

light sensor kit

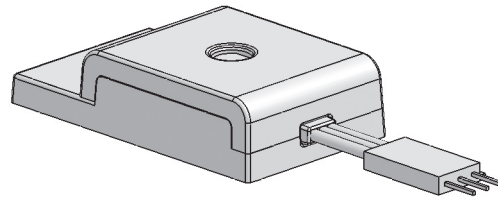
Light Sensor Kit

With a light sensor, you can add a whole new range of capabilities to your robot. Design a simple tracker that follows the beam of a flashlight, or use a light sensor to help your robot to avoid getting stuck under furniture by making it steer away from shadows. Conserve battery power by programming your robot to shut down in the absence of light. You can even give your robot color vision by putting colored filters on different light sensors!

INSERT THESE PAGES
at the **back of the**
Sensor Chapter in your
Vex Inventor's Guide.

**YOU MUST HAVE A
PROGRAMMING KIT
TO USE THIS SENSOR!**

light sensor x 1



screw x 2
(8-32, $\frac{3}{8}$ ")



keps nut x 2



Limited 90-day Warranty

This product is warranted by Innovation One against manufacturing defects in material and workmanship under normal use for ninety (90) days from the date of purchase from authorized Innovation One dealers. For complete warranty details and exclusions, check with your dealer.

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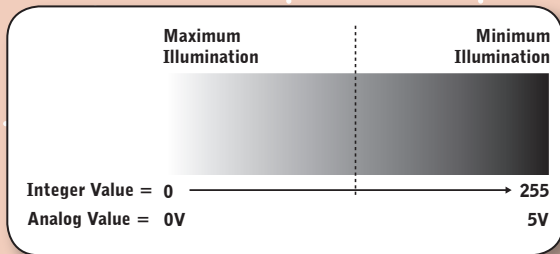
light sensor kit, continued

1 Technical overview

The light sensor uses a Cadmium Sulfoselenide photoconductive photocell, or CdS cell for short. A CdS cell is a photoresistor, meaning that its resistance value changes based on the amount of incident light.

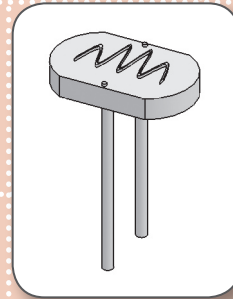
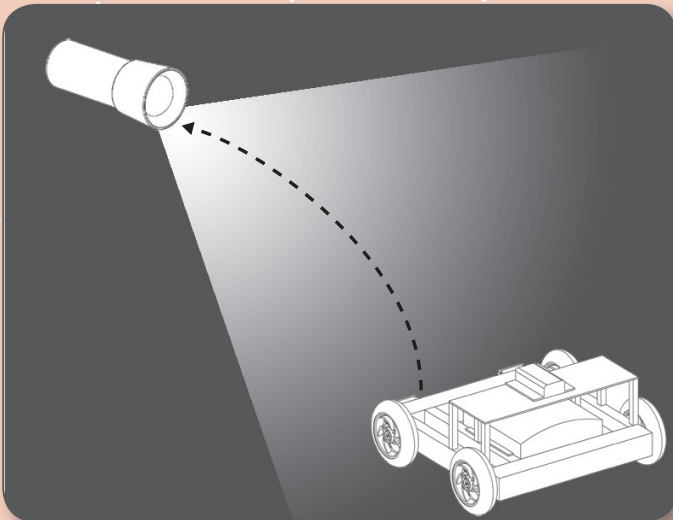
This is an analog sensor, so its output covers a range of values (in this case, from zero to five volts) rather than being only high (five volts) or low (zero volts), as is the case for a digital sensor. This range of outputs from zero to five volts is sent to the microcontroller, which reads it as a range of integer values from 0 to 255. [For more detail, refer to the Sensors chapter in your Vex Inventor's Guide.]

For this particular sensor, a low value (around 0) corresponds to very bright light, and a high value (around 255) corresponds to darkness.



We can then set a threshold value in our code to act as a trigger for behaviors.

From this basic premise, we can build more complicated behaviors. For example, if you have two light sensors on the front of your robot (one on the left, and one on the right), then you can program your robot to follow a bright light by telling it to steer toward bright light (in the direction of the sensor that is receiving low values) and away from darkness (away from the direction of the sensor that is receiving high values).

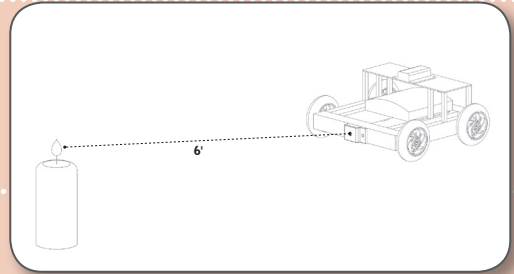


light sensor kit, continued

1 Technical overview, continued

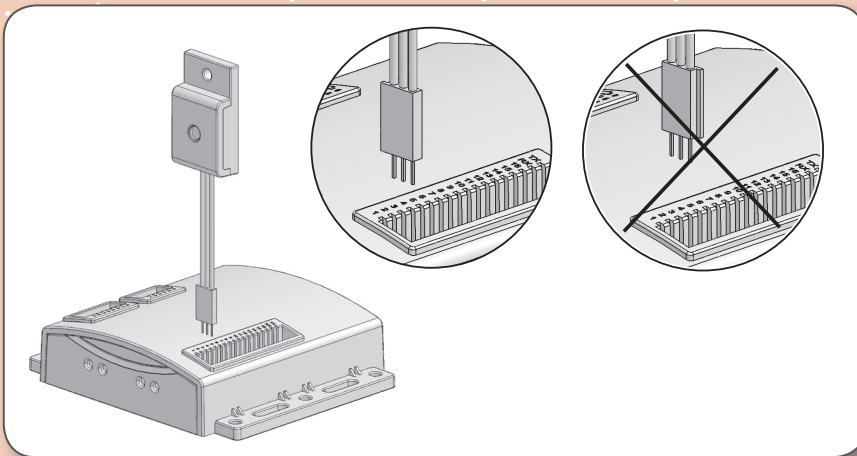
The light sensor has a usable range of 0 to 6 feet, so it can distinguish a light source from ambient light up to six feet away; a light source more than 6 feet away will blend into the ambient light and be lost. The range is dependent on the intensity of the light source as well as the intensity of the ambient light in the environment. The range will be greater for a very bright point source in a very dark room, but dramatically reduced for a flashlight outdoors on a sunny day.

This light sensor is sensitive to visible light only; it will not provide useful data for infrared or ultraviolet sources.



2 Detecting light level: Reprogramming your microcontroller to read the sensor

Start by plugging your light sensor into any port in the Analog/Digital bank on the Vex Microcontroller. Note that the connector is keyed to fit into the microcontroller port in a specific orientation; plugging it in backwards could damage or even destroy your sensor.



In order for your robot to be able to read the sensor, you will have to reprogram the microcontroller. Sample code to help you get started is available on the Vex website. Refer to the Programming chapter in your Vex Inventor's Guide for information on how to add or change code.