



DATA SHEET

WTB4FP-2216R150A00

W4
Photoelectric sensors

SICK

Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WTB4FP-2216R150A00

ORDERING INFORMATION

Type	part no.
WTB4FP-2216R150A00	1119989

Further device versions and accessories at www.sick.com/W4



DETAILED TECHNICAL DATA

FEATURES

Functional principle		Photoelectric proximity sensor
Functional principle detail		Background suppression, MultiSwitch, distance value
Sensing range		
	Sensing range min.	4 mm
	Sensing range max.	220 mm
Adjustable switching threshold for background suppression		15 mm ... 220 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%)		3 mm, at a distance of 80 mm
Recommended sensing range for the best performance		40 mm ... 140 mm
Distance value		
	Measuring range	15 mm ... 220 mm
	Repeatability	0,3 mm ... 2,2 mm ^{1) 2) 3)}
	Accuracy	Typ. 3.0 mm at 15 ... 50 mm distance ¹⁾
		Typ. 4.5 mm at 50 ... 100 mm distance ¹⁾
		Typ. 6.5 mm at 100 ... 150 mm distance ¹⁾
		Typ. 12 mm at 150 ... 220 mm distance ¹⁾
	Distance value output	Via IO-Link
	Resolution	1 mm
	Update rate of the distance value	20 ms
Emitted beam		
	Light source	PinPoint LED
	Type of light	Visible red light
	Shape of light spot	Point-shaped
	Light spot size (distance)	Ø 4.2 mm (130 mm)

¹⁾ 6% ... 90% remission factor.
²⁾ Equivalent to 1 σ.
³⁾ See repeatability characteristic lines.

Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)		< +/- 1.5° (at T _u = +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 °C
Smallest detectable object (MDO) typ.		0.2 mm, At 130 mm distance (object with remission factor of 90% (complies with standard white according to DIN 5033))
Adjustment	Teach-in button	BluePilot For setting the sensing range
	IO-Link	For configuring the sensor parameters and Smart Task functions
Display	LED blue	BluePilot: Display of mode, display of output states Q _{L1} (LED 1-3 permanently on) and Q _{L2} (LED 5-7 permanently on)
	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

¹⁾ 6% ... 90% remission factor.

²⁾ Equivalent to 1 σ.

³⁾ See repeatability characteristic lines.

SAFETY-RELATED PARAMETERS

MTTF _D	642 years
DC _{avg}	0 %
T _M (mission time)	20 years

COMMUNICATION INTERFACE

IO-Link		✓, 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}
		Process data structure: A: Bit 2 ... 15 = Current receiver level (live). Process data structure B: Bit 2 ... 15 = Distance to object. Can be switched between A and B via IO-Link.
	VendorID	26
	DeviceID HEX	0x8002B4
	DeviceID DEC	8389300
	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}

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.

Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 25 mA, without load. At $U_B = 24\text{ V}$
Protection class	III
Digital output	Number Type Signal voltage PNP HIGH/LOW Signal voltage NPN HIGH/LOW Output current $I_{\max}$ Circuit protection outputs Response time Repeatability (response time) Switching frequency
Pin/Wire assignment	Function of pin 4/black (BK) Function of pin 4/black (BK) – detail Function of pin 2/white (WH) Function of pin 2/white (WH) – detail

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
Design detail	Flat
Dimensions (W x H x D)	16 mm x 40.1 mm x 12.1 mm
Connection	Male connector M8, 4-pin
Material	Housing Front screen Male connector
Weight	Approx. 30 g
Maximum tightening torque of the fixing screws	0.4 Nm

AMBIENT DATA

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529)
Ambient operating temperature	–40 °C ... +60 °C
Ambient temperature, storage	–40 °C ... +75 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
Shock resistance	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
Vibration resistance	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 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

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: 450 Hz ¹⁾ IOL: 450 Hz ²⁾
Response time	SIO Logic: 1100 µs ¹⁾ IOL: 1100 µs ²⁾
Repeatability	SIO Logic: 400 µs ¹⁾ IOL: 450 µs ²⁾
Switching signal	Switching signal Q _{L1} Switching output Switching signal Q _{L2} 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.

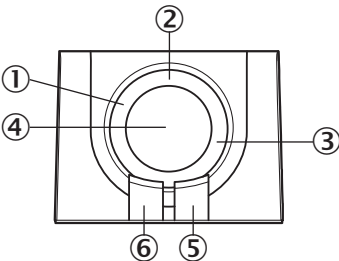
DIAGNOSIS

Device temperature	Measuring range	Very cold, cold, moderate, warm, hot
Device status		Yes
Detailed device status		Yes
Operating hour counter		Yes
Operating hours counter with reset function		Yes
Quality of teach		Yes

CERTIFICATES

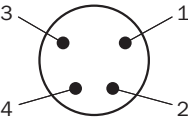
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
ECOLAB certificate	✓
cULus certificate	✓
IO-Link certificate	✓
Photobiological safety (DIN EN 62471) certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DISPLAY AND ADJUSTMENT ELEMENTS

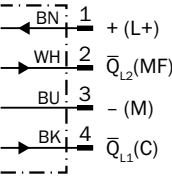


- ① LED blue
- ② indicator switching output mode
- ③ indicator distance mode
- ④ Teach-in button
- ⑤ LED yellow
- ⑥ LED green

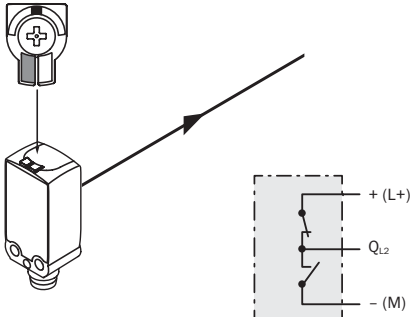
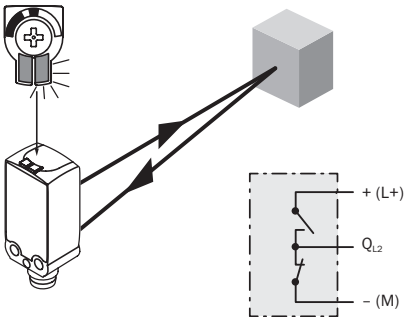
CONNECTION TYPE MALE CONNECTOR M8, 4-PIN



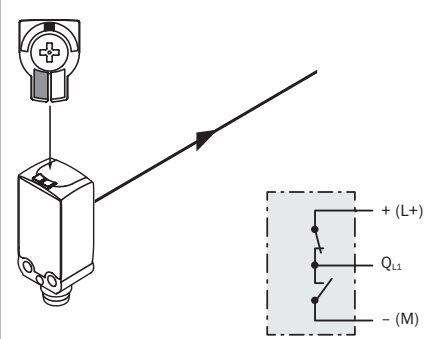
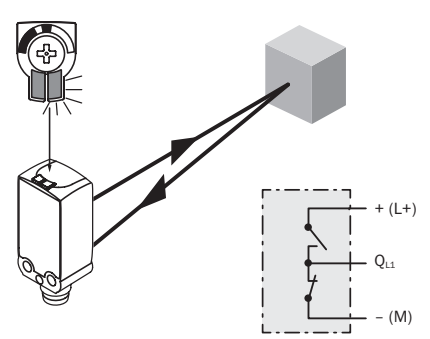
CONNECTION DIAGRAM CD-520



TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING QL2

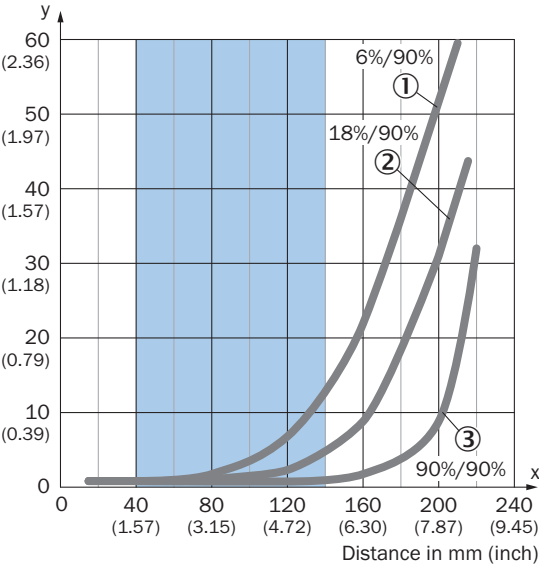
	Dark switching Q _{L2} (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	💡
Load resistance to L+	✗	⚡
Load resistance to M	⚡	✗
		

TRUTH TABLE PUSH-PULL: PNP/NPN – DARK SWITCHING QL1

	Dark switching Q_{L1} (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

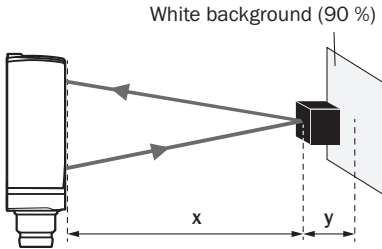
Minimum distance in mm (y) between the set sensing range and white background (90 % remission)



Recommended sensing range for the best performance

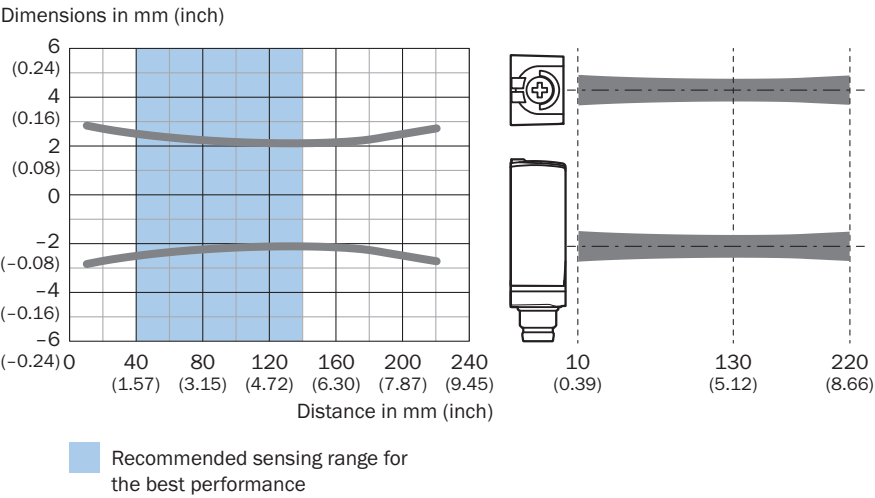
- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor

Example:
Safe suppression of the background

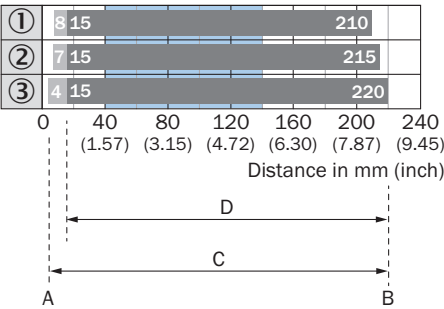


Black object (6 % remission)
Set sensing range $x = 120$ mm
Needed minimum distance to white background $y = 7$ mm

LIGHT SPOT SIZE



SENSING RANGE DIAGRAM



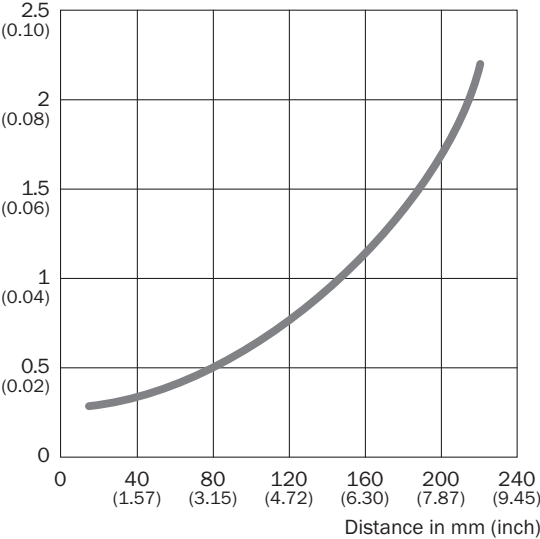
A = Sensing range min. in mm
B = Sensing range max. in mm
C = Viewing range
D = Adjustable switching threshold for background suppression

Recommended sensing range for the best performance

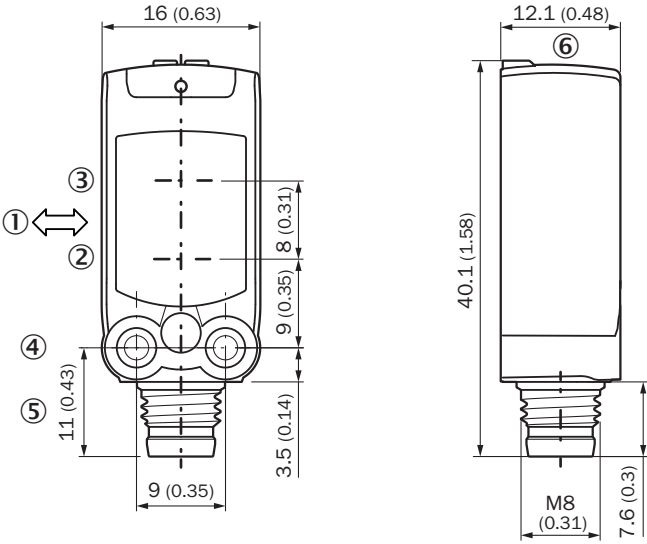
- ① Black object, 6% remission factor
- ② Gray object, 18% remission factor
- ③ White object, 90% remission factor

REPEATABILITY

Repeatability in mm (inch)



DIMENSIONAL DRAWING



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 M3 mounting hole
- ⑤ Connection
- ⑥ display and adjustment elements

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/1119989



SICK AG
WALDKIRCH
GERMANY
SICK.COM

SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

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.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

SICK
Sensor Intelligence