



Figure can vary

Part no.: 53800289
RSL445-L/CU429-10
Safety laser scanner



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Technical data

| Basic data | |
|---|---|
| Series | RSL 400 |
| Application | Mobile danger zone guarding Mobile side guarding Stationary access guarding Stationary danger zone guarding |
| Special design | |
| Special design | Measurement data output optimized for vehicle navigation |
| Functions | |
| Functions | Data output, configurable Dynamic contactor monitoring (EDM), selectable E-stop linkage Four-field mode Resolution, selectable Safe time delay, internal |
| Characteristic parameters | |
| Type | 3 , IEC/EN 61496 |
| SIL | 2 , IEC 61508 |
| SILCL | 2 , IEC/EN 62061 |
| Performance Level (PL) | d , EN ISO 13849-1 |
| PFH _D | 9E-08 per hour |
| Mission time T _M | 20 years , EN ISO 13849-1 |
| Category | 3 , EN ISO 13849 |
| Protective field data | |
| Scanning angle | 270 ° |
| Minimum adjustable range | 50 mm |
| Number of field pairs, reversible | Up to 100 |
| Number of quads, reversible | 50 |
| Number of protective functions | 2 Piece(s) |
| Number of independent sensor configurations | Up to 10 |
| Diffuse reflection, min. | 1.8 % |
| Operating range | 0 ... 6.25 m |
| Warning field data | |
| Number of field pairs | Up to 100 |
| Operating range | 0 ... 20 m |
| Object size | 150 mm x 150 mm |
| Diffuse reflection, min. | 10 % |
| Optical data | |
| Light source | Laser , Infrared |
| Laser light wavelength | 905 nm |
| Laser class | 1 , IEC/EN 60825-1:2007 |
| Transmitted-signal shape | Pulsed |
| Repetition frequency | 90 kHz |

| Measurement data | |
|--|--|
| Detection range | 0 ... 50 m , Diffuse reflection > 90% |
| Diffuse reflection | 20 % |
| Angular resolution | 0.1 ° |
| Distance resolution, radial | 1 mm |
| Distance resolution, lateral | 0.1 ° |
| Systematic measurement error $D_{meas} - D_{real}$ | min.: -20 mm typ.: -10 mm max.: 0 mm (Diffuse reflection: 1.8% ... retro-reflector Measurement range: 0.2 ... 25 m) |
| Measurement value noise | 10 mm , 1 σ (• Diffuse reflection: 1.8% ... 20% Measurement range: 0 ... 9 m • Diffuse reflection: 20% ... retro-reflector Measurement range: 0 ... 25 m) |
| Laser spot (H x W), 10 m | 60 mm x 13 mm |
| Laser spot (H x W), 20 m | 165 mm x 24 mm |
| Laser spot (H x W), 30 m | 265 mm x 40 mm |
| Laser spot (H x W), 40 m | 285 mm x 57 mm |

| Electrical data | |
|------------------------|------------------------|
| Protective circuit | Overvoltage protection |

Performance data

| | |
|--|---|
| Supply voltage U_B | 24 V , DC , -30 ... 20 % |
| Current consumption (without load), max. | 700 mA , (use power supply unit with 3 A) |
| Power consumption, max. | 17 W , For 24 V, plus output load |

Outputs

| | |
|--|------------|
| Number of safety-related switching outputs (OSSDs) | 4 Piece(s) |
|--|------------|

Safety-related switching outputs

| | |
|------------------------------|--------------------------------------|
| Type | Safety-related switching output OSSD |
| Switching voltage high, min. | 20.8 V |
| Switching voltage low, max. | 2 V |
| Voltage type | DC |

Safety-related switching output 1

| | |
|-------------------|-------------------------|
| Assignment | Connection 1, gray wire |
| Switching element | Transistor , PNP |

Safety-related switching output 2

| | |
|-------------------|-------------------------|
| Assignment | Connection 1, pink wire |
| Switching element | Transistor , PNP |

Safety-related switching output 3

| | |
|-------------------|--------------------------------|
| Assignment | Connection 1, yellow/gray wire |
| Switching element | Transistor , PNP |

Safety-related switching output 4

| | |
|-------------------|-------------------------------|
| Assignment | Connection 1, pink/green wire |
| Switching element | Transistor , PNP |

| Service interface | |
|--------------------------|-----------|
| Type | Bluetooth |

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| Bluetooth | |
|------------------------------|---|
| Function | Configuration/parametering |
| Frequency band | 2,400 ... 2,483.5 MHz |
| Radiated transmitting power | Max. 4.5 dBm (2.82 mW), class 2 |
| Type | USB |
| USB | |
| Function | Configuration/parametering |
| Connection | USB 2.0 mini-B, socket |
| Transmission speed, max. | 12 Mbit/s |
| Cable length | ≤ 5m Longer cable lengths are possible using active cables. |
| Connection | |
| Number of connections | 2 Piece(s) |
| Connection 1 | |
| Type of connection | Cable |
| Function | Machine interface |
| Cable length | 10,000 mm |
| Sheathing material | PVC |
| Cable color | Black |
| Number of conductors | 29 -wire |
| Wire cross section supply | 1 mm ² |
| Wire cross section signals | 0.14 mm ² |
| Connection 2 | |
| Type of connection | Connector |
| Function | Data interface |
| Thread size | M12 |
| Type | Female |
| Material | Metal |
| No. of pins | 4 -pin |
| Encoding | D-coded |
| Cable properties | |
| Cable resistance, max. | 15 Ω |
| Mechanical data | |
| Dimension (W x H x L) | 140 mm x 149 mm x 140 mm |
| Housing material | Metal Plastic , Diecast zinc , |
| Lens cover material | Plastic/PC |
| Net weight | 3,000 g |
| Housing color | Yellow, RAL 1021 |
| Type of fastening | Mounting plate Through-hole mounting Via optional mounting device |
| Operation and display | |
| Type of display | Alphanumeric display LED indicator |
| Number of LEDs | 6 Piece(s) |
| Type of configuration | Software Sensor Studio |
| Operational controls | Software Sensor Studio |

Environmental data

| | |
|------------------------------------|---------------|
| Ambient temperature, operation | 0 ... 50 °C |
| Ambient temperature, storage | -20 ... 60 °C |
| Relative humidity (non-condensing) | 15 ... 95 % |

Certifications

| | |
|---|---|
| Degree of protection | IP 65 |
| Protection class | III , EN 61140 |
| Certifications | TÜV Süd |
| Test procedure for EMC in accordance with standard | DIN 40839-1/3 EN 61496-1 |
| Test procedure for oscillation in accordance with standard | EN 60068-2-6 |
| Test procedure for continuous shock in accordance with standard | IEC 60068-2-29 |
| US patents | US 2016/0086469 A US 7,656,917 B US 7,696,468 B US 8,520,221 B |

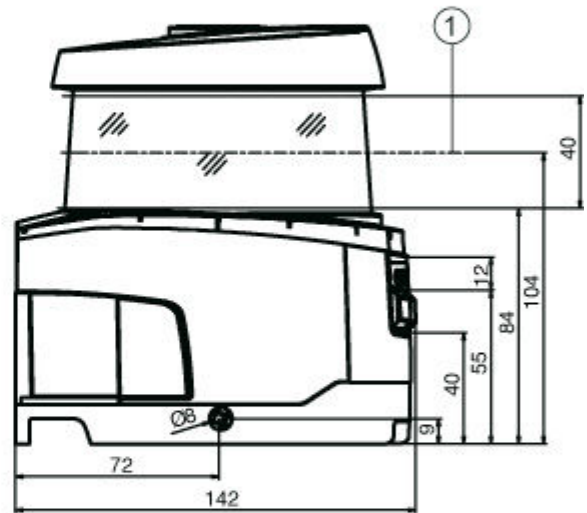
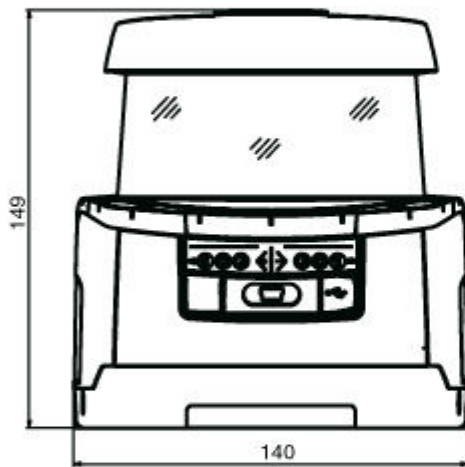
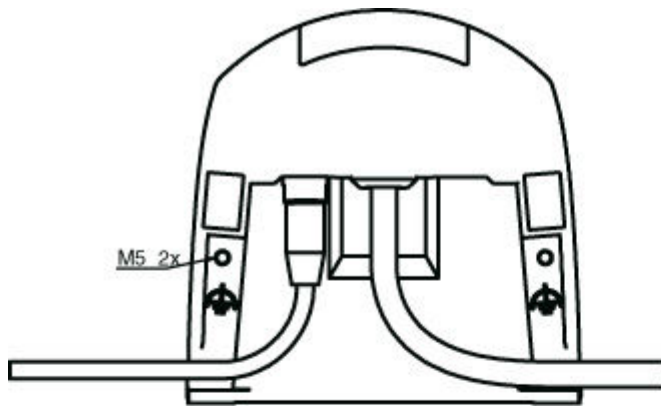
Classification

| | |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| eCl@ss 8.0 | 27272705 |
| eCl@ss 9.0 | 27272705 |
| ETIM 5.0 | EC002550 |
| ETIM 6.0 | EC002550 |

Dimensioned drawings

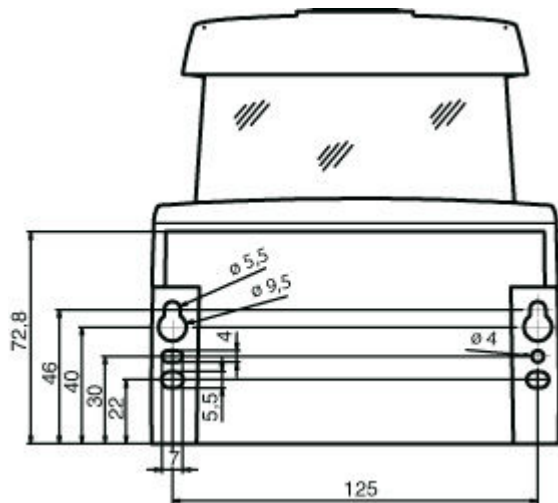
All dimensions in millimeters

Dimensions safety laser scanner with connection unit

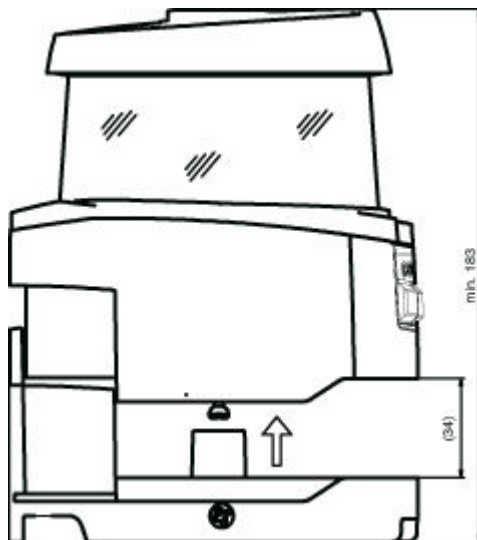


1 Scan level

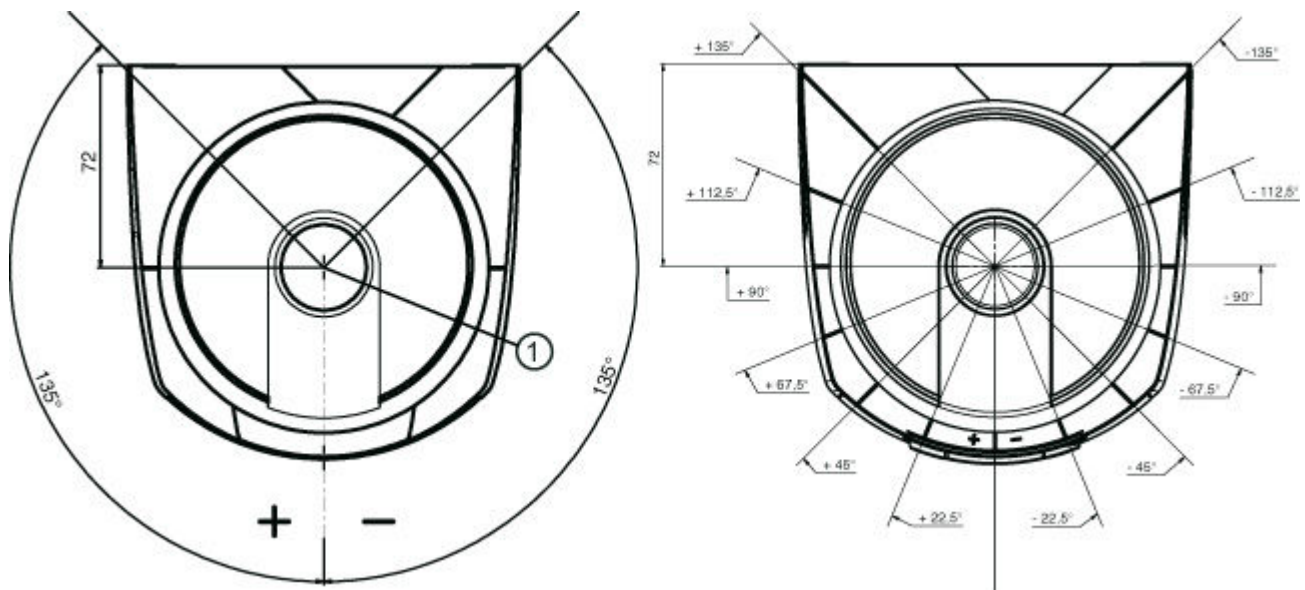
Mounting dimensions safety laser scanner with connection unit



Minimum space requirements for installation and replacement of scanner unit



Dimensions of scanning range



1 Reference point for distance measurement and protective field radius

Electrical connection

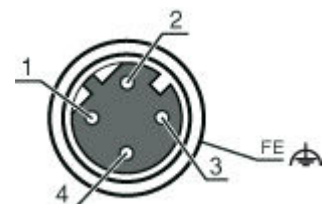
| Connection 1 | |
|----------------------------|----------------------|
| Type of connection | Cable |
| Function | Machine interface |
| Cable length | 10,000 mm |
| Sheathing material | PVC |
| Cable color | Black |
| Number of conductors | 29 -wire |
| Wire cross section | |
| Wire cross section supply | 1 mm ² |
| Wire cross section signals | 0.14 mm ² |

| Conductor color | Conductor assignment |
|-----------------|----------------------|
| White | RES1 |
| Brown | +24V |
| Green | EA1 |
| Yellow | A1 |
| Gray | OSSDA1 |
| Pink | OSSDA2 |
| Blue | GND / Ground |
| Red | MELD |
| Black | F1 |
| Violet | F2 |
| Gray Pink | F3 |
| Blue Red | F4 |
| Green White | F5 |

| Conductor color | Conductor assignment |
|-----------------|----------------------|
| Brown Green | SE1 |
| White Yellow | SE2 |
| Brown Yellow | A2 |
| Gray White | A3 |
| Brown Gray | A4 |
| Pink White | EA2 |
| Brown Pink | EA3 |
| Blue White | EA4 |
| Blue Brown | F6 |
| Red White | F7 |
| Brown Red | F8 |
| Black White | F9 |
| Black Brown | F10 |
| Gray Green | RES2 |
| Gray Yellow | OSSDB1 |
| Green Pink | OSSDB2 |

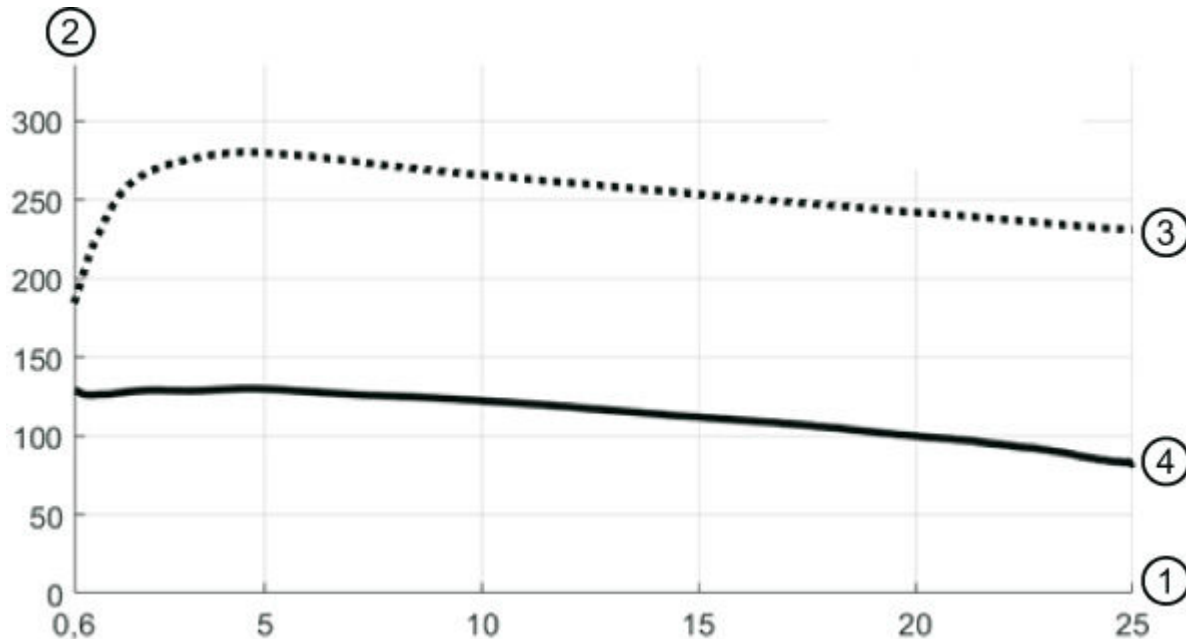
| Connection 2 | |
|--------------------|----------------|
| Type of connection | Connector |
| Function | Data interface |
| Thread size | M12 |
| Type | Female |
| Material | Metal |
| No. of pins | 4 -pin |
| Encoding | D-coded |
| Connector housing | FE/SHIELD |

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1 | TD+ | Yellow |
| 2 | RD+ | White |
| 3 | TD- | Orange |
| 4 | RD- | Blue |
| 5 | | |



Diagrams

Signal strength curves depending on the distance



- 1 Object distance [m]
- 2 Signal strength
- 3 Retro-reflector film
- 4 White surface

The figure shows a typical curve of the signal strength transmitted by the safety sensor as a function of the measured object distance and object diffuse reflection for the following boundary conditions:

- Angle of incidence of the laser beam: 0°
- Share of area of the light spot on the object: 100%

Operation and display

LEDs

| LED | Display | Meaning |
|-----|--------------------------|---|
| 1 | Off | Device switched off |
| | Red, continuous light | OSSD off |
| | Red, flashing | Error |
| | Green, continuous light | OSSD on |
| 2 | Off | RES deactivated or RES activated and released |
| | Yellow, flashing | Protective field occupied |
| | Yellow, continuous light | RES activated and blocked but ready to be unlocked - protective field free and linked sensor is enabled if applicable |
| 3 | Off | Free warning field |
| | Blue, continuous light | Warning field interrupted |
| 4 | Off | Free warning field |
| | Blue, continuous light | Warning field interrupted |
| 5 | Off | RES deactivated or RES activated and released |
| | Yellow, flashing | Protective field occupied |
| | Yellow, continuous light | RES activated and blocked but ready to be unlocked - protective field free and linked sensor is enabled if applicable |
| 6 | Off | Device switched off |
| | Red, continuous light | OSSD off |

| LED | Display | Meaning |
|-----|-------------------------|---------|
| | Red, flashing | Error |
| | Green, continuous light | OSSD on |

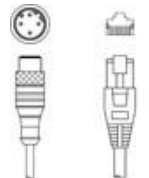
Notes

| Observe intended use! |
|---|
| <ul style="list-style-type: none"> The product may only be put into operation by competent persons. Only use the product in accordance with its intended use. |


| WARNING! INVISIBLE LASER RADIATION – LASER CLASS 1 |
|---|
| <p>The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product of laser class 1 as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24, 2007.</p> <ul style="list-style-type: none"> Observe the applicable statutory and local laser protection regulations. The device must not be tampered with and must not be changed in any way. There are no user-serviceable parts inside the device. Repairs must only be performed by Leuze electronic GmbH + Co. KG. |

Accessories

Connection technology - Interconnection cables


| | Part no. | Designation | Article | Description |
|---|----------|-----------------------------|-----------------------|--|
|  | 50135081 | KSS ET-M12-4A-RJ45-A-P7-050 | Interconnection cable | Suitable for interface: Ethernet Connection 1: Connector, M12, Axial, Male, D-coded, 4 -pin Connection 2: RJ45 Shielded: Yes Cable length: 5,000 mm Sheathing material: PUR |

Mounting technology - Mounting brackets



| | Part no. | Designation | Article | Description |
|---|----------|-------------|------------------|--|
|  | 53800134 | BT840M | Mounting bracket | Application: Mounting on chamfered 90° corner Dimensions: 84.9 mm x 72 mm x 205.2 mm Color: Yellow, RAL 1021 Type of fastening, at system: Through-hole mounting Type of fastening, at device: Screw type Material: Metal |

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Mounting

| | Part no. | Designation | Article | Description |
|---|----------|-------------|------------|--|
|  | 53800131 | BTP800M | Loop guard | Dimensions: 160 mm x 169 mm Color: Black Material: Metal |

Services

| | Part no. | Designation | Article | Description |
|--|----------|-------------|---|--|
|  | S981051 | CS40-I-141 | Safety inspection "Safety laser scanners" | Details: Checking of a safety laser scanner application in accordance with current standards and guidelines. Inclusion of the device and machine data in a database, production of a test log per application. Conditions: It must be possible to stop the machine, support provided by customer's employees and access to the machine for Leuze employees must be ensured. Restrictions: Travel costs and accommodation expenses charged separately and according to expenditure. |
|  | S981047 | CS40-S-141 | Start-up support | Details: For safety devices including stopping time measurement and initial inspection. Conditions: Devices and connection cables are already mounted, price not including travel costs and, if applicable, accommodation expenses. Restrictions: Max. 3 h., no mechanical (mounting) and electrical (wiring) work performed, no changes (attachments, wiring, programming) to third-party components in the nearby environment. |