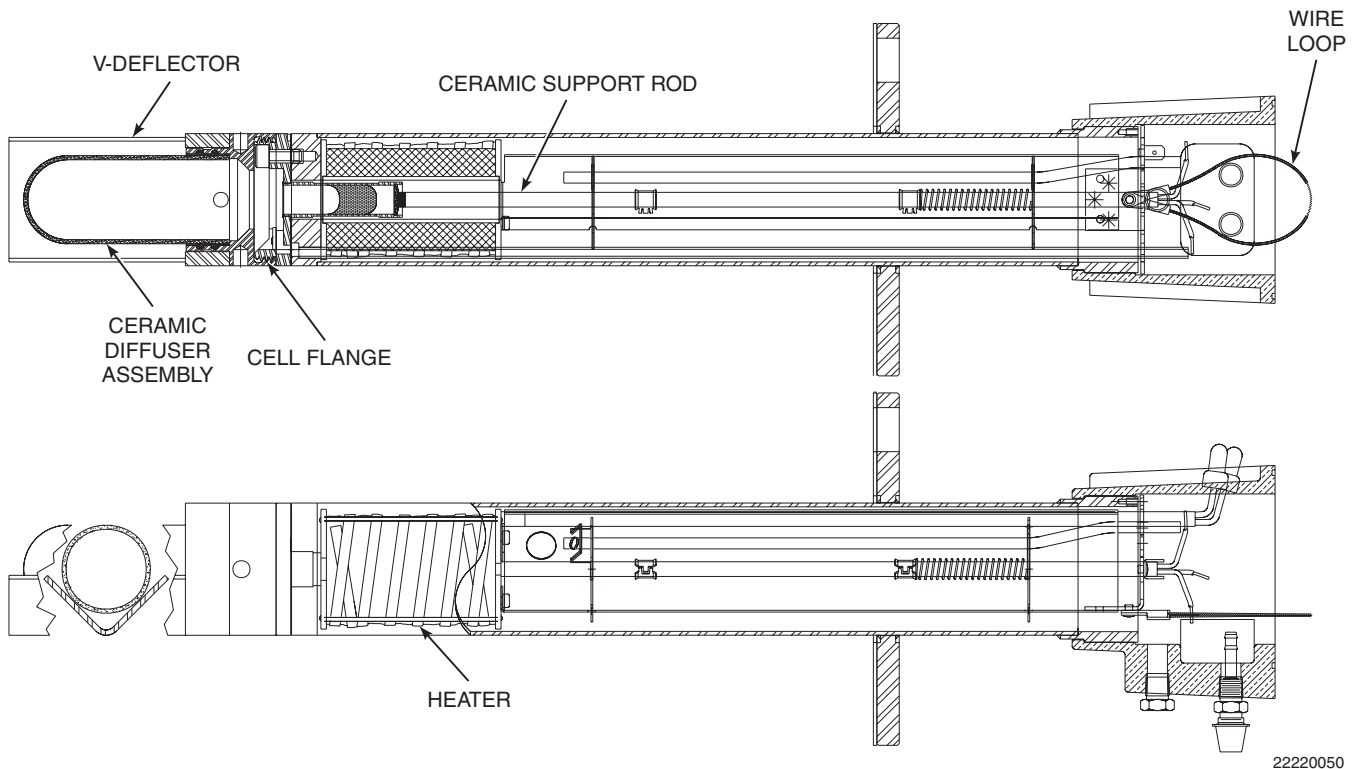


Figure 4-4. Heater Strut Assembly

- h. When replacing the strut, orient the probe so that the small calibration gas tube 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. It will turn to align the hole on the back plate of the strut with the calibration gas line. When the hole and the calibration gas line are aligned correctly, the strut will slide in the rest of the way.
- i. 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.
- j. Push down on the back plate of the strut to make sure you have spring tension and then tighten the three screws on the back plate.
- k. Replace the CAL and REF gas silicon tubes.

- l. Install the termination housing per the instructions in paragraph 4-5 steps e through j.
- m. Follow the instructions in paragraph 4-3b to install the Oxymitter DR into the stack or duct.

4-7 CELL REPLACEMENT

This paragraph covers oxygen sensing cell replacement. Do not attempt to replace the cell until all other possibilities for poor performance have been considered. If cell replacement is needed, order the cell replacement kit (Table 7-1).

The cell replacement kit (Figure 4-5) contains a cell and flange assembly, corrugated seal, setscrews, socket head cap screws, and anti-seize compound. The items are carefully packaged to preserve precise surface finishes. Do not remove items from the packaging until they are ready to be used. Spanner wrenches and hex wrenches needed for this procedure are part of an available special tools kit (Table 7-1).

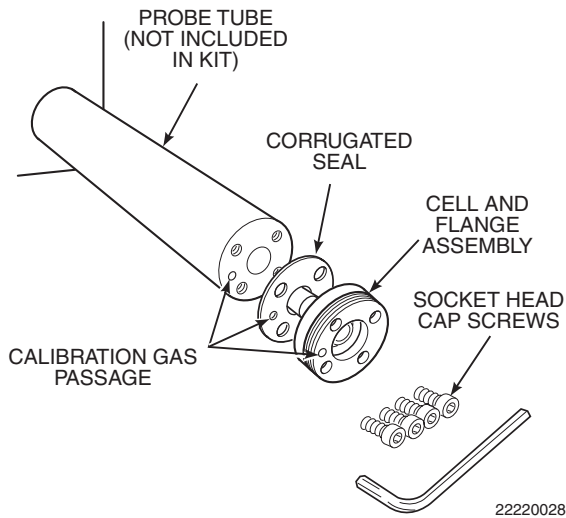


Figure 4-5. Cell Replacement Kit

WARNING

Use heat-resistant gloves and clothing when removing the probe. Do not attempt to work on these components until they have cooled to room temperature. Probe components can be as hot as 800°F (427°C). This can cause severe burns.

Disconnect and lock out power before working on any electrical components. There is voltage of up to 115 VAC.

CAUTION

Do not remove the cell unless certain it needs to be replaced. Removal may damage the cell and platinum pad. Go through the complete troubleshooting procedure to make sure the cell needs to be replaced before removing it.

- a. Follow the instructions in paragraph 4-3a to remove the Oxymitter DR from the stack or duct.
- b. If the probe uses the standard diffusion element, use a spanner wrench to remove the diffusion element.

NOTE

To determine if the diffusion element needs to be replaced, refer to paragraph 4-2.

- c. If equipped with the optional ceramic diffusion assembly, remove and discard the setscrews and remove the vee deflector (Figure 4-6). Use spanner wrenches from the probe disassembly kit (Table 7-1), to turn the hub free from the retainer. Inspect the diffusion element. If damaged, replace the element.
- d. Loosen the four socket head cap screws from the cell and flange assembly and remove the assembly and the corrugated seal. The cell flange has a notch that may be used to gently pry the flange away from the probe. Note that the contact pad inside of the probe will sometimes fuse to the oxygen sensing cell. If the cell is fused to the contact pad, push the cell assembly back into the probe (against spring pressure) and quickly twist the cell assembly. The cell and contact pad should separate. **If the contact pad stays fused to the cell**, a new contact/thermocouple assembly must be installed. Disconnect the cell and the thermocouple wires at the probe electronics and withdraw the cell with the wires still attached.
- e. Remove the right housing cover (11, Figure 4-1).
- f. Unplug the heater and the oxygen and thermocouple connectors, Figure 4-3.
- g. Remove the four screws (7, Figure 4-1) from the probe finned housing. Separate the probe and termination housing.
- h. If the contact assembly is damaged, replace the strut or the contact pad. Instructions for replacing the contact pad are in the cell replacement kit.
- i. Remove and discard the corrugated seal. Clean the mating faces of the probe tube and retainer. Remove burrs and raised surfaces with a block of wood and crocus

cloth. Clean the threads on the retainer and hub.

- j. Rub a small amount of anti-seize compound on both sides of the new corrugated seal.
- k. Assemble the cell and flange assembly, corrugated seal, and probe tube. Make sure the calibration tube lines up with the calibration gas passage in each component. Apply a small amount of anti-seize compound to the screw threads and use the screws to secure assembly. Torque to 35 in-lbs (4 N·m).
- l. Install the termination housing per the instructions in paragraph 4-5 steps e through j.
- m. Apply anti-seize compound to the threads of the cell assembly, hub, and setscrews. Reinstall the hub on the cell assembly. Using pin spanner wrenches, torque to 10 ft-lbs (14 N·m). If applicable, reinstall the vee deflector, orienting apex toward gas flow. Secure with the setscrews and anti-seize compound. Torque to 25 in-lbs (2.8 N·m).
- n. On systems equipped with an abrasive shield, install the dust seal gaskets, with joints 180° apart.
- o. Reinstall the probe and gasket on the stack flange.
- p. Follow the instructions in paragraph 4-3b to install the Oxymitter DR 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.
- q. Turn on power and monitor thermocouple output. It should stabilize at 29.3+0.2 mV. Set reference air flow at 2 scfh (56.6 l/hr). After the Oxymitter DR stabilizes, calibrate the unit. If new components have been installed, repeat calibration after 24 hours of operation.

4-8 CERAMIC DIFFUSION ELEMENT REPLACEMENT

NOTE

This refers to the ceramic diffusion element only.

a. General

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

Damage to the ceramic 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.

Hex wrenches needed to remove setscrews and socket head screws in the following procedure are available as part of a Probe Disassembly Kit, Table 7-1.

b. Replacement Procedure

1. Follow the instructions in paragraph 4-3a to remove the Oxymitter DR from the stack or duct.
2. Loosen setscrews, Figure 4-6, using hex wrench from Probe Disassembly Kit, Table 7-1, and remove vee deflector. Inspect setscrews. If damaged, replace with stainless setscrews coated with anti-seize compound.
3. On systems equipped with abrasive shield, remove dual dust seal gaskets.
4. Use spanner wrenches from Probe Disassembly Kit, Table 7-1, to turn hub free from retainer.

5. Put hub in vise. Break out old ceramic diffusion element with chisel along cement line. Use a 3/8 in. (9.5 mm) pin punch and clean fillet from the 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 Table 7-1. This consists of a diffusion element, cement, setscrews, anti-seize compound, and instructions.
8. Test fit replacement ceramic diffusion element to be sure seat is clean.

CAUTION

Do not get cement on ceramic diffusion element except where it touches the hub. Any cement on ceramic diffusion element blocks airflow through element. Wiping wet cement off of ceramic only forces cement into pores. Also, do not get any cement onto the flame arrestor element.

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. Do not get any cement on upper part of ceramic diffusion element. Ensure complete penetration of cement around 3 grooves in hub. Cement should extrude from opposite hole. Wipe excess material back into holes and wipe top fillet of cement to form a uniform fillet. (A cotton swab is useful for this.) Clean any excess cement from hub with water.

10. Allow filter to dry at room temperature overnight or 1 to 2 hours at 200°F (93°C).
11. Wipe a heavy layer of anti-seize compound onto the threads and mating surfaces of the flame arrestor, diffusion hub, and probe tube.
12. Assemble flame arrestor and diffusion hub with two pin spanner wrenches. Torque to 10 ft-lbs (14 N·m). Secure with hub retaining setscrew.
13. On systems equipped with abrasive shield, install dust seal gaskets with joints 180° apart.
14. Reinstall vee deflector, orienting apex toward gas flow. Apply anti-seize compound to setscrews and tighten with hex wrench.
15. Reinstall probe on stack flange.

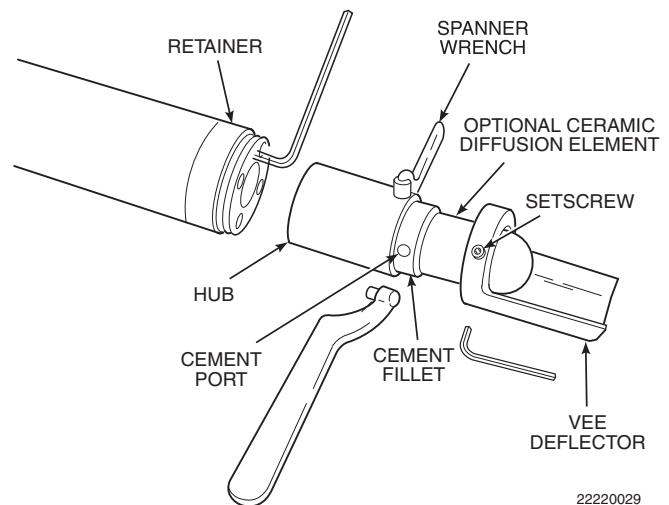


Figure 4-6. Ceramic Diffusion Element Replacement

4-9 TERMINATION HOUSING WIRING

During normal maintenance involving removal of the heater strut assembly, it is necessary to remove the right side cover from the termination housing. This side of the housing contains two connectors for hookup of wiring from the heater strut assembly to the termination housing. The mating plugs do not need to be disconnected from the housing unless the wiring, connectors, or mating components are damaged. Refer to Figure 4-7.

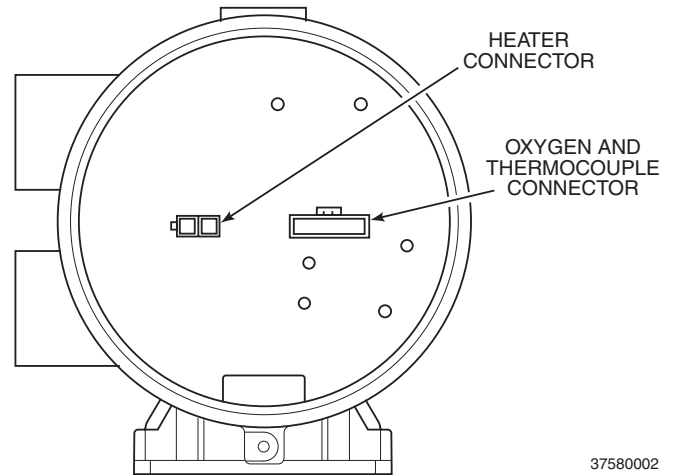


Figure 4-7. Termination Housing Connections

Calibration Record
For
Rosemount Analytical In Situ O₂ Probe

Probe Serial Number: _____

Probe Tag Number: _____

Probe Location: _____

Date Placed Into Service: _____

Date	Slope	Constant	Impedance	Response _{initial}	Response _{final}

Notes: Response_{initial} When the second calibration gas is turned off, note the number of seconds required for the O₂ value to begin migrating back to the process value.

Response_{final} When the second calibration gas is turned off, note the number of seconds required for the O₂ value to settle out at the process value.

SECTION 5 TROUBLESHOOTING

WARNING

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

5-1 OVERVIEW

Troubleshooting for the oxygen analyzer system is broken down to the main component level. In addition to the information in this section, instruction bulletins for individual models also discuss troubleshooting.

For Models 218, 225, and 132 (analog), refer to IB-106-101.

For Model 218A, refer to IB-106-101A.

For Model TC200, refer to IB-107-020.

For Model 132 (digital), refer to IB-106-106A.

For Yokogawa (YEW) ZA8C Converter, refer to original converter documentation.

5-2 PROBE TROUBLESHOOTING

a. Probe Faults

Listed below are the five symptoms of probe failure.

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

b. Symptoms

Table 5-1 provides a guide to fault finding for the above symptoms.

Table 5-1. Fault Finding

Symptom	Check	Fault	Remedy
1. No response to oxygen concentration change when: Heater is cold and TC mV output is less than setpoint	Thermocouple continuity Heater cold resistance should be 67 ohm to 77 ohm Triac O/P to heater	Thermocouple failure Heater failure Failure of electronics	Replace thermocouple or return probe to Rosemount. Replace heater or return probe to Rosemount. Check electronics package.

Table 5-1. Fault Finding (Continued)

Symptom	Check	Fault	Remedy
Heater is hot and T/C mV output is at setpoint ± 0.2 mV	Recorder chart Cell mV input to electronics and cell mV at probe head	Recorder failure No cell mV at probe when test gas applied Probe cell mV OK but no input to electronics Cell mV satisfactory both at junction box and input to electronics - failure of electronics	See Recorder Instruction Manual. Replace cell or return probe to Rosemount. Check out cable connection. Check electronics package.
2. System responds to oxygen concentration changes <u>but</u> does not give correct indication Good response, with incorrect indication	Recorder or remote indicator System calibration Probe mounting and condition of duct Cell mV input to electronics	Calibration error Calibration error Air ingress into duct Failure of electronics	Recalibrate recorder or indicator. Reference Recorder Instruction Manual. Recalibrate system. Replace cell if necessary. Stop air leaks or resite probe. Check electronics package.
3. Probe does not give accurate indication of applied test gas	Test gas input port Ceramic diffusion element broken	Blocked port Diffusion element cracked, broken, or missing	Clean port. If the flue gas is condensing in the test gas line, insulate the back of the probe. Make sure that the test gas line is capped between calibrations, or a check valve is installed. Replace diffusion element.
4. Probe takes a long time to return to flue gas value after calibration gas is turned off	Plugged diffusion element	Plugged diffusion element	Change diffusion element or snubber diffusion element.
5. Probe heater temperature unstable	Proper voltage heater is installed	Wrong heater	Change heater to proper voltage.

Table 5-1. Fault Finding (Continued)

Symptom	Check	Fault	Remedy
6. Probe passes calibration, but appears to read high.	Check for loose or missing calibration gas fitting. Check calibration gas hoses or tubing for leaks. Check cell flange corrugated seal for leaks. If equipped with an abrasive shield, check flange mounting gasket.	Leak in calibration gas lines.	Repair leak or replace cap. Repair leaks in hose or tubing. Replace seal. Replace gasket.
7. Probe passes calibration, but appears to read low.	Flow calibration gas to the probe until reading stabilizes. Shut off calibration gas and note the time required to return to process gas values. Time should be <20 sec. (<40 sec. for hazardous area probes).	Diffusion element plugged from high process particulate may cause a calibration shift.	Replace plugged diffusion element.

SECTION 6 RETURN OF MATERIAL

6-1 EQUIPMENT RETURN

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

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

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

- b. Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to ensure that no additional damage will occur during shipping.
- c. In a cover letter, describe completely:
 1. The symptoms from which it was determined that the equipment is faulty.
 2. The environment in which the equipment has been operating (housing, weather, vibration, dust, etc.).
 3. Site from which equipment was removed.
 4. Whether warranty or nonwarranty service is requested.

5. Complete shipping instructions for return of equipment.

6. Reference the return authorization number.

- d. Enclose a cover letter and purchase order and ship the defective equipment according to instructions provided in Rosemount Return Authorization, prepaid, to:

Rosemount Analytical Inc.
RMR Department
1201 N. Main Street
Orrville, Ohio 44667

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

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

SECTION 7 REPLACEMENT PARTS

Table 7-1. Replacement Parts for Probe

Figure and Index No.	Part Number		Description
	No Dust Seal	Dust Seal	
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G01	3D39649G01	18" ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G02	3D39649G02	3' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G03	3D39649G03	6' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G04	3D39649G04	9' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G05	3D39649G05	12' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G53	15' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G54	18' ANSI Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G06	3D39649G06	18" JIS Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G07	3D39649G07	3' JIS Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G08	3D39649G08	6' JIS Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G09	3D39649G09	9' JIS Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G10	3D39649G10	12' JIS Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G11	3D39649G11	18" DIN Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G12	3D39649G12	3' DIN Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G13	3D39649G13	6' DIN Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G14	3D39649G14	9' DIN Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G15	3D39649G15	12' DIN Probe with Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G17	3D39649G17	18" ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G18	3D39649G18	3' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G19	3D39649G19	6' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G20	3D39649G20	9' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G21	3D39649G21	12' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G55	15' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G56	18' ANSI Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G22	3D39649G22	18" JIS Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G23	3D39649G23	3' JIS Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G24	3D39649G24	6' JIS Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G25	3D39649G25	9' JIS Probe with Flame Arrestor and Ceramic Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G26	3D39649G26	12' JIS Probe with Flame Arrestor and Ceramic Diffuser

Table 7-1. Replacement Parts for Probe (Continued)

Figure and Index No.	Part Number		Description
	No Dust Seal	Dust Seal	
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G27	3D39649G27	18" DIN Probe with Flame Arrestor and Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G28	3D39649G28	3' DIN Probe with Flame Arrestor and Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G29	3D39649G29	6' DIN Probe with Flame Arrestor and Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G30	3D39649G30	9' DIN Probe with Flame Arrestor and Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G31	3D39649G31	12' DIN Probe with Flame Arrestor and Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G33	3D39649G33	18" ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G34	3D39649G34	3' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G35	3D39649G35	6' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G36	3D39649G36	9' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G37	3D39649G37	12' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G49	15' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	—	3D39649G50	18' ANSI Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G38	3D39649G38	18" JIS Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G39	3D39649G39	3' JIS Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G40	3D39649G40	6' JIS Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G41	3D39649G41	9' JIS Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G42	3D39649G42	12' JIS Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G43	3D39649G43	18" DIN Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G44	3D39649G44	3' DIN Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G45	3D39649G45	6' DIN Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G46	3D39649G46	9' DIN Probe with Snubber Diffuser
4-1, 1 thru 6, 8, 9, 21 thru 24	3D39648G47	3D39649G47	12' DIN Probe with Snubber Diffuser
4-1, 6	3D39644G01		18" ANSI Probe Tube Assy.
4-1, 6	3D39644G02		3' ANSI Probe Tube Assy.
4-1, 6	3D39644G03		6' ANSI Probe Tube Assy.
4-1, 6	3D39644G04		9' ANSI Probe Tube Assy.
4-1, 6	3D39644G05		12' ANSI Probe Tube Assy.
4-1, 6	3D39644G17		15' ANSI Probe Tube Assy.
4-1, 6	3D39644G18		18' ANSI Probe Tube Assy.
4-1, 6	3D39644G06		18" JIS Probe Tube Assy.
4-1, 6	3D39644G07		3' JIS Probe Tube Assy.
4-1, 6	3D39644G08		6' JIS Probe Tube Assy.
4-1, 6	3D39644G09		9' JIS Probe Tube Assy.
4-1, 6	3D39644G10		12' JIS Probe Tube Assy.
4-1, 6	3D39644G11		18" DIN Probe Tube Assy.
4-1, 6	3D39644G12		3' DIN Probe Tube Assy.
4-1, 6	3D39644G13		6' DIN Probe Tube Assy.
4-1, 6	3D39644G14		9' DIN Probe Tube Assy.
4-1, 6	3D39644G15		12' DIN Probe Tube Assy.

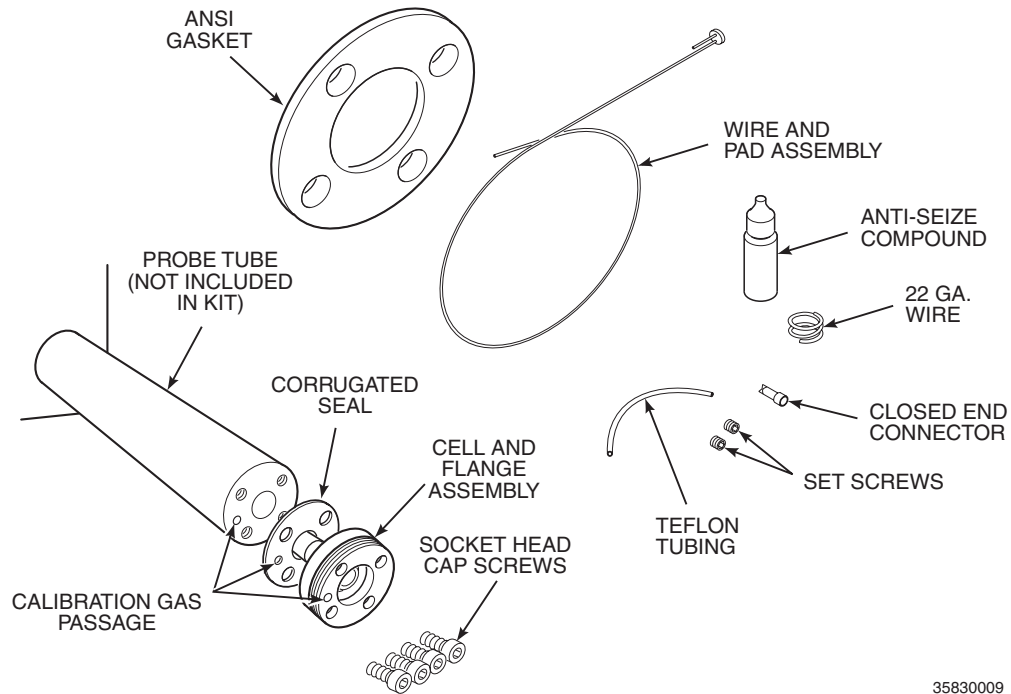


Figure 7-1. Cell Replacement Kit

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Table 7-1. Replacement Parts for Probe (Continued)

Figure and Index No.	Part Number	Description
4-1, 1	3D39645G01	18" Heater Strut Assy.
4-1, 1	3D39645G02	3' Heater Strut Assy.
4-1, 1	3D39645G03	6' Heater Strut Assy.
4-1, 1	3D39645G04	9' Heater Strut Assy.
4-1, 1	3D39645G05	12' Heater Strut Assy.
4-1, 1	3D39645G07	15' Heater Strut Assy.
4-1, 1	3D39645G08	18' Heater Strut Assy.
7-1	4847B61G02	ANSI 18" Cell Replacement Kit*
7-1	4847B61G03	ANSI 3' Cell Replacement Kit*
7-1	4847B61G04	ANSI 6' Cell Replacement Kit*
7-1	4847B61G05	ANSI 9' Cell Replacement Kit*
7-1	4847B61G06	ANSI 12' Cell Replacement Kit*
7-1	4847B61G27	ANSI 15' Cell Replacement Kit*
7-1	4847B61G28	ANSI 18' Cell Replacement Kit*
7-1	4847B61G08	JIS 18" Cell Replacement Kit*
7-1	4847B61G09	JIS 3' Cell Replacement Kit*
7-1	4847B61G10	JIS 6' Cell Replacement Kit*
7-1	4847B61G11	JIS 9' Cell Replacement Kit*
7-1	4847B61G12	JIS 12' Cell Replacement Kit*
7-1	4847B61G14	DIN 18" Cell Replacement Kit*
7-1	4847B61G15	DIN 3' Cell Replacement Kit*
7-1	4847B61G16	DIN 6' Cell Replacement Kit*
7-1	4847B61G17	DIN 9' Cell Replacement Kit*
7-1	4847B61G18	DIN 12' Cell Replacement Kit*

*Includes pad and wire.

Table 7-1. Replacement Parts for Probe (Continued)

Figure and Index No.	Part Number	Description
7-1	4849B94G01 4849B94G02	ANSI High Sulfur/HCl Resistant Cell Only ANSI 18" Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G03	ANSI 3' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G04	ANSI 6' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G05	ANSI 9' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G06	ANSI 12' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G19	ANSI 15' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G20	ANSI 18' Cell Replacement Kit, High Sulfur/HCl Resistant*
	4849B94G07	JIS High Sulfur/HCl Resistant Cell Only
7-1	4849B94G08	JIS 18" Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G09	JIS 3' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G10	JIS 6' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G11	JIS 9' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G12	JIS 12' Cell Replacement Kit, High Sulfur/HCl Resistant*
	4849B94G13	DIN High Sulfur/HCl Resistant Cell Only
7-1	4849B94G14	DIN 18" Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G15	DIN 3' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G16	DIN 6' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G17	DIN 9' Cell Replacement Kit, High Sulfur/HCl Resistant*
7-1	4849B94G18	DIN 12' Cell Replacement Kit, High Sulfur/HCl Resistant*
1-3	3D39003G03	JIS 3' Abrasive Shield Assy.
1-3	3D39003G04	JIS 6' Abrasive Shield Assy.
1-3	3D39003G05	DIN 3' Abrasive Shield Assy.
1-3	3D39003G06	DIN 6' Abrasive Shield Assy.
1-3	3D39003G07	ANSI 9' Abrasive Shield Assy.
1-3	3D39003G08	ANSI 12' Abrasive Shield Assy.
1-3	3D39003G09	JIS 9' Abrasive Shield Assy.
1-3	3D39003G10	JIS 12' Abrasive Shield Assy.
1-3	3D39003G11	DIN 9' Abrasive Shield Assy.
1-3	3D39003G12	DIN 12' Abrasive Shield Assy.
1-3	3D39003G13	ANSI 18" Abrasive Shield Assy.
1-3	3D39003G14	JIS 18" Abrasive Shield Assy.
1-3	3D39003G15	DIN 18" Abrasive Shield Assy.
1-3	3D39003G25	ANSI 15' Abrasive Shield Assy.
1-3	3D39003G28	ANSI 18' Abrasive Shield Assy.

*Includes pad and wire.

Table 7-1. Replacement Parts for Probe (Continued)

Figure and Index No.	Part Number	Description
	4513C61G03	18" Contact and Thermocouple Replacement Assy.
	4513C61G04	3' Contact and Thermocouple Replacement Assy.
	4513C61G05	6' Contact and Thermocouple Replacement Assy.
	4513C61G06	9' Contact and Thermocouple Replacement Assy.
	4513C61G07	12' Contact and Thermocouple Replacement Assy.
	4513C61G08	15' Contact and Thermocouple Replacement Assy.
	4513C61G09	18' Contact and Thermocouple Replacement Assy.
2-1	3534B18G01	Ceramic Diffuser Hub Assy.
2-1	3534B48G01	Vee Deflector Assy.
7-2	3535B42G02	Probe Disassembly Kit
1-4 and 2-1	3535B60G01	Ceramic Diffuser with Dust Seal
1-5 and 2-1	3535B63G01	Flame Arrest Ceramic Diffuser with Dust Seal
4-1, 2	4843B37G01	Snubber Diffusion Assy.
1-8 and 2-1	4843B38G02	Snubber Diffuser with Dust Seal
1-10	4851B89G04	Cup Type Diffusion Assembly, 5 microns
1-10	4851B89G05	Cup Type Diffusion Assembly, 40 microns
1-9	4851B90G04	Cup Type Diffusion Assembly/Dust Seal, 5 microns
1-9	4851B90G05	Cup Type Diffusion Assembly/Dust Seal, 40 microns

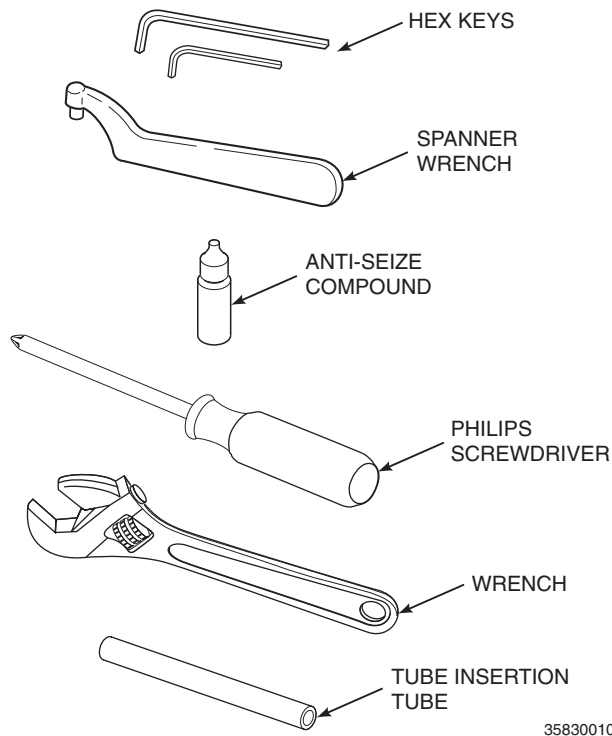


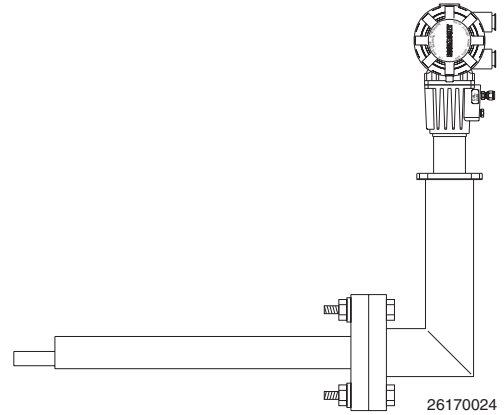
Figure 7-2. Probe Disassembly Kit

SECTION 8 OPTIONAL ACCESSORIES

BY-PASS PACKAGES

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

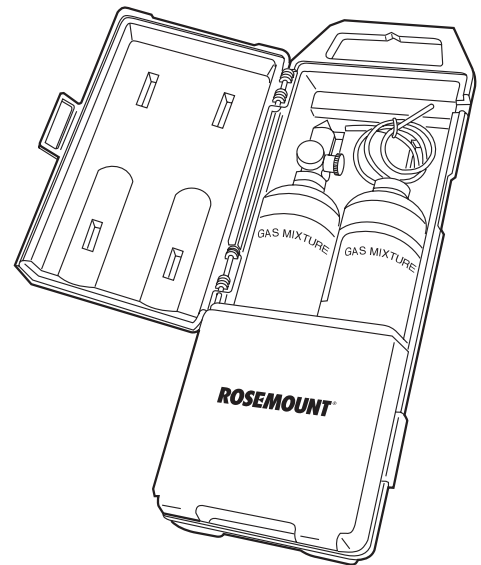
For more information, call Rosemount Analytical at 1-800-433-6076.



O₂ CALIBRATION GAS SEQUENCER

Rosemount Analytical's O₂ Calibration Gas and Service Kits have been carefully designed to provide a more convenient and fully portable means of testing, calibrating, and servicing Rosemount Analytical's oxygen analyzers. These lightweight, disposable gas cylinders eliminate the need to rent gas bottles.

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



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SECTION 9
APPENDICES

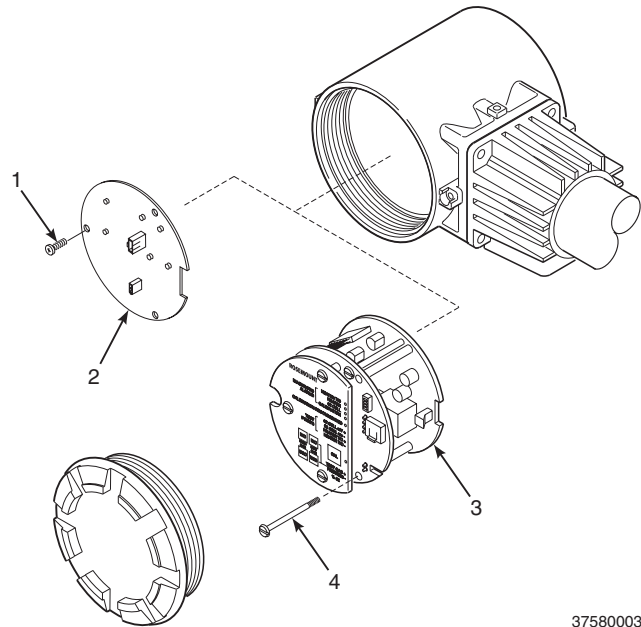
APPENDIX A. UPGRADING OXYMITTER DR TO FULL OXYMITTER

APPENDIX A UPGRADING OXYMITTER DR TO FULL OXYMITTER

A-1 UPGRADE PROCEDURE

Perform the following procedure to upgrade the Oxymitter DR to a full Oxymitter.

- a. Remove power from the Oxymitter DR.
- b. Remove the left and right covers from the Oxymitter termination housing.
- c. Remove and discard the screws and OXT adaptor board (1 and 2, Figure A-1) located in the right side of the termination housing.
- d. Place the new Oxymitter electronic assembly (3) near the right side of the termination housing.
- e. Plug the white connector with the two black wires into the white socket on the bottom power supply card.
- f. Insert the electronics assembly into the termination housing. Ensure the black 4-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.
- g. Plug the black 4-wire connector into the black socket on the microprocessor card.
- h. Tighten three screws (4) securing the electronics assembly into the termination housing.



1. Screw
2. OXT adaptor board
3. Electronic assembly
4. Screw

37580003

Figure A-1. Component Replacement

- i. In the left side of the termination housing, place the new termination designation labels over the labels on the existing terminal block. After placing the new labels, the terminal block should appear as shown in Figure A-2.
- j. The existing wiring from the Oxymitter to the electronics may be reused. However, the wires will be carrying new signals as noted by the new labels. The 4-20 mA wires must be removed from the old electronics and re-terminated to the wires carrying the 4-20 mA O₂ signal to the control room.
- k. The wires carrying the heater power must be converted to carry AC power (90-250 VAC, 50/60 Hz) for the Oxymitter. The re-terminations may be inside the old electronics housing, which will function as a simple junction box. Alternatively, the old electronics may be removed and replaced with a smaller junction box.
- l. Place the round error blink code and calibration instructions label on the inside of the right housing cover.

- m. Install both housing covers.
- n. Refer to the instruction bulletin provided with your upgrade kit, IB-106-340, for start-up and diagnostic information.

A-2 NOTES

- a. The HART electronics offers the following additional features:
 1. HART communications
 2. Automatic calibration (requires SPS or IMPS autocal gas sequencers)
 3. Calibration recommended diagnostic
- b. The new ambient temperature specification for the Oxymitter electronics is 185°F (85°C). This temperature can be read via HART communications.
- c. Upgrading to Fieldbus electronics requires the changeout of the entire blue electronics housing with the Fieldbus version, P/N 4850B10G11. Instruction Bulletin IB-106-350 is also required.

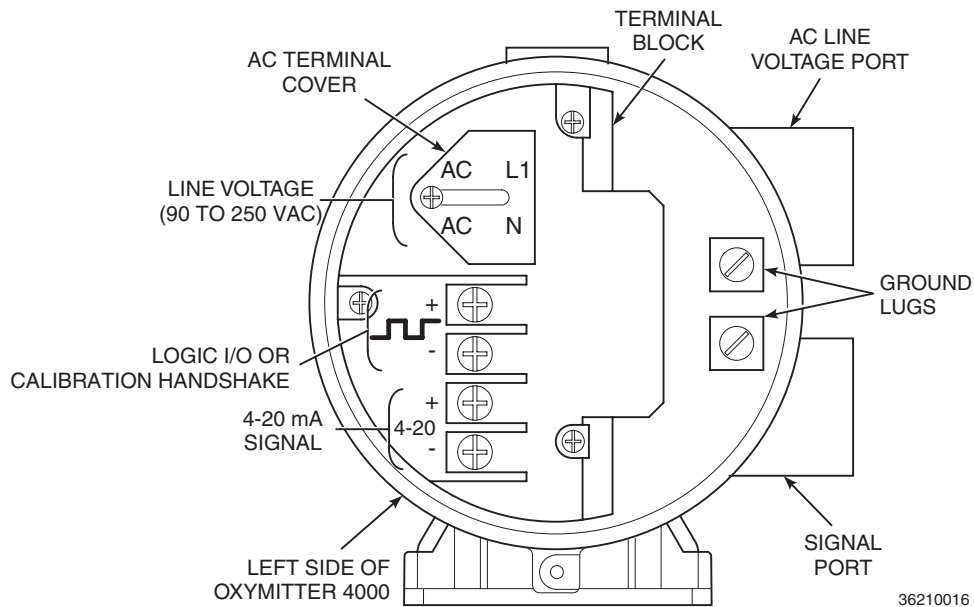


Figure A-2. Terminal Block and Wiring

SECTION 10 INDEX

This index is an alphabetized listing of parts, terms, and procedures having to do with the Oxymitter DR In-Situ Oxygen Probe. Every item listed in this index refers to a location in the manual by one or more page numbers.

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WARRANTY

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

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

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

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

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

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

Oxymitter DR
Part no. _____
Serial no. _____
Order no. _____

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