



WTS12F-24161120A00ZDZZZZZZZZZ1

W12

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

| Type | part no. |
|-------------------------------|----------|
| WTS12F-24161120A00ZDZZZZZZZZ1 | 1149429 |

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



Detailed technical data

Features

| | |
|---|---|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression, TwinEye technology |
| Sensing range | |
| Sensing range min. | 10 mm |
| Sensing range max. | 750 mm |
| Adjustable switching threshold for background suppression | 40 mm ... 750 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%) | 8 mm, at a distance of 300 mm |
| Recommended sensing range for the best performance | 50 mm ... 400 mm |
| Emitted beam | |
| Light source | PinPoint Pro LED |
| Type of light | Visible red light |
| Shape of light spot | Rectangular |
| Light spot size (distance) | 10 mm x 8 mm (300 mm) |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.0° (at T _U = +23 °C) |
| Focus position | 300 mm |

| | | |
|--|--|--|
| 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 $T_a = +25 \text{ }^\circ\text{C}$ |
| Smallest detectable object (MDO) typ. | | |
| | | 0.3 mm, at a distance of 200 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 |
| 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 |
| Special applications | | Detecting uneven, shiny objects |

Safety-related parameters

| | |
|-------------------------------------|-------------|
| MTTF_D | 1,208 years |
| DC_{avg} | 0 % |
| T_M (mission time) | 20 years |

Communication interface

| | |
|-----------------------------|---|
| IO-Link | ✓ , IO-Link V1.1 |
| Data transmission rate | COM2 (38,4 kBaud) |
| Cycle time | 2.3 ms |
| Process data length | 8 Bit |
| Process data structure | Bit 0 = switching signal Bit 1 = switching signal Q_{L1} Bit 2 = switching signal Q_{L2} Bit 3 ... 7 = empty |
| VendorID | 26 |
| DeviceID HEX | 0x80039B |
| DeviceID DEC | 8389531 |
| Compatible master port type | A |
| SIO mode support | Yes |

Electronics

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

¹⁾ Limit values.

²⁾ 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 | ≤ 40 mA, without load. At $U_B = 24\text{ V}$ |
| Protection class | III |
| Digital output | |
| Number | 2 (Complementary) |
| Type | Push-pull: PNP/NPN |
| Switching mode | Light/dark switching |
| Signal voltage PNP HIGH/LOW | Approx. $U_B - 2.5\text{ V} / 0\text{ V}$ |
| 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 | ≤ 330 μs |
| Repeatability (response time) | 100 μs |
| Switching frequency | 1,500 Hz |
| Pin/Wire assignment | |
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output \bar{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, light switching, object present → output 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 |
| 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 | -40 °C ... +60 °C |
| Ambient temperature, storage | -40 °C ... +75 °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 Switch-on delay Off delay ON and OFF delay Impulse (one shot) |
| Inverter | Yes |
| Switching frequency | SIO Logic: 1300 Hz ¹⁾ IOL: 1200 Hz ²⁾ |
| Response time | SIO Logic: 390 μs ¹⁾ IOL: 420 μs ²⁾ |
| Repeatability | SIO Logic: 140 μs ¹⁾ IOL: 170 μs 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 |

Certificates

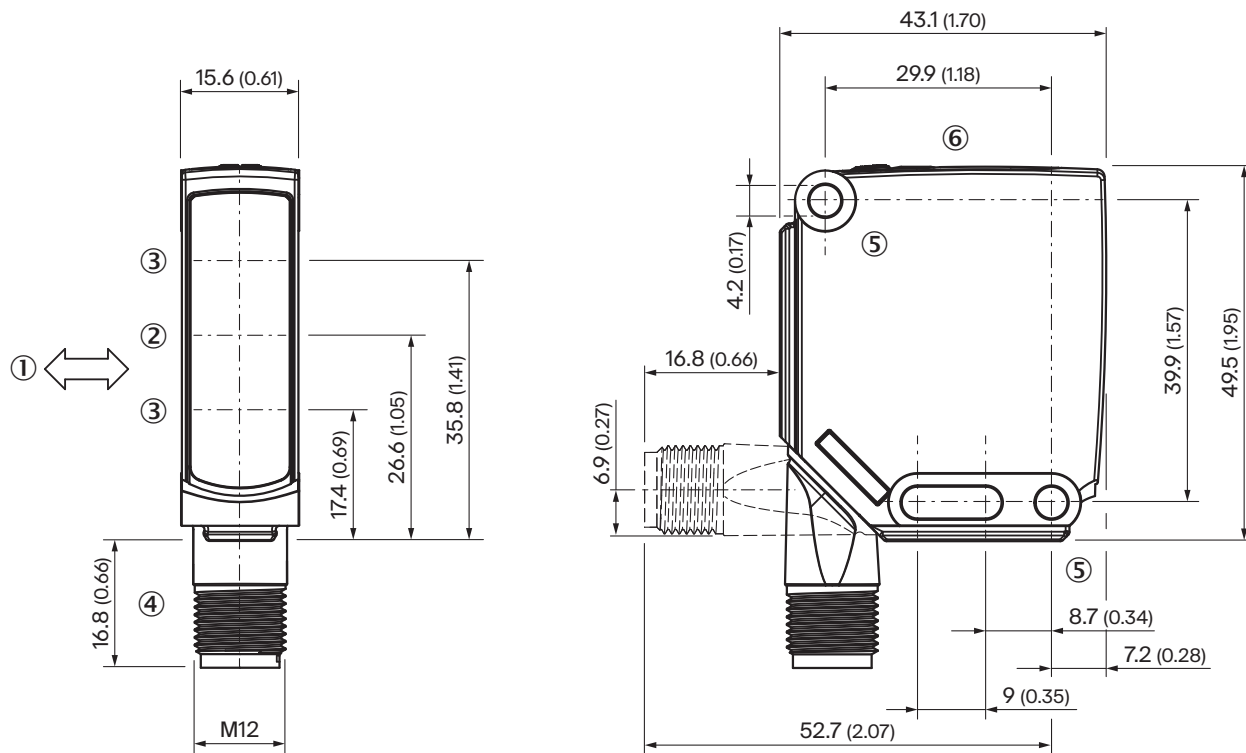
| | |
|-------------------------------------|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |

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

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 |

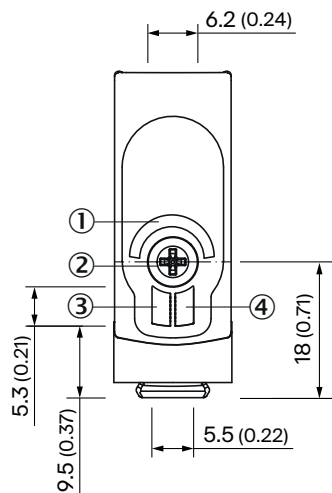
Dimensional drawing, sensor



Dimensions in mm (inch)

- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ Connection
- ⑤ Mounting hole, Ø 4.2 mm
- ⑥ display and adjustment elements

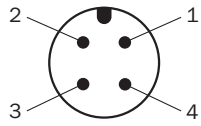
display and adjustment elements



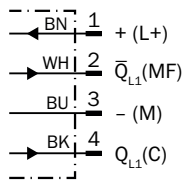
- ① LED blue
- ② Teach-Turn adjustment
- ③ LED green

④ LED yellow

Connection type M12 male connector, 4-pin



Connection diagram Cd-490



Truth table Push-pull: PNP/NPN - light switching Q

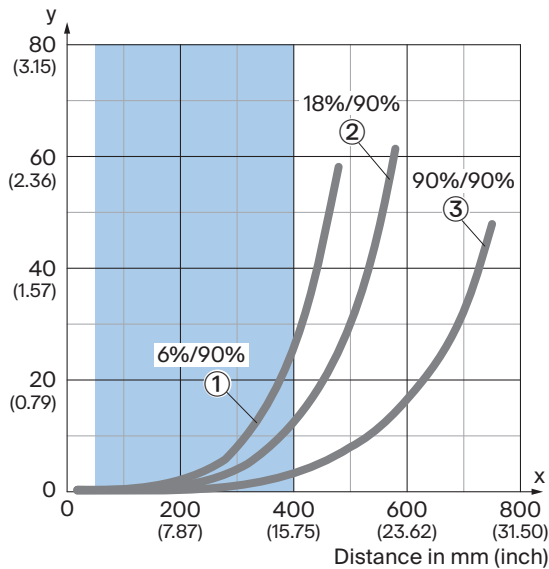
| | Light switching Q (normally open (upper switch), normally closed (lower switch)) | |
|-------------------------|--|------------------------------|
| | Object not present → Output LOW | Object present → Output HIGH |
| Light receive | ✘ | ✔ |
| Light receive indicator | ✘ | ☀ |
| Load resistance to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

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

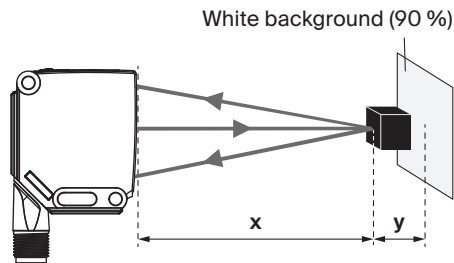
| | Dark switching \bar{Q} (normally closed (upper switch), normally open (lower switch)) | |
|-------------------------|---|-----------------------------|
| | Object not present → Output HIGH | Object present → Output LOW |
| Light receive | ⊗ | ☑ |
| Light receive indicator | ⊗ | ☀ |
| Load resistance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



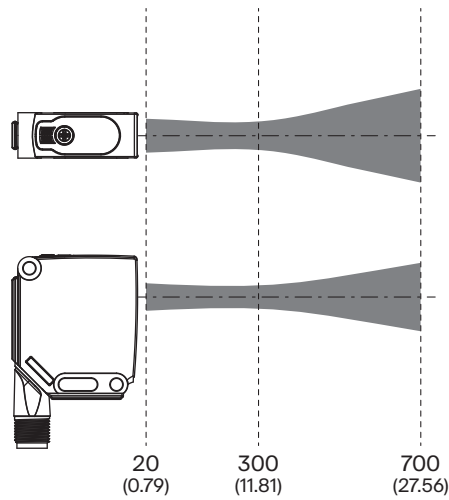
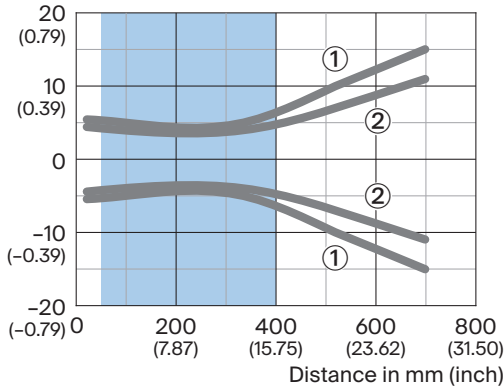
Black object (6 % remission)
Set sensing range $x = 300$ mm
Needed minimum distance to white background $y = 8$ mm

Recommended sensing range for the best performance

- 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

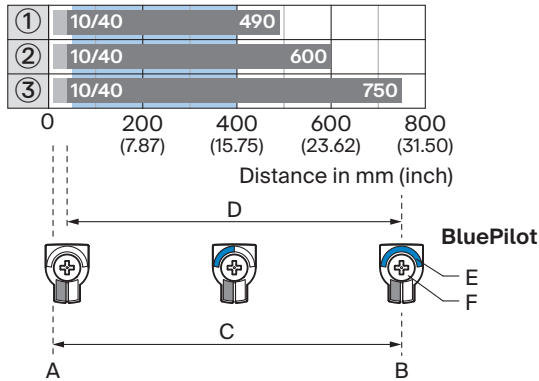
Dimensions in mm (inch)



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 |

Recommended accessories

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

| | Brief description | Type | part no. |
|---|---|--------------------|----------|
| Mounting systems | | | |
|  | <ul style="list-style-type: none"> Description: Plate N02N for universal clamp bracket Material: Stainless steel, stainless steel Details: Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp) Items supplied: Universal clamp (5322627), mounting hardware Usable for: W4S-3 Glass, W10, W4SLG-3, W4S-3 Inox, W4S-3 Inox Glass, W9, W11-2, W12-3, W12-2 Laser, W12G, W12 Teflon, W16, W250, W250-2, PowerProx, W11G-2, TranspaTect, WTT12, UC12, P250, G6 Inox, W4S, W4SL-3V, W4SLG-3V, W4SL-3H | BEF-KHS-N02N | 2051618 |
|  | <ul style="list-style-type: none"> Description: Mounting bracket, large Material: Stainless steel Details: Stainless steel Items supplied: Mounting hardware included Suitable for: W11-2, W12-3, W16 | BEF-WG-W12 | 2013942 |
| connectors and cables | | | |
|  | <ul style="list-style-type: none"> Description: Sensor/actuator cable, unshielded 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, PUR, halogen-free Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation | YF2A14-050UB3XLEAX | 2095608 |
|  | <ul style="list-style-type: none"> Description: Sensor/actuator cable, unshielded 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 Application: Uncontaminated zones, Zones with chemicals | YF2A14-050VB3XLEAX | 2096235 |
|  | <ul style="list-style-type: none"> Description: Sensor/actuator cable, unshielded Connection type head A: Female connector, M12, 4-pin, straight Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PVC Connection systems: Flying leads Note: This product is generally resistant to chemical cleaning agents (see ECOLAB). Please do not use cleaning agents of any other Kind., Not resistant against lactic acid & hydrogen peroxide (H2O2) Application: Uncontaminated zones, Hygienic and washdown zones, Zones with chemicals | YF2AP4-050VB3XLEAX | 6052615 |

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.”

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