



WTS16P-24161300CZZ

W16

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	part no.
WTS16P-24161300CZZ	1111622

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

Detailed technical data

Features

Functional principle		Photoelectric proximity sensor
Functional principle detail		Background suppression, TwinEye technology, MultiPulse
Sensing range		
	Sensing range min.	50 mm
	Sensing range max.	750 mm
	Adjustable switching threshold for background suppression	100 mm ... 750 mm
	Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
	Minimum distance between set sensing range and background (black 6% / white 90%)	50 mm, at a distance of 100 mm
	Recommended sensing range for the best performance	100 mm ... 300 mm
Emitted beam		
	Light source	PinPoint LED
	Type of light	Visible red light
	Shape of light spot	Point-shaped
	Light spot size (distance)	Ø 8 mm (300 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	
IO-Link	For configuring the sensor parameters and Smart Task functions
Display	
LED blue	BluePilot: sensing range indicator
LED yellow	Status of received light beam Static on: object present Static off: object not present
Special features	Factory setting: sensing range 205 mm Dynamic blind zone 50 mm ... 75 mm MultiPulse: sensor with self-monitoring
Special applications	Detecting uneven, shiny objects, Detecting objects wrapped in film

Safety-related parameters

MTTF_D	419 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	0x800277
DeviceID DEC	8389239
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

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	$\leq 0.1 \text{ s}$ ²⁾
	Switching frequency	10 Hz ³⁾
Pin/Wire assignment		
	Function of pin 4/black (BK)	Digital output, object present → output Q_{L1} , HIGH/LOW oscillating 10 Hz ; 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, object present → output Q_{L1} , LOW/HIGH oscillating 10 Hz 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	$-40 \text{ °C} \dots +60 \text{ °C}$
Ambient temperature, storage	$-40 \text{ °C} \dots +75 \text{ °C}$
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))

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

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: 10 Hz ¹⁾ IOL: 10 Hz ²⁾
Response time	SIO Logic: < 0.1 s ¹⁾ IOL: < 0.1 s ²⁾
Repeatability	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

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	✓

✓

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

Technical drawing of the 1000 Series LED light fixture, showing front and side views with dimensions in mm and inches.

Front View Dimensions:

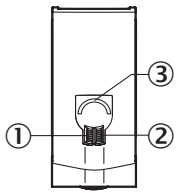
- Top width: 20 (0.79)
- Bottom width: 18 (0.71)
- Bottom thread: M12
- Overall height: 12.2 (0.48)
- Internal height: 12.2 (0.48)
- Internal width: 24.2 (0.95)

Side View Dimensions:

- Top width: 42 (1.65)
- Top offset: 4.1 (0.16)
- Top radius: R5
- Overall height: 55.7 (2.19)
- Internal height: 45.5 (1.79)
- Internal width: 5 (0.2)
- Internal offset: 7 (0.28)
- Internal thread: 7.5 (0.3)
- Internal width: 17.5 (0.24)
- Internal offset: 29.9 (0.18)
- Internal width: 52.9 (2.08)
- Internal offset: 6 (0.24)
- Internal thread: Ø4.1 (0.16)
- Internal width: 39.9 (1.57)
- Internal offset: 55.4 (2.18)
- Internal width: 6.5 (0.26)
- Internal offset: 3 (0.12)
- Internal thread: 15 (0.59)
- Internal width: 28 (1.1)
- Internal offset: 35.5 (1.4)

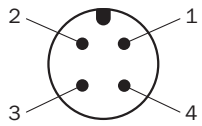
- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- ③ Mounting hole, $\varnothing$ 4.1 mm
- ④ Connection
- ⑤ display and adjustment elements

display and adjustment elements

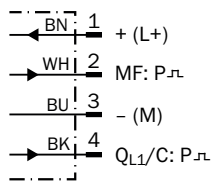


- ① LED indicator green
- ② LED indicator yellow
- ③ LED blue

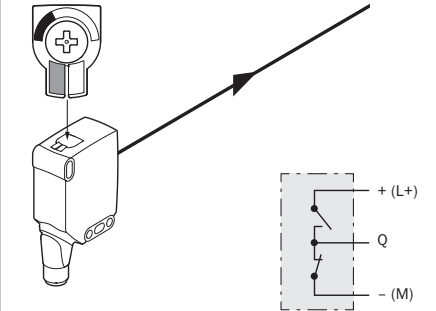
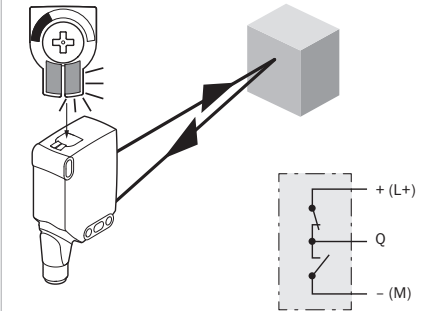
Connection type M12 male connector, 4-pin



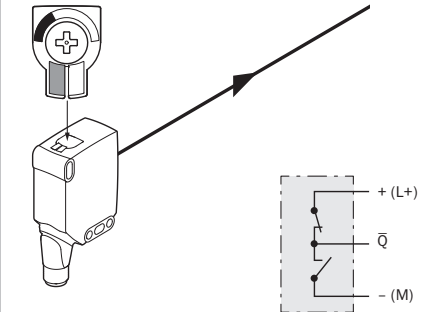
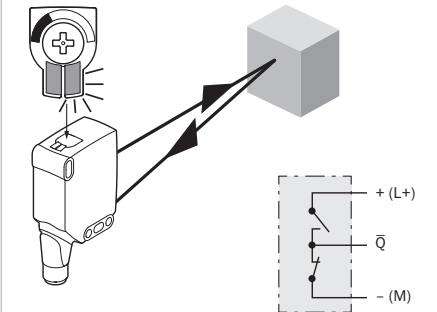
Connection diagram Cd-413



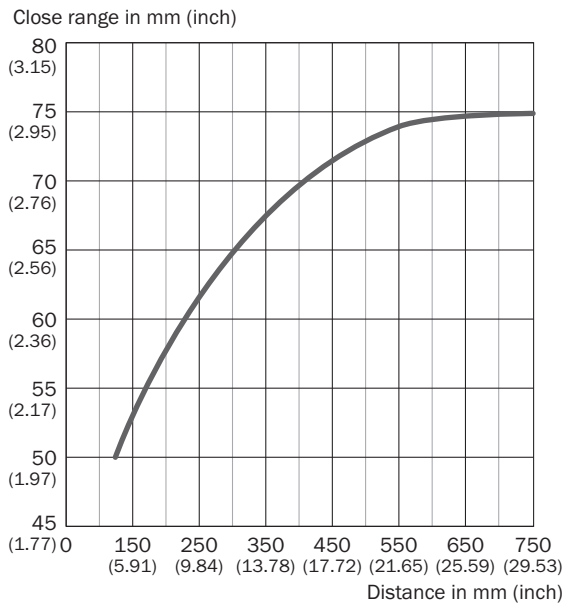
Truth table Push-pull: PNP/NPN - light switching Q

	Light switching 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 – dark switching $\bar{Q}$

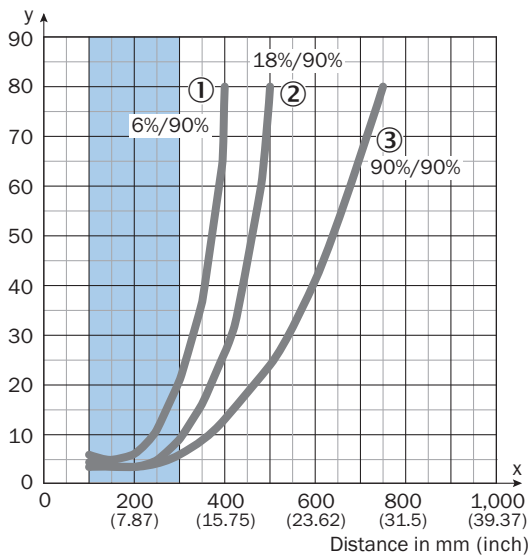
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗
		

Characteristic curve Dynamic blind zone



Characteristic curve

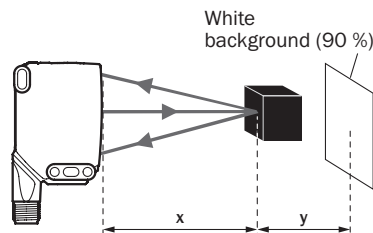
Minimum distance in mm (y) between the set sensing range (x) and white background (90 % remission)



Recommended sensing range for the best performance

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

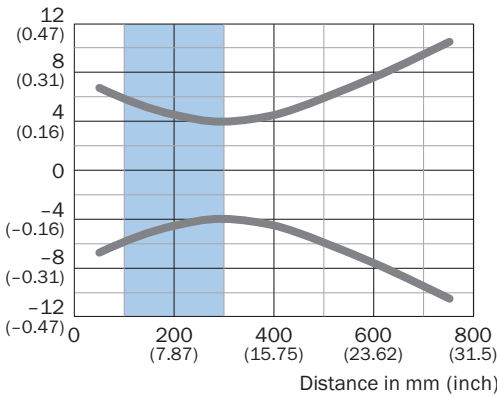
Example:
Safe suppression of the background



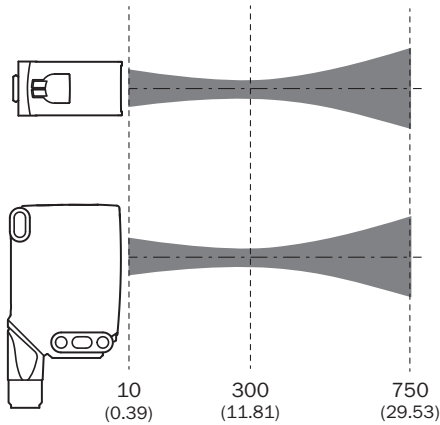
Black object (6 % remission)
Set sensing range $x = 300$ mm
Needed minimum distance to white background $y = 20$ mm

Light spot size

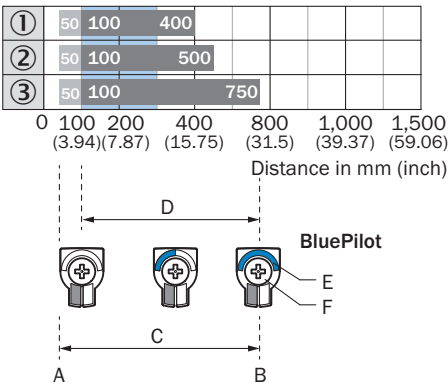
Dimensions in mm (inch)



Recommended sensing range for the best performance



Sensing range diagram WTS16P-xxxxx3xx



Recommended sensing range for the best performance

1	Black object, 6% remission factor
2	Gray object, 18% remission factor
3	White object, 90% remission factor
A	Sensing range min. in mm
B	Sensing range max. in mm
C	Field of view
D	Adjustable switching threshold for background suppression
E	Sensing range indicator
F	Teach-Turn adjustment

Recommended accessories

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

	Brief description	Type	part no.
Mounting systems			
	Description: Mounting bracket with articulated arm Material: Steel Details: Steel, zinc coated Items supplied: Mounting hardware included Suitable for: W16, W26, W11, W12, W23, W27, Dx50, W280, G10	BEF-WN-MULTI2	2093945
	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: Mounting bracket, large Material: Stainless steel Details: Stainless steel Items supplied: Mounting hardware included Suitable for: W11-2, W12-3, W16	BEF-WG-W12	2013942
	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: Plate N11N for universal clamp bracket Material: Stainless steel Details: Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp) Items supplied: Universal clamp (5322627), mounting hardware Usable for: DeltaPac, Glare, WTD20E	BEF-KHS-N11N	2071081
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
	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, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-050UB3XLEAX	2095608

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:

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