

CNR4



CNR4 is a four-component net radiometer for accurate and reliable measurements and can be used as the reference instrument for a network of lower performance net radiometers.

The instrument combines two ISO 9060:1990 Second Class pyranometers for short-wave solar radiation measurement with two pyrgeometers for long-wave radiation, all integrated into the slim body. There are four separate signal outputs and either of the integrated 10 K thermistor and Pt-100 temperature sensors can be used to calculate the FIR radiation.

CNR4 does not require power to operate; and the bubble level, screw-in mounting rod and cables with waterproof connectors, ensure that installation is quick and easy.

The white sun shield also acts as a glare screen to prevent direct illumination of the lower pyranometer at sunrise and sunset. The upper pyrgeometer has a silicon meniscus dome so that water rolls off and the field of view is 180°. The lower pyrgeometer has a flat window with 150° view.

A heated ventilation unit, the CNF4, is available to minimize offsets, maximize stability, remove precipitation and reduce the deposition of dirt and dust.

CNF4 can be purchased together with the CNR4 or added at a later date if required.

Specifications	
Spectral range (overall)	4.4 to 50 μm (long-wave)
Spectral range (50 % points)	300 to 2800 nm (short-wave) 4.5 to 42 μm (long-wave)
Sensitivity	5 to 20 $\mu\text{V/W/m}^2$ (short-wave) 5 to 15 $\mu\text{V/W/m}^2$ (long-wave)
Impedance	20 to 200 Ω
Expected output range (0 to 1500 W/m^2)	0 to 30 mV upper sensor (short-wave)
Expected output range (0 to 1000 W/m^2)	0 to 20 mV lower sensor (short-wave)
Expected output range (-200 to 200 W/m^2)	-3 to 3 mV (long-wave)
Maximum operational irradiance	2000 W/m^2 (short-wave)
Operational irradiance (net)	-250 to 250 W/m^2 (long-wave)
Response time (63 %)	< 6 s
(95 %)	< 18 s
Zero offsets (short-wave)	
(a) thermal radiation (at 200 W/m^2)	< 15 W/m^2
(b) temperature change (5 K/h)	< 3 W/m^2 (< 1 W/m^2 with CNF4)
Zero offset (long-wave)	
(b) temperature change (5 K/h)	< 5 W/m^2
Window heating offset upper sensor (with 1000 W/m^2 direct solar radiation)	< 6 W/m^2 (long-wave)
Window heating offset lower sensor (with 1000 W/m^2 direct solar radiation)	< 15 W/m^2 (long-wave)
Non-stability (change/year)	< 1 %
Non-linearity (100 to 1000 W/m^2)	< 1 % short-wave (upper and lower sensor)
Non-linearity (-250 to 250 W/m^2)	< 1 % long-wave (upper and lower sensor)
Directional response (up to 80° with 1000 W/m^2 beam)	< 20 W/m^2 (short-wave)
Spectral selectivity (350 to 1500 nm) (8 to 14 μm)	< 3 % (short-wave) < 5 % (long-wave)
Temperature response (-10°C to +40°C)	< 5 %
Tilt response (0° to 90° at 1000 W/m^2)	< 1 %
Field of view	180° upper sensor (short-wave) 170° lower sensor (short-wave) 180° upper sensor (long-wave) 150° lower sensor (long-wave)
Accuracy of bubble level	< 0.2°
Pyrgeometer temperature sensor output	10 K thermistor and Pt-100
Mounting rod (screw-in)	350 mm long x 16 mm $\varnothing$
Detector type	Thermopile
Operational temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100 % non-condensing
Ingress Protection (IP) rating	67

Part number	Instrument
0369900-032	CNR4 Net Radiometer • four-component • 10 m cable
0369900-030	CNR4 Net Radiometer • four-component • no plug, no cable

Part number	Accessories
4250024	Drying Cartridge (minimum order 5 cartridges)
See next page	CNF4 Ventilation Unit
0369701	CMB1 Mounting Bracket To enable easy attachment of the mounting rod to a pole or a wall