

PHOTOMETRIC/RADIOMETRIC PROBES WITH mV SIGNAL OUTPUT

LP PHOT 01, LP PAR 01, LP RAD 01,
LP UVA 01, LP UVB 01, LP UVC 01

PHOTOMETRIC AND RADIOMETRIC PROBES

The LP...01 series allows measurement of Photometric and Radiometric quantities as illuminance (lux), irradiance (W/m^2) across VIS-NIR, UVA, UVB, UVC spectral regions, as well as the number of photons received per unit time on a unit area, in the Photosynthetic Active Radiation (PAR) wavelength range from 400nm - 700nm.

In LP...01 probes, there is no need for external power supply. Output signal in mV is given through a resistor shunting the photodiode ends. Photocurrent generated by the photodiode when hit by light, is converted to a potential difference, which is read by a voltmeter. Once the PD (Potential Difference) has been read, the measured value can be calculated through the calibration factor. Each probe is factory calibrated and has its own calibration factor, which is both shown on the probe's body and mentioned in the user manual. LP...01 probes are equipped with cosine corrected diffuser. In probes for UV measurements the diffuser is made of sanded quartz, for the other probes, the diffuser is commonly made of acrylic material or teflon® (LP PHOT 01). LP...01 probes are designed for both in-door and out-door measurements, where quantities such as the above mentioned ones, must be constantly monitored.

Installing the probes

Once you have chosen where to install the probe, you must provide the connections between the probe and the voltmeter; the voltmeter must have proper scales of measurement. The connection diagram of the probe output cables is shown in the user manual. For measurements in weather and agriculture stations or in nursery-gardening systems, the probe reference plane should be mounted parallel to the ground; in this case, the probe shall be mounted on a LP BL (optional) support provided with bubble level.

Probe description

LP PHOT 01:

LP PHOT 01 probe measures illuminance (lux) defined as the ratio between the luminous flux (lumen) passing through a surface and the surface area (m^2).

The spectral response curve of a photometric probe is similar to the human eye curve, known as standard photopic curve $V(\lambda)$. The difference in spectral response between LP PHOT 01 and the standard photopic curve $V(\lambda)$ is calculated by means of the error f_1 . Calibration is carried out by comparison with a luxmeter, calibrated by a Primary Metrological Institute. Calibration procedures follow CIE publication No 69 (1987) "Method of Characterizing Illuminance Meters and Luminance Meters". **The measurement is carried out by illuminating the probe with a standard illuminant A.**

TECHNICAL SPECIFICATIONS

Typical sensitivity:	$0.5 \div 1.5 \text{ mV/lux}$
Spectral range:	$V(\lambda)$
Calibration accuracy:	<4%
f_1 ($V(\lambda)$ match error):	<8% Fig.2
f_2 (cosine response/directional error):	<3%
f_3 (linearity):	<1%
f_5 (fatigue):	<0.5%
Operating temperature:	0-50°C
Output impedance:	$0.5 \div 1 \text{ k}\Omega$

LP RAD 01:

LP RAD 01 probe measures irradiance (W/m^2) defined as the ratio between the radiant flux (W) passing through a surface and the surface area (m^2) in the VIS-NIR (400nm-1050nm) spectral range. These particular features apply to an instrument suitable for measurements in visible and near infrared fields. **Probe calibration is carried out by using 577/579 nm lines of a Xe-Hg lamp, filtered through a special interferential filter.**

TECHNICAL SPECIFICATIONS

Typical sensitivity:	$2.6 \mu V/(\mu W/cm^2)$
Measuring range:	0-200 mW/cm^2
Spectral range:	$\approx 400nm \div \approx 1050nm$ Fig.3
Calibration accuracy:	<6%
f_2 (cosine response/directional error):	<7%
Operating temperature:	0-50°C
Output impedance:	1 $k\Omega$

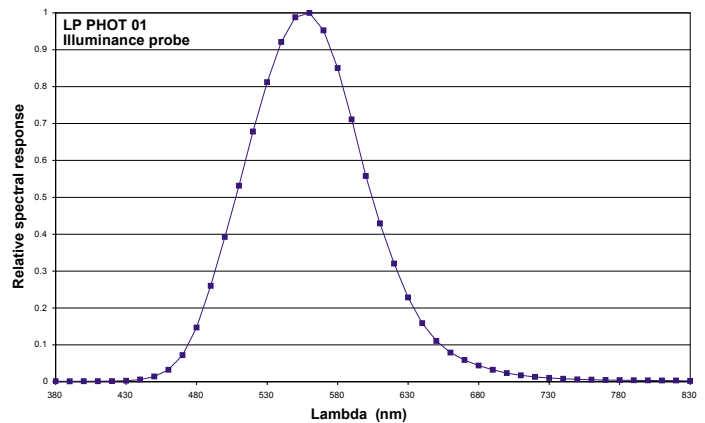


Fig.2 Typical spectral response

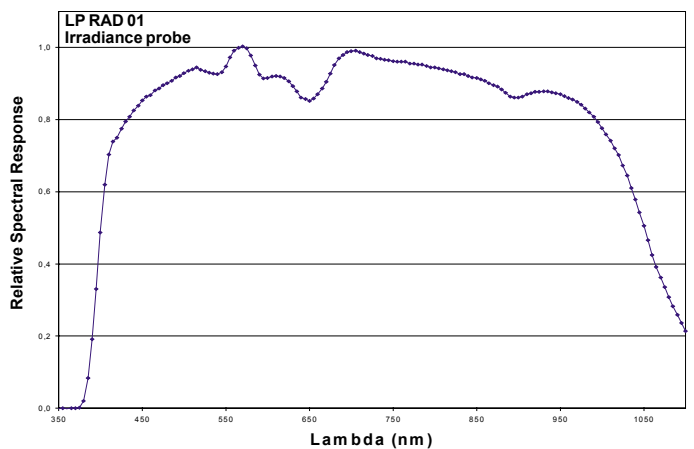


Fig.3 Typical spectral response

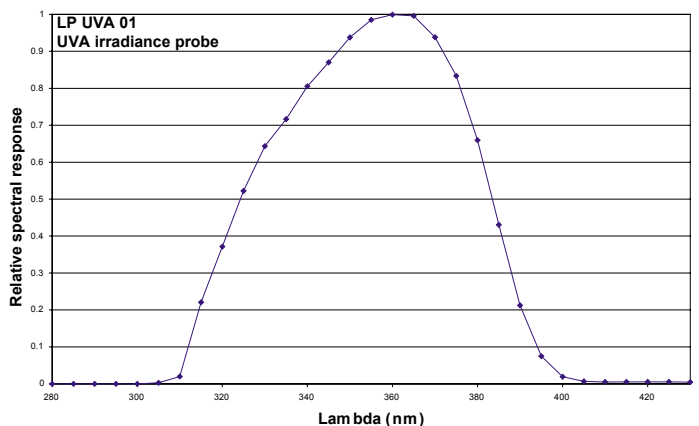


Fig.4 Typical spectral response

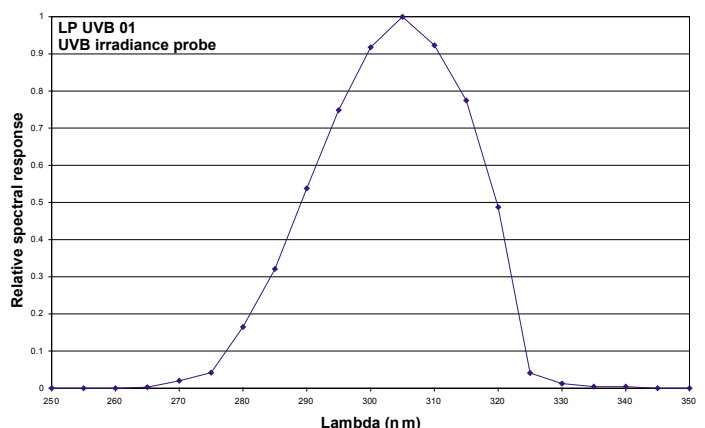


Fig.5 Typical spectral response

LP UVA 01:

LP UVA 01 probe measures irradiance (W/m^2) defined as the ratio between the radiant flux (W) passing through a surface and the surface area (m^2) in the UVA (315 nm ÷ 400 nm) spectral range. Thanks to a new type of photodiode, LP UVA 01 is blind to visible and infrared light.

Probe calibration is carried out by using a 365 nm line of a Xe-Hg lamp, filtered through a special interferential filter. Measurement is carried out by comparison with the primary standards, assigned to Delta Ohm Metrological Laboratory.

This probe can be used in all processes where ultraviolet lamp emission needs to be monitored: resins and adhesives polymerization, as well as tanning lamps.

TECHNICAL SPECIFICATIONS

Typical sensitivity: 2.6 $\mu V/(\mu W/cm^2)$
Measuring range: 0-200 mW/cm^2
Typical spectral range: peak at ≈ 360 nm and FWHM 60 nm **Fig.4**
Calibration accuracy: <6%
Working temperature: 0-50°C
Output impedance: 1 k Ω

LP UVB 01:

LP UVB 01 probe measures irradiance (W/m^2) defined as the ratio between the radiant flux (W) passing through a surface and the surface area (m^2) in the UVB (280 nm – 315 nm) spectral range. Thanks to a new type of photodiode, LP UVB 01 is blind to visible and infrared light.

Probe calibration is carried out by using a 313 nm line of a Xe-Hg lamp, filtered through a special interferential filter. Measurement is carried out by comparison with the primary standards, assigned to Delta Ohm Metrological Laboratory.

TECHNICAL SPECIFICATIONS

Typical sensitivity: 0.19 $\mu V/(\mu W/cm^2)$
Measuring range: 0-200 mW/cm^2
Typical spectral range: peak at ≈ 305 nm and FWHM 31 nm **Fig.5**
Calibration accuracy: <8%
Working temperature: 0-50°C
Output impedance: 2 k Ω

LP UVC 01:

LP UVC 01 probe measures irradiance (W/m^2) defined as the ratio between the radiant flux (W) passing through a surface and the surface area (m^2) in the UVC (200nm ÷ 280nm) spectral range. Thanks to a new type of photodiode, LP UVC 01 is blind to visible and infrared light.

The probe calibration is carried out by measuring irradiance coming from a deuterium lamp at a fixed distance.

TECHNICAL SPECIFICATIONS

Typical sensitivity: 0.19 $\mu V/(\mu W/cm^2)$
Measuring range: 0-200 mW/cm^2
Typical spectral range: peak at 260 and FWHM 32nm **Fig.6**
Calibration accuracy: <10%
Working temperature: 0-50°C
Output impedance: 2 k Ω

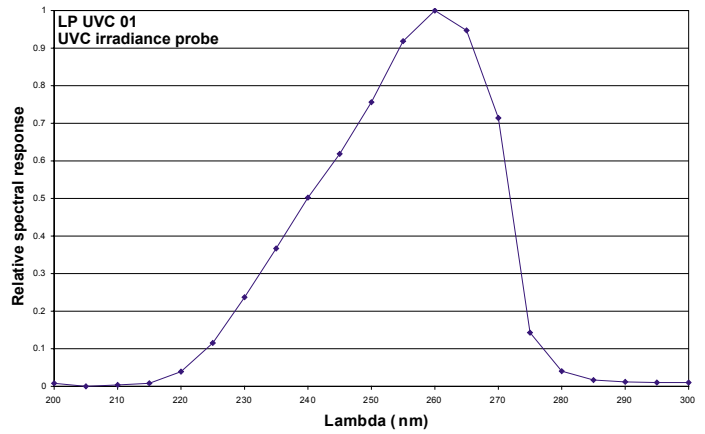


Fig.6 Typical spectral response

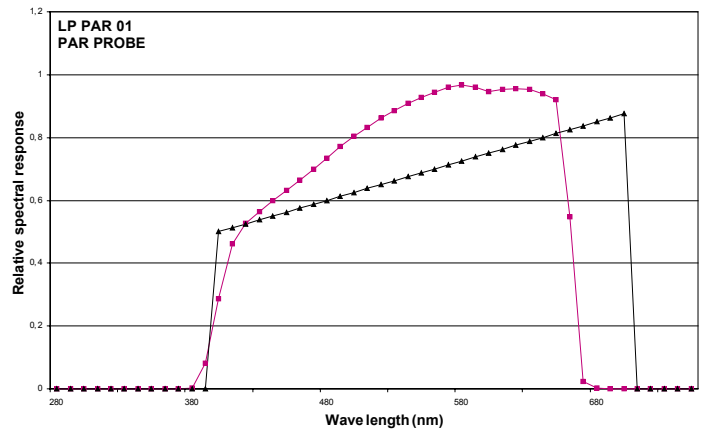
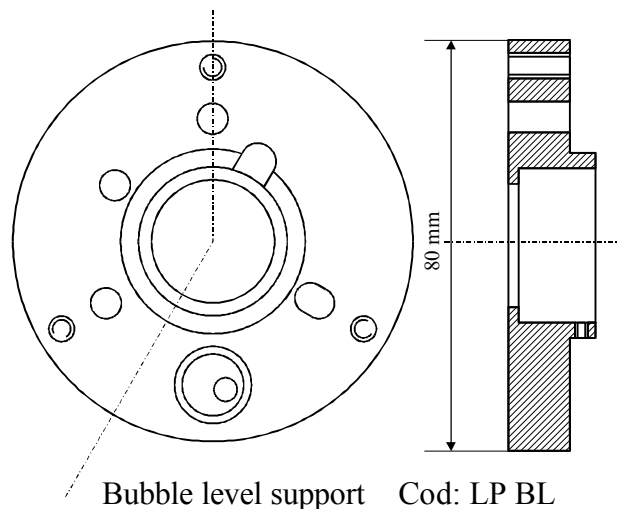
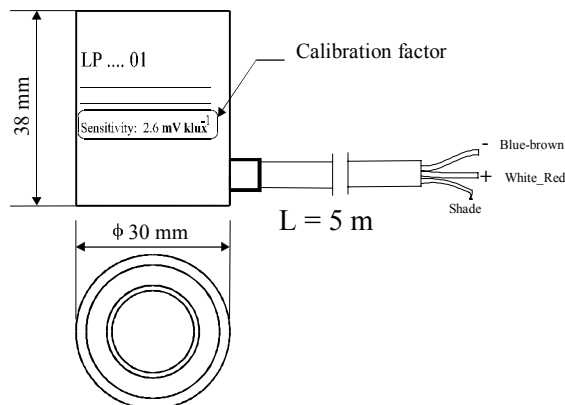


Fig.7 Typical spectral response



LP PAR 01:

LP PAR 01 probe measures the ratio between the number of photons that strike a surface in one second, in the 400nm - 700nm spectral range and the surface area (m^2). This quantity is defined as PAR: Photosynthetically Active Radiation.

The probe calibration is carried out by using an alogen lamp, with a known spectral irradiance in a specific spectral range.

Temperature slightly affects the probe spectral response.

The diffuser and the probe particular structure, allow the response to the variation of the light incidence angle on the diffuser, to be cosine corrected

TECHNICAL SPECIFICATIONS

Typical sensitivity:	30 $\mu V/(\mu mol/(m^2s))$
Measuring range:	0-5000 ($\mu mol/(m^2s)$)
Typical spectral range:	400 nm ÷ 660 nm Fig.7
Calibration accuracy:	<6%
f_2 (cosine response/directional error):	<7%
Operating temperature:	0-50°C
Output impedance:	1 k Ω

Order codes:

LP PHOT 01: Photometric probe for measuring ILLUMINANCE, CIE photopic filter, diffuser for correction according to the cosine law. mV per klux output, 5 m cable.

LP RAD 01: Radiometric probe for measuring IRRADIANCE, diffuser for correction according to the cosine law. mV per klux output, 5 m cable.

LP PAR 01: Radiometric probe for measuring PHOTONS FLUX in the range of PAR (Photosynthetically Active Radiation). Cosine correction. mV/micromol/ $m^2 s$, 5 m cable.

LP UVA 01: Radiometric probe for measuring IRRADIANCE in the UVA (315... 400nm). $\mu V/\mu Wcm^2$ output, 5m cable

LP UVB 01: Radiometric probe for measuring IRRADIANCE in the UVB (280... 315nm). $\mu V/\mu Wcm^2$ output, 5m cable.

LP UVC 01: Radiometric probe for measuring IRRADIANCE in the UVC (200... 280nm). $\mu V/\mu Wcm^2$ output, 5m cable

LP BL: Base with levelling device. On request for assembly with the probes at the time of placing the order.

