



WTS16P-24161320CZZ

W16

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ

Ordering information

| Type | part no. |
|--------------------|----------|
| WTS16P-24161320CZZ | 1111636 |

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 $T_a = +25^\circ\text{C}$ |
| Adjustment | Teach-Turn adjustment | BluePilot: For setting the sensing range |
| Display | LED blue | BluePilot: sensing range indicator |
| | LED yellow | Status of received light beamStatic on: object presentStatic off: object not present |
| Special features | | MultiPulse: sensor with self-monitoring Dynamic blind zone 50 mm ... 75 mm |
| 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 | $\leq 5 \text{ V}_{\text{pp}}$ |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | $\leq 30 \text{ mA}$, without load. At $U_B = 24 \text{ V}$ |
| Protection class | III |
| Digital output | |
| Number | 2 (Complementary) |

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.

| | |
|---------------------------------------|--|
| Type | Push-pull: PNP/NPN |
| 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 | ≤ 0.1 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 °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)) |

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 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.

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 |

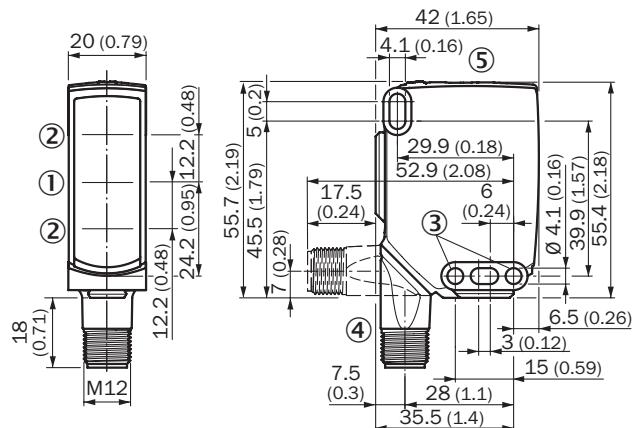
UNSPSC 16.0901

39121528

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 | ✓ |

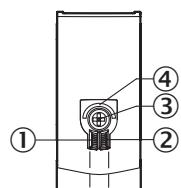
Dimensional drawing, sensor



Dimensions in mm (inch)

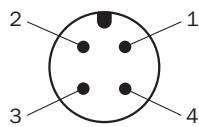
- ① Center of optical axis, sender
- ② Center of optical axis, receiver
- ③ Mounting hole, Ø 4.1 mm
- ④ Connection
- ⑤ display and adjustment elements

display and adjustment elements

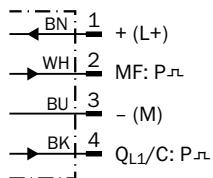


- ① LED indicator green
- ② LED indicator yellow
- ③ Teach-Turn adjustment
- ④ LED blue

Connection type M12 male connector, 4-pin



Connection diagram Cd-413

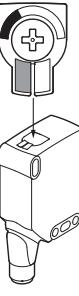


Truth table Push-pull: PNP/NPN - light switching Q

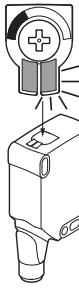
| Light switching Q (normally open (upper switch), normally closed (lower switch)) | | |
|--|---------------------------------|------------------------------|
| | Object not present → Output LOW | Object present → Output HIGH |
| Light receive | ✗ | ✓ |
| Light receive indicator | ✗ | ✗ |
| Load resistance 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 | ⚠ | × |



Light receive



Light receive indicator

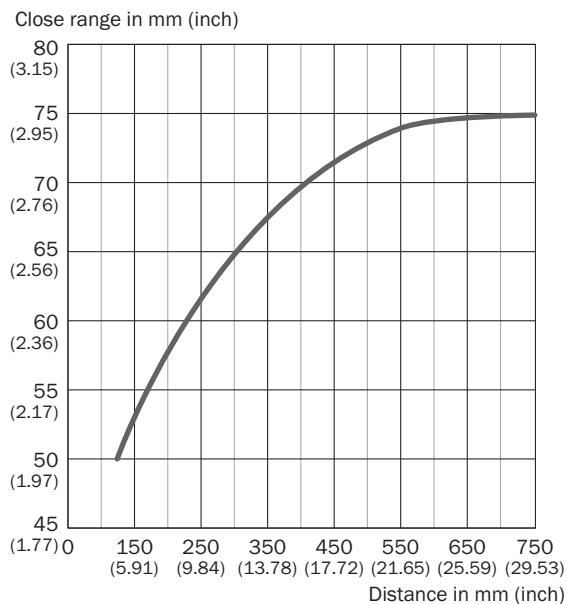


Load resistance to L+



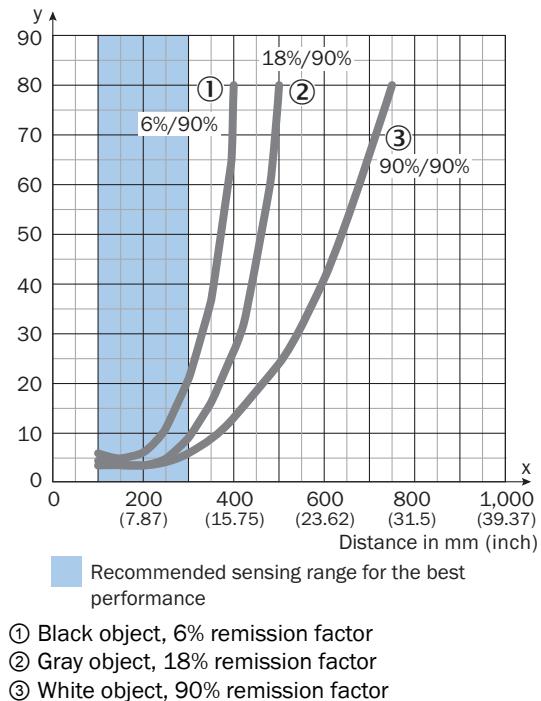
Load resistance to M

Characteristic curve Dynamic blind zone

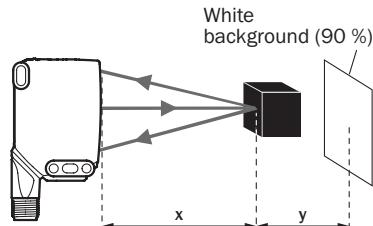


Characteristic curve

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



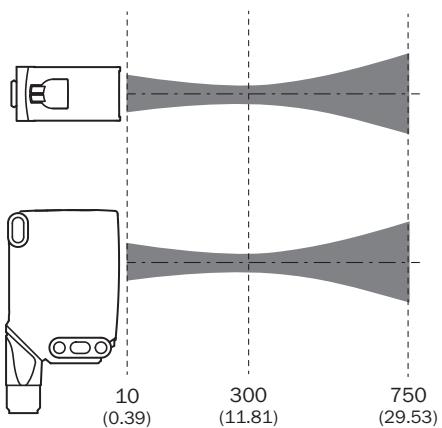
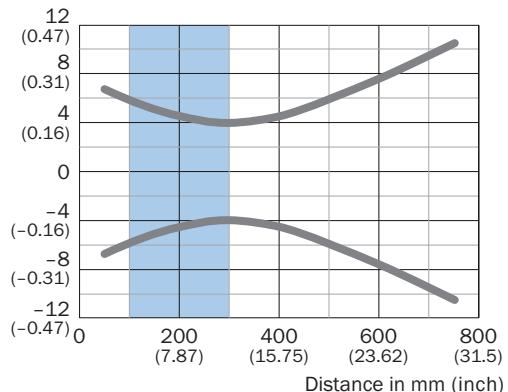
Example:
Safe suppression of the background



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

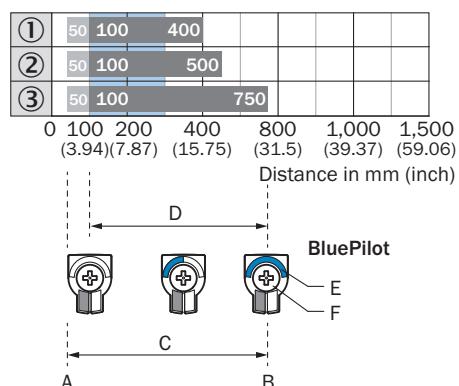
Light spot size

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 | | | |
| | <ul style="list-style-type: none"> 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 |
| | <ul style="list-style-type: none"> 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 |

| | Brief description | Type | part no. |
|---|--|--------------------|-----------------|
| connectors and cables | | | |
|  | <ul style="list-style-type: none">Connection type head A: Female connector, M12, 4-pin, straight, A-codedConnection type head B: Flying leadsSignal type: Sensor/actuator cableCable: 5 m, 4-wire, PVCDescription: Sensor/actuator cable, unshieldedApplication: 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:

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