



SILICON-CELL PYRANOMETER METERS | MP-100 & MP-200

Features

Output Options

- Attached hand-held meter
- Separate sensor attached via cable

Stable Measurements

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

Unique Design

A patented dome-shaped sensor head keeps the sensor clean and minimizes errors by shedding water. Sensors are housed in a rugged anodized aluminum body and electronics are fully-potted.

Typical Measurement Applications

- Solar panel arrays
- Agricultural, ecological, and hydrological weather networks

Calibration Traceability

Apogee SP sensors are calibrated through side-by-side comparison to the mean of (4) Apogee SP-110 transfer standard sensors under high intensity discharge metal halide lamps. The transfer standard sensors are calibrated through side-by-side comparison to the mean of at least (2) ISO-classified reference pyranometers under sunlight in Logan, UT. Each of (4) ISO-classified reference sensors are recalibrated on an alternating year schedule at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. NREL reference standards are calibrated to the World Radiometric Reference (WRR) in Davos, Switzerland.

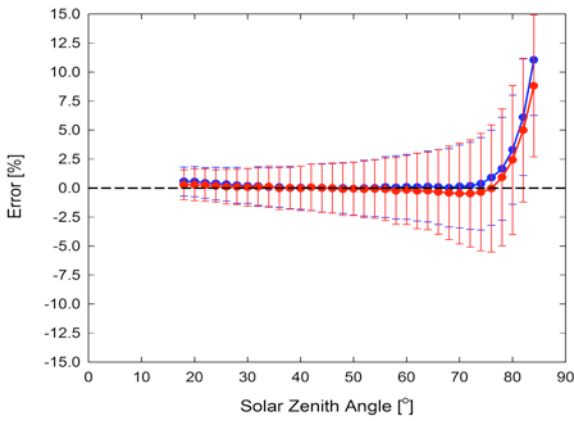


Accurate and stable global shortwave radiation measurement

Product Specifications

	MP-100	MP-200
Calibration Uncertainty	± 5 %	
Measurement Repeatability	Less than 1 %	
Long-term Drift	Less than 2 % per year	
Non-linearity	Less than 1 % up to 1750 W m ⁻²	
Response Time	Less than 1 ms	
Field of View	180°	
Spectral Range	360 to 1120 nm	
Directional (Cosine) Response	± 5 % at 75° zenith angle	
Temperature Response	-0.04 ± 0.04 % 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 depths of 30 m	
Sensor Dimensions	Integrated with Meter	24 mm diameter, 33 mm height
Meter Dimensions	126 cm length, 70 mm width, 24 mm height	
Mass	150 g	180 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	

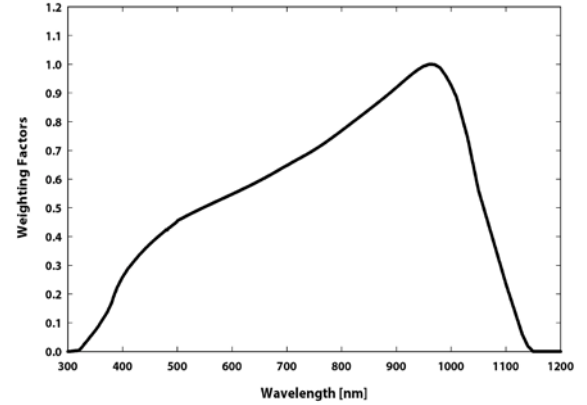
Cosine Response



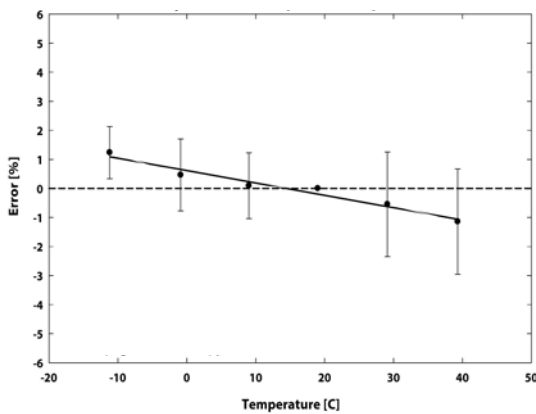
Mean **cosine response** of eleven Apogee silicon-cell pyranometers (error bars represent two standard deviations above and below mean). Cosine response measurements were made during broadband outdoor radiometer calibration (BORCAL) performed during two different years at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. Cosine response was calculated as the relative difference of pyranometer sensitivity at each solar zenith angle to sensitivity at 45° solar zenith angle. The blue symbols are AM measurements; the red symbols are PM measurements.

Spectral response estimate of Apogee silicon-cell pyranometers. Spectral response was estimated by multiplying the spectral response of the photodiode, diffuser, and adhesive. Spectral response measurements of diffuser and adhesive were made with a spectrometer, and spectral response data for the photodiode were obtained from the manufacturer.

Spectral Response



Temperature Response



Mean **temperature response** of ten Apogee silicon-cell pyranometers (error bars represent two standard deviations above and below mean). Temperature response measurements were made at 10 C intervals across a temperature range of approximately -10 to 40 C in a temperature controlled chamber under a fixed, broad spectrum, electric lamp. At each temperature set point, a spectroradiometer was used to measure light intensity from the lamp and all pyranometers were compared to the spectroradiometer. The spectroradiometer was mounted external to the temperature control chamber and remained at room temperature during the experiment.

