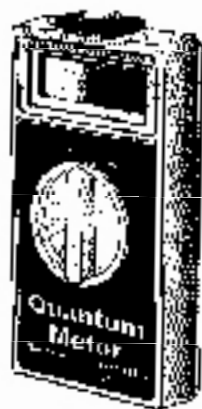




Quantum Meter Owners Manual



Quantum Meter Models

A quantum refers to the amount of energy carried by a photon. Quantum meters approximate the quantity of photons between 400 and 700 nanometers. Photosynthesis is largely driven by the number of photons between these wavelengths, so this radiation is called the Photosynthetic Photon Flux (PPF) and is measured in $\mu\text{mol m}^{-2} \text{s}^{-1}$.

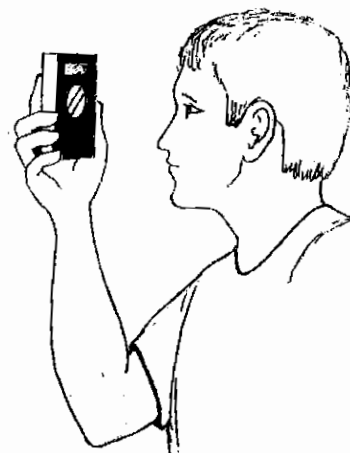
Using the Instrument

1. Turn the dial clockwise to the "on" position.
2. Meter should be kept level, see page 4.
3. The number displayed is the PPF in units of $\mu\text{mol m}^{-2} \text{s}^{-1}$.
4. Turn the meter off after use to conserve battery power.

Handheld Readings

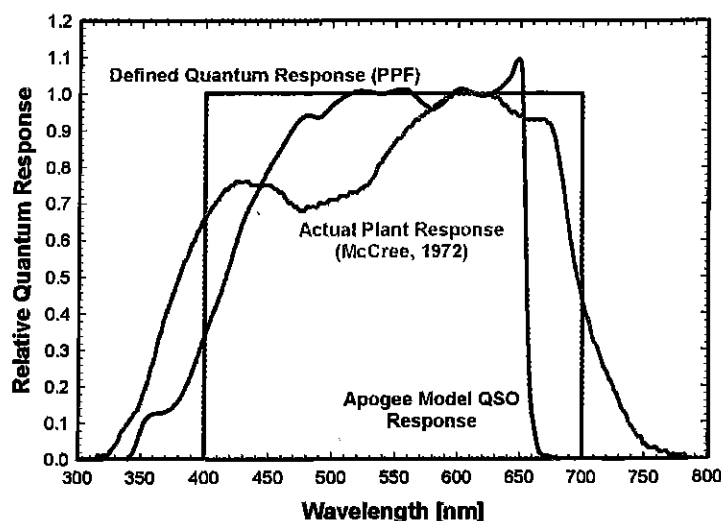
Hold the meter at eye level to avoid shading the sensor.

Keep the sensor as level as possible. Small changes in orientation can cause measurement errors.



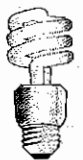
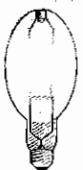


Spectral Response

As shown in the graph below, quantum response by definition is from 400 to 700 nm, and gives equal emphasis to all photons in that range. The spectral response of the sensor, as well as a typical plant response, are also shown.



Calibration

Quantum meters are calibrated for electric light. Average spectral errors are shown below.

	Electric Calibration
 Cool White Fluorescent	0% error
 Metal Halide	0% error
 High Pressure Sodium	6% low
 Sunlight	8% low

Cosine response

Some of the radiation coming into a sensor at low angles is reflected, which causes low readings. The convex optical disc is designed to capture radiation at low angles and minimize cosine response errors. The cosine error for typical applications is less than 2%.

Temperature response

The temperature response is less than 0.1% per degree Celsius. This temperature error is not significant in most applications.

Long-term stability

Our research indicates that the output increases approximately 1% per year because of changes in the optical transparency of the diffusion disk. We recommend returning the sensor for recalibration every 2 years.

Recalibration

Contact Apogee to have your meter recalibrated.

Specifications

Application	Measuring Photosynthetic Photon Flux
Measurement range	0-1999 $\mu\text{mol m}^{-2} \text{s}^{-1}$
Input power	Standard 9 V battery
Operating environment	0 to 50 °C. Less than 90% non-condensing relative humidity up to 30 °C. Less than 70% RH from 30 to 50 °C.
Display	3-1/2 digit, 1.2 cm height
Dimensions	12.6 x 7.0 x 2.4 cm
Mass	150 g
Warranty	1 year parts and labor



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