Hukseflux
Thermal Sensors

# SRA20-D2

## Digital Class A albedometer

*SRA20-D2 albedometer is an instrument that measures global and reflected solar radiation and the solar albedo, or solar reflectance, with the highest accuracy. It is composed of two SR20-D2 spectrally flat Class A pyranometers and one AMF02 albedometer mounting kit. AMF02 includes one glare screen, one mounting fixture with rod, mounting hardware and tools. Each pyranometer offers two types of commonly used irradiance outputs: digital via Modbus RTU over RS-485 and analogue 4-20 mA (current loop). Individually tested for temperature and directional response, SRA20-D2 is an extremely accurate digital Class A albedometer. SRA20-D2 complies with the latest ISO and WMO standards. The modular design facilitates maintenance and calibration.*

**Figure 1** *SRA20-D2 Class A albedometer.*

## The best albedometer for the PV industry

SRA20-D2 is the most accurate digital Class A albedometer available. Its benefits:

- digital outputs: 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 as required by ISO 9060
- modular; can be calibrated as separate pyranometers

## Suggested use

- PV monitoring with bifacial solar modules
- high-accuracy meteorological observations
- building physics, roof reflectance studies extreme climates (tropical / polar)

## Albedo and albedometers

Albedo, also called solar reflectance, is defined as the ratio of the reflected to the global radiation. The solar albedo depends on the directional distribution of incoming radiation and on surface properties at ground level. Albedos of typical surfaces range from about 4 % for fresh asphalt, and 15 % for green grass to 90 % for fresh snow.

Using SRA20-D2 albedometer is easy. The instrument is composed of two SRA20-D2 digital Class A pyranometers; the upfacing one measuring global solar radiation, the downfacing one measuring reflected solar radiation. SRA20-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 SRA20-D2. The working principle and specifications of the pyranometers can be found in the SR20-D2 user manual. We recommend to use SRA20-D2 in particular in applications where the highest measurement accuracy is required.

## SRA20-D2 design

SRA20-D2 consists of two identical pyranometers model SR20-D2, one facing up, one facing down. The two sensors should be ordered with one AMF02 albedometer mounting kit. AMF02 includes a fixture with rod for mounting purposes and a glare screen. The user assembles these modular components into SRA20-D2 albedometer. SRA20 can be ordered optionally with longer cables. SRA20-D2, including its sun screen fixation, connector and desiccant holder, is very robust. The albedometer has an incorporated temperature sensor.

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## Demanding applications

Albedometers are used for general meteorological observations, building physics, roof reflectance studies, climate studies and solar collector testing. A common application is for outdoor solar radiation balance measurements as part of a meteorological station. This application requires horizontal levelling; a bubble level and a mounting rod are included. SRA20-D2 is suited for use in extreme climates.

## Hukseflux Sensor Manager software

For communication between a PC and SRA20-D2, the Hukseflux Sensor Manager software is included. It allows the user to plot and export data, and change the SRA20-D2 Modbus address and its communication settings.

## Spectrally flat

For the reflected solar radiation measurement, it is essential to employ spectrally flat pyranometers; the reflected solar radiation has a different spectrum compared to the global solar radiation. SRA20 has spectrally flat sensors on board, they can measure global and relected solar radiation using the same instrument with the same calibration.

## Options

- longer cables, in multiples of 5 m, cable lengths above 20 m in multiples of 10 m

## See also

- AMF02 albedometer mounting kit
- SR20-D2 digital pyranometer
- ALF01 albedometer levelling fixture
- CMF01 crossarm mounting fixture for albedometers
- SRA30-D1 spectrally flat Class A albedometer for higher accuracy albedo measurements
- alternative instrument: NR01 for solar and longwave radiation balance

## 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.

Interested in this product?
E-mail us at: info@hukseflux.com

## SRA20-D2 specifications

| | |
|---|---|
| Measurand | global solar radiation and reflected solar radiation |
| Optional measurand | albedo or solar reflectance |
| Optional measurand | net solar radiation |
| Included sensors | 2 x identical ISO 9060 spectrally flat Class A pyranometer |
| Mounting | mounting rod with 15 x $10^{-3}$ m diameter |
| Calibration uncertainty | < 1.2 % (k = 2) |
| Calibration traceability | to WRR |
| Measurement range | 0 to 2000 W/m$^2$ |
| Spectral range | 285 to 3000 x $10^{-9}$ m |
| Rated operating temperature range | -40 to +80 °C |
| Temperature response | <± 0.4 % (-30 to +50 °C) |
| Temperature response test and directional response test | reports included |
| Standard cable length | 2 x 5 m (see options) |
| Rated operating voltage range | 5 to 30 VDC |
| Power consumption | < 150 x $10^{-3}$ W at 12 VDC (in total) |

## Digital communication

| | |
|---|---|
| Digital output | - irradiance in W/m$^2$<br>- instrument body temperature in °C |
| Communication protocol | Modbus |
| Transmission mode | RTU |
| Hardware interface | 2-wire (half duplex) RS-485 |

## 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 | < 150 x $10^{-3}$ W at 12 VDC (in total) |
| - 4-20 mA current loop | < 80 x $10^{-3}$ W at 12 VDC, with recommended 2 x 100 Ω shunt resistors |

## Sensors

(2 x) SR20-D2 spectrally flat Class A pyranometer

## Included with AMF02

(1 x) glare screen
(1 x) fixture with rod
(2 x) o-ring
(1 x) conical positioner
(2 x) plug (pre-mounted)
(2 x) M5x12 socket head cap screw