

SR20-TR

Secondary standard pyranometer with 4-20 mA transmitter

SR20-TR is a solar radiation sensor of the highest category in the ISO 9060 classification system: secondary standard. It should be used where highest measurement accuracy is required. SR20-TR houses a 4-20 mA transmitter for easy read-out by dataloggers commonly used in the industry.



Figure 1 SR20-TR secondary standard pyranometer with 4-20 mA transmitter

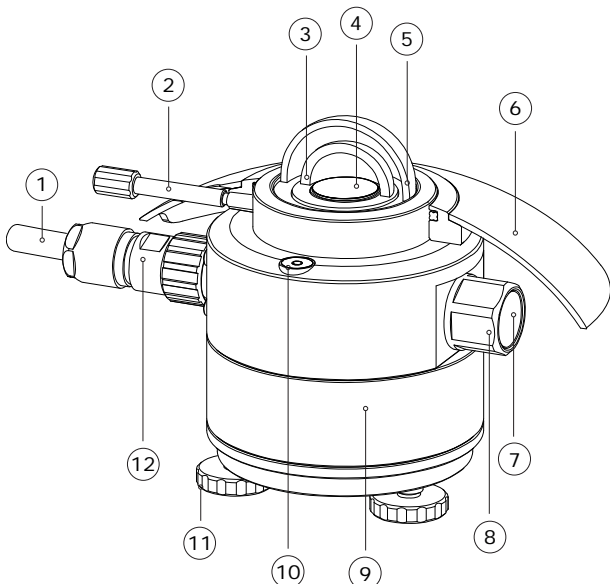


Figure 2 overview of SR20-TR:
 (1) cable, (2) fixation of sun screen, (3) inner dome,
 (4) thermal sensor with black coating, (5) outer dome,
 (6) sun screen, (7) humidity indicator, (8) desiccant holder,
 (9) transmitter housing, (10) bubble level,
 (11) levelling feet, (12) connector

Introduction

SR20-TR measures the solar radiation received by a plane surface, in W/m^2 , from a 180° field of view angle. SR20-TR enables you to attain the highest measurement accuracy and excels in demanding applications. Output of the sensor is 4-20 mA, complying with industry standards. After a thorough programme of acceptance testing, SR20-TR secondary standard pyranometer was released February 2013.

Improved measurement accuracy

In order to improve overall measurement accuracy, Hukseflux effectively targeted two major sources of measurement uncertainty: calibration and "zero offset a".

The initial calibration uncertainty is reduced to less than 1.2 %, an improvement of 15 % relative to competing models. The "zero offset a" specification of SR20-TR is $5 W/m^2$ unventilated. Competing models state $12 W/m^2$ unventilated and $7 W/m^2$ ventilated.

Demanding applications

SR20-TR's low temperature dependence makes it an ideal candidate for use under very cold and very hot conditions. The temperature dependence of every individual 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 incorporated heater reduces measurement errors caused by early-morning dew deposition.

Operation

Using SR20-TR is easy. The pyranometer can be connected directly to commonly used data logging systems. The irradiance in W/m^2 is calculated by using the transmitter's output. In SR20-TR's standard configuration, the 4 to 20 mA output corresponds to a transmitted range of 0 to $1600 W/m^2$. This range can be adjusted at the factory upon request.

SR20-TR design

SR20-TR pyranometer uses a state of the art thermopile sensor with black coated surface, two domes and an anodised aluminium body, which also houses the transmitter. The connector, desiccant holder and sun screen fixation are ultra robust and designed for industrial use. All parts are specified for use across SR20-TR's entire rated operating temperature range.



Figure 3 SR20-TR side view

Suggested use

- PV system performance monitoring
- scientific meteorological observations
- reference instrument for comparison
- extreme climates (tropical / polar)

Choosing the right instrument

Pyranometers are subject to classification in three classes according to ISO 9060. From second class to first class and from first class to secondary standard, the achievable accuracy improves by a factor 2. Measurement accuracy does not only depend on instrument properties, but also on measurement conditions. A very accurate instrument will quickly underperform without a regular schedule of maintenance. Our pyranometer [selection guide](#) assists you in choosing the right instrument. Whatever your application is: Hukseflux offers the highest accuracy in every class at the most attractive price level.

Standards

Applicable instrument classification standards are ISO 9060 and WMO-No. 8. Included in delivery as required by ISO 9060: test certificates for temperature response and directional response. Calibration is according to ISO 9847. PV related standards are ASTM E2848 and IEC 61724.

SR20-TR specifications

Measurand	hemispherical solar radiation
ISO classification	secondary standard pyranometer
Calibration uncertainty	< 1.2 % (k = 2)
Zero offset	5 W/m ² unventilated
Calibration traceability	to WRR
Spectral range	285 to 3000 x 10 ⁻⁹ m
Transmitted range	0 to 1600 W/m ²
Rated operating temperature range	-40 to +80 °C
Temperature response	< ± 1 % (-10 to +40 °C) < ± 0.4 % (-30 to +50 °C) with correction in data-processing
Temperature response test of individual instrument	report included
Directional response test of individual instrument	report included
Temperature sensor	Pt100 or 10 kΩ thermistor
Heater	1.5 W at 12 VDC
Standard cable length	5 m

Options

- longer cable, in multiples of 5 metres
- adapted transmitted range

See also

- [SR20](#) secondary standard pyranometer with linear millivolt output
- [SR20-D1](#) digital secondary standard pyranometer – Modbus protocol
- view our complete [product range of solar sensors](#)

About Hukseflux

Hukseflux Thermal Sensors, founded in 1993, aims to advance thermal measurement. We offer a complete range of sensors and systems for measuring heat flux, solar radiation and thermal conductivity. We also provide consultancy and services such as performing measurements and designing instrumentation according to customer requirements. Hukseflux is ISO 9001:2008 certified. Customers are served through the main office in Delft in the Netherlands, and locally owned representations in the USA, Brazil, India, China and Japan.

Interested in this product?
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