

HUKX

Sensor
Technology

Brochure

Industrial Class A and Class B
albedometers

SRA300-D1
SRA200-D1
SRA100-D1

SRA300-D1, SRA200-D1, SRA100-D1 Industrial Class A pyranometer and Class B albedometers

Hukx introduces “industrial-grade” albedometers. The all-digital Class A models SRA300-D1 and SRA200-D1, and Class B model SRA100-D1 albedometers are engineered to measure global and reflected solar radiation and solar albedo, also called solar reflectance, with the utmost reliability and measurement accuracy. Besides, Hukx offers other albedometer models with non-digital output signals and a lower – Class C – accuracy class.

- the right albedometer for every application and budget
- main applications: PV system performance monitoring and meteorology
- integrated surge protection, designed to withstand the extreme conditions encountered on PV power plants and meteorological stations, upgradable to 4 kV with optional SPD01 Surge Protection Device
- complies with the latest ISO and WMO standards
- the modular design facilitates maintenance and calibration

Figure 1 Industrial albedometer model SRA300-D1.



Albedo and albedometers

An albedometer is an instrument that measures both global and reflected solar radiation and, by calculation, the solar albedo, or solar reflectance for a particular ground surface. An albedometer is composed of two pyranometers, both installed horizontally, the downfacing one measuring reflected solar radiation.

In the open field, the solar albedo depends on the directional distribution of incoming radiation and on surface properties at ground level. It is usually expressed as a single number, determined by taking an average over a day with solar elevation $> 10^\circ$. Changes of albedo are typically slow and seasonal, except when it snows. Albedos of typical surfaces range from about 4 % for fresh asphalt and 15 % for green grass to 90 % for fresh snow.

SRA300-D1, SRA200-D1 and SRA100-D1 design

To create an albedometer, two sensors are combined with one [AMF03](#) albedometer mounting kit. AMF03 includes a fixture with a rod for mounting purposes and a glare screen. The user assembles these modular components into an albedometer. The modular design facilitates maintenance and calibration.

Using the albedometer is easy. The instrument is composed of two pyranometers. The irradiance in W/m^2 is transmitted via the Modbus protocol over 2-wire RS-485. The working principle and specifications of the pyranometers can be found in the pyranometer user manuals. The pyranometers can be connected directly to commonly used data logging and SCADA systems.

Industrial-grade, high-accuracy and reliable

SRA300-D1 consists of two identical pyranometer models SR300-D1, one facing up, one facing down. SRA200-D1 consists of two SR200-D1's, SRA100-D1 consists of two SR100-D1's.

SR300-D1 complies with industrial-grade immunity, emission, electrical, environmental, and safety requirements for use in these outdoor industrial environments, significantly improving measurement reliability. Ease of operation is further enhanced through advanced functionality and diagnostics. See Table 1 for a comparison of the pyranometer properties.

Table 1 The building blocks of SRA300-D1, SRA200-D1 and SRA100-D1 albedometers are respectively the SR300-D1, SR200-D1 and SR100-D1 pyranometers. In the table below, the main specifications are compared.

Instrument specifications			
	SR300-D1	SR200-D1	SR100-D1
ISO 9060:2018 classification	spectrally flat Class A	spectrally flat Class A	spectrally flat Class B
IEC 61724-1:2021 compliance for solar irradiance measurement	meets Class A PV monitoring system requirements	meets Class A PV monitoring system requirements	meets Class B PV monitoring system requirements
	for all locations and climatic conditions	for locations where dew and frost are expected for < 2 % of annual GHI hours	for all locations and climatic conditions
dew and frost mitigation	heating included	-	-
IEC 61724-1:2021 compliance for single-axis tracker and pyranometer tilt angle measurement	meets Class A PV monitoring system requirements	-	-
tilt measurement	tilt measurement included	-	-
manufacturer's estimate of achievable measurement accuracy for daily sums, of global horizontal solar irradiance following ASTM G213 uncertainty evaluation*	2.3 %	2.4 %	4.6 %
on-site diagnostics power and communication status LED	•	-	-
remote diagnostics alerts instrument leakage	•	-	-
heating malfunction	•	-	-
change of tilt and rotation	•	-	-

remote diagnostics

measurements

internal humidity

internal pressure

instrument tilt and rotation

•	•	•
•	-	-
•	-	-

* in summer at mid-latitudes, instruments used under rated operating conditions, expanded measurement uncertainties $k = 2$

SR300-D1

SR300-D1 is intended for deployment where the highest measurement reliability and accuracy are required. Most importantly, it is heated to mitigate dew and frost, and has an on-board tilt sensor.

Surge protection in industrial environments: immunity to high-impulse voltages & currents

SR300-D1, SR200-D1 and SR100-D1 are tested and classified for Industrial Environments according to IEC 61326-1 and IEC 61000-6-2. When designing a measuring system, pyranometer users may reach several levels of immunity. With the optional Surge Protection Device **SPD01** this immunity can be increased to 4 kV.



Figure 2 The SPD01 Surge Protection Device.

Optional accessories

We offer accessories for use with the SRA300-D1, SRA200-D1 and SRA100-D1, including electrical and mounting hardware options.

- **SPD01** Surge Protection Device to upgrade Surge Protection to level 4 (for up to 3 pyranometers) for cables longer than 3 meters
- **ALF01** albedometer levelling fixture
- **CMF01** crossarm mounting fixture

ALF01

ALF01 is a levelling tool that can be used with AMF03 to easily level the instrument. The ALF01 is mounted on a 1 inch outer diameter crossarm, and can be rotated around the tube axis for 360 ° as well as tilted over $\pm 2^\circ$.



Figure 3 ALF01 albedometer leveling tool.



Figure 4 Using the SRA300-D1 albedometer is easy; the instrument is composed of one AMF03 and two SR300-D1 pyranometers.

See also

- [SR300-D1](#), [SR200-D1](#) and [SR100-D1](#) pyranometers
- [SRA01](#) spectrally flat Class C albedometer for lower accuracy albedo measurements
- alternative instrument: [NR01](#) for solar and longwave radiation balance
- introduction of SR300-D1 on [our YouTube channel](#)
- why [ventilate and heat pyranometers](#)
- view our complete [range of solar sensors](#)

SRA300-D1, SRA200-D1 and SRA100-D1 specifications

General specifications

included	2 x SR300-D1 or 2 x SR200-D1 or 2 x SR100-D1 and 1 x AMF03
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measurand	global solar radiation and reflected solar radiation
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optional measurand	albedo or solar reflectance
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optional measurand	net solar radiation
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mounting	mounting rod with 15×10^{-3} m diameter
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rated operating temperature range	-40 to +80 °C
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standard cable length	3 m
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EMC and Surge immunity *

equipment classification	Industrial Equipment
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surge immunity	Level 2, test level 1 kV
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with optional SPD01	Level 4, test level 4 kV
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Electrical safety in the workplace

safety compliance	EU Low Voltage Directive (2014/35/EU) USA National Electric Code (NFPA70)
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earthing terminal	included on instrument
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Digital communication

communication protocol	Modbus RTU
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RS-485 isolation voltage	1.5 kV
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hardware interface	2-wire RS-485
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AMF03

- 1x glare screen
- 1x AMF03 fixture with rod
- 1x conical positioner
- 2x M5x12 socket head cap screw
- 1x M6x8 socket head cap screw
- 2x M8x12 set screw (pre-mounted)
- 1x mounting instruction sheet

* at standard cable length of 3 m

About Hukx

Hukx is the leading innovator in solar radiation and heat flux sensor technology. We are proud to set the standard in high-accuracy measurement, and to be working at the heart of the energy transition.

Customers worldwide rely on our bestselling pyranometers and heat flux sensors. From sensor design and selection to supply and recalibration, we support you across the entire lifecycle.

Hukx is headquartered in the Netherlands, with locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia, and Japan.

Let us help you select the best sensor for your application. Get in touch with our experts today via: info@hukx.com

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We reserve the right to change specifications without prior notice.

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