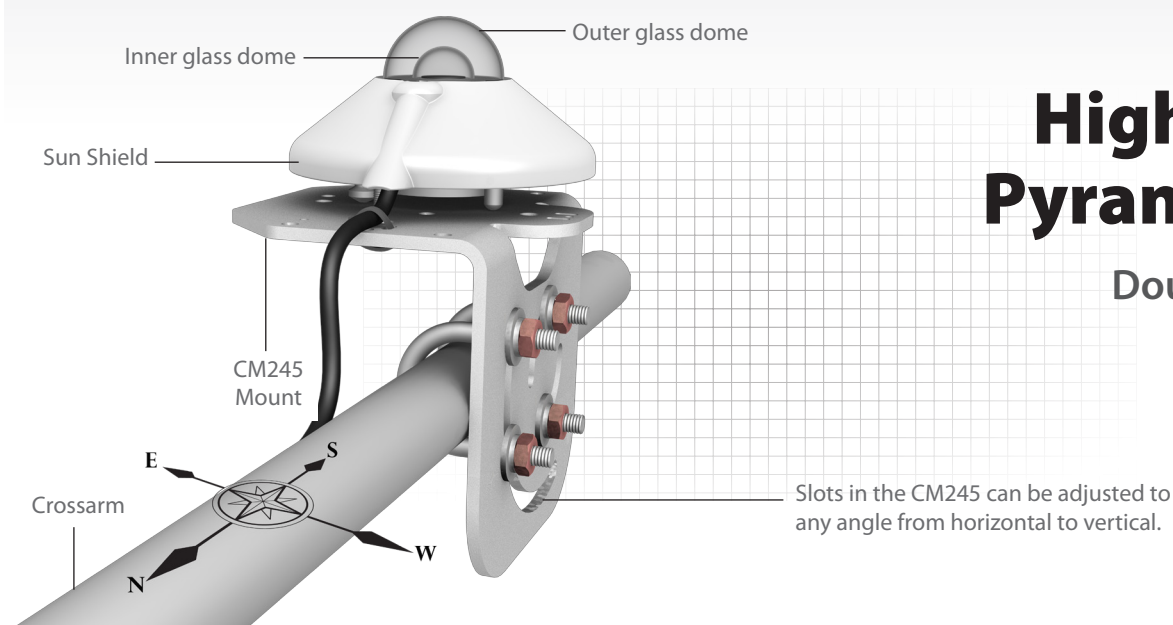




## CMP6, CMP11, CMP21

Kipp & Zonen Solar Radiation Sensors



# High Quality Pyranometers

Double glass dome

## Overview

The CMP6, CMP11, and CMP21 pyranometers\* 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.\*\* These pyranometers produce a millivolt signal that is measured directly by a Campbell Scientific datalogger.

## Benefits and Features

- › Double glass dome
- › Compatible with most Campbell Scientific dataloggers
- › Integrated bubble level is visible without removing sun shield
- › Desiccant-filled drying cartridge prevents dew from forming on the inner sides of the domes
- › Compatible with the CVF3 heater/ventilator that keeps the domes free from ice and dew
- › Measures reflected solar radiation when inverted
- › Provides measurements in direct sunlight, under plant canopies, when the sky is cloudy, and in artificial light

## Model Description

Based on differences in accuracy and performance, the CMP6 has an ISO classification of *First Class*, and the CMP11 and CMP21 have an ISO classification of *Secondary Standard*. The CMP21 also includes an internal thermistor allowing individually optimized temperature compensation of the measurements.

## Mounting

The pyranometers have a bubble level and two leveling feet, which allow them to be leveled without using a leveling base. They mount to a mast, crossarm, or pole (1.0 in. to 2.1 in. OD) via the CM245 Mounting Stand, assuming the heater/ventilator is not used. The CVF3 Heater/Ventilator attaches to the 27084 Mounting Stand, which mounts to a crossarm or pole via the CM225 Right-Angle Mount or the 17953 NU-RAIL fitting.

\*The CMP3, CMP6, CMP11, and CMP21 are manufactured by Kipp & Zonen, and then cabled by Campbell Scientific.

\*\* 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	CMP11	CMP21
ISO Classification	First Class	Secondary Standard	
Spectral Range	285 to 2800 nm		
Sensitivity	5 to 20 $\mu\text{V W}^{-1} \text{ m}^2$	7 to 14 $\mu\text{V W}^{-1} \text{ m}^2$	
Temperature Dependence of Sensitivity	< 4% (-10° to +40°C)	< 1% (-10° to +40°C)	< 1% (-20° to +50°C)
Response Time (95% of final value)	< 18 s	< 5 s	
Zero Off set Due To Thermal Radiation (200 W/m <sup>2</sup> )	< 15 W/m <sup>2</sup>	< 7 W/m <sup>2</sup>	
Non-Stability (change/year)	< 1%	< 0.5%	
Non-Linearity (0 to 1000 W/m <sup>2</sup> )	< 1%	< 0.2%	
Directional Error (up to 80° with 1000 W/m <sup>2</sup> beam)	< 20 W/m <sup>2</sup>	< 10 W/m <sup>2</sup>	
Tilt Error	< 1%	< 0.2%	
Level Accuracy	0.1°		
Impedance	20 to 200 $\Omega$	10 to 100 $\Omega$	
Operating Temperature	-40° to +80°C		
Typical Signal Output for Atmospheric Applications	0 to 20 mV	0 to 15 mV	
Maximum Irradiance	2000 W/m <sup>2</sup>	4000 W/m <sup>2</sup>	
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)		

### CVF3 Heater/Ventilator

- › Power Supply: 12 Vdc, 1.3 A (with 10 W Heater)
- › Operating Temperature: -40° to +70°C
- › Ventilation Power: 5 W continuously
- › Heating Power: 5 W or 10 W

- › Heater Induced Offset: < 1 W/m<sup>2</sup> (with CMP11)
- › Weight without cable: 1.6 kg (3.5 lb)
- › Dimensions  
Height: 12.9 cm (5.1 in.)  
Diameter: 22.4 cm (8.8 in.)

## Ordering Information

### Solar Radiation Sensors

The pyranometers have user-specified cable lengths; enter the length, in feet, after the -L. Must choose a cable termination option (see below).

- CMP6-L** Kipp & Zonen pyranometer with an ISO-classification of First Class.
- CMP11-L** Kipp & Zonen pyranometer with an ISO-classification of Secondary Standard.
- CMP21-L** Kipp & Zonen pyranometer with an internal thermistor and an ISO-classification of Secondary Standard.

### Optional Heater/Ventilation Unit

- CVF3-L** Heater/Ventilator for CMP6, CMP11, or CMP21. Enter cable length, in feet, after the -L. Must choose a cable termination option (see below).

### Cable Termination Options for CMP6, CMP11, CMP21, and CVF3 (choose one)

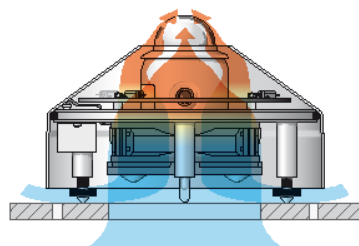
- PT** Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.
- PW** Cable terminates in a connector for attachment to a prewired enclosure.
- CWS** CMP6/CMP11 cable terminates in a connector for attachment to a CWS900 interface, which allow a CMP6 or CMP11 to be used in a wireless sensor network. Option not available for the CMP21 or CVF3.

### Mounts

- CM245** Mounting Stand for attaching a CMP-series pyranometer to a mast or crossarm.
- 27084** CVF4 Mounting Stand; requires the CM225 Right-Angle Mount or 17953 NU-RAIL fitting to attach to a mast or crossarm.
- CM225** Right-Angle Mount used to attach the 27084 to a mast or crossarm.
- 17593** 1 x 1 inch NURAIL Crossover Fitting used to attach the 27084 to a crossarm.

### Replacement Parts

- 27052** Replacement desiccant used in the drying cartridge. Replace when desiccant changes color from orange to clear. Desiccant has limited shelf life.
- 27055** Replacement filters for the CVF4 Heater/Ventilator.



Transparent view of the CVF3 shows air drawn and heated over the pyranometer.