



# WSE4FP-22162100A00

W4

MINIATURE PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



## Ordering information

| Type               | Part no. |
|--------------------|----------|
| WSE4FP-22162100A00 | 1116537  |

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

Illustration may differ



## Detailed technical data

### Features

|   |   |
|---|---|
| <b>Functional principle</b>   | Through-beam photoelectric sensor           |
| <b>Sensing range</b>  |   |
| Sensing range min.  | 0 m   |
| Sensing range max.  | 10 m  |
| Maximum distance range from receiver to sender (operating reserve 1)                            | 0 m ... 10 m                                |
| Recommended distance range from receiver to sender (operating reserve 2)                        | 0 m ... 7.5 m                               |
| Recommended sensing range for the best performance  | 0 m ... 7.5 m                               |
| <b>Emitted beam</b>   |   |
| Light source  | PinPoint LED                                |
| Type of light   | Visible red light                           |
| Shape of light spot   | Point-shaped                                |
| Light spot size (distance)  | Ø 40 mm (1,000 mm)                          |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.5° (at T <sub>a</sub> = +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 T <sub>a</sub> = +25 °C        |

|   |  |  |
|---|--|--|
| <b>Adjustment</b>                           | IO-Link  | For configuring the sensor parameters and Smart Task functions                               |
|   | Wire/pin   | For deactivation of the sender and execution of test logic                                   |
| <b>Indication</b>                           | LED blue   | BluePilot: Alignment aid   |
|   | 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 not present<br>Static off: object present |
| <b>Part number of individual components</b> | WS04FP-223ZZ1A0ZZZ, 2113053<br>WE04FP-22162100A00, 2113054 |  |

### Safety-related parameters

|                                     |           |
|-------------------------------------|-----------|
| <b>MTTF<sub>D</sub></b>             | 574 years |
| <b>DC<sub>avg</sub></b>             | 0 %       |
| <b>T<sub>M</sub> (mission time)</b> | 20 years  |

### 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> |
| VendorID                    | 26   |
| DeviceID HEX                | 0x800193   |
| DeviceID DEC                | 8389011  |
| Compatible master port type | A  |
| SIO mode support            | Yes  |

### Electrical data

|                                     |  |
|-------------------------------------|--|
| <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)<br>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                              | 2 (Complementary)  |
| 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   |

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

<sup>2)</sup> With light/dark ratio 1:1.

|                                       |   |
|---------------------------------------|---|
| Circuit protection outputs            | Reverse polarity protected<br>Overcurrent protected<br>Short-circuit protected                        |
| Response time                         | ≤ 500 μs  |
| Switching frequency                   | 1,000 Hz <sup>2)</sup>  |
| <b>Digital input</b>                  |   |
| Number                                | 1   |
| <b>Pin/Wire assignment, sender</b>    |   |
| Function of pin 4/black (BK)          | Input, sender off, LOW active   |
| <b>Pin/Wire assignment, receiver</b>  |   |
| Function of pin 4/black (BK)          | Digital output, light switching, object present → output Q <sub>L1</sub> LOW; IO-Link communication C |
| Function of pin 4/black (BK) – detail | The pin 4 function of the sensor can be configured, Additional possible settings via IO-Link          |
| Function of pin 2/white (WH)          | Digital output, dark switching, object present → output $\bar{Q}_{L1}$ HIGH                           |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be configured, Additional possible settings via IO-Link          |

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

<sup>2)</sup> With light/dark ratio 1:1.

### Mechanical data

|   |                           |
|---|---------------------------|
| <b>Housing</b>  | Rectangular               |
| <b>Design detail</b>                                  | Flat                      |
| <b>Dimensions (W x H x D)</b>                         | 16 mm x 40.1 mm x 12.1 mm |
| <b>Connection</b>                                     | Male connector M8, 4-pin  |
| <b>Material</b>                                       |                           |
| Housing   | Plastic, VISTAL®          |
| Front screen  | Plastic, PMMA             |
| Male connector  | Plastic, VISTAL®          |
| <b>Weight</b>   | Approx. 30 g              |
| <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: ≤ 15,000 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>On delay<br>Off delay<br>ON and OFF delay<br>Impulse (one shot) |
| <b>Inverter</b>                  | Yes  |
| <b>Switching frequency</b>       | SIO Logic: 800 Hz <sup>1)</sup><br>IOL: 750 Hz <sup>2)</sup>                   |
| <b>Response time</b>             | SIO Logic: 600 μs <sup>1)</sup><br>IOL: 650 μs <sup>2)</sup>                   |
| <b>Repeatability</b>             | SIO Logic: 200 μs <sup>1)</sup><br>IOL: 250 μs <sup>2)</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).

<sup>2)</sup> Use of Smart Task functions with IO-Link communication function.

## 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                                  |

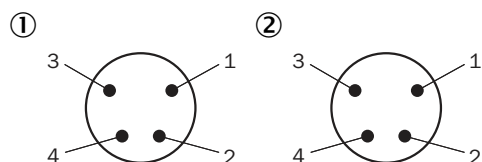
## Classifications

|                     |          |
|---------------------|----------|
| <b>eCl@ss 5.0</b>   | 27270901 |
| <b>eCl@ss 5.1.4</b> | 27270901 |
| <b>eCl@ss 6.0</b>   | 27270901 |
| <b>eCl@ss 6.2</b>   | 27270901 |
| <b>eCl@ss 7.0</b>   | 27270901 |
| <b>eCl@ss 8.0</b>   | 27270901 |
| <b>eCl@ss 8.1</b>   | 27270901 |
| <b>eCl@ss 9.0</b>   | 27270901 |
| <b>eCl@ss 10.0</b>  | 27270901 |
| <b>eCl@ss 11.0</b>  | 27270901 |
| <b>eCl@ss 12.0</b>  | 27270901 |
| <b>ETIM 5.0</b>     | EC002716 |
| <b>ETIM 6.0</b>     | EC002716 |

|                       |          |
|-----------------------|----------|
| <b>ETIM 7.0</b>       | EC002716 |
| <b>ETIM 8.0</b>       | EC002716 |
| <b>UNSPSC 16.0901</b> | 39121528 |

## Connection type

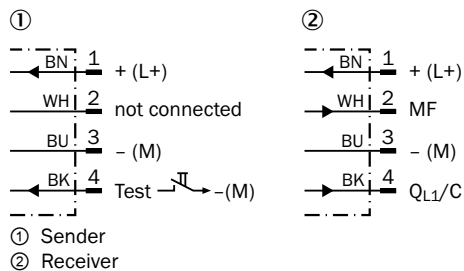
Male connector M8, 4-pin



- ① Receiver
- ② Sender

## Connection diagram

Cd-392



- ① Sender
- ② Receiver

## Truth table

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

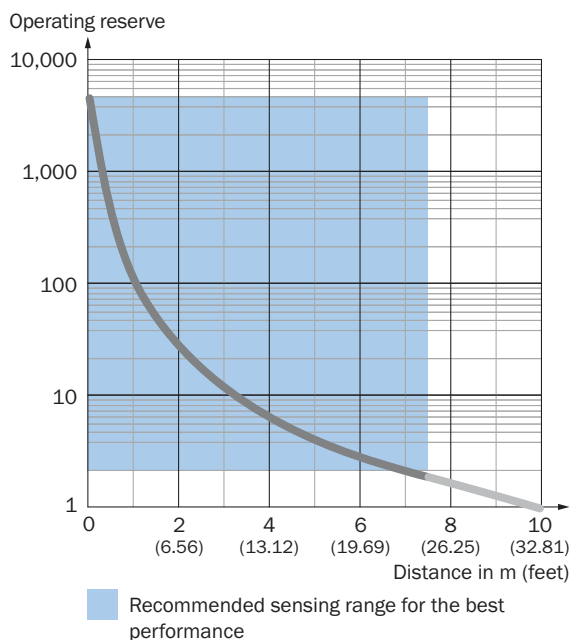
|                         | Dark switching $\bar{Q}$ (normally open (upper switch), normally closed (lower switch)) |                              |
|-------------------------|---|------------------------------|
|                         | Object not present → Output LOW   | Object present → Output HIGH |
| Light receive           | ✔   | ✘                            |
| Light receive indicator | ☀   | ✘                            |
| Load resistance to L+   | ⚠   | ✘                            |
| Load resistance to M    | ✘   | ⚠                            |
|                         |   |                              |

Push-pull: PNP/NPN - light switching Q

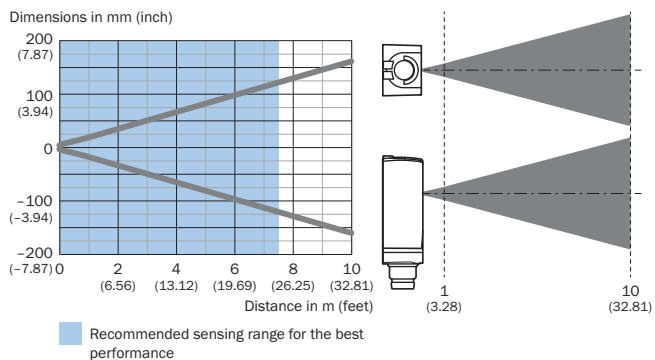
|                         | Light switching Q (normally closed (upper switch), normally open (lower switch)) |                             |
|-------------------------|--|-----------------------------|
|                         | Object not present → Output HIGH   | Object present → Output LOW |
| Light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

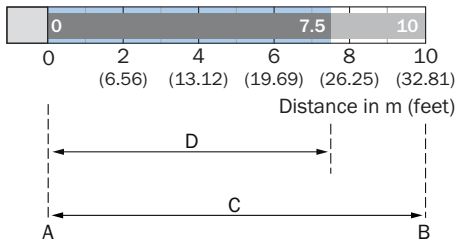
Characteristic curve



Light spot size



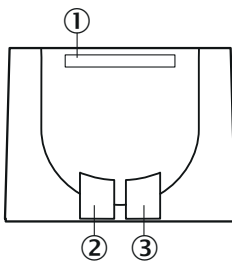
### Sensing range diagram



- A = Sensing range min. in m
  - B = Sensing range max. in m
  - C = Maximum distance range from receiver to sender
  - D = Recommended distance range from receiver to sender
- Recommended sensing range for the best performance

### Adjustments

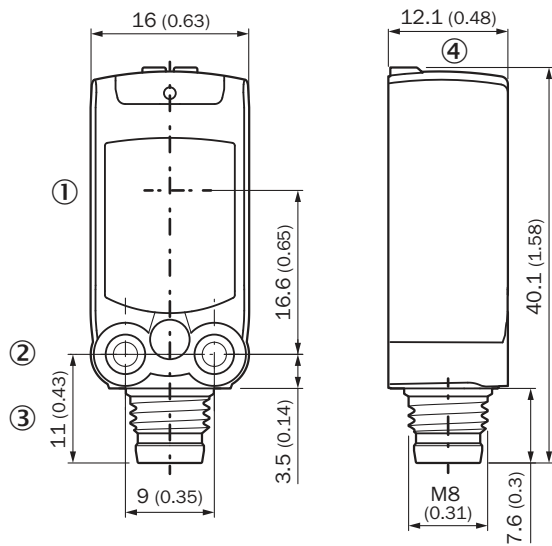
Display and adjustment elements



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





**Dimensional drawing** (Dimensions in mm (inch))



- ① Center of optical axis
- ② M3 mounting hole
- ③ Connection
- ④ Display and adjustment elements

**Recommended accessories**

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

|   | Brief description  | Type       | Part no. |
|---|--|------------|----------|
| <b>Mounting brackets and plates</b>   |  |            |          |
|  | Mounting bracket for wall mounting, Stainless steel 1.4571, mounting hardware included | BEF-W4-A   | 2051628  |
| <b>Plug connectors and cables</b>   |  |            |          |
|  | Head A: male connector, M8, 4-pin, straight<br>Cable: unshielded                       | STE-0804-G | 6037323  |

## 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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