



DATA SHEET

WTB4FP-2216D200A91

W4
Photoelectric sensors

SICK

Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WTB4FP-2216D200A91

ORDERING INFORMATION

Type	part no.
WTB4FP-2216D200A91	1142830

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



DETAILED TECHNICAL DATA

FEATURES

Functional principle		Photoelectric proximity sensor
Functional principle detail		Background suppression, MultiSwitch, NarrowBeam, distance value
Sensing range		
	Sensing range min.	4 mm
	Sensing range max.	100 mm
Adjustable switching threshold for background suppression		15 mm ... 100 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%)		2.5 mm, at a distance of 40 mm
Recommended sensing range for the best performance		30 mm ... 60 mm
Distance value		
	Measuring range	15 mm ... 100 mm
	Repeatability	0,3 mm ... 2,2 mm ^{1) 2) 3)}
	Accuracy	Typ. 3.0 mm at 15 ... 50 mm distance ¹⁾ Typ. 4.5 mm at 50 ... 100 mm distance ¹⁾
	Distance value output	Via IO-Link
	Resolution	1 mm
Update rate of the distance value		20 ms
Emitted beam		
	Light source	PinPoint LED
	Type of light	Visible red light
	Shape of light spot	Point-shaped
Light spot size (distance)		Ø 2 mm (50 mm)

¹⁾ 6% ... 90% remission factor.
²⁾ Equivalent to 1 σ.
³⁾ See repeatability characteristic lines.

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.		0.1 mm, At 50 mm distance (object with 90% remission (complies with standard white according to DIN 5033))
Adjustment		
	IO-Link	For configuring the sensor parameters and Smart Task functions
Display		
	LED blue	BluePilot: Display of mode, display of output states Q ₁ (LED 1-3 permanently on) and Q ₂ (LED 5-7 permanently on)
	LED green	Operating indicator Static on: power on Flashing: IO-Link mode
	LED yellow	Status of received light beam Static on: object present Static off: object not present
Special features		Sensor with Smart Task function "time stamp"
Special applications		Detecting flat objects, Detecting small objects
Pin 2 configuration		External input, Teach-in input, Sender off input, Detection output, logic output

¹⁾ 6% ... 90% remission factor.

²⁾ Equivalent to 1 σ.

³⁾ See repeatability characteristic lines.

SAFETY-RELATED PARAMETERS

MTTF _D	642 years
DC _{avg}	0 %
T _M (mission time)	20 years

COMMUNICATION INTERFACE

IO-Link		✓, IO-Link V1.1
	Data transmission rate	COM2 (38,4 kBaud)
	Cycle time	2.3 ms
	Process data length	16 Bit
	Process data structure	Bit 0 = switching signal Q ₁ Bit 1 = switching signal Q ₂ Process data structure: A: Bit 2 ... 15 = Current receiver level (live). Process data structure B: Bit 2 ... 15 = Distance to object. Can be switched between A and B via IO-Link.
	VendorID	26
	DeviceID HEX	0x800376
	DeviceID DEC	8389494
	Compatible master port type	A
	SIO mode support	Yes

ELECTRONICS

Supply voltage U _s	10 V DC ... 30 V DC ¹⁾
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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.

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	2 (individually adjustable)
	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	≤ 1,000 μs ²⁾
	Repeatability (response time)	360 μs
	Switching frequency	500 Hz ³⁾
Pin/Wire assignment	Function of pin 4/black (BK)	Digital output, light switching, object present → output Q _{L1} HIGH; IO-Link communication C ⁴⁾
	Function of pin 4/black (BK) – detail	The pin 4 function of the sensor can be configured Additional possible settings via IO-Link
	Function of pin 2/white (WH)	Digital output, light switching, object present → output Q _{L2} HIGH ⁴⁾
	Function of pin 2/white (WH) – detail	The pin 2 function of the sensor can be configured Additional possible settings via IO-Link

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.

MECHANICS

Housing	Rectangular	
Design detail	Flat	
Dimensions (W x H x D)	16 mm x 40.1 mm x 12.1 mm	
Connection	Male connector M8, 4-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
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SMART TASK

Smart Task name	Timestamp + debouncing
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Response time	SIO Direct: 300 µs ... 450 µs ¹⁾ SIO Logic: 800 µs ... 950 µs ²⁾ IOL: --- ³⁾
Repeatability	SIO Direct: 150 µs ¹⁾ SIO Logic: 150 µs ²⁾ IOL: --- ³⁾
Time stamp accuracy	SIO Direct: --- SIO Logic: --- IOL: - 80 ... + 330 µs
Min. Time between two process events (switches)	SIO Direct: 450 µs SIO Logic: 500 µs IOL: 800 µs
Time stamp number buffer	SIO Direct: --- SIO Logic: --- IOL: 8
Max. TimeStamp Range	SIO Direct: --- SIO Logic: --- IOL: 260 ms
Debounce time max.	SIO Direct: --- SIO Logic: 52 ms IOL: 52 ms
Switching signal	Switching signal Q _{L1} Switching output Switching signal Q _{L2} Switching output
Measuring value	Timestamp

¹⁾ SIO Direct: sensor operation in standard I/O mode without IO-Link communication and without using internal sensor logic or time parameters (set to "direct"/"deactivated").

²⁾ SIO Logic: Sensor operation in standard I/O mode without IO-Link communication. Sensor-internal logic or timing parameters plus Automation Functions used.

³⁾ IOL: Sensor operation with full IO-Link communication and usage of logic, timing and Automation Function parameters.

DIAGNOSIS

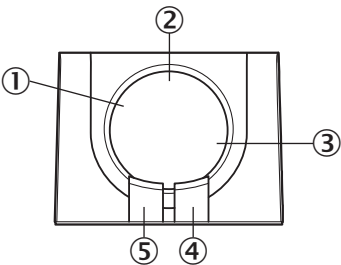
Device temperature	Measuring range	Very cold, cold, moderate, warm, hot
Device status		Yes
Detailed device status		Yes
Operating hour counter		Yes
Operating hours counter with reset function		Yes
Quality of teach		Yes

CERTIFICATES

EU declaration of conformity	✓
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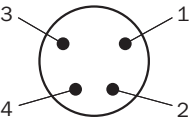
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
ECOLAB certificate	✓
cULus certificate	✓
IO-Link certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DISPLAY AND ADJUSTMENT ELEMENTS

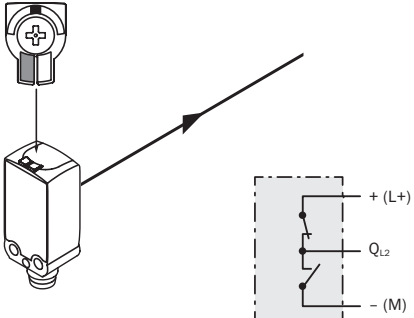
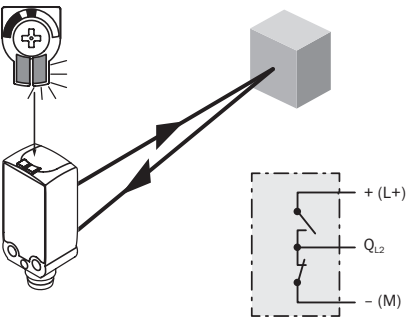


- ① LED blue
- ② indicator switching output mode
- ③ indicator distance mode
- ④ LED yellow
- ⑤ LED green

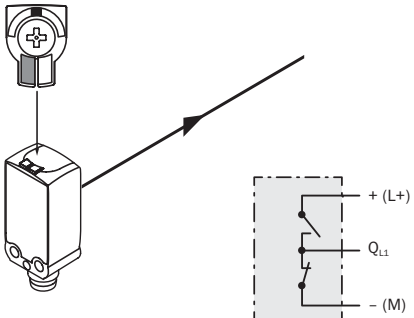
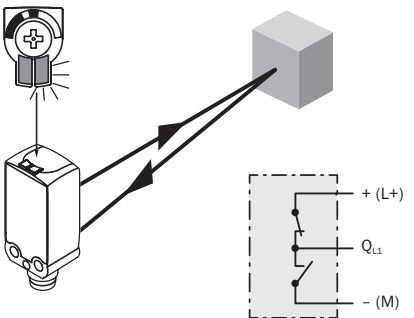
CONNECTION TYPE MALE CONNECTOR M8, 4-PIN



TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q_{L2}

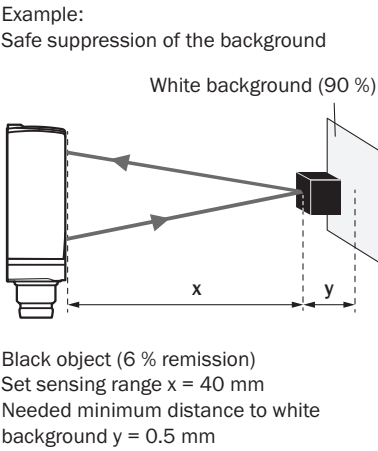
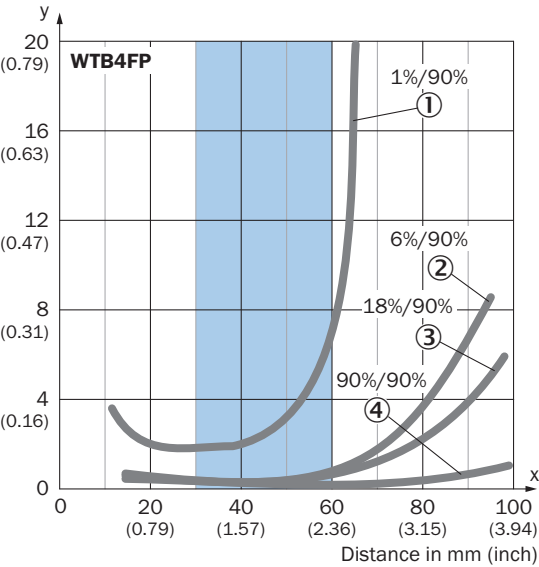
	Light switching Q _{L2} (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	⚡	✗
Load resistance to M	✗	⚡
		

TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q_{L1}

	Light switching Q _{L1} (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

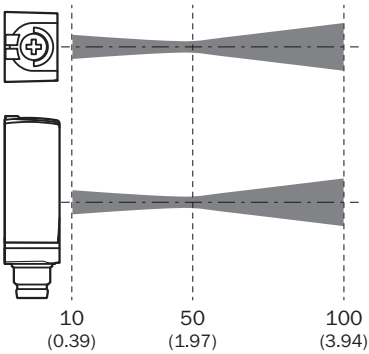
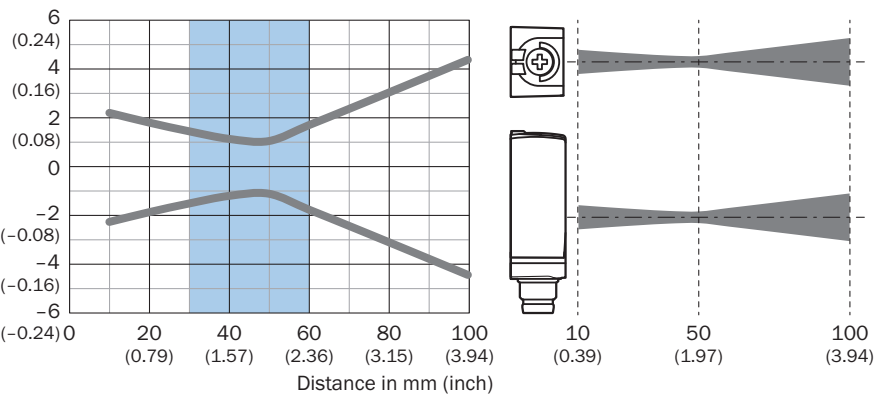
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



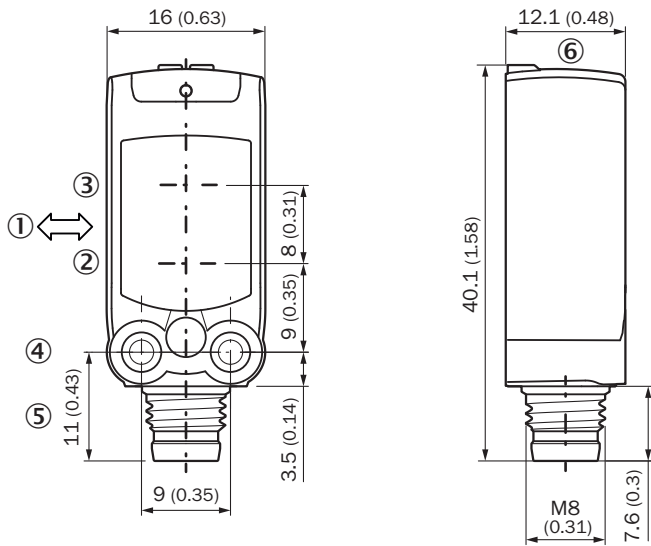
- Recommended sensing range for the best performance
- ① ultra-black object, 1% remission factor
 - ② Black object, 6% remission factor
 - ③ Gray object, 18% remission factor
 - ④ White object, 90% remission factor

LIGHT SPOT SIZE

Dimensions in mm (inch)



- Recommended sensing range for the best performance

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

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/1142830



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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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