



1170 - Wireless Oxygen In Air Sensor Manual

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Introduction

Thank you for purchasing the Smart Wireless Oxygen in Air Sensor. We pride ourselves on producing high quality products that meet with the demands of the busy classroom environment. If you have any problems using this sensor, please read this documentation in full before contacting the Data Harvest support team.



Overview

The smart wireless oxygen sensor is a 4 channel sensor measuring oxygen (%), temperature (°C), pressure (kPa) and humidity (%RH).

It can be used to study respiration, breathing, photosynthesis and the rate of oxygen evolution some chemical reactions. The sensor is an electrochemical device that has a life span of approximately 5 years. Calibration is available to compensate for deterioration of the sensor output or set the oxygen level to local conditions.

Pack Contents

This product is supplied with the following items:

- [1 x Smart Wireless Oxygen in Air Sensor](#)
- 1 x USB Connecting Lead
- 1 x Nalgene Bottle

Additional Accessories

To get the most from your Smart Wireless Carbon Dioxide Sensor, the following items should be considered:

- [Wireless Carbon Dioxide](#)
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Operational Overview

The diagram below shows the specific parts of the sensor. Read further to explore the functionality of each part of the sensor.



- 1. Sensor End Cap
- 2. Status Indicator
- 3. On/Off Switch
- 4. USB Port
- 5. Unique ID Number



Sensor End Cap (1)

Most Smart Wireless Sensors feature an end cap that is specific to the requirements of the device's internal sensor. The sensor's end cap is the direct interface between the device's internal sensor and your experiment.

The Status Indicators (2)

The sensor features a single status indicator that changes colour and flashes. See the table below for further information.

Status Light	Indicates
No light	Sensor is Off. Short press the On/Off switch
Blue flashing	Sensor On and Bluetooth advertising
White flashing	Charging via USB mains charger or USB port
Green flashing	Communication with the EasySense2 app (via USB or Bluetooth) has been established

Orange flashing		Recording data
Red flashing		Battery is low

On/Off Switch (3)

The sensor's on/off switch allows you to turn the sensor on, off or perform a hard reset.

To switch the sensor off

- Press and hold down the On/Off switch until the white light shows, then release.
- If not communicating with the EasySense2 app, the sensor will turn off after a period of one hour of inactivity.

Hard resetting the sensor

- If necessary, attach the sensor to power.
- Press and hold down the On/Off button for at least 8 seconds until the status LED gives a flash of blue light, then release.
- If the sensor fails to respond, contact Product Support at Data Harvest. Please provide details of:
 - The computer platform it is being used with and the EasySense2 app's version number.
 - A description of the problem being encountered.

USB Port (4)

Use to connect to a computer or a charging unit.

For specific USB or Bluetooth connectivity instructions, please see the 'Connectivity' section of this documentation.

For instructions on charging your device, see the section on 'Charging the Sensor'.

Unique ID Number (5)

All Smart Wireless Sensors are labelled with a unique ID number. This number is used in the EasySense2 app, so that you can identify each sensor when making a connection wirelessly.

Connectivity

The sensor is both USB and Bluetooth compatible. Install the EasySense2 app, if it is not already on your device. For details of how to operate the EasySense2 app, please refer to the EasySense2 documentation.

USB Connectivity

Quick Steps

1. Connect the sensor to the computer's USB port using the USB cable supplied.
2. The computer will automatically detect a new device and depending on your operating system, will install any applicable device drivers.
3. Start EasySense 2 app.
4. Within the EasySense2 app, the Devices icon will change to green to show that the sensor is connected, and the status light on the sensor will also turn green.
5. Begin your practical investigations.

Bluetooth Connectivity

Using Bluetooth, the sensor can wirelessly connect to mobile devices such tablets and mobile phones, as well as desktop or laptop computers, giving students the ability to run experiments independently without being tethered to a device.

See the EasySense2 app user manual system requirements for further details.

Quick Notes on Bluetooth Connectivity

Only use with the EasySense2 app, you do not need to pair the device. If paired, the sensor will not be available to the EasySense2 app.

Computers or devices will need to support Bluetooth Low Energy (BLE). For further information refer to the instructions provided for the EasySense2 app.

Quick Steps

1. Short press the on/off switch to turn the sensor on, blue LED will flash.
 2. Open the EasySense2 app.
 3. Select the Devices icon.
 4. Select your sensor from the list of available sensors to connect to the device. Your sensor is identified by its unique ID in the list.
 5. Click on connect at the side of your sensor in the list.
 6. The Devices icon will change to green and the status light on the sensor will flash green to indicate a connection has been established.
 7. Begin your practical investigations.
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Charging the Sensor

The Smart Wireless sensors are fitted with a rechargeable lithium-ion battery and can be charged via the USB port. Use the supplied USB lead to connect the sensor either directly to a USB port on your computer, a powered USB hub or a USB mains charger that outputs 5 V at 500 mA or more.

A full charge can take up to 4 hours.

Additional Information

Whenever the sensor is connected to the USB port on the computer or to a USB mains charger (output 5 V at 500 mA or more), it will automatically recharge the battery (LED status flashing white).

When connected to a computer, the computer should be turned on and not in sleep or standby mode, as the battery may drain instead of charge.

The sensor will stay awake for 60 mins when Bluetooth advertising (LED status flashing blue).

Lithium-ion batteries are 'memory-free' and prefer a partial rather than a full discharge. Constant partial discharges with frequent recharges will not cause any harm. Frequent full discharges should be avoided whenever possible. Ideally the sensor should be stored at about 40% or more charge.

The speed at which a lithium-ion battery will age is governed by both its storage temperature (preferably less than 40 C) and state-of-charge.

Calibration

The sensor can be calibrated in the EasySense2 App.

Firmware Updates

Occasionally Data Harvest may release updated firmware which will contain improvements or new features.

Updates will take place when you connect your sensor to the EasySense2 app. You will be given the option to decline an update.

Updates can be performed over USB or Bluetooth and will typically take less than one minute. Updating firmware over USB will be quicker than Bluetooth.

Do not disconnect the sensor, or power off during the update.

If you have a wireless connection to the EasySense2 app, the sensor will have to be reconnected after performing the update.

Usage Information

Please read the following guidelines carefully before using this sensor

- The sensor is an electrochemical sensor, in effect it is like a battery, it will need replacing at approximately 5 years. The exact duration of the sensor will depend upon storage temperature and correct storage. The 5 year estimation is based upon storage at an ambient of 21 to 25 Celsius and the sensor being stored vertically when not in use and the amount of available oxygen.
 - Failure to store the sensor vertically will affect warranty conditions.
 - If necessary, clean the outer surface of the sensor housing using a damp cloth. Do not immerse the sensor in any cleaning media. Do not use alcohols.
 - Liquid will permanently damage the Oxygen in Air sensor. If the sensor is to be used in an environment where there is a risk of condensation e.g. with a plant in a sealed environment (e.g. a plastic bag), position the sensor so that any liquid that does condense will not come into contact with the sensing element.
 - Allow a few minutes for the sensor to settle into a new environment after set up so the readings can stabilise before starting to record data. This allows the gas being sampled time to percolate/diffuse into the sensor and for it to adjust to any change in air pressure or temperature.
 - The response time of this sensor will depend considerably on air circulation i.e. it will respond more quickly in a moving current of air.
 - The Oxygen in Air sensor has been designed for educational purposes only. It should not be used to indicate any environmental compliance regulations.
 - If the sensor does not read 20 - 21% oxygen at connection leave for a few moments to settle and if still not reading true use the calibration button in the devices drop down to set the value. You can use known oxygen concentration atmospheres or use the accepted value of 20.95% for the atmosphere.
 - The sensor does use temperature compensation for slow changes, if the temperature changes rapidly the compensation will not respond – it will need to catch up.
 - The Humidity, Temperature and pressure sensors are accurate and will allow the user to collect that data alongside oxygen levels, This makes it very useful for environmental work or simple physiology work (for example measuring changes in air in, air out – use humidity, temperature and oxygen to show changes) thus reducing the need to have multiple sensors. If you use an alternative temperature sensor turn off the oxygen sensor temperature channel.
 - The sensor is designed to fit into the supplied Nalgene bottle, the black end cap is not a constant diameter to accommodate variations in the bottle opening.
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Practical Investigations

The Oxygen In Air Sensor can be used to investigate a number of scientific experiments such as:

- Monitoring human respiration in inhaled and exhaled air
- Exhaled breath before and after exercise
- Air quality
- Oxygen changes during photosynthesis and respiration of plants
- Consumption of oxygen as a measure of respiratory activity of animals, insects, yeast or germinating seeds
- Decomposition of hydrogen peroxide by the enzyme catalyse
- Change in oxygen level during combustion

Online Videos

Learn how to use data logging in the classroom with our Secondary Science Academy demonstration videos, which will walk you through using the new EasySense2 app and show you how to get hands-on with the latest Bluetooth wireless sensors. The video experiments will show you how to get the best out of your science lessons.

New online content is being continuously uploaded onto our YouTube channel, including practical worksheets as well as videos.

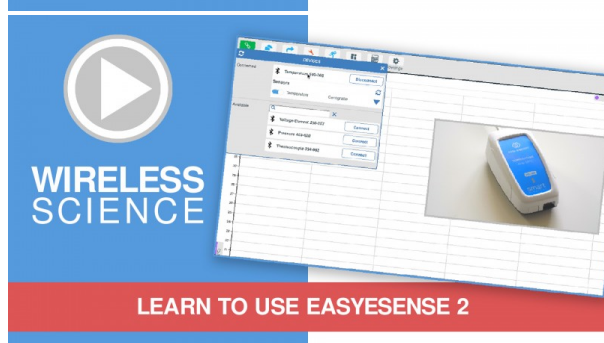
See our website for further information and links.



Explore Bluetooth Sensors

Are you looking to make the jump to our smart wireless sensors? Or have you recently purchased them and want to know more about how they work?

[View video playlist](#)



Explore EasySense2

The core of our science platform is our EasySense2 software. In these videos you will learn everything from the basics of our software to the most in-depth features.

[View video playlist](#)



Explore Science Practicals

See our Smart Wireless Sensors in action with a range of practical experiments. This is the best way to get started with the new Bluetooth sensors!

[View video playlist](#)

Sensor Specifications

Please read the following table for sensor specifications.

Feature	Detail
Measurement Ranges	O2: 0 to 100 % Temperature: -40 to 85 C Pressure: 30 to 110 kPa Humidity: 0 to 100 %RH
Resolution	O2: 0.1% Temperature: 0.1 C Pressure: 0.01 kPa Humidity: 0.1%RH
Fastest logging speed	10 samples per second [100ms]
Connectivity	Wired via USB Wireless via Bluetooth
Bluetooth Specifications	Bluetooth 4.2 low energy radio, single mode compliant Transmit (TX) power: 0 dBm Receiver (RX) sensitivity: - 90 dBm Usable transmission range: up to 10 m in open air Frequency Range: 2.402 to 2.480 GHz operation
Internal Battery	Rechargeable internal lithium-ion 3.7 V, 1300 mAh Power specification: 5 V at 500 mA
Storage/Operating Temperature	0 - 40 C
Humidity	0 to 95% RH (non-condensing)
Physical Specifications	Weight: approx. 115 g External dimensions: approx. height 33 mm x width 50 mm x length 152 mm

Limited Warranty

For information about the terms of the product warranty, see the Data Harvest website at: <https://data-harvest.co.uk/warranty>

Product Repairs

When returning goods to Data Harvest, please download and complete the repair return [form](#) to ensure you have sent us all the information we require, and send it to us alongside the item to be repaired. The second page of this form includes a return address label.

If you have purchased a Data Harvest manufactured product via a different company, please also supply proof of purchase.

Postage Charges

- In the event of a fault developing, the product must be returned in suitable packaging to Data Harvest for repair or replacement at no expense to the user other than postal charges.
- There will be no postal charge for the return of repaired goods to any mainland UK address (for other areas, additional shipping charges may apply).

Out of Warranty Repairs

Please visit <https://data-harvest.co.uk/repairs> for the most up to date charges for out of warranty repairs.

Warranty on Repaired Items

Once an item has been serviced and repaired, the product will have 1 year warranty against further failure of the component repaired.

International Returns

Please contact the authorised Data Harvest representative in your country for assistance in returning equipment for repair.

Compliance

This product complies to the following standards

Waste Electrical and Electronic Equipment Legislation

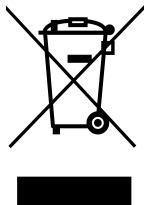
Data Harvest Group Ltd is fully compliant with WEEE legislation and is pleased to provide a disposal service for any of our products when their life expires. Simply return them to us clearly identified as 'life expired' and we will dispose of them for you.

FCC Details

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE

This product conforms to the CE specification. It has been assessed and deemed to meet EU safety, health and environmental protection requirements as required for products manufactured anywhere in the world that are then marketed within the EU.



Troubleshooting

If you experience any problems with your product, please try the following troubleshooting tips before contacting the Data Harvest support team.

Feature	Detail
Loss of Bluetooth Connectivity	<p>If the sensor loses Bluetooth connection and will not reconnect try:</p> <p>Closing and reopening the EasySense 2 app.</p> <p>Switching the sensor Off and then On again.</p> <p>If you are using a Bluetooth Smart USB Adaptor on your computer, unplug the adaptor, plug back in again and try to reconnect.</p> <p>Hard reset the sensor and then try to reconnect.</p>

Notices

Please read the following notices with regards to using your sensor

1. The sensor is much smarter than traditional Bluetooth sensors and you are not required to pair the device. If paired, the sensor will not be available to the EasySense 2 app.
 2. Do not allow the sensing element to get wet at any time. The sensor is intended only for measuring gasses – not liquid O₂ concentrations.
 3. When the sensor is connected to a computer, the computer should be turned on and not in sleep or standby mode or the battery may drain instead of charge.
 4. Data Harvest products are designed for educational use and are not intended for use in industrial, medical or commercial applications.
 5. The sensor is not waterproof.
 6. Plastic parts may fade or discolour over time if exposed to UV light. This is normal and will not affect the operation of the sensor.
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Contact Information

To contact Data Harvest directly, please use any of the following channels

Traditional Communications

Data Harvest Group Ltd.
1 Eden Court, Eden Way,
Leighton Buzzard,
Bedfordshire,
LU7 4FY
United Kingdom

Tel: +44 (0) 1525 373666

Fax: +44 (0) 1525 851638

Sales email: sales@data-harvest.co.uk

Support email: support@data-harvest.co.uk

Online Communications

We have active social media support channels using the following platforms

- [Facebook](#)
- [Twitter](#)
- [YouTube](#)

Office Opening Hours

Monday to Thursday - 08:30 to 16:45

Friday - 08:30 to 13:30

Saturday & Sunday & UK Bank Holidays - Closed

PDF Translations

The PDF formatted download of this manual is by default provided in the English (United Kingdom) language. If an alternative translation is available, it will be listed here.

We have for your convenience included a webpage translation feature to the online documentation which will allow you to translate and print individual pages of this documentation.
