# Technical data sheet

## Polarized retro-reflective photoelectric sensor

Part no.: 50133756

PRK3CL1.BA3/LP



For Illustration purposes only

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**The Sensor People**

# Technical data

**Leuze**

## Basic data

| | |
|---|---|
| **Series** | 3C |
| **Operating principle** | Reflection principle |

## Special version

| | |
|---|---|
| **Special version** | Autocollimation |

## Optical data

| | |
|---|---|
| **Operating range** | 0 ... 2 m (guaranteed operating range), With reflector MTKS 50x50.1 |
| **Operating range limit** | 0 ... 3 m (typical operating range), With reflector MTKS 50x50.1 |
| **Beam path** | Collimated |
| **Light source** | Laser, Red |
| **Wavelength** | 655 nm |
| **Laser class** | 1, in accordance with IEC 60825-1:2014 (EN 60825-1:2014) |
| **Max. laser power** | 0.0017 W |
| **Transmitted-signal shape** | Pulsed |
| **Pulse duration** | 5.3 µs |
| **Light spot size [at sensor distance]** | 1 mm [3,000 mm] |
| **Type of light spot geometry** | Round |
| **Shift angle** | Typ. ± 2° |

## Electrical data

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

### Performance data

| | |
|---|---|
| **Supply voltage $U_B$** | 10 ... 30 V, DC, Incl. residual ripple |
| **Residual ripple** | 0 ... 15 %, From $U_B$ |
| **Open-circuit current** | 0 ... 15 mA |

### Outputs

| | |
|---|---|
| **Number of digital switching outputs** | 2 Piece(s) |

#### Switching outputs

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

#### Switching output 1

| | |
|---|---|
| **Switching element** | Transistor, Push-pull |
| **Switching principle** | IO-Link / light switching (PNP)/dark switching (NPN) |

#### Switching output 2

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

## Time behavior

| | |
|---|---|
| **Switching frequency** | 3,000 Hz |
| **Response time** | 0.17 ms |
| **Readiness delay** | 300 ms |

## Interface

| | |
|---|---|
| **Type** | IO-Link |

## IO-Link

| | |
|---|---|
| **COM mode** | COM2 |
| **Min. cycle time** | COM2 = 2.3 ms |
| **Frame type** | 2.5 |
| **Specification** | V1.1 |
| **SIO-mode support** | Yes |

## Connection

| | |
|---|---|
| **Number of connections** | 1 Piece(s) |

### Connection 1

| | |
|---|---|
| **Function** | Signal IN |
| | Signal OUT |
| | 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 |

## Mechanical data

| | |
|---|---|
| **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** | Two M3 threaded sleeves |
| | 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** | Sensitivity adjustment |

## Environmental data

| | |
|---|---|
| **Ambient temperature, operation** | -10 ... 55 °C |
| **Ambient temperature, storage** | -40 ... 70 °C |

## Certifications

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

## Classification

| | |
|---|---|
| **Customs tariff number** | 85365019 |
| **ECLASS 5.1.4** | 27270902 |
| **ECLASS 8.0** | 27270902 |
| **ECLASS 9.0** | 27270902 |
| **ECLASS 10.0** | 27270902 |
| **ECLASS 11.0** | 27270902 |
| **ETIM 5.0** | EC002717 |
| **ETIM 6.0** | EC002717 |
| **ETIM 7.0** | EC002717 |

# Dimensioned drawings

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All dimensions in millimeters



A   Green LED
B   Yellow LED
C   Optical axis
D   Teach button
E   Mounting sleeve (standard)
F   Threaded sleeve (3C.B series)
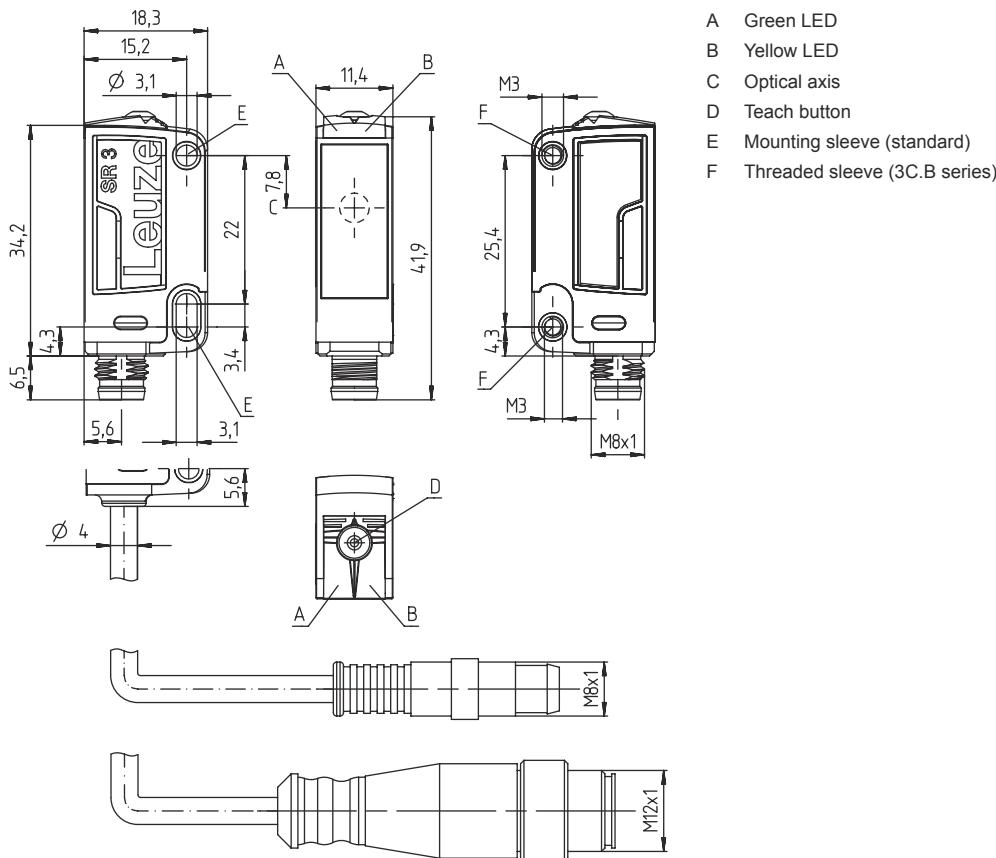
# Electrical connection

**Connection 1**

| Function | Signal IN |
| --- | --- |
|  | Signal OUT |
|  | 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 | OUT 2 |
| Blue | GND |
| Black | IO-Link / OUT 1 |

# Operation and display

| LED | Display | Meaning |
| --- | --- | --- |
| 1 | Green, continuous light | Operational readiness |

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# Operation and display

| LED | Display | Meaning |
|---|---|---|
| 2 | Yellow, continuous light | Light path free |
| | Yellow, flashing | Light path free, no function reserve |

# Reflectors & reflective tapes

| | Part no. | Designation | Operating range<br>Operating range limit | Description |
|---|---|---|---|---|
| | 50040894 | MTKS 20x30 | 0 ... 1.6 m<br>0 ... 2.2 m | Design: Rectangular<br>Triple reflector size: 1.2 mm<br>Reflective surface: 19 mm x 29 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive |
| | 50104130 | MTKS 20x40.1 | 0 ... 1 m<br>0 ... 1.5 m | Design: Rectangular<br>Triple reflector size: 12 mm<br>Reflective surface: 17 mm x 38 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive |
| | 50117583 | MTKS 50x50.1 | 0 ... 2 m<br>0 ... 3 m | Design: Rectangular<br>Triple reflector size: 1.2 mm<br>Reflective surface: 50 mm x 50 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive |
| | 50110192 | REF 6-A-50x50 | 0 ... 1 m<br>0 ... 1.4 m | Design: Rectangular<br>Triple reflector size: 0.3 mm<br>Reflective surface: 50 mm x 50 mm<br>Material: Plastic<br>Chemical designation of the material: PMMA<br>Fastening: Self-adhesive |
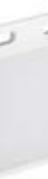
# Part number code

Part designation: **AAA 3C d EE-f.GG H/i J-K**

| AAA3C | **Operating principle / construction**<br>HT3C: Diffuse reflection sensor with background suppression<br>LS3C: Throughbeam photoelectric sensor transmitter<br>LE3C: Throughbeam photoelectric sensor receiver<br>PRK3C: Retro-reflective photoelectric sensor with polarization filter<br>ODT3C: Distance diffuse sensor with background suppression |
|---|---|
| d | **Light type**<br>n/a: red light<br>I: infrared light |
| EE | **Light source**<br>n/a: LED<br>L1: laser class 1<br>L2: laser class 2 |
| f | **Preset range (optional)**<br>n/a: operating range acc. to data sheet<br>xxxF: Preset range [mm]<br>2M: operating range of 2 meters |

# Part number code

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| GG | **Equipment** |
|---|---|
| | n/a: standard |
| | A: Autocollimation principle (single lens) for positioning tasks |
| | B: Housing model with two M3 threaded sleeves, brass |
| | F: Permanently set range |
| | L: Long light spot |
| | S: small light spot |
| | T: autocollimation principle (single lens) for highly transparent bottles without tracking |
| | TT: autocollimation principle (single lens) for highly transparent bottles with tracking |
| | V: V-optics |
| | XL: Extra long light spot |
| | X: extended model |
| | HF: Suppression of HF illumination (LED) |
| H | **Operating range adjustment** |
| | n/a with HT: range adjustable via 8-turn potentiometer |
| | n/a with retro-reflective photoelectric sensors (PRK): operating range not adjustable |
| | 1: 270° potentiometer |
| | 3: teach-in via button |
| | 6: auto-teach |
| i | **Switching output/function OUT 1/IN: Pin 4 or black conductor** |
| | 2: NPN transistor output, light switching |
| | N: NPN transistor output, dark switching |
| | 4: PNP transistor output, light switching |
| | P: PNP transistor output, dark switching |
| | 6: push-pull switching output, PNP light switching, NPN dark switching |
| | G: Push-pull switching output, PNP dark switching, NPN light switching |
| | L: IO-Link interface (SIO mode: PNP light switching, NPN dark switching) |
| | 8: activation input (activation with high signal) |
| | X: pin not used |
| | 1: IO-Link / light switching (NPN) / dark switching (PNP) |
| J | **Switching output / function OUT 2/IN: pin 2 or white conductor** |
| | 2: NPN transistor output, light switching |
| | N: NPN transistor output, dark switching |
| | 4: PNP transistor output, light switching |
| | P: PNP transistor output, dark switching |
| | 6: push-pull switching output, PNP light switching, NPN dark switching |
| | G: Push-pull switching output, PNP dark switching, NPN light switching |
| | W: warning output |
| | X: pin not used |
| | 8: activation input (activation with high signal) |
| | 9: deactivation input (deactivation with high signal) |
| | T: teach-in via cable |
| K | **Electrical connection** |
| | n/a: cable, standard length 2000 mm, 4-wire |
| | 5000: cable, standard length 5000 mm, 4-wire |
| | M8: M8 connector, 4-pin (plug) |
| | M8.3: M8 connector, 3-pin (plug) |
| | 200-M8: cable, length 200 mm with M8 connector, 4-pin, axial (plug) |
| | 200-M8.3: cable, length 200 mm with M8 connector, 3-pin, axial (plug) |
| | 200-M12: cable, length 200 mm with M12 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. |

# Notes

# Leuze

| | **For UL applications:** |
|---|---|
| | ✋ For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code). |
| | ✋ These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/ CYJV7 or PVVA/PVVA7) |

| | **WARNING! 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. |

# Further information

- Light source: Average life expectancy 50,000 h at an ambient temperature of 25 °C
- Response time: For short decay times, an ohmic load of approx. 5 kOhm is recommended
- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C
- Permissible operating temperature range during IO-Link operation: -10 °C to +40 °C

# Accessories

## Connection technology - Connection unit

| Part no. | Designation | Article | Description |
|---|---|---|---|
| 50144900 | MD 798i-11-82/L5-2222 | IO-Link master | Current consumption, max.: 11,000 mA Interface: IO-Link, Automatic protocol detection, EtherNet IP, Modbus TCP, PROFINET Connections: 12 Piece(s) Sensor connections: 8 Piece(s) Degree of protection: IP 67, IP 65, IP 69K |

## Mounting technology - Mounting brackets

| Part no. | Designation | Article | Description |
|---|---|---|---|
| 50139831 | BT 205M | Mounting device | Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Rigid Material: Metal |

# Accessories

## Mounting technology - Rod mounts

| Part no. | Designation | Article | Description |
|---|---|---|---|
| 50117255 | BTU 200M-D12 | Mounting system | Contains: 2x M3 x 16 screw, 2 M3 x 20 screws, 2x position washers<br>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. |

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