BARBEN ANALYTICAL

AMETEK®

IOM (Safety) -
Installation, Operation and Maintenance Manual
(Abridged, Safety-related part)



OXYvisor™

Optical Oxygen Analyzer (BOA)

For use with BOSx Optical Sensors

Optical O_2 Products (BOA)

ATEX / IEC / NEC / CEC

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Document Revision Table

Revision	ECO	Drawing No.	Document Name	Device Serial Numbers	Date
A	-	1907BA-IOM(safe)	IOM (Safety) OXYvisor - BA	1907-00001 to 20F1181	July 31'st, 2019
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C	3683	BA-MAN-OXY-IOMSAF	IOM (Safety) OXYvisor - BA	20F1182 to current	September, 2023

Disclaimer
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Section 1 - General Information & Safety

1.1 Introduction - Purpose of this Manual

The purpose of this abridged manual is to specifically inform the user of all the pertinent and required information, as it pertains to safety to install and operate this product. The product is to be used for its intended purposes, as detailed below in Section 1.2, and by qualified personnel.

For additional product and services related to the use and installation of this OXYvisor product, such as technical assistance, field start-up services, classroom product trainings, wet-gas sample probes, heated sample lines, pressure reduction stations or other needs please contact us at Barben Analytical or a factory qualified local representative (see back page for complete contact information).

1.2 About the OXYvisor Product - (Overview)

The OXYvisor measures from trace level (ppmv(g) / ppb(aq)) oxygen to percent level oxygen in both the gas and liquid phases. It's intended for indoor and outdoor use, as a continuous analytical measuring device, in manufacturing and industrial processes, along with laboratories.

The analyzer is either pipe or wall mounted in the proximity of the measuring point. The analyzer has a local display and can be operated (configuration, calibration, etc.) with the HMI via the "through-the-glass," keypad or via the OXYvisor software on a PC. The analyzer connects to a fiber optic cable, via a fiber optic SMA connection located in the easily accessible junction box. The fiber optic cable links the analyzer to the process sensor, which is mounted directly into the process or within an extractive sample system. The analyzer is fully compatible with all of the Barben Optical Sensors (BOSx) which are sold separately or included with integrated Sample Calibration Panels (SCP).

1.3 Definition of Symbols

Definition of the symbols for hazardous, cautionary, precautionary and general information are found and defined here.



WARNING

Safety warning indicates a potentially or imminently hazardous situation which, if not avoided, may result in personal injury or environmental contamination.



AVERTISSEMENT

L'avertissement de sécurité indique une situation potentiellement dangereuse ou imminente qui, si elle n'est pas évitée, peut entraîner des blessures ou une contamination de l'environnement.



CAUTION

General warning, caution, that if an operating procedure which, if not strictly observed, may result in damage or malfunction of the analyzer.



ATTENTION

Avertissement général, mise en garde, si une procédure d'exploitation qui, si elle n'est pas strictement observée, peut entraîner des dommages ou un dysfonctionnement de l'analyseur.



CAUTION

Caution, possibility of electric shock may occur if an operating procedure which, if not strictly observed, may occur.



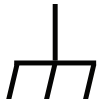
ATTENTION

Attention, un choc électrique peut se produire si une procédure qui, si elle n'est pas strictement observée, peut se produire.



IEC 60417-5019

Protective conductor terminal. (*Borne du conducteur de protection.*)



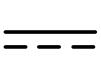
IEC 60417-5020

Frame or chassis terminal. (*Terminal cadre ou châssis*)



IEC 60417-5032

Alternating Current (AC) (*Courant alternatif*)



IEC 60417-5031

Direct Current (DC) (*Courant continu*)



Useful and/or important information that should not be overlooked (*Informations utiles et / ou importantes à ne pas négliger*)

1.4 Safety Summary

The **OXYvisor** is designed for use in manufacturing, industrial and laboratory analytical applications. The installer should consult national, local codes and any site specific installation requirements to ensure governing regulations are met. The **OXYvisor** goes through functional, performance and quality testing prior to leaving the factory. For safe operation, prior to installation, read the entire manual and adhere strictly to all the **WARNINGS**, **CAUTIONS**, and **NOTES** contained within this manual. Failure to do so could result in serious injury to the operator, the equipment or property.



If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired!
Si l'équipement est utilisé d'une manière non spécifiée, la protection fournie par l'équipement peut être altérée!

1.4.1 Electrical Safety



Up to 240 VAC may be present in the analyzer housings. Always shut down power source(s) before maintenance or troubleshooting. Only a qualified electrician should make electrical connections and ground checks.

Jusqu'à 240 VAC peuvent être présents dans les boîtiers de l'analyseur. Arrêtez toujours la ou les sources d'alimentation avant d'effectuer une maintenance ou un dépannage. Seul un électricien qualifié doit effectuer les raccordements électriques et les vérifications à la terre.

1.4.2 Grounding

Instrument grounding is mandatory. Performance specifications and safety protection are void if instrument is operated from an improperly grounded power source.



Verify ground connections and continuity of all equipment before applying power.

Vérifiez les connexions à la terre et la continuité de tous les équipements avant d'appliquer le courant.

1.4.3 General Installation Precautions

When installing electronic measurement or control equipment, general installation precautions should be observed:

- Select a site that is free from direct sunlight, extreme temperatures, or abrupt temperature variations.
- Select a site where the ambient air is free from corrosive gases or abrasive materials.

The equipment should not contact surfaces or enclosures subjected to severe vibration or conductive heat. Protective mounts should be installed to isolate the equipment from excessive vibration and thermal conduction.

- Do not install analyzer near equipment emitting electromagnetic interference (e.g. AC pumps, motors, etc).
- Electrical wiring should be installed according to the National Electrical Code, local regulations and codes along with and in addition to any other applicable industry codes and regulations.
- The supply voltage should strictly adhere to the instrument specifications, be supplied from a stable reliable source, and be provided with proper ground connection(s).
- Signal connections should be made using shielded wiring.
- Signal, control, and interface wiring should be located separately from power supply lines.

1.5 Environmental Information (WEEE)

The **OXYvisor** product contains materials that can be reclaimed and recycled. Waste Electrical and Electronic Equipment (WEEE) should never be disposed of in a municipal waste system (residential trash). The Wheelie Bin marking on this product is a reminder to dispose of the product properly after it has completed its useful life and been removed from service in order to recycle the metals, plastics, and other components.

According the directive 2012/19/EU, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life must not be disposed of with other waste. The user must dispose of the WEEE to a designated collection point for recycling of WEEE or send them back to the local Barben Analytical authorized distributor or the designated PCS (producer compliance scheme).

Sales direct to end-user in European Union Member States:
The responsibility lies within the importer of the goods into each Member State, in this case it becomes the end-user's responsibility to dispose of the goods according to the regulations of that Member State. Barben Analytical has no obligation to dispose of these goods.

Sales made via our authorized distributors in European Union Member States:
In the case where our local distributor, located in Member State, imports and takes ownership of the goods they will bear the responsibility for disposal of the goods according to the regulations of the own Member State. Barben Analytical has no obligation to dispose of these goods.

Section 2 - Technical Product Specifications - RATINGS

2.1 OXYvisor - BOA Oxygen Analyzer Specifications

OXYvisor Oxygen Analyzer Specifications		
Power Supply - Selectable as AC or DC via Product Selection Nomenclature		
AC Power	~	85-240* VAC, 47-63 Hz, 6W (AC, "4-wire," line powered analyzer), (*Zone 1 and CID2 can be up to 264 V)
DC Power	⎓	24 V DC +/-10% 5W (Class 2 / LPS source) (DC, "4-wire," line powered analyzer. Not a 2-wire loop powered transmitter)
Environmental (Allowable Ambient Conditions)		
Operating Temperature		-20 to +55ºC (-4 to 131ºF)
Storage Temperature		-20 to +65ºC (-4 to 149ºF)
Max. Operating Relative Humidity		95%, non-condensing
Max Altitude		Maximum altitude up to 2,000 meters (6,561 ft)
IEC		IEC Installation Category II and Pollution Degree 2
Physical		
Main Enclosure and Junction Box	**Ratings**	IP66 and NEMA 4x, protected against dust and high pressure water ingress. Corrosion resistant.
	Material Type	Aluminum pressure die-casting with yellow chromating and chemically resistant paint
	Conduit Entries	Main enclosure = QTY 4, junction box = QTY 2, 3/4" FNPT or M25 x 1.5 6H conduit entries
	O-Ring Seals	Silicone VMQ rubber
Dimensions H x W x D (combined)		12.0 x 5.5 x 11.0 inches (30.5 x 14.0 x 28 cm)
Weight (total/combined)		13.7 lb (6.2 kg)
Liquid Crystal Display		Viewing = 79 (W) x 40 (H) mm, 240 x 128 dots, FSTN / Positive / Transflective
HMI Touch-Keys (through-the-glass)		(4) proximity switches, infrared contacts for interactive user interface at HMI
Input Information		
Sensor Inputs	**Optical O_2**	(1) O_2 optical input BOS1, BOS2 or BOS3 sensor (SMA connector)
	RTD - Temp	(1) Pt100 or Pt1000 4-wire RTD Inputs (isolated)
	Analog Input	(1) 4-20 mA input (24 Vdc active from OXYvisor) - User configurable for Temperature or Pressure transmitter
	Pressure Sensor	(1) On-board integrated pressure sensor measures and compensates for ambient pressure conditions
Digital Inputs		(2) optically isolated inputs, 5 Vdc powered, remote initiation of automatic calibration and live validation gas
Output Information		
Analog Outputs		(2) Programmable current outputs with galvanic isolation, 4 to 20 mA (Active), Linear or Bi-Linear, 24 Vdc
Digital Outputs (Alarm/Relays)		(4) Programmable relays, optically isolated, passive, 24Vdc, 0.05A pilot duty, 0.45 A general use/ resistive load.
Digital Communication		(1) Modbus RTU serial protocol RS485 - Two way Communication

Table 1 - OXYvisor Technical Product Specification - Ratings

2.2 BOS Sensor Overview (determines operating range for OXYvisor)

Barben Oxygen Sensors (BOS), are sold separately or as parts of an integrated (SCP) package with the OXYvisor. The sensors consist of a fiber optic cable with SMA termination at one end, for connection to the OXYvisor, and the other end, an oxygen sensing luminophore, to be placed into the process or sample stream. For additional information on BOS sensors, please refer to the OXYvisor IOM, OXYvisor data sheet or BOSx Sensors product data sheet. The BOSx oxygen sensors are shown on the installation control drawings.

2.3 OXYvisor Configuration - Product Model Selection

Analyzer	Power	Agency Approval	Sensor Style	Mounting Orientation	Conduit Entries	
OXYvisor Base Model Number						
BOA	OXYvisor - Barben Oxygen Analyzer					
	Input Power					
	DC	21.6 to 26.4 VDC, 5W (4-wire, line powered analyzer, this is NOT a loop powered analyzer. Requires two wires for DC power and two separate wires for 4-20 mA output)				
	AC	85 to 240* VAC, 47-63 Hz, 6 W (4-wire, line powered analyzer), (*Zone 1 and CID2 can be up to 264 V)				
		Agency Approval				
		1	CE Ex II 2 G	Ex db op is IIC T4 Gb	||	ATEX
			IECEx	Ex db op is IIC T4 Gb	||	IEC / EU
			Class I Zone 1	AEx db op is IIC T4 Gb	||	US (NEC 505)
				Ex db op is IIC T4 Gb	||	CA (CEC Section 18)
		2	Class I Division 2	Group A, B, C, D T4a	||	US (NEC 500) and CA (CEC Annex J18)
		3	CE Ex II 3 G	Ex ec [ic] op is IIC T4 Gc	||	ATEX
			IECEx	Ex ec [ic] op is IIC T4 Gc	||	IEC / EU
			Sensor Style			
			SFP	Standard Fiber Patch		
			X*	Saved for future use - Integral Wands with lengths (2.5, 5.0 and 10 M)		
				Mounting Orientation		
				B	Junction Box placed below main enclosure, fiber optic exits bottom (as shown)	
				Y**	Saved for future use - other orientations w/ display and JB	
					Conduit Entries	
					SI	25 mm Conduit Entries
					AM	3/4" FNPT Conduit Entries
Analyzer	**Power**	**Agency Approval**	**Sensor Style**	**Mount Orientation**	**Conduit Entries**	
BOA	***DC***	***2***	***SFP***	***B***	***AM***	***Typical Analyzer Model Number (Example)***

Table 2 - OXYvisor Configuration - Product Model Selection

Additional Options for Product Model Selection (Table 2)

* Sensor Style - Selection “X” can be: Sxyz, where xyz is equal to fiber length in meters (e.g. S025, S050)

** Mounting Orientation - Selection “Y” can be either “L” or “R”

2.4 OXYvisor Accessories

Part Number	Description
B5008-1125	Pipe Mount Kit - 316 SS (1 to 1.5” pipe) - Included with OXYvisor (standard)
B4951-1140	Plug 3/4” MNPT Aluminum Zone 1&2
B4951-1141	Plug M25 Aluminum Zone 1&2
B4951-1142	Plug 3/4” MNPT CI D1&2

Table 3 - OXYvisor Accessories Parts

2.5 General principle of operation

The **OXYvisor** analyzer uses a quench fluorescence technique with a sensor optically isolated from the process, using the absorbency as a diagnostic function and analyzing the phase angle for measurement of the analyte, oxygen, in the modulated time domain. This gives the analyzer the ability to measure accurately and precisely under various and changing ambient and process conditions.

The resulting measurement is specific to oxygen concentration. The luminophore is unaffected by other constituent gases and flow rate. The measurement is applicable in both gas and liquid phase. Temperature compensation is required to account for quenching efficiency at different temperatures and pressure compensation is required to measure at process pressured different than the pressure at time of calibration.

2.6 OXYvisor Analyzer Features (Hardware/Firmware/Software)

OXYvisor Analyzer Overview

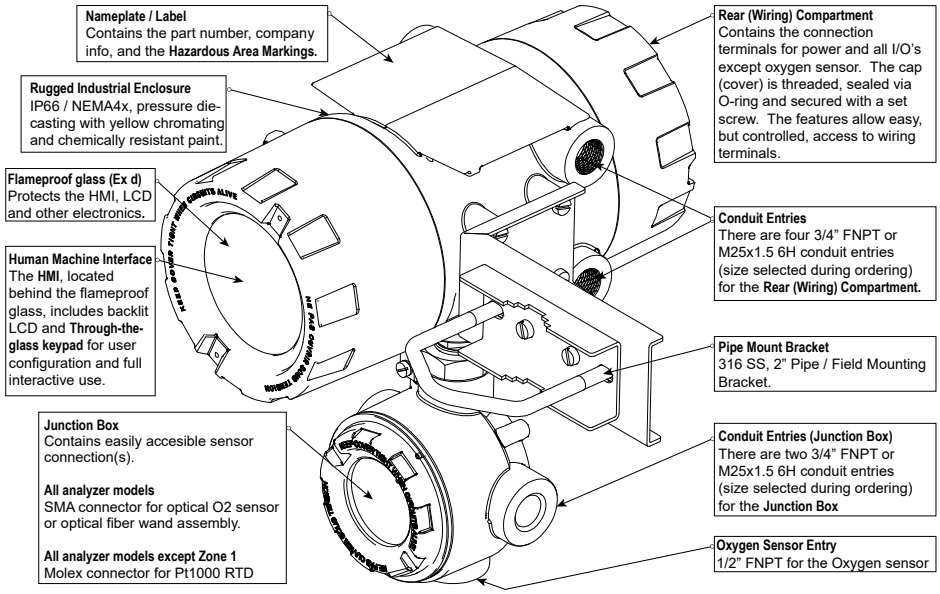


Figure 1 - OXYvisor overview of hardware features

OXYvisor Analyzer Dimensions

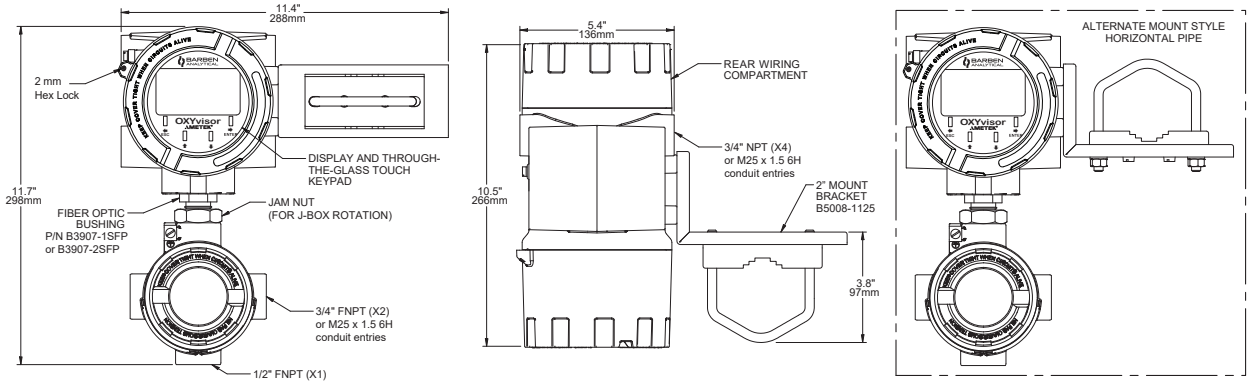


Figure 2 - OXYvisor Overall Dimensions

2.7 Hazardous Area Agency Certification & Markings - [Recapitulation]

2.7.1 Zone 1 Group IIC with Specific Conditions of Use

OXYvisor is certified as **Process Control Equipment** for use in **Zone Classified Hazardous Locations** (**QVAJ** and **QVAJ7**) - Zone 1, Group IIC

ATEX Zone 1, Group IIC Markings:

CE 0539 Ex II 2 G Ex db op is IIC T4 Gb Ta = -20 C to +55 C

Certificate Number: DEMKO 19 ATEX 2031, issued by UL DEMKO International A/S

Standards: EN IEC 60079-0:2018
EN 60079-1:2014
EN 60079-28:2015

IECEx Zone 1, Group IIC Markings:

Ex db op is IIC T4 Gb Ta = -20 C to +55 C

Certificate Number: IECEx UL 19.0040 issued by UL LLC

Standards:

IEC 60079-0,	7th Edition,	Issued 2017-12
IEC 60079-1,	7th Edition,	Issued 2014-06
IEC 60079-28,	2nd Edition,	Issued 2015-05

North American Zone 1, Group IIC Markings:

c UL us LISTED Class 1 Zone 1 AEx db op is IIC T4 Gb Ta = -20 C to +55 C
Ex db op is IIC T4 Gb Ta = -20 C to +55 C

US NEC Standards:	UL 60079-0,	7th Edition,	Dated 2020-04-15
	UL 60079-1,	7th Edition,	Dated 2020-01-23
	UL 60079-28,	2nd Edition,	Dated 2021-12-07
CAN CEC Standards:	CSA C22.2 No. 60079-0,	4th Edition,	Dated 2019-02
	CSA C22.2 No. 60079-1,	3rd Edition,	Dated 2016-05
	CSA C22.2 No. 60079-28,	1st Edition,	Dated 2016-12

WARNING

Specific Conditions of Use - Consult Drawing No. 2P0345 for complete installation details.

- **Unused entries shall be closed with suitable certified Ex db blanking elements with a minimum IP66 rating**
- **Flameproof joints are not intended to be repaired. For repair or replacement of any part, contact Barben Analytical.**

2.7.2 Zone 2 Group IIC with Specific Conditions of Use

The OXYvisor is certified as **Process Control Equipment** for use in **Zone Classified Hazardous Locations** - Zone 2, Group IIC

ATEX Zone 2 Markings:

CE Ex II 3 G Ex ec [ic] op is IIC T4 Gc Ta = -20 C to +55 C

Certificate Number: DEMKO 19 ATEX 2036

Standards:

CENELEC	EN 60079-0	2018
CENELEC	EN 60079-7 +A1	2015, 2018
CENELEC	EN 60079-11	2012
CENELEC	EN 60079-28	2015

Ex ec [ic] op is IIC T4 Gc

Certificate Number: IECEx UL 19.0072

Standards:

IEC 60079-0,	Edition 7,	Issued 2017-12
IEC 60079-7,	Edition 5.1,	Issued 2017-08
IEC 60079-11,	Edition 6,	Issued 2019-12
IEC 60079-28,	Edition 2,	Issued 2019-10

North American Zone 2, Group IIC Markings:

c UL us LISTED Class 1 Zone 2 AEx ec [ic] op is IIC T4 Gc
Class 1 Zone 2 Ex ec [ic] op is IIC T4 Gc

US NEC Standards:	UL 60079-0,	Edition 6,	Dated 2017/10/20
	UL 60079-7,	Edition 5.1,	Dated 2017/04/21
	UL 60079-11,	Edition 6,	Dated 2018/09/14
	UL 60079-28,	Edition 2,	Dated 2017/12/08
CAN CEC Standards:	CSA C22.2 No. 60079-0,	Edition 3,	Issue Date 2015/10/01
	CSA C22.2 No. 60079-7,	Edition 2,	Issue Date 2016
	CSA C22.2 No. 60079-11,	Edition 2,	Issue Date 2014/02/01
	CSA C22.2 No. 60079-28,	Edition 1,	Issue Date 2016

WARNING

Specific Conditions of Use - Consult Drawing No. 2P0346 for complete installation details.

- **Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.**
- **The equipment shall only be used in an area of not more than Pollution Degree 2, as defined in IEC/EN 60664-1.**

2.7.3 Class I, Division 2 Groups A,B,C, & D

The OXYvisor is certified as **Process Control Equipment** for use in hazardous locations (**QUZW**, **QUZW7**) **Class I, Division 2 Groups A, B, C, & D**

c UL us LISTED Class I, Division 2, Groups A, B, C, & D T4A

US NEC Standards: UL 12.12.01 - Edition 9 Issued 2017/09/15

CAN CEC Standards: CSA C22.2 No. 213-17 - Edition 3 Issued 2017/09/15

2.8 Product Label / Name Plate

2.8.1 - Product Label / Name Plate Overview

The Product Label (Name Plate) is found at the top of the analyzer (Figure 1). The product label identifies important information and attributes of the specific model and should be reviewed in detail prior to installation.

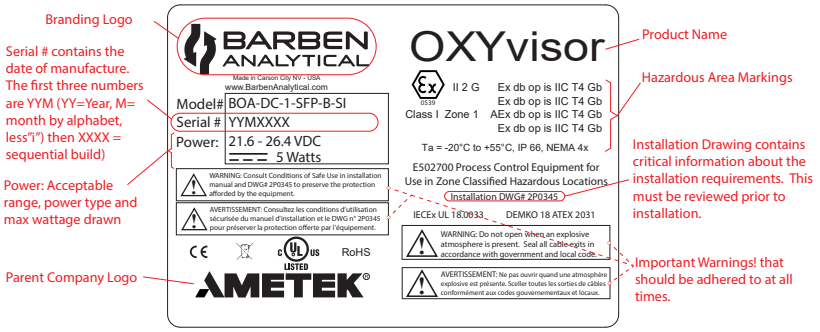
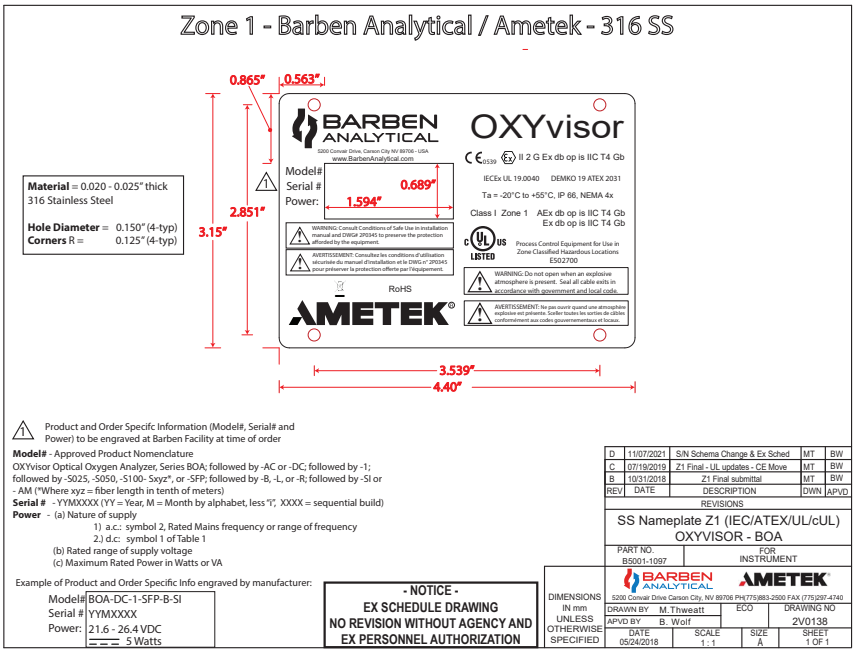
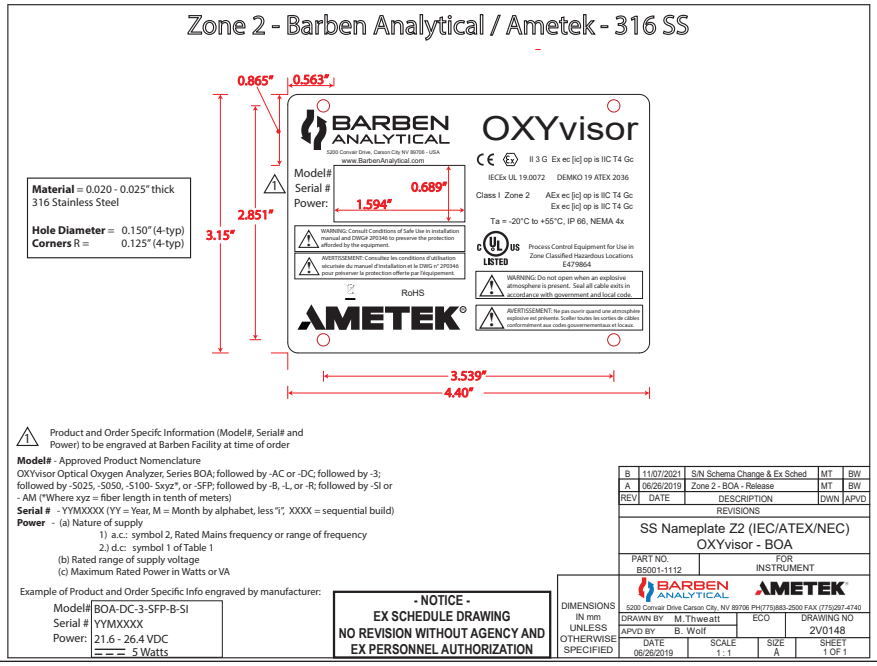


Figure 3 - OXYvisor Product Label / Name Plate

2.8.2 - Zone 1 Groups IIC - Barben Analytical | AMETEK



2.8.3 - Zone 2 Groups IIC - Barben Analytical | AMETEK



2.9 Declaration of Conformity - Certificate

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AMETEK

CE

Declaration of Conformity

According to EN ISO/IEC 17050-1:2010

Manufacturer Name (Nom du Fabricant): Barben Analytical | AMETEK
Address (Adresse): 5200 Convair Drive
Carson City NV, 89706 USA
Web: https://www.barbenanalytical.com

We hereby declare under our sole responsibility that the following apparatus:
(Nous déclarons par la présente sous notre seule responsabilité que les appareils suivants:)

Product Name (Nom du produit): OXYvisor
Product Description (Description du produit): Process Oxygen Analyzer
Model Number(s) (Numéros de modèle): Series BOA; followed by -AC or -DC; followed by -1, -2 & -3; followed by -S025, -S050, -S100, -Sxyz, or-SFP; followed by -B, -L or -R; followed by -SI or -AM
Product Category (Catégorie de produit): Electrical equipment for meaurement , control and laboratory use.

Complies with the essential requirements of the following applicable European Directives:
(Conforme aux exigences essentielles des directives européennes applicables suivantes):

Electromagnetic Compatibility (EMC) Directive 2014/30/EU
Low-voltage (Safety) Directive 2014/35/EU
Potentially Explosive Atmospheres (ATEX) Directive 2014/34/EU
RoHS Directive 2011/65/EU

EMC:

Emissions (Les émissions)
- EN 61326-1:2013 (IEC 61326-1:2012) Group 1 Class A
- EN 61000-3-2:2014 (IEC 61000-3-2:2014)
- EN 61000-3-3:2013 (IEC 61000-3-3:2013)

Immunity (Immunité)
- EN 61326-1:2013 (IEC 61326-1:2012) Group 1, Class A
- EN 61000-4-2:2009 (IEC 61000-4-2:2009)
- EN 61000-4-3:2006/A1:2008/A2:2010 (IEC 61000-4-3:2006+A1+A2)
- EN 61000-4-4:2004/A1:2010 (IEC 61000-4-4:2004+A1)
- EN 61000-4-5:2006 (IEC 61000-4-5:2006)
- EN 61000-4-6:2009 (IEC 61000-4-6:2009)
- EN 61000-4-8:2010 (IEC 61000-4-8:2010)
- EN 61000-4-11:2004 (IEC 61000-4-11:2004)

Safety (Sécurité): EN 61010-1 (IEC 61010-1)

Potentially Explosive Atmospheres:
(Atmosphères Potentiellement Explosif):

Zone 1 (Model Selection):
EN 60079-0:2012/A11:2013 (IEC 60079-0 6th Ed)
EN 60079-1:2014 (IEC 60079-1 7th Ed)
EN 60079-28:2015 (IEC 60079-28 2nd Ed)

Zone 2 (Model Selection):
EN 60079-0:2018 (IEC 60079-0 7th Ed)
EN 60079-7:2015/A1:2018 (IEC 60079-7 Ed 5.1)
EN 60079-11:2012 (IEC 60079-11 6th Ed)
EN 60079-28:2015 (IEC 60079-28 2nd Ed)

Meets the applicable HazLoc requirements as described in Certificates:

Zone 1 (Model Selection):
Demko 19 ATEX 2031 Rev. 1,
CE 0539 Ex II 2 G Ex db op is IIC T4 Gb
issued by UL DEMKO International A/S
IECEx UL 19.0040, Ex db op is IIC T4 Gb
issued by UL LLC

Zone 2 (Model Selection):
Demko 19 ATEX 2036 Rev. 1,
CE Ex II 3 G Ex ec [ic] op is IIC T4 Gc
issued by UL DEMKO International A/S
IECEx UL 19.0072, Ex ec [ic] op is IIC T4 Gc
issued by UL LLC

Environmental Affairs (Affaires environnementales): EN IEC 63000:2018
Articles manufactured on or after the Date of Issue of this Declaration of Conformity do not contain any of the restricted substances in concentrations/applications not permitted by the RoHS Directive.

Supplementary Information (Information supplémentaire):
1. This product meets the Safety requirements of the United States (UL 61010-1) and Canada (CAN/CSA-C22.2 No. 61010-1)
2. This product meets the HazLoc Zone 1 requirements in the United States (UL 60079-0 7th Ed, UL 60079-1 7th Ed and 60079-28 2nd Ed) and Canada (CAN/CSA C22.2 No. 60079-0 4th Ed, CSA C22.2 No. 60079-1 3rd Ed, CSA C22.2 No. 60079-28 1st Ed)
3. This product meets the HazLoc Zone 2 requirements in the United States (UL 60079-0 7th Ed, UL 60079-7 Ed 5.1, UL 60079-11 6th Ed and UL 60079-28 2nd Ed) and Canada (CAN/CSA C22.2 No. 60079-0 4th Ed, CSA C22.2 No. 60079-7 2nd Ed, CSA C22.2 No. 60079-11 2nd Ed and CSA C22.2 No. 60079-28 1st Ed)

September 6th, 2023 || Carson City NV USA
Date and Place of Issue

Gary Evans || Director of Engineering

OV BA DoC EU R2

Figure 4 - OXYvisor Declaration of Conformity

Section 3 - Installation

3.1 Installation Overview

The OXYvisor Optical Oxygen Analyzer includes a 316 SS pipe-mount bracket for field mounting. Additional components needed to produce a functional oxygen measurement include a Barben Oxygen Sensor (BOS) and Pt1000 RTD (Resistance Temperature Sensor).

It is important that the product **Name Plate** (Figure 3) is reviewed to properly identify the product, it's power input, and the specific hazardous area markings for the actual unit. It is equally important that the installation control drawing referenced in Table 4, is fully understood and followed along with the inclusion of any applicable federal, state and local codes.

OXYvisor Model Number	Type of Protection	Installation - Control DWG
BOA-DC-1-SFP-B-SI/AM	Zone 1 IIC	2P0345 (Zone 1)
BOA-AC-1-SFP-B-SI/AM		
BOA-DC-2-SFP-B-SI/AM	Class I, Division 2 Groups A,B,C,D	2P0335 (Class I, Div. 2)
BOA-AC-2-SFP-B-SI/AM		
BOA-DC-3-SFP-B-SI/AM	Zone 2 IIC	2P0346 (Zone 2)
BOA-AC-3-SFP-B-SI/AM		

Table 4 - OXYvisor HazLoc Summary by Product Model Number Selection

The OXYvisor is used to quantitatively measure the amount of oxygen in a gaseous or liquid sample. The analyzer may only be installed as specified in these instructions per its intended use. Modifications to the analyzer which are not expressly referred to within these instructions will result in an application which is not in accordance with the intended use. Such modifications are then the exclusive responsibility of the user.

3.2 Inspection of the Analyzer Shipment (consignment)

Check the packaging and the device for visible damage caused by inappropriate handling, during shipping. Close attention should be paid to the analyzer enclosure for signs of impact during shipping. All threads should be inspected for burrs and any residual packing material should be removed.

Report any claims for damages immediately to the shipping company. Take pictures and retain damaged parts for clarification. Check the scope of delivery by comparing the shipping documents with your order for correctness and completeness.



Do not use any damaged or incomplete devices. Danger of explosion in hazardous areas.

3.3 Weight

The approximate weight of the analyzer is 13.7 lb (6.2 kg).

3.4 Tools

Suggested tools to complete the installation are listed below:

- M8 or Small crescent Wrench (Used for 2" pipe mount bracket installation)
- Large flathead Screwdriver (Used to mount analyzer to mounting bracket)
- Small flathead Screwdriver (used for wiring)
- 36mm Open End or large adjustable wrench (Used to adjust jam nut between analyzer and junction box)
- 2 mm Hex Key or driver to lock the rear compartment
- Loctite 577, P/N: B8008-1014 (Only if J-Box needs re-orientation, see Section 5.4.2

3.5 Mounting the Analyzer

Factors to consider when mounting the analyzer:

- **Analyzer/Pipe Mount Orientation**: The analyzer and pipe mount kit can be mated/arranged to mount to either a vertical (Fig. 6) or horizontal pipe (Fig 7). See Fig. 5 and 6.



The front compartment contains the display and electronics boards. It is secured via the 2 mm Hex Lock and is not meant to be opened in the field at any time. If it is opened, follow the instruction to tighten and secure the Rear (Wiring) Compartment lid. Section 5.4.1.



OPTICAL BUSHING / MAIN ENCLOSURE - The optical bushing going into the upper main enclosure must not be removed nor turned. There is a locking screw (4 mm Hex) to prevent this.



OPTICAL BUSHING / JUNCTION BOX - To maintain the safety afforded by this analyzer do not change the orientation, remove or re-install the Junction Box in the field.



UNUSED ENTRIES - Unused entries shall be closed with suitable certified Ex db blanking elements with a minimum IP66 rating.

3.5.1 Orientation of the Junction Box

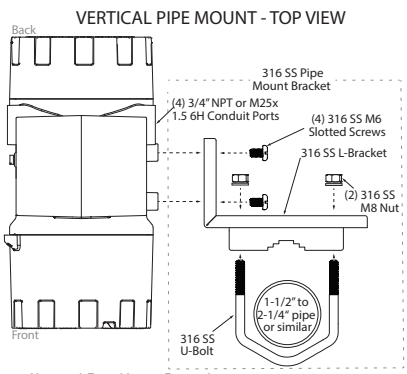
The Junction Box is fitted and located at the bottom of the analyzer with a front-forward orientation as standard and as shown in Figure 5 & 6. The orientation is locked into position via a Jam Nut and the 3/4" NPT threads (mating to Fiber Optic Bushing) are sealed with a thread-sealant. The orientation can be specifically selected in the ordering process or sent back to the factory for adjustment.



The Junction Box is not to be adjusted, removed or re-installed in the field for Zone 2 applications. Doing so will affect the safety evaluation and certificates of the device.

3.5.2 OXYvisor - Pipe-Mount to Vertical Pipe

1. Locate the proper height for the HMI and display so that it is easily accessible for user
2. Install the L-bracket to the analyzer by tightening down the (4) M6 slotted screws.
3. Install the U-bolt around the pipe at the proper height into the L-bracket and tighten the M8 nuts
4. Double check tightness of the screws and bolts



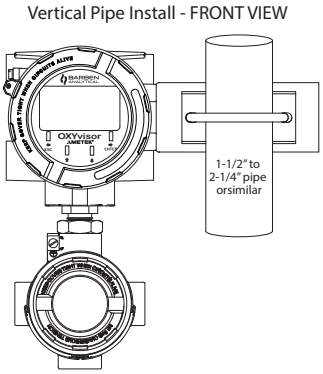
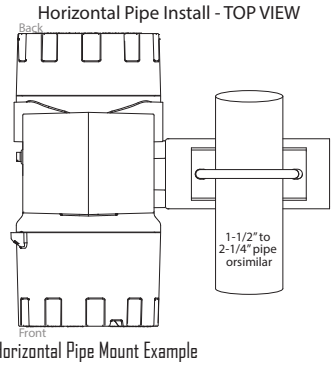


Figure 5 - OXYvisor Vertical Pipe Mount Examples

1. Locate the proper height for the HMI and display so that it is easily accessible for user
2. Install the L-bracket to the analyzer by tightening down the (4) M6 slotted screws.
3. Install the U-bolt around the pipe at the proper height into the L-bracket and tighten the M8 nuts
4. Double check tightness of the screws and bolts

3.5.3 OXYvisor - Pipe-Mount to Horizontal Pipe



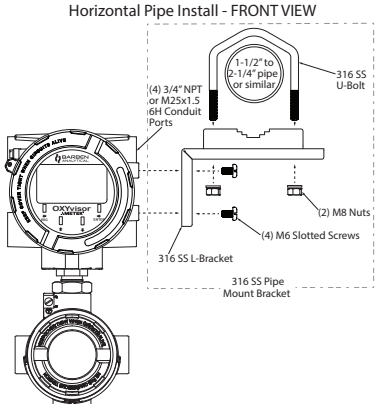


Figure 6 - OXYvisor Horizontal Pipe Mount Example

3.6 Wiring - Power

3.6.1 Protective Ground (Earthing) Screw

The OXYvisor can be ordered with either 120-240VAC input power or 24VDC input power. Before connecting any electrical signal or power, a protective ground on the analyzer enclosure must be connected. Requirements for the Protective Ground conductor are as follows:

- The protective conductor must be of equal or greater size than any other current-carrying wiring.
- The protective conductor must remain connected until all other wiring is removed.

Figure (7) shows the Protective Ground screw locations.

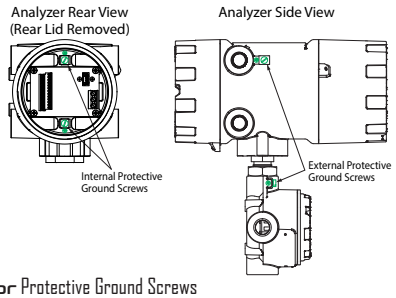


Figure 7 - OXYvisor Protective Ground Screws

3.6.2 AC Powered Analyzer

Analyzer- Mains Supply Connections (AC Version)

The OXYvisor control unit can operate using between 85-240 volts AC, 47 to 63 Hz. There is no power switch or circuit breaker on the control unit, and it must be protected by installing it on a circuit-protected line, with recommended maximum 1 amperes, with a switch or circuit breaker in close proximity to the control unit and within easy reach of an operator. Mark the switch or circuit breaker as the control unit disconnecting device.

Warning - Hazardous voltage and risk of electrical shock - make sure main power is shut off prior to attaching wiring to analyzer.

AC Power

OXYvisor analyzers ordered with AC power input will have a termination board labeled with “Line”, “Neutral”, and “Earth” (Ground) as shown in Figure (8).

CAUTION

Power Supply wiring requirements:

- 24 to 12 gauge (IEC .500 to 2.00)
- Copper, stranded wire
- Minimum 300V Insulation
- Tightened (torque) to 0.5 to 0.6 Nm

3.6.3 DC Powered Analyzer

Analyzer - Power Supply Connections (DC Version)

The OXYvisor control unit can operate using 24 VDC +/-10%. When energized by mains the 24 V DC supply must be from a Class2 or LPS source, OR that a fuse (1 A) will be required in the installation.

USEFUL INFORMATION

Please note that the 24VDC version of the analyzer is a 4-wire device. It has separate wiring for power and signal (not a loop powered device).

DC Power

OXYvisor analyzers ordered with DC power input will have a termination board labeled with “24VDC (+)”, “24VDC (-)”, and “Earth” (Ground) as shown in Figure (9).

3.7 Wiring - Input/Outputs

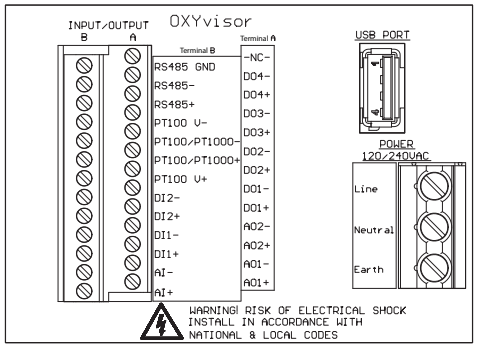
Input / Output Wiring

Input/Output wiring for the OXYvisor is located on the left side of the board as shown in Figure (8) & (9). For wiring assignments see Table (7).

CAUTION

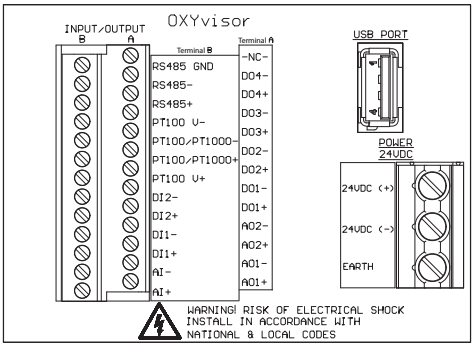
Input /Output wiring requirements:

- 26 to 16 gauge (IEC .400 to 1.25)
- Copper, stranded wire
- Minimum 300V Insulation
- Tightened (torque) to .22 to .25 Nm



AC OPTION

Figure 8 - AC Terminal Board - Located in Rear (Wiring) Compartment



DC OPTION

Figure 9- DC Terminal Board - Located in Rear (Wiring) Compartment

AC TERMINAL BOARD POWER WIRING

Label	Terminal	Description	Function
Line	Power 120/240VAC	85-240 VAC 47/63Hz Input Power	Line Power Wiring
Neutral	Power 120/240VAC	85-240 VAC 47/63Hz Input Power	Neutral Power Wiring
Earth	Power 120/240VAC	Earth Terminal	Earth Terminal

Table 5 - AC Terminal Board Power Wiring

DC TERMINAL BOARD POWER WIRING

Label	Terminal	Description	Function
24VDC (+)	Power 24VDC	21.6 - 26.4 VDC	Positive DC Power Wiring
24VDC (-)	Power 24VDC	21.6 - 26.4 VDC	Negative DC Power Wiring
Earth	Power 24VDC	Earth Terminal	Earth Terminal

Table 6 - DC Terminal Board Power Wiring

INPUT / OUTPUT WIRING

	Label	Description	Function
Input / Output TERMINAL - A	-NC-	Not used	Not used
	DO4 -	Relay Output 4 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Negative wire
	DO4 +	Relay Output 4 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Positive wire
	DO3 -	Relay Output 3 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Negative wire, (Process Gas Relay if AutoCal is used)
	DO3 +	Relay Output 3 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Positive wire, (Process Gas Relay if AutoCal is used)
	DO2 -	Relay Output 2 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Negative wire, (Span Cal Relay if AutoCal is used)
	DO2 +	Relay Output 2 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Positive wire, (Span Cal Relay if AutoCal is used)
	DO1 -	Relay Output 1 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Negative wire, (Zero Cal Relay if AutoCal is used)
	DO1 +	Relay Output 1 (24VDC, 0.05A pilot duty, 0.4A resistive load)	Programmable, Isolated Relay Positive wire, (Zero Cal Relay if AutoCal is used)
	AO2 -	Analog Output 2 (4-20mA) Active	Analog Output (Negative wire, Active 24 VDC)
	AO2 +	Analog Output 2 (4-20mA) Active	Analog Output (Positive wire, Active 24 VDC)
	AO1 -	Analog Output 1 (4-20mA) Active	Analog Output (Negative wire, Active 24 VDC)
	AO1 +	Analog Output 1 (4-20mA) Active	Analog Output (Positive wire, Active 24 VDC)

	Label	Description	Function
Input / Output TERMINAL - B	RS485 GND	Serial Communication	Modbus RS485 RTU Common Wire
	RS485 -	Serial Communication	Modbus RS485 RTU Data Negative Wire
	RS485 +	Serial Communication	Modbus RS485 RTU Data Positive Wire
	PT100 V -	PT1000 4-wire or jumper to next terminal	PT100 4 wire RTD input, Drive Voltage negative wire (black)
	PT100/PT1000 -	PT1000 Temperature Sensor	PT1000 negative wire then jumper to PT100 - terminal above
	PT100/PT1000 +	PT1000 Temperature Sensor	PT1000 positive wire then jumper to PT100 + terminal below
	PT100 V+	PT1000 4-wire, 3'rd wire or jumper to above terminal	PT100 4 wire RTD input, Drive Voltage positive wire (red)
	DI2 -	Digital Input 2 (0 VDC)	Powered Digital input, Negative Wire, Connect to external switch for remote Test Gas Insert
	DI2 +	Digital Input 2 (5 VDC)	Powered Digital input, Positive Wire, Connect to external switch for remote Test Gas Insert
	DI1 -	Digital Input 1 (0 VDC)	Powered Digital input, Negative Wire, Connect to external switch for remote AutoCal Initiation
	DI1 +	Digital Input 1 (5 VDC)	Powered Digital input, Positive Wire, Connect to external switch for remote AutoCal Initiation
	AI1 -	Analog Input (0 VDC, 4-20mA)	Analog Input, Negative Wire, 24VDC Powered,. Programmable for Temperature or Pressure
	AI1 +	Analog Input (24 VDC, 4-20mA)	Analog Input, Positive Wire, 24VDC Powered,. Programmable for Temperature or Pressure

Table 7 - Terminal Board - Input / Output - Wiring

3.8 Electrical Entries

CAUTION

Unused entries shall be closed with suitable certified Ex db blanking elements with a minimum IP66 rating

3.9 Securing the Rear (Wiring) Compartment lid.

CAUTION

After wiring the power and any input / output connections and before powering up the analyzer, the Rear (Wiring) Compartment lid should be installed and fully tightened. Follow the detailed instruction found in Section 5.4.1.

3.10 Sensor Connection Options

Barben Optical Sensors (BOS) connect to the OXYvisor through a fiber optic cable connection. The fiber optic cable from the OXYvisor is easily mated to the BOS oxygen sensor via a finger-tightened SMA coupler connection, located in the lower sensor junction box (J-Box). Both integral and external RTD's can be connected to the OXYvisor through the Rear (Wiring) Compartment and via the J-Box when the later connection is available. Figures 10, 11 & 12 show some common arrangements for the OXYvisor and BOS sensors.

3.10.1 BOS Sensor with Integral and External RTD via J-Box

When the BOS sensor is specified with an integral RTD, and the OXYvisor model is selected with Agency Approval "2" or "3", the RTD can also be connected through the J-Box via a Molex connector. See Figure 10.

USEFUL INFORMATION

The mating RTD Molex connection in the Junction Box is only available on OXYvisor models with Agency Approval selection "2" (cULus CID2 and ATEX/IEC Zone 2 3G) per OXYvisor Configuration - Product Model Selection, Table 2.

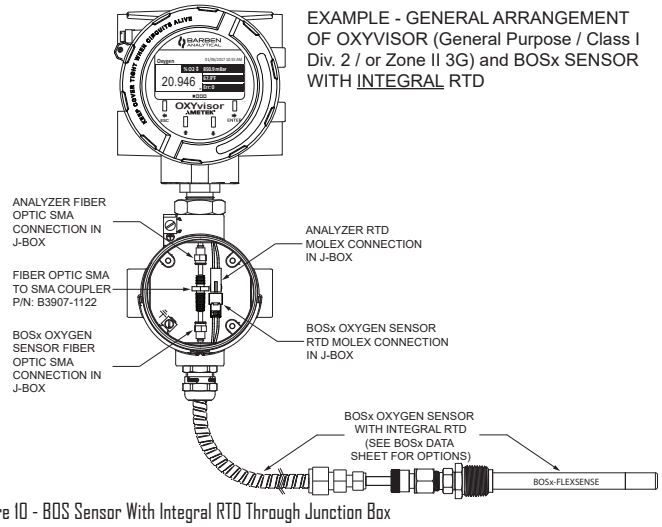


Figure 10 - BOS Sensor With Integral RTD Through Junction Box

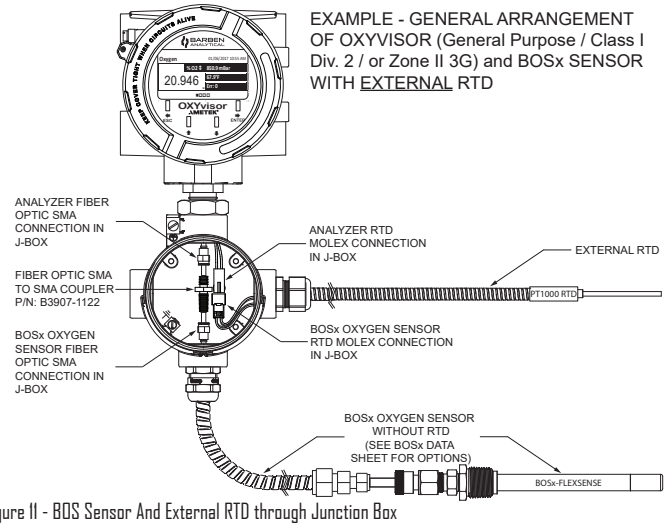


Figure 11 - BOS Sensor And External RTD through Junction Box

3.10.3 BOS Sensor with External RTD via Rear (Wiring) Compartment

For OXYvisor installations in Zone 1, where the model is selected with Agency Approval "1", the BOS sensor (as standard) is not allowed to be installed with integral RTD. An external RTD will be the standard recommended installation. For this case, the RTD can be wired through the Rear (Wiring) Compartment as shown in Figure 12.

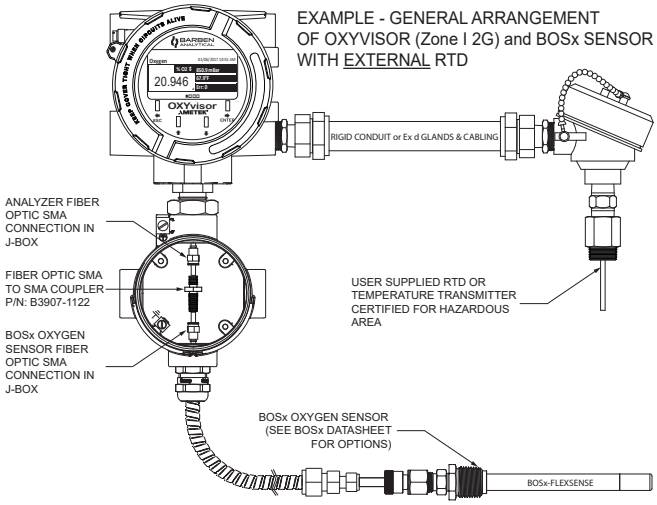


Figure 12 - BOS Sensor And External RTD or Zone I

3.11 Hazardous Area - Installation & Control Drawings

3.11.1 Zone 1 - Group IIC - 2P0345

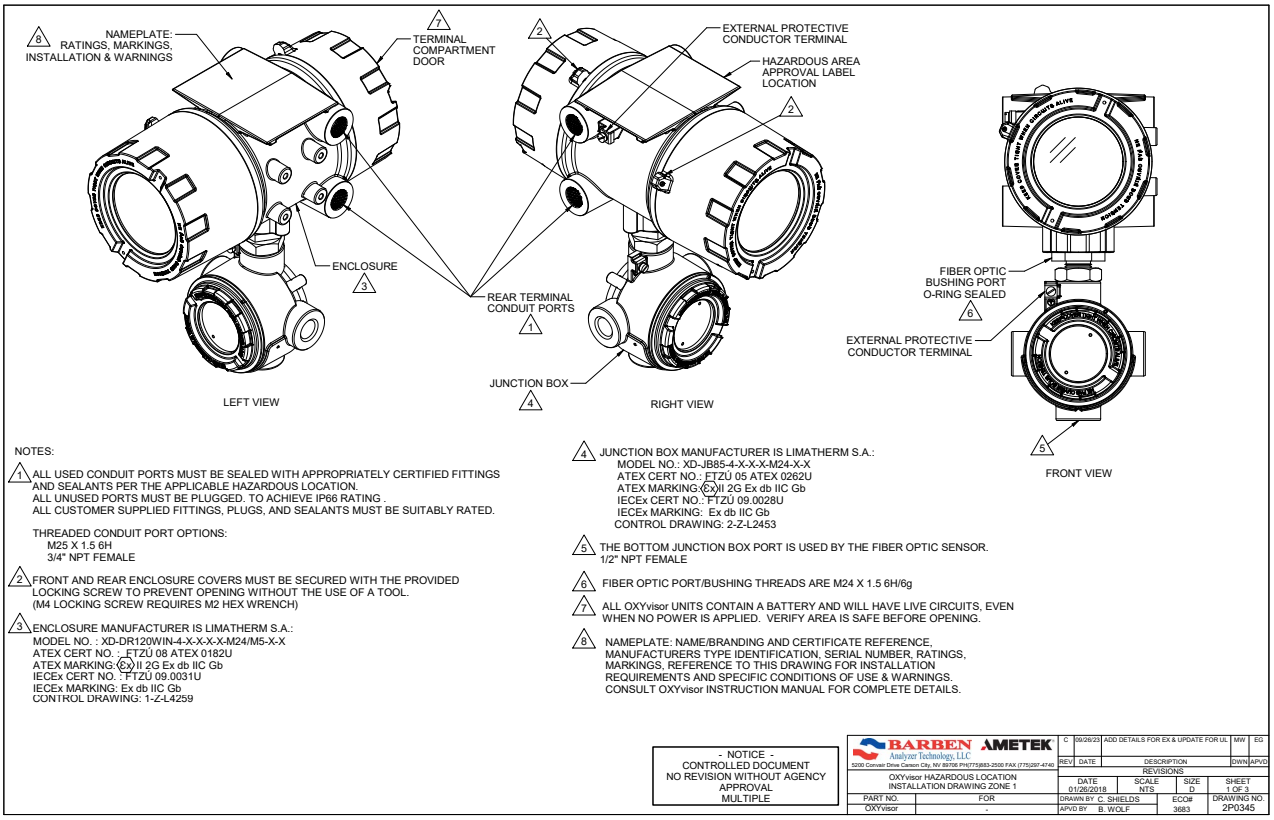


Figure 13.1 - Zone 1 HazLoc - Installation Control DWG - 2P0345 (p.1)

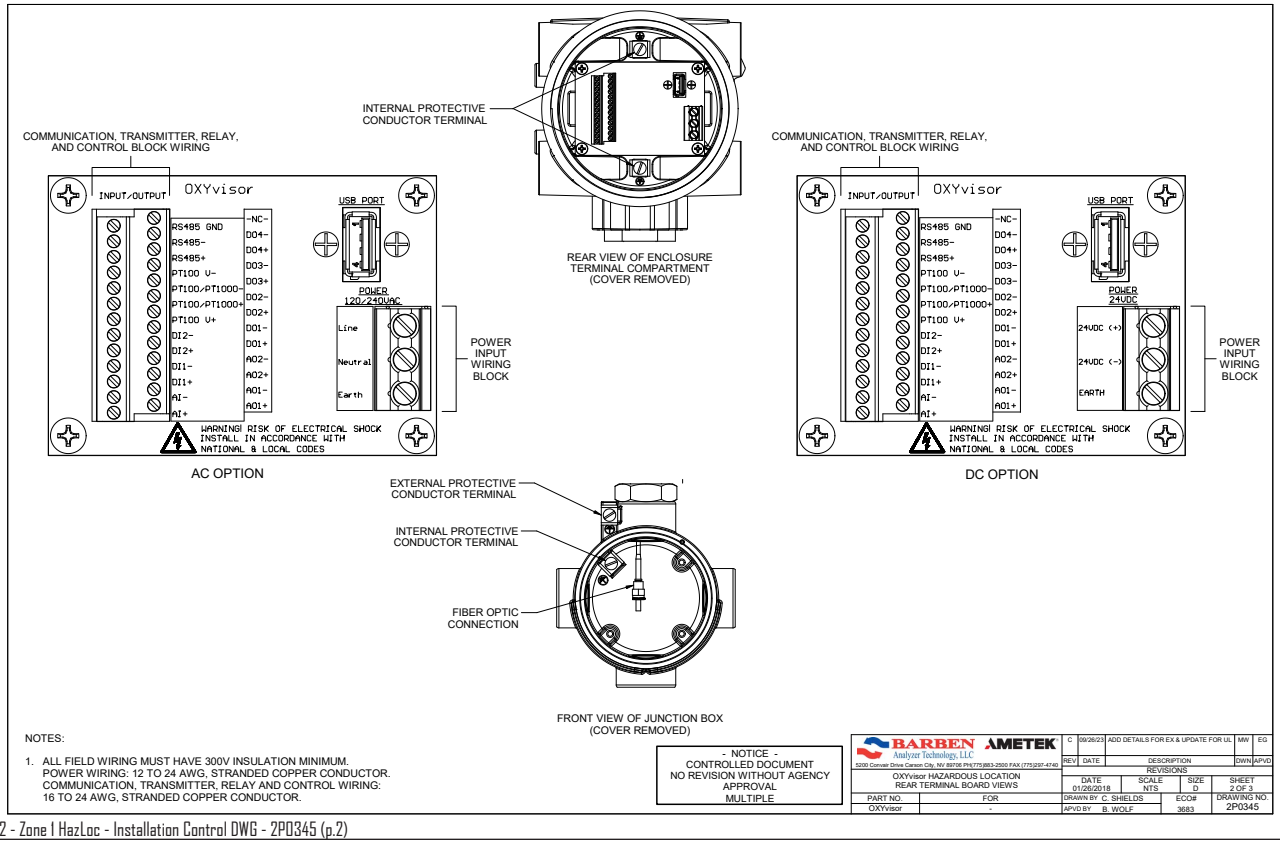
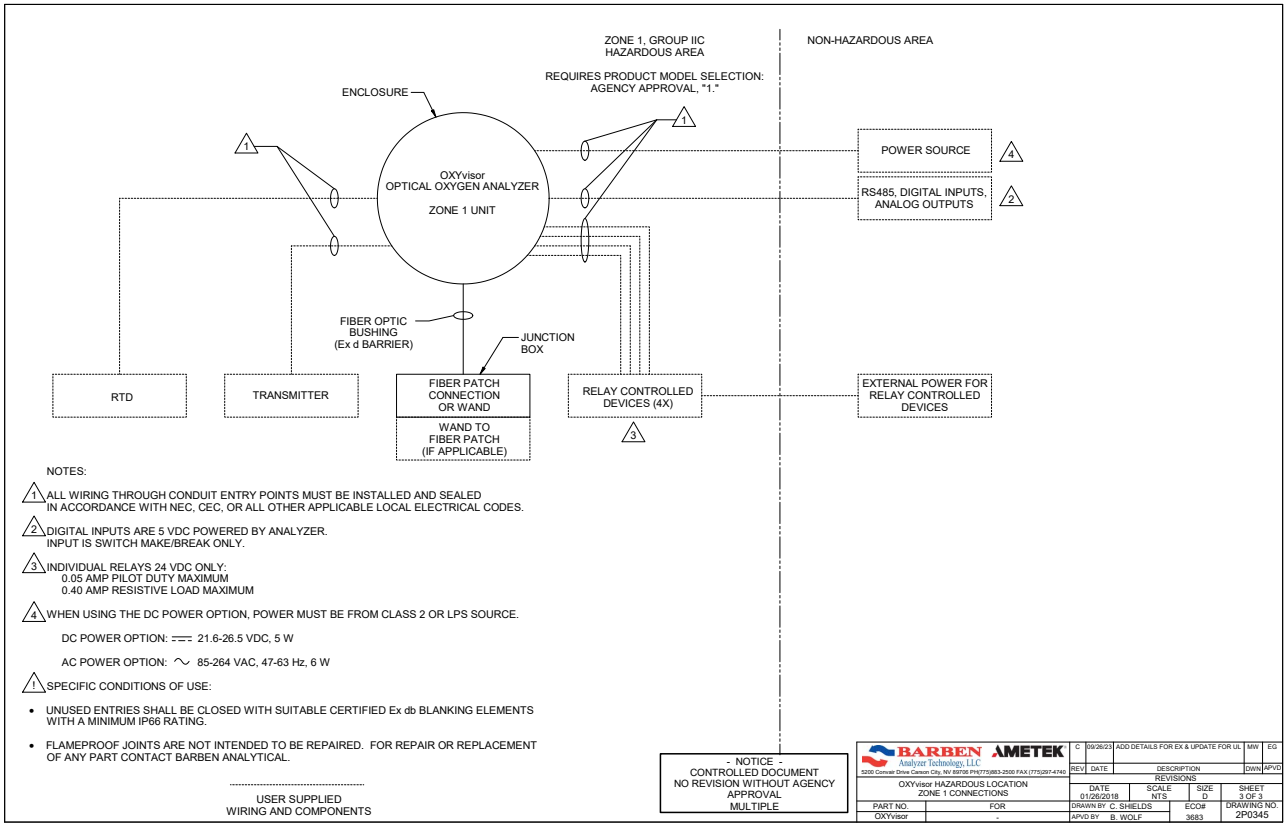


Figure 13.2 - Zone 1 HazLoc - Installation Control DWG - 2P0345 (p.2)



NOTES:

1. ALL WIRING THROUGH CONDUIT ENTRY POINTS MUST BE INSTALLED AND SEALED IN ACCORDANCE WITH NEC, CEC, OR ALL OTHER APPLICABLE LOCAL ELECTRICAL CODES.
2. DIGITAL INPUTS ARE 5 VDC POWERED BY ANALYZER. INPUT IS SWITCH MAKE/BREAK ONLY.
3. INDIVIDUAL RELAYS 24 VDC ONLY:
   0.05 AMP PILOT DUTY MAXIMUM
   0.40 AMP RESISTIVE LOAD MAXIMUM
4. WHEN USING THE DC POWER OPTION, POWER MUST BE FROM CLASS 2 OR LPS SOURCE.

   DC POWER OPTION: ⎓ 21.6-26.5 VDC, 5 W

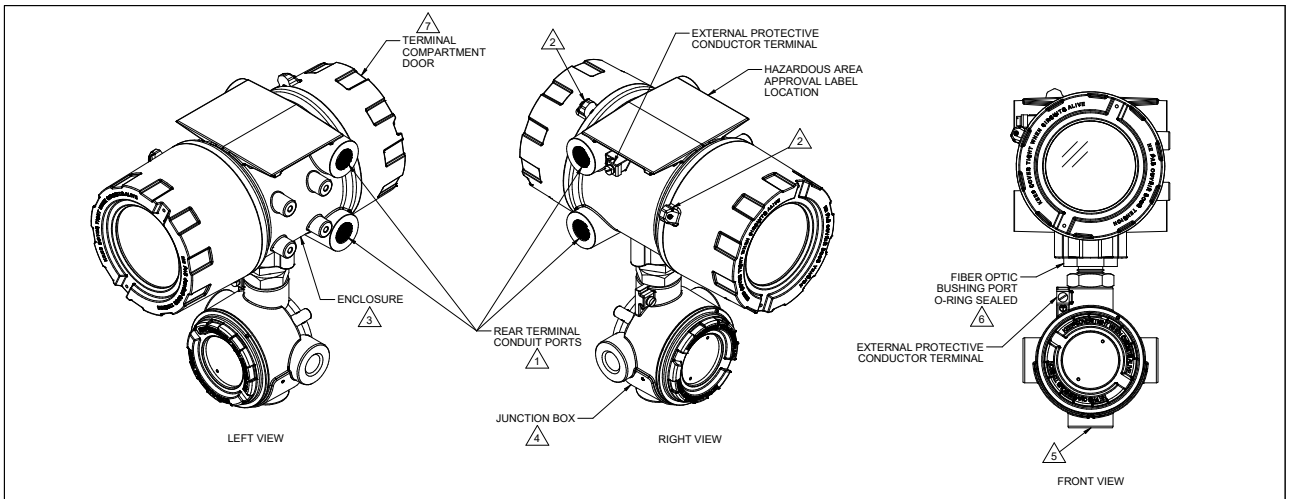
   AC POWER OPTION: ~ 85-264 VAC, 47-63 Hz, 6 W

! SPECIFIC CONDITIONS OF USE:

- UNUSED ENTRIES SHALL BE CLOSED WITH SUITABLE CERTIFIED Ex db BLANKING ELEMENTS WITH A MINIMUM IP66 RATING.
- FLAMEPROOF JOINTS ARE NOT INTENDED TO BE REPAIRED. FOR REPAIR OR REPLACEMENT OF ANY PART CONTACT BARBEN ANALYTICAL.

Figure 13.3 - Zone I HazLoc - Installation Control DWG - 2P0345 (p.3)

3.11.2 Zone 2 - Group IIC - 2P0346



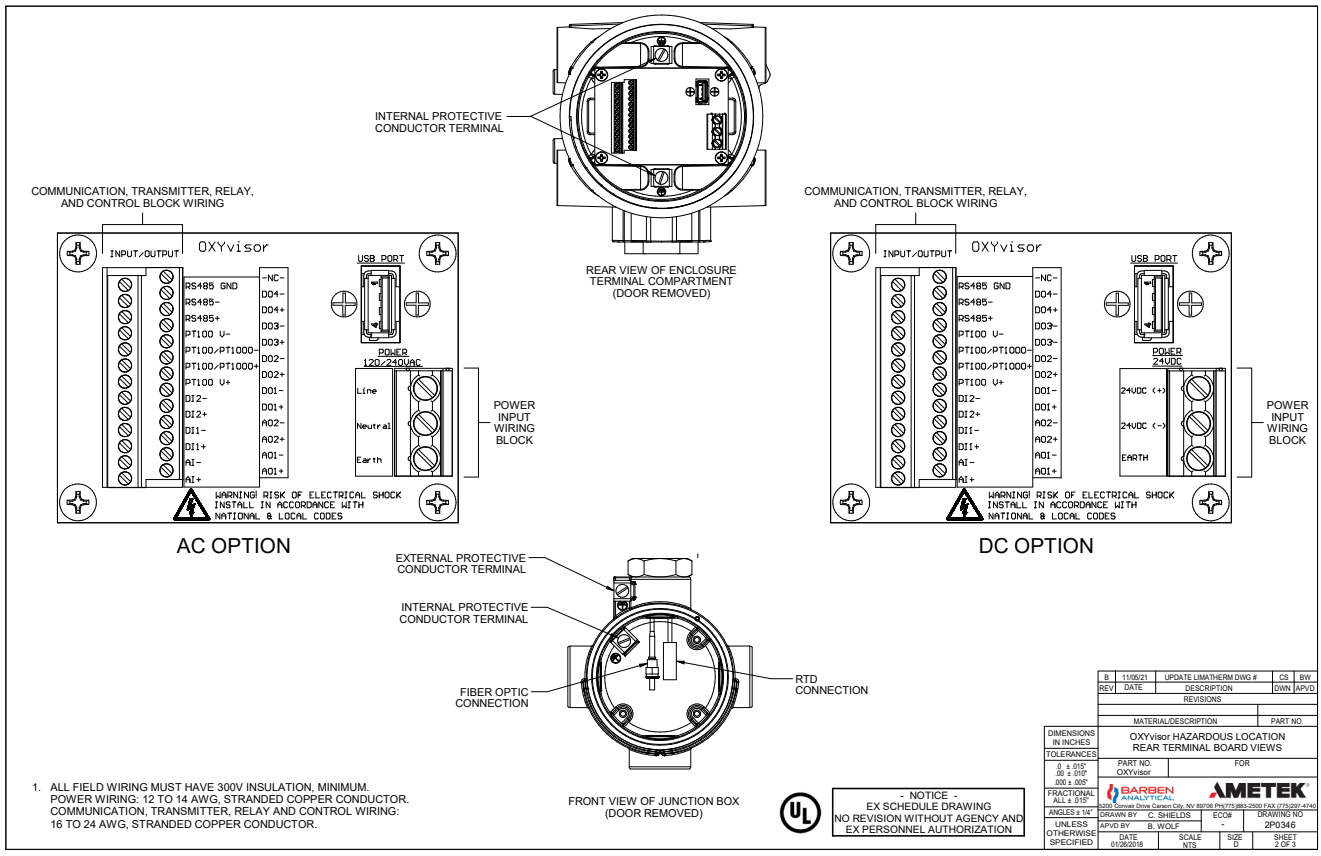
1. ALL USED CONDUIT PORTS IN ENCLOSURE AND JUNCTION BOX MUST BE SEALED WITH APPROPRIATELY CERTIFIED FITTINGS AND SEALANTS PER THE APPLICABLE HAZARDOUS LOCATION. ALL UNUSED PORTS MUST BE PLUGGED. TO ACHIEVE IP66 RATING (MAXIMUM,) ALL CUSTOMER SUPPLIED FITTINGS, PLUGS, AND SEALANTS MUST BE SUITABLY RATED.

   THREADED CONDUIT PORT OPTIONS:
   M25 X 1.5 6H
   3/4" NPT FEMALE
2. FRONT AND REAR ENCLOSURE DOORS MUST BE SECURED WITH THE PROVIDED LOCKING SCREW TO PREVENT OPENING WITHOUT THE USE OF A TOOL. (M4 LOCKING SCREW REQUIRES M2 HEX WRENCH)
3. ENCLOSURE MANUFACTURER IS LIMATHERM S.A.:
   MODEL NO. : XD-DR120WIN-4-N3-N3-N3-N3-M24/M5-SPU-CW
   OR
   XD-DR120WIN-4-M25-M25-M25-M25-M24/M5-SPU-CW
   ATEX CERTIFICATION NO. : FTZÚ 08 ATEX 0182U
   ATEX MARKING: Ⓔx II 2G Ex db IIC Gb
   IEC Ex CERTIFICATION NO. : FTZÚ 09.0031U
   IEC Ex MARKING: Ex db IIC Gb
   CONTROL DRAWING: 1-Z-L4259
   COATING: SPRAYED POLYURETHANE ON SPRAYED EPOXY LAYER
4. JUNCTION BOX MANUFACTURER IS LIMATHERM S.A.:
   CONTROL DRAWING: 2-Z-L2453
   COATING: SPRAYED POLYURETHANE ON SPRAYED EPOXY LAYER
5. THE BOTTOM JUNCTION BOX PORT IS CONSUMED BY THE FIBER OPTIC SENSOR. 1/2" NPT FEMALE
6. FIBER OPTIC PORT/BUSHING THREADS ARE M24 X 1.5 6H/6g
7. ALL OXYvisor UNITS CONTAIN A BATTERY AND WILL HAVE LIVE CIRCUITS, EVEN WHEN NO POWER IS APPLIED. DECLASSIFY HAZARDOUS AREAS BEFORE OPENING.

- NOTICE - EX SCHEDULE DRAWING NO REVISION WITHOUT AGENCY AND EX PERSONNEL AUTHORIZATION

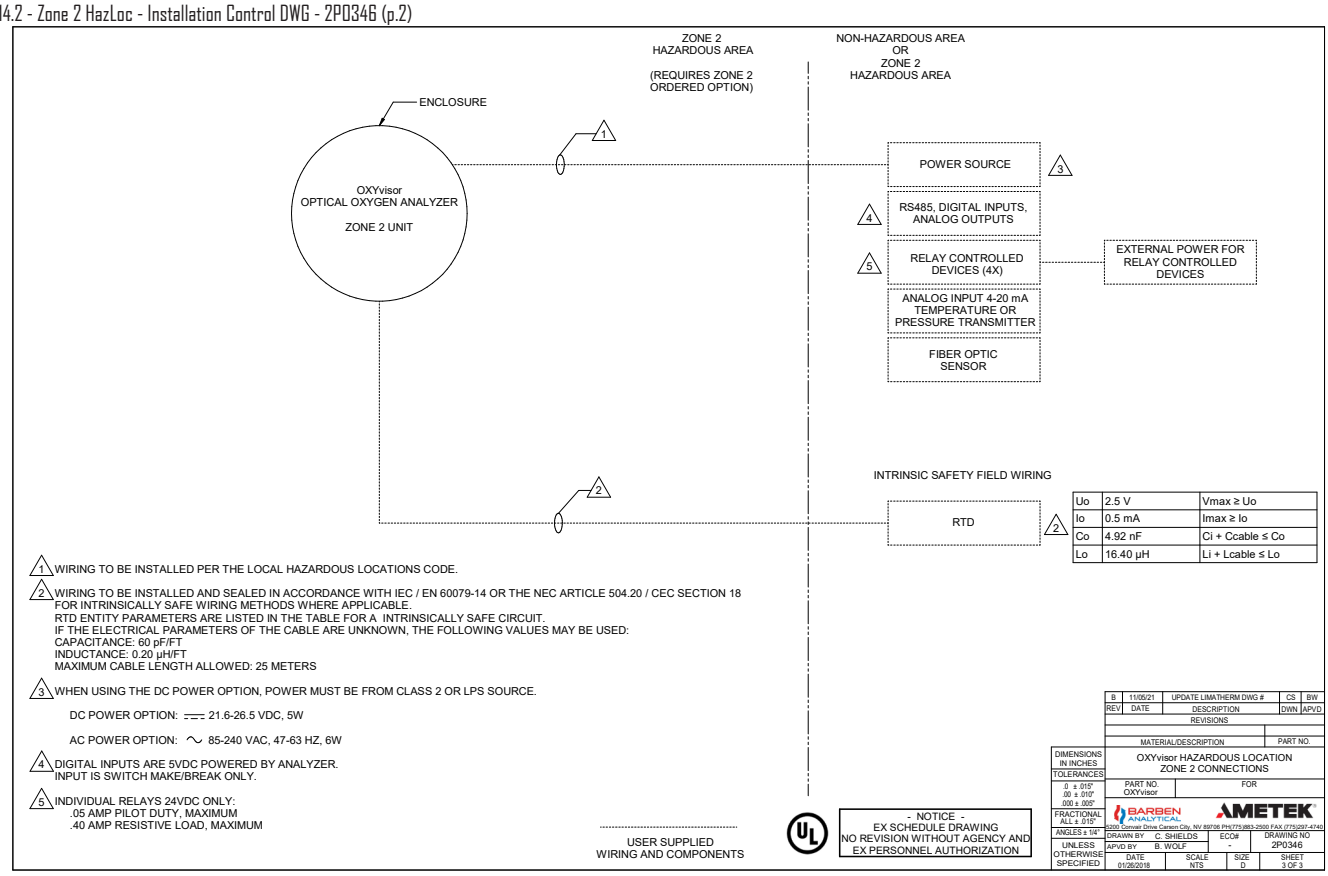
OXYvisor HAZARDOUS LOCATION INSTALLATION DRAWING ZONE 2
BARBEN ANALYTICAL AMETEK
DRAWING NO. 2P0346

Figure 14.1 - Zone 2 HazLoc - Installation Control DWG - 2P0346 (p.1)



1. ALL FIELD WIRING MUST HAVE 300V INSULATION, MINIMUM.
   POWER WIRING: 12 TO 14 AWG, STRANDED COPPER CONDUCTOR.
   COMMUNICATION, TRANSMITTER, RELAY AND CONTROL WIRING:
   16 TO 24 AWG, STRANDED COPPER CONDUCTOR.

Figure 14.2 - Zone 2 HazLoc - Installation Control DWG - 2P0346 (p.2)



1. WIRING TO BE INSTALLED PER THE LOCAL HAZARDOUS LOCATIONS CODE.
2. WIRING TO BE INSTALLED AND SEALED IN ACCORDANCE WITH IEC / EN 60079-14 OR THE NEC ARTICLE 504.20 / CEC SECTION 18 FOR INTRINSICALLY SAFE WIRING METHODS WHERE APPLICABLE.
   RTD ENTITY PARAMETERS ARE LISTED IN THE TABLE FOR A INTRINSICALLY SAFE CIRCUIT.
   IF THE ELECTRICAL PARAMETERS OF THE CABLE ARE UNKNOWN, THE FOLLOWING VALUES MAY BE USED:
   CAPACITANCE: 60 pF/FT
   INDUCTANCE: 0.20 µH/FT
   MAXIMUM CABLE LENGTH ALLOWED: 25 METERS
3. WHEN USING THE DC POWER OPTION, POWER MUST BE FROM CLASS 2 OR LPS SOURCE.
   DC POWER OPTION: ⎓ 21.6-26.5 VDC, 5W
   AC POWER OPTION: ∿ 85-240 VAC, 47-63 HZ, 6W
4. DIGITAL INPUTS ARE 5VDC POWERED BY ANALYZER. INPUT IS SWITCH MAKE/BREAK ONLY.
5. INDIVIDUAL RELAYS 24VDC ONLY:
   .05 AMP PILOT DUTY, MAXIMUM
   .40 AMP RESISTIVE LOAD, MAXIMUM

Figure 14.3 - Zone 2 HazLoc - Installation Control DWG - 2P0346 (p.3)

3.11.3 Class I, Div2 - 2P0335

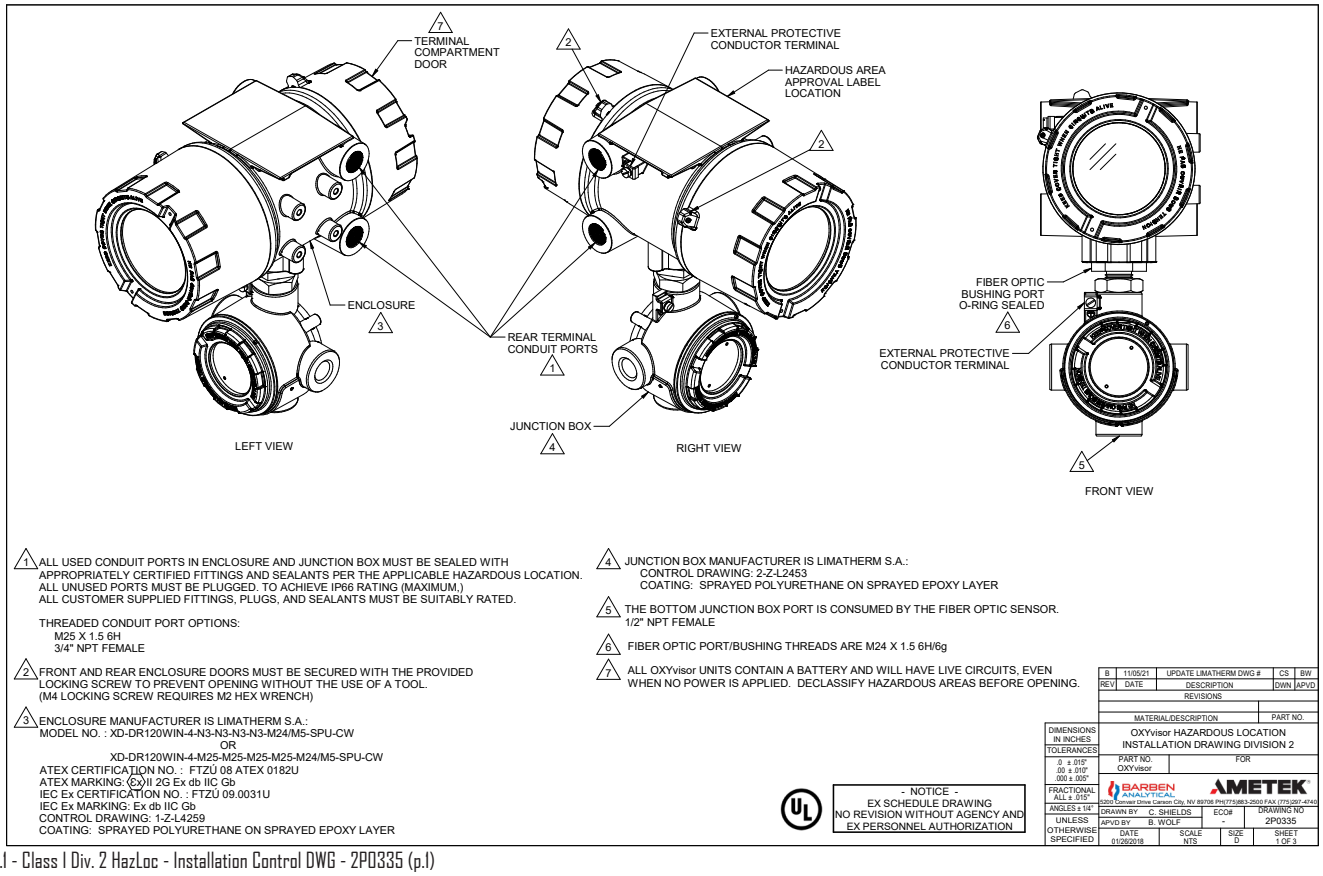


Figure 15.1 - Class I Div. 2 HazLoc - Installation Control DWG - 2P0335 (p.1)

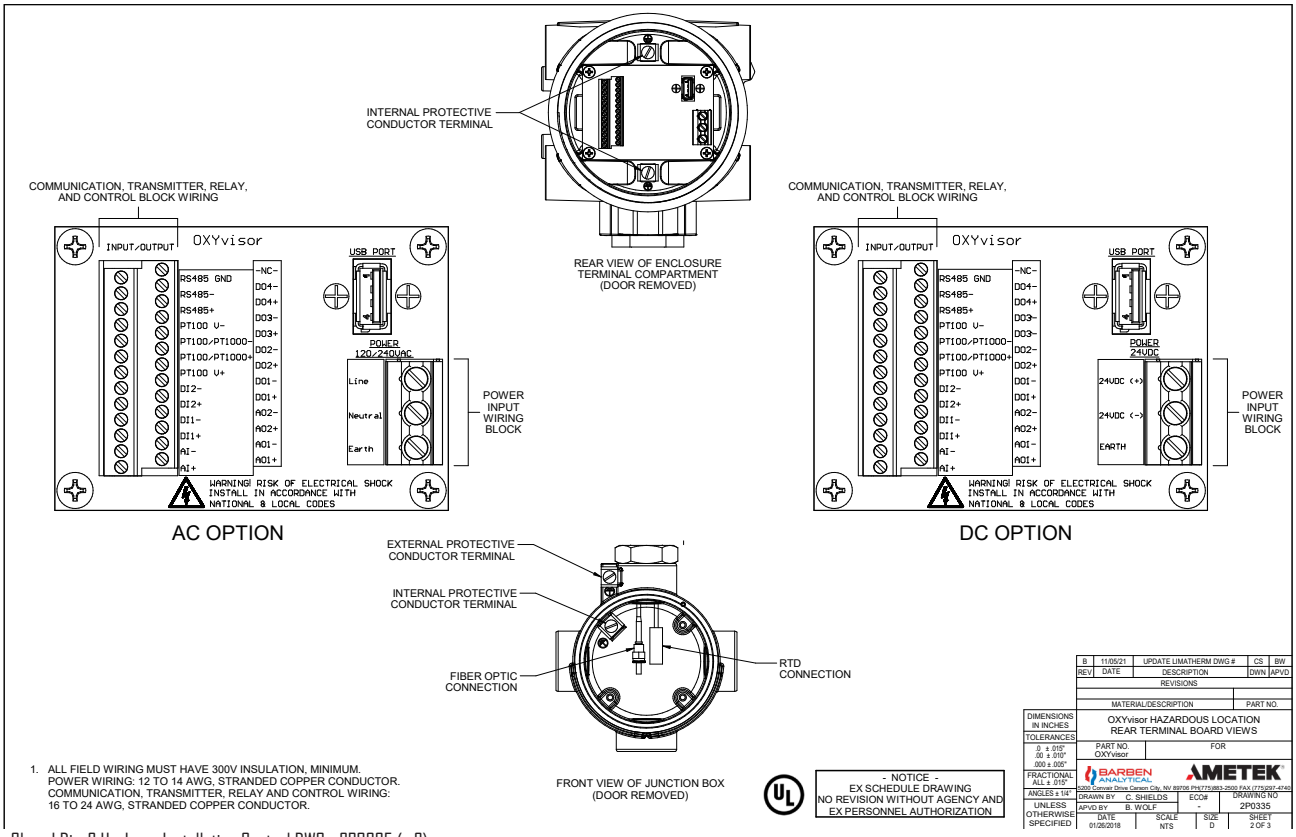


Figure 15.2 - Class I Div. 2 HazLoc - Installation Control DWG - 2P0335 (p.2)

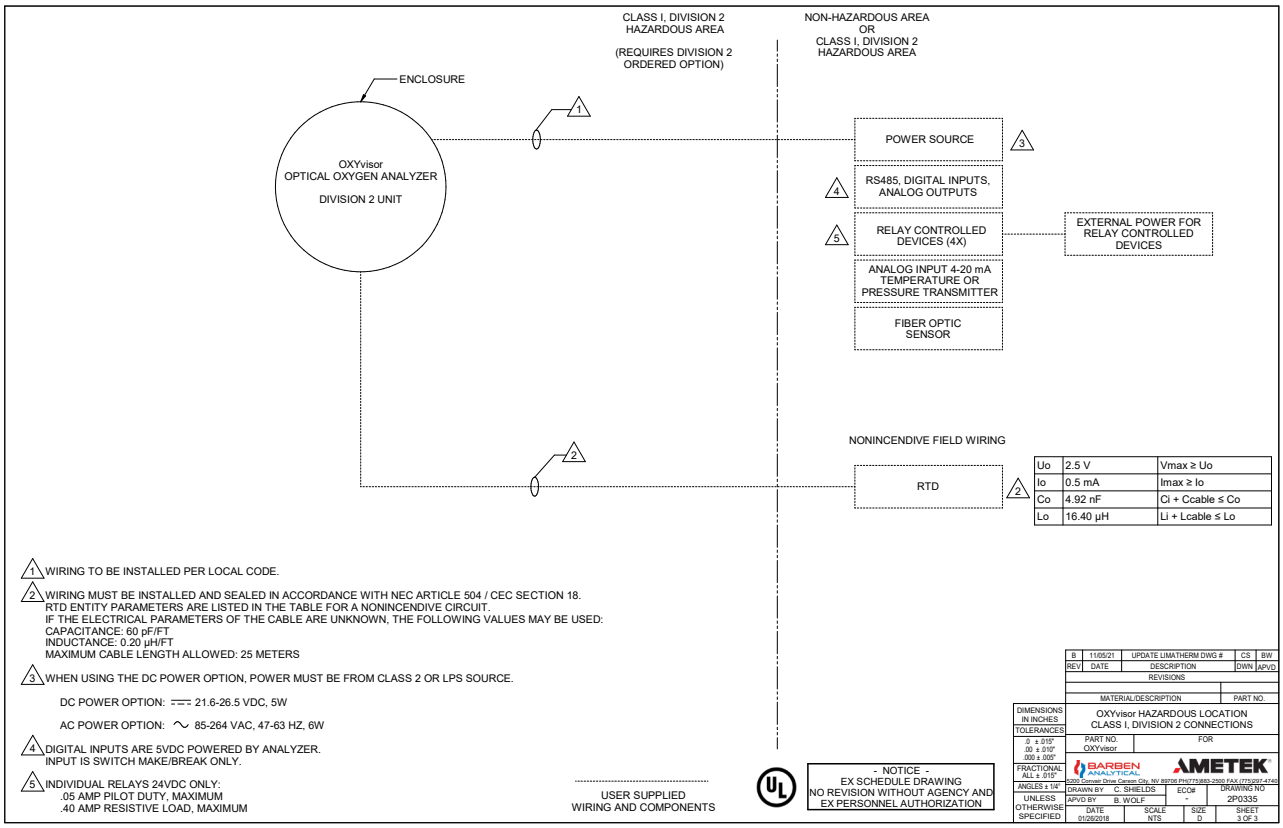


Figure 15.3 - Class I Div.2 HazLoc - Installation Control DWG - 2P0335 (p.3)

Section 4 - Operations

4.1 Operations Overview

All programming of the OXYvisor analyzer can be accomplished either through the keypad or through the OXYvisor software provided with the unit. Consult the OXYvisor IOM and/or the OXYvisor IM Software for detailed operation instructions. With regards to safety, the OXYvisor was tested to the standards stated in Section 2.7, while configured and loaded to the worst case conditions.

4.2 Sub-Menu - Error Codes

The analyzer will show any active error codes on the active display, along with recording the error into the log and throwing any associated alarm. The error codes are broken into two main groups, "N" for non-critical alarms and "X" for critical. "N" Non-critical alarms, Table 8, indicate an issue that should be immediately investigated and resolved, however it has been determined that the measurement is still likely good and it is unnecessary to fault the output. A "X" critical fault, Table 9, identifies something that likely renders the device immediately faulty and fails the 4-20 mA outputs.

Error Code	N-type (non-critical) Error Description	Trouble shooting and things to check
N12	Optical measurement error. Optical board is not able to perform the calculation from the sensor input available.	Check O_2 sensor connections. Check sensor tip for damage. Place sensor into Zero gas and observe. Consult factory.
N13	Phase Angle "out of range"	This is a common error for BOS3 sensors while exposed to air. Place sensor in zero gas and observe. Check O_2 sensor connections. Check sensor tip for damage. Consult factory.
N15	Data sent to the Optical Board is wrong or out of bounds.	Consult factory.
N21	Data present in flash is in an unrecognized format.	Consult factory. Flash type error. User will be required to roll-back to previous firmware rev or will have to erase the log in order to proceed.
N25	Ambient pressure reading is out of range (500 mBar to 11 mBar).	Check local ambient conditions. Configure for manual pressure input and give best estimate value for measurement and calibration pressure(s).
N35	Modbus validation engine has flagged an error and some unauthorized operation was performed over Modbus.	Check the Modbus master device. If a Modbus to USB cable is being used, check cable requirements and replace.
N36	Unauthorized register was accessed via the Modbus. It can be flagged while writing or reading via Modbus.	Check your Modbus master device and any converters.
N41	Sensor temperature protection. The sensor operating temperature is out of range.	Investigate the process temperature. Process temp must be greater than -10 °C and less than 90 °C. Reduce process or sample temperature.
N42	Zero phase angle is out of the allowed limits (45° to 70°)	Check calibration gas flow during calibration. Check for leaks. Check sensor connections. Error is cleared with a proper calibration.
N44	Auto calibration zero value has crossed the user defined tolerance limit.	Check calibration gas flow during calibration. Check for leaks. Check sensor connections. Error is cleared with a proper calibration.
N45	Auto calibration span value has crossed the tolerance limit.	Check calibration gas flow during calibration. Check for leaks. Check sensor connections. Error is cleared with a proper calibration.
N46	The O_2 reading exceeds the user defined 20mA value.	Check the 20 mA point. Increase the 20 mA point or consider bi-linear 4-20 mA output to account for this high O_2 condition.
N47	The O_2 reading is lower than user defined 4mA value.	Check the 4 mA point. If 4 mA point is set to zero, re-perform a zero calibration.
N51	RTD not detected in the system.	Check the wiring and any jumpers at the termination board. Remove the sensor and check for proper Pt1000 resistance with Multimeter.
N52	Temperature reading is out of user defined 4-20 mA limits	Check the 20 mA point. Increase the 20 mA point or consider bi-linear 4-20 mA output to account for this high O_2 condition.
N53	Analog output 1, AO1, is open circuit.	Check wiring to device. OXYvisor is (active, powered output) so make certain the receiving device is passive (non-powered). If AO1 is not planned to be used, set to inactive
N54	Analog output 2, AO2, is open circuit.	Check wiring to device. OXYvisor is (active, powered output) so make certain the receiving device is passive (non-powered). If AO2 is not planned to be used, set to inactive
N56	Analog input, AI, pressure value is outside of user defined 4-20 mA limits.	Check that process or sample pressure value is within the limits. Check transmitter wiring to the AI terminals. Expand 4-20 input range if required.

Table 8 - "N" Non-Critical - Error Code Table

Error Code		X-type (critical) Error Description	Trouble shooting and things to check
X11	Signal intensity is too low .		Sensor signal is fully quenched. This is a common error when BOS3 sensors is exposed to ambient air, fix by running in process or O_2 less than 1,000 ppm. For other sensor types; check the SMA sensor connectors, sensor caps and that the wand for the FlexSense are pushed all the way in.
X14	Spectrometer communication has failed.		Record all errors and consult factory
X16	Spectrometer was disconnected.		Record all errors and consult factory
X21	Signal intensity is too high.		Signal intensity is defaulted for FlexSense style sensors. If you have a FiberSense, turn down the signal intensity. See Table 10 for general recommended values.
X22	Signal is too high.		Record all errors and consult factory.
X23	Spectrometer reference path error.		
X24	Spectrometer EEPROM has failed.		
X31	Spectrometer microprocessor has failed.		
X32	Spectrometer pulse counter overflowed.		
X33	The error indicates that the firmware present in the spectrometer has undergone a reset.		Power OFF and ON. If error is still present, consult the factory.
X34	This error indicates that some component on the main board has failed. The error is never cleared if set. A number is printed on the main display next to the X34 error. This number can be used to identify the cause of failure. The bitmap shown below can be used to identify the component that failed.		Record the details of error, "X34 - Bit YZ" and consult the factory
	0	Bit 0 - ADC Communication Failure	
	1	Bit 1 - Altimeter wrong manufacture ID	
	4	Bit 2 - Altimeter Disconnected	
	8	Bit 3 - DAC 1 Communication Failure	
	16	Bit 4 - DAC 2 Communication Failure	
	32	Bit 5 - Reserved	
	64	Bit 6 - Non Volatile Memory ID Failure	
	128	Bit 7 - Non Volatile Memory Communication Failure	
	256	Bit 8 - Flash ID Failure	
	512	Bit 9 - Flash Memory Type Failure	
	1024	Bit 10 - Flash Memory Capacity Failure	
	2048	Bit 11 - FRAM Communication Failure	
	4096	Bit 12 - RTD ADC Communication Failure	
	8192	Bit 13 - UI Board Reset Error	
	16384	Bit 14 - Flash Data Corruption Error	
X55		The error indicates that the system has encountered a power failure. This error is cleared once the user acknowledges this . This error is not set for software resets.	Indicated the analyzer lost power. Check wiring. Check power source.

Table 9 - "X" Critical - Error Code Table

Section 5- Maintenance / Repair / Service

5.1 Safety Instructions



Only use original accessories or original spare parts as described within this instruction. Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the accessory or spare parts.



If an error message exist: (1) Check the gravity of the error, (2) Correct the error, and (3) If the device is faulty take it out of operation.



There is a danger of explosion when performing repairs and maintenance on the device in a hazardous area. Isolate the device from power and ensure the atmosphere is explosion-free (hot work permit) before opening the analyzer.



Danger of explosion in areas subject to explosion hazard. Connect the device correctly after maintenance. Close and seal the device after maintenance work.

Technical Assistance is available directly from, Barben Analytical | AMETEK - 5200 Convair Drive, Carson City NV 89706 | +1.775.883.2500 | Sales.Barben@Ametek.com

5.2 Maintenance Overview

The OXYvisor analyzer has minimal maintenance requirements. As good practice, from time-to-time it is recommended to:

- Visually inspect the analyzer and its components for any damage.
- Check the Alarm Log for any conditions and take actions if they persist.
- Wash the analyzer clean with water to remove any buildups of corrosive components.

Maintenance for the BOS oxygen sensors are not covered in this manual. Please consult the BOS maintenance manual.

5.3 Repairs

The OXYvisor is not intended for field repair, except a few minor direct part replacements. The only field components allowed for replacement are the Rear (Wiring) Compartment lid and the Junction Box.



Flameproof joints are not intended to be repaired. For repair or replacement of any part, contact Barben Analytical.

5.4 Service

This section covers removal and installation of field removable or replaceable items.

5.4.1 - Removing and Replacing Rear (Wiring) Compartment Lid



There is a danger of explosion when carrying out repairs and maintenance on the device in a hazardous area. Isolate the device from power and ensure the atmosphere is explosion-free (hot work permit) before opening the analyzer.

The Rear (Wiring) Compartment lid can be removed by:

1. Using a tool (2 mm Hex), unlock the Rear (Wiring) Compartment 2 mm Hex Lock.
2. Turn the Rear (Wiring) Compartment lid by rotating counter-clockwise.



It is important to be careful when screwing the rear lid cover on or off. Thread surface should be free of any grains, pellets and other impurity, which cause seizing, and thread could be damaged. Never screw on the cover forcefully!

The Rear (Wiring) Compartment lid can be installed and secured by:

1. Turn the Rear (Wiring) Compartment lid by rotating clockwise.
2. Ensure lid threads completely, compresses o-ring and no gap exist between lid and main enclosure.
3. Secure the lid by tightening the 2 mm Hex Lock with tool.

Contact Us

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