



# Flexibly safe.

Transponder-coded safety systems **CES**

**EUCHNER**

More than safety.

# Transponder-coded safety systems CES

The coded electronic safety systems CES are modern interlocking devices of type 4 for the protection of persons, machines and processes. They are based on non-contact transponder technology and consist of a coded actuator, a read head and evaluation electronics. In some systems, the read head and evaluation electronics form a self-contained unit. A unit of this kind is referred to as a safety switch. All safety functions are combined in a single component here (internal evaluation). With external evaluation, the actuator is read via a separate read head connected to an evaluation unit in the control cabinet.

## ■ Simple function

The safety switch or read head is usually mounted on the fixed part of the guard, and the actuator on the movable part. When the door is closed, the actuator is moved toward the safety switch or read head. On reaching the actuating range, the read head inductively reads the transponder data from the coded actuator and forwards them to the evaluation electronics. If the data transmitted from the actuator agree with the stored data, the safety outputs are enabled.

## ■ Multiple applications

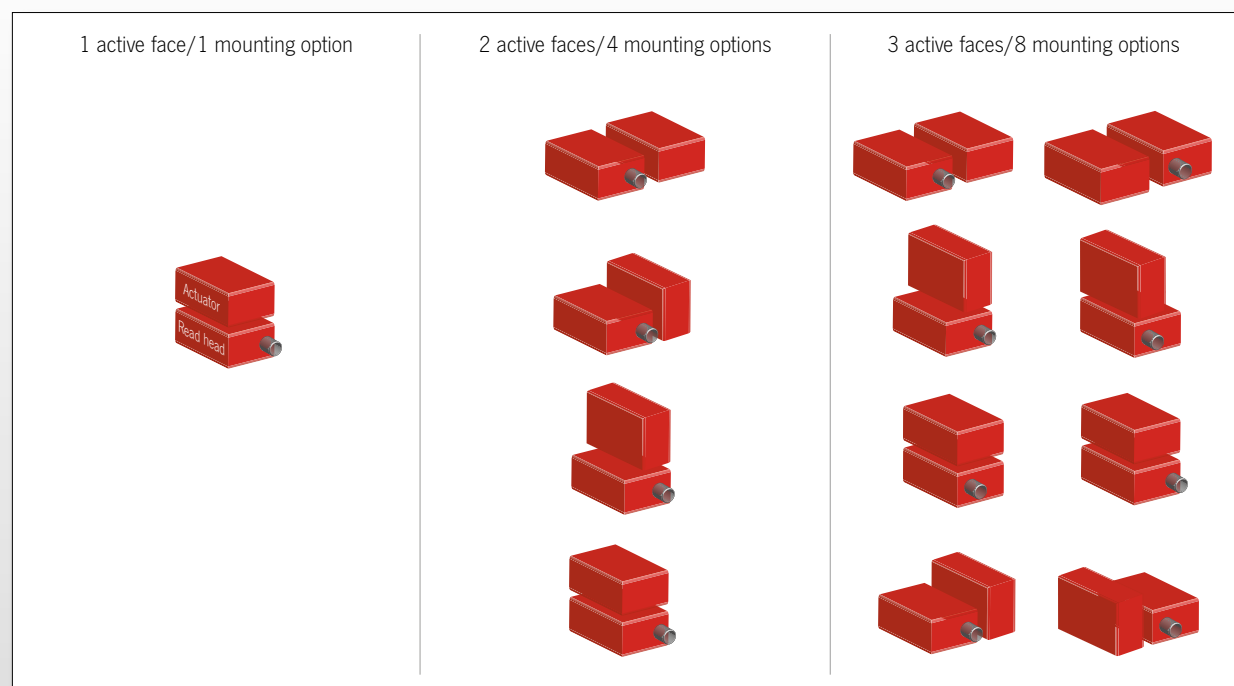
Safety systems CES are used in securing guards, e.g. doors and flaps, and for safe position detection in mechanical and systems engineering.

The use of CES products is preferred when

- ▶ environments are harsh
- ▶ high demands are placed on the safety category/  
Performance Level
- ▶ a large actuating range and/or center offset is required
- ▶ a high level of protection against tampering must be ensured
- ▶ the switch and the actuator must be installed  
in different positions
- ▶ the wiring work must be minimized
- ▶ vibrations cannot be ruled out
- ▶ wear must be minimized

## ■ Maximum flexibility

Many sizes and designs of CES products are available to suit the most diverse applications. The comprehensive product spectrum includes standard housings, ranging from very flat and compact designs to the smallest design in an M12 housing. Depending on the product, the safety systems CES feature one to three active faces. The higher the number of faces, the more diverse the mounting options. Thanks to the transponder's homogeneous actuating range, the read head can be approached from any number of directions. This is particularly advantageous if confined spaces require ideal, simple mounting of the products. CES products offer maximum flexibility with their large selection of sizes and designs and the variable mounting and approach options.



# External evaluation

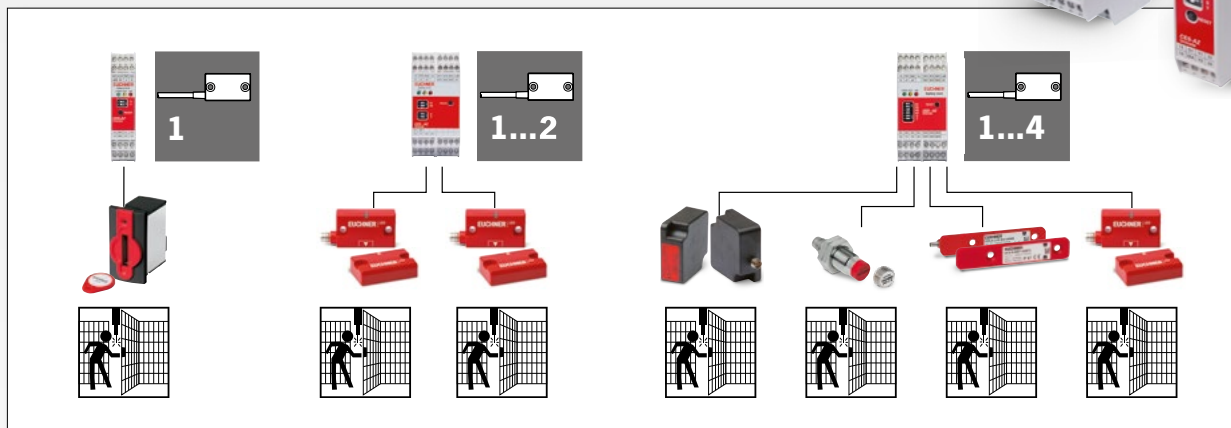
With external evaluation, the evaluation electronics for the transponder signals are accommodated in a separate housing. This separation minimizes the read head's size. This is particularly advantageous if the available space at the location to be protected is very limited.

## Evaluation of signals in the control cabinet

Transponder signals are evaluated in the evaluation unit CES, directly in the control cabinet. Up to four read heads (which may be of different types) can be connected and evaluated. The wiring work is minimal, because each read head can be connected to the evaluation unit via only two flexible wires.

### ■ CES-AZ evaluation units

CES evaluation units combine transponder evaluation with a safety relay in a single device. They feature two safety outputs and monitoring outputs for each connected CES read head, and they also possess connections for a monitored start button and a feedback loop. The safety outputs are switched via relay contacts and permit the direct connection of contactors and loads up to 6 A. The devices are available in three unicode and three multicode versions, depending on the number of read heads to be connected (one, two or four).



### ■ Read heads with external evaluation

#### CKS

- ▶ Use as safe lockout, authorization or trapped key system
- ▶ Safe entry into installations
- ▶ Selection of operating mode
- ▶ Version with AS-Interface available



#### CES LNN

- ▶ Ideal for mounting on profiles
- ▶ Diagnostic function by means of LED
- ▶ 2 active faces



#### CES LQA

- ▶ Actuator/read head with especially large center offset
- ▶ Large operating distance up to 23 mm
- ▶ 1 active face



#### CES LMN

- ▶ Cylindrical version of actuator and read head in M12 housing
- ▶ Very small design
- ▶ 1 active face
- ▶ Degree of protection IP67 / IP69 / IP69K



#### CES LSP

- ▶ Direct mounting in profile slots
- ▶ Very flat design
- ▶ Diagnostic function by means of LED
- ▶ 1 active face



## Evaluation of signals in the field

The transponder signals are evaluated in the field evaluation unit CES-FD. Read heads CKS and CES-LMN can be connected to the device via an M8 plug. The status of the CES-FD can be seen at any time on two LED indicators. The switched semiconductor signals (safety outputs) are forwarded to the higher-level control system via an M12 plug connector.

### ■ CES-FD

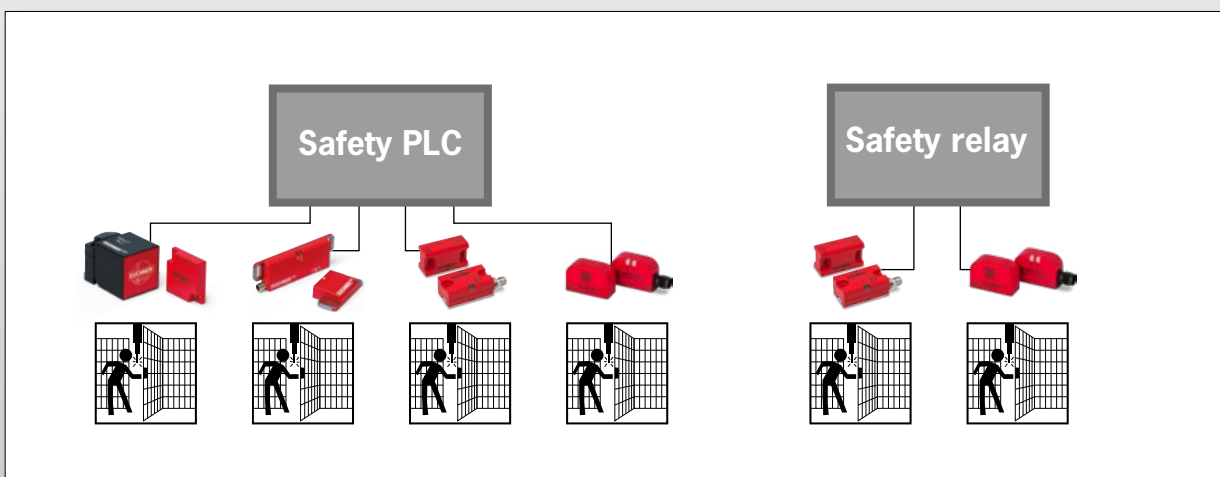


## Internal evaluation

With internal evaluation, the evaluation electronics and read head are accommodated in the same housing (safety switch). Transponder signals are evaluated in the field, not in the control cabinet. Furthermore, no separate evaluation unit is required. Safety switch versions AP/BP and AR/BR possess clocked semiconductor outputs (OSSD) to detect short circuits.

### ■ System family AP/BP

System family AP/BP is intended to be used for separate operation. The devices are particularly suitable for the connection of safety evaluation units and safety control systems that require short test pulses. Some versions have been optimized for connection to decentralized peripheral systems, such as the ET200pro series from SIEMENS.



## ■ System family AR/BR

For series connection of up to 20 safety switches CES. All EUCHNER products with an AR or BR interface can be connected in series. A mix of AR and BR devices must not be used in a switch chain, however. Three different wiring concepts are available:

### 1. Series connection in the control cabinet

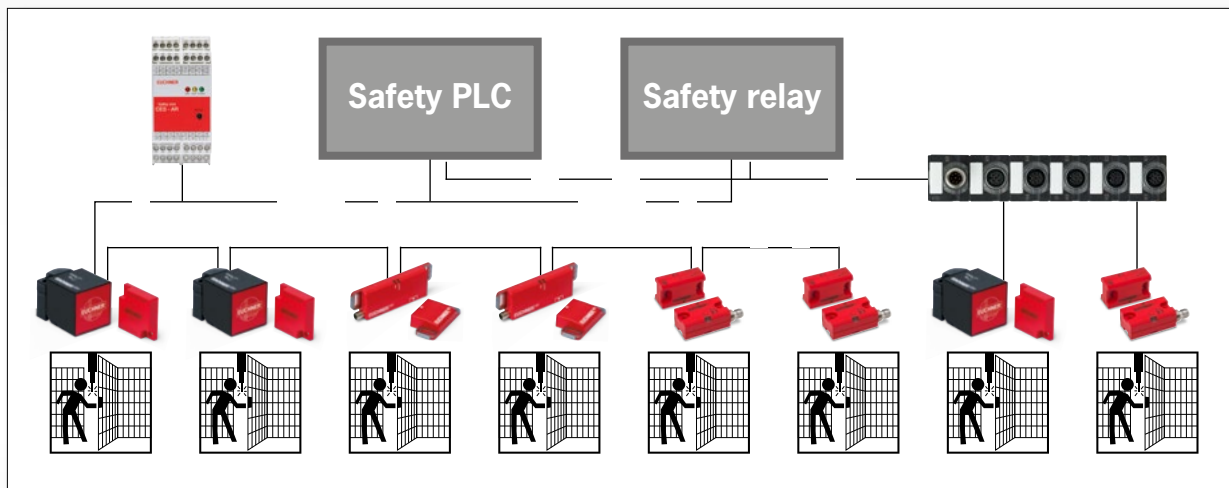
Wiring takes place in the control cabinet. All information about the status of individual CES products can be forwarded directly to the control system.

### 2. Series connection via plug connectors in the field

All safety switches used are interconnected by Y-plugs in the field, and the information is transmitted centrally via a single cable to the control system. The connection of only four flexible wires greatly reduces the wiring work. For products with AR interface, a CES-AR evaluation unit can optionally be used to forward the status signals from the individual safety switches to the control system. This is particularly advantageous in case of large and expansive machines and installations, because it is immediately clear which door is open or closed.

### 3. Series connection via passive distribution module in the field

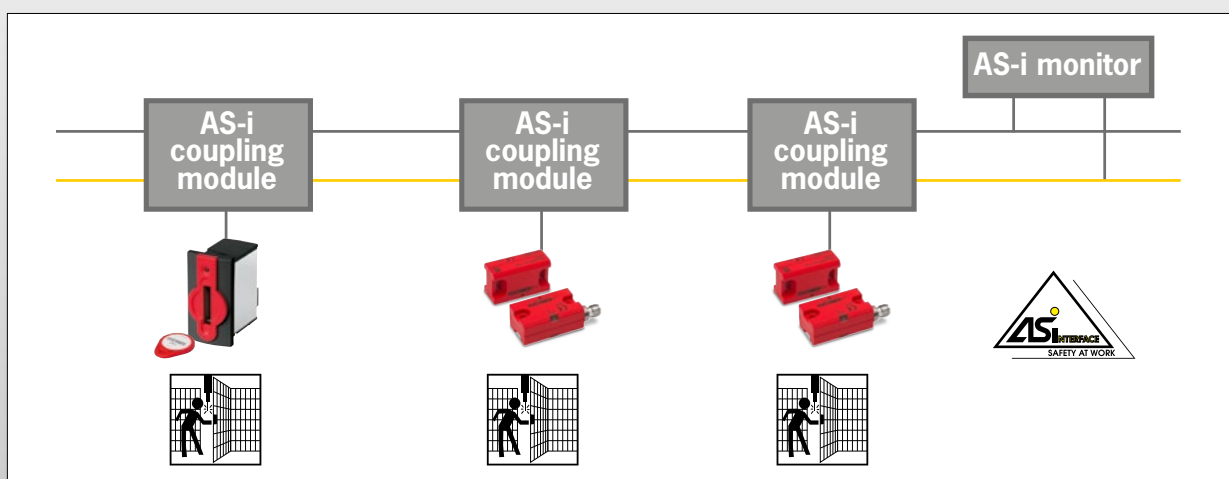
The safety switches are connected directly to the passive distribution module in the field via M12 plug connectors. The electrical connection to the control system is made centrally using one cable. It is possible to connect several passive distribution modules in series. The door monitoring signal on each safety switch connected can be polled on the passive distribution module by the control system.



## Evaluation via AS-Interface

### ■ System family AS

Version with integrated AS-Interface. The safety switch is connected directly to the ribbon cable via an AS-i coupling module. The wiring work is therefore reduced to a minimum, as all information on the safety switch is made available to the control system via AS-Interface.



## ■ Products with internal evaluation

### ■ System families AP/AR

Products in system family AP are used as single devices.

Products in system family AR can be interconnected in series.

#### CES-C01

- ▶ Compact, square design
- ▶ 1 active face; can be repositioned in 5 directions
- ▶ Diagnostics via 2 LEDs
- ▶ Large actuating range
- ▶ Standard housing (EN 60947-5-2)
- ▶ Category 4 / PL e



#### CES-C02

- ▶ Narrow, elongated design
- ▶ 2 active faces
- ▶ Diagnostics via 2 LEDs
- ▶ Limit-range indication
- ▶ Direct mounting on aluminum profiles
- ▶ Large temperature range (down to -40 °C)
- ▶ Degree of protection IP67 / IP69 / IP69K
- ▶ Category 4 / PL e



#### CES-C04

- ▶ Small design
- ▶ 3 active faces
- ▶ Mounting distance 32 mm (EUCHNER standard)
- ▶ Diagnostics via 2 x 2 LEDs
- ▶ Version with AS-Interface
- ▶ Suitable for ATEX, zone 2/22
- ▶ Limit-range indication
- ▶ Very large actuating range
- ▶ Actuator can be positioned in 3 steps by means of slot
- ▶ Degree of protection IP67 / IP69 / IP69K
- ▶ Category 4 / PL e



### ■ System family BP/BR

Products in system family BP are used as single devices. Products in system family BR can be interconnected in series. EUCHNER BR/IO-Link Gateways can be used to read process and device data from the switches and to send the data to an IO-Link master.

#### CES-C07

- ▶ Small design
- ▶ Mounting distance 22 mm (industrial standard)
- ▶ 3 active faces
- ▶ Limit-range indication
- ▶ Diagnostics via 2 x 2 LEDs
- ▶ Extremely short risk time
- ▶ Degree of protection IP67 / IP69 / IP69K
- ▶ Material resistance/ECOLAB
- ▶ Category 4 / PL e / SIL CL 3



### ■ System family A

System family A is characterized by the ability to switch through clock pulses from safe control systems via its semiconductor outputs.

#### CES-A-C5

- ▶ Standard housing (EN 60947-5-2)
- ▶ 1 active face; can be repositioned in 5 directions
- ▶ Diagnostics via 2 LEDs
- ▶ Suitable for ATEX, zone 2/22
- ▶ Switches clocked input signals
- ▶ Large actuating range
- ▶ Series connection (only identical devices)
- ▶ Category 4 / PL e



## ■ Protection against tampering with unicode evaluation

Each CES actuator features a transponder with high coding level (corresponding to EN ISO 14119), enabling absolute protection against tampering. The highly coded actuator is precisely assigned to the safety switch via a teach-in operation. This prevents bypassing the guard using an actuator of identical design.

There are different types of actuator recognition:

- ▶ Unicode: Only the actuator taught-in for the safety switch is recognized.
- ▶ Fixcode: An actuator is permanently assigned to the safety switch on delivery and cannot be replaced with another actuator.

Safety switches with multicode evaluation can be used in applications in which the actuator does not have to be coded. The actuator is not precisely assigned to the safety switch here. It is only checked whether or not the actuator is a valid actuator.

## ■ Maximum safety

CES products deliver maximum safety. Category 4 and PL e according to the EN ISO 13849 standard are already attained with a single safety system CES. The safety level remains unchanged, even when several CES products are connected in series.

## ■ Sophisticated accessories

From preassembled cables in various lengths, various plug connectors (5-pin and 8-pin) and mounting plates to complete bolt systems: The comprehensive range of accessories offers many ways to mount and integrate the CES products.

Secure against tampering ✓

Use in harsh environment ✓

Flexible mounting ✓

Maximum safety Category 4/PL e ✓

Wear free ✓

Mounting plates for simple mounting of the CES-C04 on aluminum profiles



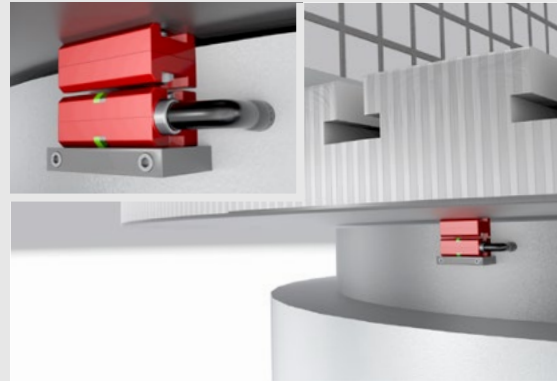
Bolt systems for simple mounting on guards





## Overview of CES advantages

- ▶ Secure against tampering
- ▶ Maximum safety Category 4 / PL e
- ▶ Simple diagnostics
- ▶ Use in harsh environment
- ▶ Insensitivity to dirt
- ▶ Wear free
- ▶ Insensitivity to external magnetic fields
- ▶ Insensitivity to vibration
- ▶ High degree of protection
- ▶ Exact door guidance not necessary
- ▶ Flexible mounting
- ▶ Different designs and sizes



CES-C04



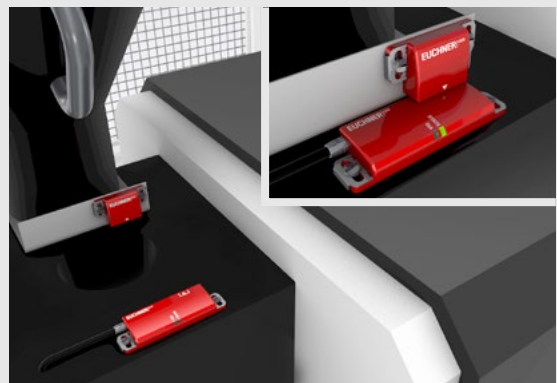
CES-C04



CES-C04, series connection via Y-plugs



CES-C01 bolt



CES-C02

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