



Wireless Motion Sensor (P4506-MO) User manual



Rev.01 (JAN. 30, 2023)

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

Introduction

The Wireless motion sensor use ultrasonic waves to measure the distance between objects. When designing scientific experiments, complex experimental setups can be more easily moved and fixed without the need to connect signal cables. In addition, since the sensor has a display window, the measurement value can be checked immediately, and it can be measured by remotely connecting to a smart device or PC through wireless or wired without an interface.

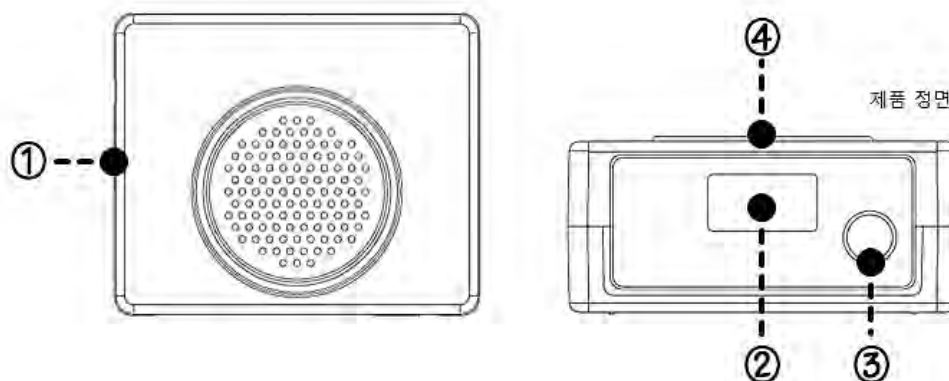
Composition & Usage

Composition

1. Wireless Motion Sensor (P4506-MO)
2. USB-A/C cable
3. Steel Rod for Stand
4. Booklet

Picture

(Unit: mm)

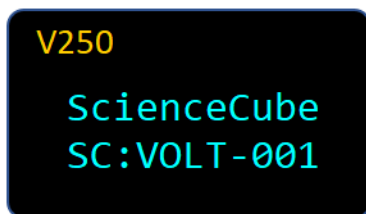


- ① USB port : Used to connect to the USB port of a PC for experiments or to charge the sensor.
- ② Display : Displays the measured sensor value and battery level.
- ③ Power button : Press the button to turn on the power, and press for about 5 seconds to turn off the power.
- ④ Sensor : Where the ultrasonic signal comes out when measuring the distance to an object

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	Click once	■	Change sensor type or range. (Multi-sensor or range sensor only)
	Long click	■■■■■	Turns off.

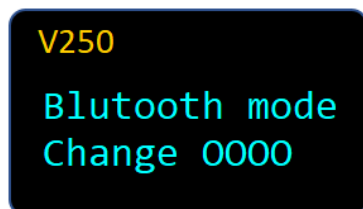
Start screen



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)

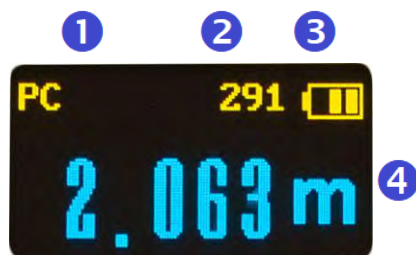
Mode change



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



① Connection 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.
② Sensor-ID	This is the sensor's unique number and is displayed along with the sensor name in the device name when connected via Bluetooth.
③ Battery	Check the battery status, and when charging via USB, the display will change to charging.
④ Value	1) Displays sensor measurement values and units in real time. 2) For sensors with multiple ranges , the current range is displayed.

Features and Specification

Features

Contents	Description
Features	Measure the distance to the subject. Ultrasound spreads at an angle of 15° from the sensor and is detected up to 40°. When measuring the change in distance to an object, creates an experimental environment so that other objects are not captured. Connect up to 4 sensors simultaneously
Uses	The sensing element is inside a black or silver metal mesh and only detects when it is at least 15 cm away from the sensor. It supports dual-mode Bluetooth, so you can experiment using the Science# application by connecting to a desktop PC, laptop, or smart device. Through the USB port, you can experiment anywhere with the Science# program on Windows OS.

Specification

Contents	Detailed description
Measurement Range	0.15m ~6.5m
Resolution	± 0.001m
Uncertainty	± 1%
Sampling Rate	Max. 100samples/second
Interface	Windows PC (USB or Bluetooth) Smart Device (Bluetooth)
Application	Science#
Connection	Bluetooth 5.0 or USB (Type-C)
Power	Li-Po Rechargeable Battery (2,000mAh) Operating time approximately 22 hours when the battery is fully charged. (Depends on conditions of use.)
Dimension	66 * 80 * 36 (L*W*H, mm)
Weight	112 g (4 oz)
Materials	PC+ABS (Housing)

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.



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Guide for scientific experiments

<Scientific experiment activities by using Wireless Motion Sensor>

Momentum and energy	Free Fall Experiment	Constant velocity linear motion	Laws of conservation of mechanical energy Pendulum movement	Speed of a freely falling object
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Materials

Science# program
wireless Motion sensor
Ball
Books

Experimental Method

- ① Place the wireless motion sensor on the floor.
(CAUTION) Stack books next to the sensor to prevent balls from directly touching the sensor.
- ② Run Science# and connect the wireless motion sensor via Bluetooth.
- ③ Set the experiment settings to [Automatic collection]-[Line chart]. Data collection interval: 20 Hz Experiment time: 5 seconds.
- ④ Press [Start Experiment], hold the ball with both hands and drop it.
Be careful not to touch the sensor at this time.

At the end of the experiment, view and analyze the graph.





Safety Warnings

All data, analyzes and derivative works obtained with this product may be used only for the purpose of scientific experiment education and not for other purposes such as professional research or commercial purposes.

The safety precautions are intended to prevent accidents and risks by using the product safely and correctly.

Please note that this product does not have any legal liability for accidental accidents caused by user's negligence during the scientific experiment activities or for the use of other uses.

- ① **Never separate or modify the sensor except for a professional technician.** Permanent damage to the unit may result. The sensor is permanently sealed in the process and cannot be disassembled for any purpose. In addition, please use customer support center for inspection, adjustment and repair.
- ② Experiment safety rules must be observed and parents should be fully informed about the risk of safety accidents according to the contents of the experiment. For more information about the experiment, please contact your science experiment teacher or the author of the experiment.
- ③ **Do not try to open it in a place with high humidity or splashing water.** If water enters the main body, cable or power supply unit, it may occur electric shock, fire, malfunction or deformation.
- ④ **Do not conduct experiments where heat or smoke (gas) is generated in an enclosed space.** Experimentation in an enclosed space may cause suffocation and fire. Be sure to follow the safety instructions in the well-ventilated area.
- ⑤ **When contacting the temperature sensor with strongly acidic, alkaline or other liquids, be sure to check the compatibility of the temperature sensor stainless steel and the solution you want to use.**
- ⑥ **Do not use the unit beyond the operating limits or exceeding the short-term exposure limits.** If the exposure exceeds the maximum allowable range, the reliability of the sensor may be lowered.

Experimental Safety Precautions

1. Please be careful of electrical safety accidents such as electric shock and fire during the experiment.
2. Turn off the power when not doing the experiment.
3. Do not experiment with wet hands.
4. Do not mess around with sensors
5. Keep out of the reach of children

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



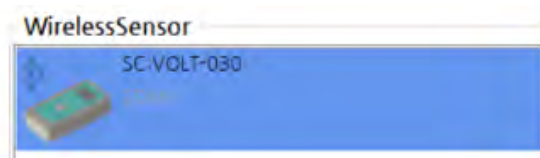
Features

- 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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