



# Sky Radiometers and Sun Photometer

---

**FOR THE MEASUREMENT OF AEROSOL PROPERTIES AND THE SOLAR SPECTRUM**

Multi-band and spectral measurement of direct solar radiation  
Multi-band measurement of diffuse and scattered solar radiation  
Temperature stabilised detection systems  
Weatherproof reliable and robust

## INTRODUCTION

With the increasing interest in climate change and associated investigations, the effects of stratospheric aerosols are being studied in greater detail. Primarily, this refers to water vapour and suspended particles such as smoke, dust, sand and ash. These absorb and scatter solar radiation, act as nuclei for the formation of clouds and promote atmospheric chemical reactions. There are also a number of areas of research where it is interesting to know the spectrum of the energy from the sun, particularly in solar energy.

Understanding atmospheric aerosols is one of the most important ways that scientists can improve models for weather and air quality forecasting and for climate change prediction. In order to gather information on their size and shape it is necessary to measure the characteristics of light directly from the sun and also light scattered and absorbed by the aerosols, at angles up to 90 degrees away from the sun.

The POM sky radiometer is manufactured by Prede Co. Ltd. in Tokyo and distributed by Kipp & Zonen. It is a radiometer with a narrow field of view that makes measurements in several narrow wavebands in the ultraviolet, visible and near-infrared parts of the spectrum. POM includes a dedicated sun tracker that can follow the sun for direct radiation measurements and can also make programmed scans across the sky at defined angles away from the sun.

The PGS-100 sun photometer from Prede measures the continuous spectrum of direct solar radiation in the wavelength range from 350 nm to 1050 nm. In order to make measurements PGS-100 must be fitted to an automatic sun tracker.

## APPLICATIONS

POM and PGS are weatherproof and designed for a long operating life with simple maintenance. The key optical and detection components are temperature stabilized for accurate measurement in a wide range of environmental conditions.



POM-O1 and POM-O2 are installed around the world for reliable automatic solar radiation measurements in meteorology, climatology, atmospheric chemistry and pollution studies. POM is the basis of the Asia-Pacific SKYNET network for aerosol monitoring and satellite ground-truthing. Parameters such as optical depth, scattering coefficients, aerosol distribution and energy distribution can be derived from the data.

PGS-100 is particularly suited to monitoring the solar radiation spectrum and atmospheric absorptions for photovoltaic solar energy research and development.

---

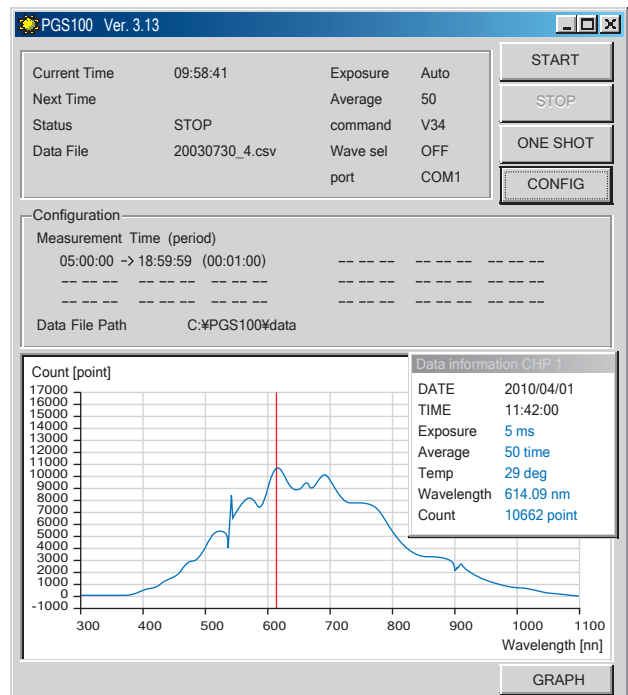
**POM-O1 Sky Radiometer** is a radiometer with a dedicated sun tracker. It uses a single silicon photo-diode detector and rotating filter wheel to measure radiation in seven narrow wavebands from 315 nm to 1020 nm. The instrument has a base with levelling feet and a sun sensor for active tracking. It can point either directly at the sun or scan at user-defined angles away from the sun. Installation is quick and simple. A precipitation sensor is included so that the radiometer is pointed downwards during rain to keep the optics clean.

POM-O1 must be connected to a computer running the operating software in order to make measurements and store data. The Windows™ operating software provides comprehensive user selection of the scanning modes and scheduling, and data storage on the computer. The included software does not provide any post-processing or analysis of the ASCII data files.



**PGS-100 Sun Photometer** is a radiometer that uses a solid state spectrometer with a CCD detector array to measure the direct solar radiation in the wavelength range from 350 nm to 1050 nm. The only maintenance is to periodically clean the optical window and check the desiccant in the radiometer. The PGS-100 must be mounted on an automatic sun tracker to make measurements. Mounting kits are available for the Kipp & Zonen SOLYS 2 and 2AP sun trackers.

PGS-100 must be connected to a computer running Windows™ operating software in order to make measurements and store data. The software allows selection of the spectrum acquisition modes, graphically displays the results, and stores the data for analysis.



*Example of spectral measurement by PGS-100*

The stored ASCII files can be post-processed by the user (software not included) to derive a variety of parameters, including; optical depth, energy distribution, and absorption by atmospheric gasses.

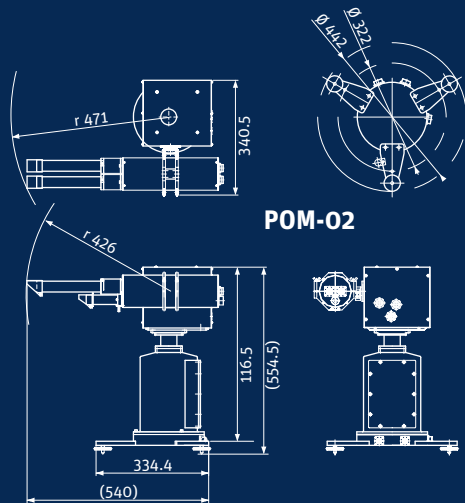
PGS-100 provides spectral information that is valuable in the evaluation of different types of solar cell technologies and solar panel constructions. It is often used together with a thermopile type pyrheliometer and pyranometer(s), which measure the broadband solar radiation.

**POM-02 Sky Radiometer** has all the features of the POM-01, but with an extended waveband range. There is growing interest in monitoring aerosols of larger size and this requires measurement at longer wavelengths. In addition to the POM-01 optical system, the POM-02 has a second system with an Indium Gallium Arsenide infrared detector.

The filter wheel has 11 wavebands, provides measurements to 2200 nm, and also has additional UV channels. Like POM-01, the POM-02 must be connected to a computer to operate, and maintenance is minimal; consisting of regular cleaning of the optical windows and checking the desiccant in the radiometer.

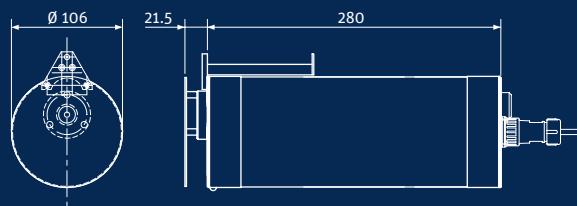
Both instruments have options for operation in very hot or cold climates and to provide dust protection for the optical window(s).





**POM-02**

**PGS-100**



All dimensions in mm

Specifications	POM-01	POM-02	PGS-100
Measurement principle	Multi-band filter radiometer UV, Visible and NIR radiometer	Multi-band filter Radiometer UV, Visible and extended NIR radiometer	Solid-state grating spectrometer Visible and NIR
Detector	UV-enhanced silicon photo-diode	UV-enhanced silicon and InGaAS photo-diodes	Silicon CCD array
Wavelengths	315, 400, 500, 675, 870, 940 and 1020 nm	315, 340, 380, 400, 500, 675, 870, 940, 1020, 1627 and 2200 nm	350 nm to 1050 nm
Wavelength accuracy	2 nm	2 nm	0.5 nm
Half-power bandwidth	3 nm for 315 nm filter, 10 nm for other filters	3 nm for 315 nm filter, 10 nm for other filters	3.6 nm
Full opening view angle	1°	1°	2°
Operating temperature range	-10 °C to +45 °C	-30 °C to +35 °C	-10 °C to +45 °C
Low temperature option	-30 °C to +45 °C	-50 °C to +35 °C	-30 °C to +45 °C
High temperature option	-10 °C to +60 °C	-35 °C to +50 °C	-10 °C to +60 °C
Sun tracker	Integrated; sun position sensor, rain sensor, adjustable stand for levelling		Fits to a Kipp & Zonen Solys 2 or 2AP (requires accessory mounting kit)
Supply voltage	115/230 VAC, 50/60 Hz (standard) 24 VDC (optional)		115/230 VAC, 50/60 Hz only
Dust protection system	Filter and blower system for input optics (AC power only)		N/A
Measurement modes	Direct sun, zenith (cloud), azimuth scan, sun-disk, x-scan		Direct sun only
Windows™ operating software	Instrument setup, wavelength selection, scan modes and configuration, data storage as ASCII files		Acquire spectra, store as ASCII files, display
Communication	RS 232 to computer (not included) running operating software		
Note: PGS-100 must be fitted to an automatic sun tracker with a pointing accuracy of 0.2 ° or better			
Note: The performance specifications quoted are worst-case and/or maximum values			



## HEAD OFFICE

**Kipp & Zonen B.V.**  
 Delftechpark 36, 2628 XH Delft  
 P.O. Box 507, 2600 AM Delft  
 The Netherlands  
 T: +31 (0) 15 2755 210  
 F: +31 (0) 15 2620 351  
 info@kippzonen.com  
 www.kippzonen.com

Kipp & Zonen B.V. reserve the right to alter specifications of the equipment described in this documentation without prior notice

## Distributor for Germany and Switzerland

**Gengenbach Messtechnik e.K.**  
 Heinrich-Otto-Straße 3  
 D-73262 Reichenbach / Fils  
 Deutschland  
 T: +49 (0)7153 9258-0  
 F: +49 (0)7153 9258-160  
 info@rg-messtechnik.de  
 www.rg-messtechnik.de

4414438-V1310