



**LP PYRA 05 - LP PYRA 06  
ALBEDOMETERS**

Delta Ohm manufactures two different models of albedometers: **LP PYRA 05** is constructed starting from two 1<sup>st</sup> class pyranometers and the **LP PYRA 06** starting from two 2<sup>nd</sup> 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 pyranometer 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 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 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/m <sup>2</sup> )	
Typical Impedance	33 Ω ÷ 45 Ω	
Irradiance range	0 ÷ 2000 W/m <sup>2</sup>	
Viewing angle	2π sr	
Spectral range	305 nm ÷ 2800 nm W/m <sup>2</sup> (50%)	
Operating Temperature	-40 °C ÷ 80 °C	
Weight (pyranometer only)	1.35 Kg	1.1 Kg
<b>ISO 9060 Specifications</b>		
Response time (95 %)	< 28 sec	< 30sec
Zero off-set		
3a) thermal radiation (200 Wm <sup>-2</sup> )	15 W/m <sup>2</sup>	25 W/m <sup>2</sup>
3b) temperature change 5K/h	< ± 4 W/m <sup>2</sup>	< ± 6 W/m <sup>2</sup>
3a) Long term stability 1 year	< ± 1.5 %	< ± 2.5 %
3b) Non linearity	< ± 1 %	< ± 2 %
3c) Cosine response	< ±18 W/m <sup>2</sup>	< ±22 W/m <sup>2</sup>
3d) Spectral selectivity	< ±5 %	< ±7 %
3e) Temperature response	< 4 %	< 8 %
3f) Tilt response	< ± 2 %	< ± 4 %

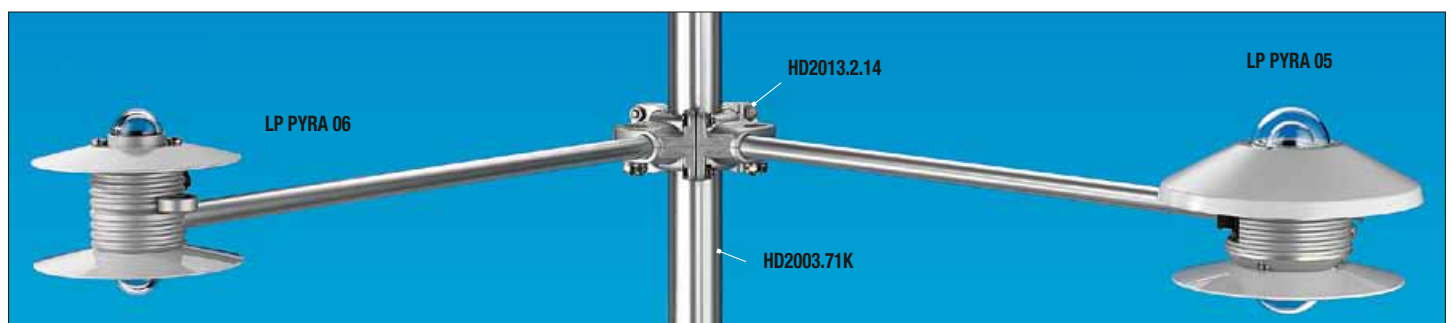
\* All technical data, excluding weight, are referred to one of the two pyranometers composing the albedometer.

**ORDERING CODES**

**LP PYRA 05:** Albedometer made up of two 1<sup>st</sup> 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, and Report of Calibration. Typical sensitivity 10μV/(W/m<sup>2</sup>). **The connection cable has to be ordered separately.**

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

**LP SP3:** Bottom shade disc for albedometer LP PYRA 05 (downward pyranometer).



HD 2013.2.14 + LP PYRA 05 + LP PYRA 06

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

**LP G:** Pack of 5 cartridges of silicagel.

**LP PYRA 06:** Albedometer made up of two 2<sup>nd</sup> Class pyranometers, according to ISO 9060. Complete with: top shade disk and bottom shade disk, spirit level, rod for attachment to a mast, connecting cable 5m and Report of Calibration. Typical sensitivity 10 $\mu$ W/(W/m<sup>2</sup>). **The connection cable has to be ordered separately.**

**CP AA 2.5:** Flying 7-pole connector, complete with UV-resistant cable L=5m.

For the instruments LP PYRA 05- LP PYRA 06 - LP UVB 02.

**CP AA 2.10:** Flying 7-pole connector, complete with UV-resistant cable L=10m.

For the instruments LP PYRA 05- LP PYRA 06 - LP UVB 02.

**HD978TR3** Configurable signal converter amplifier with 4 $\div$ 20mA (20 $\div$ 4mA) output. Input measuring range -10...+60mV. Default setting 0 $\div$ 20mV. Minimum measuring range 2mV.

**HD978TR5:** Wall configurable, signal converter amplifier with 4 $\div$ 20mA (20 $\div$ 4mA) output. Input measuring range -10...+60mV. Default settings 0 $\div$ 20mV. Minimum measuring range 2mV.

**HD978TR4** Configurable signal converter amplifier with 0 $\div$ 10 (10 $\div$ 0Vdc) output.

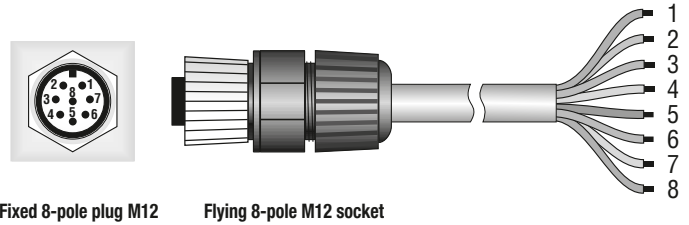
Input measuring range -10...+60mV. Default setting 0 $\div$ 20mV.

Minimum measuring range 2mV.

**HD978TR6:** Wall configurable, signal converter amplifier with 0 $\div$ 10 (10 $\div$ 0Vdc) output.

Input measuring range -10...+60mV. Default settings 0 $\div$ 20mV. Minimum measuring range 2mV.

## WIRING DIAGRAM LP PYRA 05 - LP PYRA 06



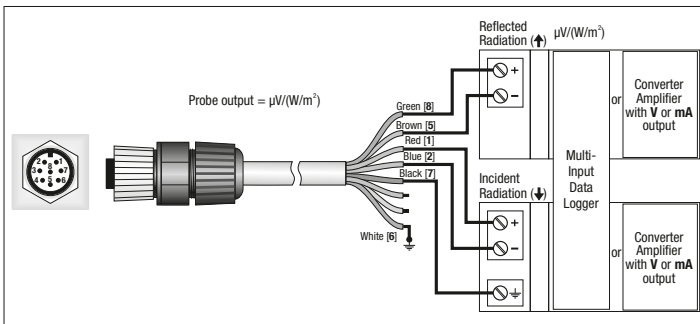
Fixed 8-pole plug M12

Flying 8-pole M12 socket

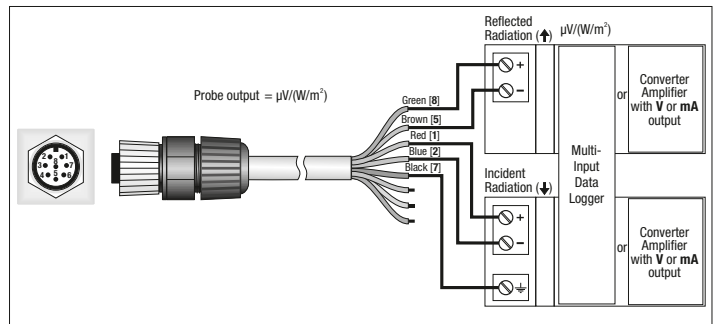
Connector	Function	Colour
8	V out (+) of the signal generated by the lower detector ( $\uparrow$ )	Green
6	Housing ( $\neq$ ) (LP PYRA 05) Not connected (LP PYRA 06)	White
2	V out (-) of the signal generated by the upper detector ( $\downarrow$ )	Blue
1	V out (+) of the signal generated by the upper detector ( $\downarrow$ )	Red
7	Display ( $\pm$ )	Black
5	V out (-) of the signal generated by the lower detector ( $\uparrow$ )	Brown

## CONNECTION DIAGRAMS

### LP PYRA 05



### LP PYRA 06



LP PYRA 05



LP PYRA 06