

ifm electronic



Operating instructions  
Diffuse reflection sensor with  
background suppression

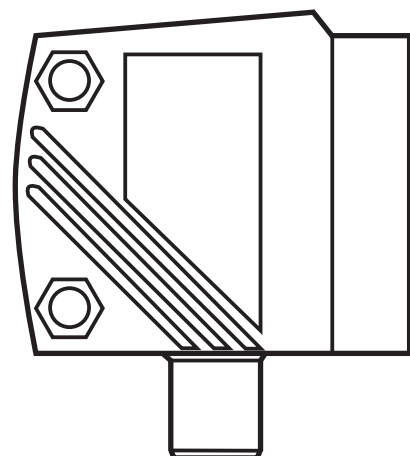
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**efector200<sup>®</sup>**

**O1D101**

**O1D104**

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# Contents

1 Preliminary note.....	3
1.1 Symbols used .....	3
1.2 Warning signs used .....	3
2 Safety instructions .....	3
3 Functions and features .....	4
3.1 Applications .....	4
4 Installation.....	5
5 Electrical connection.....	5
6 Operating and display elements .....	6
7 Settings.....	6
7.1 Setting of the maximum sensing range .....	7
7.2 Setting unsuccessful.....	7
7.3 Electronic lock.....	8
8 Set-up / operation .....	8
8.1 Error indications.....	8
8.2 Table repeatability and accuracy .....	9
9 Maintenance, repair, disposal.....	9
10 Scale drawing .....	10

# 1 Preliminary note

## 1.1 Symbols used

▶ Instruction

> Reaction, result

[...] Designation of pushbuttons, buttons or indications

→ Cross-reference



Important note

Non-compliance can result in malfunction or interference.



Information

Supplementary note.

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## 1.2 Warning signs used

### **WARNING**

Warning of serious personal injury.

Death or serious irreversible injuries may result.

## 2 Safety instructions

- Please read this document prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application. That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.
- In case of malfunction of the unit please contact the manufacturer. If the unit is tampered with and/or modified, any liability and warranty is excluded.

## **⚠ WARNING**

Visible laser light; laser protection class 2.

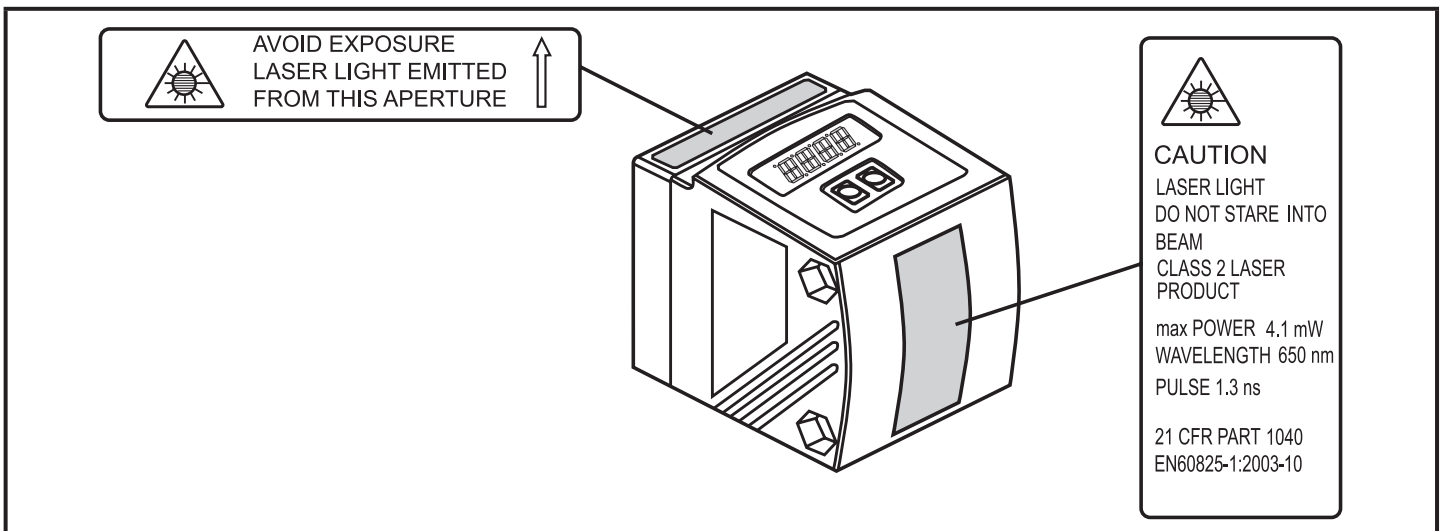
Use of controls or adjustments other than those specified herein may result in hazardous radiation exposure. Damage to the retina is possible.

- ▶ Do not stare into the laser beam!
- ▶ Apply the enclosed labels (laser warning) in the immediate vicinity of the unit.
- ▶ Adhere to the caution and warning notes on the product label.
- ▶ Use the enclosed label for the power supply cable.

### **Label for supply cable**



### **Product label**



## **3 Functions and features**

The diffuse reflection sensor detects objects and materials without contact and indicates their presence by a switching signal. In addition, the distance to the object is indicated.

### **3.1 Applications**

- Range 0.2...10 m (on white paper 200 x 200 mm, 90 % remission).
- Background suppression >10...100 m.
- The measured value is shown in a 10-segment display.



The distance between the sensor and the background must be limited to max. 100 m by the customer. Otherwise measured values can be ambiguous.

## 4 Installation

- ▶ Align the diffuse reflection sensor to the object to be detected.
- ▶ Secure it to a bracket.

The unambiguity range of the sensor is fixed to 100 m. Objects within a range >10...100 m are suppressed.



Reflecting objects in the direct beam path of the sensor - also in the range > 100 m – are to be avoided by the customer. Otherwise the measured values can be ambiguous.

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## 5 Electrical connection

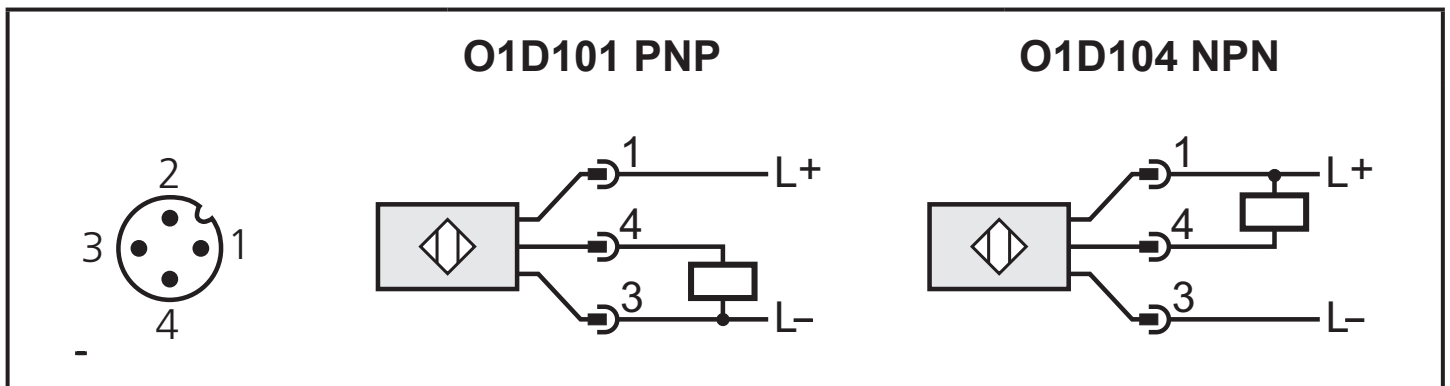


The unit must be connected by a qualified electrician.

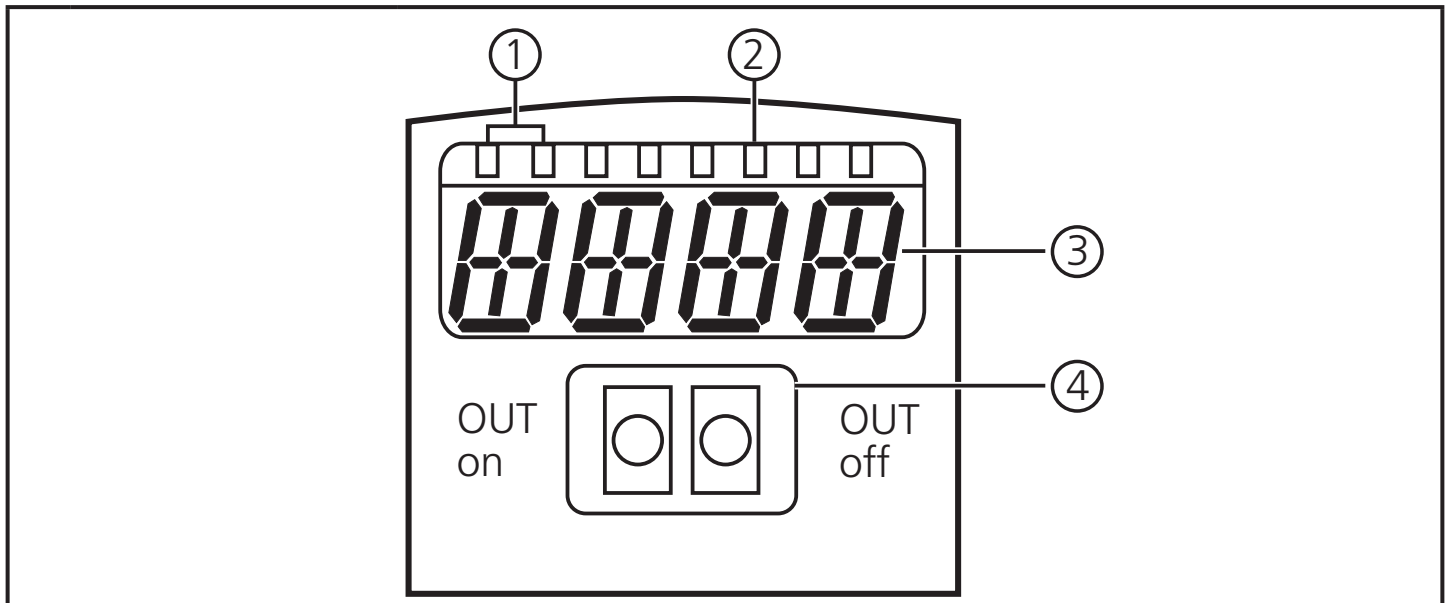
- ▶ The national and international regulations for the installation of electrical equipment must be adhered to.
- ▶ Ensure voltage supply to EN 50178, SELV, PELV.

The device shall be supplied from an isolating source and protected by an overcurrent device such that the limited voltage requirements in accordance with UL 508 are met.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:



## 6 Operating and display elements



1: 2 x LED green	LED 1: unit is ready for operation LED 2: display unit for distance to the object (mm)
2: LED yellow	Indication of the switching status; lights when the corresponding output is switched.
3: 4-digit alphanumeric display	Indication of the distance to the object in mm; indications concerning the setting operation; error messages
4: Setting buttons	Setting of the sensing range and switching function.

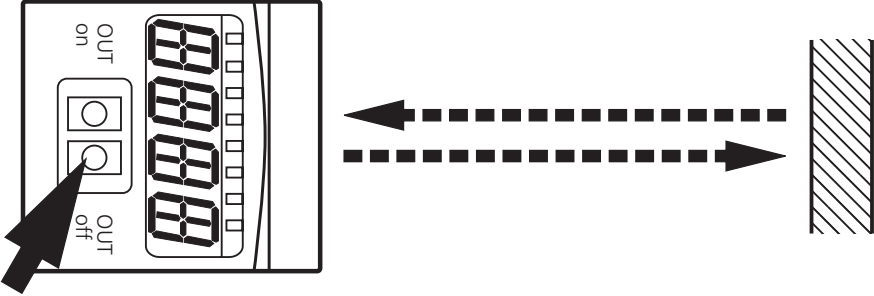
## 7 Settings

The sensor is to switch when the object is detected

1

► Position the object.

► Press [OUT on] for 2 s.  
> The display indicates [WAIT].

2	<ul style="list-style-type: none"> <li>▶ [OFF] flashes.</li> <li>▶ Remove the object.</li> </ul>  <ul style="list-style-type: none"> <li>▶ Press [Out off] for 2 s.</li> <li>&gt; The display indicates [WAIT].</li> <li>&gt; The displays indicates [donE] as soon as the setting operation is completed.</li> </ul>
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### The sensor is not to switch when the object is detected

- ▶ Position the object (see figure 1) and press [OUT off].
- ▶ Remove the object (see figure 2) and press [OUT on].

The settings can also be carried out first without object (step 1) and then with object (step 2).

## 7.1 Setting of the maximum sensing range

- ▶ Align the sensor so that no light is reflected.
- > The display indicates [--] or [FAR]

### The sensor is to switch when the object is detected

- ▶ First press [OUT on], then [OUT off].

### The sensor is to switch when the object is not detected

- ▶ First press [OUT off], then [OUT on].

## 7.2 Setting unsuccessful

- > The displays indicates [FAIL], the switch point is not adopted.

### Possible causes

- Measured value difference is too small.
- Measurement not possible (e.g. due to a reflective surface).

## 7.3 Electronic lock

The unit can be locked electronically to prevent unauthorised setting. On delivery the unit is not locked.

### Locking

- ▶ Make sure that the unit is in the normal operating mode.
- ▶ Keep [OUT On] + [OUT Off] pressed until [Loc] is displayed.
- > The unit is locked.

[Loc] is displayed briefly if you try to change parameter values on the locked unit during operation.

### Unlocking

- ▶ Keep [OUT On] + [OUT Off] pressed until [Loc] is displayed.
- > The unit is unlocked.

## 8 Set-up / operation

- ▶ After installation, electrical connection and programming, check whether the unit operates correctly.
- > If the unit has been correctly set up, the distance to the object is indicated.



Lifetime of a laser diode: 50,000 hours

### 8.1 Error indications

Display	Possible cause
[++]	too much light, e.g. reflective surface
[- -]	not enough light, no object
[nEAr]	object to be measured outside the measuring range < 0.2 m
[FAr]	object to be measured outside the measuring range > 10 m
[SC]	short circuit at the switching output



## 8.2 Table repeatability and accuracy

Values for sampling rate 15 Hz\* - extraneous light on the object max. 40 klx

Distance in [mm]	Repeatability		Accuracy	
	white 90 % remission	grey 18 % remission	white 90 % remission	grey 18 % remission
200...1000	± 4.5 mm	± 6.0 mm	± 15.0 mm	± 16.0 mm
1000...2000	± 5.0 mm	± 8.0 mm	± 15.0 mm	± 18.0 mm
2000...4000	± 16.0 mm	± 19.0 mm	± 25.0 mm	± 30.0 mm
4000...6000	± 24.0 mm	± 33.0 mm	± 35.0 mm	± 45.0 mm
6000...10000	± 50.0 mm	—	± 65.0 mm	—

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Values for sampling rate 15 Hz\* - extraneous light on the object max. 40...100 klx

Distance in [mm]	Repeatability		Accuracy	
	white 90 % remission	grey 18 % remission	white 90 % remission	grey 18 % remission
200...2000	± 14.0 mm	± 14.0 mm	± 24.0 mm	± 24.0 mm
2000...4000	± 25.0 mm	± 30.0 mm	± 35.0 mm	± 40.0 mm
4000...6000	± 31.0 mm	± 45.0 mm	± 41.0 mm	± 55.0 mm
6000...10000	± 60.0 mm	—	± 70.0 mm	—

\*Range referred to black (6 % remission) ≤ 4000 mm.

The values apply at:

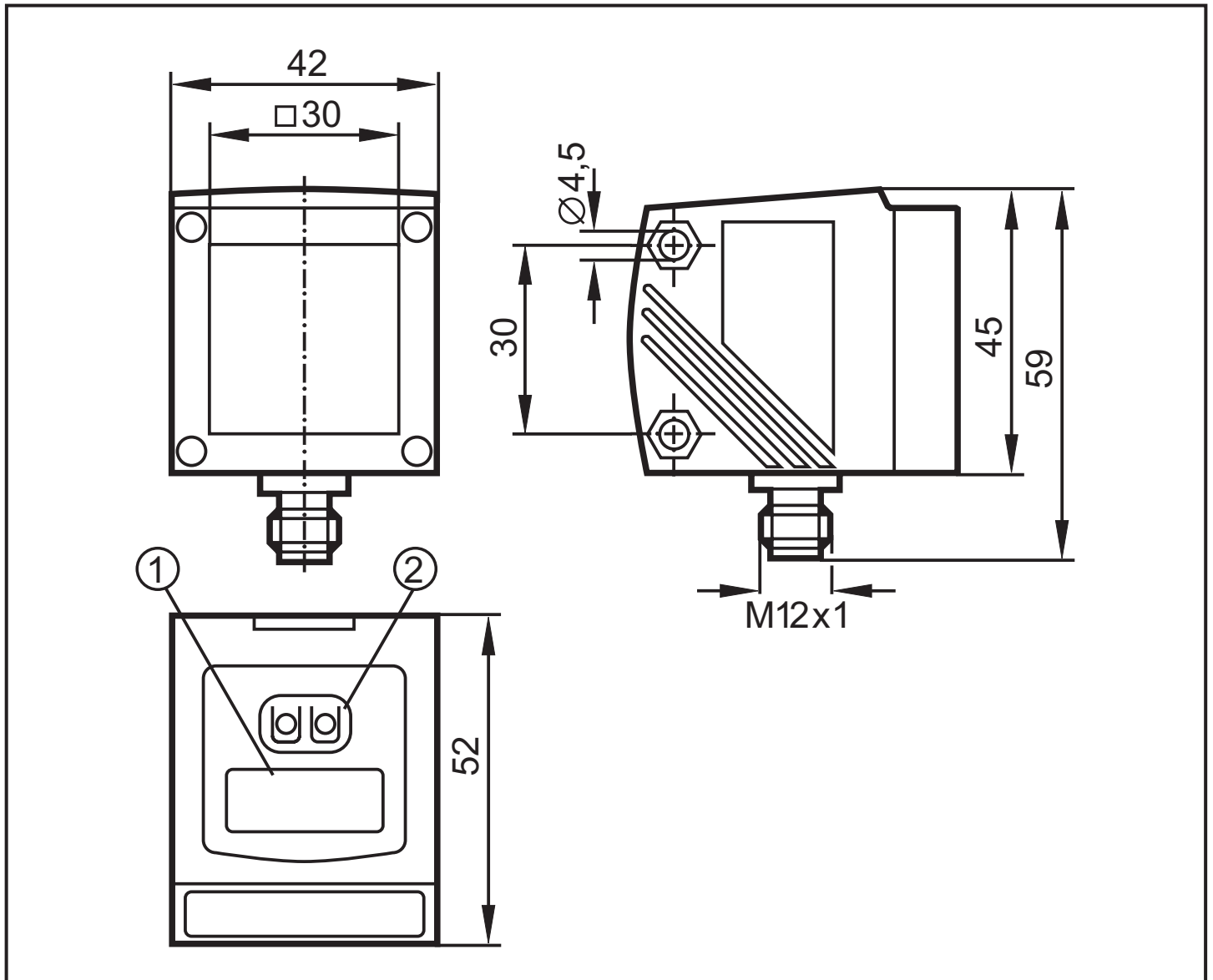
- constant ambient conditions (23° C / 960 hPa)
- only after unit powered up for 10 minutes.

## 9 Maintenance, repair, disposal

Faulty sensors must only be repaired by the manufacturer.

- ▶ Keep the front lens of the sensor clean.
- ▶ After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.

## 10 Scale drawing



Dimensions in mm

- 1: 4-digit alphanumeric display / LED function display
- 2: Programming buttons

Technical data and further information at [www.ifm.com](http://www.ifm.com)

