LIGHTSCOUT™

Full Spectrum Quantum PAR Light Sensor

PRODUCT MANUAL

Item # 3668A

Spectrum®
Technologies, Inc.

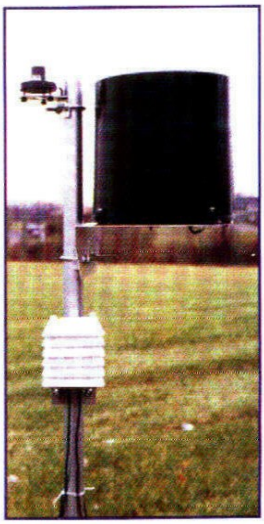
LightScout Sensor Reader

Just plug the sensor into the reader, and SET the reader to "PAR SUN". For more details, see the LightScout Sensor Reader Manual. You may wish to remove the mounting bracket when using the PAR sensor with a LightScout Sensor Reader. If so, loosen the thumbscrews, and save the parts for reassembly.

WatchDog Installation

The Full Spectrum Quantum PAR Sensor includes a 6 foot data cable which is plugged into an available external port on a WatchDog weather station. For 3000 Series stations, use the WatchDog Mobile app to configure the sensor ports. For 1000 or 2000 stations, use SpecWare or SpecConnect software to program the station to log PAR Light on the desired port. PAR Light Hours and Daily Light Integral can be reported by SpecConnect and SpecWare.

The sensor can be placed above or within plant canopies, as well as in growth rooms and greenhouses. Install the sensor so that it is level. Once the sensor is mounted, use the adjustment screws to level the sensor so that the bubble is centered on the level indicator. Mount the sensor on a 1" to 1¼" mast or pipe using the u-bolt provided.



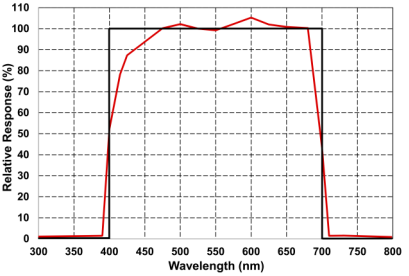
Position the sensor in an appropriate area that monitors the plant conditions. Make sure the PAR sensor is not being shadowed or blocked by another external sensor. Contact your cooperative extension agricultural agent for further suggestions on field placement.

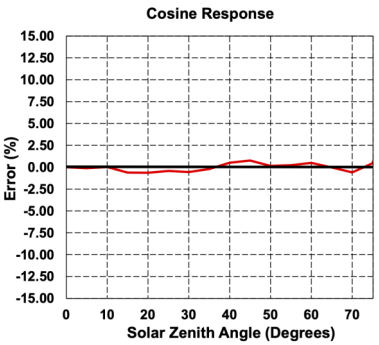
NOTE: *When measuring under fluorescent or LED lights values may vary because fluorescent lights flicker on and off 50, 60, 100 or 120 times per second. The sensor value depends on the precise instant when the reading is taken. Because the values are averaged, the variation is usually apparent only when 1 minute (and to a lesser extent, 5 minute) intervals are selected. When recording longer intervals, or when using the LightScout External Light Sensor Meter (Item #3415FX), the effect is generally not noticeable.*

PAR Light

Photosynthesis is driven primarily by photons with wavelengths between 400 and 700 nanometers, which is referred to as Photosynthetically Active Radiation, or PAR light. Because a quantum is the amount of energy possessed by a photon, PAR light is sometimes labeled quantum light. The intensity of PAR light is referred to as Photosynthetic Photon Flux Density (PPFD), which is measured in units of µmol m^{-2} s^{-1} (the number of photons, in units of micromoles, striking an area one meter square each second). Quantum Light sensors are calibrated to display PPFD.

The chart to the right displays the spectral response of the Quantum Light sensor compared to the ideal PAR light response. The sensor is accurate for all light sources, including LEDs.





Because the detected light intensity is dependent on the angle of the incoming rays, the sensor must be constructed to minimize this error. This is called **cosine correction** because the radiant intensity of the incident light is dependent on the cosine of the angle between the sun and an imaginary vertical line extending from the ground. The Full Spectrum Quantum PAR sensor is designed to give accurate readings over a wide range of solar position. This is accomplished by recessing the photodiode within a structure that includes an outer wall around a protective diffuser that scatters the light in such a way that the sensor output is accurate. The above left chart shows the cosine response error as a function of the solar angle. This error meets or exceeds the performance of other commercially available sensors.

Specifications

Wavelength Range	400 to 700 nm
Intensity Range	0-3000 µMol/m^2s
Accuracy	±5%
Directional (Cosine Response)	±1%
Field of View	180°
Environmental Rating	IP65

For WatchDog stations and LightScout meters:

Power Supply	3.0 VDC
Resolution	1 µMol/m^2s
Calibration Factor	1 µMol/m^2s = 1 mV

For Other Devices:

Power Supply	2.7 to 3.6 VDC
Calibration Factor	µMol/m^2s = 3000 * Vo/Vi

Warranty

This product is warranted to be free from defects in material or workmanship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

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