SOLUTIONS FOR PACKAGING SYSTEMS

SSP

Safety System Products

RFID sensors   S. 4

Light curtains IP69K

Process guard locking devices   S. 8

Protective enclosures   S. 38

Operational units   S. 36
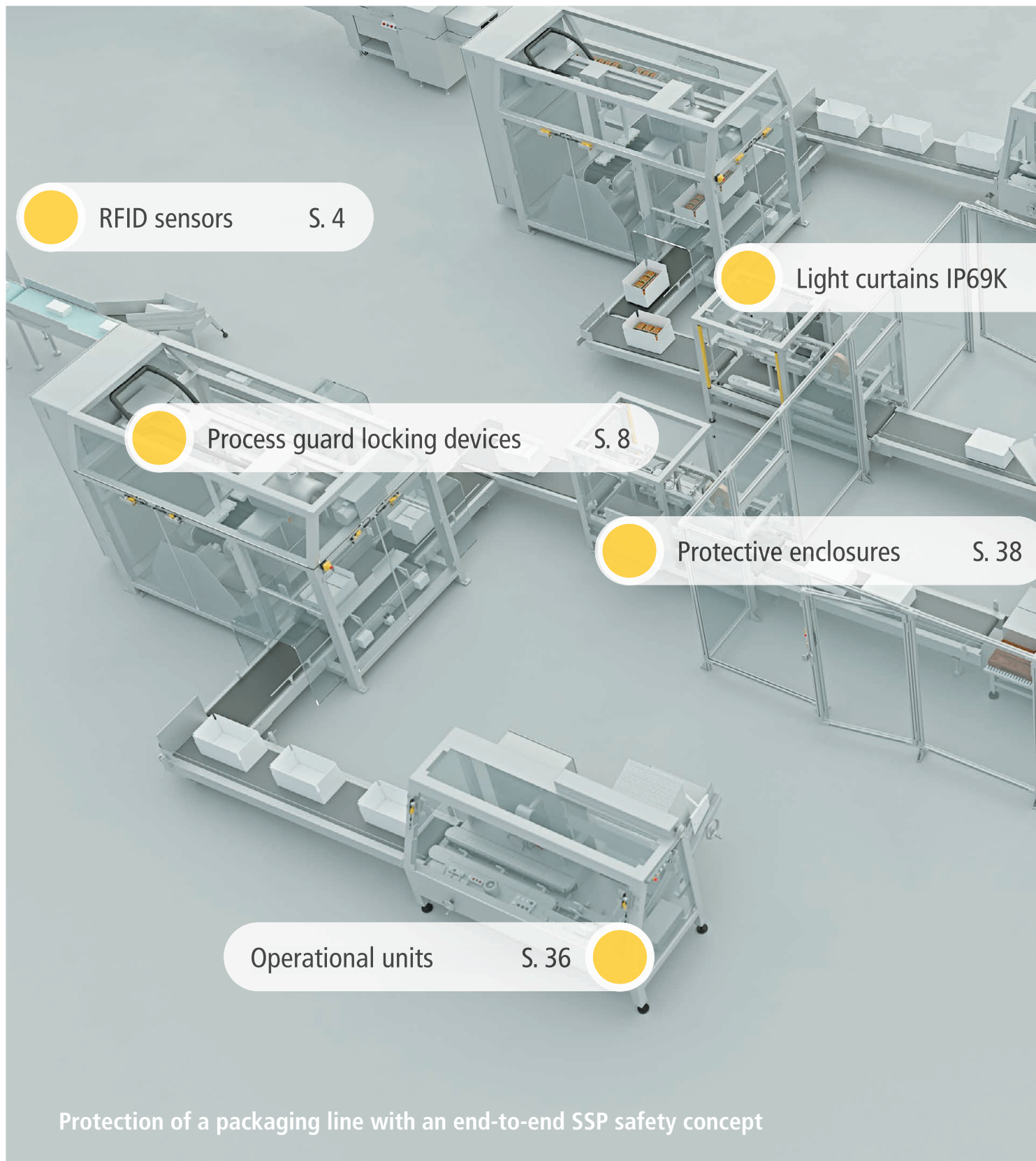
Protection of a packaging line with an end-to-end SSP safety concept

**Reach your goal faster with intelligent safety technology**

The packaging industry has complex and frequently changing requirements for safety technology. Economical, simple and customized solutions for both individual safety applications and entire lines.

SSP
Safety System Products

Rolling gates   S. 40

S. 14

Wireless safety   S. 32

Interlocking function   S. 18

Muting   S. 15
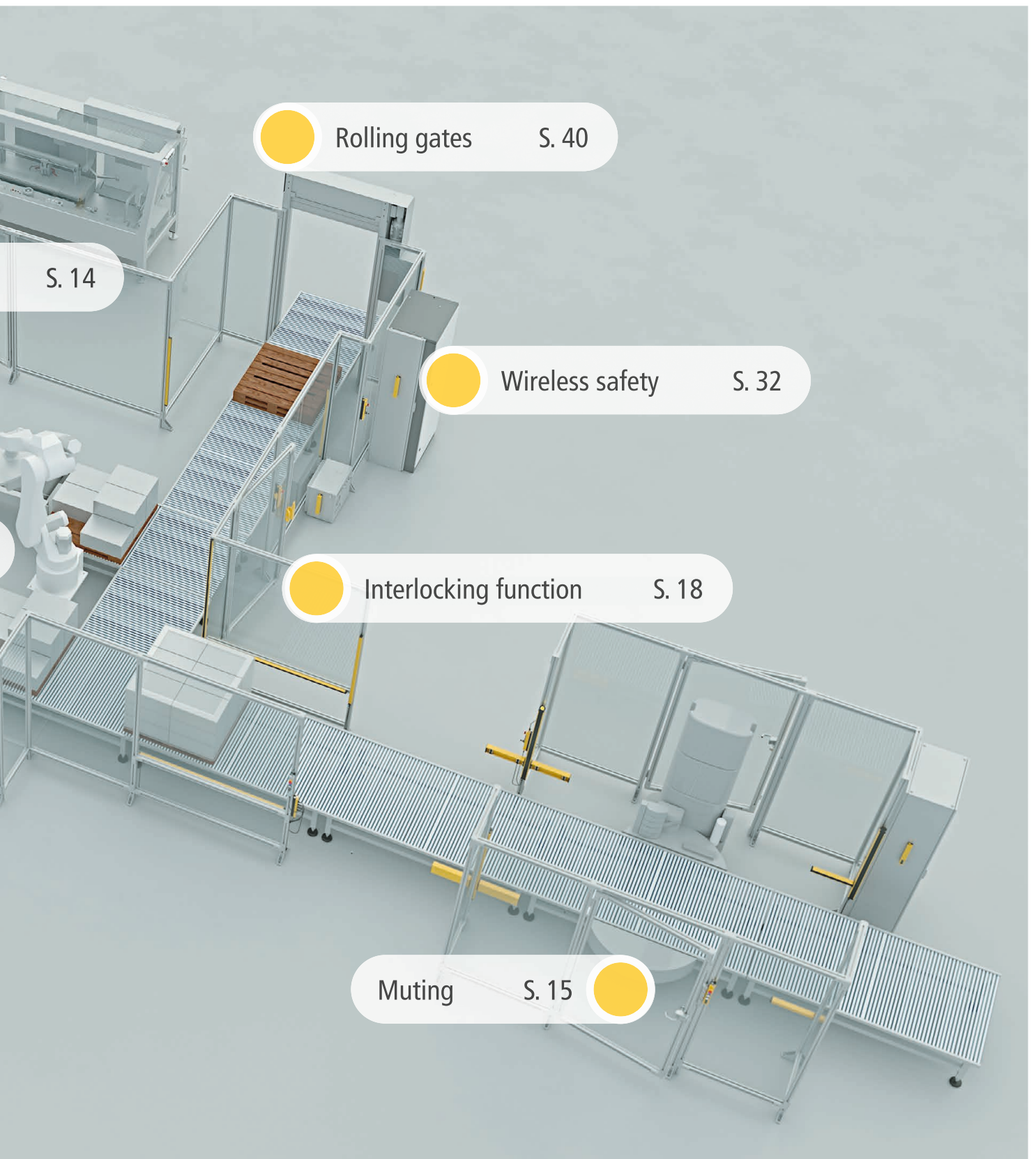
SSP offers a broad portfolio of safety components designed specially for the packaging industry. These include fast RFID safety sensors, robust guard lockings for personal or process protection, light curtains that are resistant to moisture and cleaning agents, safety controls for interlinked systems and enabling switches for setup functions.

SAFIX 3 - fast RFID sensors
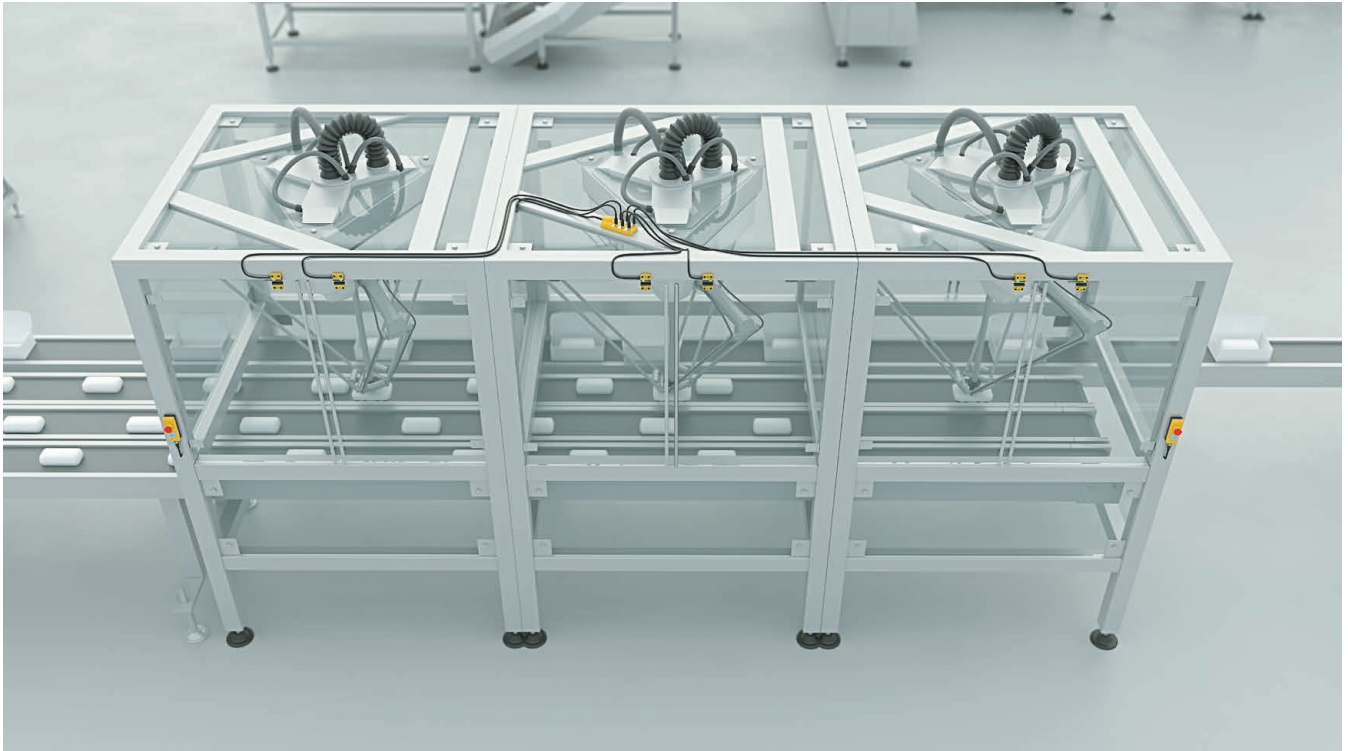
Example for the protection of a packaging plant with the RFID sensors SAFIX 3

intelligent and safe door monitoring

Non-contact RFID safety sensors are used whenever it is possible to open a door at any time. However, the prerequisite for this is that the system quickly comes to a standstill or that the required safety distance can be maintained. Therefore, short reaction times and a fast and flexible wiring concept are often one of the most important requirements.
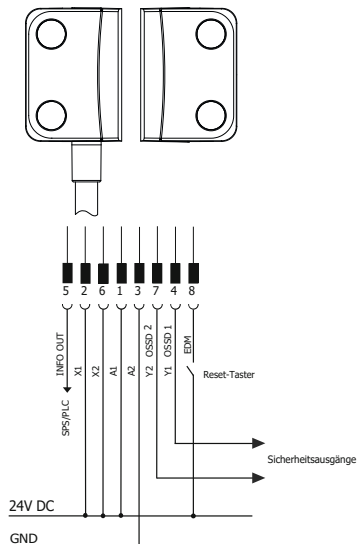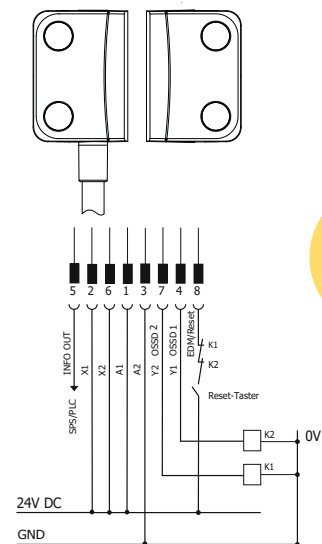
Electrical connection

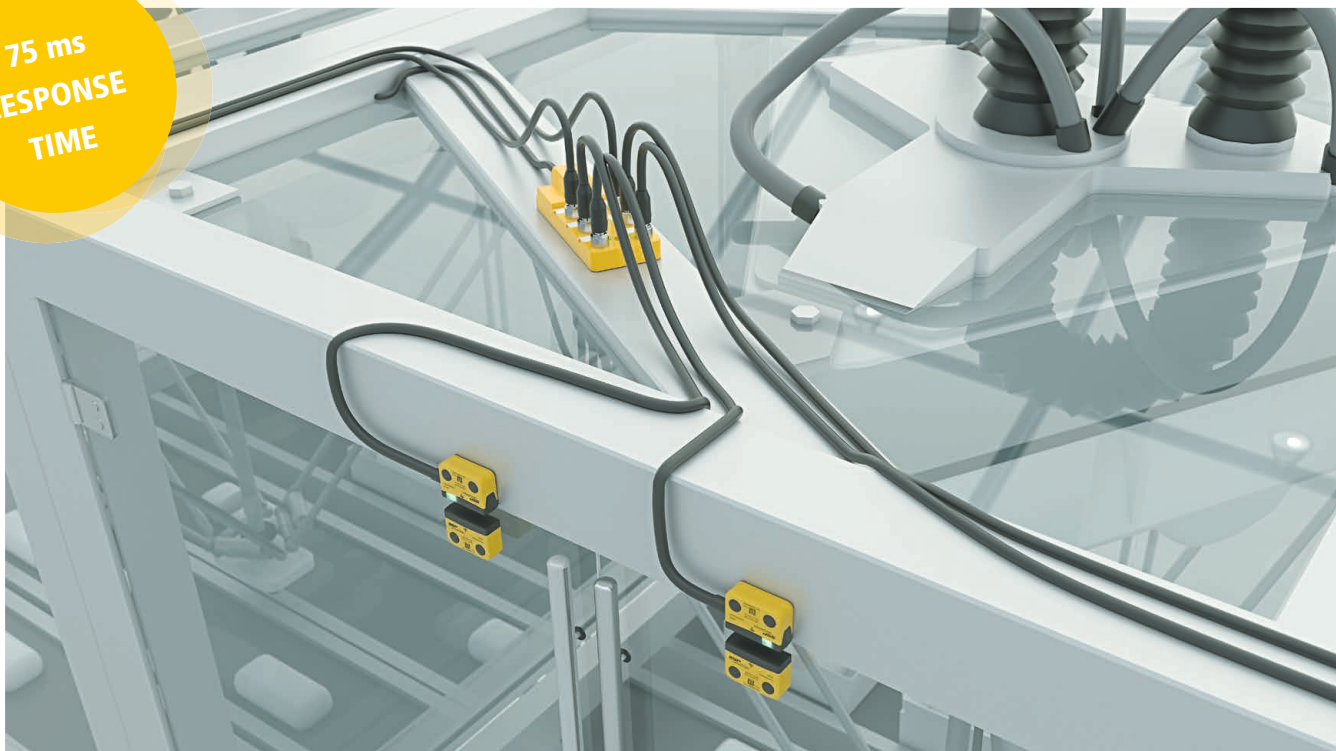SAFIX 3 _-A-_ _
Automatic reset
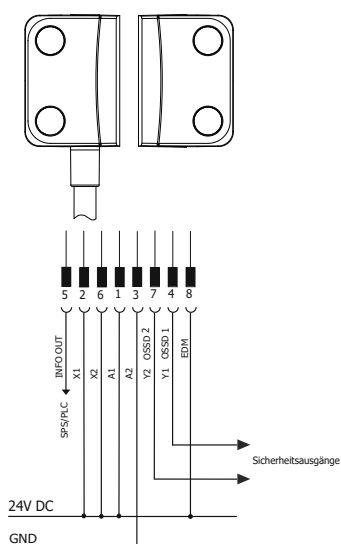
SAFIX 3 _-X-_ _
Manual reset

SAFIX 3 _-X-_ _
Manual reset + EDM

INTEGRATED EDM FUNCTION

SSP
Safety System Products

75 ms RESPONSE TIME

SAFIX 3 sensors with XCONN passive junction

Wide range of safety applications

✓ PLe acc. to EN ISO 13849-1:2016

✓ High coded acc. to EN ISO 14119:2013

✓ Series connection of up to 30 sensors without loss of safety

✓ Response time only 75 ms

✓ Integrated EDM function with manual or automatic reset (no safety relay required)

Flexible in assembly and wiring

✓ High protection classes IP67 and IP69K for use in harsh environments, ECOLAB approval

✓ Flexible wiring concept with the XCONN passive junction or wireless-distributor

✓ Connections via fixed 5 m and 10 m cable or M12 pigtail connector

✓ Extended LED diagnosis

Waterproof housing

Resistant to cleaning agents

Flat actuator SAFIX T6

DID YOU KNOW...

... how important fast response times of RFID sensors are and how does the response time affect the distance to the danger point?

The standard EN ISO 13855:2010 describes the arrangement of protective devices with regard to the approach speed of human bodies. The minimum distance of a guard without guard locking to the first dangerous movement is therefore calculated as shown in the following diagram.

$$S = K \cdot T$$

S = Distance to danger point   **K** = Constant = 1600 mm/s   **T** = Total time to standstill

Example calculations of the response time

» In the following calculations we would like to show you an example of how the reaction time of RFID safety sensors can affect the distance to the danger point (without series connection).

Example RFID safety sensor SAFIX 3 or process guard locking HOLDX R	**Example of standard RFID safety sensor or process guard locking**
Switch-off delay (toff) actuator to OSSD output: max. 75 ms	Switch-off delay (toff) actuator to OSSD output: max. 260 ms
$S = 1600\ mm/s \cdot 75\ ms$ $\qquad$ $S = 120\ mm$	$S = 1600\ mm/s \cdot 260\ ms$ $\qquad$ $S = 416\ mm$
The response time of 75 ms alone results in a safety distance of 120 mm. For very precise calculation, you must add the response time of the evaluation unit (e.g. safety controller) and the overrun to standstill.	The calculation shows that by using a response time of 260 ms, a safety distance of 412 mm is already maintained. This is 292 mm more than in the previous calculation. This can be an important factor for the design of a machine.

» If safety sensors are connected in series, the reaction time of switching off the inputs must also be taken into account in the calculation. In the following example, 24 sensors are connected in series.

Example RFID safety sensor SAFIX 3 or process guard locking HOLDX R	**Example of standard RFID safety sensors or process guard locking devices**
1 x Switch-off delay (toff) actuator to OSSD output: max. 75 ms	1 x Switch-off delay (toff) actuator to OSSD output: max. 260 ms.
23 x switch-off delay (toff) inputs max. 3 ms	23 x switch-off delay (toff) inputs max. 20 ms
$T = 75\ ms + 23 \cdot 3\ ms$ $\qquad$ $T = 144\ ms$	$T = 260\ ms + 23 \cdot 20\ ms$ $\qquad$ $T = 720\ ms$
$S = 1600\ mm/s \cdot 144\ ms$ $\qquad$ $S = 230.4\ mm$	$S = 1600\ mm/s \cdot 720\ ms$ $\qquad$ $S = 1152\ mm$
For correct calculation, you must also add the response time of the evaluation unit (e.g. safety controller) and the overrun to standstill.	

Smart process guard locking HOLDX R1

Case erector with process guard locking HOLDX RS1

Protecting processes and humans

The smart HOLDX R process guard locking protects packaging systems from unintentional opening. The integrated RFID safety sensor ensures the safety of the system, while the electromagnet keeps the door closed and thus protects automated processes. The integrated RFID safety sensor meets the highest performance level PLe according to EN ISO 13849-1:2016. An integrated Bluetooth interface and extended LED diagnosis enable smart operation and fast diagnosis. With the variants RS (small, 600 N locking force) and RL (large, 1200 N locking force), two variants are available for a wide range of applications.

Advantages of Bluetooth diagnosis

✓ Has a guard locking been manipulated (wrong actuator)?

✓ How often a new actuator has been trained?

✓ How often was a door torn open even though it was locked?

✓ Storage of valuable information such as:

- Short circuit

- Loose contact in the cable

- Wrong actuator

- Voltage fluctuation

- B_{10D}-value of downstream actuators

SSP
Safety System Products

Process guard locking HOLDX RS1 on a sliding door, tGard operational unit for controlling the system

Advantages in the application

✓ PLe acc. to EN ISO 13849-1:2016

✓ Series connection of up to 30 guard locking devices HOLDX R1 without loss of safety

✓ High coded acc. to EN ISO 14119:2013

✓ Wear-free process guard locking

✓ Response time only 75 ms

✓ Locking force of 600 N or 1200 N

✓ Extended LED diagnosis

✓ Diagnostics via the integrated Bluetooth interface

✓ One diagnostic output provides up to 17 messages

✓ Functional modules for evaluation of the diagnosis are available for Siemens, Beckhoff and Rockwell

✓ Two designs for different installation situations

Electrical connection
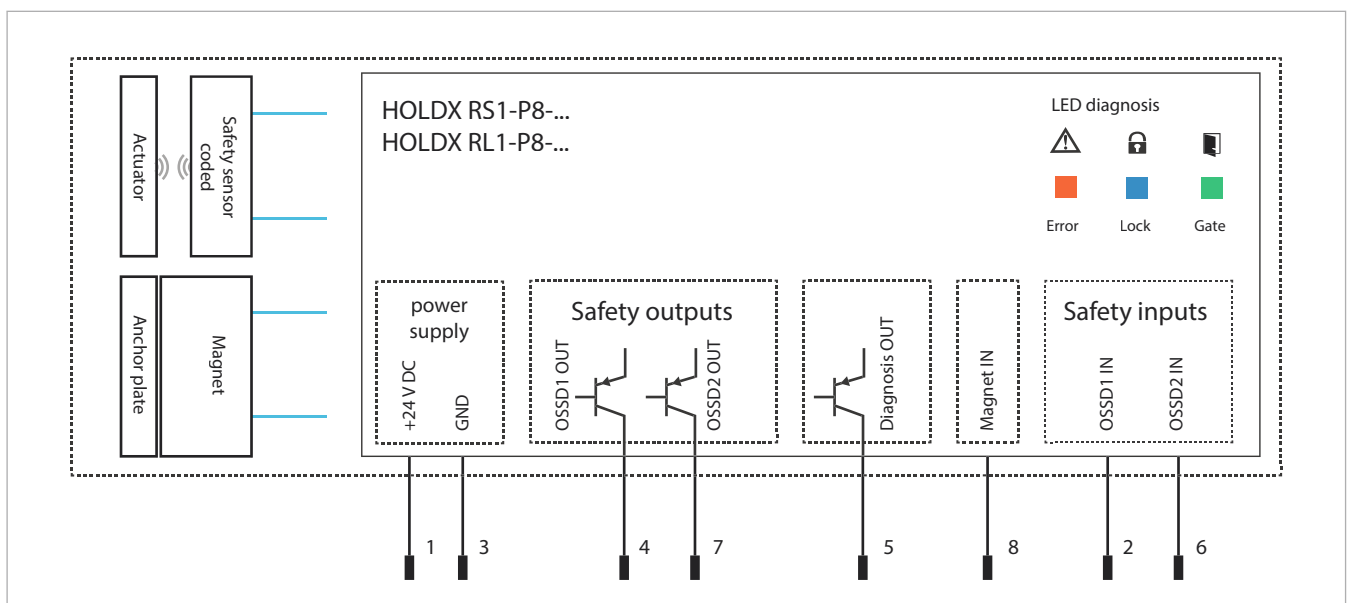
The smart process guard locking HOLDX R2

Packaging machine with six process guard locking devices HOLDX RS2, intelligently connected in series

Smart series connection with several doors

Packaging machines often have many doors so that easy access to the machine is guaranteed during set-up mode or for maintenance purposes. More than ten doors in a safety circuit are not uncommon. The smart HOLDX R2 process guard locking was developed for exactly this kind of applications.

Thanks to an intelligent and simple wiring concept, up to 30 HOLDX R2 can be easily connected in series without giving up the diagnosis options. This allows individual evaluation of each participant without the need for an additional gateway. It is also possible to evaluate the information from the HOLDX R2 on any commercially available control unit. SSP offers ready-to-use functional modules for controllers from Siemens, Beckhoff, Rockwell and B&R. Thus, the HOLDX R2 provides more than 300 pieces of information for diagnosis on the control unit.

Extensive diagnosis

✓ Door opened/closed

✓ Door locked

✓ Dirty or poorly adjusted

✓ Manipulation of RFID sensors has taken place (values are stored)

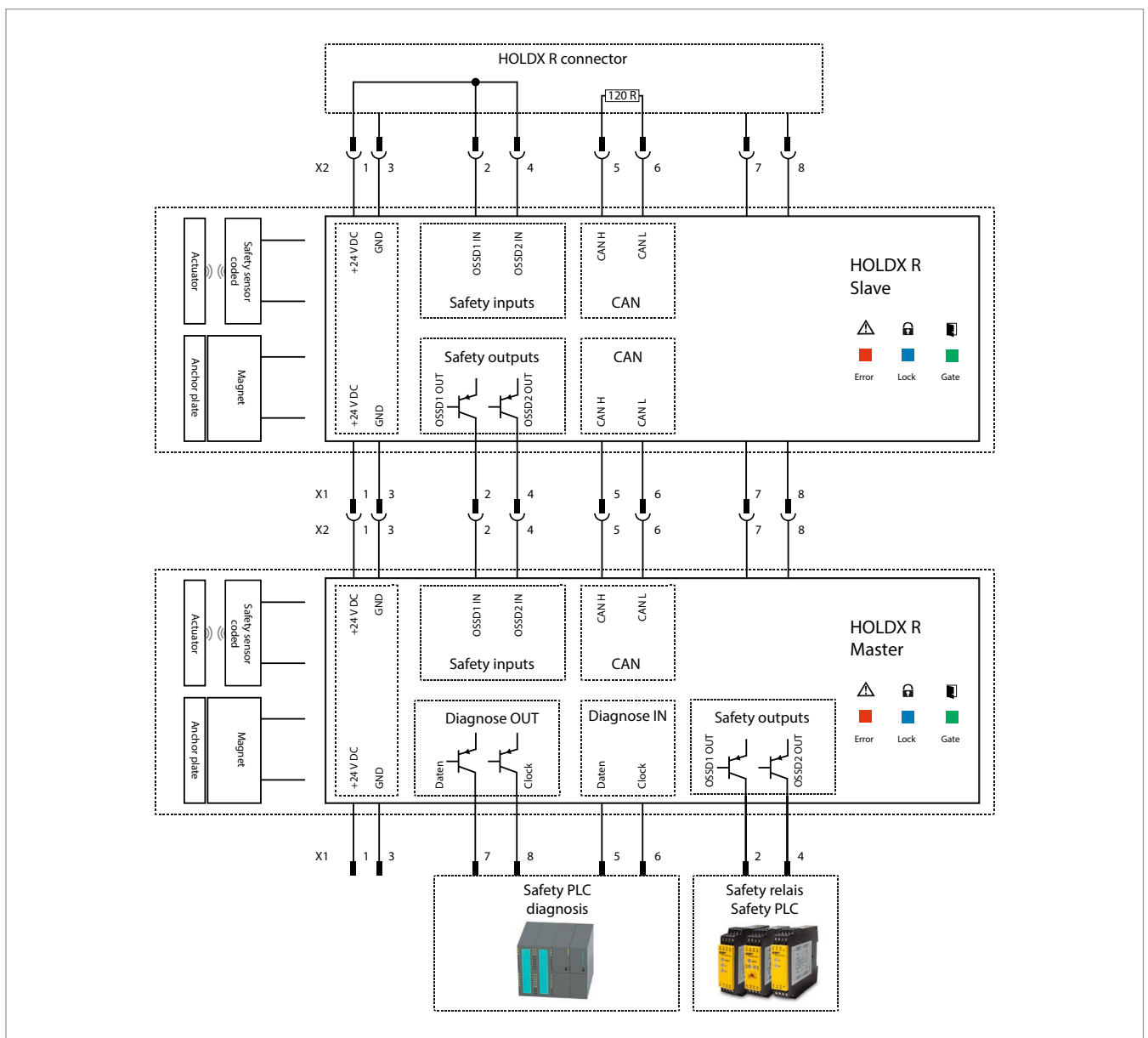✓ Short-circuit in input or output circuit

Advantages in the application

✓ High locking force of up to 1200 N

✓ PLe acc. to EN ISO 13849-1:2016

✓ Series connection of up to 30 guard locking devices without loss of safety

✓ No gateway required for diagnosis and communication with the higher-level PLC

✓ Single information signals of each HOLDX R2 available

✓ Locking force of 600 N or 1200 N

Simple series connection HOLDX RS2 thanks to Y-pigtail cable

Electrical connection for series connection

HOLDX R connector

120 R

X2   1   3   2   4   5   6   7   8

| Actuator | Safety sensor coded |
| Anchor plate | Magnet |

+24 V DC | GND | OSSD1 IN | OSSD2 IN | CAN H | CAN L

Safety inputs   CAN

HOLDX R
Slave

⚠ 🔒 📄
Error Lock Gate

Safety outputs   CAN

+24 V DC | GND | OSSD1 OUT | OSSD2 OUT | CAN H | CAN L

X1   1   3   2   4   5   6   7   8
X2   1   3   2   4   5   6   7   8

| Actuator | Safety sensor coded |
| Anchor plate | Magnet |

+24 V DC | GND | OSSD1 IN | OSSD2 IN | CAN H | CAN L

Safety inputs   CAN

HOLDX R
Master

⚠ 🔒 📄
Error Lock Gate

+24 V DC | GND | Diagnose OUT | Diagnose IN | Safety outputs

Daten | Clock | Daten | Clock | OSSD1 OUT | OSSD2 OUT

X1   1   3   7   8   5   6   2   4

Safety PLC
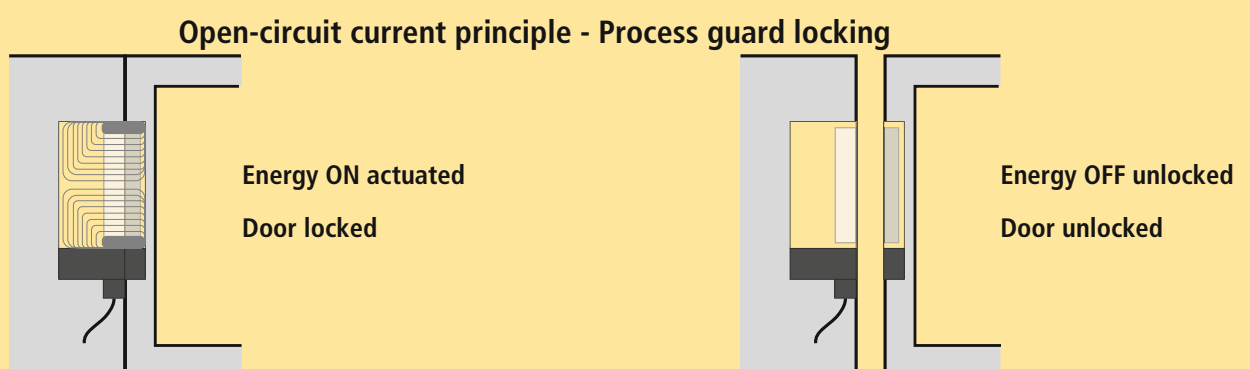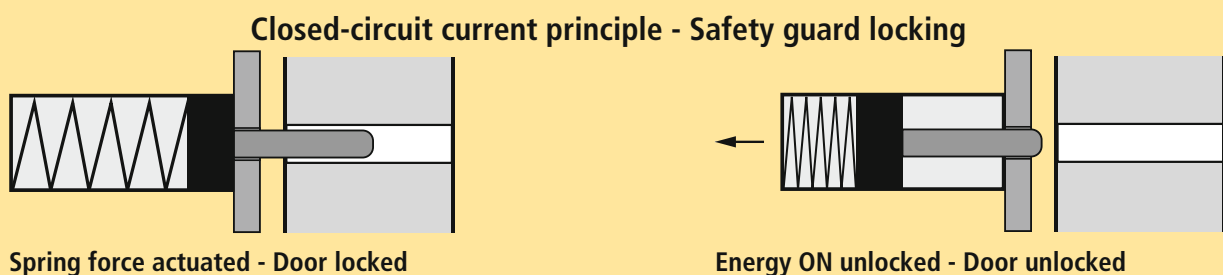diagnosis

Safety relais
Safety PLC

DID YOU KNOW...

... what is the difference between a process guard locking and a safety guard locking?

DIN EN ISO 14119:2014 describes the function of an interlocking guard with guard locking. Its purpose is to hold a guard in the closed position so that:

- the machine cannot be in operation if the protective device is not closed and locked;
- the guard remains locked until there is no longer any risk of injury.

Due to these requirements, it is important to differentiate between a process guard locking and a safety guard locking, because there are significant differences in the mode of operation. While a **process guard locking** is open without voltage according to the open-circuit current principle, a **safety guard locking** works according to the **closed-circuit current principle** and is therefore closed without voltage, as the actuator is held in place by spring force. On the other hand, an electromagnet is used for a process guard locking. The door, or a similar access, is thereby kept closed by magnetic force.

If the magnet is no longer energized, the process guard locking can open immediately. For example, if the system loses power due to a power failure, the door could be immediately opened while movements inside the system are still running out. For this reason, the run-down time as well as the calculation of the safety distance to the danger point (see page 6/7) must always be taken into account when process guard locking devices are used. In simplified terms, it can be said that safety guard locking devices are used for systems with a long run-down time and process guard locking devices are used for systems with a short run-down time. Specifically, the C standard for packaging machines, DIN EN 415-5:2010-04 in Section 5.2.2.1.7, defines the stopping time more precisely. If the system comes to a standstill within one second after opening the guard, a process guard locking can usually be used.

Closed-circuit current principle - Safety guard locking

Spring force actuated - Door locked

Energy ON unlocked - Door unlocked

Open-circuit current principle - Process guard locking

Energy ON actuated

Door locked

Energy OFF unlocked

Door unlocked

ATOM safety guard locking

ATOM safety guard locking, connected to the wireless safety controller Safety Simplifier

Safe guard locking with RFID coding

The compact and robust ATOM safety guard locking can be used for all applications in which doors and flaps of the system or machine must be locked in a safety-related manner. With high locking force and additional RFID coding, it can be used up to PLe. The flexible actuator can be used in tight radii and can correct misalignment, e.g. due to door misalignment. Self-monitoring OSSD outputs can be connected directly to the safety controller or to the safety relay. A version with 2 x M12 plugs is also available for series connection.

Advantages in the application:

✓ Extremely small design

✓ Flexible actuator

✓ 7500 N locking force

✓ High RFID coding acc. to DIN EN ISO 14119:2014-03

✓ PLe acc. to DIN EN 13849-1:2016-06

✓ OSSD outputs

✓ Series connection possible

✓ LED diagnosis

✓ 14 mm offset possible

Safety light curtains EOS4

EOS4 safety light curtain for efficient protection of danger points during cyclic accesses

Safe intervention

Light curtains are often used on packaging machines to protect hazardous areas where frequent intervention is necessary. Thanks to its slim design, the EOS4 (PLe) light curtain from REER is particularly suitable for applications in tight spaces. The fast response times of the EOS4 safety light curtains enable a compact design of the plant. The integrated LED display allows the transmitter and receiver to be positioned quickly and safely. The light curtain is also configured via the pin assignment, the use of programming software or DIP switches is not required.

Advantages in the application

✓ Compact design of just 28 x 30 mm

✓ LED diagnosis and contamination indicator

✓ Use in dump environments IP65 - IP67

✓ Optional IP69K in waterproof housings

✓ Temperature range from -30°C to +50°C

✓ No one-sided blind range

LED diagnosis

✓ Fault diagnosis

✓ Contamination indicator

✓ Alignment control
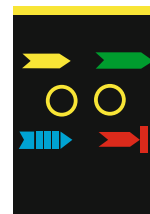
Light curtains EOS4 WT in the food and pharmaceutical packaging industry

The waterproof housing makes it possible to use the light curtains or light grids under harsh conditions where water and steam occur. In addition, the protective housings can also be used in the food and beverage industry due to the use of hygienic and non-toxic components, as they are ideally suited for packaging or filling systems. The compact, cylindrical EOS WTF and WTHF protective housing (only 56 mm diameter) is IP69K rated and can withstand a water jet with a pressure of up to 80 bar at a temperature of 80°C. The housing has a venting membrane which allows any moisture present in the housing to escape, thus reducing the formation of condensation. The WTHF models (with heating) have a thermo-controlled heating system to enable applications in environments down to -30°C.

Venting membrane avoids start-up in the event of temperature fluctuations

Protection tube complies with IP69K and has ECOLAB approval

Built-in heating enables use at temperatures down to -30°C

Adjustable stainless steel clamps

Simple, standard-compliant muting solutions with SAFEGATE

T-Muting with M5 multi-beam sensors for complex charges and partial muting

Secure loading and unloading of pallets and packages

Muting plays a decisive role in conveying and storage technology or in palletizing and strapping systems in order to transfer goods in and out. The temporary bypass of a safety function (muting) has high normative requirements. The SAFEGATE muting light curtain from REER significantly simplifies the standardization-compliant use.

Simplification of standardization requirements

✓ Muting technology integrated in the light curtain

✓ Fixed muting arms guarantee the normatively correct position of the muting sensors

✓ Inputs for partial muting meet standard requirements for different delivery heights

✓ Additional input for starting the muting reduces the possibility of manipulation

Optimization of the application

✓ Less connections in TRX version because transmitter and receiver are in one housing

✓ 5-beam muting sensors detect different materials to be conveyed

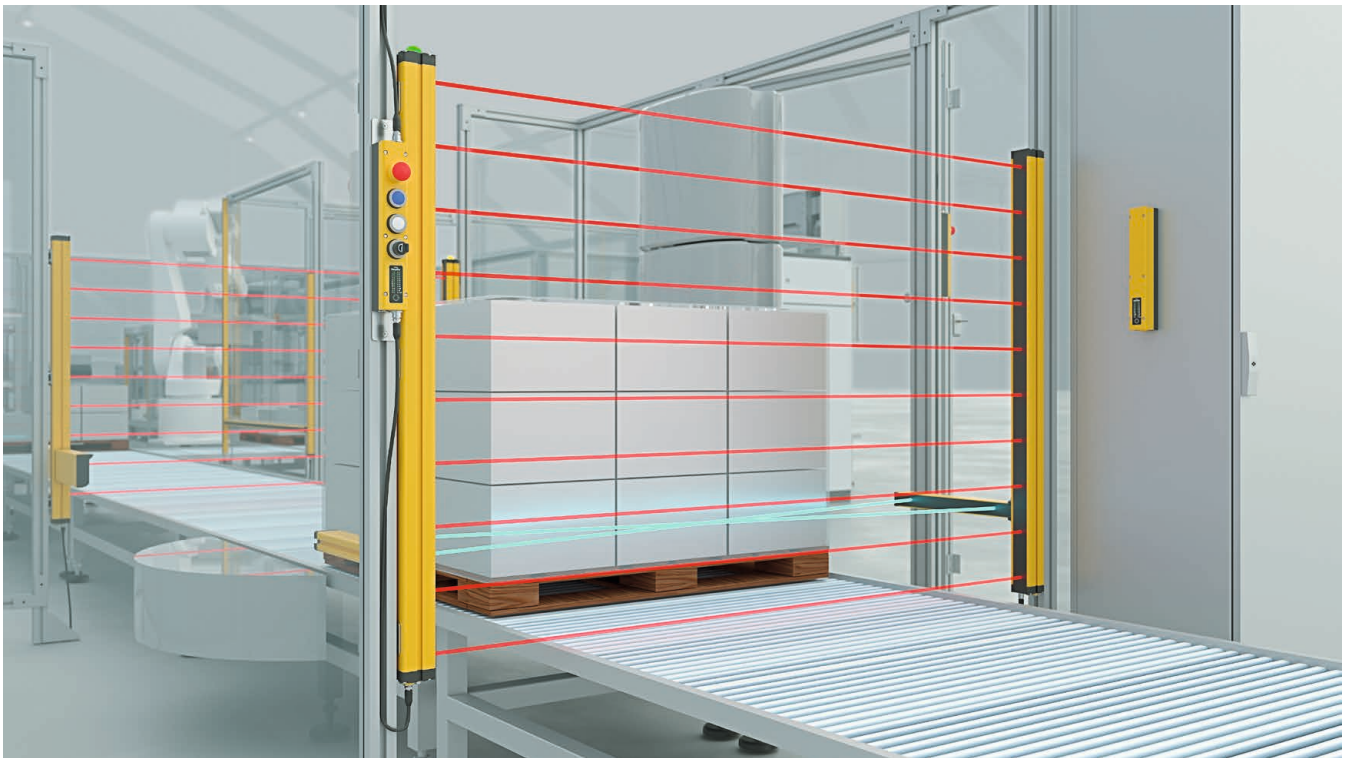✓ Muting sensors with clear glass detection for process-reliable detection of transparent objects

LED diagnosis

✓ Fault diagnosis

✓ Contamination indicator

✓ Alignment control

PRG ●	● COM
CLR ●	◯ ⇥
MUT ●	● OVR
S 1 ●	● S 2
S 3 ●	● S 4

SSP
Safety System Products

SAFEGATE muting light curtain
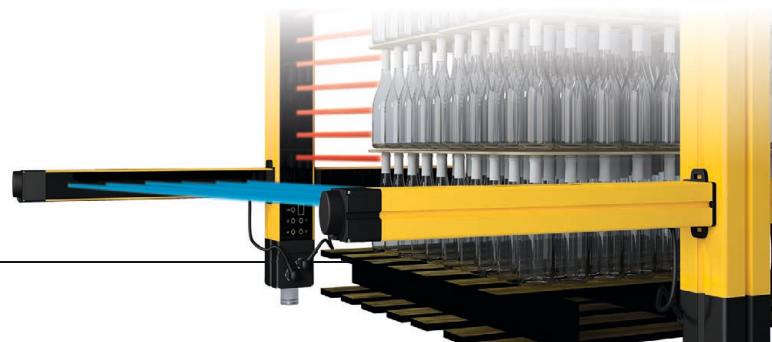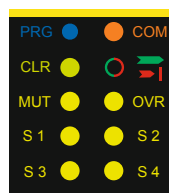
L-muting for unloading of pallets with crossed muting sensors

Muting light curtain and sensors with a PFHd value

For muting applications, a performance level must be determined or calculated in the functional safety for muting light beams and the corresponding muting sensors. REER provides this PFHd value directly for light curtains and muting sensors. In this way, the user receives a complete system without complex calculation of the PFHd value. Cross and parallel muting for L and T arms are available for various applications.

Override in case of malfunction

Wireless safety controller Safety Simplifier ensures safe evaluation of the OSSD signals. Various functions such as override enable the light curtain to be safely retracted and bypassed in the event of a malfunction.

LEDs for status and muting indication

Connections of the muting sensors
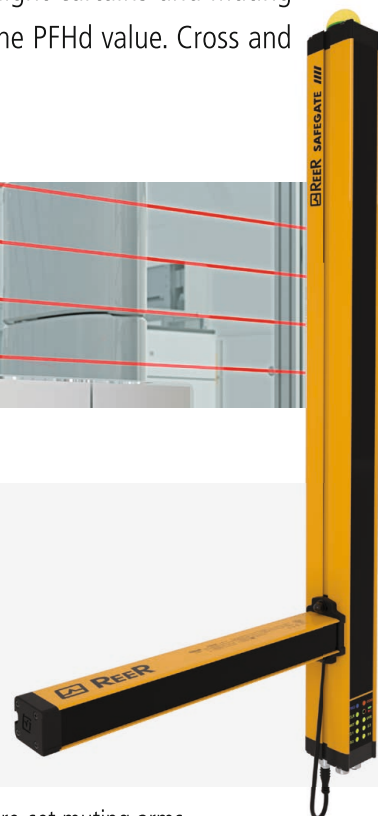
Pre-set muting arms

DID YOU KNOW...

... what are the security requirements for ESPD systems to secure the loading and unloading of products?

When it comes to the safety of packaging machines, experienced designers appreciate the Type C series of standards DIN EN 415. The ten parts of this standard describe a large number of requirements for machines. Currently these are:

DIN EN 415-1:2014	Terminology and classification of packaging machines and related equipment
DIN EN 415-3:1999+A1:2009	Forming, filling and closing machines
DIN EN 415-5:2006	Wrapping machines
DIN EN 415-6:2013	Pallet wrapping machines
DIN EN 415-7:2006+A1:2008	Group packing machines
DIN EN 415-8:2008	Strapping machines
DIN EN 415-9:2009	Noise measurement methods for packaging machines, packaging lines and auxiliary equipment - Accuracy classes 2 and 3
DIN EN 415-10:2014	General requirements

The various machines are usually closed systems that operate fully automatically. In order to transport products and materials into and out of the safety area, non-contact protective devices are used, especially for larger openings, which are controlled by corresponding safety functions. It must be ensured that products and materials can be transported in and out without persons being able to enter the danger zone undetected through these openings. One way to protect such openings is to bypass or hide the ESPD system. This function is also called muting.

DIN EN 415-10:2014, Section 5.2.1.4 places corresponding requirements on the function of such systems, as the following abbreviated copy shows.

(a) The bypass period shall be limited to a period which is only long enough to allow the product to pass through the detection zone.

(b) The configuration of the bypass sensors shall be capable of distinguishing a person from the material;

c) All bypass functions must have the same performance level;

d) There must be no operational waiting position for a product within the bypass area.

For further details, DIN EN 415-10:2014 refers to DIN EN IEC 62046:2019.

Section 5.5.3 requires the bypass function to be automatically initiated and terminated. This can be done by using appropriately selected and arranged sensors or, in some cases, signals from the safety-related control system. No bypass condition shall be made possible by faulty signals, sequences or timing of the bypass sensors or signals.

The control circuit performing the bypass function must have a suitable safety-related performance level (SIL or PL, see DIN EN 62061:2016 or DIN EN 13849-1:2016).

In addition, the safety of the machine during muting must be ensured by other means, for example by maintaining the following lateral distances and by ensuring that the load is at least 900 mm high.

If the requirements described above do not guarantee safety, other solutions may be used, such as interlocking function.

Systems with two beams

L-configuration with time control of the sensors (only run out of the danger zone)
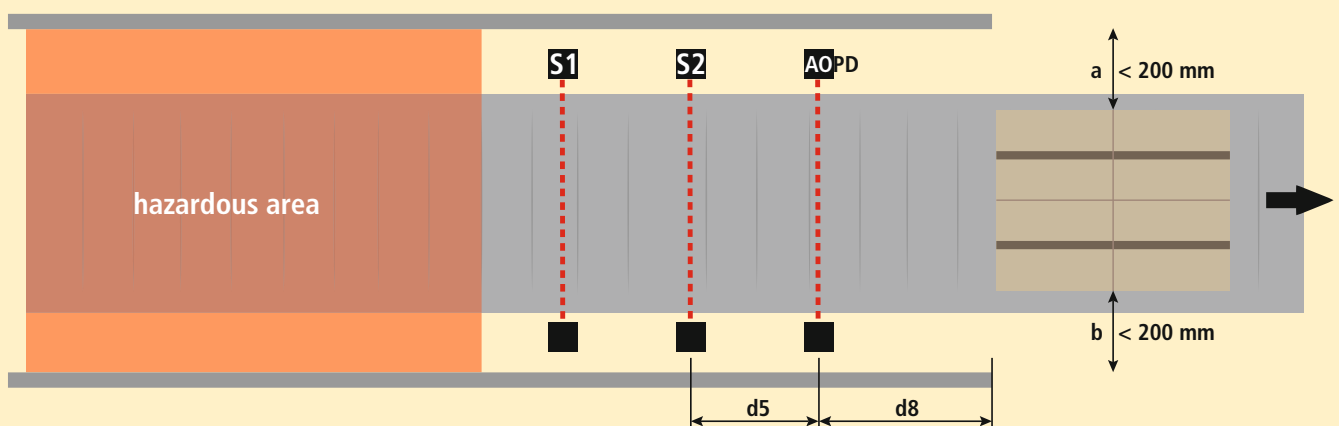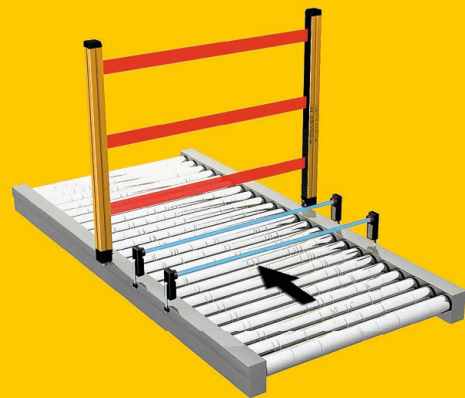

- Both sensors must be within the danger zone
- Both beams must be used within a certain period of time
- If the electrosensitive protecting device is free or 4 seconds passed after leaving the first sensor, muting must be deactivated
- If the termination only occurs after 4 seconds, an additional **distance d8** must be met.

Systems with two beams

T-configuration with time control of the sensors

for inward and outward transfer from the danger area.

a	< 200 mm
b	< 200 mm

500 mm

d5 <= 200 mm
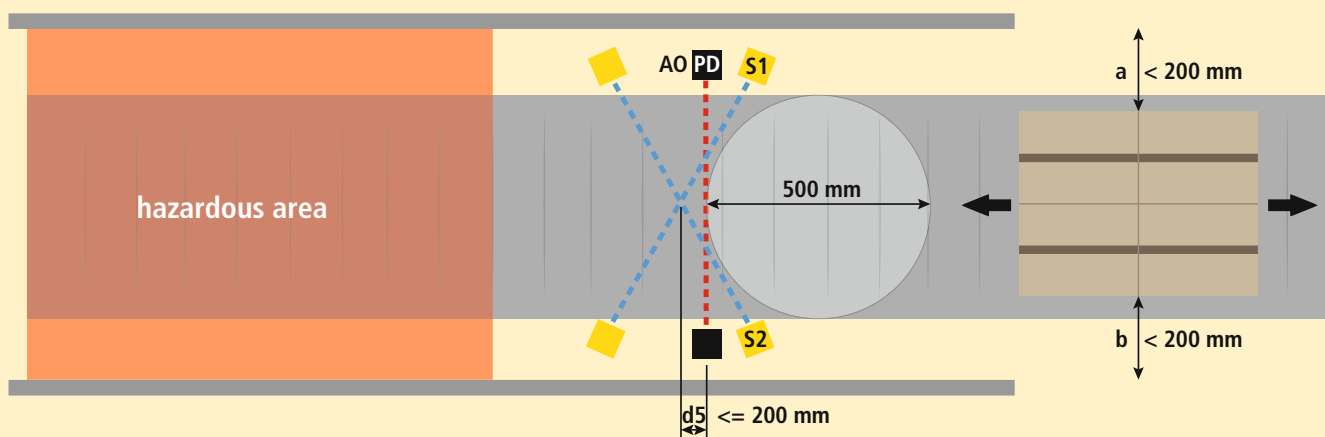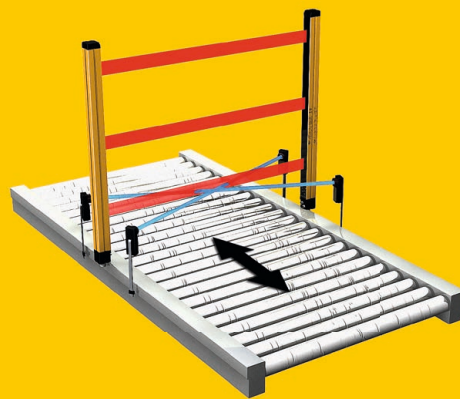
- The intersection point must be within the danger zone.
- The intersection point should be as close as possible to the ESPD ($\leq$ 200 mm)
- The distance between the load and the guard should not exceed 200 mm
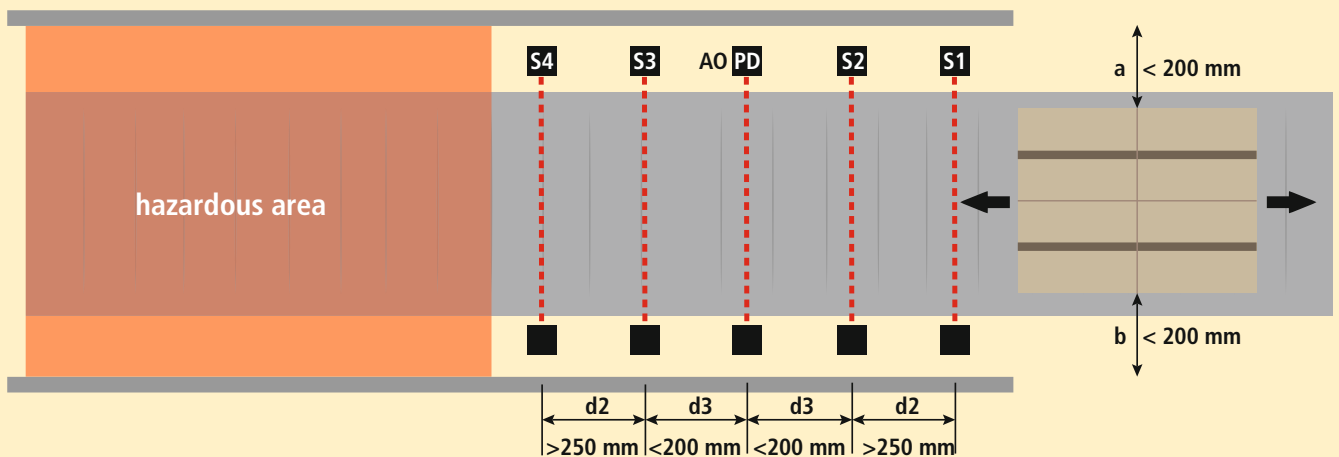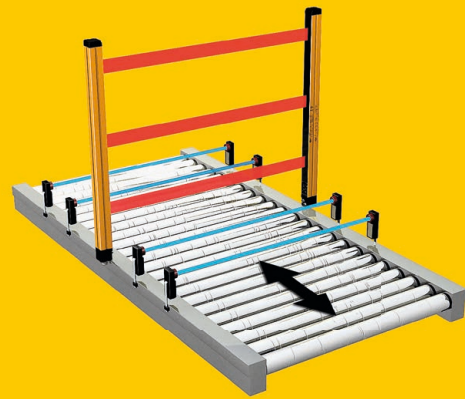- A round test piece of 500 mm must not trigger muting.
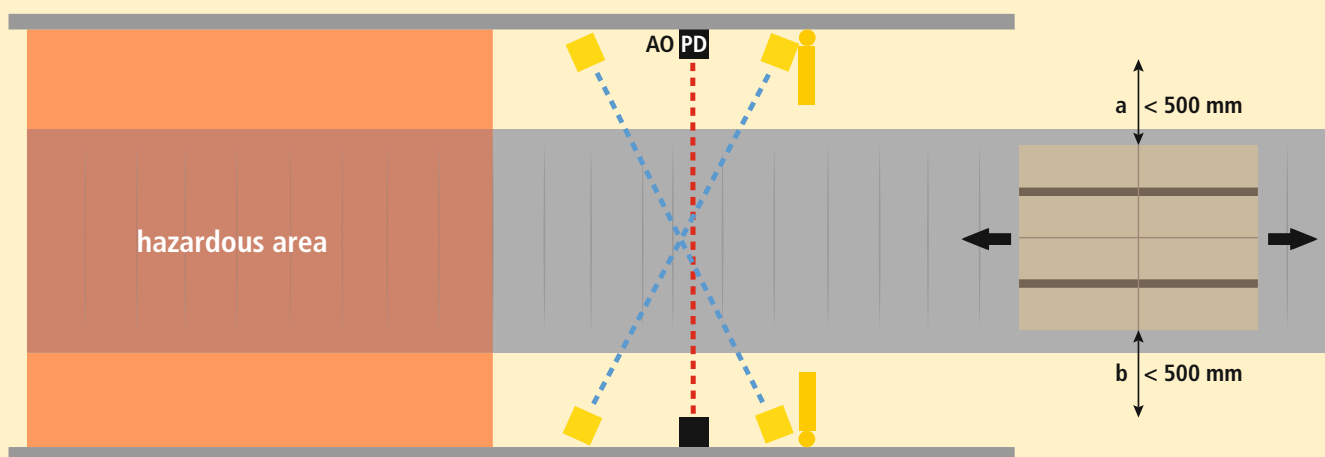
a	< 500 mm
b	< 500 mm

- If there is a risk of body parts being crushed between the load and stationary parts, DIN EN 349:2008 recommends a minimum distance of 500 mm between the moving load and the stationary parts of the system to avoid the risk of crushing or shearing. Further details are given in EN 349.

Systems with four beams

T configuration with sequential process

for inward and outward transfer from the danger area.

- The muting sensors should be as close as possible to the "ESPD" (distance < 200 mm)
- The distance between sensors S1 and S4 must be greater than 500 mm
- The distance between sensors S1 and S2 and between sensors S3 and S4 must be greater than 250 mm
- The distance between the load and the guard should not exceed 200 mm.
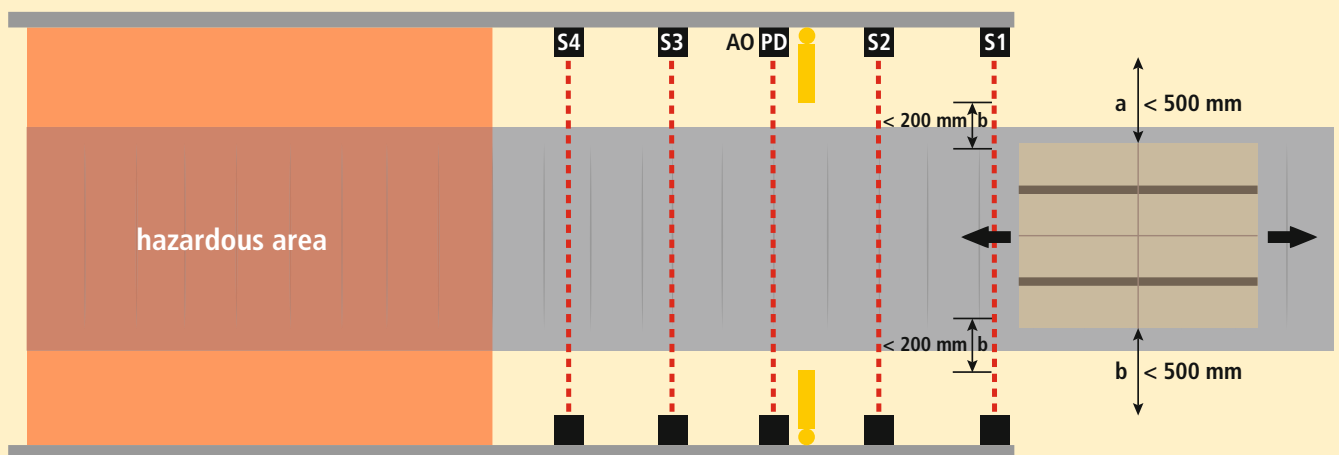
- If there is a risk of body parts being crushed between the load and stationary parts, DIN EN 349:2008 recommends a minimum distance of 500 mm between the moving load and the stationary parts of the system to avoid the risk of crushing or shearing. Further details are given in EN 349.

Safety Simplifier interlocking function

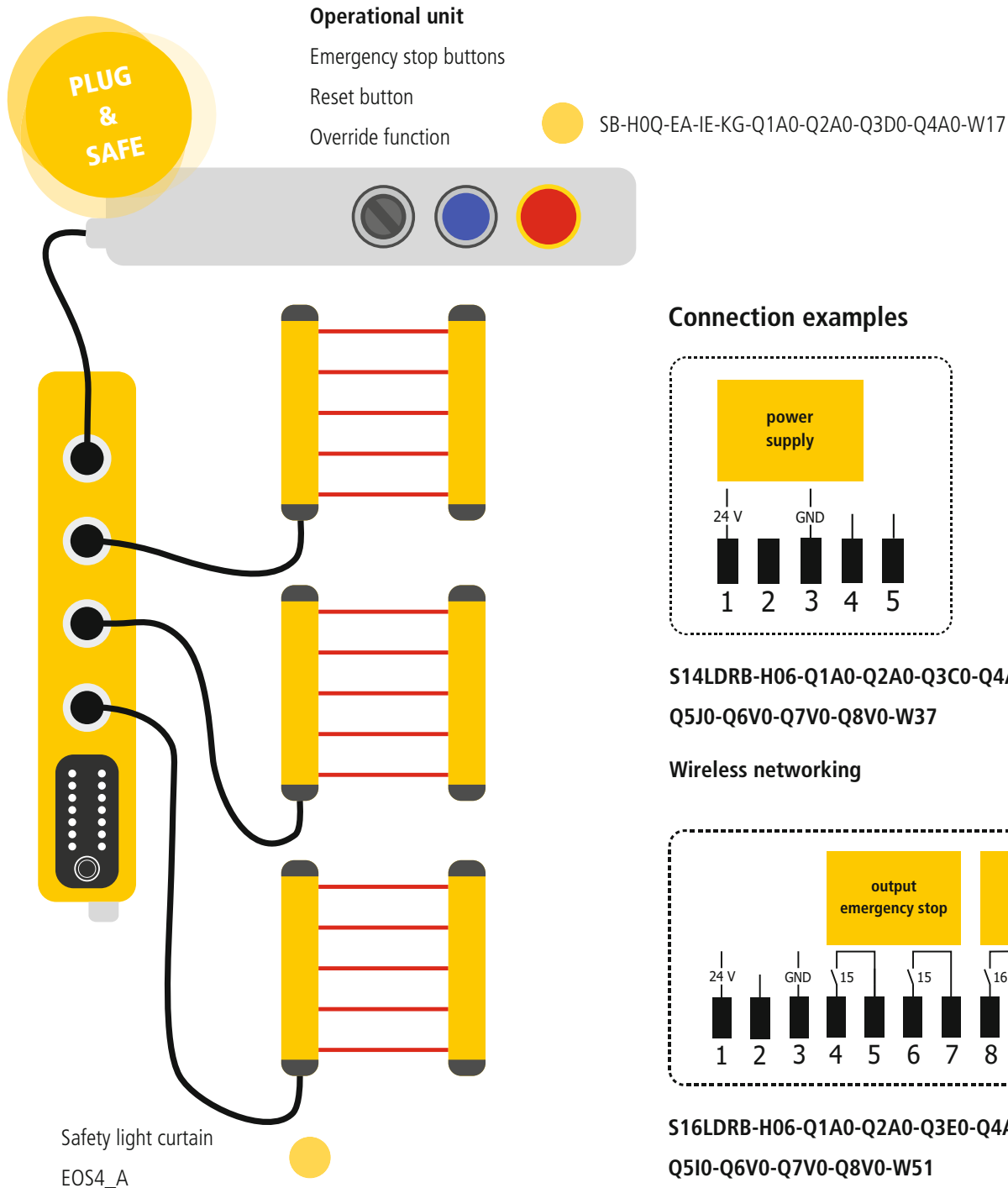Safety Simplifier interlocking function with EOS4 light grids for unloading of pallets

Safety Simplifier interlocking function

The Safety Simplifier interlocking function with the EOS4 safety light grids from REER is used whenever:
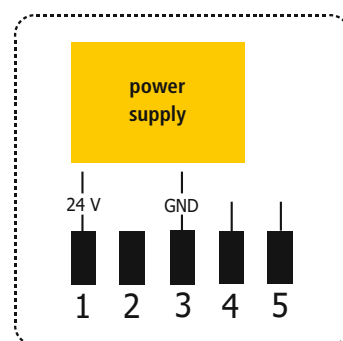
✓ Pallets or components are unloaded from the danger zone,

✓ Muting light grids are not normatively possible,

✓ Conveyed material that does not block the whole access (e.g. format changes, half-full pallets),

✓ Pallets of different widths or heights are used,

✓ Components stop in the muting light beam,

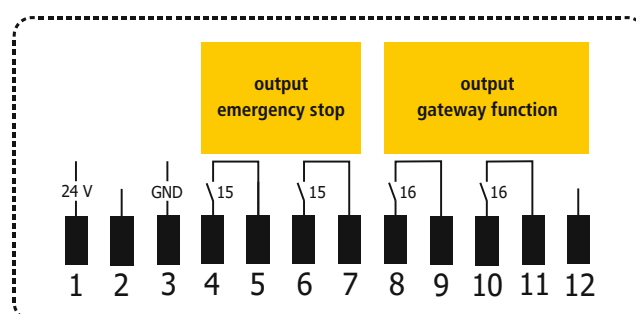✓ The conveyed material does not have a minimum diameter of 500 mm,
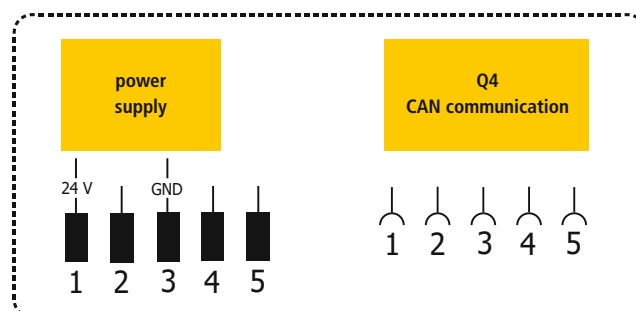

Diagnosis display

PLUG & SAFE

Operational unit

Emergency stop buttons

Reset button

Override function

SB-H0Q-EA-IE-KG-Q1A0-Q2A0-Q3D0-Q4A0-W17

Safety light curtain
EOS4_A

Connection examples

power supply

24 V | GND

1 2 3 4 5

S14LDRB-H06-Q1A0-Q2A0-Q3C0-Q4A0-Q5J0-Q6V0-Q7V0-Q8V0-W37

Wireless networking

output emergency stop **output gateway function**

24 V | GND | 15 | 15 | 16 | 16

1 2 3 4 5 6 7 8 9 10 11 12

S16LDRB-H06-Q1A0-Q2A0-Q3E0-Q4A0-Q5I0-Q6V0-Q7V0-Q8V0-W51

Stand-alone

power supply **Q4 CAN communication**

24 V | GND

1 2 3 4 5   1 2 3 4 5

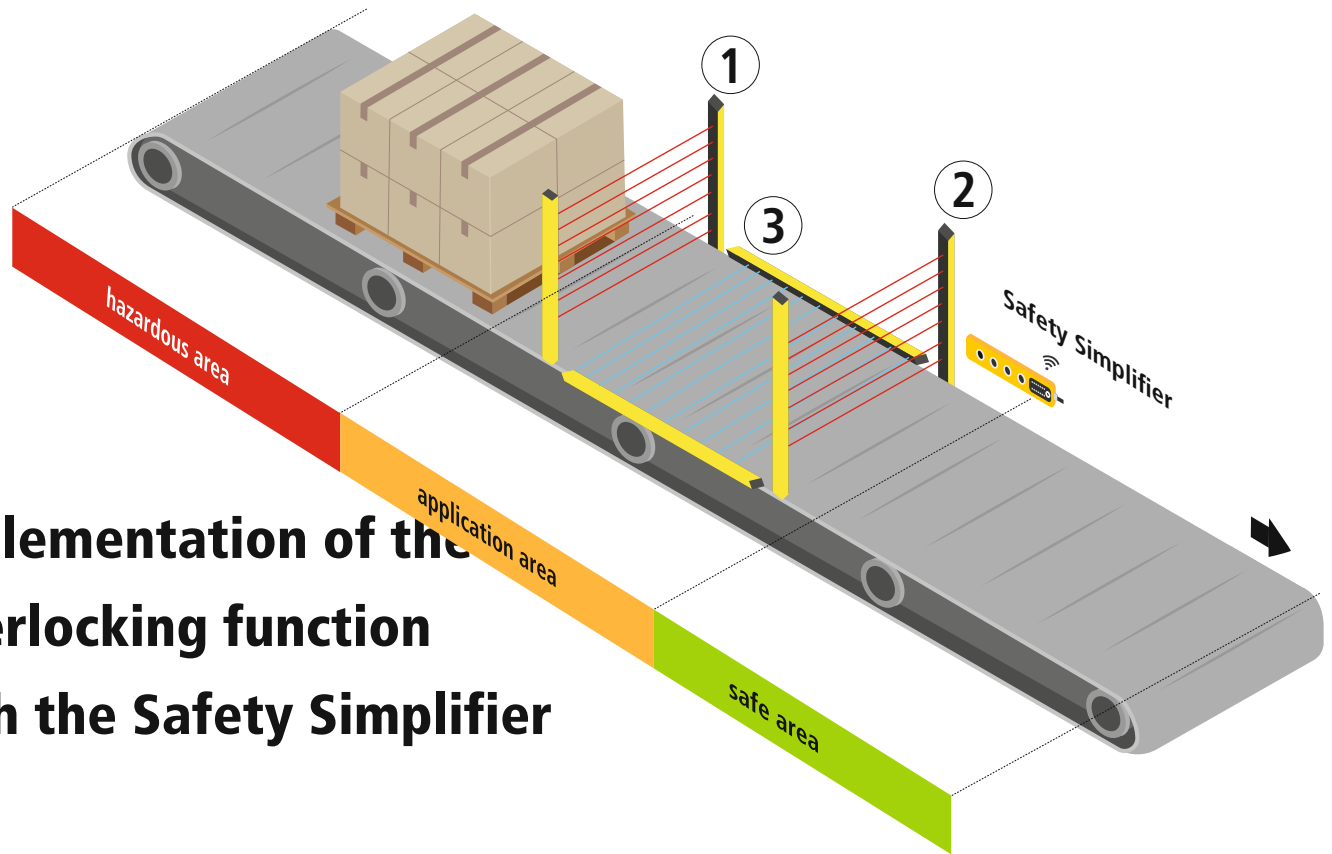**S14LDRBCA-H06-Q1H0-Q2A0-Q3C0-Q4A0-Q5J0-Q6V0-Q7V0-Q8V0-W37-S0025**
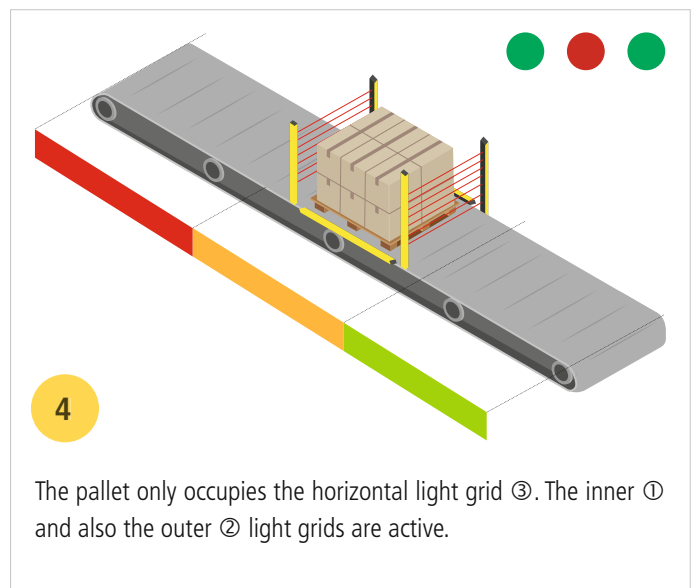
Wireless and CAN networking
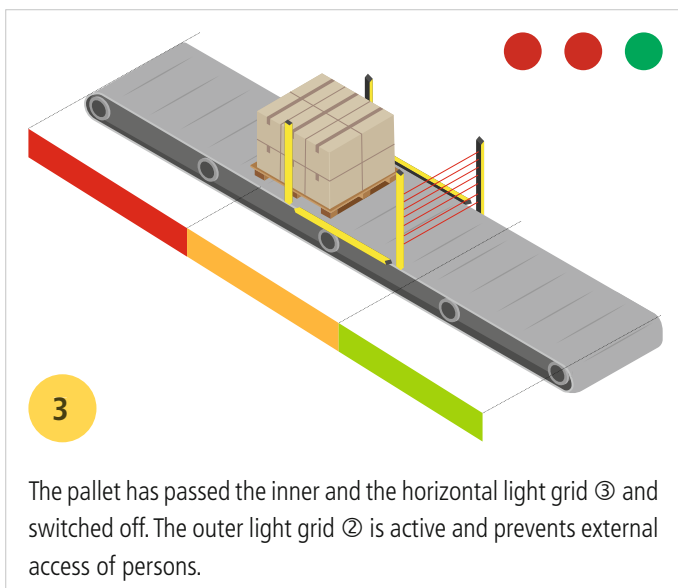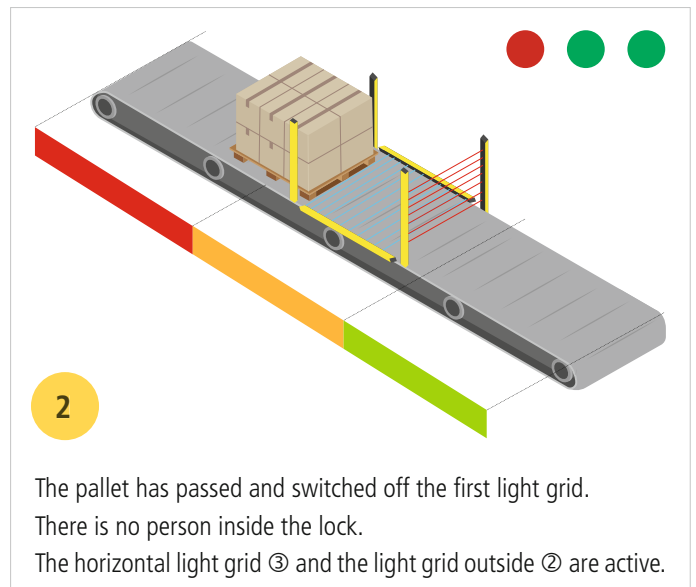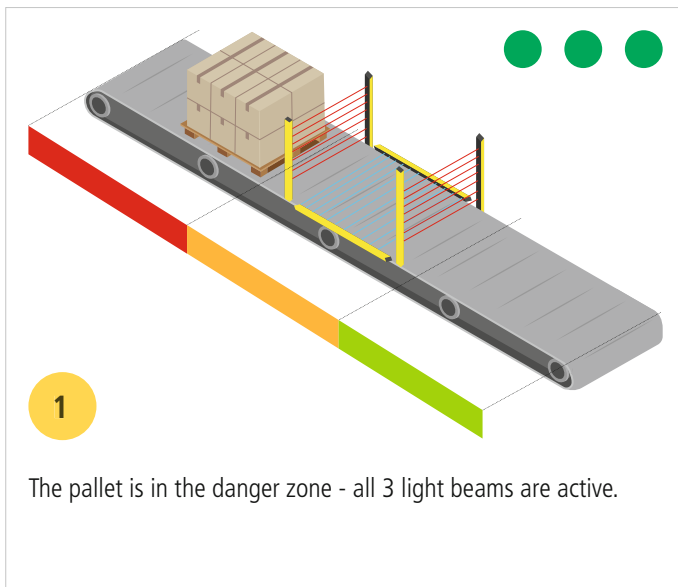
Safety Simplifier interlocking function
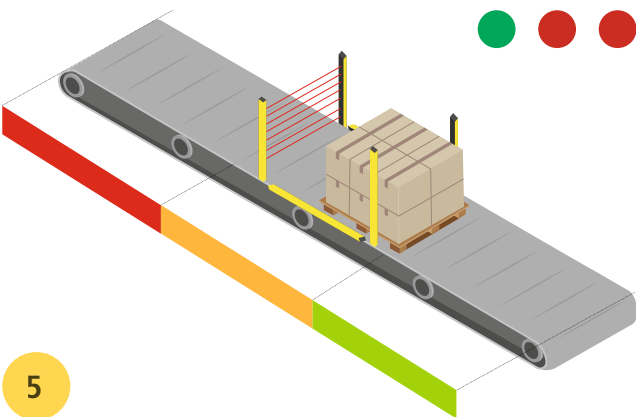
Safety Simplifier is available in 3 versions:

✓ Stand-alone

✓ Networked - Wireless communication

✓ Networked - CAN communication

Pre-programmed safety function available in the interlocking function

# Implementation of the interlocking function with the Safety Simplifier

1

The pallet is in the danger zone - all 3 light beams are active.

2

The pallet has passed and switched off the first light grid.
There is no person inside the lock.
The horizontal light grid ③ and the light grid outside ② are active.

3

The pallet has passed the inner and the horizontal light grid ③ and switched off. The outer light grid ② is active and prevents external access of persons.

4

The pallet only occupies the horizontal light grid ③. The inner ① and also the outer ② light grids are active.

SSP
Safety System Products

5

The pallet occupies the horizontal ③ and the outer ② light grid. The inner light grid ① protects the system against intervention.
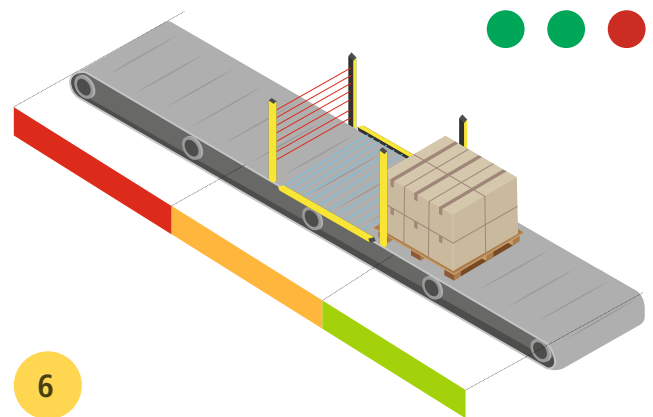
6

The pallet only occupies the outer light grid ②. The horizontal light grid ③ is active. There is no one inside the lock.
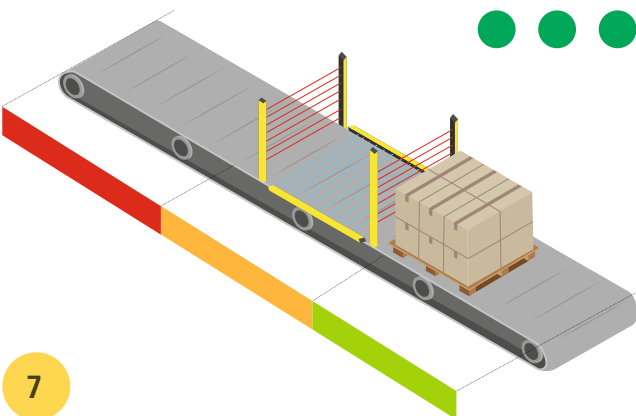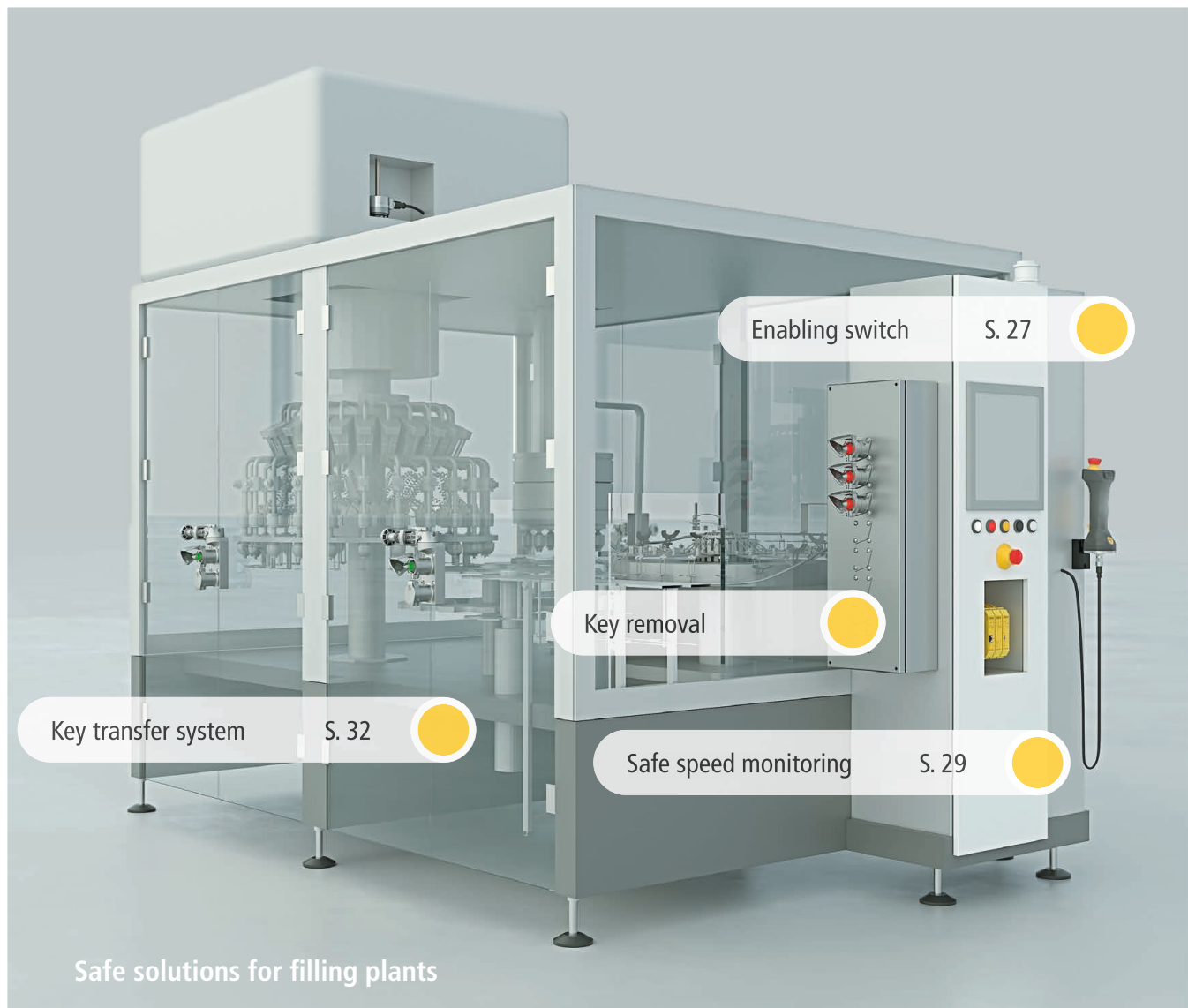

7

The pallet is discharged. All 3 light grids are active again.

If malfunctions occur during the lock function
(e.g. unauthorized access by persons to the lock),
the override function makes it possible to manually discharge the pallet on site and restart the system.

Enabling switch   S. 27

Key removal

Key transfer system   S. 32

Safe speed monitoring   S. 29

Safe solutions for filling plants

Safety technology for filling plants

Filling systems for the beverage industry have to meet high requirements, such as extremely high cycle rates in narrow spaces, food suitability and resistance to cleaning. These requirements make a compact and innovative safety concept necessary. With reliable standstill monitoring and enabling switch for the set-up mode as well as a key transfer system made of stainless steel components, SSP offers a coordinated product range and a high degree of experience for applications on filling plants.

Advantages of key transfer with mGard

✓ No electrics at the door

✓ Fast commissioning

✓ No cable routing

✓ Robust design in stainless steel

✓ IP96K

✓ Safety key for safeguarding areas that can be stepped behind

✓ Modularly expandable

✓ PLe acc. to DIN EN 13849-1:2016

SSP
Safety System Products

Key transfer systems for filling plants
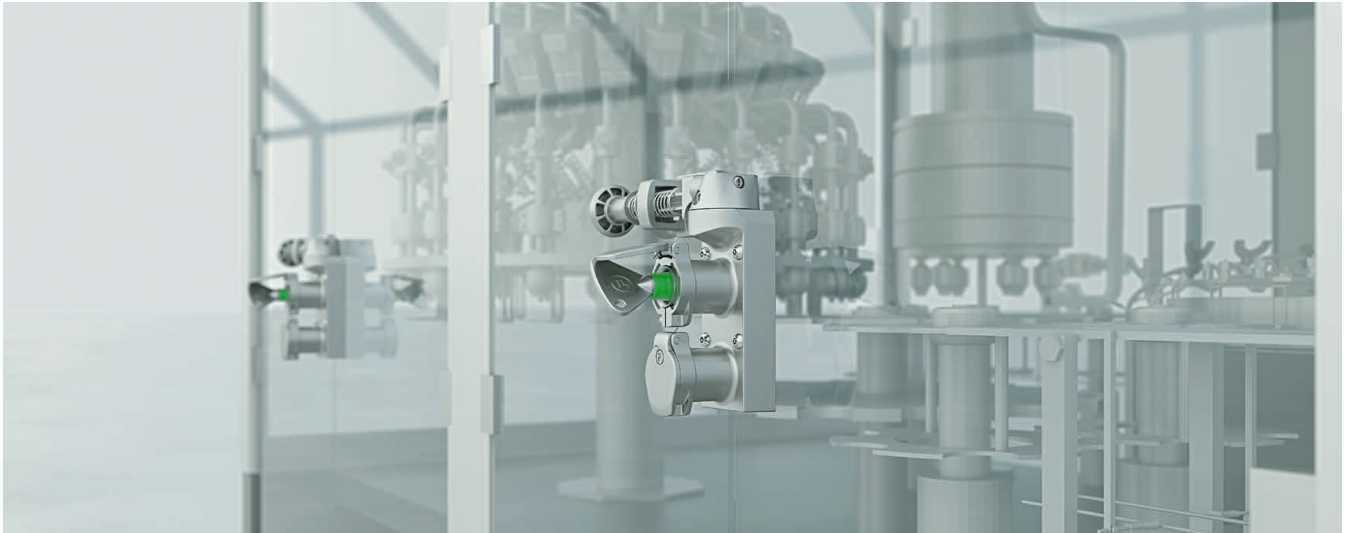
Hygienic key transfer system mGard in stainless steel at a filling plant

Key transfer system

The hygienic DMSK2 double lock is made entirely of stainless steel and has hardly any grooves or holes in which dirt could accumulate. It requires no wiring and is opened by a key transfer system. Another special feature is the safety key function, which offers optimum protection by removing the safety key. If the operator has to enter the difficult-to-view danger area, he can protect himself personally by taking the key with him. The highly coded keys can be labeled and color coded. A module with only one lock can also be used for smaller openings or openings that cannot be stepped behind.

MOSAIC safety controller and mGard key transfer system with removal unit

DID YOU KNOW...

... that DIN EN 415-10:2014 in Chapter 5.16.2.3 also proposes the possibility of using key transfer systems with a safety key?

DIN EN 14119:2003 also describes the key transfer systems very specifically as a locking device based on the transfer of a key between the key switch and the key lock. The system is characterized by the key, which is always held either in the key switch or on the key lock. In concrete terms, this means that the key is not released until the guard is securely closed and locked.

A combination of different processes is also possible, as shown in the drawing below.

- When the plant is stationary, the key is first removed, which interrupts the safety circuit via positively driven contacts.

- With the red key, the operator can now release two further blue keys in a purely mechanical "key exchange box". These keys now open a flap and a door. A single lock is used for the hatch, which cannot be stepped behind. The blue key is entered and the hatch is thus opened. The key cannot be removed while the hatch is open.

- A double lock with comparable logic is used for the door, which can be stepped behind. However, in addition the operator removes a safety key (green) and takes it with him into the plant. This key is used for personal security. To start the plant, the entire procedure must be carried out in reverse order. The keys are high-coded with more than 1000 codes according to DIN EN 14119:2013.

Key in control cabinet,
Key lock connected with security system   Key exchange station   Flap   Door
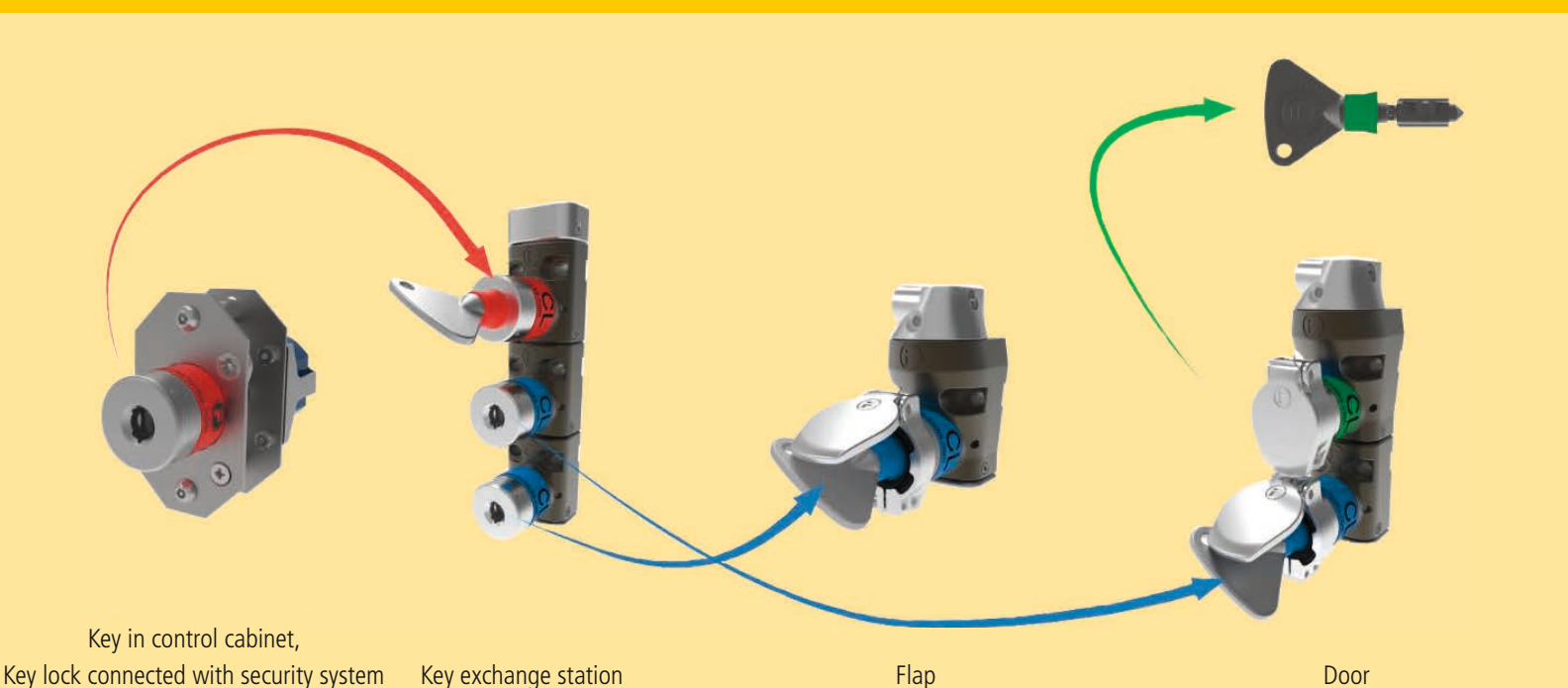
Set-up mode with safe speed monitoring

Safe speed monitoring with MOSAIC safety controller, ZEUS enabling switch, EDI emergency stop button, Simplifier switch elements

Enabling switch ZEUS

If it is necessary to provide the operator a special operating mode for work such as commissioning, maintenance, repair or process set-up, important legal requirements must be observed.

The enabling mode has proven effective. In this operating mode, the machine operator has the option to bypass certain safety devices, like safety doors, by selecting the operating mode and actuating the enabling unit. The important point here is the 3-level function.

Only in the middle position the 3-step enabling switch allows certain hazardous movements under additional precautions. If the operator releases the enabling switch or pushes it into the Level 3, the system switches off for safety.

Emergency stop button integrated in the control unit

Control of up to 120 machine functions

3-level enabling switch

Hand detection sensor for protection against manipulation

Home sensor

Flexible cable length allows clear view during enabling operation

SSP
Safety System Products

DID YOU KNOW...

... what are the requirements of EN 415-10 for a safety PLC?

Section 5.16.3 of DIN EN 415-10 describes under point h) the activities with open guards. The set-up mode with the guard open is therefore only permitted at reduced speed, reduced power, reduced pressure or reduced energy supply. A safety controller can be used to evaluate these parameters.

Section 5.14.7 also describes the stopping time. The safety controller of the machine must ensure that hazardous functions stop after opening a locked movable guard and that the safety distance is maintained.

If this cannot be implemented, the standard prescribes the use of guards with guard locking. For further details and the requirements for a guard locking, please refer to DIN EN 14119:2003, Chapters 5.7, 5.2 and 5.3.

Safe rotary encoder for speed monitoring

Advantages

✓ Speed monitoring (up to PLe)

✓ Standstill monitoring

✓ Maximum speed monitoring

✓ Detection of speed ranges

✓ Monitoring of the direction of rotation

Safe speed monitoring

If the stopping time of a system is not the same in all situations and if a safe delay time for opening a locked guard (safety switch with guard locking) is not possible, safe standstill monitoring is frequently used. The MOSAIC safety controller from the Italian manufacturer REER provides economical and simple safe speed and standstill monitoring. The MOSAIC can monitor existing rotary encoders, evaluate inductive sensors for speed monitoring or implement safe standstill and speed monitoring with safe rotary encoders up to a performance level PLe. It can be modularly extended and is therefore suitable for use on systems of any size.

MV0 - Module for the connection of 2 inductive sensors

MV1 - Module for 1 rotary encoder and 2 inductive sensors

MV2 - Module for 2 rotary encoder and 2 inductive sensors

SSP
Safety System Products

Safe speed and standstill monitoring in the packaging industry

Set-up mode with door open

If a packaging plant must be set up with the door open, the ZEUS enabling switch can be used with the MOSAIC safety controller. This allows the plant to be set up at reduced speed.

MOSAIC monitors...

✓ the two-channel key switch in a set-up mode,

✓ the two-channel emergency stop buttons on the ZEUS and on the machine,

✓ the two-channel enabling switch for the enabling function,

✓ the OSSD signals of the:
  - safe locking device or guard locking,
  - safety light barriers.

It checks...

✓ the safe speed of the drives:
  - existing rotary encoders sine/cosine, TTL/HTL,
  - inductive sensors,
  - safe own encoders,

✓ the safe direction of rotation of the drives:

✓ safely reduced pressure due to safe analog inputs.

Safe unlocking of the guard locking for personal protection at standstill

If a packaging machine cannot be stopped within the safe stopping time of one second or if it is not possible to maintain the safety distance to the following dangerous movement, guard locking devices must be used for personal protection.

MOSAIC monitors...

✓ the safe OSSD outputs of the guard locking for personal protection.

It checks...

✓ the safe standstill of the plant with a safe standstill monitoring,

✓ with the safe analog inputs:
  - analog pressure sensors,
  - analog temperature sensors,

✓ releases the safe guard locking via a safe OSSD output or safe relay outputs,

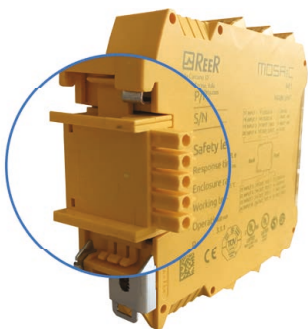✓ can release the doors after a certain time via logic and timer modules.
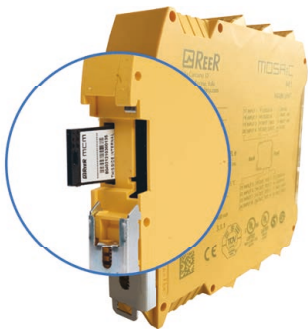
MCM

MOSAIC Configuration Memory

Removable memory card to back-up MOSAIC configuration data for later transfer to a new device without a PC

MTB

Screw terminals

Removable terminals with screw contacts

MSC

MOSAIC Safety Communication

Enables communication between the different modules via a proprietary high-speed bus

MTBC

Spring-loaded terminals

Removable terminals with spring-loaded terminals

MCT

Modules for decentralized configuration

Decentralized design enables the connection of outsourced expansion modules via the MSC bus

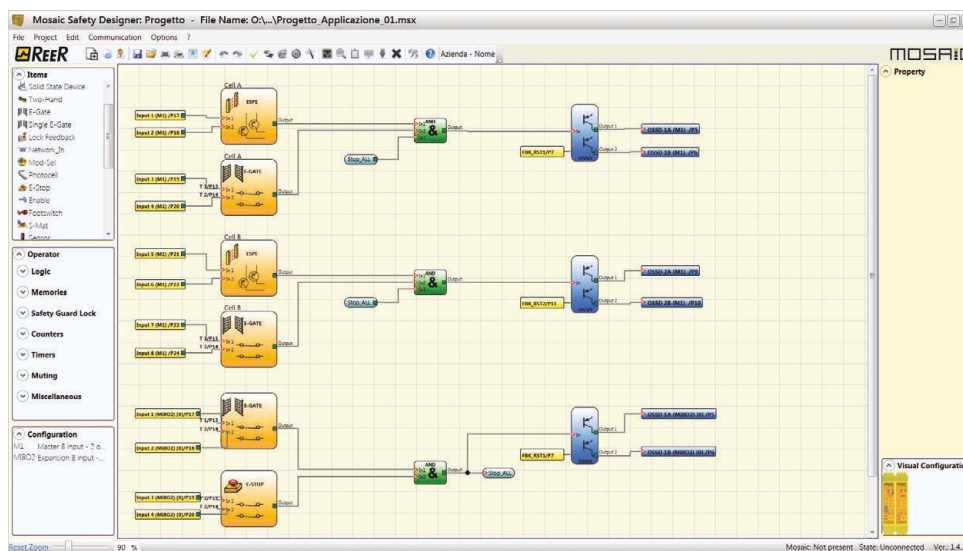**Additional I/O**   **Additional inputs**   **Additional outputs**

MOSAIC - grows with its tasks

MOSAIC Safety Designer

Free, easy to use, intuitive MOSAIC configuration software for master modules M1 and M1S. With the Drag&Drop user interface, programming can be implemented easily and in accordance with standards.
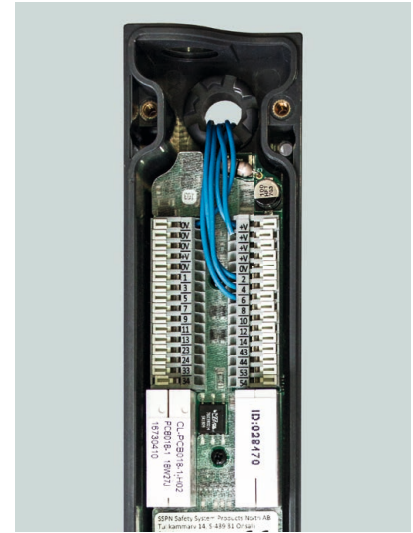

✓ Drag & Drop

✓ User-friendly

✓ Real-time monitoring

✓ Design validation

✓ Simulation

✓ Password protection

✓ Report and log data

✓ Project information

✓ Free Software

Safety Simplifier - The safety controller

Safety components can be easily connected and integrated

Connection terminals with
Cabinet feed-through

In the packaging industry there is a trend towards increasingly complex, decentralized applications. One of the big challenges in the safety field is the most efficient possible coupling of various safety components. With the Safety Simplifier, SSP offers simple and flexible solutions for this: safe coupling via the wireless or safe CAN connection. Regardless which solution you choose, in the maximum configuration up to 16 participants with up to 256 inputs and/or outputs can be securely networked together. However, the Safety Simplifier is not just a decentralized safety PLC. The system also integrates control devices such as emergency stop buttons, illuminated buttons and key switches for activating different operating modes.

✓ modular design

✓ safe wireless or CAN network

✓ programmable safety PLC

✓ 14 safe I/O's + optional 2 safe relay outputs

✓ networking of up to 16 units

✓ two-way communication

✓ networking of up to 256 I/O's

WIRELESS

Safety CAN

IP 65

Wireless interface for safe communication, programming and diagnosis

40 mm construction width for installation on aluminum profiles

Spring terminals secure the connections also in case of strong vibrations

14 I/O's as safety inputs or redundant OSSD outputs

4 relays for 2 × double-safety outputs (optional)

LED diagnosis using the touch pad

Memory card with application software for easy exchange

Safe CAN and/or wireless communication

SSP
Safety System Products

Applications with Safety Simplifier

Safety Simplifier with operating elements, wireless safety interface and safe monitoring of safety switches

Safety Simplifier, mounted on the control cabinet for safe shut down of hazardous drives

Safety Simplifier with override function and monitoring of muting light beams

Safety Simplifier with integrated interlocking function, monitoring of light curtains for removal of pallets out of the danger zone

Safety Simplifier for safe wiring of systems and safety functions

Safe communication

State-of-the-art safety technology

Up to 16 Safety Simplifier can be networked via safe wireless communication. The repeater function implemented as standard achieves optimum process reliability. Each Safety Simplifier shares all available safety information with all other Safety Simplifiers within its range. Two modules communicate over a distance of up to 100 m. For longer distances or in unfavorable environmental conditions, additional Safety Simplifiers can be used as repeaters, or a wired CAN connection is used. Mixed solutions are also possible.

### I/O assignment of the Safety Simplifier S16

Safety Simplifier S16

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 23 | 24 | 33 | 34 | 43 | 44 | 53 | 54 |

Relais 15   Relais 16

Safety Simplifier 14 I/O + 2 Safety Relay

Safe wireless connection

Safe combined wireless and CAN connection

Safe CAN connection

36
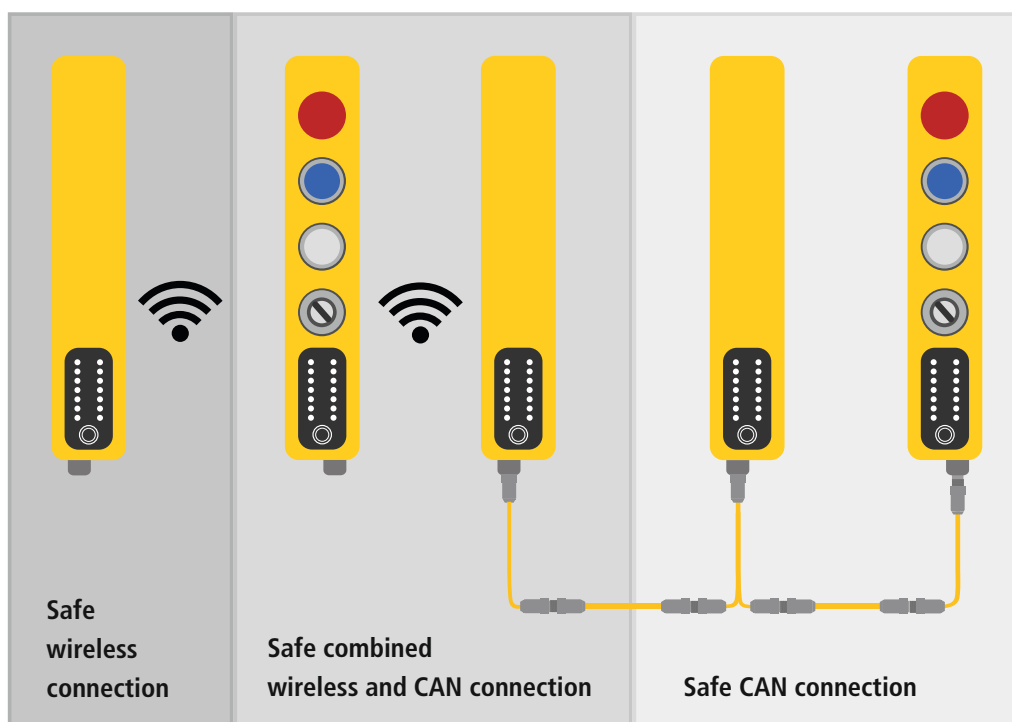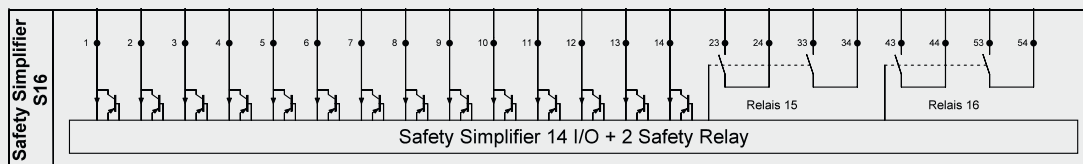
Simplifier Manager Configuration Software

Diagnosis and programming – easier than ever!

Simplifier Manager is the free software for the Safety Simplifier System

Program the safety functions in an easy and uncomplicated way using the Simplifier Manager configuration software. The functional modules for emergency stops, safety switches, light curtains, two-hand controls, mode selector switches and many other applications are available as standard.
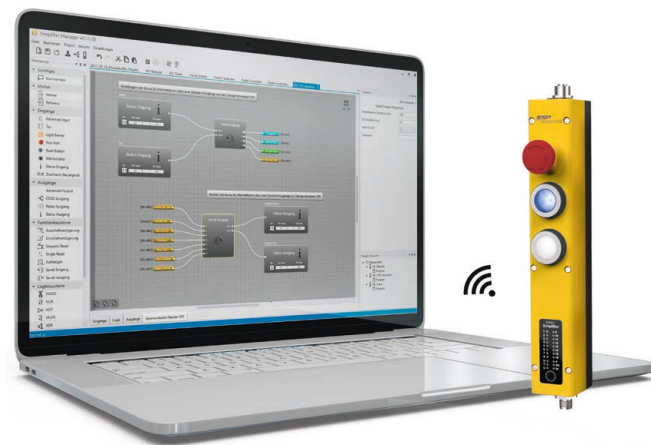
✓ saves time and resources

✓ Drag & drop function

✓ user-friendly, intuitive interface

✓ predefined functional modules for easy and fast programming

✓ wireless connection using the SRM-sticks or optionally via USB connection

✓ on-line mode for live diagnosis

With the SRM stick (Simplifier Radio Monitor stick) it is possible to access the online mode and therefore to start the integrated diagnostic function either wireless or via USB interface.
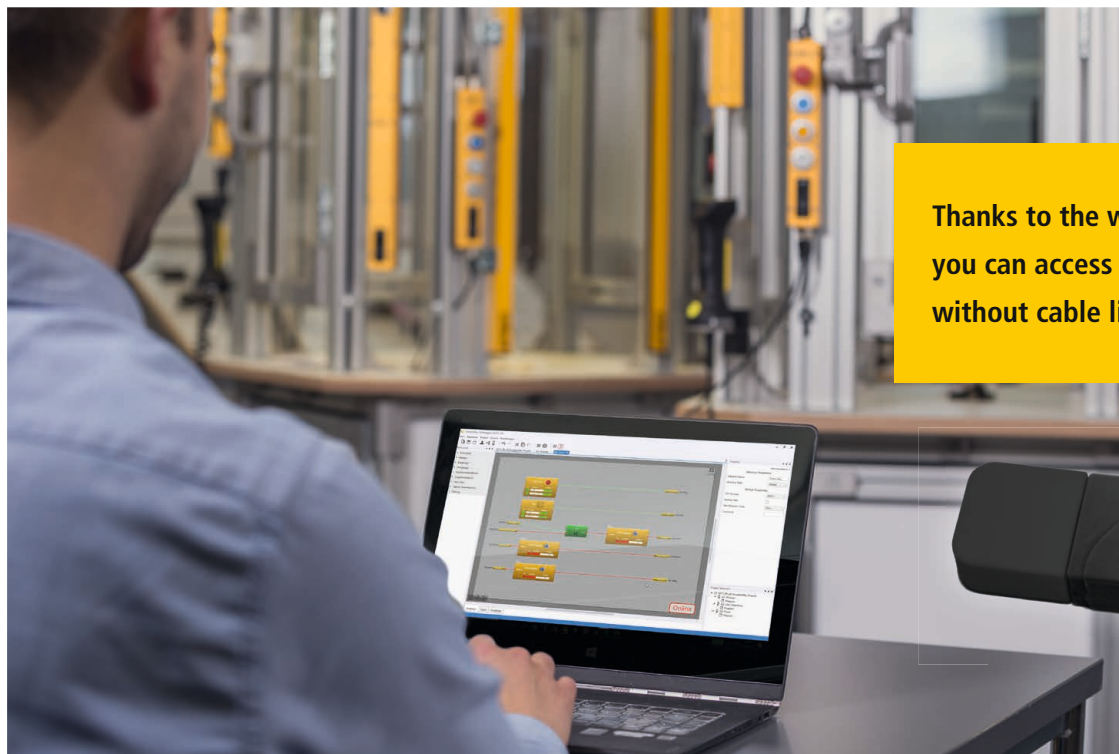
Thanks to the wireless functionality, you can access your Safety Simplifier without cable limitation.

Operating elements

Operating elements for all applications

The SSP control elements can be used in a wide range of applications, from the simplest to the most demanding environments requiring ECOLAB and IP69K certifications. With compact housing dimensions of less than 40 mm, the operating elements of the EDI series, such as the tGard series, can be easily mounted on standard aluminum profile systems. Numerous individual designs and button configurations can be realized with Fortress switches and thus adapt to different application conditions.
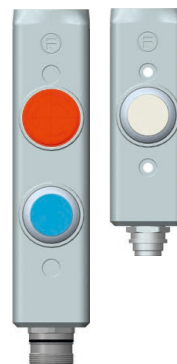
FORTRESS

EDI series

EDI emergency stop button and operational units

Narrow housing shapes with holding brackets for quick assembly.
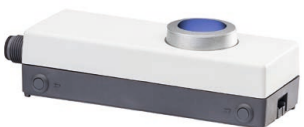
tGard series

tGard operating elements

Modular operational unit with up to 9 buttons.

amGard S40 operational units

Modular operational units with up to 3 buttons in stainless steel and IP69K.

Buttons

Switch elements for control cabinets and operating panels

The command and signal devices of the Simplifier and EDI series are easy and flexible to integrate. Thanks to their high degree of IP67 protection and partially IP69K, the application areas are universal. The robust design of the control devices, combined with modern design and optimum functionality, forms the basis for a safe man-machine interface.

Simplifier series provides fast connection with spring-loaded terminals. Optimal for installation in control cabinets and machine profiles due to a flat installation depth

20.5 mm
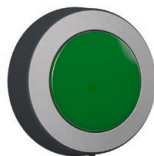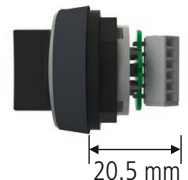
Flexible safety fence solutions according to the Machine Directive

Design-oriented, robust and easily expandable aluminum profile technology

Fast removal fields reduce maintenance times with infrequent access. Thanks to the special key, no electronic protection is required.

Openings can be made quickly and easily in any location of your safety fence. This enables a flexible fence route at all angles.
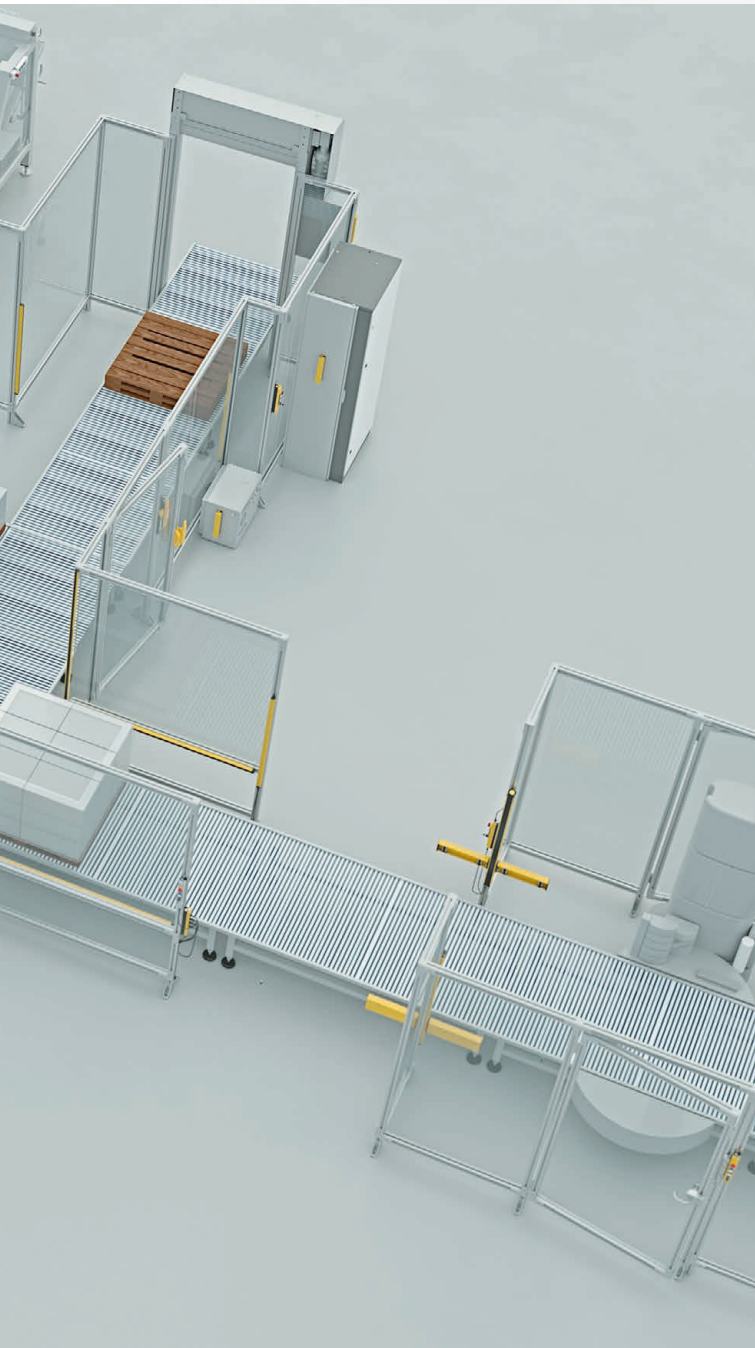
The 'SSP-Fast-Connect-Technology' enables quick connection of the aluminum profiles. Drilling and thread cutting is no longer necessary.

Fillings can be individually combined. Manual lifting gates can also be used.

SSP
Safety System Products
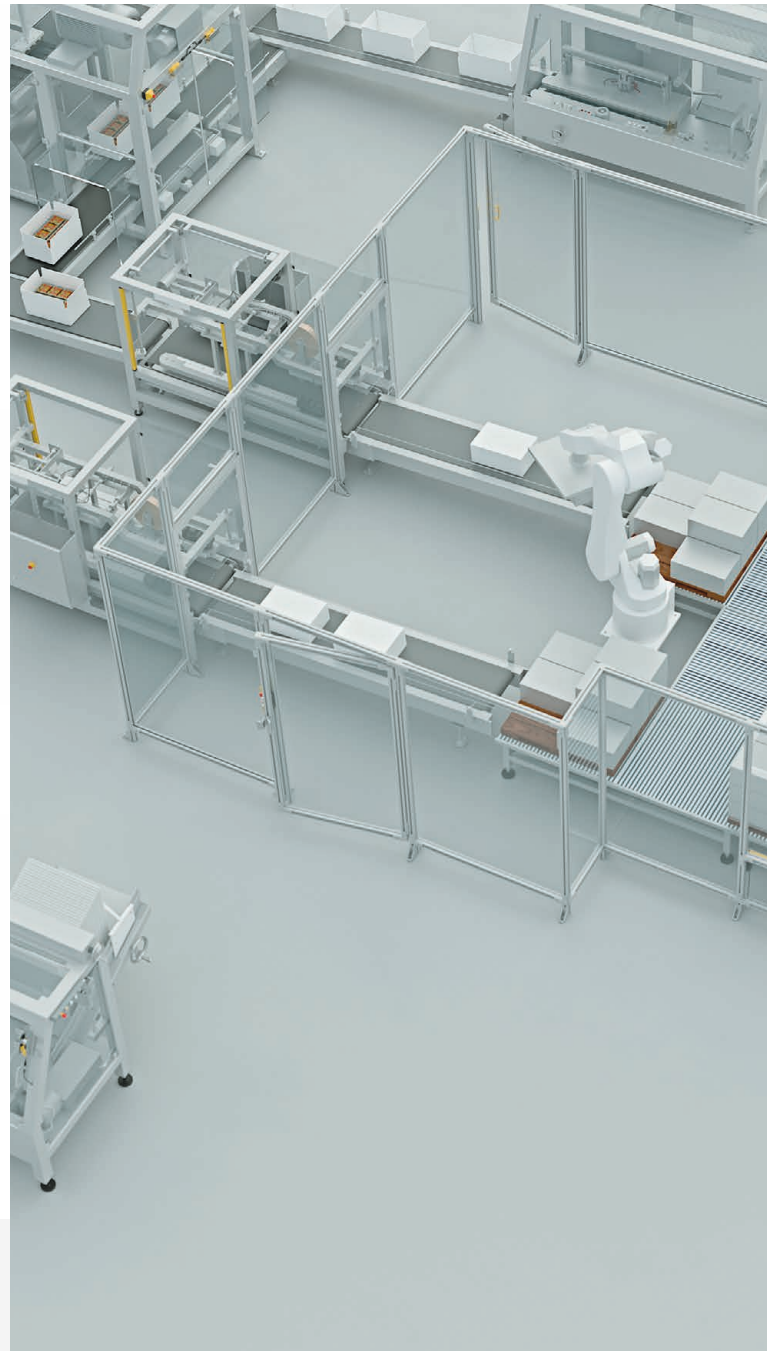
The combination of floor mounting bracket and aluminum profile easily compensates for any unevenness.

The "SSP grid fixation" ensures a firm connection between the profile and the filling. This increases the overall stability of your protective enclosure.

The aluminum slot system enables simple and individual mounting of add-on components at any height and in any position.

The "SSP Slot Nuts" automatically align themselves in the direction of the slot when they are opened. This makes it easy to disconnect existing connections.

Safe high-speed door "Nordic Door"

High-speed door with leading safety light barrier for pallet feeding

High-speed doors with minimum space requirement

High-speed doors are often used for pallet feeding. Opening speeds of up to 2.5 m/s ensure smooth operation with extremely short cycle times. Especially for the packaging industry, the very robust construction and the antistatic surface of the door curtain are ideal. The integrated light beam takes over the function of the safety edge - contactless and therefore wear-free. This ensures early collision-free detection of objects that are already reliably detected during the travel movement. The integrated non-contact safety sensor SAFIX 3 monitors the position of the rolling gate.

Nordic Door high-speed doors are characterized by narrow frames of only 80 mm and thus enable compact system cells. Thanks to the arrangement of the upper roller shaft at the rear of the door, the design is attractive and offers the operator more safety. A forklift can move closer to the cell when loading or equipping it.

Safety

✓ Patented push protection with efficient locking. The push system is not subject to any wear during normal operation.

✓ The door blade can only be pushed over a limited distance, therefore it is possible to place the door closer to the workplace.

✓ The floor support cannot be tilted so that the contact-less switches (Cat. 4 + PLe) can react faster and more reliably.

✓ Integrated light beam or alternatively electrical safety edges with wireless connection.

✓ Finger protection around the floor support.

Function

✓ Alternative drive systems with or without vector inverter control.

✓ Flexible motor bracket with 4 alternative motor positions: up/down/forward/back.

✓ Sophisticated bracket for the contactless switches with which the position of the door can be easily adjusted to any opening height.

✓ Efficient stop holder with damping effect.

Simplifier at the rolling gate

Safety Simplifier with switch elements controls the high-speed door during travel. The wireless interface serves for simple integration into the safety concept of the system.

INTERNATIONAL PARTNERS

Find them on our website

www.safety-products.de

we simplify safety