

HT10

Laser diffuse sensors with background suppression

2023/03/15 50130293-04



100 ... 25000mm

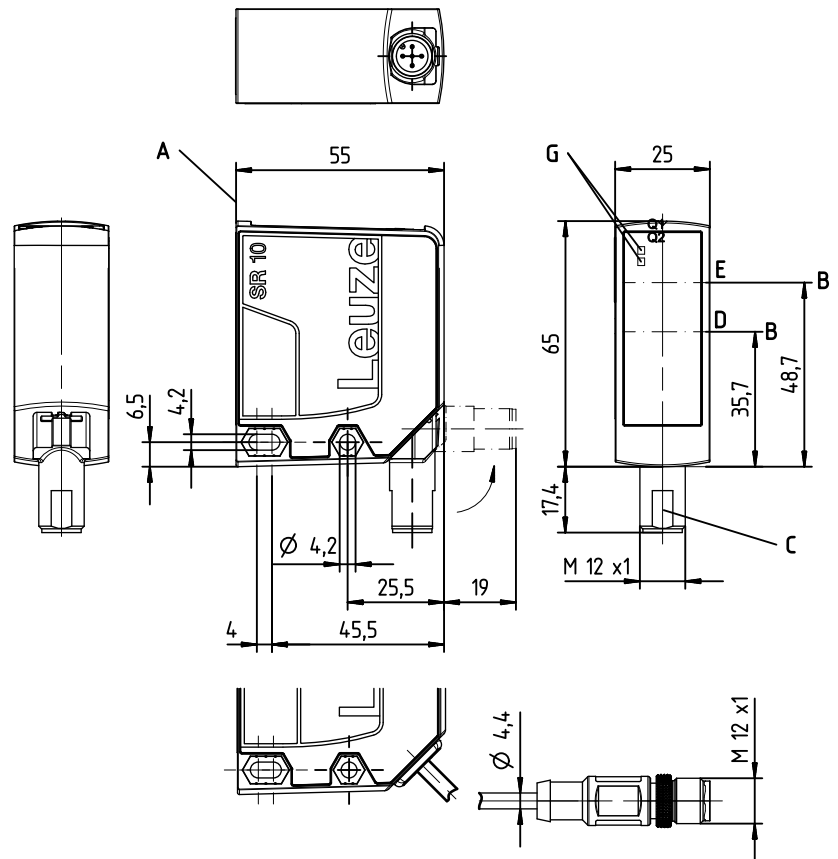
- The laser diffuse sensor, based on the principle of light propagation time measurement, makes a large detection range and universal application possible
- Optimized for use with reflective tape
- Preset hysteresis and reserve ensure reliable switching behavior
- Extremely simple operation, teachable switching points
- Input for deactivating the laser
- Minimum teach duration prevents unintentional changing of the switching points

Accessories:

(available separately)

- HighGain reflective tape REF 7-A-100x100 (Part no. 50111527)
- 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)

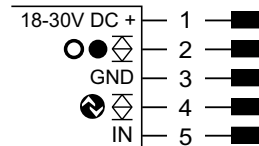
2 x yellow (control panel and lens cover)

H Membrane keyboard

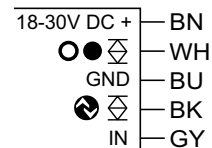
Electrical connection

HT10L1-25M.3/L69-M12

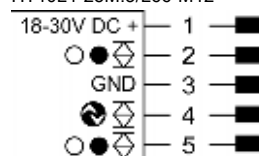
HT10L1-25M.3/L69,200-M12



HT10L1-25M.3/L69



HT10L1-25M.3/L66-M12



Technical data

Optical data

Typ. maximum range ^{1) 2)}	100 ... 25000mm (HighGain reflective tape)
Operating range ³⁾	100 ... 25000mm (HighGain reflective tape)
Adjustment range (teach-in range)	100 ... 25000mm (HighGain reflective tape)
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. 25x25mm ² at 25m

Error limits

Accuracy ⁴⁾	± 50mm
Reproducibility ⁵⁾	16mm
Temperature drift	± 2mm/K

Time behavior

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

Electrical data

Operating voltage U_B ⁶⁾	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 150mA
Switching output	Push-pull switching output ⁷⁾ , PNP light switching, NPN dark switching
Signal voltage high/low	≥ ($U_B - 2V$) / ≤ 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 ² (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 ⁸⁾	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 ^{6) 9)}

Additional functions

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

- 1) Typ. maximum range: guaranteed operating range against 90% at maximum setting
- 2) Sensor is optimized for reflective tape
- 3) Operating range: recommended range with function reserve
- 4) Measurement on HighGain tape REF 7-A-100x100 (part no. 50111527), identical environmental conditions, "Speed" operating mode, after 20min warmup time.
- 5) Same object, identical environmental conditions, "Speed" operating mode, measuring value noise 1 sigma, after 20 min. warmup time, measurement object ≥ 50x50mm²
- 6) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
- 7) The push-pull switching outputs must not be connected in parallel
- 8) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs
- 9) 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)
- 10) 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

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.
Reflective tape between sensor and background is detected.
After teaching, indicators Q1/Q2 are off. If object/reflective tape is detected, the corresponding indicator illuminates.
- 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. 150mm,
reserve: approx. 150mm.
Both values can be changed on request.

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.

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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

H	T	1	0	L	1	-	2	5	M	.	3	/	L	6	9	,	2	0	0	-	M	1	2
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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)

Measurement range

25M Extended detection range 100 ... 25000mm, measurement on HighGain tape REF 7-A-100x100

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	HT10L1-25M.3/L69-M12	50129541
Connection: cable, length 2000mm with wire-end sleeves, 5-wire IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input	HT10L1-25M.3/L69	50129547
Connection: cable, length 200mm with M12 connector, 5-pin IO-Link 1.1/switching output, 1 push/pull switching output, deactivation input	HT10L1-25M.3/L69,200-M12	50129552
Connection: M12 connector, 5-pin IO-Link 1.1/switching output, 2 push/pull switching outputs	HT10L1-25M.3/L66-M12	50144701
Accessories		
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

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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	Flash	Flashing	-->	On
Yellow LED	On	simultaneously	alternately	On	-->	Off
Dark						Light
Green LED	On	Flash	Flash	Flashing	-->	On
Yellow LED	Off	simultaneously	alternately	On	-->	On
2 Object is not detected (distance to object > set operating range + reserve + hysteresis)						
Light						Dark
Green LED	On	Flash	Flash	Flashing	-->	On
Yellow LED	Off	simultaneously	alternately	On	-->	On
Dark						Light
Green LED	On	Flash	Flash	Flashing	-->	On
Yellow LED	On	simultaneously	alternately	On	-->	Off