



WLA16P-24161100A00

W16

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	part no.
WLA16P-24161100A00	1220993

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

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.	10 m
Maximum distance range from reflector to sensor (operating reserve 1)	0 m ... 10 m
Recommended distance range from reflector to sensor (operating reserve 3,75)	0 m ... 7 m
Reference reflector	Reflector PL80A
Recommended sensing range for the best performance	0 m ... 7 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 80 mm (5 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 $T_a = +25\text{ °C}$
Adjustment		
	IO-Link	For configuring the sensor parameters and Smart Task functions
Display		
	LED blue	BluePilot: Alignment aid
	LED green	Operating indicatorStatic on: power onFlashing: IO-Link mode
	LED yellow	Status of received light beamStatic on: object not presentStatic off: object presentFlashing: Below the 1.5 function reserve
Special applications		Detecting objects wrapped in film

Safety-related parameters

MTTF_D	690 years
DC_{avg}	0%
T_M (mission time)	20 years

Communication interface

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 = empty
	VendorID	26
	DeviceID HEX	0x80016C
	DeviceID DEC	8388972
	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}
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 30 mA, without load. At U _B = 24 V
Protection class	III
Digital output	

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.

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 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)	$150 \mu\text{s}$
Switching frequency	$1,000 \text{ Hz}$ ³⁾
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, dark switching, object present → output $\bar{Q}_{L1}$ HIGH; 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)	Digital output, light switching, object present → output Q_{L1} LOW ⁴⁾
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
Dimensions (W x H x D)	20 mm x 55.7 mm x 42 mm
Connection	Male connector M12, 4-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))

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

	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.

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
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: 650 Hz ²⁾
Response time	SIO Logic: 600 µs ¹⁾ IOL: 750 µs ²⁾
Repeatability	SIO Logic: 300 µs ¹⁾ IOL: 750 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 status	Yes
Quality of teach	Yes
Quality of run	Yes, Contamination display

Certificates

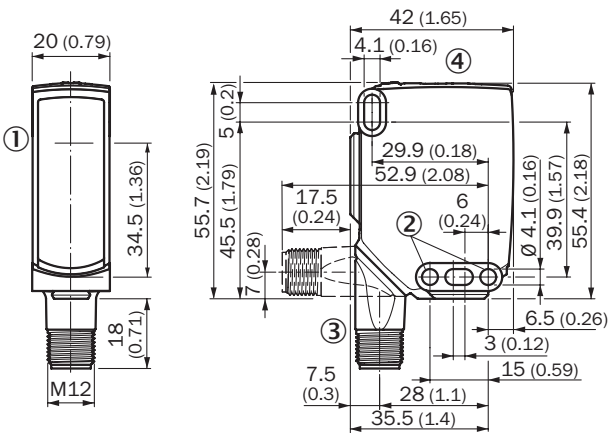
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China-RoHS	✓
ECOLAB certificate	✓
cULus certificate	✓

IO-Link	✓
Photobiological safety (DIN EN 62471) certificate	✓

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

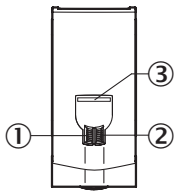
Dimensional drawing, sensor



Dimensions in mm (inch)

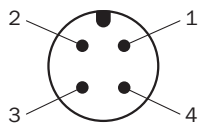
- ① Center of optical axis
- ② Mounting hole, $\varnothing$ 4.1 mm
- ③ Connection
- ④ display and adjustment elements

display and adjustment elements

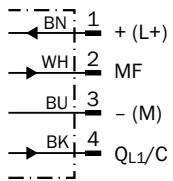


- ① LED indicator green
- ② LED indicator yellow
- ③ LED blue

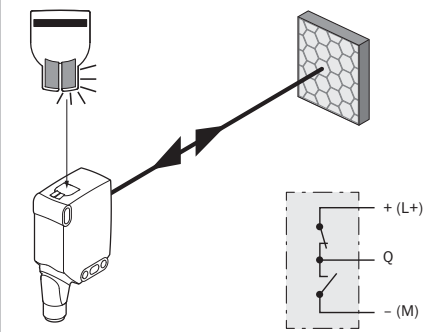
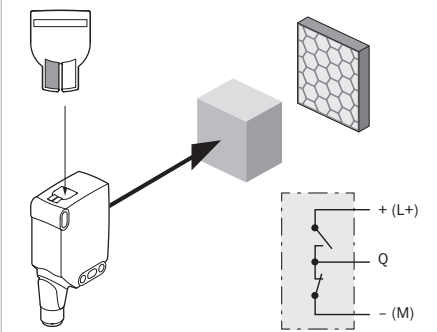
Connection type M12 male connector, 4-pin



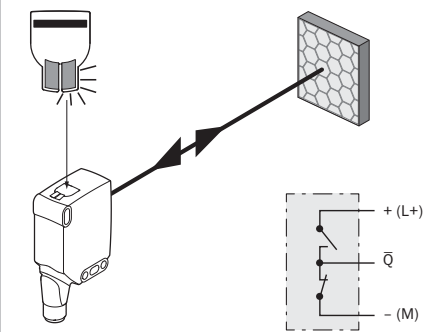
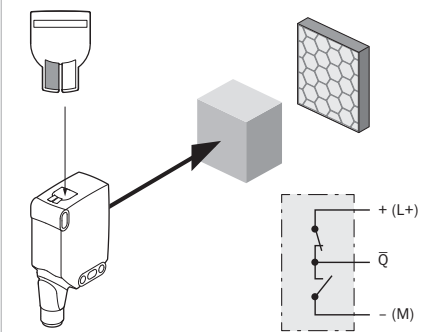
Connection diagram Cd-390



Truth table Push-pull: PNP/NPN - light switching Q

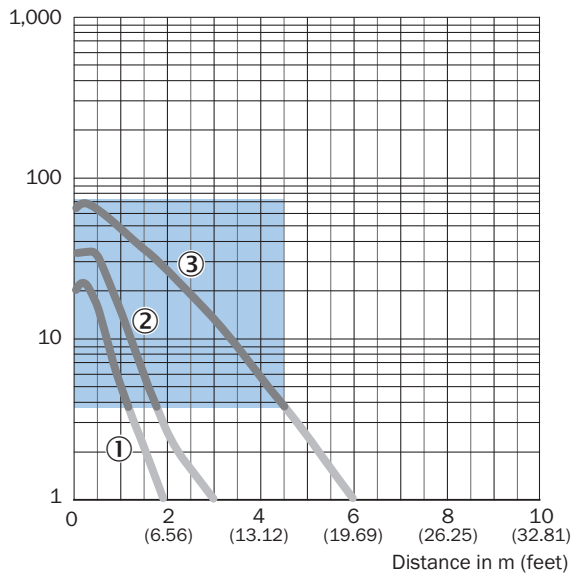
	Light switching Q (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✓	✗
Light receive indicator	☀	✗
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗
		

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	✗	⚡
		

Characteristic curve Reflective tape

Operating reserve

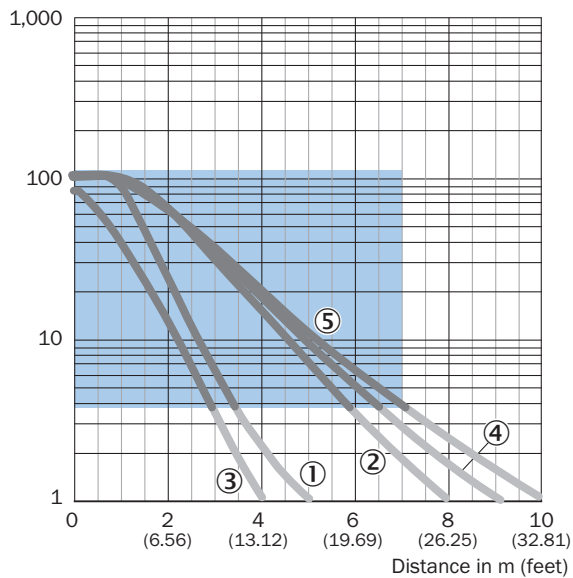


Recommended sensing range for the best performance

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

Characteristic curve Standard reflectors

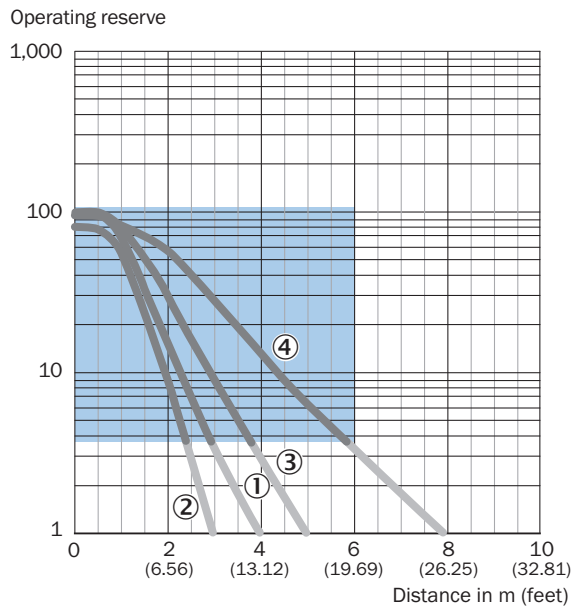
Operating reserve



Recommended sensing range for the best performance

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

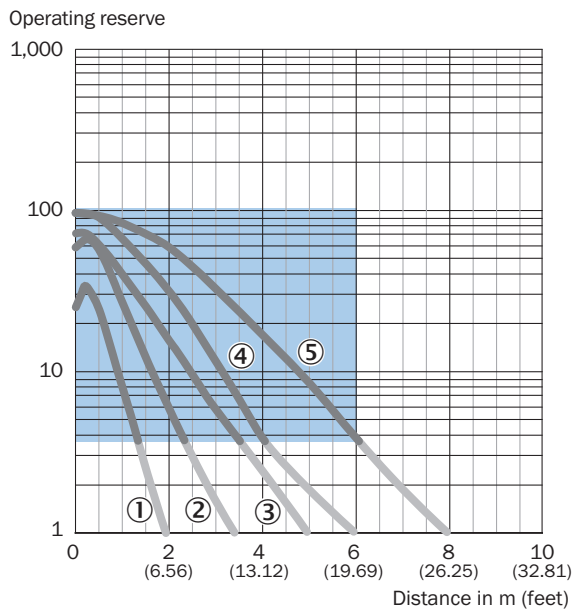
Characteristic curve Fine triple reflectors



Recommended sensing range for the best performance

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

Characteristic curve Chemical-resistant reflectors

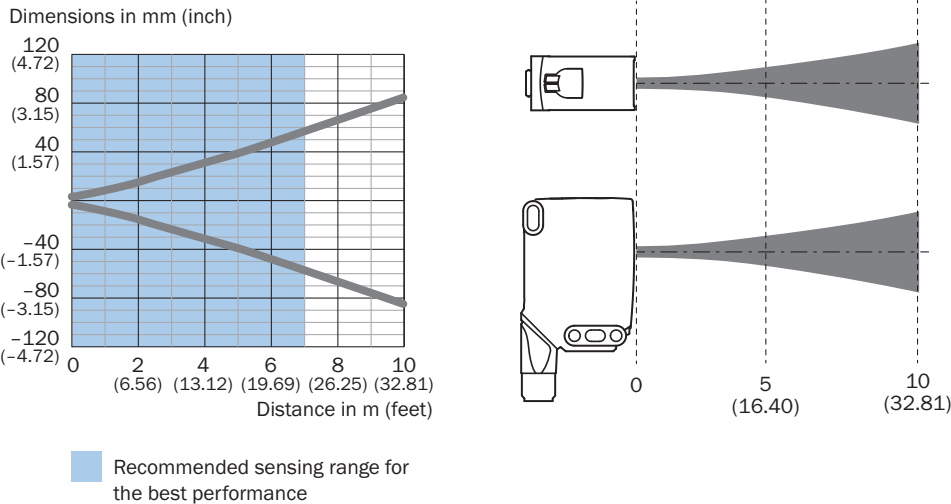


Recommended sensing range for the best performance

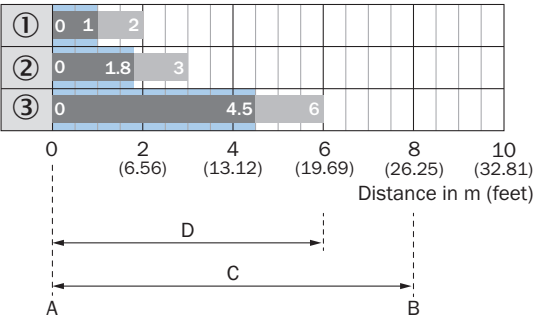
- ① PL10F CHEM reflector
- ② Reflector PL20 CHEM
- ③ Reflector P250 CHEM
- ④ Reflector P250H

⑤ Reflector PL40A Antifog

Light spot size WLA16P-xxxxx1xx



Sensing range diagram Reflective tape

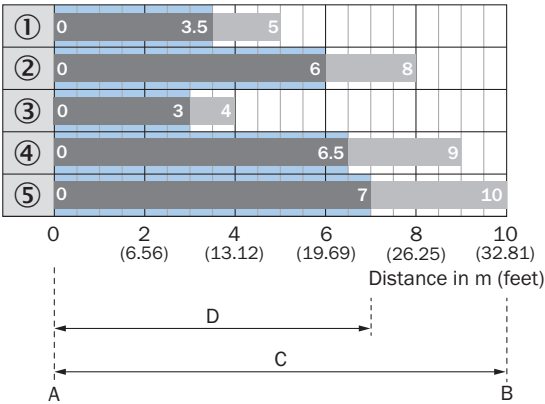


Recommended sensing range for the best performance

WLA16P-xxxxx1xx

1	Reflective tape REF-DG (50 x 50 mm)
2	Reflective tape REF-IRF-56 (50 x 50 mm)
3	Reflective tape REF-AC1000 (50 x 50 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 re- flector to sensor (operating reserve 3,75)

Sensing range diagram Standard reflectors

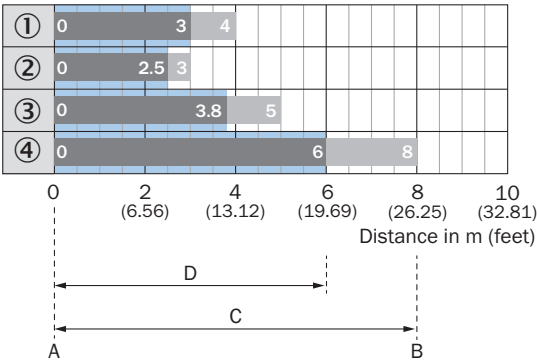


Recommended sensing range for the best performance

WLA16P-xxxxx1xx

1	Reflector PL22
2	Reflector P250, PL30A
3	Reflector PL20A
4	Reflector PL40A
5	Reflector PL80A, C110A
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 re- flector to sensor (operating reserve 3,75)

Sensing range diagram Fine triple reflectors



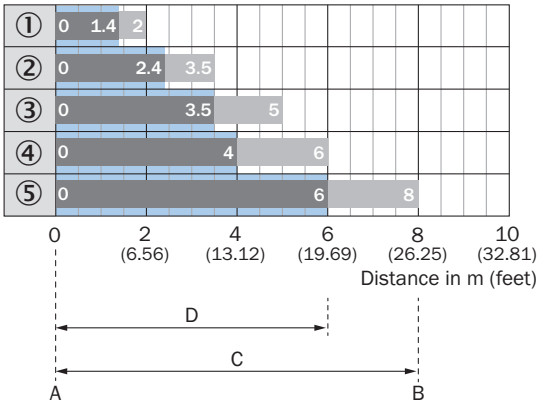
Recommended sensing range for the best performance

WLA16P-xxxxx1xx

1	PL10FH-1 reflector
2	PL10F reflector
3	Reflector PL20F

4	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 re- flector to sensor (operating reserve 3,75)

Sensing range diagram Chemical-resistant reflectors



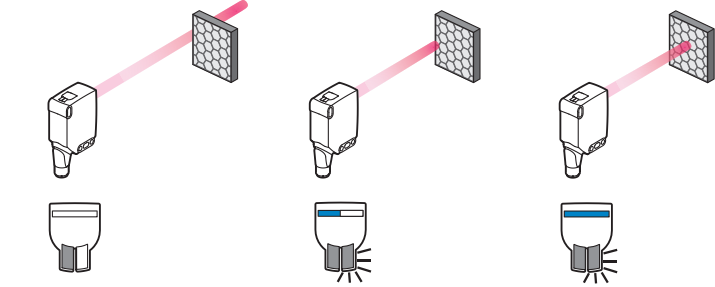
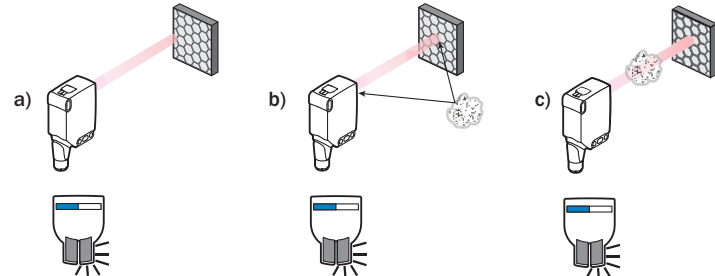
Recommended sensing range for the best performance

WLA16P-xxxx1xx

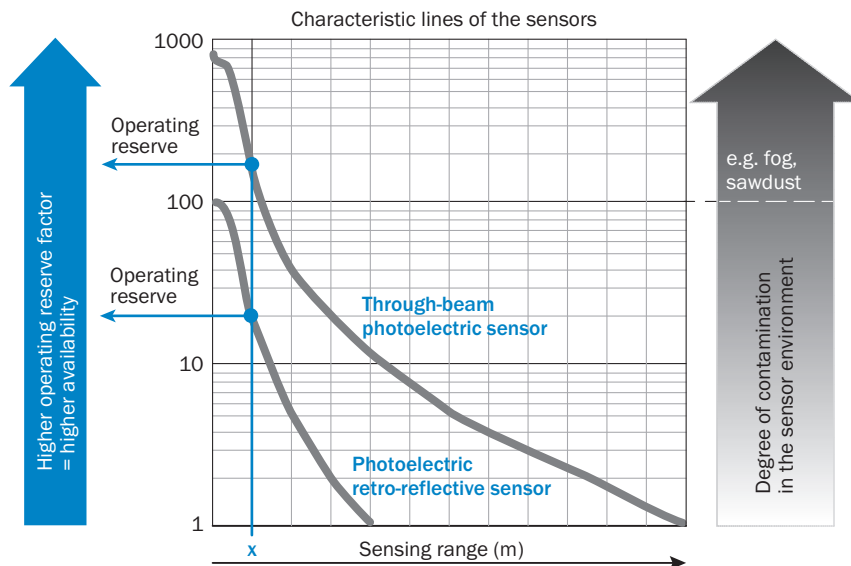
1	PL10F CHEM reflector
2	Reflector PL20 CHEM
3	Reflector P250 CHEM
4	Reflector P250H
5	Reflector PL40A Antifog
A	Sensing range min. in m
B	Sensing range max. in m
C	Maximum distance range from reflector to sensor (operating reserve 1)
D	Recommended distance range from re- flector to sensor (operating reserve 3,75)

Functions Operation note

BluePilot: Blue indicator LEDs with double benefits

Easy and quick sensor alignment with the help of the LED indicator All blue LEDs illuminate – optimum alignment – highest possible operating reserve	WLA photoelectric retro-reflection sensor alignment 
Service note A reduction in sensor availability is displayed by a decrease of the blue LEDs. Possible causes: - insufficient alignment - contamination of the optical surfaces - particles in the light beam	

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			
	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
	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
	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
reflectors and optics			
	Description: Rectangular, screw connection Dimensions: 84 mm 84 mm Ambient operating temperature: -30 °C ... +65 °C	PL80A	1003865
connectors and cables			
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PVC Description: Sensor/actuator cable, unshielded Application: Zones with chemicals, Uncontaminated zones	YF2A14-050VB3XLEAX	2096235

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