



**WTB4ST-31312120ZZZ**

W4

**PHOTOELECTRIC SENSORS**

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
WTB4ST-31312120ZZZ	1140101

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

Illustration may differ



## Detailed technical data

## Features

<b>Functional principle</b>	Photoelectric proximity sensor
<b>Functional principle detail</b>	Background suppression, DoubleLine
<b>Sensing range</b>	
Sensing range min.	0 mm
Sensing range max.	150 mm
Adjustable switching threshold for background suppression	10 mm ... 150 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%)	0.8 mm, At 70 mm distance
Recommended sensing range for the best performance	50 mm ... 90 mm
<b>Emitted beam</b>	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Line-shaped, two parallel line-shaped light spots
Light spot size (distance)	2.5 mm x 16 mm (50 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at Ta = +23 °C)
<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 Ta = +25 °C
<b>Smallest detectable object (MDO) typ.</b>	

	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>Display</b>	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
<b>Special applications</b>	Detecting flat objects, Detecting objects wrapped in film, Detecting perforated objects, Detecting uneven, shiny objects

## Safety-related parameters

<b>MTTF<sub>D</sub></b>	1,399 years
<b>DC<sub>avg</sub></b>	0%

## Electronics

<b>Supply voltage U<sub>B</sub></b>	10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>	≤ 5 V <sub>pp</sub>
<b>Usage category</b>	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
<b>Current consumption</b>	≤ 20 mA, without load. At U <sub>B</sub> = 24 V
<b>Protection class</b>	III
<b>Digital output</b>	
Number	1
Type	Push-pull: PNP/NPN
Switching mode	Dark switching
Signal voltage PNP HIGH/LOW	Approx. U <sub>B</sub> -2.5 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. U <sub>B</sub> / < 2.5 V
Output current I <sub>max.</sub>	≤ 100 mA
Circuit protection outputs	Reverse polarity protected
	Overcurrent protected
	Short-circuit protected
Response time	≤ 1,000 µs
Repeatability (response time)	240 µs
Switching frequency	500 Hz
<b>Pin/Wire assignment</b>	
Function of pin 4/black (BK)	Digital output, dark switching, object present → output $\bar{Q}$ LOW <sup>2)</sup>

<sup>1)</sup> Limit values.<sup>2)</sup> This switching output must not be connected to another output.

## Mechanics

<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>	Cable with connector M8, 3-pin, 110 mm

<b>Connection detail</b>	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm <sup>2</sup>
Cable diameter	Ø 3.4 mm
Length of cable (L)	77 mm
<b>Material</b>	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
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

## Certificates

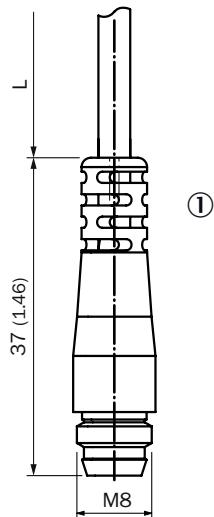
<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>Moroccan declaration of conformity</b>	✓
<b>China-RoHS</b>	✓
<b>cULus certificate</b>	✓

## 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

## Dimensional drawing, connection

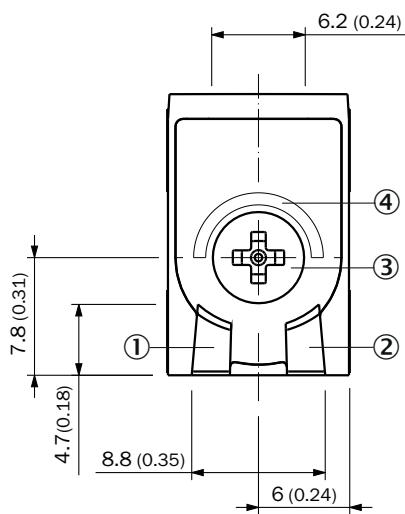


Dimensions in mm (inch)

For length of cable (L), see technical data

① cable with connector M8

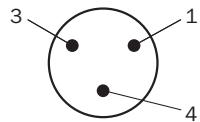
## display and adjustment elements



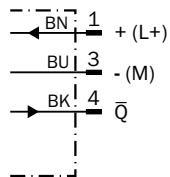
① LED green

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

### Connection type Connector M8, 3-pin



### Connection diagram Cd-514

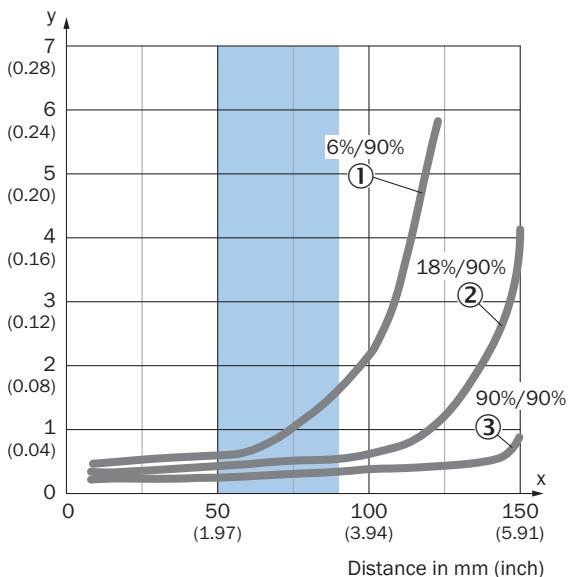


### Truth table Push-pull: PNP/NPN – dark switching $\bar{Q}$

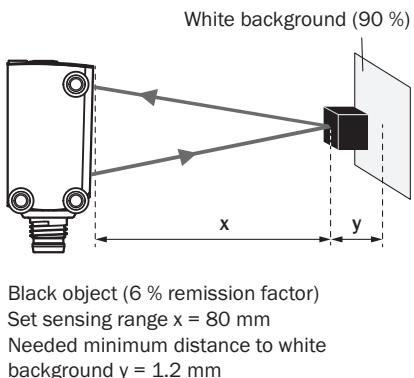
Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))		
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	✗
Load resistance to L+	✗	✗
Load resistance to M	✗	✗
	<div style="border: 1px dashed gray; padding: 5px; display: inline-block;"> </div>	<div style="border: 1px dashed gray; padding: 5px; display: inline-block;"> </div>

## Characteristic curve

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



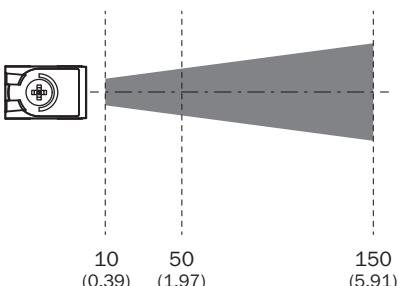
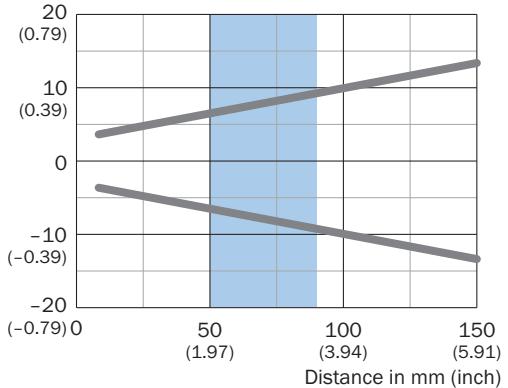
Example:  
Safe suppression of the background



- 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

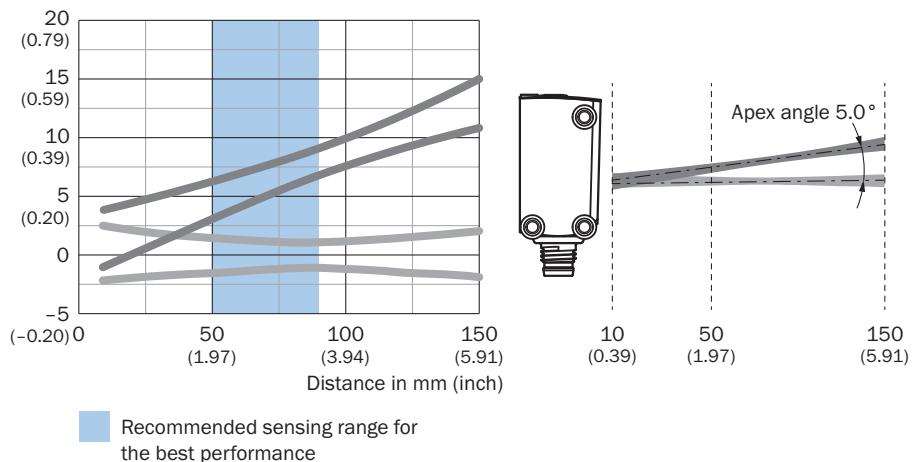
Dimensions in mm (inch)



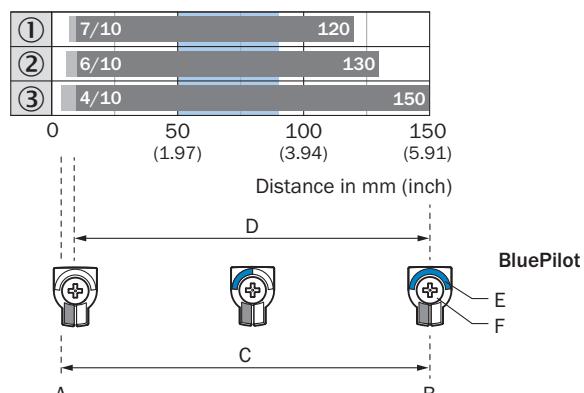
- Recommended sensing range for the best performance

## Light spot size

Dimensions in mm (inch)



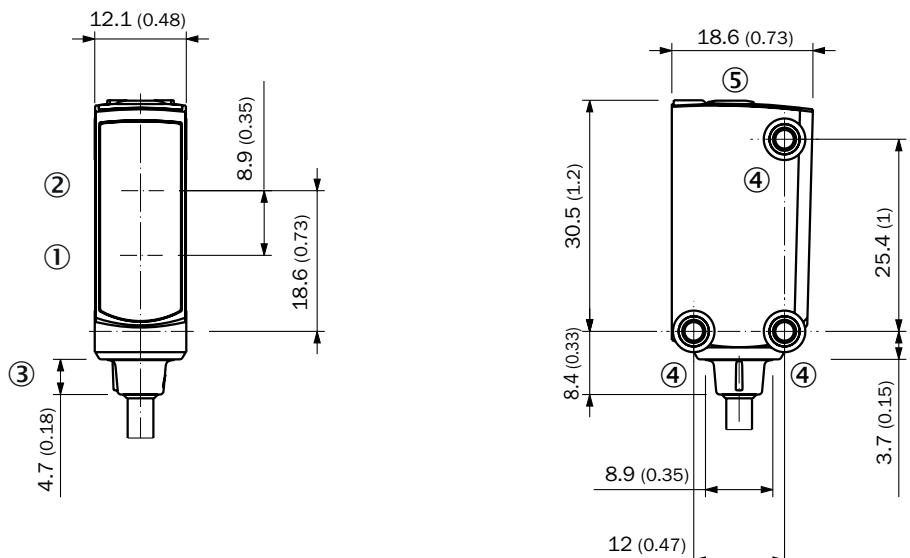
## Sensing range diagram



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, sensor



Dimensions in mm (inch)

- ① Center of optical axis, receiver
- ② Center of optical axis, sender
- ③ Connection
- ④ M3 mounting hole
- ⑤ 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)