



# PYRAsense12 LPS12...

## SPECTRALLY FLAT CLASS B PYRANOMETER WITH SHADOW RING

### INTRODUCTION

The LPS12... is built around the LPS02, our Class B Spectrally Flat pyranometer. This family of pyranometers is standard equipped with an adjustable shadow ring that prevents the direct solar radiation to reach the sensor the whole day long, so that **only the diffuse solar radiation** will be measured.

Measuring only diffuse solar radiation provides valuable information about the **atmospheric conditions and overall energy distribution** in a particular location. This data are particularly relevant especially for:

- gathering information about cloud cover and atmospheric transparency - crucial for weather forecasting, climate modeling, and understanding regional climate patterns;
- understanding the proportion of diffuse radiation relative to total solar radiation for assessing the solar energy potential of a region - essential for planning and optimizing the performance of solar energy systems, such as solar panels and solar thermal collectors;
- understanding the complex interactions between solar radiation, atmospheric dynamics, and climate processes - necessary for improving climate models, predicting climate change impacts, and assessing regional climate variability.

### FEATURES

#### Integrated diagnostic for digital models

Internal temperature, relative humidity, and pressure sensors. You can keep an eye on the operating condition of your pyranometer and predict any maintenance work in advance, thus always ensuring reliable measurements.

Built-in **days-of-operation counter** to optimize your maintenance schedule effortlessly, ensuring peak performance.

#### Integrated bubble level in the base of the support

To ease levelling during installation.

Moreover, the pyranometer can be equipped with an optional tilt sensor which allows the position of the complete ring and sensor structure to be monitored over time.

### CONFIGURATION & MEASUREMENT

#### The sensors

Using the PC application software DATAsense, it is possible to configure the sensor (e.g., Modbus parameters, measuring range for the analog output, etc.), monitor the measurements in real time and save the values detected during the connection in a file.

#### Passive, analog or RS485 Modbus-RTU isolated output + optional additional analog output

Configurable 0...10 V, 0...5 V, 0...1 V, 4...20 mA or 0...20 mA.

#### The irradiance range

It is configurable for the analog output.

#### Calibration report

The pyranometers are supplied factory calibrated according to ISO 9847:2023 (Type A1) standard and with an individual Calibration Report.



#### SMART TECHNOLOGY

Digital models with internal diagnostic sensors to keep operating conditions always under control. Built-in days-of-operation counter.



#### EASY TO SET UP & QUICK TO INSTALL

Integrated bubble level and optional tilt sensor to ensure accurate installation in any position. Configuration and real time data monitoring via software.



#### ACCURATE & RELIABLE

Supplied factory calibrated with individual Calibration Report. ISO 17025 Calibration Certificate available upon request.



#### ACCORDING TO THE STANDARD

Spectrally Flat Class B according to ISO 9060. WMO recommendations & IEC 61724-1 requirements fully compliant.



#### GREAT FLEXIBILITY

Wide variety of outputs choice.

## Technical specifications according to ISO 9060:2018

|  |   |                          |
|--|---|--------------------------|
| Classification   | Spectrally Flat Class B   |                          |
| Response time (95%)  | < 10 s  |                          |
| Zero offset  | a) response to a 200 W/m <sup>2</sup> thermal radiation             | <  ±10  W/m <sup>2</sup> |
|  | b) response to a 5 K/h change in ambient temperature                | <  ±4  W/m <sup>2</sup>  |
|  | a) total zero offset including the effects a), b) and other sources | <  ±15  W/m <sup>2</sup> |
| Long-term instability (1 year)                                   | <  ±1  %  |                          |
| Non-linearity  | <  ±1  %  |                          |
| Directional response (up to 80° with 1000 W/m <sup>2</sup> beam) | <  ±18  W/m <sup>2</sup>  |                          |
| Spectral error   | <  ±0.5  %  |                          |
| Temperature response (-10...+40°C)                               | <  ±1.5  %  |                          |
| Tilt response  | <  ±1  %  |                          |

## Additional measurements in digital models

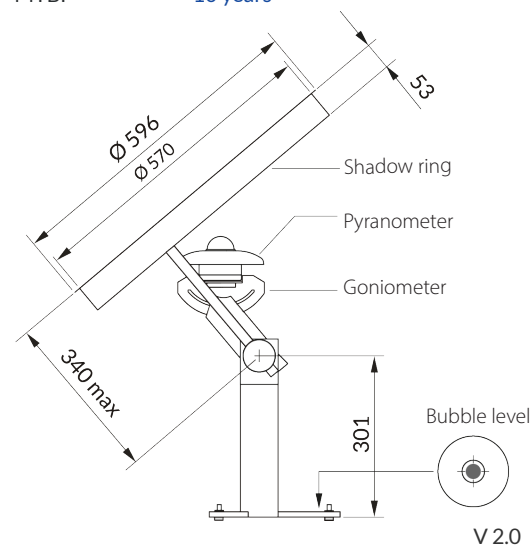
|                            |            |                              |
|----------------------------|------------|------------------------------|
| Internal temperature       | range      | -40...+80 °C                 |
|                            | resolution | 0.1 °C                       |
|                            | accuracy   | ± 0.5 °C (0...60 °C)         |
| Internal relative humidity | range      | 0...100 %RH                  |
|                            | resolution | 0.1 %RH                      |
|                            | accuracy   | ± 3 %RH @25 °C (20...80 %RH) |
| Internal pressure          | range      | 300...1100 hPa               |
|                            | resolution | 0.1 hPa                      |
|                            | accuracy   | ± 1 hPa (0...60 °C)          |
| Tilt sensor                | range      | 0°...+180°                   |
|                            | resolution | 0.1°                         |
|                            | accuracy   | < 0.5°                       |

## Ordering codes

|          |     |   |
|----------|-----|---|
| LPS12... | M00 | Modbus output, without tilt                       |
|          | M0T | Modbus output, with tilt                          |
|          | MA0 | Modbus + configurable analog output, without tilt |
|          | MAT | Modbus + configurable analog output, with tilt    |
|          | OCO | 2-wire (current loop) 4...20 mA output            |
|          | OPO | mV output   |

## General specifications

|                              |   |
|------------------------------|---|
| Sensor                       | Thermopile  |
| Typical sensitivity          | 6...12 µV/Wm <sup>2</sup>   |
| Measuring range              | -200...4000 W/m <sup>2</sup><br>The irradiance range for the analog output is 0...2000 W/m <sup>2</sup> by default, and is configurable in LPS12Mxx   |
| Resolution                   | 0.1 W/m <sup>2</sup>  |
| Viewing angle                | 2π sr   |
| Spectral range (50%)         | 283...2800 nm   |
| Output                       | Depending on the model: <ul style="list-style-type: none"> <li>• RS485 Modbus-RTU</li> <li>• RS485 Modbus-RTU + configurable analog 4...20 mA (default), 0...20 mA, 0...1 V, 0...5 V or 0...10 V</li> <li>• 2-wire (current loop) 4...20 mA</li> <li>• passive in mV</li> </ul> |
| Power supply                 | 7...30 Vdc for RS485 output<br>10...30 Vdc for analog output<br>15...30 Vdc for output 0...10 V   |
| Consumption (digital models) | <i>Models with Modbus output:</i><br>15 mA @ 24 Vdc<br>21 mA @ 12 Vdc<br><i>Models with Modbus + analog output:</i><br>37 mA @ 24 Vdc & Iout=22 mA<br>43 mA @ 12 Vdc & Iout=22 mA   |
| Connection                   | 5-pole M12<br>8-pole M12 (only for LPS12MAx)  |
| Weight                       | 6.8 kg approx.  |
| Operating conditions         | -40...+80 °C<br>0...100 %RH<br>Max. altitude 6000 m   |
| Bubble level accuracy        | < 0.2°  |
| Protection degree            | IP 67   |
| Materials                    | Housing: anodized aluminium<br>Screen: ASA<br>Dome: optical glass<br>Ring and stand: aluminum alloy and stainless steel   |
| MTBF                         | > 10 years  |



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