# Versatile and 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 people, 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 safety guard, and the actuator on the movable part. When the door is closed, the actuator is moved toward the safety switch or read head. When reaching the operating distance, the read head inductively reads the transponder data from the coded actuator and forwards it to the evaluation electronics. If the transmitted data of the actuator agrees with the stored data, the safety outputs are enabled.

## Numerous applications

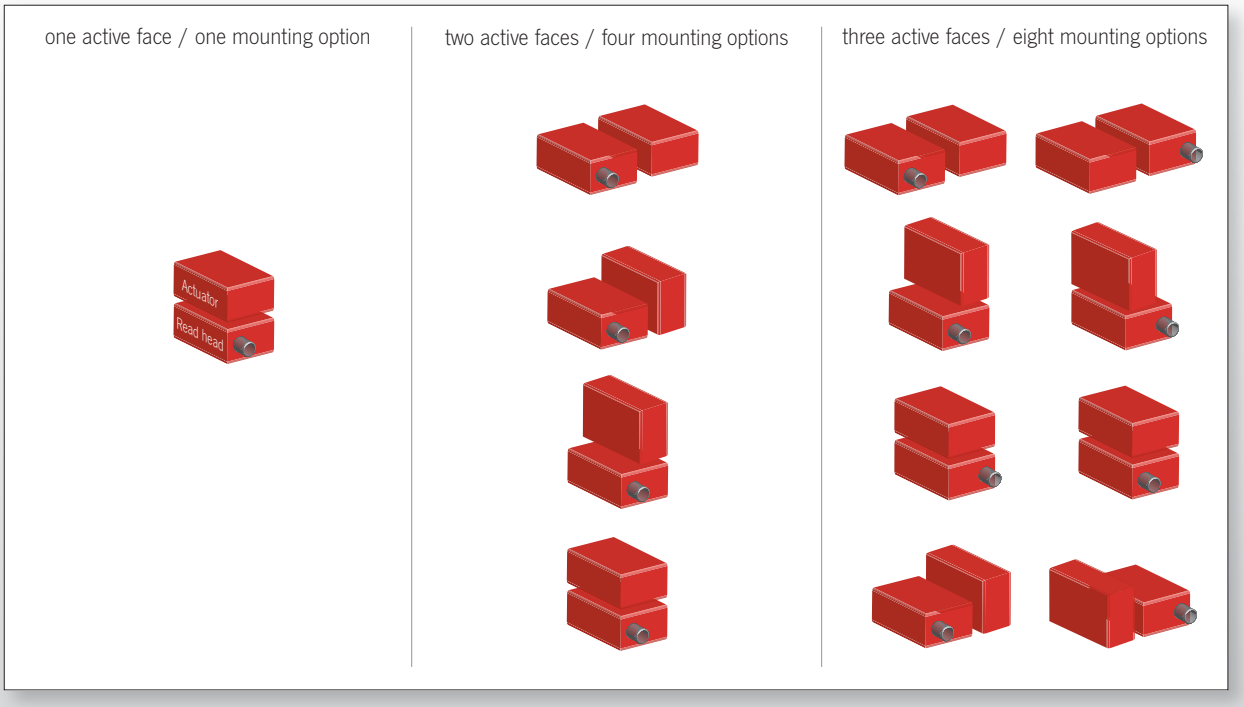
Safety systems CES are used in protecting safety guards, e.g. doors and flaps, and for reliable position detection in machine and plant construction.

Use of CES products is preferred when

- environments are harsh
- high demands are placed on the safety category/Performance Level
- a large operating distance and/or center offset is required
- different approach directions are required
- a high level of tampering protection must be ensured
- 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 operating distance, the read head can be approached from any number of directions. This is particularly advantageous if constricted 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

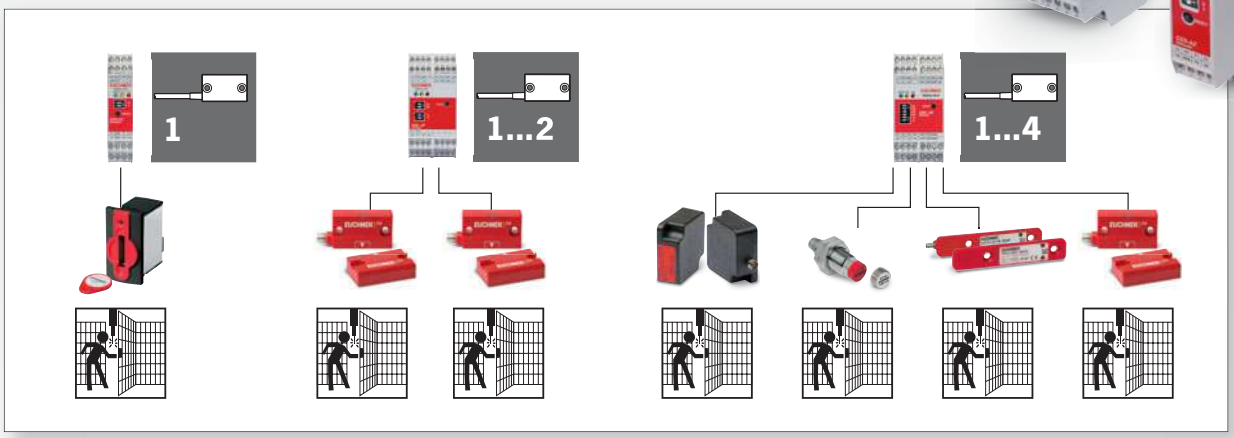
With external evaluation the evaluation electronics for the transponder signals are accommodated in a separate housing. This separation minimizes the read head's size. This is particularly advantageous if the available space at the location to be safeguarded is very limited.

## Evaluation of signals in the control cabinet

Transponder signals are evaluated in the CES evaluation unit, not in the control cabinet. Up to 4 read heads (which may be of different types) can be connected and evaluated. The wiring effort 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 every connected CES read head. The devices also possess connections for a monitored start button and a feedback loop. The safety outputs are switched via relay contacts and permit direct connection of contactors and loads up to 6 A. Depending on the number of read heads to be connected (one, two, four), the CES evaluation units are available in unicode and multicode versions.




## Read heads with external evaluation

### CKS

- Safe lockout mechanism
- Safe entry into installations
- Key adapter with integrated CES read head
- Version with AS-Interface available

### CES LNN

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


### CES LQA

- Actuator/read head with especially large center offset
- Large switch-on distance up to 23 mm
- One active face

### CES LMN

- Cylindrical version of actuator and read head in M12 housinge
- Very compact design
- One active face
- Degree of protection IP 67 / IP 69 / IP 69K

### CES LSP

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

## Evaluation of signals in the field

The transponder signals are evaluated in the field evaluation unit CES-FD. Read heads CKS as well as 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

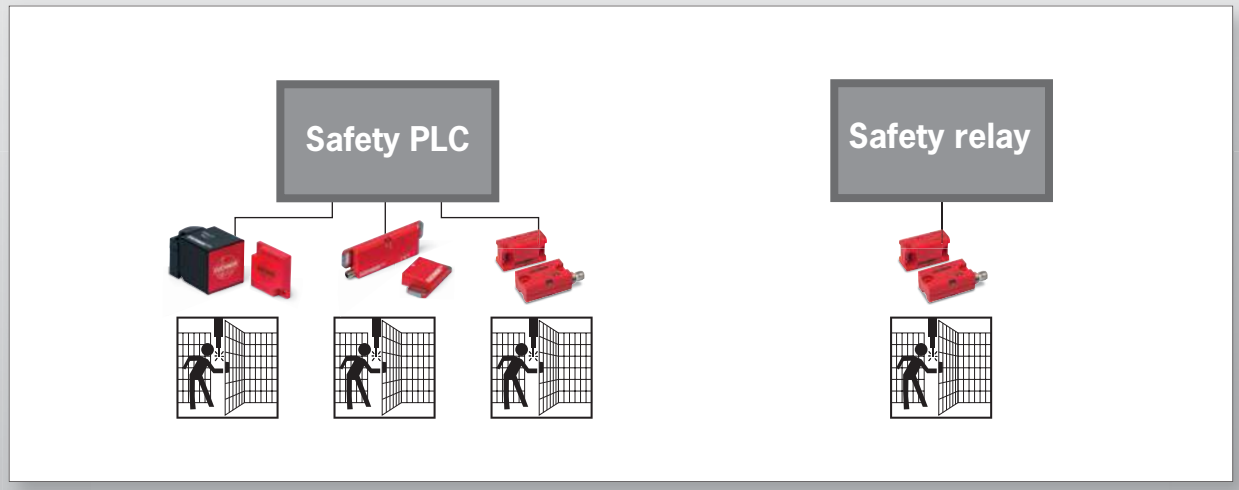


# Internal evaluation

Devices with internal evaluation has the evaluation electronics and read head 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 and AR possess clocked semiconductor outputs (OSSD) to detect short circuits.

### System family AP

Version for use as single device. Special version for connection to decentralized peripheral systems with IP 67.



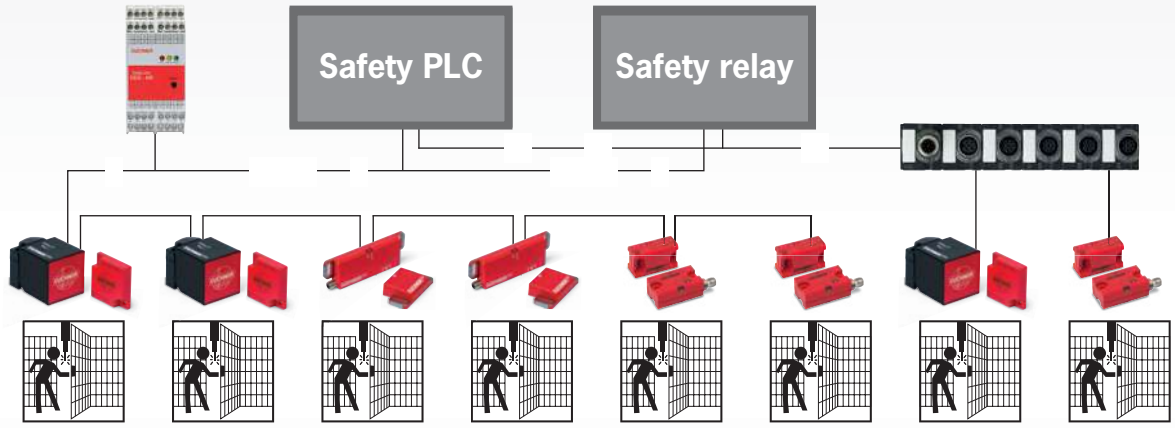
## System family AR

For series connection of up to twenty safety switches CES. All EUCHNER products with an AR interface can be connected in series. 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-distributors in the field, and the information is transmitted centrally via a single line to the control system. The connection of only four flexible wires greatly reduces the wiring work. Optionally, a CES-AR evaluation unit can be used to produce status signals of each individual safety switch. This is particularly advantageous in case of large and expansive machines and plants, because it is immediately clear which door is open or closed.

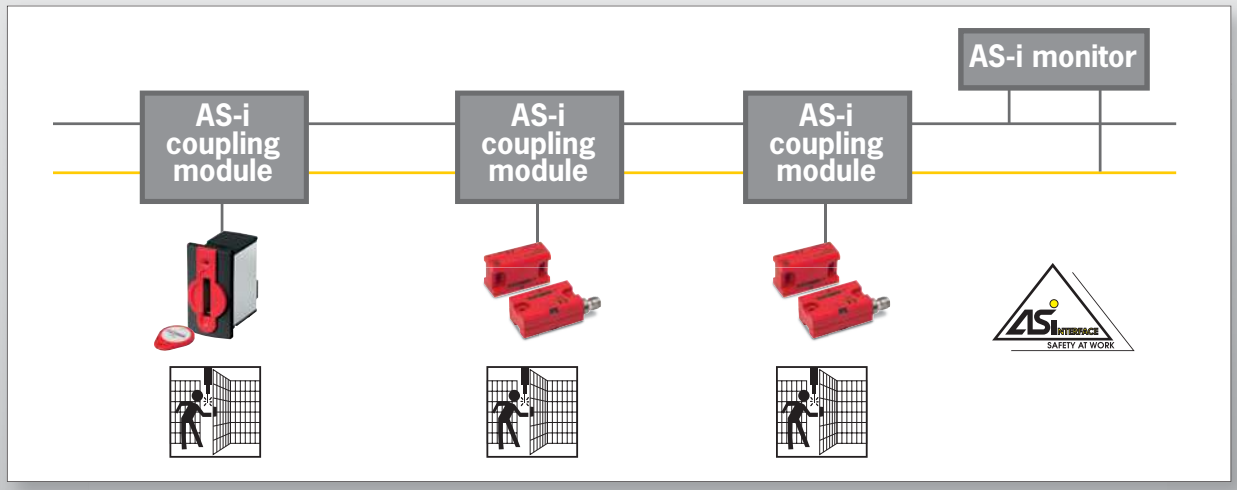
**3.** Series connection via passive distribution module in the field
The safety switches are connected directly to the passive distribution module via M12 plug connectors. The electrical connection to the control system is made centrally using one cable. It is possible to connect several passive distribution 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 flat 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 the AS-Interface.



# Products with internal evaluation

## System family AP/AR

Products in system family AP are used as a single device.
Products in system family AR can be interconnected in series.


**CES-C01**

- Compact, square design
- One active face, can be repositioned in five directions
- Diagnostics via two LEDs
- Standard housing (EN 60947-5-2)
- Large operating distance
- PL e / Category 4

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**CES-C02**


- Narrow, elongated design
- Two active faces
- Diagnostics via two LEDs
- Limit-range indication
- Direct mounting on aluminum profiles
- PL e / Category 4
- Degree of protection IP 67 / IP 69 / IP 69K

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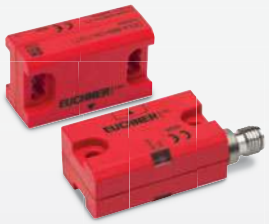
**CES-C04**



- Smallest design
- Three active faces
- Diagnostics via 2 x 2 LEDs
- Limit-range indication
- Actuator can be positioned in three steps
- PL e / Category 4
- Version with AS-Interface available
- Degree of protection IP 67 / IP 69 / IP 69K

## System family AH

Specially developed for switching large currents. This permits direct switching of contactors and loads without additional safety relay.


**CES-AH-C03**

- Standard housing (EN 60947-5-2)
- One active face
- Diagnostics via two LEDs
- Switches loads up to 4 A
- Large operating distance
- PL d / Category 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)
- One active face, can be repositioned in five directions
- Diagnostics via two LEDs
- Switches clocked input signals
- Large operating distance
- Series connection (only identical devices)
- PL e / Category 4

## Tamper proof through unique coding

Each CES actuator possesses a unique code and is therefore absolutely tamper proof. The uniquely coded actuator is precisely assigned to the safety switch via a teach-in operation. It is therefore impossible to bypass the safety 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.

Multicode safety switches 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 the actuator is valid or not.

## Maximum safety

CES products deliver maximum safety. Performance Level e (PL e) and Category 4 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.

**Tamper proof** ✓

**Use in harsh environment** ✓

**Flexible mounting** ✓

**Maximum safety PL e/Category 4** ✓

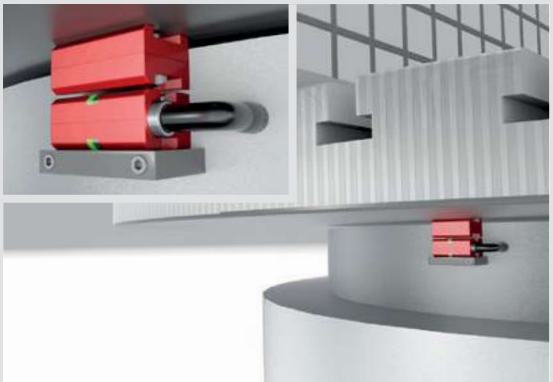
**Wear free** ✓

Mounting plates: For simple mounting of the CES-C04 on aluminum profile

Bolt systems: For simple mounting on safety guards

# Overview of CES advantages

- Tamper proof
- Maximum safety PL e, Category 4
- Simple diagnostics
- Use in harsh environment
- Resistant 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-distributors

CES-C01 bolt

CES-C02

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