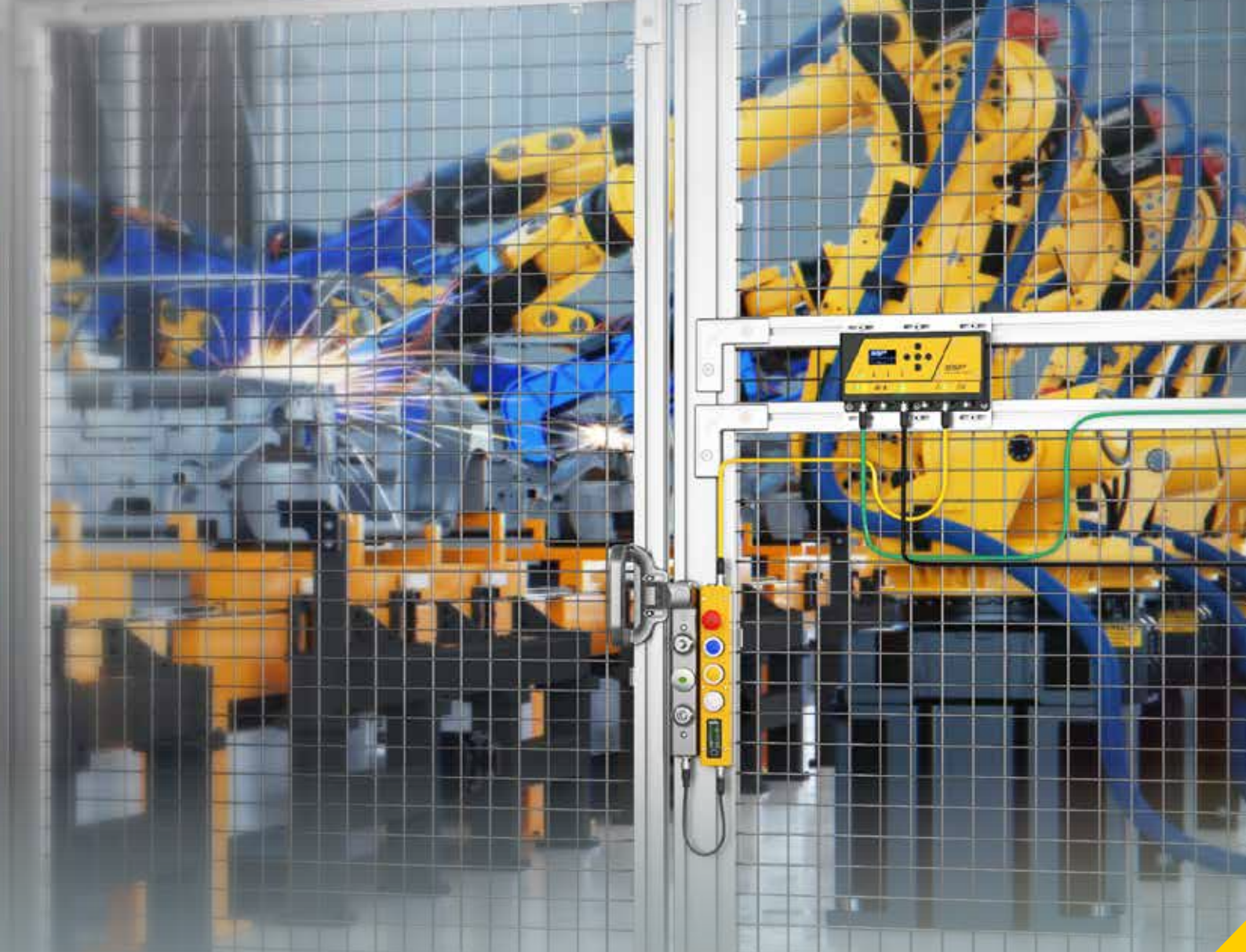




SOLUTIONS FOR SAFE BUS SYSTEMS



Wireless safety

Simplifier Gateway Profisafe
and Simplifier system



We simplify safety

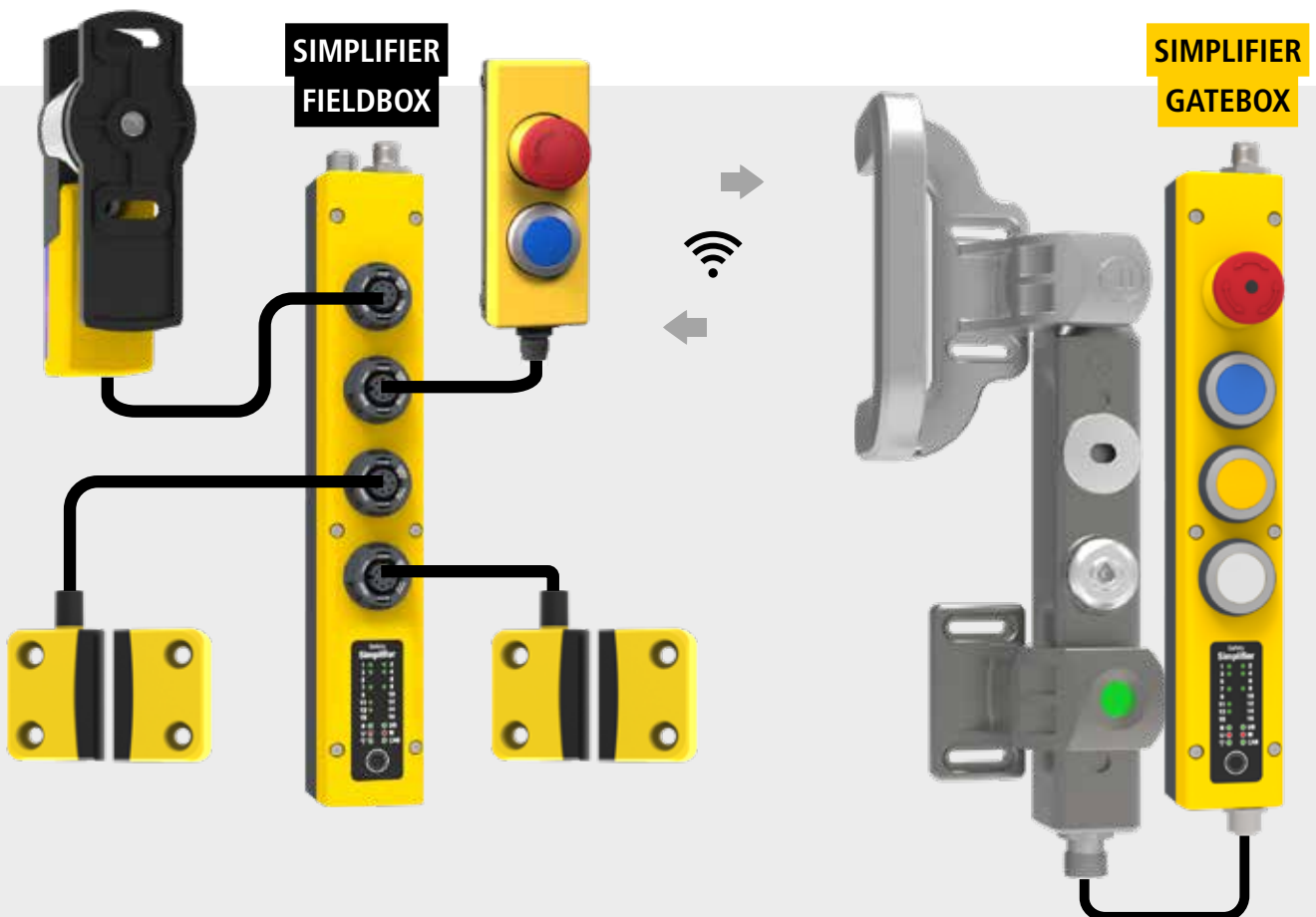
SSP
Safety System Products

The best of two worlds

Wireless safety meets safe bus systems

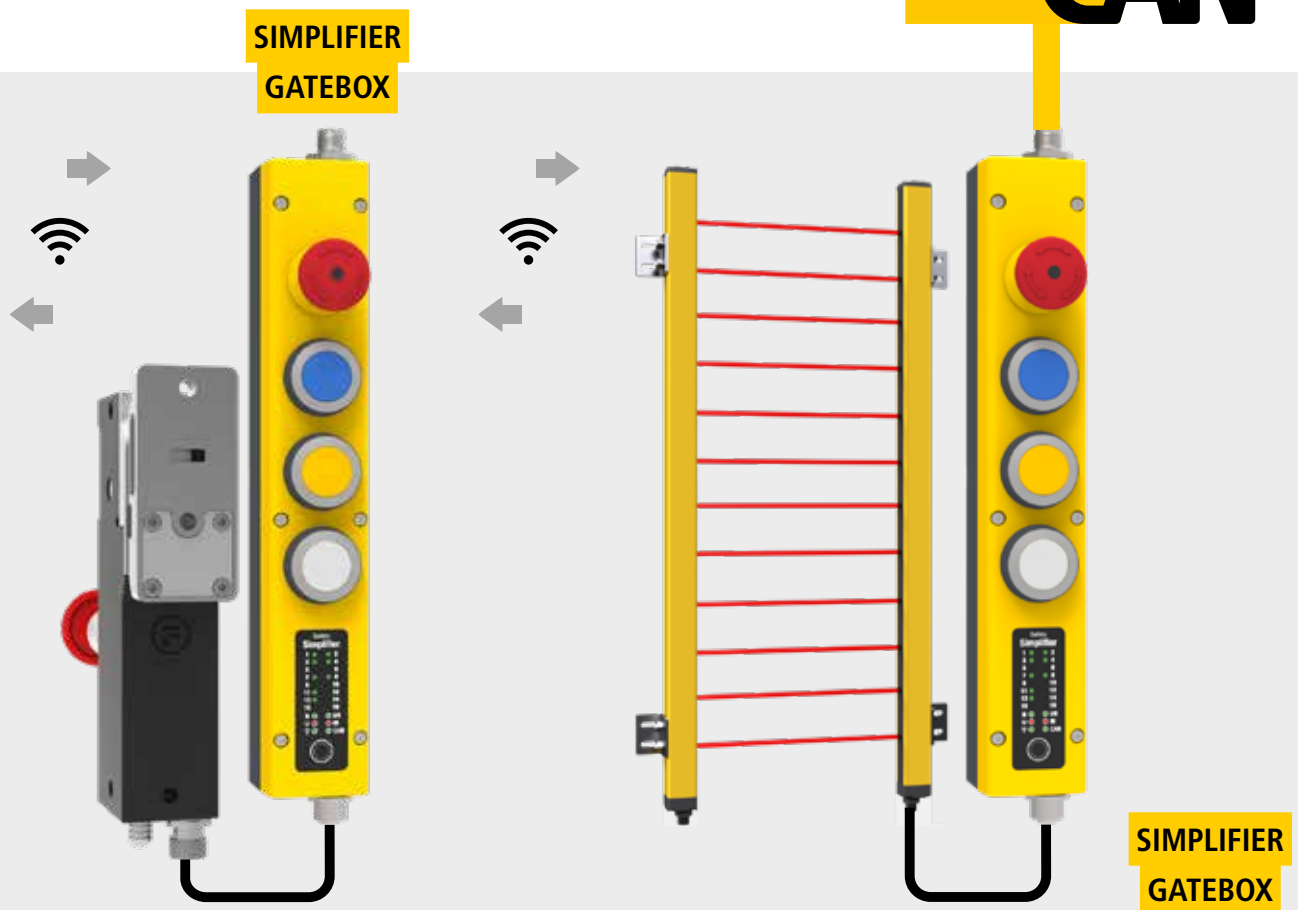
The Simplifier system is a flexible solution for various safety applications. Thanks to wireless communication and the integration of the PROFIsafe bus, the system enables the protection of doors, hatches, lifting gates and many more. Easy installation, seamless integration and flexible customization makes the system the perfect choice. A Simplifier Gateway can connect up to 32 Simplifier devices with 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
- ✓ Programming of all safety functions centrally in the Siemens control system or in Simplifier Manager
- ✓ Low wiring effort thanks to safe wireless or CAN communication
- ✓ Modular and expandable - for safety switches, safety light curtains, I/O modules, push-button boxes and much more
- ✓ Both Simplifier devices and the Gateway can be placed outside the electrical cabinet





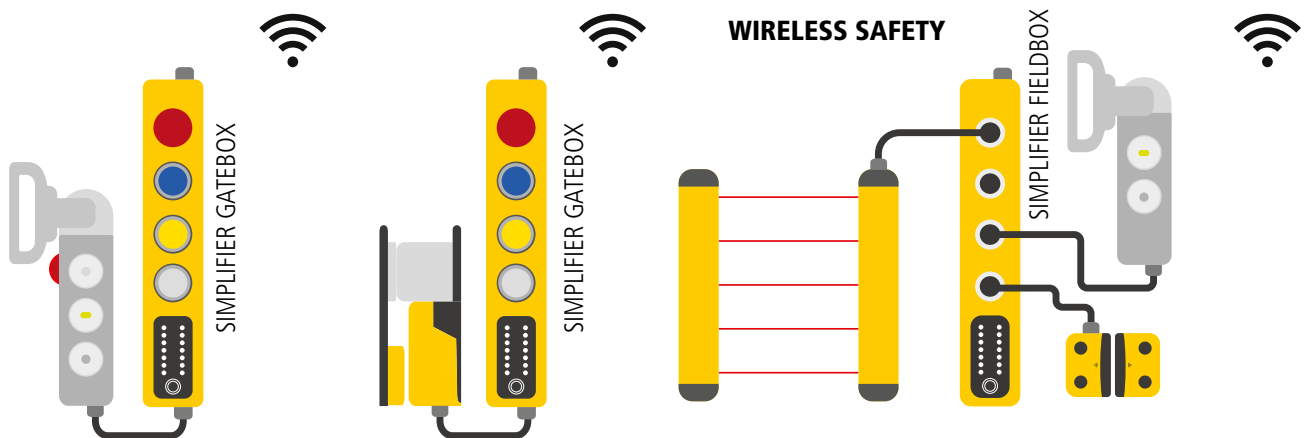
Simple
CAN



The Simplifier System

Two types of safety communication

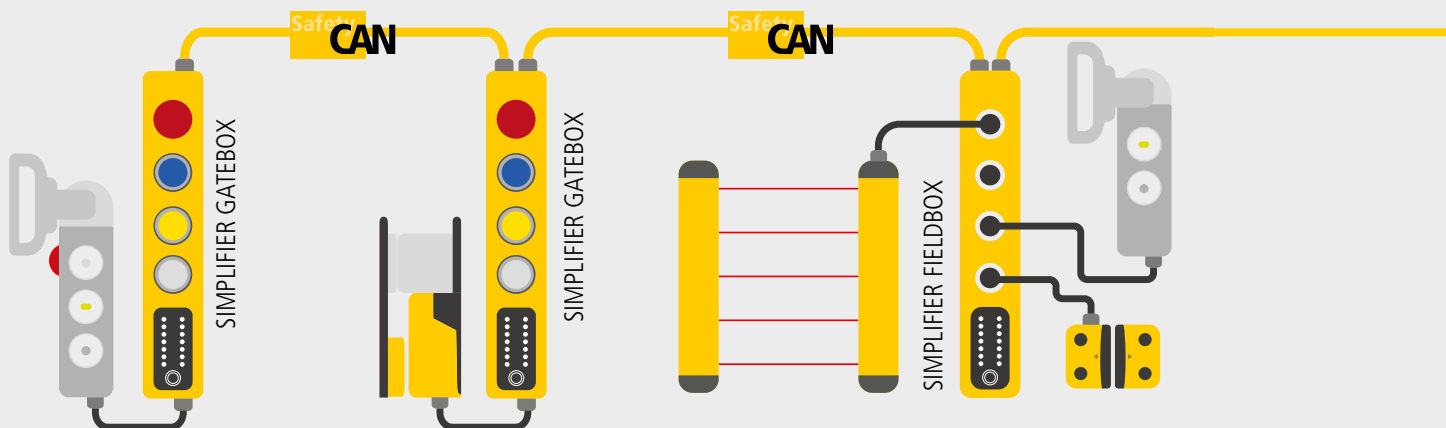
1 | WIRELESS COMMUNICATION

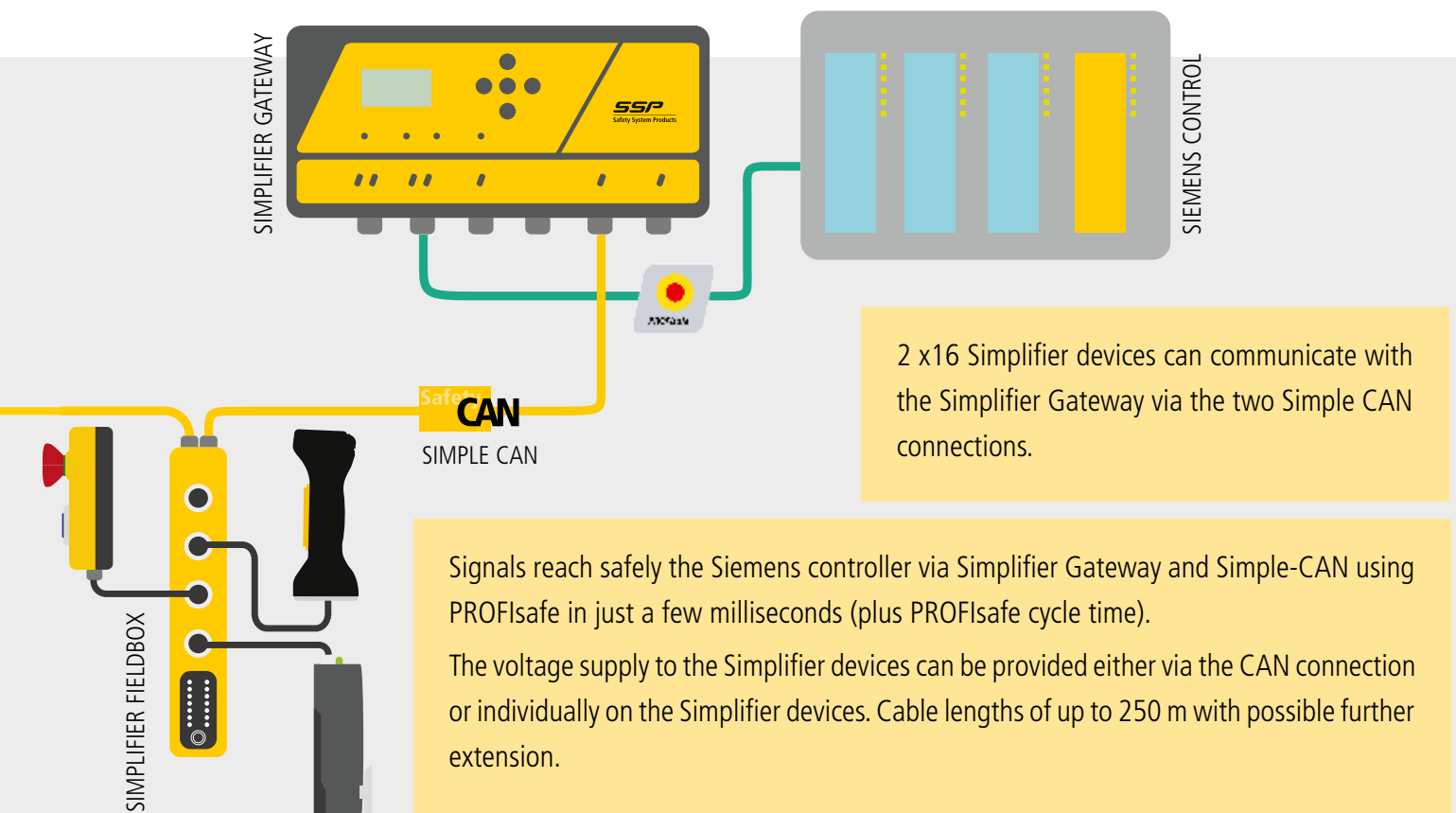
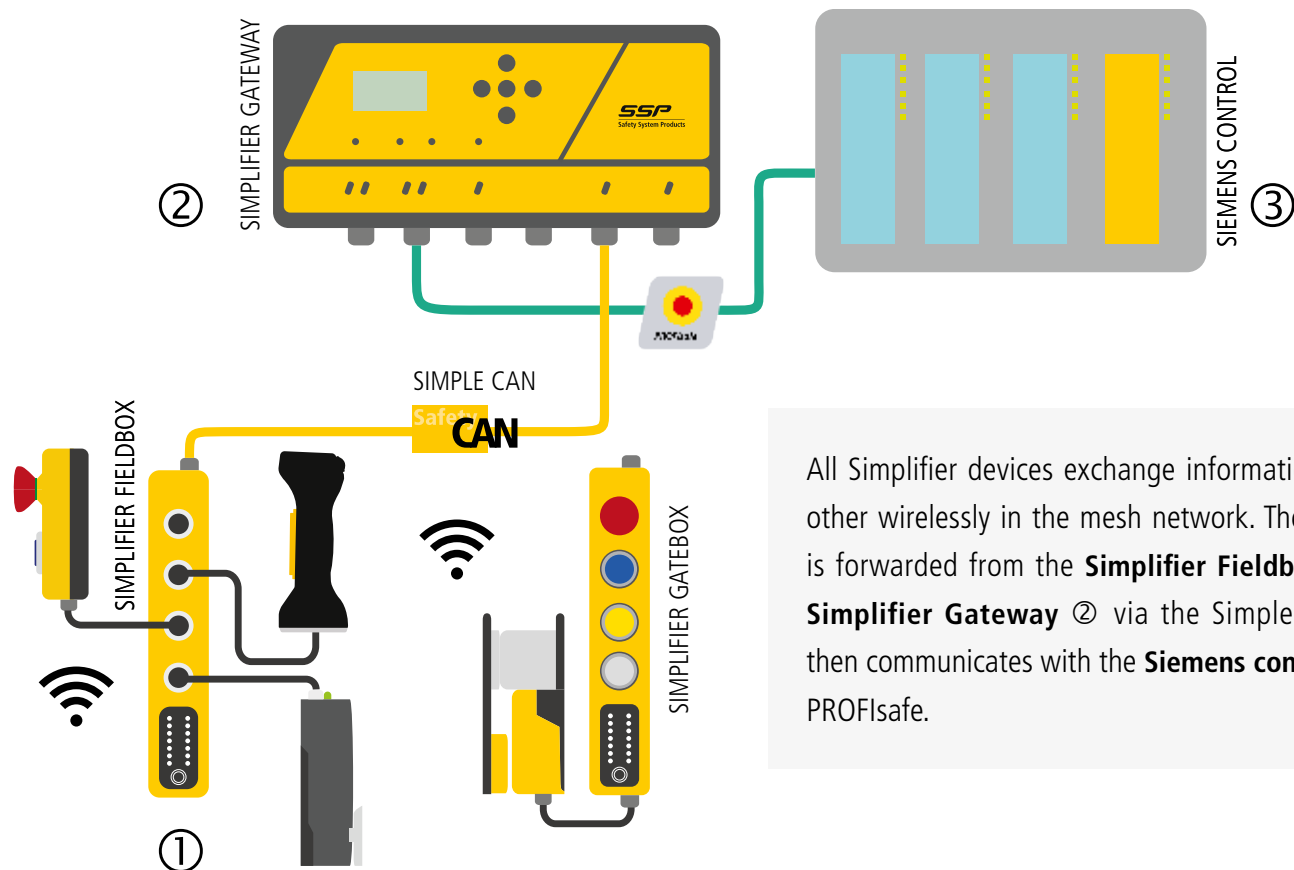


Independently of CAN or wireless safety, all information reaches the Siemens controller via the Simplifier Gateway on PROFI-safe and can be programmed and managed centrally in the TIA programming software.



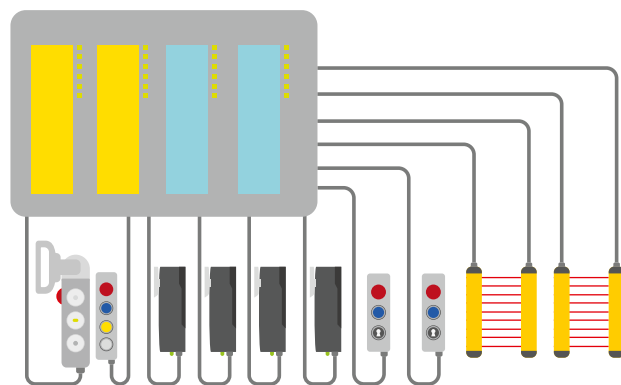
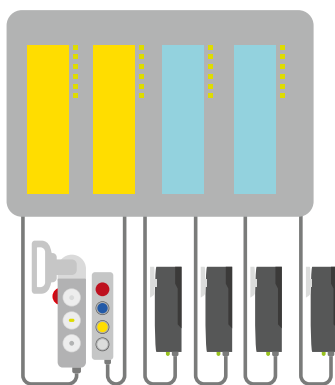
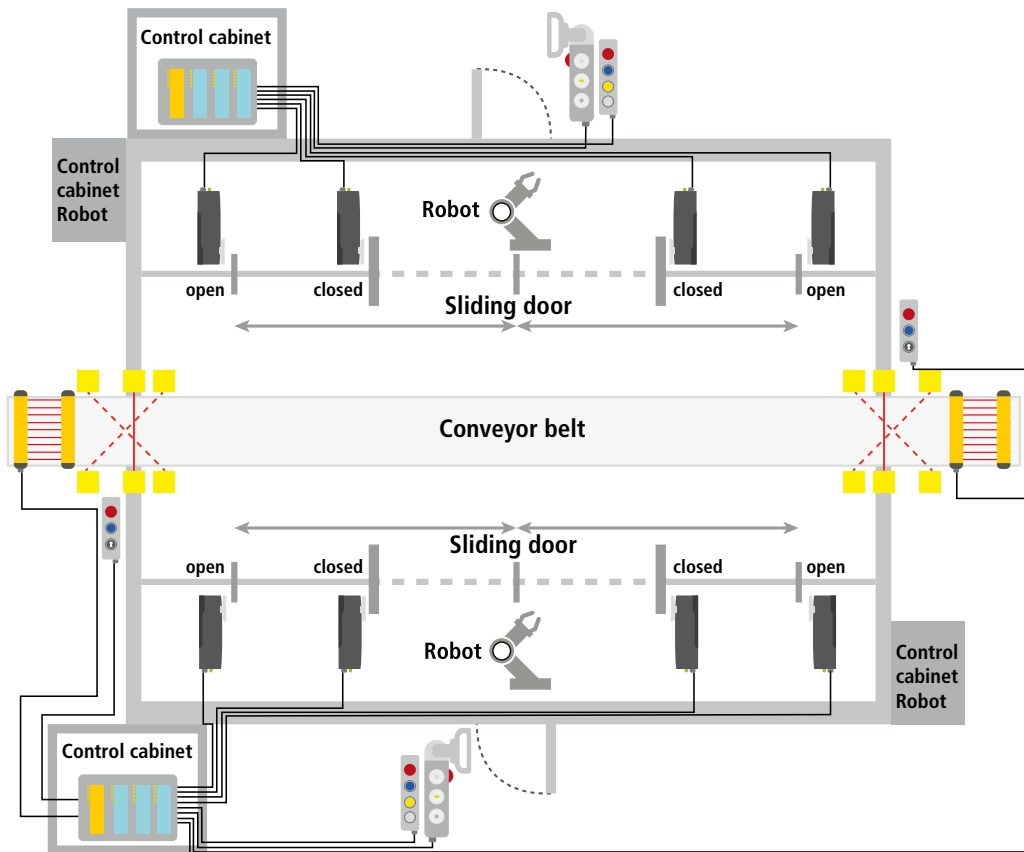
2 | CAN COMMUNICATION





Common PROFIsafe concepts

» Decentralized design with control cabinets

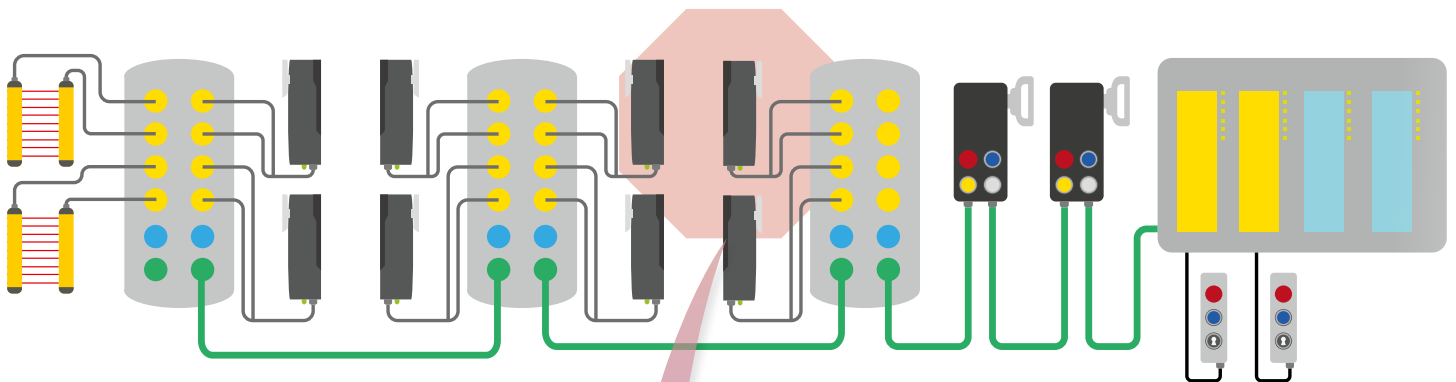


Disadvantages:

- ✗ Large wiring effort during installation and de-commissioning of the system
- ✗ Prone to errors during wiring
- ✗ Great effort for the creation of circuit diagrams when changing the application

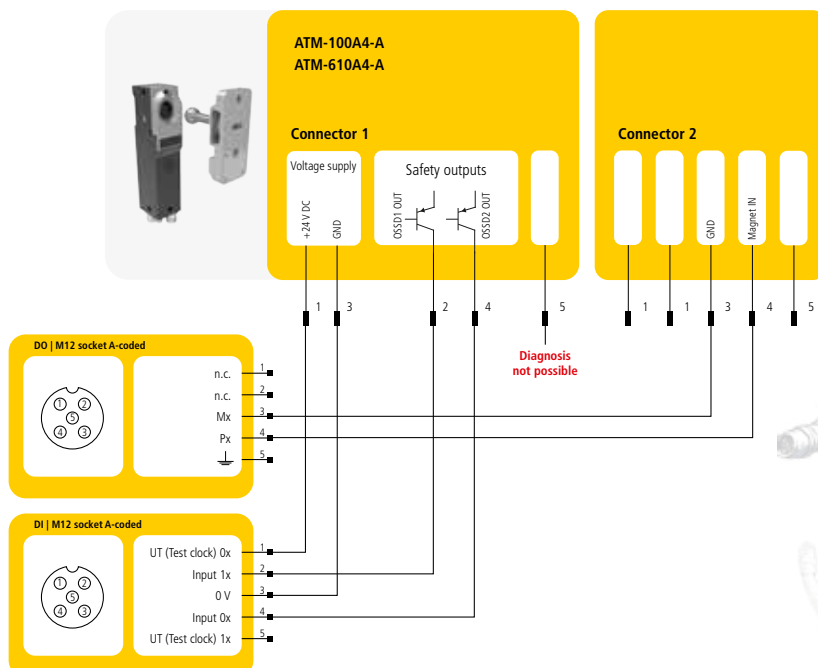
Decentralized setup with field boxes

Three different technologies | Field distributors, PROFIsafe safety switches, safe, decentralized I/O modules in the control cabinet.



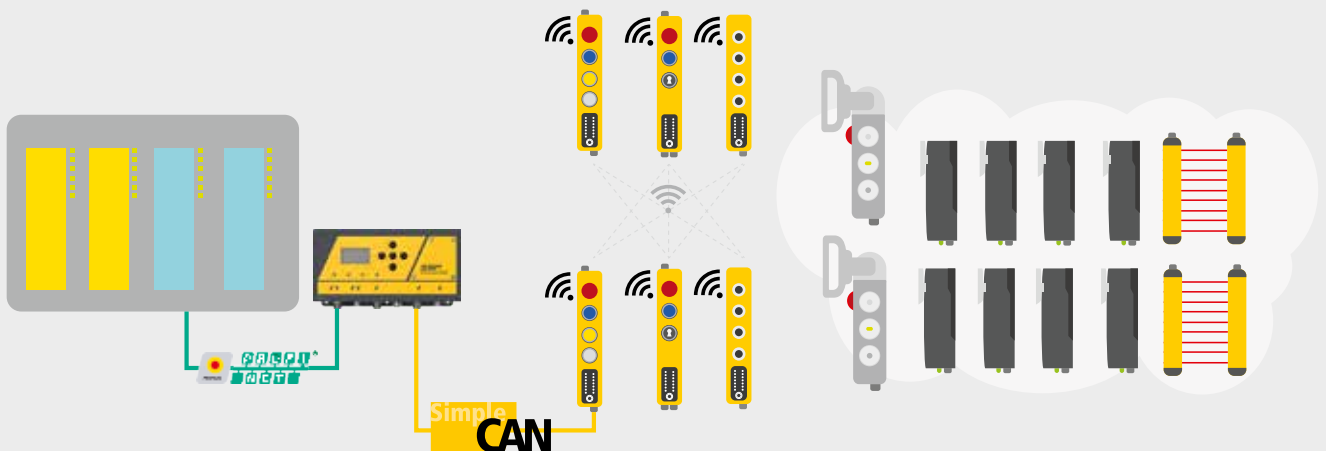
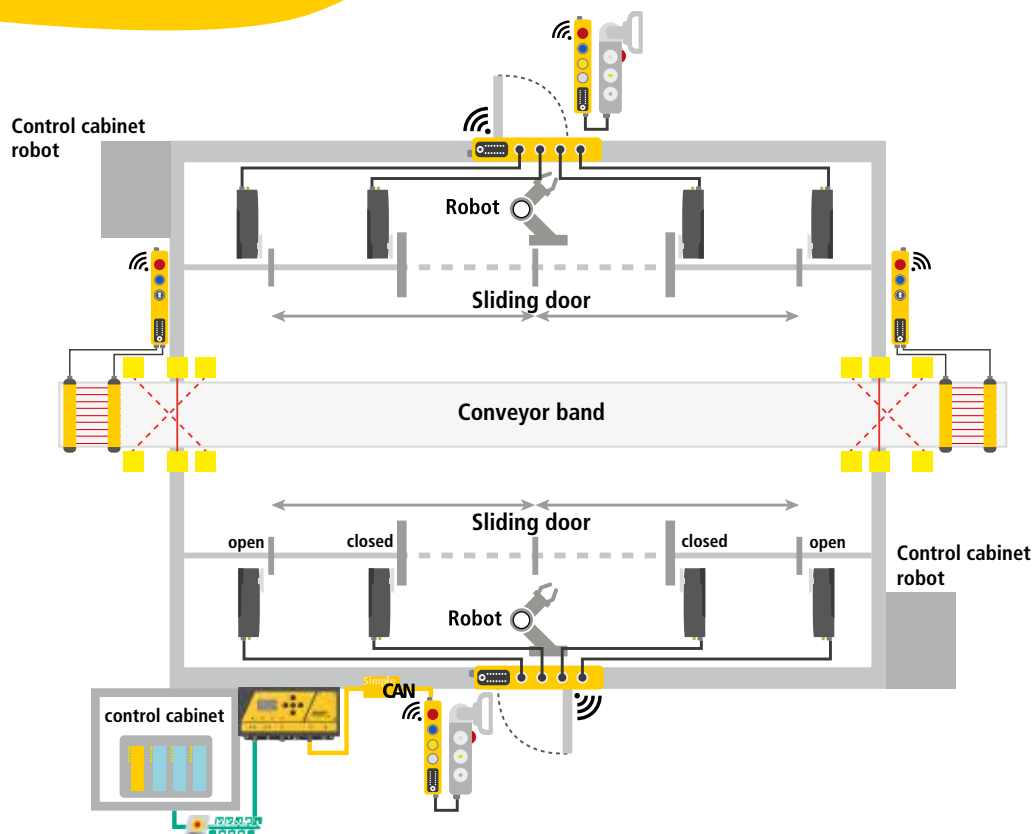
Disadvantages:

- ✗ Many different PROFIsafe devices, cost-intensive
- ✗ Enormous wiring effort for the various participants
- ✗ Control elements must be integrated
- ✗ Inaccurate to no diagnosis of open or closed doors
- ✗ Different PROFIsafe devices and technologies result in additional effort:
 - Planning & commissioning
 - Maintenance & warehousing



Simplifier PROIsafe concepts

» Decentralized setup with the Simplifier System



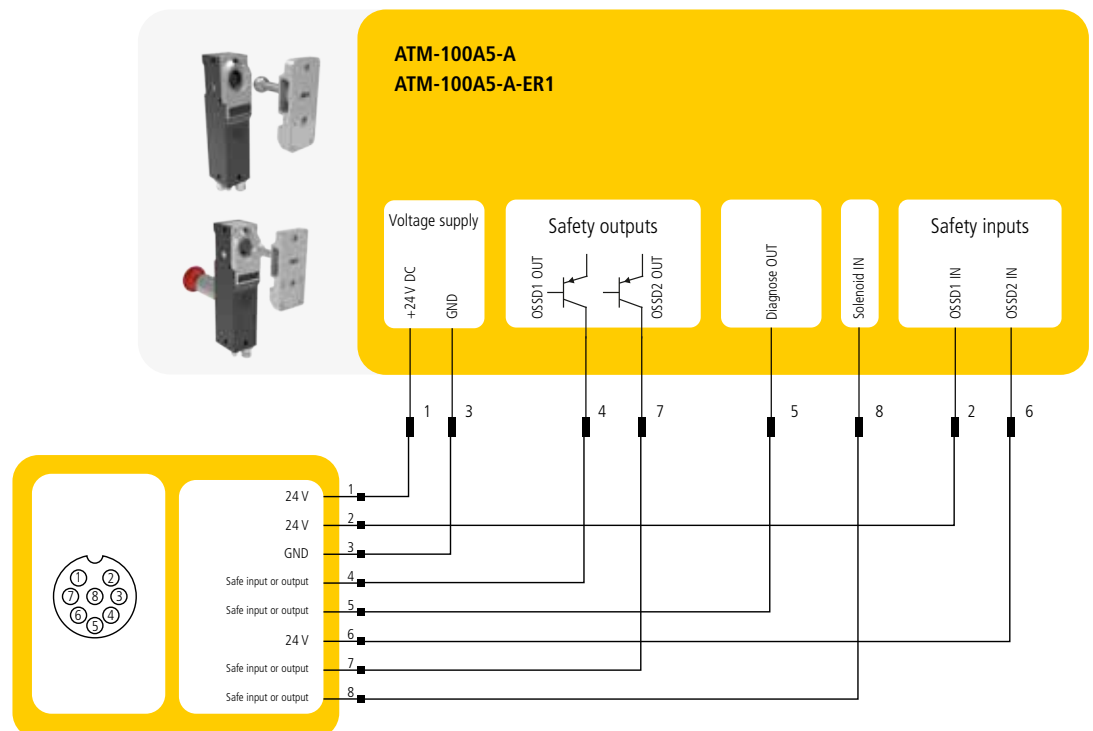
Advantages:

- ✓ **Reduced wiring:** Safety devices are collected via Simplifier and sent to Gateway
- ✓ **Simple circuit diagram creation and customization:** Fast and low-cost adaptation to application changes

Simplifier Fieldbox

Advantages:

- ✓ **Efficient integration:** Reduction in overall costs thanks to simplified connection options
- ✓ **Standardized security technology:** Only one PROFIsafe device is required, the Simplifier Gateway. In this way, complicated mixing systems that involve time-consuming storage and commissioning are no longer necessary.
- ✓ **Saving resources and time:** Less wiring thanks to M12 8-pin connections



Simplifier Gateway



Display for diagnosis

Function buttons

LED diagnosis

2 PROFINET connections M12-D coded with integrated switch function

2x power supplies in/out

Two Simple CAN connections for safety networks with Simplifiers

Pin 1	Pin 1	24 V	Pin 1	shield
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.

Different connections for the perfect application

- ✓ Voltage supply via M12-A coded plugs on CAN cable up to max. 4 A
- ✓ Voltage supply by means of M12-L coded plugs up to max. 16 A
- ✓ Ethernet / voltage supply with and without daisy chain option

The Simplifier devices can be supplied with operating voltage via the Simple CAN connection or individually to each device. Extra operating voltage if needed.

DID YOU KNOW...



... what is an F address 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. This involves assigning a unique F address to each PROFIsafe device or module. 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
- ✓ Voltage is supplied via the A-coded connections

Simplifier Gatebox

**PLUG
&
PLAY**



Voltage & CAN connection

Voltage 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.



Push-button 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.



we simplify safety

Simplifier Fieldbox

SWITCHABLE
INPUTS & OUTPUTS

Voltage & CAN connection

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

Connection of safety components

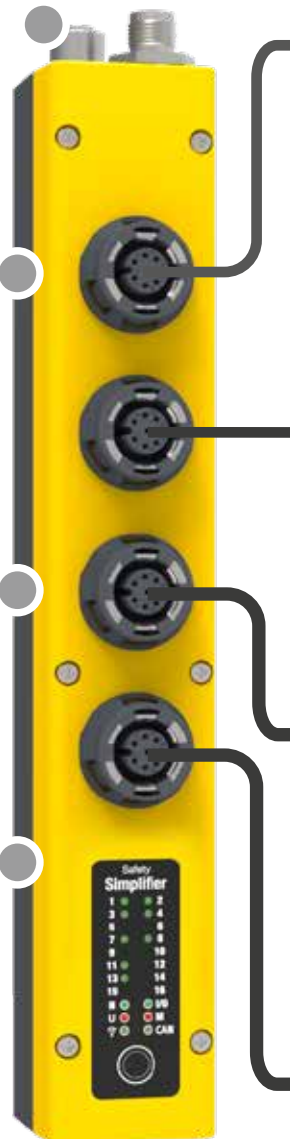
Socket plug, M12 8-pin.

4 shutdown circuits

Individually evaluable
safety functions

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 input or output

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

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 relay output 2 A

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 relay output 2 A

Many safety guard locks/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.

**Safety guard locks can be connected directly
to a single plug on the Simplifier Fieldbox.**

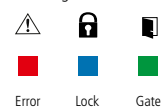
When connecting safety sensors, two OSSD inputs,
a safe output for the control of the guard lock and a
diagnostic input are available for each connection.

4 safe
I/Os per slot



HOLDX RS1-P8-...

LED diagnostics



Voltage supply

+24V DC
GND

1 3

Safety outputs

OSSD1 OUT
OSSD2 OUT

4 7

Diagnose OUT

5

Magnet IN

8

Safety inputs

OSSD1 IN
OSSD2 IN

2 6



Examples of

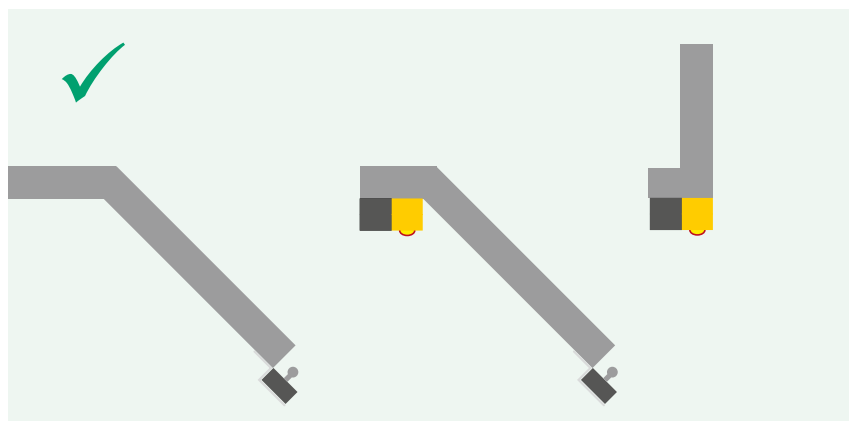
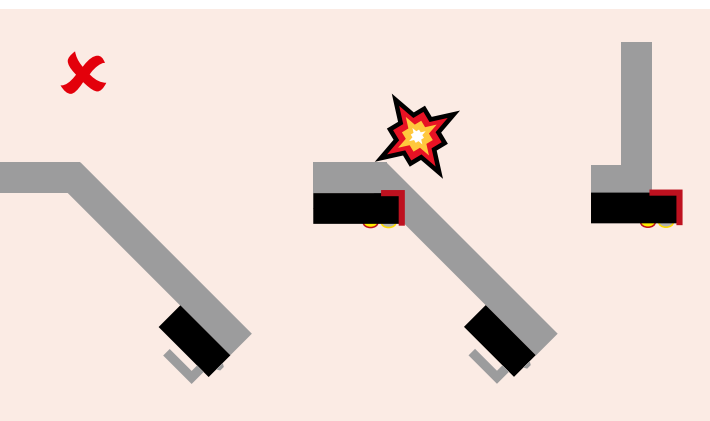


Simple door protection with **tGard safety switch**.

PROFIsafe for all safety switches: Regardless of which safety switch is connected to the Simplifier Gateway, the information is sent to the Siemens controller via PROFIsafe.

Individual assembly: The Simplifier Gateway can be installed anywhere on the fence and is not tied to the safety guard locks or doors.

Slim design: The combination of Simplifier Gatebox and tGard can be mounted directly on the fence profile without protrusion or additional panels.





Flexible installation on the lintel with **Atom safety guard lock**.

More flexibility: Safety guard locks or other safety functions can be freely selected and connected via the Simplifier Gatebox.

Free placement: If the safety switch has to be fitted inside the safety fence or on the lintel of the door for design or functional reasons, this is not a problem for the Simplifier system.

Quick commissioning: The appropriate safety switch for the application is selected and connected to the corresponding M12 plug.

- ✓ 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 PROFI-safe in the Siemens control system



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

The flexible and economical solution.

Less components, lower costs: Up to two safety guard locks can be connected to one Simplifier Gatebox.

Consistent monitoring: Each safety guard lock is transmitted to the higher-level safety controller as an individual safety function. Two individually controllable safety outputs can release each safety guard lock 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 lock 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

Safe information flow via CAN with operating units on every door.

CAN or wireless communication: As an alternative to wireless communication, up to 16 doors can be connected and networked via the safe Simple-CAN.

- ✓ Configuration of the Simplifier Gateway is stored on the memory card
- ✓ Response time from safety switches to the Siemens controller of just 150 ms

Safety guard lock tGard

- ✓ Performance level d or e
- ✓ Optional escape release - can be used with swing and sliding doors
- ✓ Left or right door hinge



Simplifier System: Integrated safety solutions for industrial plants.

- ✓ **Installation flexibility:** The system enables flexible placement of the safety devices independently of the Simplifier Gateboxes and the Simplifier Gateway.
- ✓ **Wireless communication:** Up to 16 gateboxes can be safely connected to the Simplifier Gateway in accordance with PL e, which provides PROFIsafe transmission to the Siemens controller.
- ✓ **Simplified connection options:** Compared to standard field boxes with 5-pin connections, which require two slots, the Simplifier system simplifies this process significantly with 8-pin connectors.



- ✓ **Status transmission:** Information such as door open/closed or locked/unlocked can be transmitted directly which is not the case with standard field boxes.
- ✓ **Double wing 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.
- ✓ **Operational units:** Complicated wiring is no longer necessary for operational units, and safety functions can be evaluated directly via a Simplifier Gatebox without a control cabinet..

CAN

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

Universal protection with PROFIsafe: safety light curtains easily integrated.

Safe bus system: Simply connect PROFIsafe for safety light curtains via plug connector.

Flexible and safe: Reliable transmission of safety-relevant information to the Siemens control system.

Fast transmission: All relevant information is transmitted via PROFIsafe.

- ✓ Easy to plan
- ✓ Extremely fast response times via Simple-CAN
- ✓ Simple integration of different safety functions





Access control via RFID safety key.

Personal key: RSK Safety Key Protects a person from accidentally switching a system back on.



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



Products used: 4 x tGard, Atom,
Simplifier Gateway, 2 x Simplifier Gatebox

The flexible and cost-effective PROFIsafe solution for large systems.

Safety based on flexibility: Up to 32 Safety Simplifiers per gateway for a versatile application.

Optimal scaling: Cost optimization with increasing integration of doors and light curtains.

Simple planning: A wide range of safety functions can be integrated.

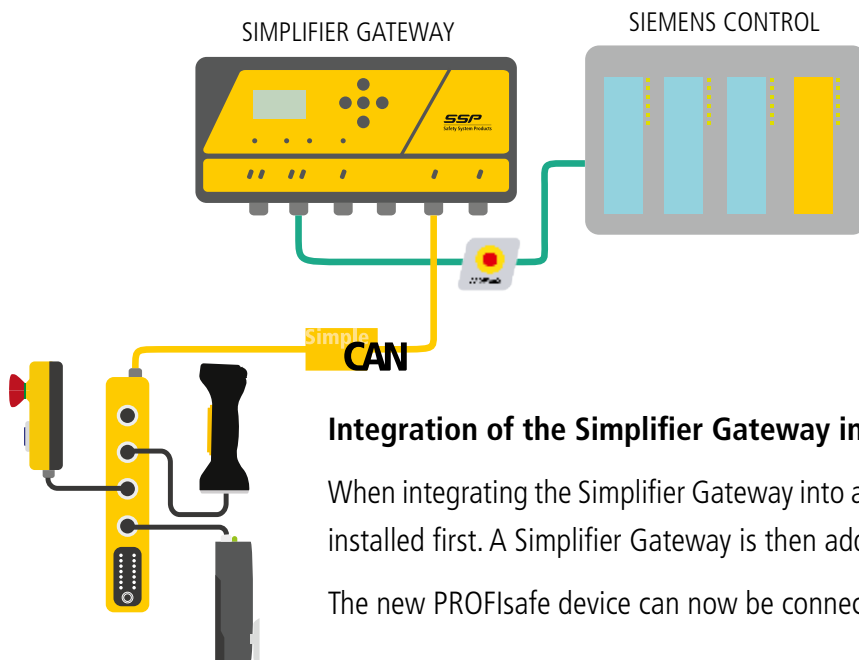


Seamless integration: PROFIsafe enables the interface to the Siemens control system.

Individual evaluation: Single or individual - the safe guard locking can be unlocked with one or two safe outputs.

Additional connections: Up to 2 safety switches can be connected to each Simplifier Gatebox.

Siemens integration



Integration of the Simplifier Gateway in the TIA Portal.

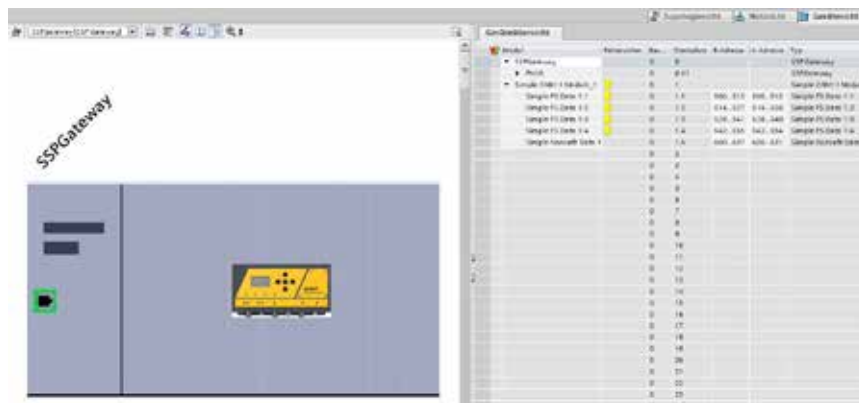
When integrating the Simplifier Gateway into an existing project, the GSDML file should be installed first. A Simplifier Gateway is then added in the hardware configuration.

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



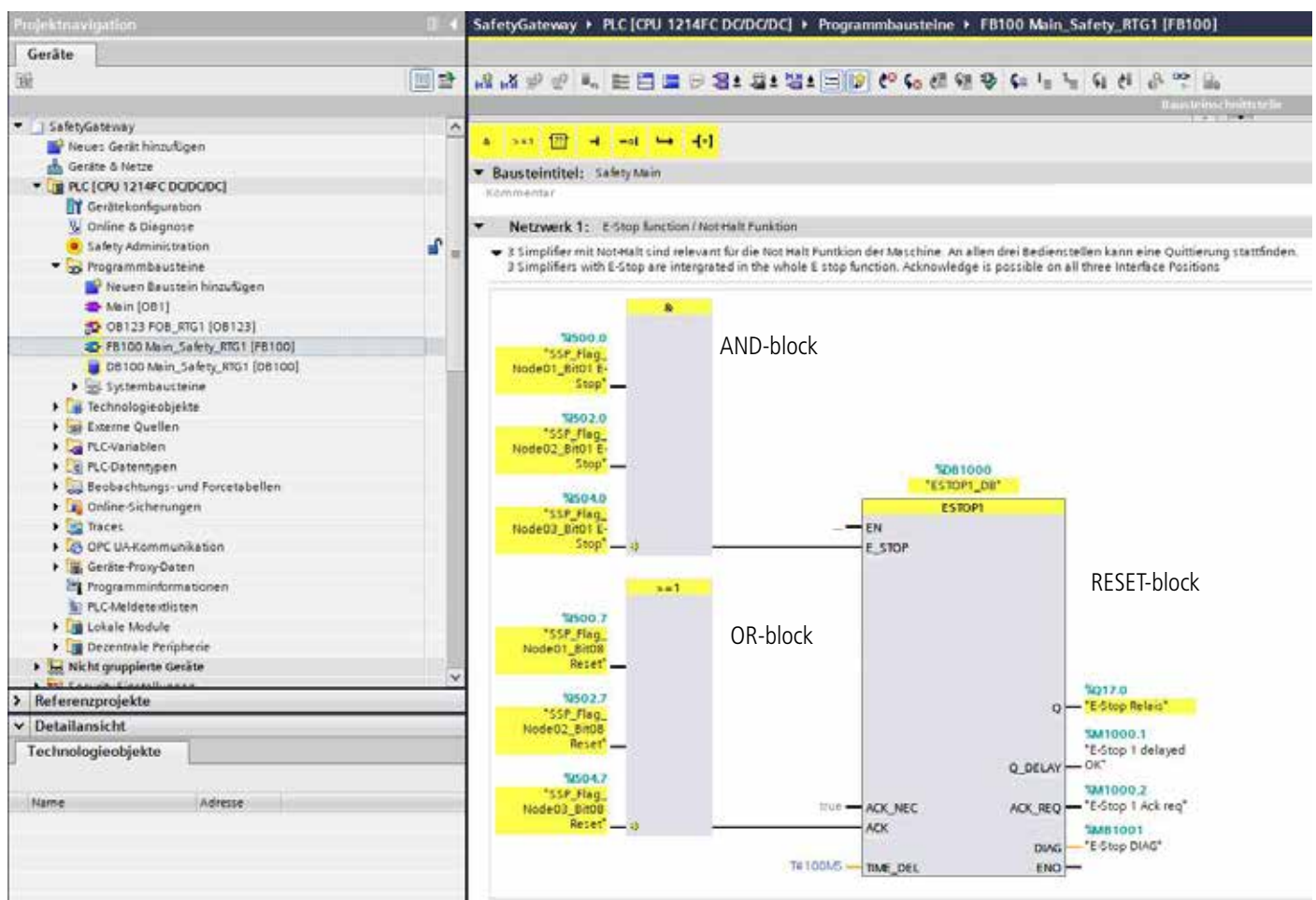
The data areas can be added to the device overview using drag & drop.

In our example, only module_1 is shown, which already provides 64-bit information.



The safe function blocks are configured in the next step. The safe signals from the Simplifier Gateway can be processed there.

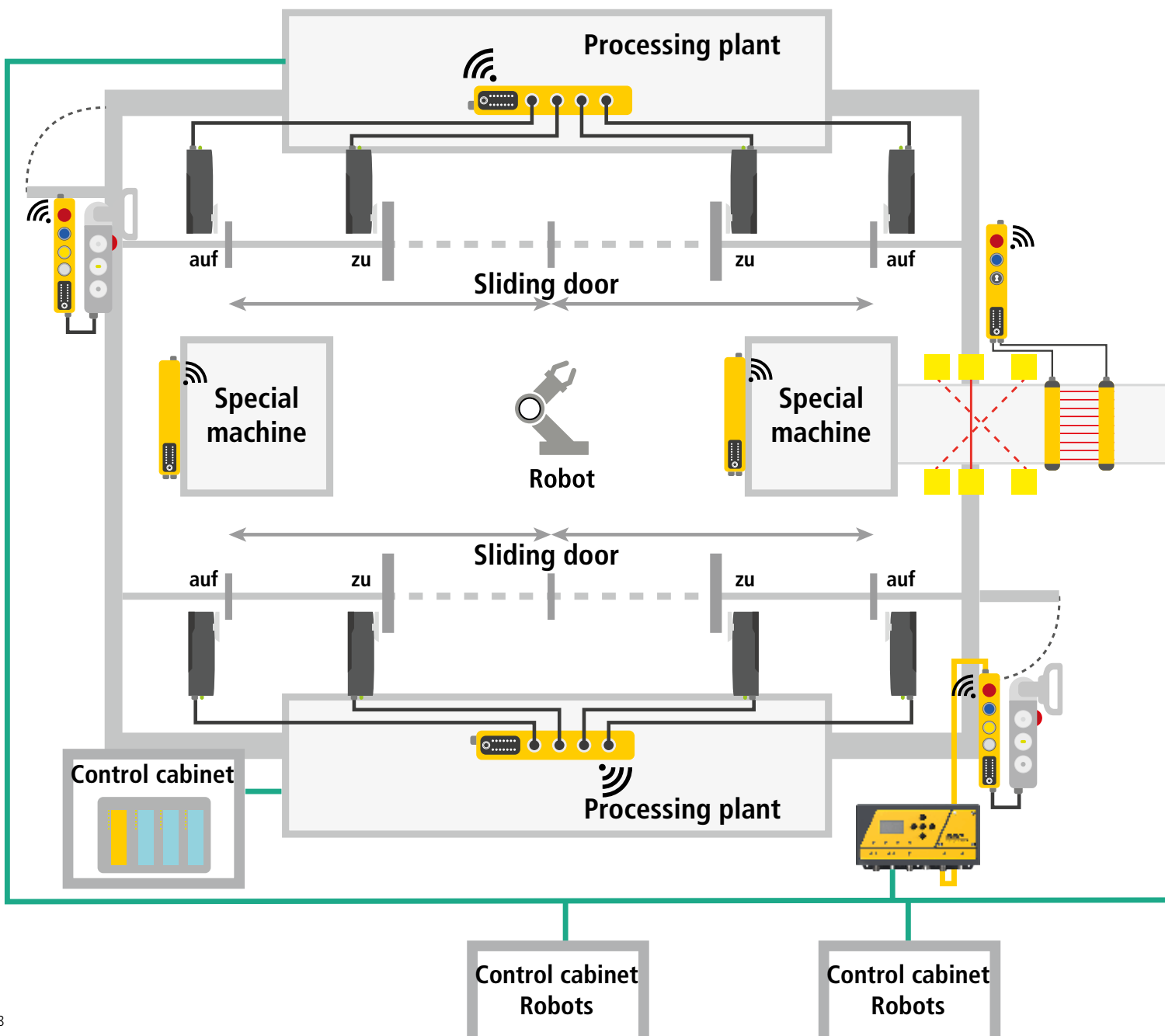
The example below shows an emergency stop function with signals from 3 Simplifiers. Each Simplifier sends an emergency stop signal and a reset signal. The three emergency stop button signals are linked via an AND module and the three RESET button signals are linked via an OR module. The signals then go accordingly to the RESET module provided by Siemens.

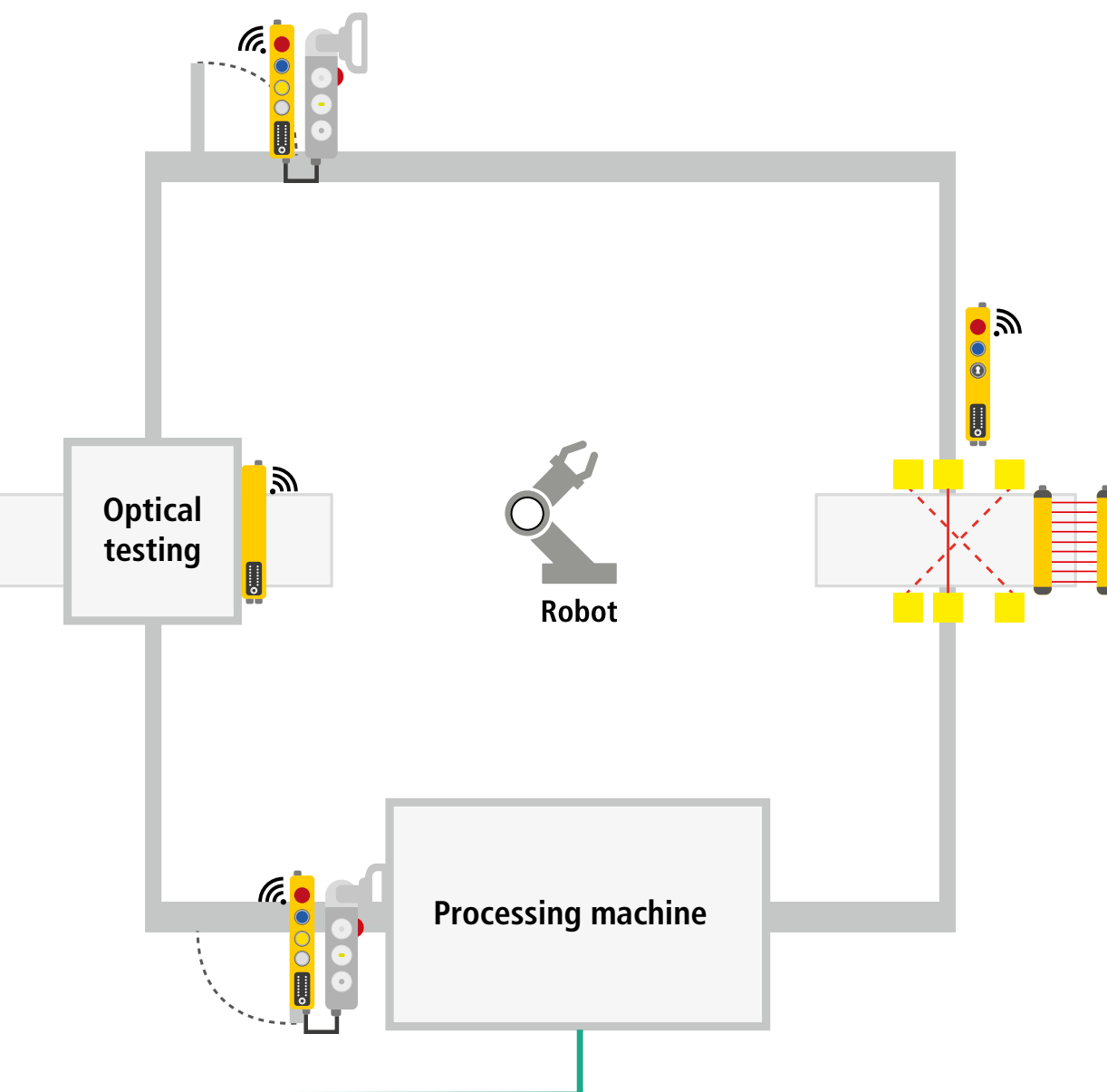


Simple integration of

Connection of various machines.

In the following example, some parts of the machines, such as the robot and the machining center, are already supported by PROFIsafe. However, other parts of the machines are still traditionally controlled via potential-free contacts with emergency stop and operator protection circuits. With the Simplifier system, both requirements can be easily implemented. A Simplifier acts as an interface between the machines and the entire system and simultaneously provides all the necessary signals. The Simplifier System turns complex tasks into elegant solutions!



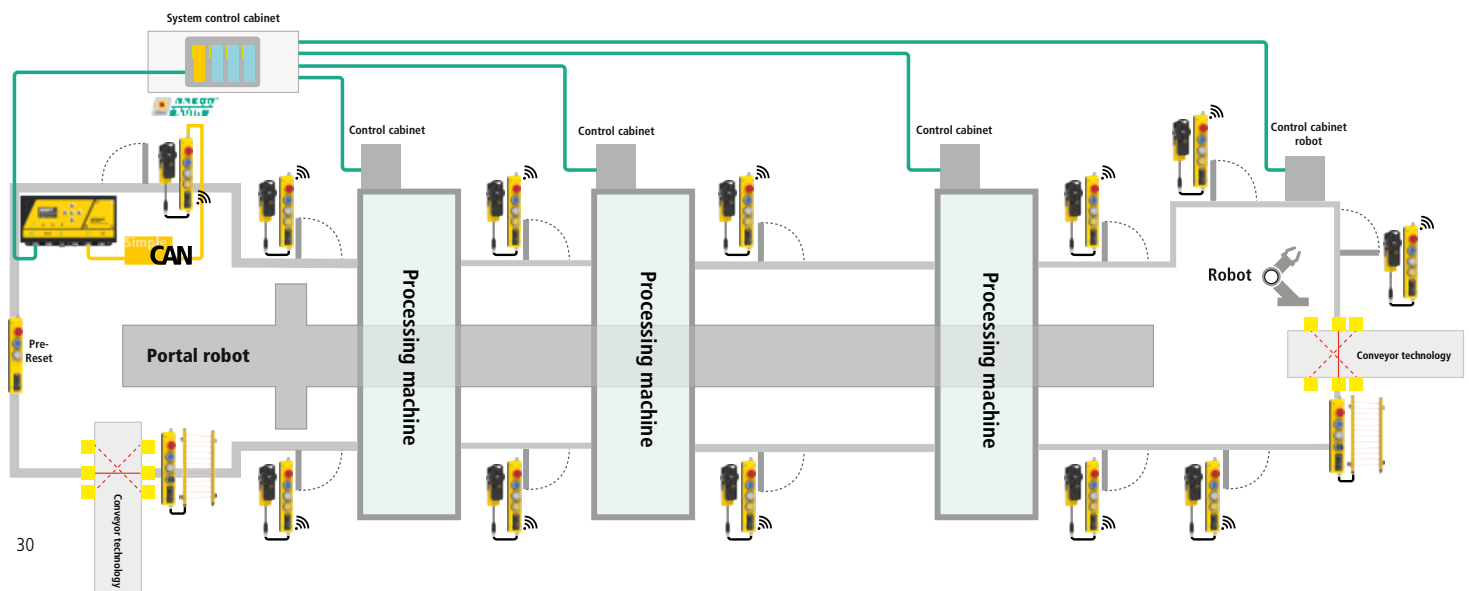


Complex large systems



Minimal wiring errors in large automation systems.

- ✓ The Simplifier Gateway can be used to link up to 16 Simplifier projects in a system network, which means a maximum number of 256 Simplifier devices.
- ✓ Thanks to wireless safety communication, the ground potential of the power supply is irrelevant for the Simplifier gatebox.
- ✓ No Profinet cables required for each door during installation and removal the system; safe information distribution via wireless communication.
- ✓ Considerably reduced wiring effort due to reduction to a single Simplifier Gateway.
- ✓ If system components do not have a PROFIsafe interface, they can simply be integrated into the safety concept in the conventional way via potential-free contacts.

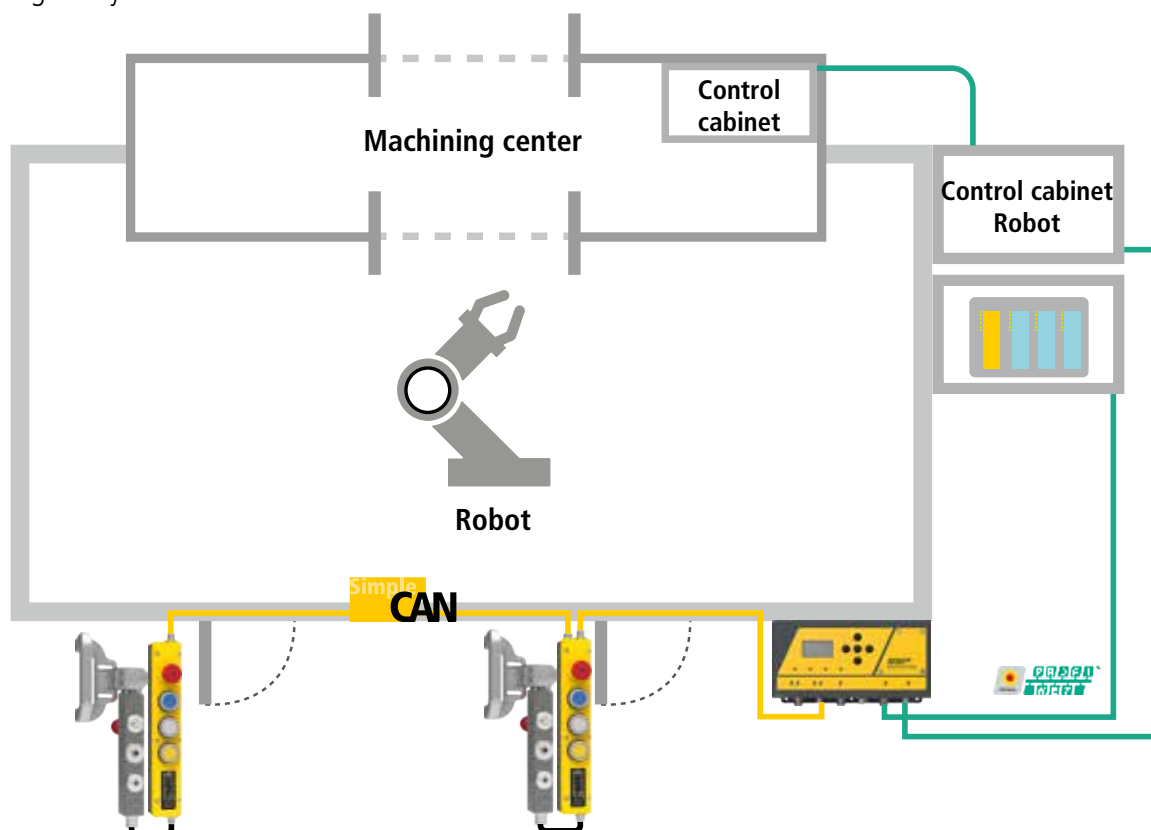


Simple systems



Safe communication between the Simplifier gateboxes and the Simplifier gateway takes place either via a safe wireless network or Simple-CAN according to PLe.

- ✓ Simple commissioning
- ✓ Ready-made Eplan macros
- ✓ No wiring errors when installing and decommissioning the system
- ✓ Simple and flexible expansion

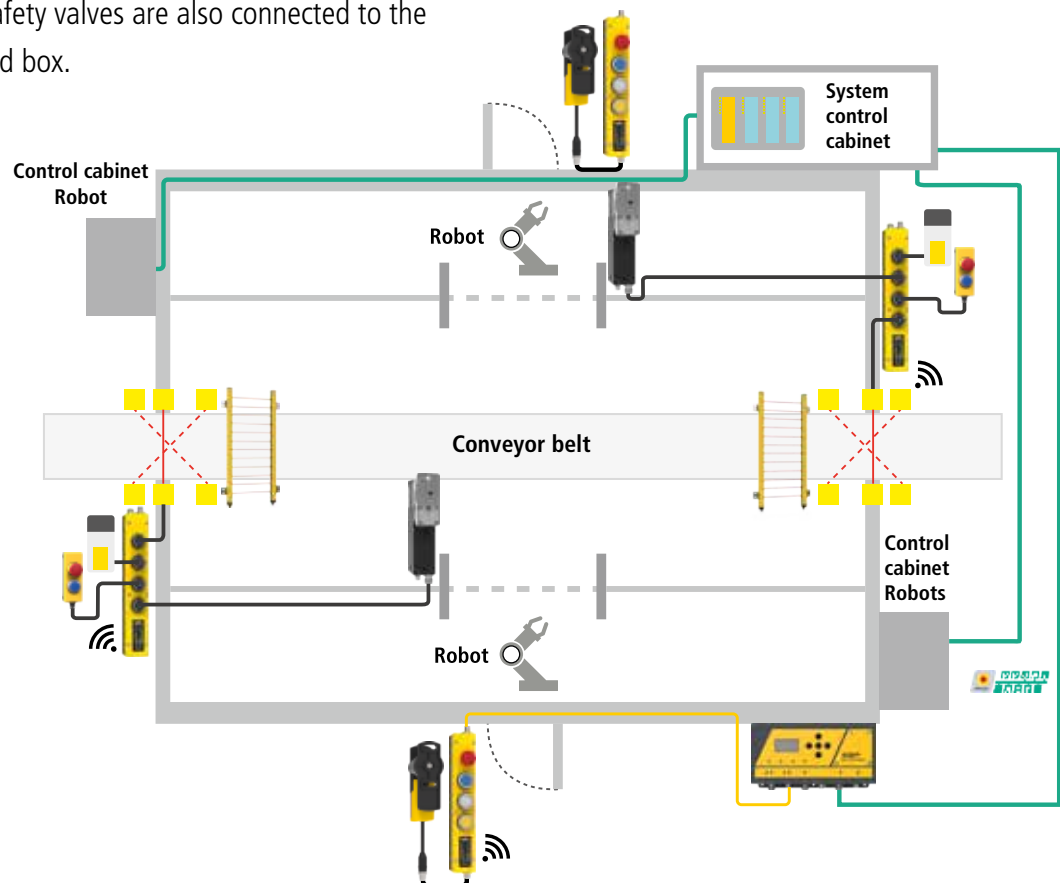


Robot systems



Securing two access doors to a system with robot and conveyor belt

- ✓ Four Simplifier gateboxes decentrally monitor all safe inputs and outputs of the system.
- ✓ Two process locks at the access doors monitor access to the system.
- ✓ Sliding or lifting gates are monitored by a safety guard lock connected to Simplifier field boxes.
- ✓ Pneumatic safety valves are also connected to the Simplifier field box.

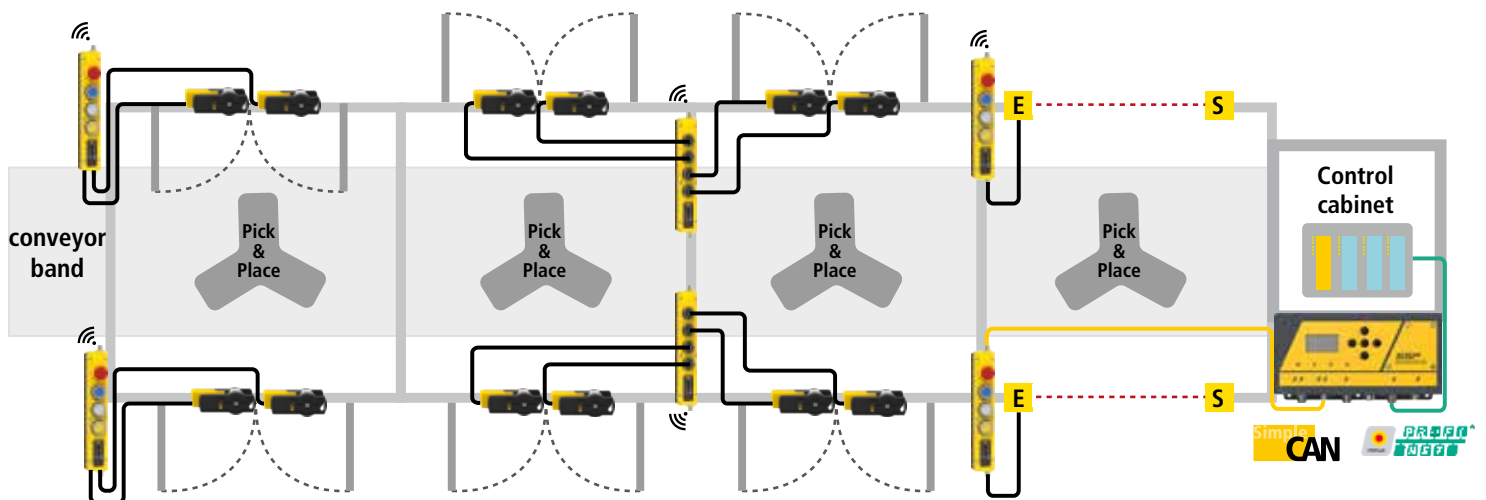


Packaging plants



Assembly and packaging machines with many doors.

- ✓ Wireless communication and PROFIsafe for fast information flow with low installation effort.
- ✓ Operators: Two operating units on each side with emergency stop and reset buttons.
- ✓ Two Simplifier Fieldboxes are each used to monitor four process locks in a decentralized manner.
- ✓ Safety light curtains and other process locks are connected to the Simplifier gate boxes.
- ✓ No separate control cabinet required; Siemens controller in the control cabinet receives information via

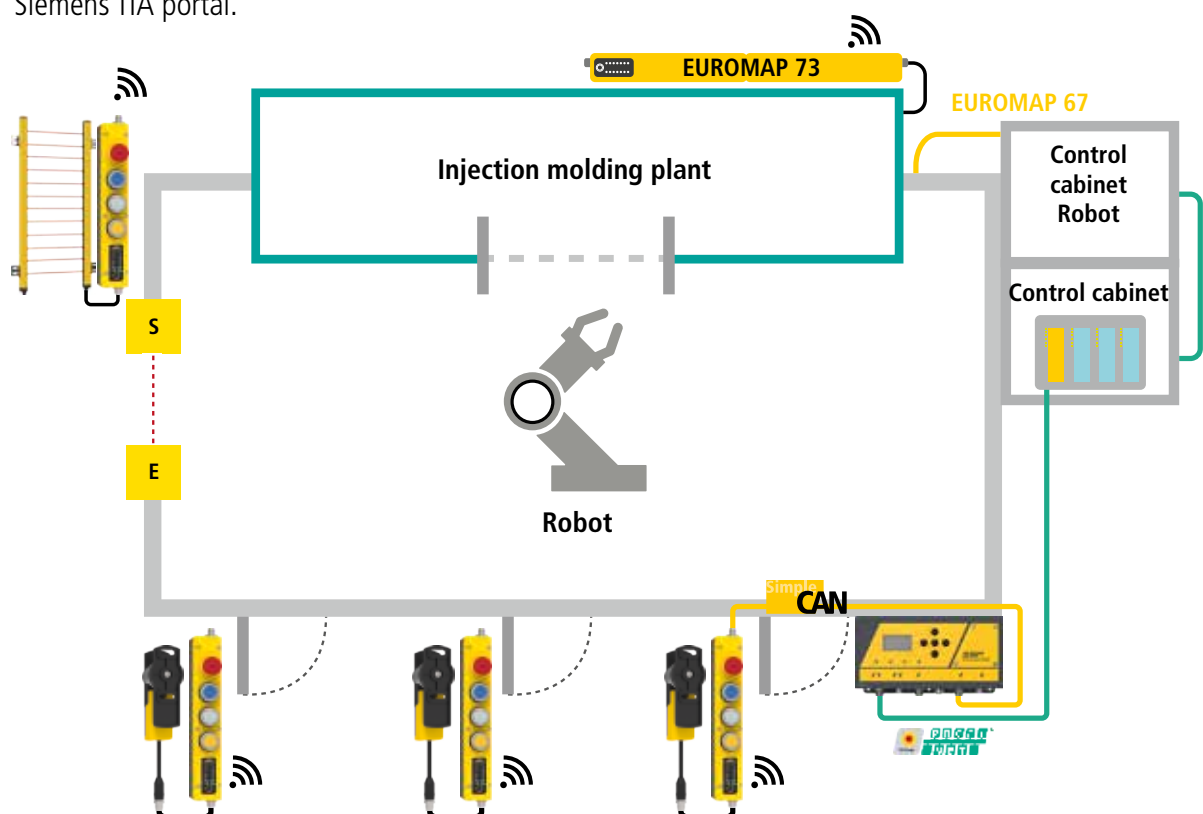


Injection molding



Injection moulding machine can be addressed decentrally and directly via EUROMAP 73/78 interface with PROFIsafe for the first time.

- ✓ Effective safety monitoring with just five Simplifier gate boxes.
- ✓ Standardized EUROMAP 73/78 interfaces can be addressed directly via PROFIsafe.
- ✓ All safety elements (switches, operating units, safety light curtains) and the interface are available in the Siemens TIA portal.

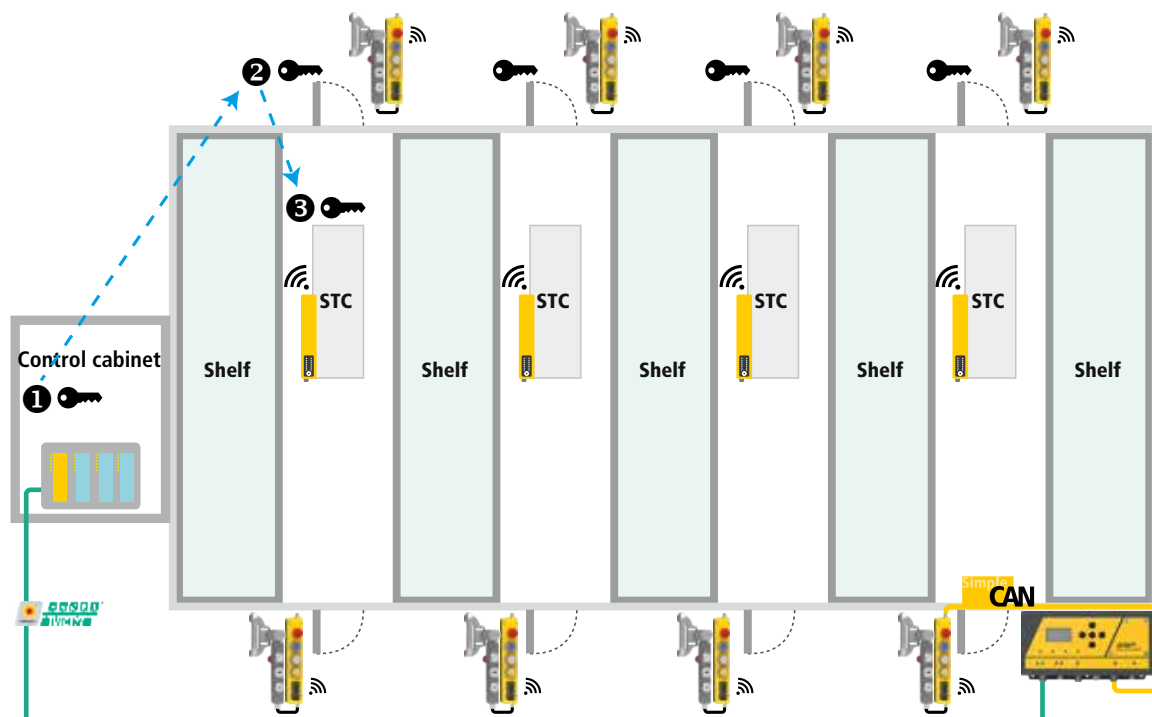


Warehouse logistics



Key switch system for optimized control.

- ✓ The key transfer system makes it possible to switch between automatic and manual control and in this way to access and activate the STC.
- ✓ Forced-opening safety switches protect against unauthorized access.
- ✓ Simplifier system: Central programming in Siemens control system, wireless communication.
- ✓ STCs can be switched off wirelessly for safety reasons.





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Modifications and errors excepted

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