

## Technical data sheet

### Polarized retro-reflective photoelectric sensor

Part no.: 50133734

PRK3CL1.BTT3/4P-M8

#### Contents

- Technical data
- Dimensioned drawings
- Electrical connection
- Operation and display
- Reflectors & reflective tapes
- Part number code
- Notes
- Further information
- Accessories



CDRH



UK  
CA

For illustration purposes only

# Technical data

## Basic data

|                     |   |
|---------------------|---|
| Series              | 3C  |
| Operating principle | Reflection principle  |
| Application         | Detection of highly transparent bottles<br>Detection of transparent films |
|                     |   |

## Special version

|                 |                                      |
|-----------------|--------------------------------------|
| Special version | Autocollimation<br>Tracking function |
|-----------------|--------------------------------------|

## Optical data

|                                      |   |
|--------------------------------------|---|
| Operating range                      | 0 ... 0.4 m (guaranteed operating range)                    |
| Operating range limit                | 0 ... 0.5 m (typical operating range)                       |
| Beam path                            | Collimated  |
| Light source                         | Laser, Red  |
| Wavelength                           | 655 nm  |
| Laser class                          | 1, in accordance with IEC 60825-1:2014<br>(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 [500 mm]   |
| Type of light spot geometry          | Round   |
| Shift angle                          | Typ. ± 2°   |

## Electrical data

|                    |   |
|--------------------|---|
| Protective circuit | Polarity reversal protection<br>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: $\geq (U_B - 2V)$<br>low: $\leq 2 V$ |

### Switching output 1

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

### Switching output 2

|                     |                     |
|---------------------|---------------------|
| Assignment          | Connection 1, pin 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   |

## Connection

|                       |                              |
|-----------------------|------------------------------|
| Number of connections | 1 Piece(s)                   |
| <b>Connection 1</b>   |                              |
| Function              | Signal OUT<br>Voltage supply |
| Type of connection    | Connector                    |
| Thread size           | M8                           |
| Type                  | Male                         |
| Material              | Metal                        |
| No. of pins           | 4 -pin                       |

## 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                                     | 10 g  |
| Housing color                                  | Red   |
| Type of fastening                              | Two M3 threaded sleeves<br>Via optional mounting device |
| Recommended tightening torque for M3 fastening | 0.9 N·m   |
| 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 | -40 ... 55 °C |
| Ambient temperature, storage   | -40 ... 70 °C |

## Certifications

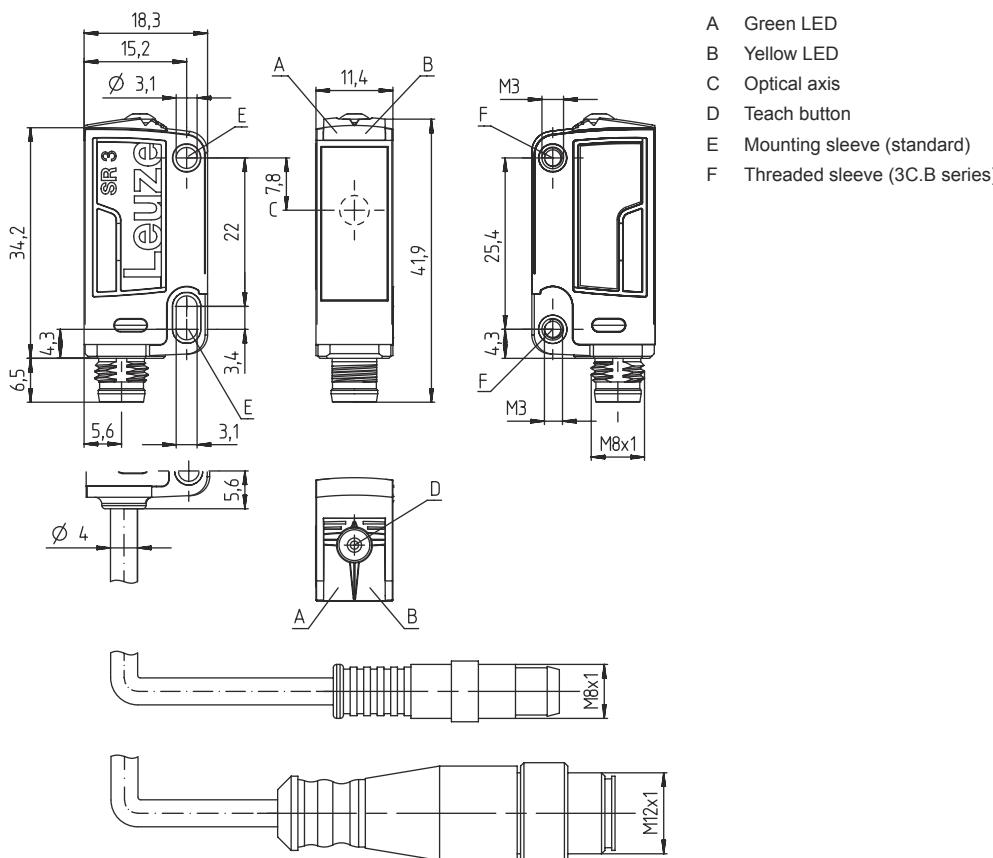
|                      |                 |
|----------------------|-----------------|
| Degree of protection | IP 67<br>IP 69K |
| Protection class     | III             |
| Approvals            | c UL US         |
| Standards applied    | IEC 60947-5-2   |

## Technical data

|                       |          |
|-----------------------|----------|
| 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 |
| ECLASS 12.0           | 27270902 |
| ECLASS 13.0           | 27270902 |
| ECLASS 14.0           | 27270902 |
| ECLASS 15.0           | 27270902 |
| ECLASS 16.0           | 27270902 |
| ETIM 5.0              | EC002717 |
| ETIM 6.0              | EC002717 |
| ETIM 7.0              | EC002717 |
| ETIM 8.0              | EC002717 |
| ETIM 9.0              | EC002717 |
| ETIM 10.0             | EC002717 |

## Dimensioned drawings

All dimensions in millimeters

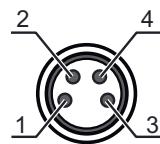


## Electrical connection

### Connection 1

|                    |                              |
|--------------------|------------------------------|
| Function           | Signal OUT<br>Voltage supply |
| Type of connection | Connector                    |
| Thread size        | M8                           |
| Type               | Male                         |
| Material           | Metal                        |
| No. of pins        | 4 -pin                       |

| Pin | Pin assignment |
|-----|----------------|
| 1   | V+             |
| 2   | OUT 2          |
| 3   | GND            |
| 4   | OUT 1          |



## Operation and display

| LED | Display                  | Meaning               |
|-----|--------------------------|-----------------------|
| 1   | Green, continuous light  | Operational readiness |
| 2   | Yellow, continuous light | Light path free       |

## Reflectors & reflective tapes

| Part no.  | Designation            | Operating range<br>Operating range<br>limit | Description   |
|---|------------------------|---|---|
|   | 50110191 REF 6-A-25x25 | 0 ... 0.4 m<br>0 ... 0.5 m                  | Design: Rectangular<br>Triple reflector size: 0.3 mm<br>Reflective surface: 25 mm x 25 mm<br>Material: Plastic<br>Chemical designation of the material: PMMA<br>Fastening: Self-adhesive  |
|  | 50114185 REF 6-S-20x40 | 0 ... 0.4 m<br>0 ... 0.5 m                  | Design: Rectangular<br>Triple reflector size: 0.3 mm<br>Reflective surface: 16 mm x 38 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Screw type                   |
|  | 50112142 TK BR 53      | 0 ... 0.4 m<br>0 ... 0.5 m                  | Design: Rectangular<br>Triple reflector size: 0.3 mm<br>Reflective surface: 29 mm x 10 mm<br>Material: Plastic<br>Base material: Stainless steel<br>Chemical designation of the material: Stainless steel<br>Fastening: Housing fit |

## 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 |
|-------|---|

## Part number code

|           |  |
|-----------|--|
| <b>d</b>  | <b>Light type</b><br>n/a: red light<br>I: infrared light   |
| <b>EE</b> | <b>Light source</b><br>n/a: LED<br>L1: laser class 1<br>L2: laser class 2<br>PP: Power PinPoint® LED   |
| <b>f</b>  | <b>Preset range (optional)</b><br>n/a: operating range acc. to data sheet<br>xxxF: Preset range [mm]<br>2M: operating range of 2 meters  |
| <b>GG</b> | <b>Equipment</b><br>n/a: standard<br>A: Autocollimation principle (single lens) for positioning tasks<br>B: Housing model with two M3 threaded sleeves, brass<br>F: Permanently set range<br>L: Long light spot<br>S: small light spot<br>T: autocollimation principle (single lens) for highly transparent bottles without tracking<br>TT: autocollimation principle (single lens) for highly transparent bottles with tracking<br>V: V-optics<br>XL: Extra long light spot<br>X: extended model<br>HF: Suppression of HF illumination (LED)  |
| <b>H</b>  | <b>Operating range adjustment</b><br>n/a with HT: range adjustable via 8-turn potentiometer<br>n/a with retro-reflective photoelectric sensors (PRK): operating range not adjustable<br>1: 270° potentiometer<br>3: teach-in via button<br>6: auto-teach   |
| <b>i</b>  | <b>Switching output/function OUT 1/IN: Pin 4 or black conductor</b><br>2: NPN transistor output, light switching<br>N: NPN transistor output, dark switching<br>4: PNP transistor output, light switching<br>P: PNP transistor output, dark switching<br>6: push-pull switching output, PNP light switching, NPN dark switching<br>G: Push-pull switching output, PNP dark switching, NPN light switching<br>L: IO-Link interface (SIO mode: PNP light switching, NPN dark switching)<br>8: activation input (activation with high signal)<br>X: pin not used<br>1: IO-Link / light switching (NPN) / dark switching (PNP) |
| <b>J</b>  | <b>Switching output / function OUT 2/IN: pin 2 or white conductor</b><br>2: NPN transistor output, light switching<br>N: NPN transistor output, dark switching<br>4: PNP transistor output, light switching<br>P: PNP transistor output, dark switching<br>6: push-pull switching output, PNP light switching, NPN dark switching<br>G: Push-pull switching output, PNP dark switching, NPN light switching<br>W: warning output<br>X: pin not used<br>8: activation input (activation with high signal)<br>9: deactivation input (deactivation with high signal)<br>T: teach-in via cable                                 |
| <b>K</b>  | <b>Electrical connection</b><br>n/a: cable, standard length 2000 mm, 4-wire<br>5000: cable, standard length 5000 mm, 4-wire<br>M8: M8 connector, 4-pin (plug)<br>M8.3: M8 connector, 3-pin (plug)<br>200-M8: cable, length 200 mm with M8 connector, 4-pin, axial (plug)<br>200-M8.3: cable, length 200 mm with M8 connector, 3-pin, axial (plug)<br>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](http://www.leuze.com).

## Notes

|   |   |
|---|---|
|  | <b>Observe intended use!</b>  |
|   | <ul style="list-style-type: none"> <li>↳ This product is not a safety sensor and is not intended as personnel protection.</li> <li>↳ The product may only be put into operation by competent persons.</li> <li>↳ Only use the product in accordance with its intended use.</li> </ul> |

|  |  |
|--|--|
|  | <b>For UL applications:</b>  |
|  | <ul style="list-style-type: none"> <li>↳ For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).</li> <li>↳ 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)</li> </ul> |

|  |   |
|--|---|
|  | <b>WARNING! LASER RADIATION – CLASS 1 LASER PRODUCT</b>   |
|  | <p>The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of <b>laser class 1</b> 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.</p> <ul style="list-style-type: none"> <li>↳ Observe the applicable statutory and local laser protection regulations.</li> <li>↳ The device must not be tampered with and must not be changed in any way.<br/>There are no user-serviceable parts inside the device.<br/>Repairs must only be performed by Leuze electronic GmbH + Co. KG.</li> </ul> |

## 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
- For REF 6-A- reflective tape, the sensor's side edge must be aligned parallel to the side edge of the reflective tape.
- The devices may only be operated with the reflectors listed above.

## Accessories

### Connection technology - Connection cables

| Part no.  | Designation | Article           | Description   |
|---|-------------|-------------------|---|
|  | 50130850    | KD U-M8-4A-V1-050 | Connection cable<br>Application: Chemical resistant<br>Connection 1: Connector, M8, Axial, Female, 4 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PVC  |
|  | 50130871    | KD U-M8-4W-V1-050 | Connection cable<br>Application: Chemical resistant<br>Connection 1: Connector, M8, Angled, Female, 4 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PVC |

## Accessories

### Mounting technology - Mounting brackets

| Part no. | Designation | Article         | Description   |
|----------|-------------|-----------------|---|
| 50139831 | BT 205M     | Mounting device | 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   |
|----------|--------------|-----------------|---|
| 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.