

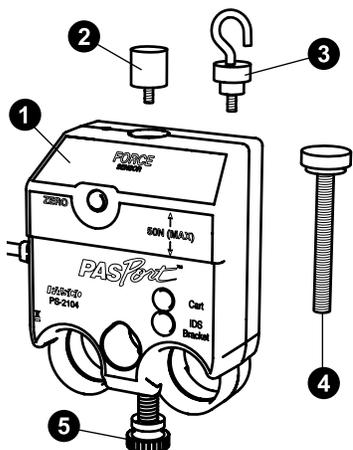
Force Sensor (PS-2104)

Introduction

The Force Sensor connects to a PASPORT interface or datalogger and records force in the range of ± 50 N at a rate of up to 1000 samples per second.

Equipment

Included equipment:



- ❶ Force Sensor
- ❷ Bumper attachment
- ❸ Hook attachment
- ❹ Cart thumbscrew (M5 x 45 mm)
Use to secure the sensor to a PASCO dynamics cart.
- ❺ Rod clamp thumbscrew (1/4-20 x 0.75 in.)
Use to secure the sensor to a rod, such as the 120 cm Stainless Steel Rod (ME-8741).

Additional equipment required:

- PASPORT interface, such as the 550 Universal Interface (UI-5001) or 850 Universal Interface (UI-5000)
- PASCO Capstone or SPARKvue data collection software

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 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

Go to Main Menu  > **Check for Updates**

PASCO Capstone

Go to **Help** > **Check for Updates**.

Software setup

SPARKvue

To connect the sensor to SPARKvue:

1. Turn on SPARKvue, then click **Sensor Data**.
2. Turn on the PASPORT interface if needed, then connect your interface to SPARKvue. For more specific details, see the manual for your chosen interface and the SPARKvue online help.
3. Plug the Force Sensor into one of the PASPORT ports on the interface. SPARKvue will automatically detect and identify the sensor.

To collect data using SPARKvue:

1. From the **Select Measurements for Templates** column, select the appropriate measurement for your experiment.
2. From the **Templates** column, select **Graph** to enter the experiment screen. The display will automatically plot your selected measurement on the y-axis and time on the x-axis.
3. Click **Start**  to begin recording data.

PASCO Capstone

To connect the sensor to Capstone:

1. Turn on Capstone, then click **Hardware Setup** from the **Tools** palette.
2. Turn on the PASPORT interface if needed, then connect your interface to Capstone. For more specific details, see the manual for your chosen interface and the Capstone online help.
3. Plug the Force Sensor into one of the PASPORT ports on the interface. Capstone will automatically detect and identify the sensor.

To collect data using Capstone:

1. Double-click the **Graph** icon from the **Displays** palette to create a new Graph display.
2. Click each **<Select Measurement>** box and select an appropriate measurement to assign that measurement to the associated axis.
3. Click **Record**  to begin recording data.

Zero the sensor

Press the **ZERO** button on the front of the sensor to automatically adjust the sensor's output to zero.

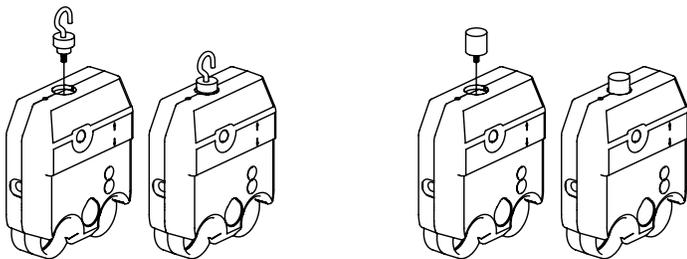
Sample rate

By default, the sensor collects 20 samples per second. It can collect data as fast as 1000 samples per second (or up to 5000 samples per second if connected to an 850 or 550 Universal Interface) or as slowly as one sample every 24 hours. The sample rate can be changed in PASCO Capstone or SPARKvue.

Hardware setup

Connect bumper and hook attachments

Screw the bumper or hook into the sensor as illustrated below.



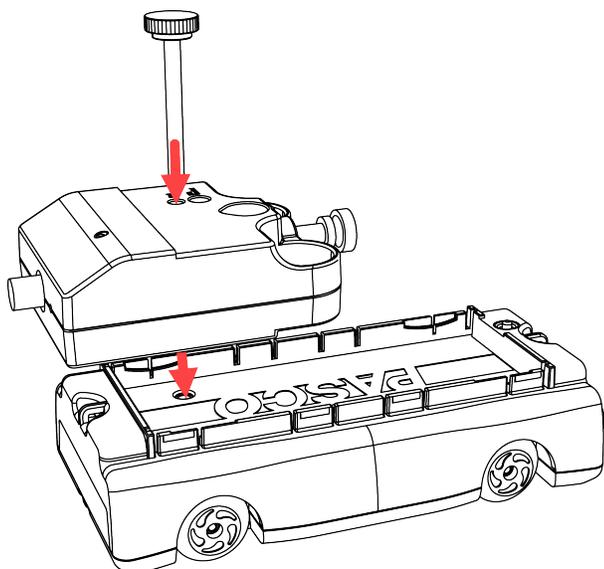
IMPORTANT: When performing experiments that involve a collision, **do NOT** use the rubber bumper with the Force Sensor, as this may damage the internal components. Instead, any of the following components can be used as a bumper for collision experiments:

- Light Spring Bumper (ME-9275)
- Bumper Accessory Set (ME-9884)
- Magnetic Bumper Set (ME-9885A)

Sensor mounting

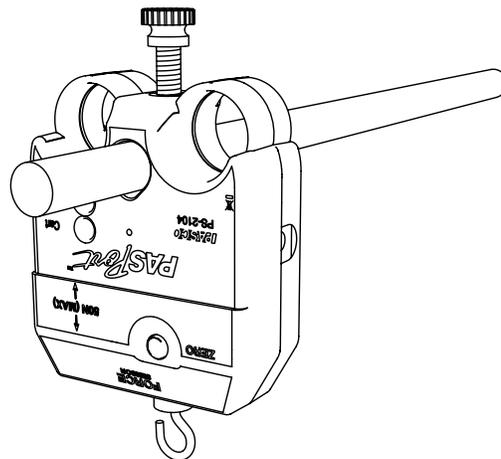
To mount the sensor on a PASCO cart:

1. Align the hole in the sensor labeled **Cart** with one of the threaded holes in the accessory tray of the cart.
2. Insert the included cart thumbscrew through the **Cart** hole in the sensor.
3. Screw the thumbscrew into the threaded hole on top of the cart, as shown below.



To mount the sensor on a rod:

1. Slide the sensor onto a rod, as shown below.
2. Tighten the thumbscrew to secure the rod in place.



Software help

The SPARKvue and PASCO Capstone Help provide additional information on how to use this product with the software. You can access the help 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-2104 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-2104.

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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