



WTB4SP-31312100ZZZ

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

Type	Part no.
WTB4SP-31312100ZZZ	1139283

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.	100 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%)	5 mm, at a distance of 100 mm
Recommended sensing range for the best performance	40 mm ... 100 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 (100 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 $T_a = +25\text{ °C}$						
Smallest detectable object (MDO) typ.	0.2 mm (at a distance of 100 mm) Object with 90% remission factor (complies with standard white according to DIN 5033)						
Adjustment	None –						
Indication	<table border="0"> <tr> <td>LED blue</td> <td>BluePilot: Alignment aid</td> </tr> <tr> <td>LED green</td> <td>Operating indicator Static on: power on</td> </tr> <tr> <td>LED yellow</td> <td>Status of received light beam Static on: object not present Static off: object present Flashing: Below the 1.5 function reserve</td> </tr> </table>	LED blue	BluePilot: Alignment aid	LED green	Operating indicator Static on: power on	LED yellow	Status of received light beam Static on: object not present Static off: object present Flashing: Below the 1.5 function reserve
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Special features	Fixed sensing range 100 mm						

Safety-related parameters

MTTF_D	1,404 years
DC_{avg}	0%

Electrical data

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾																				
Ripple	$\leq 5 V_{pp}$																				
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)																				
Current consumption	$\leq 20\text{ mA}$, without load. At $U_B = 24\text{ V}$																				
Protection class	III																				
Digital output	<table border="0"> <tr> <td>Number</td> <td>1</td> </tr> <tr> <td>Type</td> <td>Push-pull: PNP/NPN</td> </tr> <tr> <td>Switching mode</td> <td>Dark switching</td> </tr> <tr> <td>Signal voltage PNP HIGH/LOW</td> <td>Approx. $U_B - 2.5\text{ V} / 0\text{ V}$</td> </tr> <tr> <td>Signal voltage NPN HIGH/LOW</td> <td>Approx. $U_B / < 2.5\text{ V}$</td> </tr> <tr> <td>Output current I_{max}</td> <td>$\leq 100\text{ mA}$</td> </tr> <tr> <td>Circuit protection outputs</td> <td>Reverse polarity protected Overcurrent protected Short-circuit protected</td> </tr> <tr> <td>Response time</td> <td>$\leq 500\text{ }\mu\text{s}$</td> </tr> <tr> <td>Repeatability (response time)</td> <td>150 μs</td> </tr> <tr> <td>Switching frequency</td> <td>1,000 Hz</td> </tr> </table>	Number	1	Type	Push-pull: PNP/NPN	Switching mode	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	$\leq 500\text{ }\mu\text{s}$	Repeatability (response time)	150 μs	Switching frequency	1,000 Hz
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Pin/Wire assignment	Function of pin 4/black (BK) Digital output, dark switching, object present \rightarrow output \bar{Q} LOW ²⁾																				

¹⁾ Limit values.

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

Mechanical data

Housing	Rectangular
Design detail	Slim
Dimensions (W x H x D)	12.1 mm x 41.9 mm x 18.6 mm
Connection	Cable with connector M8, 3-pin, 110 mm
Connection detail	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm ²
Cable diameter	Ø 3.4 mm
Length of cable (L)	77 mm
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
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

Classifications

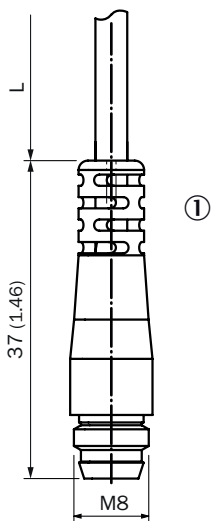
ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903

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))

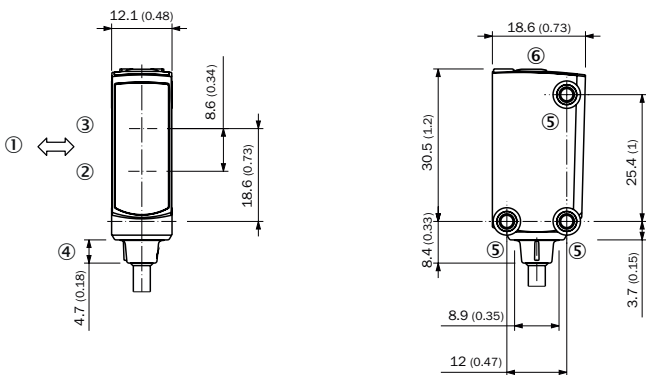
Dimensional drawing, connection



For length of cable (L), see technical data

① Cable with connector M8

Dimensional drawing, sensor



① Standard direction of the material being detected

② Center of optical axis, sender

③ Center of optical axis, receiver

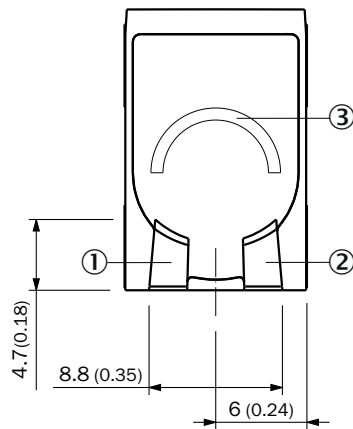
④ Connection

⑤ M3 mounting hole

⑥ Display and adjustment elements

Adjustments

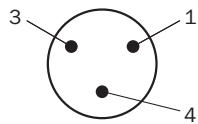
Display and adjustment elements



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

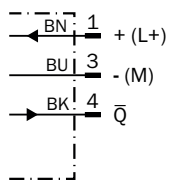
Connection type

Connector M8, 3-pin



Connection diagram

Cd-514



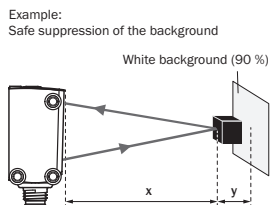
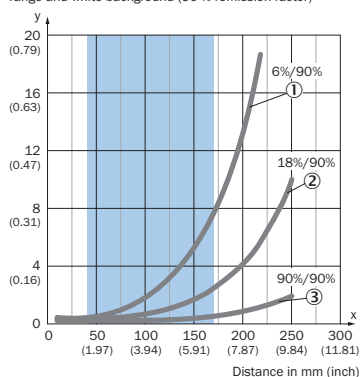
Truth table

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 factor)



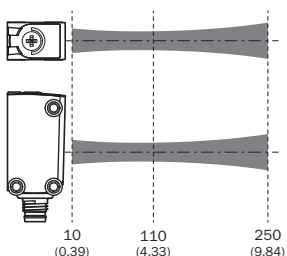
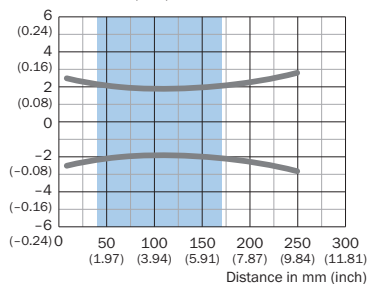
Black object (6 % remission factor)
Set sensing range $x = 150$ mm
Needed minimum distance to white background $y = 5.5$ mm

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

Light spot size

Dimensions in mm (inch)



Recommended sensing range for the best performance

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.”

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