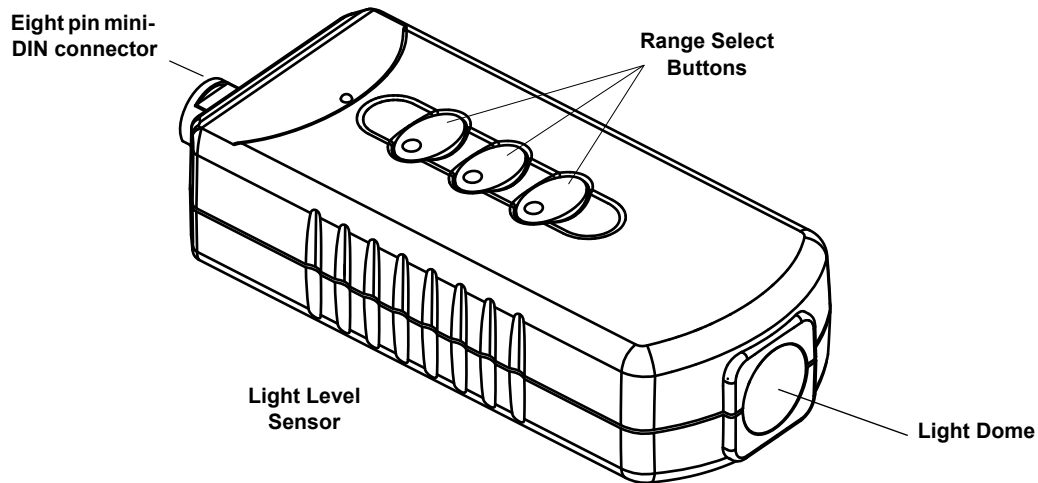




Light Level Sensor

PS-2177



Included Equipment	Part Number
Light Level Sensor	PS-2177
Recommended Items	
PASPORT Extension Cable	PS-2500
PASCO Interface	Catalog or web site*
Data Acquisition Software	Catalog or web site*

*See the PASCO catalog or web site at www.pasco.com for compatible PASPORT interfaces and Data Acquisition Software..

Introduction

Photometry deals with the measurement of visible light as perceived by human eyes. The PASPORT Light Level Sensor measures illuminance in lux. The readings of the sensor mimic the wavelength sensitivity of the human eye, which is most sensitive in the green part of the spectrum (peaking at about 555 nanometers). This is achieved with a green filter in the sensor.

In photometry, illuminance is the *luminous flux* incident on a surface, *per unit area*. In other words, it is the measure of the intensity of the incident light, wavelength-weighted to correlate with human brightness perception. Illuminance is measured in lux, or lumens per square meter. Luminous flux, measured in lumens, is the perceived power (energy per unit of time) of light. One lumen is defined as the luminous flux of light produced by a light source that emits one candela of luminous intensity over a solid angle of one steradian. Luminous intensity, measured in candela, is the wavelength-weighted power emitted in a particular direction per unit solid angle. If a light source emits one candela, a metric (SI) base unit, it emits monochromatic green light with a frequency of 540 terahertz (THz) that has a radiant energy of 1/683 watts per steradian in a given direction. A one-hundred watt incandescent light bulb emits about 120 candela. A uniform one candela source emits 12.6 lumens.

About the Sensor

The PS-2177 Light Level Sensor uses a silicon photodiode that produces a voltage that is proportional to light intensity. The photodiode has a spectral response range from 320 to 730 nanometers (nm) and a peak sensitivity at 560 nm, which is very close to the peak sensitivity wavelength of the human eye. The maximum dark current is 10 picoamperes at one volt. The accuracy is $\pm 10\%$.



**PS-2500 PASPORT
Extension Cable**

Light Level Ranges

The sensor has three ranges which can be selected using the range select buttons on the sensor. The range for each button is represented by an icon.

Icon	Light Level	Resolution
Candle	0 to 1,500 lux	0.5 lux
Light bulb	0 to 15,000 lux	5 lux
Sun	0 to 150,000 lux	50 lux

Illuminance: Typical Readings

The following table shows typical readings for a variety of conditions

Condition	Illuminance (lx)	Condition	Illuminance (lx)
Sunlight	100,000	Quarter moon	0.01
Full daylight	10,000	Starlight	0.001
Overcast day	1,000	Warehouse	150
Very dark day	100	Offices, labs	500
Twilight	10	Supermarkets	750
Deep twilight	1	Operating rooms	1,000
Full moon	0.1	Detailed drawing work	1,500 to 2,000

Usage

The sensor can be used for a variety of experiments.

- Plant growth versus light intensity.
- Light intensity through polarized filters.
- Amounts of solar energy in various locations.
- Relationship of light intensity versus distance for a point source.

Setup

Hardware Setup

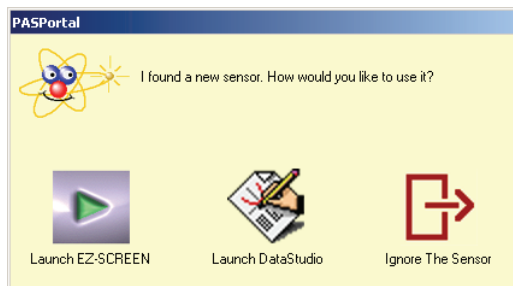
- Connect the Light Level Sensor to a PASPORT interface.

If you will be using a computer, connect the PASPORT interface to the computer's USB port.

DataStudio Setup


If you will be using the Light Level Sensor with a computer, install the latest version of DataStudio first. Check the PASCO web site at www.pasco.com for information.


1. When you connect the Light Level Sensor to the computer through a PASPORT interface, the PASPortal window will launch automatically (if DataStudio is not already running).



2. Select *Launch DataStudio* in the PASPortal window.

A Digits display for Light Level measured in lux will open automatically.

3. Click  to begin data collection.


To view and change the sample rate and other sensor properties, click  to open the Experiment Setup window. The default sample rate is 5 Hz and the maximum sample rate is 1000 Hz.



Using the Sensor

- Point the light dome on the sensor toward the light source.
- The default light intensity range is “Light Bulb”.
- Select a different range if needed by pressing the button next to the icon.
- When a button is pressed, the green LED lights up.

Xplorer and Xplorer GLX Setup

If you will be using an Xplorer or Xplorer GLX in logging mode (not connected to a computer), connect the Light Level Sensor to the Xplorer or Xplorer GLX, turn the interface on, and press  to begin data collection.

SPARK Setup

- If the SPARK Science Learning System (SLS) is off, press and hold the power button on the bottom to turn it on and then wait for the SPARK to boot up. The screen will show a message to plug in a sensor.
- Connect the PASPORT sensor to either of the ports on the top of the SPARK. The screen will show the list of quantities measured by the connected sensor.

spark 
TO BEGIN
COLLECTING DATA
PLUG IN A SENSOR

Graph Display (default)

To open a graph display, touch any quantity in the list and then touch SHOW to open PAGE 1. Touch the right arrow next to PAGE 1 to go to the next display (digits). Touch the **Start** button to begin collecting data.



Select a Display

To set up a particular display (e.g., digits display), touch BUILD. Touch a quantity from the list, and then touch one of the display icons. Touch OK to open the display, and then touch the **Start** button to begin collecting data.



Calibration

You do not need to calibrate the Light Level Sensor

Specifications

Accuracy: $\pm 10\%$

Maximum Sample Rate: 1000 Hz

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: 916-786-3800 (worldwide)
800-772-8700 (U.S.)

Fax: (916) 786-3292

Web: www.pasco.com

Email: support@pasco.com

For more information about the Light Level Sensor and the latest revision of this Instruction Sheet, visit: www.pasco.com/go?PS-2177

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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/disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol (to the right) and on the product or its packaging indicates that this product **must not** be disposed of in a standard waste container.

