



WTB4FP-31312120ZZZ

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

| Type | Part no. |
|--------------------|----------|
| WTB4FP-31312120ZZZ | 1120713 |

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



Detailed technical data

Features

| | |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Functional principle | Photoelectric proximity sensor |
| Functional principle detail | Background suppression |
| Sensing range | |
| Sensing range min. | 4 mm |
| Sensing range max. | 220 mm |
| Adjustable switching threshold for background suppression | 15 mm ... 220 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%) | 3 mm, at a distance of 80 mm |
| Recommended sensing range for the best performance | 40 mm ... 140 mm |
| Emitted beam | |
| Light source | PinPoint LED |
| Type of light | Visible red light |
| Shape of light spot | Point-shaped |
| Light spot size (distance) | Ø 4.2 mm (130 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 | 635 nm |
| Average service life | 100,000 h at $T_a = +25\text{ °C}$ |
| Smallest detectable object (MDO) typ. | 0.2 mm (At 130 mm distance (object with 90% remission (complies with standard white according to DIN 5033))) |
| Adjustment | |
| Teach-Turn adjustment | BluePilot: For setting the sensing range |
| Indication | |
| LED blue | BluePilot: sensing range indicator |
| LED green | Operating indicator Static on: power on |
| LED yellow | Status of received light beam Static on: object present Static off: object not present |
| Special applications | Detecting flat objects |

Safety-related parameters

| | |
|-------------------------------------|--------------------------------------------|
| MTTF_D | 642 years |
| DC_{avg} | 0 % |
| T_M (mission time) | 20 years (EN ISO 13849, rate of use: 60 %) |

Electrical data

| | |
|-------------------------------------|--------------------------------------------------------------------------------|
| Supply voltage U_B | 10 V DC ... 30 V DC ¹⁾ |
| Ripple | ≤ 5 V _{pp} |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | ≤ 25 mA, without load. At U _B = 24 V |
| Protection class | III |
| Digital output | |
| Number | 1 |
| Type | Push-pull: PNP/NPN |
| 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 Overcurrent protected Short-circuit protected |
| Response time | ≤ 500 μs ²⁾ |
| Repeatability (response time) | 150 μs |
| Switching frequency | 1,000 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.

⁴⁾ This switching output must not be connected to another output.

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

- 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 |
| Design detail | Flat |
| Dimensions (W x H x D) | 16 mm x 40.1 mm x 12.1 mm |
| Connection | Cable with connector M8, 3-pin, 110 mm |
| Connection detail | |
| Deep-freeze property | Do not bend below 0 °C |
| Conductor size | 0.14 mm ² |
| Cable diameter | Ø 3.4 mm |
| Length of cable (L) | 77 mm |
| Material | |
| Housing | Plastic, VISTAL® |
| Front screen | Plastic, PMMA |
| Cable | PVC |
| 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 |

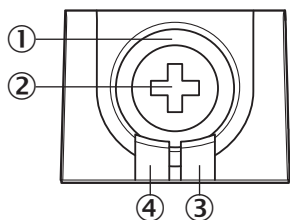
Classifications

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

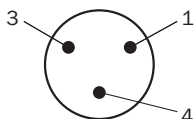
Display and adjustment elements



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

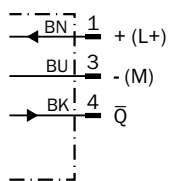
Connection type

Connector M8, 3-pin



Connection diagram

Cd-514



Truth table

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

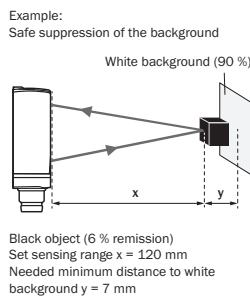
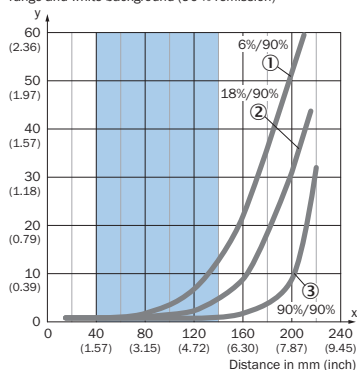
| | Dark switching \bar{Q} (normally closed (upper switch), normally open (lower switch)) | |
|-------------------------|-----------------------------------------------------------------------------------------|-----------------------------|
| | Object not present → Output HIGH | Object present → Output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

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 | ⊗ | ⚠ |
| | | |

Characteristic curve

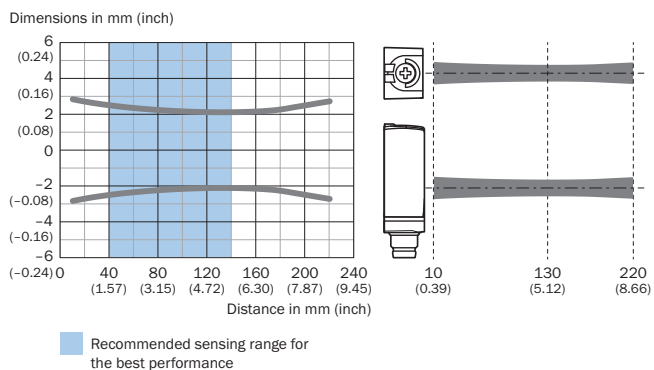
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



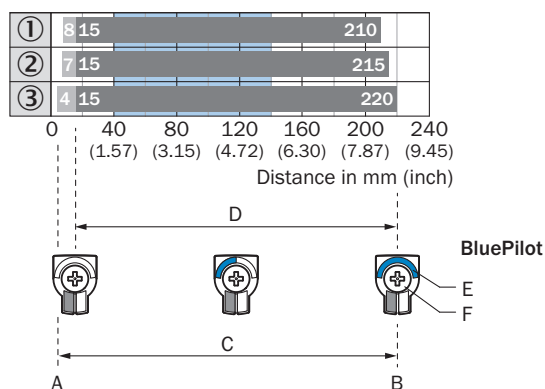
Recommended sensing range for the best performance

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

Light spot size



Sensing range diagram

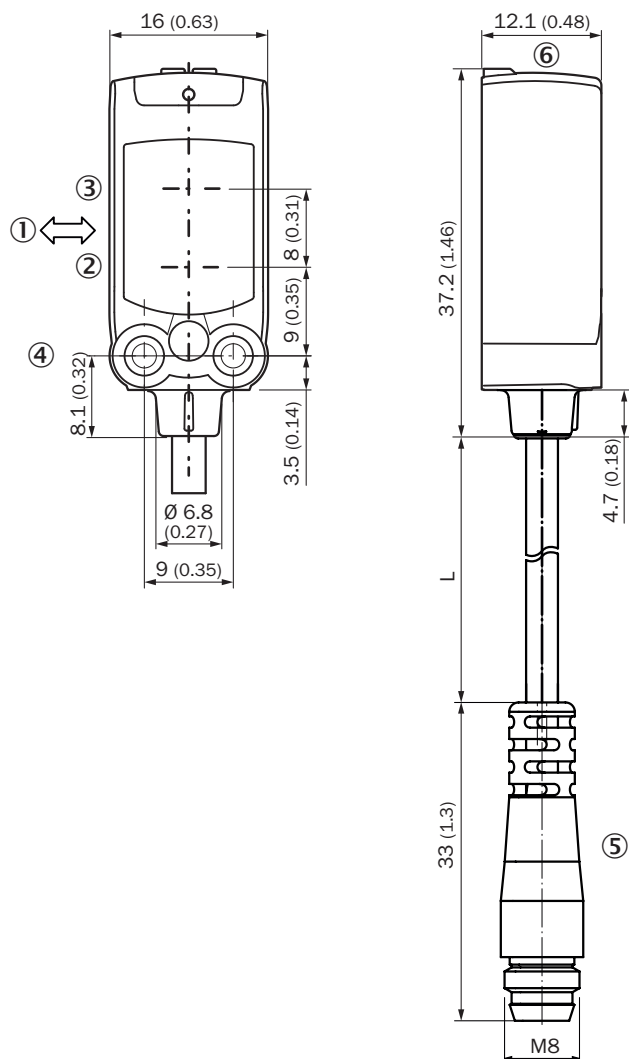


- A = Sensing range min. in mm
- B = Sensing range max. in mm
- C = Viewing range
- D = Adjustable switching threshold for background suppression
- E = Sensing range indicator
- F = Teach-Turn adjustment

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))






For length of cable (L), see technical data

- 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 Cable with connector M8
- ⑥ Display and adjustment elements

Recommended accessories

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

| | Brief description | Type | Part no. |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|-----------------|
| Mounting brackets and plates | | | |
|  | Mounting bracket for wall mounting, Stainless steel 1.4571, mounting hardware included | BEF-W4-A | 2051628 |

| | Brief description | Type | Part no. |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|
| Plug connectors and cables | | | |
|  | <ul style="list-style-type: none"> • Connection type head A: Male connector, M8, 3-pin, straight • Description: Unshielded • Connection systems: Screw-type terminals • Permitted cross-section: 0.14 mm² ... 0.5 mm² | STE-0803-G | 6037322 |
| Others | | | |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M8, 3-pin, straight, A-coded • Connection type head B: Flying leads • Signal type: Sensor/actuator cable • Cable: 5 m, 3-wire, PVC • Description: Sensor/actuator cable, unshielded • Application: Zones with chemicals | YF8U13-050VA1XLEAX | 2095884 |

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For us, that is “Sensor Intelligence.”

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