



WLA4SP-8416A100A00

W4

PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | part no. |
|--------------------|----------|
| WLA4SP-8416A100A00 | 1139765 |

Other models and accessories → www.sick.com/W4

Detailed technical data

Features

| | |
|---|---|
| Functional principle | Photoelectric retro-reflective sensor |
| Functional principle detail | Without reflector minimum distance (autocollimation/coaxial optics) |
| Sensing range | |
| Sensing range min. | 0 m |
| Sensing range max. | 4 m |
| Maximum distance range from reflector to sensor (operating reserve 1) | 0 m ... 4 m |
| Recommended distance range from reflector to sensor (operating reserve 3,75) | 0 m ... 2.6 m |
| Reference reflector | Reflector PL80 |
| Recommended sensing range for the best performance | 0 m ... 2.6 m |
| Polarisation filters | Yes |
| Emitted beam | |
| 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 Ta = +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 Ta = +25 °C |

| | | |
|-----------------------------|------------|--|
| Adjustment | IO-Link | |
| | | For configuring the sensor parameters and Smart Task functions |
| Display | LED blue | BluePilot: Alignment aid |
| | LED green | Operating indicatorStatic on: power onFlashing: IO-Link mode |
| | LED yellow | Status of received light beamStatic on: object not presentStatic off: object presentFlashing: Below the 1.5 function reserve |
| Special features | | Pin2 pre-setting (MF): not active |
| Special applications | | Detecting objects wrapped in film |

Safety-related parameters

| | |
|-------------------------|-------------|
| MTTF_D | 1,956 years |
| DC_{avg} | 0% |

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} |
| | | Bit 2 ... 15 = Current receiver level (live) |
| | VendorID | 26 |
| | DeviceID HEX | 0x800356 |
| | DeviceID DEC | 8389462 |
| | 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} |
| Usage category | DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2) |
| Current consumption | ≤ 20 mA, without load. At U _B = 24 V |
| Protection class | III |
| Digital output | |
| Number | 2 |
| Type | Push-pull: PNP/NPN |
| Switching mode | Dark switching |
| Signal voltage PNP HIGH/LOW | Approx. U _B -2.5 V / 0 V |
| Signal voltage NPN HIGH/LOW | Approx. U _B / < 2.5 V |
| Output current I _{max.} | ≤ 100 mA |
| Circuit protection outputs | Reverse polarity protected |

¹⁾ Limit values.

²⁾ This switching output must not be connected to another output.

| | |
|---------------------------------------|---|
| | Overcurrent protected |
| | Short-circuit protected |
| Response time | ≤ 500 µs |
| Repeatability (response time) | 150 µs |
| Switching frequency | 1,000 Hz |
| Pin/Wire assignment | |
| Function of pin 4/black (BK) | Digital output, dark switching, object present → output \bar{Q}_{L1} HIGH ²⁾ |
| | IO-Link communication C |
| 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) | Not active ²⁾ |
| Function of pin 2/white (WH) – detail | The pin 2 function of the sensor can be configured |
| | Additional possible settings via IO-Link |

¹⁾ Limit values.

²⁾ This switching output must not be connected to another output.

Mechanics

| | |
|---|--|
| Housing | Rectangular |
| Design detail | Slim |
| Dimensions (W x H x D) | 12.1 mm x 41.9 mm x 18.6 mm |
| Connection | Cable with M12 male connector, 4-pin, 190 mm |
| Connection detail | |
| Deep-freeze property | Do not bend below 0 °C |
| Conductor size | 0.14 mm ² |
| Cable diameter | Ø 3.4 mm |
| Length of cable (L) | 142 mm |
| Length of male connector | 48 mm |
| Material | |
| Housing | Plastic, VISTAL® |
| Front screen | Plastic, PMMA |
| Cable | Plastic, PVC |
| Male connector | Plastic, VISTAL® |
| 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 |
| Timer function | Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot) |
| Inverter | Yes |
| Switching frequency | SIO Logic: 800 Hz ¹⁾ |
| Response time | SIO Logic: 600 µs ¹⁾ |
| Repeatability | SIO Logic: 200 µs ¹⁾ |
| Switching signal | |
| Switching signal Q _{L1} | Switching output |
| Switching signal \bar{Q}_{L1} | Switching output |

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

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 |
| Quality of run | Yes, Contamination display |

Certificates

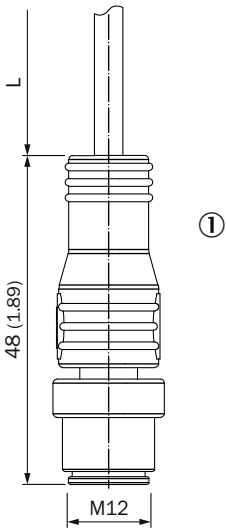
| | |
|---|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China-RoHS | ✓ |
| cULus certificate | ✓ |

Classifications

| | |
|---------------------|----------|
| ECLASS 5.0 | 27270902 |
| ECLASS 5.1.4 | 27270902 |
| ECLASS 6.0 | 27270902 |

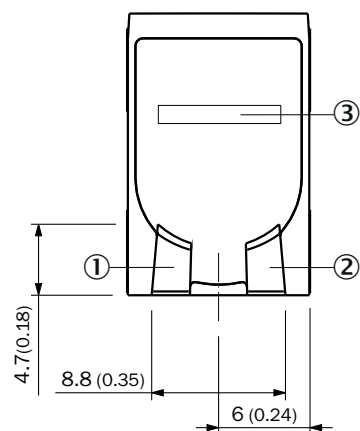
| | |
|----------------|----------|
| ECLASS 6.2 | 27270902 |
| ECLASS 7.0 | 27270902 |
| ECLASS 8.0 | 27270902 |
| ECLASS 8.1 | 27270902 |
| ECLASS 9.0 | 27270902 |
| ECLASS 10.0 | 27270902 |
| ECLASS 11.0 | 27270902 |
| ECLASS 12.0 | 27270902 |
| ETIM 5.0 | EC002717 |
| ETIM 6.0 | EC002717 |
| ETIM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

Dimensional drawing, connection



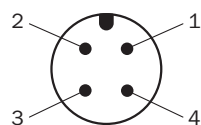
Dimensions in mm (inch)
For length of cable (L), see technical data
① Cable with M12 male connector

display and adjustment elements

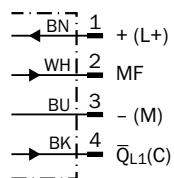


- ① LED green
- ② LED yellow
- ③ LED blue

Connection type M12 male connector, 4-pin



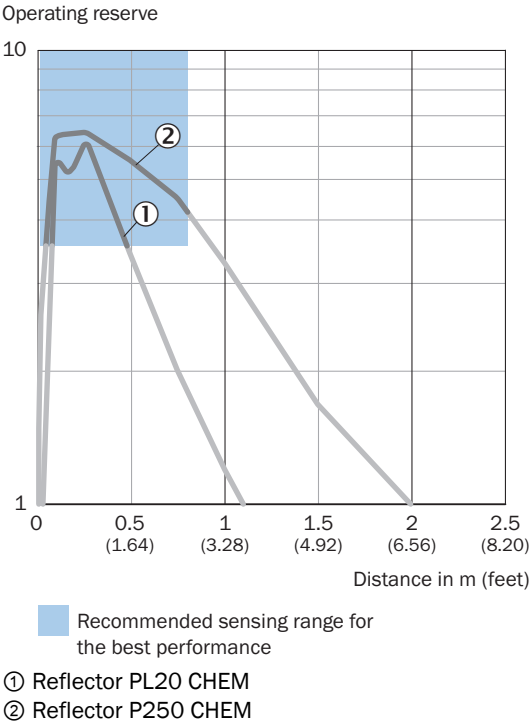
Connection diagram Cd-512



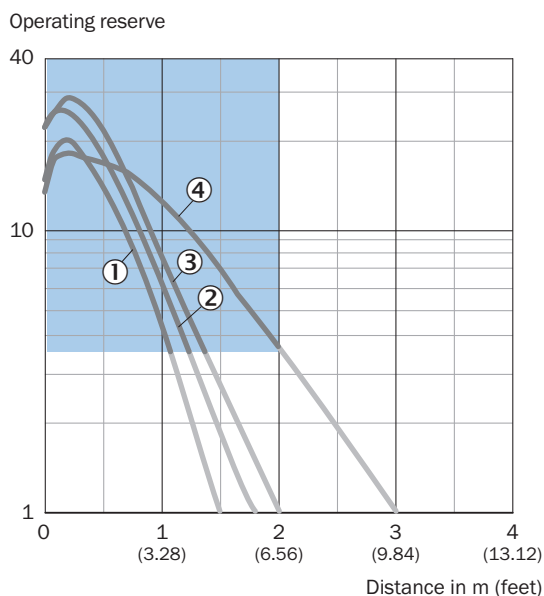
Truth table Push-pull: PNP/NPN – dark switching \bar{Q}

| | 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 | ✗ | ⚡ |
| | | |

Characteristic curve Chemical-resistant reflectors



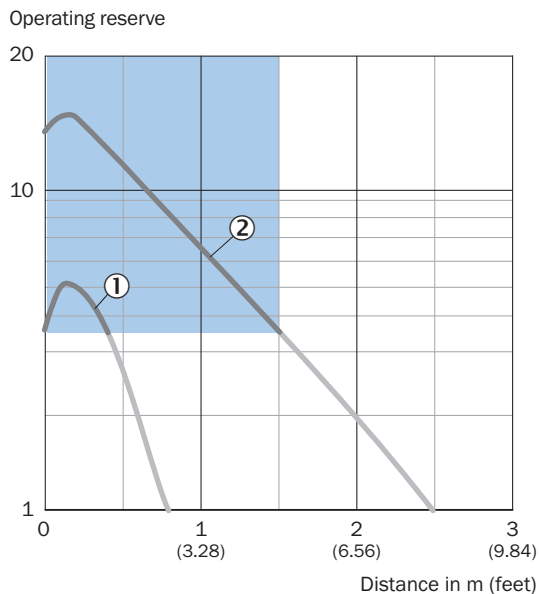
Characteristic curve Fine triple reflectors



Recommended sensing range for the best performance

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

Characteristic curve Reflective tape

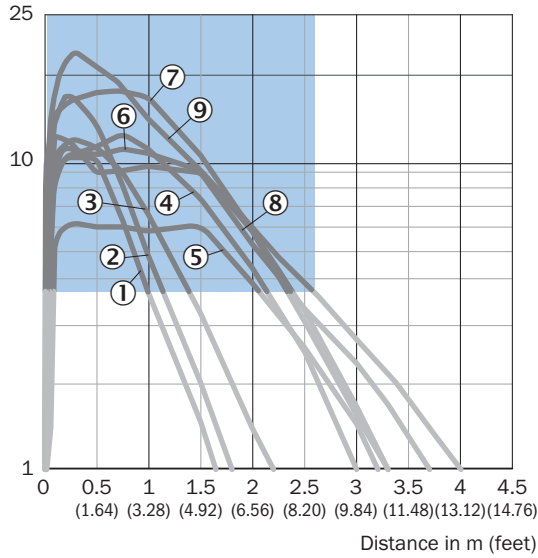


Recommended sensing range for the best performance

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

Characteristic curve Standard reflectors

Operating reserve

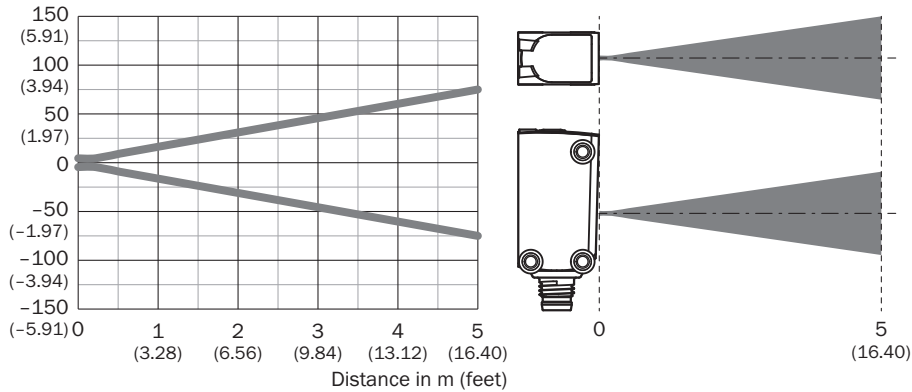


Recommended sensing range for the best performance

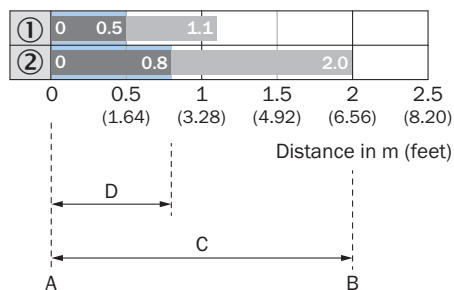
- ① Reflector PL20A
- ② reflector PL22-2
- ③ Reflector P250H
- ④ Reflector PL30A
- ⑤ Reflector PL40A Antifog
- ⑥ Reflector PL40A
- ⑦ Reflector P250
- ⑧ Reflector C110A
- ⑨ Reflector PL80A

Light spot size

Dimensions in mm (inch)



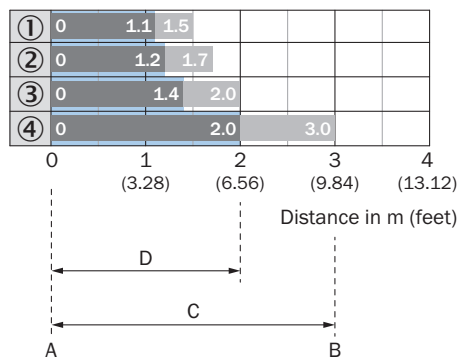
Sensing range diagram Chemical-resistant reflectors



Recommended sensing range for the best performance

| 1 | Reflector PL20 CHEM |
|---|--|
| 2 | 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) |

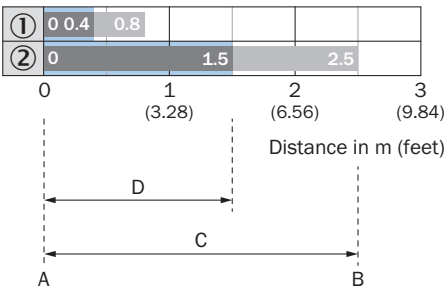
Sensing range diagram Fine triple reflectors



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) |

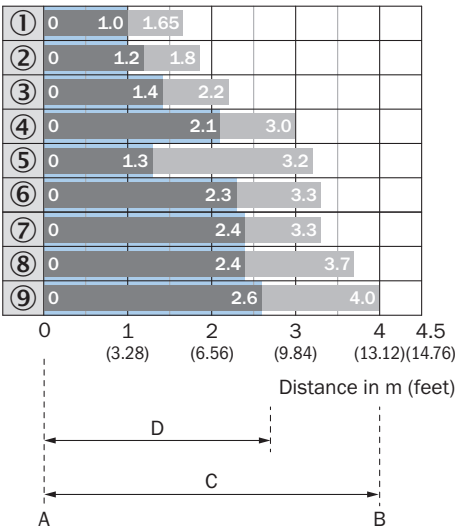
Sensing range diagram Reflective tape



Recommended sensing range for the best performance

| 1 | Reflective tape REF-IRF-56 |
|---|--|
| 2 | 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) |

Sensing range diagram Standard reflectors

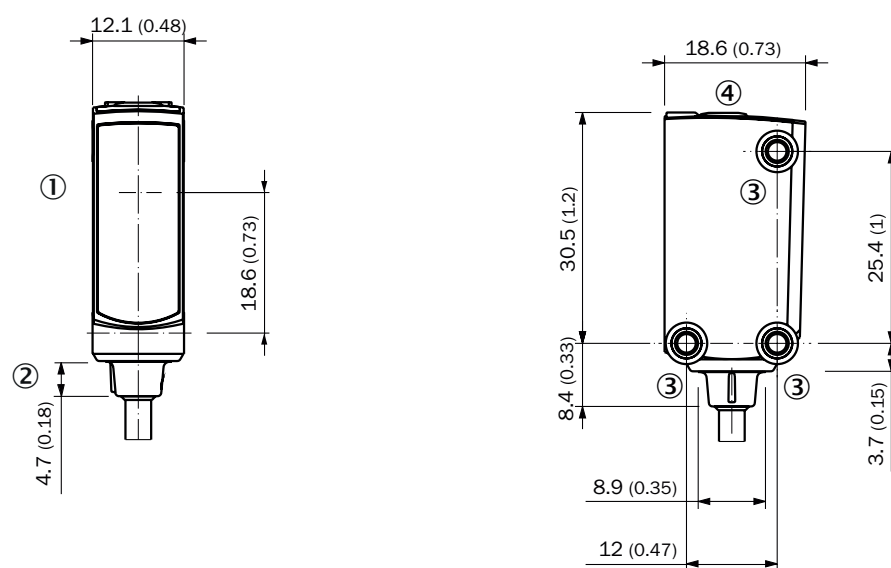


Recommended sensing range for the best performance

| 1 | Reflector PL20A |
|---|-------------------------|
| 2 | Reflector PL22-2 |
| 3 | Reflector P250H |
| 4 | Reflector PL30A |
| 5 | Reflector PL40A Antifog |

| 6 | Reflector PL40A |
|---|---|
| 7 | Reflector P250 |
| 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 re- flector to sensor (operating reserve 3,75) |

Dimensional drawing, sensor




Dimensions in mm (inch)

- 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

| | Brief description | Type | part no. |
|---|--|-------|----------|
| reflectors and optics | | | |
|  | <ul style="list-style-type: none">• Description: Rectangular, screw connection• Dimensions: 84 mm 84 mm• Ambient operating temperature: -30 °C ... +65 °C | 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.”

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