HUKX

Sensor
Technology

Brochure

Analog 2-component radiometer

RA01

RA01
Analog 2-component radiometer

with heating and spectrally flat Class C pyranometer

RA01 is a market-leading 2-component radiometer, primarily used in scientific-grade energy balance and surface flux networks. It offers 2 separate measurements of global solar and downward longwave radiation with a pyranometer and a pyrgeometer, respectively. Product features include a modular design, low weight, easy leveling, and low solar offsets in the longwave measurement.

RA01's unique capability to heat the pyrgeometer reduces measurement errors caused by dew deposition. When combined with estimates of solar albedo and 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.

Introduction

RA01 measures the 2 incoming components of the surface radiation balance: global solar and downward longwave radiation. The solar radiation sensor is called a pyranometer, and the longwave sensor is referred to as a pyrgeometer. To calculate sky temperature, it is necessary to compensate for irradiated heat emitted by the pyrgeometer (Stefan-Boltzmann law). A Pt100 temperature sensor is included in RA01's body for this purpose. Sunshine duration may also be estimated using the WMO-approved pyranometric method.

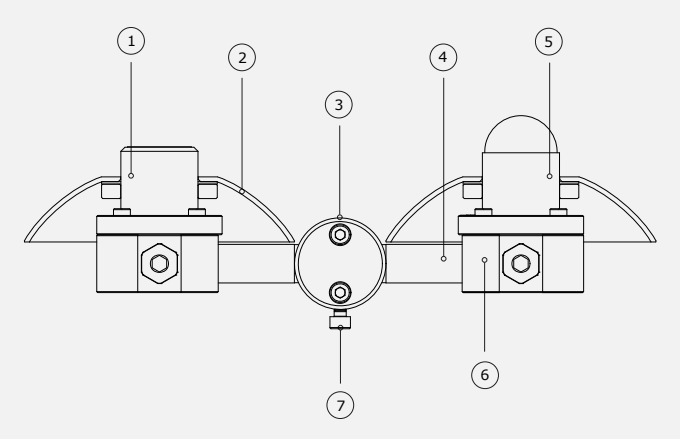

Figure 2 Overview of RA01: (1) upward-facing pyrgeometer, (2) sun screens, (3,4,7) leveling assembly for x- and y-axis, (5) upward-facing pyranometer, and (6) instrument body.

Operation

Using the RA01 radiometer is easy. It directly connects to the most commonly used data logging systems.
The irradiance levels (in W/m^2) are calculated by dividing the RA01 outputs, small voltages, by the sensitivities of the sensors. Longwave irradiance should be corrected using the instrument body temperature. The sensitivities of all sensors are provided on RA01's product certificate.

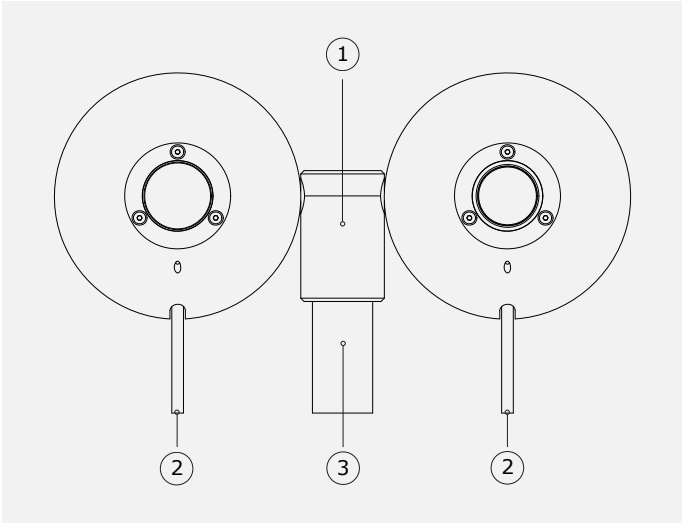

Figure 3 Top view of RA01: (1) leveling assembly for x- and y-axis, (2) cables, (3) mounting tube (not included).

RA01 design

RA01 radiometer has a modular design. This makes it possible to take the instrument apart and replace or recalibrate individual sensors. A 2-axis leveling assembly is included, which fits a 1-inch NPS tube (recommended outer diameter: 33.4×10^{-3} m). With the included RA01 shim, it can also be mounted on a ¾ inch NPS tube.

Figure 4 RA01 2-component radiometer in detail: pyranometer model SR01.

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*.

Options

– longer cable, in multiples of 5 m; cable lengths above 20 m in multiples of 10 m
– 10 kΩ thermistor instead of Pt100 temperature sensor

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
– CMF01 mounting fixture for installing RA01 on a mast
– View our complete product range of pyranometers and pyrgeometers.

RA01 specifications

General specifications

measurand	global solar radiation
ISO 9060:2018 classification	pyranometer: spectrally flat Class C
WMO compliance	pyranometer: WMO Class C
measurand	downward longwave radiation*
optional measurand	sky temperature*
optional measurand	sunshine duration
included sensors	1 x ISO 9060 spectrally flat Class C pyranometer 1 x pyrgeometer with 150 ° field of view angle
leveling	2-axis leveling assembly included
mounting	on a 1-inch NPS tube; RA01 delivery includes a shim for easy alternative mounting on a ¾ inch tube (tubes not included).
temperature sensor	Pt100
measurand Pt100	instrument body temperature
required readout	2 x DC voltage, 1 x Pt100
calibration traceability solar	to WRR
spectral range solar	285 to 3000 x 10^{-9} m
calibration traceability longwave	to WISG
spectral range longwave	4.5 to 42 x 10^{-6} m
rated operating temperature range	-40 to +80 °C
heater on pyrgeometer	12 VDC, 1.5 W
standard cable length	2 x 5 m (see options)

* required measurand instrument body temperature.

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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