

# OxyCheq Expedition-X Oxygen Analyzer

## Operator's Manual

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## 1.0 Introduction

- 1.1 The Expedition-X Oxygen Analyzer is designed to measure oxygen levels in the 0.1-100% oxygen range. It can be used to measure the oxygen content for mixes used in Nitrox, Trimix and Heliox.
- 1.2 The analyzer can be used for cylinder oxygen level verification or for monitoring a gas mixing panel. If the analyzer is used with a gas mixing panel, an alternate analyzer should be used to verify the cylinder.
- 1.3 The Expedition-X has a digital display, an internally mounted temperature compensated sensor with a 3 year life span. The Expedition-X is powered by three AAA 1.5 volt batteries providing an expected life span of up to three years of operation before replacement is required.
- 1.4 The Expedition-X has an environmentally sealed case, potentiometer, on/off/on with back light switch, sensor, and digital panel meter. Water resistance is achieved by means of a combination of o-rings or gaskets. The cable must be plugged in to ensure water resistance.
- 1.5 Expedition-X is shipped ready to use after you connect the cable to the analyzer and sensor to the cable.

## 2.0 Controls

- 2.1 The Expedition-X has a splashproof on/off/on with back light switch. When the switch is centered, it is in the off position. When not in use, the switch should be in the off position to conserve battery power. When flipped up, the switch is in the on position. When flipped down, the switch is in the on position with the panel meter back light activated. The back light option should only be used in limited light conditions to extend the life of the batteries. Excessive use of the backlight will result in a significantly shorter battery life.

When switched on, the analyzer's display will indicate an oxygen reading. Please note that the analyzer must be calibrated prior to use (see section 3.0).

- 2.2 The low battery warning is a battery symbol in the left corner of the display. When present, change the batteries prior to using the analyzer.
- 2.3 A waterproof potentiometer/calibration knob is located on the right side of the analyzer. Turn it fully from left to right and then left again. The display reading should decrease in value when turned to the left and increase when turned to the right. If the reading does not change, refer to section 8.0 on Maintenance.
- 2.4 The display has a 0.1% resolution and a sealed gasket. It also has a low battery indicator and a backlight (controlled via the on/off switch).

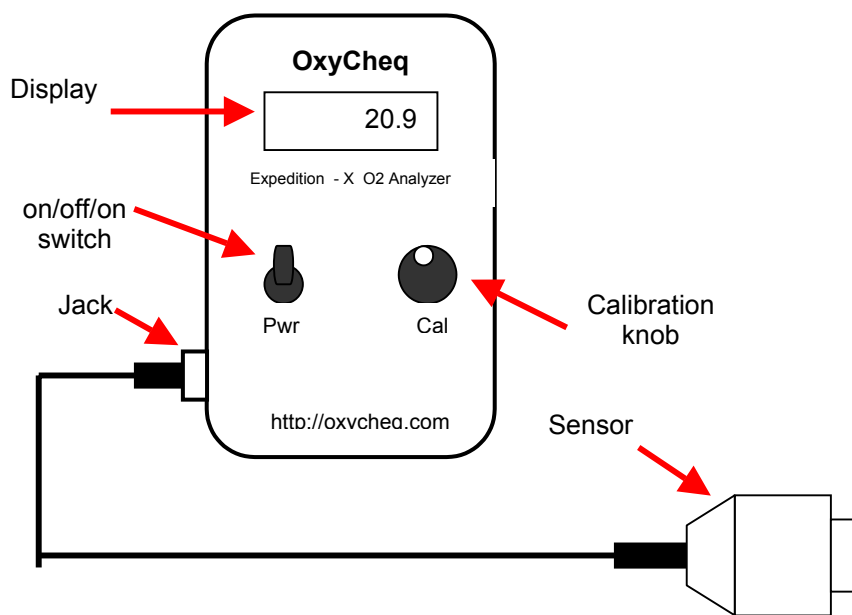


Figure #1

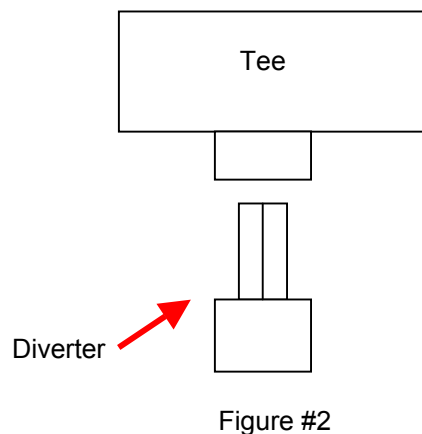


Figure #2

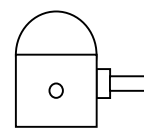


Figure #3  
(sensor cap/flow restrictor)

### 3.0 Air Calibration

- 3.1 Calibration is essential prior to every use. For oxygen mixtures above 50% always calibrate in 100% oxygen before measurement for most accurate results.
- 3.2 Ensure that the sensor plug and the sensor cap are removed and the display reading has stabilized.

Expose the analyzer to clean air for a minute and adjust the calibration knob until the display reads 20.9%. If this is not possible refer to section 6.0 on Troubleshooting or to section 7.0 Maintenance.

- 3.3 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 pressure as the oxygen measurement.

### 4.0 Oxygen Calibration

- 4.1 Connect 100% oxygen from a certified distributor and measure gas with a 2 to 3 liter per minute flow rate.
- 4.2 Allow the reading to stabilize.

## 5.0 Operation

5.1 The Expedition-X comes complete with a sensor flow cap/restrictor (figure #3) that allows you to read directly from a cylinder valve.

- a) Connect the cable to the sensor and analyzer.
- b) Connect the sensor flow cap by screwing it over the sensor threads. It should be snug, but not tight.
- c) Slowly open the cylinder valve until you hear a slow, steady hiss. Place the sensor flow cap against the valve outlet facing you.
- d) Once the display reaches a consistent reading, close the cylinder valve.
- e) Note that after a few seconds after the gas flow has stopped, the display reading will begin to drop until it reaches the ambient oxygen percentage (20.9%).
- f) If in doubt, repeat the procedures above.
- g) An alternative method to sample gas would be to attach an optional flow restrictor to the arm on the sensor flow cap/restrictor and connect it to your BC low pressure hose.

5.2 The Expedition-X also comes with a tee and diverter (figure #2) that allows you to sample gas from the cylinder valve.

- a) Connect the cable to the sensor and analyzer.
- b) Screw the diverter onto the sensor threads.
- c) Place the diverter into the bottom of the tee.
- d) Slowly open the cylinder valve until you hear a slow, steady hiss. Place the tee against the valve outlet facing you making sure you are not introducing air into the tee via Venturi effect.
- e) Once the display reaches a consistent reading, close the cylinder valve.
- f) Note that after a few seconds after the gas flow has stopped, the display reading will begin to drop until it reaches the ambient oxygen percentage (20.9%).
- g) If in doubt, repeat the procedures above.
- h) An alternative method to sample gas would be to attach the tee to the optional DIN flow restrictor. Doing so would eliminate any introduction of air via Venturi effect.

## 6.0 Troubleshooting

Problem	Possible Solution
Cannot calibrate analyzer	Replace sensor
No display once analyzer is turned on	Replace batteries
Low battery indicator is displayed	Replace batteries

## 7.0 Maintenance

### 7.1 Battery Replacement

- a) Remove the 4 screws located on the back of the analyzer and carefully remove the back cover.
- b) Slide the batteries out of their holder and replace them with new AAA batteries. Dispose of batteries in accordance with local regulations.
- c) Make sure no wire leads are outside of the enclosure, and the o-ring is in place. Carefully secure the lid and replace the screws.

### 7.2 Sensor Replacement

- a) Remove existing sensor from cable.
- b) Properly dispose of the old sensor in accordance with local regulations.
- c) Connect replacement sensor to cable.

## 8.0 Care of the Expedition-X

- 8.1 The Expedition-X is an electronics instrument and should be treated as such. When not in use, store it in the carrying case to protect it from sunlight and physical damage.
- 8.2 The Expedition-X is a splashproof analyzer when the cable is connected. The enclosure was designed to withstand normal use by divers in harsh environments. However, it should not be intentionally dropped in water or physically abused. Treat it as any other precision electronics instrument and it will provide you with a long life.
- 8.3 Use a damp cloth to clean the analyzer.
- 8.4 Avoid extreme temperatures long exposures to direct sunlight to prevent any damage to the LCD screen.
- 8.5 The sensor in the Expedition contains caustic electrolyte. Prior to touching the sensor, always make sure there are no electrolyte leaks. In the rare case a leak is present, avoid direct contact with skin or clothing. If physical contact occurs, refer to Safety (9.0).

## 9.0 Safety

9.1 When the batteries or sensor require replacement, dispose of them in accordance with local regulations.

9.2 The sensor contains a KOH Potassium Hydroxide solution that is hazardous and can result in the following:

Eye Permanent eye damage is possible. Flush eye with water for 15 minutes and seek medical attention.

Ingestion Can be fatal if swallowed. Drink a lot of fresh water and seek medical attention.

Skin Chemical burn is possible. Wash area of skin exposed and remove any clothing that was contacted. Seek medical attention if needed.

## 9.3 Sensor Handling

Additional sensors are supplied in a sealed package. Look closely at the sensor once the package is opened to make sure a leak has not occurred. If a leak is noticed, avoid physical contact with the sensor. If clean up is required, use rubber gloves and safety goggles. Rinse any contaminated area with water and properly dispose of any rags.

## 10.0 Technical Specifications

Range	0.1 – 100% oxygen
Display Accuracy	0.1%
Response time	90% in <5seconds
Sensor Type	Galvanic
Sensor Life	More than 36 months in air 24 month guarantee in air
Battery	3 AAA 1.5 volt batteries
Battery life	Up to 36 months use
Operating temp.	-5 to 50 C
Storage temp.	-5 to 50 C
Pressure	Sensitive to partial pressures of oxygen

## 11.0 Spares and Accessories

Your Expedition-X oxygen analyzer is supplied with an oxygen sensor, three AAA batteries, a high pressure sensor flow cap, a straight-shielded cable, a diverter, a deluxe tee and a deluxe carrying case. Additional accessories for the Expedition include a BC LP flow restrictor, DIN valve restrictor, 10' coiled-

shielded cable and a sensor saver. Spares include an oxygen sensor and an electronics enclosure o-ring. You can order all of these items by contacting your supplier or OxyCheq directly. Our website is <http://oxycheq.com>.

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