



WTB4FT-97A11120ZZZ

W4

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
WTB4FT-97A11120ZZZ	1148339

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

Illustration may differ



## Detailed technical data

## Features

<b>Functional principle</b>	Photoelectric proximity sensor
<b>Functional principle detail</b>	Background suppression, DoubleLine
<b>Sensing range</b>	
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
<b>Emitted beam</b>	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	DoubleLine, 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)
<b>Key LED figures</b>	

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 $T_a = +25^\circ\text{C}$	
<b>Smallest detectable object (MDO) typ.</b>	1 mm (At 50 mm distance (object with 90% remission (complies with standard white according to DIN 5033)))	
<b>Adjustment</b>		
Teach-Turn adjustment	BluePilot: For setting the sensing range	
<b>Display</b>		
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	
<b>Special applications</b>	Detecting flat objects, Detecting objects wrapped in film, Detecting perforated objects, Detecting uneven, shiny objects	

## Safety-related parameters

<b>MTTF<sub>D</sub></b>	1,439 years
<b>DC<sub>avg</sub></b>	0 %
<b>T<sub>M</sub> (mission time)</b>	20 years

## Electronics

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

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

Function of pin 4/black (BK)	Digital output, light switching, object present → output Q HIGH
------------------------------	---

1) Limit values.

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

3) With light/dark ratio 1:1.

## Mechanics

<b>Housing</b>	Rectangular
<b>Design detail</b>	Flat
<b>Dimensions (W x H x D)</b>	16 mm x 40.1 mm x 12.1 mm
<b>Connection</b>	Cable with connector M8, 3-pin, with knurled nut, 338 mm
<b>Connection detail</b>	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm <sup>2</sup>
Cable diameter	Ø 3.4 mm
Length of cable (L)	300 mm
<b>Material</b>	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
Male connector	Plastic, VISTAL®
<b>Weight</b>	Approx. 30 g
<b>Maximum tightening torque of the fixing screws</b>	0.4 Nm

## Ambient data

<b>Enclosure rating</b>	IP66 (EN 60529) IP67 (EN 60529)
<b>Ambient operating temperature</b>	-40 °C ... +60 °C
<b>Ambient temperature, storage</b>	-40 °C ... +75 °C
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
<b>Shock resistance</b>	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
<b>Vibration resistance</b>	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 min (EN60068-2-6))
<b>Air humidity</b>	35 % ... 95 %, relative humidity (no condensation)
<b>Electromagnetic compatibility (EMC)</b>	EN 60947-5-2
<b>Resistance to cleaning agent</b>	ECOLAB
<b>UL File No.</b>	NRKH.E181493 & NRKH7.E181493

## Certificates

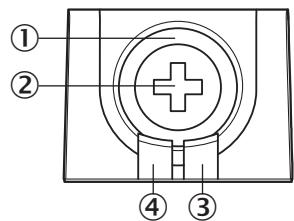
<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>Moroccan declaration of conformity</b>	✓
<b>China-RoHS</b>	✓
<b>ECOLAB certificate</b>	✓

cULus certificate	✓
EAC certificate / DoC	✓
IO-Link	✓

## Classifications

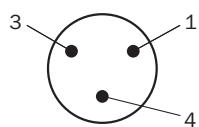
<b>ECLASS 5.0</b>	27270904
<b>ECLASS 5.1.4</b>	27270904
<b>ECLASS 6.0</b>	27270904
<b>ECLASS 6.2</b>	27270904
<b>ECLASS 7.0</b>	27270904
<b>ECLASS 8.0</b>	27270904
<b>ECLASS 8.1</b>	27270904
<b>ECLASS 9.0</b>	27270904
<b>ECLASS 10.0</b>	27270904
<b>ECLASS 11.0</b>	27270904
<b>ECLASS 12.0</b>	27270903
<b>ETIM 5.0</b>	EC002719
<b>ETIM 6.0</b>	EC002719
<b>ETIM 7.0</b>	EC002719
<b>ETIM 8.0</b>	EC002719
<b>UNSPSC 16.0901</b>	39121528

## display and adjustment elements

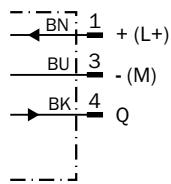


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

## Connection type Connector M8, 3-pin



## Connection diagram Cd-045

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	⚡	✗

Object present → Output LOW

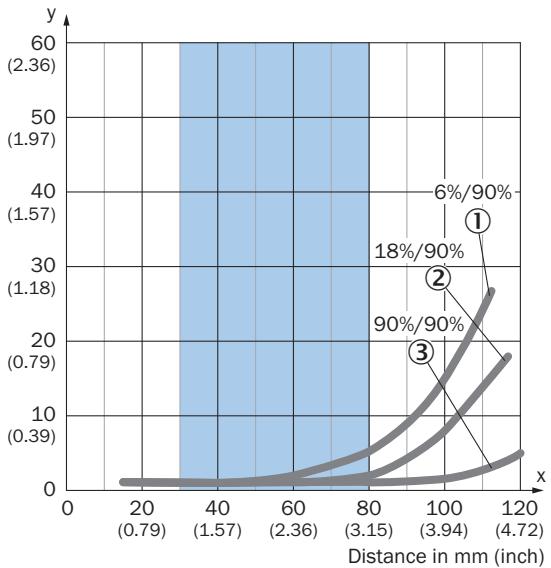
Object not present → Output HIGH

## 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		✗	⚡

## Characteristic curve

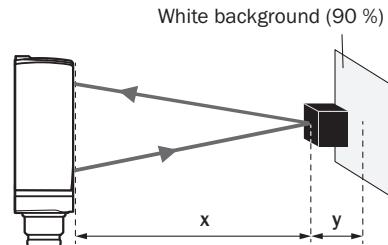
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



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

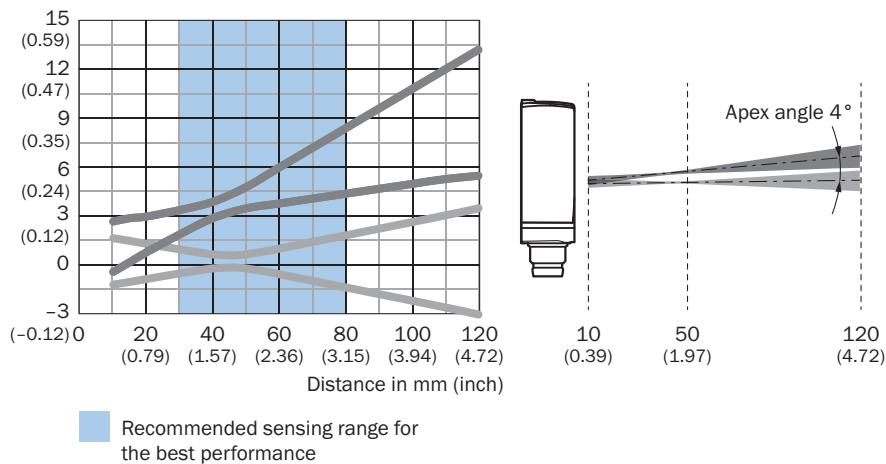
Example:  
Safe suppression of the background



White background (90 %)  
Black object (6 % remission)  
Set sensing range x = 80 mm  
Needed minimum distance to white background y = 5 mm

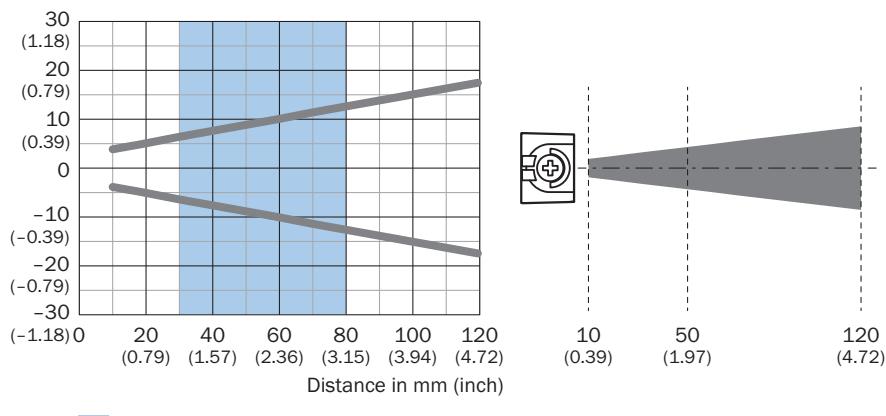
## Light spot size Vertical

Dimensions in mm (inch)

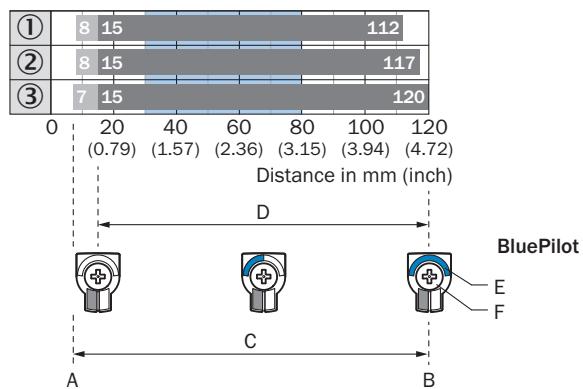


## Light spot size Horizontal

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

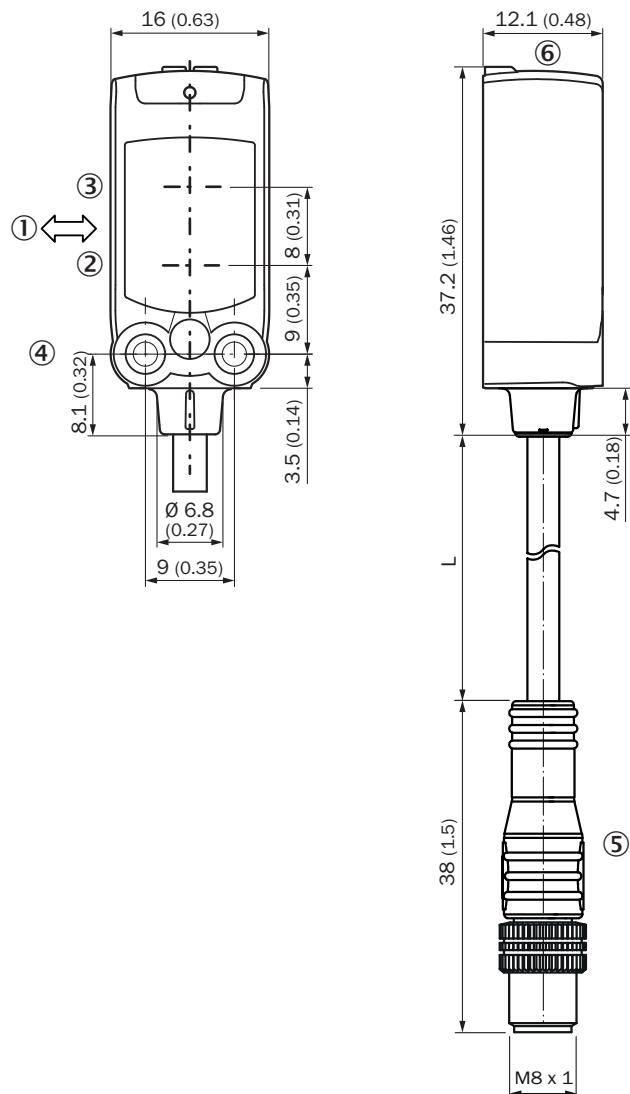
Recommended sensing range for the best performance

① Black object, 6% remission factor

② Gray object, 18% remission factor

③ White object, 90% remission factor

## Dimensional drawing



Dimensions in mm (inch)

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, with knurled nut

⑥ display and adjustment elements

## Recommended accessories

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none"><li><b>Description:</b> Mounting bracket for wall mounting</li><li><b>Material:</b> Stainless steel</li><li><b>Details:</b> Stainless steel 1.4571</li><li><b>Items supplied:</b> Mounting hardware included</li><li><b>Suitable for:</b> W4S, W4F, W4S</li></ul>	BEF-W4-A	2051628
connectors and cables			
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Male connector, M8, 3-pin, straight, A-coded</li><li><b>Description:</b> Unshielded</li><li><b>Connection systems:</b> Screw-type terminals</li><li><b>Permitted cross-section:</b> 0.14 mm<sup>2</sup> ... 0.5 mm<sup>2</sup></li></ul>	STE-0803-G	6037322
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M8, 3-pin, straight, A-coded</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Sensor/actuator cable</li><li><b>Cable:</b> 5 m, 3-wire, PVC</li><li><b>Description:</b> Sensor/actuator cable, unshielded</li><li><b>Application:</b> Zones with chemicals, Uncontaminated zones</li></ul>	YF8U13-050VA1XLEAX	2095884

## 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:

Contacts and other locations [www.sick.com](http://www.sick.com)