



DATA SHEET

WLD4FP-21A121A0ZZZ

W4
Photoelectric sensors

SICK

Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WLD4FP-
21A121A0ZZZ

ORDERING INFORMATION

Type	part no.
WLD4FP-21A121A0ZZZ	1129443

Further device versions and accessories at 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 filter		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 _U = +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		None	–
Display			
	LED green	Operating indicator Static on: power on	
	LED yellow	Status of received light beam Static on: object not present Static off: object present	

Flashing: Below the 1.5 function reserve

SAFETY-RELATED PARAMETERS

MTTF _D	1,390 years
DC _{avg}	0 %
T _M (mission time)	20 years

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	<table> <tr> <td>Number</td><td>1</td></tr> <tr> <td>Type</td><td>PNP</td></tr> <tr> <td>Switching mode</td><td>Light switching</td></tr> <tr> <td>Signal voltage PNP HIGH/LOW</td><td>Approx. U_B-2.5 V / 0 V</td></tr> <tr> <td>Output current I_{max}</td><td>≤ 100 mA</td></tr> <tr> <td>Circuit protection outputs</td><td>Reverse polarity protected Overcurrent protected Short-circuit protected</td></tr> <tr> <td>Response time</td><td>≤ 500 μs</td></tr> <tr> <td>Repeatability (response time)</td><td>150 μs ²⁾</td></tr> <tr> <td>Switching frequency</td><td>1,000 Hz ³⁾</td></tr> </table>	Number	1	Type	PNP	Switching mode	Light switching	Signal voltage PNP HIGH/LOW	Approx. U _B -2.5 V / 0 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⁾
Number	1																		
Type	PNP																		
Switching mode	Light switching																		
Signal voltage PNP HIGH/LOW	Approx. U _B -2.5 V / 0 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 LOW																		

¹⁾ Limit values.²⁾ Signal transit time with resistive load in switching mode.³⁾ With light/dark ratio 1:1.**MECHANICS**

Housing	Rectangular						
Design detail	Flat						
Dimensions (W x H x D)	16 mm x 40.1 mm x 12.1 mm						
Connection	Connector M8, 3-pin						
Material	<table> <tr> <td>Housing</td><td>Plastic, VISTAL®</td></tr> <tr> <td>Front screen</td><td>Plastic, PMMA</td></tr> <tr> <td>Male connector</td><td>Plastic, VISTAL®</td></tr> </table>	Housing	Plastic, VISTAL®	Front screen	Plastic, PMMA	Male connector	Plastic, VISTAL®
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

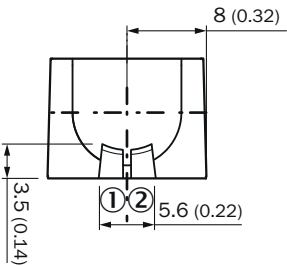
Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529)
Ambient operating temperature	-40 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +75 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx

	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

CERTIFICATES

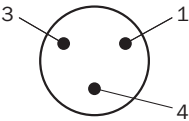
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
ECOLAB certificate	✓
cULus certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓

DISPLAY AND ADJUSTMENT ELEMENTS

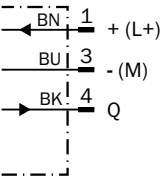


- ① LED green
- ② LED yellow

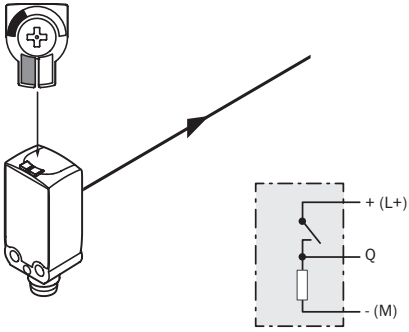
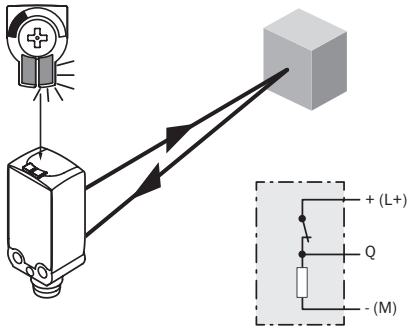
CONNECTION TYPE CONNECTOR M8, 3-PIN



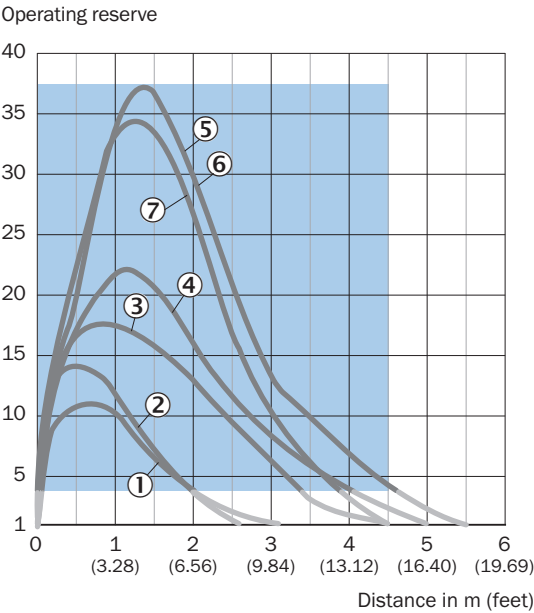
CONNECTION DIAGRAM CD-045



TRUTH TABLE PNP - LIGHT SWITCHING

	Light switching 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 M	✗	⚡
		

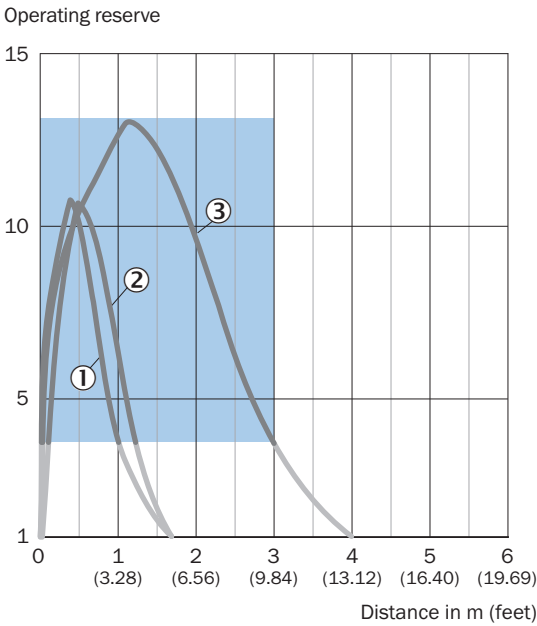
CHARACTERISTIC CURVE STANDARD REFLECTORS



Recommended sensing range for the best performance

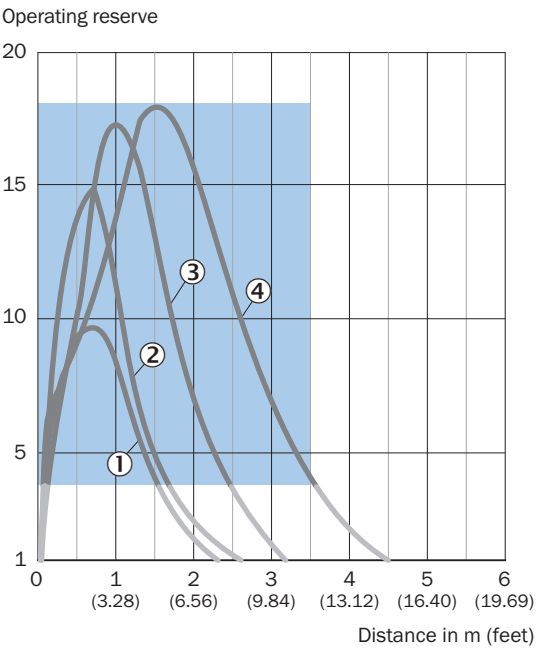
- ① Reflector PL22
- ② Reflector PL20A
- ③ Reflector PL30A
- ④ Reflector PL40A
- ⑤ Reflector PL80A
- ⑥ Reflector C110A
- ⑦ Reflector P250

CHARACTERISTIC CURVE REFLECTIVE TAPE



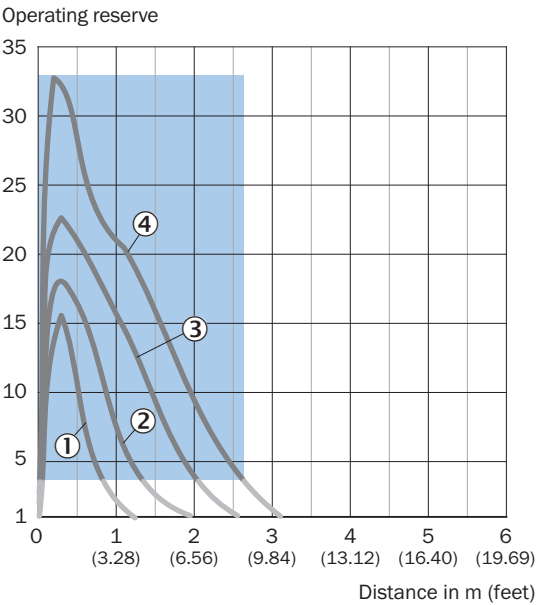
- Recommended sensing range for the best performance
- ① Reflective tape REF-DG
 - ② reflective tape REF-IRF-56
 - ③ Reflective tape REF-AC1000

CHARACTERISTIC CURVE FINE TRIPLE REFLECTORS



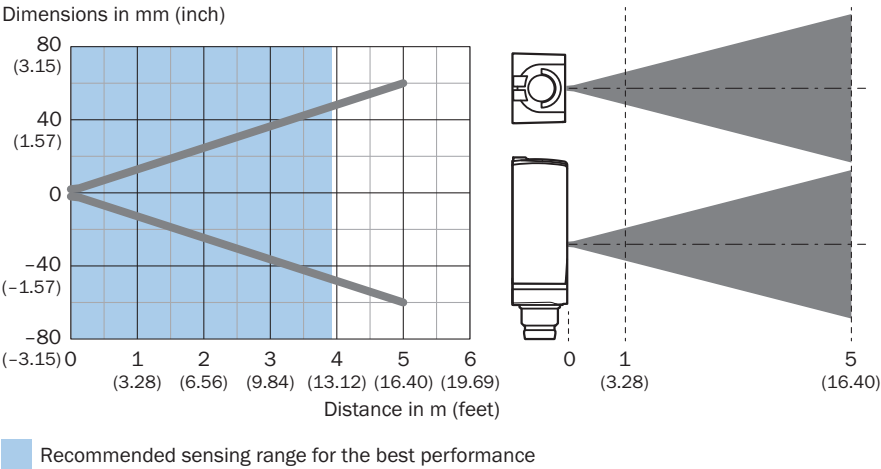
- Recommended sensing range for the best performance
- ① PL10FH reflector
 - ② PL10F reflector
 - ③ Reflector PL20F
 - ④ Reflector P250F

CHARACTERISTIC CURVE CHEMICAL-RESISTANT REFLECTORS



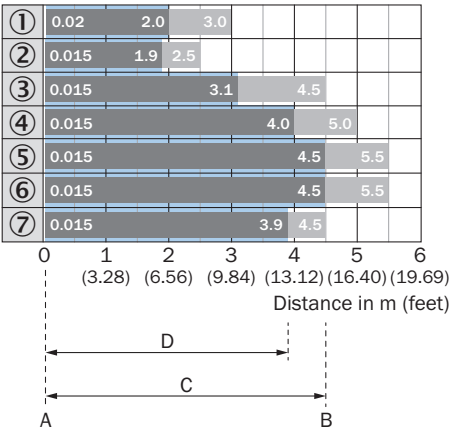
- Recommended sensing range for the best performance
- ① PL10F CHEM reflector
 - ② Reflector PL20 CHEM
 - ③ Reflector P250 CHEM
 - ④ Reflector P250H

LIGHT SPOT SIZE



- Recommended sensing range for the best performance

SENSING RANGE DIAGRAM STANDARD REFLECTORS

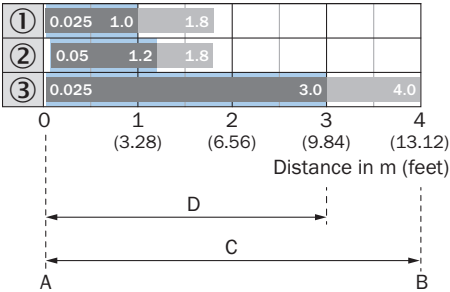


A = Sensing range min. in m
B = Sensing range max. in m
C = Maximum distance range from reflector to sensor (operating reserve 1)
D = Recommended distance range from reflector to sensor (operating reserve 3.75)

Recommended sensing range for the best performance

- ① Reflector PL22
- ② Reflector PL20A
- ③ Reflector PL30A
- ④ Reflector PL40A
- ⑤ Reflector PL80A
- ⑥ Reflector C110A
- ⑦ Reflector P250

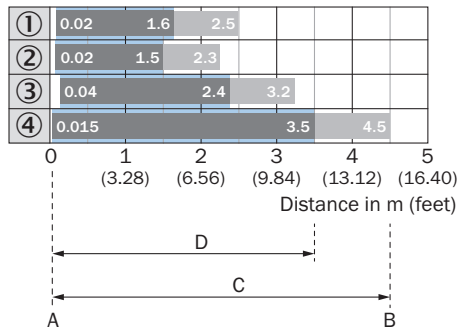
SENSING RANGE DIAGRAM REFLECTIVE TAPE



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

- ① Reflective tape REF-DG (50 x 50 mm)
- ② reflective tape REF-IRF-56
- ③ Reflective tape REF-AC1000

SENSING RANGE DIAGRAM FINE TRIPLE REFLECTORS

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)

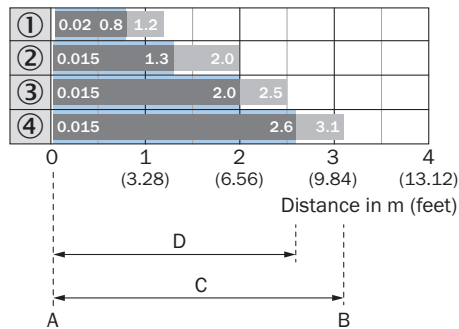
 Recommended sensing range for the best performance

① PL10FH reflector

② PL10F reflector

③ Reflector PL20F

④ Reflector P250F

SENSING RANGE DIAGRAM CHEMICAL-RESISTANT REFLECTORS

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

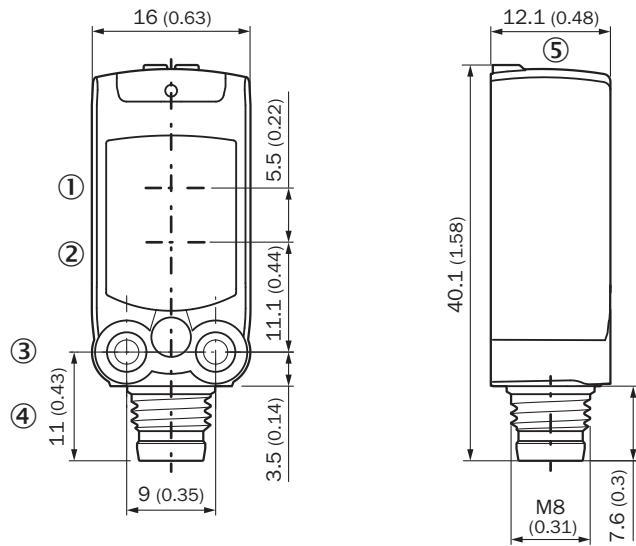
① PL10F CHEM reflector

② Reflector PL20 CHEM

③ Reflector P250 CHEM

④ Reflector P250H

DIMENSIONAL DRAWING



Dimensions in mm (inch)

- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- ③ M3 mounting hole
- ④ Connection
- ⑤ 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/1129443



SICK AG
WALDKIRCH
GERMANY
SICK.COM

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

SICK
Sensor Intelligence