Hukseflux
Thermal Sensors

instrumentos de medida

SRA15 SERIES

Spectrally Flat Class B albedometers

SRA15 series Spectrally Flat Class B albedometer is an instrument that measures global and reflected solar radiation and the solar albedo, or solar reflectance. It is composed of two SR15 series Spectrally Flat Class B pyranometers and one AMF03 albedometer mounting kit. AMF03 includes one glare screen, one mounting fixture with rod, mounting hardware and tools. Each pyranometer has a thermopile sensor, the upfacing one measuring global solar radiation, the downfacing one measuring reflected solar radiation. You may choose digital SR15-D1 pyranometers with heating, analogue SR15-A1 pyranometers, offering millivolt output and heating, or SR15-D2A2 pyranometers with 4-20 mA output. SRA15 complies with the latest ISO and WMO standards. The modular design facilitates maintenance and calibration.

Figure 1 *SRA15 series albedometer*

SRA15 design

SRA15 consists of two identical pyranometers model SR15, one facing up, one facing down. To create an SRA15, the two sensors are combined with one AMF03 albedometer mounting kit. AMF03 includes a fixture with rod for mounting purposes and a glare screen. The user assembles these modular components into an SRA15 series albedometer. Mounting hardware, tools and a mounting and fixation instruction are part of AMF03. The modular design of SRA15 facilitates maintenance and calibration.

Suggested use

- PV monitoring with bifacial solar modules
- high-accuracy meteorological observations
- building physics, roof reflectance studies

Introduction

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.

An albedometer is an instrument composed of two pyranometers, the upfacing one measuring global solar radiation, the downfacing one measuring reflected solar radiation. You can then derive the solar albedo, or solar reflectance and net solar radiation.

Using SRA15 albedometer is easy. The instrument is composed of two SR15 Spectrally Flat Class B pyranometers; the upfacing one measuring global solar radiation, the downfacing one measuring reflected solar radiation. When using SR15-A1, the irradiance in W/m^2 in each direction is calculated by dividing the pyranometer output, a small voltage, by the sensitivity. Other models SR15-D1 and SR15-D2A2 models have digital outputs. The working principle and specifications of the pyranometers can be found in the SR15 series user manual. SRA15 can be connected directly to commonly used datalogging systems.

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. Albedometers are increasingly popular in bifacial PV module performance monitoring. This application requires horizontal levelling; a bubble level and a mounting rod are included.

Copyright by Hukseflux. Version 1904. We reserve the right to change specifications without prior notice

Hukseflux
Thermal Sensors

Standards

Applicable instrument-classification standards are ISO 9060 and WMO-No. 8. Calibration is according to ISO 9847 and ASTM G207-11.

Uncertainty evaluation

The uncertainty of a measurement under outdoor conditions depends on many factors. Guidelines for uncertainty evaluation according to the "Guide to Expression of Uncertainty in Measurement" (GUM) can be found in our manuals. We provide spreadsheets to assist in the process of uncertainty evaluation of your measurement.

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 ± 2 °. The CMF01 bracket may be used to mount the crossarm to a mast.

Figure 2 *ALF01 albedometer levelling tool*

See also

- AMF03 albedometer mounting kit
- SR15-A1 pyranometer
- SR15-D2 pyranometer
- SR15-D2A2 pyranometer
- ALF01 albedometer levelling fixture
- CMF01 crossarm mounting fixture for albedometers
- SRA30-D1 Spectrally Flat Class A albedometer for higher accuracy albedo measurements
- SRA01 Spectrally Flat Class C albedometer for lower accuracy albedo measurements
- alternative instrument: NR01 for solar and longwave radiation balance

Options

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

SRA15 series specifications

Included	2 x SR15, 1 x AMF03
Measurand	global solar radiation and reflected solar radiation
Optional measurand	albedo or solar reflectance
Optional measurand	net solar radiation
Mounting	mounting rod with 15 x 10^{-3} m diameter
Rated operating temperature range	-40 to +80 °C

SR15

Included sensors	2 x identical ISO 9060 Spectrally Flat Class B pyranometer either SR15-D1, SR15-A1 or SR15-D2A2
Output	analogue millivolt (SR15-A1), digital Modbus RTU over RS-485 (SR15-D1) or Modbus RTU over TTL and 4-20 mA (SR15-D2A2)
Calibration uncertainty	< 1.8 % (k = 2)
Calibration traceability	to WRR
Measurement range	0 to 2000 W/m^2
Spectral range	285 to 3000 x 10^{-9} m
Temperature response	<± 2 % (-10 to +40 °C)
Standard cable length	5 m (see options)

AMF03

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

About Hukseflux

Hukseflux Thermal Sensors offers measurement solutions for the most challenging applications. We design and supply sensors as well as test & measuring systems, and offer related services such as engineering and consultancy. Hukseflux sensors, systems and services are offered worldwide via our office in Delft, the Netherlands and local distributors.

instrumentos de medida
SEPTIEMBRE, 31 28022 MADRID
TEL. 913000191
www.idm-instrumentos.es
idm@idm-instrumentos.es

Copyright by Hukseflux. Version 1904. We reserve the right to change specifications without prior notice