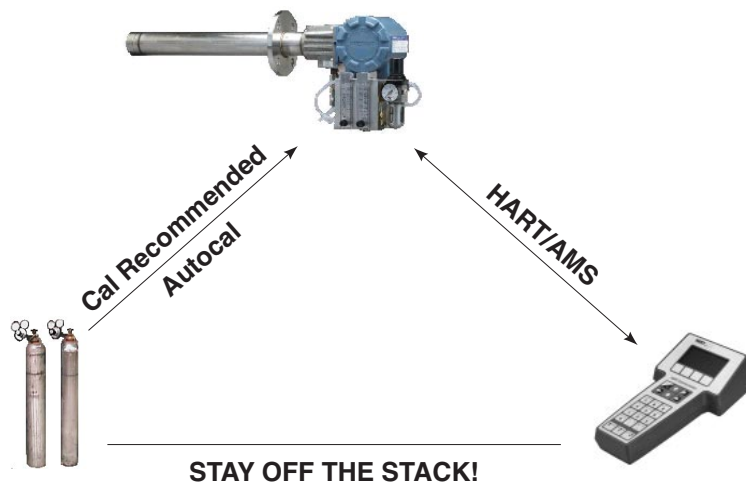


SPS 4000 SINGLE PROBE AUTOCALIBRATION SEQUENCER

Instruction Bulletin IB-106-340AC

Revision 1.0

SPS 4000	
Part no.	_____
Serial no.	_____
Order no.	_____



ROSEMOUNT[®] ANALYTICAL

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HIGHLIGHTS OF CHANGES

Effective Feb., 1999 Rev. 1.0

PAGE	SUMMARY
Page 1-0	Added the Oxymitter 5000 to the product matrix in Table 1-1. Removed the disposable gas bottles and flow regulators from the product matrix in Table 1-1 and created Table 1-2 to distinguish these components as separate order items because the calibration gas bottles cannot be shipped via airfreight.
Page 1-1	Added note concerning the Oxymitter 5000.
Page 1-3	Updated the table number.
Page 6-1	Added Table 6-2 to list the calibration gas bottles and flow regulators as replacement parts.

ROSEMOUNT 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.

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 -aarding terug geplaatst worden. Ten alle tijde moet de betrouwbaarheid van de aarding behouden blijven.
3. Voedingskabels moeten onderworpen zijn aan de IEC227 of de IEC245 voorschriften.
4. Alle bekabeling moet geschikt zijn voor het gebruik in omgevingstemperaturen, hoger dan 75°C.
5. Alle wartels moeten zo gedimensioneerd zijn dat een degelijke kabel bevestiging verzekerd is.
6. Om de veilige werking van dit toestel te verzekeren, moet de voeding door een stroomonderbreker gevoerd worden (min 10A) welke alle draden van de voeding moet onderbreken. De stroomonderbreker mag een mechanische schakelaar bevatten. Zoniet moet een andere mogelijkheid bestaan om de voedingsspanning van het toestel te halen en ook duidelijk zo zijn aangegeven. Stroomonderbrekers of schakelaars moeten onderworpen zijn aan een erkende standaard zoals IEC947.
7. Waar toestellen of deksels aangegeven staan met het symbool is er meestal hoogspanning aanwezig. Deze deksels mogen enkel verwijderd worden nadat de voedingsspanning werd afgelegd en enkel door getraind onderhoudspersoneel.
8. Waar toestellen of deksels aangegeven staan met het symbool is er gevaar voor hete oppervlakken. Deze deksels mogen enkel verwijderd worden door getraind onderhoudspersoneel nadat de voedingsspanning verwijderd werd. Sommige oppervlakken kunnen 45 minuten later nog steeds heet aanvoelen.
9. Waar toestellen of deksels aangegeven staan met het symbool gelieve het handboek te raadplegen.
10. Alle grafische symbolen gebruikt in dit produkt, zijn afkomstig uit een of meer van devolgende standaards: EN61010-1, IEC417 en ISO3864.

VIGTIGT

Sikkerhedsinstruktion for tilslutning og installation 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 kabelforskrutninger 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 matalajännittdirektiivin (Low Voltage Directive) yhteensopivuus. Myös EU:hun kuulumattomien valtioiden tulee noudattaa tätä ohjetta, elleivät kansalliset standardit estä sitä.

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

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. Nichtmitgliedsstaaten der europäischen Gemeinschaft sollten die national gültigen Normen und Richtlinien einhalten.

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

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 anerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av 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 frångörare. Om så inte är fallet, måste ett annat förfarande för att frångöra utrustningen från strömförsörjning tillhandahållas och klart framgå genom markering. Säkring eller omkopplare måste 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 εκσφαλμάτωση 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 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 παροχηθούν και σαφώς να σημειθούν σαν τέτοια. Οι ασφαλειοδιακόπτες ή διακόπτες πρέπει να συμφωνούν με αναγνωρισμένα πρότυπα όπως το IEC947.
7. Οπου 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. Οπου 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. Οπου 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.

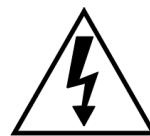


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Table 1-1. Product Matrix.

SPS 4000 B	Autocalibration System for Oxymitter 4000 or Oxymitter 5000. Mounted separate from the probe.				
	SPS 4000 Autocalibration System - Instruction Bulletin				
Code	Oxygen Analyzer System				
20	Used with Oxymitter 4000 or Oxymitter 5000 system (remote mounted only)				
Code	Reference Air				
1	No reference air required ⁽¹⁾				
2	Reference air provided				
Code	Fittings and Tubing⁽²⁾				
1	Brass Fittings, Teflon Tubing				
2	Stainless Steel Fittings and Tubing				
Code	Electrical Classification				
10	NEMA 4X				
20	Hazardous Area Classifications - Cenelec EExd IIB + H2 ⁽³⁾				
30	Hazardous Area Classifications (Class I, Div. I, Group B,C,D) - PENDING ⁽³⁾				
SPS 4000 B	20	1	1	10	Example

Notes:

⁽¹⁾Reference air is recommended with 9 ft (2.74 m) and 12 ft (3.66 m) long probes. Reference air is also recommended when ambient air may not contain the normal 20.95% O₂, such as when the probe is mounted into a positive pressure duct with leaks or where there is a process unit nearby with leaks.

⁽²⁾Customer to pipe from remote SPS 4000 to probe.

⁽³⁾Hazardous area classifications require stainless steel fittings and tubing.

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, includes bottle rack*
1A99119G02	Two flow regulators for calibration gas bottles

*Calibration gas bottles cannot be shipped via airfreight.

When the bottles are used with “CALIBRATION RECOMMENDED” features, the bottles should provide 2 to 3 years of calibrations in normal service.

SECTION I. DESCRIPTION

NOTE

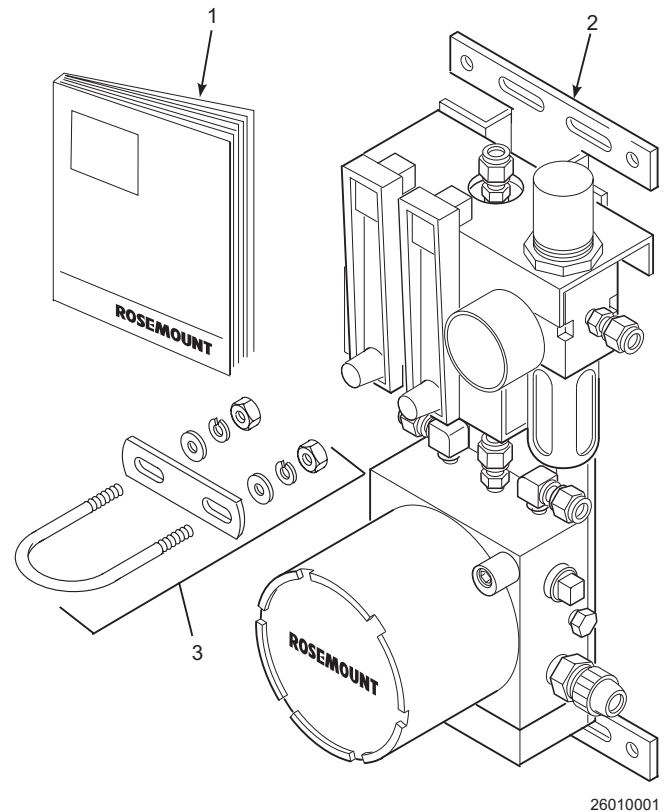
The SPS 4000 Single Probe Autocalibration Sequencer operates exactly the same with either the Oxymitter 4000 Oxygen Transmitter or the Oxymitter 5000 Oxygen Transmitter with FOUNDATION fieldbus Communications. Any references to the Oxymitter 4000 throughout this instruction bulletin also include the Oxymitter 5000. When referred to an instruction bulletin for more information, reference IB-106-340 for the Oxymitter 4000 and IB-106-340-FB for the Oxymitter 5000.

- 1-1. **COMPONENT CHECKLIST.** A typical SPS 4000 Single Probe Autocalibration Sequencer should contain the items shown in Figure 1-1. Record the part number, serial number, and order number for the SPS 4000 on the first page of this manual.

Also, use the product matrix in Table 1-1 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 sequencer. Ensure the features and options specified by your order number are on or included with the unit.

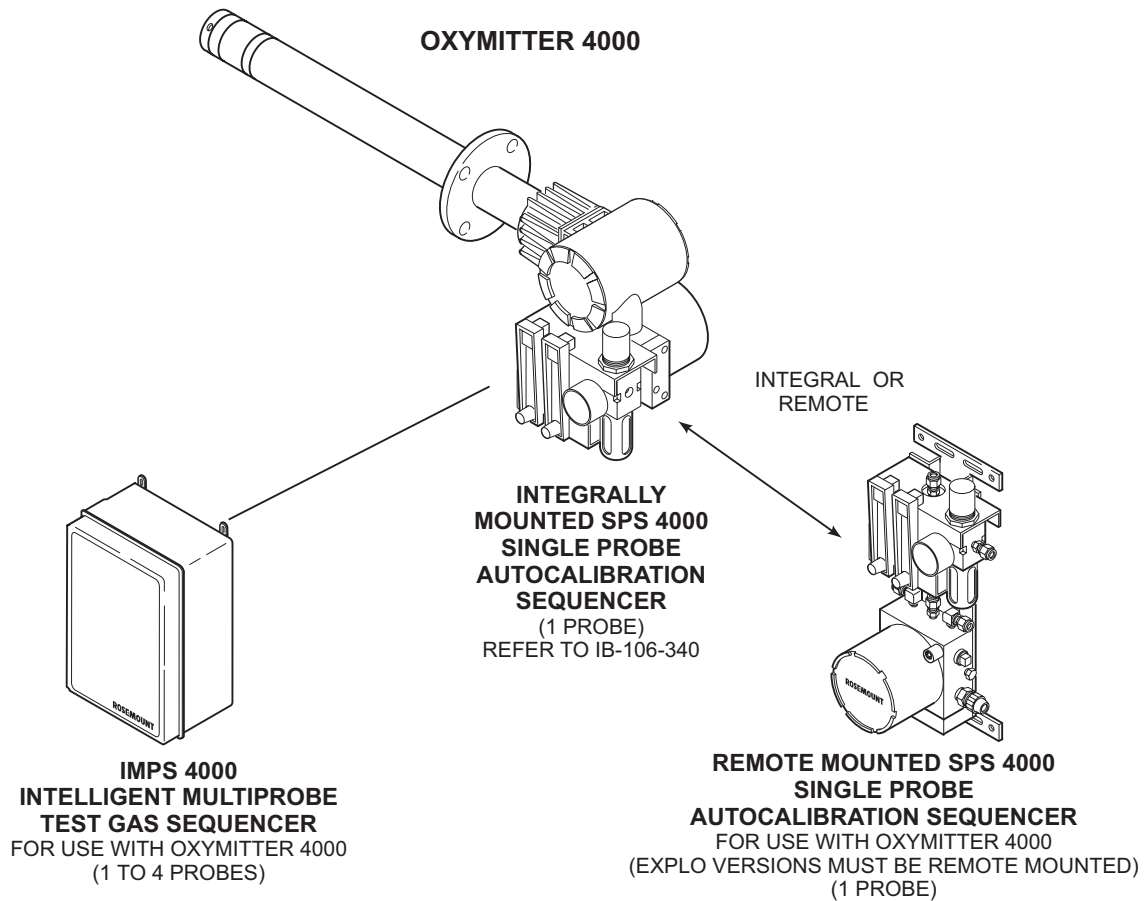
- 1-2. **OVERVIEW.** The SPS 4000 provides the capability of performing automatic, timed or on demand, calibrations of a single Oxymitter 4000 without sending a technician to the probe site.

The SPS 4000 can be mounted either directly to an in situ Oxymitter 4000 or at a remote location if space is limited. See Figure 1-2. However, this instruction bulletin only covers remote mounted sequencers. For information regarding integrally mounted sequencers, refer to the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin. For information on equipping your existing Oxymitter 4000 with an integrally mounted SPS 4000, contact Rosemount.



ITEM	DESCRIPTION
1	Instruction Bulletin
2	SPS 4000 (shown with optional reference air components)
3	Optional Mounting Hardware (for pipe mounting)

Figure 1-1. Typical SPS 4000 Package



26010003


Figure 1-2. Autocalibration System Installation Options

In addition to the SPS 4000, multiprobe sequencers are also available as shown in Figure 1-2. Rosemount has offered multiprobe autocalibration sequencer systems for many years. These autocalibration systems are most cost effective for boilers

and other combustion processes that utilize many probes. Users with only one probe per combustion process can now take advantage of Rosemount's autocalibration capability by utilizing the SPS 4000.

1-3. SPECIFICATIONS.

Table 1-3. SPS 4000 Specifications.

Mounting	Integral to Oxymitter 4000 Remote from Oxymitter 4000
Materials of construction	
Manifold/electronics enclosure.....	Aluminum
Mounting brackets	316 stainless steel (SS)
Pneumatic fittings	1/8 in. brass NPT (SS optional)
Pneumatic tubing	1/4 in. Teflon (SS optional)
Assembly hardware.....	Galvanized and stainless steel
Humidity range	100% relative humidity
Ambient temperature range.....	-40° to 149°F (-40° to 65°C)
Electrical classification.....	NEMA 4X (IP56)
Explosion-proof option (both pending)	CENELEC EExd IIB + H2 (Class 1, Div. 1, Group B,C,D)
Electrical feedthroughs	1/2 in. NPT
Input power.....	90 to 250VAC, 50/60Hz
Power consumption.....	5VA maximum
External electrical noise.....	EN 50 082-2, includes 4KV electrostatic discharge
Handshake signal to/from Oxymitter 4000 (self-powered).....	5V (5mA maximum)
Cal initiate contact input from control room.....	5VDC (self-powered)
Relay outputs to control room.....	5 to 30VDC, Form A (SPST) (one “In-Cal”, one “Cal Failed”)
Cabling distance between SPS 4000 and Oxymitter 4000	Maximum 1000 ft (303 m)
Piping distance between SPS 4000 and Oxymitter 4000	Maximum 300 ft (91 m)
Approximate shipping weight	10 lbs (4.5 kg)
 Fisher-Rosemount has satisfied all obligations coming from the European legislation to harmonize the product requirements in Europe.	

1-4. **PHYSICAL DESCRIPTION.** The main components of the SPS 4000 are described in the following paragraphs and illustrated in Figure 1-3.

- a. **Manifold.** The manifold provides a mounting platform for the circuit board(s) and terminations and contains the electrical feedthroughs. Also, calibration gases are piped into and sequenced through solenoids mounted on the manifold.
- b. **Calibration Gas Solenoids.** The calibration gas solenoids sequence the calibration gases. One solenoid controls calibration gas 1 (high calibration gas), and the other controls calibration gas 2 (low calibration gas). The solenoids activate and deactivate to allow the calibration gases to flow between the sequencer and Oxymitter 4000.
- c. **Pressure Switch.** The pressure switch detects if the pressure of a calibration gas is low, which can be caused by an empty gas bottle, a disconnected gas line, etc. Calibration is prohibited when calibration gas pressure is low.
- d. **Power Supply Board.** This board converts the incoming line voltage from AC to DC for use by the solenoids, terminations, and the programmable logic device. The power supply board also has a 5 A, 250 V, slow blow fuse.

- e. **Interface Board.** The interface board contains a programmable logic device (PLD) that has the electronics to energize and deenergize the solenoids based on a signal from the Oxymitter 4000.
- f. **Calibration Gas Flowmeter.** The calibration gas flowmeter indicates the flow rate of calibration gas flowing to the Oxymitter 4000.
- g. **Reference Air Flowmeter (Optional).** The reference air flowmeter indicates the amount of reference air continuously flowing to the Oxymitter 4000.
- h. **Pressure Regulator (Optional).** The pressure regulator ensures the instrument air (reference air) flowing to the Oxymitter 4000 is at a constant pressure [20 psi (138 kPa)]. The regulator also has a filter to remove particulates in the reference air and a drain valve to bleed the moisture that collects in the filter bowl.
- i. **Terminal Strip.** The terminal strip housed within the terminal cover provides convenient access for all signal and power user connections.

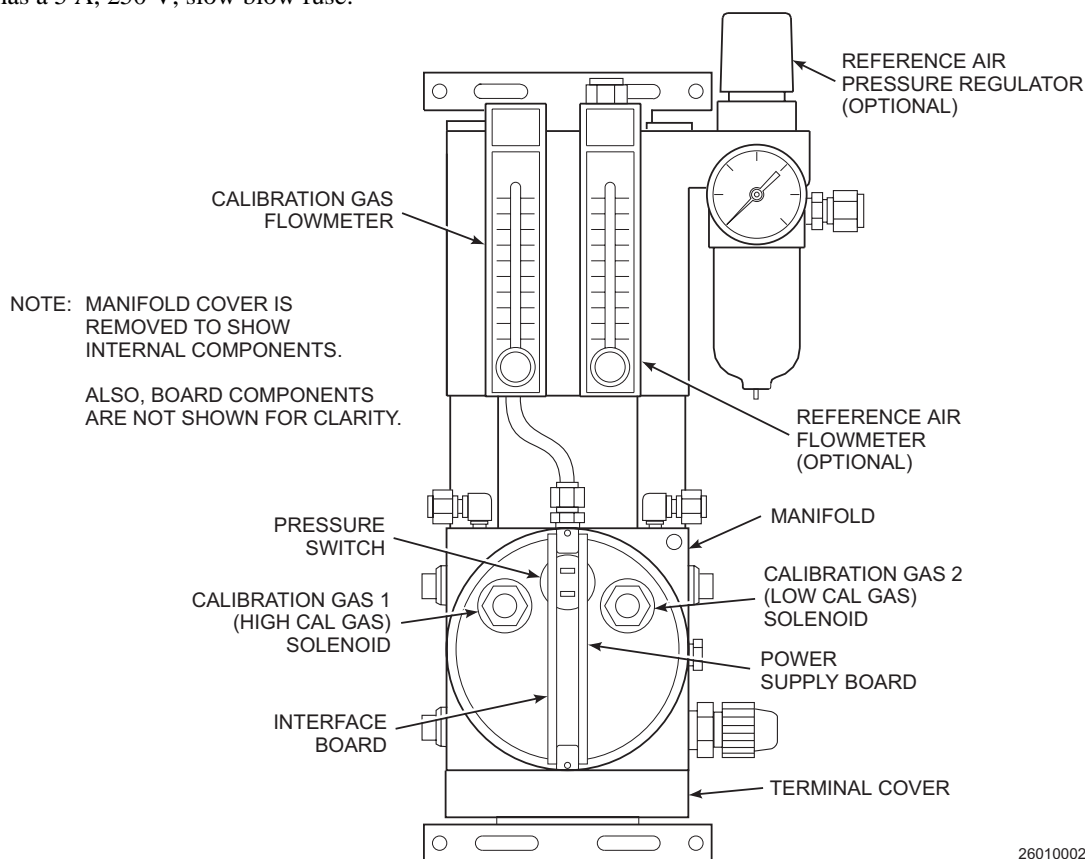


Figure 1-3. SPS 4000 Components

1-5. THEORY OF OPERATION. The Oxymitter 4000 is one of the few instruments found in industry that permit the permanent piping of a calibration standard into the probe. Most instruments measuring pressure, flow, or temperature require that a calibration standard be brought to the instrument or that the instrument be taken to the calibration source in the instrument shop.

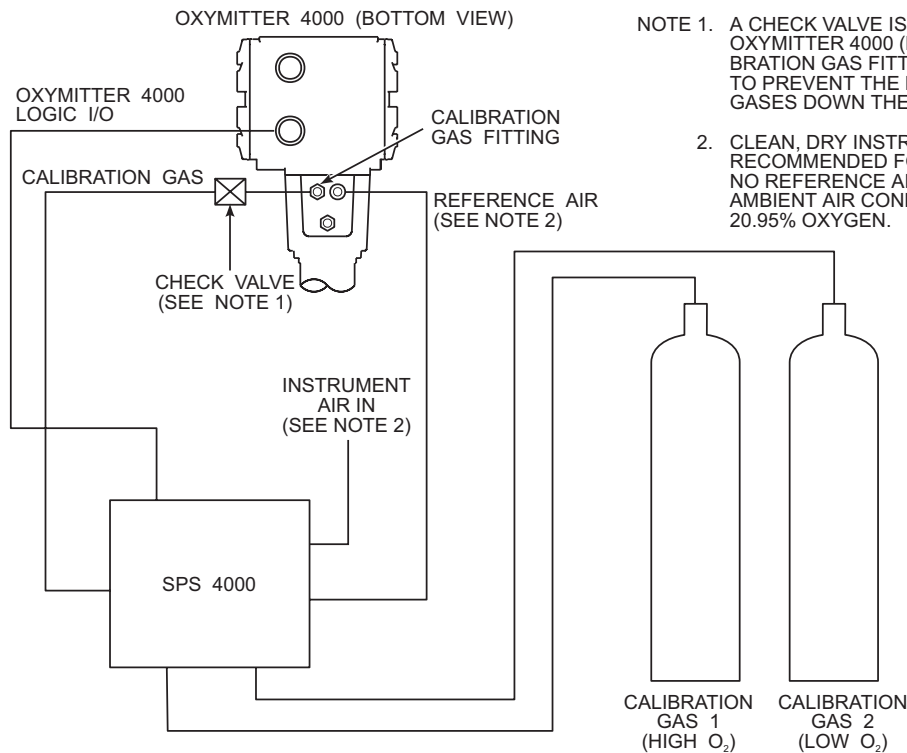
The permanent calibration gas connections allow for autocalibrations to occur without operator intervention. The following paragraphs describe how an Oxymitter 4000 is autocalibrated when used with the SPS 4000.

a. In addition to the calibration methods available via the Oxymitter 4000 keypad, HART communicator, AMS software, or a remote contact, the SPS 4000 works in conjunction with the Oxymitter 4000's CAL RECOMMENDED feature to perform an autocalibration. This feature automatically performs an impedance check every hour on the Oxymitter 4000. If a calibration is recommended and its contact output signal is set for "handshaking" with the sequencer, the Oxymitter 4000 sends a signal to the sequencer. The sequencer automatically performs a calibration upon receiving the signal.

Thus, no human interface is required for the automatic calibration to take place.

b. When a calibration is required, the Oxymitter 4000 sends a signal to the programmable logic device (PLD) on the interface board of the sequencer. The PLD energizes the calibration gas 1 (high O₂) solenoid. Calibration gas 1 then flows through the sequencer to the Oxymitter 4000. The Oxymitter 4000 measures the oxygen content of calibration gas 1 and sends a signal to the sequencer indicating that it received the gas. When the sequencer receives the signal, the PLD deenergizes the calibration gas 1 solenoid.

c. Next, the PLD energizes the calibration gas 2 (low O₂) solenoid, and calibration gas 2 then flows through the sequencer to the Oxymitter 4000. The Oxymitter 4000 measures the oxygen content of calibration gas 2 and sends a signal to the sequencer indicating that it received the gas. After measuring the two calibration gases, the Oxymitter 4000 automatically makes an internal calibration adjustment and sends the signal to the sequencer. When the sequencer receives the signal, the PLD deenergizes the calibration gas 2 solenoid.



26010004

Figure 1-4. SPS 4000 Calibration Setup

SECTION II. INSTALLATION

- 2-1. **OVERVIEW.** This section describes the installation of the SPS 4000.

WARNING

Before starting to install this equipment, read the “Safety Instructions for the Wiring and Installation of this Apparatus” at the front of this Instruction Bulletin. Failure to follow the safety instructions could result in injury or death.

WARNING

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

- 2-2. **MECHANICAL INSTALLATION.** The outline drawing in Figure 2-1 shows mounting centers and clearances of the SPS 4000. The unit is designed to mount on a wall, bulkhead, or pipe. Ensure the unit is installed according to the following specifications.

- a. Install the unit no further than 300 ft (91 m) from the Oxymitter 4000 and no further than 1000 ft (303 m) from the electronics package or any customer-supplied remote input or relay output connections in the control room.
- b. Locate the unit where the ambient temperature is between -40° and 149°F (-40° and 65°C).

- 2-3. **GAS CONNECTIONS.** Use the following procedure to connect the calibration gases and reference air.

- a. **Reference Air (Figure 2-1).**

1. For units with the optional reference air components, connect the instrument air supply to the IN port of the pressure regulator.
2. The pressure regulator is factory set at 20 psi (138 kPa). If necessary, readjust by turning the knob on the top of the regulator until the desired pressure is obtained.
3. Next, connect the reference air from the upper 1/4 in. tube fitting on the reference air flowmeter to the REF GAS port on the Oxymitter 4000.

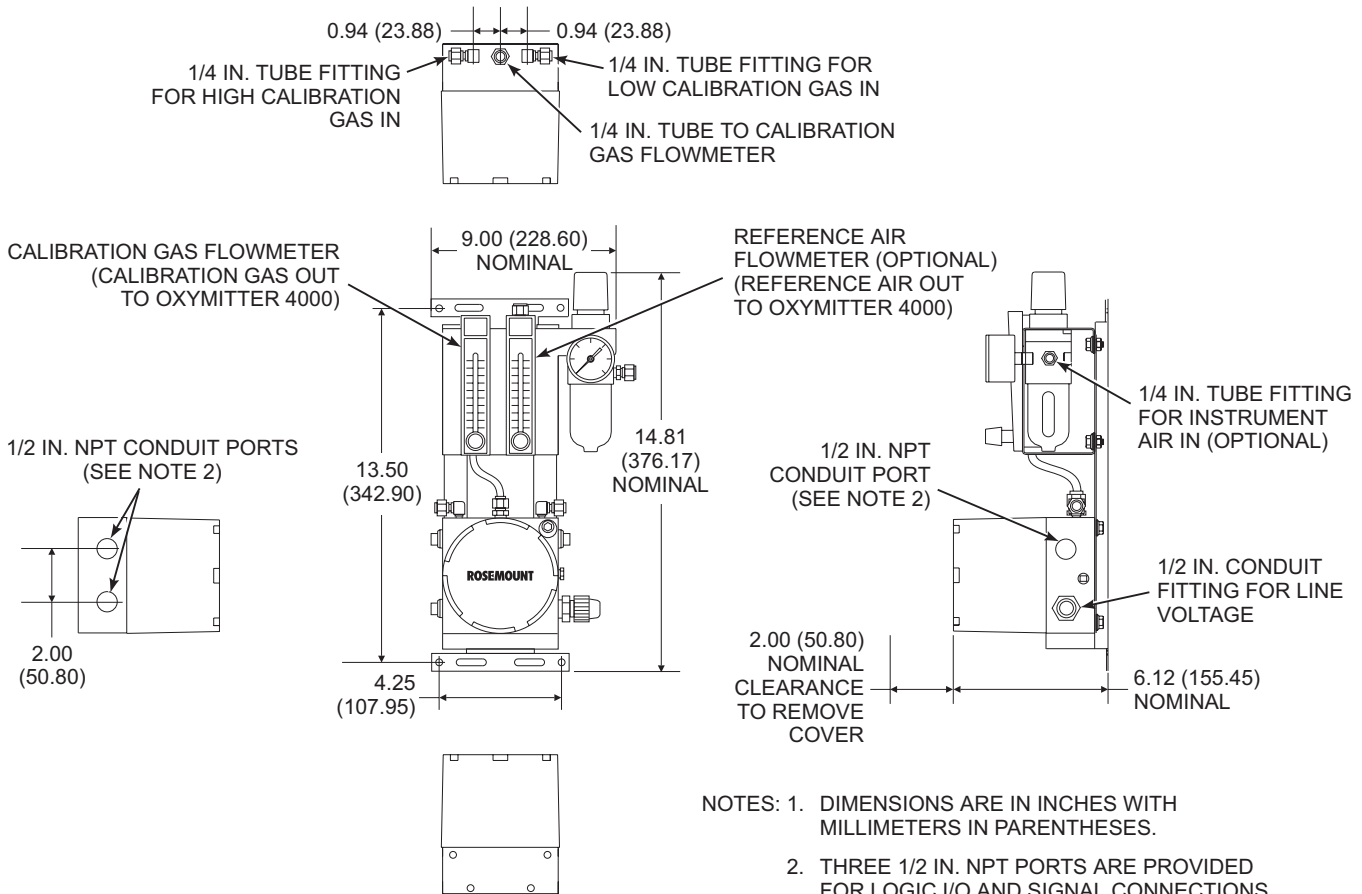
- b. **Calibration Gas (Figure 2-1).**

1. Connect O₂ calibration gas 1 (high calibration gas) to the HIGH CAL GAS IN 1/4 in. tube fitting on the top of the manifold. Ensure the calibration gas pressure is set at 20 psi (138 kPa).

CAUTION

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

2. Connect O₂ calibration gas 2 (low calibration gas) to the LOW CAL GAS IN 1/4 in. tube fitting on the top of the manifold. Ensure the calibration gas pressure is set at 20 psi (138 kPa).
3. Connect the calibration gas from the upper 1/4 in. tube fitting on the calibration gas flowmeter to the check valve connected to the CAL GAS port on the Oxymitter 4000.



26010006

Figure 2-1. Installation

2-4. ELECTRICAL CONNECTIONS. All wiring must conform to local and national codes. Use the following procedure to connect an SPS 4000 to an Oxymitter 4000.

WARNING

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

NOTE

Ensure the Oxymitter 4000 is set up to handshake with the sequencer by configuring the logic I/O to mode 8. Refer to the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin for more information.

a. Remove screws (20, Figure 5-1) securing terminal cover (19) and remove the cover.

b. Route the line voltage leads into the manifold through the lower 1/2 in. conduit fitting on the right side of the manifold (Figure 2-1) and out through the bottom of the manifold. Connect the incoming 90 to 250 VAC, 50/60 Hz line voltage leads to the terminal strip as indicated in Figure 2-2.

c. Route the handshake logic I/O wires through one of the 1/2 in. NPT conduit ports on the manifold (Figure 2-1) and out through the bottom of the manifold. Connect the 5V (5 mA maximum) logic I/O leads from the Oxymitter 4000 to the terminal strip as indicated in Figure 2-2.

d. To set up the SPS 4000 to initiate a calibration from a remote location, route the 5 VDC calibration initiate contact input through one of the 1/2 in. NPT conduit ports on the manifold (Figure 2-1) and out through the bottom of the manifold. Connect the input leads to the terminal strip as shown in Figure 2-2.

e. Relay output connections are available on the unit to signal when the Oxymitter 4000 is in calibration or when calibration failed. Relay outputs can be connected to either indicator lights or a computer interface. The relay contacts are capable of handling a 5 to 30 VDC maximum power source. The cabling requirement is 1000 ft (303 m) maximum. Route the relay output wires

through one of the 1/2 in. NPT conduit ports on the manifold (Figure 2-1) and out through the bottom of the manifold. Connect the relay output wires to the terminal strip as shown in Figure 2-2.

f. Once all connections are made, install terminal cover (19, Figure 5-1) and secure with screws (20).

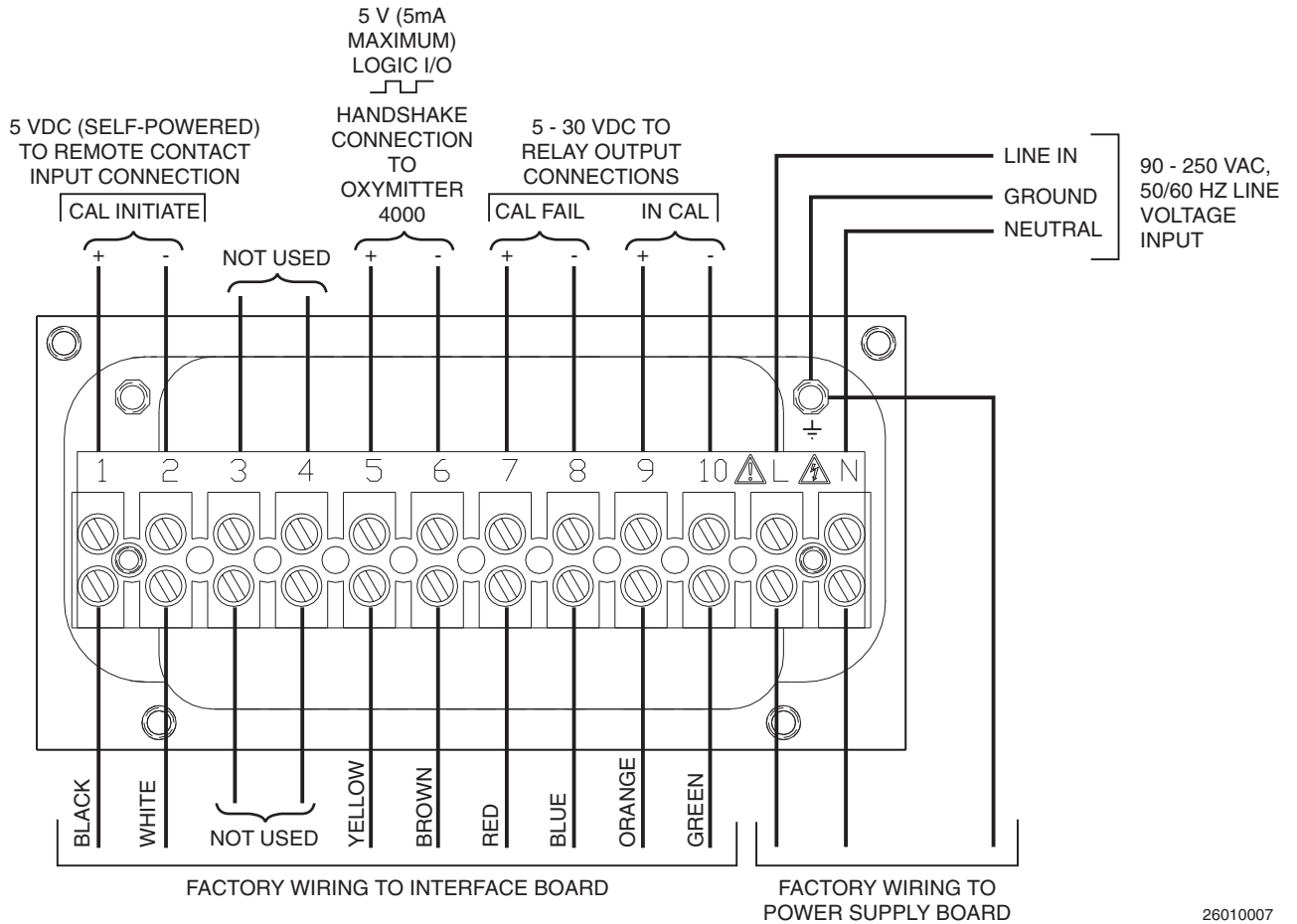


Figure 2-2. Electrical Connections

26010007

SECTION III. OPERATION

3-1. OVERVIEW. This section specifies the requirements to set up an Oxymitter 4000 calibration and how to verify the calibration gas flow setup. It also explains the differences between automatic and semi-automatic calibrations and how to initiate them.

3-2. CALIBRATION REQUIREMENTS.

- a. Two tanks of precision calibration gas mixtures are required. Recommended calibration gases are nominally 0.4% and 8.0% oxygen in nitrogen.

CAUTION

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

In addition to the optional disposable gas bottles available from Rosemount, two additional sources of calibrated gas mixtures are:

**LIQUID CARBONIC GAS CORP.
SPECIALTY GAS LABORATORIES**

700 South Alameda Street
Los Angeles, California 90058
213/585-2154

767 Industrial Road
San Carlos, California 94070
415/592-7303

9950 Chemical Road
Pasadena, Texas 77507
713/474-4141

12054 S.W. Doty Avenue
Chicago, Illinois 60628
312/568-8840

603 Bergen Street
Harrison, New Jersey 07029
201/485-1995

255 Brimley Road
Scarborough, Ontario, Canada
416/266-3161

**SCOTT ENVIRONMENTAL
TECHNOLOGY, INC.
SCOTT SPECIALTY GASES**

2600 Cajon Blvd.
San Bernardino, California 92411
714/887-2571
TWX: 910-390-1159

1290 Combermere Street
Troy, Michigan 48084
314/589-2950

Route 611
Plumsteadville, Pennsylvania 18949
215/766-8861
TWX: 510-665-9344

2616 South Loop West
Suite 100
Houston, Texas 77054
713/669-0469

- b. A check valve is required at the Oxymitter 4000 (between the calibration fitting and the gas line) to prevent the migration of process gases down the calibration gas line.

A typical calibration setup for the Oxymitter 4000 is shown in Figure 1-4.

3-3. CALIBRATION GAS FLOW SETUP. After installing the SPS 4000 as described in Section II, calibrate the Oxymitter 4000 to verify SPS 4000 operation and the communication link between the sequencer and Oxymitter 4000.

- a. Verify that both calibration gases are connected to the SPS 4000. Also verify that the pressure regulators on both calibration gas bottles are set to 20 psig (138 kPa gage).
- b. Initiate a semi-automatic calibration using one of the methods specified in paragraph 3-5.

NOTE

Only set the calibration gas flowmeter upon initial installation and after changing the diffusion element in the Oxymitter 4000. Refer to the flowmeter adjustments in Section V for more information.

- c. As the Oxymitter 4000 and SPS 4000 apply the first calibration gas, set the calibration gas flowmeter to 5 scfh. During the application of the second calibration gas, verify that the flowmeter reads 5 scfh. If not, adjust the pressure regulator on the second calibration gas bottle so the 5 scfh flow is provided.

3-4. AUTOMATIC CALIBRATION. Automatic calibrations require no operator action and can be performed through the Oxymitter 4000 CAL RECOMMENDED feature or through scheduled time intervals that can be programmed through the HART/AMS for the Oxymitter 4000. In addition, the calibration gases must be permanently piped to the Oxymitter 4000.

- a. **CAL RECOMMENDED.** If the Oxymitter 4000 is configured for handshake mode with the SPS 4000, the Oxymitter 4000 can initiate a calibration by sending a signal to the sequencer when the CAL RECOMMENDED LED activates. To enable handshake mode, the Oxymitter 4000 logic I/O must be set for mode 8.

Handshake mode is configured at the factory or can be accessed through HART/AMS. Refer to the logic I/O information in the HART/AMS section of the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin for more information.

- b. **Timed Interval.** An automatic calibration can also be programmed to occur at a specific time interval, in hours, using the HART communicator or AMS software. Refer to the HART/AMS section of the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin for this procedure.

3-5. SEMI-AUTOMATIC CALIBRATION. Semi-automatic calibrations are operator initiated and can be performed using the Oxymitter 4000 keypad, HART handheld communicator/AMS software, or a remote contact. In addition, the calibration gases must be permanently piped to the Oxymitter 4000.

- a. **Oxymitter 4000 Keypad.** A semi-automatic calibration can be initiated by pressing the CAL button on the Oxymitter 4000 keypad. For more information, refer to the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin.

- b. **HART Handheld Communicator/AMS Software.** A semi-automatic calibration can be initiated by connecting the HART handheld communicator, or AMS software, to the Oxymitter 4000 4-20 mA signal line and using the HART communicator keypad or computer keyboard to access the applicable calibration menu. Refer to the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin or the available HART documentation for more information.

- c. **Remote Contact.** A semi-automatic calibration can be initiated using a remote contact such as a customer's control system. The remote contact processes the calibration command on a PC and sends the signal to the Oxymitter 4000. For more information on remote-site calibrations, refer to the documentation for the system in use.

SECTION IV. TROUBLESHOOTING

- 4-1. **OVERVIEW.** This section describes the SPS 4000 troubleshooting procedures. Additional troubleshooting information can be found in the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin.

WARNING

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

- 4-2. **SPS 4000 TROUBLESHOOTING.** Use the CAL FAIL and IN CAL relay outputs to identify possible SPS 4000 faults.

- a. If a calibration was not successfully completed, the SPS 4000 sends a CAL FAIL contact indication to the control room. To determine if the SPS 4000 caused the failed calibration, go to the Oxymitter 4000 site to view the keypad. Or, access the HART/AMS menus. For more information on HART/AMS, refer to the HART/AMS section in the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin.
1. If no alarms are indicated on the keypad or in the HART/AMS STATUS sub-menu, the calibration did not fail because of an Oxymitter 4000 fault. Therefore, a calibration gas flow problem occurred. Refer to Table 4-1 or Figure 4-1 to troubleshoot the SPS 4000.
 2. If the LAST CAL FAILED alarm is indicated on the keypad or in the HART/AMS STATUS sub-menu, the failure is due to either a bad Oxymitter 4000 cell or a calibration gas flow problem.

- (a) Verify your calibration setup per paragraph 2-3 in Section II, INSTALLATION; Section III, OPERATION; and paragraph 5-8 in Section V, SERVICE AND NORMAL MAINTENANCE.
- (b) Perform another calibration and monitor the process. If the calibration fails before both calibration gases finish sequencing, a gas flow problem exists. Refer to Table 4-1 or Figure 4-1 to troubleshoot the SPS 4000.

If the calibration setup is correct and the Oxymitter 4000 indicates an invalid slope fault (fault 12) before the gases are purged and a last calibration failed fault (fault 14) after the gases are purged, replace the Oxymitter 4000 cell per the Oxymitter 4000 Oxygen Transmitter Instruction Bulletin.

- b. If a semi-automatic or manual calibration is being performed but no 5 - 30 VDC relay output contact (IN CAL or CAL FAIL) is being received by the control room, the interface board relays are malfunctioning. Replace the interface board per paragraph 5-3 in Section V, SERVICE AND NORMAL MAINTENANCE.

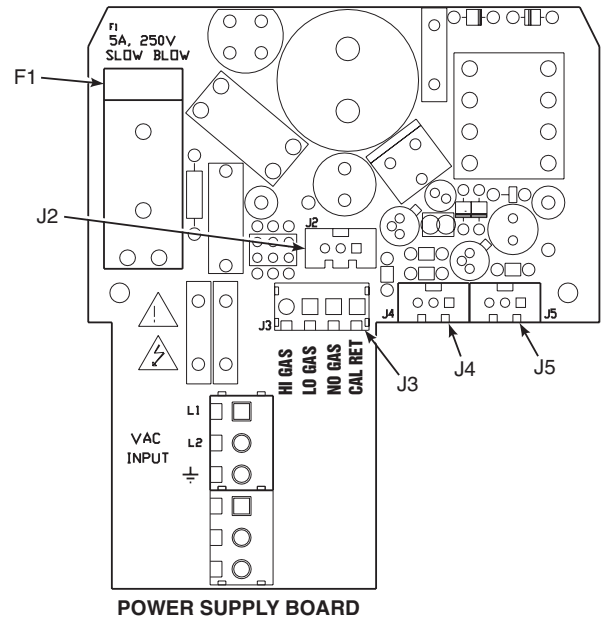
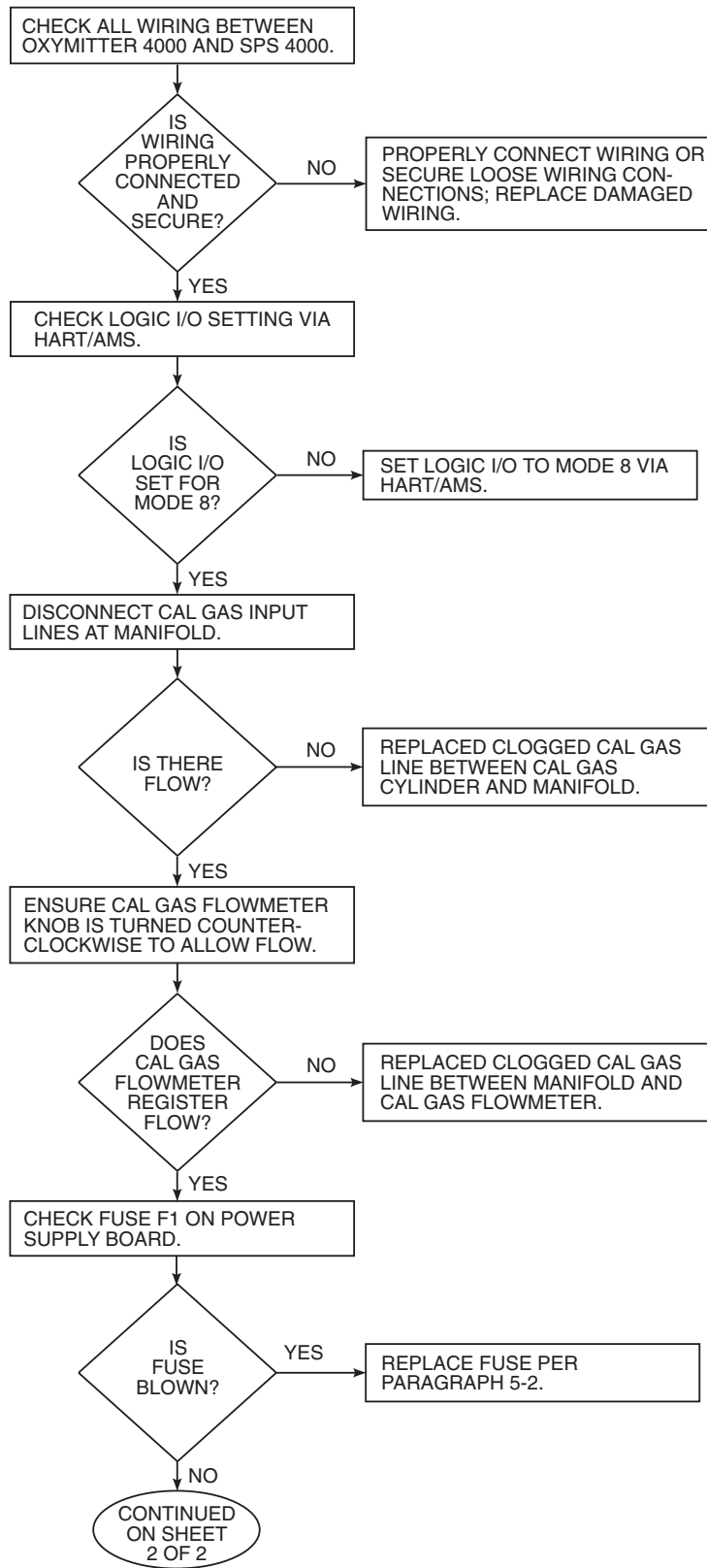
NOTE

If the unit is performing frequent auto-calibrations, investigate at the Oxymitter 4000 site or using HART/AMS. This condition may indicate an aging cell in the Oxymitter 4000.

Table 4-1. SPS 4000 Fault Finding.

SYMPTOM	CHECK	FAULT	REMEDY
No calibration gas flow	Wiring	Improper wire connections, loose connections, or damaged wiring	Properly connect wiring or secure loose wiring connections; replace damaged wiring if necessary.
	Logic I/O	Oxymitter 4000 logic I/O not set for calibration handshaking with SPS 4000	Set logic I/O to mode 8 via HART/AMS.
	Calibration gas lines between cylinders and manifold	Clogged calibration gas line	Replace clogged calibration gas line.
	Calibration gas flowmeter knob	Flowmeter knob not turned counterclockwise to allow flow	Turn calibration gas flowmeter knob counterclockwise to allow calibration gas to flow.
	Calibration gas line between manifold and calibration gas flowmeter	Clogged calibration gas line	Replace clogged calibration gas line.
	Fuse on power supply board	Blown fuse	Replace fuse per paragraph 5-2.
	Interface board operation	Interface board not sending signals	Replace interface board per paragraph 5-3.
	Check valve	Clogged check valve	Replace check valve per paragraph 5-6.
	Calibration gas line between calibration gas flowmeter and check valve	Clogged calibration gas line	Replace calibration gas line.
	Calibration gas flowmeter	Clogged flowmeter	Replace flowmeter per paragraph 5-9.
	Power supply output	Power supply failure	Replace power supply board per paragraph 5-3.
	Solenoid	Solenoid failure	Replace solenoid per paragraph 5-4.
	Pressure switch	Pressure switch failure	Replace pressure switch per paragraph 5-5.

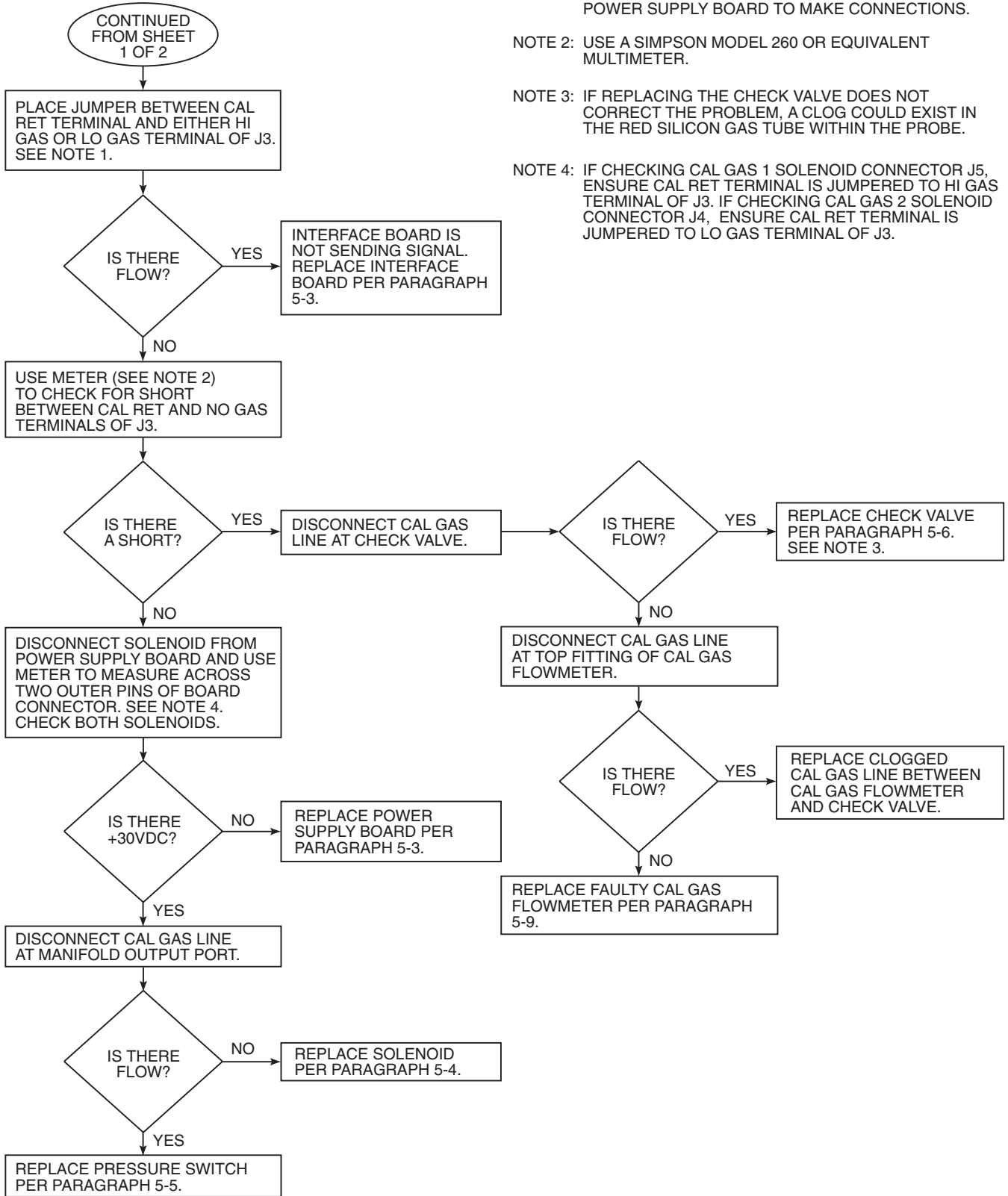
SYMPTOM — NO CALIBRATION GAS FLOW



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Figure 4-1. SPS 4000 Troubleshooting Flowchart (Sheet 1 of 2)

SYMPTOM — NO CALIBRATION GAS FLOW (CONTINUED)



NOTE 1: SECURELY TIGHTEN ALL J3 SCREW TERMINALS ON POWER SUPPLY BOARD TO MAKE CONNECTIONS.

NOTE 2: USE A SIMPSON MODEL 260 OR EQUIVALENT MULTIMETER.

NOTE 3: IF REPLACING THE CHECK VALVE DOES NOT CORRECT THE PROBLEM, A CLOG COULD EXIST IN THE RED SILICON GAS TUBE WITHIN THE PROBE.

NOTE 4: IF CHECKING CAL GAS 1 SOLENOID CONNECTOR J5, ENSURE CAL RET TERMINAL IS JUMPERED TO HI GAS TERMINAL OF J3. IF CHECKING CAL GAS 2 SOLENOID CONNECTOR J4, ENSURE CAL RET TERMINAL IS JUMPERED TO LO GAS TERMINAL OF J3.

Figure 4-1. SPS 4000 Troubleshooting Flowchart (Sheet 2 of 2)

SECTION V. SERVICE AND NORMAL MAINTENANCE

- 5-1. **OVERVIEW.** This section describes service and routine maintenance of the SPS 4000. Replacement parts referenced are available from Rosemount. Refer to Section VI for part numbers and ordering information.

WARNING

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

- 5-2. **FUSE REPLACEMENT.** The SPS 4000 has a fuse on the power supply board. Refer to Table 6-1 for replacement fuse specifications. Perform the following procedure to check or replace the fuse.

WARNING

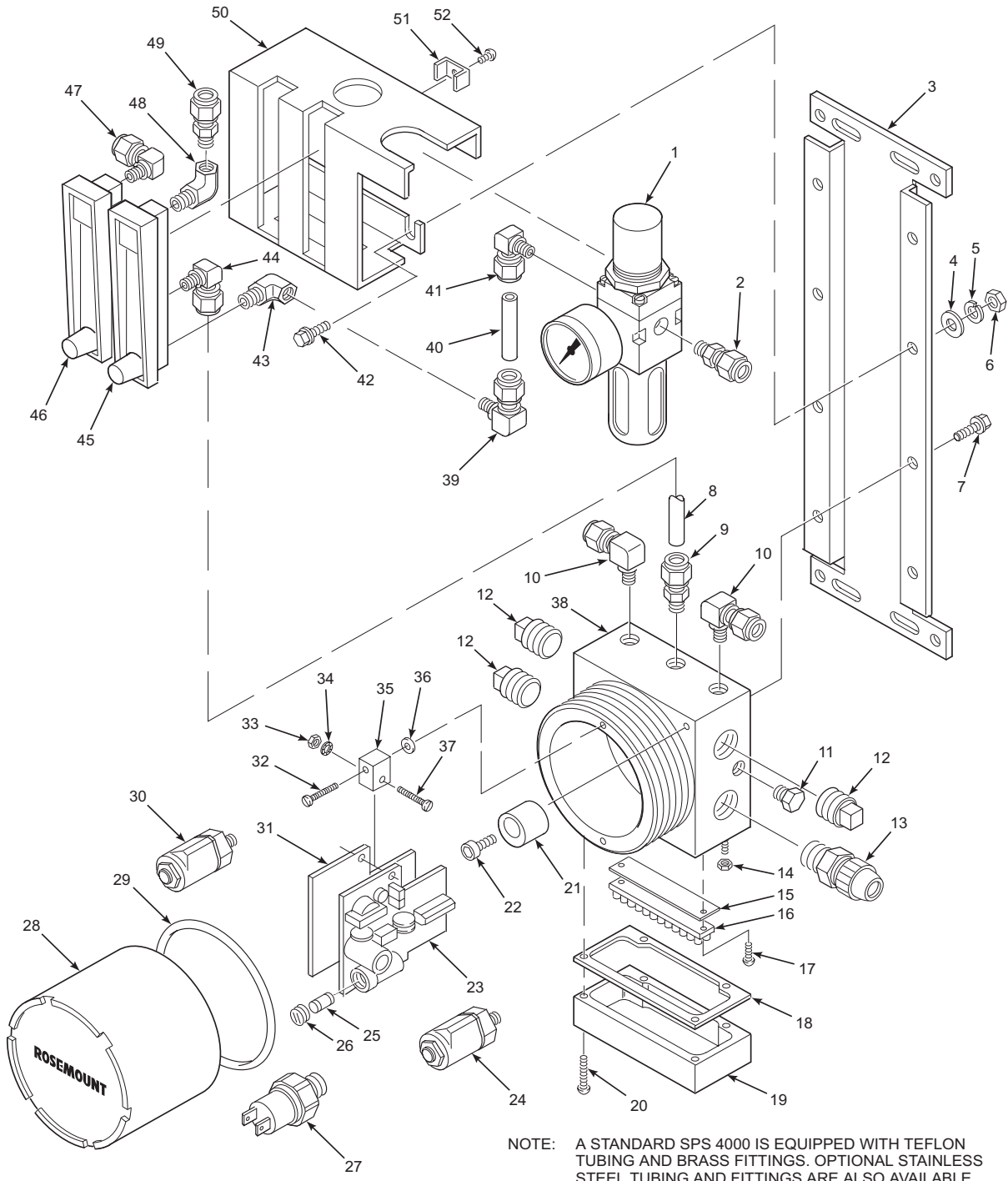
Disconnect and lock out power before working on any electrical components.

- a. Turn off power to the system.
 - b. Remove screw (22, Figure 5-1) securing manifold cover lock (21) and remove the lock.
 - c. Remove manifold cover (28).
 - d. Remove fuseholder (26) by pushing in the top and turning 1/4 turn counterclockwise. Remove fuse (25).
 - e. After checking or replacing fuse (25), install fuseholder (26) by pushing in the top and turning 1/4 turn clockwise.
 - f. Install manifold cover (28) and secure with manifold cover lock (21) and screw (22).
- 5-3. **BOARD REPLACEMENT.** Perform the following procedure to replace power supply board (23, Figure 5-1) or interface board (31).

WARNING

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

- a. Turn off power to the system.
- b. Remove screw (22) securing manifold cover lock (21) and remove the lock.
- c. Remove manifold cover (28).
- d. Remove two screws (32) attaching spacers (35) to manifold (38).
- e. Being careful not to disconnect the board wiring, carefully lift power supply board (23) and interface board (31) from manifold (38) and set aside. Do not lose o-rings (36) from the bottom of spacers (35).
- f. For the board to be replaced, tag all leads to simplify installation.
- g. If replacing the power supply board, refer to Figure 5-2. Remove the line voltage input leads from connector J7. Also, unplug calibration gas 1 solenoid leads from connector J5, calibration gas 2 solenoid leads from connector J4, and pressure switch leads from connector J2.
- h. If replacing the interface board, refer to Figure 5-2. Remove the CAL INITIATE leads from connector J3, CAL FAIL and IN CAL leads from connector J4, and logic I/O handshake connection from connector J5.
- i. Remove stop nuts (33, Figure 5-1), washers (34), and screws (37) securing power supply board (23) and interface board (31) to spacers (35).
- j. Carefully separate boards (23 and 31).
- k. Connect replacement board to board (23 or 31).
- l. Install screws (37), washers (34), and stop nuts (33) to secure interface board (31) and power supply board (23) to spacers (35).



NOTE: A STANDARD SPS 4000 IS EQUIPPED WITH TEFLON TUBING AND BRASS FITTINGS. OPTIONAL STAINLESS STEEL TUBING AND FITTINGS ARE ALSO AVAILABLE. REFER TO SECTION VI FOR ORDERING INFORMATION.

26010009

Figure 5-1. SPS 4000, Exploded View

LEGEND FOR FIGURE 5-1

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Reference Air Pressure Regulator (Optional)	18	Terminal Cover Gasket	36	O-ring
2	Straight Fitting	19	Terminal Cover	37	Screw
3	Mounting Bracket	20	Screw	38	Manifold
4	Flat Washer	21	Manifold Cover Lock	39	Elbow Fitting (Optional)
5	Lockwasher	22	Screw	40	Tubing (Optional)
6	Hex Nut	23	Power Supply Board	41	Elbow Fitting (Optional)
7	Screw	24	Calibration Gas 2 Solenoid	42	Screw
8	Tube	25	Fuse	43	Elbow Street Fitting (Optional)
9	Straight Fitting	26	Fuseholder	44	Elbow Fitting
10	Elbow Fitting	27	Pressure Switch	45	Reference Air Flowmeter (Optional)
11	Hex Head Plug	28	Manifold Cover	46	Calibration Gas Flowmeter
12	Square Head Plug	29	O-ring	47	Elbow Fitting
13	Conduit Fitting	30	Calibration Gas 1 Solenoid	48	Elbow Street Fitting (Optional)
14	Ground Nut	31	Interface Board	49	Straight Fitting (Optional)
15	Terminal Base	32	Screw	50	Flowmeter Bracket
16	Terminal Strip	33	Stop Nut	51	Bracket
17	Screw	34	Washer	52	Screw
		35	Spacer		

- m. Install all applicable leads in the appropriate locations on the power supply board or interface board as shown in Figure 5-2.
- n. Install power supply board (23, Figure 5-1) and interface board (31) into manifold (38). Align spacers (35) with the mounting holes on the manifold and secure with screws (32). Ensure o-rings (36) are installed between the spacers and the manifold surface.
- o. Install manifold cover (28) and secure with manifold cover lock (21) and screw (22).
- e. Remove two screws (32) attaching spacers (35) to manifold (38).
- f. Being careful not to disconnect the board wiring, carefully lift the board and spacer assembly from manifold (38) and set aside. Do not lose o-rings (36) from the bottom of spacers (35).
- g. Tag and unplug solenoid (30 or 24) leads from power supply board (23). Refer to Figure 5-2. Calibration gas 1 solenoid wires connect to connector J5, and calibration gas 2 solenoid wires connect to connector J4.
- h. Remove the top nut of solenoid (30 or 24) securing the coil assembly and washer to the base. Remove the coil assembly, including the leads, and washer. Place a 13/16 in. deep socket over the solenoid base and remove.

5-4. SOLENOID REPLACEMENT. Use this procedure to replace either calibration gas 1 (high calibration gas) solenoid (30, Figure 5-1) or calibration gas 2 (low calibration gas) solenoid (24).

WARNING

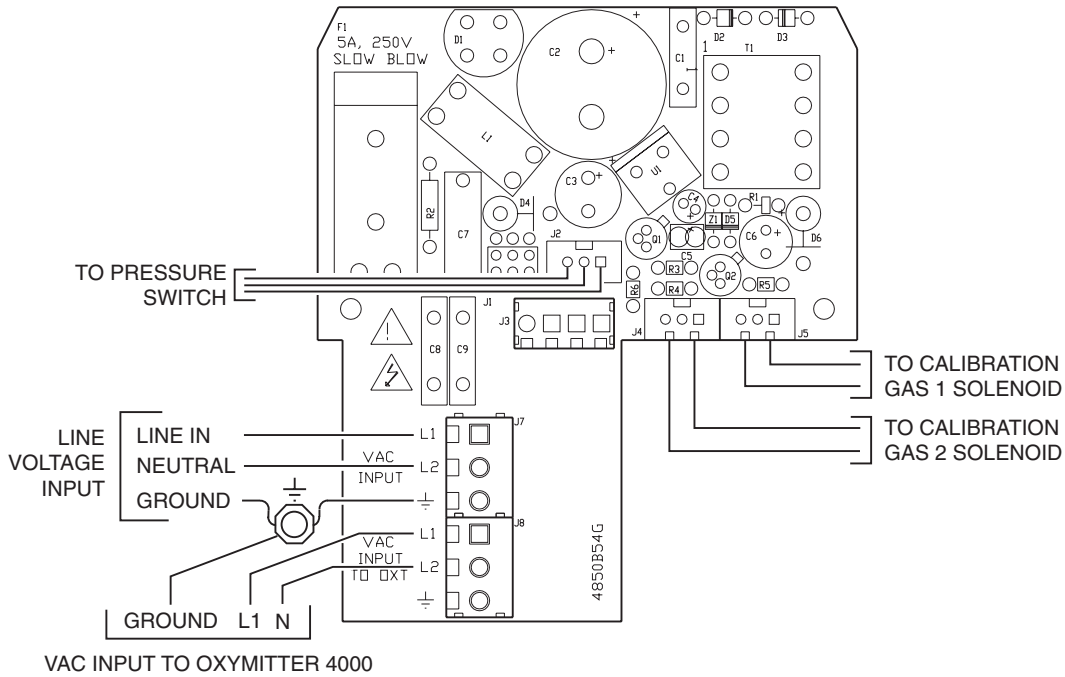
Disconnect and lock out power before working on any electrical components.

CAUTION

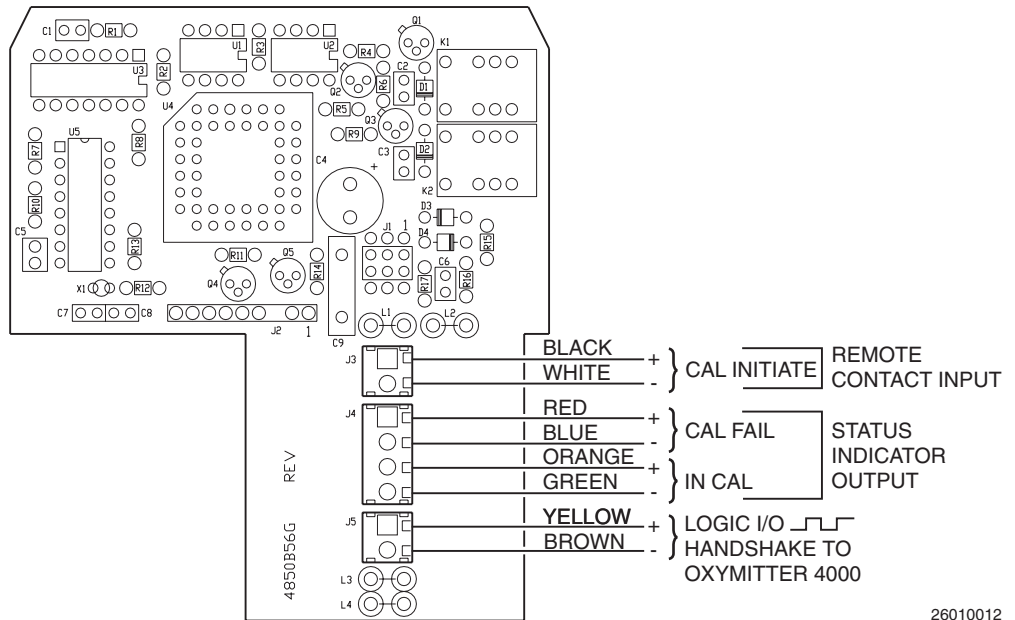
When installing a solenoid, do not overtighten. Damage to the solenoid may occur.

- a. Turn off power to the system.
- b. Shut off the calibration gases at the cylinders.
- c. Remove screw (22) securing manifold cover lock (21) and remove the lock.
- d. Remove manifold cover (28).
- i. Install the new solenoid base. Be careful not to overtighten. Install the new washer and coil assembly and secure with the top nut. Connect the leads to the proper connector on power supply board (23). Refer to Figure 5-2 if necessary.

POWER SUPPLY BOARD



INTERFACE BOARD



26010012

Figure 5-2. Board Connections

- j. Carefully install the board and spacer assembly into manifold (38, Figure 5-1) by aligning spacers (35) with the mounting holes on the manifold and securing with screws (32). Ensure o-rings (36) are installed between the spacers and the manifold surface.
- k. Install manifold cover (28), and secure with manifold cover lock (21) and screw (22).
- l. Turn on the calibration gases at the cylinders.

5-5. PRESSURE SWITCH REPLACEMENT. Use the following procedure to replace pressure switch (27, Figure 5-1).

- a. Turn off power to the system.
- b. Shut off the calibration gases at the cylinders.
- c. Remove screw (22) securing manifold cover lock (21) and remove the lock.
- d. Remove manifold cover (28).
- e. Remove two screws (32) attaching spacers (35) to manifold (38).
- f. Being careful not to disconnect the board wiring, carefully lift the board and spacer assembly from manifold (38) and set aside. Do not lose o-rings (36) from the bottom of spacers (35).
- g. Tag and remove the leads from pressure switch (27).
- h. Place a 1-1/16 in. 6-point socket over pressure switch (27) and remove.

CAUTION

When installing the pressure switch, do not overtighten. Damage to the solenoid may occur.

- i. Install new pressure switch (27). Be careful not to overtighten. Connect the leads to the proper terminals on the pressure switch.
- j. Carefully install the board and spacer assembly into manifold (38, Figure 5-1) by aligning spacers (35) with the mounting holes on the manifold and securing with screws (32). Ensure o-rings (36) are installed between the spacers and the manifold surface.

- k. Install manifold cover (28), and secure with manifold cover lock (21) and screw (22).
- l. Turn on the calibration gases at the cylinders.

5-6. CHECK VALVE REPLACEMENT. The check valve may stick or become plugged over time. Replace when necessary. If condensation deposits are noted upon removal, consider insulating the check valve.

5-7. PRESSURE REGULATOR (OPTIONAL) MAINTENANCE.

- a. **Pressure Adjustments.** Reference air pressure regulator (1, Figure 5-1) is factory set to 20 psi (138 kPa). Adjust using the knob on top of the pressure regulator if necessary.

WARNING

Do not use fingers to release valve stem. The valve may release air at high pressures and cause injury.

- b. **Condensation Drain.** To drain excess moisture from the filter bowl of reference air pressure regulator (1), use a screwdriver or comparable tool to periodically release the valve stem on the bottom of the pressure regulator.

5-8. FLOWMETER ADJUSTMENTS.

- a. **Calibration Gas Flowmeter.** Calibration gas flowmeter (46, Figure 5-1) regulates the calibration gas flow and must be set to 5 scfh. However, only adjust the flowmeter to 5 scfh after placing a new diffusion element on the end of the Oxymitter 4000. Adjusting the flowmeter at any other time can pressurize the cell and bias the calibration.

In applications with a heavy dust loading, the O₂ probe diffusion element may become plugged over time, causing a slower speed of response. The best way to detect a plugged diffusion element is to note the time it takes the Oxymitter 4000 to return to the normal process reading after the last calibration gas is removed and the calibration gas line is blocked off. A plugged element also can be indicated by a slightly lower reading on the flowmeter.

Change the diffusion element when the calibration gas flowmeter reads slightly lower during calibration or when the response time to the process flue gases becomes very slow. Each time the diffusion element is changed, reset the calibration gas flowmeter to 5 scfh and calibrate the Oxymitter 4000. For more information on changing the diffusion element, refer to the instruction bulletin for the Oxymitter 4000 in use.

- b. **Reference Air Flowmeter (Optional).** Reference air flowmeter (45) regulates the reference air and must be set to 2 scfh. Adjust the flow with the knob on the bottom of the reference air flowmeter when necessary.

5-9. FLOWMETER REPLACEMENT. Use this procedure to replace either reference air flowmeter (45, Figure 5-1) or calibration gas flowmeter (46).

- a. Turn off power to the system.
- b. Shut off the calibration gases at the cylinders.
- c. Loosen, but do not remove, four screws (42) securing flowmeter bracket (50) to mounting bracket (3).
- d. Flex the bottom of flowmeter bracket (50) downward and away to disengage and remove the flowmeter bracket from mounting bracket (3).
- e. For reference air flowmeter (45), remove pressure regulator (1) by disconnecting tubing (40) from elbow fitting (39). Also, disconnect the tubing between the Oxymitter 4000 and sequencer from straight fitting (49).

For calibration gas flowmeter (46), disconnect the tubing between the Oxymitter 4000 and the sequencer at elbow fitting (47). Also, disconnect tube (8) from elbow fitting (44).

- f. Remove screws (52) and bracket (51) securing flowmeter (45 or 46) to flowmeter bracket (50).
- g. Remove flowmeter (45 or 46), with installed fittings, from flowmeter bracket (50).
- h. For reference air flowmeter (45), remove elbow street fittings (43 and 48). It is not necessary to remove fittings (39 and 49) from the street fittings.

For calibration gas flowmeter (46), remove elbow fittings (44 and 47).

- i. Apply pipe thread sealant to the threads of top fitting (48 or 47) and bottom fitting (43 or 44) and install fittings into new flowmeter (45 or 46).
- j. Position flowmeter (45 or 46) into flowmeter bracket (50) and secure with bracket (51) and screw (52).
- k. For reference air flowmeter (45), connect tubing (40) to elbow fitting (39) and install pressure regulator (1). Also, connect the tubing between the Oxymitter 4000 and sequencer to straight fitting (49).

For calibration gas flowmeter (46), connect tube (8) to elbow fitting (44) and connect the gas tubing between the Oxymitter 4000 and sequencer to elbow fitting (47).

- l. Slide the top slots of flowmeter bracket (50) onto screws (42). Flex the bottom of the bracket downward and toward mounting bracket (3) to engage the bottom bracket slots and screws. Tighten screws.
- m. Turn on the calibration gases at the cylinders.

SECTION VI. REPLACEMENT PARTS

Table 6-1. SPS 4000 Replacement Parts.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
1-4	6292A97H03	Check Valve
5-1, 29	1A99089H01	Cover O-ring
5-1, 46	771B635H01	Flowmeter Assembly, Calibration Gas
5-1, 45	771B635H02	Flowmeter Assembly, Reference Air (Optional)
5-1, 1	1A99094H01	Reference Air Pressure Regulator (Optional)
5-1, 25	1A97913H03	Fuse, 5A, 250V, 5 × 20 mm, Slow Blow
5-1, 31	4850B56G01	Interface Board
5-1, 23	4850B54G01	Power Supply Board
5-1, 27	7305A67H01	Pressure Switch
5-1, 24 and 30	1A97905H01	Solenoid
5-1, 18	4850B75H01	Terminal Cover Gasket
5-1, 16	1A99147H01	Terminal Strip

Table 6-2. Calibration Replacement Parts.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
1-4	1A99119G01	Calibration Gas Bottles — 0.4% and 8% O ₂ , balance nitrogen — 550 liters each, includes bottle rack*
1-4	1A99119G02	Two flow regulators (for calibration gas bottles)

*Calibration gas bottles cannot be shipped via airfreight.

SECTION VII. RETURNING EQUIPMENT TO THE FACTORY

7-1. If factory repair of defective equipment is required, proceed as follows:

- a.** Secure a return authorization 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 the defective unit in a sturdy box with sufficient shock absorbing material to ensure no additional damage occurs during shipping.
- c.** In a cover letter, describe completely:
 - 1. The symptoms that determined the equipment is faulty.
 - 2. The environment in which the equipment was operating (housing, weather, vibration, dust, etc.).
 - 3. Site from where the equipment was removed.
 - 4. Whether warranty or nonwarranty service is requested.
 - 5. Complete shipping instructions for the return of the equipment.

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

American

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

European

Rosemount Ireland
Equipment Return Repair Dept.
151 Shannon Industrial Estate
Co. Clare
Ireland

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.

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