

Oxygen Sensor (Sealed) DT222A (for EcoLog XL)



The Oxygen sensor is a maintenance free galvanic oxygen electrode, capable of measuring % O₂ in air.

The Oxygen sensor can be used to perform a wide variety of experiments to determine changes in % O₂ in air especially in photosynthesis and respiration of plants and monitoring human respiration.

The Oxygen sensor consists of a galvanic oxygen sensitive electrode with a processing unit (oxygen adaptor, equipped with a calibration knob) and a storage shorting cap.

The Oxygen sensor has to be calibrated before every measurement.

Typical Experiments

- Monitoring human respiration
- Monitoring changes in oxygen levels during photosynthesis and respiration of plants
- Demonstrating how oxygen is removed from the air by re-breathing the sample of air in a paper bag using different patterns of breathing
- Respiration of animals, insects, germinating seeds
- Consumption of oxygen by yeast during respiration of sugars
- Discovering the change in oxygen level during combustion – using a candle burning in a bell jar

How it Works

The Oxygen sensor uses a thin membrane to cover a layer of electrolyte two-electrode system (made from mixed metal), where the two metals have different



potentials for their metal - oxygen couple. The output potential is dependant on the metals chosen for the probe and on the amount of oxygen in the solution being measured. Oxygen diffuses through the membrane and reacts with the two metals inside. An electric current develops which is proportional to the partial pressure of oxygen in the sample and the concentration of the dissolved oxygen. The adaptor amplifies the current and converts it to 0 to 5 Volts accepted by the data logger.

Sensor Specification

Range:	0 – 25%
Accuracy:	± 7% over entire range
Resolution:	0.025%
Temperature Compensation:	No
Response Time for 95% of Reading:	Up to 2 minutes
Default Sample Rate:	10 samples per second
Features:	Equipped with an offset calibration knob Maintenance free Galvanic oxygen probe
Sensor Storage:	Store the Oxygen electrode with the shorting cap

Contents

Adaptor & Oxygen electrode set	DT222A
Adaptor only	DT222
Oxygen electrode	DT118

Equipment Setup

1. Connect the electrode to the adaptor.
2. Connect the adaptor to the data logger's input.




Technical Notes

- The sample temperature has to be 25 °C since the Oxygen sensor can only be calibrated at 25 °C.

- The Oxygen electrode is supplied with a protecting cap that covers the membrane. Before using the electrode for the first time remove the protecting cap.
- The sensor is supplied with a storage shorting cap. Improper storage without the shorting cap voids the warranty.


Using the Oxygen Sensor with EcoLog XL and EcoLab Software


Calibration

1. Connect EcoLog XL to the computer.
2. Connect the Oxygen sensor to the EcoLog XL's sensor input. The sensor is automatically recognized by the EcoLab software.
3. If EcoLog XL is running in one of its stand-alone modes, press the **Stop**  button on the EcoLog XL front panel.
4. Launch EcoLab.
5. In the **Setup** window deactivate the internal sensors by clicking the button next to the sensors' icon and program the EcoLog XL's sample rate to be 5 samples per second and set the recording time to be 3 minutes.
6. Choose **Table** display on the main tool bar.
7. Hold the electrode in the air.
8. Click **Run**  to start recording and turn the knob on the Oxygen adaptor until a value of **20.9%** is shown.
9. Wait the reading to stabilize on **20.9%**.
10. Click **Stop**  on the main tool bar.
11. Start using the Oxygen sensor.

Note: This method is not recommended when air temperature changes (for example, when the air conditioner turns on and off or if it is windy).

Set a Measurement


1. Calibrate the electrode using one of the methods described (see **Calibration** above).
2. Program the data logger's sample **Rate** and the **Recording** time.
3. Click **Run**  on the main toolbar to start the measurement.

- You can stop recording at any time by clicking **Stop**  on the toolbar.


To conduct remote recording

For remote logging it is necessary to send the setting to EcoLog XL before disconnecting from the computer.

- In the Setup window deactivate the internal sensors by clicking the button next to the sensors' icon and program the EcoLog XL's sample **Rate** and the **Recording** time.


- Click **Send Setup**  on the main tool bar, wait until you will see the following message on the EcoLog XL screen:

Remote logging
 Waiting for Go


- Disconnect the EcoLog XL from the computer, place the EcoLog XL at the desired recording location and press the **Go**  button on the EcoLog XL front panel.

To download data that was recorded offline

EcoLog XL always stores the last four experiments. To download data that was recorded offline, or while EcoLog XL was not connected to the computer:

- Connect the EcoLog XL to the computer and if EcoLog XL is collecting data, click **Stop**  to end collecting and to return to the main menu.

- Launch EcoLab.

- Click **Download**  on the main toolbar to open the **Selective Download** dialog:

Selective Download			
	Sampling time	Data type	Number of samples
<input type="radio"/>	23/05/03 12:58:21	Remote EzyLog	8
<input type="radio"/>	23/05/03 12:58:37	Snapshot	4
<input checked="" type="radio"/>	23/05/03 13:00:54	Remote EzyLog	10
<input type="radio"/>	23/05/03 12:52:55	Snapshot	3

The dialog contains details of the stored experiments: the starting time and date, the logging mode and the number of samples taken.

4. Click an option to select the experiment you wish to download, and then click **OK**. This will start the Post-experiment Data Transfer communication mode. Once the transfer is complete, the data will be displayed automatically in the graph window and in the table window.

Maintenance and Storage

- At the end of the measurement, remove the electrode from the sample; rinse the electrode with distilled water over the *waste* beaker. Blot the electrode dry with a lab wipe. The electrode is now ready for a new measurement.
- It is VERY IMPORTANT to store the electrode dry with the shorting plug and protecting cap attached to maintain the long-term functionality of this galvanic electrode.

An Example of using the Oxygen Sensor

Catalytic Decomposition of H₂O₂ by the Enzyme, Catalase: Effect of Enzyme Concentration

In this experiment we follow the changes in Oxygen in Air vs. Time, due to oxygen released at different concentrations of catalase. Under saturating substrate concentrations, the rate of enzyme catalysis is directly proportional to the concentration of the enzyme. Figure 1 below displays the change in Oxygen in Air vs. Time, due to oxygen release at different catalase concentrations.

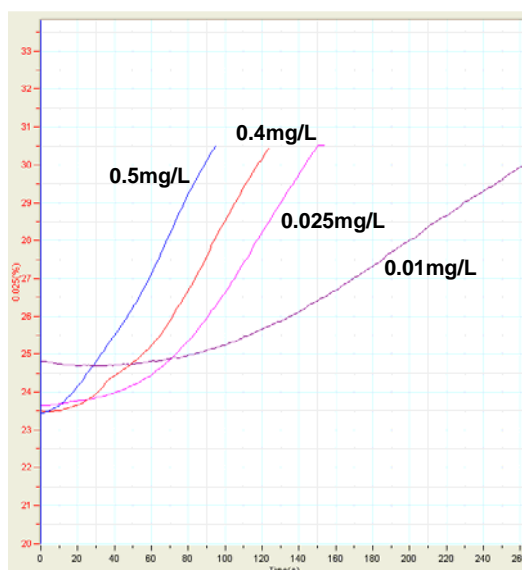


Figure 1: Oxygen in Air vs. Time



Technical Support

Please contact Fourier technical support as follows:

Web: http://www.fourier-sys.com/support_support.html

Email: support@fourier-sys.com

Consult the FAQs before contacting technical support:

http://www.fourier-sys.com/support_faq.html

Copyright and Warranty

All standard Fourier Systems sensors carry a one-year warranty, which states that for a period of twelve months after the date of delivery to you, it will be substantially free from significant defects in materials and workmanship.

This Warranty does not cover breakage of the product caused by misuse or abuse.

This Warranty does not cover Fourier Systems consumables such as electrodes, batteries, EKG stickers, cuvettes and storage solutions or buffers.