



MQ-100, MQ-200, & MQ-300 Series

DESCRIPTION

The MQ-200 has a hand-held meter, attached via cable, that displays and stores measurements. The sensor head features a fully potted, domed-shaped design making it fully waterproof, weatherproof and self-cleaning. Typical applications include PPFD measurement over plant canopies in outdoor environments, greenhouses, and growth chambers, and reflected or under-canopy (transmitted) PPFD measurements in the same environments. Quantum sensors are also used to measure PAR/PPFD in aquatic environments, including salt water aquariums where corals are grown.

The meter has a sample and log mode, and will record an integrated daily total in $\text{mol.m}^{-2}\text{d}^{-1}$. Sample mode will record up to 99 manual measurements. Log mode will power the meter on/off to make a measurement every 30 seconds. Every 30 minutes the meter will average the sixty 30 second measurements and record the averaged value to memory. The meter can store up to 99 averages, once full it will start to overwrite the oldest measurement with new ones. An integrated daily total will be recorded from the 48 averaged measurements (making a 24 hr period). Sample and log measurements can be reviewed on the LCD display or by downloading the data to a computer, however, the integrated daily total can only be viewed by downloading the data to a computer. Downloading data to a computer requires the AC-100 communication cable (a standard USB cable will not work) and Apogee AMS software.



Features:

Multiple Output Options

- Attached hand-held meter
- Separate sensor
- Line quantum meter- 3 sensors
- Line quantum meter- 6 sensors
- Line quantum meter- 10 sensors

Accurate, Stable Measurements

Cosine-corrected with directional errors less than $\pm 5\%$ at a solar zenith angle of 75° . Long-term non-stability less than 2 % per year.

Unique Design

Cost-effective, original quantum sensors work well for broadband radiation sources. The patented, dome-shaped aluminum head is cosine-corrected, self-cleaning, and fully potted for a waterproof design

Line Quantum Sensor Options

Sensors are available with multiple detectors mounted along the length of a rugged anodized aluminum bar, which provide spatially averaged PPFD measurements along the length of the bar.

Typical PPFD Measurement Applications

- Incoming and reflected PPFD over and under plant canopies in greenhouses, in fields, and in growth chambers
- Aquatic environments including salt water aquariums and freshwater lakes and streams

Calibration Traceability

Apogee SQ sensors are calibrated through side-by-side comparison to the mean of four transfer standard sensors under a reference lamp. The reference sensors are recalibrated with a quartz halogen lamp traceable to the National Institute of Standards and Technology (NIST).

DESCRIPTION

Cosine Response

Mean cosine response of twenty-three SQ series quantum sensors. Cosine response measurements were made by direct side-by-side comparison to the mean of four reference thermopile pyranometers, with solar zenith angle-dependent factors applied to convert total shortwave radiation to PPFD.

Spectral Response

Mean spectral response of six SQ series quantum sensors (error bars represent two standard deviations above and below mean) compared to PPFD weighting function. Spectral response measurements were made at 10 nm increments across a wavelength of 300 to 800 nm in a monochromator with an attached electric light source. Measured spectral data from each quantum sensor were normalized by the measured spectral response of the monochromator/electric light combination, which was measured with a spectroradiometer.

MQ-210

| | MQ-100 | MQ-200 | MQ-301 | MQ-303/306 |
|---------------------------------|--|---------------------------|--|--|
| Calibration Uncertainty | $\pm 5 \%$ | | | |
| Measurement Repeatability | Less than 1 % | | | |
| Long-term Drift (Non-stability) | Less than 2 % per year | | | |
| Non-linearity | Less than 1 % (up to $3000 \mu\text{mol m}^{-2} \text{s}^{-1}$) | | | |
| Response Time | Less than 1 ms | | | |
| Field of View | 180° | | | |
| Spectral Range | 410 to 655 nm (wavelengths where response is greater than 50 % of maximum) | | | |
| Directional (Cosine) Response | $\pm 5 \%$ at 75° zenith angle | | | |
| Temperature Response | $0.06 \pm 0.06 \%$ per C | | | |
| Operating Environment | 0 to 50 C; less than 90 % non-condensing relative humidity up to 30 C; less than 70 % non-condensing relative humidity from 30 to 50 C; separate sensors can be submerged in water up to depth of 30 m | | | |
| Meter Dimensions | 113.9 mm height, 59.9 mm width | | | |
| Sensor Dimensions | Integrated with Meter | 24 mm width, 33 mm height | 700 mm length, 15 mm width, 15 mm height | 500 mm length, 15 mm width, 15 mm height |
| Mass | 150 g | 180 g | 380 g | 300 g |
| Cable | 2 m of shielded, twisted-pair wire; additional cable available; TPR jacket (high water resistance, high UV stability, flexibility in cold conditions) | | | |
| Warranty | 4 years against defects in materials and workmanship | | | |

Contact info



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This Instrument is manufactured by our principle company

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