PASCO

Wireless Blood Pressure Sensor

PS-3218

About the product

The Wireless Blood Pressure Sensor is a digital sphygmomanometer that uses an electronic pressure sensor to measure the mean arterial pressure. The data collection software uses this measurement to calculate systolic and diastolic blood pressure, and heart rate. The blood pressure cuff consists of an inflatable bladder connected by one hose to a hand pump bulb and by a second hose that attaches to the pressure sensor box.

Note: This is not a medical device. It is designed for educational use only and should not be used in any medical process such as life support or patient diagnosis. It is not intended for use in graduate research or industry including industrial control or any type of industrial testing.

What's Included

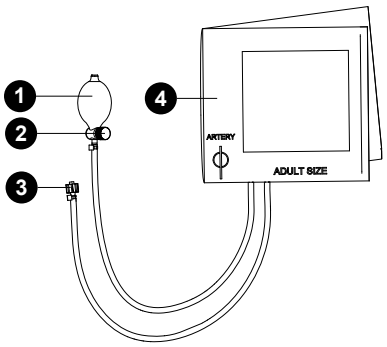
- Wireless Blood Pressure Sensor
- Blood Pressure Cuff, Standard
- USB Cable

Required Items

- Data Collection Software
  This product requires either SPARKvue or PASCO Capstone for data collection and analysis.

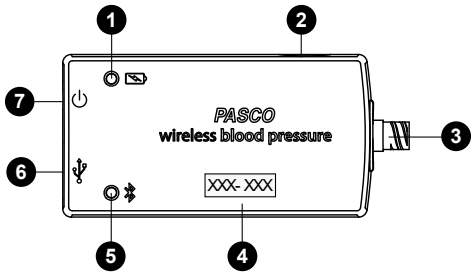
Part names and descriptions

Blood pressure cuff



1. Bulb
   Squeeze the bulb rapidly to add pressure to the cuff.
2. Release Valve
   Press the button to release pressure from the cuff. In the center of the button is a screw that you can use to adjust the pressure release rate.
3. Luer Connector
   Connects to the luer connector on the sensor.
4. Cuff
   The cuff wraps around the upper left arm. Align the white index line on the cuff over the main artery on the inside of the arm.

Sensor



1. Battery Status Light
   Indicates the battery level and charging status.

LIGHT	STATUS
Red, blink	Low battery level
Green, solid	Fully charged
Yellow, solid	Charging

2. Threaded Hole
   Use for mounting the sensor, such as to a mounting rod. Accepts 1/4-in–20 screws.
3. Luer Connector
   Connects to the luer connector on the blood pressure cuff.
4. Device ID
   Use to identify the sensor when connecting using Bluetooth.
5. Bluetooth Status Light
   Indicates the status of the Bluetooth connection.

LIGHT	STATUS
Red, blink	Ready to pair
Green, blink	Paired
Yellow, blink	Remotely logging data

6. USB Port
   Use with the USB cable to connect to a USB wall charger to charge the battery. Also use to send measurement data to software when connected to a USB port of a computer or mobile device (iOS devices not supported).
7. Power Button
   Press and hold for one second to turn the sensor on or off.

Getting started

Perform the tasks in this section before using this device in the classroom.

Charge the battery

The Wireless Blood Pressure Sensor contains a rechargeable battery that lasts an entire school day when fully charged. Charge the battery before using the Wireless Blood Pressure Sensor for the first time since it is not shipped with a full charge.

To charge the battery, connect the sensor to a USB wall charger or powered USB port using the USB cable. The battery status light is solid yellow while the battery is charging and changes to solid green when fully charged.

Install or update data collection software

The latest update of PASCO Capstone or SPARKvue is required to use the Wireless Blood Pressure Sensor. Download and install the software from the PASCO website. Check if an update is available if the software is already installed.

SPARKvue

Windows and Mac Computers
Download: Go to **pasco.com/sparkvue** then click **Downloads**.

Update: Click ☰ then select **Check for Updates**.

Mobile Devices and Chromebooks
Search for SPARKvue in your device's app store. SPARKvue automatically installs updates.

Download on the App Store | GET IT ON Google Play | Available in the Chrome Web Store

PASCO Capstone

Windows and Mac Computers
Download: Go to **pasco.com/capstone** then click **Downloads**.

Update: Click **Help** then select **Check for updates**.

Check for a firmware update

Update the sensor firmware to access the latest features and bug fixes. Sensor firmware is installed using SPARKvue or PASCO Capstone. Connect the sensor to SPARKvue or PASCO Capstone to check for a firmware update.

SPARKvue

1. Turn on the Wireless Blood Pressure Sensor.
2. Open SPARKvue then click Sensor Data.
3. Select the sensor that matches the device ID.
4. If a notification appears, click **Yes** to update the firmware. If a notification doesn't appear, the firmware is up to date.

PASCO Capstone

1. Turn on the Wireless Blood Pressure Sensor.
2. Open Capstone then click Hardware Setup.
3. Select the sensor that matches the device ID.
4. If a notification appears, click **Yes** to update the firmware. If a notification doesn't appear, the firmware is up to date.

Using the sensor

Using the sensor requires two people since you can't measure your own blood pressure. You need a partner to attach the cuff to your arm, inflate the cuff, and collect the data.

Set up the hardware

1. Insert the luer connector on the sensor into the connector on the blood pressure cuff. Turn the connector until it's finger-tight.
2. Press and hold the push-button release valve to release all of the air in the cuff.
3. Wrap the cuff snugly around the upper left arm above the elbow.

   Note: Remove any constrictive clothing or jewelry that may interfere with the cuff placement.

4. Position the cuff's bottom edge about 3 cm above the elbow pit. Rotate the cuff as needed to position the white index line on the cuff over the main artery on the inside of your left arm.
5. Use the hook-and-loop material to hold the cuff in place.
6. Allow the two tubes to hang down, one on each side of the arm.

Figure 1. Cuff placement on the arm.

Set up the software

SPARKvue

1. Turn on the sensor.
2. Open SPARKvue then click **Sensor Data**.

3. Select the that matches its device ID.
4. Under Quick Start Experiments, select **Monitoring Blood Pressure**.

PASCO Capstone

1. Turn on the sensor.
2. Open Capstone then click **Hardware Setup**.
3. Select the that matches its device ID. Click **Hardware Setup** to close the panel.
4. Select the **Monitoring Blood Pressure** Quick Start Experiment.

Collect data

1. Click **Start** (SPARKvue) or **Record** (Capstone) to begin data collection.
2. Have your partner rapidly pump air into the cuff until the pressure reaches approximately 170 mmHg.

   ⚠ **CAUTION:** Do not pump above 200 mmHg. If there is discomfort, push and hold the push-button on the release valve to deflate the cuff.

3. Remain still as possible during data collection. The cuff pressure deflates by itself at a rate between 2 and 5 mmHg per second.

   Note: If the pressure is not deflating between 2 and 5 mmHg per second, adjust the release rate by turning the adjustment screw on the pressure release valve. Turn the screwdriver counter-clockwise to decrease the rate and turn clockwise to increase the rate.

4. Stop collecting data when the systolic and diastolic pressure measurements appear in the digits displays (about 30-60 seconds after starting data collection).

   Note: If the pressure measurements do not appear, try the following:

   - Adjust the pressure release rate so that it is between 2 and 5 mmHg per second.
   - Check the cuff placement on the arm (**Figure 1**).
   - Try inflating the cuff at a faster rate.
   - Use a different cuff size (sold separately).

5. Release the remaining air in the cuff by pressing the push-button release valve on the bulb.

Analyzing blood pressure

The Wireless Blood Pressure Sensor uses the oscillometric technique to estimate blood pressure. When the oscillations of pressure in a blood pressure cuff are recorded during gradual deflation, the point of maximal oscillation corresponds to the mean intra-arterial pressure. The oscillations begin at approximately systolic pressure and continue below diastolic, so that systolic and diastolic pressure can only be estimated indirectly according to an empirically derived algorithm.

Systolic pressure is the pressure of the blood on the artery walls when it leaves the ventricles at peak ventricular contraction, when the heart is emptying its chambers of blood. It is the “top number” of the blood pressure ratio. Normal systolic pressure for a male is approximately 120 mmHg and for a female is approximately 110 mmHg.

Diastolic pressure is the pressure of the blood on the artery walls when the ventricles relax and the heart's chambers fill with blood. It is the “bottom number” of the blood pressure ratio. Normal diastolic pressure for a male is approximately 80 mmHg and for females is approximately 70 mmHg.

To find the systolic and diastolic blood pressure manually:

1. Zoom in on an area of the pressure measurement between 120 and 60 mmHg.
2. Identify when your data *begins* to form small oscillations. This is your systolic pressure.
3. Identify when your data *stops* forming small oscillations. This is your diastolic pressure.

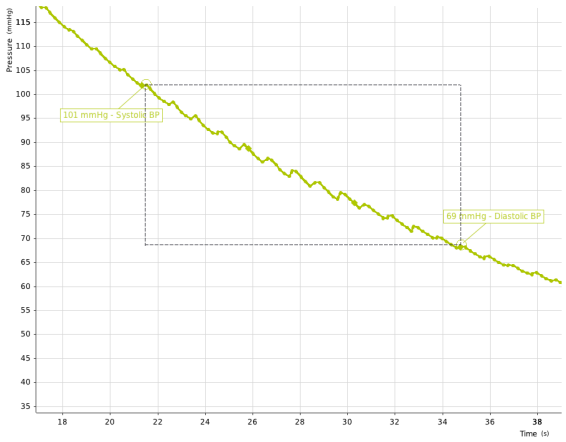


Figure 2. Example data showing how to find systolic and diastolic pressure manually.

Additional resources

Experiments

Print-ready experiment worksheets are available to download from the PASCO website. Go to **pasco.com/freelabs** and enter **PS-3218** in the **Part No.** field.

Product information

Visit the product web page at **pasco.com/product/PS-3218** for additional information including:

- Specifications
- Buying Guide
- Experiments
- Documents

Software help

The SPARKvue and PASCO Capstone Help provide additional information on how to use the Wireless Blood Pressure Sensor with the software. Access the help within the software or online.

SPARKvue

Software: Click then select **Help**.

Online: pasco.com/help/sparkvue

PASCO Capstone

Software: In the menu bar, click **Help** then select **PASCO Capstone Help**.

Online: pasco.com/help/capstone

Technical Support

Need more help? Our knowledgeable and friendly Technical Support staff is ready to provide assistance with this or any other PASCO product.

Phone (USA)	1-800-772-8700 (Option 4)
Phone (International)	+1 916 462 8384
Online	**pasco.com/support**

Regulatory information

Warranty, Copyright, and Trademarks

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 instructions

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.

Battery disposal instructions

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.

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.