



WLA12L-24162830A00

W12

SMALL PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

Type	Part no.
WLA12L-24162830A00	1125938

Other models and accessories → www.sick.com/W12



Detailed technical data

Features

Functional principle	Photoelectric retro-reflective sensor
Functional principle detail	Without reflector minimum distance (autocollimation/coaxial optics)
Sensing range	
Sensing range min.	0 m
Sensing range max.	11 m
Maximum distance range from reflector to sensor (operating reserve 1)	0 m ... 11 m
Recommended distance range from reflector to sensor (operating reserve 3,75)	0 m ... 7.5 m
Reference reflector	Reflector P250F
Recommended sensing range for the best performance	0 mm ... 600 mm
Polarisation filters	Yes
Emitted beam	
Light source	Laser
Type of light	Visible red light
Shape of light spot	Ellipse shape
Light spot size (distance)	0.4 mm x 0.35 mm (300 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.2° (at Ta = +23 °C)
Focus position	300 mm

Key laser figures	Normative reference	EN 60825-1:2014, IEC 60825-1:2014
	Laser class	1
	Wave length	655 nm
	Pulse duration	4 μ s
	Maximum pulse power	< 2.13 mW
	Average service life	50,000 h at $T_U = +25$ °C
Adjustment	Teach-in button	BluePilot: for sensitivity adjustment
	IO-Link	For configuring the sensor parameters and Smart Task functions
Indication	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 applications		Detecting small objects, Detection of objects moving at high speeds, Detecting objects wrapped in film

Safety-related parameters

MTTF_D	371 years
DC_{avg}	0 %
T_M (mission time)	10 years (EN ISO 13849) Rate of use: 60 %

Communication interface

Communication interface	IO-Link V1.1
Communication Interface detail	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	0x8002DD
DeviceID DEC	8389341
Compatible master port type	A
SIO mode support	Yes

Electrical data

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
Ripple	≤ 5 V

¹⁾ Limit values.

²⁾ Signal transit time with resistive load in switching mode.

³⁾ With light/dark ratio 1:1.

Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 14 mA, without load. At $U_B = 24\text{ V}$
Protection class	III
Digital output	
Number	2 (Complementary)
Type	Push-pull: PNP/NPN
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	≤ 200 μs ²⁾
Repeatability (response time)	85 μs ²⁾
Switching frequency	2,500 Hz ³⁾
Pin/Wire assignment	
BN 1	+ (L+)
WH 2	\bar{Q}_{L1} /MF Digital output, dark switching, object present → output \bar{Q}_{L1} HIGH The pin 2 function of the sensor can be configured Additional possible settings via IO-Link
BU 3	- (M)
BK 4	QL1/C Digital output, light switching, object present → output Q_{L1} LOW The pin 4 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.

Mechanical data

Housing	Rectangular
Dimensions (W x H x D)	15.6 mm x 49.5 mm x 43.1 mm
Connection	Male connector M12, 4-pin
Material	
Housing	Metal, zinc diecast
Front screen	Plastic, PMMA
Male connector	Plastic, VISTAL®
Weight	Approx. 77 g
Maximum tightening torque of the fixing screws	1.4 Nm

Ambient data

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529)
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Ambient operating temperature	-20 °C ... +55 °C
Ambient temperature, storage	-40 °C ... +70 °C
Warm-up time	< 15 min, Where T _u is under -10 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
Shock resistance	50 g, 11 ms (25 positive and 25 negative shocks along X, Y, Z axes, 150 total shocks (EN60068-2-27))
Vibration resistance	10 Hz ... 2,000 Hz (Amplitude 0.5 mm / 10 g, 20 sweeps per axis, for X, Y, Z axes, 1 octave/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 On delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Logic: 2000 Hz ¹⁾ IOL: 1600 Hz ²⁾
Response time	SIO Logic: 250 μs ¹⁾ IOL: 300 μs ²⁾
Repeatability	SIO Logic: 120 μs ^{1) 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

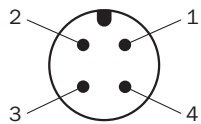
Classifications

eCI@ss 5.0	27270902
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eCl@ss 5.1.4	27270902
eCl@ss 6.0	27270902
eCl@ss 6.2	27270902
eCl@ss 7.0	27270902
eCl@ss 8.0	27270902
eCl@ss 8.1	27270902
eCl@ss 9.0	27270902
eCl@ss 10.0	27270902
eCl@ss 11.0	27270902
eCl@ss 12.0	27270902
ETIM 5.0	EC002717
ETIM 6.0	EC002717
ETIM 7.0	EC002717
ETIM 8.0	EC002717
UNSPSC 16.0901	39121528

Connection type

M12 male connector, 4-pin



Truth table

Push-pull: PNP/NPN – dark switching \bar{Q}

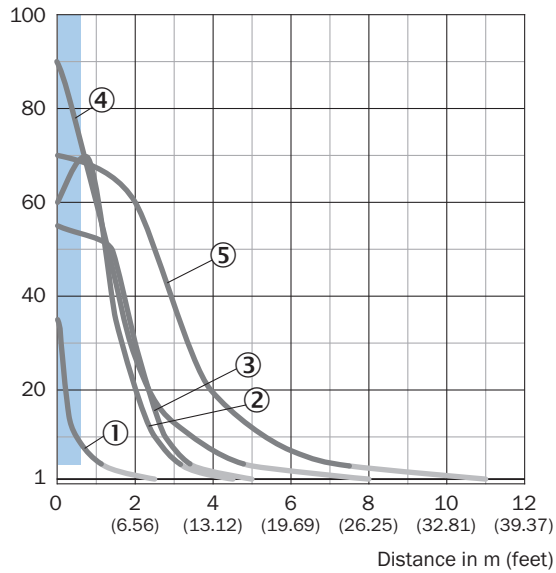
	Dark switching \bar{Q} (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	☑	☒
Light receive indicator	☑	☒
Load resistance to L+	⚠	☒
Load resistance to M	☒	⚠

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

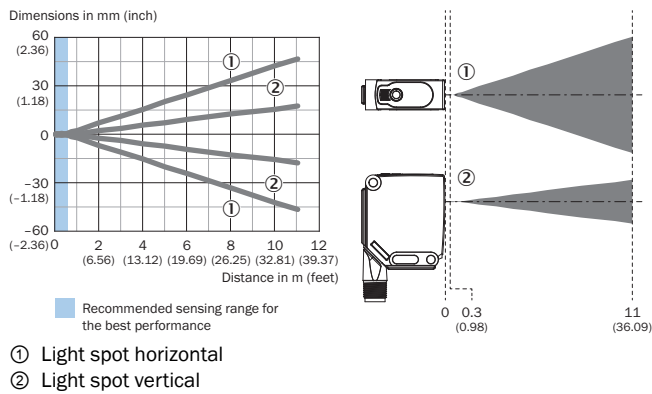
Operating reserve



Recommended sensing range for the best performance

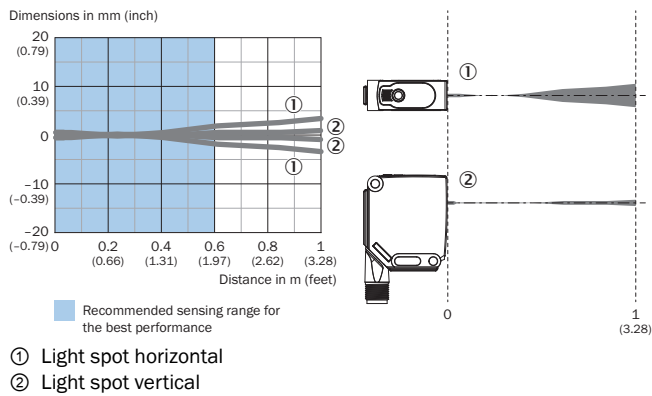
- ① Reflective tape REF-IRF-56
- ② PL10F reflector
- ③ Reflector PL20F
- ④ Reflective tape REF-AC1000
- ⑤ Reflector P250F

Light spot size

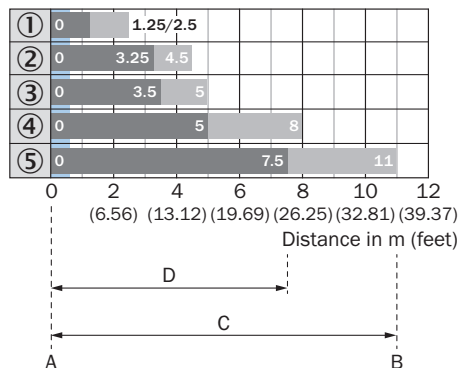


Light spot size (detailed view)

Close range



Sensing range diagram



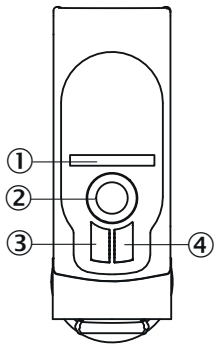
Recommended sensing range for the best performance

1	Reflective tape REF-IRF-56
2	PL10F reflector

3		Reflector PL20F
4		Reflective tape REF-AC1000
5		Reflector P250F
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)

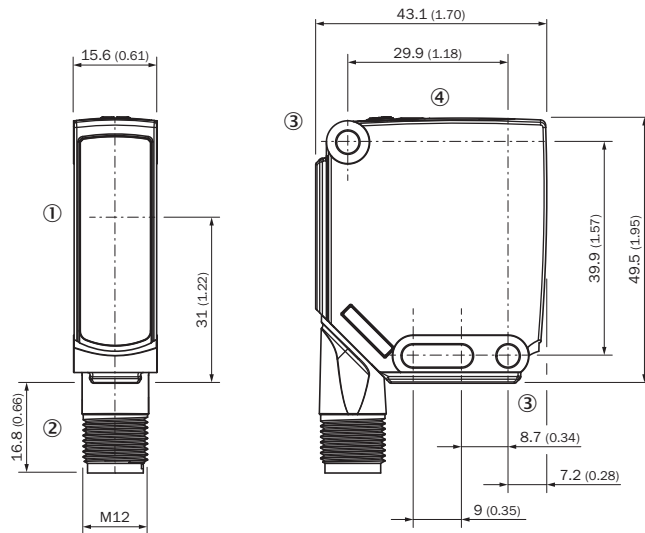
Adjustments

Display and adjustment elements



- ① LED blue
- ② Teach-in button
- ③ LED yellow
- ④ LED green







Dimensional drawing (Dimensions in mm (inch))



- ① Center of optical axis
- ② Connection
- ③ Mounting hole, \varnothing 4.2 mm
- ④ Display and adjustment elements

Recommended accessories

Other models and accessories → www.sick.com/W12

	Brief description	Type	Part no.
Universal bar clamp systems			
	Plate N03 for universal clamp bracket, zinc coated, Zinc plated steel (sheet), Zinc die cast (clamping bracket), Universal clamp (5322626), mounting hardware	BEF-KHS-N03	2051609
	Mounting bar, straight, 300 mm, steel, steel, zinc coated, without mounting hardware	BEF-MS12G-B	4056055
	Bar clamp for bar diameter of 12 mm (fixing the mounting rod), Aluminum, 2 screws M6 x 30, 2 spring discs	BEF-RMC-D12	5321878
Mounting brackets and plates			
	Mounting bracket, large, stainless steel, mounting hardware included	BEF-WG-W12	2013942
	BEF-AP-W12	BEF-AP-W12	2127742
Plug connectors and cables			
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 5 m	YF2A14-050VB3XLEAX	2096235
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 1 m	YF2A14-010UB3M2A14	2095997

	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 1.5 m	YF2A14-015VB3M2A14	2096598
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 2 m	YF2A14-020UB3M2A14	2096000
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 2 m	YF2A14-020VB3M2A14	2096599
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 5 m	YF2A14-050UB3M2A14	2096001
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 5 m	YF2A14-050UB3N2A14	2095787
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 5 m	YF2A14-050VB3M2A14	2096600
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 6 m	YF2A14-060UB3M2A14	2102153
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 10 m	YF2A14-100UB3M2A14	2096002
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 10 m	YF2A14-100UB3N2A14	2096114
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 10 m	YF2A14-100VB3M2A14	2096601
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 15 m	YF2A14-150UB3N2A14	2096115
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 20 m	YF2A14-200VB3M2A14	2096602
	Head A: female connector, M12, 5-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.2 m	YF2A14-C20UB3M2A14	2096013
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.6 m	YF2A14-C60UB3M2A14	2095999
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.6 m	YF2A14-C60UB3N2A14	2095728
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: male connector, M12, 4-pin, straight, A-coded Cable: Sensor/actuator cable, PVC, unshielded, 0.6 m	YF2A14-C60VB3M2A14	2096248
	Head A: female connector, M12, 4-pin, angled, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 2 m Only suitable for PNP sensors	YI2A14-020UB3N2A14	2095790
	Head A: female connector, M12, 4-pin, angled, A-coded Head B: male connector, M12, 4-pin, angled, A-coded Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.6 m Only suitable for PNP sensors	YI2A14-C60UB3N2A14	2095788

	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, straight Cable: unshielded	DOS-1204-G	6007302
		DOS-1204-GQU6	6042088
		DOS-1204-GQU8	6053328
	Head A: female connector, M12, 4-pin, angled Cable: unshielded	DOS-1204-W	6007303
	Head A: male connector, M12, 4-pin, straight Test voltage 1.25 kV eff/60 s, insulation group C to VDE 0110, for field bus technology	STE-1204-GQU6	6042089
	Head A: male connector, M12, 4-pin, straight Cable: unshielded	STE-1204-GQU8	6044998
	Head A: male connector, M12, 4-pin, angled Cable: unshielded	STE-1204-W	6022084
Reflectors			
	Fine triple reflector, screw connection, suitable for laser sensors, 52 mm x 62 mm, PM-MA/ABS, Screw-on, 2 hole mounting	P250F	5308843
Terminal and alignment brackets			
	Clamping block for dovetail mounting, Aluminum (anodised), mounting hardware included	BEF-KH-W12	2013285
Sensor Integration Gateway			
	<ul style="list-style-type: none"> • Further functions: Web server integrated, IIoT interface available (dual talk) • Logic editor: no • Communication interface: IO-Link, Ethernet, PROFINET, REST API, MQTT, OPC UA • Product category: IO-Link Master 	SIG350-0004AP100	6076871

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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