



DATA SHEET

WTB4FT-97A11120ZZZ

W4
Photoelectric sensors

SICK Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WTB4FT-97A11120ZZZ

ORDERING INFORMATION

Type	part no.
WTB4FT-97A11120ZZZ	1148339

Further device versions and accessories at www.sick.com/W4



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	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 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	635 nm
	Average service life	100,000 h at T _a = +25 °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

	LED yellow	Static on: power on 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 un-even, shiny objects

SAFETY-RELATED PARAMETERS

MTTF _D	1,439 years
DC _{avg}	0 %
T _M (mission time)	20 years

ELECTRONICS

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	PNP
Switching mode	Light switching
Signal voltage PNP HIGH/LOW	Approx. U _B - 2.5 V / 0 V
Output current I _{max.}	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	≤ 1,000 μs ²⁾
Repeatability (response time)	240 μs
Switching frequency	500 Hz ³⁾
Pin/Wire assignment	
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

Housing	Rectangular
Design detail	Flat
Dimensions (W x H x D)	16 mm x 40.1 mm x 12.1 mm
Connection	Cable with plug M8, 3-pin, with knurled nut, 338 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)	300 mm
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
Male connector	Plastic, VISTAL®
Weight	Approx. 30 g

Maximum tightening torque of the fixing screws	0.4 Nm
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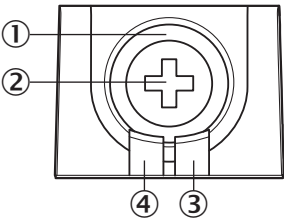
AMBIENT DATA

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

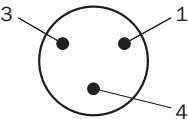
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
ECOLAB certificate	✓
cULus certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓

DISPLAY AND ADJUSTMENT ELEMENTS

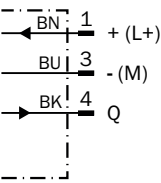


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

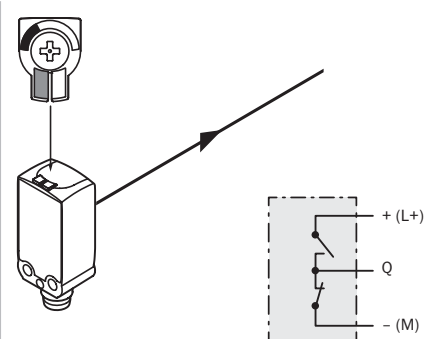
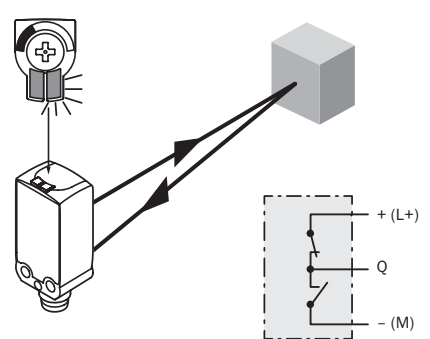
CONNECTION TYPE CONNECTOR M8, 3-PIN



CONNECTION DIAGRAM CD-045



TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q

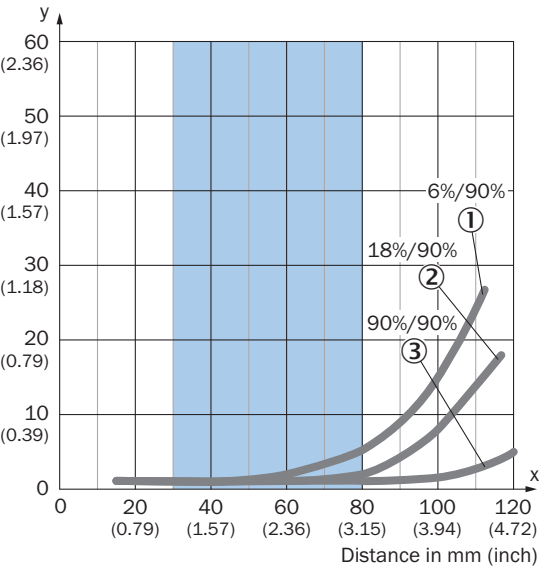
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	⚡	✗
Load resistance to M	✗	⚡
		

TRUTH TABLE PUSH-PULL: PNP/NPN – DARK SWITCHING $\bar{Q}$

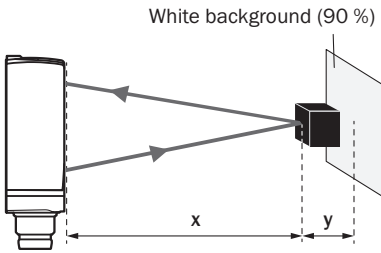
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⊗	⚡
Load resistance to M	⚡	⊗

CHARACTERISTIC CURVE

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



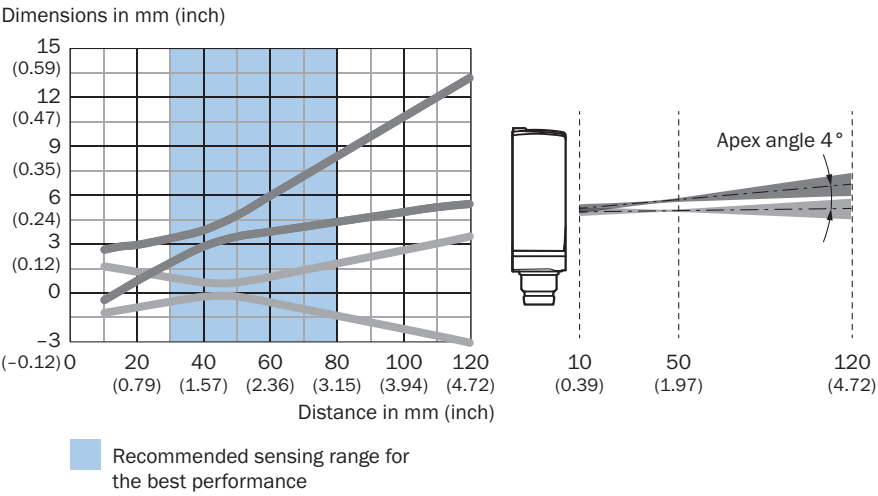
Example:
Safe suppression of the background



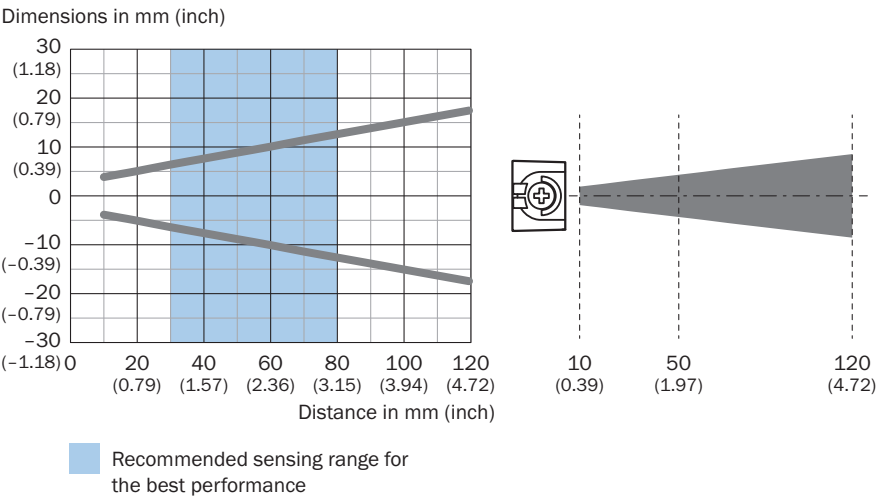
Black object (6 % remission)
Set sensing range x = 80 mm
Needed minimum distance to white background y = 5 mm

- 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

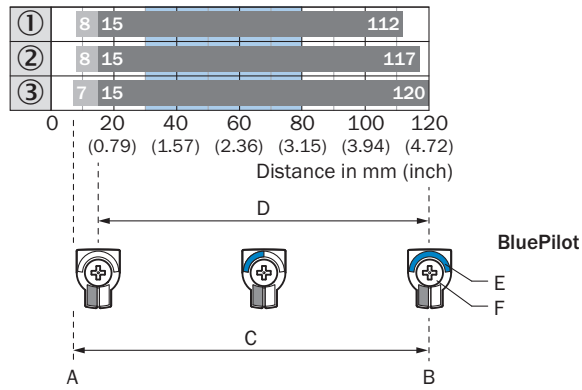
LIGHT SPOT SIZE VERTICAL



LIGHT SPOT SIZE HORIZONTAL



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

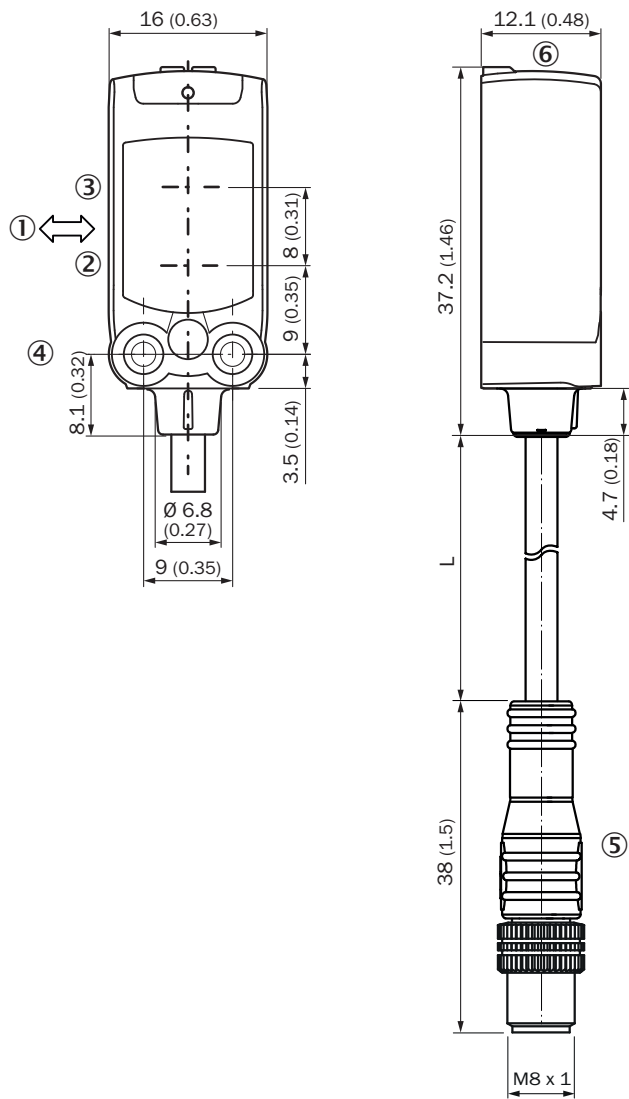
E = Sensing range indicator

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 plug M8, with knurled nut
- ⑥ display and adjustment elements

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at www.sick.com/1148339



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SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

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