

Technical data sheet

Safety laser scanner

Part no.: 53800297

RSL445-L/CU429-300-WPU

Contents

- Technical data
- Dimensioned drawings
- Electrical connection
- Diagrams
- Operation and display
- Notes
- Accessories



For illustration purposes only



Technical data

Basic data

| | |
|-------------|--|
| Series | RSL 400 |
| Application | Mobile danger zone guarding Mobile side guarding Stationary access guarding Stationary danger zone guarding |

Special version

| | |
|-----------------|--|
| Special version | Measurement data output optimized for vehicle navigation |
|-----------------|--|

Functions

| | |
|-----------|---|
| Functions | Data output, configurable Dynamic contactor monitoring (EDM), selectable E-stop linkage Four-field mode Safe time delay, internal |
| Restart | Start/restart interlock (RES), selectable |

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

| | |
|---|-----------------------|
| Resolution (adjustable) | 30/40/50/60/70/150 mm |
| Minimum adjustable range | 50 mm |
| Number of field pairs, switchable | Up to 100 |
| Number of quads, switchable | 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 |
| Wavelength | 905 nm |
| Laser class | 1, IEC/EN 60825-1:2014 |
| Transmitted-signal shape | Pulsed |
| Repetition frequency | 90 kHz |
| Angular resolution | 0.1 ° |
| Scanning angle | 270 ° |

Measurement data

| | |
|--|--|
| Detection range | 0 ... 50 m, Diffuse reflection > 90% |
| Diffuse reflection | 90 % |
| 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 signal outputs, configurable | 9 Piece(s) |
| 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 |
| Switching current, max. | 300 mA |

Safety-related switching output 1

| | |
|-------------------|---------------------|
| Assignment | Connection 1, pin 4 |
| Switching element | Transistor, PNP |

Safety-related switching output 2

| | |
|-------------------|---------------------|
| Assignment | Connection 1, pin 5 |
| Switching element | Transistor, PNP |

Safety-related switching output 3

| | |
|-------------------|----------------------|
| Assignment | Connection 1, pin 26 |
| Switching element | Transistor, PNP |

Safety-related switching output 4

| | |
|-------------------|----------------------|
| Assignment | Connection 1, pin 27 |
| Switching element | Transistor, PNP |

Time behavior

| | |
|---------------|---------------|
| Response time | 80 ms, \geq |
|---------------|---------------|

Technical data

Service interface

| | |
|-----------------------------|--|
| Type | Bluetooth, Ethernet, USB |
| Ethernet | |
| Function | Configuration/parametization |
| | TCP/IP |
| Connection | M12 connector, 4-pin, D-coded |
| Bluetooth | |
| Function | Configuration/parametization |
| Frequency band | 2,400 ... 2,483.5 MHz |
| Radiated transmitting power | Max. 4.5 dBm (2.82 mW), class 2 |
| USB | |
| Function | Configuration/parametization |
| 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 | |
| Function | Machine interface |
| Type of connection | Cable with connector |
| Cable length | 300 mm |
| Sheathing material | PVC |
| Cable color | Black |
| Wire cross section supply | 1 mm ² |
| Wire cross section signals | 0.14 mm ² |
| Thread size | M30 |
| Type | Male |
| Material | Plastic |
| No. of pins | 30 -pin |
| Connection 2 | |
| Function | Data interface |
| Type of connection | Connector |
| 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 |
| Metal housing | 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 | Alphanumerical 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 |
| Approvals | 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 10,304,307B |
| | US 7,656,917 B |
| | US 7,696,468 B |
| | US 8,520,221 B |

Classification

| | |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4 | 27272705 |
| ECLASS 8.0 | 27272705 |
| ECLASS 9.0 | 27272705 |
| ECLASS 10.0 | 27272705 |
| ECLASS 11.0 | 27272705 |
| ECLASS 12.0 | 27272705 |
| ECLASS 13.0 | 27272705 |
| ECLASS 14.0 | 27272705 |
| ECLASS 15.0 | 27272705 |
| ETIM 5.0 | EC002550 |
| ETIM 6.0 | EC002550 |
| ETIM 7.0 | EC002550 |
| ETIM 8.0 | EC002550 |
| ETIM 9.0 | EC002550 |
| ETIM 10.0 | EC002550 |

Dimensioned drawings

All dimensions in millimeters

Dimensions safety laser scanner with connection unit



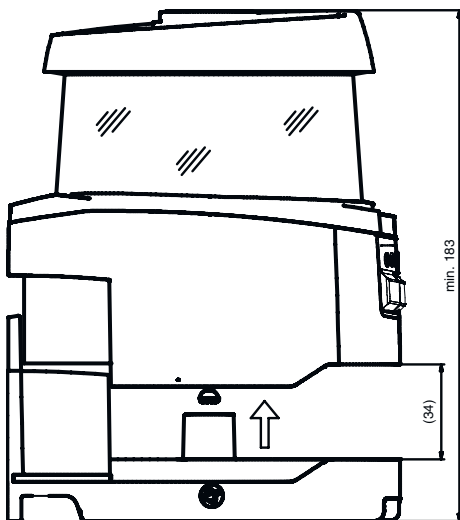
1 Scan level

Dimensioned drawings

Mounting dimensions safety laser scanner with connection unit



Minimum space requirements for installation and replacement of scanner unit



Dimensioned drawings

Dimensions of scanning range



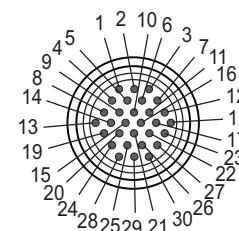
1 Reference point for distance measurement and protective field radius

Electrical connection

Connection 1

| | |
|----------------------------|----------------------|
| Function | Machine interface |
| Type of connection | Cable with connector |
| Cable length | 300 mm |
| Sheathing material | PVC |
| Cable color | Black |
| Wire cross section supply | 1 mm ² |
| Wire cross section signals | 0.14 mm ² |
| Thread size | M30 |
| Type | Male |
| Material | Plastic |
| No. of pins | 30 -pin |
| Connector housing | FE/SHIELD |

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1 | RES1 | White |
| 2 | +24 V | Brown |
| 3 | EA1 | Green |
| 4 | OSSDA1 | Gray |
| 5 | OSSDA2 | Pink |
| 6 | MELD | Red |
| 7 | A1 | Yellow |
| 8 | F1 | Black |
| 9 | F2 | Violet |
| 10 | F3 | Gray / Pink |
| 11 | F4 | Blue / Red |
| 12 | F5 | Green / White |
| 13 | SE1 | Brown / Green |
| 14 | SE2 | White / Yellow |
| 15 | A2 | Brown / Yellow |
| 16 | A3 | Gray / White |



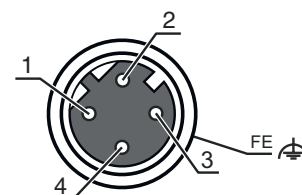
Electrical connection

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 17 | A4 | Brown / Gray |
| 18 | EA2 | Pink / White |
| 19 | EA3 | Brown / Pink |
| 20 | EA4 | Blue / White |
| 21 | F6 | Blue / Brown |
| 22 | F7 | Red / White |
| 23 | F8 | Brown / Red |
| 24 | F9 | Black / White |
| 25 | F10 | Black / Brown |
| 26 | OSSDB1 | Gray / Yellow |
| 27 | OSSDB2 | Green / Pink |
| 28 | n.c. | - |
| 29 | GND / Ground | Blue |
| 30 | RES2 | Gray / Green |

Connection 2

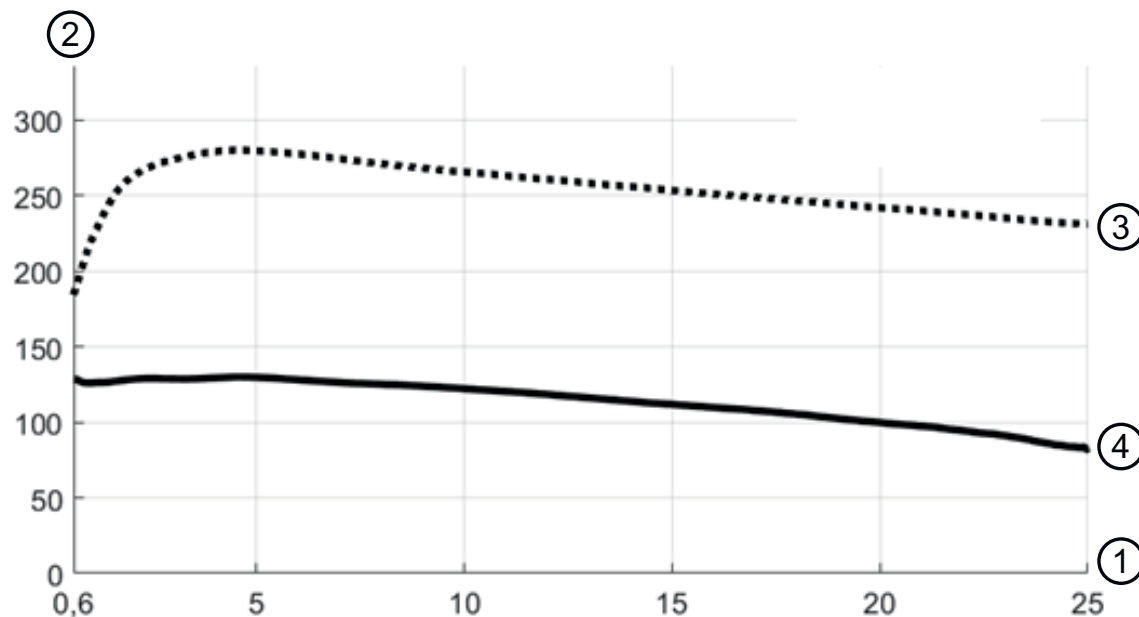
| | |
|--------------------|----------------|
| Function | Data interface |
| Type of connection | Connector |
| Thread size | M12 |
| Type | Female |
| Material | Metal |
| No. of pins | 4 -pin |
| Encoding | D-coded |
| Connector housing | FE/SHIELD |

| 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

| 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 |
| | Red, flashing | Error |
| | Green, continuous light | OSSD on |

Notes

Observe intended use!

The product may only be put into operation by competent persons.
 Only use the product in accordance with its intended use.

ATTENTION! INVISIBLE LASER RADIATION – CLASS 1 LASER PRODUCT

The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of **laser class 1** and complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

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 - Connection cables




| | Part no. | Designation | Article | Description |
|--|----------|---------------------|------------------|--|
| | 50137269 | KD S-M30-30A-V1-050 | Connection cable | Connection 1: Connector, M30, Axial, Female, 30 -pin Connector, LED: No Connection 2: Open end Shielded: Yes Cable length: 5.000 mm Sheathing material: PVC |

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 |
| | 50135082 | KSS ET-M12-4A-RJ45-A-P7-100 | Interconnection cable | Suitable for interface: Ethernet Connection 1: Connector, M12, Axial, Male, D-coded, 4 -pin Connection 2: RJ45 Shielded: Yes Cable length: 10,000 mm Sheathing material: PUR |
| | 50135083 | KSS ET-M12-4A-RJ45-A-P7-150 | Interconnection cable | Suitable for interface: Ethernet Connection 1: Connector, M12, Axial, Male, D-coded, 4 -pin Connection 2: RJ45 Shielded: Yes Cable length: 15,000 mm Sheathing material: PUR |

Accessories


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 |
|  | 53800132 | BTF815M | Mounting bracket | Application: Mounting bracket for floor mounting Dimensions: 186 mm x 120 mm x 288 mm Scan level height: 150 mm Color: Yellow, RAL 1021 Type of fastening, at system: Through-hole mounting Type of fastening, at device: Screw type Material: Metal |
|  | 53800133 | BTF830M | Mounting bracket | Application: Mounting bracket for floor mounting Dimensions: 186 mm x 275 mm x 288 mm Scan level height: 300 mm Color: Yellow, RAL 1021 Type of fastening, at system: Through-hole mounting Type of fastening, at device: Screw type Material: Metal |

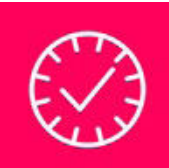
Mounting

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

General

| | Part no. | Designation | Article | Description |
|--|----------|----------------|--------------|---|
|  | 430400 | RS4-clean-Set1 | Cleaning set | Number of cleaning cloths: 40 Piece(s) Content of cleaning fluid: 150 ml |

Services

| | Part no. | Designation | Article | Description |
|--|----------|-------------|-------------------|--|
|  | S981051 | CS40-I-141 | Safety inspection | 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. |

Accessories

| | Part no. | Designation | Article | Description |
|--|----------|-------------|------------------|--|
| | 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. |

| Note | |
|------|---|
| | A list with all available accessories can be found on the Leuze website in the Download tab of the article detailed page. |