WTF4SD-84162220A00

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.

Illustration may differ

Ordering information

Type	Part no.
WTF4SD-84162220A00	1136374

Other models and accessories ➜ www.sick.com/W4

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 Ta = +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	0x80031D
DeviceID DEC	8389405
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

[1] Limit values.

[2] This switching output must not be connected to another output.

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
Switching frequency	750 Hz
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, light switching, object present → output Q_{L1} LOW [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, dark switching, object present → output $\bar{Q}_{L1}$ HIGH [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 M12 male connector, 4-pin, 190 mm
Connection detail	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm²
Cable diameter	Ø 3.4 mm
Length of cable (L)	142 mm
Length of male connector	48 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 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

Classifications

ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904

ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

Maßzeichnung (Dimensions in mm (inch))
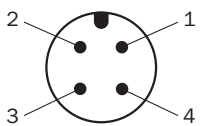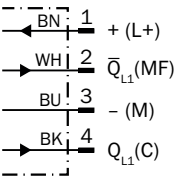
Dimensional drawing (Dimensions in mm (inch))

12.1 (0.48)

8.6 (0.34)

① ↔ ③

②

18.6 (0.73)

④

4.7 (0.18)

18.6 (0.73)

⑥

30.5 (1.2)

⑤

8.4 (0.33)

⑤   ⑤

8.9 (0.35)

12 (0.47)

25.4 (1)

3.7 (0.15)

Adjustments

6.2 (0.24)

④

③

7.8 (0.31)

①   ②

4.7 (0.18)

8.8 (0.35)

6 (0.24)

Connection type

2   1

3   4

Connection diagram

BN	1	+ (L+)
WH	2	$\overline{Q}_{L1}$(MF)
BU	3	– (M)
BK	4	Q_{L1}(C)
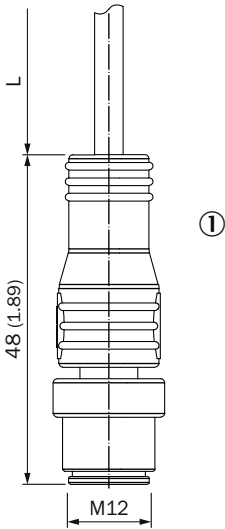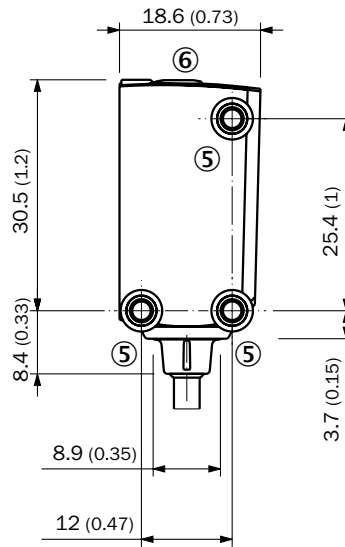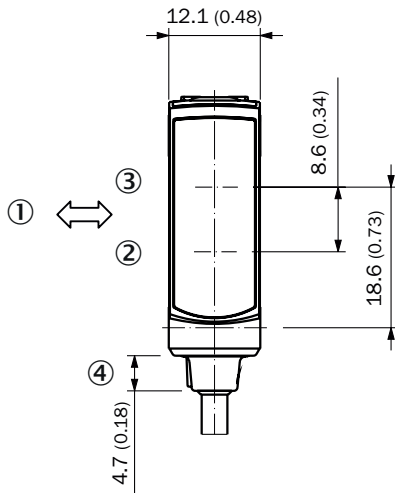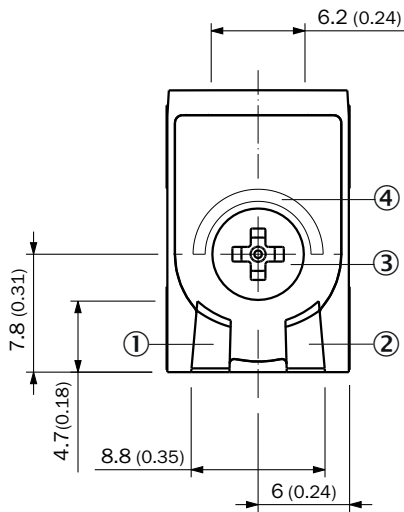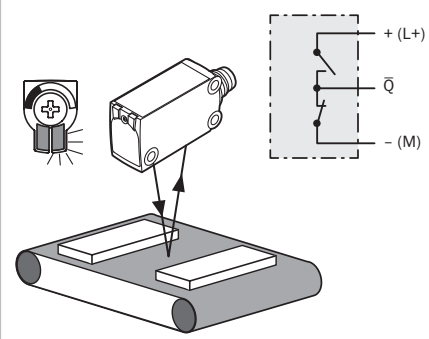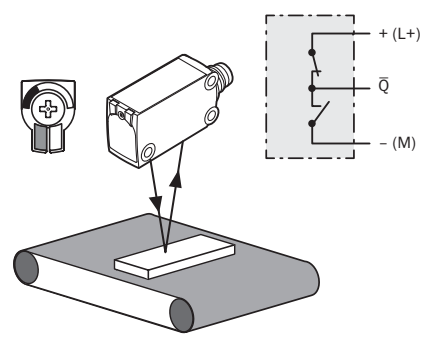
Truth table

	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	⚡	✕

	Dark switching $\overline{Q}$ (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 object height in mm (inch)

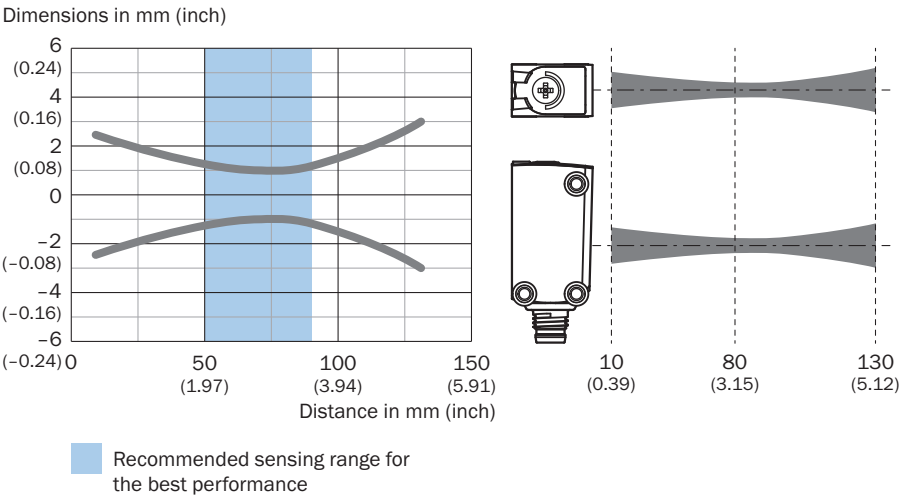Recommended sensing range for the best performance
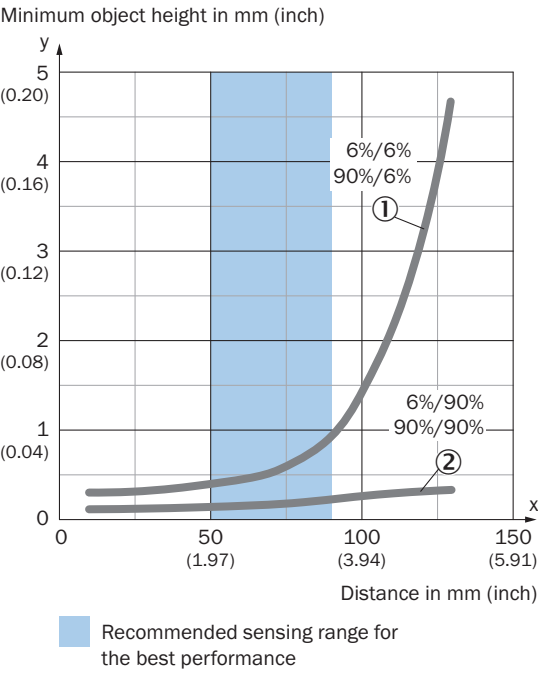
Example:
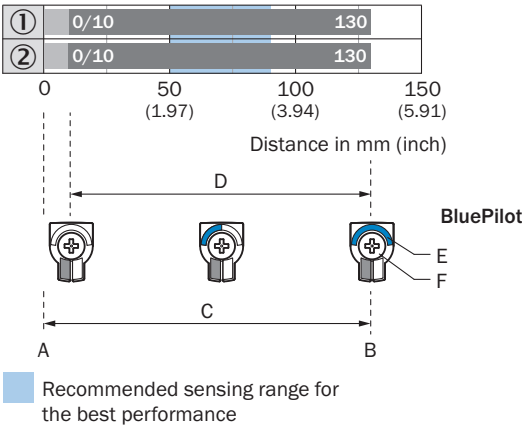Reliable detection of the object
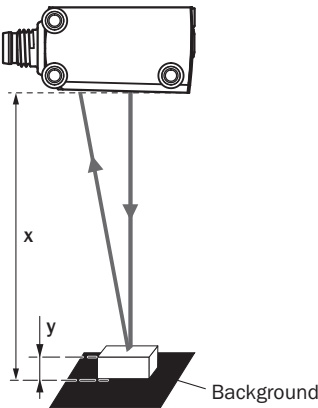
Black background (6 % remission factor)
Distance of sensor to background x = 70 mm
Required minimum object height y = 0.6 mm
For all objects regardless of their colors

Light spot size

Dimensions in mm (inch)

Distance in mm (inch)

Recommended sensing range for the best performance

Sensing range diagram

Distance in mm (inch)

BluePilot

Recommended sensing range for the best performance

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."

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