

Technical Notes

Oxygen Gas Sensor - Mark 2

The oxygen gas sensor enables many areas of science to be explored in exciting new ways. It opens the door to explore areas that hitherto have been impossible to examine and in conjunction with the ALBA software allows new ways of teaching and learning to be presented.

The oxygen gas sensor must be used with version 2.03 or greater of the ALBA Core software.

The mark 2 version of our oxygen sensor has several advantages:

- Increased life compared with other oxygen sensors. This is because the EC410 does not contain reagents that can be consumed (such as lead). The sensor lifetime is estimated to be greater than five years
- The internal pressure inside the mark 2 sensor does not change with time. The pressure in lead- based oxygen sensors rises with time, increasing the chances of leakage both internally (causing premature sensor death) or externally.
- The mark 2 sensor does not contain any toxic metals.
- The sensor response to pressure is as good if not better than other oxygen sensors.

Uses for your Oxygen Gas Sensor

There are several ALBA applications that use the oxygen sensor:

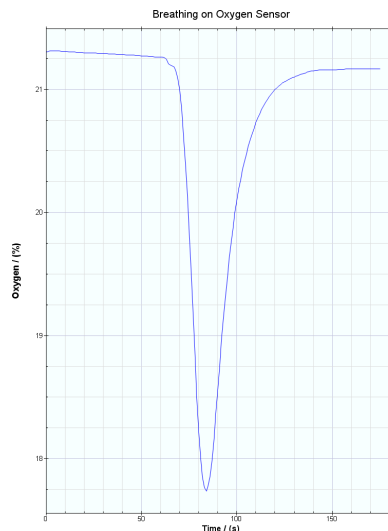
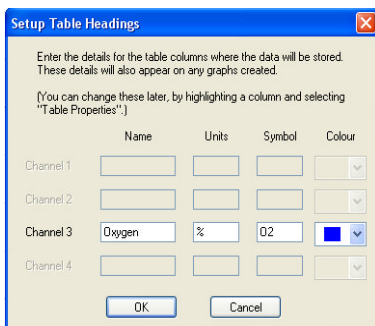
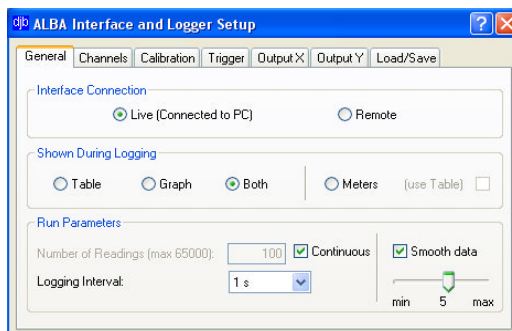
- Germinating seeds
- Photosynthesis
- Enzyme experiments
- Catalyst MnO₂ (O₂ from H₂O₂)
- Respiration of snails, woodlice etc
- Rusting
- Catalyst
- Breathing

Users will find other uses for their oxygen sensor and where there are no suitable off-the-shelf Applications from **djb microtech** then the ALBA Investigator software should be used.

Using your Oxygen Gas Sensor with the Investigator Software

- Connect your oxygen sensor to channel 3 or 4 at the back of the ALBA Interface and Logger.
- Allow fully five minutes to reach stable operating conditions.
- From the Investigator menu select *Setup and Go*.
- Make the setup selections shown.
- Click the Channels tab to check that the software knows that an oxygen sensor is connected.
- Start the data capture when you are ready and let it sample the air for at least 30 seconds. Now take a deep breath and breathe out slowly over the sensor.

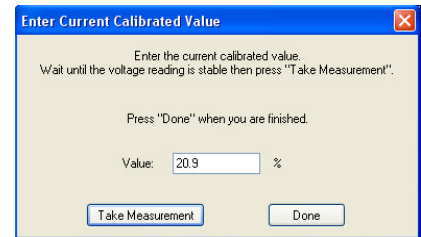
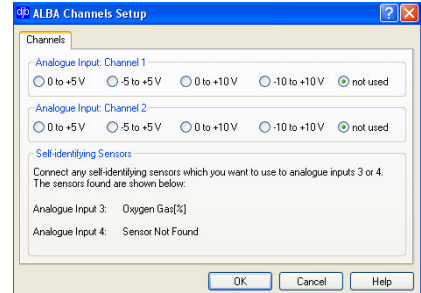
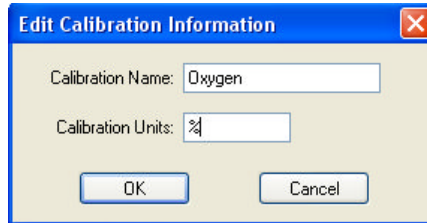
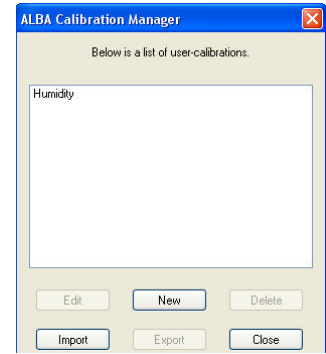
Note that oxygen level may not return to the exact starting value. This is because the sensor is slightly sensitive to the temperature and humidity of your breath.



Calibrating your Oxygen Gas Sensor

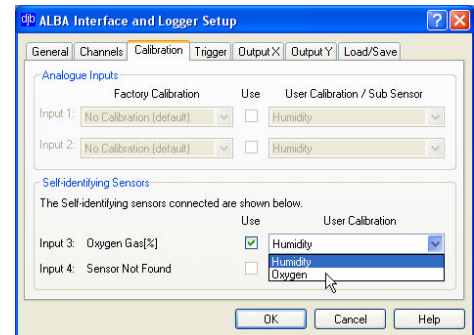
Your oxygen sensor is calibrated at the factory to give a reading of 20.9% in free air. There will be times when you wish to recalibrate the sensor using the ALBA Investigator software and to do this follow the steps below:

- Connect the sensor to the ALBA Interface and Logger. Leave for five minutes to reach stable operating conditions.
- Place the sensor in fresh air.
- From the Experiment menu select *Calibration Manager*.
- Click New then on the Calibration Setup screen click ok.
- The Channels setup screen indicates that the software knows that an oxygen sensor is connected. Click ok.
- In the Calibration Information window enter a name for the calibration (e.g. oxygen) and the units as %.
- On the Calibrated Value screen enter a value of 20.9 and when the measurement is steady click Take Measurement.
- Now click Done.



Applying a Calibration

- Select Setup and Go from the Investigator menu.
- Click on the Calibration tab.
- Now click on Use (as in use calibration for oxygen sensor)
- From the drop-down select the calibration that you want to apply to your data
- If you have set up everything in the General tab then click ok.



Technical Information

Range	0 - 30% O ₂
Over-range.....	100% O ₂
Resolution.....	0.1% O ₂
Output signal in 20.9% O ₂	300 – 400 ¼A
Output signal in N ₂	40 ¼A
Response time (T90)	<15 s
Temperature range	-20 to +55 °C
Temperature coefficient (see Fig 1)	<0.5% signal/°C
Pressure range	90 - 110 kPa (nominal)
Pressure coefficient	0.07% typical signal per mbar change
Humidity range.....	15 - 95% RH (non-condensing)

Caring for your Oxygen Gas Sensor

- Avoid banging/dropping the sensor as sudden shocks can damage the internal operation of the cell.
- Do not immerse the sensor in liquid. If you need to measure dissolved oxygen then see our website for a suitable sensor.

djb microtech ltd

Delfie House, 1 Delfie Drive, Greenock, Scotland, PA16 9EN

Phone/Fax: 01475 786540 Email: info@djb.co.uk Website: www.djb.co.uk