



WLD4FP-22166130A00

W4

MINIATURE PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WLD4FP-22166130A00	1124157

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

Detailed technical data

Features

Functional principle	Photoelectric retro-reflective sensor
Functional principle detail	With minimum distance to reflector (dual lens system)
Sensing range	
Sensing range min.	0 m
Sensing range max.	4.5 m
Maximum distance range from reflector to sensor (operating reserve 1)	0.015 m ... 4.5 m
Recommended distance range from reflector to sensor (operating reserve 3,75)	0.035 m ... 3.9 m
Reference reflector	Reflector P250
Recommended sensing range for the best performance	0.035 m ... 3.9 m
Polarisation filters	Yes
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	Ø 38 mm (1,000 mm)

Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at T _a = +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
Adjustment	
Teach-in button	BluePilot: for sensitivity adjustment
IO-Link	For configuring the sensor parameters and Smart Task functions
Display	
LED blue	BluePilot: Alignment aid
LED green	Operating indicator Static on: power on Flashing: IO-Link mode
LED yellow	Status of received light beam Static on: object not present Static off: object present Flashing: Below the 1.5 function reserve
Special features	Pin2 pre-setting (MF): alarm output

Safety-related parameters

MTTF_D	747 years
DC_{avg}	0 %
T_M (mission time)	20 years (EN ISO 13849) Rate of use: 60 %

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	0x8002EB
DeviceID DEC	8389355
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}

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.

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 $U_B = 24\text{ V}$
Protection class	III
Digital output	
Number	1
Type	Push-pull: PNP/NPN
Switching mode	Light switching
Signal voltage PNP HIGH/LOW	Approx. $U_B - 2.5\text{ V} / 0\text{ V}$
Signal voltage NPN HIGH/LOW	Approx. $U_B / < 2.5\text{ V}$
Output current $I_{\max.}$	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	≤ 500 μs
Repeatability (response time)	150 μs ²⁾
Switching frequency	1,000 Hz ³⁾
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, light switching, object present → output Q_{L1} LOW; 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)	Health output
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

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: 800 Hz ¹⁾ IOL: 750 Hz ²⁾
Response time	SIO Logic: 600 µs ¹⁾ IOL: 650 µs ²⁾
Repeatability	SIO Logic: 200 µs ¹⁾ IOL: 250 µs ²⁾
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).

²⁾ Use of Smart Task functions with IO-Link communication function.

Diagnosis

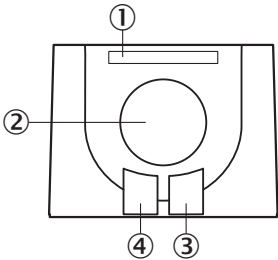
Device temperature	
Measuring range	Very cold, cold, moderate, warm, hot
Device status	Yes
Detailed device status	Yes
Operating hour counter	Yes
Operating hours counter with reset function	Yes
Quality of teach	Yes
Quality of run	Yes, Contamination display

Classifications

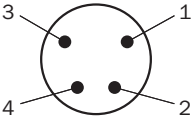
ECLASS 5.0	27270902
ECLASS 5.1.4	27270902

ECLASS 6.0	27270902
ECLASS 6.2	27270902
ECLASS 7.0	27270902
ECLASS 8.0	27270902
ECLASS 8.1	27270902
ECLASS 9.0	27270902
ECLASS 10.0	27270902
ECLASS 11.0	27270902
ECLASS 12.0	27270904
ETIM 5.0	EC002717
ETIM 6.0	EC002717
ETIM 7.0	EC002717
ETIM 8.0	EC002717
UNSPSC 16.0901	39121528

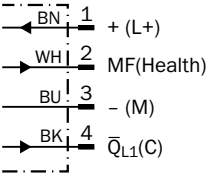
Adjustments



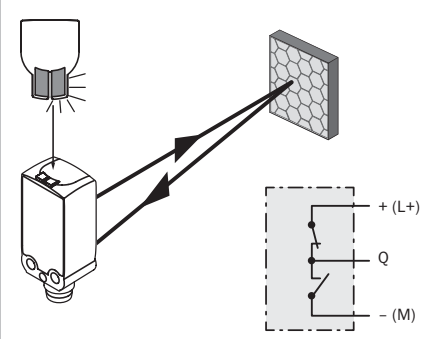
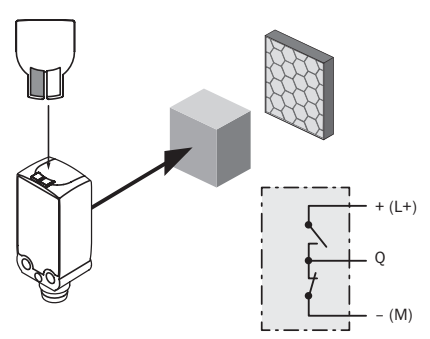
Connection type

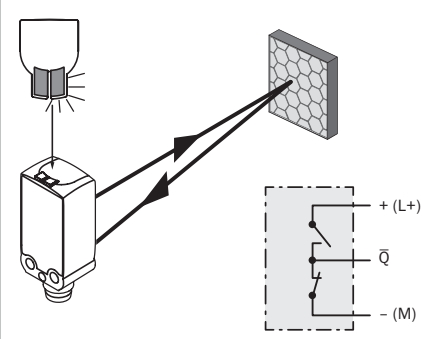
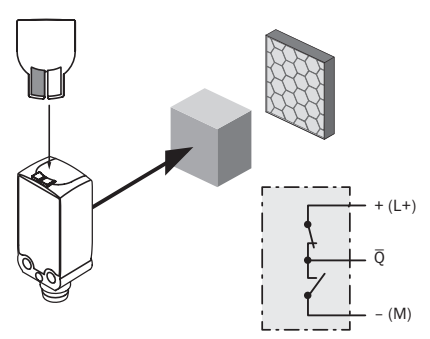


Connection diagram

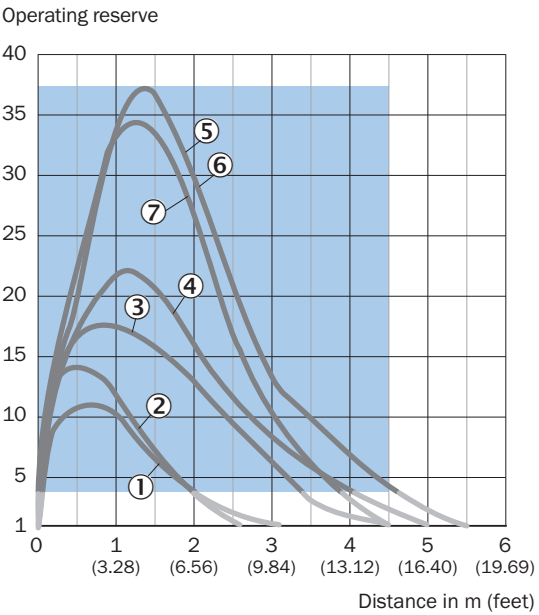
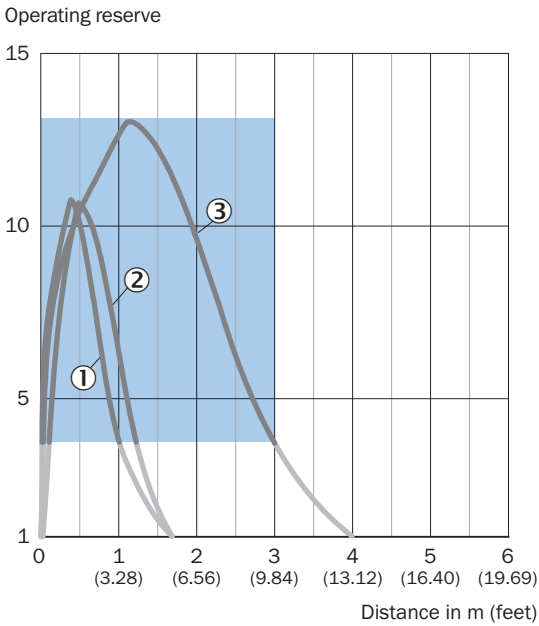


Truth table

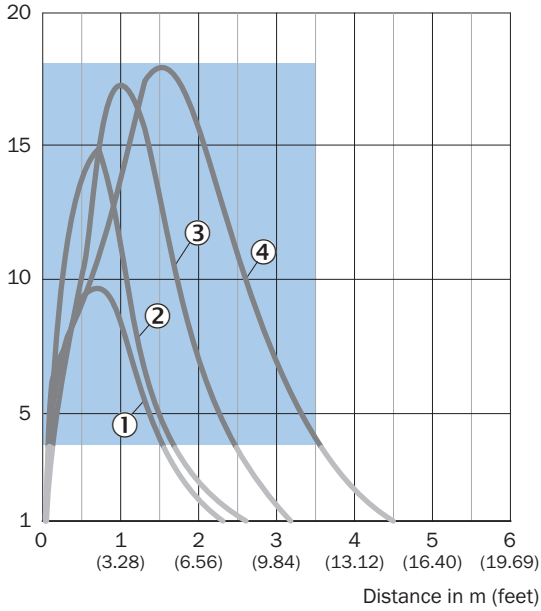
	Light switching Q (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✓	✗
Light receive indicator	☀	✗
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗
		

	Dark switching $\bar{Q}$ (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	✗	⚡
		

Characteristic curve

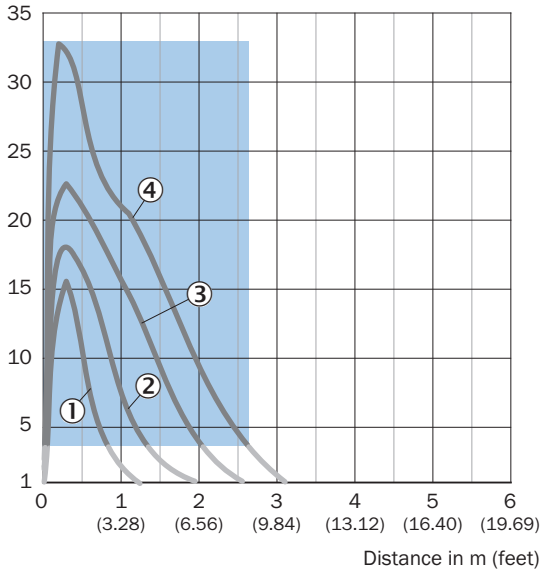


Operating reserve



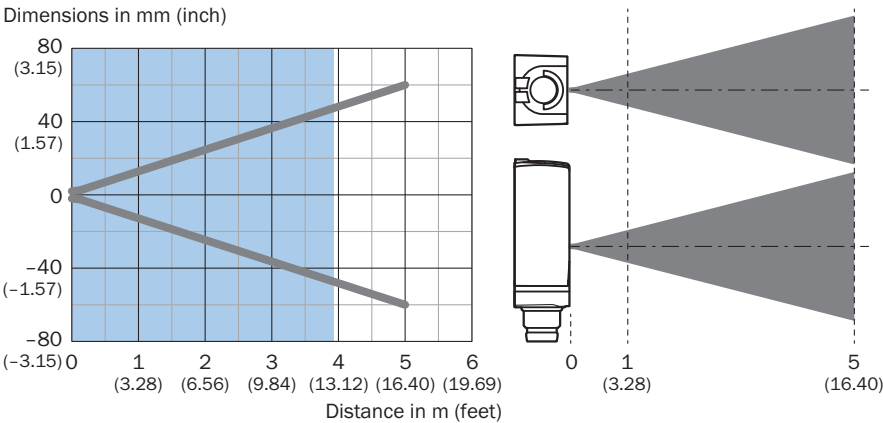
Recommended sensing range for the best performance

Operating reserve



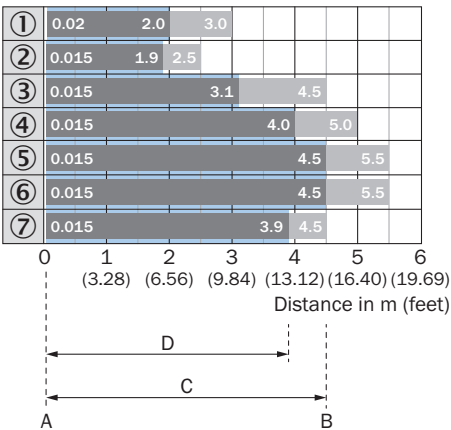
Recommended sensing range for the best performance

Light spot size



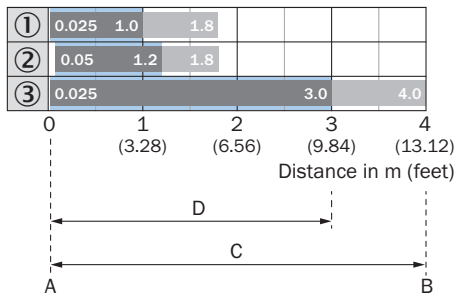
Recommended sensing range for the best performance

Sensing range diagram



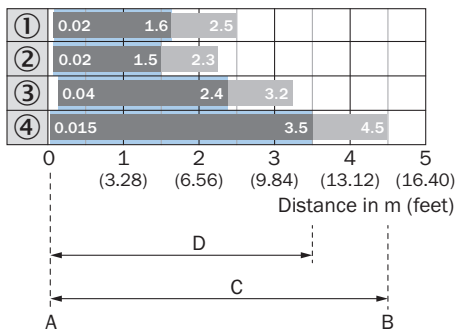
A = Sensing range min. in m
B = Sensing range max. in m
C = Maximum distance range from reflector to sensor (operating reserve 1)
D = Recommended distance range from reflector to sensor (operating reserve 3.75)

Recommended sensing range for the best performance



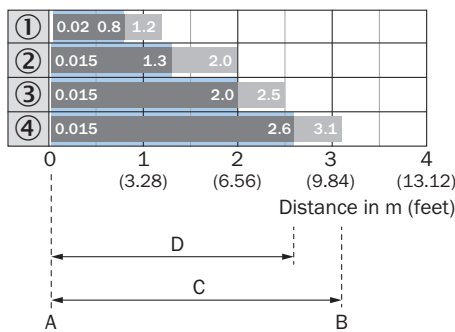
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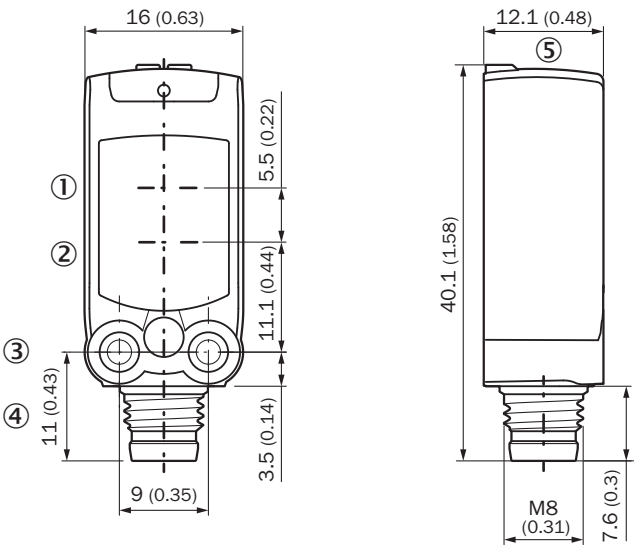
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Recommended sensing range for the best performance

Dimensional drawing (Dimensions in mm (inch))



Recommended accessories

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

	Brief description	Type	Part no.
Mounting brackets and plates			
	• Description: Mounting bracket for wall mounting • Material: Stainless steel • Details: Stainless steel 1.4571 • Items supplied: Mounting hardware included • Suitable for: W4S, W4F, W4S	BEF-W4-A	2051628
Others			
	• Description: Fine triple reflector, screw connection, suitable for laser sensors • Dimensions: 20 mm 32 mm • Ambient operating temperature: -30 °C ... +65 °C	PL10F	5311210
	• Connection type head A: Male connector, M8, 4-pin, straight, A-coded • Description: Unshielded • Connection systems: Screw-type terminals • Permitted cross-section: 0.14 mm² ... 0.5 mm²	STE-0804-G	6037323

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.”

WORLDWIDE PRESENCE:

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