



APOGEE NET RADIOMETER | SN-500-SS

Accurate measurement in a compact design

Features

High Accuracy

Measure all four components of net radiation with a digital output that saves datalogger channels. Comparable accuracy to industry-leading competition in long-term field testing.

Digital Output

An on-board 24-bit A to D converter makes measurements and provides a digital SDI-12 output. This eliminates the need for multiple analog datalogger channels to measure each of the four components of net radiation.

Compact and Lightweight

The small lightweight design enables easy mounting to a cross arm using the AM-500 mounting bracket that facilitates precision leveling.

Heated Sensors

Each sensor includes a 0.2 W heater to minimize errors from dew, frost, rain, and snow that can block the radiation path.

Typical Applications

Net radiation is a key variable in the surface energy balance and influences turbulent fluxes, including evapotranspiration. Applications include measurements on flux towers and weather stations.



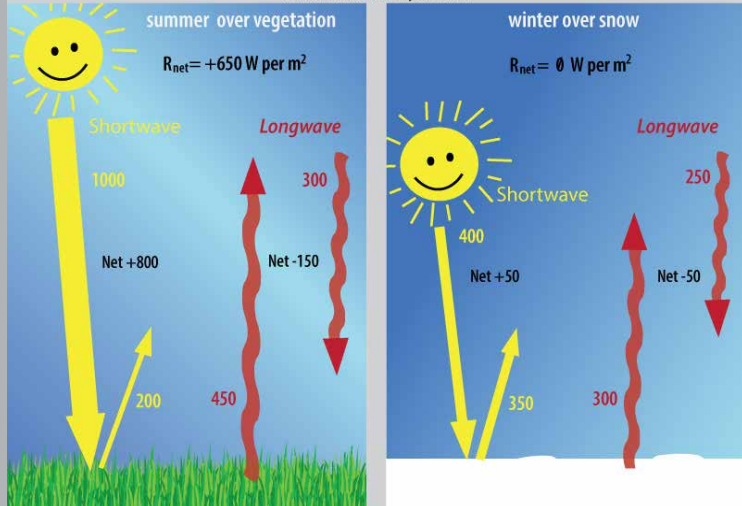
Photo credit: Alaska Electric Light & Power

Product Specifications

| SN-500-SS | |
|---------------------------------------|---|
| Input Voltage Range | 5 to 16 V DC (heaters are optimized to run at 12 V DC) |
| Current Draw (12 V DC Supply Voltage) | Heaters on, communication enabled: 63 mA; Heaters off, communication enabled: 1.5 mA; Heaters off, communication disabled: 0.6 mA |
| Response Time (using SDI-12 Protocol) | 1 s (SDI-12 data transfer rate; detector response times are 0.5 sec) |
| Heaters (sensors individually heated) | 62 mA current draw and 740 mW power requirement at 12 V DC |
| Operating Environment | -50 to 80 C; 0 to 100 % relative humidity |
| Dimensions | 116 mm length, 45 mm width, 66 mm height |
| Mass | 320 g (with mounting rod and 5 m of lead wire) |
| Cable | M8 connector (IP68 rating) to interface to sensor housing; 5 m of four conductor, shielded, twisted-pair wire in a TPR jacket with pigtail lead wires |

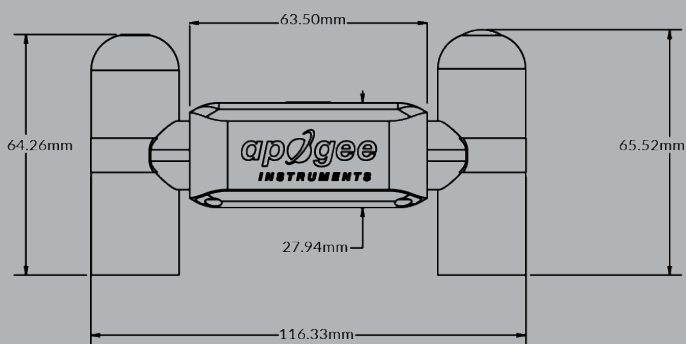
Typical Radiation Fluxes

at solar noon for clear sky conditions

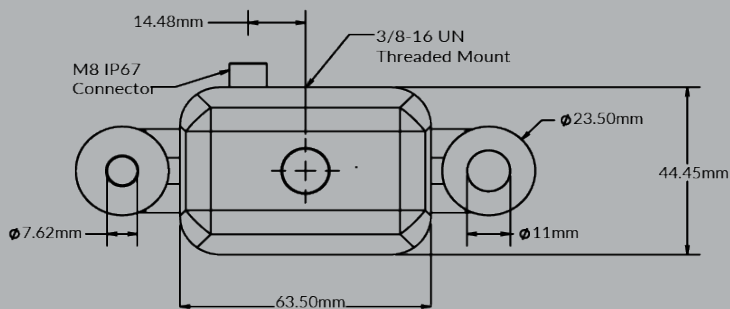


Radiation Fluxes

Net radiation is the sum of the four components shown to the left (incoming shortwave, outgoing shortwave, incoming longwave, outgoing longwave). Incoming shortwave incident on the surface is either reflected or absorbed by the surface material, and longwave radiation is emitted from the surface and emitted from the molecules of air in the atmosphere. Typical clear sky summer fluxes over grass and clear sky winter fluxes over snow are shown. A typical summer flux at solar noon would be $+650 \text{ W m}^{-2}$; in winter it would be 0 W m^{-2} .



Dimensions



Product Specifications

SL-500 Series

| | |
|--|--|
| Sensitivity | 0.12 mV per W m^{-2} (variable from sensor to sensor, typical value listed) |
| Calibration Factor (Reciprocal of Sensitivity) | 8.5 W m^{-2} per mV |
| Calibration Uncertainty | $\pm 5 \%$ |
| Measurement Range | -200 to 200 W m^{-2} (net longwave irradiance) |
| Measurement Repeatability | Less than 1 % |
| Long-term Drift | Less than 2 % change in sensitivity per year |
| Non-linearity | Less than 1 % |
| Response Time | Less than 0.5 s |
| Field of View | 150° |
| Spectral Range | 5 to $30 \mu\text{m}$ (50 % points) |
| Temperature Response | Less than 5 % from -15 to 45 C |
| Window Heating Offset | Less than 10 W m^{-2} |
| Zero Offset B | Less than 5 W m^{-2} |
| Tilt Error | Less than 0.5 % |
| Uncertainty in Daily Total | $\pm 5 \%$ |
| Temperature Sensor | 30 k Ω thermistor, $\pm 1 \text{ C}$ tolerance at 25 C |
| Output from Thermistor | 0 to 2500 mV (typical, other voltages can be used) |
| Input Voltage Requirement for Thermistor | 2500 mV excitation (typical, other voltages can be used) |

SP-500 Series

| | |
|--|---|
| Sensitivity (variable from sensor to sensor) | 0.057 mV per W m^{-2} (upward); 0.15 mV per W m^{-2} (downward); (typical values listed) |
| Calibration Factor (Reciprocal of Sensitivity) | 17.5 W m^{-2} per mV (upward); 6.7 W m^{-2} per mV (downward) |
| Calibration Uncertainty | $\pm 5 \%$ |
| Output Range | 0 to 114 mV (upward); 0 to 300 mV (downward) |
| Measurement Range | 0 to 2000 W m^{-2} (net shortwave irradiance) |
| 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° (upward); 150° (downward) |
| Spectral Range | 385 nm to 2105 nm (upward); 295 to 2685 nm (downward) |
| Directional (Cosine) Response | Less than 30 W m^{-2} at 80° solar zenith (upward); Less than 20 % for angles between 0 to 60° (downward) |
| 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 in Daily Total | Less than 5 % |