



Figure can vary

**Part no.: 50122592**  
**FT28.3/4P**  
**Energetic diffuse sensor**



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## Technical data

| <b>Basic data</b>                   |   |
|-------------------------------------|---|
| Series                              | 28  |
| Operating principle                 | Diffuse reflection principle                            |
| <b>Special design</b>               |   |
| <b>Optical data</b>                 |   |
| Operating range                     | Guaranteed operating range                              |
| Operating range, white 90%          | 0.001 ... 0.21 m  |
| Operating range, gray 50%           | 0.002 ... 0.185 m                                       |
| Operating range, gray 18%           | 0.003 ... 0.145 m                                       |
| Operating range, black 6%           | 0.005 ... 0.125 m                                       |
| Operating range limit               | Typical operating range                                 |
| Operating range limit, white 90%    | 0 ... 0.25 m  |
| Operating range limit, gray 50%     | 0.002 ... 0.225 m                                       |
| Operating range limit, gray 18%     | 0.003 ... 0.175 m                                       |
| Operating range limit, black 6%     | 0.005 ... 0.15 m  |
| Light source                        | LED , Red   |
| LED light wavelength                | 620 nm  |
| Transmitted-signal shape            | Pulsed  |
| LED group                           | Exempt group (in acc. with EN 62471)                    |
| <b>Electrical data</b>              |   |
| Protective circuit                  | Polarity reversal protection<br>Short circuit protected |
| <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   |
| <b>Outputs</b>                      |   |
| Number of digital switching outputs | 2 Piece(s)  |
| <b>Switching outputs</b>            |   |
| Voltage type                        | DC  |
| Switching current, max.             | 100 mA  |
| Switching voltage                   | high: $\geq(U_B-2.5V)$<br>low: $\leq 2.5V$              |
| <b>Switching output 1</b>           |   |
| Assignment                          | Connection 1, conductor 4                               |
| Switching element                   | Transistor , PNP  |
| Switching principle                 | Light switching   |
| <b>Switching output 2</b>           |   |
| Assignment                          | Connection 1, conductor 2                               |
| Switching element                   | Transistor , PNP  |
| Switching principle                 | Dark switching  |
| <b>Timing</b>                       |   |
| Switching frequency                 | 500 Hz  |
| Response time                       | 1 ms  |

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|                 |        |
|-----------------|--------|
| Readiness delay | 300 ms |
|-----------------|--------|

### Connection

#### Connection 1

|                      |                              |
|----------------------|------------------------------|
| Function             | Signal OUT<br>Voltage supply |
| Type of connection   | Cable                        |
| Cable length         | 2,000 mm                     |
| Sheathing material   | PUR                          |
| Cable color          | Black                        |
| Number of conductors | 4 -wire                      |
| Wire cross section   | 0.2 mm <sup>2</sup>          |

### Mechanical data

|                       |                 |
|-----------------------|-----------------|
| Dimension (W x H x L) | 15 mm x 46.5 mm |
| Thread size           | M18             |
| Dimension             | 31.8 mm         |
| Housing material      | Plastic , ABS   |
| Lens cover material   | Plastic         |
| Net weight            | 75 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

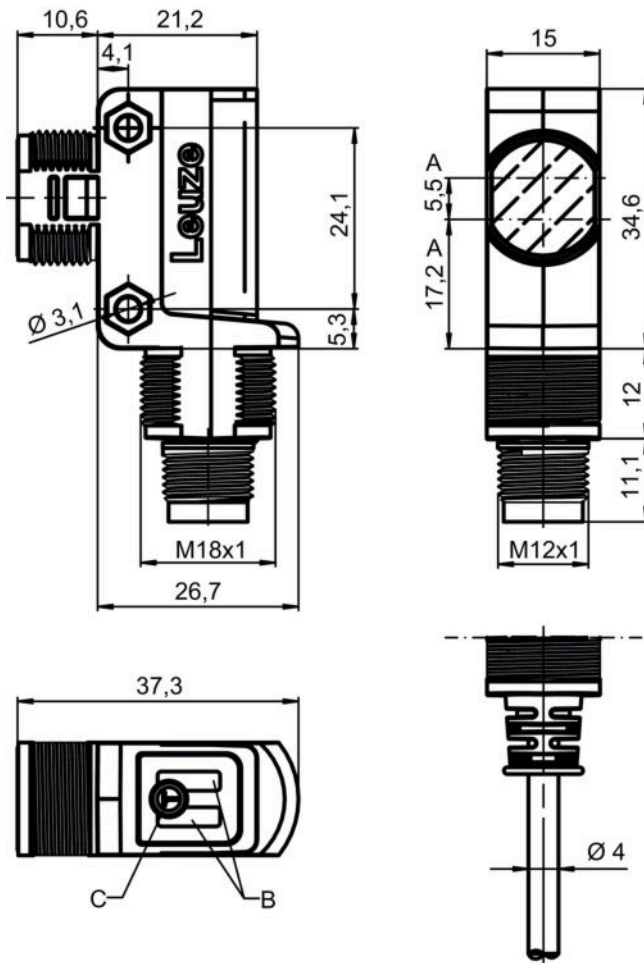
|                      |               |
|----------------------|---------------|
| Degree of protection | IP 67         |
| Protection class     | III           |
| Certifications       | c UL US       |
| Standards applied    | IEC 60947-5-2 |

### Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| eCl@ss 8.0            | 27270903 |
| eCl@ss 9.0            | 27270903 |
| ETIM 5.0              | EC001821 |
| ETIM 6.0              | EC001821 |

## Dimensioned drawings

All dimensions in millimeters



A Optical axis  
 B Indicator diode  
 C Teach button

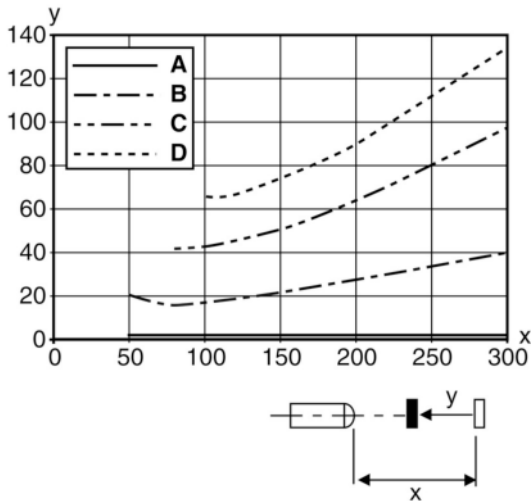
## Electrical connection

| Connection 1         |                              |
|----------------------|------------------------------|
| Function             | Signal OUT<br>Voltage supply |
| Type of connection   | Cable                        |
| Cable length         | 2,000 mm                     |
| Sheathing material   | PUR                          |
| Cable color          | Black                        |
| Number of conductors | 4 -wire                      |
| Wire cross section   | 0.2 mm <sup>2</sup>          |

| Conductor color | Conductor assignment |
|-----------------|----------------------|
| Brown           | V+                   |
| White           | OUT 2                |
| Blue            | GND                  |
| Black           | 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:

**black/white error = reduction of the operating range against black / operating range against white x 100%**

## Operation and display

### LEDs

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

## Part number code

Part designation: **AAA28d.E/ ff-hh**

|       |  |
|-------|--|
| AAA28 | <b>Operating principle / construction:</b><br>LS28: throughbeam photoelectric sensor transmitter<br>LE28: throughbeam photoelectric sensor receiver<br>ET28: energetic diffuse reflection sensor<br>FT28: diffuse reflection sensor with fading<br>PRK28: retro-reflective photoelectric sensor with polarization filter |
| d     | <b>Light type:</b><br>n/a: red light<br>l: infrared light  |
| E     | <b>Equipment:</b><br>3: teach-in via button  |

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|    |  |
|----|--|
| ff | <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>D: deactivation input (deactivation with low signal)<br>9: deactivation input (deactivation with high signal) |
| hh | n/a: cable, standard length 2000 mm, 4-wire<br>200-M12: cable, length 200 mm with M12 connector, 4-pin, axial (plug)   |

|   |
|---|
| <b>Note</b>   |
| A list with all available device types can be found on the Leuze electronic 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> |

|  |
|--|
| <b>For UL applications:</b>  |
| <ul style="list-style-type: none"> <li>• For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).</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> |

- 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

### Mounting technology - Mounting brackets

|   | Part no. | Designation   | Article             | Description   |
|---|----------|---------------|---------------------|---|
|  | 50124651 | BT 205M-10SET | Mounting device set | Contains: 10x<br>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 |

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## 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 |
|  | 50117490 | BTU D18M-D12 | Mounting system | Design of mounting device: Mounting system<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<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 electronic website in the Download tab of the article detailed page.