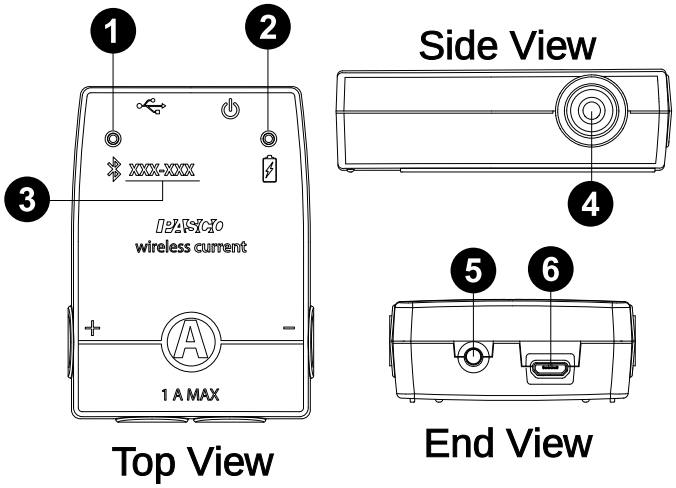
Wireless Current Sensor (PS-3212)

Introduction

The Wireless Current Sensor is a combination wireless and USB sensor that connects to a computer or tablet device via Bluetooth, and can also connect to a computer using the included micro USB cable. The sensor measures current in two ranges: between -1 ampere (A) and +1 A, and between -0.1 A and +0.1 A. PASCO Capstone or SPARKvue can be used to display and analyze the measurements from the sensor.

The sensor is designed to optimize battery usage time. Since each sensor has a unique device ID number, more than one can be connected to a computer or tablet at the same time.

Components



1 Bluetooth Status LED
Indicates the status of the sensor's Bluetooth connection.

Bluetooth LED	Status
Red blink	Ready to pair
Green blink	Connected
Yellow blink	Logging data

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

NOTE: The Bluetooth Status LED is disabled when the sensor is connected to a computer via the micro USB cable.

2 Battery Status LED
Indicates the charge level and status of the sensor battery.

Battery LED	Status
Red blink	Low power
Yellow ON	Charging
Green ON	Fully charged

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

4 Red test lead jack
Connect the red shrouded alligator clip lead from here to the circuit being measured. Connect the black shrouded alligator clip lead from here to the black test lead jack on the opposite side of the sensor. The test lead jacks are color coded for ease of identification.

5 ON/OFF button
Press to turn the sensor on. Press and briefly hold to turn the sensor off. Note that the sensor automatically turns itself on when connected to a computer via USB. To preserve battery, the sensor puts itself to sleep after several minutes of inactivity if not connected.

6 Micro USB cable
Use with the included micro USB cable to connect the sensor to a USB charger. The port and cable can also be used to directly connect the sensor to a computer without the use of Bluetooth. This connection method is not supported by iOS.

Included Equipment:

- Wireless Current Sensor (PS-3212)
- Micro USB cable
- Red and black shrouded alligator clip leads

Initial step: Charge the battery

Charge the battery by connecting the micro USB port to any standard USB charger. The Battery Status LED is solid yellow while charging. When fully charged, the LED changes to solid green.

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.
3. Select **Sensor Data** on the Welcome Screen.

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

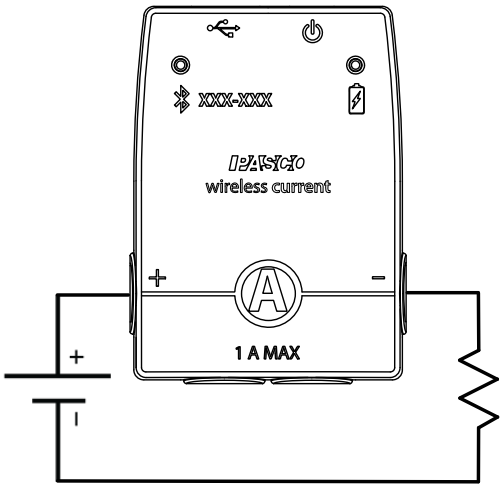
1. Press and hold the power button until the LEDs turn on.
2. Open PASCO Capstone.
3. Click **Hardware Setup**.

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 hardware

Connecting the sensor for measurement

Current is measured through an electric circuit. For that reason, the Wireless Current Sensor must always be connected *in series* with the circuit, with the sensor being a part of the circuit. For example, in the diagram below, the sensor is connected in series with a resistor ("load") and a battery ("source"); the sensor will measure the current that passes through this circuit.



CAUTION: Do **NOT** connect the wireless current sensor directly across a battery or other voltage source **under any circumstances**! Make sure that there is a resistor or other "load" in series with the sensor at all times!

Protection

The Wireless Current Sensor has built-in protection against damaging over-current. If the current exceeds ±2 amps, an alarm in the sensor will sound and the status LEDs will both shine red. If this occurs, immediately take the steps necessary to reduce or stop the current through the sensor, including disconnecting the power source. Analyze the circuit to determine why the over-current occurred. Do **not** reconnect the power source until the problem is fixed.

Set up the software

SPARKvue

Connecting the sensor to a tablet or computer via Bluetooth:

1. Turn on the Wireless Current 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 Current Sensor.

Connecting the sensor to a computer via micro USB cable:

1. Open SPARKvue, then click **Sensor Data**.
2. Connect the provided micro USB cable from the micro USB port on the sensor to a USB port or powered USB hub connected to the computer. The sensor should automatically connect to SPARKvue.

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 plotted against time.
3. Click **Start** to begin recording data.

PASCO Capstone

Connecting the sensor to a computer via Bluetooth:

1. Turn on the Wireless Current 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 Current Sensor.

Connecting the sensor to a computer via micro USB cable:

1. Open Capstone. If desired, open **Hardware Setup** to check the connection status of the sensor.
2. Connect the provided micro USB cable from the micro USB port on the sensor to a USB port or powered USB hub connected to the computer. The sensor should automatically connect to Capstone.

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.

Troubleshooting

- If the sensor loses Bluetooth connection and will not reconnect, try cycling the ON button. Press and briefly **hold** the button until the LEDs blink in sequence, then release the button. Start the sensor in the usual way.
- If the sensor stops communicating with the computer software or tablet application, try restarting the software or application. If the problem persists, press and **hold** the ON button for 10 seconds, then release the button and start the sensor in the usual way.
- If the previous steps do not fix a connection problem, turn Bluetooth off and then back on for your computer or tablet, then retry.

About the battery

The Wireless Current Sensor's battery is partially charged at the factory. If the battery status LED blinks red, use the micro USB cable to connect the sensor to a USB port or USB charger.

Maximizing battery life

Two factors that affect battery life are the storage temperature and the number of charge cycles. Therefore, to maximize battery life, avoid storing the sensor in very cold or very hot environments, and disconnect the sensor from its charger once it has been fully charged.

Specifications and accessories

Visit the product page at pasco.com/product/PS-3212 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-3212.

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.

Copyright

Trademarks

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.