

# Technical data sheet

## Unpolarized retro-reflective photoelectric sensor

Part no.: 50143107

RK46C.DL3/4P-M12



For illustration purposes only

### Contents

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



## Technical data

### Basic data

|                          |   |
|--------------------------|---|
| Series                   | 46C   |
| Operating principle      | Reflection principle  |
| Application              | Detection of irregular objects on conveyor belt<br>Detection of polybags on conveyor belt |
| Switching distance $S_n$ | 0 ... 1,500 mm  |

### Special version

|                 |            |
|-----------------|------------|
| Special version | Light-band |
|-----------------|------------|

### Optical data

|                                      |   |
|--------------------------------------|---|
| Operating range                      | 0.55 ... 1.5 m (guaranteed operating range) |
| Operating range limit                | 0.55 ... 1.5 m (typical operating range)    |
| Light source                         | LED, Red                                    |
| Wavelength                           | 620 nm                                      |
| Transmitted-signal shape             | Pulsed                                      |
| LED group                            | Exempt group (in acc. with EN 62471)        |
| Light spot size [at sensor distance] | 25 mm x 19 mm [1,000 mm]                    |
| Type of light spot geometry          | Rectangular                                 |

### Measurement data

|                     |   |
|---------------------|---|
| Minimum object size | 3 mm, with optimum alignment and use.<br>(see 'Further information'). |
|---------------------|---|

### Electrical data

|                         |   |
|-------------------------|---|
| Protective circuit      | Polarity reversal protection<br>Short circuit protected<br>Transient protection |
| <b>Performance data</b> |   |
| Supply voltage $U_B$    | 10 ... 30 V, DC, Incl. residual ripple  |
| Residual ripple         | 0 ... 15 %, From $U_B$  |
| Open-circuit current    | 0 ... 20 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 | 250 Hz |
| Response time       | 2 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           | M12                          |
| Type                  | Male                         |
| Material              | Plastic                      |
| No. of pins           | 4 -pin                       |
| Encoding              | A-coded                      |

### Mechanical data

|  |   |
|--|---|
| Dimension (W x H x L)                          | 20.5 mm x 76.3 mm x 44 mm                             |
| Housing material                               | Plastic   |
| Plastic housing                                | PC-PBT  |
| Lens cover material                            | Plastic / PMMA  |
| Net weight                                     | 60 g  |
| Housing color                                  | Red   |
| Type of fastening                              | Through-hole mounting<br>Via optional mounting device |
| Recommended tightening torque for M3 fastening | 0.9 N·m   |
| Recommended tightening torque for M4 fastening | 1.4 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 | Light/dark switching<br>Sensitivity adjustment |

### Environmental data

|                                |               |
|--------------------------------|---------------|
| Ambient temperature, operation | -40 ... 60 °C |
| Ambient temperature, storage   | -40 ... 70 °C |

### Certifications

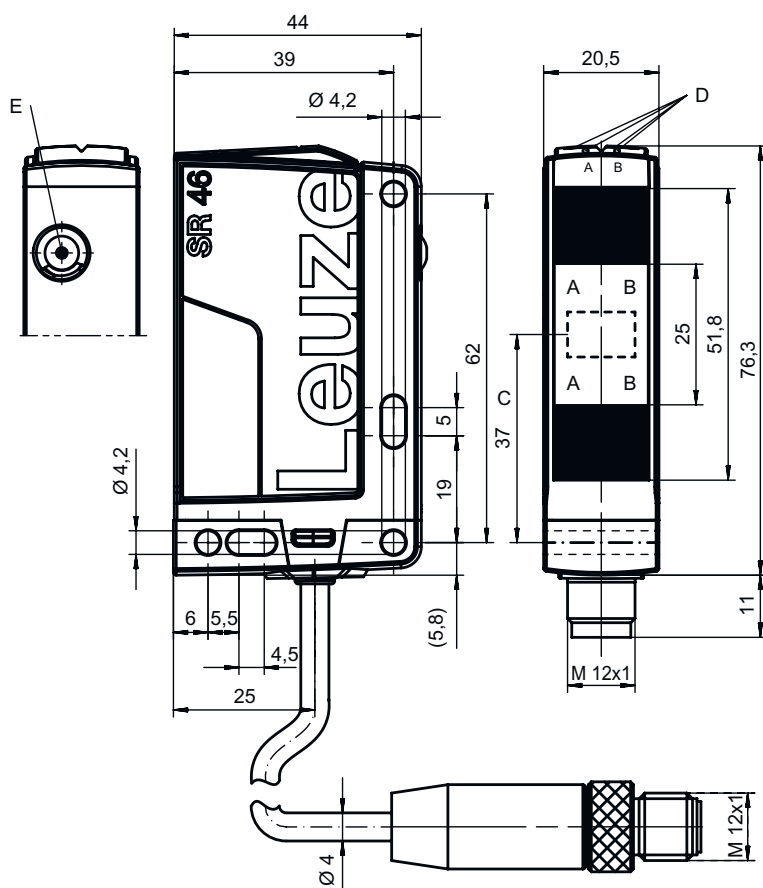
|                      |                 |
|----------------------|-----------------|
| Degree of protection | IP 67<br>IP 69K |
| Protection class     | III             |
| Approvals            | c UL US         |
| Standards applied    | IEC 60947-5-2   |

## 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 |
| 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



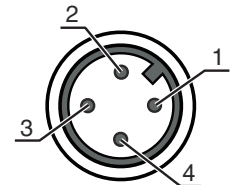
- A Transmitter side
- B Receiver side
- DA Green LED
- DB Yellow LED
- E Teach button
- F Top edge height of the conveyor belt

## Electrical connection

### Connection 1

|                    |                |
|--------------------|----------------|
| Function           | Signal OUT     |
|                    | Voltage supply |
| Type of connection | Connector      |
| Thread size        | M12            |
| Type               | Male           |
| Material           | Plastic        |
| No. of pins        | 4 -pin         |
| Encoding           | A-coded        |





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



## Operation and display

| Display LED 1           | Display LED 2            | Meaning               |
|-------------------------|--------------------------|-----------------------|
| Green, continuous light | Off                      | Operational readiness |
| Green, continuous light | Yellow, continuous light | Light path free       |
| Green, flashing         | Yellow, flashing         | Teach event active    |

## Reflectors & reflective tapes

|   | Part no. | Designation   | Operating range<br>Operating range<br>limit | Description  |
|---|----------|---------------|---|--|
|  | 50108300 | REF 4-A-50x50 | 0.55 ... 1.5 m<br>0.55 ... 1.5 m            | Design: Rectangular<br>Reflective surface: 50 mm x 50 mm<br>Material: Plastic<br>Chemical designation of the material: PMMA<br>Fastening: Self-adhesive  |
|  | 50022816 | TKS 100X100   | 0.55 ... 1.5 m<br>0.55 ... 1.5 m            | Design: Rectangular<br>Triple reflector size: 4 mm<br>Reflective surface: 96 mm x 96 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive   |
|  | 50109257 | TKS 40x60.1   | 0.55 ... 1.5 m<br>0.55 ... 1.5 m            | Design: Rectangular<br>Triple reflector size: 2.3 mm<br>Reflective surface: 37 mm x 56 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive |
|  | 50022814 | TKS 50X50     | 0.55 ... 1.5 m<br>0.55 ... 1.5 m            | Design: Rectangular<br>Triple reflector size: 4 mm<br>Reflective surface: 47 mm x 48 mm<br>Material: Plastic<br>Base material: Plastic<br>Chemical designation of the material: PMMA8N<br>Fastening: Through-hole mounting, Adhesive   |

## Part number code

Part designation: **AAA46C d EE-f.GG H/i J-K**

|               |   |
|---------------|---|
| <b>AAA46C</b> | <b>Operating principle / construction</b><br>HT46C: Diffuse reflection sensor with background suppression<br>LS46C: Throughbeam photoelectric sensor transmitter<br>LE46C: Throughbeam photoelectric sensor receiver<br>PRK46C: Retro-reflective photoelectric sensor with polarization filter<br>RK46C: Retro-reflective photoelectric sensor  |
| <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   |
| <b>f</b>      | <b>Preset range (optional)</b><br>n/a: operating range acc. to data sheet<br>xxxF: Preset range [mm]  |
| <b>GG</b>     | <b>Equipment</b><br>n/a: standard<br>1: 270° potentiometer<br>8: activation input (activation with high signal)<br>01: diffuse reflection sensor with background suppression (HT): HG tape (HighGain tape) is not detected from a distance of 900 mm with a set operating range of ≤ 450 mm (diffuse reflection: 6%, black)<br>D: Depolarizing media<br>E: Diffuse reflection sensor with background suppression (HT): optimized for dusty environments<br>SL: Diffuse reflection sensor with background suppression (HT): slit diaphragm 25 mm x 3 mm<br>P: throughbeam photoelectric sensor receiver (LE): edge filter for parallel operation<br>L: Light-band<br>XL: Extra long light spot |
| <b>H</b>      | <b>Operating range adjustment &amp; version</b><br>n/a with diffuse reflection sensor with background suppression (HT): range adjustment via mechanical adjusting spindle<br>n/a with retro-reflective photoelectric sensors (PRK): operating range not adjustable<br>1: retro-reflective photoelectric sensors (PRK/RK): sensitivity adjustment via potentiometer<br>3: teach-in via button<br>P2: resolution 2 mm   |
| <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>L: IO-Link<br>G: Push-pull switching output, PNP dark switching, NPN light switching<br>6: push-pull switching output, PNP light switching, NPN dark switching   |
| <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>8: activation input (activation with high signal)<br>9: deactivation input (deactivation with high signal)<br>W: warning output<br>X: pin not used<br>G: Push-pull switching output, PNP dark switching, NPN light switching<br>6: push-pull switching output, PNP light switching, NPN dark switching   |
| <b>K</b>      | <b>Electrical connection</b><br>n/a: cable, standard length 2000 mm, 4-wire<br>200-M12: cable, length 200 mm with M12 connector, 4-pin, axial (plug)<br>M12: M12 connector, 4-pin (plug)<br>500-M12: cable, length 500 mm with M12 connector, 4-pin, axial (plug)<br>1000-M12: cable, length 1000 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)

## Further information

- Light source: Average life expectancy 100,000 h at an ambient temperature of 25 °C
- Rating voltage 50 V
- Detection range: Depending on the object size and the set sensor sensitivity
- Temperature compensation  $\pm 15^{\circ}\text{C}$
- Response time: For short decay times, an ohmic load of approx. 5 kOhm is recommended
- The default minimum object height is 5 mm. With optimum alignment in the tape gap, 3 mm can be achieved, see operating instructions. When detecting objects < 5 mm that are to be detected closer than 200 mm to the sensor, the sensor must be moved upward approx. 5 mm (object below the middle).


## Accessories

### Connection technology - Connection cables



|  | Part no. | Designation        | Article          | Description  |
|--|----------|--------------------|------------------|--|
|  | 50130652 | KD U-M12-4A-V1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5.000 mm<br>Sheathing material: PVC  |
|  | 50130690 | KD U-M12-4W-V1-050 | Connection cable | Connection 1: Connector, M12, Angled, Female, A-coded, 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  |
|---|----------|-------------|-----------------|--|
|  | 50105315 | BT 46       | 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  |
|--|----------|--------------|-----------------|--|
|   | 50117252 | BTU 300M-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 M4 screws<br>Type of mounting device: Clampable, Adjustable, Turning, 360°<br>Material: Metal |
|  | 50128380 | BTU 460M-D12 | Mounting system | Design of mounting device: Mounting system<br>Fastening, at system: For 12 mm rod<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Adjustable, Turning, 360°<br>Material: Metal  |

### Start-up/diagnosis

|  | Part no. | Designation   | Article       | Description   |
|--|----------|---------------|---------------|---|
|  | 50143109 | BT ARH 46C.DL | Alignment aid | Type of article: Alignment aid for fast and reproducible alignment of RK46C.DL above the conveyor belt. For a reliable operation, the RK46C.DL should always be aligned with this alignment aid |

#### Note



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