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DATA SHEET

# WTB4SP-1H162120A00

W4
Photoelectric sensors

SICK Sensor Intelligence




Illustration may differ

## PHOTOELECTRIC SENSORS

# WTB4SP-1H162120A00

### ORDERING INFORMATION

| Type | part no. |
|---|---|
| WTB4SP-1H162120A00 | 1139081 |

Further device versions and accessories at 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 $T_U$ = +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<br>Object with 90% remission factor (complies with standard white according to DIN 5033) |
| Adjustment | |
| Teach-Turn adjustment | BluePilot<br>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<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 |

## 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 $Q_{L1}$<br>Bit 1 = switching signal $Q_{L2}$<br>Bit 2 ... 15 = Current receiver level (live) |
| VendorID | 26 |
| DeviceID HEX | 0x800335 |
| DeviceID DEC | 8389429 |
| 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)<br>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 | Light/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<br>Overcurrent protected<br>Short-circuit protected |
| Response time | ≤ 500 µs |
| Repeatability (response time) | 150 µs |

[1] Limit values.

[2] This switching output must not be connected to another output.

| | |
|---|---|
| Switching frequency | 1,000 Hz |
| Pin/Wire assignment | |
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output $\bar{Q}_{L1}$ LOW [2] |
| | 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 output, light switching, object present → output $Q_{L1}$ HIGH [2] |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be configured<br>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 | Cable, 4-wire, 2 m |
| Connection detail | |
| Deep-freeze property | Do not bend below 0 °C |
| Conductor size | 0.14 mm² |
| Cable diameter | Ø 3.4 mm |
| Length of cable (L) | 2 m |
| Material | |
| Housing | Plastic, VISTAL® |
| Front screen | Plastic, PMMA |
| Cable | Plastic, PVC |
| 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 |

## SMART TASK

| | |
|---|---|
| Smart Task name | Base logics |
| Logic function | Direct<br>AND<br>OR |
| Timer function | Deactivated<br>Switch-on delay<br>Off delay<br>ON and OFF delay<br>Impulse (one shot) |
| Inverter | Yes |

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

| | |
|---|---|
| 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).

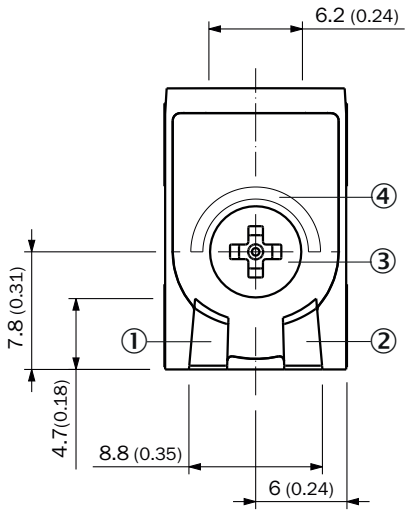
## DIAGNOSIS

| | |
|---|---|
| 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 |

## CERTIFICATES

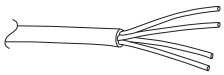
| | |
|---|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS | ✓ |
| China Compulsory Product Certification (CCC) exempt | ✓ |
| cULus certificate | ✓ |
| IO-Link certificate | ✓ |
| Photobiological safety (IEC EN 62471) | ✓ |
| Information according to Art. 3 of Data Act (Regulation EU 2023/2854) | ✓ |

## DISPLAY AND ADJUSTMENT ELEMENTS

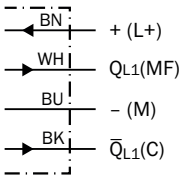



① LED green
② LED yellow
③ Teach-Turn adjustment
④ LED blue

## CONNECTION TYPE CABLE, 4-WIRE

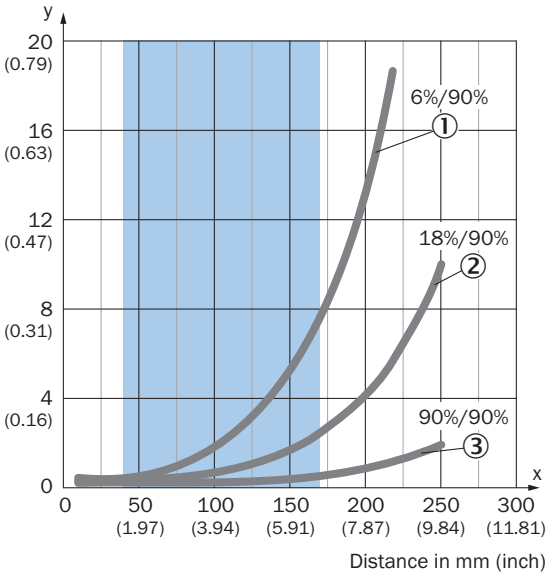


## CONNECTION DIAGRAM CD-504



## CHARACTERISTIC CURVE

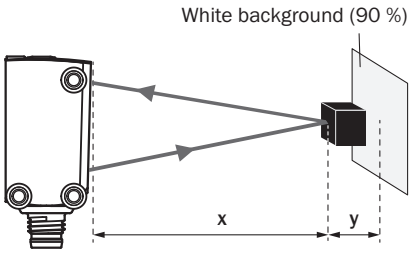
Minimum distance in mm (y) between the set sensing range and white background (90 % remission factor)




Recommended sensing range for the best performance

① Black object, 6% remission factor
② Gray object, 18% remission factor
③ White object, 90% remission factor

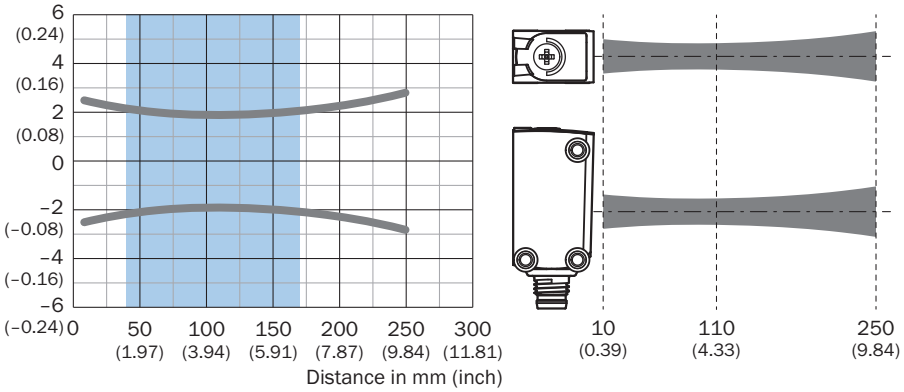
Example:
Safe suppression of the background




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

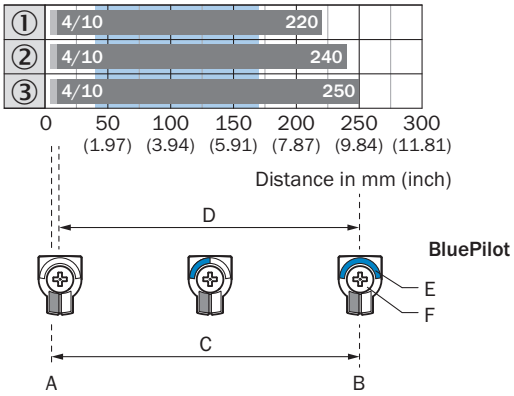
## LIGHT SPOT SIZE

Dimensions in mm (inch)




Recommended sensing range for the best performance

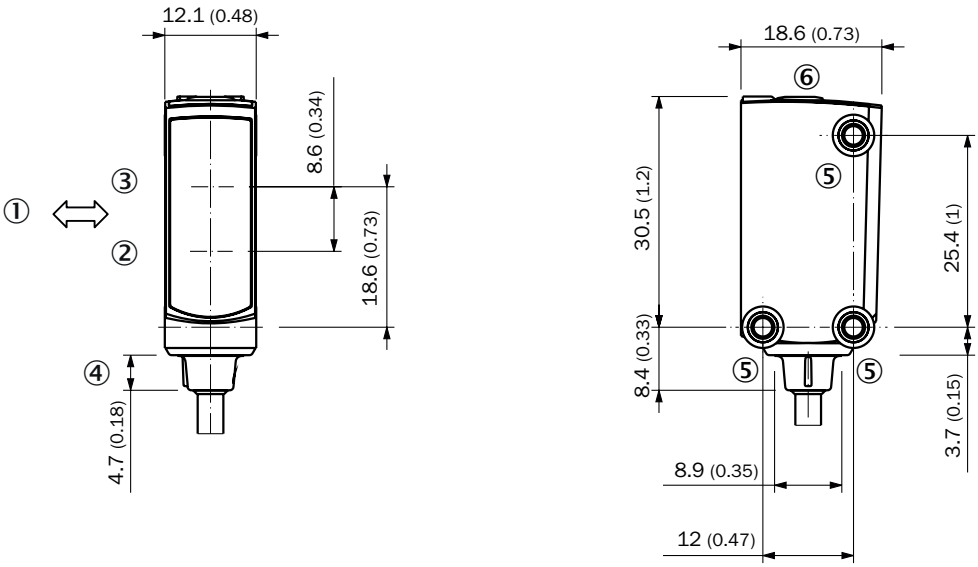
## SENSING RANGE DIAGRAM




Recommended sensing range for the best performance

| | |
|---|---|
| 1 | Black object, 6% remission factor |
| 2 | Gray object, 18% remission factor |
| 3 | White object, 90% remission factor |
| A | Sensing range min. in mm |
| B | Sensing range max. in mm |
| C | Field of view |
| D | Adjustable switching threshold for background suppression |
| E | Sensing range indicator |
| F | Teach-Turn adjustment |

## DIMENSIONAL DRAWING, SENSOR




Dimensions in mm (inch)
① Standard direction of the material being detected
② Center of optical axis, receiver
③ Center of optical axis, sender
④ Connection
⑤ M3 mounting hole
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/1139081



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