

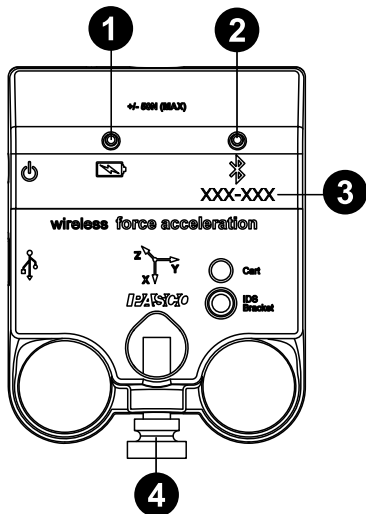
Wireless Force-Acceleration Sensor

PS-3202

Introduction

The Wireless Force-Acceleration Sensor measures force up to ± 50 newtons (N), acceleration up to ± 16 g (where 1 g is equal to 9.8 m/s^2), and angular rotation rate up to ± 2000 degrees per second (dps). The sensor measures force as a push or pull along its x-axis and measures acceleration in three dimensions (x, y, and z). You can display the measurements by connecting the sensor to PASCO Capstone or Sparkvue via Bluetooth or micro USB.

Features



1 Battery Status LED

Indicates the charging status of the battery.

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

2 Bluetooth Status LED

Indicates the status of the sensor's Bluetooth connection.

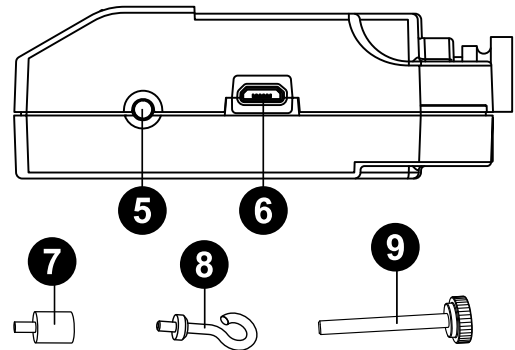
Bluetooth LED	Status
Red blink	Ready to pair
Green blink	Connected
Yellow blink	Remotely logging data

3 Device ID

Use to identify the sensor when connecting via Bluetooth.

4 Rod clamp thumbscrew

Use to mount the sensor to a rod or rod stand.



5 ON/OFF button

Press and briefly hold to turn the sensor on or off. To preserve battery, the sensor automatically turns itself off after several minutes of inactivity if not connected.

6 Micro USB port

Use with the included micro USB cable to connect the sensor to a USB charger. You can also use the port and cable to connect the sensor to the software using the USB port or powered USB hub of a compatible computing device.

7 Bumper attachment

Attach this to the threaded hole on the front of the sensor when recording measurements from forces pushing on the cart.

NOTE: Do not use the rubber bumper for collisions, as the impact force may damage the sensor. The following accessories are recommended for collision experiments:

- Bumper Accessory Set (ME-9884)
- Magnetic Bumper Set (ME-9885A)

8 Hook attachment

Attach this to the threaded hole on the front of the sensor when recording measurements from forces pulling on the cart.

9 Cart thumbscrew

Use to mount the sensor to a PASCO cart.

Get started

Step 1: 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.

Step 2: Get the software

PASCO software is needed to collect data with the sensor. The sensor can be used with Sparkvue, PASCO Capstone, or Chemvue.

Sparkvue: Open the software in a web browser at sparkvue.pasco.com. You can also install Sparkvue by visiting your device's app store.



PASCO Capstone: Additional purchase required. Go to pasco.com/downloads for details.

Step 3: Check for a firmware update

The sensor may have a firmware update available, providing feature improvements and bug fixes. To minimize disruptions, update the firmware before using the sensor with students.

1. Turn on the sensor. Check to make sure the Bluetooth Status LED is blinking red.
2. Open Sparkvue, then select  **Sensor Data**.
3. Select  **Wireless Devices**. If you are using the web app version of Sparkvue, also select  **Connect a Wireless Device**.
4. From the list of available wireless devices, select the device which matches the device ID printed on your sensor.
5. A notification will appear if a critical firmware update is available. Select **Update** to download the firmware update.

For instructions on updating the software with PASCO Capstone instead of Sparkvue, see the software help.

Set up the hardware

Screw the bumper or hook attachment into the threaded hole on the front end of the sensor, as shown in Figure 1. This will connect the attachment to the force sensor, allowing force values to be properly recorded.

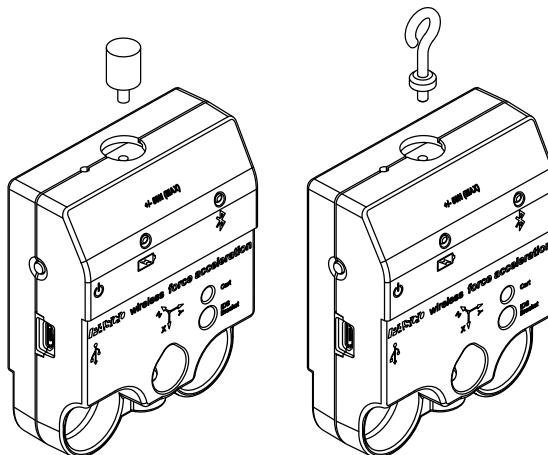
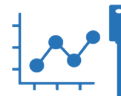


Figure 1

Set up the software

Follow the steps below to connect the sensor to Sparkvue using Bluetooth and begin collecting data. For instructions on using the sensor with PASCO Capstone, or connecting the sensor using micro USB, see the software help.

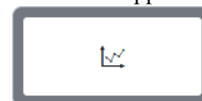
1. Turn on the sensor. Check to make sure the Bluetooth Status LED is blinking red.
2. Open Sparkvue, then select **Sensor Data**.



3. Select **Bluetooth Devices**. If you are using the web app version of Sparkvue, also select  **Connect a Wireless Device**.



4. From the list of available wireless devices, select the device which matches the device ID printed on your sensor.
5. Select **Done**.
6. In the **Measurements for Templates** column, select the ☒ check box next to the name of the measurement you want to display.
7. Select the graph display in the **Templates** column. A graph of the selected measurement versus time appears.



8. Select  **Start** to begin collecting data.



Directions of acceleration sensitivity

The acceleration sensing units inside the sensor are oriented so that the lines of greatest sensitivity follow the x , y , and z arrows marked on the case. The orientation of these axes is shown in Figure 2.

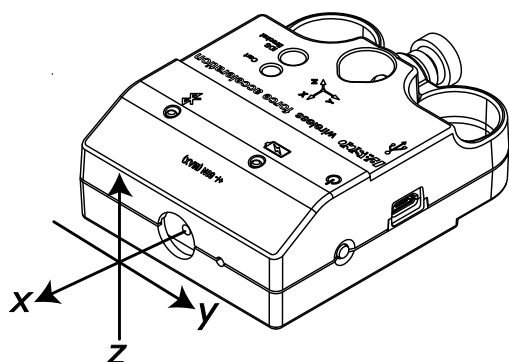


Figure 2: Axes of greatest acceleration sensitivity.

Mount the sensor

To mount the sensor on a rod, slide the sensor onto a rod and secure it in place with the rod clamp thumbscrew, as shown in Figure 3.

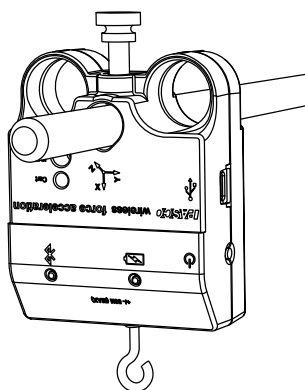


Figure 3

To mount the sensor on a PASCO cart, place the sensor onto the top surface of the cart so that the hole labeled **Cart** on the sensor is aligned with the threaded hole on top of the cart, then screw the included cart thumbscrew into this hole.

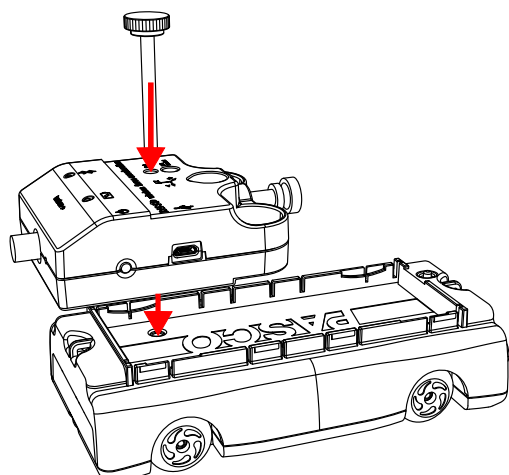


Figure 4

Zero (tare) the sensor

At the beginning of an experiment, the measurement from the sensor may not be zero when the force or acceleration is actually zero. This is a normal behavior that can be corrected by zeroing (or taring) the sensor using PASCO Capstone or Sparkvue. For information on zeroing the sensor, visit the software help and search for "**Zero Sensor Data**".

NOTE: The acceleration sensor should *only* be zeroed if you are measuring the acceleration on only one axis, as zeroing the acceleration sensor will cause one or both of the other two acceleration measurements to no longer be accurate.

Calibration

The Wireless Force-Acceleration Sensor is calibrated at the factory. Further calibration is not usually necessary, especially if you are measuring a change in force, acceleration, or rotational motion rather than the absolute values of these measurements. However, it is possible to calibrate the sensor using PASCO Capstone or Sparkvue if desired. For more information, see the online help.

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.
- 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.

Software help

The Sparkvue and PASCO Capstone help provide information on how to use this product with the software. You can access the help from within the software or online.

Sparkvue

Software: Main Menu > Help

Online: help.pasco.com/sparkvue

PASCO Capstone

Software: Help > PASCO Capstone Help

Online: help.pasco.com/capstone

Specifications and accessories

Visit the product page at pasco.com/product/PS-3202 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. Visit pasco.com/freelabs/PS-3202.

Technical support

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

- 🌐 Web pasco.com/support
- 💬 Chat pasco.com
- ✉ Email support@pasco.com
- 📞 Phone 1-800-772-8700 x1004 (USA)
+1 916 462 8384 (outside USA)

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.