

RA01

2-component radiometer

RA01 is a 2-component radiation sensor that is used for scientific-grade energy balance and surface flux studies. It offers separate measurements of solar and longwave radiation. When combined with estimates of solar albedo and of local surface temperature, this instrument can also be used for estimation of net radiation. The advantages of this approach are cost reduction and independence from local surface properties.



Figure 1 RA01 2-component radiometer

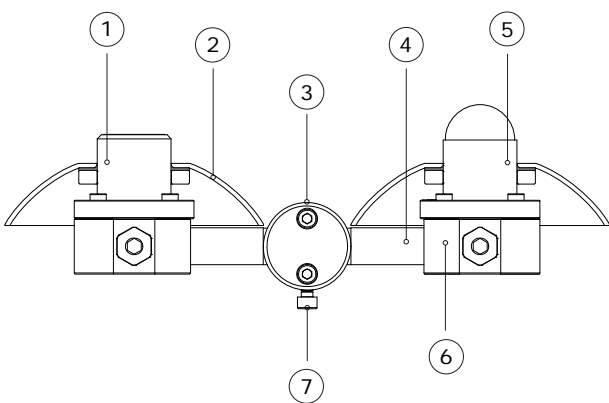


Figure 2 overview of RA01:
 (1) upfacing pyrgeometer, (2) sun screens, (3,4,7) levelling assembly for x- and y-axis, (5) upfacing pyranometer, (6) instrument body

Introduction

RA01 radiometer measures 2 separate components of the surface radiation balance: solar and longwave radiation. The solar radiation sensor is called pyranometer and the longwave sensor is called pyrgeometer. For calculation of sky temperature, a Pt100 temperature sensor is included in the pyrgeometer. To prevent deposition of dew, the pyrgeometer has internal heating. A 2-axis levelling assembly is included.

Operation

Using RA01 radiometer is easy. It can be connected directly to commonly used data logging systems. The irradiance levels in W/m^2 are calculated by dividing the RA01 outputs, small voltages, by the sensitivities. The longwave irradiance should be corrected using the instrument body temperature. The sensitivities of all sensors are provided with RA01 on its product certificate. RA01 radiometers are often used in scientific-grade energy balance and surface flux studies.

RA01 design

RA01 radiometer has a modular design: it is possible to take the instrument apart and replace or re-calibrate individual sensors. The included levelling assembly fits a 3/4 inch NPS tube (the outer diameter must be <math>< 28.7 \times 10^{-3} \text{ m}</math>). Such a mounting tube is not part of the delivery.

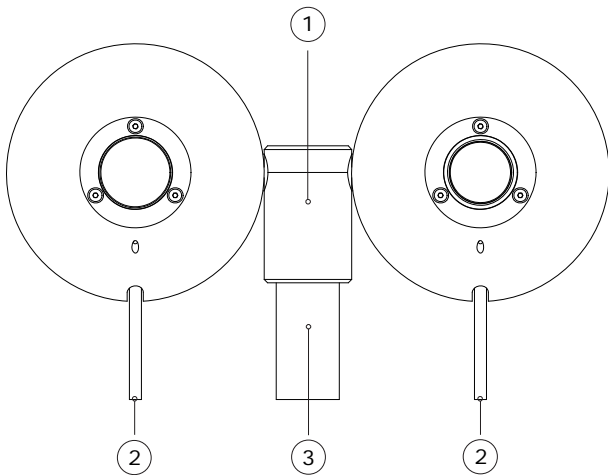


Figure 3 top view of RA01:
(1) levelling assembly for x- and y-axis, (2) cables,
(3) mounting tube (not included)

Suggested use

- energy balance studies
- surface flux measurements
- climatological networks

Standards

Applicable instrument-classification standards are ISO 9060 and WMO-No.-8; Guide to Meteorological Instruments and Methods of Observation.



Figure 4 RA01 2-component radiometer in detail

RA01 specifications

Measurand	incoming solar radiation
Measurand	incoming longwave radiation*
Optional measurand	sky temperature
Required readout	2 x DC voltage, 1 x Pt100
Calibration traceability solar	to WRR
Calibration traceability longwave	to WISG
Spectral range solar	285 to 3000 x 10 ⁻⁹ m
Spectral range longwave	4.5 to 40 x 10 ⁻⁶ m
Rated operating temperature range	-40 to +80 °C
Temperature sensor	Pt100
Heater	12 VDC, 1.5 W
Standard cable length	5 m (see options)
* Required measurand	instrument body temperature

Options

- longer cable, in multiples of 5 m

See also

- See also [NR01](#) 4-component net radiometer, the most popular instrument to measure net radiation and the 4 separate components of the surface radiation balance: downward and upward solar and longwave radiation
- stand-alone pyranometer: [LP02](#)
- stand-alone pyrgeometer: [IR02](#)
- view our complete [product range of solar sensors](#)

About Hukseflux

Hukseflux Thermal Sensors, founded in 1993, aims to advance thermal measurement. We offer a complete range of sensors and systems for measuring heat flux, solar radiation and thermal conductivity. We also provide consultancy and services such as performing measurements and designing instrumentation according to customer requirements. Customers are served through the main office in Delft in the Netherlands, and locally owned representations in the USA, China and Japan.

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