

# Pyrheliometer

## LPPYRHE16

**DeltaOHM**

Member of GHM GROUP

### ACCORDING TO THE STANDARD

Spectrally Flat Class B according to ISO 9060:2018  
WMO recommendations fully compliant

### FLEXIBILITY & VERSATILITY

Multiple choice of outputs to operate  
according to your needs

### STAND ALONE OR PART OF A NETWORK

Often combined with pyranometers for a **complete overview** of all components of the solar radiation

### ACCURATE MEASUREMENTS OVER THE TIME

Radiation with **automatical temperature compensation**

### RELIABLE DATA

Supplied **factory calibrated** &  
with a Calibration Report.



### Main Applications

Meteorological Research Stations  
Climate observations  
Estimation of the solar collector's  
efficiency  
Performance of PV plants

## The perfect solution for direct incidence solar radiation measurements

The pyrheliometer is an instrument that measure the **direct solar irradiance** ( $W/m^2$ ). The receiving surface must be positioned **perpendicularly to sun's rays**, via a solar tracker or else.

LPPYRHE16 is a Class B pyrheliometer with a **field of view of 5° and a slope angle of 1°** in accordance with ISO 9060:2018 standard and with the criteria of the WMO.

The working principle is based on a passive thermopile sensor. The sensitive surface of the thermopile is coated with a matt black paint, which makes the pyrheliometer not selective to the different wave lengths. The spectral range of the pyrheliometer is determined by the transmission of the quartz window, whose function is to protect the sensor from dust and water. A special quartz allows to perform a **nonselective measurement from 200 nm to 4000 nm**.

The adopted sensor allows the **response time to be even lower than ISO 9060:2018 requirements** for the classification of class B pyrheliometers. Radiant energy is absorbed by the blackened surface of the thermopile, thus creating a difference in temperature between the hot junction and the body of the pyrheliometer, which acts in this case as a cold junction. Thanks to the Seebeck effect, the difference in temperature between hot and cold junction is converted into a Difference of Potential.

In order to reduce the variations of sensitivity depending on temperature and to fall within the specifications requested to a class B pyrheliometer, LPPYRHE16 is provided with a passive compensation circuit. Deviations are calculated starting from sensitivity measured at 20 °C.

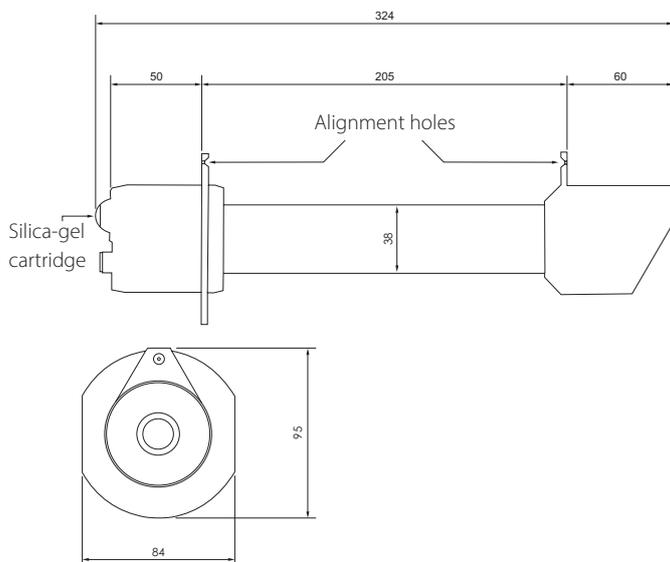
Sensors are supplied with their own Calibration Report.

## Technical Specifications

Sensor	Thermopile
Typical Sensitivity	5 $\mu\text{V}/\text{Wm}^{-2}$
Impedance	5...50 $\Omega$
Measuring range	0...2000 $\text{W}/\text{m}^2$
Viewing angle	5° (slope 1°)
Spectral range (50%)	200...4000 nm
Output	Depending on the model: - Analog in $\mu\text{V}/\text{Wm}^{-2}$ - Analog 4...20 mA - Analog 0...1 V, 0...5 V or 0...10 V - Double output: analog 4...20 mA + digital RS485 Modbus-RTU - Digital RS485 Modbus-RTU
Power supply	10...30 Vdc (for 4...20 mA, 0...1 V and 0...5 V outputs) 15...30 Vdc (for 0...10 V output) 5...30 Vdc (for RS485 Modbus-RTU output)
Connection	- 4-pole M12 connector for analog output models - 8-pole M12 connector for digital and double output models
Weight	1.5 kg approx.
Operating conditions	-40...80 °C / 0...100 %RH

### Installation and dimensions

To point the pyrhelimeter, the two holes in the front and back flange are used. To properly align the instrument, just make sure that the sun's beams that pass through the first hole (on the front flange of the pyrhelimeter) reach the second hole (on the back flange).



## ISO 9060:2018 Technical Specifications

Classification	Spectrally Flat Class B
Response time (95%)	< 9 s
Zero offset in response to a 5 K/h change in ambiente temperature	< $ \pm 3  \text{ W}/\text{m}^2$
Long-term instability (1 year)	< $ \pm 1  \%$
Non-linearity	< $ \pm 0.5  \%$
Spectral error	< $ \pm 0.8  \%$
Temperature response (-10...+40 °C)	< $ \pm 2  \%$
Tilt response	< $ \pm 0.5  \%$



### Ordering Codes

LPPYRHE16

**Blank** = analog output in  $\mu\text{V}/\text{Wm}^{-2}$   
**AC** = analog output 4...20 mA  
**ACS** = analog output 4...20 mA + digital output Modbus-RTU  
**AV** = analog output 0...1 V, 0...5 V or 0...10 V (to be defined when ordering)  
**S** = digital output RS485 Modbus-RTU

Pyrhelimeters are supplied with light shade, cartridge with silica-gel crystals, M12 movable connector and Calibration Report.

The cables have to be ordered separately.

#### Accessories

- CPM12AA4.xx** Cable for LPPYRHE16 / 16AC / 16AV models. 4-pole M12 connector on one end, open wires on the other end (available length 2, 5 or 10 m).
- CPM12-8D.xx** Cable for LPPYRHE16S. 8-pole M12 connector on one end, open wires on the other end (available length 2, 5 or 10 m).
- CPM12-8DA.xx** Cable for LPPYRHE16ACS. 8-pole M12 connector on one end, open wires on the other end (available length 2, 5 or 10 m).
- CP24** PC connecting cable for the RS485 MODBUS parameters configuration (only for models with RS485 output). With built in RS485/USB converter. 8-pole M12 connector on instrument side and A type USB connector on PC side.

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In order to ensure the quality of our instruments, we are constantly re-evaluating our products. Improvements can imply changes in specification; we advise you to always check our website for the newest version of our documentation.

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