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SRA01

Second class albedometer

SRA01 albedometer is an instrument that measures the solar albedo, or solar reflectance, and net solar radiation. It is composed of two second class pyranometers with thermopile sensors, the upper one measuring global radiation, the lower one measuring reflected solar radiation. It complies with the latest ISO and WMO standards.

Figure 1 SRA01 second class albedometer

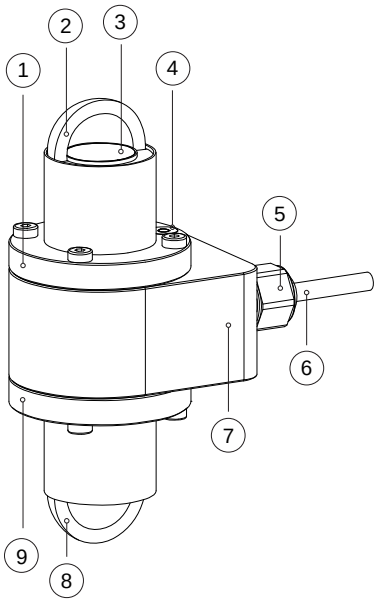

Figure 2 overview of SRA01:
(1) upfacing pyranometer body, (2) glass dome, (3) thermal sensor with black coating, (4) bubble level, (5) cable gland, (6) cable, (7) albedometer body, (8) glass dome, (9) downfacing pyranometer body

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.

Using SRA01 is easy. The albedometer is composed of two pyranometers, the upper one measuring global solar radiation, the lower one measuring reflected solar radiation. The irradiance in W/m^2 in each direction is calculated by dividing the pyranometer output, a small voltage, by the sensitivity. The sensitivity of both pyranometers, model SR01, is provided on the SRA01 product certificate. The albedo is calculated by dividing the reflected radiation by the global radiation. The working principle and specifications of the pyranometers can be found in the SRA01 manual. SRA01 can be connected directly to commonly used datalogging systems.

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 measurements as part of a meteorological station. This application requires horizontal levelling; a bubble level is included. SRA01 is made to fit a ¾ inch NPS mounting tube.

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) are found in our manuals. We provide spreadsheets to assist in the process of uncertainty evaluation of your measurement.

SRA01 design

SRA01 consists of two pyranometers, one facing up, one facing down. The albedometer body is designed to fit a ¾ inch NPS tube (the outer diameter must be < 28.7 x 10^{-3} m) for mounting purposes. The cable can be led away through the tube. Such a mounting tube is not part of the delivery. SRA01 can be ordered with longer cable and optional sun screens.

Figure 3 SRA01 second class albedometer, designed to fit a mounting tube

Suggested use

- agricultural networks
- general meteorological observations
- building physics, roof reflectance studies

Standards

Applicable instrument-classification standards are ISO 9060 and WMO-No. 8. Calibration is according to ISO 9847 and ASTM G207-11. SRA01 may also be used for measurements according to ASTM E1918 - 06 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.

SRA01 specifications

Measurand	hemispherical solar radiation and reflected solar radiation
Optional measurand	albedo or solar reflectance
Optional measurand	net solar radiation
ISO classification	second class pyranometers
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
Sensitivity (nominal)	15 x 10^{-6} V/(W/m^2)
Rated operating temperature range	-40 to +80 °C
Temperature response	< ± 3 % (-10 to +40 °C)
Standard cable length	5 m (see options)

Options

- longer cable, in multiples of 5 m
- sun screens

See also

- alternative instrument: NR01 for solar and longwave radiation balance
- view our complete product range of solar sensors