

## Technical data sheet

### Diffuse sensor with background suppression

Part no.: 50141258

HT46CI/LP-M12



For illustration purposes only

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## Technical data

### Basic data

|                     |                                                          |
|---------------------|----------------------------------------------------------|
| Series              | 46C                                                      |
| Operating principle | Diffuse reflection principle with background suppression |

### Optical data

|                             |                                      |
|-----------------------------|--------------------------------------|
| Black-white error           | < 10% up to 1200 mm                  |
| Operating range             | Guaranteed operating range           |
| Operating range, white 90%  | 0.005 ... 3 m                        |
| Operating range, gray 18%   | 0.02 ... 2 m                         |
| Operating range, black 6%   | 0.05 ... 1.5 m                       |
| Operating range limit       | 0.005 ... 3 m                        |
| Operating range limit       | Typical operating range              |
| Adjustment range            | 120 ... 3,000 mm                     |
| Beam path                   | Focused                              |
| Light source                | LED, Infrared                        |
| Wavelength                  | 860 nm                               |
| Transmitted-signal shape    | Pulsed                               |
| LED group                   | Exempt group (in acc. with EN 62471) |
| Type of light spot geometry | Rectangular                          |
| Focus                       | Fixed                                |

### 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 ... 30 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, Push-pull                                |
| Switching principle                 | IO-Link / light switching (PNP)/dark switching (NPN) |
| 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 |

### 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 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                | Multiturn potentiometer |
| Function of the operational control | Range adjustment        |

### Environmental data

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

### Certifications

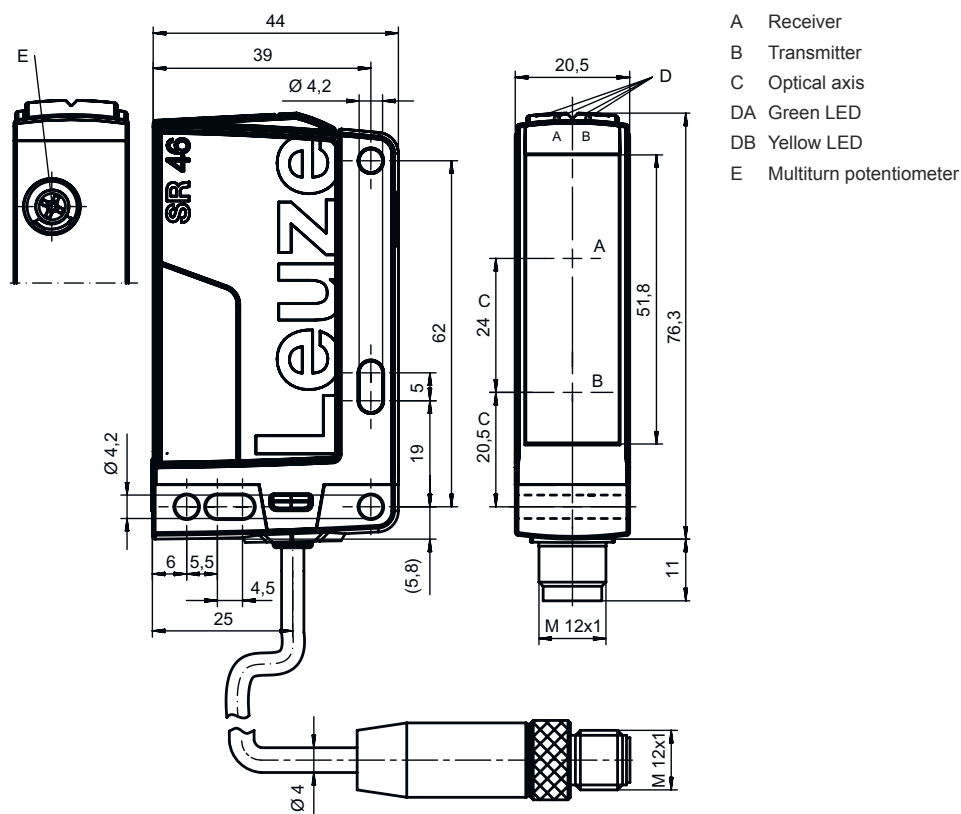
|                      |                 |
|----------------------|-----------------|
| Degree of protection | IP 67<br>IP 69K |
| Protection class     | III             |
| Approvals            | c UL US         |
| Standards applied    | IEC 60947-5-2   |

## Technical data

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 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

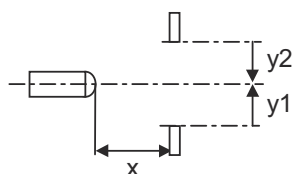
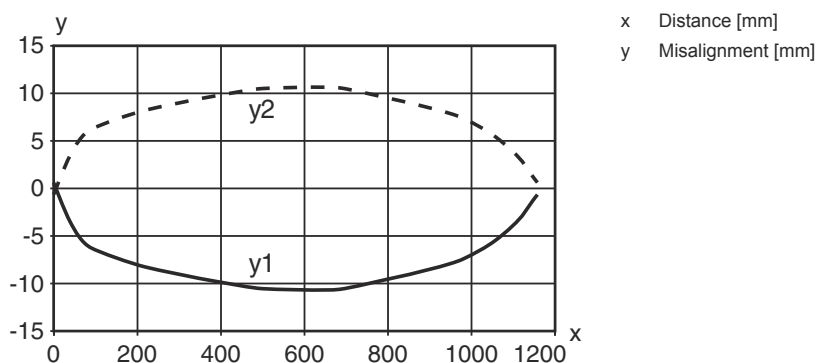
|                    |                |
|--------------------|----------------|
| Function           | Signal OUT     |
|                    | Voltage supply |
| Type of connection | Connector      |
| Thread size        | M12            |
| Type               | Male           |
| Material          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

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



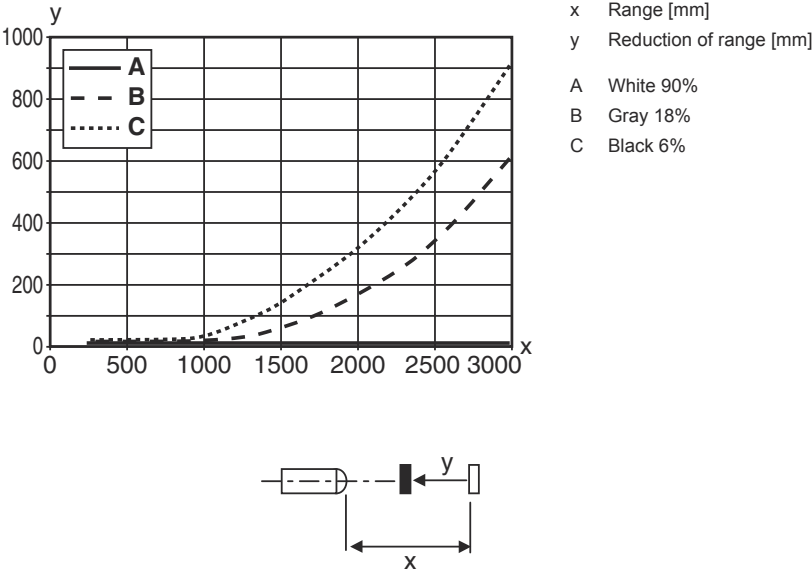
## Diagrams

Typ. response behavior (white 90 %)



Diagrams

Typ. black/white behavior



Operation and display

| LED | Display                  | Meaning               |
|-----|--------------------------|-----------------------|
| 1   | Green, continuous light  | Operational readiness |
| 2   | Yellow, continuous light | Reflection            |
|     | Yellow, flashing         | No function reserve   |

Part number code

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

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AAA46C | <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                                                                                                                                                                                                                                                                                                                                                |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| f      | <b>Preset range (optional)</b><br>n/a: operating range acc. to data sheet<br>xxxF: Preset range [mm]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| GG     | <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 |

## Part number code

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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)

## Notes

### NOTE



↪ Permissible operating temperature range during IO-Link operation: -10 °C to +40 °C

## Further information

- Light source: Average life expectancy 100,000 h at an ambient temperature of 25 °C
- Response time: For short decay times, an ohmic load of approx. 5kOhm is recommended

## Accessories

### Connection technology - Connection unit

|                                                                                   | Part no. | Designation           | Article        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------|----------|-----------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50144900 | MD 798i-11-82/L5-2222 | IO-Link master | Type: IO-Link master<br>Current consumption, max.: 11,000 mA<br>Switching outputs for each sensor connection: 1 Piece(s)<br>Switching output: Transistor, PNP<br>Interface: IO-Link, Automatic protocol detection, EtherNet IP, Modbus TCP, PROFINET<br>Connections: 12 Piece(s)<br>Sensor connections: 8 Piece(s)<br>Connections for voltage supply: 2 Piece(s)<br>Interface connections: 2 Piece(s)<br>Degree of protection: IP 67, IP 65, IP 69K |

### 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 |

#### Note



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