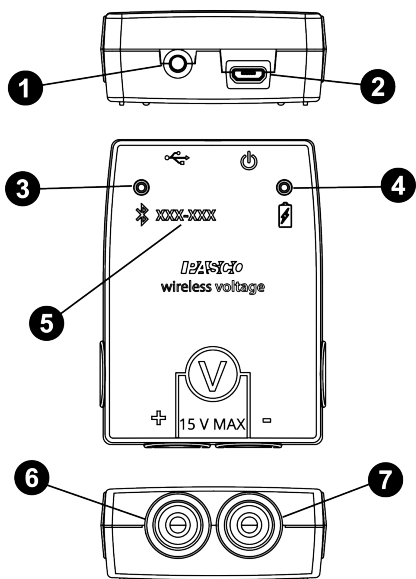


Wireless Voltage Sensor (PS-3211)



- 1 ON/OFF Button
- 2 Micro USB Port
- 3 Bluetooth Status LED
- 4 Battery Status LED
- 5 Device ID Number
- 6 Red Test Lead Jack
- 7 Black Test Lead Jack
- 8 Micro USB Cable (not pictured)

Included Equipment

- Wireless Voltage Sensor (PS-3211)
- Micro USB Cable (1 meter)
- Test Leads, Shrouded (Red/Black)

Introduction

The Wireless Voltage Sensor is a combination wireless *and* USB sensor that connects to a computer or tablet device through Bluetooth, and can also connect to a computer with a USB cable (included). The sensor measures voltage in the range between -15 volts (V) and +15 V.



NOTE: The maximum voltage range of the sensor can be changed in PASCO Capstone or SPARKvue to a range of -5 V to +5 V, allowing for greater precision of measurements. For more information, see the online SPARKvue or Capstone help.

The sensor has built-in overload protection. PASCO Capstone or SPARKvue will display and analyze the measurements from the sensor; the software also supports "remote data logging" for long-term experiments.

The sensor is designed to optimize the 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.

Charge the battery

Charge the battery by connecting the USB port to any standard USB charger. The battery status light is solid yellow while charging. When fully charged, the light 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](https://www.pasco.com/products/guides/software-comparison).

SPARKvue is available as a free app for Chromebook, iOS, and Android devices. We also offer a free trial of SPARKvue and Capstone for Windows and Mac. To get the software, go to [pasco.com/downloads](https://www.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:** Open the Main Menu , then select **Check for Updates**
- PASCO Capstone:** Select **Help**, then click **Check for Updates**.

Check for a firmware update

SPARKvue

- Press the power button until the lights turn on.
- Open SPARKvue.
- Select **Sensor Data** on the Welcome Screen.
- Select the sensor that matches its device ID. A notification appears if a firmware update is available. Click **Yes** to update the firmware.
- Close SPARKvue

PASCO Capstone

- Press and hold the power button until the lights turn on.
- Open PASCO Capstone.
- Click **Hardware Setup** .
- Select the sensor that matches its device ID. A notification appears if a firmware update is available. Click **Yes** to update the firmware.
- Close Capstone.

ON/OFF Information

To turn the sensor off, press and hold the ON button on the back of the sensor for a moment, until the status LEDs stop blinking. The Wireless Voltage Sensor puts itself to sleep after several minutes of inactivity if not connected, and about one hour of inactivity if connected.

LED Information

The Bluetooth and the Battery Status LEDs operate as follows depending on the type of connection:

| Bluetooth LED | Status |
|---------------|---------------|
| Red blink | Ready to pair |
| Green blink | Connected |
| Yellow blink | Logging* |

| Battery LED | Status |
|-------------|-----------|
| Red blink | Low power |
| Yellow ON | Charging |
| Green ON | Charged |

***Logging:** PASCO wireless sensors can either stream live data to a compatible device for "real-time" viewing or log data (save it to the sensor's memory). After logging, the data can be uploaded to the computing device for display and analysis at a later time. Logging capability supports long-term or remote data collection while not connected to a device. For more information about data logging, consult the online software help.



NOTE: The Bluetooth LED will not light up while the sensor is connected directly to a computer via a USB port.

Set Up the Hardware

Connecting the Shrouded Test Leads to the Sensor

- Connect the boot-shaped shrouded end of the red test lead to the red voltage jack on the sensor.
- Connect the end of the black test lead to the black voltage jack on the sensor.

Connecting the Sensor for Measurement

Voltage is measured from one point to another point. For example, voltage is measured "across" a component in a circuit. The sensor is connected in parallel to the circuit, **not** in series as a part of the circuit.

For example, in Figure 1, the alligator clip of the red test lead is connected to one end of a light bulb that is in a circuit with a battery. The alligator clip of the black test lead is connected to the other end of the light bulb. The Wireless Voltage Sensor measures the "voltage drop" across the bulb.

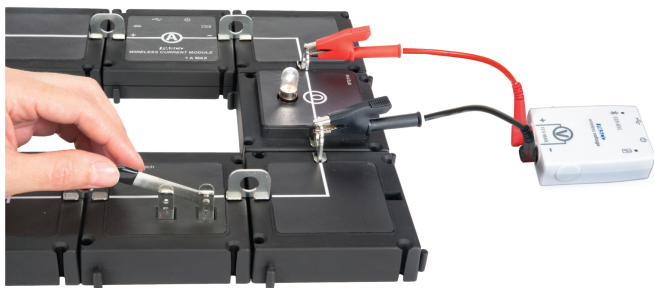


Figure 1. The Wireless Voltage Sensor connected in parallel to a circuit.

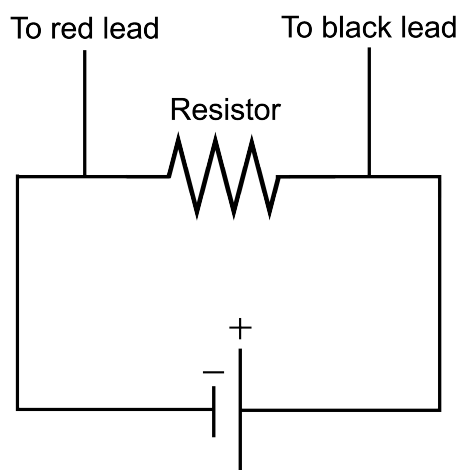


Figure 2. A simple circuit diagram, showing how the Wireless Voltage Sensor should be connected.

Set Up the Software

The Wireless Voltage Sensor can be connected to PASCO Capstone or SPARKvue using either Bluetooth or the provided micro USB cable. To set up the software for data collection, consult the section for the program and connection method you will be using, then proceed to the "Collect Data" section for the chosen program.



Connecting the Wireless Sensor to a Tablet or Computer via Bluetooth

1. Turn on the sensor.
2. Start SPARKvue, then select **Sensor Data**.
3. Select the Bluetooth icon to open the Wireless Device list. In the Wireless Devices list, the sensors are ordered by proximity to the device.
4. In SPARKvue, select the correct device ID that matches the XXX-XXX number found on the sensor. A list of measurements will automatically appear under the sensor in the "Select Measurements for Templates" window.

Connecting the Wireless Sensor to a Computer with the Micro USB Cable

1. Start SPARKvue, then select **Sensor Data**.
2. Connect the micro end of the included Micro USB Cable into the micro USB port on the end of the sensor.
3. Connect the other end of the Micro USB Cable to a USB port on the computer, or into a powered USB hub connected to the computer. The system should automatically detect and connect to the sensor.

Collect Data

1. From the **Sensor Data** screen, select a measurement from the list under the sensor's name.
2. Select a template from the list at the right of the screen to open the Experiment Screen.
3. Select the **Start** button to begin collecting data.



Connecting the Wireless Sensor to a Tablet or Computer via Bluetooth

1. Start Capstone, then select **Hardware Setup** in the Tools palette. The sensors in the list will be ordered by proximity to the wireless device.
2. Select the sensor with the address that matches the XXX-XXX Device ID number on the sensor.

Connecting the Wireless Sensor to a Computer with the Micro USB Cable

1. Start Capstone, then select **Hardware Setup** in the Tools palette.
2. Connect the micro end of the included Micro USB Cable into the micro USB port on the end of the sensor.
3. Connect the other end of the Micro USB Cable to a USB port on the computer, or into a powered USB hub connected to the computer. The system should automatically detect and connect to the sensor.

Collect Data

1. Select a display in the main window, or from the Display palette by double-clicking the icon for the desired display type. If necessary, use the **<Select Measurement>** menu to pick a measurement to be shown.
2. Select **Record** to begin collecting data.

Troubleshooting

- If the Wireless Voltage Sensor loses Bluetooth connection and will not reconnect, try cycling the ON button. Press and briefly hold the button until the status 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 remains, press and hold the ON button for 10 seconds and then release. Start the sensor in the usual way.
- Turn Bluetooth off and then back on. Retry.

About the Battery

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

Battery Usage

Battery life is very important to making the sensor simple and always ready to use, so all of the PASCO wireless products are designed for long battery life. For example, the sensor turns itself off after a few minutes of inactivity to conserve battery life.

The battery life between charges for the sensor varies depending on the sampling rate. The battery life ranges between eleven hours for high sample rates to more than 70 hours for low sample rates.


In typical classroom/lab use, this would translate to a battery life between charges ranging from one to four weeks or more, because full-day continuous sampling would be unusual. Even in the most extreme case with a high sample rate, the Voltage Sensor would support a full day of use before needing to recharge.

Maximizing Battery Life

One of the factors that affects battery life is the storage temperature. Therefore, avoid storing the sensor in very cold or very hot environments.

Software Help

See the SPARKvue Help or PASCO Capstone Help for information about collecting, displaying, and analyzing data.

- In SPARKvue, click the **Main Menu**  button in any screen, including the Home Screen, and select the **Help...** option.
- In PASCO Capstone, open the Help menu and select **PASCO Capstone Help**, or press F1.

You can also view the online help for the software by visiting the following sites:

-  **SPARKvue:** help.pasco.com/sparkvue
-  **Capstone:** help.pasco.com/capstone

Specifications and accessories

Visit the product page at pasco.com/product/PS-3211 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-3211.

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

Replacement Parts

For information about possible replacement parts, contact Technical Support:

- USB Cable, Micro-to-USB A
- Shrouded Test Leads (Red/Black)

Limited Warranty

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

Copyright

This document is copyrighted with all rights reserved. Permission is granted to non-profit educational institutions for reproduction of any part of this manual, providing the reproductions are used only in their laboratories and classrooms, and are not sold for profit. Reproduction under any other circumstances, without the written consent of PASCO scientific, is prohibited.

Trademarks

PASCO and PASCO scientific are trademarks or registered trademarks of PASCO scientific, in the United States and in other countries. All other brands, products, or service names are or may be trademarks or service marks of, and are used to identify, products or services of, their respective owners. For more information visit www.pasco.com/legal.

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.