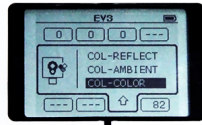


COLOR SENSOR: SHIELDING AND CALIBRATION

By Droids Robotics, 2015

The EV3 Color Sensor

The sensor detects the color or intensity of the light that enters the sensor. It can be used in three modes: Color, Reflected Light Intensity and Ambient Light Intensity.



In Color Mode, the sensor recognizes seven LEGO colors and No Color. You do not need to calibrate the sensors in this mode. However, if the mat you are running the robot on is not the same "red" or "green" or "black" as pre-set, the robot will not perform correctly.

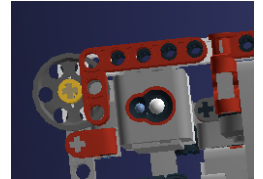


In Reflected Light Mode, the sensor measures how much light is reflected back from a red light that is emitted from the sensor itself (0 = very dark and 100 = very light).

Shielding can be helpful in both modes. Calibration is critical in Reflected Light Mode.

Color Sensor Shielding

This refers to surrounding your color sensors with beams to prevent ambient light from interfering with the color sensor's readings. This is especially valuable if you run your robot in drastically different light settings (very sunny room, very dark room). EV3 color sensors tolerate ambient light better, but still work better with shielding.



Color Sensor Calibration

Calibration is how you train your robot to identify colors when using them in Reflected Light Mode. The goal is to "teach" the robot to identify the darkest color on the mat (black) and the lightest color on the mat (white). This makes the readings more similar even on different mats or with different lighting conditions.

Shielding vs. Calibration?

Neither system is perfect and they solve slightly different problems.

	Shielding	Calibration
What is it?	<ul style="list-style-type: none"> Using LEGO beams to surround the color sensors so that no external (ambient) light sources impact the sensor readings 	<ul style="list-style-type: none"> Training your robot to know what is the darkest color and lightest color on the mat you are working on.
Why bother?	<ul style="list-style-type: none"> Robot repeatability Consistent sensor readings 	<ul style="list-style-type: none"> Training the robot will help it to accurately identify black, white and all the range of darkness in between
How do you do it?	<ul style="list-style-type: none"> Surround each color sensor with beams. 	<ul style="list-style-type: none"> You must run a calibration program You place the robot on black and white and save the values. See EV3Lessons.com Calibration Lesson
Common Errors	<ul style="list-style-type: none"> Don't let your beams scrape on the ground. Don't install your color sensor in an angle or too far from the ground to fit beams around it. 	<ul style="list-style-type: none"> You do not need to calibrate your sensors if you use them only in Color Mode. You do not need to calibrate separately for 2 sensors on the robot. One calibration will set the readings for both sensors.