



DATA SHEET

WTB16I-39111120ZZZ

W16
Photoelectric sensors

SICK Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WTB16I-39111120ZZZ

ORDERING INFORMATION

Type	part no.
WTB16I-39111120ZZZ	1222708

Further device versions and accessories at www.sick.com/W16



DETAILED TECHNICAL DATA

FEATURES

Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression
Sensing range	
Sensing range min.	10 mm
Sensing range max.	1,500 mm
Adjustable switching threshold for background suppression	100 mm ... 1,500 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%)	70 mm, at a distance of 600 mm
Recommended sensing range for the best performance	100 mm ... 600 mm
Emitted beam	
Light source	LED
Type of light	Infrared light
Shape of light spot	Point-shaped
Light spot size (distance)	Ø 12 mm (800 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at T ₀ = +23 °C)
Key LED figures	
Normative reference	EN 62471:2008-09 IEC 62471:2006, modified
LED risk group marking	Free group
Wave length	850 nm
Average service life	100,000 h at T _a = +25 °C
Adjustment	
Teach-Turn adjustment	BluePilot For setting the sensing range
Display	
LED blue	BluePilot: sensing range indicator
LED green	Operating indicator Static on: power on
LED yellow	Status of received light beam Static on: object present

Static off: object not present

SAFETY-RELATED PARAMETERS

MTTF _D	626 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 Type Switching mode Signal voltage PNP HIGH/LOW Signal voltage NPN HIGH/LOW Output current I_{max} Circuit protection outputs Response time Repeatability (response time) Switching frequency 2 (Complementary) Push-pull: PNP/NPN Light/dark switching Approx. U_B-2.5 V / 0 V Approx. U_B / < 2.5 V ≤ 100 mA Reverse polarity protected Overcurrent and short-circuit protected ≤ 500 μs ³⁾ 150 μs 1,000 Hz ⁴⁾
Pin/Wire assignment	Function of pin 4/black (BK) Pin 5 function/white (WH) Digital output, light switching, object present → output Q HIGH ⁵⁾ Digital output, dark switching, object present → output $\bar{Q}$ LOW

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 with Q6 male connector, 6-pin, DC-coded, 298 mm
Connection detail	Deep-freeze property Conductor size Cable diameter Length of cable (L) Bending radius Bending cycles Do not bend below 0 °C 0.14 mm² Ø 4.8 mm 270 mm For flexible use > 12 x cable diameter 1,000,000
Material	Housing Front screen Cable Male connector Plastic, VISTAL® Plastic, PMMA Plastic, PVC Plastic, VISTAL®

Weight	Approx. 70 g
Maximum tightening torque of the fixing screws	1.3 Nm

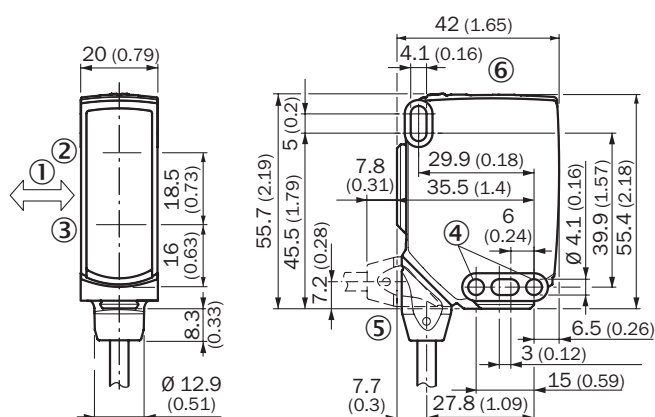
AMBIENT DATA

Enclosure rating	IP65 (EN 60529)
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
UL File No.	NRKH.E181493 & NRKH7.E181493

CERTIFICATES

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

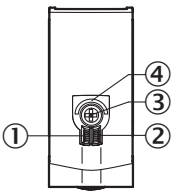
DIMENSIONAL DRAWING, SENSOR



Dimensions in mm (inch)

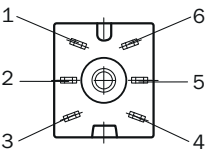
- ① Standard direction of the material being detected
- ② Center of optical axis, sender
- ③ Center of optical axis, receiver
- ④ Mounting hole, Ø 4.1 mm
- ⑤ Connection
- ⑥ display and adjustment elements

DISPLAY AND ADJUSTMENT ELEMENTS

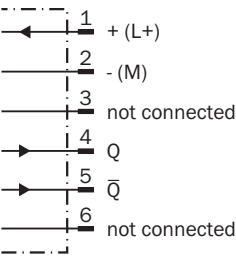


- ① LED indicator green
- ② LED indicator yellow
- ③ Teach-Turn adjustment
- ④ LED blue

CONNECTION TYPE CUBIC CONNECTOR, 6-PIN



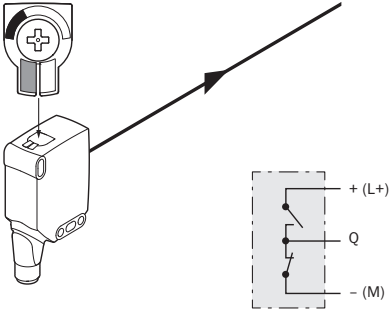
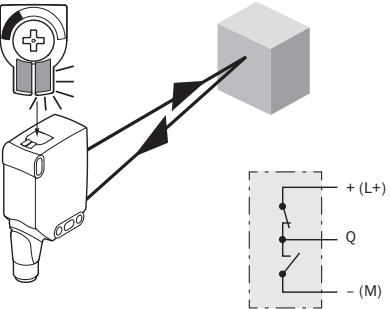
CONNECTION DIAGRAM CD-176



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

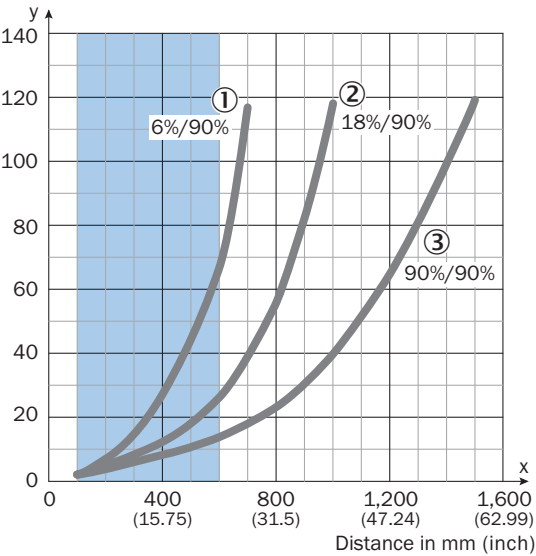
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	💡
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗

TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q

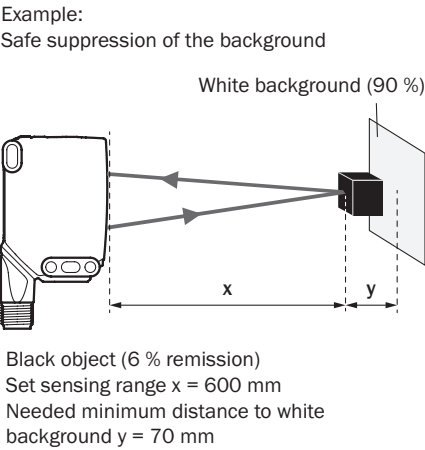
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⚡	⊗
Load resistance to M	⊗	⚡
		

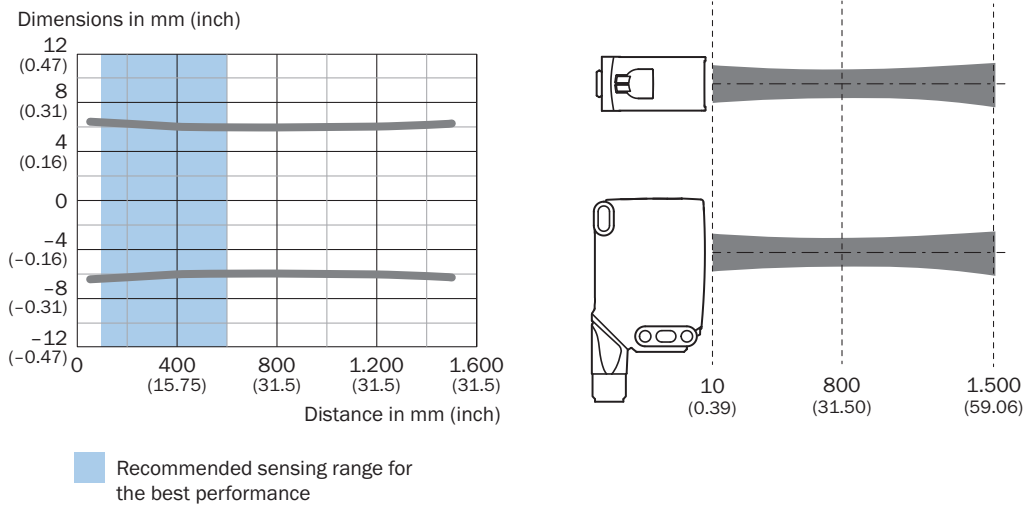
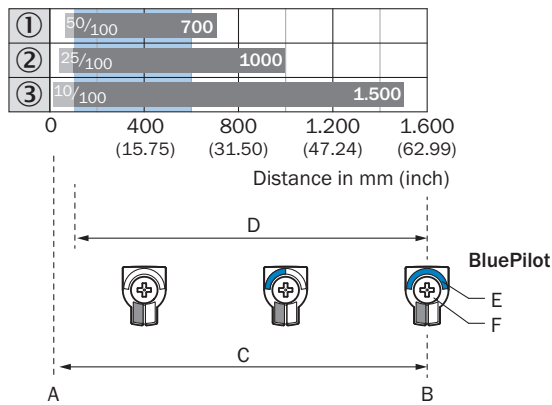
CHARACTERISTIC CURVE

Minimum distance in mm (y) between the set sensing range 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



LIGHT SPOT SIZE WTB16I-XXXXX1XX, WTB16I-XXXXAXX**SENSING RANGE DIAGRAM**

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

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/1222708



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SICK AT A GLANCE

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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.

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