

**SR20-T2-L****ISO Class A Pyranometer with 10K Thermistor**

## High Measurement Accuracy

Ideal for PV system performance monitoring

### Overview

The SR20-T2, manufactured by Hukseflux Thermal Sensors, is an ISO 9060:2018 spectrally flat Class A (secondary standard) pyranometer that measures solar short-wave radiation in a full hemisphere of the sky. It has a built-in case temperature sensor and embedded heater for removing dew and light rain. It connects directly to a Campbell Scientific data logger and is

designed for applications that require high measurement accuracy in demanding applications such as scientific meteorological observation networks and utility scale solar-energy-power production sites.

### Benefits and Features

- › Low temperature dependence
- › Embedded 1.5 W heater to reduce effects of dew deposition
- › Embedded 10K temperature sensor
- › Ultra robust connector, desiccant holder, and sun screen
- › Temperature dependence characterized and supplied for each instrument
- › Directional response tested on each instrument

### Detailed Description

The SR20-T2 pyranometer measures the hemispherical solar radiation received by a plane surface, in  $\text{W/m}^2$ , from a  $180^\circ$  field of view. The SR20 can be deployed indoors with lamp-based solar simulators or more commonly outdoors under the sun. Its orientation depends on the application and may be installed horizontally, tilted for plane or array irradiance, positioned on a sun tracker with shadow-ring for diffuse measurements, or inverted for reflected radiation.

The SR20-T2's low temperature dependence makes it an ideal candidate for use under very cold and very hot conditions. The temperature dependence of each instrument is tested and

supplied as a second-degree polynomial. This information can be used for further reduction of temperature dependence during post-processing.

The SR20 is equipped with an internal temperature sensor. Campbell Scientific supplies the T2 version, which has a 10 kohm thermistor. The T1 version, in contrast, has a PT100 and is available upon request.

The embedded heater reduces measurement errors caused by early-morning dew deposition. Campbell Scientific



recommends using the instrument in accordance with the recommended practices of ISO, WMO and ASTM.

The output of the SR20-T2 is analog. The SR20-D2-L model, in contrast, offers two other types of commonly used irradiance outputs: digital via Modbus RTU over 2-wire RS-485, and analog 4 to 20 mA output (current loop).

## Specifications

Sensor	High-quality blackened thermopile protected by two glass domes
Measurement Description	Measures hemispherical solar radiation
ISO Classification	Spectrally flat Class A (secondary standard) pyranometer (ISO 9060:2018 )
WMO Performance Level	High-quality pyranometer
Response Time	3 s (95%)
Zero Offset A	5 W/m <sup>2</sup> (unventilated), 2.5 W/m <sup>2</sup> (ventilated) (response to 200 W/m <sup>2</sup> net thermal radiation)
Zero Offset B	≤ -2 W/m <sup>2</sup> (response to 5 K/h change in ambient temperature)
Non-Stability	≤ -0.5% change per year
Non-Linearity	≤ -0.2% (100 to 1000 W/m <sup>2</sup> )
Directional Response	< ±10 W/m <sup>2</sup>

Spectral Selectivity	< ±3% (0.35 to 1.5 x 10 <sup>-6</sup> m)
Temperature Response	< ±1% (-10° to +40°C), < 0.4% (-30° to +50°C) with correction in data processing
Tilt Response	< ±0.2% (0 to 90° at 1000 W/m <sup>2</sup> )
Heater	1.5 W (at 12 Vdc)
Steady-state Zero Offset	0 to -8 W/m <sup>2</sup> (caused by heating)
Calibration Uncertainty	< 1.2% (k=2)
Level Accuracy	< 0.1° (bubble entirely in ring)
Sensor Resistance Range	100 to 200 ohm
Operating Temperature Range	-40° to +80°C
Field of View (FOV)	180°
Measurement Range	0 to 4000 W/m <sup>2</sup>
Sensitivity	7 to 25 x 10 <sup>-6</sup> V/(W/m <sup>2</sup> )
Spectral Range	285 to 3000 x 10 <sup>-9</sup> m (20% transmission points)