Product data sheet


# WLA12L-34162830A00

## W12

**SMALL PHOTOELECTRIC SENSORS**

SICK
Sensor Intelligence.

Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| WLA12L-34162830A00 | 1126045 |

Other models and accessories ➜ www.sick.com/W12

## Detailed technical data

### Features

| | |
|---|---|
| **Functional principle** | Photoelectric retro-reflective sensor |
| **Functional principle detail** | Without reflector minimum distance (autocollimation/coaxial optics) |
| **Sensing range** | |
| Sensing range min. | 0 m |
| Sensing range max. | 11 m |
| Maximum distance range from reflector to sensor (operating reserve 1) | 0 m ... 11 m |
| Recommended distance range from reflector to sensor (operating reserve 3,75) | 0 m ... 7.5 m |
| Reference reflector | Reflector P250F |
| Recommended sensing range for the best performance | 0 mm ... 600 mm |
| **Polarisation filters** | Yes |
| **Emitted beam** | |
| Light source | Laser |
| Type of light | Visible red light |
| Shape of light spot | Ellipse shape |
| Light spot size (distance) | 0.4 mm x 0.35 mm (300 mm) |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.2° (at Ta = +23 °C) |
| **Focus position** | 300 mm |

| | |
|---|---|
| **Key laser figures** | |
| Normative reference | EN 60825-1:2014, IEC 60825-1:2014 |
| Laser class | 1 |
| Wave length | 655 nm |
| Pulse duration | 4 µs |
| Maximum pulse power | < 2.13 mW |
| Average service life | 50,000 h at $T_U$ = +25 °C |
| **Adjustment** | |
| Teach-in button | BluePilot: for sensitivity adjustment |
| IO-Link | For configuring the sensor parameters and Smart Task functions |
| **Indication** | |
| 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<br>Flashing: Below the 1.5 function reserve |
| **Special applications** | Detecting small objects, Detection of objects moving at high speeds, Detecting objects wrapped in film |

## Safety-related parameters

| | |
|---|---|
| **$MTTF_D$** | 371 years |
| **$DC_{avg}$** | 0 % |
| **$T_M$ (mission time)** | 10 years (EN ISO 13849, rate of use: 60 %) |

## 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 | 0x8002DD |
| DeviceID DEC | 8389341 |
| Compatible master port type | A |
| SIO mode support | Yes |

## Electronics

| | |
|---|---|
| **Supply voltage $U_B$** | 10 V DC ... 30 V DC [1] |
| **Ripple** | ≤ 5 V |

[1] Limit values.
[2] Signal transit time with resistive load in switching mode.
[3] With light/dark ratio 1:1.
[4] This switching output must not be connected to another output.

| | |
|---|---|
| **Usage category** | DC-12 (According to EN 60947-5-2)<br>DC-13 (According to EN 60947-5-2) |
| **Current consumption** | ≤ 14 mA, without load. At $U_B$ = 24 V |
| **Protection class** | III |
| **Digital output** | |
| Number | 2 (Complementary) |
| 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 | ≤ 200 µs [2] |
| Repeatability (response time) | 85 µs [2] |
| Switching frequency | 2,500 Hz [3] |
| **Pin/Wire assignment** | |
| BN 1 | + (L+) |
| WH 2 | $\bar{Q}_{L1}$/MF<br>Digital output, dark switching, object present → output $\bar{Q}_{L1}$ HIGH [4]<br>The pin 2 function of the sensor can be configuredAdditional possible settings via IO-Link |
| BU 3 | - (M) |
| BK 4 | QL1/C<br>Digital output, light switching, object present → output $Q_{L1}$ LOW [4]<br>The pin 4 function of the sensor can be configuredAdditional possible settings via IO-Link |

[1] Limit values.
[2] Signal transit time with resistive load in switching mode.
[3] With light/dark ratio 1:1.
[4] This switching output must not be connected to another output.

## Mechanics

| | |
|---|---|
| **Housing** | Rectangular |
| **Dimensions (W x H x D)** | 15.6 mm x 49.5 mm x 43.1 mm |
| **Connection** | Cable with M12 male connector, 4-pin, 315 mm |
| **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) | 275 mm |
| Bending radius | For flexible use > 12 x cable diameter |
| Bending cycles | 1,000,000 |
| **Material** | |
| Housing | Metal, zinc diecast |
| Front screen | Plastic, PMMA |
| Cable | Plastic, PVC |

| | |
|---|---|
| Male connector | Plastic, VISTAL® |
| **Weight** | Approx. 94 g |
| **Maximum tightening torque of the fixing screws** | 1.4 Nm |

## Ambient data

| | |
|---|---|
| **Enclosure rating** | IP66 (EN 60529)<br>IP67 (EN 60529)<br>IP69 (EN 60529) |
| **Ambient operating temperature** | –20 °C ... +55 °C |
| **Ambient temperature, storage** | –40 °C ... +70 °C |
| **Warm-up time** | < 15 min, Where $T_u$ is under –10 °C |
| **Typ. Ambient light immunity** | Artificial light: ≤ 50,000 lx<br>Sunlight: ≤ 50,000 lx |
| **Shock resistance** | 50 g, 11 ms (25 positive and 25 negative shocks along X, Y, Z axes, 150 total shocks (EN60068-2-27)) |
| **Vibration resistance** | 10 Hz ... 2,000 Hz (Amplitude 0.5 mm / 10 g, 20 sweeps per axis, for X, Y, Z axes, 1 octave/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 |
| **Switching frequency** | SIO Logic: 2000 Hz [1]<br>IOL: 1600 Hz [2] |
| **Response time** | SIO Logic: 250 µs [1]<br>IOL: 300 µs [2] |
| **Repeatability** | SIO Logic: 120 µs [1] [2] |
| **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).
[2] Use of Smart Task functions with IO-Link communication function.

## 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 |

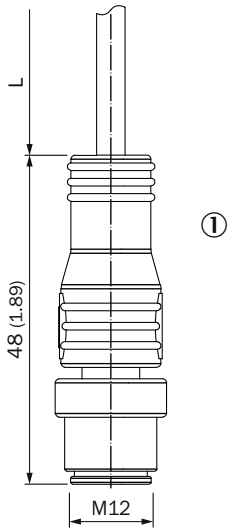
## Classifications

| | |
|---|---|
| **ECLASS 5.0** | 27270902 |
| **ECLASS 5.1.4** | 27270902 |
| **ECLASS 6.0** | 27270902 |
| **ECLASS 6.2** | 27270902 |
| **ECLASS 7.0** | 27270902 |
| **ECLASS 8.0** | 27270902 |
| **ECLASS 8.1** | 27270902 |
| **ECLASS 9.0** | 27270902 |
| **ECLASS 10.0** | 27270902 |
| **ECLASS 11.0** | 27270902 |
| **ECLASS 12.0** | 27270902 |
| **ETIM 5.0** | EC002717 |
| **ETIM 6.0** | EC002717 |
| **ETIM 7.0** | EC002717 |
| **ETIM 8.0** | EC002717 |
| **UNSPSC 16.0901** | 39121528 |

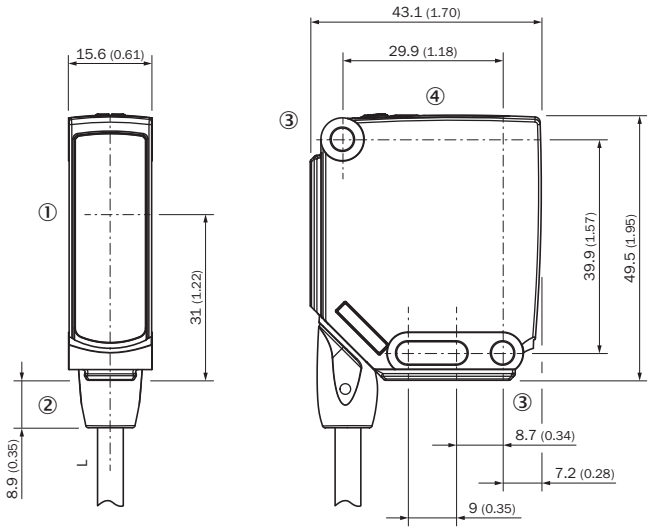
## Maßzeichnung (Dimensions in mm (inch))

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

Dimensional drawing, connection



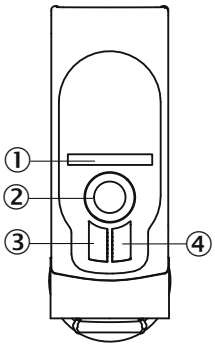

For length of cable (L), see technical data
① Cable with M12 male connector




For length of cable (L), see technical data
① Center of optical axis
② Connection
③ Mounting hole, Ø 4.2 mm
④ Display and adjustment elements

## Adjustments

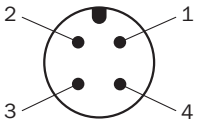
Display and adjustment elements




① LED blue
② Teach-in button
③ LED yellow
④ LED green

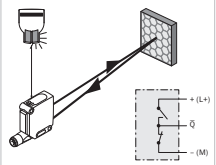
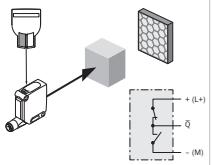
## Connection type

M12 male connector, 4-pin

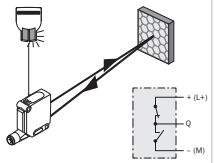
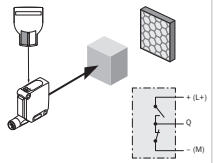



## Truth table

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

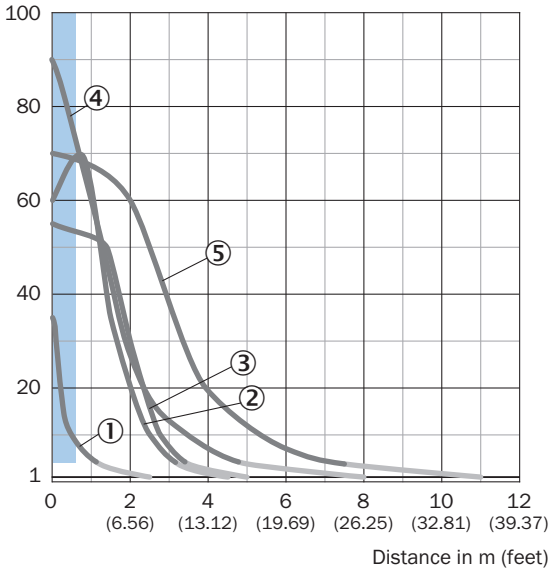
| | Dark switching $\bar{Q}$ (normally open (upper switch), normally closed (lower switch)) | |
|---|---|---|
| | Object not present ➔ Output LOW | Object present ➔ Output HIGH |
| Light receive | ✓ | ✗ |
| Light receive indicator | ☀ | ✗ |
| Load resistance to L+ | ⚠ | ✗ |
| Load resistance to M | ✗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

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

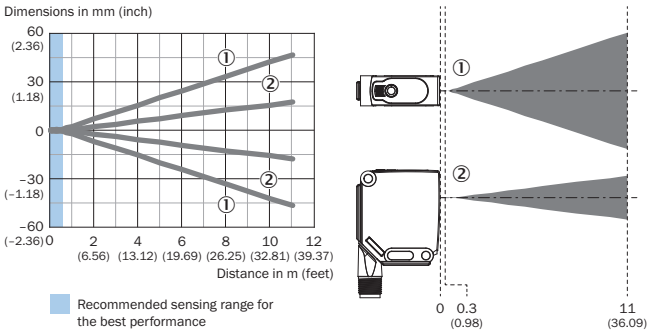
Operating reserve




Recommended sensing range for the best performance

① Reflective tape REF-IRF-56
② PL10F reflector
③ Reflector PL20F
④ Reflective tape REF-AC1000
⑤ Reflector P250F

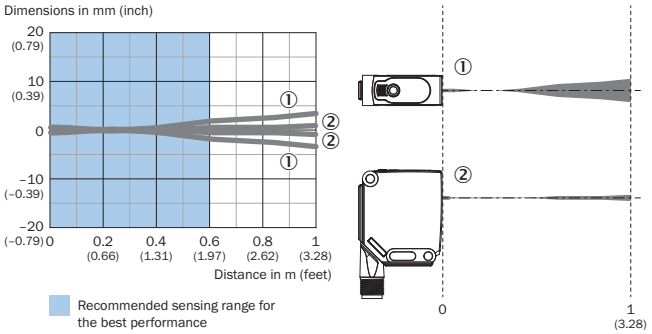
## Light spot size




① Light spot horizontal
② Light spot vertical

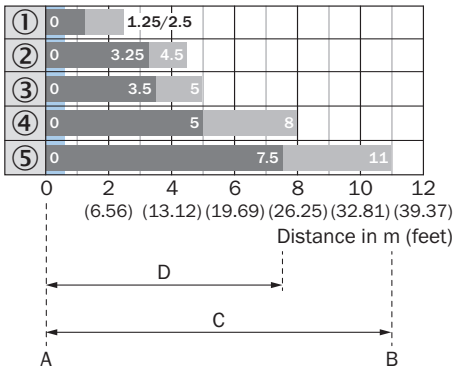
## Light spot size (detailed view)

Close range




① Light spot horizontal
② Light spot vertical

## Sensing range diagram



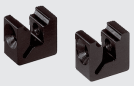

Recommended sensing range for the best performance

| | |
|---|---|
| 1 | Reflective tape REF-IRF-56 |
| 2 | PL10F reflector |

| | |
|---|---|
| 3 | Reflector PL20F |
| 4 | Reflective tape REF-AC1000 |
| 5 | Reflector P250F |
| A | Sensing range min. in m |
| B | Sensing range max. in m |
| C | Maximum distance range from reflector to sensor (operating reserve 1) |
| D | Recommended distance range from reflector to sensor (operating reserve 3,75) |

## Recommended accessories

Other models and accessories ➜ www.sick.com/W12

| | Brief description | Type | Part no. |
|---|---|---|---|
| **Mounting brackets and plates** | | | |
| | • **Material:** Aluminum<br>• **Details:** Aluminum<br>• **Items supplied:** Including mounting material (sensor) and mounting material (bracket)<br>• **Usable for:** Adapter plate for W23L/W27L to W12L | BEF-AP-W12 | 2127742 |
|  | • **Description:** Mounting bracket, large<br>• **Material:** Stainless steel<br>• **Details:** Stainless steel<br>• **Items supplied:** Mounting hardware included<br>• **Suitable for:** W11-2, W12-3, W16 | BEF-WG-W12 | 2013942 |
| **Terminal and alignment brackets** | | | |
|  | • **Description:** Clamping block for dovetail mounting<br>• **Material:** Aluminum<br>• **Details:** Aluminum (anodised)<br>• **Items supplied:** Mounting hardware included<br>• **Suitable for:** W11-2, W12-3 | BEF-KH-W12 | 2013285 |
| **Universal bar clamp systems** | | | |
|  | • **Description:** Plate N03 for universal clamp bracket, zinc coated<br>• **Material:** Steel, zinc diecast<br>• **Details:** Zinc plated steel (sheet), Zinc die cast (clamping bracket)<br>• **Items supplied:** Universal clamp (5322626), mounting hardware<br>• **Usable for:** UC12, W14-2, W18-2, W18-3, W11-2, W12-3, W12-2 Laser, W12G, W12 Teflon, W16, W24-2 Ex, PowerProx, W11G-2, TranspaTect, W18-3 Ex, W24-2, PL50A, PL80A, PL40A, P250 | BEF-KHS-N03 | 2051609 |
|  | • **Description:** Mounting bar, straight, 300 mm, steel<br>• **Material:** Steel<br>• **Details:** Steel, zinc coated<br>• **Items supplied:** Without mounting hardware<br>• **Usable for:** Fiber-optic sensors | BEF-MS12G-B | 4056055 |
|  | • **Description:** Bar clamp for bar diameter of 12 mm (fixing the mounting rod)<br>• **Material:** Aluminum<br>• **Details:** Aluminum<br>• **Items supplied:** 2 screws M6 x 30, 2 spring discs<br>• **Usable for:** Fiber-optic sensors | BEF-RMC-D12 | 5321878 |

| | Brief description | Type | Part no. |
|---|---|---|---|
| Others | | | |
|  | • **Description:** Fine triple reflector, screw connection, suitable for laser sensors<br>• **Dimensions:** 52 mm 62 mm<br>• **Ambient operating temperature:** –30 °C ... +65 °C | P250F | 5308843 |
|  | • **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 |
| Sensor Integration Gateway | | | |
|  | • **Further functions:** Web server integrated, IIoT interface available (dual talk)<br>• **Logic editor:** no<br>• **Communication interface:** IO-Link, Ethernet, PROFINET, REST API, MQTT, OPC UA<br>• **Product category:** IO-Link Master | SIG350-0004AP100 | 6076871 |

# 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