

Optical safety sensors for point-of-operation and access guarding

Safety at Leuze



Safety light curtains

Multiple/Single light beam safety devices

Muting and Smart Process Gating

Our optical safety sensors provide solutions for all applications aimed at safeguarding points of operation and access points at machines and systems. They ensure the safety of persons and make sure that processes run smoothly.

Safety light curtains

Our safety light curtains are used wherever people and machines work “hand-in-hand.” They detect hands and fingers, thereby safeguarding points of operation and access points to danger zones.



Multiple light beam safety devices

Multiple light beam safety devices offer cost-effective solutions for access guarding at machines and systems. Their high operating ranges of up to 70 m mean that they can also be used as a simple way to safeguard large areas.



Single light beam safety devices

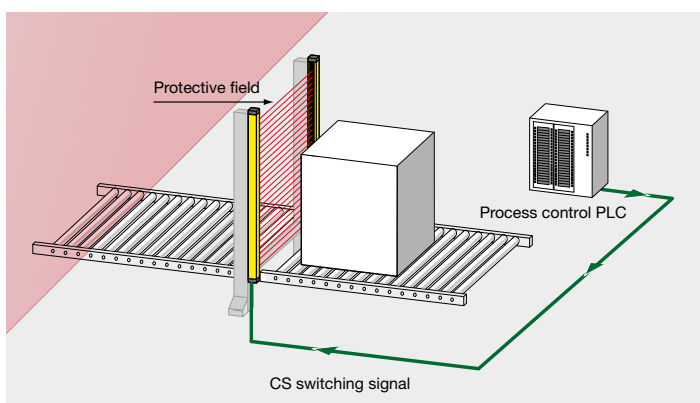
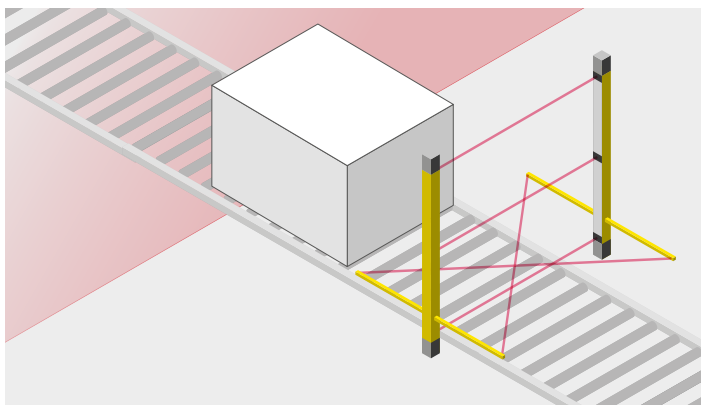
Single light beam safety devices safeguard narrow openings and are used for access guarding in difficult installation situations.

Our products have integrated testing or operate as a compact variant with external testing.



Access guarding on conveyor lines with muting and Smart Process Gating

If access guarding is installed on conveyor lines, it must be bridged to allow material transport. Our devices with muting functions are easy to integrate. Smart Process Gating developed by us provides a space-saving alternative and does not require any trigger sensors.



Safety at Leuze

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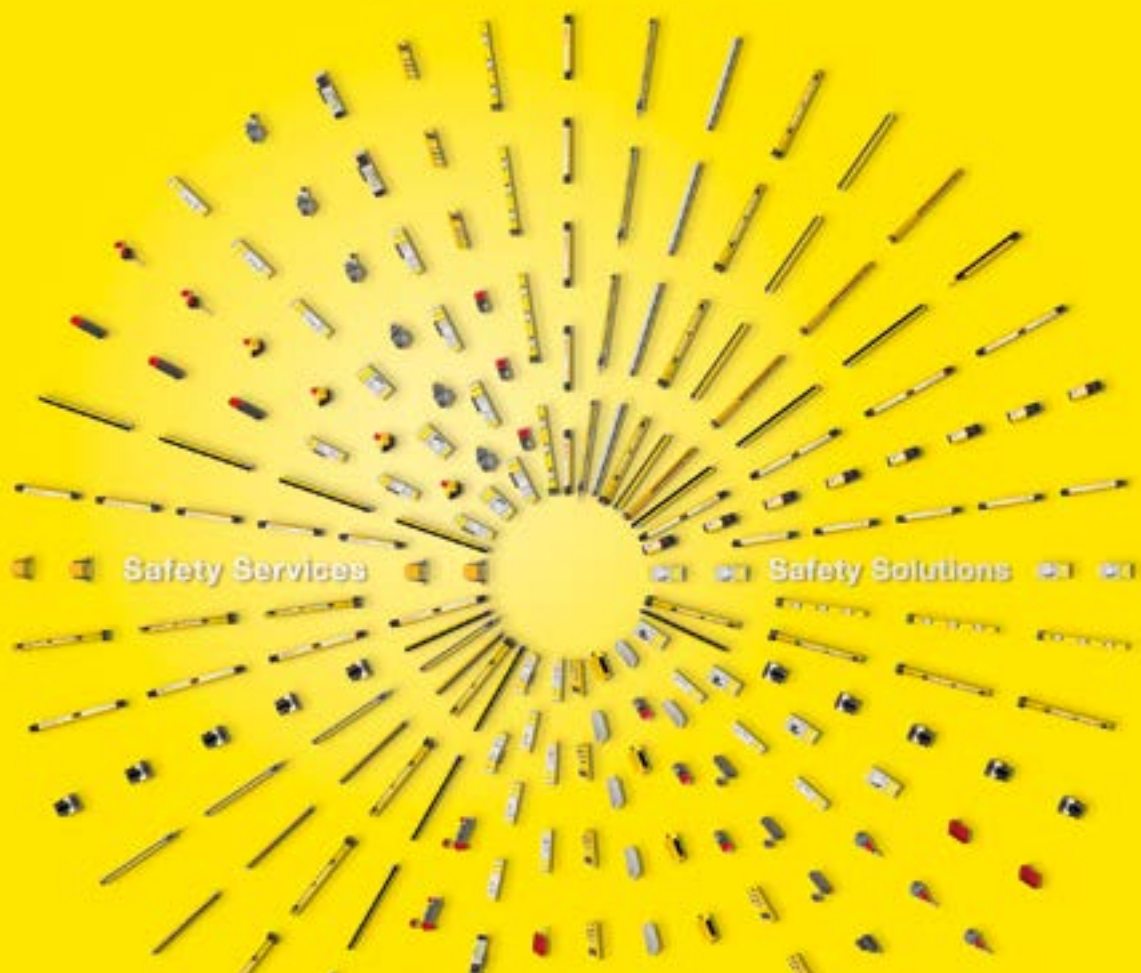
Company/locations

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Safety at Leuze

The advance of automation in industry places increased demands on safety concepts. Automation continuously gives rise to new requirements aimed at ensuring the safety of persons. At the same time, the importance of smooth processes is growing constantly as a result of automation and networking.

Our driving force is the desire to guarantee you gapless safety, efficient material flow and maximum availability at all times. This is why we have bundled our expertise in work and machine safety into one portfolio so that together with you we can find optimum solutions to these challenges: Safety at Leuze.





Experts for your application

Effective solutions begin with a comprehensive understanding of the relevant requirements. Our specialized application know-how and many years of experience in our core industries mean that we can offer a unique insight into safety-related applications. Coupled with extensive knowledge of norms and standards, we provide you with targeted answers that are able to solve even complex challenges effectively and efficiently.



Everything from a single source

Individual requirements need flexible solutions. Our high-quality products and intelligent systems as well as competent technical advice and support form the basis of our safety portfolio. Benefit from our extensive range of products. The diversity of our portfolio means that we are able to provide you with all components, from sensor to control, from a single source – all with maximum user-friendliness and all optimally matched to each other.



Experienced safety specialists

Sustainable machine safety begins with professional planning of the safety systems. It spans the entire lifecycle of a machine. Let our experienced and certified safety experts support you with competent advice. Take advantage of over 30 years of experience in machine safety and the passionate commitment of the Sensor People.



Innovative safety concepts

New challenges call for innovative approaches. We are constantly developing new products and system solutions in order to meet existing requirements even better and to meet new challenges effectively. Particularly in the area of optical sensors, new technological concepts mean that we are able to set milestones again and again. From the very first photoelectric sensor to concepts such as Smart Process Gating – we actively shape the advances made in industry.

Applications

Guarding of points of operation

Guarding of points of operation

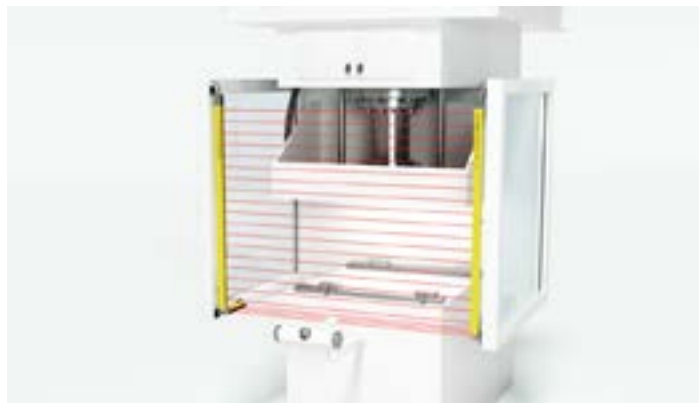
Requirement: The point of operation at a machine or system is to be guarded by an electro-sensitive protective device. The necessary distance between the protective device and point of operation is to be as small as possible.



Solution: The safety light curtains of the ELC and MLC series with various resolutions ranging from 14 to 40 mm ensure reliable finger and hand detection. This allows small safety distances between the safety sensor and the point of operation to be realized.

Guarding of points of operation with reach-under and step-behind protection

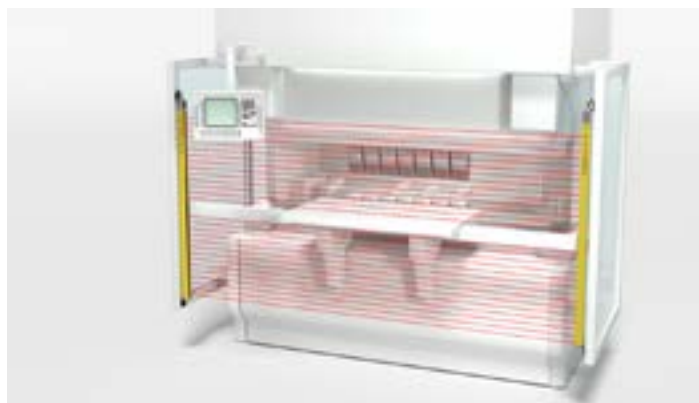
Requirement: Access to the point of operation is to be guarded by means of a safety light curtain. If this sensor can be reached under or stepped behind, then a further safety light curtain is required in order to detect these situations.



Solution: The cascable MLC 520 and MLC 520-S safety light curtains allow up to 3 segments to be linked together. They are integrated in the control via a common connection. This makes installation easy and cost-effective.

Guarding of points of operation with permissible objects in protective field

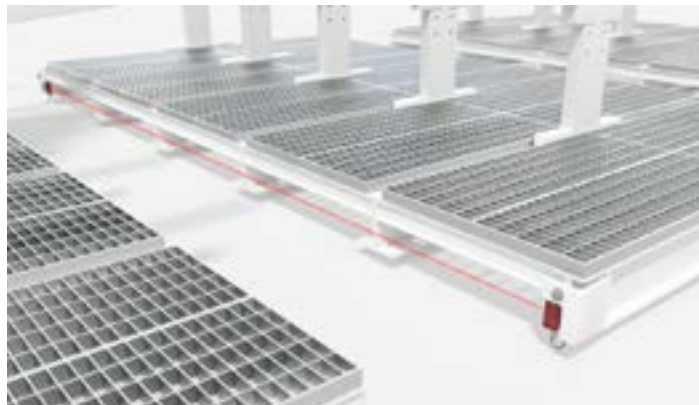
Requirement: Guarding of the point of operation must detect violation of the protective field. Fixed or moving machine parts or work pieces inside the protective field, however, are to be permitted and must not cause a shutdown.



Solution: The MLC 530 safety light curtains have the following functions: fixed blanking, floating blanking and reduced resolution. These functions can be configured so that certain objects are permitted inside the protective field.

Guarding of foot space on side-tracking shelves

Requirement: While the side-tracking shelf is moving, the foot space is to be monitored for the presence of persons. If multiple shelf rows are installed one behind the other, there must be no interference between the sensor signals of the rows.



Solution: The SLS 46C single light beam safety devices monitor the foot space over a length of up to 70 m. They are available as a type 4 variant and as a particularly easy-to-align type 2 variant. The use of models with red light and infrared light prevents mutual interference between the shelf rows.

Guarding of narrow openings

Requirement: If it is possible to reach through a narrow opening into an area where a hazardous movement takes place, then this opening must be guarded to prevent access.



Solution: The SLS 46C single light beam safety devices are used at narrow openings. They are available as type 2 and type 4 variants and can be integrated easily using connectors or cables.

Access guarding

Access guarding

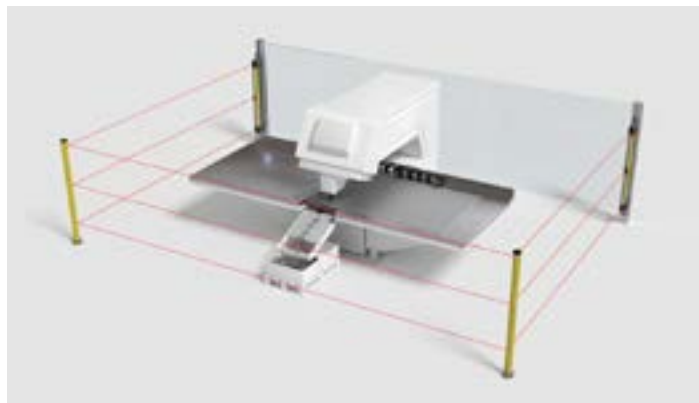
Requirement: Access to a dangerous area at a machine or system is to be guarded. To enable simple entry and exit of material, optoelectronic safety sensors are to be used.



Solution: The MLD 300/500 multiple light beam safety devices provide cost-effective access guarding solutions. The transceiver models with an operating range of up to 8 m are especially easy to install. For wide-area guarding, transmitter/receiver models are available with a range of up to 70 m.

Multi-sided access guarding

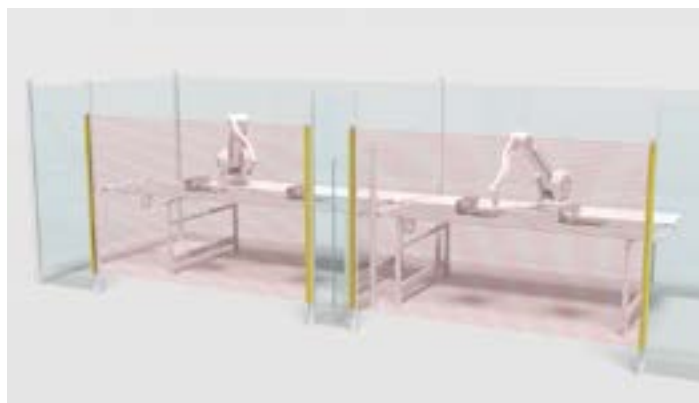
Requirement: Access to the working range is to be guarded while the machine is in operation. To enable material entry and exit, the machine must be easily accessible from multiple sides.



Solution: The MLD 300/500 multiple light beam safety devices in combination with the UMC mirror columns safeguard access to the machine on multiple sides and over lengths of up to 70 m. The integrated laser alignment aid makes installation quick and easy.

Access guarding with short safety distances

Requirement: Access to dangerous areas on machines and systems is to be safeguarded using optoelectronic safety sensors. For a compact system design, the safety sensors must be installed as close as possible to the dangerous area.



Solution: The safety light curtains of the ELC and MLC series with their large protective fields and operating ranges up to 20 m safeguard access points at machines and systems. The resolutions of 14 to 40 mm for finger and hand detection ensure short safety distances and thereby enable a compact system design.

Access guarding on conveyor lines, with muting function

Requirement: Access guarding on conveyor lines is to prevent persons from accessing the danger zone, while at the same time allowing the transported goods to pass through.



Solution: The muting function bridges the safety sensor in a controlled manner to allow the transported goods to pass through. This function is already integrated in the MLD 300/500 multiple light beam safety devices and the MLC 500 safety light curtains. The MSI-MD-FB muting interface and MSI 400 safety control provide an external muting control.

Access guarding on conveyor lines, with Smart Process Gating

Requirement: Access guarding on conveyor lines is to prevent persons from accessing the danger zone, while at the same time allowing the transported goods to pass through.



Solution: With Smart Process Gating, the safety sensor is bridged by means of a control signal from the PLC. The function is integrated in the MLC 530 SPG safety light curtain. Additional muting sensors are not required and, owing to SPG, the systems have low space requirements.

ELC 100 safety light curtains

For a cost-effective machine design

The ELC 100 safety light curtains focus on the essentials of what matters when safeguarding points of operation. For applications with an operating range of up to six meters, the robust devices are perfect for cost-effective machine designs. And they are very easy to integrate and install.



Advantages for you

- You receive reliable safety technology of proven quality at an attractive price.
- The devices can be flexibly integrated in the machine design with little effort.
- The simple mechanical design enables quick installation of the devices. No configuration is required.
- The multi-level alignment display ensures fast and optimum alignment of the devices. No prior knowledge required.
- The housings are made of metal throughout to ensure reliable operation. Their unique design also makes the ELC 100s extremely shock and vibration proof.

Areas of application

- Guarding of points of operation
- Access guarding with short safety distances

ELC 100

Features	Safety: Type 4 / performance level PL e / SIL 3
	Protective field lengths of 300 mm to 1500 mm in 300 mm grid
	Resolution / operating range: 17 mm / 3 m, 30 mm / 6 m
	Connection: 150 mm cable with 4-pin M12 connector
	Shock resistance up to 40 g
	Temperature range from 0 to 50 °C

Quick and optimal alignment



The multi-level alignment display makes commissioning the devices especially easy. Even rough alignments are reliably displayed. Thanks to the well-visible, bright LEDs, the alignment result can be monitored right from the transmitter. The optimal setup is thus quickly achieved. This saves time and money during commissioning and leaves room for operation.

Simple and flexible integration



The ELC 100s are easily and flexibly integrated into the machine design. The specially designed housing enables flexible cable routing in all directions. The cable is always optimally routed into the interior of the machine and protected at the same time. In addition, the protective field extends in both directions to the edge of the housing. As a result, the devices can be mounted flush at the boundaries without any dead zones occurring. No additional safeguarding measures are required.

Fast installation



The swivel function of the robust supports facilitate the quick alignment of the devices. These are mounted right in the grooves provided on both sides of the ELC 100. If no alignment is necessary, such as for applications with short operating ranges, the sliding blocks included in the scope of delivery are used, which reduces costs even further.

Robust in operation



The robust housings are made of metal throughout and protect the front screens with their tall side walls. Thanks to intelligent beam evaluation with object tracking, the devices operate reliably without switching off unnecessarily, even in demanding environments with chips or sparks.

Their unique design also makes the ELC 100s extremely shock and vibration proof. This also makes the devices suitable for use on machines that are subject to strong accelerations or vibrations, such as presses.

MLC 300 / 500 safety light curtains

The extensive series for a wide range of safety applications

The safety light curtains of the MLC 300 (type 2/PL c) and MLC 500 (type 4/PL e) series leave nothing to be desired in terms of resolution, protective field height and operating range. With four function classes, the robust and compact devices perform a wide variety of guarding tasks, from standard applications to controlled special safeguarding, e.g. with blanking function. Furthermore, variants for special applications and environmental conditions are also available. The models with Smart Process Gating offer a space-saving alternative for access guarding on conveyor lines: this function requires no muting sensors.



Advantages for you

- Protective field lengths of 150 to 3,000 mm, resolutions of 14 to 90 mm and 4 function classes always offer the right solution
- Simple mounting and commissioning by means of various mounting brackets and fail-safe configuration via pin assignment
- Reliable operation of adjacent machines thanks to selectable beam coding and reducible operating range
- Solutions for specific applications and environmental conditions (pages 13–14)
- Integrated muting and Smart Process Gating functions (pages 22–25) for access guarding on conveyor lines

MLC 300 / MLC 500

Features	MLC 300: type 2, performance Level PL c, SIL 1 MLC 500: type 4, performance level PL e, SIL 3
	Resolutions of 14 mm, 20 mm, 30 mm, 40 mm, 90 mm
	Protective field lengths of 150 mm to 3000 mm in 150 mm grid
	Operating range up to 20 m
	Connection: M12 connector
	Reliable operation of adjacent machines thanks to channel switching and reducible operating range
	Blanking functions and reduced resolution for stationary or moving objects in the protective field (MLC 530)
	Wide temperature range from –30 ... 55°C

Areas of application

- Guarding of points of operation
- Access guarding with short safety distances
- Access guarding on conveyor lines, with Smart Process Gating and muting functions

Robust housings



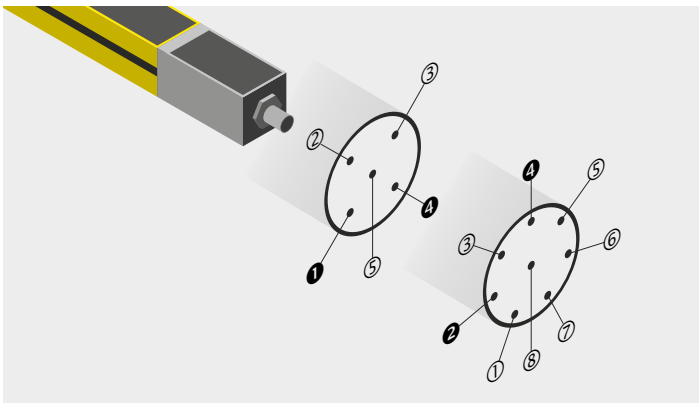
The compact devices with their robust housing design are characterized by reinforced side walls and a recessed front screen.

Simple mounting and alignment



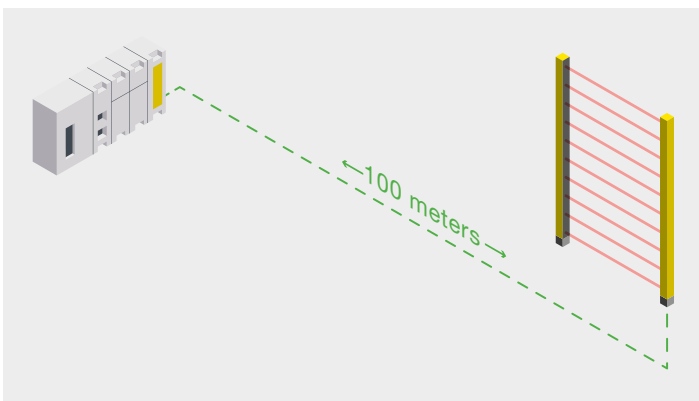
Different mounting brackets ensure quick and simple mounting in any installation situation. They have a low space requirement and are easy to align. Versions with additional damping elements reduce the transmission of physical shocks and vibration. They also guarantee reliable operation under demanding conditions.

Simple and fail-safe commissioning



All settings on the device can be configured by means of pin assignment. This saves time and money when commissioning and ensures error-free configuration. A device can be swapped out easily by means of plug&play without reconfiguration.

100 meters from switch cabinet



Transmitters and receivers of the MLC series can be connected to the switch cabinet using cables measuring up to 100 meters in length. This allows flexible positioning of the machines without the need for additional components.

MLC 300 / 500 safety light curtains

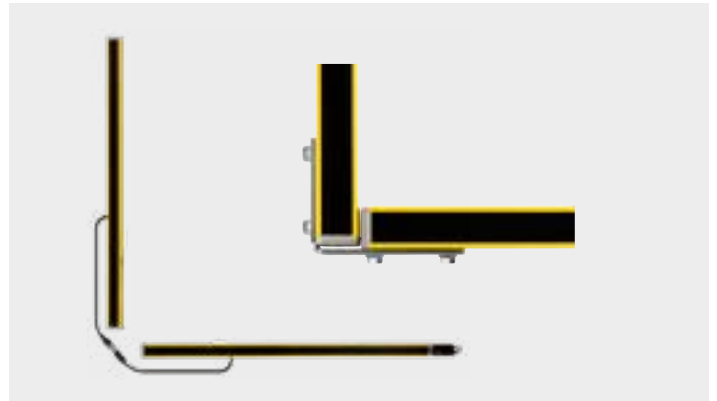
Versions for special applications

Extremely slim design – perfectly integrated into the machine design



The MLC 520-S models are characterized by their ultra-slim design of only 15.4 x 32.6 mm. The protective field length is available with an extremely fine gradation (30 mm grid). The devices also have no zones, which makes them ideal for installation in machine openings and facilitates a clear machine design.

Cascadable host-guest models



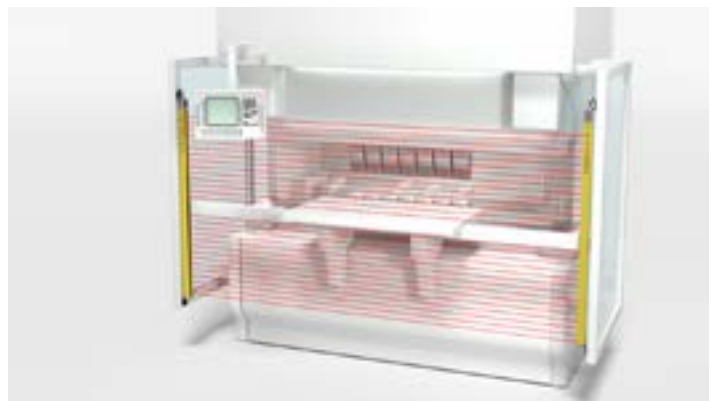
Using the cascadable models, it is possible to link together up to 3 safety light curtain segments that are integrated in the control via a common connection. This set-up can be used to easily and economically implement reaching-under and stepping-behind protection, to facilitate installation around a corner, or to safeguard the front and rear sides of a machine. The device design and the special segment connectors ensure that the high resolution is retained even at the transition points.

Integration in AS-i Safety at Work networks



The variants with AS-i interface enable direct and economical integration in an AS-Interface network.

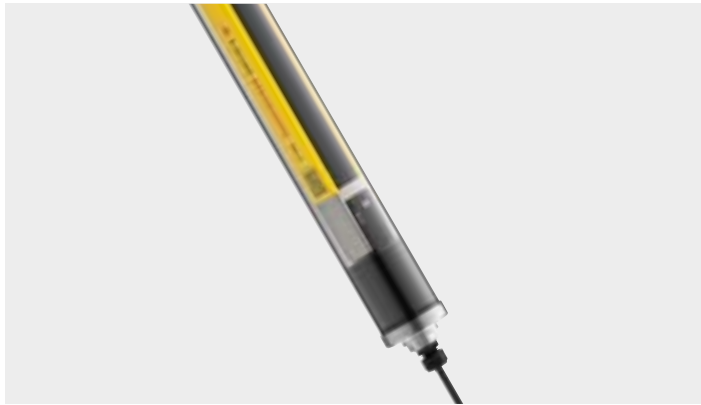
Guarding of points of operation with permissible objects in protective field



Safeguarding points of operation requires violation of the protective field to be detected. When other objects are located in the protective field for operational reasons – for example fixed or moving machine parts or work pieces – intelligent evaluations are required to prevent the objects from triggering shutdowns. For these applications, the MLC 530 safety light curtains feature the fixed blanking, floating blanking and reduced resolution functions. These functions can be configured so that certain objects are permitted inside the protective field.

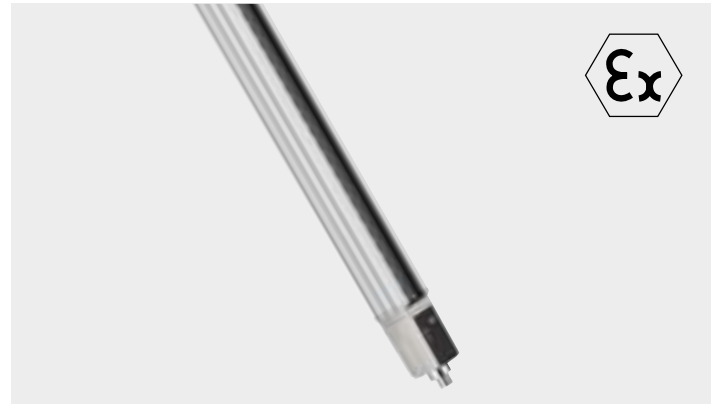
Versions for special environmental conditions

Degree of protection IP 67 / IP 69K



With this solution, the MLC safety light curtains are mounted in a transparent and encapsulated tube. The MLC 510-IP devices thereby achieve the highest degrees of protection IP 67 / IP69K and are suitable, e.g., for use in the food industry.

Ex marking acc. to EN 60079



The MLC 520 EX2 models are designed for use in potentially explosive atmospheres and comply with the ATEX directive of equipment group II, category 3, zone 2 (gas) and zone 22 (dust).

Operating temperature down to -30 °C ❄️



To facilitate use in cold stores in the food industry, many models of the MLC series offer a particularly wide operating temperature range reaching as low as -30 °C.

Extra shock and vibration resistant



Due to their optimized device design, the variants of the MLC / V version are particularly resistant to shock and vibration and can withstand up to 40 g. This makes them ideal for use on machines where high acceleration or severe vibration occurs, such as mechanical presses.

MLD 300 / 500

multiple light beam safety devices

The multiple light beam safety devices of the MLD 300 (type 2/PL c) and MLD 500 (type 4/PL e) series are used for access guarding on machines and systems. The devices are available as transmitter-receiver systems for large operating ranges up to 70 m and as cost-efficient 2 and 3-beam transceiver systems for operating ranges up to 8 m.



Advantages for you

- With 2, 3 and 4-beam versions and operating ranges up to 70 m, the MLD family always offers the right solution
- Practical swivel mount and clamp brackets for fast installation and alignment
- Easy set-up of multi-sided guarding together with the UMC mirror columns (page 19)
- Integrated laser alignment aid for easy alignment, even over large distances
- Integrated muting functions for easy set-up of access guarding on conveyor lines (pages 24 – 25)

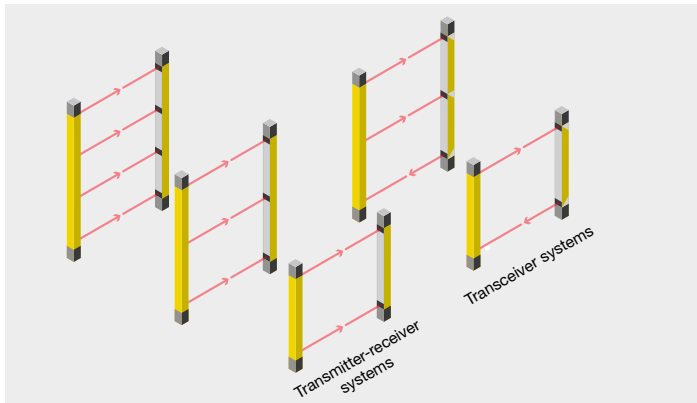
Areas of application

- One-sided and multi-sided access guarding
- Access guarding on conveyor lines with muting function

MLD 300 / MLD 500

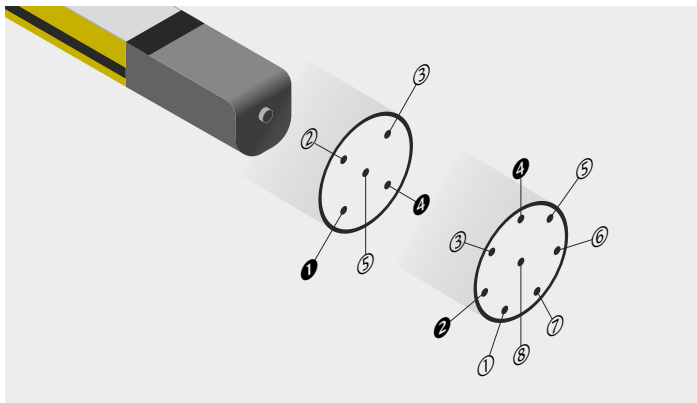
Features	MLD 300: type 2, performance Level PL c, SIL 1 MLD 500: type 4, performance Level PL e, SIL 3
	2 and 3-beam transceiver systems for operating ranges up to 8 m
	2, 3 and 4-beam transmitter-receiver systems for operating ranges up to 70 m
	Integrated 2-sensor muting, timing controlled and sequence controlled Integrated 4-sensor muting, timing controlled
	Integrated laser alignment aid
	Mirror columns for multi-sided safeguarding (see page 19)
	Device status can be read off from 7-segment display at all times
	Reliable operation of adjacent transmitter-receiver systems thanks to a reduced operating range
	Variant with AS-i Safety interface for direct integration into AS-i bus systems
	Wide temperature range from –30 ... 55°C

Efficient solutions for any operating range



The transceiver systems consist of an active transmitter/receiver and a passive deflecting mirror without electrical connection. This allows cost-effective solutions with low installation effort. The transmitter-receiver systems consist of a separate transmitter and receiver for applications with large operating ranges up to 70 meters. Deflecting mirrors can be added for multi-sided safeguarding.

Simple and fail-safe configuration



All settings on the device can be configured by means of pin assignment. This saves time and money when commissioning and ensures error-free configuration. A device can be swapped out easily by means of plug&play without reconfiguration.

Quick and easy mounting



The practical swivel mounts and clamp brackets make the devices quick to install and easy to align.

For simple alignment over large distances



Thanks to the integrated laser alignment aid, alignment can be performed quickly and easily even over large distances and with multi-sided safeguarding with deflecting mirrors.

MLD 300 / 500

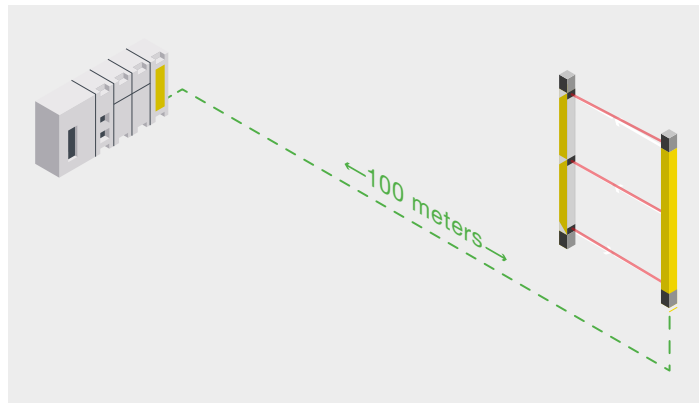
multiple light beam safety devices

Clearly visible status



The integrated, multi-color indicator lights clearly show the status of the OSSD outputs at all times. Reset requests are also indicated if required.

100 meters from switch cabinet



Transmitters and receivers of the MLD 300/500 family can be connected to the switch cabinet using cables measuring up to 100 meters in length. This allows safeguarding over a wide area and flexible positioning of the machines without the need for additional components.

Integration in AS-i Safety at Work networks



The variants with AS-i interface enable direct and economical integration in an AS-Interface network.

Plug&play with pre-mounted sets



MLD-UDC protective sensor sets ensure efficient set-up and fast commissioning. The pre-mounted sets are immediately ready for use and also require less logistical work. Models with a protective screen are also available.

Accessories

DC and UDC device columns
 UMC mirror columns
 PS, PSC protective screens

Areas of application

- Freestanding floor assembly of MLC safety light curtains and MLD multiple light beam safety devices
- Setup of multi-sided access guarding
- Easily replaceable sensor protection



The DC and UDC device columns enable easy, freestanding mounting of the MLD multiple light beam safety devices and MLC safety light curtains. The UMC mirror columns are used to set up multi-sided access guarding.

Advantages for you

MULTI-SIDED GUARDING

The easy-to-adjust mirror columns can be used for easy and reliable set-up of multi-sided access guarding.



HIGH AVAILABILITY

The spring elements in the foot of the columns absorb mechanical impacts and reset the columns automatically to their initial position. Alignment or repair work is unnecessary.



PROTECTIVE AND EASILY REPLACED

The PS/PSC protective screens protect the front of the sensors in harsh environments and can be easily replaced when required. They are available for the MLC safety light curtains and the device columns.



	DC, UDC device columns	UMC mirror columns	PS, PSC protective screens
Features	Robust profile construction for stable mounting and reliable protection of the safety devices	Variants with individual mirrors for operation in combination with MLD multiple light beam safety devices	PS removable protective screens for MLC safety light curtains. Protection against device soiling and damage
	Simple installation of the safety devices with quick height adjustment and alignment thanks to special mounting brackets	Variants with continuous mirror for operation in combination with ELC and MLC safety light curtains	PSC removable protective screens for DC and UDC device columns. Protection against device soiling and damage
	UDC variant: additionally with spring elements for automatic resetting after mechanical impacts	Robust design with easy-to-adjust mirrors	Hard-wearing PMMA plastic with particularly good transparency
	Simple mounting of the muting sensor sets to the external slot (page 25)	Spring elements for automatic resetting after mechanical impacts	

MLD 500

single light beam safety devices

With integrated testing

The MLD 500 single light beam safety devices have integrated testing and their OSSD outputs enable them to be integrated easily into the safety circuit. They are used wherever there are no space restrictions or extremely large operating ranges are required.



Advantages for you

- The flexible arrangement of the single beam sensors means that access guarding can be installed even in challenging mounting conditions
- Easy integration in the safety circuit thanks to OSSD outputs and integrated testing
- Operating range up to 100 m for guarding particularly large areas

Areas of application

- Access guarding in difficult installation situations and with flexible beam spacing
- Guarding of points of operation at narrow openings
- Collision protection, e.g. on overhead cranes

Fast installation and alignment



MLD 500

Features

Type 4, performance level PL e, SIL 3 (self-monitoring)
Operating range up to 100 m
Integrated 2-sensor muting, timing controlled and sequence controlled
Integrated laser alignment aid
Reliable operation at adjacent machines thanks to reducible operating range
Variant with AS-i Safety interface for direct integration into AS-i bus systems
Wide temperature range from –30 ... 55°C

The practical swivel mounts and clamp brackets make the MLD easy to install and align. Thanks to the integrated laser alignment aid, alignment can be performed quickly and easily even over large distances and with multi-sided safeguarding.

SLS 46C

single light beam safety devices

With external testing



The compact SLS 46C single light beam safety devices require little space and are used together with the MSI-TR evaluation units for periodic testing.

Advantages for you

- Compact sensors for use in safeguarding applications with limited installation space
- Evaluation of up to 6 linked SLS 46C devices with one MSI-TR safety relay allows low-cost installations
- Red light and infrared light variants to avoid mutual interference, e.g. in the case of foot space monitoring of side-tracking shelves installed next to each other

Areas of application

- Guarding of points of operation at narrow openings
- Guarding of foot space on side-tracking shelves
- Access guarding in difficult installation situations and with flexible beam spacing
- Collision protection, e.g. on overhead cranes

Certified with PL e / SIL 3



SLS 46C

Features

SLS 46C type 2: operation in combination with safety monitoring devices
SLS 46C type 4: operation in combination with an MSI-TRM safety relay (AOPD with performance level PL e, SIL 3)
Operating range up to 70 m
Red light and infrared light variants to avoid mutual interference in installations positioned next to each other
Evaluation of up to 6 linked SLS 46C devices by means of one MSI-TR safety relay
Degree of protection IP 67 / IP 69K
ECOLAB certification
Connection: M12 connector or cable
Wide temperature range from -30 ... 60°C

The SLS 46C safety sensors in combination with the MSI-TRM safety relays form a type 4 AOPD that is already certified with PL e / SIL 3. The expense and effort for individual safety considerations is therefore no longer necessary.

MLC 530 SPG

Access guarding with Smart Process Gating

The MLC 530 SPG safety light curtains with Smart Process Gating offer a space-saving alternative for access guarding on conveyor lines. With this innovative technology, process control takes place in combination with the system control. This solution requires no muting sensors and operates exceptionally reliably.



Advantages for you

- Allows a particularly compact and space-saving system design because no additional trigger sensors are necessary
- Reliable passage of transported goods through the system, even with incomplete or changing loads
- No service calls required for trigger sensor alignment
- The process starts only in combination with the system control and cannot be bypassed by the operating personnel. This provides optimum protection.

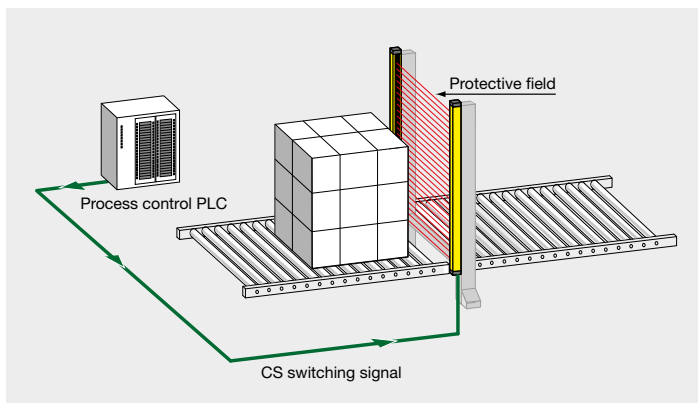
Areas of application

- Access guarding on conveyor lines, with Smart Process Gating function for bridging to allow material transport

MLC 530 SPG

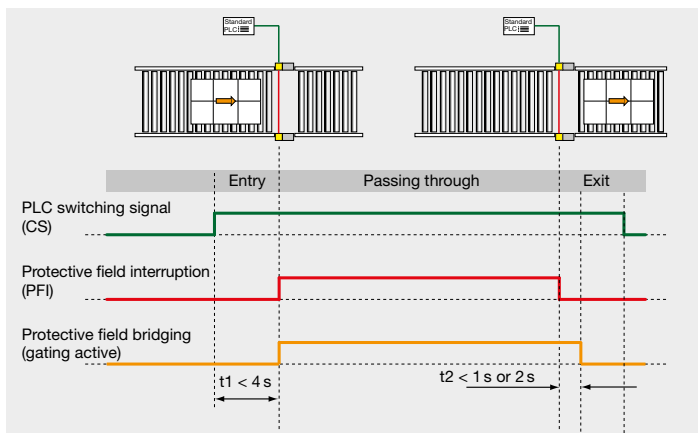
Features	Safety light curtain with protective field lengths of 150 mm to 3000 mm in a 150 mm grid
	Resolutions of 30 mm, 40 mm, 90 mm
	Type 4, performance level PL e, SIL 3
	Configuration of the settings by means of pin assignment for easy commissioning and fast replacement in the case of servicing
	Partial gating (upper beams always remain active) for the execution of a second safety function
	Blanking of stationary objects in the protective field
	Reliable operation of adjacent machines thanks to channel switching and reducible operating range
	Wide temperature range from –30 ... 55°C

No trigger sensors required



With Smart Process Gating, process control takes place in combination with the system control. A switching signal provided by the PLC and interruption of the protective field by the transported goods are used as triggers for activation of the gating function. No additional trigger sensors are required.

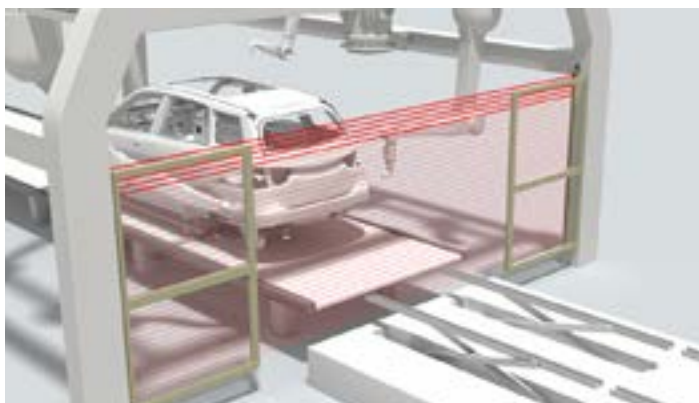
Operating principle and signal response of SPG



The gating function (bridging of the protective field) is activated by the correct sequence of switching signal and protective field violation and monitored by the light curtain.

The gating ends either automatically or – in the case of higher conveyor line speeds – by resetting of the switching signal.

Two safety functions combined



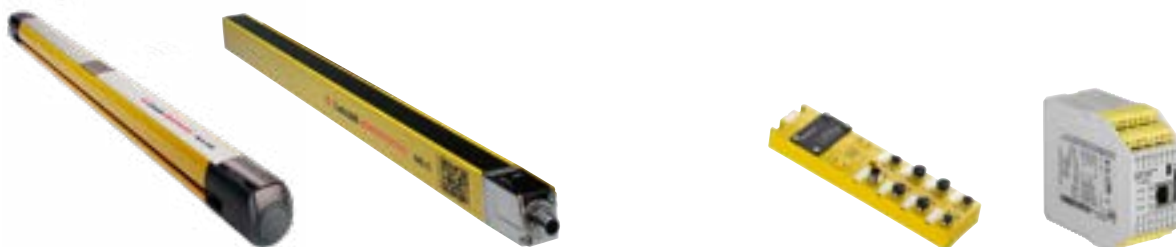
In 'Partial Gating' mode, the upper beams of the light curtain remain active during gating and can therefore be used to simultaneously monitor a second safety function.

The example shows parallel monitoring of the pendulum flaps by the safety light curtain. The safety light curtain continues to monitor the closed state of the flaps during gating. The otherwise usual safety switches for monitoring the flaps are no longer required.

MLD, MLC, MSI-MD-FB, MSI 400

Access guarding with muting function

Muting functions control and monitor the bridging function for material transport on conveyor lines. They use the signals from muting sensors to distinguish between transported goods and persons. Depending on the application, muting functions are available in various safety sensors and control components.



Advantages for you

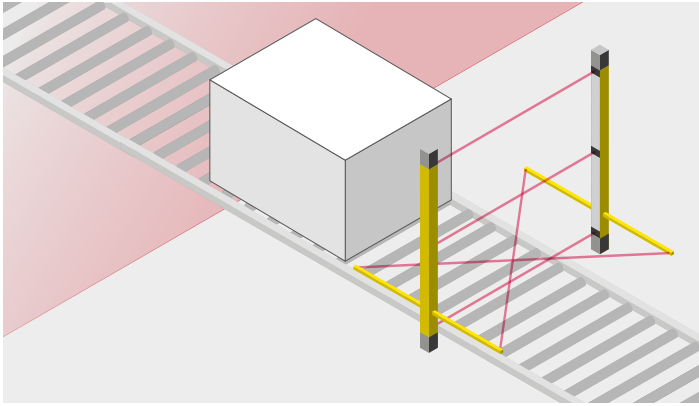
- Access guarding with muting function can be integrated into the safety circuit of the system control easily using OSSD outputs
- The muting functions are integrated in the devices and can be easily configured if required. Safety functions do not need to be programmed.
- 2 and 4-sensor muting as well as muting functions in safety sensors and in control devices provide solutions for all muting applications

Areas of application

- Access guarding on conveyor lines, with muting function for bridging to allow material transport

		MLD 300, MLD 500 	MLC 500 	MSI-MD-FB 	MSI 400 
Features	Device type	Multiple light beam safety devices, see page 16	Safety light curtains, see page 12	Muting interface, field module	Configurable Safety control
	Muting function integrated in safety sensor	x	x		
	Muting function integrated in control device			x	x
Muting functions	2-sensor muting, timing controlled	x	x	x	x
	2-sensor muting, sequence controlled	x		x	x
	4-sensor muting, timing controlled	x			x
	4-sensor muting, sequence controlled			x	x
	'Release muting' input signal	x		x	x
	Partial muting	x			

Operating principle of muting



In the case of access guarding with muting function, muting sensors are used to distinguish between transported goods and persons.

The muting sensor signals are evaluated either in the safety sensor or in an external control unit.

Typical areas of application for muting solutions



2-sensor muting, timing controlled. Universal solution for entry and exit. The muting sensors are arranged in a cross formation.



2-sensor muting, sequence controlled. Only for exit zones. For increased requirements, e.g. in terms of shape and position of the load. The muting sensors are aligned parallel to each other.



4-sensor muting, timing controlled. For entry and exit. For increased requirements, e.g. in terms of shape and position of the load. The muting sensors are aligned parallel to each other.

Fast and simple commissioning using muting sensor sets



With their pre-mounted and ready-to-use setup, the Set-AC muting sensor sets ensure fast and error-free commissioning. The sets are used together with the MLD multiple light beam safety devices and the MLC safety light curtains. They are mounted easily to the side of the DC/UDC device columns or directly to the MLD and MLC devices. The AC-SCM sensor modules also ensure simple connection of all components. Muting sensors, restart pushbutton and display element are connected to the modules, and a collector cable is used to connect them to the MLD or MLC devices.

Fully preconfigured

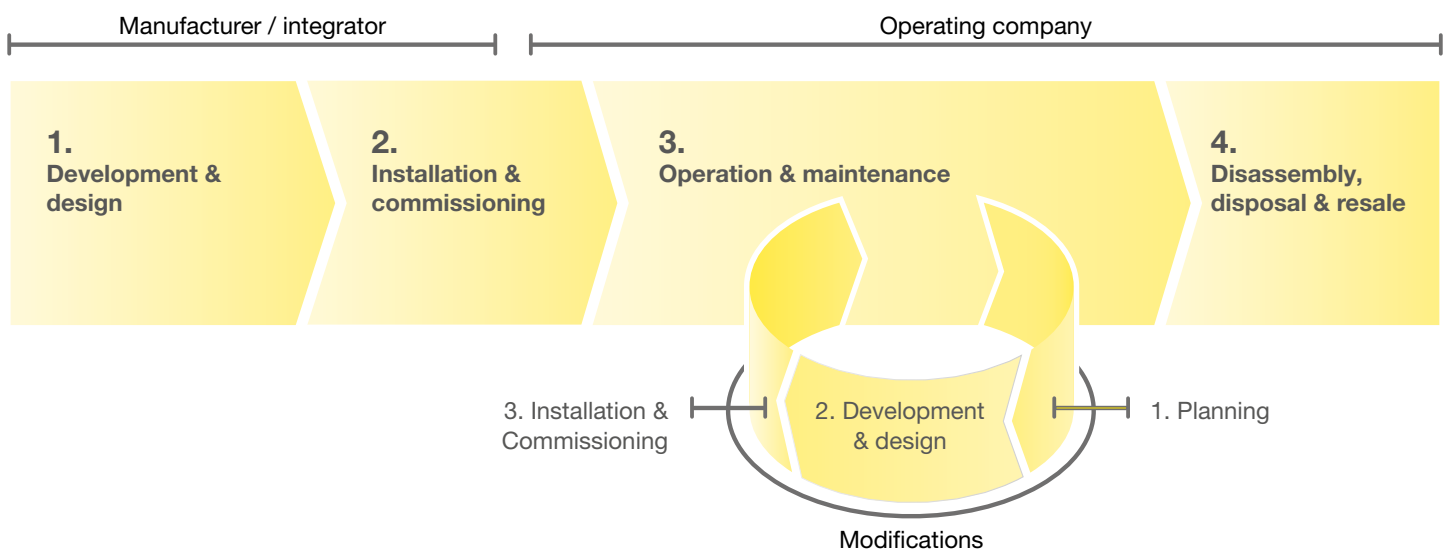


The MLDSET protective sensor sets offer complete solutions for access guarding with muting function. Thanks to the ready-to-use design with pluggable connections, the pre-mounted sets guarantee efficient setup and fast commissioning. A wide selection of turnkey variants optimized to the different muting tasks is available.

Machine Safety Services

Sustainable machine safety begins with professional planning of the safety systems and spans the entire lifecycle of a machine. Our teams of experienced and certified experts offer the appropriate support here.

Stages of a machine life cycle



When designing and constructing machines, we create the safety-related concept together with you and support you in its realization. During operation, we regularly perform tests to ensure the permanent function of the safety systems. If changes are made to existing machines, we provide you with support on everything from the safety-related planning to renewed commissioning.

Through our services, you benefit from our many years of experience in the area of machine safety and our extensive industry and application knowledge. Efficient safety-related solutions for every phase of a machine's life cycle are thereby created together.

Our service offerings



Status check 'safety technology on machines and systems'

- Our experts analyze the safety-related condition of your machinery and check whether the current safety-related requirements are satisfied in accordance with the current state of the art.
- In the event of deviations, we provide recommendations on what corrections can be performed so as to comply with legal requirements.



Risk assessment and hazard assessment

In accordance with applicable directives, the manufacturer of a machine is required to perform a risk assessment. This also applies in the case of significant modifications or extensions of machines.

The national regulations for the operation of machines require employers to conduct a hazard assessment before using work equipment and to update this assessment at regular intervals according to the current state of the art.

- Our experts support you in identifying the dangers, in assessing and evaluating the risks as well as in defining the risk-reducing measures.



Inspection of protective devices

- Within the scope of the initial or regular inspection, we check the condition, mounting and correct function of the protective device as well as the correct integration in the safe part of the machine control
 - We summarize the results of the tests in a detailed report.
- If necessary, this includes practically oriented suggestions on how deviations can be corrected.



Stopping time measurement

For the correct placement of the protective device, the required minimum distance between protective device and dangerous movements is to be calculated. To do this, the stopping time of the machine must be known. With the stopping time measurement, we determine this value reliably.

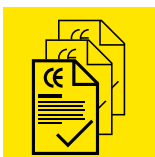
- By measuring the stopping time within the scope of regular inspections, any wear, such as in brake components, can be detected in good time.



Status check 'CE marking of machines'

During the development of machines, the specifications from the machinery directive must be adhered to and documented by the manufacturer. This is confirmed with the Declaration of Conformity and the CE marking.

- We check the documentation for completeness and give recommendations of how any deviations can be corrected.



Conformity assessment in accordance with the European machinery directive

The machinery directive defines the procedure for the design and construction of machines for satisfying the applicable safety and health protection requirements. This is a prerequisite for the Declaration of Conformity and the CE marking.

- We help you comply with and implement the legal requirements of the machinery directive.



Safety concept and safety design

The measures necessary for risk minimization are known from the risk analysis.

The safety concept and the safety functions are developed on the basis of these requirements.

- With our extensive industry knowledge and our many years of safety-related experience, we create practically oriented concept proposals for you and support you during their implementation.



Verification and validation

To avoid errors during the implementation of safety functions, both the hardware as well as the software must be checked to determine whether the requirements of the functional specification were met completely and correctly. The function test of all safety functions is to be performed according to the validation plan.

- We support you during the planning, development and execution of the function tests as well as with the creation of the required documentation.







Technical data

Safety light curtains



ELC 100

MLC 310
MLC 510

General	Type in accordance with EN IEC 61496	Type 4	MLC 300: type 2 MLC 500: type 4
	SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)	SIL 3	MLC 300: SIL 1 MLC 500: SIL 3
	Performance Level (PL) in accordance with EN ISO 13849-1	PL e	MLC 300: PL c MLC 500: PL e
	Resolution	17 / 30 mm	14 / 20 / 30 / 40 / 90 mm
	Operating range	3 / 6 m	6 / 15 / 10 / 20 / 20 m
	Protective field height	0 ... 1,500 mm	150 ... 3,000 mm
	Response time	4.5 – 21 ms	MLC 300: 3 – 51 ms MLC 500: 3 – 64 ms
	Profile cross section	34.7 mm × 39.3 mm	29 × 35 mm
	Temperature range	0 ... +50°C	MLC 300: 0 ... +55°C MLC 500: –30 ... +55°C
	Degree of protection	IP 65	IP 65
	Safety-related switching outputs (OSSDs)	2 PNP transistor outputs	2 PNP transistor outputs
	Connection type	150 mm cable with M12 connector	M12 connector
	Certifications	 	   
Functions	Range reduction on the transmitter		X
	Switchable transmission channels		X
	LED indicator	X (additional alignment indicator)	X
	7-segment display		
	Configuration by means of wiring		X
	Automatic start / restart	X	X
	Start / restart interlock (RES)		
	Contact monitoring (EDM)		
	Beam blanking, fixed or movable		
	Muting function, integrated		
Versions for special applications	Linkage of safety output, multiscan		
	Extremely slim design		
	Cascadable (triple)		
	AS-i Safety interface		X
	Ex marking acc. to EN 60079		
	Degrees of protection IP 67 / IP 69K, mounted in protective tube		X
	Extra shock / vibration resistant	X (standard for all devices)	X



MLC 320
MLC 520


















MLC 520-S



MLC 530



MLC 530-SPG

MLC 300: type 2 MLC 500: type 4	Type 4	Type 4	Type 4
MLC 300: SIL 1 MLC 500: SIL 3	SIL 3	SIL 3	SIL 3
MLC 300: PL c MLC 500: PL e	PL e	PL e	PL e
14 / 20 / 30 / 40 / 90 mm	14 / 24 mm	14 / 20 / 30 / 40 / 90 mm	30 / 40 / 90 mm
6 / 15 / 10 / 20 / 20 m	6 m	6 / 15 / 10 / 20 / 20 m	10 / 20 / 20 m
150 ... 3,000 mm	150 ... 1,200 mm	150 ... 3,000 mm	150 ... 3,000 mm
MLC 300: 3 – 51 ms MLC 500: 3 – 64 ms	7 – 17 ms	3 – 64 ms	100 ms
29 × 35 mm	15.4 × 32.6 mm	29 × 35 mm	29 × 35 mm
MLC 300: 0 ... +55°C MLC 500: –30 ... +55°C	–10 ... +55°C	–30 ... +55°C	–30 ... +55°C
IP 65	IP 65	IP 65	IP 65
2 PNP transistor outputs	2 PNP transistor outputs	2 PNP transistor outputs	2 PNP transistor outputs
M12 connector	160 mm cable with M12 connector	M12 connector	M12 connector
   	  	   	   
X		X	X
X		X	X
X	X	X	X
X		X	X
X	X	X	X
X	X	X	
X	X	X	X
		X	X
		X (2-sensor timing controlled)	X (Smart Process Gating)
		X	
	X		
X	X		
X (group II, cat 3D and 3G)			
X		X	

Multiple light beam safety devices



MLD 310
MLD 510



MLD 320
MLD 520



MLD 330
MLD 530



MLD 335
MLD 535

General	Type in accordance with EN IEC 61496	MLD 310: type 2 MLD 510: type 4	MLD 320: type 2 MLD 520: type 4	MLD 330: type 2 MLD 530: type 4	MLD 335: type 2 MLD 535: type 4
	SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)	MLD 310: SIL 1 MLD 510: SIL 3	MLD 320: SIL 1 MLD 520: SIL 3	MLD 330: SIL 1 MLD 530: SIL 3	MLD 335: SIL 1 MLD 535: SIL 3
	Performance Level (PL) in accordance with EN ISO 13849-1	MLD 310: PL c MLD 510: PL e	MLD 320: PL c MLD 520: PL e	MLD 330: PL c MLD 530: PL e	MLD 335: PL c MLD 535: PL e
	Number of beams/beam distance	2 / 500 mm 3 / 400 mm 4 / 300 mm	2 / 500 mm 3 / 400 mm 4 / 300 mm	2 / 500 mm 3 / 400 mm 4 / 300 mm	2 / 500 mm 3 / 400 mm 4 / 300 mm
	Operating range	0.5 ... 50 m or 20 ... 70 m (transmitter-receiver systems) 0.5 ... 6/8 m (transceiver systems)	0.5 ... 50 m or 20 ... 70 m (transmitter-receiver systems) 0.5 ... 6/8 m (transceiver systems)	0.5 ... 50 m or 20 ... 70 m (transmitter-receiver systems) 0.5 ... 6/8 m (transceiver systems)	0.5 ... 50 m or 20 ... 70 m (transmitter-receiver systems) 0.5 ... 6/8 m (transceiver systems)
	Dimensions	Profile cross section 52 x 65 mm	Profile cross section 52 x 65 mm	Profile cross section 52 x 65 mm	Profile cross section 52 x 65 mm
	Temperature range	-30 ... +55 °C	-30 ... +55 °C	-30 ... +55 °C	-30 ... +55 °C
	Degree of protection	IP 67	IP 67	IP 67	IP 67
	Safety-related switching outputs (OSSDs)	2 PNP transistor outputs	2 PNP transistor outputs	2 PNP transistor outputs	2 PNP transistor outputs
	Connection type	M12 connector	M12 connector	M12 connector	M12 connector
	Certifications				
Functions	LED indicator	X	X	X	X
	7-segment display		X	X	X
	Start / restart interlock (RES)		X	X	X
	Contact monitoring (EDM)		X	X	X
	Configuration by means of wiring		X	X	X
	Range reduction (for transmitter-receiver systems)	X	X	X	X
	Laser alignment aid (optional for transmitter/receiver systems)	X	X	X	X
	2-sensor muting (timing and sequence controlled)			X	X
	4-sensor muting (timing controlled)				X
	Muting-timeout extension to up to 100 hours			MLD 330, MLD 530	X
	Integrated status indicator (optional)			X	X
	AS-i Safety interface	MLD 510			















Single light beam safety devices



MLD 510, MLD 520, MLD 530

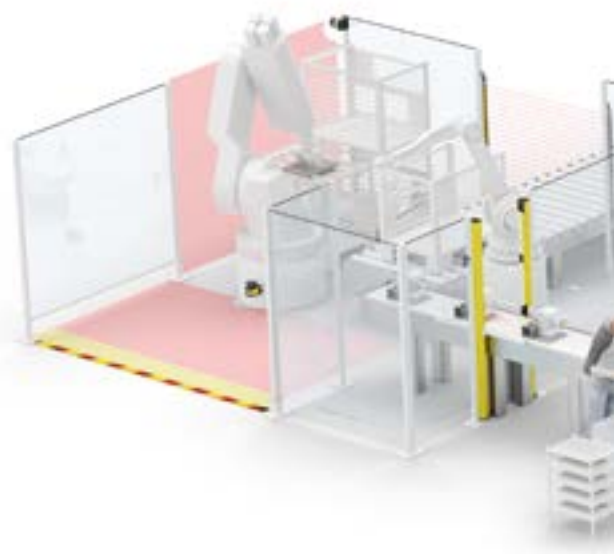
SLS 46C

SLS 46C

General	Type in accordance with EN IEC 61496	Type 4 (self-monitoring)	Type 4 (in combination with a MSI-TRM safety relay)	Type 2 (in combination with a safety monitoring device)
	SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)	SIL 3	SIL 3 (in combination with a MSI-TRM safety relay)	SIL 1 (in combination with a safety monitoring device)
	Performance Level (PL) in accordance with EN ISO 13849-1	PL e	PL e (in combination with an MSI-TRM safety relay)	PL c (in combination with a safety monitoring device)
	Number of beams	1	1	1
	Operating range	0.5 ... 70 m 20 ... 100 m	0.25 ... 40 m 5 ... 70 m	0.25 ... 40 m 5 ... 70 m
	Light source	Infrared	Red light / infrared	Red light / infrared
	Dimensions, W × H × D	52 × 65 × 193 mm	20.5 × 77 × 44 mm	20.5 × 77 × 44 mm
	Housing	Metal	Plastic	Plastic
	Temperature range	−30 ... +55 °C	−30 ... +60 °C	−30 ... +60 °C
	Degree of protection	IP 67	IP 67 / IP 69K	IP 67 / IP 69K
	Safety-related switching outputs	2 PNP transistor outputs (OSSDs)	2 push-pull transistor outputs	2 push-pull transistor outputs
	Connection type	M12 connector	Cable 2 m, M12 connector	Cable 2 m, M12 connector
	Certifications	   	    	    
Functions	LED indicator	X	X	X
	7-segment display	MLD 520, MLD 530		
	Start / restart interlock (RES)	MLD 520, MLD 530		
	Contact monitoring (EDM)	MLD 520, MLD 530		
	Configuration by means of wiring	MLD 520, MLD 530		
	Range reduction	X		
	Laser alignment aid, optional	X		
	2-sensor muting (timing and sequence controlled)	MLD 530		
	Muting-timeout extension up to 100 hours	MLD 530		
	AS-i Safety interface	MLD 510		

Safety from a single source

Individual requirements need flexible solutions. Our high-quality products and intelligent systems as well as competent technical advice and support form the basis of our safety portfolio. Benefit from our extensive range of products. The diversity of our portfolio means that we are able to provide you with all components, from sensor to control, from a single source – all with maximum user-friendliness and all optimally matched to each other.



Products



Safety laser scanners



Safety light curtains / with Smart Process Gating



Multiple light beam safety devices / with muting



Single light beam safety devices



Safety radar sensors



Safety switches



Safety proximity sensors



Safety locking devices



Safety controls and relays



Safety command devices

Solutions



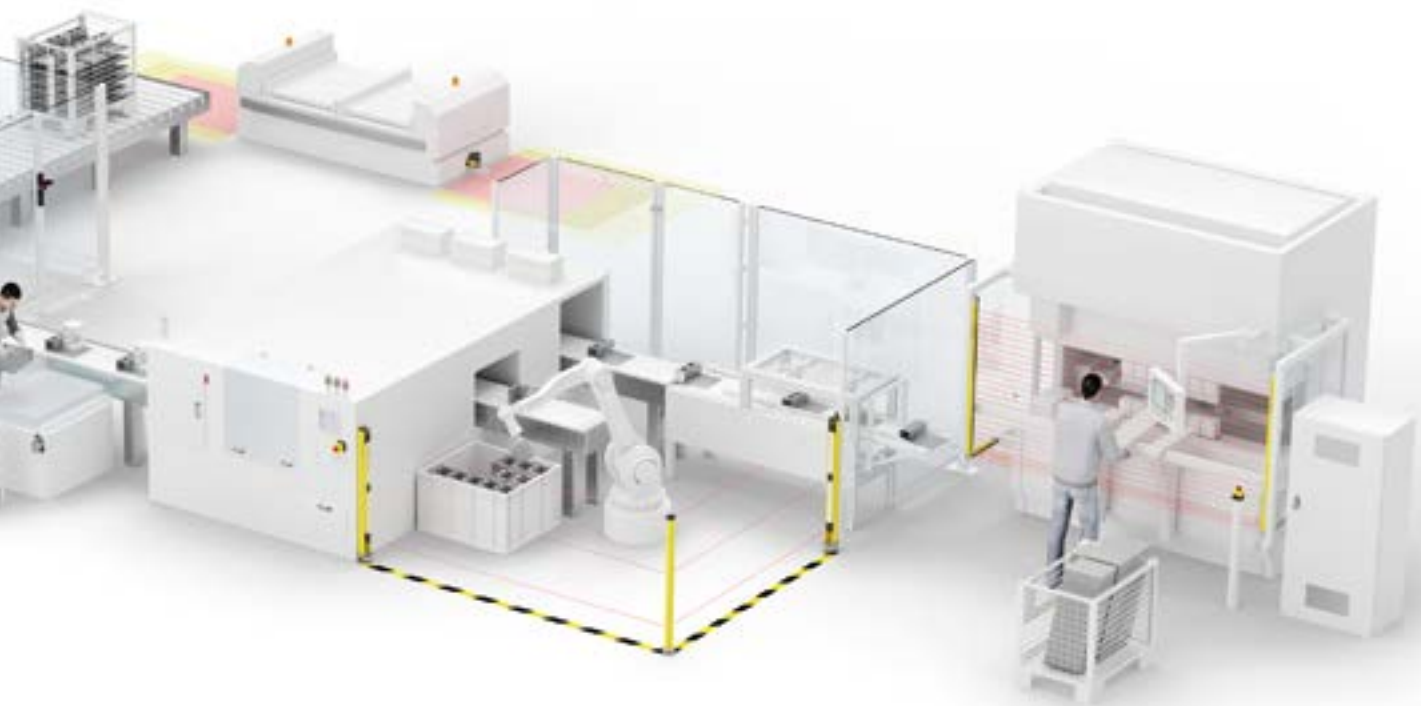
Safety solutions, e.g. for guarding transfer stations



Services



Safety services, e.g. inspections, risk analysis and validation



Accessories and suitable products



Connection boxes

For simple connection of muting sensors



Alignment aids

For simple alignment over large distances



Programmable safety control

MSI 400 basic and extension modules with up to 168 I/Os and gateway functions for integrating safety sensors into the machine circuit



Safety relays

MSI evaluation units, evaluation units with time delay and contact extensions for integrating safety sensors into the machine circuit



Cables

To facilitate the integration of our sensors, we offer a large variety of connection and interconnection cables with M8, M12, and M23 connectors – straight or angled, and with or without LED.



Signaling devices

For visual and acoustic status visualization, pre-mounted or modular

Our company

Everything at a glance

In a constantly changing industrial world, we work together with our customers to find the best solution for their sensor applications: innovatively, precisely and efficiently.

Key figures

Foundation	1963
Company structure	GmbH + Co. KG, wholly family-owned
Executive management	Ulrich Balbach
Headquarters	Owen, Germany
Distribution companies	21
Production locations	6
Technological competence centers	3
Distributors	40
Employees	> 1,200

Product range

- Switching sensors
- Measuring sensors
- Safety
- Identification
- Data transmission
- Network and connection technology
- Industrial image processing
- Accessories and supplementary products

Focus industries

- Intralogistics
- Packaging industry
- Machine tools
- Automotive industry
- Laboratory automation



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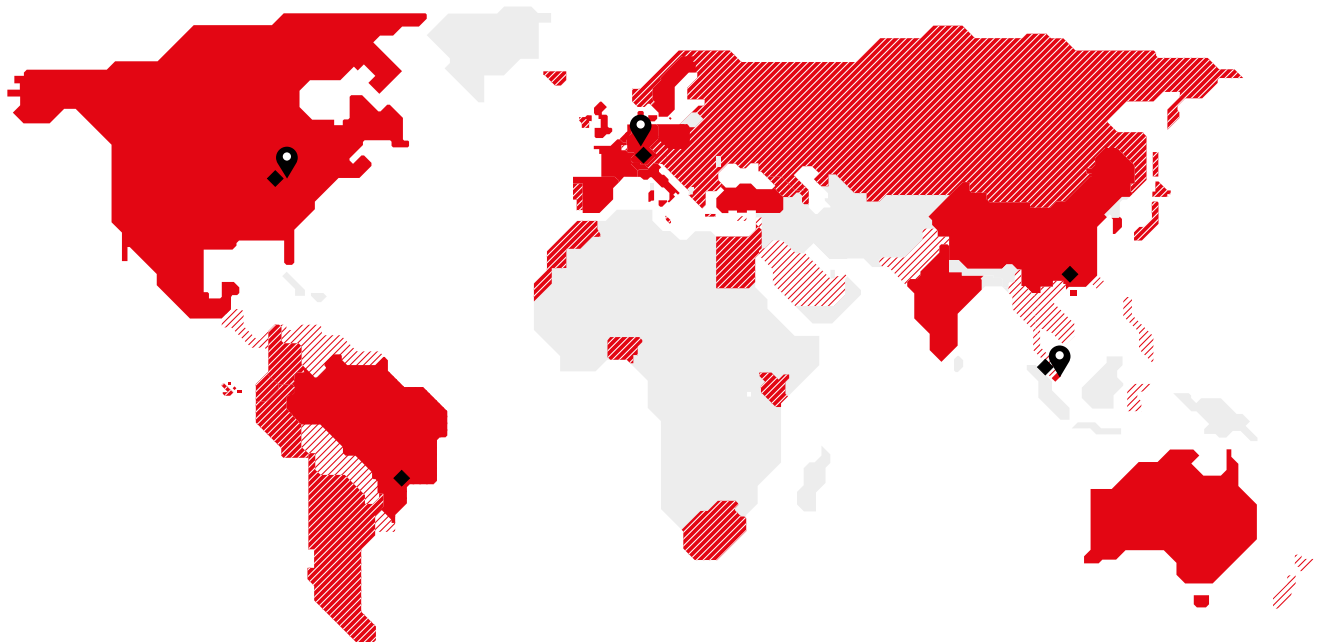




Our Locations

At work for you around the world

Your success is our motivation. We therefore place great value on always being personally, quickly, and easily accessible to you. We produce on four continents, allowing us to offer you reliable product availability.



- 📍 Technological competence centers
- ◆ Production locations
- Distribution companies
- ▨ Distributor
- ▤ Distribution through neighboring country

Technological competence centers

Owen, Germany
New Hudson/Detroit, USA
Singapore

Production locations

Owen, Germany
Unterstadion, Germany
New Hudson/Detroit, USA
Shenzhen, China
São Paulo, Brazil
Malacca, Malaysia

Distribution companies

Australia/New Zealand	Italy
Belgium	Mexico
Brazil	Poland
China	Singapore
Denmark/Sweden	South Korea
France	Spain
Germany – headquarters	Switzerland
Germany – distribution company	The Netherlands
Great Britain	Turkey
Hong Kong	USA/Canada
India	

Our product range at a glance

Switching Sensors

- Optical Sensors
- Inductive Switches
- Capacitive Sensors
- Ultrasonic Sensors
- Fiber Optic Sensors
- Fork Sensors
- Light Curtains
- Special Sensors

Measuring Sensors

- Distance Sensors
- Sensors for Positioning
- 3D Sensors
- Light Curtains
- Bar Code Positioning Systems
- Fork Sensors

Safety

- Safety Solutions
- Safety Laser Scanners
- Safety Light Curtains
- Single and Multiple Light Beam Safety Devices
- Safety Radar Systems
- Safe Locking Devices, Switches and Proximity Sensors
- Safety Controls and Relays
- Machine Safety Services

Identification

- Bar Code Identification
- 2D-Code Identification
- RF Identification

Data Transmission

- Optical Data Transmission Systems

Network and Connection Technology

- Connection Technology
- Modular Connection Units

Industrial Image Processing

- Light Section Sensors
- Smart Camera

Accessories and Supplementary Products

- Signaling Devices
- Mounting Systems
- Reflectors

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