



# WTB4SP-22167220A00

## W4

MINIATURE PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ



Ordering information

| Type               | Part no. |
|--------------------|----------|
| WTB4SP-22167220A00 | 1139487  |

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 <sub>a</sub> = +25 °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   |
| IO-Link                                      | For configuring the sensor parameters and Smart Task functions                               |
| <b>Display</b>                               |  |
| LED blue                                     | BluePilot: sensing range indicator   |
| LED green                                    | Operating indicator<br>Static on: power on<br>Flashing: IO-Link mode                         |
| LED yellow                                   | Status of received light beam<br>Static on: object present<br>Static off: object not present |
| <b>Special features</b>                      | Pin2 pre-setting (MF): teach-in via cable  |
| <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%          |

#### Communication interface

|                             |  |
|-----------------------------|--|
| <b>IO-Link</b>              | ✓, 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 <sub>L1</sub><br>Bit 1 = switching signal Q <sub>L2</sub><br>Bit 2 ... 15 = Current receiver level (live) |
| VendorID                    | 26   |
| DeviceID HEX                | 0x80034F   |
| DeviceID DEC                | 8389455  |
| Compatible master port type | A  |
| SIO mode support            | Yes  |

#### 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) |

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

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

|                                       |   |
|---------------------------------------|---|
|                                       | DC-13 (According to EN 60947-5-2)   |
| <b>Current consumption</b>            | ≤ 20 mA, without load. At $U_B = 24\text{ V}$   |
| <b>Protection class</b>               | III   |
| <b>Digital output</b>                 |   |
| Number                                | 2   |
| 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 $I_{\max.}$            | ≤ 100 mA  |
| Circuit protection outputs            | Reverse polarity protected<br>Overcurrent protected<br>Short-circuit protected                                  |
| Response time                         | ≤ 500 $\mu\text{s}$   |
| 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 → output $Q_{L1}$ HIGH <sup>2)</sup><br>IO-Link communication C |
| Function of pin 4/black (BK) – detail | The pin 4 function of the sensor can be configured<br>Additional possible settings via IO-Link                  |
| Function of pin 2/white (WH)          | Digital input, teach, HIGH active <sup>2)</sup>   |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be configured<br>Additional possible settings via IO-Link                  |

<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>                                     | Male connector M8, 4-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)<br>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<br>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  |

## Smart Task

|                                  |   |
|----------------------------------|---|
| <b>Smart Task name</b>           | Base logics   |
| <b>Logic function</b>            | Direct<br>AND<br>OR   |
| <b>Timer function</b>            | Deactivated<br>Switch-on delay<br>Off delay<br>ON and OFF delay<br>Impulse (one shot) |
| <b>Inverter</b>                  | Yes   |
| <b>Switching frequency</b>       | SIO Logic: 900 Hz <sup>1)</sup>   |
| <b>Response time</b>             | SIO Logic: 550 µs <sup>1)</sup>   |
| <b>Repeatability</b>             | SIO Logic: 200 µs <sup>1)</sup>   |
| <b>Switching signal</b>          |   |
| Switching signal Q <sub>L1</sub> | Switching output  |
| Switching signal $\bar{Q}_{L1}$  | Switching output  |

<sup>1)</sup> Use of Smart Task functions without IO-Link communication (SIO mode).

## Diagnosis

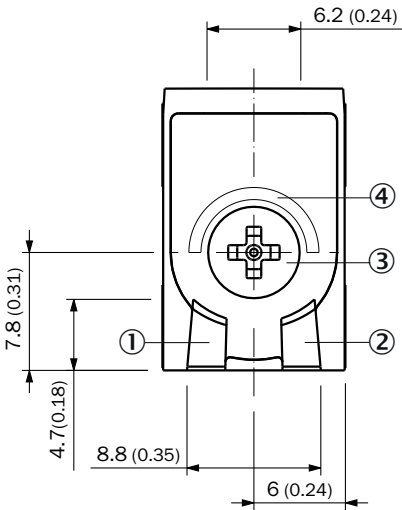
|  |                                      |
|--|--------------------------------------|
| <b>Device temperature</b>                          |                                      |
| Measuring range                                    | Very cold, cold, moderate, warm, hot |
| <b>Device status</b>                               | Yes                                  |
| <b>Detailed device status</b>                      | Yes                                  |
| <b>Operating hour counter</b>                      | Yes                                  |
| <b>Operating hours counter with reset function</b> | Yes                                  |
| <b>Quality of teach</b>                            | Yes                                  |

## Classifications

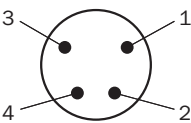
|                     |          |
|---------------------|----------|
| <b>ECLASS 5.0</b>   | 27270904 |
| <b>ECLASS 5.1.4</b> | 27270904 |
| <b>ECLASS 6.0</b>   | 27270904 |
| <b>ECLASS 6.2</b>   | 27270904 |
| <b>ECLASS 7.0</b>   | 27270904 |
| <b>ECLASS 8.0</b>   | 27270904 |
| <b>ECLASS 8.1</b>   | 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 |

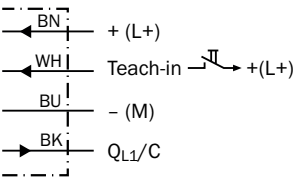
Adjustments



Connection type



Connection diagram

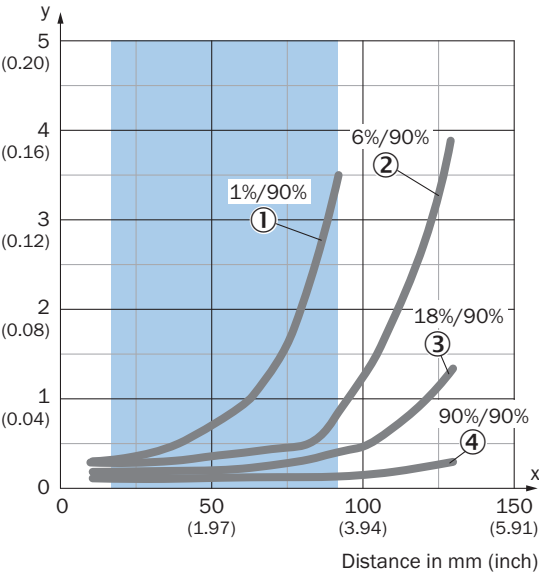


Truth table

|                         | 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    | ⊗  | ⚡                            |
|                         |  |                              |

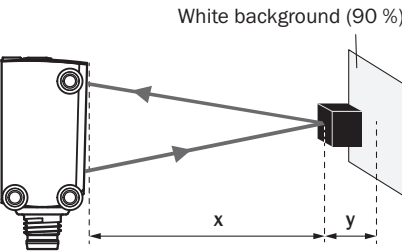
Characteristic curve

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



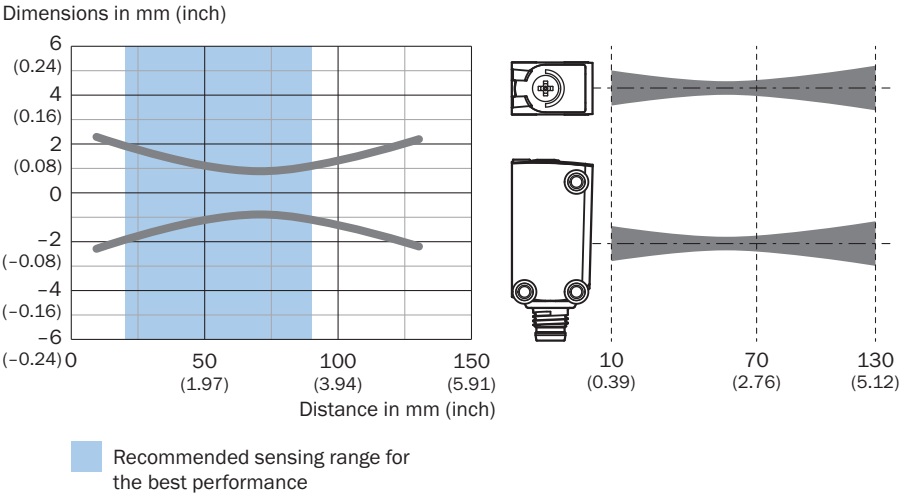
Recommended sensing range for the best performance

Example:  
Safe suppression of the background

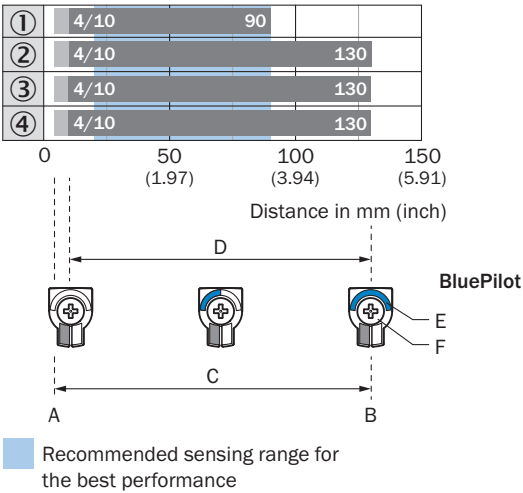


Black object (6 % remission factor)  
Set sensing range  $x = 80 \text{ mm}$   
Needed minimum distance to white background  $y = 0.5 \text{ mm}$

Light spot size

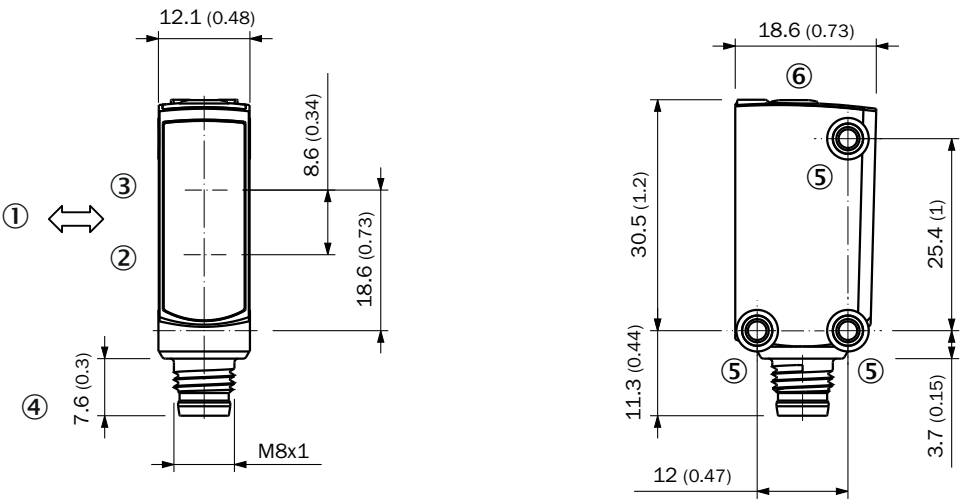


Sensing range diagram





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.

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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