



WTF16P-24161420A00

W16

SMALL PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WTF16P-24161420A00	1113468

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

Detailed technical data

Features

Functional principle	Photoelectric proximity sensor
Functional principle detail	Foreground suppression
Sensing range	
Sensing range min.	0 mm
Sensing range max.	600 mm
Adjustable switching threshold for background suppression	100 mm ... 600 mm
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Minimum object height at set sensing range in front of black background (6% remission factor)	9 mm, at a distance of 400 mm
Recommended sensing range for the best performance	100 mm ... 400 mm
Emitted beam	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	Ø 6 mm (500 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 not present Static off: object present
Special applications		Detecting flat objects

Safety-related parameters

MTTF_D	626 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	0x800274
	DeviceID DEC	8389236
	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
Protection class	III

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.

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	$\leq 2.5 \text{ ms}$ ²⁾	
Repeatability (response time)	$150 \text{ }\mu\text{s}$	
Switching frequency	200 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.

Mechanical data

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	$-40 \text{ }^{\circ}\text{C}$... $+60 \text{ }^{\circ}\text{C}$
Ambient temperature, storage	$-40 \text{ }^{\circ}\text{C}$... $+75 \text{ }^{\circ}\text{C}$
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))

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

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: 200 Hz ¹⁾ IOL: 200 Hz ²⁾
Response time	SIO Logic: 2,5 ms ¹⁾ IOL: 2,5 ms 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

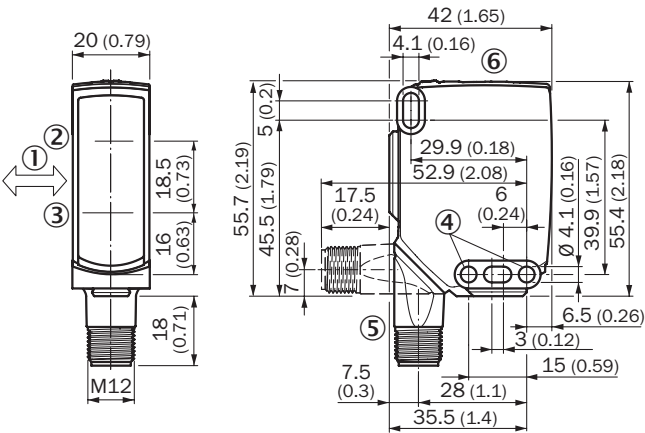
Classifications

ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903

ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

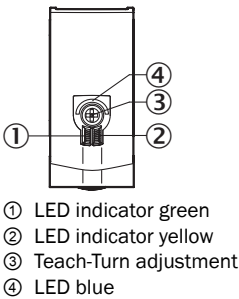
Dimensional drawing (Dimensions in mm (inch))

Dimensional drawing, sensor



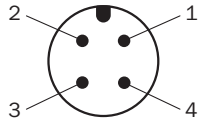
Adjustments

Display and adjustment elements



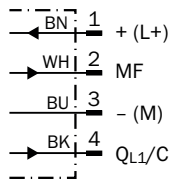
Connection type

M12 male connector, 4-pin

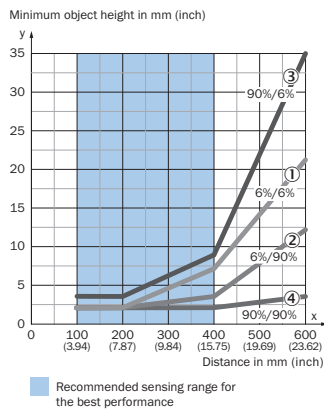


Connection diagram

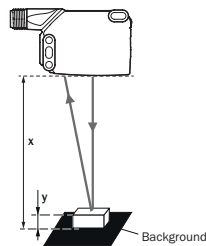
Cd-390



Characteristic curve



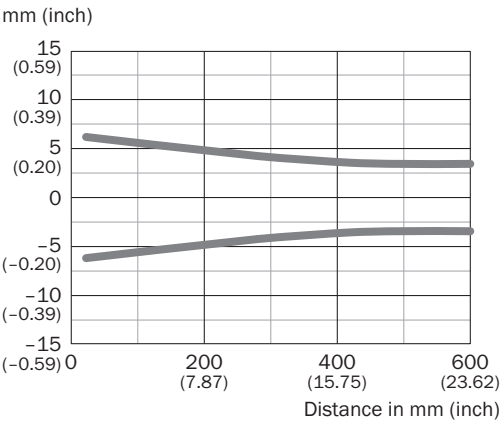
Example:
Reliable detection of the object



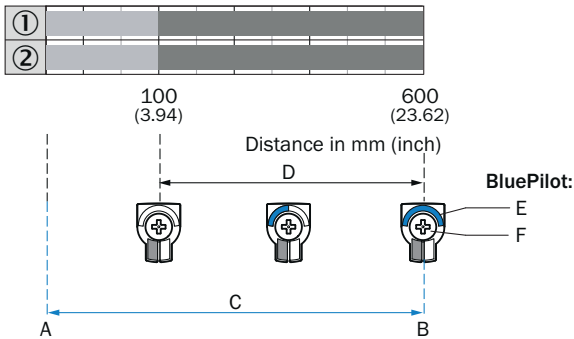
Black background (6 % remission factor)
Distance of sensor to background $x = 400$ mm
Minimum object height for white object (90 % remission factor) $y = 9$ mm

- ① Black object, 6% remission factor, in front of black background, 6% remission factor
- ② Black object, 6% remission factor, in front of white background, 90% remission factor
- ③ White object, 90% remission factor, in front of black background, 6% remission factor
- ④ White object, 90% remission factor, in front of white background, 90% remission factor

Light spot size



Sensing range diagram



- A = Sensing range min. in mm
 B = Sensing range max. in mm
 C = Viewing range
 D = Adjustable switching threshold for foreground suppression
 E = Sensing range indicator
 F = Teach-Turn adjustment
- ① Sensing range on black, 6% remission factor
 ② Sensing range on white, 90% remission factor

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

	Brief description	Type	Part no.
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

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