



# WTB12L-1H161520A00

W12

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
WTB12L-1H161520A00	1126057

Other models and accessories → [www.sick.com/W12](http://www.sick.com/W12)

Illustration may differ



## Detailed technical data

## Features

<b>Functional principle</b>	Photoelectric proximity sensor
<b>Functional principle detail</b>	Background suppression
<b>Sensing range</b>	
Sensing range min.	15 mm
Sensing range max.	400 mm
Adjustable switching threshold for background suppression	25 mm ... 400 mm
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Minimum distance between set sensing range and background (black 6% / white 90%)	0.5 mm, at a distance of 80 mm
Recommended sensing range for the best performance	40 mm ... 120 mm
<b>Emitted beam</b>	
Light source	Laser
Type of light	Visible red light
Shape of light spot	Ellipse shape
Light spot size (distance)	0.22 mm x 0.18 mm (80 mm)

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

Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at $T_U = +23^\circ\text{C}$ )
<b>Focus position</b>	80 mm
<b>Key laser figures</b>	
Normative reference	EN 60825-1:2014, IEC 60825-1:2014
Laser class	1 <sup>1)</sup>
Wave length	655 nm
Pulse duration	4 $\mu\text{s}$
Maximum pulse power	< 4.03 mW
Average service life	50,000 h at $T_U = +25^\circ\text{C}$
<b>Smallest detectable object (MDO) typ.</b>	
	0.15 mm, at a distance of 80 mm
	Object with 90% remission factor (complies with standard white according to DIN 5033)
<b>Adjustment</b>	
Teach-Turn adjustment	BluePilot For setting the sensing range
IO-Link	For configuring the sensor parameters and Smart Task functions
<b>Display</b>	
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
<b>Special applications</b>	Detecting small objects, Detection of objects moving at high speeds, 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

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

### Communication interface

<b>IO-Link</b>	✓, 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	0x8002D4
DeviceID DEC	8389332

Compatible master port type	A
SIO mode support	Yes

## Electronics

<b>Supply voltage <math>U_B</math></b>	10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>	$\leq 5$ V
<b>Usage category</b>	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
<b>Current consumption</b>	$\leq 14$ mA, without load. At $U_B = 24$ V
<b>Protection class</b>	III
<b>Digital output</b>	
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 $I_{max.}$	$\leq 100$ mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	$\leq 200$ $\mu$ s <sup>2)</sup>
Repeatability (response time)	85 $\mu$ s <sup>2)</sup>
Switching frequency	2,500 Hz <sup>3)</sup>
<b>Pin/Wire assignment</b>	
BN	+ (L+)
WH	$\bar{Q}_{L1}/MF$ Digital output, dark switching, object present $\rightarrow$ output $\bar{Q}_{L1}$ LOW <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 $\rightarrow$ output Q <sub>L1</sub> HIGH <sup>4)</sup> The pin 4 function of the sensor can be configured IO-Link communication C 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

<b>Housing</b>	Rectangular
<b>Dimensions (W x H x D)</b>	15.6 mm x 49.5 mm x 43.1 mm
<b>Connection</b>	Cable, 4-wire, 2 m
<b>Connection detail</b>	

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
<b>Material</b>	
Housing	Metal, zinc diecast
Front screen	Plastic, PMMA
Cable	Plastic, PVC
<b>Weight</b>	Approx. 132 g
<b>Maximum tightening torque of the fixing screws</b>	1.4 Nm

## Ambient data

<b>Enclosure rating</b>	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529)
<b>Ambient operating temperature</b>	-20 °C ... +55 °C
<b>Ambient temperature, storage</b>	-40 °C ... +70 °C
<b>Warm-up time</b>	< 15 min, Where T <sub>u</sub> is under -10 °C
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
<b>Shock resistance</b>	50 g, 11 ms (25 positive and 25 negative shocks along X, Y, Z axes, 150 total shocks (EN60068-2-27))
<b>Vibration resistance</b>	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))
<b>Air humidity</b>	35 % ... 95 %, relative humidity (no condensation)
<b>Electromagnetic compatibility (EMC)</b>	EN 60947-5-2
<b>Resistance to cleaning agent</b>	ECOLAB
<b>UL File No.</b>	NRKH.E181493 & NRKH7.E181493

## Smart Task

<b>Smart Task name</b>	Base logics
<b>Logic function</b>	Direct AND OR
<b>Timer function</b>	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
<b>Inverter</b>	Yes
<b>Switching frequency</b>	SIO Logic: 2000 Hz <sup>1)</sup> IOL: 1600 Hz <sup>2)</sup>
<b>Response time</b>	SIO Logic: 250 µs <sup>1)</sup>

<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.

<b>Repeatability</b>	IOL: 300 $\mu$ s <sup>2)</sup> SIO Logic: 120 $\mu$ s <sup>1)</sup> IOL: 150 $\mu$ s <sup>2)</sup>
<b>Switching signal</b>	Switching signal $Q_{L1}$ Switching output
	Switching signal $\bar{Q}_{L1}$ 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

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

## Classifications

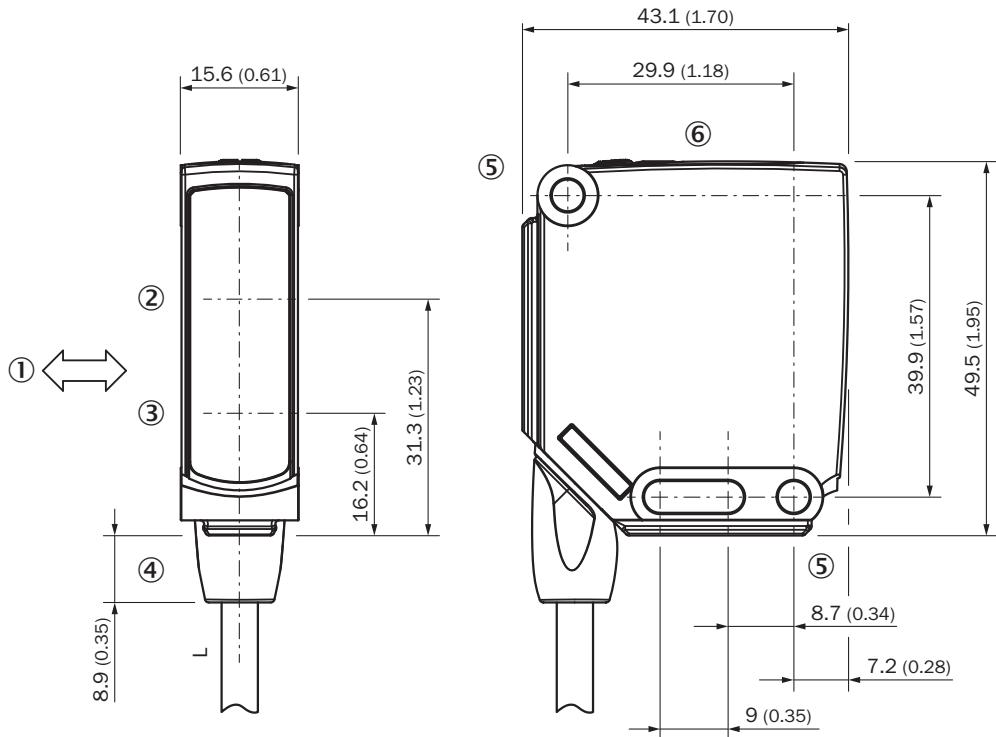
<b>ECLASS 5.0</b>	27270904
<b>ECLASS 5.1.4</b>	27270904
<b>ECLASS 6.0</b>	27270904
<b>ECLASS 6.2</b>	27270904
<b>ECLASS 7.0</b>	27270904
<b>ECLASS 8.0</b>	27270904
<b>ECLASS 8.1</b>	27270904
<b>ECLASS 9.0</b>	27270904
<b>ECLASS 10.0</b>	27270904
<b>ECLASS 11.0</b>	27270904
<b>ECLASS 12.0</b>	27270903
<b>ETIM 5.0</b>	EC002719
<b>ETIM 6.0</b>	EC002719
<b>ETIM 7.0</b>	EC002719
<b>ETIM 8.0</b>	EC002719
<b>UNSPSC 16.0901</b>	39121528

## Certificates

<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>Moroccan declaration of conformity</b>	✓
<b>China RoHS</b>	✓
<b>ECOLAB certificate</b>	✓
<b>cULus certificate</b>	✓

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, sensor

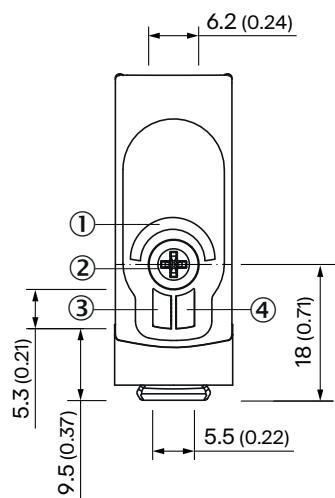


## Dimensions in mm (inch)

For length of cable (L), see technical data

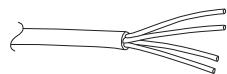
- ① Standard direction of the material being detected
- ② Center of optical axis, receiver
- ③ Center of optical axis, sender
- ④ Connection
- ⑤ Mounting hole, Ø 4.2 mm
- ⑥ display and adjustment elements

## display and adjustment elements



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

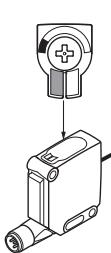
## Connection type Cable, 4-wire

Truth table Push-pull: PNP/NPN – dark switching  $\bar{Q}$ 

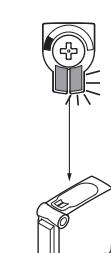
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	Object not present → Output HIGH	Object present → Output LOW
Light receive		✗	✓
Light receive indicator		✗	✗
Load resistance to L+		✗	⚠
Load resistance to M		⚠	✗

## Truth table Push-pull: PNP/NPN - light switching Q

Light switching 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	✗	⚡



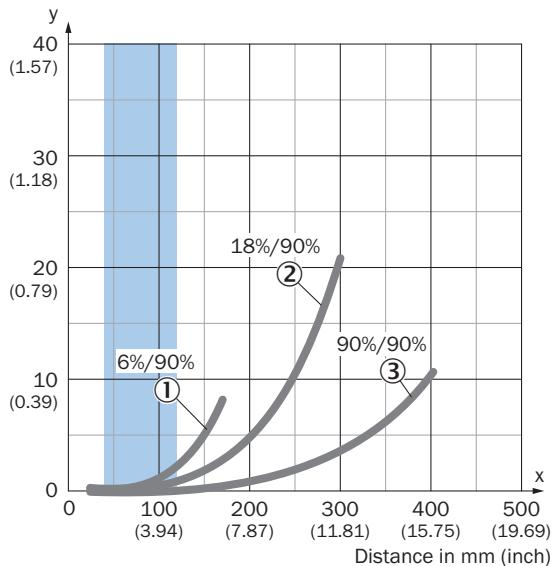
Object not present → Output LOW



Object present → Output HIGH

## Characteristic curve

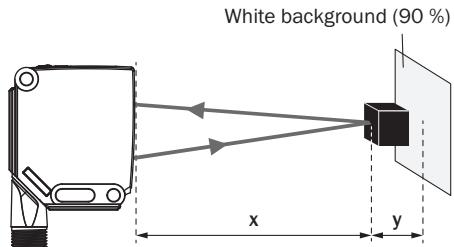
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



Recommended sensing range for the best performance

- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor

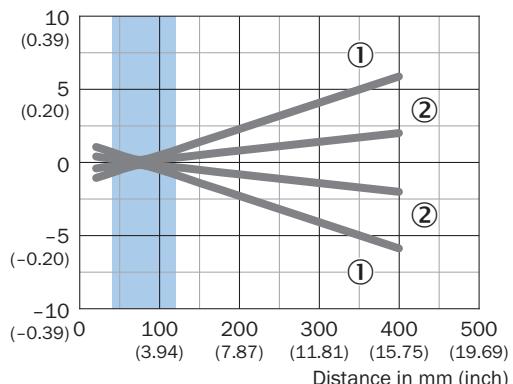
Example:  
Safe suppression of the background



Black object (6 % remission)  
Set sensing range  $x = 80$  mm  
Needed minimum distance to white background  $y = 0.5$  mm

## Light spot size

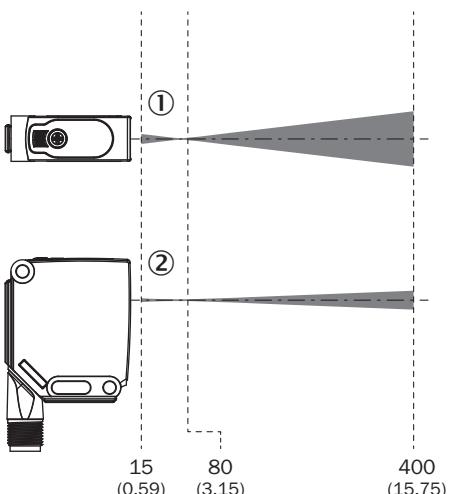
Dimensions in mm (inch)



■ Recommended sensing range for the best performance

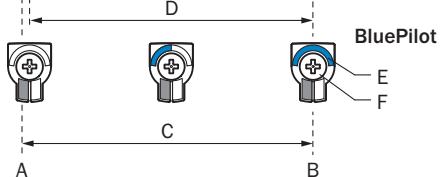
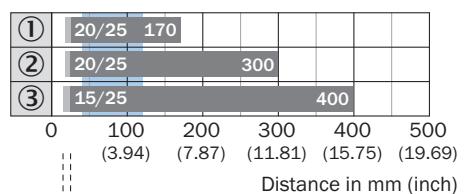
① Light spot horizontal

② Light spot vertical



15  
(0.59)  
80  
(3.15)  
400  
(15.75)

## Sensing range diagram



■ Recommended sensing range for the best performance

1		Black object, 6% remission factor
2		Gray object, 18% remission factor
3		White object, 90% remission factor
A		Sensing range min. in mm
B		Sensing range max. in mm
C		Field of view
D		Adjustable switching threshold for background suppression
E		Sensing range indicator
F		Teach-Turn adjustment

## Recommended accessories

Other models and accessories → [www.sick.com/W12](http://www.sick.com/W12)

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none"> <li><b>Description:</b> Plate N03 for universal clamp bracket, zinc coated</li> <li><b>Material:</b> Steel, zinc diecast</li> <li><b>Details:</b> Zinc plated steel (sheet), Zinc die cast (clamping bracket)</li> <li><b>Items supplied:</b> Universal clamp (5322626), mounting hardware</li> <li><b>Usable for:</b> UC12, W14-2, W18-2, W18-3, W11-2, W12-3, W12-2 Laser, W12G, W12 Teflon, W16, W24-2 Ex, PowerProx, W11G-2, TranspaTect, W18-3 Ex, W24-2, PL50A, PL80A, PL40A, P250</li> </ul>	BEF-KHS-N03	2051609
	<ul style="list-style-type: none"> <li><b>Description:</b> Clamping block for dovetail mounting</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum (anodised)</li> <li><b>Items supplied:</b> Mounting hardware included</li> <li><b>Suitable for:</b> W11-2, W12-3</li> </ul>	BEF-KH-W12	2013285
	<ul style="list-style-type: none"> <li><b>Description:</b> Mounting bracket, large</li> <li><b>Material:</b> Stainless steel</li> <li><b>Details:</b> Stainless steel</li> <li><b>Items supplied:</b> Mounting hardware included</li> <li><b>Suitable for:</b> W11-2, W12-3, W16</li> </ul>	BEF-WG-W12	2013942
	<ul style="list-style-type: none"> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including mounting material (sensor) and mounting material (bracket)</li> <li><b>Usable for:</b> Adapter plate for W23L/W27L to W12L</li> </ul>	BEF-AP-W12	2127742
connectors and cables			
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li><b>Description:</b> Unshielded</li> <li><b>Connection systems:</b> Screw-type terminals</li> <li><b>Permitted cross-section:</b> ≤ 0.75 mm<sup>2</sup></li> </ul>	STE-1204-G	6009932
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection systems:</b> Cutting technology</li> <li><b>Permitted cross-section:</b> 0.14 mm<sup>2</sup> ... 0.34 mm<sup>2</sup></li> <li><b>Note:</b> Test voltage 1.25 kV eff/60 s, insulation group C to VDE 0110, for field bus technology</li> </ul>	STE-1204-GQU6	6042089

	Brief description	Type	part no.
network devices			
		SIG300-0A0GAA100	1131014
		SIG300-0A04AA100	1131011
		SIG300-0A05AA100	1131012
		SIG300-0A06AA100	1131013

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

**For us, that is "Sensor Intelligence."**

## WORLDWIDE PRESENCE:

Contacts and other locations [www.sick.com](http://www.sick.com)