



WLD16P-257221A0ZZZ

W16

PHOTOELECTRIC SENSORS

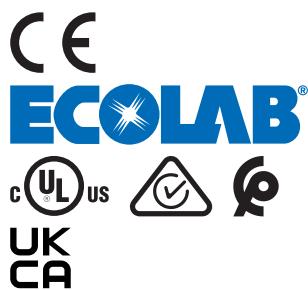
SICK
Sensor Intelligence.



Illustration may differ

Ordering information

Type	part no.
WLD16P-257221A0ZZZ	1223065

Other models and accessories → www.sick.com/W16

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.	0.25 m
Sensing range max.	14 m
Maximum distance range from reflector to sensor (operating reserve 1)	0.25 m ... 14 m
Recommended distance range from reflector to sensor (operating reserve 3,75)	0.25 m ... 10 m
Reference reflector	Reflector PL80A
Recommended sensing range for the best performance	0.25 m ... 10 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 16 mm (1 m)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (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 $T_a = +25^\circ\text{C}$
Adjustment	Wire/pin	For activating the test input
Display	LED green	Operating indicatorStatic on: power on
	LED yellow	Status of received light beamStatic on: object not presentStatic off: object presentFlashing: Below the 1.5 function reserve

Safety-related parameters

MTTF_D	2,009 years
DC_{avg}	0 %
T_M (mission time)	20 years

Electronics

Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
Ripple	$\leq 5 \text{ V}_{\text{pp}}$
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	$\leq 30 \text{ mA}$, without load. At $U_B = 24 \text{ V}$
Protection class	III
Digital output	
Number	2 (Complementary)
Type	Push-pull: PNP/NPN
Switching mode	Light/dark 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.}	$\leq 100 \text{ mA}$
Circuit protection outputs	Reverse polarity protected Overcurrent and short-circuit protected
Response time	$\leq 500 \mu\text{s}$ ²⁾
Repeatability (response time)	150 μs
Switching frequency	1,000 Hz ³⁾
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, light switching, object present \rightarrow output Q LOW ⁴⁾
Function of pin 2/white (WH)	Digital output, dark switching, object present \rightarrow output \bar{Q} HIGH ⁴⁾
Pin 5 function/gray (GY)	Test at 0 V

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
Dimensions (W x H x D)	20 mm x 55.7 mm x 42 mm
Connection	Plug, M12, 5-pin
Material	Housing Plastic, VISTAL®
	Front screen Plastic, PMMA
	Male connector Plastic, VISTAL®
Weight	Approx. 50 g
Maximum tightening torque of the fixing screws	1.3 Nm

Ambient data

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529) ¹⁾
Ambient operating temperature	-40 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +75 °C
Shock resistance	50 g, 11 ms (25 positive and 25 negative shocks per axis, for X, Y, Z axes, 150 shocks in total (EN60068-2-27)) 50 g, 6 ms (5,000 positive and 5,000 negative shocks per axis, for X, Y, Z axes, 30,000 shocks in total (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

¹⁾ Replaces IP69K with ISO 20653: 2013-03.

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	27270902
ETIM 5.0	EC002717
ETIM 6.0	EC002717
ETIM 7.0	EC002717
ETIM 8.0	EC002717

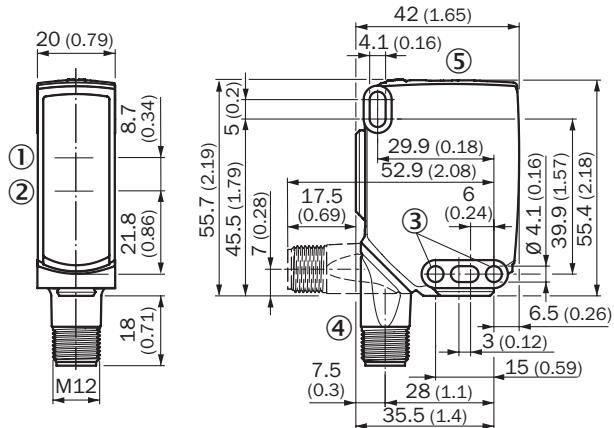
UNSPSC 16.0901

39121528

Certificates

EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China-RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓

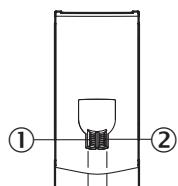
Dimensional drawing, sensor



Dimensions in mm (inch)

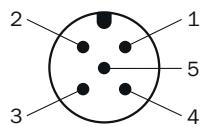
- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- ③ Mounting hole, Ø 4.1 mm
- ④ Connection
- ⑤ display and adjustment elements

display and adjustment elements

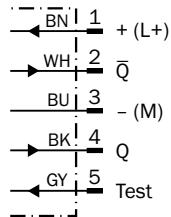


- ① LED indicator green
- ② LED indicator yellow

Connection type Plug, M12, 5-pin

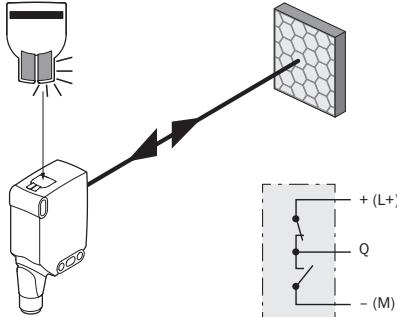
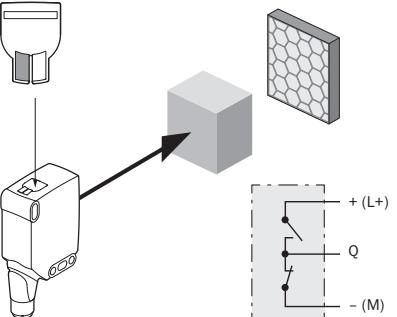


Connection diagram Cd-267

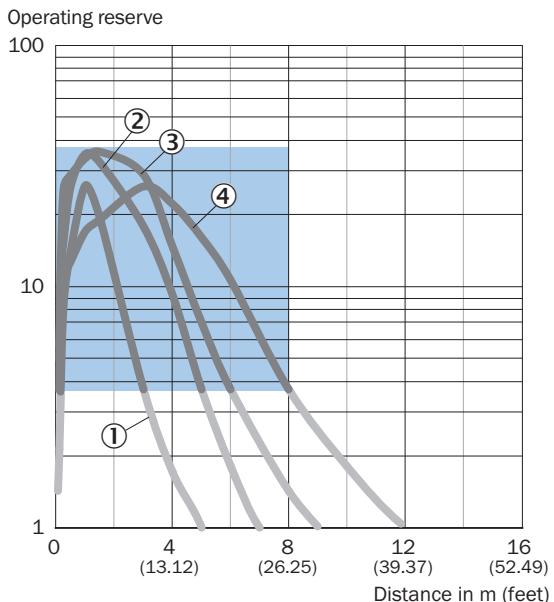
Truth table Push-pull: PNP/NPN – dark switching \bar{Q}

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	✗	✗																								
	<div style="border: 1px dashed gray; padding: 5px;"> <table> <tr> <td>+ (L+)</td> <td>•</td> <td>- (M)</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> </table> </div>	+ (L+)	•	- (M)	•	•	•	•	•	•	•	•	•	<div style="border: 1px dashed gray; padding: 5px;"> <table> <tr> <td>+ (L+)</td> <td>•</td> <td>- (M)</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> </table> </div>	+ (L+)	•	- (M)	•	•	•	•	•	•	•	•	•
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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

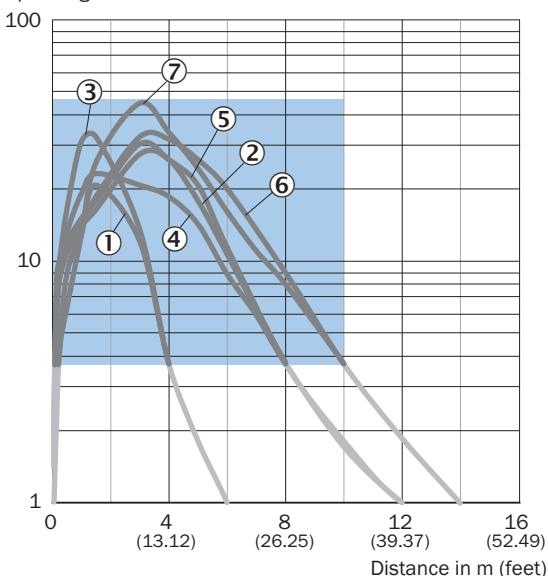


Recommended sensing range for the best performance

- ① Reflector PL20 CHEM
- ② Reflector P250 CHEM
- ③ Reflector P250H
- ④ Reflector PL40A Antifog

Characteristic curve

Operating reserve

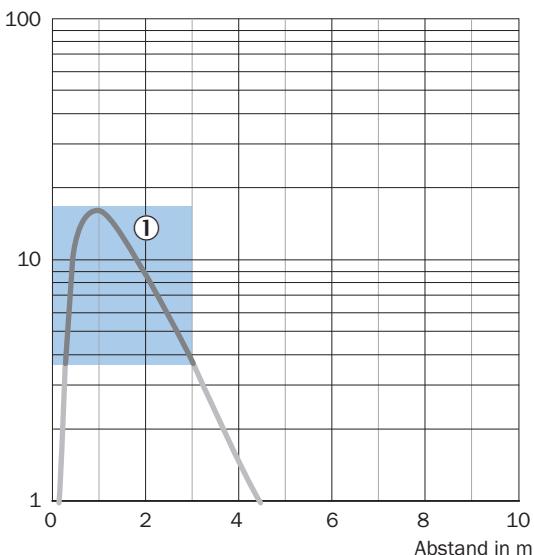


■ Recommended sensing range for the best performance

- ① Reflector PL22
- ② Reflector P250
- ③ Reflector PL20A
- ④ Reflector PL30A
- ⑤ Reflector PL40A
- ⑥ Reflector C110
- ⑦ Reflector PL80A

Characteristic curve

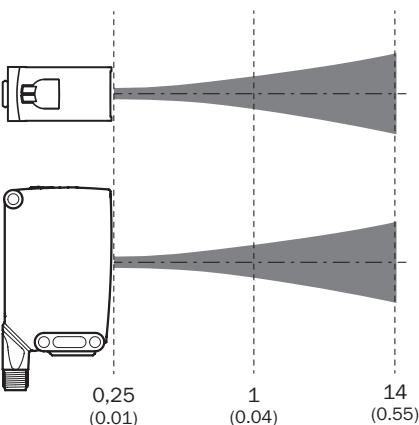
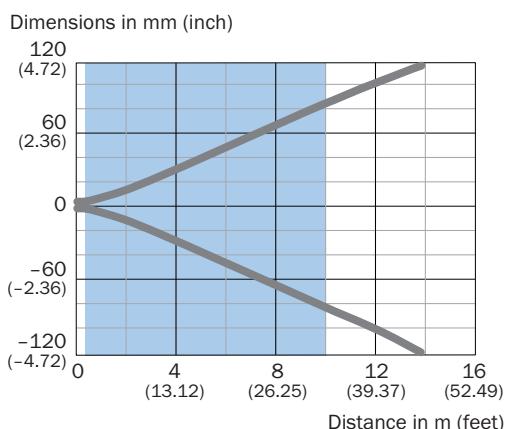
Funktionsreserve



■ Empfohlener Schaltabstandsbereich für beste Performance

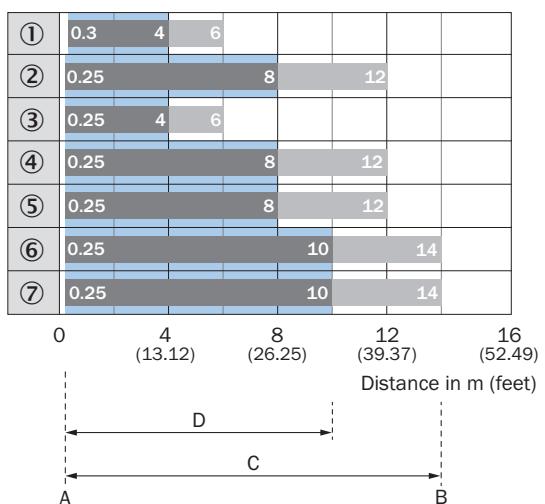
- ① Reflective tape REF-IRF-56 (50 x 70 mm)

Light spot size



Recommended sensing range for the best performance

Sensing range diagram

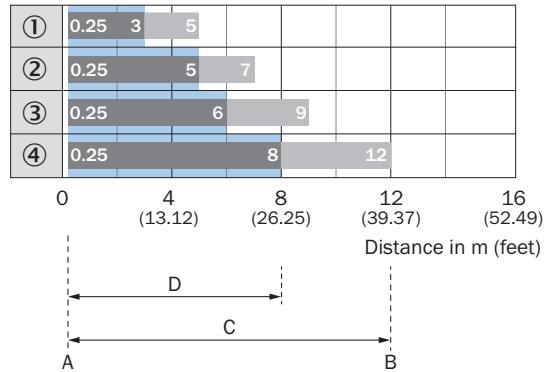


Recommended sensing range for the best performance

1		Reflector PL22
2		Reflector P250
3		Reflector PL20A
4		Reflector PL30A
5		Reflector PL40A
6		Reflector C110
7		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)
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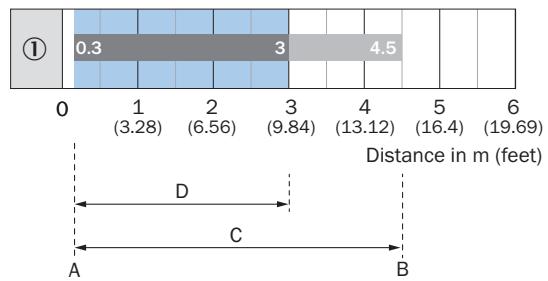
Sensing range diagram



Recommended sensing range for the best performance

1	Reflector PL20 CHEM
2	Reflector P250 CHEM
3	Reflector P250H
4	Reflector PL40A Antifog
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

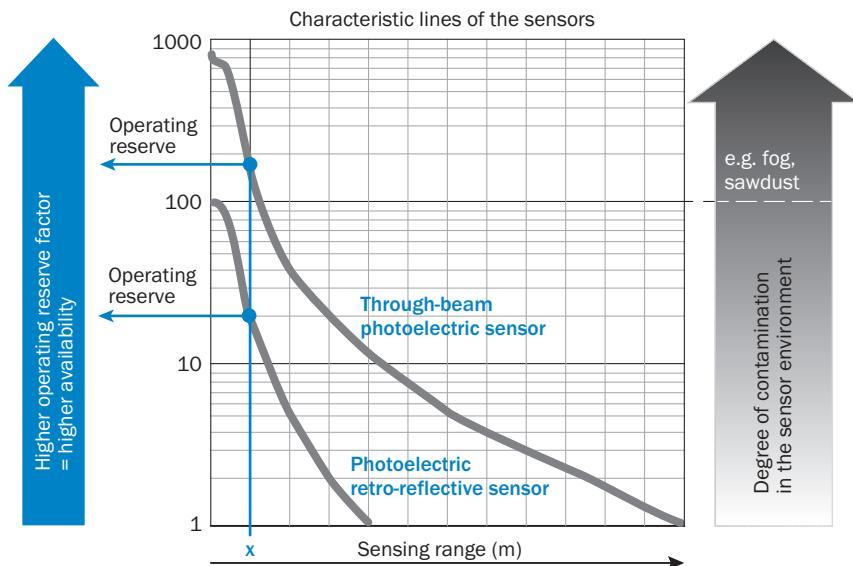


Recommended sensing range for the best performance

1	Reflective tape REF-IRF-56 (50 x 70 mm)
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)

Functions Operation note



At a sensing range of „x“ the photoelectric retro-reflective and through-beam photoelectric sensors have different operating reserves (see blue arrow). The higher the operating reserve factor, the better the sensor can compensate the contamination in the air or in the light beam and on the optical surfaces (front screen, reflector), i.e. the sensor has the maximum availability, otherwise the sensor switches due to pollution although there is no object in the path of the light beam.

Recommended accessories

Other models and accessories → www.sick.com/W16

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none"> Description: Plate N02 for universal clamp bracket Material: Steel, zinc diecast Details: Zinc plated steel (sheet), Zinc die cast (clamping bracket) Items supplied: Universal clamp (5322626), mounting hardware Usable for: W4S-3 Glass, W10, W4SLG-3, W4S-3 Inox, W4S-3 Inox Glass, W9, W11-2, W12-3, W12-2 Laser, W12G, W12 Teflon, W16, W250, W250-2, PowerProx, W11G-2, TranspaTect, WTT12, UC12, P250, G6 Inox, W4S, W4SL-3V, W4SLG-3V, W4SL-3H 	BEF-KHS-N02	2051608
	<ul style="list-style-type: none"> Description: Adapter for mounting W16 sensors in existing W14-2/W18-3 installations or L25 sensors in existing L28 installations Material: Plastic Details: Plastic Items supplied: Fastening screws included 	BEF-AP-W16	2095677
	<ul style="list-style-type: none"> Description: Universal mounting bracket for reflectors Dimensions (W x H x L): 85 mm x 90 mm x 35 mm Material: Steel Details: Steel, zinc coated Suitable for: C110A, P250, PL20, PL30A, PL40A, PL80A 	BEF-WN-REFX	2064574

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:

Contacts and other locations www.sick.com