LTL-X Mark II

Specifications

Optical specifications

Field of measurement:

- Width: 45 mm / 1.77 in
- Hight: 200 mm / 7.87 in

Illumination angle R_L EN 1436: 1.24°
Illumination angle R_L ASTM E 1710: 88.76°
Observation angle R_L EN 1436: 2.29°
Observation angle R_L ASTM E 1710: 1.05°
Illumination angular spread:
Horisontal: / Vertical: 0.33 / 0.17°
Observation angular spread: ±0.17°
Equivalent observations distance: 30 m
R_L min. reading (mcd·m^{-2}·lx^{-1}): 0
R_L max. reading (mcd·m^{-2}·lx^{-1}): 2000

Construction

Structural parts: Aluminum
Housing: Polymer
Keyboard: Silicone rubber
Circuit boards: Epoxy glass

Instrument dimensions

Length: 573 mm / 22.6 in
Width: 222 mm / 8.7 in
Height: 538 mm / 21.2 in
Weight: 9 Kg / 20 lb

Regulatory compliance

Radio: EN 300440-1 V1.6.1:2010
EMC: EN 301489-1 V1.8.1:2008, EN 301489-3 V1.4.1:2002
Safety: EN/IEC 60950-1 :2006, EN/IEC 60950-22 :2006
FCC: 47 CFR, FCC Part 15B, Class A

Electrical characteristics

Battery: Built in 12 volt / 4,5 Ah Hi-Power
External charger power supply: Friwo FW7530/15
(100-240 VAC / 15VDC)
Charging time: Approx. 3 hour 30 min
Charger fuse (5*20 mm): T3.15A
Power supply fuse (5*20 mm): T3.15A

Data

Data memory: 200,000 measurements
Data transfer: USB 2.0
Typical repeatibility: +/- 2%
Typical reproducibility: +/- 5%

Environmental specification

Temperature:

- Operating: 0°C to +60°C / 32°F to 140°F
- Storage: -15°C to +60°C / 5°F to 140°F
- Humidity: < 85%, non condensing

Timing

Measurement time: < 1 sec
Time between measurement: 1 sec

Standards

EN 1436 (R_L & Qd), ASTM E 1710 (R_L), ASTM E 2177 (R_L wet), ASTM E 2832 (R_L continuous wetting)

Features

- Easy readable colour LED display
- Night time visibility (R_L) measurement
- Measures plain texture and profiled markings up to 15 mm/0.6 in
- Measures dry and wet markings and under continuous wetting
- Wet timer to facilitate measuring wet road markings
- Shows and stores day, time, humidity and temperature
- Facility for averaging measurements
- ID functions (road, operator, line type)
- Multilingual menu
- Data storage and communication
- RSC software for PC downloads and data presentation
- Ergonomic design and operation, single hand operated
- Stray light compensated
- Maintenance free LED light

Standard delivery

- LTL-X Mark II retroreflectometer
- Transportation box on wheels
- Telescopic handle and wheels
- Built-in printer
- Calibration standard with DANAK certificate

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- Battery charger
- Quick guide
- Built-in GPS

Downloads

To be downloaded from www.roadsensors.com under 'Products':

- LTL-X Mark II user and PC software manuals
- LTL software pack. Provide automatic download of driver and RSC software

Warranty

2 years

R&TTE Declaration of Conformity (DoC) and US Attestation of Conformity (AoC) can by supplied by DELTA upon request or viewed on: roadsensors.madebydelta.com/technical-background/certification

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The LTL-XL & LTL-X Mark II retroreflectometer features

The professional choice for measuring the retroreflection of road markings

LTL-XL & LTL-X Mark II instruments

LTL-XL and LTL-X Mark II are robust, long lasting and advanced instruments, designed for professionals employing i.s.f using the latest developments in light and sensor technology. Using DELTA's gradient index technology and patented optical system, the instruments can measure all types of flat and profiled markings. The sensor response, combining the CIE eye response and the CIE illuminant A, meets both CEN and ASTM requirements for profile capacity and colour.

LTL-XL and LTL-X Mark II comply with the following standards: EN 1436, ASTM E 1710, ASTM E 2176, ASTM E 2177, ASTM E 2302, ASTM E 2832

General features

- Memory capacity for 200.000 measurements
- Multiple language menu
- Easy readable colour LED display
- GPS positioning
- Data presentation on Goggle Earth
- USB interface
- Measurement statistics
- Stray light compensation
- Shows and stores day, time, humidity and temperature
- Facility for entering and storing of road ID, marking type and user ID
- Facility for averaging measurements
- Wet timer to facilitate measuring wet road markings
- Comes with maintenance free LED light
- Single handed operation, user-friendly

The LTL-XL specific features

- R_L and Qd under dry and wet conditions
- Short measurement time of 1-3 seconds
- Measures plain and profiled markings up to 5 mm/0.2 inch

The LTL-X Mark II specific features

- R_L under dry, wet and continuous wetting
- Short measurement time of less than 1 second
- Measures plain and profiled markings up to 15 mm/0.6 inch

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Performance

LTL-XL and LTL-X Mark II measure all types of road markings at a simulated distance of 30 m with the highest level of accuracy. The instruments operate with a reproducibility of +/- 5 % and a repeatability of +/- 2 %.

LTL-XL and LTL-X Mark II measure, depending on the model chosen, R_L (nighttime visibility), Qd (daytime visibility), visibility under dry, wet and continuous wetting.

LTL-XL and LTL-X Mark II measure white and yellow markings with no adjustment.

LTL-XL and LTL-X Mark II have automatic stray light compensation, so daylight and other outside light sources will not affect the accuracy of the measurements.

The Road Sensor Control (RSC) software supplied with the instrument, combined with the USB interface, makes it easy to download data and generate reports like MS-Excel reports. GPS data can easily be transferred to a GPS program like Goggle Earth for visual overview showing the results and where measurements have been taken.

Add-ons

LTL-XL and LTL-X Mark II can be fitted with telescopic handle and wheels to make the handling of the instrument ergonomic and easy. The adjustable handle will allow the operator to work in upright position, and the wheels make it easy to move the instrument to a new measurement location. All operations can be carried out single-handed with single-touch securing easy and safe use in traffic.

LTL-XL and LTL-X Mark II can be fitted with built-in precision WAAS GPS and printer. GPS makes it possible to determine exactly where any specific measurement has been carried out. The printer can provide you with immediate written proof of a measurement. The internal memory automatically stores the measurements with relevant support data.

Calibration standards

LTL-XL and LTL-X Mark II instruments are calibrated at DELTA's DANAK-accredited laboratory and assuring traceability to PTB (Physikalish-Technische Bundesanstalt, Germany) and NIST (National Institute of Standards and Technology, USA). The recommended daily calibration of the instruments is simple and easy to carry out.

Contact and further information

For further information about DELTA´s LTL-XL and LTL-X Mark II, please contact:

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Telescopic handle

Wheels

Printer

GPS

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