Wireless Temperature Sensor (PS-3201)

Battery Status LED
Indicates the battery level of the sensor by blinking red when the battery is low on charge.

ON button
Press to turn the sensor on. Press and hold to turn the sensor off. Note that the sensor automatically turns itself off after several minutes of inactivity if not connected, or after about one hour of inactivity if connected.

Bluetooth Status LED
Indicates the status of the sensor’s Bluetooth connection.

<table>
<thead>
<tr>
<th>Bluetooth LED</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red blink</td>
<td>Ready to pair</td>
</tr>
<tr>
<td>Green blink</td>
<td>Connected</td>
</tr>
<tr>
<td>Yellow blink</td>
<td>Logging data</td>
</tr>
</tbody>
</table>

For information on remote data logging, see the PASCO Capstone or SPARKvue online help.

Device ID
Use this to identify the sensor when connecting via Bluetooth.

Water-resistant gasket
Protects the sensor from damage in the event of exposure to water.

Sensor Housing
Tolerates temperatures between -15 °C and 50 °C.

Temperature Probe
Tolerates temperatures between -40 °C and 125 °C.

Introduction
The Wireless Temperature Sensor measures temperature over a range of -40 °C to 125 °C. The stainless steel temperature probe is more durable than a glass thermometer and is able to work in a wide variety of situations. The temperature measurement is transmitted wirelessly through Bluetooth and is recorded and displayed by PASCO Capstone or SPARKvue on a connected tablet or computer. Since each sensor has a unique device ID number, more than one can be connected to the same computer or tablet at a time.

The Wireless Temperature Sensor is powered by a replaceable three volt coin cell battery and is well-suited for continuous recording and discrete measurements. The sensor is designed to optimize the battery usage time.

The sensor housing is water resistant, but immersing it in water may cause a loss of wireless connection. Only the Temperature Probe should be exposed to the substance being measured. Do not immerse the sensor housing in boiling hot water.

Get the software
You can use the sensor with SPARKvue or PASCO Capstone software. If you’re not sure which to use, visit pasco.com/products/guides/software-comparison.

SPARKvue is available as a free app for Chromebook, iOS, and Android devices. We offer a free trial of SPARKvue and Capstone for Windows and Mac. To get the software, go to pasco.com/downloads or search for SPARKvue in your device’s app store.

If you have installed the software previously, check that you have the latest update:

SPARKvue
Go to Main Menu ➔ > Check for Updates

PASCO Capstone
Go to Help > Check for Updates.

Check for a firmware update

SPARKvue
1. Press the power button until the LEDs turn on.
2. Open SPARKvue.
4. From the list of available devices, select the sensor that matches your sensor’s device ID. A notification appears if a firmware update is available. Click Yes to update the firmware.
5. Close SPARKvue once the update is complete.

PASCO Capstone
1. Press and hold the power button until the LEDs turn on.
2. Open PASCO Capstone.
3. Click Hardware Setup.
4. From the list of available devices, select the sensor that matches your sensor’s device ID. A notification appears if a firmware update is available. Click Yes to update the firmware.
5. Close Capstone once the update is complete.
Set up the software

**SPARKvue**

Connecting the sensor to a tablet or computer via Bluetooth:

1. Turn on the Wireless Temperature Sensor. Check to make sure the Bluetooth Status LED is blinking red.
2. Open SPARKvue, then click **Sensor Data**.
3. From the list of available wireless devices on the left, select the device which matches the device ID printed on your Wireless Temperature Sensor.

Collecting data using SPARKvue:

1. Select the measurements you intend to record from the **Select Measurements for Templates** menu by clicking the check box next to the relevant measurements’ names.
2. Click **Graph** in the **Templates** section to open the Experiment Screen. The graph’s axes will auto-populate with the selected measurements.
3. Click **Start** to begin recording data.

**PASCO Capstone**

Connecting the sensor to a computer via Bluetooth:

1. Turn on the Wireless Temperature Sensor. Check to make sure the Bluetooth Status LED is blinking red.
2. Open Capstone, then click **Hardware Setup** in the **Tools** palette.
3. From the list of **Available Wireless Devices**, click the device which matches the device ID printed on your Wireless Temperature Sensor.

Collecting data using Capstone:

1. Double-click the **Graph** icon in the **Displays** palette to create a new blank graph display.
2. To assign measurements to the graph’s axes, click each **<Select Measurement>** box and select an appropriate measurement from the list.
3. Click **Record** to begin collecting data.

**Calibration**

Calibration is generally not necessary when using the Wireless Temperature Sensor, especially if you are measuring a change in temperature rather than absolute temperature values. However, it is possible to calibrate the sensor using the following procedures.

**Prepare for Calibration**

Calibration will require an ice water bath, a container of hot water, and a thermometer. The sensor will need to be connected to PASCO Capstone or SPARKvue for these procedures; see **Set up the software** for details on connecting the sensor.

1. Place the thermometer into the container of hot water.
2. Create a Graph display with Temperature as one of the measured quantities, as described under the **SPARKvue** section of **Set up the software**.
3. Click the **Show Hardware Setup** button in the bottom right of the Experiment Screen, then click the **Calibrate measurement** icon next to **Temperature** to open the Calibrate Sensor menu.
4. Check to make sure that the selected sensor is **Wireless Temperature Sensor**, the measurement is **Temperature (°C)**, and the Calibration Type is **2 point (Adjust Slope and Offset)**, then click **Continue**.
5. Place the Wireless Temperature Sensor into the container of hot water. Wait for the temperature reading to stabilize.
6. Using the thermometer, determine the temperature of the hot water. Enter this value into the **Standard Value** box under **Calibration Point 1**, then click **Set Calibration**.
7. Remove the thermometer and Temperature Sensor from the hot water container, wipe them both dry, and place them into the ice water bath. Wait for both the thermometer measurement and the sensor reading to stabilize.
8. Using the thermometer, determine the temperature of the ice water. Enter this value into the **Standard Value** box under **Calibration Point 2**, then click **Set Calibration**.
9. Check your new calibration for accuracy, then click **OK**.
1. Place the thermometer into the container of hot water.

2. Select Calibration from the Tools palette.

3. Ensure that Two Standards (2 point) is selected from the list of calibration types, then click Next.

4. Place the Wireless Temperature Sensor into the container of hot water. Wait for the temperature reading to stabilize.

5. Using the thermometer, determine the temperature of the hot water. Enter this value into the Standard Value box, then click Set Current Value to Standard Value.

6. Remove the thermometer and Temperature Sensor from the hot water container, wipe them both dry, and place them into the ice water bath. Wait for both the thermometer measurement and the sensor reading to stabilize.

7. Using the thermometer, determine the temperature of the ice water. Enter this value into the Standard Value box, then click Set Current Value to Standard Value.

8. Review your calibration to ensure it is accurate, then click Finish.

9. Battery usage

The included battery should provide more than one year of battery life, but the actual amount depends on factors such as the data collection sampling rate.

Sensor storage

The Wireless Temperature Sensor contains a three volt coin cell battery (CR2032). Battery life is very important to making the sensor simple and always ready to use. Therefore, like all PASCO wireless products, the Wireless Temperature Sensor is designed for long battery life. For example, after several minutes of inactivity, the sensor turns itself off to preserve the battery.

Battery removal and replacement

If the sensor’s Battery Status LED blinks red, the battery may need to be replaced. Replacing the battery requires removing the Battery Compartment Door on the bottom of the sensor, removing the old battery, installing a new battery of the same type, and replacing the Battery Compartment Door. This procedure requires a coin and a CR2032 three volt battery, such as those included in the PS-3504 Coin Cell Battery Pack.

NOTE: This type of battery is also commonly available in electronic and commercial stores.
Re replacing the Battery Compartment Door

Put the Battery Compartment Door, along with the new battery, back onto the sensor. Align the indicator on the door with the second mark, then use the coin in the slot to turn the door clockwise until the indicator is aligned with the first mark on the sensor.

When disposing of the battery, follow the battery disposal guidelines under Regulatory information.

Temperature Probe Maintenance

Rinse and dry the temperature probe before storing the sensor. The probe is stainless steel and the diameter (5 mm, or 0.197") is compatible with standard stoppers.

Troubleshooting

- If the sensor loses Bluetooth connection and will not reconnect, try cycling the ON button. Press and briefly hold the button until the status LEDs blink, then release the button.
- If the sensor stops communicating with the computer software or tablet application, try restarting the software or application and attempting to connect again.
- If the problem persists, press and hold the ON button for ten seconds, then release the button and start the sensor in the usual way.
- If the above steps do not fix the connection problem, turn Bluetooth off and back on for your computer or tablet, then retry.

Software help

The SP ARKvue and P ASCO Capstone Help provide additional information on how to use this product with the software. You can access the help within the software or online.

SP ARKvue
Software: Main Menu > Help
Online: help.pasco.com/sparkvue

P ASCO Capstone
Software: Help > P ASCO Capstone Help
Online: help.pasco.com/capstone

Specifications and accessories

Visit the product page at pasco.com/product/PS-3201 to view the specifications and explore accessories. You can also download experiment files and support documents from the product page.

Experiment files

Download one of several student-ready activities from the PASCO Experiment Library. Experiments include editable student handouts and teacher notes. Visit pasco.com/freelabs/PS-3201.

Technical support

Need more help? Our knowledgeable and friendly Technical Support staff is ready to answer your questions or walk you through any issues.

Chat pasco.com
Phone 1-800-772-8700 x1004 (USA)
+1 916 462 8384 (outside USA)
Email support@pasco.com

Regulatory information

Limited warranty
For a description of the product warranty, see the Warranty and Returns page at www.pasco.com/legal.

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Product end-of-life disposal

This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment.

To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle or disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol on the product or its packaging indicates that this product must not be disposed of in a standard waste container.

CE statement
This device has been tested and found to comply with the essential requirements and other relevant provisions of the applicable EU Directives.

FCC statement
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.

Battery disposal
Batteries contain chemicals that, if released, may affect the environment and human health.
Batteries should be collected separately for recycling and recycled at a local hazardous material disposal location adhering to your country and local government regulations.
To find out where you can drop off your waste battery for recycling, please contact your local waste disposal service, or the product representative.
The battery used in this product is marked with the European Union symbol for waste batteries to indicate the need for the separate collection and recycling of batteries.