

## Diffuse mode sensor

OBD300-12GM40-E5-0,3M-V31

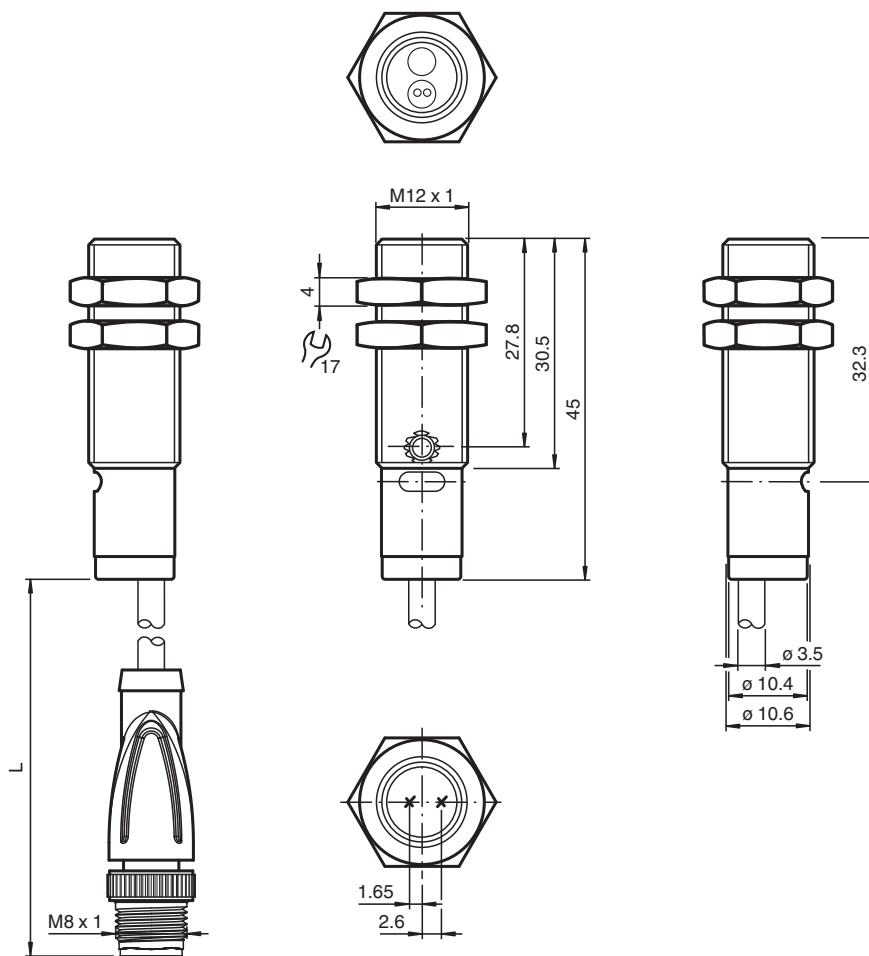


- Robust M12 threaded housing
- Less space required
- Light-on/dark-on, programmable
- Degree of protection IP67

Diffuse mode sensor, M12 threaded housing design, metal housing, front optical face, 300 mm detection range, red light, light/dark on, 1 PNP output, fixed cable



### Dimensions



### Technical Data

#### General specifications

Detection range 0 ... 300 mm

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Technical Data

|                                                 |                |                                                                                            |
|-------------------------------------------------|----------------|--------------------------------------------------------------------------------------------|
| Adjustment range                                |                | 20 ... 300 mm                                                                              |
| Reference target                                |                | standard white 100 mm x 100 mm                                                             |
| Light source                                    |                | LED                                                                                        |
| Light type                                      |                | red , 640 nm                                                                               |
| Angle deviation                                 |                | +/- 2 °                                                                                    |
| Diameter of the light spot                      |                | approx. 20 mm at a distance of 300 mm                                                      |
| Opening angle                                   |                | approx. 4 °                                                                                |
| Optical face                                    |                | frontal                                                                                    |
| Ambient light limit                             |                | EN 60947-5-2 10000 Lux                                                                     |
| <b>Functional safety related parameters</b>     |                |                                                                                            |
| MTTF <sub>d</sub>                               |                | 800 a                                                                                      |
| Mission Time (T <sub>M</sub> )                  |                | 20 a                                                                                       |
| Diagnostic Coverage (DC)                        |                | 0 %                                                                                        |
| <b>Indicators/operating means</b>               |                |                                                                                            |
| Operation indicator                             |                | LED green: Power on                                                                        |
| Function indicator                              |                | LED yellow ON: lights when object is detected                                              |
| Control elements                                |                | Sensing range adjuster                                                                     |
| <b>Electrical specifications</b>                |                |                                                                                            |
| Operating voltage                               | U <sub>B</sub> | 10 ... 30 V DC , class 2                                                                   |
| Ripple                                          |                | 10 %                                                                                       |
| No-load supply current                          | I <sub>0</sub> | ≤ 15 mA                                                                                    |
| <b>Input</b>                                    |                |                                                                                            |
| Control input                                   |                | light on +UB<br>dark on: 0 V                                                               |
| <b>Output</b>                                   |                |                                                                                            |
| Switching type                                  |                | light/dark on electrically switchable                                                      |
| Signal output                                   |                | 1 PNP output, short-circuit protected, reverse polarity protected, open collector          |
| Switching voltage                               |                | max. 30 V DC                                                                               |
| Switching current                               |                | max. 100 mA , resistive load                                                               |
| Voltage drop                                    | U <sub>d</sub> | ≤ 2 V                                                                                      |
| Switching frequency                             | f              | ≤ 1000 Hz                                                                                  |
| Response time                                   |                | 0.5 ms                                                                                     |
| <b>Conformity</b>                               |                |                                                                                            |
| Product standard                                |                | EN 60947-5-2                                                                               |
| <b>Compliance with standards and directives</b> |                |                                                                                            |
| Standard conformity                             |                |                                                                                            |
| Standards                                       |                | UL 508                                                                                     |
| <b>Approvals and certificates</b>               |                |                                                                                            |
| UL approval                                     |                | cULus Listed, Class 2 Power Source, Type 1 enclosure                                       |
| CCC approval                                    |                | CCC approval / marking not required for products rated ≤36 V                               |
| Approvals                                       |                | CE, cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure) |
| <b>Ambient conditions</b>                       |                |                                                                                            |
| Ambient temperature                             |                | -30 ... 60 °C (-22 ... 140 °F)                                                             |
| Storage temperature                             |                | -40 ... 70 °C (-40 ... 158 °F)                                                             |
| <b>Mechanical specifications</b>                |                |                                                                                            |
| Degree of protection                            |                | IP67                                                                                       |
| Connection                                      |                | fixed cable with 4-pin M8 x 1 connector                                                    |
| Material                                        |                |                                                                                            |
| Housing                                         |                | brass, nickel-plated                                                                       |
| Optical face                                    |                | PMMA                                                                                       |
| <b>Cable</b>                                    |                |                                                                                            |
| Length                                          | L              | 300 mm                                                                                     |
| Mass                                            |                | approx. 45 g                                                                               |

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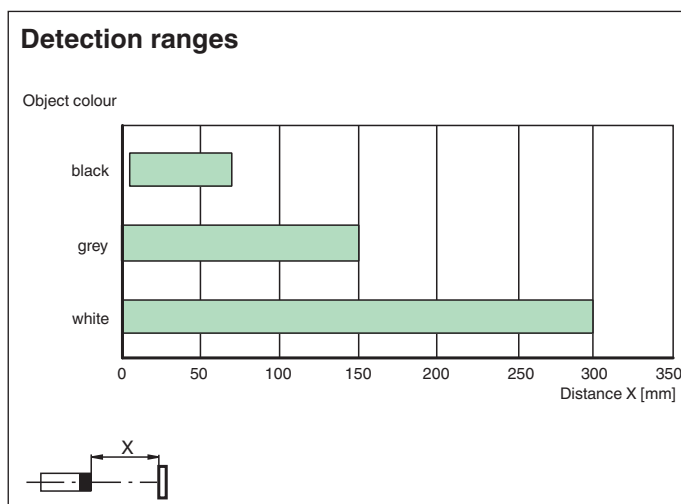
|   |    |         |
|---|----|---------|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue)  |
| 4 | BK | (black) |

|   |                   |        |
|---|-------------------|--------|
| 1 | Operating display | green  |
| 2 | Signal display    | yellow |
| 3 | Potentiometer     |        |
| 4 | Emitter           |        |
| 5 | Receiver          |        |

Figure 10 is a line graph titled "Stability control" showing the "Relative received light strength" (Y-axis, logarithmic scale from 0.1 to 100) versus "Distance X [m]" (X-axis, linear scale from 0 to 0.3). The graph displays three curves representing different surface colors: white (90%), grey (18%), and black (6%). All curves show a sharp initial increase in light strength near X=0, followed by a peak and then a gradual decay. The white curve reaches the highest peak (around 50 at X ≈ 0.02 m), followed by the grey curve (around 15 at X ≈ 0.02 m) and the black curve (around 5 at X ≈ 0.02 m). The black curve decays most rapidly, falling below 0.1 by X ≈ 0.15 m. The grey curve decays more slowly, remaining above 0.1 at X = 0.3 m. The white curve decays the slowest, remaining above 0.1 at X = 0.3 m.

| Distance X [m] | White 90% (Solid) | Grey 18% (Dashed) | Black 6% (Dash-dot) |
|----------------|-------------------|-------------------|---------------------|
| 0.00           | 0.1               | 0.1               | 0.1                 |
| 0.02           | 50                | 15                | 5                   |
| 0.05           | 20                | 8                 | 1.5                 |
| 0.10           | 10                | 4                 | 0.6                 |
| 0.15           | 6                 | 2.5               | 0.3                 |
| 0.20           | 4                 | 1.5               | 0.2                 |
| 0.25           | 2.5               | 0.8               | 0.15                |
| 0.30           | 1.5               | 0.5               | 0.1                 |

## Characteristic Curve



## Additional Information

### System Description

A retroreflective sensor contains both an emitter and a receiver in a single housing. The light of the emitter is reflected by the detected object, returned to, and evaluated by the receiver. The sensing range depends on the object color. For dark or very small objects, the sensing range is reduced.

### Mounting

The sensor has an M12 x 1 threaded design and a nut with AF = 17 mm to be tightened with a maximum torque of 1.5 Nm.

- Direct sensor mounting: Screw into a single bore hole of Ø 12 mm.
- Sensor mounting with bracket: Possible. Not included in the delivery.

When mounting the sensor, ensure the visibility of the control elements and LEDs.

### Adjusting the sensitivity

Apply operating voltage to the sensor. The power indicator lights green.

Application type I: During normal operation, an object is present in the detection field of the sensor. Adjust the sensitivity of the sensor as follows. Turn the sensitivity adjuster counter-clockwise until it reaches minimum. Next determine the positions A and B:

- Position A: Position the object in the scanning range of the sensor. Turn the sensitivity adjuster clockwise until the yellow indicator lights up.  
=> The sensitivity adjuster is now set to position A. Make a note of this setting.
- Position B: Remove the object from the scanning range of the sensor. Turn the sensitivity adjuster counter-clockwise until the yellow indicator lights up again.  
=> The sensitivity adjuster is now set to position B. Make a note of this setting.

Application type II: During normal operation, no object (e.g. parked pallet etc.) is present in the detection range of the sensor. It is not necessary to determine the position with an object present in order to adjust the sensitivity of the sensor.

In case no object is present, the yellow indicator will not even light up when the adjuster is set to the absolute maximum.

Application type III: During normal operation, no object (e.g. parked pallet etc.) is present in the detection range of the sensor. It cannot be guaranteed that no object will ever be present in the detection range of the sensor.

Determine the likely position of the object to set the sensor's sensitivity, compare application type I. Therefore, place an object at the most likely position and, after you have determined A and B, remove the object again. For optimum adjustment turn the sensitivity adjuster in the middle between the positions A and B.

### Maintenance

**Cleaning:** Clean the light emitter of the sensor at regular intervals.

**Servicing:** Check the mounting screw connections and the electrical plug connections regularly.

## Accessories

|                                                                                     |                      |                                                                                   |
|-------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------|
|  | <b>BF 12</b>         | Mounting flange, 12 mm                                                            |
|  | <b>BF 12-F</b>       | Plastic mounting adapter, 12 mm                                                   |
|  | <b>BF 5-30</b>       | Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm |
|  | <b>V31-GM-2M-PUR</b> | Female cordset single-ended M8 straight A-coded, 4-pin, PUR cable grey            |
|  | <b>V31-WM-2M-PUR</b> | Female cordset single-ended M8 angled A-coded, 4-pin, PUR cable grey              |