

HT10

Laser light scanner with background suppression

en 02-2016/08 50130294-01



50 ... 8000mm



- Laser light scanner 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

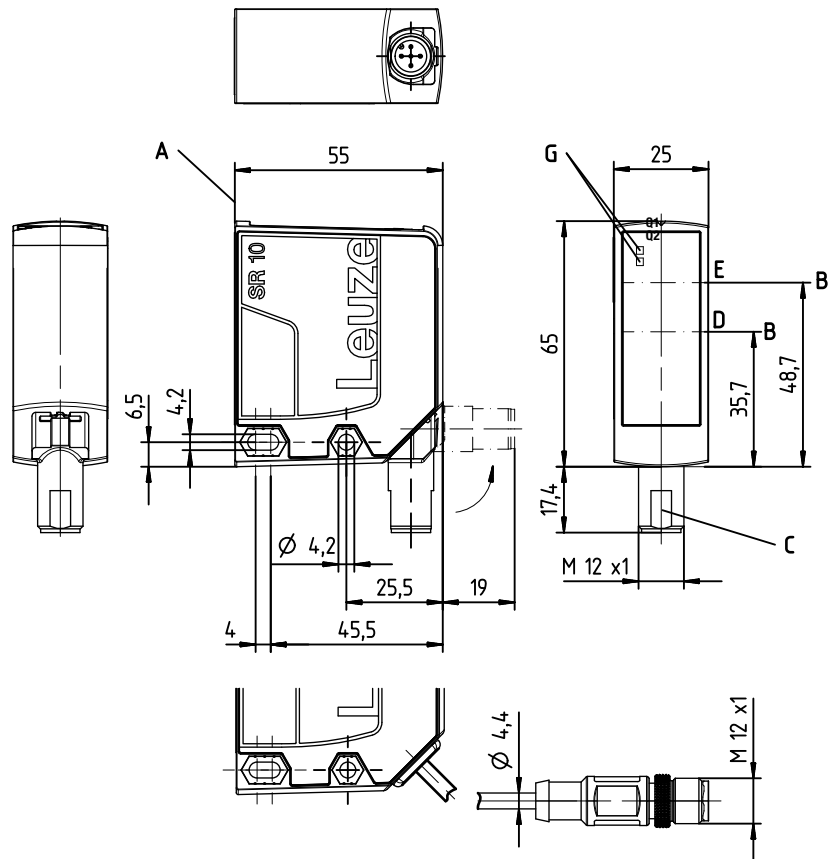


Accessories:

(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)

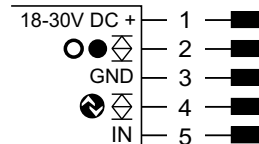
Dimensioned drawing



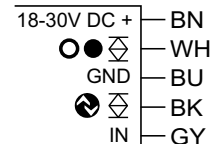
- A Reference edge for the measurement
- B Optical axis
- C Turning M12 connector, 90°
- D Receiver
- E Transmitter
- G Indicator diodes green/red (control panel)  
2 x yellow (control panel and lens cover)
- H Key pad

Electrical connection

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\_01.fm

## Specifications

### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	50 ... 8000mm
Scanning 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

### Timing

Switching frequency	40Hz
Response time	< 50ms
Delay before start-up	≤ 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 M 12 connector, 90° 2m cable, core 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 safety class	III
Degree of protection	IP 67
Standards applied	IEC 60947-5-2
Certifications	UL 508, CSA C22.2 No.14-13 <sup>4) 7)</sup>

### Options

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

- 1) Typ. scanning range limit: max. attainable range without function reserve
- 2) Scanning range: recommended range with function reserve
- 3) For 50 ... 3500mm measurement range, luminosity coefficient 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

## Remarks

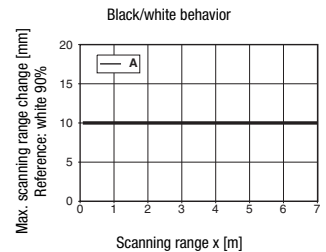
- You can download the IO Device Description (IODD file) and the *Sensor Studio* configuration software (requires IO-Link USB master) from the Internet at [www.leuze.com](http://www.leuze.com).

## 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

## Remarks

### 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:**  
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 scanning range, a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.
- Scanning range/reflectivity:

Object/diffuse reflection	
6%	0.05 ... 3.5m
90%	0.05 ... 8m

### Operate in accordance with 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 the intended use.

**HT10**

**Laser light scanner with background suppression**

**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 in **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24th, 2007.

- ⚡ Adhere to the applicable legal and local regulations regarding protection from laser beams.
- ⚡ 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)

**Input data device**

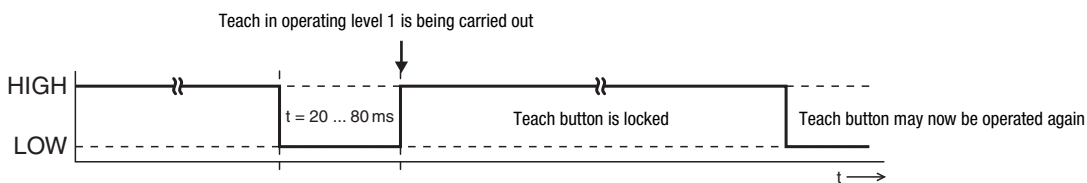
None

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

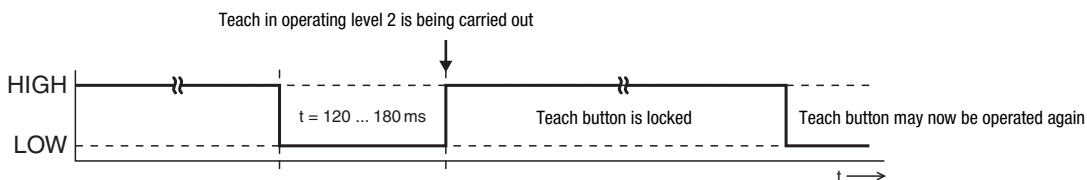


- Signal level **LOW** ≤ 2V
- Signal level **HIGH** ≥ (U<sub>B</sub>-2V)

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



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



**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**

<b>Operating principle</b>	
<b>HT</b>	Laser light scanner with background suppression
<b>Series</b>	
<b>10</b>	Series 10
<b>Laser class</b>	
<b>L1</b>	Laser class 1 (acc. to IEC 60825-1:2007)
<b>Equipment</b>	
<b>3</b>	Membrane keyboard for teach-in
<b>Assignment pin 4</b>	
<b>L</b>	IO-Link (with dual channel, also push/pull switching output)
<b>Assignment pin 2</b>	
<b>6</b>	Push/pull switching output
<b>Assignment pin 5</b>	
<b>T</b>	Teach input for external teach-in (> 8VDC, configurable)
<b>Additional function</b>	
<b>P1</b>	Window function
<b>Electrical connection</b>	
<b>-M12</b>	M12 connector, 5-pin
<b>,YYYY</b>	Cable, length YYYYmm with wire-end sleeves, 5-wire (not specified = standard length 2000mm)
<b>,200-M12</b>	Cable, length 200mm with M12 connector, 5-pin

**Order guide**

	<b>Designation</b>	<b>Part no.</b>
<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