Pro O2 Oxygen Analyzer

Owners Manual - Read all instructions before use

1. Introduction
   - 1.1. The Pro 02 Oxygen Analyzer is designed to measure oxygen levels in the range 0.1-100% 02.
   - 1.2 The analyzer should be used for cylinder oxygen level verification or for monitoring a gas-mixing panel but should not be used for both. If the analyzer is used for measuring the oxygen level in the output from a mixing panel, another Pro 02 should be used for cylinder verification purposes.
   - 1.3. The Pro 02 has a digital display and operates from an internal temperature compensated 3-year electrochemical oxygen sensor Power is provided by an internal 9-volt battery.
   - 1.4. The Pro 02 is a water-resistant, drop resistant, self-contained unit designed specifically for the diving industry - Sport (Nitrox), commercial and military.
   - 1.5. Your Pro 02 is supplied ready to use. To preserve the life of the sensor, it is supplied with a seal that must be removed before use. Please check the unit for damage and make sure the sensor seal is intact. If there is any damage, or the sensor seal is broken, or not in place, contact your supplier.

2. Controls
   - 2.1. The analyzer is fitted with an on/off switch located on the front of the unit. Push the switch in to turn the unit on and push in again to turn it off. When it is switched on the analyzer's display will show an oxygen reading but do not use before calibration (see section 3.0)
   - 2.2. The low battery warning is a battery symbol in the corner of the display. When present, change the batteries before using tne instrument, (see section 8.0 Maintenance.]
   - 2.3. A waterproof calibration knob is located on the front. Turn it fully from left to right and then fully left, the reading should increase and then decrease. (If the reading does not change see section 8,0 Maintenance.)

3. Air Calibration
   - 3.1. Air calibration is essential before every use and is performed as follows.
   - 3.2. Ensure that any seals and the flow adapter cap are removed and the reading on the display has stabilized.
   - 3.3. Expose the sensor port to clean air for two minutes and adjust the calibration knob until the display reads 20.9. (If this is not possible refer to paragraph 3.4 or section 8.0 maintenance.) In conditions of high temperature and humidity, refer to the chart in section 5.6 for calibration.
   - 3.4. It is possible that at very high altitudes normal calibration is not achievable. In this event you must ascertain the actual pressure in BAR and multiply the atmospheric oxygen percent (20.9%) by this pressure and set the reading during calibration to the calculated level (this is the surface equivalent oxygen percentage.) 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 oxygen in your sample. For example: At an atmospheric pressure of 0.8 BAR the surface equivalent oxygen percentage is 20.9% x 0.8 = 16,7% 02 surface equivalent. If the reading you then obtain from your sample is 32% you must divide this by 0 8 to obtain the true oxygen percentage, 32.0 / 0.8 = 40.0% 02 True Percentage.
   - 3.5. The analyzer is now ready for oxygen measurement.

Warning
The analyzer is sensitive to oxygen partial pressure.
Calibration must always be carried out at the same atmospheric pressure as oxygen measurement

4. Pure Oxygen calibration for measuring oxygen purity up to 100%
   - 4.1. Connect 100% bottled oxygen (certified) to the flow adapter and adjust the flow rate to between 1.0 and 2.0 liters per minute.
   - 4.2. Allow the reading to settle. For 100% 02 this may take a few minutes.
   - 4.3. Expose to atmosphere, the reading should display +/- 0.4 of corrected humidity value i.e. between 20.5 and 21.3.

5. Operation
   - 5.1. The Pro 02 comes complete with a unique flow adapter cap that allows you to directly apply the analyzer to the outlet on your nitrox tank.
   - 5.2. Ensure the sensor seal is removed. Connect the flow adapter cap to the analyzer by pushing the adapter over the sensor port. The O-ring on the sensor should ensure a comfortable fit
   - 5.3. Open the cylinder valve slowly until a slight hiss can be heard. Hold the flow adapter cap end up to the gas flow.
   - 5.4. The reading should stabilize in 15 seconds or less and the display reading taken. If in doubt repeat the procedure making sure there is a very low gas flow.
   - 5.5. Note that after a few seconds of the gas flow being stopped the reading will begin to change towards the level in the surrounding air of 20.9% 02. You should therefore take the reading while flow is ON.

WARNING Do not pressurize the sensor as inaccurate readings will result.

5.6. Oxygen Compensation Chart

OXYGEN COMPENSATION CHART FOR MOISTURE IN THE ATMOSPHERE

ATMOSHERE OXYGEN PERCENT IN RELATION TO TEMPERATURE AND RELATIVE HUMIDITY

TEMP F	32	40	50	60	70	80	90	100	110	120
TEMP C	0	4	10	16	21	27	32	38	43	49
RELATIVE HUMIDITY	ATMOSPHERIC OXYGEN PERCENT									
10	20.9	20.9	20.9	20.9	20.8	20.8	20.8	20.8	20.7	20.7
20	20.9	20 9	20.8	20.8	20.8	20.8	20 7	20.6	20.5	20.4
30	20.9	20.8	20.8	20.8	20.7	20.7	20.6	20.5	20.4	20.2
40	20.8	20.8	20 8	20.7	20.7	20.6	20.5	20.4	20.2	19.9
50	20.8	20.8	20.8	20.7	20.6	20.5	20.4	20.2	20.0	19.7
60	20.8	20.8	20.7	20.7	20,6	20.5	20.3	20.1	19.8	19.5
70	20.8	20.8	20.7	20.6	20.5	20.4	20.2	19.9	19.6	19.2
80	20.8	20.8	20.7	20.6	20.5	20.3	20.1	19.8	19.5	19.0
90	20.8	20.7	20.7	20.6	20.4	20.3	20.0	19.7	19.3	18.7
100	20.8	20.7	20.6	20.5	20.4	20.2	1S.9	19.5	19.1	18.5
H20at 100% RH	0.6	0.8	1.2	1.8	2.5	3.4	4.7	6.5	8.6	11.5

If the temperature and RH axis meet in this part of the chart, calibrate to the chart Q2 level or with dry air to maintain 0.5% 02 accuracy in NITROX.

6. Accessories
   6.1. The Pro02 is supplied with a flow adapter cap and flexible tubing.

7. Troubleshooting

SYMPTOM	REASON	SOLUTION
Battery symbol	Low Battery	Change the battery
No display	Switched off Bad connection	Switch on Check display connection Check battery connection
Zero reading	Sensor disconnected Sensor expired	Check connection Change sensor
Reading erratic	Pressure on sensor Radio transmission Sensor old or faulty Condensation on sensor.	Check flow Move unit away Change sensor Dry in air
Heading *does not change when* calibration knob is turned	*Faulty connections* Sensor failure	*Check connections* Change sensor
Display segments missing	Display faulty	Return to dealer
Will not calibrate	Sensor faulty Sensor not in air High altitude	Change sensor Check flow adapter Calculate percent equivalent - 20.9% x bar
Reading drifts	Rapid temperature change	Stabilize temperature & recalibrate

8. Maintenance
   8.1. *Battery replacement.*
      8.1.1. Remove the 4 screws located at each corner of the unit and carefully lift the lid.
      8.1.2. Slide battery out of its spring bracket and disconnect the lead.
      8.1.3. Connect the lead to the new battery and slide the battery behind the spring bracket.
      8.1.4. Replace the lid carefully and screw down taking care that the sensor locates properly.
      8.1.5. Ensure that you do not trap any wires.
   8.2. Sensor replacement
      8.2.1. Replacement sensor: Internal sensor model - part number D-15
      Remote sensor model - part number D-16
      8.2.2. Remove the 4 screws located at each corner of the unit and carefully lift the lid.
      8.2.3. Remove the flow adapter cap if fitted and slide the sensor out of the lid.
      8.2.4. Disconnect the in-line sensor connector.
      8.2.5. Dispose of the old sensor according to local regulations for lead and potassium hydroxide solution.
      8.2.6. Remove the new sensor from its bag, connect to the in-line connector and slide through lid.
      8.2.7. Replace the lid carefully and screw down taking care that the sensor locates properly. Ensure that you do not trap any wires.

9. Care of the Pro 02

9 1. Although designed to be water-resistant the Pro 02 should not be intentionally immersed in liquid or left outside unprotected. 9 2 The Pro 02 is built to resist the effects of day to day shocks and drops but remember it is a precision oxygen analyzer and should be looked after carefully to give long trouble free service. 9.3.

To clean the Pro 02 use a damp soft cloth.

9.4. Protect the *Pro* 02 from long periods of direct sunlight and do not subject it to high or low temperature extremes, 9.5 The sensor in the Pro 02 is an electrochemical device and contains a caustic electrolyte. Always check to make sure that it is not leaking and do not allow it onto any part of your body *or* clothing. In the event that you do come into contact with the electrolyte, wash the contaminated part with copious amounts of water - see Safety Information.

WARNING
If after handling the Pro 02 your fingers or other part of your body feels slippery or stings wash with a lot of water. If stinging persists get medical attention!

10. Safety Information Pro 02

10.1. when the life of the battery has expired it should be disposed of safely in accordance with local regulations.

10.2. When the life of the sensor has expired or it is leaking or otherwise damaged it must be disposed of safely in accordance with local regulations.

10.3. The sensor contains KOH Potassium Hydroxide solution which is hazardous and can have the following effects:

Skin	Potassium Hydroxide is corrosive - skin contact could result in a chemical burn.
Ingestion	Can be harmful or FATAL if swallowed.
Eye Contact	Can result in the permanent loss of sight.

first Aid Procedures

Skin	Wash the affected area with a lot of water and removed contaminated clothing. If stinging persists get medical attention.
Ingestion	Drink a lot of fresh water. Do not induce vomiting. Get immediate medical attention.
Eye Contact	Flush eyes with fresh water for at least 15 minutes and get medical help immediately.

10.4. Sensor Handling Information:

02 oxygen sensors are supplied in sealed bags. Before the bag is opened check that the sensor has not leaked. The sensors are themselves sealed and do not under normal circumstances present a health hazard, however, if leakage of the Potassium Hydroxide electrolyte has occurred use rubber gloves and wear chemical splash goggles to handle and clean up. Rinse contaminated surfaces with water.

11. Specifications

Range	0.1 - 100% oxygen
Accuracy	+/-1 % of reading over range 0-50% when calibrated on air in accordance with this manual. +/- 2% of reading over range 0 -100% when calibrated on certified pure oxygen in accordance with this manual.
Resolution	0.1% oxygen
Response time	90% in less than 15 seconds
Sensor Type	Electrochemical 9212
Sensor Life	More than 36 months in air. The unit is warranted for 24 months from the label date.
Battery	Replaceable 9-volt battery
Operating temp	*~5 to 50°C /* 22 to 120°F
Storage temp	-5to50°C / 22to120°F
Pressure	Sensitive to the partial pressure of oxygen.

12. Spares

Your Pro 02 unit is supplied with an oxygen sensor (D -15 for Internal sensor model or D-16 for Remote sensor model), a nine-volt battery, flow adapter cap, and flexible tubing.

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