



O₂ Analyzer

Professional
Dive Oxygen
Analyzer

OWNER'S MANUAL



Item: OX-ANII

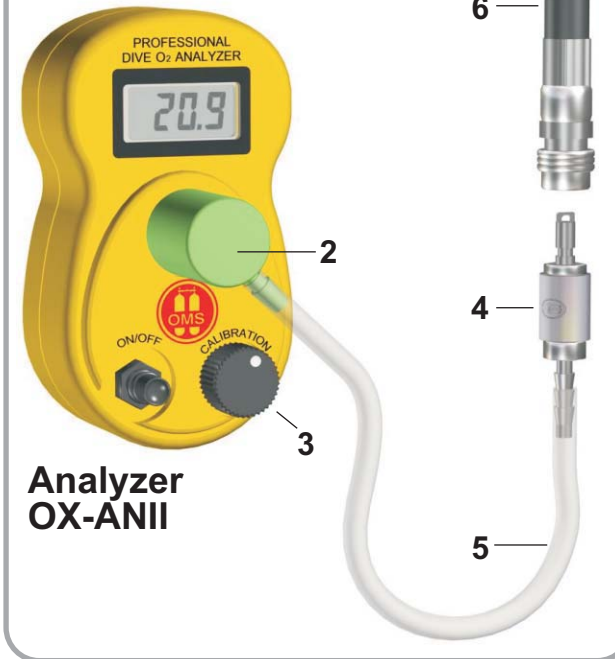


OCEAN MANAGEMENT SYSTEMS, INC.



O₂ Analyzer

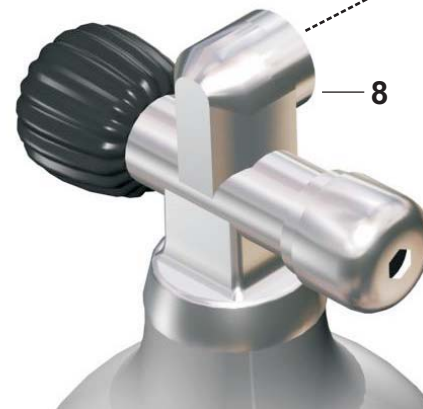
Connecting Option (1)



ANALYZER
OX-ANII



Connecting Option (2)



1. Threaded male port
2. Collection adapter
3. Calibration knob
4. Ox-Hectox flow meter
5. Collection hose
6. Low pressure BC inflator hose
7. Optional (OX-1S492) 2-3 LPM Flowmeter
8. Cylinder valve
9. Optional Din to K valve adapter

Oxygen Analyzer System (OXAN)

Introduction

The most accurate portable analyzer on the market! Did you know that most Oxygen Analyzers are designed for medical use: ventilators, incubators, emergency transports, oxygen tents, concentrators, respiratory therapy – and not for analysis of diving gases?

Do you know that these units due to the –

- Calibration method
 - Stated accuracy
 - Sampling technique
 - Humidity and temperature sensitivity
- can introduce a significant cumulative sampling error?

The OMS® Professional Dive Oxygen Analyzer is specifically engineered to be an accurate oxygen analyzer for use in a real world dive environment. It has been tested and utilized under the harshest conditions and is currently in use in the North Sea and by the military for the ultimate accuracy in measuring oxygen content in gas.

Setting up your Analyzer

Before use, unscrew clear sensor sealing cap from front of unit and screw on collection adapter (2) until adequate seal is formed (finger tight). Retain clear sensor sealing cap.

If instrument is not to be used for an extended period of time, it is recommended that the collection adapter (2) is removed and replaced with clear sensor sealing cap in order to maximize the life of the sensor.



Specifications

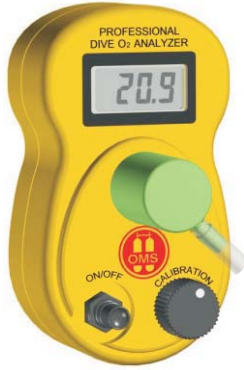
| OMS® | Other(s) | OMS® Advantage |
|--|--|--|
| SPLASHPROOF HOUSING | NOT WATERPROOF | THE OMS® O2 ANALYZER, (OXAN), OFFERS IMPROVED PROTECTION |
| INTERNAL OXYGEN SENSOR IS TEMPERATURE COMPENSATED | EXTERNAL O2 SENSOR NOT TEMPERATURE COMPENSATED | TEMPERATURE INDUCED ERROR IS REDUCED. THE OXAN IS MORE ACCURATE |
| SENSOR LIFE: 1 YEAR, Typical* | 1/2 TO 1 YEAR | COMPARABLE |
| GAS INTERFERANT: He N, NOT DETECTED | < .2% | THE OXAN IS MORE ACCURATE |
| O2 RANGE: 0.1%–100% | 0%- 100% | COMPARABLE |
| RESOLUTION: 0.1% O2 | 0.1% | COMPARABLE |
| **ACCURACY: ± 1% OF READOUT (±1 count) | ±2% OF FULL SCALE | THE OXAN IS SIGNIFICANTLY MORE ACCURATE |
| RECOMMENDED CALIBRATION GAS: AIR OR QUANTIFIED GAS % CLOSEST TO GAS BREATHED | 100% O2 | OMS® CALIBRATION METHOD PROVIDES A SIGNIFICANTLY MORE ACCURATE READING |
| RESPONSE TIME TO 90% FINAL READING: LESS THAN 15 SECONDS | 13 SECONDS | COMPARABLE |
| OPERATING TEMP: 32°F to 121°F (0°C to 50°C) | 32°F to 104°F (0°C to 40°C) | THE OXAN CAN BE USED OVER A GREATER TEMPERATURE RANGE |
| DIMENSIONS AND WEIGHT: 4.4"L x 2.6"W x 1.85"D 7.0 oz (112 L x 66 W x 47 D mm 200g) | 4.62"L x 2.5"W x 1.5"D 8.25 oz (117 L x 64 W x 38 D mm 235g) | THE OXAN IS LIGHTER AND ERGONOMICALLY DESIGNED |
| SAMPLING TECHNIQUE: LP INFLATOR HOSE CONNECTED TO OX-HECTOX (OPTIONAL) 2-3 LPM OR OPTIONAL DIN 2-3 LPM FLOW METER (OX-1S492) | VARIES, WITH POORLY DEFINED FLOW RATE. NO FLOWMETER | THE OXAN IS MORE ACCURATE |

* The oxygen sensor is guaranteed for 6 months.

**The accuracy of the readout degrades ±4% when used in close proximity of light RF fields and degrades further to ±15% when in proximity of strong RF fields. If reading appears to jump in large steps or have a fixed offset, this is an indication of RF interference. The analyzer should not be used in close proximity to a high output radio transmitter, such as marine radio etc. It is the user's responsibility to ensure that the instrument is used in a suitable

Readout Accuracy Example

OMS[®] uses Readout Accuracy. The competitors, “Full Scale Accuracy” alone, can introduce significant error. This error is further compounded if the user follows the manufacturer’s recommendations and calibrates to 100% O₂. This type of error CANNOT be tolerated when using low % oxygen mixtures.



Example: Dive plan: depth 430 fsw/10% O₂ Mix /PO₂ limit: 1.4 ATA at depth

| OMS [®] | Planned PO ₂ | Actual PO ₂ w/ Max. Error |
|------------------|-------------------------|--------------------------------------|
| OMS [®] | 1.4 ATA | 1.4 ATA |
| OTHER | 1.4 ATA | 1.68 ATA |

Sampling Technique:

It should be noted that many of the methods currently in use to measure O₂% vary; most collecting the gas at the high pressure SCUBA valve or low pressure hose areas. For the most part, these devices poorly regulate the flow rate of the gas to the sensor. Poor regulation of the gas flow can introduce significant readout errors >±3%, by changing the PO₂ (partial pressure of oxygen) or gas temperature to the sensor!

| Item | Description |
|-----------|---|
| OX-ANII | OMS [®] OXYGEN ANALYZER SYSTEM INCLUDES: ANALYZER, OX-1S492 FLOW METER COLLECTION HARDWARE, AND PROTECTIVE O-RING CASE |
| OX-HECTOX | OPTIONAL LP INFLATOR HOSE, FLOW METER |
| R239 | ADAPTER ALLOWS DIN FLOW METER (OX-1S492) TO BE USED WITH STANDARD K-VALVES |

OMS[®] O₂ System Description

The OMS[®] Oxygen Analyzer System (OXAN) consists of the following components:

Standard Flow Meter

The (OX-1S492) flow meter has the following features:
DIN First Stage equipped with the OX-492 precision ruby orifice flow device that outputs at a constant 2-3 lpm.

OX-492 Barbed Flow Meter:

Connects to one end of the collection hose and the threaded end is inserted into the LP port of your regulator.

OX-492 Barbed Flow Meter



Warning: USE ONLY A LOW PRESSURE INFLATOR HOSE. USE OF HIGH PRESSURE HOSES, OR USE OF HIGH PRESSURE WITH A LOW PRESSURE HOSE CAN RESULT IN FLOW METER EXPLOSION, CAUSING PERSONAL INJURY OR DEATH.

Optional OX-HECTOX Flow Meter

This optional, constant flow (2-3 lpm) flow meter has a fitting that couples directly to most LP BC inflator hoses. The outlet nipple connects to one end of the collection hose and the other end of the hose is connected to the collection adapter nipple (on the analyzer).



Analyzer

Collection Adapter: This adapter connects to the collection hose that exits the flow meter(s) and attaches to the threaded male port on the analyzer body.



How To Use Your O₂ Analyzer

A. Connections *(see inside front cover)*

1. Standard Flow Meter (OX-1S492): Connect First Stage regulator to the valve inlet (8) and make sure your cylinder valve is in the “off position.” Then connect one end of the collection hose to the analyzer collection adapter nipple and the other end of the hose to the flow meter outlet.

2. Optional Flow Meter (OX-HECTOX): With your cylinder valve in the off position, connect the nipple to the BC LP inflator hose. Then connect one end of the collection hose to the analyzer collection adapter nipple and the other end of the hose to the outlet nipple on this flow meter.

3. Optional Flow Meter (OX-492): This precision flow meter incorporates, a submicron filter followed by a precision machined ruby orifice. This is the heart of the OX-HECTOX and the OX-1S492 and outputs at a constant 2-3 lpm. The OX-492 can be purchased separately and installed into the LP port of your regulator.



Warning: IT IS MANDATORY THAT THE DIN PORTION OF THE OX-1S492 BE PROPERLY THREADED INTO AND COMPLETELY SEATED IN THE DIN VALVE OR THE R239 ADAPTER BEFORE PRESSURIZING. FAILURE TO DO SO CAN CAUSE THE FLOW METER TO BECOME A “PROJECTILE,” RESULTING IN DAMAGE, PERSONAL INJURY OR EVEN DEATH.

B. Calibration



Caution: YOU MUST CALIBRATE YOUR OXYGEN ANALYZER BEFORE EVERY USE. THE FLOW RATE IS AUTOMATIC FOR ALL FLOW METERS (OX-1S492, OX-492 AND OX-HECTOX) AND THEREFORE IS THE SAME FOR CALIBRATION AND GAS SAMPLE TESTING.

1. Calibration to air or a quantified % gas sample: Turn the calibration cylinder valve on.
2. Both OX-1S492 and OX-HECTOX output at a constant 2-3 lpm so no adjustment is required:
 - a. Air: Run the air to the analyzer for approximately 2 minutes and adjust the analyzer LCD display value, using the calibration knob, to 20.9%.
 - b. Quantified Gas Sample: For accuracy purposes it is best to calibrate to a known oxygen percentage closest to the gas to be breathed. Run the quantified O₂% gas sample to the analyzer for approximately 2 minutes and adjust the analyzer readout to the known oxygen percentage of the quantified gas sample.

How To Use Your O₂ Analyzer

High Altitude Compensation

Note for high altitudes: At very high altitudes, you may need to determine the actual pressure in BAR (14.5 psi), multiply this figure by 20.9% and then set the reading during the calibration. When you measure the level of oxygen in the sample you must divide the reading by the same atmospheric pressure value to obtain the true percentage of O₂ in your sample.

For example: At an atmospheric pressure of .9 BAR (13.05 psi) the surface equivalent O₂ percentage is $20.9 \times 0.9 = 18.81$ O₂ Surface Equivalent. You must take the reading from your sample; for example, 50% O₂ and divide this by the 0.9 BAR factor to obtain an accurate high altitude percentage (50 divided by 0.9 = 55.56% Adjusted Percentage). You are now ready to analyze the O₂ percentage of your breathing mixture.

C. Operation (Gas Analysis)



Caution: YOU MUST CALIBRATE YOUR UNIT BEFORE EVERY USE. THE SAME FLOW RATE FOR CALIBRATION AND GAS SAMPLE TESTING IS AUTOMATIC SO THE HIGHEST ACCURACY IS OBTAINED.

1. Turn the breathing gas cylinder valve on.
2. Both the OX-1S492 and the OX-HECTOX automatically output at a constant 2-3 lpm so no adjustment is necessary.
 - a. Air: Run the air/gas to the analyzer for approximately 2 minutes until the reading stabilizes.
 - b. Take Reading: When a stable reading is observed with the gas flow on, and/or 2 to 3 seconds after gas being turned off, record reading.

Troubleshooting

| Problem | Reason | Solution |
|---|---|--|
| BATTERY SYMBOL | LOW BATTERY | CHANGE BATTERY |
| NO DISPLAY | SWITCH OFF | TURN ON |
| "0" READING | A. SENSOR DISCONNECTED B. OLD SENSOR | A. CONNECT SENSOR B. REPLACE SENSOR |
| ERRATIC READING; UNABLE TO CALIBRATE | A. PRESSURE B. RFI / EMI C. OLD/ DAMAGED SENSOR D. WET SENSOR E. BAD CONNECTION | A. CHECK FLOW RATE B. RELOCATE UNIT C. REPLACE SENSOR D. DRY SENSOR E. CHECK CONNECTIONS |
| ERRATIC DISPLAY | | RETURN TO OMS |
| READOUT DRIFT | RAPID TEMPERATURE CHANGE | ALLOW ANALYZER TO TEMPERATURE STABILIZE |



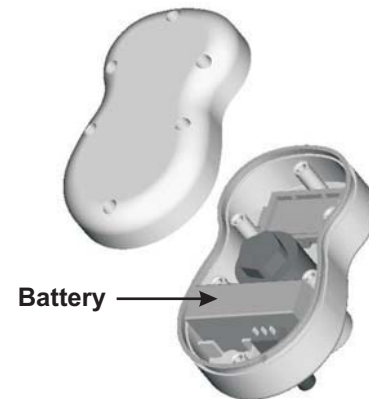
Warning: SENSOR ELECTROLYTE IS POTASSIUM HYDROXIDE AND CAN CAUSE BURNS IF IT COMES IN CONTACT WITH SKIN, EYES, ETC. First Aid: WASH SKIN OR FLUSH EYES WITH FRESH WATER FOR 15 MINUTES. IF SWALLOWED, DRINK A GLASSFUL OF WATER. CALL A PHYSICIAN IMMEDIATELY.

Maintenance

Battery Replacement

- Remove the six screws located on the rear of the unit and carefully lift the lid.
- Slide battery out of its compartment and disconnect the lead.
- Connect the lead to the new battery and slide battery back into its compartment.
- Carefully replace and screw down lid. (Make sure all wires are within the case and that the seal is seated correctly).

Note: If instrument is not to be used for an extended period of time, it is recommended that the battery is removed.



Sensor Life and Replacement

Typical sensor life is (1) one year under normal use. It can be as short as 6 months when the unit is subjected to high humidity, heat, moisture and constant testing with high oxygen percentages. Sensor replacement should be made only by the OMS[®] factory or by an OMS[®] certified technician.

General

- The OMS[®] Professional Dive Oxygen Analyzer is splash proof. It is not designed to be used underwater. Avoid immersion in water.
- Sunlight: Do not expose the analyzer to direct sunlight and/or high temperatures.
- Cleaning: Use only mild, non-solvent, house-hold cleaners when cleaning. Be sure not to get the cleaner on the sensor.
- Shock and vibration: The unit is shock and vibration resistant, but it is an electronic measuring instrument. It should not be dropped.
- Sensor: The sensor is an electrochemical device containing a caustic electrolyte. It should be checked on a regular basis for leakage. If leakage develops, wear protective rubber gloves and remove the sensor; or return the unit to OMS for service.



This instrument has been designed and tested to meet the relevant requirements of:

EN 50270: 1999 that covers 'Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen.

EN 60601-1-2:1993 Medical Electrical equipment (EMC Only).

EN 60945 Maritime Navigation and Radiocommunication equipment and systems (Radiated Emissions Only).

This OMS® Product is warranted by OMS® to be free from defects in material and workmanship for one (1) year from the date of purchase.

During this period if this product is found to be defective in material or workmanship, OMS® or one of its authorized service facilities will at its option, either repair or replace this Product without charge, subject to the following conditions, limitations and exclusions:

1. This warranty extends to the original consumer purchaser only and is not assignable or transferable.
2. This warranty shall not apply to any Product which has been subjected to misuse, abuse, abnormal use, negligence, alteration or accident or has had its serial number altered or removed.
3. This warranty does not apply to any defects or damage directly or indirectly caused by or resulting from the use of unauthorized replacement parts and/or service performed by unauthorized personnel.
4. This warranty does not apply to the batteries.
5. The Oxygen Analyzer Sensor is warranted by OMS® to be free from defects in material and workmanship for six (6) months from the date of purchase.
6. Repairs made under this warranty will not extend the warranty period.
7. OMS® will not extend this warranty.

THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS ON THE PART OF OMS®, PROVIDED HOWEVER, THAT IF THE DISCLAIMER OF IMPLIED WARRANTIES IS INEFFECTIVE UNDER APPLICABLE LAW, THE DURATION OF ANY IMPLIED WARRANTIES ARISING BY OPERATION OF LAW SHALL BE LIMITED TO ONE (1) YEAR FROM THE DATE OF PURCHASE OR APPLICABLE LAW MAY REQUIRE SUCH LONGER PERIOD AS.

OMS® HEREBY DISCLAIMS ANY AND ALL LIABILITY FOR CONSEQUENTIAL AND INCIDENTAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH ANY BREACH OF THIS WARRANTY OR ANY OTHER CLAIM WITH RESPECT TO THIS PRODUCT INCLUDING BUT NOT LIMITED TO, CLAIMS OF NEGLIGENCE, STRICT LIABILITY IN TORT OR BREACH OF CONTRACT.

In order to obtain performance of the warranty obligations, the original consumer purchaser must first obtain a Return Authorization number and then return this warranty form and this OMS® product together with proof of purchase and proof of purchase date (bill of sale) to an authorized OMS® dealer or OMS® at 1625 Route 211 East Middletown, NY 10941 by UPS or other carrier or at P.O. Box 146, Montgomery, NY 12549 by USPS.

In returning this Product for repair or replacement under this warranty, the original consumer purchaser must prepay all postage, shipping transportation; insurance and delivery costs and the product must be delivered in either its original carton or a similar package affording an equal degree of protection. OMS® will not be responsible for any loss or damage incurred in connections with the return of this product.

THIS WARRANTY FORM MAY NOT BE REPRODUCED OR COPIED AND WILL BE VALID ONLY WITH AUTHENTIC PRODUCTS SOLD BY OCEAN MANAGEMENT SYSTEMS INC. (OMS®)



Equipment for Underwater Exploration™



WARNING

Using gases for diving with an oxygen content different than air could result in serious injury or death. DO NOT use this Oxygen Analyzer until you have read, understood and followed all instructions and safety precautions in the owners manual, and have received and successfully completed a sanctioned Nitrox (EANx) or other mixed gas professional diving course from a certified instructor by a recognized certifying agency.



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