



WTB4SP-22161A20A00

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WTB4SP-22161A20A00	1131621

Other models and accessories → www.sick.com/W4

Detailed technical data

Features

Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression
Sensing range	
Sensing range min.	4 mm
Sensing range max.	500 mm
Adjustable switching threshold for background suppression	10 mm ... 500 mm
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Recommended sensing range for the best performance	50 mm ... 200 mm
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	4 mm (150 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at Ta = +23 °C)
Key LED figures	
Normative reference	EN 62471:2008-09 IEC 62471:2006, modified

LED risk group marking	Free group
Wave length	635 nm
Average service life	100,000 h at T _a = +25 °C
Smallest detectable object (MDO) typ.	0.1 mm (At 180 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
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

Safety-related parameters

MTTF_D	1,404 years
DC_{avg}	0%

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	0x800319
DeviceID DEC	8389401
Compatible master port type	A
SIO mode support	Yes

Electronics

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
Ripple	≤ 5 V _{pp}
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 20 mA, without load. At U _B = 24 V
Protection class	III
Digital output	
Number	2

¹⁾ Limit values.

²⁾ This switching output must not be connected to another output.

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	$\leq 1,000 \text{ } \mu\text{s}$
Repeatability (response time)	$240 \text{ } \mu\text{s}$
Switching frequency	30 Hz
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, light switching, object present → output $Q_{L1} \text{ HIGH}^{2)}$ IO-Link communication C
Function of pin 4/black (BK) – detail	The pin 4 function of the sensor can be configured Additional possible settings via IO-Link
Function of pin 2/white (WH)	Digital output, dark switching, object present → output $\bar{Q}_{L1} \text{ LOW}^{2)}$
Function of pin 2/white (WH) – detail	The pin 2 function of the sensor can be configured Additional possible settings via IO-Link

¹⁾ Limit values.

²⁾ This switching output must not be connected to another output.

Mechanics

Housing	Rectangular
Design detail	Slim
Dimensions (W x H x D)	$12.1 \text{ mm} \times 41.9 \text{ mm} \times 18.6 \text{ mm}$
Connection	Male connector M8, 4-pin
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Male connector	Plastic, VISTAL®
Maximum tightening torque of the fixing screws	0.4 Nm

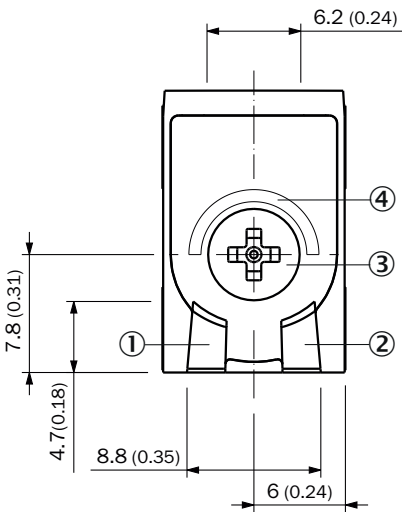
Ambient data

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529)
Ambient operating temperature	$-40 \text{ }^{\circ}\text{C} \dots +60 \text{ }^{\circ}\text{C}$
Ambient temperature, storage	$-40 \text{ }^{\circ}\text{C} \dots +75 \text{ }^{\circ}\text{C}$
Typ. Ambient light immunity	Artificial light: $\leq 50,000 \text{ lx}$ Sunlight: $\leq 50,000 \text{ lx}$
Shock resistance	30 g , 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
Vibration resistance	$10 \text{ Hz} \dots 1,000 \text{ Hz}$ (Amplitude 1 mm , $3 \times 30 \text{ min}$ (EN60068-2-6))
Air humidity	$35 \% \dots 95 \%$, relative humidity (no condensation)
Electromagnetic compatibility (EMC)	EN 60947-5-2
Resistance to cleaning agent	ECOLAB

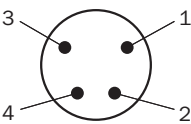
UL File No.		NRKH.E181493 & NRKH7.E181493	
Smart Task			
Smart Task name		Base logics	
Logic function		Direct AND OR	
Timer function		Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)	
Inverter		Yes	
Switching frequency		SIO Logic: 900 Hz ¹⁾	
Response time		SIO Logic: 550 µs ¹⁾	
Repeatability		SIO Logic: 200 µs ¹⁾	
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).			
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	

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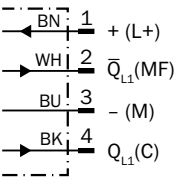
Adjustments



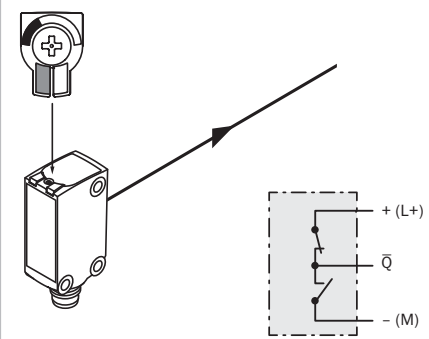
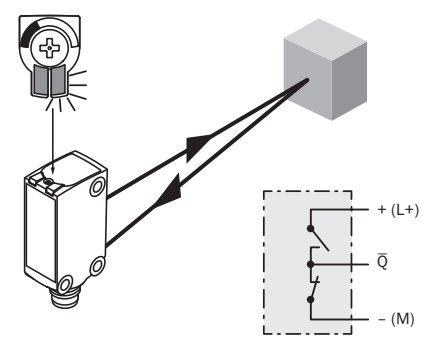
Connection type

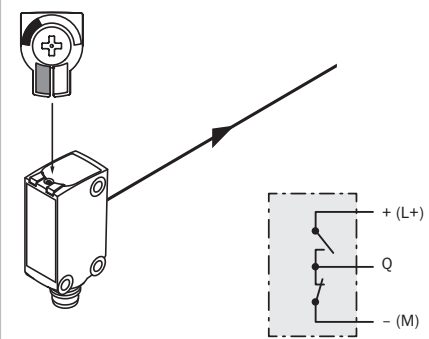
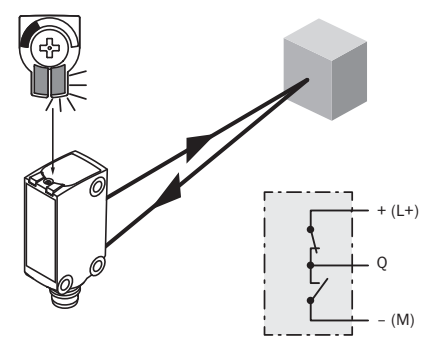


Connection diagram



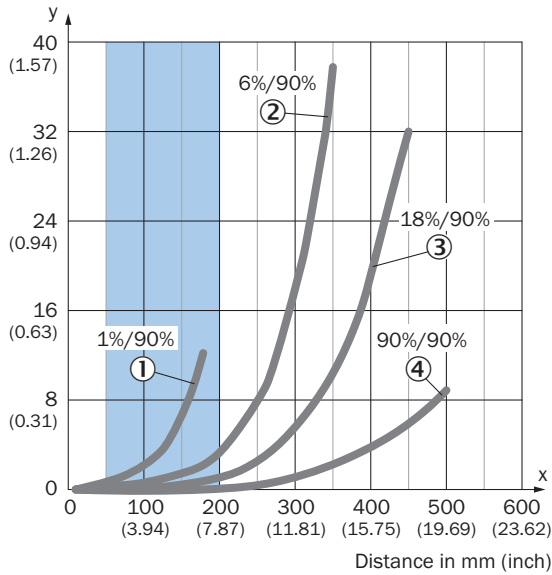
Truth table

	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	⚡	✗
		

	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	✗	⚡
		

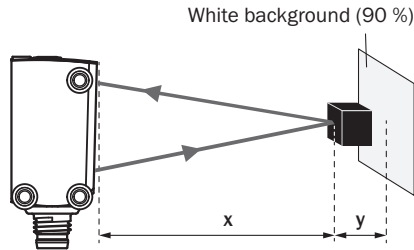
Characteristic curve

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



Recommended sensing range for the best performance

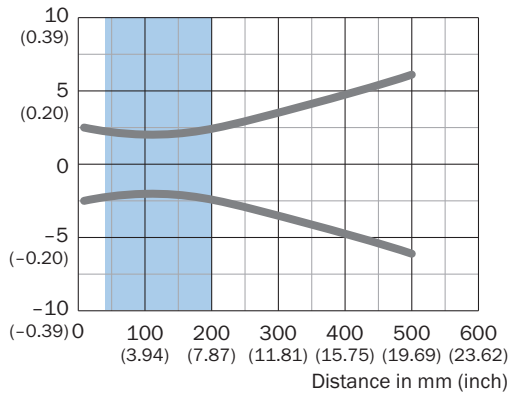
Example:
Safe suppression of the background



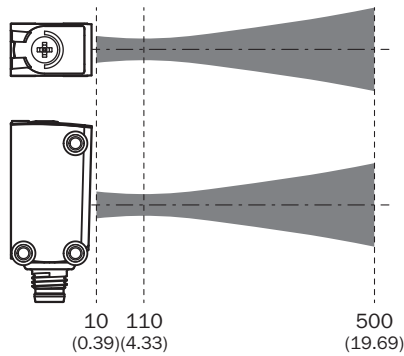
Black object (6 % remission factor)
 Set sensing range $x = 300$ mm
 Needed minimum distance to white background $y = 17$ mm

Light spot size

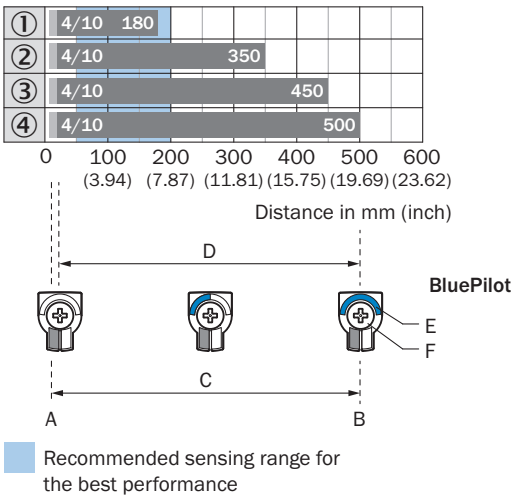
Dimensions in mm (inch)



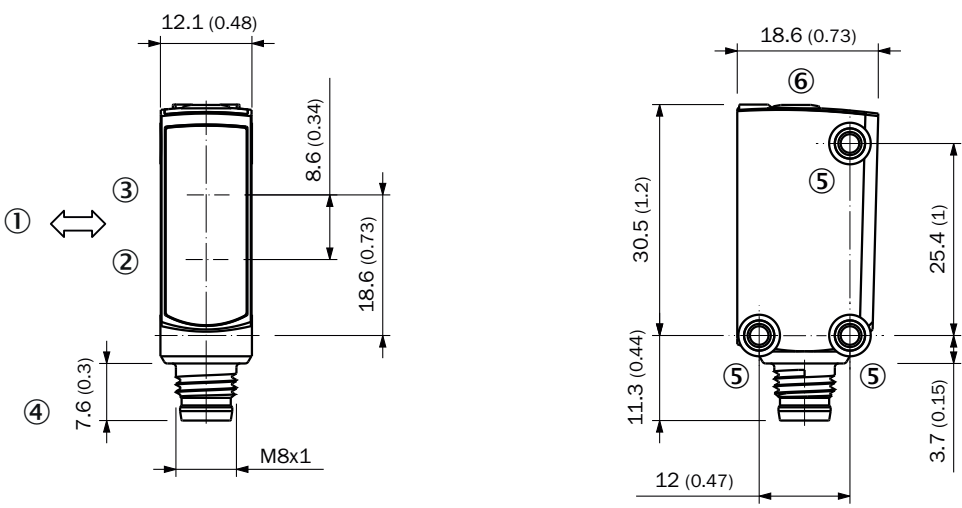
Recommended sensing range for the best performance



Sensing range diagram



Dimensional drawing (Dimensions in mm (inch))



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.

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For us, that is “Sensor Intelligence.”

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