LI-200SA Pyranometer Sensor

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Total Solar Radiation

The LI-200SA Pyranometer is designed for field measurement of global solar radiation in agricultural, meteorological, and solar energy studies. In clear unobstructed daylight conditions, the LI-COR pyranometer compares favorably with first class thermopile type pyranometers (1, 2), but is priced at a fraction of the cost.

Patterned after the work of Kerr, Thurtell and Tanner (3), the LI-200SA features a silicon photovoltaic detector mounted in a fully cosine-corrected miniature head. Current output, which is directly proportional to solar radiation, is calibrated against an Eppley Precision Spectral Pyranometer (PSP) under natural daylight conditions in units of watts per square meter (w m^{-2}). Under most conditions of natural daylight, the error is <5%.

The spectral response of the LI-200SA does not include the entire solar spectrum (Figure 1), so it must be used in the same lighting conditions as those under which it was calibrated. Therefore, the LI-200SA should only be used to measure unobstructed daylight. It should NOT be used under vegetation, artificial lights, in a greenhouse, or for reflected solar radiation.

LI-200SA Specifications

Calibration: Calibrated against an Eppley Precision Spectral Pyranometer (PSP) under natural daylight conditions. Typical error under these conditions is ± 5%.

Sensitivity: Typically 90 µA per 1000 W m^{-2}.

Linearity: Maximum deviation of 1% up to 3000 W m^{-2}.

Stability: < ± 2% change over a 1 year period.

Response Time: 10 µs.

Temperature Dependence: 0.15% per °C maximum.

Cosine Correction: Cosine corrected up to 80° angle of incidence.

Azimuth: < ± 1% error over 360° at 45° elevation.

Tilt: No error induced from orientation.

Operating Temperature: -40 to 65°C.

Relative Humidity: 0 to 100%.

Detector: High stability silicon photovoltaic detector (blue enhanced).

Sensor Housing: Weatherproof anodized aluminum case with acrylic diffuser and stainless steel hardware.

Size: 2.38 Dia. × 2.54 cm H (0.94" × 1.0").

Weight: 28 g (1 oz).

Cable Length: 3.0 m (10 ft).

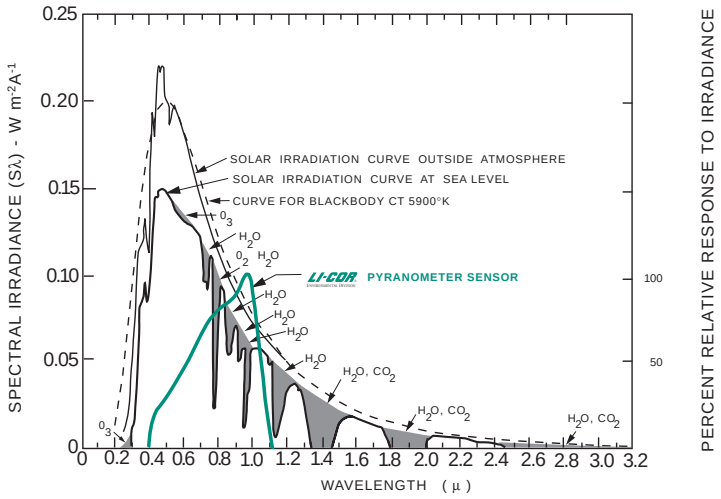

Figure 1. The LI-200SA Pyranometer spectral response is illustrated along with the energy distribution in the solar spectrum (3).

Ordering Information

The LI-200SA Pyranometer Sensor cable terminates with a BNC connector that connects directly to the LI-250 Light Meter or LI-1400 DataLogger. The 2220 Millivolt Adapter should be ordered if the LI-200SA will be used with a strip chart recorder or datalogger that measures millivolts. The 2220 uses a 147 ohm precision resistor to convert the LI-200SA output from microamps to millivolts. The sensor can also be ordered with bare leads (without the connector) designated LI-200SZ. Both are available with 50 foot cables, LI-200SA-50 or LI-200SZ-50. The 2003S Mounting and Leveling Fixture is recommended for each sensor unless other provisions for mounting are made. Other accessories are described on the Accessory Sheet.

LI-200SA Pyranometer
LI-200SZ Pyranometer
LI-200SA-50 Pyranometer
LI-200SZ-50 Pyranometer
2220 Millivolt Adapter
2003S Mounting and Leveling Fixture
2222SB-50 Extension Cable
2222SB-100 Extension Cable

REFERENCES

1. Flowers, E.C. 1978. Comparison of solar radiation sensors from various manufacturers. In: 1978 annual report from NOAA to the DOE.

2. Palmiter, L.S., L.B. Hamilton, M.J. Holtz. 1979. Low cost performance evaluation of passive solar buildings. SERI/RR-63-223. UC-59B.

3. Kerr, J.P., G.W. Thurtell and C.B. Tanner. 1967. An integrating pyranometer for climatological observer stations and mesoscale networks. J. Appl. Meterol. 6:688-694.

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