



EII CO
User Manual

List of Contents

| | | |
|-----|-----------------------------------|----|
| 1 | Introduction..... | 6 |
| 1.1 | Package Content | 6 |
| 1.2 | About the EII CO | 6 |
| 2 | Operation..... | 7 |
| 2.1 | Switching On | 7 |
| 2.2 | Freezing the Display | 7 |
| 2.3 | Switching off..... | 7 |
| 2.4 | Low battery indication | 7 |
| 2.5 | Checking your Tank | 8 |
| 3 | Calibration | 10 |
| 3.1 | Air Calibration..... | 10 |
| 3.2 | Bump Testing..... | 10 |
| 4 | Troubleshooting..... | 12 |
| 5 | Maintenance | 13 |
| 5.1 | Battery Replacement | 13 |
| 5.2 | Sensor Replacement | 13 |
| 5.3 | General Care..... | 13 |
| 5.4 | Sensor Handling Information | 14 |
| 6 | Safety Information | 15 |
| 7 | Warranty Information..... | 16 |
| 8 | Specifications | 17 |
| 9 | Spares | 18 |
| 10 | Disposal..... | 19 |
| 11 | Declaration of Conformity..... | 20 |

1 Introduction

1.1 Package Content

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

- a) **EII CO**
- b) **Sampling dome**
- c) User manual
- d) Any accessories ordered for your **EII CO**, from:
 - Storage Case
 - Bump Testing Gas Kit (50 ppm CO Aerosol)



1.2 About the EII CO

The EII CO carbon monoxide analyser is designed to measure CO levels in the range 0 to 50ppm for tank CO level checking.

The EII CO 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 facilitate checking your tank. It is fitted with a large digital display and incorporates an internal electrochemical carbon monoxide sensor. Power is provided by a 9V battery which will last for approximately 1 year before replacement is necessary. The EII CO will automatically switch off after 10 minutes to ensure battery life is not compromised if the instrument is accidentally turned on.

The EII CO is water and drop resistant. Designed specifically for the diving industry – whether you may be a Sport, Commercial or Military diver - where hostile environmental conditions are the norm not the exception.

Your EII CO is supplied ready to use, all you need to do is push in the sampling dome.

2 Operation

2.1 Switching On

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 analyser's display will now show a carbon monoxide reading in parts per million (ppm).

Do not use the EII CO before calibration (see Section 3).

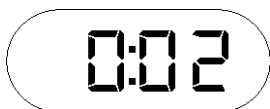


Switch On

2.2 Freezing the Display

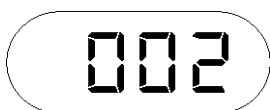
In use, the 'ON' button also acts as a 'HOLD' button to allow the instrument to be removed from the tank for easier reading without losing the measured gas concentration.

Press once to freeze the current reading on the display (a frozen reading is indicated by a ':' symbol being shown)



Reading held

Press again to cancel and continue measuring:



Reading released (monitoring ambient CO)

2.3 Switching off

The EII CO will automatically switch off after 10 minutes to prevent the battery from being drained if the unit is accidentally switched on.

2.4 Low battery indication

The low battery warning is shown by an 'L' on the display, indicating that the battery **must** be changed before using the instrument (see Section 5.1).



'L' Low battery symbol

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

2.5 Checking your Tank

The EII CO comes complete with a unique sampling dome which allows you to directly apply the analyser to the outlet on your tank.

1. Ensure that the span calibration of the device is within date (within 6 months)
2. Ensure that the instrument has been air calibrated (See Section 3.2) and bump tested (See Section 3.3) before checking your tank.
3. Push the sampling dome into the sensor aperture.
4. **Very slowly** open the pillar valve with your right hand until the hiss of gas escaping can just be heard.



**WARNING: Open tank valve
EXTREMELY CAREFULLY
before applying the EII CO**

**Eye protection should be worn
during this procedure**

5. Hold the EII CO in your left hand and press the sampling dome firmly against the tank outlet.



Take a direct reading from your tank

6. Close the pillar valve after thirty seconds when a stable reading is observed on the EII CO.
7. If in doubt repeat the procedure taking care to ensure a very low gas flow.
8. For ease of use, the EII CO is fitted with a hold feature. Once a stable reading has been observed, press the 'ON' button to hold this reading. The EII CO can then be moved away from the tank to enable you to record the CO reading. To cancel the reading, press the 'ON' button again.



Reading Held

9. 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 (0ppm CO) 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 Calibration

3.1 Span calibration

Span calibration of the device is valid for six months from the date of calibration. See section 9 for details of calibration kits available.

Alternatively, contact an Analox approved service centre for span calibration. A full list of service centres can be found on the Analox website (www.analox.net)

3.2 Air Calibration

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

1. Expose the analyser (with sampling dome disconnected) to clean air for two minutes and adjust the calibration knob until the display reads 0ppm. If this is not possible refer to the note below or to Section 4



Calibration in clean air

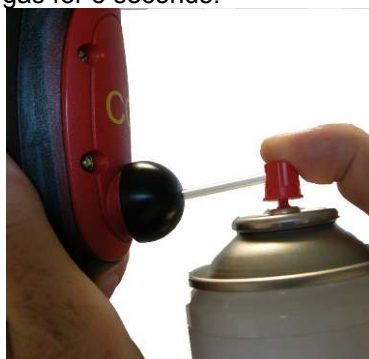
The analyser is now ready for carbon monoxide measurement.

3.3 Bump Testing

A 'bump' test is a means of verifying that the instrument is working within acceptable limits by briefly exposing to a known gas mixture formulated to change the output of the sensor. This is different from a calibration where the instrument is also exposed to a known gas mixture but is allowed to settle to a steady figure and the reading adjusted to the stated gas concentration of the test mixture.

Bump testing of the device is necessary to ensure correct response to carbon monoxide gas.

1. Directing the nozzle tube of the bump test gas aerosol into dome aperture, spray the bump test gas for 5 seconds.



2. Ensure that the displayed reading rises above 25ppm CO



3. If bump testing fails to raise the display reading sufficiently, ensure that sufficient gas remains in the bump test kit. Please see Section 4 for further troubleshooting information.

4 Troubleshooting

| SYMPTOM | CONDITION | ACTION |
|---|--------------------------|---|
| 'L' symbol | Low battery | Change battery |
| No display | Switched off | Switch on |
| | Poor battery connection | Check battery connection Return to supplier |
| Bump Test Fail | Sensor expired | Please refer to website |
| | Incorrect bump gas | Ensure bump gas is 50ppm CO (as supplied by Analox) |
| | Calibration expired | Contact an Analox approved service centre or purchase a calibration kit. |
| | Bump test gas exhausted | Contact Analox to purchase a new bump test kit (A bump test kit should supply around 20 bump tests) |
| Reading erratic | Pressure on sensor | Reduce gas flow rate |
| | Radio interference | Move unit away from any radio equipment |
| | Sensor old or faulty | Change sensor |
| | Condensation on sensor | Shake water off sensor face |
| Reading does not change when calibration knob is turned | Reading held | Press 'ON' button to unfreeze |
| | Sensor failure | Change sensor |
| | Faulty connections | Return to supplier |
| Display segments missing | Display faulty | Return to supplier |
| Will not calibrate | Sensor faulty | Change sensor |
| | Sensor not in air | Check sample dome is not fitted |
| Reading drifts | Rapid temperature change | Do not move analyser from one temperature to another immediately before use |

5 Maintenance

5.1 Battery Replacement

1. Loosen the 4 screws located on the front cover. The gasket seal is designed to prevent water leaking into the EII CO so the seal may be tight. Loosen the seal by moving the lid from side to side, and then carefully lift the cover.
2. Slide the battery out of its holder and disconnect the lead.
3. Connect the lead to the new battery and slide the battery into its holder, under the battery clip
4. Replace the cover carefully taking care that the sensor locates properly, and that no wires are trapped. Screw down until you feel the gasket compress; do not over tighten the screws.

5.2 Sensor Replacement

1. Replacement part number for your sensor is: 9100-1700A
2. Loosen the 4 screws located on the front cover. The gasket seal is designed to prevent water leaking into the EII CO so the seal may be tight. Loosen the seal by moving the lid from side to side, and then and carefully lift the cover.
3. Unplug the connector from the back of the sensor.
4. Unscrew the sensor from the front cover.
5. Dispose of the old sensor according to local regulations for acidic compounds.
6. Remove the new sensor from its pack and check it for leaks (See section 6 for safety information), 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 connect to the EII connector. An arrow on the back of the sensor shows where the connector should be fitted. Align the metal sockets on the connector with the pins of the sensor and push on firmly.
7. Replace the cover carefully, ensuring that the sensor locates properly and that no wires are trapped. Screw down until you feel the gasket compress; do not over tighten the screws.
8. Push on the sampling dome.

5.3 General Care

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

The EII CO is built to resist the effects of day to day shocks and drops but remember it is an electronic measurement device and should be looked after carefully to give long trouble free service.

To clean the EII CO use a damp soft cloth.



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

The sensor in the EII CO is an electrochemical device and contains an acidic electrolyte. Always check to make sure that it is not leaking (See Section 6 for safety information). In the event that you do come into contact with the electrolyte wash the contaminated part with copious amounts of water see Section 6.

5.4 Sensor Handling Information

EII CO carbon monoxide 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 electrolyte has occurred use rubber gloves and wear chemical splash goggles to handle and clean up. Rinse contaminated surfaces with water. If anybody comes into contact with the electrolyte, please refer to Section 6.

6 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 an acidic electrolyte which is hazardous. In the event of an accident, use the following first aid procedures

| Body Part | Effect | First Aid Procedures |
|------------|---|--|
| Skin | <p>Contact could result in a chemical burn.</p> <p>Persons with pre-existing skin disorders may be more susceptible to the effects of the substance.</p> | <p>Immediately flush the skin thoroughly with water for at least 15 minutes.</p> <p>Remove contaminated clothing and wash before re-use.</p> <p>Obtain medical advice if continued irritation.</p> |
| Ingestion | <p>Corrosive. May cause sore throat, abdominal pain, nausea, and severe burns of the mouth, throat, and stomach, and may be fatal.</p> | <p>If swallowed DO NOT INDUCE VOMITING.</p> <p>Wash out mouth thoroughly with water and give plenty of water to drink.</p> <p>Obtain medical advice immediately</p> |
| Eye | <p>Persons with pre-existing eye problems may be more susceptible to the effects of the substance.</p> <p>Corrosive. May cause redness, pain, blurred vision, and eye burns.</p> <p>Contact can result in the permanent loss of sight.</p> | <p>Irrigate thoroughly with water for at least 15 minutes.</p> <p>Obtain medical advice immediately.</p> |
| Inhalation | <p>Persons with pre-existing impaired respiratory function may be more susceptible to the effects of the substance.</p> <p>Inhalation is not an expected hazard unless heated to high temperatures.</p> <p>Mist or vapour inhalation can cause irritation to the nose, throat, and upper respiratory tract.</p> | <p>Remove to fresh air.</p> <p>Rest and keep warm.</p> <p>Obtain medical advice if applicable.</p> |

7 Warranty Information

We provide the following Warranties for the **EII CO**:

A 2 year electronics warranty.

A 1 year sensor 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.

8 Specifications

| | |
|----------------------------|--|
| Range | 0 to 50ppmCO |
| Accuracy | $\pm(0.5\text{ppm CO} + 5\% \text{ reading})$ |
| Resolution | 1ppm CO |
| Warm Up Time | < 5 seconds |
| Response Time (T_{90}) | < 20 seconds |
| Sensor Type | Analox 9100-1700A type electrochemical sensor |
| Sensor Life | 1 year in air 12 month 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 | 1013mbar \pm 10% |
| Temperature Effect | <2 ppm CO/°C (<1.1 ppm CO/ °F) |
| Weight | 225g 8oz |
| Dimensions | 130 (l) x 70 (w) x 55 (d) mm 5 ¼ (l) x 2 ¾ (w) x 2 ¼ (d) inches |
| Ingress Protection | IP65/ NEMA 4 |

If you have any comments or queries about the **EII CO** please contact us;

Tel: +44 1642 711400
 Fax: +44 1642 713900
 Email: info@analox.net
 Website www.analox.net

9 Spares

The EII CO can be supplied with any of the following accessories;

| Item | Description | Part Number |
|---|--|------------------|
|  | Storage Case; compact water proof case ideal for protecting your EII CO. | SA2EIIIMINICASE |
|  | Bump test gas kit Providing around 20 bump tests from a standard bump test kit. | SA7CAN5150 |
|  | Calibration Gas Kit | SA7EIIICOCALKIT |
|  | Calibration Tool Kit | SA7EIIICOTOOLKIT |

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.

11 Declaration of Conformity

DECLARATION OF CONFORMITY

Number: P0107-903-00

Manufacturers name: Analox Sensor Technology Ltd

Manufacturers address: 15 Ellerbeck Court
Stokesley Business Park
Stokesley
England
TS9 5PT

It is declared that the following product:

Product name: Analox EIICO
Product code: EIICO

Conforms to all applicable requirements of: BS EN 61000-6-1,
BS EN 61000-6-3,
IEC/EN 61010-1:2001 (2nd ed)
BS EN 60529 IP6X

The above product complies with the requirements of the EMC Directive 89/336/EEC, as amended.

The above product complies with the requirements of the Low Voltage Directive 73/23/EEC, as amended.

Signed on behalf of: Analox Sensor Technology Ltd
Date: 01st December 2010

Signed:



Name: Mark Lewis
Position: Managing Director

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