



DATA SHEET

# WTF12L-1H162120A00

W12  
Photoelectric sensors

# SICK

Sensor Intelligence

PHOTOELECTRIC SENSORS

WT-  
F12L-1H162120A00

ORDERING INFORMATION

Type	part no.
WTF12L-1H162120A00	1125925

Further device versions and accessories at [www.sick.com/W12](http://www.sick.com/W12)



Illustration may differ

DETAILED TECHNICAL DATA

FEATURES

Functional principle	Photoelectric proximity sensor	
Functional principle detail	Foreground suppression	
Sensing range	Sensing range min.	80 mm
	Sensing range max.	350 mm
Adjustable switching threshold for background suppression	100 mm ... 350 mm	
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)	
Minimum object height at set sensing range in front of black background (6% remission factor)	2.2 mm, at a distance of 150 mm	
Recommended sensing range for the best performance	100 mm ... 200 mm	
Emitted beam	Light source	Laser
	Type of light	Visible red light
	Shape of light spot	Ellipse shape
	Light spot size (distance)	2.6 mm x 1.2 mm (150 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at T <sub>0</sub> = +23 °C)	
Key laser figures	Normative reference	EN 60825-1:2014, IEC 60825-1:2014
	Laser class	1 <sup>1)</sup>
	Wave length	655 nm
	Pulse duration	4 µs
	Maximum pulse power	< 6.74 mW

<sup>1)</sup> Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

Average service life	50,000 h at $T_U = +25\text{ °C}$	
Smallest detectable object (MDO) typ.	2.5 mm, at a distance of 200 mm Object with 90% remission factor (complies with standard white according to DIN 5033)	
Adjustment	Teach-Turn adjustment	BluePilot For setting the sensing range
	IO-Link	For configuring the sensor parameters and Smart Task functions
Display	LED blue	BluePilot: sensing range indicator
	LED green	Operating indicator Static on: power on Flashing: IO-Link mode
	LED yellow	Status of received light beam Static on: object present Static off: object not present
Special applications	Detecting small objects, Detection of objects moving at high speeds, Detecting flat objects, Detecting perforated objects	

<sup>1)</sup> Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

### SAFETY-RELATED PARAMETERS

MTTF <sub>D</sub>	280 years
DC <sub>avg</sub>	0 %
T <sub>M</sub> (mission time)	10 years

### COMMUNICATION INTERFACE

IO-Link	✓, IO-Link V1.1
Data transmission rate	COM2 (38,4 kBaud)
Cycle time	2.3 ms
Process data length	16 Bit
Process data structure	Bit 0 = switching signal Q <sub>L1</sub>
	Bit 1 = switching signal Q <sub>L2</sub>
	Bit 2 ... 15 = Current receiver level (live)
VendorID	26
DeviceID HEX	0x8002CE
DeviceID DEC	8389326
Compatible master port type	A
SIO mode support	Yes

### ELECTRONICS

Supply voltage U <sub>b</sub>	10 V DC ... 30 V DC <sup>1)</sup>
Ripple	≤ 5 V
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 14 mA, without load. At U <sub>b</sub> = 24 V

<sup>1)</sup> Limit values.

<sup>2)</sup> Signal transit time with resistive load in switching mode.

<sup>3)</sup> With light/dark ratio 1:1.

<sup>4)</sup> This switching output must not be connected to another output.

Protection class	III	
Digital output	Number	2 (Complementary)
	Type	Push-pull: PNP/NPN
	Switching mode	Light/dark switching
	Signal voltage PNP HIGH/LOW	Approx. $U_B$ -2.5 V / 0 V
	Signal voltage NPN HIGH/LOW	Approx. $U_B$ / < 2.5 V
	Output current $I_{max}$	≤ 100 mA
	Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
	Response time	≤ 500 μs <sup>2)</sup>
	Repeatability (response time)	150 μs <sup>2)</sup>
	Switching frequency	1,000 Hz <sup>3)</sup>
Pin/Wire assignment	BN	+ (L+)
	WH	$\bar{Q}_L$ /MF Digital output, dark switching, object present → output $\bar{Q}_L$ HIGH <sup>4)</sup> The pin 2 function of the sensor can be configured Additional possible settings via IO-Link
	BU	- (M)
	BK	QL1/C Digital output, light switching, object present → output $Q_L$ LOW <sup>4)</sup> The pin 4 function of the sensor can be configured Additional possible settings via IO-Link

<sup>1)</sup> Limit values.

<sup>2)</sup> Signal transit time with resistive load in switching mode.

<sup>3)</sup> With light/dark ratio 1:1.

<sup>4)</sup> This switching output must not be connected to another output.

## MECHANICS

Housing	Rectangular	
Dimensions (W x H x D)	15.6 mm x 49.5 mm x 43.1 mm	
Connection	Cable, 4-wire, 2 m	
Connection detail	Deep-freeze property	Do not bend below 0 °C
	Conductor size	0.14 mm <sup>2</sup>
	Cable diameter	Ø 3.4 mm
	Length of cable (L)	2 m
	Bending radius	For flexible use > 12 x cable diameter
	Bending cycles	1,000,000
Material	Housing	Metal, zinc diecast
	Front screen	Plastic, PMMA
	Cable	Plastic, PVC
Weight	Approx. 132 g	
Maximum tightening torque of the fixing screws	1.4 Nm	

## AMBIENT DATA

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529)
Ambient operating temperature	-20 °C ... +55 °C
Ambient temperature, storage	-40 °C ... +70 °C
Warm-up time	< 15 min, Where $T_a$ is under -10 °C

Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
Shock resistance	50 g, 11 ms (25 positive and 25 negative shocks along X, Y, Z axes, 150 total shocks (EN60068-2-27))
Vibration resistance	10 Hz ... 2,000 Hz (Amplitude 0.5 mm / 10 g, 20 sweeps per axis, for X, Y, Z axes, 1 octave/min, (EN60068-2-6))
Air humidity	35 % ... 95 %, relative humidity (no condensation)
Electromagnetic compatibility (EMC)	EN 60947-5-2
Resistance to cleaning agent	ECOLAB
UL File No.	NRKH.E181493 & NRKH7.E181493

### SMART TASK

Smart Task name	Base logics
Logic function	Direct AND OR
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Logic: 900 Hz <sup>1)</sup> IOL: 800 Hz <sup>2)</sup>
Response time	SIO logic: 550 μs <sup>1)</sup> IOL: 600 μs <sup>2)</sup>
Repeatability	SIO Logic: 200 μs <sup>1)</sup> IOL: 250 μs <sup>2)</sup>
Switching signal	Switching signal $Q_{Li}$ Switching output Switching signal $\bar{Q}_{Li}$ Switching output

<sup>1)</sup> Use of Smart Task functions without IO-Link communication (SIO mode).

<sup>2)</sup> Use of Smart Task functions with IO-Link communication function.

### DIAGNOSIS

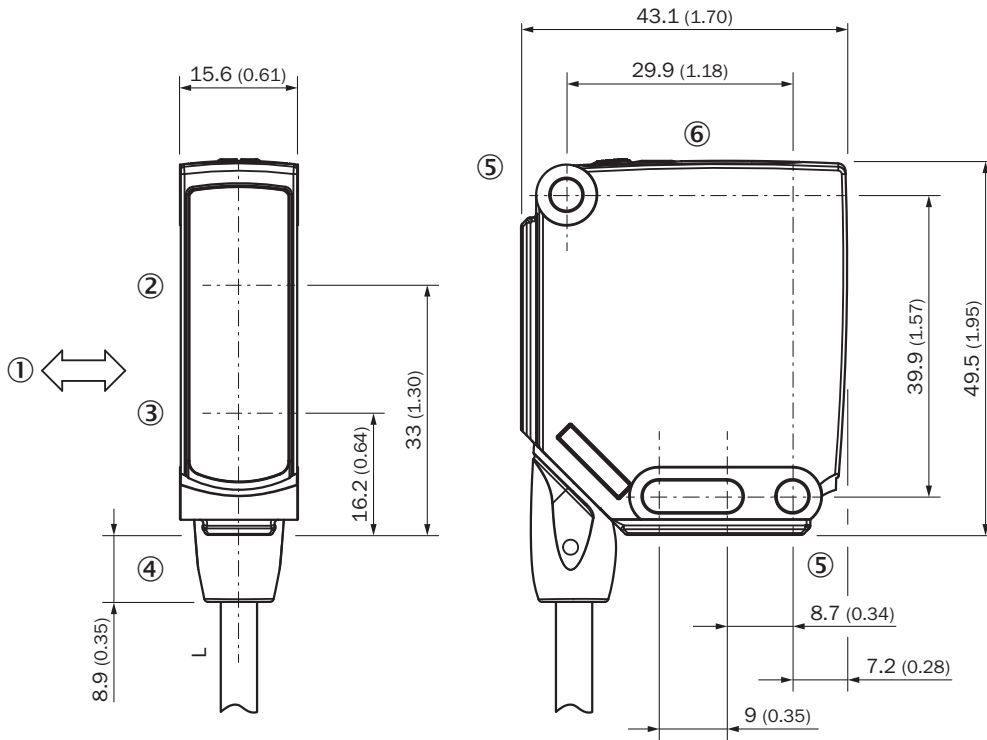
Device temperature	Measuring range	Very cold, cold, moderate, warm, hot
Device status		Yes
Detailed device status		Yes
Operating hour counter		Yes
Operating hours counter with reset function		Yes
Quality of teach		Yes

### CERTIFICATES

EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓

IO-Link certificate	✓
Laser safety (IEC 60825-1) declaration of manufacturer	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

**DIMENSIONAL DRAWING**

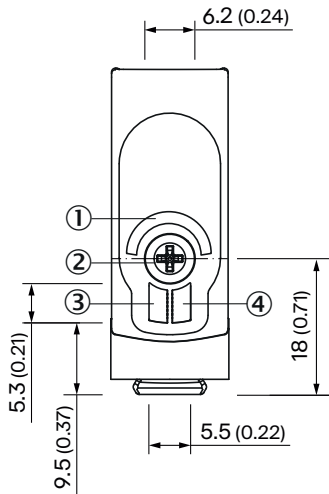


Dimensions in mm (inch)

For length of cable (L), see technical data

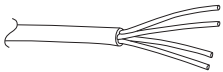
- ① Standard direction of the material being detected
- ② Center of optical axis, receiver
- ③ Center of optical axis, sender
- ④ Connection
- ⑤ Mounting hole, Ø 4.2 mm
- ⑥ display and adjustment elements

DISPLAY AND ADJUSTMENT ELEMENTS



- ① LED blue
- ② Teach-Turn adjustment
- ③ LED green
- ④ LED yellow

CONNECTION TYPE CABLE, 4-WIRE



TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING  $\bar{Q}$

	Dark switching $\bar{Q}$ (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✔	✘
Light receive indicator	☀	✘
Load resistance to L+	⚡	✘
Load resistance to M	✘	⚡

**TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q**

	Light switching Q (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✓	✗
Light receive indicator	☀	✗
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗

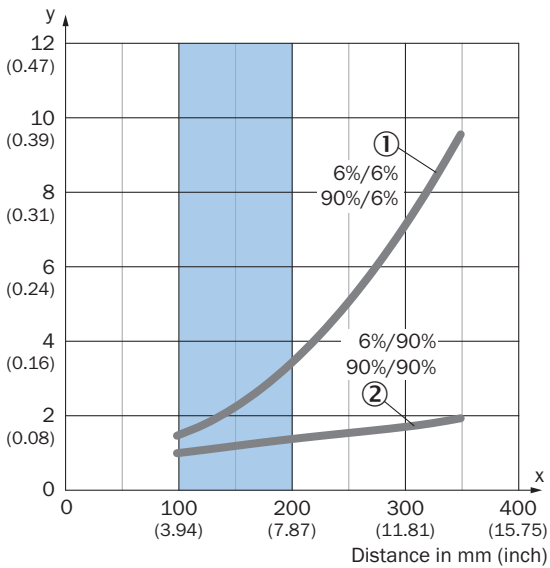
  

+ (L+)  
Q  
- (M)

+ (L+)  
Q  
- (M)

**CHARACTERISTIC CURVE**

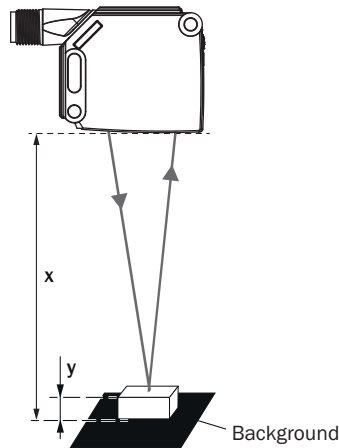
Minimum object height in mm (inch)



Recommended sensing range for the best performance

- ① Black background, 6% remission factor
- ② White background, 90% remission factor

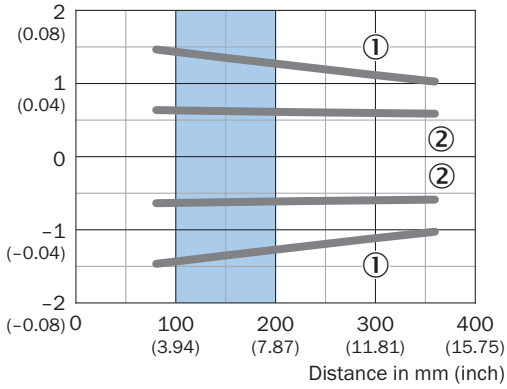
Example:  
Reliable detection of the object



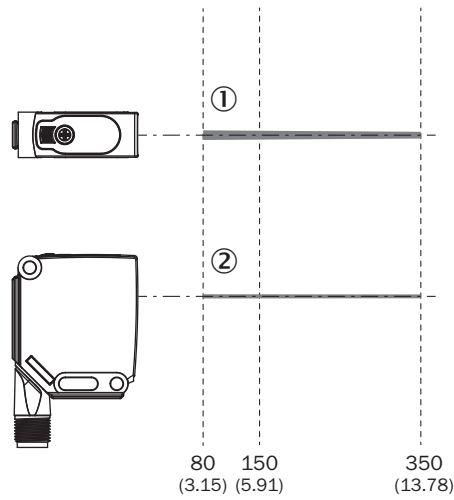
Black background (6 % remission factor)  
Distance of sensor to background  $x = 150 \text{ mm}$   
Required minimum object height  $y = 2.2 \text{ mm}$   
For all objects regardless of their colors

**LIGHT SPOT SIZE**

Dimensions in mm (inch)

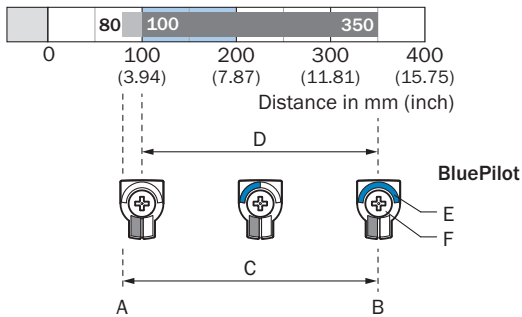


Recommended sensing range for the best performance



- ① Light spot horizontal
- ② Light spot vertical

**SENSING RANGE DIAGRAM**



Recommended sensing range for the best performance

A	Sensing range min. in mm
B	Sensing range max. in mm
C	Field of view
D	Adjustable switching threshold for foreground suppression
E	Sensing range indicator
F	Teach-Turn adjustment

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at [www.sick.com/1125925](http://www.sick.com/1125925)



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# SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

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