

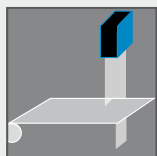


## Array Sensors

Ax20 array sensors for edge and diameter detection solutions

## For fast web edge and line detection

### Reliable under pressure

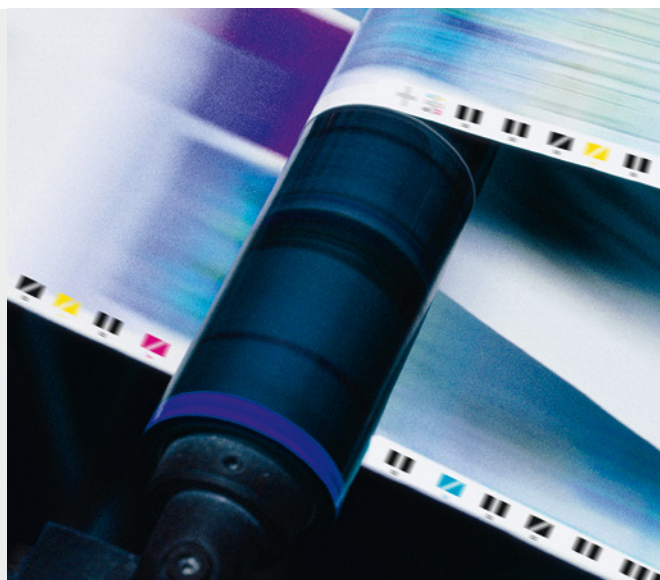


Edge

The Ax20 traces the position of the web edge and detects the lateral position of the paper or foil web.

**Benefits:**

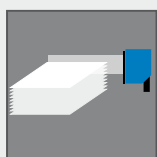
- Sensing system enables flexible installation (no fork design)
- Very high reproducibility
- Clearly visible light spot for precise setting
- Long measurement range eliminates need for fine web adjustments



**Web edge detection**

The Ax20 “looks” at the web from above and has a long measurement range, making it especially flexible.

### When the highest level of precision counts



Edge

The Ax20 monitors stack heights with high reliability, ensuring that, for example, the gripper can pick up the next sheet of paper in an optimal fashion.

**Benefits:**

- Small housing – ensures trouble-free integration into any machine
- Precise functioning for a variety of materials
- Long measurement range
- Low sensitivity to ambient light

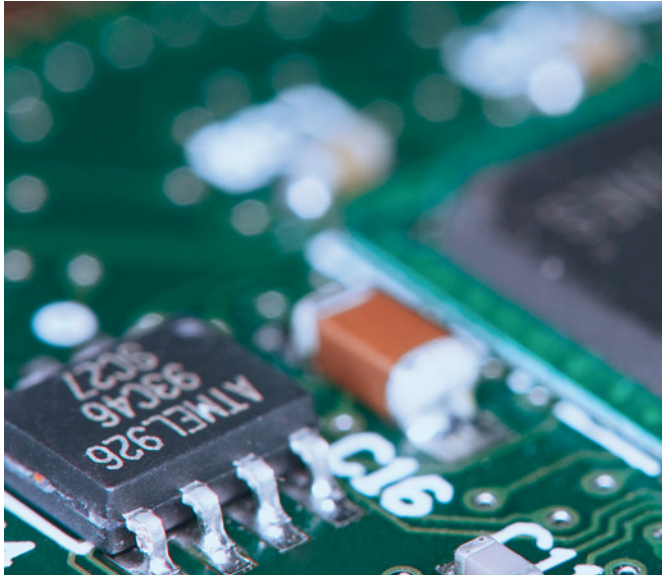


**Stack height monitoring**

The Ax20 is installed aimed at the side of the stack and can detect even the smallest stack edges, even when objects are closely positioned.

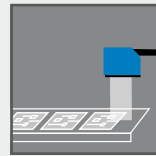
## Efficient width, diameter and small parts detection

### High accuracy positioning



#### Object positioning

The high-performance Ax20 uses non contact measurement as a longer-lasting alternative to mechanical solutions.



Edge

The Ax20 quickly and precisely recognizes the front edge of an object such as an electronic printed circuit board, which enables reliable positioning and assembling processes even under high transport speeds.

#### Benefits:

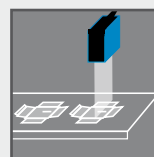
- Precise positioning enabled by highly visible light spot
- Replaces mechanical limit stop with an optical one, eliminating mechanical wear
- Enables a variety of positioning tasks in a cost-effective manner

### A high-speed solution



#### Glue beads detection

The Ax20 ensures reliable detection of glue beads – enabling high cycle rates in the packaging, pharmaceutical and automotive industries.



Diameter

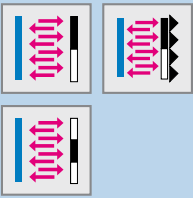


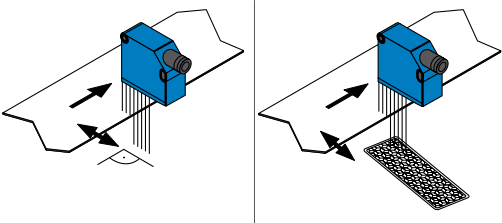
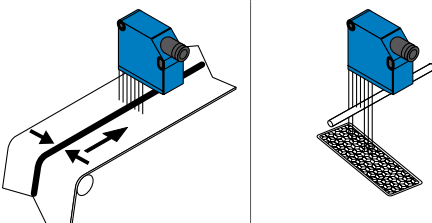
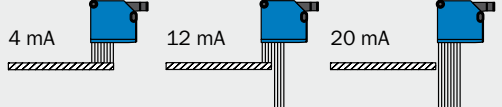
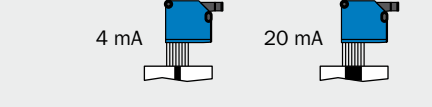
The packaging industry depends on high throughput and fast production speeds – and the Ax20 is up to the task. With its IP 67 protection rating and high immunity to ambient light, the Ax20 ensures quality control when applying glue and adhesive, even under the toughest conditions.

#### Benefits:

- Reliable detection of glue bead via thickness measurement
- Excellent contrast resolution, (e.g., with transparent adhesive on white cardboard)
- Long sensing distance prevents contamination



Product family overview

	 <p><b>Ax20E Edge</b></p>	 <p><b>Ax20D Diameter</b></p>
<p>Ax20E array sensors – edge detection</p>		<p>Ax20D array sensors – diameter detection</p>
<p><b>Technical data overview</b></p>		
<p><b>Functional principle</b></p>	<p>Proximity and reflector or only reflector</p>	<p>Proximity and reflector</p>
<p><b>Sensing distance</b></p>	<p>25 mm / 100 mm</p>	<p>25 mm / 100 mm</p>
<p><b>Measurement range</b></p>	<p>20 mm / 30 mm</p>	<p>20 mm / 30 mm</p>
<p><b>Reproducibility</b></p>	<p>0.03 mm / 0.05 mm</p>	<p>0.03 mm / 0.05 mm</p>
<p><b>Minimum detectable object (MDO)</b></p>	<p>0.8 mm / 1.6 mm</p>	<p>0.8 mm / 1.6 mm</p>
<p><b>Analog output QA</b></p>	<p>4 mA ... 20 mA</p>	<p>4 mA ... 20 mA</p>
<p><b>Switching output</b></p>	<p>Q (NPN) / Q (PNP)</p>	<p>Q (NPN) / Q (PNP)</p>
<p><b>At a glance</b></p>		
	<ul style="list-style-type: none"> <li>• Detect position of edge of material</li> <li>• Reflector mode version also available</li> <li>• Compact, metal housing</li> <li>• Reproducibility of 0.03 mm</li> <li>• Sensing distance 25 mm or 100 mm</li> <li>• Measurement range up to 30 mm</li> <li>• Analog output 4 mA ... 20 mA</li> </ul>	<ul style="list-style-type: none"> <li>• Detection of diameter and width</li> <li>• Compact, metal housing</li> <li>• Reproducibility of 0.03 mm</li> <li>• Sensing distance 25 mm or 100 mm</li> <li>• Measurement range up to 30 mm</li> <li>• Analog output 4 mA ... 20 mA</li> </ul>
<p><b>Further information</b></p>		
<p><b>Functional principle</b></p>	<p>Proximity      Reflector</p> 	<p>Proximity      Reflector</p> 
<p><b>Analog output</b></p>		
<p><b>Fields of application</b></p>	<ul style="list-style-type: none"> <li>• Measurement web edge guidance control, e.g., paper webs, foil and transparent materials</li> <li>• Object positioning (end of travel indication)</li> <li>• Line tracking</li> </ul>	<ul style="list-style-type: none"> <li>• Gap detection</li> <li>• Width measurement</li> <li>• Line diameter detection</li> </ul>
<p><b>Detailed information</b></p>	<p>→ 6</p>	<p>→ 6</p>

## Ax20 array sensors for edge and diameter detection solutions



### Additional information

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### Product description

Array sensors use closely spaced beams of light to detect even the slightest differences in gray scale between the target and the background within their field-of-view. They are ideal for edge and diameter detection as well as detecting

widths and gaps. SICK's array sensors offer industry-leading reproducibility, in addition to compact, rugged metal housings for use in highly restricted or harsh environments.

### At a glance

- Proximity contrast line sensor in a compact housing
- Application-specific sensor functions
- Detect position of edge of material
- Diameter, width and gap detection of different objects
- Very high reproducibility of 0.03 mm
- Large measurement range: 30 mm
- Visible white LED light spot to enable accurate alignment
- Simple setup, no teach-in necessary

### Your benefits

- Cost-effective solution to reliably determine edge position and width measurement
- Easy-to-integrate, compact housing can be mounted over the web so less downtime is required for maintenance
- No reflector is required, reducing maintenance and providing greater product reliability. Reduces downtime. Only array sensors available in diffuse mode, making them ideal for environments where dirt and dust can interfere with other types of solutions that require a reflector.
- High reproducibility of 0.03 mm and industry-leading resolution enable greater accuracy and quality control
- Highly visible white LED light spot ensures fast and accurate alignment, reducing time-consuming fine adjustment
- No teach, program or menu activities make setup virtually hassle free

▶ [www.mysick.com/en/Ax20](http://www.mysick.com/en/Ax20)

## Detailed technical data

### Features

Dimensions (L x W x H)	54.1 mm x 24.3 mm x 59.8 mm
Operating range	20 mm ... 30 mm / 90 mm ... 110 mm
Measurement range	20 mm / 30 mm
Light spot size	30 mm x 5 mm / 50 mm x 10 mm
Light source <sup>1)</sup>	LED white
Linearity <sup>2)</sup>	± 2 %

<sup>1)</sup> Wave length: 400 nm ... 700 nm.

<sup>2)</sup> Analog current range (16 mA).

### Mechanics/electronics

Supply voltage $V_s$ <sup>1)</sup>	DC 24 V ± 20 %
Ripple <sup>2)</sup>	≤ 5 V
Power consumption <sup>3)</sup>	< 3.1 W
Switching output voltage	NPN: HIGH = approx. $V_s$ / LOW ≤ 2 V PNP: HIGH = $V_s -$ ≤ 2 V / LOW approx. 0 V
Analog output $Q_A$	4 mA ... 20 mA
Resolution of analog output	12 bit
Output rate of analog output	1 ms
Output current $I_{max}$	< 100 mA
Initialization time <sup>4)</sup>	0.48 s
Connection type	Connector M12, 5-pin
Protection class	III
Circuit protection	$V_s$ connections reverse-polarity protected Output Q short-circuit protected Interference suppression
Enclosure rating	IP 67
Weight	Approx. 135 g
Housing material	Metal

<sup>1)</sup> Operation in short-circuit protected network max. 8 A.

<sup>2)</sup> May not exceed or fall short of  $V_s$  tolerances.

<sup>3)</sup> Without load.

<sup>4)</sup> Typ. max. 1.6 s.

### Ambient data

Ambient temperature	Operation: -10 °C ... +55 °C Storage: -25 °C ... +75 °C
Shock load	According to IEC 60068

### Specific data

Functional principle	Model name	Ordering information
Edge detection, proximity and reflector	AT20E	8
Edge detection, reflector	AL20E	8
Diameter detection, proximity and reflector	AT20D	8

## Ordering information

### AT20E

- **Functional principle:** Edge detection, proximity and reflector

Sensing distance	Measurement range	Reproducibility <sup>1)</sup>	MDO <sup>2)</sup>	Switching output <sup>3)</sup>	Model name	Part no.
25 mm	20 mm	0.03 mm	0.8 mm	Q (NPN)	AT20E-NM111	1046458
				Q (PNP)	AT20E-PM111	1044484
100 mm	30 mm	0.05 mm	1.6 mm	Q (NPN)	AT20E-NM331	1046459
				Q (PNP)	AT20E-PM331	1045990

<sup>1)</sup> With respect to sensing distance.

<sup>2)</sup> Minimum detectable object.

<sup>3)</sup> Active when object detected.

### AL20E

- **Functional principle:** Edge detection, reflector

Sensing distance	Measurement range	Reproducibility <sup>1)</sup>	MDO <sup>2)</sup>	Switching output <sup>3)</sup>	Model name	Part no.
25 mm	20 mm	0.03 mm	0.8 mm	Q (NPN)	AL20E-NM111	1046460
				Q (PNP)	AL20E-PM111	1046463
100 mm	30 mm	0.05 mm	1.6 mm	Q (NPN)	AL20E-NM331	1046461
				Q (PNP)	AL20E-PM331	1046462

<sup>1)</sup> With respect to sensing distance.

<sup>2)</sup> Minimum detectable object.

<sup>3)</sup> Active when object detected.

### AT20D

- **Functional principle:** Diameter detection, proximity and reflector

Sensing distance	Measurement range	Reproducibility <sup>1)</sup>	MDO <sup>2)</sup>	Switching output <sup>3)</sup>	Model name	Part no.
25 mm	20 mm	0.03 mm	0.8 mm	Q (NPN)	AT20D-NM111	1046466
				Q (PNP)	AT20D-PM111	1046464
100 mm	30 mm	0.05 mm	1.6 mm	Q (NPN)	AT20D-NM331	1046467
				Q (PNP)	AT20D-PM331	1046465

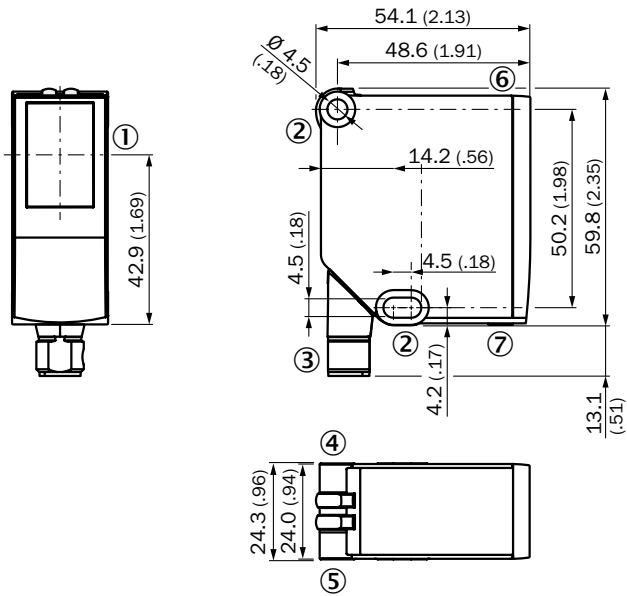
<sup>1)</sup> With respect to sensing distance.

<sup>2)</sup> Minimum detectable object.

<sup>3)</sup> Active when object detected.



### Dimensional drawing

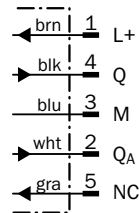
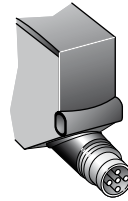


All dimensions in mm (inch)

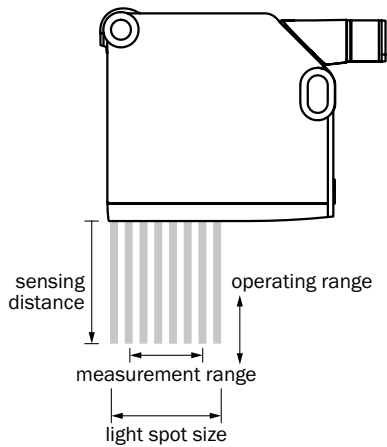
- ① Center of optical axis
- ② Mounting hole,  $\varnothing$  4.5 mm
- ③ Connector M12 (rotatable up to 90°)
- ④ Function signal indicator (green)
- ⑤ Function signal indicator (yellow), switching output
- ⑥ Head side
- ⑦ Connector side

### Connection type and diagram

Connector  
M12, 5-pin



### Explanation of parameters



Sensing distance	Operating range	Measurement range	Light spot size
25 mm	20 mm ... 30 mm	20 mm	30 mm x 5 mm
100 mm	90 mm ... 110 mm	30 mm	50 mm x 10 mm

## Recommended accessories

### Plug connectors and cables

#### Connector M12, 5-pin

Connector type	Enclosure rating	Flying leads	Sheath material	Cable length	Model name	Part no.
Female connector	IP 67	Straight	PVC	2 m	DOL-1205-G02M	6008899
				5 m	DOL-1205-G05M	6009868
				10 m	DOL-1205-G10M	6010544
		Angled	PVC	2 m	DOL-1205-W02M	6008900
				5 m	DOL-1205-W05M	6009869
				10 m	DOL-1205-W10M	6010542
		Straight	-	-	DOS-1205-G	6009719
				Angled	-	DOS-1205-W

### Mounting brackets/plates

Mounting system type	Material	Model name	Part no.
Mounting bracket	Stainless steel (1.4301)	BEF-WN-DT20	4043524

### Reflectors

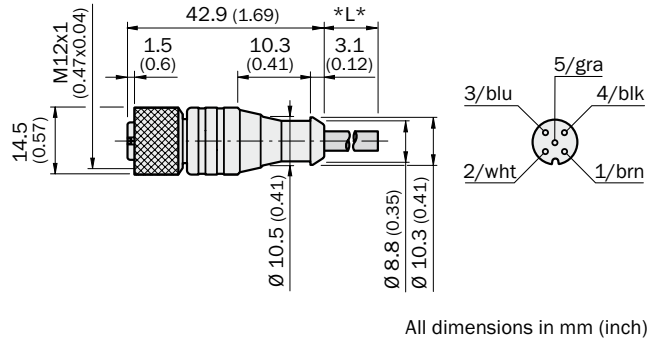
Dimensions (L x W x H)	Model name	Part no.
110 mm x 30 mm x 2.3 mm	REF-AX001	2049250
95 mm x 30 mm x 0.15 mm	REF-AX002	2049249

For additional accessories, please see [www.mysick.com/en/Ax20](http://www.mysick.com/en/Ax20)

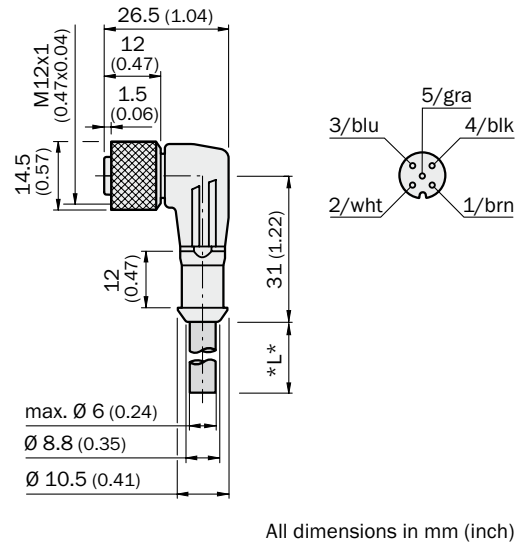
### Dimensional drawings accessories

#### Plug connectors and cables

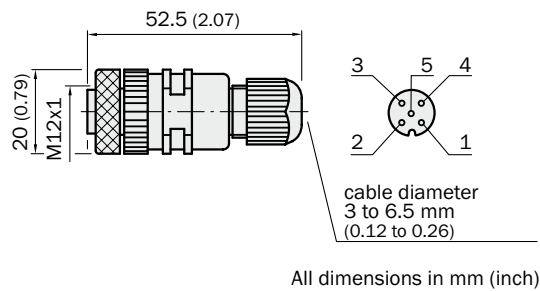
**DOL-1205-G02M**  
**DOL-1205-G05M**  
**DOL-1205-G10M**



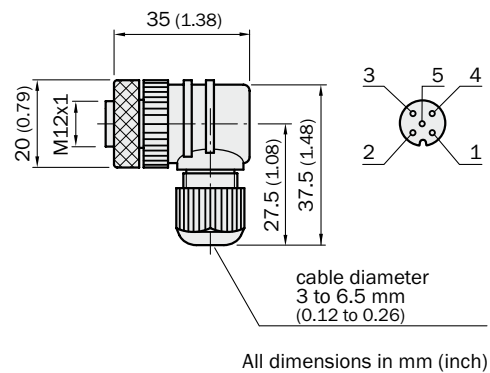
**DOL-1205-W02M**  
**DOL-1205-W05M**  
**DOL-1205-W10M**



**DOS-1205-G**

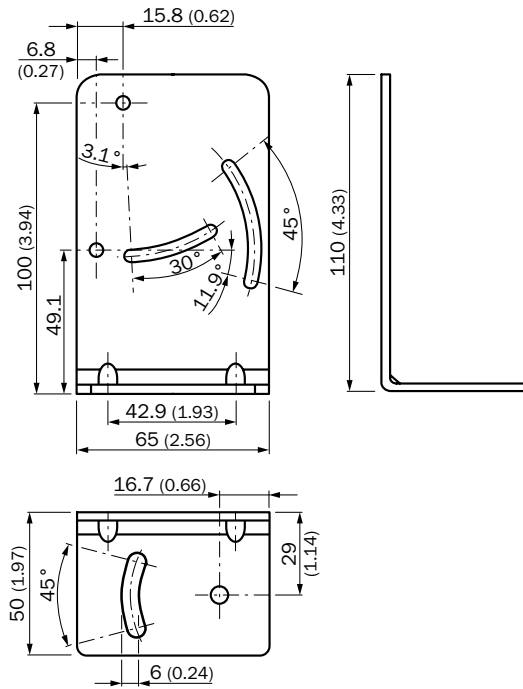


**DOS-1205-W**



Mounting brackets/plates

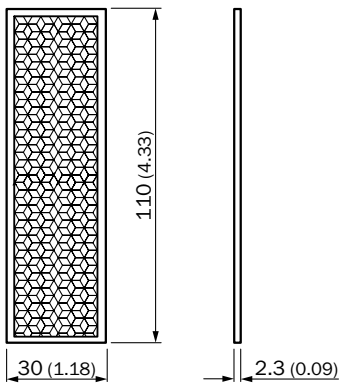
**BEF-WN-DT20**



All dimensions in mm (inch)

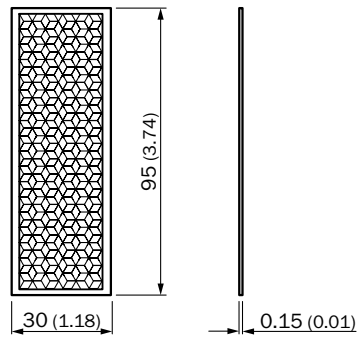
Reflectors

**REF-AX001**



All dimensions in mm (inch)

**REF-AX002**

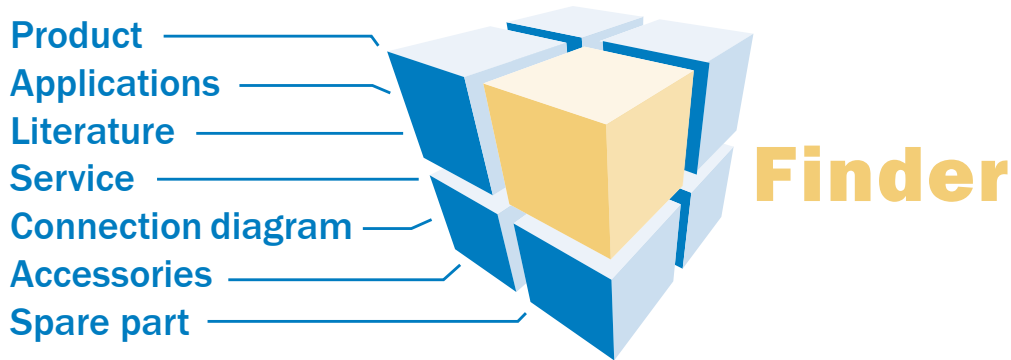


All dimensions in mm (inch)





## Search online quickly and safely with the SICK “Finders”



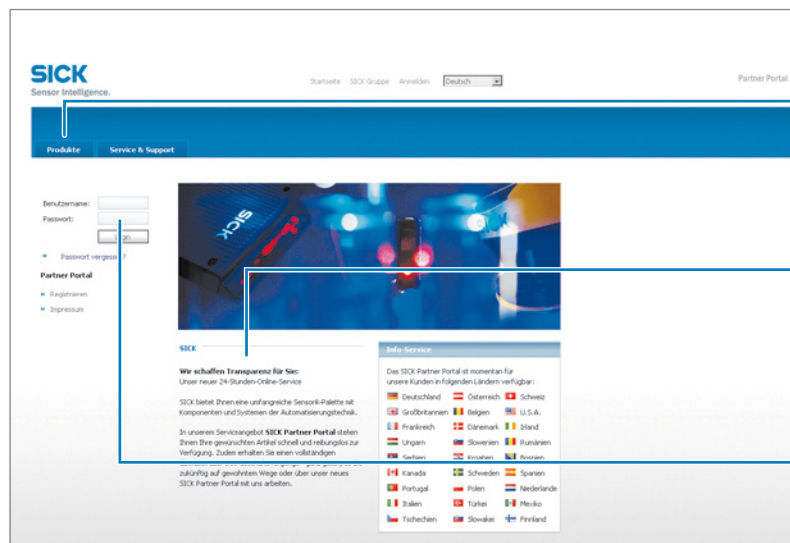
**Product Finder:** We can help you to quickly target the product that best matches your application.

**Applications Finder:** Select the application description on the basis of the challenge posed, industrial sector, or product group.

**Literature Finder:** Go directly to the operating instructions, technical information, and other literature on all aspects of SICK products.

These and other Finders at [www.mysick.com](http://www.mysick.com)

## Efficiency – with SICK e-commerce tools



**Clearly structured:** You can find everything you need for your sensor planning under the menu items Products, Information, and My Account.

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### Find out prices and availability

Determine the price and possible delivery date of your desired product simply and quickly.

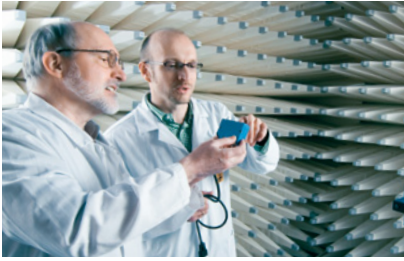
### Order online

You can go through the ordering process in just a few steps.

### Request or view a quote

You can have a quote generated online here. Every quote is confirmed to you via e-mail.

## SICK at a glance



### Leading technologies

With a staff of more than 5,000 and over 50 subsidiaries and representations worldwide, SICK is one of the leading and most successful manufacturers of sensor technology. The power of innovation and solution competency have made SICK the global market leader. No matter what the project and industry may be, talking with an expert from SICK will provide you with an ideal basis for your plans – there is no need to settle for anything less than the best.



### Unique product range

- Non-contact detecting, counting, classifying, positioning and measuring of any type of object or media
- Accident and operator protection with sensors, safety software and services
- Automatic identification with bar code and RFID readers
- Laser measurement technology for detecting the volume, position and contour of people and objects
- Complete system solutions for analysis and flow measurement of gases and liquids



### Comprehensive services

- SICK LifeTime Services – for safety and productivity
- Application centers in Europe, Asia and North America for the development of system solutions under real-world conditions
- E-Business Partner Portal [www.mysick.com](http://www.mysick.com) – price and availability of products, requests for quotation and online orders

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España  
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India  
Israel  
Italia  
Japan

México  
Nederland  
Norge  
Österreich  
Polska  
România  
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United Arab Emirates  
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