



DATA SHEET

# WTB4FP-3131120ZZZ

W4  
Photoelectric sensors

# SICK

Sensor Intelligence

PHOTOELECTRIC SENSORS

WTB4F-  
P-3131120ZZZ

ORDERING INFORMATION

Type	part no.
WTB4FP-3131120ZZZ	1107692

Further device versions and accessories at [www.sick.com/W4](http://www.sick.com/W4)



Illustration may differ

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 T <sub>0</sub> = +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 <sub>a</sub> = +25 °C
Smallest detectable object (MDO) typ.		

		0.2 mm, At 130 mm distance (object with remission factor of 90% (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

**SAFETY-RELATED PARAMETERS**

MTTF <sub>D</sub>	642 years
DC <sub>avg</sub>	0 %
T <sub>M</sub> (mission time)	20 years

**ELECTRONICS**

Supply voltage U <sub>B</sub>	10 V DC ... 30 V DC <sup>1)</sup>
Ripple	≤ 5 V <sub>pp</sub>
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 <sub>B</sub> = 24 V
Protection class	III
Digital output	Number 1 Type Push-pull: PNP/NPN Switching mode Light switching Signal voltage PNP HIGH/LOW Approx. U <sub>B</sub> -2.5 V / 0 V Signal voltage NPN HIGH/LOW Approx. U <sub>B</sub> / < 2.5 V Output current I <sub>max</sub> ≤ 100 mA Circuit protection outputs Reverse polarity protected Overcurrent protected Short-circuit protected Response time ≤ 500 μs <sup>2)</sup> Repeatability (response time) 150 μs Switching frequency 1,000 Hz <sup>3)</sup>
Pin/Wire assignment	Function of pin 4/black (BK) Digital output, light switching, object present → output Q HIGH <sup>4)</sup>

<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.

<sup>4)</sup> This switching output must not be connected to another output.

**MECHANICS**

Housing	Rectangular
Design detail	Flat
Dimensions (W x H x D)	16 mm x 40.1 mm x 12.1 mm

# PHOTOELECTRIC SENSORS - WTB4FP-3131120ZZZ

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 <sup>2</sup>
	Cable diameter	Ø 3.4 mm
	Length of cable (L)	77 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	

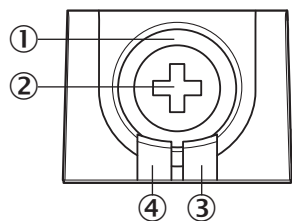
## AMBIENT DATA

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

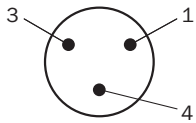
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓

## DISPLAY AND ADJUSTMENT ELEMENTS

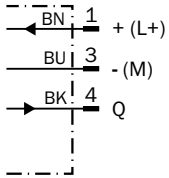


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

**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	✗	⚡
	<p>Diagram showing a light sensor with a light source. The output Q is connected to a load and returns to terminal M (-). The internal switch is in the normally closed position, resulting in a LOW output.</p>	<p>Diagram showing a light sensor with a light source and an object blocking the light. The output Q is connected to a load and returns to terminal M (-). The internal switch is in the normally open position, resulting in a HIGH output.</p>

**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	⚡	⊗

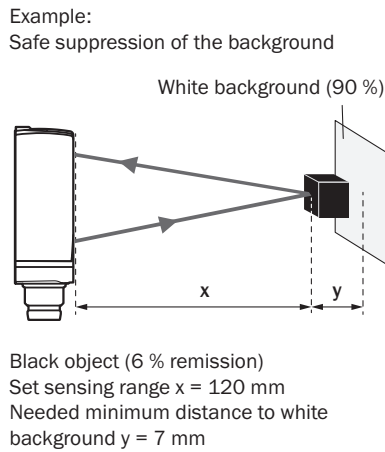
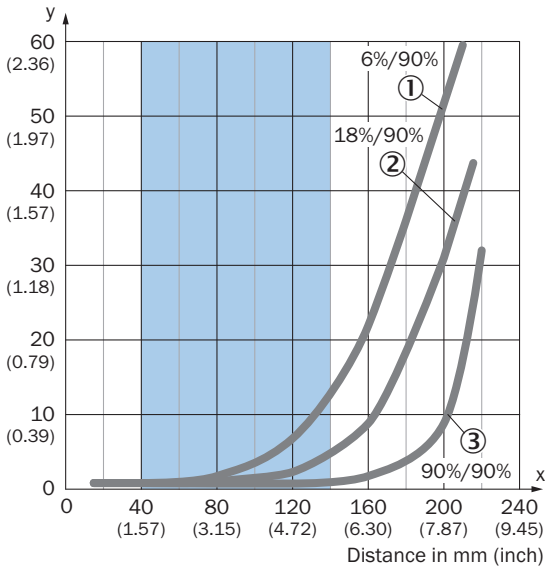
  

Object not present

Object present

**CHARACTERISTIC CURVE**

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

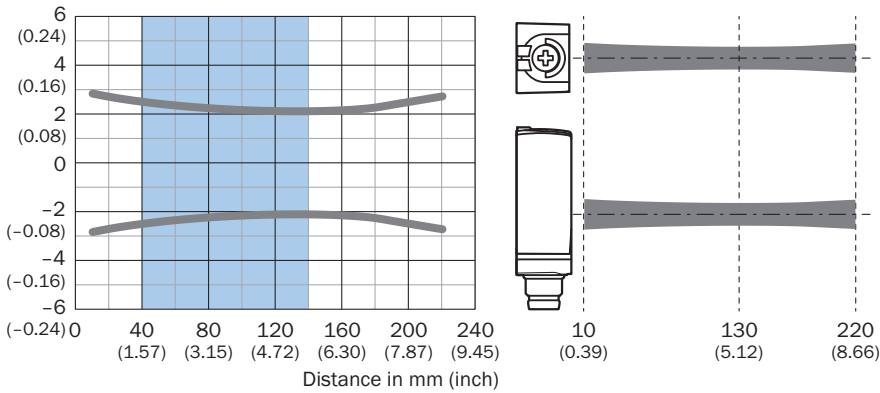


Recommended sensing range for the best performance

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

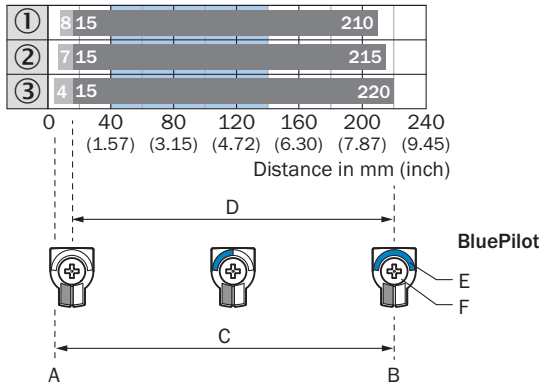
**LIGHT SPOT SIZE**

Dimensions in mm (inch)



Recommended sensing range for the best performance

**SENSING RANGE DIAGRAM**

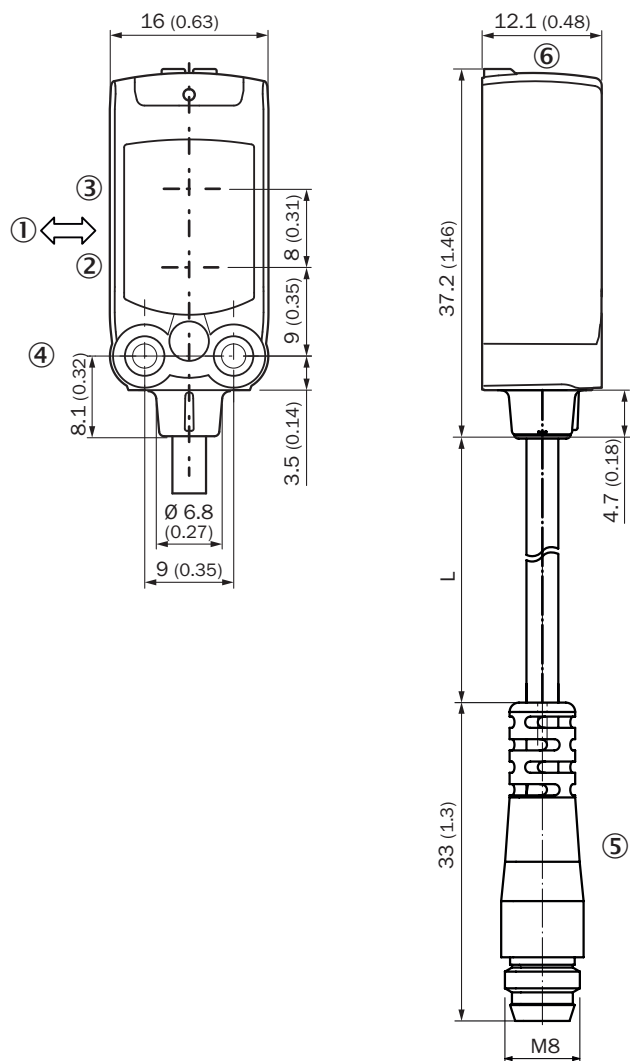


- A = Sensing range min. in mm
- B = Sensing range max. in mm
- C = Viewing range
- D = Adjustable switching threshold for background suppression
- E = Sensing range indicator
- F = Teach-Turn adjustment

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)

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

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/1107692](http://www.sick.com/1107692)



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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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