



WMO Class Quality

Four-way, research-quality radiometer; thermistor and Pt-100 built in

Overview

The CNR4, manufactured by Kipp & Zonen, is a research-grade net radiometer that measures the energy balance between incoming and outgoing radiation. Our dataloggers

measure the CNR4's output. This net radiometer offers a professional solution for scientific-grade energy balance studies.

Benefits and Features

- › Research-grade performance
- › Meniscus dome on upper long-wave detector allows water droplets to easily roll off of it and increases field of view to nearly 180°
- › Internal temperature sensors provide temperature compensation of measurements
- › Drying cartridge helps keep the electronics dry
- › Compatible with the CNF4 ventilation unit with heater that reduces formation of dew and melts frost
- › Separate outputs of short-wave and long-wave infrared radiation for better accuracy and more thorough quality assurance
- › Solar shield reduces thermal effects on the sensors

Technical Description

The CNR4 consists of a pyranometer and pyrgeometer pair that faces upward and a complementary pair that faces downward. The pyranometers and pyrgeometers measure shortwave and long-wave infrared radiation, respectively.

The upper long-wave detector of the CNR4 has a meniscus dome that allows water droplets to easily roll off of it. The dome shape also increases the field of view to nearly 180° instead of 150° for a flat window.

The CNR4 contains both an internal thermistor and an internal Pt-100 RTD. Typically, the thermistor makes the instrument housing temperature measurements used to compensate the infrared readings. Alternatively, the RTD can provide these measurements if a CR3000 or CR5000 datalogger is used.

The CNR4 has a solar shield that reduces the thermal effects on both the short-wave and long-wave measurements. A drying cartridge helps keep the radiometer's electronics dry. The CNF4, an optional ventilation unit with heater, can be fitted onto the CNR4 to minimize the formation of dew as well as melt frost.

Specifications

Sensor	Two thermopile pyranometers, two pyrgometers, Pt100 RTD, and thermistor
Measurement Description	Measures incoming and outgoing short-wave and long-wave radiation
Response Time	< 18 s
Temperature Dependence of Sensitivity	< 4% (-10° to +40°C)
Sensitivity	5 to 20 $\mu\text{V W}^{-1} \text{m}^2$
Non-Linearity	< 1%
Tilt Error	< 1%
Directional Error	< 20 W m^{-2} (pyranometer) Angles up to 80° with 1000 W/m^2 beam radiation
Operating Temperature Range	-40° to +80°C
Compliance	Conforms to the CE guideline 89/336/EEC 73/23/EEC.

Height	6.6 cm (2.6 in.) dome-to-dome
Width	11.1 cm (4.4 in.)
Length	› 23.5 cm (9.3 in.) › 40.4 cm (15.9 in.) with CNF4
Weight	850 g (30.0 oz) without cable

Pyranometer

Spectral Range	305 to 2800 nm
Uncertainty in Daily Total	< 5% (The uncertainty values are for a 95% confidence level.)
Output Range	0 to 15 mV (The output range is typical for atmospheric applications.)

Pyrgometer

Spectral Range	4500 to 42,000 nm
Uncertainty in Daily Total	< 10% (The uncertainty values are for a 95% confidence level.)
Output Range	± 5 mV (The output range is typical for atmospheric applications.)

For comprehensive details, visit: www.campbellsci.eu/cnr4 



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