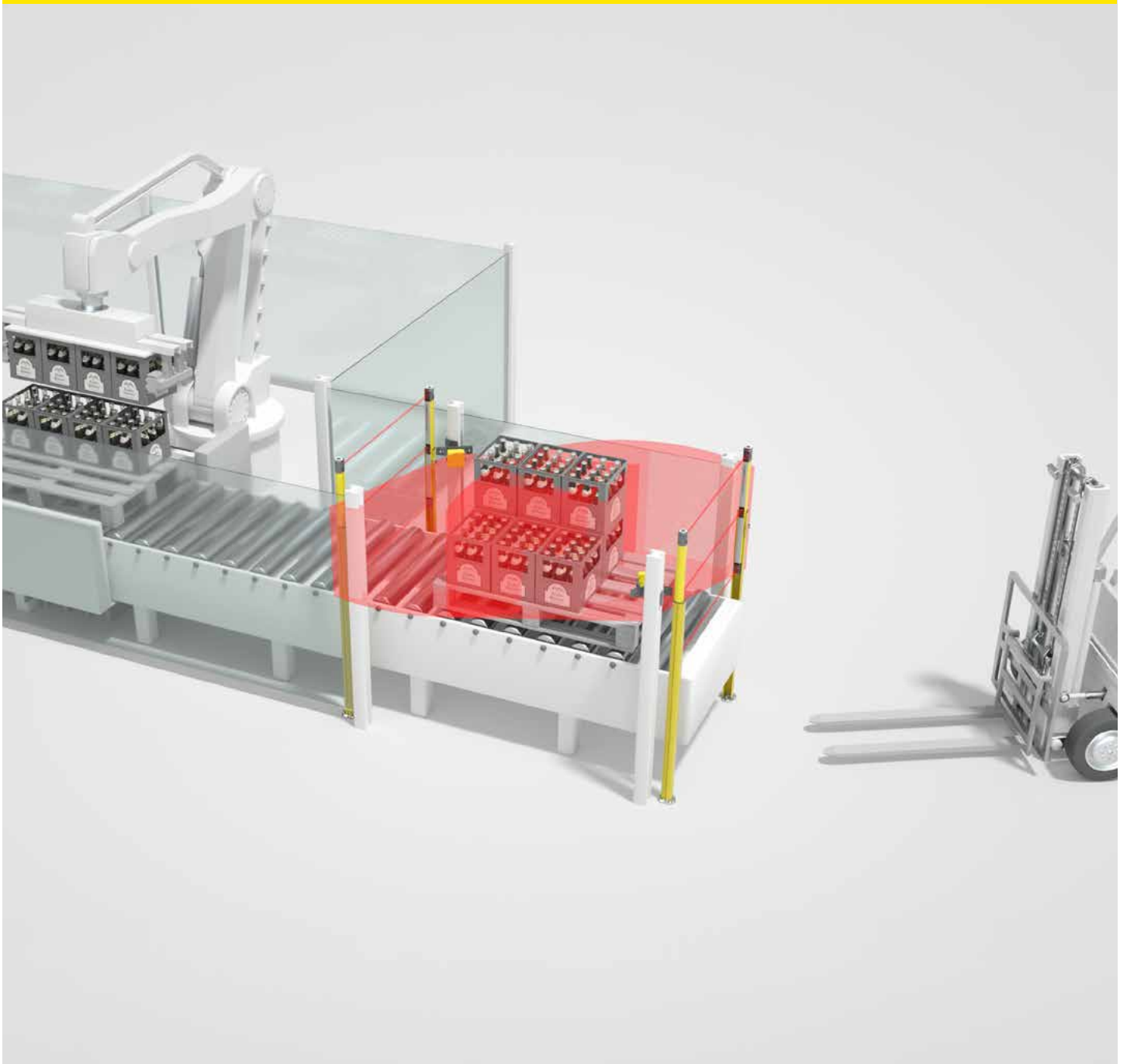


## Safety Solutions

Complete solutions for your systems  
Simple. Safe. Productive.

Safety at Leuze



# Safety Solutions

## Simple. Safe. Productive.

From risk assessment to validation: our safety solutions provide complete solutions for your systems. The innovative safety concepts of our expert teams ensure efficient material flow, gapless safety and high availability of your system. Even in applications where classic concepts are pushed to their limits. Always with legal certainty, CE certification and compliance with standards. This makes implementation extremely easy for you.



### Advantages for you

- Simple for you: 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 implementation

### Benefit from our experience

Innovative ideas are based on experience and know-how. 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 is supported by us in the project until handover:

- Engineering services with parameterization according to project requirements
- Start-up support
- Validation of the safety function



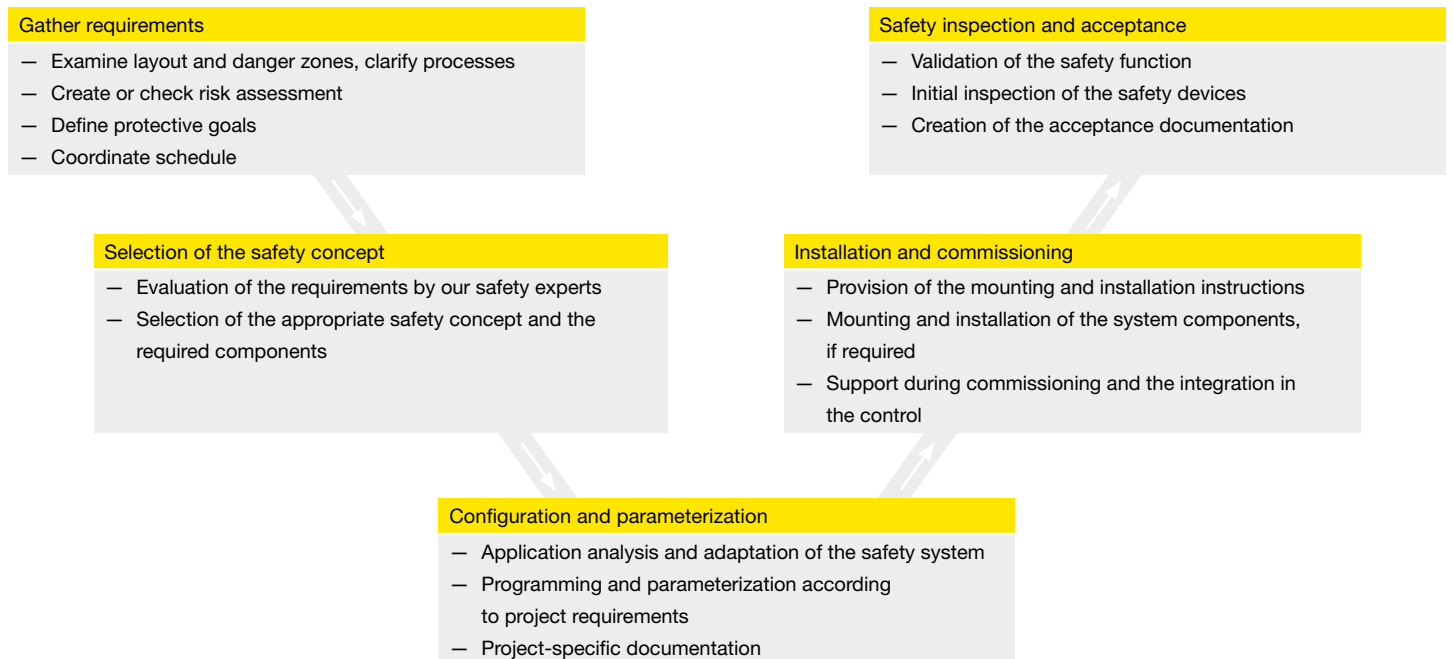
## Hardware and software components

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

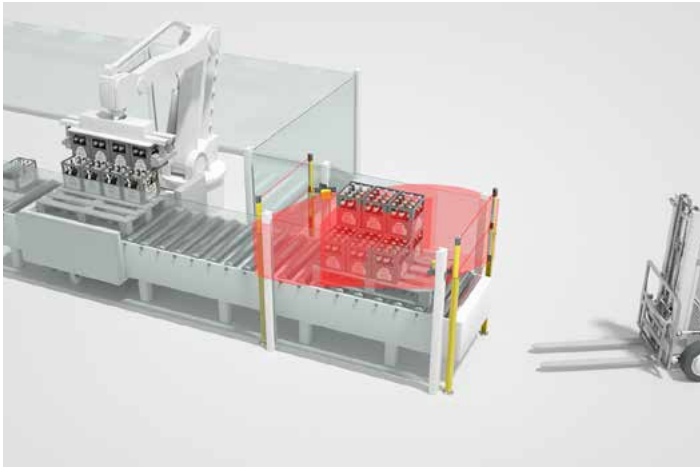


# Safety solutions – examples

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## 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 safeguarded 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 means of safety radar sensors.

### Advantages for you

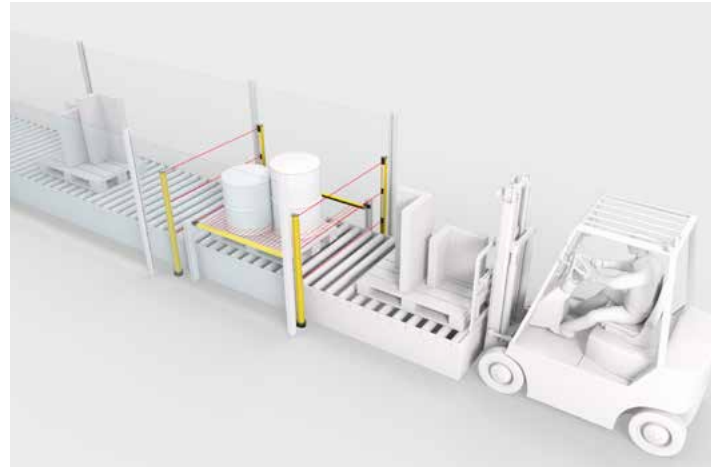
- Higher capacity utilization of the system through interruption-free operation of the robot cell, even during loading
- Infeed of transported goods of any shape or size thanks to an optimized safety concept
- Safe and reliable even under demanding conditions, e.g. with fully loaded or empty pallets
- 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 signalling 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 safeguarded. To ensure optimum utilization of the system, it must be operated without interruption even when the pallets are being transported out.



**Solution:** A safety lock 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

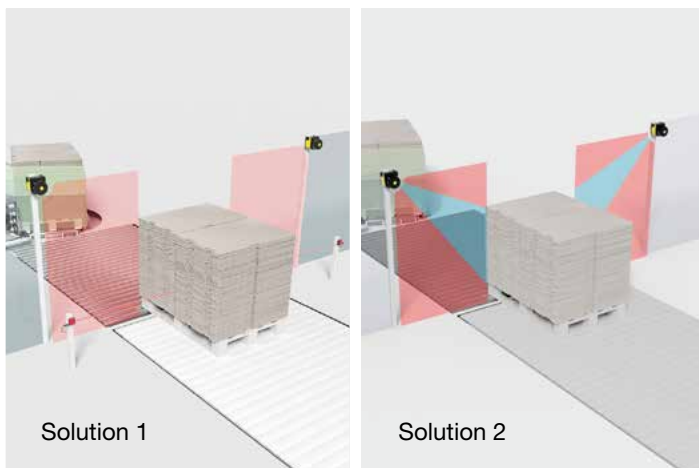
- Flexible safety concept for optimum utilization of the system through interruption-free operation, even with changing loads
- Reliable outward transport of goods of any shape and size as well as partially loaded pallets
- No modifications required in the event of a format change
- No operator intervention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

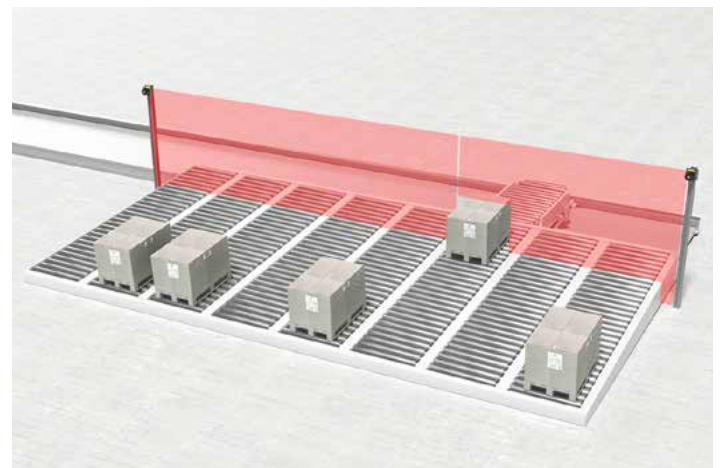
- Continuous monitoring of the entire access area offers gapless safety during the transport cycles
- High reliability and availability
- Optimum protection against manipulation
- Easy to retrofit
- Solution 1: Safety distance to the hazard smaller compared to solution 2
- Solution 2: No additional measuring 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 acc. with ISO 13849-1, SILCL 2 in acc. with IEC 62061
- 2-channel safety output

## Access guarding at 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 should only release the track on which the pallet is output.



**Solution:** Access guarding takes place via two vertically oriented safety laser scanners. From the system control, the safety system receives the information about the track onto which the pallet is output and adapts the protective field for the passage of the pallet 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 9 m
- Gapless safety during the transport cycles
- High reliability and availability
- Optimum protection against manipulation
- No additional trigger sensors necessary
- Easy to retrofit

### System components and safety parameters

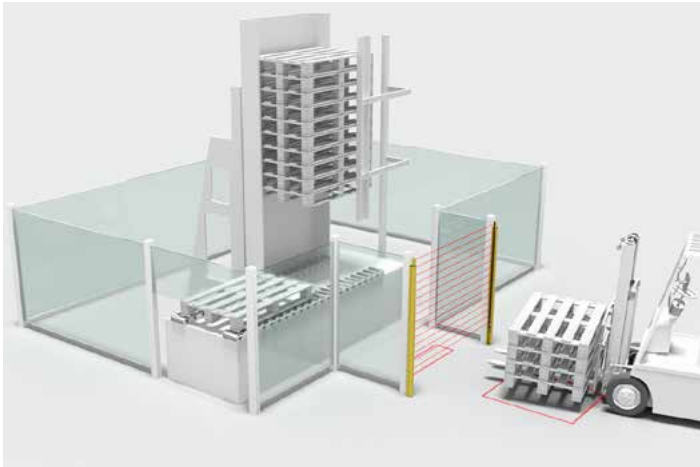
- Safety sensors: RSL 400 laser scanner
- System control: Leuze MSI 400
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

# Safety solutions – examples

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## Access guarding at 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. The safety system can thereby distinguish between forklift truck and persons.

### Advantages for you

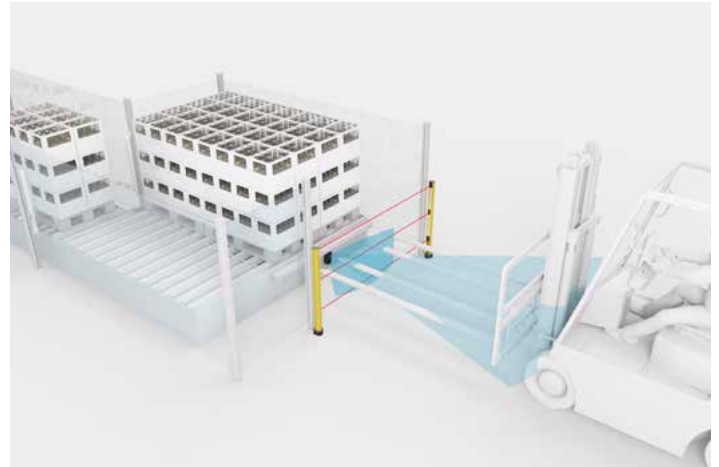
- Optimum system utilization through automatic restart of the machine without manual operator interventions
- High reliability and availability
- Low service costs
- Optimum protection against manipulation
- Simple integration in the safety circuit of the primary control

### 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 ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

## Access guarding at pallet grouper / de-grouper

**Requirement:** Pallet groupers and de-groupers must be safeguarded 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 safeguarded 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

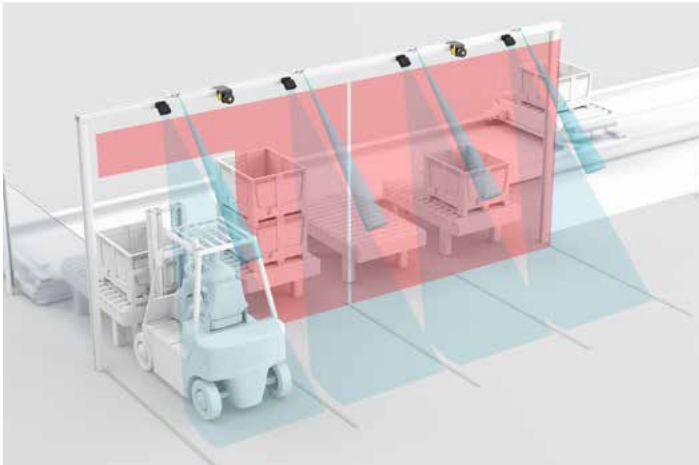
- Optimum system utilization through automatic restart of the system without manual operator intervention
- High reliability and availability with optimum protection against manipulation
- No components need to be installed in the floor
- Low service costs
- Simple integration in the safety circuit of 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 should 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 provide this information to the safety system. The safety system appropriately adjusts the protective field 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 protection against manipulation

### System components and safety parameters

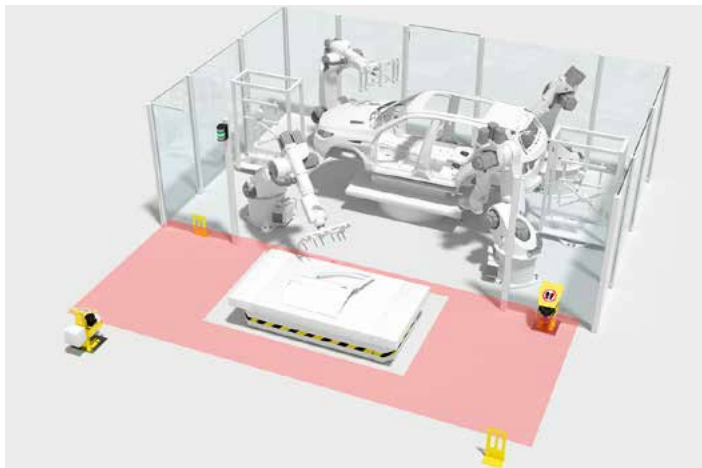
- Safety sensors: RSL 400 laser scanner
- Monitoring sensors: ultrasonic and radar sensors
- System control: Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1,  
SILCL 2 in accordance with IEC 62061
- 2-channel safety output

# Safety solutions – examples

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## Safeguarding of robot / AGV transfer station

**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

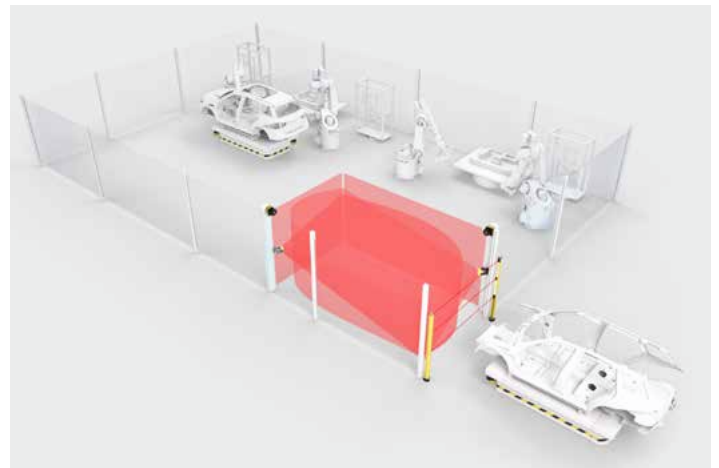
- Monitoring for the entry and presence of persons
- Gapless safety during the entire cycle
- No restrictions during part transfer, e.g., for parts that protrude at the front or side
- Autonomous system, simple safety integration

### 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 lock for access guarding

**Requirement:** The extensive danger zone must be safeguarded 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 lock 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 lock 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

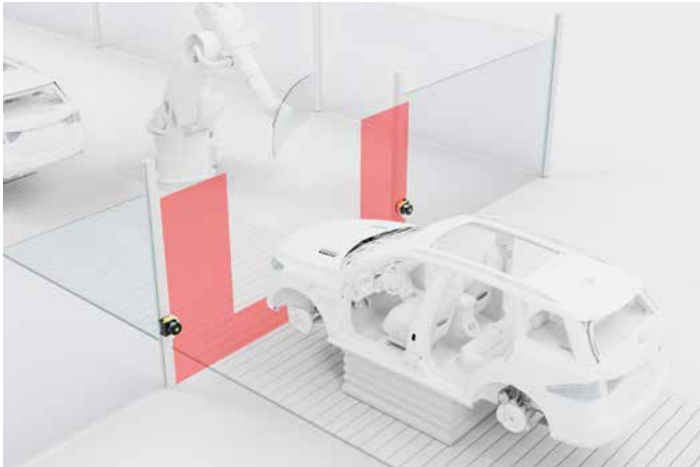
### System components and safety parameters

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



## Access guarding at skid transfer area

**Requirement:** The infeed and outfeed interfaces at skid transfer areas must be safeguarded against access by persons. The safety concept must allow different body variants to be transported. Persons moving alongside the skid 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 protection against manipulation, the protective device cannot be bypassed unconsciously
- Easy to retrofit

## System components and safety parameters

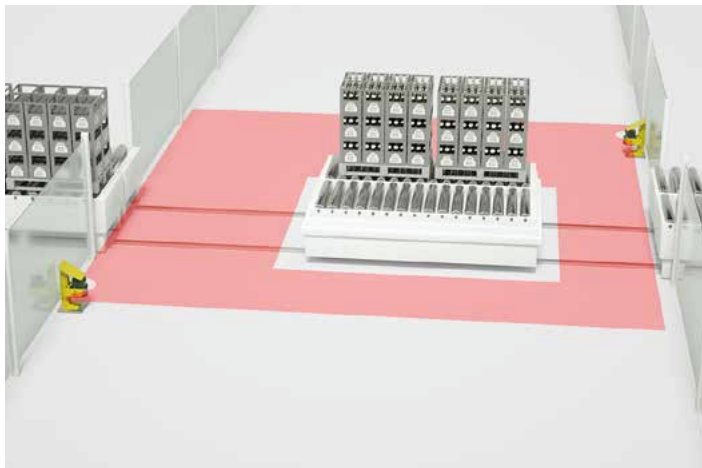
- Safety sensor: RSL 400 safety laser scanner
- System control: MSI 400 safety control or Siemens SIMATIC S7
- Leuze safety program
- PL d in accordance with EN ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

# Safety solutions – examples

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## Safeguarding of traffic area when transfer car is crossing

**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 should, 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 contour of the skate is dynamically blanked out of the protective fields. The entire area thereby remains optimally protected at all times.

### Advantages for you

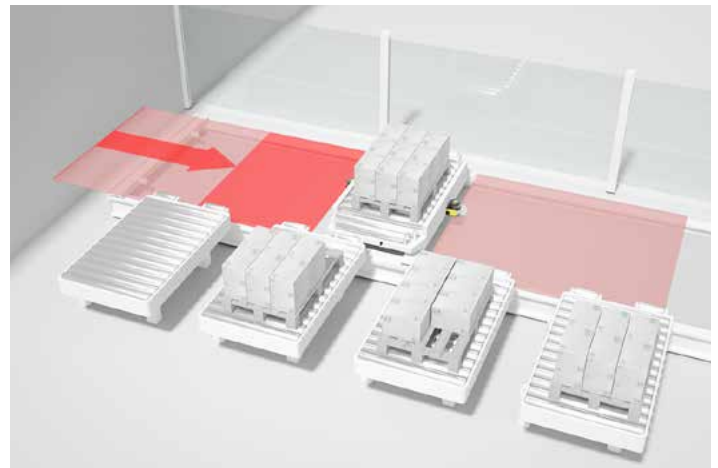
- Monitoring for the entry and presence of persons
- Gapless safety during the entire process
- No restrictions during part transfer – even parts that protrude are possible
- Autonomous system with simple integration in the safety circuit of the primary control

### 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 ISO 13849-1, SILCL 2 in accordance with IEC 62061
- 2-channel safety output

## Area guarding at transfer shuttles

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



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

### Advantages for you

- Improvement of the safety concept across the entire travel range of the transfer shuttle without any reduction in system performance
- The autonomous systems can each be easily integrated into the system control via a two-channel safety output
- Easy to retrofit, minimal mechanical installation requirements
- Also for the operation of 2 skates in one aisle

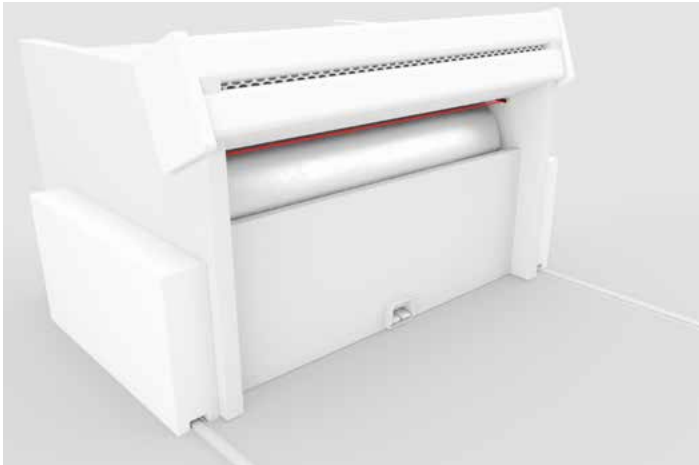
### System components and safety parameters

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

## Safeguarding of feed points at 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, such as by using a footswitch. In addition to the selected operating mode, the feed point should be protected from fingers/hands reaching in.



**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 identifies 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

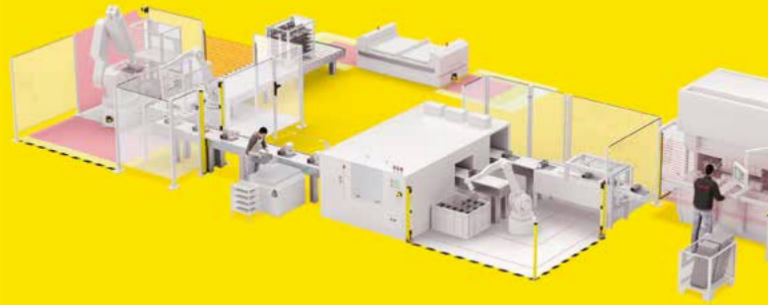
- Save time and money with our pre-developed and process-optimized safety solutions
- Safe monitoring of the feed area of printing machines avoids dangers when inserting
- Gapless safety during the insertion process
- High reliability and availability
- Easy to retrofit

### System components and safety parameters

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

# Safety from a single source

Our high-quality products, intelligent solutions as well as competent technical services form the basis of our safety portfolio. 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.



## Safety components



Safety laser scanners



Safety light curtains / with Smart Process Gating



Multiple light beam safety devices / with muting



Single light beam safety devices



Safety radar sensor



Safe bar code positioning system



Safety switches and safety proximity sensors



Safety locking devices



Safety PLCs and relays



Safety command devices, tower lights

## Safety services



Risk assessment  
Hazard assessment



Safety concept  
Safety design



Verification & validation



Inspection of protective devices



Stopping time measurement