



WTB4FQ-21A12120ZZZ

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Ordering information

| Type | part no. |
|--------------------|----------|
| WTB4FQ-21A12120ZZZ | 1137888 |

Other models and accessories → www.sick.com/W4

Illustration may differ



Detailed technical data

Features

| | |
|---|---|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression, DoubleLine |
| Sensing range | |
| Sensing range min. | 7 mm |
| Sensing range max. | 120 mm |
| Adjustable switching threshold for background suppression | 15 mm ... 120 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 50 mm |
| Recommended sensing range for the best performance | 30 mm ... 80 mm |
| Emitted beam | |
| Light source | PinPoint LED |
| Type of light | Infrared light |
| Shape of light spot | Line-shaped, two parallel line-shaped light spots |
| Light spot size (distance) | 1.2 mm x 17 mm (50 mm) |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.5° (at Ta = +23 °C) |
| Key LED figures | |

| | | |
|--|--|--|
| Normative reference | EN 62471:2008-09 IEC 62471:2006, modified | |
| LED risk group marking | Free group | |
| Wave length | 880 nm | |
| Average service life | 100,000 h at $T_a = +25^\circ\text{C}$ | |
| Smallest detectable object (MDO) typ. | 1 mm (At 50 mm distance (object with 90% remission (complies with standard white according to DIN 5033))) | |
| Adjustment | | |
| Teach-Turn adjustment | BluePilot: For setting the sensing range | |
| Display | | |
| LED blue | BluePilot: sensing range indicator | |
| LED green | Operating indicatorStatic on: power on | |
| LED yellow | Status of received light beamStatic on: object presentStatic off: object not present | |
| Special applications | Detecting flat objects, Detecting objects wrapped in film, Detecting perforated objects, Detecting uneven, shiny objects | |

Safety-related parameters

| | |
|-------------------------------------|-----------|
| MTTF_D | 661 years |
| DC_{avg} | 0 % |
| T_M (mission time) | 20 years |

Electronics

| | |
|-------------------------------------|--|
| Supply voltage U_B | 10 V DC ... 30 V DC ¹⁾ |
| Ripple | $\leq 5 \text{ V}_{\text{pp}}$ |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | $\leq 25 \text{ mA}$, without load. At $U_B = 24 \text{ V}$ |
| Protection class | III |
| Digital output | |
| Number | 1 |
| Type | PNP |
| Switching mode | Dark switching |
| Signal voltage PNP HIGH/LOW | Approx. $U_B - 2.5 \text{ V} / 0 \text{ V}$ |
| Output current I _{max.} | $\leq 100 \text{ mA}$ |
| Circuit protection outputs | Reverse polarity protected Overcurrent protected Short-circuit protected |
| Response time | $\leq 1,000 \text{ }\mu\text{s}$ ²⁾ |
| Repeatability (response time) | 240 μs |
| Switching frequency | 500 Hz ³⁾ |
| Pin/Wire assignment | |

¹⁾ Limit values.²⁾ Signal transit time with resistive load in switching mode.³⁾ With light/dark ratio 1:1.

| | |
|------------------------------|---|
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output \bar{Q} LOW |
|------------------------------|---|

- 1) Limit values.
- 2) Signal transit time with resistive load in switching mode.
- 3) With light/dark ratio 1:1.

Mechanics

| | |
|---|---------------------------|
| Housing | Rectangular |
| Design detail | Flat |
| Dimensions (W x H x D) | 16 mm x 40.1 mm x 12.1 mm |
| Connection | Connector M8, 3-pin |
| Material | |
| Housing | Plastic, VISTAL® |
| Front screen | Plastic, PMMA |
| Male connector | Plastic, VISTAL® |
| Weight | Approx. 30 g |
| Maximum tightening torque of the fixing screws | 0.4 Nm |

Ambient data

| | |
|--|---|
| Enclosure rating | IP66 (EN 60529) 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 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 |

Certificates

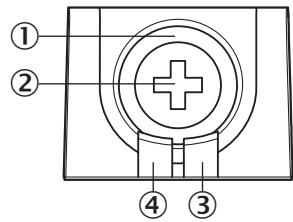
| | |
|---|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China-RoHS | ✓ |
| ECOLAB certificate | ✓ |
| cULus certificate | ✓ |
| EAC certificate / DoC | ✓ |
| IO-Link | ✓ |

Classifications

| | |
|-------------------|----------|
| ECLASS 5.0 | 27270904 |
|-------------------|----------|

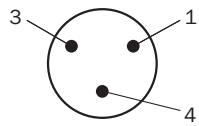
| | |
|-----------------------|----------|
| ECLASS 5.1.4 | 27270904 |
| ECLASS 6.0 | 27270904 |
| ECLASS 6.2 | 27270904 |
| ECLASS 7.0 | 27270904 |
| ECLASS 8.0 | 27270904 |
| ECLASS 8.1 | 27270904 |
| ECLASS 9.0 | 27270904 |
| ECLASS 10.0 | 27270904 |
| ECLASS 11.0 | 27270904 |
| ECLASS 12.0 | 27270903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

display and adjustment elements

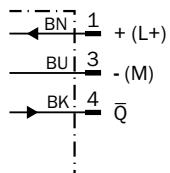


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

Connection type Connector M8, 3-pin



Connection diagram Cd-514

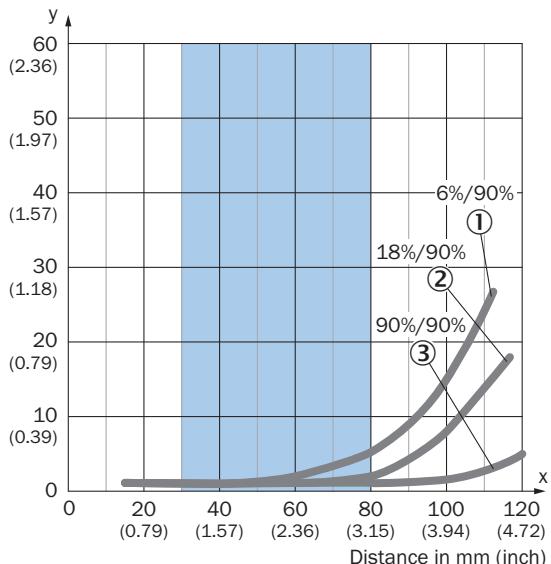


Truth table PNP - dark switching

| 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 M | ✗ | ✗ |
| |   |  |

Characteristic curve

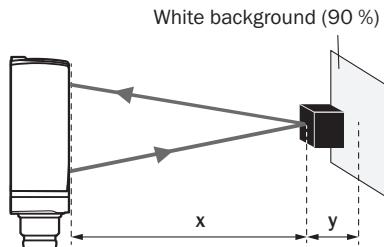
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



■ 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

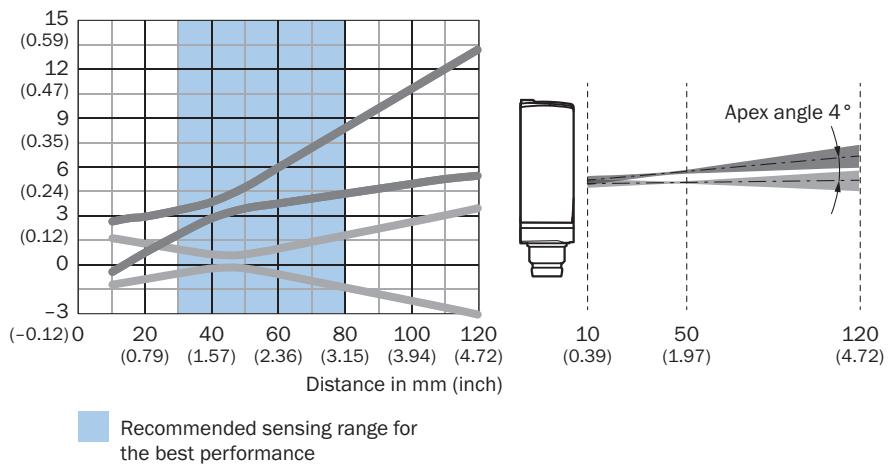
Example:
Safe suppression of the background



Black object (6 % remission)
Set sensing range $x = 80$ mm
Needed minimum distance to white background $y = 5$ mm

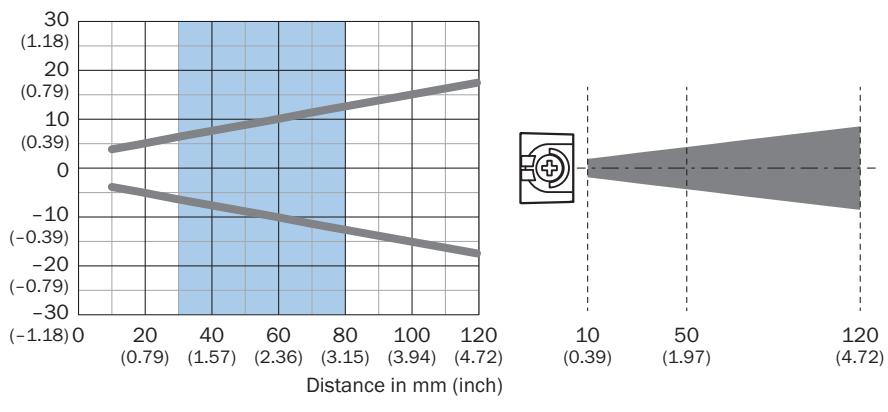
Light spot size Vertical

Dimensions in mm (inch)

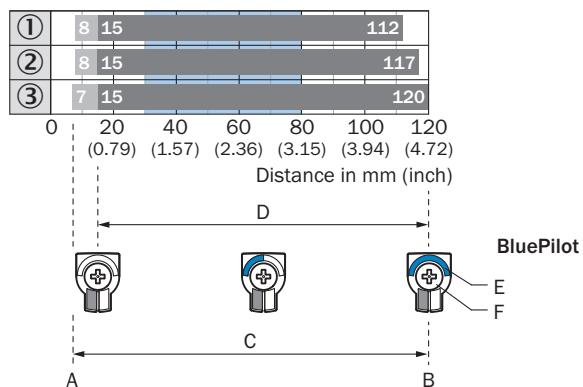


Light spot size Horizontal

Dimensions in mm (inch)



Sensing range diagram



A = Sensing range min. in mm

B = Sensing range max. in mm

C = Viewing range

D = Adjustable switching threshold for background suppression

E = Sensing range indicator

F = Teach-Turn adjustment

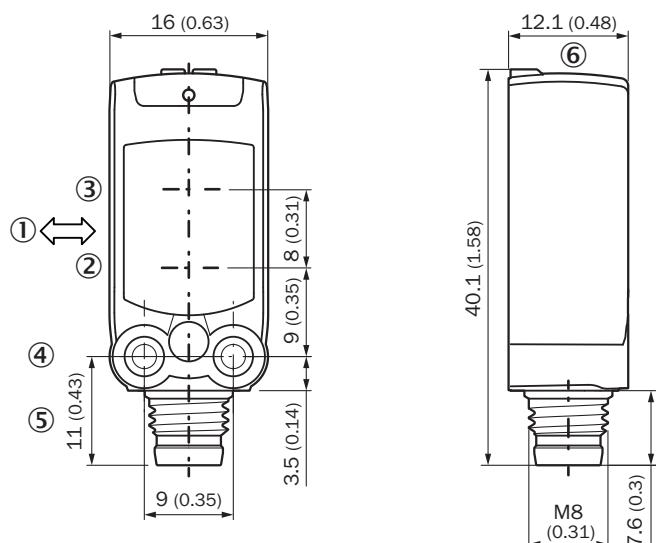
■ Recommended sensing range for the best performance

① Black object, 6% remission factor

② Gray object, 18% remission factor

③ White object, 90% remission factor

Dimensional drawing



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 M3 mounting hole

⑤ Connection

⑥ display and adjustment elements

Recommended accessories

Other models and accessories → www.sick.com/W4

| | Brief description | Type | part no. |
|---|---|--------------------|----------|
| Mounting systems | | | |
|  | <ul style="list-style-type: none">Description: Mounting bracket for wall mountingMaterial: Stainless steelDetails: Stainless steel 1.4571Items supplied: Mounting hardware includedSuitable for: W4S, W4F, W4S | BEF-W4-A | 2051628 |
| connectors and cables | | | |
|  | <ul style="list-style-type: none">Connection type head A: Female connector, M8, 3-pin, straight, A-codedConnection type head B: Flying leadsSignal type: Sensor/actuator cableCable: 5 m, 3-wire, PVCDescription: Sensor/actuator cable, unshieldedApplication: Zones with chemicals, Uncontaminated zones | YF8U13-050VA1XLEAX | 2095884 |
|  | <ul style="list-style-type: none">Connection type head A: Male connector, M8, 3-pin, straight, A-codedDescription: UnshieldedConnection systems: Screw-type terminalsPermitted cross-section: 0.14 mm² ... 0.5 mm² | STE-0803-G | 6037322 |

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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