

Quantum Meter

Owners Manual

Model: BQM

LQM

QMSS

QMSW

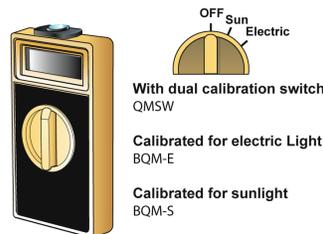
QMSW-SS



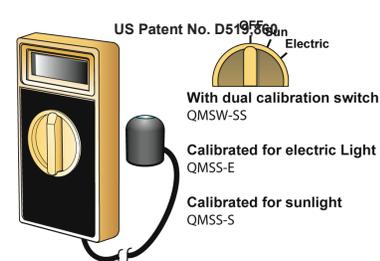
Quantum Meter Models

A quantum refers to the amount of energy carried by a photon. Apogee 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 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

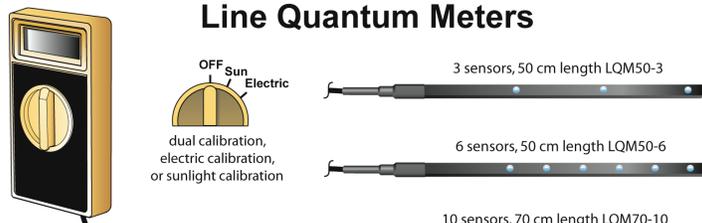
Integral Sensors



Separate Sensors



Line Quantum Meters



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Using the Instrument

1. Turn the dial clockwise to the "on" position. For dual calibration models, turn to "sunlight" or "electric" depending on the current light source. Where both sunlight and electric light are present select "sunlight."
2. Quantum sensors should be kept level. Mount separate sensors and bars on a horizontal surface. Handheld meters should be held vertical, 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.



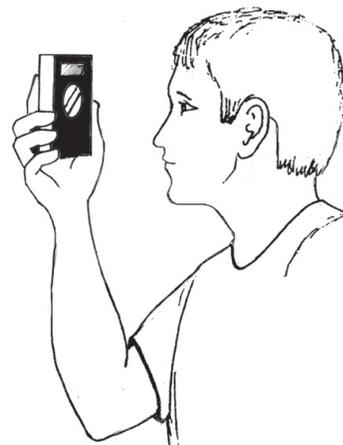
Our leveling plate, Model LEV, is recommended for mounting separate sensors.

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Handheld Readings

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

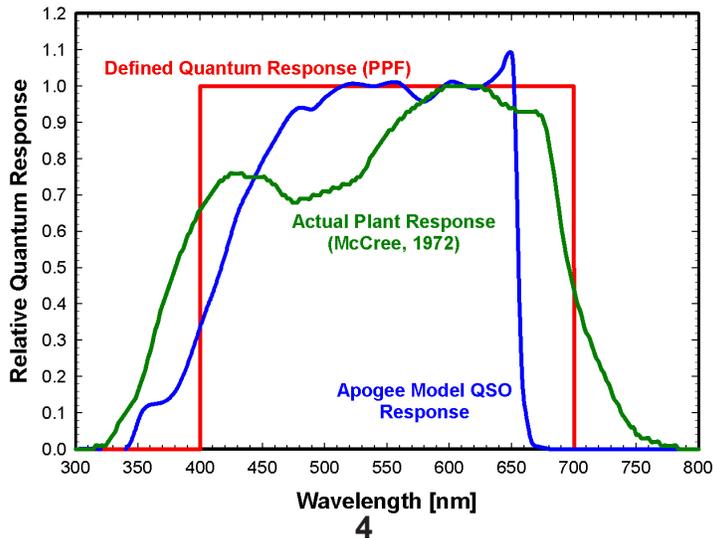
Keep the sensor as level as possible. Small changes in orientation can cause measurement errors.



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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 Apogee sensor, as well as a typical plant response, are also shown.



Calibration

Quantum meters are calibrated for electric light or sunlight. Average spectral errors associated with each calibration are shown below.

		Electric Calibration	Sunlight Calibration
	Cool White Fluorescent	0% error	8% high
	Metal Halide	0% error	8% high
	High Pressure Sodium	6% low	2% high
	Sunlight	8% low	0% error

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Cosine response

Some of the radiation coming into a sensor at low angles is reflected, which causes low readings. The convex optical disc found on meters, sensors, and line quantum sensors, 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 average 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.

✉ techsupport@apogee-inst.com

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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
Cable	For models with separate sensor: 2 meters of shielded, twisted-pair wire with Santoprene casing, ending in pigtail leads. Additional cable *1.95/meter.
Dimensions	12.6 x 7.0 x 2.4 cm
Mass	150 g-BQM, QMSW; 180 g-QMSS, QMSW-SS; 410 g-LQM50-3, LQM50-6; 500 g-LQM-70-10
Warranty	1 year parts and labor



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