



DATA SHEET

# WTB4FP-97311A0ZZZ

W4  
Photoelectric sensors

PHOTOELECTRIC SENSORS

WTB4FP-97311A0ZZZ

ORDERING INFORMATION

| Type              | part no. |
|-------------------|----------|
| WTB4FP-97311A0ZZZ | 1125738  |

Further device versions and accessories at [www.sick.com/W4](http://www.sick.com/W4)



Illustration may differ



DETAILED TECHNICAL DATA

FEATURES

|                                       |   |   |
|---------------------------------------|---|---|
| Functional principle                  | Photoelectric proximity sensor  |   |
| Functional principle detail           | Background suppression, MultiPulse  |   |
| Sensing range                         | Sensing range min.  | 28 mm   |
|                                       | Sensing range max.  | 165 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%)                                      | 23 mm, at a distance of 165 mm  |
| Emitted beam                          | Light source  | PinPoint LED  |
|                                       | Type of light   | Visible red light   |
|                                       | Shape of light spot   | Point-shaped  |
|                                       | Light spot size (distance)  | Ø 4.2 mm (130 mm)   |
|                                       | Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)                       | < +/- 1.5° (at T <sub>0</sub> = +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 <sub>a</sub> = +25 °C  |
| Smallest detectable object (MDO) typ. | 0.2 mm, At 130 mm distance (object with remission factor of 90% (complies with standard white according to DIN 5033)) |   |
| Adjustment                            | None  | -   |
| Display                               | LED green   | Operating indicator   |

|                  |            |   |
|------------------|------------|---|
|                  | LED yellow | Static on: power on<br>Status of received light beam<br>Oscillating: object present<br>Static off: object not present |
| Special features |            | MultiPulse: sensor with self-monitoring   |

## SAFETY-RELATED PARAMETERS

|                               |           |
|-------------------------------|-----------|
| MTTF <sub>0</sub>             | 642 years |
| DC <sub>avg</sub>             | 0 %       |
| T <sub>M</sub> (mission time) | 20 years  |

## ELECTRONICS

|                                 |   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
|---------------------------------|---|------------------------------|---|------|--------------------|-----------------------------|--------------------------------------|-----------------------------|----------------------------------|---------------------------------|----------|----------------------------|--|---------------|-----------------------|-------------------------------|--------|---------------------|---------------------|
| Supply voltage U <sub>B</sub>   | 10 V DC ... 30 V DC <sup>1)</sup>   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Ripple                          | ≤ 5 V <sub>pp</sub>   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Usage category                  | DC-12 (According to EN 60947-5-2)<br>DC-13 (According to EN 60947-5-2)  |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Current consumption             | ≤ 25 mA, without load. At U <sub>B</sub> = 24 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>Signal voltage PNP HIGH/LOW</td> <td>Approx. U<sub>B</sub> - 2.5 V / 0 V</td> </tr> <tr> <td>Signal voltage NPN HIGH/LOW</td> <td>Approx. U<sub>B</sub> / &lt; 2.5 V</td> </tr> <tr> <td>Output current I<sub>max</sub></td> <td>≤ 100 mA</td> </tr> <tr> <td>Circuit protection outputs</td> <td>Reverse polarity protected<br/>Overcurrent protected<br/>Short-circuit protected</td> </tr> <tr> <td>Response time</td> <td>≤ 0.1 s<sup>2)</sup></td> </tr> <tr> <td>Repeatability (response time)</td> <td>150 μs</td> </tr> <tr> <td>Switching frequency</td> <td>10 Hz<sup>3)</sup></td> </tr> </table> | Number                       | 1   | Type | Push-pull: PNP/NPN | 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<br>Overcurrent protected<br>Short-circuit protected | Response time | ≤ 0.1 s <sup>2)</sup> | Repeatability (response time) | 150 μs | Switching frequency | 10 Hz <sup>3)</sup> |
| Number                          | 1   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Type                            | Push-pull: PNP/NPN  |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| 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<br>Overcurrent protected<br>Short-circuit protected  |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Response time                   | ≤ 0.1 s <sup>2)</sup>   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Repeatability (response time)   | 150 μs  |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Switching frequency             | 10 Hz <sup>3)</sup>   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Pin/Wire assignment             | <table border="0"> <tr> <td>Function of pin 4/black (BK)</td> <td>Digital output, object present → output Q, HIGH/LOW oscillating 10 Hz<sup>4)</sup></td> </tr> </table>  | Function of pin 4/black (BK) | Digital output, object present → output Q, HIGH/LOW oscillating 10 Hz <sup>4)</sup> |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |
| Function of pin 4/black (BK)    | Digital output, object present → output Q, HIGH/LOW oscillating 10 Hz <sup>4)</sup>   |                              |   |      |                    |                             |                                      |                             |                                  |                                 |          |                            |  |               |                       |                               |        |                     |                     |

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

<sup>2)</sup> Signal transit time with resistive load in switching mode.

<sup>3)</sup> With light/dark ratio 1:1.

<sup>4)</sup> This switching output must not be connected to another output.

## MECHANICS

|                        |   |                      |                        |                |                      |                |              |                     |                  |
|------------------------|---|----------------------|------------------------|----------------|----------------------|----------------|--------------|---------------------|------------------|
| Housing                | Rectangular   |                      |                        |                |                      |                |              |                     |                  |
| Design detail          | Flat  |                      |                        |                |                      |                |              |                     |                  |
| Dimensions (W x H x D) | 16 mm x 40.1 mm x 12.1 mm   |                      |                        |                |                      |                |              |                     |                  |
| Connection             | Cable with plug M8, 3-pin, with knurled nut, 318 mm   |                      |                        |                |                      |                |              |                     |                  |
| Connection detail      | <table border="0"> <tr> <td>Deep-freeze property</td> <td>Do not bend below 0 °C</td> </tr> <tr> <td>Conductor size</td> <td>0.14 mm<sup>2</sup></td> </tr> <tr> <td>Cable diameter</td> <td>Ø 3.4 mm</td> </tr> <tr> <td>Length of cable (L)</td> <td>280 mm</td> </tr> </table> | 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) | 280 mm           |
| 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)    | 280 mm  |                      |                        |                |                      |                |              |                     |                  |
| Material               | <table border="0"> <tr> <td>Housing</td> <td>Plastic, VISTAL®</td> </tr> <tr> <td>Front screen</td> <td>Plastic, PMMA</td> </tr> <tr> <td>Cable</td> <td>Plastic, PVC</td> </tr> <tr> <td>Male connector</td> <td>Plastic, VISTAL®</td> </tr> </table>                            | Housing              | Plastic, VISTAL®       | Front screen   | Plastic, PMMA        | Cable          | Plastic, PVC | Male connector      | Plastic, VISTAL® |
| Housing                | Plastic, VISTAL®  |                      |                        |                |                      |                |              |                     |                  |
| Front screen           | Plastic, PMMA   |                      |                        |                |                      |                |              |                     |                  |
| Cable                  | Plastic, PVC  |                      |                        |                |                      |                |              |                     |                  |
| Male connector         | Plastic, VISTAL®  |                      |                        |                |                      |                |              |                     |                  |
| Weight                 | Approx. 30 g  |                      |                        |                |                      |                |              |                     |                  |

|  |        |
|--|--------|
| Maximum tightening torque of the fixing screws | 0.4 Nm |
|--|--------|

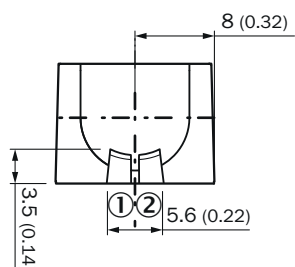
### AMBIENT DATA

|                                     |   |
|-------------------------------------|---|
| Enclosure rating                    | IP66 (EN 60529)<br>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<br>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

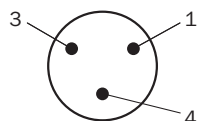
|                                    |   |
|------------------------------------|---|
| EU declaration of conformity       | ✓ |
| UK declaration of conformity       | ✓ |
| ACMA declaration of conformity     | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS                         | ✓ |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

### DISPLAY AND ADJUSTMENT ELEMENTS

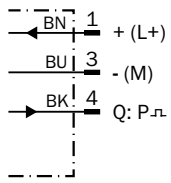


- ① LED green
- ② LED yellow

### CONNECTION TYPE CONNECTOR M8, 3-PIN

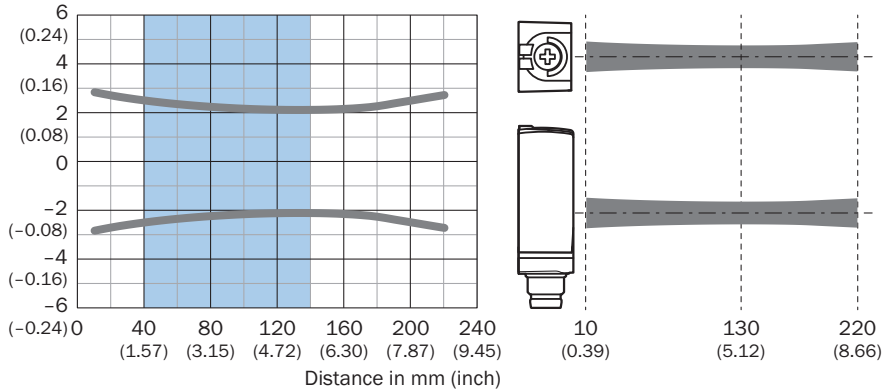


**CONNECTION DIAGRAM CD-522**



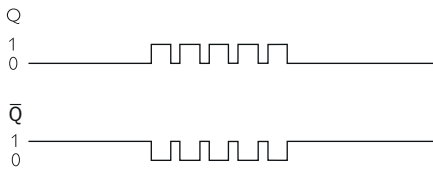
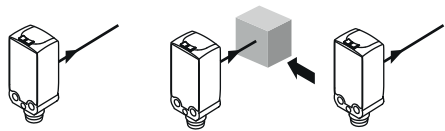
**LIGHT SPOT SIZE**

Dimensions in mm (inch)

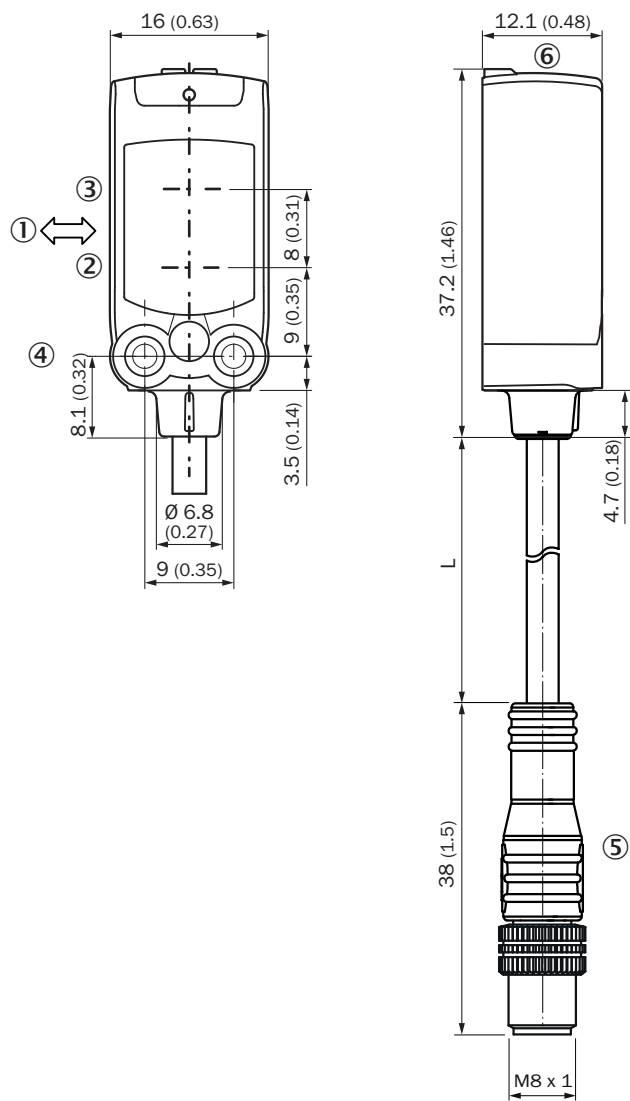


Recommended sensing range for the best performance

**FUNCTIONAL PRINCIPLE: SWITCHING STATUS**



**DIMENSIONAL DRAWING**



Dimensions in mm (inch)

For length of cable (L), see technical data

- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ M3 mounting hole
- ⑤ Cable with plug M8, with knurled nut
- ⑥ display and adjustment elements

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at [www.sick.com/1125738](http://www.sick.com/1125738)



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# SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

**SICK**  
Sensor Intelligence