High Sensitivity Light Sensor

PS-2176

Included Equipment	Part Number
High Sensitivity Light Sensor	PS-2176
Extension Cable	PS-2500
Sensor Handle	CI-9874
Additional Equipment Required	
PASPORT Interface	See www.pasco.com or PASCO catalog

Quick Start

1. Connect the sensor to your PASPORT interface.
2. If you are using a computer, connect the PASPORT interface to it and start DataStudio.
3. Press a button on the sensor to select a range.
4. Press or click the start button (on the interface or in DataStudio) to begin recording data.

Introduction

The PASCO High Sensitivity Light Sensor has a high resolution and wide range, allowing it to measure visible light intensity in a variety of applications. The table below gives examples of experiments that can be done using the three range settings.

Range	Typical Experiment	Recommended Equipment	
0 to 10000	*Inverse Square Law:* Measure light intensity as a function of distance.	Flash light Meter stick	
0 to 100	*Diffraction and Interference:* Measure the intensity of a diffraction pattern formed by a diode laser and a single or double slit.	Diffraction Optics Kit	OS-8531
		Optics Bench (120 cm)	OS-8508
		Linear Translator	OS-8535
		Aperture Bracket	OS-8534
		Rotary Motion Sensor	PS-2120
0 to 1	*Spectrophotometry:* Analyze the Balmer series in the emission spectrum of hydrogen.	Educational Spectrophotometer Kit	OS-8537
		Optics Bench (60 cm)	OS-8541
		Aperture Bracket	OS-8534
		Rotary Motion Sensor	PS-2120
		Spectral Tube Power Supply	SE-9460
		Hydrogen Spectral Tube	SE-9461

The range buttons are marked with their approximate lux ranges; however, the sensor does not measure illuminance in lux because it does not have a filter.

Set-up

Connect Sensor to Interface

Plug the sensor into any port of you PASPORT interface, either directly or using the included extension cable. The interface or software detects the sensor and automatically prepares itself for data collection.

Select a Range

Press one of the range buttons on the sensor. The button of the selected range is illuminated. Select a lower range to measure lower light levels with higher resolution. Select a higher range to measure brighter light.

Sensor Positioning and Mounting

- Point the aperture of the sensor at the source to be measured.

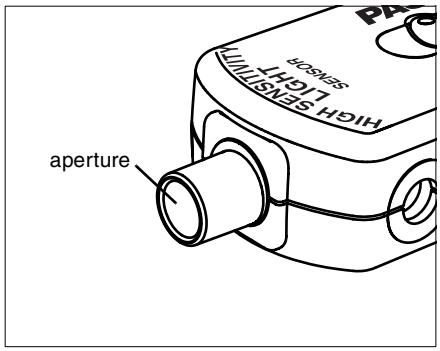

Figure 1: Aperture

- Attach the included Sensor Handle or other 1/4-20 thread screw to the mounting hole.

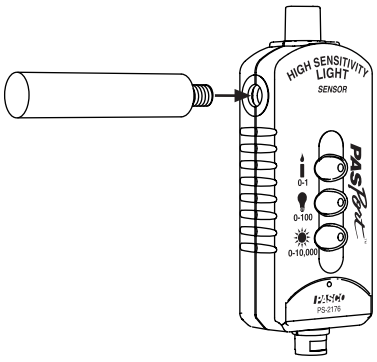

Figure 2: Sensor Handle

- To use the sensor with a Basic Optics bench or Educational Spectrometer (OS-8537), mount it on an Aperture Bracket (OS-8534).

About the measurements

Measurements and Units

The sensor make two measurements: Light Intensity and Relative Intensity.

The Light Intensity measurement is the percentage of full scale, where 100% represents the maximum measurement possible at the selected range. Thus, a reading of 50% taken at the medium-range setting is equal to a reading of 0.5% at the high-range setting.

The Relative Intensity measurement is scaled according to the range setting; a reading of 50 at the medium-range setting would also be 50 at the high-range setting. The Relative Intensity ranges are 0–1, 0–100, and 0–10000.

Resolution

The resolution of the measurement depends on two factors: the selected range and the sampling rate.

The resolution of each range setting is 100 times better than the next higher setting. For the highest resolution, use the lowest range.

The sensor uses different amounts of oversampling at different sample rates. Oversampling reduces noise, produces smoother data, and improves the resolution. To increase oversampling, set the sample rate lower. Maximum oversampling occurs at a sample rate of 1 Hz or slower.

To Select a Measurement

The default measurement is Light Intensity (percentage of maximum for the selected range). To use the Relative Intensity measurement, do one of the following:

DataStudio

1. Click **Setup** to open the Experiment Setup window.
2. Select the **Relative Intensity** check box.

GLX (Standalone Mode)

1. In the Graph screen (or any other display screen), press ✓ twice to open a data source menu.
2. Select **More** to expand the menu
3. Select **Relative Intensity**.

Spectral Response

The sensor's Si PIN photodiode is responsive across a spectrum ranging from 320 nm to 1100 nm. The response curve is shown in Figure 3.

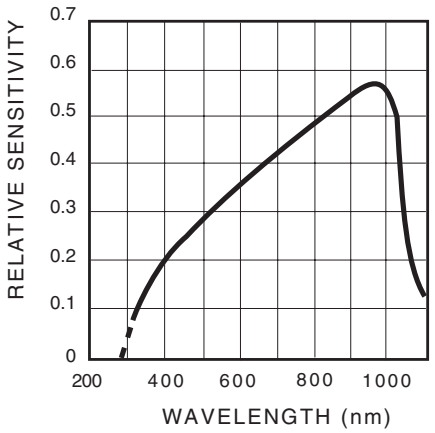

Figure 3: Spectral Response

Specifications

Sensing Element	Si PIN photodiode
Spectral Response	320 nm to 1100 nm
Gain Levels	10000×, 100×, and 1×; switch selectable
Approximate Lux Ranges	0 to 1, 0 to 100, 0 to 10000
Maximum Sample Rate	1000 Hz
Resolution (relative intensity units)	±0.01 at 1000 Hz on 0 to 100 scale ±0.0005 at 5 Hz on 0 to 100 scale

Technical Support

For assistance with any PASCO product, contact PASCO at:

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