



WTB12L-34161220A00

W12

SMALL PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WTB12L-34161220A00	1126056

Other models and accessories → www.sick.com/W12

Detailed technical data

Features

Functional principle		Photoelectric proximity sensor
Functional principle detail		Background suppression
Sensing range		
	Sensing range min.	15 mm
	Sensing range max.	350 mm
	Adjustable switching threshold for background suppression	25 mm ... 350 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%)	0.2 mm, At 45 mm distance
	Recommended sensing range for the best performance	25 mm ... 60 mm
Emitted beam		
	Light source	Laser
	Type of light	Visible red light
	Shape of light spot	Ellipse shape
	Light spot size (distance)	0.34 mm x 0.18 mm (45 mm)
	Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at Ta = +23 °C)
Focus position		45 mm
Key laser figures		

Normative reference	EN 60825-1:2014, IEC 60825-1:2014
Laser class	1
Wave length	655 nm
Pulse duration	4 µs
Maximum pulse power	< 4.03 mW
Average service life	50,000 h at T _U = +25 °C
Smallest detectable object (MDO) typ.	0.15 mm (At 45 mm distance) 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
Indication	
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 perforated objects

Safety-related parameters

MTTF_D	280 years
DC_{avg}	0 %
T_M (mission time)	10 years (EN ISO 13849, rate of use: 60 %)

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 _{L1} Bit 1 = switching signal Q _{L2} Bit 2 ... 15 = Current receiver level (live)
VendorID	26
DeviceID HEX	0x8002D3
DeviceID DEC	8389331
Compatible master port type	A
SIO mode support	Yes

Electronics

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
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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.

Ripple	$\leq 5 \text{ V}$	
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)	
Current consumption	$\leq 14 \text{ mA}$, without load. At $U_B = 24 \text{ V}$	
Protection class	III	
Digital output		
	Number	2 (Complementary)
	Type	Push-pull: PNP/NPN
	Switching mode	Light/dark switching
	Signal voltage PNP HIGH/LOW	Approx. $U_B - 2.5 \text{ V} / 0 \text{ V}$
	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	$\leq 200 \mu\text{s}$ ²⁾
	Repeatability (response time)	$85 \mu\text{s}$ ²⁾
	Switching frequency	$2,500 \text{ Hz}$ ³⁾
Pin/Wire assignment		
	BN 1	+ (L+)
	WH 2	$\bar{Q}_{L1}/\text{MF}$ Digital output, dark switching, object present → output $\bar{Q}_{L1}$ LOW ⁴⁾ The pin 2 function of the sensor can be configuredAdditional possible settings via IO-Link
	BU 3	- (M)
	BK 4	Q_{L1}/C Digital output, light switching, object present → output Q_{L1} HIGHIO-Link communication C ⁴⁾ The pin 4 function of the sensor can be configuredAdditional 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	Cable with M12 male connector, 4-pin, 318 mm	
Connection detail		
	Deep-freeze property	Do not bend below $0 \text{ }^{\circ}\text{C}$
	Conductor size	0.14 mm^2
	Cable diameter	$\varnothing 3.4 \text{ mm}$
	Length of cable (L)	270 mm
	Length of male connector	48 mm
	Bending radius	For flexible use $> 12 \times$ cable diameter
	Bending cycles	1,000,000
Material		

Housing	Metal, zinc diecast
Front screen	Plastic, PMMA
Cable	Plastic, PVC
Male connector	Plastic, VISTAL®
Weight	Approx. 94 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: $\leq 50,000$ lx Sunlight: $\leq 50,000$ 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: 2000 Hz ¹⁾ IOL: 1600 Hz ²⁾
Response time	SIO Logic: 250 μ s ¹⁾ IOL: 300 μ s ²⁾
Repeatability	SIO Logic: 120 μ s ^{1) 2)}
Switching signal	
Switching signal Q_{L1}	Switching output
Switching signal $\bar{Q}_{L1}$	Switching output

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

²⁾ 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

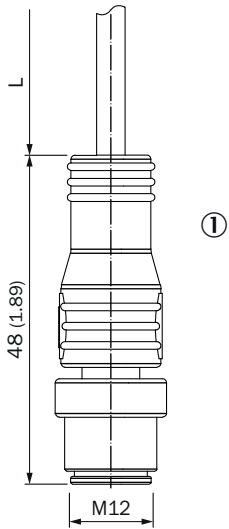
Classifications

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

Maßzeichnung (Dimensions in mm (inch))

Dimensional drawing (Dimensions in mm (inch))

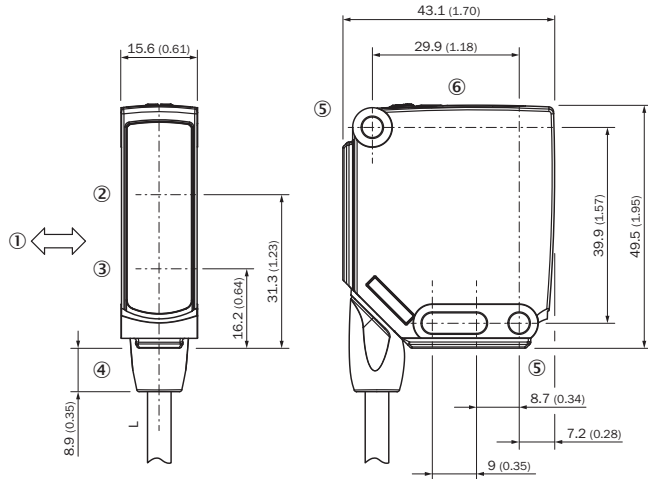
Dimensional drawing, connection



For length of cable (L), see technical data

① Cable with M12 male connector

Dimensional drawing, sensor

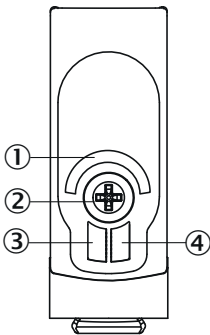


For length of cable (L), see technical data

- 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, $\varnothing$ 4.2 mm
- ⑥ Display and adjustment elements

Adjustments

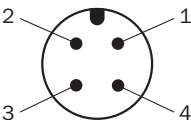
Display and adjustment elements



- 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

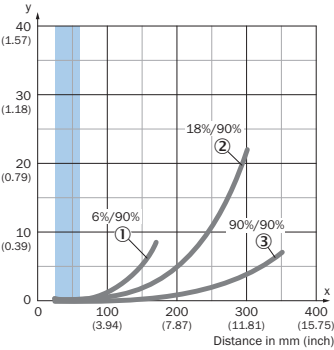
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	⚡	✗
Load resistance to M	✗	⚡

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

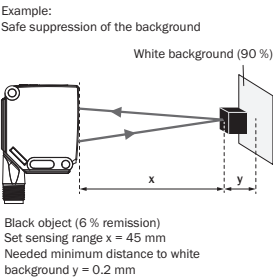
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	✗	⚠
Load resistance to M	⚠	✗

Characteristic curve

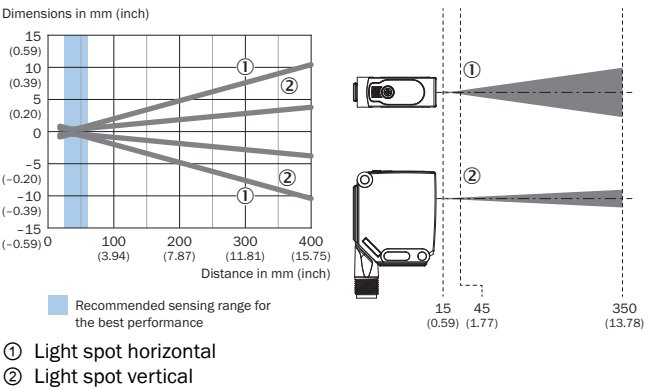
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



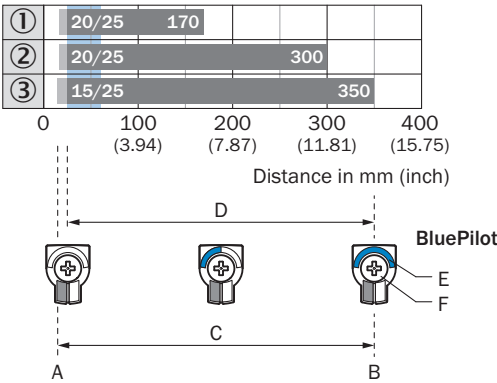
- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor



Light spot size



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

	Brief description	Type	Part no.
Mounting brackets and plates			
	Material: Aluminum Details: Aluminum Items supplied: Including mounting material (sensor) and mounting material (bracket) Usable for: Adapter plate for W23L/W27L to W12L	BEF-AP-W12	2127742
	Description: Mounting bracket, large Material: Stainless steel Details: Stainless steel Items supplied: Mounting hardware included Suitable for: W11-2, W12-3, W16	BEF-WG-W12	2013942
Terminal and alignment brackets			
	Description: Clamping block for dovetail mounting Material: Aluminum Details: Aluminum (anodised) Items supplied: Mounting hardware included Suitable for: W11-2, W12-3	BEF-KH-W12	2013285
Universal bar clamp systems			
	Description: Plate N03 for universal clamp bracket, zinc coated Material: Steel, zinc diecast Details: Zinc plated steel (sheet), Zinc die cast (clamping bracket) Items supplied: Universal clamp (5322626), mounting hardware Usable for: 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	BEF-KHS-N03	2051609
	Description: Mounting bar, straight, 300 mm, steel Material: Steel Details: Steel, zinc coated Items supplied: Without mounting hardware Usable for: Fiber-optic sensors	BEF-MS12G-B	4056055
	Description: Bar clamp for bar diameter of 12 mm (fixing the mounting rod) Material: Aluminum Details: Aluminum Items supplied: 2 screws M6 x 30, 2 spring discs Usable for: Fiber-optic sensors	BEF-RMC-D12	5321878
Others			
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PVC Description: Sensor/actuator cable, unshielded Application: Zones with chemicals, Uncontaminated zones	YF2A14-050VB3XLEAX	2096235
Sensor Integration Gateway			
	Further functions: Web server integrated, IIoT interface available (dual talk) Logic editor: no Communication interface: IO-Link, Ethernet, PROFINET, REST API, MQTT, OPC UA Product category: IO-Link Master	SIG350-0004AP100	6076871

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