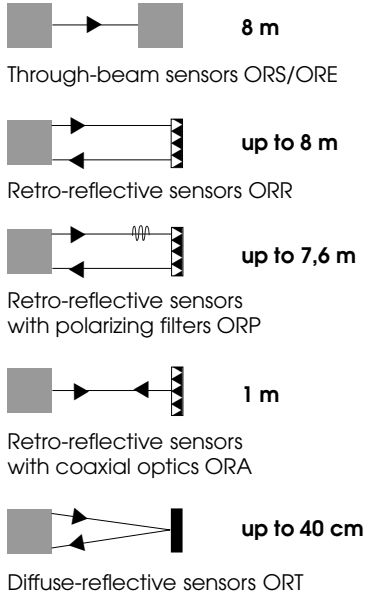


# Series OR

## Industrial – proven – graceful sensors in a robust metal housing



### High functionality

#### Diverse principles with large ranges

ELESTA's OR sensors are available as through-beam sensors, retro-reflective sensors with and without polarizing filters, as well as diffuse-reflective sensors. Additionally, retro-reflective sensors with coaxial optics and diffuse-reflective sensors with background suppression are available.

#### Sensors with coaxial optics

The ORA sensors work according to the coaxial optics principle (see page 6). Because they have no blind range, they are very effective code-readers.

#### Light reserve warning indicator

All of the sensors in the OR series contain a light-reserve warning indicator (blinking function indicator) for controlling dirt build-up on the lenses and as an alignment aid.

#### High switching frequency

All OR sensors have a 1000 Hz switching frequency, allowing for the reliable detection of even fast moving objects.

#### Wide supply voltage range

The allowable supply voltage range is 10...45 VDC.

#### Low power consumption

The OR sensors distinguish themselves with an extremely small power consumption of less than 20 mA.

#### Test input as option

As an option, the OR sensors are available with test input, for confirming that the sensor is operating properly. A sensor with test input has only one output, either light-on or dark-on.

### Simple installation and operation

#### Adjustable range

The optical range of each OR sensor can be adjusted to meet the specific application.

#### Versatile mounting options

The OR sensors have two large counter-sunk holes for flat mounting, as well as an M4 thread for mounting from the back.

#### Various connection versions

All OR sensors are available standard with a 2m cable or an M8 connector.

#### Compact housing with low lying optics and function indicator in front

The OR sensors distinguish themselves especially with a compact 12 mm wide housing. A very bright function indicator at the top of the optical filter is easily seen from the front and side of the sensor. These sensors can therefore be mounted into tight slots.



### Reliable for the highest demands

#### Robust construction with IP 67 sealing

The OR photoelectric sensors are built in a die-cast zinc housing, and are protected against water and dust. The sensors meet the sealing requirements of IP 67.

#### EMC-tested

The OR sensors are tested according to IEC 801, EN50081-1 and EN50082-2. This assures trouble free use even in high electromagnetically contaminated environments.

#### High ambient light rejection

Thanks to pulse modulation and a multi-level disturbance rejection, the OR sensors are extremely insensitive to foreign light sources.

#### Reverse polarity protection

All of the OR sensor's electrical connections are protected against reverse wiring.

#### Short-circuit protection

The OR sensor's transistor outputs are electronically protected against short circuit.

#### Power-up output suppression

During power-up the outputs of the OR sensors are blocked for typically 30 msec.

#### Glass-protected optics

Partially standard, but also as an option, the OR sensors are available with a glass window to protect the optics against aggressive chemicals and mechanical damage (scratching).

**Designation code**

OR x xxx xxx xx

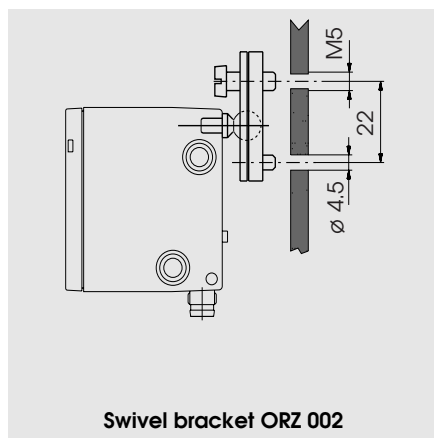
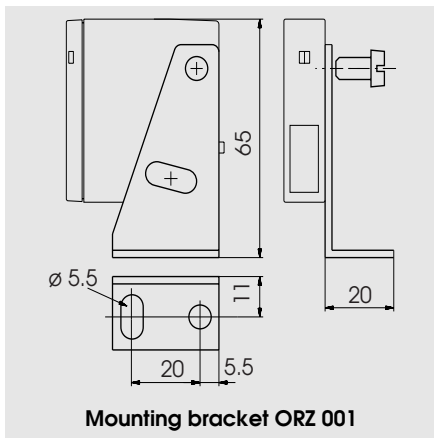
| Principle                                   | Supply       | Outputs                    | Connection                                  | Electr. option                       | Light                 | Range   |
|---|--------------|----------------------------|---|--------------------------------------|-----------------------|---|
| A: Retro-reflective with coaxial optics     | 2: 10-45 VDC | KA: No output              | 0: Cable special length                     | 00: Range adjustable                 | I: Infrared<br>R: Red | ORS/ORE:<br>1: 8 m                                  |
| E: Through-beam receiver                    |              | NA: NPN light- and dark-on | 1: Cable 2 m                                | 01: Range adjustable, test input     |                       | ORP/ORR/ORR:<br>1: 3,5 m<br>2: 4 m<br>3: 1 m        |
| P: Retro-reflective with polarizing filters |              | ND: NPN dark-on            | 5: Connector M8                             | 40: Range not adjustable             |                       | ORT:<br>1: 5 cm<br>2: 10 cm<br>3: 20 cm<br>4: 40 cm |
| R: Retro-reflective                         |              | NH: NPN light-on           | 6: Connector Torson (on a 20 cm long cable) | 41: Range not adjustable, test input |                       |   |
| S: Through-beam emitter                     |              | PA: PNP light- and dark-on |   |                                      |                       |   |
| T: Diffuse-reflective                       |              | PD: PNP dark-on            |   |                                      |                       |   |
| Z: Accessory                                |              | PH: PNP light-on           |   |                                      |                       |   |

**Accessories**

**Retroreflectors:** see page 130

**Connector cables:** see page 128

**Mounting:**



# Retro-reflective sensors with polarizing filters, in a metal housing



- Robust die-cast zinc housing
- Glass protected optics
- Light reserve warning indicator
- Dual transistor outputs, NPN or PNP
- Short-circuit protection, reverse polarity protection, and power-up output suppression
- Test input (option)
- Connections: Cable, 2 meter  
Connector, M8  
Connector, Torson, on 20 cm long cable (option)
- EMC tested according to IEC 801 and EN50081-1/EN 50082-2



## Product designation <sup>1)</sup>

|                  |
|------------------|
| Output           |
| Connection       |
| Range adjustment |

## Optical data <sup>2)</sup>

|         |
|---------|
| Range   |
| Emitter |

## Electrical data <sup>2)</sup>

|                                    |
|------------------------------------|
| Supply voltage $U_s$               |
| Allowable ripple                   |
| Current consumption (without load) |
| Max. load current $I_L$            |
| Residual voltage                   |
| Max. switching frequency           |

## Environmental data

|  |
|--|
| Sealing                                      |
| Temperature $T_A$<br>(operating and storage) |
| Weight                                       |

## Option <sup>1)</sup>

|                        |
|------------------------|
| Test input: emitter on |
| emitter off            |

| ORP 2NA<br>100 R1                                       | ORP 2NA<br>500 R1 | ORP 2PA<br>100 R1        | ORP 2PA<br>500 R1 |
|---|-------------------|--------------------------|-------------------|
| NPN (light- and dark-on)                                |                   | PNP (light- and dark-on) |                   |
| Cable 2 m   | Connector M8      | Cable 2 m                | Connector M8      |
| Yes   |                   |                          |                   |
| 0,3...3,5 m (retroreflector OZR 001)                    |                   |                          |                   |
| Visible-red LED, 660 nm, pulsed, with polarizing filter |                   |                          |                   |
|   |                   | 10...45 VDC              |                   |
|   |                   | +/- 10% of $U_s$         |                   |
|   |                   | < 20 mA                  |                   |
|   |                   | 250 mA                   |                   |
|   |                   | < 1,6 V                  |                   |
|   |                   | 1000 Hz                  |                   |
| IP 67   |                   |                          |                   |
| -20...+60 °C  |                   |                          |                   |
| ca. 150 g   | ca. 85 g          | ca. 150 g                | ca. 85 g          |

|                 |               |
|-----------------|---------------|
| + $U_s$ or open |               |
| < 1,5 V         | < $U_s$ - 8 V |

1) For product designation of sensors with options see designation code on page 67.

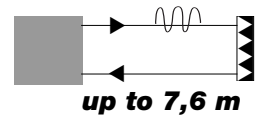
2) When not otherwise noted, all technical data at  $T_A = 25\text{ °C}$  and  $U_s = 24\text{ V}$ .

| Retro-reflector ● | Range        | Retro-reflector ■ | Range        | Retro-reflective tape | Range        |
|-------------------|--------------|-------------------|--------------|-----------------------|--------------|
| OZR 001           | 0.30 – 3.5 m | OZR 101           | 0.15 – 5.0 m | OZR 201               | 0 m          |
| OZR 002           | 0.15 – 3.4 m | OZR 102           | 0.20 – 1.9 m | OZR 202               | 0 m          |
| OZR 003           | 0.25 – 1.4 m | OZR 103           | 0.15 – 4.8 m | OZR 203               | 0.35 – 1.7 m |
|                   |              | OZR 104           | 0.15 – 7.6 m | OZR 204*              | 0.35 – 1.3 m |
|                   |              |                   |              | OZR 205*              | 0.35 – 1.7 m |

\* 30 cm long

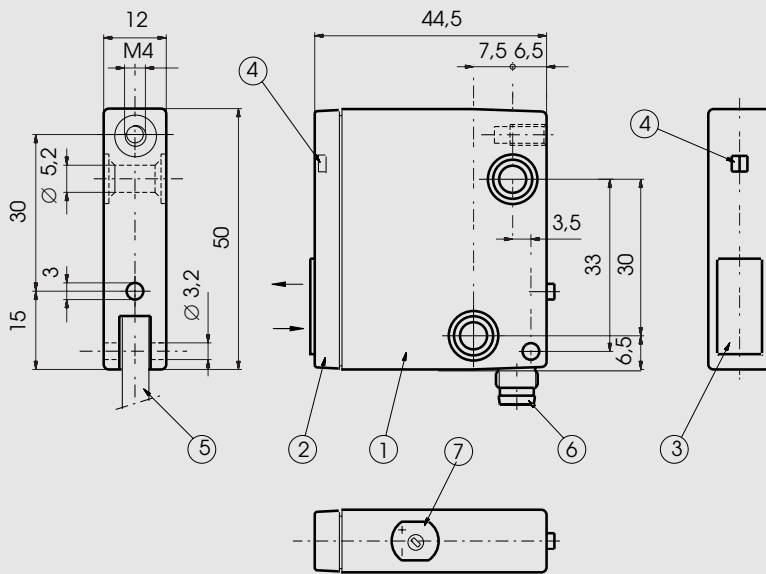
10...45 VDC

NPN / PNP  
light-on and  
dark-on output



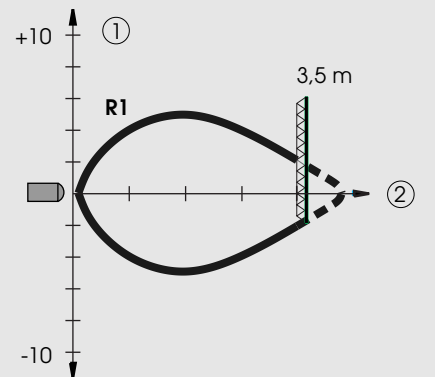
**ORP**

**Dimensions (50 mm x 44,5 mm x 12 mm)**



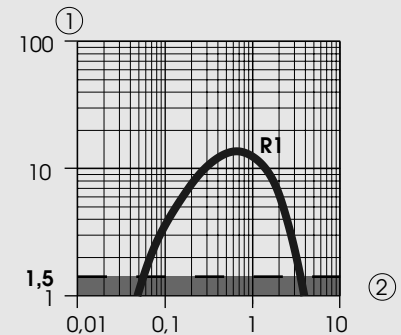
- ① Housing
- ② Lens/filter
- ③ Glass cover
- ④ Function indicator
- ⑤ Cable
- ⑥ Connector M8
- ⑦ Range adjustment

**Optical diagrams**



**Typical beam diameter**  
(with retroreflector OZR 001)

- ① Diameter in (cm)
- ② Range in (m)

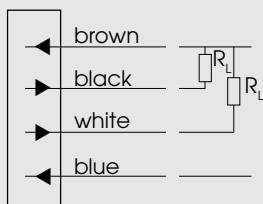


**Typical excess gain curve**  
(with retroreflector OZR 001)

- ① Gain factor
- ② Range in (m)

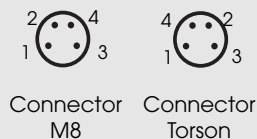
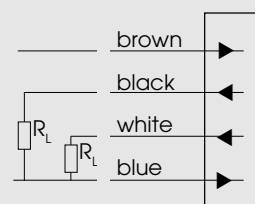
**Wiring diagram**

**NPN-output**



⊕ Supply voltage 10...45 V  
Light-on output  
Dark-on output  
⊖ Supply voltage

**PNP-output**



| Connection for connector M8 | Wire color | Connection for test input |
|-----------------------------|------------|---------------------------|
| 1                           | brown      | Supply+                   |
| 2                           | white      | Test input                |
| 3                           | blue       | Supply-                   |
| 4                           | black      | Output                    |

Light-on output:  
Output energized when no object is present.

Dark-on output:  
Output energized when object is present.