



# Wireless Barometric Pressure & Temperature (P4534-BA) User manual

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

*The Wireless Barometric Pressure & Temperature Sensor Explore the relationship between pressure and temperature in real time.*

**The wireless Barometric Pressure & Temperature sensor** measures atmospheric pressure and temperature simultaneously, allowing students to observe how these two variables change together.

With real-time data collection, learners can explore scientific principles such as Boyle's Law, cloud formation, and other weather-related experiments, linking classroom theory with real-world phenomena.

Wireless connectivity and the Science# app make it easy to set up experiments and analyze results interactively.

Barometric pressure and temperature are essential parameters in meteorology, physics, and environmental science. By using this sensor, students can observe Boyle's law, weather changes, cloud formation, convection, and other scientific principles in action. Optimized for STEM (Science, Technology, Engineering, Mathematics) education, the sensor is particularly effective for project-based learning (PBL) and interdisciplinary experimental lessons. Wireless data transmission ensures mobility and convenience, creating a flexible learning environment without the restrictions of wired connections.

### **Key Features**

- Simultaneous measurement of barometric pressure and temperature
- Real-time wireless data transmission
- Automatic graph generation and analysis with the Science# app
- Ideal for STEM lessons and experimental projects
- Portable and easy to install

### **Suggested experiments**

- Observation of Daily Classroom Pressure and Temperature Changes
- Barometric Pressure Variation with Building Height (Altitude)
- Cloud-in-a-Bottle Experiment (Adiabatic Expansion and Compression)
- Short-Term Weather Prediction Using Barometric Pressure Trends

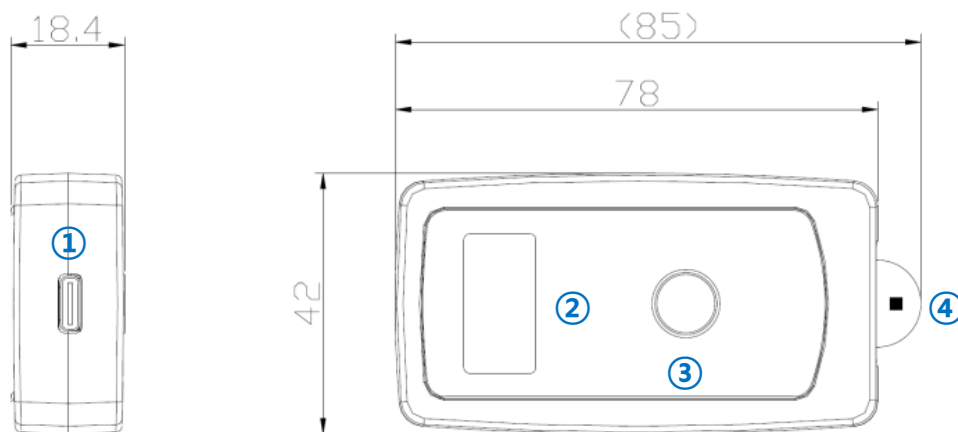
## Composition

*The wireless energy sensor consists of the following.*

- Wireless Barometric Pressure/Temperature Sensor (P4534-BA)
- 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 **Sensor Detection Unit**: It has a built-in sensor that detects atmospheric pressure and temperature, and is protected by a thin coating film.



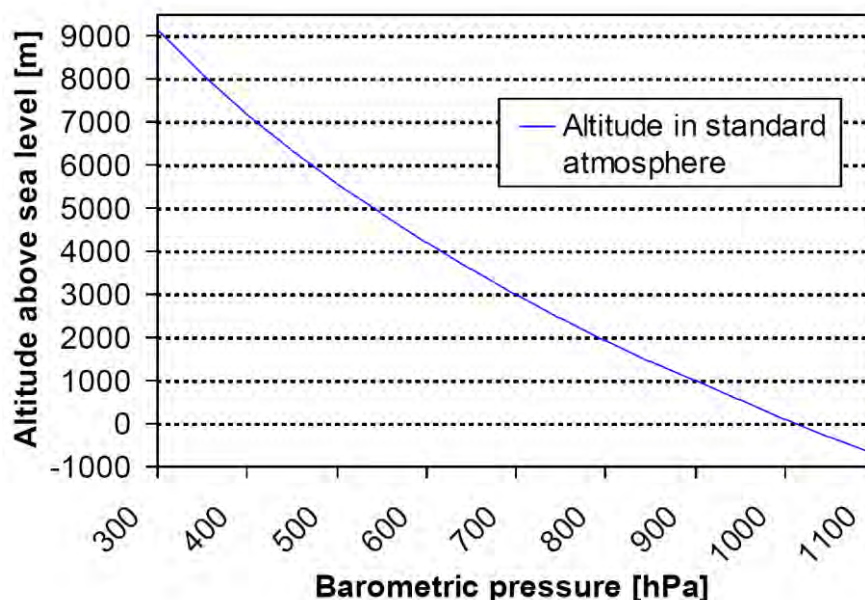
## How it Works

Wireless Barometric Pressure & Temperature Sensor uses digital chip to measure both air pressure and temperature at the same time.

Inside the sensor is a very thin silicon diaphragm that bends slightly when air pushes on it. This bending changes the resistance of piezo-resistors, and the sensor converts this change into an electrical signal.

The digital chip also includes a tiny built-in temperature sensor. It uses this temperature information, together with calibration data stored in the chip, to correct the pressure reading. This makes the measurements more accurate even when the surrounding temperature changes.

The corrected pressure and temperature values are then sent wirelessly to a tablet or computer. With the Science# app, the data is displayed in real time as graphs, making it easy to see how pressure and temperature change together.




Additionally, because atmospheric pressure decreases with increasing altitude, this sensor can be used to determine the relationship between altitude and atmospheric pressure.

This makes it a useful tool for learning about various scientific concepts, such as weather changes, cloud formation, and Boyle's Law.

## Using the Sensor


The wireless voltage sensor can be measured in the following ways


1. Run '**Science#** ' and connect the sensor wirelessly or wired.
2. Set the **[Data Collection Interval]** and **[Experiment Time]** in **[Experiment Settings]**.
3. Click **[Start]** to start the experiment.

For more information on how to use the **Science#**  application, see the help.

## Guide for scientific experiments

### Cloud-in-a-Bottle Experiment

1. Pour about 5–10 mL of water into a clear 1.5 L plastic bottle.
2. Shake the bottle several times to moisten the inner air and walls.
3. Place the wireless barometric pressure and temperature sensor inside the bottle, then seal it tightly.
4. Use a hand pump or rubber stopper pump to increase the air pressure inside the bottle.
5. Monitor the pressure and temperature in real time using the **Science#**  app.
6. Once the pressure is sufficiently high, quickly release the cap to drop the pressure suddenly.
7. The temperature inside will fall rapidly, and water vapor will condense to form a visible cloud.
8. The inside of the bottle becomes foggy, showing tiny water droplets—this means success.
9. Re-pressurize the bottle to make the cloud disappear and observe the temperature returning to normal.
10. Repeat the process and compare pressure–temperature graphs to analyze when condensation occurs.

\*For detailed experimental information, please refer to the **Science #**  content.

## Specifications

Item	Description
Range	300 ~ 1100hPa, - 40 ~ 60°C
Resolution	0.01°C, 0.1hPa
Sampling Time	10 Samples / second (Data Update Interval) 100 Samples/second (Logging program based)
Condition	-20 ~ 60°C, Max. 85%RH
Wireless Connection	Bluetooth 5.0 or Classic 2.1
Wired Connection	USB 2.0 (Type-C)
Battery	700mAh Li-Polymer rechargeable
Charging Time	within 2 hours
Operating Time	Approximately 8 hours after full charge (depending on usage conditions)
EMC	CE : EN 61326-1, EN 55011, EN 55032, EN 301 Ⓜ202-SMD070

**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](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)

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




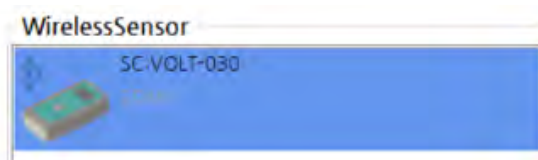
## Features

- 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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