# Technical data sheet
# Contrast sensor
Part no.: 50148500
KRT3CL1.3S2/4T

For Illustration purposes only

**Contents**

# Technical data

## Basic data

| | |
|---|---|
| **Series** | 3C |

## Special version

| | |
|---|---|
| **Special version** | Teach input |
| | Time function |

## Optical data

| | |
|---|---|
| **Operating range** | 60 mm ± 20 mm |
| **Beam path** | Focused |
| **Light source** | Laser, Red |
| **Wavelength** | 655 nm |
| **Laser class** | 1, IEC 60825-1:2014 / EN 60825-1:2014+A11:2021 |
| **Max. laser power** | 0.0027 W |
| **Transmitted-signal shape** | Pulsed |
| **Pulse duration** | 5 µs |
| **Light spot size [at sensor distance]** | 0.5 mm x 1 mm [60 mm] |
| **Light spot orientation** | Vertical |
| **Type of light spot geometry** | Oval |
| **Light beam exit** | Front |
| **Focus** | Fixed |

## Measurement data

| | |
|---|---|
| **Repeatability** | 0.05 mm |

## Electrical data

| | |
|---|---|
| **Protective circuit** | Polarity reversal protection |
| | Short circuit protected |

### Performance data

| | |
|---|---|
| **Supply voltage $U_B$** | 12 ... 30 V, DC, Incl. residual ripple |
| **Residual ripple** | 0 ... 15 %, From $U_B$ |
| **Open-circuit current** | 0 ... 25 mA |

### Inputs

| | |
|---|---|
| **Number of teach inputs** | 1 Piece(s) |

#### Teach inputs

| | |
|---|---|
| **Voltage type** | DC |
| **Switching voltage** | high: ≥8V |
| | low: ≤ 2 V or not connected |
| **Delay** | 10 ms |
| **Input resistance** | 15,000 Ω |

##### Teach input 1

| | |
|---|---|
| **Function** | Keyboard lockout |
| | Setting the pulse stretching |
| | Teach-in |
| **Active switching state** | High |
| **Teach process** | Static 2-point |

### Outputs

| | |
|---|---|
| **Number of digital switching outputs** | 1 Piece(s) |

#### Switching outputs

| | |
|---|---|
| **Voltage type** | DC |
| **Switching current, max.** | 100 mA |
| **Switching voltage** | high: ≥($U_B$-2V) |
| | low: ≤ 2 V |

##### Switching output 1

| | |
|---|---|
| **Switching element** | Transistor, PNP |
| **Switching principle** | Light switching |

## Time behavior

| | |
|---|---|
| **Switching frequency** | 4,000 Hz |
| **Response time** | 0.125 ms |
| **Readiness delay** | 300 ms |
| **Response jitter** | 35 µs |

## Connection

### Connection 1

| | |
|---|---|
| **Function** | Signal OUT |
| | Teach input |
| | Voltage supply |
| **Type of connection** | Cable |
| **Cable length** | 2,000 mm |
| **Number of conductors** | 4 -wire |

## Mechanical data

| | |
|---|---|
| **Design** | Cubic |
| **Dimension (W x H x L)** | 11.4 mm x 34.2 mm x 18.3 mm |
| **Housing material** | Plastic |
| **Plastic housing** | PC-ABS |
| **Lens cover material** | Plastic / PMMA |
| **Net weight** | 50 g |
| **Housing color** | Red |
| **Type of fastening** | Via optional mounting device |
| **Compatibility of materials** | ECOLAB |

## Operation and display

| | |
|---|---|
| **Type of display** | LED |
| **Number of LEDs** | 2 Piece(s) |
| **Operational controls** | Teach button |
| **Function of the operational control** | Setting the pulse stretching |
| | Switching-threshold adjustment |
| | Teach-in |

## Environmental data

| | |
|---|---|
| **Ambient temperature, operation** | -40 ... 55 °C |
| **Ambient temperature, storage** | -40 ... 70 °C |

## Certifications

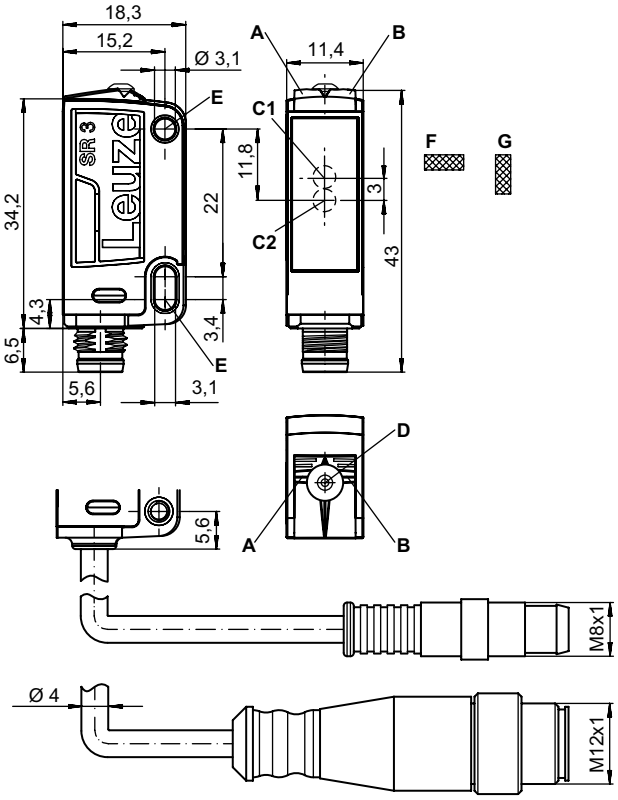
| | |
|---|---|
| **Degree of protection** | IP 67 |
| | IP 69K |
| **Protection class** | III |
| **Certifications** | c UL US |
| **Standards applied** | EN IEC 60947-5-2 |

# Technical data

| | |
|---|---|
| **Customs tariff number** | 85365019 |
| **ECLASS 5.1.4** | 27270906 |
| **ECLASS 8.0** | 27270906 |
| **ECLASS 9.0** | 27270906 |
| **ECLASS 10.0** | 27270906 |
| **ECLASS 11.0** | 27270906 |
| **ECLASS 12.0** | 27270906 |
| **ECLASS 13.0** | 27270906 |
| **ECLASS 14.0** | 27270906 |
| **ETIM 5.0** | EC001820 |
| **ETIM 6.0** | EC001820 |
| **ETIM 7.0** | EC001820 |
| **ETIM 8.0** | EC001820 |
| **ETIM 9.0** | EC001820 |

# Dimensioned drawings

All dimensions in millimeters




A Green LED
B Yellow LED
C1 Optical axis (receiver)
C2 Optical axis (transmitter)
D Teach button
E Mounting sleeve
F Light spot orientation horizontal
G Light spot orientation vertical

# Electrical connection

### Connection 1

| | |
|---|---|
| **Function** | Signal OUT |
| | Teach input |
| | Voltage supply |
| **Type of connection** | Cable |
| **Cable length** | 2,000 mm |
| **Sheathing material** | PUR |
| **Cable color** | Black |
| **Number of conductors** | 4 -wire |
| **Wire cross section** | 0.2 mm² |

| Conductor color | Conductor assignment |
|---|---|
| **Brown** | V+ |
| **White** | Teach-in |
| **Blue** | GND |
| **Black** | OUT 1 |

# Operation and display

| Display LED 1 | Display LED 2 | Meaning |
|---|---|---|
| Green, continuous light | Off | Operational readiness |
| Green, flashing, 3 Hz | Yellow, flashing, 3 Hz | Teach event active |
| Green, flashing, 15 Hz | Yellow, flashing, 15 Hz | Teach error |
| Green, continuous light | Yellow, continuous light | Mark detected |

# Part number code

Part designation: **KRT3C A.BCDD/EF-G**

| | |
|---|---|
| **KRT3C** | **Operating principle**<br>KRT3C: Contrast sensor |
| **A** | **Light type**<br>M: LED, multicolor<br>W: White light<br>L1: laser class 1 |
| **B** | **Light spot orientation**<br>L: vertical<br>Q: horizontal |
| **C** | **Control button**<br>3: teach-in via button |
| **DD** | **Teach mode**<br>S1: Static 1-point teach<br>S2: Static 2-point teach<br>D2: Dynamic 2-point teach |
| **E** | **Switching output/function OUT 1/IN: Pin 4 or black conductor**<br>2: NPN transistor output, light switching<br>4: PNP transistor output, light switching<br>6: push-pull switching output, PNP light switching, NPN dark switching<br>L: IO-Link / light switching (PNP)/dark switching (NPN) |
| **F** | **Switching output / function OUT 2/IN: pin 2 or white conductor**<br>G: Push-pull switching output, PNP dark switching, NPN light switching<br>T: teach-in via cable |

# Part number code

| | |
|---|---|
| **G** | **Electrical connection**<br>n/a: cable, standard length 2000 mm, 4-wire<br>M8: M8 connector, 4-pin (plug)<br>200-M12: cable, length 200 mm with M12 connector, 4-pin, axial (plug)<br>200-M8: cable, length 200 mm with M8 connector, 4-pin, axial (plug) |

**Note**

- A list with all available device types can be found on the Leuze website at www.leuze.com.

# Notes

**Observe intended use!**

- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.

**For UL applications:**

- For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).

**ATTENTION! LASER RADIATION – CLASS 1 LASER PRODUCT**

The device satisfies the requirements of IEC 60825-1:2014 / EN 60825-1:2014+A11:2021 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.

# Further information

- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C

# Accessories

## Mounting technology - Mounting brackets

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50105546 | BT 3B | Mounting device | Design of mounting device: Angle, L-shape<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Rigid<br>Material: Metal |

## Mounting technology - Rod mounts

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50117829 | BTP 200M-D12 | Mounting system | Design of mounting device: Protection hood<br>Fastening, at system: For 12 mm rod<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Clampable, Adjustable, Turning, 360°<br>Material: Metal |
|  | 50117255 | BTU 200M-D12 | Mounting system | Design of mounting device: Mounting system<br>Fastening, at system: For 12 mm rod, Sheet-metal mounting<br>Mounting bracket, at device: Screw type, Suited for M3 screws<br>Type of mounting device: Clampable, Adjustable, Turning, 360°<br>Material: Metal |

**Note**

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