

**HT10**

**Laser diffuse sensors with background suppression**

en 03-2019/05/16 50130292-02



50 ... 8000mm



- Laser diffuse sensor with large detection range for universal application (visible red light)
- Light propagation time measurement makes use possible under extreme environmental conditions (brightness, light, interfering contours)
- Extremely simple operation, teachable switching points
- Minimum teach duration prevents unintentional changing of the switching points
- Preset hysteresis and reserve ensure reliable switching behavior
- Switching behavior independent of the entry direction
- Optimized for positioning applications and reliable object detection (e.g. compartment occupation check, shelf positioning)

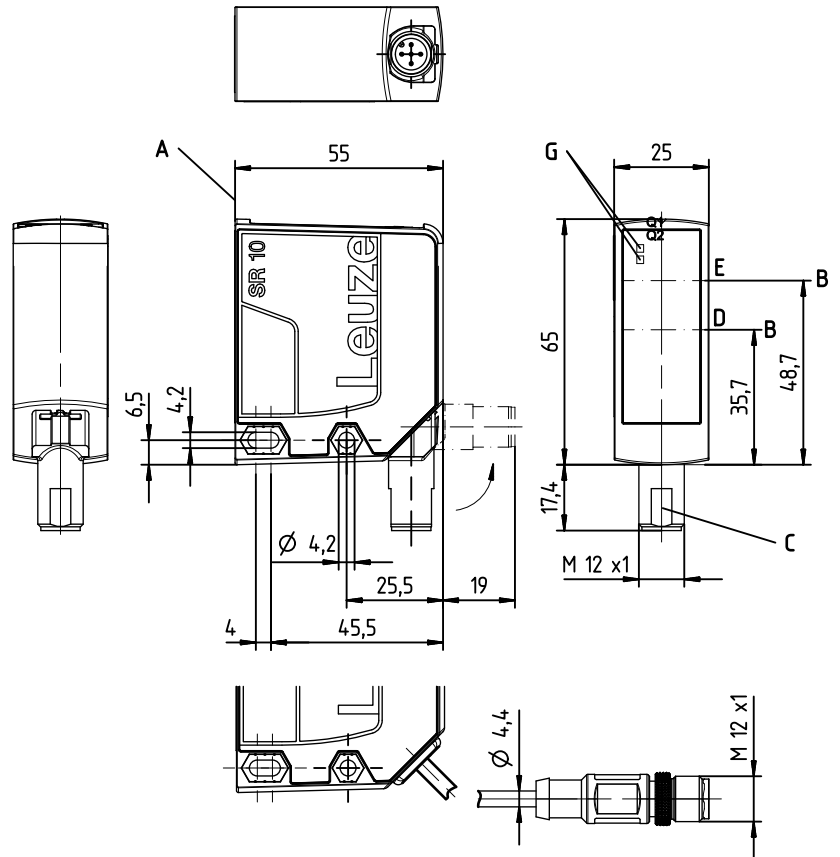


**Accessories:**

(available separately)

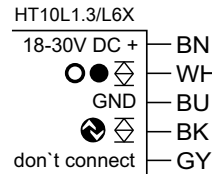
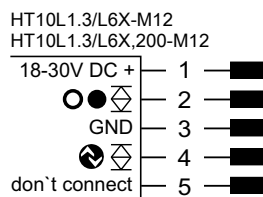
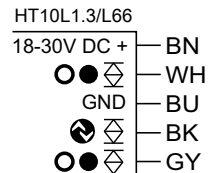
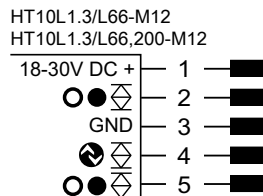
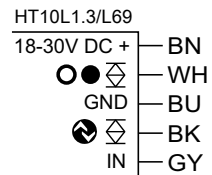
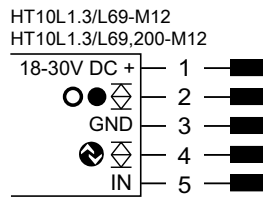
- Mounting systems
- Cable with M12 connector (K-D ...)
- IO-Link master set  
SET MD12-US2-IL1.1 + accessories - diagnostics set (part no. 50121098)

**Dimensioned drawing**



- A Reference edge for the measurement
- B Optical axis
- C Turning M12 connector, 90°
- D Receiver
- E Transmitter
- G Indicator diodes green/red (control panel)  
2 x yellow (control panel and lens cover)
- H Membrane keyboard

**Electrical connection**



We reserve the right to make changes • DS\_HT10\_en\_50130292\_02.fm

## Technical data

### Optical data

Typ. maximum range (white 90%) <sup>1)</sup>	50 ... 8000mm
Operating range <sup>2)</sup>	50 ... 3500mm
Adjustment range (teach-in range)	50 ... 8000/3500mm (90%/6% diffuse reflection)
Light source	Laser
Laser class	1 (acc. to IEC 60825-1:2007)
Wavelength	658nm (visible red light)
Impulse duration	6ns
Max. output power (peak)	391mW
Light spot	Approx. 7x7mm <sup>2</sup> at 7m

### Error limits

Accuracy <sup>3)</sup>	± 30mm
B/W detection thresh. (6 ... 90% rem.)	± 10mm
Temperature drift	± 2mm/K

### Time behavior

Switching frequency	40Hz
Response time	< 50ms
Readiness delay	≤ 300ms

### Electrical data

Operating voltage U <sub>B</sub> <sup>4)</sup>	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U <sub>B</sub>
Open-circuit current	≤ 150mA
Switching output	.../...6... Push-pull switching output <sup>5)</sup> , PNP light switching, NPN dark switching
Signal voltage high/low	≥ (U <sub>B</sub> -2 V)/≤ 2V
IO-Link	COM2 (38.4kBaud), vers. 1.1, min. cycle time 2.3ms, SIO is supported

### Indicators

Green/red LED	Green continuous light	Ready
	Red	No signal
	Orange	Warning, weak signal
	Off	No voltage
Yellow LEDs Q1/Q2	On	Object detected
	Off	Object not detected

### Mechanical data

Housing	Plastic
Optics cover	Glass
Weight	70g (M 12 connector) 133g (2m cable) 90g (cable with M 12 connector)
Connection type	Turning M12 connector, 90° 2m cable, wire cross section 5 x 0.14mm <sup>2</sup> (5 x 26 AWG) 0.2m cable with M12 connector

### Environmental data

Ambient temp. (operation/storage)	-40 °C ... +50 °C/-40 °C ... +70 °C
Protective circuit <sup>6)</sup>	1, 2, 3
VDE protection class	III
Degree of protection	IP 67
Standards applied	IEC 60947-5-2
Certifications	UL 508, CSA C22.2 No.14-13 <sup>4)</sup> 7)

### Additional functions

#### Deactivation input

Transmitter inactive/active	≥ 8V/≤ 2V <sup>8)</sup>
Activation/disable delay	≥ 20ms
Input resistance	Approx. 10kΩ

- 1) Typ. maximum range: guaranteed operating range against 90% at maximum setting
- 2) Operating range: recommended range with function reserve
- 3) for measurement range 50 ... 3500mm, diffuse reflection 6% ... 90%, "Speed" operating mode, at 20°C after 20min. warmup time, medium range of U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>
- 4) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
- 5) The push-pull switching outputs must not be connected in parallel
- 6) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs
- 7) 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)
- 8) Upon deactivation of the laser, the outputs become inactive

## Notes

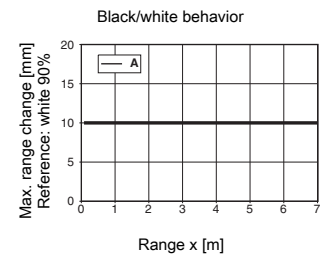
- You can download the IO Device Description (IODD file) and the *Sensor Studio* configuration software (requires IO-Link USB master) from the Internet at [www.leuze.com](http://www.leuze.com).

## Tables

Switching points <sup>1)</sup>	No reflection	Object detected
Yellow LED Q 1	Off	On
Yellow LED Q 2	Off	On

1) Applies for object teach

## Diagrams



A 6 ... 90% diffuse reflection

## Notes

### Adjusting the switching points

- **Object teach:**  
Align sensor with object.  
Q1: Press teach button 1 for approx. 2s,  
Q2: Press teach button 2 for approx. 2s,  
Q3: Press teach buttons 1+2 for approx. 2s.  
Switching point is taught.  
Object is detected if the respective Q1/Q2 indicator illuminates. No LED present for Q3.
- **Teach against background:**  
Point sensor at background.  
Q1: Press teach button 1 for approx. 7s,  
Q2: Press teach button 2 for approx. 7s,  
Q3: Press teach buttons 1+2 for approx. 7s.  
Switching point is taught.  
Objects between sensor and background are detected.
- **Hysteresis:**  
To ensure continuous object detection in the switching point, the sensor has a switch hysteresis.  
Object is no longer detected if: distance to sensor > teach point + hysteresis + reserve.
- **Factory setting:**  
Hysteresis: approx. 50mm,  
Reserve: approx. 50mm.
- With the set detection range, a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.
- Range/reflectivity:

Object/dif-fuse reflection	
6%	0.05 ... 3.5m
90%	0.05 ... 8m

### 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.

**Laser safety notices**

**ATTENTION, LASER RADIATION – LASER CLASS 1**

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product of **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24, 2007.

- ↳ Observe the applicable statutory and local laser protection regulations.
- ↳ The device must not be tampered with and must not be changed in any way.
  - There are no user-serviceable parts inside the device.
  - Repairs must only be performed by Leuze electronic GmbH + Co. KG.

**IO-Link process data format**

(IO-Link 1.1, M-sequence TYPE\_2\_1)

**Output data device (8 bit)**

Data bit								Assignment	Meaning
7	6	5	4	3	2	1	0	Switching output Q1	0 = inactive, 1 = active
								Switching output Q2	0 = inactive, 1 = active
								Switching output Q3	0 = inactive, 1 = active (if Q3 not present = 0)
								Measurement	0 = initialization/teach/deactivation, 1 = running measurement
								Signal	0 = no signal or signal too weak, 1 = signal ok
								Warning	0 = no warning, 1 = warning, e.g., weak signal
								0	Not assigned (initial state = 0)
								0	Not assigned (initial state = 0)

**Device input data**

None

## Part number code

**HT10L1.3 / L69,200-M12**

### Operating principle

**HT** Laser diffuse sensors with background suppression

### Series

**10** 10 series

### Laser class

**L1** Laser class 1 (acc. to IEC 60825-1:2007)

### Equipment

**3** Membrane keyboard for teach-in

### Assignment pin 4

**L** IO-Link (with dual channel, also push/pull switching output)

### Assignment pin 2

**6** Push/pull switching output

### Assignment pin 5

**9** Deactivation input (factory setting) or teach input (> 8VDC, configurable)

**6** Push/pull switching output

**X** Do not connect

### Electrical connection

**-M12** M12 connector, 5-pin

**,YYYY** Cable, length YYYY mm with wire-end sleeves, 5-wire (no information = standard length 2000 mm)

**,200-M12** Cable, length 200mm with M12 connector, 5-pin

## Order guide

### Connection: M12 connector, 5-pin

- IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input
- IO-Link 1.1/switching output, 2 push/pull switching outputs
- IO-Link 1.1/switching output, 1 push/pull switching output

### Designation

### Part no.

HT10L1.3/L69-M12	50129537
HT10L1.3/L66-M12	50129540
HT10L1.3/L6X-M12	50128388

### Connection: cable, length 2000 mm with wire-end sleeves, 5-wire

- IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input
- IO-Link 1.1/switching output, 2 push/pull switching outputs
- IO-Link 1.1/switching output, 1 push/pull switching output

HT10L1.3/L69	50129542
HT10L1.3/L66	50129546
HT10L1.3/L6X	50129543

### Connection: cable, length 200 mm with M12 connector, 5-pin

- IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input
- IO-Link 1.1/switching output, 2 push/pull switching outputs
- IO-Link 1.1/switching output, 1 push/pull switching output

HT10L1.3/L69,200-M12	50129549
HT10L1.3/L66,200-M12	50129551
HT10L1.3/L6X,200-M12	50129548

### Accessories

- Mounting system for mounting on rods Ø 10 mm
- Mounting system for mounting on rods Ø 12 mm
- Connection cable with M12 connector, angled, 5-pin, length 2m, PVC sheathing (many other connection cables are available)
- IO-Link master set


BTU 460M-D10	50128379
BTU 460M-D12	50128380
K-D M12W-5P-2m-PVC	50104556
SET MD12-US2-IL1.1 + accessories - diagnostics set	50121098

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**The following teach options are available:**

The Q1, Q2 (Q3) switching outputs can be individually set.

	Teach options	Part designations
	<b>Standard teach (object teach)</b>	.../L6X_6_T..
	Press 2 to 7 sec	
	<b>Teach against background</b>	.../L6X_6_T..
	Press 7 to 12 sec	
	<b>Light/dark switching</b>	.../L6X_6_T..
	Press 12 to 17 sec	
	<b>Window teach</b>	.../L6T.P1..
	<b>Upper limit</b>	
	Press 7 to 12 sec	
	<b>Lower limit</b>	
	Press 12 to 17 sec	
	<b>Teach against object</b>	
Press up to 2 sec		

**Teach process for light/dark switching**

The following processes are identical for Q1, Q2, (Q3).

Q1, Q2 (Q3) can be individually set.



Teach  $\xrightarrow{\hspace{10em}}$  > 12 sec Release

LED	Status LED	2 sec	7 sec	12 sec	Release	Status LED
<b>1 Object is detected (distance to object <math>\leq</math> set operating range)</b>						
<b>Light</b>	$\xrightarrow{\hspace{10em}}$					<b>Dark</b>
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	On			On	-->	Off
<b>Dark</b>	$\xrightarrow{\hspace{10em}}$					<b>Light</b>
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	Off			On	-->	On
<b>2 Object is not detected (distance to object <math>&gt;</math> set operating range + reserve + hysteresis)</b>						
<b>Light</b>	$\xrightarrow{\hspace{10em}}$					<b>Dark</b>
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	Off			On	-->	On
<b>Dark</b>	$\xrightarrow{\hspace{10em}}$					<b>Light</b>
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	On			On	-->	Off

