

# HelioScale

Measurement Solutions for Solar Radiation



HelioScale  $\Phi$   
[phi]

Your robust, low cost solution for measurement of Direct Normal Irradiance.

Reduce  
Project Risk  
Monitor Plant  
Performance  
Deliver  
Bankable  
Data

With **HelioScale  $\Phi$** , you acquire a robust, low cost and low maintenance solution for measurement of Global Horizontal, Diffuse and Direct Normal Irradiance. Its accuracy combined with the ease of operation makes it your first choice for site qualification, feasibility studies or financial bankability of CSP and PV power plants. To contribute to your successful project development we offer:

- Rugged and precise measurement of global radiation (GHI), as well as diffuse (DIF) and direct (DNI) components of solar irradiance with a Rotating Shadowband Irradiometer (RSI) based on a fast response photodiode sensor
- High accuracy due to outdoor calibration of our RSI
- Robust stand-alone system with low maintenance requirements
- Off-grid power supply consisting of a photovoltaic system including 12V backup batteries to ensure operation in low irradiance conditions
- Daily data retrieval via mobile phone networks, satellite or radio connections
- A calibrated data logging system
- Measurement data storage in 1 minute resolution for 1 year

The meteorological stations are engineered, assembled and tested by Wilmers Messtechnik. The stations are usually sold to the client, who would then be in charge of recalibration, operation and maintenance. Suntrace offers these monitoring services and quality control plus data analysis in an additional package.

[www.HelioScale.com](http://www.HelioScale.com)

**HelioScale**  
Solar Measurement Solutions

**Rotating Shadowband Irradiometer (RSI)**  
DNI, GHI & DIF  
[W/m<sup>2</sup>]



Sensing element	Silicon photodiode (LI-COR LI-200)
Output signal global irradiance	0 to 1500 [W/m <sup>2</sup> ] = 0 to 135 $\mu$ A
Output signal diffuse irradiance	0 to 1500 [W/m <sup>2</sup> ] = 0 to 135 $\mu$ A
Output temperature	-40 to +60 °C = 2.3315 to 3.3315 V= (10 mV/K)
Spectral response	400 to 1100 nm
Longterm accuracy of DNI	$\pm$ 3 %
Response time	10 $\mu$ s
Operating temperature	-40 to +70 °C
Relative humidity	0 to 100%

**Silicon Based Pyranomete**  
[W/m<sup>2</sup>]



Response time 95%	<1 ms
Zero offset – Thermal rad. (200 W/m <sup>2</sup> )	0 W/m <sup>2</sup>
Spectral range	400 to 1100 nm
Operating temperature range	-30 to +70 °C
Non-stability (change/year)	$\pm$ 2%

**Thermo Hygro Sensor**  
Air-temperature  
[°C]



Sensing element	Semi-conductor temperature with capacitive humidity sensor
Transducer	Electronical with serial output
Output signal	RS485
Accuracy	$\pm$ 0.5 °C from 0 to 40 °C
Operating temperature	-40 to +80 °C
Accuracy	$\pm$ 2% from 10 to 90 %RH
Typical long-term stability	$\pm$ 1 %RH/a
Response time	<10 s
Radiation shield	Naturally aspirated multi-plate radiation shield

Relative Humidity  
[%]

**Barometric Pressure Sensor**  
Barometric Pressure  
[hPa]

Type	Integrated in the blueberry COMPACT
Measuring range	400 to 1100 hPa
Resolution	0.1 hPa
Long-term stability	$\pm$ 0.5 hPa/a

**Data Logging System**  
blueberry COMPACT



Digital inputs	10
Analogue inputs	6 differential or 12 single ended
Additional inputs	Via RS485 and INPUT modules
Serial inputs	RS485, half-duplex, RS232 for modem
Analogue measuring range	0 to 10 V
Resolution	16 bit, autoranging
Measuring interval	1 s to 24 h
Statistical interval	1 s to 24 h
Statistical functions	Mean value, standard deviation, max, min, sum
Data memory	1 GB (non-volatile ring buffer)
Data interface	RS232 interface, 1200 to 115200 baud, RS485 interface, half duplex, 1200 to 115200 baud
Remote data transfer	Ethernet interface (LAN), 10 MBit/s, GSM, GPRS, DSL, ISDN router
External power supply	15 to 30 VDC or solar panel (optional 120/220)
Power consumption	Typ. 600 mW (50 mA at 12 V)
Sensor excitation	12 VDC switched, max. 100 mA
Temperature range	-40 to +70 °C

**Technical Surrounding**

Autonomous power supply
Lightning protection & grounding kit
Waterproof enclosure