

Spectrally Flat Class B Pyranometer

LPPYRA02

○ ACCORDING TO THE STANDARD

Fully compliant with ISO 9060:018 for incident radiation measurement (short band)

○ GREAT FLEXIBILITY

Wide availability of standard output signals for **easy integration** in any installation

○ EASY TO SET UP AND QUICK TO INSTALL

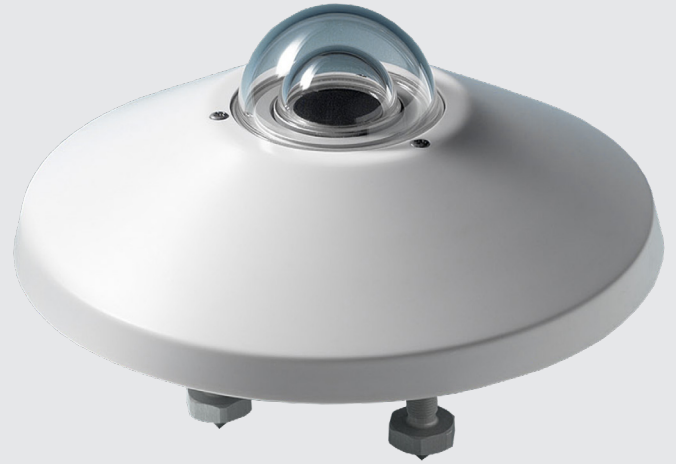
Rugged housing with low temperature response
Integrated **levelling device** for perfect positioning

○ ACCURATE AND RELIABLE SYSTEM

High reliability - extended warranties
Individual Calibration Reports for each instrument

○ HIGH IMMUNITY AGAINST INTERFERENCE

Protected against overpower and **fully electrically isolated** from any mounting surface



Main Applications

PV monitoring
Solar energy
Meteorology
Agriculture

Measuring solar efficiency – highly accurate

The LPPYRA02 series has been designed to provide a very highly **stable and accurate** solution for measuring solar and to be used for research studies.

The pyranometers in this series are all based on the **thermopile principle, very precise**. This principle provides a μV signal without the need of an external power supply. To be able to transfer the signal over a longer distance and to prevent interference, mostly types are equipped with an integrated transmitter. When using a 4-20 mA, 0-10 VDC or RS485 Modbus-RTU output, an external active power supply is necessary. The output of these series is always related to W/m^2 .

All our pyranometers are made in a way that the electrical system is totally isolated from the housing, making it possible to mount the pyranometer on any surface, including metal ones, without the need of isolation.

Delta OHM is one of the main pyranometer producers worldwide. We produce a full range of pyranometers according to the **ISO 9060: 2018 - Spectrally Flat Class A, B and C**.

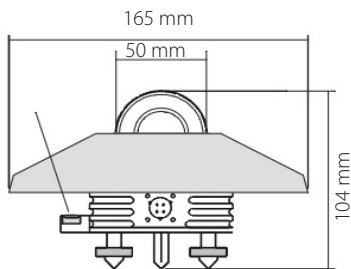
Each of our pyranometers is **calibrated separately** during production; all are supplied standard with a Report of Calibration in accordance with the ISO 9847:1992. Next to this, we are the only pyranometer producer that has invested in a full range of 6 accredited ISO 17025 Calibration Laboratories.

Pyranometers can be used **as stand-alone or in combination with our weather stations**. Delta OHM provides a full range of data loggers with integrated GSM/3G/4G modem to read and transfer measured data to any database or Cloud solution.

Technical Specifications

| | |
|------------------------------------|--|
| Sensor | Thermopile |
| Typical Sensitivity | $6 \div 12 \mu\text{V}/\text{W}/\text{m}^2$ |
| Impedance | $33 \div 45 \Omega$ |
| Measuring range | $0 \div 2000 / 4000 \text{ W}/\text{m}^2$ |
| Responding Time | $< 15 \text{ sec}$ (95% of response) |
| Spectral range (50%) | $283 \div 2800 \text{ nm}$ |
| Operating temperature/ humidity | $-40 \div 80 \text{ }^\circ\text{C}$ $0 \div 100 \text{ \% RH}$ |
| Output | Output Signal $0 \div 1 \text{ Volt}$ Output Signal Range $0 \div 30 \text{ mV}$ |
| Power supply | $10 \div 30 \text{ Vdc}$ ($4 \div 20 \text{ mA}$ - $0 \div 1 \text{ V}$ - $0 \div 5 \text{ V}$ outputs) $15 \div 30 \text{ Vdc}$ ($0 \div 10 \text{ V}$ output) $5 \div 30 \text{ Vdc}$ (RS485 Modbus-RTU) $7 \div 30 \text{ Vdc}$ (SDI-12) |
| Consumption | $< 200 \mu\text{A}$ for SDI-12 version |
| Connection | - 4-pole M12 connector for analog output models - 8-pole M12 connector for digital and double output models |
| Accuracy of levelling device | $< 0.1^\circ$ |
| Protection Degree | IP 67 |
| MTBF | $> 10 \text{ years}$ |

Dimensions



LPPYRA02 is also available in the version with shadow-ring (LPPYRA12). This measures the diffuse solar radiation eliminating the contribution of direct irradiance.



ISO 9060:2018 Technical Specifications

| Classification | Spectrally Flat Class B | |
|----------------------|--|-----------------------------------|
| Response time (95%) | $< 10 \text{ s}$ | |
| Zero offset | a) response to a $200 \text{ W}/\text{m}^2$ thermal radiation | $< \pm 10 \text{ W}/\text{m}^2$ |
| | b) response to a 5 K/h change in ambient temperature | $< \pm 4 \text{ W}/\text{m}^2$ |
| | c) total zero off-set including the effects a), b) and other sources | $< \pm 15 \text{ W}/\text{m}^2$ |
| No-estability | $< 1 \text{ \%}$ | |
| No-linearity | $< 1 \text{ \%}$ <small>100 to $1000 \text{ W}/\text{m}^2$ of radiation (short beam)</small> | |
| Directional Error | $< 20 \text{ W}/\text{m}^2$ (angle until 80° with $1000 \text{ W}/\text{m}^2$ radiation beam) | |
| Spectral error | $< \pm 0.5 \text{ \%}$ | |
| Temperature response | $< 2\%$ (-20° to $+40^\circ\text{C}$) | |
| Tilt response | $< \pm 2 \text{ \%}$ | |

Ordering Codes

| | | |
|----------|---|--|
| LPPYRA02 | <input type="checkbox"/> <input type="checkbox"/> | Blank = $0 \dots 2000 \text{ W}/\text{m}^2$ 4 = $0 \dots 4000 \text{ W}/\text{m}^2$ Only for AC - AV - ACS models. |
|----------|---|--|

Blank = Analog in $\mu\text{V}/\text{W}/\text{m}^2$
AC = Analog $4 \div 20 \text{ mA}$
AV = Analog $0 \div 1 \text{ V}$, $0 \div 30 \text{ mV}$ or $0 \div 10$ (to be defined when ordering) ACS = Analog $4 \div 20 \text{ mA}$ + digital Modbus-RTU
S = Digital RS485 Modbus-RTU
S12 = Digital SDI-12

All pyranometers are supplied with shade disk, cartridge for silica-gel crystals, 2 spare sachets, levelling device, Calibration Report.

Accessories

| | |
|--------------|---|
| LPS1 | Fixing bracket for mast $\text{Ø}40 \div 50 \text{ mm}$. |
| LPRING02 | Base with levelling device and adjustable holder. |
| LPRING04 | Adjustable holder for mounting the pyranometer a $\text{Ø}40 \text{ mm}$ mast in an inclined position. |
| HD2003.79K | Kit to install the pyranometer on a transverse mast. |
| HD2003.85K | Kit with adjustable height to mount on a $\text{Ø}40 \text{ mm}$ mast. |
| LPS6 | Installation kit including: 750 mm mast, base fitting, graduated support plate, bracket for pyranometers. |
| CPM12AA4.xx | Cable for LPPYRA02 / 02AC / 02AV models. M12 connector on one end, open wires on the other end (2, 5 or 10 m). |
| CPM12-8D.xx | Cable for LPPYRA02S / 02S12. M12 connector on one end, open wires on the other end (2, 5 or 10 m). |
| CPM12-8DA.xx | Cable for LPPYRA02ACS. M12 connector on one end, open wires on the other end (2, 5 or 10 m). |
| CP24 | PC connecting cable for the RS485 MODBUS parameters configuration (only for models with RS485 output). |

Delta OHM

Member of GHM GROUP

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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