



WTB12L-24161200A00

W12

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

Type	part no.
WTB12L-24161200A00	1149949

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 Tu = +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	IO-Link	For configuring the sensor parameters and Smart Task functions
Display	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
Special features		Sensing range preset: 45 mm
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

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⁾
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 _B = 24 V
Protection class	III
Digital output	Number 2 (Complementary)
	Type Push-pull: PNP/NPN

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.

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	≤ 200 μ s ²⁾
Repeatability (response time)	85 μ s ²⁾
Switching frequency	2,500 Hz ³⁾
Pin/Wire assignment	
BN 1	+(L+)
WH 2	\bar{Q}_{L1} /MFDigital output, dark switching, object present → output \bar{Q}_{L1} LOW ⁴⁾ The pin 2 function of the sensor can be configured Additional possible settings via IO-Link
BU 3	-(M)
BK 4	QL1/CDigital output, light switching, object present → output Q_{L1} HIGH ⁴⁾ 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: $\leq 50,000$ 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

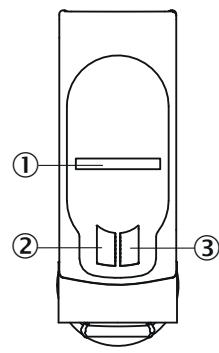
Device temperature	Measuring range	Very cold, cold, moderate, warm, hot
Device status	Yes	
Detailed device status	Yes	
Operating hour counter	Yes	
Operating hours counter with reset function	Yes	
Quality of teach	Yes	

Classifications

ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904

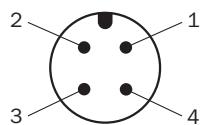
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

display and adjustment elements

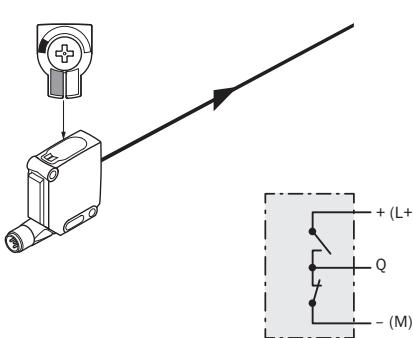
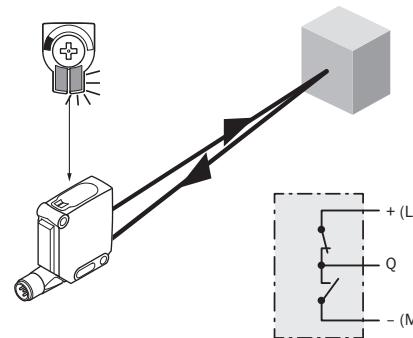


- ① LED blue
- ② LED yellow
- ③ LED green

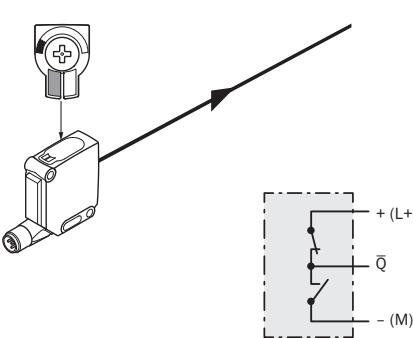
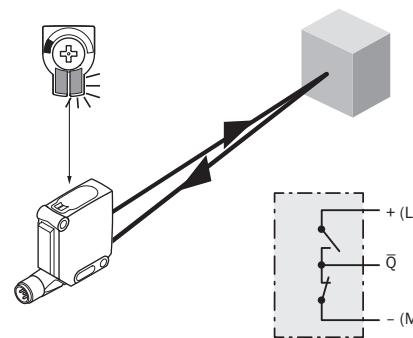
Connection type M12 male connector, 4-pin



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

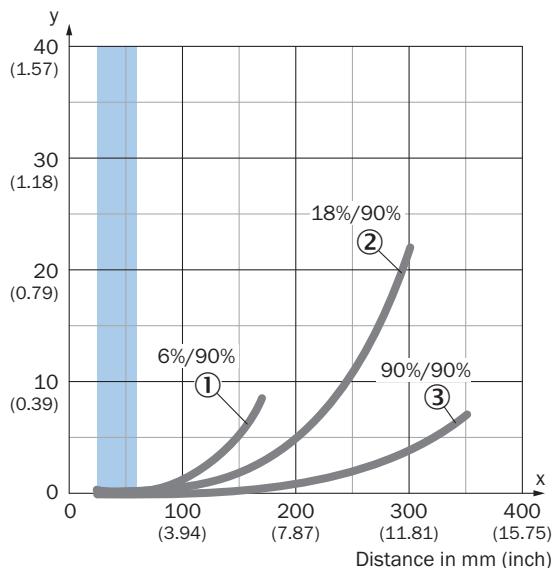
Light switching Q (normally open (upper switch), normally closed (lower switch))		
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	✗
Load resistance to L+	⚠	✗
Load resistance to M	✗	⚠
		

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

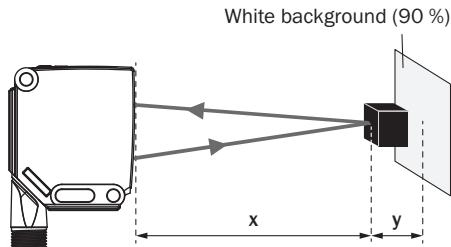
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



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

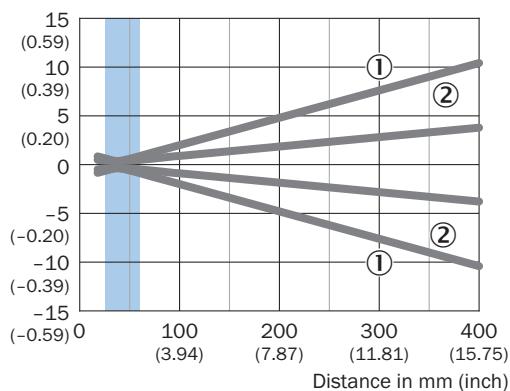
Example:
Safe suppression of the background



White background (90 %)
Black object (6 % remission)
Set sensing range $x = 45$ mm
Needed minimum distance to white background $y = 0.2$ mm

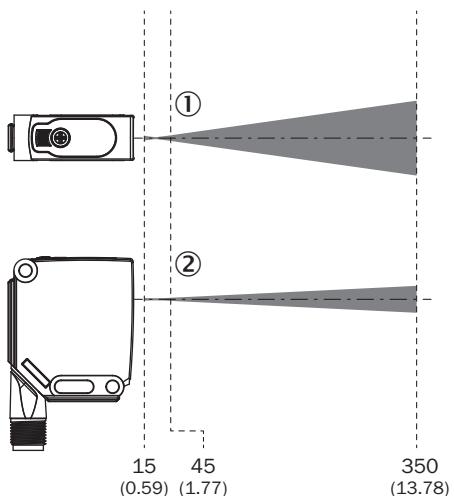
Light spot size

Dimensions in mm (inch)

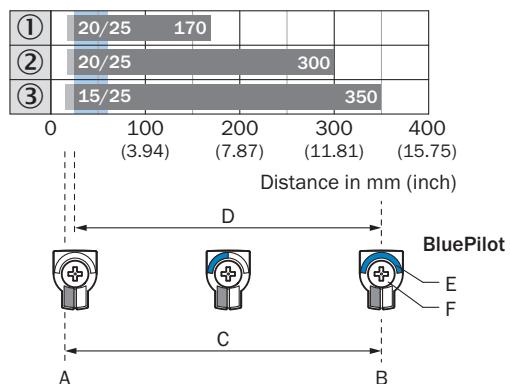


Recommended sensing range for the best performance

- ① Light spot horizontal
- ② Light spot vertical



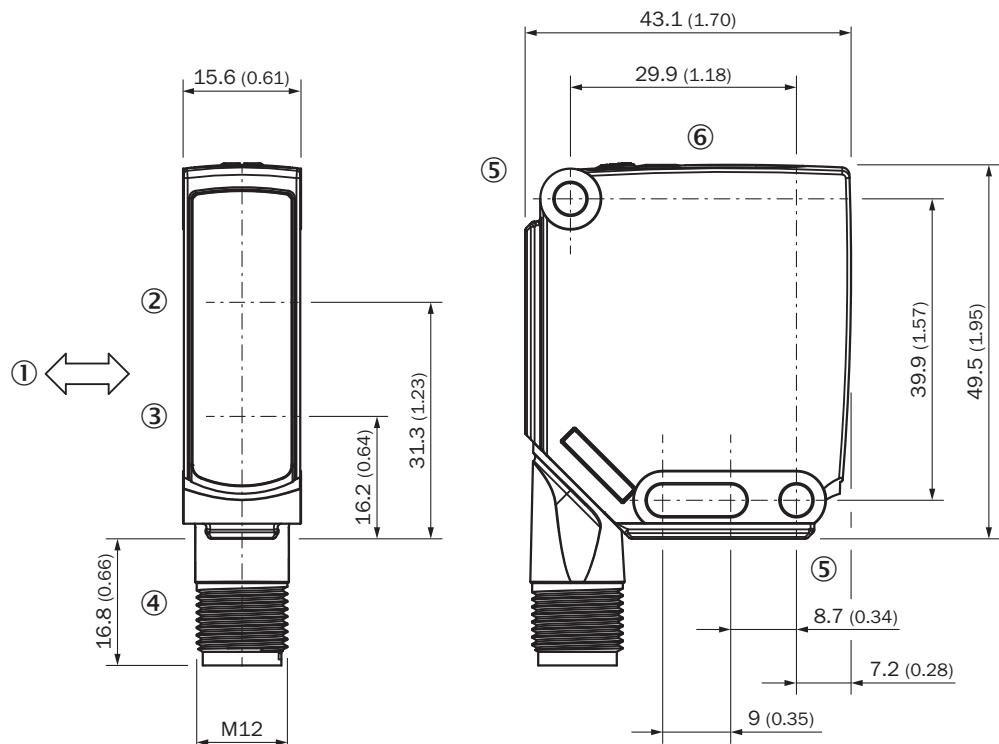
Sensing range diagram



■ 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

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none">Description: Plate N03 for universal clamp bracket, zinc coatedMaterial: Steel, zinc diecastDetails: Zinc plated steel (sheet), Zinc die cast (clamping bracket)Items supplied: Universal clamp (5322626), mounting hardwareUsable 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
	<ul style="list-style-type: none">Description: Clamping block for dovetail mountingMaterial: AluminumDetails: Aluminum (anodised)Items supplied: Mounting hardware includedSuitable for: W11-2, W12-3	BEF-KH-W12	2013285
	<ul style="list-style-type: none">Description: Mounting bracket, largeMaterial: Stainless steelDetails: Stainless steelItems supplied: Mounting hardware includedSuitable for: W11-2, W12-3, W16	BEF-WG-W12	2013942
	<ul style="list-style-type: none">Material: AluminumDetails: AluminumItems supplied: Including mounting material (sensor) and mounting material (bracket)Usable for: Adapter plate for W23L/W27L to W12L	BEF-AP-W12	2127742
connectors and cables			
	<ul style="list-style-type: none">Connection type head A: Female connector, M12, 4-pin, straight, A-codedConnection type head B: Flying leadsSignal type: Sensor/actuator cableCable: 5 m, 4-wire, PVCDescription: Sensor/actuator cable, unshieldedApplication: Zones with chemicals, Uncontaminated zones	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