CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

CMP6, CMP10, CMP11, CMP21
Kipp & Zonen Solar Radiation Sensors

High Quality Pyranometers

Double glass dome

Overview

The CMP6, CMP10, CMP11, and CMP21 pyranometers[a] measure solar radiation with a high-quality blackened thermopile protected by two glass domes. Their flat spectral sensitivity, from 285 to 2800 nm, makes them ideal for applications in natural sunlight, under plant canopies, in green houses or buildings, and inverted to measure reflected solar radiation. Typical uses include environmental monitoring, solar resource assessment, and solar power performance applications[b]. These pyranometers produce a millivolt signal that is measured directly by a Campbell Scientific data logger.

Benefits and Features

› Provides measurements in direct sunlight, under plant canopies, when the sky is cloudy, and in artificial light
› Double glass dome
› Integrated bubble level is visible without removing sun shield
› Compatible with most Campbell Scientific data loggers
› Compatible with the CVF4 heater/ventilator that keeps the domes free from ice and dew
› Measures reflected solar radiation when inverted

Model Description

The CMP6 has an ISO classification of *First Class*, and the other pyranometers have an ISO classification of *Secondary Standard*. To prevent dew from forming on the inner sides of the domes, the CMP10 has an internal drying cartridge that will last for at least 10 years if the housing is not opened. The drying cartridge of the CMP6, CMP11, and CMP21 uses desiccant that needs to be periodically replaced. The CMP21 has an internal thermistor allowing individually optimized temperature compensation of the measurements.

Mounting

The pyranometers should be mounted away from all obstructions and reflective surfaces that might adversely effect the measurement. They have a bubble level and two leveling feet, which allow them to be leveled without using a leveling base.

The pyranometers typically mount to a mast, crossarm, or pole (1.0 in. to 2.1 in. OD) via the CM255 or CM255LS mounting stand, assuming the heater/ventilator is not used. They can also mount near the end cap of an ATI or NexTracker torque tube by using the CM260 or CM265 mounting kit, respectively.

The CVF4 Heater/Ventilator attaches to the 31153 Mounting Stand, which mounts to a crossarm or pole via the CM225 Right-Angle Mount or the 17953 Nu-Rail fitting.

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[a] *The CMP3, CMP6, CMP10, CMP11, and CMP21 are manufactured by Kipp & Zonen, and then cabled by Campbell Scientific.*
[b] *Typically, these pyranometers are oriented perpendicular to the Earth's surface to measure global horizontal irradiance (GH). Diffuse sky radiation can also be measured with the use of a shade mechanism (contact Campbell Scientific for more information).*

Specifications

	CMP6	CMP10/CMP11	CMP21
ISO Classification	First Class	Secondary Standard	
Spectral Range	285 to 2800 nm		
Sensitivity	5 to 20 µV W^{-1} m^2	7 to 14 µV W^{-1} m^2	
Temperature Dependence of Sensitivity	< 4% (-10° to +40℃)	< 1 % (-10° to +40℃)	< 1 % (-20° to +50℃)
Response Time (95% of final value)	<18 s	<5 s	
Zero Offset Due To Thermal Radiation (200 W/m²)	< 15 W/m^2	< 7 W/m^2	
Non-Stability (change/year)	< 1%	<0.5%	
Non-Linearity (0 to 1000 W/m²)	< 1%	< 0.2%	
Directional Error (up to 80° with 1000 W/m² beam)	< 20 W/m^2	< 10 W/m^2	
Tilt Error	< 1%	< 0.2%	
Level Accuracy	0.1°		
Impedance	20 to 200 Ω	10 to 100 Ω	
Operating Temperature	-40° to +80℃		
Typical Signal Output for Atmospheric Applications	0 to 20 mV	0 to 15 mV	
Maximum Irradiance	2000 W/m^2	4000 W/m^2	
Expected Daily Uncertainty	< 5%	< 2%	
Dimensions	Width w/Shield: 15 cm (5.9 in); Height: 9.25 cm (3.64 in); Dome Diameter: 5 cm (2 in)		
Weight with 33 ft cable	0.9 kg (2 lb)		

CVF4 Heater/Ventilator

❯ Power Supply: 12 Vdc, 0.9 A (with 5.5 W Heater)

❯ Operating Temperature Range: -40° to +70℃

❯ Ventilation Power: 5 W continuously

❯ Heating Power: 5.5 W

❯ Heater Induced Offset: <1 W/m^2 (with CMP11)

❯ Weight without cable: 1.6 kg (3.5 lb)

❯ Height: 12.95 cm (5.1 in)

❯ Length: 35.5 cm (14.0 in)

❯ Width: 23.0 cm (9.1 in)