



WTB4FQ-21A12120ZZZ

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.

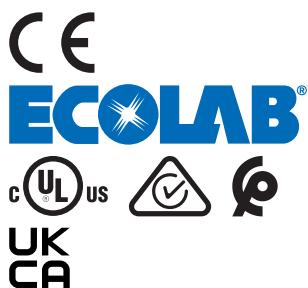


Ordering information

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 $T_U = +23$ °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 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, 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⁾

¹⁾ Limit values.

²⁾ Signal transit time with resistive load in switching mode.

³⁾ With light/dark ratio 1:1.

Pin/Wire assignment	
	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

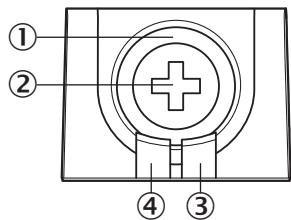
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓

Classifications

ECLASS 5.0	27270904
ECLASS 5.1.4	27270904

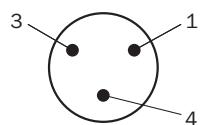
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

display and adjustment elements

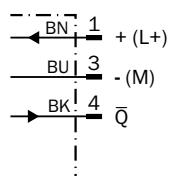


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

Connection type Connector M8, 3-pin



Connection diagram Cd-514

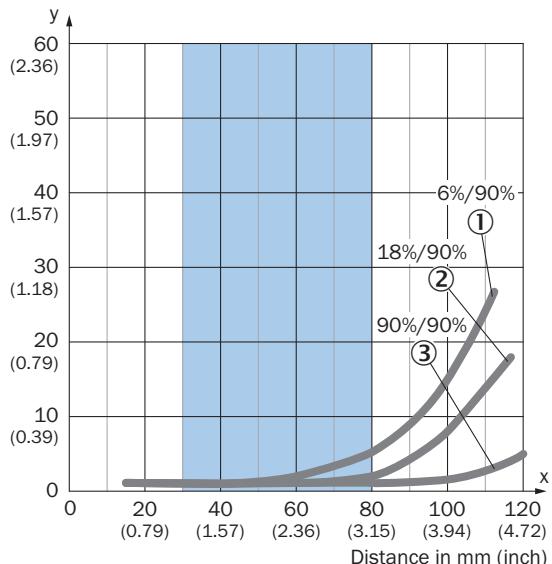


Truth table PNP - dark switching

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

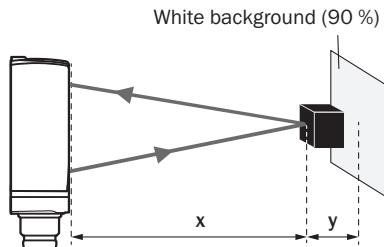
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



■ 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

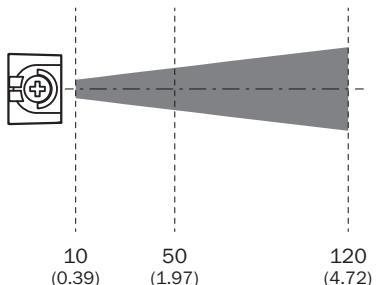
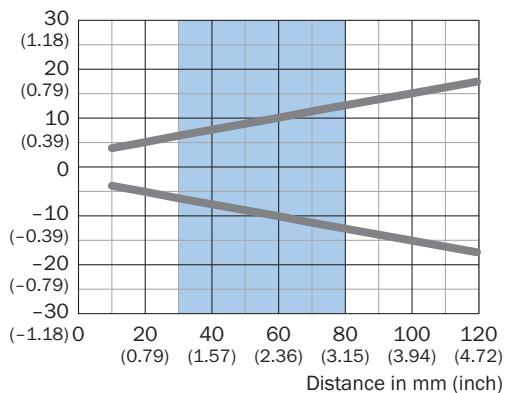
Example:
Safe suppression of the background



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

Light spot size Horizontal

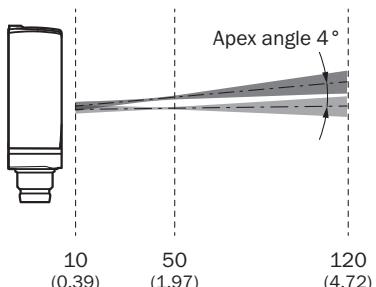
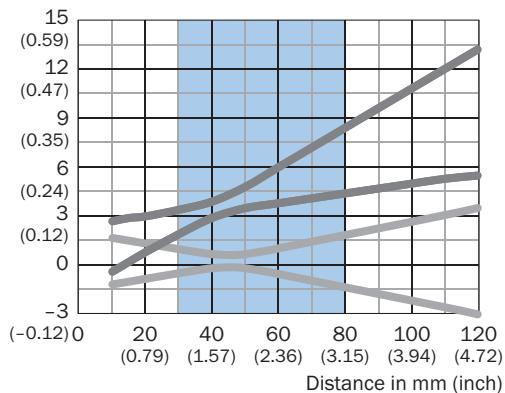
Dimensions in mm (inch)



Recommended sensing range for the best performance

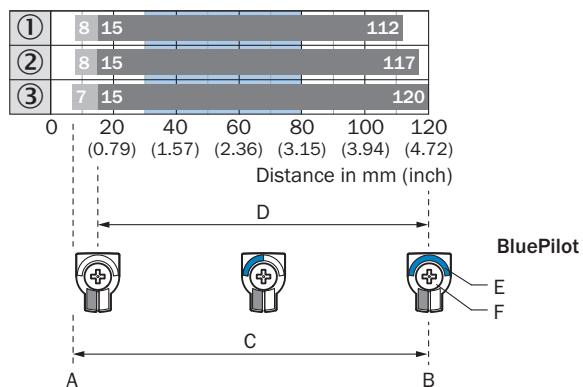
Light spot size Vertical

Dimensions in mm (inch)



Recommended sensing range for the best performance

Sensing range diagram

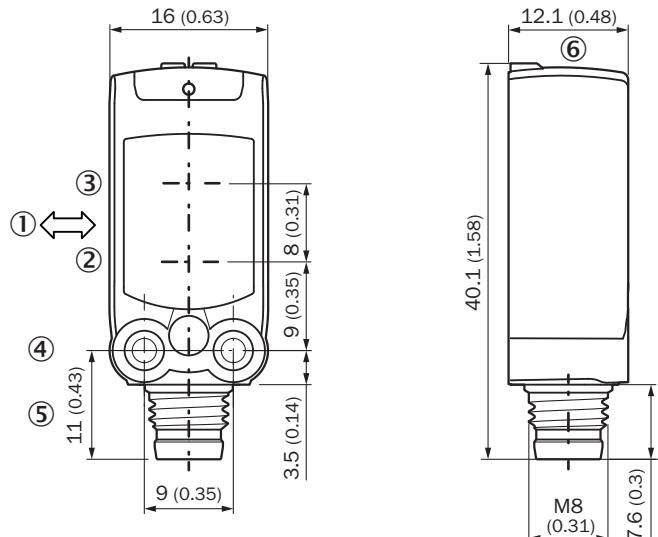


A = Sensing range min. in mm
 B = Sensing range max. in mm
 C = Viewing range
 D = Adjustable switching threshold for background suppression
 E = Sensing range indicator
 F = Teach-Turn adjustment

■ 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 mounting Material: Stainless steel Details: Stainless steel 1.4571 Items supplied: Mounting hardware included Suitable for: W4S, W4F, W4S 	BEF-W4-A	2051628
	<ul style="list-style-type: none"> Description: Mounting bracket for floor mounting Material: Stainless steel Details: Stainless steel 1.4571 Items supplied: Mounting hardware included Suitable for: W4S, W4F, W4S 	BEF-W4-B	2051630
	<ul style="list-style-type: none"> Description: Plate N08 for universal clamp bracket Material: Steel, zinc diecast Details: Zinc plated steel (sheet), Zinc die cast (clamping bracket) Items supplied: Universal clamp (5322626), mounting hardware Usable for: W100, W150, W4S, W4F, W8, W9-3, W8G, W8 Laser, W8 Inox, G6, W100 Laser, W100-2, W10, G6 Inox, RAY10, W4SLG-3, W9, GR18, MultiPulse, Reflex Array, MultiLine, LUT3, KT5, KT8, KT10, CS8 	BEF-KHS-N08	2051607
connectors and cables			
	<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: Uncontaminated zones, Zones with chemicals 	YF8U13-050VA1XLEAX	2095884
	<ul style="list-style-type: none"> Connection type head A: Male connector, M8, 3-pin, straight, A-coded Description: Unshielded Connection systems: Screw-type terminals Permitted cross-section: 0.14 mm² ... 0.5 mm² 	STE-0803-G	6037322
	<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, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation 	YF8U13-050UA1XLEAX	2094788

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:

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