



# WTB12L-24161A20A00

## W12

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ

### Ordering information

Type	part no.
WTB12L-24161A20A00	1126340

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

### 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.	80 mm
Sensing range max.	1,200 mm
Adjustable switching threshold for background suppression	90 mm ... 1,200 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%)	6 mm, at a distance of 650 mm
Recommended sensing range for the best performance	100 mm ... 700 mm
<b>Emitted beam</b>	
Light source	Laser
Type of light	Visible red light
Shape of light spot	Ellipse shape
Light spot size (distance)	1.3 mm x 1.1 mm (650 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at Ta = +23 °C)
<b>Key laser figures</b>	
Normative reference	EN 60825-1:2014, IEC 60825-1:2014
Laser class	1
Wave length	655 nm
Pulse duration	4 µs
Maximum pulse power	< 6.74 mW
Average service life	50,000 h at T <sub>U</sub> = +25 °C
<b>Smallest detectable object (MDO) typ.</b>	
	1.3 mm (at a distance of 650 mm)

<b>Adjustment</b>		Object with 90% remission factor (complies with standard white according to DIN 5033)
	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 indicatorStatic on: power onFlashing: IO-Link mode
	LED yellow	Status of received light beamStatic on: object presentStatic off: object not present
<b>Special applications</b>		Detecting small objects, Detection of objects moving at high speeds, Detecting perforated objects

## 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	0x8002CF
	DeviceID DEC	8389327
	Compatible master port type	A
	SIO mode support	Yes

## Electronics

<b>Supply voltage U<sub>B</sub></b>		10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>		≤ 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>		≤ 14 mA, without load. At U <sub>B</sub> = 24 V
<b>Protection class</b>		III
<b>Digital output</b>	Number	2 (Complementary)
	Type	Push-pull: PNP/NPN
	Switching mode	Light/dark switching

<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.

Signal voltage PNP HIGH/LOW	Approx. $U_B - 2.5 \text{ V} / 0 \text{ V}$
Signal voltage NPN HIGH/LOW	Approx. $U_B / < 2.5 \text{ V}$
Output current $I_{\max}$	$\leq 100 \text{ mA}$
Circuit protection outputs	Reverse polarity protected
	Overcurrent protected
	Short-circuit protected
Response time	$\leq 15 \text{ ms}^{2)}$
Repeatability (response time)	$5 \text{ ms}^{2)}$
Switching frequency	$30 \text{ Hz}^{3)}$
<b>Pin/Wire assignment</b>	
BN 1	+ (L+)
WH 2	$\bar{Q}_{L1}$ /MFDigital 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 3	- (M)
BK 4	$Q_{L1}$ /CDigital output, light switching, object present $\rightarrow$ output $Q_{L1}$ HIGH <sup>4)</sup> The pin 4 function of the sensor can be configured
	IO-Link communication CAdditional possible settings via IO-Link

1) Limit values.

2) Signal transit time with resistive load in switching mode.

3) With light/dark ratio 1:1.

4) 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	Male connector M12, 4-pin
Material	
	Housing Metal, zinc diecast
	Front screen Plastic, PMMA
	Male connector Plastic, VISTAL®
Weight	Approx. 77 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 $T_u$ is under -10 °C
Typ. Ambient light immunity	Artificial light: $\leq 50,000 \text{ lx}$ Sunlight: $\leq 50,000 \text{ lx}$
Shock resistance	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: 900 Hz <sup>1)</sup> IOL: 800 Hz <sup>2)</sup>
<b>Response time</b>	IOL: 600 µs <sup>2)</sup>
<b>Repeatability</b>	SIO Logic: 200 µs <sup>1)</sup> IOL: 250 µs <sup>2)</sup>
<b>Switching signal</b>	
Switching signal Q <sub>L1</sub>	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

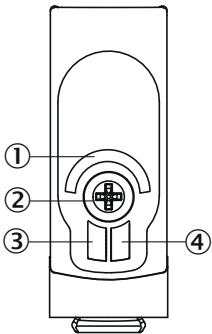
<b>Device temperature</b>	
Measuring range	Very cold, cold, moderate, warm, hot
<b>Device status</b>	Yes
<b>Detailed device status</b>	Yes
<b>Operating hour counter</b>	Yes
<b>Operating hours counter with reset function</b>	Yes
<b>Quality of teach</b>	Yes

## 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

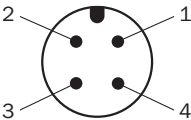
<b>ECLASS 10.0</b>	27270904
<b>ECLASS 11.0</b>	27270904
<b>ECLASS 12.0</b>	27270903
<b>ETIM 5.0</b>	EC002719
<b>ETIM 6.0</b>	EC002719
<b>ETIM 7.0</b>	EC002719
<b>ETIM 8.0</b>	EC002719
<b>UNSPSC 16.0901</b>	39121528

display and adjustment elements



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

Connection type M12 male connector, 4-pin



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

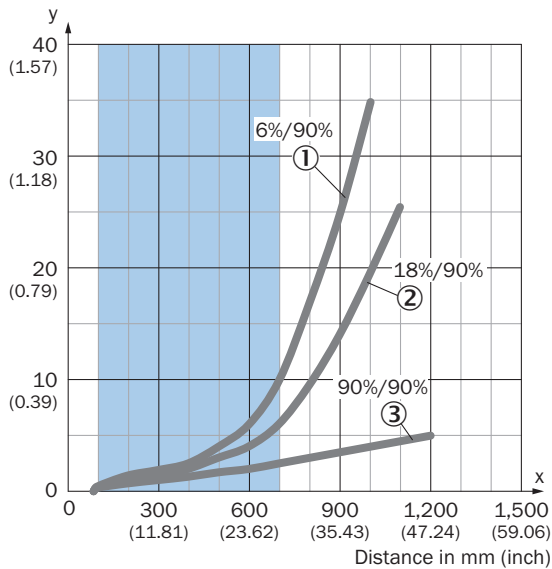
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⚡	⊗
Load resistance to M	⊗	⚡

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	⚡	⊗

## Characteristic curve

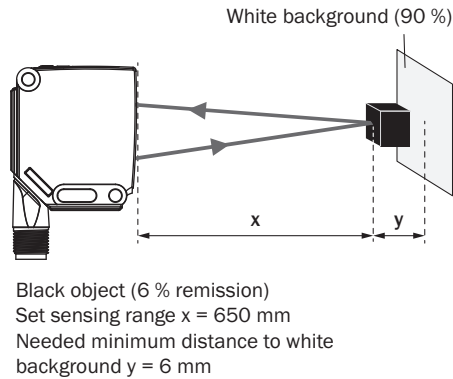
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



Recommended sensing range for the best performance

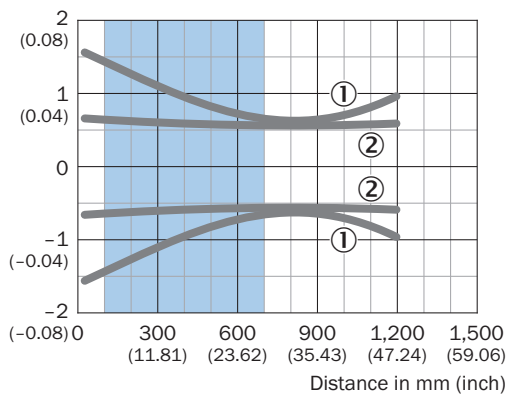
- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor

Example:  
Safe suppression of the background



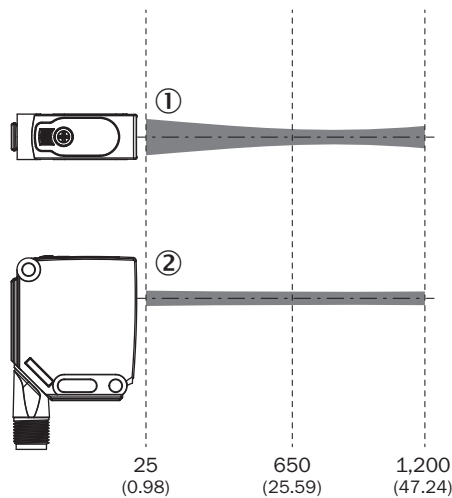
## Light spot size

Dimensions in mm (inch)



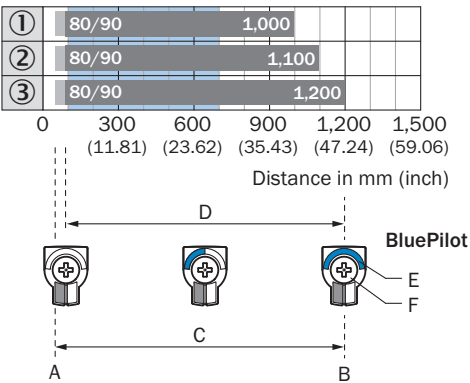
Recommended sensing range for the best performance

- ① Light spot horizontal
- ② Light spot vertical





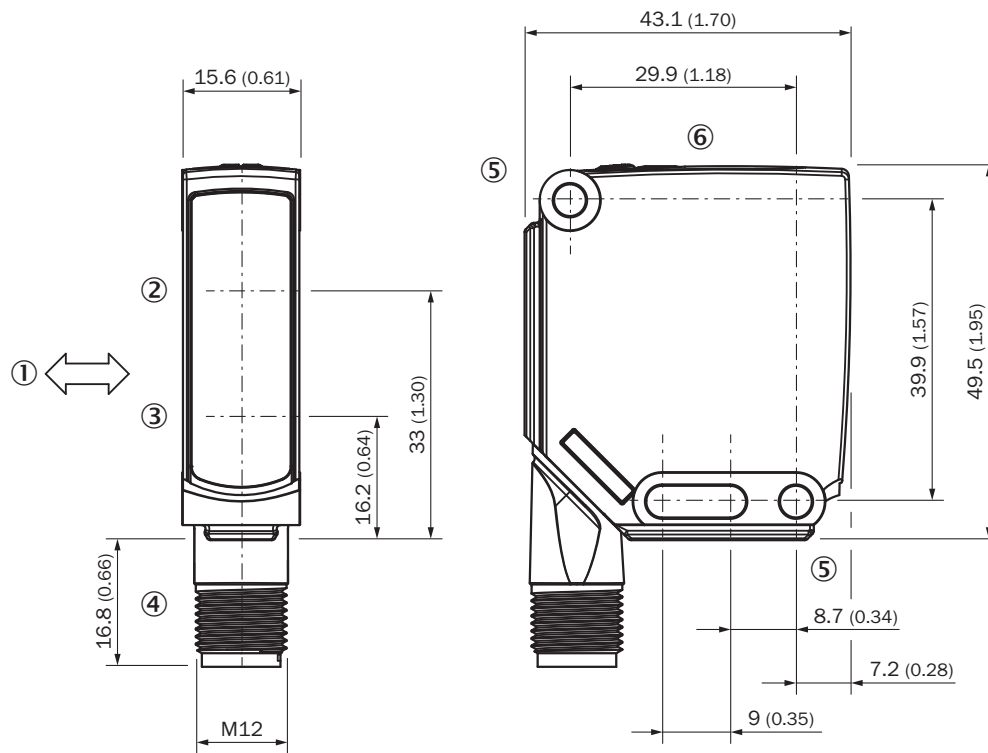
Sensing range diagram



Recommended sensing range for the best performance

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

### Dimensional drawing










Dimensions in mm (inch)

- 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

## 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> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 5 m, 4-wire, PVC</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Zones with chemicals, Uncontaminated zones</li> </ul>	YF2A14-050VB3XLEAX	2096235

	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)