



# WLA4SP-22161130A00

W4

MINIATURE PHOTOELECTRIC SENSORS

**SICK**  
Sensor Intelligence.



Illustration may differ

### Ordering information

| Type               | Part no. |
|--------------------|----------|
| WLA4SP-22161130A00 | 1139755  |

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



### 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.   | 7.1 m   |
| Maximum distance range from reflector to sensor (operating reserve 1)        | 0 m ... 7.1 m   |
| Recommended distance range from reflector to sensor (operating reserve 3,75) | 0 m ... 5 m   |
| Reference reflector  | Reflector PL80  |
| Recommended sensing range for the best performance                           | 0 m ... 5 m   |
| <b>Polarisation filters</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)   | 150 mm (5 m)  |

|   |  |
|---|--|
| 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>   |  |
| Teach-in button   | BluePilot: for sensitivity adjustment  |
| IO-Link   | For configuring the sensor parameters and Smart Task functions   |
| <b>Indication</b>   |  |
| LED blue  | BluePilot: Alignment aid   |
| LED green   | Operating indicator<br>Static on: power on<br>Flashing: IO-Link mode   |
| 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> | 1,601 years |
| <b>DC<sub>avg</sub></b> | 0%          |

#### Communication interface

|                             |  |
|-----------------------------|--|
| <b>IO-Link</b>              | ✓, 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 <sub>L1</sub><br>Bit 1 = switching signal Q <sub>L2</sub><br>Bit 2 ... 15 = Current receiver level (live) |
| VendorID                    | 26   |
| Compatible master port type | A  |
| SIO mode support            | Yes  |

#### 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)<br>DC-13 (According to EN 60947-5-2) |
| <b>Current consumption</b>          | ≤ 20 mA, without load. At U <sub>B</sub> = 24 V                        |
| <b>Protection class</b>             | III  |
| <b>Digital output</b>               |  |

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

<sup>2)</sup> This switching output must not be connected to another output.

|                                       |  |
|---------------------------------------|--|
| Number                                | 2  |
| 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 $I_{\max.}$            | $\leq 100 \text{ mA}$  |
| Circuit protection outputs            | Reverse polarity protected<br>Overcurrent protected<br>Short-circuit protected                                     |
| Response time                         | $\leq 500 \mu\text{s}$   |
| Repeatability (response time)         | 150 $\mu\text{s}$  |
| Switching frequency                   | 1,000 Hz   |
| <b>Pin/Wire assignment</b>            |  |
| Function of pin 4/black (BK)          | Digital output, dark switching, object present → output $\bar{Q}_{L1}$ HIGH, IO-Link communication C <sup>2)</sup> |
| 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, light switching, object present → output $Q_{L1}$ LOW <sup>2)</sup>                                |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be configured, Additional possible settings via IO-Link                       |

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

<sup>2)</sup> This switching output must not be connected to another output.

### Mechanical data

|   |                             |
|---|-----------------------------|
| <b>Housing</b>  | Rectangular                 |
| <b>Design detail</b>                                  | Slim                        |
| <b>Dimensions (W x H x D)</b>                         | 12.1 mm x 41.9 mm x 18.6 mm |
| <b>Connection</b>                                     | Male connector M8, 4-pin    |
| <b>Material</b>                                       |                             |
| Housing   | Plastic, VISTAL®            |
| Front screen  | Plastic, PMMA               |
| Male connector  | Plastic, VISTAL®            |
| <b>Maximum tightening torque of the fixing screws</b> | 0.4 Nm                      |

### Ambient data

|  |   |
|--|---|
| <b>Enclosure rating</b>                    | IP66 (EN 60529)<br>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: $\leq 50,000 \text{ lx}$<br>Sunlight: $\leq 50,000 \text{ lx}$                  |
| <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  |

## Smart Task

|                                 |   |
|---------------------------------|---|
| <b>Smart Task name</b>          | Base logics   |
| <b>Logic function</b>           | Direct<br>AND<br>OR   |
| <b>Timer function</b>           | Deactivated<br>Switch-on delay<br>Off delay<br>ON and OFF delay<br>Impulse (one shot) |
| <b>Inverter</b>                 | Yes   |
| <b>Switching frequency</b>      | SIO Logic: 800 Hz <sup>1)</sup>   |
| <b>Response time</b>            | SIO Logic: 600 μs <sup>1)</sup>   |
| <b>Repeatability</b>            | SIO Logic: 200 μs <sup>1)</sup>   |
| <b>Switching signal</b>         |   |
| Switching signal $Q_{L1}$       | Switching output  |
| Switching signal $\bar{Q}_{L1}$ | Switching output  |

<sup>1)</sup> Use of Smart Task functions without IO-Link communication (SIO mode).

## Diagnosis

|  |                                      |
|--|--------------------------------------|
| <b>Device temperature</b>                          |                                      |
| Measuring range                                    | Very cold, cold, moderate, warm, hot |
| <b>Device status</b>                               | Yes                                  |
| <b>Detailed device status</b>                      | Yes                                  |
| <b>Operating hour counter</b>                      | Yes                                  |
| <b>Operating hours counter with reset function</b> | Yes                                  |
| <b>Quality of teach</b>                            | Yes                                  |
| <b>Quality of run</b>                              | Yes, Contamination display           |

## Classifications

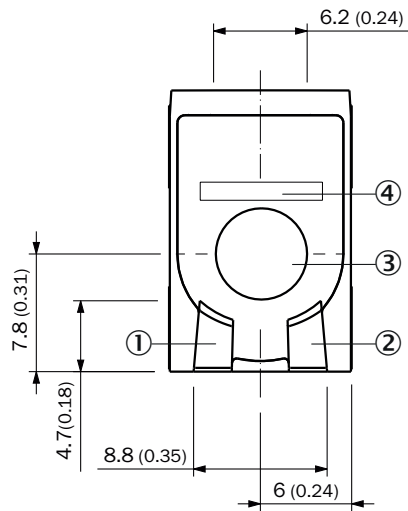
|                     |          |
|---------------------|----------|
| <b>ECLASS 5.0</b>   | 27270902 |
| <b>ECLASS 5.1.4</b> | 27270902 |
| <b>ECLASS 6.0</b>   | 27270902 |
| <b>ECLASS 6.2</b>   | 27270902 |
| <b>ECLASS 7.0</b>   | 27270902 |
| <b>ECLASS 8.0</b>   | 27270902 |
| <b>ECLASS 8.1</b>   | 27270902 |
| <b>ECLASS 9.0</b>   | 27270902 |
| <b>ECLASS 10.0</b>  | 27270902 |
| <b>ECLASS 11.0</b>  | 27270902 |
| <b>ECLASS 12.0</b>  | 27270902 |
| <b>ETIM 5.0</b>     | EC002717 |
| <b>ETIM 6.0</b>     | EC002717 |
| <b>ETIM 7.0</b>     | EC002717 |
| <b>ETIM 8.0</b>     | EC002717 |

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### Adjustments

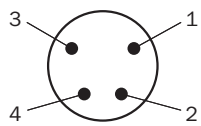
Display and adjustment elements



- ① LED green
- ② LED yellow
- ③ Teach-in button
- ④ LED blue

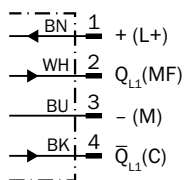
### Connection type

Male connector M8, 4-pin



### Connection diagram

Cd-503



## 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    | ✗   | ⚠                            |
|                         |   |                              |

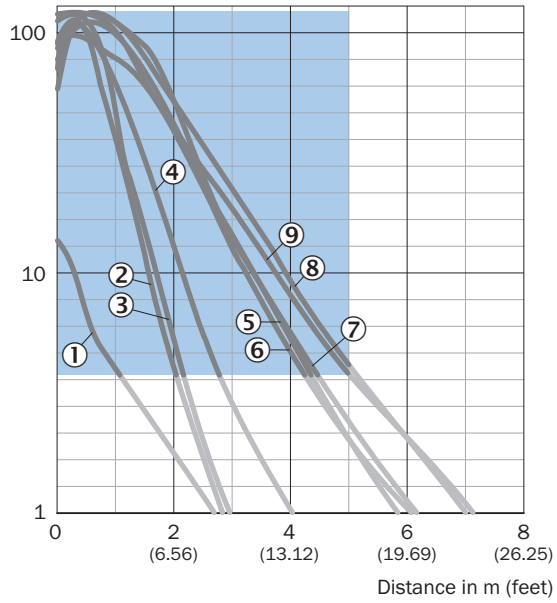
Push-pull: PNP/NPN - light switching Q

|                         | 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

Standard reflectors

Operating reserve



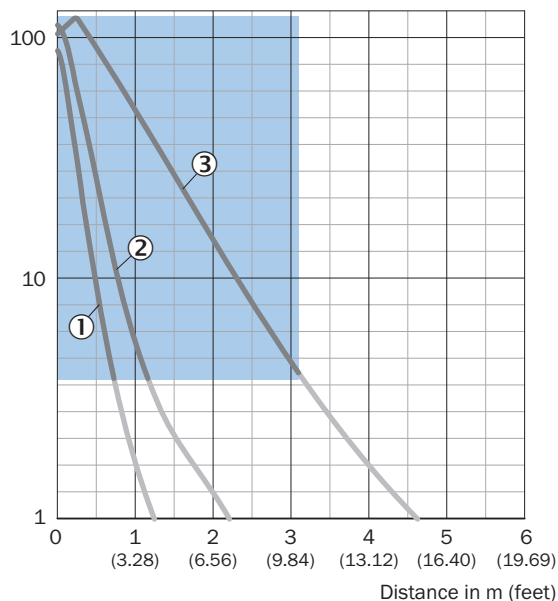
Recommended sensing range for the best performance

- ① Reflector PL40A Antifog
- ② Reflector PL20A
- ③ Reflector PL22-2
- ④ Reflector P250H
- ⑤ Reflector P250
- ⑥ Reflector PL30A
- ⑦ Reflector PL40A
- ⑧ Reflector C110A
- ⑨ Reflector PL80A



Reflective tape

Operating reserve

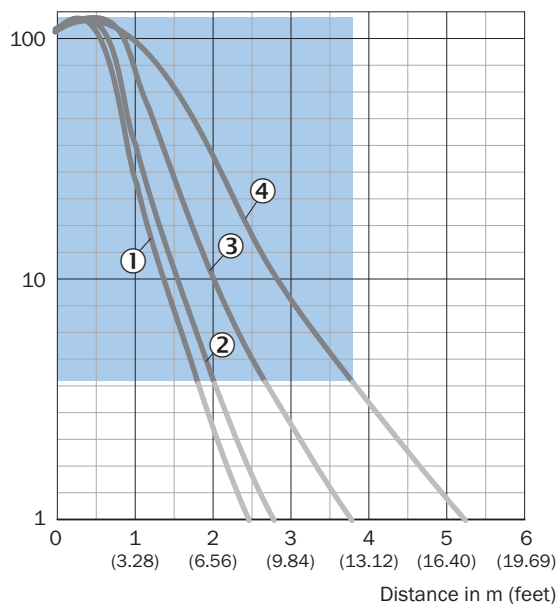


Recommended sensing range for the best performance

- ① Reflective tape REF-DG
- ② Reflective tape REF-IRF-56
- ③ Reflective tape REF-AC1000

Fine triple reflectors

Operating reserve

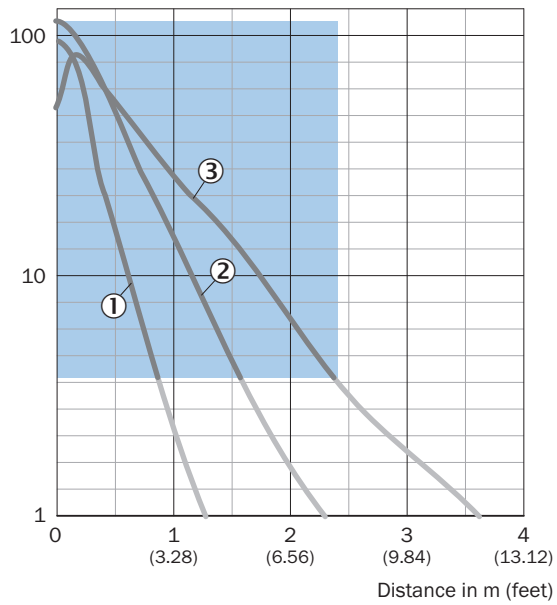


Recommended sensing range for the best performance

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

Chemical-resistant reflectors

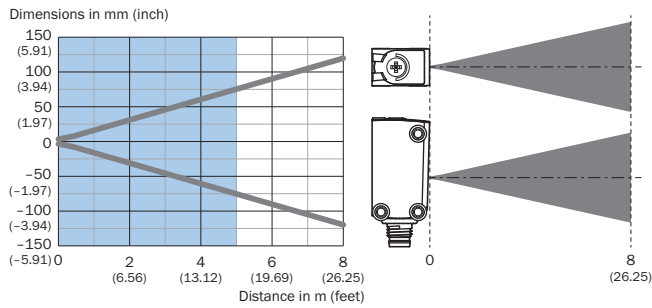
Operating reserve



Recommended sensing range for the best performance

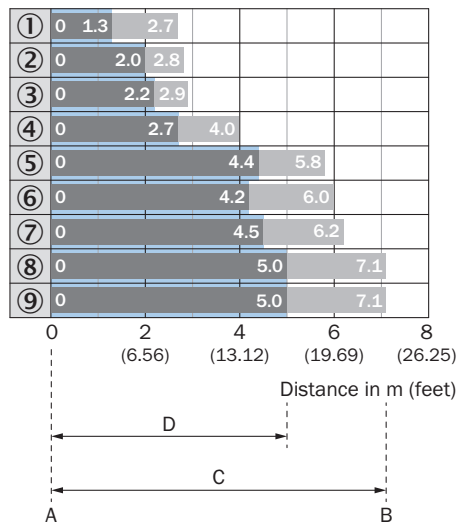
- ① PL10F CHEM reflector
- ② Reflector PL20 CHEM
- ③ Reflector P250 CHEM

Light spot size



## Sensing range diagram

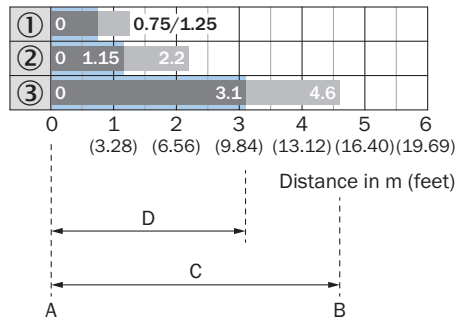
Standard reflectors



Recommended sensing range for the best performance

|   |  |
|---|--|
| 1 | Reflector PL40A Antifog  |
| 2 | Reflector PL20A  |
| 3 | Reflector PL22-2   |
| 4 | Reflector P250H  |
| 5 | Reflector P250   |
| 6 | Reflector PL30A  |
| 7 | Reflector PL40A  |
| 8 | Reflector C110A  |
| 9 | Reflector PL80A  |
| 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) |

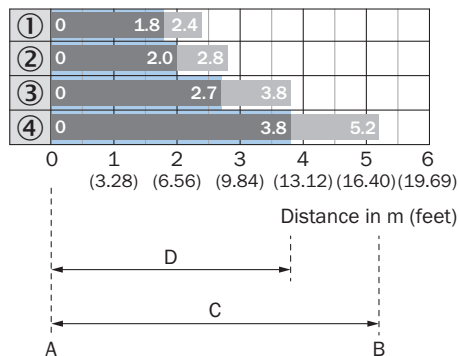
Reflective tape



Recommended sensing range for the best performance

|   |  |
|---|--|
| 1 | Reflective tape REF-DG   |
| 2 | Reflective tape REF-IRF-56   |
| 3 | Reflective tape REF-AC1000   |
| 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) |

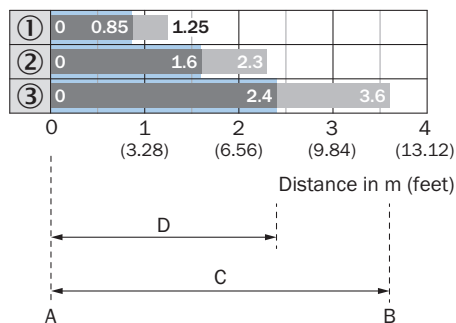
Fine triple reflectors



Recommended sensing range for the best performance

|   |  |
|---|--|
| 1 | PL10F reflector  |
| 2 | PL10FH-1 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) |

Chemical-resistant reflectors



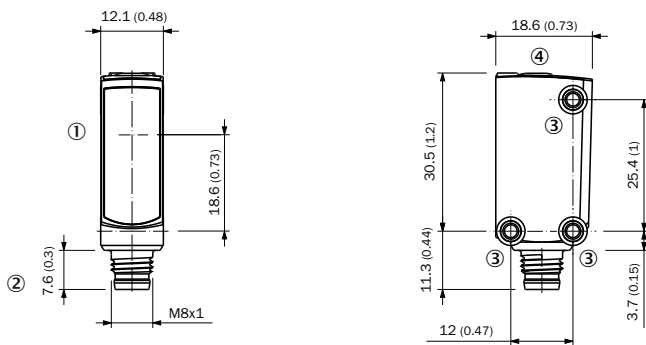
Recommended sensing range for the best performance

|   |                      |
|---|----------------------|
| 1 | PL10F CHEM reflector |
|---|----------------------|

|   |  |
|---|--|
| 2 | Reflector PL20 CHEM  |
| 3 | Reflector P250 CHEM  |
| 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) |

**Dimensional drawing** (Dimensions in mm (inch))




Dimensional drawing, sensor



- ① Center of optical axis
- ② Connection
- ③ M3 mounting hole
- ④ Display and adjustment elements

**Recommended accessories**

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

|   | Brief description  | Type               | Part no. |
|---|--|--------------------|----------|
| <b>Reflectors</b>   |  |                    |          |
|  | Rectangular, screw connection, 84 mm x 84 mm, PMMA/ABS, Screw-on, 2 hole mounting  | PL80A              | 1003865  |
| <b>Others</b>   |  |                    |          |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Male connector, M8, 4-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 mm<sup>2</sup> ... 0.5 mm<sup>2</sup></li> </ul>   | STE-0804-G         | 6037323  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M8, 4-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, 4-wire, PVC</li> <li>• <b>Description:</b> Sensor/actuator cable, unshielded</li> <li>• <b>Application:</b> Zones with chemicals</li> </ul> | YF8U14-050VA3XLEAX | 2095889  |

## 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)