



**Applications**  
Scientific Research  
Baseline Surface Radiation Network

## Pyranometer

Premium pyranometers for highest requirements

### **ISO 9060 Spectrally Flat Class A**

**Highest level accuracy**

**Broadest spectral range**

**Analog and digital outputs**

**5 years warranty**

### **ISO 9060 & IEC 61724 Class A**

Fully compliant with ISO 9060:2018 spectrally flat Class A specifications, the CMP21, CMP22, and SMP22 provide solar irradiance measurements with highest accuracy and reliability. They are the sensors of choice for renowned research institutes around the world. Adding highest-quality quartz domes for a wider spectral range makes the CMP22 and the SMP22 the most accurate pyranometers available.

### **Minimized maintenance**

The CMP21 and CMP22 as well as the smart SMP22 are extremely robust pyranometers that have been designed to fulfill the highest requirements of scientific research. The CMP21 and CMP22 have an easy-to-remove drying cartridge filled with easy-to-replace desiccant that is supplied in convenient refill packets. In contrast, the SMP is fitted with a maintenance-free internal desiccant that lasts at least 10 years.

### **Analog or digital outputs**

The CMP21 and CMP22 do not require any power. Incoming solar radiation generates a continuous millivolt output, which is converted in a data logger to irradiance in  $W/m^2$  using the calibrated sensitivity. For easy integration into SCADA systems the SMP22 has Modbus<sup>®</sup> RTU RS-485 serial communication, plus an amplified analog output. A specific, individual polynomial correction function is stored in each SMP22.

### **5 years warranty**

All pyranometers from Kipp & Zonen come with a 5-year warranty and we have service and calibration centers around the world.

# Technical Specifications

	CMP21	CMP22	SMP22
Classification to ISO 9060:2018	Spectrally Flat Class A	Spectrally Flat Class A	Spectrally Flat Class A
Sensitivity	7 to 14 $\mu\text{V}/\text{W}/\text{m}^2$	7 to 14 $\mu\text{V}/\text{W}/\text{m}^2$	-
Impedance	10 to 100 $\Omega$	10 to 100 $\Omega$	-
Expected output range (0 to 1500 $\text{W}/\text{m}^2$ )	0 to 21 mV	0 to 21 mV	-
Maximum operational irradiance	4000 $\text{W}/\text{m}^2$	4000 $\text{W}/\text{m}^2$	4000 $\text{W}/\text{m}^2$
Analogue output • V-version	-	-	0 to 1 V
Analogue output range • V-version*	-	-	-200 to 2000 $\text{W}/\text{m}^2$
Analogue output • A-version	-	-	4 to 20 mA
Analogue output range • A-version*	-	-	0 to 1600 $\text{W}/\text{m}^2$
Serial output	-	-	RS-485 Modbus® RTU
Serial output range	-	-	-400 to 4000 $\text{W}/\text{m}^2$
Response time (63 %)	< 1.66 s	< 1.66 s	< 0.7 s
Response time (95 %)	< 5 s	< 5 s	< 2 s
Spectral range (20 % points)	270 to 3000 nm	210 to 3600 nm	210 to 3600 nm
Spectral range (50 % points)	285 to 2800 nm	210 to 3600 nm	350 to 3500 nm
Zero offsets (unventilated)			
(a) thermal radiation (at 200 $\text{W}/\text{m}^2$ )	< $\pm 7 \text{ W}/\text{m}^2$	< $\pm 3 \text{ W}/\text{m}^2$	< $\pm 3 \text{ W}/\text{m}^2$
(b) temperature change (5 K/h)	< $\pm 2 \text{ W}/\text{m}^2$	< $\pm 1 \text{ W}/\text{m}^2$	< $\pm 1 \text{ W}/\text{m}^2$
(c) total zero offset	< $\pm 9 \text{ W}/\text{m}^2$	< $\pm 4 \text{ W}/\text{m}^2$	< $\pm 4 \text{ W}/\text{m}^2$
Non-stability (change/year)	< $\pm 0.5\%$	< $\pm 0.5\%$	< $\pm 0.5\%$
Non-linearity (100 to 1000 $\text{W}/\text{m}^2$ )	< $\pm 0.2\%$	< $\pm 0.2\%$	< $\pm 0.2\%$
Directional response (up to 80° with 1000 $\text{W}/\text{m}^2$ beam)	< $\pm 10 \text{ W}/\text{m}^2$	< $\pm 5 \text{ W}/\text{m}^2$	< $\pm 5 \text{ W}/\text{m}^2$
Spectral selectivity (350 to 1500 nm)	< $\pm 3\%$	< $\pm 3\%$	< $\pm 3\%$
Tilt response (0° to 180° at 1000 $\text{W}/\text{m}^2$ )	< $\pm 0.2\%$	< $\pm 0.2\%$	< $\pm 0.2\%$
Temperature response	< $\pm 1\%$ (-20 to +50°C)	< $\pm 0.5\%$ (-20 to +50°C)	< $\pm 0.3\%$ (-20 to +70°C) < $\pm 0.3\%$ (-40 to +70°C)
Field of view	180°	180°	180°
Accuracy of bubble level	$\pm 0.1^\circ$	$\pm 0.1^\circ$	$\pm 0.1^\circ$
Power consumption (at 12 VDC)	-	-	V-version: 55 mW A-version: 100 mW
Supply voltage	-	-	5 to 30 VDC
Software, Windows™	-	-	SmartExplorer Software, for configuration, test and data logging
Detector type	Thermopile	Thermopile	Thermopile
Operating temperature range	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +70 °C
Storage temperature range	-40 °C to +80 °C	-40 °C to +80 °C	-40 °C to +80 °C
Humidity range	0 to 100%	0 to 100%	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years	> 10 years	> 10 years
Ingress Protection (IP) rating	IP67	IP67	IP67
Recommended applications	Scientific research requiring the highest level of measurement accuracy and reliability under all conditions.		

Dimensions	CMP21	CMP22	SMP22
Diameter x height	150 x 92.5 mm	150 x 92.5 mm	150 x 92.5 mm
Diffusor height	68 mm	68 mm	68 mm
Cable length	10, 25, or 50 m	10, 25, or 50 m	10, 25, or 50 m

\* adjustable with SmartExplorer Software | Note: The performance specifications quoted are worst-case and/or maximum values