

## Technical data sheet

## Polarized retro-reflective photoelectric sensor

Part no.: 50133747

PRK3CL1.BA3/4T-M8



For illustration purposes only

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CDRH



## Technical data

### Basic data

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

### Special version

|                 |                 |
|-----------------|-----------------|
| Special version | Autocollimation |
|                 | Teach input     |

### 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] | 3 mm [1,000 mm]                                                     |
| Type of light spot geometry          | Round                                                               |
| Shift angle                          | Typ. $\pm 2^\circ$                                                  |

### 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                            |

### Inputs

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

### Teach inputs

|                   |                                                             |
|-------------------|-------------------------------------------------------------|
| Type              | Teach input                                                 |
| Voltage type      | DC                                                          |
| Switching voltage | high: $\geq 0.65 \times U_B$<br>low: $\leq 0.35 \times U_B$ |
| Delay             | 1 ms                                                        |
| Input resistance  | 20,000 $\Omega$                                             |

### Teach input 1

|                        |                        |
|------------------------|------------------------|
| Assignment             | Connection 1, pin 2    |
| Function               | Keyboard lockout       |
|                        | Light/dark switching   |
|                        | Sensitivity adjustment |
| Active switching state | High                   |

### Outputs

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 1 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     |

### Time behavior

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

### Connection

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

### Connection 1

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



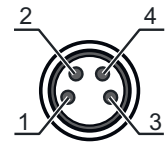
- A Green LED
- B Yellow LED
- C Optical axis
- D Teach button
- E Mounting sleeve (standard)
- F Threaded sleeve (3C.B series)

## Electrical connection

### Connection 1

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

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



## Operation and display

| LED | Display                  | Meaning                              |
|-----|--------------------------|--------------------------------------|
| 1   | Green, continuous light  | Operational readiness                |
| 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<br>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**

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AAA3C</b> | <b>Operating principle / construction</b><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                                                                                                                                                                                                                                                                   |
| <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                                 |

## Part number code

|   |                                                                       |
|---|-----------------------------------------------------------------------|
| K | <b>Electrical connection</b>                                          |
|   | 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](http://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).
- ⚡ 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. 5kOhm is recommended
- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C

## Accessories

### Connection technology - Connection cables

|                                                                                   | Part no. | Designation       | Article          | Description                                                                                                                                                              |
|-----------------------------------------------------------------------------------|----------|-------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50130850 | KD U-M8-4A-V1-050 | Connection cable | 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 | 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 |

### 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 | 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.