



# WTV4FE-213111A0ZZZ

## W4

MINIATURE PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ



Ordering information

Type	Part no.
WTV4FE-213111A0ZZZ	1120709

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

Detailed technical data

Features

<b>Functional principle</b>	Photoelectric proximity sensor
<b>Functional principle detail</b>	Background suppression, V-optics
<b>Sensing range</b>	
Sensing range min.	2 mm
Sensing range max.	22 mm
Minimum distance between set sensing range and background (black 6% / white 90%)	1 mm, at a distance of 21 mm
<b>Emitted beam</b>	
Light source	PinPoint LED
Type of light	Visible red light
Shape of light spot	Rectangular
Light spot size (distance)	0.5 mm x 1.9 mm (30 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.5° (at T <sub>a</sub> = +23 °C)
<b>Key LED figures</b>	
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 <sub>a</sub> = +25 °C
<b>Adjustment</b>	

	None	-
<b>Indication</b>		
	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
<b>Special applications</b>		Detecting transparent objects

#### Safety-related parameters

<b>MTTF<sub>D</sub></b>	683 years
<b>DC<sub>avg</sub></b>	0 %
<b>T<sub>M</sub> (mission time)</b>	20 years (EN ISO 13849, rate of use: 60 %)

#### Electrical data

<b>Supply voltage U<sub>B</sub></b>		10 V DC ... 30 V DC <sup>1)</sup>
<b>Ripple</b>		≤ 5 V <sub>pp</sub>
<b>Usage category</b>		DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
<b>Current consumption</b>		≤ 25 mA, without load. At U <sub>B</sub> = 24 V
<b>Protection class</b>		III
<b>Digital output</b>		
	Number	1
	Type	Push-pull: PNP/NPN
	Switching mode	Light switching
	Signal voltage PNP HIGH/LOW	Approx. U <sub>B</sub> -2.5 V / 0 V
	Signal voltage NPN HIGH/LOW	Approx. U <sub>B</sub> / < 2.5 V
	Output current I <sub>max.</sub>	≤ 100 mA
	Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
	Response time	≤ 500 μs
	Repeatability (response time)	150 μs <sup>2)</sup>
	Switching frequency	1,000 Hz <sup>3)</sup>
<b>Pin/Wire assignment</b>		
	Function of pin 4/black (BK)	Digital output, light switching, object present → output Q HIGH <sup>4)</sup>

<sup>1)</sup> Limit values.

<sup>2)</sup> Signal transit time with resistive load in switching mode.

<sup>3)</sup> With light/dark ratio 1:1.

<sup>4)</sup> This switching output must not be connected to another output.

#### Mechanical data

<b>Housing</b>	Rectangular
<b>Design detail</b>	Flat
<b>Dimensions (W x H x D)</b>	16 mm x 40.1 mm x 12.1 mm
<b>Connection</b>	Connector M8, 3-pin

<b>Material</b>	Housing	Plastic, VISTAL®
	Front screen	Plastic, PMMA
	Male connector	Plastic, VISTAL®
<b>Weight</b>		Approx. 30 g
<b>Maximum tightening torque of the fixing screws</b>		0.4 Nm

Ambient data

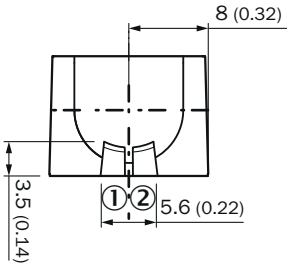
<b>Enclosure rating</b>	IP66 (EN 60529) IP67 (EN 60529)
<b>Ambient operating temperature</b>	-40 °C ... +60 °C
<b>Ambient temperature, storage</b>	-40 °C ... +75 °C
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
<b>Shock resistance</b>	30 g, 11 ms (3 positive and 3 negative shocks along X, Y, Z axes, 18 total shocks (EN60068-2-27))
<b>Vibration resistance</b>	10 Hz ... 1,000 Hz (Amplitude 1 mm, 3 x 30 min (EN60068-2-6))
<b>Air humidity</b>	35 % ... 95 %, relative humidity (no condensation)
<b>Electromagnetic compatibility (EMC)</b>	EN 60947-5-2
<b>Resistance to cleaning agent</b>	ECOLAB
<b>UL File No.</b>	NRKH.E181493 & NRKH7.E181493

Classifications

<b>ECLASS 5.0</b>	27270904
<b>ECLASS 5.1.4</b>	27270904
<b>ECLASS 6.0</b>	27270904
<b>ECLASS 6.2</b>	27270904
<b>ECLASS 7.0</b>	27270904
<b>ECLASS 8.0</b>	27270904
<b>ECLASS 8.1</b>	27270904
<b>ECLASS 9.0</b>	27270904
<b>ECLASS 10.0</b>	27270904
<b>ECLASS 11.0</b>	27270904
<b>ECLASS 12.0</b>	27270903
<b>ETIM 5.0</b>	EC002719
<b>ETIM 6.0</b>	EC002719
<b>ETIM 7.0</b>	EC002719
<b>ETIM 8.0</b>	EC002719
<b>UNSPSC 16.0901</b>	39121528

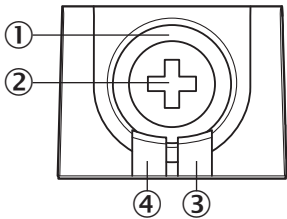
Adjustments

Display and adjustment elements



- ① LED green
- ② LED yellow

Display and adjustment elements

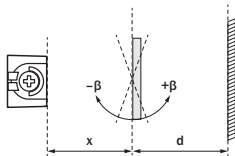
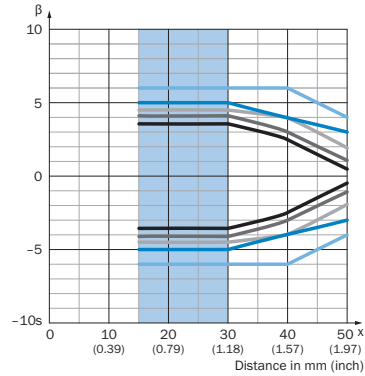


- ① LED blue
- ② Teach-Turn adjustment
- ③ LED yellow
- ④ LED green

Installation note

Angle of acceptance, pane of glass in front of background,  $\beta$

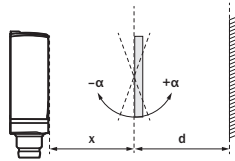
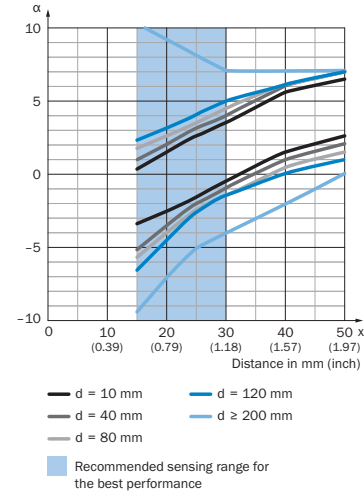
Transparent pane of glass in front of background  
(18 % remission), angle of acceptance



Example:  
Set sensing range  $x = 30$  mm  
Distance object to background  $d \geq 200$  mm  
Angle of acceptance between  $-6^\circ$  and  $+6^\circ$

Angle of acceptance, pane of glass in front of background,  $\alpha$

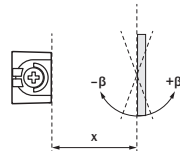
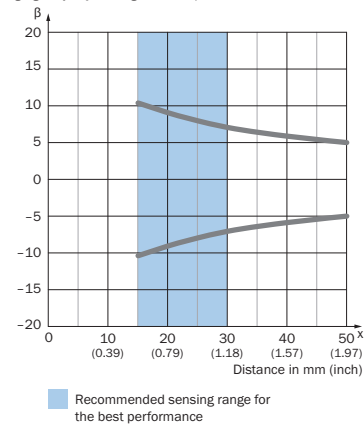
Transparent pane of glass in front of background  
(18 % remission), angle of acceptance



Example:  
Set sensing range  $x = 30$  mm  
Distance object to background  $d \geq 200$  mm  
Angle of acceptance between  $-4^\circ$  and  $+7^\circ$

Angle of acceptance, on high-glossy object,  $\beta$

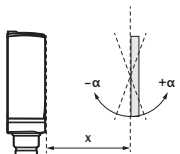
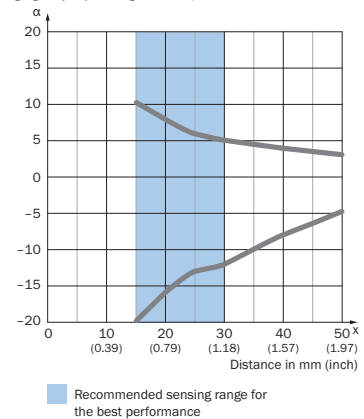
High-glossy object, angle of acceptance



Example:  
Set sensing range  $x = 30$  mm  
Angle of acceptance between  $-7^\circ$  and  $+7^\circ$

Angle of acceptance, on high-glossy object,  $\alpha$

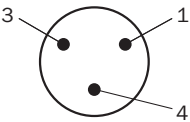
High-glossy object, angle of acceptance



Example:  
Set sensing range  $x = 30$  mm  
Angle of acceptance between  $-12^\circ$  and  $+5^\circ$

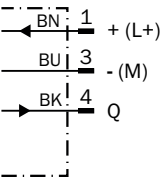
Connection type

Connector M8, 3-pin



Connection diagram

Cd-045



Truth table

Push-pull: PNP/NPN – dark switching  $\bar{Q}$

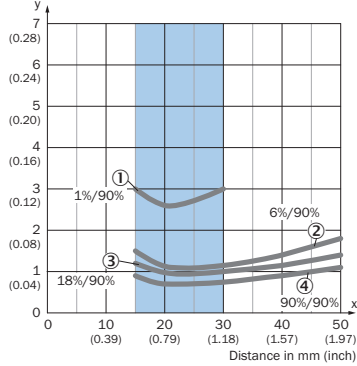
	Dark switching $\bar{Q}$ (normally closed (upper switch), normally open (lower switch))	
	Object not present → Output HIGH	Object present → Output LOW
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	✗	⚠
Load resistance to M	⚠	✗

Push-pull: PNP/NPN - light switching Q

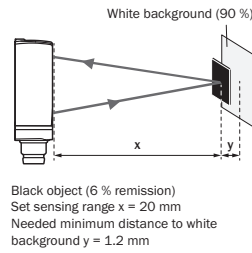
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present → Output LOW	Object present → Output HIGH
Light receive	✗	✓
Light receive indicator	✗	☀
Load resistance to L+	⚠	✗
Load resistance to M	✗	⚠

## Characteristic curve

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



Example:  
Safe suppression of the background



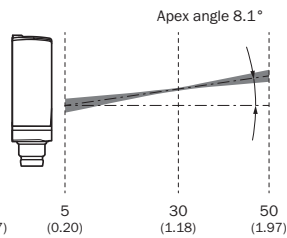
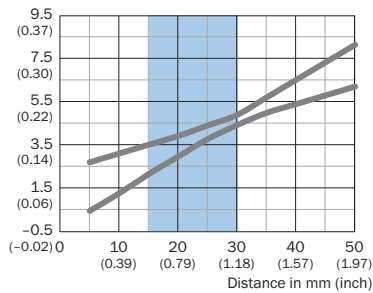
Recommended sensing range for the best performance

- ① Ultra-black object, 1% remission factor
- ② Black object, 6% remission factor
- ③ Gray object, 18% remission factor
- ④ White object, 90% remission factor

## Light spot size

### Vertical

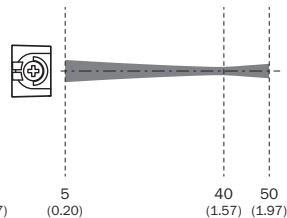
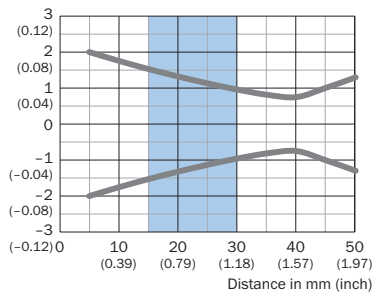
Dimensions in mm (inch)



Recommended sensing range for the best performance

### Horizontal

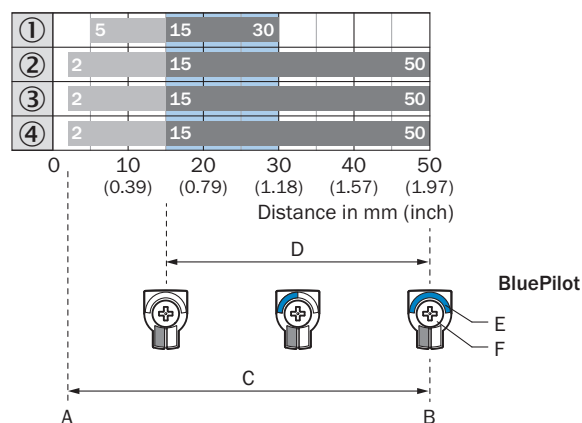
Dimensions in mm (inch)



Recommended sensing range for the best performance



## 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

E = Sensing range indicator

F = Teach-Turn adjustment

Recommended sensing range for the best performance

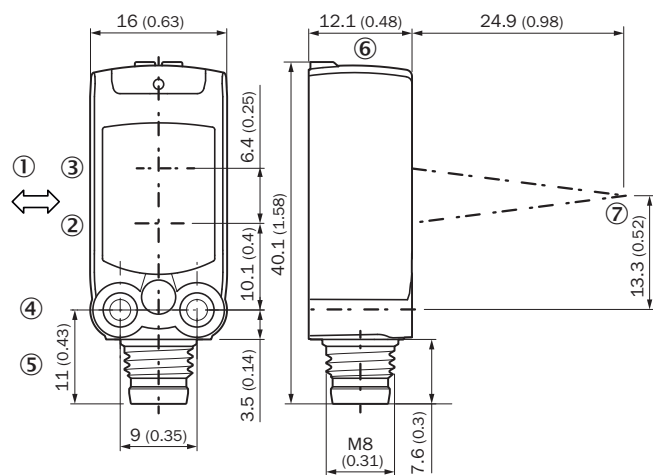
① Ultra-black object, 1% remission factor

② Black object, 6% remission factor

③ Gray object, 18% remission factor

④ White object, 90% remission factor

## 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

⑦ Focus

## Recommended accessories

Other models and accessories → [www.sick.com/W4](http://www.sick.com/W4)

	Brief description	Type	Part no.
Mounting brackets and plates			
	Mounting bracket for wall mounting, Stainless steel 1.4571, mounting hardware included	BEF-W4-A	2051628
Others			
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M8, 3-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> Sensor/actuator cable</li> <li>• <b>Cable:</b> 5 m, 3-wire, PVC</li> <li>• <b>Description:</b> Sensor/actuator cable, unshielded</li> <li>• <b>Application:</b> Zones with chemicals</li> </ul>	YF8U13-050VA1XLEAX	2095884
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Male connector, M8, 3-pin, straight, A-coded</li> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection systems:</b> Screw-type terminals</li> <li>• <b>Permitted cross-section:</b> 0.14 mm² ... 0.5 mm²</li> </ul>	STE-0803-G	6037322

## 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](http://www.sick.com)