

Light Sensor

CI-6504A

Introduction

The Light Sensor is designed to be used with a PASCO interface and data collection software to measure relative light intensity.

Through the use of the gain options on the sensor box and within PASCO Capstone or SPARKvue, the Light Sensor has a working range of up to seven orders of magnitude, allowing application across a wide range of lighting levels. The sensor is best suited for experiments at ambient light levels. At the low end of the range, interference patterns of monochromatic light can be measured after the light passes through single or multiple slits. At the higher end, measurements can be made of the relative light intensities of daylight. The range switch settings (1, 10, and 100) on the top of the sensor roughly correspond to maximum input light levels of 500, 50, and 5 lux respectively. Always select a gain setting for which the intensity levels on the display vary appropriately for measuring the changes in relative light intensity in your experiment.

The sensing element of the Light Sensor is a stable and electrically quiet Si PIN photodiode. The photodiode is responsive across a wide spectrum ranging from 320 nm to 1100 nm. The response curve for the photodiode is shown in Figure 1.

Spectral Response

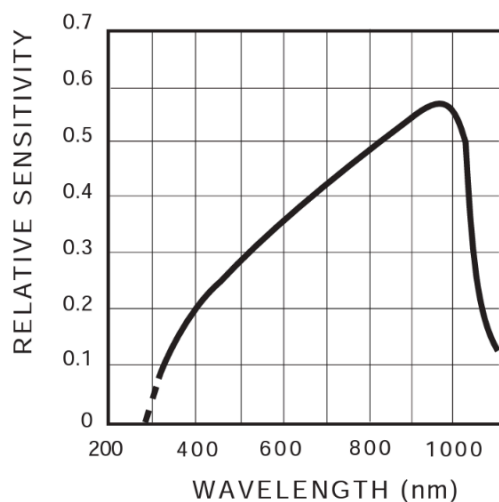
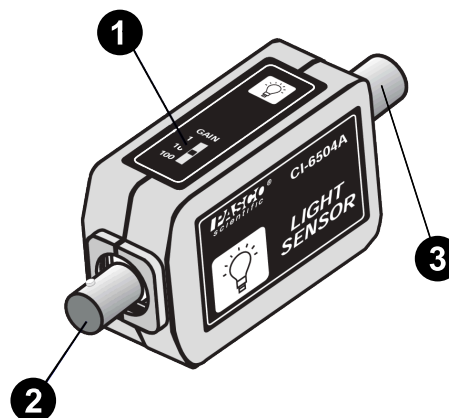


Figure 1: Response curve for the photodiode.

The Light Sensor can be plugged directly into any PASCO analog interface. You can also connect the sensor to the interface using the supplied DIN connector cable for greater reach.

Components

Features:



- ❶ Gain adjustment switch
- ❷ Aperture for photodiode
- ❸ DIN port

Included equipment:

- Light Sensor
- 6-foot cable with 8-pin DIN connectors
- Mounting rod (1/4-20)

Additional equipment required:

- PASCO analog interface, such as the 850 Universal Interface (UI-5000) or 550 Universal Interface (UI-5001)
- 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: Main Menu > Check for Updates

PASCO Capstone: Help > Check for Updates

Setup

SPARKvue

1. Connect the Light Sensor to an analog port on your chosen PASCO interface, either by plugging it in directly or via the included DIN cable.
2. Start SPARKvue, then select **Sensor Data**.
3. Connect your analog interface to SPARKvue. For more information on this, see the manual for the chosen interface and the SPARKvue online help.
4. From the **Select measurements for templates** column, click the **Settings**  icon next to the name of the analog channel to which the Light Sensor is connected.
5. From the **Assign Analog Adapter** menu, select **Light Sensor** and click **OK**.
6. From the **Select measurements for templates** column, check the box next to **Light Intensity**.
7. Select **Graph** from the **Templates** column to open the Experiment Screen. The graph display will automatically be set to measure light intensity (as a percentage of the sensor's maximum measurement) versus time.
8. Click **Start**  to begin collecting data.

PASCO Capstone

1. Connect the Light Sensor to an analog port on your chosen PASCO interface, either by plugging it in directly or via the included DIN cable.
2. Start Capstone, then select **Hardware Setup** from the **Tools** palette.
3. Connect your analog interface to Capstone. For information on this, see the manual for the chosen interface and the Capstone online help.
4. In the Hardware Setup tool, locate the image of the interface you are using. Click inside the yellow circle over the analog channel to which the Light Sensor is connected, then select **Light Sensor** from the list.
5. Double-click **Graph** from the **Displays** palette to create a Graph display.
6. Within the display, click the **<Select Measurement>** box on the y-axis and select **Light Intensity (%)** from the list. The x-axis should automatically adjust to measure time.
7. Click **Record**  to begin collecting data.

Reducing noise in measurements

The gain adjustment switch on the sensor allows you to reduce the noise in the sensor. The value of the light measurement will be multiplied by the current setting of the slider (either 1, 10, or 100), reducing the impact of the noise on collected data. Higher gain settings will allow better data to be collected in low-light environments.

If the gain switch is already set to 100 and the data still has too much noise, consider increasing the sensitivity in PASCO Capstone or SPARKvue. This can be done by adjusting the **Gain** setting through the

following steps. (Note that this is a *separate* gain function from the one provided by the gain adjustment switch.)

-  **SPARKvue:** From the Experiment Screen, click the Live Data Bar for the Light Sensor in the bottom left, then select **Configure Sensor**. Click the box next to **Gain**, select a setting from the list, and click **OK**.
-  **PASCO Capstone:** From the Hardware Setup tool, click the **Properties**  icon next to the Light Sensor's name. Click the button next to **Gain**, select a setting from the dropdown list, and click **OK**.



NOTE: Increasing the sensitivity of the sensor will reduce the value at which the sensor's intensity measurement peaks. Therefore, this function should only be used in low light conditions.

Mounting on an apparatus

The 1/4-20 threaded connector located on the bottom of the sensor box can be used to secure the Light Sensor to an experimental apparatus, or to the mounting rod included with the sensor. The alignment hole fits over the alignment pin included on some PASCO apparatuses. (See Figure 2.)

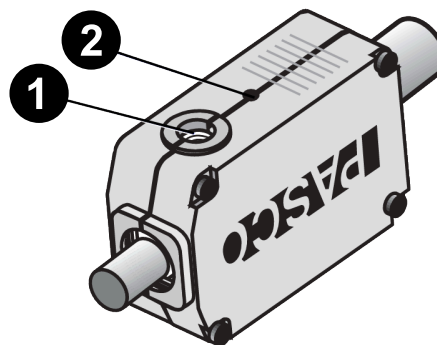
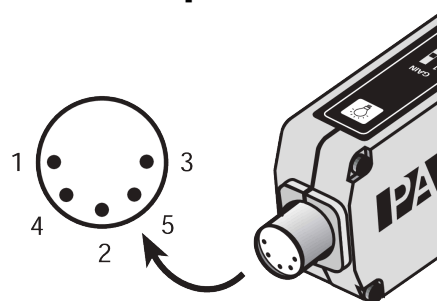


Figure 2: Features for mounting the Light Sensor.
 1: 1/4-20 threaded connector. 2: Alignment hole.

DIN connector specifications



- **1:** Analog output (+), 0 to 5 V
- **2:** Analog output (-), signal ground
- **3:** [No connection]
- **4:** +5 V DC power
- **5:** Power ground

Software help

The SPARKvue and PASCO Capstone Help provide 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/CI-6504A to view the specifications and explore accessories. You can also download support documents from the product page.

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



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CE statement

This device has been tested and found to comply with the essential requirements and other relevant provisions of the applicable EU Directives.