

## LP PYRA 02 : Pyranometer (ISO 9060 1<sup>st</sup> Class)



**LP PYRA 02 Pyranometers** (ISO First Class) with calibration certificate, which fully comply with ISO 9060 standards, and meet the requirements defined by the World Meteorological Organization (WMO), The LP PYRA 02 Pyranometer measures the irradiance on a plane surface ( $Watt/m^2$ ). Measured irradiance is the result of the sum of direct solar irradiance and of diffuse irradiance. A 10 meter long cable complete with SICRAM module, These are strong and reliable ground-based instruments, especially designed to be used under all weather conditions.

### Working Principle

LP PYRA 02 pyranometer is based on a thermopile sensor. The thermopile sensitive surface is coated with a black matt paint, which allows the pyranometer not to be selective at different wave lengths. The pyranometer spectral range is determined by the transmittance of the **two glass domes** type K5, Radiant energy is absorbed by the thermopile black surface, thus creating a difference of temperature between the center of the thermopile (hot junction) and the pyranometer body (cold junction). Thanks to the Seebeck effect, the difference of temperature between hot and cold junction is converted into a Difference of Potential. In order to grant the thermopile a proper thermal insulation from the wind and reduce the sensitivity to thermal irradiance, LP PYRA 02 is equipped with two concentric domes having a diameter of 50mm and 30mm, respectively. The domes protect the thermopile from the dust, which, laying down on the black surface, might change spectral sensitivity.

### Recommended use:-

- Atmospheric research
- Weather stations, Climatology
- Energy saving research
- Productive efficiency test of photovoltaic plants, etc.

No power supply is needed; Pyranometers generate a voltage, Every pyranometer is calibrated separately and is supplied standard with a WRR (World Radiometric Reference) Report of Calibration.

### Technical Specification

**ISO 9060 Classification :** First class

**Detector type :** Based on a thermopile sensor

**Measuring range :** 0 to 2000  $W/m^2$

**Spectral range (50%) :** 305 nm to 2800 nm

**Typical sensitivity :** 10  $\mu V/(W/m^2)$

**Operating temperature :** - 40  $^{\circ}C$  to 80  $^{\circ}C$

**Response time (95%) :** < 28 sec.

**Field of View :** 180 $^{\circ}$

**Zero Off-set: (a) Response to thermal radiation (200 $Wm^{-2}$ ) :** 15  $W/m^2$

**(b) Response to temperature change 5K/h :** <  $\pm 4 W/m^2$

**Non stability over 1 year :** <  $\pm 1.5\%$

**Non linearity :** <  $\pm 1\%$

**Cosine response :** <  $\pm 18 W/m^2$

**Spectral selectivity :** <  $\pm 5\%$

**Temperature response :** < 4%

**Tilt response :** <  $\pm 2\%$

**Impedance :** 33 $\Omega$  - 45 $\Omega$

**Cable :** 10 meter long cable complete with SICRAM module (The Cable can be extend up to 60 meter on request).

**Weight :** 0.90 Kg



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### HD2102.2 : Digital Datalogger (Hand Held)



#### HD2102.2 Digital Datalogger

The HD2102.2 Digital Datalogger (Hand Held) is portable instruments with a large LCD display. They measure illuminance, luminance, PAR and Irradiance (across VIS-NIR, UVA, UVB and UVC spectral regions or measurement of irradiance effective according to the UV action curve). The probes are fitted with the SICRAM automatic detection module: in addition to detection, the unit of measurement selection is also automatic. The factory calibration data are already stored inside the instruments. Some thresholds can be associated with the integrated measurement and with the integration time, which can be set in the menu. The datalogger stores up to **38,000 data** which can be transferred from the instrument connected to a PC via USB cable, The datalogger fitted with USB port and can transfer the acquired measurements in real time to a PC or to a portable printer. **The Max, Min and Avg.** function calculate the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can also be excluded.

DeltaLog9 Software is windows based software which allow to configuration, Store data, Real time data, Download data, Graphical Data.

### Technical Specification

#### Measured values storage data:-

**Measuring unit :** W/m<sup>2</sup> -lux - fcd - lux/s - cd/s -  $\mu$ W/cm<sup>2</sup> - J/m<sup>2</sup> -  $\mu$ J/cm<sup>2</sup> -  $\mu$ mol(m<sup>2</sup>.s) -  $\mu$ mol/m<sup>2</sup> - cd/m<sup>2</sup>

**Data Storage Capacity :** 38000 Data set

**Type :** 2000 pages containing 19 samples each

**Storage interval :** 1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1hour

**PC interface :** USB Port

**Type :** USB cable

**Cable length :** 2 meter

**Immediate print interval :** 1 sec. to 3600 sec. (1hour)

**Digital Display :** 2x4½ digits plus symbols - 52x42mm

**Visible area :** 52x42mm

**Batteries :** 4AA 1.5V type batteries

**Autonomy :** 200 hours with 1800mAh alkaline batteries

**Power absorbed with instrument off :** 20 $\mu$ A

**Mains Output adapter :** 12Vdc / 1000mA

**Security of memorized data :** Unlimited, independent of battery charge conditions

**Date and time :** Schedule in real time

**Accuracy :** 1min/month max drift

#### Operating conditions:-

**Operating temperature :** -5 to 60 °C

**Storage temperature :** -25 to 65 °C

**Working relative humidity :** 0 to 90% RH without condensation

**Instrument Dimensions :** (Length x Width x Height) : 185x90x40mm

**Weight :** 470g (complete with batteries)

**Protection degree :** IP67

**Materials :** ABS, rubber

**Includes:** Main Unit, USB Data Cable, 4AA batteries, 12V mains Power adapter, Software, Manual, Carrying case

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