ANALOX ATA™ - Trimix Analyser

Technical Manual

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We are delighted to welcome you as a user of the
Analox ATA™

The following guide should assist you in using your
ATA™

1. Packaging and Contents Check

On opening your Analox **ATA™**, please check you have the following items:

a) **ATA™** & Battery
b) Flow Adaptor, Tubing & Sample Dome
c) O2 Compensation Card
d) User Manual
e) Any additional options or accessories ordered for your **ATA™**, from:
- External Power Adaptor
- DIN or A-Clamp Flow Restrictor
- Storage Case

Analox ATA™ Kit

2. About the ATA™

The Analox **ATA™** is designed to be a true trimix analyser, measuring the concentration of Oxygen, Helium and balance gas in your trimix. The Oxygen and Helium sensors measure in the range 0.1-100%.

The **ATA™** has been designed to offer the highest levels of accuracy without compromising ease of use. Oxygen calibration and Helium zero adjust features are provided as standard, and Oxygen compensation is provided to ensure you get more accurate Helium readings.
Readings are displayed individually on a scroll through backlit display.

Power is provided by one D size battery or mains power, if the external power option has been ordered. The **ATA™** will automatically switch off after 15 minutes to ensure battery life is not compromised if the instrument is accidentally turned on. On receipt of the **ATA™** all you have to do is fit the battery, refer to section 5.1 Battery Replacement.

The **ATA™** has been designed specifically for the diving industry where hostile environmental conditions are the norm not the exception.

3. Operation

3.1 Controls

The analyser is fitted with an on/off button located on the front of the unit. To turn the unit on press the button once, the unit will automatically turn off after 15 minutes, to prevent accidental battery drainage. Alternatively the unit can be turned off by pressing and holding the on/off button for 3 seconds.

When the analyser is switched on it will display a reading and a marker indicating which gas is being displayed, O2, He or BAL.

Do not use the ATA™ before calibration
(see section 3.3 Oxygen Sensor Calibration).

The on/off button also turns the backlight on and off, the backlight will automatically turn off after 30 seconds.

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

Waterproof calibration and zero adjustment knobs are located on the front of the instrument for Oxygen and Helium sensor adjustments. Turn them fully from left to right and then fully left, the reading should increase and then decrease. (If the reading does not change see section 4.0 Quick Check). When the Helium sensor adjustment is fully left the instrument display may show 'Err', this is not a fault if the display returns to numbers when the adjustment is set to the mid point

WARNING

Do NOT use when the LOW BATTERY symbol is on!

3.2 External Power

An **ATA**™ supplied with an external power option can be operated either from the battery or external power. If you are operating the unit from its internal battery please make sure the sealing cap to the external power socket is screwed on tight to maintain the waterproof seal.

To operate the **ATA**™ from external power, unscrew the sealing cap, line up the connector with the mating slot in the socket and screw the locking ring into place to secure the connector.

NOTE: When the **ATA**™ is running from external power the auto switch off feature is disabled. To turn the unit off, press and hold the on/off button.

3.3 Oxygen Sensor Calibration

Oxygen sensor calibration in clean air is essential before every use and is performed as follows;

1. Remove the flow adaptor from the sensors.

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.

O_2 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% O2 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.

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

3.4 Helium Sensor Zero Adjust

The Helium sensor zero adjust enables you to retain the accuracy of the analyser over its operational life, as the sensor ages.

1. Remove the flow adaptor from the sensors.
2. Use the mode button to change the display to read Helium.
3. Expose the analyser to clean air for two minutes and adjust the calibration knob until the display reads 0.0. If the Helium sensor adjustment is turned too far to the left the instrument display may show 'Err', this is not a fault, just return the adjustment to the mid point then readjust for a reading of 0.0

3.5 Analysing Your Mix

The Analox **ATA™** is provided with a flow adapter and tubing which can be connected to the gas Sampling Dome.

1. Ensure the Analox **ATA™** has been calibrated as per the instructions in sections 3.3, and 3.4.
2. Push the flow adaptor into the sensors, as per the picture over the page.
3. Attach the tubing from the flow adaptor to the Sampling Dome
4. Very slowly open the Tank valve until gas can just be heard quietly hissing out.
5. Press the sampling dome firmly against the tank outlet.

6. Allow approx. 10-15 seconds for the reading to stabilise on the display, and take the O2 reading.
7. Use the mode button to change the display to read the Helium concentration. Ensure the readings are stable and take the He reading
8. Use the mode button to change the display to show the balance gas (BAL.), i.e. the inferred Nitrogen concentration. Take your reading and close the tank

Analysing your mix

9. If in doubt repeat the procedure taking care to ensure a very low gas flow.
10. If you wish to carry out multiple cylinder checks, to re-zero the sensors, you will need to remove the flow adaptor. This will allow the previous gas mix to quickly vent into the atmosphere.

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

3.6 Accessories

The **ATA™** can be supplied with any of the following accessories;

a) Sample Dome
Part Number: 8000-6011A

b) DIN flow restrictor
Part Number: MI02REDIN

c) A-Clamp flow restrictor
Part Number: MI02ACLAMP

d) Storage Case; compact water proof, drop proof case ideal for storing your ATA™, and accessories.
Part Number: SA2ATACASE

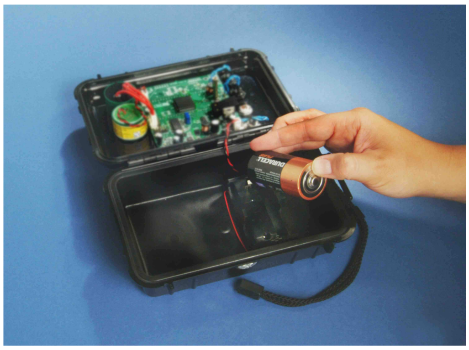
4. Quick Check

SYMPTOM	CONDITION	ACTION
'bAt L' symbol flashing intermittently on display	Low battery	Change battery
No display	Switched off Bad connection	Switch on Check battery connection Return to supplier
Zero reading on O2	O2 Sensor disconnected O2 sensor polarity incorrect O2 Sensor expired No Oxygen	Check connection Check sensor is connected correctly Change sensor Check in air and ensure sensor face is free from obstruction
'Err' shown on helium display	He Zero knob turned too far left Helium sensor disconnected Helium sensor fault	Turn knob to mid point before calibrating Check connection Return to supplier
He Reading is negative	Zero Adjust required	Adjust the reading using the He zero pot on the front If still negative Recalibrate using internal pots
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	Faulty connections Sensor failure	Return to supplier Change O2 sensor Recalibrate the Helium sensor using internal pots
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. After Sales Service

5.1 Battery Replacement

a) In a clean, dry environment, open the analyser case.
b) Slide the battery out of its holder.
c) Push in the new battery, ensuring the polarity is correct. The polarity is shown in the base of the battery holder.
d) Close the lid.
e) Ensure the unit is turned off after fitting the battery.



5.2 Sensor Replacement

O_2 sensor

a) Replacement sensor part number: 9100-9212-94.
b) In a clean, dry environment, open the analyser case.
c) Disconnect the O_2 sensor from the circuit board.
d) Unscrew the O_2 sensor locking ring on the front face of the analyser.
e) Pull out the O_2 sensor.

f) Dispose of the old sensor according to local regulations for Lead and Potassium Hydroxide solution.
g) 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. Push the sensor through the hole in the lid and screw on the locking ring.
h) Connect to the circuit board.
i) Close the lid.

He Sensor

a) Replacement sensor part number: 9100-4535
b) In a clean, dry environment, open the analyser case.
c) Disconnect the He sensor from the circuit board.
d) Unscrew the He sensor locking ring on the front face of the analyser.
e) Pull out the He sensor, and dispose of it.
f) Remove the new sensor from its pack, check the sensor has a rubber o-ring fitted at the base of the thread on the front of the sensor. Push the sensor through the hole in the lid and screw on the locking ring.
g) Connect to the circuit board.
h) Turn the **ATA™** on and calibrate the O2 sensor in clean air, as per the instructions in section 3.3
i) Change the display to show the Helium concentration, and expose the He sensor to clean air.
j) Adjust the external zero adjust pot to the mid point.
k) Adjust the internal zero potentiometer until the display reads 0.0.
l) Expose the sensor to span gas i.e. 100% Helium and allow the reading to stabilise.
m) Adjust the internal Span potentiometer until the display reads 100, or the concentration of Helium in the span gas.
n) Close the lid.

5.3 Warranties

The **ATA™** is supplied with a 2 year electronics warranty. The He sensor is supplied with a 1 year warranty, and the O2 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 **ATA™** should not be intentionally immersed in liquid or left outside unprotected.

To clean the **ATA™** use a damp soft cloth.

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

The O2 sensor in the **ATA™** 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 9100-9212-94
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 O_2 sensor has expired or it is leaking or otherwise damaged it must be disposed of safely in accordance with local regulations.

The O_2 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

ATA™ 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. Warranty Information

We provide the following Warranties for the Analox ATA:

A 3 year graded Oxygen sensor warranty.
A 1 year Helium sensor warranty
A 2 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.

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. Specification

RANGE:	0.1- 100% O2, 0.1-100% He
ACCURACY	O2 - +/-1% of Reading, +/-0.2% of O2 at STP He - +/-1% of Full Scale at STP
RESOLUTION	0.1%
WARM UP TIME	< 15 seconds
RESPONSE TIME	90% in less than 15 seconds
O2 SENSOR TYPE	Analox 9100-9212-94 EC sensor
O2 SENSOR LIFE	up to 4 - 5 years in air. 36 month graded warranty
He SENSOR TYPE	Analox 9100-4535 TC sensor
He SENSOR LIFE	up to 10 years 12 month warranty
POWER (Standard)	D size Alkaline Battery
BATTERY LIFE	200 hours
POWER (Option)	External 110/ 230V power supply
OPERATING TEMP	0 to 50°C / 32 to 122°F
STORAGE TEMP	-5 to 50°C / 23 to 122°F
WEIGHT	0.6kg
DIMENSIONS (mm)	195 (l) x 130 (w) x 85 (d) (7.28 x 5.12 x 3.35”)
Certification	CE marked
IP RATING	IP65

If you have any comments or queries about the ATA™ please contact us;

Tel: +44 (0)1642 711400
Fax: +44 (0)1642 713900
Email: info@analox.net

or visit our website;

www.analox.net

8. Altitude Correction Chart

Altitude		Pressure	Atmospheric O2 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 altitude, but will not lead to significant error in your readings.

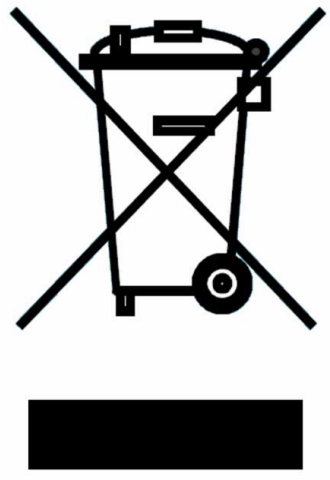
9. Oxygen Compensation Chart

Oxygen compensation chart for moisture in the atmosphere

Atmosphere 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	19.9	19.5	19.1	18.5
H_20 at 100% RH	If the temperature and RH axis meet in this part of the chart, calibrate to the chart % O_2 level or with dry air to maintain 0.5% O_2 accuracy in NITROX									
	0.6	0.8	1.2	1.8	2.5	3.4	4.7	6.5	8.6	11.5

10. Disposal



According to WEEE regulation this electronic product can not be placed in household waste bins. Please check local regulations for information on the disposal of electronic products in your area.