

## HT10

## Laser diffuse sensors with background suppression

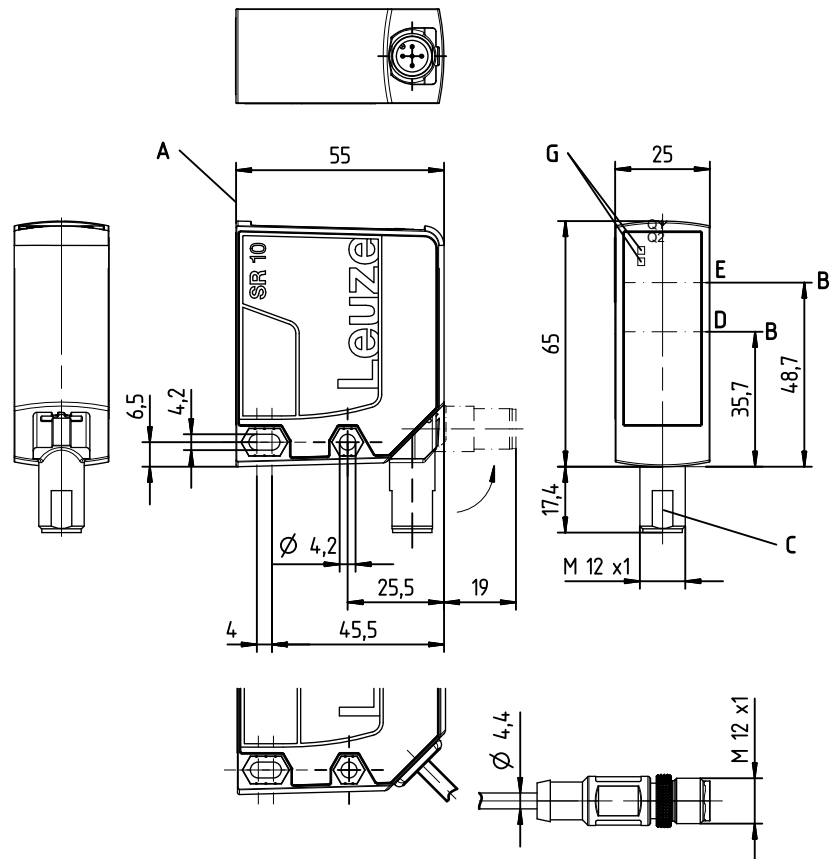
en 2021/03/12 50130294-02



50 ... 8000mm

- Laser diffuse sensor based on the principle of light propagation time measurement – simple operation using teachable switching points
- Sensor performance allows reliable detection of both glossy and less-reflective objects at extreme angles
- Preset hysteresis and reserve ensure reliable switching behavior
- Optimized for positioning applications and reliable object detection (e.g. compartment occupation check, shelf positioning, feed-through monitoring)
- External teach input for precise referencing (detection and storage of distance to the object)
- Window function

## 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

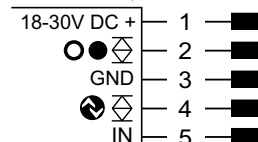
## Electrical connection

## Accessories:

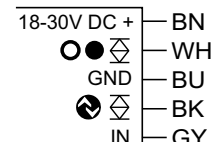
(available separately)

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

HT10L1.3/L6T-M12  
 HT10L1.3/L6T.P1-M12  
 HT10L1.3/L6T,200-M12



HT10L1.3/L6T



We reserve the right to make changes • DS\_HT10\_SON\_en\_50130294\_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 (in acc. with IEC 60825-1:2014)
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: max. attainable range without function reserve
- 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

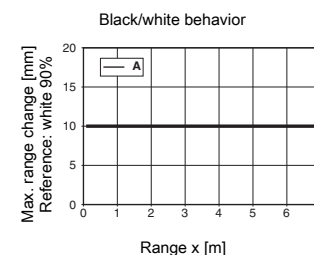
- You can download the IO Device Description (IODD file) and the *Sensor Studio* configuration software (requires IO-Link USB master) from the Internet at [www.leuze.com](http://www.leuze.com).

### 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.  
Switching point is taught.  
Object is detected if the respective Q1/Q2 indicator illuminates.
- Teach against background:**  
Point sensor at background.  
Q1: Press teach button 1 for approx. 7s.  
Q2: Press teach button 2 for approx. 7s.  
Switching point is taught.  
Objects between sensor and background are detected.
- Hysteresis:**  
three selectable hysteresis settings (switchable via IO-Link):  
Coarse: 50mm (default)  
Medium: 25mm  
Fine: 12mm
- Factory setting:**  
hysteresis: 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/diffuse 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.

## HT10

## Laser diffuse sensors with background suppression

## Laser safety notices

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

The device satisfies the requirements of IEC/EN 60825-1:2014 safety regulations for a product of **laser class 1** and complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

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

## Device input data

None

## Teach-in via teach input (pin 5)

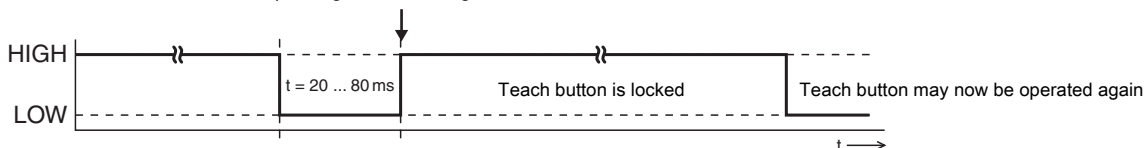


Signal level LOW  $\leq 2V$

Signal level HIGH  $\geq (U_B - 2V)$

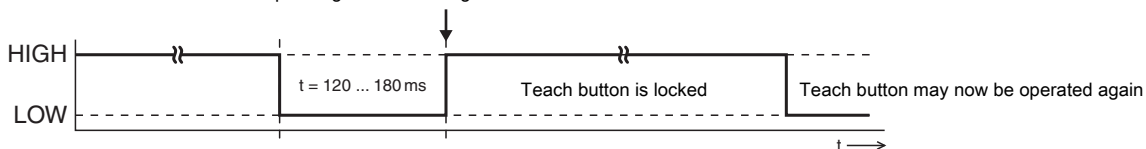
## Line teach Q1/pin 4 (operating level 1)

Teach in operating level 1 is being carried out



## Line teach Q2/pin 2 (operating level 2)

Teach in operating level 2 is being carried out



## Window function

Located symmetrically around the teach point is a **switching window**. In principle, the window width must be set by teaching the upper and lower limit: **Window width = (upper limit - lower limit) + 2 x hysteresis** (2 x 50mm).

Teach duration	Function
2s	Window teach (teach against object)
7s	Upper limit of switching window
12s	Lower limit of switching window

### Part number code

HT10L1.3/L6T.P1,200-M12

#### Operating principle

HT Laser diffuse sensors with background suppression

#### Series

10 10 series

#### Laser class

L1 Laser class 1 (in acc. with IEC 60825-1:2014)

#### 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

T Teach input for external teach-in (> 8VDC, configurable)

#### Additional function

P1 Window function

#### 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

	Designation	Part no.
<b>Connection: M12 connector, 5-pin</b>		
IO-Link 1.1/switching output, 1 push/pull switching output, teach input	HT10L1.3/L6T-M12	50129538
IO-Link 1.1/switching output, 1 push/pull switching output, teach input, window function	HT10L1.3/L6T.P1-M12	50129539
<b>Connection: cable, length 2000mm with wire-end sleeves, 5-wire</b>		
IO-Link 1.1/switching output, 1 push/pull switching output, teach input	HT10L1.3/L6T	50129545
<b>Connection: cable, length 200mm with M12 connector, 5-pin</b>		
IO-Link 1.1/switching output, 1 push/pull switching output, teach input	HT10L1.3/L6T,200-M12	50129550
<b>Accessories</b>		
HighGain reflective tape, 100mm x 100mm, self-adhesive	REF 7-A-100x100	50111527
Mounting system for mounting on rods Ø 10mm	BTU 460M-D10	50128379
Mounting system for mounting on rods Ø 12mm	BTU 460M-D12	50128380
Connection cable with M12 connector, angled, 5-pin, length 2m, PVC sheathing (many other connection cables are available)	K-D M12W-5P-2m-PVC	50104556
IO-Link master set	SET MD12-US2-IL1.1 + accessories - diagnostics set	50121098