**System overview**
The LTL-M system consists of:
- **Sensor**: 500 x 180 x 200 mm/19.7 x 7.1 x 8.0 in
  12.5 kg/28 lbs
- **Processor**: 400 x 170 x 200 mm/16.0 x 6.8 x 8.0 in
  8 kg/18 lbs
- **Tablet PC**: 256 x 175 x 10 mm/10.0 x 6.9 x 0.4 in
  0.6 kg/1.3 lbs

The LTL-M light source is a flash system. The LTL-M measurement system consists of a digital camera and proprietary software.

**Optical specifications**
- **Field of measurement**: 1000 x 1000 mm / 39.4 x 39.4 in
- **Illumination angle RL**: According to EN 1436 and ASTM E 1710
- **Observation angle RL**: According to EN 1436 and ASTM E 1710

LTL-M works based on reversed geometry, this is according to ASTM E 1767.

- **Illumination angular spread**:
  - Horizontal: 0.33°
  - Vertical: 0.17°
- **Observation angular spread**: ±0.17°
- **Equivalent observation distance**: 30 m
- **RL range (mcd·m⁻²·lx⁻¹)**: 0 - 2000
- **RRPMs/Road studs**: 2 % level for new (white), 0.14 CIL value

**Regulatory compliance**

**EU**
The LTL-M system without GPS unit complies with the following directives of the European Parliament and of the Council:
- Directive 2011/65/EU of 8 June 2011 on restriction of the use of certain hazardous substances (RoHS).

The equipment is tested to the following standards:
- R&TTE article 3.1a (health & safety):
- R&TTE article 3.1b (electromagnetic compatibility):
  - EN 301489-1 V1.8.1:2008
  - EN 301489-3 V1.4.1:2002
- R&TTE article 3.2 (radio parameters):
  - EN 300440-2 V1.4.1:2010

**USA**
The LTL-M system including GPS unit complies with the following rule part of the Federal Communications Committee:
- FCC CFR 47 Part 15, Subpart B, specific rule parts $15.5$ & $15.29$.

The incorporated GPS module is not an intentional transmitter in FCC definitions, and the LTL-M system is exempted from other rule parts that the specifically mentioned pursuant to $15.103$.

As automotive equipment, the LTL-M system is exempted from safety testing under authority of OSHA.
Electrical characteristics
Power supply: 12 V vehicle power/15 A

Environmental specification
Temperature:
- Operating: 0°C to +45°C / 32°F to 113°F
- Storage: -15°C to +55°C / 5°F to 131°F
- Humidity: 85%, non condensing

Data
Typical repeatability: +/- 3%
Typical reproducibility: +/- 5%

Standards
EN 1436 and ASTM E-1710 for pavement markings
EN 1463-1: 1997 for RRPMs

Features
- Continuous measurement of night time visibility (R_l) of road markings at driving speed
- Automatic compensation for vehicle movements (Patented)
- Measures daylight contrast and line geometry
- Measures presence of road studs (RRPMs)
- Measures all types of plain and profiled markings
- Measures retroreflection of white and yellow markings
- Measures dry markings
- Measures profiles up to 25 mm / 1 in
- Stop and mark function during operation
- Measured data are automatically stored
- Multilingual menu
- Can be operated by one person
- Software for reporting and transfer of data to MS-Excel
- Data presentation on Google Earth
- Future software upgrades can easily be integrated

Standard delivery
- LTL-M retroreflectometer system (sensor, processor, user interface tablet PC with hybrid cable)
- GPS
- Transportation boxes on wheels
- Software for data presentation
- Calibration standard with DANAK certificate and alignment board
- Vehicle fixture (2 sets)
- User manual and quick guide
- Spare window glasses and gaskets
- Tablet PC windscreen holder
- USB ethernet adapter for remote service
- 8 m measurement tape

Options
- Overhead video camera
- DMI (Distance Measurement Instrument)

Approval
StrausZert, Test no.: 0913-2011-02
US patent no.: US 9,176,057 B2

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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