



WSE4SP-22161100A00

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.

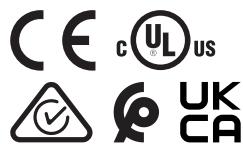


Ordering information

| Type | part no. |
|--------------------|----------|
| WSE4SP-22161100A00 | 1140392 |

Other models and accessories → www.sick.com/W4

Illustration may differ



Detailed technical data

Features

| | | |
|---|--|--|
| Functional principle | Through-beam photoelectric sensor | |
| Sensing range | | |
| Sensing range min. | 0 m | |
| Sensing range max. | 12 m | |
| Maximum distance range from receiver to sender (operating reserve 1) | 0 m ... 12 m | |
| Recommended distance range from receiver to sender (operating reserve 2) | 0 m ... 9 m | |
| Recommended sensing range for the best performance | 0 m ... 9 m | |
| Emitted beam | | |
| Light source | PinPoint LED | |
| Type of light | Visible red light | |
| Shape of light spot | Point-shaped | |
| Light spot size (distance) | 60 mm (2 m) | |
| 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 Ta = +25 °C | |
| Adjustment | | |
| IO-Link | For configuring the sensor parameters and Smart Task functions | |
| Display | | |
| LED blue | BluePilot: Alignment aid | |
| LED green | Operating indicatorStatic on: power onFlashing: IO-Link mode | |

| | | |
|---|------------|--|
| | LED yellow | Status of received light beam Static on: object not present Static off: object present Flashing: Below the 1.5 function reserve |
| Special applications | | Detection of poorly remitting and tilted objects |
| Part number of individual components | | WS04SP-223ZZ1A0ZZ, 2137117 WE04SP-22161100A00, 2140373 |

Safety-related parameters

| | |
|-------------------------|-------------|
| MTTF_D | 1,219 years |
| DC_{avg} | 0% |

Communication interface

| | |
|-----------------------------|--|
| IO-Link | ✓, 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 _{L1} Bit 1 = switching signal Q _{L2} Bit 2 ... 15 = empty |
| VendorID | 26 |
| Compatible master port type | A |
| SIO mode support | Yes |

Electronics

| | |
|-------------------------------------|--|
| Supply voltage U_B | 10 V DC ... 30 V DC ¹⁾ |
| Ripple | ≤ 5 V _{pp} |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | ≤ 20 mA, without load. At U _B = 24 V |
| Protection class | III |
| Digital output | |
| Number | 2 |
| Type | Push-pull: PNP/NPN |
| Switching mode | Dark switching |
| Signal voltage PNP HIGH/LOW | Approx. U _B -2.5 V / 0 V |
| Signal voltage NPN HIGH/LOW | Approx. U _B / < 2.5 V |
| Output current I _{max.} | ≤ 100 mA |
| Circuit protection outputs | Reverse polarity protected Overcurrent protected Short-circuit protected |
| Response time | ≤ 500 µs |
| Repeatability (response time) | 150 µs |
| Switching frequency | 1,000 Hz |
| Pin/Wire assignment, sender | |

¹⁾ Limit values.²⁾ This switching output must not be connected to another output.

| | |
|---------------------------------------|--|
| Function of pin 4/black (BK) | Input, sender off, LOW active |
| Pin/Wire assignment, receiver | |
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output \bar{Q}_{L1} HIGH ²⁾ |
| | 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 |

¹⁾ Limit values.²⁾ This switching output must not be connected to another output.

Mechanics

| | |
|---|-----------------------------|
| Housing | Rectangular |
| Design detail | Slim |
| Dimensions (W x H x D) | 12.1 mm x 41.9 mm x 18.6 mm |
| Connection | Male connector M8, 4-pin |
| Material | |
| Housing | Plastic, VISTAL® |
| Front screen | Plastic, PMMA |
| 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: ≤ 15,000 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 |

Smart Task

| | |
|------------------------|---|
| Smart Task name | Base logics |
| Logic function | Direct AND OR |
| Timer function | Deactivated Switch-on delay Off delay ON and OFF delay |

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

| | | |
|----------------------------|--------------------------------------|------------------|
| Inverter | Impulse (one shot) | |
| Switching frequency | Yes | |
| Response time | SIO Logic: 800 Hz ¹⁾ | |
| Repeatability | SIO Logic: 600 μ s ¹⁾ | |
| Switching signal | Switching signal Q_{L1} | Switching output |
| | Switching signal \bar{Q}_{L1} | Switching output |

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

Diagnosis

| | |
|--|--------------------------------------|
| Device temperature | |
| | Measuring range |
| | Very cold, cold, moderate, warm, hot |
| Device status | Yes |
| Detailed device status | Yes |
| Operating hour counter | Yes |
| Operating hours counter with reset function | Yes |
| Quality of teach | Yes |
| Quality of run | Yes, Contamination display |

Certificates

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

Classifications

| | |
|---------------------|----------|
| ECLASS 5.0 | 27270901 |
| ECLASS 5.1.4 | 27270901 |
| ECLASS 6.0 | 27270901 |
| ECLASS 6.2 | 27270901 |
| ECLASS 7.0 | 27270901 |
| ECLASS 8.0 | 27270901 |
| ECLASS 8.1 | 27270901 |
| ECLASS 9.0 | 27270901 |
| ECLASS 10.0 | 27270901 |
| ECLASS 11.0 | 27270901 |
| ECLASS 12.0 | 27270901 |
| ETIM 5.0 | EC002716 |
| ETIM 6.0 | EC002716 |
| ETIM 7.0 | EC002716 |

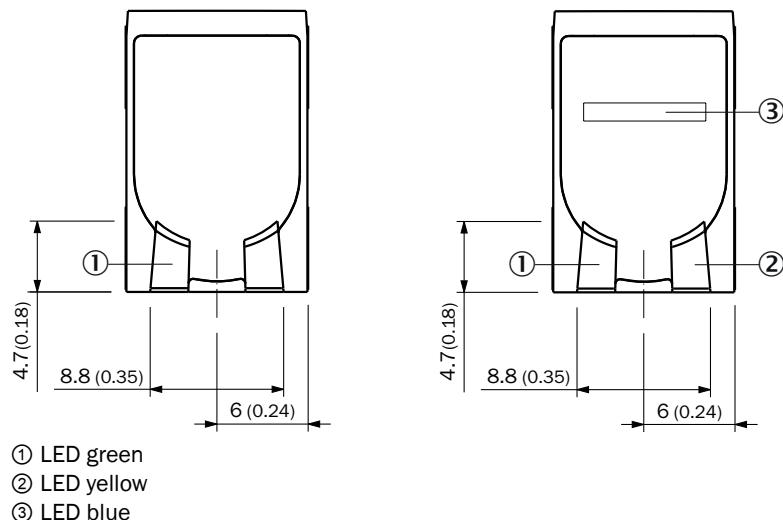
ETIM 8.0

EC002716

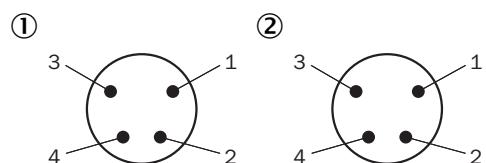
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display and adjustment elements



pinouts

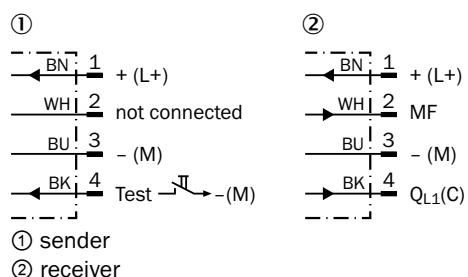


male connector M8, 4-pin

① receiver

② sender

Connection diagram Cd-516



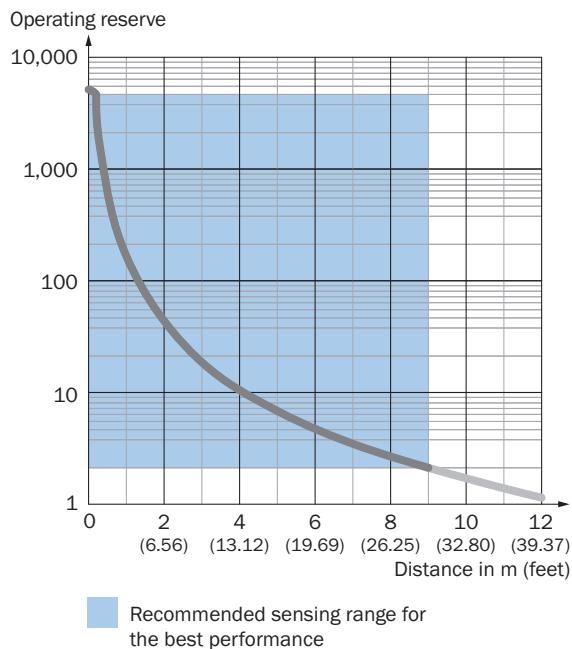
Truth table Push-pull: PNP/NPN – dark switching \bar{Q}

| 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 | ✗ | ✗ |
| | | |

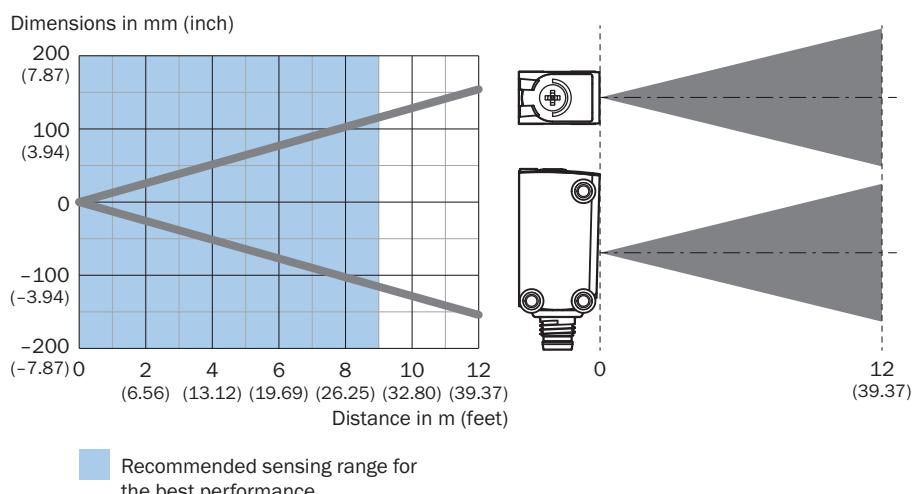
Truth table Push-pull: PNP/NPN - light switching Q

| 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 | ✗ | ✗ |
| | | |

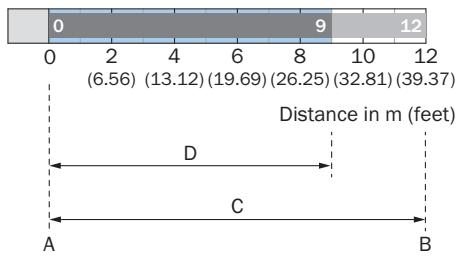
Characteristic curve



Light spot size



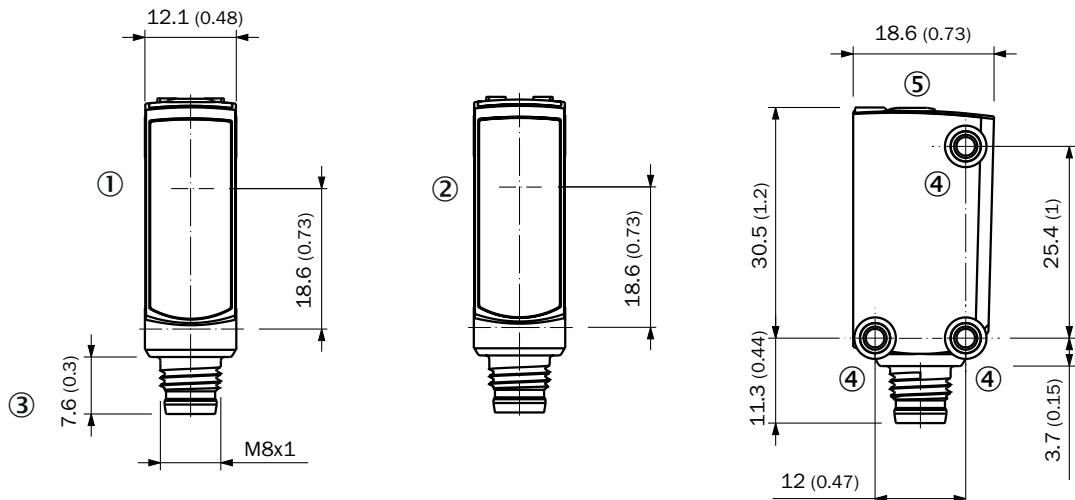
Sensing range diagram



Recommended sensing range for the best performance

| 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 |

Dimensional drawing, sensor



Dimensions in mm (inch)

- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- 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."

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Contacts and other locations www.sick.com