

## Technical data sheet Energetic diffuse sensor

Part no.: 50140134

ET412B.1/4X-M12



For illustration purposes only

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## Technical data

### Basic data

|                     |                              |
|---------------------|------------------------------|
| Series              | 412B                         |
| Operating principle | Diffuse reflection principle |

### Optical data

|                                  |                                      |
|----------------------------------|--------------------------------------|
| Operating range                  | Guaranteed operating range           |
| Operating range, white 90%       | 0.004 ... 0.54 m                     |
| Operating range, gray 50%        | 0.007 ... 0.46 m                     |
| Operating range, gray 18%        | 0.008 ... 0.3 m                      |
| Operating range, black 6%        | 0.01 ... 0.22 m                      |
| Operating range limit, white 90% | 0.004 ... 0.66 m                     |
| Operating range limit, gray 50%  | 0.007 ... 0.57 m                     |
| Operating range limit, gray 18%  | 0.008 ... 0.37 m                     |
| Operating range limit, black 6%  | 0.01 ... 0.285 m                     |
| Operating range limit            | Typical operating range              |
| Light source                     | LED, Red                             |
| Wavelength                       | 660 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 ... 36 V, DC, Incl. residual ripple |
| Residual ripple      | 0 ... 20 %, From $U_B$                 |
| Open-circuit current | 0 ... 15 mA                            |

### Outputs

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 1 Piece(s) |
|-------------------------------------|------------|

### Switching outputs

|                         |                          |
|-------------------------|--------------------------|
| Type                    | Digital switching output |
| Voltage type            | DC                       |
| Switching current, max. | 200 mA                   |

### Switching output 1

|                     |                 |
|---------------------|-----------------|
| Switching element   | Transistor, PNP |
| Switching principle | Light switching |

### Time behavior

|                     |          |
|---------------------|----------|
| Switching frequency | 1,000 Hz |
| Response time       | 0.5 ms   |
| Readiness delay     | 60 ms    |

### 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           | Metal                        |
| No. of pins        | 4 -pin                       |
| Encoding           | A-coded                      |

### Mechanical data

|                                |               |
|--------------------------------|---------------|
| Dimension ( $\varnothing$ x L) | 12 mm x 60 mm |
| Thread size                    | M12 x 1 mm    |
| Housing material               | Metal         |
| Metal housing                  | Chromed brass |
| Lens cover material            | Glass         |
| Net weight                     | 20 g          |
| Housing color                  | Silver        |

### Operation and display

|                                     |                        |
|-------------------------------------|------------------------|
| Type of display                     | LED                    |
| Number of LEDs                      | 3 Piece(s)             |
| Operational controls                | 270° potentiometer     |
| Function of the operational control | Sensitivity adjustment |

### Environmental data

|                                |               |
|--------------------------------|---------------|
| Ambient temperature, operation | -25 ... 55 °C |
|--------------------------------|---------------|

### Certifications

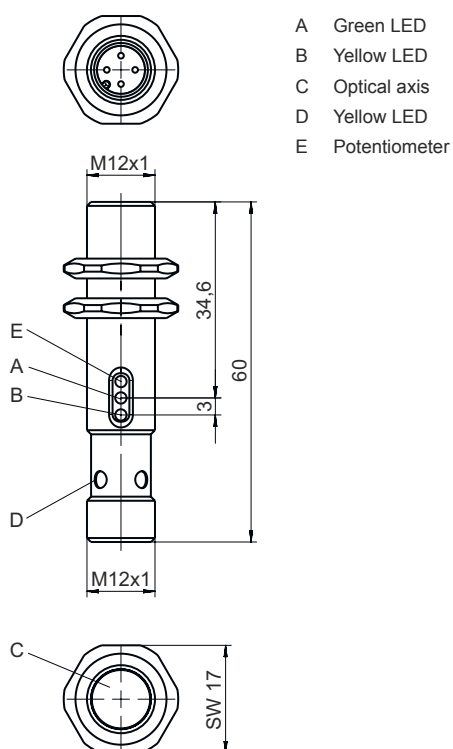
|                      |               |
|----------------------|---------------|
| Degree of protection | IP 67         |
| Protection class     | III           |
| Approvals            | c UL US       |
| Standards applied    | IEC 60947-5-2 |

### 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 |
| ECLASS 14.0           | 27270903 |
| ECLASS 15.0           | 27270903 |
| ECLASS 16.0           | 27270903 |
| ETIM 5.0              | EC001821 |
| ETIM 6.0              | EC001821 |
| ETIM 7.0              | EC001821 |
| ETIM 8.0              | EC001821 |
| ETIM 9.0              | EC001821 |
| ETIM 10.0             | EC001821 |
| UNSPSC 26.08          | 39121528 |

## Dimensioned drawings

All dimensions in millimeters



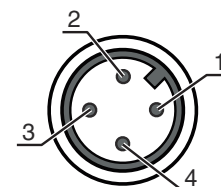
## Electrical connection

### Connection 1

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

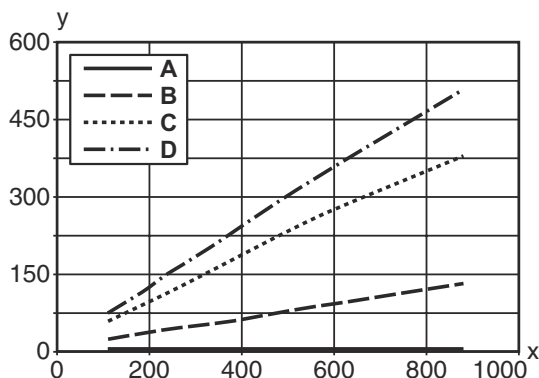
### Pin Pin assignment

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



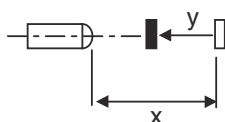
## Diagrams

### Typ. black/white behavior



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

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



## Operation and display

| LED | Display                  | Meaning                                 |
|-----|--------------------------|---|
| 1   | Green, continuous light  | Function reserve                        |
| 2   | Yellow, continuous light | Switching output/switching state active |

## Part number code

Part designation: **AAA412BGG.H/ii-K**

|                |   |
|----------------|---|
| <b>AAA412B</b> | <b>Operating principle / construction</b><br>LS412B: Throughbeam photoelectric sensor transmitter<br>LE412B: Throughbeam photoelectric sensor receiver<br>ET412B: Energetic diffuse reflection sensor<br>PRK412B: Retro-reflective photoelectric sensor with polarization filter  |
| <b>GG</b>      | <b>Light source</b><br>n/a: LED<br>L2: laser class 2  |
| <b>H</b>       | <b>Operating range adjustment</b><br>1: 270° potentiometer  |
| <b>ii</b>      | <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>X: pin not used |
| <b>K</b>       | <b>Electrical connection</b><br>n/a: cable, standard length 2000 mm, 3-wire<br>M12: M12 connector, 4-pin (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



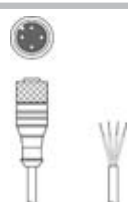

**Observe intended use!**




- ⌘ 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.

## 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  |
|--|----------|-------------|------------------|--|
|  | 50113549 | BT D12M.5   | Mounting bracket | Diameter, inner: 12 mm<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: Stainless steel |

#### Note



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