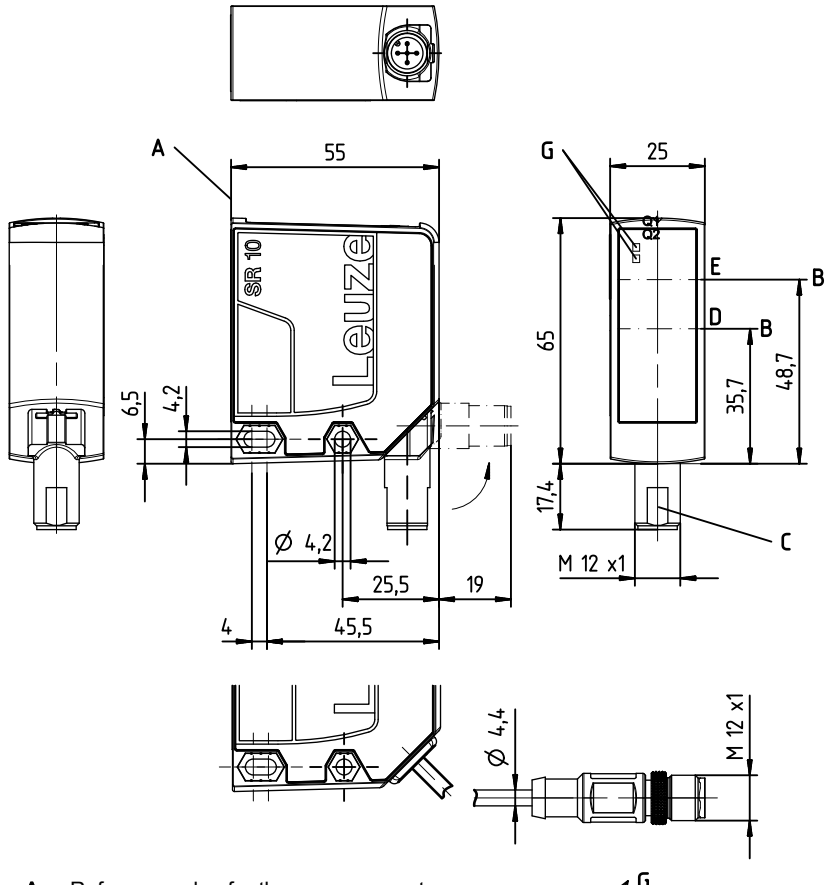
HT10 Laser diffuse sensors with background suppression

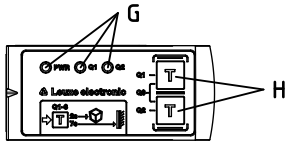
en 2021/03/16 50130293-03

100 … 25000 mm

- 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

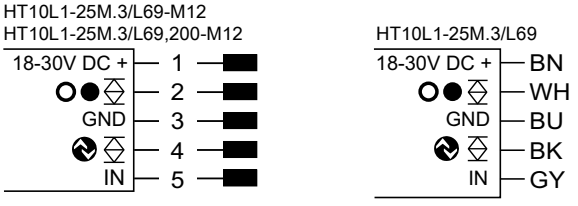
Dimensioned drawing





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)

- 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)

Technical data

Optical data

Typ. maximum range [1] [2]		100 … 25000 mm (HighGain reflective tape)
Operating range [3]		100 … 25000 mm (HighGain reflective tape)
Adjustment range (teach-in range)		100 … 25000 mm (HighGain reflective tape)
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. 25 x 25 mm² at 25 m

Error limits

Accuracy [4]		± 50 mm
Reproducibility [5]		16 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 [6]		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 [7] , 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 [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	≥ 8 V/≤ 2 V [10]
Activation/disable delay	≥ 20 ms
Input resistance	Approx. 10 kΩ

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 20 min warmup time.
5) Same object, identical environmental conditions, "Speed" operating mode, measuring value noise 1 sigma, after 20 min. warmup time, measurement object ≥ 50 x 50 mm²
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 30 V, 0.5 A 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. 2 s,
  Q2: Press teach button 2 for approx. 2 s.
  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. 7 s,
  Q2: Press teach button 2 for approx. 7 s,
  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. 150 mm, reserve: aprox. 150 mm.
  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.

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

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 … 25000 mm, 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 (> 8 VDC, configurable)
6	push/pull switching output
X	do not connect

Electrical connection

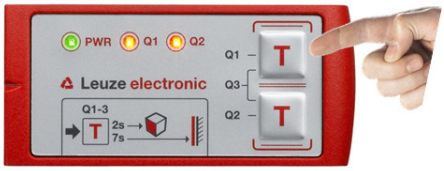
-M12	M12 connector, 5-pin
,YYYY	Cable, length YYYY mm with wire-end sleeves, 5-wire (no information = standard length 2000 mm)
,200-M12	Cable, length 200 mm with M12 connector, 5-pin

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 2000 mm 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 200 mm 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
Accessories		
HighGain reflective tape, 100 mm x 100 mm, self-adhesive	REF 7-A-100x100	50111527
Mounting system for mounting on rods Ø 10 mm	BTU 460M-D10	50128379
Mounting system for mounting on rods Ø 12 mm	BTU 460M-D12	50128380
Connection cable with M12 connector, angled, 5-pin, length 2 m, 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.

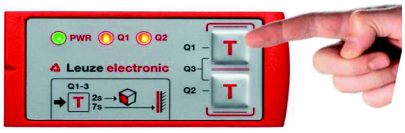


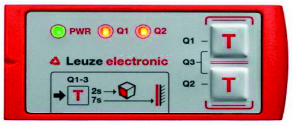
Teach options		Part designations
Standard teach (object teach)		…/L6X_6_T..
Press	2 to 7 sec	
Teach against background		…/L6X_6_T..
Press	7 to 12 sec	
Light/dark switching		…/L6X_6_T..
Press	12 to 17 sec	
Window teach		.../L6T.P1..
Upper limit		
Press	7 to 12 sec	
Lower limit		
Press	12 to 17 sec	
Teach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