SR20-D2

Digital Class A pyranometer with Modbus RTU and 4-20 mA output

SR20-D2 is a solar radiation sensor of the highest category in the ISO 9060 classification system: spectrally flat Class A. SR20-D2 is designed for the solar PV industry, offering two types of commonly used irradiance outputs: digital via Modbus RTU over RS-485 and analogue 4-20 mA (current loop). Pyranometer users prefer pyranometers for their unsurpassed measurement accuracy and their lowest total cost of ownership.


Figure 2 *To reduce total cost of ownership: make use of the worldwide Hukseflux calibration organisation.*

Introduction

SR20-D2 measures the solar radiation received by a plane surface, in W/m², from a 180° field of view angle. It is employed where the highest measurement accuracy is required. SR20-D2 offers two types of outputs commonly used in the solar PV industry: digital via Modbus RTU over RS-485 and analogue 4-20 mA (current loop). These industry standards allow for easy data acquisition, easy read-out and error-free instrument exchange when using SR20-D2.

SR20-D2 benefits

- digital output: easy implementation & servicing
- best-in-class temperature response < ± 0.4 % (-30 to +50 °C), best "zero offset a" and best calibration uncertainty
- test certificates for temperature- and directional response included
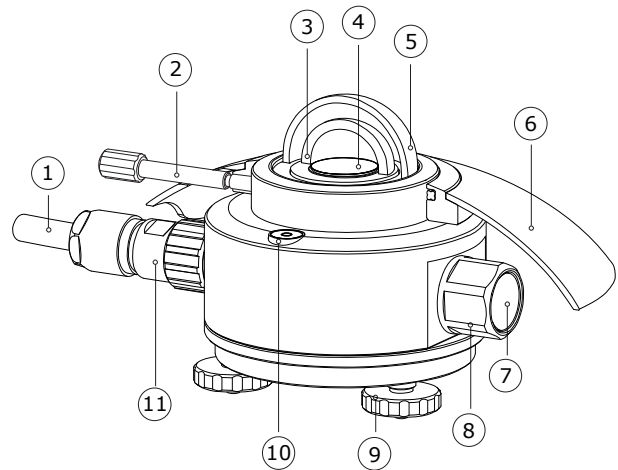
Figure 3 *Overview of SR20-D2:*
(1) cable, (2) fixation of sun screen, (3) inner dome, (4) thermal sensor with black coating, (5) outer dome, (6) sun screen, (7) humidity indicator, (8) desiccant holder, (9) levelling feet, (10) bubble level, (11) connector.

Standards

Applicable instrument classification standards are ISO 9060 and WMO-No. 8.

Choosing the right instrument

Pyranometers are subject to classification in three classes according to ISO 9060. From Class C to Class B and from Class B to Class A, 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.

Figure 4 *SR20-D2 Class A pyranometers with digital output for GHI (Global Horizontal Irradiance) and POA (Plane of Array) measurements.*

Hukseflux Sensor Manager software

For communication between a PC and SR20-D2, the Hukseflux Sensor Manager software can be used. It allows the user to plot and export data, and change the SR20-D2 Modbus address and its communication settings.
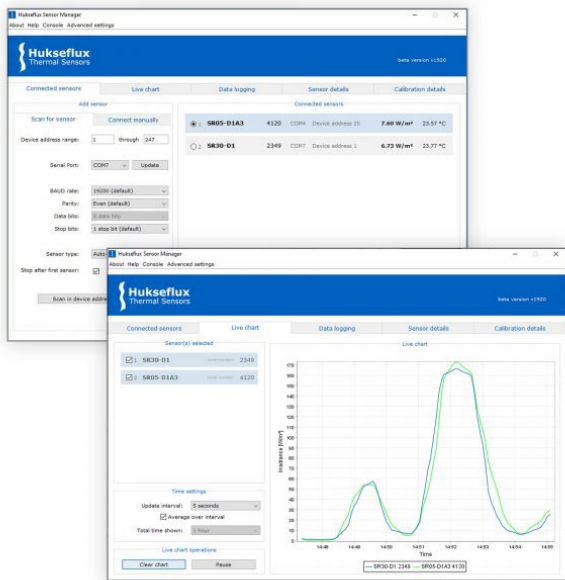
Figure 5 *User interface of the Hukseflux Sensor Manager.*

Suggested use

- PV system performance monitoring
- all networks with regular instrument exchange

Figure 6 *SR20-D2 side view.*

See also

- SR30 digital spectrally flat Class A pyranometer with heating and tilt sensor
- SR20 analogue Class A pyranometer with millivolt output
- alternative instruments: SR15 and SR05 for lower accuracy measurements
- PMF01 and PMF02 pyranometer mounting fixtures, also for POA (Plane of Array)
- the making of SR20 documented
- view our complete product range of solar sensors

Figure 7 *VU01 ventilation unit with SR20 pyranometer.*

SR20-D2 specifications

Measurand	hemispherical solar radiation
ISO 9060:2018	spectrally flat Class A pyranometer
ISO 9060:1990	secondary standard pyranometer
WMO performance level	high quality pyranometer
IEC 61724-1 compliance	with VU01: meets Class A PV monitoring system requirements
Calibration uncertainty	< 1.2 % (k = 2)
Zero offset a	5 W/m^2 unventilated 2.5 W/m^2 ventilated
Calibration traceability	to WRR
Spectral range	285 to 3000 x 10^{-9} m
Rated operating temperature range	-40 to +80 ºC
Temperature response	< ± 0.4 % (-30 to +50 °C)
Heater	no heating
Temperature response test of individual instrument	report included
Directional response test of individual instrument	report included to 95 ˚
Standard cable length	5 m
Rated operating voltage range	5 to 30 VDC
Power consumption	< 75 x 10^{-3} W at 12 VDC

Digital communication

Digital output	- irradiance in W/m^2 - instrument body temperature in ºC
Communication protocol	Modbus
Hardware interface	2-wire (half duplex) RS-485
Transmission mode	RTU

4-20 mA output

Output	irradiance in W/m^2
Transmitted range of 4-20 mA output	0 to 1600 W/m^2
Rated operating voltage range of 4-20 mA output	5.5 to 40 VDC
Power consumption	
- main supply	< 75 x 10^{-3} W at 12 VDC
- 4-20 mA current loop	< 40 x 10^{-3} W at 12 VDC, with recommended 100 Ω shunt resistor

Levelling mounts

There are several mounting options available for SR20. They allow for simplified mounting, levelling and instrument exchange on a flat surface or a tube.

Options

- longer cable, in multiples of 5 metres
- adapted transmitted range for 4-20 mA output
- ventilated with VU01 ventilation unit
- PMF series mounting fixtures
- AMF albedo mouting fixture

About Hukseflux

Hukseflux is the leading expert in measurement of energy transfer. We design and manufacture sensors and measuring systems that support the energy transition. We are market leaders in solar radiation- and heat flux measurement.
Customers are served through the main office in the Netherlands, and locally owned representations in the USA, Brazil, India, China, Southeast Asia and Japan.

SR20-D2 digital Class A pyranometer

This overview summarises the main features and benefits of SR20-D2. Customers prefer Hukseflux pyranometers for their unsurpassed measurement accuracy and their lowest total cost of ownership.

Best measurement accuracy
- spectraly flat
- low zero offsets
- low calibration uncertainty
- best temperature response

Lowest total cost of ownership
- efficient worldwide calibration support
- ISO/IEC 17025 calibration available
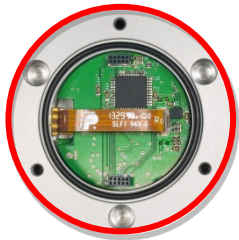- fast servicing organisation

Best connector
- interchangeable cables
- IP67 grade
- for industrial use

Best desiccant cartridge
- visible indicator of instrument health
- rugged aluminium design
- serviceable by user

Best digital interface
- industry standard output types
- Modbus RTU over 2-wire RS-485
- 4-20 mA (current loop)
- registers for re-calibration accessible to users

Best humidity protection
- wrench-operated
- o-ring compressed to spec
- desiccant service interval > 2 years