

## Technical data sheet

### Distance diffuse sensor with background suppression

Part no.: 50150020

ODT3CL1-2M.3/L6-200-M12

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For illustration purposes only



CDRH



## Technical data

### Basic data

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Series              | 3C                                                  |
| Operating principle | Distance diffuse sensor with background suppression |

### Special version

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Special version | 2 independent switching outputs<br>Measurement value output |
|-----------------|-------------------------------------------------------------|

### Optical data

|                             |                                                |
|-----------------------------|------------------------------------------------|
| Black-white error           | ±20 mm                                         |
| Operating range             | 0.07 ... 2 m (guaranteed operating range)      |
| Adjustment range            | 50 ... 2,500 mm                                |
| Beam path                   | Focused                                        |
| Light source                | Laser, Red                                     |
| Wavelength                  | 680 nm                                         |
| Laser class                 | 1, IEC 60825-1:2014 / EN 60825-1:2014+A11:2021 |
| Transmitted-signal shape    | Pulsed                                         |
| Type of light spot geometry | Round                                          |
| Shift angle                 | Typ. ± 1.5°                                    |

### Measurement data

|                                        |                 |
|----------------------------------------|-----------------|
| Measurement range                      | 50 ... 2,500 mm |
| Resolution                             | 1.0 mm          |
| Accuracy                               | -20 ... 20 mm   |
| Reproducibility (1 sigma)              | 0 ... 8 mm      |
| Measurement value output               | via IO-Link     |
| Optical distance measurement principle | Time of flight  |

### Electrical data

|                                     |                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------|
| Protective circuit                  | Polarity reversal protection<br>Short circuit protected<br>Transient protection |
| Performance data                    |                                                                                 |
| Supply voltage $U_B$                | 10 ... 30 V, DC, Incl. residual ripple                                          |
| Residual ripple                     | 0 ... 15 %, From $U_B$                                                          |
| Open-circuit current                | 0 ... 35 mA                                                                     |
| Outputs                             |                                                                                 |
| Number of digital switching outputs | 2 Piece(s)                                                                      |

#### Switching outputs

|                         |                                           |
|-------------------------|-------------------------------------------|
| Type                    | Digital switching output                  |
| Voltage type            | DC                                        |
| Switching current, max. | 90 mA                                     |
| Switching voltage       | high: $\geq(U_B - 2V)$<br>low: $\leq 2 V$ |

#### Switching output 1

|                     |                                                      |
|---------------------|------------------------------------------------------|
| Assignment          | Connection 1, pin 4                                  |
| Switching element   | Transistor, Push-pull                                |
| Switching principle | IO-Link / light switching (PNP)/dark switching (NPN) |

#### Switching output 2

|                     |                                            |
|---------------------|--------------------------------------------|
| Assignment          | Connection 1, pin 2                        |
| Switching element   | Transistor, Push-pull                      |
| Switching principle | Light switching (PNP)/dark switching (NPN) |

### Time behavior

|                     |                                                |
|---------------------|------------------------------------------------|
| Switching frequency | 7 ... 15 Hz, depending on diffuse reflectance  |
| Response time       | 33 ... 70 ms, depending on diffuse reflectance |
| Readiness delay     | 300 ms                                         |

### Interface

|                  |                      |
|------------------|----------------------|
| Type             | IO-Link              |
| IO-Link          |                      |
| COM mode         | COM3                 |
| Profile          | Smart sensor profile |
| Min. cycle time  | COM3 = 0.6 ms        |
| Frame type       | 2.V                  |
| Specification    | V1.1                 |
| Device ID        | 2220                 |
| SIO-mode support | Yes                  |

### Connection

|                       |                                           |
|-----------------------|-------------------------------------------|
| Number of connections | 1 Piece(s)                                |
| Connection 1          |                                           |
| Function              | Signal IN<br>Signal OUT<br>Voltage supply |
| Type of connection    | Cable with connector                      |
| Cable length          | 200 mm                                    |
| Sheathing material    | PUR                                       |
| Cable color           | Black                                     |
| Number of conductors  | 4 -wire                                   |
| Wire cross section    | 0.2 mm <sup>2</sup>                       |
| Thread size           | M12                                       |
| Type                  | Male                                      |
| Material              | Metal                                     |
| No. of pins           | 4 -pin                                    |
| Encoding              | A-coded                                   |

### 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                                     | 30 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                                               |
| Compatibility of materials                     | ECOLAB                                                |

## Technical data

### 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>Range adjustment |

### Environmental data

|                                |               |
|--------------------------------|---------------|
| Ambient temperature, operation | -30 ... 50 °C |
| Ambient temperature, storage   | -40 ... 70 °C |

### Certifications

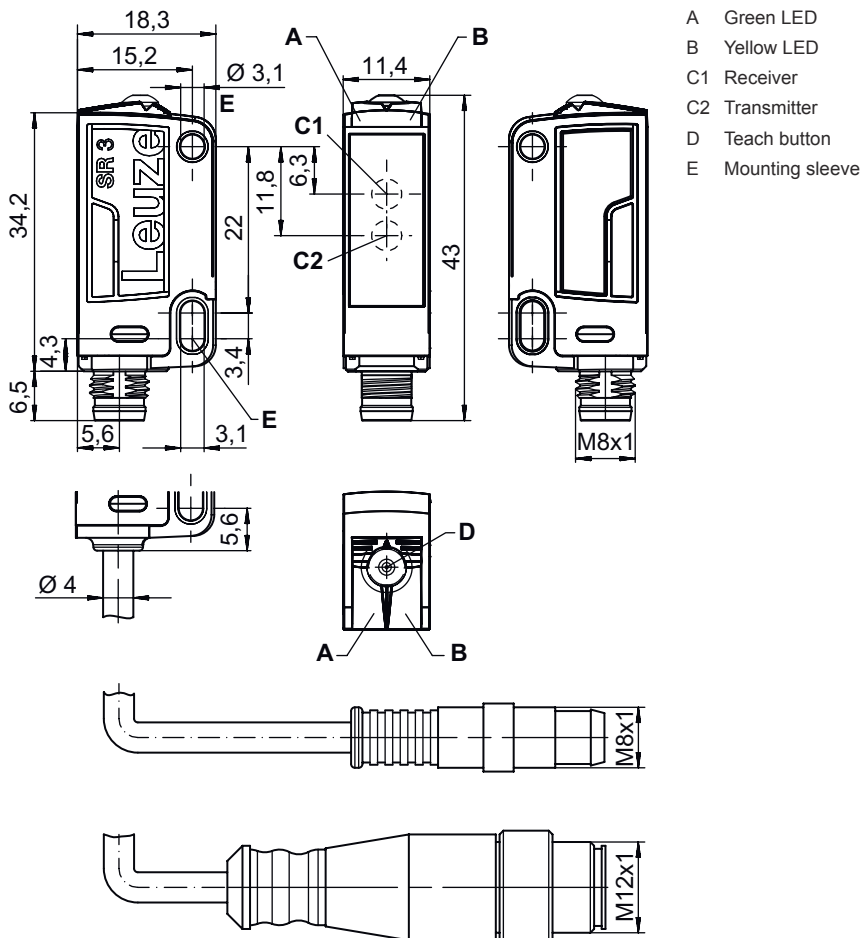
|                      |                 |
|----------------------|-----------------|
| Degree of protection | IP 67<br>IP 69K |
| Protection class     | III             |
| Approvals            | c UL US         |
| Standards applied    | IEC 60947-5-2   |

### Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 27270904 |
| ECLASS 8.0            | 27270904 |
| ECLASS 9.0            | 27270904 |
| ECLASS 10.0           | 27270904 |
| ECLASS 11.0           | 27270904 |
| ECLASS 12.0           | 27270903 |
| ECLASS 13.0           | 27270903 |
| ECLASS 14.0           | 27270903 |
| ECLASS 15.0           | 27270903 |
| ETIM 5.0              | EC002719 |
| ETIM 6.0              | EC002719 |
| ETIM 7.0              | EC002719 |
| ETIM 8.0              | EC002719 |
| ETIM 9.0              | EC002719 |
| ETIM 10.0             | EC002719 |

## Dimensioned drawings

All dimensions in millimeters

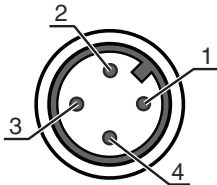


Electrical connection

Connection 1

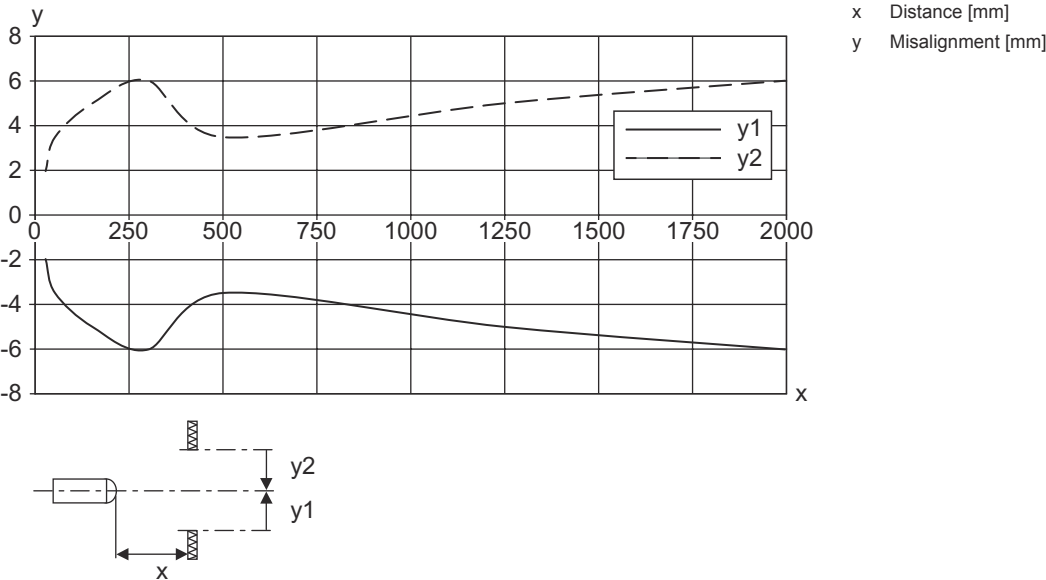
|                      |                      |
|----------------------|----------------------|
| Function             | Signal IN            |
|                      | Signal OUT           |
|                      | Voltage supply       |
| Type of connection   | Cable with connector |
| Cable length         | 200 mm               |
| Sheathing material   | PUR                  |
| Cable color          | Black                |
| Number of conductors | 4 -wire              |
| Wire cross section   | 0.2 mm²              |
| Thread size          | M12                  |
| Type                 | Male                 |
| Material             | Metal                |
| No. of pins          | 4 -pin               |
| Encoding             | A-coded              |

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



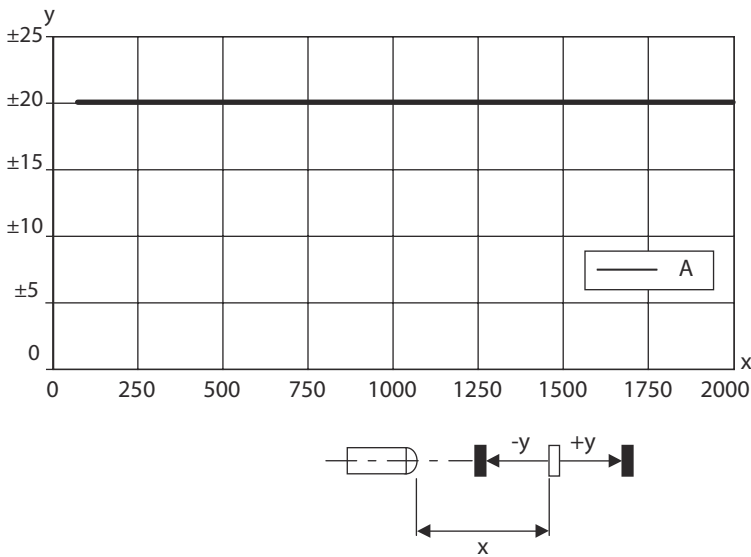
Diagrams

Typ. response behavior (white 90 %)



Diagrams

Typ. black/white behavior / measurement accuracy



x Range [mm]  
y Typ. range change [mm], reference: white 90%  
A 6 ... 90% diffuse reflectance

Operation and display

| LED | Display                  | Meaning         |
|-----|--------------------------|-----------------|
| 1   | Green, continuous light  | Ready           |
| 2   | Yellow, continuous light | Object detected |

Part number code

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

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AAA3C | <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                                                                                                                                                                                      |
| d     | <b>Light type</b><br>n/a: red light<br>I: infrared light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| EE    | <b>Light source</b><br>n/a: LED<br>L1: laser class 1<br>L2: laser class 2<br>PP: Power PinPoint® LED                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| f     | <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                                                                                                                                                                                                                                                                                                                                                                                                       |
| GG    | <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) |

## Part number code

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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



### 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)

## Notes



### 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.

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
- With a supply voltage >18 V and an ambient temperature <40 °C, the maximum switching current is 100 mA per switching output.
- When starting the sensor below -20°C, a warmup time of one minute is required until the first teach-in

## Accessories

### Connection technology - Connection cables

|                                                                                                                                                                                                                                                                                                                                                 | Part no. | Designation        | Article          | Description                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | 50130652 | KD U-M12-4A-V1-050 | Connection cable | Application: Chemical resistant<br>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 | Application: Chemical resistant<br>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 |

### Mounting technology - Mounting brackets

|                                                                                     | Part no. | Designation | Article         | Description                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|----------|-------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50060511 | BT 3        | 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 |

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. |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|