

## HRTR 2

## Miniature diffuse reflection light scanner with background suppression

2024/03/01 50112211

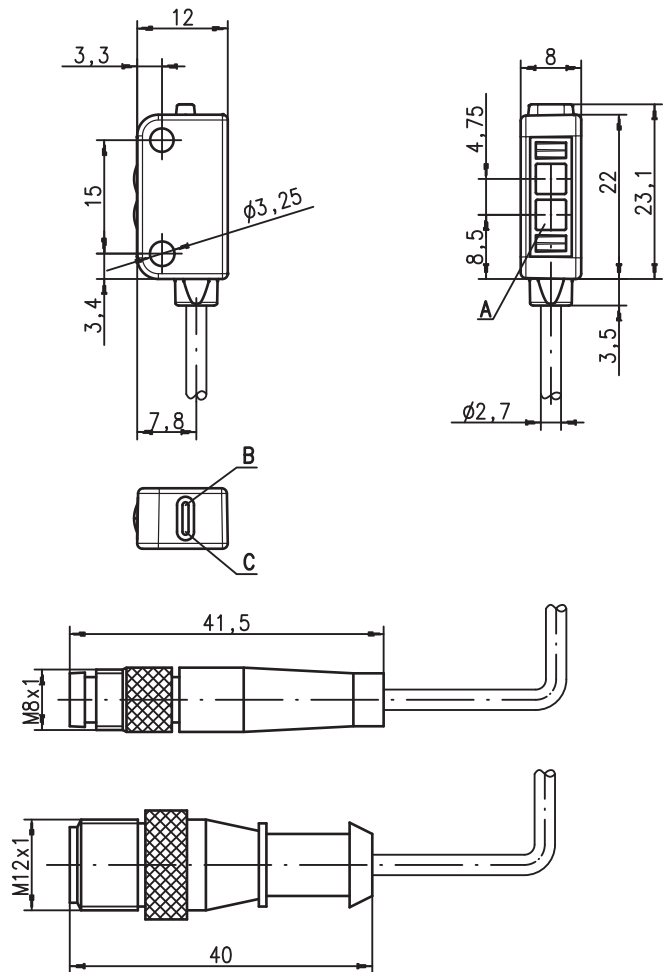


Figure can vary

15mm (fixed)  
30mm (fixed)  
50mm (fixed)

- Miniature diffuse reflection light scanner with visible red light
- Homogenous, focussed light beam with a very small, laser-like light spot
- Very good background suppression
- 3 permanently set scanning ranges: 15mm, 30mm or 50mm
- Miniature construction with temperature-stable plastic housing with protection class IP 67 and 2 inlaid metal fastening sleeves for secure mounting

## Dimensioned drawings



- A Transmitter  
B Yellow indicator diode  
C Green indicator diode

All dimensions in millimeters

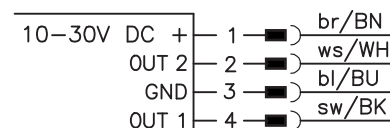
## Accessories:

(available separately)

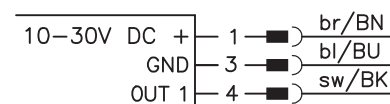
- Mounting device BT 002 M.5 (50112206)
- Cable with M8 or M12 connector (K-D ...)

## Electrical connection

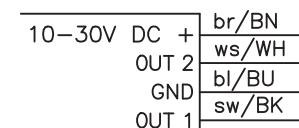
Plug connection, 4-pin



Plug connection, 3-pin



Cable, 4 wires



We reserve the right to make technical changes

### Technical data

#### Optical data

Typ. scanning range limit <sup>1)</sup>  
Scanning range <sup>2)</sup>  
Light beam characteristic  
Light spot at focal point  
Light source<sup>3)</sup>  
Wavelength

HRTR 2...-15F... 15mm  
HRTR 2...-30F... 30mm  
HRTR 2...-50F... 50mm  
see tables  
focussed at 10mm focussed at 16mm focussed at 16mm  
typ. < 1mm  
LED (modulated light)  
640nm (visible red light)

#### Timing

Switching frequency 700Hz  
Response time 0.72ms  
Repeatability 175µs  
Delay before start-up ≤ 120ms

#### Electrical data

Operating voltage  $U_B$  <sup>4)</sup> 10 ... 30VDC (incl. residual ripple)  
Residual ripple ≤ 10% of  $U_B$   
Open-circuit current ≤ 20mA  
Switching output .../42 OUT1 (pin 4): PNP light switching  
OUT2 (pin 2): NPN light switching  
.../42D OUT1 (Pin 4): PNP dark switching  
OUT2 (Pin 2): NPN dark switching

Output configuration .../2 OUT1 (pin 4): NPN light switching  
bipolar transistor with open collector,  
leakage current (OFF):  
PNP=10µA, NPN=200µA,  
saturation voltage (ON, at 50mA):  
PNP=1.45V, NPN=1.25V  
max. 50mA (per output and total)  
C ≤ 2.2µF

Output current  
Load

#### Indicators

Green LED in continuous light  
Green LED, flashing  
Yellow LED in continuous light  
Yellow LED, flashing

ready  
output overloaded  
object detected - reflection  
object detected - reflection, performance reserve too low

#### Mechanical data

Housing plastic (TPE)  
Optics cover plastic (PC)  
Fastening by means of 2 brass sleeves integrated in the housing  
Weight with 2m cable: 50g  
with 150mm cable and connector: 20g  
2m cable, PVC, 4-wire, core cross section 4x0.14mm<sup>2</sup>,  
150mm cable with M8/M12 connector, 4-pin,  
150mm cable with M8/M12 connector, 3-pin

Connection type

#### Environmental data

Ambient temp. (operation/storage) -20°C ... +55°C/-30°C ... +75°C  
Protective circuit <sup>5)</sup> 1, 2, 3, 4  
VDE safety class III  
Protection class IP 67  
LED class 1 (in accordance with EN 60825-1)  
Standards applied IEC 60947-5-2  
Certifications cURus (Recognised Component Mark for Canada and USA)

- 1) Typ. scan. range limit: max. achievable scanning range for light objects (white 90%)
- 2) Scanning range: recommended scanning range for objects with different diffuse reflection
- 3) Average life expectancy 100,000h at an ambient temperature of 25°C
- 4) For UL applications: for use in class 2 circuits according to NEC only
- 5) 1=overload protection, 2=polarity reversal protection, 3=short circuit protection for all transistor outputs, 4=transient protection max. ± 50V

#### NOTES



#### Approved purpose

The diffuse reflection light scanners are optical electronic sensors for optical, contactless detection of objects. This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.

### Tables

#### HRTR 2...-15F...

|   |   |   |                     |    |    |
|---|---|---|---------------------|----|----|
| 1 | 1 | 4 | Scanning range [mm] | 14 | 18 |
| 2 | 3 | 5 |                     | 12 | 17 |
| 3 | 4 | 7 |                     | 10 | 16 |

#### HRTR 2...-30F...

|   |   |   |                     |    |    |
|---|---|---|---------------------|----|----|
| 1 | 1 | 5 | Scanning range [mm] | 28 | 35 |
| 2 | 3 | 6 |                     | 24 | 33 |
| 3 | 4 | 7 |                     | 20 | 32 |

#### HRTR 2...-50F...

|   |   |   |                     |    |    |
|---|---|---|---------------------|----|----|
| 1 | 1 | 4 | Scanning range [mm] | 46 | 60 |
| 2 | 3 | 6 |                     | 34 | 52 |
| 3 | 4 | 8 |                     | 24 | 45 |

|   |           |
|---|-----------|
| 1 | white 90% |
| 2 | grey 18%  |
| 3 | black 6%  |

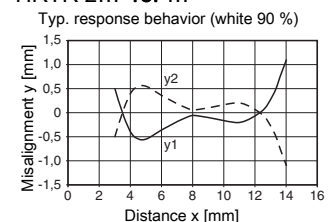
Scanning range [mm]  
Typ. scanning range limit [mm]  
Sensor OFF

#### NOTE

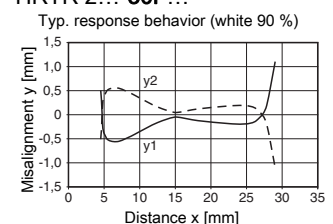
In the areas between "Sensor OFF" and the operating range, the sensor functions with only a low performance reserve. The sensor typically flashes in this case. Depending on the tolerance, it is, however, also possible that the sensor no longer detects objects.

### Diagrams

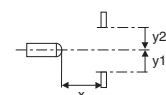
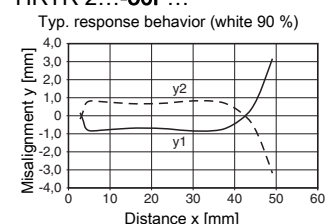
#### HRTR 2...-15F...



#### HRTR 2...-30F...



#### HRTR 2...-50F...



## HRTR 2

## Miniature diffuse reflection light scanner with background suppression

## Part number code

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H | R | T | R | 2 | / | 4 | 2 | D | - | 1 | 5 | F | , | 1 | 5 | 0 | - | S | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

## Operating principle

|             |                                                                          |
|-------------|--------------------------------------------------------------------------|
| <b>HRTR</b> | Miniature light scanners with background suppression, red light          |
| <b>PRK</b>  | Miniature retro-reflective photoelectric sensor with polarization filter |
| <b>LSSR</b> | Miniature throughbeam photoelectric sensor, red-light transmitter        |
| <b>LSER</b> | Miniature throughbeam photoelectric sensor, red-light receiver           |

## Series

|          |          |
|----------|----------|
| <b>2</b> | 2 Series |
|----------|----------|

## Switching output

|            |                                                                                  |
|------------|----------------------------------------------------------------------------------|
| <b>/42</b> | Bipolar transistor output open collector, OUT 1 (pin 4): PNP, OUT 2 (pin 2): NPN |
|------------|----------------------------------------------------------------------------------|

## Switching output function

|            |                                      |
|------------|--------------------------------------|
| <b>N/A</b> | OUT 1 and OUT 2 both light switching |
| <b>D</b>   | OUT 1 and OUT 2 both dark switching  |

## Scanning range (only with operating principle HRTR)

|             |                                  |
|-------------|----------------------------------|
| <b>-15F</b> | Scanning range limit set to 15mm |
| <b>-30F</b> | Scanning range limit set to 30mm |
| <b>-50F</b> | Scanning range limit set to 50mm |

## Electrical connection

|                  |                                                           |
|------------------|-----------------------------------------------------------|
| <b>N/A</b>       | Cable, PVC, standard length 2000mm, 4-wire                |
| <b>,150-S8</b>   | Cable, PVC, length 150mm with M8 connector, 4-pin, axial  |
| <b>,150-S12</b>  | Cable, PVC, length 150mm with M12 connector, 4-pin, axial |
| <b>,150-S8.3</b> | Cable, PVC, length 150mm with M8 connector, 3-pin, axial  |

## Order guide

The sensors listed here are preferred types; current information at [www.leuze.com](http://www.leuze.com)

## Order code

## Part no.

## Scanning range permanently set to 15mm

|                         |          |
|-------------------------|----------|
| HRTR 2/42-15F           | 50112109 |
| HRTR 2/42-15F, 150-S8   | 50112110 |
| HRTR 2/42-15F, 150-S12  | 50112111 |
| HRTR 2/42D-15F          | 50112112 |
| HRTR 2/42D-15F, 150-S8  | 50112113 |
| HRTR 2/42D-15F, 150-S12 | 50112114 |

## Scanning range permanently set to 30mm

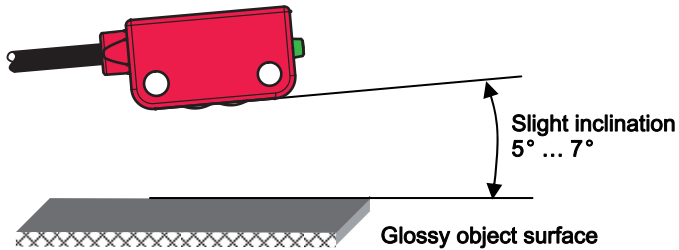
|                         |          |
|-------------------------|----------|
| HRTR 2/42-30F           | 50112115 |
| HRTR 2/42-30F, 150-S8   | 50112116 |
| HRTR 2/42-30F, 150-S12  | 50112117 |
| HRTR 2/42D-30F          | 50112118 |
| HRTR 2/42D-30F, 150-S8  | 50112119 |
| HRTR 2/42D-30F, 150-S12 | 50112120 |

## Scanning range permanently set to 50mm

|                         |          |
|-------------------------|----------|
| HRTR 2/42-50F           | 50112121 |
| HRTR 2/42-50F, 150-S8   | 50112122 |
| HRTR 2/2-50F, 150-S8.3  | 50120855 |
| HRTR 2/42-50F, 150-S12  | 50112123 |
| HRTR 2/42D-50F          | 50112124 |
| HRTR 2/42D-50F, 150-S8  | 50112125 |
| HRTR 2/42D-50F, 150-S12 | 50112126 |

### Application notes

- When detecting glossy surfaces (e.g. metals), the light beam should not be incident on the object surface at a right angle. A slight inclination is sufficient for preventing undesired direct reflections. The following rule of thumb applies: the smaller the scanning range, the larger the angle of inclination (approx.  $5^\circ \dots 7^\circ$ ).



- Objects should only be moved laterally from the right or left. Moving in objects from the cable side or LED side is to be avoided.
- The sensors are equipped with effective measures for the maximum avoidance of mutual interference should they be mounted opposite one another. Opposite mounting of multiple sensors of the same type should, however, absolutely be avoided.