# **Wireless Ethanol Sensor**

### PS-4252

# Introduction

The Wireless Ethanol Sensor is used to measure the ethanol concentration of the vapor above a liquid sample. The device consists of a rectangular sensor body and a flexible probe with the sensing element installed in its tip. The sensor body's OLED screen displays a live measurement of the ethanol concentration. The Ethanol Sensor is compatible with SPARKvue, PASCO Capstone, or Chemvue.

() **IMPORTANT:** Do not expose the Ethanol Sensor to gases with concentrations greater than 3% ethanol, as these gases may damage the sensing element and reduce the sensor's usable lifespan. The data collection software will notify you if the measured concentration exceeds this limit.

### Components

### **Included components:**

- Wireless Ethanol Sensor
- Ethanol probe
- Teflon tape
- USB-C charging cable
- Calibration bottle
- #6 stopper

### **Required software:**

• PASCO Capstone, SPARKvue, or Chemvue data collection software

### **Recommended equipment:**

- Photosynthesis Tank (PS-2521B)
- Photosynthesis Chamber (PS-3251)

### **Features**

### **Probe features:**



### 1 Sensor jack

Plug this end into the probe port on the sensor to connect the probe to the sensor.

### **2** Probe shield

Holds the Teflon tape in place and provides additional protection against splashing liquids.

### **3** Sensing element

Should be fully covered by the Teflon tape before use.



### 1 Bluetooth Status LED

Blinks red to indicate that the sensor is ready to pair. Blinks green to indicate that the sensor is connected. Blinks yellow to indicate that the sensor is logging data. (For more information on remote data logging, see the software's online help.)

### **2** OLED display

Displays either the ethanol percentage or the sensor resistance, updating at half-second intervals.

### **3** Battery Status LED

Blinks red to indicate that the sensor is low on power. Lights up yellow to indicate that the sensor is charging. Lights up green to indicate that the sensor is fully charged.

### 4 Probe port

Insert the ethanol probe into this port to connect it to the sensor.



### **5** Mounting hole

Use to mount the sensor to a  $\frac{1}{4}$ -20 threaded rod, such as the Mounting Rod (ME-9483).

### 6 Charging port

Connect the USB-C cable provided with the sensor to this port to charge the sensor.

### **7** Power button

Press and briefly hold to turn the Ethanol Sensor on or off. Press twice in quick succession to toggle the OLED display measurement between ethanol percentage and sensor resistance.

### 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, PASCO Capstone, or Chemvue software. If you're not sure which to use, visit <u>pasco.com/products/</u><u>guides/software-comparison</u>.

A browser-based version of SPARKvue is available for free on all platforms. We offer a free trial of SPARKvue and Capstone for Windows and Mac. To get the software, go to <u>pasco.com/downloads</u> or search for **SPARKvue** or **Chemvue** in your device's app store.

If you have installed the software previously, check that you have the latest update:

SPARKvue: Main Menu > Check for Updates

PASCO Capstone: Help > Check for Updates

b Chemvue: See the download page.

### Check for a firmware update

### SPARKvue

- 1. Press the power button until the LEDs turn on.
- 2. Open SPARKvue, then select **Sensor Data** on the Welcome Screen.



- 3. From the list of available devices, select the sensor that matches your sensor's device ID.
- 4. A notification will appear if a firmware update is available. Click **Yes** to update the firmware.
- 5. Close SPARKvue once the update is complete.

#### PASCO Capstone

- 1. Press the power button until the LEDs turn on.
- 2. Open PASCO Capstone and click **Hardware Setup** from the Tools palette.
- 3. From the list of available wireless devices, select the sensor that matches your sensor's device ID.
- 4. A notification will appear if a firmware update is available. Click **Yes** to update the firmware.
- 5. Close Capstone once the update is complete.

### b Chemvue

- 1. Press the power button until the LEDs turn on.
- 2. Open Chemvue, then select the **Bluetooth** *\** button.
- 3. From the list of available devices, select the sensor that matches your sensor's device ID.
- 4. A notification will appear if a firmware update is available. Click **Yes** to update the firmware.
- 5. Close Chemvue once the update is complete.

### Hardware setup

- 1. Remove the probe shield from the tip of the probe.
- 2. Cut two strips of the provided Teflon tape, each long enough to cover the sensing element.
- 3. Place the tape strips in parallel over the tip of the probe, making sure that the sensing element is *completely covered*. Fold any extra length of the tape strips down against the side of the probe.
- 4. Place the probe shield back onto the tip of the probe so that it holds the tape in place.
- 5. Plug the sensor jack on the other end of the probe cable into the probe port on the sensor.
- 6. Mount the probe as desired so that the sensing element is exposed to the vapor above a liquid sample.

# Software setup

### 🙂 SPARKvue

### Connect the sensor to a tablet or computer via Bluetooth:

- 1. Turn on the Ethanol 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 sensor.

#### Connect the sensor to a computer via USB-C cable:

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

#### Collect data using SPARKvue:

- 1. Select the measurement you intend to record from the **Select measurements for templates** column by clicking the check box next to the relevant measurement's name.
- 2. Click **Graph** in the **Templates** column to open the Experiment Screen. The graph's axes will auto-populate with the selected measurement versus time.
- 3. Click **Start** begin collecting data.

### PASCO Capstone

#### Connect the sensor to a computer via Bluetooth:

- 1. Turn on the Ethanol Sensor. Check to make sure the Bluetooth Status LED is blinking red.
- 2. Open PASCO 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 sensor.



#### Connect the sensor to a computer via USB-C cable:

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

#### Collect data using Capstone:

- 1. Double-click the **Graph** k icon in the **Displays** palette to create a new blank graph display.
- In the graph display, click the <Select Measurement> box on the y-axis and select an appropriate measurement from the list. The xaxis will automatically adjust to measure time.
- 3. Click **Record (**) to begin collecting data.

### b Chemvue

### Connect the sensor to a computer via Bluetooth:

- 1. Turn on the Ethanol Sensor. Check to make sure the Bluetooth Status LED is blinking red.
- 2. Open Chemvue, then click the **Bluetooth** *\** button at the top of the screen.
- 3. From the list of available wireless devices, click the device which matches the device ID printed on your sensor.

#### Connect the sensor to a computer via USB-C cable:

- 1. Open Chemvue. If desired, click the **Bluetooth** *\** button to check the connection status of the sensor.
- 2. Connect the provided USB-C cable from the USB-C port on the sensor to a USB port or powered USB hub connected to the computer. The sensor should automatically connect to Chemvue.

#### **Collect data using Chemvue:**

- Open the Graph display by selecting its icon from the navigation bar at the top of the page.
- 2. The display will automatically be set to plot ethanol percentage versus time. If a different measurement is desired for either axis, click the box containing the default measurement's name and select the new measurement from the list.
- 3. Click **Start** to begin collecting data.

### Calibration

In order to obtain accurate data, the Wireless Ethanol Sensor should be calibrated before being used. Once you have connected the sensor to your program of choice, follow the steps below to calibrate it before performing data collection.

### Preparation

- 1. Prepare a solution of 1% ethanol. This is most easily done by adding 1 mL of anhydrous ethanol to a 100 mL volumetric flask and filling to the line with distilled water. Place this sample into the calibration bottle included with the Ethanol Sensor.
- 2. Insert the Ethanol Sensor's probe securely into the calibration bottle so that the sensing element is directly over the liquid's surface, exposing it to the vapors.

- 3. In your chosen software, create a display to monitor the sensor's concentration measurement, then begin collecting data.
- 4. Wait for the measurement of the concentration to stabilize, then stop data collection and follow the calibration procedure for your chosen software.

### 🙂 SPARKvue

- 1. In the bottom left corner of the Experiment Screen, select the live data bar for the concentration measurement, then select **Calibrate measurement**.
- 2. Make sure that the following settings are selected:
  - ° Sensor: Wireless Ethanol Sensor
  - Measurement: % Ethanol
  - Calibration type: 1 point (Adjust Offset Only)
- 3. Select **Calibrate**. The program will set the value of the concentration measurement to 1%.

### PASCO Capstone

- 1. Select Calibration <sup>(1)</sup> from the Tools palette.
- 2. Select **Concentration** for the measurement to calibrate, then click **Next**.
- 3. Make sure that the correct sensor and measurement are selected in the list of probes to calibrate, then click **Finish**. The program will set the value of the concentration measurement to 1%.

### b Chemvue

- 1. Select the name of the concentration measurement in the display, then select **Calibrate** from the list of options.
- 2. Select One Standard (1 point offset), then select Next.
- 3. Enter 1 into the Standard Value box, then select Set Calibration.
- 4. Review your new calibration, then select **Apply**. The program will set the value of the concentration measurement to 1%.

## Software help

The SPARKvue, PASCO Capstone, and Chemvue 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: <u>help.pasco.com/sparkvue</u>

PASCO Capstone

Software: Help > PASCO Capstone Help

Online: help.pasco.com/capstone

#### 🕹 Chemvue

Software: Main Menu > Help

Online: <u>help.pasco.com/chemvue</u>



# Specifications and accessories

Visit the product page at <u>pasco.com/product/PS-4252</u> 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 <u>pasco.com/freelabs/PS-4252</u>.

# **Technical support**

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

$\square$ Chat	pasco.com
& Phone	1-800-772-8700 x1004 (USA) +1 916 462 8384 (outside USA)

Email support@pasco.com

### 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.

