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DATA SHEET

WLA16P-1I421100ZZZ

W16
Photoelectric sensors

SICK Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WLA16P-1I421100ZZZ

ORDERING INFORMATION

Type	part no.
WLA16P-1I421100ZZZ	1222704

Further device versions and accessories at 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 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 80 mm (5 m)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (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	
Wire/pin	For activating the test input
Display	
LED blue	BluePilot: Alignment aid
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
Special applications	Detecting objects wrapped in film

SAFETY-RELATED PARAMETERS

$MTTF_D$	690 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	≤ 30 mA, without load. At U_B = 24 V [2]
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 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. U_B / < 2.5 V
Output current $I_{max.}$	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent and short-circuit protected
Response time	≤ 500 µs [3]
Repeatability (response time)	150 µs
Switching frequency	1,000 Hz [4]
Pin/Wire assignment	
Function of pin 4/black (BK)	Digital output, dark switching, object present → output $\bar{Q}$ HIGH [5]
Function of pin 2/white (WH)	Digital output, light switching, object present → output Q LOW [5]
Function of pin 5/gray (GY)	Digital input, sender off, HIGH active

[1] Limit values.

[2] 10 V DC ... 16 V DC, without load.

[3] Signal transit time with resistive load in switching mode.

[4] With light/dark ratio 1:1.

[5] 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	Cable, 5-wire, 2 m
Connection detail	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm²
Cable diameter	Ø 4.8 mm
Length of cable (L)	2 m
Bending radius	For flexible use > 12 x cable diameter

Bending cycles	1,000,000
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	Plastic, PVC
Weight	Approx. 100 g
Maximum tightening torque of the fixing screws	1.3 Nm

AMBIENT DATA

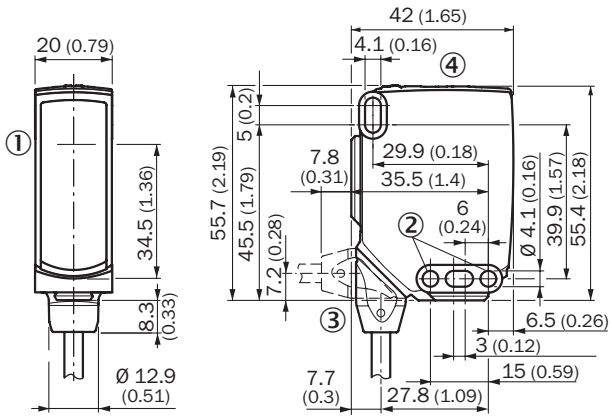
Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529) [1]
Ambient operating temperature	–40 °C ... +60 °C
Ambient temperature, storage	–40 °C ... +75 °C
Shock resistance	50 g, 11 ms (25 positive and 25 negative shocks per axis, for X, Y, Z axes, 150 shocks in total (EN60068-2-27)) 50 g, 6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

CERTIFICATES

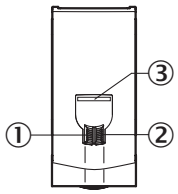
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
ECOLAB certificate	✓
cULus certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓

DIMENSIONAL DRAWING, SENSOR



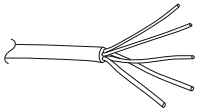
Dimensions in mm (inch)
① Center of optical axis
② Mounting hole, Ø 4.1 mm
③ Connection
④ display and adjustment elements

DISPLAY AND ADJUSTMENT ELEMENTS

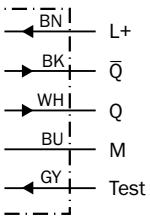


① LED indicator green
② LED indicator yellow
③ LED blue

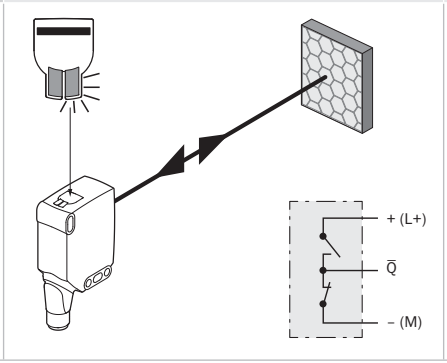
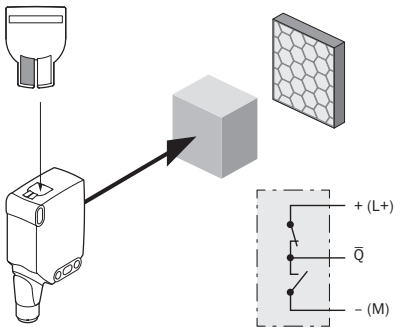
CONNECTION TYPE CABLE, 5-WIRE



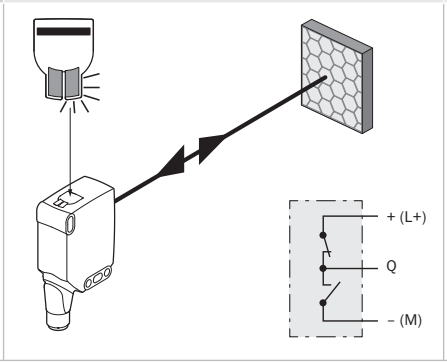
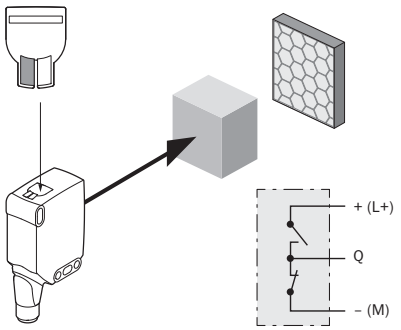
CONNECTION DIAGRAM CD-428



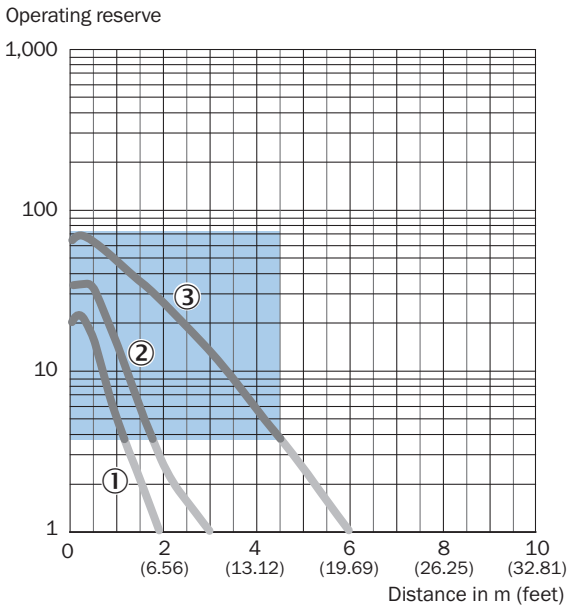
TRUTH TABLE PUSH-PULL: PNP/NPN – DARK SWITCHING $\overline{Q}$

	Dark switching $\overline{Q}$ (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	✗	⚠
		

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	⚠	✗
		

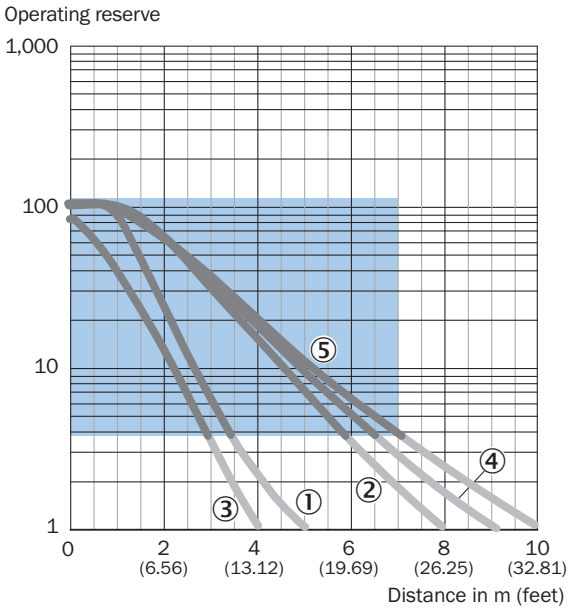
CHARACTERISTIC CURVE REFLECTIVE TAPE



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)

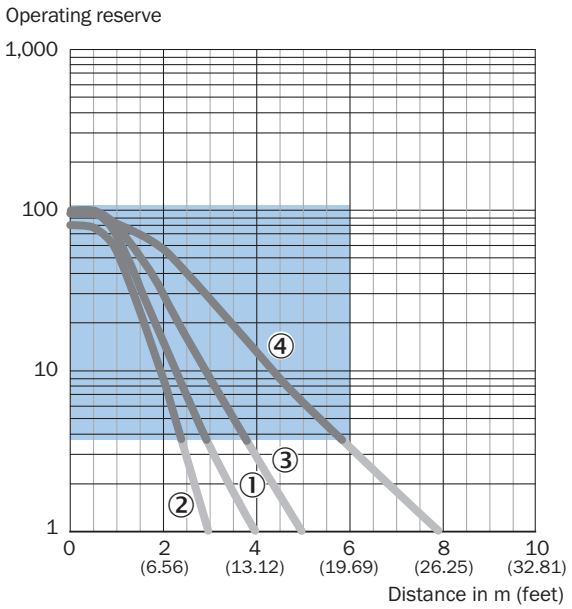
CHARACTERISTIC CURVE STANDARD REFLECTORS



Recommended sensing range for the best performance

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

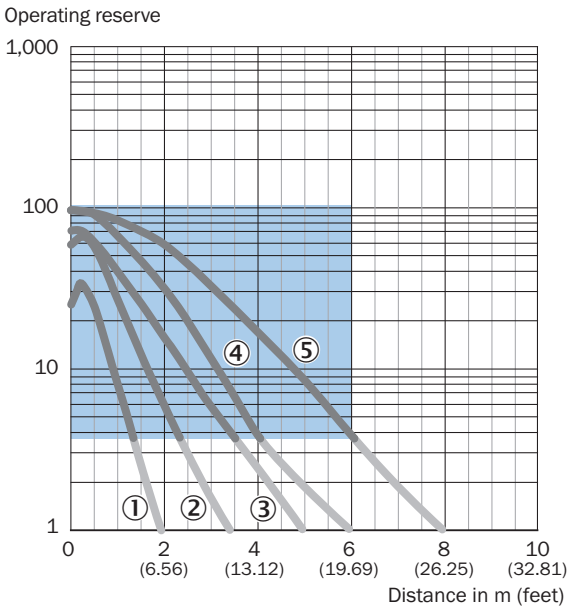
CHARACTERISTIC CURVE FINE TRIPLE REFLECTORS



Recommended sensing range for the best performance

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

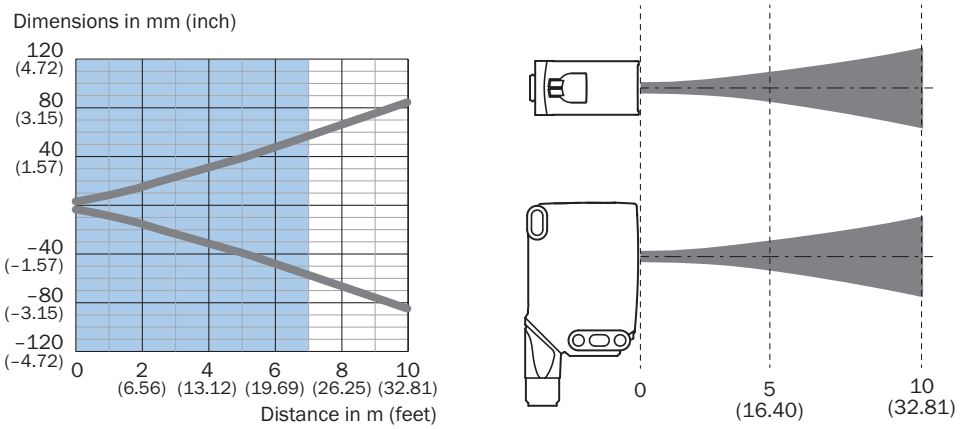
CHARACTERISTIC CURVE CHEMICAL-RESISTANT REFLECTORS



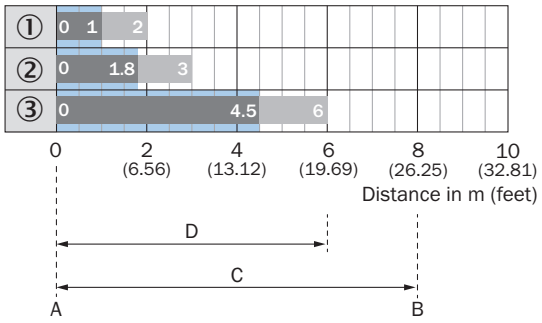
Recommended sensing range for the best performance

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

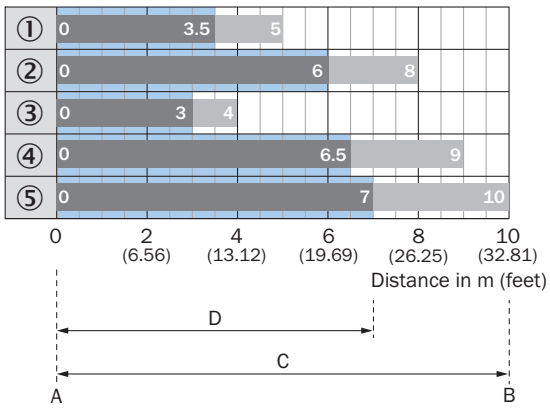


Recommended sensing range for the best performance

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 reflector to sensor (operating reserve 3,75)

SENSING RANGE DIAGRAM STANDARD REFLECTORS

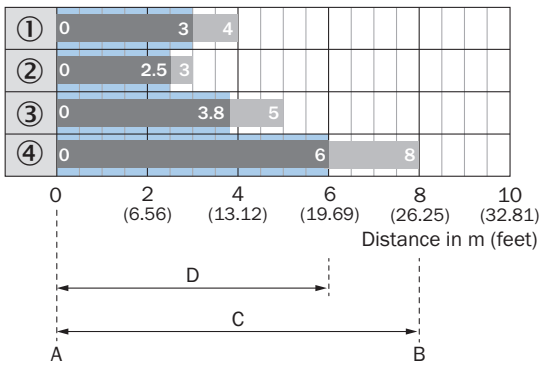


Recommended sensing range for the best performance

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 reflector to sensor (operating reserve 3,75)

SENSING RANGE DIAGRAM FINE TRIPLE REFLECTORS

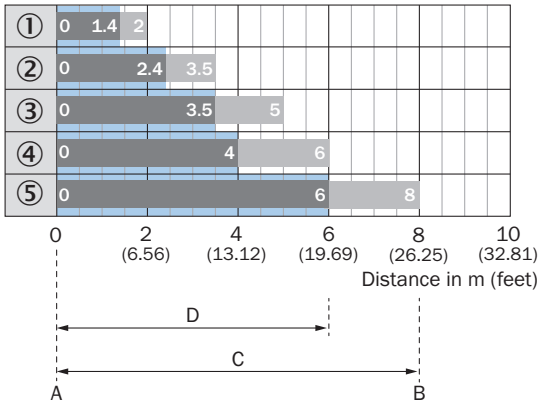


Recommended sensing range for the best performance

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 reflector to sensor (operating reserve 3,75)

SENSING RANGE DIAGRAM CHEMICAL-RESISTANT REFLECTORS



Recommended sensing range for the best performance

WLA16P-xxxxx1xx

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 reflector to sensor (operating reserve 3,75)

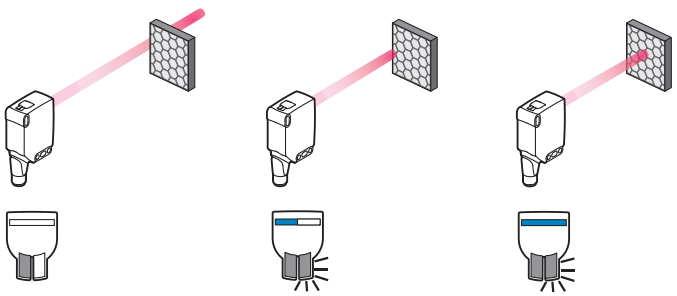
FUNCTIONS OPERATION NOTE

BluePilot: Blue indicator LEDs with double benefits

Easy and quick sensor alignment with the help of the LED indicator

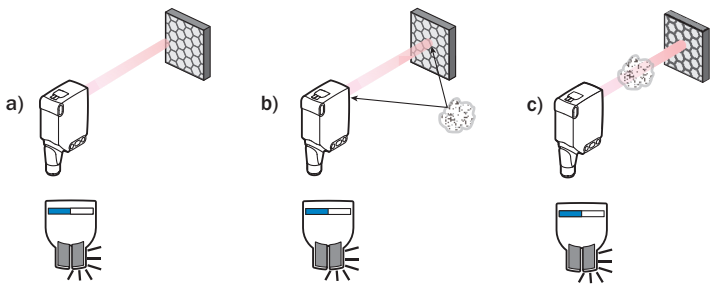
All blue LEDs illuminate
- optimum alignment
- highest possible operating reserve

WLA photoelectric retro-reflection sensor alignment

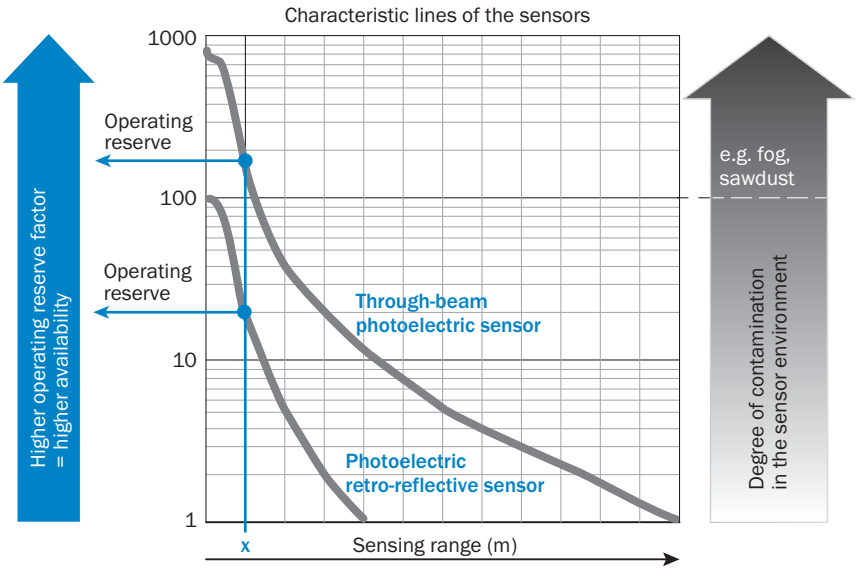


Service note
A reduction in sensor availability is displayed by a decrease of the blue LEDs.

Possible causes:
a) insufficient alignment
b) contamination of the optical surfaces
c) 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 availablity, otherwise the sensor switches due to pollution although there is no object in the path of the light beam.

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/1222704

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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