Pyranometers-Albedometers-NET Irradiance Meter

LP PYRA 02 - LP PYRA 03
LP PYRA 12 - LP PYRA 05
LP PYRA 06 - LP NET 07

We offer First Class LP PYRA 02 & LP PYRA 12 & Second Class LP PYRA 03 pyranometers which fully comply with ISO 9060 standards, & meet the requirements defined by the World Meteorological Organization (WMO). These are strong and reliable ground-based instruments, especially designed to be used under all weather conditions. They are suitable for installation on the field.

Recommended used : Atmospheric Research, Weather Stations, Climatology, Energy Saving Research, Productive Efficiency Test of Photovoltaic Plnats, etc...

Pyranometers LP PYRA 02 & LP PYRA 03 are well suited for the measurement of incoming global solar radiation (0.3µm ÷ 3µm spectral range). LP PYRA 12 shadow ring is designed to shield the instrument sensor from direct radiation; by that, an exact measurement of the diffuse sky radiation is possible. No power supply is needed; pyranometers generate a voltage which is usually equal to:

$$10 \ \frac{mV}{kW \cdot m^2}$$

Every pyranometer is calibrated separately & is supplied standard with a WRR (World Radiometric Reference) Report of Calibration.

Technical Specification	LP PYRA 02 / LP PYRA 12*	LP PYRA 03
Typical Sensitivity	10 µV (W/m²)	
Impedance	33 W ÷ 45 W	
Measuring Range	0 to 2000 W/m²	
Viewing field	2 p sr	
Spectral Field	305 nm to 2800 nm W/m² (50%)	
Operating Temperature	–40 °C to 80 °C	
Working Temperature	0.90 Kg	0.45 Kg
ISO 9060 Specifications		
Response Time	< 28 sec	< 30 sec
Zero Off-set		
a) Response to thermal radiation (200Wm⁻²)	15 W/m²	25 W/m²
b) Response to Temperature change 5K/h	<|±4| W/m²	<|±6|W/m²
3a) Non stability over 1 year	< |±1.5|%	< |±2.5|%
3b) Non linearity	< |±1|%	< |±2|%
3c) Spectral Selectivity	<|±18|W/m²	<|±22|W/m²
3e) Response with Regard to Temperature	< |±5|%	<|±7|%
3f) Tilt-response	< 4%	< 8%
3f) Risposta in funzione del Tilt	< |±2|%	< |±4|%
Shadow ring for LP PYRA 12		
Weight		5.90 Kg
Diameter		570 mm
Height		54 mm
Basis Diameter		300 mm

ORDERING CODE :

LP PYRA 02-5 : First Class Pyranometer according to ISO 9060. Complete with shade disk, drying cartridge with silicagel crystals, 2 silicagel cartridges, spirit level & Report of Calibration. Connecting cable 5 m.

LP PYRA 02-10 : See above : Connecting cable 10m.

LP S1 : Mounting kit for LP PYRA 02 : Bracket for attachment to a mast, including fasteners and leveling screws.

LP SP1 : Shade disk for LP PYRA 02

LP SG : Drying cartridge with silicagel crystals, complete with O-ring.

LP G : Pack of 5 cartridges of silicagel.

LP PYRA 03-5 : Second Class Pyranometer according to ISO 9060. Complete with Report of Calibration. Connecting Cable 10 m.

LP S2 : Mounting kit : spirit level & stud for mounting LP PYRA 03 on a support which is also part of the kit. Fasteners, shade disk LP SP2 are included.

LP SP2 : Shade disk.

LP PYRA 12 : First Class Pyranometer (LP PYRA 02) according to ISO 9060. Complete with shade disk, shadow ring for diffuse radiation, drying cartridge for silicagel crystals, 2 silicagel cartridges and Report of Calibration. Connecting Cable 10m

ALBEDOMETERS

Delta Ohm Manufactures two different models of albedometers :

LP PYRA 05 is constructed starting from two 1st Class* Pyranometers and the LP PYRA 06 starting from two 2nd Class* Pyranometers (* according to ISO 9060 standards and to specifications published by the World Meteorological Organization). An albedometer basically consists of two pyranometers, mounted back-to-back, one looking upward (sky) and one downward (earth). The upward pyrameter measures the incident global radiation (direct radiation + diffuse radiation) striking the ground, while the downward one, measures the global radiation reflected from the ground. The outputs of the two pyranometers electric signals (the two pyranometers which made up of the LP PYRA 05 are coupled in order to have the same sensitivity) can be directly sent to a data logger or to an automatic data processor. Albedo is the fraction of solar radiation that is reflected from the ground, with respect to incident radiation :

$$\text{ALBEDO} = \frac{\text{Reflected Global Radiation}}{\text{Incident Global Radiation}}$$

By using albedometers, we can calculate the net radiation obtained through the difference between incident global radiation and reflected global radiation. Delta Ohm albedometers operate within 0.3 µm ÷ 3 µm spectral range. No power supply is needed, as the two pyranometers generate a voltage which is usually equal to :

$$10 \ \frac{\text{mV}}{\text{kW}\cdot\text{m}^2}$$

Every pyranometer composing the albedometer is calibrated separately as per the WRR (World Rediometric 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 of the field.

Recommended use : climatological research, weather stations, road weather stations, agriculture stations, etc....

TECHNICAL SPECIFICATION	LP PYRA 05*	LP PYRA 06*
Typical Sensitivity	10 µV (W/m²)	
Typical Impedance	33 W ÷ 45 W	
Irradiance Range	0 to 2000 W/m²	
Viewing Angle	2 p sr	
Spectral Range (50%)	305 nm ÷ 2800 nm W/m²	
Operating Temperature	–40 °C to 80 °C	
Weight (Pyranometer only)	1.35 Kg	1.1 Kg
ISO 9060 Specifications		
Response Time (95%)	< 28 sec	< 30 sec
Zero Off-set		
a) Thermal Radiation (200Wm⁻²)	15 W/m²	25 W/m²
b) Temperature Change 5K/h	<|±4| W/m²	<|±6|W/m²
Non stability	< |±1.5|%	< |±2.5|%
Non linearity	< |±1|%	< |±2|%
Directional Error	<|±18|W/m²	<|±22|W/m²
Spectral Selettivity	< |±5|%	<|±7|%
Temperature Response	< 4%	< 8%
Tilt Response	< |±2|%	< |±4|%

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

ORDERING CODE :

LP PYRA 05 : Albedometer made up of two First Class Pyranometers, according to ISO 9060. Complete with : top shade disk and bottom shade disc, drying cartridge with silicagel crystals, 2 silica gel cartridges, spirit level, rod for attachment to a mast, connecting cable 10m and Report of Calibration.

LP SP1 : Top shade disc for albedometer LP PYRA 05 (upward pyranometer).

LP SP3 : Bottom shade disk for albedometer LP Pyra 05 (downward pyranometer)

LP SG : Drying cartridge with silicagel crystals, complete with O-ring.

LP PYRA 06-05 : Albedometer made up of two 2nd Class Pyranometers, according to ISO 9060. Complete with : top shade disk and bottom shade disc, spirit level, rod for attachment to a mast, connecting cable 5m and Report of Calibration.

LP PYRA 06-10 : See above. Connecting cable 10m.

LP SP2 : Shade disc of pyranometer LP PYRA 03.

NET IRRADIANCE METER

LP NET 07 net radiometer is designed to measure the Net radiation passing through a surface, across the spectral range between the near ultraviolet and the far infrared. The Net radiation is defined as the difference between the radiation that strikes the top surface, and the radiation that strikes the bottom surface of the net radiometer. The upward facing surface measures direct and diffuse solar radiation plus long-ware irradiance from the sky (clouds), while the downward facing surface measures the reflected solar radiation (Albedo) plus the terrestrial long-ware irradiance.

LP NET 07 is designed for continuous outdoor use, and is suitable for all weather conditions.

Although net radiometers are generally used in meteorology to measure radiation balance, the LP NET 07 can also be used to measure indoor radiant temperature (ISO 7726).

Working Principle

LP NET 07 is based on a thermopile sensor with one set of hot junctions in contact with the upper surface and a set of cold junctions in contact with the lower surface. The difference in temperature between the two receivers is proportional to the net radiation. Through the Seebeck effect, the difference in temperature between hot and cold junctions is translated into a Potential Difference. A hemispheric Teflon® - coated dome protects the two receivers, and their particular shape allows an optimal cosine corrected response. The Teflon® coating allows both a continuous outdoor use and a constant spectral response, ranging from the near ultraviolet (200nm) to the far infrared (100µm) spectral regions.

TECHNICAL SPECIFICATION

Typical Sensitivity :	10µV/(W/m²)
Impedance :	2Ω + 4Ω
Measuring Range :	±2000 W/m²
Spectral Range :	0.2µm ÷ 100 µm
Operating Temperature	–40°C ÷ 80°C
Weight :	0.35 Kg
Response Time (95%) :	< 75 sec

ORDERING CODE :

LP NET 07 : Net radiometer. Connecting Cable : 5 m Standard length. Different cable lengths upon request.

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HTA INSTRUMENTATION (P) LTD.,
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