

PIRSC –Silicon cell pyranometers (Rev.2 010715)



Description

PIRSC silicon cell pyranometers are meteorological sensors used to the measuring of global solar radiation in conformity to the guideline of WMO Annex8 (World Meteorological Organization). All pyranometers are calibrated individually with reference to a certified standard pyranometer with higher accuracy.

Using a special silicon photodiode (400 ... 1100nm) and thanks to the particular geometry of the diffuser and filter applied to the transducer, the PIRSC pyranometer reaches an average accuracy (expected daily uncertainty) of $\pm 3\%$ and a field of view of 180 degrees according to the cosine law.

Pyranometers PIRSC series are available with amplified normalized outputs in voltage (0...5Vdc) or current (4...20mA).

Measuring principle

The current generated by the photodiode invested by the solar radiation is converted into a potential difference from the shunt resistor. Under the clear sky irradiance value measured by the pyranometer has uncertainty $<3\%$. In cloudy conditions, at dawn or dusk the solar spectrum can slightly change from the one which the instrument has been calibrated with, so the error can approach between $\pm 3-3.5\%$.

Advantages

- ✓ Excellent quality / price ratio
- ✓ High sensitivity measurement
- ✓ Output signal can be easily interfaced from the most common logger and PC
- ✓ Excellent strength and reliability
- ✓ Noises immunity

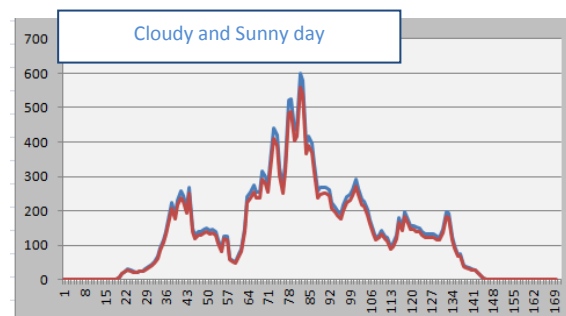
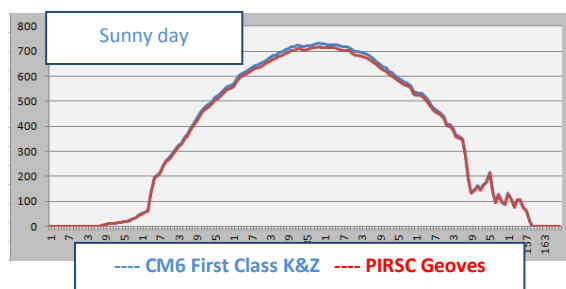
Main applications

Thanks to the excellent response to the cosine law, the pyranometer can be used even when the sun was very low elevation: in this way the instruments measuring is correct throughout the seasons of the year. The main applications are:

- ✓ Meteorology and Climatology
- ✓ Photovoltaic
- ✓ Energy Saving
- ✓ Agriculture
- ✓ Industrial Measurements



Technical features

Model	PIRSC	
Typical measuring range	0...2000 W/m ²	
Spectral field	0,3...1,15μ (0,4...1,1μm linear)	
Transducer	Silicon photodiode	
Typical Sensitivity	10 μV/(W/m ²)	
Electrical Outputs /power supply	-N 10 μV/(W/m ²)	/ none



Versions:	-I 4...20mA / 9...24Vdc -V 0...5Vdc / 9...24Vdc
Impedance	100 Ω
Working Temperature	-40...+80°C
Housing	Anodized aluminium and teflon
Dimensions / weight	\varnothing 50xh44mm / 100g
Spectral features	
Response time (95 %)	< 50 ms
Stability	< \pm 2%
Non linearity	<1% (in the range 0...1000W/m ²)
Spectral selectivity	from -5% (cloudy sky) to +2% (clear sky)
Temperature Response	0,05%/°C (nel range -10...+40°C)
Tilt Response	0...70°<3% 70...80°<6%

Electrical Connection

Versions:	-N (natural output without amplification)	-I (outside amplifier cod.CV/I)	-V (outside amplifier cod.CV/V)
Electrical output:	10 μ V/(W/m ²)	4...20mA (0...2000 W/m ²)	0...5Vdc (0...2000 W/m ²)
Load resistance shunt:	20 Ω	25...440 Ω (tip.100 Ω)	25...440 Ω (tip.100 Ω)
IP68 Connector (sensor side)	Pin1: Out+ signal; Pin2: Out- signal; Pin3: Pin4: Pin5: 	Pin1: +Vdc; Pin2: Out+ signal; Pin3: Gnd Pin4: Pin5: 	

Mounting

Install the pyranometer away from obstacles that can throw the sun's reflection (or their shadows) on the sensor. The pyranometer should be positioned so that the signal cable comes out toward North Pole if used in the northern hemisphere (on the opposite side when installed in the southern hemisphere), in accordance with ISO TR9901 and the dell'WMO recommendations. For an accurate horizontal positioning, the pyranometer is optionally equipped with bubble: the adjustment is made with the two screws with nut recording that allow to change the pyranometer inclination. In order to facilitate the installation of the pyranometer, Geoves provides on request a series of accessories which allow the installation on vertical and horizontal poles and in oblique position (the latter one is used e.g. to allow the pyranometer installation at the same inclination of photovoltaic panels in a photovoltaic power plant).

The installer will check that the height of the mast does not exceed the level of the pyranometer, to avoid measurement errors caused by reflections and shadow of the mast. It's recommended that pyranometer were thermically insulated from his bracket ensuring that there were a good electrical contact to ground.



Installation

Application	Installation height	Orienting and Localization
Meteorology (ref. WMO Annex 8)	1,5...2 m from the ground or on the top of main pole	Oriented toward South without any obstacle over standing that can throw shadow above the sensor. It's advisable an height installation of 1,5-2m to ensure an easy maintenance and check of transducer cleaning.