Small photoelectric sensors

Product description

SICK’s W18-3 photoelectric sensor series reliably detects objects under difficult application conditions. Different variants are available, including proximity sensors with high-precision background suppression, retro-reflective sensors with autocollimation and through-beam sensors with high operating reserves.

At a glance

- Best-in-class optical performance due to superior OES technology
- Autocollimation optics
- Background suppression with second sender LED

Your benefits

- Reliable object detection due to best-in-class background suppression and resistance to ambient light
- A wide range of product variants provides increased user flexibility
- Less downtime in industrial environments

Detailed technical data

Features

<table>
<thead>
<tr>
<th></th>
<th>WT18-3</th>
<th>WT18-3 Ex</th>
<th>WL18-3</th>
<th>WL18-3 Ex</th>
<th>WS/WE18-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor principle</td>
<td>Photoelectric proximity sensor</td>
<td>Photoelectric retro-reflective sensor</td>
<td>Through-beam photoelectric sensor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection principle</td>
<td>Background suppression</td>
<td>Autocollimation</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>37.6 mm x 75.5 mm x 33.5 mm</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing design (light emission)</td>
<td>Rectangular</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensing range max.</td>
<td>10 mm ... 1,000 mm (depending on type)</td>
<td>0 m ... 7 m</td>
<td>0 m ... 20 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensing range</td>
<td>50 mm ... 1,000 mm (depending on type)</td>
<td>0 m ... 5 m</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of light</td>
<td>Visible red light/Infrared light (depending on type)</td>
<td>Infrared light</td>
<td>Visible red light</td>
<td>Visible red light/Infrared light (depending on type)</td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>LED</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Wave length</td>
<td>Visible red light 675 nm</td>
<td>Infrared light 870 nm</td>
<td>645 nm</td>
<td>880 nm</td>
<td></td>
</tr>
<tr>
<td>Adjustment</td>
<td>Potentiometer, 4 turns</td>
<td>Double teach-in push-button or potentiometer</td>
<td>–</td>
<td>Potentiometer, 4 turns</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>10 V DC ... 30 V DC</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Power consumption, sender</td>
<td>&lt; 45 mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Power consumption, receiver</td>
<td>&lt; 35 mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Output type</td>
<td>Complementary</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Output function</td>
<td>Light/dark-switching</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Output current</td>
<td>100 mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>&lt; 700 µs</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Switching frequency</td>
<td>700 Hz</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Angle of reception</td>
<td>Visible red light 1.8°</td>
<td>Infrared light 45°</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

Additional information

- Detailed technical data
- Ordering information
- Dimensional drawings
- Adjustments
- Characteristic curves
- Bar diagrams
- Connection diagram
- Recommended accessories

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

*Average service life of 100,000 h at Trench = +25 °C.

Object with 90% reflectance (referred to standard white, DIN 5032)

PILBOA.

### Ordering information

**WT18-3**
- **Sensor principle**: photoelectric proximity sensor
- **Detection principle**: background suppression
- **Switching mode**: light/dark-switching

**WT18-3 Ex**
- **Sensor principle**: photoelectric proximity sensor
- **Detection principle**: background suppression
- **Type of light**: visible red light
- **Connection**: cable with connector M12, 4-pin, 0.29 m PVC

#### Sensing range max.

<table>
<thead>
<tr>
<th>Type of light</th>
<th>Sensing range max.</th>
<th>Light spot size (distance)</th>
<th>Output type</th>
<th>Adjustment</th>
<th>Connection</th>
<th>Connection diagram</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible red light</td>
<td>10 mm ... 600 mm</td>
<td>Ø 15 mm (300 mm)</td>
<td>P/IF</td>
<td>Potentiometer, 4 turns</td>
<td>Cable, 4 wire 2 m PVC</td>
<td>C0-094</td>
<td>WT18-3P10</td>
<td>1025895</td>
</tr>
<tr>
<td></td>
<td>Infrared light</td>
<td>10 mm ... 700 mm</td>
<td>Ø 20 mm (400 mm)</td>
<td>P/IF</td>
<td>Potentiometer, 4 turns</td>
<td>Cable, 4 wire 5 m PVC</td>
<td>C0-094</td>
<td>WT18-3P30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 mm ... 1,000 mm</td>
<td>Ø 30 mm (600 mm)</td>
<td>P/IF</td>
<td>Potentiometer, 4 turns</td>
<td>Cable, 4 wire 5 m PVC</td>
<td>C0-094</td>
<td>WT18-3P10</td>
</tr>
</tbody>
</table>

1) **WT18-3 Ex**
- **Sensor principle**: photoelectric proximity sensor
- **Detection principle**: background suppression
- **Switching mode**: light/dark-switching
- **Type of light**: visible red light
- **Connection**: cable with connector M12, 4-pin, 0.29 m PVC

#### Sensing range max.

<table>
<thead>
<tr>
<th>Sensing range max.</th>
<th>Output type</th>
<th>Adjustment</th>
<th>Hazardous area category</th>
<th>Connection diagram</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mm ... 1,000 mm</td>
<td>P/IF</td>
<td>Potentiometer, 4 turns</td>
<td>3D, 3G</td>
<td>C0-083</td>
<td>WT18X-3P920</td>
<td>1029901</td>
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</tbody>
</table>

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**Connection type**

<table>
<thead>
<tr>
<th>Connection type</th>
<th>WT18-3</th>
<th>WT18-3 Ex</th>
<th>WL18-3</th>
<th>WL18-3 Ex</th>
<th>W18/WL18-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable, 2 m 6)</td>
<td>Male connector, M12 (depending on type)</td>
<td>Cable with connector, M12 (depending on type)</td>
<td>Cable with connector, M12 (depending on type)</td>
<td>Male connector, M12 (depending on type)</td>
<td>Cable with connector, M12 (depending on type)</td>
</tr>
</tbody>
</table>

**Circuit protection**

A 7), C 8), D 9)
Small photoelectric sensors

**WL18-3**
- Sensor principle: photoelectric retro reflective sensor
- Detection principle: autocollimation
- Switching mode: light/dark-switching
- Type of light: visible red light
- Polarization filter: ✓

<table>
<thead>
<tr>
<th>Sensing range max.</th>
<th>Light spot size (distance)</th>
<th>Output type</th>
<th>Adjustment</th>
<th>Test input</th>
<th>Connection</th>
<th>Connection diagram</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 m ... 7 m</td>
<td>Ø 40 mm (2 m)</td>
<td>Potentiometer, 1 turn</td>
<td></td>
<td></td>
<td>-</td>
<td>Cable, 4-wire 2 m PVC</td>
<td>WL18-3P100</td>
<td>1025909</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>Cable, 5-wire 2 m PVC</td>
<td>WL18-3P101</td>
<td>1025912</td>
</tr>
</tbody>
</table>

**WL18-3 Ex**
- Sensor principle: photoelectric retro reflective sensor
- Detection principle: autocollimation
- Switching mode: light/dark-switching
- Type of light: visible red light
- Polarization filter: ✓
- Connection: cable with connector M12, 4-pin 0.29 m PVC

<table>
<thead>
<tr>
<th>Sensing range max.</th>
<th>Light spot size (distance)</th>
<th>Output type</th>
<th>Adjustment</th>
<th>Hazardous area category</th>
<th>Connection diagram</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 m ... 7 m</td>
<td>Ø 40 mm (2 m)</td>
<td>Potentiometer, 1 turn</td>
<td></td>
<td>30, 3G</td>
<td></td>
<td>WL18X-3P010</td>
<td>1029902</td>
</tr>
</tbody>
</table>

**WS/WE18-3**
- Sensor principle: through-beam photoelectric sensor
- Switching mode: light/dark-switching

<table>
<thead>
<tr>
<th>Type of light</th>
<th>Sensing range max.</th>
<th>Light spot size (distance)</th>
<th>Output type</th>
<th>Adjustment</th>
<th>Connection</th>
<th>Connection diagram</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible red light</td>
<td>0 m ... 20 m</td>
<td>Ø 450 mm (15 m)</td>
<td>Potentiometer, 1 turn</td>
<td></td>
<td>Cable, 4-wire 2 m PVC</td>
<td>WL18-3P130</td>
<td>1025922</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connector M12, 4-pin</td>
<td>WL18-3P130</td>
<td>1025923</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cubic connector, 6-pin</td>
<td>WL18-3P130</td>
<td>1025924</td>
<td></td>
</tr>
<tr>
<td>Infrared light</td>
<td>0 m ... 20 m</td>
<td>Ø 950 mm (15 m)</td>
<td>Potentiometer, 1 turn</td>
<td></td>
<td>Cable, 4-wire 2 m PVC</td>
<td>WL18-3P110</td>
<td>1025928</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connector M12, 4-pin</td>
<td>WL18-3P110</td>
<td>1025927</td>
<td></td>
</tr>
</tbody>
</table>

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Dimensional drawings

**WL18-3, potentiometer**
- Standard direction of the material being detected
- Center of optical axis, sensor
- Center of optical axis, receiver
- Mounting hole ø 4.1 mm
- Status indicator LED, yellow: Status of received light beam
- Status indicator LED green: power on
- Sensing range adjustment: potentiometer, 4-turn

**WL18-3, double teach-in button**
- Standard direction of the material being detected
- Center of optical axis, sensor
- Center of optical axis, receiver
- Mounting hole ø 4.1 mm
- Status indicator LED, yellow: Status of received light beam
- Status indicator LED green: power on
- Sensing range adjustment: double teach-in button
- Connector M12, 4-pin or 2 m cable or cubic plug, 6-pin

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<table>
<thead>
<tr>
<th>Potentiometer, 1 turn</th>
<th>Cable, 4-wire 2 m PVC</th>
<th>GI-083</th>
<th>WL18X-3P100</th>
<th>1029902</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Connector M12, 4-pin</td>
<td></td>
<td>WL18X-3P100</td>
<td>1029903</td>
</tr>
<tr>
<td></td>
<td>Cubic connector, 6-pin</td>
<td></td>
<td>WL18X-3P100</td>
<td>1029904</td>
</tr>
<tr>
<td></td>
<td>Cable, 5-wire 2 m PVC</td>
<td></td>
<td>WL18X-3P100</td>
<td>1029905</td>
</tr>
<tr>
<td></td>
<td>Connector M12, 4-pin</td>
<td></td>
<td>WL18X-3P100</td>
<td>1029906</td>
</tr>
<tr>
<td></td>
<td>Cubic connector, 6-pin</td>
<td></td>
<td>WL18X-3P100</td>
<td>1029907</td>
</tr>
</tbody>
</table>

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**WS/WE18-3**
- Standard direction of the material being detected
- Center of optical axis, sensor
- Center of optical axis, receiver
- Mounting hole ø 4.1 mm
- Status indicator LED, yellow: Status of received light beam
- Status indicator LED green: power on
- Sensing range adjustment: double teach-in button
- Connector M12, 4-pin or 2 m cable

---

<table>
<thead>
<tr>
<th>Potentiometer, 1 turn</th>
<th>Cable, 4-wire 2 m PVC</th>
<th>GI-083</th>
<th>WS/WE18-3P100</th>
<th>1025922</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Connector M12, 4-pin</td>
<td></td>
<td>WS/WE18-3P100</td>
<td>1025923</td>
</tr>
<tr>
<td></td>
<td>Cubic connector, 6-pin</td>
<td></td>
<td>WS/WE18-3P100</td>
<td>1025924</td>
</tr>
<tr>
<td></td>
<td>Cable, 5-wire 2 m PVC</td>
<td></td>
<td>WS/WE18-3P100</td>
<td>1025925</td>
</tr>
<tr>
<td></td>
<td>Connector M12, 4-pin</td>
<td></td>
<td>WS/WE18-3P100</td>
<td>1025926</td>
</tr>
<tr>
<td></td>
<td>Cubic connector, 6-pin</td>
<td></td>
<td>WS/WE18-3P100</td>
<td>1025927</td>
</tr>
</tbody>
</table>
Small photoelectric sensors

**W18**

- LED indicator
- Sensing range adjustment
- Center of optical axis, sensor
- Center of optical axis, receiver
- Mounting hole ø 4.1 mm
- Connection

**W18-3**

- LED indicator
- Sensing range adjustment
- Center of optical axis, sensor
- Center of optical axis, receiver
- Mounting hole ø 4.1 mm
- Connection

**W18-3 Ex**

- Adjustments:
  - Sensing range adjustment: potentiometer, 4-turn
  - Status indicator LED green: power on
  - Status indicator LED yellow: Status of received light beam
  - Center of optical axis
  - Mounting hole ø 4.1 mm

**WL18-3**

- Adjustments:
  - Sensing range adjustment: double teach-in button
  - Status indicator LED yellow: Status of received light beam
  - Status indicator LED green: power on
  - Center of optical axis
  - Mounting hole ø 4.1 mm

**WL18-3 Ex**

- Adjustments:
  - Sensing range adjustment: potentiometer, 4-turn
  - Sensing range adjustment: double teach-in button
  - Status indicator LED yellow: Status of received light beam
  - Status indicator LED green: power on
  - Center of optical axis
  - Mounting hole ø 4.1 mm
Characteristic curves

**Black-white shift**

**WT18-3, red light**

**WT18-3, Infrared, 700 mm**

**WT18-3 (Ex), Infrared, 1,000 mm**

1. Sensing range on black, 6% remission
2. Sensing range on gray, 18% remission
3. Sensing range on white, 90% remission

Operating reserve

**WL18-3, WL18-3 Ex**

**WS/WE18-3**

1. Sensing range on black, 6% remission
2. Sensing range on gray, 18% remission
3. Sensing range on white, 90% remission

Bar diagrams

**WT18-3, red light**

**WT18-3, Infrared, 700 mm**

1. Sensing range on black, 6% remission
2. Sensing range on gray, 18% remission
3. Sensing range on white, 90% remission
Small photoelectric sensors

**WL18-3, WL18-3 Ex**

- Sensing range on black: 6% remission
- Sensing range on gray: 18% remission
- Sensing range on white: 90% remission

**Connection diagram**

- **Cd-072**
  - (+L) not connected
  - (-M) not connected
  - Test

- **Cd-074**
  - (+L)
  - (-M)
  - Q

- **Cd-075**
  - (+L) not connected
  - (-M) not connected
  - Test

- **Cd-083**
  - (+L)
  - (-M)
  - Q

- **Cd-094**
  - (+L)
  - (-M)
  - Q

- **Cd-102**
  - (+L)
  - (-M)
  - Q

- **Cd-141**
  - (+L)
  - (-M)
  - Q

- **Cd-178**
  - (+L)
  - (-M)
  - Q

---

**WT18-2 (Ex), Infrared, 1,000 mm**

- Sensing range on black: 6% remission
- Sensing range on gray: 18% remission
- Sensing range on white: 90% remission

- Sensing range
- Sensing range typ. max.

**W5/WE18-3**

- Sensing range
- Sensing range typ. max.
### Recommended accessories

#### Mounting brackets/plates

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Steel, zinc coated</td>
<td>Mounting bracket</td>
<td>BEF-WA14</td>
<td>2019064</td>
</tr>
<tr>
<td></td>
<td>Steel, zinc coated</td>
<td>Mounting bracket with hinged arm</td>
<td>BEF-WA18</td>
<td>2009317</td>
</tr>
</tbody>
</table>

#### Plug connectors and cables

**Connecting cable (female connector-open)**

- **Cable material:** PVC
- **Connector material:** TPU

<table>
<thead>
<tr>
<th>Figure</th>
<th>Connection type head A</th>
<th>Connection type head B</th>
<th>Connecting cable</th>
<th>Enclosure rating</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female connector, M12, 4-pin, straight</td>
<td>Cable, open conductor heads</td>
<td>2 m, 4-wire</td>
<td>IP 67</td>
<td>DOL-1204-01M</td>
<td>6009382</td>
</tr>
<tr>
<td></td>
<td>Female connector, M12, 4-pin, angled</td>
<td>Cable, open conductor heads</td>
<td>2 m, 4-wire</td>
<td>IP 67</td>
<td>DOL-1204-02M</td>
<td>6009383</td>
</tr>
</tbody>
</table>

#### Universal bar clamp systems

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zinc diecast</td>
<td>Universal bar clamp for mounting bars with 12 mm diameter</td>
<td>BEF-KHS-013</td>
<td>5122526</td>
</tr>
<tr>
<td></td>
<td>Zinc plated steel (sheet), Diecast zinc clamp</td>
<td>Plate N03 for universal clamp bracket</td>
<td>BEF-KHS-N03</td>
<td>2051809</td>
</tr>
<tr>
<td></td>
<td>Zinc plated steel (protective housing), Diecast zinc (clamp)</td>
<td>Plate N04 for universal clamp bracket</td>
<td>BEF-KHS-N04</td>
<td>2051810</td>
</tr>
</tbody>
</table>

#### Device protection (mechanical)

**Protective housing/flexible**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zinc plated steel (protective housing), Diecast zinc (clamp)</td>
<td>Protective housing for universal clamp</td>
<td>BEF-SG-W14</td>
<td>2058124</td>
</tr>
<tr>
<td></td>
<td>Zinc plated steel (protective housing), Diecast zinc (clamp)</td>
<td>Protective housing for universal clamp</td>
<td>BEF-SG-W27</td>
<td>2039061</td>
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</tbody>
</table>

### Reflectors

#### Angular

<table>
<thead>
<tr>
<th>Figure</th>
<th>Material</th>
<th>Description</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PMMA/ABS</td>
<td>Rectangular, screw connection, 47 mm x 47 mm</td>
<td>P250</td>
<td>5304812</td>
</tr>
<tr>
<td></td>
<td>PMMA/ABS</td>
<td>Rectangular, screw connection, 38 mm x 15 mm</td>
<td>P20A</td>
<td>1012719</td>
</tr>
<tr>
<td></td>
<td>PMMA/ABS</td>
<td>Rectangular, screw connection, 56 mm x 28 mm</td>
<td>P30A</td>
<td>1002314</td>
</tr>
<tr>
<td></td>
<td>PMMA/ABS</td>
<td>Rectangular, screw connection, 37 mm x 56 mm</td>
<td>P40A</td>
<td>1012720</td>
</tr>
<tr>
<td></td>
<td>PMMA/ABS</td>
<td>Rectangular, screw connection, 80 mm x 80 mm</td>
<td>P80A</td>
<td>1003865</td>
</tr>
</tbody>
</table>

#### Reflective tape

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-adhesive, 50 mm x 60 mm</td>
<td>REF-IRF-S6</td>
<td>5314244</td>
</tr>
</tbody>
</table>

For additional accessories, please see page 1-91.