ANALOX O_2 EII®
Oxygen Analyser
User Manual for your
Personal Protection

WARNING

IT IS IMPORTANT THAT THESE INSTRUCTIONS ARE READ BEFORE USING THE ANALOX O_2 EII®

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We are delighted to welcome you as a user of the
Analox O_2 EII®

The following guide should assist you in using
your **O_2 EII**®

CONTENTS

1.0 Packaging and Contents Check

On opening your Analox **O_2 EII**®, please check you have the following items.

a) **O_2 EII**®
b) **EII** Adaptor
c) Compensation card
d) User manual
e) Any accessories ordered for your **O_2** EII®, from:
- Storage Case
- Sensor Saver
- Hygro-Thermometer

Analox O_2 EII®

2.0 About the O_2 EII®

The **O_2 EII**® Oxygen Analyser is designed to measure Oxygen levels in the range 0.1-100% O_2 for tank oxygen level verification.
The **O_2 EII**® is ergonomically designed, and equipped with several features to ensure ease of use, and reliability. The instrument has been designed to be held in the left hand to enable ease of use when checking your tank. It is fitted with a large digital display and operates from an internal temperature compensated electrochemical oxygen sensor. Power is provided by a 9V battery which will last for approximately 1 year before replacement is necessary. The **O_2 EII**® will automatically switch off after 10 minutes to ensure battery life is not compromised if the instrument is accidentally turned on.
The **O_2 EII**® is water and drop resistant. Designed specifically for the diving industry – whether you may be a Sport (NITROX), Commercial or Military diver- where hostile environmental conditions are the norm not the exception.

Your **O_2 EII**® is supplied ready to use. To preserve the life of the sensor a silver seal is fitted to the front of the sensor which 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.

3.0 Operation

3.1 Controls

The analyser is fitted with an on button located on the side of the unit, when held in your left hand the button should sit comfortably under your thumb. To turn the unit on press the button once, the unit will automatically turn off 10 minutes after the button has been pressed, as a result if the **O_2 EII**® is accidentally turned on your battery will not be drained of power. When it is switched on the analyser's display will show an oxygen reading **do not use the O_2 EII® before calibration** (see section 3.2).

Switch on

The On button also acts as a hold button, to freeze the reading on the display press the 'on' button once, a **:** symbol will appear to show the instrument is holding the reading. To cancel the hold press the 'on' button once, the **:** symbol will disappear and the instrument will monitor ambient O_2.

Reading held

Reading released
monitoring ambient O_2

The low battery warning is a shown by 'L' on the display. When present, change the battery before using the instrument (see section 5.0 After Sales Service).

'L' low battery
symbol

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 5.0 After Sales Service).

WARNING
Do NOT use when
the LOW BATTERY symbol is on!

3.2 Air Calibration

Air calibration is essential before every use and is performed as follows.

1. Ensure that the silver sensor seal or white sensor saver is not in place and that the EII adapter is fitted.

2. Expose the analyser to clean air for two minutes and adjust the calibration knob until the display reads the correct value using the oxygen compensation chart (you can find this chart on the inside of the back cover). If this is not possible refer to paragraph 3 below or to sections 4.0 Quick check and 5.0 After Sales Service.

Calibration in clean air

3. It is possible that at very high altitude 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). An altitude correction chart is shown for reference on page 22. 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% O_2 Surface Equivalent. If the reading you then obtain from your sample is 32.0% you must divide this by 0.8 to obtain the true Oxygen percentage, 32.0/0.8 = 40.0%O2 True Percentage.

The analyser is now ready for oxygen measurement.

WARNING
The analyser is sensitive to Oxygen partial pressure. Calibration must always be carried out at the same atmospheric pressure as Oxygen measurement.

3.3 Checking your tank

The Analox **O_2 EII**® comes complete with a unique sampling dome which allows you to directly apply the analyser to the outlet on your nitrox tank.

1. Ensure the Analox **O_2 EII**® has been calibrated as per the instructions in section 3.2.

2. Ensure the silver sensor seal, or the white sensor saver is removed. Place the sampling dome into the sensor aperture until tight.

3. Very slowly open the pillar valve with your right hand until gas can just be heard quietly hissing out.

Open the tank until the Nitrox is heard gently hissing out

4. Once the pillar valve has been opened and the nitrox is heard gently hissing, hold the **O_2 EII**® in your left hand and press the sampling dome firmly against the tank outlet.

Take a direct reading from your tank

WARNING
Open tank valve
EXTREMELY CAREFULLY
Before the O_2 EII®. is applied

5. Close the pillar valve after fifteen seconds when a stable reading is observed on the **O_2 EII**®.

6. If in doubt repeat the procedure taking care to ensure a very low gas flow.

7. For ease of use when sampling several tanks, the **O_2 EII**® is fitted with a hold feature. Once a stable reading has been observed, press the on button to hold this reading. The **O_2 EII**® can then be moved away from the tank to enable you to record the O_2 reading. To cancel the reading press the on button once.

Reading held

8. It is important to 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% O_2 you should therefore take the reading or press the hold button while flow is ON.

WARNING

Very high flows may pressurise the sensor and inaccurate readings or sensor damage will result.

3.4 Accessories

The **O_2 EII**® can be supplied with any of the following accessories;

a) Storage Case; compact water proof case ideal for protecting your **O_2 EII**®.
Part Number: SA2EIIMINICASE

b) Sensor Saver; screw in cap to reduce the sensors exposure to oxygen and extend its life.
Part Number: 8000-6016A

c) Hygro-Thermometer; tells you the temperature and humidity in order for you to calibrate your **O_2 EII**®.
Part Number: 2836-HYGRO.

4.0 Quick Check

SYMPTOM	CONDITION	ACTION
'L' symbol	Low battery	Change battery
No display	Switched off Bad connection	Switch on Check battery connection Return to supplier
Zero reading	Sensor disconnected Sensor expired No Oxygen	Check connection Change sensor Check in air and ensure silver seal and sensor saver are removed
Reading is negative	Sensor polarity incorrect	Connect the sensor correctly
Reading erratic	Pressure on sensor Radio transmission Sensor old or faulty Condensation on sensor	Check flow Move unit away Change sensor Dry sensor face
Reading does not change when calibration knob is turned	Reading held Faulty connections Sensor failure	Press on button to unfreeze Return to supplier Change sensor
Display segments missing	Display faulty	Return to supplier
Will not calibrate	Sensor faulty Sensor not in air High altitude	Change sensor Check flow adapter is correct Calculate percent equivalent = 20.9% x bar
Reading drifts	Rapid temperature change	Do not move analyser from one temperature to another immediately before use

5.0 After sales service

5.1 Battery replacement

a) Loosen the 4 screws located on the front cover and carefully lift the cover. Please note the sensor is housed in the front cover. Do not stress the cable between the sensor and the main unit.
b) Slide the battery out of its holder and disconnect the lead.
c) Connect the lead to the new battery and slide the battery into its holder, under the battery clip
d) Replace the cover carefully and screw down taking care that the sensor locates properly, and that you do not trap any wires.

5.2 Sensor Replacement

a) Replacement sensor part number: 9100-9220-9B
b) Loosen the 4 screws located on the front cover and carefully lift the cover. Do not stress the cable between the sensor and the main unit.
c) Carefully unplug the connector from the rear of the sensor.
d) Unscrew the sensor from the front cover.
e) Dispose of the old sensor according to local regulations for Lead and Potassium Hydroxide solution.
f) Remove the new sensor from its pack and check it for leaks, check the sensor has a rubber o-ring fitted at the base of the thread on the front of the sensor.

Screw the sensor into the front cover tightly and carefully plug in the connector to the rear of the sensor.

g) Replace the cover carefully and screw down taking care that the sensor locates properly and that you do not trap any wires.

5.3 Warranties

The **O_2 EII**® is supplied with a standard 3 year electronics warranty. The Sensor is supplied with a 3 year graded warranty detailed below.

1 year	Free replacement
12-18 months	75% credit towards a replacement sensor
18-24 months	50% credit towards a replacement sensor
24-36 months	25% credit towards a replacement sensor

5.4 General care

Although designed to be water resistant the **O_2 EII**® should not be intentionally immersed in liquid or left outside unprotected.

The **O_2 EII**® is built to resist the effects of day to day shocks

and drops but remember it is a precision oxygen analyser and should be looked after carefully to give long trouble free service.

To clean the **O_2 EII**® use a damp soft cloth.

Protect the **O_2 EII**® from long periods of direct sunlight and do not subject it to high or low temperature extremes.

The sensor in the **O_2 EII**® 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 5.5 Safety Information.

ANALOX 9100-9220-9
OXYGEN SENSOR

WARNING
If after handling the sensor your fingers or other parts of your body feel slippery or stings wash with a lot of water.

If stinging persists get medical attention!

5.5 Safety Information

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

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.

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 part with a lot of water and remove contaminated clothing. If stinging persists get medical attention.
Ingestion	Drink a lot of fresh water. Do not induce vomiting. Get medical attention.
Eye	Wash with a lot of water for at least 15 minutes and get medical help immediately.

5.6 Sensor Handling Information

O_2 EII® oxygen sensors are normally supplied in sealed packs. Before the pack 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.

6.0 Warranty Information

We provide the following Warranties for the Analox O2EII®:

A 3 year graded sensor warranty.
A 3 year electronics warranty.

In both cases the Warranty period runs from the date of our Invoice.

We warrant that the equipment will be free from defects in workmanship and materials.

The Warranty does not extend to and we will not be liable for defects caused by the effects of normal wear and tear, erosion, corrosion, fire, explosion, misuse, use in any context or application for which the equipment is not designed or recommended, or unauthorised modification.

All warranties will become invalid if the back cover of the unit has been removed or tampered with.

Following a valid Warranty claim in accordance with the above, the equipment, upon return to us, would be repaired or replaced without cost or charge but in our discretion we may elect instead to provide to you which ever is the lesser of the cost of replacement or a refund of net purchase price paid as per our Invoice on initial purchase from us. We shall have no liability for losses, damages, costs or delays whatsoever. We shall have no liability for any incidental or consequential losses or

damages. All express or implied warranties as to satisfactory or merchantable quality, fitness for a particular or general purpose or otherwise are excluded and no such Warranties are made or provided, save as set out in this Clause 7.

In order to effectively notify a Warranty claim, the claim with all relevant information and documentation should be sent in writing to:

Analox Sensor Technology Limited
15 Ellerbeck Court
Stokesley Business Park
Stokesley
North Yorkshire
TS9 5PT
Or by e-mail to : info@analox.net
Or by Fax to : +44 1642 713900

We reserve the right to require from you proof of dispatch to us of the notification of Warranty claim by any of the above alternative means.

The equipment should not be sent to us without our prior written authority. All shipping and Insurance costs of returned equipment are to be born by you and at your risk. All returned items must be properly and sufficiently packed.

7.0 Specification

RANGE:	0.1- 100% O_2
ACCURACY	+/-1% of reading ± 0.2% of O_2
RESOLUTION	0.1% Oxygen
WARM UP TIME	< 5 seconds
RESPONSE TIME	90% in less than 15 seconds
SENSOR TYPE	Analox 9100-9220-9B EC sensor
SENSOR LIFE	4 – 5 years in air. 36 month graded warranty
BATTERY	9V Alkaline (PP3)
BATTERY LIFE	Approximately 1 year
OPERATING TEMP	-5 to 50°C / 23 to 122°F
STORAGE TEMP	-20 to 50°C / -4 to 122°F
PRESSURE	Sensitive to the partial pressure of Oxygen.
TEMPERATURE EFFECT	0.1% O_2/ °C 0.055% O_2/ °F
WEIGHT	225g
DIMENSIONS (mm)	130 (l) x 70 (w) x 55 (d)
EMC	CE marked
IP RATING	IP65

If you have any comments or queries about the **O_2 EII**®
please contact us; Tel: +44 (0)1642 711400 or Fax: +44
(0)1642 713900 Email: info@analox.net or visit our website;
www.analox.net

8.0 Altitude correction chart

Altitude		Pressure	Atmospheric O_2 concentration	
Feet	Meters	in Bar	PP O2 mBar	SEV %O2
-1000	-305	1.03	217	21.67
0	0	1	209	20.9
1000	305	0.97	202	20.16
2000	610	0.94	194	19.43
3000	914	0.92	187	18.73
4000	1219	0.89	181	18.05
5000	1524	0.86	174	17.39
6000	1829	0.84	168	16.75
7000	2134	0.81	161	16.13
8000	2438	0.79	155	15.53
9000	2743	0.76	149	14.94
10000	3048	0.74	144	14.38
11000	3353	0.72	138	13.83
12000	3658	0.69	133	13.3
13000	3962	0.67	128	12.78
14000	4267	0.65	123	12.28
15000	4572	0.63	118	11.8
16000	4877	0.61	113	11.33
17000	5182	0.59	109	10.88
18000	5486	0.57	104	10.44
19000	5791	0.55	100	10.02
20000	6096	0.53	96	9.61

Pressure will vary depending on latitude, but will not lead to significant error in your readings.

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Oxygen compensation chart for moisture in the atmosphere

Atmosphere oxygen percent in relation to temperature and relative humicity

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 humicity	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	19.9	19.5	19.1	18.5
H20 at 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 O2 level or with dry air to maintain 0.5% O2 accuracy in your gas mix.

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