

# RaZON<sup>+</sup> ALL-IN-ONE Solar Monitoring System



## More accurate than our CMP11

RaZON<sup>+</sup> is an ALL-IN-ONE Solar Monitoring System that accurately measures both direct normal irradiance (DNI) and diffuse horizontal irradiance (DHI). Even though the standard RaZON<sup>+</sup> instrument specifications are first or second class, the calculated GHI is even more accurate than our SMP11 or SMP21 secondary standard pyranometers. The integrated PH1 pyrheliometer is tested to be within 1% of our CHP1 and SHP1.

## Integrated Logging, GPS and Wi-Fi Communication

All irradiance measurements in W/m<sup>2</sup>, sunshine duration in hours, energy in kilowatt hours/m<sup>2</sup>, solar position angles and status information is logged on the integrated logger. With the Wi-Fi connection you can easily set-up, configure and check the RaZON<sup>+</sup> using any smart device like a tablet. RS-485 (Modbus or ASCII) and Ethernet are available for measurement data communication. The integrated GPS receiver provides accurate location information and accurate time stamps.

## Anti-Soiling Design and Minimal Maintenance

The innovative features of the pyrheliometer minimize the effects of soiling when operated unattended in remote locations, without compromising the high accuracy of the instrument. Both the pyrheliometer and pyranometer are based on quartz diffuser technology. Thanks to the open collimator tube design and the quartz diffuser, the pyrheliometer is resistant to the effects of soiling. Moreover, RaZON<sup>+</sup> is based on a completely maintenance-free gear drive sun tracking mechanism.

## Full Weather Station and On-Site Calibration

For beginning of 2017 a firmware upgrade will be available for the RaZON<sup>+</sup>. The already available Modbus input will then accept Compact Weather Stations, a tilted irradiance (POA) pyranometer or PV Panel Temperature sensor, making it the meteorological center of any Solar Power Plant. An integrated calibration algorithm will make it possible to compare your pyranometers against the RaZON<sup>+</sup>. With Internet access to the Kipp & Zonen server an on-site pyranometer check and calibration according to the ISO9847 standard will be possible.

Specifications	
Pointing accuracy	0.2°
Payload	Sufficient for 1 pyranometer and 1 pyrheliometer
Angular velocity	30°/s
Rotation	110° zenith, 540° azimuth
Protection against over rotation	Physical limit stops
Supply voltage	24 VDC
Power	13 W
Operating temperature range	-20 °C to +50 °C
Weight	9 kg
Dimensions (WxDxH)	60x60x48 cm
Accuracy of bubble level	< 0.1°
Ingress Protection (IP) rating	65
CE/FCC compliance	Yes
RoHS	Yes
Transmission	Gear drives
Power connections	DC power
Communication interface	RS-485 Modbus® for external sensor/system RS-485 to host, Modbus® or ASCII Ethernet RJ-45 or Wi-Fi, web based
Data logging	1 minute average
GPS, location and time/date	Standard
Installation	Plug-and-play, Wi-Fi enabled device used
Functional self-test	Standard
Test/diagnostic facility	Standard via Ethernet connection
Sun tracking mode	Standard
PC system requirements	Ethernet connection, web browser
Firmware update possible	Flash memory
Maintenance	No scheduled maintenance required Annual inspection recommended
Restart after power interruption	Automatic

PR1 Smart Pyranometer	
Response time (95%)	< 0.2 s
Response time (63%)	< 0.1 s
Spectral range	310 to 2700 nm
Zero offsets	
(a) thermal radiation (at 200 W/m <sup>2</sup> )	1 W/m <sup>2</sup>
(b) temperature change (5 K/h)	1 W/m <sup>2</sup>
Non-linearity (100 to 1000 W/m <sup>2</sup> )	< 0.3 %
Directional response	< 20 W/m <sup>2</sup>
(up to 80° with 1000 W/m <sup>2</sup> beam)	
Temperature response	< 1 % (-20 °C to +50 °C)
Field of view	180°
Measurement range	0 to 1500 W/m <sup>2</sup>
Operating temperature range	-40 °C to +80 °C
Ingress Protection (IP) rating	67

PH1 Smart Pyrheliometer	
Response time (95%)	< 0.2 s
Response time (63%)	< 0.1 s
Spectral range	310 to 2700 nm
Zero offsets	
(b) temperature change (5 K/h)	1 W/m <sup>2</sup>
Non-linearity (100 to 1000 W/m <sup>2</sup> )	< 0.3 %
Field of view	5° ±0.2°
Slope angle	1° ±0.2°
Measurement range	0 to 1500 W/m <sup>2</sup>
Operating temperature range	-40 °C to +80 °C
Ingress Protection (IP) rating	67