Welcome to the global player for sensor technology.
SENSICK – The brand name for highly advanced and powerful sensor technology. SENSICK automation solutions can be found wherever processes have been optimised and improved. Today, with over 3300 employees in more than 20 different countries, SICK is one of the world’s leading sensor manufacturers.

Optimising entire process sequences.
Nowadays companies must think and react in terms of processes instead of individual functions. They must abandon inflexible working methods and optimise value-added activities as a whole. The answer is not found in specific individual measures, but rather in solutions, which deal with the problem in its entirety.

SICK, as one of the world’s leading providers of sensor systems for automation, safety technology, analyzers and process instrumentation as well as systems for automatic identification, makes a major contribution to modernising and rationalising industrial processes. With over 50 years of experience in sensor technology, SICK has comprehensive application know-how from virtually all industrial branches and is, therefore, able to provide perfect solutions for all branches of industry.

Quality is a central element.
The success of our customers all over the world clearly demonstrates that the quality and long service life of SICK sensors set global standards. This is the result of consistent quality management in development, production, distribution and service. Since the concept of quality has long been a central element of SICK’s company philosophy, each and every employee feels responsible for making their own personal contribution to maintaining the high level of product quality.

Cooperative partnerships: Joint success resulting from intensive dialogue.
Innovative automation solutions are the result of intensive dialogue with our customers. SICK considers critical analysis and continuous improvement of one’s own performance to be of prime importance in maintaining a stable business partnership with its customers.

With great ambition, SICK development engineers continuously seek to develop existing applications further with regard to precision, ease of application and economic efficiency.

A global service network that is there where you need it.
A wide sales and service network with subsidiaries and representatives all over the world provide you with expert support where you need it. We support our customers and trading partners by providing well-founded courses and training seminars, assistance in planning and commissioning, information concerning technical innovations, and clearly written and complete documentation.
All this ultimately contributes to the continued cost-effectiveness and availability of your systems.

In automated production processes, photelectric safety switches and safety light grids, laser scanners and safety switches provide effective protection against accidents and injury.

In power stations and industrial plants, SICK systems make sure that the specified limits are observed, and also support process management.

In many cases, SENSICK sensors ensure cost-effective automation processes.
Modern automated production processes need management and control systems, and control systems need information.

With the information they provide, SICK’s highly developed sensors make way for new economical applications – based on more than 50 years’ experience.
High-precision displacement and angle measurement

Displacement, position, angle – in industrial automation where positions have to be precisely determined, you simply cannot beat an encoder. The same applies when determining speed and acceleration. Due to their working principle, the photoelectric scanning of optical code patterns, in linear displacement measurement these sensors have a resolution of micrometers and in angle measurement they have a resolution of a few thousandths of a degree. With less demanding tasks, of course, they cope easily.

Compared to incremental encoders, absolute encoders have one decisive advantage – they do not need a initialising reference-run.

Incremental encoders, rotary

Incremental encoders generate information relating to position and angle in the form of electrical impulses. The number of pulses per revolution determines the resolving capability. The individual position is determined by counting these pulses from a point of reference. When the power is first switched on an initialising reference run is needed to determine absolute position.

Absolute encoders, rotary

Absolute encoders generate information relating to position, angle or number of revolutions in the form of unique codes. A unique code is assigned to each angular step. The number of unique code patterns per revolution determines the resolving capability. Since an absolute position is assigned to each unique code pattern, an initialising reference run is not required. Singleturn and multiturn versions are available.

Absolute encoders, linear

Linear position measuring systems for material handling applications e.g. storage and conveying systems, have particularly high requirements. The current position is continuously evaluated by the sensor unit and is directly transmitted as an encoded signal by the evaluation electronics housed in the sensor unit. Since the sensor unit and the reference scale are separate components, even extremely long distances can be measured.
### Incremental encoders
- Number of pulses per rotation: any number of pulses
- Number of steps per revolution: 1 to 10,000
- Zero-Pulse Teach-in at the press of a button
- Opto-ASIC with chip-on-board technology
- Wide range of flanges and hollow shafts
- Various electrical interfaces

### Singleturn absolute encoders
- Number of steps per rotation: 2 to 32,768
- Simple electronic zero-set at the push of a button or via a signal line
- Various interfaces

### Multiturn absolute encoders
- Number of steps per revolution: 2 to 8,192
- Maximum number of revolutions: 8,192
- The multiturn function is achieved using a geared mechanism
- MR sensor system with chip-on-board technology

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### Rotary encoders

#### DRS 60
- Any number of pulses between 1 ... 8,192
- Ø 60 mm
- TTL/RS 422, HTL/push pull
- 4.5 ... 5.5 V DC
- or 10 ... 32 V DC
- 20 °C ... +85 °C
- Axial/radial cable, circular screwing connector system axial/radial
- IP 65/IP 67

#### DGS 60/DGS 65/DGS 66
- 100 to 10,000 all conventional numbers of pulses
- Ø 60 mm
- TTL/RS 422, HTL/push pull
- 4 ... 6 V DC, 10 ... 32 V DC
- –20 °C ... +85 °C
- Axial/radial cable, circular screwing connector system axial/radial

#### Technical data

- **Number of pulses per rotation**
- **Dimensions**
- **Interfaces/drivers**
- **Supply voltage**
- **Approvals**
- **Solid shaft**
  - Serve flange
  - Face mount flange
  - Max. operating speed
  - Ambient operating temperature
  - Connection type
- **Blind hollow shaft**
  - Shaft diameter
  - Max. operating speed
  - Ambient operating temperature
  - Connection type
- **Enclosure rating**
  - **Through hollow shaft**
    - Shaft diameter
    - Max. operating speed
    - Ambient operating temperature
    - Connection type
  - **Enclosure rating**

#### Absolute encoders
- Max. measuring length: 1,700 m
- Resolution: 0.1 mm
- Various interfaces
- Non-contact and wear-free

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### Linear encoders

#### Absolute encoders
- Max. measuring length: 1,700 m
- Resolution: 0.1 mm
- Various interfaces
- Non-contact and wear-free

#### Technical data

- **Number of pulses from 1 to 10,000.**
- Zero-pulse Teach-in at the press of a button
- Opto-ASIC with chip-on-board technology
- Wide range of flanges and hollow shafts
- Various electrical interfaces

#### Incremental encoders
- Number of pulses per rotation: any number of pulses
- Number of steps per revolution: 1 to 10,000
- Zero-Pulse Teach-in at the press of a button
- Opto-ASIC with chip-on-board technology
- Wide range of flanges and hollow shafts
- Various electrical interfaces

#### Multiturn absolute encoders
- Number of steps per revolution: 2 to 32,768
- Simple electronic zero-set at the push of a button or via a signal line
- Various interfaces

#### Rotary encoders

* Without shaft seal
## Rotary encoders

### ARS 60
- **Single-turn encoder**
- **Resolution**: Any resolution from 2 to 32,768 steps
- **Dimensions**: Ø 60 mm
- **Interfaces/drivers**: SSI or parallel (push-pull)
- **Supply voltage**: 10 ... 32 V DC
- **Approvals**: 10 ... 32 V DC

### ATM 60/ATM 90
- **Multiturn encoder**
- **Resolution**: 8,192 steps per revolution
- **Dimensions**: Ø 60 mm (ATM 60) Ø 93 mm (ATM 90)
- **Interfaces**: SSI and RS 422 parameter interface, Profibus, DeviceNet
- **Supply voltage**: 10 ... 30 V DC

### Solid shaft
- **Servo flange**
- **Face mount flange**
- **Max. operating speed**: 6,000/10,000 rpm
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**
- **Solid shaft**
  - **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
  - **Max. operating speed**: 3,000 min⁻¹
  - **Ambient operating temperature**: –20 °C ... +85 °C
  - **Connection type**
  - **Enclosure rating**

### Blind hollow shaft
- **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
- **Max. operating speed**: 3,000 min⁻¹
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**

### Through hollow shaft
- **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
- **Max. operating speed**: 3,000 min⁻¹
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**

### Approvals
- **Without shaft seal**

## Linear encoders

### POMUX® KH 53
- **Up to 1,700 m**
- **0.1 mm**
- **300 µm**
- **SSI, RS 422, Profibus**
- **10 ... 32 V DC**
- **–20 ... +60 °C**
- **Cable or round screwing system**
- **IP 65/IP 66**
- **6.6 m/s**

### Technical data
- **Measurement range**
- **Reproducibility**
- **Interfaces**
- **Operating voltage**
- **Ambient operating temperature**
- **Connection type**
- **Enclosure rating**
- **Max. process speed with continual measurement value output**
- **Approvals**

### Scanning interval
- **SSI**
- **RS 422**
- **Profibus**

### Approvals
- **0.8 ms**
- **0.9 ms**
- **1.1 ms**

## Absolute encoders

### ATM 60
- **Single-turn encoder**
- **8,192 steps per revolution**
- **8,192 revolutions**
  - **(max. 25 bit with SSI)**
- **Dimensions**: Ø 60 mm (ATM 60) Ø 93 mm (ATM 90)
- **Interfaces**: SSI and RS 422 parameter interface, Profibus, DeviceNet
- **Supply voltage**: 10 ... 30 V DC

### ATM 90
- **Multiturn encoder**
- **8,192 steps per revolution**
- **8,192 revolutions**
  - **(max. 25 bit with SSI)**
- **Dimensions**: Ø 60 mm (ATM 60) Ø 93 mm (ATM 90)
- **Interfaces**: SSI and RS 422 parameter interface, Profibus, DeviceNet
- **Supply voltage**: 10 ... 30 V DC

### Solid shaft
- **Servo flange**
- **Face mount flange**
- **Max. operating speed**: 6,000 min⁻¹
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**
- **Solid shaft**
  - **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
  - **Max. operating speed**: 6,000 min⁻¹
  - **Ambient operating temperature**: –20 °C ... +85 °C
  - **Connection type**
  - **Enclosure rating**

### Blind hollow shaft
- **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
- **Max. operating speed**: 6,000 min⁻¹
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**

### Through hollow shaft
- **Shaft diameter**: 6, 8, 10, 12, 15 mm as well as ⅛, ⅜ and ½ inch
- **Max. operating speed**: 6,000 min⁻¹
- **Ambient operating temperature**: –20 °C ... +85 °C
- **Connection type**
- **Enclosure rating**

### Approvals
- **Without shaft seal**
Detection and distance measurement with sound

Almost no material exists which can damp sound so effectively that it is no longer detectable by an ultrasonic sensor. Even transparent objects and fluids are detected. Additional advantages are the excellent background blanking and immunity to all types of impurities in the surrounding air. The application determines the output – binary or analogue, as required.

### Ultrasonic proximity switch
- Non-contact detection and distance measurement of objects using ultrasonic
- Teach-in
- High measurement accuracy
- Large scanning ranges
- Detects even transparent objects and liquids
- Immune to particulate matter in pollution of the air
- Compact, dirt-resistant design
- Binary switching output or analogue output

### Ultrasonic double-sheet detector
- Detection of double sheets and missing sheets
- Automatic setting, no adjustment necessary
- Spectrum of materials from ultra-thin film to thin metal sheets
- Almost no material exists which can damp sound so effectively that it is no longer detectable by an ultrasonic sensor. Even transparent objects and fluids are detected. Additional advantages are the excellent background blanking and immunity to all types of impurities in the surrounding air. The application determines the output – binary or analogue, as required.

## Technical data

### Dimensions
- M 30 x 127.5 \(^{8}\)

### Housing material
- Brass, nickel-plated

### Supply voltage
- 12 ... 30 V DC

### Enclosure rating
- IP 65

### Ambient operating temperature
- \(-20 \text{ °C} \ldots +70 \text{ °C}\)

### Approvals
- Yes

### Scanning range
- 30 ... 1300

### Operational area
- 0.36

### Scanning distance [mm]
- 0.15 %

### Reproducibility
- Yes

### Temperature compensation
- Yes

### Teach-in
- Yes

### Connection type
- Plug connector M 12

### Output function
- Analog output
- 4 ... 20 mA or 0 ... 10 V DC
- PNP, Q/Q-  
- PNP, Q1, Q2/Q–

### Switching outputs
- Double-sheet
- Mis-fed-sheet

### 1) Thread diameter x Length [mm]
## Ultrasonic sensors

### Ultrasonic proximity detector

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Enclosure rating</th>
<th>Ambient operating temperature</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanning range</td>
<td>UM 30</td>
<td>Brass, nickel-plated</td>
<td>12 ... 30 V DC</td>
<td>IP 65</td>
<td>-20 °C ... +70 °C</td>
<td>YES</td>
</tr>
<tr>
<td>Operational area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
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<tr>
<td>Scanning distance [mm]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution [mm]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>800 ... 6000</td>
</tr>
<tr>
<td>Reproducibility</td>
<td></td>
<td></td>
<td></td>
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<td>1</td>
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<tr>
<td>Temperature compensation</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.15 %</td>
</tr>
<tr>
<td>Teach-in</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plug connector M 12</td>
</tr>
<tr>
<td>Connection type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output function</td>
<td>Analog output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 ... 20 mA or 0 ... 10 V DC</td>
</tr>
<tr>
<td>or 1 switching output</td>
<td>PNP, Q/Q</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or 2 switching output</td>
<td>PNP, Q1, Q2/Q–</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching outputs</td>
<td>Double-sheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mis-fed-sheet</td>
<td></td>
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</tr>
</tbody>
</table>

1) Thread diameter x Length [mm]

### Ultrasonic double-sheet detector

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Enclosure rating</th>
<th>Ambient operating temperature</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanning range</td>
<td>UM 18</td>
<td>Brass, nickel-plated</td>
<td>20 ... 30 V DC</td>
<td>IP 65</td>
<td>+5 °C ... +60 °C</td>
<td>YES</td>
</tr>
<tr>
<td>Operational area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Scanning distance [mm]</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Resolution [mm]</td>
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<td></td>
</tr>
<tr>
<td>Reproducibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Teach-in</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Connection type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Output function</td>
<td>Analog output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PNP</td>
</tr>
<tr>
<td>or 1 switching output</td>
<td>PNP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or 2 switching output</td>
<td>PNP, Q/Q</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Switching outputs</td>
<td>Double-sheet</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Mis-fed-sheet</td>
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</tbody>
</table>

2) Sender/Receiver: Thread diameter x Length [mm]

Paper grams per square meter of 20 ... 1200 g/m², metal-laminated sheets and films ≤ 0.4 mm thickness, self-adhesive films, metal sheets ≤ 0.3 mm, ultra-fine corrugated cardboard

Cable
Sensors with a feeling for metal

When voltage becomes information, induction often plays a part. Inductive sensors detect metallic objects in typically very small scanning areas. The sensor diameter is the decisive factor for the switching distance which is often only a few millimetres. On the other hand, inductive sensors are fast, accurate and extremely rugged.

Inductive proximity sensors

- Single sensing range
- Double sensing range
- Triple sensing range
- Flush installation
- Cylinder housing
- Threaded cylinder housing
- Cuboid housing
- Non-flush installation

Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Housing material</th>
<th>DC 3/4-wire</th>
<th>Operating voltage ( U_{DC} )</th>
<th>Continuous current ( I_c ) [mA]</th>
<th>Switching output</th>
<th>Output function</th>
<th>Flush installation</th>
<th>Sensing range ( S_n ), single [mm]</th>
<th>Sensing range ( S_n ), double [mm]</th>
<th>Sensing range ( S_n ), triple [mm]</th>
<th>Connection type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brass, nickel-plated</td>
<td>10 ... 30 V DC</td>
<td>( \leq 100 )</td>
<td>( \leq 200 )</td>
<td>PNP/NPN</td>
<td>v</td>
<td>PNP/NPN</td>
<td>0.6</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
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<td>o</td>
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<td></td>
</tr>
</tbody>
</table>

Approvals

- \( \odot \) Approvals

Further designs

- Short version
- Multitalent (freely configurable output function/switching output)

Further electrical designs

- DC 2-wire
- AC/DC 2-wire
- NAMUR to EN 50227

1) Thread diameter x Pitch [mm]
2) Diameter [mm]
3) Width x Height x Length [mm]
Inductive sensors

### IM series

**IM 08**
- M 8 x 1
- Brass, nickel-plated
- 10 ... 30 V DC
- ≤ 200 PNP/NPN
- 1.5 2.5
- Cable/connector M 8 x 1/M 12 x 1
- IP 67
- 5000

**IM 12**
- M 12 x 1
- Brass, nickel-plated
- 10 ... 30 V DC
- ≤ 300 PNP/NPN
- 2 4
- Cable/connector M 12 x 1
- IP 67
- 2000

**IM 18**
- M 18 x 1
- Brass, nickel-plated
- 10 ... 30 V DC
- ≤ 400 PNP/NPN
- 5 8
- 8 12
- 12 20
- Cable/connector M 12 x 1
- IP 67/IP 68
- 5000

**IM 30**
- M 30 x 1.5
- Brass, nickel-plated
- 10 ... 30 V DC
- ≤ 100 PNP/NPN
- 10 15
- 15 20
- 22 40
- Cable/connector M 12 x 1
- IP 67/IP 68
- 2000

### IH series

**IH 03**
- 3
- Stainless steel
- 10 ... 30 V DC
- ≤ 100 PNP/NPN
- 0.6
- Cable
- IP 67
- 5000

**IH 04**
- 4
- Stainless steel
- 10 ... 30 V DC
- ≤ 200 PNP/NPN
- 0.8
- Cable
- IP 67
- 5000
## IH series

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Operating voltage U_b</th>
<th>Continuous current I_2</th>
<th>Switching output</th>
<th>Output function</th>
</tr>
</thead>
<tbody>
<tr>
<td>IH 06</td>
<td>6.5 x 20</td>
<td>Stainless steel</td>
<td>10 ... 30 V DC</td>
<td>≤ 200</td>
<td>PNP/NPN</td>
<td>Flush installation</td>
</tr>
<tr>
<td>IH 20</td>
<td>20 x 50</td>
<td>Plastic</td>
<td>20 ... 250 V AC/DC</td>
<td>10</td>
<td>4</td>
<td>Sensing range S_n, single [mm]</td>
</tr>
<tr>
<td>IH 34</td>
<td>34 x 70</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>≤ 200</td>
<td>PNP/NPN</td>
<td>Sensing range S_n, double [mm]</td>
</tr>
<tr>
<td>IQ 05</td>
<td>5 x 5 x 25</td>
<td>Brass, nickel-plated</td>
<td>10 ... 30 V DC</td>
<td>≤ 300</td>
<td>PNP/NPN</td>
<td>Sensing range S_n, triple [mm]</td>
</tr>
<tr>
<td>IQ 08</td>
<td>8 x 8 x 40/49</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>≤ 300</td>
<td>PNP/NPN</td>
<td>Connection type</td>
</tr>
<tr>
<td>IQ 10</td>
<td>10 x 16 x 28/37</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>≤ 300</td>
<td>PNP/NPN</td>
<td>Enclosure rating</td>
</tr>
</tbody>
</table>

### Further designs

- Short version
- Multitalent (freely configurable output function/switching output)

### Further electrical designs

- DC 2-wire
- AC/DC 2-wire
- NAMUR to EN 50227

### Approvals

- CE
- UL
- CSA

### Notes

1) Thread diameter x Pitch [mm]
2) Diameter [mm]
3) Width x Height x Length [mm]
### Inductive proximity sensors

#### IQ series

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions [mm]</th>
<th>Housing material</th>
<th>DC 3/4-wire</th>
<th>Operating voltage Udc (V)</th>
<th>Continuous current Ic (mA)</th>
<th>Switching output</th>
<th>Output function</th>
<th>Flush installation</th>
<th>Sensing range Sm, single [mm]</th>
<th>Sensing range Sm, double [mm]</th>
<th>Sensing range Sm, triple [mm]</th>
<th>Connection type</th>
<th>Enclosure rating</th>
<th>Max. switching frequency f [1/μs]</th>
<th>Reverse polarity protection</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ 40 Short model</td>
<td>40 x 40 x 66³</td>
<td>Plastic</td>
<td>≤ 250</td>
<td>PNP</td>
<td>15 20</td>
<td>Programmable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ 40</td>
<td>40 x 40 x 121³</td>
<td>Plastic</td>
<td>≤ 250</td>
<td>PNP</td>
<td>15 20</td>
<td>Programmable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>IQ 80</td>
<td>80 x 40 x 105/112³</td>
<td>Plastic</td>
<td>≤ 250</td>
<td>PNP</td>
<td>50 50 44.5</td>
<td>Complementary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ 12</td>
<td>12 x 26 x 40/49³</td>
<td>Plastic</td>
<td>6 ... 36 V DC</td>
<td>PNP/NPN</td>
<td>3 6</td>
<td>Terminal chamber</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Detection of widely differing materials

Metallic and non-metallic substances, whether liquid or solid, have a certain conductivity and an electrical constant. Capacitive sensors detect changes caused by these substances in the electrical field of their detection area. The evaluation of the changes gives exact information on the presence of objects in this area, or, for example, material levels in containers and silos.

Capacitive sensors

- High level of temperature stability
- Enhanced sensing ranges for functional reserve

High level of immunity against:
- Electrostatic discharge, e.g. in plastic or wood production
- Electromagnetic interference, e.g. caused by radio transceivers and mobile telephones
- Interference surge voltage caused by switching devices or solenoid valves
- Conducted high frequency, e.g. frequency converters or switched-mode power supplies

Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Housing material</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 4-wire</td>
<td>Plastic, PTFE</td>
</tr>
<tr>
<td>Continuous current Ia [mA]</td>
<td>≤ 200</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Output function</td>
<td>Complementary</td>
</tr>
<tr>
<td>Installation type</td>
<td>Sensing range S [mm]</td>
</tr>
<tr>
<td>Connection type</td>
<td>Cable</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>Max. switching frequency f [1/s]</td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td>Reverse polarity protection</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
</tr>
</tbody>
</table>

1) PTFE = polytetrafluorethylene-coated
2) Thread diameter x Pitch [mm]
3) Width x Height x Length [mm]
Capacitive sensors

Capacitive proximity sensors

Capacitive sensors are used to monitor the fill level of bottles in filling systems.

Paper feed monitoring in printing or cutting machines. Capacitive sensors are the ideal solution for this application.

Capacitive sensors fitted in an injection moulding machine to monitor the flow of material into containers.

### CM series

<table>
<thead>
<tr>
<th>Specification</th>
<th>CM 30</th>
<th>CQ 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Plastic</td>
<td>Plastic</td>
</tr>
<tr>
<td>Operating voltage U0</td>
<td>10 ... 40 V DC</td>
<td>10 ... 40 V DC</td>
</tr>
<tr>
<td>Continuous current Ia</td>
<td>≤ 200 mA</td>
<td>≤ 200 mA</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP/NPN</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Output function</td>
<td>Complementary</td>
<td>Complementary</td>
</tr>
<tr>
<td>Installation type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensing range Sn</td>
<td>16 mm</td>
<td>16 mm</td>
</tr>
<tr>
<td>Connection type</td>
<td>Cable, connector M 12 x 1</td>
<td>Cable, connector M 12 x 1</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
<td>IP 67</td>
</tr>
<tr>
<td>Max. switching frequency f / [Hz]</td>
<td>50 Hz</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-circuit protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) PTFE = polytetrafluoroethylene-coated
2) Thread diameter x Pitch [mm]
3) Width x Height x Length [mm]
Detection of magnets

Very high switching distances and detection of permanent magnets through material are possible using accurate and reliable magnetic sensors.

**Magnetic sensors**

- Detection of magnetic objects, usually permanent magnets
- Large sensing ranges despite compact designs
- Objects can be detected through non-magnetic materials

**Technical data**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Housing material</th>
<th>Operating voltage $U_b$</th>
<th>Continuous current $I_a$ [mA]</th>
<th>Switching output</th>
<th>Output function</th>
<th>Sensing range $S_n$ [mA]$^1$</th>
<th>Connection type</th>
<th>Enclosure rating</th>
<th>Max. switching frequency $f$ [Hz]</th>
<th>Power-up pulse suppression</th>
<th>Short-circuit protection</th>
<th>Reverse polarity protection</th>
<th>Wire-break protection</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8 x 1$^1$</td>
<td>Brass, nickel-plated</td>
<td>10 ... 30 V DC</td>
<td>$\leq$ 300</td>
<td>PNP/NPN</td>
<td>60</td>
<td>60</td>
<td></td>
<td>IP 67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 12</td>
<td>Brass, nickel-plated</td>
<td>10 ... 30 V DC</td>
<td>$\leq$ 300</td>
<td>PNP/NPN</td>
<td>60</td>
<td>60</td>
<td></td>
<td>IP 67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Further designs**

<table>
<thead>
<tr>
<th>NMUR EN 50227</th>
</tr>
</thead>
</table>

$^1$ Thread diameter x Pitch [mm]
$^2$ Width x Height x Length [mm]

$^3$ Refers to device embedded in non-magnetic materials with magnet M 4.0 (see Accessories)
Magnetic proximity sensors are used for triggering automated guided vehicle systems in high-bay warehouses. They actuate the safety sensor systems (e.g., SICK laser scanner) when the vehicle enters the aisle between the high-bay racks.

### Magnetic proximity sensors

#### Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Operating voltage $U_b$</th>
<th>Continuous current $I_a$ [mA]</th>
<th>Switching output</th>
<th>Output function</th>
<th>Sensing range $S_n$ [mA]$^3$</th>
<th>Connection type</th>
<th>Enclosure rating</th>
<th>Max. switching frequency $f$ [/s]</th>
<th>Power-up pulse suppression</th>
<th>Short-circuit protection</th>
<th>Reverse polarity protection</th>
<th>Wire-break protection</th>
<th>Approvals</th>
</tr>
</thead>
</table>
| MM 18      | M 18 x 1$^1$            | Brass, nickel-plated         | 10 ... 30 V DC    | ≤ 300          | PNP/NPN                      | 70             | Pipe/connector M 12 x 1 | IP 67                         | 5000                         |                |                      |                      | NAMUR EN 50227
| MQ 10      | 10 x 16 x 28/37$^2$     | Plastic                       | 10 ... 30 V DC    | ≤ 300          | PNP/NPN                      | 60             | Cable/connector M 8 x 1 | IP 67                         | 5000                         |                |                      |                      | NAMUR EN 50227

$^1$ Thread diameter x Pitch [mm]
$^2$ Width x Height x Length [mm]
$^3$ Refers to devices embedded in non-magnetic materials with magnet M 4.0 (see Accessories)
Magnetic cylinder sensors

SICK offers a range of special magnetic cylinder sensors, which are used for detecting the position of pistons in pneumatic cylinders. They are attached directly to the cylinder body. The sensors reliably detect a magnetic ring on the piston through the housing wall (made of aluminium, brass or stainless steel) and trigger a switching signal.

- **Weld immune**
  Strong magnetic fields capable of impairing the functioning of the sensors are produced during welding. The MZU 2 magnetic cylinder sensors from SICK can be used under these difficult conditions.

- **Easy mounting**
  The magnetic cylinder sensors for profile cylinders with T-slot can be inserted from above into all standard T-slots. This makes additional assembly work unnecessary and also allows the sensors to be used for applications where space is restricted.

### Technical data

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>3.6 x 2.8 x 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Plastic</td>
</tr>
<tr>
<td>Operating voltage Ue</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>Output current Ia [mA]</td>
<td>≤ 70</td>
</tr>
<tr>
<td>Switching output</td>
<td>PNP/Reed</td>
</tr>
<tr>
<td>Output function</td>
<td>mV</td>
</tr>
<tr>
<td>Sensitivity [mT]</td>
<td>Sensing face</td>
</tr>
<tr>
<td>Connection type</td>
<td>IP 67</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>Max. switching frequency f [Hz]</td>
</tr>
<tr>
<td>Protective measures</td>
<td>≤ 100/≤ 500</td>
</tr>
<tr>
<td>Approvals</td>
<td>1000/500</td>
</tr>
<tr>
<td>Special designs</td>
<td>2, 3</td>
</tr>
<tr>
<td>NAMUR EN 50227</td>
<td>Weld immune</td>
</tr>
<tr>
<td>Reed switch</td>
<td>Can be inserted from above</td>
</tr>
<tr>
<td>Teflon coating</td>
<td>Weld immune</td>
</tr>
<tr>
<td>Accessories</td>
<td>Mounting adapter</td>
</tr>
</tbody>
</table>

#### MZ series

**MZL/RZL 1**
- Dimensions: 6.05 x 4.3 x 31.5
- Housing material: Plastic
- Operating voltage: 10 ... 30 V DC
- Output current: ≤ 100/≤ 500
- Switching output: PNP/NPN/Reed
- Connection type: mV
- Enclosure rating: 5000/400
- Protective measures: 1, 2, 3, 4
- Special designs: NAMUR EN 50227, Reed switch, Teflon coating, Can be inserted from above, Weld immune
- Accessories: Mounting adapter

**MZT 6/RZT 6**
- Dimensions: 6.05 x 4.3 x 31.5
- Housing material: Plastic
- Operating voltage: 10 ... 30 V DC
- Output current: ≤ 100/≤ 500
- Switching output: PNP/Reed
- Connection type: mV
- Enclosure rating: 5000/400
- Protective measures: 1, 2, 3, 4
- Special designs: NAMUR EN 50227, Reed switch, Teflon coating, Can be inserted from above, Weld immune
- Accessories: Mounting adapter
### Magnetic sensors

#### Magnetic cylinder sensors

<table>
<thead>
<tr>
<th>MZT 1/RZT 1</th>
<th>MZF 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 x 4.6 x 30</td>
<td>6.7 x 6 x 30</td>
</tr>
<tr>
<td>Plastic</td>
<td>Plastic</td>
</tr>
<tr>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>≤ 100</td>
<td>≤ 150</td>
</tr>
<tr>
<td>PNP/Reed</td>
<td>PNP</td>
</tr>
<tr>
<td>≤ 3</td>
<td>3</td>
</tr>
<tr>
<td>Cable, cable with connector M 8 x 1</td>
<td>Cable, cable with connector M 8 x 1</td>
</tr>
<tr>
<td>IP 67</td>
<td>IP 67</td>
</tr>
<tr>
<td>5000/400</td>
<td>5000</td>
</tr>
<tr>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

### MZ series

<table>
<thead>
<tr>
<th>MZZ 1</th>
<th>MZZ 2</th>
<th>MZZ 3</th>
<th>MZZ 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 x 23/34 x 30</td>
<td>37.5 x 35.5/44.5 x 35</td>
<td>37.3 x 25.4 x 30</td>
<td>40.8/54 x 32 x 30</td>
</tr>
<tr>
<td>Aluminium</td>
<td>Plastic/aluminium</td>
<td>Aluminium</td>
<td>Aluminium</td>
</tr>
<tr>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>≤ 300</td>
<td>≤ 300</td>
<td>≤ 300</td>
<td>≤ 300</td>
</tr>
<tr>
<td>PNP/NPN</td>
<td>PNP/NPN</td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td>≤ 3</td>
<td>≤ 3</td>
<td>≤ 3</td>
<td>≤ 3</td>
</tr>
<tr>
<td>Cable, connector M 12 x 1</td>
<td>Cable, connector M 12 x 1</td>
<td>Cable, connector M 12 x 1</td>
<td>Cable, connector M 12 x 1</td>
</tr>
<tr>
<td>IP 67</td>
<td>IP 67</td>
<td>IP 67</td>
<td>IP 67</td>
</tr>
<tr>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

#### Technical data

- **Dimensions**: Width x Height x Length [mm]
- **Housing material**: Plastic, Aluminium
- **Operating voltage**: 10 ... 30 V DC
- **Output current**: ≤ 100 mA
- **Sensitivity**: ≤ 3 mT
- **Enclosure rating**: IP 67
- **Max. switching frequency**: ≤ 300 Hz
- **Protective measures**: 1 = Power-up pulse suppression, 2 = Short-circuit protection, 3 = Reverse polarity protection, 4 = Wire-break protection

#### Special designs

- NAMUR EN 50227
- Reed switch
- Teflon coating
- Can be inserted from above
- Weld immune

#### Accessories

- BEF-KHZ ST1 ...
- BEF-KHZ PT1 ...
- BEF-KHZ RT1 ...

#### Application

- Profile cylinder T-slot mounting
- Profile cylinder T-slot mounting
- Profile cylinder T-slot mounting
- Profile cylinder T-slot mounting
- Tie rod cylinder up to rod ø 10 mm
- Tie rod cylinder up to rod ø 12.5 mm
- Integrated profile cylinder up to profile width 14 mm
- Integrated profile cylinder up to profile width 18 mm

---

*1 Width x Height x Length [mm]*

*2 1 = Power-up pulse suppression, 2 = Short-circuit protection, 3 = Reverse polarity protection, 4 = Wire-break protection*
## Magnetic cylinder sensors

### MZ series

<table>
<thead>
<tr>
<th>MZK 1/MZK 3</th>
<th>MZR 1</th>
<th>MZR 2</th>
<th>MZU 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions 1)</td>
<td>Ø B; L = 30/37</td>
<td>12 x 12/19 x 30</td>
<td>18 x 29 x 48</td>
</tr>
<tr>
<td>14.3/21 x 13.5 x 26</td>
<td>Aluminium</td>
<td>Aluminium</td>
<td>Die-cast zinc</td>
</tr>
<tr>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>≤ 300</td>
<td>≤ 300</td>
<td>≤ 300</td>
<td>≤ 300</td>
</tr>
<tr>
<td>PNP</td>
<td>PNP/NPN</td>
<td>PNP/NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Cable, connector M 8 x 1</td>
<td>Cable, connector M 8 x 1</td>
<td>Connector M 12 x 1</td>
<td></td>
</tr>
<tr>
<td>IP 67</td>
<td>IP 67</td>
<td>IP 67</td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>5000</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
</tr>
</tbody>
</table>

### Technical data

- **Dimensions**: Width x Height x Length [mm]
- **Housing material**: Aluminium, Die-cast zinc
- **Operating voltage**: 10 ... 30 V DC
- **Switching output**: ≤ 300 mA
- **Output function**: PNP, PNP/NPN
- **Enclosure rating**: IP 67
- **Max. switching frequency**: 5000 Hz

### Special designs

- **NAMUR EN 50227**
- **Reed switch**
- **Teflon coating**
- **Can be inserted from above**
- **Weld immune**

### Accessories

- **Mounting adapter**

### Application

- **Short-stroke cylinder**
- **Round-body cylinder up to ø 63 mm**
- **Round-body cylinder up to ø 100 mm; universal**
- **Pull-rod cylinder up to rod ø 20 mm, integrated profile cylinder up to profile width 18 mm, profile cylinder with T-slip**

---

1) Width x Height x Length [mm]
2) 1 = Power-up pulse suppression
   2 = Short-circuit protection
   3 = Reverse polarity protection
   4 = Wire-break protection

---

Mounting adapter for MZT 1/RZT 1 and MZT 6/RZT 6
- Integrated profile cylinder
- Tie rod cylinder
- Round-body cylinder
- Cylinder with dovetail groove
Transmit light, gain information

Modern optoelectronic sensors operate on the basis of different light sources. Depending on the application, visible red light, invisible infrared light, blue, green or laser light may be used. Every change in the light beam is detected, evaluated in the receiver and converted into a digital or analogue signal.

Different functional principles open up a wide field of applications for optoelectronic sensors in all areas of automation.

**Photoelectric proximity switches and photoelectric reflex switches**

Photoelectric proximity switches make use of the light reflected from the object being detected. The sensors detect the reflected light and evaluates it – combined with efficient blanking of background and foreground, this is an excellent solution. Photoelectric reflex switches require an additional reflector which is mounted opposite the sender-receiver unit. Every break in the light beam is detected and evaluated.

**Photoelectric switches with fibre-optic cables**

In particularly confined spaces, fibre-optic cables are often the only way of getting a sensor into position. The flexible plastic and fibre-optic cables increase the field of application of proximity switches and through-beam systems.

**Photoelectric switches**

photoelectric switches

**Contrast, colour and luminescence sensors**

Complex sensors are used not only for detecting but also distinguishing objects. Whether high-tone contrast, luminescence detection or colour distinction are required, there is a sensor specially designed for each. With the help of light grids, some sensors are even able to cover the second dimension.

**Distance sensors**

Binary switching or measurement required? Analogue sensors also measure distances with the help of time-of-light measurements or triangulation, depending on the application.

**Vision sensors**

The important step to structure and object recognition is possible using vision sensors. With the appropriate sensors, all three dimensions of the check are covered. As with the other sensors, the same simple basic principles of ‘Teach-in, comparing and evaluating’, produce a simple and reliable detection process. Integrated and external lighting, side and back respectively, makes vision sensors suitable for a wide range of applications. In this way, a large number of solutions can be achieved simply and without demanding programming operations.
Optoelectronic sensors

Photoelectric switches and photoelectric proximity switches

**Overview**

**Photoelectric proximity switches**
- Sender and receiver in one housing
- No reflector required
- No reaction to light reflected off object to be detected

**Photoelectric proximity switches, energetic**
- Scanning range switching point can be set by adjusting sensitivity

**Through-beam photoelectric switches**
- Separate sender and receiver (2 devices)
- Very large scanning ranges
- High operating reserves
- Reliable detection of both transparent and reflective objects
- Automatic sensitivity adjustment with “Teach-in” sensors

**Fibre-optic photoelectric switches**
- Sender and receiver in one housing
- 2 fibre-optic cables, scanning or through-beam principle possible
- Appropriate fibre-optic cable available for each task
- Especially suitable where installation space is limited and for use in hostile environments

**Technical data**

<table>
<thead>
<tr>
<th>Photoelectric proximity switches</th>
<th>Miniature photoelectric switches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S 130</strong></td>
<td><strong>W 2 Slim</strong></td>
</tr>
<tr>
<td>Dimensions**1)</td>
<td>Dimensions**1)</td>
</tr>
<tr>
<td>9.2 x 27 x 16</td>
<td>7.6 x 22 x 13.5</td>
</tr>
<tr>
<td>8.5 x 17/23 x 11.2</td>
<td>8.5 x 17/23 x 11.2</td>
</tr>
<tr>
<td>15.2/21.7 x 22/23 x 3.2</td>
<td>15.2/21.7 x 22/23 x 3.2</td>
</tr>
<tr>
<td>Housing material</td>
<td>Housing material</td>
</tr>
<tr>
<td>Plastic</td>
<td>Plastic</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td>Switching outputs</td>
<td>Switching outputs</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>Enclosure rating</td>
</tr>
<tr>
<td>IP 66</td>
<td>IP 66</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>Ambient operating temperature</td>
</tr>
<tr>
<td>–25 °C ... +55 °C</td>
<td>–25 °C ... +55 °C</td>
</tr>
<tr>
<td>Connection type</td>
<td>Connection type</td>
</tr>
<tr>
<td>Cables/connector</td>
<td>Cables/connector</td>
</tr>
<tr>
<td>Approvals</td>
<td>Approvals</td>
</tr>
<tr>
<td>Photoelectric proximity switches</td>
<td>Photoelectric proximity switches</td>
</tr>
<tr>
<td>Energetic scanning range [mm]</td>
<td>Energetic scanning range [mm]</td>
</tr>
<tr>
<td>BGS2) range [mm]</td>
<td>BGS2) range [mm]</td>
</tr>
<tr>
<td>0 ... 60/0 ... 200</td>
<td>0 ... 60/0 ... 200</td>
</tr>
<tr>
<td>BGB3) range [mm]</td>
<td>BGB3) range [mm]</td>
</tr>
<tr>
<td>0 ... 0.5/PL 40 A</td>
<td>0 ... 0.5/PL 40 A</td>
</tr>
<tr>
<td>FGS4) range [mm]</td>
<td>FGS4) range [mm]</td>
</tr>
<tr>
<td>0 ... 1</td>
<td>0 ... 1</td>
</tr>
<tr>
<td>Special features</td>
<td>Special features</td>
</tr>
<tr>
<td>Light source</td>
<td>Light source</td>
</tr>
<tr>
<td>Red light/green light</td>
<td>Red light/green light</td>
</tr>
</tbody>
</table>

---

1) Width x Height x Depth [mm]
2) BGS = Background suppression
3) BGB = Background blanking
4) FGS = Foreground suppression
## Optoelectronic sensors

### Photoelectric switches and photoelectric proximity switches

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Switching outputs</th>
<th>Enclosure rating</th>
<th>Ambient operating temperature</th>
<th>Connection type</th>
<th>Approvals</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 4-2</td>
<td>16 x 32 x 12</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>NPN/PNP</td>
<td>IP 67</td>
<td>–40 °C ... +60 °C</td>
<td>Cable/connector</td>
<td>CE</td>
<td></td>
</tr>
<tr>
<td>W 4-2 Teflon®</td>
<td>22 x 42 x 22</td>
<td>Teflon® coated</td>
<td>10 ... 30 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SEMI, FDA</td>
<td></td>
</tr>
<tr>
<td>W 140-2</td>
<td>11 x 31 x 20</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>NPN/PNP</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W 150</td>
<td>10 x 28 x 17.5</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>NPN/PNP</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W 160</td>
<td>11 x 23 x 38</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>NPN/PNP</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W 160T</td>
<td>11 x 23 x 38</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>NPN/PNP</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Technical data

#### Dimensions
- W = Width x Height x Depth [mm]
- Teflon® for transparent objects
- T = Teach-in setting via button or external control cable
- BGS = Background suppression
- FGS = Foreground suppression

#### Approvals
- CE
- SEMI, FDA

#### Special features
- Red light
- Pin Point LED
- Teach-in
- Glass detection
- Slotted masks, polarising filter attachments
- Infrared light

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**Optoelectronic sensors**

### Photoelectric switches and photoelectric proximity switches

<table>
<thead>
<tr>
<th>Small photoelectric switches</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image of photoelectric switch" /></td>
</tr>
<tr>
<td><img src="image2" alt="Image of photoelectric switch" /></td>
</tr>
<tr>
<td><img src="image3" alt="Image of photoelectric switch" /></td>
</tr>
<tr>
<td><img src="image4" alt="Image of photoelectric switch" /></td>
</tr>
</tbody>
</table>

#### Technical data

- **Dimensions**: 12 x 37 x 29 mm
- **Housing material**: Plastic/metal
- **Supply voltage**: 10 ... 30 V DC
- **Switching outputs**: NPN/PNP
- **Enclosure rating**: IP 67
- **Ambient operating temperature**: –25 °C ... +55 °C
- **Connection type**: Cable/connector

- **Photoelectric proximity switches**
  - **Energetic scanning range**: 10 ... 550 mm
  - **BGS** range: 0.01 ... 4.0 mm
  - **FGS** range: 0.01 ... 0.8 mm
  - **Special features**: Glass detection
  - **Light source**: Red light on reflector

- **Photoelectric reflex switches**
  - **Operating range**: 0.1 ... 8 mm
  - **Typical max. range**: 0.01 ... 8 mm
  - **Special features**: Glass detection
  - **Light source**: Laser, red; class 2

- **Through-beam photoelectric switches**
  - **Typical max. range**: 0 ... 5 m
  - **Special features**: Teflon®

---

**Note:**

1. Width x Height x Depth (mm)
2. For transparent objects
3. BS = Background suppression
4. T = Teach-in setting via button or external control cable
5. Teflon® is a registered trademark of the Dupont Corporation
6. Teflon coating on request

---

**Photoelectric reflex switches**

- **Operating range**: 0 ... 10 mm
- **Typical max. range**: 0.01 ... 8 mm
- **Special features**: Glass detection
- **Light source**: Red light on reflector

**Through-beam photoelectric switches**

- **Typical max. range**: 0 ... 5 m
- **Special features**: Teflon®

---

**Photoelectric proximity switches**

- **Energetic scanning range**: 10 ... 550 mm
- **BGS** range: 0.01 ... 4.0 mm
- **FGS** range: 0.01 ... 0.8 mm
- **Special features**: Glass detection
- **Light source**: Red light on reflector

---

**Photoelectric switches**

- **Operating range**: 0 ... 10 mm
- **Typical max. range**: 0.01 ... 8 mm
- **Special features**: Glass detection
- **Light source**: Laser, red; class 2

---

**Photoelectric reflex switches**

- **Operating range**: 0 ... 50 mm
- **Typical max. range**: 0.01 ... 8 mm
- **Special features**: Glass detection
- **Light source**: Laser, red; class 2

---

**Through-beam photoelectric switches**

- **Typical max. range**: 0 ... 5 m
- **Special features**: Teflon®

---

**Photoelectric proximity switches**

- **Energetic scanning range**: 10 ... 550 mm
- **BGS** range: 0.01 ... 4.0 mm
- **FGS** range: 0.01 ... 0.8 mm
- **Special features**: Glass detection
- **Light source**: Red light on reflector
### Technical data

<table>
<thead>
<tr>
<th>Photoelectric proximity switches</th>
<th>Small photoelectric switches</th>
<th>Standard photoelectric switches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong> 1)</td>
<td><strong>W 12 G</strong></td>
<td><strong>W 12 L-2</strong></td>
</tr>
<tr>
<td>Width x Height x Depth [mm]</td>
<td>15 x 49 x 41.5</td>
<td>15 x 49 x 41.5</td>
</tr>
<tr>
<td><strong>Housing material</strong></td>
<td>Metal</td>
<td>Metal</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>10 ... 30 V DC</td>
<td>10 ... 30 V DC</td>
</tr>
<tr>
<td><strong>Switching outputs</strong></td>
<td>NPN/PNP</td>
<td>NPN/PNP</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
<td>IP 67</td>
<td>IP 67</td>
</tr>
<tr>
<td><strong>Ambient operating temperature</strong></td>
<td>–25 °C ... +60 °C</td>
<td>–10 °C ... +50 °C</td>
</tr>
<tr>
<td><strong>Connection type</strong></td>
<td>Plug connector</td>
<td>Plug connector</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Photoelectric reflex switches

<table>
<thead>
<tr>
<th>Operating range [m] on reflector</th>
<th><strong>WL 12 G</strong></th>
<th><strong>WL 12 L-2</strong></th>
<th><strong>WL 14</strong></th>
<th><strong>WL 18-2</strong></th>
<th><strong>WS/WE 12 L-2</strong></th>
<th><strong>WL 24-2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>0 ... 2/T, PL 80 A</td>
<td>0 ... 13/P, PL 80 A</td>
<td>0 ... 3/PL 80 A</td>
<td>0 ... 5/PL 80 A</td>
<td>0 ... 80</td>
<td>0 ... 15/P, PL 80 A</td>
</tr>
<tr>
<td>Special features</td>
<td>Glass detection</td>
<td>Yes, red light, class 2</td>
<td>Yes, red light, class 2</td>
<td>Yes, red light</td>
<td>Laser, red, class 2</td>
<td>Yes, red light</td>
</tr>
</tbody>
</table>

### Through-beam photoelectric switches

<table>
<thead>
<tr>
<th>Typical max. range [m]</th>
<th><strong>WL 12 L-2</strong></th>
<th><strong>WL 14</strong></th>
<th><strong>WL 18-2</strong></th>
<th><strong>WS/WE 12 L-2</strong></th>
<th><strong>WS/WE 18-2</strong></th>
<th><strong>WS/WE 24-2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>30 ... 300</td>
<td>50 ... 1500</td>
<td>50 ... 250/50 ... 600/50 ... 700/50 ... 1000</td>
<td>0.1 ... 3/PL 80 A</td>
<td>0.1 ... 7/PL 80 A</td>
<td>0 ... 60</td>
</tr>
<tr>
<td>Special features</td>
<td>Laser, red, class 2</td>
<td>Red light</td>
<td>Red light/Infrared light</td>
<td>Laser, red, class 2</td>
<td>Yes, red light</td>
<td>Laser, red</td>
</tr>
</tbody>
</table>

**Notes:**

1) Width x Height x Depth [mm]
2) BGS = Background suppression
3) BGB = Background blanking
4) FGS = Foreground suppression
5) For transparent objects
6) T = Teach-in setting via button or external control cable
7) **AO** = Alarm output
8) **TI** = Test input
9) Teflon® is a registered trademark of the Dupont Corporation
Optoelectronic sensors

### Photoelectric switches and photoelectric proximity switches

#### Technical data
- **Dimensions**
  - Width x Height x Depth [mm]
- **Housing material**
- **Supply voltage**
- **Switching outputs**
- **Enclosure rating**
- **Ambient operating temperature**
- **Connection type**
- **Approvals**

#### Photoelectric proximity switches
- **Energetic scanning range [mm]**
  - BGB
  - BGS
  - FGS
- **Special features**
- **Light source**

#### Photoelectric reflex switches
- **Operating range [m] on reflector**
- **Typical max. range [m] on reflector**
- **Special features**
- **Polarising filter/light source**

#### Through-beam photoelectric switches
- **Typical max. range [m]**
- **Special features**
- **Light source**

#### Standard photoelectric switches

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Switching outputs</th>
<th>Enclosure rating</th>
<th>Ambient operating temperature</th>
<th>Connection type</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 24 Exi</td>
<td>27 x 87.5 x 65</td>
<td>Metal</td>
<td>8 V DC (5.0 ... 15.5 V)</td>
<td>10 ... 30 V DC/ 12 ... 240 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–20 °C ... +50 °C</td>
<td>Terminal chamber/plug connector</td>
</tr>
<tr>
<td>W 250</td>
<td>20 x 65 x 43</td>
<td>Plastic</td>
<td>8 V DC (5.0 ... 16.5 V)</td>
<td>10 ... 30 V DC/ 12 ... 240 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–20 °C ... +50 °C</td>
<td>Terminal chamber/plug connector</td>
</tr>
<tr>
<td>W 260</td>
<td>25 x 77.5 x 63</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 23</td>
<td>24 x 80 x 54</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–25 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 27-2</td>
<td>24 x 80 x 54</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–40 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 34</td>
<td>27 x 92 x 70</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–40 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 24 Exi</td>
<td>27 x 87.5 x 65</td>
<td>Metal</td>
<td>8 V DC (5.0 ... 15.5 V)</td>
<td>10 ... 30 V DC/ 12 ... 240 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–20 °C ... +50 °C</td>
<td>Terminal chamber/plug connector</td>
</tr>
<tr>
<td>W 250</td>
<td>20 x 65 x 43</td>
<td>Plastic</td>
<td>8 V DC (5.0 ... 16.5 V)</td>
<td>10 ... 30 V DC/ 12 ... 240 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–20 °C ... +50 °C</td>
<td>Terminal chamber/plug connector</td>
</tr>
<tr>
<td>W 260</td>
<td>25 x 77.5 x 63</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–25 °C ... +55 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 23</td>
<td>24 x 80 x 54</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–25 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 27-2</td>
<td>24 x 80 x 54</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–40 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
<tr>
<td>W 34</td>
<td>27 x 92 x 70</td>
<td>Plastic</td>
<td>10 ... 30 V DC/ 24 ... 240 V AC</td>
<td>NPN/NPN/Rel. SPDT</td>
<td>IP 67</td>
<td>–40 °C ... +60 °C</td>
<td>Cable/connector</td>
<td></td>
</tr>
</tbody>
</table>

### Notes
- [1] Width x Height x Depth [mm]
- [2] BGB = Background blanking
- [3] BGS = Background suppression
- [4] FGS = Foreground suppression
- [5] For transparent objects
- [6] T = Teach-in setting via button or external control cable
- [7] AO = Alarm output
- [8] TI = Test input
- [9] II 2G Ex iIC T6

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### Optoelectronic sensors

#### Photoelectric switches and photoelectric proximity switches

**Technical data**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>W 45</th>
<th>WTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width x Height x Depth [mm]</td>
<td>60 x 105 x 105</td>
<td>18/51.5 x 99.5/151 x 46</td>
</tr>
</tbody>
</table>

| Housing material | Metal | Plastic/metal |

| Supply voltage | 10 ... 30 V DC | 24 ... 240 V AC |

| Switching outputs | NPN/PNP, Q + Q–/Rel. SPDT | PNP/PNP, Q/NPN, Q/TRIAC |

| Enclosure rating | IP 67 | IP 54 |

| Ambient operating temperature | –25 °C ... +55 °C | –25 °C ... +70 °C |

| Connection type | Terminal chambers/plug connector | Cable/connector |

| Approvals | |

**Photoelectric proximity switches**

<table>
<thead>
<tr>
<th>Energetic scanning range [mm]</th>
<th>WT 45</th>
<th>WTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGS2) range [mm]</td>
<td>400 ... 2000</td>
<td>300 ... 900</td>
</tr>
</tbody>
</table>

| BGP range [mm] | |

| Enclosure rating | IP 67 |

| Ambient operating temperature | –25 °C ... +70 °C |

| Connection type | Cable/connector |

| Approvals | |

**Photoelectric reflex switches**

<table>
<thead>
<tr>
<th>Operating range [m]/on reflector</th>
<th>WL 45</th>
<th>VL 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical max. range [m]/on reflector</td>
<td>0 ... 25/PL 80 A</td>
<td>0.005 ... 2/C 110</td>
</tr>
</tbody>
</table>

| Special features | AO, Ti |

| Polarising filter/light source | Yes/Red light |

<table>
<thead>
<tr>
<th>Through-beam photoelectric switches</th>
<th>WL/WE 45</th>
<th>VS/VE 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical max. range [m]</td>
<td>0 ... 350</td>
<td>0 ... 5</td>
</tr>
</tbody>
</table>

| Special features | AO, Ti |

**Photoelectric switches**

<table>
<thead>
<tr>
<th>Energetic scanning range [mm]</th>
<th>V 12</th>
<th>V 18 straight</th>
<th>V 18 angled</th>
<th>V 18 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical max. range [m]</td>
<td>M 12 x 66/80</td>
<td>M 18 x 63.6/78/80</td>
<td>M 18 x 60.6/75</td>
<td>M 18 x 98/108</td>
</tr>
</tbody>
</table>

| Housing material | Metal | Plastic/metal | Metal | Metal |

| Supply voltage | 10 ... 30 V DC | 10 ... 30 V DC | 10 ... 30 V DC | 10 ... 30 V DC |

| Switching outputs | PNP, Q | PNP, NPN, Q/TRIAC | PNP, NPN, Q | PNP, NPN |

| Enclosure rating | IP 67 | IP 67 | IP 67 |

| Ambient operating temperature | –25 °C ... +60/70 °C | –25 °C ... +60/70 °C | –25 °C ... +60/70 °C | –25 °C ... +70 °C |

| Connection type | Cable/connector | Cable/connector | Cable/connector | Plug connector |

| Approvals | |

**Photoelectric reflex switches**

<table>
<thead>
<tr>
<th>Operating range [m]/on reflector</th>
<th>VL 12</th>
<th>VL 18</th>
<th>VL 18 angled</th>
<th>VL 18 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical max. range [m]</td>
<td>0.005 ... 2/C 110</td>
<td>0.05 ... 3/C 110</td>
<td>0.05 ... 3/C 110</td>
<td>0 ... 30/P 250 F</td>
</tr>
</tbody>
</table>

| Special features | AO, Ti |

| Polarising filter/light source | Yes/Red light |

<table>
<thead>
<tr>
<th>Through-beam photoelectric switches</th>
<th>VS/VE 12</th>
<th>VS/VE 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical max. range [m]</td>
<td>0 ... 20</td>
<td>0 ... 20</td>
</tr>
</tbody>
</table>

| Special features | AO, Ti |

| Light source | Infrared light |

| Approvals | |

---

1) Width x Height x Depth [mm]  
2) BGS = Background suppression  
3) BGP = Background suppression  
4) FGS = Foreground suppression  
5) For transparent objects  
6) AO = Alarm output  
7) AO = Alarm output  
8) TI = Test input
### Photoelectric switches with fibre-optic cables

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Switching outputs</th>
<th>Max. switching frequency</th>
<th>Time delay</th>
<th>Enclosure rating</th>
<th>Amb. operat. temp.</th>
<th>Connection type</th>
<th>Approvals</th>
<th>Scanning system</th>
<th>Special models</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLL 160 (T)</td>
<td>12 x 38.5 x 591</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>1660/s</td>
<td>Time delay, selectable</td>
<td>IP 66</td>
<td>–25 ... +55 °C</td>
<td>Connector M 8</td>
<td>0 ... 70 mm</td>
<td>0 ... 100 mm</td>
<td>Test input, sensitivity can be adjusted with Teach-in ( ), manually or via control wire</td>
</tr>
<tr>
<td>WLL 170 (H/A/T)</td>
<td>9 x 38.5 x 601</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>1430/s; 10000/s (High-speed)</td>
<td>Off delay, 40 ms fix, selectable</td>
<td>IP 66</td>
<td>–25 ... +55 °C</td>
<td>Connector M 8</td>
<td>0 ... 50 mm</td>
<td>0 ... 600 mm</td>
<td>Analog output 1 ... 5 V Sensitivity can be adjusted with Teach-in ( ), manually or via control wire Mark sensor (green light)</td>
</tr>
<tr>
<td>WLL 190 T</td>
<td>10.5 x 32.2 x 76.51</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>2000/s, selectable</td>
<td>0 ... 9 s, selectable</td>
<td>IP 66</td>
<td>–25 ... +55 °C</td>
<td>Connector M 8</td>
<td>0 ... 300 mm</td>
<td>0 ... 1300 mm</td>
<td>Integrated: block installation for internal BUS: 8-times anti-interference, reduced wiring work, internal evaluation logic</td>
</tr>
<tr>
<td>WLL 12</td>
<td>15 x 49 x 531</td>
<td>Metal</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>1300/s</td>
<td>50/s</td>
<td>IP 67</td>
<td>–25 ... +55 °C</td>
<td>Connector M 12</td>
<td>0 ... 50 mm</td>
<td>0 ... 550 mm</td>
<td>Adjusted sensitivity with Teach-in ( ), manual, or via control wire</td>
</tr>
<tr>
<td>WLL 24 Exi</td>
<td>27 x 87.5 x 631</td>
<td>Metal</td>
<td>8.2 V DC</td>
<td>PNP/NPN</td>
<td>50/s</td>
<td>700/s; 25/s (UC)</td>
<td>IP 67</td>
<td>–25 ... +55 °C</td>
<td>Connector M 12/terminal</td>
<td>0 ... 65 mm</td>
<td>0 ... 800 mm</td>
<td>In accordance with EU directive 94/9/EG (ATEX) Ex d IIC T6</td>
</tr>
<tr>
<td>WLL 260</td>
<td>25 x 77.5 x 631</td>
<td>Plastic</td>
<td>10 ... 30 V DC; 12 ... 240 V DC/24 ... 240 V AC</td>
<td>PNP/NPN/Retus 1 x a</td>
<td>700/s; 25/s (UC)</td>
<td>Time delay selectable (UC)</td>
<td>IP 67</td>
<td>–25 ... +70 °C</td>
<td>Connector M 12/terminal</td>
<td>0 ... 50 mm</td>
<td>0 ... 200 mm</td>
<td>Adjustable sensitivity with Teach-in ( ), manual, or via control wire</td>
</tr>
<tr>
<td>VLL 18T</td>
<td>M 18 x 89.42</td>
<td>Plastic</td>
<td>10 ... 30 V DC</td>
<td>PNP/NPN</td>
<td>800/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Dimensions**: Width x Height x Depth [mm]
- **Thread diameter**: x Length [mm]
- **Technical data**: Through-beam systems
- **System features**: Scanning system with background suppression
- **Special models**: Adjustable sensitivity with Teach-in ( ), manual, or via control wire
Optoelectronic sensors

Contrast, colour, luminescence, fork sensors

**Contrast scanners**
- Can distinguish up to 30 shades of grey between black and white
- Switching threshold can be set manually or by Teach-in (static or dynamic)
- High switching frequency
- Can detect print marks, using the difference in contrast between the marks and the background
- Also available with fibre-optic cables

**Colour sensors**
- Identification, checking and sorting according to colour
- Precise colour recognition using transmitted and incident light
- Detection of up to three colours
- Simple programming by means of Teach-in
- Also available with fibre-optic cables

**Luminescence scanners**
- React to luminescent substances
- Detect markings otherwise invisible to the naked eye
- Scanning range adjusted by changing lens
- Also available with fibre-optic cables

**Fork sensors**
- Sender and receiver in one housing
- Large number of different fork widths
- Can be precisely adjusted to the object
- Detection of minute differences in light intensity
- Teach-in function by button or control cable (WF 3T, WF 5T)

Contrast scanners

**ST 130**
- Dimensions: 9.2 x 27 x 16
- Housing material: Plastic
- Supply voltage: 10 ... 30 V DC
- Enclosure rating: IP 66
- Ambient operating temperature: –25 °C ... +55 °C
- Approvals: PNP/NPN
- Switching frequency: 2500/s
- Light source: Green/red light
- Interface: Q
- Connection type: Cable/connector M 8
- Teach-in: Manual/external

**Technical data**
- Dimensions: Width x Height x Depth [mm]
- Housing material
- Supply voltage
- Enclosure rating
- Ambient operating temperature
- Approvals
- Scanning distance (scanning mode) [mm]
- Switching outputs
- Analog output
- Switching frequency
- Light source
- Interface
- Connection type
- Teach-in

**WTM 160 (T)**
- Dimensions: 11 x 23 x 16
- Housing material: Plastic
- Supply voltage: 10 ... 30 V DC
- Enclosure rating: IP 67
- Ambient operating temperature: –25 °C ... +55 °C
- Approvals: PNP/NPN
- Scanning distance (scanning mode) [mm]
- Switching outputs
- Analog output
- Switching frequency
- Light source
- Interface
- Connection type
- Teach-in
- Cable/connector M 8
- Teach-in: Manual/external
## Technical data

### Dimensions\(^1\)

<table>
<thead>
<tr>
<th>Device</th>
<th>Width x Height x Depth [mm]</th>
<th>Housing material</th>
<th>Supply voltage</th>
<th>Enclosure rating</th>
<th>Ambient operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>KT 3</td>
<td>15 x 49 x 41.5</td>
<td>Metal</td>
<td>10 ... 30 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +55 °C</td>
</tr>
<tr>
<td>KT 4-L</td>
<td>30.4 x 99 x 56</td>
<td>Metal</td>
<td>10 ... 30 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +40 °C</td>
</tr>
<tr>
<td>KT 4-L fibre-optic cables</td>
<td>30.4 x 53 x 118.5</td>
<td>Metal</td>
<td>10 ... 30 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +55 °C</td>
</tr>
</tbody>
</table>

### Approvals

- CE
- UL

### Scanning distance (scanning mode) [mm]

<table>
<thead>
<tr>
<th>Device</th>
<th>Scanning distance (scanning mode) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>KT 2</td>
<td>12.5</td>
</tr>
<tr>
<td>KT 3</td>
<td>12.5</td>
</tr>
<tr>
<td>KT 4-L</td>
<td>150</td>
</tr>
<tr>
<td>KT 4-L fibre-optic cables</td>
<td>150</td>
</tr>
</tbody>
</table>

### Switching outputs

- PNP/NPN
- 0 ... 10 mA
- 10000/s
- Red, green light/green light
- Q, ET\(^2\), LD\(^2\), FC\(^2\), Q\(_L\)
- Plug connector M 12

### Analog output

- 0 ... 10 mA (optional)
- 10000/s
- Red, blue, green light/green light
- Q, ET\(^2\), LD\(^2\), FC\(^2\), Q\(_L\)
- Plug connector M 12

### Switching frequency

- 1000/s; 10000/s
- Q\(_P\)/Q\(_N\)
- Plug connector M 12

### Light source

- Laser, red; class 2

### Interface

- Cable/connector M 8

### Connection type

- Static/dynamic

### Teach-in

- ET = Teach-in input
- LD = Light/dark-switching
- FC = Fine/coarse input

---

**Optoelectronic sensors**

**Contrast, colour, luminescence, fork sensors**

### WL 170 (T)

- Plastic
- 10 ... 30 V DC
- IP 67
- –25 °C ... +55 °C
- 10000/s
- Red, blue, green light/green light
- Plug connector M 12

### KT 2

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, blue, green light/green light
- Plug connector M 12

### KT 3

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, blue, green light/green light
- Plug connector M 12

### KT 5

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +40 °C
- 10000/s
- Green light
- Plug connector M 12

### KT 5L

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Laser, red; class 2
- Plug connector M 12

---

**Contrast scanners**

### WLL 170 (T)

- Plastic
- 10 ... 30 V DC
- IP 50
- –25 °C ... +55 °C
- Depending on fibre-optic cable LL3, objective
- PNP/NPN
- 10000/s
- Green/red light
- Q, QA
- Cable/connector M 8

---

**Contrast scanners**

### KT 2

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, green light
- QP/QN
- Plug connector M 12

### KT 3

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, green light/green light
- Q, ET\(^2\), LD\(^2\), FC\(^2\), Q\(_L\)
- Plug connector M 12

### KT 5

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +40 °C
- 10000/s
- Laser, red; class 2
- Plug connector M 12

### KT 5L

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Laser, red; class 2
- Plug connector M 12

### KTL 5-2 fibre-optic cables

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- Depending on fibre-optic cable
- PNP/NPN
- 10000/s
- Green light
- Plug connector M 12

---

**Contrast scanners**

### WLL 170 (T)

- Plastic
- 10 ... 30 V DC
- IP 50
- –25 °C ... +55 °C
- Depending on fibre-optic cable LL3, objective
- PNP/NPN
- 10000/s
- Green/red light
- Q, QA
- Cable/connector M 8

### KT 2

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, green light
- QP/QN
- Plug connector M 12

### KT 3

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Red, green light/green light
- Q, ET\(^2\), LD\(^2\), FC\(^2\), Q\(_L\)
- Plug connector M 12

### KT 5

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +40 °C
- 10000/s
- Laser, red; class 2
- Plug connector M 12

### KT 5L

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- 10000/s
- Laser, red; class 2
- Plug connector M 12

### KTL 5-2 fibre-optic cables

- Metal
- 10 ... 30 V DC
- IP 67
- –10 °C ... +55 °C
- Depending on fibre-optic cable
- PNP/NPN
- 10000/s
- Green light
- Plug connector M 12
### Optoelectronic sensors

#### Contrast, colour, luminescence, fork sensors

<table>
<thead>
<tr>
<th><strong>Technical data</strong></th>
<th><strong>Dimensions</strong>&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Metal</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>12 ... 30 V DC</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>–10 °C ... +60 °C</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
</tr>
<tr>
<td>Scanning distance (scanning mode) [mm]</td>
<td>12.5</td>
</tr>
<tr>
<td>Switching outputs</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Analog output</td>
<td></td>
</tr>
<tr>
<td>Switching frequency</td>
<td>25000/s</td>
</tr>
<tr>
<td>Light source</td>
<td>Red, blue, green light</td>
</tr>
<tr>
<td>Interface</td>
<td>Q&lt;sub&gt;1&lt;/sub&gt;, ET&lt;sup&gt;2&lt;/sup&gt;, AT&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plug connector M 12</td>
</tr>
<tr>
<td>Teach-in</td>
<td>Dynamic</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Width x Height x Depth [mm]
<sup>2)</sup> ET = Teach-in input
<sup>3)</sup> AT = Blanking input

#### Contrast scanners

<table>
<thead>
<tr>
<th><strong>Technical data</strong></th>
<th><strong>Dimensions</strong>&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Plastic</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V DC ± 20 %</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>–10 °C ... +55 °C</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
</tr>
<tr>
<td>Scanning distance (scanning mode) [mm]</td>
<td>12.5</td>
</tr>
<tr>
<td>Scanning range</td>
<td></td>
</tr>
<tr>
<td>Switching outputs</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>1500/s</td>
</tr>
<tr>
<td>Light source</td>
<td>Red, blue, green light</td>
</tr>
<tr>
<td>Interface</td>
<td>Q&lt;sub&gt;1&lt;/sub&gt;, ET&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plug connector M 12</td>
</tr>
<tr>
<td>Teach-in</td>
<td>1 (programmable)</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Width x Height x Depth [mm]
<sup>2)</sup> ET = Teach-in input

#### Colour sensors

<table>
<thead>
<tr>
<th><strong>Technical data</strong></th>
<th><strong>Dimensions</strong>&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Metal</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>12 ... 30 V DC</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>–10 °C ... +55 °C</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
</tr>
<tr>
<td>Scanning distance (scanning mode) [mm]</td>
<td>12.5</td>
</tr>
<tr>
<td>Scanning range</td>
<td></td>
</tr>
<tr>
<td>Switching outputs</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>0.05 ... 1</td>
</tr>
<tr>
<td>Light source</td>
<td>Red, blue, green light</td>
</tr>
<tr>
<td>Interface</td>
<td>ET&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plug connector M 12</td>
</tr>
<tr>
<td>Teach-in</td>
<td>1/3 (programmable)</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Width x Height x Depth [mm]
<sup>2)</sup> ET = Teach-in input

### Technical data

<table>
<thead>
<tr>
<th>CSL 1</th>
<th>LUT 1-4</th>
<th>LUT 2</th>
<th>LUT 3/3-8/3-9</th>
<th>LUT 3-8/9 fibre-optic cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>30.4 x 53 x 118.5</td>
<td>64 x 138 x 200</td>
<td>12 x 40 x 22</td>
<td>27 x 88 x 85.2</td>
</tr>
<tr>
<td>Housing material</td>
<td>Metal</td>
<td>Metal</td>
<td>Plastic</td>
<td>Metal</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>DC 12 ... 30 V</td>
<td>18 ... 30 V DC</td>
<td>24 V DC ± 20 %</td>
<td>12 ... 30 V DC</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
<td>IP 67</td>
<td>IP 67</td>
<td>IP 67</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>–10 °C ... +55 °C</td>
<td>0 °C ... +45 °C</td>
<td>–10 °C ... +55 °C</td>
<td>–10 °C ... +55 °C</td>
</tr>
<tr>
<td>Approvals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanning range (scanning mode) [mm]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanning range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching outputs</td>
<td>PNP/NPN</td>
<td>PNP/analog</td>
<td>PNP/NPN</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Analog output</td>
<td>1000/s</td>
<td>0 ... 1.5 V</td>
<td>5000/s</td>
<td>0.5 ... 10 mA</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>8/15 with fibre-optic cable</td>
<td>UV</td>
<td>8/15 with fibre-optic cable</td>
<td>UV</td>
</tr>
<tr>
<td>Light source</td>
<td>Red, blue, green light</td>
<td>Q</td>
<td>UV</td>
<td>Q</td>
</tr>
<tr>
<td>Interface</td>
<td></td>
<td>Q</td>
<td></td>
<td>Q</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plug connector M 12</td>
<td>Plug connector</td>
<td>Plug connector M 12</td>
<td>Plug connector M 12</td>
</tr>
<tr>
<td>Teach-in</td>
<td>Static (1)</td>
<td>Static (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of colours</td>
<td>Depending on fibre-optic cable (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (programmable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Width x Height x Depth [mm]
2) Fibre-optic cable as accessory
3) ET = Teach-in input
4) AT = Blanking input

---

**Optoelectronic sensors**

**Contrast, colour, luminescence, fork sensors**

**Colour sensors**

**Luminescence scanners**
Labels can only be cut and punched if printing and control marks can be accurately detected. Fork sensors are used to ensure that everything runs smoothly and reliably.

The high repeat accuracy of the KT 10 is required to ensure precise cutting.

### Technical data

<table>
<thead>
<tr>
<th>Dimensions&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>WF/WFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 37 ... 155 x 60 ... 80</td>
<td></td>
</tr>
</tbody>
</table>

- **Housing material**: Metal
- **Supply voltage**: 10 ... 30 V DC
- **Enclosure rating**: IP 65
- **Ambient operating temperature**: –20 °C ... +60 °C
- **Approvals**: CE

<table>
<thead>
<tr>
<th>Fork widths [mm]</th>
<th>WF: 2; 15; 30; 50; 80; 120; 225; WFT: 3; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching outputs</td>
<td>PNP/NPN</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>500/s; 10000/s</td>
</tr>
<tr>
<td>Light source</td>
<td>Infrared light</td>
</tr>
<tr>
<td>Interface</td>
<td>WFT: Teach-in input</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plug connector</td>
</tr>
<tr>
<td>Teach-in</td>
<td>WFT: static&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> Depending on fork width and depth
## Optoelectronic sensors

### Light grids

Through-beam (MLG) and reflection systems (WLG)
- Two-dimensional detection range
- Recording and counting irregular objects
- Measuring and sorting different heights
- Presence and protrusion monitoring
- Sag monitoring for web-shaped materials
- Teach-in function
- Software-supported user-friendly parameterization and user guidance via application wizards (MLG)

<table>
<thead>
<tr>
<th>Technical data</th>
<th>WLG 12&lt;sup&gt;4)&lt;/sup&gt;</th>
<th>MLG&lt;sup&gt;5)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong>&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>62 x 106 x 47</td>
<td>29 x 215 ... 3325 x 34</td>
</tr>
<tr>
<td><strong>Housing material</strong></td>
<td>Plastic</td>
<td>Metal</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>18 ... 30 V DC</td>
<td>15 ... 30 V DC</td>
</tr>
<tr>
<td><strong>Enclosure rating</strong></td>
<td>IP 67</td>
<td>IP 65</td>
</tr>
<tr>
<td><strong>Ambient operating temperature</strong></td>
<td>–25 °C ... +55 °C</td>
<td>–25 °C ... +55 °C</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>3 ... 240, modular structure</td>
<td>5/8.5</td>
</tr>
<tr>
<td><strong>Number of light beams</strong></td>
<td>8</td>
<td>3 ... 240, modular structure</td>
</tr>
<tr>
<td><strong>Scanning range</strong></td>
<td>0 ... 1.5</td>
<td>5/8.5</td>
</tr>
<tr>
<td><strong>Smallest detectable object size [mm]</strong>&lt;sup&gt;2)&lt;/sup&gt;</td>
<td>6 ... 12.5 adjustable&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>10 ... 55&lt;sup&gt;5)&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Switching outputs</strong></td>
<td>8 x PNP + 1 x Alarm</td>
<td>Up to 6 outputs/2 inputs</td>
</tr>
<tr>
<td></td>
<td>1 x PNP + 1 x Alarm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 x PNP, Q, Q–, 2 x NPN, Q, Q–</td>
<td></td>
</tr>
<tr>
<td><strong>Switching frequency</strong></td>
<td>850/s</td>
<td>Infrared light</td>
</tr>
<tr>
<td><strong>Light source</strong></td>
<td>Red light</td>
<td>RS 485 data/</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>RS 485 data/</td>
<td>measurement value output</td>
</tr>
<tr>
<td><strong>Connection type</strong></td>
<td>Static &lt;sup&gt;6)&lt;/sup&gt;</td>
<td>Terminal chamber/plug connector</td>
</tr>
<tr>
<td><strong>Teach-in</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of colours</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Width x Height x Depth [mm]
2) Reflex system
3) Depending on range and reflector
4) Through-beam system
5) Depending on range and beam distance
Distance sensors

- Non-contact, precise distance measurement with red or laser light
- Large operational ranges
- High resolution
- Easy to use thanks to programmable parameters or Teach-in
- Serial interfaces, also SSI for further external processing
- Can be coupled to Profinet, Interbus-S, DeviceNet bus
- Used for positioning cranes, automated guided vehicle systems, rack serving units as well as for monitoring filling levels, loop control and detecting minute parts to μm tolerances

IR data transmission photoelectric switches

- Cableless transmission of data
- Bidirectional communication between sender and receiver
- Low cable installation and maintenance costs
- High degree of immunity against ambient light
- Large operational ranges
- Compatible with Profinet, Interbus and SSI

Distance sensors

Technical data

<table>
<thead>
<tr>
<th>Distance sensors</th>
<th>Optoelectronic sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong>¹</td>
<td></td>
</tr>
<tr>
<td><strong>Housing material</strong></td>
<td>Plastic</td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>18 ... 30 V DC</td>
</tr>
<tr>
<td><strong>_Enclosure rating</strong></td>
<td>IP 67</td>
</tr>
<tr>
<td><strong>Ambient operating temperature</strong></td>
<td>–25 °C ... +50 °C</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scanning distance (scanning mode) [mm]</strong></td>
<td>200 ... 6000</td>
</tr>
<tr>
<td></td>
<td>0.2 ... 20</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>± 8 % on current value²</td>
</tr>
<tr>
<td><strong>Resolution [mm]</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Switching outputs</strong></td>
<td>2 x PNP/NPN</td>
</tr>
<tr>
<td></td>
<td>10/s; 50/s</td>
</tr>
<tr>
<td><strong>“Contamination” output</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>“Light path free” output</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog output</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output rate</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serial Interface</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inputs**

- Light source

**Connection type**

- Laser, infrared; class 1
- Laser, red; class 2

¹) Width x Height x Depth [mm]
²) Object with 90 % remission
³) without heating
⁴) With heating
⁵) ET = Teach-in input
⁶) SH = Blanking input
## Distance sensors

### Technical data

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions (mm)</th>
<th>Housing Material</th>
<th>Supply Voltage</th>
<th>Enclosure Rating</th>
<th>Ambient Operating Temperature</th>
<th>Approvals</th>
<th>Scanning Distance (scanning mode) [mm]</th>
<th>Scanning Range (Reflector mode) [m]</th>
<th>Accuracy</th>
<th>Resolution [mm]</th>
<th>Switching Outputs</th>
<th>Switching Frequency</th>
<th>“Contamination” Output</th>
<th>“Light path free” Output</th>
<th>Analog Outputs</th>
<th>Output Type</th>
<th>Serial Interface</th>
<th>Data Transmission Rate, max.</th>
<th>Inputs</th>
<th>Light Source</th>
<th>Connection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTA 24</td>
<td>27 x 88 x 65</td>
<td>Metal</td>
<td>12 ... 30 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +55 °C</td>
<td></td>
<td>100 ... 3000</td>
<td></td>
<td>± 5 mm (3)</td>
<td>1</td>
<td>2 x PNP</td>
<td>5/4, 50/5, 100/5</td>
<td>Q1</td>
<td>0 ... 20 mA</td>
<td>30 ms</td>
<td>4 ... 20 mA</td>
<td>16 ... 1024 ms, adjustable</td>
<td>4 ... 20 mA, programmable</td>
<td>18 % remission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DT 200</td>
<td>54 x 105 x 138</td>
<td>Metal</td>
<td>18 ... 30 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +45 °C</td>
<td></td>
<td>100 ... 2000</td>
<td></td>
<td>0.1 ... 240</td>
<td>0.1 ... 500</td>
<td>2 x PNP</td>
<td>5/4, 50/5, 100/5</td>
<td>Q1</td>
<td>0 ... 20 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DME 3000</td>
<td>54 x 105 x 138</td>
<td>Metal</td>
<td>18 ... 30 V DC</td>
<td>IP 65</td>
<td>0 °C ... +40 °C</td>
<td></td>
<td>100 ... 8000</td>
<td></td>
<td>0.15 ... 150</td>
<td>0.05 ... 5, adjustable</td>
<td>2 x B</td>
<td>2 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DME 5000</td>
<td>61 x 101 x 176</td>
<td>Metal</td>
<td>18 ... 30 V DC</td>
<td>IP 65</td>
<td>–10 °C ... +55 °C –40 °C ... +55 °C</td>
<td></td>
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</tr>
<tr>
<td>DMT/DML</td>
<td>99.5 x 99.5 x 213.5</td>
<td>Metal</td>
<td>18 ... 30 V DC</td>
<td>IP 65</td>
<td>0 °C ... +40 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
### Optoelectronic sensors

#### Distance sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions (mm)</th>
<th>Housing Material</th>
<th>Supply Voltage</th>
<th>Enclosure Rating</th>
<th>Ambient Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD/OD Hi/ODC</td>
<td>24 x 60 x 50</td>
<td>Plastic/metal</td>
<td>12 ... 24 V DC</td>
<td>IP 67</td>
<td>–10 °C ... +40 °C</td>
</tr>
<tr>
<td>ISD 230/260/280</td>
<td>72 x 169 x 100</td>
<td>Metal</td>
<td>24 V DC ± 20 %</td>
<td>IP 65 with connector cover</td>
<td>0 °C ... +55 °C</td>
</tr>
</tbody>
</table>

#### Data transmission systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions (mm)</th>
<th>Housing Material</th>
<th>Supply Voltage</th>
<th>Enclosure Rating</th>
<th>Ambient Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISD 300</td>
<td>89 x 190 x 120</td>
<td>Metal</td>
<td>18 ... 30 V DC</td>
<td>IP 65</td>
<td>+5 °C ... +50 °C</td>
</tr>
</tbody>
</table>

---

**Technical data**

- **Dimensions**: 24 x 60 x 50 mm for OD/OD Hi/ODC, 72 x 169 x 100 mm for ISD 230/260/280, 89 x 190 x 120 mm for ISD 300.
- **Housing Material**: Plastic/metal for OD/OD Hi/ODC, Metal for ISD 230/260/280, Metal for ISD 300.
- **Supply Voltage**: 12 ... 24 V DC for OD/OD Hi/ODC, 24 V DC ± 20 % for ISD 230/260/280, 18 ... 30 V DC for ISD 300.
- **Enclosure Rating**: IP 67 for OD/OD Hi/ODC, IP 65 with connector cover for ISD 230/260/280, IP 65 for ISD 300.
- **Ambient Operating Temperature**: –10 °C ... +40 °C for OD/OD Hi/ODC, 0 °C ... +55 °C for ISD 230/260/280, +5 °C ... +50 °C for ISD 300.

**Approvals**

- **Scanning distance (scanning mode) [mm]**
  - OD/OD Hi/ODC: 20 ... 400
  - ISD 230/260/280: 0.2 ... 180/200
  - ISD 300: 0.2 ... 120/200

**Scanning range (Reflector mode) [m]**

- OD/OD Hi/ODC: Up to 80 µm, 1 µm
- ISD 230/260/280: 280 µs
- ISD 300: 4 ... 20 mA, 280 µs

**Accuracy**

- OD/OD Hi/ODC: 1 µm
- ISD 230/260/280: 0.2 µm
- ISD 300: 0.2 µm

**Resolution [mm]**

- OD/OD Hi/ODC: 1 µm
- ISD 230/260/280: 0.2 µm
- ISD 300: 0.2 µm

**Switching outputs**

- OD/OD Hi/ODC: 1 x PNP, PNP
- ISD 230/260/280: PNP
- ISD 300: PNP

**Switching frequency**

- OD/OD Hi/ODC: 5/s
- ISD 230/260/280: 5/s
- ISD 300: 5/s

**“Contamination” output**

- OD/OD Hi/ODC: None
- ISD 230/260/280: None
- ISD 300: None

**“Light path free” output**

- OD/OD Hi/ODC: None
- ISD 230/260/280: None
- ISD 300: None

**Analog output**

- ISD 230/260/280: 1.5 Mbit/s
- ISD 300: 1.5 Mbit/s

**Output rate**

- OD/OD Hi/ODC: 280 µs
- ISD 230/260/280: 280 µs
- ISD 300: 280 µs

**Serial Interface**

- OD/OD Hi/ODC: Profibus-DP, RS 232
- ISD 300: Profibus, Interbus/RS 485, Interbus/RS 422, Interbus/LWL DH+/RIO

**Data transmission rate, max.**

- OD/OD Hi/ODC: 1.5 Mbit/s
- ISD 230/260/280: 1.5 Mbit/s, 500 kbit/s, 2 Mbit/s, 230.4 kbit/s
- ISD 300: 1.5 Mbit/s

**Inputs**

- OD/OD Hi/ODC: ET, SH
- ISD 300: ET, SH

**Light source**

- OD/OD Hi/ODC: Red light/laser, red; class 2
- ISD 300: Infrared light, 880 nm

**Connection type**

- OD/OD Hi/ODC: Cable, connector
- ISD 300: Connector

---

**Applications**

- **Robotics**: OD displacement sensors for aligning and positioning robot arms and controlling welding robots used in constructing special-purpose machines or in serial production.
- **Optoelectronics**: Positioning and checking the diameters of rolled materials. The object can move closer to the DS 60 during positioning. The switching output is activated as soon as the taught-in distance is undershot.
- **Electronics**: Red light/laser, class 2.
Intelligent Camera Sensors

- Especially reliable object detection due to very even illumination and strong light intensity assures high safety of production processes.
- Simple installation through integration of lighting, image acquisition, evaluation and result output in a single industrial housing. Suitable for applications with high cycle rates and moving objects, through fast picture acquisition and processing, starting from 2.5 ms. Easy use and flexible adjustment, since the sensor calculates its own setting for the application and the user can then optimize all the parameters systematically if required. The display of the camera image, the parameters and the step-by-step menu guidance are valuable and indispensable aids.
- The scanning of bright surfaces is possible through CMOS technology. In many cases, the brightness characteristics of the object can be used to good effect.
- Simultaneous detection of up to four objects permits sorting tasks or random change of product.
- In addition, the ICS 110 offers rotation contour comparison that permits the recognition even of rotated objects which can be checked for an maximum permissible angle of rotation. Also the ICS 110 possesses an improved level of selectivity.

Vision sensors

- Reliable positioning at docking and transfer points in storage and transport systems, even for temperature, load and steel structure related tolerances.
- Accurate fine positioning (with mm accuracy) of shelf-stacking units after rough positioning.
- Two analogue outputs signal the relative distance of the reflector to the centre of the receiver unit on the x and y axes.

Offset stack counters

- For counting overlapping objects such as magazines, cartons, collapsible boxes.
- Correct counting even with interrupted or irregular shingles.

Position finders

- For detecting the position of objects, monitoring height profiles, level detection and control of material strips.
- Five integrated software modes selectable by button for specific tasks.
- Easy saving of reference values in manually or signal-controlled Teach-in process.

Technical data

- **Dimensions**
  - 47.5 x 47.5 x 139 mm
  - 24 V DC ± 20 %
  - IP 64
  - 0 °C ... +50 °C

- **Approvals**
  - CE

- **Technical data**
  - Scanning distance (scanning mode) [mm]
  - Light sender/Light source
  - Camera
  - Viewing window
  - Number of objects (Verification programs)
  - Switching frequency
  - Switching outputs
  - Connection type
  - Number of Evaluation procedures/software modes

- **ICS 100**
  - 47.5 x 47.5 x 139
  - Metal
  - 24 V DC ± 20 %
  - IP 64
  - 0 °C ... +50 °C

- **ICS 110**
  - 47.5 x 47.5 x 139
  - Metal
  - 24 V DC ± 20 %
  - IP 64
  - 0 °C ... +50 °C

- **Intelligent Camera Sensors**

- **Height finders**
  - For detecting the position of objects, monitoring height profiles, level detection and control of material strips.
  - Easy saving of reference values in manually or signal-controlled Teach-in process.
Vision sensors

Position finders

Light section sensors

Position finders

Light section sensors

Optoelectronic sensors

The DMP used to ensure precise positioning so that vehicles in automatic car parks are placed in their parking space safely and with millimetre accuracy.

Handling vehicles usually approach high-bay storage racks fully automatically. The DMP provides pin-point positioning to ensure that they reach their destination accurately.
Accessories/Interfaces

An extensive range of practical sensor accessories completes the SENSICK program:

- To facilitate electrical and mechanical installation
- To finely adapt sensors to their intended application
- To assist in aligning the sensors
- To protect the sensors against moisture, dust, heat and cold
- To enable specified supply voltages to be connected
- To process output signals and to convert them into logic operations
- To integrate sensors in bus systems

With over 50 years of experience in sensor technology, SICK has comprehensive application know-how from virtually all industry branches. Our product specialists will provide the perfect solution for your particular application problem using sensors or complete systems which ensure that your system continues to function efficiently and remain available at all times.
Other accessories

- Dust and weather shields
  - For sensors used in hostile environments

- Cooling plates for water cooling
  - For sensors used at temperatures up to +160 °C

- Peltier cooling unit
  - For distance measuring equipment used at temperatures up to +55 °C

- Heating unit
  - For distance measuring equipment used at temperatures from –38 to +40 °C

- Luminescence scale
  - Test standard and reference for signal intensity of luminescent markings

- Fiber-optic cables
  - LL3 plastic fibre-optic cables
    - Fibre-optic cable and sheath made of plastic
    - High flexibility, small bending radii
    - Can be shortened to almost any length (cutter supplied)
    - Ambient operating temperature –40 °C to +70 °C
    - Special versions up to 180 °C
    - Lens attachments for large scanning ranges (or focused) available as accessories
  - LIS/LBS glass fibre-optic cables with metal filament coil
    - Stainless-steel sheath
    - Through-beam and scanning systems
    - Min. bending radius 19 mm
    - Ambient operating temperature –58 to +315 °C
  - LM/LT glass fibre-optic cables
    - With PVC sheath or chromium-plated metal filament coil
    - Min. bending radius 20 mm
    - Ambient operating temperature –40 °C to +125 °C
    - Not flexible at temperatures below 0 °C
  - LLUV UV fibre-optic cables
    - Ambient operating temperature –5 to +35 °C
    - Not flexible at temperatures below 0 °C
  - LLUV UV fibre-optic cables

- Switching devices and power supply units

- Switching devices
  - Universal supply voltages
  - Inputs with combination options
  - Adjustable time delays
  - Clip-on mounting for DIN 46277 supporting rail

- Disconnecting switches
  - Reliable electrical isolation between input, output and supply voltage
  - AC or DC voltage supply
  - 2 channels, each with one SPDT relay output
  - Intrinsically safe inputs to (Ex ia) IIC
  - Clip-on mounting for DIN 46277 supporting rail

- Power supply units for contrast scanners
  - Clip-on rail mounting or Euro-card
  - Selectable mains voltage
  - Relay output

- BUS gateways
  - AS-Interface Components
    - Master/Gateways
      - Master with serial interface RS 232 C
        - Simple SPS “AS-Interface Control” Version 2.1 IP 20
        - Advanced AS-Interface diagnostics
      - Gateway Profibus
        - Single/master
        - Version 2.1 IP 20
        - Advanced AS-Interface diagnostics
      - Gateway DeviceNet
        - Single master
        - Version 2.1 IP 20
        - Advanced AS-Interface diagnostics

- Module IP 20
  - For cabinet mounting
  - Digital inputs and outputs
  - Sensor/Actuator connection via Combicon plug
  - 4 inputs
  - 4 inputs/4 outputs
  - Version 2.1

- Module IP 67
  - For applications field
  - Digital inputs and outputs
  - Connection of 3- or 4-wire sensors
  - 4 inputs
  - 2 inputs/2 outputs
  - 4 inputs/4 outputs
  - Version 2.1
  - 2 LED/2 push-buttons module
  - 2 inputs/2 outputs
  - Version 2.0

- BUS gateway components
  - Power supply units
    - Supply voltage 115/230 V
    - Output current 2.8/8 A
    - Output overload and short-circuit protected
    - Power input and output direct-coupled
    - Plug-in bridge for switching off AS-Interface communication
      - IP 20

- Software AS-Interface control tools with advanced AS-Interface diagnostics
  - Addressing unit
    - Version 2.1
  - Repeater
  - Power Extender
  - Module lower parts
  - AS interface flat cable
  - Rubber, yellow/black
  - Mounting clip
  - Connection cable
The dialogue continues.

Copy, complete and fax.

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Name

Position/Department

Address

Post code/Town

Phone/Fax

Industry/Field of application

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