



PAR Light Sensor

PRODUCT MANUAL

Item # 3668I, 3668S



Spectrum[®]
Technologies, Inc.

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Thank you for purchasing a PAR Light Quantum Sensor to use with your WatchDog Data Logger. The sensor approximates the radiation between 400 and 700 nanometers, the most influential wavelengths for optimum plant growth.

This manual will aid you in placement and mounting of the sensor. Read it thoroughly to insure proper and effective use.

SPECIFICATIONS

Range	0-3000 $\mu\text{Mol}/\text{m}^2\text{s}$, $\pm 5\%$
Excitation Voltage	3.0-5.0VDC
Sensor Output	0-3.0V
	Linear: $\mu\text{Mol}/\text{m}^2\text{s} = V * 1000$

USE WITH A FIELD SCOUT LIGHT SENSOR READER

You may wish to remove the mounting bracket when using the PAR sensor with a Field Scout Light Sensor Reader. If so, loosen the thumbscrews, and save the parts for reassembly.

Just plug the sensor into the reader, and SET the reader to "PAR SUN" or "PAR ELEC". For more details, see the Field Scout Sensor Reader Manual.

USE WITH A WATCHDOG STATION OR LOGGER

The PAR Light Sensor includes a 6 foot data cable; which is plugged into an available external port on a WatchDog weather station or data logger. Once the sensor is in a representative micro-climate, insert the data cable plug into the WatchDog external channel to log PAR Light data.

INSTALLATION

Use **SpecWare** software to program the WatchDog to log PAR Light on the desired port. Refer to the **SpecWare Instruction Manual** for detailed launch and/or readout instructions. PAR Light Hours and Daily Light Integral can be calculated in SpecWare Software under "Reports".

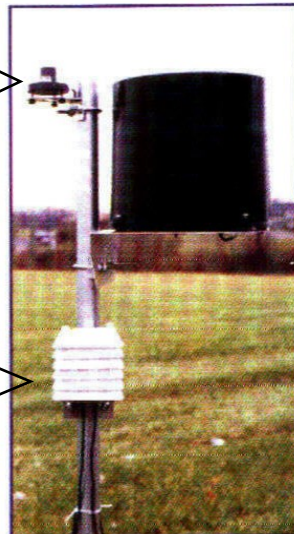
The sensor can be placed above or within plant canopies, as well as in growth rooms and greenhouses. Install the sensor so that it is level. Once the sensor is mounted, use the adjustment screws to level the sensor so that the bubble is centered on the level indicator. Mount the sensor on a 1" to 1¼"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

Inspect the sensors frequently to make certain the sensors are still level and clear of obstructions.

Place PAR Light sensor in a position that it will mimic the sunlight the plant is getting, while being within reach of external WatchDog data port.

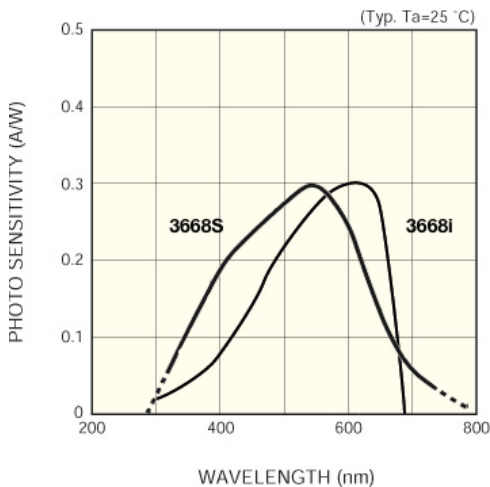
WatchDog Data
Logger inside
mini-radiation
shield



PAR LIGHT

Photosynthesis is driven primarily by photos of light 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 $\mu\text{mol m}^{-2} \text{s}^{-1}$ (the number of photons, in units of micromoles, striking an area one meter square each second). Quantum Light sensors are calibrated to display PPFD.

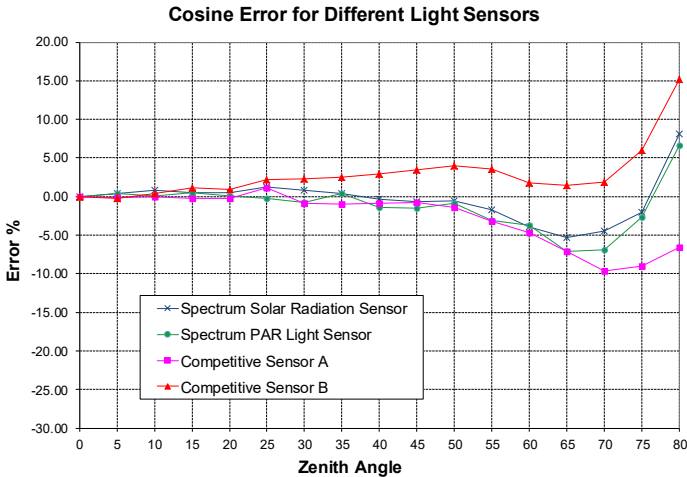
The chart below displays the spectral response of the Quantum Light sensor. The sensor is calibrated for sunlight. Due to the response curves, it does not measure red/blue LED lights accurately. For LED lighting, use the 3668A Full Spectrum PAR sensor instead.



NOTE: When measuring under fluorescent lights values may vary because fluorescent lights flicker on and off 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 FieldScout External Light Sensor Meter (Item #3415FX), the effect is generally not noticeable.

COSINE CORRECTION

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 PAR light sensor is designed to give accurate readings over a wide range of solar position. This is accomplished by recessing the photodiode and building a protective diffuser that scatters the light in such a way that the sensor output is accurate. The following chart shows the cosine response error as a function of the solar angle. This error compares favorably with other commercially available sensors.



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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