

Spectrally Flat Albedometer Class A - B - C

LPPYRA11 - LPPYRA06 - LPPYRA05

ACCORDING TO THE STANDARD

Follows recommendations of the WMO
fully compliant with ISO 9060:2018

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
Individual Calibration Reports for each instrument

HIGH IMMUNITY AGAINST INTERFERENCE

Protected against overpower and fully electrically
isolated from any mounting surface

FULLY INDEPENDENT

No power supply needed



Main Applications

Climatological research
Weather stations
Agriculture
Environmental research

A complete range of sensors for the measurement of surface albedo

Albedometers are composed of **two pyranometers with thermopile sensors** that are mounted back-to-back. An albedometer measures in two directions; one pyranometer is facing upwards (measuring the global solar radiation), the other pyranometer is facing downwards (measuring the reflected solar radiation).

Albedo is the fraction of solar radiation that is reflected from the ground, with respect to incident radiation. $ALBEDO = \frac{\text{Reflected Global Radiation}}{\text{Incident Global Radiation}}$ also called Solar Reflectance. By using albedometers, we can calculate the net radiation obtained through the difference between incident global radiation and reflected global radiation.

Delta OHM albedometer series is fully compliant with **ISO 9060: 2018** and with the criteria of the WMO "Guide to Meteorological Instruments and Methods of Observation". 3 different versions are available: **LPPYRA11 - Spectrally Flat Class A**, **LPPYRA05 - Spectrally Flat Class B** and **LPPYRA06 - Spectrally Flat Class C**.

All albedometers are passive and do not require any power supply. They are composed in a way that the outputs of the two pyranometers electric signals can be directly sent to a data logger or to an automatic data processor. Moreover, the two pyranometers are coupled in order to have the same sensitivity.

Every pyranometer composing the albedometer is **calibrated separately** as per the WRR (World Radiometric Reference) standard and is supplied with the relevant Report of Calibration. These are strong and reliable ground-based instruments, especially designed to be used under all weather conditions. They are suitable for installation in the field.

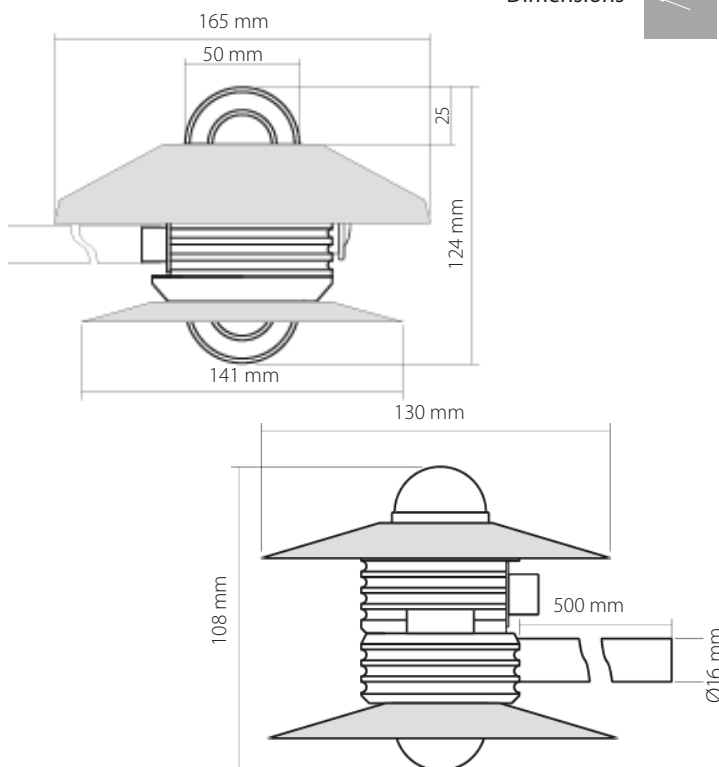
Technical Specifications	LPPYRA11*	LPPYRA05*	LPPYRA06*
Typical sensitivity	6 to 11 $\mu\text{V}/(\text{W}/\text{m}^2)$	6 to 12 $\mu\text{V}/(\text{W}/\text{m}^2)$	5 to 15 $\mu\text{V}/(\text{W}/\text{m}^2)$
Impedance	$5 \Omega \div 50 \Omega$	$33 \Omega \div 45 \Omega$	$33 \Omega \div 45 \Omega$
Measuring range	$0 \div 4000 \text{ W}/\text{m}^2$	$0 \div 2000 \text{ W}/\text{m}^2$	$0 \div 2000 \text{ W}/\text{m}^2$
Viewing angle	$2\pi \text{ sr}$	$2\pi \text{ sr}$	$2\pi \text{ sr}$
Spectral range (50%)	283 nm \div 2800 nm	283 nm \div 2800 nm	300 nm \div 2800 nm
Operating temperature / humidity	$-40 \text{ }^\circ\text{C} \div 80 \text{ }^\circ\text{C} - 0 \text{ to } 100\% \text{ RH}$	$-40 \text{ }^\circ\text{C} \div 80 \text{ }^\circ\text{C} - 0 \text{ to } 100\% \text{ RH}$	$-40 \text{ }^\circ\text{C} \div 80 \text{ }^\circ\text{C} - 0 \text{ to } 100\% \text{ RH}$
Output	Analog in $\mu\text{V}/\text{Wm}^{-2}$	Analog in $\mu\text{V}/\text{Wm}^{-2}$	Analog in $\mu\text{V}/\text{Wm}^{-2}$
Connection	8-pole M12 connector	8-pole M12 connector	8-pole M12 connector
Weight	1.35 kg	1.35 kg	1.1 kg
Accuracy of bubble level	$< 0.1^\circ$	$< 0.1^\circ$	$< 0.2^\circ$
Ingress Protection (IP) rating	67	67	67
Mean Time Between Failures	$> 10 \text{ years}$	$> 10 \text{ years}$	$> 10 \text{ years}$

ISO 9060:2018 Specifications

Classification	Spectrally Flat Class A	Spectrally Flat Class B	Spectrally Flat Class C
Response time 95%	$< 5 \text{ s}$	$< 10 \text{ s}$	$< 20 \text{ s}$
Zero Off-set	a) Response to thermal radiation ($200 \text{ W}/\text{m}^2$)	$< \pm 7 \text{ W}/\text{m}^2$	$< \pm 15 \text{ W}/\text{m}^2$
	b) Response to temperature change 5K/h	$< \pm 2 \text{ W}/\text{m}^2$	$< \pm 4 \text{ W}/\text{m}^2$
	c) total zero off-set including the effects a), b) and other sources	$< \pm 10 \text{ W}/\text{m}^2$	$< \pm 15 \text{ W}/\text{m}^2$
Long-term instability (1 year)	$< \pm 0.5 \%$	$< \pm 1 \%$	$< \pm 1 \%$
Non-linearity	$< \pm 0.2 \%$	$< \pm 1 \%$	$< \pm 1.5 \%$
Response according to the cosine law	$< \pm 10 \text{ W}/\text{m}^2$	$< \pm 18 \text{ W}/\text{m}^2$	$< \pm 20 \text{ W}/\text{m}^2$
Spectral error	$< \pm 0.2 \%$	$< \pm 0.5 \%$	$< \pm 2 \%$
Temperature response ($-10^\circ\text{C} \dots +40^\circ\text{C}$)	$< 1 \%$	$< 1.5 \%$	$< 3 \%$
Tilt response	$< \pm 0.2 \%$	$< \pm 2 \%$	$< \pm 2 \%$

* All technical data, excluding weight, are referred to one of the two pyranometers composing the albedometer.

Dimensions



Ordering Codes

LPPYRA

11 = Spectrally Flat Class A
05 = Spectrally Flat Class B
06 = Spectrally Flat Class C

All albedometer are supplied with upper and bottom shade disk, cartridge with silica-gel crystals, 2 spare sachets, levelling device, support bracket $\varnothing 16 \times 500 \text{ mm}$ and **Calibration Report**.

Accessories

- LPSP1 Spare upper shade disk for LPPYRA05 and LPPYRA11 (upper one).
- LPSP2 Spare shade disk for LPPYRA06 albedometer.
- LPSP3 Spare shade disk for LPPYRA05 and LPPYRA11 (lower one).
- CPM12AA8.xx Cable with 8-pole M12 connector on one end, open wires on the other end. (2, 5 or 10 m).