



# WLA4SP-1H165100A00

## W4

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ

### Ordering information

Type	part no.
WLA4SP-1H165100A00	1140053

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

### Detailed technical data

#### Features

<b>Functional principle</b>	Photoelectric retro-reflective sensor
<b>Functional principle detail</b>	Without reflector minimum distance (autocollimation/coaxial optics)
<b>Sensing range</b>	
Sensing range min.	0 m
Sensing range max.	4 m
Maximum distance range from reflector to sensor (operating reserve 1)	0 m ... 4 m
Recommended distance range from reflector to sensor (operating reserve 3,75)	0 m ... 2.6 m
Reference reflector	Reflector PL80
Recommended sensing range for the best performance	0 m ... 2.6 m
<b>Polarisation filter</b>	Yes
<b>Emitted beam</b>	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	150 mm (5 m)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at T <sub>U</sub> = +23 °C)
<b>Key LED figures</b>	
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 <sub>a</sub> = +25 °C
<b>Adjustment</b>	
IO-Link	For configuring the sensor parameters and Smart Task functions
<b>Display</b>	

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
<b>Special features</b>	Pin2 pre-setting (MF): alarm output
<b>Special applications</b>	Detecting objects wrapped in film

## Communication interface

<b>IO-Link</b>	✓ , 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 <sub>L1</sub> Bit 1 = switching signal Q <sub>L2</sub> Bit 2 ... 15 = Current receiver level (live)
VendorID	26
Compatible master port type	A
SIO mode support	Yes

## Electronics

<b>Supply voltage U<sub>B</sub></b>	10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>	≤ 5 V <sub>pp</sub>
<b>Usage category</b>	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
<b>Current consumption</b>	≤ 20 mA, without load. At U <sub>B</sub> = 24 V
<b>Protection class</b>	III
<b>Digital output</b>	
Number	2
Type	Push-pull: PNP/NPN
Switching mode	Light switching
Signal voltage PNP HIGH/LOW	Approx. U <sub>B</sub> -2.5 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. U <sub>B</sub> / < 2.5 V
Output current I <sub>max</sub>	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	≤ 500 μs
Repeatability (response time)	150 μs
Switching frequency	1,000 Hz
<b>Pin/Wire assignment</b>	

<sup>1)</sup> Limit values.

<sup>2)</sup> This switching output must not be connected to another output.

Function of pin 4/black (BK)	Digital output, light switching, object present → output Q <sub>L1</sub> LOW <sup>2)</sup> 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)	Alarm output <sup>2)</sup>
Function of pin 2/white (WH) – detail	The pin 2 function of the sensor can be configured Additional possible settings via IO-Link

<sup>1)</sup> Limit values.

<sup>2)</sup> This switching output must not be connected to another output.

### Mechanics

<b>Housing</b>	Rectangular
<b>Design detail</b>	Slim
<b>Dimensions (W x H x D)</b>	12.1 mm x 41.9 mm x 18.6 mm
<b>Connection</b>	Cable, 4-wire, 2 m
<b>Connection detail</b>	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm <sup>2</sup>
Cable diameter	Ø 3.4 mm
Length of cable (L)	2 m
<b>Material</b>	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
<b>Maximum tightening torque of the fixing screws</b>	0.4 Nm

### Ambient data

<b>Enclosure rating</b>	IP66 (EN 60529) IP67 (EN 60529)
<b>Ambient operating temperature</b>	-40 °C ... +60 °C
<b>Ambient temperature, storage</b>	-40 °C ... +75 °C
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
<b>Shock resistance</b>	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
<b>Vibration resistance</b>	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 min (EN60068-2-6))
<b>Air humidity</b>	35 % ... 95 %, relative humidity (no condensation)
<b>Electromagnetic compatibility (EMC)</b>	EN 60947-5-2
<b>Resistance to cleaning agent</b>	ECOLAB
<b>UL File No.</b>	NRKH.E181493 & NRKH7.E181493

### Smart Task

<b>Smart Task name</b>	Base logics
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<sup>1)</sup> Use of Smart Task functions without IO-Link communication (SIO mode).

<b>Logic function</b>	Direct AND OR
<b>Timer function</b>	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
<b>Inverter</b>	Yes
<b>Switching frequency</b>	SIO Logic: 800 Hz <sup>1)</sup>
<b>Response time</b>	SIO Logic: 600 µs <sup>1)</sup>
<b>Repeatability</b>	SIO Logic: 200 µs <sup>1)</sup>
<b>Switching signal</b>	
Switching signal Q <sub>L1</sub>	Switching output
Switching signal $\bar{Q}_{L1}$	Switching output

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

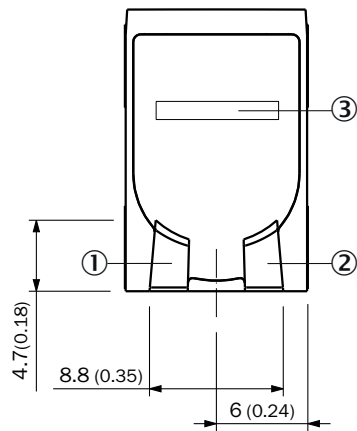
## Diagnosis

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

## Classifications

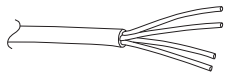
<b>ECLASS 5.0</b>	27270902
<b>ECLASS 5.1.4</b>	27270902
<b>ECLASS 6.0</b>	27270902
<b>ECLASS 6.2</b>	27270902
<b>ECLASS 7.0</b>	27270902
<b>ECLASS 8.0</b>	27270902
<b>ECLASS 8.1</b>	27270902
<b>ECLASS 9.0</b>	27270902
<b>ECLASS 10.0</b>	27270902
<b>ECLASS 11.0</b>	27270902
<b>ECLASS 12.0</b>	27270902
<b>ETIM 5.0</b>	EC002717
<b>ETIM 6.0</b>	EC002717
<b>ETIM 7.0</b>	EC002717
<b>ETIM 8.0</b>	EC002717
<b>UNSPSC 16.0901</b>	39121528

### display and adjustment elements

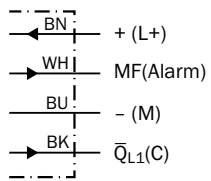


- ① LED green
- ② LED yellow
- ③ LED blue

### Connection type Cable, 4-wire



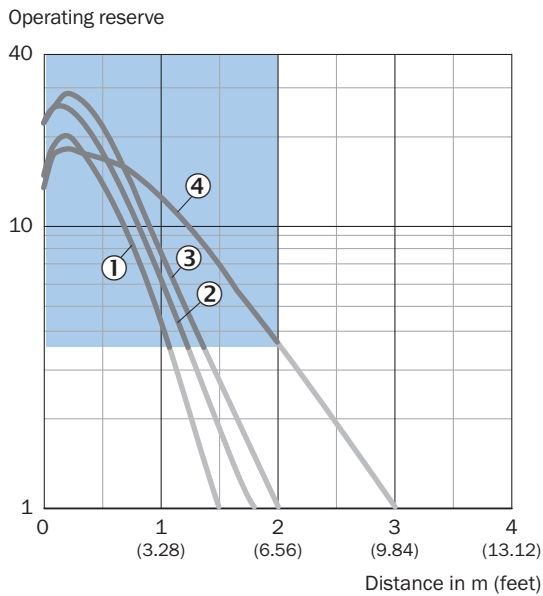
### Connection diagram Cd-572



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	⚡	✗

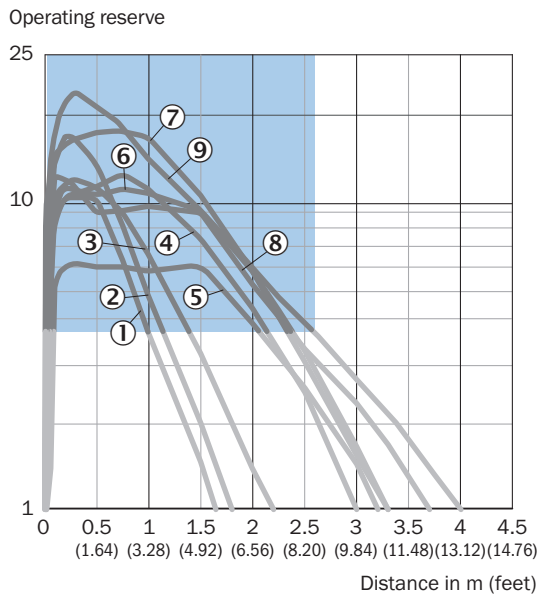
Characteristic curve Fine triple reflectors



Recommended sensing range for the best performance

- ① PL10F reflector
- ② PL10FH-1 reflector
- ③ Reflector PL20F
- ④ Reflector P250F

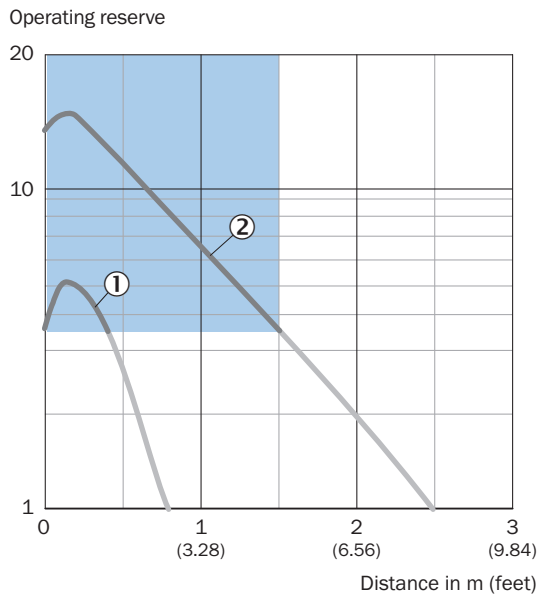
### Characteristic curve Standard reflectors



Recommended sensing range for the best performance

- ① Reflector PL20A
- ② reflector PL22-2
- ③ Reflector P250H
- ④ Reflector PL30A
- ⑤ Reflector PL40A Antifog
- ⑥ Reflector PL40A
- ⑦ Reflector P250
- ⑧ Reflector C110A
- ⑨ Reflector PL80A

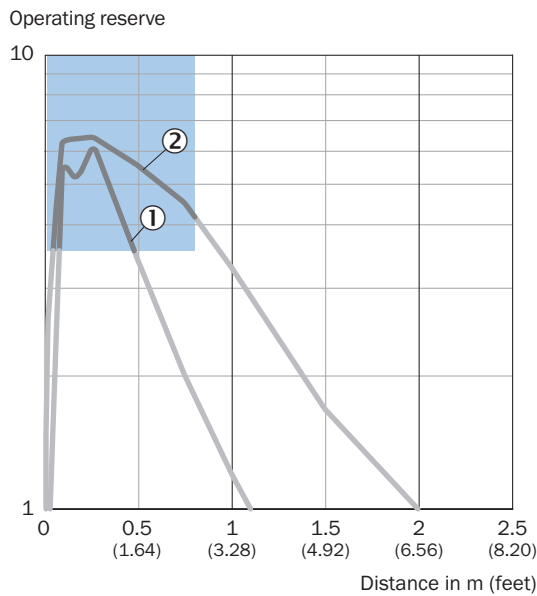
### Characteristic curve Reflective tape



Recommended sensing range for the best performance

- ① Reflective tape REF-IRF-56
- ② Reflective tape REF-AC1000

### Characteristic curve Chemical-resistant reflectors

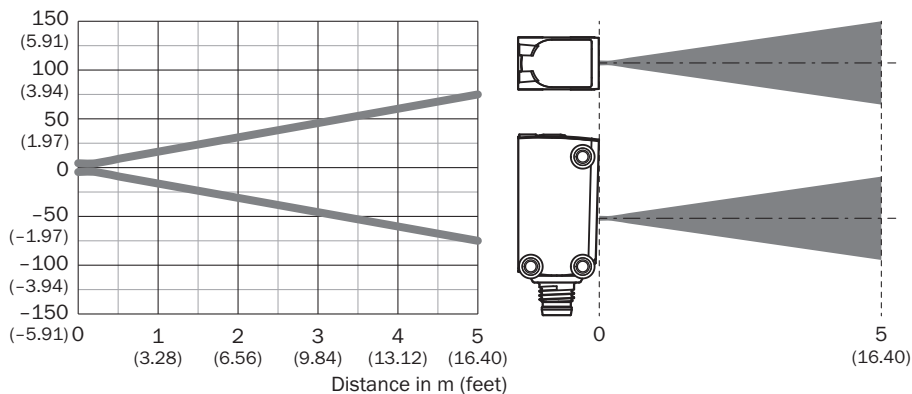


Recommended sensing range for the best performance

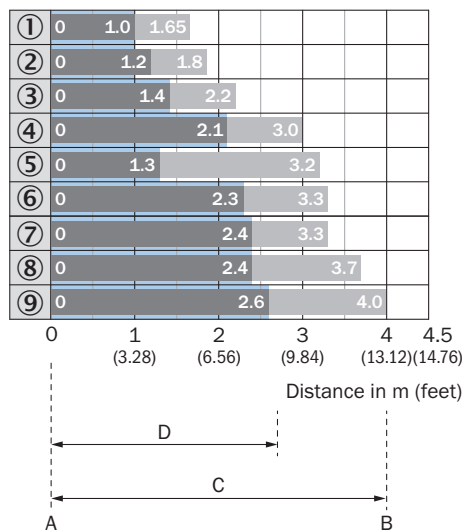
- ① Reflector PL20 CHEM
- ② Reflector P250 CHEM

### Light spot size

Dimensions in mm (inch)



### Sensing range diagram Standard reflectors

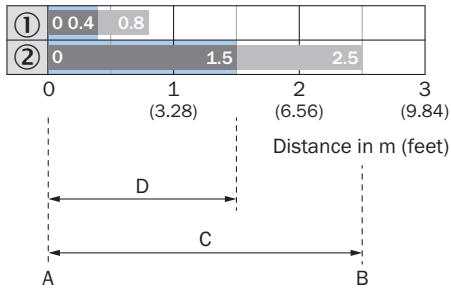


Recommended sensing range for the best performance

1	Reflector PL20A
2	Reflector PL22-2
3	Reflector P250H
4	Reflector PL30A
5	Reflector PL40A Antifog
6	Reflector PL40A
7	Reflector P250
8	Reflector C110A
9	Reflector PL80A
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)

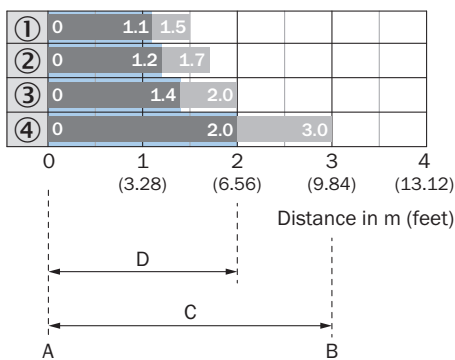
### Sensing range diagram Reflective tape



Recommended sensing range for the best performance

1	Reflective tape REF-IRF-56
2	Reflective tape REF-AC1000
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)

### Sensing range diagram Fine triple reflectors

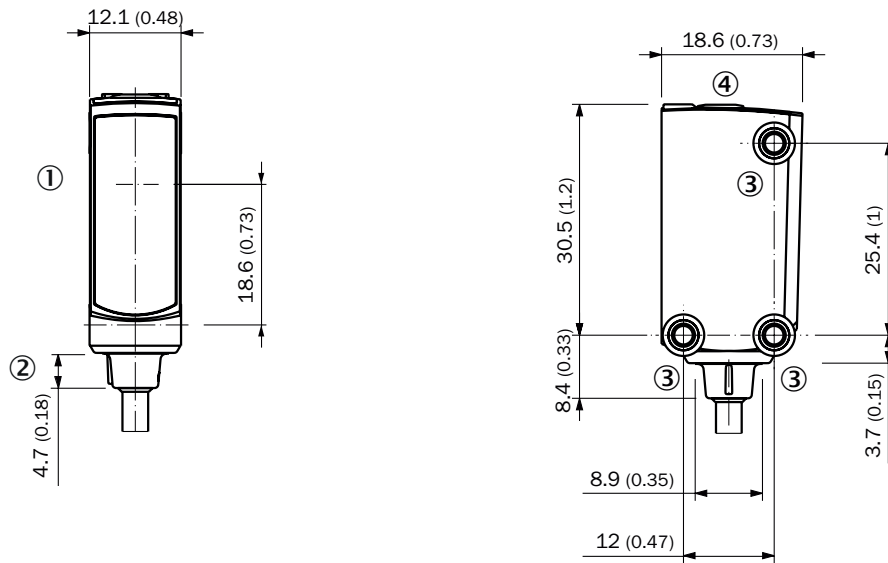


Recommended sensing range for the best performance

1	PL10F reflector
2	PL10FH-1 reflector
3	Reflector PL20F
4	Reflector P250F



### Dimensional drawing, sensor








Dimensions in mm (inch)

- ① Center of optical axis
- ② Connection
- ③ M3 mounting hole
- ④ display and adjustment elements

### Recommended accessories

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

	Brief description	Type	part no.
reflectors and optics			
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Rectangular, screw connection</li> <li>• <b>Dimensions:</b> 84 mm 84 mm</li> <li>• <b>Ambient operating temperature:</b> -30 °C ... +65 °C</li> </ul>	PL80A	1003865
Mounting systems			
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Plate N08 for universal clamp bracket</li> <li>• <b>Material:</b> Steel, zinc diecast</li> <li>• <b>Details:</b> Zinc plated steel (sheet), Zinc die cast (clamping bracket)</li> <li>• <b>Items supplied:</b> Universal clamp (5322626), mounting hardware</li> <li>• <b>Usable for:</b> W100, W150, W4S, W4F, W8, W9-3, W8G, W8 Laser, W8 Inox, G6, W100 Laser, W100-2, W10, G6 Inox, RAY10, W4SLG-3, W9, GR18, MultiPulse, Reflex Array, MultiLine, LUT3, KT5, KT8, KT10, CS8</li> </ul>	BEF-KHS-N08	2051607
	<ul style="list-style-type: none"> <li>• <b>Material:</b> Stainless steel</li> <li>• <b>Details:</b> Stainless steel (1.4301)</li> <li>• <b>Suitable for:</b> W4S, W4S</li> </ul>	BEF-WN-G6	2062909

	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection type head A:</b> Male connector, M8, 4-pin, straight, A-coded</li> <li>• <b>Connection systems:</b> Screw-type terminals</li> <li>• <b>Permitted cross-section:</b> 0.14 mm<sup>2</sup> ... 0.5 mm<sup>2</sup></li> </ul>	STE-0804-G	6037323
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection type head A:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li>• <b>Connection systems:</b> Screw-type terminals</li> <li>• <b>Permitted cross-section:</b> ≤ 0.75 mm<sup>2</sup></li> </ul>	STE-1204-G	6009932

## 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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Contacts and other locations –[www.sick.com](http://www.sick.com)