



SP-510 & SP-610

DESCRIPTION

The SP-510 is an upward-looking thermopile pyranometer with an analog output of 0 to 114 mV. The sensor incorporates a blackbody thermopile detector and acrylic diffuser with a rugged, self-cleaning sensor housing design. Typical applications include shortwave radiation measurement in agricultural, ecological, and hydrological weather networks. Sensors are also used to optimize photovoltaic systems.

These sensors can also be coupled with our downward facing pyranometer to form an albedometer. For this application, we recommend using our AL-130 Albedometer mounting bracket. Sensor includes IP68 marine-grade stainless-steel cable connector 30 cm from head to simplify sensor removal and replacement for maintenance and recalibration.



Features:

Output Options

- 0 to 114 mV
- Downward sensor available for measuring shortwave reflectance, or combine with an upward head to measure albedo.

Unique Design

The thermopile, blackbody detector results in significant spectral response improvements over silicon-cell pyranometers. A small design keeps the price low and optimizes power requirement for the 0.2 W heater that minimizes errors from dew, frost, and snow.

Accurate, Stable Measurements

Directional errors are less than 30 W m⁻² at 80° solar zenith angle. Long-term non-stability determined from multiple replicate pyranometers in accelerated aging tests and field conditions is less than 2 % per year.

Calibration Traceability

Apogee SP-500 and SP-600 sensors are calibrated through side-by-side comparison to the mean of four Apogee 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 two ISO-classified reference pyranometers under sunlight in Logan, UT. Each of two 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.

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	SP-510-SS	SP-610-SS
Sensitivity (variable from sensor to sensor, typical values listed)	0.057 mV per W m ⁻²	0.15 mV per W m ⁻²
Calibration Factor (reciprocal of sensitivity) (variable from sensor to sensor, typical values listed)	17.5 W m ⁻² per mV	6.7 W m ⁻² per mV
Calibration Uncertainty	± 5 %	
Output Range	0 to 114 mV	0 to 300 mV
Measurement Range	0 to 2000 W m ⁻² (net shortwave radiation)	
Measurement Repeatability	Less than 1 %	
Long-term Drift	Less than 2 % per year	
Non-linearity	Less than 1 %	
Detector Response Time	0.5 s	
Field of View	180°	150°
Spectral Range (50% points)	385 nm to 2105 nm	295 nm to 2685 nm
Directional (Cosine) Response	Less than 30 W m ⁻² at 80° solar zenith	Less than 20 % for angles between 0 and 60°
Temperature Response	Less than 5 % from -15 to 45 C	
Zero Offset A	Less than 5 W m ⁻² ; Less than 10 W m ⁻² (heated)	
Zero Offset B	Less than 5 W m ⁻²	
Uncertainty with Daily Total	Less than 5 %	
Operating Environment	-50 to 80 C; 0 to 100% relative humidity	
Heater	780 Ω, 15.4 mA current draw and 185 mW power requirement at 12 V DC	
Dimensions	28.7 mm height, 23.5 mm diameter	
Mass	90 g	100 g
Cable	5 m of four conductor, shielded, twisted-pair wire; additional cable available in multiples of 5 m; TPR jacket (high water resistance, high UV stability, flexibility in cold conditions); pigtail lead wires	
Warranty	4 years against defects in materials and workmanship	

Contact info



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APPLICATIONS

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

This Instrument is manufactured by our principle company

Apogee Instruments - USA