SOLUTIONS FOR
SAFE BUS SYSTEMS

PROFIsafe

PROFI NET®
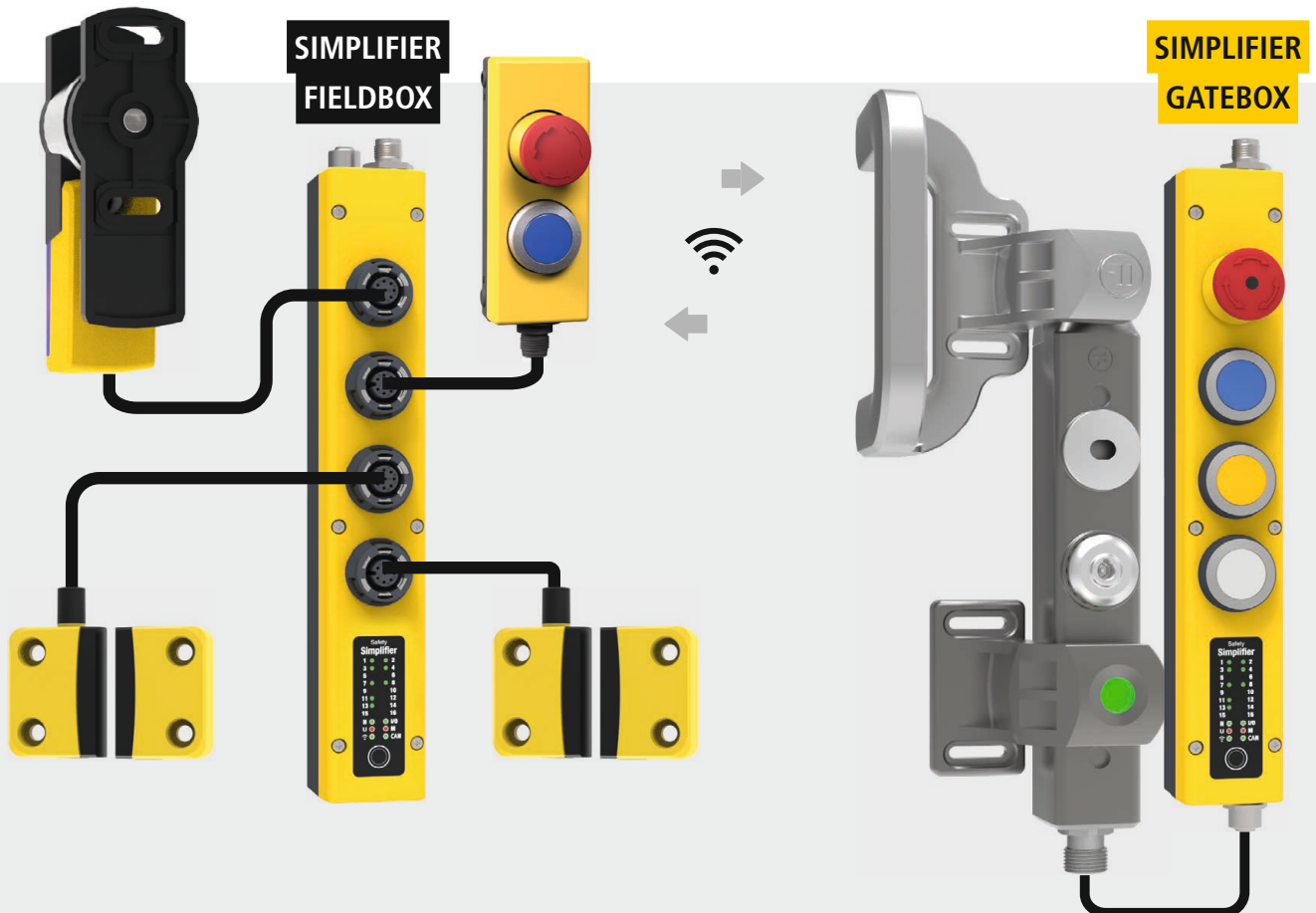
WIRELESS SAFETY

SSP
Safety System Products

The best of two worlds

Wireless safety meets safe bus systems

The Simplifier system is a versatile solution for various safety applications. With wireless communication and the integration of the PROFIsafe bus, it enables the protection of doors, drawers, lift gates and more. Easy installation, seamless integration and flexible customization make it the ideal choice. A Simplifier Gateway can connect up to 32 Simplifier devices to the Siemens control system via PROFIsafe.

- ✓ A wide variety of safety functions can be integrated independently of the system

- ✓ Less planning and design work thanks to plug & play and slimline design

- ✓ Programming of all safety functions directly and directly in the Siemens control system

- ✓ Low cabling effort thanks to secure wireless communication or CAN communication

- ✓ Modular and expandable - for safety switches, safety light curtains, I/O modules, push-button boxes, etc.
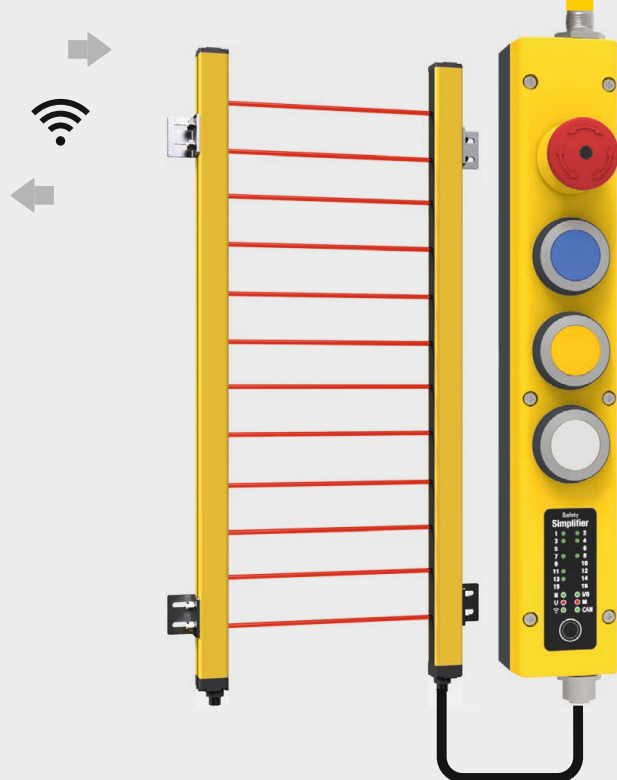
SIMPLIFIER FIELDBOX

SIMPLIFIER GATEBOX

SIMPLIFIER GATEWAY
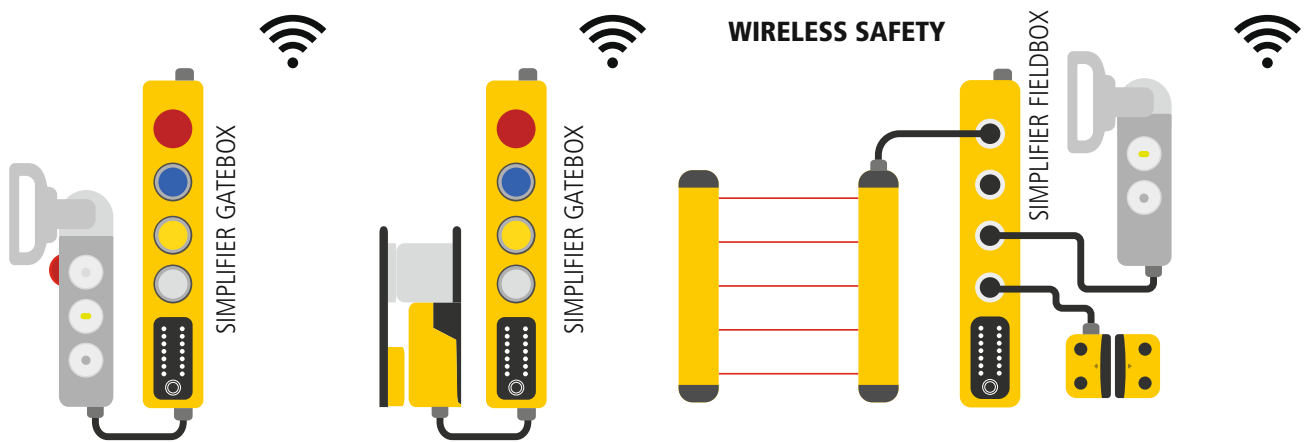
PROFINET®

PROFIsafe

Simple CAN

SIMPLIFIER GATEBOX

SIMPLIFIER GATEBOX

3

The Simplifier System

Two secure communication types

1 | WIRELESS COMMUNICATION

WIRELESS SAFETY

SIMPLIFIER GATEBOX

SIMPLIFIER GATEBOX

SIMPLIFIER FIELDBOX
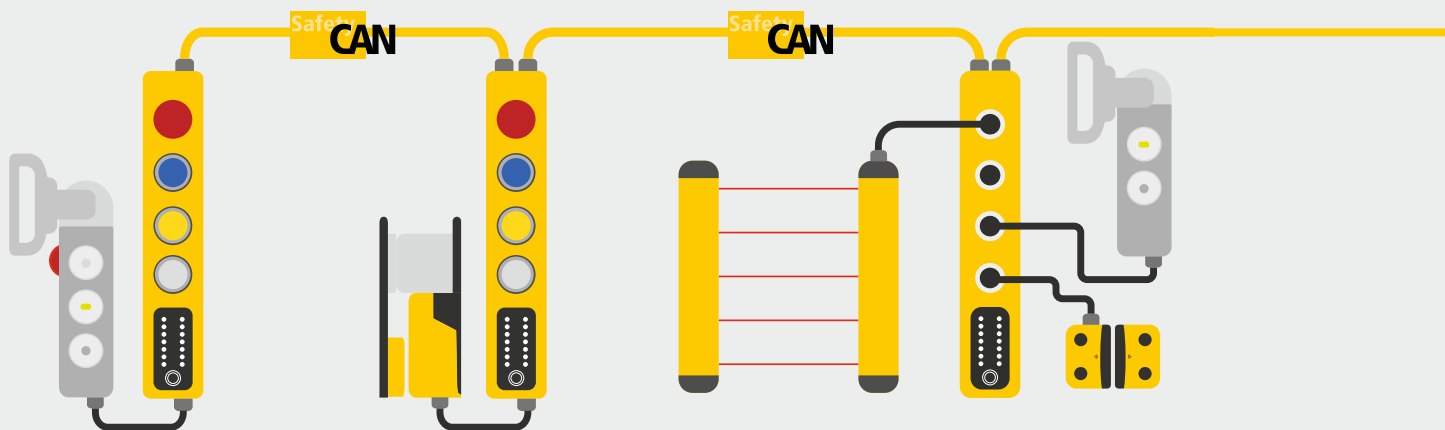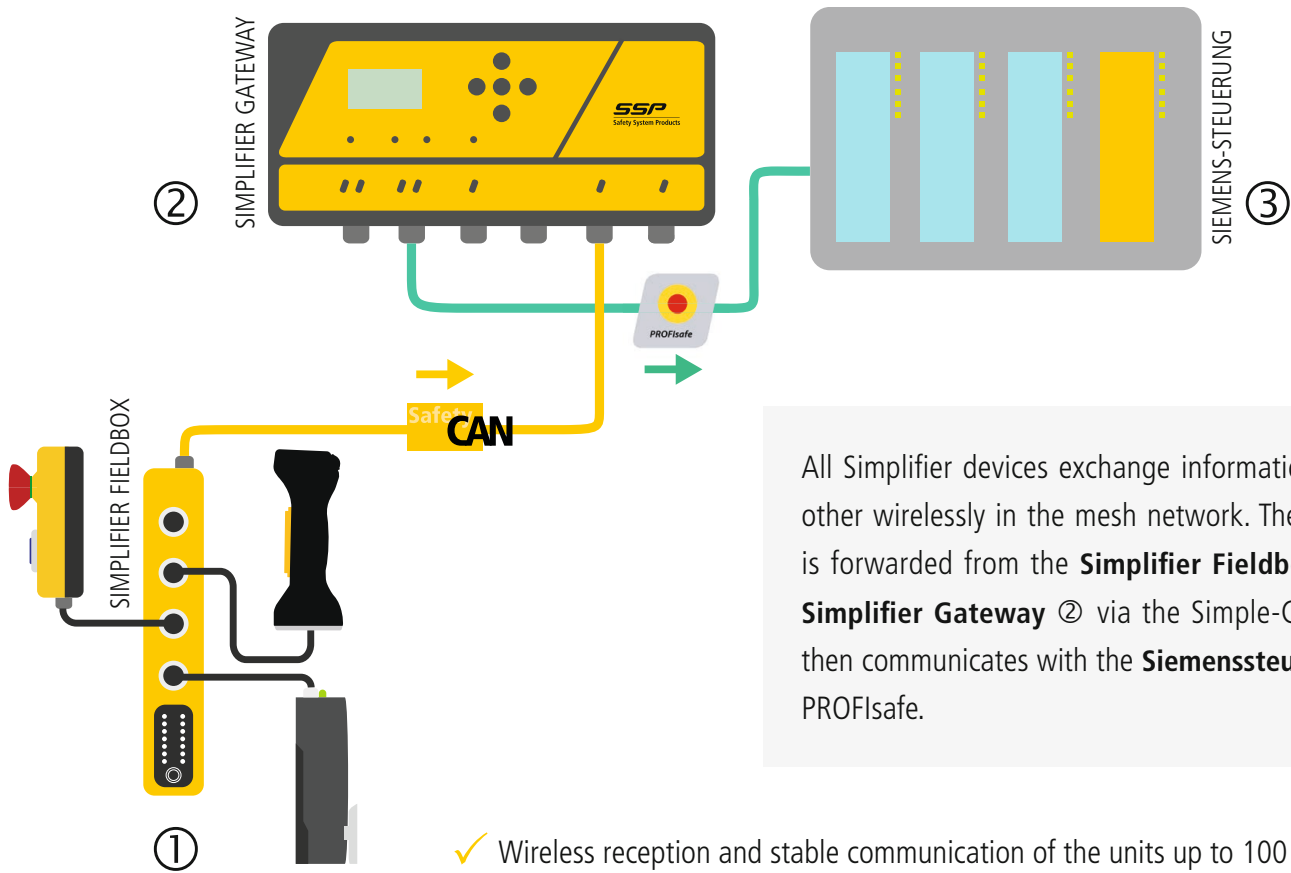
Whether CAN or wireless safety, all information reaches the Siemens controller via the Simplifier Gateway on PROFIsafe and can be programmed and managed centrally in the TIA programming software.
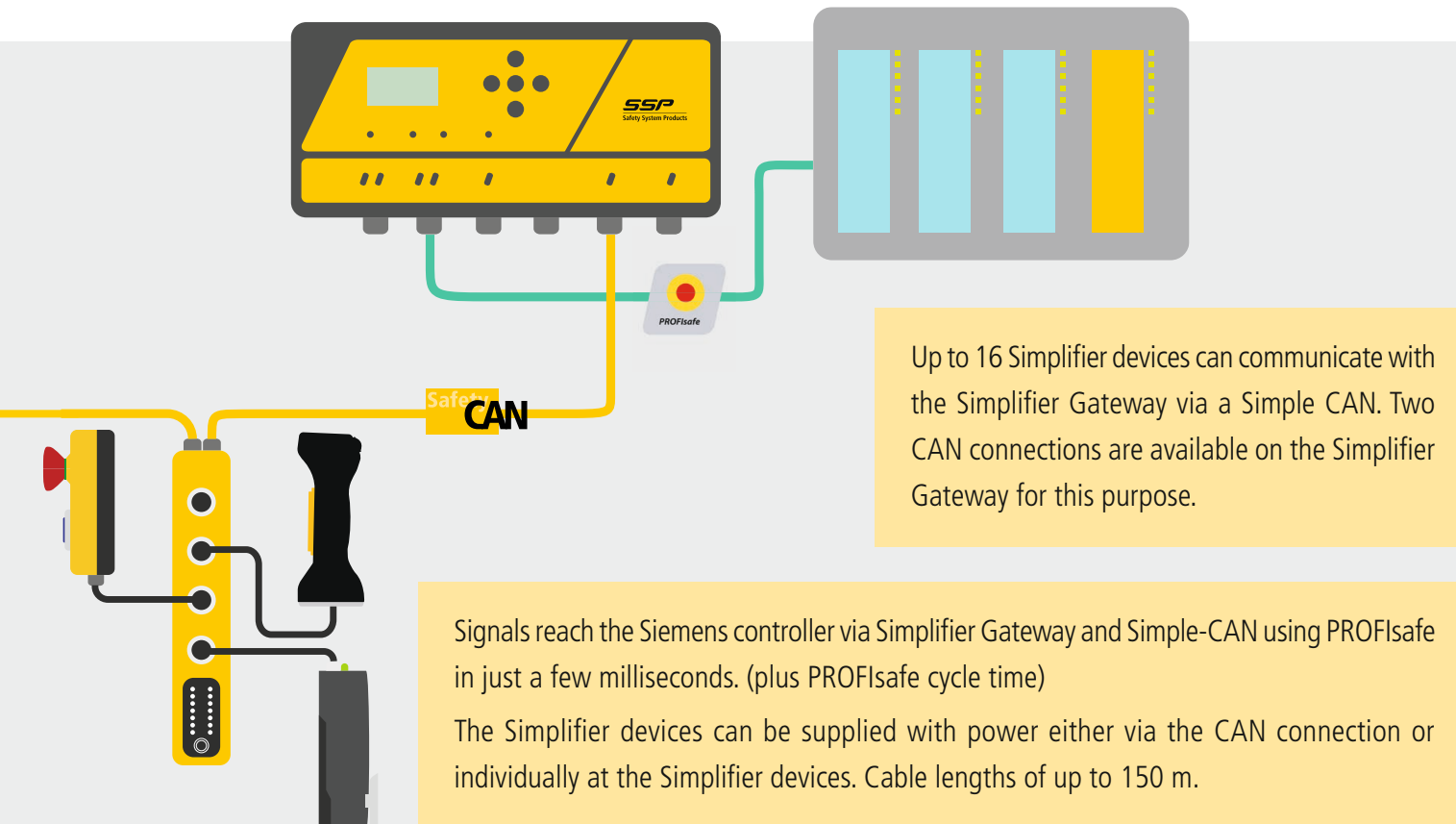
!

2 | CAN COMMUNICATION

Safety **CAN**

Safety **CAN**

②

③

CAN

Safety

PROFIsafe

All Simplifier devices exchange information with each other wirelessly in the mesh network. The information is forwarded from the **Simplifier Fieldbox** ① to the **Simplifier Gateway** ② via the Simple-CAN and this then communicates with the **Siemenssteuerung** ③ via PROFIsafe.

①

✓ Wireless reception and stable communication of the units up to 100 m

CAN

Safety

PROFIsafe

Up to 16 Simplifier devices can communicate with the Simplifier Gateway via a Simple CAN. Two CAN connections are available on the Simplifier Gateway for this purpose.

Signals reach the Siemens controller via Simplifier Gateway and Simple-CAN using PROFIsafe in just a few milliseconds. (plus PROFIsafe cycle time)

The Simplifier devices can be supplied with power either via the CAN connection or individually at the Simplifier devices. Cable lengths of up to 150 m.

Simplifier Gateway

Display for diagnosis

Function buttons

LED diagnosis

SSP
Safety System Products

2 PROFINET connections M12-D codiert c with integrated switch function

2x Power supplies in/out

Safe connections for 2 different CAN networks

Pin 1	Pin 1	24 V	Pin 1	Schirm
Pin 2	Pin 2		Pin 2	24 V
Pin 3	Pin 3	0 V	Pin 3	0 V
Pin 4	Pin 4		Pin 4	CAN H
	Pin 5		Pin 5	CAN L

Exchangeable at any time

Seamless gateway change without new settings: Simply change the memory card - no configuration adjustment or F-address change necessary. All central system data, such as number of subscribers, baud rate or F-address are transferred directly.

The first or additional Simplifier Field or Gateboxes can optionally be supplied with operating voltage via the Simple CAN connection.

Different connections for the ideal application

✓ Power supply via M12-A coded plugs up to max. 4 A

✓ Power supply by means of M12-L coded plugs up to max 16 A

✓ Ethernet / Spannungsversorgung mit und ohne daisy chain option

DID YOU KNOW...

... What an F-address is used for?

The PROFIsafe F-address is a special electronic address that is used in PROFIsafe networks to address and transmit safety-critical information. Here are some important points about the electronic F-address in PROFIsafe:

Electronic identification

The electronic F-address is a digital identification that is assigned to a PROFIsafe device. It is used to uniquely identify the device in the PROFIsafe network.

Binary format

The F-address is represented in a binary format, which means that it consists of a sequence of zeros and ones. This binary format is used to localize the device within the PROFIsafe network.

Configuration

The F-address is usually configured during commissioning of the PROFIsafe network. Each PROFIsafe device or module is assigned a unique F-address. The configuration can be software-controlled or via hardware DIP switches.

Addressing

When addressing PROFIsafe frames, the electronic F-address of the target device is used. The PROFIsafe frame contains this address to ensure that the safety-critical message reaches the correct device.

Safety

The electronic F-address plays an important role in the safety of PROFIsafe networks. It ensures that safety-critical information is only sent to the intended devices and prevents unauthorized access to this information.

✓ 16 Simplifier devices can communicate with one Simplifier Gateway per CAN connection. Both CAN connections, M12-A coded, allow a total of up to 32 devices

✓ Power is supplied via the A-coded connections

Simplifier Gatebox

PLUG & PLAY

Power & CAN connection

Power supply, optional safe CAN connection. Additional CAN connection possible.

Individual, illuminated buttons

Labeling & colors interchangeable.

Diagnosis

Quick status determination thanks to LED diagnostics and touchpad.

Connection of safety components

Up to two safety components can be connected from a large selection.

Pushbutton box and information collector

The Simplifier gateboxes can be selected from a wide range of housings, push-button types and connection options. This means that a suitable design can be selected for every requirement.

Simplifier Fieldbox

Pin 1	24 V
Pin 2	24 V
Pin 3	GND
Pin 4	safe input or output
Pin 5	safe input or output
Pin 6	24 V
Pin 7	safe input or output
Pin 8	safe input or output

Anschluss Spannung & CAN

Power supply,

optional secure CAN connection.

Additional CAN connection possible.

Connection of safety components

Female connector, M12 8-pin.

Pin 1	24 V
Pin 2	24 V
Pin 3	GND
Pin 4	safe input or output
Pin 5	safe input or output
Pin 6	24 V
Pin 7	safe input or output
Pin 8	safe input or output

4 Switch-off circuits

Individually evaluable safety functions

Pin 1	24 V
Pin 2	24 V
Pin 3	GND
Pin 4	safe input or output
Pin 5	safe input or output
Pin 6	24 V
Pin 7	safe input or output
Pin 8	safe output 2 A

Diagnosis

Quick status determination thanks to LED diagnostics and touchpad.

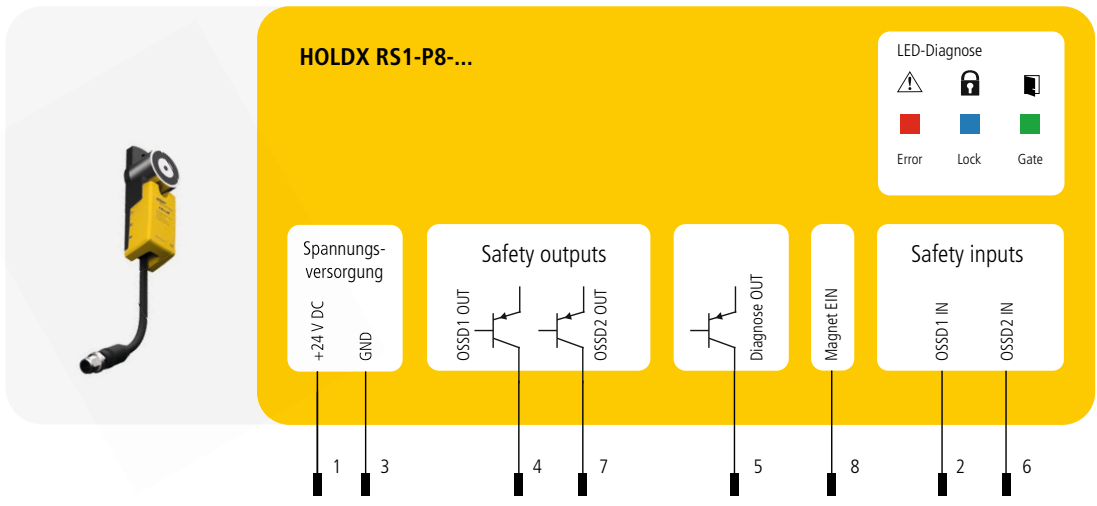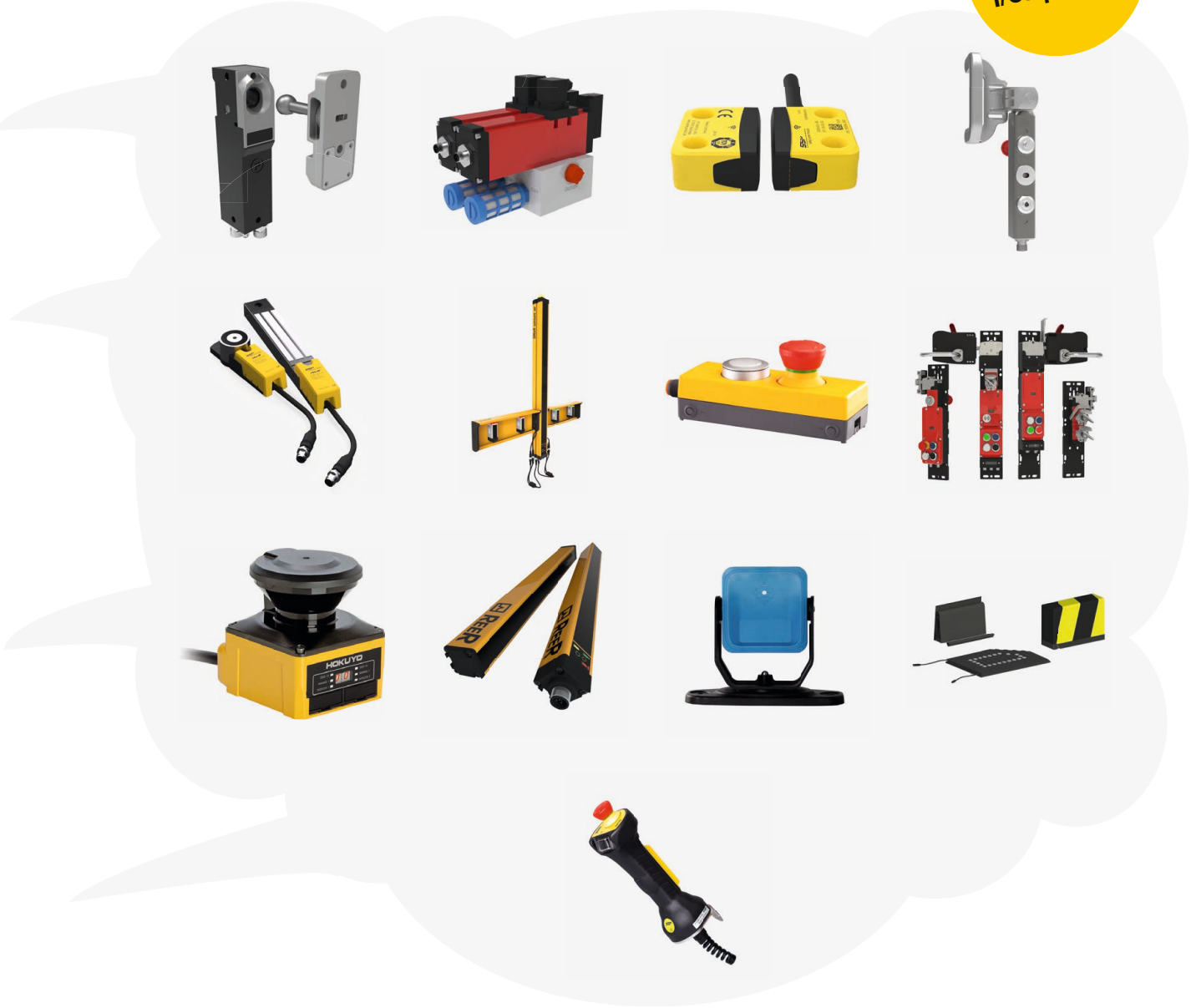|	
Pin 1	24 V
Pin 2	24 V
Pin 3	GND
Pin 4	safe input or output
Pin 5	safe input or output
Pin 6	24 V
Pin 7	safe input or output
Pin 8	safe output 2 A

Many solenoid interlocks/safety switches require an M12 8-pin connection for safe monitoring.

Conventional field boxes only have 4 or 5-pin connections, in which case two slots have to be wired in a complicated manner.

Solenoid interlocks can be connected directly to a single plug on the Simplifier Fieldbox.
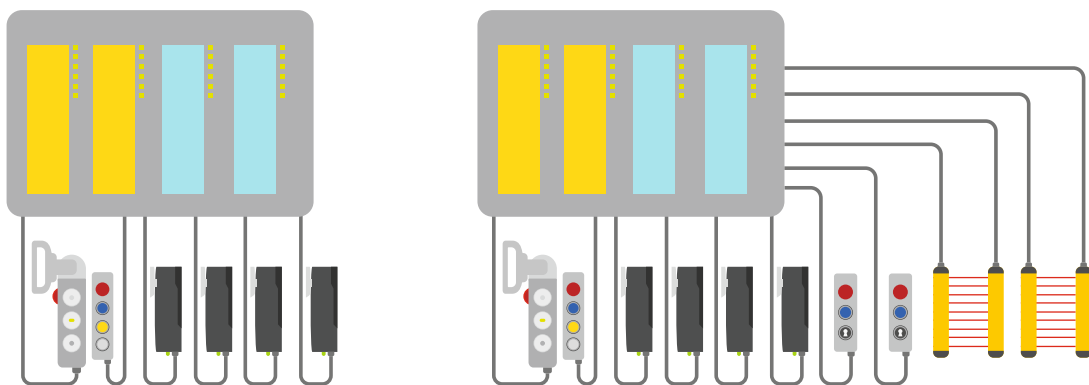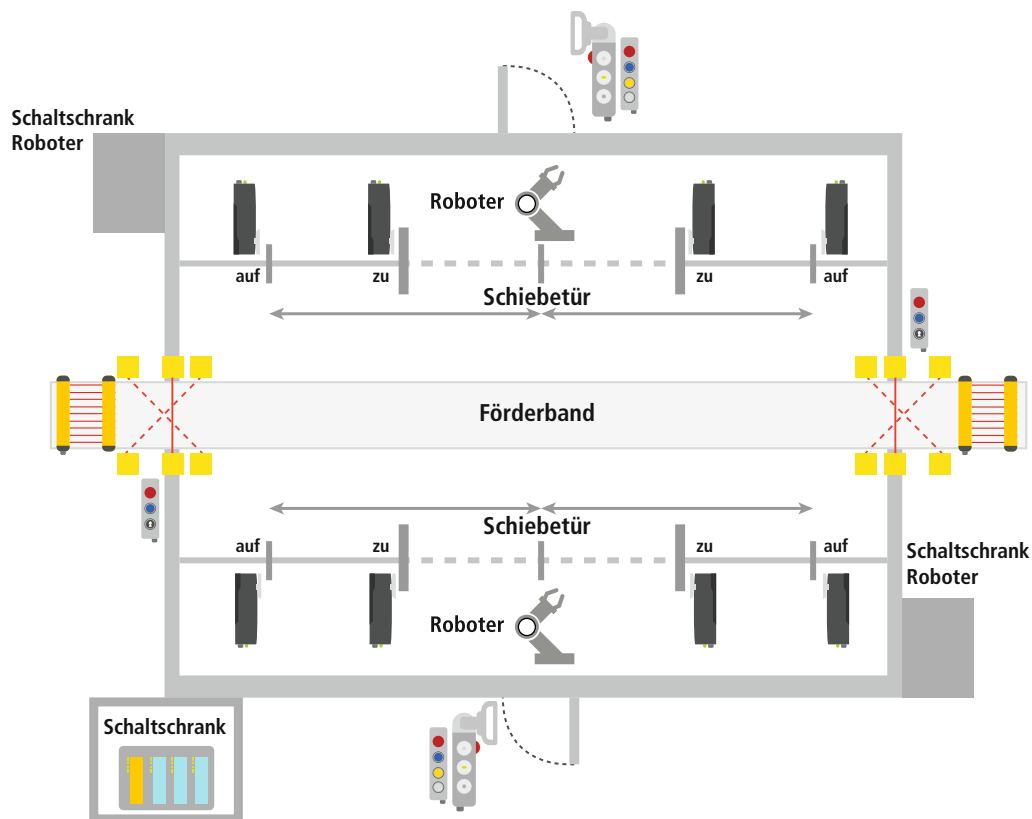
When connecting safety sensors, two OSSD inputs, a safe output for controlling guard locking and a diagnostic input are available for each connection.

HOLDX RS1-P8-...

LED-Diagnose

⚠ 🔒 📄

Error   Lock   Gate

Spannungs-versorgung		Safety outputs			Diagnose OUT	Magnet EIN	Safety inputs	
+ 24 V DC	GND	OSSD1 OUT	OSSD2 OUT		Diagnose OUT	Magnet EIN	OSSD1 IN	OSSD2 IN
1	3	4	7		5	8	2	6

Common PROFIsafe concepts

For a decentralized setup with control cabinets

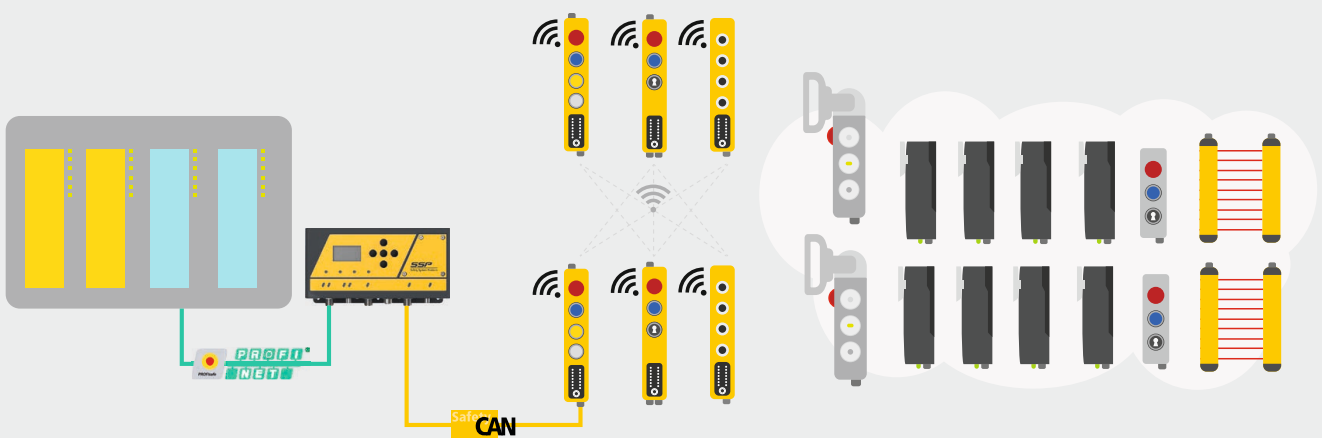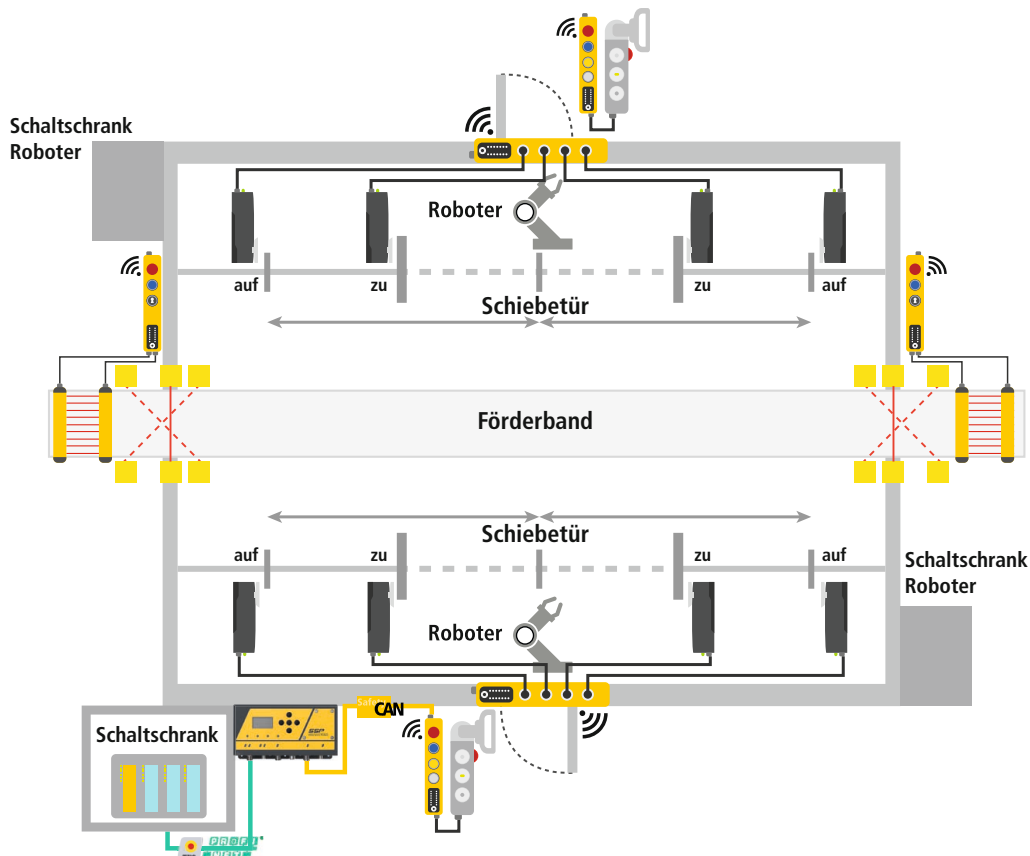**Disadvantages:**

✖ Large amount of wiring required to set up and dismantle the system

✖ Prone to errors during wiring

✖ Great effort for the creation of circuit diagrams when changing the application

Simplifier PROFIsafe concept

Decentralized concept with the Simplifier System and PROFIsafe

Schaltschrank Roboter

Roboter

auf zu zu auf

Schiebetür

Förderband

Schiebetür

auf zu zu auf

Schaltschrank Roboter

Roboter

Schaltschrank

Safe CAN

PROFINET

PROFINET

Safe CAN

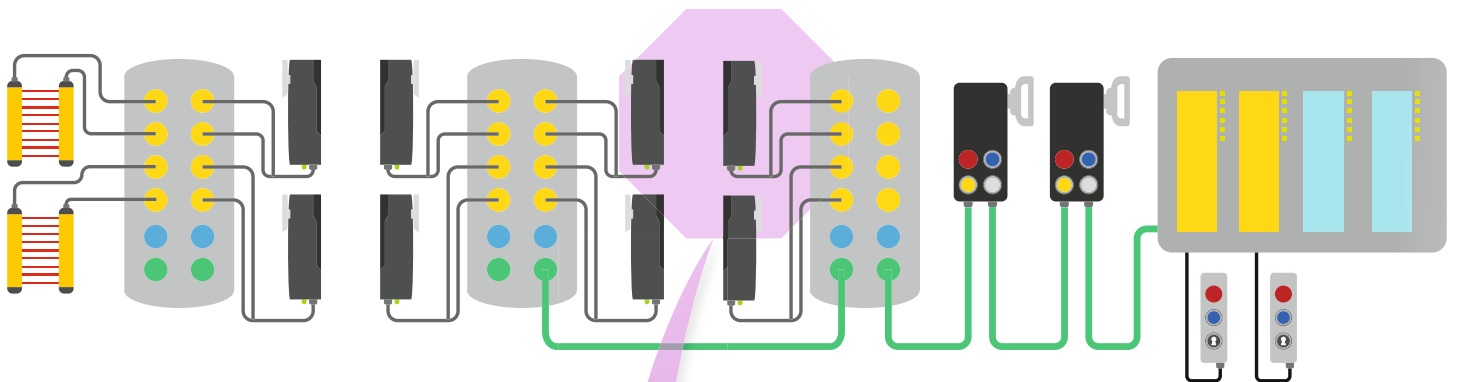## Advantages:

✓ **Reduced wiring:** Security devices are collected via Simplifier and sent to Gateway

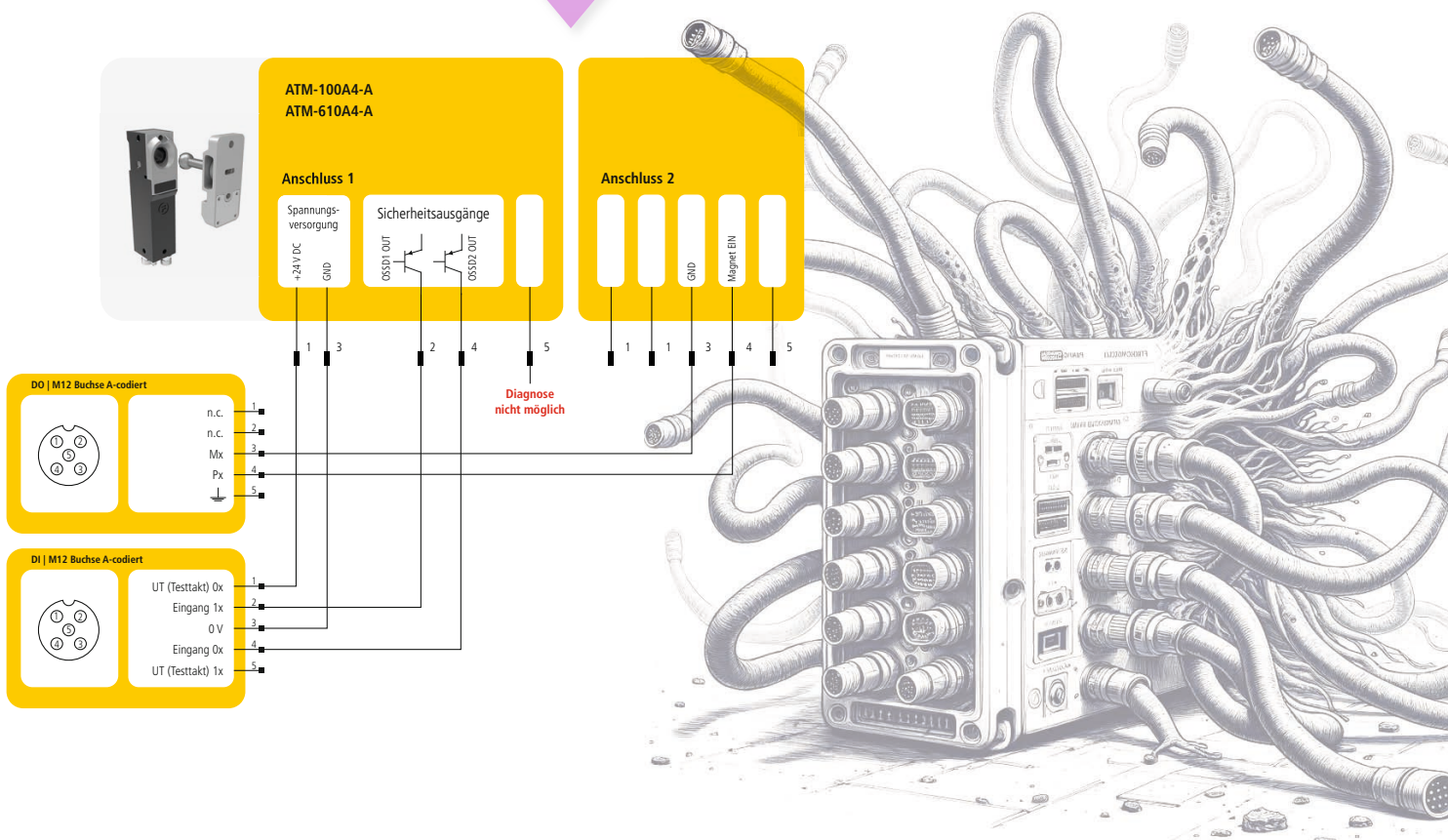✓ **Simple circuit diagram creation and customization:** Fast and low-cost adaptation to application changes

Common PROFIsafe concepts

In a decentralized setup with standard field boxes and PROFIsafe modules

I/O modules with M12 4- or 5-pin connections

Disadvantages:

✖ Many different PROFIsafe devices, cost-intensive

✖ Enormous wiring effort for the different participants

✖ Inaccurate to no diagnosis of open or closed doors

✖ Different PROFIsafe devices and technologies, additional effort:

- Planning & commissioning

- Maintenance & warehousing

ATM-100A4-A
ATM-610A4-A

Anschluss 1

Spannungs-versorgung

+24 V DC | GND

Sicherheitsausgänge

OSSD1 OUT | OSSD2 OUT

Anschluss 2

GND | Magnet EIN

1 | 3 | 2 | 4 | 5 | 1 | 1 | 3 | 4 | 5

Diagnose nicht möglich

DO | M12 Buchse A-codiert

n.c. 1
n.c. 2
Mx 3
Px 4
⏚ 5

DI | M12 Buchse A-codiert

UT (Testtakt) 0x 1
Eingang 1x 2
0 V 3
Eingang 0x 4
UT (Testtakt) 1x 5

Simplifier Fieldbox concept

Advantages:

✓ **Efficient integration:** Reduction in overall costs thanks to simplified connection options

✓ **Standardized security technology:** Only one PROFIsafe device is required, the Simplifier Gateway. This eliminates the need for complicated mixing systems that involve time-consuming storage and commissioning

✓ **Saving resources and time:** Less cabling due to M12 8-pin connections

✓ **Precise diagnostic capabilities:** Precise condition monitoring thanks to OSSD outputs
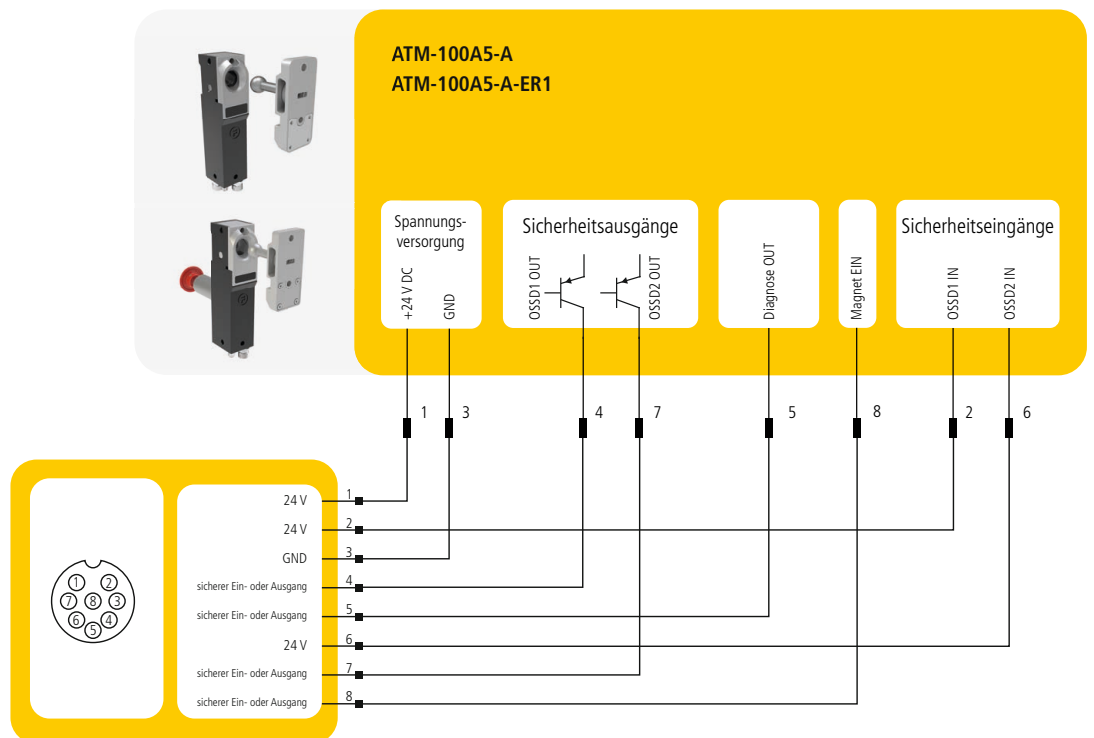
Application examples
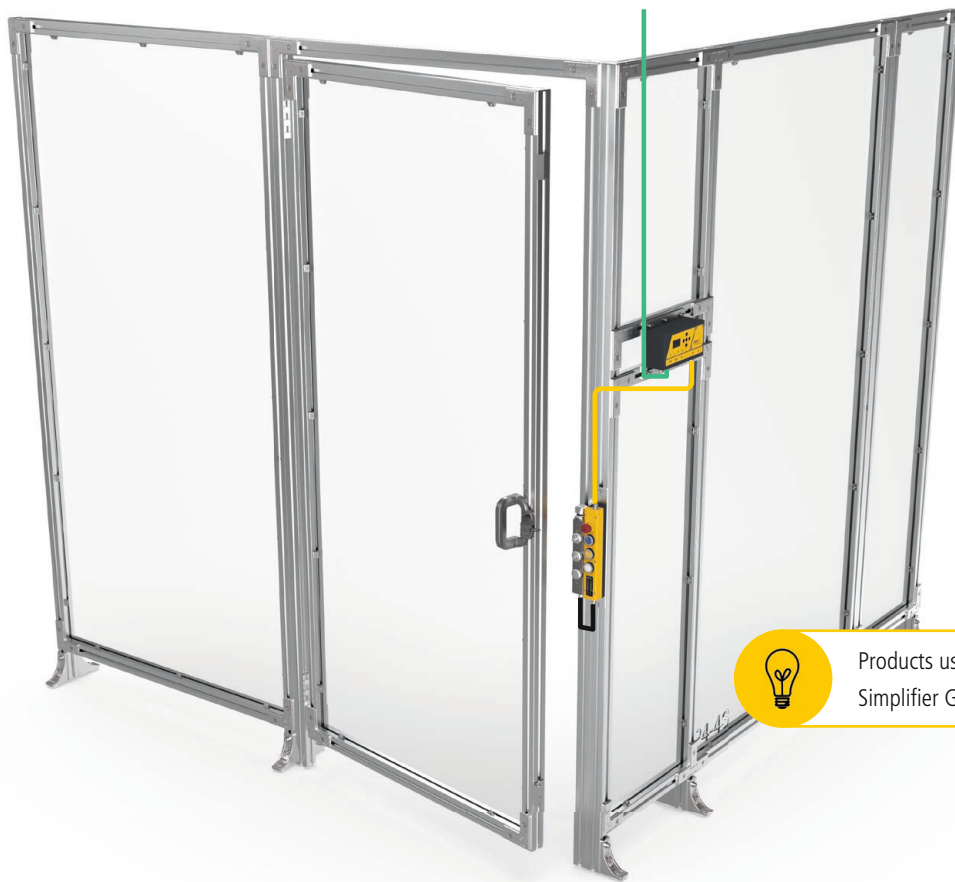
Products used: tGard,
Simplifier Gateway, Simplifier Gatebox

Simple door protection with tGard safety switch.

Coordinated design, the combination of our solenoid interlocks and a Simplifier gatebox result in a width of only 80 mm and can therefore be ideally attached to a safety fence - without any overhang. The Simplifier Gateway can also be mounted anywhere on the fence and is not tied to the solenoid interlocks or doors.

All information is transmitted securely to the Siemens control system via the Simplifier Gateway using PROFIsafe and can be integrated into the existing program there. Functions such as button illumination or safe inputs and outputs can be programmed centrally in the Siemens control system. The solenoid interlock connected to the Simplifier gatebox is controlled directly via the Siemens controller in accordance with Performance Level e.

✓ Configuration of the Simplifier Gateway is stored on the memory card

✓ Response time from safety switches to the Siemens controller of just 150 ms

✓ Solenoid interlock tGard Performance Level d oder e

✓ Optional escape release - can be used with swing and sliding doors

✓ Left or right door hinge

Safety switch on the lintel

Products used: Atom,
Simplifier Gateway, Simplifier Gatebox

Flexible mounting on the door lintel with Atom solenoid interlock.

The Simplifier Gatebox and the Simplifier Gateway can be installed independently of each other. Solenoid interlocks or other safety functions can be freely selected and connected via the Simplifier Gatebox. This offers maximum flexibility in the planning of the system and reduces the costs for the protective housing. If, for design or functional reasons, the safety switch has to be fitted inside the safety fence or on the lintel of the door, it's no problem for the Simplifier system. The appropriate safety switch for the application is selected and connected to the corresponding M12 connector, regardless of whether this is 5, 8 or 12-pin, the appropriate connection interface is available.

✓ Any modern safety switch can be connected to the Simplifier Gatebox

✓ Safety switches can be mounted to save space

✓ Complete implementation of the function via PROFIsafe in the Siemens control system

Products used: 2 x tGard,
Simplifier Gateway, Simplifier Gatebox

Flexible and cost-effective solution.

If an operating unit is not required at each train approach door, the Simplifier Gatebox is the most economical solution for monitoring two doors. Up to two solenoid interlocks can be connected to one Simplifier Gatebox.

Each solenoid interlock is transmitted to the higher-level safety controller as an independent safety function. Two individually controllable safety outputs can release each guard locking individually.

✓ Connection of up to 2 safety switches to one Simplifier Gatebox

✓ Cost-optimized application

✓ Simple integration into the Siemens control system via PROFIsafe

✓ Each safe guard locking can be evaluated separately and individually and unlocked with one or two safe outputs each

CAN — Products used: 2 x tGard, Simplifier Gateway, 2 x Simplifier Gatebox

The wireless alternative: secure information flow via CAN with operating units at every door.

If a solenoid interlock or process interlock is required at each access door to the system, as well as emergency stop buttons and operating units, up to 16 doors can be networked wirelessly or via secure CAN communication and transferred to the higher-level safety controller via a Simplifier Gateway using PROFIsafe.
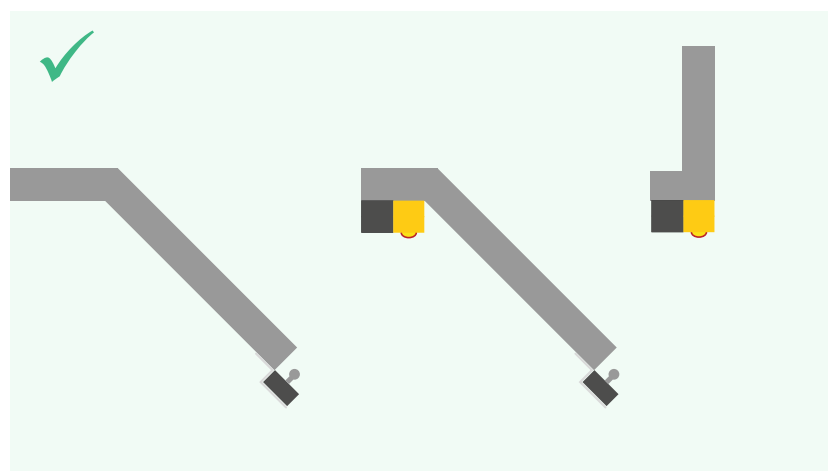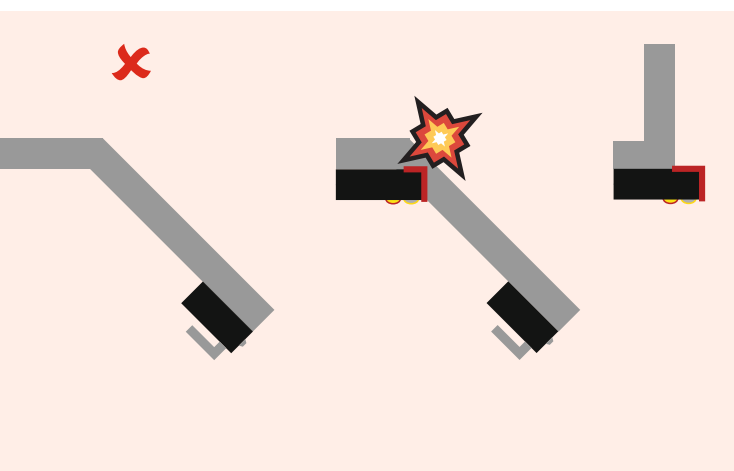
No interfering contours when opening the door and no protrusion at the end of the fence
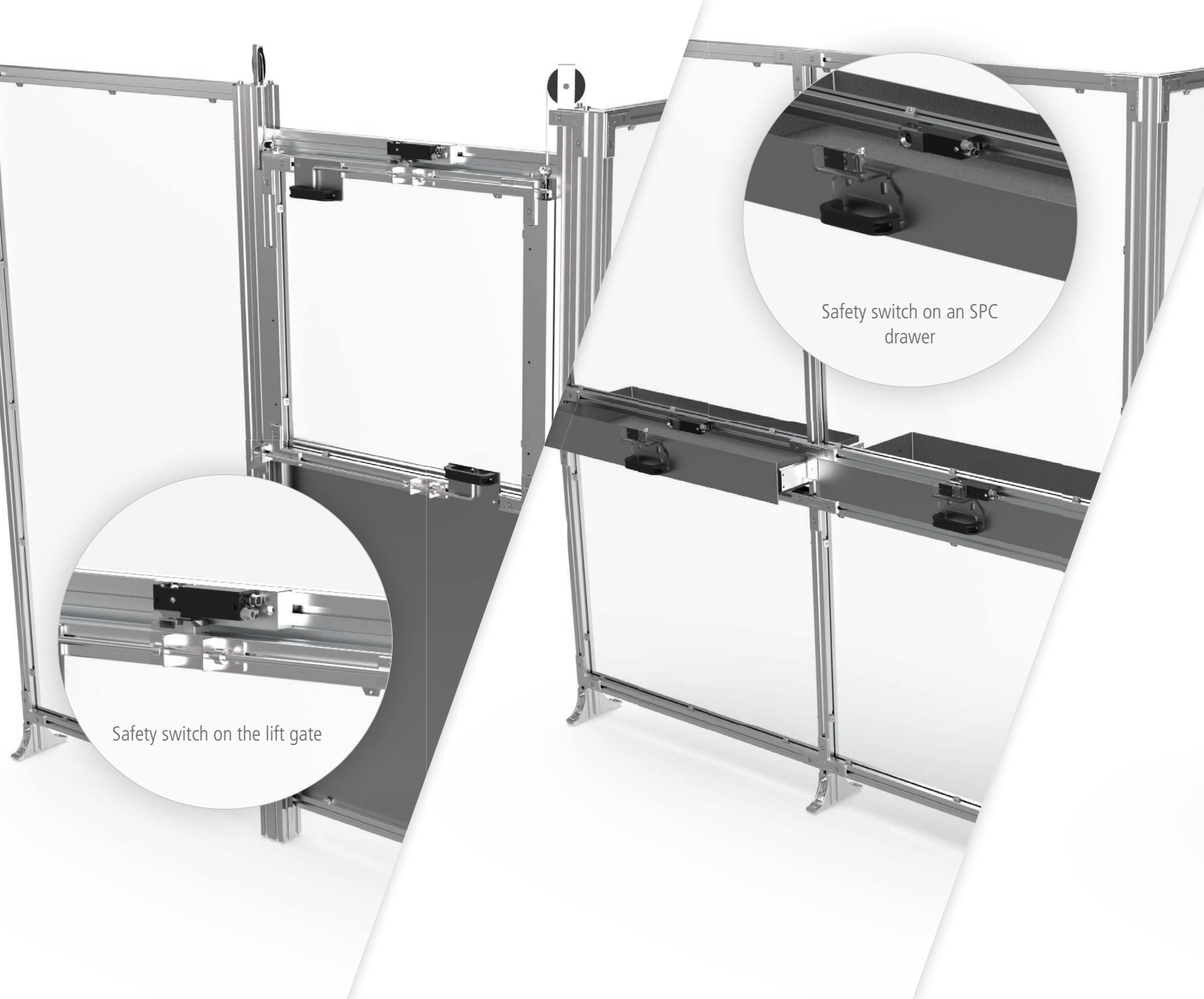
Safety switch on an SPC drawer

Safety switch on the lift gate

Simplifier System: Integrated safety solutions for industrial plants.

✓ **Installation flexibility:** The system enables flexible placement of the security devices independently of the Simplifier Gateboxes and the Simplifier Gateway

✓ **Wireless communication:** Up to 16 gateboxes can be securely connected to the Simplifier Gateway in accordance with PL e, which provides PROFIsafe transmission to the Siemens controller

✓ **Simpler connections:** Compared to conventional field boxes with 5-pin connections, which require two slots, the Simplifier system simplifies this process significantly

✓ **Status transmission:** Information such as door open/closed or locked/unlocked can be transmitted directly which is not the case with standard field boxes

Safety switch on the lintel

✓ **Decentralization:** The solutions for lift gates and SPC drawers allow a secure and direct connection to the gateway without having to do without PROFIsafe

✓ **Double-leaf doors:** Monitoring is simplified by the Simplifier Gatebox, whereby door status information and safety functions can be transmitted directly without complex wiring and control cabinet evaluation

✓ **Operating units:** No more complicated wiring is required for operating units, and safety functions can be evaluated directly via a Simplifier Gatebox without a control cabinet

we simplify safety

Products used: tGard, light curtain
Simplifier Gateway, 2x Simplifier Gatebox

Universeller Schutz mit PROFIsafe: Sicherheitslichtvorhänge einfach integriert.

PROFIsafe guarantees flexible, safe and reliable transmission of all safety-relevant information to the Siemens control system - regardless of the protection used. Both solenoid interlocks and safety light curtains can be easily connected to the Simplifier Gatebox. This ensures that all relevant information is ultimately transmitted via PROFIsafe, regardless of the connected safety functions or devices. This ensures maximum flexibility and safety for machines and systems.

✓ Easy to plan

✓ Extremely fast response times via Simple-CAN

✓ Simple integration of different safety functions

Access control via RFID safety key.

After the door has been requested to open at the Simplifier Gatebox, the system switches to a safe state. However, before the guard locking releases the door, an employee must remove an RSK Safety Key. This personal key protects the person from accidentally reactivating the system. Up to four RSK keys for up to four people can be monitored at one access door.

Only when all persons have left the system and all RSK Safety Keys are back in the unit (RFID monitored), the system can be acknowledged and switched on again.

Entering the facility

1 | Requesting access

2 | Unlocking and removing the RSK Safety Key

3 | Release of the door magnet

4 | Safe entry to the system

Leaving the system

1 | Exit the system

2 | Returning all RSK keys

3 | Closing the doors

4 | Reset the system

5 | Locking the doors and RSK keys

6 | Switching on the system

Siemens integration

**Integration of the Simplifier Gateway in the TIA Portal**

If the Simplifier Gateway is to be integrated into an existing project, the GSDML file should be installed first. A Simplifier Gateway is then added in the hardware configuration.

The new PROFIsafe device can now be connected to the master PLC using drag & drop.
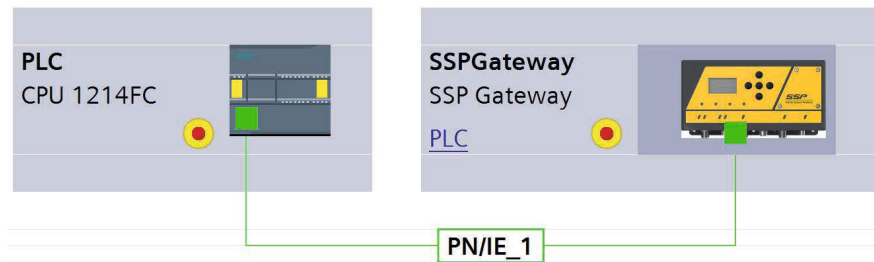

The data areas can be added to the device overview using drag & drop.

In our example, only module_1 is shown, which already provides 64-bit information.
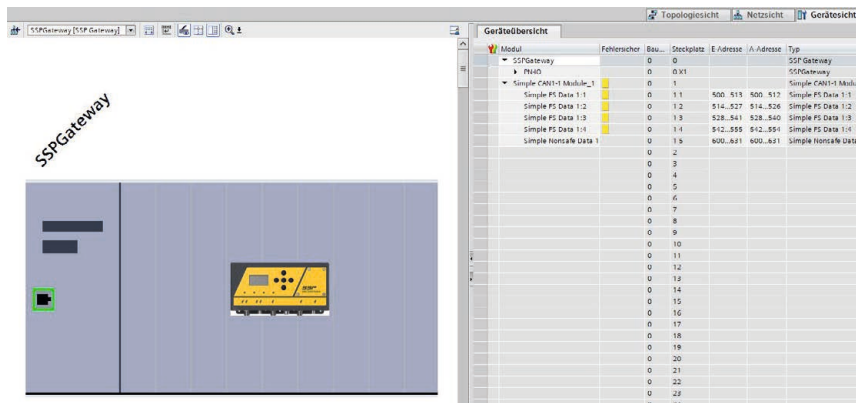
In the next step, the safe function block is configured. The safe signals from the Simplifier Gateway can be processed there.

The example below shows a simple acknowledgement function. A total of three emergency stop buttons are linked via an AND module. There are also three RESET buttons that are linked via an OR module. The signals then go accordingly to the RESET module provided by Siemens.
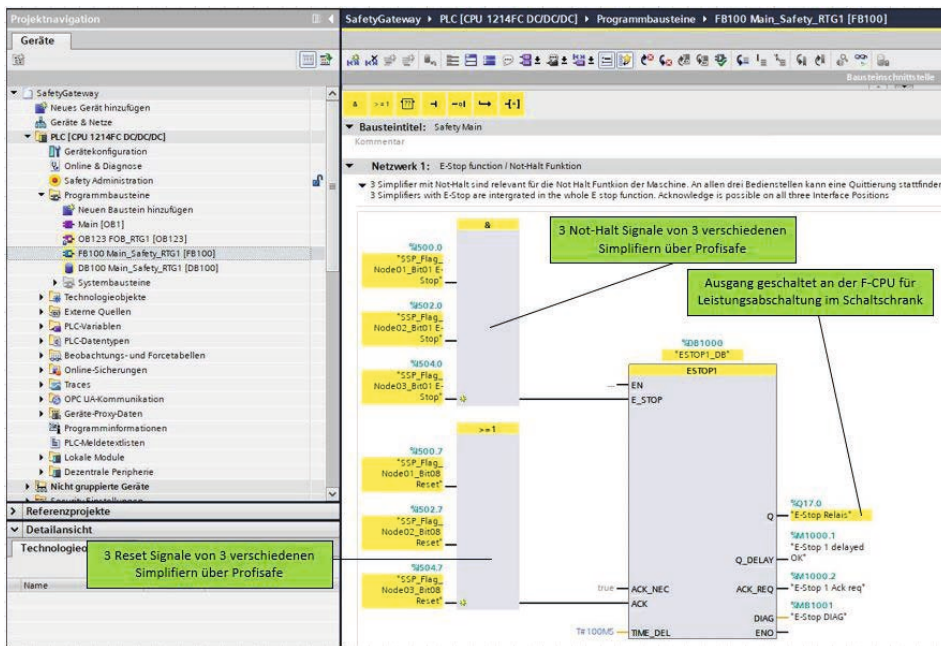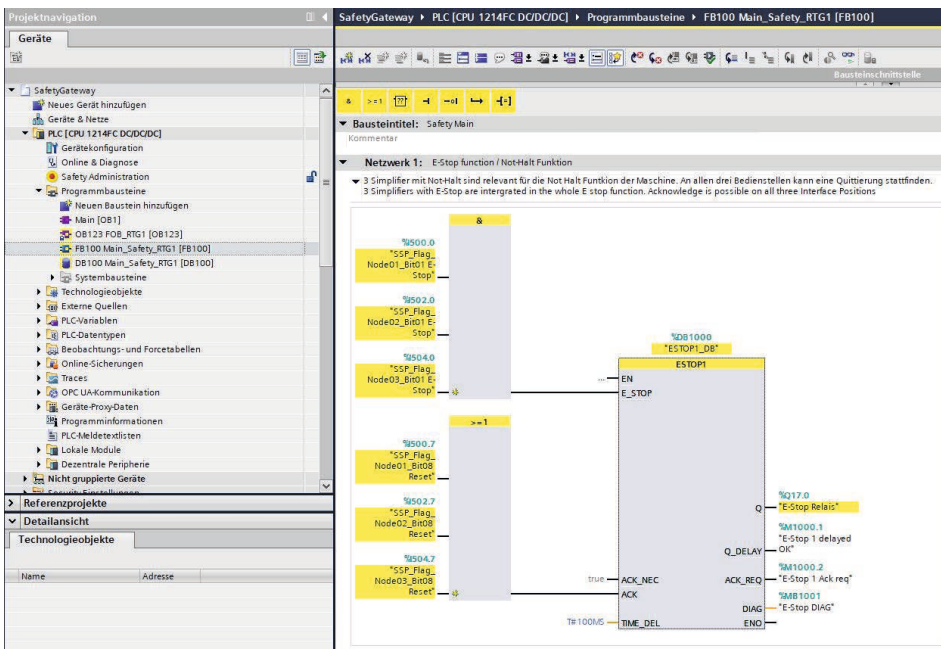
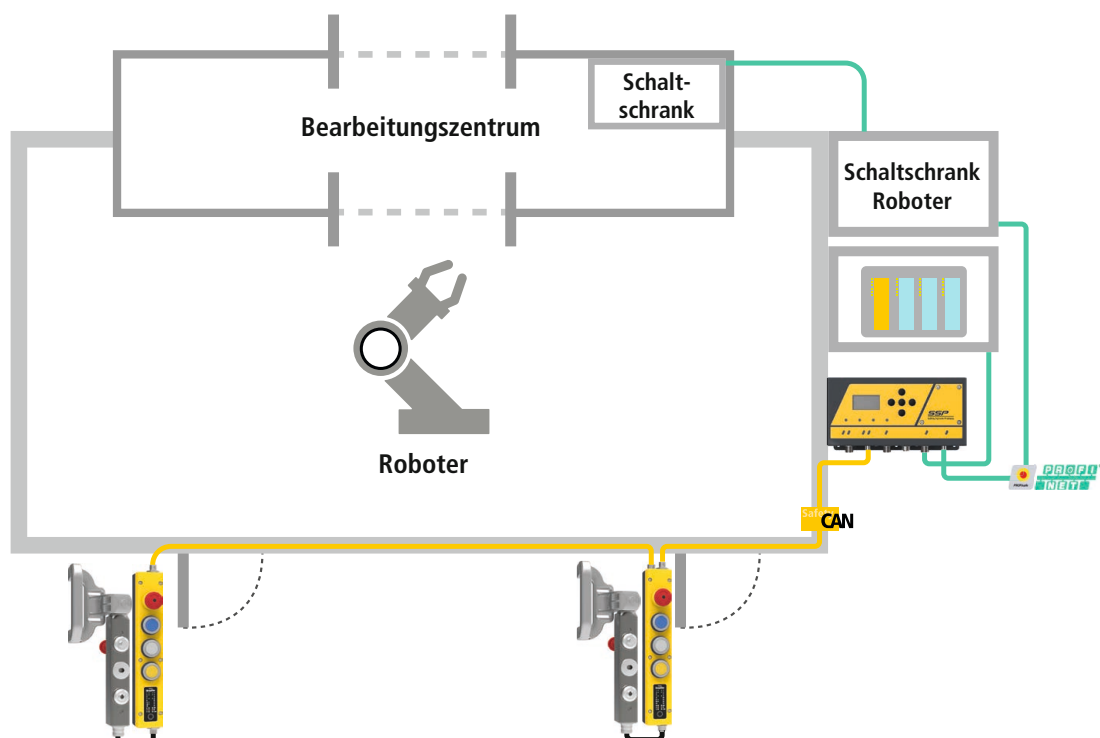# Application examples
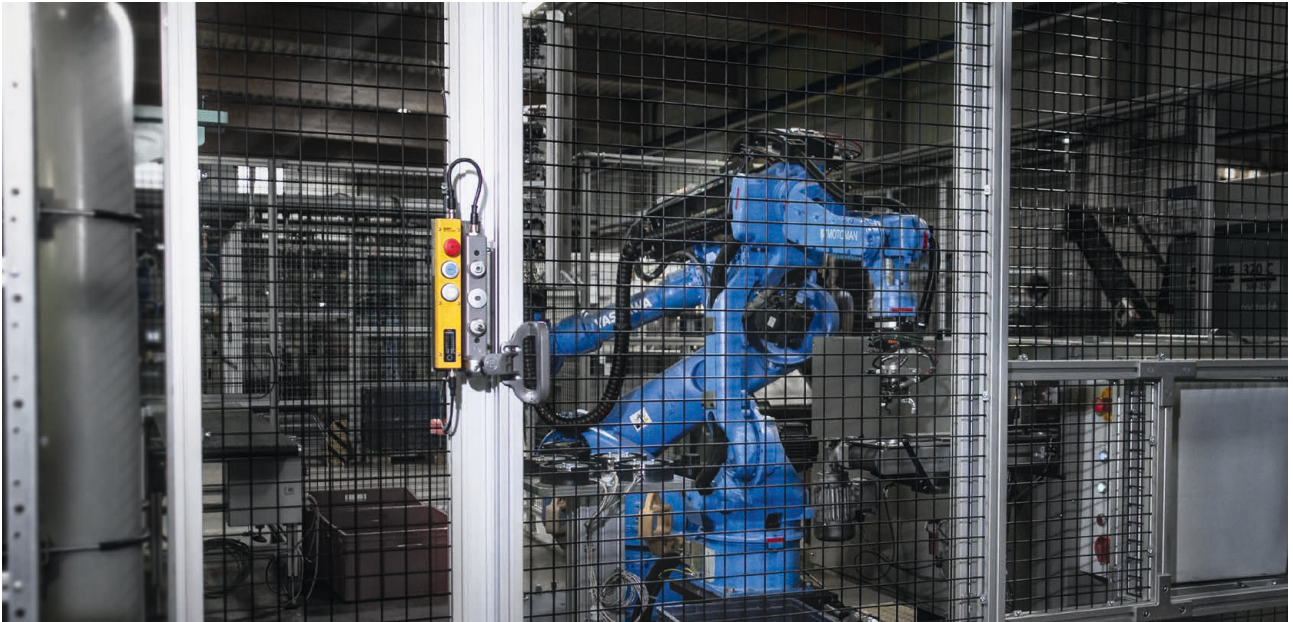
The secure communication between the Simplifier gateboxes and the Simplifier Gateway runs either via a secure wireless network or Simple-CAN according to PL e. Two access doors can be easily monitored with the Simplifier Fieldbox.

✓ Simple commissioning

✓ No wiring errors when setting up and dismantling the system

✓ Ready-made Eplan macros
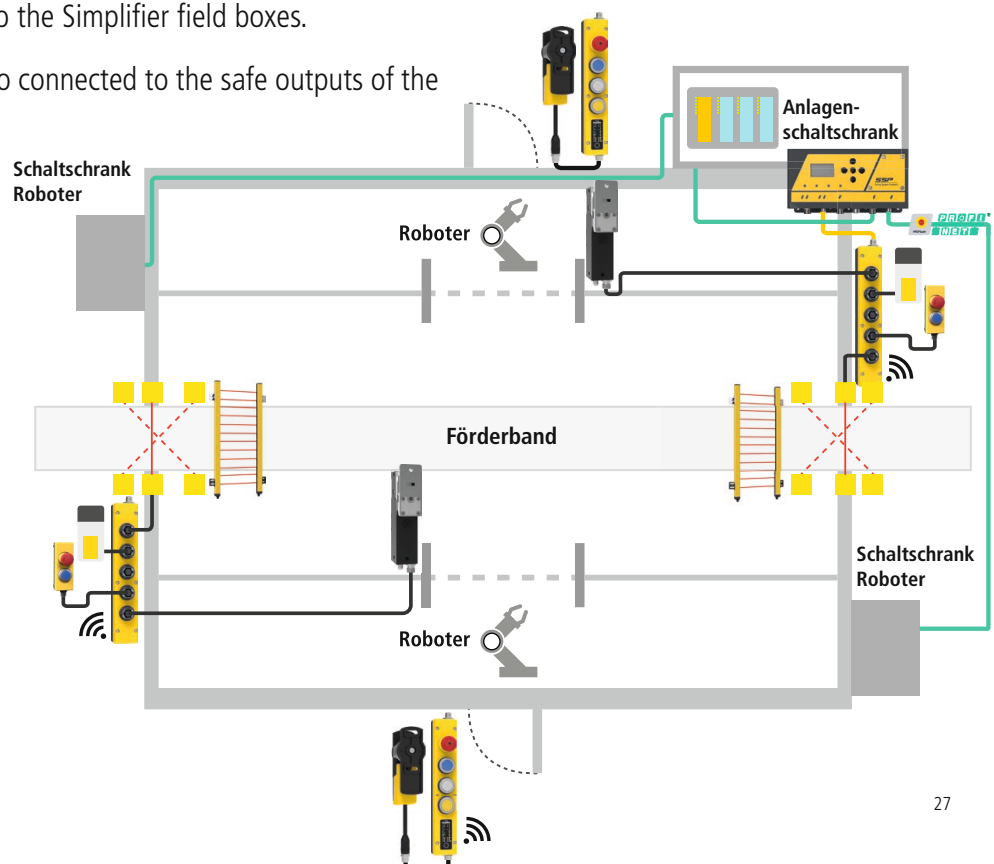
✓ Simple and flexible expansion

Robot systems

In the example of a robot application, two access doors to a system with robots and conveyor belt must be secured. Within the system, lifting or sliding gates can be used to separate the robots from the conveyor belt for maintenance work. Safety light curtains with muting monitor the material transport.

With just four Simplifier Gateboxes, all safe inputs and outputs of the system can be monitored decentrally. Two access doors, each with a process interlock, monitor access to the system. The sliding or lifting gates are monitored by a solenoid interlock connected to the Simplifier field boxes.

The pneumatic safety valves are also connected to the safe outputs of the Simplfier Fieldbox.

Schaltschrank Roboter

Anlagen-schaltschrank

Roboter

Förderband

Schaltschrank Roboter

Roboter

Packaging systems
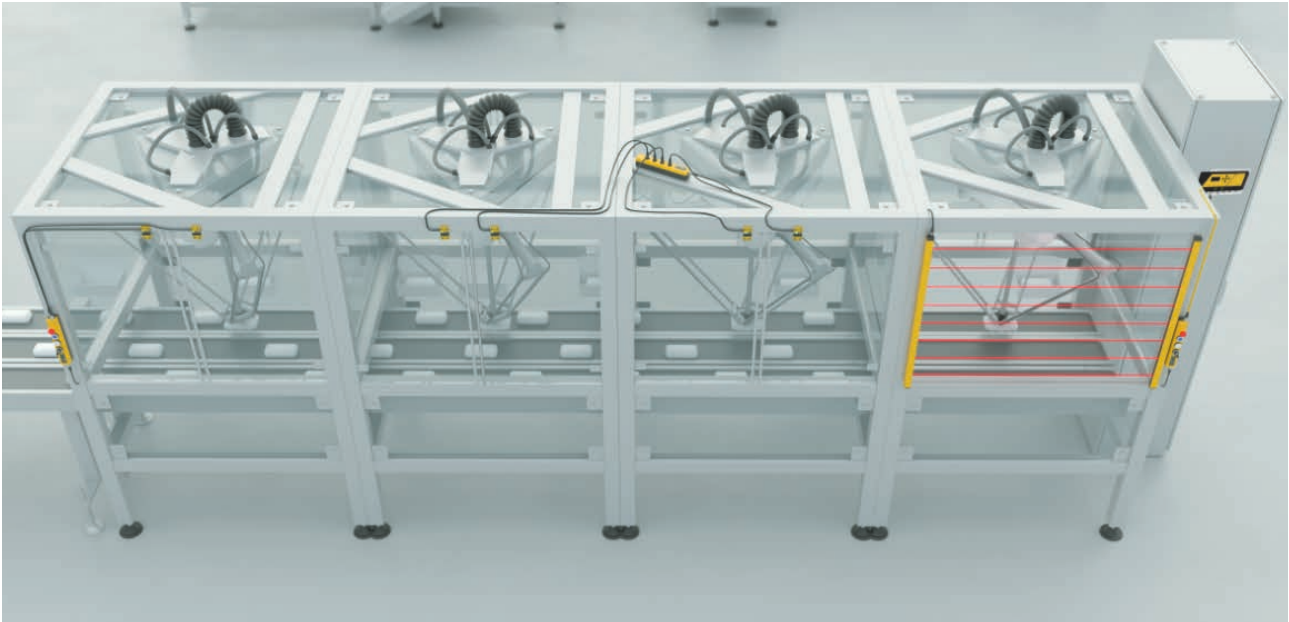
Assembly and packaging machines often have numerous doors to ensure access to the machine. The combination of HOLDX magnetic guard locks and Simplifier devices in conjunction with the Simplifier Gateway is the ideal solution. Wireless communication and PROFIsafe transmission guarantee a fast flow of information with minimal installation and wiring.

Two operating units with emergency stop and reset buttons are available on each side of the system for the operator to be able to react to hazardous situations at any time. Two Simplifier field boxes monitor four process interlocks in a decentralized manner. Safety light curtains and the other guard locks are connected to the Simplifier gateboxes. There is no need for a control cabinet for the safety application. The Siemens controller in the control cabinet receives all information via PROFIsafe.

Spritzgussanlagen

For the first time, an injection moulding machine can be addressed and evaluated decentrally and directly via the EUROMAP 73/78 interface using PROFIsafe. With just five Simplifier Gateboxes, a complex injection molding automation system can be effectively monitored in terms of safety. In addition, standardized EUROMAP 73/78 interfaces can be addressed directly via PROFIsafe. This means that all safety switches, operating units, safety light curtains and the EUROMAP 73/78 interface are directly available in the Siemens TIA portal in a safety-relevant manner.

Complex large-scale plants

**Minimal wiring errors in large automation systems.**

Safe wireless communication makes it possible for up to 128 Simplifier devices to communicate with each other and send information to a Simplifier Gateway. Thanks to wireless safety communication, the earth potential of the power supply for the Simplifier Gatebox is irrelevant.

When setting up and dismantling the system, Profinet cables do not have to be laid to each door; information is distributed securely via wireless communication. The number of Profinet addresses is reduced to a single Simplifier Gateway, which significantly reduces the cabling effort.

If secure Profinet communication is not available for the processing machines, this can be integrated potential-free on site via the Simplifier Gateway.
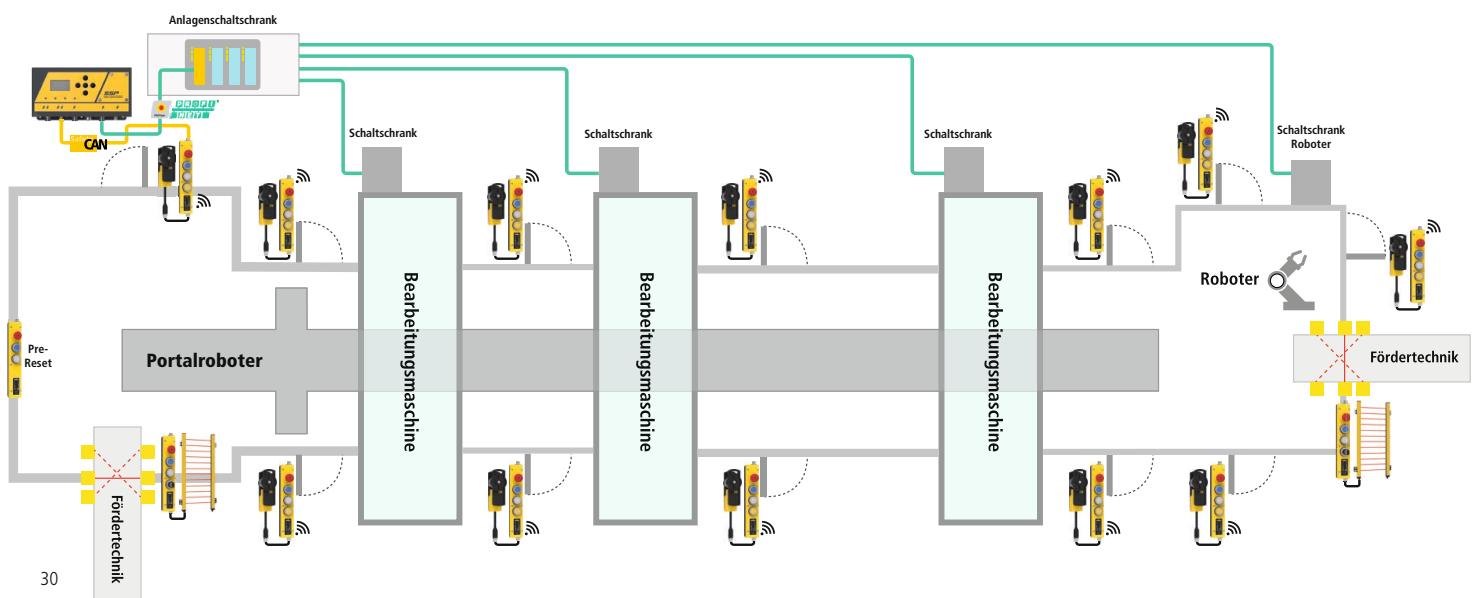
Intralogistics
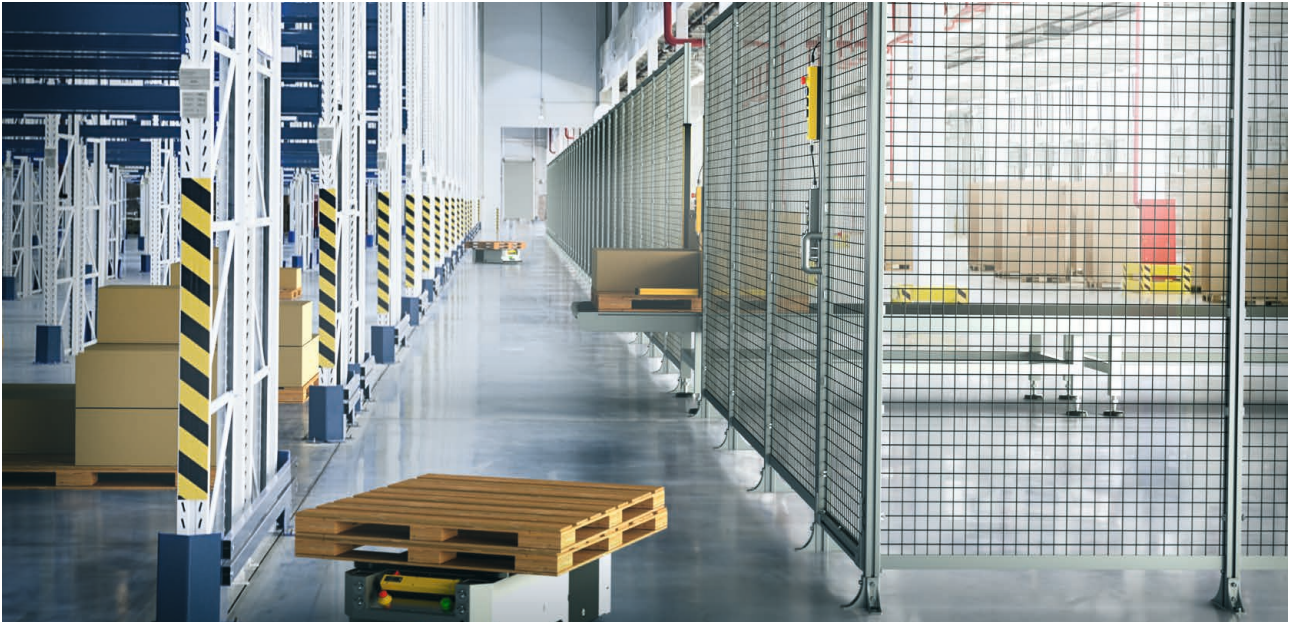
Key switch system for optimized control.

Three key switches enable switching between automatic and manual control, supported by positive opening safety switches in accordance with EN 60947-5-1. This measure protects against unauthorized access and keeps the safety functions intact. The advantage of implementation with the Simplifier system is the central programming in the Siemens control system and the wireless communication of all Simplifiers on the doors and SRMs. The SRMs can thus be switched off wirelessly for safety reasons.
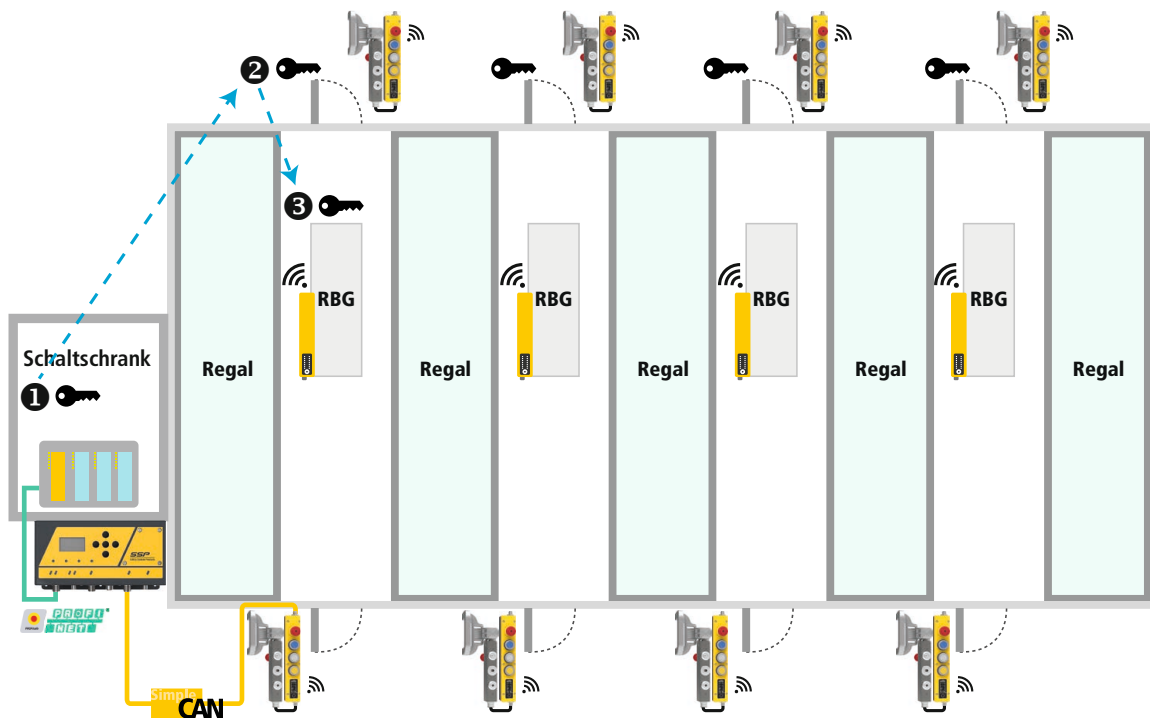
tGard safety switch

Modular and versatile

Different actuators

Rotatable head
Right/left stop

Auxiliary or escape
release

LED display

40 mm width

RFID actuator optional

Connection via spring
terminals or plug

THM-RX-SMDU-NTQ+T04829X001
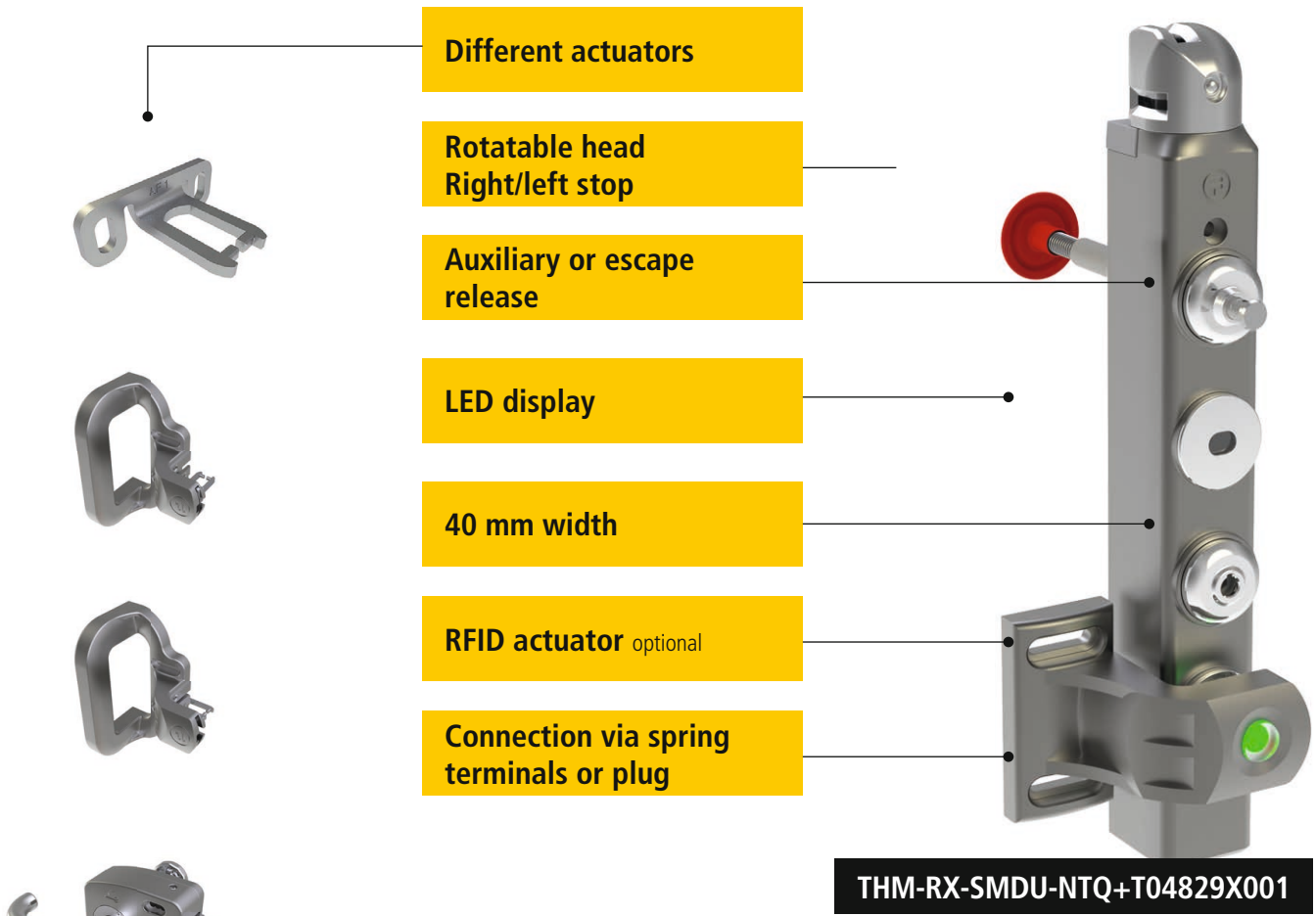
THM-RX-SMDU-QM

THM-SMDU-QM

PLe
HIGH
CODED

PLd
STANDARD
CODED

THM-SMDU-NTQ+T04829X001

Atom | ATM

The safety switch with RFID sensor

- ✓ Very small design in robust housing
- ✓ Flexible actuator that allows 14 mm offset
- ✓ Up to 8000 N locking force
- ✓ High RFID coding in acc. with EN ISO 14119
- ✓ SIL3 | Cat. 4 | PLe
- ✓ OSSD outputs
- ✓ Series connection possible
- ✓ LED status display

Louis | HGL

Hygienic safety switch with RFID sensor

IP 69

- ✓ Stainless steel housing for high hygienic requirements
- ✓ Up to 8000 N locking force
- ✓ High RFID coding in acc. with EN ISO 14119
- ✓ SIL3 | Cat. 4 | PLe
- ✓ IP67 and IP69
- ✓ First guard locking for 3-A sanitary standard

SAFIX safety sensor

Compact design

22 mm hole spacing
36 mm width

High protection classes

IP 67 - IP 69K

Connections

5 m cable /
10 m cable
or pigtail cable M12 8-pin

Technology

Modern RFID sensor technology

Switching distance

12 mm, can also be
approached from the side

Extended LED diagnostics

Double-sided

ECOLAB®   IP69K

Intelligent and secure door monitoring

Non-contact RFID safety sensors are always used when it is possible to open a door at any time. However, the prerequisite for this is that the system comes to a standstill quickly or that the required safety distance can be maintained. Short risk times and a fast and flexible wiring concept are therefore often among the most important requirements. This is where SAFIX, with its short risk time of just 75 ms and its series connection, can significantly simplify the planning of a system.

HOLDX R

The smart magnetic guard lock HOLDX R

Protecting process and people

The smart HOLDX R guard locking system protects packaging systems against 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 PL e in accordance with EN ISO 13849-1:2015. An integrated Bluetooth interface and the extended LED diagnostics enable smart operation and fast evaluation. With the RS (small, 600 N locking force) and RL (large, 1200 N locking force) versions, two variants are available for a wide range of applications.

Flexible

Movable anchor plate

Intelligent failure monitoring

With the help of magnetic flux measurement

LED diagnosis

Extended status display

High coding

2 coding levels according to EN 14119 standard/ individually coded

Magnetic force

600 N locking force variant S
1200 N locking force variant L
50 N permanent magnet

Compact design

Mounting on aluminum profiles from 35 mm width

Secure electrical locking

according to PLe EN ISO 13849-1

Connection

flexible pigtail cable
M12 8-pin or
M12 12-pin

INTERNATIONAL PARTNERS

Find them on our website

www.safety-products.de

Modifications and errors excepted

November 2023 | 1.0

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we simplify safety