



WTB4SP-22161120A00

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|--------------------|----------|
| WTB4SP-22161120A00 | 1131618 |

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

Detailed technical data

Features

| | |
|---|---|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression |
| Sensing range | |
| Sensing range min. | 4 mm |
| Sensing range max. | 250 mm |
| Adjustable switching threshold for background suppression | 10 mm ... 250 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%) | 5 mm, at a distance of 150 mm |
| Recommended sensing range for the best performance | 40 mm ... 170 mm |
| Emitted beam | |
| Light source | PinPoint LED |
| Type of light | Visible red light |
| Shape of light spot | Point-shaped |
| Light spot size (distance) | 4 mm (150 mm) |
| 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 T _a = +25 °C |
| Smallest detectable object (MDO) typ. | | |
| | | 0.2 mm (At 180 mm distance) |
| | | Object with 90% remission factor (complies with standard white according to DIN 5033) |
| Adjustment | | |
| | Teach-Turn adjustment | BluePilot: For setting the sensing range |
| | IO-Link | For configuring the sensor parameters and Smart Task functions |
| Display | | |
| | LED blue | BluePilot: sensing range indicator |
| | LED green | Operating indicator Static on: power on Flashing: IO-Link mode |
| | LED yellow | Status of received light beam Static on: object present Static off: object not present |

Safety-related parameters

| | |
|-------------------------|-------------|
| MTTF_D | 1,404 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 = Current receiver level (live) |
| | VendorID | 26 |
| | DeviceID HEX | 0x80031B |
| | DeviceID DEC | 8389403 |
| | Supported DeviceIDs for predecessor DEZ models | 8388818 |
| | 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 |

¹⁾ Limit values.

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

| | |
|---------------------------------------|---|
| Protection class | III |
| Digital output | |
| Number | 2 |
| Type | Push-pull: PNP/NPN |
| Switching mode | Light/dark 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 $I_{\max.}$ | $\leq 100 \text{ mA}$ |
| Circuit protection outputs | Reverse polarity protected Overcurrent protected Short-circuit protected |
| Response time | $\leq 500 \mu\text{s}$ |
| Repeatability (response time) | $150 \mu\text{s}$ |
| Switching frequency | 1,000 Hz |
| Pin/Wire assignment | |
| Function of pin 4/black (BK) | Digital output, light switching, object present → output 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} LOW ²⁾ |
| 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: $\leq 50,000 \text{ lx}$ Sunlight: $\leq 50,000 \text{ lx}$ |
| 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 Impulse (one shot) |
| Inverter | Yes |
| Switching frequency | SIO Logic: 900 Hz ¹⁾ |
| Response time | SIO Logic: 550 µs ¹⁾ |
| Repeatability | SIO Logic: 200 µs 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

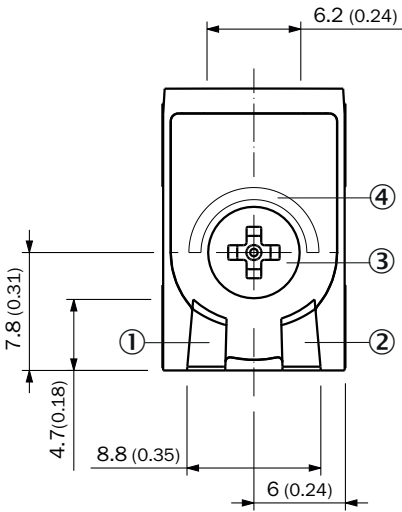
| | |
|--|--------------------------------------|
| Device temperature | |
| Measuring range | Very cold, cold, moderate, warm, hot |
| Device status | Yes |
| Detailed device status | Yes |
| Operating hour counter | Yes |
| Operating hours counter with reset function | Yes |
| Quality of teach | Yes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

Classifications

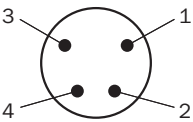
| | |
|---------------------|----------|
| ECLASS 5.0 | 27270904 |
| ECLASS 5.1.4 | 27270904 |
| ECLASS 6.0 | 27270904 |
| ECLASS 6.2 | 27270904 |
| ECLASS 7.0 | 27270904 |
| ECLASS 8.0 | 27270904 |
| ECLASS 8.1 | 27270904 |
| ECLASS 9.0 | 27270904 |
| ECLASS 10.0 | 27270904 |
| ECLASS 11.0 | 27270904 |
| ECLASS 12.0 | 27270903 |
| ETIM 5.0 | EC002719 |

| | |
|-----------------------|----------|
| ETIM 6.0 | EC002719 |
| ETIM 7.0 | EC002719 |
| ETIM 8.0 | EC002719 |
| UNSPSC 16.0901 | 39121528 |

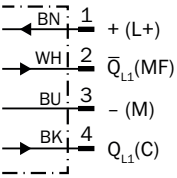
Adjustments



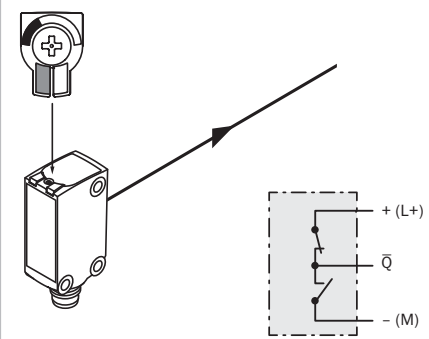
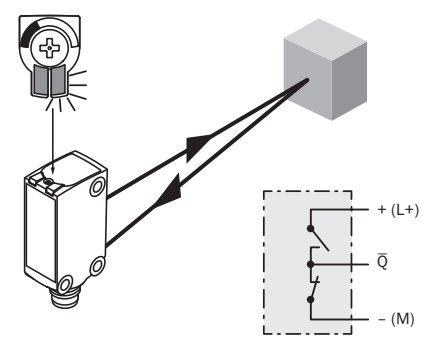
Connection type

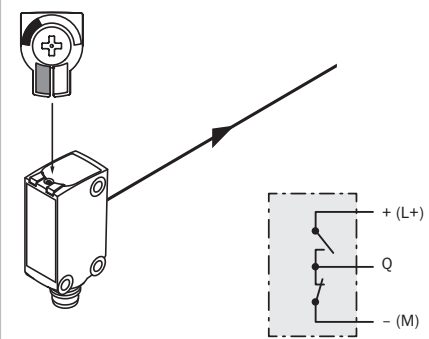
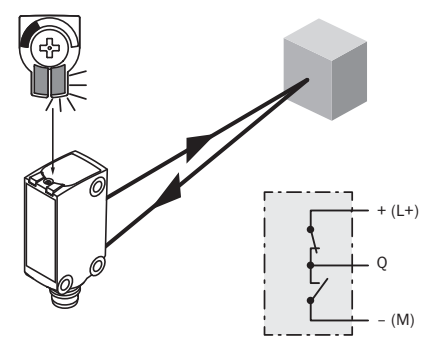


Connection diagram



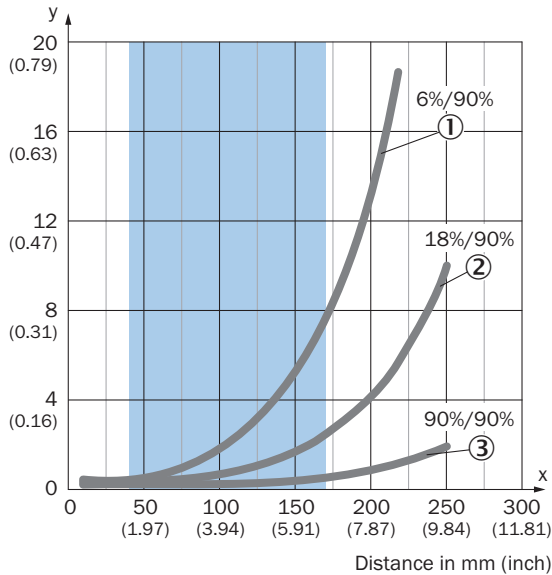
Truth table

| | 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 | ⚡ | ✗ |
| |  |  |

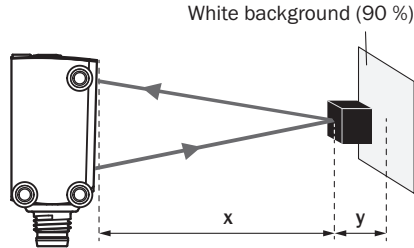
| | Light switching Q (normally open (upper switch), normally closed (lower switch)) | |
|-------------------------|---|---|
| | Object not present → Output LOW | Object present → Output HIGH |
| Light receive | ✗ | ✓ |
| Light receive indicator | ✗ | ☀ |
| Load resistance to L+ | ⚡ | ✗ |
| Load resistance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

Characteristic curve

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



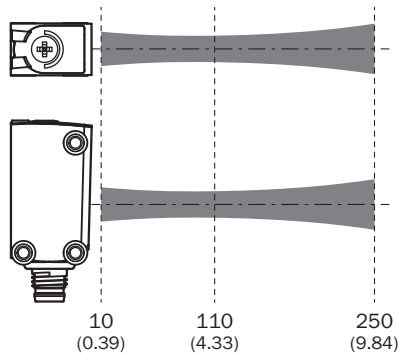
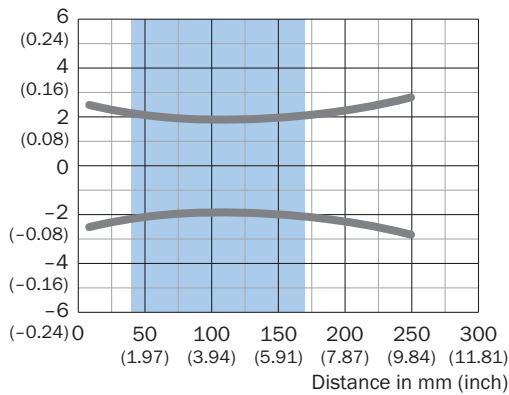
Example:
Safe suppression of the background



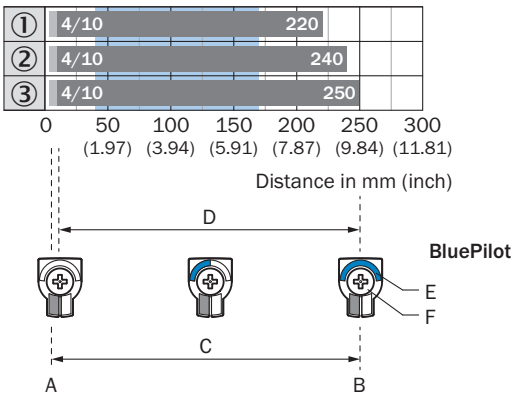
Black object (6 % remission factor)
Set sensing range $x = 150$ mm
Needed minimum distance to white background $y = 5.5$ mm

Light spot size

Dimensions in mm (inch)

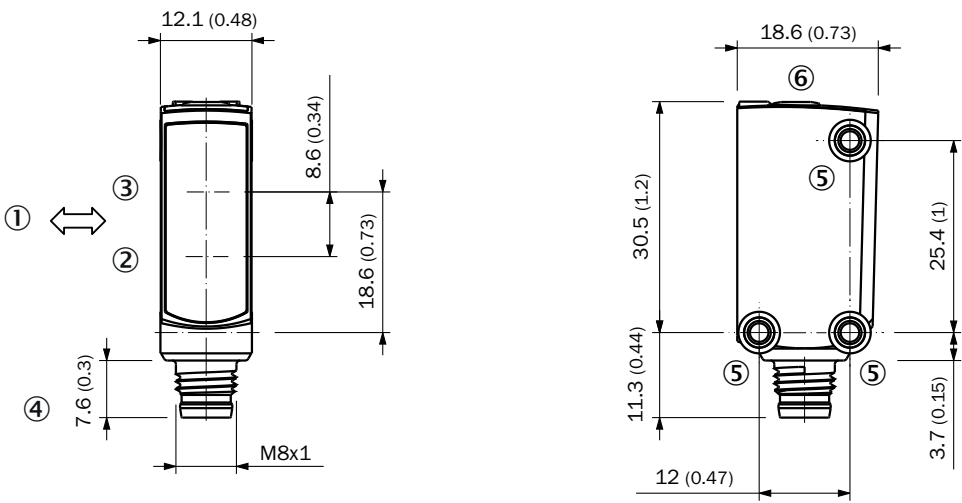


Sensing range diagram



Recommended sensing range for the best performance

Dimensional drawing (Dimensions in mm (inch))



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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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