# WTB9LC-3P2462A70

W9

**SMALL PHOTOELECTRIC SENSORS**

**SICK**
Sensor Intelligence.

# WTB9LC-3P2462A70 | W9

## SMALL PHOTOELECTRIC SENSORS

## Ordering information

| Type | Part no. |
|---|---|
| WTB9LC-3P2462A70 | 1080943 |

The sensor is equipped with a special Smart Task function. Additional information can be found in the "Technical Data." Use of the sensor for pure object detection is limited.

Other models and accessories ➜ www.sick.com/W9

Illustration may differ

## Detailed technical data

## Features

| | |
|---|---|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression |
| Dimensions (W x H x D) | 12.2 mm x 52.2 mm x 23.6 mm |
| Housing design (light emission) | Rectangular |
| Mounting hole | M3 |
| Sensing range max. | 25 mm ... 300 mm [1] |
| Sensing range | 25 mm ... 300 mm [1] |
| Type of light | Visible red light |
| Light source | Laser [2] |
| Light spot size (distance) | Ø 1 mm (170 mm) |
| Wave length | 650 nm |
| Laser class | 1 (IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11) |
| Adjustment | IO-Link, Single teach-in button |
| Pin 2 configuration | External input, Teach-in input, Sender off input, Detection output, logic output |
| Special applications | Detecting small objects |

[1] Object with 90% remission (based on standard white, DIN 5033).
[2] Average service life: 50,000 h at $T_U$ = +25 °C.

## Mechanics/electronics

| | |
|---|---|
| **Supply voltage $U_B$** | 10 V DC … 30 V DC [1] |
| **Ripple** | < 5 $V_{pp}$ [2] |
| **Current consumption** | 30 mA [3] |
| **Switching output** | PNP [4] [5] |
| **Output function** | Complementary |
| **Switching mode** | Light/dark switching [4] |
| **Output current $I_{max.}$** | ≤ 100 mA |
| **Response time** | ≤ 0.5 ms [6] |
| **Response time Q/ on Pin 2** | 300 µs … 450 µs [6] [7] |
| **Switching frequency** | 1,000 Hz [8] |
| **Switching frequency Q / to pin 2** | ≤ 1,000 Hz [9] |
| **Connection type** | Male connector M12, 4-pin |
| **Circuit protection** | A [10]<br>B [11]<br>C [12] |
| **Protection class** | III |
| **Weight** | 13 g |
| **Housing material** | Plastic, VISTAL® |
| **Optics material** | Plastic, PMMA |
| **Enclosure rating** | IP66<br>IP67<br>IP69K |
| **Ambient operating temperature** | –10 °C … +50 °C |
| **Ambient operating temperature extended** | –30 °C … +55 °C [13] [14] |
| **Ambient temperature, storage** | –30 °C … +70 °C |
| **UL File No.** | NRKH.E181493 |
| **Repeatability Q/ on Pin 2:** | 150 µs [7] |

[1] Limit values when operated in short-circuit protected network: max. 8 A.

[2] May not fall below or exceed $U_V$ tolerances.

[3] Without load.

[4] Q = light switching.

[5] Pin 4: This switching output must not be connected to another output.

[6] Signal transit time with resistive load.

[7] Valid for Q \ on Pin2, if configured with software.

[8] With light/dark ratio 1:1.

[9] With light / dark ratio 1:1, valid for Q \ on Pin2, if configured with software.

[10] A = $V_S$ connections reverse-polarity protected.

[11] B = inputs and output reverse-polarity protected.

[12] C = interference suppression.

[13] As of $T_a$ = 50 °C, a max. supply voltage $V_{max.}$ = 24 V and a max. load current $I_{max.}$ = 50 mA is permitted.

[14] Operation below Tu –10 °C is possible if the sensor is already switched on at Tu > –10 °C, then cools down, and the supply voltage is subsequently not switched off. Switching on below Tu –10 °C is not permissible.

## Safety-related parameters

| | |
|---|---|
| $MTTF_D$ | 326 years (EN ISO 13849-1) [1] |
| $DC_{avg}$ | 0 % |
| $T_M$ (mission time) | 10 years |

[1] Mode of calculation: Parts-Count-calculation.

## Communication interface

| | |
|---|---|
| Communication interface | IO-Link V1.1 |
| Communication Interface detail | 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 = measuring value |
| VendorID | 26 |
| DeviceID HEX | 0x80010D |
| DeviceID DEC | 8388877 |

## Smart Task

| | |
|---|---|
| Smart Task name | Time measurement + debouncing |
| Logic function | Direct<br>WINDOW |
| Timer function | Deactivated<br>Switch-on delay<br>Off delay<br>ON and OFF delay<br>Impulse (one shot) |
| Inverter | Yes |
| Time measurement accuracy | SIO Direct: --- [1]<br>SIO Logic: - 0,7 ... + 0,7 ms ± 0,5 % of time measurement value [2]<br>IOL: - 0.9 ... + 0.9 ms ± 0.5% of the time measurement [3] |
| Time measurement accuracy (e.g. accuracy for time measurement value = 1 s ) | SIO Direct: --- [1]<br>SIO Logic: - 5,7 ... + 5,7 ms [2]<br>IOL: - 5,9 ... + 5,9 ms [3] |
| Resolution time measuring value | 1 ms |
| Min. Time between two process events (switches) | SIO Direct: ---<br>SIO Logic: 500 µs<br>IOL: 800 µs |
| Debounce time max. | SIO Direct: ---<br>SIO Logic: 30.000 ms<br>IOL: 30.000 ms |
| Switching signal | |
| Switching signal $Q_{L1}$ | Output type (dependant on the adjusted threshold) |
| Switching signal $Q_{L2}$ | Output type (dependant on the adjusted threshold) |
| Measuring value | Time measurement value |

[1] SIO Direct: sensor operation in standard I/O mode without IO-Link communication and without using internal sensor logic or time parameters (set to "direct"/"deactivated").

[2] SIO Logic: Sensor operation in standard I/O mode without IO-Link communication. Sensor-internal logic or timing parameters plus Automation Functions used.

[3] IOL: Sensor operation with full IO-Link communication and usage of logic, timing and Automation Function parameters.

## Diagnosis

| Device status | Yes |
|---|---|

## Classifications

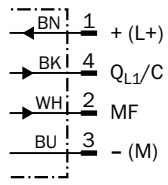| ECLASS 5.0 | 27270904 |
|---|---|
| ECLASS 5.1.4 | 27270904 |
| ECLASS 6.0 | 27270904 |
| ECLASS 6.2 | 27270904 |
| ECLASS 7.0 | 27270904 |
| ECLASS 8.0 | 27270904 |
| ECLASS 8.1 | 27270904 |
| ECLASS 9.0 | 27270904 |
| ECLASS 10.0 | 27270904 |
| ECLASS 11.0 | 27270904 |
| ECLASS 12.0 | 27270903 |
| ETIM 5.0 | EC002719 |
| ETIM 6.0 | EC002719 |
| ETIM 7.0 | EC002719 |
| ETIM 8.0 | EC002719 |
| UNSPSC 16.0901 | 39121528 |

## Adjustments

Single teach-in button
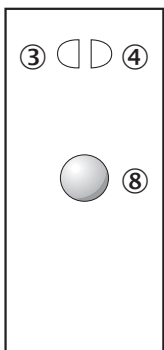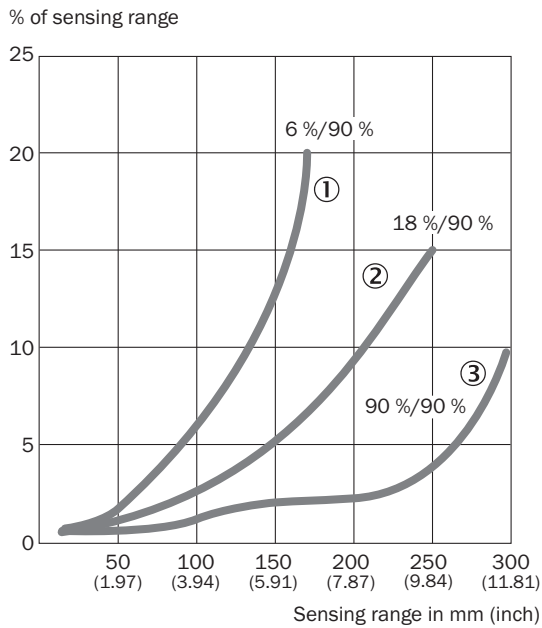
③ LED indicator yellow: Status of received light beam
④ LED indicator green: power on
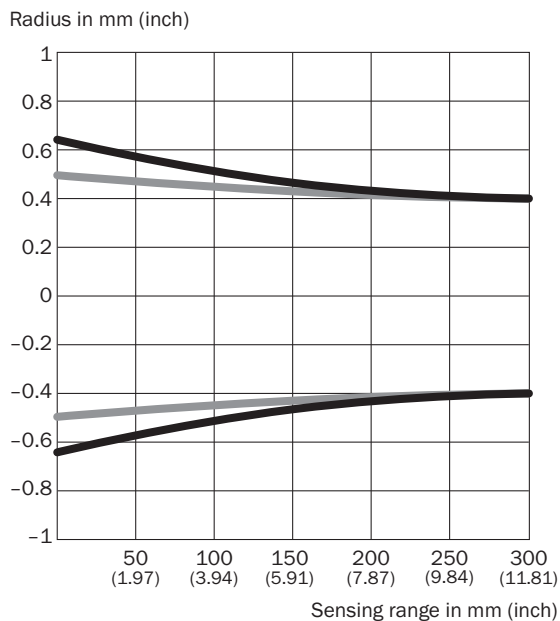⑧ Teach-in button

## Connection diagram

Cd-367

| BN | 1 | + (L+) |
| BK | 4 | $Q_{L1}$/C |
| WH | 2 | MF |
| BU | 3 | − (M) |

## Characteristic curve

% of sensing range

6 %/90 %

① 

18 %/90 %

② 

③ 

90 %/90 %

Sensing range in mm (inch)

① Sensing range on black, 6% remission factor
② Sensing range on gray, 18% remission factor
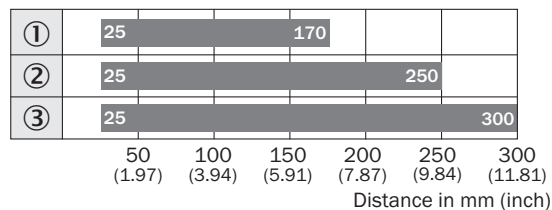③ Sensing range on white, 90% remission factor

## Light spot size

Radius in mm (inch)



Sensing range in mm (inch)

— Vertical
— Horizontal

### Dimensions in mm (inch)

| Sensing range | Vertical | Horizontal |
|---|---|---|
| **50 mm** (1.97) | 1.2 (0.05) | 1.0 (0.04) |
| **100 mm** (3.94) | 1.1 (0.04) | 1.0 (0.04) |
| **200 mm** (7.87) | 0.9 (0.04) | 0.9 (0.04) |
| **300 mm** (11.81) | 0.8 (0.03) | 0.8 (0.03) |

## Sensing range diagram
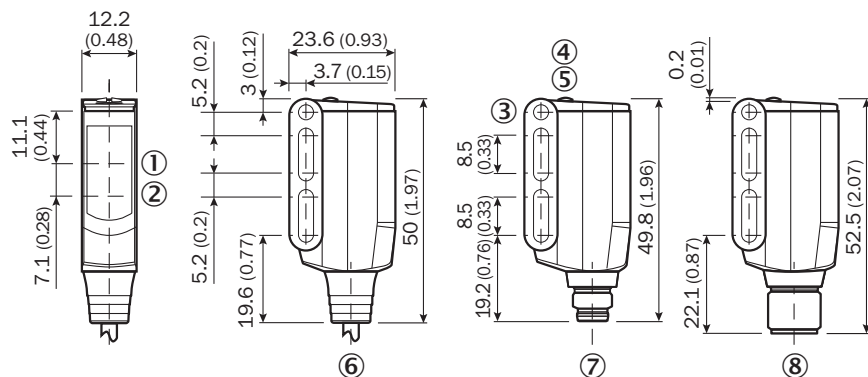


① 25 — 170
② 25 — 250
③ 25 — 300

Distance in mm (inch)

■ Sensing range typ. max.

① Sensing range on black, 6% remission factor
② Sensing range on gray, 18% remission factor
③ Sensing range on white, 90% remission factor

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

WTB9L-3



① Center of optical axis, receiver
② Center of optical axis, sender
③ Mounting hole M3 (Ø 3.1 mm)
④ LED indicator yellow: Status of received light beam
⑤ LED indicator green: power on
⑥ Connecting cable or connecting cable with connector
⑦ Male connector M8, 4-pin
⑧ Male connector M12, 4-pin

## Recommended accessories

Other models and accessories ➜ www.sick.com/W9

| | Brief description | Type | Part no. |
|---|---|---|---|
| **Mounting brackets and plates** | | | |
| | Mounting bracket, steel, zinc coated, mounting hardware included | BEF-WN-W9-2 | 2022855 |
| **Others** | | | |
| | • **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Sensor/actuator cable<br>• **Cable:** 5 m, 4-wire, PVC<br>• **Description:** Sensor/actuator cable, unshielded<br>• **Application:** Zones with chemicals, Uncontaminated zones | YF2A14-050VB3XLEAX | 2096235 |
| | • **Connection type head A:** Male connector, M12, 4-pin, straight, A-coded<br>• **Description:** Unshielded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | STE-1204-G | 6009932 |

## Recommended services

| | Type | Part no. |
|---|---|---|
| **Function Block Factory** | | |
| • **Description:** The Function Block Factory is an engineering tool for creating device and environment-specific function blocks that enable IO-Link sensors to be integrated into programmable logic controllers. The Function Block Factory supports common programmable logic controllers (PLCs) of various manufacturers such as Siemens, Beckhoff, Rockwell Automation B&R and more. More information on the FBF can be found <a href="https://fbf.cloud.sick.com" target="_blank"> here </a>.<br>• **Provision:** Customers can obtain access to the Function Block Factory and the license via <a href="https://fbf.cloud.sick.com"target="_blank">https://fbf.cloud.sick.com</a>. | Function Block Factory | On request |

# 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."**

# WORLDWIDE PRESENCE:

Contacts and other locations –**www.sick.com**

SICK AG  |  Waldkirch  |  Germany  |  www.sick.com

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