012-06306C
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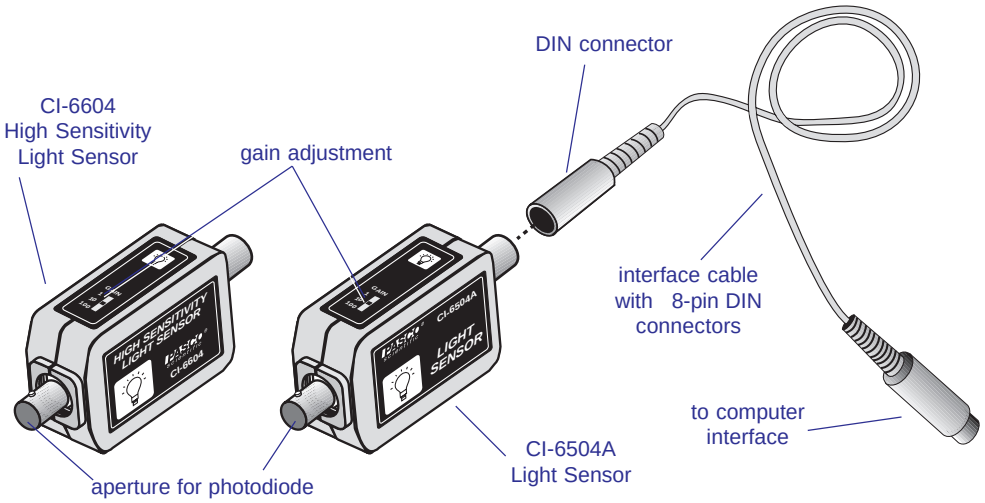
$1.00

Instruction Sheet for the PASCO Model CI-6504A and CI-6604

LIGHT SENSOR AND HIGH SENSITIVITY LIGHT SENSOR



Introduction

The PASCO CI-6504A Light Sensor and CI-6604 High Sensitivity Light Sensor are designed to be used with a PASCO computer interface to make measurements of relative light intensity.

Through the use of the gain options on the sensor box and within *ScienceWorkshop*®, the Light Sensor has a working range of up to seven orders of magnitude, allowing application across a wide range of lighting levels.

The CI-6504A is best suited for experiments performed at ambient light levels. At the lower end of the range, interference patterns of monochromatic light after it passes through single or multiple slits can be measured; at the higher end, measurements can be made of relative light intensities of daylight. The range switch settings (1X, 10X, and 100X) on the top of the sensor roughly corresponds to maximum input light levels of 500, 50, and 5 lux.

The CI-6604 can be used where experiments are performed at low light levels. Interference patterns of monochromatic light, after it passes through single or multiple slits, can be measured and spectral lines from a spectrometer may be detected. The range switch settings (1X, 10X, and 100X) on the top of the sensor roughly corresponds to maximum input levels of 5, 0.5, and 0.05 lux. At the highest gain setting (100X on the sensor and 10X in *Science Workshop*) the High Sensitivity Light Sensor has a resolution of about 10 micro lux.

The Light Sensor may be used with or without the fiber optics probe (available separately as PASCO part no. 003-01383). Greater sensitivity is achieved by measuring light directly, without the probe attached.

The sensing element of the CI-6504A and CI-6604 Light Sensors is a stable and electrically quiet Si PIN photodiode. The photodiode is responsive across a wide spectrum ranging from 320 nm through 1100 nm. The response curve for the photodiode is shown in Figure 1.

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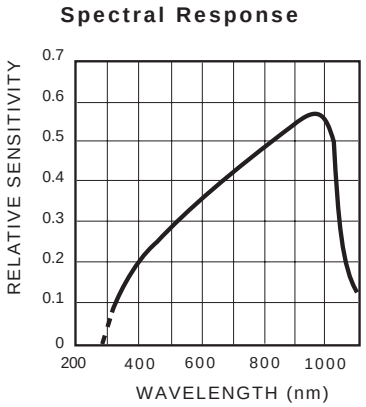


Figure 1. Spectral response curve of the photodiode

The Light Sensor can be plugged directly into any PASCO computer interface box or can be connected to the interface box using the supplied cable with DIN connectors.

Equipment Included:

- Light Sensor
- 6-foot cable with 8-pin DIN connectors

Additional Equipment Required:

- Any PASCO computer interface (300, 500, or 700 *ScienceWorkshop*® series for Macintosh or Windows or the 6500 series interface for DOS)

➤ ***Note:*** The manual has been written with the assumption that the user has a basic familiarity with *Science Workshop* and has access to the *User's Guide for Science Workshop*. Users can gain basic skills with *Science Workshop* by working through the tutorial within *Science Workshop.* Another useful resource is the *Quick Reference Card* for *Science Workshop.*

Setup Procedure

① Connect the Light Sensor and any analog channel of the interface box with the interface cable (Figure 2A),

or

insert the DIN plug of the Light Sensor into the jack of any analog channel of the interface box (Figure 2B).

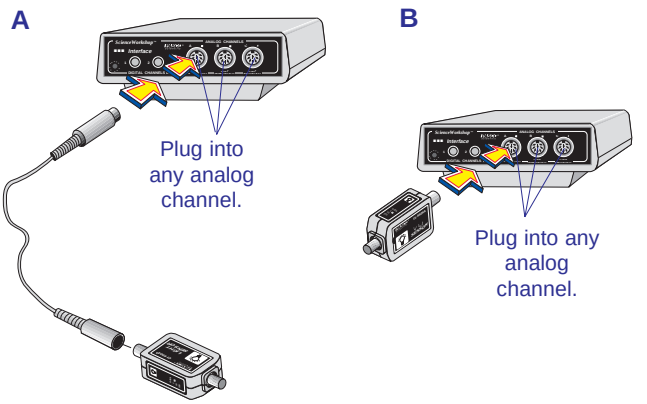


Figure 2. Connecting the Light Sensor and the computer interface

② If the fiber optics probe (PASCO part no. 003-01383) is to be used, attach it by slipping the connector of the fiber optics probe over the input connector on the Light Sensor (Figure 3). A quarter twist clockwise locks the probe to the Light Sensor. (To disconnect, press the connector towards the sensor box, turn it counterclockwise one-quarter turn, and pull away from the box.)

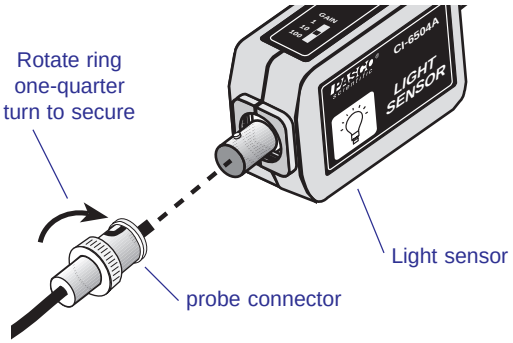


Figure 3. Attaching the fiber optics probe to the Light Sensor

③ Open the Experiment Setup window in *Science Workshop.* Click and drag the analog plug icon to the analog channel icon that matches the analog port you are using for the Light Sensor.

NOTE: Use care when handling the fiber optics probe. The optical fibers inside may be damaged if the cable is bent sharply. Do not coil tighter than a 10 cm (4 in.) diameter circle. Be sure not to damage the input end of the probe; scratches may impair light transmission.

④ Select **Light Sensor** from the drop-down menu.

⑤ Open a display window, such as the Digits display, by dragging and dropping the appropriate display icon on the Light Sensor icon.

⑥ Select the appropriate gain setting on the sensor box for the light levels to be measured (Figure 4). The correct gain setting is the one for which the intensity levels on the display vary appropriately for measuring the relative light intensity changes in your experiment.

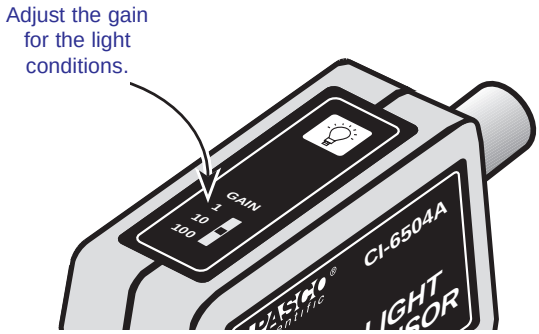


Figure 4. Setting the gain on the Light Sensor

Calibration and Sensitivity Adjustment in *Science Workshop*

① To open the Light Sensor's calibration window, double-click on the Light Sensor icon in the Experiment Setup window.

② If the Light Sensor is in analog channel A or B, you can adjust the sensitivity (gain) in *ScienceWorkshop* by selecting the appropriate level from the drop-down menu. If the Light Sensor is producing voltage above 1 V, set the sensitivity to **Low (1x)**. If the Light Sensor is producing voltages between +1 V and 0 V, select **Med (10x)**. With the *ScienceWorkshop 700* interface, set the sensitivity to **High (100x)** if the voltage is very low (between +0.1 V and 0 V). Refer to the *User's Guide for ScienceWorkshop* for more details concerning adjusting the sensitivity setting.

➤ ***Note:*** Gain for channel C cannot be adjusted in *Science Workshop*. Use Channels A or B if necessary to adjust gain in *Science Workshop*.

③ Use the calibration window in *Science Workshop* to calibrate the Light Sensor. The sensor may be calibrated in relative units such as percent of sensor voltage output. If a standard is used, the Light Sensor output may also be referenced to absolute units such as lux. Refer to the *User's Guide for Science Workshop* for more details concerning calibration.

Mounting on an Experimental Apparatus

① Use the 1/4-20 threaded connector located on the bottom of the sensor box to secure the Light Sensor to an experimental apparatus (Figure 5). The alignment hole fits over an alignment pin included on some PASCO apparatuses.

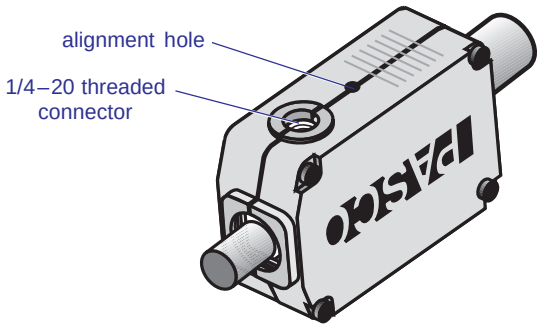
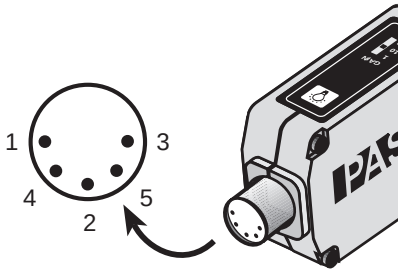


Figure 5. Mounting connector and alignment hole

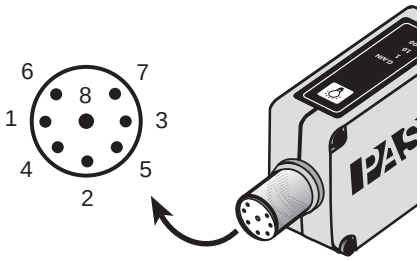
DIN Connector Specifications for CI-6504A

1: analog output (+), 0 to 5 V
2: analog output (-), signal ground
3: (no connection)
4: + 5 V DC power
5: power ground



DIN Connector Specifications for CI-6604

1: analog output (+), 0 to 10 V
2: analog output (-), signal ground
3: (no connection)
4: + 5 V DC power
5: power ground
6: +12 VDC power
7: -12 VDC power
8: (no connection)



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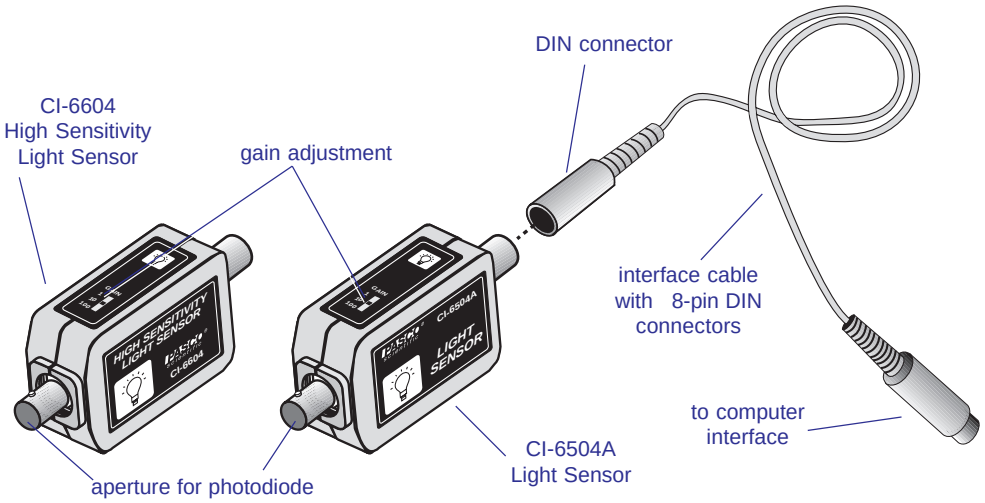

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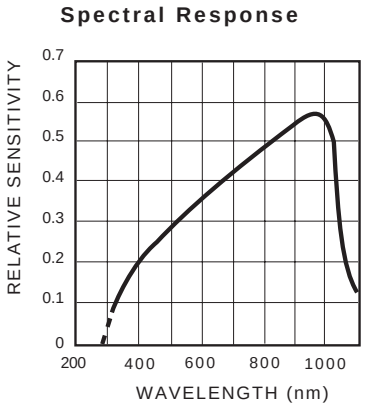

Figure 1. Spectral response curve of the photodiode

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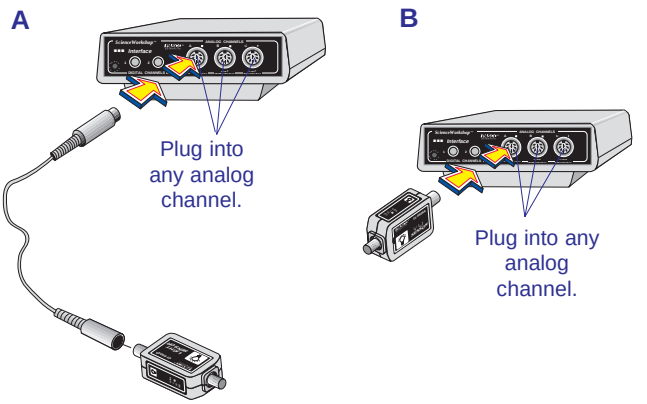

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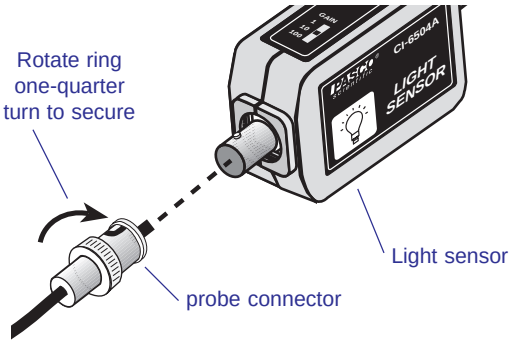

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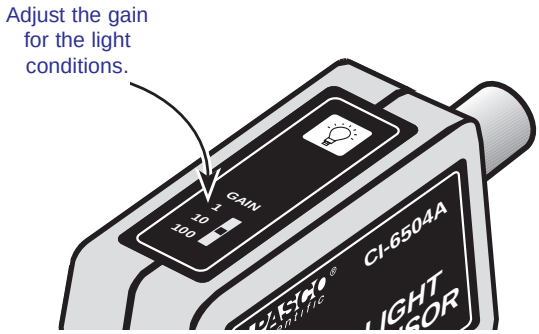

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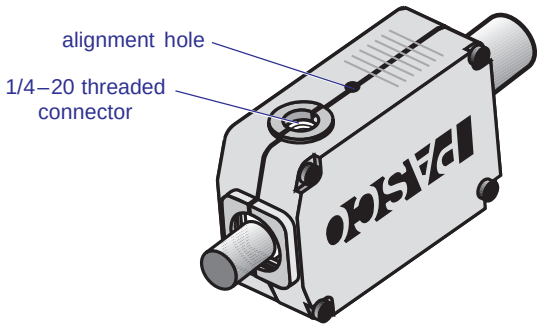

Figure 5. Mounting connector and alignment hole

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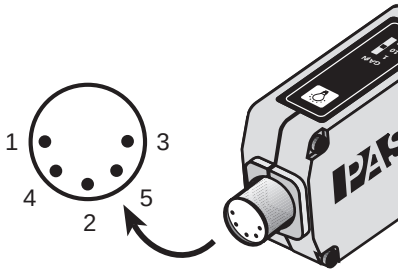

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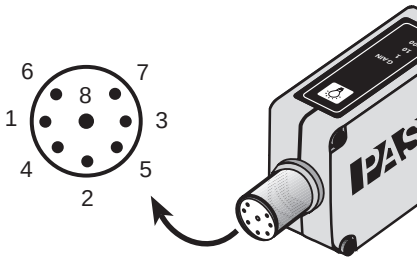

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