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

<table>
<thead>
<tr>
<th>Features</th>
<th>ELC 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety: Type 4 / performance level PL e / SIL 3</td>
<td></td>
</tr>
<tr>
<td>Protective field lengths of 300 mm to 1500 mm in 300 mm grid</td>
<td></td>
</tr>
<tr>
<td>Resolution / operating range: 17 mm / 3 m, 30 mm / 6 m</td>
<td></td>
</tr>
<tr>
<td>Connection: 150 mm cable with 4-pin M12 connector</td>
<td></td>
</tr>
<tr>
<td>Shock resistance up to 40 g</td>
<td></td>
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<tr>
<td>Temperature range from 0 to 55 °C</td>
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</tbody>
</table>
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

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

MLC 300 / MLC 500

<table>
<thead>
<tr>
<th>Features</th>
<th>MLC 300: type 2, performance Level PL c, SIL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MLC 500: type 4, performance level PL e, SIL 3</td>
</tr>
<tr>
<td>Resolutions</td>
<td>14 mm, 20 mm, 30 mm, 40 mm, 90 mm</td>
</tr>
<tr>
<td>Protective field lengths</td>
<td>150 mm to 3000 mm in 150 mm grid</td>
</tr>
<tr>
<td>Operating range</td>
<td>up to 20 m</td>
</tr>
<tr>
<td>Connection</td>
<td>M12 connector</td>
</tr>
<tr>
<td>Reliability of adjacent</td>
<td>Operation of adjacent machines thanks to channel switching and reducible operating range</td>
</tr>
<tr>
<td>machines</td>
<td>Blank functions and reduced resolution for stationary or moving objects in the protective field (MLC 530)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Wide temperature range from –30 … 55°C</td>
</tr>
</tbody>
</table>
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

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

<table>
<thead>
<tr>
<th>Features</th>
<th>DC, UDC device columns</th>
<th>UMC mirror columns</th>
<th>PS, PSC protective screens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust profile construction for stable mounting and reliable protection of the safety devices</td>
<td>Variants with individual mirrors for operation in combination with MLD multiple light beam safety devices</td>
<td>PS removable protective screens for MLC safety light curtains. Protection against device soiling and damage</td>
<td></td>
</tr>
<tr>
<td>Simple installation of the safety devices with quick height adjustment and alignment thanks to special mounting brackets</td>
<td>Variants with continuous mirror for operation in combination with ELC and MLC safety light curtains</td>
<td>PSC removable protective screens for DC and UDC device columns. Protection against device soiling and damage</td>
<td></td>
</tr>
<tr>
<td>UDC variant: additionally with spring elements for automatic resetting after mechanical impacts</td>
<td>Robust design with easy-to-adjust mirrors</td>
<td>Hard-wearing PMMA plastic with particularly good transparency</td>
<td></td>
</tr>
<tr>
<td>Simple mounting of the muting sensor sets to the external slot (page 25)</td>
<td>Spring elements for automatic resetting after mechanical impacts</td>
<td></td>
<td></td>
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</tbody>
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19
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

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

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.

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

<table>
<thead>
<tr>
<th>Features</th>
<th>MLC 530 SPG</th>
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<tr>
<td>Safety light curtain with protective field lengths of 150 mm to 3000 mm in a 150 mm grid</td>
<td></td>
</tr>
<tr>
<td>Resolutions of 30 mm, 40 mm, 90 mm</td>
<td></td>
</tr>
<tr>
<td>Type 4, performance level PL e, SIL 3</td>
<td></td>
</tr>
<tr>
<td>Configuration of the settings by means of pin assignment for easy commissioning and fast replacement in the case of servicing</td>
<td></td>
</tr>
<tr>
<td>Partial gating (upper beams always remain active) for the execution of a second safety function</td>
<td></td>
</tr>
<tr>
<td>Blanking of stationary objects in the protective field</td>
<td></td>
</tr>
<tr>
<td>Reliable operation of adjacent machines thanks to channel switching and reducible operating range</td>
<td></td>
</tr>
<tr>
<td>Wide temperature range from –30 ... 55°C</td>
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</tbody>
</table>
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.
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

<table>
<thead>
<tr>
<th>Features</th>
<th>MLD 300, MLD 500</th>
<th>MLC 500</th>
<th>MSI-MD-FB</th>
<th>MSI 400</th>
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<td>Device type</td>
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<td>Safety light curtains, see page 12</td>
<td>Muting interface, field module</td>
<td>Configurable Safety control</td>
</tr>
<tr>
<td>Muting function integrated in safety sensor</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>Muting function integrated in control device</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
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<tr>
<td>Muting functions</td>
<td></td>
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<tr>
<td>2-sensor muting, timing controlled</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2-sensor muting, sequence controlled</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4-sensor muting, timing controlled</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-sensor muting, sequence controlled</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>'Release muting' input signal</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Partial muting</td>
<td>x</td>
<td></td>
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</tr>
</tbody>
</table>
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 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

### General

<table>
<thead>
<tr>
<th></th>
<th>ELC 100</th>
<th>MLC 310</th>
<th>MLC 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type in accordance with EN IEC 61496</td>
<td>Type 4</td>
<td>MLC 300: type 2</td>
<td>MLC 500: type 4</td>
</tr>
<tr>
<td>SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)</td>
<td>SIL 3</td>
<td>MLC 300: SIL 1</td>
<td>MLC 500: SIL 3</td>
</tr>
<tr>
<td>Performance Level (PL) in accordance with EN ISO 13849-1</td>
<td>PL e</td>
<td>MLC 300: PL c</td>
<td>MLC 500: PL e</td>
</tr>
<tr>
<td>Resolution</td>
<td>17 / 30 mm</td>
<td>14 / 20 / 30 / 40 / 90 mm</td>
<td></td>
</tr>
<tr>
<td>Operating range</td>
<td>3 / 6 m</td>
<td>6 / 15 / 10 / 20 / 20 m</td>
<td></td>
</tr>
<tr>
<td>Protective field height</td>
<td>0 … 1,500 mm</td>
<td>150 … 3,000 mm</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>4.5 – 21 ms</td>
<td>MLC 300: 3 – 51 ms</td>
<td>MLC 500: 3 – 64 ms</td>
</tr>
<tr>
<td>Profile cross section</td>
<td>34.7 mm × 39.3 mm</td>
<td>29 × 35 mm</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 … +55°C</td>
<td>MLC 300: 0 … +55°C</td>
<td>MLC 500: −30 … +55°C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 65</td>
<td>IP 65</td>
<td></td>
</tr>
<tr>
<td>Safety-related switching outputs (OSSDs)</td>
<td>2 PNP transistor outputs</td>
<td>2 PNP transistor outputs</td>
<td></td>
</tr>
<tr>
<td>Connection type</td>
<td>150 mm cable with M12 connector</td>
<td>M12 connector</td>
<td></td>
</tr>
<tr>
<td>Certifications</td>
<td>![CE] ![UL]</td>
<td>![CE] ![UL]</td>
<td></td>
</tr>
</tbody>
</table>

### Functions

<table>
<thead>
<tr>
<th></th>
<th>ELC 100</th>
<th>MLC 310</th>
<th>MLC 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range reduction on the transmitter</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switchable transmission channels</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED indicator</td>
<td>X (additional alignment indicator)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7-segment display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configuration by means of wiring</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic start/restart</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start/restart interlock (RES)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contactor monitoring (EDM)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam blanking, fixed or movable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muting function, integrated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkage of safety output, multiscan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Special applications

<table>
<thead>
<tr>
<th></th>
<th>ELC 100</th>
<th>MLC 310</th>
<th>MLC 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely slim design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cascadable (triple)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS-i Safety interface</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ex marking acc. to EN 60079</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees of protection IP 67 / IP 69K, mounted in protective tube</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Extra shock/vibration resistant</td>
<td>X (standard for all devices)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### General
- **Type** in accordance with EN IEC 61496
- **SIL** in accordance with IEC 61508 and EN IEC 62061 (SIL CL)
- **Performance Level (PL)** in accordance with EN ISO 13849-1

### 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 … +55°C
- MLC 500: –30 … +55°C

### Degree of protection
- IP 65

### Safety-related switching outputs (OSSDs)
- 2 PNP transistor outputs

### Connection type
- 150 mm cable with M12 connector
- 160 mm cable with M12 connector

### Certifications
- US

### Functions
- **Range reduction on the transmitter**
- **Switchable transmission channels**
- **LED indicator** (additional alignment indicator)
- **7-segment display**
- **Configuration by means of wiring**
- **Automatic start / restart**
- **Start / restart interlock (RES)**
- **Contactor monitoring (EDM)**
- **Beam blanking, fixed or movable**
- **Muting function, integrated** (2-sensor timing controlled) (Smart Process Gating)
- **Linkage of safety output, multiscan**
- **Versions for special applications**
  - Extremely slim design
  - Cascadable (triple)
  - AS-i Safety interface
  - Ex marking acc. to EN 60079 (group II, cat 3D and 3G)
  - Degrees of protection IP 67 / IP 69K, mounted in protective tube
  - Extra shock / vibration resistant

### Technical data
<table>
<thead>
<tr>
<th>MLC 320 MLC 520</th>
<th>MLC 520-S</th>
<th>MLC 530</th>
<th>MLC 530-SPG</th>
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<tbody>
<tr>
<td><strong>MLC 300</strong>: type 2</td>
<td>Type 4</td>
<td>Type 4</td>
<td>Type 4</td>
</tr>
<tr>
<td><strong>MLC 500</strong>: type 4</td>
<td>Type 4</td>
<td>Type 4</td>
<td>Type 4</td>
</tr>
<tr>
<td><strong>MLC 300</strong>: SIL 1</td>
<td>SIL 3</td>
<td>SIL 3</td>
<td>SIL 3</td>
</tr>
<tr>
<td><strong>MLC 500</strong>: SIL 3</td>
<td>SIL 3</td>
<td>SIL 3</td>
<td>SIL 3</td>
</tr>
<tr>
<td><strong>MLC 300</strong>: PL e</td>
<td>PL e</td>
<td>PL e</td>
<td>PL e</td>
</tr>
<tr>
<td><strong>MLC 500</strong>: PL e</td>
<td>PL e</td>
<td>PL e</td>
<td>PL e</td>
</tr>
<tr>
<td>14/20/30/40/90 mm</td>
<td>14/24 mm</td>
<td>14/20/30/40/90 mm</td>
<td>30/40/90 mm</td>
</tr>
<tr>
<td>6/15/10/20/20 m</td>
<td>6 m</td>
<td>6/15/10/20/20 m</td>
<td>10/20/20 m</td>
</tr>
<tr>
<td>150 … 3,000 mm</td>
<td>150 … 1,200 mm</td>
<td>150 … 3,000 mm</td>
<td>150 … 3,000 mm</td>
</tr>
<tr>
<td><strong>MLC 300</strong>: 3 – 51 ms</td>
<td>7 – 17 ms</td>
<td>3 – 64 ms</td>
<td>100 ms</td>
</tr>
<tr>
<td><strong>MLC 500</strong>: 3 – 64 ms</td>
<td>15.4 × 32.6 mm</td>
<td>29 × 35 mm</td>
<td>29 × 35 mm</td>
</tr>
<tr>
<td><strong>MLC 300</strong>: 0 … +55°C</td>
<td>–10 … +55°C</td>
<td>–30 … +55°C</td>
<td>–30 … +55°C</td>
</tr>
<tr>
<td><strong>MLC 500</strong>: –30 … +55°C</td>
<td>IP 65</td>
<td>IP 65</td>
<td>IP 65</td>
</tr>
<tr>
<td>2 PNP transistor outputs</td>
<td>2 PNP transistor outputs</td>
<td>2 PNP transistor outputs</td>
<td>2 PNP transistor outputs</td>
</tr>
<tr>
<td>M12 connector</td>
<td>160 mm cable with M12 connector</td>
<td>M12 connector</td>
<td>M12 connector</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
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### Certifications
- CE
- UL
- US
- C TÜV
- C UL
- C TÜV US
- CE
- UL
- C TÜV
- CE
- UL

### Safety at Leuze
### Technical data

#### Multiple light beam safety devices

<table>
<thead>
<tr>
<th>Model</th>
<th>MLD 310</th>
<th>MLD 510</th>
<th>MLD 320</th>
<th>MLD 520</th>
<th>MLD 330</th>
<th>MLD 530</th>
<th>MLD 335</th>
<th>MLD 535</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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 | X | | | | |
| Start / restart interlock (RES) | X | X | X | X | | | | |
| Contactor monitoring (EDM) | X | X | X | X | | | | |
| Configuration by means of wiring | X | 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 | X | X | | | | |
| 4-sensor muting (timing controlled) | X | X | X | 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 | | | | | | | |
# Technical data

## General

<table>
<thead>
<tr>
<th>MLD 510, MLD 520, MLD 530</th>
<th>SLS 46C</th>
<th>SLS 46C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type in accordance with EN IEC 61496</td>
<td>Type 4 (self-monitoring)</td>
<td>Type 4 (in combination with a MSI-TRM safety relay)</td>
</tr>
<tr>
<td>SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)</td>
<td>SIL 3</td>
<td>SIL 3 (in combination with a MSI-TRM safety relay)</td>
</tr>
<tr>
<td>Performance Level (PL) in accordance with EN ISO 13849-1</td>
<td>PL e</td>
<td>PL e (in combination with an MSI-TRM safety relay)</td>
</tr>
<tr>
<td>Number of beams</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Operating range</td>
<td>0.5 … 70 m</td>
<td>0.25 … 40 m</td>
</tr>
<tr>
<td>Light source</td>
<td>Infrared</td>
<td>Red light / infrared</td>
</tr>
<tr>
<td>Dimensions, W x H x D</td>
<td>52 x 65 x 193 mm</td>
<td>20.5 x 77 x 44 mm</td>
</tr>
<tr>
<td>Housing</td>
<td>Metal</td>
<td>Plastic</td>
</tr>
<tr>
<td>Temperature range</td>
<td>–30 ... +55 °C</td>
<td>–30 ... +60 °C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 67</td>
<td>IP 67 / IP 69K</td>
</tr>
<tr>
<td>Safety-related switching outputs</td>
<td>2 PNP transistor outputs (OSSDs)</td>
<td>2 push-pull transistor outputs</td>
</tr>
<tr>
<td>Connection type</td>
<td>M12 connector</td>
<td>Cable 2 m, M12 connector</td>
</tr>
<tr>
<td>Certifications</td>
<td></td>
<td></td>
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</tbody>
</table>

## Functions

<table>
<thead>
<tr>
<th>MLD 510, MLD 520, MLD 530</th>
<th>SLS 46C</th>
<th>SLS 46C</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED indicator</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7-segment display</td>
<td>MLD 520, MLD 530</td>
<td></td>
</tr>
<tr>
<td>Start / restart interlock (RES)</td>
<td>MLD 520, MLD 530</td>
<td></td>
</tr>
<tr>
<td>Contactor monitoring (EDM)</td>
<td>MLD 520, MLD 530</td>
<td></td>
</tr>
<tr>
<td>Configuration by means of wiring</td>
<td>MLD 520, MLD 530</td>
<td></td>
</tr>
<tr>
<td>Range reduction</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Laser alignment aid, optional</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2-sensor muting (timing and sequence controlled)</td>
<td>MLD 530</td>
<td></td>
</tr>
<tr>
<td>Muting-timeout extension up to 100 hours</td>
<td>MLD 530</td>
<td></td>
</tr>
<tr>
<td>AS-i Safety interface</td>
<td>MLD 510</td>
<td></td>
</tr>
</tbody>
</table>
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

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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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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.
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

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

Data Transmission
— Optical Data Transmission Systems

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

Network and Connection Technology
— Connection Technology
— Modular Connection Units

Industrial Image Processing
— Light Section Sensors
— Smart Camera

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

Accessories and Supplementary Products
— Signaling Devices
— Mounting Systems
— Reflectors

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