Wireless
O2(Oxygen) Gas
(P4513-OX)
User Guide

Rev. WL113O2-12-2023

This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.

The wireless Oxygen Gas sensor can measure the concentration of oxygen gas in the air.

The wireless oxygen gas sensors can accurately measure the amount of oxygen in the atmosphere or confined spaces. The measurement range is wide, allowing various measurements. It can be used with a carbon dioxide sensor to measure oxygen and carbon dioxide levels outdoors or in the classroom. Additionally, the sensor has a display window so you can immediately check the measured values.
You can measure by remotely connecting to a smart device or PC wirelessly or wired.

Suggested experiments

- Photosynthesis experiment
- Decomposition of hydrogen peroxide
- Animal respiration experiments

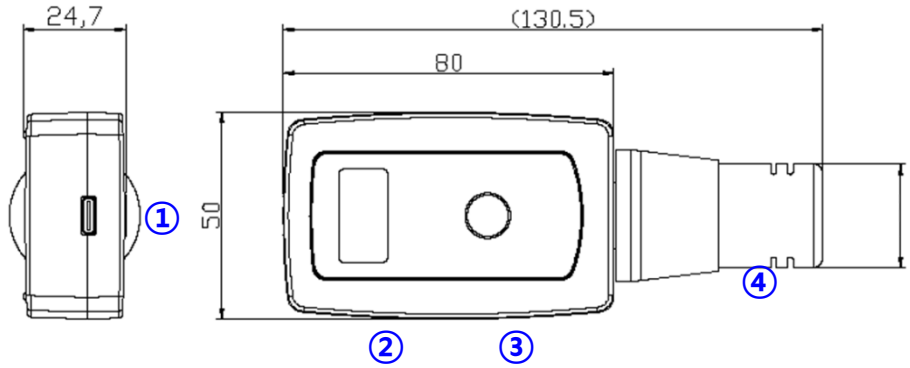
Composition

The wireless Oxygen Gas sensor *consists of the following.*

- Wireless Oxygen Gas sensor (P4513-OX)
- USB-A/C cable
- Booklet

Function of wireless sensor

Structure



① USB port : Connect the sensor to a PC and use it for experiments or charging.

② OLED Display : Displays measured sensor values, sensor type, sensor ID, and remaining battery level.

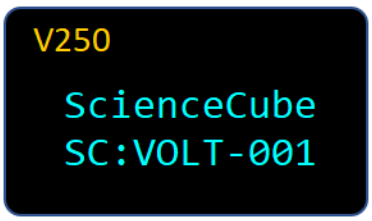
③ Power/Function Button : It has functions such as power ON/OFF, measurement sensor change and calibration, etc.

④ Sensing part : A chemical oxygen cell is placed, protected by an aluminum cap.

Power/Function Button

Status	Turn	Action	Description
When the power is off	Click once	■	A short press turns the sensor on.
	Long click	▬▬	A long press changes the mode and turns on the sensor.
When it's on	Double click	■■	1) A user calibration (if the sensor has a calibration function) is performed and **U0** or **UC** is displayed above the device.
	Long click	▬▬	Turns off.

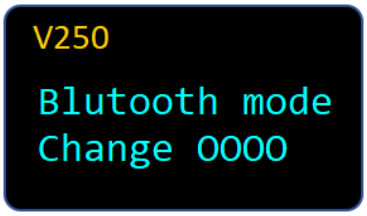
Start screen



V250 : Displays the sensor's firmware version.

SC:OOOO-001 : When you search for a Bluetooth device, the device name will be displayed. (Sensor name and 3-digit serial number)

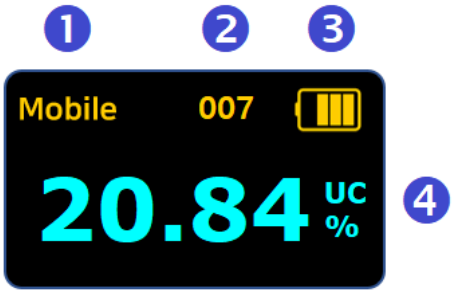
Mode change



When you press and hold the power button and turn it on, the Bluetooth connection mode changes to **Mobile** or **PC** with the following message.

See last page for more information.

Measurement screen



①Connection mode	**Mobile** : Connecting Android or iOS **PC** : Connecting to Windows PC : Connected via **USB** cable ※ A long press changes the mode and turns on the sensor.
②Sensor-ID	This is the sensor's unique number and is displayed along with the sensor name in the device name when connected via Bluetooth.
③Battery	Check the battery status, and when charging via USB, the display will change to charging.
④Value	1) Displays sensor measurement values and units in real time. 2) If **user calibration** is used, **U0** or **UC** will be displayed above the units.

Using the Sensor

Oxygen concentration in the air shows similar values in most regions without significant differences. Typically, it has a value of 20.9%, and users can calibrate the wireless oxygen sensor based on this value.

1. Place the oxygen sensor in the air until the values stabilize.
2. When the value is stable, press the calibration button and check whether a constant value of 20.9% is displayed.
3. If the value moves, repeat until it stabilizes.
4. Install the sensor in the environment you want to measure.

User calibration is temporary and returns to default when powered on or off.

Atmospheric oxygen concentration

Since the oxygen concentration (%) in the atmosphere varies depending on the water vapor pressure, in order to calibrate the oxygen sensor more precisely, it must be calibrated with the oxygen concentration in the atmosphere.
Atmospheric oxygen concentration of 20.9% is calculated based on dry air (0% humidity). If you know the relative humidity of your current location, you can correct it using the values in the table below instead of 20.9%.

Relative Humidity(%RH)	0%RH	25%RH	50%RH	75%RH	100%RH
Volume concentration (% Vol.)	20.9	20.7	20.5	20.3	20.1

Specifications

Item	Description
Range	0 ~25 Vol. %
Resolution	0.01 Vol. %
Sampling Time	Max. 100Hz (0.01 sec.), (Typical 1Hz)
Condition	-20 ~ 60℃, ~85%RH
Wireless Connection	Bluetooth 5.0 or Classic 2.1
Wired Connection	USB-C
Battery	700mAh Li-Polymer rechargeable
Charging Time	within 2 hours
Operating Time	Approximately 12 hours after full charge (depending on usage conditions)
EMC	CE : EN 61326-1, EN 55011, EN 55032, EN 301

CAUTION: Do not use the instrument beyond the measurement range or in conditions that exceed the short-term exposure limits. Prolonged exposure beyond the maximum permissible range can cause serious damage to the sensor.

How to install Science#

- **Install Windows PC version**

Online installation file (approximately 39MB)
http://www.koreadigital.com/url/updates/sciencesharppc/setup.exe
* Internet connection is required during installation

Offline installation file (approximately 340MB)
http://www.koreadigital.com/url/updates/sciencesharppc/setup_full.exe
* Installation does not require an Internet connection, but contains large content

- **Install from a mobile smart device (Smartphone or Tablet PC)**

1. Download Science# to your smart device (Refer to QR codes below)
2. Connect using Bluetooth (See Science# documentation or refer to next page)
3. Run Science#
4. When you connect the sensor, the measurement is displayed on the Science# screen

GET IN ON Google Play

Download on the App Store

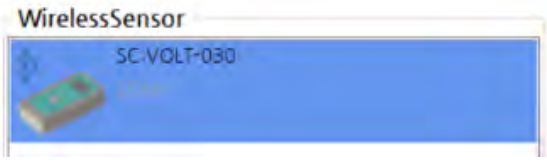
Features

- Up to four wireless sensors can be connected to a PC or smart device at the same time.
- It supports dual-mode Bluetooth, allowing you to connect not only smart devices but also desktop and laptop PCs to conduct experiments using the **Science#** application.
- It can be connected to a PC through a USB port and experiments can be performed using the **Science#** program.

How to connect Wireless Sensor to Science# program

- **Windows PC**

1. Install and run Science# (Refer to previous page for installation method)
2. Power on the sensor
3. Click the  [Connect] icon and select [Bluetooth Interface] from [Select Interface]
4. [Add Bluetooth or other device] → [Bluetooth] → Add sensor number after checking the number on the backside of sensor
5. When you see like the picture, click on Wireless Sensor and connect



- **Android or iOS (Smartphone or Tablet PC)**

1. Install and run Science# (Refer to previous page for installation method)
2. Power on the sensor
3. Click the  [Connect] icon and select [Bluetooth Interface]
4. After selecting the device search, check the sensor number on the backside and connect

If you experience any connection issues, check Bluetooth mode on the sensor. Please refer to the next page for instructions on how to change it.

How to switch to Bluetooth mode for Android and iOS

For mobile devices (Android, iOS) Bluetooth Low Energy technology is used for wireless communication. For these devices do not pair the sensor just use it directly in the software.

Turn off the sensor. Then press and hold the power button until the text ‘Bluetooth mode Change Mobile’ is shown, then release the button. The mode is set to ‘Mobile’, meaning that Bluetooth Low Energy is used.

How to switch to Bluetooth mode for Windows

For Windows computers, Bluetooth Classic technology is used for wireless communication. Before you start to use the sensor for measurement you have to pair it. If you are asked for a PIN, enter either “1234” or “0000”.

Turn off the sensor. Then press and hold the power button until the text ‘Bluetooth mode Change PC’ is shown, then release the button. The mode is set to ‘PC’, meaning Bluetooth Classic is used.

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