

## Technical data sheet Energetic diffuse sensor

Part no.: 50131580

FT5I.3/2N-M8

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Figure can vary



## Technical data

### Basic data

|                     |                              |
|---------------------|------------------------------|
| Series              | 5                            |
| Operating principle | Diffuse reflection principle |

### Special version

### Optical data

|                                  |                                      |
|----------------------------------|--------------------------------------|
| Operating range                  | Guaranteed operating range           |
| Operating range, white 90%       | 0.001 ... 0.215 m                    |
| Operating range, gray 50%        | 0.001 ... 0.19 m                     |
| Operating range, gray 18%        | 0.003 ... 0.15 m                     |
| Operating range, black 6%        | 0.005 ... 0.125 m                    |
| Operating range limit            | Typical operating range              |
| Operating range limit, white 90% | 0.001 ... 0.28 m                     |
| Operating range limit, gray 50%  | 0.001 ... 0.245 m                    |
| Operating range limit, gray 18%  | 0.003 ... 0.19 m                     |
| Operating range limit, black 6%  | 0.005 ... 0.16 m                     |
| Light source                     | LED, Infrared                        |
| Wavelength                       | 850 nm                               |
| Transmitted-signal shape         | Pulsed                               |
| LED group                        | Exempt group (in acc. with EN 62471) |

### 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 ... 20 mA                            |

### Outputs

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 2 Piece(s) |
|-------------------------------------|------------|

### Switching outputs

|                         |   |
|-------------------------|---|
| Voltage type            | DC  |
| Switching current, max. | 100 mA  |
| Switching voltage       | high: $\geq(U_B - 2.5V)$<br>low: $\leq 2.5 V$ |

### Switching output 1

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

### Switching output 2

|                     |                     |
|---------------------|---------------------|
| Assignment          | Connection 1, pin 2 |
| Switching element   | Transistor, NPN     |
| Switching principle | Dark switching      |

### Time behavior

|                     |        |
|---------------------|--------|
| Switching frequency | 500 Hz |
| Response time       | 1 ms   |
| Readiness delay     | 300 ms |

### Connection 1

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

### Mechanical data

|                       |                           |
|-----------------------|---------------------------|
| Dimension (W x H x L) | 14 mm x 32.5 mm x 20.2 mm |
| Housing material      | Plastic                   |
| Plastic housing       | ABS                       |
| Lens cover material   | Plastic                   |
| Net weight            | 20 g                      |
| Housing color         | Black<br>Red              |

### Operation and display

|                      |              |
|----------------------|--------------|
| Type of display      | LED          |
| Number of LEDs       | 2 Piece(s)   |
| Operational controls | Teach button |

### Environmental data

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

### Certifications

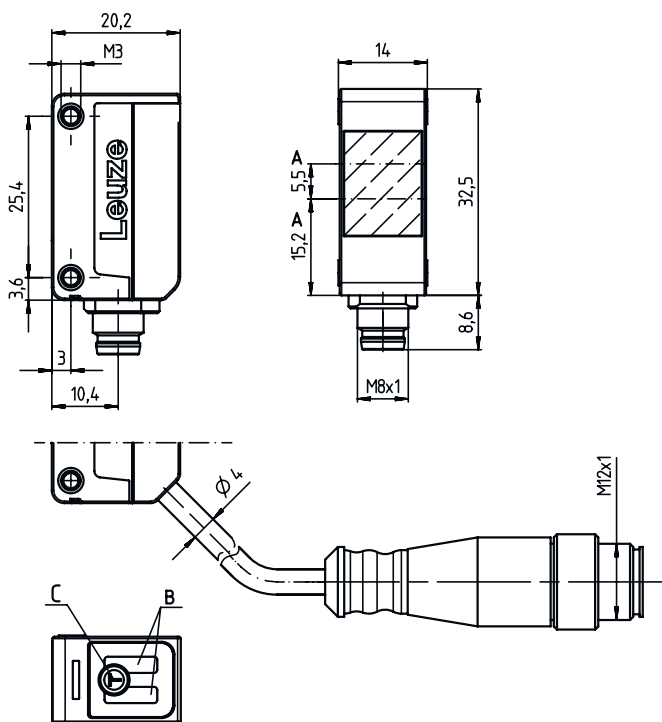
|                      |               |
|----------------------|---------------|
| Degree of protection | IP 67         |
| Protection class     | III           |
| Certifications       | c UL US       |
| Standards applied    | IEC 60947-5-2 |

### Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 27270903 |
| ECLASS 8.0            | 27270903 |
| ECLASS 9.0            | 27270903 |
| ECLASS 10.0           | 27270903 |
| ECLASS 11.0           | 27270903 |
| ECLASS 12.0           | 27270903 |
| ECLASS 13.0           | 27270903 |
| ETIM 5.0              | EC001821 |
| ETIM 6.0              | EC001821 |
| ETIM 7.0              | EC001821 |
| ETIM 8.0              | EC001821 |

# Dimensioned drawings

All dimensions in millimeters



- A Optical axis
- B Indicator diode
- C Teach button

## Electrical connection

### Connection 1

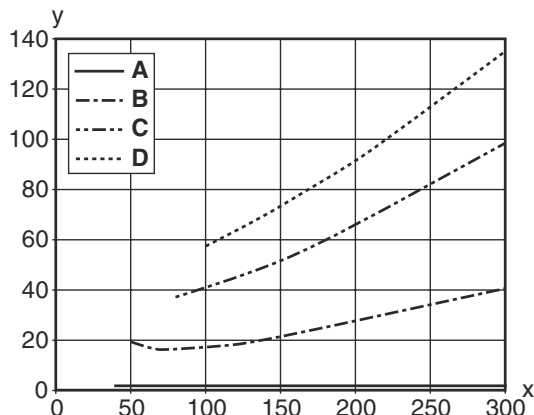
|                    |                              |
|--------------------|------------------------------|
| Function           | Signal OUT<br>Voltage supply |
| Type of connection | Connector                    |
| Thread size        | M8                           |
| Type               | Male   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

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



# Diagrams

## Typ. black/white behavior



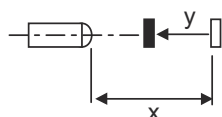
x Range [mm]  
y Reduction of range [mm]

- A White 90%
- B Gray 50%
- C Gray 18%
- D Black 6%

**Fading: black/white error < 50 %**

The black/white error is calculated from the operating range against white and the reduction of the operating range against black:

$$\text{black/white error} = \frac{\text{reduction of the operating range against black}}{\text{operating range against white}} \times 100\%$$



## Operation and display

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

## Part number code


Part designation: AAA5d.EE/ ff-GG-hh-l

|             |   |
|-------------|---|
| <b>AAA5</b> | <p><b>Operating principle / construction</b><br/>                     HT5: diffuse reflection sensor with background suppression<br/>                     LS5: throughbeam photoelectric sensor transmitter<br/>                     LE5: throughbeam photoelectric sensor receiver<br/>                     ET5: energetic diffuse reflection sensor<br/>                     FT5: diffuse reflection sensor with fading<br/>                     PRK5: retro-reflective photoelectric sensor with polarization filter</p>                                       |
| <b>d</b>    | <p><b>Light type</b><br/>                     n/a: red light<br/>                     l: infrared light</p>   |
| <b>EE</b>   | <p><b>Equipment</b><br/>                     1: adjustable range<br/>                     M: for semi-transparent objects<br/>                     H: For the detection of transparent films<br/>                     X: reinforced fading<br/>                     3: teach-in via button<br/>                     R: combination product for reflector DTKS 30x50</p>   |
| <b>ff</b>   | <p><b>Switching output / function / OUT1OUT2 (OUT1 = pin 4, OUT2 = pin 2)</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/>                     X: pin not used<br/>                     9: deactivation input (deactivation with high signal)<br/>                     D: Deactivation input (deactivation with low signal)</p> |
| <b>GG</b>   | <p><b>Version</b><br/>                     P1: narrow light beam</p>  |






## Part number code

|    |   |
|----|---|
| hh | <b>Electrical connection</b><br>n/a: cable, standard length 2000 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)<br>M8.1: Snap-in, M8 connector, 4-pin (plug) |
| I  | <b>Configuration</b><br>P1: different configuration   |




### Note

|   |   |
|---|---|
| i |  A list with all available device types can be found on the Leuze website at <a href="http://www.leuze.com">www.leuze.com</a> . |
|---|---|

## 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> |

### For UL applications:


|   |   |
|---|---|
| i |  <ul style="list-style-type: none"> <li> Only for use in "class 2" circuits</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> |
|---|---|

## Further information


- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C
- With the set scanning range, a tolerance of the operating range is possible depending on the reflection properties of the material surface.

## 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 |

## Accessories

|  | Part no. | Designation       | Article          | Description  |
|--|----------|-------------------|------------------|--|
|  | 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  |
|--|----------|---------------|---------------------|--|
|  | 50124651 | BT 205M-10SET | Mounting device set | 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 |

### Note



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