HT10

Laser diffuse sensors with background suppression

en 2021/03/12 50130292-03

50 … 8000 mm

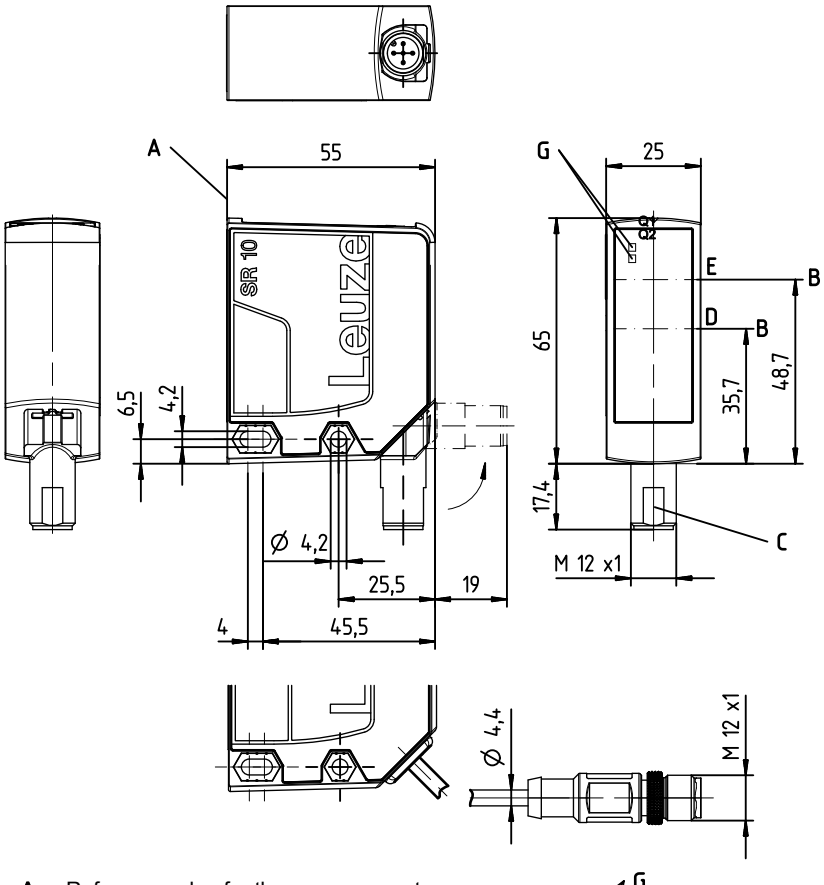
- Laser diffuse sensor with large detection range for universal application (visible red light)
- Light propagation time measurement makes use possible under extreme environmental conditions (brightness, light, interfering contours)
- Extremely simple operation, teachable switching points
- Minimum teach 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)

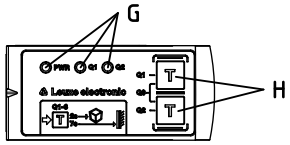
Accessories:

(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

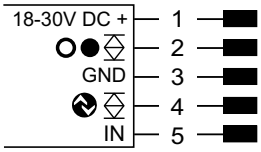




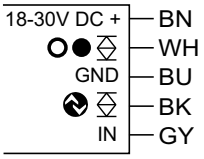
A Reference edge for the measurement
B Optical axis
C Turning M12 connector, 90°
D Receiver
E Transmitter
G Indicator diodes green/red (control panel)
2 x yellow (control panel and lens cover)
H Membrane keyboard

Electrical connection

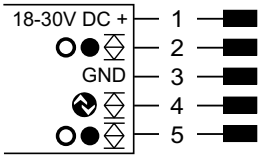
HT10L1.3/L69-M12
HT10L1.3/L69,200-M12



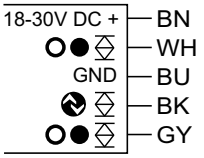
HT10L1.3/L69



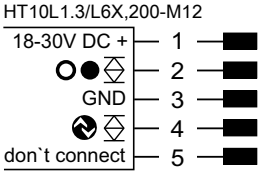
HT10L1.3/L66-M12
HT10L1.3/L66,200-M12



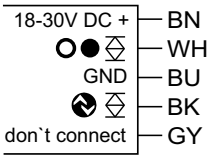
HT10L1.3/L66



HT10L1.3/L6X-M12
HT10L1.3/L6X,200-M12



HT10L1.3/L6X



We reserve the right to make changes • DS_HT10_en_50130292_03.fm

Technical data

Optical data

Typ. maximum range (white 90 %) [1]		50 … 8000 mm
Operating range [2]		50 … 3500 mm
Adjustment range (teach-in range)		50 … 8000/3500 mm (90 %/6 % diffuse reflection)
Light source		Laser
Laser class		1 (in acc. with IEC 60825-1:2014)
Wavelength		658 nm (visible red light)
Impulse duration		6 ns
Max. output power (peak)		391 mW
Light spot		Approx. 7 x 7 mm² at 7 m

Error limits

Accuracy [3]		± 30 mm
B/W detection thresh. (6 … 90% rem.)		± 10 mm
Temperature drift		± 2 mm/K

Time behavior

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

Electrical data

Operating voltage U_B [4]		18 … 30 V DC (incl. residual ripple)
Residual ripple		≤ 15 % of U_B
Open-circuit current		≤ 150 mA
Switching output	…/…6…	Push-pull switching output [5] , PNP light switching, NPN dark switching
Signal voltage high/low		≥ (U_B-2 V)/≤ 2 V
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	70 g (M 12 connector) 133 g (2 m cable) 90 g (cable with M 12 connector)
Connection type	Turning M12 connector, 90° 2 m cable, wire cross section 5 x 0.14 mm² (5 x 26 AWG) 0.2 m cable with M12 connector

Environmental data

Ambient temp. (operation/storage)	-40 °C … +50 °C/-40 °C … +70 °C
Protective circuit [6]	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 [4] [7]

Additional functions

Deactivation input

Transmitter inactive/active	≥ 8 V/≤ 2 V [8]
Activation/disable delay	≥ 20 ms
Input resistance	Approx. 10 kΩ

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 … 3500 mm, diffuse reflection 6% … 90%, "Speed" operating mode, at 20 °C after 20 min. warmup time, medium range of U_B, measurement object ≥ 50 x 50 mm²
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*.

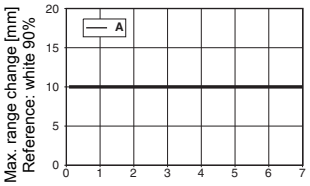
Tables

Switching points[1)]	No reflection	Object detected
Yellow LED Q 1	Off	On
Yellow LED Q 2	Off	On

1) Applies for object teach

Diagrams

Black/white behavior



A 6 … 90% diffuse reflection

Notes

Adjusting the switching points

- **Object teach:**
  Align sensor with object.
  Q1: Press teach button 1 for approx. 2 s,
  Q2: Press teach button 2 for approx. 2 s,
  Q3: Press teach buttons 1+2 for approx. 2 s.
  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. 7 s,
  Q2: Press teach button 2 for approx.7 s,
  Q3: Press teach buttons 1+2 for approx.7 s,
  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. 50 mm
- 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 … 3.5 m
90%	0.05 … 8 m

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 – 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	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 (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

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

	Designation	Part no.
Connection: M12 connector, 5-pin		
IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input	HT10L1.3/L69-M12	50129537
IO-Link 1.1/switching output, 2 push/pull switching outputs	HT10L1.3/L66-M12	50129540
IO-Link 1.1/switching output, 1 push/pull switching output	HT10L1.3/L6X-M12	50128388
Connection: cable, length 2000mm with wire-end sleeves, 5-wire		
IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input	HT10L1.3/L69	50129542
IO-Link 1.1/switching output, 2 push/pull switching outputs	HT10L1.3/L66	50129546
IO-Link 1.1/switching output, 1 push/pull switching output	HT10L1.3/L6X	50129543
Connection: cable, length 200mm with M12 connector, 5-pin		
IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input	HT10L1.3/L69,200-M12	50129549
IO-Link 1.1/switching output, 2 push/pull switching outputs	HT10L1.3/L66,200-M12	50129551
IO-Link 1.1/switching output, 1 push/pull switching output	HT10L1.3/L6X,200-M12	50129548
Accessories		
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

The following teach options are available:

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

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

LED	Status LED	2 sec	7 sec	12 sec	Release	Status LED
1	**Object is detected (distance to object ≤ set operating range)**					
Light	→					**Dark**
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	On			On	-->	Off
Dark	→					**Light**
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	Off			On	-->	On
2	**Object is not detected (distance to object > set operating range + reserve + hysteresis)**					
Light	→					**Dark**
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	Off			On	-->	On
Dark	→					**Light**
Green LED	On	Flash simultaneously	Flash alternately	Flashing	-->	On
Yellow LED	On			On	-->	Off