



MQ-210

DESCRIPTION

The MQ-210 quantum meter is designed for underwater PAR measurements and already applies the sensor's immersion effect correction factor to the meter readings through firmware. The meter is excellent for all light sources, except LEDs, where post-measurement correction factors need to be applied to achieve accurate readings. The meter consists of a waterproof quantum sensor attached via waterproof cable to a handheld meter. The waterproof sensor incorporates a blue-enhanced silicon photodiode and custom optical filters with a rugged, anodized aluminum body with acrylic diffuser. The underwater quantum sensor is typically used in salt water aquariums where corals are grown. Note: The handheld meter is not waterproof, only the sensor and cable are waterproof.

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 ApogeeAMS software.



Features:

Accurate, Stable Measurements

Long-term non-stability is determined from multiple replicate quantum sensors in accelerated aging tests and field conditions less than 2 % per year

Ready for Underwater Use

The MQ-210 has the immersion effect correction factor preprogrammed in the meter firmware allowing you to make excellent underwater measurements right out of the box.

Unique Design

The original Apogee quantum sensor works well for broadband radiation sources (sun, high pressure sodium, metal halide, cool white fluorescent lamps). The meter features a waterproof sensor head that is fully-potted for a complete seal and to ensure it has no hollow cavities for water to penetrate and cause measurement errors.

Datalogging Capabilities

The meter records up to 99 manual measurements. In logging mode the meter will make a measurement every 30 seconds. Every 30 minutes the meter will average the sixty 30 second measurements and record the averaged value. The meter can store up to 99 averages.

Calibration Traceability

Apogee SQ sensors are calibrated through side-by-side comparison to the mean of four transfer standard sensors under high output T5 cool white fluorescent lamps. The transfer standard sensors are calibrated through side-by-side comparison to the mean of at least four reference quantum sensors under high output T5 cool white fluorescent lamps traceable to the National Institute of Standards and Technology (NIST).

DESCRIPTION

Mean **cosine response** of twenty-three MQ-210 quantum sensors (error bars represent two standard deviations above and below mean). 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.

Mean spectral response measurements of six MQ-210 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.

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Calibration Uncertainty	± 5 %
Measurement Repeatability	Less than 0.5 %
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	± 5 % at 75° zenith angle
Temperature Response	0.06 ± 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	114 mm length, 60 mm width, 14 mm depth
Sensor Dimensions	24 mm diameter, 33 mm height
Mass	180 g
Cable	2 m of shielded, twisted-pair wire; additional cable available; TPR jacket
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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