



WTB4SP-21311220ZZZ

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	part no.
WTB4SP-21311220ZZZ	1139075

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

Detailed technical data

Features

Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression, NarrowBeam
Sensing range	
Sensing range min.	4 mm
Sensing range max.	130 mm
Adjustable switching threshold for background suppression	10 mm ... 130 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 70 mm distance
Recommended sensing range for the best performance	20 mm ... 90 mm
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	1.8 mm (70 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at Ta = +23 °C)
Focus position	70 mm
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 Ta = +25 °C

Smallest detectable object (MDO) typ.		
		0.1 mm (At 70 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
Display		
	LED blue	BluePilot: sensing range indicator
	LED green	Operating indicatorStatic on: power on
	LED yellow	Status of received light beamStatic on: object presentStatic off: object not present
Special applications		Detecting uneven, shiny objects, Detection of poorly remitting and tilted objects

Safety-related parameters

MTTF_D	1,404 years
DC_{avg}	0%

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	1
	Type	Push-pull: PNP/NPN
	Switching mode	Light 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	≤ 500 μs
	Repeatability (response time)	150 μs
	Switching frequency	1,000 Hz
Pin/Wire assignment		
	Function of pin 4/black (BK)	Digital output, light switching, object present → output Q HIGH ²⁾

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 mm x 41.9 mm x 18.6 mm

Connection	Connector M8, 3-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 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +75 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 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 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 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

Certificates

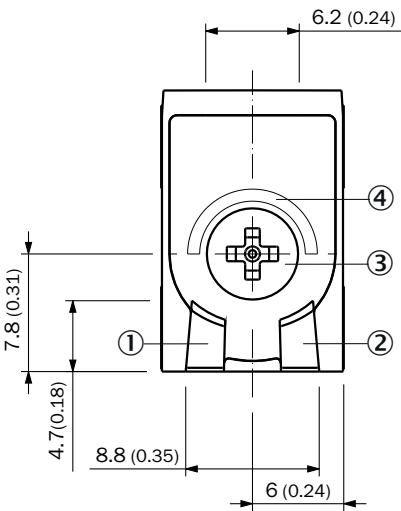
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China-RoHS	✓
cULus certificate	✓

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

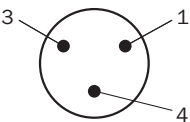
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

display and adjustment elements

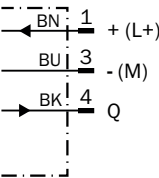


- ① LED green
- ② LED yellow
- ③ Teach-Turn adjustment
- ④ LED blue

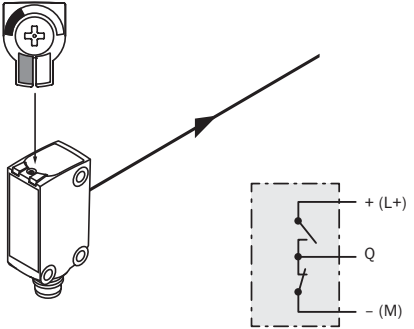
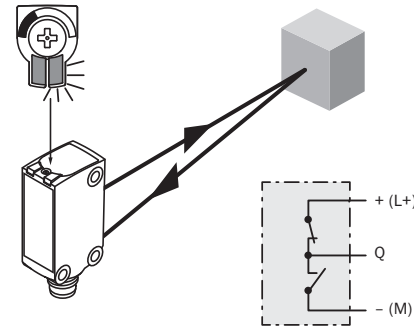
Connection type Connector M8, 3-pin



Connection diagram Cd-045

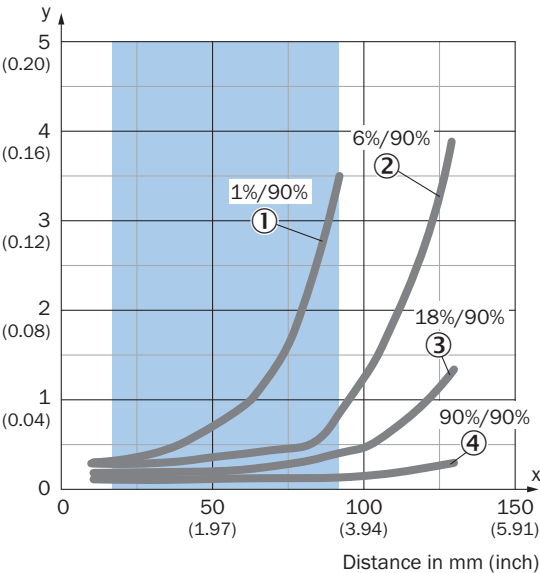


Truth table Push-pull: PNP/NPN - light switching Q

	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	✗	⚡
		

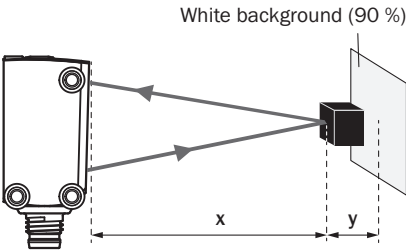
Characteristic curve

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



- ① ultra-black object, 1% remission factor
- ② Black object, 6% remission factor
- ③ Gray object, 18% remission factor
- ④ White object, 90% remission factor

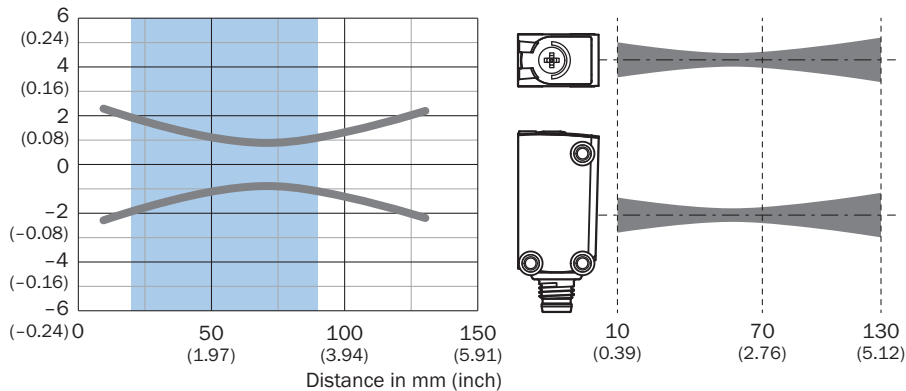
Example:
Safe suppression of the background



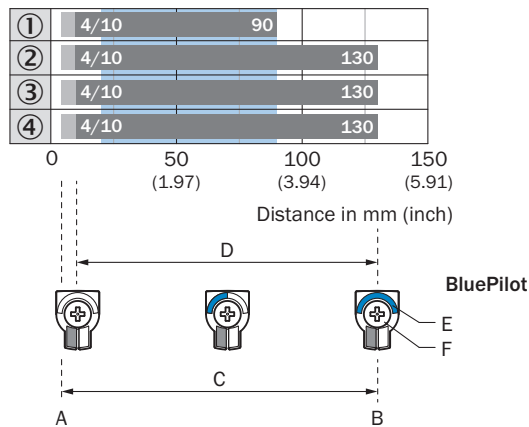
Black object (6 % remission factor)
Set sensing range $x = 80 \text{ mm}$
Needed minimum distance to white background $y = 0.5 \text{ mm}$

Light spot size

Dimensions in mm (inch)



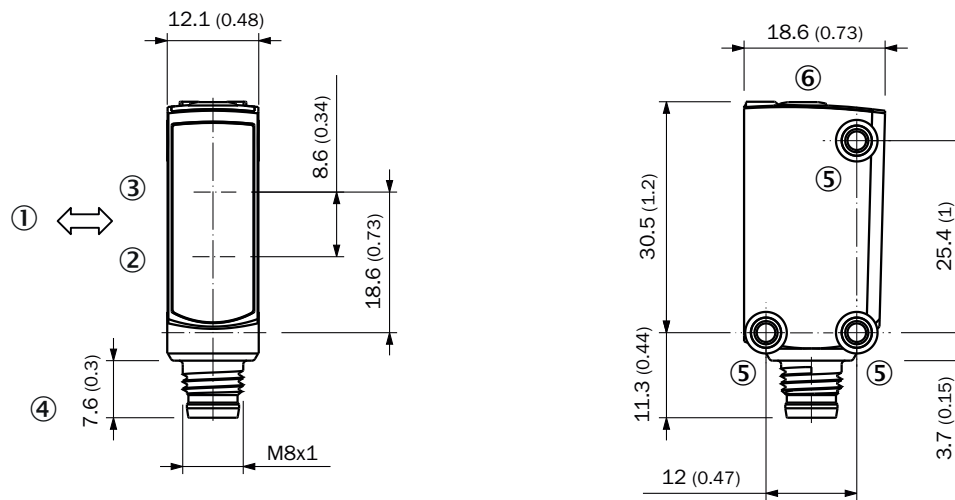
Sensing range diagram



Recommended sensing range for the best performance

1	Ultra-black object, 1% remission factor
2	Black object, 6% remission factor
3	Gray object, 18% remission factor
4	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, sensor



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 M3 mounting hole
- ⑥ display and adjustment elements

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:

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