



Illustration may differ

Ordering information

| Type | Part no. |
|--------------------|----------|
| WTB12L-24161720A00 | 1126040 |

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



Detailed technical data

Features

| | |
|---|---|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression |
| Sensing range | |
| Sensing range min. | 15 mm |
| Sensing range max. | 400 mm |
| Adjustable switching threshold for background suppression | 30 mm ... 400 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%) | 1 mm, at a distance of 100 mm |
| Recommended sensing range for the best performance | 50 mm ... 140 mm |
| Emitted beam | |
| Light source | Laser |
| Type of light | Visible red light |
| Shape of light spot | Ellipse shape |
| Light spot size (distance) | 0.17 mm x 0.1 mm (100 mm) |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.0° (at Ta = +23 °C) |
| Focus position | 100 mm |
| Key laser figures | |

| | |
|--|--|
| Normative reference | EN 60825-1:2014, IEC 60825-1:2014 |
| Laser class | 1 |
| Wave length | 655 nm |
| Pulse duration | 4 μ s |
| Maximum pulse power | < 4.03 mW |
| Average service life | 50,000 h at $T_U = +25$ °C |
| Smallest detectable object (MDO) typ. | 0.25 mm (at a distance of 100 mm) 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 |
| Indication | |
| 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 |
| Special applications | Detecting small objects, Detection of objects moving at high speeds, Detecting perforated objects |

Safety-related parameters

| | |
|-------------------------------------|--|
| MTTF_D | 280 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} Bit 1 = switching signal Q _{L2} Bit 2 ... 15 = Current receiver level (live) |
| VendorID | 26 |
| DeviceID HEX | 0x8002D5 |
| DeviceID DEC | 8389333 |
| Compatible master port type | A |
| SIO mode support | Yes |

Electrical data

| | |
|-------------------------------------|-----------------------------------|
| Supply voltage U_B | 10 V DC ... 30 V DC ¹⁾ |
|-------------------------------------|-----------------------------------|

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.

| | |
|-------------------------------|--|
| Ripple | ≤ 5 V |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | ≤ 14 mA, without load. At $U_B = 24\text{ V}$ |
| Protection class | III |
| Digital output | |
| Number | 2 (Complementary) |
| Type | Push-pull: PNP/NPN |
| 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} . | ≤ 100 mA |
| Circuit protection outputs | Reverse polarity protected Overcurrent protected 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 Digital output, dark switching, object present → output \bar{Q}_{L1} LOW ⁴⁾ The pin 2 function of the sensor can be configuredAdditional possible settings via IO-Link |
| BU 3 | - (M) |
| BK 4 | QL1/C Digital output, light switching, object present → output Q_{L1} HIGHIO-Link communication C ⁴⁾ 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.

Mechanical data

| | |
|---|-----------------------------|
| Housing | Rectangular |
| Dimensions (W x H x D) | 15.6 mm x 49.5 mm x 43.1 mm |
| Connection | Male connector M12, 4-pin |
| Material | |
| Housing | Metal, zinc diecast |
| Front screen | Plastic, PMMA |
| Male connector | Plastic, VISTAL® |
| Weight | Approx. 77 g |
| Maximum tightening torque of the fixing screws | 1.4 Nm |

Ambient data

| | |
|-------------------------|---|
| Enclosure rating | IP66 (EN 60529) IP67 (EN 60529) 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 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 AND OR |
| Timer function | Deactivated On delay Off delay ON and OFF delay Impulse (one shot) |
| Inverter | Yes |
| Switching frequency | SIO Logic: 2000 Hz ¹⁾ IOL: 1600 Hz ²⁾ |
| Response time | SIO Logic: 250 μs ¹⁾ 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 |

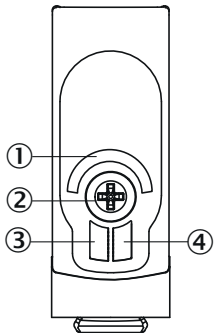
Classifications

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

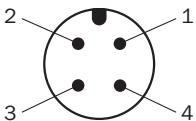
Display and adjustment elements



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

Connection type

M12 male connector, 4-pin



Truth table

Push-pull: PNP/NPN - light switching Q

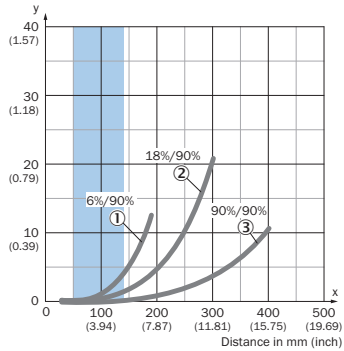
| | Light switching Q (normally open (upper switch), normally closed (lower switch)) | |
|-------------------------|--|------------------------------|
| | Object not present → Output LOW | Object present → Output HIGH |
| Light receive | ⊗ | ☑ |
| Light receive indicator | ⊗ | ☀ |
| Load resistance to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

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

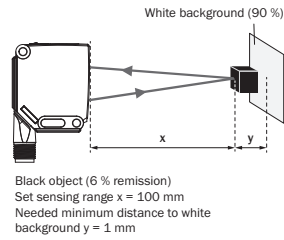
| | Dark switching \bar{Q} (normally closed (upper switch), normally open (lower switch)) | |
|-------------------------|---|-----------------------------|
| | Object not present → Output HIGH | Object present → Output LOW |
| Light receive | ⊗ | ☑ |
| Light receive indicator | ⊗ | ☀ |
| Load resistance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

Characteristic curve

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



Example:
Safe suppression of the background

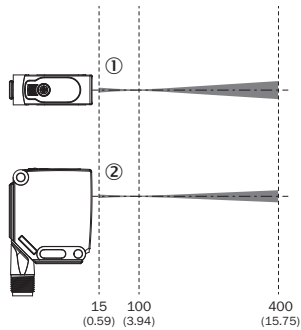
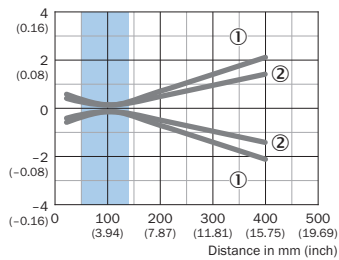


Recommended sensing range for the best performance

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

Light spot size

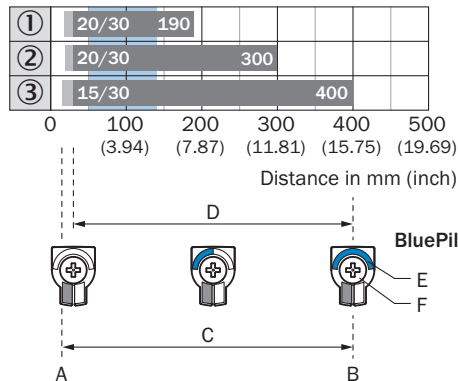
Dimensions in mm (inch)



Recommended sensing range for the best performance

- ① Light spot horizontal
- ② Light spot vertical

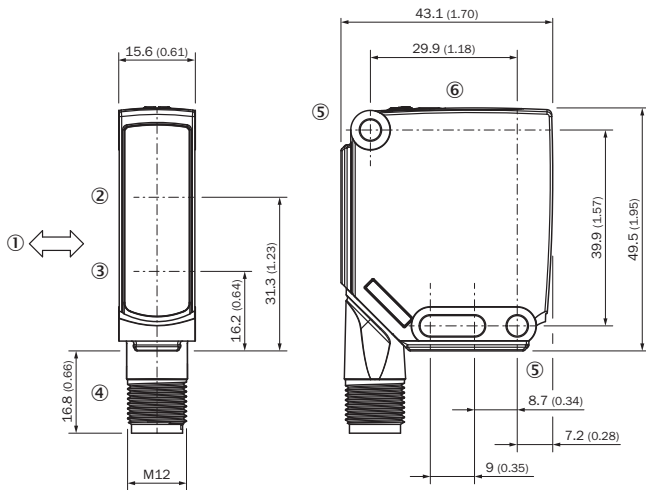
Sensing range diagram



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 (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 Mounting hole, Ø 4.2 mm
- ⑥ Display and adjustment elements

Recommended accessories

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

| | Brief description | Type | Part no. |
|---|---|-------------|----------|
| Universal bar clamp systems | | | |
|  | Plate N03 for universal clamp bracket, zinc coated, Zinc plated steel (sheet), Zinc die cast (clamping bracket), Universal clamp (5322626), mounting hardware | BEF-KHS-N03 | 2051609 |
|  | Mounting bar, straight, 300 mm, steel, steel, zinc coated, without mounting hardware | BEF-MS12G-B | 4056055 |

| | Brief description | Type | Part no. |
|---|---|--------------------|----------|
|  | Bar clamp for bar diameter of 12 mm (fixing the mounting rod), Aluminum, 2 screws M6 x 30, 2 spring discs | BEF-RMC-D12 | 5321878 |
| Mounting brackets and plates | | | |
|  | Mounting bracket, large, stainless steel, mounting hardware included | BEF-WG-W12 | 2013942 |
| | BEF-AP-W12 | BEF-AP-W12 | 2127742 |
| Plug connectors and cables | | | |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 4-pin, straight, A-coded • Connection type head B: Flying leads • Signal type: Sensor/actuator cable • Cable: 5 m, 4-wire, PVC • Description: Sensor/actuator cable, unshielded • Application: Zones with chemicals | YF2A14-050VB3XLEAX | 2096235 |
| Terminal and alignment brackets | | | |
|  | Clamping block for dovetail mounting, Aluminum (anodised), mounting hardware included | BEF-KH-W12 | 2013285 |
| Sensor Integration Gateway | | | |
|  | <ul style="list-style-type: none"> • Further functions: Web server integrated, IIoT interface available (dual talk) • Logic editor: no • Communication interface: IO-Link, Ethernet, PROFINET, REST API, MQTT, OPC UA • Product category: IO-Link Master | SIG350-0004AP100 | 6076871 |

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