



# WLA16P-39421100ZZZ

## W16

PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.

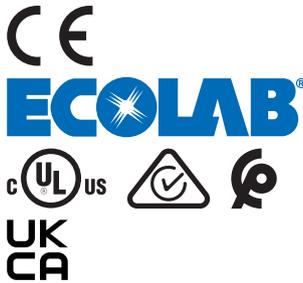


Illustration may differ

### Ordering information

| Type               | part no. |
|--------------------|----------|
| WLA16P-39421100ZZZ | 1222700  |

Other models and accessories → [www.sick.com/W16](http://www.sick.com/W16)



### Detailed technical data

#### Features

|   |   |
|---|---|
| <b>Functional principle</b>   | Photoelectric retro-reflective sensor                               |
| <b>Functional principle detail</b>  | Without reflector minimum distance (autocollimation/coaxial optics) |
| <b>Sensing range</b>  |   |
| Sensing range min.  | 0 m   |
| Sensing range max.  | 10 m  |
| Maximum distance range from reflector to sensor (operating reserve 1)                           | 0 m ... 10 m  |
| Recommended distance range from reflector to sensor (operating reserve 3,75)                    | 0 m ... 7 m   |
| Reference reflector   | Reflector PL80A   |
| Recommended sensing range for the best performance  | 0 m ... 7 m   |
| <b>Polarisation filter</b>  | Yes   |
| <b>Emitted beam</b>   |   |
| Light source  | PinPoint LED  |
| Type of light   | Visible red light   |
| Shape of light spot   | Point-shaped  |
| Light spot size (distance)  | Ø 80 mm (5 m)   |
| Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle) | < +/- 1.0° (at T <sub>U</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 $T_a = +25\text{ °C}$   |
| <b>Adjustment</b>           |  |
| Wire/pin                    | For activating the test input  |
| <b>Display</b>              |  |
| LED blue                    | BluePilot: Alignment aid   |
| LED green                   | Operating indicator<br>Static on: power on   |
| LED yellow                  | Status of received light beam<br>Static on: object not present<br>Static off: object present<br>Flashing: Below the 1.5 function reserve |
| <b>Special applications</b> | Detecting objects wrapped in film  |

## Safety-related parameters

|                                     |           |
|-------------------------------------|-----------|
| <b>MTTF<sub>D</sub></b>             | 690 years |
| <b>DC<sub>avg</sub></b>             | 0 %       |
| <b>T<sub>M</sub> (mission time)</b> | 20 years  |

## Electronics

|                                     |   |
|-------------------------------------|---|
| <b>Supply voltage U<sub>B</sub></b> | 10 V DC ... 30 V DC <sup>1)</sup>   |
| <b>Ripple</b>                       | $\leq 5\text{ V}_{pp}$  |
| <b>Usage category</b>               | DC-12 (According to EN 60947-5-2)<br>DC-13 (According to EN 60947-5-2)      |
| <b>Current consumption</b>          | $\leq 30\text{ mA}$ , without load. At $U_B = 24\text{ V}$<br><sup>2)</sup> |
| <b>Protection class</b>             | III   |
| <b>Digital output</b>               |   |
| Number                              | 2 (Complementary)   |
| Type                                | Push-pull: PNP/NPN  |
| Switching mode                      | Light/dark switching  |
| Signal voltage PNP HIGH/LOW         | Approx. $U_B - 2.5\text{ V} / 0\text{ V}$                                   |
| Signal voltage NPN HIGH/LOW         | Approx. $U_B / < 2.5\text{ V}$  |
| Output current I <sub>max.</sub>    | $\leq 100\text{ mA}$  |
| Circuit protection outputs          | Reverse polarity protected<br>Overcurrent and short-circuit protected       |
| Response time                       | $\leq 500\text{ }\mu\text{s}$ <sup>3)</sup>                                 |
| Repeatability (response time)       | 150 $\mu\text{s}$   |
| Switching frequency                 | 1,000 Hz <sup>4)</sup>  |
| <b>Pin/Wire assignment</b>          |   |

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

<sup>2)</sup> 10 V DC ... 16 V DC, without load.

<sup>3)</sup> Signal transit time with resistive load in switching mode.

<sup>4)</sup> With light/dark ratio 1:1.

<sup>5)</sup> This switching output must not be connected to another output.

|                              |  |
|------------------------------|--|
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output $\bar{Q}$ HIGH <sup>5)</sup> |
| Pin 5 function/white (WH)    | Digital output, light switching, object present → output Q LOW                       |
| Pin 6 function/gray (GY)     | Test after L+  |

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

<sup>2)</sup> 10 V DC ... 16 V DC, without load.

<sup>3)</sup> Signal transit time with resistive load in switching mode.

<sup>4)</sup> With light/dark ratio 1:1.

<sup>5)</sup> This switching output must not be connected to another output.

## Mechanics

|   |   |
|---|---|
| <b>Housing</b>  | Rectangular   |
| <b>Dimensions (W x H x D)</b>                         | 20 mm x 55.7 mm x 42 mm                               |
| <b>Connection</b>                                     | Cable with Q6 male connector, 6-pin, DC-coded, 298 mm |
| <b>Connection detail</b>                              |   |
| Deep-freeze property                                  | Do not bend below 0 °C                                |
| Conductor size  | 0.14 mm <sup>2</sup>                                  |
| Cable diameter  | Ø 4.8 mm  |
| Length of cable (L)                                   | 270 mm  |
| Bending radius  | For flexible use > 12 x cable diameter                |
| Bending cycles  | 1,000,000   |
| <b>Material</b>                                       |   |
| Housing   | Plastic, VISTAL®                                      |
| Front screen  | Plastic, PMMA   |
| Cable   | Plastic, PVC  |
| Male connector  | Plastic, VISTAL®                                      |
| <b>Weight</b>   | Approx. 70 g  |
| <b>Maximum tightening torque of the fixing screws</b> | 1.3 Nm  |

## Ambient data

|  |  |
|--|--|
| <b>Enclosure rating</b>                    | IP65 (EN 60529)  |
| <b>Ambient operating temperature</b>       | -40 °C ... +60 °C  |
| <b>Ambient temperature, storage</b>        | -40 °C ... +75 °C  |
| <b>Shock resistance</b>                    | 50 g, 11 ms (25 positive and 25 negative shocks per axis, for X, Y, Z axes, 150 shocks in total (EN60068-2-27))<br>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)) |
| <b>Vibration resistance</b>                | 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))  |
| <b>Air humidity</b>                        | 35 % ... 95 %, relative humidity (no condensation)   |
| <b>Electromagnetic compatibility (EMC)</b> | EN 60947-5-2   |
| <b>UL File No.</b>                         | NRKH.E181493 & NRKH7.E181493   |

## Certificates

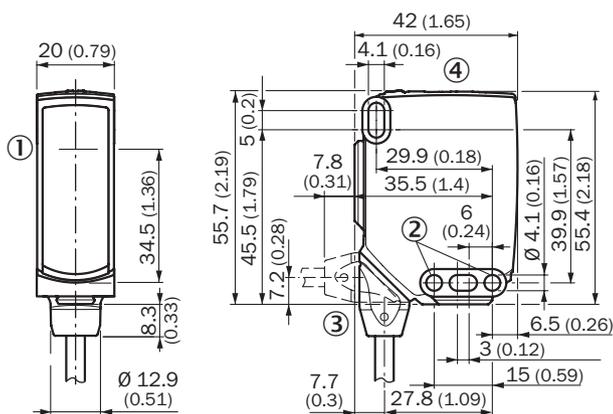
|                                       |   |
|---------------------------------------|---|
| <b>EU declaration of conformity</b>   | ✓ |
| <b>UK declaration of conformity</b>   | ✓ |
| <b>ACMA declaration of conformity</b> | ✓ |

|   |   |
|---|---|
| Moroccan declaration of conformity                | ✓ |
| China RoHS  | ✓ |
| ECOLAB certificate                                | ✓ |
| cULus certificate                                 | ✓ |
| Photobiological safety (DIN EN 62471) certificate | ✓ |

Classifications

|                |          |
|----------------|----------|
| ECLASS 5.0     | 27270902 |
| ECLASS 5.1.4   | 27270902 |
| ECLASS 6.0     | 27270902 |
| ECLASS 6.2     | 27270902 |
| ECLASS 7.0     | 27270902 |
| ECLASS 8.0     | 27270902 |
| ECLASS 8.1     | 27270902 |
| ECLASS 9.0     | 27270902 |
| ECLASS 10.0    | 27270902 |
| ECLASS 11.0    | 27270902 |
| ECLASS 12.0    | 27270902 |
| ETIM 5.0       | EC002717 |
| ETIM 6.0       | EC002717 |
| ETIM 7.0       | EC002717 |
| ETIM 8.0       | EC002717 |
| UNSPSC 16.0901 | 39121528 |

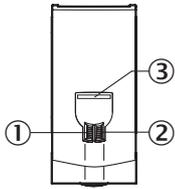
Dimensional drawing, sensor



Dimensions in mm (inch)

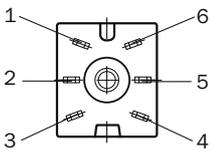
- ① Center of optical axis
- ② Mounting hole, Ø 4.1 mm
- ③ Connection
- ④ display and adjustment elements

### display and adjustment elements

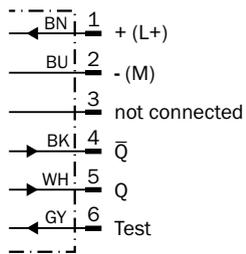


- ① LED indicator green
- ② LED indicator yellow
- ③ LED blue

### Connection type Cubic connector, 6-pin



### Connection diagram Cd-427



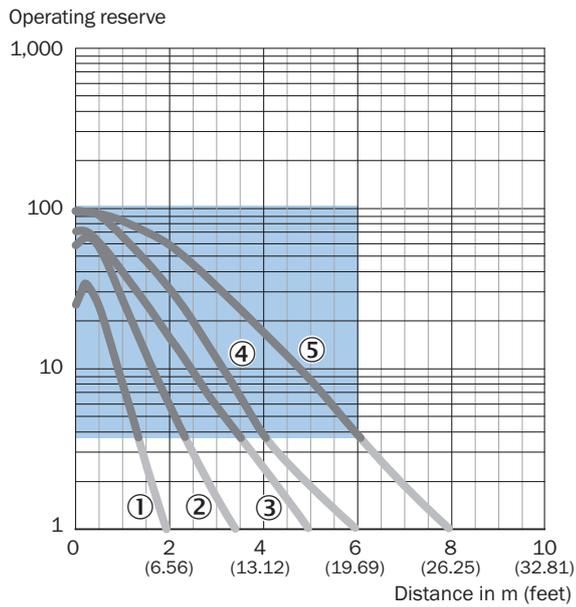
Truth table Push-pull: PNP/NPN – dark switching  $\bar{Q}$

|                         | Dark switching $\bar{Q}$ (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 - light switching Q

|                         | Light switching 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    | ⚡  | ✗                           |
|                         |  |                             |

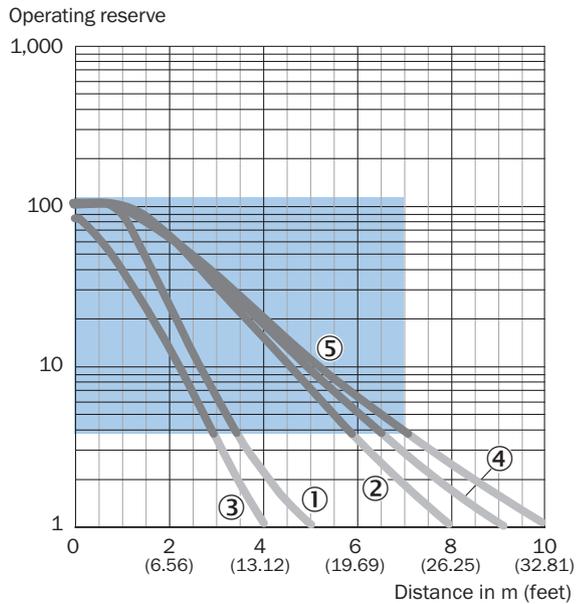
**Characteristic curve Chemical-resistant reflectors**



Recommended sensing range for the best performance

- ① PL10F CHEM reflector
- ② Reflector PL20 CHEM
- ③ Reflector P250 CHEM
- ④ Reflector P250H
- ⑤ Reflector PL40A Antifog

**Characteristic curve Standard reflectors**

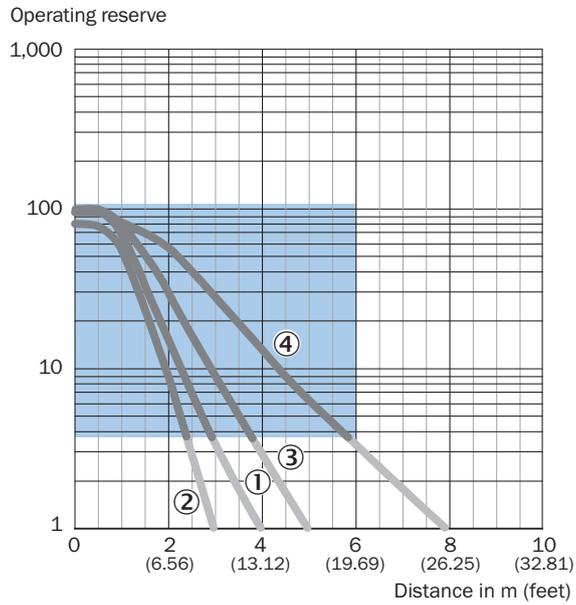


Recommended sensing range for the best performance

- ① Reflector PL22
- ② Reflector P250, PL30A
- ③ Reflector PL20A

- ④ Reflector PL40A
- ⑤ Reflector PL80A, C110A

Characteristic curve Fine triple reflectors

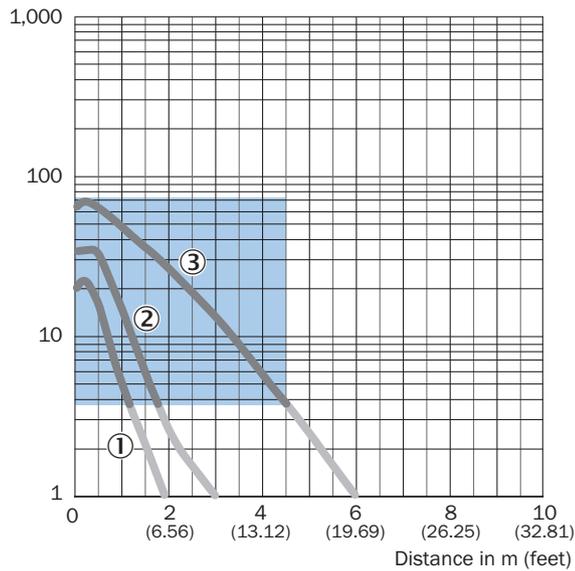


Recommended sensing range for the best performance

- ① PL10FH-1 reflector
- ② PL10F reflector
- ③ Reflector PL20F
- ④ Reflector P250F

### Characteristic curve Reflective tape

Operating reserve

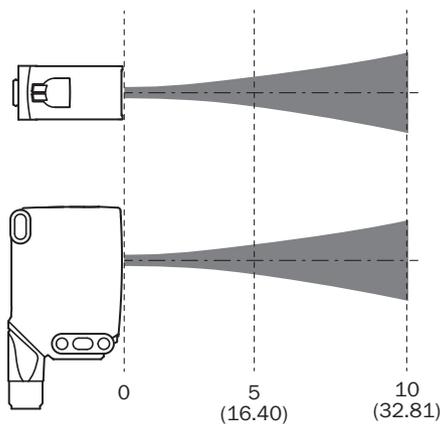
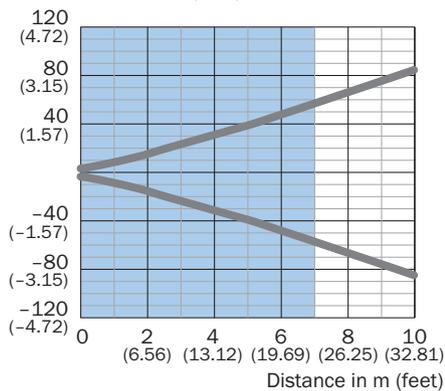


Recommended sensing range for the best performance

- ① Reflective tape REF-DG (50 x 50 mm)
- ② Reflective tape REF-IRF-56 (50 x 50 mm)
- ③ Reflective tape REF-AC1000 (50 x 50 mm)

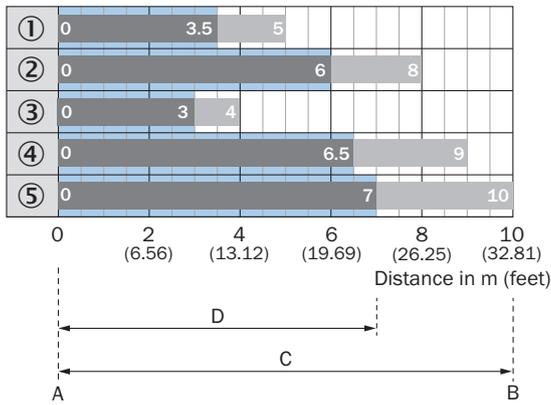
### Light spot size WLA16P-xxxx1xx

Dimensions in mm (inch)



Recommended sensing range for the best performance

Sensing range diagram Standard reflectors

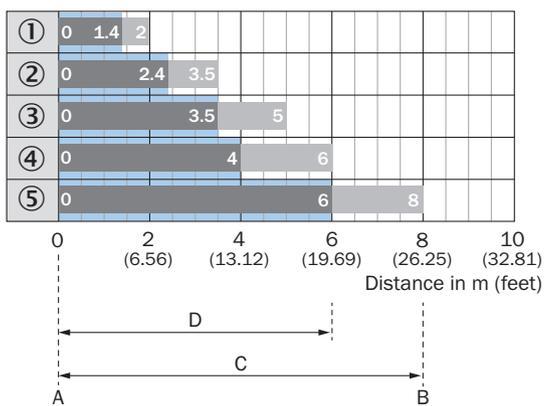


Recommended sensing range for the best performance

WLA16P-xxxx1xx

|   |  |
|---|--|
| 1 | Reflector PL22   |
| 2 | Reflector P250, PL30A  |
| 3 | Reflector PL20A  |
| 4 | Reflector PL40A  |
| 5 | Reflector PL80A, C110A   |
| A | Sensing range min. in m  |
| B | Sensing range max. in m  |
| C | Maximum distance range from reflector to sensor (operating reserve 1)        |
| D | Recommended distance range from reflector to sensor (operating reserve 3,75) |

Sensing range diagram Chemical-resistant reflectors



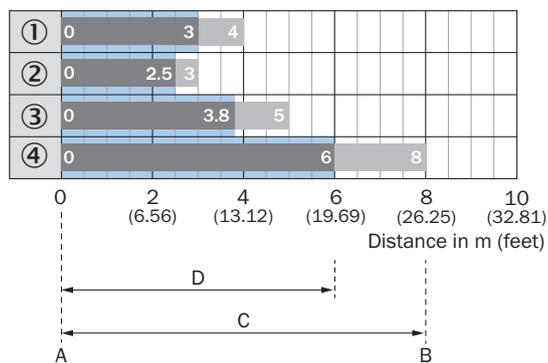
Recommended sensing range for the best performance

WLA16P-xxxx1xx

|   |                      |
|---|----------------------|
| 1 | PL10F CHEM reflector |
| 2 | Reflector PL20 CHEM  |

|   |  |
|---|--|
| 3 | Reflector P250 CHEM  |
| 4 | Reflector P250H  |
| 5 | Reflector PL40A Antifog  |
| A | Sensing range min. in m  |
| B | Sensing range max. in m  |
| C | Maximum distance range from reflector to sensor (operating reserve 1)        |
| D | Recommended distance range from reflector to sensor (operating reserve 3,75) |

### Sensing range diagram Fine triple reflectors

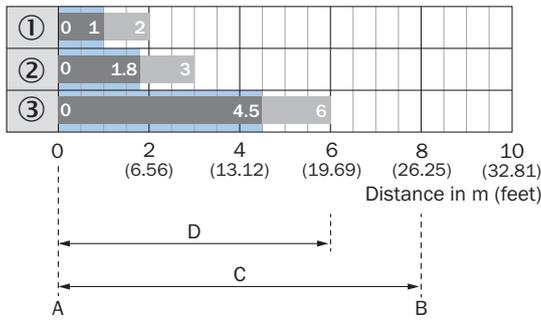


Recommended sensing range for the best performance

WLA16P-xxxx1xx

|   |  |
|---|--|
| 1 | PL10FH-1 reflector   |
| 2 | PL10F reflector  |
| 3 | Reflector PL20F  |
| 4 | Reflector P250F  |
| A | Sensing range min. in m  |
| B | Sensing range max. in m  |
| C | Maximum distance range from reflector to sensor (operating reserve 1)        |
| D | Recommended distance range from reflector to sensor (operating reserve 3,75) |

Sensing range diagram Reflective tape

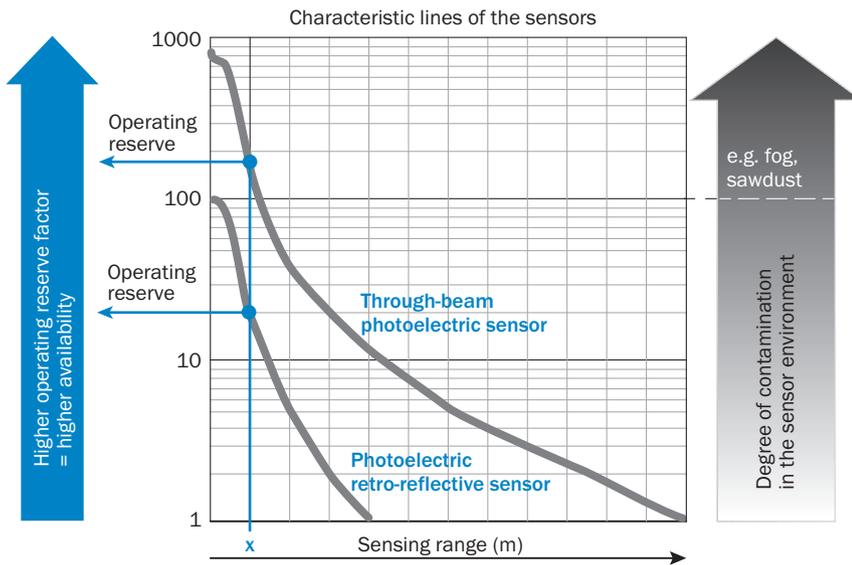


Recommended sensing range for the best performance

WLA16P-xxxx1xx

|   |  |
|---|--|
| 1 | Reflective tape REF-DG (50 x 50 mm)  |
| 2 | Reflective tape REF-IRF-56 (50 x 50 mm)                                      |
| 3 | Reflective tape REF-AC1000 (50 x 50 mm)                                      |
| A | Sensing range min. in m  |
| B | Sensing range max. in m  |
| C | Maximum distance range from reflector to sensor (operating reserve 1)        |
| D | Recommended distance range from reflector to sensor (operating reserve 3,75) |

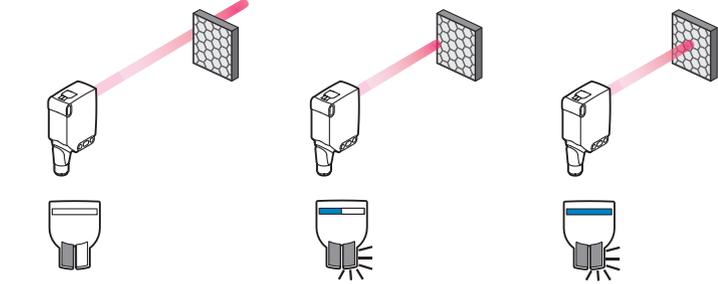
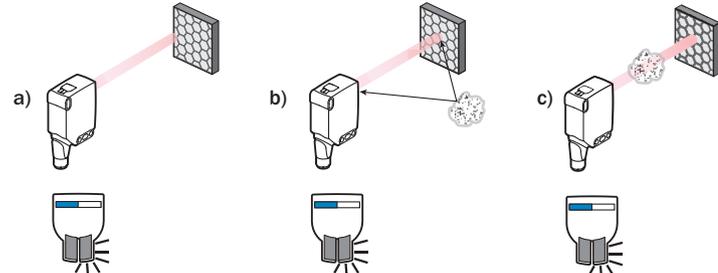
Functions Operation note



At a sensing range of „x“ the photoelectric retro-reflective and through-beam photoelectric sensors have different operating reserves (see blue arrow). The higher the operating reserve factor, the better the sensor can compensate the contamination in the air or in the light beam and on the optical surfaces (front screen, reflector), i.e. the sensor has the maximum availability, otherwise the sensor switches due to pollution although there is no object in the path of the light beam.

### Functions Operation note

#### BluePilot: Blue indicator LEDs with double benefits

|  |  |
|--|--|
| <p>Easy and quick sensor alignment with the help of the LED indicator</p> <p>All blue LEDs illuminate</p> <ul style="list-style-type: none"> <li>- optimum alignment</li> <li>- highest possible operating reserve</li> </ul>  | <p><b>WLA photoelectric retro-reflection sensor alignment</b></p>  |
| <p><b>Service note</b></p> <p>A reduction in sensor availability is displayed by a decrease of the blue LEDs.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> <li>insufficient alignment</li> <li>contamination of the optical surfaces</li> <li>particles in the light beam</li> </ol> |    |

### Recommended accessories

Other models and accessories → [www.sick.com/W16](http://www.sick.com/W16)

|   | Brief description   | Type          | part no. |
|---|---|---------------|----------|
| connectors and cables   |   |               |          |
|  | <ul style="list-style-type: none"> <li>• <b>Description:</b> Sensor/actuator cable, unshielded</li> <li>• <b>Connection type head A:</b> Female connector, 6-pin, angled, DC-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> 2 m, PVC</li> </ul> | DOL-1306-W02M | 6030217  |

|   | Brief description  | Type          | part no. |
|---|--|---------------|----------|
| Mounting systems  |  |               |          |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Mounting bracket with articulated arm</li> <li><b>Material:</b> Steel</li> <li><b>Details:</b> Steel, zinc coated</li> <li><b>Items supplied:</b> Mounting hardware included</li> <li><b>Suitable for:</b> W16, W26, W11, W12, W23, W27, Dx50, W280, G10</li> </ul>   | BEF-WN-MULTI2 | 2093945  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Plate N02 for universal clamp bracket</li> <li><b>Material:</b> Steel, zinc diecast</li> <li><b>Details:</b> Zinc plated steel (sheet), Zinc die cast (clamping bracket)</li> <li><b>Items supplied:</b> Universal clamp (5322626), mounting hardware</li> <li><b>Usable for:</b> 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</li> </ul> | BEF-KHS-N02   | 2051608  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Mounting bracket, large</li> <li><b>Material:</b> Stainless steel</li> <li><b>Details:</b> Stainless steel</li> <li><b>Items supplied:</b> Mounting hardware included</li> <li><b>Suitable for:</b> W11-2, W12-3, W16</li> </ul>  | BEF-WG-W12    | 2013942  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Adapter for mounting W16 sensors in existing W14-2/W18-3 installations or L25 sensors in existing L28 installations</li> <li><b>Material:</b> Plastic</li> <li><b>Details:</b> Plastic</li> <li><b>Items supplied:</b> Fastening screws included</li> </ul>   | BEF-AP-W16    | 2095677  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Universal mounting bracket for reflectors</li> <li><b>Dimensions (W x H x L):</b> 85 mm x 90 mm x 35 mm</li> <li><b>Material:</b> Steel</li> <li><b>Details:</b> Steel, zinc coated</li> <li><b>Suitable for:</b> C110A, P250, PL20, PL30A, PL40A, PL80A</li> </ul>   | BEF-WN-REFX   | 2064574  |
| reflectors and optics   |  |               |          |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Rectangular, screw connection</li> <li><b>Dimensions:</b> 84 mm 84 mm</li> <li><b>Ambient operating temperature:</b> -30 °C ... +65 °C</li> </ul>   | PL80A         | 1003865  |

## 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)