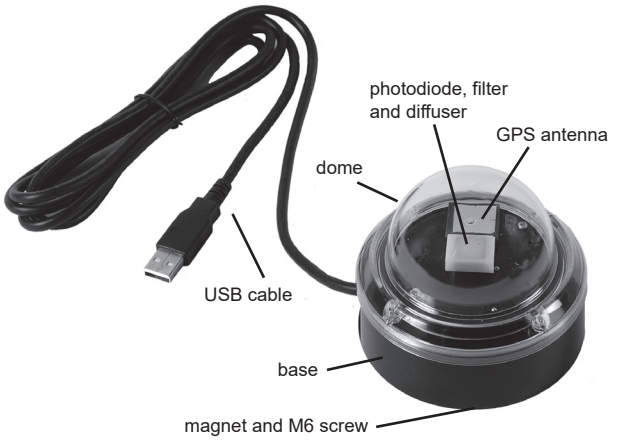
LX-GPS V2 PROBE



TECHNICAL SPECIFICATIONS

- Compatible satellites: GPS, Beidou, Galileo, Glonass, QZSS.
- GPS position accuracy 2.0m CEP.
- GPS speed accuracy 0.1m/second.
- Filter which responds similarly to the light sensitivity of the human eye.
- Diffuser to adapt the angular response of the sensor to the cosine curves (α) between -80º and 80º.
- Flat PN silicon photodiode in a hermetically sealed case especially designed for high precision linear applications.
- Measurement range: 0-50000 Lux.
- Includes a 12-bit A/D converter to convert the measurement into luxs.
- Automatic scale setting with a resolution of between 0.1 and 13.5 Lux.
- Field of view: 2π sr.
- Spectral range: photopic curve V(λ).
- RMSE mean square error relative to V(λ): 3,5% max.
- Linearity error: 1% max.
- Temperature coefficient: 0.1% / ºC max.
- Supply voltage 5-15 V d.c. and maximum current 20 mA.
- Transparent and UV-stabilised PC-V0 polycarbonate dome.
- V0 polycarbonate base.
- Degree of protection: IP65.
- Storage temperature: -40 to 85ºC.
- Room temperature: -10 to 50ºC.
- Humidity (non-condensing): 95%.
- CR2032 3V lithium battery to save the last GPS position.
- Dimensions: Ø 88 x 75mm and weight 170gr.
- Mounting of the probe using a magnet and/or M6 screw (maximum depth: 9 mm from the base).
- Built-in USB communication cable, 3 meters in length.

DESCRIPTION

The LX-GPS probe consists of a luxometric sensor based on a high-sensitivity photodiode, with integrated GPS and USB connectivity for use with laptops or other devices compatible with the Windows operating system.

It has been specifically designed for measuring illuminance in outdoor lighting systems, both under dynamic conditions (while in motion aboard a vehicle) and during static measurements. Thanks to its optical system, which incorporates spectral filters and a unique diffuser, the probe offers a spectral and angular response closely aligned with the sensitivity of the human eye, in accordance with standard photometric requirements.

The integration of the GPS module within the probe itself allows precise and synchronized georeferencing of the illuminance measurements, optimizing the spatial accuracy of the recorded data. Additionally, this integration simplifies the system setup by eliminating the need for external positioning devices.

These instructions describe the probe, its installation, and its operation. To access these instructions in electronic format, visit www.afeisa.es.

SAFETY WARNINGS

Any use of the LX-GPS probe outside of the parameters and conditions specified by the manufacturer may compromise the integrity of the equipment and put the user's safety at risk.

Manipulating the LX-GPS probe, the laptop, or any other component of the LX-GPS system while driving is strictly prohibited, as it represents a significant risk of accident and can seriously impair the driver's attention and road safety.

PRECAUTIONS FOR USE

During transport, the LX-GPS probe must be placed in its protective case included in the LX-GPS KIT, in order to prevent impacts that could damage the dome or any other component of the device.

The probe should be handled with care, as it incorporates a high-power magnet at its base, designed for attachment to metallic surfaces such as a the vehicle roof. This magnet can interfere with sensitive electronic components, such as hard drives, screens, or electronic devices, and should therefore be kept away from such items during handling and storage.

MAINTENANCE

For the maintenance of the LX-GPS probe, only original spare parts and components certified by the manufacturer must be used, in compliance with the applicable technical standards. The manufacturer accepts no responsibility for functional failures, performance loss, or structural damage resulting from interventions carried out by unauthorized personnel or outside its technical service.

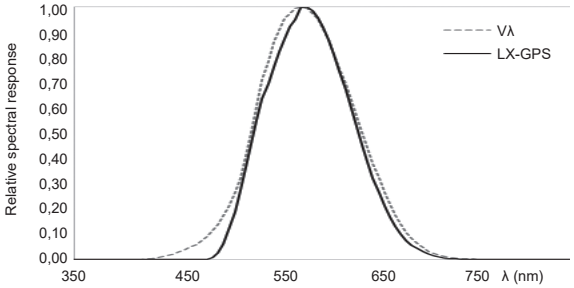
It is recommended that the LX-GPS probe be stored in the protective case included in the LX-GPS KIT, ensuring controlled environmental conditions to preserve its accuracy class. The storage environment should be dry, protected from direct light exposure, and maintained at a constant temperature as specified in the technical specifications provided by the manufacturer.

Once stored, no weight should be placed on top of the LX-GPS KIT case.

To clean the probe, use a soft cloth slightly dampened with a solution of water and neutral soap. Abrasive cleaners, solvents, acidic, or alcoholic products must not be used, as they could damage the device's sensitive components.

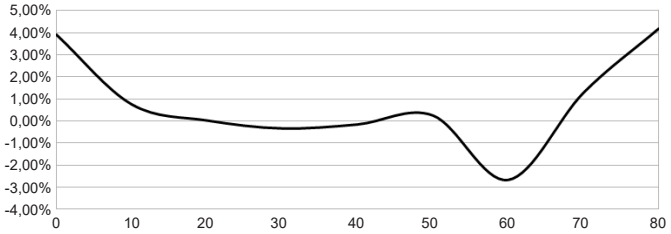
SPECTRAL RESPONSE

The LX-GPS probe, thanks to its high-sensitivity photodiode and exclusive optical filter system, provides a spectral response aligned with the sensitivity spectrum of the human eye, enabling photometrically representative measurements.



ANGULAR RESPONSE

The angular response of the LX-GPS probe in relation to the ideal cos(α) curve is achieved through the combined action of the diffuser and the optical dome. The deviation of the probe's actual angular response from the theoretical cosine curve is as follows:



SOFTWARE

The LX-GPS probes are connected to a laptop or similar device via a USB interface, allowing management and configuration through the LX-GPS software for the Windows operating system.

To download the software, visit the following link www.afeisa.es/software-lx-gps or scan the QR code provided below:

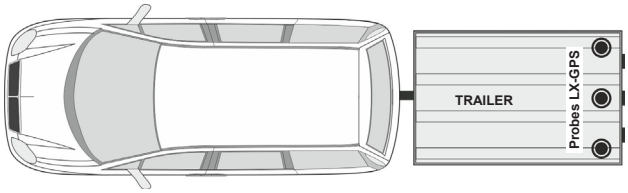
This software includes tools to facilitate illuminance data capture while driving in a vehicle (measurements with GPS or in tunnels) or by taking static measurements at regular time intervals (measurements without GPS). It also offers features for managing, analyzing, and comparing measurements taken at different times or in various installations.

For detailed information, refer to the LX-GPS software user manual, available within the software download package.

MOUNTING

The measurement system can operate with either one or three LX-GPS probes, and the possible configurations are as follows:

On a trailer at ground level hitched to a vehicle.



The probes must be installed aligned and centered along a transverse axis of the trailer, in the direction of the vehicle's movement. It is recommended to use a standard passenger car or a light commercial vehicle for towing the trailer.

It is essential to avoid casting shadows or light sources from the towing vehicle itself, as well as from other moving elements that could interfere with the measurements.

The cabling must be securely fastened to the trailer using cable ties or Velcro straps, without applying tension, and must be kept away from moving parts such as the axis or wheels to prevent mechanical damage or interference.

Also, mandatory signaling must be included, and all safety procedures outlined in the applicable local road regulations for vehicles with trailers and additional installed equipment must be followed.

On the roof of the vehicle using the magnet integrated into the base of the probe.

LX-GPS probe mounting via magnet

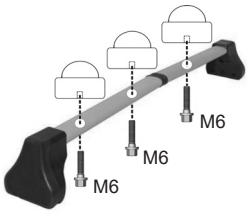
The probes must be installed aligned and centered along a transverse axis on the roof of the vehicle, in accordance with the direction of travel.

It is recommended to use a standard passenger car or a light commercial vehicle that allows for stable and secure mounting on its upper surface.

This arrangement ensures uniform and symmetrical capture of lighting conditions during movement.

On an overhead bar positioned above the vehicle roof, such as a roof rack bar.

LX-GPS probe mounting example: roof rack bar



LX-GPS probe mounting on roof rack bar

The probes must be installed aligned and centered along a transverse axis on the overhead bar of the vehicle, preferably on a roof rack bar mounted on the roof. The orientation must follow the direction of travel to ensure accurate data capture.

It is recommended to use a standard passenger car or a light commercial vehicle with a structure compatible with the secure mounting of the system.

This configuration ensures uniform and symmetrical capture of lighting conditions during movement.

RECOMMENDATIONS FOR MEASUREMENT

Measurements must be performed exclusively under stable weather conditions, avoiding any situations that could alter light distribution or cause uncontrolled scattering, such as heavy rain or dense fog.

Furthermore, measurements should be performed at night, between sunset and sunrise, to ensure conditions that accurately represent outdoor lighting conditions. This restriction does not apply to enclosed environments such as tunnels, where lighting conditions are artificial and controlled.

It is essential to ensure that the LX-GPS probes have an unobstructed field of view toward the sky, free from interference by vehicle structures or nearby objects (this requirement does not apply in enclosed environments like tunnels).

In configurations using three probes, they must be installed transversely aligned and equidistantly spaced, with one probe on the right side, one in the center, and one on the left side of the vehicle. When using a single LX-GPS probe, it must be positioned in the center.

All probes must be kept as horizontal as possible and arranged to cover the maximum width of the vehicle, in order to optimize measurement coverage and ensure the system's proper leveling.

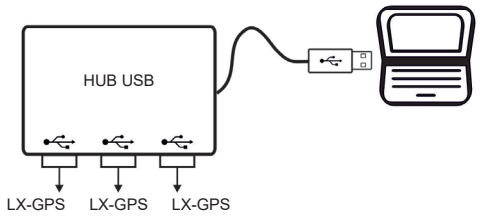
Cabling should be routed in a manner that does not interfere with vehicle operation, especially avoiding areas near the driver. It must be securely fastened to prevent shifting or tension during movement.

USB CONNECTION

The USB cables of the LX-GPS probes must be connected directly to a laptop or similar device. If there are not enough available USB ports, use the USB hub provided with the LX-GPS KIT case.

If using a different USB hub not supplied with the LX-GPS KIT, it must meet the following minimum requeriments:

- USB 2.0 interface or higher.
- At least three USB Type-A ports
- Capable of simultaneously powering all connected probes (self-powered or with an external power source).
- Compatible with the Windows operating system.



METROLOGICAL VERIFICATION

As with all measuring and testing equipment, periodic verification is necessary to ensure measurement accuracy. It is recommended to perform a metrological verification of the LX-GPS probe every two years; however, under intensive use conditions, this interval should be reduced to one year.

For verifications and calibrations, please contact the manufacturer's technical service exclusively.

Calibration is performed using a traceable reference standard, accompanied by a calibration certificate issued by a laboratory accredited in accordance with the ISO/IEC 17025 standard and recognized by ENAC (Entidad Nacional de Acreditación) of Spain.

BATTERY AND ELECTRONIC EQUIPMENT DISPOSAL

The LX-GPS probe contains a 3V lithium battery, type CR2032, which must not be disposed of with regular household waste.

Proper disposal of this device and its battery helps prevent potential adverse effects on the environment and human health caused by improper handling of electronic and chemical waste.

Appropriate recycling of its components contributes to the conservation of natural resources and the reduction of environmental impact.

Battery replacement must be carried out exclusively by qualified technical personnel through our technical service.

To ensure proper end-of-life treatment of the equipment, please dispose of it at an authorized collection point for waste electrical and electronic equipment, in accordance with applicable local legislation.

SAFETY INSTRUCTIONS

This equipment is designed in accordance with CE standards.

Proper and safe operation of the product assumes that transport, storage, installation, and assembly are carried out in compliance with the guidelines described in this user manual.

In case of any doubts regarding operation or malfunction, please contact:

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