

ifm electronic



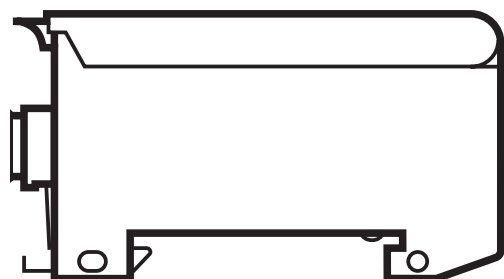
Operating instructions  
Switching amplifier  
for fibre optics

**efector200**<sup>®</sup>

**OBF5xx**

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704513 / 00 04 / 2009



# Contents

|   |    |
|---|----|
| 1 Preliminary note.....   | 3  |
| 1.1 Symbols used .....  | 3  |
| 2 Functions and features .....                                      | 3  |
| 2.1 Applications .....  | 3  |
| 3 Installation.....   | 3  |
| 3.1 Attaching the fibre optics .....                                | 4  |
| 4 Electrical connection.....  | 5  |
| 5 Operating and display elements .....                              | 6  |
| 6 Set-up .....  | 6  |
| 7 Settings.....   | 7  |
| 7.1 Automatic setting of the sensitivity.....                       | 7  |
| 7.1.1 The sensor is to switch when the object is detected .....     | 7  |
| 7.1.2 The sensor is not to switch when the object is detected ..... | 8  |
| 7.1.3 Measured value difference too small.....                      | 8  |
| 7.2 Manual setting of the sensitivity.....                          | 8  |
| 7.3 Setting of maximum sensitivity .....                            | 9  |
| 7.4 Setting of the pulse stretching .....                           | 10 |
| 7.5 Electronic lock.....  | 11 |
| 8 Operation .....   | 11 |
| 8.1 Set-up .....  | 11 |
| 8.2 Fault indications.....  | 12 |
| 9 Maintenance, repair, disposal .....                               | 12 |

# 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 malfunctions or interference.



Information

Supplementary note.

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## 2 Functions and features

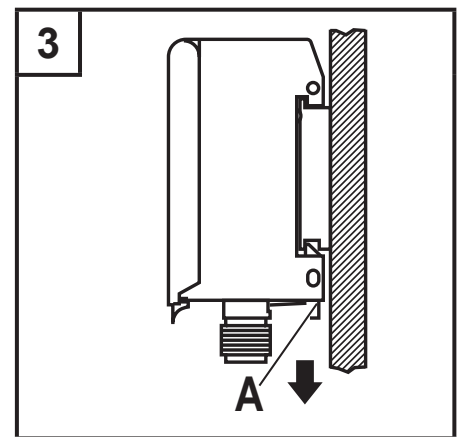
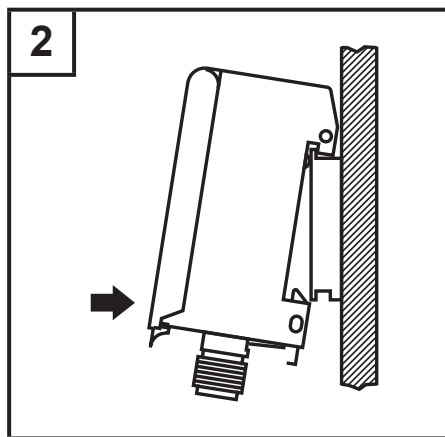
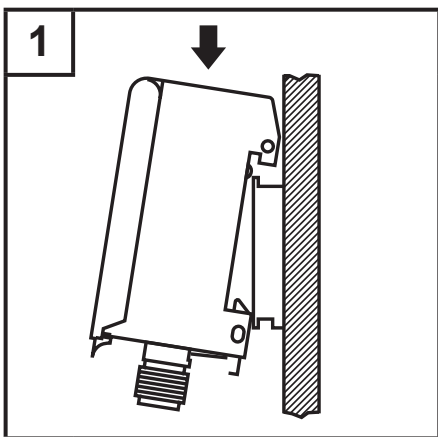
The switching amplifier detects objects and materials without contact and indicates their presence by a switching signal.

### 2.1 Applications

- Only for use with ifm fibre optics type FE-11 and FT-11.
- The range is determined by the fibre optics.
- Pulse stretching, adjustable 0 or 1 ... 90 ms.  
Each input pulse is stretched to the set value.

## 3 Installation

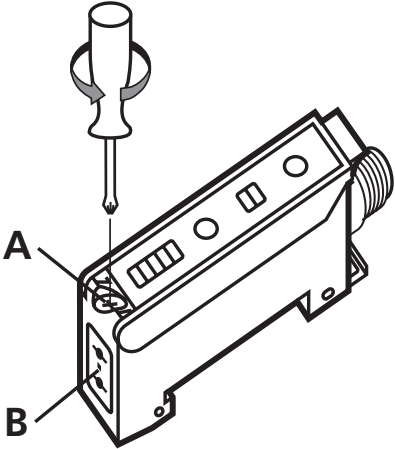
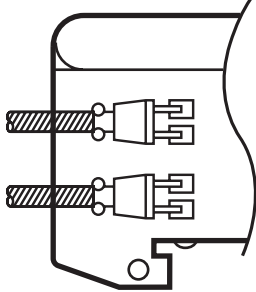
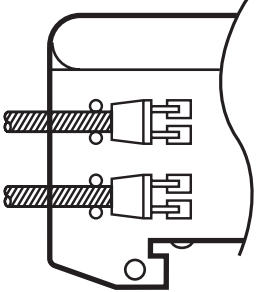
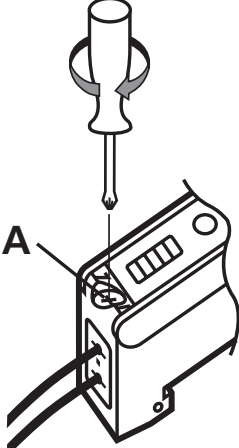
- ▶ Hook the unit into the DIN rail (1) and clip it into place (2) or fix it by means of a mounting fixture.



### Removal

- ▶ Lever out the mounting clip (A) with a screwdriver (3) and remove the unit.

### 3.1 Attaching the fibre optics

|   |  |   |
|---|--|---|
| 1 | ▶ Loosen the screw (A).  |     |
| 2 | ▶ Push the fibre optics into the sensor holes (B) until you feel a slight resistance (O-ring). |    |
| 3 | ▶ Push the fibre optics until the end stop (optic elements) and hold them.                     |   |
| 4 | ▶ Tighten the screw (A).   |  |



If the fibre optics are not in contact with the optic elements, the sensing range is reduced.

## 4 Electrical connection


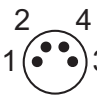
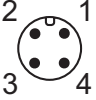
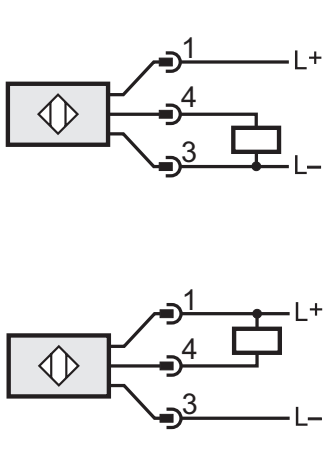
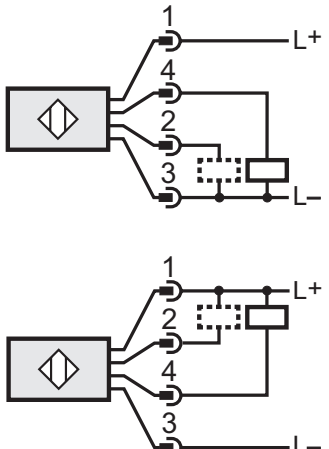
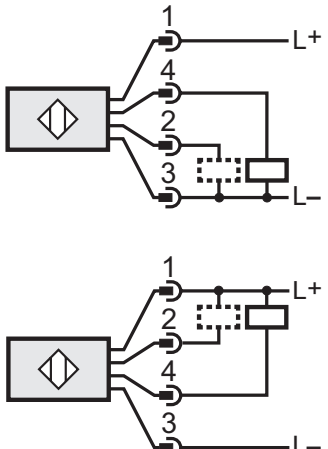
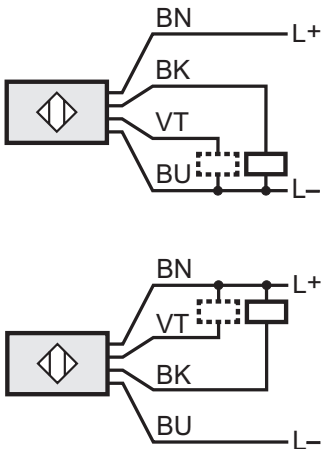


The unit must be connected by a qualified electrician.

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

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

### Automatic PNP / NPN detection

| M8  | M8  | M12  | Cable  |
|--|--|---|--|
|     |    |      |  |
|  |  |   |  |

Core colours:

BN (brown), BU (blue), BK (black), VT (violet).



On power up, the unit detects automatically if the switching output is connected to L- (= PNP) or to L+ (= NPN). The polarity of the function check output is set according to the polarity of the switching output. Both outputs must be connected with the same polarity: PNP or NPN!

## 5 Operating and display elements

|  |   |  |
|--|---|--|
| Row of LEDs<br>1: (4 x LED green<br>1 x LED red) | Excess gain in %<br>Input signal strength<br>Pulse stretching in ms       |  |
| 2: Programming button [OUT on]                   | Automatic setting "OUT on"<br>Manual setting "+"<br>Pulse stretching "+"  |  |
| 3: LED yellow                                    | Switching status  |  |
| 4 LED green                                      | Operating status  |  |
| 5: Programming button [OUT off]                  | Automatic setting "OUT off"<br>Manual setting "-"<br>Pulse stretching "-" |  |

## 6 Set-up

### Diffuse reflection optics (FT-11)

For operation as diffuse reflection sensor, the light-on mode with maximum sensitivity is set on delivery.

### Through-beam optics (FE-11)

For operation as through-beam sensor, the light-on mode with maximum sensitivity is set on delivery.

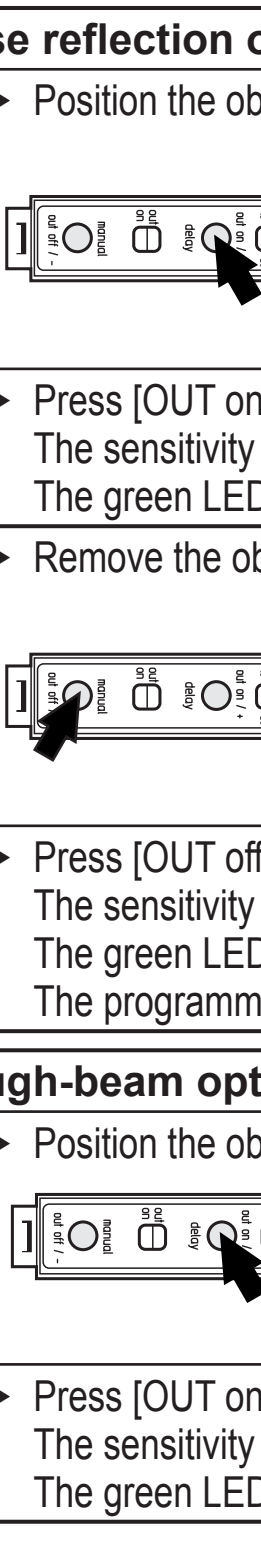
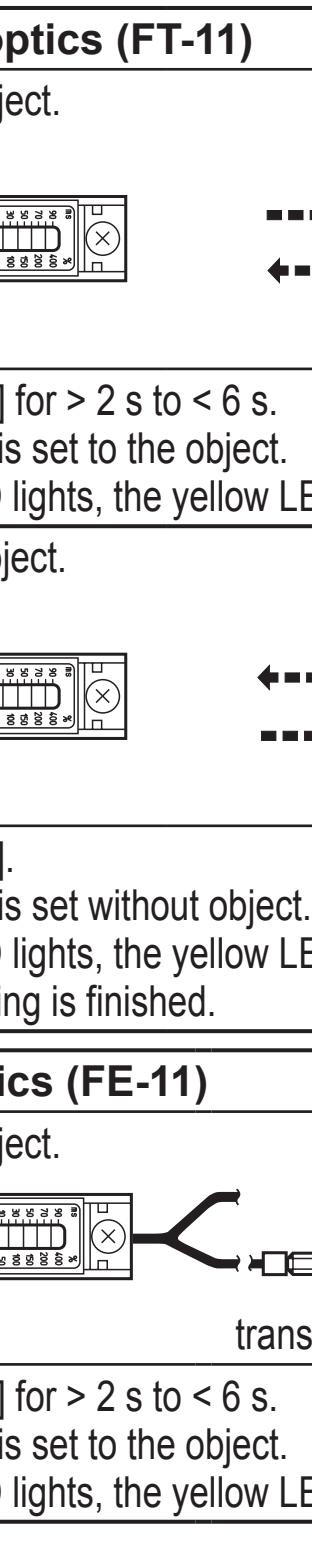
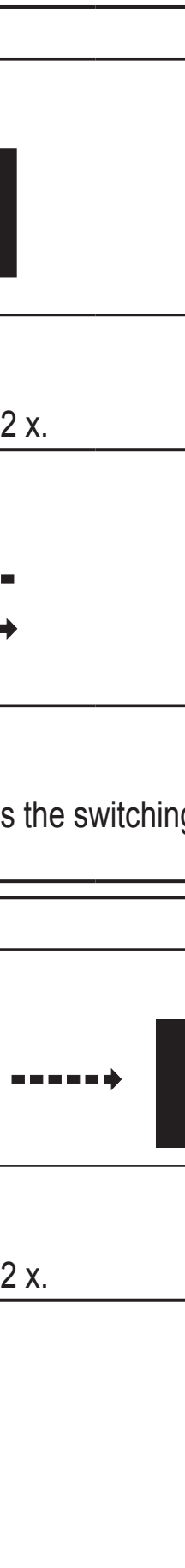


Carry out the automatic setting of the sensitivity to determine the light-on / dark-on mode → 7.1 Automatic setting of the sensitivity.


# 7 Settings

## 7.1 Automatic setting of the sensitivity

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

| <b>Diffuse reflection optics (FT-11)</b> |  |
|--|--|
| 1  | <p>▶ Position the object.</p>  <p>▶ Press [OUT on] for &gt; 2 s to &lt; 6 s.</p> <ul style="list-style-type: none"><li>&gt; The sensitivity is set to the object.</li><li>&gt; The green LED lights, the yellow LED flashes 2 x.</li></ul>   |
| 2  | <p>▶ Remove the object.</p>  <p>▶ Press [OUT off].</p> <ul style="list-style-type: none"><li>&gt; The sensitivity is set without object.</li><li>&gt; The green LED lights, the yellow LED indicates the switching status.</li><li>&gt; The programming is finished.</li></ul>   |
| <b>Through-beam optics (FE-11)</b>       |  |
| 1  | <p>▶ Position the object.</p>  <p style="text-align: center;">transmitter</p> <p style="text-align: center;">receiver</p> <p>▶ Press [OUT on] for &gt; 2 s to &lt; 6 s.</p> <ul style="list-style-type: none"><li>&gt; The sensitivity is set to the object.</li><li>&gt; The green LED lights, the yellow LED flashes 2 x.</li></ul> |

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|          |   |
|----------|---|
| <b>2</b> | <p>▶ Remove the object.</p>  <p style="text-align: center;">transmitter <span style="margin-left: 200px;">receiver</span></p>                                       |
|          | <p>▶ Press [OUT off].</p> <ul style="list-style-type: none"> <li>&gt; The sensitivity is set without object.</li> <li>&gt; The green LED lights, the yellow LED indicates the switching status.</li> <li>&gt; The programming is finished.</li> </ul> |

### 7.1.2 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).

#### Timeout

 If no button is pressed for 15 min during the setting procedure, the unit changes to the normal operating mode with unchanged values.

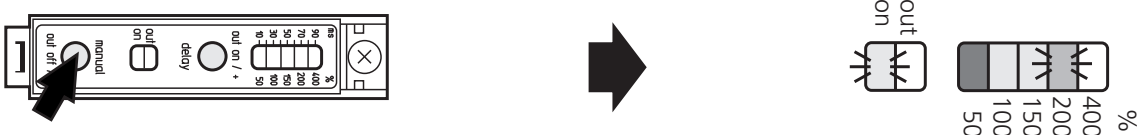
### 7.1.3 Measured value difference too small

If the measured value difference is too small, the switching threshold can be manually adjusted.

- > The unit changes to the manual setting mode. → 7.2 Manual setting of the sensitivity / step 2.

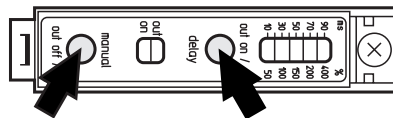
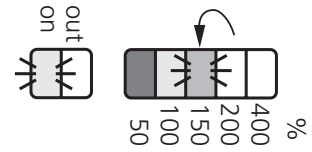
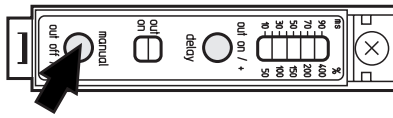
## 7.2 Manual setting of the sensitivity

 Carry out the automatic setting prior to the manual setting to determine the light-on / dark-on mode.

| <b>Diffuse reflection optics (FT-11) / through-beam optics (FE-11)</b> |   |
|--|---|
| <b>1</b>   | <p>▶ Press [OUT off] for &gt; 6 s to &lt; 20 s.</p>   |
|  |   |
|  | <ul style="list-style-type: none"> <li>&gt; The green LED flashes with 2 Hz, the yellow LED indicates the switching status.</li> <li>&gt; The row of LEDs indicates the input signal strength and flashes to indicate the switching threshold.</li> </ul> |



|   |   |
|---|---|
| 2 | <p><b>Modify the switching threshold</b></p> <ul style="list-style-type: none"> <li>▶ Press [OUT off] to reduce the switching threshold.</li> <li>▶ Press [OUT on] to increase the switching threshold.</li> <li>- Fast forward by keeping the button pressed.</li> </ul> |
| 3 | <p><b>Exit setting</b></p> <ul style="list-style-type: none"> <li>▶ Press [OUT on] + [OUT off] simultaneously.</li> <li>&gt; The unit changes to the normal operating mode.</li> </ul>  |
| 4 | <ul style="list-style-type: none"> <li>▶ Check the safe switching function. If necessary, repeat the setting (→ step 1).</li> </ul>   |



## Timeout



If no button is pressed for 15 min during the setting procedure, the unit changes to the normal operating mode with unchanged values.

## 7.3 Setting of maximum sensitivity

▶ Align the fibre optics so that no light is received.

### The sensor is to switch when light is received

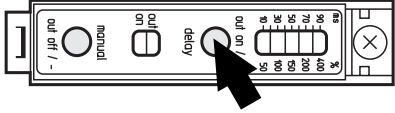
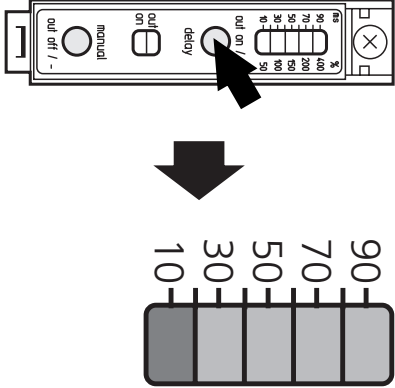
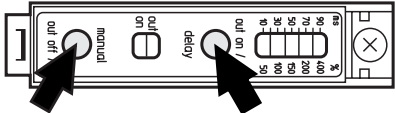
▶ First press [OUT on], then [OUT off].

### The sensor is to switch when no light is received

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

## 7.4 Setting of the pulse stretching

The length of the output signal can be adjusted. If the object does not stay in the detection zone long enough, it is possible to stretch the pulse time.

|                 |  |   |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
|-----------------|--|---|---|---|---|--|--|--|--------|---|--|--|--|--|---------|---|---|--|--|--|---------|--|---|--|--|--|---------|--|---|---|--|--|---------|--|--|---|--|--|---------|--|--|---|---|--|---------|--|--|--|---|--|---------|--|--|--|---|---|---------|--|--|--|--|---|
| <p><b>1</b></p> | <ul style="list-style-type: none"> <li>▶ Press [OUT on] for &gt; 6 s to &lt; 20 s.</li> <li>&gt; The green LED flashes with 4 Hz, the yellow LED indicates the switching status.</li> <li>&gt; The row of LEDs indicates the pulse stretching.</li> </ul>  |    |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| <p><b>2</b></p> | <p><b>Set the pulse stretching time.</b></p> <ul style="list-style-type: none"> <li>▶ Press [OUT off] to reduce the pulse stretching time.</li> <li>▶ Press [OUT on] to increase the pulse stretching time.</li> <li>- 1 push on the button corresponds to 1 ms.</li> <li>- Fast forward by keeping the button pressed.</li> </ul> |  <table border="1" data-bbox="954 992 1414 1675"> <tr> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1 - 10</td> <td>●</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11 - 20</td> <td>●</td> <td>●</td> <td></td> <td></td> <td></td> </tr> <tr> <td>21 - 30</td> <td></td> <td>●</td> <td></td> <td></td> <td></td> </tr> <tr> <td>31 - 40</td> <td></td> <td>●</td> <td>●</td> <td></td> <td></td> </tr> <tr> <td>41 - 50</td> <td></td> <td></td> <td>●</td> <td></td> <td></td> </tr> <tr> <td>51 - 60</td> <td></td> <td></td> <td>●</td> <td>●</td> <td></td> </tr> <tr> <td>61 - 70</td> <td></td> <td></td> <td></td> <td>●</td> <td></td> </tr> <tr> <td>71 - 80</td> <td></td> <td></td> <td></td> <td>●</td> <td>●</td> </tr> <tr> <td>81 - 90</td> <td></td> <td></td> <td></td> <td></td> <td>●</td> </tr> </table> <p style="text-align: center;">time (ms)      lighting LEDs</p> | 0 |   |   |  |  |  | 1 - 10 | ● |  |  |  |  | 11 - 20 | ● | ● |  |  |  | 21 - 30 |  | ● |  |  |  | 31 - 40 |  | ● | ● |  |  | 41 - 50 |  |  | ● |  |  | 51 - 60 |  |  | ● | ● |  | 61 - 70 |  |  |  | ● |  | 71 - 80 |  |  |  | ● | ● | 81 - 90 |  |  |  |  | ● |
| 0               |  |   |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 1 - 10          | ●  |   |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 11 - 20         | ●  | ●   |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 21 - 30         |  | ●   |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 31 - 40         |  | ●   | ● |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 41 - 50         |  |   | ● |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 51 - 60         |  |   | ● | ● |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 61 - 70         |  |   |   | ● |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 71 - 80         |  |   |   | ● | ● |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| 81 - 90         |  |   |   |   | ● |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |
| <p><b>3</b></p> | <p><b>Exit setting</b></p> <ul style="list-style-type: none"> <li>▶ Press [OUT on] + [OUT off] simultaneously.</li> <li>&gt; The unit changes to the normal operating mode.</li> </ul>   |    |   |   |   |  |  |  |        |   |  |  |  |  |         |   |   |  |  |  |         |  |   |  |  |  |         |  |   |   |  |  |         |  |  |   |  |  |         |  |  |   |   |  |         |  |  |  |   |  |         |  |  |  |   |   |         |  |  |  |  |   |

## Timeout



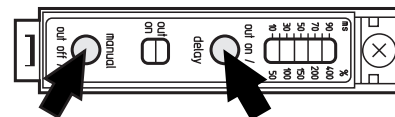
If no button is pressed for 15 min during the setting procedure, the unit changes to the normal operating mode.

## 7.5 Electronic lock

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

### Locking / unlocking

- ▶ Press [OUT on] and [OUT off] simultaneously for 10 s.
- > Acknowledgement is indicated by a change of the status of the yellow LED.
- > The unit is locked.
- ▶ To unlock repeat this step.



## 8 Operation

### 8.1 Set-up

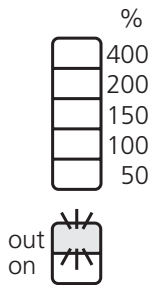
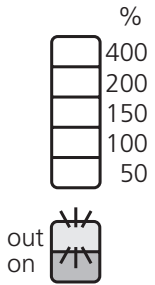
- ▶ After installation, electrical connection and parameter setting, check whether the unit operates correctly.
- > Display by LEDs.



The red LED lights and the output FC "function check output" is switched in case of a detection problem (insufficient object recognition, maladjustment, soiling of the lens).

After rectification of the fault and several successful switching operations, the function check output is automatically switched off.

## 8.2 Fault indications

| Display  |  | Cause   |
|--|--|---|
|  | <p>LED yellow flashes at 2 Hz.<br/>LED green is off.<br/>Row of LEDs is off.</p> | Internal fault  |
|  | <p>LED yellow flashes at 8 Hz.<br/>Green LED is lit.<br/>Row of LEDs is off.</p> | <p>Timeout:<br/>Max. Programming time of 15 min. exceeded.<br/>Change to the normal operating mode.</p> |

## 9 Maintenance, repair, disposal

Faulty sensors must only be repaired by the manufacturer.

- ▶ After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.

Technical data and further information at  
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