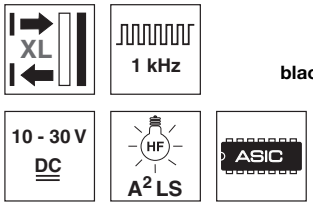
# HT3C XL

## Diffuse reflection sensor with background suppression

en 01-2016/06 50130056




**5 ... 100 mm**
**60mm with**
**black-white error < 10%**

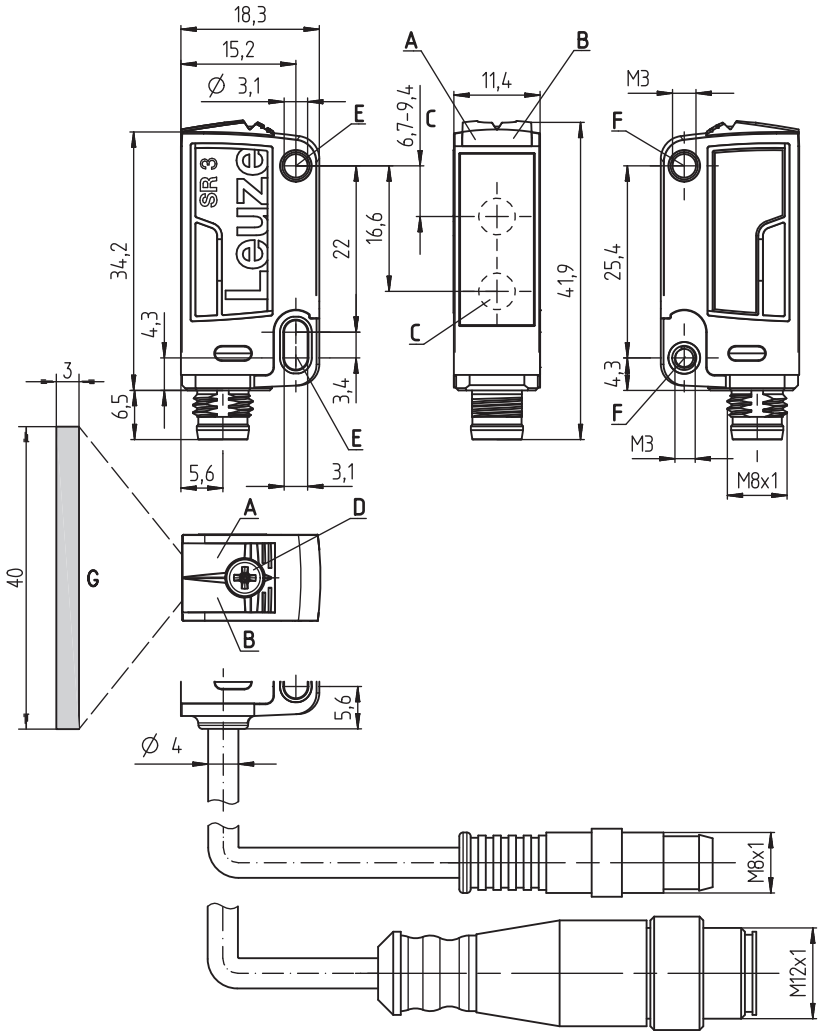
- Diffuse reflection sensor with visible red light and adjustable background suppression
- Wide, rectangular light spot guarantees the reliable detection of:
  - objects with openings, holes and grooves
  - transparent foils and bottles
  - objects with grid structures (e.g. blister packs)
  - objects with variable position
- Small and compact construction with robust plastic housing, degrees of protection IP 67 and IP 69K, tested in accordance with Ecolab for industrial application
- ***NEW***: Housing variant with two integrated M3 metal threaded sleeves
- ***NEW***: Housing variant with integrated slotted-hole mounting sleeve made of metal


## Accessories:

**(available separately)**

- Mounting systems (BT ...)
- Cable with M8 or M12 connector (K-D ...)

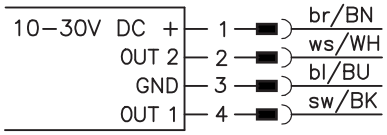
## Dimensioned drawing



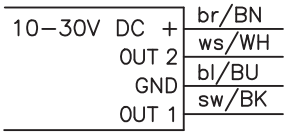

**A** Green indicator diode
**B** Yellow indicator diode
**C** Optical axis
**D** 8-turn potentiometer for scanning range adjustment
**E** Mounting sleeve (standard)
**F** Threaded sleeve (HT3C....**B**...)
**G** Light spot 3 mm x 40 mm at a scanning range of 50 mm

## Electrical connection

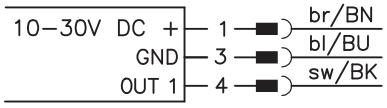
Connector, 4-pin




Cable, 4-wire




Connector, 3-pin



# Technical data

## Optical data

| | |
|---|---|
| Typ. scanning range limit [1] | 5 … 100mm |
| Scanning range [2] | See tables |
| Adjustment range | 20 … 100mm |
| Black/white error < 10% up to | 60mm |
| Light spot | approx. 3 x 40mm² at 50mm |
| Light source [3] | LED (modulated light) |
| Wavelength | 633nm (visible red light) |

## Timing

| | |
|---|---|
| Switching frequency | 1,000Hz |
| Response time | 0.5?ms [4] |
| Response jitter | 166µs |
| Readiness delay | ≤ 300ms (acc. to. IEC 60947-5-2) |

## Electrical data

| | |
|---|---|
| Operating voltage $U_B$ [5] | 10 … 30VDC (incl. residual ripple) |
| Residual ripple | ≤ 15% of $U_B$ |
| Open-circuit current | ≤ 15mA |
| Switching output | see part number code on page 3 |
| Function | light/dark switching, see part number code on page 3 |
| Signal voltage high/low | ≥ ($U_B$-2V)/≤ 2V |
| Output current | max. 100mA [6] |
| Scanning range | adjustable via 8-turn potentiometer |

## Indicators

| | |
|---|---|
| Green LED | ready |
| Yellow LED | object detected - reflection |

## Mechanical data

| | |
|---|---|
| Housing | plastic (high-strength PC-ABS);<br>2x diecast zinc mounting sleeves or<br>2x M3 brass threaded sleeves |
| Optics cover | plastic (PMMA) |
| Weight | with connector: 10g<br>with 200mm cable and connector: 20g<br>with 2m cable: 50g |
| Connection type | cable 2m (cross section 4x0.20mm²),<br>connector M8, metal,<br>cable 0.2m with connector M8 or M12 |

## Environmental data

| | |
|---|---|
| Ambient temp. (operation/storage) | -40°C … +60°C/-40°C … +70°C |
| Protective circuit [7] | 2, 3 |
| VDE safety class | III |
| Degree of protection | IP 67 IP 69K |
| Light source | exempt group (in acc. with EN 62471) |
| Standards applied | IEC 60947-5-2 |
| Certifications | UL 508, CSA C22.2 no.14-13 [5] [8] |

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 short decay times, an ohmic load of approx. 5kOhm is recommended
5) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
6) Sum of the output currents for both outputs, 50mA for ambient temperatures > 40°C
7) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
8) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

# Tables

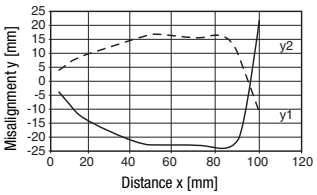
| | | | |
|---|---|---|---|
| 1 | 5 | 50 | 100 |
| 2 | 5 | 45 | 90 |
| 3 | 5 | 40 | 80 |

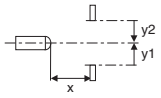
| | |
|---|---|
| 1 | white 90% |
| 2 | gray 18% |
| 3 | black 6% |

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

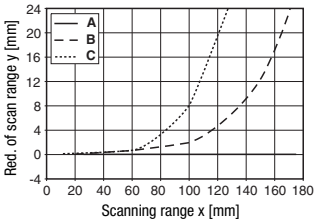
# Diagrams

Typ. response behavior (white 90%)

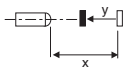



Typ. black/white behavior




**A** white 90%
**B** gray 18%
**C** black 6%




# Notes

**Observe intended use!**

- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.

## HT3C XL — Diffuse reflection sensor with background suppression

## Part number code

| H | T | 3 | C | | | | - | X | X | X | X | . | | | / | 4 | P | - | 2 | 0 | 0 | - | S | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Operating principle**

| | |
|---|---|
| **HT** | Diffuse reflection sensor with background suppression |

**Construction/version**

| | |
|---|---|
| **3C** | SR3C series |

**Light type**

| | |
|---|---|
| **N/A** | Red light |
| **I** | Infrared light |

**Radiation source**

| | |
|---|---|
| **N/A** | LED |

**Pre-set scanning range (optional)**

| | |
|---|---|
| **XXXX** | Pre-set scanning range [mm] |

**Equipment**

| | |
|---|---|
| **N/A** | Standard |
| **B** | Housing model with two M3 threaded sleeves (brass) |
| **S** | Small light spot |
| **L** | Long light spot |
| **XL** | Extra long light spot |
| **V** | V-optics |
| **F** | Permanently set scanning range |

**Scanning range adjustment**

| | |
|---|---|
| **N/A** | Scanning range adjustable via 8-turn potentiometer |
| **1** | 270° potentiometer |

**Switching output/function OUT 1/IN: Pin 4 or black conductor**

| | |
|---|---|
| **2** | NPN transistor output, light switching |
| **N** | NPN transistor output, dark switching |
| **4** | PNP transistor output, light switching |
| **P** | PNP transistor output, dark switching |
| **X** | Not connected (n. c.) |

**Switching output/function OUT 2/IN: Pin 2 or white conductor**

| | |
|---|---|
| **2** | NPN transistor output, light switching |
| **N** | NPN transistor output, dark switching |
| **4** | PNP transistor output, light switching |
| **P** | PNP transistor output, dark switching |
| **X** | Not connected (n. c.) |

**Electrical connection**

| | |
|---|---|
| **N/A** | Cable, PVC, standard length 2000 mm, 4-wire |
| **M8** | M8 connector, 4-pin (plug) |
| **M8.3** | M8 connector, 3-pin (plug) |
| **200-M8** | Cable, PVC, length 200 mm with M8 connector, 4-pin, axial (plug) |
| **200-M8.3** | Cable, PVC, length 200 mm with M8 connector, 3-pin, axial (plug) |
| **200-M12** | Cable, PVC, length 200 mm with M12 connector, 4-pin, axial (plug) |

## Order guide

The sensors listed here are preferred types; current information at *www.leuze.com*

**Sensors with through-holes**

| Order code | Part no. |
|---|---|
| HT3C.XL/4P-M8 | 50129383 |
| HT3C.XL/4P | 50129384 |
| HT3C.XL/4P-200-M12 | 50129385 |
| HT3C.XL/4P-200-M8 | 50129386 |

**Sensors with threaded sleeves**

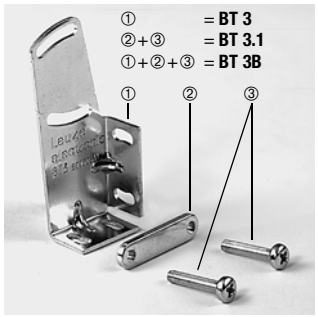
| Order code | Part no. |
|---|---|
| HT3C.BXL/4P-M8 | 50133606 |
| HT3C.BXL/4P | 50133607 |
| HT3C.BXL/4P-200-M12 | 50133608 |
| HT3C.BXL/4P-200-M8 | 50133609 |

**Accessories mounting systems**

| Order code | Part no. |
|---|---|
| **For sensors with through-holes:** | |
| BT 3 | 50060511 |
| BT 3.1 [1] | 50105585 |
| BT 3B | 50105546 |
| **For sensors with threaded sleeves:** | |
| BT 200M.5 | 50118542 |
| BT 205M [1] | 50124651 |
| BTU 200M-D10 | 50117256 |
| BTU 200M-D12 | 50117255 |
| BTU 200M.5-D12 | 50120426 |
| BTU 200M-D14 | 50117254 |

1) Packaging unit: PU = 10 pcs.

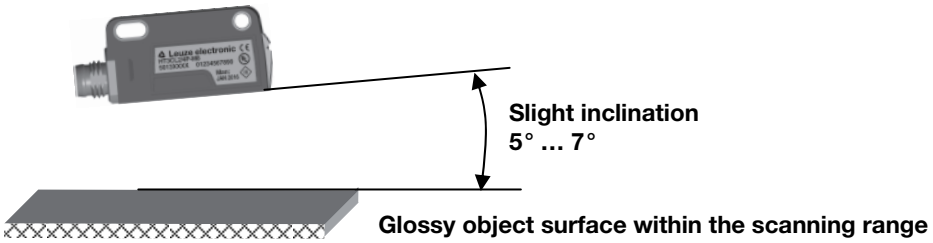
## Mounting systems





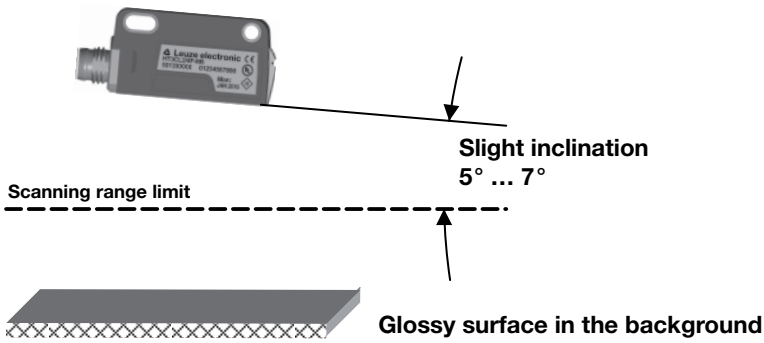

## Application notes

- **<u>Detection of glossy surfaces</u> within the scanning range**:
  When detecting glossy surfaces (e.g. metals), the light beam should not hit the object surface at a right angle. A slight inclination is enough to detect the object reliably. The following applies: the smaller the scanning range, the greater the angle of inclination (approx. 5° to 7°).




- **<u>Avoiding interference from glossy surfaces</u> in the background**:
  If a glossy surface is in the background (distance larger than scanning range limit), reflections may cause interfering signals. They may be avoided by mounting the device at a slight inclination (see figure below).

**Attention!**
It is imperative to note the task and the associated inclination of the sensor of approx. 5° … 7°.




- Outside of the scanning range, the sensor operates as an energetic diffuse reflection sensor. Light objects can still be reliably detected up to the scanning range limit.
- 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.