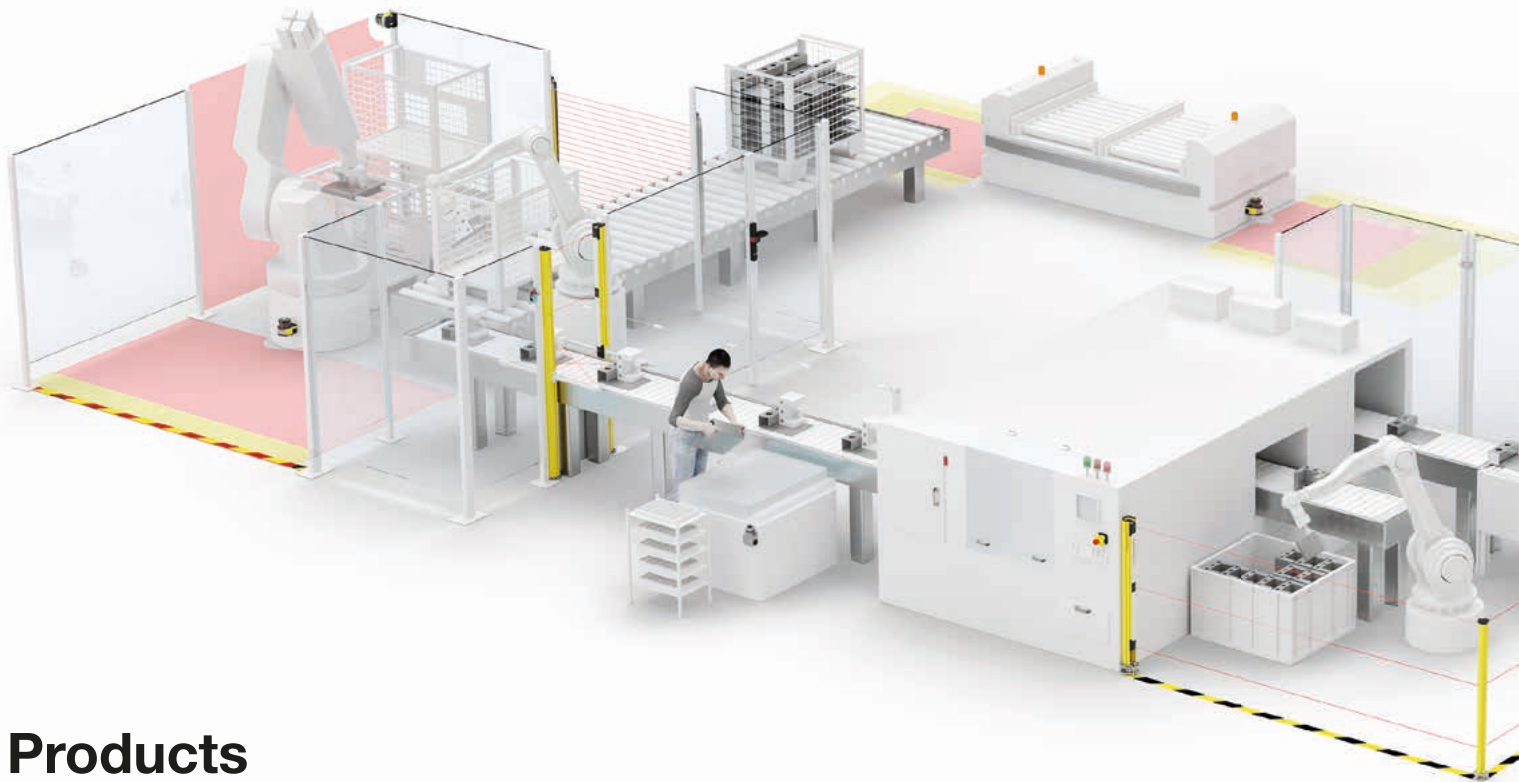


Safety

Products, solutions and services
for machine safety

Safety at Leuze





Products



Safety laser scanners



**Safety light curtains /
with Smart Process Gating**



Safety switch



**Multiple light beam
safety devices / with muting**



**Safety
proximity sensors**



**Single light beam
safety devices**



Safety locking devices



Safety radar sensors



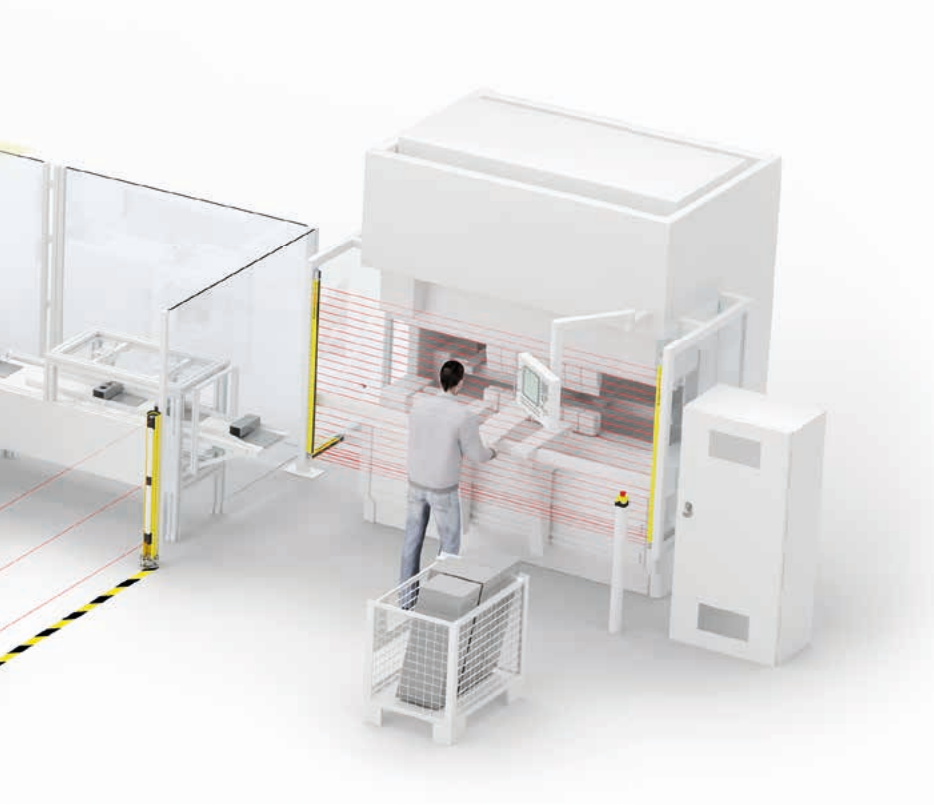
Safety command devices



**Safety bar code
positioning system**



**Safety controllers
and relays**



Safety at Leuze

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Applications

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Safety products

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Safety solutions

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Safety services

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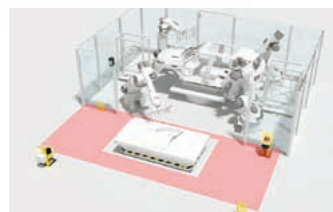
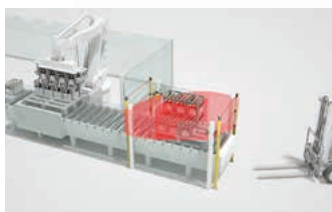
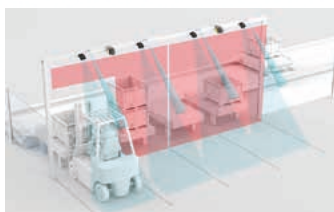
Technical data

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Suitable products

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Solutions



Safety solutions, e.g. for safeguarding transfer stations and access points to transport systems

Services



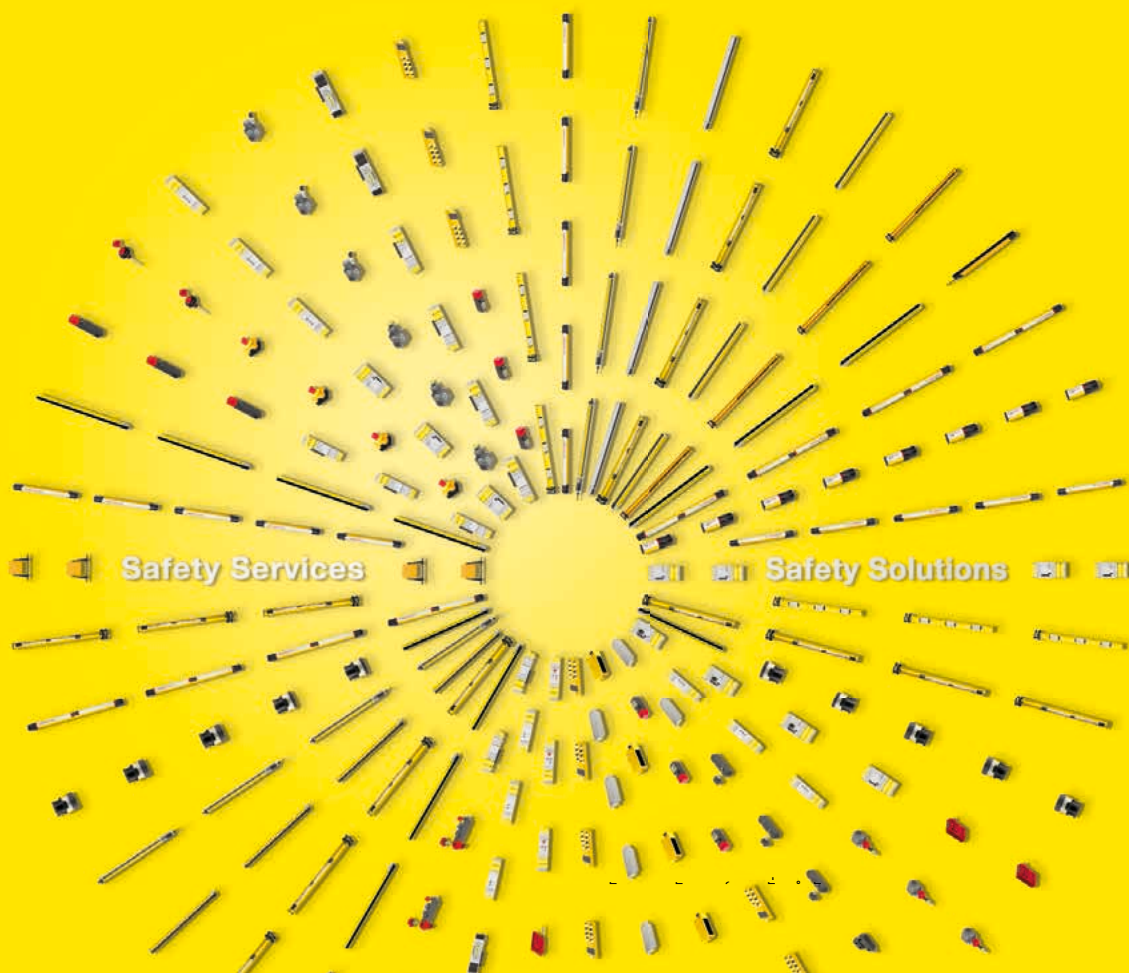
Safety services, e.g. inspections, risk analysis and validation

Safety at Leuze

Safety Thought Further.
For all your safety applications worldwide.

Global industry is in a constant state of change. And with it, the complex requirements for safety concepts to protect people and systems. At the same time, the importance of smooth process flows continues to grow due to 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: Safety at Leuze.





Experts for your application

Effective solutions begin with a comprehensive understanding of the relevant requirements. Our specialized application expertise 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

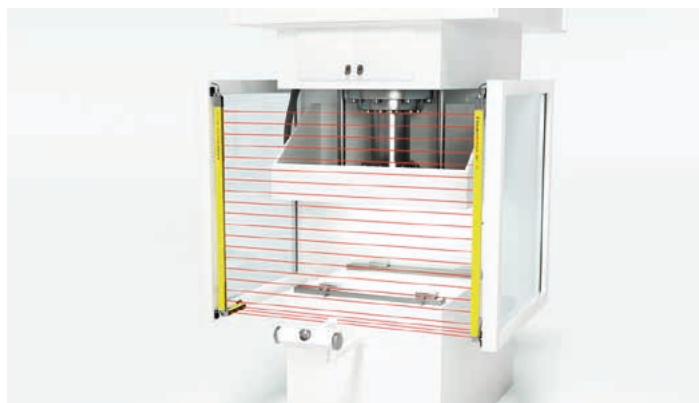
Requirement: The point of operation at a machine or system is to be guarded by an electro-sensitive protective device. The necessary distance between the protective device and point of operation is to be as small as possible.



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 for small safety distances between the safety sensor and the point of operation.

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 the 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 shut-down.



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 beam safety devices monitor the foot space over a length of up to 70 m. They are available as a type 4 and 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

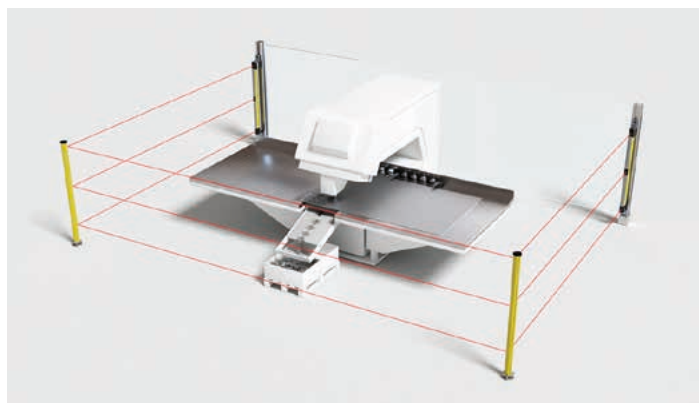
Requirement: Access to a dangerous area at a machine or system is to be guarded. To enable simple entry and exit of material, optoelectronic safety sensors are to be used.



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 safe-guarding, transmitter/receiver models are available with a range of up to 70 m.

Multi-sided access guarding

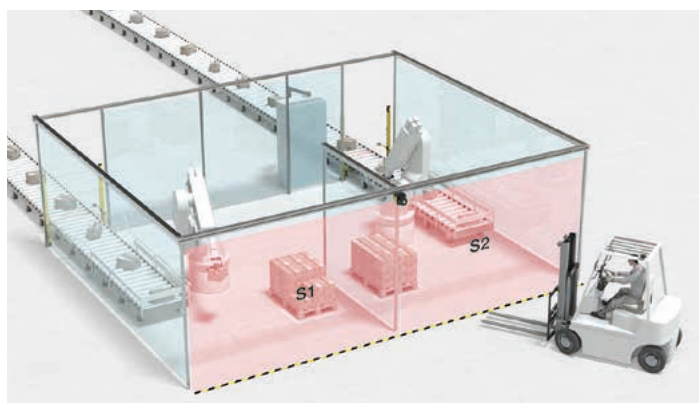
Requirement: Access to the working range is to be guarded while the machine is in operation. To enable material entry and exit, the machine must be easily accessible from multiple sides.



Solution: The MLD 300/500 multiple light beam safety devices in combination with the UMC mirror columns safe-guard 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 using sensors outside the working range

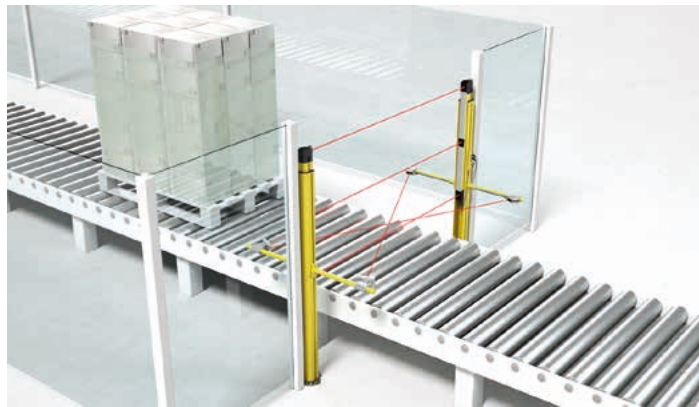
Requirement: Access to dangerous areas by persons and vehicles is to be monitored using safety sensor technology. The sensors must not hinder free movement within the working range.



Solution: The RSL 400 safety laser scanner is installed above the access area and the protective field is aligned vertically. This ensures that the working range is not restricted. By using two safety functions working in parallel, one RSL 400 can monitor two stations simultaneously and independently from each other.

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

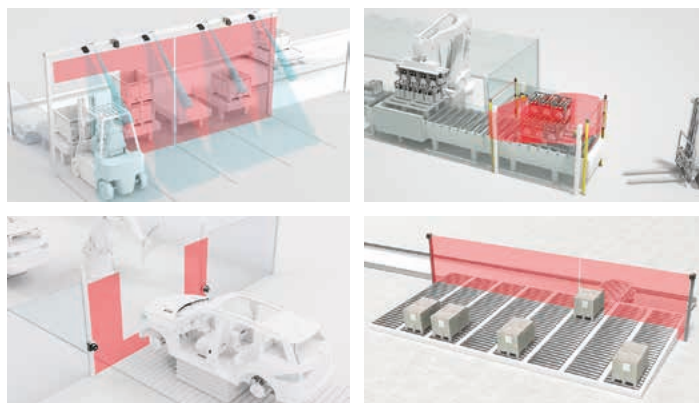
Requirement: Access guarding on conveyor lines is to prevent persons from accessing the danger zone, while at the same time allowing the transported goods to pass through.



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 no longer required, and particularly space-saving systems can be designed thanks to SPG.

Safety solutions

Requirement: Automated processes often require customized safety concepts. Especially when the shape and size of the transported goods change, or when manual intervention is to be avoided. This is where traditional concepts can reach their limits.

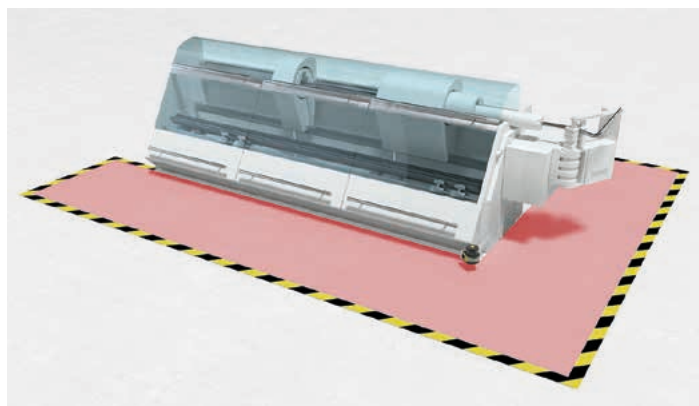


Solution: From risk assessment to validation: our safety solutions provide you with complete solutions for your systems. 'Our expert teams' innovative safety concepts ensure efficient material flow, gapless safety and high availability of your system. You can find more information from page 54 onwards.

Area guarding at machines and systems

Safeguarding hazardous areas

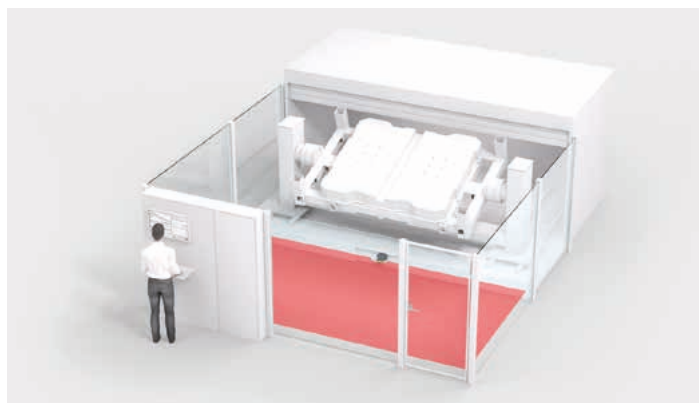
Requirement: The hazardous working range of the machine is to be guarded against entry by and the presence of persons. The contour of the monitored area is to be adapted to the contour of the machine.



Solution: The RSL 400 safety laser scanners use configurable protective fields for area monitoring. Thanks to the 8.25 m operating range and 270° scanning range, large areas can be guarded with just one device.

Restart protection and monitoring of hidden areas

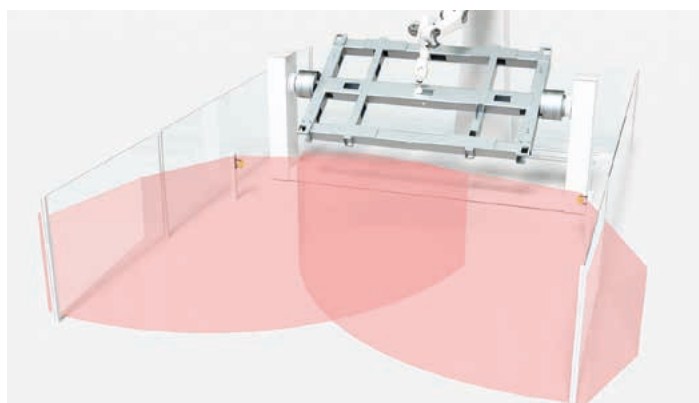
Requirement: To prevent danger, the process is not permitted to restart until it has been ensured that no persons are in the working range or in the hidden area.



Solution: The RSL 400 safety laser scanner with its configurable protective field monitors the presence of persons. The LBK 3D safety radar system is used under harsh ambient conditions and also allows the presence of static objects in the monitored area.

Safeguarding hazardous areas in harsh environments

Requirement: The hazardous working range of the machine is to be guarded against entry by and the presence of persons. Safe operation and high availability must also be guaranteed under harsh ambient conditions – such as dirt, welding sparks, sawdust or humidity.

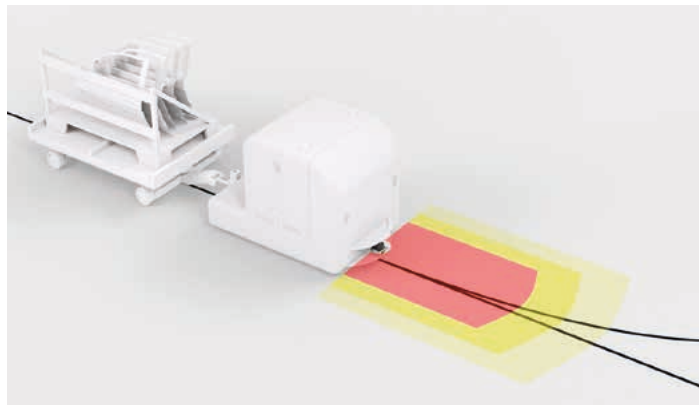


Solution: The LBK 3D safety radar system detects movements in the monitored area and operates reliably even under harsh ambient conditions. Furthermore, the radar technology allows the presence of static objects in the monitored area.

AGV and AMR safeguarding and navigation

Safeguarding compact vehicles with simple transportation paths

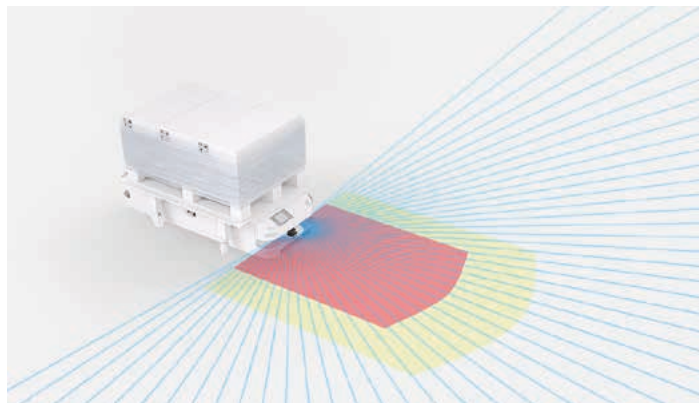
Requirement: The compact towing vehicle moves in one direction – e.g. by means of optical guidance. The transportation path of the vehicle must be safeguarded.



Solution: The particularly compact RSL 220 safety laser scanner secures the vehicle's path of travel. Eight switchable sets of protective and warning fields enable easy adaptation in the case of curved paths and different speeds.

AGV and AMR safeguarding and navigation for small loads

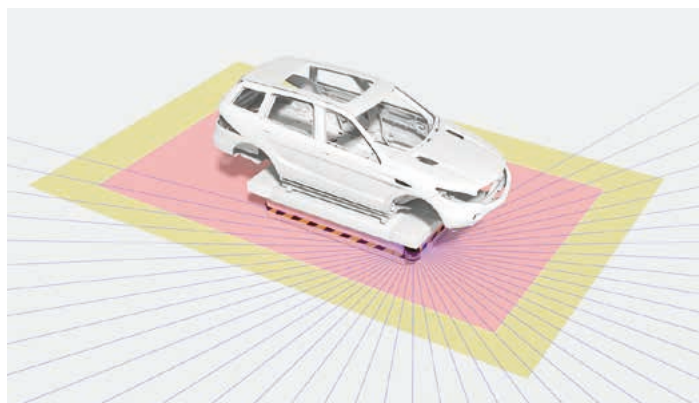
Requirement: The transportation path of the AGV must be guarded by means of safety sensors. The protective fields are to be flexibly adapted to the movement and loading situation. If the principle of natural navigation is used, the device is to provide the measurement data for the navigation software at the same time.



Solution: The particularly compact RSL 200 safety laser scanner combines safety technology and measured value output in a single device measuring just 80 x 80 x 86 mm. It has a scanning range of 275° with a range of 3 m and up to 32 switchable field sets (1 protective field and 2 warning fields each).

AGV and AMR safeguarding and navigation for large loads

Requirement: The transportation path of the AGV must be guarded by means of safety sensors. The protective fields are to be flexibly adapted to the movement and loading situation. If the principle of natural navigation is used, the device is to provide the measurement data for the navigation software at the same time.



Solution: The RSL 400 safety laser scanner merges safety technology and high-quality measurement value output in a single device. It has a scanning range of 270° with a range of up to 8.25 m and up to 100 switchable field pairs. Two scanners therefore provide optimum safeguarding of the AGV. The measurement data has a particularly high angular resolution of 0.1°.

Guarding of physical safety guards

Monitoring of doors and flaps

Requirement: Moving safety guards such as doors and flaps protect the operator from hazards. The closed state of the protective devices must be monitored.



Solution: The safety switches of the S20/200 series with their robust housings and wide range of installation options can be used universally. The MC series' contactless, magnetically coded switches are ideal for use in harsh, dirty or damp environments.

Monitoring of doors and flaps, with high level of manipulation protection

Requirement: The closed state of safety guards such as doors or flaps must be monitored. EN ISO 14119 stipulates that measures to protect against manipulation must also be provided. If this is not possible through constructive measures, the sensor must have a high level of manipulation protection.



Solution: The RD 800 contactless safety transponders with RFID coding offer maximum protection against manipulation. With their OSSD outputs, they are also easy to integrate in the safety circuit.

Monitoring of doors and flaps with guard locking, for long stopping times

Requirement: Areas with hazardous movements can be entered via safety doors to allow maintenance. If the movement does not stop immediately after the door is opened, the door is to be guarded by a safety switch with guard locking.



Solution: The robust L series safety switches with guard locking keep safety doors securely locked until access is released by an electric signal. The series includes standard designs, devices with integrated operational controls as well as devices with RFID-coded actuators.

Monitoring of doors and flaps, with guard locking for process protection

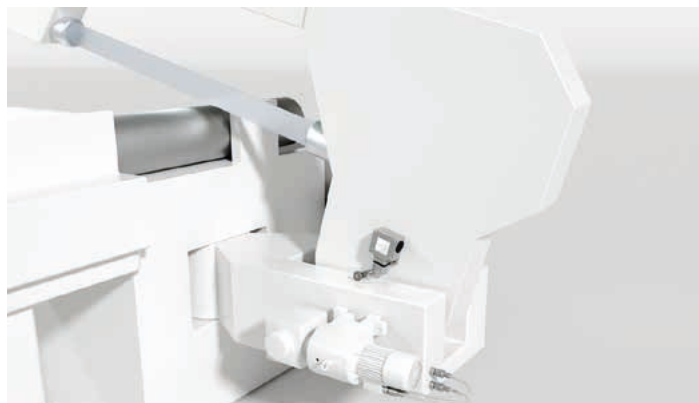
Requirement: When doors or flaps are opened, the process is allowed to stop only at defined positions in order to avoid scrap or maintenance work when the process starts up again. The doors or flaps are to be released only when these positions are reached.



Solution: The L series safety switches with guard locking keep safety doors locked until the process control sends an electric release signal.

Safe monitoring of final positions

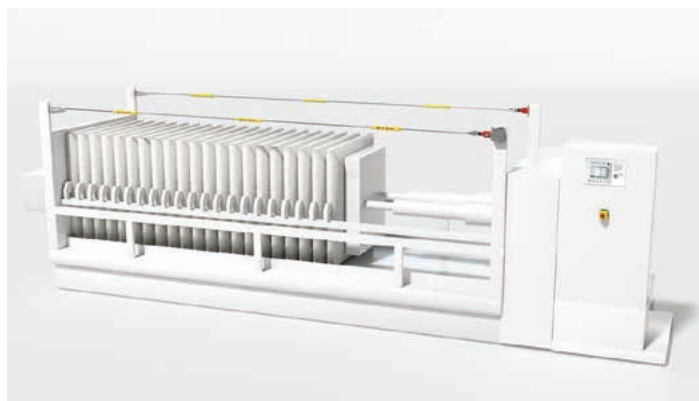
Requirement: To trigger shut-down at the end of the cutting process or for service work, it is necessary to monitor when the saw blade reaches the final position.



Solution: The S300 position switch monitors when the final position is reached. Variants with plunger and various actuators make the device suitable for universal use. With its forced normally closed contacts, the S300 can also be directly integrated into the safety circuit.

Triggering of an emergency stop

Requirement: Machines and systems with dangerous movements must be equipped with an E-Stop device. This device can be actuated manually in the event of danger.

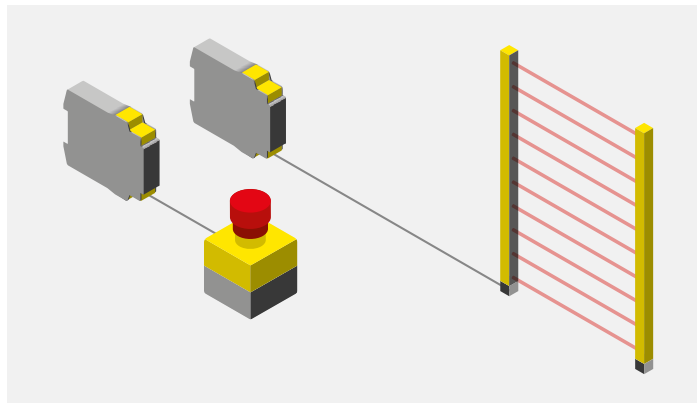


Solution: The ESB 200 E-Stop button is used wherever it makes sense to be able to enter a stop command at a specific location. The ERS 200 E-Stop rope switch is used for larger danger zones.

Evaluation of safety sensors by safe control components

Evaluation of individual safety sensors

Requirement: For correct execution of the safety function, safety sensors must be integrated into the machine circuit using safe control components in accordance with the requirements defined in EN ISO 13849-1.



Solution: With the reliable MSI safety relays, individual safety sensors can be integrated quickly and easily into the safety circuit of machines and systems. Depending on the model, the relays are tailored to specific applications or can be used universally.

Evaluation of multiple safety sensors with configurable safety functions

Requirement: Multiple safety sensors must be integrated into the machine or system control. Functions such as a time delay for releasing a guard locking or signal connections are also to be configured.



Solution: The basic module of the MSI 400 expandable safety control already has 24 safe inputs/outputs as well as an Ethernet interface with Industrial Ethernet protocols. The safety control can be configured quickly and efficiently using the license-free configuration software MSI.designer.

Safe monitoring of presses

Requirement: The specific requirements on the safety of mechanical and hydraulic presses are described in standard EN ISO 16092. The implementation of these requirements and the integration in the press operating sequence are to be supported and simplified by the configuration tool.



Solution: The MSI.designer configuration tool offers a special function library for use on eccentric and hydraulic presses. It contains tailored function blocks for the control and protection of presses and thereby enables quick and easy configuration of the MSI 400 safety controller.

Safe position detection

Safe position detection on stacker cranes

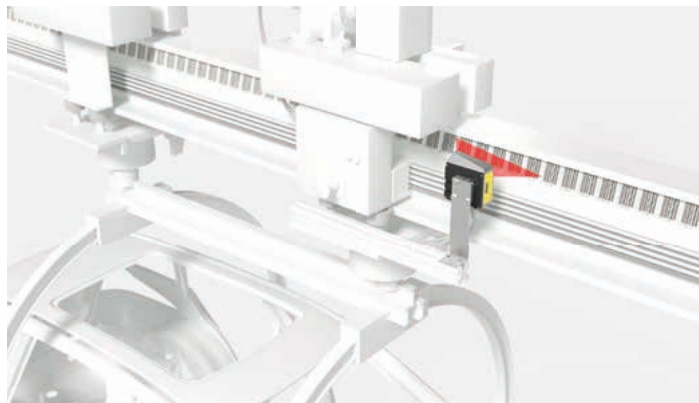
Requirement: The dangers present at the system and the necessary Performance Level PLr have been determined with a risk assessment. The EN 528 standard supports the safety requirements for stacker cranes. The necessary safe position and speed monitoring requires safe position detection.



Solution: The FBPS 600i safe bar code positioning system offers safe position detection with just one device. It is certified as a safety device and fulfills the requirements for PL e / SIL 3. This means that safety functions can now be easily implemented.

Positioning of the transport unit

Requirement: For control of the electric monorail system, the position of the transport unit on the carrier must be known with millimeter precision at all times. "Safe positioning" must be ensured especially when workers are working very close to the transport unit.



Solution: The safe FBPS 600i bar code positioning systems enable precise positioning over a length of up to 10,000 m. The devices can be easily integrated into the control thanks to a wide range of interfaces. The self-adhesive bar code tapes are optimized for industrial application and are extremely resilient.

RSL 200 safety laser scanner

Efficient safety with minimal space requirements

The RSL 200 safety laser scanners are optimized for minimal space requirements. With an operating range of 3.0 m, a scanning angle of 275° and measuring just 80 x 80 x 86 mm, they are ideal for use on AGVs and AMRs. Clever details, such as the rotating connections and the diagnostic app, ensure easy integration and efficient safety.



Advantages for you

- Thanks to the small dimensions of 80 x 80 x 86 mm, the devices can also be integrated perfectly into compact AGVs and AMRs
- Reliable operation: Robust against dirt and particles in the air as well as against shocks and vibrations
- Different function variants always offer the right solution:
 - up to 32 switchable field sets for dynamic adaptation to the protection scenario
 - high-quality data output for AGV and AMR navigation
- Easy integration thanks to standard M12 connections with rotating connectors
- Fast access to status information and simple diagnosis using the RSL 200 app

RSL 200

Features	3.00 m operating range with 275° scanning angle
	Safety: Type 3, Performance Level PL d, SIL 2
	Up to 32 configurable field sets (1 protective field and 2 warning fields)
	Configuration and diagnosis via USB and Bluetooth, also Ethernet TCP/IP in the case of RSL 230/235
	RSL 235: High-quality measurement data output of distance value and signal strength
	Selectable resolution 70/50 mm
	Easy and convenient diagnosis via RSL 200 app (Android and iOS)
	Easy-to-use configuration software in 9 languages with context-sensitive online help

Areas of application

- Safeguarding hazardous areas
- AGVs safeguarding and navigation
- Restart protection, monitoring of hidden areas

Robust in operation



The RSL 200 is very adept at filtering out objects that are not safety-relevant, such as dust and particles in the air. This reduces unnecessary switching off.

Rotating connections for perfect integration



With its rotating connections, the RSL 200 provides maximum flexibility for integration. Cables can thus be routed optimally and the required installation space is minimized.

Optimized for minimal space requirements



The mounting bracket allows easy horizontal and vertical alignment of the RSL 200. Here, too, the design is optimized for minimal space requirements. Furthermore, if servicing is required, the devices can be swapped out easily with just four screws without needing to be realigned.

AGV and AMR safeguarding and navigation

This is where the RSL 200 shows its strengths: minimal space requirement, up to 96 configurable fields, easy integration and measurement value output for navigation make it ideal for use on AGVs and AMRs.

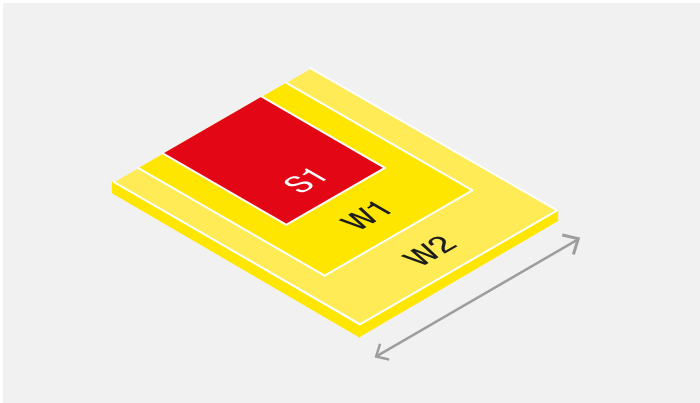
Ideal for compact vehicles



With their small dimensions of 80 x 80 x 86 mm (W x H x D), the RSL 200 scanners are ideal for safeguarding compact vehicles. The devices have a scanning angle of 275°. This allows vehicles to be fully safeguarded on all sides using two scanners.

At the same time, the RSL 200 models deliver the necessary measurement data for navigation of the vehicles.

Flexible safeguarding



Up to 96 configurable fields enable flexible adaptation to the speed, direction of travel and vehicle load. Switchover takes place in 3-field sets (triples), which each consist of one protective field and two warning fields. Up to 32 adapted configurations are therefore available.

Easy I/O concept



The RSL 200 is connected via a standard M12 connector with 8 pins or 12 pins depending on the device's respective function. All functions, including protective field switchover, can be controlled and evaluated via this connection. This makes the RSL 200 scanners particularly easy to integrate.

The RSL 230 / 235 models have additional Ethernet data transmission via an extra 4-pin M12 connection.

Simple and efficient

Whether installation, operation or service: sophisticated details ensure easy handling and fast access to status information.

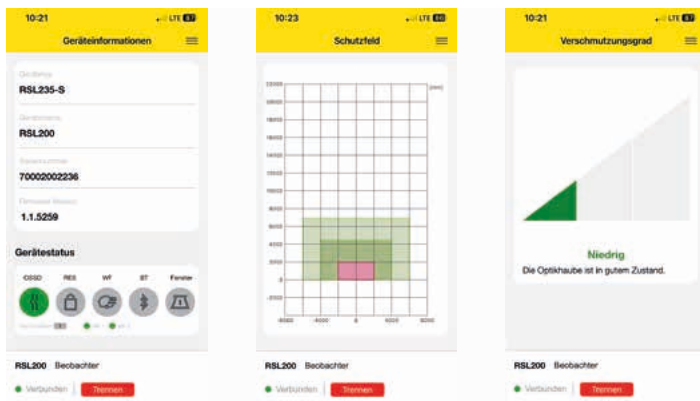
Three communication options



All RSL 200 scanners have USB and Bluetooth interfaces for configuration and diagnosis. In addition, thanks to their integrated Ethernet TCP/IP interface, the RSL 230 / 235 models are already network-capable, e.g. for the transmission of measurement data for navigating AGVs / AMRs or for diagnosis via central access points.

- USB
- Bluetooth
- Ethernet TCP / IP (RSL 230 or later)

Fast diagnosis using the RSL 200 app



The RSL 200 app enables easy access to status information and diagnostic data via Bluetooth – even if the RSL 200 is mounted in a poorly visible area or access to the device is limited. It allows important, detailed information to be collected remotely without having to interrupt the protective field. All messages are displayed in plain text and, if necessary, can also be sent directly to the Leuze service center.

The app can be used on smartphones and tablets with the Android or iOS operating system.

High availability thanks to removable configuration memory



The RSL 200 models have a removable configuration memory. If the device needs to be serviced, the device configuration can thus be quickly and easily transferred to a new device.

RSL 400 safety laser scanner

Innovations successfully combined

The innovative RSL 400 safety laser scanners are characterized by their performance, robustness and easy handling. Thanks to its high operating range of 8.25 m and a scanning angle of 270°, it can monitor even large areas. Together with two protective functions, one RSL 400 is able to perform tasks that previously required two scanners.



Advantages for you

- Operating ranges of 3 m to 8.25 m and various function variants always offer the right solution for your application
- Simple integration into industrial networks by using variants with PROFIsafe/PROFINET interface
- High-quality measurement value output with a resolution of 0.1° for reliable AGV navigation
- Simple handling through removable connection unit, display that is readable from a distance, and integrated spirit level

Areas of application

- Safeguarding hazardous areas
- AGVs safeguarding and navigation
- Restart protection and monitoring of hidden areas
- Access guarding using sensors outside of working range

RSL 400

Features	Operating range up to 8.25 m with a scanning angle of 270°
	Safety: Type 3, Performance Level PL d, SIL 2
	Up to 200 configurable fields, as field pairs or 4-field sets
	2 parallel and independent protective functions (I/O models), 4 parallel protective functions in PROFIsafe models
	Configuration and diagnosis via Ethernet TCP/IP, USB (RSL 420 or later) and Bluetooth
	High-quality measurement data output of distance value and signal strength with 0.1° angular resolution
	Selectable resolution of 30 / 40 / 50 / 60 / 70 / 150 mm
	Easy-to-use configuration software in 9 languages with context-sensitive online help

Unique technology for robust operation



Thanks to the high angular resolution of 0.1° , the RSL 400 is able to filter out non-safety-relevant objects, e.g. dust and particles in the air, particularly well (approx. 3x higher sampling rate than with conventional scanners). This reduces unnecessary switching off.

To do so, the RSL 400's entire transmitter-receiver system rotates. This generates an extremely narrow and uniform laser spot across the entire scanning range which forms the basis for the high angular resolution and high-quality measurement value output.

Integrated display keeps you informed



The large characters on the integrated display are easily visible even from a distance. Various functions and messages are thereby always in view.

- The built-in electronic spirit level allows you to quickly align the device
- Thanks to the output of messages and details on protective field violations you always have an eye on the device status
- The signature (CRC checksum) can be called up without PC directly at the device

Removable connection unit with configuration memory



The connection unit of the RSL 400 is removable and can be mounted separately. The scanner head thus remains protected and can simply be attached afterwards.

If servicing is required, it takes less than 30 seconds to swap out the scanner: turn two screws by 90 degrees and the scanner head can easily be changed. Without realignment, readjusting and configuration effort, as the configuration memory is integrated in the connection unit.

Three communication options



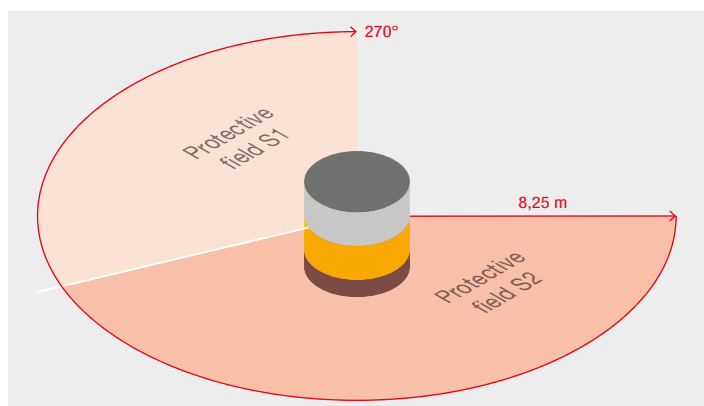
Suitable access is always guaranteed with three means of communication for configuration and diagnosis. In addition, all RSL 400 models are already network-capable thanks to the standard Ethernet-TCP/IP interface, e.g. for diagnosis via central access points.

- Ethernet TCP / IP
- USB (RSL 420 or later)
- Bluetooth

Always the right configuration

8.25 m operating range, 270° scanning angle, 200 configurable fields and up to four parallel protective functions: with their diverse protective and warning functions, the RSL 400 scanners can be flexibly adapted to both stationary and mobile applications.

Two scanners in one



With their operating range of up to 8.25 meters and the scanning angle of 270 degrees, the RSL 400 models are also able to monitor large areas at machines and systems simply and efficiently. Together with two protective functions, one RSL 400 is able to perform tasks that previously required two scanners.

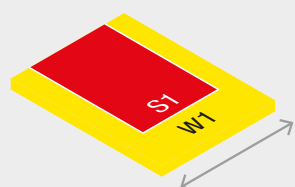
Safeguarding and navigation of large AGVs



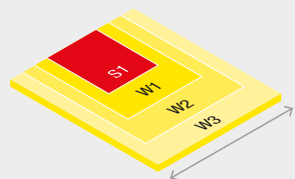
With an operating range of up to 8.25 m, the RSL 400 scanners are ideal for safeguarding large vehicles and loads. Up to 100 switchable field pairs allow the protective fields to be easily adapted to different transport materials. The RSL 400 models deliver the measurement data necessary for navigation according to the principle of natural feature navigation.

Maximum flexibility with 200 fields

1 protective function

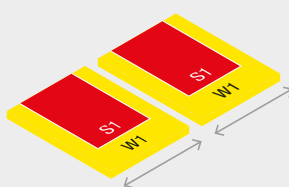


100 switchable field pairs:
1 protective field +
1 warning field

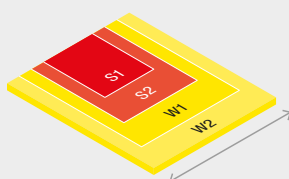


10 switchable 4-field sets:
1 protective field +
3 warning fields

2 parallel protective functions



2 x 10 switchable field pairs: each 1 protective field + 1 warning field, independently switchable

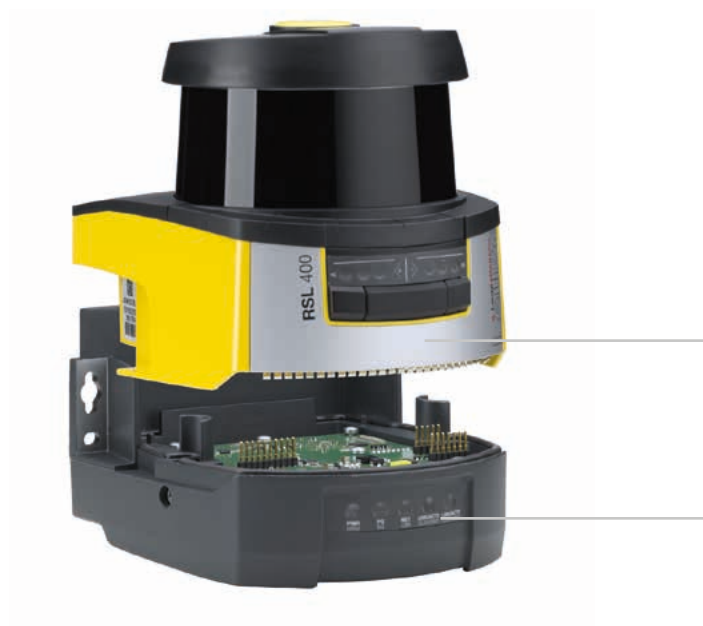


50 switchable 4-field sets: 2 protective fields + 2 warning fields
Can also be configured as a set with 4 protective fields with PROFIsafe

The RSL 400 offers maximum flexibility to adapt to the given application with up to 200 configurable fields that can be switched as pairs or sets of 4 fields. With two parallel protective functions, it works like two devices in one or offers an additional, upstream protective field as an alternative to a warning field. This safeguards the warning function. In the PROFIsafe version, the RSL 400 monitors even four protective fields simultaneously.

Safe in the network

The RSL 400 PROFI-safe scanners with PROFINET interface can be easily integrated into industrial networks. Thanks to the standardized connection technology, integration is fast and reliable. Furthermore, the models also have interesting additional functions for mobile and stationary applications.



- 2-port switch integrated in connection unit
- Network functions remain intact even if a scanner is swapped out; no network interruptions
- For use in star, line and ring topologies
- Supports PROFINET Conformance Class C and Isochronous Real Time communication (IRT)

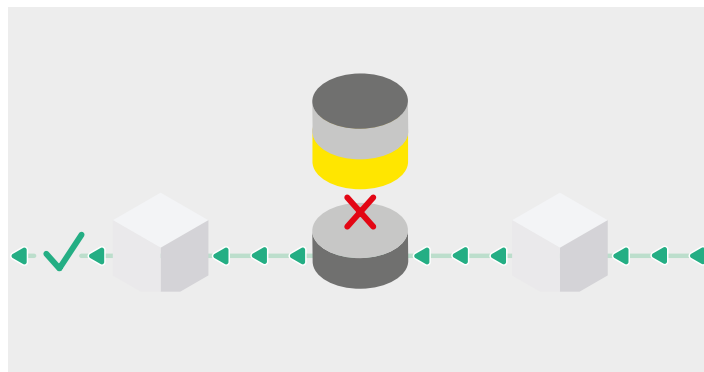
Scanner head with PROFI-safe function



Connection unit with integrated PROFINET switch



Replace without network interruption



The removable connection unit with PROFINET switch enables the scanner head to be replaced without interruption, since all network functions are handled within the connection unit and remain fully intact during replacement.

Customized connection units



- The PROFINET connection unit has industrial M12 connectors for the 2-port switch and the power supply. Alternatively, the 4x M12 variant offers an additional output for supplying power to several devices in series.
- The AIDA-compliant PROFINET connection unit is equipped with push-pull connectors. Connection to the network is via copper or fiber optic cable.

ELC 100 safety light curtains

For a cost-effective machine design

The ELC 100 safety light curtains focus on the essentials when it comes to safeguarding points of operation. For applications with an operating range of up to 6 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 100 extremely shock and vibration proof.

ELC 100

Features	Safety: Type 4 / performance level PL e / SIL 3
	Protective field lengths of 300 mm to 1,500 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

Areas of application

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

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 100 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 extensive series of MLC safety light curtains offers both type 4 (MLC 500) and type 2 (MLC 300) safety light curtains that 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 with cascading, extra slim design, EX protection marking and protection class IP 69K offer tailor-made solutions for special application cases.



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 parameterization via pin assignment
- Reliable operation of adjacent machines thanks to selectable beam coding and reducible operating range
- Special versions with Smart Process Gating, muting and blanking functions, cascading, extra-slim design, ex marking and protection class IP 69K offer solutions for special application cases

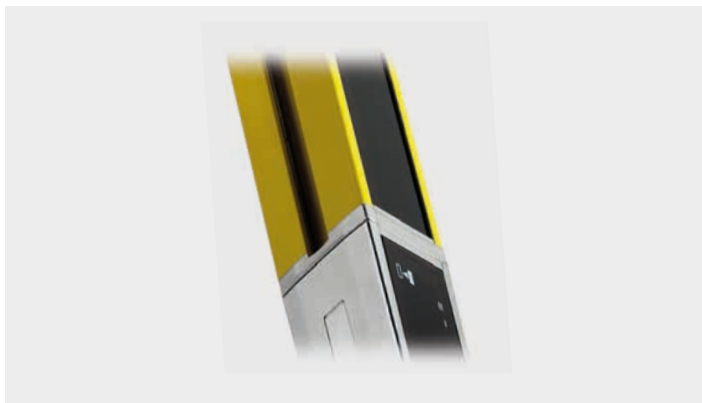
MLC 300 / MLC 500

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
	Reliable operation of adjacent machines thanks to channel switching and reducible operating range
	3x cascable
	Blanking functions and reduced resolution for stationary or moving objects in the protective field
	Wide temperature range from -30 ... 55°C

Areas of application

- Safeguarding points of operation
- Access guarding with short safety distances
- Access guarding on conveyor lines with Smart Process Gating and muting functions (see pages 34 and 36)

Robust housings



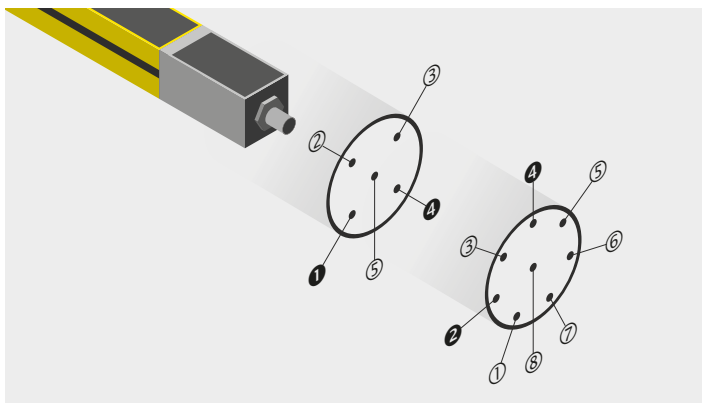
The compact devices with their robust housing design are characterized by reinforced side walls and a recessed front screen.

Simple mounting and alignment



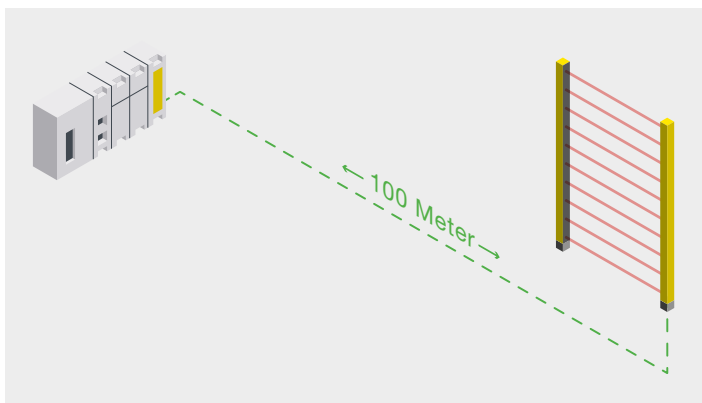
Different mounting brackets ensure quick and simple mounting in any installation situation. They have a low space requirement and are easy to align. Versions with additional damping elements reduce the transmission of physical shocks and vibration. They also guarantee reliable operation under demanding 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-and-play without reconfiguration.

100 meters from switch cabinet



Transmitters and receivers of the MLC 300/500 family 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

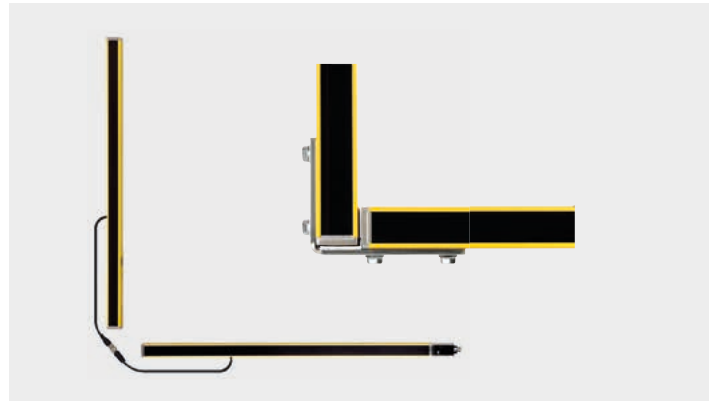
Versions for special applications

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



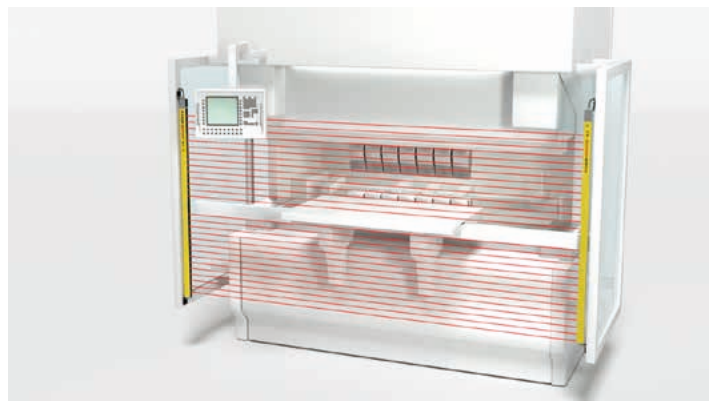
Using the cascadable models, it is possible to link together up to 3 safety light curtain segments that are integrated in the control via a common connection. This setup can be used to easily and economically implement reaching-under and stepping-behind protection, to facilitate installation around a 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

Economical access guarding

The multiple light beam safety devices of the MLD 300 (type 2) and MLD 500 (type 4) series are used for access guarding at 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 33)
- Integrated laser alignment aid for easy alignment, even over large distances
- Integrated muting functions for easy set-up of access guarding on conveyor lines (page 36)

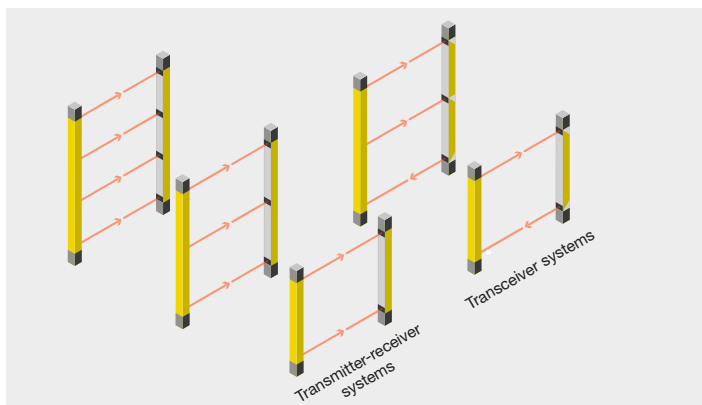
Areas of application

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

MLD 300 / MLD 500

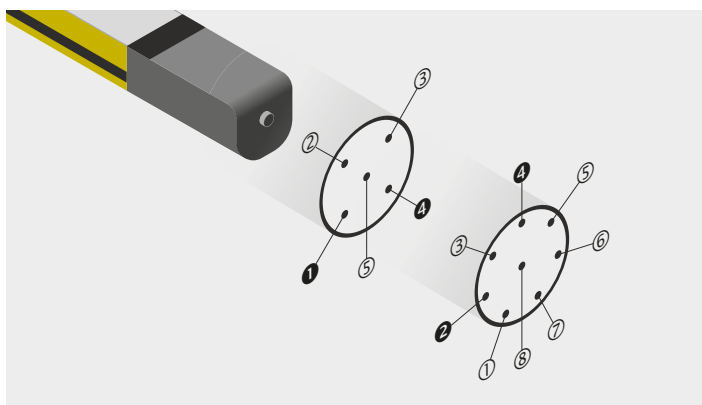
Features	MLD 300: Type 2, performance Level PL c, SIL 1 MLD 500: Type 4, performance Level PL e, SIL 3
	2- and 3-beam transceiver systems for operating ranges up to 8 m
	2-, 3- and 4-beam transmitter-receiver systems for operating ranges up to 70 m
	Integrated 2-sensor muting, timing and sequence controlled Integrated 4-sensor muting, timing controlled
	Integrated laser alignment aid
	Mirror columns for multi-sided safeguarding (see page 33)
	Reducible operating range for reliable operation of adjacent transmitter-receiver systems
	Device status can be read off from 7-segment display at all times
	Variant with AS-i Safety interface for direct integration into AS-i bus systems
	Multiple scanning for reliable operation even in demanding environments
	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-and-play without reconfiguration.

Quick and easy alignment



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

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.

MLD 500, SLS 46C single light beam safety devices

The compact SLS 46C single light beam safety devices are used together with the MSI-TR evaluation units for periodic testing. The MLD 500 single light beam safety devices in which the testing function is already integrated are used wherever there are no space restrictions or extremely large operating ranges are required.



SLS 46C 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 foot space on side-tracking shelves
- Guarding of narrow openings
- Access guarding, e.g. with flexible beam spacing
- Collision protection, e.g. on overhead cranes

SLS 46C

Features	Type 2 variants: Operation in combination with safety monitoring devices
	Type 4 variants: 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
	Evaluation of up to 6 linked SLS 46C devices by means of one MSI-TR safety relay
	ECOLAB certification
	Wide temperature range from -30 ... 60°C



MLD 500 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

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
	Variant with AS-i Safety interface for direct integration into AS-i bus systems
	Wide temperature range from -30 ... 55°C

DC, UDC device columns

UMC mirror columns

Pre-mounted device sets

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 access guarding can be installed quickly and reliably with the easily adjustable mirror columns
- Special brackets ensure easy installation of the safety devices in the device columns
- The spring elements in the base of the columns ensure high availability of the installations. They absorb mechanical impacts and reset the columns automatically to their initial position. Alignment or repair work is unnecessary.

Areas of application

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

	UDC, DC device columns	UMC mirror columns	MLD-UDC device sets
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	Mechanically optimally matched, pre-mounted sets
	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 MLC safety light curtains	Consisting of UDC device columns and MLD multiple light beam safety devices
	UDC variant: with spring elements for automatic resetting after mechanical impacts	Robust design with easy-to-adjust mirrors	Pre-aligned for fast installation
	PSC removable protective screens provide protection against device soiling and damage	Spring elements for automatic resetting after mechanical impacts	
	Simple mounting of the muting sensor sets to the external slot (see page 37)		

MLC 530 SPG, MLC 535 SPG

Access guarding with Smart Process Gating

The MLC 530 SPG G and MLC 535 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

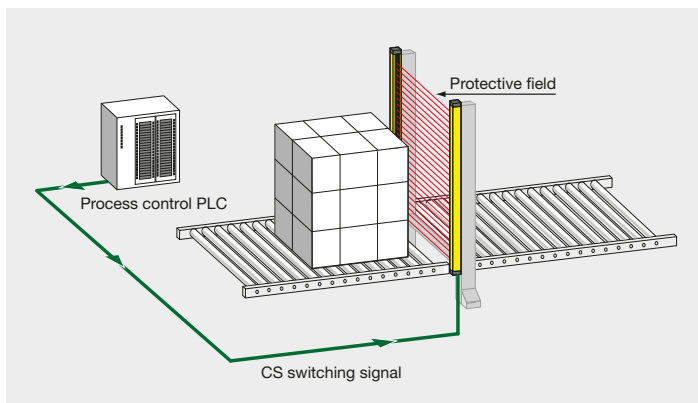
- Access guarding on conveyor lines, with Smart Process Gating function for bridging to allow material transport

MLC 530 SPG

Features

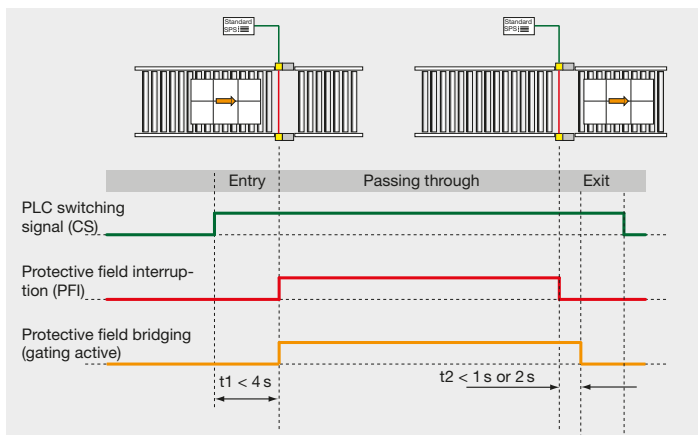
Safety light curtain with protective field lengths of 150 mm to 3000 mm in a 150 mm grid
Resolutions of 30 mm, 40 mm, 90 mm
Type 4, Performance Level PL e, SIL 3
Configuration of the settings by means of pin assignment for easy commissioning
Partial gating: the upper beams of the device are permanently active and can therefore perform a second safety function
Blanking of stationary objects in the protective field
Versions with reduced resolution available
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.

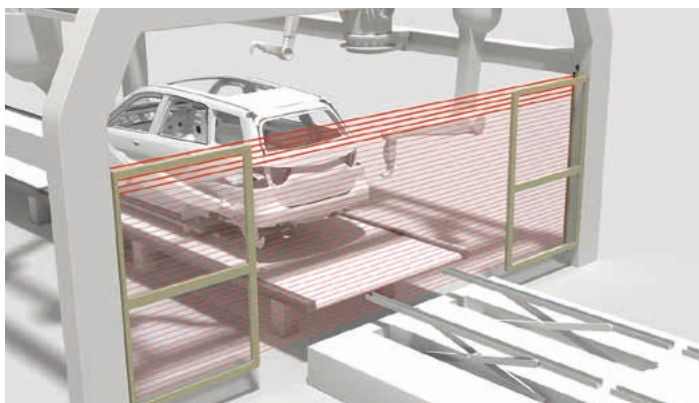
Operating principle and signal response of SPG



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

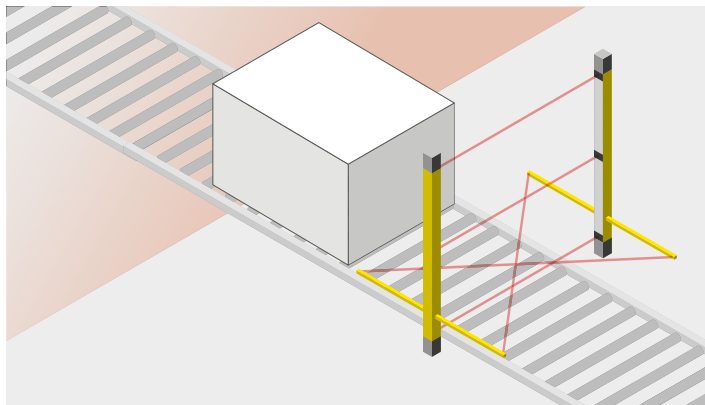
- Access guarding with muting function are easy to integrate into the safety circuit of the system control using OSSD outputs
- The muting functions are built into the devices and can be easily configured if required. Safety functions do not need to be programmed.
- 2 and 4-sensor muting as well as muting 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 30	Safety light curtains, see page 28	Muting interface, field module, see page 53	Configurable safety control, see page 50
	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
	Input signal, 'release muting'	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 UDC device columns or directly to the MLD and 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.

LBK

Safety radar system

The safe LBK 3D radar system was developed for monitoring hazardous areas in harsh industrial environments. It detects human bodies, allowing it to monitor the protected area for their access and presence. Up to 6 sensors can be combined via one controller.



Advantages for you

- Reliable operation, even under harsh environmental conditions with, e.g., dirt, dust, smoke, and light
- Flexible adaptation of the protected area to the application
- Determine the number and position of the sensors, configure the length and opening angle / width of the area
- Static objects are permitted in the protective field and do not lead to the shutdown of the safety outputs
- Fast integration due to simple system design and controller with PROFIsafe or FSoE interface and CIP Safety
- Project planning and setup service for your application by our certified experts on request
- 4/8 or 32 switchable configurations

Areas of application

- Safeguarding hazardous areas in harsh environments
- Restart protection
- Monitoring of hidden areas

LBK

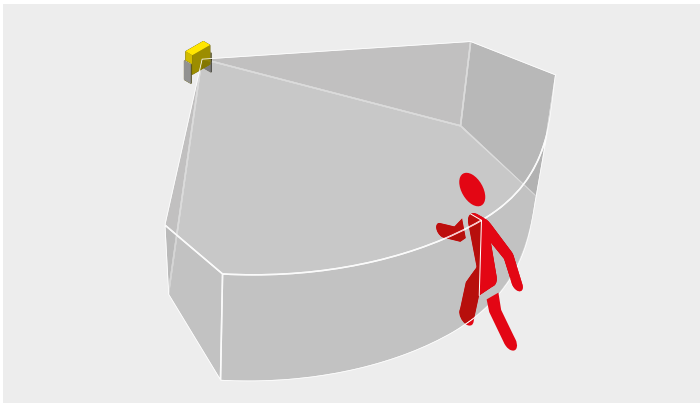
Features	Safe 3D radar system with FMCW modulation for detecting movements	
	Configurable protected area and warning range, 4 configurable signal outputs	
	Up to 6 sensors can be combined via one controller, dynamic switching of the configuration during operation	
	Safety	Performance Level PL d, SIL 2 LBK S-01: Cat. 2, LBK SBV-x: Cat. 3
	Operating range	LBK S-01: 4 m, LBK SBV-01/201: 5 m, LBK SBV205: 9 m
	Angle of radiation (horizontal / vertical)	LBK S-01: 50° / 15° or 110° / 30° LBK SBV-x: 10° ... 100° / 20°
	Frequency range	LBK S01: 24 GHz, LBK SBV-x: 60 GHz
	Environmental conditions	Temperature range: -30 ... 60 °C sensor protection class: IP 67
	Controller with I/O interfaces, SD card slot (optional)	Safety: 2x OSSDs Configuration and diagnostics: Micro-USB, Ethernet TCP / IP (optional)
	Controller with safe fieldbus interface, SD card slot (optional)	Safety: PROFIsafe or FSoE, 2x OSSDs Configuration and diagnosis: Micro-USB, Ethernet TCP / IP, CIP-Safety

Reliable operation under demanding environmental conditions



The radar principle is resistant to environmental influences such as dirt, dust, sawdust, smoke, oil, humidity and light. This guarantees reliable operation of the machine even under demanding environmental conditions and avoids unnecessary shutdown.

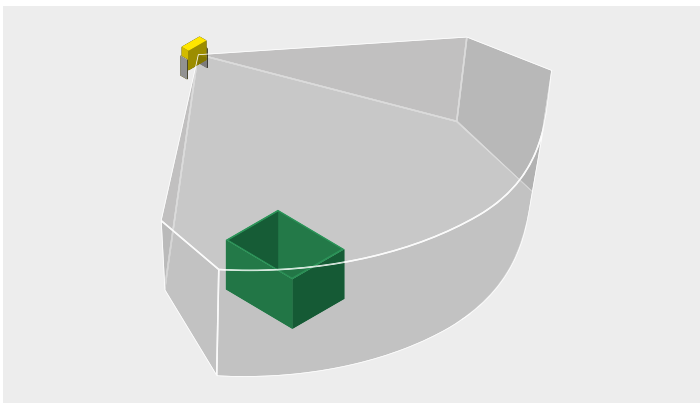
Function



The LBK safety radar sensors detect movements and are used for safeguarding hazardous areas. They monitor the protected area for access by and the presence of persons. Even persons who are standing still are not really 'static' and are therefore detected reliably by the sensor.

The 3D radar principle allows areas on steps, pedestals and behind non-metallic shadowing to be monitored as well.

Static objects permitted in protected area

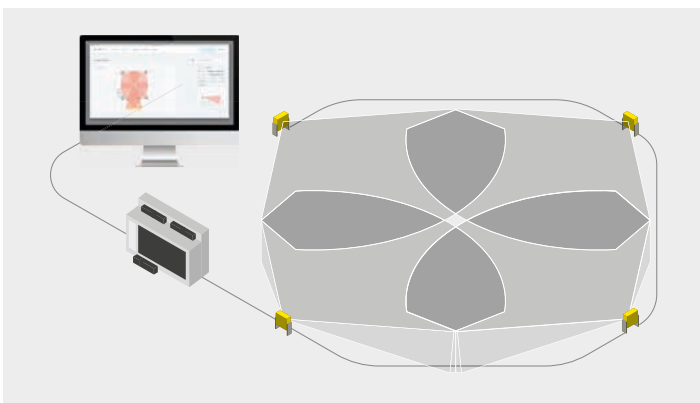


The radar technology reacts sensitively to movements.

However, static objects in the monitored area do not cause the safety signal to switch off.

Static objects such as pallets, material containers and tool trays are therefore allowed to be placed in the protected area.

Simple and flexible system design



To safeguard larger areas, a controller evaluates up to 6 sensors. With 4 channel configurations per controller, up to 24 sensors can be used in one application.

The system parameters can be simply adapted to the application using the LBK Designer configuration software.

Controllers with PROFIsafe-, FSoE or CIP Safety interfaces are available to enable integration into secure fieldbus systems. Thus, detailed status information relating to the system can also be queried.

FBPS 600i

Safe bar code positioning system

With the world's first FBPS 600i safety bar code positioning system, only one sensor is required for reliable position detection. The device is connected to a safe evaluation unit or PROFIsafe via two SSI interfaces and is suitable for applications up to Performance Level PL e. This makes safety functions particularly easy to implement and reduces installation and service costs.



Advantages for you

- Safe position detection with one device up to PL e
- Low space requirement and reduced installation effort
- Particularly simple implementation of the safety function
- Short fault response time of 10 ms for use on fast stacker cranes
- Reliable operation thanks to simultaneous scanning of multiple codes and extremely robust and UV-resistant bar code tape
- Large working range from 50 to 170 mm and a well-designed mounting concept ensure easy installation and integration
- PROFIsafe: Integrated switch for linear topology

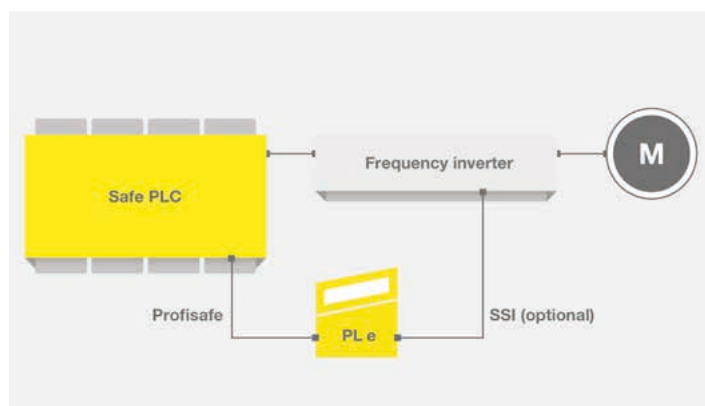
Areas of application

- Safe position detection

FBPS 600i

Technical data	Safety	PL e, SIL 3, Category 4 (ISO 13849-1 and ISO 61508)
	Error response time	10 ms ... 400 ms (adjustable)
	Connections	SSI interface: 2x M12 connector PROFINET / PROFIsafe, opt. SSI: 2(3)x M12 connector Power supply: M12 plug Configuration and diagnostics: Mini USB
	Reproducibility	±0.15 mm (1 sigma)
	Reading distance	50 – 170 mm
	Temperature range	–5 ... +60°C with heating –35 ... +60°C
Features	Connections on the side or bottom	
	Optional display for position and status information	
	Status signal, 'read quality' for early detection of contamination	
	Bar code tape Extremely resilient plastic tape, UV-resistant, self-adhesive with acrylate adhesive, position values printed in plain text, grid dimension 30 mm. Standard tapes with a height of 25 or 47 mm, length up to 200 m. Configurable tapes: Selectable height as well as start and end value. PROFIsafe: Optional SSI interface (non-safe).	

Safe position detection with one device up to PL e



With the FBPS 600i, only one sensor is required for safe position detection. The device is either connected to a safe control system via PROFIsafe / PROFINET or to a safe evaluation unit via two SSI interfaces. Parameterization is carried out directly via the control unit / GSDML or the frequency inverter's encoder library. The devices already fulfil the requirements for PL e / SIL 3. This makes safety functions particularly easy to implement and reduces installation and service costs.

Suitable for fast movements



The FBPS 600i is particularly suitable for position detection during fast movements, such as for use on stacker cranes. For this purpose, the FBPS 600i has an extremely short error reaction time of just 10 ms. This allows speed curves and handling performance to be optimized.

Reliable operation



The FBPS 600i operates with exceptional reliability. Each scanning process reads multiple codes, from which the software determines highly accurate position values. The oblique path of the scanning beam and the movement of the device ensure that each code is scanned at different points. This prevents reading errors caused by local contamination or damage.

The bar code tape is also optimized for industrial use. The self-adhesive plastic tape is UV-resistant, extremely durable, and mechanically resilient. The printed position values are also easy to read, simplifying handling.

Always quick and easy to install



The well-designed mounting concept with quick-change device makes the FBPS 600i easy to install. The devices are securely fastened with just one easily accessible screw on the clamp holder. This saves time during installation and allows the devices to be quickly replaced in the event of servicing. Furthermore, thanks to their wide reading distance range of 50 to 170 mm, the FBPS 600i devices are easy to integrate into existing systems.

S20 / S200 switches with separate actuator

Owing to their robust housings and wide variety of installation options, the S20 and S200 series safety switches with separate actuator can be used universally. They have five different approach directions for the actuator. Thanks to the funnel-shaped insertion opening, the actuator is centered and the reliability in operation increased. Different contact configurations, connection via cable or connector and a broad range of actuators offer the right solution for your application.



Advantages for you

- Low-cost solutions for monitoring doors and flaps
- Thanks to their positive opening contacts, all devices can be easily integrated into a safety circuit
- 5 actuator approach directions enable simple adaptation to different installation situations
- Avoidance of unwanted machine downtimes: Through generously dimensioned actuator play in the actuator head

Areas of application

- Monitoring of doors and flaps

S20 / S200

Features

Type 2 interlock device without guard locking in acc. with EN ISO 14119

S20: Technopolymer housing / S200: Metal housing, both with degree of protection IP 67

Actuator with mechanical tongue and low coding level in acc. with EN ISO 14119

Positive-opening contacts for integration in a safety circuit

Easy mounting with standard construction

The head can be adjusted in 90° increments. In combination with entry from above, 5 approach directions are available for the actuators.

Up to 8 different actuators

High-quality silver contacts for long life expectancy

Appropriate installation – Reliable operation



A wide range of actuators ensures that the appropriate installation option is always available for your machine or system. For all actuators, the switches have generously dimensioned play of up to 4.5 mm in the actuator head. As a result, slight movements of the protective device do not lead to unwanted machine downtimes.

S300 position switches

The S300 safety position switches monitor the reaching of final positions. They are used for position monitoring on machines or as an alternative to hinge switches. Different contact sets and variants with plungers or various actuators enable optimum adaptation to the installation situation.



S300 advantages for you

- With up to 4 actuator approach directions and 3 cable entries, the devices can be easily mounted in a wide variety of installation situations
- Thanks to their positive opening contacts, all devices can be easily integrated into a safety circuit
- Optimum adaptation through adjustable actuator angle in 10° grid
- Easy adjustment of the switching point using a standard screwdriver

S300

Features	Type 1 interlock device without guard locking in acc. with EN ISO 14119
	Technopolymer and metal housing, degree of protection IP 67
	Actuation by unencoded cam in acc. with EN ISO 14119
	Positive-opening contacts for integration in a safety circuit
	Universal use thanks to individually set actuator approach directions and actuator angles in 10° grid
	Switching direction selectable
	Variants with plunger actuator and various roll actuators
	Extremely durable and robust

Areas of application

- Monitoring of doors and flaps
- Safe monitoring of final positions

S400 Hinge switches

The S400 safety hinge switches monitor the closing state of safety guards that can rotate, such as protection hoods or flaps. They unite the safety switch and door hinge functions in a single component with appealing design.



S400 advantages for you

- High level of manipulation protection through switching function being encapsulated in the device
- Switching point easily adjustable using a screwdriver
- Repeatable setting (switching angle alignment) with skewed or misaligned doors
- Thanks to their positive opening contacts, all devices can be easily integrated into a safety circuit
- The hidden screws on the rear side and the rear-side connection for concealed cable routing provide the possibility of creating machines and systems with attractive design

S400

Features	Type 1 interlock device without guard locking in acc. with EN ISO 14119
	Metal housing, degrees of protection IP 67 / IP 69K
	Actuation by encapsulated position switch inside hinge, high level of manipulation protection
	Positive opening contacts for integration into a safety circuit, connection via cable or M12 plug
	Concealed cable routing thanks to connection on rear side
	180° maximum opening angle of the protective device
	Adjustable switching point
	Model S410 with wide fork dimension for special materials, e.g. glass
	Optional additional hinges (without contacts, mechanical function only)

Areas of application

- Monitoring of doors and flaps
- Manipulation protection integrated in the sensor is necessary

MC 300 / RD 800 Safety proximity sensors

Magnet-coded

Owing to their enclosed design and contact-free operating principle, the MC 300 magnetically coded proximity sensors are ideal for use in harsh, dirty and damp environments. The cubic and cylindrical designs enable use in many different applications.



MC 300 advantages for you

- Wear-free operation and long life expectancy, even with frequent operating cycles
- For use in dusty, dirty and damp environments
- Flexible use thanks to different designs, contact configurations and connections

MC 300

Features	Type 4 interlock device/contactless actuation in acc. with EN ISO 14119
	High-strength plastic housing, degree of protection IP 67
	Actuator with low coding level in acc. with EN ISO 14119
	Models with additional signaling contact and status LED
	Connection via cable or M8 / M12 connector
	Wide temperature range from -30 ... 70°C

Areas of application

- Monitoring of doors and flaps

RFID-coded

The RD 800 safety transponders with RFID-coded actuator offer optimum manipulation protection. Extra installation measures to protect against tampering are therefore no longer necessary. The RD 800 series already achieves Performance Level e in accordance with EN ISO 13849-1 with just one device. Thanks to the OSSD outputs, they can also be integrated easily into the safety circuit.



RD 800 advantages for you

- Wear-free operation and long life expectancy, even with frequent operating cycles
- RFID-coded actuators offer optimum manipulation protection. Extra installation measures are therefore no longer necessary.
- Performance Level e in accordance with EN ISO 13849-1 is already achieved with just one device
- Reliable due to wide operating area from different directions

RD 800

Features	Type 4 interlock device, contactless actuation in acc. with EN ISO 14119
	High-strength plastic housing, degrees of protection IP 67 / IP 69K
	Actuator with low or high coding level in acc. with EN ISO 14119
	Performance level PL e, category 4 in acc. with EN ISO 13849-1 with a single device
	OSSD safety outputs, series connection possible
	Laser inscription, permanently legible even under harsh conditions
	LEDs for status display on sensor and signal output
	Models with programming input for teaching-in actuators
	Connection via cable or M12 connector

Areas of application

- Monitoring of doors and flaps
- Manipulation protection integrated in the sensor necessary

L100 / L200 safety locking devices

The versatile L100 safety guard locking is used both for personnel safety as well as for machine protection. Six different heavy-duty actuators support use in various mounting conditions. The devices are available as variants with electromagnetic and spring-force-actuated locking type.



The L200 safety guard locking is designed for high mechanical stress in harsh environments. It is used for heavy-duty applications on large machines and systems as well as at large protective doors and sliding gates. The optional emergency unlock function (panic button) allows the protective device to be opened manually in an emergency.



L100 advantages for you

- Low-cost solution for monitoring and guard locking of doors and flaps
- Easy adaptation to different installation situations thanks to the standard construction, 6 different actuators and cable entry in 3 directions
- Avoidance of unwanted machine downtimes through generously dimensioned actuator play in the actuator head

L100

Features	Type 2 interlock device with guard locking in acc. with EN ISO 14119
	Mechanical tongue with low coding, 6 different actuators
	Positive-opening contacts for integration in the safety circuit
	Models with electromagnetic or spring-force-actuated locking type
	For safety applications up to Performance Level PL e, SIL 3
	Locking force 1,100 N, technopolymer housing with degree of protection IP 67
	In the unlocked state, the low locking force of 30 N holds the protective device in position so that it does not open by itself
	Cable entries in 3 directions for maximum flexibility, e.g. in constrained spaces and with series connection

Areas of application

- Monitoring of doors and flaps with guard locking, with safety locking device for long stopping times

L200 advantages for you

- Heavy-duty access guarding for use on large machines and systems in harsh ambient conditions
- Easy adaptation to different installation situations thanks to the standard construction, 6 different actuators and cable entry in 3 directions
- Optional escape unlocking function (ergonomically optimized panic button) for manually opening the protective devices in the event of an emergency
- Avoidance of unwanted machine downtimes through generously dimensioned actuator play in the actuator head

L200

Features	Type 2 interlock device with guard locking in acc. with EN ISO 14119
	Mechanical tongue with low coding, 6 different actuators
	Positive-opening contacts for integration in the safety circuit
	Models with electromagnetic or spring-force-actuated locking type
	For safety applications up to Performance Level PL e, SIL 3
	Locking force 2,800 N, metal housing with degree of protection IP 67
	In the unlocked state, the low locking force of 30 N holds the protective device in position so that it does not open by itself
	Cable entries in 3 directions for maximum flexibility, e.g. in constrained spaces and with series connection
	Escape unlocking function through ergonomically optimized panic button
	LED display unit for on-site diagnosis

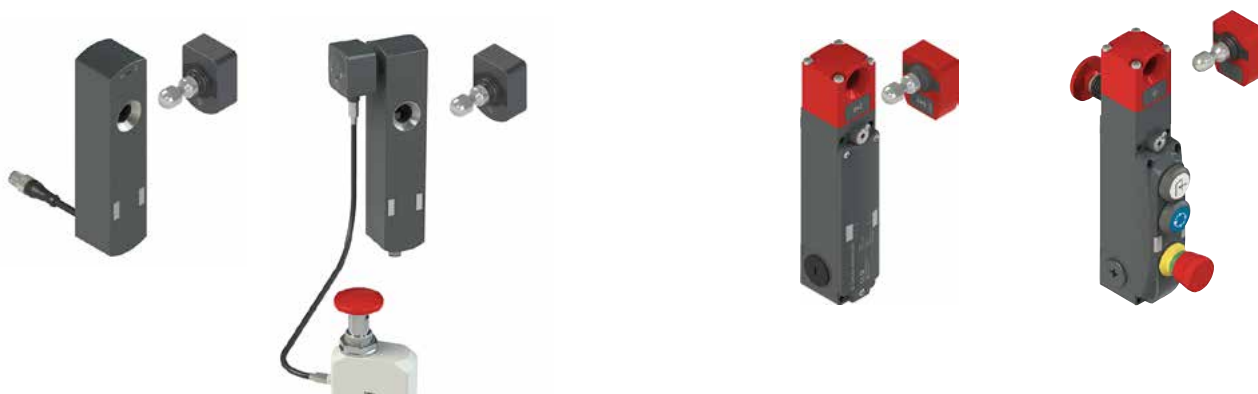
Areas of application

- Monitoring of doors and flaps with guard locking, with safety locking device for long stopping times

L250, L300

Safety locking devices with RFID coding

The robust L250 and L300 safety locking devices for safety applications up to PL e / SIL 3 are used for safeguarding safety doors on machines and systems. Using modern RFID technology, these devices offer maximum manipulation protection (type 4 according to EN ISO 14119) and are easy to integrate. Complete safety functions can be easily implemented with the L250's command transmitter module and the L300's integrated command and E-Stop buttons.



Advantages for you

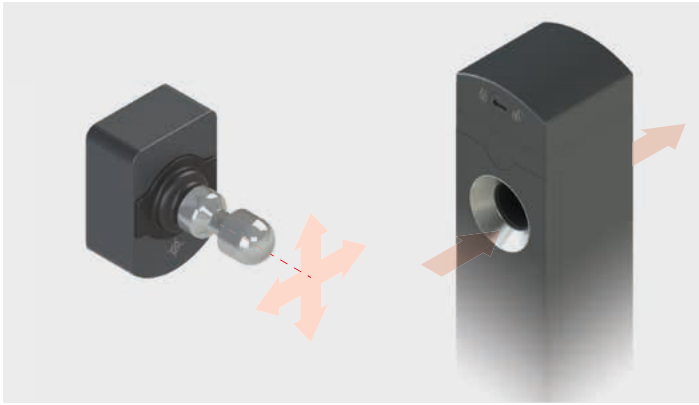
- The RFID-coded actuators offer optimum protection against manipulation. Extra installation measures are therefore no longer necessary.
- Thanks to their OSSD safety outputs, all devices can be easily integrated into a safety circuit
- Simple installation of complete safety functions on safety gates using command and E-Stop buttons, matching door handle and lockout-tagout safeguarding

Areas of application

- Monitoring of doors and flaps, with guard locking for long stopping times (personnel protection)
- Monitoring of doors and flaps, with guard locking for process protection

	L250	L300
Features		
Type 4 interlock device with guard locking in acc. with EN ISO 14119	X	X
RFID-coded actuator for maximum manipulation protection	X	X
Performance Level PL e / SIL 3 with one device, OSSD switching outputs	X	X
Locking force 2,100 N for universal use on small to medium-sized safety doors	X	
Locking force 9,750 N for use on heavy doors even under the heaviest loads		X
Housing with degree of protection IP 67 / IP 69K	Technopolymer, easy to clean	Metal housing, for use in harsh environments
Variable installation thanks to 3-sided fastening and alignment of the components in 90° steps	X	X
Low locking force even when unlocked, protective device does not open by itself	20 N	30 N
6 LEDs for fast diagnosis at the device	X	X
Optional: Escape unlocking button Command and E-Stop buttons, integrated	X -	X X
Accessories: Lockout-tagout device Door handle Remote escape unlocking button with 5 m cable, command devices (designed and engineered to match the L250)	X X X X	X X - -

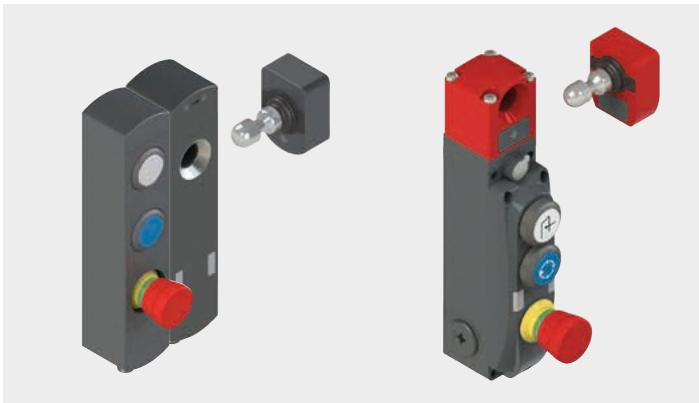
Designed for reliable operation



The special design of the L250 and L300 guarantees maximum reliability and availability. The joint at the actuator and the large, chamfered opening on the device minimize the risk of collision between the sensor and actuator and prevents damage even with imprecisely closing doors.

And the unobstructed opening allows accumulated dirt to be simply pushed out on the rear side

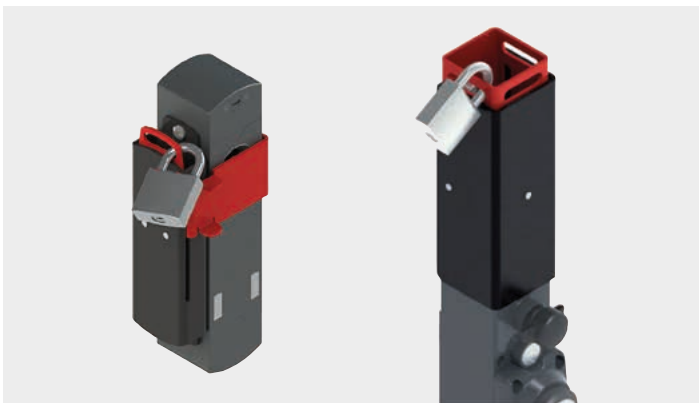
Fully safeguarded



For the L250, the optional CD-B command devices simplify the setup of safety functions on safety doors. The request, reset and emergency stop buttons make it easy to implement complete solutions for a security installation on access doors. The command device and guard locking have the same design with identical dimensions. This results in modules that are optimally matched both in terms of appearance and function.

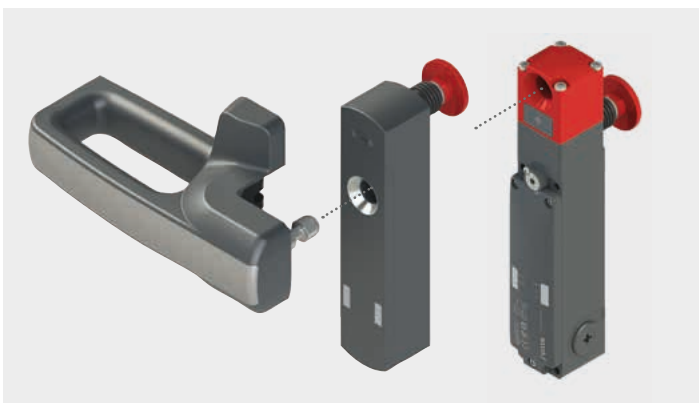
On the L300, the command buttons are even integrated into the device.

Lockout-tagout



The lockout-tagout device prevents operating personnel from being locked inside the danger zone by using individual padlocks. To do this, the safety mechanism is pushed in front of the safety guard lock's opening and the lock is hooked in. This mechanically locks the opening and additionally shields RFID detection of the actuator. Several padlocks can be hooked into the elongated eyelets.

Robust door handle in attractive design



The AC-SH2 door handles for L250 and L300 impress with their robust construction and modern, ergonomic design.

The fastening screws are invisibly covered by snap-in protection caps. This prevents the accumulation of dirt and simplifies cleaning. Furthermore, the protection against manipulation means that standard screws can be used – special safety screws are not necessary. In addition, the AC-L300-SH door handle with its extremely stable and robust metal construction offers an alternative for the L300 on particularly heavy doors and in harsh environments.

All handles are suitable both for use on swing doors (hinges on right or left) and for use on sliding gates (opening to left or right).

ESB 200 E-Stop button

ERS 200 E-Stop rope switch

For stopping in emergencies, EN ISO 12100-1 stipulates protective devices and supplementary measures such as E-Stop buttons or emergency rope switches. The ESB 200 E-Stop button is used wherever it makes sense to be able to enter a stop command at a specific location. The ERS 200 E-Stop rope switch is used for larger danger zones.



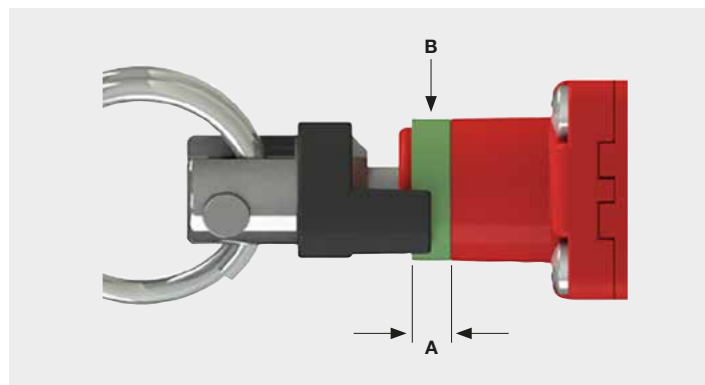
Advantages for you

- The ESB 200 E-Stop button in the surface-mounted version with screw terminals or M12 connection can be used universally and is easy to install
- The ERS 200 E-Stop rope switches are available with left-pull actuation, right-pull actuation, and actuation along the longitudinal axis, and thus can always be integrated at the optimum position in the machine

Areas of application

- Triggering of an emergency stop

Simple mounting and matching accessories



	ESB 200 E-Stop button	ERS 200 E-Stop rope switch
Features	Surface-mounted variant for universal use	Clicks in on both sides with positive-opening contacts
	2 safety circuits, 1 signal circuit	Easy alignment with switching point indicator
	Optionally with key release	Easy integration thanks to cable entries on 3 sides
	Connection with screw terminals and M12 connector	Compact metal housing, degree of protection IP 67
	Ergonomically optimized	Reset button with status display
	Degree of protection IP 67 and IP 69K	Temperature compensation for longer rope lengths
		Accessories: Steel rope, clamping bolts, rope end piece, deflection rollers, rope labeling 'STOP'

The rope switches have a green ring (A), which indicates the correct rope tensioning range. The rope only needs to be tensioned until the black tension indicator reaches the middle of the ring (B). If the indicator leaves the green range due to voltage or sag, the safety contacts are opened.

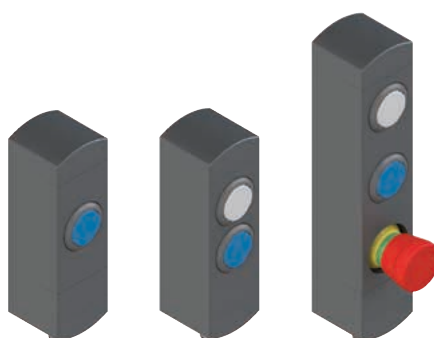
The emergency stop devices are easy to install thanks to the matching accessories such as steel rope, clamping bolts, deflection rollers and the attachable rope labeling with 'STOP' imprint.

CD-B

Command devices

The modular CD-B command devices can be used both individually and in combination with safety sensors, e.g. for entering a reset request or triggering an emergency stop.

When combined with the L250 series safety locking devices, the result is modules that are perfectly matched in terms of both appearance and function: both devices have the same design and identical dimensions.



Advantages for you

- Compact devices with small dimensions for easy and flexible integration in machinery and systems
- The flush-fitted command buttons prevent inadvertent triggering and impress with their attractive design

Areas of application

- Inputting of commands, e.g. request for a reset or for opening a door with guard locking
- Triggering of an emergency stop
- Combined with L250 locking devices: perfectly matched modules in terms of function and appearance

CD-B

Features	Shock-resistant technopolymer housing, glass fiber reinforced and self-extinguishing
	Compact dimensions with minimal housing width (40 mm)
	Models with 1 or 2 command buttons and with E-Stop button
	Dimensions and design identical to L250 series locking devices

MSI 400

Configurable safety control

The compact MSI 400 safety controls evaluate the signals of a wide range of safety sensors and are used with small- to medium-sized machines for monitoring the safety circuit. With their configurable safety functions, they can very easily be adapted to the respective requirements. Even the basic modules have 24 safe inputs/outputs and are modularly expandable. The safety control can be configured quickly and efficiently using the license-free configuration software MSI.designer. It is easy to use and has numerous comfort functions.



Advantages for you

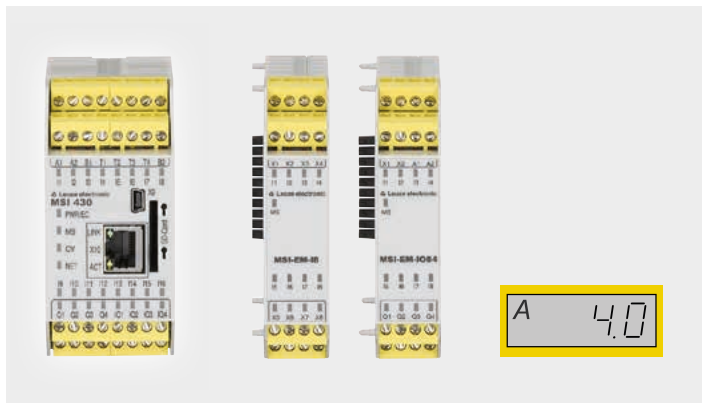
- Three basic modules always offer the right solution, from standard functions to integrated gateways. All basic modules can be modularly expanded if necessary
- 24 safe I/Os and Industrial Ethernet protocols are integrated on a width of just 45 mm. This reduces the space required in the switch cabinet and simplifies ordering because there is only one part number.
- Available at each output of the system is 4 A of wear-free switching power. This means that e.g. valves can be controlled directly and no additional relays are required.
- The integrated online diagnosis and the system logbook provide a quick overview of the system status. Possible problems can thereby be quickly localized

Areas of application

- Evaluation of multiple safety sensors
- Evaluation with configurable safety functions
- Safe monitoring of presses

	MSI 400	MSI.designer
Features	Basic modules with a width of 45 mm and 24 safe inputs/outputs	More than 40 certified function modules
	Expandable to 116 safe inputs and 56 safe outputs	Up to 300 function modules per project
	Optical function indicator via LEDs for each system input/output	Freely configurable views spread over multiple screens
	Gateways for PROFINET, Ethernet/IP and Modbus are integrated in the basic module. Gateway modules are available for EtherCAT, PROFIBUS and CANopen.	Connection of sensors / actuators and function blocks directly in the logic editor with automatic assignment of the inputs and outputs
	Safety functions for press control	Simulation function and integrated logic analyzer for checking the configured functions
	4 A wear-free switching power	Configurable report for simple and professional documentation
	All devices either with screw terminals or spring-cage terminals	Password protection of projects and function blocks
		Online diagnosis with system logbook and remote maintenance function

Perfect start – modularly expandable



Even the MSI 400 basic modules have 24 safe inputs and outputs, making them the perfect entry-level solution for many applications. In addition to 16 inputs and 4 outputs, 4 further connections can be used as inputs or outputs. If necessary, the basic modules can be expanded with the I/O extension modules to up to 116 safe inputs and 56 safe outputs. Up to 4 A of wear-free switching capacity is available at each system output. This means that e.g. valves can be controlled directly and no additional relays are required.

Integrated gateways



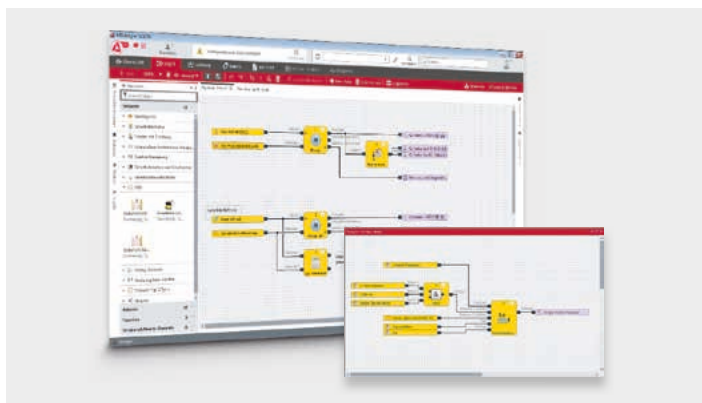
The MSI 430 safety controls can be integrated easily into industrial networks. With a width of just 45 mm, Ethernet interface and Industrial Ethernet protocols are already integrated. Gateway modules are used for integration into other fieldbuses such as EtherCAT, PROFIBUS and CANopen.

Removable program memory



The removable program memory in SD card format, which can be accessed from the front side, provides plenty of space for application programs and comments. This simplifies project handling and reduces the time required for commissioning, duplication and servicing. The cover fastened to the control protects the memory from unintended removal.

Graphic – intuitive – easy



With the configuration tool MSI.designer you can create projects simply and efficiently. The license-free software supports you during the creation, testing and documentation of projects.

- Extensive library of certified function blocks
- Fast program creation through the direct use of sensors and actuators in the logic editor
- Simulation and logic analysis for testing the safety function right from a PC
- Force mode for detailed function tests
- Configurable report for professional and well-organized documentation

MSI-SR

Safety relays and contact extensions

With the MSI safety relays, individual safety sensors can be integrated quickly and easily into the safety circuit of machines and systems. The applications range from the monitoring of simple components, such as E-Stops or safety switches, to the integration of optoelectronic sensors and the implementation of time-delayed functions.

The contact extensions are used both as an output extension for OSSDs and for contact multiplication for evaluation units and safety controls.



Advantages for you

- Custom as well as universal evaluation units are available for safety sensors, switches and command devices
- All devices are available either with screw terminals or spring-cage terminals. This allows you to focus on reduced device costs or simplified installation.
- The terminals on all MSI devices are pluggable. This means easier access during installation and allows devices to be swapped out quickly during servicing.

Areas of application

- Evaluation of individual safety sensors
- Contact multiplication for safety relays and safety controls
- Output extension for OSSDs

	Evaluation units	Contact extensions
Features	Two or three normally open contacts (NO) and one normally closed contact (NC)	Contact multiplication for evaluation units and safety controls
	Automatic and manual restart	Extension to up to 5 normally open contacts (NO)
	Contactor monitoring (EDM)	Simplified variants for output extension of OSSDs
	Switching current up to 8 A	Switching current up to 6 A
	Parallel evaluation of two safety devices with one relay (MSI-SR5 model)	Model with two parallel output extensions 2x (2 NO / 1 NC) in one device (MSI-SR-CM42R)
	Models with adjustable time delay up to 30 seconds	
	Models with periodic testing for type 2 and type 4 safety sensors	

MSI-MD-FB muting interface

The MSI-MD-FB muting interface provides extensive muting functions in combination with the standard variants of the MLC safety light curtains and MLD multiple light beam safety devices. As a field module, it is installed close to the protective device and combines all the necessary connections for sensors, muting indicators and reset buttons. Three muting operating modes and other detailed functions ensure optimal adaptation to the application. If low safety distances are necessary, the MSI-MD-FB together with the ELC or MLC safety light curtains offer a flexible muting solution.



Advantages for you

- With the configurable muting functions, the muting interface can be flexibly adapted to the application
- Simple configuration of the devices without a PC via the concealed DIP switches
- The same version of the safety sensor can be used in all applications using the muting interface.
This reduces the variety of types for applications with and without muting.



MSI-MD-FB

Features

- Muting interface for muting applications in combination with standard variants of the MLC safety light curtains and MLD multiple light beam safety devices
- Muting operating modes: 2 timing controlled sensors, 2 and 4 sequence controlled sensors
- Input signal, 'release muting'
- Selectable muting timeout times: 20 sec., 2 min., 10 min., 100 hrs.
- M12 connector, 5 and 8-pin
- Wide temperature range from -30 ... 60°C, degree of protection IP 67

Areas of application

- Access guarding on conveyor lines with muting function

Safety solutions

Simple. Safe. Productive.

From risk assessment to validation: our safety solutions provide complete solutions for your systems. Our expert teams' innovative safety concepts ensure efficient material flow, gapless safety and high availability of your system. Even in applications where classic concepts are pushed to their limits. Always legally compliant, CE-certified and standard-compliant. This makes implementation particularly easy for you.



Advantages for you

- It's that simple: We transform your concept requirements into customized solutions
- Efficient material flow and gapless safety – even where classic concepts reach their limits
- All safety solutions are CE-certified and compliant with standards. This gives you legal security.
- Our teams of certified safety experts are with you throughout the project and ensure competent deployment.

Benefit from our experience

Innovative ideas are based on experience and expertise. For more than 35 years, we have been supporting safety-related applications in different industries by offering a broad range of products. Our safety experts have comprehensive knowledge of the latest norms and standards and extensive experience in designing safety concepts. This allows us to develop efficient safety solutions for use in automated environments.

- Global network of certified experts for the creation of safety concepts and the validation of the solutions on-site
- In-house Solutions Engineering Center
- Development and design according to the V-model in accordance with EN ISO 13849-1
- Extensive selection of in-house safety products



Simple. Safe. Productive.

Complete solutions for your systems

Our solutions are based on qualified safety concepts which, if necessary, can also be extended or created new. We take care of all the necessary process steps, from standards research to start-up support. And in the project, each solution is individually adapted to your system layout.

Concept and design

The conceptualization and design of the safety solutions is carried out entirely by our Solutions Engineering Center.

This includes:

- Directives and standard research
- Creation of the safety concept and the system architecture
- Software development and validation
- Comprehensive documentation, including CE declaration of conformity



Services – Individual for your project

Each safety solution is individually adapted to your system and supported by us in the project until handover:

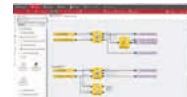
- Risk assessment (on demand)
- Engineering services with configuration according to project requirements
- Start-up support
- Validation of the safety function



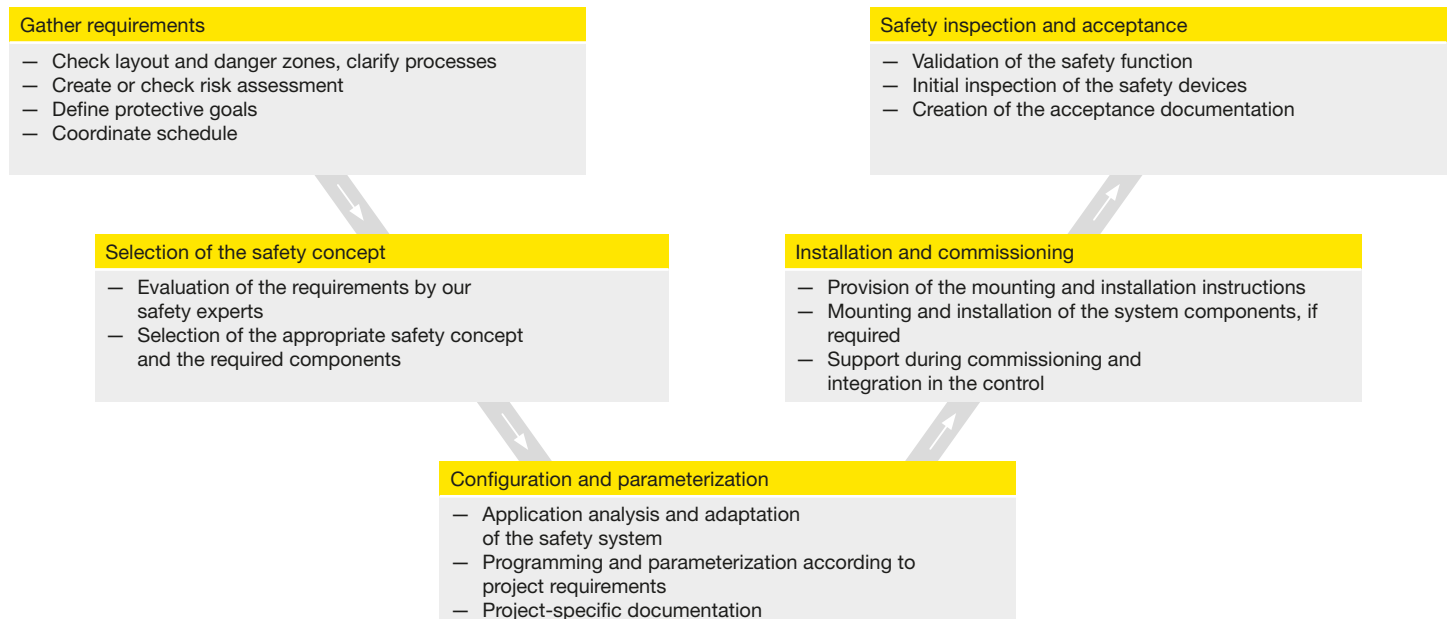
Hardware and software components

Our safety solutions include all the necessary hardware and software components for integration into your system:

- Safety sensors
- Safety control
- Leuze safety program
- Compact switch cabinet, as required
- Wiring



The path to your solution

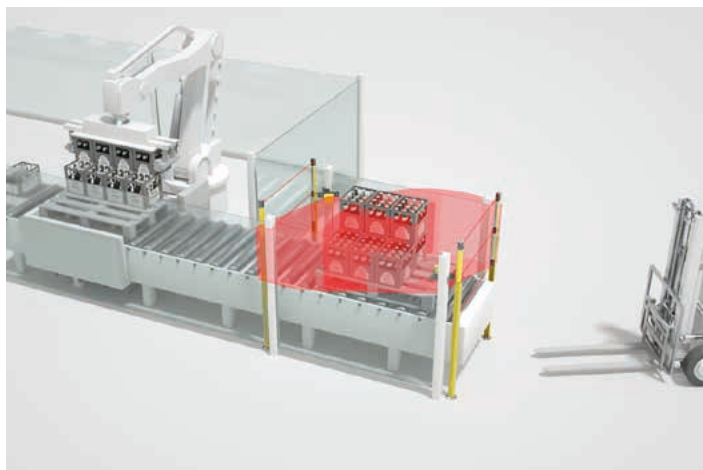


Safety solutions – examples

Simple. Safe. Productive.

Access guarding at material transfer station

Requirement: The robot cell is fed automatically. The material is loaded onto the conveyor line, e.g. using a forklift truck, and then transported into the cell. Access to the cell must be safeguarded. To guarantee optimum capacity utilization of the robot cell, the safety concept must also allow uninterrupted operation of the cell during loading.



Solution: The loading area of the conveyor line is guarded at both the entry and exit side by multiple light beam safety devices. The area between the photoelectric sensors is monitored for the presence of persons by safety radar sensors.

Advantages for you

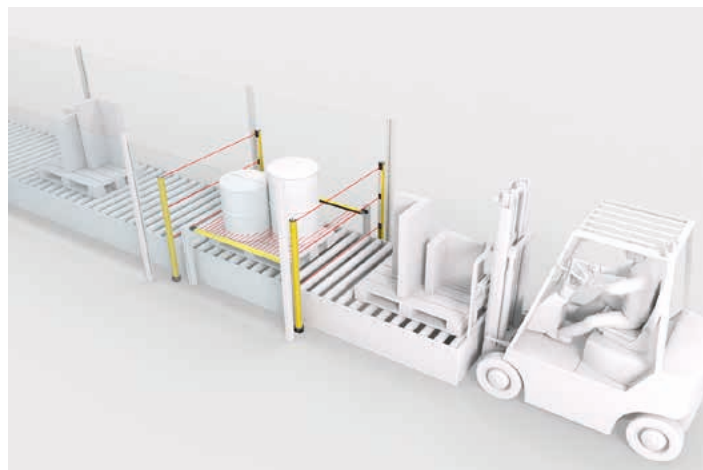
- Higher capacity utilization of the system through interruption-free operation of the robot cell, even during loading
- Infeed of transported goods of any shape or size thanks to an optimized safety concept
- Safe and reliable even under demanding conditions, e.g. with fully loaded or empty pallets
- Supports automatic starting of the conveyor line to improve efficiency and safety
- No operator action required
- No visual monitoring of the danger zone necessary

System components and safety parameters

- Safety sensors:
 - MLD 500 multiple light beam safety devices,
 - LBK safety radar sensors with controller
- System control: MSI 400 safety control
- Leuze safety program
- PL e in accordance with EN ISO 13849-1, SILCL 3 in accordance with IEC 62061
- 2-channel safety output, 2 signal outputs

Access guarding at material output station

Requirement: Pallets with changing load – e.g. different shape and size or partially loaded pallets – must be transported out of the danger zone. Access to the system must be guarded. To ensure optimum utilization of the system, it must be operated without interruption even when the pallets are being transported out.



Solution: A safety gate with two multiple light beam safety devices at each end is installed on the conveyor line. The area between the photoelectric sensors is monitored by a horizontally mounted safety light curtain. The safety light curtain uses its protective field to detect the presence of people.

Advantages for you

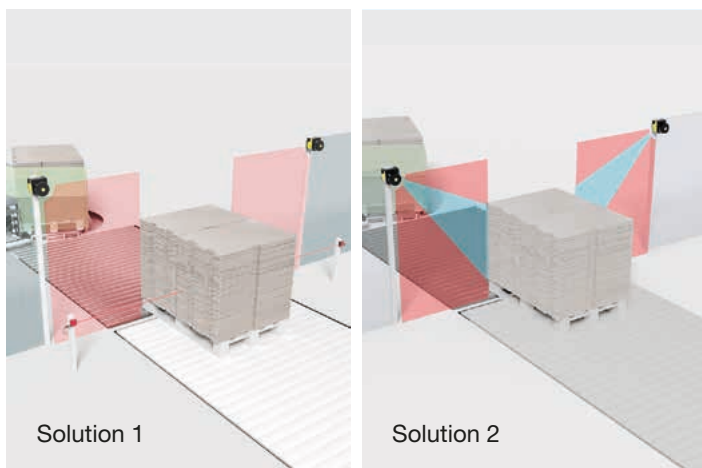
- Flexible safety concept for optimum utilization of the system through interruption-free operation, even with changing loads
- Reliable outward transport of goods of any shape and size as well as partially loaded pallets
- No modifications required in the event of a format change
- No operator intervention necessary

System components and safety parameters

- Safety sensors:
 - MLD 500 multiple light beam safety devices,
 - ELC 100 or MLC 500 safety light curtain
- System control: MSI 400 safety control
- Leuze safety program
- PL e in accordance with EN ISO 13849-1, SILCL 3 in accordance with IEC 62061
- 2-channel safety output, 2 signal outputs

Access guarding with dynamic format adaptation

Requirement: Pallets are automatically fed in and out by a conveyor belt. Access guarding should permit the transport of goods with changing width as well as with different positioning on the pallet and simultaneously prevent persons from running alongside.



Solution: Two vertically aligned safety laser scanners guard access. Measuring distance sensors (solution 1) or the parallel measurement function of the scanners (solution 2) determine the width and position of the goods and send this information to the Leuze safety system. This appropriately adapts the protective field for passage of the goods.

Advantages for you

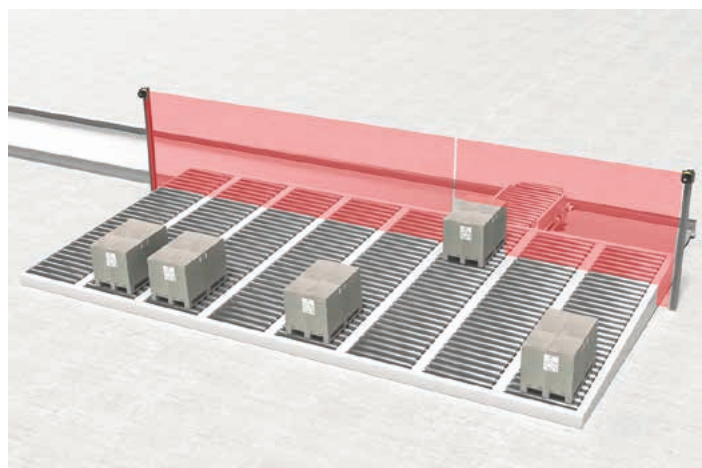
- Continuous monitoring of the entire access area offers gapless safety during the transport cycles
- High reliability and availability
- Optimum manipulation protection
- Easily retrofittable
- Solution 1: Safety distance to the hazard smaller compared to solution 2
- Solution 2: No additional measuring distance sensors required

System components and safety parameters

- Safety sensors: RSL 400 safety laser scanner
- Measuring sensors: ODS optical distance sensors (solution 1), measurement data output of RSL 400 safety laser scanners (solution 2)
- System control: Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with ISO 13849-1, SILCL 2 in accordance with IEC 62061 2-channel safety output

Access guarding on multi-track transport systems

Requirement: Pallets are output on individual tracks that are fed via a cross conveyor. The cross conveyor and the area located behind it are to be safeguarded against entry by persons. The protection must only release the track on which the pallet is output.



Solution: Access guarding takes place via two vertically oriented safety laser scanners. The safety system receives information from the system control as to which track the pallet is being output on and adjusts the protective field for the pallet's passage accordingly. The entire process is monitored for safety.

Advantages for you

- Continuous monitoring of the entire transfer area for up to 10 tracks and width of up to 9m
- Gapless safety during the transport cycles
- High reliability and availability
- Optimum manipulation protection
- No additional trigger sensors necessary
- Easily retrofittable

System components and safety parameters

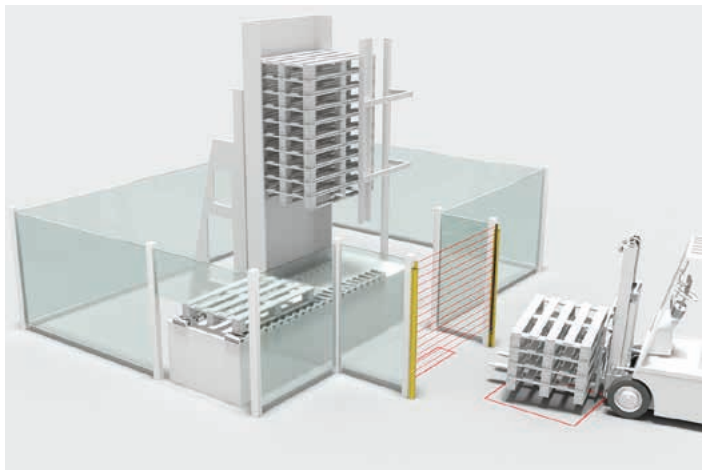
- Safety sensors: RSL 400 laser scanner
- System control: Leuze MSI 400
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Safety solutions – examples

Simple. Safe. Productive.

Access guarding on pallet magazine – with automatic restart

Requirement: Access guarding of the pallet magazine should prevent the entry of persons and simultaneously permit the entry of pallets by a forklift truck. After the forklift truck has again left the transfer area, restart should occur automatically to minimize the interruption of the work process.



Solution: The access area is safeguarded by a safety light curtain. In addition, induction loops are embedded in the floor in the areas in front of and behind the safety sensor. These allow the safety system to distinguish between forklift truck and persons.

Advantages for you

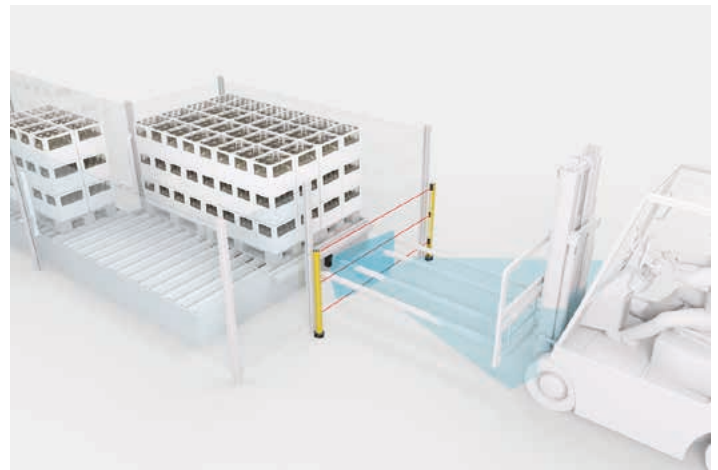
- Optimum system utilization through automatic restart of the machine without manual operator interventions
- High reliability and availability
- Low service costs
- Optimum manipulation protection
- Simple integration in the safety circuit of the primary control

System components and safety parameters

- Safety sensor: MLC 500 safety light curtain, with device columns for floor mounting
- Induction loop set with evaluation unit
- System control: MSI 400 safety control
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Access guarding at pallet grouper / ungrouper

Requirement: Pallet groupers and ungroupers must be guarded against access by persons. This requires reliable distinction between persons and the manually operated forklift trucks. To simplify the workflow and to minimize interruptions, an automatic system restart must be possible.



Solution: Access to the danger zone is guarded by a multiple light beam safety device. A sensor for detecting the forklift truck is installed behind this. By evaluating the sensor signals and their sequence, the safety system distinguishes between forklift trucks and persons. Automatic restart is possible.

Advantages for you

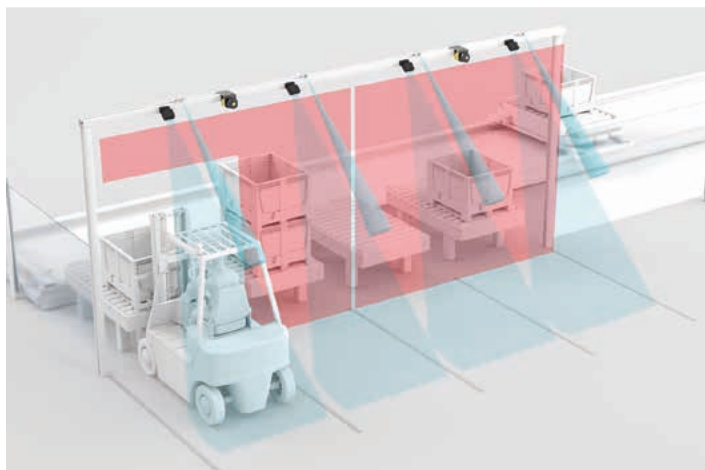
- Optimum system utilization through automatic restart of the system without manual operator intervention
- High reliability and availability with optimum manipulation protection
- No components need to be installed in the floor
- Low service costs
- Simple integration in the safety circuit of the primary control

System components and safety parameters

- Safety sensors: MLD 500 multiple light beam safety device
- Sensor for process monitoring: radar sensor
- System control: MSI 400 safety control
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Multi-station access guarding in forklift truck logistics

Requirement: A cross conveyor has several transfer stations at which forklift trucks carry materials in and out. The entire transfer area has to be protected against access by people. When a forklift truck approaches, the relevant station must be released for access.



Solution: Safety laser scanners with a vertically aligned protective field secure the access point. At each station, additional sensors monitor the movement of the forklift trucks and send this information to the safety system. The safety system adjusts the protective field accordingly for access into the station. The entire process is monitored for safety

Advantages for you

- Save time and money with our pre-developed and process-optimized safety solutions
- Continuous monitoring of the entire transfer area with reliable differentiation between forklift trucks and operating personnel
- Scalable to the number of stations in your system
- Reliable separation of the traffic and transfer areas enables further optimization of individual work procedures
- High reliability and availability
- Optimum manipulation protection

System components and safety parameters

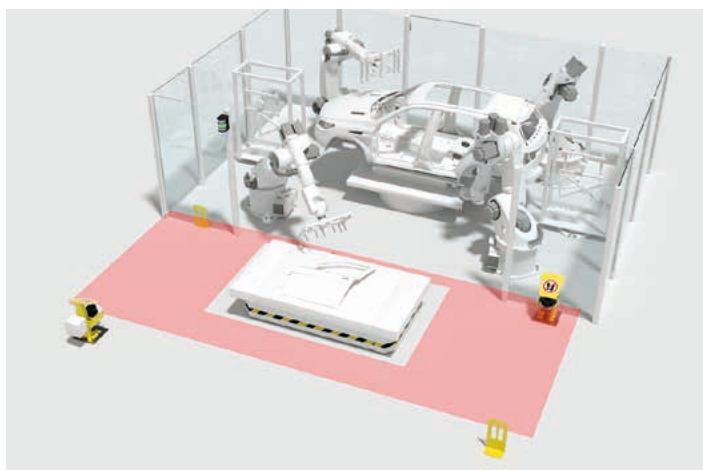
- Safety sensors: RSL 400 laser scanner
- Monitoring sensors: ultrasonic and radar sensors
- System control: Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Safety solutions – examples

Simple. Safe. Productive.

Robot / AGV transfer station safeguarding

Requirement: The danger zone of the robot and the working range of the transfer station should be safeguarded against entry by persons during the entire process. The vehicle should be able to enter and exit the work area fully automatically.



Solution: The entire area of the transfer station is safeguarded with safety laser scanners. As the vehicle passes through, the protective field dynamically adapts to the position of the vehicle by blanking the outline of the AGV from the protective field.

Advantages for you

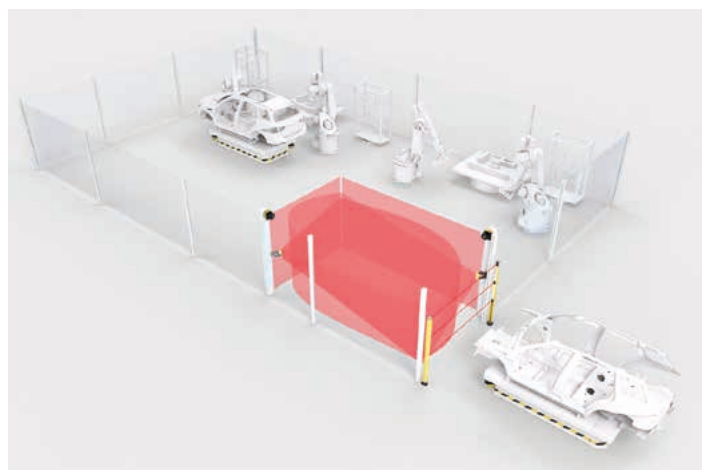
- Monitoring for the entry and presence of persons
- Gapless safety during the entire cycle
- No restrictions during part transfer, e.g., for parts that protrude at the front or side
- Autonomous system, simple safety integration

System components and safety parameters

- Safety sensors: RSL 400 safety laser scanner
- System controls: Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Bidirectional AGV gate for access guarding

Requirement: The extensive danger zone must be guarded against access by persons. At the same time, AGVs with different loads must be able to enter and exit the danger zone. The transportation path of the AGV inside the production cell must not be restricted by the access guarding system.



Solution: A safety gate has optoelectronic safety sensors on three sides. This allows the AGV's transportation path toward the danger zone to be freely selected. Safety radar sensors check whether persons are present within the gate area. After a corresponding release has been given, the AGV can continue its journey.

Advantages for you

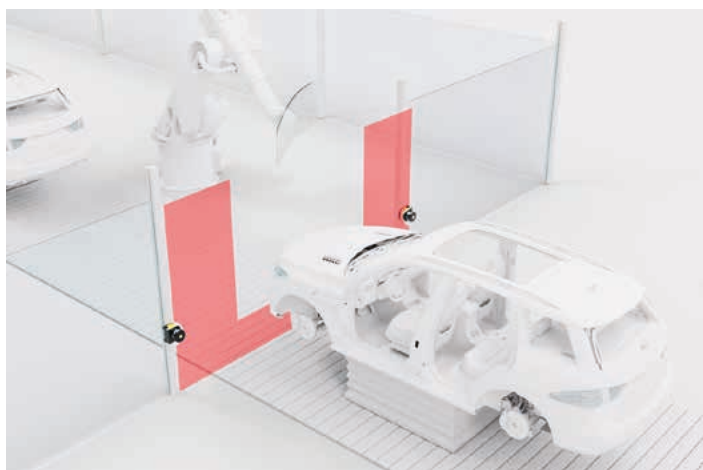
- Gapless safety during the entire cycle without restricting parts transport (for loads of any shape and size)
- Optimum utilization of the system through interruption-free operation, even when the AGV is entering and exiting
- Free routing of the AGV's transportation path toward the danger zone because no hard guards are necessary
- No operator action or visual checking of the gate area necessary

System components and safety parameters

- Safety sensors: MLD 500 multi-beam safety light curtain, LBK safety radar system, RSL 400 safety laser scanner
- System control: MSI 400 safety control
- Leuze safety program
- PL e in accordance with EN ISO 13849-1, SILCL 3 in accordance with IEC 62061
- 2-channel safety output

Access guarding at skilnet transfer area

Requirement: The inward/outward transport interfaces at skilnet transfer areas must be guarded against access by persons. The safety concept must allow different body variants to be transported. Persons moving alongside the skilnet must also be detected.



Solution: Two vertically aligned safety laser scanners use their protective field to guard access to the danger zone. The system control tells the safety system which body variant will be transported next, and the safety system adapts the protective field accordingly. The entire process is monitored for safety.

Advantages for you

- Continuous monitoring of the entire access area
- Gapless safety during the transport cycles
- High reliability and availability
- Low space and service requirements
- Optimum manipulation protection; the protective device cannot be bypassed unconsciously
- Easily retrofittable

System components and safety parameters

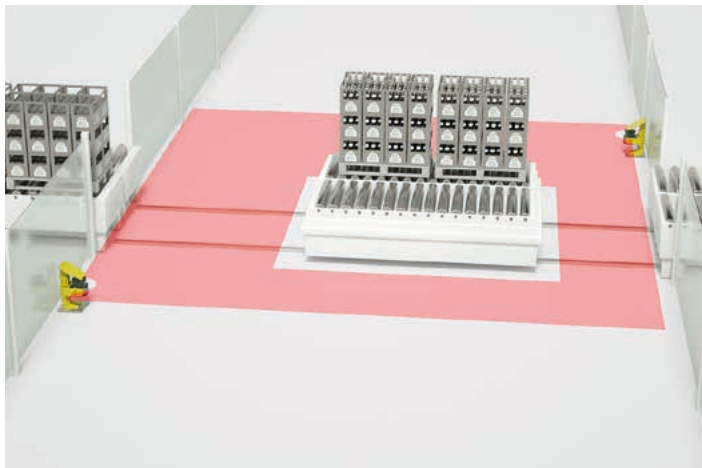
- Safety sensor: RSL 400 safety laser scanner
- System control: MSI 400 safety control or Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Safety solutions – examples

Simple. Safe. Productive.

Travel path safeguarding for crossing transfer cars

Requirement: The transfer car crosses the travel path at regular intervals. During the entire movement process, the relevant part of the travel path is to be safeguarded against the entry of persons. The transfer car must, however, be able to pass through the monitored area fully automatically.



Solution: The relevant part of the travel path is safeguarded by safety laser scanners. These use their protective fields to detect the entry and presence of persons. During the travel process, the outline of the car is dynamically blanked out of the protective fields. The entire area thereby remains optimally protected at all times.

Advantages for you

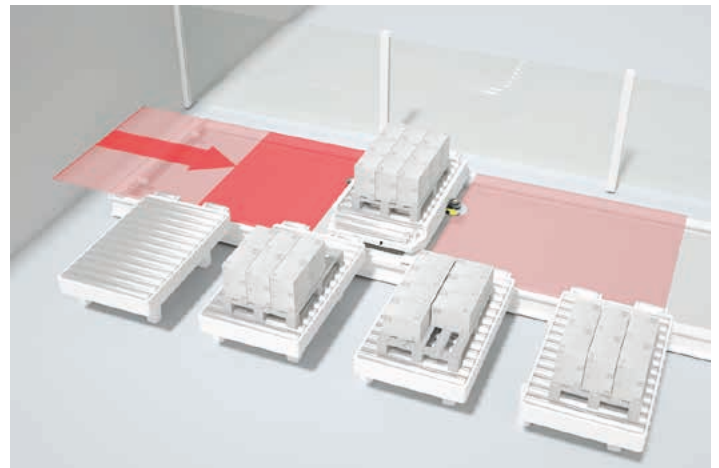
- Monitoring for the entry and presence of persons
- Gapless safety during the entire process
- No restrictions during parts transfer – even parts that protrude are possible
- Autonomous system with simple integration in the safety circuit of the primary control

System components and safety parameters

- Safety sensors: RSL 400 safety laser scanner
- System control: Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Area guarding at transverse transfer car

Requirement: The transportation path of the transverse transfer car is to be monitored for the presence of persons by using safety laser scanners. To ensure optimum utilization of the hall's surface area, the car must move right up to the wall. For this purpose, the protective field of the safety laser scanner must gradually be reduced as the car approaches the wall.



Solution: An area protection system with a safety laser scanner in each direction of travel is installed on the transverse side-tracking skate. The autonomous system detects when the car is approaching the adjacent wall, and automatically reduces the size of the protective field of the safety laser scanner.

Advantages for you

- Improving the safety concept in the transfer car's entire travel range while maintaining high system performance
- The autonomous systems can each be easily integrated into the system control via a two-channel safety output
- Easily retrofittable, minimal mechanical installation requirements
- Also for the operation of 2 skates in one aisle

System components and safety parameters

Area protection system using the following in each direction of travel

- Safety sensor: RSL 400 safety laser scanner
- System control: MSI 400 safety control
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

Guarding of feed points on printing and paper processing machines

Requirement: The printing plates and cloths must be inserted manually during setup mode. The rollers are controlled in inching mode by the operator, e.g. by using a foot switch. In addition to the selected operating mode, the feed point must be secured against access by fingers/hands.



Solution: A photoelectric sensor is installed right before the feed point (point of operation), which is connected to a safety system. If the photoelectric sensor detects fingers or hands nearing the point of operation, the dangerous movement is reliably stopped by the safety system. The actual work process remains the same.

Advantages for you

- Save time and money with our pre-developed and process-optimized safety solutions
- Safe monitoring of the feed area of printing machines avoids dangers when inserting
- Gapless safety during the insertion process
- High reliability and availability
- Easily retrofittable

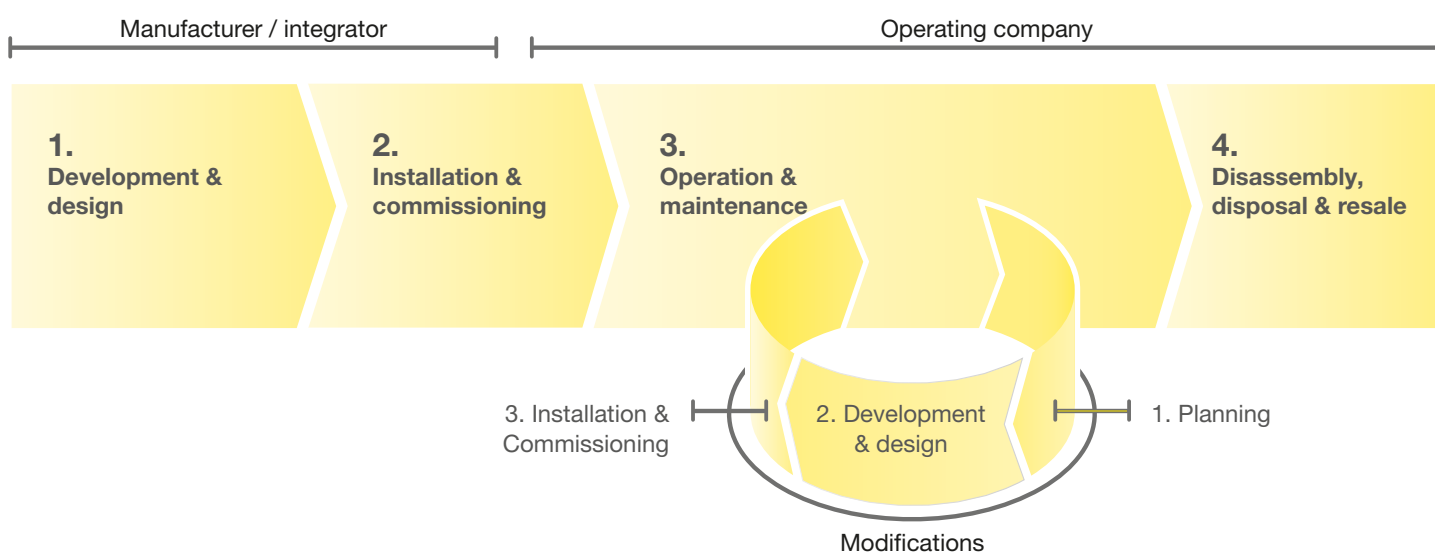
System components and safety parameters

- Sensor: Throughbeam photoelectric sensor 3C
- Evaluation unit: Safety relay MSI-TR1B
- PL b in accordance with EN ISO 13849-1, SILCL 1 in accordance with IEC 62061
- 2-channel safety output

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.

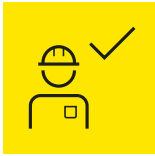
Stages of a machine life cycle



Each phase of the machine lifecycle places specific requirements on machine safety. Adherence to the respective, applicable laws and regulations is a management task that often goes beyond the capacities within a company both with respect to personnel as well as financially. This is because the setup and the continuous updating of the necessary knowledge are complex and often not something that can simply be done on the side.

Our services offer you tailored support for the required measures – for manufacturers, integrators and operating companies. 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 safety services



'Safety technology on machines and systems' status check

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

Our experts support you in identifying hazards, assessing and evaluating risks, and defining risk-reducing measures.



Inspection of protective devices

As part of the initial or regular inspection, we check the condition, mounting and correct function of the protective device as well as its correct integration in the safe part of the machine control. We summarize the results of the tests in a detailed report.



Stopping time measurement

Through measurement, we determine the stopping time reliably. Using this information, the necessary minimum distance between protective device and hazardous movements can be calculated and any wear, such as in brake components, can be detected in good time.



'CE marking of machines' status check

We check the documentation for the EU declaration of conformity and the CE marking for completeness and give recommendations on 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. We help you comply with and implement the legal requirements of the Machinery Directive.



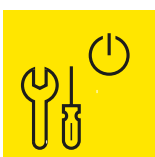
Safety concept and safety design

During the development of the safety concept and the safety functions, we create practically oriented concept proposals for you and support you during their implementation.



Verification and validation

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

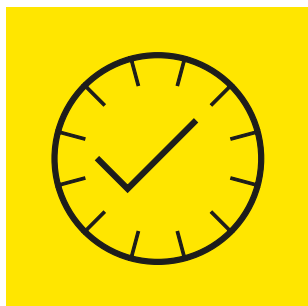


Start-up support

Typical tasks during the commissioning of safety sensors are optimum alignment, configuration and parameterization. Our experienced service technicians support you as needed depending on the application and sensors used.

Inspection of protective devices

As part of the initial or regular inspection, we check the condition, mounting and function of the protective devices as well as their integration in the safe part of the machine control. We summarize the results of the tests in a detailed report.



Advantages for you

- Minimization of accident risks and machine downtime
- Legal security for the operating company through verification of safety and quality standards
- Practical solutions for the rapid elimination of safety deficiencies
- Independent, external assessment by a qualified person in accordance with TRBS 1203
- Clear documentation with our own test database based on more than 20 years of experience
- Inspection of protective devices from all manufacturers

Your requirement

- Safety at work is the employer's responsibility. Through the regular inspection of the protective devices, adherence to safety and quality standards is ensured.
- Inspections minimize undesired machine downtimes as part of the preventive maintenance plan.
- In Germany, the Betriebssicherheitsverordnung (Ordinance on Industrial Safety and Health) requires that machines be tested prior to the initial commissioning and thereafter at regular intervals. A test is also necessary after longer downtimes and after changes to the machine.
- The testing and inspection of protective devices may only be carried out by qualified persons.

Our solution

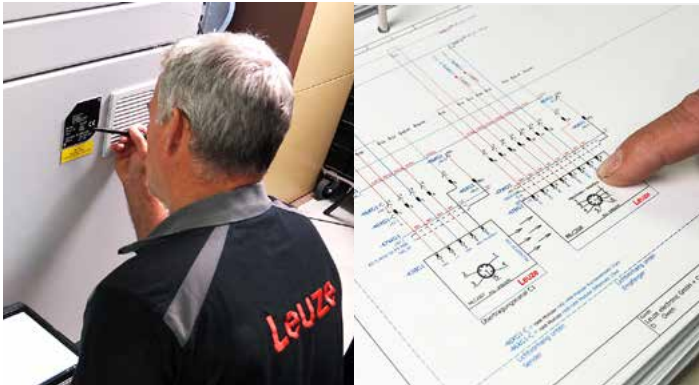
- | |
|---|
| Inspection of electro-sensitive protective equipment (ESPE), safety switches and emergency stop equipment |
| Testing the condition, functional installation and correct function of the protective device as well as its safe integration in the machine control |
| Testing the safety distance to the safeguarding point of operation as stipulated by standards through measurement of the stopping time |
| Detailed test log, attachment of the inspection sticker |

Areas of application

- Service for manufacturers and integrators
- Service for operating companies
- Service for changes in operation (modifications)

The process on site

Collect data – test integration



The inspection begins with the recording of data from the machine and protective devices. We then test the safety-related integration of the protective devices and their switching outputs. This work is conducted during operation without affecting the productivity of the machine.

Checking protective devices



In the next step, we test the function of the protective devices. In the case of optical safety devices, for example, this includes:

- Testing the detection capability and possible reflection bypass. Testing is performed with a test piece suited to the resolution of the device.
- Testing of special functions such as reduced resolution, cycle control, muting and blanking
- Testing function of the start / restart interlock
- Visual check of the device state

Evaluating mounting and safety distance



We check that the protective device is mounted correctly, and assess the safety distance:

- Can the protective device be circumvented, e.g. by reaching over, under or around or by stepping over?
- Is it possible to crawl under the protective device?
- Measurement of the stopping time for determining the safety distance (if necessary and possible, see next page).

Log test results – attach inspection sticker



We record all results in the inspection database and use this information to create a clear test log. On completion of the inspection, we attach the inspection stickers to the machine, which also include the inspection number of the test log for easy tracking.

Technical data

Safety laser scanners



RSL 210, RSL 220

RSL 230, 235

General	Protective field range	3.0 m	3.0 m
	Scanning angle	275°	275°
	Angular resolution	0.2°	0.2°
	Warning field range (at 10% diffuse reflection)	15 m	15 m
	Resolution, selectable	50 / 70 mm	50 / 70 mm
	Response time	≥ 75 ms	≥ 75 ms
	Safety	Type 3, SIL 2, PL d	Type 3, SIL 2, PL d
	Dimensions, incl. connection unit (W × H × D)	80 × 80 × 86 mm	80 × 80 × 86 mm
	Temperature range	0 ... +50 °C	0 ... +50 °C
Functions	Approvals	CE CDRH TÜV	CE CDRH TÜV
	Safety-related switching outputs	1	1
	Number of 3-field sets (1 protective field + 2 warning fields)	RSL 210: 1 RSL 220: 8	32
	Diagnosis via RSL mobile app	X	X
	Configurable signal outputs	RSL 210: 4 RSL 220: 4 (used in conjunction with the protection field switch function)	8 (of which 6 used together with protective field switching function)
Interfaces / Connection	UDP data output optimized for AGV navigation, configurable	–	RSL 235: Distance and signal strength, operating range 25 m angle resolution 0.2°
	Connection, rotatable: – for I/Os and power supply – for data transmission	M12 connector, 8-pin –	M12 connector, 12-pin M12 connector, 4-pin
	Interfaces for configuration and diagnosis	USB, Bluetooth	USB, Bluetooth, Ethernet TCP / IP
	Further features	Technology for robust operation Contactor monitoring (EDM), start/restart interlock (RES)	Technology for robust operation Contactor monitoring (EDM), start/restart interlock (RES)

Safety laser scanners



RSL 410, RSL 420, RSL 425

RSL 430, RSL 440, RSL 445

RSL 420P, RSL 450P, RSL 455P

General	Protective field range	3.0 / 4.5 / 6.25 / 8.25 m	3.0 / 4.5 / 6.25 / 8.25 m	3.0 / 4.5 / 6.25 / 8.25 m
	Scanning angle	270°	270°	270°
	Angular resolution	0.1°	0.1°	0.1°
	Warning field range (at 10% diffuse reflection)	20 m	20 m	20 m
	Resolution, selectable	30 / 40 / 50 / 60 / 70 / 150 mm	30 / 40 / 50 / 60 / 70 / 150 mm	30 / 40 / 50 / 60 / 70 / 150 mm
	Response time	≥ 80 ms	≥ 80 ms	≥ 120 ms
	Safety	Type 3, SIL 2, PL d	Type 3, SIL 2, PL d	Type 3, SIL 2, PL d
	Dimensions, incl. connection unit (W × H × D)	140 × 149 × 140 mm	140 × 149 × 140 mm	140 × 169 × 140 mm
	Temperature range	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Functions	Approvals	CE CDRH cULUS TÜV	CE CDRH cULUS TÜV	CE CDRH cULUS TÜV
	Safety-related switching outputs	1	2	RSL 420P: PROFIsafe, 1 protective field RSL 450P, 455P: PROFIsafe, 4 simultaneous protective fields
	Number of field pairs (1 protective field + 1 warning field)	RSL 410: 1 RSL 420: 10	RSL 430: 10+10 RSL 440, 445: 100	RSL 420P: 10 RSL 450P, 455P: 100
	Number of 4-field sets (1 protective field + 3 warning fields)	RSL 410: 1 RSL 420: 10	10	
	Number of 4-field sets (2 protective fields + 2 warning fields)	–	50	RSL 450P, 455P: 50 (Warning fields can be evaluated as protective fields)
	Number of independent sensor configurations	1	RSL 430: 2 RSL 440, 445: 10	RSL 420P: 1 RSL 450P, 455P: 10
	Plain-text display, integrated electronic spirit level	X	X	X
	Configurable signal outputs	RSL 410: 3 RSL 420: 4	9	All status information can be called up
Interfaces / connection	UDP data output optimized for AGV navigation, configurable	RSL 425: Distance and signal strength, operating range 50 m, angle resolution 0.1°	RSL 445: Distance and signal strength, operating range 50 m, angle resolution 0.1°	RSL 455P: Distance and signal strength, operating range 50 m, angular resolution 0.1°
	Connection unit (removable, with integrated configuration memory)	RSL 410: M12 connector, RSL 420, 425: cable or connector, 16-pin	Cable or connector, 29-pin	3x M12 connector for 2-port switch and power supply or 4x M12 connector with additional voltage output AIDA variant with push-pull connectors, communication via copper or fiber-optic cable
	Interfaces for configuration and diagnosis	Ethernet TCP/IP, Bluetooth, RSL 420, 425: USB	Ethernet TCP/IP, USB, Bluetooth	Ethernet TCP/IP, USB, Bluetooth
	PROFINET	–	–	Conformance class C Network load class III PROFINET device according to specification V2.3.4 GSDML according to specification V2.3.2
	Further features	Technology for robust operation Contactor monitoring (EDM), start/restart interlock (RES) Vertical access guarding with reference contour monitoring Park function (protective field switch-off, RSL 420 and RSL 425)	Technology for robust operation Contactor monitoring (EDM), start/restart interlock (RES) Vertical access guarding with reference contour monitoring Park function (protective field switch-off)	Technology for robust operation Start/restart interlock (RES) Vertical access guarding with reference contour monitoring Park function (protective field switch-off)

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 (300 mm steps)	150 ... 3,000 mm (150 mm steps)
	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 / IP 69K
	Safety-related switching outputs (OSSDs)	2 PNP transistor outputs	2 PNP transistor outputs
	Connection type	150 mm cable with M12 connector	M12 plug
	Approvals	 	   
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)	MLC 500

MLC 320
MLC 520

MLC 520-S



MLC 530

MLC 530-SPG
MLC 535-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 plug	160 mm cable with M12 connector	M12 plug	M12 plug
   	   	   	   
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	X	X
		X	X
		X (2-sensor timing controlled)	X (Smart Process Gating)
		X	
	X		
X	X		
X (group II, cat 3D and 3G)			
MLC 500		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 plug	M12 plug	M12 plug	M12 plug
Functions	Approvals	   	   	   	   
	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 controlled.			X	
	2-sensor muting, sequence controlled			X	X
	4-sensor muting, timing controlled				X
	Muting-timeout extension to up to 100 hours			X	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 an 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 × 193 × 65 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 plug	Cable 2 m, M12 plug	Cable 2 m, M12 plug
	Approvals	   	   	   
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 to up to 100 hours	MLD 530		
	AS-i Safety interface	MLD 510		

Safety radar systems



**LBK S/SBV
radar sensors**



**LBK ISC
Controller**

System	SIL in accordance with EN IEC 62061 (SILCL)	SIL 2
	Performance Level (PL) in accordance with EN ISO 13849-1	PL d
	Category in accordance with EN ISO 13849-1	LBK S01: Category 2, LBK SBV-x: Category 3
	Operating principle	FMCW (frequency modulated continuous wave) for movement detection
	Response time	100 ms
	Temperature range	-30 ... +60°C
	Approvals	 

Sensors	Operating range	LBK S-01: 4 m LBK SBV-01 / 201: 5 m LBK SBV205: 9 m
	Angle of radiation (horizontal / vertical)	LBK S-01: 50° / 15° or 110° / 30° LBK SBV-x: 10° ... 100° / 20°
	restart time	LBK S-01: 10 s LBK SBV-x: 4 s
	Frequency range	LBK S-01: 24.0 ... 24.5 GHz LBK SBV-x: 60.6 ... 62.8 GHz
	Emitted power	LBK S-01: ≤ 13 dBm LBK SBV-x: ≤ 16 dBm
	Connection	M12, 5-pin
	Supply voltage	Via controller
	Dimensions (W × H × D)	LBK S-01: 165 × 123 × 49 mm LBK SBV-x: 158 × 135 × 71 mm
	Degree of protection	IP 67
Controller	With I/O interface:	
	Safety outputs:	2x 2 PNP transistor outputs (OSSDs)
	Configuration and diagnosis:	Micro-USB, Ethernet TCP / IP (optional)
	SD card slot:	Optional
	With safe fieldbus interface	
	Safety outputs:	PROFIsafe or FSoE, CIP safety, additionally 2x 2 PNP transistor outputs (OSSDs)
	Configuration and diagnosis:	Micro-USB, Ethernet TCP / IP
	SD card slot:	Optional
	Signal outputs	The PNP transistor outputs can be configured as signal outputs
	Inputs	2x two-channel, 4x one-channel
	Number of sensors in a system	6
	Configurations, switchable	I/O interface: 8 Fieldbus interface: 32
	Functions	Deactivation of individual groups, start/restart interlock (RES)
	Dimensions (W × H × D)	ISC x: 105 × 58 × 103 mm ISC110 x: 106 × 33 × 103 mm
	Degree of protection	IP 20

Safe bar code positioning system



FBPS 600i

General	SIL in accordance with EN IEC 62061 (SILCL)	SIL 3
	Performance Level (PL) in accordance with EN ISO 13849-1	PL e
	Category in accordance with EN ISO 13849-1	Category 4
	Error response time	10 ms ... 400 ms (adjustable)
	Interfaces	FBPS 607i: Standard SSI interface, 2-channel (2x M12 plug) FBPS 617i: SSI interface with CRC, 2-channel (2x M12 plug) FBPS 648i: PROFIsafe interface, optional SSI (2x M12 connector)
	Reproducibility	± 0.15 mm (1 sigma)
	Reading distance	50 ... 170 mm
	Degree of protection	IP 65
	Temperature range	-5 ... +60 °C With heating: -35 ... +60 °C
	Further connections	Power supply: M12 connector Configuration and diagnosis: Mini-USB
	Dimensions (W x H x D)	Lateral connections: 116.3 x 112.5 x 51.5 mm Bottom connections: 105 x 123.8 x 51.5 mm
	Approvals	CE cULus TÜV
Functions	Display (optional)	Display of position and status information directly on the device
	Status signal of reading quality	For early detection of soiling
	Assembly	Quick, reliable and position-neutral mounting via clamp bracket with quick-change system
Bar code tape	Features	Self-adhesive plastic tape (acrylic adhesive), extremely robust and mechanically resilient, each bar code's position value can be read in plain text
	Standard bar code tapes	Height: 25 mm, 47 mm Length: up to 200 m
	Configurable bar code tapes	Height: 20 mm to 140 mm Selectable start and end value in the range from 0 to 10,000 m
	Bar code grid dimension	30 mm (G30), 40 mm (G40)

Safety
switch

S20, S200

Safety
position switches

S300

Safety
hinge switches

S400, S410

Safety
guard locking

L100, L200

General	Type in accordance with EN ISO 14119	Type 2 interlock device without guard locking	Type 1 interlock device without guard locking	Type 1 interlock device without guard locking	Type 2 interlock device with guard locking
	Safety	For safety applications up to Performance Level PL e/SIL 3	For safety applications up to Performance Level PL e/SIL 3	For safety applications up to Performance Level PL e/SIL 3	For safety applications up to Performance Level PL e/SIL 3
	Housing Degree of protection	S20: Technopolymer S200: Metal IP 67 in each case	Technopolymer or metal both IP 67	Metal IP 67 / IP 69K	L100: Technopolymer L200: Metal IP 67 in each case
	Actuators	Mechanical tongue, with low coding level in accordance with EN ISO 14119	Actuated by unencoded cam in accordance with EN ISO 14119	Encapsulated position switch inside hinge	Mechanical tongue, with low coding level in accordance with EN ISO 14119
	Locking type, locking force acc. to ISO 14119				With either quiescent current principle or open circuit current principle L100: F _{1max} 1,100 N L200: F _{1max} 2,800 N
	Connection type	Cable entry M20 × 1.5 (S20: optional 3-way), M12 connector	Cable entry M20 × 1.5 (1- or 3-way), M12 connector	M12 plug, cable, cable with M12 plug, alignment: top, bottom, at wall side	Cable entry M20 × 1.5 (3-way)
	Approvals	CE cULus	CE cULus	CE cULus	CE cULus
Functions	Function	Safety switches with separate actuator	Safety switches with plunger and roll actuator	Safety switches and door hinge in one component	Safety switches with guard locking
	Integration in safety circuit	Positive-opening contacts for integration in a safety circuit	Positive-opening contacts for integration in a safety circuit	Positive-opening contacts for integration in a safety circuit	Positive-opening contacts for integration in the safety circuit
	Actuators	Up to 8 different actuators	6 different plunger and roll actuators		Multiple heavy-duty actuators
	Status indicator				LED status display (L200)
	Escape release				Models with escape unlocking (L200)
	Special functions		Switching direction selectable	Additional hinge (without contacts)	
Features		Universal use with 5 actuator approach directions	Universal use with individually set actuator approach directions and angles in 10° grid	High manipulation protection through encapsulated position switch	Universal use with 5 actuator approach directions
		Easy mounting with standard construction	Extremely durable / robust	Elegant design for discreet and effective integration in the system	Robust design for big machinery and systems in harsh ambient conditions (L200)
		High-quality silver contacts for long life expectancy	Various contact blocks	Hidden cable routing thanks to connection on rear side	Flexible and independent alignment of connection unit and escape release (L200)
		Various contact blocks		180° maximum opening angle of the protective device, adjustable switching point	
				Model S410 with wide fork dimension for special materials, e.g., glass	

Safety
guard locking

L250

Safety
guard locking

L300

Type 4 interlock device with guard locking	Type 4 interlock device with guard locking
Performance Level PL e / SIL 3 with a single device	Performance Level PL e / SIL 3 with a single device
Technopolymer IP 67 / IP 69K	Metal IP 67 / IP 69K, IP 65 for integrated operational controls
Mechanical tongue with RFID-encoded actuator in accordance with EN ISO 14119; AC-L250-SCA: low AC-L250-UCA: high	Mechanical tongue with RFID-encoded actuator in accordance with EN ISO 14119; AC-L300-SCA: low AC-L300-UCA: high
With either quiescent current principle or open circuit current principle, F_{1max} 2,100 N	With either quiescent current principle or open circuit current principle, F_{1max} 9,750 N
M12 plug, cable with M12 plug, various outgoing lines	Cable entry M20 x 1.5 (3-way), M12 (8- or 12-pin), M23 (19-pin)
	
Safety switches with guard locking	Safety switches with guard locking
OSSD safety-related switching outputs	OSSD safety-related switching outputs
Contactless actuation through RFID technology	Contactless actuation through RFID technology
LED status display	LED status display
Models with integrated escape release button	Models with integrated escape release button
Accessories: Command device, remote escape unlocking button	Variants with Command and E-Stop buttons
Large center opening for actuator shaft	Large center opening for actuator shaft
Flexibly mounted actuator enables secure closing even with warped doors	Flexibly mounted actuator enables secure closing even with warped doors
Variable installation options: Front and side mounting with just two screws	Variable installation options: Flexible and independent alignment of device head and escape unlocking
Door handle for simple mounting of switches and actuators (optional)	Door handle for simple mounting of switches and actuators (optional)
Lockout / tagout (optional)	Lockout / tagout (optional)

Safety proximity sensors,
magnetically coded

MC 300

Safety proximity sensors,
RFID-coded

RD 800

General	Type in accordance with EN ISO 14119	Type 4 interlock device without guard locking	Type 4 interlock device without guard locking
	Category in accordance with EN ISO 13849-1	Up to 4 (depending on number of sensors)	4
	Performance Level (PL) in accordance with EN ISO 13849-1	Up to PL e (depending on the number of sensors)	PL e with a single device
	Housing Degree of protection	High-strength plastic IP 67	High-strength plastic IP 67/ IP 69 K
	Code type	Actuator with low coding level in accordance with EN ISO 14119	Actuator with low and high coding level in accordance with EN ISO 14119
	Dimensions (housing)	M30 x 36 mm (MC 330) 36 x 26 x 13 mm (MC 336) 88 x 25 x 13 mm (MC 388)	87.5 x 25 x 18 mm (sensor) 45 x 25 x 18 mm (actuator)
	Assured operating distances (Seo, Sar)	< 6 mm, > 14 mm (MC 330) < 3 mm, > 11 mm (MC 336) < 6 mm, > 30 mm (MC 388)	12 mm, 10 mm
	Switching tolerance	± 1 mm	
	Contact type	2 NC or 1 NC + 1 NO	OSSD safety-related switching outputs
	Min. approach speed of actuator towards sensor	50 mm/s	
Functions	Response time	3 ms	7 ms (typical), 12 ms (max.)
	Connection type	M8 connector, cable, cable with M12 connector	M12, cable
	Approvals		
	Encoding	Magnetically coded	RFID coded, for maximum protection against manipulation
Features	Status indicator	LED	4 LEDs
	Signaling contact	X	X
	Programming input		For teaching-in actuators
Features		Contactless actuation without mechanical contacts Long life expectancy Insensitive to soiling	Contactless actuation without mechanical contacts Long life expectancy Insensitive to soiling Series connection possible

Safety control



MSI 420



MSI 430

Extension modules

MSI-EM-I8
MSI-EM-IO84MSI-FB-EtherCAT
MSI-FB-PROFIBUS
MSI-FB-CANopen

General	Device type/function	Safety control main module	Safety control main module	Safe extension module	Gateway
	Category / Performance Level (PL) in accordance with EN ISO 13849-1	4 / PL e	4 / PL e	4 / PL e	
	SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)	3	3	3	
	Inputs/outputs / Inputs or outputs, configurable	16 / 4 / 4	16 / 4 / 4	8 / – / – (EM-I8) 8 / 4 / – (EM-IO84)	
	Maximum switching power per output	4 A	4 A	4 A	
	Test outputs / signal generators	4 / 4	4 / 4	8 / 2 (EM-I8) 2 / 2 (EM-IO84)	
	Interfaces for configuration and diagnosis	USB mini, Ethernet TCP/IP	USB mini, Ethernet TCP/IP		
	Fieldbus protocols		PROFINET IO, EtherNet / IP and Modbus TCP integrated		EtherCAT PROFIBUS-DP CANopen
	Connection	Screw or spring-cage terminals, pluggable	Screw or spring-cage terminals, pluggable	Screw or spring-cage terminals, pluggable	2x RJ45 sockets 1x RS485 (Sub-D) Screw terminals, 5-pin
	Dimensions	45 × 96 × 115 mm	45 × 96 × 115 mm	22.5 × 93.7 × 120.8 mm	22.5 × 96.5 × 121 mm
Functions	Approvals	   	   	   	  
	Modular expansion	Expandable to up to 116 safe inputs 56 safe outputs and 2 gateway modules	Expandable to up to 116 safe inputs 56 safe outputs and 2 gateway modules	Each base module can be expanded by up to 12 freely selectable extension modules	Each base module can be expanded with up to 2 gateway modules
	Function indicator	1 LED per I/O and 4 LEDs for module status	1 LED per I/O and 4 LEDs for module status	1 LED per I/O and 1 LED for module status	3–5 LEDs for module status
	Memory	Removable program memory in SD card format, 512 MB	Removable program memory in SD card format, 512 MB		
	Special applications	Function blocks for press control	Function blocks for press control	MSI-EM-IO84NP non-safe extension module with 4 inputs 4 outputs 4 inputs or outputs, configurable For economical actuation of non-safety relevant elements, e.g., signal lights	
Software	Configuration	Via MSI.designer configuration software (license-free)	Via MSI.designer configuration software (license-free)		
	Function blocks	Over 40 certified function blocks	Over 40 certified function blocks		
	Function blocks per project	Up to 300	Up to 300		
	Other functions	Integrated simulation with logic analyzer Configurable report Online diagnosis	Integrated simulation with logic analyzer Configurable report Online diagnosis		

Safety relays



		MSI-SR-2H21	MSI-SR-ES31	MSI-SR-LC21 / DT30	MSI-SR-LC31AR MSI-SR-LC31MR	MSI-SR4B MSI-SR5B	MSI-RM2	MSI-SR-CM42R	MSI-SR-CM43	MSI-TR1/2 MSI-TRM
General	Device type/function	Evaluation unit					Output extension for OSSDs	Contact extension		Evaluation unit, for periodic testing
	Sensors / application (input signals)	Two-hand control device TYPE III C, EN 574	E-Stop, safety switches with relay contacts	E-Stop Safety switches: – with relay contacts – with OSSD outputs – with reed contacts Safety light curtain Safety laser scanners			safety light barrier, safety laser scanner, safety switch with OSSD outputs	Extension for safety controls		Testable optoelectronic protective devices of type 2 (MSI-TR1/2) Testable optoelectronic protective devices of type 4 (MSI-TRM)
Functions	Category / Performance Level (PL) in accordance with EN ISO 13849-1	4 / PL e	3 / PL d	4 / PL e	4 / PL e	4 / PL e	4 / PL e	4 / PL e	3 / PL d	4 / PL e
	SIL in accordance with IEC 61508 and EN IEC 62061 (SILCL)	3	2	3	3	3	3	3	2	3
	Number of release contacts (NC)	2	3	2	3	3 (SR4) 2 (SR5)	2 (changeover contact)	2 x 2	4	2
	Number of signal contacts (NO)	1	2	1	1	1 (SR4) – (SR5)	1	2 x 1	3	2 (semi-conductor)
	Manual / automatic restart	Through synchronous actuation	M / A	M / A	M (MR) A (AR)	M / A	A	A	A	M / A
	Contactor monitoring (EDM)	X	X	X	X	X				X
	Release time	50 ms	60 ms	25 ms	10 ms	10 ms	10 ms	15 ms	40 ms	20 ms (TR1) 130 ms (TR2 / TRM)
	Max. continuous current per path	6 A	8 A	6 A	8 A	3 A (SR4) 2 A (SR5)	3 A	6 A	6 A	3 A
	Special functions			DT30: Delay 0.1 – 30 s		SR5: Parallel evaluation of 2 sensors		2 extensions in one device		1 or 2 input circuits, up to 3 sensors each

Suitable products

Product-specific holders and mounting brackets



For simple mounting and alignment of the sensors

Example for MLD multiple light beam safety devices



Example for MLC safety light curtains



Example for SLS single light beam safety devices



Connection boxes

For simple connection of muting sensors, ext. muting controller

Accessories for RSL 200 and RSL 400 safety laser scanner



Mounting system

For horizontal and vertical alignment



Loop guard

To protect the optics cover, in conjunction with the mounting system



RSL 400 mounting bracket for floor mounting

For scanning heights of 150 mm, 300 mm and 75–375 mm



Alignment aids

For simple alignment over large distances



Optical / acoustic signaling devices

For status visualization, pre-mounted or modular



Passive distribution boxes

MD distribution box for signal bundling and distribution



Connection and interconnection cables

With standard M8 and M12 connection, various sheath materials



User-configurable connectors and Y distribution boxes

With M12 connection

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 year	1963
Company structure	GmbH & Co. KG, wholly family-owned
Executive management	Salvatore Buccheri, Dr. Henning Grönzin, Helge Held
Headquarters	Owen/Teck, Germany
Distribution companies	22
Production locations	5
Technological competence centers	3
Distributors	45
Employees	> 1,200

Product range

- Switching Sensors
- Measuring Sensors
- Safety
- Identification
- Data Transmission
- Network and Connection Technology
- Industrial Image Processing
- Accessories and Supplementary Products



Leuze electronic GmbH + Co. KG

In der Braike 1
73277 Owen
Phone: +49 7021 573-0
Fax: +49 7021 573-199
E-mail: info@leuze.com
www.leuze.com

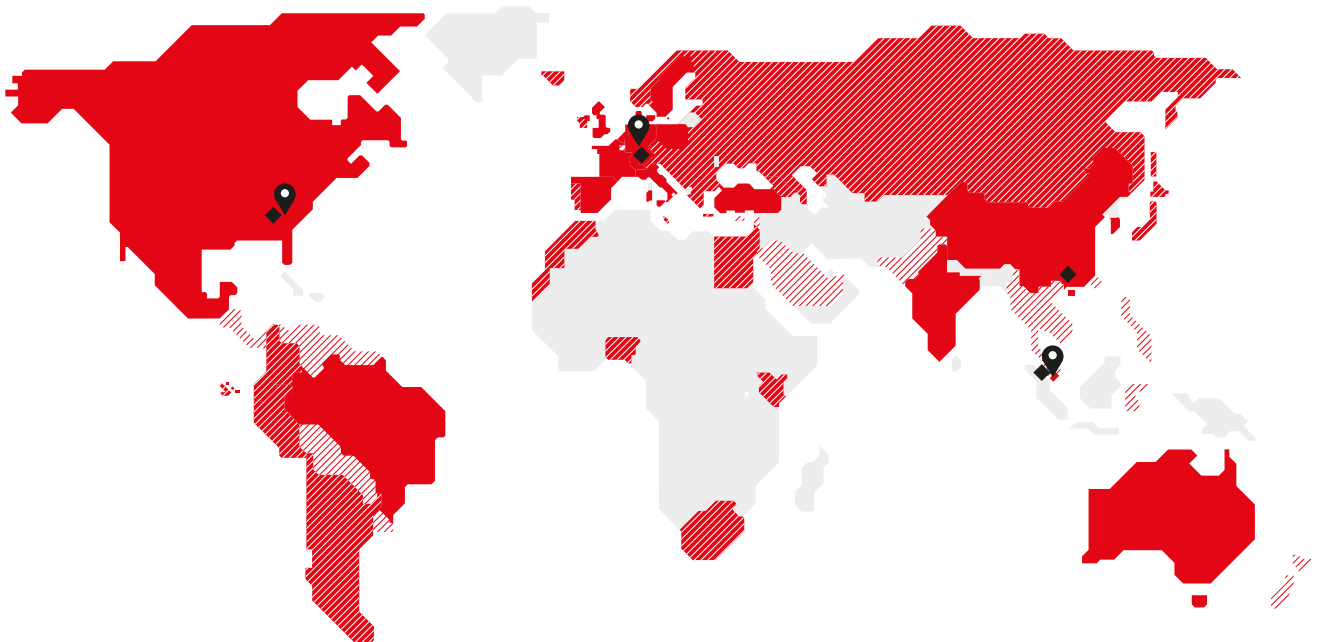




Our locations

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
Duluth/Georgia, USA
Singapore

Production locations

Owen, Germany
Unterstadion, Germany
Duluth/Georgia, USA
Shenzhen, China
Malacca, Malaysia

Distribution companies

Australia/New Zealand	India
Austria	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

Our product range at a glance

Switching Sensors

- Optical sensors
- Inductive sensors
- Capacitive sensors
- Ultrasonic sensors
- Fiber optic sensors
- Fork sensors
- Light curtains
- Special sensors

Measuring Sensors

- Distance sensors
- Positioning sensors
- 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 Sensors
- Secure Locking Devices, Switches and Proximity Sensors
- Safety Controllers 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 add-on products

- Signaling devices
- Mounting systems
- Reflectors



ตัวแทนจำหน่ายอย่างเป็นทางการ



PROPLUS CORPORATION

บริษัท โปรพลัส คอร์ปอเรชั่น จำกัด

Mobile : 099-6103519 | 099-7358459

Email : Sales@propluscorp.co.th

Web : www.Propluscorp.co.th



@propluscorp