



DATA SHEET

WTF4SD-32161220A00

W4
Photoelectric sensors

SICK

Sensor Intelligence

PHOTOELECTRIC SENSORS

WT-
F4SD-32161220A00

ORDERING INFORMATION

Type	part no.
WTF4SD-32161220A00	1139114

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



Illustration may differ

DETAILED TECHNICAL DATA

FEATURES

Functional principle	Photoelectric proximity sensor
Functional principle detail	Foreground suppression
Sensing range	
Sensing range min.	0 mm
Sensing range max.	130 mm
Adjustable switching threshold for background suppression	10 mm ... 130 mm
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Minimum object height at set sensing range in front of black background (6% remission factor)	0.6 mm, At 70 mm distance
Recommended sensing range for the best performance	50 mm ... 90 mm
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Rectangular, Consisting of two parallel light spots
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at T _v = +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.	0.6 mm, At 70 mm distance

		Object with 90% remission factor (complies with standard white according to DIN 5033)
Adjustment	Teach-Turn adjustment	BluePilot For setting the sensing range
	IO-Link	For configuring the sensor parameters and Smart Task functions
Display	LED blue	BluePilot: sensing range indicator
	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 applications		Detecting flat objects, Detecting uneven, shiny objects

SAFETY-RELATED PARAMETERS

MTTF _D	1,399 years
DC _{avg}	0%

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 _{L1}
		Bit 1 = switching signal Q _{L2}
		Bit 2 ... 15 = Current receiver level (live)
	VendorID	26
	DeviceID HEX	0x800338
	DeviceID DEC	8389432
	Compatible master port type	A
	SIO mode support	Yes

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	≤ 20 mA, without load. At U _b = 24 V	
Protection class	III	
Digital output	Number	2
	Type	Push-pull: PNP/NPN
	Switching mode	Light/dark switching
	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	≤ 650 μs
Repeatability (response time)	300 μs	

¹⁾ Limit values.

²⁾ This switching output must not be connected to another output.

Switching frequency	750 Hz
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, dark switching, object present → output \bar{Q}_{L_HIGH} ²⁾ IO-Link communication C
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_{L_LOW} ²⁾
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⁾ This switching output must not be connected to another output.

MECHANICS

Housing	Rectangular
Design detail	Slim
Dimensions (W x H x D)	12.1 mm x 41.9 mm x 18.6 mm
Connection	Cable with M8 male connector, 4-pin, 114 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)	77 mm
Length of male connector	37 mm
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
Male connector	Plastic, VISTAL®
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

SMART TASK

Smart Task name	Base logics
Logic function	Direct AND OR
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay

¹⁾ Use of Smart Task functions without IO-Link communication (SIO mode).

	Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Logic: 700 Hz ¹⁾
Response time	SIO Logic: 700 µs ¹⁾
Repeatability	SIO Logic: 350 µs ¹⁾
Switching signal	Switching signal Q _{L1} Switching output
	Switching signal \bar{Q}_{L1} Switching output

¹⁾ Use of Smart Task functions without IO-Link communication (SIO mode).

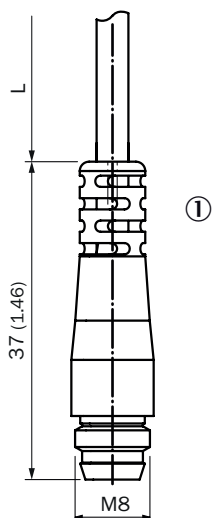
DIAGNOSIS

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

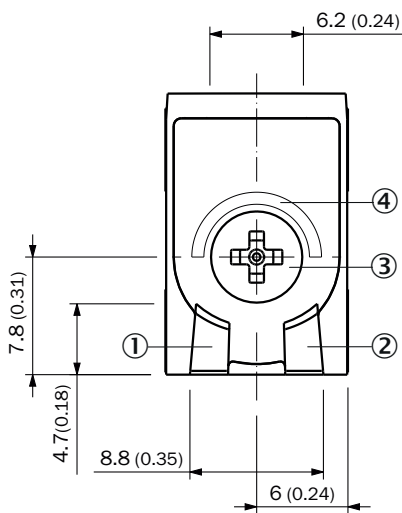
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
cULus certificate	✓
IO-Link certificate	✓
Photobiological safety (IEC EN 62471)	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DIMENSIONAL DRAWING, CONNECTION



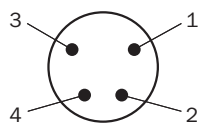
Dimensions in mm (inch)
 For length of cable (L), see technical data
 ① cable with connector M8

DISPLAY AND ADJUSTMENT ELEMENTS

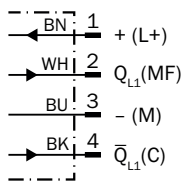


- ① LED green
- ② LED yellow
- ③ Teach-Turn adjustment
- ④ LED blue

CONNECTION TYPE MALE CONNECTOR M8, 4-PIN



CONNECTION DIAGRAM CD-503



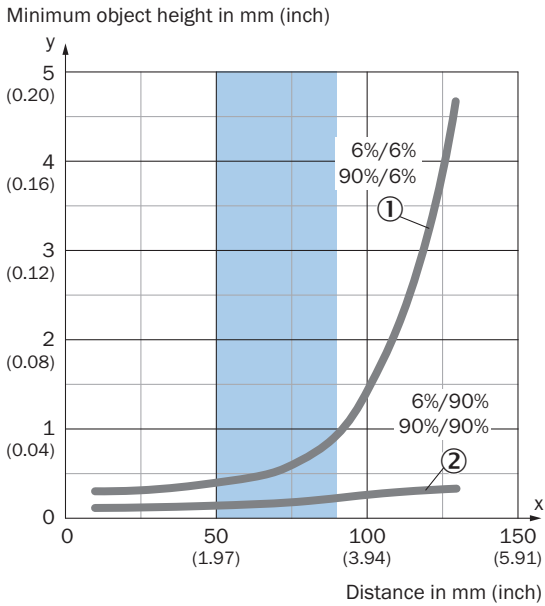
TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING \bar{Q}

	Dark switching \bar{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	✘	⚡

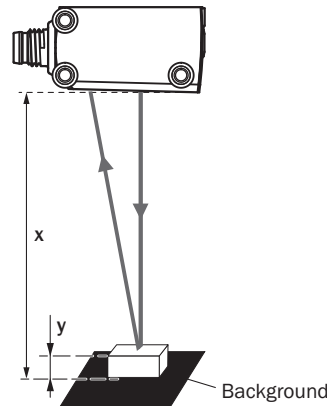
TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q

	Light switching 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



Example:
Reliable detection of the object



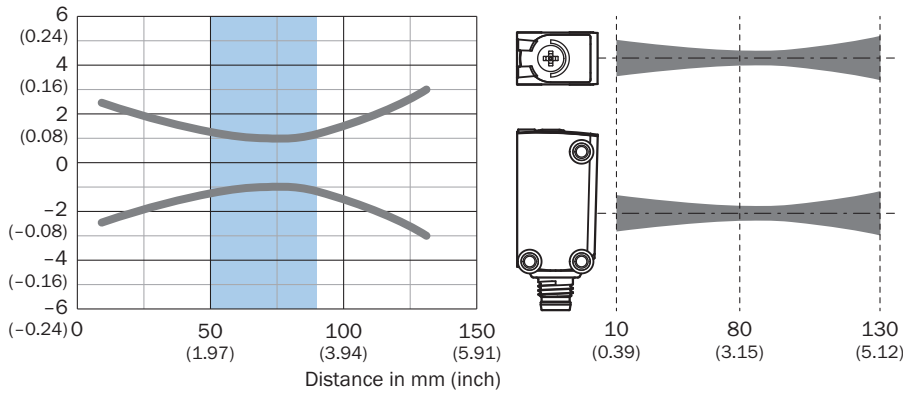
Black background (6 % remission factor)
Distance of sensor to background $x = 70 \text{ mm}$
Required minimum object height $y = 0.6 \text{ mm}$
For all objects regardless of their colors

Recommended sensing range for the best performance

- ① Black background, 6% remission factor
- ② White background, 90% remission factor

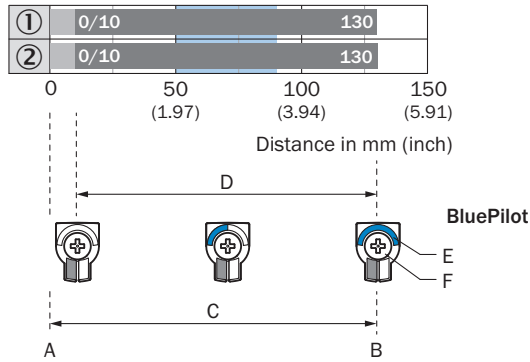
LIGHT SPOT SIZE

Dimensions in mm (inch)



Recommended sensing range for the best performance

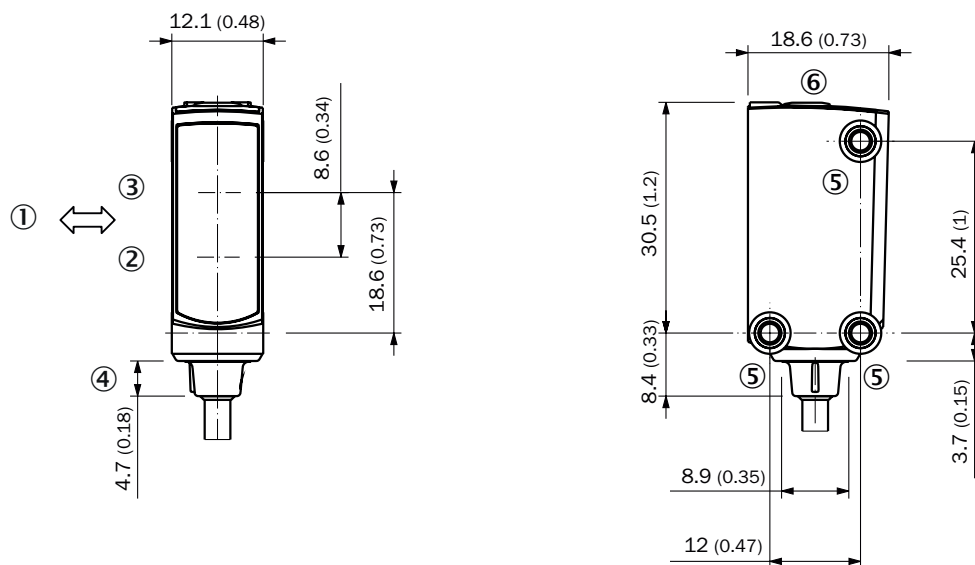
SENSING RANGE DIAGRAM



Recommended sensing range for the best performance

1	Black background, 6% remission factor
2	White background, 90% remission factor
A	Sensing range min. in mm
B	Sensing range max. in mm
C	Field of view
D	Adjustable switching threshold for foreground suppression
E	Sensing range indicator
F	Teach-Turn adjustment

DIMENSIONAL DRAWING, SENSOR



Dimensions in mm (inch)

- ① Standard direction of the material being detected
- ② Center of optical axis, receiver
- ③ Center of optical axis, sender
- ④ Connection
- ⑤ M3 mounting hole
- 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/1139114



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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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