



# WTB4SP-21311220ZZZ

W4

MINIATURE PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

Type	Part no.
WTB4SP-21311220ZZZ	1139075

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

### Detailed technical data

#### Features

<b>Functional principle</b>	Photoelectric proximity sensor
<b>Functional principle detail</b>	Background suppression, NarrowBeam
<b>Sensing range</b>	
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
<b>Emitted beam</b>	
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)
<b>Focus position</b>	70 mm
<b>Key LED figures</b>	

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 $T_a = +25 \text{ }^\circ\text{C}$
<b>Smallest detectable object (MDO) typ.</b>	0.1 mm (At 70 mm distance) Object with 90% remission factor (complies with standard white according to DIN 5033)
<b>Adjustment</b>	
Teach-Turn adjustment	BluePilot: For setting the sensing range
<b>Indication</b>	
LED blue	BluePilot: sensing range indicator
LED green	Operating indicator Static on: power on
LED yellow	Status of received light beam Static on: object present Static off: object not present
<b>Special applications</b>	Detecting uneven, shiny objects, Detection of poorly remitting and tilted objects

#### Safety-related parameters

<b>MTTF<sub>D</sub></b>	1,404 years
<b>DC<sub>avg</sub></b>	0%

#### Electrical data

<b>Supply voltage <math>U_B</math></b>	10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>	$\leq 5 V_{pp}$
<b>Usage category</b>	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
<b>Current consumption</b>	$\leq 20 \text{ mA}$ , without load. At $U_B = 24 \text{ V}$
<b>Protection class</b>	III
<b>Digital output</b>	
Number	1
Type	Push-pull: PNP/NPN
Switching mode	Light 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	$\leq 500 \text{ } \mu\text{s}$
Repeatability (response time)	150 $\mu\text{s}$
Switching frequency	1,000 Hz
<b>Pin/Wire assignment</b>	
Function of pin 4/black (BK)	Digital output, light switching, object present $\rightarrow$ output Q HIGH <sup>2)</sup>

<sup>1)</sup> Limit values.

<sup>2)</sup> This switching output must not be connected to another output.

Mechanical data

<b>Housing</b>	Rectangular
<b>Design detail</b>	Slim
<b>Dimensions (W x H x D)</b>	12.1 mm x 41.9 mm x 18.6 mm
<b>Connection</b>	Connector M8, 3-pin
<b>Material</b>	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Male connector	Plastic, VISTAL®
<b>Maximum tightening torque of the fixing screws</b>	0.4 Nm

Ambient data

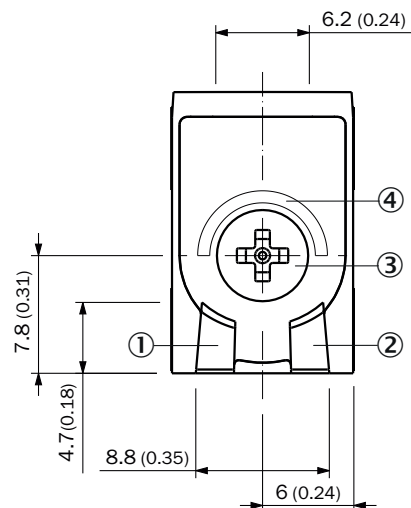
<b>Enclosure rating</b>	IP66 (EN 60529) IP67 (EN 60529)
<b>Ambient operating temperature</b>	-40 °C ... +60 °C
<b>Ambient temperature, storage</b>	-40 °C ... +75 °C
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
<b>Shock resistance</b>	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
<b>Vibration resistance</b>	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 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

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

## Adjustments

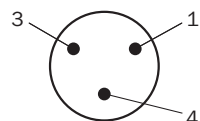
Display and adjustment elements



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

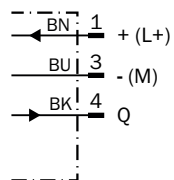
## Connection type

Connector M8, 3-pin



## Connection diagram

Cd-045



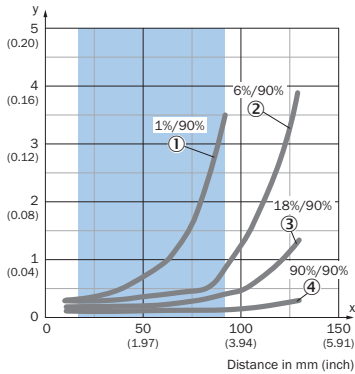
**Truth table**

Push-pull: PNP/NPN - light switching Q

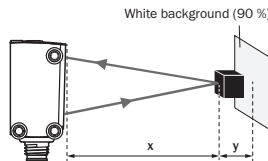
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	⊗	☑
Light receive indicator	⊗	☑
Load resistance to L+	⚠	⊗
Load resistance to M	⊗	⚠

**Characteristic curve**

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



Example:  
Safe suppression of the background



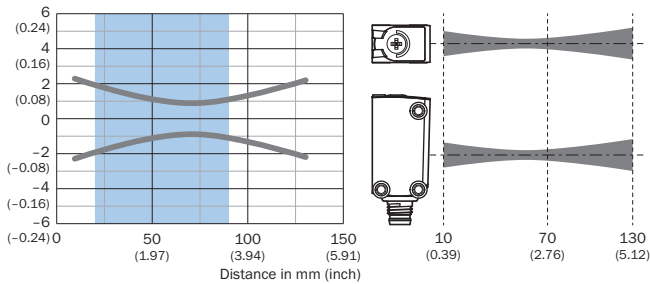
Black object (6 % remission factor)  
 Set sensing range x = 80 mm  
 Needed minimum distance to white background y = 0.5 mm

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

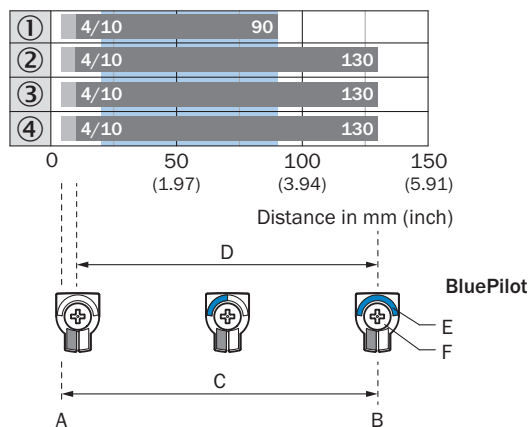
**Light spot size**

Dimensions in mm (inch)



Recommended sensing range for the best performance

### Sensing range diagram

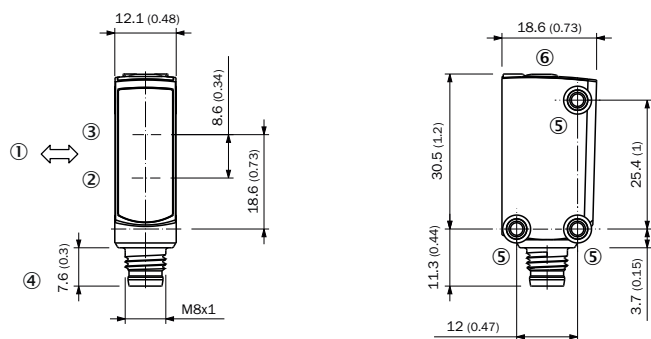


Recommended sensing range for the best performance

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 (Dimensions in mm (inch))

Dimensional drawing, sensor



- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- 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:

Contacts and other locations –[www.sick.com](http://www.sick.com)