



WTL16P-34161120A00

W16

SMALL PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WTL16P-34161120A00	1218945

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

Detailed technical data

Features

Device type	Photoelectric sensors
Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression, LineSpot technology
Sensing range	
Sensing range min.	10 mm
Sensing range max.	500 mm
Adjustable switching threshold for background suppression	100 mm ... 500 mm
Reference object	Object with 90% remission (based on standard white, DIN 5033)
Minimum distance between set sensing range and background (black 6% / white 90%)	15 mm, at a distance of 200 mm
Recommended sensing range for the best performance	150 mm ... 250 mm
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Line-shaped
Light spot size (distance)	3 mm x 30 mm (200 mm)
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		
	Teach-Turn adjustment	BluePilot: For setting the sensing range
	IO-Link	For configuring the sensor parameters and Smart Task functions
Indication		
	LED blue	BluePilot: sensing range indicator
	LED green	Operating indicator Static on: power on Flashing: IO-Link mode
	LED yellow	Status of received light beam Static on: object present Static off: object not present
Special features		Line-shaped light spot
Special applications		Detecting perforated objects

Safety-related parameters

MTTF_D	629 years
DC_{avg}	0 %
T_M (mission time)	20 years (EN ISO 13849) Rate of use: 60 %

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	0x800168
	DeviceID DEC	8388968
	Compatible master port type	A
	SIO mode support	Yes

Electrical data

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

¹⁾ Limit values.

²⁾ Signal transit time with resistive load in switching mode.

³⁾ With light/dark ratio 1:1.

Protection class	III
Digital output	
Number	2 (Complementary)
Type	Push-pull: PNP/NPN
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, light switching, object present → output Q_{L1} HIGH; 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)	Digital output, dark switching, object present → output $\bar{Q}_{L1}$ LOW
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.

Mechanical data

Housing	Rectangular
Dimensions (W x H x D)	20 mm x 55.7 mm x 42 mm
Connection	Cable with M12 male connector, 4-pin, 317 mm
Connection detail	
Deep-freeze property	Do not bend below 0°C
Conductor size	0.14 mm^2
Cable diameter	$\varnothing 4.8 \text{ mm}$
Length of cable (L)	270 mm
Bending radius	For flexible use $> 12 \times$ cable diameter
Bending cycles	1,000,000
Material	
Housing	Plastic, VISTAL®
Front screen	Plastic, PMMA
Cable	PVC
Male connector	Plastic, VISTAL®
Weight	Approx. 70 g
Maximum tightening torque of the fixing screws	1.3 Nm

Ambient data

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529)
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¹⁾ Replaces IP69K with ISO 20653: 2013-03.

	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.

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated 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: 400 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

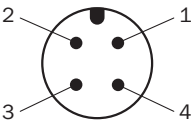
Classifications

eCl@ss 5.0	27270904
eCl@ss 5.1.4	27270904
eCl@ss 6.0	27270904
eCl@ss 6.2	27270904

eCl@ss 7.0	27270904
eCl@ss 8.0	27270904
eCl@ss 8.1	27270904
eCl@ss 9.0	27270904
eCl@ss 10.0	27270904
eCl@ss 11.0	27270904
eCl@ss 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

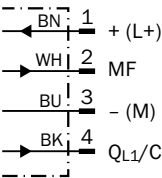
Connection type

M12 male connector, 4-pin



Connection diagram

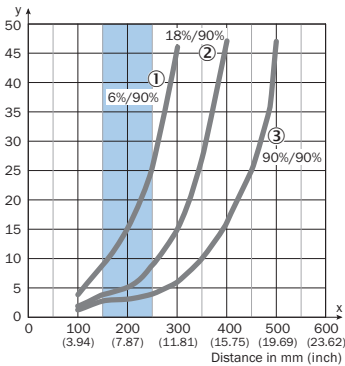
Cd-390



Characteristic curve

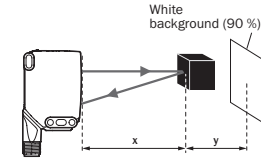
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Minimum distance in mm (y) between the set sensing range (x) and white background (90 % remission)



Recommended sensing range for the best performance

Example:
Safe suppression of the background

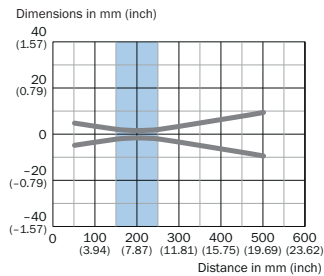


Black object (6 % remission)
Set sensing range x = 200 mm
Needed minimum distance to white background y = 15 mm

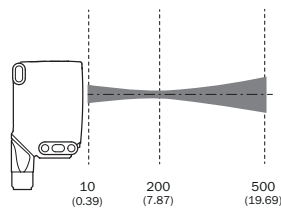
- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor

Light spot size

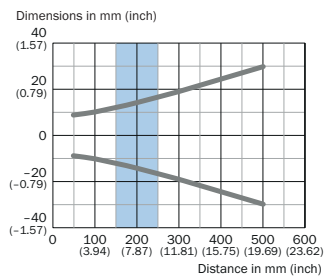
Vertical



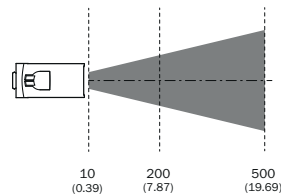
Recommended sensing range for the best performance



Horizontal

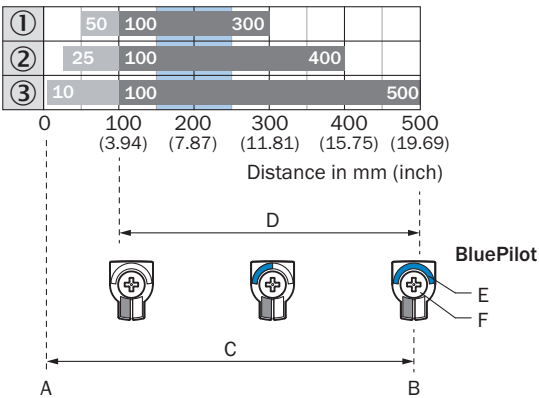


Recommended sensing range for the best performance



Sensing range diagram

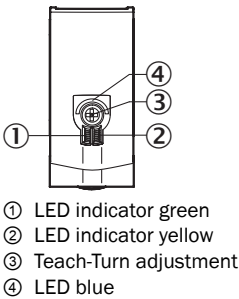
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Recommended sensing range for the best performance

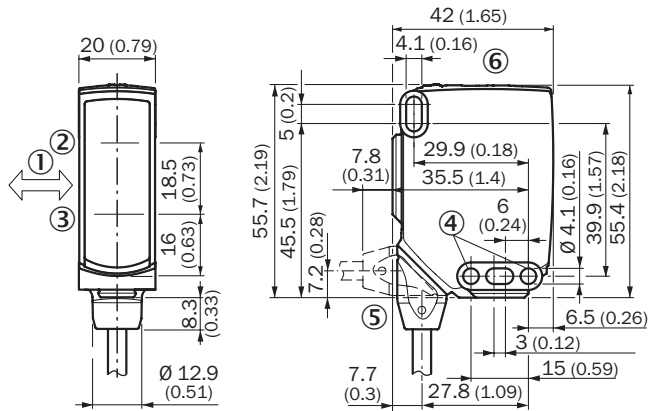
Adjustments

Display and adjustment elements



Dimensional drawing (Dimensions in mm (inch))

WTB16, WTL16, WTF16, cable



- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ Mounting hole, Ø 4.1 mm
- ⑤ Connection
- ⑥ Display and adjustment elements

Recommended accessories

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

	Brief description	Type	Part no.
Universal bar clamp systems			
	Plate N02 for universal clamp bracket, Zinc plated steel (sheet), Zinc die cast (clamping bracket), Universal clamp (5322626), mounting hardware	BEF-KHS-N02	2051608
Mounting brackets and plates			
	Adapter for mounting W16 sensors in existing W14-2/W18-3 installations or L25 sensors in existing L28 installations, plastic, fastening screws included	BEF-AP-W16	2095677
Plug connectors and cables			
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 5 m	YF2A14-050VB3XLEAX	2096235
	Head A: male connector, M12, 4-pin, straight Cable: unshielded	STE-1204-G	6009932

Recommended services

Additional services → www.sick.com/W16

	Type	Part no.
Function Block Factory		
Description: The Function Block Factory supports common programmable logic controllers (PLCs) from various manufacturers, such as Siemens, Beckhoff, Rockwell Automation and B&R. More information on the FBF can be found here.	Function Block Factory	On request

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